



John Deere

Service Manual

3400

Rotoboom

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JD-S-SM2082

Service Manual

SERVICE MANUAL

JOHN DEERE

3400

ROTOBOOM

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INTRODUCTION

This service manual contains service and maintenance information for the John Deere 3400 Rotoboom.

The manual is divided into sections. Each section covers a certain part of the system. The information is sub-divided into groups within each section.

All sections should be carefully studied by the serviceman.

The method used for disassembly and repair are, for the most part, those proved to be the most practical, both from a factory and a field standpoint.

Section 30 contains troubleshooting information which lists symptoms, causes and remedies for troubles encountered in the various hydraulic systems. When diagnosing trouble, refer to the section applying to that particular phase of the system for recommended service procedures.

The service manual will be useful in the training of new men within the organization.

The manual was prepared for the service department; it should be kept there and used often. If this manual is used in conjunction with current parts catalogs (for correct parts replacement), your 3400 Rotoboom service work can be done more efficiently and in less time.

The manual is prepared in loose-leaf form. Whenever newer or improved service methods are developed, or improvements are made on the 3400 Rotoboom, information will be provided to you on new loose-leaf pages. Insert these pages in your manual as soon as you receive them, and your service manual will prove to be a valuable asset in your service department.

NOTE: There are changes being made from time to time in the design of the Rotoboom which may account for some small discrepancies in illustrations.

In the case of minor changes, no additional explanation is included.

If any major modifications are made, a serial number break will be included in the write-up.

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Section 10

DESCRIPTION AND SPECIFICATIONS

Group 5

IDENTIFICATION AND SPECIFICATIONS

IDENTIFICATION

The 3400 Rotoboom is designed to operate on JD350 and JD450 Crawler Tractors with bulldozers or loaders, 2010 and JD500 Wheel Tractors with loaders and on a JD440 Skidder.

The 3400 Rotoboom is a versatile machine which can be used for various loading applications. It is controlled by seven valve actuating levers which are mounted in a valve console. The valves control the stabilizer movement, mast

rotation, main boom lift, crowd boom movement, clam rotation and clam opening and closing. The levers and valves, coupled with the large capacity hydraulic pump, are designed to give positive control with minimum effort.

One or more of these functions can be operated at the same time, such as swinging the boom in or out at the same time it is moved to the right or left.

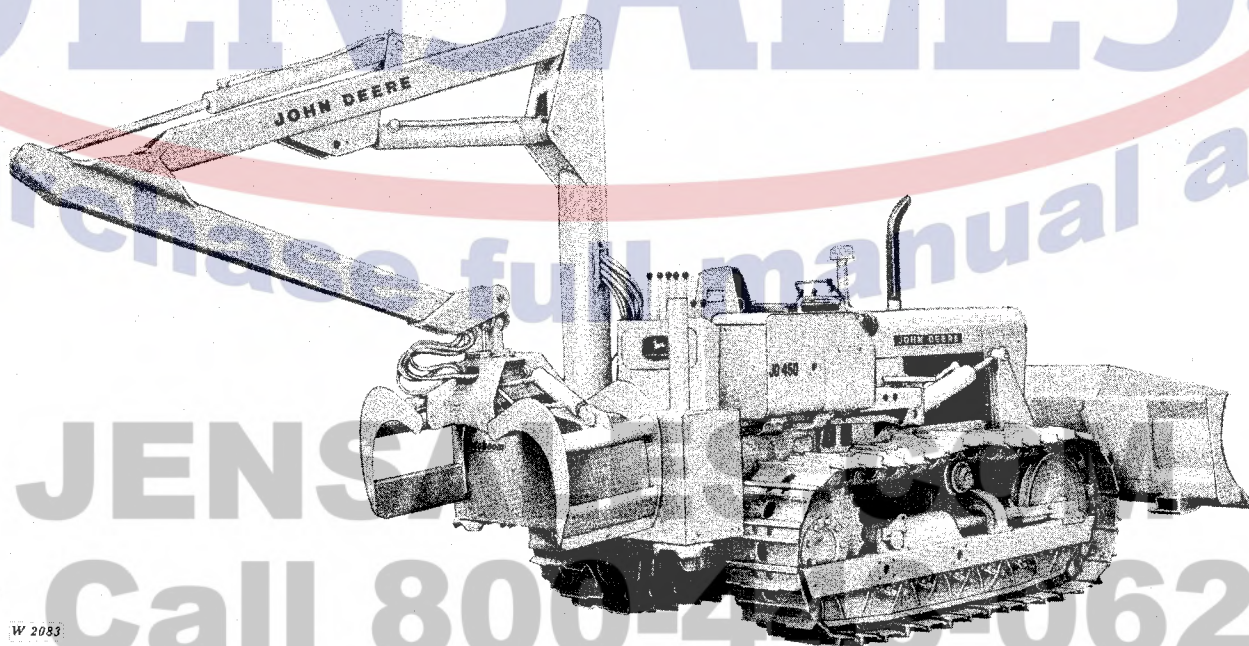


Fig. 10-5-1—John Deere 3400 Rotoboom Mounted on JD450 Crawler Bulldozer in Rear Transport Position

SPECIFICATIONS

(Rotoboom Mounted on JD350 Crawler with 6300 Bulldozer.)

Tractor Mounting	Two-Pin hookup to brackets on rear of tractors, for JD350 and JD450 Crawler Loaders or Bulldozers, 2010 or JD500 Wheel Loaders and JD440 Skidder.
Boom Rotation	290 degrees (Factory set from Front-Center; Clockwise 290 degrees).
Grapple Rotation	200 degrees.
Grapple Capacity	1/6 cord (in closed grapple).
Lifting Capacity at Max. Reach	
Grapple	1000 lbs.
Hook	1500 lbs.
Maximum Reach	12 ft.
(Boom parallel to ground)	
Maximum Reach	10 ft. 9 inches
(Grapple on ground)	
Minimum Reach	1 ft. 8 inches
Maximum Loading Height (at 6 ft. 11 in. reach)	15 ft. 4 inches
Maximum Depth Below Ground Level	4 ft. 5 inches (Using Alternate Lift Cylinder Position in Main Boom)
Hydraulic System Operation Pressure	2000 psi on JD350, JD450 and 2010 Tractors 2200 to 2300 psi on JD500 Tractor and JD440 Skidder
Hydraulic Cylinders	
Boom Swing	Two 3-1/2 x 18.8 inch single-acting cylinders with rack and pinion.
Boom Lift	3-1/2 x 26-inch double acting.
Crowd	3 x 26-inch double acting.
Grapple Rotation	Rotary vane type.
Grapple Close	2-1/2 x 6-inch double acting.
Stabilizers	3 x 29-1/2-inch double acting.
Dimensions	
Over-all Height (Grapple on Dozer)	9 ft. 6 inches
Over-all Width	60-1/2 inches
Over-all Length (Forward Transport Position of Boom)	12 ft. 8 inches
Over-all Length (Rear Transport Position of Boom)	20 ft.
Weight, with Stabilizers	2160 lbs.
Attachments	
8 Ft. Pulpwood Grapple	
Safety Hook	

NOTE: Stabilizers are recommended for maximum utilization of Rotoboom performance and for the quick attaching and detaching feature they provide. Stabilizers are optional on JD350 and JD450 Crawler Loaders or Bulldozers.

(Specifications and design subject to change without notice. Whenever, applicable, specifications are in accordance with I.E.M.C. Standards.)

LUBRICATION AND PERIODIC MAINTENANCE

Group 5 LUBRICATION



CAUTION: To avoid possible injury, and to insure best results, always stop tractor operation and lower all units before lubricating.

Lubricate the indicated points thoroughly, but avoid excessive lubrication. Dirt collects on excessively greased parts and increases wear. Wipe dirt from fittings before greasing and replace those that are lost or damaged immediately.

NOTE: Lubrication recommendations are based on normal Rotoboom operation. Severe or unusual conditions may require more frequent lubrication.

SYMBOLS



Grease every 10 hours with Multipurpose-Type Grease.

NOTE: When Rotoboom is mounted on wheel tractors with loaders, see the loader operator's manual for hydraulic system service instructions. When Rotoboom is mounted on JD350 and JD450 Crawler Tractors, see tractor operator's manual for hydraulic system service instructions.



Fig. 20-5-1-3400 Tractor-Mounted Rotoboom

CHECKING OIL LEVEL



Fig. 20-5-2—Checking Oil Level

An oil level window is provided on the side of the reservoir allowing the operator to check the oil level daily. For the most accurate check, place grapple and bulldozer blade or loader bucket on the ground in the level position.

DRAINING OIL FROM SYSTEM

Drain oil from reservoir at the drain plug at least once a year to remove any sludge that may have accumulated.

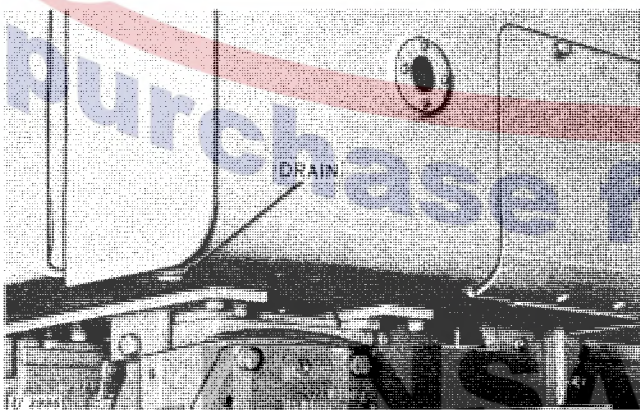


Fig. 20-5-3—Removing Drain Plug

FILLING SYSTEM WITH OIL

Remove the reservoir filler cap and after replacing drain plug, fill the reservoir with oil of the viscosity and service classification recommended in the chart below. Be sure the oil is clean to avoid faulty operation.

Start the engine and operate the Rotoboam. Add oil and operate the Rotoboam until boom will raise to full height and grapple will open and close smoothly.

Raise boom to full height, open and close grapple, and lower boom to ground. Repeat at least four times.

With the grapple level on the ground and the engine shut off, check the oil level in the window. If necessary, add oil to bring level to proper height.

NOTE: The hydraulic system is completely closed and pressurized during operation. When replacing filler cap, be sure it is screwed down tight and the gasket is in good condition.



CAUTION: Loosen filler cap slightly to the stop to relieve any excess pressure before removing the cap completely.

KEEP LUBRICANTS CLEAN

Use only high grade lubricants that have been stored in clean containers. Wipe away all grease and dirt before removing filler cap.

TEMPERATURE—OIL WEIGHT CHART

Air Temperature	John Deere Type 303 Special Purpose Oil	Automatic Transmission Fluid, Type "A"
Above 90° F.	X	..
60° F. to 90° F.	X	X
32° F. to 60° F.	X	X
-10° F. to 32° F.	X	X
Below -10° F.	..	X

SERVICING RESERVOIR MICRONIC FILTER

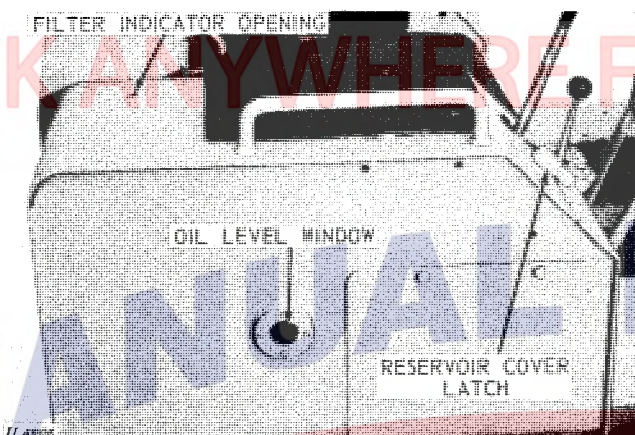


Fig. 20-5-4—Servicing Reservoir Micronic Filter

The filtering unit consists of a micronic filter element that filters the oil as it returns to the reservoir, and a wire mesh filter that filters the suction oil as it goes to the pump.

If the micronic filter becomes plugged, a valve at the top of the reservoir allows oil to bypass the filter and enter the reservoir. As the valve rises to allow oil to bypass the filter, an indicator rises up through the reservoir cover showing the operator that the filter element is plugged and should be replaced. To prevent damage to the hydraulic system, it is extremely important that the filtering system be serviced as soon as the indicator rises through the reservoir cover and stays up.

NOTE: If the oil is extremely cold, increased viscosity may cause the indicator to rise. As soon as the oil reaches operating temperature, the indicator should drop back to its normal position.



Fig. 20-5-5—Micronic Filter

To replace the filter, remove the six cap screws holding the micronic filter and indicator to the reservoir. Lift the filter assembly from the reservoir. Remove the filter from the filter cap by unscrewing the bolt inside the filter.

Reassemble the filter unit using a new micronic filter.

Replace the O-rings at the return oil and suction oil ports and beneath the filter baffle if necessary.

NOTE: Replace the micronic filter after the first 50 hours of operation and then every 600 hours or when the indicator stays in the raised position.

SERVICING RESERVOIR WIRE MESH FILTER

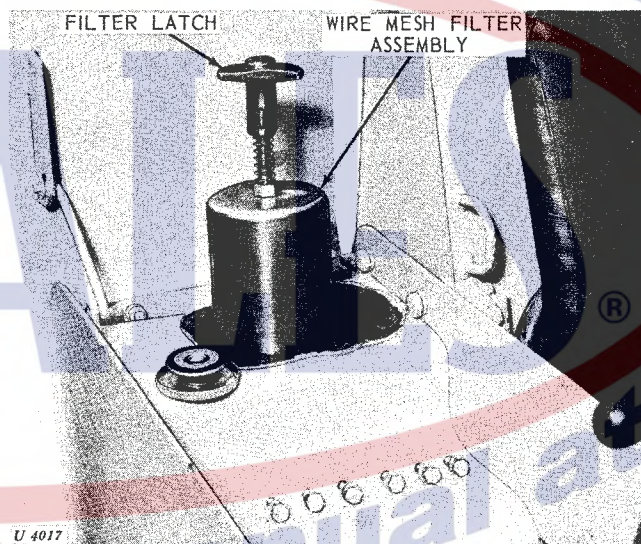


Fig. 20-5-6—Wire Mesh Filter

Reach into the reservoir and push down on the filter latch and remove wire mesh filter assembly from the suction tube.

Remove the wire mesh filter from the filter can by unscrewing the nut on the suction strainer rod.

Wash the wire mesh filter in diesel fuel and blow out the impurities lodged in the screen with compressed air.

Insert the wire mesh filter in the filter can and secure with a nut on the suction strainer rod.

Replace the wire mesh filter assembly over the suction tube and push down on the filter latch and release it into the latch catch. Make sure filter assembly is secure.

Replace the filter cap and micronic filter assembly in the reservoir, making sure that it fits over the return tube properly. Bolt the filter cap to the reservoir with six cap screws and lock washers.

OIL LINES AND HOSES

Check all oil lines and connections periodically for leaks and dents. Oil leaks in pressure lines can be located by carefully inspecting the external area of system. Before replacing any parts wipe suspected area dry to determine location of leaks.

To check for air leaks in suction lines or pump shaft packing, place hand over reservoir filler hole. If air is being drawn into system, pressure will be felt against the hand.

When tightening connections, always use two wrenches to prevent bending or breaking tubing.

CAUTION: Do not tighten fittings too tight. Make them just tight enough to eliminate leaks.

Dented tubing should be replaced because this causes oil foaming and faulty Rotoboom operation.

Wash oil lines with diesel fuel to remove dirt from inside and outside before installing on Rotoboom.

When installing new lines or hoses, replace them one at a time to eliminate confusion concerning points of attachment.

IMPORTANT: When disassembling hydraulic parts, keep them clean to exclude foreign material.

Occasional torque checks on all bolted assemblies should be made.

Torque bolts to recommended specifications given in chart below.

BOLT TORQUE CHART

Bolt Size	Recommended Torque Ft-Lbs
1"	350-380
3/4"	300-320
5/8"	170-180
1/2"	85-90
7/16"	55-60

Be Careful



THE LIFE YOU SAVE MAY BE YOUR OWN...

NATIONAL SAFETY COUNCIL

THE COMPLETE OBSERVANCE of one simple rule would prevent many thousand serious injuries each year. THAT RULE IS: "NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST A MACHINE WHILE IT IS IN MOTION."

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Section 30

TROUBLE SHOOTING

Group 5

SYMPTOMS, CAUSES AND REMEDIES

Diagnosing trouble is done best by an orderly process of eliminating the most probable causes first and then, if the trouble persists, test for all other possible causes until the one cause for the trouble is found.

The following pages list the causes and remedies for problems that can be attributed to the hydraulic system:

NOTE: Most hydraulic problems stem from contamination of the system. During any disassembly or repair:

1. Check the filter and clean or replace if necessary.
2. Check the reservoir for foreign objects.
3. Check lines and cylinders for contamination.

If metal filings or dirt are found in any function, check further into all hydraulic components to determine the source or the cause before the unit is placed in operation again.

SLOW OR INOPERATIVE HYDRAULIC SYSTEM BECAUSE OF LOW PUMP OUTPUT

Possible Cause	Remedy
Worn pump from excess use or dirty oil.	Replace or repair pump. Check system for contamination.
System relief valve pressure low (open-center system).	Check relief valve pressure. Clean and repair relief valve as outlined in Section 90, Group 10. Check system for contamination.
Variable displacement pump out of adjustment (closed-center system).	Adjust stroke control valve as outlined in the tractor service manual.
Insufficient oil.	Add oil. See page 20-5-2.
Cold oil.	Allow oil to warm up at slow engine speeds.
Oil viscosity too high.	Use oil as recommended in chart on page 20-5-2.
Insufficient engine speed.	Refer to operator's manual for recommended tractor rpm.
Air leak in suction line of pump.	Check suction line. Replace if necessary. Tighten all fittings.
Restriction in suction line or filter.	Check and clean if required.

CONTROL VALVE INOPERATIVE

<i>Possible Cause</i>	<i>Remedy</i>
Worn control valve due to contamination or excess use.	Repair or replace valve. See page 70-10-1. Check system for contamination.
Sticking valve spool due to improper machining or foreign material.	Remove and check spool. See page 70-10-1. Check system for contamination.
Sticking valve spool due to binding linkage or excessively tight tie bolts.	Lubricate linkage so it operates freely. Check torque on tie bolts. See page 70-10-6.

HYDRAULIC CYLINDERS INOPERATIVE

<i>Possible Cause</i>	<i>Remedy</i>
Worn cylinder packings due to contamination in the system or simply from extended use.	Overhaul cylinder and replace packings. See Section 80, Group 15. Check hydraulic system for contamination.
Damaged cylinder packings due to excess heating of oil.	Operate with a lower duty cycle.
Bent cylinder rod due to excessive loading or loose piston nut.	Repair damaged parts and torque piston nut to proper specifications. See Section 80, Group 15.
Cracked rod guide due to loose piston nut.	Replace guide and torque piston nut to proper specifications.
Scored cylinder due to contamination.	Repair cylinder and check hydraulic system for contamination.
Hydraulic hoses attached improperly.	Check hydraulic circuitry. See Section 60, Group 5.

SWING CYLINDER OPERATES TOO SLOWLY

<i>Possible Cause</i>	<i>Remedy</i>
Assembly worn or out of adjustment.	Replace worn parts and adjust assembly. See Section 80, Group 10. Check system for contamination. Adjust rack according to procedure on page 80-10-8.
Dirt or obstruction in orifice plate in control valve.	Remove dirt from orifice plate. Check to insure that they are installed correctly and seating properly. See page 70-10-6.
Circuit relief valve dirty or leaking.	Clean screens and orifice and replace O-rings. See page 90-10-3. Replace complete cartridge if necessary.

SWING CYLINDER OPERATES TOO FAST

Possible Cause

Remedy

Orifice plate installed backward or not in control valve.

Install orifice plates correctly in valve stack. See page 70-10-6.

Obstruction or dirt under seat of orifice plate.

Remove foreign material.

SWING CYLINDER STOPS TOO ABRUPTLY AT END OF STROKE

Possible Cause

Remedy

Dirt in cushion valve or cushion valve not seating properly.

Check swing cylinder cushion valve assembly for dirt or improper seating.

SWING CYLINDER SPONGY AND SLOW AT END OF STROKE

Possible Cause

Remedy

Dirt in cushion valve orifice, stopping oil flow.

Clean cushion valve and check system for contamination.

NOISY SWING CYLINDER OPERATION

Possible Cause

Remedy

Rack guide loose.

Set up guide according to procedure on page 80-10-8.

Rack bent.

Replace rack and set up rack guide.

Wear on bronze bearings.

Replace bearings and adjust swing cylinder.

Mast pinion broken or chipped.

Remove mast and replace pinion.

ROTARY CYLINDER FAILS TO TURN OR TURNS SLOWLY

Possible Cause

Remedy

Vane packings cut or worn.

Disassemble rotary cylinder and replace packings. See Section 80, Group 5.

Circuit relief valve leaking.

Clean and repair or replace complete cartridge.

ROTARY CYLINDER TURNS TOO FAST

Possible Cause

Remedy

Orifice plates in control valve not seating or improperly installed.

Install orifice plate in valve stack correctly.

MAIN BOOM OR CROWD BOOM DROPS TOO QUICKLY*Possible Cause**Remedy*

Orifice plate in head end of cylinder not seating properly or improperly installed.

Check seating surface and install orifice plate correctly.

BOOMS DROP WHEN VALVE SPOOL IS IN "SLOW RAISE" POSITION*Possible Cause**Remedy*

Damaged lift check assembly due to improper installation or contamination in the oil.

Repair lift check assembly and check the system for contamination.

EXTERNAL OIL LEAKS*Remedy*

On hoses equipped with fittings. Apply a thread compound to the male end where the hose is threaded directly into a pipe fitting. These hoses do not require compound when attached to a swivel fitting because they are equipped with a tapered seat.

O-ring fittings do not require thread compound.

HYDRAULIC LINE LEAKAGE*Possible Cause**Remedy*

Broken or cracked metal boom lines due to excessive vibration.

Tighten retainer nuts holding lines in place.

Leaks at any hose fitting due to looseness or lack of thread compound.

Tighten fittings or use compound where recommended.

Damaged valve to mast lines due to installation of improper length hoses resulting in hose stretching.

See Section 60, Group 10 and install hoses having proper free length.

Damaged main boom to secondary boom oil lines.

See Section 60, Group 10 for proper installation of secondary boom lines.

HYDRAULIC HOSE FAILURE OR LEAKAGE*Possible Cause**Remedy*

Hose twisted or installed in a manner that when the hose moves all the twist is imposed in one direction.

Remove twist from hose. If grapple cylinder hose does move, install the hose with zero twist when the grapples are in the "half-opened" position.

Leakage at hose fitting.

Check for a loose connection or overtightening. Check connection for correct torque.

EXTERNAL OIL LEAKS AT VALVE STACK

<i>Possible Cause</i>	<i>Remedy</i>
Tie bolts too loose.	Torque to 20 ft-lbs.
Damaged O-rings between sections from excess heating.	Replace O-rings and operate at a lower duty cycle. See Section 70, Group 10.
Damaged O-rings on lift check cage from excess heating or improper installation.	Replace O-rings.
Worn O-rings on spool due to contamination or extended use.	Clean valve, replace O-rings and check system for contamination. See Section 70, Group 10.
Damaged O-ring on a plug or fitting due to improper installation.	Replace O-rings.

HYDRAULIC CYLINDER LEAKAGE

<i>Possible Cause</i>	<i>Remedy</i>
Rod end seal leaking due to loose piston nut.	Replace seals and tighten piston nut to proper specifications. See Section 80, Group 15.
Rod end seal leaking due to contamination or extended use.	Replace seal and check system for contamination.

HYDRAULIC PUMP LEAKAGE

<i>Possible Cause</i>	<i>Remedy</i>
Damaged seal around drive shaft due to contamination, excessive use or vibration in drive line.	Check system for contamination. Secure drive line. Replace seals in pump with repair kit. See tractor service manual.
Leakage at fittings on the pump.	Tighten fittings if possible.

OIL HEATS

<i>Possible Cause</i>	<i>Remedy</i>
Operator holds valves open too long causing relief valve to open.	Return lever to neutral position when not in use.
Using light oil in very hot weather.	Use oil as recommended in chart on page 20-5-2.
Dirty oil.	Drain and refill with new oil. Replace filter cartridge. See page 20-5-3.
Incorrect system relief valve pressure.	Check pressure and clean or replace relief valve. See Section 90, Group 10.