RR/RS REPAIR MANUAL

Manual Number RR/RSR8909

RR-40B, RR-30C, RR-34B, RS-40C, RS-50B RIDER TRUCKS

Effective Serial Numb[illegible]RXXX170373

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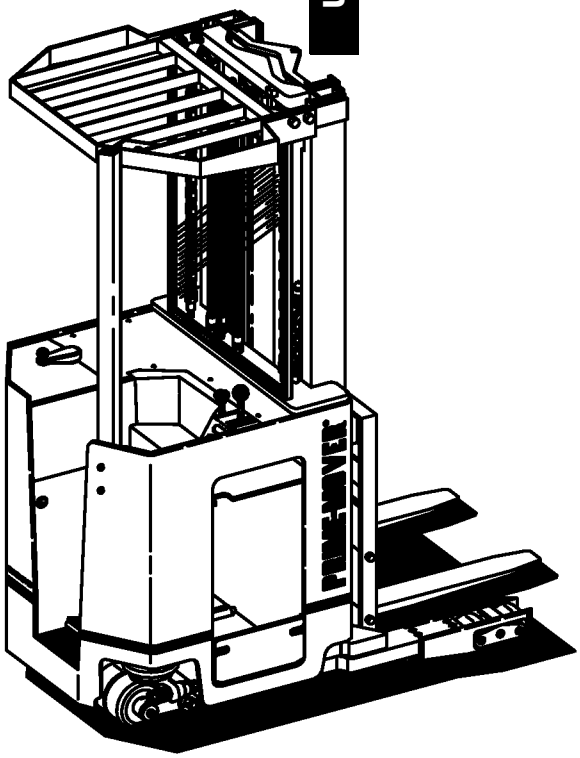

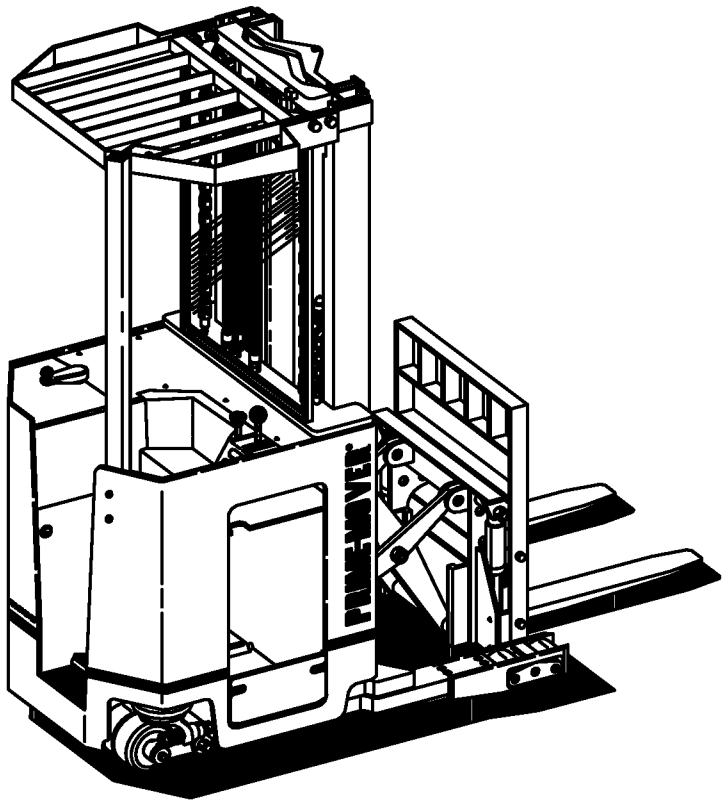

WARNING Read and observe all warnings on the unit before operating it. Do not operate this equipment unless all factory installed guards and shields are properly secured in place.

ISSUED SEPTEMBER 1989

PRIME-MOVER®

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RR/RS ADJUSTMENTS

1.0 Brakes

1.1 RR30C/34B - RS40C

The brakes on these Prime-Mover trucks are mechanically released and spring applied. The brake has a drum and brake shoes on the drive motor armature. Braking is accomplished by a spring on the cam arm. The cam forces the brake shoes against the brake drum. This action clamps the brake shoes against the drum and provides braking anytime the pedal is in the raised position.

When the brake pedal is depressed, a cable connected to the pedal moves, the other end of the cable is connected to the cam arm. The cam arm forces the cam to twist, springs on the brake shoes pull the brake shoes away from the brake drum. This releases the brake and allows the drum and drive motor armature to turn.

Adjustment

1. Too little brake, corrective action is to increase spring tension. Depress the brake pedal to avoid overadjusting the spring tension. There are two (2) nuts on the top end of the brake cable, one on either side of the mounting bracket. Loosen nut nearest the end of the cable and tighten the other nut up against the bracket.

2. Brake will not release, loosen the nut on the outside of the bracket (side of bracket closest to operator compartment), and tighten the other nut up against the bracket.

   Note: There is some additional at the lower end of the cable. Make sure the yoke at upper end of cable does not hit the cable shield when the brake pedal is depressed.

1.2 RR40B - RS50B

The brakes on these Prime-Mover trucks are hydraulically released and spring applied. The brake has a drum and brake shoes on the drive motor armature and on the idler wheel assemble. Braking is accomplished by a spring on the cam arm. The cam forces the brake shoes against brake drum. This action clamps the brake shoes against the drum and provide braking anytime the pedal is in the raised position. When the pedal is depressed a master cylinder rod connector to it forces brake fluid from the master cylinder to the brake cylinders on the drive motor and idler wheel. The brake cylinders are connected to the cam arm. The cam arm forces the cam to twist, springs on the brake shoes pull the brake shoes away from the brake drum. This releases the brake on the drive motor armature and idler wheel.

Adjustment

1. Too little brake, tighten the nut on the rod to apply more tension on the spring. Make sure the brake cylinder plunger is not bottomed, if it is, screw the cylinder out of the mounting bracket.

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1.0 PRESTOLITE MOTOR SERVICE INSTRUCTIONS

(General Notes)

CLEANING

Prior to any testing or inspection, the motor components, except bearings and armature, should be thoroughly cleaned with a good grade petroleum base cleaning solvent and dried with compressed air.

⚠WARNING Be extremely careful when working with solvent. Even a small explosion or fire could cause injury or death.

⚠WARNING Wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.

The armature should be blown off with compressed air to remove brush dust and dirt from around the commutator and windings.

Bearings should be wiped clean with a cloth and never submerged in a solvent. Submerging bearings in a solvent will deteriorate internal lubrication which cannot be replaced.

VISUAL INSPECTION

After the motor components have been thoroughly cleaned and dried, they should be inspected for the following:

1. Drive end head
   Check bearings recess for any signs of wear. Check mounting holes for any stripped or crossed threads or broken studs.

2. Commutator end head
   Check bearing recess for any signs of wear. Check bearing holder insulation for cracks or any signs of burning. Check brush holders and springs for wear.

3. Oil seal
   Oil seal, if upon disassembly of the motor, the field coils or cummutator are oily. A faulty oil seal is indicated. A good service practice is to replace the oil seal whenever the motor is overhauled. The oil seal seat on the armature shaft should be checked for rough spots, grooves, or scars.

4. Bearings
   Check bearings by turning them with your fingers. Feel for binding or gritty effects and for excessive looseness or wobble. A good bearing should also have a small amount of drag or stiffness caused by the lubrication. If the bearing turns very freely, it should be replaced.

5. Frame and field assembly
   Check the condition of all insulation. If the insulation on the field coils appears blackened or charred, the serviceability of the coils is questionable. Burned or charred insulation is a result of coils over-heating due to overloading conditions, grounded or shorted coil windings. Check condition of all other insulation such as brush rigging, under coil connections, and around terminal studs.

6. Armature
   Check the shaft bearing journals, splines or keyways for wear. Check windings, commutator connections and commutator bars for any signs of burning. If deep burned sections are evident, either in the brush track or on the rider end of the commutator bars, an open circuit in the armature winding is indicated.

TESTING

Frame and Field Assembly

After thorough inspection, the frame and field assembly should be checked for grounded, open, or shorted circuits. Grounded and open circuits can be checked using 110 volt A.C. test leads with a 50 watt bulb in series.

1. Grounded circuit
   Touch one test lead to a clean bare metal spot on the frame and check all terminals with the other lead. If a grounding condition exists, the test light lights.

		24V	36V
2.0	Drive Motor		
2.1	Part Number	40506-00	41555-00
2.2	Minimum Brush Length	9/16"	9/16"
2.3	Minimum Commutator Diameter	2.938"	2.938"
2.4	Brush Spring Tension	30-36 oz.	30-36 oz.
2.5	Field Coil Resistance	.002-.0033 ohm	.002-.0033 ohm
2.6	Part number of:		
2.61	Brushes	200239	200239
2.62	Springs	200240	200240
2.63	Armature	200251	200242
2.64	Stud package	200131	200131
2.65	Field Coil		
3.0	Lift Motor		
3.1	Part Number - 24V	41521-00	40505-00
3.2	Minimum Brush Length	9/16"	9/16"
3.3	Minimum Commutator Diameter	2.938"	2.938"
3.4	Brush Spring Tension	30-36 oz.	30-36 oz.
3.5	Field Coil Resistance	.0014-.0018 ohm	.0014-.0018 ohm
3.6	Part number of:		
3.61	Brushes	202182	200239
3.62	Springs	200242	200240
3.63	Armature	202177	200250
3.64	Stud package	200067	200145
3.65	Field Coil	202180	200252
3.1.1	Part number - 36V	41519-00	40097-00
3.2.1	Minimum Brush Length	9/16"	9/16"
3.3.1	Minimum Commutator Diameter	2.938"	2.938"
3.4.1	Brush Spring Tension	30-36 oz.	30-36 oz.
3.5.1	Field Coil Resistance	.0014-.0018 ohm	.0014-.0018 ohm
3.6.1	Part number of:		
3.611	Brushes	202309	200239
3.621	Springs	200240	200240
3.631	Armature	202307	200259
3.641	Stud Package	202311	200145
3.651	Field Coil	202308	200252

4.0	Steering Motor	
4.1	Part Number	
4.2	Minimum Brush Length	
4.3	Minimum Commutator Diameter	
4.4	Brush Spring Tension	
4.5	Field Coil Resistance	
4.6	Part number of:	
4.61	Brushes	
4.62	Springs	
4.63	Armature	
4.64	Stud Package	
4.65	Field Coil	

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7.4 EV-100 MAINTENANCE INSTRUCTIONS

GENERAL MAINTENANCE INSTRUCTIONS

The SCR control, like all electrical apparatus, does have some thermal losses. The semiconductor junctions have finite temperature limits above which these devices may be damaged. For these reasons, normal maintenance should guard against any action which will expose the components to excessive heat, such as steam cleaning; or which will reduce heat dissipating ability of the control, such as restricting air flow.

The following DO'S and DON'TS should be observed:

Any controls that will be used in ambients of 100 F (40 C) or over should be brought to the attention of the truck manufacturer.

All external components having inductive coils must be filtered. Refer to vehicle manufacturer for specifications.

The control should not be steam cleaned. In dusty areas, use low-pressure air to blow off the control. In oily or greasy areas, a mild solution of detergent or denatured alcohol can be used to wash off the control and then blow completely dry with low-pressure air. The control can also be cleaned with Freon TF degreaser.

For the SCR panel to be most effective, it must be mounted against the frame of the truck. The truck frame, acting as an additional heat sink, will give improved truck performance by keeping the SCR control package cooler. The use of a heat-transfer grease (Dow Corning 340) is recommended.

Terminal boards and other exposed SCR control parts should be kept free of dirt and paint that might change the effective resistanc between points.

CAUTION: The truck should not be plugged when the truck is jacked up and the drive wheels are in a free wheeling position. The higher motor speeds can create excessive voltages that can be harmful to the control.

Do not hipot (or megger) the control. Unless the terminals of each semiconductor and card are connected together, the control may be damaged. Refer to control manufacturer before hipotting.

Use a lead-acid battery with the voltage and ampere hour rating specified for the vehicle. Follow normal battery maintenance procedures, recharging before 80 percent discharged and with periodic equalizing charges.

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	SYMPTOM	PROBABLE CAUSE
3H	FW contactor will not drop out with increasing load.	* Check drop out setting on control card. * Check for shorted FWD driver. * Replace control card.(4A)
3J	Stiff plug. (Severe reversal)	* Check plug adjustment setting on control card. * Check yellow wire on current sensor for open. * Check 4REC for open circuit.(4H) * Replace control card. (4A)
3K	Hourmeter feed faults:	
(1)	Pump contactor closes when direction is selected.	* Diode shorted HMD3 to HMD4. (4H) Replace hourmeter block.
(2)	One direction okay; opposite direction picks up both directional contactors.	* Diode shorted HMD1 to HMD4 or HMD2 to HMD4.(4H) Replace hourmeter block.
(3)	Either direction picks up both directional contactors.	* Diode shorted HMD1 to HMD4 of HMD2 to HMD4.(4H) Replace hourmeter block.
3L	Very soft reversal	* Check plug adjustment setting on control card. * Replace control card. (4A)
3M	Blown power fuse. Very hot power cables	* Check 3REC for short.(4H) (Possible damage also to 1REC.)

G. Negative side of pump contactor coil
0 volts, repair mechanical binding in pump contactor or faulty contactor. Battery volts repair open wire from negative side of contactor coil to battery negative.

7.11.3 Pump runs, does not lift

7.11.31 Conditions for test: Pump motor running when operated from platform.

Test for voltage at:

A. Positive side of lift valve coil
0 volts, repair open wire from right hand platform lift switch to valve coil.

B. Negative side of lift valve coil.
0 volts, replace lift valve coil.
Battery volts, repair open wire from valve coil to battery negative or replace foot pedal switch.

7.11.4 Will not lower from platform, will lift

7.11.41 Conditions for test: Battery plugged in, emergency disconnect closed, platform key switch on, left and right hand platform lower switches closed.

Test for voltage at:

A. Negative side of left platform lower switch
0 volts, replace switch

B. Positive side of right platform lower switch
0 volts, repair open wire from left hand to right hand lower switch

C. Negative side of right hand platform switch
0 volts, replace right hand switch

D. Positive side of lower valve coil
0 volts, repair wire from right hand switch to lower valve coil

E. Negative side of lower valve coil
0 volts, replace lower valve coil
Battery volts, repair open wire from lower valve coil to battery negative

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1.4 Seal kit number

1.4.1 41680-00 pump

seal Kit - 41685-00

1.4.2 41178-00 pump

Seal kit - 201989 shaft seal
201990 housing seals

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ASSEMBLY

1. Install new o-rings in valve body.

2. Coat valve spool with 10 wt. oil and install in body.

3. Install centering spring and spring seats over end of spool.

4. Install spool retaining nut. Torque to 20-25 ft/lbs.

5. Install micro switch mounting bracket.

6. Install switch bracket retaining nut. Torque to 15-20 ft/lbs.

7. Install switch actuating cam over spool extension and put in retainer roll pin.

8. Install micro switch and adjust so that switch activates with .20" to .60" spool movement in either direction. The switch should activate within .010" equal movement either direction.

9. Install check valve and spring.

4.3 Seal kit part numbers

4.3.1 Lift valve - 41364-00
Seal kit - 201627

4.3.2 Auxiliary valve - 41331-00
Seal kit - 202104

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DRIVE WHEEL REMOVAL AND INSTALLATION

The drive wheel may be removed without removing the transmission from machine. To remove and/or replace the drive wheel, the following steps should be taken:

1. Disconnect the battery.

2. Hoist the machine approximately one (1) foot off the floor and block.

   Note: Use elevating instructions in this manual.

3. Remove the eight (8) nuts holding the drive wheel hub on transmission drive shaft.

4. Remove drive tire from wheel hub, tap drive tire off the wheel hub shoulder.

5. Check the wheel hub for wear and replace if needed.

ASSEMBLY

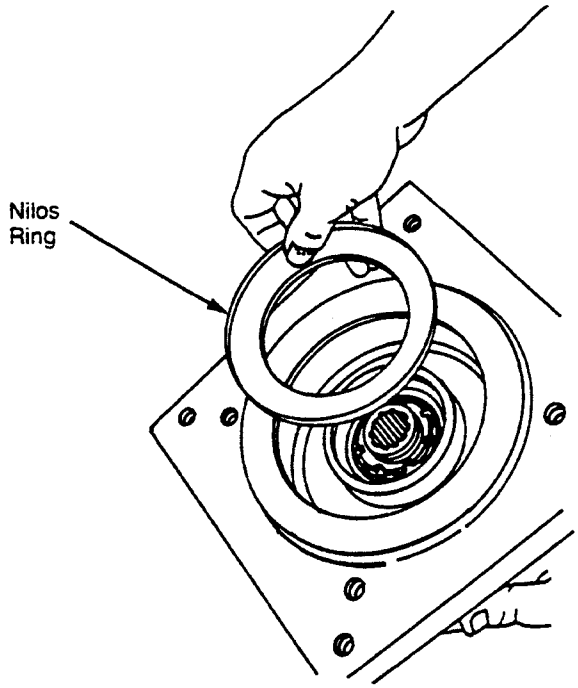
1. Press drive tire on wheel hub, check that the drive tire fits completely over shoulder of wheel hub.

2. Install drive wheel on drive shaft aligning the drive wheel with studs.

3. Install nuts and pull down evenly before torquing to 90 ft./lbs.

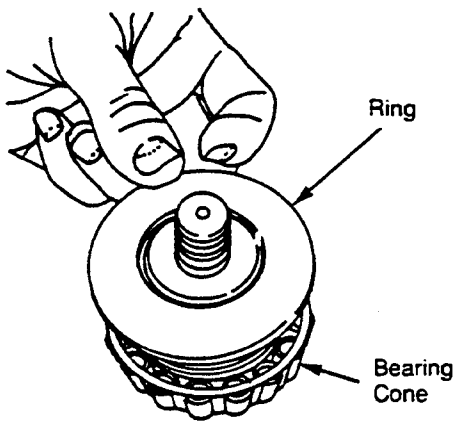
4. Lower machine to floor, connect battery and test operation.

Remove sealing ring over bearing on pivot pin.



2.1.5 To remove pivot pin loosen nut so it is even with the end of pin threads. This will allow striking of pin with out damage to threads.

Once the pin is loosened, remove nut and washer from pin and pin from transmission.



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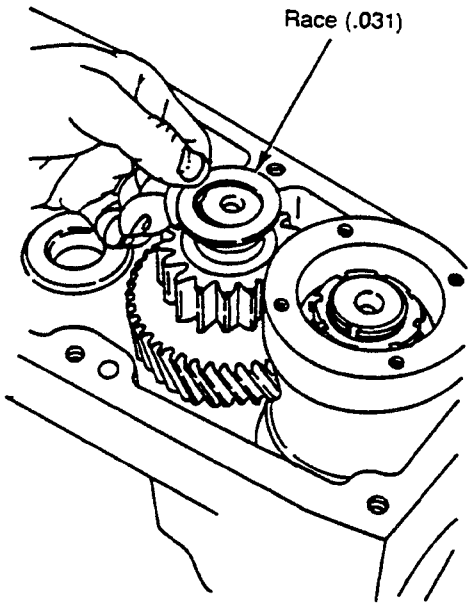
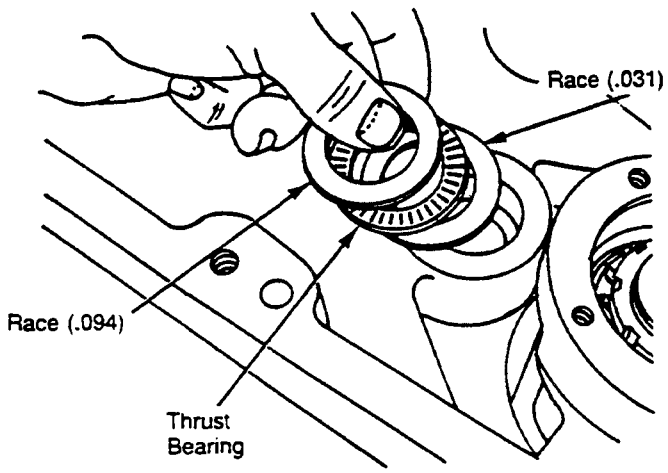
2.1.19 Remove race (.094), thrust bearing, and race (.031) from shaft of small gear set and remove gear by pushing the bearing holder away from the gear by pulling straight up and out of gear case.



Race (.031), thrust bearing, and race (.094) will need to be removed from the gear case.



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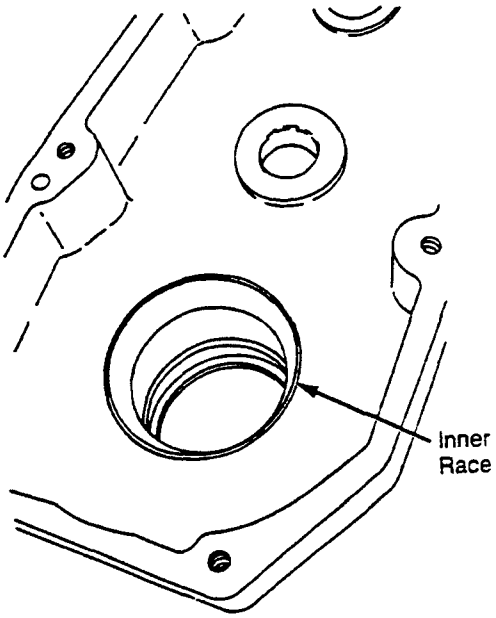
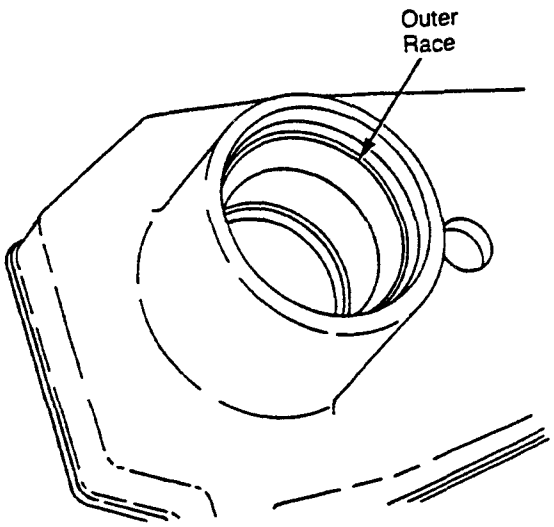
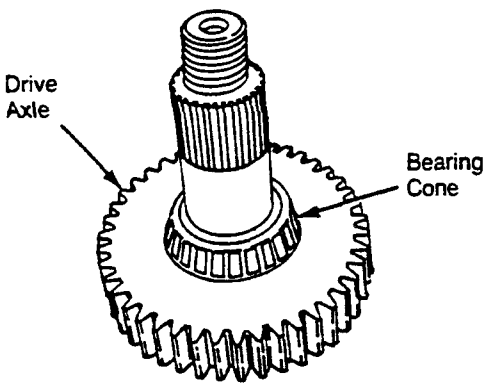




2.3.2 Using a piece of pipe, press or drive the bearing cone on the drive axle.



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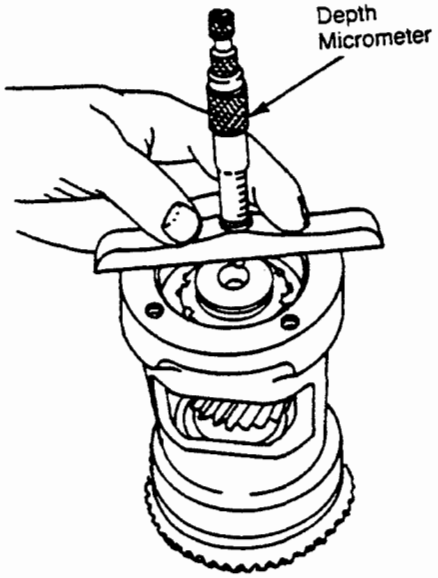
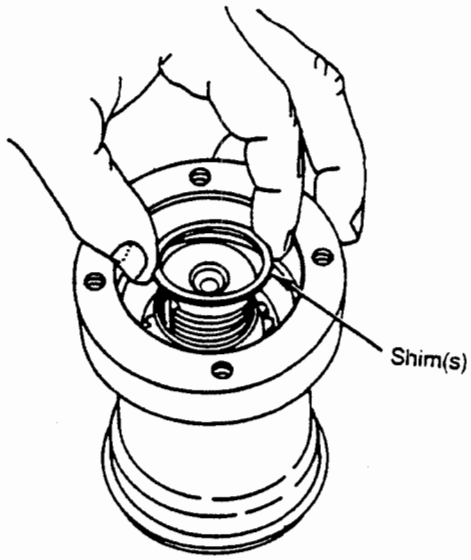
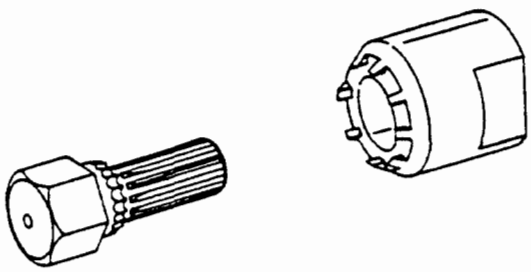
NOTE: Always measure each shim separately with micrometer and add together to achieve total shimming thickness from original buildup.

NOTE: Gear shaft should be shimmed to .001 to .004 tight. Place shim(s) between gear and bearing cone.





The Prime-Mover Company has designed a special tool to be used in disassembly and assembly of gear shaft. It is available from Prime-Mover.



Securely clamp the nut on the gear side of gear shaft in a soft jawed vice with gear up. This will allow you to use the nut half of tool (tool will fit in slots of locknut) and a wrench to tighten nut to 250 ft./lbs.

Once the locknut is tightened to proper torque, one of the lock-washers tabs should be bent up into one of the locknuts slots to prevent locknut from loosening.

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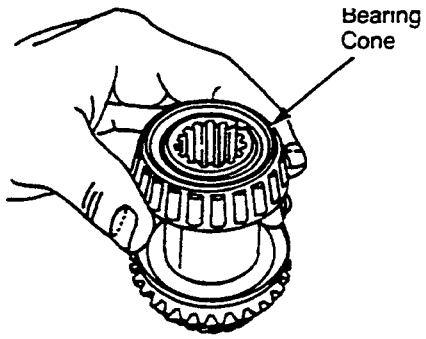
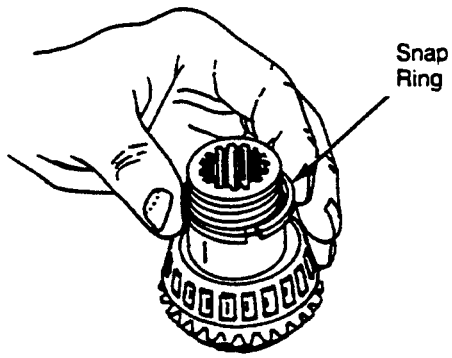
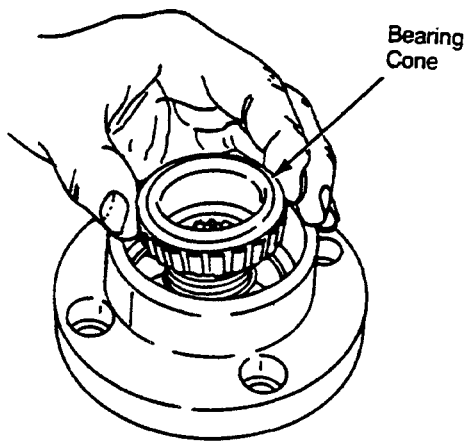
2.3.32 Using a piece of pipe, press or drive the bearing cone on drive pinion.



2.3.33 Install snap ring spacer on drive pinion against bearing cone.



2.3.34 Slide drive pinion through collar and install bearing cone on pinion.



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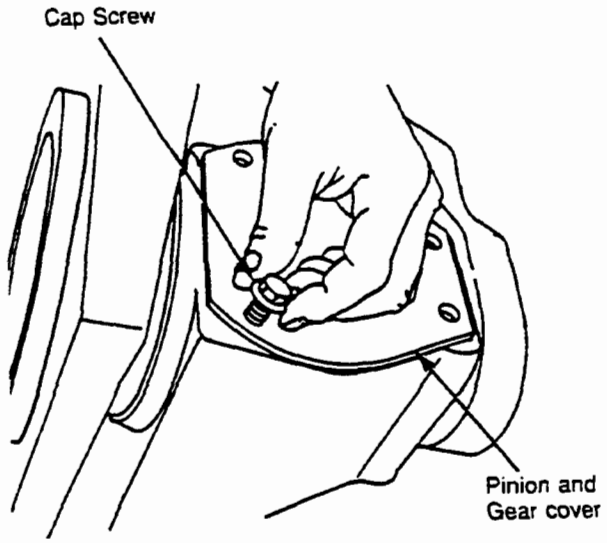
2.3.59 Install cover and four (4) cap screws in gear case. Torque screws to 30 ft./lbs.



2.3.60 Install grease fitting in yoke. Using a standard lub gun grease fittings with Tex. Reference C & C #880 lubricant.

2.3.61 Install air vent in gear case cover.

2.3.62 Install drain plug with new o-ring at bottom of transmission. Make sure o-ring has been lubricated with ATF.

2.3.63 Pour two (2) quarts of clean transmission fluid (ATF Dextron II) in fluid fill hole.

2.3.64 Install fill plug with new o-ring at fill hole on transmission. Make sure o-ring has been lubricated with ATF.

2.3.65 Install drive tire assembly and nuts on transmission. Torque nuts to 90 ft./lbs.

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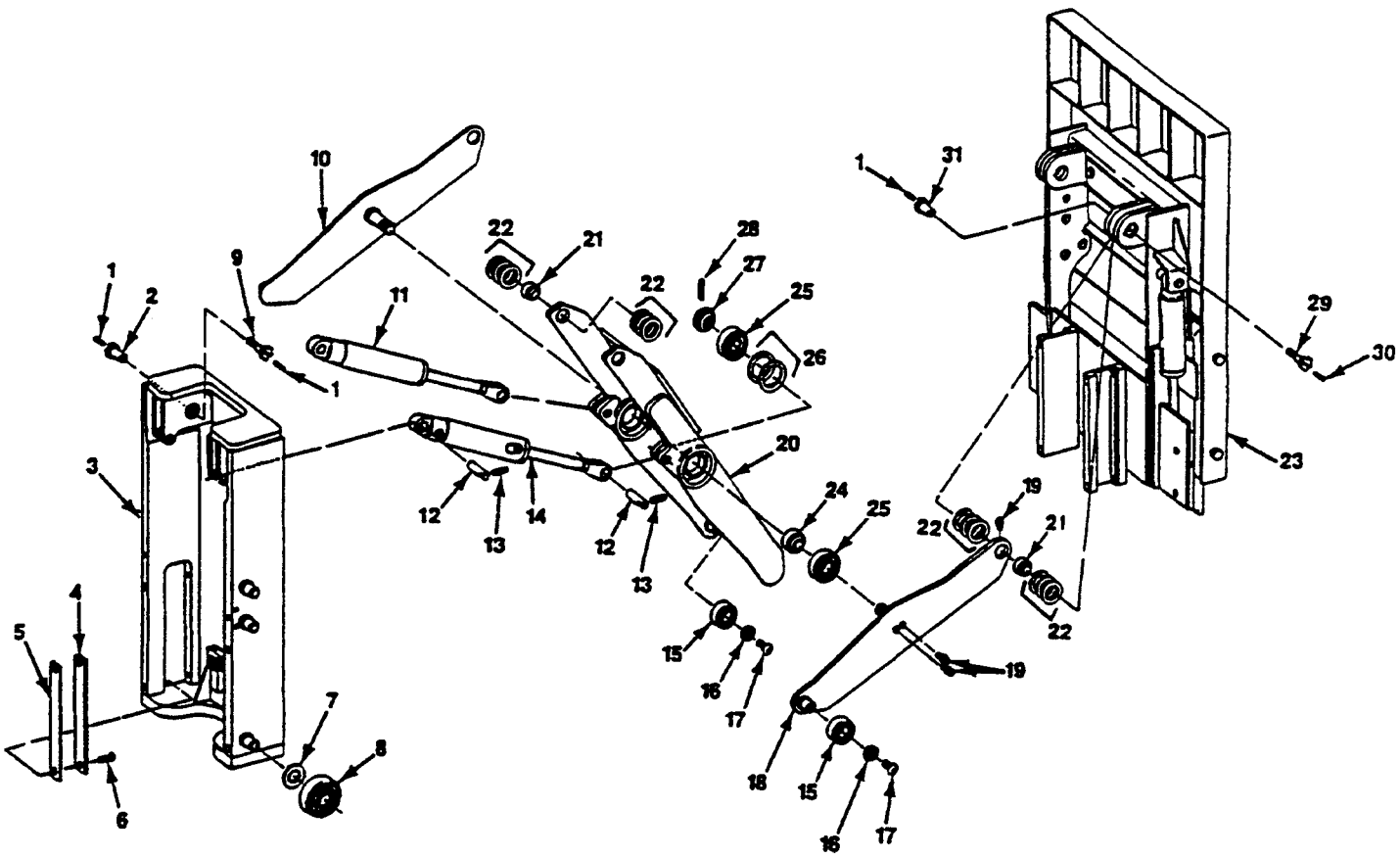
FIGURE # 74 SINGLE REACH ASSEMBLY



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Assemble Steer Axle Linkage

1. Install new bearings as needed.
2. Install cylinder rod end and tie rod (11) onto pin of arm (32).
3. Install retaining ring (7).
4. Install tie rod end (19) onto pin of arm (23).
5. Install retaining ring (7).
6. Install steer cylinder and arm assembly into steer axle frame.
7. Install pins (25). (Do not install lock bolts.)
8. Install arm (29) onto pin (30) of transmission case and onto pin of arm (32).
9. Install arm (24) on pin of arm (23) and pin in idler wheel assembly.

Left Hand Turn Adjustment

1. Check and adjust left angle if necessary.

   Note: Turn transmission into complete left turn. Arm (29) should be ¼" and parallel to from transmission case. If not correct, adjust by turning eccentric pin (17) until adjustment is within specificaiton. Left hand turn adjustment must be made first.

Right Hand Turn Adjustment

1. Check and adjust right angle if necessary.

   Note: Turn to a complete right turn. Arm (27) should be parallel to the back of the idler wheel assembly when adjustment is correct. If not correct, turn the tie rod (11) until it is within specification. If tie rod (11) and tie rod end (19) were separated during repair initial adjustment can be accomplished by starting tie rod end (19) onto tie rod (11) then turn tie rod end (11) nine complete turns.

3.4	Steering relief	RR30C/RR34B/RS40C	900 +/- 50 psi
		RR45/RS50B	1100 +/- 50 psi
3.5	Auxiliary relief		1550 +/- 50 psi

4.0 Tires & Wheels

4.1	Drive Tire		
4.1.1	Size		13 1/2 x 5 1/2 x 8"
4.1.2	Part Number	Rubber	40266-01
		Tire and hub - rubber	40267-01
4.2	Drive tire compound		
4.2.1	Rubber		Shore "A" 60-70 Durometer
4.3	Load Wheel		
4.3.1	Size		
4.311	Single		10 1/2 x 4 1/2 x 8"
4.312	5" Articulating		5 x 3 1/2"
4.313	4" Articulating		4 x 2 7/8"
4.3.2	Part Number		
4.321	Single		40254-00
4.322	5" Articulating		40222-00
4.323	4" Articulating		40868-02
4.4	Load Wheel Compound		Polyurethane Shore "D" Durometer 60-65
4.5	Caster wheel RR30C/RR34B/RS40C		
4.5.1	Size		7 x 2 1/2"
4.5.2	Part Number		40721-00
4.6	Caster Wheel Compound		Polyurethane Shore "A" 93 Durometer
4.7	Idler Wheel RR45/RS50B		
4.7.1	Size		10 x 5 x 6 1/2"
4.7.2	Part Number		40265-00
4.8	Idler Wheel Compound		Polyurethane Shore "A" 90 Durometer

5.0 Fluids and Lubricants

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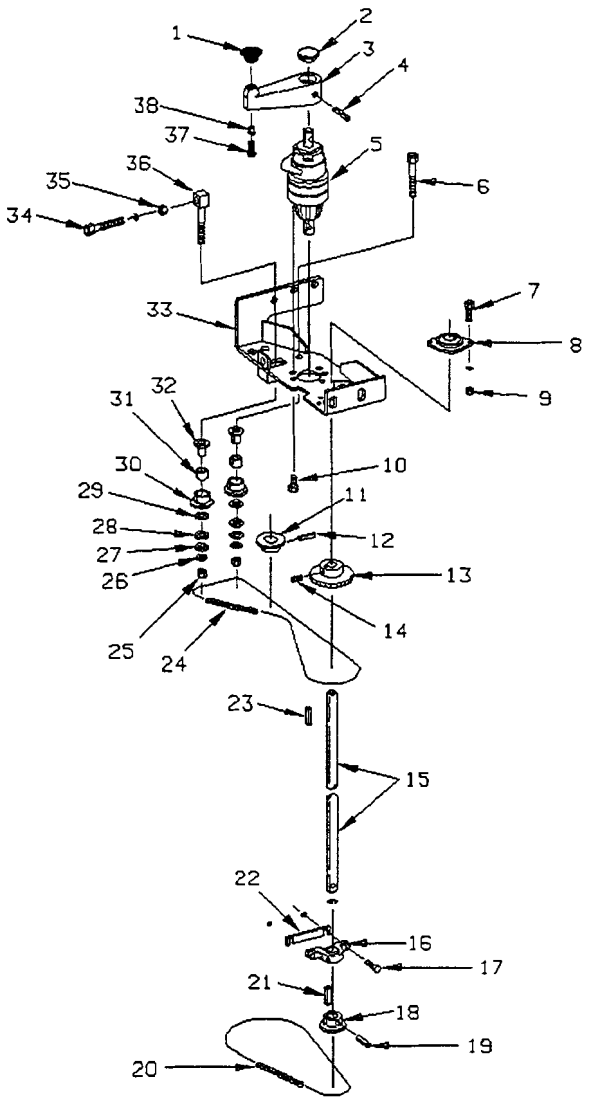
17.0 Steering Chain

17.1 Adjust upper chain RR30C/34B - RS40C

17.2 Loosen nut (26) and nut (34) turn bolt (33). Adjust until chain has between 0" and 1/8" of slack on one side, while the other side of this chain is tight.

17.3 Loosen bolts (17) add shims between pillow block bearing (16) and transmission yoke. Adjust until chain has between 0" and 1/8" slack on one side, while the other side of the chain is tight.



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The only practical method of testing these armatures is to perform a light load test after the motor has been completely assembled. If the motor does not meet or exceed all parts of the light load specification, replace the armature.

FRAME AND FIELD SERVICE NOTES

If the inside of the motor is exceptionally dirty and there is evidence of a grounding condition caused by dirt, the inside of the motor can be given an additional cast of insulating varnish. Red glyptol can be used if a better material is not available, however, we recommend using a Class "F" Polyurethane air drying insulating varnish. This is readily available under various brand names from electrical repair or parts houses in aerosol type dispensers.

Before spraying field coils, make sure they are absolutely clean and dry. Keep varnish off of brush rigging, pole shoe faces, and end head seats.

FIELD COIL INSTALLATION

Good solder connections are important due to the vibration characteristics encountered by these motors which can cause cold or poorly soldered connections to break. Prior to installing the field coils, the connections which require soldering should be buffed or wire brushed clean to remove any oxidization. The connections should then be tinned with a 90% tin solder using a soldering iron.

NOTE: WE DO NOT RECOMMEND USING A SOLDERING GUN OR TORCH. SOLDERING GUNS CANNOT PROVIDE THE HEAT CONCENTRATION REQUIRED AND SOLDERING TORCHES CAN DAMAGE THE INSULATION.

After field coil installation, connect the solder joint, making sure the solder is flowing properly to avoid a cold soldered joint.

There is an optional method of connecting field coils which provides a mechanical connection prior to soldering. This method facilitates soldering and results in a stronger connection for added vibration protection.

After tinning and installing the field coils in the frame, align the coil straps and drill an 11/64" hole (#18 Drill) through both straps. Insert a #8-32 brass screw and nut or a brass pop rivet and solder the connection. After the connection has been made, check the clearance between it and the end head to prevent grounding the connection when the end head is installed.

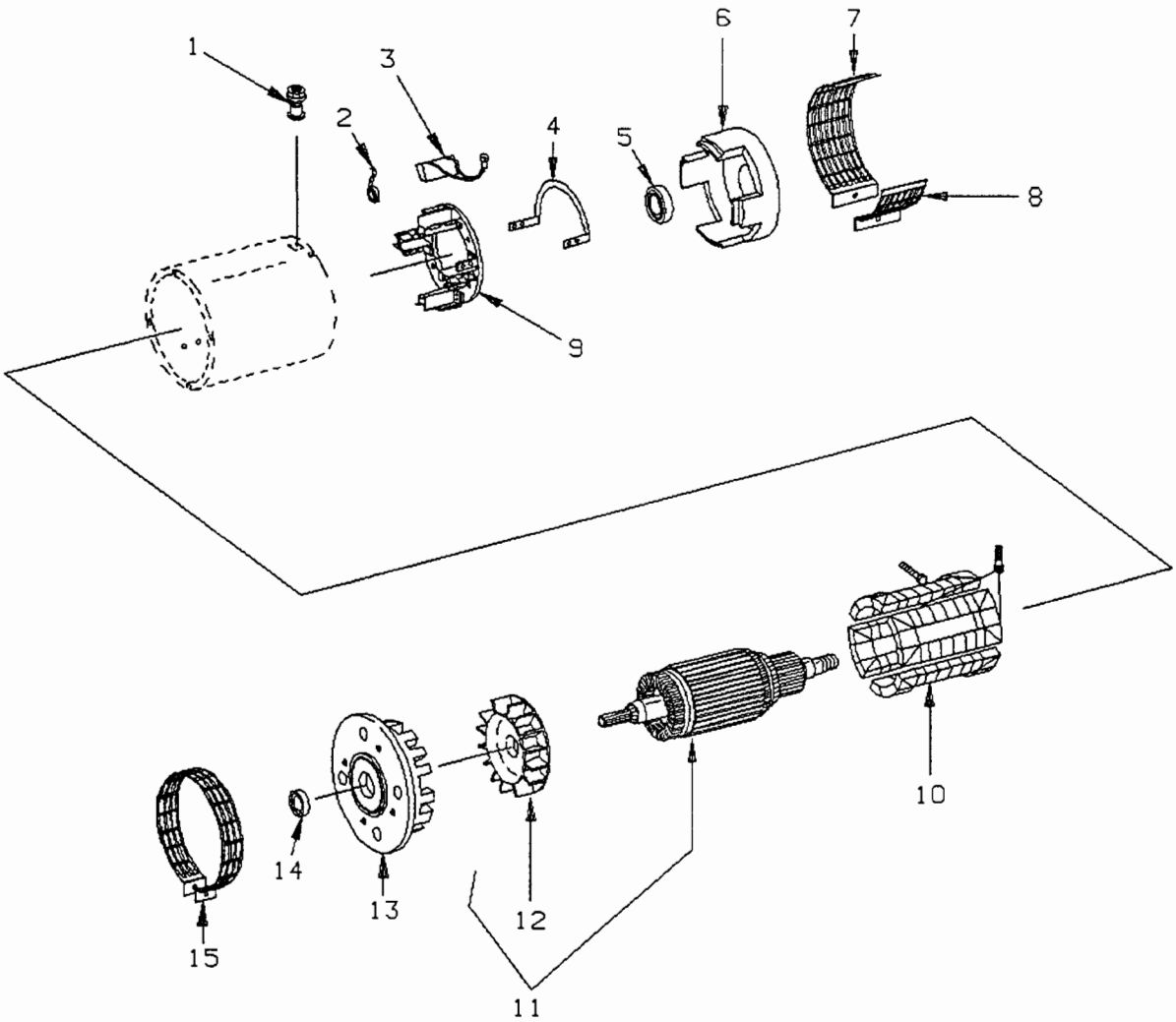
ASSEMBLY AND TESTING

After the motor components have been thoroughly cleaned, tested, and repaired or replaced, assemble the unit. Refer to the individual motor page of your service manual for specific assembly information.

After assembly, the motor should be connected as specified in test connections, and tested to the specifications contained on the individual motor page.

Return

DRIVE MOTOR



ITEM #	NAME	ITEM #	NAME
1	STUD AND NUT ASSY.	10	COIL, 24 VOLT FIELD
2	SPRING	10	COIL, 36 VOLT FIELD
3	BRUSH	11	ARMATURE, 24 VOLT
4	CONNECTOR, CROSS	11	ARMATURE, 36 VOLT
5	BEARING	12	FAN
6	END, SHIELD C.E.	13	END, SHIELD D.E.
7	COVER, 24 VOLT LARGE	14	SEAL, SHAFT
7	COVER, 36 VOLT LARGE	15	COVER, 24 VOLT D.E.
8	COVER, SMALL	15	COVER, 36 VOLT D.E.
9	YOKE AND HOLDER ASSY.	16	KIT, "EE" SOLID COVER

Return

TERMINAL CONNECTION FOR LX/LXT LOGIC CARDS

TB1	ACCEL POT INPUT
TB2	FOOT SW INPUT
TB3	FOOT SW INPUT
TB4	KEY SW INPUT
TB5	FOR. DIR INPUT
TB6	REV DIR INPUT
PA1	NOT USED
PA2	NOT USED
PA3	NOT USED
PA4	NOT USED
PA5	NOT USED
PA6	SPEED CUT BACK SW
PB1	NOT USED
PB2	NOT USED
PB3	SP COIL DRIVER
PB4	F COIL DRIVER
PB5	R COIL DRIVER
PB6	1A COIL DRIVER
PY1	DASH DISPLAY 4 INPUT
PY2	DASH DISPLAY 3 INPUT
PY3	DASH DISPLAY 1 INPUT
PY4	DASH DISPLAY 2 INPUT
PY5	DASH DISPLAY 5 INPUT

Return

1. Load the traction motor to 100 battery amps in 1A and record the voltage (Vo) at the SCR positive and negative power terminal.

2. Load the traction motor to 200 battery amps in 1A and record the voltage (Vl) at the SCR positive and negative power terminal.

3. Calculate voltage drop (Vd) as follows:

   Vd = Vo - Vl

4. Use the table below to determine the setting using the calculated Vd as a reference.

SETTING	EV100 VD	SETTING	EV100 VD
2	11.44	17	01.34
3	07.60	18	01.27
4	05.72	19	01.20
5	04.57	20	01.14
6	03.81	21	01.09
7	03.27	22	01.04
8	02.86	23	00.99
9	02.54	24	00.95
10	02.28	25	00.91
11	02.08	26	00.88
12	01.90	27	00.85
13	01.76	28	00.82
14	01.63	29	00.79
15	01.52	30	00.76
16	01.43	31	00.74

FUNCTION 15 BATTERY VOLTS (PUSH 15)

This function allows for the adjustment of voltage range for controls equipped with the Battery Discharge Indication function. In order for the BDI to operate properly, the setting as shown in the table must be entered.

BATTERY VOLTS	SET UNITS
24 volts	Between 0 and 31
36 volts	Between 32 and 44

THE FOLLOWING FUNCTIONS HAVE FUNCTION NUMBERS LARGER THAN THE NUMBERS ON THE HANDSET KEYBOARD. TO ACCESS THESE FUNCTIONS, PUSH THE CONT KEY AND THE NUMBER SHOWN IN THE FOLLOWING INSTRUCTIONS AT THE SAME TIME.

FUNCTION 16 PEDAL POSITION PLUG (PUSH CONT AND 1)

This function will allow the adjustment of the pedal position plug range. Pedal position will reduce the plugging current to the current value set by this function as the accelerator is returned to the creep speed position. Maximum plug current is obtained with the accelerator in the top speed position.

Range	100 to 930 amps (EV100)
Set	0 to 255
Resolution	3.2 amps per set unit (EV100)

Example: Setting of 20 = 164 amps

To disable the pedal position plug function, adjust the current value to the same current value as the plug distance current.

Example: If plug distance current Function 5 is set at 500 amps, then set pedal plug current at 500 amps. With this setting pedal position will have no effect on plugging distance.

FUNCTION 17 CARD TYPE SELECTION (PUSH CONT AND 2)

EV100 STANDARD FUNCTION	SPEED WITH FW	LIMIT	REGEN/FW
STD C/L	0 TO 4	20 TO 24	40 TO 44
HIGH C/L	5 TO 9	25 TO 29	45 TO 49
STD C/L (AUTO PLUG)	10 TO 14	30 TO 34	50 TO 54
HIGH C/L (AUTO PLUG)	15 TO 19	35 TO 39	55 TO 59

Settings for these functions should be made in between the values shown.

WARNING!! THESE SETTINGS MUST BE CHANGED BY AUTHORIZED PERSONNEL ONLY, FOLLOWING INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. CARD TYPE

Return

STATUS CODE -08

DESCRIPTION

Accelerator input voltage too low on power up after initial key switch closure.

MEMORY RECALL

No

CIRCUIT

Traction

SYMPTOM

Forward or reverse contactor does not pick up.

POSSIBLE CAUSE

Accelerator input mis-adjusted or defective.

> Input voltage at TB1 should be more than 3.0 volts. Adjust or replace accelerator unit to insure that the voltage at TB1 is more than 3.0 bolts before depressing pedal.

Short circuit between battery negative and TB1 in accelerator input circuit.

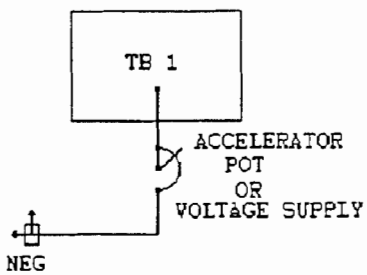
> Disconnect wire from TB1. Check for short circuit from wire to battery negative. Resistance should be greater than 4.7K ohms.

Defective card

> Disconnect wire from TB1. Measure voltage from TB1 to negative. Voltage should be greater than 4.5 volts, if not replace card.

STATUS INDICATION CRITERIA

This status code will be displayed when the accelerator input voltage at TB1 is less than 3.0 volts, and any of the following connections are opened and closed, battery plug, foot switch or key switch.



Return

STATUS CODE -42

DESCRIPTION
SCR motor current sensor input missing.

MEMORY RECALL
No

CIRCUIT
Traction

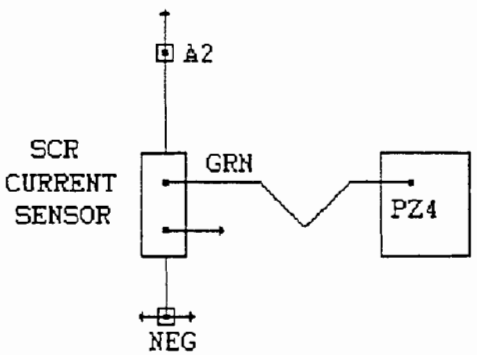
SYMPTOM
No power to traction motor in SCR range.

POSSIBLE CAUSE

Open sensor wire circuit to PZ4.

Check for loose connection or broken wire (green wire) from current sensor to PZ4 on the logic card.

STATUS INDICATION CRITERIA
This status code is displayed when voltage between PY7 and negative is greater than 1.6 volts with no current flowing in the motor circuit.



Return

STATUS CODE -52

DESCRIPTION
Excessive capacitor voltage when motor current is low.

MEMORY RECALL
Yes

CIRCUIT
Traction

SYMPTOM
Forward or reverse contactors open and close, then can only be closed by opening and closing the key switch.

POSSIBLE CAUSE
Excessive source inductance

Tag lines without filters are being used.

Battery cables are too long.

Defective 4 REC circuit

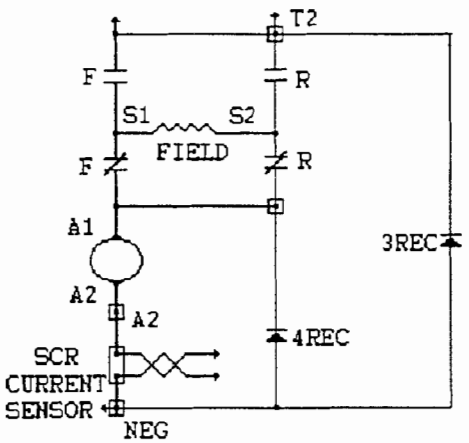
Check for shorted 4 REC.

Check for open circuit or loose connection in 4 REC circuit.

Defective 3 REC circuit.

Check for open circuit or loose connection in 3 REC circuit.

STATUS INDICATION CRITERIA
This status code is displayed when capacitor volts exceed 225 volts and motor current is less than 200 amps.



Return

INSTRUCTIONS - EV100 PLUGS

GENERAL

The plug system used in the GE EV-100 utilizes AMP (Ampmodu 1) pins and receptacles (wire terminals). The plugs are sealed to provide protection in the electric vehicle environment.

Normally the plugs do not require maintenance, but should the need arise to assemble or disassemble the plugs, correct tools and procedures must be followed to prevent damage to the plug body, wire terminals or the EV-100 terminal board.

PROCEDURES

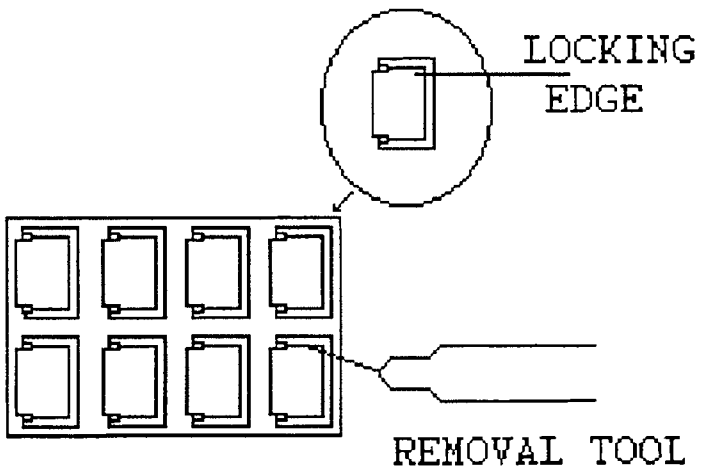
To unplug harness from EV-100

Depress latch on plug.
Grasp plug body and pull plug from terminal board. If the plug has a shoulder near the terminal board, insert a medium size flat blade screwdriver in this gap and gently pry out the plug, alternating sides.

To remove a terminal from the plug body

Referring to Figure 1, insert the terminal removal tool into the plug body (which depresses the terminal locking lance). With a gentle push-pull motion on the wire, remove the wire.

USE AMP REMOVAL TOOL - 91065-1.



7.11 Manlift Controls

7.11.1 Lift pump motor does not run when operating the hydraulic control lever in the operator's compartment.

7.11.10 Conditions for testing: Battery plugged in, emergency disconnect closed,platform key switch off.

Test for battery volts at:

A. Positive side of Fuse 2.

0 volts, repair open wiring from battery to fuse 2.

B. Negative side of fuse 2.

0 volts, replace fuse 2.

C. Positive side (wire #12) platform key switch.

0 volts, repair open wiring from fuse 2 to platform key switch.

D. Negative side (wire #73) platform key switch.

0 volts, replace switch.

E. Proceed to section 7.11 step C of this manual.

7.11.2 Lift pump motor does not run when operating from manlift platform. Does run when operated from operator compartment.

7.11.2 Conditions for testing: Battery plugged in, emergency disconnect closed platform key switch, left and right platform switches closed.

Test for battery volts at:

A. Negative side (wire #70) of platform key switch.

0 volts, replace key switch.

B. Positive side of left platform lift switch.

0 volts, repair open wiring from platform.
Key switch to left hand lift switch.

C. Negative side of left platform lift switch.

0 volts, replace switch.

D. Positive side of right hand platform left switch.

0 volts, repair open wire between the left and right hand switches.

Return

4. Connect hydraulic lines to pump (noting that lines are connected to the right ports).

5. Connect electrical cables to motor (noting that cables are connected to the right terminals).

6. Connect battery and test operation of pump and motor.

3.0 Auxiliary System Pump

Prime-Mover reach trucks use a common pump and motor for a combined steering and auxiliary hydraulic system.

4.0 Spool Valve

4.1 Lift valve - 41364-00
Auxiliary valve - 41331-00

4.2 Rebuilding Instructions

4.21 41364-00 - lift valve

REMOVAL

⚠WARNING Before beginning any work on the hydraulic system the lift cylinders must be fully lowered so there is no pressure in the system. Disconnect battery.

1. Open motor/transmission compartment access door.
2. Remove top cover, crossbar and console in front of operator's compartment.
3. Disconnect lift valve linkage at spool.
4. Disconnect wires from valve switch.
5. Disconnect three hoses from lift valve.
7. Unbolt valve from truck. Bolt heads are accessible underneath from battery compartment with an "Allen" wrench.
8. Slide valve out the side of compartment.

DISASSEMBLY AND INSPECTION

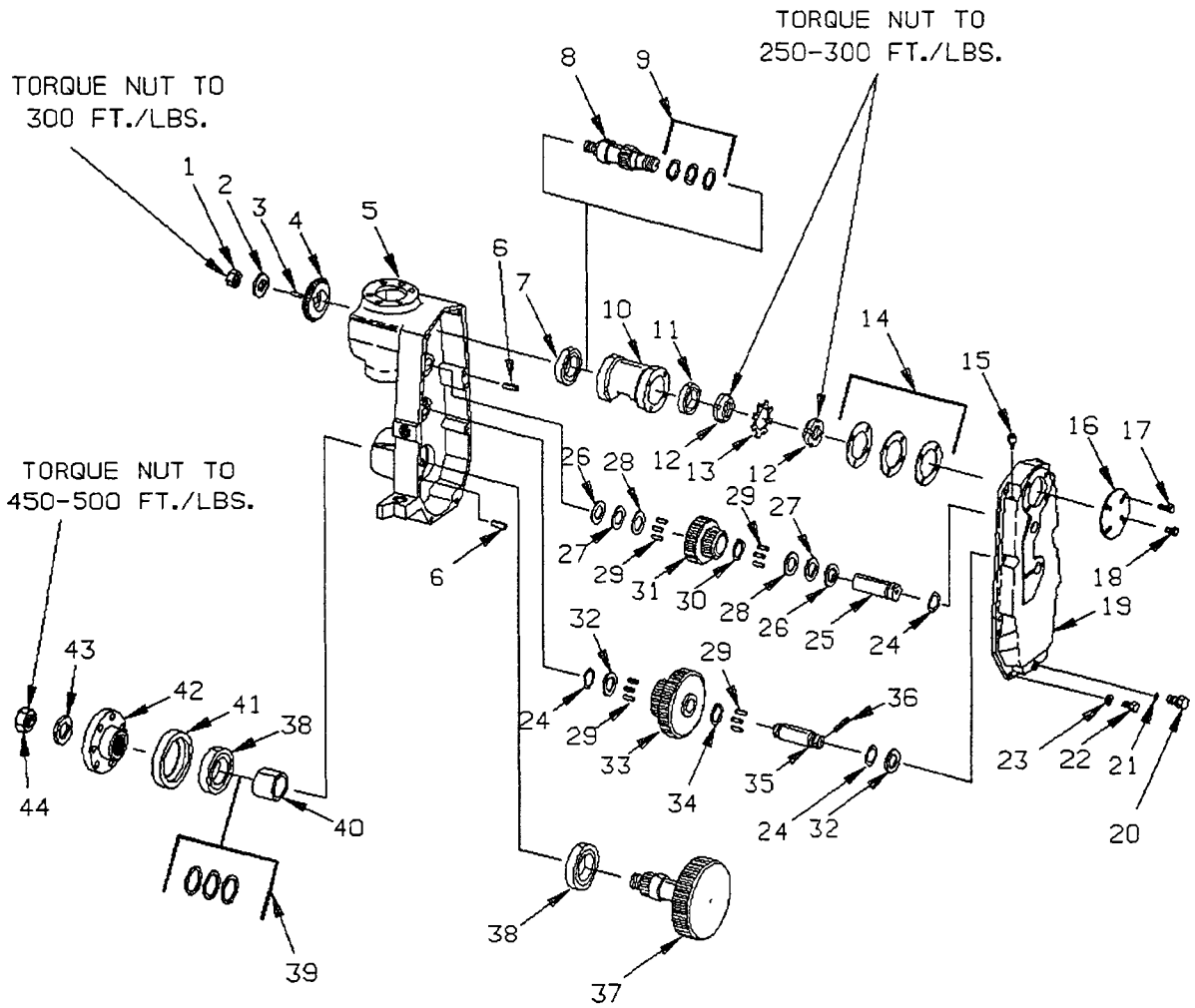
1. Plug all outside ports and clean valve with safety solvent. Dry with compressed air.
2. Remove the lift check plug, spring and plunger (9).
3. Remove relief valve (14).
4. Remove valve switch and mounting bracket from valve body.

Return

6.2C No lowering, or slow lowering, with optional manlift platform when using platform lowering controls.

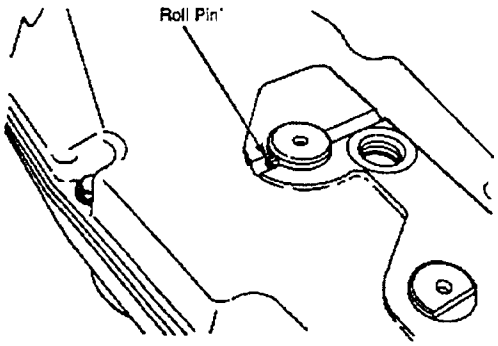
Return

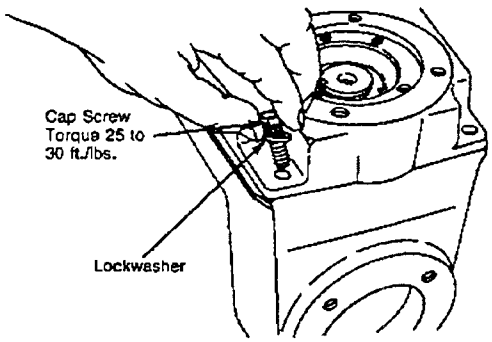
TRANSMISSION ASSEMBLY PART #II



Return

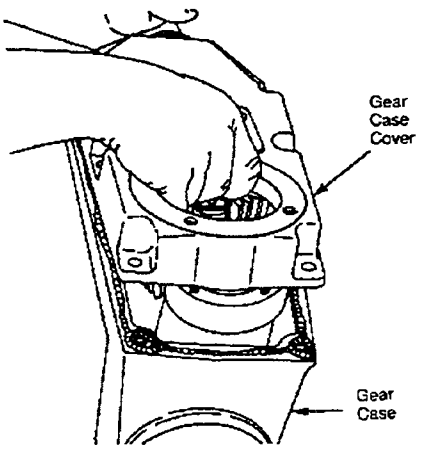
2.1.14 Remove the roll pin used to secure the lower immediate gear shaft. Remove the capscrews and lockwashers used to secure gear case cover on gear case.



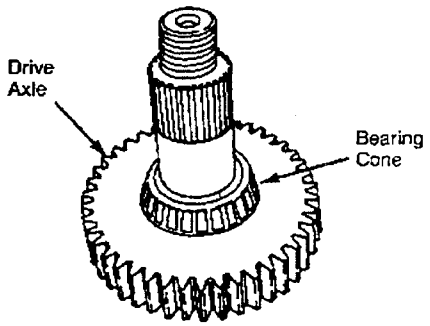


2.1.15 The gear case cover may be removed by tapping with a soft metal (lead) hammer around the cover to loosen. The cover may then be removed straight up from the gear case.

NOTE: The gear shafts may be retained with the gear case cover and should be tapped out of cover before removing cover.

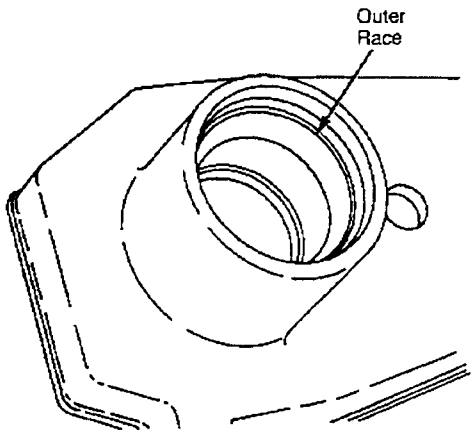


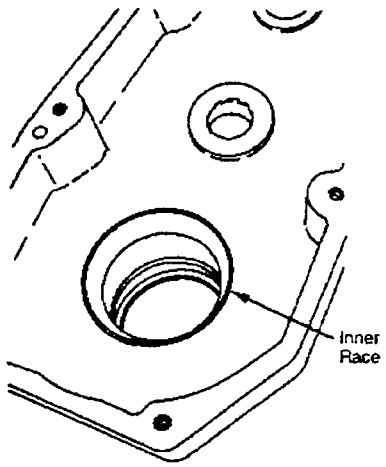
The bearing cone on drive axle can be removed from drive axle and inspected for wear and damage.



2.1.25 Inspect drive axle races in gear case for wear or damage, replace if needed.

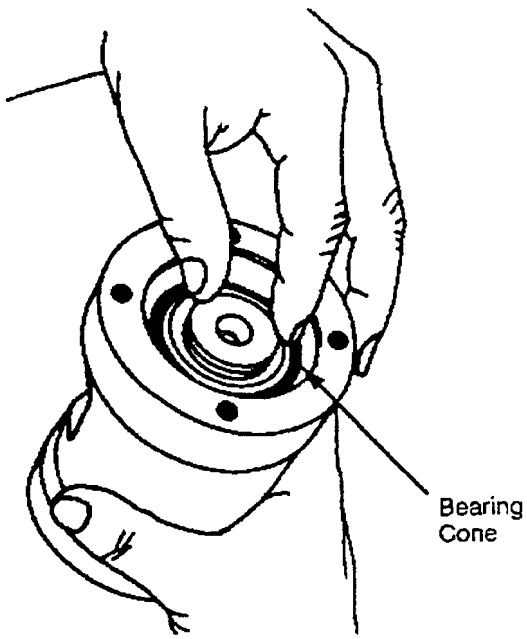
The races may be driven out of gear case from the other side of the race.

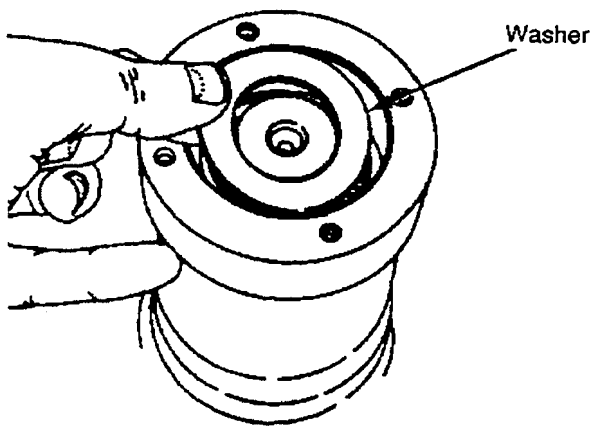


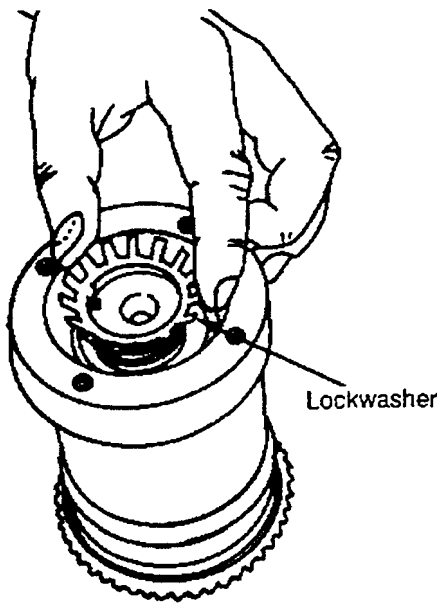


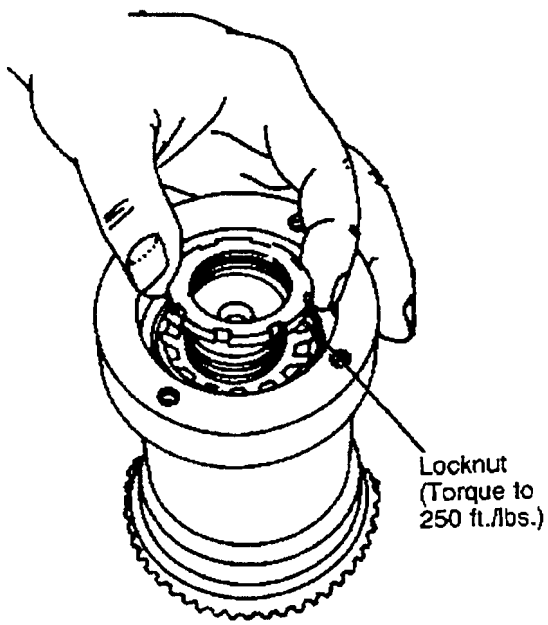
2.3.11 Install gear shaft in bearing holder making sure that the four (4) thread holes are on the opposite side as gear.

2.3.12 To shim gear shaft, install .150" shims, bearing cone, washer and locknut. Torque nut to 250 ft./lbs.



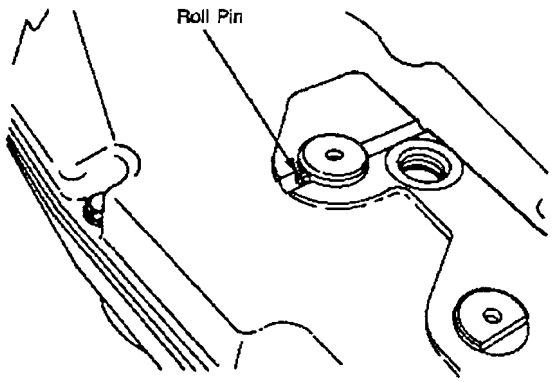




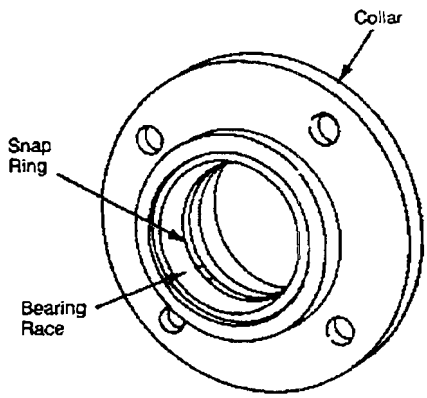


Return

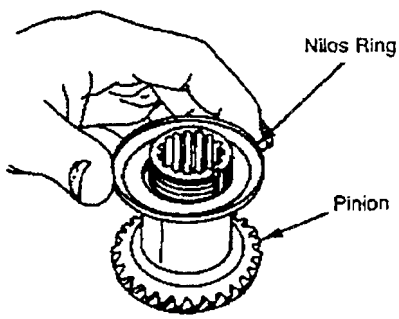
2.3.29 Install roll pin in shaft to secure in place.



2.3.30 Using a soft metal (lead) hammer, drive the races in collar with snap ring between races. Gap in snap ring must line up with grease hole in collar.

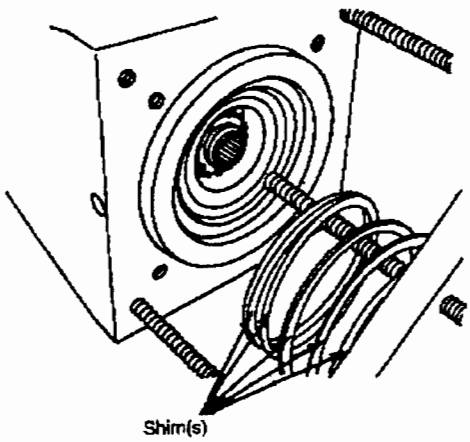


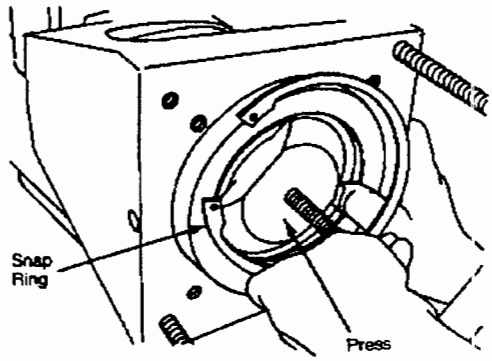
2.3.31 Install a nilos ring on drive pinion.



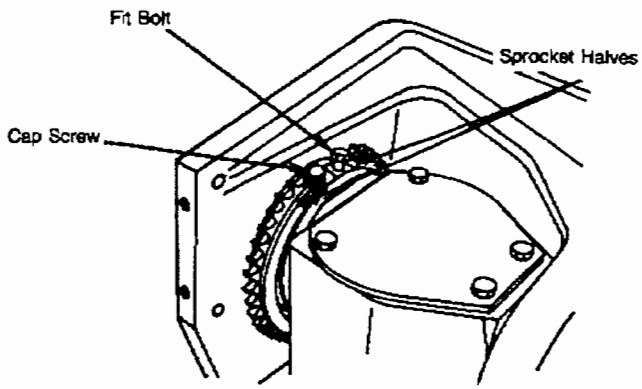
Return

2.3.55 Shim bearing against snap ring to remove end play so yoke turns freely, but not loose.



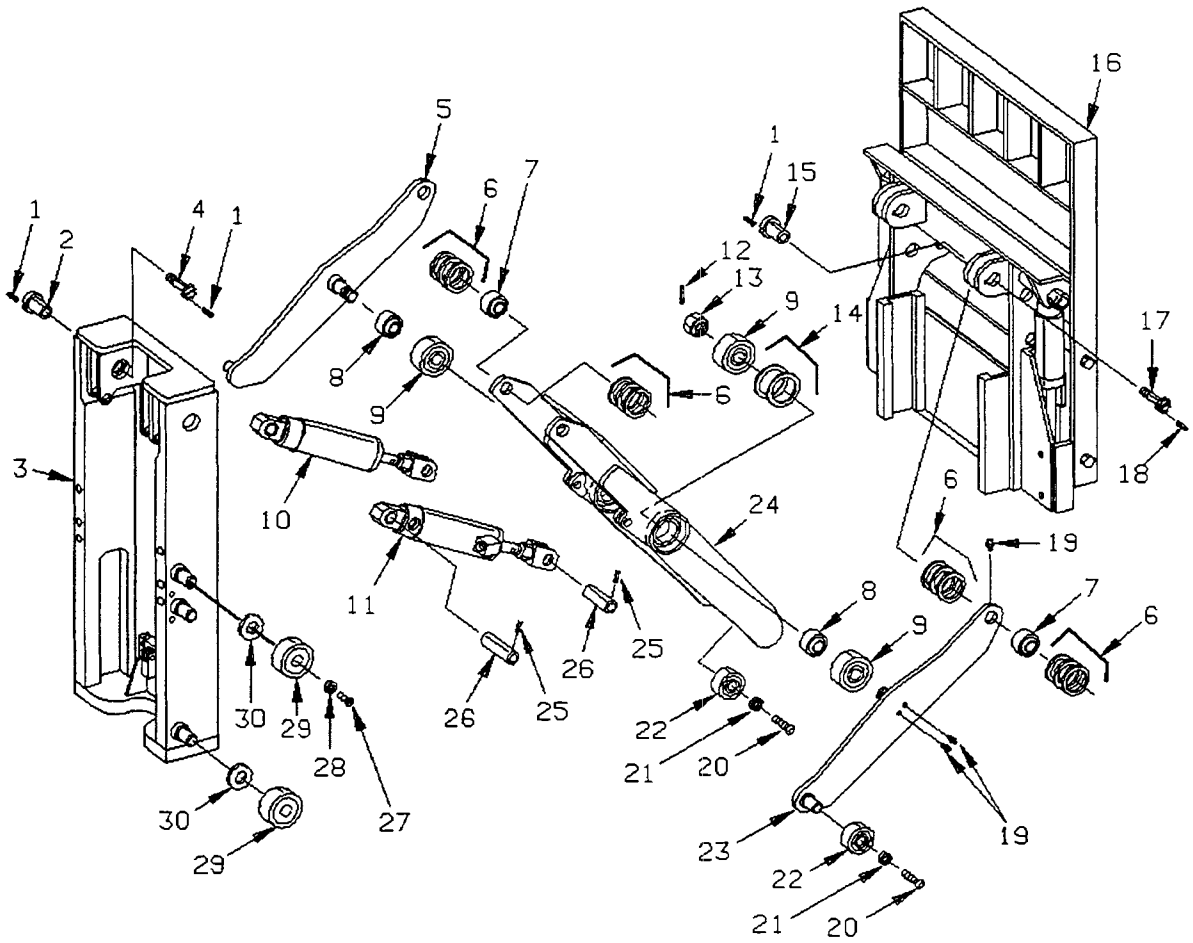


2.3.56 Install steering chain sheave halves with two (2) cap screws and two (2) fit bolts. Install fit bolts in opposite sheave halves with two (2) capscrews in remaining holes. (RR30/34 - RS40C only)



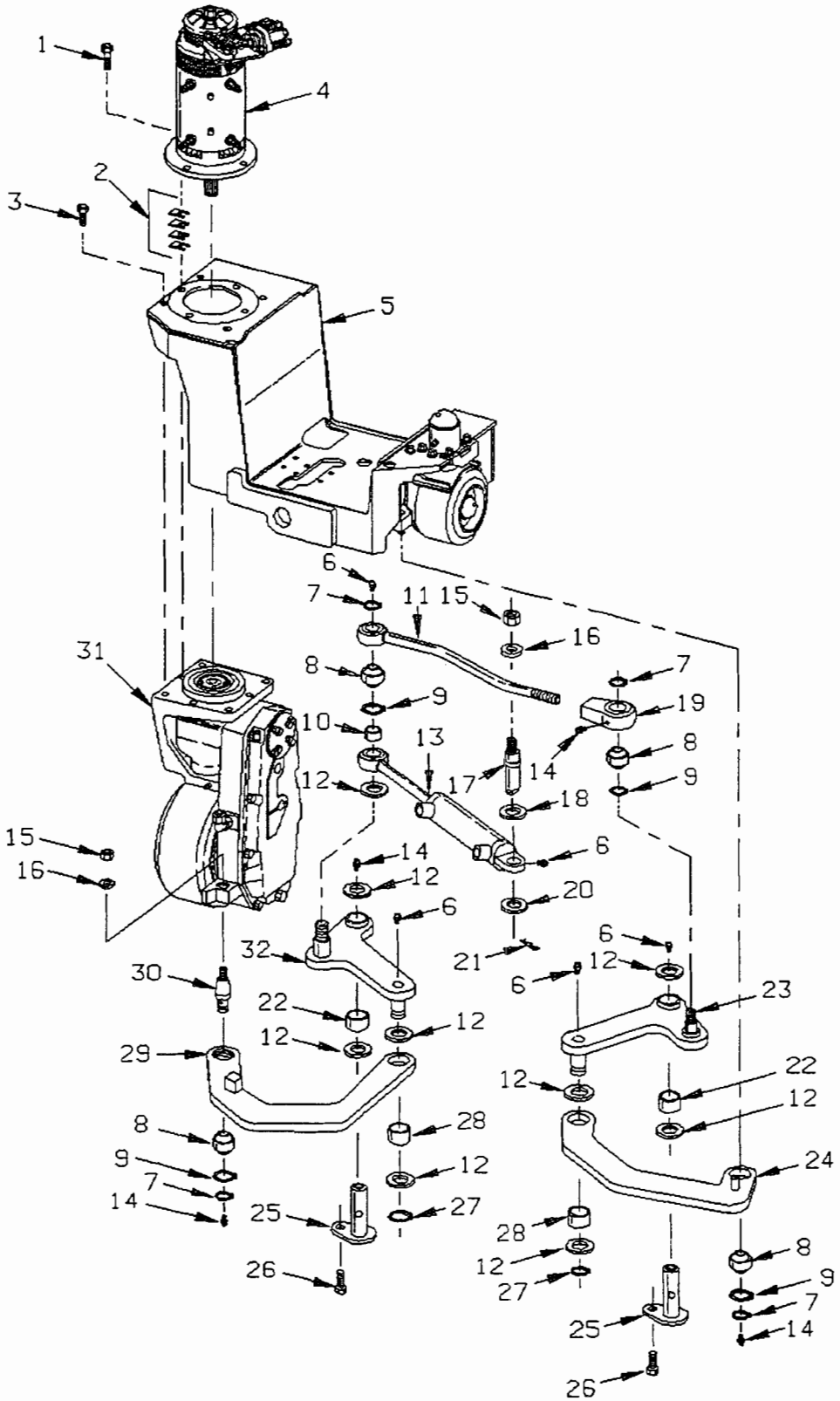
2.3.57 Install one-quarter cup of clean oil in gear and pinion gear case.

REACH ASSEMBLY



Return

TRANSMISSION AND STEERING INSTALLATION



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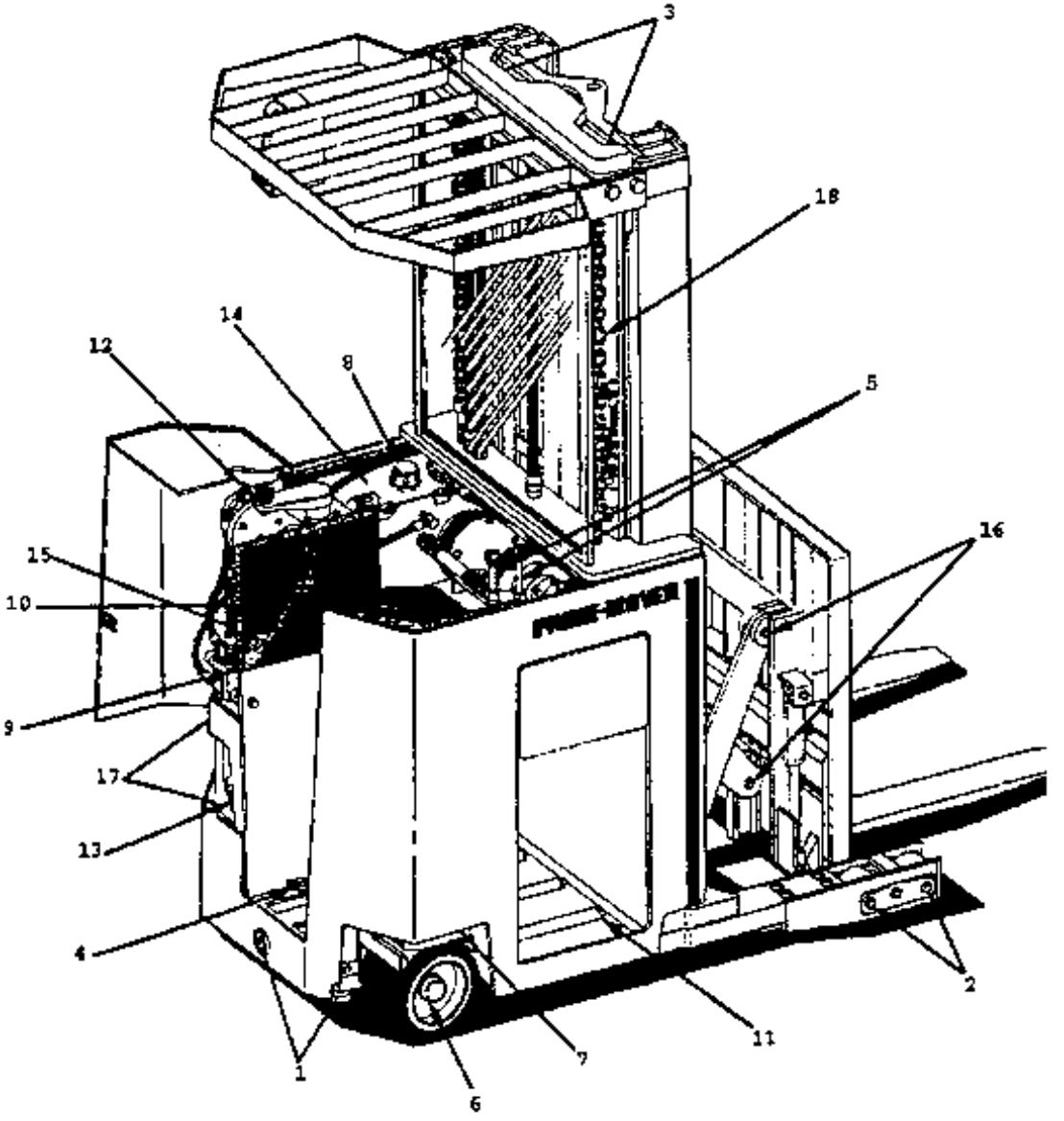
3
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11

DRIVE TIRE REPLACEMENT

1. Park machine on level floor, lower forks, disconnect battery and block machine in both directions at the load wheels.

2. Hoist or jack rear of machine so that drive tire clears the floor.

3. Remove lugs from the wheel studs and remove tire and wheel assembly.

4. Press on new tire, make sure the tire is flush with the lug nut side of the wheel.

5. Install wheel and lug nut. Torque lug nut to 90 ft./lbs.

TABLE #1

INDICATIONS, CAUSES AND CORRECTION OF UNSATISFACTORY BRUSH PERFORMANCE

INDICATIONS	IMMEDIATE CAUSES	PRIMARY CAUSES
Sparking	Commutator surface condition	1-2-3-43-44-45-46-49-59-60
	Over-commutation	7-12-31-33
	Under-commutation	7-12-30-32
	Too rapid reversal of current	7-12-30-32
	Faulty machine adjustment	8-9-11
	Mechanical fault in machine	6-14-15-16-17-18-19-20-21-28-29
	Electrical fault in machine	35-27-28-29
	Bad load condition	38-39-40-41-42
	Poor equalized parallel operation	7-13-23-34
	Vibration	51-52
	Chattering of brushes	See "Chattering or Noisy Brushes"
	Wrong brush grade	55-57-59
	Fluctuating contact drop	50
Etched or Burned Bands on Brush Face	Over-commutation	7-12-31-33
	Under-commutation	7-12-30-32
	Too rapid reversal of current	7-12-30-32
Pitting of Brush Face	Glowing	See "Glowing at Brush Face"
	Embedded copper	See "Copper in Brush Face"
Rapid Brush Wear	Commutator surface condition	See specific surface fault in evidence. Also 50.
	Severe sparking	See "Sparking"
	Imperfect contact with commutator	11-14-15-16-51-52
	Wrong brush grade	54-58
Glowing at Brush Face	Embedded copper	See "Copper in Brush Face"
	Faulty machine adjustment	7-12
	Severe load condition	38-39-41-42
	Bad service condition	46-47
	Wrong brush grade	57-61-62

produces the optimum frequencies through the SCR range.
The rate at which the oscillator may increase its percent ON time is limited by "Controlled Acceleration". The minimum time required to go from creep speed to 80-85% on time point may be varied by trimpot (C/A) on the card, adjustable from approximately 0.5 seconds to 3.5-4.5 seconds.

CURRENT LIMIT - This circuit monitor motor current by utilizing a sensor in series with the armature. The information detected across the sensor is fed back to the card so current may be limited to a preset value. If heavy load currents are detected this circuit overrides oscillator and limits the average current to a value set by the C/L adjustment pot. The C/L setting is based on the maximum thermal rating of 1REC and the peak voltage on the capacitor. Because of the flyback current through 3REC, the motor current usually runs 2 to 3 times battery current. The current limit is set with the "C/L" trimpot on the card.

PLUGGING - Slow down is accomplished when reversing by providing a small amount of retarding torque for deceleration. If the vehicle is moving the directional lever is moved from one direction to the other, the motor field is reversed. The plug signal is initiated by the fact that the directional switch has moved from one direction to the other. The motor armature, driven by the inertia of the vehicle, acts as generator. This generated current passes through 4REC and the sensor. The oscillator circuit regulates at a plug current limit level as set by the plug trimpot on the control card. This controls the pulse rate 1REC to regulate the generated motor current and bring the truck to a smooth stop and reversal. The accelerator potentiometer input will modulate plugging current. With the accelerator potentiometer at minimum resistance, the plugging trimpot will enable adjustment of plugging current from max to min. current level. With the accelerator potentiometer at maximum resistance, the plugging current will be reduced.

RAMP START - This feature provides full SCR torque to restart a vehicle on an incline. The memory for this function is the directional switch. When stopping on an incline, the directional switch must be left in its original or off position to allow the control to assure full power when restarted. The accelerator potentiometer input will modulate ramp start current.

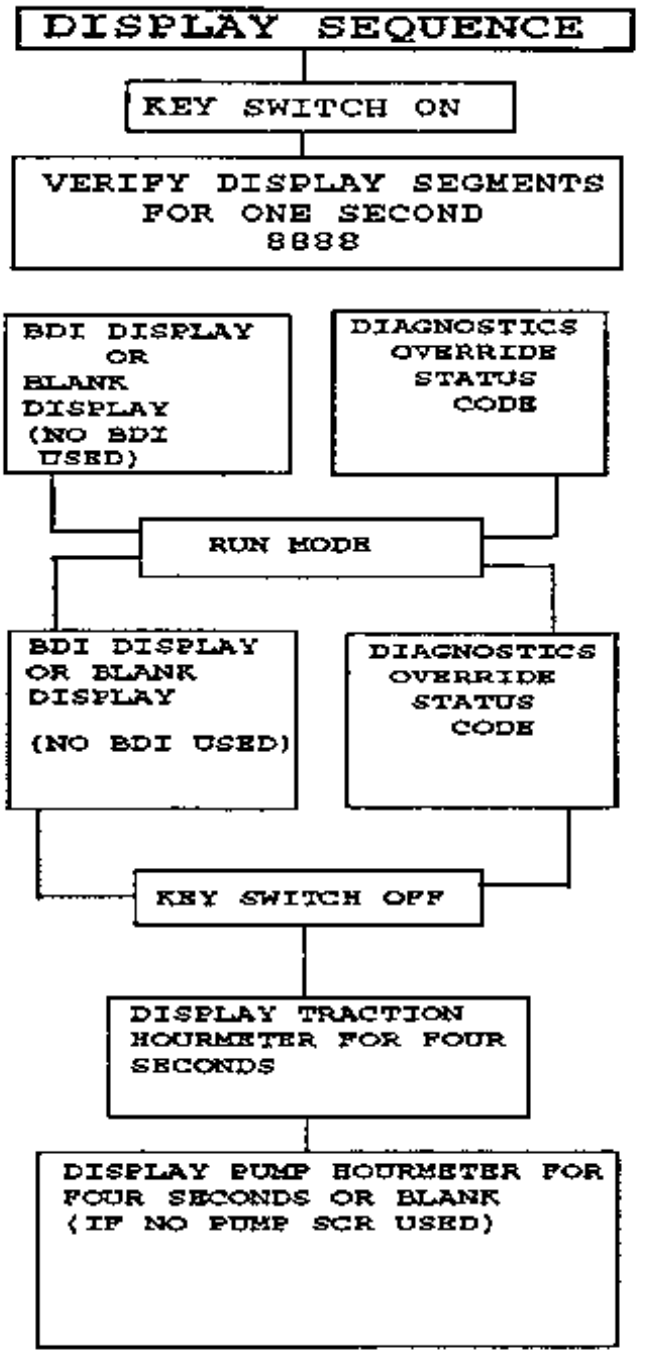
FULL POWER TRANSITION - This built-in feature provides smooth transition from SCR to 1A bypass. This accomplished by the SCR continuing to pulse until the 1A contactor power tips close.

1A CONTROL - The contactor has two modes of control:

1. Timed Pickup - this feature works with the potentiometer in the accelerator. When the accelerator potentiometer is activated so that accelerator voltage is reduced to 0.5 volt or less, the 1A time is enabled. The time delay pickup of 1A is provided by a circuit in the card. This allows the truck to accelerate through the SCR range until 1A picks up, even if the accelerator potentiometer is actuated immediately. The time delay is adjustable by means of a 1A time trimpot on the card.

2. If motor current is reduced during cutback to a point where 1A pickup would cause a severe torque increase, the 1A timed pickup function will be disabled.

STATIC RETURN TO OFF - this built-in feature of the control is set up to make the driver return the directional lever to neutral anytime he leaves the vehicle and returns. If the seat switch or key switch is opened, the control will shut off and cannot be 2restarted until directional lever is returned to neutral. A time delay is built into the seat switch input, .75 second, to allow momentary opening of the seat switch if a bump is encountered.



DISPLAY READOUT EXAMPLES
086 = BATTERY INDICATION (000 TO 100)
1789 = HOURMETER READING (0000 TO 9999)
-18 = STATUS CODES (MINUS SIGN PREFIX)

STATUS CODE - 01

DESCRIPTION
No foot switch input.

MEMORY RECALL
No

CIRCUIT
Traction

SYMPTOM
Forward or reverse contactor will not pick up.

POSSIBLE CAUSE
Mis-adjusted or defective foot switch.

Check foot switch to insure proper switch closure.

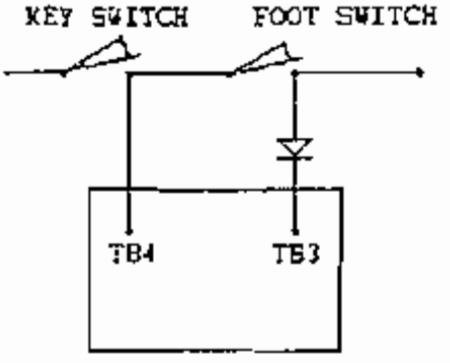
Open circuit between battery positive TB3.

Check for loose connections or broken wire between: positive side of the key switch and TB3.

STATUS INDICATION CRITERIA

This status code will be displayed when TB3 is less than 50% battery volts.

Check for loose connections or broken wire between negative side of key switch and positive side of foot switch, negative side of foot switch and TB3, voltage at TB3.



STATUS CODE -16

DESCRIPTION
Battery volts too high.

MEMORY RECALL
No

CIRCUIT
Traction

SYMPTOM
Forward and reverse contactor will not pick up.

POSSIBLE CAUSE
Incorrect control card adjustment

Check function 15 for proper adjustment for battery being used. See handset instructions for details. Adjust to proper setting.

Open circuit in regen sensor-circuit

Check yellow wire from sensor #2 to PA4 for broken wire, loose connections or broken weld at sensor. Check PA4 for loose plug or pin connection.

Battery over charged or incorrect battery used

Check battery for proper open circuit voltage per table in diagram below. If voltage excessive - check battery charger for proper output voltage.

STATUS INDICATION CRITERIA
This status code is displayed when the battery volts are greater than 2.40 volts per cell at initial start up. (See diagram below).

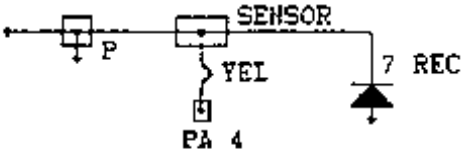


TABLE A

BATT CONN	NOMINAL BATTERY VOLTS	MIN LIMIT VOLTS @2.40
BATT	24	28.8
	36	43.2
BATT CONN	48	57.6

STATUS CODE -46

DESCRIPTION
Look ahead test for T2 volts. (Greater than 85% of battery volts)

MEMORY RECALL
No

CIRCUIT
Traction

SYMPTOM
Forward or reverse contactor will not pick up.

POSSIBLE CAUSE

Defective 1 REC

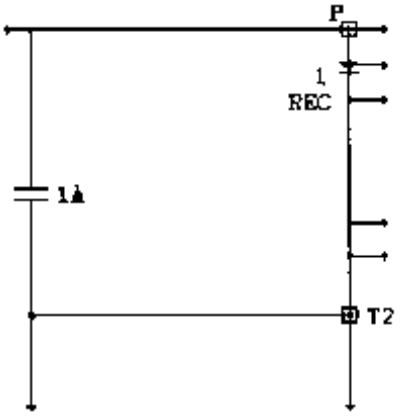
Check for shorted 1 REC.

Check for defective 1 REC insulator (co-therm) that may short 1 REC heat sink to base plate.

Defective 1A contactor

Check for welded 1A contactor power tips.

STATUS INDICATION CRITERIA
This status code is displayed when the voltage at T2 is greater than 85% of battery volts.



Return

MAIN LOGIC CARD

All trouble-shooting is written to check all outside devices and eliminate them as the source of the symptoms. The conclusion being then that the card is faulty.

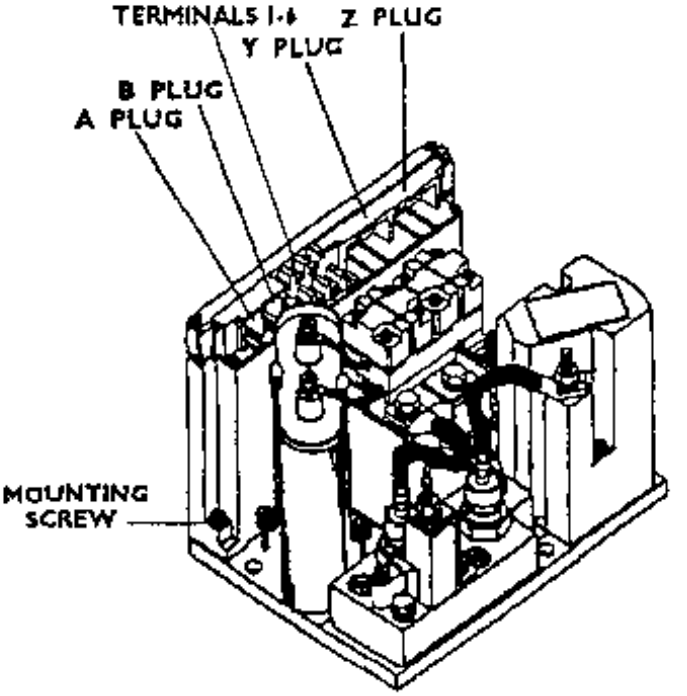
1. Instructions for Removal of Control Card.

   Remove control wires on the screw terminals 1 through 6 as required.

   Unplug A, B and Z plugs by pressing down on tab with wide blade screwdriver and rotating 90 degrees.

   Remove the two mounting screws and lift card box free.
   NOTE: DO NOT ATTEMPT TO REMOVE CIRCUIT BOARD FROM CARD BOX.

   Reverse procedures to install new control card.



EV100 LX/LXT

7.22 Steer motor does not run, contactor closes. See Electric Power Troubleshooting. (Section 7.10)

7.23 Steer motor runs continuously when key switch is on.

7.231 Condition for test: Battery plugged in, wire disconnected from negative side of foot switch, key switch on.

Test for voltage at:

A. Negative side of steer motor contactor coil.

Battery volts - repair mechanical binding or replace faulty contactor. Shorted 1A wire to steer motor.

0 volts - check SCR card.

7.24 Steer motor runs continuously when key switch is off.

7.241 Condition for test: Battery plugged in, key switch is off.

A. Repair contactor mechanical binding or welded contactor tips. Shorted 1A wire to steer motor.

7.3 Auxiliary

7.31 Pump motor does not run when hydraulic lever is operated. Contactor does not close.

7.311 Condition for test: Battery plugged in, key switch on, hydraulic lever activated.

Test for battery voltage at:

A. Positive side of fuse 2.

0 volts - repair open wire from battery to fuse.

B. Negative side of fuse 2.

0 volts - replace fuse 2.

C. Positive side of key switch.

0 volts - repair open wire from fuse 2 to key switch.

D. Negative side of key switch.

0 volts - replace key switch.

E. Positive side of hydraulic control valve spool switch.

0 volts - repair wire between key switch and spool switch.

F. Negative side of hydraulic control valve spool switch.

0 volts - replace spool switch.

G. Positive side of separating diode.

0 volts - repair wire from spool switch to diode.

Return

DISASSEMBLY AND INSPECTION:

NOTE: Overhaul pump only in a clean, dust-free location, using clean tools and equipment. Dirt or grit will damage the highly machined surfaces and will result in leakage or premature failure of the pump.

Before beginning disassembly, scribe match marks on the body and cover to insure that the pump will be reassembled in the same manner as it was shipped from the factory.

1. Clean outside of pump with safety solvent and dry thoroughly.

2. Secure unit in vise (use light clamping pressure) with shaft end down; remove cap screws (1) and washers (2).

   NOTE: During disassembly, take special note of the wear patterns on the wear plate (8) thrust plate (6) and body (15). Relate these patterns to the inlet and outlet sides of the pump. The large port in the rear cover (3) always corresponds to the inlet side of the pump. The inlet side can be further identified by the gear contact pattern in the body (gear) bore. The wear plate (8) will have a somewhat heavier wear pattern on the inlet side. The thrust plate (6) will also have a pattern that can be established for reassembly. Also note that the long journal of the driven gear (13) is toward the front of the pump.

3. Separate rear cover (3) from body (15) by supporting pump, shaft end up, on the mounting flanges and pressing on drive shaft end in arbor press, or tap drive shaft with a plastic mallet.

⚠WARNING Use one hand to support rear cover from underneath, since cover and internal parts will drop suddenly when dowels are disengaged.

An alternative method of removing the rear cover is to pry simultaneously with two large screwdrivers in the relieved areas between body and cover.

⚠WARNING At no time should screwdrivers be inserted further into pump body more than the depth of the relieved areas. Any burr must be removed from the body (15) and/or cover (3) after this operation to assure a good seal between body and cover.

4. Holding pump, shaft end down, remove rear cover (3). Dowel pins (7) may remain either with body or rear cover.

   NOTE: Cover gasket (5) and thrust plate (6) may or may not remain with rear cover. Should they remain with body, remove gasket and lift out thrust plate before proceeding.

5. Lift out driven gear (13), drive gear (14), and wear plate.

6. Invert pump body with shaft seal up. Remove shaft seal (10) by prying it out with a large screwdriver.

⚠WARNING Care should be taken not to damage (gouge) the shaft seal bore, this will result in shaft seal leakage.

7. Wash all parts and dry thoroughly.

5.0 Solenoid Valves

5.1 Valve part numbers

5.1.1 Manifold valve located in reach mechanism used for auxiliary functions (reach, tilt, sideshift).

Single reach valve - 41242-00
Double reach valve - 41478-00

5.1.2 Electric multi-function auxiliary valve

24 volt - 42062-00
36 volt - 42062-01
Seal Kit - 301972-000

5.1.3 Optional: Manlift platform

Blocking valve number

24 volt - 41461-01
36 volt - 41461-00

Raise/Lower valve number

24 volt - 41460-01
36 volt - 41460-00

5.2 Rebuilding Instructions

5.2.1 Single reach manifold valve - 41242-00

Repair of the single reach auxiliary functions manifold valve is limited to the replacement of the individual solenoid valves and their operating coils. Electrical and hydraulic troubleshooting procedures must be followed to determine the failure.

Solenoid part number - 41187-00

Contamination in the hydraulic system will necessitate further repairs to locate the cause of the contamination and to flush the hydraulic system.

Double reach manifold valve - 41478-00

The double reach auxiliary functions manifold valve is similar to the single reach manifold valve. Individual solenoids and coils circuits may be replaced upon determination of failure. In addition, there is a relief valve in the reach extend available for service, only the complete relief valve is available.

Solenoid part number - 41187-00
Relief valve part number - 49573-00

5.2.2 Optional: Manlift platform

A. Blocking valve - 41461-01 (24 volt), 41461-00 (36 volt)

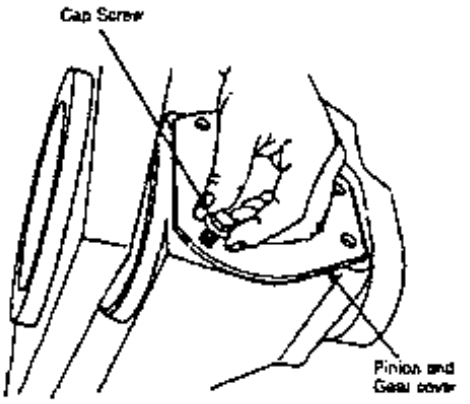
The purpose of this valve is to prevent lifting operation by using the spool valve and master control handle when the manlift platform is attached. Oil flow from the spool valve lift circuit will be blocked.

No service parts are available.

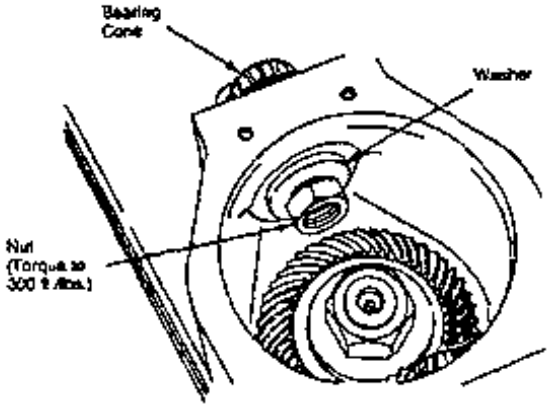
Return

2.1.5 Remove capscrews retaining gear set cover and pry gear set cover off gear case.

NOTE: Transmission lubrication fluid will be trapped behind this cover.

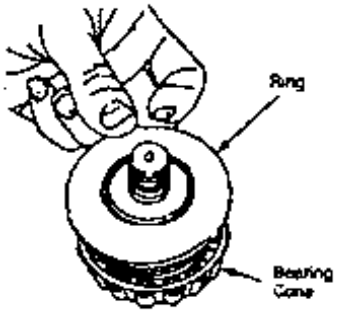


After cover has been removed, inspect nut, washer, and pin in transmission for wear, replace if needed.



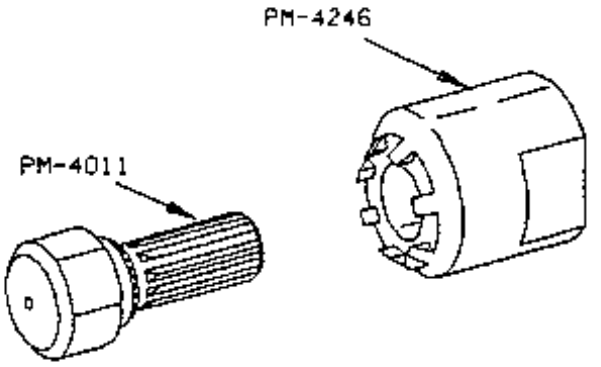
2.1.6 To remove pivot pin loosen nut so it is even with the end of pin threads. This will allow striking of pin without damage to threads.

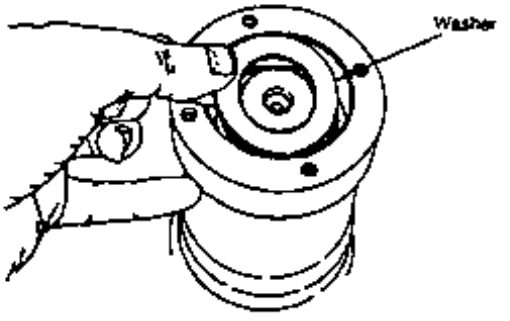
Once the pin is loosened, remove nut and washer from pin and pin from transmission.



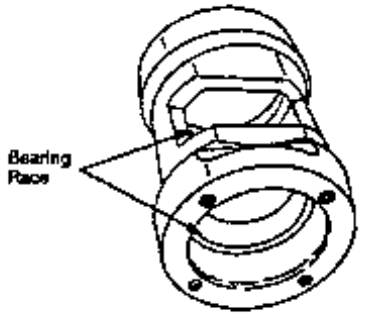
Place cross shaft hexnut in jaws of vise and clamp.

Remove locknut (this can be done using the special tool from Prime-Mover), lockwasher, washer and bearing holder. Once the bearing holder is removed the top bearing cone will go with it and should be removed for cleaning and inspection.





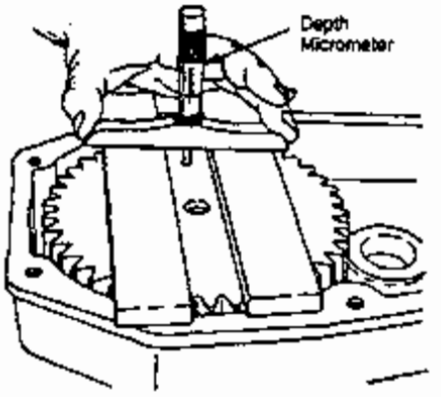
Bearing holder and bearing races should be inspected for wear and damage, replaced if found. Remove shims from shaft and now remove shaft from vice and rotate so nut is on top and clamp in vice as shown in illustration.



2.3.5 Shim drive gear bearings.

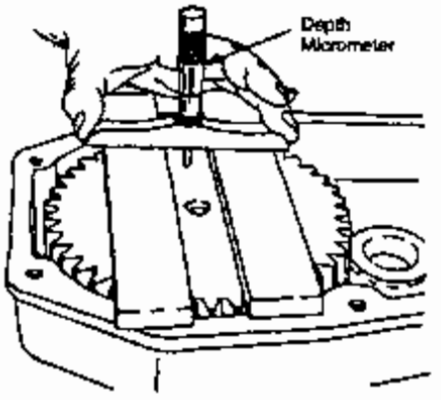
A. Drive the axle shaft assembly as far into the case as possible by aggressively striking end of axle shaft with a lead hammer. Rotate axle shaft to insure proper seating of bearing.

B. Using a depth micrometer, measure the distance from the front of gear case to front of drive gear. Mark the position on case and gear where measurement was taken. Record this measurement as "C"



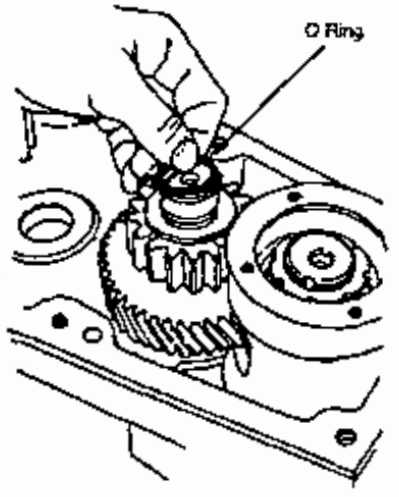
C. Drive axle shaft assembly as far out the case as is possible by aggressively striking drive gear with a lead hammer.

D. Measure distance in the same place as previously measured and record this measurement as "D".

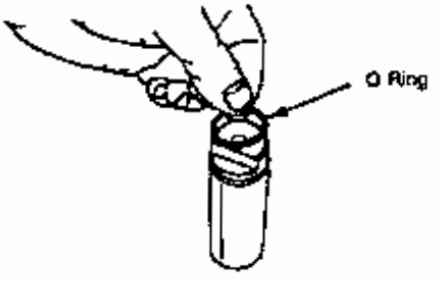


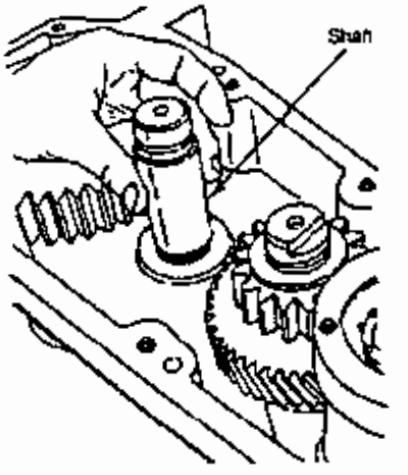
2.3.19 Install o-ring on shaft making sure that o-ring has been lubricated with transmission fluid.

NOTE: Slot on shaft is to be on same side as bearing holder.



2.3.20 Install o-ring on shaft of large gear set, then push shaft in gear case. Always making sure that o-ring has been lubricated with transmission fluid.





On bottom end of pinion is etched a plus (+) number, a minus (-) number, or a zero (0) number, which indicates best running position for gear set. This dimension is controlled by shimming underneath collar.

For example: If pinion is etched +3, this pinion would require .003" less shims than a pinion etched "0", this means by removing shims, mounting distance of pinion is increased to 3.503" which is just what a +3 indicates. Or if a pinion is etched -3, we would wand to add .003" more shims that would be required if pinion were etched "0". By adding .003 shims, mounting distance of pinion was decreased to 3.497" which is just what a -3 etching indicates.

If old gear and pinion set is to be reused, measure original shim pack and build a new shim pack to this same dimension.

To change pinion adjustment, shims are available in thicknesses of .005", .007", .010" and .020".

Measure each shim separately with a micrometer and add together to get total shim pack thickness from original buildup.

If a new gear set is being used, notice the (+) or (-) etching on both old and new pinion and adjust thickness of new shim pack to compensate for difference of those two figures.

For example: If old pinion reads (+2) and new pinion reads (-2) add .004" shims to original pack.

NEW PINION MARKING

OLD PINION MARKING	-4	-3	-2	-1	0	+1	+2	+3	+4
+4	+0.008	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0
+3	+0.007	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001
+2	+0.006	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002
+1	+0.005	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003
0	+0.004	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004
-1	+0.003	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005
-2	+0.002	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006
-3	+0.001	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007
-4	0	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008

USE THIS CHART AS A GUIDELINE TO SET PINION.

1.2A.1 Remove all hydraulic hoses and tubes from mast.

1.2A.2 Remove all electrical cable and limit switch from mast.

1.2A.3 Remove retaining bolt holding top of lift cylinder to guide. The lift cylinder will now be free to fall to the back of the mast. Support cylinder with overhead hoist.

1.2A.4 Move the lift cylinder towards the top of the mast to disengage locating pins on bottom of cylinder.

1.2A.5 When lift cylinder is clear of locating pins remove cylinder from mast.

1.2A.6 Remove inner rail stop that is bolted on bottom crossmember of outer rail.

1.2A.7 Using the overhead hoist to support the inner rail, move inner rail out bottom of outer rail only far enough so bearings can be removed.

1.2A.8 Remove bearings and shims from bottom of inner rail and top of outer rail.

NOTE: The mast bearings can be shimmed for proper adjustment at this point. Mast disassembly is completed with the next step (1.2A.9)

1.2A.9 Move inner rail out the top of the outer rail. When the bearing mounting pins get near the top, the rails can be separated by moving pins through cutouts in the outer rail flange.

1.2B Mast Disassembly - 3 stage mast

Mast should be removed from truck and laying on its back on the floor.

1.2B.1 Remove all hydraulic hoses and tubes from mast.

1.2B.2 Remove all electrical cable and limit switch from mast.

1.2B.3 Remove staging lift chains and chain anchor bolts.

1.2B.4 Remove chain, hose and cable sheaves from top of intermediate rail.

1.2B.5 Remove retaining rings from locator pins at bottom of free lift cylinder. Move freelift cylinder towards top of mast and lift away from mast.

REMOVAL IDLER WHEEL ASSEMBLY RR45/RS50B

1. Disconnect brake line and plug to prevent contamination.
2. Remove hub cap (9).
3. Remove cotter pin (11).
4. Remove slotted nut (10).

   NOTE: Idler wheel must be supported. It could drop when slotted nut is removed.

5. Remove idler wheel assembly.
6. Clean and inspect bearings and seals.

DISASSEMBLE IDLER WHEEL RR45/RS50B

1. Remove hub cap (30).
2. Straighten tab on lock (28).
3. Remove nut (29).
4. Remove washer (27) and bearing (24).
5. Remove wheel (31).
6. Remove bearing (24) and seal (25).
7. Clean and inspect bearings and seal.

   NOTE: Brake shoe and actuation linkage can be inspected for wear at this time.