

**VOLVO CONSTRUCTION EQUIPMENT**

**OPERATOR'S MANUAL**

# **SD70/SD70D/SD70DA**

**OPERATOR'S MANUAL VOLVO SD70/SD70D/SD70DA**

**VOLVO**

**Volvo Construction Equipment**  
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### **Legal Statement**

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### **California Proposition 65 Warning**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

### **California Proposition 65 Warning**

Battery posts, terminals and other related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and other reproductive harm.

**Wash hands after handling.**

**OPERATION & MAINTENANCE  
MANUAL  
for  
SD-70, SD-70D, SD-70F AND SD-DA70DA  
VIBRATORY COMPACTOR**

**Effective With All SD-70 Series Machines**

**CPN 59041913**



**November 13, 1995**

**Read this instruction manual before operating this equipment**

VOE21A1004910H













**SD-70 SERIES  
VIBRATORY COMPACTOR  
OPERATION AND  
MAINTENANCE MANUAL  
COMMUNICATION NO. 59041913  
SECTION**

To easily locate the major sections in this manual, the first page of each major section is imprinted with a black square in a position corresponding to the section position listed on this page. To use the rapid index, hold the manual and spread the edges of the pages with the right thumb until the square is located which corresponds to the index position of the section desired. Then open the book. The contents of these sections are listed on the first page of each section.

This manual should be used with all related supplemental books, engine and transmission manuals, and parts books. Related Service Bulletins should be reviewed to provide information regarding some of the recent changes.

If any questions arise concerning this publication or others, contact your local distributor for the latest available information.

Contents of this manual are based on information in effect at the time of publication and are subject to change without notice.

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## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

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### OVERVIEW

#### BEFORE YOU OPERATE, MAINTAIN OR IN ANY OTHER WAY USE THIS COMPACTOR:

READ and STUDY this manual. KNOW how to safely use the compactor's controls and what you must do for safe maintenance.

ALWAYS wear or use the proper safety items required for your personal protection.

If you have ANY QUESTIONS about the safe use or maintenance of this compactor, ASK YOUR SUPERVISOR OR CONTACT ANY INGERSOLL-RAND DISTRIBUTOR - NEVER GUESS - ALWAYS CHECK!

### PRE-START INSPECTION

INSPECT your compactor daily. Ensure the routine maintenance and lubrication are being dutifully performed. Have any malfunctioning, broken or missing parts corrected or replaced before use. DO NOT operate a damaged or poorly maintained compactor. You risk lives when operating faulty equipment, INCLUDING your own.

VERIFY that all instruction and safety decals are in place and readable. These are as important as any other equipment on the compactor.

CLEAN any foreign material from the steps and operator's platform to reduce the danger of slipping.

NEVER fill the fuel tank, with the engine running, while near an open flame, or when smoking. ALWAYS wipe up any spilled fuel.

CHECK for WARNING tags placed on the compactor. DO NOT operate the compactor until repairs have been made and the WARNING tags are removed by authorized personnel.

KNOW the location of the Emergency Shut-Down Control if the compactor is so equipped.

ALWAYS know the capability and limitations of your equipment - speed, gradeability, steering and braking.

BE AWARE of the dimensions of your compactor - height and width, as well as your transporter dimensions and weight.

WATCH for overhanging obstructions such as wires or tree limbs.

CHECK for any conditions that could be dangerous - holes, banks, underground culverts, manhole covers, water meter pits, curb and/or street boxes.

### STARTING

USE the hand rails and steps (if equipped) to get on and off the compactor. ALWAYS maintain a 3-point contact when climbing onto or off the compactor.

READ and FOLLOW ALL instruction decals.

WHEN using a compactor with a ROPS (roll-over protection structure), seat belts and other OSHA required safety equipment must be worn.

BEFORE you start the compactor, ENSURE that the propulsion control is in the neutral (STOP) position.

BEFORE you start the compactor, ENSURE that the parking brake control is in the "Applied" position.

START the engine from the operator's position only.

Jump starting the engine is NOT RECOMMENDED. If you do jump start, use EXTREME CAUTION. Prior to jump starting, ENSURE:

- Propulsion control is in neutral (STOP) position.
- A TRAINED OPERATOR is at the controls when the engine starts.
- Parking brake is applied.

### OPERATING

ALWAYS make sure that no person or obstruction is in your line of travel BEFORE starting the compactor in motion.

NEVER climb onto, stand up, or climb off the compactor while it is in motion.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

### OPERATING - CON'T.

USE extreme caution and be observant when working in close quarters or congested areas.

OPERATE ONLY from the seated position, and NEVER carry passengers.

KNOW the area in which you are working. Familiarize yourself with work site obstructions and any other potential hazards in the area.

KNOW and USE the hand signals required for particular jobs and know who has the responsibility for signaling.

DO NOT work in the vicinity of overhanging banks, or on grades that could cause the compactor to slide or roll over.

ALWAYS keep the propulsion control lever in the slow position, close to the neutral (STOP) position, when descending a hill.

AVOID side-hill travel. Operate up and down a slope whenever possible. If it is absolutely necessary for side-hill travel, use extreme caution and slow speed. NEVER descend an incline in a gear higher or a speed greater than that which was used in ascending the incline. Ingersoll-Rand recommends the optional certified Roll-Over Protection (ROPS) equipped compactor with seat belt if side-hill or up and down travel is unavoidable.

NEVER allow anyone to stand within the compactor's articulation area with the engine running.

ALWAYS look in all directions BEFORE changing your direction of travel.

DO NOT attempt to control compactor travel speed with the throttle control. When operating the compactor, maintain the engine speed at full "Operating RPM".

DO NOT tow or push the compactor, except as explained under "TOWING" in SECTION 5 - OPERATING INSTRUCTIONS of this manual.

DO NOT run the engine in a closed building for an extended length of time. EXHAUST FUMES CAN KILL.

### STOPPING

ALWAYS park the compactor off the asphalt and on solid,

level ground. If this is not possible, always park the compactor at a right angle to the slope and chock the wheels and drum.

AVOID leaving the operator's platform with the engine running. ALWAYS move the propulsion control to the neutral (STOP) position, apply the parking brake, install the articulation lock bar/lock pin, position the throttle control to "Idle RPM", pull the fuel shut-off control (if so equipped), turn the ignition switch to Off and lock all lockable compartments.

USE proper flags, barriers and warning devices especially when parking in areas of traffic.

### MAINTENANCE

AVOID whenever possible, servicing, cleaning or examining the compactor with the engine running.

AVOID whenever possible, servicing or providing maintenance to the compactor unless the wheels and drum are adequately chocked, and the articulation lock bar/lock pin is in place.

NEVER fill the fuel tank with the engine running, while near an open flame, or when smoking. ALWAYS wipe up any spilled fuel.

AVOID removing the pressurized radiator cap until the engine's cooling system has cooled.

DO NOT alter the engine governor settings from that indicated in the engine manual and the engine option plate.

ALWAYS replace damaged or lost decals. Refer to the parts manual for the proper location and part number of all decals.

DISCONNECT the battery cables when working on the electrical system or when welding on the compactor.

BE SURE the battery area is well ventilated (clear of fumes) should it become necessary to connect a jump battery or battery charger. Fumes from the battery can ignite by a spark and explode.

IF battery charging is required, be sure the battery charger is "Off" when making the connections.

BE SURE the correct battery polarity is observed [negative (-) to negative (-) and positive (+) to positive (+)] when connecting to a battery charger or jumper cable.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

### TRANSPORTING AND HAULING

DO NOT attempt to load the compactor on the transporter without knowledge and experience with the operation of the compactor.

ALWAYS use a ramp when loading the compactor on the transporter. Be sure ramps are of adequate strength, low angle and proper height.

USE proper chock blocks in front and rear of the wheels of the transporter when loading the compactor.

BE SURE to approach the transporter loading ramps squarely to make sure the compactor does not drop off the side of the ramp.

KEEP the transporter deck clean of clay, oil, ice or frost or any other material which can become slippery.

USE proper chock blocks in front and rear of the compactor wheels and/or drums.

SHUT the engine Off, apply the parking brake, and lock all lockable compartments.

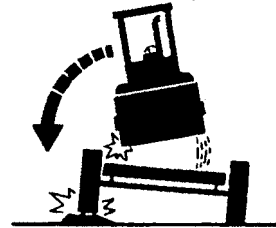
ALWAYS be sure the articulation lock bar/lock pin is secured in the locked position before transporting the compactor.

ALWAYS know the overall height of the compactor and hauling vehicle. Observe height and weight regulations and overhead objects to be sure you can safely pass beneath them.

When roading your compactor on a public access, obey all traffic regulations and be sure that the proper clearance flags, lights and warning signs, including the "Slow Moving Vehicle" emblem, are properly displayed. Know your approximate stopping distance at any given speed. Never turn corners at excessive speeds. Look in all directions before reversing your direction of travel.



# DANGER



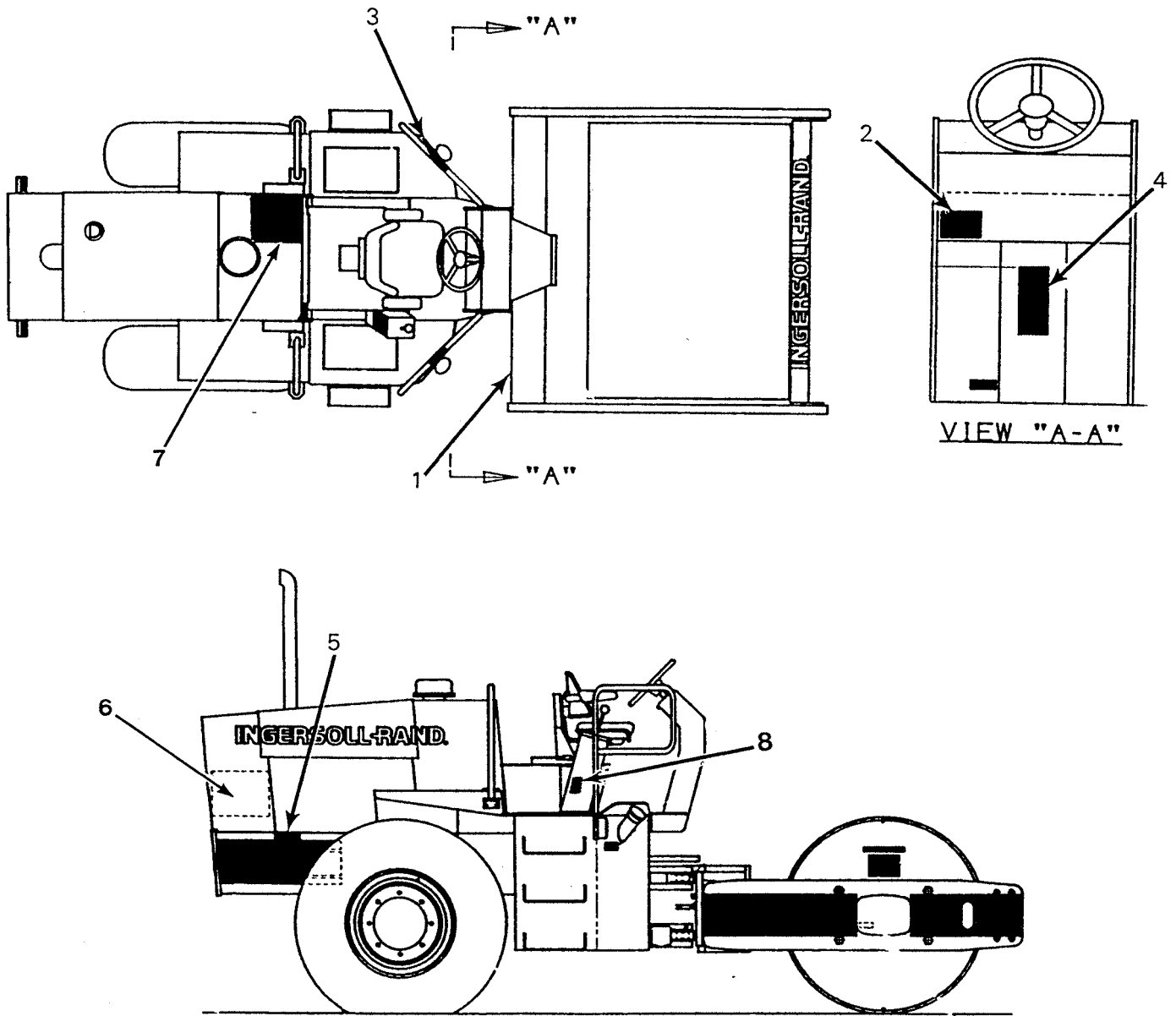
A loose compactor may shift or fall while being transported.

**Tie down the compactor securely before moving the hauling vehicle or transporter.**

1. Position the compactor on the transporter or hauling vehicle centered from side to side and apply the parking brake.
2. Ensure that the articulation lock bar/lock pin is in place.
3. With adequate chains or cables and blocks, secure the compactor to the deck of the hauling vehicle or transporter to meet ICC or local regulations.

# SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

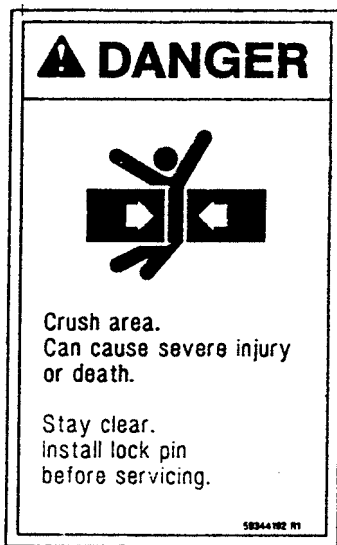
## SAFETY RELATED DECALS



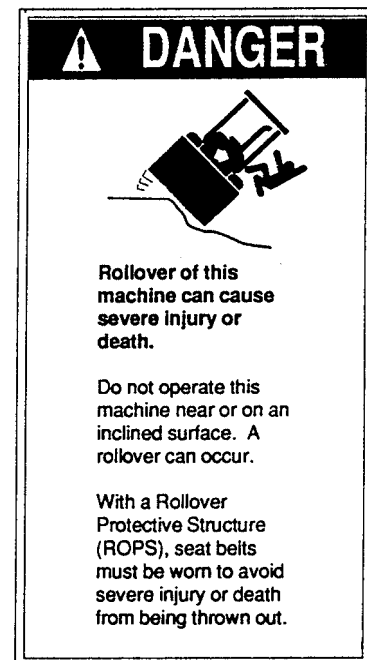
DECAL	Qty.	Location
1. DANGER - Crushing Hazard	2	Articulation Area
2. Misoperation WARNING	1	Console Area
3. WARNING - Do Not Sit On Rail	2	Railing
4. Rollover - DANGER	1	Console Area
5. WARNING - Rotating Fan	2	Rear Side Frame
6. WARNING - Maintenance Warning	1	Left Rear Frame
7. Checklist	1	Behind Seat
8. Gear Selector - WARNING/NOTICE	1	Control Console

**SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES**  
**SAFETY RELATED DECALS**

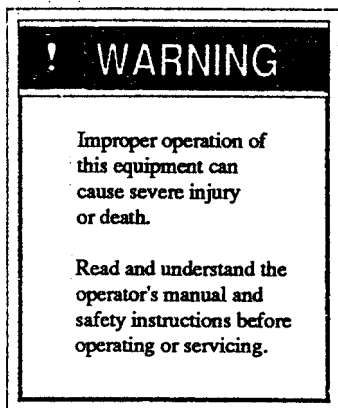
**1. DANGER - CRUSHING HAZARD**



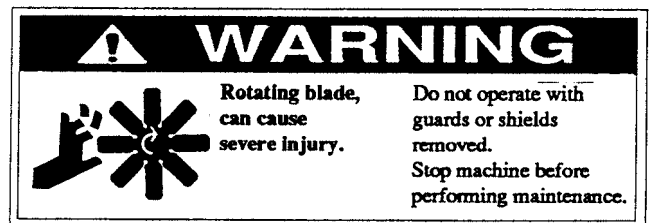
**4. ROLLOVER DANGER**



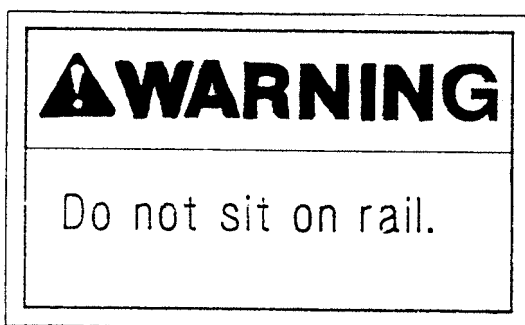
**2. MISOPERATION DANGER**



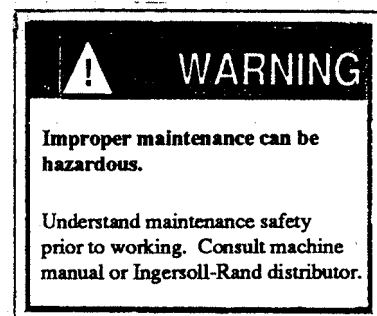
**5. WARNING - ROTATING FAN AND BELTS**



**3. WARNING - DO NOT SIT ON RAIL**



**6. WARNING - MAINTENANCE**



## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

### 7. CHECKLIST

TRANSPORT	STARTING	OPERATING	SHUTDOWN
<p><b>Hauling :</b>                      Articulation Lock Pin - LOCK                      Machine - CHOCK                      SECURE SAFELY TO TRAILER</p> <p><b>Towing :</b>                      DO NOT TOW UNTIL YOU REFER TO OPERATOR'S MANUAL FOR INSTRUCTIONS.</p>	<p>CONSULT OPERATOR'S MANUAL - SEE YOUR SUPERVISOR</p> <p>Seat Belt - FASTEN</p> <p>Propulsion Lever - NEUTRAL</p> <p>Vibration Control - OFF                      - VIBRATION LIGHT - VERIFY OFF (If Applicable)</p> <p>Throttle - IDLE RPM</p> <p>Parking Brake - PULL TO APPLY</p> <p>Work Area - CLEAR</p> <p>Ignition Switch - ON                      BRAKE LIGHT - VERIFY ON</p> <p>Ignition Switch - START (30 Sec. Max.)                      V-BELT LIGHT - VERIFY ON (If Applicable)</p>	<p>Articulation Lock Pin - REMOVE AND STOW</p> <p>Throttle - OPERATING RPM</p> <p>Gear Selector - SHIFT TO : (If Applicable)                      Low - working gear                      High - roading only</p> <p>Parking Brake - PUSH TO RELEASE</p> <p>Propulsion Lever - SLOWLY MOVE FOR DRUM FWD/TRACTOR FWD. NEUTRAL FOR NORMAL BRAKING.</p> <p>Vibration Control - ENGAGE ONLY WHEN IN MOTION</p> <p>Operation :</p> <p>Operating - STAY SEATED                      ALLOW NO PASSENGERS                      ALLOW NO BYSTANDERS</p> <p>Down Hill Travel - SAME SPEED AS UP HILL TRAVEL                      GO SLOW</p>	<p>Machine - ON LEVEL SURFACE</p> <p>Parking Brake - PULL TO APPLY</p> <p>Gear Selector - LOW GEAR (If Applicable)                      Articulation Lock Pin - LOCK</p> <p>Throttle - IDLE RPM</p> <p>Engine - IDLE SHORTLY</p> <p>Ignition Switch - OFF</p>
<p style="text-align: center;"><b>PRE-STARTING</b></p> <p>Articulation Lock Pin - LOCK</p> <p>Hoses, Safety Shrouds, Muffler, Engine, Tires, Railings, Fittings - INSPECT FOR DAMAGE</p> <p>Fluid Levels - CHECK</p> <p>DO NOT OPERATE FAULTY EQUIPMENT</p>			

### 8. GEAR SELECTOR

**⚠ WARNING**

Runaway machine.  
 Can cause death, injury or property damage.

Shift only when  
 -on level ground,  
 -parking brake is applied.

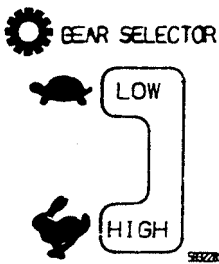
Shifting on incline may result in runaway machine.

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**NOTICE**

Compact in low gear only.  
 Otherwise drive train damage will occur.

Use high gear for roading only.



**GEAR SELECTOR**

The diagram shows a gear selector lever with two positions. The top position is labeled 'LOW' and is accompanied by a turtle icon, indicating slow speed. The bottom position is labeled 'HIGH' and is accompanied by a hand icon, indicating faster speed. A gear icon is positioned to the left of the text 'GEAR SELECTOR'.

S52218 R1



## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

### **▲ HAZARDOUS SUBSTANCE PRECAUTION**

The following information is provided to assist the owners and operators of Ingersoll-Rand Road Machinery Equipment. Further information may be obtained by contacting your Ingersoll-Rand Road Machinery Equipment Distributor.

The following substances are used in the manufacture of this machine and may be hazardous to health if used incorrectly.

SUBSTANCE	PRECAUTION
Antifreeze (Water cooled engine)	Avoid ingestion, skin contact and breathing fumes.
Hydraulic Oil	Avoid ingestion, skin contact and breathing fumes.
Engine Lubricating Oil	Avoid ingestion, skin contact and breathing fumes.
Preservative Grease	Avoid ingestion, skin contact and breathing fumes.
Rust Preventative	Avoid ingestion, skin contact and breathing fumes.
Engine Fuel	Avoid ingestion, skin contact and breathing fumes.
Battery Fluid	Avoid ingestion, skin contact and breathing fumes.
SAE Gear Oil	Avoid ingestion, skin contact and breathing fumes.

The following substances may be produced during the operation of this machine and may be hazardous to health.

SUBSTANCE	PRECAUTION
Engine Exhaust Fumes	Avoid breathing.
Engine Exhaust Fumes	Avoid buildup of fumes in confined spaces.
Electric Motor Dust (Brushes/Insulation)	Avoid breathing during maintenance.



## SECTION 2 - INTRODUCTION

**CONGRATULATIONS!** You have just acquired an Ingersoll-Rand Compactor...an application-designed product built with your needs in mind. The SD-70 Series single drum, vibratory compactors are highly maneuverable, compact machine that offer the highest performance in their class. The SD-70 and SD-70D are suitable for compaction of granular and semi-cohesive materials. The SD-70F is designed for compaction of cohesive soils while the SD-70DA is an asphalt machine. Each model offers many benefits, including a powerful, fuel efficient diesel engine, high torque propulsion system, high grade capability, excellent visibility to the work area, ease of serviceability and safe, comfortable operation.

### **Model Comparison**

The SD-70 is the axle drive version of the SD-70 Series, and weighs 14,730 pounds. It is an economical version of the SD-70D, but with lower gradeability. The SD-70D has a smooth drum and weighs 14,990 pounds. It is a drum drive machine that provides the extra traction necessary on steep grades or deep lifts of loose granular soils. The SD-70F weighs 16,460 pounds and has a padfoot drum which delivers the necessary compaction force to economically compact cohesive soils. Rectangular manganese steel tamping feet on the drum, arranged in a chevron pattern, compact and exit the soil with minimal loosening of the surface.

The SD-70DA machine is the 16,260 pound sub-base/asphalt version. It has a water sprinkling system for complete coverage of the drum and tires while operating. With it's drum, water spray system, and smooth tires, this machine is ready for rural roads, industrial sites, parking lots and numerous other jobs. The machine has the capability of compacting the entire job from granular sub-base to finished hot mix asphalt.

### **Drum Performance**

A smooth or padfoot drum is available depending on the model. The drum vibration frequency is pre-set to 2500 vibrations per minute (vpm) for the asphalt machine (SD-70DA) and 1890 for the soil machines prior to serial number 5628. Variable vibration was previously optional for soil machines, but is now standard equipment.

### **Powerful Diesel Engine**

These machines feature high-horsepower, water-cooled diesel engines. Each engine ensures superior performance and ample reserve horsepower for difficult applications. Large fuel capacities permit non-stop operation in excess of 10 hours.

### **Serviceability**

A ground-level engine compartment encourages daily preventive maintenance. The operator's seat tilts forward to expose battery, hydraulic pumps, filters and hoses. Color-coded lube charts show service point location, service interval and proper lubricant.

Ingersoll-Rand strongly recommends a ROPS (Roll-Over Protection Structure) equipped compactor for operator and equipment protection for use on other than level ground. Basically, a ROPS used in conjunction with the seat belt, will protect the operator from injury if the compactor undergoes a single rollover.

Safe operation depends on reliable equipment and the use of proper operating procedures. Performing the checks and service described in this manual will help keep your compactor in good condition. These recommended operation procedures will help you avoid unsafe practices.

Safety notes have been included throughout this manual to help the operator avoid injury and prevent damage to the compactor. These safety notes are not intended to cover all eventualities; it is impossible to anticipate and evaluate all possible methods of operation. Therefore, the operator is the only person who can guarantee safe operation and maintenance.

It is important that any procedure not specifically recommended in this manual, be thoroughly evaluated from the standpoint of safety before it is implemented.

## **WARNING**

Some photographs or illustrations in this manual may show guards or cover panels removed for purposes of clarity.

**Always replace guards and cover panels before operating.**

### **NOTE:**

*Some photographs in this manual show compactors with optional equipment installed. This optional equipment may be purchased from your local Ingersoll-Rand Road Machinery Equipment Distributor.*

*Some photographs or illustrations in this manual may show prototype models. Production machines may vary in some detail from that shown.*

Continued improvement and advancement of product design may cause changes to machines that may not be included in this manual. Each manual is reviewed and revised as required, to update and include necessary changes in later editions. Ingersoll-Rand reserves the right to modify or make changes within a specific machine model group without notice, and without incurring any liability to retrofit machines previously shipped from the factory. Contact your Ingersoll-Rand distributor for non-routine maintenance not covered in this manual.

## SECTION 2 - INTRODUCTION

Record the machine serial number located on the Vehicle Identification Plate for your reference and any machine or component warranties. The plate is located on the side of the machine in the articulation area. Refer to Figure 2-1.

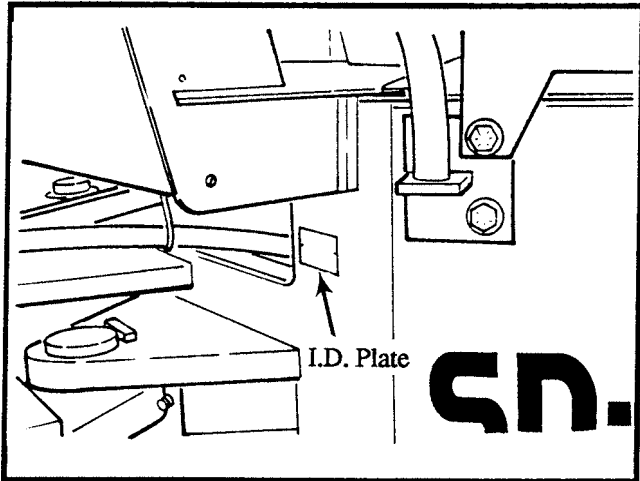


Figure 2-1. Vehicle Identification Plate

Check to ensure that the Parts Manual and Operation and Maintenance Manual are with the machine. The manual pouch is mounted behind the operator's seat. ALWAYS RETURN THE PARTS MANUAL AND OPERATION AND MAINTENANCE MANUAL TO THE POUCH WHEN FINISHED USING THEM. Refer to Figure 2-2.

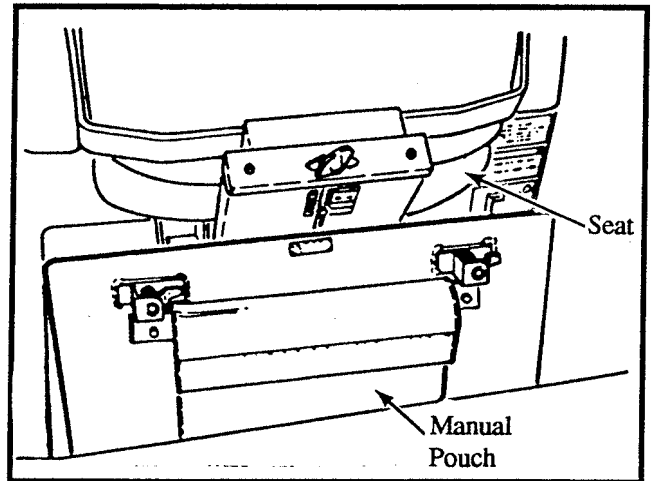






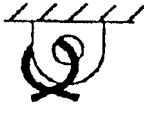
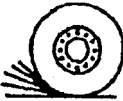
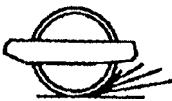








Figure 2-2. Manual Pouch

## SECTION 3 - SYMBOL IDENTIFICATION

Contents	Page	Contents	Page
Ingersoll-Rand Machine Symbols (2.1)	1	International Symbols (2.2)	2

### 2.1 INGERSOLL-RAND MACHINE SYMBOLS










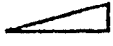




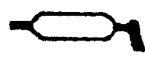




























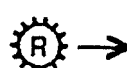

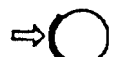
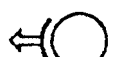















 1	 2	 3	 4	 5	 6
 7	 8	 9	MAN  10	AUTO  11	 12
 13	 14	 15			

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Drum Vibration</li> <li>2. Drum Vibration Control</li> <li>3. High Amplitude</li> <li>4. Low Amplitude</li> <li>5. Frequency (Vibration)</li> <li>6. Ignition Switch</li> <li>7. Tiedown Point</li> <li>8. Anti-Wheel Spin</li> </ul> | <ul style="list-style-type: none"> <li>9. Anti-Drum Spin</li> <li>10. Manual Vibration Control</li> <li>11. Automatic Vibration Control</li> <li>12. Double Drum Vibration Mode</li> <li>13. Single Drum Vibration Mode</li> <li>14. Vibration Control Mode</li> <li>15. Caution</li> </ul> |
|---|---|



## SECTION 3 - SYMBOL IDENTIFICATION

### 2.2 INTERNATIONAL SYMBOLS

 1	 2	 3	 4	 5	 6
 7	 8	 9	 10	 11	 12
 13	 14	 15	 16	 17	 18
 19	 20	 21	 22	 23	 24
 25	 26	 27	 28	 29	 n/min 30
 31	 32	 33	 34	 STOP 35	 36
 37	 38	 39	 40	 H 41	 L 42
 F 43	 R 44	 (P) 45	 46	 47	 48
 49	 50	 51	 52	 53	 54
 55	 56	 57	 58	 59	 60
 61	 62				

### SECTION 3 - SYMBOL IDENTIFICATION

1. On Start
2. Off/Stop
3. On/Off
4. Plus/Positive
5. Minus/Negative
6. Horn
7. Battery Condition
8. Hourmeter
9. Seat (Lap) Belt
10. Linear
11. Rotational
12. Volume Empty
13. Volume Half-Full
14. Volume Full
15. Grease
16. Oil Lubrication Point
17. Lift Point
18. Jack or Support Point
19. Filling/Emptying
20. Read Operator's Manual
21. Engine Oil
22. Engine Oil Pressure
23. Engine Oil Pressure - Failure
24. Engine Oil Level
25. Engine Oil Filter
26. Engine Oil Temperature
27. Engine Coolant
28. Engine Coolant Level
29. Coolant Temperature
30. Engine Rotations (RPM)
31. Gas Inject (Cold Start)
32. Engine Air Filter
33. Engine Air Filter - Failure
34. Fan Belt - Failure
35. Emergency Engine Stop
36. Engine Start
37. Engine On/Run
38. Start Switch
39. Transmission
40. Transmission Oil Level
41. High Gear
42. Low Gear
43. Forward Direction
44. Reverse Direction
45. Parking Brake
46. Brake On
47. Brake Off
48. Primer (Start Aid)
49. Hydraulic Oil
50. Hydraulic Oil Pressure
51. Hydraulic Oil Level
52. Hydraulic Oil Filter
53. Hydraulic Oil Temperature
54. Fuel (Diesel)
55. Fuel Level
56. Fuel Filter
57. Work Light
58. Flashing Beacon
59. Control Lever - Dual Direction
60. Control Lever - Multi Direction
61. Clockwise Rotation
62. Counterclockwise Rotation





## SECTION 4 - OPERATING CONTROLS AND INSTRUMENTS

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VOLTMETER	1	TIRE WATER SWITCH (SD-70DA ONLY)	5
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FRONT LIGHT SWITCH (OPTIONAL)	4	STRIKE-OFF BLADE CONTROL-SD-70D/F ONLY	5
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VIBRATION CONTROL (ON/OFF)	4	AMPLITUDE ADJUST. WHEEL (SD-70DA Only)	6
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PROPULSION CONTROL	4		

### ARTICULATION LOCK PIN



During shipment and before performing any checks or service operations, place the articulation lock pin into it's locked position.

For compactor operation, the lock pin is to be removed from it's locked position and placed into it's stowed position.

The articulation lock pin is stored on the right side of the front console weldment during machine operation. During shipment and while the machine is parked, the lock pin must be installed into the lock weldment on the right side of the machine in the articulation area. Refer to Figure 4-1.

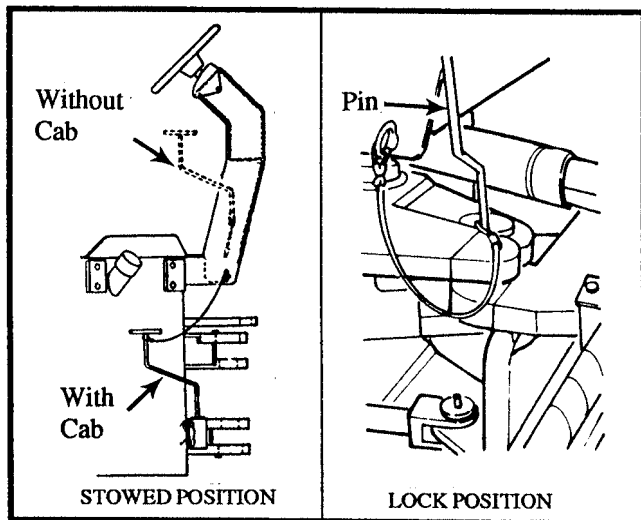


Figure 4-1. Articulation Lock Pin

### NOTE

The following controls and instruments are indexed to the figure titled Controls and Instruments.

### TACHOMETER/HOURMETER

The tachometer/hourmeter (1) is located on the left side of the LH console panel. It is calibrated in RPM x 100 with a range of zero (0) to 30. It utilizes a signal from a sending unit on the engine, and uses the 12-volt electrical system. The tachometer incorporates an hourmeter which displays the engine running time in hours and tenths.

### VOLTMETER

The voltmeter (BATTERY) gauge (2) is located in the center of the LH console panel beside the tachometer. With the ignition switch On, the voltmeter indicates the condition of the battery on a scale calibrated from 10 to 16 volts (normal running range is 12.5 to 14). With the engine running, the voltmeter indicates output voltage of the alternator.

### VIBRATION INDICATOR

The vibration indicator (3) is located on the LH console panel, and when lit indicates that the drum is in the vibration mode of operation.

### HORN BUTTON

The HORN button (4) is located in the lower center of the LH console panel. Depressing the button energizes the horn circuit sounding the horn. This allows the operator to alert ground personnel to the approach of the compactor.

## SECTION 4 - OPERATING CONTROLS AND INSTRUMENTS

### LEGEND FOR FIGURE 4-2. CONTROLS AND INSTRUMENTS

1. Tachometer/Hourmeter
  2. Voltmeter
  3. Vibration Indicator
  4. Horn Button
  5. Front Light Switch (Optional)
  6. Rear Light Switch (Optional)
  7. Oil Pressure Gauge
  8. Ignition Switch
  9. Water Temperature Gauge
  10. Parking Brake On Indicator
  11. Parking Brake Control
  
  12. Vibration Control -(On/Off) - Offered on all SD-70 Series machines up to S/N 5627. From S/N 5628 and above, this control only offered on the SD-70DA model.
- or
12. Traction Control - Available as an option on the SD-70D and SD-70F models since October 1991 built machines.
  
  13. Propulsion Control
  14. Gear Selector Control
  15. Throttle Control
  16. Articulation Lock Pin
  17. Steering Wheel
  18. Tire Water Switch (SD-70DA Only)
  19. Drum Water Switch (SD-70DA Only)
  20. Drum Selector Switch (SD-70DA Only)
  
  21. Fill Level Blade Control (Optional - SD-70F Only) - Location shown for machines S/N 5627 and below.
- or
21. Variable Vibration Control (SD-70, SD-70D, SD-70F) - Optional for machines S/N 5627 and below. Standard for machines S/N 5628 and above.
  
  22. Vibration Control - Hi/Low (Optional)
  23. Vibrating Reed Tachometer - Not Shown (Optional)
  24. Speedometer (Optional)
  25. Air Restriction Indicator (Optional)
  26. Hydraulic Filter Restriction Indicator (Optional)
  27. Fill Level Blade Control (Optional - SD-70F Only) - Location shown for machines S/N 5628 and above.

SECTION 4 - OPERATING CONTROLS AND INSTRUMENTS

ITEM 23 - NOT SHOWN

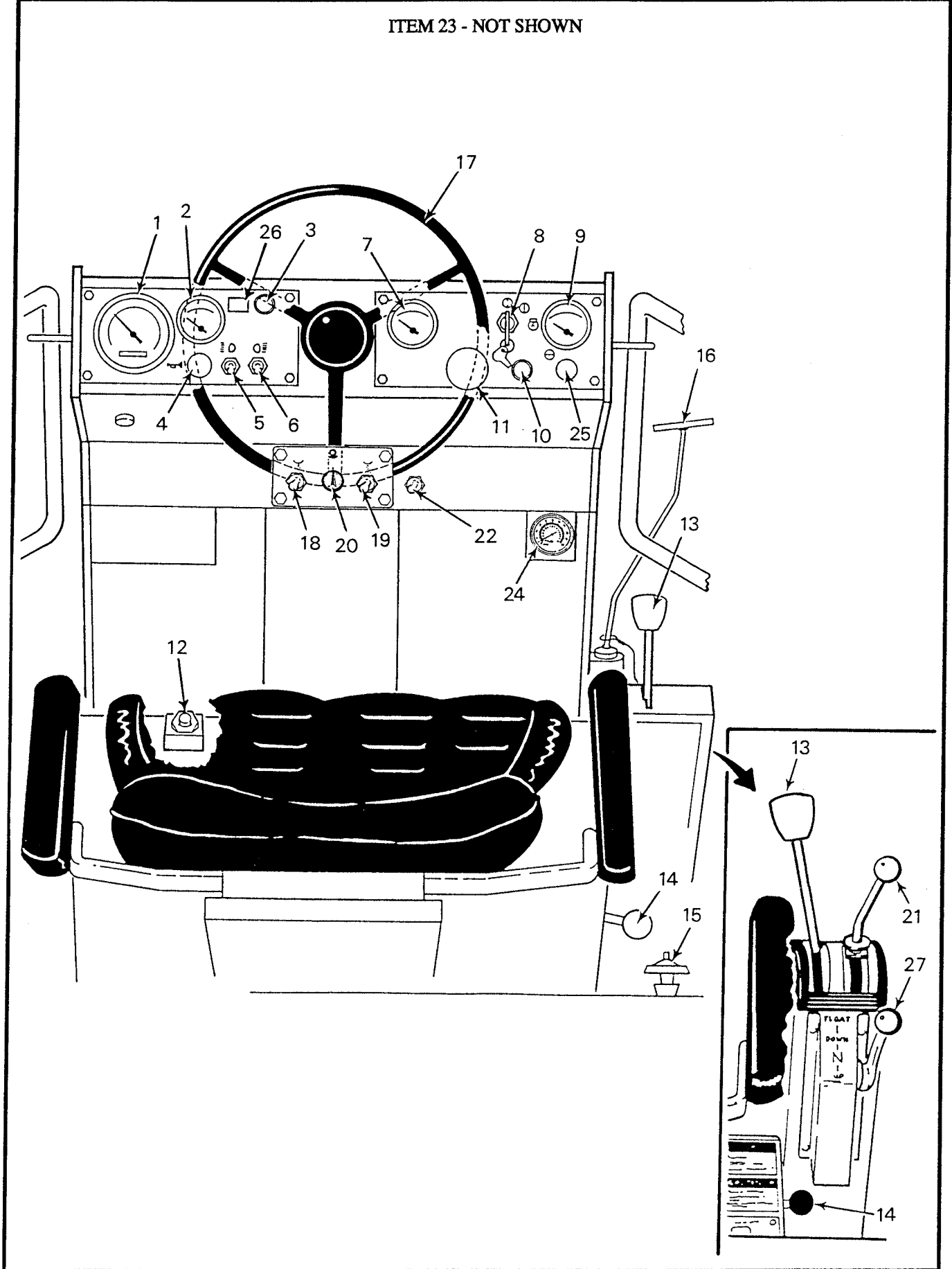


Figure 4-2. Controls and Instruments (Sheet 2 of 2)

## SECTION 4 - OPERATING CONTROLS AND INSTRUMENTS

### FRONT LIGHT SWITCH (OPTIONAL)

The Front Light Switch (5), located on the lower LH console panel, is an ON/OFF toggle switch used to control the front light on the machine.

### REAR LIGHT SWITCH (OPTIONAL)

The Rear Light Switch (6), located on the lower LH console panel, is an ON/OFF toggle switch used to control the rear light on the machine.

### OIL PRESSURE GAUGE

The Oil Pressure (OIL PRESS) Gauge (7) is located in the upper left corner of the RH console panel. The gauge indicates the engine oil pressure on a dual scale calibrated from 0 to 100 psi and 0 to 700 Kpa. Normal engine oil pressure should be from 40 to 60 psi at operating speeds, and 5 to 15 psi at idle speed.

### IGNITION SWITCH

The Ignition Switch (8) is a three position switch located in the upper center of the RH console panel. When the switch is turned clockwise to the On position, the electrical system is energized. When turned past On to the Start position, the starter will engage. Once the engine starts, release the switch immediately and the spring will return the switch to the On position.

## NOTICE

Starter may overheat if operated longer than 30 seconds.

If engine does not start, allow the starter to cool for 2 to 3 minutes before trying again.

### WATER TEMPERATURE GAUGE

The Water Temperature (WATER TEMP) Gauge (9) is located in the upper right corner of the RH console panel. The gauge indicates the engine water temperature on a dual scale calibrated from 100°F. (38°C) to 280°F. (138°C). The normal operating water temperature is from 160° to 185° F.

### PARKING BRAKE ON INDICATOR

The Parking Brake "On" Indicator (10) is located on the RH console panel to the right of the Parking Brake Control. This indicator illuminates red when the parking brakes are applied and the Ignition Switch is On.

### PARKING BRAKE CONTROL

The Parking Brake (BRAKE - PULL TO APPLY) Control (11) is a two position valve located on the lower left of the RH console panel. When pulled outward to the "applied" position, hydraulic oil is bled from the brake system causing the brakes to apply. When pushed inward to the "release" position, hydraulic oil is routed to the brakes. This provides necessary hydraulic pressure to overcome the brake spring pressure and release the brakes.

### VIBRATION CONTROL (ON/OFF)

The Vibration Control (12) is a foot switch located on the left side of the operator's compartment on the floor. This control was available for all SD-70 Series machines prior to S/N 5628. Now, the control is only available for the SD-70DA machines from S/N 5628 and above. The control is activated by pressing in on the switch with your foot. A red indicator (3) next to the Voltmeter will illuminate as the drum vibration mode is selected. Pressing the foot switch a second time with your foot de-activates the vibration mode. The drum vibration will now cease and the indicator will go out.

### TRACTION CONTROL (SD-70, SD-70D, SD-70F ONLY)

The Traction Control (12) is a foot switch located on the left side of the operator's compartment on the floor. This control has been available for the SD-70, SD-70D and SD-70F machines built since October 1991. The switch is foot controlled and used to increase the traction effort of the compactor during operation. Depress the switch with your foot and hold as long as increased traction is required. Releasing the switch returns the machine to normal operation.

### PROPULSION CONTROL

The Propulsion Control (13) is located at the right side of the operator's seat. To propel the machine forward, gradually move the lever forward and away from the seated position. To stop the travel of the machine, gradually move the lever back to the "neutral" or STOP position. To propel the machine in reverse, gradually move the lever backward from the STOP position. To stop the travel of the machine in reverse, gradually move the lever back to the STOP position.

## SECTION 4 - OPERATING CONTROLS AND INSTRUMENTS

### GEAR SELECTOR CONTROL



Runaway machine may cause death or severe injury.

Shifting on an incline may result in a runaway machine.

Shift only when on level ground and the machine is stopped.



Runaway machine may cause death or severe injury.

Never descend an incline in a gear higher or a speed greater than that which was used in ascending the incline.

**HIGH GEAR IS ONLY TO BE USED IN TRAVELING TO AND FROM THE JOB SITE. ALL COMPACTION MUST BE DONE IN LOW GEAR.**

The GEAR SELECTOR Control (14) is located at floor level to the right side of the operator's seat. Positioning the control to either HIGH or LOW selects the axle reduction ratio. In LOW gear, travel speed is reduced and should be used for all compacting operations. In HIGH gear, greater travel speed is possible but at reduced operating torque. Only use HIGH gear for roading the machine. The control should be shifted only when the machine is stationary, and on level ground with the parking brake control "applied".

### THROTTLE CONTROL

The THROTTLE Control (15) is a knob located on the side of the engine compartment to the right rear behind the operator's seat. This control is connected to the engine governor by a cable. To obtain engine idle speed, grasp the knob while depressing its button and push in until the knob stops. Then, turn the knob clockwise or towards the HOLD position. To obtain engine operating speed, turn the knob counterclockwise or towards the RELEASE position while depressing its button. Pull the knob out fully to obtain the operating speed. When the operating speed is reached, turn the knob clockwise or towards the HOLD direction to lock onto that position.

### TIRE WATER SWITCH (SD-70DA ONLY)

The Tire Water Switch (18) is a two position switch. When positioned to ON, the switch activates the water spray system to allow water to be sprayed onto the tires. With the switch in the OFF position, the spray system is off or deactivated.

### DRUM WATER SWITCH (SD-70DA ONLY)

The Drum Water Switch (19) is a three-position switch. When the switch is in the upper position, the primary drum spray is activated. With the switch in the center position or Off, both drum spray systems are off. The secondary spray system is activated when the switch is in the lower position. When the switch is positioned to the lower position, the secondary spray system is used.

### DRUM SELECTOR SWITCH (SD-70DA ONLY)

The Drum Selector Switch (20) is located between the Tire and Drum Water Switches and is used to select Manual or Automatic vibration. With the switch in the center or AUTO position, the drum will start vibrating only when the machine is moving and the Vibration Foot Switch is activated. The drum vibration will turn the same direction as the drum travel (clockwise when rolling forward), and will automatically stop and reverse (counterclockwise) as the machine changes direction. With the switch to the FWD position, drum vibration will run clockwise whether the machine is rolling forward, backward or stopped. With the switch in the REV position, drum vibration will run counterclockwise. The vibration in the above mentioned modes (FWD, AUTO, REV) can be stopped by depressing the Foot Switch.

### STRIKE-OFF BLADE CONTROL - SD-70D/SD-70F ONLY (OPTIONAL)

Your machine may be equipped with a strike-off blade. The control (21 or 27) is located at the operator's compartment. Machines built prior to S/N 5628 will have the control located as shown (item 21) on Figure 4-2. Machines built from S/N 5628 and above, will have the control located as shown (item 27) on Figure 4-2. See Section 15 for more information on the strike-off blade.

### VARIABLE VIBRATION CONTROL

The Variable Vibration Control (21) was offered as an option to the foot switch (12) for the SD-70, SD-70D and SD-70F models. The control is now standard for these models from machine S/N 5628 and above. To increase drum vibration, push the control away from the operator's seated position and towards the HI position. To decrease drum vibration, pull the control towards the operator's seated position and towards the LOW position.

## SECTION 4 - OPERATING CONTROLS AND INSTRUMENTS

### VIBRATION CONTROL - HI/LOW (SD-70DA ONLY)

This two position switch (22) is used to select a HI or LOW pump displacement which affects the drum vibration. Positioning the switch to HI allows for the maximum vibration of the drum, while positioning the switch to LOW, will allow for less drum vibration.

### VIBRATING REED TACHOMETER (OPTIONAL)

The Vibrating Reed Tachometer (23) is located at the lower left side of the operator's compartment and LH console panel. The Tachometer indicates the machine's drum vibration frequency at any given time.

### SPEEDOMETER (OPTIONAL)

The Speedometer (24) is located at the far right side of the operator's compartment below the RH console panel. The Speedometer records machine ground speed from 0 to 10 mph (0 - 16 Km/H).

### AIR RESTRICTION INDICATOR (OPTIONAL)

The Air Restriction Indicator (25) is a red indicator that lights if the engine air cleaner becomes clogged. If the indicator lights during operation, shut down the engine immediately to prevent damage. Check and clean the air cleaner, following the instructions provided in SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE of this manual.

### HYDRAULIC FILTER RESTRICTION INDICATOR (OPTIONAL)

The Hydraulic Filter Restriction Indicator (26) is a red indicator that lights when the suction filter becomes clogged or dirty. The indicator lights as the vacuum switch mounted on the side port of the filter head signals the indicator. If the indicator lights during operation, shut down the machine to prevent damage and clean or replace the filter.

### AMPLITUDE ADJUSTING WHEEL (SD-70DA ONLY)

The Amplitude Adjusting Wheel (Figure 4-3) is located on the left side of the drum. The eight position (1 - 8) wheel is adjustable and controls variable amplitude by repositioning the eccentrics weights inside the drum.

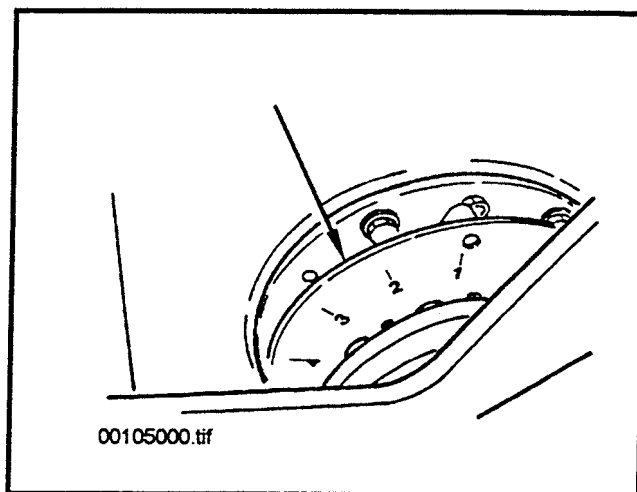


Figure 4-3. Amplitude Adjusting Wheel

## **! WARNING**

The amplitude wheel turns with the drum eccentric weight.

**SERIOUS INJURY** can occur while making adjustments with the engine running if the machine's system is energized allowing drum movement to occur.

**ALWAYS** make sure engine is shut down, machine is chocked, and the articulation lock pin is in the locked position before performing any adjustments or service to the amplitude wheel and drum area.

To turn the adjusting wheel, shut down the engine. Then, pull the spring-loaded wheel to release it from its detent. Turn wheel clockwise to increase drum amplitude (dynamic force) and counter-clockwise to decrease amplitude. When the desired drum amplitude has been determined, release wheel to engage the mechanism.

### BACK-UP ALARM

When the machine is traveling in a reverse direction, the Back-up Alarm sounds alerting personnel in the path of the machine. The alarm is located at the right rear of the machine inside the engine cowling. Always check to confirm that the alarm is working properly before working the machine. To confirm that the alarm sounds, slowly move the Propulsion Control from the neutral or STOP position towards the reverse or R position. The alarm should sound prior to the initial reverse movement of the machine. If the alarm does not sound or begins to sound after machine movement has begun, shut down the machine and correct the problem before further operation.

## SECTION 5 - OPERATING INSTRUCTIONS

Contents	Page	Contents	Page
SAFETY CHECKS - PRESTARTING _____	1	SHUT-DOWN PROCEDURE _____	3
START-UP PROCEDURE _____	2	TOWING _____	4
COMPACTOR OPERATION _____	3		

### **WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock pin, apply the parking brake and shut down the engine before working on the machine.

### **WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### SAFETY CHECKS - PRESTARTING

Before starting each day, check and inspect the following items in addition to the 10 hour daily routine maintenance. Checking these items will help to keep your machine trouble free and operating at peak performance. Also, it is extremely important to heed and follow the safety recommendations listed here to ensure machine and operator safety.

1. Check the fluid lines, hoses, fittings, filler openings, drain plugs, pressure cap, tires, muffler, engine, safety rail, safety shrouds and underneath the machine for signs of leakage. Correct the problem or leakage before operating the machine.
2. Use the "Routine Maintenance" sections of this manual along with the Lubrication Chart to perform any required fluid checks and/or maintenance.

### **WARNING**

Injury can occur when removing the radiator cap.

Steam or fluid escaping from the radiator can burn. Inhibitor contains alkali, avoid contact with skin and eyes.

Always shut down the engine and allow to cool down before removing the radiator cap. Remove the cap slowly to relieve pressure. Avoid contact with steam or escaping fluid.

3. Check the coolant level in the radiator which is located at the rear of the machine. The coolant level with a cold engine should be 1 1/2 inches below the bottom of the filler neck at all times. This is recommended to allow for the coolant to expand at engine operating temperature without overflowing the system. If you need to add coolant, use a reliable brand of permanent anti-freeze and clean water in a 50-50 mixture. Refer to Section 8 for more details.

4. Inspect the entire machine for damaged or missing parts. Repair or replace them as needed.

### **WARNING**

Fuel is flammable. May cause injury and property damage.

Shut down the engine, extinguish all open flames and do not smoke while filling the tank.

Always wipe up any spilled fuel.

5. Check the fuel level. An optional fuel level gauge may be located on the fuel tank cover plate or an electrical gauge located on the control console. If necessary, fill the fuel tank with clean No. 2 diesel fuel as specified in Section 6 - Fuel and Lubrication Specifications of this manual.

Continued

## SECTION 5 - OPERATING INSTRUCTIONS

### SAFETY CHECKS - PRESTARTING - CON'T.

6. Check the hydraulic oil level in the reservoir located on the left side of the machine. Loosen and remove the fill cap and check the attached dipstick. If the oil level is low, fill the reservoir with fresh, clean anti-wear hydraulic oil as specified in Section 6 - Fuel and Lubrication Specifications of this manual.
7. Check the water level in the tank for the optional drum spray system (SD-70DA Only) The tank is located at the front of the machine. Open the access lid and if level is low, add clean water to the tank.
8. Check the electrolyte level in the battery. The battery is located under the operator's seat. If the battery level is low, add clean, distilled water as instructed in Section 8 - 10 Hour or Daily Routine Maintenance of this manual.
9. **DO NOT** operate faulty equipment.
10. Be observant and aware of people and obstructions within and around the work area.
11. Mount the compactor maintaining a three point contact, and seat yourself in the operator's seat. Adjust the seat to the desired position.
12. Always know the job site requirements.

### START-UP PROCEDURE

**IF YOU ARE IN DOUBT OF THE OPERATION OF THIS COMPACTOR AFTER READING THESE PROCEDURES - SEE YOUR SUPERVISOR. READ AND UNDERSTAND ALL OF THE INSTRUCTIONS PRIOR TO STARTING THE MACHINE.**

#### NOTE:

*All switches, gauges and controls mentioned in the following procedures are shown and discussed in detail in Section 4 of this manual.*

Perform the following procedure to "start" the machine:

1. Position yourself in the operator's seat and fasten the seat belt.
2. Make sure the Propulsion Control is in the "neutral" or STOP position.
3. Turn Ignition Switch to On and verify that the Vibration Indicator is not illuminated, thus indicating that vibration is off.
4. Locate THROTTLE Control to the Idle RPM position.

5. Make sure Parking Brake Control is at the "applied" position (PULL TO APPLY).
6. Make sure the optional water system is Off.
7. Make sure the work area is clear of all personnel and obstructions.

## WARNING

**Starting aids are extremely flammable and can explode.**

**Overloading the engine air intake system could result in an explosion.**

**Avoid overloading the engine air intake system with starting aids.**

#### NOTE

*For cold weather starting, use starting aids as necessary. However, refer to the engine operators manual before doing so.*

## NOTICE

**Starter may overheat if operated longer than 30 seconds.**

**If engine does not start, allow the starter to cool for 2 to 3 minutes before trying again.**

8. Turn the Ignition Switch key to the extreme right or Start position and immediately release it when the engine starts. The switch will automatically return to the On position.
9. Make sure the Parking Brake Indicator is lit.
10. Continue to monitor all instruments for proper operation. Refer to Section 4 - Controls and Instruments for details on normal operation.

## NOTICE

**Incorrect oil pressure or temperature can cause engine damage.**

**If gauges do not display the proper readings, shut down the engine and correct the malfunction before operation.**

#### NOTE

*To prevent damage to the hydraulic components, warm up the hydraulic system oil before operating.*

Continued



## SECTION 5 - OPERATING INSTRUCTIONS

### START-UP PROCEDURE - CON'T.

11. Allow the engine to run at slow throttle for a few minutes before normal operation. Never race the engine during the warm up period.
12. Confirm that Back-up Alarm does work properly. Refer to Section 4 - Controls and Instruments for procedure to check alarm before operating machine.

## NOTICE

Idling the engine unnecessarily for long periods of time wastes fuel and fouls injector nozzles.

Unburned fuel causes carbon formation; oil dilution; formation of lacquer or gummy deposits on the valves, pistons and rings; and rapid accumulation of sludge in the engine.

**Do not idle unnecessarily for long periods of time.**

### COMPACTOR OPERATION

## ! WARNING

Observe and heed all safety rules. Remain seated at all times and avoid any passengers or bystanders.

Always exercise extreme caution whenever on a hill or bank. Downhill travel should be at a slow travel speed.

#### NOTE

*The speed of travel of a vibratory compactor has a tremendous effect on compaction results, as opposed to a static compactor where speed of travel matters very little. A vibratory compactor needs "dwell" time for each vibration to develop its potential. This means that travel speed is of the utmost importance if maximum consolidation is to be accomplished. Travel speeds of more than 3 mph (4.83 km/hr) usually do not develop the compaction needed, in proportion to the increased travel speed. On the other hand it is very easy to achieve over-compaction with multiple passes over the same plot due to the efficiency of Ingersoll-Rand Compactors. Statistics show that over-compaction may actually reduce final density due to machine bounce which tends to break down the already achieved density. Over-compaction can also lead to excessive wear on your machine. If in doubt about the proper compaction technique, consult your Ingersoll-Rand Road Machinery Equipment distributor.*

After the engine has started and warmed up, the compactor is ready for operation in accordance with the following procedure:

1. Check the travel and work area for people and obstructions.
2. Remove and stow the Articulation Lock Pin to its proper place at the right front of the operator's compartment.
3. Make sure the Gear Selector Control is in LOW. The HIGH position is for "roading" the machine. The machine should be on solid, level ground before changing gears.
4. Locate the THROTTLE Control to the "Operating RPM" position.
5. Push the Parking Brake Control in to "release" the brake.
6. Turn on the optional water spray system (SD-70DA only) depending on the machine operation.
7. Raise or lower the optional Fill Level Blade depending on operation.

## ! WARNING

Loss of machine control.

Moving the Propulsion Control quickly may cause loss of machine control, lurching or serious injury.

Move the Propulsion Control slowly.

8. Move the Propulsion Control to achieve the desired direction and speed of travel based on conditions. The further the control is moved from the "neutral" or STOP position, the greater the speed in that direction. Return the control to the STOP position for normal braking.

9. Once the machine is in motion, vibration can be started by depressing the Vibration Control On/Off or using the Variable Vibration Control.

### SHUT-DOWN PROCEDURE

Perform the following procedure to "shut down" the machine.

#### NOTE:

*Every attempt should be made to position the compactor on a solid, level surface for shut down.*

## SECTION 5 - OPERATING INSTRUCTIONS

### SHUT-DOWN PROCEDURE - CON'T.

### TOWING

1. Stop drum vibration by disengaging the Vibration Control On/Off or using the Variable Vibration Control .
2. Stop movement of the compactor by returning the Propulsion Control to the neutral or STOP position.
3. If the optional water spray system is On, position the Drum and Tire Water Switches to Off.

## **! WARNING**

Severe cutting or crushing injury.

On some machines during engine shut down, the blade lowers automatically.

Operator must ensure that the area around the blade is clear of personnel and obstructions prior to engine shut down.

4. Lower the optional Fill Level Blade by placing the control to the DOWN position.
5. Pull the Parking Brake Control to "apply" the brake.
6. Install the Articulation Lock Pin to it's locked position.
7. Position the THROTTLE Control from "Operating RPM" to "Idle RPM".
8. Make sure the Gear Selector Control is in the LOW position.
9. Idle the engine for a short period of time before shut down.
10. Turn the Ignition Switch to the Off position.
11. Fill the fuel tank with clean No. 2 Diesel Fuel to prevent condensation inside the tank.
12. Remove the ignition key from the machine and secure all lockable compartments.

## **! CAUTION**

Never transport the compactor unless the articulation lock pin is in the locked position.

Towing the compactor is limited to off the job site, onto the transporter, off the transporter and into the shop.

Refer to Transporting and Hauling in Section 1 before transporting the compactor.

In the event of an engine problem or other malfunction, it may become necessary to tow the compactor. To tow the compactor requires disengaging the propulsion system and releasing the spring applied brakes if the engine will not start. The propulsion pump is designed with a bypass function consisting of two multi-function valve cartridges used for disengagement of the propulsion system. The propulsion pump is located in the engine compartment. Refer to Figure 5-1. If the engine will not start, it may be necessary to release the spring applied, hydraulically released brakes prior to towing. This is accomplished by using a portable power source.

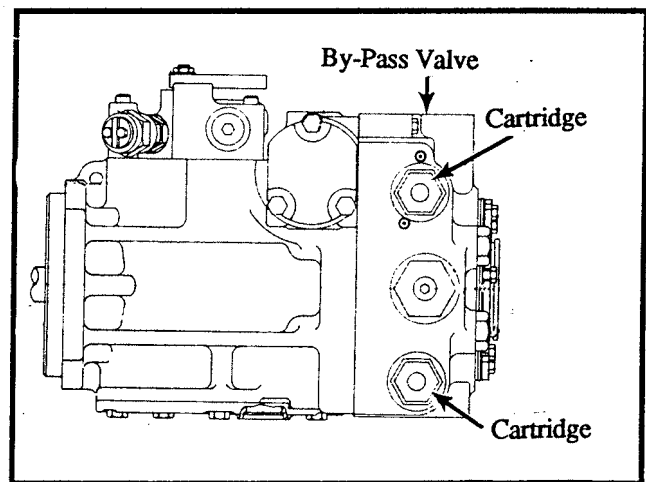


Figure 5-1. Propulsion Pump

Use the following procedure to disengage the propulsion system, to release the spring applied hydraulic brakes and tow the machine.

Continued

## SECTION 5 - OPERATING INSTRUCTIONS

### TOWING - CON'T.

To disengage the propulsion system, use the following steps (1, 2 and 3).

1. Ensure that the Parking Brake Control is in the "applied" position.
2. Gain access to the hex adjustments located on the multi-function cartridges. Using a 1 1/16" wrench on the middle size hex on the cartridge and a 1 1/4" wrench on the large hex to prevent cartridge rotation, rotate the middle size hex (3) revolutions counterclockwise to open each by-pass valve. Do not rotate more than 3 1/2 revolutions, as additional rotation will generate external leakage. Perform this step for each cartridge.
3. Locate the Propulsion Control to the full Forward (F) or Reverse (R) positions.

If the engine will not run, a portable hydraulic pressure source is required to release the brakes prior to towing the machine. To release the brakes use the following steps (4, 5 and 6).

4. Remove the bolts to the console cover and lift the cover off. Locate the Parking Brake valve mounted inside the control console.

5. Disconnect the hydraulic line that leads from the brake valve to the Propulsion Pump at the valve (port "A") and plug the port.

6. Connect a portable hydraulic pressure source (300 - 500 psi) to the Parking Brake Valve (port "A") to supply the required pressure to release the brakes.

To tow the compactor, to remove the portable hydraulic pressure source and to engage the propulsion system, use the following steps (7, 8 and 9):

7. With the propulsion system disengaged and the Parking Brake Control in the "released" position, the compactor may be towed for a short distance only. Tow at a maximum speed of 200 feet per minute (a slow walking pace).

8. At the service destination, the portable hydraulic pressure source can be removed from the machine and the hydraulic line reattached at the Parking Brake Valve (port "A").

9. To engage the propulsion system, gain access to the hex adjustments on the cartridges. Use the 1 1/4" wrench on the large size hex to prevent cartridge rotation. While holding the large hex, use the 1 1/16" wrench on the middle size hex rotating it (3) revolutions in a clockwise direction to close each by-pass valve. Do not over tighten the hex adjustments as external leakage will occur. Perform this step for each cartridge. The propulsion system is now engaged once again.



## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

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FLUID CAPACITIES	5	CUMMINS FUEL OIL SPECIFICATIONS	10
HYDRAULIC OIL REQUIREMENTS AND SPECIFICATIONS	8	HAZARDOUS SUBSTANCE PRECAUTION	11

### GENERAL INFORMATION

Lubrication is an essential part of preventive maintenance affecting to a great extent the useful life of the machine. Different lubricants are required, and some components in the machine require more frequent lubrication than others. Therefore, it is important that instructions regarding types of lubricants and frequency of application be explicitly followed. Periodic lubrication of the moving parts minimizes mechanical failures.

The lubrication chart shows those items requiring regular service, and the intervals in which they should be performed. Details concerning fuel, oil, and other lubricants follow the lubrication chart. A regular service program should be geared to the items listed under each interval. On the following pages, each item is listed in the sequence in which lubrication and maintenance is to be performed. These intervals are based on average operating conditions. In the event of severe, dusty or wet operating conditions, more frequent lubrication than specified may be necessary.

Specific recommendations of brand and grade of lubricants are not listed due to regional availability, operating conditions, and continual development of improved products. Where questions arise, refer to the component manufacturer's manual and a reliable supplier.

All oil levels are to be checked with the machine parked on a level surface, and while the oil is cold unless otherwise specified.

On plug type check points, the oil levels are to be at the bottom edge of the check port.

All grease fittings are SAE STANDARD unless otherwise indicated. Grease non-sealed fittings until grease extrudes from the joint or area being greased. One ounce (28 grams) of EP-MPG grease equals one pump on a standard one pound (0.45 kg) grease gun.

Over lubrication of non-sealed fittings will not harm the fittings or the components being lubricated. However, under lubrication of non-sealed fittings will definitely lead to a shorter lifetime.

Unless otherwise indicated, items not equipped with grease fittings such as linkages, pins, levers, etc. should be lubricated with oil once a week. Motor oil applied sparingly, will provide necessary lubrication, and help prevent rust formation. An Anti-Seeze compound may be used if rust has not formed. Otherwise, the component must be cleaned first.

Grease fittings that are worn or that have a stuck check ball, must be replaced.

All filters and elements for air, fuel, engine oil, and hydraulic fluid, must be obtained through Ingersoll-Rand. Ordering the recommended filters and elements as listed in the parts catalog will ensure the proper size and filtration for the machine. Use only genuine Ingersoll-Rand replacement parts.

Several other services or checks are mentioned to prevent minor irregularities from developing into serious conditions involving machine shutdown and major repairs. The purpose of these services or checks is to ensure the uninterrupted and safe operation of the machine by revealing the need for adjustment caused by normal wear.

Thoroughly wash all fittings, caps, plugs, etc. with non-flammable, non-toxic, cleaning solution before servicing. This will prevent dirt from entering while performing the service.

Most lubricants must be at operating temperature when draining.

Visually check the entire machine regarding capscrews, nuts, and pins being properly secured. Spot check several capscrews and nuts for proper torque. If any are loose, perform a more thorough investigation.

This symbol represents an area where lubrication is required.

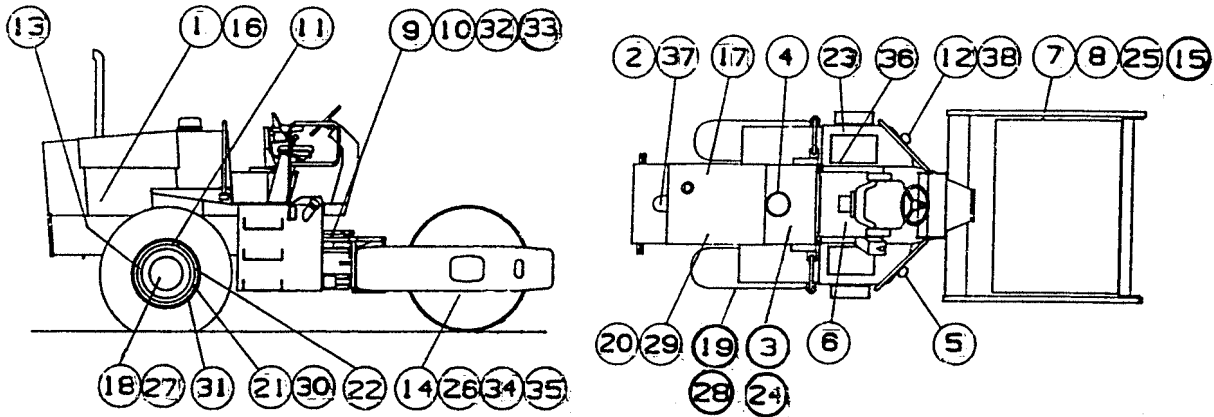


## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

**INGERSOLL-RAND SD-70**

⚠ CAUTION

IMPROPER MAINTENANCE CAN BE HAZARDOUS.  
UNDERSTAND MAINTENANCE SAFETY PRIOR TO WORKING.  
CONSULT MACHINE MANUAL OR INGERSOLL-RAND DISTRIBUTOR.



SERVICE INTERVAL	REF NO.	DESCRIPTION	SERVICE	REMARKS	QUANTITY
10 HOURS OR DAILY	1	ENGINE OIL	S A	SAE 15W40 CD	FILL TO DIPSTICK FULL MARK
	2	ENGINE COOLANT	S A	WATER & ANTI-FREEZE	
	3	FUEL FILTER	D	COLLECTED WATER	
	4	AIR CLEANER	S CL		AR
	5	FUEL TANK	S A	#2 DIESEL FUEL	FILL TO NECK
50 HOURS OR WEEKLY	6	BATTERY	S A	DISTILLED WATER	AR
	7	TORQUE HUB OIL	S A	GL-5 SAE 90	FTLH
	8	TORQUE HUB WHEEL NUT	S T		220 POUND FOOT
	9	SWIVEL & CYL. PINS	G	MPG - EP2 GREASE	320 POUND FOOT (SD-70F ONLY)
	10	CENTER SWIVEL	G	MPG - EP2 GREASE	3 SHOTS EACH
	11	TIRE PRESSURE	S A	COMPRESSED AIR	5 SHOTS
	12	HYDRAULIC OIL	S A	SUS 200 AT 100 DEG. F.	24 PSI
	13	WHEEL NUTS	S T		FILL TO DIPSTICK FULL MARK
	14	ECCENTRIC OIL	S A	GL-5 SAE 90	350 POUND FOOT
15	SEAL BOOT GREASE	G	MPG-EP2 GREASE	FTLH SEE OPS. MANUAL	
100 HOURS OR MONTHLY	16	ENGINE OIL	D F	SAE 15W40 CD	11.5 QTS./11.0 LITERS
	17	ENGINE OIL FILTER	C	SEE PARTS MANUAL	
	18	AXLE HOUSING OIL	S A	GL-5 SAE 90	FTLH
	19	WHEEL END OIL	S A	SAE 15W40 CD	FTLH
	20	BRAKE END OIL	S A	SAE 15W 40 CD	FTLH
	21	TRANSMISSION OIL	S A	GL-5 SAE 90	FTLH
300 HOURS OR QUARTERLY	22	AXLE/TRANSMISSION BREATHER	CL	SEE OPS. MANUAL	
	23	HYDRAULIC FILTERS	C	SEE OPS/PARTS MANUAL	2
	24	FUEL FILTER	C	SEE PARTS MANUAL	2
500 HOURS OR SEMI-ANNUAL	25	TORQUE HUB OIL	D F	GL-5 SAE 90	FTLH
	26	ECCENTRIC OIL	D F	GL-5 SAE 90	17.5 QTS./16.5 LITERS
	27	AXLE HOUSING OIL	D F	GL-5 SAE 90	11.5 QTS./11.0 LITERS
	28	WHEEL END OIL	D F	SAE 15W40 CD	1.75 QTS./1.6 LITERS
	29	BRAKE END OIL	S A	SAE 15W 40CD	
	30	TRANSMISSION OIL	D F	GL-5 SAE 90	2.0 QTS./1.9 LITERS
	31	AXLE MOUNTING BOLTS	S T	SEE OPS. MANUAL	440 POUND FOOT
	32	OSCILLATION SWIVEL NUT	S T	SEE OPS. MANUAL	1000 POUND FOOT
	33	ARTICULATION SWIVEL NUTS	S T	SEE OPS. MANUAL	500 POUND FOOT
	34	CARRIER OIL	D F	GL-5 SAE 90	1.0 PT. (.47 LITER)
35	CARRIER RELIEF VALVE	CL			
1000 HOURS OR ANNUALLY	36	SUCTION STRAINER	CL		
	37	ENGINE COOLANT	D F	WATER & ANTI-FREEZE	21.0 QTS./19.8 LITERS
	38	HYDRAULIC OIL	D F	SUS 200 AT 100 DEG. F.	42.0 GAL./159 LITERS

**SERVICE FUNCTIONS:**

S - CHECK  
C - CHANGE

A - ADD  
D - DRAIN

G - GREASE  
F - FILL

T - TORQUE  
CL - CLEAN

AR - AS REQUIRED  
FTLH - FILL TO LEVEL HOLE

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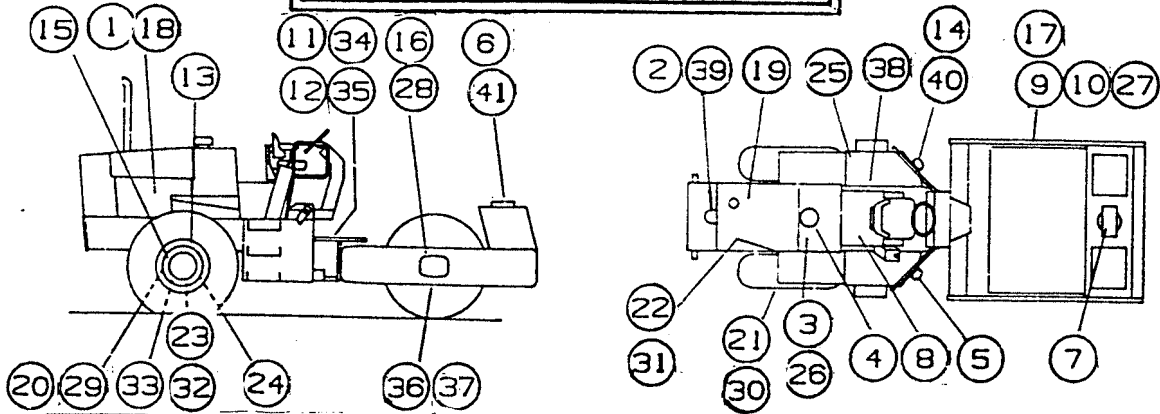
Figure 6-1. Lubrication Chart (SD-70, SD-70D, SD-70F)

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

(R) INGERSOLL-RAND SD - 70DA

### CAUTION

IMPROPER MAINTENANCE CAN BE HAZARDOUS.  
UNDERSTAND MAINTENANCE SAFETY PRIOR TO WORKING.  
CONSULT MACHINE MANUAL OR INGERSOLL-RAND DISTRIBUTOR.



SERVICE INTERVAL	REF. NO.	DESCRIPTION	SERVICE	REMARKS	QUANTITY
10 HOURS OR DAILY	1	ENGINE OIL	S A	SAE 15W40 CD	FILL TO DIPSTICK FULL MARK
	2	ENGINE COOLANT	S A	WATER & ANTI-FREEZE	AR
	3	FUEL FILTER	D	COLLECTED WATER	
	4	AIR CLEANER	S CL		
	5	FUEL TANK	S A	#2 DIESEL FUEL	FILL TO NECK
	6	WATER TANKS	S A	WATER	AR
	7	WATER STRAINER	CL		
50 HOURS OR WEEKLY	8	BATTERY	S A	DISTILLED WATER	AR
	9	TORQUE HUB OIL	S A	GL-5 SAE 90	FTLH
	10	TORQUE HUB WHEEL NUT	S T		220 POUND FOOT
	11	SWIVEL & CYL. PINS	G	MPG - EP2 GREASE	3 SHOTS EACH
	12	CENTER SWIVEL	G	MPG - EP2 GREASE	5 SHOTS
	13	TIRE PRESSURE	S A	COMPRESSED AIR	28 PSI
	14	HYDRAULIC OIL	S A	SUS 200 AT 100 DEG. F.	FILL TO DIPSTICK FULL MARK
100 HOURS OR MONTHLY	15	WHEEL NUTS	S T		350 POUND FOOT
	16	ECCENTRIC OIL	S A	GL-5 SAE 90	FTLH
	17	SEAL BOOT GREASE	G	MPG-EP2 GREASE	SEE OPS. MANUAL
	18	ENGINE OIL	D F	SAE 15W40 CD	11.5 QTS./11.0 LITERS
	19	ENGINE OIL FILTER	C	SEE OPS/PARTS MANUAL	
	20	AXLE HOUSING OIL	S A	GL-5 SAE 90	FTLH
	21	WHEEL END OIL	S A	SAE 15W40 CD	FTLH
300 HOURS OR QUARTERLY	22	BRAKE END OIL	S A	SAE 15W 40 CD	FTLH
	23	TRANSMISSION OIL	S A	GL-5 SAE 90	FTLH
	24	AXLE/TRANSMISSION BREATHER	CL	SEE OPS. MANUAL	
	25	HYDRAULIC FILTERS	C	SEE OPS/PARTS MANUAL	2
500 HOURS OR SEMI-ANNUAL	26	FUEL FILTER	C	SEE PARTS MANUAL	2
	27	TORQUE HUB OIL	D F	GL-5 SAE 90	FTLH
	28	ECCENTRIC OIL	D F	GL-5 SAE 90	17.5 QTS./16.5 LITERS
	29	AXLE HOUSING OIL	D F	GL-5 SAE 90	11.5 QTS./11.0 LITERS
	30	WHEEL END OIL	D F	SAE 15W40 CD	1.75 QTS./1.6 LITERS
	31	BRAKE END OIL	D F	SAE 15W 40CD	
	32	TRANSMISSION OIL	D F	GL-5 SAE 90	2.0 QTS./1.9 LITERS
	33	AXLE MOUNTING BOLTS	S T	SEE OPS. MANUAL	440 POUND FOOT
	34	OSCILLATION SWIVEL NUT	S T	SEE OPS. MANUAL	1000 POUND FOOT
	35	ARTICULATION SWIVEL NUTS	S T	SEE OPS. MANUAL	500 POUND FOOT
1000 HOURS OR ANNUALLY	36	CARRIER OIL	D F	GL-5 SAE 90	1.0 PT. (.47 LITER)
	37	CARRIER RELIEF VALVE	CL		
	38	SUCTION STRAINER	CL	SEE OPS. MANUAL	
	39	ENGINE COOLANT	D F	WATER & ANTI-FREEZE	21.0 QTS./19.8 LITERS
40	HYDRAULIC OIL	D F	SUS 200 AT 100 DEG. F.	42.0 GAL./159 LITERS	
	41	WATER TANK	D CL F	WATER	130 GAL./492 LITERS

SERVICE FUNCTIONS:

S - CHECK  
C - CHANGE

A - ADD  
D - DRAIN

G - GREASE  
F - FILL

T - TORQUE  
CL - CLEAN

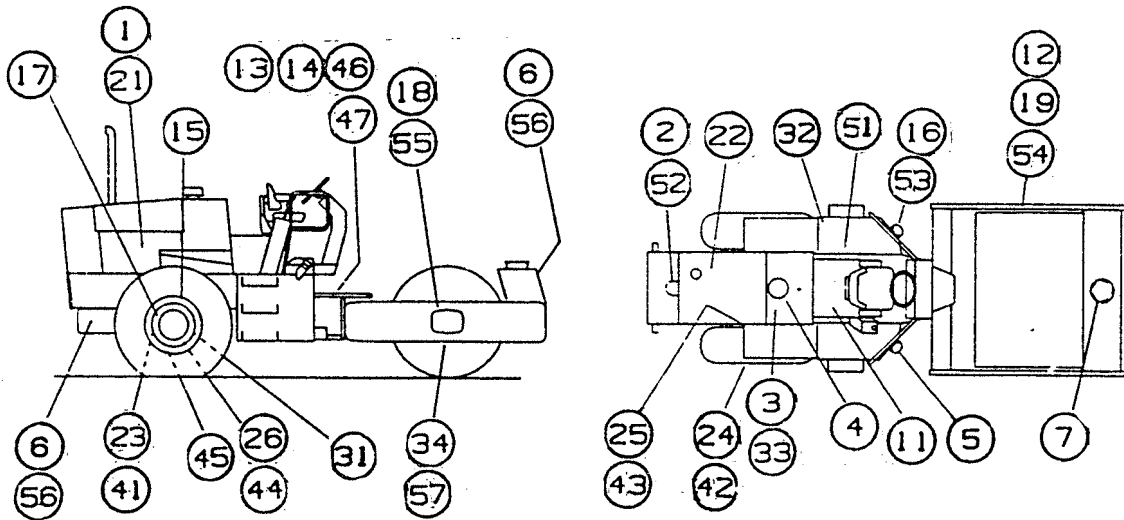
AR - AS REQUIRED  
FTLH - FILL TO LEVEL HOLE

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Figure 6-2. Lubrication Chart (SD-70DA - Prior to S/N 5512)

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

INGERSOLL-RAND SD - 70 DA



SERVICE INTERVAL	REF. NO.	DESCRIPTION	SERVICE	REMARKS	QUANTITY
10 HOURS OR DAILY	1	ENGINE OIL	S A	SAE 15W40 CD	FILL TO DIPSTICK FULL MARK
	2	ENGINE COOLANT	S A	WATER & ANTI-FREEZE	AR
	3	FUEL FILTER	D	COLLECTED WATER	
	4	AIR CLEANER	S		CHECK INDICATOR
	5	FUEL TANK	S A	#2 DIESEL FUEL	FILL TO NBCK
	6	WATER TANKS	S A	WATER	AR
	7	WATER STRAINER	CL		
50 HOURS OR WEEKLY	11	BATTERY	S A	DISTILLED WATER	AR
	12	TORQUE HUB OIL	S A	MOBIL SHC 630	FTLH
	13	CYLINDER PINS	G	MPG - EP2 GREASE	3 SHOTS EACH
	14	ARTIC. & OSCILLATION JOINTS	G	MPG - EP2 GREASE	5 SHOTS
	15	TIRE PRESSURE	S A	COMPRESSED AIR	24 PSI
	16	HYDRAULIC OIL	S A	SUS 200 AT 100 DEG. F.	FILL TO DIPSTICK FULL MARK
	17	WHEEL NUTS	S T		350 POUND FOOT
	18	ECCENTRIC OIL	S A	MOBIL SHC 630	FTLH
	19	SEAL BOOT GREASE	G	MPG-EP2 GREASE	SEE OPS. MANUAL
100 HOURS OR MONTHLY	21	ENGINE OIL	DF	SAE 15W40 CD	11.5 QTS./11.0 LITERS
	22	ENGINE OIL FILTER	C	SEE OPS/PARTS MANUAL	
	23	AXLE HOUSING OIL	S A	GL-5 SAE 90	FTLH
	24	WHEEL END OIL	S A	SAE 15W40 CD	FTLH
	25	BRAKE END OIL	S A	SAE 15W 40 CD	FTLH
	26	TRANSMISSION OIL	S A	GL-5 SAE 90	FTLH
300 HOURS OR QUARTERLY	31	AXLE/TRANSMISSION BREATHER	CL	SEE OPS. MANUAL	2
	32	HYDRAULIC FILTERS	C	SEE OPS/PARTS MANUAL	2
	33	FUEL FILTER	C	SEE OPS/PARTS MANUAL	2
	34	CARRIER RELIEF VALVE	CL		
500 HOURS OR SEMI-ANNUAL	41	AXLE HOUSING OIL	DF	GL-5 SAE 90	11.5 QTS./11.0 LITERS
	42	WHEEL END OIL	DF	SAE 15W40 CD	1.75 QTS./1.6 LITERS
	43	BRAKE END OIL	DF	SAE 15W 40CD	
	44	TRANSMISSION OIL	DF	GL-5 SAE 90	2.0 QTS./1.9 LITERS
	45	AXLE MOUNTING BOLTS	S T	SEE OPS. MANUAL	440 POUND FOOT
	46	OSCILLATION SWIVEL NUT	S T	SEE OPS. MANUAL	1000 POUND FOOT
	47	ARTICULATION SWIVEL NUTS	S T	SEE OPS. MANUAL	500 POUND FOOT
1000 HOURS OR ANNUALLY	51	SUCTION STRAINER	CL	SEE OPS. MANUAL	
	52	ENGINE COOLANT	DF	WATER & ANTI-FREEZE	21.0 QTS./19.8 LITERS
	53	HYDRAULIC OIL	DF	SUS 200 AT 100 DEG. F.	42.0 GAL./159 LITERS
	54	TORQUE HUB OIL	DF	MOBIL SHC 630	
	55	ECCENTRIC OIL	DF	MOBIL SHC 630	
	56	WATER TANK	D CL F		130 GAL/492 LITERS
	57	CARRIER OIL	DF	MOBIL SHC 630	1.0 PT. (.47 LITER)

**SERVICE FUNCTIONS:**

S - CHECK  
C - CHANGE

A - ADD  
D - DRAIN

G - GREASE  
F - FILL

T - TORQUE  
CL - CLEAN

AR - AS REQUIRED  
FTLH - FILL TO LEVEL HOLE

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## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

<b>FLUID CAPACITIES</b>
-------------------------

<u>FLUID/OIL</u>	<u>APPROXIMATE CAPACITY</u>
DIESEL FUEL (#2 Diesel Fuel):	41 Gallons (155 Liters)
HYDRAULIC OIL (SUS 200 at 100 Degrees F.):	43 Gallons (163 Liters)
MOTOR OIL (SAE 15W40 CD):	
Wheel End And Brake End Oil	1.75 Quarts (1.6 Liters)
4BT3.9 Cummins Engine	11.5 Quarts (11.0 Liters)
GEAR OIL (GL-5 SAE 90):	
Torque Hub:      SD-70 (W3 Hub)	2.0 Quarts (1.9 Liters)
SD-70D (W6 Hub)	1.5 Quarts (1.4 Liters)
SD-70F (R7 Hub)	3.0 Quarts (1.4 Liters)
Eccentric (Both Sides)	17.5 Quarts (16.5 Liters)
Carrier	1.0 Pint (.47 Liters)
Transmission	2.0 Quarts (1.9 Liters)
Axle Housing	11.5 Quarts (11.0 Liters)
ENGINE COOLANT (Water and Antifreeze):	
4BT3.9 Cummins Engine	21.0 Quarts (19.8 Liters)

Table 6-1. Fluid Capacities (SD-70, SD-70D and SD-70F)

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

### FLUID CAPACITIES

<u>FLUID/OIL</u>	<u>APPROXIMATE CAPACITY</u>
DIESEL FUEL (#2 Diesel Fuel): _____	41 Gallons (155 Liters)
HYDRAULIC OIL (SUS 200 at 100 Degrees F.): _____	43 Gallons (163 Liters)
MOTOR OIL (SAE 15W40 CD):	
Wheel End And Brake End Oil _____	1.75 Quarts (1.6 Liters)
4BT3.9 Cummins Engine _____	11.5 Quarts (11.0 Liters)
GEAR OIL (GL-5 SAE 90):	
Torque Hub: _____ SD-70DA (L3 Hub) _____	2.75 Quarts (2.6 Liters)
Eccentric (Both Sides) _____	17.5 Quarts (16.5 Liters)
Carrier _____	1.0 Pint (.47 Liters)
Transmission _____	2.0 Quarts (1.9 Liters)
Axle Housing _____	11.5 Quarts (11.0 Liters)
ENGINE COOLANT (Water and Antifreeze):	
4BT3.9 Cummins Engine _____	21.0 Quarts (19.8 Liters)
WATER:	
Water Tank _____	130 Gallons (492 Liters)

Table 6-2. Fluid Capacities (SD-70DA - Prior to S/N 5512)

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

<b>FLUID CAPACITIES</b>
-------------------------

<u>FLUID/OIL</u>	<u>APPROXIMATE CAPACITY</u>
DIESEL FUEL (#2 Diesel Fuel):	41 Gallons (155 Liters)
HYDRAULIC OIL (SUS 200 at 100 Degrees F.):	43 Gallons (163 Liters)
MOTOR OIL (SAE 15W40 CD):	
Wheel End And Brake End Oil	1.75 Quarts (1.6 Liters)
4BT3.9 Cummins Engine	11.5 Quarts (11.0 Liters)
GEAR OIL (Mobil SHC-630):	
Torque Hub                      SD-70DA (L3 Hub)	2.75 Quarts (2.6 Liters)
Eccentric (Both Sides)	17.5 Quarts (16.5 Liters)
Carrier	1.0 Pint (.47 Liters)
GEAR OIL (GL-5 SAE 90):	
Transmission	2.0 Quarts (1.9 Liters)
Axle Housing	11.5 Quarts (11.0 Liters)
ENGINE COOLANT (Water and Antifreeze):	
4BT3.9 Cummins Engine	21.0 Quarts (19.8 Liters)
WATER:	
Water Tank	130 Gallons (492 Liters)

Table 6-3. Fluid Capacities (SD-70DA - Effective with S/N 5512)

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

### HYDRAULIC OIL REQUIREMENTS AND SPECIFICATIONS

The quality of the hydraulic oil is important to the satisfactory performance of any hydraulic system. The oil serves as the power transmission medium, system coolant, and lubricant. Selection of the proper oil is essential to ensure proper

system performance and life. For the specifications and requirements that hydraulic oil used in this unit should meet, refer to Table 6-4, Requirements for Hydraulic Oil.

Viscosity:	60 SUS Minimum at operating temperature 7500 SUS Maximum at starting temperature 150 to 225 SUS at 100° Fahrenheit (generally) 44 to 48 SUS at 210° Fahrenheit (generally)
Viscosity Index:	90 Minimum
Aniline Point:	-175 Minimum
API Gravity:	28 Minimum Paraffinic oils: 28 or more; Mixed base: 24 to 28; Naphthanic or asphaltic base: 24 or less
Recommended Additives:	Rust and oxidation inhibitors Foam depressant
Desirable Characteristics:	Stability of physical and chemical characteristics High demulsibility (low emulsibility) for separation of water, air, and contaminants Resistance to the formation of gums, sludges, acids, tars, and varnishes. High lubricity and film strength.

Table 6-4. Requirements for Hydraulic Oil

The following are only a few examples of the commercial brand oils meeting specifications for use at temperatures above 10°F (-12°C).

International Harvester \_\_\_\_\_ Hy Tran  
Auto. Trans. Fluid \_\_\_\_\_ Type F  
Mobil Oil Company \_\_\_\_\_ Mobil Fluid DTE 25  
Sun Oil Company \_\_\_\_\_ Sun Oil 2105

For temperatures below 10°F (-12°C), the following examples meet specifications.

Auto Transmission Fluid \_\_\_\_\_ Type F  
Mobil Oil Company \_\_\_\_\_ Mobil DTE 13  
Shell Oil Company \_\_\_\_\_ Tellus T-27

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

<b>LUBRICATING OIL/GREASE SPECIFICATIONS (EXCEPT ENGINE)</b>
--

### EXTREME PRESSURE MULTIPURPOSE LUBRICANT

This gear lubricant is compounded to achieve high load carrying capacity and meet the requirements of either API-GL-5 or MIL-L-2105C. Unless otherwise specified, SAE 90 viscosity may be used for year-round service. Low temperature usage is restricted as follows:

SAE Viscosity Number	Minimum Ambient Temperature °F (°C)
75W	-40 (-40)
80W	-15 (-26)
85W	+10 (-12)
90	+20 (- 7)
140	+40 ( +5)
250	+50 (+10)

### MOBIL SHC - 630 BEARING AND GEAR LUBRICANT

This gear lubricant provides better thermal and oxidation stability than conventional mineral oils. The lubricant has naturally high viscosity indexes compared to mineral oils, providing lower viscosity at lower temperatures and higher viscosity at higher temperatures.

ISO Viscosity Grade:	220
API Gravity	31.4
Viscosity Index:	152
Viscosity:	
cSt at 40 degrees C:	217
cSt at 100 degrees C:	25.9
SUS at 100 degrees F:	1122
SUS at 210 degrees kF:	127

### EXTREME PRESSURE MULTIPURPOSE GREASE

This is a lithium soap base grease with a high load carrying capacity. The following properties are recommended:

Timken OK Load	40 Lb. Minimum
Dropping Point	350°F (177°C) Minimum
Oil Viscosity	75 SUS Minimum at 210°F (99°C)
Water Resistance	Excellent

Under normal operating conditions, the following consistency grades are recommended:

- NLGI No. 0 for subzero Fahrenheit temperatures.
- NLGI No. 1 or No. 2 for normal ambient temperatures.
- NLGI No. 2 or No. 3 for temperatures over 100°F (38°C).

<b>ENGINE LUBRICATING OIL SPECIFICATIONS</b>
--

*NOTE*

*For latest applicable engine lubricating oil specifications, contact engine manufacturer/distributor or your Ingersoll-Rand Distributor.*

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

<b>CUMMINS FUEL OIL SPECIFICATIONS</b>
--

Cummins diesel engines have been developed to take advantage of the high energy content and generally lower cost of No. 2 Diesel Fuels. Experience has shown that a

Cummins diesel engine will also operate satisfactorily on No. 1 fuels or other fuels within the specifications shown in Table 6-5, Cummins Fuel Oil Specifications.

<b>VISCOSITY (ASTM D-445)</b>	1.3 to 5.8 centistokes per second at 104°F (1.3 to 5.8 mm/sec at 40°C).
<b>CETANE NUMBER (ASTM D-613)</b>	40 minimum except in cold weather or in service with prolonged idle, a higher cetane number is desirable.
<b>SULFUR CONTENT (ASTM D-129 or 1552)</b>	Not to exceed 1 percent by weight.
<b>WATER AND SEDIMENT (ASTM D-1796)</b>	Not to exceed 0.1 percent by volume.
<b>CARBON RESIDUE (Ramsbottom, ASTM-D-524 or Conradson ASTM D-189)</b>	Not to exceed 0.25 percent by weight on 10 percent volume residue.
<b>FLASH POINT (ASTM-D-93)</b>	At least 125°F (52°C) or legal temperature if higher than 125°F (52°C).
<b>DENSITY (ASTM D-287) to</b>	30° to 42°F (-1° to 6°C) A.P.I. gravity at 60°F (16°C) (0.816 to 0.876 Sp. Gr.).
<b>CLOUD POINT (ASTM D-97)</b>	10°F (6°C) below lowest ambient temperature at which the fuel is expected to operate.
<b>ACTIVE SULFUR</b>	Copper strip corrosion not to exceed No. 2 rating after 3 hours at 122°F (49°C).
<b>ASH (ASTM D-482)</b>	Not to exceed 0.02 percent by weight.
<b>DISTILLATION (ASTM D-86)</b>	The distillation curve must be smooth and continuous. At least 90 percent of the fuel must evaporate at less than 680°F (360°C). All of the fuel must evaporate at less than 725°F.

Table 6-5. Cummins Fuel Oil Specifications

## SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS

### HAZARDOUS SUBSTANCE PRECAUTION

The following information is provided to assist the owners and operators of Ingersoll-Rand Road Machinery Equipment. Further information may be obtained by contacting your Ingersoll-Rand Road Machinery Equipment Distributor.

The following substances are used in the manufacture of this machine and may be hazardous to health if used incorrectly.	
SUBSTANCE	PRECAUTION
Antifreeze (Water cooled engine)	Avoid ingestion, skin contact and breathing fumes.
Hydraulic Oil	Avoid ingestion, skin contact and breathing fumes.
Engine Lubricating Oil	Avoid ingestion, skin contact and breathing fumes.
Preservative Grease	Avoid ingestion, skin contact and breathing fumes.
Rust Preventative	Avoid ingestion, skin contact and breathing fumes.
Engine Fuel	Avoid ingestion, skin contact and breathing fumes.
Battery Fluid	Avoid ingestion, skin contact and breathing fumes.
SAE Gear Oil	Avoid ingestion, skin contact and breathing fumes.

The following substances may be produced during the operation of this machine and may be hazardous to health.	
SUBSTANCE	PRECAUTION
Engine Exhaust Fumes	Avoid breathing.
Engine Exhaust Fumes	Avoid buildup of fumes in confined spaces.
Electric Motor Dust (Brushes/Insulation)	Avoid breathing during maintenance.
Brake Lining Dust *	Avoid breathing during maintenance.

\* Only on machines with dry axle brakes.

Table 6-6. Hazardous Substance Precautions





## SECTION 7 - INITIAL BREAK-IN MAINTENANCE

Contents	Page	Contents	Page
GENERAL _____	1	WHEEL END AND BRAKE END OIL _____	1
TORQUE HUB OIL _____	1	ARTICULATION SWIVEL PIN NUTS _____	1
ECCENTRIC OIL _____	1	OSCILLATION SWIVEL NUT _____	1
AXLE HOUSING OIL _____	1	AXLE MOUNTING BOLTS _____	1
TRANSMISSION OIL _____	1	CARRIER OIL _____	1

### **WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### GENERAL

Any new equipment requires an initial modification of the maintenance schedule to properly break-in the various systems and components. Perform this one time initial break-in maintenance after 50 to 100 hours of operation. This maintenance is **IN ADDITION TO** the 10 hour, 50 hour and 100 hour maintenance tasks described on the following pages. After this initial phase, the regular intervals should be followed.

#### TORQUE HUB OIL

Change the oil. For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance* or *Section 13 - 1000 Hour or Annual Routine Maintenance*.

#### ECCENTRIC OIL

Change the oil. For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance* or *Section 13 - 1000 Hour or Annual Routine Maintenance*.

#### AXLE HOUSING OIL

Change the oil. For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance*.

#### TRANSMISSION OIL

Change the oil. For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance*.

#### WHEEL END AND BRAKE END OIL

Change the oil. For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance*.

#### ARTICULATION SWIVEL PIN NUTS

Torque the nuts to 500 foot-pounds (69 Kgm). For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance*.

#### OSCILLATION SWIVEL NUT

Torque the nut to 1000 foot-pounds (138 Kgm). For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance*.

#### AXLE MOUNTING BOLTS

Torque the nuts to 440 foot-pounds (61 Kgm). For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance*.

#### CARRIER OIL

Change the oil. For the procedure, refer to *Section 12 - 500 Hour or Semiannual Routine Maintenance* or *Section 13 - 1000 Hour or Annual Routine Maintenance*.

#### NOTE:

To change the oil in the Torque Hub, Eccentric or Carrier for all SD-70, SD-70D, SD-70F and SD-70DA (serial number 5511 and below), refer to *Section 12* for the procedure. Refer to *Section 13* for SD-70DA machines (serial number 5512 and above).



## SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE

Contents	Page	Contents	Page
ENGINE OIL _____	1	ENGINE V-BELT _____	5
AIR CLEANER _____	1	DRUM _____	6
FUEL/WATER SEPARATOR _____	4	DRUM SCRAPER _____	6
FUEL TANK _____	5	WATER TANKS (SD-70DA ONLY) _____	6
ENGINE COOLANT (CUMMINS ENGINE) _____	5	WATER STRAINER (SD-70DA ONLY) _____	6

### ⚠ WARNING

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### ⚠ WARNING

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### ENGINE OIL

Check the engine oil level at the start of each day, and maintain the level to the full mark on the dipstick. Refer to Figure 8-1. If the level is low, fill the crankcase with SAE 15W40 CD (MIL-L-2104) oil for normal operating conditions year round. Additional engine oil specifications can be found in Section 6 - Fuel and Lubrication Specifications of this manual.

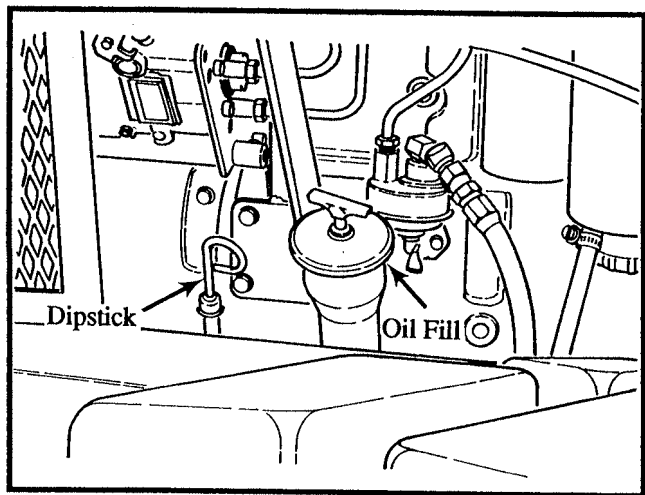


Figure 8-1. Engine Oil Dipstick and Fill

#### AIR CLEANER

The air cleaner is located under the operator's seat and is accessible by lifting the seat upward and forward. Refer to Figure 8-2. The air cleaner is the dry type with a replaceable element. The air cleaner helps prolong the life of the engine by preventing contaminants from being drawn into the engine intake manifold. The air cleaner must be cleaned as often as dirt builds up to prevent air restriction. Dust passing the air cleaner, even through small holes, can cause rapid engine wear. Make sure all connections between the air cleaner and the engine are tight and sealed. If these connections are all tight and sealed and there is still evidence of dust leakage, check the following possibilities:

1. Inspect the inlet tube from engine to air cleaner for damage.
2. Make sure the o-ring between the cup and housing is not damaged, and that the o-ring seals against both.
3. Check for structural failures. Any damaged parts must be replaced.

#### NOTE

*Dust that gets by the air cleaner system can often be detected by looking for dust streaks on the inlet tube or just inside the intake manifold inlet.*

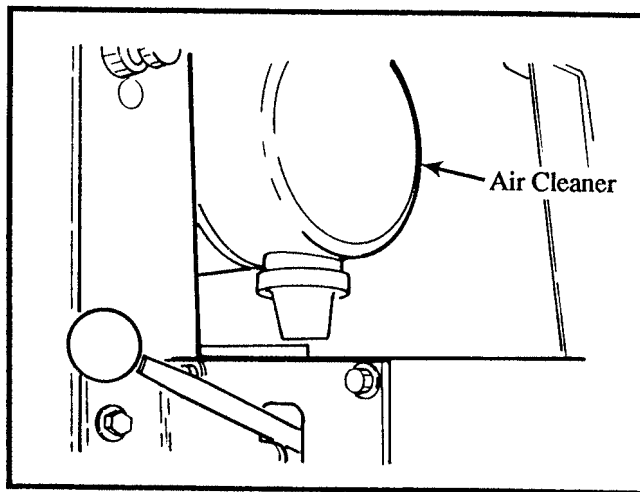


Figure 8-2. Air Cleaner

Continued  
8-1

## SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE

### AIR CLEANER - CONT.

#### FILTER ELEMENT REPLACEMENT

## CAUTION

**Engine damage.**

**Raw, unfiltered air can cause engine damage.**

**Never service the air cleaner while the engine is running.**

The following procedure should be used when replacing the air cleaner element:

1. Loosen the bolt on the clamp band and remove the clamp band and cup.
2. Remove the wing nut and then remove the primary element.
3. Clean the element as outlined in the following paragraphs entitled ELEMENT CLEANING. Replace the element after six cleanings or annually, whichever comes first.
4. Inspect all parts of the intake system and air cleaner.
5. Install the cleaned or new primary element into the air cleaner housing. Secure the element.
6. Make sure the o-ring around the air cleaner housing is in place and not damaged.
7. Install the cup on the air cleaner housing and secure with the clamp band and tighten the bolt.

#### ELEMENT CLEANING

There are two acceptable methods to clean the primary air cleaner element. One method is to use a water-detergent solution and the second method is to use compressed air to blow out the element. If the element contains substantial amounts of soot or oil fumes, washing in a water solution works better than compressed air. If the contaminant is mostly loose dust, either method works equally well.

If the element is cleaned with compressed air, it can be put back into service immediately. However, if the element is cleaned by washing, it must be dried before returning to service.

#### NOTE

*Some elements are partially covered by a plastic sleeve with fins. The covered portion can be cleaned with water or air without removing the sleeve. Use a stiff fiber (not wire) brush to remove oil and grease deposits from the sleeve and fins. Never remove the sleeve and fins from the element.*

#### Cleaning With Compressed Air.

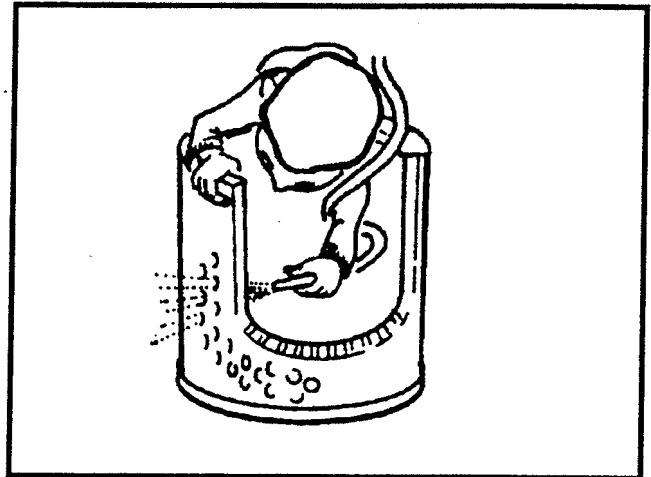


Figure 8-3. Cleaning with Compressed Air

## NOTICE

**Excessive air pressure can damage the element.**

**Pressure at the air nozzle must not exceed 40 psi.**

Use the following procedure to clean the air cleaner element with compressed air:

1. Direct a jet of clean, dry air from the inside of the element perpendicular to the pleats.
2. Move the jet of air up and down along the pleats, slowly rotating the element, until no more dust is being removed. Be careful not to rupture the element with the nozzle or air jet.

#### Cleaning With Water.

Use the following procedure when cleaning an air cleaner element with water:

Continued

## SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE

### AIR CLEANER - CON'T.

#### ELEMENT CLEANING - CONT.

## WARNING

Fuel and/or solvents are extremely flammable.

May cause injury.

Never use fuel or solvents to clean the elements.

1. The element can be cleaned by washing with water and a good non-sudsing detergent. Direct a jet of clean, dry air to the inside of the filter element to remove loose dust and soot. When the loose dust and soot have been removed, the element is ready to be washed. Fuel or solvents can damage the element and explode or burn.
2. Dissolve the detergent in a small amount of cool water.
3. Add warm water, approximately 100° F (38° C), to get the proper proportions of detergent and water. Use about one cup of detergent to five gallons of water.
4. Soak the element in the water-detergent solution for at least 15 minutes.

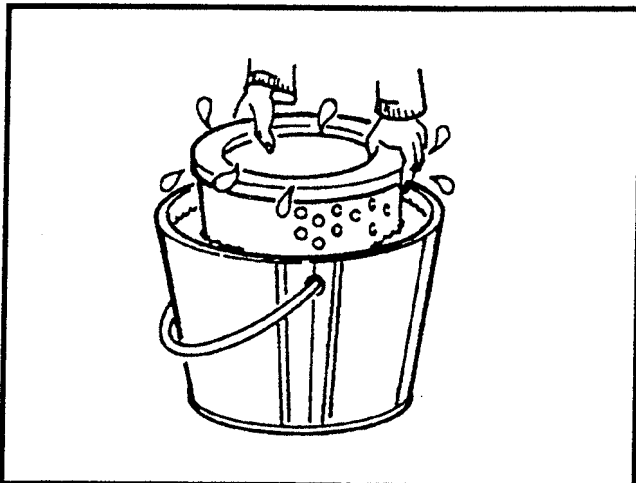


Figure 8-4. Soaking the Element

5. Agitate the element in the solution for about two minutes to loosen dust and dirt.

## NOTICE

Excessive water pressure can damage the element.

Keep water pressure at hose or tap below 40 psi (276 kPa).

6. Rinse the element with clean water until the water coming through the element is clean. Air-dry the element thoroughly before putting it back into service.

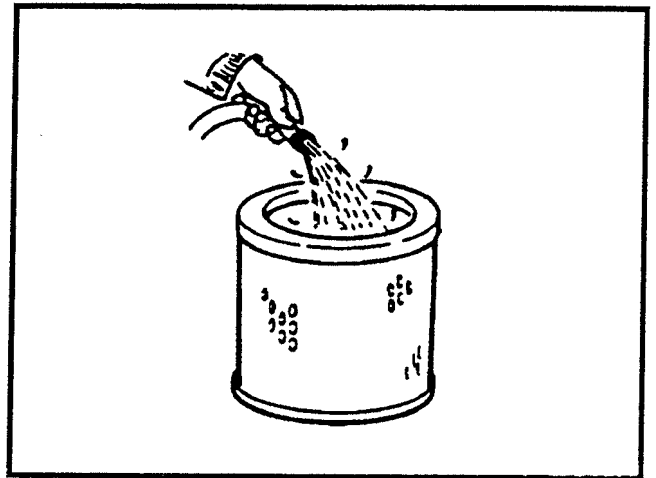


Figure 8-5. Rinsing the Element

## NOTICE

Element damage can occur during drying.

Never use light bulbs for drying elements.

Heated air {maximum temperature 160° F. (71° C.)} must have circulation when drying elements.

7. Mechanized drying methods can be used. However, any method used must not tear, puncture, or overheat the element.

### INSPECTION

#### Element.

After cleaning the air cleaner element, inspect it for damage. Refer to Figure 8-6. Look for dust on the clean air side, slight ruptures or damaged gaskets. A good method to detect

Continued

## SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE

### AIR CLEANER - CON'T.

#### INSPECTION - CON'T.

ruptures in the element is to place a light inside the element, and look toward the light from the outside. Any size hole in the element will pass dust to the engine, and cause unnecessary engine wear. Replace the element if such holes are evident.

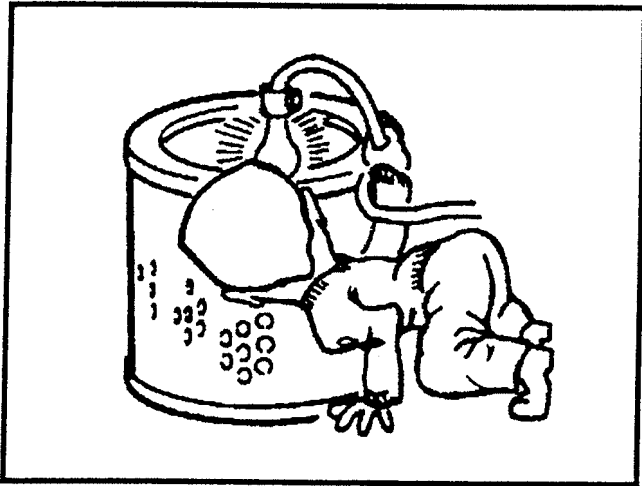


Figure 8-6. Inspecting for Damage

#### Air Cleaner Body.

Before installing the air cleaner element, remove any foreign material (leaves, lint, or other foreign matter) that may have collected inside the air inlet cap. Inspect the inside of the body for dents or other damage. Any damage or foreign material may interfere with the air flow and the fins on the element. Repair any body dents being careful not to damage the sealing surfaces.

#### Vacuator Valve.

The vacuator valve is designed to expel loose dust and dirt accumulation from the air cleaner body. Refer to Figure 8-7. This helps to extend the service life of the air cleaner element. The valve lips must point straight down to operate effectively, and they must be kept free from debris. Periodically, mud and chaff can lodge in these lips and hold them open during engine operation.

Check the condition of the valve and lips frequently and keep them clean. The valve lips should be open only when the engine is shut down or running at low idle speed. If the valve is turned inside out, check for a clogged air cleaner inlet. Malfunction of this valve does not reduce the air cleaner

effectiveness, but does allow the element to get dirty faster reducing service life. If a valve is lost or damaged, replace it with a new valve of the same part number.

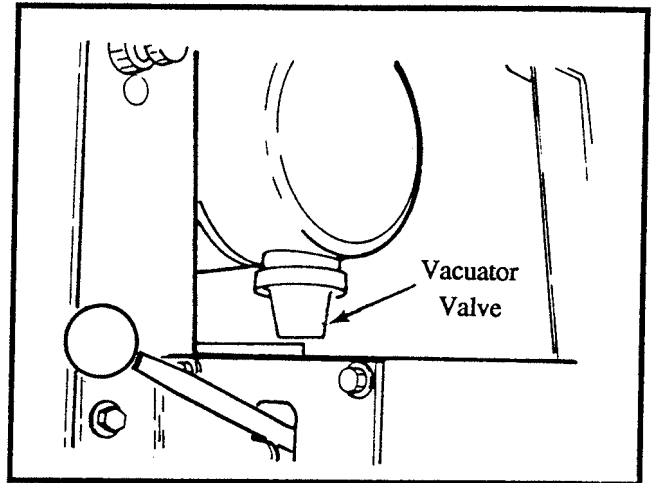


Figure 8-7. Vacuator Valve

#### Duct Work.

The following steps should be used to inspect and check the status of the duct work:

1. Check the air inlet cap and screen for accumulation of leaves, trash, and other debris that could restrict air flow. Repair the screen, or replace the cap, if any large holes are found in the screen.
2. Check all mounting hardware for security to eliminate possible vibration of inlet tube. Such vibration leads to early failure of hoses, clamps, and mounting parts. This can cause hoses to slip off the connecting pipes allowing unfiltered air into the engine air intake.
3. Check all hoses for cracks, chafing or deterioration, and replace them at the first sign of probable failure.

### FUEL/WATER SEPARATOR

The fuel/water separator located on the Cummins engine has a drain cock at the bottom. To clean and drain residue from the filter, open the drain cock and drain about one (1) cup of fuel and any water or sediment. Once this is completed, close the drain cock. Refer to Figure 8-8.

Continued

## SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE

### FUEL /WATER SEPARATOR- CON'T.

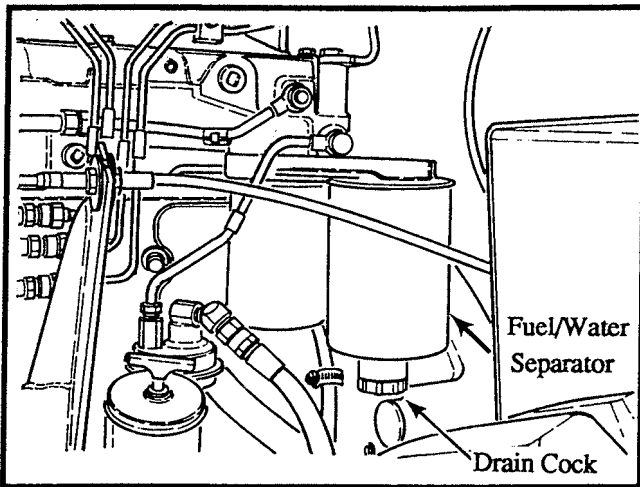


Figure 8-8. Fuel/Water Separator

### FUEL TANK

## ! WARNING

Fuel is flammable. May cause injury and property damage.

Shut down the engine, extinguish all open flames and do not smoke while filling the tank.

Always wipe up any spilled fuel.

The fuel tank and cap are located on the right side of the compactor. Refer to Figure 8-9. The fuel capacity of the tank is 41 gallons (155 liters) of No. 2 Diesel Fuel. There is an optional mechanical or electrical fuel level gauge offered on the machine. The mechanical gauge is located on the tank while the electrical gauge is on the control console. To prevent moisture condensation, fill the tank at the end of each working day. If the fuel tank must be drained, use the drain plug on the bottom of the tank.

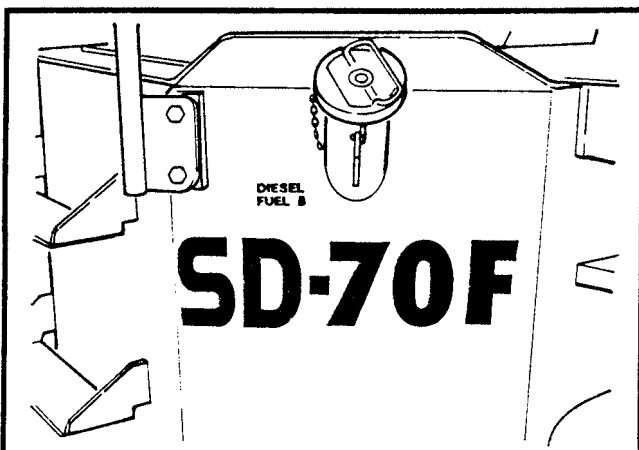


Figure 8-9. Fuel Tank

### ENGINE COOLANT (CUMMINS ENGINE)

## ! WARNING

Injury can occur when removing the radiator cap.

Steam or fluid escaping from the radiator can burn. Inhibitor contains alkali, avoid contact with skin and eyes.

Always shut down the engine and allow to cool down before removing the radiator cap. Remove cap slowly to relieve pressure. Avoid contact with steam or escaping fluid.

The radiator and cap are located at the center rear of the machine. The cap is accessible by using the access area on top of the engine cowling as shown in Figure 8-10. Some machines may have the optional latched cover. The radiator should be checked regularly for coolant level and proper coolant mix to provide adequate heat transfer and anti-freeze protection. Refer to Figure 8-10. Maintain the engine coolant to 1 1/2 inches (36 mm) below the bottom of the radiator fill cap with clean, drinkable water. It is recommended to use a 50-50 water and anti-freeze mixture. Also, a separate lubricant and corrosion inhibitor can be added to help with water pump lubrication, and guard against internal corrosion and freezing.

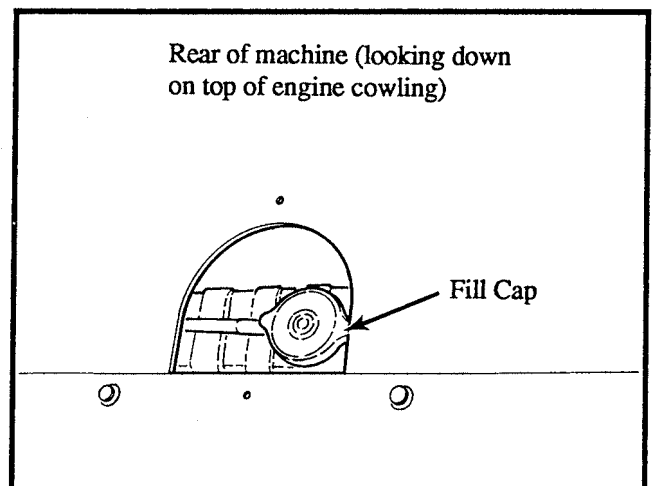


Figure 8-10. Radiator Fill Cap

### ENGINE V-BELT

Routinely check the belt for cracks or other damage. The Cummins engine has an automatic tension adjuster for the belt, so the belt should remain tight at all times. However, routinely observing the belt tension is encouraged.

## SECTION 8 - 10 HOUR OR DAILY ROUTINE MAINTENANCE

### DRUM

Perform a daily visual check to make sure the face of the drum is free of any material. Refer to Figure 8-11.

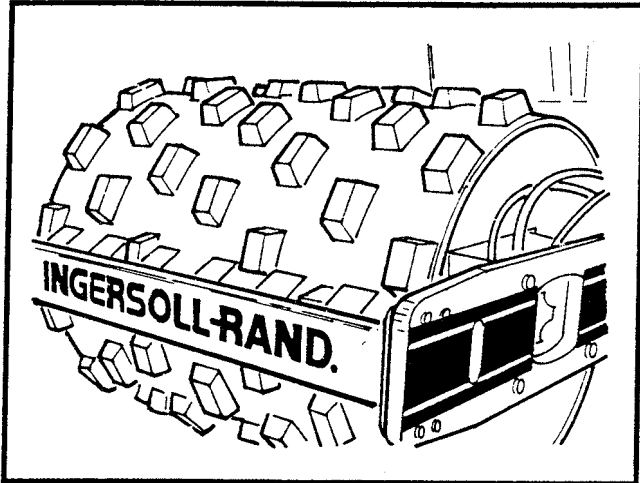


Figure 8-11. Drum (Padfoot Shown)

### DRUM SCRAPER

Perform a daily visual check of the drum scraper to make sure it is not damaged and is properly adjusted. The smooth drum scraper is offered for the SD-70DA machine and a padfoot drum scraper is offered for the SD-70F machine. For more information on the scrapers, refer to Section 15 - Miscellaneous and Optional Equipment.

### WATER TANKS (SD-70DA ONLY)

The water used to supply the water spray system for the drum and tires is held in tanks located on both the front and rear of the machine. The tank, mounted at the front of the machine, is for the drum while the tank at the rear, under the frame, is for the tires. Refer to Figure 8-12 below. Maintain full tanks of clean water at all times. Never allow the water tanks to become empty other than for cleaning.

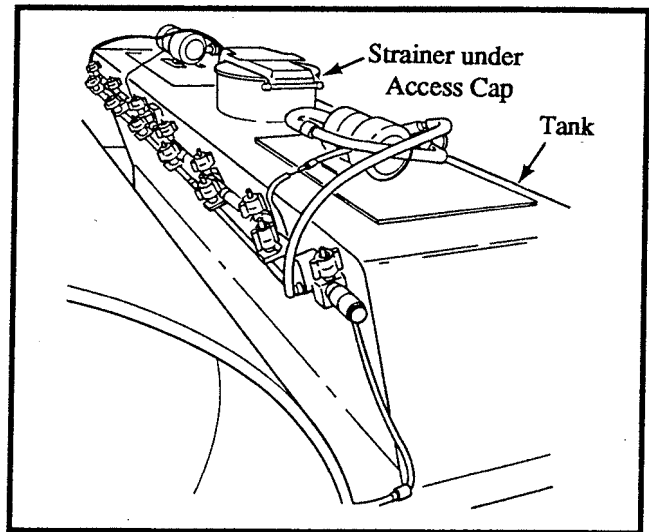


Figure 8-12. Water Tank (Front Shown)

### WATER STRAINER (SD-70DA ONLY)

There is a water strainer basket in the water tank at the front (drum) of the machine. The strainer is located inside the water fill access cap. Refer to Figure 8-12 above. Clean the strainer daily or anytime that water is added to the tanks.



## SECTION 9 - 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

Contents	Page	Contents	Page
WHEEL NUTS _____	1	ECCENTRIC OIL _____	3
OSCILLATION SWIVEL PIN _____	1	TIRE PRESSURE _____	3
ARTICULATION SWIVEL PINS _____	2	HYDRAULIC OIL _____	4
STEER CYLINDER PINS _____	2	BATTERY _____	5
WHEEL NUTS (TORQUE HUB) _____	2	SEAL BOOT GREASE (LUBE BOLT - TORQUE HUB) _____	6
TORQUE HUB OIL _____	2		

### **! WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **! WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### WHEEL NUTS

Check that the wheel nuts are torqued to the proper value. The proper torque value of the nuts is 350 foot-pounds (48 Kgm). If the wheel nuts are replaced, check and re-torque them if needed during and after the machine's initial operation. Thereafter, the nuts must be checked daily until they seat properly. Refer to Figure 9-1.

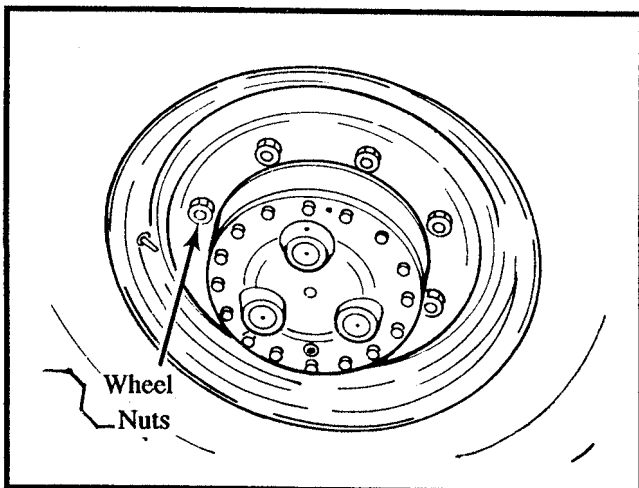


Figure 9-1. Wheel Nuts

#### OSCILLATION SWIVEL PIN

The Oscillation Swivel Pin is located in the articulation area. Grease the one fitting using five (5) shots of MPG-EP grease. Refer to Figure 9-2.

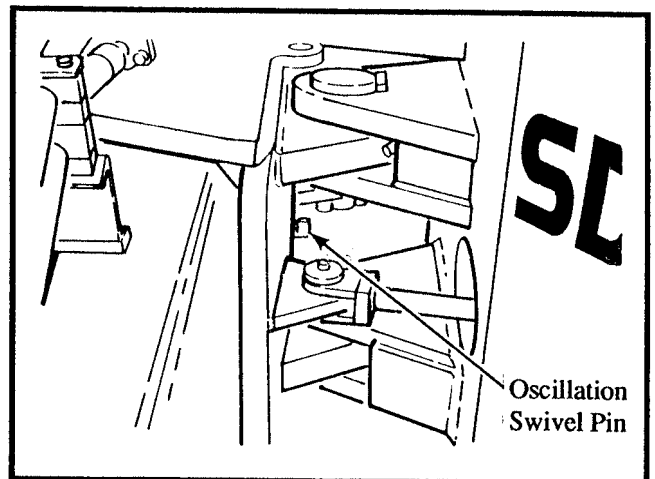


Figure 9-2. Oscillation Swivel Pin

### **! DANGER**

For ease of greasing these fittings, the SD-70 Series compactor can be articulated to obtain more work area. However, to do this the articulation lock pin can not be in the locked position. Be extremely careful that the compactor does not move while the articulation lock pin is not in the locked position. If the compactor does move, you could be crushed. Adhere to the following:

- Parking brake is APPLIED.**
- Compactor is on LEVEL GROUND.**
- Wheels and drum are CHOCKED.**
- Engine is OFF.**
- NO ONE is on the operator's platform.**

## SECTION 9 - 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

### ARTICULATION SWIVEL PINS

The articulation swivel pins are located in the articulation joint area. Grease the two fittings with three (3) shots of MPG-EP grease. Refer to Figure 9-3. The same **DANGER** precaution mentioned on page 9-1 concerning the oscillation swivel pin applies when working around the articulation swivel pins.

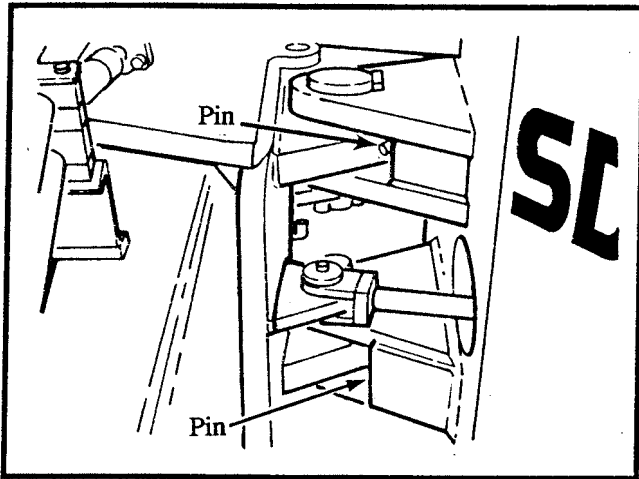


Figure 9-3. Articulation Swivel Pins

### STEER CYLINDER PINS

The lubrication fittings for the steering cylinder are located in the articulation joint area. There are four pins with each one having a fitting. There is one fitting at the rod end and one fitting at the base end of each cylinder. Lubricate each of the four pins with 3 shots of MPG-EP grease through the fittings. Refer to Figure 9-4.

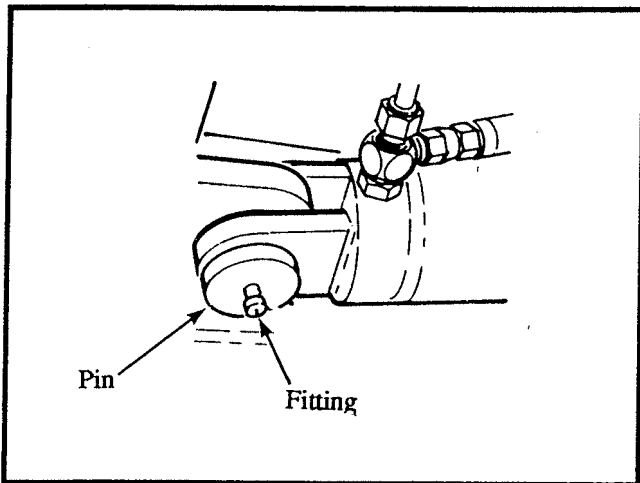


Figure 9-4. Steer Cylinder Pins

### WHEEL NUTS (TORQUE HUB)

Check that the torque hub wheel nuts are properly torqued to 220 foot-pounds (30 Kgm). If the torque hub wheel nuts are replaced, check and re-torque them during and after the initial machine operation. Thereafter, the nuts must be checked daily until they seat properly. Refer to Figure 9-5.

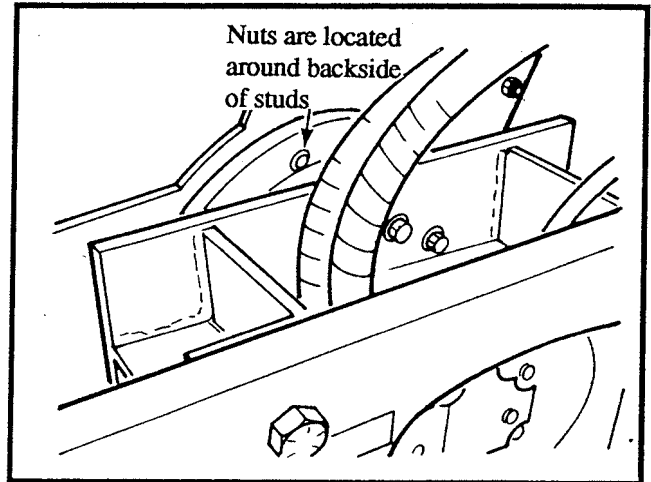


Figure 9-5. Wheel Nuts (Torque Hub)- Not Visible

### TORQUE HUB OIL

The torque hub is located on the hydraulic oil reservoir side of the compactor and mounted to the end of the drum. There are two plugs used for checking and changing the oil. Refer to Figure 9-6.

Use the following procedure to check the oil and fill:

1. Position the drum so that the index key on the drum shell is at the 12 o'clock position. This will orient the fill and level plugs to the 12 o'clock and 3 o'clock positions.
2. Apply the parking brake and chock the drum and tires.
3. Remove both plugs, and add oil if needed. Add oil through the 12 o'clock port until oil flows from the lower port. Refer to SECTION 6 - FUEL AND LUBRICATION SPECIFICATIONS and the Lube Chart for the proper oil specification.
4. Allow the oil to stop flowing from the lower port.
5. Clean, install and tighten both plugs.
6. Operate the machine and check for any leaks.

Continued

## SECTION 9 - 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

### TORQUE HUB OIL - CONT.

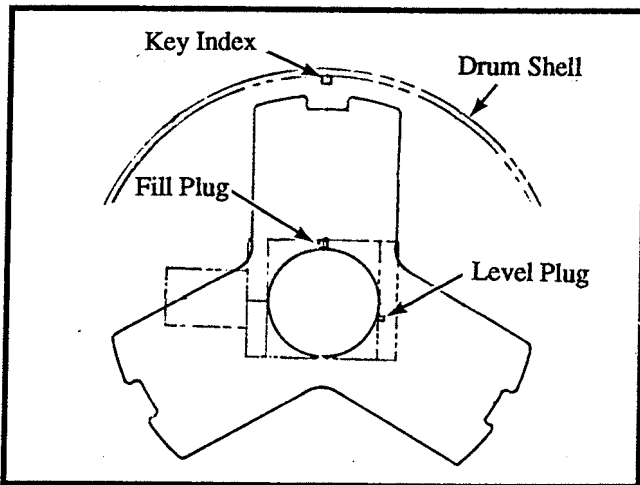


Figure 9-6. Torque Hub Oil Plugs

The oil level in the right angle drive unit (SD-70DA Only) is also to be checked at this interval. The unit is located in front of the torque hub looking in from the side of the drum. Remove the fill and level plugs located on the top and side of the unit. Refer to Figure 9-7. If oil is required, add through the fill port until oil flows from the side or level port. Once the oil stops flowing, install and tighten both plugs and check for any leaks.

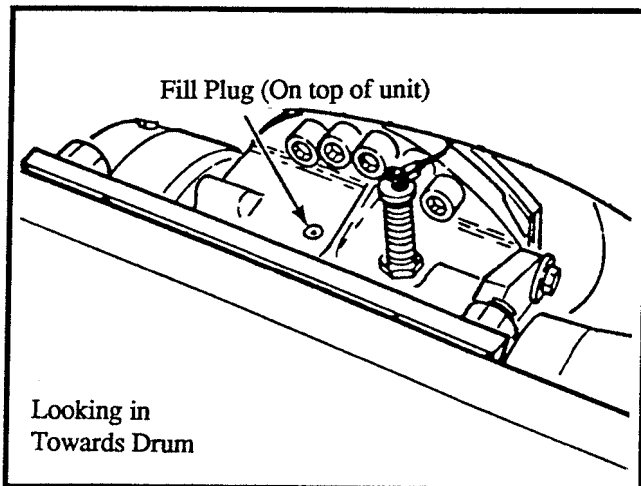


Figure 9-7. Right Angle Drive Unit

### ECCENTRIC OIL

The drum eccentric bearings are splash lubricated with oil contained in the eccentric housing. Make sure the machine is level, the parking brake is applied, and the drum and tires are chocked prior to checking the oil. Refer to Figure 9-8 for reference.

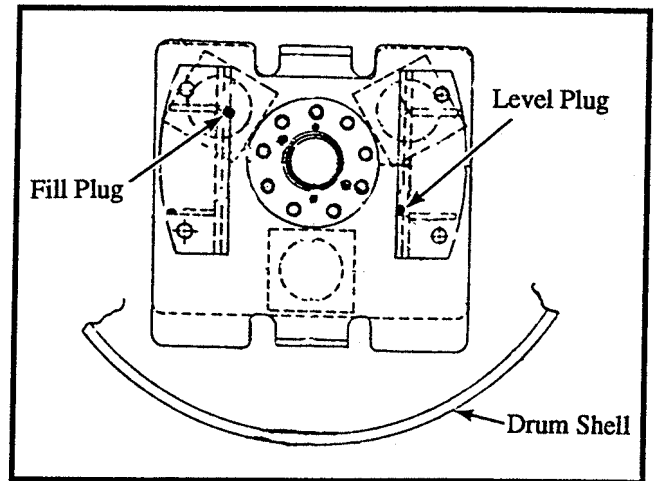


Figure 9-8. Eccentric Oil Plugs

Use the following procedure to check the eccentric oil:

1. Rotate the drum until the index on the inside diameter of the drum shell is at the 12 o'clock position. At this point, the fill plug is uppermost and the level plug is opposite, slightly below centerline.
2. Remove both plugs and add oil if needed. Fill the oil through the upper port until oil flows from the lower port. Make sure the machine is in a level position. Refer to Section 6 - Fuel and Lubrication Specifications and the lube chart for the proper oil specification.
3. Allow the oil to stop flowing from the lower port.
4. Clean, install and tighten both plugs.
5. Operate the machine and check for any leaks.

### TIRE PRESSURE

The tire pressure should be checked in the morning or prior to machine operation when the tires are cold. After checking the air pressure, be sure the valve caps are in place to prevent dirt, moisture and foreign material from damaging the valve core.

The normal tire inflation pressure is 24 psi for the tires on the SD-70, SD-70D and SD-70F machines. The tires for the SD-70DA machine have a 16 psi inflation rating.

Continued

## SECTION 9 - 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

### TIRE PRESSURE - CONT.

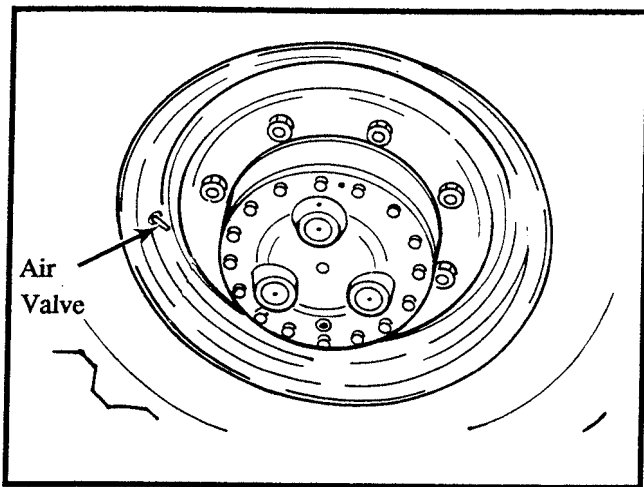


Figure 9-9. Tire Pressure Check

#### NOTE

*Be sure the tires are properly matched. Difference in make, model, size, and tire rolling radius may lead to shortened tire life.*

Improper tire inflation contributes to tire failure. Under inflation of tires will cause damage to the cord body. The repeated excessive flexing of the sidewall area may eventually cause a series of breaks and separation in the cord fabric. The recommended pressures are "cold" pressure. If 24 hour operation does not permit checking inflation pressure on completely cold tires, a correction factor can be determined.

Use the following procedure to obtain a correction factor:

1. Check and record the air pressure as often as possible with the tires "cold."
2. Check and record the air pressure again after at least two hours of machine operation.
3. The average difference must be added to the recommended pressure when checking the tires during constant operation.

For more information covering the standard and optional tires, refer to Section 15 - Miscellaneous and Optional Equipment in this manual.



## WARNING

Excessive air pressure may cause tire and rim to burst.

Flying tire and rim parts may cause serious injury or death.

Ingersoll-Rand recommends that tire mounting be done **ONLY** by a qualified person, equipped and trained to perform this service.

When mounting a tire, the qualified person should:

**BE SURE** rim is clean and rust free.

**LUBRICATE** generously both tire and rim with rubber lubricant.

**NEVER** inflate to **OVER 35 psi** to seat beads.

Excessive inflation pressure when seating beads may cause tire and rim assembly to burst with force sufficient to cause serious injury or death.

**CHECK** to ensure normal operating pressure.

Failure to comply with these safety precautions can cause the bead to break and the assembly to burst with force sufficient to cause serious injury or death.

### HYDRAULIC OIL

## NOTICE

Dirt in the hydraulic system will lead to premature component failure.

A clean contaminant-free system is extremely important in the machine's proper function.

Take extra care when working around or on the hydraulic system to ensure it's complete cleanliness.

The hydraulic reservoir is located on the left side of the machine. Since the hydraulic reservoir supplies oil for the hydraulic system, it is essential that the oil level be checked regularly. Maintain a full level of oil at all times. Hydraulic oil specifications are described in Section 6 - Fuel and Lubrication Specifications of this manual. The proper procedure for changing oil is described in Section 13 - 1000 Hour or Annual Routine Maintenance.

The oil fill cap with dipstick is located on the top side of the hydraulic reservoir. Refer to Figure 9-10. A drain plug is provided on the bottom of the reservoir. Make sure the

## SECTION 9 - 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

### HYDRAULIC OIL - CONT.

reservoir is always filled with clean hydraulic oil from unopened containers. When adding the oil, filter it through a 10 micron filter.

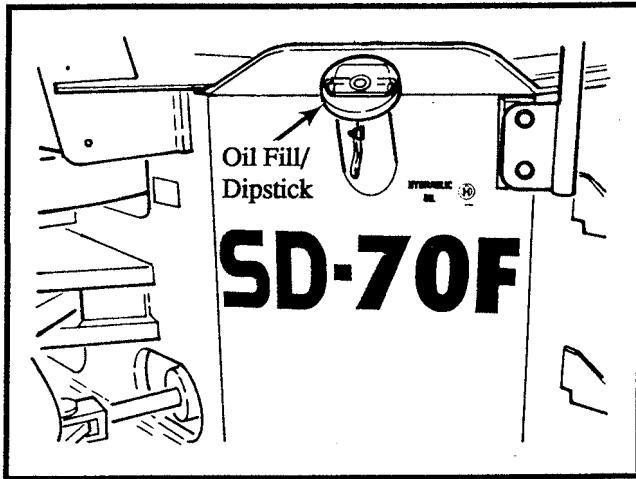


Figure 9-10. Hydraulic Oil Fill and Dipstick

### BATTERY

The battery is located under the operator's seat and is accessible by tilting the seat forward on the seat mounting plate. Refer to Figure 9-11. Check all battery connections making sure they are tight and free of corrosion. Keep the battery clean at all times. Use a small amount of grease on the terminals to help keep them free of corrosion.

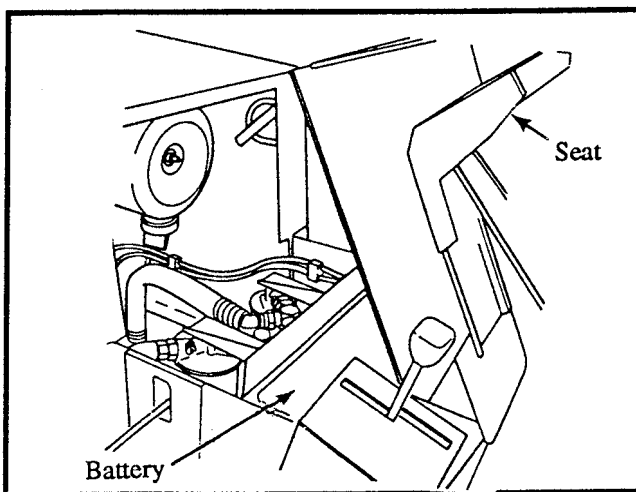


Figure 9-11. Battery

## **! WARNING**

Batteries contain an acid and can cause injury.

Battery fumes can ignite and explode. Skin and eye contact with the battery fluid can cause injury.

Do not smoke when observing battery fluid level. Avoid skin and eye contact with the battery fluid. If contact occurs, flush area immediately with water.

## **! WARNING**

Batteries give off fumes that can explode.

Be sure the battery area is well ventilated (clear of fumes) should it become necessary to connect a jump battery or battery charger.

Do not smoke or use an open flame near a battery.

The battery in the machine may be the maintenance-free type and require no maintenance. If it is not, the following information applies. Check that the electrolyte level in the battery is to the full indicator, and add clean distilled water if needed. Use a battery hydrometer to measure the specific gravity in each cell. Refer to Figure 9-12. A fully charged battery will read 1.265 specific gravity at 80° F.

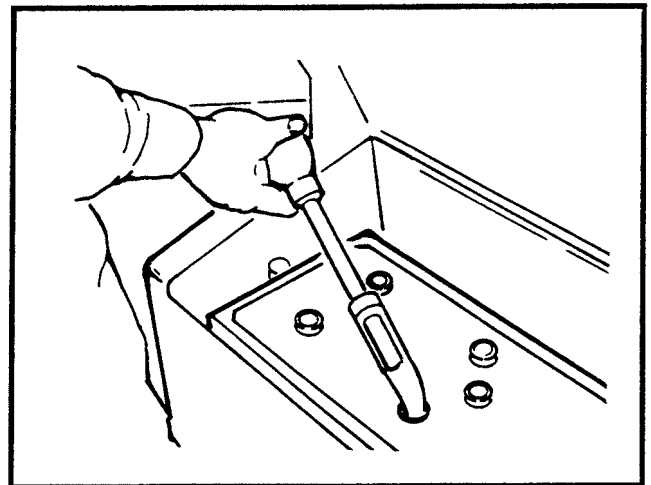


Figure 9-12. Using Battery Hydrometer

The hydrometer reading will not be absolutely correct until a temperature correction has been applied. At ordinary temperatures, the error will be very small, and no correction

Continued

## SECTION 9 - 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

### BATTERY - CONT.

will be needed. However, at extreme temperatures the correction is important. The method of correction is explained in the following paragraph.

The temperature correction depends on the temperature of the electrolyte in the battery, NOT on the temperature of the air. To make the correction, the temperature of the electrolyte must be measured. The hydrometer is calibrated to read correctly at only one temperature (80° F.). The difference between this temperature and the electrolyte temperature, is used to make the correction at the rate of 4 "points of gravity" (.004) for every 10° F. difference. An example of this calculation follows:

TEMPERATURE BELOW 80° F.		
Hydrometer Reading	1.250	
Acid Temperature (20° F.)		
Subtract	0.024	Spec. Gravity
Corrected Spec. Gravity	1.226	
TEMPERATURE ABOVE 80° F.		
Hydrometer Reading	1.235	
Acid Temperature (100° F.)		
Add	0.008	Spec. Gravity
Corrected Spec. Gravity	1.243	

The following chart illustrates typical ranges of specific gravity for a battery cell in various stages of charge. The values of specific gravity are given with respect to full charge reference values at 80° F. of 1.26 to 1.28.

### TYPICAL RANGES OF SPECIFIC GRAVITY

1.280 Sp. Gr. to		
1.260 Sp. Gr. —————	100% Charged	
1.250 Sp. Gr. to		
1.230 Sp. Gr. —————	75% Charged	
1.220 Sp. Gr. to		
1.200 Sp. Gr. —————	50% Charged	
1.190 Sp. Gr. to		
1.170 Sp. Gr. —————	25% Charged	
1.160 Sp. Gr. to		
1.140 Sp. Gr. —————	Very little useful capacity.	
1.130 Sp. Gr. to		
1.110 Sp. Gr. —————	Discharge	

### SEAL BOOT GREASE (LUBE BOLT - TORQUE HUB)

There are four mounting bolts used to hold the torque hub motor cover plate in position to the drum. Refer to Figure 9-13. One of the bolts serves as a lubrication point for the torque hub motor. At this maintenance interval, add a few shots of MPG-EP2 Grease through the bolt for lubrication.

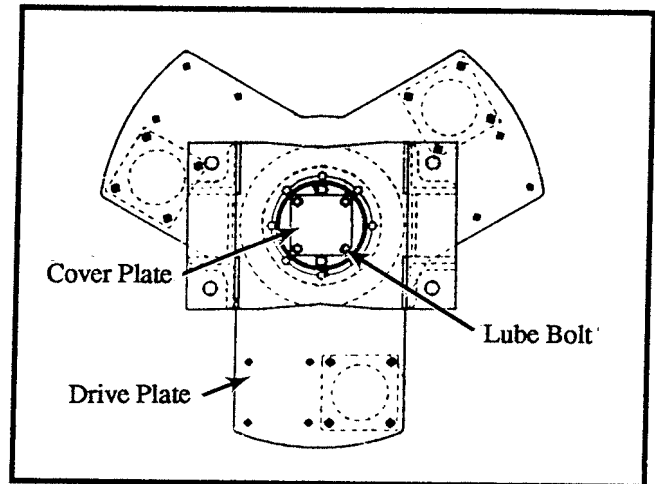


Figure 9-13. Lubrication Bolt (Torque Hub)

## SECTION 10 - 100 HOUR OR MONTHLY ROUTINE MAINTENANCE

Contents	Page	Contents	Page
ENGINE OIL AND FILTER	1	WHEEL END AND BRAKE END OIL	2
AXLE HOUSING OIL	2	SHIFT LINKAGE (AXLE)	3
TRANSMISSION OIL	2		

### **! WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **! WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### ENGINE OIL AND FILTER

### **! WARNING**

Hot oil or components can burn.

Oil must be at normal operating temperature when draining.

Avoid contact with hot oil or components.

The engine oil and filter should be changed at this time interval. The engine oil is filtered by means of a spin-on type oil filter. Refer to Figure 10-1. The oil and filter change should be done while the engine is still warm. This aids in the removal of any contaminants suspended in the oil.

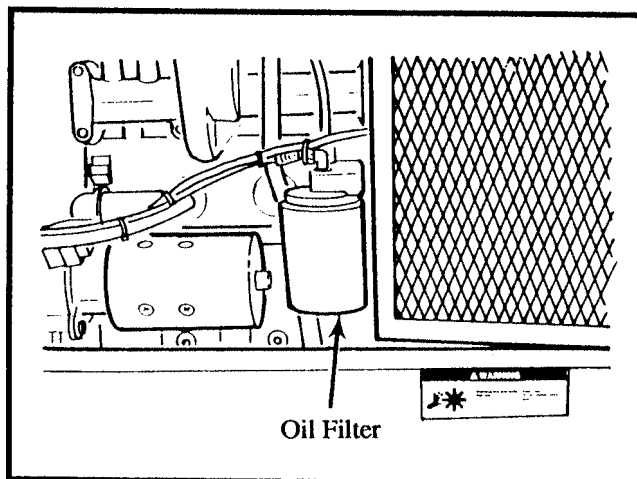


Figure 10-1. Engine Oil Filter

Use the following procedure to drain oil from the engine crankcase, replace the used oil filter, and fill the engine crankcase with new oil.

1. Remove drain plug from the bottom of the engine crankcase to drain oil. Refer to Figure 10-2.

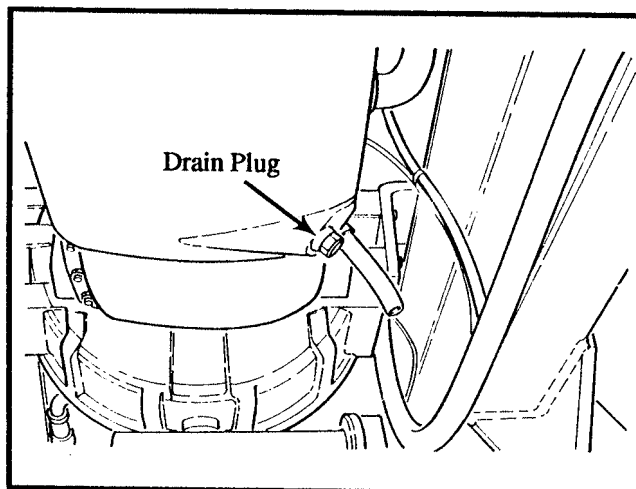


Figure 10-2. Engine Oil Drain Plug

## SECTION 10 - 100 HOUR OR MONTHLY ROUTINE MAINTENANCE

### ENGINE OIL AND FILTER - CON'T.

2. Allow all oil to drain from engine crankcase.
3. Install drain plug at bottom of engine crankcase.
4. Unscrew used oil filter and discard it.
5. Fill new oil filter replacement about two-thirds (2/3) full with clean SAE 15W40 CD (MIL-L-2104) motor oil.
6. Lightly coat the seal gasket of the new filter replacement with clean oil. Install the filter and tighten it one-half (1/2) of a turn beyond the gasket contact.
7. Fill engine crankcase with SAE 15W40 CD (MIL-L-2104) motor oil to the full mark on the dipstick. Refer to Figure 10-3.
8. Operate engine for a few minutes and look for leaks.

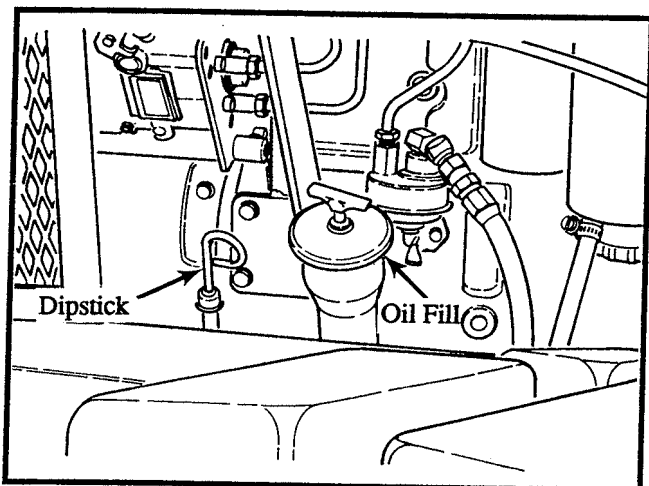


Figure 10-3. Engine Oil Fill and Dipstick

### AXLE HOUSING OIL

Check the oil level of the axle housing by removing the fill/level plug located on the face of the housing. Refer to Figure 10-4.

Make sure the oil level is maintained to the bottom of the fill/level port. If the level is low, add GL-5 SAE 90 (MIL-L-2105C) gear oil until the proper level is obtained.

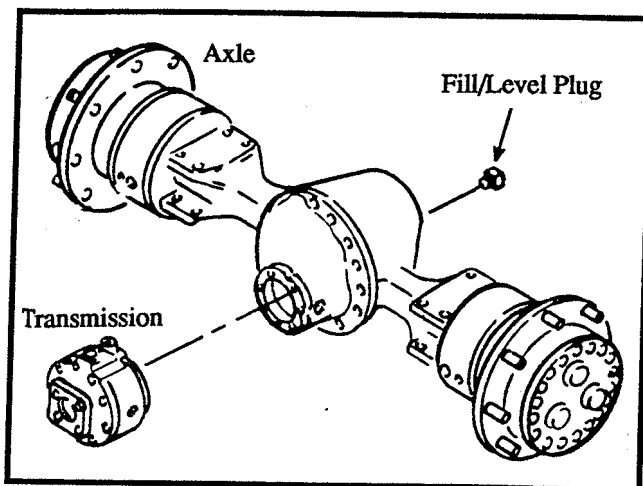


Figure 10-4. Axle Housing Fill/Level Plug

### TRANSMISSION OIL

Check the transmission oil level by removing the fill/level plug located on the side of the transmission housing. Make sure the oil level is maintained to this port. If the oil level is low, add GL-5 SAE 90 (MIL-L-2105C) gear oil through this port. There is also a fill port, located at the top of the housing, that may be more accessible to use for adding oil.

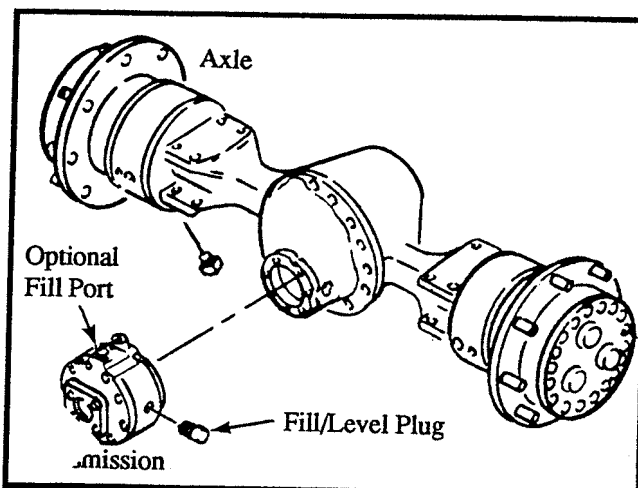


Figure 10-5. Transmission Oil Fill/Level Plug (Side)

### WHEEL END AND BRAKE END OIL

To check the oil level of the wheel end, position the wheels so that the fill/level plug is in the 3 o'clock or 9 o'clock position. Now, remove the fill/level plug located on the outside of the hub. Refer to Figure 10-6.



## SECTION 10 - 100 HOUR OR MONTHLY ROUTINE MAINTENANCE

### WHEEL END AND BRAKE END OIL - CONT.

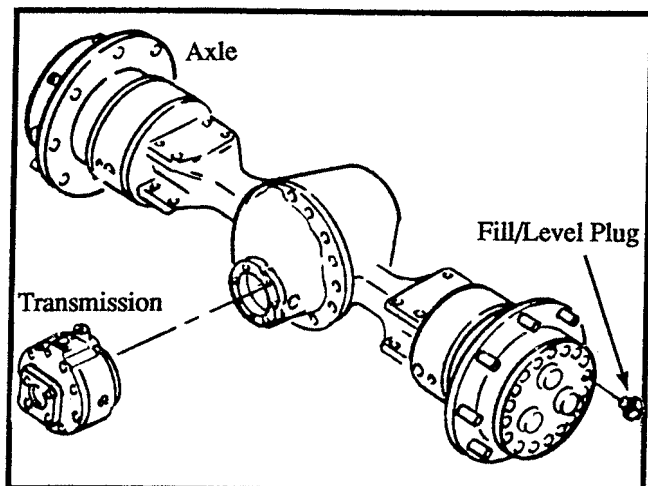


Figure 10-6. Wheel End Fill/Level Plug

Ensure that the oil level in the wheel end is maintained to this fill/level port. If the level is low, add SAE 15W40 CD (MIL-L-2104) motor oil to obtain the proper level. By adding oil to the wheel end, oil is also filling the disc brake end, since both wheel and brake share a common oil supply. However, both ends must be filled and checked separately to ensure total lubrication occurs.

To check the oil level in the disc brake end, remove the fill/level plugs located on the side of the hub. Refer to Figure 10-7. The brake end oil level should always be checked at the same time the wheel end oil is checked. When the oil level is low, add SAE 15W40 CD (MIL-L-2104) motor oil to one of these ports.

Repeat the above process for the wheel end and disc brake end located on the opposite end of the axle.

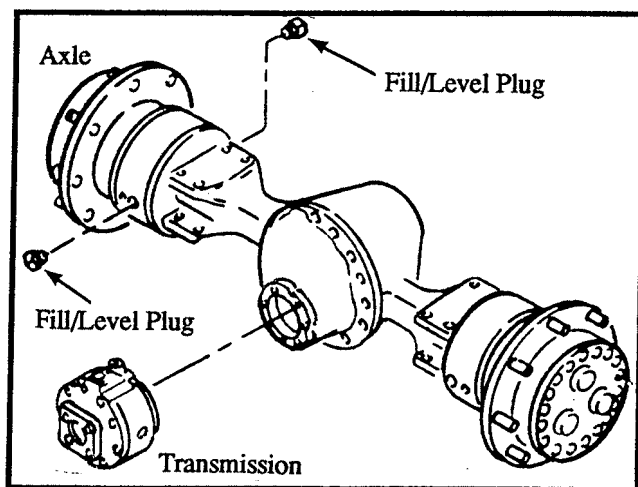


Figure 10-7. Disc Brake End Fill/Level Plug

### SHIFT LINKAGE (AXLE)

To maintain shifting ease, clean and lubricate the pivot points on the shifting linkage. Apply SAE 15W40 CD (MIL-L-2104) motor oil sparingly to provide necessary lubrication and help prevent rust formation.



## SECTION 11 - 300 HOUR OR QUARTERLY ROUTINE MAINTENANCE

Contents	Page
AXLE HOUSING BREATHER	1
TRANSMISSION HOUSING BREATHER	1
HYDRAULIC FILTER (PROPULSION SYSTEM)	1

Contents	Page
HYDRAULIC FILTER (STEERING AND VIBRATION SYSTEM)	2
FUEL FILTER AND FUEL/WATER SEPARATOR	2
CARRIER RELIEF VALVE (ONLY SD-70DA - S/N 5512 & ABOVE)	3

### ⚠ WARNING

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### ⚠ WARNING

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### AXLE HOUSING BREATHER

There is a breather located on the axle housing. Refer to Figure 11-1. Clean the area around the breather thoroughly and remove it. Cover the hole in the housing to make sure nothing can get inside until the breather is installed. Clean the breather in a non residue type solvent, inspect for damage, and dry and install it. After installing the breather, move the cap several times to make sure the breather is clean and free to move.

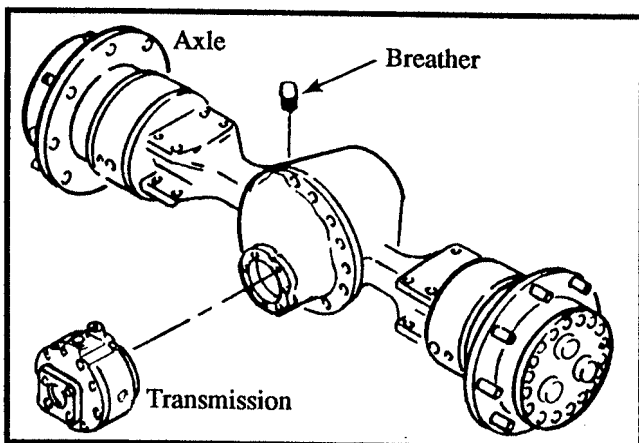


Figure 11-1. Axle Housing Breather

#### TRANSMISSION HOUSING BREATHER

A breather and hose assembly are located on the transmission. The breather is inserted into the end of the hose, and the breather end is attached to the side of the engine fly wheel housing. The other end of the hose is attached at the transmission housing. Refer to Figure 11-2. Clean the breather and the area around it. Clean the breather with a non-residue type solvent, inspect for damage, and dry and install it.

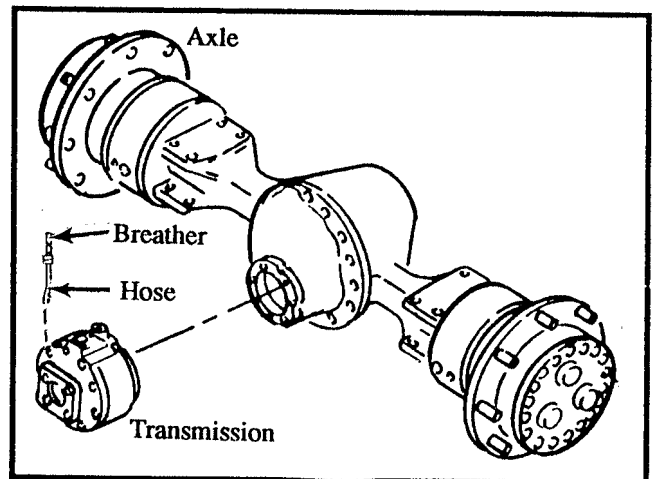


Figure 11-2. Transmission Housing Breather

#### HYDRAULIC FILTER (PROPULSION SYSTEM)

The Propulsion Hydraulic Filter is a 10 micron, spin-on type filter located on the left side of the engine compartment behind the operator's seat. This filter is for the propulsion system and must be changed every 300 hours. Refer to Figure 11-3.

Use the following procedure to remove and replace the hydraulic oil filter:

1. With the machine shut down, lift upwards on the operator's seat and towards the console to access the filter.
2. Unscrew the used filter and discard it.
3. Fill the new replacement oil filter with clean hydraulic oil.

Continued  
11-1

## SECTION 11 - 300 HOUR OR QUARTERLY ROUTINE MAINTENANCE

### HYDRAULIC FILTER (PROPULSION SYSTEM) - CONT.

4. Lightly coat the seal gasket with clean oil and install the new oil filter assembly. Tighten the oil filter one quarter (1/4) of a turn beyond gasket contact.
5. Start the machine and check for proper operation.
6. Check the machine for any leaks.

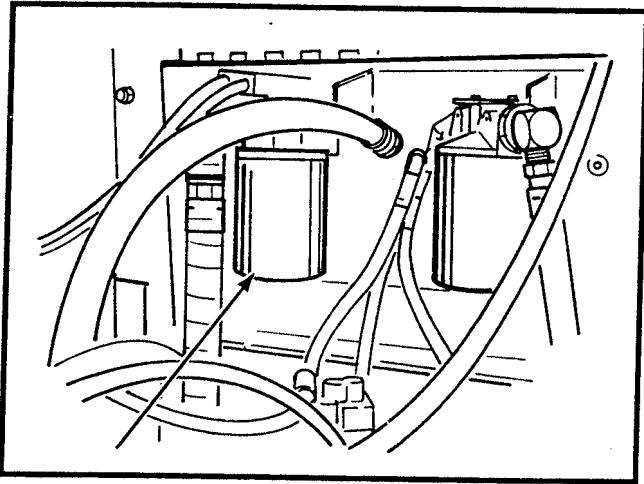


Figure 11-3. Hydraulic Filter (Propulsion System)

### HYDRAULIC FILTER (STEERING AND VIBRATION SYSTEM)

The steering and vibration filter is a 10 micron, spin-on type filter located on the right side of the engine compartment behind the operator's seat. Refer to Figure 11-4. The filter must be changed every 300 hours of operation.

Use the following procedure to remove and replace the oil filter:

1. With the machine shut down, lift upward on the operator's seat and towards the console to access the filter.
2. Unscrew the used filter and discard it.
3. Fill the new replacement oil filter with clean hydraulic oil.
4. Lightly coat the seal gasket with clean oil and install the new filter assembly. Tighten the oil filter one quarter (1/4) of a turn beyond gasket contact.
5. Start the machine and check for proper operation and any leaks.

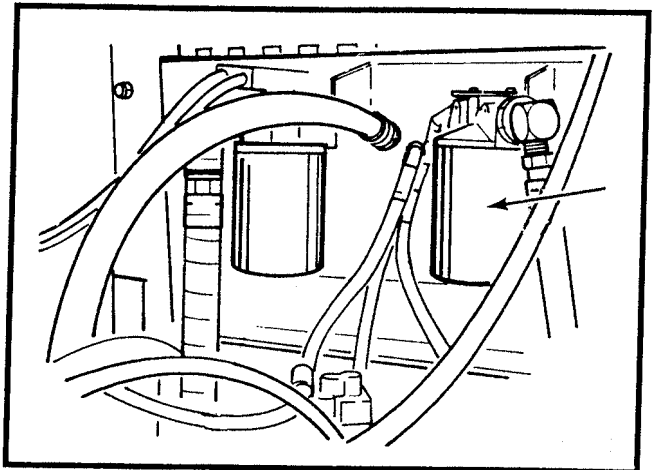


Figure 11-4. Hydraulic Filter (Steering/Vibration System)

### FUEL FILTER AND FUEL/WATER SEPARATOR

Filtration and separation of water from the fuel is important for trouble-free operation of the fuel system. Cummins engines have both a fuel filter and a fuel/water separator mounted on a dual filter adapter. Refer to Figure 11-5. The fuel flows through the adapter to a larger combination fuel/water separator filter, and back to the fuel filter for final filtering. This arrangement is especially effective in work areas where there is great exposure of the fuel to water, rust particles, dust and other contaminants. The fuel/water separator has a valve which should be opened daily to drain collected water. The filters should be changed at this maintenance interval.

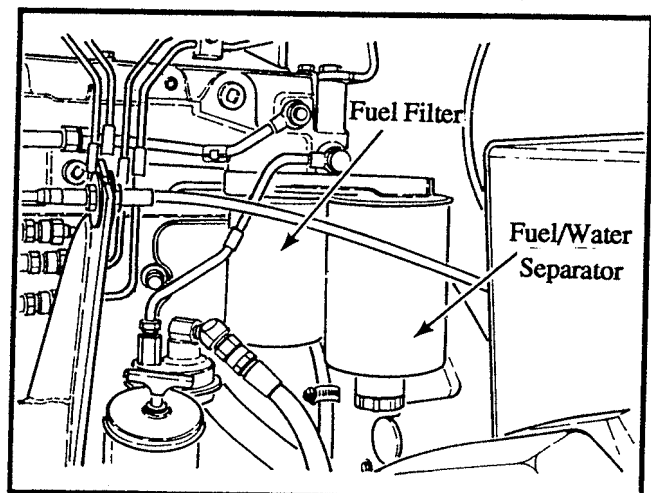


Figure 11-5. Fuel Filter and Fuel/Water Separator

Continued

## SECTION 11 - 300 HOUR OR QUARTERLY ROUTINE MAINTENANCE

### FUEL FILTER AND WATER SEPARATOR - CONT.

Use the following procedure to replace the fuel filter and fuel/water separator:

1. With the engine shut down, unscrew the used fuel filter and fuel/water separator elements and discard them.
2. Fill the new elements with clean diesel fuel.
3. Lightly coat the seal gaskets with clean diesel fuel, and install the new filter elements. Tighten the filters to one half (1/2) of a turn beyond gasket contact.
4. Start the engine and check for proper operation.
5. Check the machine for any leaks.

### CARRIER RELIEF VALVE (ONLY SD-70DA - S/N 5512 AND ABOVE)

The carrier relief valve is to be removed and cleaned at this time for all SD-70DA machines S/N 5512 and above. The valve is located in the carrier housing on the vibration side of the drum. The valve inserts through holes in the shock mounting plate and bracket. Once the valve is removed, wash in a solvent and dry thoroughly. Install the valve after cleaning and drying. Refer to Figure 11-6.

All SD-70, SD-70D, SD-70F and SD-70DA machines S/N 5511 and below should have the valve removed and cleaned at 500 hours as described in SECTION 12 - 500 Hour or Semiannual Routine Maintenance.

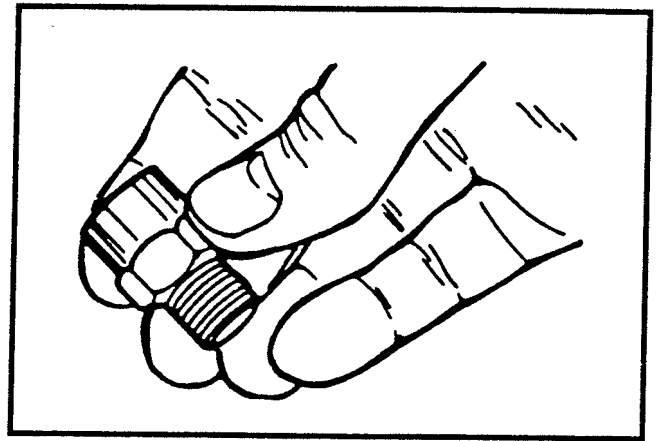


Figure 11-6. Carrier Relief Valve



## SECTION 12 - 500 HOUR OR SEMI-ANNUAL ROUTINE MAINTENANCE

Contents	Page	Contents	Page
ARTICULATION SWIVEL PIN NUTS	1	OSCILLATION SWIVEL PIN NUT	4
ECCENTRIC OIL (SD-70, SD-70D, SD-70F & SD-70DA - S/N 5511 AND BELOW)	1	TORQUE HUB OIL (SD-70, SD-70D, SD-70F & SD-70DA - S/N 5511 AND BELOW)	4
AXLE HOUSING OIL	2	CARRIER OIL (SD-70, SD-70D, SD-70F & SD-70DA - S/N 5511 AND BELOW)	5
TRANSMISSION OIL	3	CARRIER RELIEF VALVE (SD-70, SD-70D, SD-70F & SD-70DA - S/N 5511 AND BELOW)	6
WHEEL END AND BRAKE END OIL	3		
AXLE MOUNTING BOLTS	4		

### ! WARNING

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### ! WARNING

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

### ! WARNING

Hot oil or components can burn.

Oil must be at normal operating temperature when draining.

Avoid contact with hot oil or components.

#### ARTICULATION SWIVEL PIN NUTS

The swivel pin nuts are located in the articulation joint area and should be torqued to 500 foot-pounds (69 Kgm). Frequent visual checks of the vertical nuts should be made for wear and use. Refer to Figure 12-1.

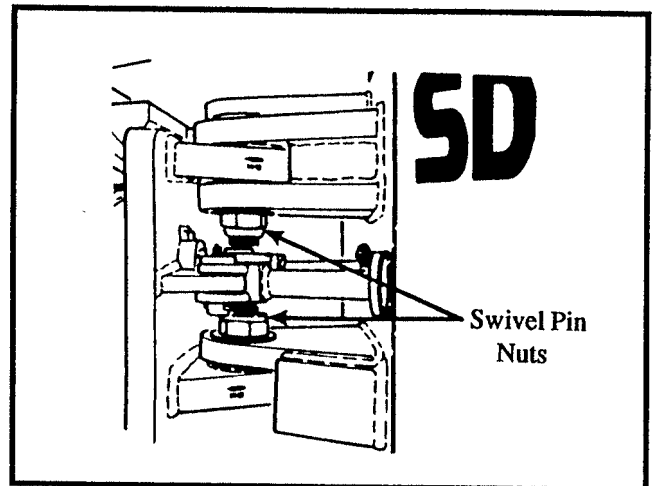


Figure 12-1. Articulation Swivel Pin Nuts

#### ECCENTRIC OIL

The eccentric bearings are splash lubricated with oil contained in the eccentric housings. Refer to Figures 12-2 and 12-3. The eccentric oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, the oil should be changed every 500 hours or semi-annually. Due to an eccentric bearing change for the SD-70DA machines S/N 5512 and above, the oil change for these machines occurs at 1000 hours or annually, instead of 500 hours. Refer to Section 13 - 1000 Hour or Annual Routine Maintenance for this oil change procedure.

Use the following procedure to change the eccentric oil at 500 hour interval:

1. Position the machine on level ground.

Continued

## SECTION 12 - 500 HOUR OR SEMI-ANNUAL ROUTINE MAINTENANCE

### ECCENTRIC OIL - CONT.

2. Position the drum so one of the two eccentric plugs is in the 6 o'clock position. Refer to Figure 12-2.

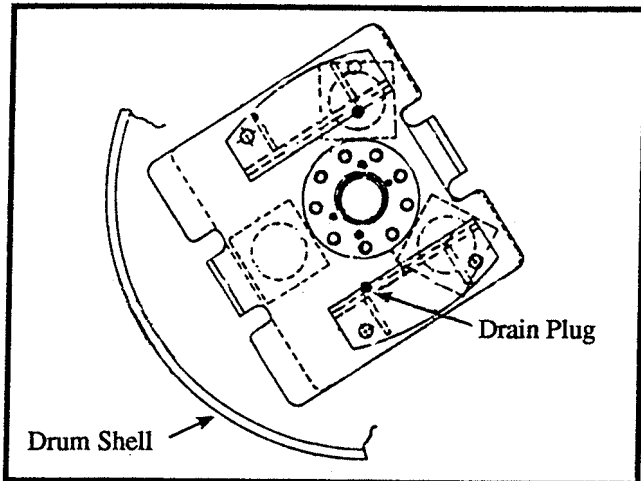


Figure 12-2. Eccentric Drain Plug Position

3. Install the articulation lock pin, apply the parking brake and shut down the engine.
4. Remove both eccentric plugs and allow the oil to drain from the housing. Be careful, hot oil and components can burn.
5. When the oil has completely drained, position the drum so the key index is in the 12 o'clock position. This positions the fill plug at the top while the level plug is opposite and slightly below the centerline. Refer to Figure 12-3.

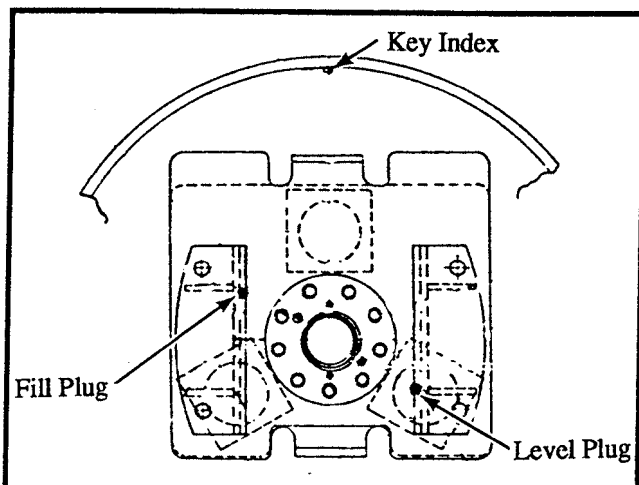


Figure 12-3. Eccentric Fill Plug Location

6. To refill the housing, add GL-5 SAE 90 (MIL-L-2105C) gear oil through the upper port until oil flows from the lower port.
7. Allow the oil to stop flowing from the lower port.
8. Clean, install and tighten both plugs.
9. Operate the machine and check for any leaks.

### AXLE HOUSING OIL

The axle housing oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, change the oil every 500 hours or semi-annually.

Use the following procedure to change the axle housing oil:

1. Position the machine on level ground.
2. Install the articulation lock pin, apply the parking brake, chock the drum and wheels, and shut down the engine.
3. Remove the drain plug in the bottom center of the axle housing. Be careful, hot oil and components can burn. Refer to Figure 12-4.

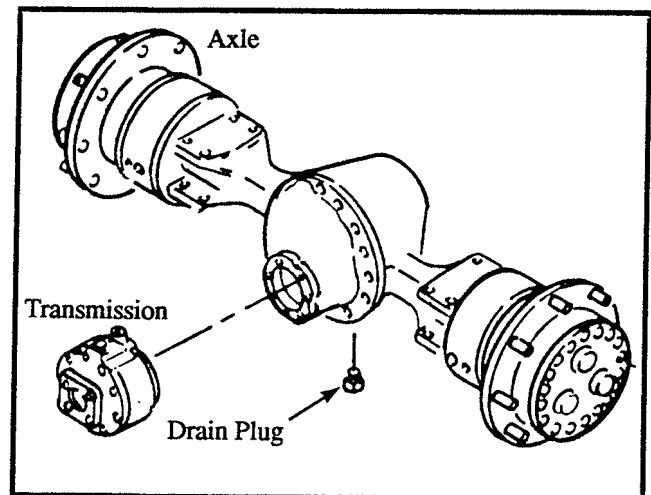


Figure 12-4. Axle Housing Drain Plug

4. Allow all of the oil to drain from the housing.
5. Clean the drain plug and install it back into the housing.
6. Remove the fill/level plug located in the face of the axle housing. Using that port, refill the housing with GL-5 SAE 90 (MIL-L-2105C) gear oil. Refer to Figure 12-5.

Continued



## SECTION 12 - 500 HOUR OR SEMI-ANNUAL ROUTINE MAINTENANCE

### AXLE HOUSING OIL - CONT.

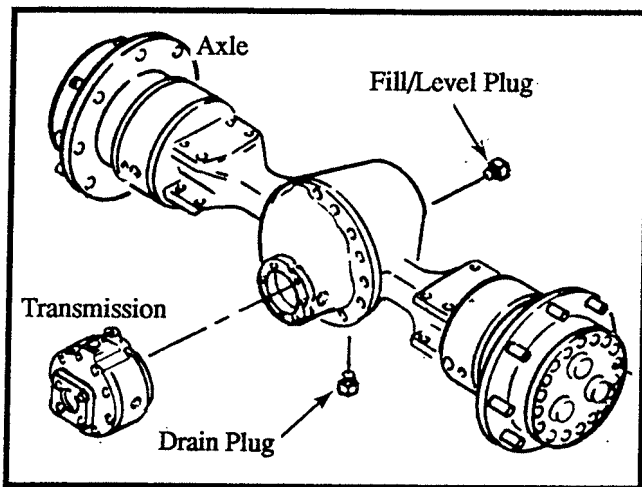


Figure 12-5. Axle Housing Fill/Level Plug

7. Clean and install the fill/level plug back into the housing.
8. Operate the machine and check for any leaks.

### TRANSMISSION OIL

The transmission oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, change the oil every 500 hours or semi-annually.

Use the following procedure to change the transmission oil:

1. Position the machine on level ground.
2. Install the articulation lock pin, apply the parking brake, chock the drum and wheels, and shut down the engine.
3. Remove the drain plug from the bottom center of the transmission housing. Be careful, hot oil and components can burn. Refer to Figure 12-6.

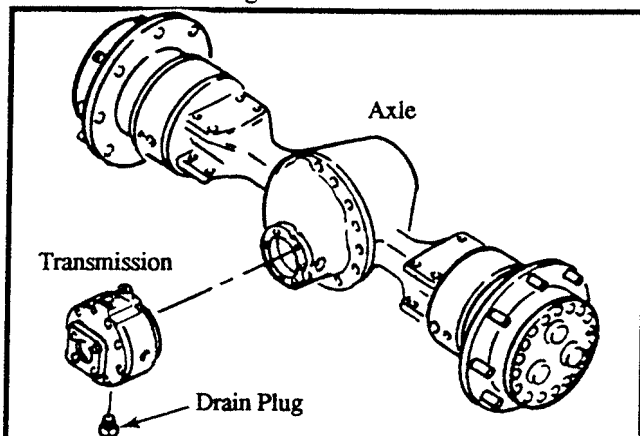


Figure 12-6. Transmission Drain Plug

4. Allow all of the oil to drain from the housing.
5. Clean the drain plug and install it back into the housing.
6. Remove the fill/level plug on the side of the transmission housing. Using this port, refill the transmission to this level using GL-5 SAE 90 (MIL-L-2105C) gear oil. Refer to Figure 12-7.

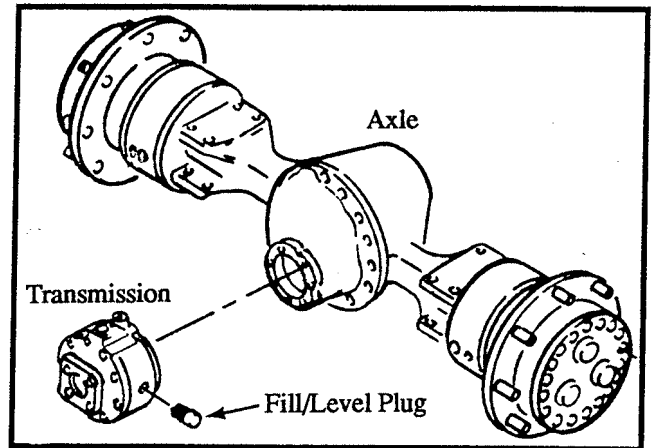


Figure 12-7. Transmission Fill/Level Plug

7. Clean the fill/level plug and install back into the housing.
8. Operate the machine and check for any leaks.

### WHEEL END AND BRAKE END OIL

The oil in the wheels and brake ends are to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, change the oil every 500 hours or semi-annually. The wheels and brake ends share a common oil supply, and should be drained and filled independently. This will ensure that the wheels and brakes are fully lubricated.

Use the following procedure to change the wheel and brake end oil. Also refer to Figure 12-8 for reference.

1. Position the machine on level ground with the wheel end plugs at the 6 o'clock position.
2. Install the articulation lock pin, apply the parking brake, and shut down the engine.

## SECTION 12 - 500 HOUR OR SEMI-ANNUAL ROUTINE MAINTENANCE

### WHEEL END AND BRAKE END OIL - CONT.

3. To drain oil from the wheel end, remove the plug at the 6 o'clock position. Be careful, hot oil or components can burn. Refer to Figure 12-8.

To drain oil from the brake end, remove the plug on the housing underside and the two plugs on each side of the brake housing.

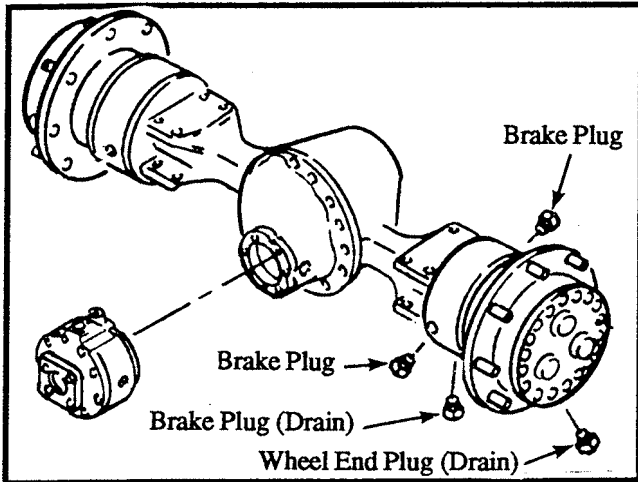


Figure 12-8. Wheel End and Brake End Plugs

4. Allow the oil to completely drain from the wheel and brake end.
5. Position the wheel end with the port used for draining to the 3 o'clock position, and replace the drain plug on the underside of the brake end. Using this 3 o'clock port for the fill port, add SAE 15W40 CD (MIL-L-2104) motor oil to fill the wheel end to the bottom of this port. Make sure oil reaches the level ports on the brake end also. If needed, add oil directly through these ports to obtain proper level.
6. Clean all of the plugs. Install the fill/level plugs back into the wheel and brake end.
7. Repeat steps 1 through 6 to change the oil in the other wheel and brake end of the axle.
8. Operate the machine and check for any leaks.

### AXLE MOUNTING BOLTS

The axle mounting bolts are accessible from under the compactor. Refer to Figure 12-9. The bolts should be torqued after the first 50 to 100 hours of operation. Thereafter, the bolts should be torqued every 500 hours or semi-annually. The bolts are to be torqued to 440 foot-pounds (61 Kgm).

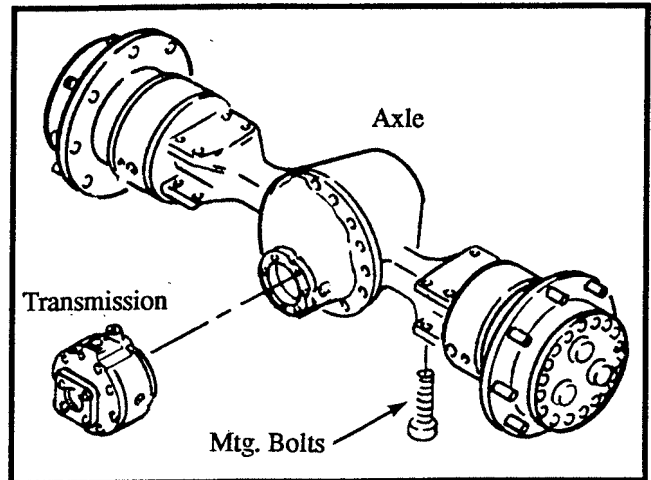


Figure 12-9. Axle Mounting Bolts

### OSCILLATION SWIVEL PIN NUT

The oscillation swivel pin nut is located in the articulation area and should be torqued to 1000 foot-pounds (138 Kgm). Refer to Figure 12-10. After torquing the nut, the clearance between the drum frame and the backing plate should be parallel as viewed from the side. If they are not parallel, the bearing needs to be replaced or an adjustment made. To make the proper bearing adjustment, refer to Section 14 - Routine Adjustments in this manual.

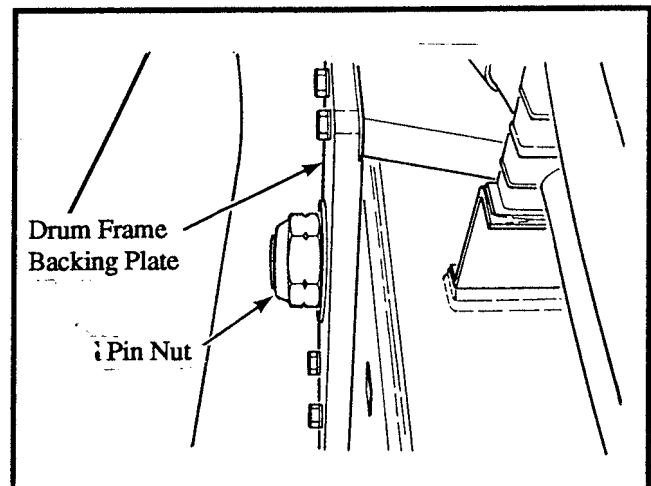


Figure 12-10. Oscillation Swivel Pin Nut

### TORQUE HUB OIL

The torque hub oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, change the oil every 500 hours or semi-annually. Due to a bearing change for the SD-70DA machines S/N 5512 and above, the oil change for these machines occurs at

Continued

## SECTION 12 - 500 HOUR OR SEMI-ANNUAL ROUTINE MAINTENANCE

### TORQUE HUB OIL - CONT.

1000 hours or annually, instead of 500 hours. Refer to Section 13 - 1000 Hour or Annual Routine Maintenance for the procedure.

Use the following procedure to change the torque hub oil at 500 hours:

1. Position the machine on level ground.
2. Position the drum so one of the two plugs is in the 6 o'clock position for draining.
3. Install the articulation lock pin, apply the parking brake and shut down the engine.
4. Remove both plugs to drain the torque hub. Be careful, hot oil or components can burn.
5. After the oil has completely drained, position the torque hub so that one of the ports is in the 12 o'clock position. Refer to Figure 12-11.

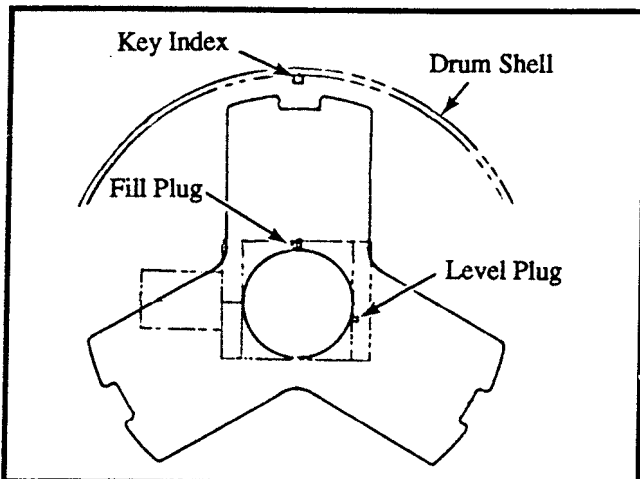


Figure 12-11. Torque Hub Plugs

6. To refill the torque hub, add GL-5 SAE 90 (MIL-L-2105C) gear oil through the 12 o'clock port until oil starts to flow from the lower port.
7. Clean, install and tighten the plugs.
8. Operate the machine and check for any leaks.

The oil in the right angle drive unit (SD-70DA Only) must also be drained during this interval. The unit is located in front of the torque hub looking in from the side of the drum. Use the following procedure.

1. Remove the fill and level plugs located on the top and side of the drive unit. Refer to Figure 12-12.

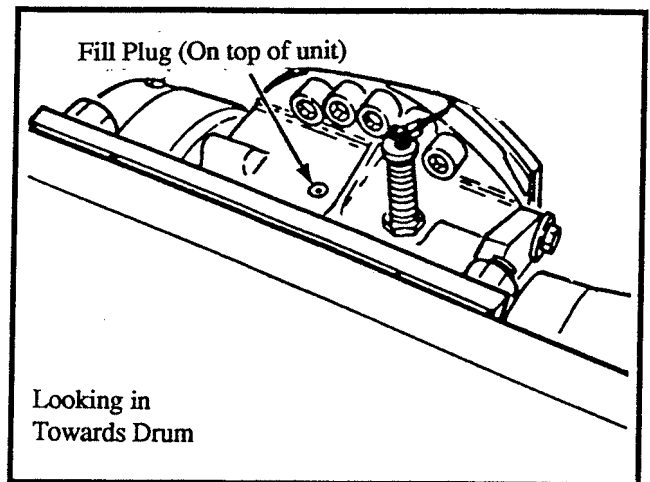


Figure 12-12. Right Angle Drive Unit

2. Remove the drain plug located underneath the drive unit, and allow the oil to drain completely. Be careful, hot oil or components can burn.
3. Clean and install the drain plug.
4. Add GL-5 SAE 90 oil through the top port until oil appears at the level port on the side of the unit.
5. Clean, install and tighten the fill and check plugs.
6. Operate the machine and check for any leaks.

### CARRIER OIL

The carrier bearings are lubricated by oil contained in the carrier. The carrier is located on the right side of the drum. The carrier oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, the oil should be changed every 500 hours or semi-annually. Due to a bearing change on the SD-70DA machines S/N 5512 and above, the oil change for these machines occurs at 1000 hours or annually, instead of 500 hours. Refer to Section 13 - 1000 Hour or Annual Routine Maintenance for this oil change.

Use the following procedure to change the carrier oil at 500 hours:

1. Position the machine on level ground with the drum key index at the 12 o'clock position.
2. Install the articulation lock pin, apply the parking brake, and shut down the engine.

Continued

## SECTION 12 - 500 HOUR OR SEMI-ANNUAL ROUTINE MAINTENANCE

### CARRIER OIL - CONT.

3. To change the oil, remove the fill and drain plug. Allow the oil to completely drain. Be careful, hot oil or components can burn. Refer to Figure 12-13.

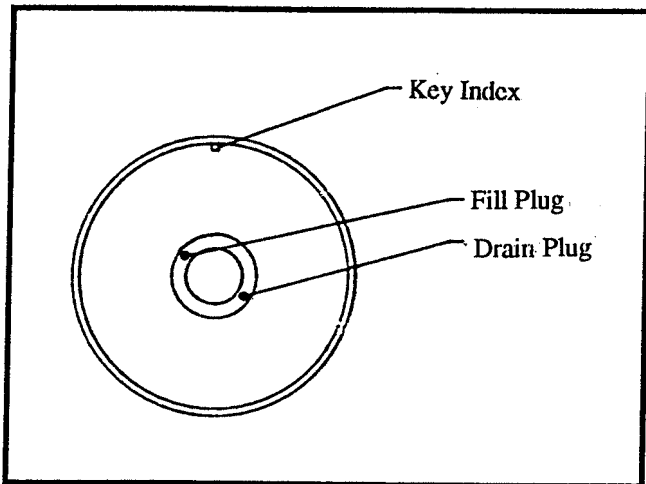


Figure 12-13. Carrier Plugs

4. Clean and install the drain plug.
5. Add approximately 1 pint of GL-5 SAE 90 (MIL-L-2105C) gear oil through the fill port. This will ensure that the bearings are lubricated.
6. Clean and install the fill plug.
7. Operate the machine and check for any leaks.

### CARRIER RELIEF VALVE (SD-70, SD-70D, SD-70F & SD-70DA - S/N 5511 AND BELOW)

The carrier relief valve is to be removed and cleaned at this time for all SD-70, SD-70D, SD-70F and SD-70DA machines S/N 5511 and below. Refer to Figure 12-14. The valve is located in the carrier housing on the vibration side of the drum. The valve inserts through holes in the shock mounting plate and bracket. Once the valve is removed, wash in a solvent and dry thoroughly. Install the valve after cleaning and drying.

The SD-70DA machines S/N 5512 and above should have the valve removed and cleaned at 300 hours as described in Section 11 of this manual.

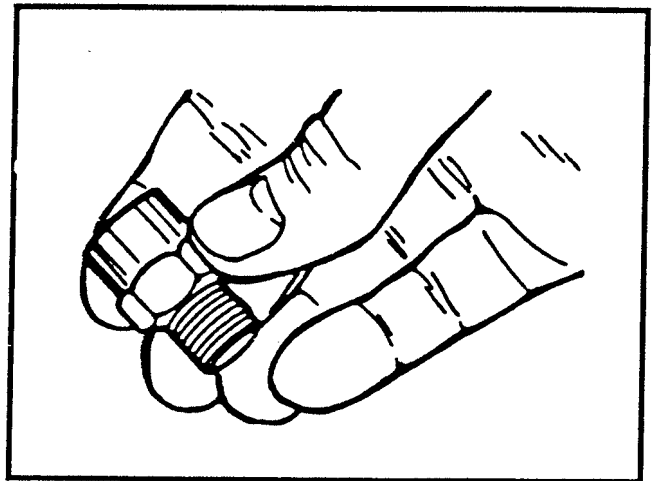


Figure 12-14. Carrier Relief Valve

## SECTION 13 - 1000 HOUR OR ANNUAL ROUTINE MAINTENANCE

Contents	Page	Contents	Page
ENGINE COOLANT (CUMMINS ONLY) —————	1	ECCENTRIC OIL (SD-70DA - S/N 5512 & Above)——	3
HYDRAULIC OIL AND SUCTION		TORQUE HUB OIL (SD-70DA - S/N 5512 & Above)—	3
STRAINER —————	1	CARRIER OIL (SD-70DA - S/N 5512 & Above)——	4
WATER TANKS (SD-70DA ONLY) —————	2		

### **WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

### **WARNING**

Hot oil or components can burn.

Oil must be at normal operating temperature when draining.

Avoid contact with hot oil or components.

#### ENGINE COOLANT (CUMMINS ONLY)

The coolant system of any vehicle should be drained and flushed at least once a year. Unless the coolant has a corrosion preventive in it, rust and scale will eventually clog the system. Any effective commercial flushing agent can and should be used once or twice a year. This helps the coolant system to resist the buildup of rust and scale.

#### NOTE

To be sure of proper draining, remove the radiator cap when draining the cooling system.

### **WARNING**

Injury can occur when removing the radiator cap.

Steam or fluid escaping from the radiator can burn. Inhibitor contains alkali, avoid contact with skin and eyes.

Always shut down the engine and allow to cool down before removing the radiator cap. Remove cap slowly to relieve pressure. Avoid contact with steam or escaping fluid.

To drain the coolant system, a petcock is located at the base of the radiator. At the same time the radiator is drained, the engine block should be drained. Refer to the engine operator's manual for the proper procedure.

Refill the radiator with clean, drinkable water. It is recommended to use a 50-50 anti-freeze and water mixture plus the addition of a separate lubricant and corrosion inhibitor. The lubricant and corrosion inhibitor will aid in water pump lubrication, and guard against internal corrosion and freezing. Maintain the engine coolant to approximately 1 1/2 inches from the bottom of the neck of the fill cap.

#### HYDRAULIC OIL AND SUCTION STRAINER

The hydraulic oil should be changed at this time interval as well as the cleaning of the suction strainer. The suction strainer screws into the hydraulic reservoir. Refer to Figure 13-1.

### **NOTICE**

Dirt in the hydraulic system will lead to premature component failure.

A clean, contaminant-free system is extremely important to the machine's proper function.

Take extra care when working around or on the hydraulic system to ensure it's complete cleanliness.

## SECTION 13 - 1000 HOUR OR ANNUAL ROUTINE MAINTENANCE

### HYDRAULIC OIL AND SUCTION STRAINER - CONT.

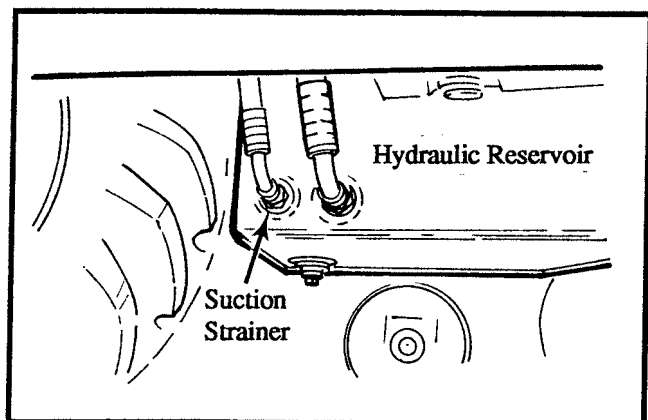


Figure 13-1. Hydraulic Oil Suction Strainer

Use the following procedure to change the oil in the hydraulic reservoir and to clean the suction strainer:

1. Install the articulation lock pin and shut down the engine.
2. Drain the reservoir by removing the magnetic drain plug located at the bottom. Be careful, hot oil and components can burn.
3. Clean the magnetic drain plug.
4. Unscrew the suction strainer from the hydraulic reservoir (tank). Be careful, hot oil and components can burn.
5. Clean the suction strainer with a cleaning solvent. Use a stiff fiber brush to help remove imbedded impurities.

## NOTICE

A partially plugged strainer will lead to contamination and a sluggish operating machine.

**Ensure that the suction strainer is cleaned or replaced.**

6. Air-blow the suction strainer from the inside out until dry.
7. Remove the cover plate from the top of the reservoir and clean out all dirt and possible contaminants.
8. Install the magnetic drain plug into the bottom of the reservoir.

9. Install the suction strainer to the reservoir.
10. Install the cover plate back onto the reservoir.
11. Before filling the reservoir (tank) with clean hydraulic oil, filter the oil through a 10 micron filter. Use oil as specified in Section 6 - Fuel and Lubrication Specifications in this manual.
12. Check to make sure the oil is at the proper level and that all fittings are tight and secure.
13. Operate the machine and check for any leaks.

### WATER TANKS (SD-70DA ONLY)

The water tanks are located at the front and rear of the machine. Refer to Figure 13-2. At least once a year, and more often if conditions warrant, drain and clean the tanks. To drain the water, remove the plug located on the bottom of each tank. After cleaning both tanks, fill them with clean water.

If the machine is to stand idle during freezing temperatures, the entire water system should be drained. To drain the system, open the petcock for the water strainer and the petcocks in the water lines. Check to make sure all water is drained and add a permanent type of anti-freeze.

To prevent damage to asphalt, before starting the machine remove all anti-freeze from the system, and add clean water.

#### NOTE

*The water tanks should never be allowed to become empty for any reason other than cleaning or storage.*

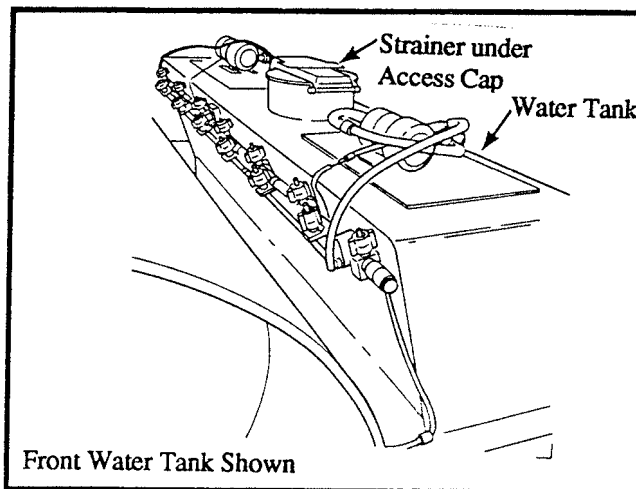


Figure 13-2. Water Tanks

## SECTION 13 - 1000 HOUR OR ANNUAL ROUTINE MAINTENANCE

### ECCENTRIC OIL (SD-70DA ONLY)

The eccentric bearings are splash lubricated with oil contained in the eccentric housings. Refer to Figures 13-3 and 13-4. The eccentric oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, all SD-70DA machines serial number 5512 and above should have the oil changed every 1000 hours. SD-70DA machines serial number 5511 and below should have the oil changed every 500 hours. Refer to Section 12 - 500 Hour or Semiannual Routine Maintenance of this manual for this oil change procedure.

Use the following procedure to change the eccentric oil:

1. Position the machine on level ground.
2. Position the drum so one of the two eccentric plugs is in the 6 o'clock position. Refer to Figure 13-3.

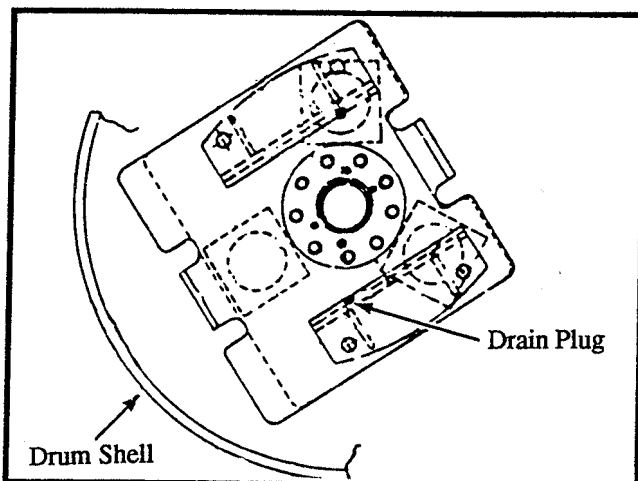


Figure 13-3. Eccentric Drain Plug Position

3. Install the articulation lock pin, apply the parking brake and shut down the engine.

#### NOTE:

*The eccentric housings on the left and right ends of the drum must be serviced independently.*

4. Remove both eccentric plugs and allow the oil to drain from the housing.
5. When oil has completely drained, position the drum with the key index in the 12 o'clock position. This places the fill plug at the top while the level plug is opposite and slightly below centerline. Refer to Figure 13-4.

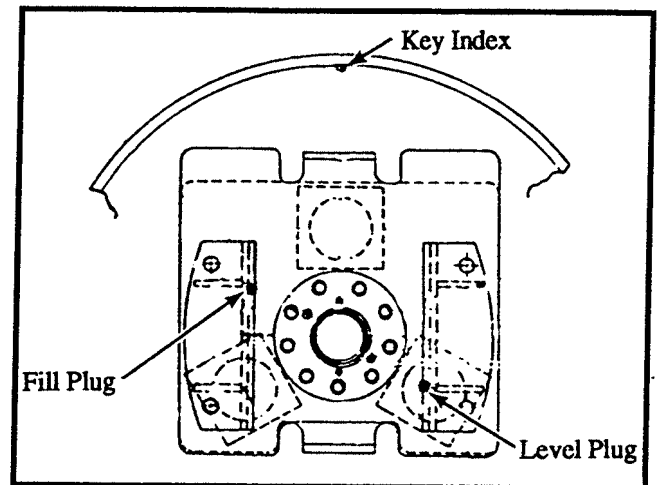


Figure 13-4. Eccentric Fill Plug Location

6. To fill the housing, add Mobil SHC 630 oil through the upper port until oil flows from the lower port.
7. Allow the oil to stop flowing from the lower port.
8. Clean, install and tighten both plugs.
9. Repeat steps 1 through 9 for the opposite eccentric housing.
10. Operate the machine and check for any leaks.

### TORQUE HUB OIL (SD-70DA ONLY)

The Torque Hub oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, all SD-70DA machines serial number 5512 and above should have the oil changed every 1000 hours. SD-70DA machines serial number 5511 and below, should have the oil changed every 500 hours. Refer to Section 12 - 500 Hour or Semiannual Routine Maintenance of this manual for this oil change procedure.

Use the following procedure to change the torque hub oil:

1. Position the machine on level ground.
2. Position the drum so one of the two plugs is in the 6 o'clock position for draining.
3. Install the articulation lock pin, apply the parking brake and shut down the engine.
4. Remove both plugs to drain the torque hub. Be careful, hot oil or components can burn.

## SECTION 13 - 1000 HOUR OR ANNUAL ROUTINE MAINTENANCE

### TORQUE HUB OIL (SD-70DA ONLY) - CONT.

5. After the oil has completely drained, position the torque hub so that one of the ports is in the 12 o'clock position. Refer to Figure 13-5.

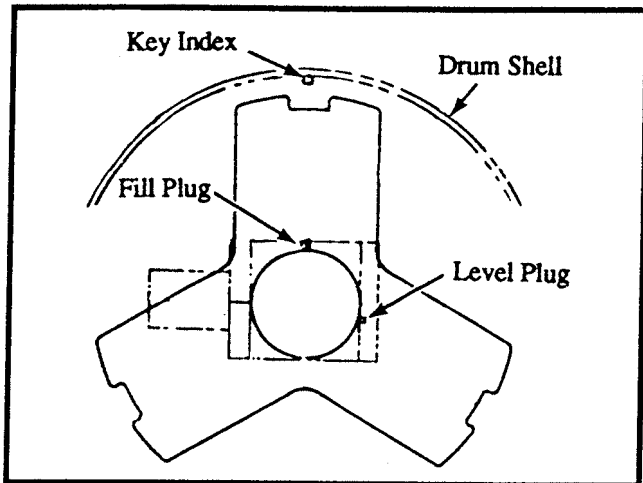


Figure 13-5. Torque Hub Plugs

6. To fill the torque hub, add Mobil SHC 630 oil through the 12 o'clock port until oil flows from the lower port.
7. Clean, install and tighten the plugs.
8. Operate the machine and check for any leaks.

The oil in the right angle drive unit (SD-70DA Only) must also be drained during this interval. The unit is located in front of the torque hub looking in from the side of the drum. Use the following procedure.

1. Remove the fill and level plugs located on the top and side of the drive unit. Refer to Figure 13-6.

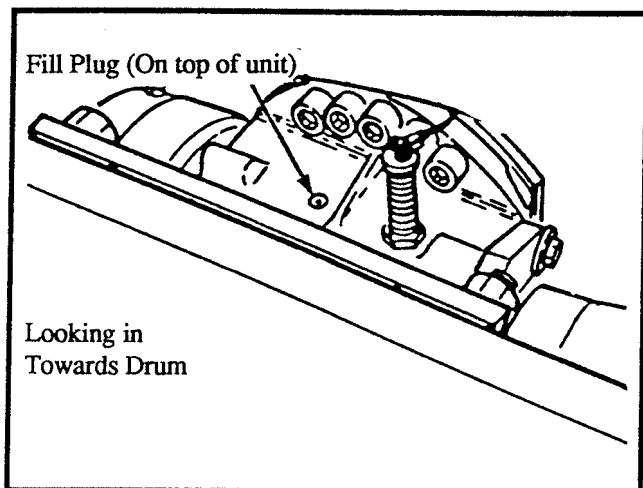


Figure 13-6. Right Angle Drive Unit

2. Remove the drain plug located underneath the drive unit and allow the oil to drain completely. Be careful, hot oil and components can burn.
3. Clean, install and tighten the drain plug.
4. Add Mobil SHC-630 oil through the top port until oil appears at the level port on the side of the unit.
5. Clean, install and tighten the fill and check plugs.
6. Operate the machine and check for any leaks.

### CARRIER OIL (SD-70DA ONLY)

The carrier bearings are lubricated by oil contained in the carrier assembly. The carrier is located on the right side of the drum. The carrier oil is to be changed after the first 50 to 100 hours of operation during the initial break-in period. Thereafter, all SD-70DA machines serial number 5512 and above should have the oil changed every 1000 hours. SD-70DA machines serial number 5511 and below, should have the oil changed every 500 hours. Refer to Section 12 - 500 Hour or Semiannual Routine Maintenance of this manual for this oil change procedure.

Use the following procedure to change the carrier oil:

1. Position the machine on level ground.
2. Install the articulation lock pin, apply the parking brake and shut down the engine.
3. To change the oil, remove the fill and drain plugs. Allow the oil to drain. Be careful, hot oil and components can burn. Refer to Figure 13-7.

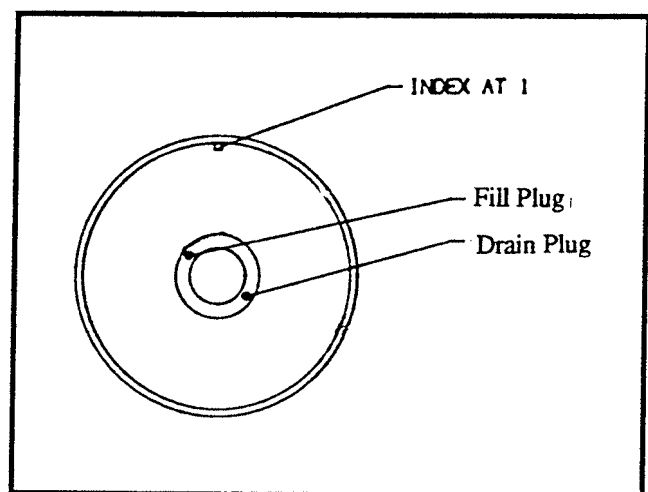


Figure 13-7. Carrier Oil Plugs

Continued



## SECTION 13 - 1000 HOUR OR ANNUAL ROUTINE MAINTENANCE

### CARRIER OIL (SD-70DA ONLY) - CONT.

4. Clean, install and tighten the drain plug.
5. Add approximately 1 pint of Mobil SHC 630 oil through the top port. This will ensure that the bearings are lubricated.
6. Clean and install the fill plug.
7. Operate the machine and check for any leaks.



## SECTION 14 - ROUTINE ADJUSTMENTS

Contents	Page	Contents	Page
OSCILLATION SWIVEL BEARING	1	SHOCK MOUNTS (DRUM)	2
DRUM SCRAPER BAR - OPT. (SD-70DA ONLY)	1	WATER TANK RELIEF VALVE (SD-70DA ONLY)	2

### **! WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **! WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### OSCILLATION SWIVEL BEARING

After torquing the oscillation swivel pin nut, the clearance between the drum frame and the backing plate should be parallel as viewed from the side. If they are not parallel, the bearing needs to be replaced or adjusted. Shims must still exist between the drum frame and backing plate to be able to make adjustment to the bearing.

Use the following procedure to make adjustment to the bearing:

1. Position a jack under the swivel frame and under both sides of the drum frame. Lift just enough to take the weight off the articulation joint to prevent binding.
2. Remove the bolts from the backing plate and back off the horizontal swivel nut to allow removal of the shims.
3. With the shims removed, torque the oscillation swivel pin nut to 500 pounds-foot (69 Kgm).
4. Measure the clearance between the backing plate and drum frame at the two points where the shims were positioned. Refer to Figure 14-1.

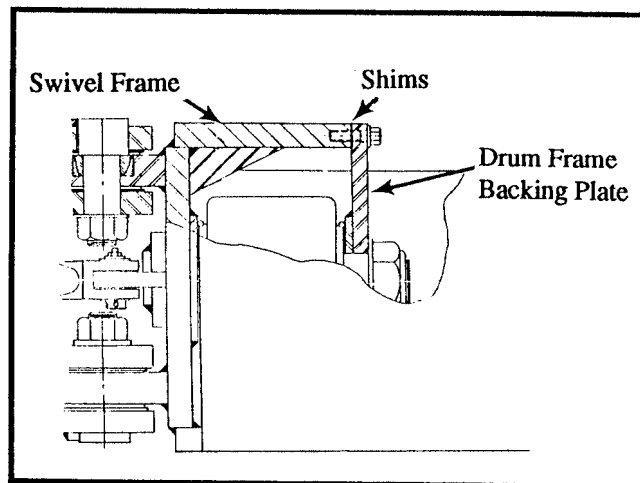


Figure 14-1. Horizontal Swivel Nut Clearance

5. Loosen the oscillation swivel pin nut and place the appropriate size shims as determined above between the backing plate and the drum frame.
6. Install the backing plate bolts and torque them to 220 foot-pounds (30 Kgm).
7. With the shims in place, torque the oscillation swivel pin nut to 1000 pounds-foot (138 Kgm).
8. Carefully remove the jack and any blocking material.

#### DRUM SCRAPER BAR (SD-70DA ONLY)

The optional drum scraper bar must be in place and securely fastened to ensure safe and proper operation.

The scraper bar should clear the drum by 3/4 to 1 inch. If it is necessary to adjust or replace the scraper bar, the capscrews securing the scraper bar must have Loctite applied and be properly torqued. The capscrews should have Loctite 271 applied and be torqued to 410 pounds-foot (57 Kgm). Refer to Figure 14-2.

Continued

## SECTION 14 - ROUTINE ADJUSTMENTS

### DRUM SCRAPER BAR (SD-70DA ONLY) - CON'T.

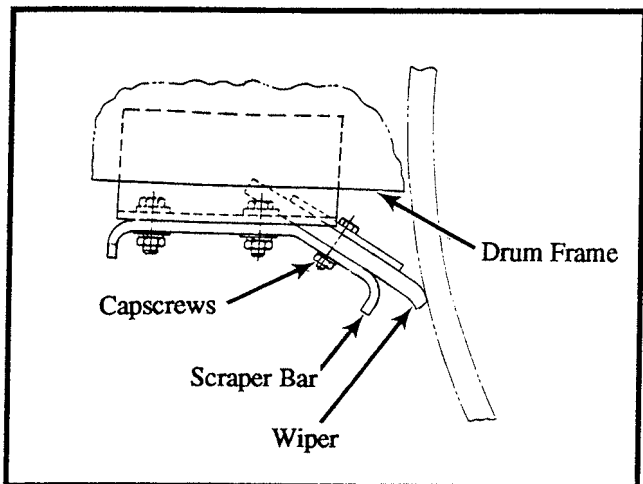


Figure 14-2. Drum Scraper Bar

### SHOCK MOUNTS (DRUM)

The vibrations generated by the rotation of the drum eccentric weights are absorbed by rubber shock mounts. Refer to Figure 14-3. The shock mounts, located on each end of the drum, must be checked periodically for looseness. Tighten the capscrews and nuts as necessary, and replace any mounts that have torn or excessively cracked rubber.

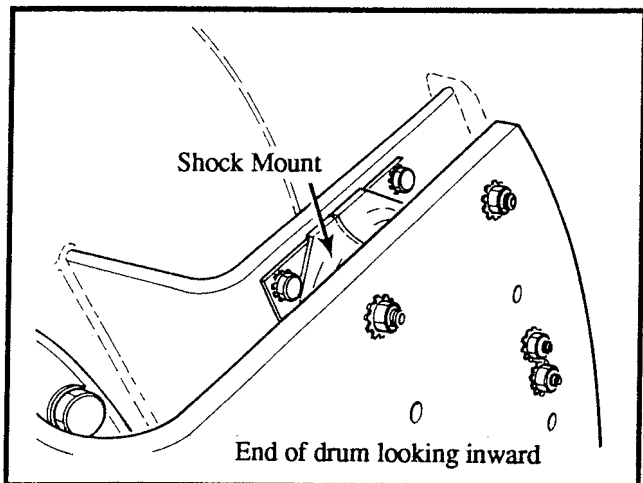


Figure 14-3. Drum Shock Mounts

### WATER TANK RELIEF VALVE (SD-70DA ONLY)

The valve is located at the left rear of the machine and is used to adjust the water supply pressure. Refer to Figure 14-4. The valve should be maintained to approximately 20 psi. To adjust the valve, pull up on the lock ring and rotate the adjustment knob counterclockwise until all load is removed from the relief spring. When this occurs, turn adjustment knob approximately 360 degrees clockwise and push down on the lock ring to secure in place.

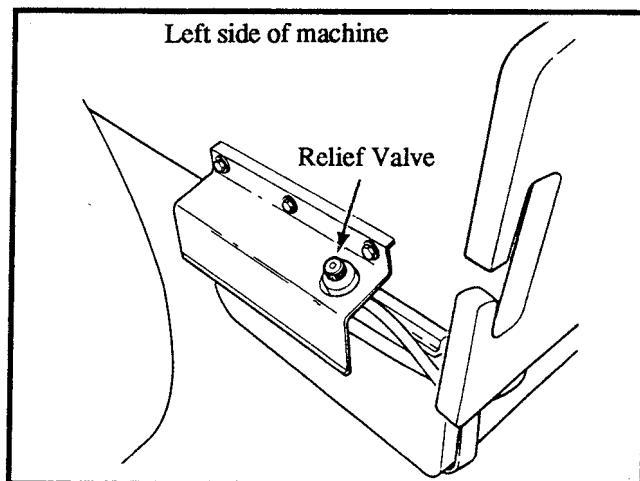


Figure 14-4. Relief Valve Adjustment

## SECTION 15 - MISCELLANEOUS AND OPTIONAL EQUIPMENT

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### **WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### FUEL LEVEL GAUGE (OPTIONAL)

The optional mechanical fuel level gauge is located in the fuel tank cover plate. It is provided to allow the operator to monitor the level of fuel in the tank. The fuel tank capacity is 41 gallons (155 liters) of No. 2 Diesel Fuel. For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

#### ELECTRIC FUEL GAUGE (OPTIONAL)

The optional electric fuel gauge is located on the console. It is provided to allow the operator to monitor the fuel level in the tank. For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

#### HYD. OIL TEMPERATURE GAUGE (OPTIONAL)

The hydraulic oil temperature gauge is located in the hydraulic oil reservoir cover plate. It is provided to allow the operator to monitor the hydraulic oil temperature in the reservoir. The gauge face reads from 20 degrees F to 240 degrees F. For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

#### SEAT BELT

Seat belts are standard equipment if the machine is supplied with a Roll-Over Protection Structure (ROPS). Before fastening the seat belt, always adjust the operator's seat to the most comfortable position. For greater safety and comfort, be sure the belt is snugly fitted around the hips (not waist) and not twisted. To lengthen the belt, tip the buckle end downward and pull the buckle until the belt ends can be joined. Join the ends of both belts together. Release the belts by pulling up the top half of the buckle. Refer to Figure 15-1.

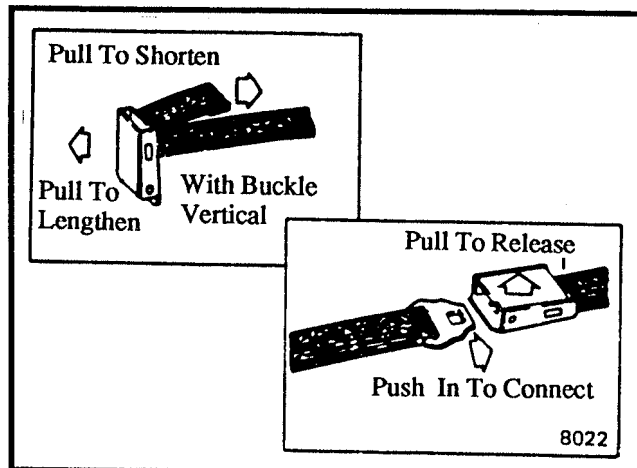


Figure 15-1. Seat Belt Usage

## SECTION 15 - MISCELLANEOUS AND OPTIONAL EQUIPMENT

### BACK-UP ALARM

When the compactor is traveling in a reverse direction, the back-up alarm sounds a warning alerting personnel in the path of the compactor. The alarm is located at the right rear of the machine inside the engine cowling.

### FLOOD LIGHTS (OPTIONAL)

The halogen flood lights are located on the front and rear of the compactor. The front lights are mounted on the handrail and the rear lights on the engine cowling. The lights are controlled by front and rear switches on the console control panel.

### ROPS

The rollover protection structure (ROPS) is available for the SD-70 Series compactors and meets the requirements of all regulatory bodies requiring rollover protection.

## DANGER

**YOUR LIFE MAY BE ENDANGERED IF THE FOLLOWING IS NOT COMPLIED WITH.**

**DO NOT** operate this machine if the Rollover Protective Structure (ROPS) is structurally damaged, shows cracks, is not properly secured as originally installed, or has been rolled.

**DO NOT** repair, modify, or add attachments to ROPS unless authorized in writing by the manufacturer.

**DO NOT** add attachments to the machine that intrude into the operator's protective area, reduce visibility, restrict emergency exits, or add weight exceeding certification weight of ROPS.

**DO NOT** operate machine unless seat belt conforming to SAE and/or ASAE standards is fastened.

See Operator's Manual or contact your dealer for complete inspection requirements and maintenance instructions.

## WARNING

When using a ROPS equipped machine, seat belts and other OSHA required safety equipment must be worn. Failure to use all safety equipment could result in severe personal injury or death.

Ingersoll-Rand strongly recommends the use of a ROPS equipped compactor for operator and equipment protection. A ROPS used with seat belts will protect the vehicle operator from injury if the vehicle undergoes a single rollover. The operator is assumed to occupy a specified "critical zone". By using a ROPS, this zone should be protected from intrusion by any part of the compactor, the ground, or the protective structure during an accident.

### SPEEDOMETER (OPTIONAL)

The speedometer is located at the far right side of the operator's compartment below the RH console panel. The speedometer records machine ground speed from 0 to 10 MPH (0-16 Km/H). Refer to Section 4 for more information.

### STRIKE-OFF BLADE (SD-70D, SD-70F ONLY)

The strike-off blade is installed on the front of the machine. The blade is only to be used for spreading fill at the job site and is only offered on the SD-70D and SD-70F models.

## WARNING

**Severe cutting or crushing injury.**

**On some machines, during engine shut down, the blade lowers automatically.**

**Operator must ensure that the area around the blade is clear of personnel and obstructions prior to engine shut down.**

The following procedure is to be used when operating the strike-off blade:

1. The throttle control must be at the "operating rpm" for the blade to operate and function.
2. To raise the blade, move the strike-off blade control toward the UP position until the desired elevation is reached.
3. To lower the blade, move the strike-off blade control towards the DOWN position until the desired elevation is reached.
4. If after raising or lowering the blade the control is released, it will self-center itself to the "Neutral" position.

Continued

## SECTION 15 - MISCELLANEOUS AND OPTIONAL EQUIPMENT

### STRIKE-OFF BLADE (SD-70D, SD-70F ONLY) - CONT.

5. To set the blade in the "Float" position, or a position that allows the blade to ride with the contour of the land, push the fill level blade control into the detent past the "Down" position to FLOAT. The control will lock itself in this position.

#### NOTE

*It is recommended that the float position be used only when the compactor is traveling in reverse.*

6. To disengage the blade from the float position, move the control back to the "Neutral" position.

7. The blade can be tilted for maximum versatility in fill-spread operations. To tilt the top of the blade away from the compactor, turn the turnbuckle handle counterclockwise. Both sides of the blade must be adjusted. To tilt the top of the blade toward the compactor, turn the turnbuckle handles clockwise.

8. With either side of the blade independently adjustable, the operator can position the blade with one side tilted towards the compactor and the opposite side tilted away. This permits the excess fill to run off the blade to the desired side of the compactor.

### TIRES

The standard tires used on the SD-70 and SD-70D machines are 14.9 x 24 x R3 while the SD-70F machines use 14.9 x 24 x R4. Both type tires have a 24 psi inflation rating. The SD-70DA asphalt machines use 13.0 x 24 tires with a 16 psi inflation rating.

The optional tires for the SD-70, SD-70D and SD-70F machines are 16.9 x 24 x 10Ply with an inflation rating of 24 psi.

### AUXILIARY DRUM SCRAPER (OPTIONAL) - SD-70DA ONLY

The auxiliary drum scraper is offered on the SD-70DA asphalt machine and consists of a scraper bar and wiper. The drum scraper must be in place and secured to ensure safe and proper operation. The scraper bar is adjustable to allow the wiper to be in firm contact with the drum face. Refer to Figure 15-2.

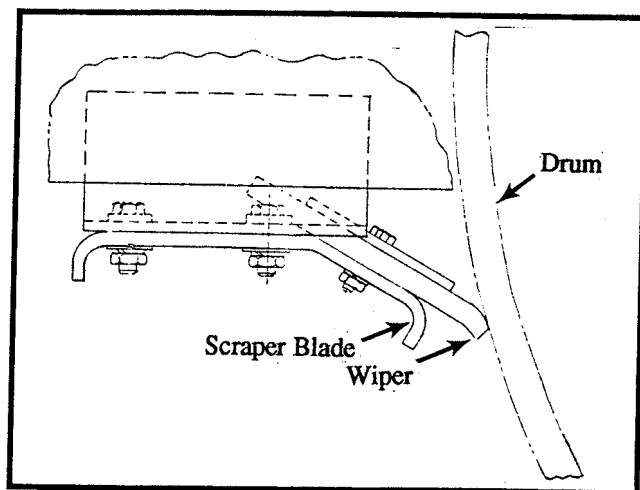


Figure 15-2. Drum Scraper

### TIRE SCRAPER & WATER SYSTEM (SD-70DA ONLY)

A tire scraper and water system option is offered on the SD-70DA asphalt machine and consists of scraper blades, cocoa mats, water hoses, spray nozzles and a water tank. This system is designed to keep the tires smooth and clean during machine operation. Refer to Figure 15-3. For more information, contact your Ingersoll Rand Road Machinery Equipment Distributor.

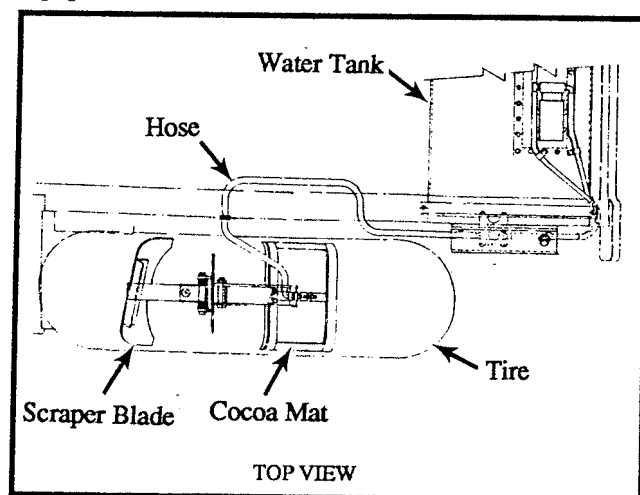


Figure 15-3. Tire Scraper and Water System

## SECTION 15 - MISCELLANEOUS AND OPTIONAL EQUIPMENT

### AUXILIARY PADFOOT SCRAPER (OPTIONAL-SD-70F ONLY)

The auxiliary padfoot scraper is offered on the SD-70F soil machine and consists of a scraper bar and mounting hardware. The scraper bar must be in place and secured to ensure safe and proper operation. For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

### SUN SHADE (OPTIONAL)

The optional fiberglass sun shade is offered on the SD-70 Series units. The sunshade can only be installed on machines with the arch-style ROPS. Refer to Figure 15-4. For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

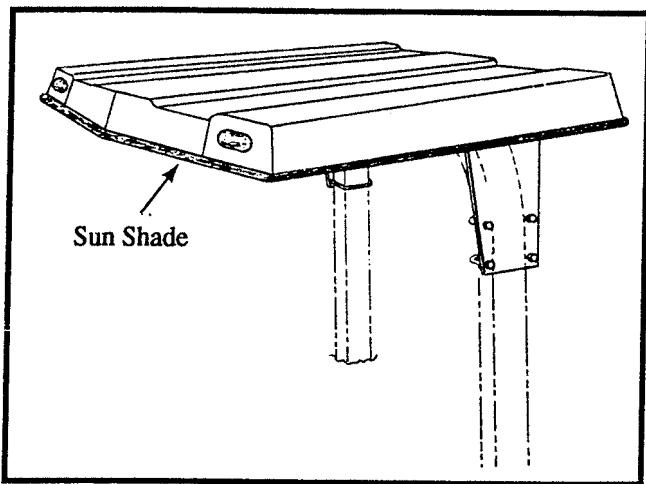


Figure 15-4. Sun Shade Option

### AUDIBLE ENGINE ALARM (OPTIONAL)

An optional audible engine alarm is offered on the SD-70 Series. The alarm is mounted to the back side of the control console. The alarm is to alert personnel of a high or elevated engine water temperature and/or engine oil pressure situation. Switches located on the engine signal the alarm when this temperature or pressure demands attention. If the alarm should sound, shut down the machine and determine and correct the problem before continuing operation.

### CAB (OPTIONAL)

The cab option is offered on all versions of the SD-70 Series Compactors. The cab is completely enclosed with access doors on both sides. Refer to Figure 15-5.

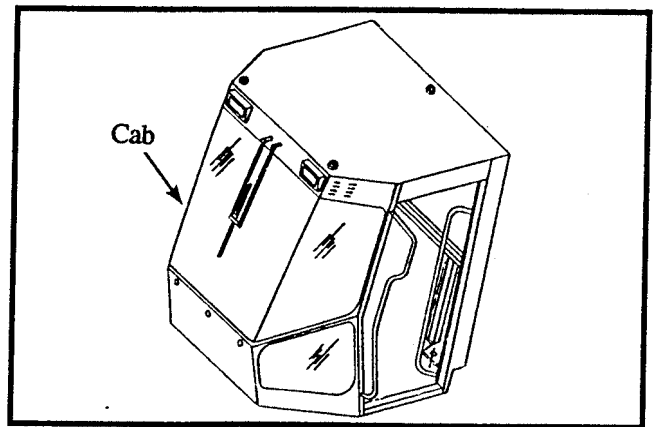


Figure 15-5. Cab Option

### BOLT - ON PADFOOT SHELL (OPTIONAL)

An optional bolt - on padfoot shell is offered for the SD-70D machines. The shell adapts the smooth drum to compaction of cohesive soil. For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

### COLD START KIT (OPTIONAL)

The optional cold start kit consists of an atomizer unit, a fuel cylinder, and the necessary connections for operation. A push button, mounted below the console, is used to prime the system and allow ether to enter the engine air intake.

### RADIATOR DOOR (OPTIONAL)

An optional radiator door is offered on the SD-70 Series machines. The door has a latch with a keylock for security. The door covers the radiator cap and prohibits unwanted access.

### TAILLIGHTS (OPTIONAL)

Optional taillights are offered on the SD-70 Series machines. The lights are mounted on the engine cowling at the rear of the machine and operated by a switch on the control console.

### URNSIGNAL/HAZARD LIGHTS (OPTIONAL)

A turnsignal option is available on the SD-70 Series machines. A switch, mounted below the control console, operates the lights which are mounted on the engine cowling at the front and rear of the machine.

### IMMERSION BLOCK HEATER (OPTIONAL)

An optional block heater is available to use with the Cummins 4BT3.9 engine. The heater is installed into a core hole in the engine block and connected to a power cord. Refer to Figure 15-6. Contact the factory for further details concerning the heater.

Continued



## SECTION 15 - MISCELLANEOUS AND OPTIONAL EQUIPMENT

### IMMERSION BLOCK HEATER (OPTIONAL) - CONT.

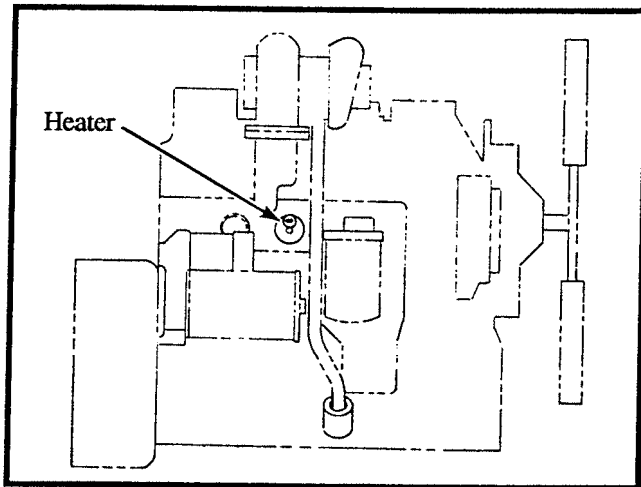


Figure 15-6. Immersion Block Heater

### OPERATOR TOOL KIT (OPTIONAL)

An operator tool kit is offered for the SD-70 Series machines. The kit consists of the following tools:

- Slip Joint Pliers - 6".
- Multi-Purpose Pliers - 12".
- Adjustable Wrench - 8".
- Open End Wrench - 1/4" x 5/16".
- Open End Wrench - 3/8" x 7/16".
- Open End Wrench - 1/2" x 9/16".
- Open End Wrench - 5/8" x 11/16".
- Open End Wrench - 3/4" x 7/8".
- Open End Wrench - 8mm x 10mm.
- Open End Wrench - 12mm x 14mm.
- Open End Wrench - 13mm x 15mm.
- Open End Wrench - 17mm x 19mm.
- Magnetic Screwdriver with 4 bits.
- Inch Hex Key Set, 11 Piece.
- Box or Pouch for all tools.

For more information on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

### COCOA MATS (SD-70DA ONLY - OPTIONAL)

Cocoa mats are optional and used only with the SD-70DA machines. A mat is located at each tire and is used to clean asphalt and debris build-up from the tires while the machine operates. For more information and detail on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

### SOUND REDUCTION PACKAGE (OPTIONAL)

The optional sound reduction package employs passive elements to significantly reduce the operating noise level of the machine. Acoustical foam placed at strategic locations around the machine help to reduce the noise level. For more information and details on this option, contact your Ingersoll Rand Road Machinery Equipment Distributor.

### VIBRATING REED TACHOMETER (OPTIONAL)

The optional vibrating reed tachometer is located at the lower left side of the operator's compartment and LH console panel. The tachometer gives a visual indication of the machine's drum vibration frequency at any given moment. For more details, refer to Section 4 and contact your Ingersoll Rand Road Machinery Equipment Distributor.

### VIBRATION CONTROL (ON/OFF) - SD-70DA ONLY

The vibration control is a foot switch located on the left side of the operator's compartment on the floor. This switch is used to control the on/off of vibration mode. This control was available for all SD-70 Series machines prior to October 1991, but is now only used with the SD-70DA version. For more information, refer to Section 4 and contact your Ingersoll Rand Road Machinery Equipment Distributor.

### TRACTION CONTROL (OPTIONAL) SD-70D, SD- 70F ONLY

The traction control is a foot switch located on the left side of the operator's compartment on the floor. The switch is foot controlled and used to increase the traction effort of the compactor during operation. For more information, refer to Section 4 and contact your Ingersoll Rand Road Machinery Equipment Distributor.

### AIR RESTRICTION INDICATOR (OPTIONAL)

The red air restriction indicator is located on the console. When the indicator is lit, the engine air cleaner is clogged and needs serviced. For more information on this option, refer to Section 4 and contact your Ingersoll Rand Road Machinery Equipment Distributor.

### HYDRAULIC FILTER RESTRICTION INDICATOR (OPTIONAL)

The hydraulic filter restriction indicator is a red indicator that lights when the suction filter becomes clogged or dirty. The indicator is located on the console. For more information, refer to Section 4 and contact your Ingersoll Rand Road Machinery Equipment Distributor.



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ELECTRICAL SCHEMATIC (SD-70, SD-70D, SD-70F) - Prior To S/N 5628	4	HYDRAULIC SCHEMATIC (SD-70DA) - Effective With S/N 5146 To S/N 5284	15
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### SCHEMATICS

All electrical and hydraulic schematics for the machine are provided here. In addition, there is a copy of A.N.S.I. Graphical Symbols to explain the symbols used on the hydraulic schematic.

### NOTE

*All schematics are current as of the date of printing and are subject to change without notice.*

SECTION 16 - SCHEMATICS

LINES AND LINE FUNCTIONS		METHODS OF OPERATION		MISCELLANEOUS	
line, working		spring		rotating shaft	
Line, Pilot		manual		enclosure	
Line, drain				reservoir vented	
connecton		push button		pressurized	
line, flexible		pedal or treadle		pressure gauge	
lines, joining				electric motor	
lines passing		mechanical		accumulator, spring loaded	
direction of flow				pressure compensated	
line to reservoir above fluid level		detent		heater	
below fluid level				accumulator gas charged	
line to vented manifold		pressure compensated		cooler	
plug or plugged connection				temperature controller	
restriction fixed		solenoid, single winding		filter, strainer	
restriction variable				internal supply	
<b>PUMPS</b>		reversing motor		pilot pressure remote supply	
single, fixed displacement					
single, variable displacement		internal supply		internal supply	
<b>ACTUATORS</b>					
motor, fixed displacement reversible		internal supply		internal supply	
motor, fixed displacement non reversible					
motor, variable displacement reversible		internal supply		internal supply	
motor, variable displacement non reversible					

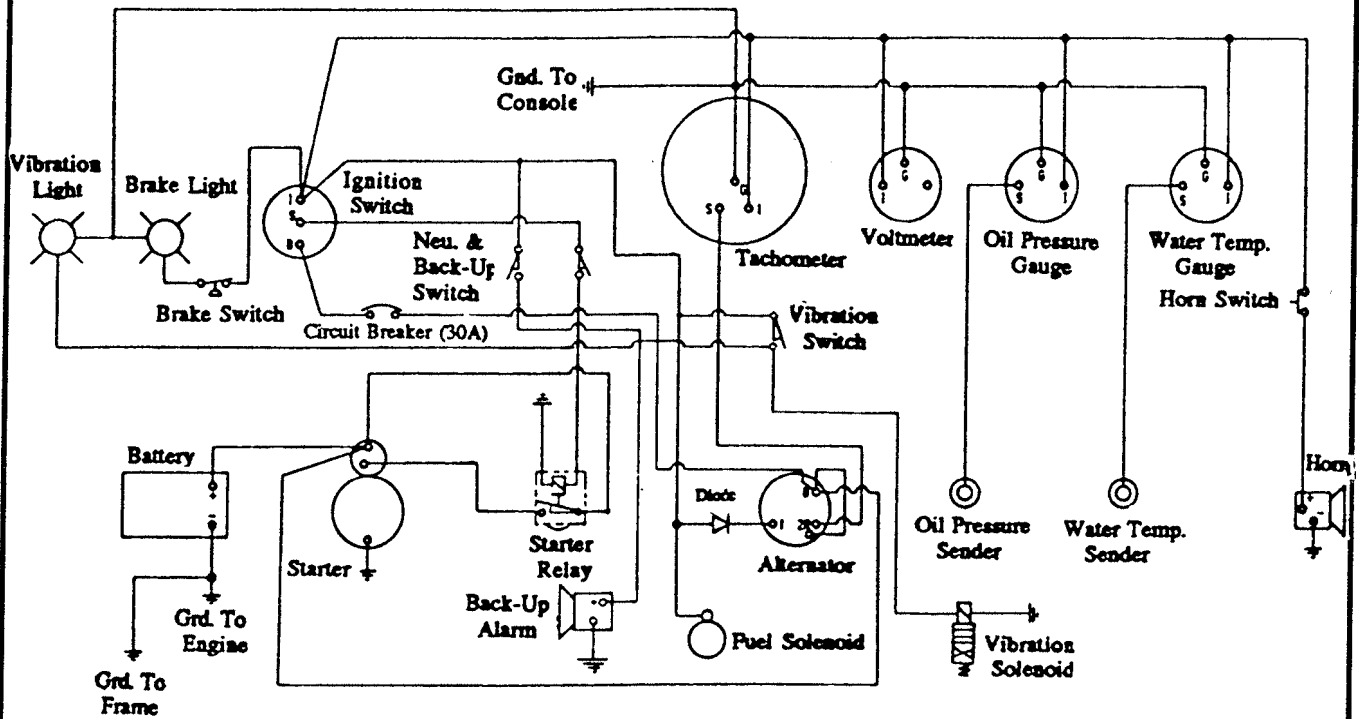
A.N.S.I. Graphical Symbols

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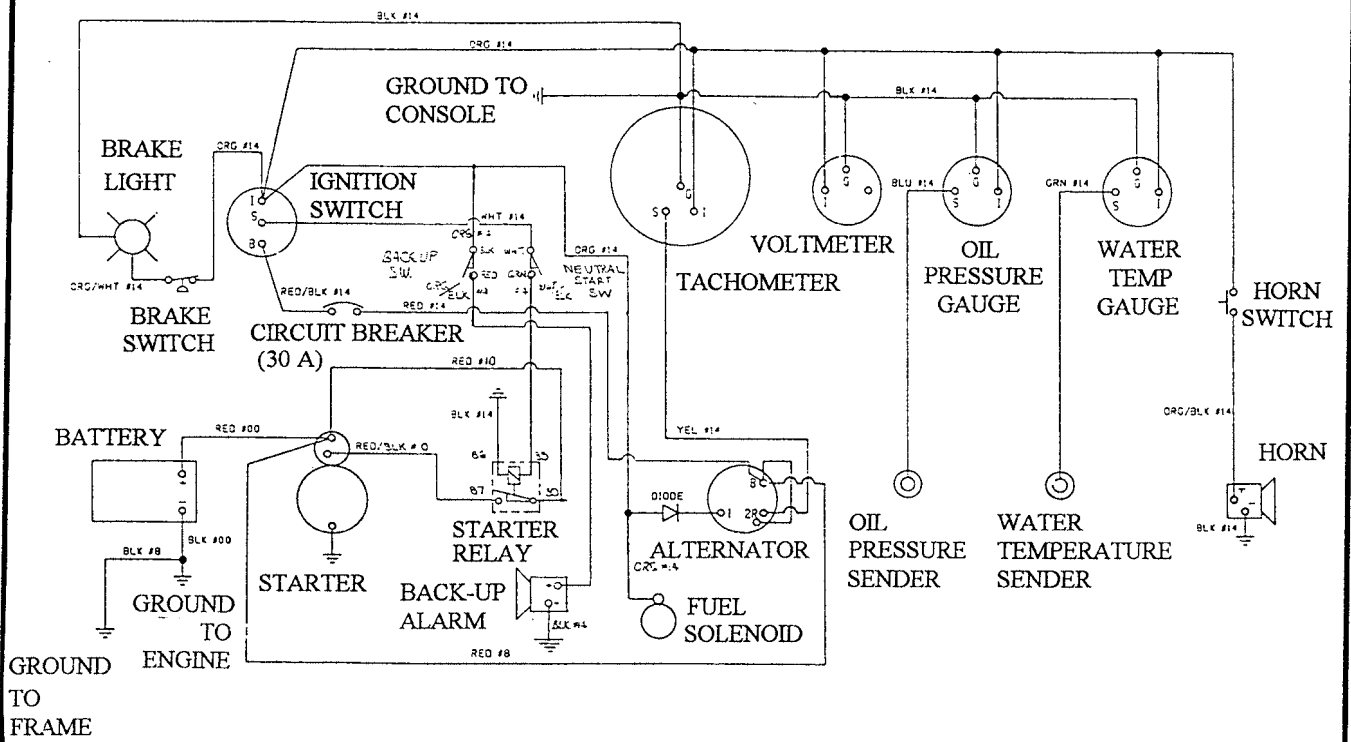
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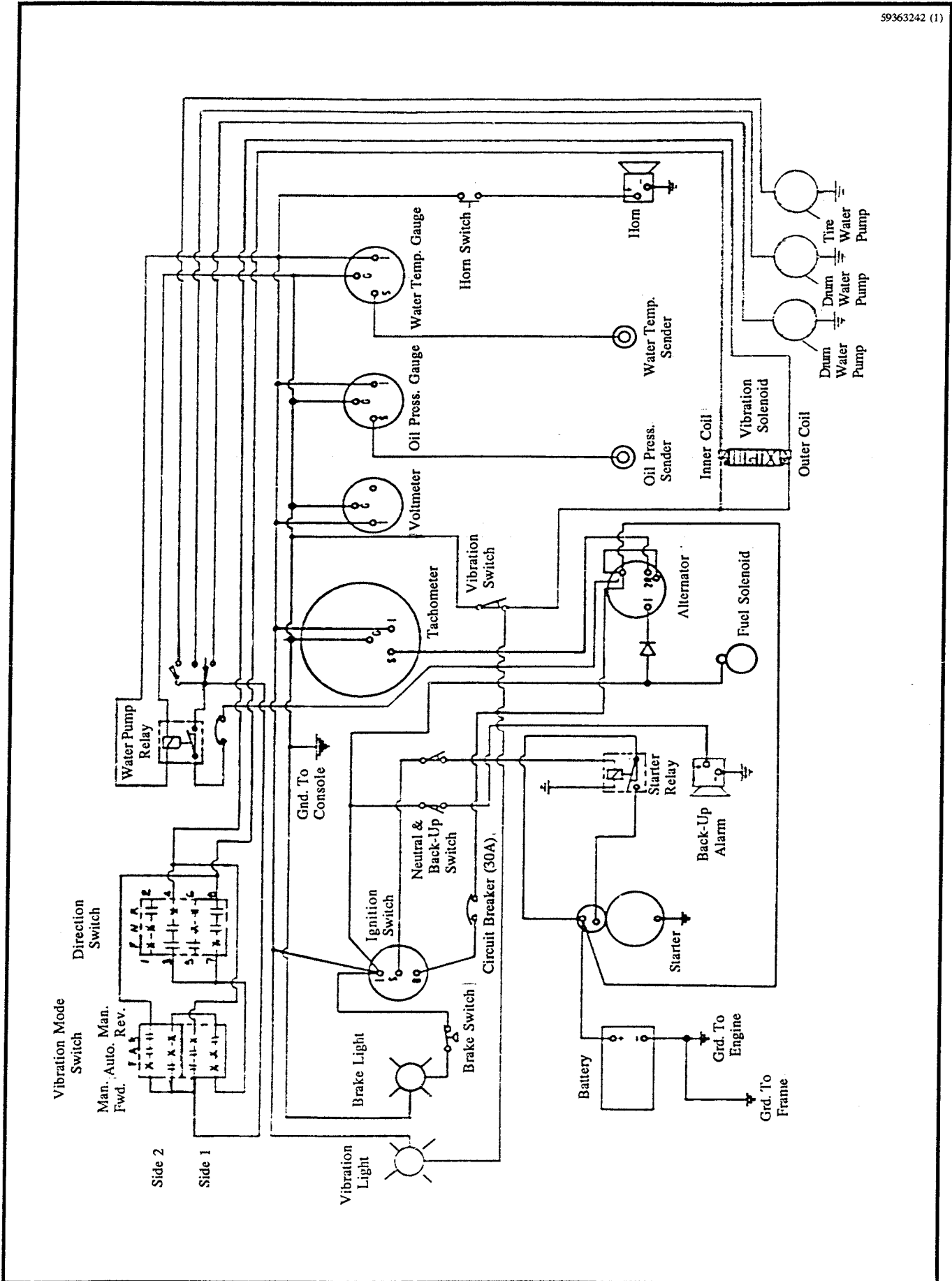
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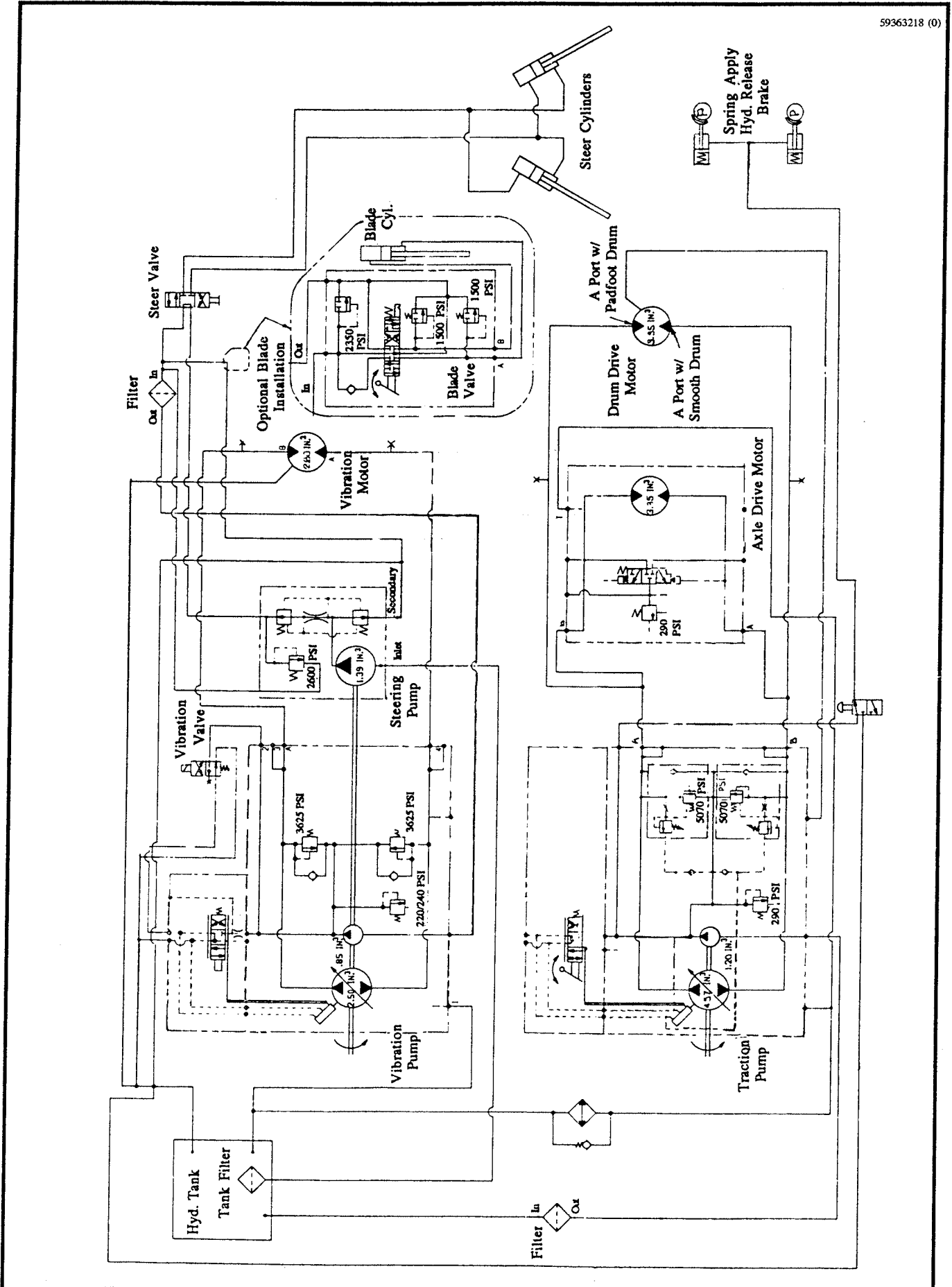


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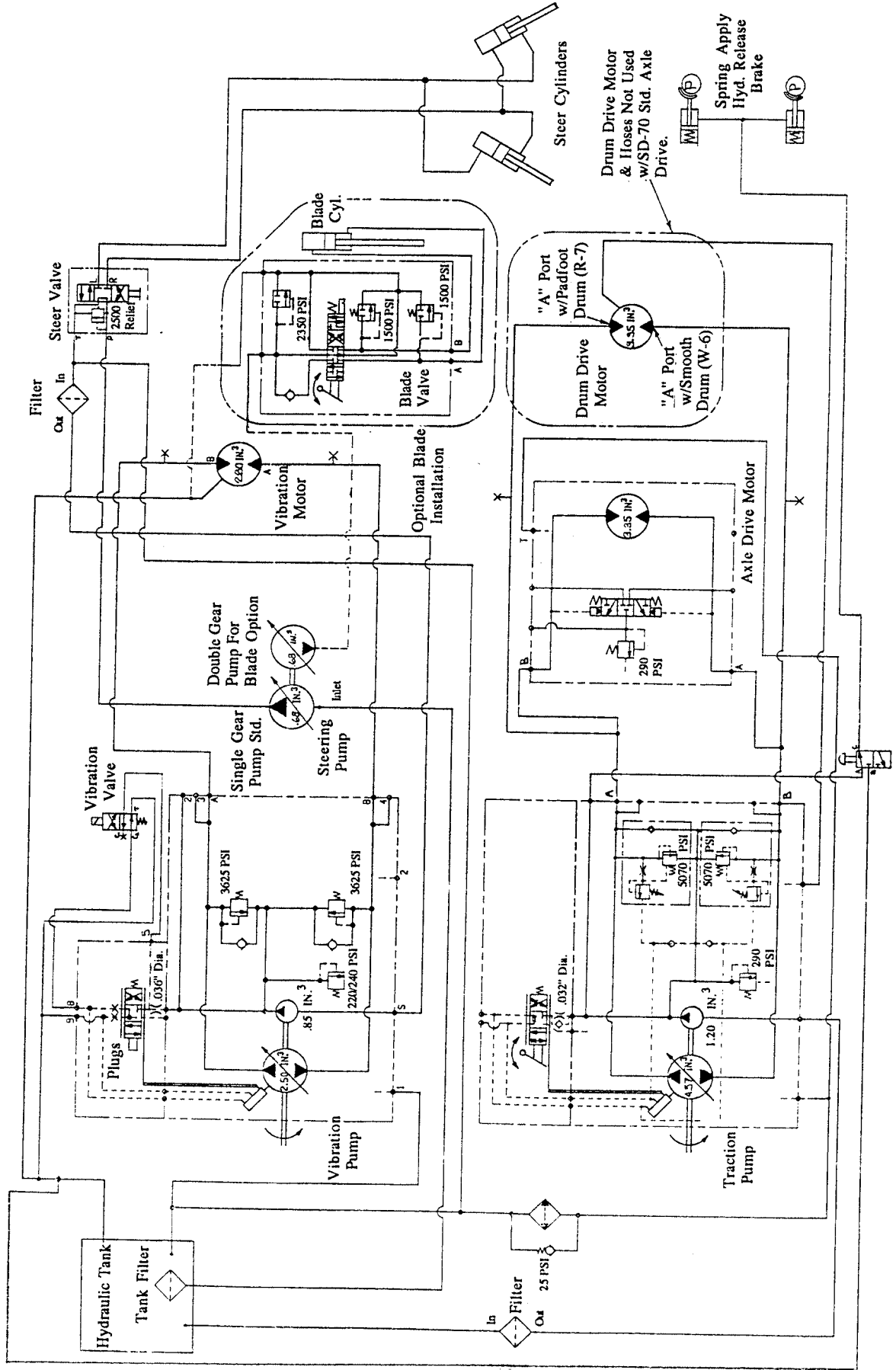
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# SECTION 16 - SCHEMATICS

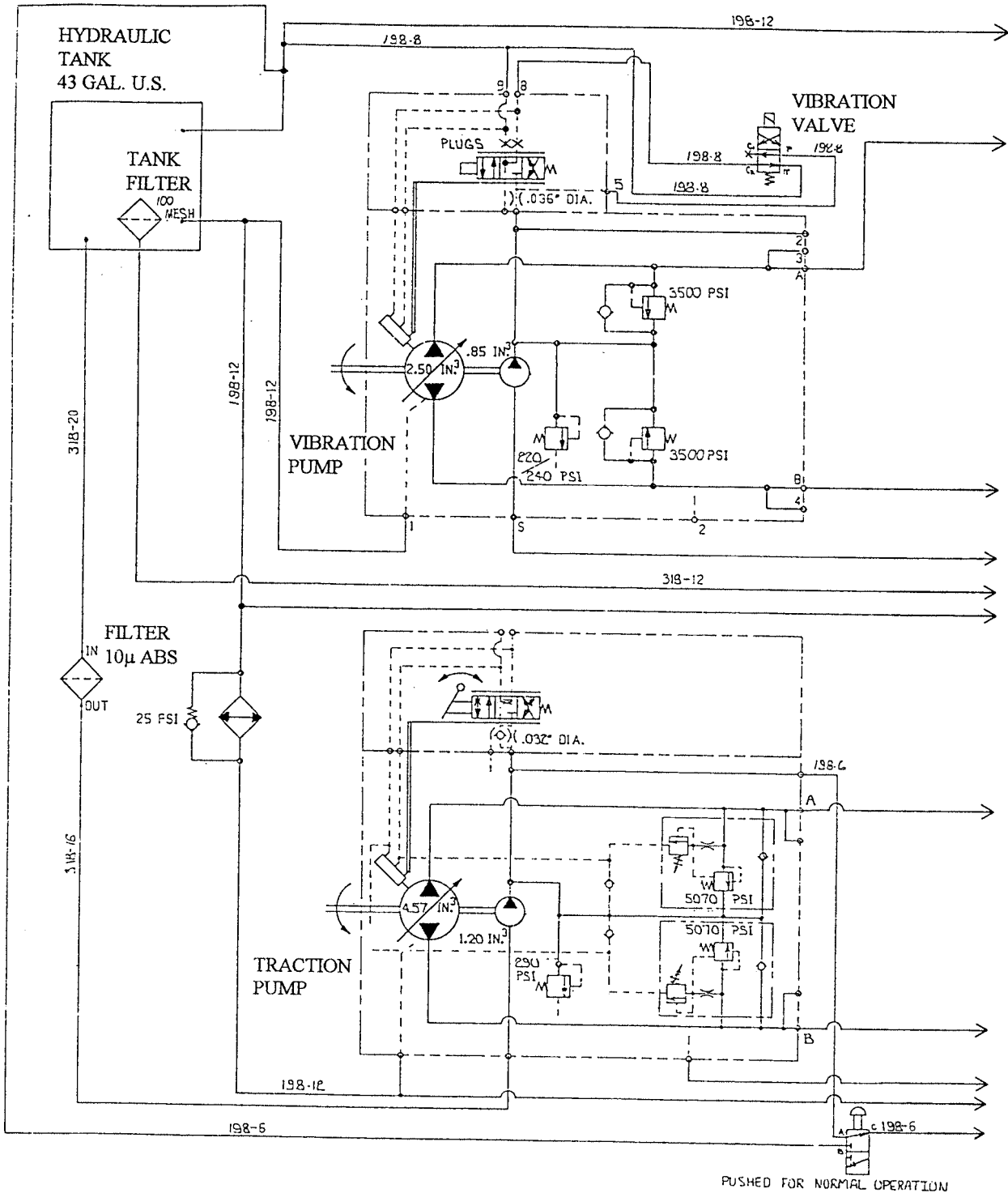
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Hydraulic Schematic (SD-70, SD-70D, SD-70F) - Effective with S/N: 5146 to S/N 5284

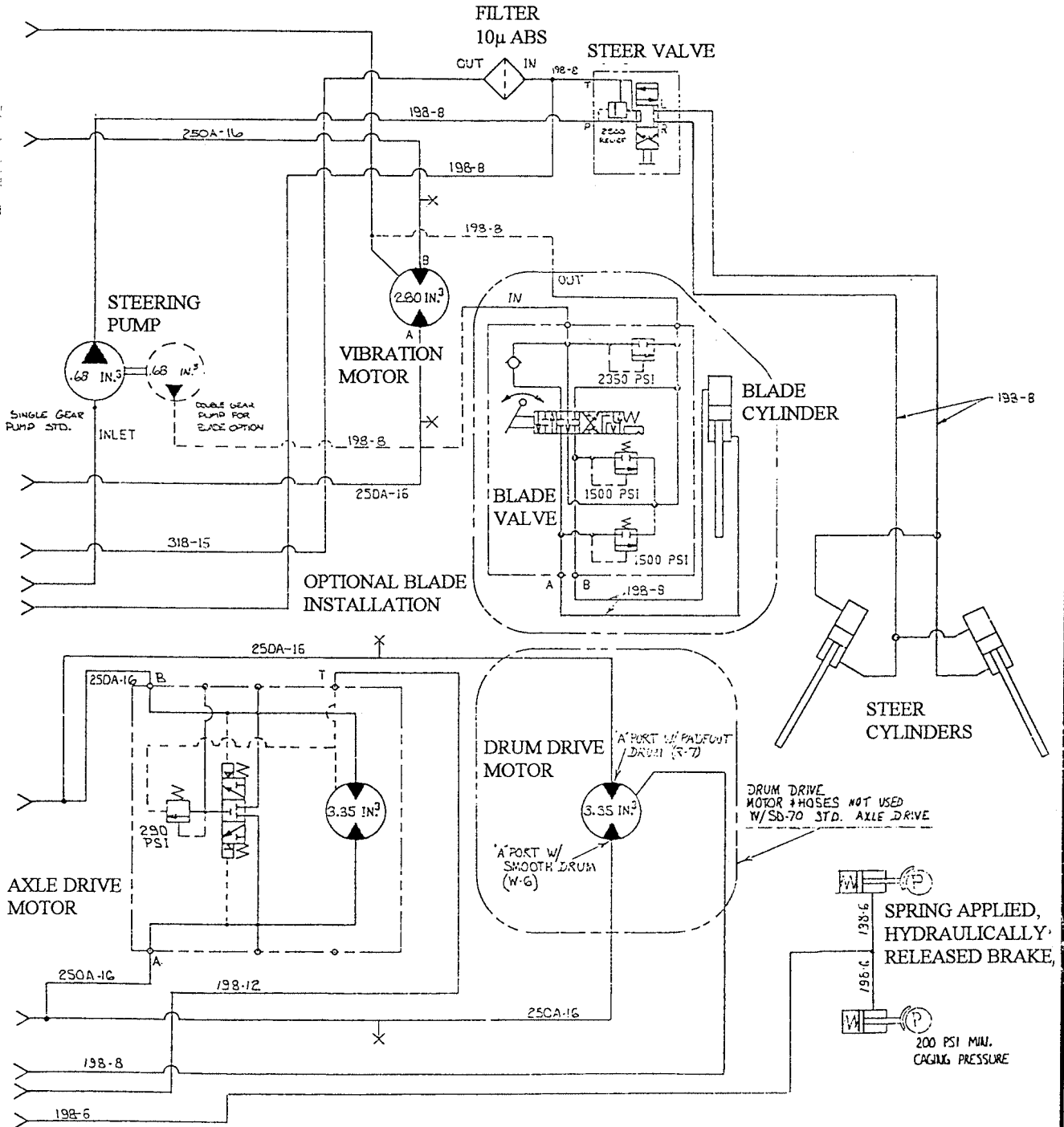
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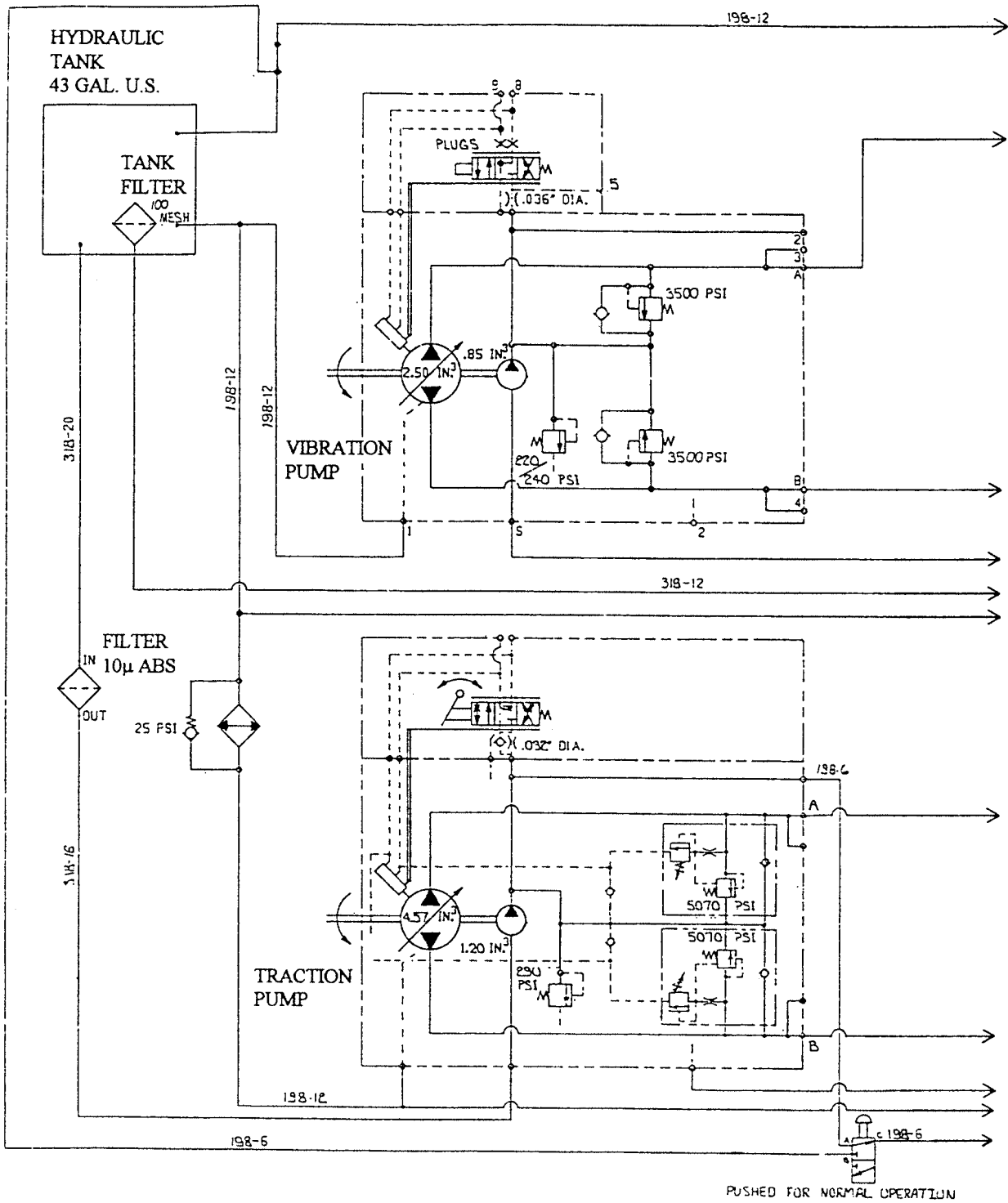
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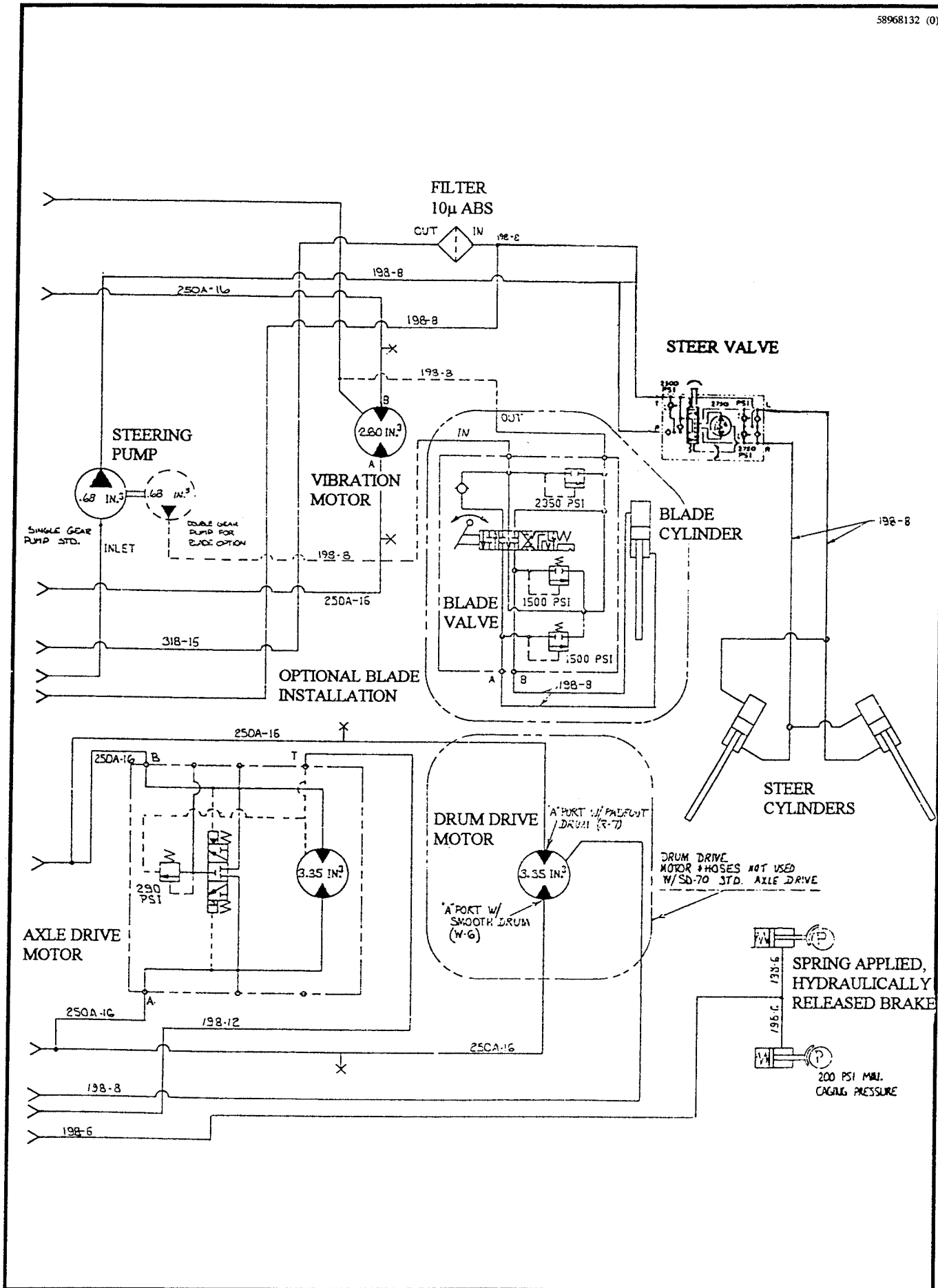
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SECTION 16 - SCHEMATICS

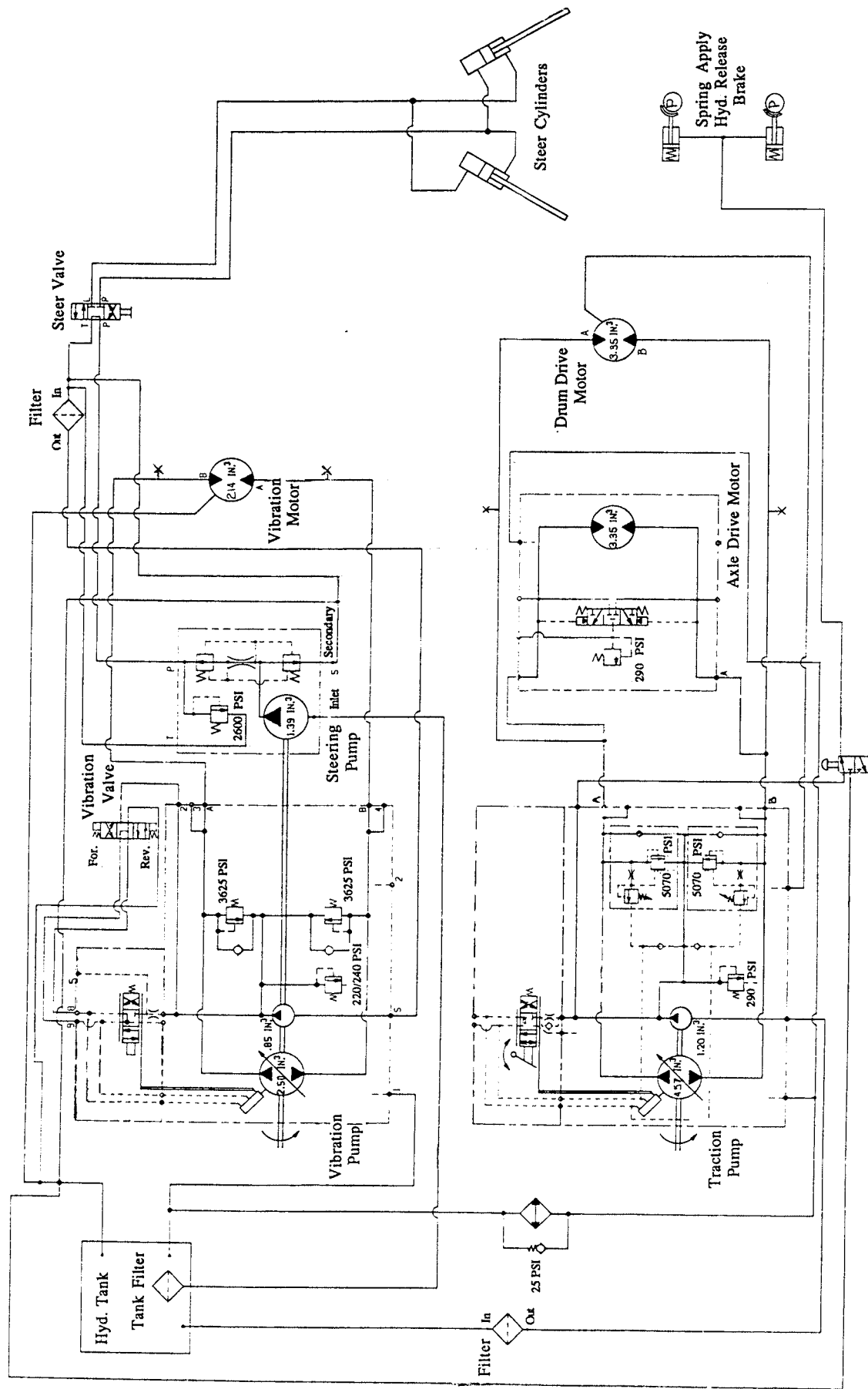
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Hydraulic Schematic (SD-70, SD-70D, SD-70F) - Effective with S/N 5713  
Sheet 2 of 2

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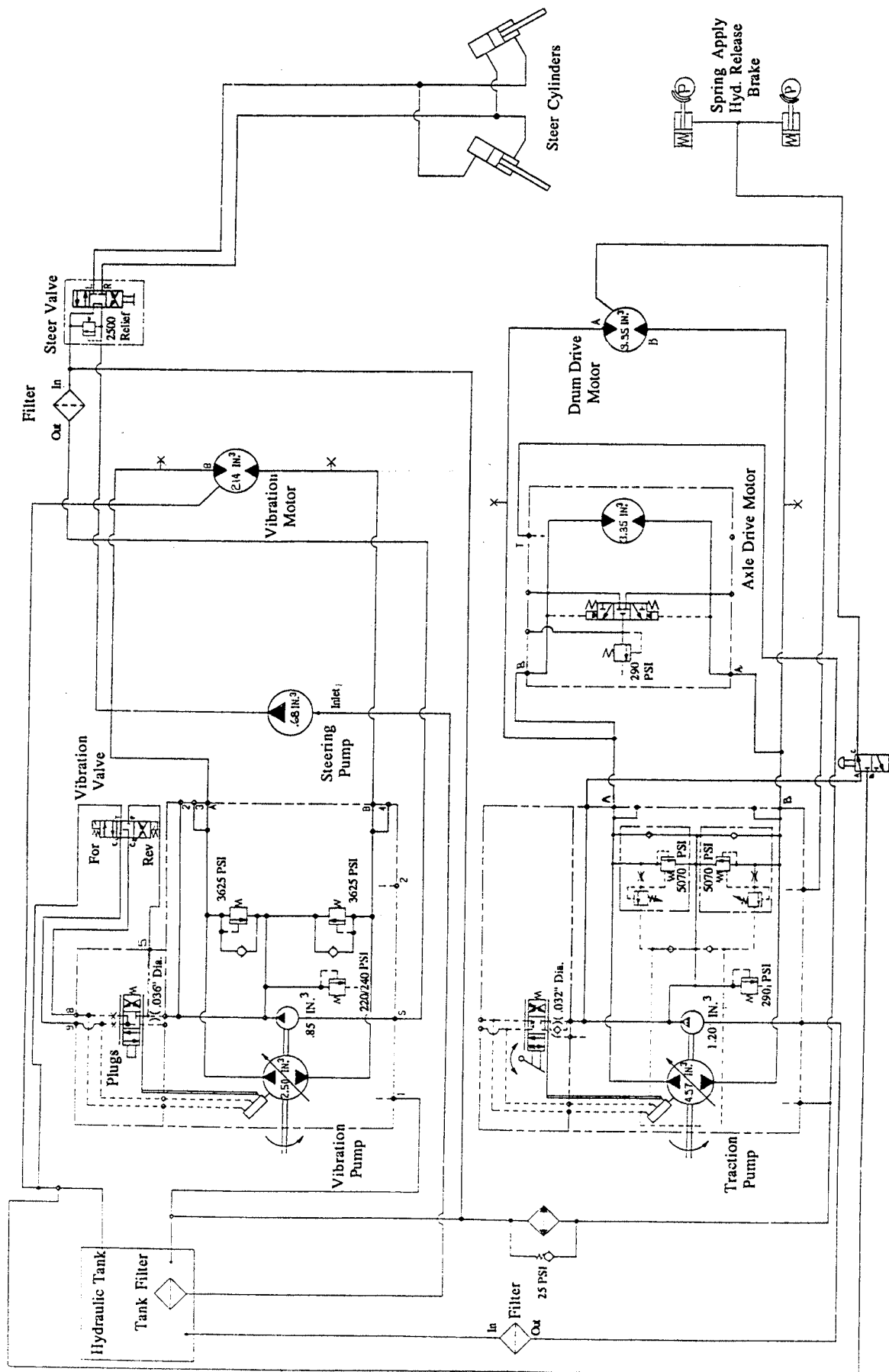
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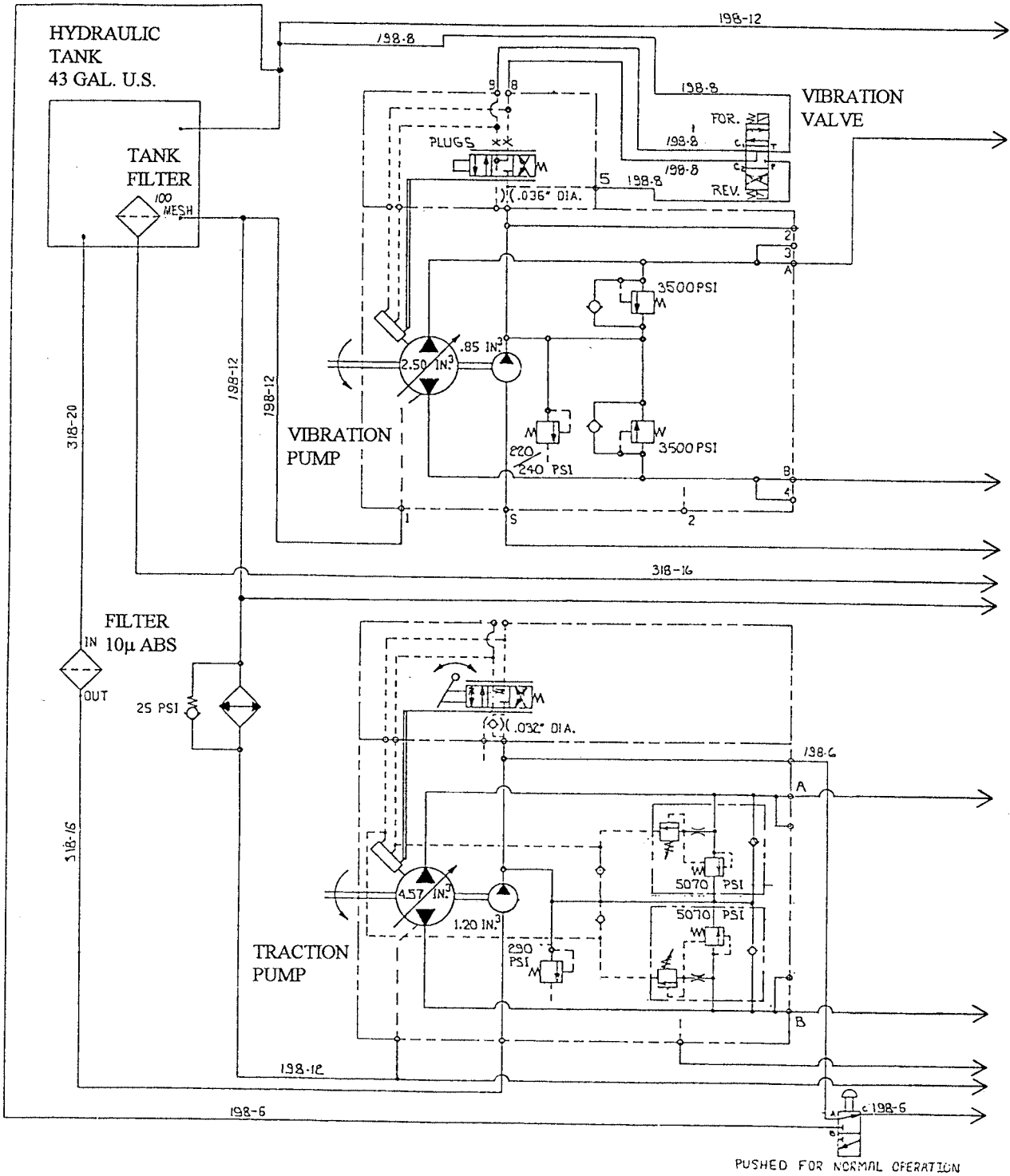
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Hydraulic Schematic (SD-70DA) - Effective with S/N 5146 to S/N 5284

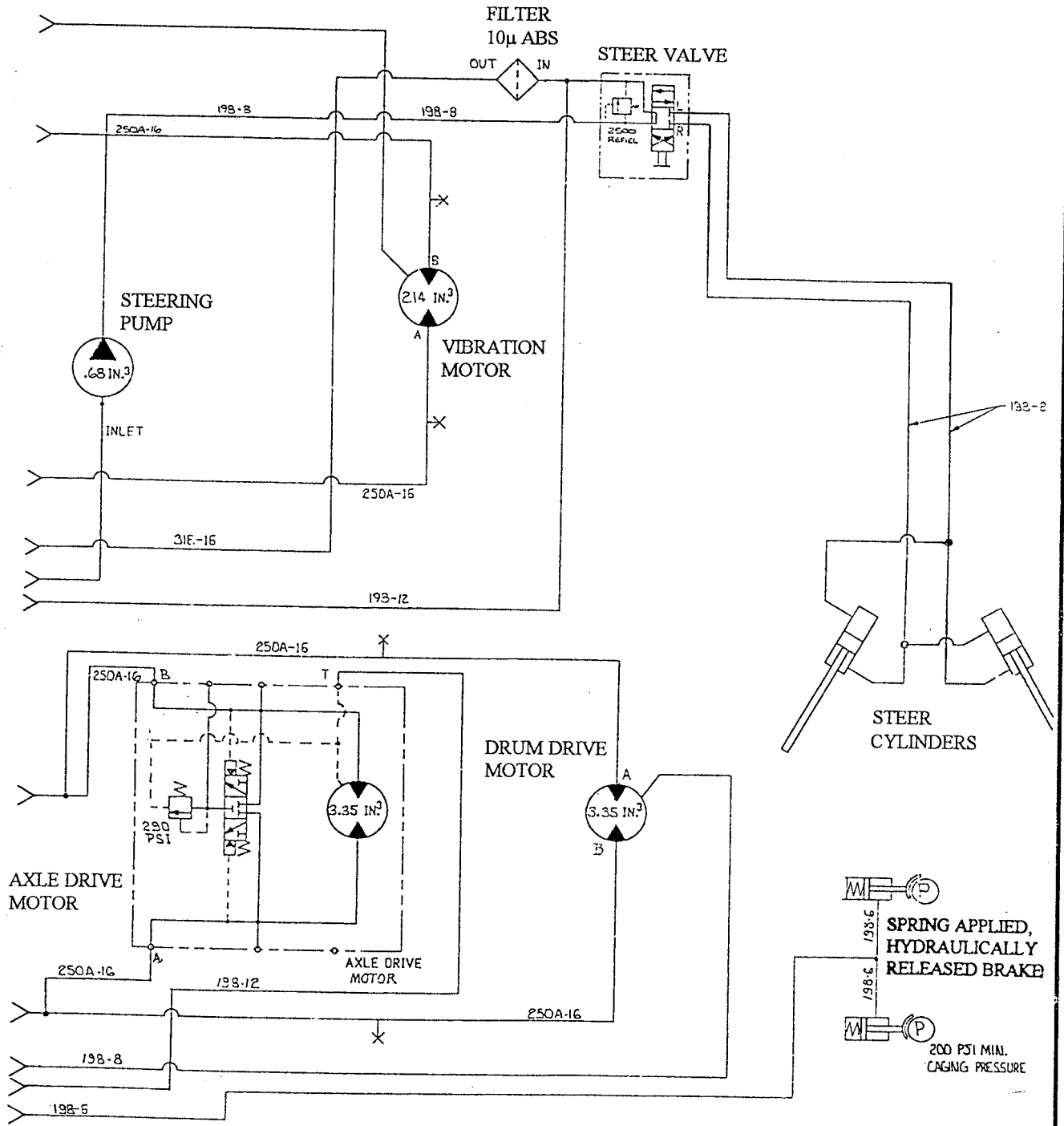
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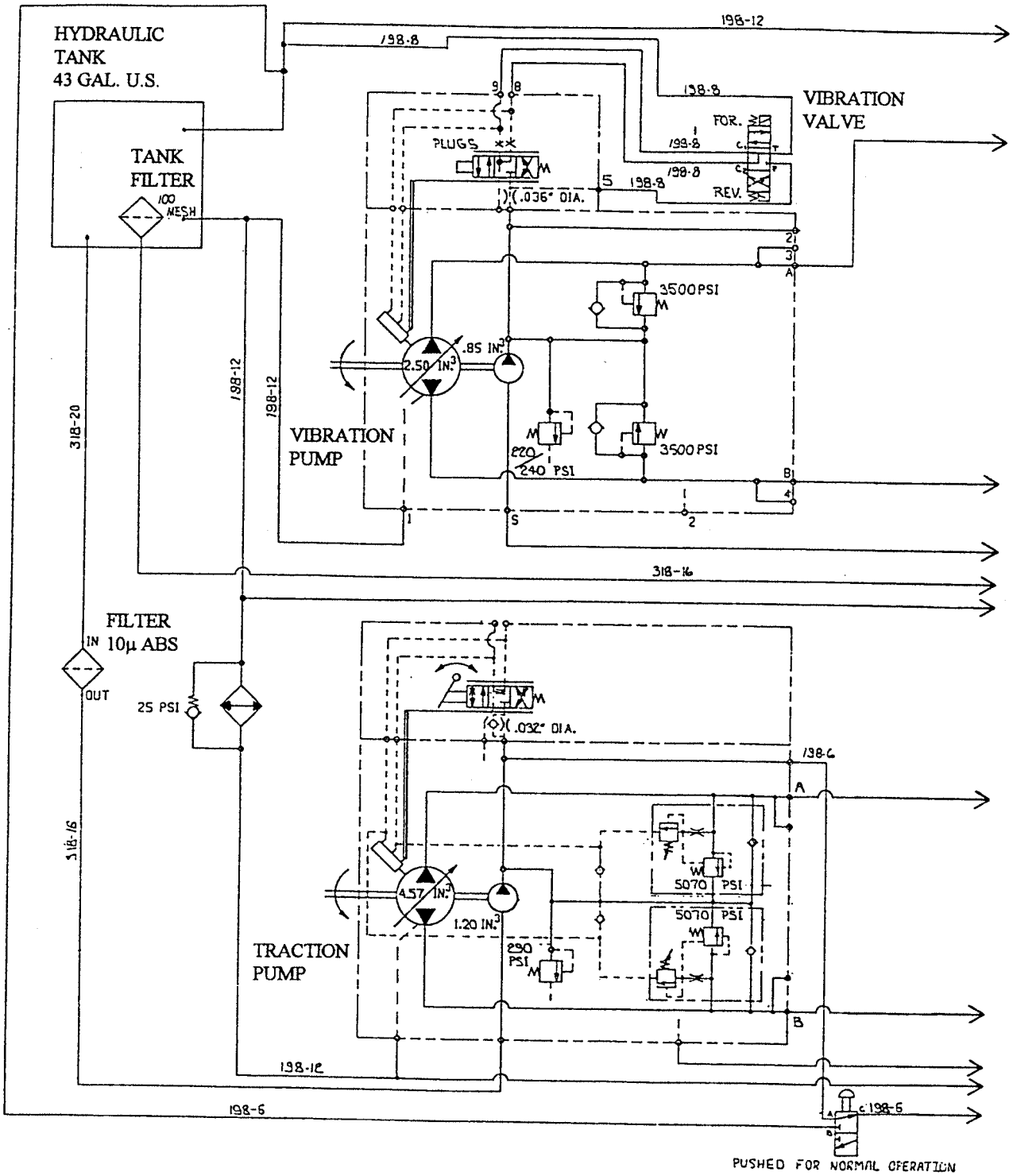
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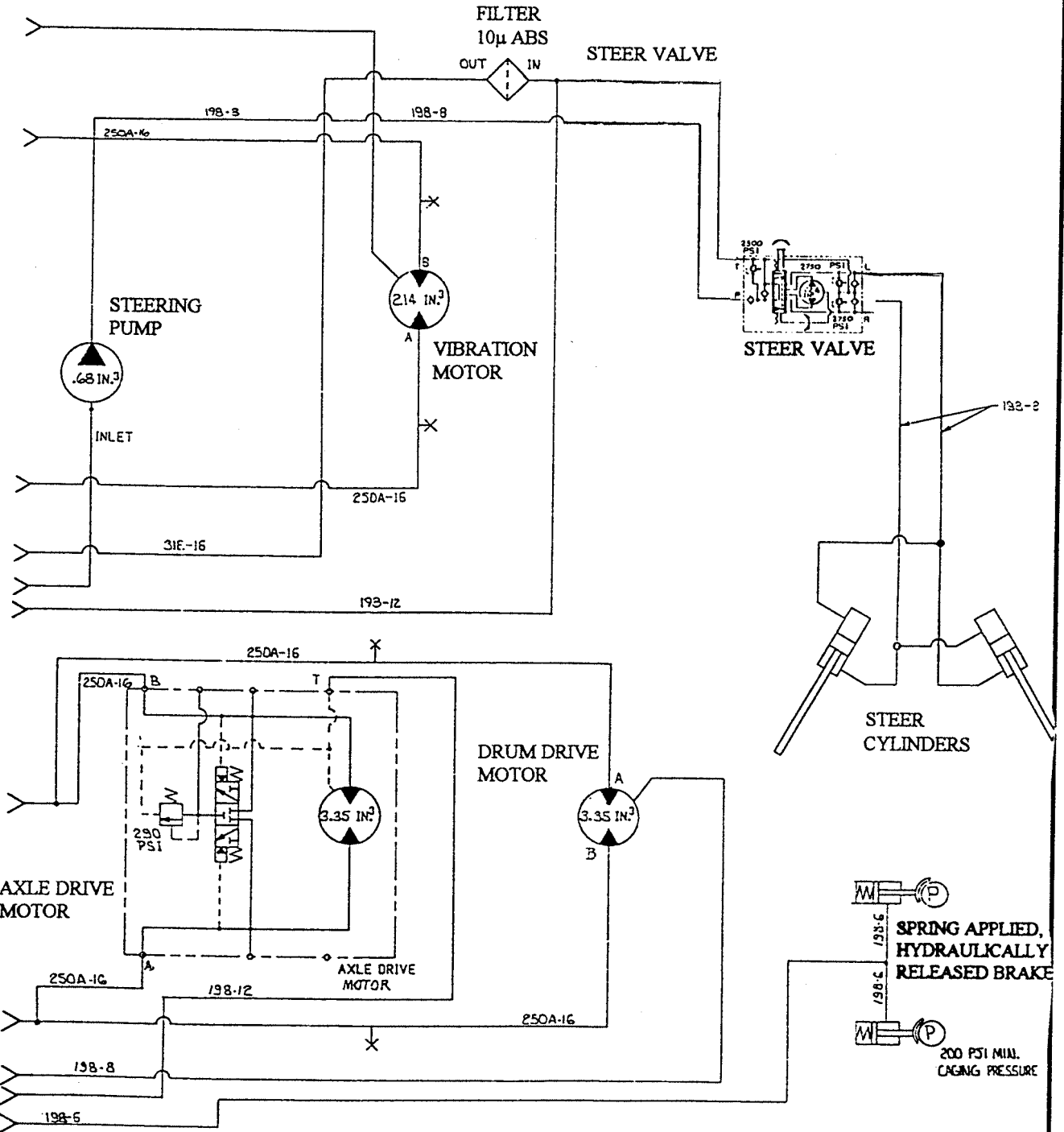
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# SECTION 16 - SCHEMATICS

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## SECTION 17 - SPECIFICATIONS

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ISO METRIC TORQUE CHART _____	2		

Use the following Recommended Torque Chart for bolts and nuts of SAE Grade 5 or better quality. If other torques are required, they will be indicated in the text.

*NOTE*

*Torque values are based on plain, unplated hardware, degreased, dried, clamping steel to steel.*

### SAE Grade 5 (Modified)

Proof Load = 74 - 85 KSI			
	Clamp Load (lbs)	Torque (lbs. ft.)	Torque (NM)
1/4 - 20	2020	96 lb. inch	11
1/4 - 28	2320	120 lb. inch	14
5/16 - 18	3340	17	23
5/16 - 24	3700	19	26
3/8 - 16	4940	30	41
3/8 - 24	5600	35	47
7/16 - 14	6800	50	68
7/16 - 20	7550	55	75
1/2 - 13	9050	75	102
1/2 - 20	10700	90	122
9/16 - 12	11600	110	149
9/16 - 18	12950	120	163
5/8 - 11	14400	150	203
5/8 - 18	16950	180	244
3/4 - 10	21300	260	353
3/4 - 16	23800	300	407
7/8 - 9	27000	400	542
7/8 - 14	29800	440	597
1 - 8	35500	580	786
1 - 12	38800	640	868
1 1/8 - 7	42300	800	1085
1 1/8 - 12	47500	880	1193
1 1/4 - 7	53800	1120	1519
1 1/4 - 12	59600	1240	1681
1 3/8 - 6	64100	1460	1980
1 3/8 - 12	73000	1680	2278
1 1/2 - 6	78000	1940	2631
1 1/2 - 12	87700	2200	2983

All threaded fasteners will be Loctited except the following:

1. Wheel Nuts.
2. Nylon Insert Nuts.
3. Whizlock Bolts and Nuts.
4. Fasteners less than 1/4 inch diameter.
5. If instructed to not apply Loctite.

Type of Loctite to be used:

1. No. 242 for 5/16 diameter and below.
2. No. 271 for greater than 5/16 diameter.
3. No. 242 for aluminum.

All Loctited fasteners will be degreased and dried. When accelerated Loctite cure times are required, Loctite primer must be used.

## SECTION 17 - SPECIFICATIONS

Use the following Recommended Torque Chart for bolts and nuts of ISO Metric strength class 8.8 and 10.9. If other torques are required, they will be indicated in the text.

*NOTE*

*Torque values are based on dry, zinc-plated capscrews. These values will be approximately 30% less if lubricated capscrews are used.*

<b>BOLT SIZE (MM)</b>	<b>GRADE 8.8 POUNDS-FOOT (Kg-Meters)</b>	<b>GRADE 10.9 POUNDS-FOOT (Kg-Meters)</b>
6	8 (1.1)	11 (1.5)
8	20 (2.8)	27 (3.8)
10	39 (5.5)	53 (7.4)
12	68 (9.5)	93 (13.0)
14	107 (15.0)	148 (21.0)
16	156 (22.0)	230 (32.0)
20	306 (43.0)	449 (63.0)
24	529 (74.0)	777 (109.0)
30	1050 (147.0)	1544 (216.0)
36	1835 (257.0)	2696 (377.0)



## SECTION 17 - SPECIFICATIONS

### SPECIAL TORQUE VALUES FOR SD-70 SERIES VIBRATORY COMPACTOR

The following are some special torque values that are different than the standard torques found on the Ingersoll-Rand Torque Values Charts found in this section.

<b>Drum Assembly</b>			
<u>Function of fastener being torqued</u>	<u>Size of fastener</u>	<u>Torque (Ft. Lbs.)</u>	<u>Loctite # if used</u>
Drive motor to torque hub	1/2" - 13 x 1.50"	120	271
Drum Carrier Assembly	3/4" - 10 x 2.0"	410	271
<b>Engine Assembly</b>			
<u>Function of fastener being torqued</u>	<u>Size of fastener</u>	<u>Torque (Ft. Lbs.)</u>	<u>Loctite # if used</u>
Pump coupling to flywheel	3/8" - 16 x .75"	48	-
Engine fan mounting	M8 - 1.25 x 65mm	21	-
Front engine mount to engine	M12 x 50mm	110	-
Rear engine mount to engine	M12 - 1.75 X 40mm	60 - 65 inch/lbs	-
<b>Miscellaneous</b>			
<u>Function of fastener being torqued</u>	<u>Size of fastener</u>	<u>Torque (Ft. Lbs.)</u>	<u>Loctite # if used</u>
Shifting mtg. bracket to transmission	5/8" - 11 x 1.25"	230 (SD-70/70DA)	271
		255 (SD-70D/70F)	271
Vibration motor to transmission	1/2" - 13 x 1.75" 1/2" -13 x 1.50"	120 (SD-70/70DA)	271
		130 (SD-70D/70F)	271
Arch ROPS mounted to frame	1 1/2" - 6 x 5 1/2"	1860	-



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