LUBRICATION CHART

Item No.	Description	Lub. Points	Type of Lubricant	Interval
*1	Hydraulic Reservoir	(1)	Valvoline Super Hydro F32-U	Check daily/Drain & clean yearly (Approx. 6.5 gallon capacity)
*2	Hydraulic Reservoir Cap	(1)	Valvoline Super Hydro F32-U	Check 30 days or 200 hours Clean w/solvent and oil
3	Hydraulic Tank Drain	(1)		Change oil yearly or 2000 hrs.
4	Hydraulic Reservoir Suction Filter	(1)		Clean during oil change
5	Transmission Oil Plug	(1)	80/90 Gear Oil	Check daily/Change oil yearly or 2000 hours
6	Transmission Drain Plug	(1)		Change oil yearly/4 qts. to fill
7	Brake Fluid Reservoir For Freezer Protection	(1)	DOT-3 DOT-5	Check 30 days or 250 hours
8	Hydraulic Oil Filter	(1)	Hyd. Oil	Change yearly
9	Lift Chain	(4)	Heavy SAE Oil	Check 30 days or 200 hrs./Clean & coat w/oil
10	Chain Sheave	(2)	Mobilux #22	Check 2 weeks or 200 hrs.
11	Free Lift Chain Sheave	(2)	Mobilux #22	Check 2 weeks or 200 hrs.
12	Idler Wheel Bearings	(2)	Mobilux #22	Check 2 weeks or 200 hrs.
13	Trans. Steer Bearings	(2)	Mobilux #22	Check 2 weeks or 200 hrs.
14	Steering Linkage	(9)	Mobilux #22	Check 2 weeks or 200 hrs.
15	Reach Arms	(8)	Mobilux #22	Check 2 weeks or 200 hrs.
16	Load Wheels	(4)	Mobilux #22	Check 2 weeks or 200 hrs.
17	Articulating Frame	(2)	Mobilux #22	Check 2 weeks or 200 hrs.
18	Sideshifter	(5)	Mobilux #22	Check 2 weeks or 200 hrs.
19	Batt. Roller Bearings	(8)	Mobilux #22	Check 1000 hrs or 6 months/Remove, clean & refill

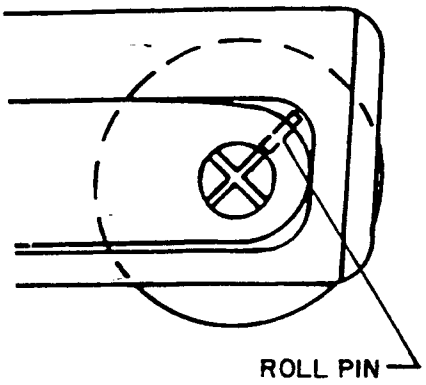
*** Freezer Protection Oil - Mobil HFA Aero OR Shell Carnea-27**

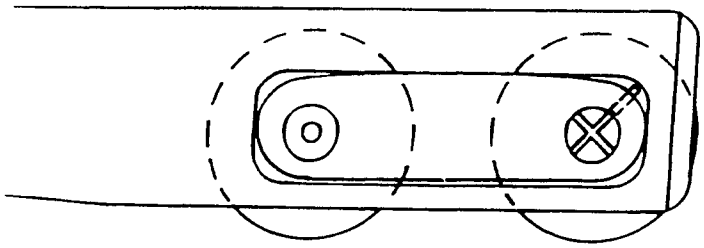
LOAD WHEELS
(STANDARD 3 X 5)

Load Wheel Repair (Cont'd)

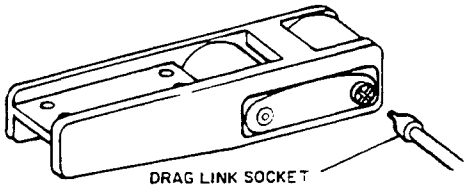
2. Using an impact wrench or breaker bar remove the four (4) mounting bolts and lift the complete load wheel assembly off of truck to a work area.

3. Drive the roll pins out, which secure the load wheel axles (as shown below).

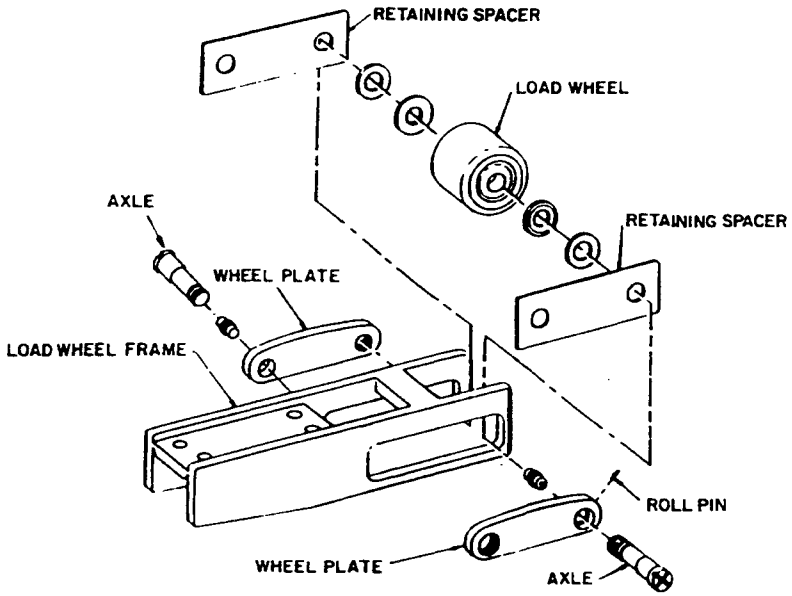




4. After both roll pins have been driven out unthread the axles using a drag link socket.



5. Remove the load wheel plates, load wheels and retaining spacers from load wheel frame. Remove roll pins from load wheel plates.



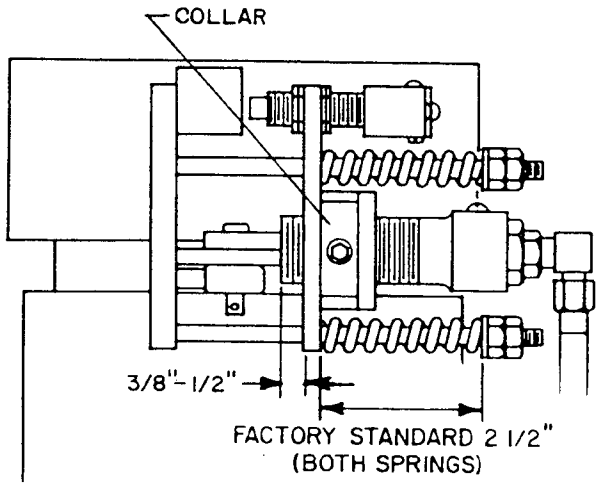
ADJUSTING PROCEDURES

Drive Motor Brake Adjustment (Cont'd)

2. b. If after a few adjustments the brakes still do not hold, it may be that the slave cylinder rod has bottomed out in the slave cylinder tube and the spring mounting weldment is too close to the slave cylinder.

   The slave cylinder has a collar which can adjust the mounting distance of the cylinder. The standard distance should be 3/8" to 1/2" of cylinder out of the weldment.

   NOTE: If an adjustment to the cylinder mounting distance is done always remember to lock down the collar into place.



   c. Anytime the brakes still do not hold lining and drum must be inspected as covered earlier in this chapter.

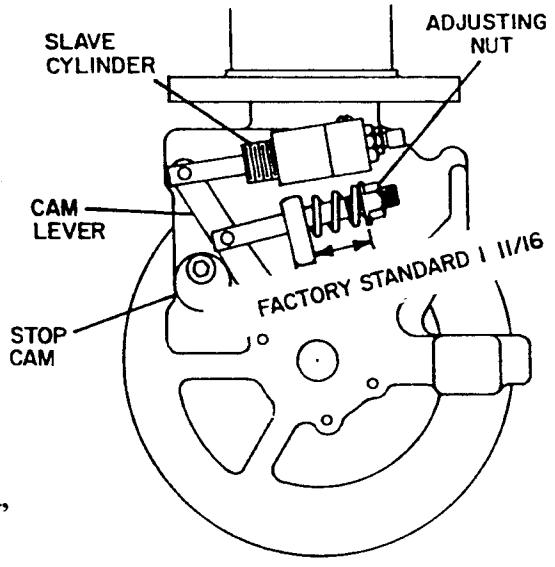
3. Check that drive wheel brakes release completely with pedal down and that they apply with the pedal up.

4. You may have to adjust the brake switch after the above adjustment is completed which is covered later in this chapter.

Idler Wheel Brake Adjustment

1. On a level floor raise both wheels off the floor.

2. If adjustment is needed on the idler wheel brake shoes, turn the adjusting nut in to maintain proper spring tension. Make small adjustments, just enough so brake will hold - standard length 1-11/16". As the adjustments for brake wear are made the idler brake cam lever will be pulled towards the idler wheel slave cylinder and the idler wheel casting gussets. If during the adjustment of the spring tension the cam lever hits the casting or the salve cylinder bottoms out; then, the brake lever arm will have to be repositioned, which is covered in this chapter.



TRANSMISSION MAINTENANCE, REMOVAL AND INSTALLATION

This chapter will deal with maintenance and removal of the transmission.

Currently NFCNA would like any and all transmissions replaced as a complete unit, so the manufacturing department can determine the cause of the field problems and/or failures.

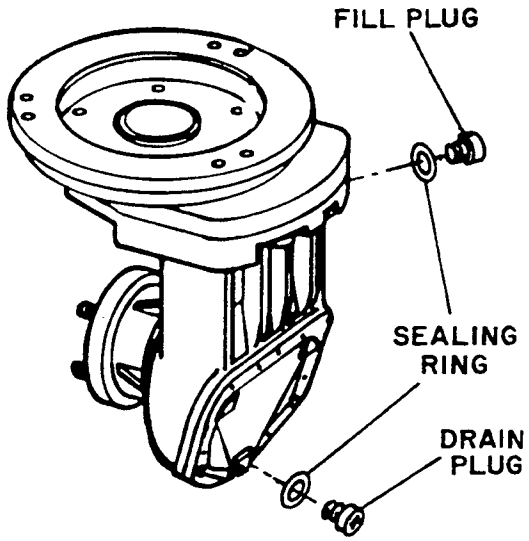
Maintenance

The 80/90 gear oil level should be checked daily. The level is checked by removing the fill plug located in the top of the transmission. The oil level should be at the bottom of the threads for the fill plug.

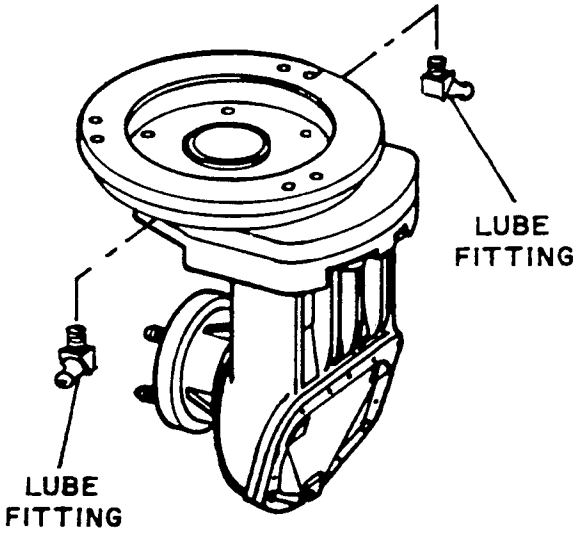
This gear oil should be changed once a year or every 1000 hours and requires about four (4) quarts.

NOTE: Both fill and drain plugs need a 6mm allen wrench to be removed.

The transmission steer bearing must be greased every 150 hours.



There are two (2) fittings on the steer bearing so you must turn the transmission in order to reach both fittings.

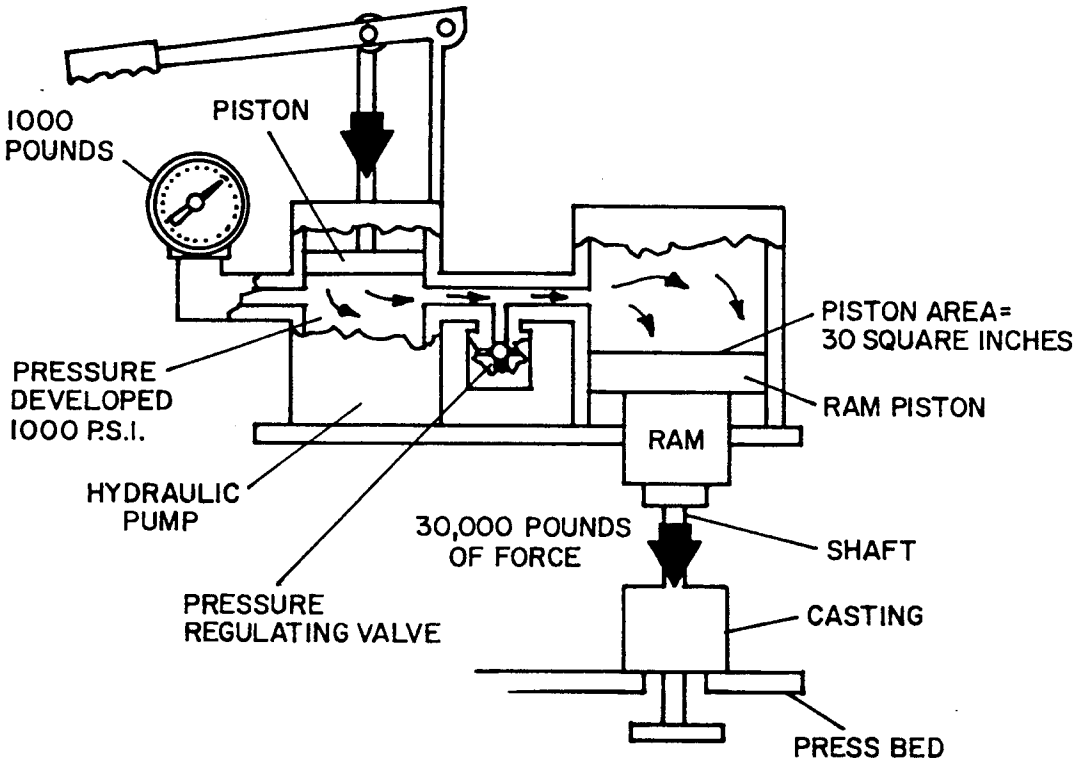


BASICS OF HYDRAULICS

Multiplying Hydraulic Pressure

In this example, we are faced with the problem of removing an extremely tight shaft from a large casting. It is literally "locked" to the bore of the casting and will probably take at least 20 tons of force to separate the shaft so that a new one can be installed in its place.

With the casting placed on the "bed" of the hydraulic press and the end of the shaft centered against the ram head, we can start to pump fluid into the other end of the ram (as shown below).



In this simplified sketch of a hydraulic press you will note that the 1000 pounds of fluid pressure developed by the hydraulic pump will apply a total force of 30,000 pounds to the end of the ram in contact with a shaft.

A valve in the line is needed to regulate pressure that will be developed. In other words, if pressure developed is too great then the valve will open (dump the excess fluid) in order to maintain a predetermined (and safe) pressure level. If we take the example that the pressure-apply area at the fluid end of the ram is 30 square inches and the pressure developed is 1000 psi, then the total force applied to the end of the ram in contact with the shaft will then be 30,000 pounds (or 15 tons of force).

MAIN HYDRAULIC LIFT

Service and Adjustments

Pumps:
The lift pumps themselves are a simple gear type pump and can not be rebuilt. All oil is filtered from the reservoir to all the hydraulic pumps from a reservoir internal filter which should be cleaned **once** a year.

Lift/Lower Control Valve:
The lift/lower control valve can be repaired or rebuilt, which is covered by its own repair section. This valve controls not only the lift and lower speeds but the relief pressure as well.

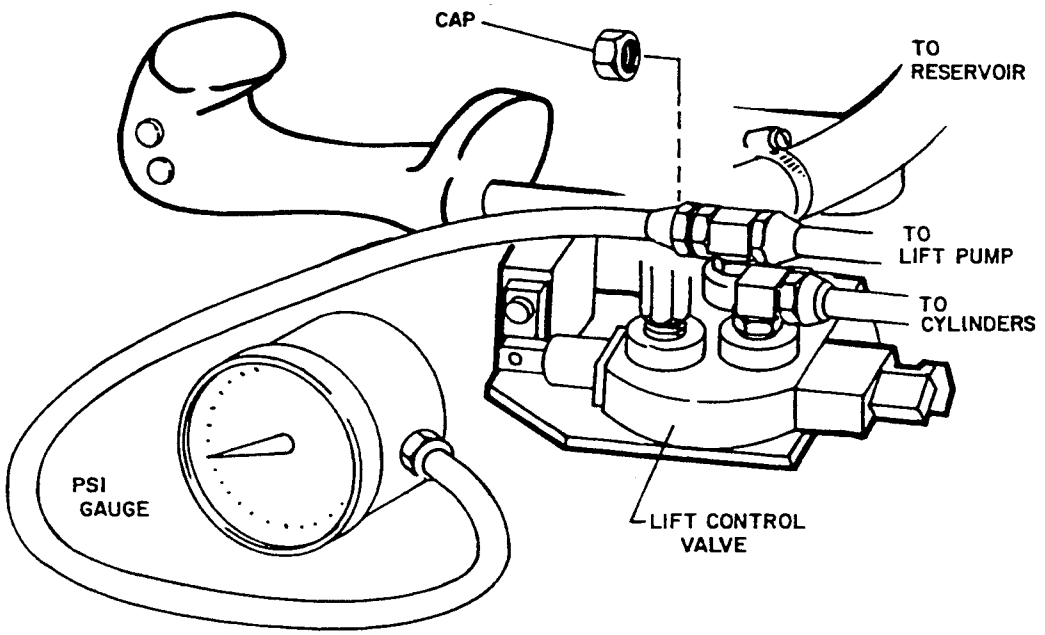
Lift Relief Pressure Adjustment

Equipment Required:
- 0-3000 psi Test Gauge
- 1/4" Allen Wrench
- General Tools
- Rags

WARNING:
Before attempting to run this test make sure that the mast can be completely lifted without any damage to the overhead equipment or roof.

1. Turn key switch off and remove main dash.

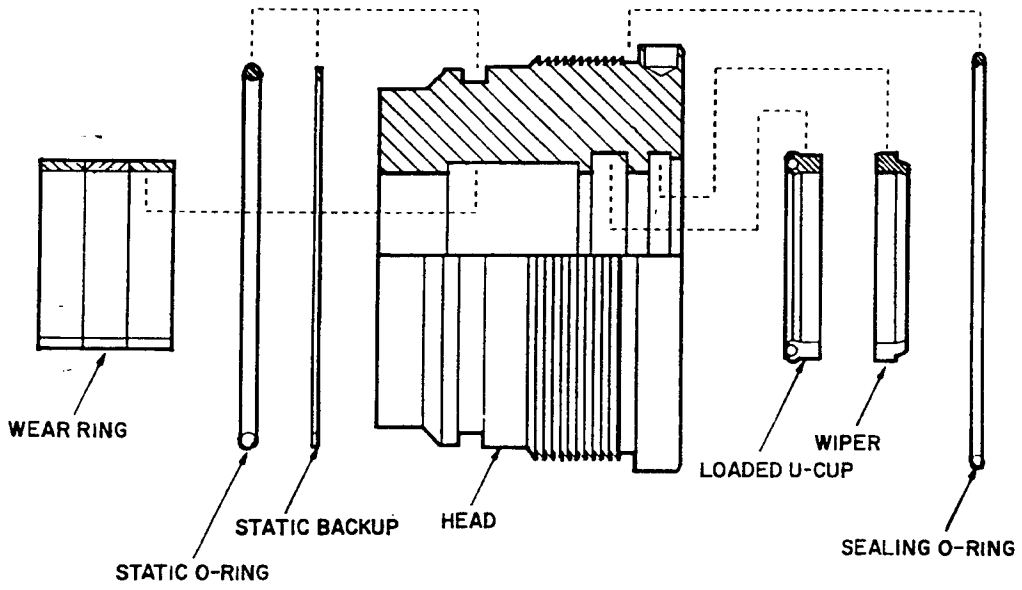
2. Connect the test gauge to pressure tap on top of the lift/lower control valve.



MAIN LIFT CYLINDER
SERVICE AND REPAIR

Assembly of Cylinder

The figure below shows the correct position of all seals and wear rings. Lubricate the head and all seals with hydraulic fluid prior to installation.



1. Using a spherical installation tool or round nose pliers, twist the loaded u-cup seal into a "C" shape as shown below. Then lower it into the head allowing the seal to snap into the groove.

2. Check that the o'ring loaded in u-cup seal did not pop out during installation.

3. Install wiper ring using the same technique as above.

4. Install static back ring and static o'ring.

5. Install sealing o'ring into groove between threads and flange lip.

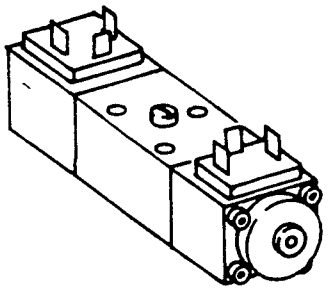
NOTE: It is recommended that when possible let the head with the new seals sit for at least one (1) hour to allow the seals to restore their original shape.

HYDRAULIC AUXILIARY MAINTENANCE AND REPAIR

Auxiliary Control Valve Assembly For Unmodified Units (32-90057 and Lower Only) (Cont'd)

Directional Control Valve - Changes the hydraulic pressure to the reach attachment which controls the direction in which the cylinder will work.

This valve is purchased as an assembly because the inside components are manufactured as **matched** sets. This valve may be dismantled and cleaned, if needed.

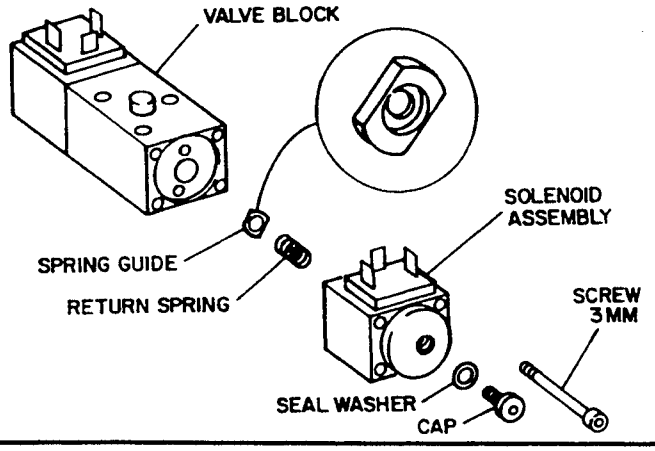


Inspection and Cleaning

Equipment Required:

3mm Allen Wrench	Punch
4mm Allen Wrench	Spray, Cleaning Solenoid

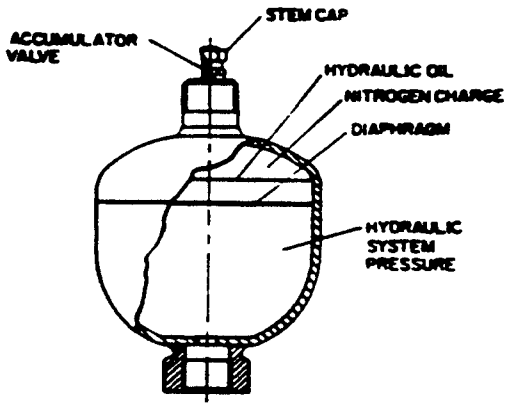
1. Turn key switch off, unplug battery and remove wires - make sure you mark the location.
2. Remove three (3) 4mm hex cap screws - loosening them equally.
3. Remove valve assembly, cover surface of combination valve with a clean cloth or towel.
4. Remove four (4) 3mm hex cap screws, which hold the solenoid assembly to the valve block. Care should be taken not to lose the spring guide or return spring (as shown below).



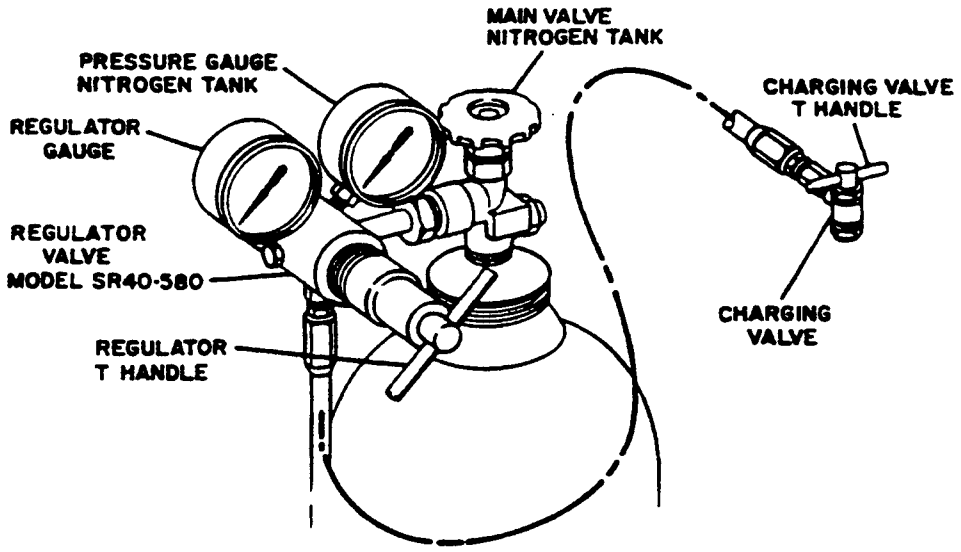
ACCUMULATOR CHARGING
AUXILIARY CONTROL

Operation (Cont'd)

The accumulator has a diaphragm which separates the charge side from the working side of the hydraulic system. In order for the accumulator to absorb hydraulic shocks it must maintain a gas (nitrogen) charge. In most cases this charge does not vary but should be checked in order to keep the hydraulic system working correctly and to keep wear to a minimum on hydraulic components.



WARNING:
When charging or checking pressure hoses and regulators in an accumulator use only equipment designed to work with industrial gases only. Most charging tanks are a 2900 psi or more. Always wear eye and hand protection.

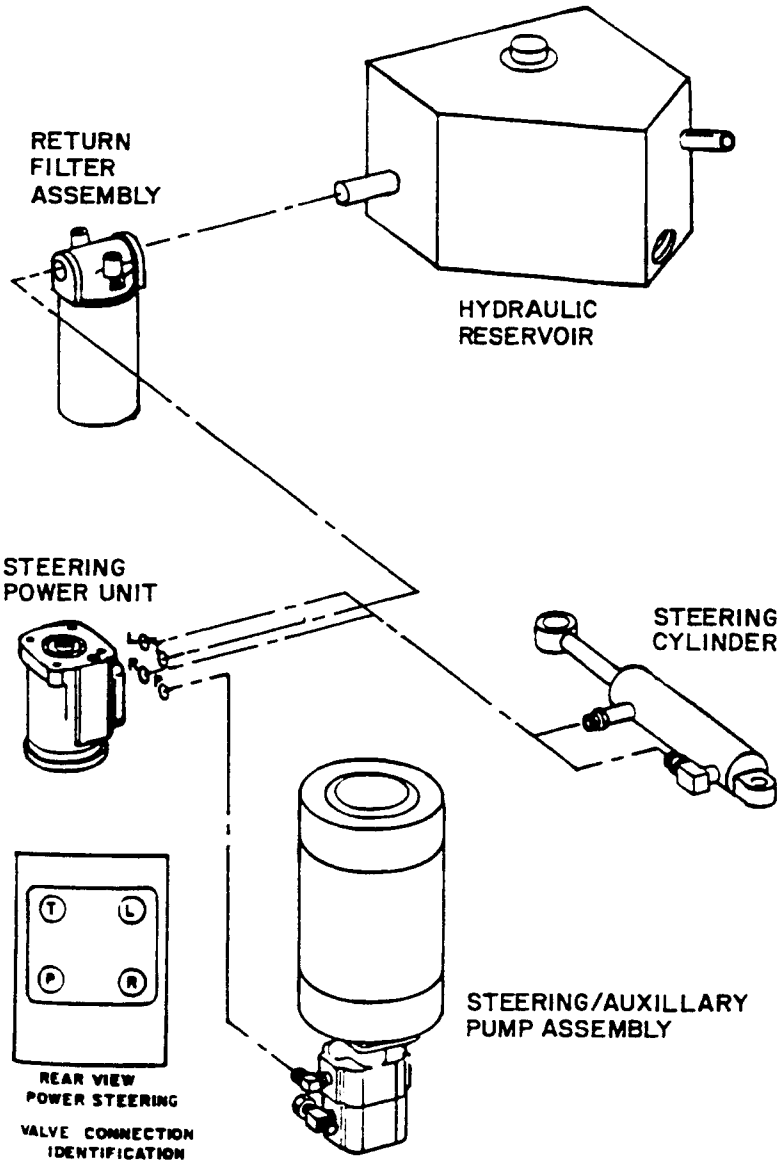


STEERING SYSTEM
MAINTENANCE ADJUSTMENT

The full time power steering system on the RRT(N)-40 utilizes the same motor as the auxiliary function but has its own pump section and relief valve.

This means anytime the operator is using any reach function he will maintain full time power steering.

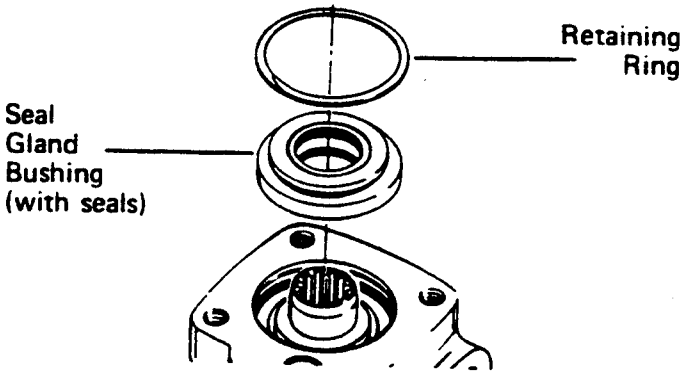
The steering system has three (3) major components, the hydraulic pump with relief valve, the steering power unit and the steering cylinder (as shown below). Also note that the steering and auxiliary system have all their return oil filtered before entering the reservoir.



STEERING POWER UNIT
SERVICE INSTRUCTIONS

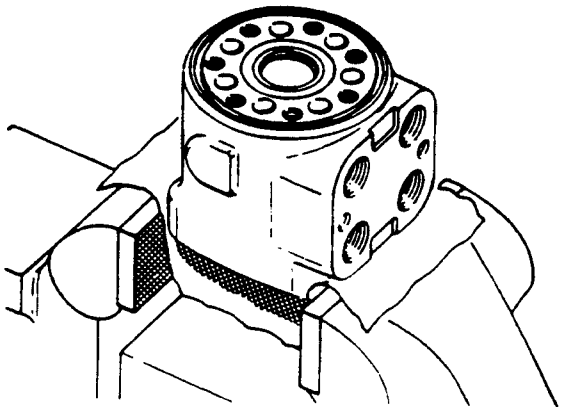
Assembly (Cont'd)

12. Install retaining ring in housing. After installing ring, tap on ring end or pry with screw driver around entire circumference of ring to properly seat ring in groove.



13. Clamp housing in vise. Clamp lightly on edges of mounting area Do not over tighten jaws.

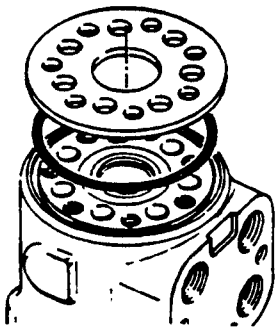
NOTE: Check to insure that the spool and Sleeve are flush or slightly below the fourteen (14) hole surface of the housing.



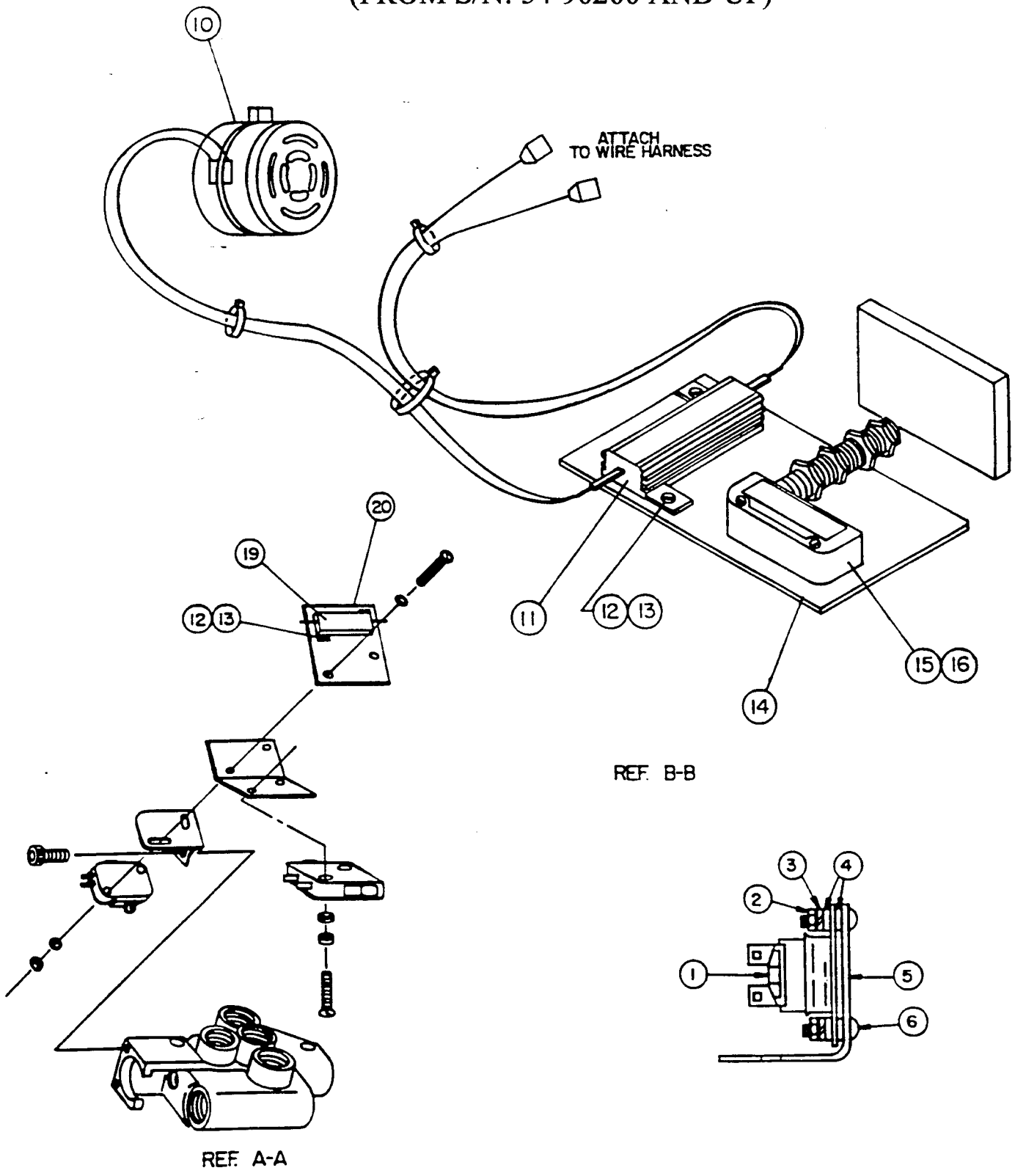
Attention: Clean the upper surface of the housing by wiping with the palm of clean hand. Clean each of the flat surfaces of the meter section parts in a similar way when ready for reassembly. **Do not use cloth or paper to clean surfaces.**

14. Install 3" diameter seal in housing.

15. Install spacer plate. Align bolt holes in spacer plate with tapped holes in housing.

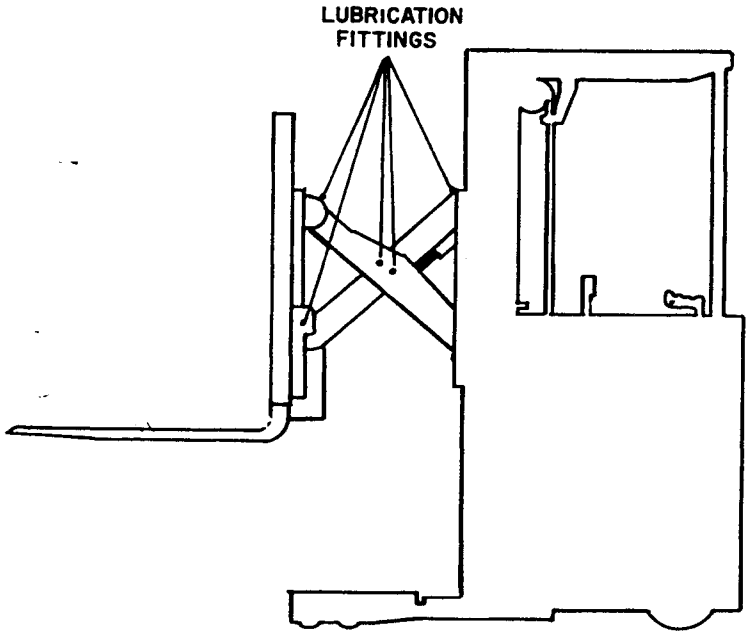


FREEZER PROTECTION
(FROM S/N: 34-90200 AND UP)

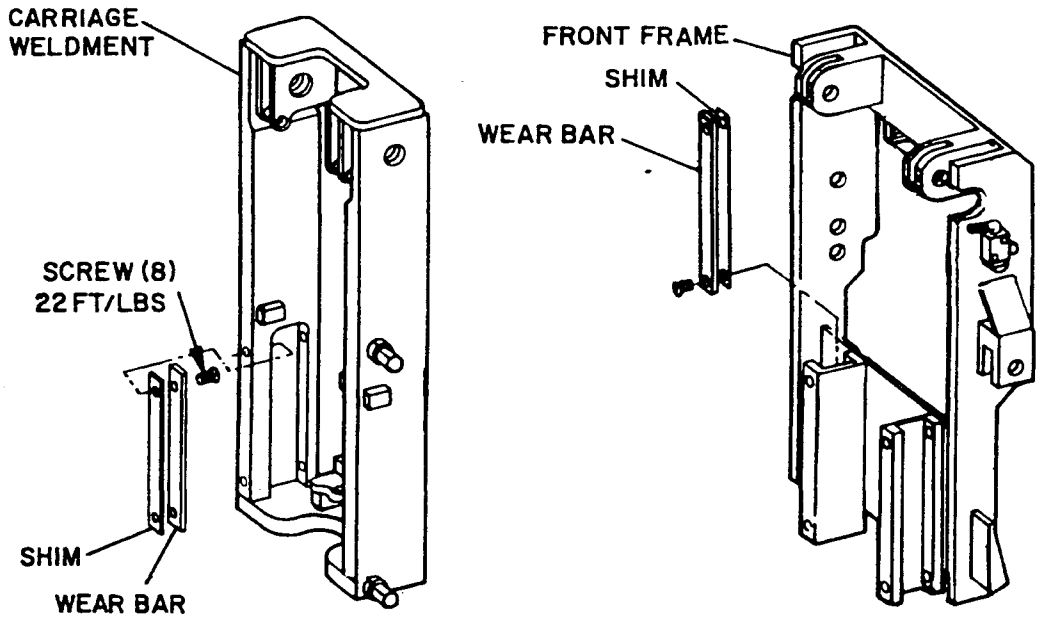


REACH MAINTENANCE AND ADJUSTMENT

The reach attachment has ten (10) lubrication fittings and the **optional** sideshifter has five (5) more, which should be greased every 2 weeks or 150 hours.



Mounted in the front and rear frames are wear bars for the rollers. These can be adjusted for proper clearance by shims, normal clearance is 0.005 to 0.010.



REACH DISASSEMBLY AND INSPECTION

Disassembly Procedure (Cont'd)

16. Removal of the reach cylinder can be completed at this time.

17. If the mast carriage needs to be removed for re-shimming, you must follow the same type of procedure as described at the beginning of this section.

Inspection

1. Inspect all pivot bearings for smooth operation and rotation within their socket.

2. Inspect roller bearing for free movement. Any rough or looseness requires that the bearing be replaced.

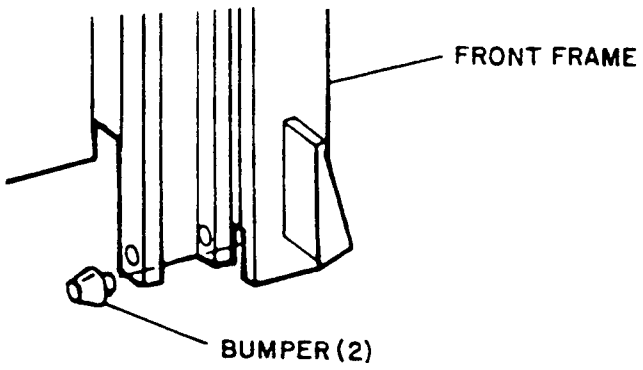
3. Check thrust bearing for external damage and ensure that they turn freely. If one thrust bearing feels rough replace both the bearings from that side.

4. Inspect the roller wear bars on both the front and mast carriage assemblies. If any uneven wear, gouging or scratches are found replace the wear bar. **Do not** try to repair.

5. Inspect the reach cylinder for leaks or damage to rods, repack or repair as needed (See Pages HD 8-1 thru 8-5 on cylinder repair). Also inspect rod end yokes for uneven wear which would indicate that one of the reach cylinders is out of adjustment.

6. Clean all grease from pivoting areas so you can inspect them for unusual wear. Smooth out any scratches or gouges before assembling.

7. Inspect reach stop bumpers, replace if damaged.



8. Check all grease fittings to ensure that grease is passing through them freely.

9. Check all pivot pins for damage or cracks. Replace any which are damaged.

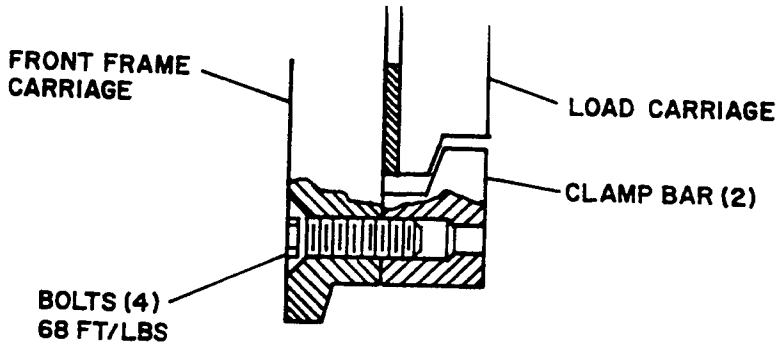
REACH - SIDESHIFTER OPTION

Replacing Slide Bars (Cont'd)

7. Before assembling ensure the sliding areas on the front frame carriage are free of nicks, scratches or material which may cause the slide bars or wear strips to become damaged.

8. Completely grease front frame carriage slide area before mounting sideshifter load carriage.

9. Mount load carriage, install clamp bars and torque bolts to 68 ft/lbs.



10. Slide load carriage back and forth to ensure smooth movement.

11. Plug in the battery and extend the hydraulic cylinder. Carefully slide carriage over rod end and install outside nut, torque to 68 ft/lbs.

12. Test the sideshifter movement with the hydraulic cylinder, then install load backrest and forks.