

# SV400 Series Shop Manual



**Sakai®**

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# About the Manual

This manual is divided into Sections. The sections and brief overviews are listed below:

- Introduction – Supplies directions on how to use the manual, general safety instructions. Panel symbols used on the compactor. Acronyms and Abbreviations pages give noun names for common acronyms and abbreviations.
- Identification – Identifies the components on the compactor and breaks them down into exploded views.
- Operation – Describes components and operating procedures for the compactor.
- Maintenance – Supplies maintenance intervals for the compactor.
- Troubleshooting – The troubleshooting section is divided into procedures that are symptom driven. The most common problems are addressed first.
- Compactor Repair – Procedures to replace individual components.
- Schematics - Hydraulic and electrical schematics are supplied.
- Service Literature – Lists service literature that can be acquired.
- Specifications – Supplies specifications for the compactor. Conversion charts are also supplied in this section.

The instructions in this manual must be followed to operate, maintain, troubleshoot and repair the compactor.

# How to Use the Manual

Prior to operation of the compactor read the following sections:

- Introduction
- System Identification
- Operation.

Use the Maintenance section to schedule and perform maintenance. The maintenance is performed at the following intervals:

- Every 10 hours or daily
- Every 50 hours
- Every 250 hours
- Every 500 hours
- Every 1000 hours
- As Required.

When a compactor issue has been identified use the Troubleshooting section of this manual. The troubleshooting section is divided into procedures that are symptom driven. Each of the individual procedures is designed to troubleshoot the most likely problem area first. When the problem area is identified the procedure will refer you to the appropriate disassembly and assembly procedure.

The Additional Service Literature section lists all of the associated manuals to be used when servicing and troubleshooting the compactor.



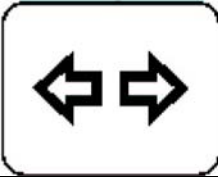




The Compactor Repair Section supplies direction with illustration to remove, clean and inspect for reuse, disassemble, assemble and install individual compactor components.


The schematic section has hydraulic schematics and electrical wiring diagrams for troubleshooting use. The troubleshooting trees will refer to the wiring diagram or hydraulic schematic. Component and wire terminology are consistent throughout the manual.

A specification section has been provided to aid in repair.

## Panel Symbols

The symbols listed below appear in the combination meter. The lamps are located adjacent to the meter.

Battery Charge Symbol – Illuminates when charging system is not functioning correctly. The engine must be running for the lamp to illuminate.	
Hydraulic Oil Filter Symbol – Illuminates when the hydraulic oil filter is restricted.	
Turn Signal Indicator Symbol – Illuminates when the turn signal lever is moved. Turn signals are an option.	
Engine Oil Pressure Warning Symbol – Illuminates when there is a low engine oil pressure issue.	
Parking Brake Symbol – Illuminates when the parking brake is engaged.	
Flood Lamp Symbol – Illuminates when the flood lamps are turned on.	
Vibration Symbol – Illuminates when the compactor has vibration engaged.	

<p>Engine Warning Lamp – Illuminates when the engine must be shut down. Shut down the engine when this lamp is on.</p>	 <p><b>Engine Warning</b></p>
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# General Safety Instructions

## Warning

**Improper operation, carelessness, or ignoring the warnings can cause cuts, burns, mutilation or death.**

## Warning

**Do not operate your machine before the manual is read. Incorrect operation can kill or cause injury. It is your responsibility to operate the machine safely.**

Read and understand this manual prior to operating, troubleshooting or repairing of the compactor. The table below contains common warnings. To reduce the possibility of personal injury or equipment damage, always follow all Danger, Warning or Caution instructions.

- Make sure area that work is to be performed in is dry, well-lit, ventilated, free from clutter and hazardous substances.
- Always wear personal protective equipment when operating and working with this equipment.
- Do not wear loose fitting or torn clothing. Remove all jewelry when working.
- Disconnect the negative (-) battery first and discharge any capacitors before beginning any work. Place a Do Not Operate tag on the start switch.
- Rotating parts can cause cuts, mutilation or strangulation.
- If the engine has been operating and the coolant is hot, allow the engine to cool before slowly loosening the filler cap to relieve the pressure from the cooling system.
- Always use blocks or proper stands to support the compactor. Do not work on anything that is supported only by lifting jacks or a hoist.
- Relieve all pressure in the air, oil, hydraulic oil, fuel and cooling systems before disconnecting any lines, fittings or related components. Stay alert for possible pressure when disconnecting any device from a system that uses pressure. Do not check for pressure with your hand. High-pressure oil, hydraulic oil or fuel can cause personal injury.
- To reduce the possibility of personal injury, use a hoist or get assistance when lifting components 50 lb [23 kg] or more. Make sure all lifting equipment is in proper working order.
- To reduce the possibility of burns, stay alert for hot parts on components that have just been turned off.
- Do not attempt a repair when fatigued or after consuming alcohol or drugs that impair your functioning.
- Some United States Federal and State agencies have determined that used engine oil can be carcinogenic. Avoid ingestion, vapor inhalation and prolonged contact with used engine oil.
- Coolant is toxic; keep away from children and small pets. If not reused dispose of in accordance with local environmental regulations.
- 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 reproductive harm.
- This manual covers proper and safe method of driving and handling of this machine. The machine is to be used only for its intended use. When this machine is used in a manner other than that covered in this manual, you assume responsibility for your personal safety.
- You must be qualified to operate this machine.
- Non-approved modifications can pose safety-related problems. Before making any modifications, consult your distributor. Non-approved modifications to this machine can cause personal injury and machine damage. Sakai accepts no responsibility for un-approved modifications.
- Follow all worksite rules and working procedures.
- Know the terrain, geology and conditions of the road surface at the worksite. Post a safety watch or put up barriers where there is a chance of falling off of the machine or shoulder collapse.

- Decide in advance the means of communication in case of an emergency. Know the location and use of a fire extinguisher and first-aid kit.
- Thoroughly understand the performance of your machine and correctly operate the machine to meet the requirements at the job site. Operating the machine beyond its capability can lead to an accident. Operate the machine within its capability only.
- Do not use a machine that has not been serviced or has not been serviced correctly at regular intervals. Prior to operating the machine perform necessary inspections. Start the machine only after the machine is found to be in good working order. Correct any faults prior to operation.
- When removing the filler cap on the hydraulic tank, release the pressure by turning it out slowly to prevent oil from flowing out.
- Mount or dismount the machine after it has come to a complete stop. Use the handrail and steps when entering or exiting the machine.
- Wear safety goggles to protect your eyes from hydraulic fluid. Hydraulic fluid can irritate the eyes. If hydraulic fluid comes in contact with your eyes, flush with water for 15 minutes and seek medical attention.
- Use gloves when handling hydraulic fluid. Hydraulic fluid can irritate the skin.
- Do not ingest hydraulic fluid. If ingested seek medical attention. Do not induce vomiting.
- Do not place parts, tools or un-necessary items on the steps, operator's station or floorboard.
- Keep steps, floorboard, controls and handholds free from mud, oil, ice or water. Mud, oil, ice or water can cause slips.
- Keep boots free from oil or water.
- Check all of the fluid levels prior to starting. Add fluid as necessary.
- Check area where machine is parked for signs of oil or coolant leaks. If there are leaks, find the cause and correct the leaks.
- Know the stopping distance of your machine. Avoid excessive speed and abrupt starting and stopping.
- Sit on operator's seat and adjust it so that your back will make contact with the seat when the brake pedal is depressed to the full extend of travel. Check to be sure the brake can be fully depressed without difficulty when your body is twisted for a reverse run.
- If the machine has a cabin, keep the windowpanes clean and the doors closed. Do not leave the doors half closed.
- Clean mirrors and adjust them for good visibility. If mirrors are damaged, they must be replaced.
- Check to make sure horns and gauges work correctly.
- Before starting the machine, make sure that each lever is in the neutral position and the parking brake is applied.
- Before starting the machine, make sure there is no one in the vicinity and there are no obstructions. Sound the horn prior to starting.
- Exhaust fumes are dangerous if breathed in. Make sure the machine is in an area with good ventilation prior to starting engine. Do not stand next to the exhaust pipe when the engine is running.
- Do not put the machine into motion immediately after the engine has started. Let the engine idle until it has reached operating temperature.
- Make a test run in a safe place to be sure the engine is operating correctly.
- Listen for unusual sounds and check for abnormal temperature rise. Park the machine in a safe location, find the source and repair before operating.
- The machine is designed for one operator only; do not allow anyone to ride on the machine. Only the operator is allowed on the machine while running or operating. Radios are not permitted.
- Make sure no one is around or under the machine when mounting it.
- When advancing up or down a hill run at low speeds. Do not attempt to shift speeds while traveling on a grade. Moving down a hill at high speeds can cause the machine to react violently. Do not shift speeds on a slope. Shifting can cause the machine to move down the hill at high speeds.











- Inattentive driving or driving relying on guesswork can cause an accident. Use extreme caution when workers are in the path of the roller or around it. In case of danger, stop and sound the horn. Proceed when the area is clear of personnel or obstructions.
- When changing the direction of travel make sure the path is clear in the new direction.
- Keep everyone away from pinch points. When making turns do not allow anyone to come close to the pinch points.
- When driving at night, carefully drive the machine at a speed suited to the illumination. Keep headlights and flood lamps illuminated. Provide extra lighting in work area if necessary.
- If a fault lamp indicates faulty operation, park the machine in a safe place and repair the machine. Do not operate machine until the fault is corrected.
- Only operate the machine from the operator's seat. Do not operate the machine while standing.
- When making a turn do not run at abnormally high speed and do not turn the steering wheel abruptly or sharply.
- When traveling on structures, such as bridges, make sure the structure can support the weight of the machine. Before traveling on a structure you must know the load capacity of the structure and the load of the machine.
- Do not make turns on a slope. Do not travel across the side of a hill. Go down the hill to level ground and make the turn.
- Park on level ground if possible. If necessary to park on a slope, place chocks on the drum at the down side of the slope.
- When required to park on a public road, provide necessary markings, such as a flag, barriers, and illumination. Make sure markings do not obstruct traffic.
- Use extreme care when loading and unloading your machine. Select hard, level ground leaving a sufficient distance from the shoulder. Use sturdy ramps with proper width, length and thickness that allow for safe use.
- To reduce the possibility of the machine slipping crossways, keep the ramps free from oil, mud and debris. The drum must also be free from debris that can cause the machine to slip.
- Do not steer the machine while on the ramp when loading. If the machine is not on the ramps correctly, back down the ramp, realign the machine and load the machine.
- Do not use kinked, twisted or damaged cable for crane or winch operation. Make sure the cable is rated for the weight of the machine.
- After the machine is loaded, place wooden chocks under the drum(s) and secure the machine with chains.
- Select a transporting route according to the overall width, height and GVW. GVW is the machine added to the truck weight.
- Batteries contain sulfuric acid. If sulfuric acid is on clothes or skin, flush with large quantities of water.
- If sulfuric acid is in eyes, flush with water and seek medical attention.
- If sulfuric acid is ingested, drink large amounts of water, milk, beaten egg, or vegetable oil and seek medical attention.
- Wear safety goggles when handling the battery.
- Wear safety goggles, full-face shield, rubber gloves, rubber apron when adding electrolyte to the battery.
- The battery generates flammable gases that can cause an explosion. Do not smoke or have open flames, sparks and ignition sources around the battery.
- Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling the battery.
- Inspect or handle the battery with the engine shut down and the starter key switch in the OFF position. Keep metal items away from the battery terminal. Make sure battery connectors are tight. Loose connectors on terminals can cause sparks.
- When checking the coolant level, shut down the engine and allow the coolant to cool down.
- For inspecting the level of fuel, oil, coolant and battery electrolyte use a burn-proof illumination. Failure to use burn-proof illumination can cause an explosion.











- When connecting the batteries from another machine for jump-starting, do not allow the machines to touch, wear safety goggles. Connect the positive (+) jumper cable first and disconnect the negative (-) jumper cable first. When connecting the negative (-) jumper cable to ground, select an area on the machine as far from the battery as possible. Do not cross connect jumper cable (positive (+) terminal to negative (-) terminal).
- If towing a machine, use cable with the rated strength for the machine. Do not tow on a slope. Do not use twisted, kinked or damaged cable. Never stand astride a towing cable. Keep all non-essential people away from the machine area when towing.
- Prior to servicing a machine attach a warning tag clearly visible from the operator's station and remove the key from the ignition. A sample DANGER tag is attached to this procedure.
- Use the proper tool for the job. Using a tool that was not designed for the job can cause personal injury and/or equipment damage.
- Complete all maintenance, at the intervals required by this manual. If the maintenance is not performed at the intervals, equipment damage or personal injury can result.
- If maintenance is required to be performed while the engine is running, such as radiator flushing, perform the work with two people. One person must be in the operators seat ready to shut the engine down. Care must be taken by the safety person not to engage additional features unintentionally.
- Clean up all spilled oil, coolant or fuels immediately. Keep filler caps tight. Do not use fuel for flushing oil. Handle fuel and oil in a well-ventilated area.
- Do not allow un-authorized persons in the work area when grinding, welding or heavy hammers are used.
- Keep the machine clean and free from oil, grease or debris. Liquids that penetrate into the electrical system can cause machine damage. Do not use water to clean sensors, connectors or the operator station.
- When welding on the machine disconnect the battery.
- Do not try to bend or hit high-pressure hoses against a hard object. Do not use hoses or pipes that are bent or damaged. Replace damaged fuel lines or damaged hydraulic hoses.
- Do not add, drain, inspect or service hydraulic systems until internal system pressure is released. Hydraulic fluid leaking through a pinhole can penetrate the eyes and skin. If you come in contact with high-pressure oil, seek medical attention. Inspect for a leak by holding a hard board close to the area.
- After the machine has been in operation, the coolant, engine oil, hydraulic oil, and machine components become hot. Wait until the machine cools down to begin repairs.
- Do not inspect the engine-cooling fan while the engine is running. Rotating engine cooling fan blades can cause personal injury and equipment damage.
- Do not discard used oil into a drain or waterway. Drain the oil into a proper container and dispose of in accordance with local environmental regulations.
- Use extreme care when replacing tires. Do not attempt to repair the tires. Take the tire to an authorized tire shop for repairs. The tire is of a split rim design and can cause personnel injury if proper equipment is not used. When dismounting a tire chock the other tire.
- When welding around the tires make sure the tires are protected from sparks. If sparks penetrate the tire, an explosion can result.








Below is an example of a tag used to secure an engine from operation. This page may be removed and the tag cut out. There is a front and back view of the tags. It is recommended to join the front with the back and laminate the tag.



The table below lists commonly used Caution, Warning and Danger symbols.

<p>Denotes there is an extreme hazard. If you fail to take proper precautions, it is highly likely that you could be killed or seriously injured (the symbol color is red).</p>	 <b>Danger</b>
<p>Denotes there is a hazard. If you fail to take proper precautions, you could be killed or seriously injured (symbol is orange).</p>	 <b>Warning</b>
<p>Calls attention to safety practices. If you fail to take proper precautions, you could be injured or cause damage to the machine (symbol is yellow).</p>	 <b>Caution</b>
<p>Understand the functions of the controls and gauges. Familiarize yourself with their location and operation. Understand the meaning of all symbols.</p>	
<p>Battery sulfuric acid warning.</p>	
<p>Indicates hazardous liquids disposal is required such as:</p> <ul style="list-style-type: none"> <li>• Engine oil</li> <li>• Hydraulic oil</li> <li>• Sulfuric acid from battery</li> <li>• Engine coolant.</li> </ul>	
<p>Eye protection is required to perform task.</p>	
<p>Gloves required to perform task.</p>	
<p>Hardhat is required in work area.</p>	
<p>Hearing protection is required in work area.</p>	

<p>Sounding horn is required for safe operation.</p>	
<p>Hot surface during and after machine operation.</p>	
<p>High-pressure hydraulic leak check and warning.</p>	
<p>No open flames allowed.</p>	
<p>No open flame, smoking or ignition allowed.</p>	
<p>Area is pinch hazard when machine is operating.</p>	
<p>Respiratory equipment is required in work area.</p>	
<p>No high speed on down hill grade with machine.</p>	
<p>Rotating parts warning.</p>	
<p>Eye protection required in work area.</p>	

<p>Safety shoes required in work area.</p>	
<p>Tire penetration with hot spark explosion warning.</p>	
<p>No unauthorized people in work area.</p>	
<p>Use spark proof illumination when inspecting this area.</p>	
<p>Use the proper tool for the proper job.</p>	
<p>Ventilation required to eliminate toxic fumes.</p>	
<p>Disconnect battery prior to welding on machine.</p>	



The safety decals used on the SV400 are shown below.

**CALIFORNIA**  
 Proposition 65 Warning  
 Diesel engine and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.  
3998-16500-0

**CAUTION**  
 Lubricate all grease fittings daily prior to commencing work.  
3998-10507-1

**DANGER**


 


**Be Careful with Fire**

- When refueling, stop the engine and do not smoke.
- The filter cap of the fuel tank must be kept tight.

3998-18501-0

**DANGER**

 **EXPLOSIVE GASES**  
 Cigarettes, flames or sparks could cause battery to explode. Always shield eyes and face from battery. do not charge or use booster cables or adjust connections without proper instruction and training.

 **CHEMICAL BURNS**  
 Contains sulfuric acid. Avoid contact with skin, eyes or clothing. In event of accident flush with water and call a physician immediately.

3998-16559-0

**WARNING**

- Do not open the hood with the engine running.
- Contact with hot parts will cause burns.
- Contact with rotating parts will cause severe injury.




3998-16499-0

**WARNING**

- 1. When Handling the Machine:**
  - Operate only while seated.
  - Use the handrails and steps when boarding and getting off.
  - Never carry passengers.
  - Never attempt to board or get off the machine while it is moving.
- 2. Preparation for Safe Operation**
  - Clean the steps, operator's station and floorboards.
  - Obey the worksite rules.
  - Sakai accepts no responsibility for any injury or damage to the machine caused by unapproved modification.
  - Do not use a machine which needs repair or maintenance.
  - Sound the horn immediately prior to starting the engine to warn people in the vicinity.
- 3. Starting the Engine**
  - Check that all operating levers are in the neutral position.
  - Idle the engine for about 5 minutes to warm it up prior to commencing work.
- 4. Parking Precautions**
  - When parking the machine, park it on level ground, set the parking switch and set the roller chocks.
  - Allow the engine to cool off by running it for about 5 minutes before stopping.
  - When getting off the machine, remove the key from the ignition switch.

3998-16504-0

**DANGER**

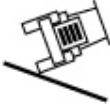
- Do not approach, or allow objects to touch the rotating parts.
- Body parts which make contact with rotating mechanism will be severed.
- Do not open the radiator cap when fluid is hot.
- Radiator fluid is flammable. Avoid exposure to flame when radiator cap has been removed.
- Avoid contact with the machine parts in the vicinity of the engine while engine is running and after it has been stopped. Contact with hot part will cause burns.

3998-16502-0

**WARNING**

- Thoroughly read the operator's manual before using the machine.
- Incorrect operation can cause severe injury or death.
- It is your responsibility to operate the machine safely.

3998-16497-1

	<b>⚠ DANGER</b>
	<b>Roll Over Prevention</b> <ul style="list-style-type: none"><li>• Do not work in the vicinity of overhanging banks, or on grades steep enough to cause the machine to slide or roll over.</li><li>• Reduce speed prior to making turns.</li><li>• Pay particular attention when operating on uneven surfaces, as the machine may become unstable.</li></ul> <small>399B-16468-1</small>

<b>⚠ CAUTION</b>
When storing this machine, release the parking brake once a month to prevent it from jamming.
<small>399B-16468-1</small>



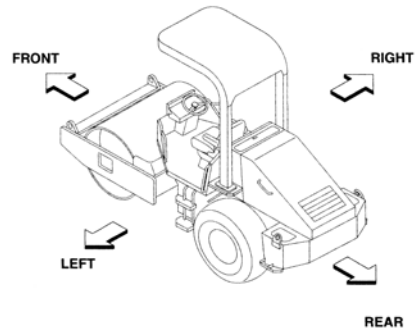
## Acronyms and Abbreviations

The table below contains commonly used acronyms and abbreviations.

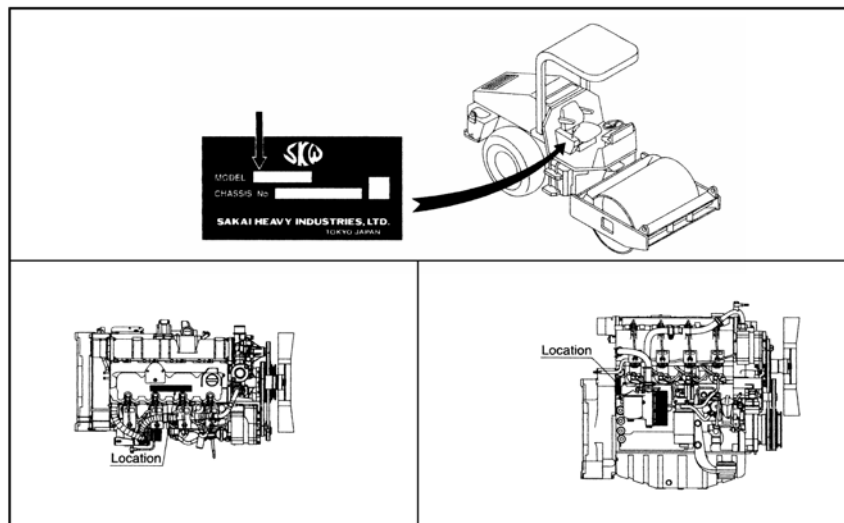
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
BTU	British Thermal Unit
°C	Celsius
°F	Fahrenheit
CARB	California Air Resources Board
C.I.D.	Cubic Inch Displacement
ECM	Electronic Control Module
EPA	Environmental Protection Agency
GVW	Gross Vehicle Weight
hp	Horsepower
kPa	Kilopascal
MPa	Megapascal
mph	Miles per Hour
OEM	Original Equipment Manufacturer
PPM	Parts Per Million
psi	Pounds Per Square Inch
SAE	Society of Automotive Engineers

# Compactor Controls Identification

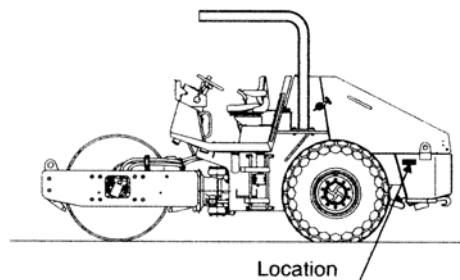
This procedure identifies all of the components used in normal operation of the SV400-2 compactor. The first graphic illustrates travel directions when sitting in the operator's seat.

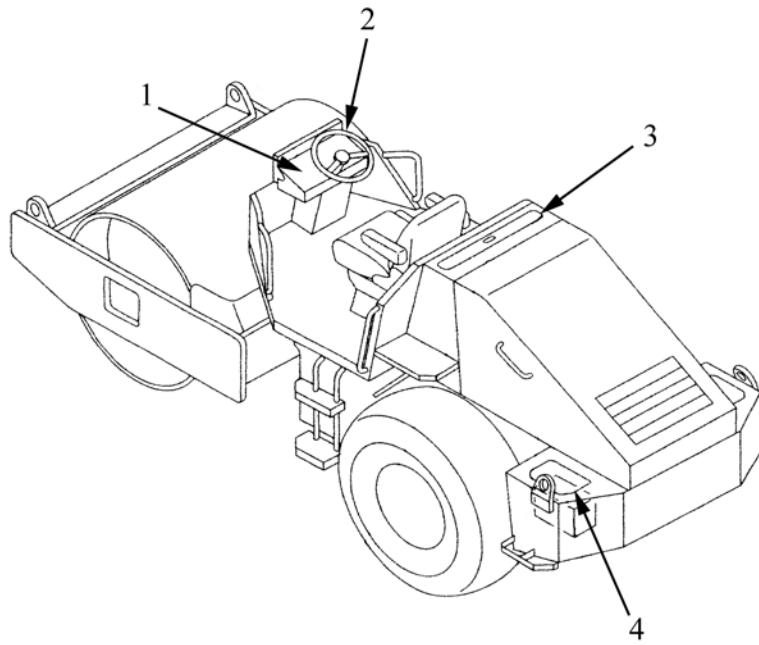


The model number is stamped onto a metal tag and located on the vibration control panel (upper frame of graphic). The engine data plate is located on the valve cover of the engine (lower right and left frame of graphic).



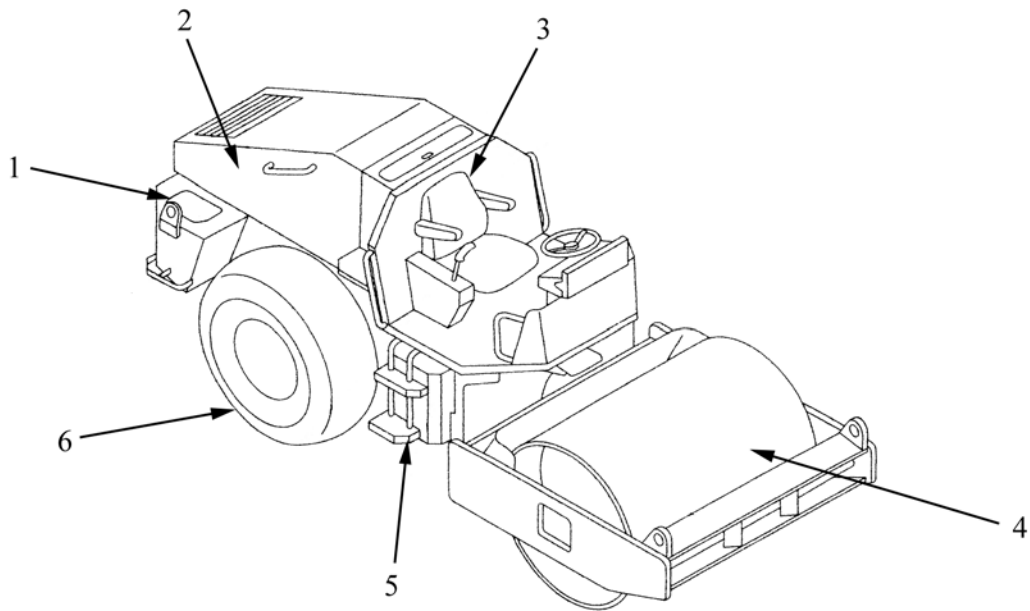
The compactor model number is located on the left side of the left rear side of the compactor.





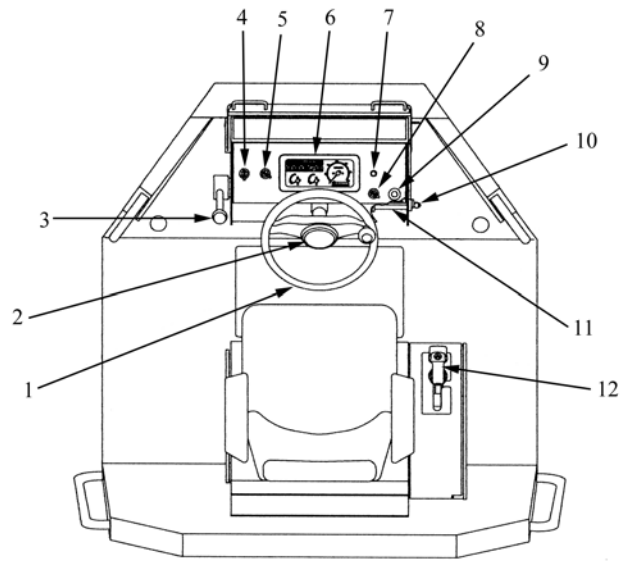
**Left View**

1. Operator information panel
2. Steering wheel
3. Radiator access door
4. Battery box.



**Right View**

1. Fuel Tank
2. Hood
3. Operators seat
4. Roller
5. Safety ladder
6. Tire.

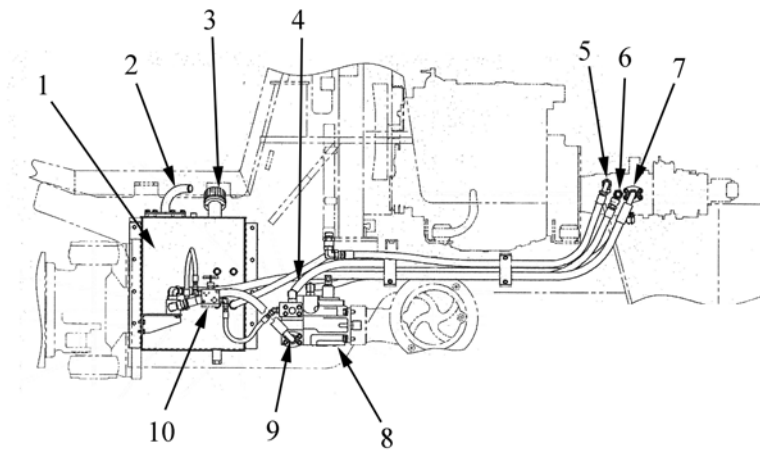


### Operator's Station

1. Steering wheel
2. Horn
3. Throttle lever
4. Vibration switch
5. Vibration selector switch
6. Combination meter
7. Engine warning lamp
8. Speed change switch
9. Parking brake switch
10. Keyswitch
11. Brake pedal
12. Forward/Reverse lever.

# Compactor Component Identification

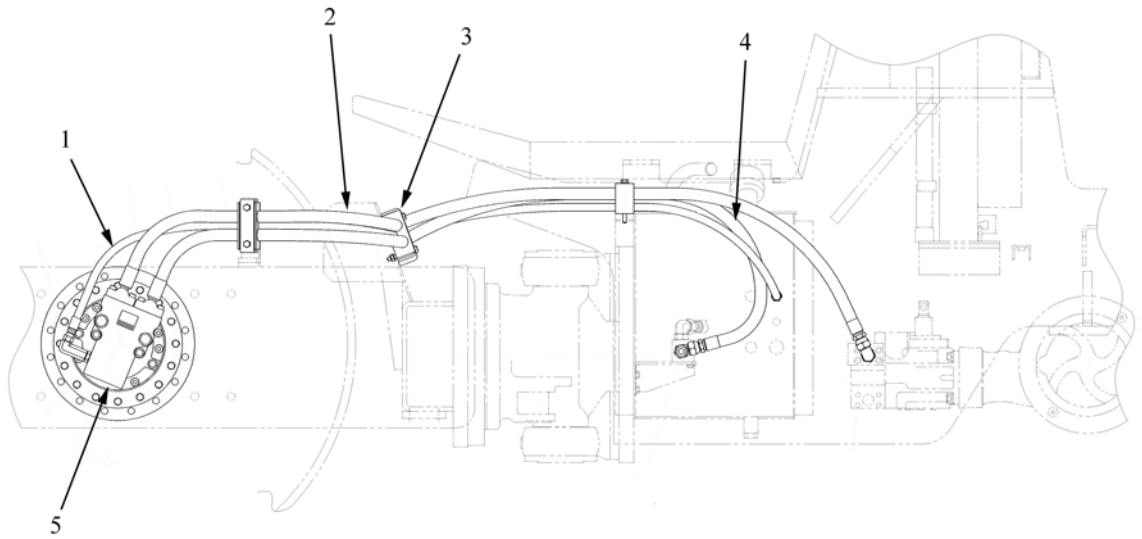
This procedure will illustrate the systems used in the SV400-2 compactor and show illustrated views of subcomponents.



## Rear Drive Hydraulic Hoses

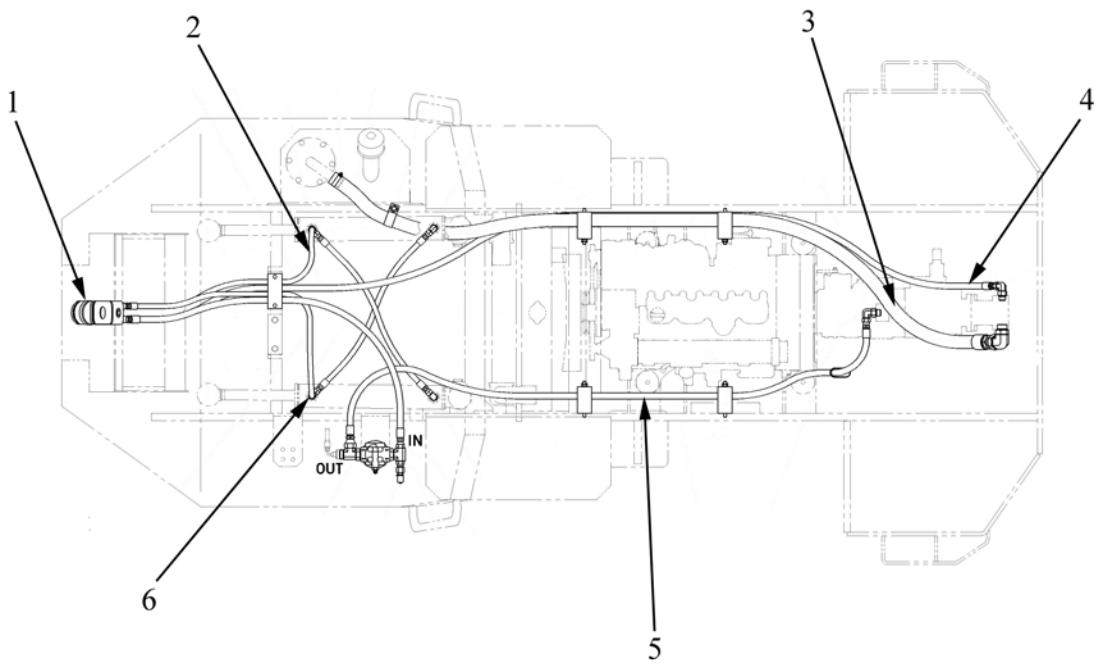
1. Hydraulic tank
2. Hydraulic tank suction tube
3. Hydraulic tank fill cap
4. Reverse travel high pressure hose
5. Oil cooler inlet hose
6. Forward travel high pressure hose
7. Reverse travel high pressure hose
8. Drive motor
9. Motor to unloader valve hose
10. Un-loader valve.





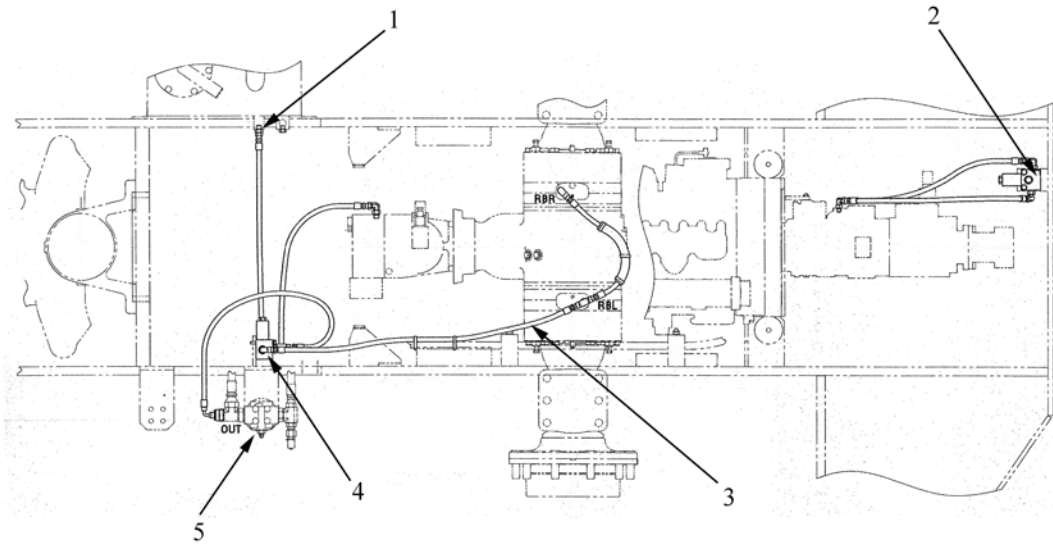
### Front Drive Hydraulic Hoses

1. Drain hose
2. High pressure hose forward travel
3. Hose mounting device
4. High pressure hose reverse travel
5. Front propulsion motor.



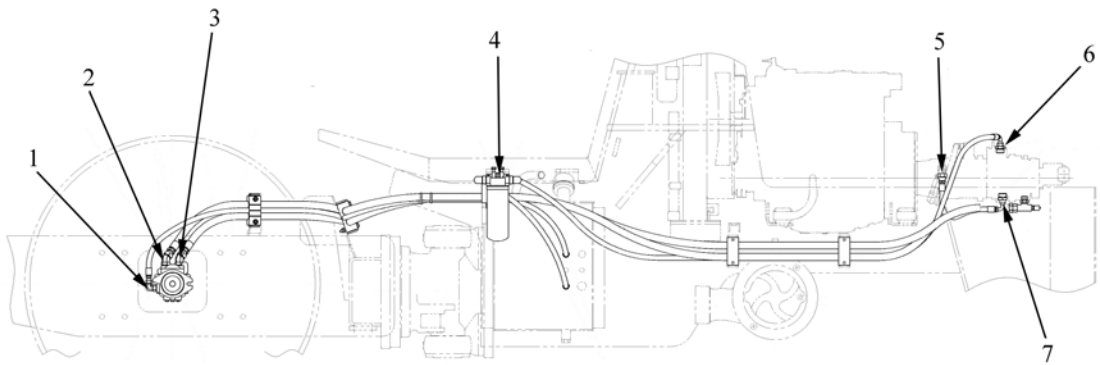
### Steering Hoses

1. Orbitrol
2. Right turn high pressure hose
3. Suction hose
4. Feed hose
5. Filter to propulsion pump charge hose
6. Left turn high pressure hose.



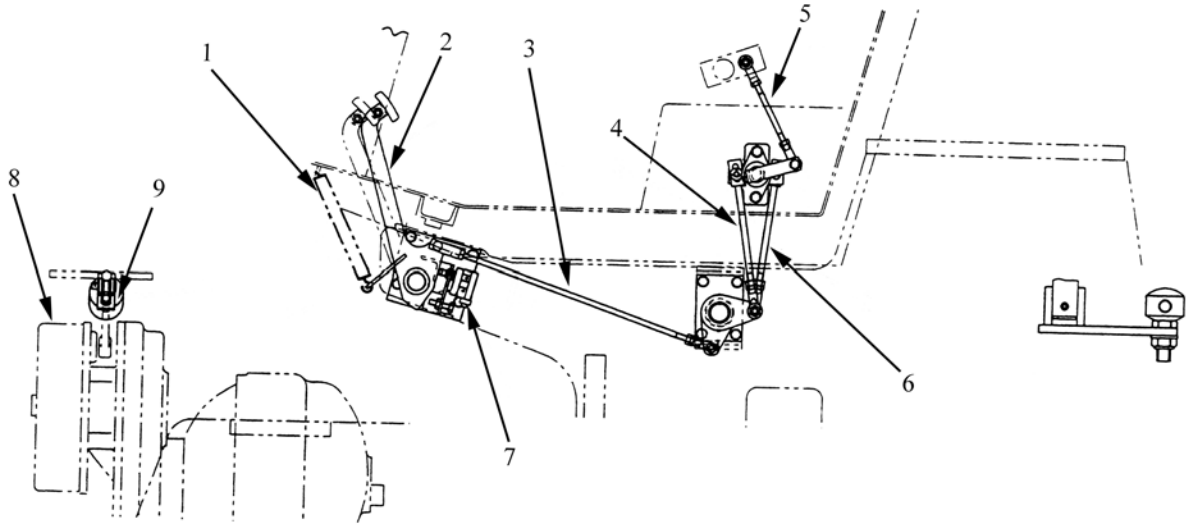
### Hydraulic Brake Hose Network

1. Return hose
2. Brake cylinder solenoid
3. Brake cylinder hose
4. Brake valve
5. Hydraulic charge filter.



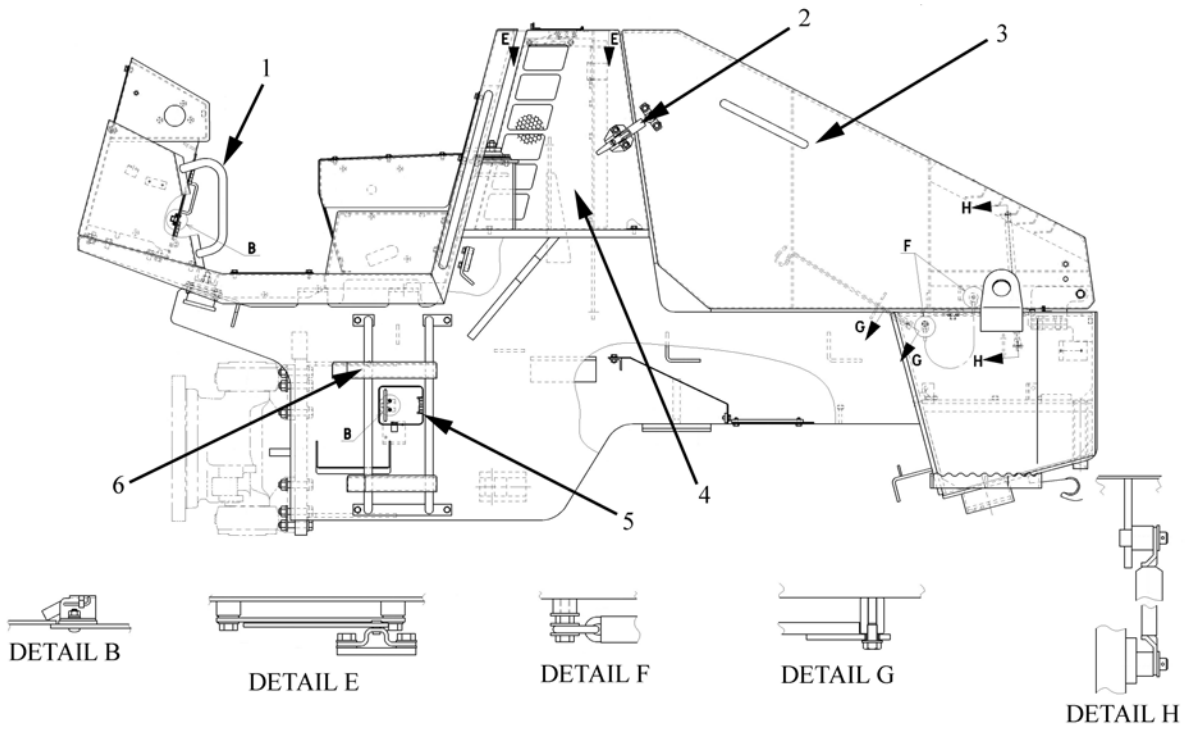
### **Vibration Hose Network**

1. Drain hose motor to pump
2. High pressure low amplitude motor hose
3. High pressure high amplitude motor hose
4. Return filter
5. Vibration pump to propulsion hose
6. Low amplitude high pressure pump hose
7. High amplitude high pressure pump hose.



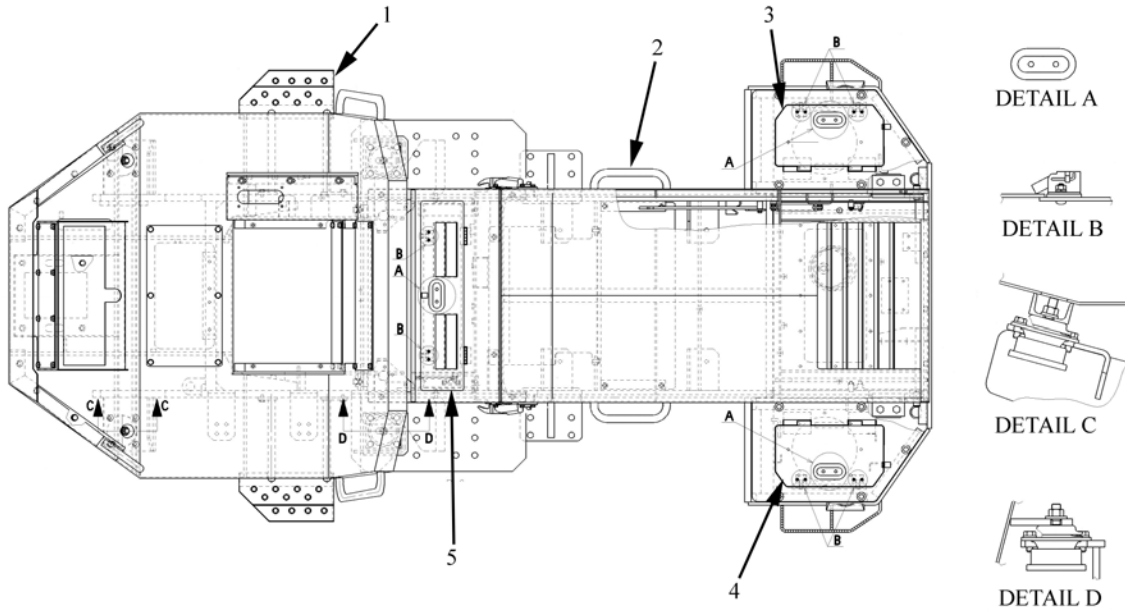
### Brake Linkage

1. Return spring
2. Brake pedal
3. Brake pedal rod
4. Forward/Reverse lever rod
5. Forward/Reverse lever
6. Forward/Reverse lever rod
7. Foot brake switch
8. Parking brake assembly
9. Parking brake cylinder.



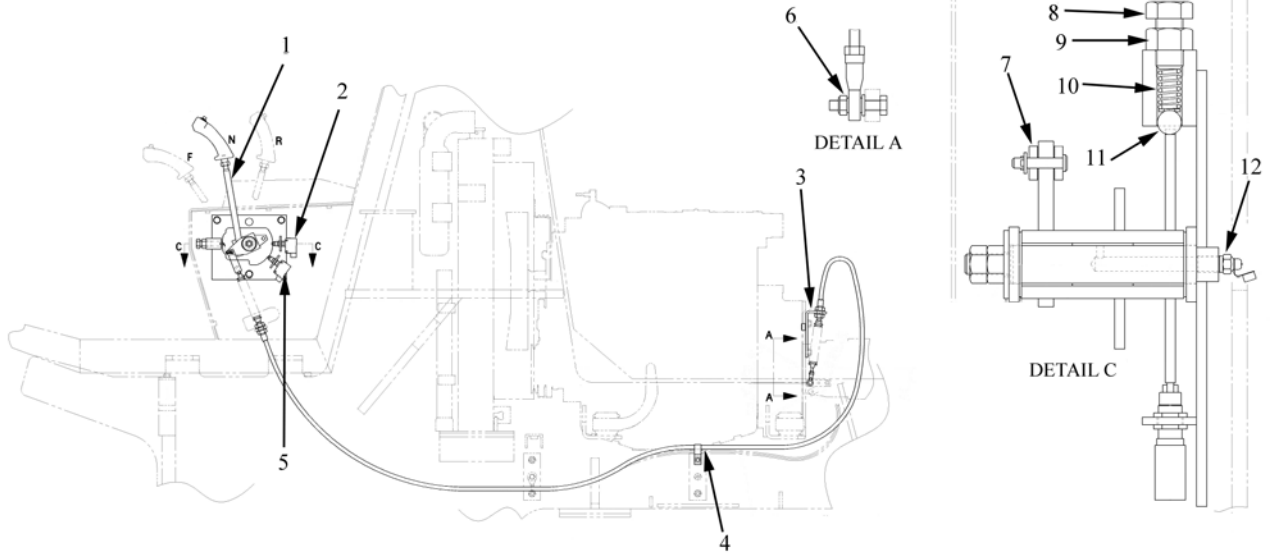
**Compactor Left Side View**

1. Safety handle
2. Hood latch
3. Hood handle
4. Radiator cover
5. Unloader valve access door
6. Safety ladder.



**Compactor Top View**

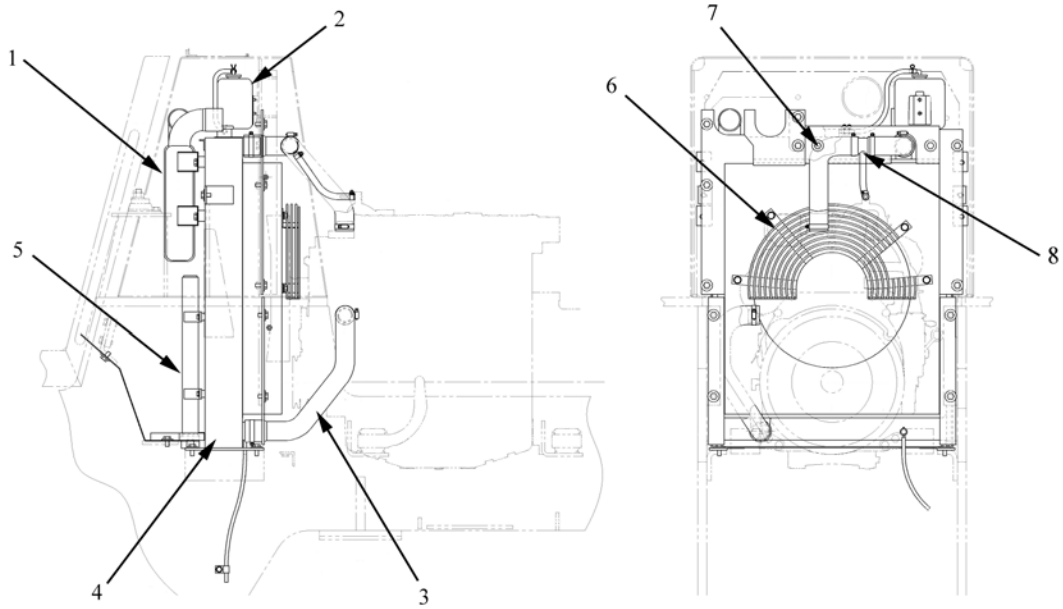
1. Safety ladder step
2. Hood handle
3. Battery access door
4. Hydraulic tank access door
5. Radiator cover door.



**Forward/Reverse Cable**

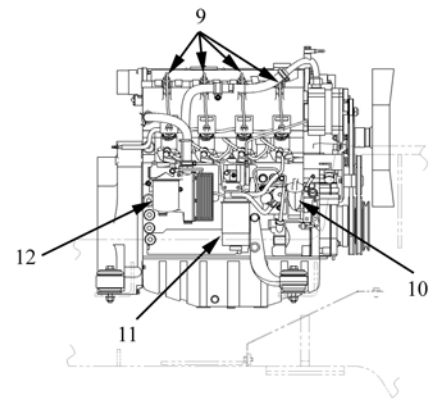
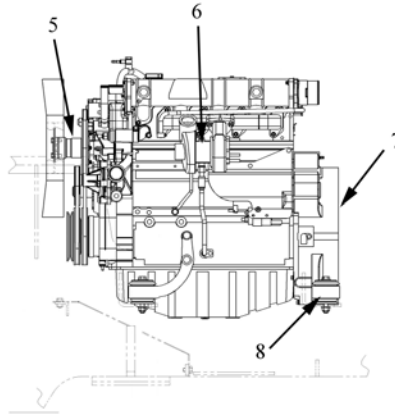
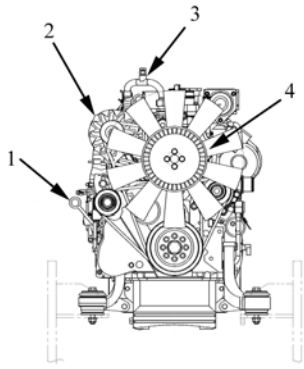
1. Forward/Reverse lever
2. Safety interlock switch
3. Cable hanger
4. Cable
5. Back up alarm switch
6. Cable connection to propulsion pump
7. Cable connection to forward/reverse lever
8. Spring tension adjustment plug
9. Locking nut
10. Spring
11. Ball bearing
12. Grease fitting.





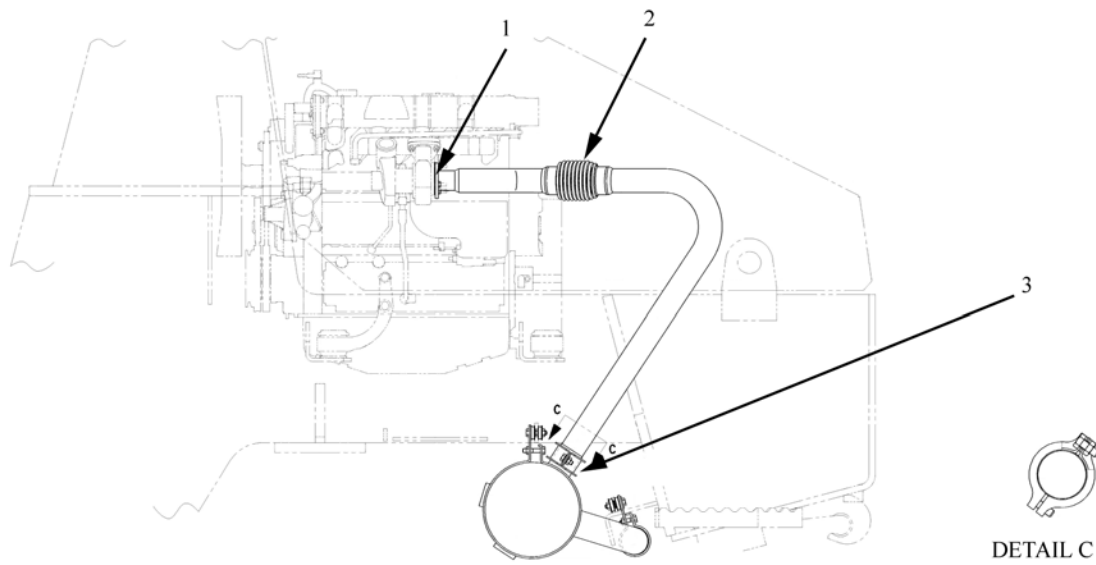
### Cooling System

1. Charge air cooler
2. Coolant overflow tank
3. Lower radiator hose
4. Radiator tank
5. Hydraulic oil cooler
6. Fan guard
7. Upper radiator hose
8. Thermostat bypass hose.



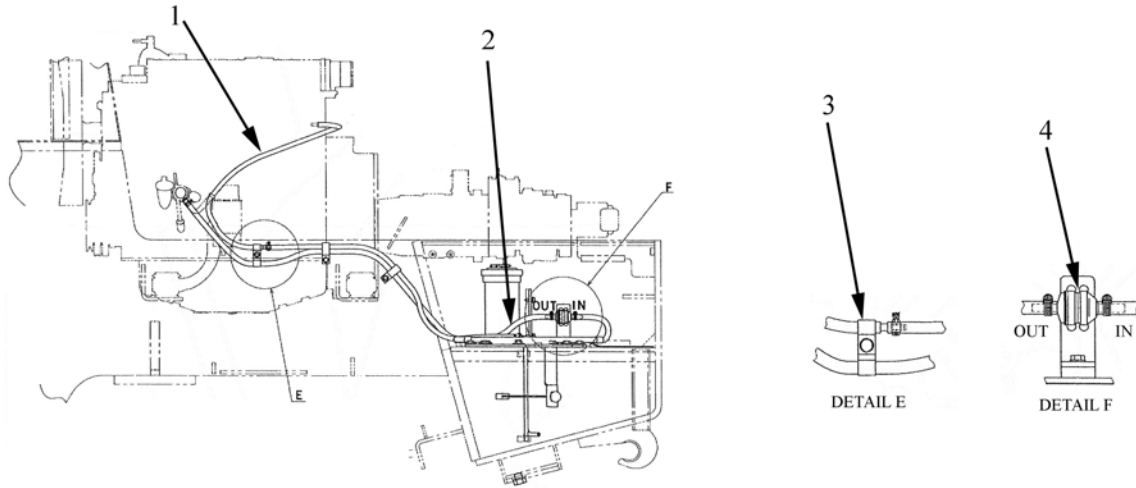
### Engine Components

1. Dipstick
2. Alternator
3. Radiator bypass fitting
4. Cooling fan
5. Fan hub
6. Turbocharger
7. Flywheel housing
8. Engine mount
9. Injectors
10. Oil fill tube
11. Fuel filter
12. Oil filter.



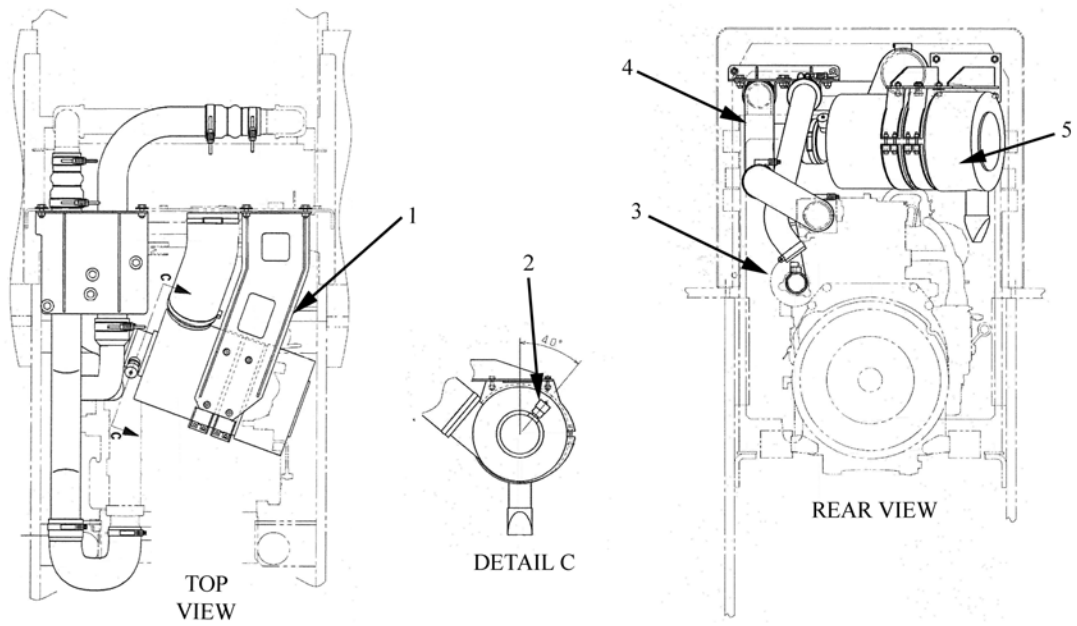
### Exhaust System

1. Exhaust pipe to turbocharger turbine housing connection
2. Flex coupling
3. Muffler.



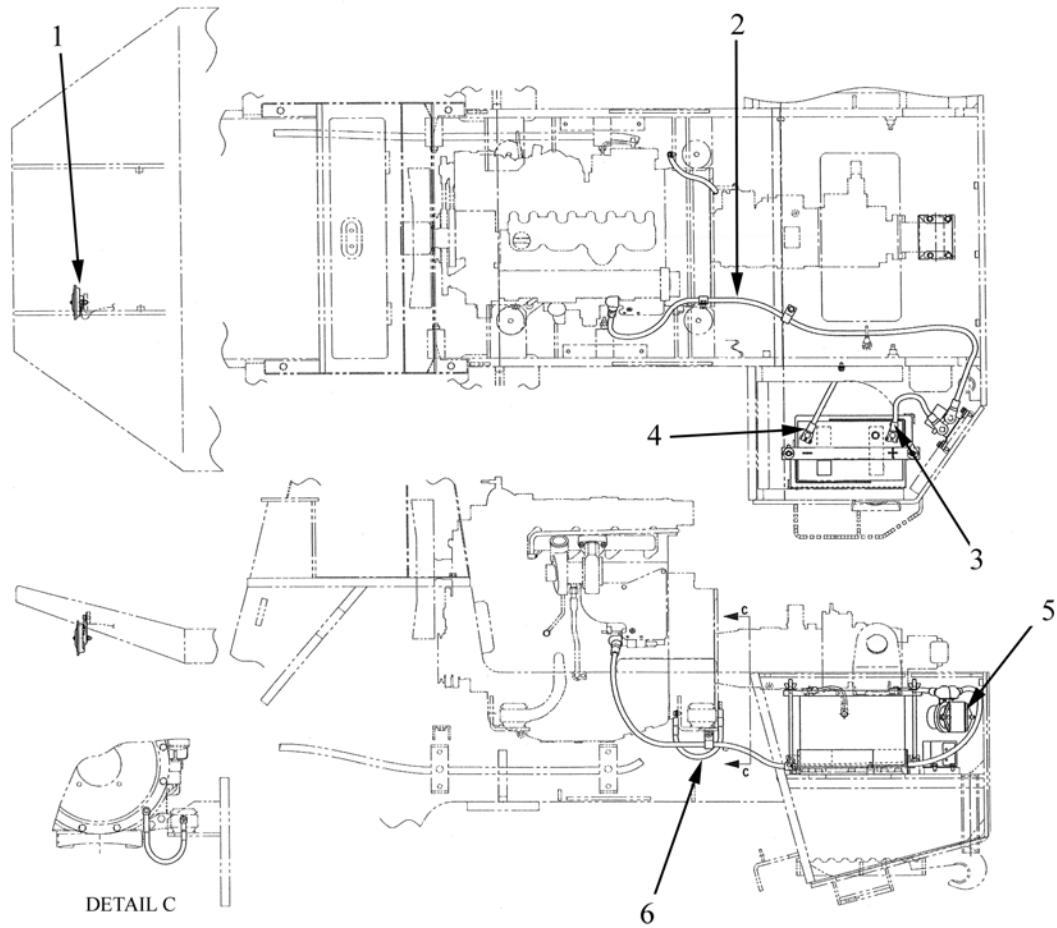
**Fuel Lines**

- 1. Fuel return hose
- 2. Fuel supply hose
- 3. Hose clamp
- 4. Tank fuel filter.



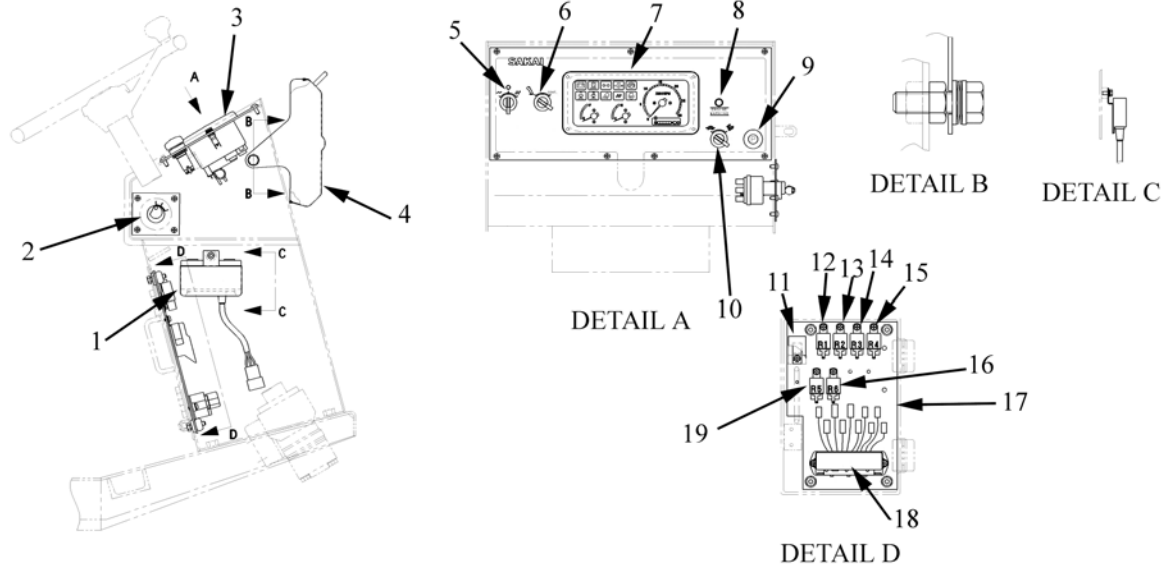
**Intake Air System**

1. Air cleaner bracket
2. Restriction indicator
3. Turbocharger
4. Charge air cooler to intake manifold tube
5. Air cleaner.



### Battery Cable Routing

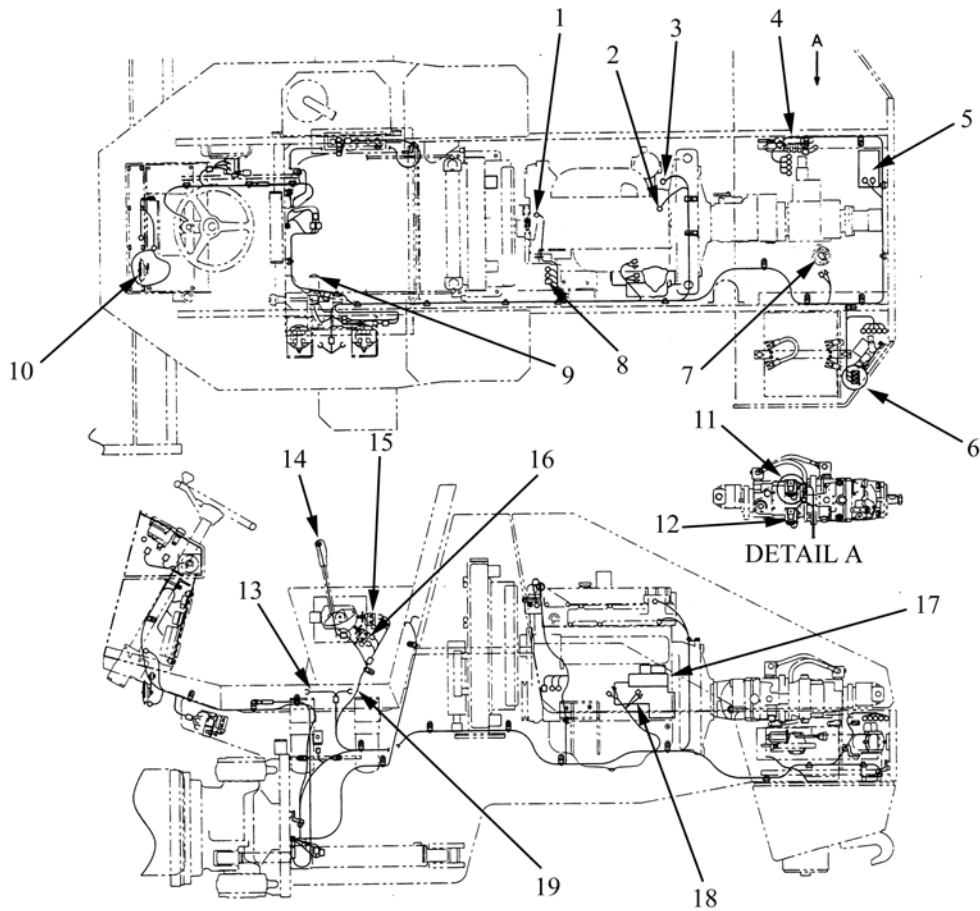
1. Horn
2. Cable from battery relay to alternator
3. Positive (+) battery cable to battery relay
4. Negative (-) battery cable
5. Battery relay
6. Engine ground cable.



1. Tachometer control box
2. Keyswitch
3. Dash panel
4. Dash cover
5. Vibration amplitude switch
6. Vibration manual control switch
7. Combination meter
8. Engine warning lamp
9. Parking brake switch
10. Compactor speed switch

### Operator's Station

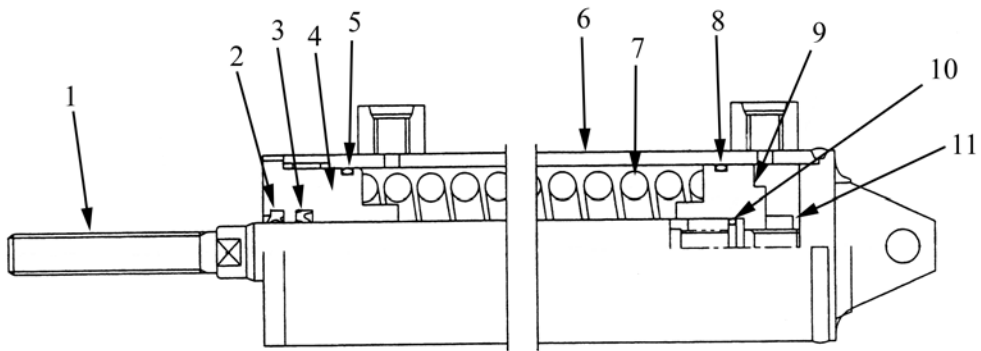
11. Diode unit
12. Relay R1
13. Relay R2
14. Relay R3
15. Relay R4
16. Relay R6
17. Circuit card
18. Fuse box
19. Relay R5.



**Electronic Component Locations**

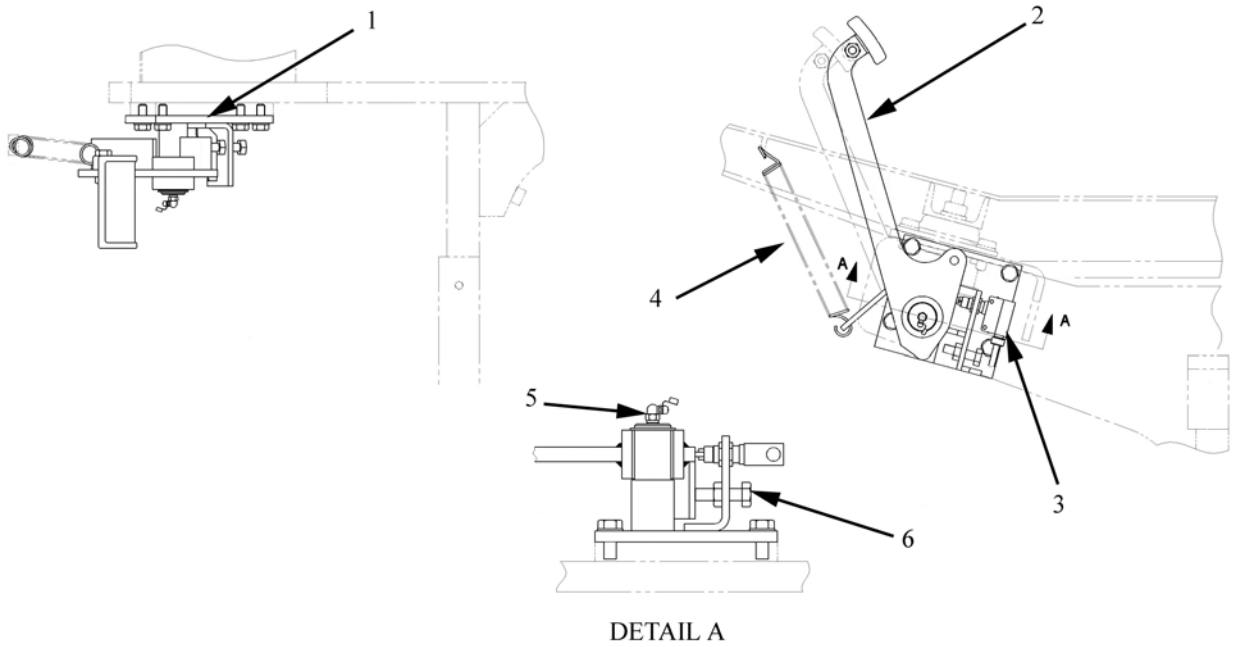
- |                                 |                                   |
|---------------------------------|-----------------------------------|
| 1. Coolant sensor               | 11. Amplitude select solenoid (A) |
| 2. Glow plug                    | 12. Amplitude select solenoid (B) |
| 3. Oil pressure switch          | 13. Oil filter switch             |
| 4. Engine stopper               | 14. Manual vibration switch       |
| 5. Back up alarm                | 15. Safety interlock switch       |
| 6. Fuseable link                | 16. Back up alarm switch          |
| 7. Fuel sending unit            | 17. Tachometer sensor             |
| 8. Alternator                   | 18. Starter                       |
| 9. Parking brake valve solenoid | 19. Forward/Reverse lever cable.  |
| 10. Horn                        |                                   |





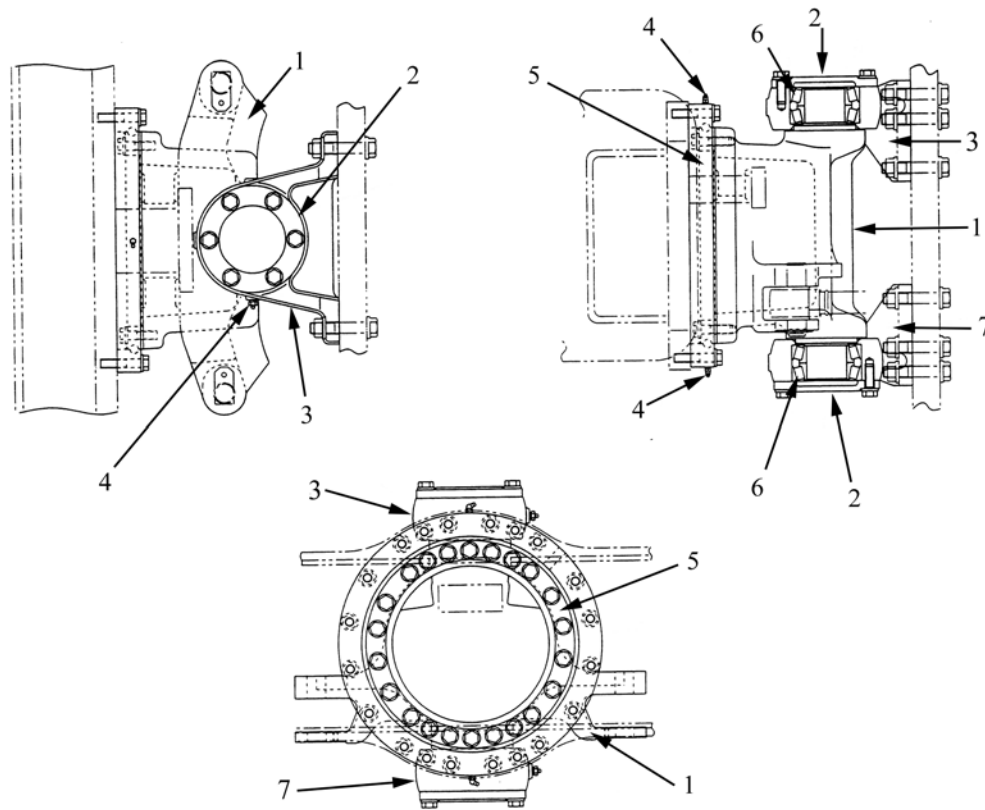
**Brake Cylinder**

- |                  |            |
|------------------|------------|
| 1. Piston rod    | 8. O-ring  |
| 2. Scraper       | 9. Piston  |
| 3. Packing       | 10. O-ring |
| 4. End cap       | 11. Nut.   |
| 5. O-ring        |            |
| 6. Cylinder body |            |
| 7. Spring        |            |



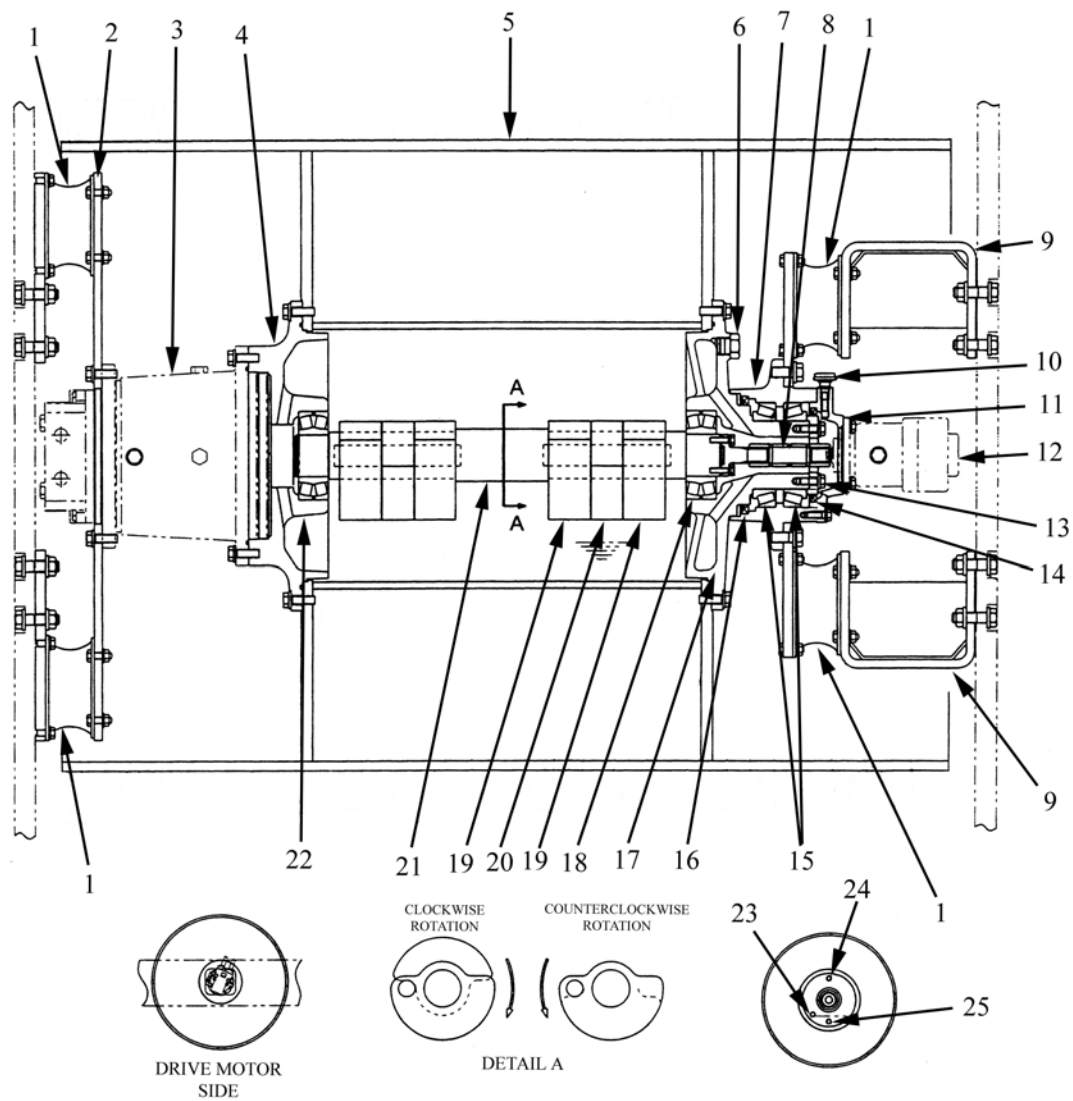
### Brake Pedal

1. Brake pedal assembly
2. Brake pedal
3. Brake switch
4. Return spring
5. Grease fitting
6. Brake pedal travel adjustment.

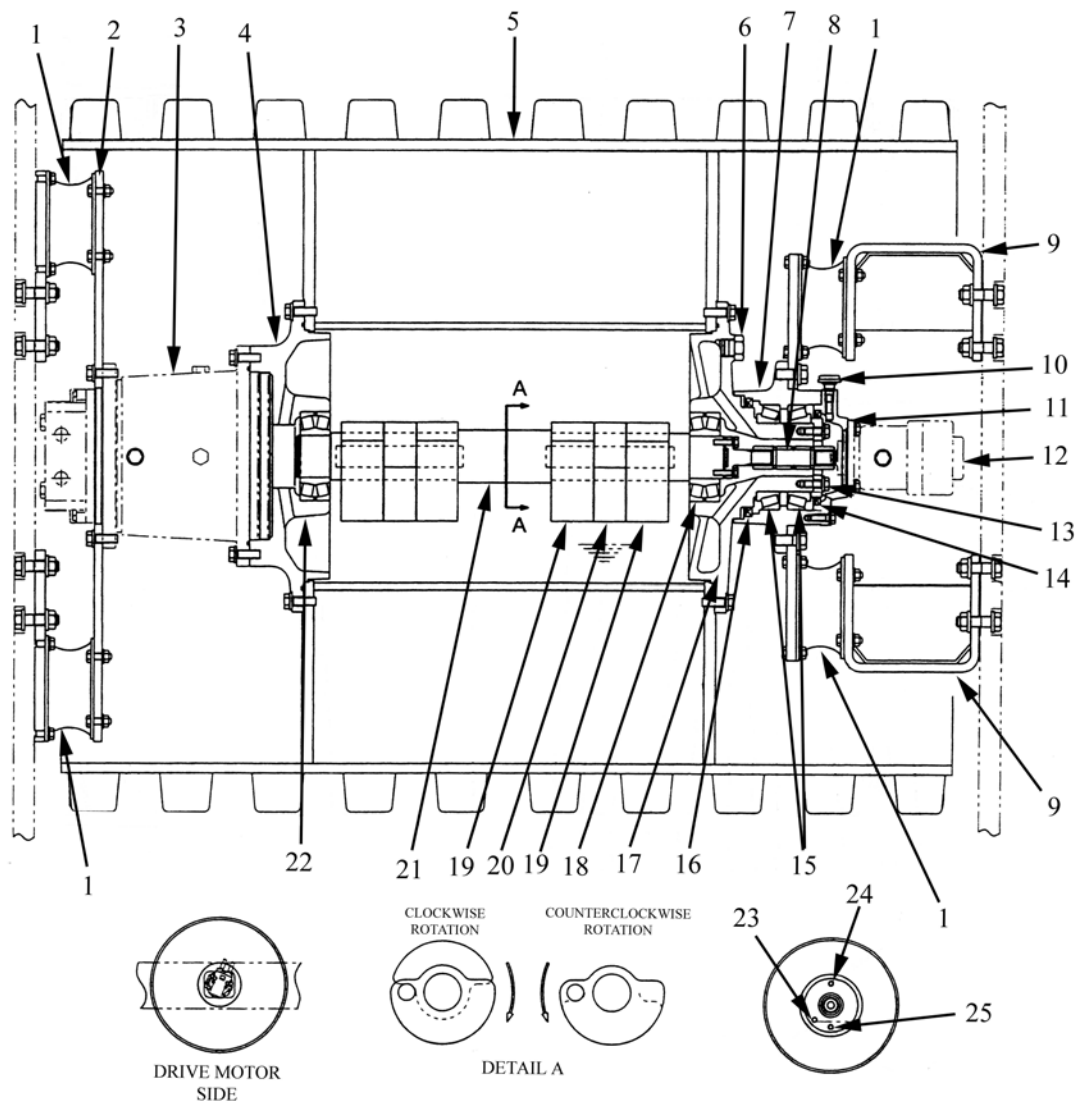


**Center Pin**

- 1. Yoke
- 2. Cover
- 3. Upper bracket
- 4. Grease fitting
- 5. Bearing
- 6. Roller bearing
- 7. Lower bracket.

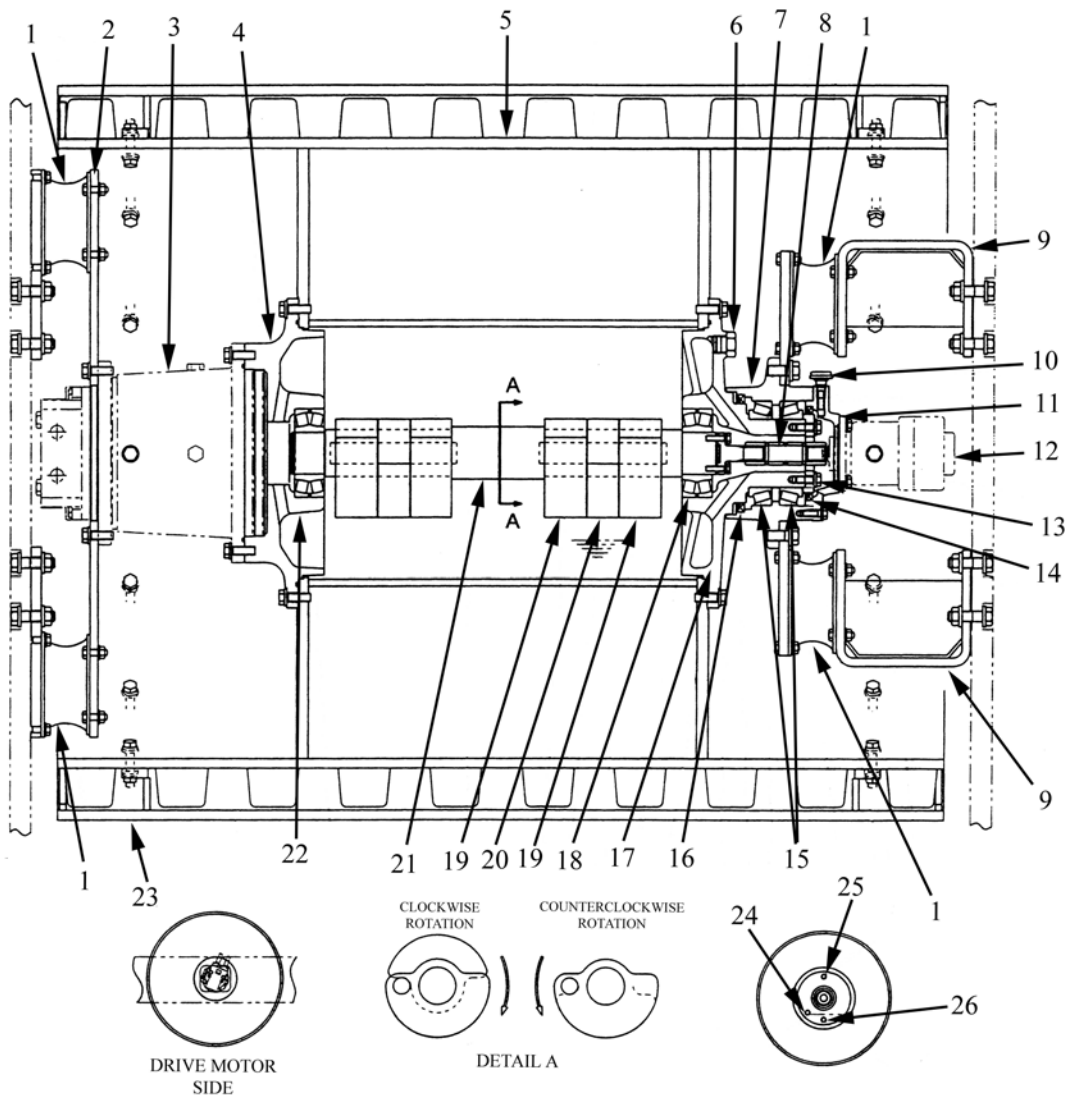


- Roller (D)**
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. Damper</li> <li>2. Disc</li> <li>3. Propulsion motor</li> <li>4. Axle shaft</li> <li>5. Flat drum</li> <li>6. Plug</li> <li>7. Housing</li> <li>8. Sleeve and spring pin</li> <li>9. Holder</li> <li>10. Breather</li> <li>11. Cover</li> <li>12. Vibrator motor</li> <li>13. Cover</li> </ul> | <ul style="list-style-type: none"> <li>14. Oil seal</li> <li>15. Roller bearing</li> <li>16. Oil seal</li> <li>17. Axle shaft</li> <li>18. Roller bearing</li> <li>19. Fixed weight</li> <li>20. Moveable weight</li> <li>21. Vibrator shaft</li> <li>22. Roller bearing</li> <li>23. Level plug</li> <li>24. Fill plug</li> <li>25. Drain plug.</li> </ul> |
|--|---|



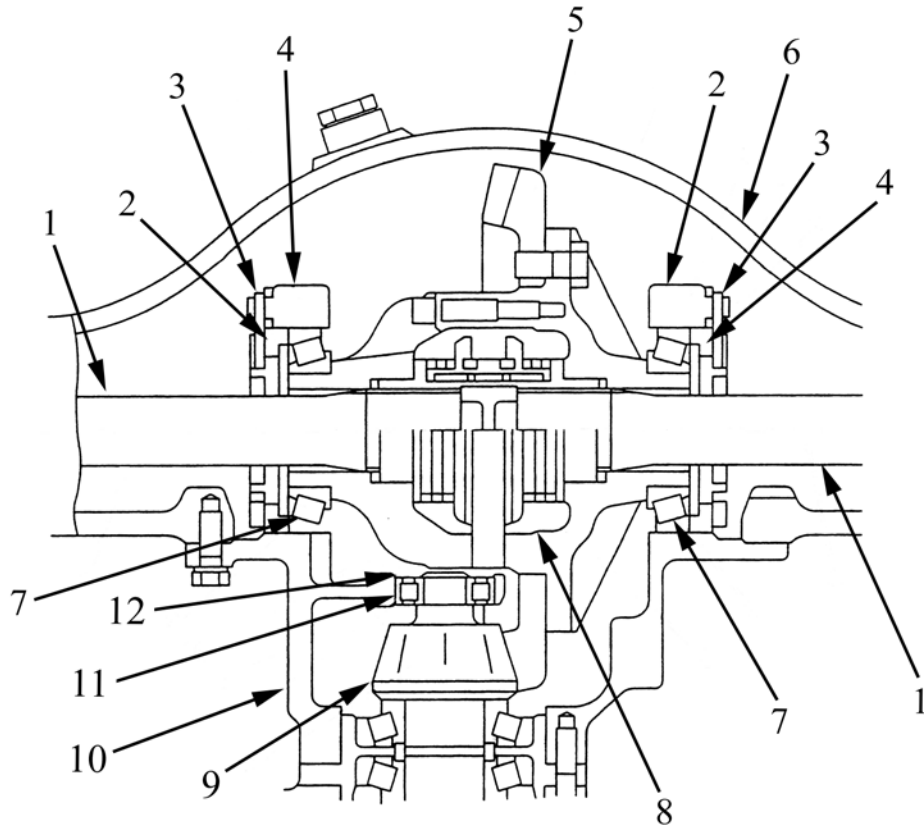
### Roller (T)

- |                          |                     |
|--------------------------|---------------------|
| 1. Damper                | 14. Oil seal        |
| 2. Disc                  | 15. Roller bearing  |
| 3. Propulsion motor      | 16. Oil seal        |
| 4. Axle shaft            | 17. Axle shaft      |
| 5. Toothed drum          | 18. Roller bearing  |
| 6. Plug                  | 19. Fixed weight    |
| 7. Housing               | 20. Moveable weight |
| 8. Sleeve and spring pin | 21. Vibrator shaft  |
| 9. Holder                | 22. Roller bearing  |
| 10. Breather             | 23. Level plug      |
| 11. Cover                | 24. Fill plug       |
| 12. Vibrator motor       | 25. Drain plug.     |
| 13. Cover                |                     |



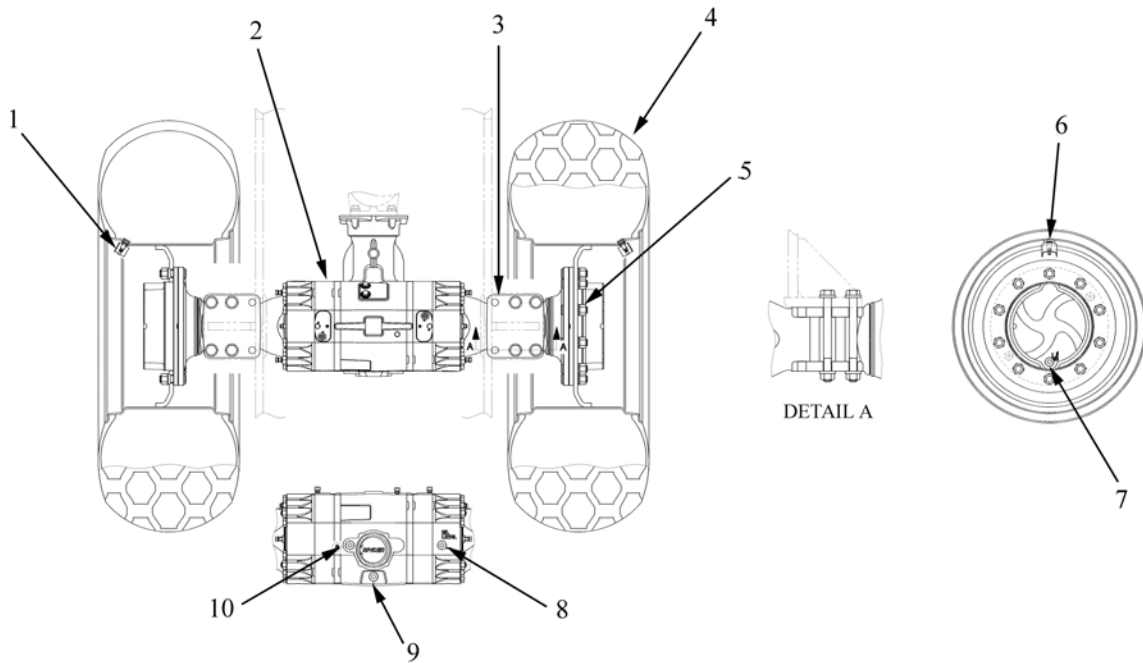
**Roller (TF)**

- |                          |                        |
|--------------------------|------------------------|
| 1. Damper                | 14. Oil seal           |
| 2. Disc                  | 15. Roller bearing     |
| 3. Propulsion motor      | 16. Oil seal           |
| 4. Axle shaft            | 17. Axle shaft         |
| 5. Toothed drum          | 18. Roller bearing     |
| 6. Plug                  | 19. Fixed weight       |
| 7. Housing               | 20. Moveable weight    |
| 8. Sleeve and spring pin | 21. Vibrator shaft     |
| 9. Holder                | 22. Roller bearing     |
| 10. Breather             | 23. Toothed drum cover |
| 11. Cover                | 24. Level plug         |
| 12. Vibrator motor       | 25. Fill plug          |
| 13. Cover                | 26. Drain plug.        |



**Differential**

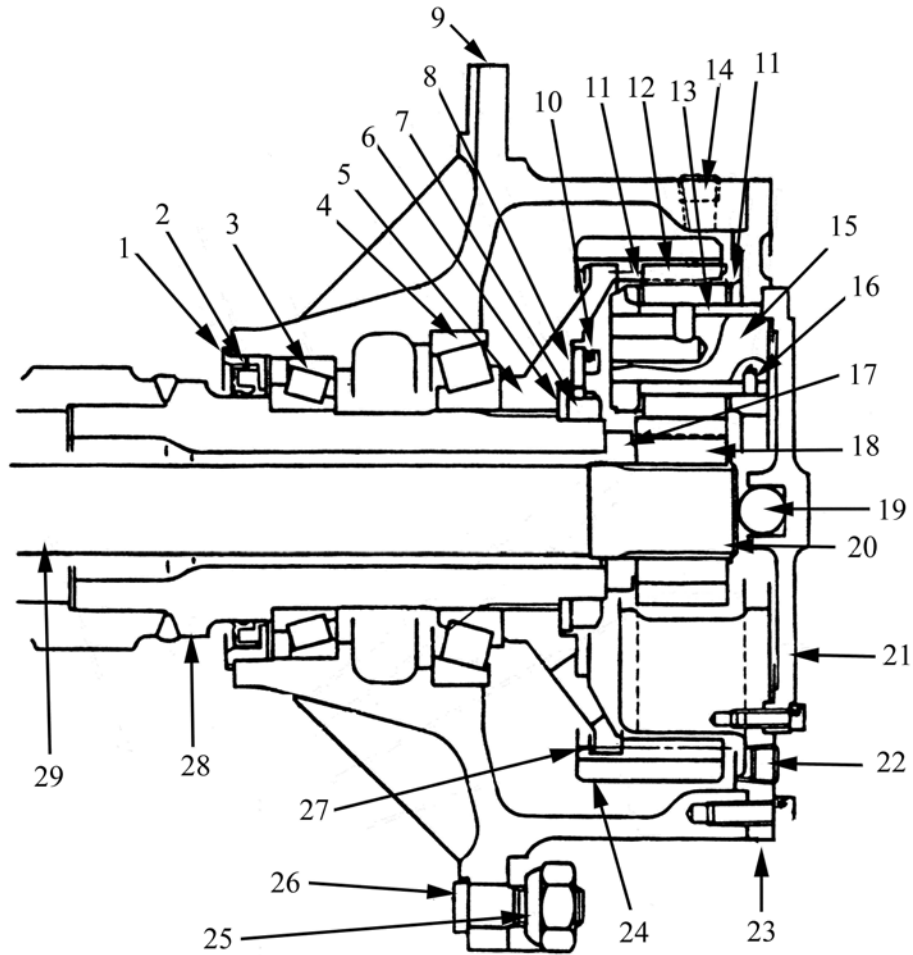
- |                   |                         |
|-------------------|-------------------------|
| 1. Axle shaft     | 8. No-spin differential |
| 2. Lock plate     | 9. Bevel pinion shaft   |
| 3. Nut            | 10. Carrier assembly    |
| 4. Cap            | 11. Roller bearing      |
| 5. Bevel gear     | 12. Lock ring.          |
| 6. Housing        |                         |
| 7. Roller bearing |                         |



### Drive Wheels

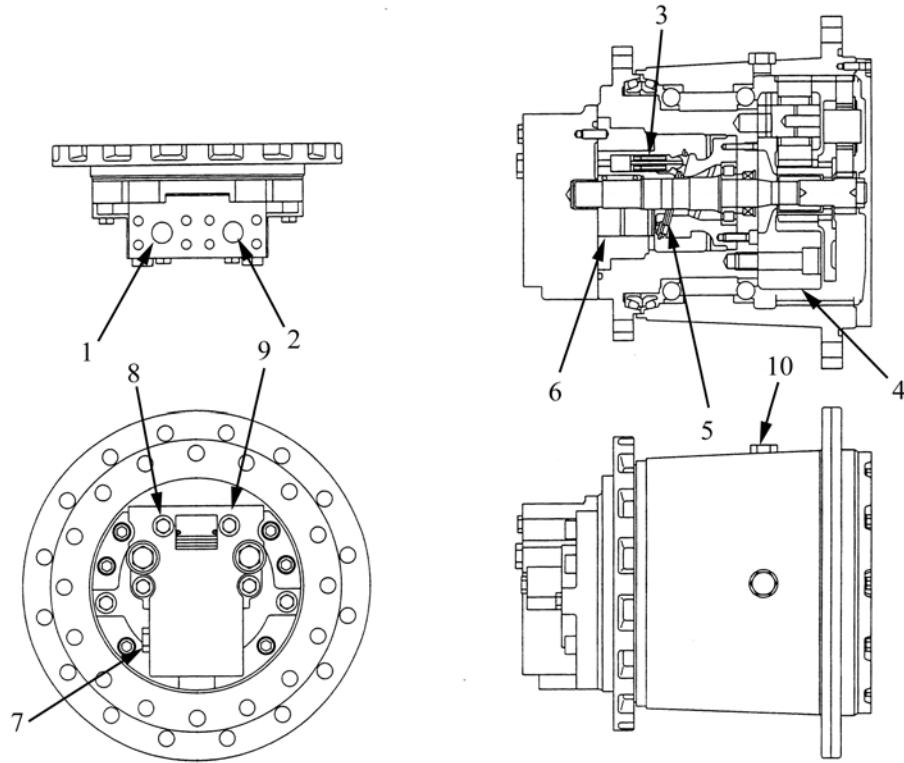
1. Valve stem
2. Differential
3. Differential mounting plate
4. Tire
5. Final drive
6. Valve stem (must be 180° from fill plug)
7. Fill plug
8. Oil level gauge
9. Drain plug
10. Oil fill plug.





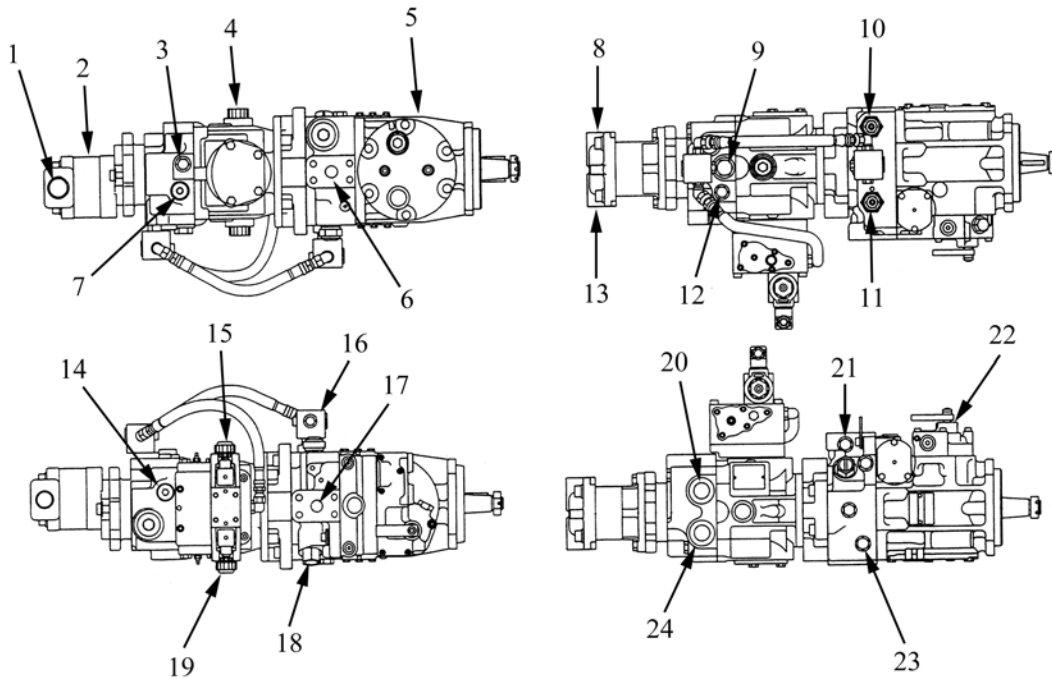
### Final Drive

- |                            |                      |
|----------------------------|----------------------|
| 1. Oil seal retainer       | 16. Pin              |
| 2. Oil seal                | 17. Thrust washer    |
| 3. Roller bearing          | 18. Sun gear         |
| 4. Roller bearing          | 19. Steel ball       |
| 5. Ring gear hub           | 20. Lock ring        |
| 6. Spacer                  | 21. Cover            |
| 7. Nut                     | 22. Plug             |
| 8. Lock plate              | 23. Planetary spider |
| 9. Wheel hub               | 24. Ring gear        |
| 10. Bolt                   | 25. Wheel nut        |
| 11. Thrust washer          | 26. Wheel bolt       |
| 12. Planetary gear         | 27. Stop wire        |
| 13. Planetary gear bushing | 28. Axle spindle     |
| 14. Plug                   | 29. Axle shaft.      |
| 15. Planetary gear shaft   |                      |



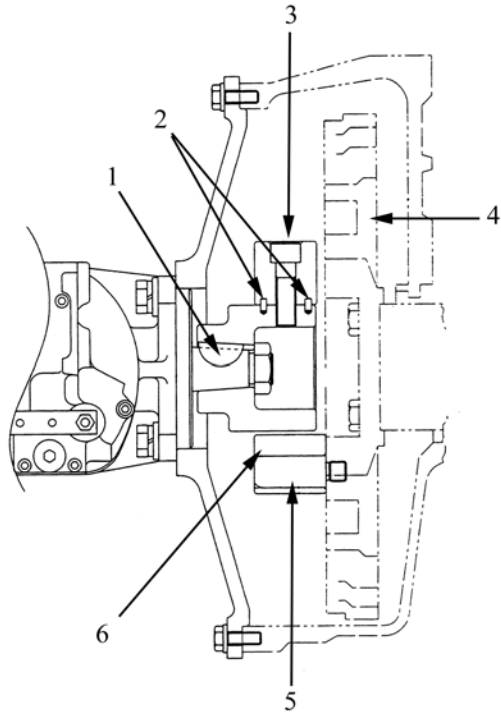
### Front Drive Propulsion Motor

1. Forward travel (port B)
2. Reverse travel (port A)
3. Piston
4. Reduction gear
5. Swash plate
6. Cylinder block
7. Drain port
8. High pressure gauge port A
9. High pressure gauge port B
10. Fill plug.



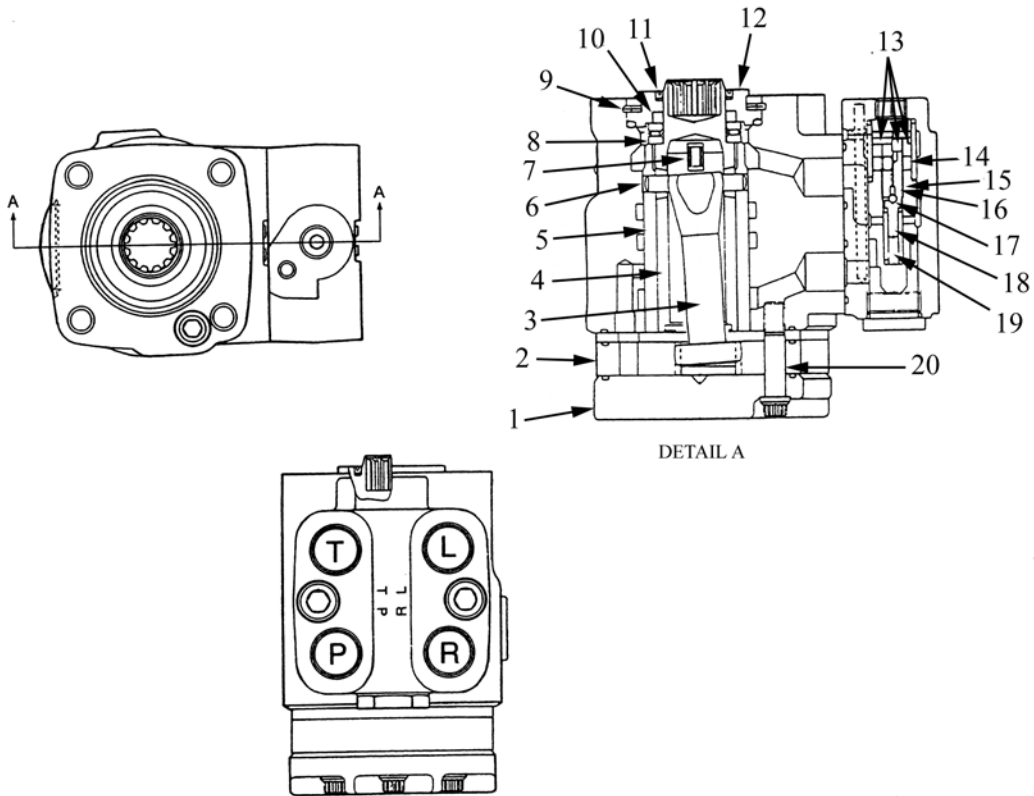
### Hydraulic Pump Assembly

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Steering pump port</li> <li>2. Steering pump</li> <li>3. Vibrator pump high pressure gauge port B2</li> <li>4. Vibrator pump</li> <li>5. Propulsion pump</li> <li>6. Reverse travel port A1</li> <li>7. High pressure relief valve port B2</li> <li>8. Steering pump suction port</li> <li>9. Vibrator pump charger relief valve</li> <li>10. Propulsion pump multifunction valve port A1</li> <li>11. Propulsion pump multifunction valve port B2</li> <li>12. Propulsion pump high pressure gauge port A2</li> <li>13. Steering pump delivery port</li> <li>14. Vibrator pump high pressure relief valve port A2</li> </ol> | <ol style="list-style-type: none"> <li>15. Amplitude selector solenoid A2</li> <li>16. Charge relief valve</li> <li>17. Forward travel port B2</li> <li>18. Charge relief valve</li> <li>19. Amplitude selector solenoid B2</li> <li>20. Vibration low amplitude port A2</li> <li>21. Circuit pressure gauge port B2</li> <li>22. Forward/Reverse control lever</li> <li>23. Circuit pressure gauge port A1</li> <li>24. High amplitude pressure port B2.</li> </ol> |
|---|--|



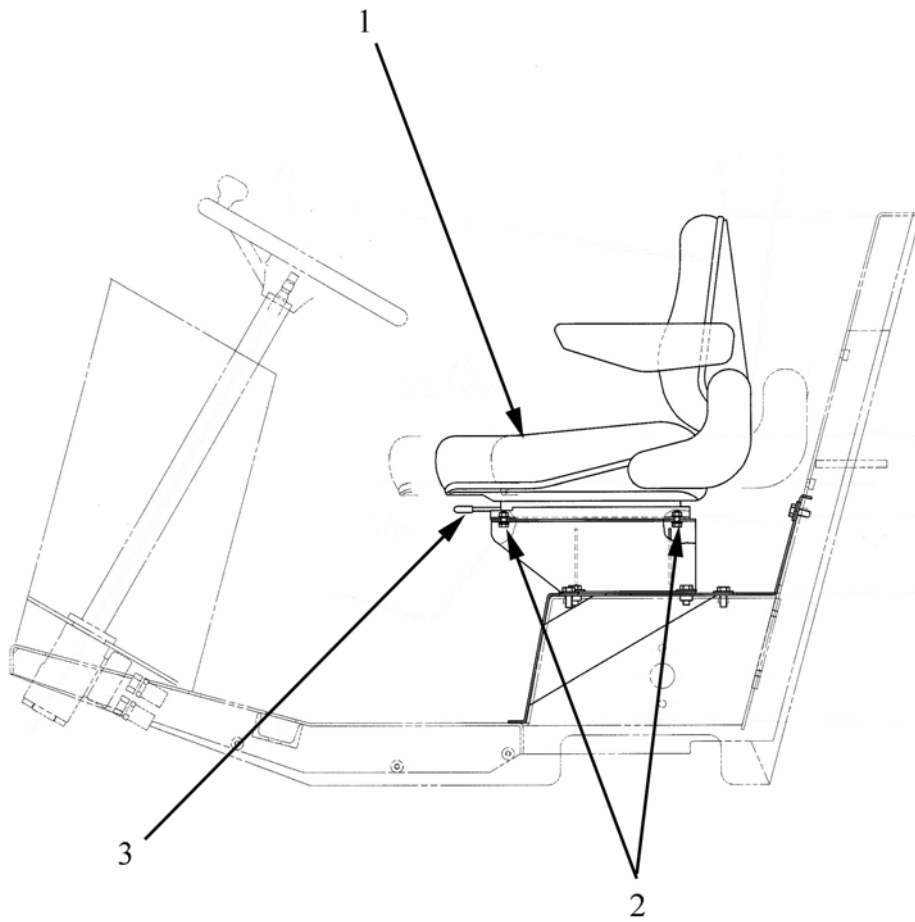
**Pump to Engine Coupling**

1. Key
2. Spring pin
3. Bolt
4. Flywheel
5. Bolt
6. Coupling.



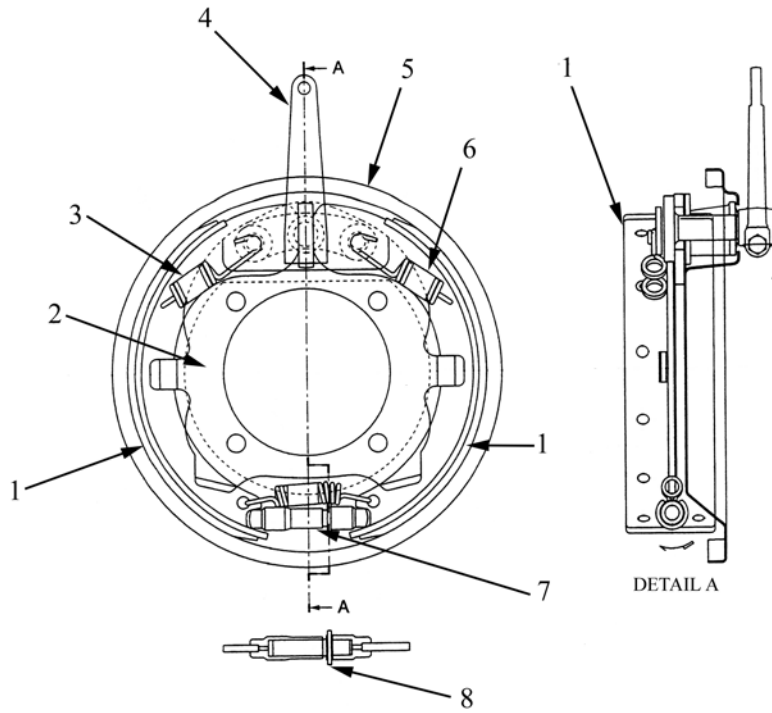
**Orbitrol Motor**

- |                     |                         |
|---------------------|-------------------------|
| 1. End cap          | 11. Dust seal           |
| 2. Gerotor set      | 12. Gland bushing seal  |
| 3. Drive            | 13. Filter sub-assembly |
| 4. Spool            | 14. Lock nut            |
| 5. Sleeve           | 15. Spool               |
| 6. Pin              | 16. Valve seat          |
| 7. Centering spring | 17. Ball                |
| 8. Thrust needle    | 18. Ball guide          |
| 9. Retaining ring   | 19. Inner valve spring  |
| 10. Oil seal        | 20. End cap bolt.       |



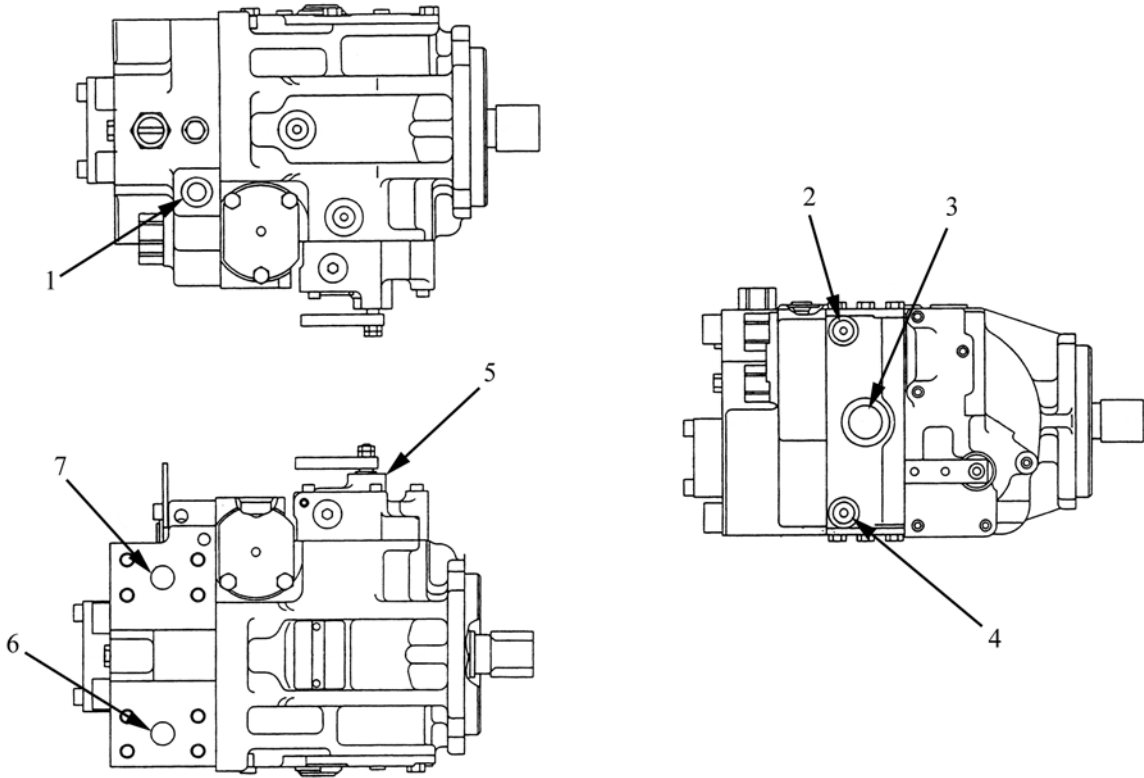
**Operator's Seat**

1. Seat
2. Seat mounting bolts
3. Seat adjusting lever.



**Parking Brake**

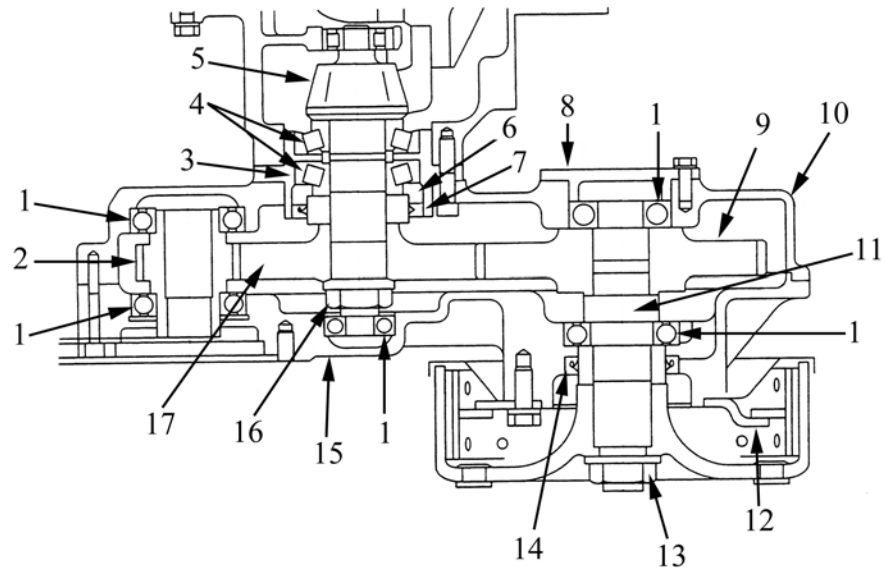
1. Brake shoe
2. Shoe holder
3. Left return spring
4. Lever
5. Brake drum
6. Right return spring
7. Brake adjuster
8. Star adjust wheel.



**Rear Drive Propulsion Motor**

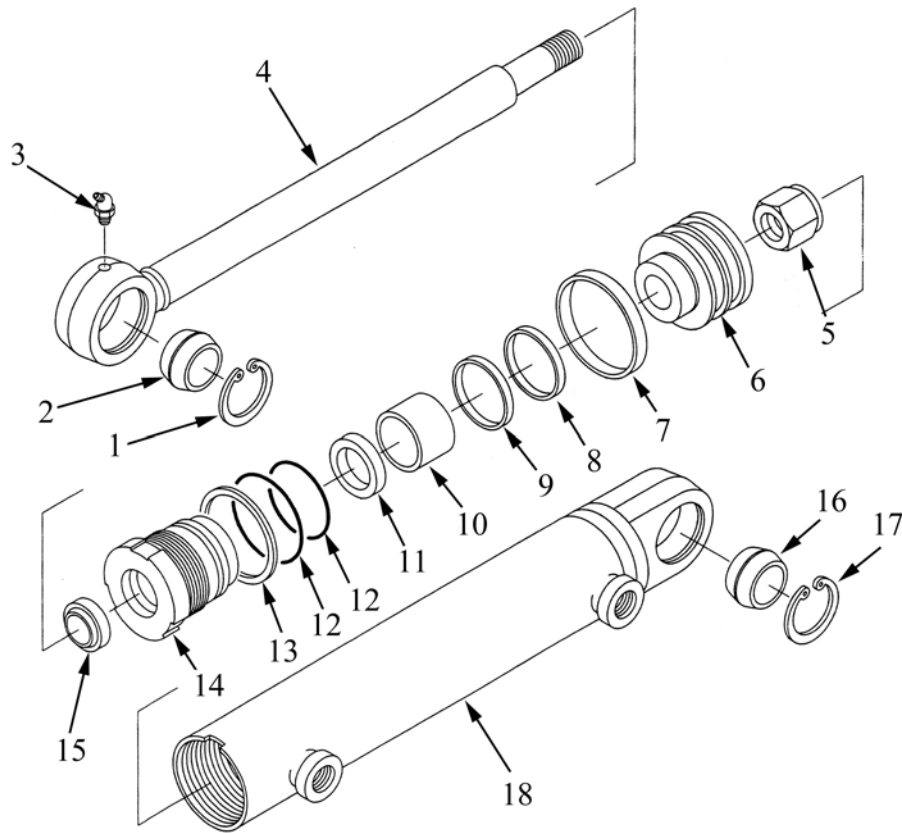
1. Speed shift circuit port (operates servo piston)
2. Low speed shift valve gauge port
3. Drain port
4. High speed shift valve gauge port
5. Control valve and lever
6. Forward travel port A
7. Reverse travel port B.





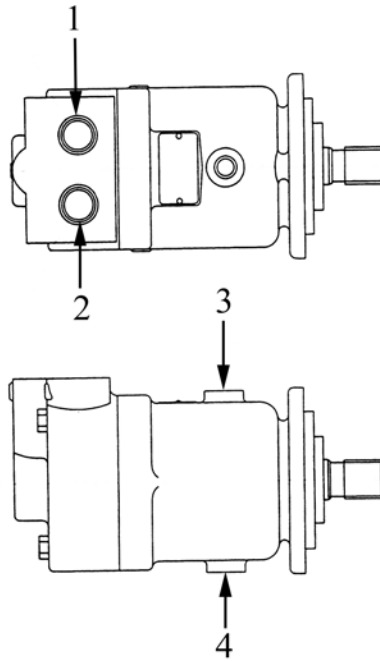
**Reduction Gear**

- |                       |                         |
|-----------------------|-------------------------|
| 1. Ball bearing       | 10. Reduction gear case |
| 2. Gear               | 11. Brake shaft         |
| 3. Bearing cage       | 12. Brake assembly      |
| 4. Roller bearing     | 13. Nut                 |
| 5. Bevel pinion shaft | 14. Oil seal            |
| 6. Oil seal collar    | 15. Case cover          |
| 7. Oil seal           | 16. Nut                 |
| 8. Cover              | 17. Gear.               |
| 9. Brake gear         |                         |



**Steering Cylinder**

- |                      |                       |
|----------------------|-----------------------|
| 1. Snap ring         | 11. U-packing         |
| 2. Spherical bearing | 12. O-ring            |
| 3. Grease fitting    | 13. Washer            |
| 4. Piston rod        | 14. End cap           |
| 5. Nut               | 15. Dust seal         |
| 6. Piston            | 16. Spherical bearing |
| 7. Wear ring         | 17. Snap ring         |
| 8. Slipper seal      | 18. Cylinder.         |
| 9. Slipper seal      |                       |
| 10. Bushing          |                       |



**Vibration Motor**

1. High amplitude port B
2. Low amplitude port A
3. Drain port
4. Drain port.

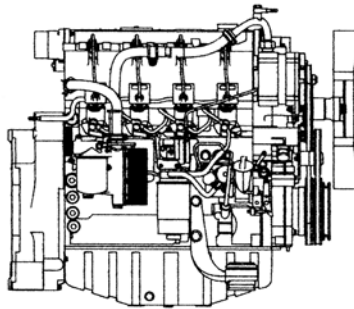
# Operating Systems Description

The SV400-2 compactor series is comprised of the following operating systems:

- Diesel Engine
- Hydraulic Drive System
- Hydraulic Vibratory System
- Hydraulic Steering System
- Brake System
- Operating Controls.

All of the above listed systems integrate together and allow the compactor to operate as designed. This procedure will define the systems and provide a description of the components of each system.

## **Diesel Engine**



### **Deutz Diesel Engine**

The SV400-2 compactor is powered by a Deutz four cylinder turbocharged diesel engine. The engine uses a mechanical fuel system.

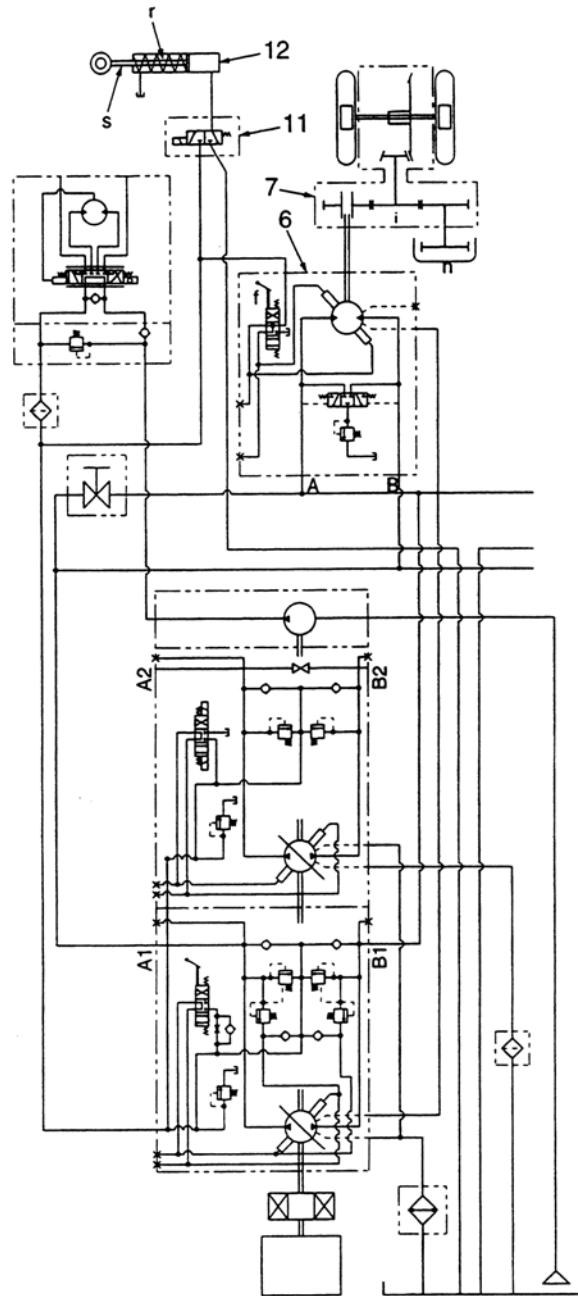
The ENGINE WARNING lamp is illuminated when a Deutz supplied thermo unit completes circuit path to ground. The engine must be shut down and the problem corrected.

For a list of manuals and wiring diagrams to service, repair and maintain the engine, refer to the Additional Service Literature procedure in this manual.

## Hydraulic Drive System

The diagram below illustrates the drive system for the SV400-2 compactor:

1. Engine
2. Coupling
3. Propulsion pump assembly
  - a. Control valve
  - b. Charge relief valve
  - c. Servo cylinder
  - d. Multi-function valve
  - e. Check valve
4. Vibrator pump
5. Steering pump
6. Rear propulsion motor
  - f. Speed selector valve
  - g. Flushing valve
  - h. Low pressure relief valve
7. Rear axle assembly
  - i. Reduction gear
  - j. Differential
  - k. Final drives
  - m. Tires
  - n. Brake assembly
8. Front propulsion motor
  - o. Gear reducer
9. Drum
10. Unloader valve
11. Brake valve
12. Brake cylinder
  - r. Spring
  - s. Rod
13. Orbitrol
14. Charge circuit line filter
15. Oil cooler
16. Return filter
17. Suction filter



### Hydraulic Drive Circuit

The hydraulic propulsion is comprised of the following items:

- Propulsion pump (3)
- Rear propulsion motor (6)
- Front propulsion motor (8)
- Rear axle assembly (7)
- Drum (9)
- Brake valve (8)
- Brake cylinder (12).

NOTE: The reference numbers (\*) are used in the hydraulic drive circuit on the preceding page.

#### Propulsion Pump

The propulsion pump is a variable pump. The flow is increased or decreased by varying the angle of the swash plate located in the pump. The angle of the swash plate affects piston stroke. This allows the operator to move the compactor from forward to neutral and neutral to reverse.

#### Propulsion Motor

The front propulsion motor is a fixed displacement hydraulic motor. The piston stroke is not variable. The rear propulsion motor is a two-speed motor. Controlling the angle of the swash plate varies the piston stroke.

#### Operation

It is assumed the compactor is operating in the forward direction and the parking brake is released.

- Moving the forward/reverse lever forward places the pump servo valve (a) into operation. The servo piston (c) tilts the pump swash plate in the forward direction.
- The propulsion pump (3) discharges hydraulic oil from port (B1). The oil flows into two lines:
  - One hydraulic hose connects to the forward travel of the rear motor (6)
  - The remaining hydraulic hose connects to the forward travel of the front motor (8) port (B).
- The hydraulic oil exits the front and rear motors, flowing from the opposite ports, and flows into the suction port in the propulsion pump. In addition part of the oil is drained to the tank through the flushing valve (g), low-pressure relief valve (h) and motor casing (6).
- The power from the rear motor (6) is delivered to the tires through the reduction gear (i), located in the rear axle assembly (7), the reduction mechanism in the differential (j) and final drives (k).
- The power from the front motor (8) is conveyed through the reduction gear (o) to the drum (15).

#### Compactor Speed Selection

It is assumed the speed selector switch is set to the turtle icon and operator is moving the switch to the rabbit icon.

- The rear motor (6) uses a speed select solenoid valve (f). Setting the selector switch to the rabbit icon routes pressurized oil from the valve to the piston (i) in the speed shift mechanism.
- The swash plate in the rear drive motor is moved to reduce the piston stroke. The motor delivery is reduced approximately by  $\frac{1}{3}$ .
- The decrease in displacement increases the vehicle speed while the pump delivery remains constant.

#### High-Pressure Circuit Protection

A multifunction valve (d) is located in the propulsion pump. If the pressure exceeds the setting of the valve it opens providing protection for the circuit

### Charge Circuit

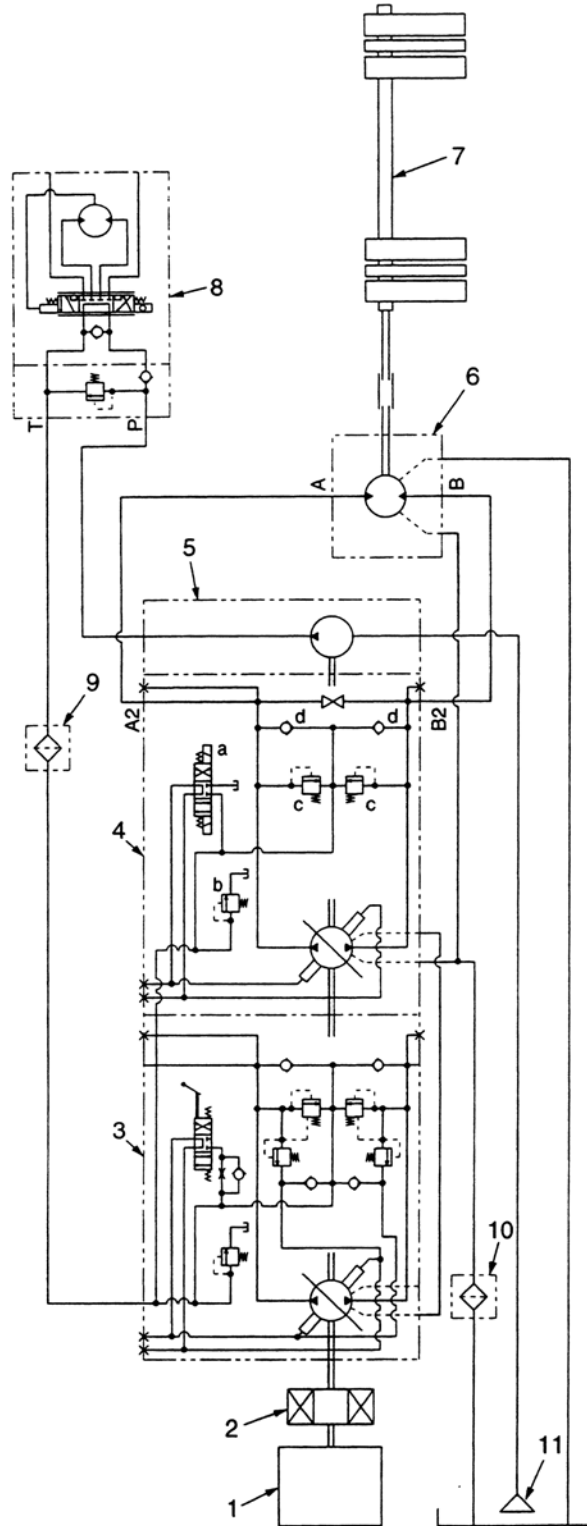
The propulsion circuit is a closed loop circuit that allows hydraulic oil to be circulated into it if a deficiency occurs.

- Hydraulic oil from the steering pump (5) flows into the steering valve, Orbitrol (13), through the filter (14) to the propulsion pump (3).
- The propulsion pump (3) charge relief valve (b) maintains pressure to operate the pump swash plate when the forward/reverse lever is in the neutral position. When compactor is moving the propulsion motor (6) relief valve (h) allows the oil to re-circulate.

### Hydraulic Vibratory System

The diagram below illustrates the vibratory system for the SV400-2 compactor:

1. Engine
2. Coupling
3. Propulsion pump assembly
4. Vibrator pump
  - a Amplitude select valve
  - b Charge relief valve
  - c High pressure relief valves
  - d Check valves
5. Steering pump
6. Vibrator motor
7. Vibrator
8. Orbitrol
9. Charge circuit hydraulic filter
10. Return hydraulic filter
11. Suction hydraulic filter.





### Hydraulic Vibratory Circuit

The vibratory system is comprised of the following components:

- Vibrator pump (4)
- Vibrator motor (6)
- Vibrator (7).

#### Vibrator Pump

A variable displacement pump is used for the pump. Changing the pump swash plate angle varies the piston stroke to allow for the selection of low amplitude, neutral and high amplitude.

#### Vibrator Motor

The vibrator motor is a fixed displacement motor. The displacement of the motor is not variable. The shaft turns at one speed depending on the oil flow that is supplied to it.

#### Operation

It is assumed that high amplitude is selected:

- The amplitude selector switch actuates the vibrator pump (4), amplitude select valve (a) to discharge hydraulic oil from the high amplitude port (B) on the pump.
- Hydraulic oil routed from the pump into the high amplitude port of the vibration motor. The hydraulic oil then is routed back to the pump.

#### High Pressure Circuit Protection

A relief valve (c) is located in the vibratory pump (3). The relief valve will open if pressures exceed specifications.

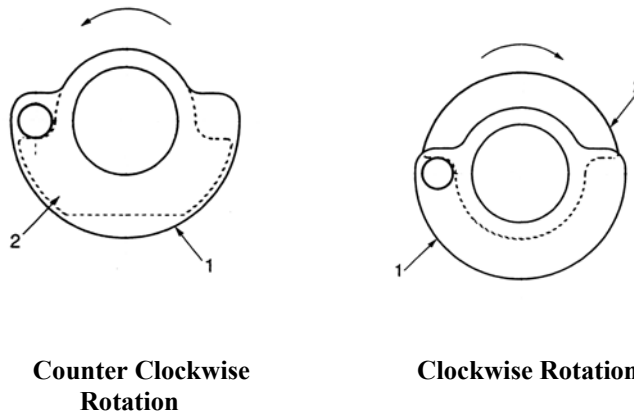
#### Charge Circuit

The vibratory circuit is a closed loop circuit that allows hydraulic oil to be circulated into it if a deficiency occurs.

- Hydraulic oil from the steering pump (5) flows into the steering valve, Orbitrol (8), through the filter (9) to the propulsion pump (3).
- The propulsion pump (3) charge relief valve (b) maintains pressure to operate the pump swash plate when the compactor is moving. The propulsion motor (6) relief valve (h) allows the oil to re-circulate.

#### Vibratory Shaft

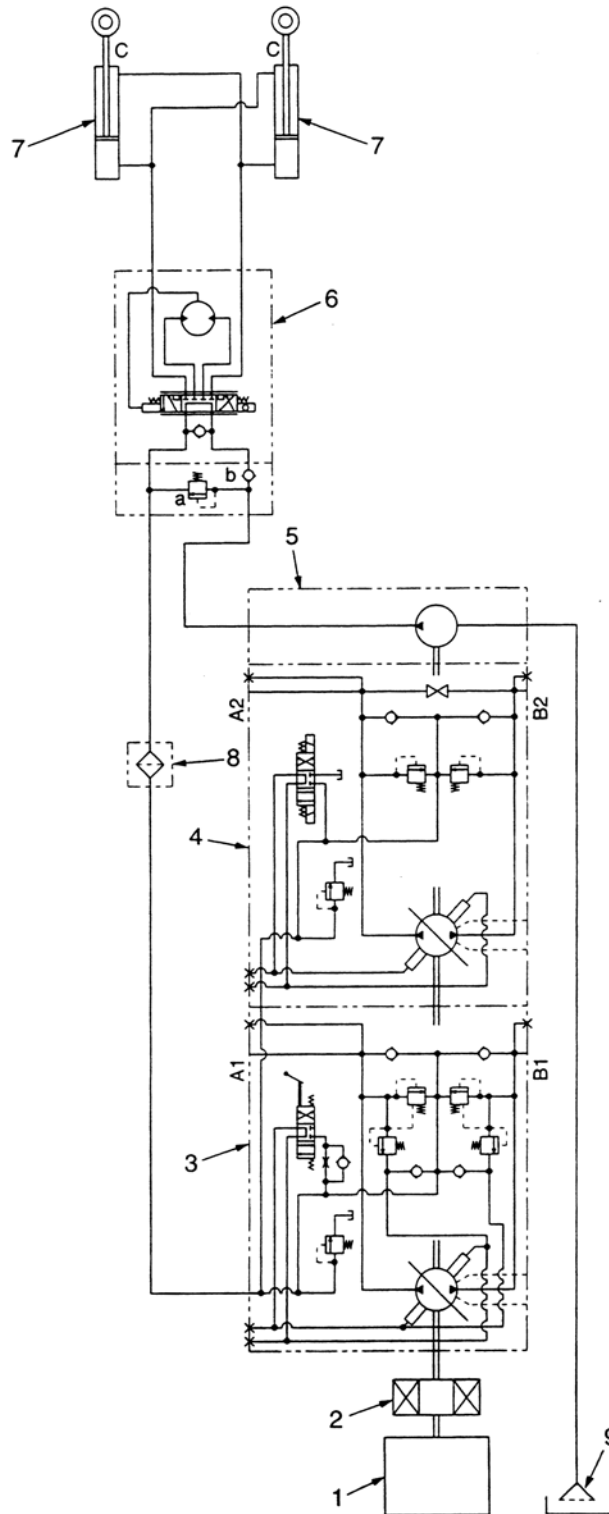
The vibratory shaft consists of a system of non-moveable weights and moveable weights. When the shaft with non-moveable weights (1) rotates in the clockwise direction the moveable weight (2) makes a more concentric shaft. When the shaft and non-moveable weights (1) rotates in the counter clockwise direction the moveable weight (2) moves to give the shaft a less concentric shape. The clockwise direction results in less vibration and the counter clockwise direction results in more vibration



### Hydraulic Steering System

The diagram below illustrates the hydraulic steering system for the SV400-2:

1. Engine
2. Coupling
3. Propulsion pump
4. Vibrator pump
5. Steering pump
6. Orbitrol
  - a. Relief valve
  - b. Check valve
7. Steering Cylinder
  - c. Piston rods
8. Charge circuit hydraulic filter
9. Suction hydraulic filter.



## Hydraulic Steering Circuit

The hydraulic steering system is comprised of the following components:

- Steering/charge pump (5)
- Orbitrol (6)
- Steering cylinders (7)
- Hydraulic filter (8).

The center pin attaches to the front and rear frame. The steering cylinders are attached to the center pin and determine the amount of articulation between the two frames.

### Operation

Hydraulic oil from the pump (5) enters the Orbitrol (6).

- The Orbitrol supplies hydraulic oil to the steering cylinders (7). The amount of hydraulic oil supplied to the steering cylinders is determined by the steering wheel direction and speed of movement.
- The hydraulic oil supplied to the steering cylinders (7) and moves the steering cylinder piston rods (c) to achieve the amount of compactor steering articulation.
- The hydraulic oil is routed from the opposite side of the steering cylinder it entered, through the Orbitrol (6), hydraulic filter (8), hydraulic propulsion pump (3) and into the hydraulic vibrator pump (4).

### High Pressure Circuit Protection

The Orbitrol (6) relief valve (a) opens if the pressure exceeds specifications.

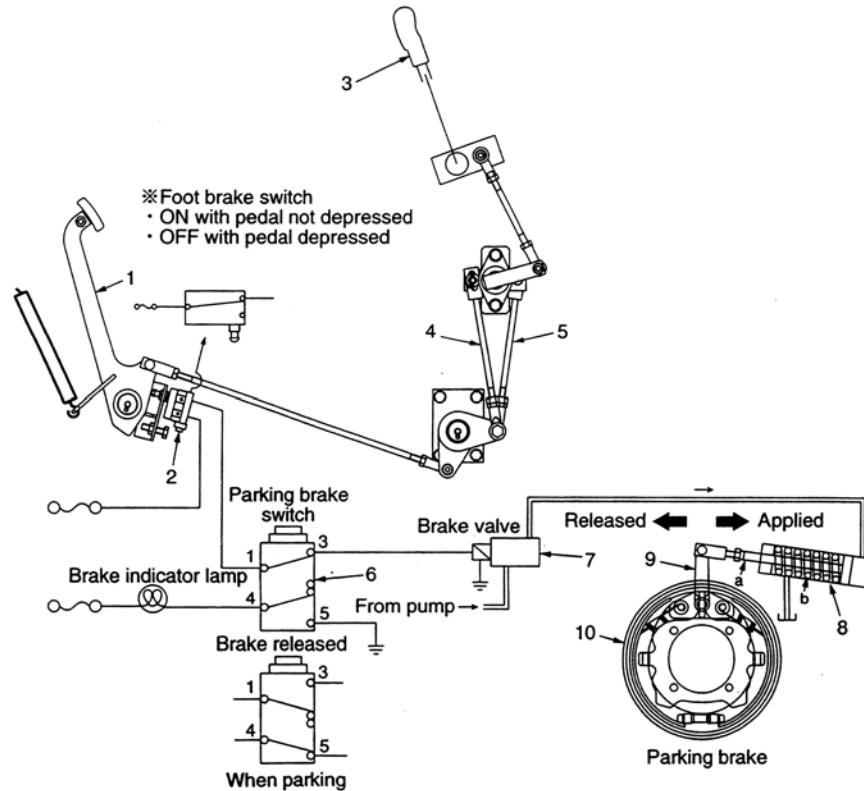
### Charge Circuit

The steering circuit is a closed loop circuit that allows hydraulic oil to be circulated into it if a deficiency occurs.

- Hydraulic oil from the steering pump (5) flows into the steering valve, Orbitrol (10), through the filter (11) to the propulsion pump (3).
- The propulsion pump (3) charge relief valve (b) maintains pressure to operate the pump swash plate when the forward/reverse lever is in the neutral position. When compactor is moving the propulsion motor (6) relief valve (h) allows the oil to re-circulate.

## Brake System

The diagram below illustrates the brake system for the SV400-2.



**Brake System**

1. Brake pedal
2. Brake pedal switch
3. Forward/Reverse lever
4. Return to neutral rod
5. Return to neutral rod
6. Parking brake switch
7. Brake valve
8. Brake cylinder
9. Lever
10. Brake shoes.

The brake pedal switch is a normally closed switch. When the brake pedal is not engaged the switch is ON. When the brake pedal is disengaged the switch is OFF.

When the brake pedal (1) is depressed the parking brake switch (2) is switched OFF. This opens the parking brake circuit and applies the brakes. The brakes will be applied if the parking brake is engaged or disengaged.

## Parking Brake

When the parking brake is applied:

- The contacts of the parking brake switch (6) are open. The circuit to the brake valve (7) is open. The contacts for the parking brake lamp are closed and the lamp illuminates.
- There is no hydraulic oil supplied to the brake valve (7) and to the brake assemblies (8). The springs (b) move the piston (a) toward the brake discs and plates so they contact one another. The brake is applied.

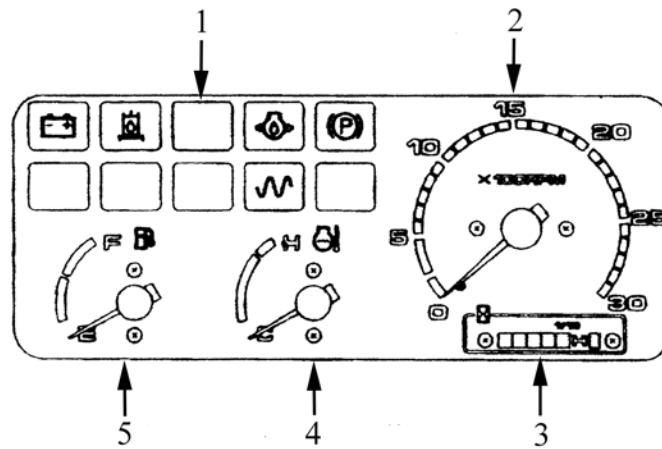
When the parking brake is released:

- The contacts to the parking brake switch (6) close and allow flow to the brake valve (7). The brake indicator lamp is not illuminated.
- The hydraulic oil supplied to the brake valve (7) routes to the pistons (a) of the brake assemblies (8) to compress the springs (b). The brake is released.

When the brake pedal is pushed down (actuated):

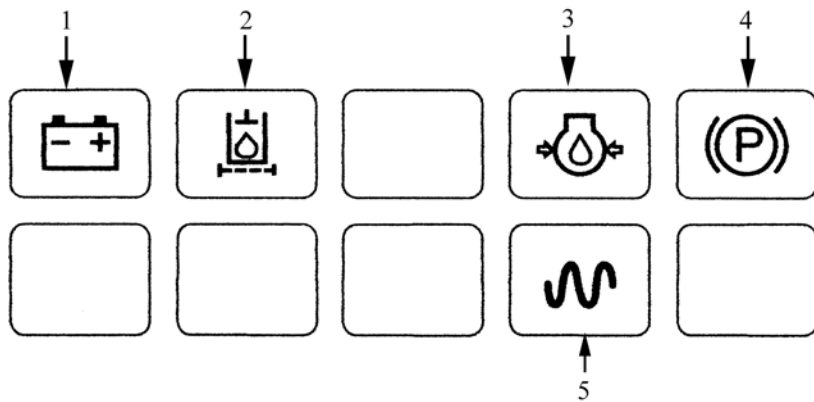
- The brake pedal switch (2) opens, disconnecting the parking brake switch (6).
- Brake valve (7) is de-energized and the brake is applied.

Combination meter indications are defined by function below:



#### Combination Meter

1. Monitor display – Illuminates when an alarm condition exists.
2. Tachometer – Indicates engine speed.
3. Hour meter – Indicates amount of time compactor has operated.
4. Temperature gauge – Indicates temperature.
5. Fuel gage – Indicates amount of fuel in compactor fuel tank.



#### Monitor Display

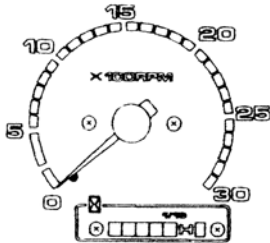
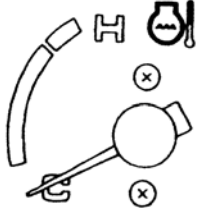
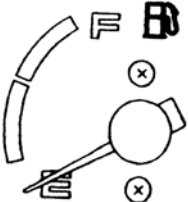

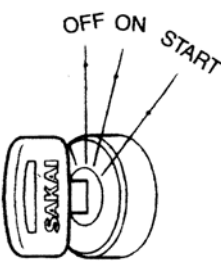
1. Battery charge lamp – Illuminates when the battery is not charging to specifications.
2. Hydraulic filter warning lamp – Illuminates when the hydraulic filter is restricted.
3. Engine oil pressure lamp – Illuminates when engine oil pressure is below specifications.
4. Parking brake lamp – Illuminates when the parking brake is engaged.
5. Vibration lamp – Illuminates when drum vibration is engaged.

#### CAUTION

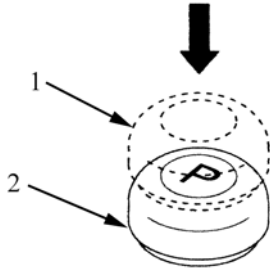
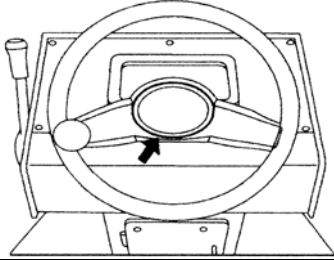
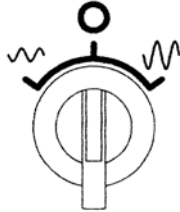
The hydraulic filter lamp can illuminate when the engine is cold and the engine rpm is increased. Allow the engine to warm and the lamp to extinguish prior to operating the compactor.


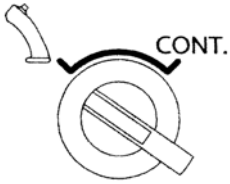
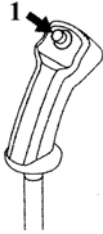

#### CAUTION

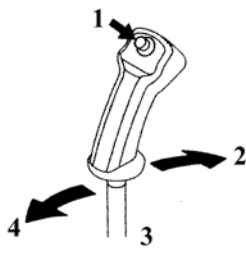
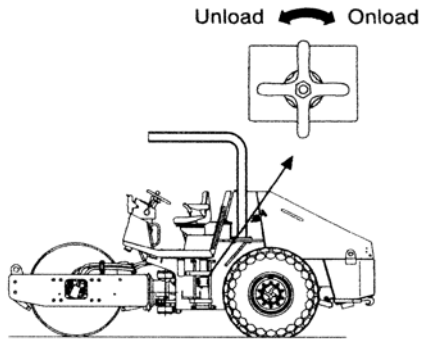
All monitor display lamps will illuminate when the key switch is turned to the ON position as a lamp check. When the engine is started the lamps extinguish. If the lamps do not illuminate and extinguish during start up, stop the engine and troubleshoot the problem prior to operating the compactor.

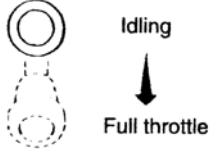
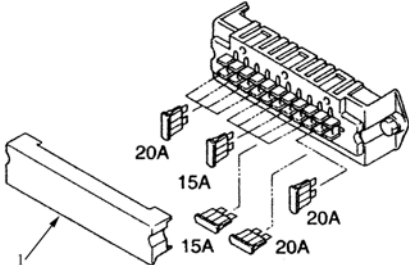
<p><b>Tachometer</b></p> <p>The tachometer is located in the combination meter.</p> <p>The tachometer indicates engine speed in rpm.</p> <p>An hour meter is located below the tachometer and indicates total compactor operating time.</p> <p>The service intervals are based on the hour meter.</p>		
<p><b>Temperature Gauge</b></p> <p>The temperature gauge measures coolant temperature of the engine.</p> <p>When the needle moves into the H region the engine must be idled and shut down if the temperature does not decrease out of the H region.</p>		
<p><b>Fuel Gauge</b></p> <p>Indicates the fuel level in the fuel tank.</p> <p>E = Empty tank F = Full tank.</p>		
<p><b>Engine Lamps</b></p> <p>When the engine warning lamp is illuminated, stop the engine immediately.</p> <p>Serious engine problems can be present.</p>		
<p><b>Starter Switch</b></p> <p>The starter switch starts and stops the engine.</p> <p>OFF position – All electric systems and engine are switched off. Key can be removed.</p> <p>ON position – Charging circuit and lamp circuit are energized. Engine is run in this position.</p> <p>START position – Engine is cranking in this position.</p> <p>Allow switch to return to ON position once engine has started.</p>		



<p><b>Parking Brake Switch</b></p> <p><b>⚠ DANGER</b></p> <p>Set the parking brake prior to dismounting the compactor. If the parking brake is not set, the compactor can move and cause personal injury or equipment damage. The parking brake can be used in an emergency.</p> <p><b>⚠ CAUTION</b></p> <p>To reduce possibility of button damage, never pull on the button to disengage. Pulling on the button can cause equipment damage.</p> <p>When the button is in the down position (2) the parking brake is on and the button lamp is illuminated.</p> <p>Press the button to release the parking brake (1).</p> <p>The parking brake button can be used to stop the compactor in an emergency.</p>		
<p><b>Horn Button</b></p> <p>The horn button is located in the center of the steering wheel.</p> <p>Press the button to activate the horn.</p>		
<p><b>Vibrator Amplitude Switch</b></p> <p><b>⚠ CAUTION</b></p> <p>To reduce the possibility of equipment damage, do not operate the vibration option unless the engine rpm is set to full.</p> <p>The vibrator amplitude switch is located on the panel to the left of the operator seat.</p> <p>The settings from left to right are minimum vibration, OFF and maximum vibration.</p> <p>Turning the switch clockwise to maximum position causes the vibration to start at maximum amplitude.</p> <p>Turning the switch counter clockwise to the minimum position causes the vibration to start at the minimum amplitude.</p>		




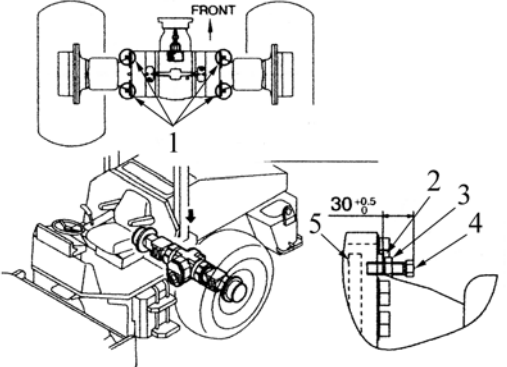
<p><b>Vibration Selector Switch</b></p> <p style="text-align: center;"> <b>CAUTION</b></p> <p><b>To reduce the possibility of equipment damage: Do not operate the vibrator on a hard surface such as cement, concrete or steel plates.</b></p> <ul style="list-style-type: none"> <li>• <b>Turn the vibrator amplitude switch to OFF position when the compactor is not moving.</b></li> <li>• <b>Turn the vibrator amplitude switch to OFF position when the compactor is stuck in mud.</b></li> </ul> <p>This switch allows the vibration control to be moved to the forward/reverse lever button or to the CONT. position for continuous use.</p>		
<p><b>Forward/Reverse Lever Vibration ON/OFF Switch</b></p> <p>The ON/OFF switch on the forward/reverse lever can be used to activate vibration when the following conditions are met:</p> <ul style="list-style-type: none"> <li>• Vibration amplitude switch in minimum or maximum vibration position.</li> <li>• Vibration selector switch in the lever position.</li> </ul> <p>Push button (1) on the lever to activate the vibration.</p> <p>Push the button on the lever a second time to deactivate vibration.</p>		
<p><b>Compactor Speed Change Switch</b></p> <p>The compactor speed change switch allows the operator to change the speed the compactor travels.</p> <ul style="list-style-type: none"> <li>• Turtle = 0 to 6 km per hour [0 to 3.7 mph]</li> <li>• Rabbit = 0 to 10 km per hour [0 to 6.2 mph].</li> </ul> <p>Only shift from rabbit to turtle or turtle to rabbit when the compactor is stopped.</p>		

<p><b>Forward/Reverse Lever</b></p> <p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>To reduce the possibility of equipment damage:</b></p> <ul style="list-style-type: none"> <li>• For normal braking, return the lever to the neutral position to stop the compactor.</li> <li>• For emergency braking use the brake pedal or press the parking brake.</li> </ul> <p>Moving the forward/reverse lever to the forward (2) or reverse position (4) directs the machine to move in associated direction.</p> <p>The machine speed increases or decreases in proportion to the position of the lever.</p> <p>Moving the forward/reverse lever to the neutral position (3) places the compactor in neutral.</p> <p>Manual vibration can be activated with button (1).</p>		
<p><b>Unloader Valve</b></p> <p style="text-align: center;"><b>⚠ DANGER</b></p> <p><b>To reduce the possibility of personal injury and equipment damage:</b></p> <ul style="list-style-type: none"> <li>• When the compactor is on a slope make sure to chock the wheels prior to unloading the hydraulic drive.</li> <li>• Make sure the parking brake is applied prior to unloading the hydraulic drive.</li> </ul> <p>The Unloader valve disengages the hydraulic drive by relieving the pressure on the drive system.</p> <p>For towing or loading, turn the valve counter clockwise.</p> <p>For normal operation, turn the valve clockwise.</p>		

<p><b>Throttle Lever</b></p> <p>When the throttle lever is moved towards the operator the engine rpm increases.</p>		
<p><b>Fuse Box</b></p> <p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of equipment damage secure power to the fuse box by turning the key switch to the OFF position.</b></p> <p>Fuses protect the electrical components from damage because of a short circuit.</p> <p>Change any fuse that is corroded or does not sit in the fuse holder securely.</p> <p>Make sure the correct amperage of fuse is used when replacing faulty fuses.</p>		

# Operating the Compactor

This procedure outlines the correct operating procedure for the compactor. For safe operation of the compactor, all operating instructions must be followed.

<p><b>Release Brakes for Towing</b></p> <p> <b>WARNING</b></p> <p>To reduce the possibility of personal injury and equipment damage do not attempt to release the brake immediately after the engine is stopped. Allow the hydraulic oil to cool down prior to releasing the brake.</p> <p> <b>WARNING</b></p> <p>To reduce the possibility of personal injury, wear safety goggles, hardhat and safety gloves when releasing the brake.</p> <p>Prior to towing the brakes must be released. The brake release bolts (1) are on top of the Dana rear end.</p> <p>To release the brakes:</p> <ul style="list-style-type: none"><li>• Loosen the locking nut (3) on both bolts (4) on one-side brakes.</li><li>• Tighten both bolts alternately until the resistance has built up.</li><li>• Repeat the process for the remaining side.</li></ul> <p>To engage the brakes:</p> <ul style="list-style-type: none"><li>• Tighten the bolts (4) alternately until the distance between the bolt head and the reducer face (2) is 34 mm [1.34 in].</li><li>• Tighten the lock nut.</li><li>• Repeat the process for the remaining side.</li></ul>		
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**Before Starting Inspection**

**⚠ WARNING**

To reduce the possibility of personal injury and equipment damage, only allow one operator on the compactor at one time.

**⚠ WARNING**

To reduce the possibility of personal injury and equipment damage, operate the compactor from the operator seat only.

**⚠ WARNING**

To reduce the possibility of personal injury and equipment damage, make sure the steering bar is in the carrying position. If the steering bar is in the steering lock position, the compactor cannot be turned.

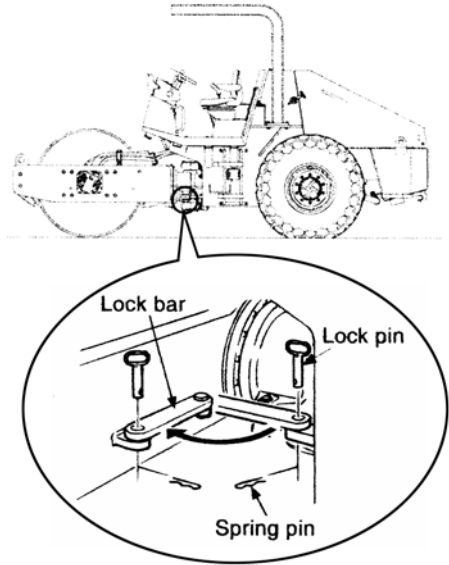
Check the position of the steering lock bar. The steering lock bar is located at the left center of the compactor.

To unlock the bar:

1. Remove the spring pin
2. Pull the lock pin out
3. Set the bar into the carrying position
4. Install lock pin and spring pin.

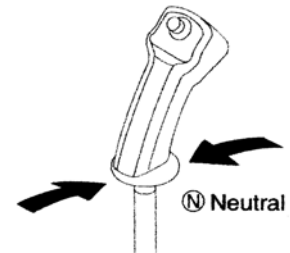
To lock the steering:

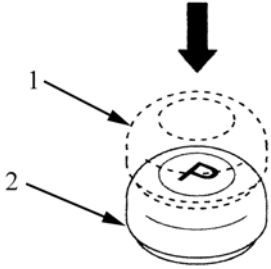
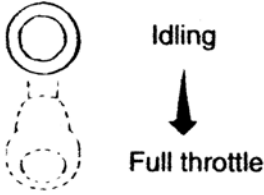
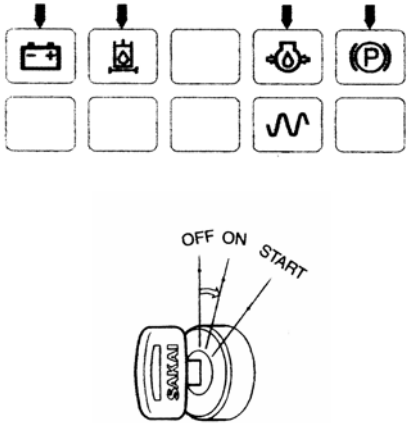
1. Remove the spring pin
2. Pull the lock pin out
3. Set the bar into the lock steering position
4. Install the lock pin and spring pin.

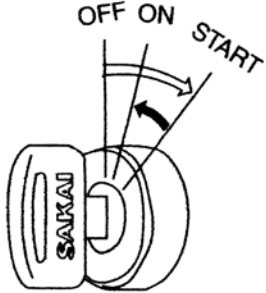
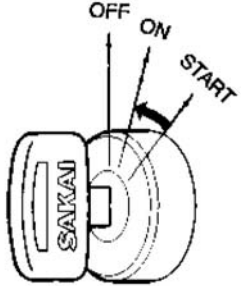


Make sure the forward/ reverse lever is in the neutral position.

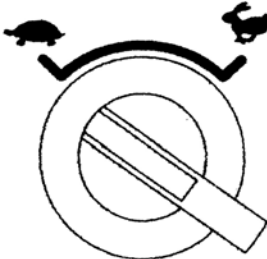
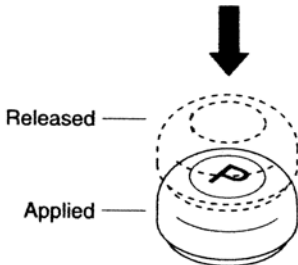
The engine will not start if the forward/reverse lever is not in the neutral position.

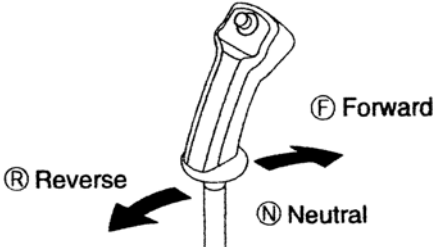
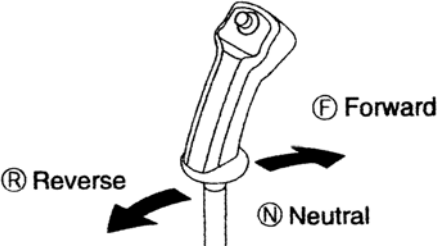
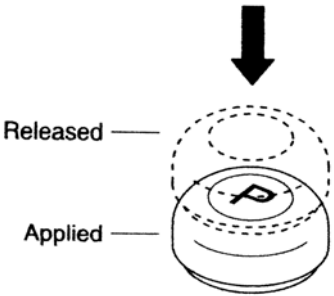


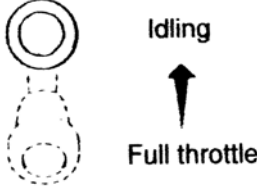
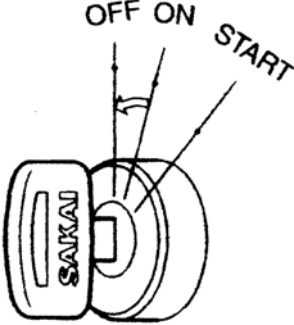
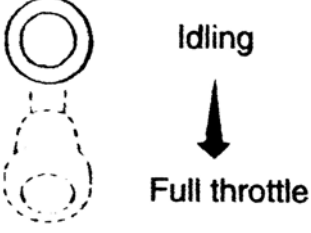
<p>Engage the parking brake switch (2).</p> <p>If the parking brake switch is not engaged (1) the engine will not start.</p>		
<p><b>Starting the Engine</b></p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury, inspect the area around the compactor for personnel that are not necessary. Sound the horn prior to starting.</p> <p>Pull the throttle lever slightly back from the idle position.</p>		
<p>Turn the starter switch to the ON position and make sure the following lamps are illuminated on the monitor:</p> <ul style="list-style-type: none"> <li>• Battery charge warning lamp</li> <li>• Hydraulic oil filter warning lamp</li> <li>• Engine coolant warning lamp</li> <li>• Parking brake lamp.</li> </ul>		

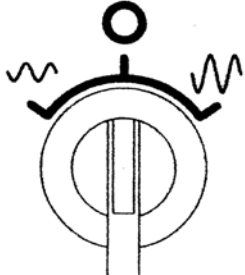
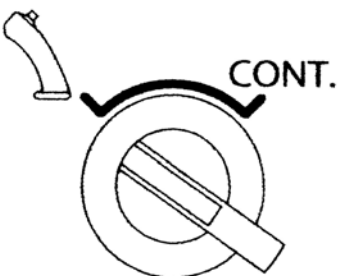
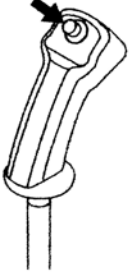
<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>To reduce the possibility of equipment damage when starting the engine:</b></p> <ul style="list-style-type: none"> <li>• Do not allow the key switch to remain in the start position longer than 15 seconds.</li> <li>• If the engine does not start in 15 seconds, allow 30 seconds for the starter to cool down.</li> <li>• Make sure the monitor lamps illuminate when the engine is cranking and extinguish immediately after the engine has started.</li> <li>• If any warning lamps illuminate while the compactor is operating, stop operation and troubleshoot the fault.</li> </ul> <p>Turn the keyswitch to the START position until the engine starts.</p> <p>Release the key and the key switch will travel to the ON position.</p>		
<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>To reduce the possibility of equipment damage, do not try to move the compactor immediately after starting or increase the engine speed abruptly. These actions can cause hydraulic pump and motor cavitation.</b></p> <p>Allow the engine to idle and warm up for approximately 5 minutes @ 1200 rpm.</p> <p>The engine and hydraulic components must be allowed to warm up to reduce the possibility of premature wear.</p> <p>After the compactor has warmed up, make sure:</p> <ul style="list-style-type: none"> <li>• Temperature gauge pointer is near the center zone</li> <li>• Fuel gauge pointer is between the E and F marks</li> <li>• Battery charge lamp is extinguished</li> <li>• Engine oil pressure lamp is extinguished</li> <li>• Engine warning lamp is extinguished</li> <li>• Make sure there are no unusual noises and the exhaust gas is normal.</li> </ul>		

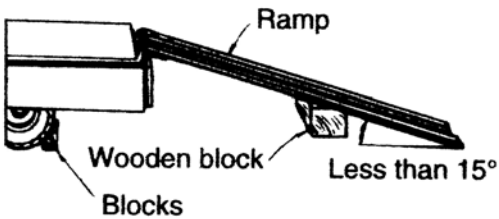
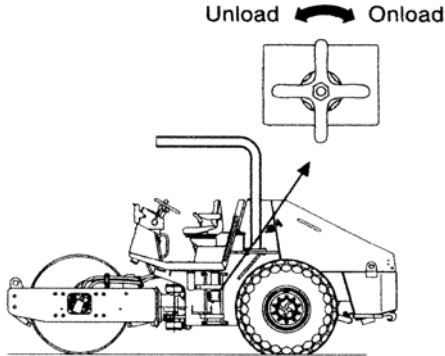


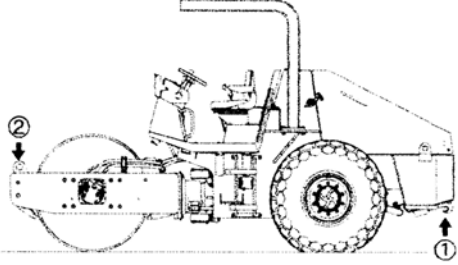
<p><b>Traveling</b></p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury, inspect the area around the compactor for personnel that are not necessary. Sound the horn prior to starting.</p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury and equipment damage, the compactor must be adjusted to the turtle speed when operated on a steep slope.</p> <p><b>⚠ CAUTION</b></p> <p>To reduce the possibility of equipment damage, do not turn the key switch to the OFF position while the compactor is in operation.</p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury, always wear a seat belt when operating the compactor.</p> <p>Select the desired speed by turning the compactor speed control switch.</p> <ul style="list-style-type: none"> <li>• Turtle = 0 to 6 km per hour [0 to 3.7 mph]</li> <li>• Rabbit = 0 to 10 km per hour [0 to 6.2 mph].</li> </ul> <p>Only shift from turtle to rabbit and rabbit to turtle when the compactor is stopped.</p>		
<p>Press the parking brake button to release the parking brake.</p> <p>Make sure the parking brake icon on the combination meter extinguishes.</p>		

<p style="text-align: center;"><b>⚠ WARNING</b></p> <p>The compactor tends to have blind spots in the rear. To reduce the possibility of personal injury and/or equipment damage, make sure nothing is behind the compactor prior to placing the forward/reverse lever in the reverse position.</p> <p style="text-align: center;"><b>⚠ CAUTION</b></p> <p>Avoid abrupt operation of the forward/reverse lever. The hydraulic drive system responds to the speed the lever travels and the location of the lever.</p> <p>Slowly move the forward/reverse lever in the desired direction of travel.</p>		
<p><b>Stopping and Parking</b></p> <p style="text-align: center;"><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury and equipment damage:</p> <ul style="list-style-type: none"> <li>• Avoid abrupt braking.</li> <li>• Avoid parking on an incline.</li> <li>• If the compactor must be parked on an incline, set the parking brake and place chocks under the wheels.</li> </ul> <p style="text-align: center;"><b>⚠ CAUTION</b></p> <p>To reduce the possibility of equipment damage:</p> <ul style="list-style-type: none"> <li>• For normal braking, return the lever to the neutral position to stop the compactor.</li> <li>• For emergency braking, use the brake pedal or press the parking brake.</li> </ul> <p>Place the forward/reverse lever in the neutral position. The compactor will stop once the lever is in the neutral position.</p>		
<p>Press the parking brake button and make sure the icon on the combination meter illuminates.</p> <p>The illuminated icon indicates the parking brake is set.</p>		

<p><b>Stopping the Engine</b></p> <p><b>⚠ CAUTION</b></p> <p>To reduce the possibility of equipment damage:</p> <ul style="list-style-type: none"> <li>• Do not suddenly shut down a hot engine, except in emergency conditions.</li> <li>• Do not shut down an overheating engine, move the throttle lever to the middle position and allow the engine to cool down.</li> </ul> <p>Move the throttle lever to the idle position.</p>		
<p><b>⚠ DANGER</b></p> <p>Set the parking brake prior to dismounting the compactor. If the parking brake is not set, the compactor can move and cause personal injury or equipment damage. The parking brake can be used in an emergency.</p> <p><b>⚠ DANGER</b></p> <p>If the compactor must be parked on an incline, set the parking brake and place chocks under the wheels. The compactor can move if not chocked on an incline and cause personal injury and equipment damage. Never fail to remove the key from the key switch.</p> <p><b>⚠ DANGER</b></p> <p>To reduce the possibility of personal injury and compactor damage, do not turn the key switch to the off position when the compactor is in motion.</p> <p>Turn the keyswitch to the OFF position to shutdown the engine. Remove the keyswitch. Check for leaks and drum abnormalities. Fill the fuel tank and remove all debris from compactor. Clean excess mud and debris from the drum.</p>		
<p><b>Vibratory Operation</b></p> <p>Move the throttle lever to the full throttle position.</p>		

<p>Set the vibration amplitude switch to the desired position.</p> <p>Clockwise from OFF position is maximum vibration.</p> <p>Counter clockwise from OFF position is minimum vibration.</p>		
<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>To reduce the possibility of equipment damage:</b></p> <ul style="list-style-type: none"> <li>• <b>Do not operate the vibrator on a hard surface such as cement, concrete or steel plates.</b></li> <li>• <b>Turn the vibrator amplitude switch to OFF position when the compactor is not moving.</b></li> <li>• <b>Turn the vibrator amplitude switch to OFF position when the compactor is stuck in mud.</b></li> </ul> <p>This switch allows the vibration control to be moved to the forward/reverse lever button for manual vibration activation.</p> <p>In the CONT. position the vibration is constant and pushing the forward/reverse lever button has no affect.</p>		
<p>The ON/OFF switch on the forward/reverse lever can be used to activate vibration when the following conditions are met:</p> <ul style="list-style-type: none"> <li>• Vibration amplitude switch in minimum or maximum vibration position.</li> <li>• Vibration selector switch in the lever position.</li> </ul> <p>Push the button on the lever to activate the vibration.</p> <p>Push the button on the lever a second time to deactivate vibration.</p>		

<p><b>Loading Using a Winch Equipped Trailer</b></p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury and equipment damage:</p> <ul style="list-style-type: none"> <li>• Use ramps of the proper width, length and thickness to allow for safe compactor load.</li> <li>• If the ramps deflect under load, place wooden blocks under the ramp to reinforce it.</li> <li>• Only load on level hard ground. Leave a sufficient distance between the compactor and shoulder.</li> </ul> <p>Engage the trailer brake and chock the wheels.</p> <p>The angle between the ramps and the ground must not exceed 15 degrees.</p> <p>Make sure the ramps are separated enough to accommodate the compactor roller width.</p> <p>Set the ramps.</p> <p>Align the compactor with the ramps.</p>		
<p><b>⚠ DANGER</b></p> <p>To reduce the possibility of personal injury and equipment damage:</p> <ul style="list-style-type: none"> <li>• When the compactor is on a slope make sure to chock the wheels prior to unloading the hydraulic drive.</li> <li>• Make sure the parking brake is applied prior to unloading the hydraulic drive.</li> </ul> <p>The Unloader valve disengages the hydraulic drive by relieving the pressure on the drive system.</p> <p>For towing or loading with a winch, turn the valve counter clockwise.</p> <p>For normal operation, turn the valve clockwise.</p>		

<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage:</b></p> <ul style="list-style-type: none"> <li>• <b>To reduce the possibility of the compactor slipping on the ramps, keep drum and ramps free from any debris and oil.</b></li> <li>• <b>Do not attempt to steer the compactor while on ramp. If the compactor is not aligned correctly, back off of the ramps, realign and load compactor.</b></li> </ul> <p>Feed the cable from the winch to the compactor.</p> <p>Connect the cable to the compactor connection points (1) or (2).</p> <p>Start the engine and release the parking brake.</p> <p>Start the trailer winch and steer the compactor onto the ramps.</p> <p>Once the compactor is loaded onto the trailer close the Unloader valve.</p> <p>Set the parking brake. Make sure the parking brake lamp is illuminated.</p> <p>Secure the compactor to the trailer.</p>		 <p>The diagram shows a side view of a compactor on a trailer. Two connection points are indicated with circled numbers and arrows: (1) is at the rear of the compactor, and (2) is at the front. The compactor has a large rear drum and a smaller front drum. The trailer has a winch mechanism at the front.</p>
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### Self Propelled Loading

#### **WARNING**

To reduce the possibility of personal injury and equipment damage:

- Use ramps of the proper width, length and thickness to allow for safe compactor load.
- If the ramps deflect under load, place wooden blocks under the ramp to reinforce it.
- Only load on level hard ground. Leave a sufficient distance between the compactor and shoulder.

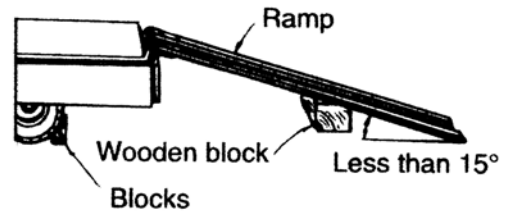
Engage the trailer brake and chock the wheels.

The angle between the ramps and the ground must not exceed 15 degrees.

Make sure the ramps are separated enough to accommodate the compactor roller width.

Set the ramps.

Align the compactor with the ramps.



#### **WARNING**

To reduce the possibility of personal injury and equipment damage:

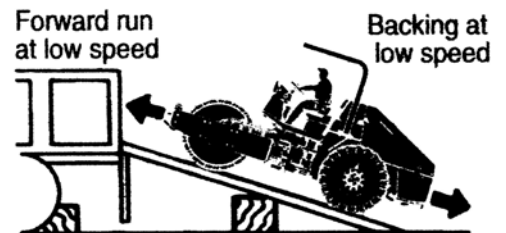
- To reduce the possibility of the compactor slipping on the ramps, keep drum and ramps free from any debris and oil.
- Do not attempt to steer the compactor while on ramp. If the compactor is not aligned correctly, back off of the ramps, realign and load compactor.

Place the compactor speed selector switch in the turtle position.

Load the compactor onto the trailer.

Set the parking brake and make sure the lamp is illuminated.

Secure the compactor onto the trailer.



## Working With the Compactor

### **WARNING**

To reduce the possibility of personal injury and equipment damage:

- When traveling up an incline the compactor must be operated at low speed.
- Do not attempt to shift to high speed when traveling up an incline. The compactor can slip during the speed change.
- When traveling down an incline adjust the compactor speed so the engine does not exceed 2500 rpm.
- Do not operate the compactor sideways on a hill. The compactor must be operated traveling up and down the hill.

### **CAUTION**

**Do not operate the compactor vibrator on a hard surface such as concrete. Operating the compactor vibrator on a hard surface can cause the machine to jump and have abnormal shock load. Damage to shock isolators will result.**

When changing the direction of travel on the compactor during asphalt mix compaction, slowly shift the forward/reverse lever.

The SV400-2 compactor can be used for the following work:

- Road improvement
- Embankment construction
- Dam construction.

The SV400-2 compactor can compact the following materials:

- Crusher run
- Concrete
- Sands
- Soils
- Slag
- Soft rock.

The SV400-2 compactor can compact the following layers:

- Base course
- Sub-grade
- Embankment.

After operating the compactor, perform the following checks:

- Check coolant temperature, engine oil pressure and fuel level.
- Remove mud and water from the compactor. Mud and water can get into the seals through the steering cylinder piston rods. Equipment damage will result.
- Park the compactor on a hard dry surface. If a hard, dry, surface is not available, park the compactor on metal plates.
- Low temperature will cause significant reduction of battery efficiency. Cover batteries or remove them from the machine and store in a warm dry location.



# Maintenance

The frequency of inspection, service and lubrication performed on the SV400-2 compactor has significant influence on the performance and life of the compactor. This procedure outlines typical intervals for inspection and service. Inspection and service must be performed in accordance within the intervals.



**To reduce the possibility of premature compactor wear:**

- **Always use Sakai genuine parts for replacement.**
- **Use lubricants recommended by Sakai. Never mix different brands of lubricants.**
- **When checking hydraulic oil level, engine oil level, or changing hydraulic, fuel and engine oil and filters, make sure dirt does not enter the system.**
- **Park the compactor on hard, level ground when changing lubricants or checking the level.**
- **Change the hydraulic or engine oil when the temperature is high enough to allow the oil to drain freely.**
- **When the compactor is set up for long-term storage, fill the fuel tank and lubricate all necessary points. Start the engine once a month and allow the engine to run for 20 minutes.**
- **Never run water in the engine coolant system. Use the proper anti-freeze to water mixture.**
- **Hydraulic pumps and motors must be serviced at authorized service shops.**
- **Turn the keyswitch to the OFF position when servicing batteries or working on the electric system of the compactor.**
- **The engine oil and filter must be changed after the first 50 hours of engine operation.**
- **When a warning lamp illuminates, the symptom must be repaired immediately.**
- **Inspect the compactor electrical system for the listed below issues at a monthly interval:**
  - **Damage to wiring harness, loose p-clips and cable ties.**
  - **Make sure connectors fit together securely.**
  - **Make sure all electrical systems function properly.**

Certain components require replacement at designated intervals. Make sure the components are replaced when advised. This practice will reduce the possibility of compactor down time because of failed components.

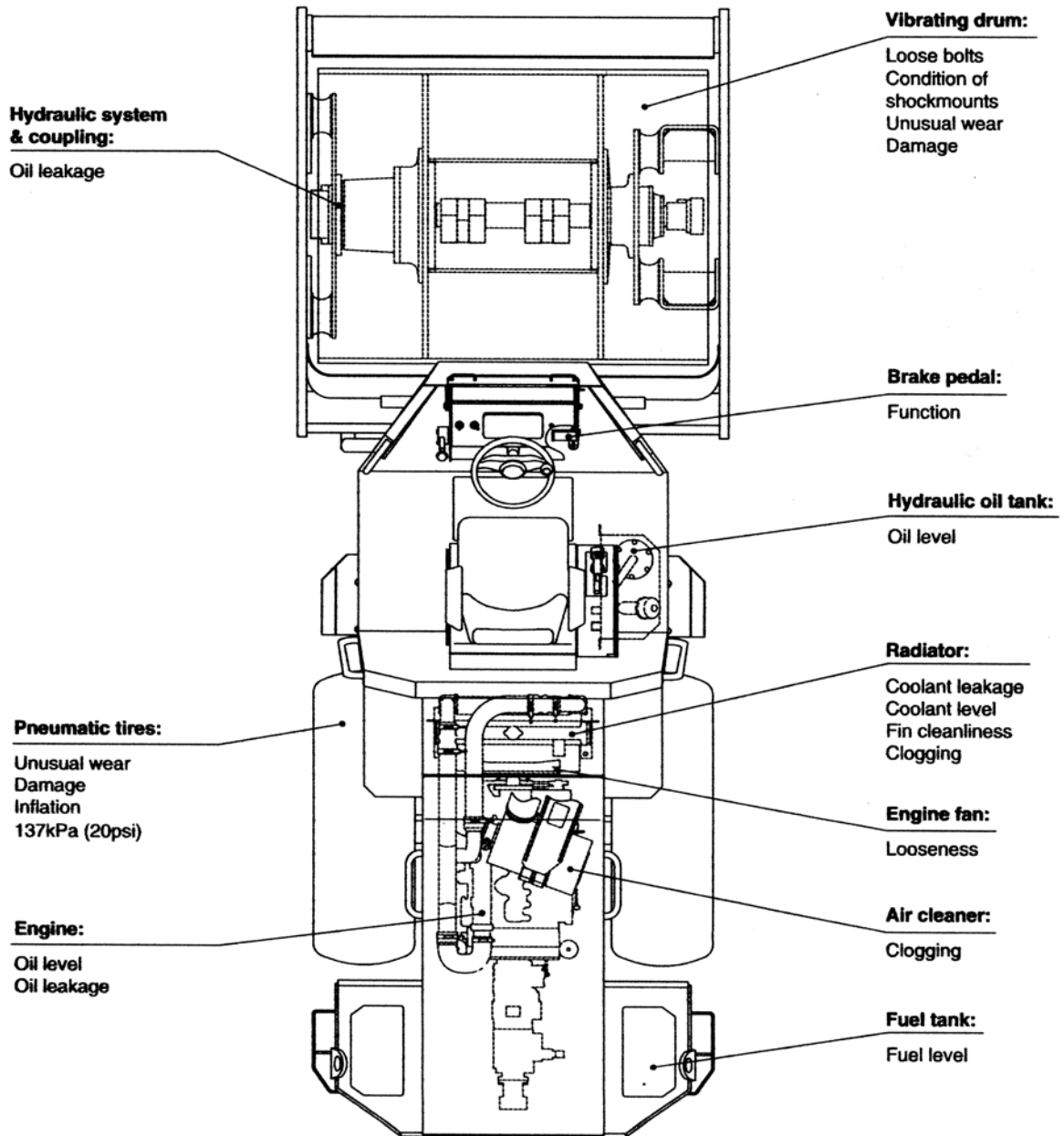
During inspection of the compactor if leaks or damaged components are detected, replace the failed component immediately.

**Compactor Maintenance Schedule**

<b>System</b>	<b>Component</b>
Every 10 Hours or Daily	Check engine oil level. Add as necessary.
	Check coolant level. Add as necessary.
	Check fan belt tension and adjust as necessary.
Every 50 Hours	Check hydraulic oil level. Add as necessary.
	Check battery electrolyte level. Add as necessary.
	Check fuel filter sediment and water. Drain as necessary.
	Check air cleaner restriction indicator.
Every 250 Hours	Check tire air pressure and condition.
	Check condition of roller rubber dampers.
	Check vibrator oil level.
	Apply grease to brake linkages.
	Check differential and final drive oil level.
	Apply grease to center pin and tilt pin bearings.
	Apply grease to steering cylinders.
	Check transmission oil level. Add as necessary.
	Check drive motor oil level.
Check tire lug nuts for tightness 631 N•m (465 ft-lb).	
Every 500 Hours	Replace hydraulic return filter.
	Replace hydraulic line filter.
	Check for loose control linkage and adjust.
	Change fuel pre-filter element.
	Change engine oil and filter.
Every 1,000 Hours	Change differential and final drive oil.
	Clean hydraulic tank suction screen.
	Change hydraulic oil.
	Change vibrator oil.
	Change drive motor oil.
	Clean fuel strainer.
As Required	Change fuel filter.
	Change or clean air cleaner element.
	Clean inside of fuel tank.
	Check tire inflation.

**Compactor Component Replacement Schedule**

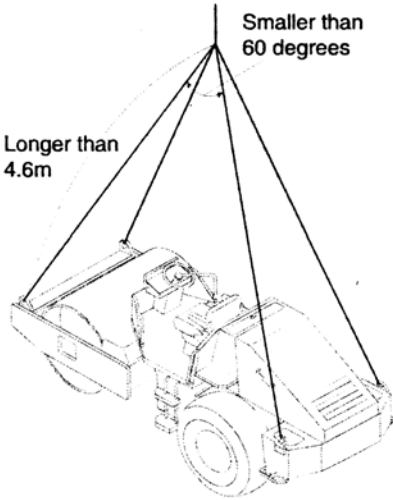
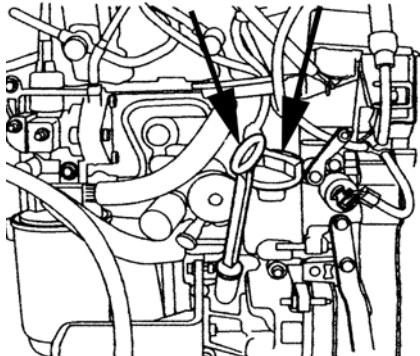

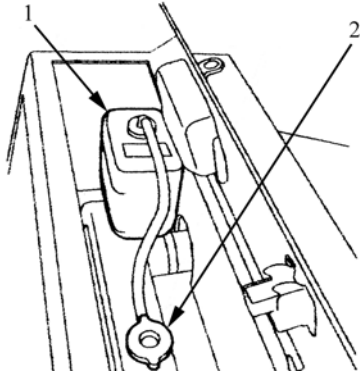
<b>System</b>	<b>Component</b>	<b>Period</b>
Brake System	Master cylinder seals	2 years
	Wheel cylinder seals	2 years
	Brake hose	2 years
	Brake cable	4 years
Steering System	Orbitrol seals	2 years
	Hydraulic hoses	2 years
	Steering cylinder seals	2 years
	Hydraulic pump seals	4 years
Drive System	Axle seals (adapted compactor only)	4 years
	Hydraulic drive pump seals	4 years
	Hydraulic drive motor seals	4 years
	Hydraulic hoses	4 years
	Roller rubber isolators	4 years
Fuel System	Fuel hoses	4 years
Engine System	Engine mounts	4 years
	V-belt	2 years
	Throttle cable	4 years
Cooling System	Radiator hose and coolant	2 years

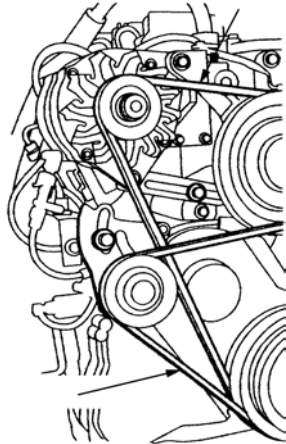
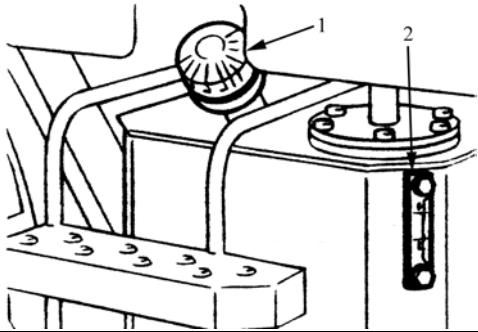

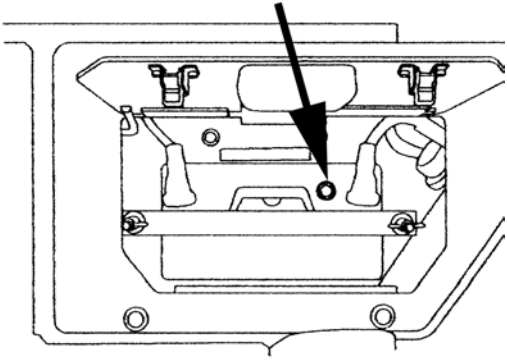


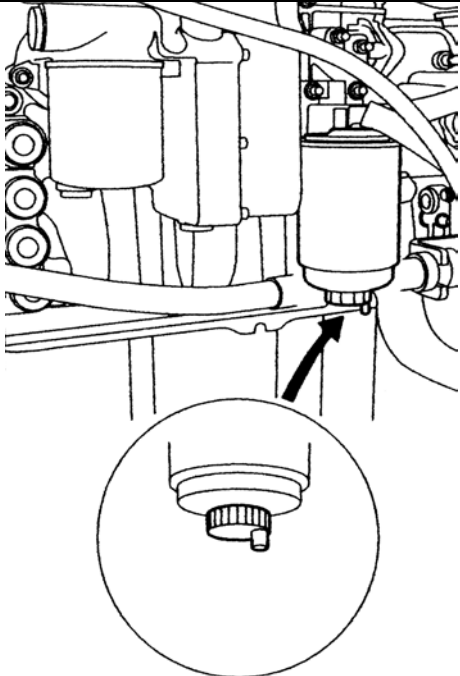
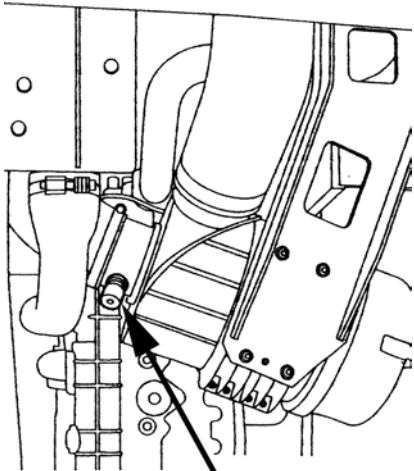
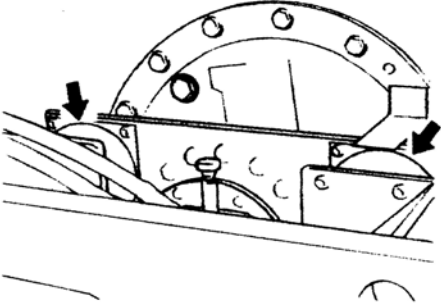
### Prior to Starting the Compactor

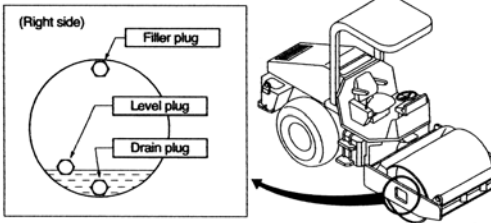
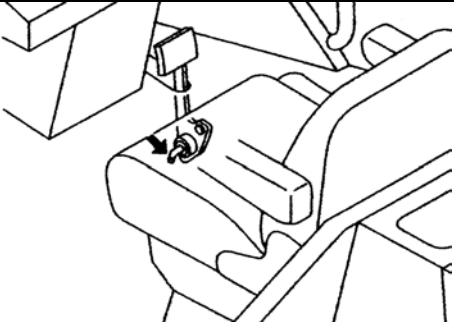
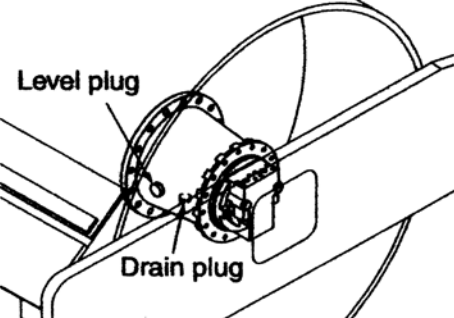
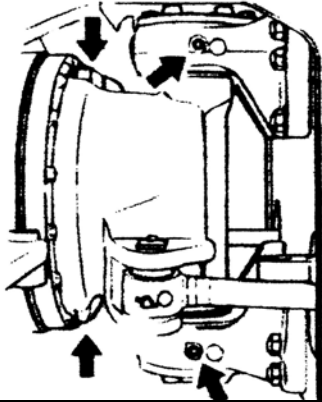
Checking the compactor daily prior to operation is a must. Before starting the engine and operating the compactor, walk around the compactor and check for:

- Loose and missing bolts and nuts
- Hydraulic oil leaks
- Engine fan loose
- Air cleaner restriction indicator
- Engine oil leaks
- Hydraulic tank oil level
- Engine oil level
- Cooling system
- Tires
- Fuel tank level.

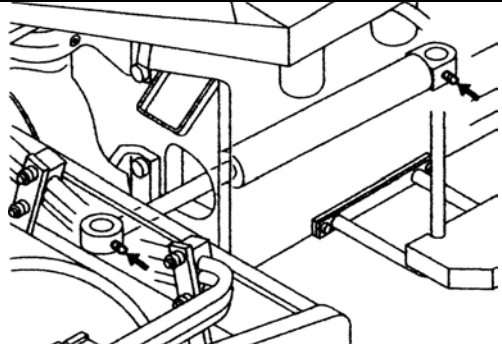
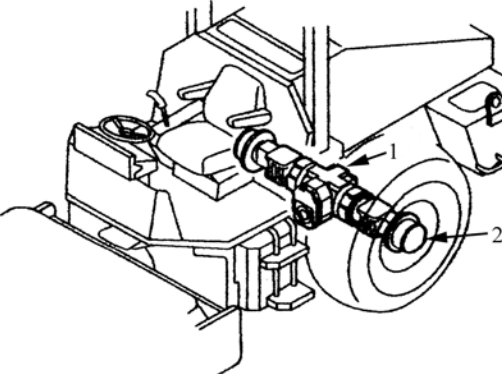
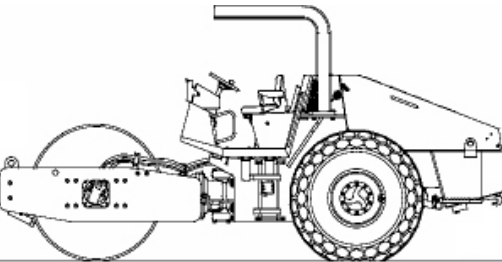
<p><b>Lifting Compactor with Hoist</b></p> <p><b>⚠ DANGER</b></p> <p>To reduce the possibility of personal injury and equipment damage:</p> <ul style="list-style-type: none"> <li>• Only qualified personnel can raise and lower the compactor with a hoist.</li> <li>• Use the appropriate lifting cables.</li> <li>• Lock the articulation of the compactor by placing the locking bar in the lock position.</li> <li>• Make sure the awning is clear from the lifting cables.</li> </ul> <p>Secure the cables on the hook and lifting points illustrated.</p> <p>If the lifting cables contact other parts of the machine, isolate with cloth or wooden blocks.</p> <p>When lifting, keep the machine properly balanced.</p>		
<p><b>Maintenance Procedures Every 10 Hours or Daily</b></p> <p>Make sure the engine is shut down.</p> <p>Check the engine oil level.</p> <p>If the oil level is not in between the MIN and MAX marks, add oil.</p>		
<p><b>⚠ DANGER</b></p> <p><b>Do not remove the pressure cap from a hot engine. Wait until the coolant temperature is below 50°C [120°F] before removing the pressure cap. Heated coolant spray or steam can cause personal injury.</b></p> <p>Check the radiator sub tank (2) level.</p> <p>If the coolant level is not up to the mark, remove the radiator cap (1) and fill the radiator and subtank with coolant.</p> <p>Change coolant every 2 years.</p>		


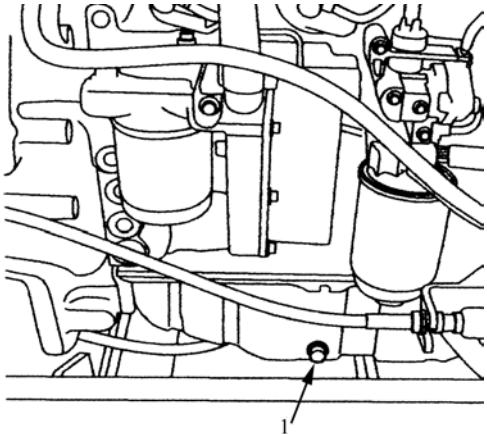
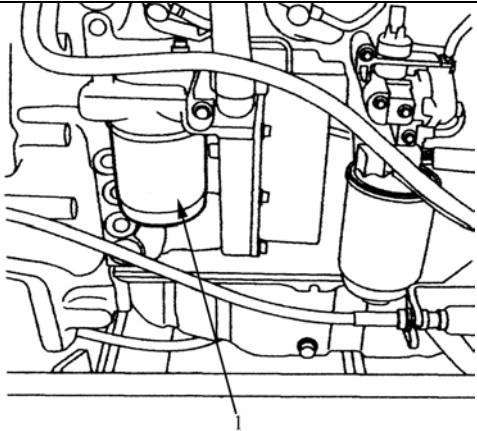
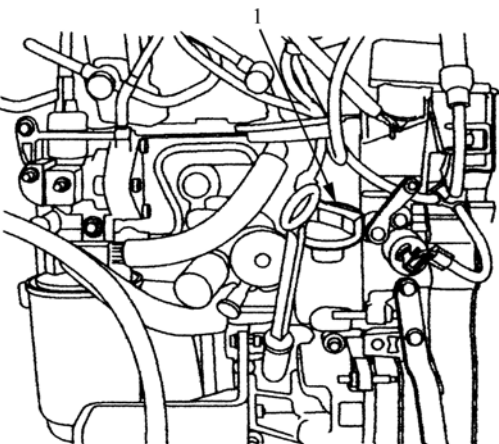
<p>Check the fan belt for wear and damage.</p> <p>Replace the fan belt if damaged.</p> <p>Check the fan belt tension. If the fan belt is loose, adjust.</p>		
<p><b>Maintenance Procedures Every 50 Hours</b></p> <p>The hydraulic tank oil level sight gauge (2) is located on the side of the hydraulic tank.</p> <p>Check the hydraulic tank oil level sight gauge.</p> <p>If the oil level is not between the H and L mark, remove the fill cap (1) and add hydraulic oil.</p>		
<p><b>⚠ WARNING</b></p> <p>Acid is extremely dangerous and can damage the machinery and can also cause serious burns. Always provide a tank of strong soda water as a neutralizing agent when servicing the batteries. Wear goggles and protective clothing to reduce the possibility of serious personal injury.</p> <p><b>⚠ WARNING</b></p> <p>Using or charging a battery with low electrolyte level can result in explosion. Continued use of a battery with low electrolyte level accelerates deterioration of battery plates.</p> <p>Check the battery hygrometer color:</p> <ul style="list-style-type: none"> <li>• Green – Satisfactory charge</li> <li>• Black – Charge is necessary</li> <li>• Semitransparent – Replace battery.</li> </ul> <p>Tighten loose terminals and apply a light coating of grease.</p>		

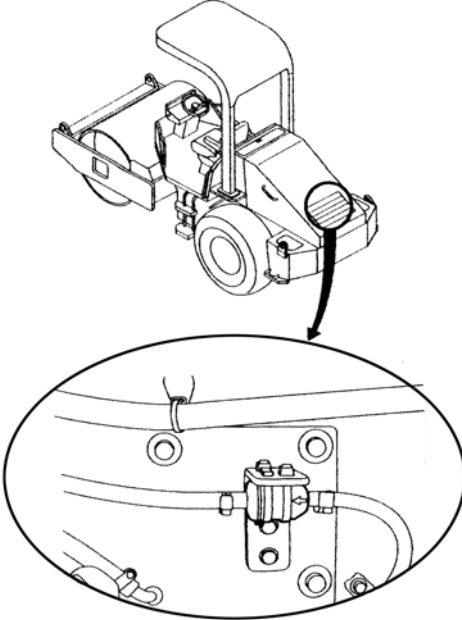
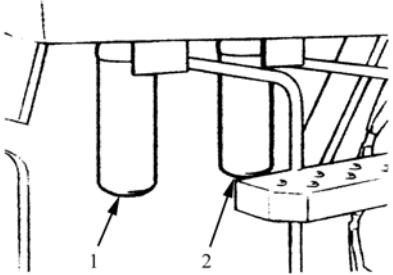
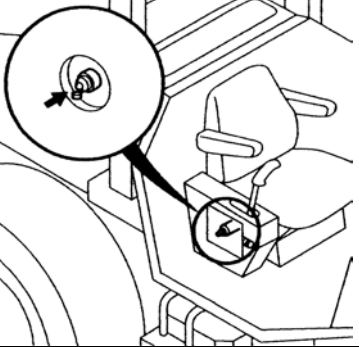
<p>Check the fuel filter sedimeter for accumulation of water.</p> <p>If there is water in the fuel filter sedimeter, drain the water out using the drain plug.</p>		
<p>Check the air cleaner restriction indicator.</p> <p>If the red float reaches the SERVICE mark, replace the air cleaner.</p>		
<p><b>Maintenance Procedures Every 250 Hours</b></p> <p>Check the rubber vibration isolators on the roller for cracks. If the cracks travel completely through the isolator, it must be replaced.</p> <p>Make sure the rubber vibration isolator mounting bolts are tight. Tighten any loose bolts.</p>		

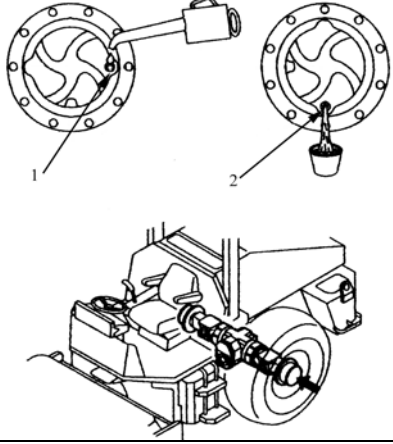
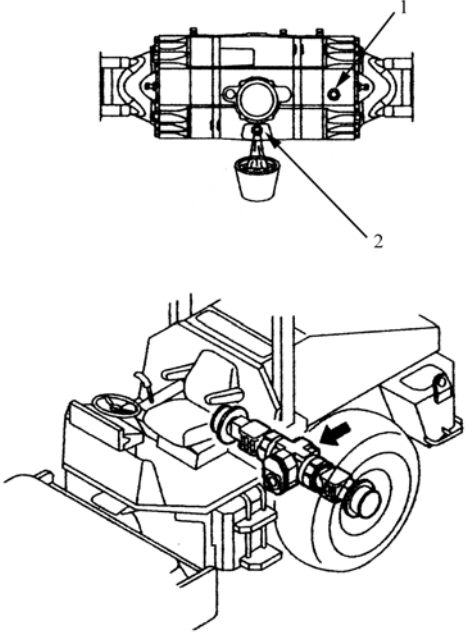
<p>Check the vibratory motor oil level.</p> <p>If the vibratory motor oil level is below the level plug, remove the fill plug and add oil.</p>		
<p>Apply grease to the brake linkages.</p>		
<p>Position the roller with the drain plug at the bottom.</p> <p>Remove the level plug and check level.</p> <p>Add oil in level plug port if needed.</p> <p>Replace level plug.</p>		
<p>Apply grease at the 4 locations on the center pin.</p>		



<p>There are 2 steering cylinders. One cylinder is located on each side of the compactor.</p> <p>Each cylinder has 2 grease locations.</p> <p>Apply grease to the steering cylinders.</p>		
<p>Check the transmission oil level (2).</p> <p>Add oil as necessary through the fill port (1).</p>		
<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>To reduce the possibility of equipment damage:</b></p> <ul style="list-style-type: none"> <li>• <b>When inspecting turn the tire in the clockwise direction.</b></li> <li>• <b>Excessive tightening of the lug nuts can cause the studs to crack.</b></li> </ul> <p>Check for loose lug nuts.</p> <p>Tighten loose lug nuts.</p> <p>Torque: 631 N•m [465 ft-lb] Tighten the lug nuts after the first 50 hours of operation.</p>		

<p><b>Maintenance Procedures Every 500 Hours</b></p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury, avoid direct contact of hot oil with your skin.</p> <p><b>⚠ WARNING</b></p> <p>Some state and federal agencies have determined that used engine oil can be carcinogenic and cause reproductive toxicity. Avoid inhalation of vapors, ingestion, and prolonged contact with used engine oil. If not reused, dispose of in accordance with local environmental regulations.</p> <p>Remove oil pan plug (1) and drain the oil.</p>		
<p>Remove oil filter (1) and replace with new one.</p>		
<p>Install oil drain plug.</p> <p>Remove oil fill cap (1) and add oil.</p> <p>Refer to the Deutz Operation Manual 2011 for complete information on changing engine oil.</p>		

<p>Change the fuel pre-filter.</p> <p>Record location of arrow on installed fuel pre-filter.</p> <p>Remove filter.</p> <p>Install new filter with the arrow on the filter pointed in the correct direction.</p>		
<p>Change the hydraulic return filter (1).</p> <p>Change the hydraulic line filter (2).</p>		
<p>Check for loose directional control linkage nuts.</p> <p>If the nuts are loose, adjust the linkage and tighten the nuts.</p> <p>Apply grease to the forward/reverse lever shaft.</p>		

<p>Rotate the wheels until the final drive drain plug is at the lowest position.</p> <p>Remove the drain plug (2) and drain the oil.</p> <p>Rotate the wheels until the final drain plug is parallel with the ground.</p> <p>Fill the oil through the drain port (1) until the oil flows out of the final drive.</p> <p>Install the drain plug.</p>		
<p>Remove the differential case drain plug, fill plug and level plug. Drain the oil.</p> <p>Install the drain plug (2).</p> <p>Fill the oil through the fill port (1) until the oil flows out of the level port.</p> <p>Install the fill and level plugs.</p>		

**Maintenance Procedures Every 1,000 Hours**

**⚠ WARNING**

**To reduce the possibility of personal injury, avoid direct contact of hot oil with your skin.**

Remove the hydraulic tank drain plug.

Drain the hydraulic oil.

Remove the hydraulic suction hose.

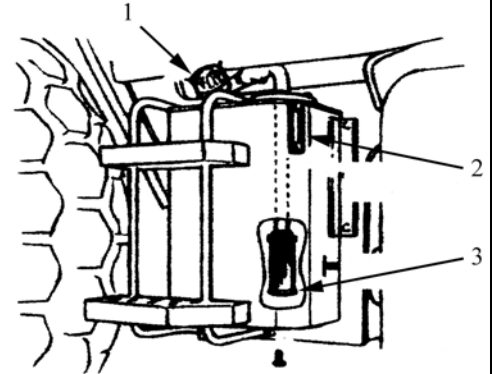
Remove the suction screen (3) from the top of the hydraulic tank.

Clean the inside of the hydraulic tank.

Fill the hydraulic tank with hydraulic oil.

Start and run the engine at idle for 2 to 5 minutes.

When the hydraulic tank is free from air bubbles stop the engine and recheck the hydraulic tank oil level (2).



**⚠ WARNING**

**To reduce the possibility of personal injury, avoid direct contact of hot oil with your skin.**

**⚠ CAUTION**

**To reduce the possibility of equipment damage, do not over fill the vibrator.**

Rotate the roller until the drain plug is located at the bottom of the roller.

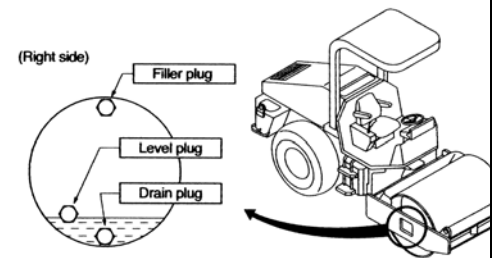
Remove the drain plug, level gauge plug and filler plug.

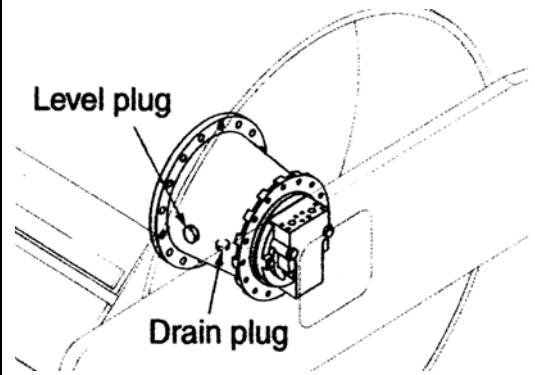
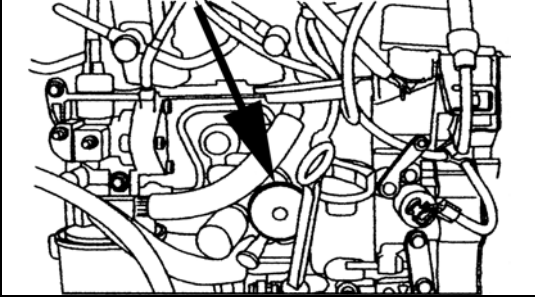
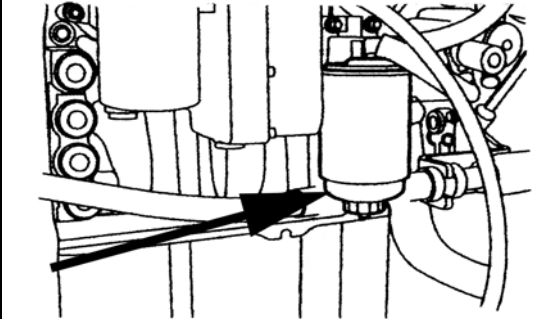
Drain the vibrator oil.


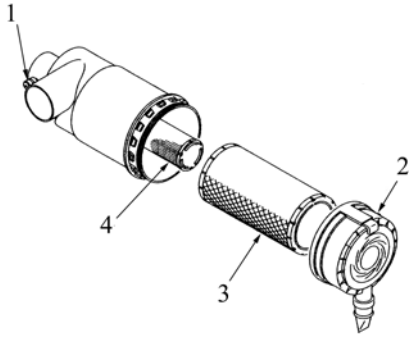

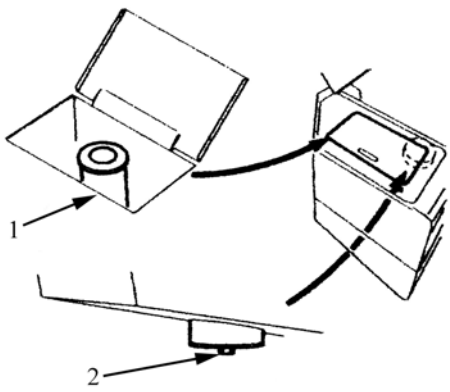
Clean the vibrator.

Install the drain plug and fill oil through the filler port until oil flows out of the level port.

Install fill plug and level plug.



<p>Position the roller so the drain plug of the drive motor is located at the bottom of the roller.</p> <p>Remove the drain plug from the hydraulic motor and drain the oil.</p> <p>Position the roller so the drain plug of the drive motor is located at the top of the roller.</p> <p>Remove the level plug.</p> <p>Fill the motor through the drain plug until oil flows out of the level plug.</p> <p>Install the drain plug and level plug.</p>		 <p>The diagram shows a hydraulic motor assembly. A label 'Level plug' points to a small plug on the side of the motor housing. Another label 'Drain plug' points to a larger plug on the bottom of the motor housing. The motor is shown in a perspective view, partially enclosed by a roller.</p>
<p>Clean the fuel strainer.</p> <p>Refer to the Deutz Operation Manual 2011 for instructions.</p>		 <p>The diagram shows a detailed view of an engine compartment. An arrow points to a specific component, the fuel strainer, which is located near the fuel lines and other engine parts.</p>
<p>Change the fuel filter cartridge.</p> <p>Refer to the Deutz Operation Manual 2011 for instructions.</p>		 <p>The diagram shows a detailed view of an engine compartment, focusing on the fuel filter area. An arrow points to the fuel filter cartridge, which is a cylindrical component mounted on the engine.</p>

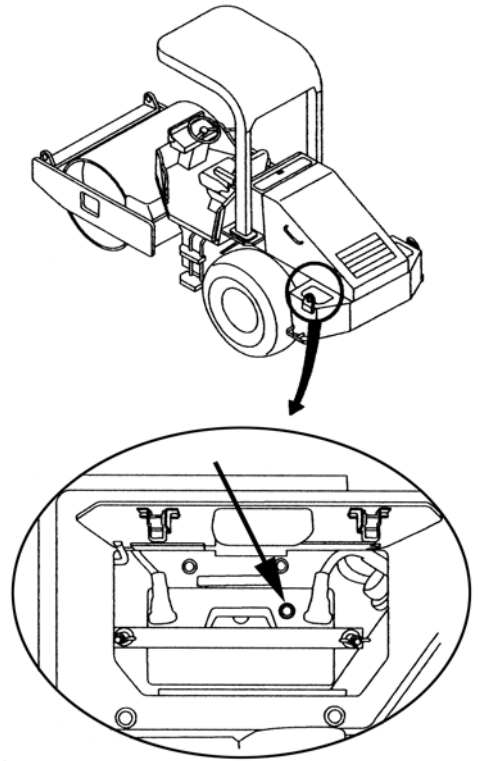
<p><b>As Required</b></p> <p><b>⚠ WARNING</b></p> <p>To reduce the possibility of personal injury, wear safety glasses when removing and cleaning the air filter element.</p> <p><b>⚠ WARNING</b></p> <p>Wear appropriate eye and face protection when using compressed air. Flying debris and dirt can cause personal injury.</p> <p>When the red float of the air filter restriction indicator (1) reaches the service line the filter must be replaced.</p> <p>Remove the clip (2) for the air filter cover and turn the cover 12 degrees to remove.</p> <p>Remove the air filter (3).</p> <p>Place the element into the air filter housing (4) and install the cover.</p> <p>Rotate the cover 12 degrees and install the clip.</p> <p>Push the air filter restriction indicator to reset it.</p>		
<p><b>⚠ WARNING</b></p> <p>Depending on the circumstance, diesel fuel is flammable. When inspecting or performing service or repairs on the fuel system, to reduce the possibility of fire and resulting severe personal injury, death or property damage, never smoke or allow sparks or flames (such as pilot lights, electrical switches, or welding equipment) in the work area.</p> <p>Remove the drain plug from the fuel tank and remove all water and sediment.</p> <p>Clean and dry the fuel tank.</p> <p>Install the drain plug (2).</p> <p>Install the cap onto the fill port (1).</p>		

Not using a battery or leaving it in storage for a long period of time can cause battery plate damage.

For long-term storage, tighten the battery cell caps, store in a cool, dry location and check the level of charge monthly.

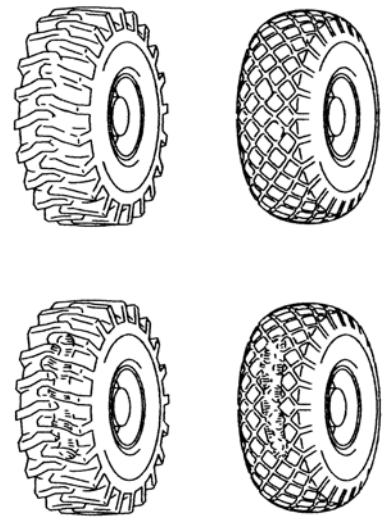
Maintain a charge above 75%.

In cold weather, start the engine with a battery charge at 100%. Do not attempt to start the engine with a battery charge below 75%.



Check for unusual wear on the tires.

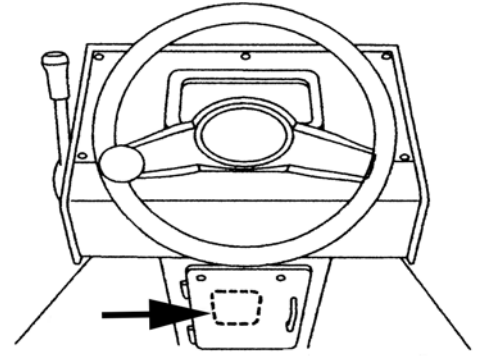
Check tire inflation 137 kPa (20 psi).





The fuse box houses the compactor fuses.

Make sure no circuit is over fused.

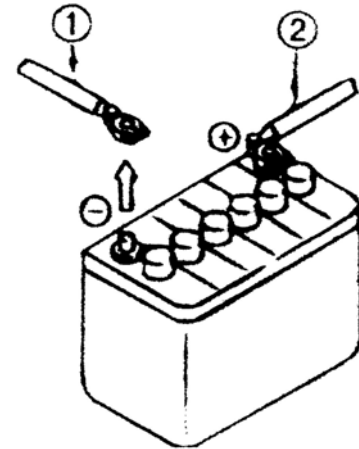


### Booster Cable Connection

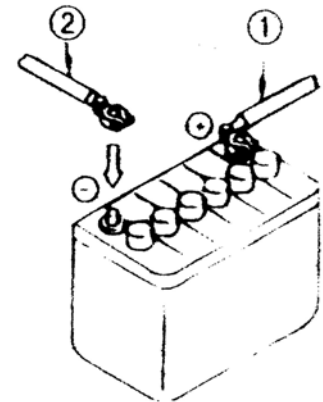
#### **WARNING**

To reduce the possibility of personal injury and equipment damage using booster cables:

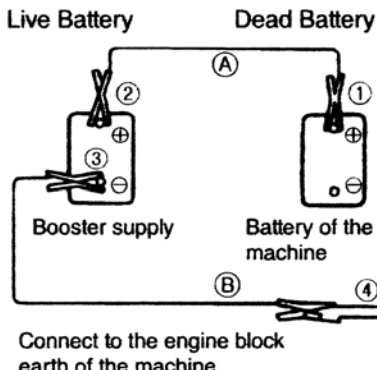
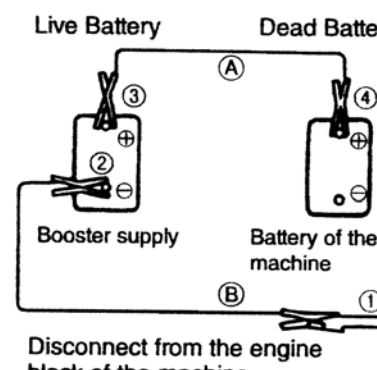
- Make sure the starter switch is in the OFF position.
- Batteries emit explosive gasses. Do not smoke when working with batteries. Keep flames and sparks away from the battery.
- Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To reduce the possibility of arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.
- Acid is extremely dangerous and can damage the machinery and can also cause serious burns. Always provide a tank of strong soda water as a neutralizing agent when servicing the batteries. Wear goggles and protective clothing to reduce the possibility of serious personal injury.
- Loose battery terminal can cause sparks. Make sure battery terminals are tight.
- Do not allow the booster cable positive (+) and negative (-) ends to connect.
- Wear safety goggles.
- Use booster cables and clamps of the appropriate size.
- Check the booster cables for damage. If the cables are damaged, they must not be used.



Disconnect



Connect

<p>Connect Booster Cables</p> <ul style="list-style-type: none"> <li>• Connect one end of the positive (+) end of the booster cable to the positive (+) battery terminal on the compactor.</li> <li>• Connect the other end of the positive (+) booster cable to the positive (+) terminal of the booster supply.</li> <li>• Connect the negative (-) end of the booster cable to the negative (-) terminal of the booster supply.</li> <li>• Connect the other end of the negative (-) booster cable to chassis ground.</li> </ul>		 <p>Connect to the engine block earth of the machine</p>
<p>Disconnect Booster Cables:</p> <ul style="list-style-type: none"> <li>• Disconnect the negative (-) booster cable from chassis ground.</li> <li>• Disconnect the negative (-) booster cable from the negative (-) booster supply terminal.</li> <li>• Disconnect the positive (+) booster cable from the positive (+) booster supply terminal.</li> <li>• Disconnect the positive (+) booster cable from the positive (+) battery terminal.</li> </ul>		 <p>Disconnect from the engine block of the machine</p>

## Long Term Storage

When winter is over, change the oil and fuel to comply with the weather. Refer to the Specifications section of this manual.

### **WARNING**

**DO NOT OPERATE A DIESEL ENGINE WHERE THERE ARE OR CAN BE COMBUSTIBLE VAPORS.** These vapors can be sucked through the air intake system and cause engine acceleration and over speeding that can result in a fire, an explosion, and extensive property damage. Numerous safety devices are available, such as air intake shutoff devices, to minimize the risk of over speeding where an engine, due to its application, is operating in a combustible environment, such as due to a fuel spill or gas leak. **THE EQUIPMENT OWNER AND OPERATOR ARE RESPONSIBLE FOR SAFE OPERATION IN A HOSTILE ENVIRONMENT. CONSULT A CUMMINS AUTHORIZED REPAIR LOCATION FOR FURTHER INFORMATION.**

### **WARNING**

**To reduce the possibility of personal injury, do not operate the compactor in an unventilated, enclosed area. Diesel exhaust gases can kill. Make sure the space is ventilated adequately.**

Long-term storage is defined as – Not operating the compactor for a period of 1 month or more.


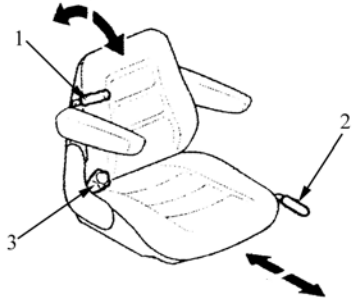
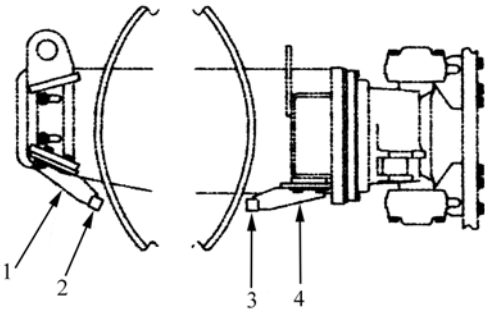
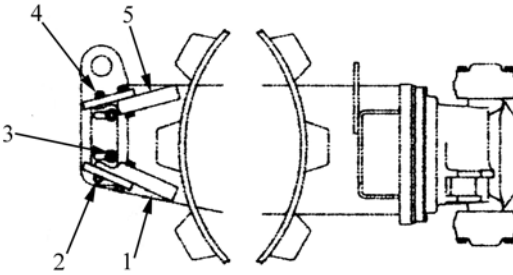
For long term storage:

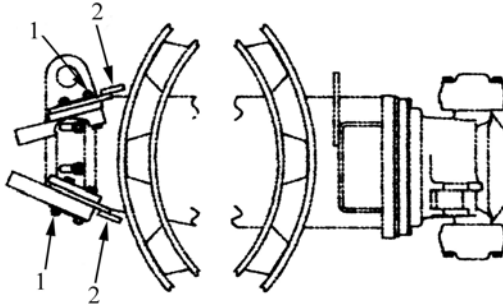
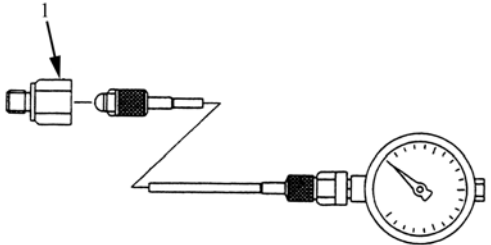
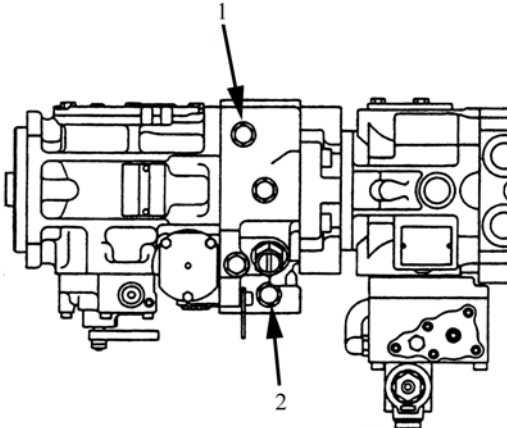
- Store the compactor in an enclosed area after cleaning.
- Service the compactor.
- Lubricate exposed steering cylinder piston rods.
- Disconnect and store the battery.
- Place the compactor in readiness condition with parking brake set, forward/reverse lever in neutral and vibration control to OFF.
- Place chocks under tires of compactor.
- Remove the key from the starter switch.
- Operate the compactor 1 time a month.
- Disengage the parking brake 1 time a month.

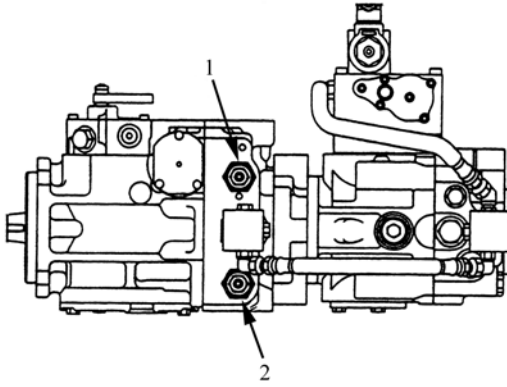
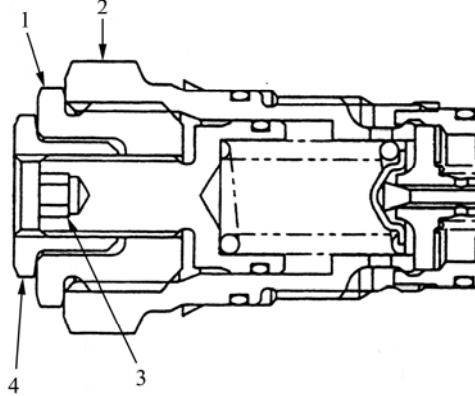
# Testing and Adjustment

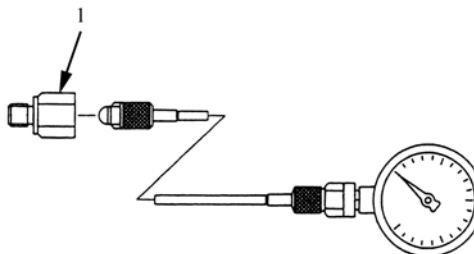
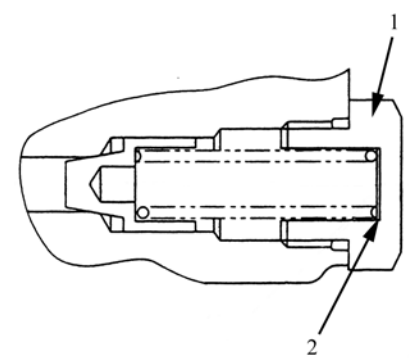
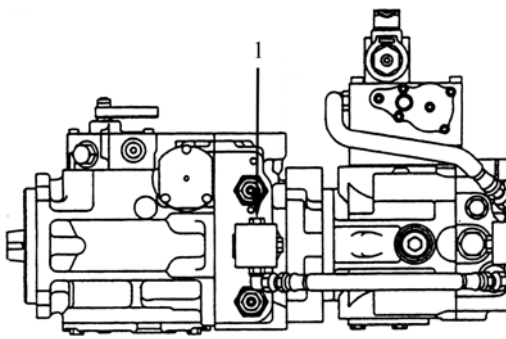
This section is divided into two procedures:

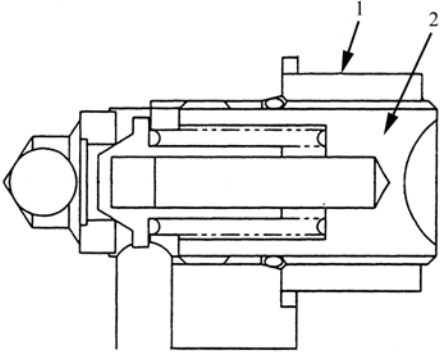
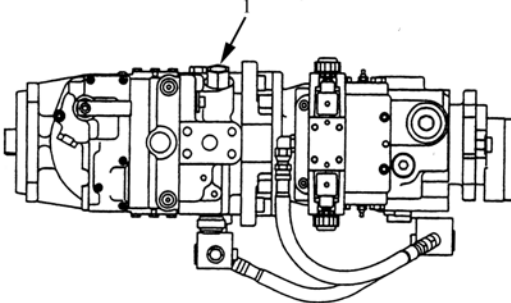
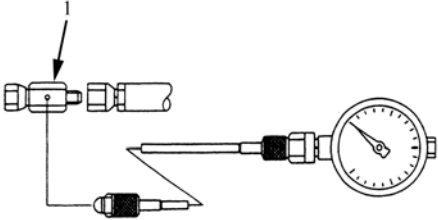
- Mechanical Adjustments – Adjustments to seat and scraper.
- Hydraulic Pump Testing and Adjustment – Testing and adjustment for the propulsion, steering and vibratory pumps.

<p><b>Seat Adjustment</b></p> <p style="text-align: center;"> <b>WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the operator must adjust the seat correctly prior to operating the compactor.</b></p> <p>To adjust the seat:</p> <ol style="list-style-type: none"> <li>1. Pull lever (2) and move the seat forward or back.</li> <li>2. Turn the seat back rest dial (3) to increase or decrease seat back position.</li> <li>3. Move the suspension lever (1) to adjust the seat for operator weight.</li> </ol>		
<p><b>Scraper Adjustment</b></p> <p>SV400D-2</p> <p>To adjust the scraper:</p> <ol style="list-style-type: none"> <li>1. Loosen scraper mounting bolt and nuts (1 and 4).</li> <li>2. Adjust scraper to 20 mm [0.79 in] distance from the drum (2 and 3).</li> <li>3. Tighten bolts and nuts (1 and 4).</li> </ol>		
<p>SV400T-2</p> <p>To adjust scraper:</p> <ol style="list-style-type: none"> <li>1. Loosen scraper mounting bolts and nuts (3).</li> <li>2. Adjust scraper to 20 mm [0.79 in] distance from the drum (1 and 5).</li> <li>3. Tighten bolts and nuts (3).</li> </ol> <p>To replace scraper:</p> <ol style="list-style-type: none"> <li>1. Remove nuts and bolts (2 and 4).</li> <li>2. Replace scraper (1 and 5).</li> </ol>		

<p>SV400TF-2 To adjust scraper:</p> <ol style="list-style-type: none"> <li>1. Loosen scraper mounting bolts and nuts (1).</li> <li>2. Adjust scraper to 20 mm [0.79 in] distance from the drum (2).</li> <li>3. Tighten bolts and nuts (1).</li> </ol>		
<p><b>Measure Hydraulic Pressure Main Propulsion Circuit</b></p> <p>Install a 9/16 18-UNF adapter (1) into the 0 to 60 MPa (0 to 9,000 psi) pressure gauge.</p>		
<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.</b></p> <p>Park the compactor on level ground, set the parking brake and chock tires. The temperature of the hydraulic oil must be <math>50^{\circ} \pm 5^{\circ}\text{C}</math> (<math>122^{\circ} \pm 41^{\circ}\text{F}</math>).</p> <p>Gauge port (1) is for forward travel. Gauge port (2) is for reverse travel.</p> <ol style="list-style-type: none"> <li>1. Remove gauge port plug (1).</li> <li>2. Install pressure adapter in gauge port (1).</li> <li>3. Apply the parking brake.</li> <li>4. Start the engine and move the throttle to the full position.</li> <li>5. Set the compactor speed switch to rabbit.</li> <li>6. Move the forward/reverse lever to the reverse position and record the measurement (2.1 MPa [300 psi]).</li> <li>7. Immediately move lever to neutral.</li> <li>8. Repeat above steps for the forward travel pressure.</li> </ol>		

<p><b>Adjust Hydraulic Pressure Main Propulsion Circuit</b></p> <p>Multi-function valve (1) is for forward travel. Multi-function valve (2) is for reverse travel.</p> <p>Each has an adjustment screw and it is secured by a lock nut.</p>		
<p>Rotating the adjusting screw:</p> <ul style="list-style-type: none"> <li>• Clockwise = increases pressure</li> <li>• Counter clockwise = decreases pressure.</li> </ul> <p>Loosen lock nut (4) on the forward travel multi-function valve adjustment screw (3).</p> <p>Increase or decrease pressure with ¼ turns of the adjustment screw.</p> <p>Rotate the adjustment screw.</p> <p>Complete the Measure Hydraulic Pressure Main Propulsion step and adjust pressure to 2.1 MPa [300 psi].</p> <p>Tighten lock nut (4).</p> <p>Repeat step for the reverse travel.</p> <p>Torque Values:</p> <ul style="list-style-type: none"> <li>• (1) - 41 N•m (30 ft-lb)</li> <li>• (2) - 79 N•m (59 ft-lb)</li> <li>• (4) - 9 N•m (79-in-lb).</li> </ul> <p>Replace damaged parts.</p>		

<p><b>Measure Propulsion Charge Pressure</b></p> <p>Install a 9/16 18-UNF adapter (1) into the 0 to 5 MPa (0 to 700 psi) pressure gauge.</p>		
<p style="text-align: center;"><b>⚠ CAUTION</b></p> <p><b>When removing and installing the spacer, make sure the shims are in place. If the correct shims are not in the charge relief valve, the hydraulic system can have problems.</b></p> <p>Install a 12 mm diameter x 10 mm thick (0.47 x 0.39 in) (2) spacer under the charge relief valve plug (1).</p>		
<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.</b></p> <p>Park the compactor on level ground, set parking brake and chock tires.</p> <p>The hydraulic oil is supplied to the propulsion charge circuit through the steering circuit. Make sure the steering circuit works properly.</p> <ol style="list-style-type: none"> <li>1. Remove the gauge port plug (1) from the hydraulic pump.</li> <li>2. Install the pressure gauge into the adapter.</li> <li>3. Start the engine and move the throttle lever to the full position.</li> <li>4. Move the forward/reverse lever slightly forward and back. The pressure will vary.</li> <li>5. Record the maximum pressure reading (0.29 MPa [41 psi]).</li> </ol>		

<p><b>Adjust Main Propulsion Charge Pressure</b></p> <p>Rotating the adjusting screw:</p> <ul style="list-style-type: none"> <li>• Clockwise = increase pressure</li> <li>• Counter Clockwise = decrease pressure.</li> </ul> <p>Increase or decrease pressure in ¼ turns of the screw.</p> <p>Loosen lock nut (1) and rotate the adjusting screw (2).</p> <p>Complete the Measure Main Propulsion Charge Pressure step. Pressure is 0.29 MPa (41 psi).</p> <p>Tighten the lock nut (1): 51 N•m (38 ft-lb).</p>		 <p>A cross-sectional diagram of a valve assembly. Label 1 points to a lock nut on the top of the assembly. Label 2 points to an adjusting screw that extends through the center of the valve.</p>
<p>If the pressure can not be adjusted to specifications, remove lock nut (1).</p> <p>Clean the charge relief valve and inspect for wear. Replace if worn.</p>		 <p>An exploded view diagram of a valve assembly. Label 1 points to a lock nut on the top of the assembly.</p>
<p><b>Measure Parking Brake Release Pressure</b></p> <p>Install gauge adapter (9/16 18-UNF) into the 0 to 5 MPa (0 to 700 psi) pressure gauge.</p>		 <p>A diagram showing a gauge adapter (a small cylindrical component with a hose) connected to a pressure gauge. Label 1 points to the gauge adapter.</p>



**⚠ WARNING**

To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.

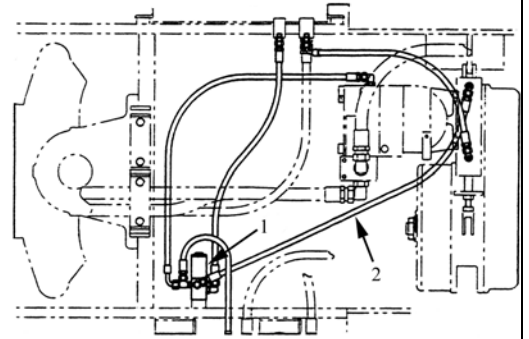
Park compactor on level ground, set the parking brake and chock the tires.

The temperature of the hydraulic oil must be  $50^{\circ} \pm 5^{\circ}\text{C}$  [ $122^{\circ} \pm 41^{\circ}\text{F}$ ].

1. Disconnect brake release hose (2) from brake valve (1).
2. Install gauge assembly into brake valve.
3. Start the engine and set the engine speed change switch to the Full position.
4. Make sure the forward/reverse lever is in the neutral position.
5. Press the parking brake set button and record the pressure.

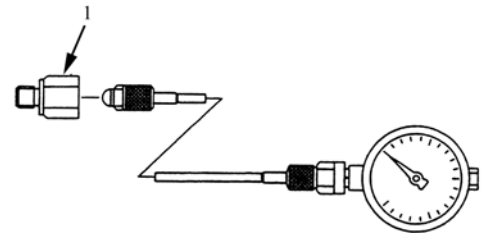
Pressure = 0 to 5 MPa (0 to 700 psi).

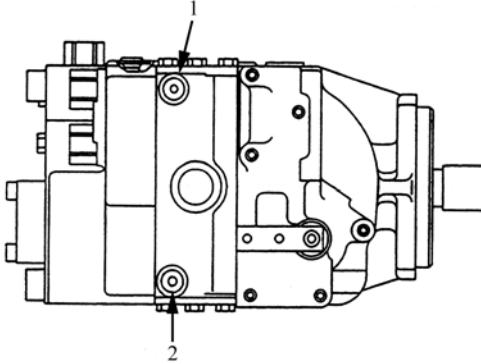
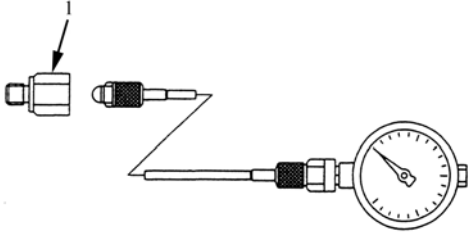
Make sure the charge pressure is up to specifications.

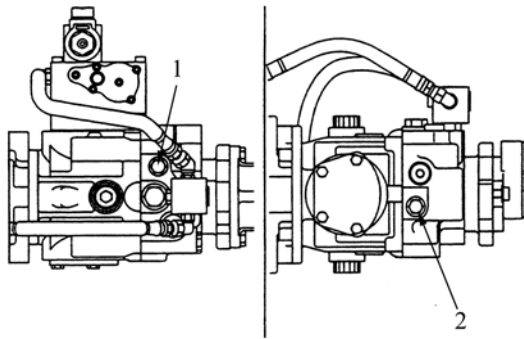
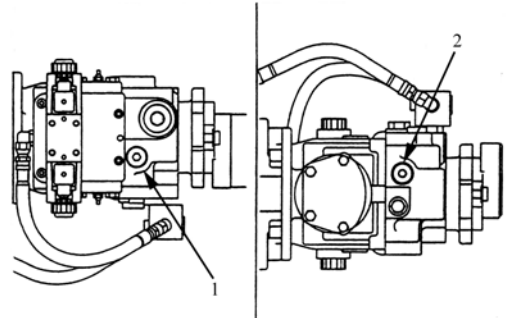


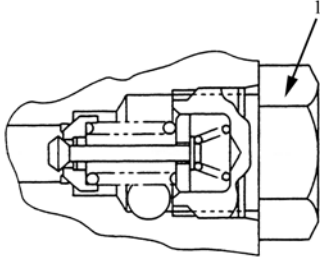
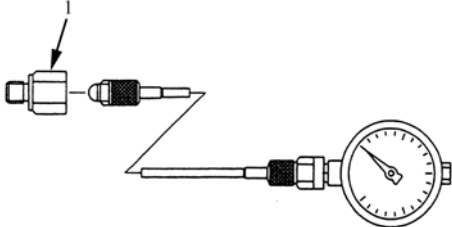
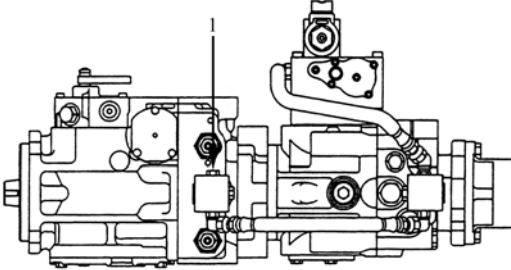
**Measure Propulsion Motor Speed Shift Valve Outlet Pressure**

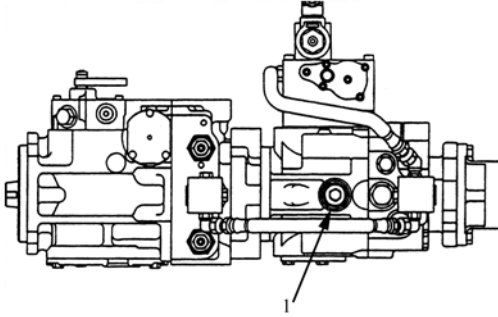
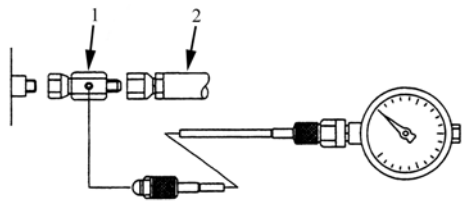
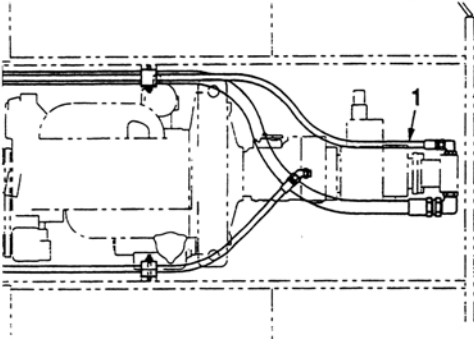
Install gauge adapter (9/16-18 UNF) into the 0 to 5 MPa (0 to 700 psi) pressure gauge.



<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.</b></p> <p>Park compactor on level ground, set the parking brake and chock the tires.</p> <p>The temperature of the hydraulic oil must be <math>50^{\circ} \pm 5^{\circ}\text{C}</math> (<math>122^{\circ} \pm 41^{\circ}\text{F}</math>).</p> <p>Port (1) is forward travel. Port (2) is reverse travel.</p> <ol style="list-style-type: none"> <li>1. Remove the plug for the desired travel pressure measurement.</li> <li>2. Remove plug and install gauge assembly.</li> <li>3. Set forward/reverse lever to neutral position.</li> <li>4. Start the engine.</li> <li>5. Move forward/reverse lever to position of desired travel slowly.</li> </ol>		 <p>A technical drawing of a hydraulic valve assembly. It shows a complex metal housing with various ports and a central lever. Two specific ports are highlighted with callouts: '1' points to a port on the top surface, and '2' points to a port on the bottom surface.</p>
<p><b>Measure Vibrator Circuit Pressure</b></p> <p>Install the 7/16-20UNF adapter (1) onto a 0 to 40 MPa (0 to 9,000) psi gauge.</p>		 <p>A diagram illustrating the connection of a pressure gauge to a hydraulic system. On the left, a small cylindrical adapter labeled '1' is shown. A line representing a hose or tube connects this adapter to a pressure gauge on the right. The gauge has a circular face with a needle and numerical markings.</p>

<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.</b></p> <p>Park the compactor on level ground, set the parking brake and chock tires.</p> <p>The temperature of the hydraulic oil must be <math>50^{\circ} \pm 5^{\circ}\text{C}</math> (<math>122^{\circ} \pm 41^{\circ}\text{F}</math>).</p> <p>Gauge port (1) is for high amplitude vibration. Gauge port (2) is for low amplitude vibration.</p> <p>High amplitude vibration:</p> <ul style="list-style-type: none"> <li>• Remove plug (1) from the high-pressure hose elbow.</li> <li>• Install gauge and adapter.</li> <li>• Disconnect and blank off high-pressure vibration pump hoses.</li> <li>• Plug the high-pressure pump port.</li> <li>• Start engine and set the throttle lever to the full position.</li> <li>• Turn the Vibrator Control switch to the forward/reverse lever position.</li> <li>• Push the vibration button on the forward/reverse lever.</li> <li>• Measure the pressure.</li> <li>• Immediately press the vibration control button on the forward/reverse lever to disengage the vibration pump.</li> </ul> <p>Repeat the steps for the low amplitude vibration port (2).</p>		
<p><b>Adjust Vibrator Circuit Pressure</b></p> <p>The high amplitude relief valve (1) and the low amplitude relief valve (2) are not adjustable.</p> <p>The valves must be replaced.</p>		

<p>Loosen the lock nut (1) on the defective relief valve.</p> <p>Remove the relief valve.</p> <p>Install a new relief valve and tighten the lock nut 176 N•m (130 ft-lb).</p>		
<p><b>Measure Vibrator Charge Pressure</b></p> <p>Install a 9/16 18-UNF adapter (1) into the 0 to 5 MPa (0 to 700 psi) pressure gauge.</p>		
<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.</b></p> <p>Park the compactor on level ground, set the parking brake and chock the tires. Make sure the forward/reverse lever is in the neutral position.</p> <p>The steering circuit supplies the vibrator circuit. Make sure the steering circuit functions correctly.</p> <p>The vibrator charge circuit connects, in parallel, to the propulsion circuit. The propulsion relief valve must be blocked by fully adjusting the screw.</p> <p>Adjust and record the amount of turns for propulsion relief valve adjusting screw.</p> <ol style="list-style-type: none"> <li>1. Remove the gauge port plug (1) from the hydraulic pump.</li> <li>2. Install the pressure gauge into the adapter.</li> <li>3. Start the engine and set the engine speed change switch to the Full position.</li> <li>4. Move the forward/reverse lever slightly forward and back. The pressure will vary.</li> <li>5. Record the maximum pressure reading (0 to 5 MPa [700 psi]).</li> </ol>		

<p><b>Adjust Vibrator Charge Pressure</b></p> <p>The vibrator charge relief valve is not adjustable.</p> <p>The relief valve must be replaced.</p> <ul style="list-style-type: none"> <li>Loosen the lock nut (1) on the defective relief valve.</li> <li>Remove the relief valve.</li> <li>Install a new relief valve and tighten the lock nut 74 N•m (54 ft-lb).</li> </ul>		
<p><b>Measure Steering Circuit Pressure</b></p> <p>Disconnect feed hose (2) from the pump.</p> <p>Install an adapter (1) into the 0 to 25 MPa (0 to 3,500 psi) pressure gauge.</p> <p>Install the feed pump hose onto the adapter and adapter on to the feed pump.</p>		
<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>To reduce the possibility of personal injury and equipment damage, the compactor must be on level ground with the parking brakes set and chocks under tires.</b></p> <p>The steering circuit routes return oil to the propulsion charge circuit. Make sure the propulsion charge circuit is operating correctly.</p> <p>Park the compactor on level ground, set the parking brake and chock the tires.</p> <p>Make sure the forward/reverse lever is in the neutral position.</p> <p>The temperature of the hydraulic oil must be 50° ± 5°C (122° ± 41°F).</p> <ol style="list-style-type: none"> <li>Start the engine and move the throttle lever to the full position.</li> <li>Rotate the steering wheel to the full lock position and measure the pressure.</li> </ol> <p>Do not allow the relief valve to stay open for more than three seconds.</p> <p>There is no adjustment for the steering circuit relief valve.</p> <p>If the relief valve is faulty, it must be replaced.</p>		

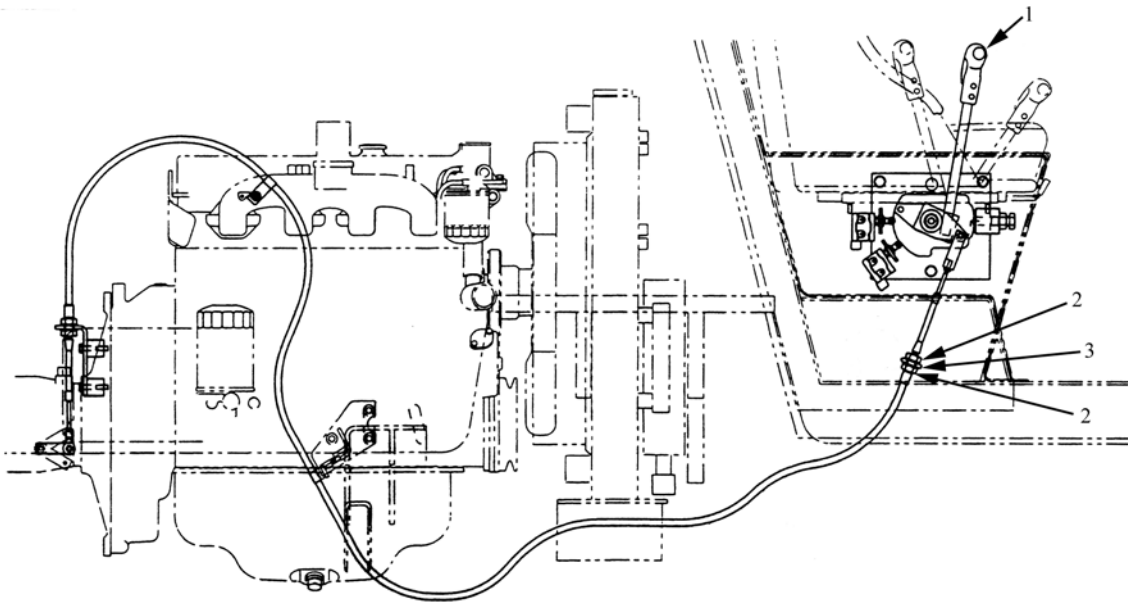
## Adjust Forward/Reverse Lever Cable



**Improper adjustment of the forward/reverse cable can cause the compactor to move when the forward/reverse lever is in the neutral position. Make sure all personnel are clear of the area when testing adjustment.**

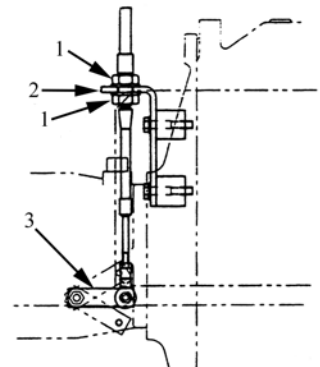
When the pump fails to stay in neutral position or the forward/reverse cable has been replaced, the cable will need to be adjusted.

1. Place the forward/reverse lever (1) in the neutral position.
2. Connect cable (2) clevis and pin to forward/reverse lever.
3. Connect cable (2) to bracket (3). Tighten the nuts.



4. Connect the cable clevis to the pump lever (3).
5. Place the cable into the bracket (2) and tighten nuts (1).
6. Move the forward/reverse lever through the full extent of travel (complete forward/complete back), making sure the propulsion lever follows the forward/reverse lever movement.
7. Adjust the neutral position by rotating the nuts (1) while moving the forward/reverse lever slowly through the full range of travel. When adjusted correctly the forward/reverse lever movement should engage the desired motion equal points.

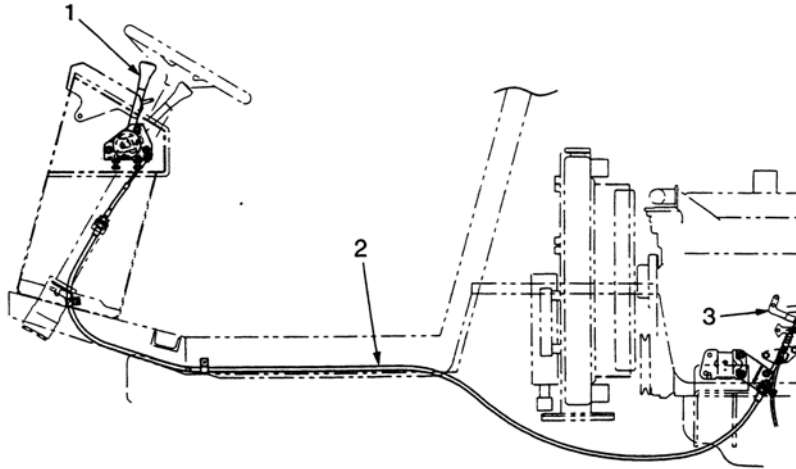
Make sure the compactor does not move when the forward/reverse lever is in the neutral position.



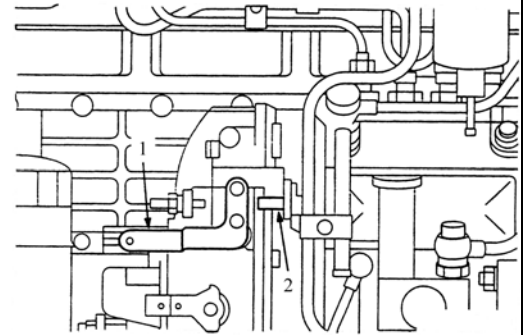
### Throttle Linkage Adjustment

Use this procedure when idle or full speed is not correct or after the throttle cable has been replaced.

1. Route the throttle cable from the throttle lever to the fuel pump governor lever.
2. Connect the throttle cable clevis to the throttle lever.
3. Connect the throttle cable clevis to the fuel pump governor lever.

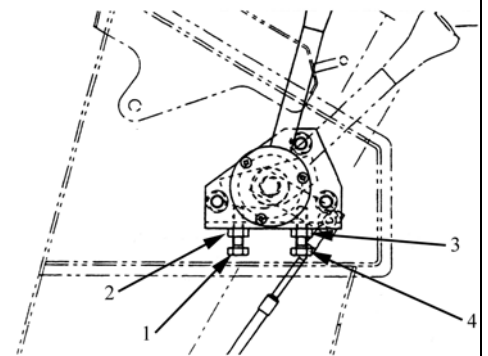


4. Set the throttle to the low idle position.
5. Make sure the throttle cable (1) is not forcing the fuel pump governor linkage into the stopper (2).



6. Loosen lock nut (2).
7. Start the engine and adjust stop bolt (1) until engine speed is  $800 \pm 20$  rpm.
8. Stop engine.
9. Tighten lock nut (2).
10. Move throttle lever to full position.
11. Loosen lock nut (3).
12. Start engine and adjust stop bolt (4) until the engine speed is  $2280 \pm 50$  rpm.
13. Stop engine and tighten lock nut (4).

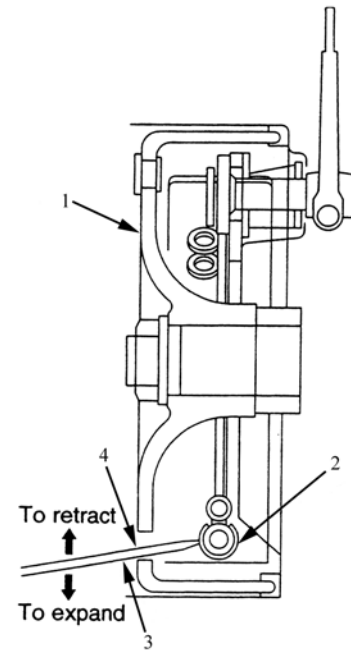
If the engine will not reach full speed and the governor lever is against the stop, the fuel pump must be replaced or injectors set.



### Parking Brake Adjustment

Use this procedure when the parking brake is not holding properly or the brake has been disassembled.

1. Rotate the brake drum (1) so the star wheel (2) can be accessed through the access hole.
2. Slide a flat head screw driver through the access hole (4) and turn the star wheel down until the brake shoes touch the drum (3).
3. Turn the star wheel upward 8 to 12 notches to retract the brake shoe.

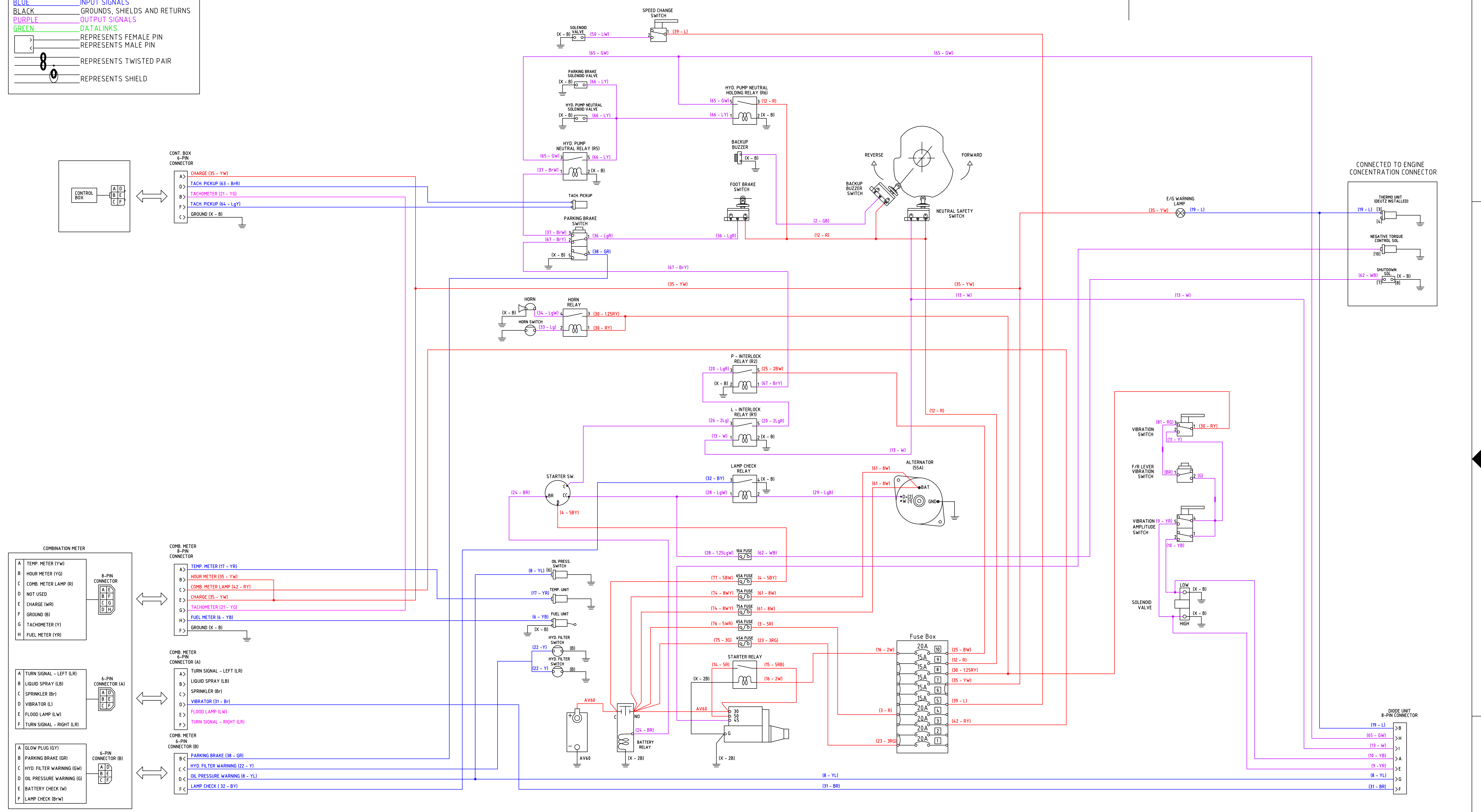




REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

**RED** DC VOLTAGE  
**BLUE** INPUT SIGNALS  
**BLACK** GROUNDS, SHIELDS AND RETURNS  
**PURPLE** OUTPUT SIGNALS  
**GREEN** DATALINKS

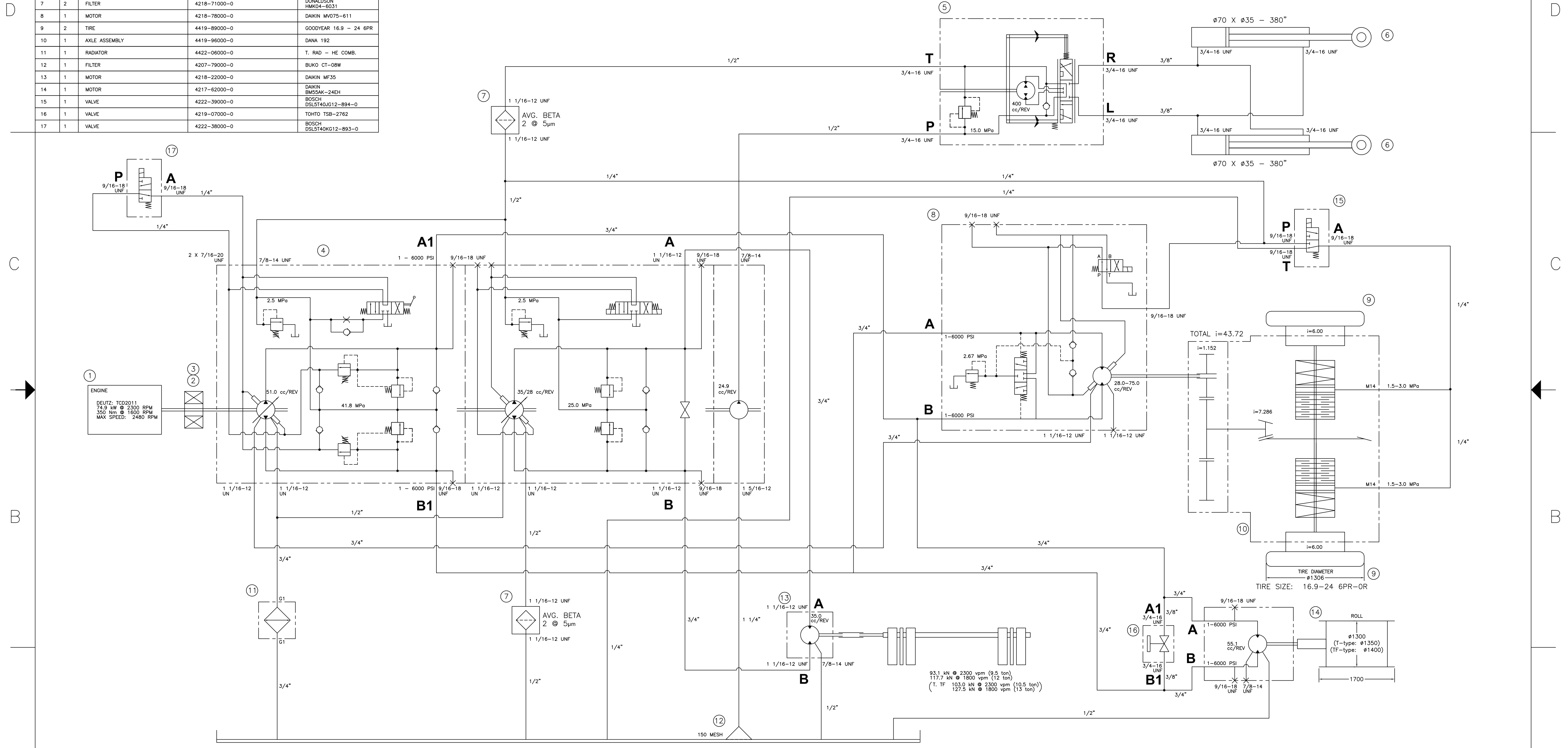
REPRESENTS FEMALE PIN  
 REPRESENTS MALE PIN  
 REPRESENTS TWISTED PAIR  
 REPRESENTS SHIELD



SAKAI SV400			
ELECTRICAL SYSTEM			
DRAWING			
SIZE	FSCM NO.	DWG NO.	REV
D			A
SCALE	NONE	SHEET	1
8-1			

PARTS LIST				
KEY	QTY	PART NAME	PART NUMBER	NOTES
1	1	ENGINE	4032-63000-0	DEUTZ TCD2011
2	1	HUB	4421-97000-0	KTR JAPAN BoWex 65
3	1	FLANGE	4421-96000-0	KTR JAPAN BoWex 65 - 10"
4	1	PUMP	4222-40000-0	DAIKIN PV05541
5	1	ORBITROL	4216-46000-0	DAIKIN OSPC 400 ON
6	2	CYLINDER	4218-82000-0	P/S HYD. CYLINDER 070X035X380S7
7	2	FILTER	4218-71000-0	DONALDSON HMK04-6031
8	1	MOTOR	4218-78000-0	DAIKIN MVO75-611
9	2	TIRE	4419-89000-0	GOODYEAR 16.9 - 24 6PR
10	1	AXLE ASSEMBLY	4419-96000-0	DANA 192
11	1	RADIATOR	4422-06000-0	T. RAD - HE COMB.
12	1	FILTER	4207-79000-0	BUKO CT-08W
13	1	MOTOR	4218-22000-0	DAIKIN MF35
14	1	MOTOR	4217-62000-0	DAIKIN BM55AK-24EH
15	1	VALVE	4222-39000-0	BOSCH DSL5T4JG12-894-0
16	1	VALVE	4219-07000-0	TOHTO TSB-2762
17	1	VALVE	4222-38000-0	BOSCH DSL5T4KG12-893-0

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



SAKAI SV400			
HYDRAULIC SYSTEM DRAWING			
SIZE	FSCM NO.	DWG NO.	REV
D			A
SCALE NONE		SHEET 1	

8-2

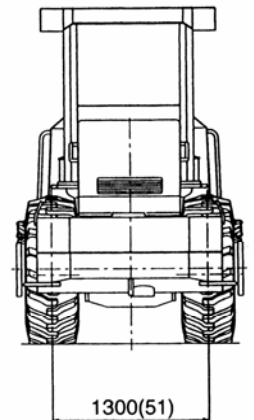
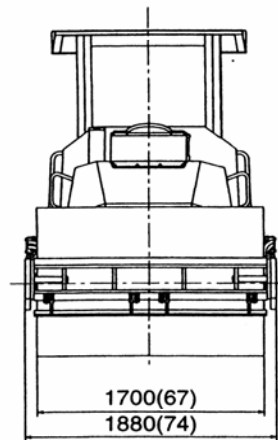
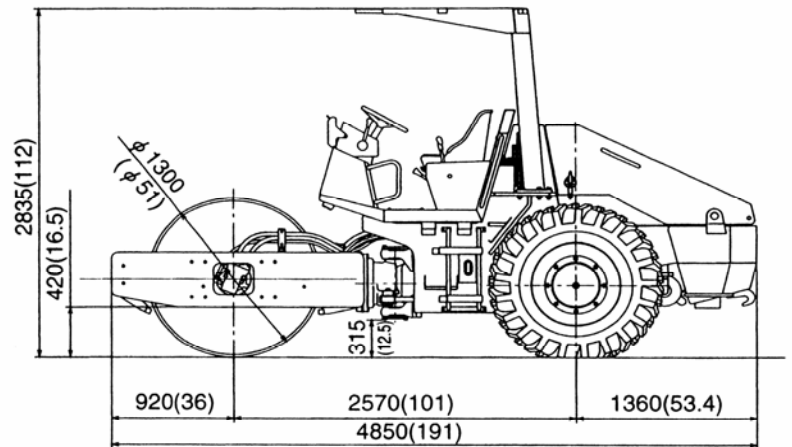
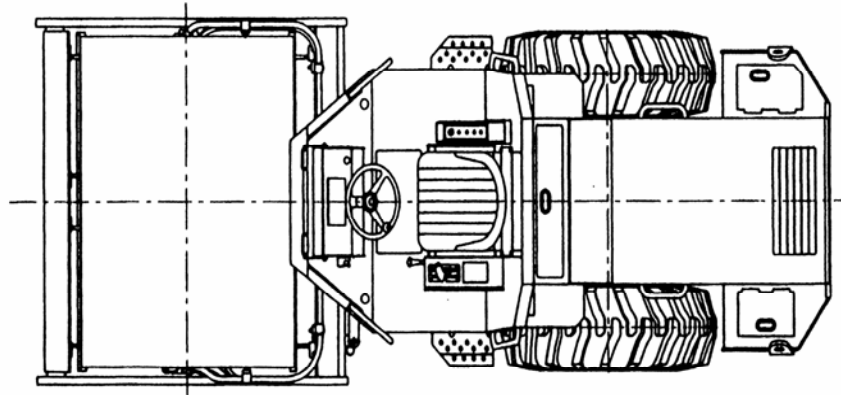
## Additional Service Literature

It is suggested the below listed service literature be purchased in order to maintain and repair the SV400-2 compactor.

<b>Title of Publication</b>
SV400-2 Parts Manual
Deutz 2011 Service Manual
Deutz Spare Parts Catalog
Deutz Operation Manual 2011
DANA Maintenance and Repair Instruction Manual (Drive Axel Type 193)

# General Specifications

<b>SV400-2 (D)</b>			
<b>Weight</b>			
Gross Weight	7,200 kg	15,880 lbs	
Rear Axle	3,500 kg	7,720 lbs	
Front Axle	3,700 kg	8,160 lbs	
<b>Dimension</b>			
Overall Length	4,850 mm	191 in	
Overall Width	1,880 mm	74 in	
Overall Height	2,835 mm	112 in	
Wheelbase	2,570 mm	101 in	
Rolling Width	1,700 mm	67 in	
Roller (Width x Diameter)	1,700 x 1,300 mm	67 x 51 in	
Wheel Rear Tire	16.9-24-10PR (OR)		
Ground Clearance	315 mm	12.5 in	
Curb Clearance	420 mm	16.5 in	
<b>Performance</b>			
Travel Speed	Turtle	0 ~ 6 km/h	0 ~ 3.7 mile/h
	Rabbit	0 ~ 10 km/h	0 ~ 6.2 mile/h
<b>Vibrating Power</b>			
Gradability	62% (32°)		
Minimum Turning Radius	4.6 m	182 inch	
Frequency	<b>Low</b>	<b>High</b>	
	40 Hz {2,400 vpm}	30 Hz {1,800 vpm}	
Centrifugal Force	<b>Low</b>	<b>High</b>	
	93 kN (20,940 lbs)	118 kN (26,460 lbs)	
<b>Engine</b>			
Model	Deutz TCD2011L04W Turbocharged		
Total Displacement	3.619 liters	221 cubic in	
Rated Output	74.9 kW	102 psi/2,300 ± 1 rpm	
Maximum Torque	106.5 hp/2,300 ± 1 rpm		
	350 N·m/1,600 ± 1 rpm		
	258 ft-lb/1,600 ± 1 rpm		



**SV400-2 (T)**

**Weight**

Gross Weight	7,450 kg	16,430 lbs
Rear Axle	3,750 kg	8,720 lbs
Front Axle	3,700 kg	8,160 lbs

**Dimension**

Overall Length	4,850 mm	191 in
Overall Width	1,880 mm	74 in
Overall Height	2,835 mm	112 in
Wheelbase	2,570 mm	101 in
Rolling Width	1,700 mm	67 in
Roller (Width x Diameter)	1,700 x 1,350 mm	67 x 53 in
Pad Height	175 mm	3 in
Number of Pads	140	
Wheel Rear Tire	16.9-24-10PR (OR)	
Ground Clearance	315 mm	12.5 in
Curb Clearance	420 mm	16.5 in

**Performance**

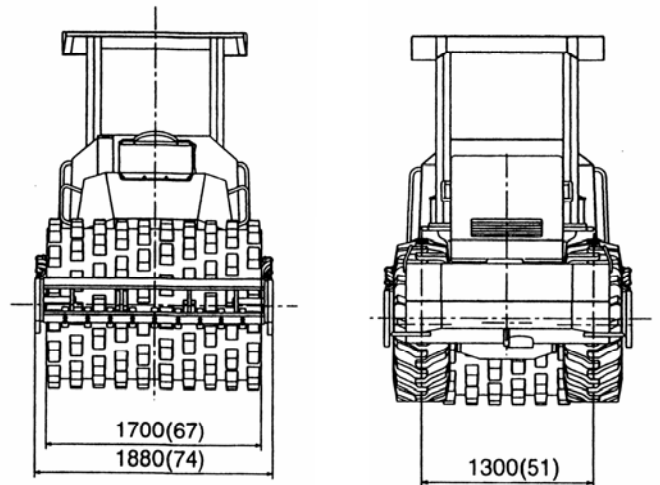
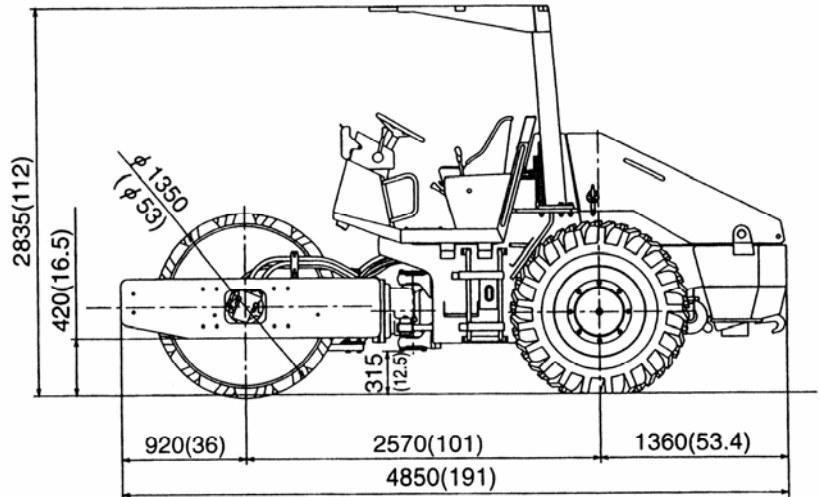
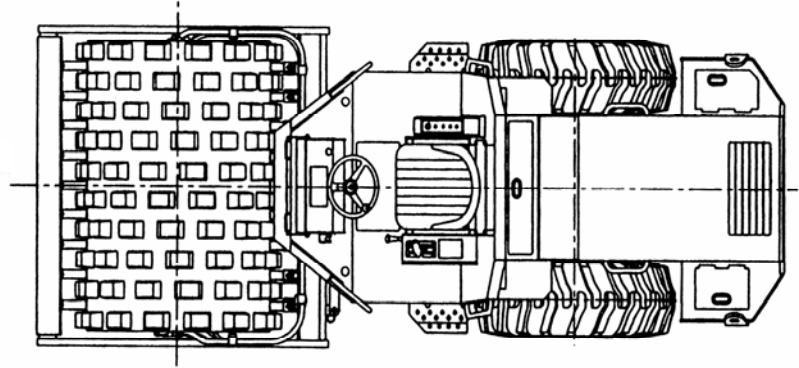
Travel Speed	Turtle	0 ~ 6 km/h	0 ~ 3.7 mile/h
	Rabbit	0 ~ 10 km/h	0 ~ 6.2 mile/h

**Vibrating Power**

Gradability	62% (32°)	
Minimum Turning Radius	4.6 m	182 inch
Frequency	<b>Low</b>	<b>High</b>
	40 Hz {2,400 vpm}	30 Hz {1,800 vpm}
Centrifugal Force	<b>Low</b>	<b>High</b>
	103 kN (23,150 lbs)	127 kN (28,660 lbs)

**Engine**

Model	Deutz TCD2011L04W Turbocharged	
Total Displacement	3.619 liters	221 cubic in
Rated Output	74.9 kW	102 psi/2,300 ± 1 rpm
Maximum Torque	106.5 hp/2,300 ± 1 rpm	
	350 N·m/1,600 ± 1 rpm	
	258 ft-lb/1,600 ± 1 rpm	



**SV400-2 (TB)**

**Weight**

Gross Weight	7,800 kg	17,200 lbs
Rear Axle	4,200 kg	9,260 lbs
Front Axle	3,600 kg	7,940 lbs

**Dimension**

Overall Length	5,200 mm	205 in
Overall Width	2,250 mm	89 in
Overall Height	2,835 mm	112 in
Wheelbase	2,570 mm	101 in
Rolling Width	1,700 mm	67 in
Roller (Width x Diameter)	1,700 x 1,350 mm	67 x 53 in
Pad Height	175 mm	3 in
Number of Pads	140	
Wheel Rear Tire	16.9-24-10PR (OR)	
Ground Clearance	315 mm	12.5 in
Curb Clearance	420 mm	16.5 in

**Performance**

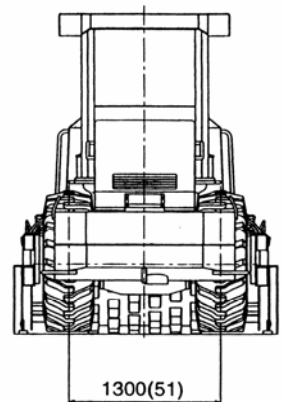
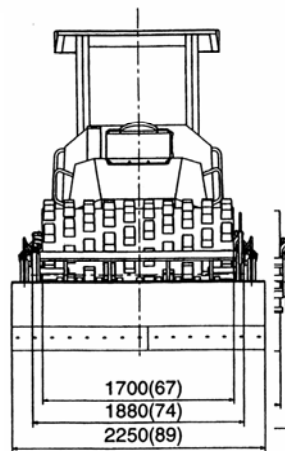
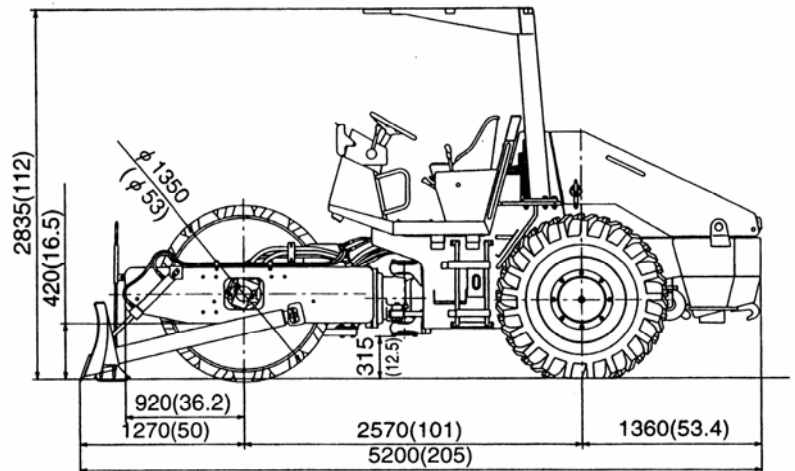
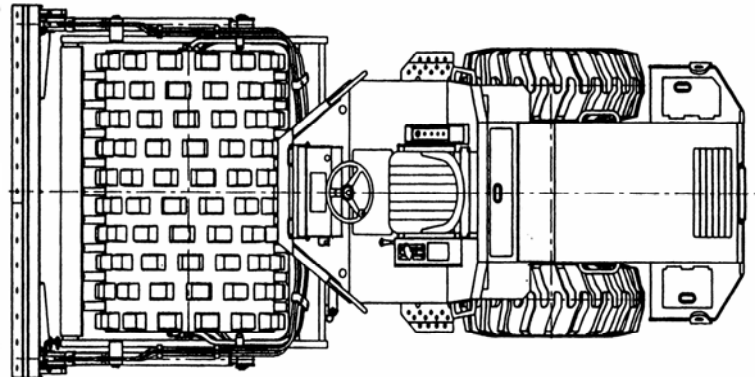
Travel Speed	Turtle	0 ~ 6 km/h	0 ~ 3.7 mile/h
	Rabbit	0 ~ 10 km/h	0 ~ 6.2 mile/h

**Vibrating Power**

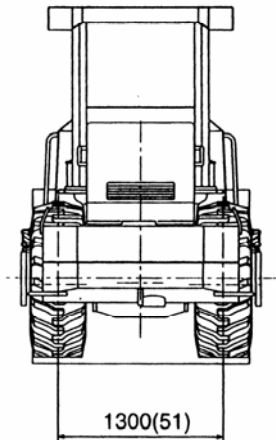
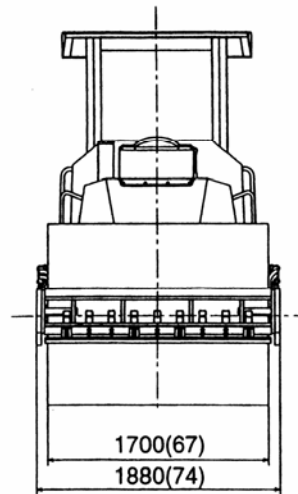
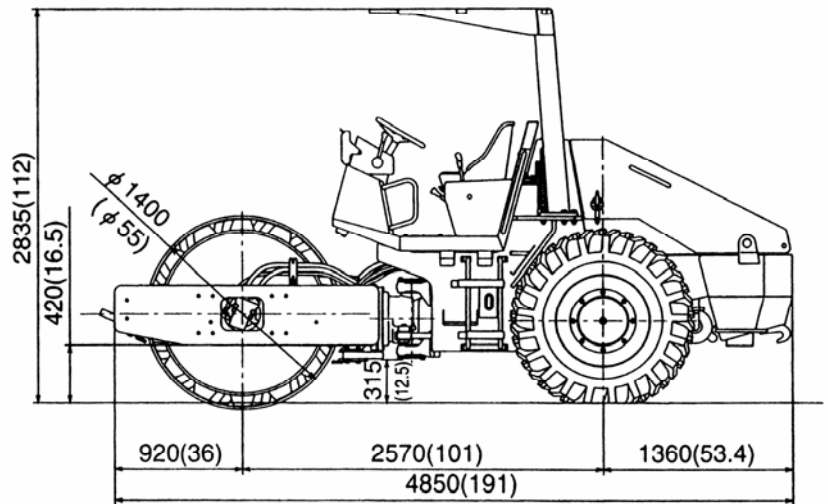
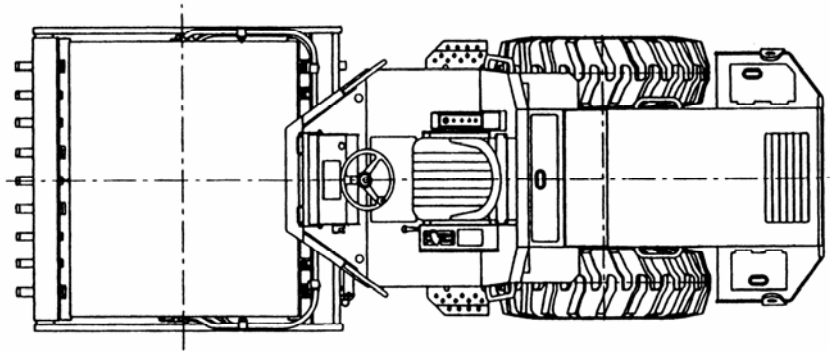
Gradability	62% (32°)	
Minimum Turning Radius	4.6 m	182 inch
Frequency	<b>Low</b>	<b>High</b>
	40 Hz {2,400 vpm}	30 Hz {1,800 vpm}
Centrifugal Force	<b>Low</b>	<b>High</b>
	103 kN (23,150 lbs)	127 kN (28,660 lbs)

**Engine**

Model	Deutz TCD2011L04W Turbocharged	
Total Displacement	3.619 liters	221 cubic in
Rated Output	74.9 kW	102 psi/2,300 ±1 rpm
Maximum Torque	106.5 hp/2,300 ±1 rpm	
	350 N·m/1,600 ±1 rpm	
	258 ft-lb/1,600 ±1 rpm	



<b>SV400-2 (TF)</b>			
<b>Weight</b>			
Gross Weight	8,750 kg	19,290 lbs	
Rear Axle	5,050 kg	11,130 lbs	
Front Axle	3,700 kg	8,160 lbs	
<b>Dimension</b>			
Overall Length	4,850 mm	191 in	
Overall Width	1,880 mm	74 in	
Overall Height	2,835 mm	112 in	
Wheelbase	2,570 mm	101 in	
Rolling Width	1,700 mm	67 in	
Roller (Width x Diameter)	1,700 x 1,400 mm	67 x 55 in	
Wheel Rear Tire	16.9-24-10PR (OR)		
Ground Clearance	315 mm	12.5 in	
Curb Clearance	420 mm	16.5 in	
<b>Performance</b>			
Travel Speed	Turtle	0 ~ 6 km/h	0 ~ 3.7 mile/h
	Rabbit	0 ~ 10 km/h	0 ~ 6.2 mile/h
<b>Vibrating Power</b>			
Gradability	62% (32°)		
Minimum Turning Radius	4.6 m	182 inch	
Frequency	<b>Low</b>	<b>High</b>	
	40 Hz {2,400 vpm}	30 Hz {1,800 vpm}	
Centrifugal Force	<b>Low</b>	<b>High</b>	
	103 kN (23,150 lbs)	127 kN (28,660 lbs)	
<b>Engine</b>			
Model	Deutz TCD2011L04W Turbocharged		
Total Displacement	3.619 liters	221 cubic in	
Rated Output	74.9 kW	102 psi/2,300 ±1 rpm	
Maximum Torque	106.5 hp/2,300 ±1 rpm		
	350 N·m/1,600 ±1 rpm		
	258 ft-lb/1,600 ±1 rpm		



<b>Hydraulic Pressure</b>				
Propulsion		Vibrator		Steering Pump
Main Circuit Pressure	Charge Circuit Pressure	Main Circuit Pressure	Charge Circuit Pressure	Circuit Pressure
41.8 MPa	2.5 MPa	25. MPa	2.5 MPa	109 MPa
6,050 psi	350 psi	3,620 psi	350 psi	1,560 psi
Note: The coolant temperature needle must be in the green zone of the meter and the hydraulic oil temperature must be 50±5°C (122±41°F).				

<b>Overall Coolant Levels</b>	
Ambient Temperature	Always
Amount of Anti-Freeze	8.8 Liter (1.7 gal)
Amount of Coolant	8.8 Liter (1.7 gal)
Ratio	50/50

<b>Battery Electrolyte Reading</b>				
Level of Charge Percentage	Ambient Temperature			
	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

<b>Compactor Capacity</b>			
Compartment	Type of Fluid	Liters	Gallons
Fuel Tank	Diesel fuel	180	48
Engine Oil Pan	Engine oil	10.5	2.8
Hydraulic Tank	Hydraulic oil	50	13.2
Wheel Motor	Gear oil	3.2	0.8
Radiator	Coolant	13	3.4
Vibrator	Gear oil	21	5.5
Transmission	Gear oil	2.0	0.5
Differential	Gear oil	7.3	1.9
Final Drives	Gear oil	1.25 x 2	0.33 x 2



<b>Fuel Oil and Grease Rating</b>					
<b>Lubricant</b>	<b>Service Classification</b>	<b>Ambient Temp. and Applicable Viscosity Rating</b>			<b>Applicable Standards</b>
		<b>-15 ~ 30°C (5 ~ 86°F)</b>	<b>0 ~ 40°C (32 ~ 104°F)</b>	<b>15 ~ 55°C (59 ~ 131°F)</b>	
Engine oil	API grade CH-4	SAE 15W-40	SAE 40	SAE 40	MIL-L-2104B
Gear oil	API grade GL4	SAE 80W-90	SAE 90	SAE 140	MIL-L-2105
Hydraulic oil	Anti wear	ISO-VG32 over VI 140	ISO-VG46 over VI 140	ISO-VG68 over VI 110	ISO-3448
Grease	Lithium type extreme pressure				NLGI-2
Fuel	Diesel				ASTM D975-2D

<b>Recommended Lubricants</b>				
<b>Lubricant Oil Company</b>	<b>Lubricant Types</b>			
	<b>Engine Oil API – CF– 4</b>	<b>Gear Oil API GL 4</b>	<b>Hydraulic Oil VG 46</b>	<b>Grease (NLGI - II)</b>
<b>CALTEX</b>	N/A	Universal Thuban 90	Rando Oil HD 46	Martifack EP 2
<b>BP</b>	Vanellus C Extra	BP Gear Oil EP 90	BP Energol HLP 46	BP Energrease LS – EP 2
<b>ESSO</b>	N/A	Esso Gear Oil GP 90	Nuto H 46	Beacon EP 2
<b>MOBIL</b>	Delvac MX	Mobil Pegasus Gear Oil 90	Nuto Oil 25	Beacon EP 25
<b>SHELL</b>	Rimula X	Shell Spirax 90 EP	Shell Tellus Oil 46	Shell Alvania EP Grease 2
<b>CASTROL</b>	Castrol GTX Diesel	Castrol Hypoy 90	Hyspin AWS 46	Spherrol ELP 2

## Compactor Bolt Torques

<b>Bolt Torque (Torque is in N•M)</b>						
<b>Bolt Size</b>	<b>Type or Bolt</b>					
	Grade 8.8 Loctite 242	Grade 8.8 Loctite 270	Grade 10.9 Loctite 242	Grade 10.9 Loctite 270	Grade 12.9 Loctite 242	Grade 12.9 Loctite 270
M6 x 1	9,5-10,5	10,5-11,5	14,3-15,7	15,2-16,8	16,2-17,8	18,1-20,0
M8 x 1,25	23,8-26,2	25,6-28,4	34,2-37,8	36,7-40,5	39,0-43,0	43,7-48,3
M10 x 1,5	48-53	52-58	68-75	73-81	80-88	88-97
M12 x 1,75	82-91	90-100	116-128	126-139	139-153	152-168
M14 x 2	129-143	143-158	182-202	200-221	221-244	238-263
M16 x 2	200-221	219-242	283-312	309-341	337-373	371-410
M18 x 2,5	276-305	299-331	390-431	428-473	466-515	509-562
M20 x 2,5	390-431	428-473	553-611	603-667	660-730	722-798
M22 x 2,5	523-578	575-635	746-824	817-903	893-987	974-1076
M24 x 3	675-746	732-809	950-1050	1040-1150	1140-1260	1240-1370
M27 x 3	998-1103	1088-1202	1411-1559	1539-1701	1710-1890	1838-2032
M30 x 3,5	1378-1523	1473-1628	1914-2115	2085-2305	2280-2520	2494-2757
M8x 1	25,7-28,3	27,5-30,5	36,2-39,8	40,0-44,0	42,8-47,2	47,5-52,5
M10 x 1,25	49,4-54,6	55,2-61,0	71,5-78,5	78,0-86,0	86,0-94,0	93,0-103,0
M12 x 1,25	90-100	98-109	128-142	139-154	152-168	166-184
M12 x 1,5	86-95	94-104	120-132	133-147	143-158	159-175
M14 x 1,5	143-158	157-173	200-222	219-242	238-263	261-289
M16 x 1,5	214-236	233-257	302-334	333-368	361-399	394-436
M18 x 1,5	312-345	342-378	442-489	485-536	527-583	580-641
M20 x 1,5	437-483	475-525	613-677	674-745	736-814	808-893
M22 x 1,5	581-642	637-704	822-908	903-998	998-1103	1078-1191
M24 x 2	741-819	808-893	1045-1155	1140-1260	1235-1365	1363-1507
M27 x 2	1083-1197	1178-1302	1520-1680	1672-1848	1834-2027	2000-2210
M30 x 2	1511-1670	1648-1822	2138-2363	2332-2577	2565-2835	2788-3082

## Hydraulic Motor Specifications

<b>Vibrator Motor Specifications</b>				
Model	Displacement	Circuit Pressure Setting		
A10FM	44.5	25MPa	3,260psi	255kgf/cm <sup>2</sup>

<b>Propulsion Motor Specifications</b>						
Model	Displacement		Circuit Pressure Setting		Low Pressure Relief Valve Setting	
MV075-607	Min: 28cm <sup>3</sup> /rev	Max: 75cm <sup>3</sup> /rev	41.8MPa	6,050psi	2.22 MPa	330psi

Metric to US Torque								
Capscrew Body Size	Cast Iron		Aluminum		Cast Iron		Aluminum	
	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
1/4 - 20	9	7	8	6	15	11	8	6
1/4 - 28	12	9	9	7	18	13	9	7
5/16 - 18	20	15	16	12	30	22	16	12
5/16 - 24	23	17	19	14	33	24	19	14
3/8 - 16	40	30	25	20	55	40	25	20
3/8 - 24	40	30	35	25	60	45	35	25
7/16 - 14	60	45	45	35	90	65	45	35
7/16 - 20	65	50	55	40	95	70	55	40
1/2 - 13	95	70	75	55	130	95	75	55
1/2 - 20	100	75	80	60	150	110	80	60
9/16 - 12	135	100	110	80	190	140	110	80
9/16 - 18	150	110	115	85	210	155	115	85
5/8 - 11	180	135	150	110	255	190	150	110
5/8 - 18	210	155	160	120	290	215	160	120
3/4 - 10	325	240	255	190	460	340	255	190
3/4 - 16	365	270	285	210	515	380	285	210
7/8 - 9	490	360	380	280	745	550	380	280
7/8 - 14	530	390	420	310	825	610	420	310
1 - 8	720	530	570	420	1,100	820	570	420
1 - 14	800	590	650	480	1,200	890	650	480

Metric to US Torque Values												
Body Size	Torque				Torque				Torque			
Diameter	Cast Iron		Aluminum		Cast Iron		Aluminum		Cast Iron		Aluminum	
mm	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb	N•m	ft-lb
6	9	5	7	4	13	10	7	4	14	9	7	4
7	14	9	11	7	18	14	11	7	23	18	11	7
8	23	17	18	14	33	25	18	14	40	29	18	14
10	45	33	30	25	65	50	30	25	70	50	30	25
12	80	60	55	40	115	85	55	40	125	95	55	40
14	125	90	90	65	180	133	90	65	195	145	90	65
16	195	140	140	100	280	200	140	100	290	210	140	100
18	280	200	180	135	390	285	180	135	400	290	180	135
20	400	290	n/a	n/a	550	400	n/a	n/a	n/a	n/a	n/a	n/a

<b>Fraction to Decimal to Millimeter Conversions</b>					
<b>Fraction</b>	<b>in</b>	<b>mm</b>	<b>Fraction</b>	<b>in</b>	<b>mm</b>
1/64	0.0156	0.397	33/64	0.5156	13.097
1/32	0.0313	0.794	17/32	0.5313	13.494
3/64	0.0469	1.191	35/64	0.5469	13.891
1/16	0.0625	1.588	9/16	0.5625	14.288
5/64	0.0781	1.984	37/64	0.5781	14.684
3/32	0.0938	2.381	19/32	0.5938	15.081
7/64	0.1094	2.778	39/64	0.6094	15.478
1/8	0.1250	3.175	5/8	0.6250	15.875
9/64	0.1406	3.572	41/64	0.6406	16.272
5/32	0.1563	3.969	21/32	0.6563	16.669
11/64	0.1719	4.366	43/64	0.6719	17.066
3/16	0.1875	4.763	11/16	0.6875	17.463
13/64	0.2031	5.159	45/64	0.7031	17.859
7/32	0.2188	5.556	23/32	0.7188	18.256
15/64	0.2344	5.953	47/64	0.7344	18.653
1/4	0.2500	6.350	3/4	0.7500	19.050
17/64	0.2656	6.747	49/64	0.7656	19.447
9/32	0.2813	7.144	25/32	0.7813	19.844
19/64	0.2969	7.541	51/64	0.7969	20.241
5/16	0.3125	7.938	13/16	0.8125	20.638
21/64	0.3281	8.334	53/64	0.8281	21.034
11/32	0.3438	8.731	27/32	0.8438	21.431
23/64	0.3594	9.128	55/64	0.8594	21.828
3/8	0.3750	9.525	7/8	0.8750	22.225
25/64	0.3906	9.922	57/64	0.8906	22.622
13/32	0.4063	10.319	29/32	0.9063	23.019
27/64	0.4219	10.716	59/64	0.9219	23.416
7/16	0.4375	11.113	15/16	0.9375	23.813
29/64	0.4531	11.509	61/64	0.9531	24.209
15/32	0.4688	11.906	31/32	0.9688	24.606
31/64	0.4844	12.303	63/64	0.9844	25.003
1/2	0.5000	12.700	1	1.0000	25.400
<b>Conversion Factor: 1 inch = 25.4 mm</b>					

<b>Metric to US Torque Conversions</b>					
<b>N•m</b>	<b>ft-lb</b>	<b>N•m</b>	<b>ft-lb</b>	<b>N•m</b>	<b>ft-lb</b>
1	9 in-lb	55	41	155	114
5	44 in-lb	60	44	160	118
6	53 in-lb	65	48	165	122
7	62 in-lb	70	52	170	125
8	71 in-lb	75	55	175	129
9	80 in-lb	80	59	180	133
10	89 in-lb	85	63	185	136
11	97 in-lb	90	66	190	140
12	106 in-lb	95	70	195	144
14	124 in-lb	100	74	200	148
15	133 in-lb	105	77	205	151
16	142 in-lb	110	81	210	155
18	159 in-lb	115	85	215	159
20	15 ft -lb	120	89	220	162
25	18	125	92	225	165
30	22	130	96	230	170
35	26	135	100	235	173
40	30	140	103	240	177
45	33	145	107	245	180
50	37	150	111	250	184

### Metric Drill and Tap Chart

Screw Size			Tapping Drills		Clearance Drills			
Nom. Dia. (mm)	Pitch (mm)	Series	Drill Size (65-75% thread)	Dec. Equiv.	Close Fit		Free Fit	
					Drill Size	Dec. Equiv.	Drill Size	Dec. Equiv.
1	0.20	Fine	0.80	0.0315	1.05	0.0413	1.20	0.0472
	0.25	Coarse	0.75	0.0295				
1.1	0.20	Fine	0.90	0.0354	1.15	0.0453	1.30	0.0512
	0.25	Coarse	0.85	0.0335				
1.2	0.20	Fine	1.00	0.0394	1.30	0.0512	1.50	0.0590
	0.25	Coarse	0.95	0.0374				
1.4	0.20	Fine	1.20	0.0472	1.50	0.0591	1.70	0.0669
	0.30	Coarse	1.10	0.0433				
1.6	0.20	Fine	1.40	0.0551	1.70	0.0669	2.00	0.0787
	0.35	Coarse	1.25	0.0492				
1.8	0.20	Fine	1.60	0.0630	1.90	0.0748	2.20	0.0866
	0.35	Coarse	1.45	0.0571				
2	0.25	Fine	1.75	0.0689	2.20	0.0866	2.60	0.1024
	0.40	Coarse	1.60	0.0630				
2.2	0.25	Fine	1.95	0.0768	2.40	0.0945	2.80	0.1102
	0.45	Coarse	1.75	0.0689				
2.5	0.35	Fine	2.15	0.0846	2.70	0.1063	3.10	0.1220
	0.45	Coarse	2.05	0.0807				
3	0.35	Fine	2.65	0.1043	3.20	0.1260	3.60	0.1417
	0.50	Coarse	2.50	0.0984				
3.5	0.35	Fine	3.15	0.1240	3.70	0.1457	4.20	0.1653
	0.60	Coarse	2.90	0.1142				
4	0.50	Fine	3.50	0.1378	4.30	0.1693	4.80	0.1890
	0.70	Coarse	3.30	0.1299				
4.5	0.50	Fine	4.00	0.1575	4.80	0.1890	5.30	0.2087
	0.75	Coarse	3.70	0.1457				
5	0.50	Fine	4.50	0.1772	5.30	0.2087	5.80	0.2283
	0.80	Coarse	4.20	0.1654				
6	0.75	Fine	5.25	0.2067	6.40	0.2520	7.00	0.2756
	1.00	Coarse	5.00	0.1969				
7	0.75	Fine	6.25	0.2461	7.40	0.2913	8.00	0.3150
	1.00	Coarse	6.00	0.2362				
8	0.75	Fine	7.25	0.2854	8.40	0.3307	10.00	0.3937
	1.00	Fine	7.50	0.2953				
	1.25	Coarse	6.80	0.2677				

Nom. Dia. (mm)	Pitch (mm)	Series	Drill Size (65-75% thread)	Dec. Equiv.	Drill Size	Dece. Equiv.	Drill Size	Dece. Equiv.
9	0.75	Fine	8.25	0.3248	9.50	0.3740	10.50	0.4134
	1.00	Fine	8.00	0.3150				
	1.25	Coarse	7.80	0.3071				
10	0.75	Fine	9.25	0.3642	10.50	0.4134	12.00	0.4724
	1.00	Fine	9.00	0.3543				
	1.25	Fine	8.80	0.3465				
	1.50	Coarse	8.50	0.3346				
11	0.75	Fine	10.25	0.4035	12.00	0.4724	13.00	0.5118
	1.00	Fine	10.00	0.3937				
	1.50	Coarse	9.50	0.3740				
12	1.00	Fine	11.00	0.4331	13.00	0.5118	15.00	0.5905
	1.25	Fine	10.75	0.4232				
	1.50	Fine	10.50	0.4134				
	1.75	Coarse	10.20	0.4016				
14	1.00	Fine	13.00	0.5118	15.00	0.5905	17.00	0.6693
	1.25	Fine	12.80	0.5039				
	1.50	Fine	12.50	0.4921				
	2.00	Coarse	12.00	0.4724				
15	1.00	Fine	14.00	0.5512	16.00	0.6299	18.00	0.7087
	1.50	Fine	13.50	0.5315				
16	1.00	Fine	15.00	0.5906	17.00	0.6693	19.00	0.7480
	1.50	Fine	14.50	0.5709				
	2.00	Coarse	14.00	0.5512				
17	1.00	Fine	16.00	0.6299	18.00	0.7087	20.00	0.7874
	1.50	Fine	15.50	0.6103				
18	1.00	Fine	17.00	0.6693	19.00	0.7480	21.00	0.8268
	1.50	Fine	16.50	0.6496				
	2.00	Fine	16.00	0.6299				
	2.50	Coarse	15.50	0.6102				
20	1.00	Fine	19.00	0.7480	21.00	0.8268	24.00	0.9449
	1.50	Fine	18.50	0.7283				
	2.00	Fine	18.00	0.7087				
	2.50	Coarse	17.50	0.6890				
22	1.00	Fine	21.00	0.8268	23.00	0.9055	26.00	1.0236
	1.50	Fine	20.50	0.8071				
	2.00	Fine	20.00	0.7874				
	2.50	Coarse	19.50	0.7677				
24	1.00	Fine	23.00	0.9055	25.00	0.9842	28.00	1.1024
	1.50	Fine	22.50	0.8858				
	2.00	Fine	22.00	0.8661				
	3.00	Coarse	21.00	0.8268				
25	1.00	Fine	24.00	0.9449	26.00	1.0236	30.00	1.1811
	1.50	Fine	23.50	0.9252				
	2.00	Fine	23.00	0.9055				
26	1.50	Fine	24.50	0.9646				



Nom. Dia. (mm)	Pitch (mm)	Series	Drill Size (65-75% thread)	Dec. Equiv.	Drill Size	Dece. Equiv.	Drill Size	Dece. Equiv.
27	1.00	Fine	26.00	1.0236	28.00	1.1024	32.00	1.2598
	1.50	Fine	25.50	1.0039				
	2.00	Fine	25.00	0.9843				
	3.00	Coarse	24.00	0.9449				
28	1.00	Fine	27.00	1.0630				
	1.50	Fine	26.50	1.0433				
	2.00	Fine	26.00	1.0236				
30	1.00	Fine	29.00	1.1417	31.00	1.2205	35.00	1.3779
	1.50	Fine	28.50	1.1220				
	2.00	Fine	28.00	1.1024				
	3.00	Fine	27.00	1.0630				
32	1.50	Fine	30.50	1.2008				
	2.00	Fine	30.00	1.1811				
33	1.50	Fine	31.50	1.2402	34.00	1.3386	38.00	1.4961
	2.00	Fine	31.00	1.2205				
	3.00	Fine	30.00	1.1811				
	3.50	Coarse	29.50	1.1614				
35	1.50	Fine	33.50	1.3189				
	2.00	Fine	33.00	1.2992				
36	1.50	Fine	34.50	1.3583	37.00	1.4567	42.00	1.6535
	2.00	Fine	34.00	1.3386				
	3.00	Fine	33.00	1.2992				
	4.00	Coarse	32.00	1.2598				
39	1.50	Fine	37.50	1.4764	40.00	1.5748	45.00	1.7716
	2.00	Fine	37.00	1.4567				
	3.00	Fine	36.00	1.4173				
	4.00	Coarse	35.00	1.3780				
40	1.50	Fine	38.50	1.5157				
	2.00	Fine	38.00	1.4961				
	3.00	Fine	37.00	1.4567				
42	1.50	Fine	40.50	1.5945	43.00	1.6929	48.00	1.8898
	2.00	Fine	40.00	1.5748				
	3.00	Fine	39.00	1.5354				
	4.00	Fine	38.00	1.4961				
	4.50	Coarse	37.50	1.4764				
45	1.50	Fine	43.50	1.7126	46.00	1.8110	52.00	2.0472
	2.00	Fine	43.00	1.6929				
	3.00	Fine	42.00	1.6535				
	4.00	Fine	41.00	1.6142				
	4.50	Coarse	40.50	1.5945				
48	1.50	Fine	46.50	1.8307	50.00	1.9685	56.00	2.2047
	2.00	Fine	46.00	1.8110				
	3.00	Fine	45.00	1.7717				
	4.00	Fine	44.00	1.7323				
	5.00	Coarse	43.00	1.6929				
50	1.50	Fine	48.50	1.9094				
	2.00	Fine	48.00	1.8898				
	3.00	Fine	47.00	1.8504				

<b>Nom. Dia. (mm)</b>	<b>Pitch (mm)</b>	<b>Series</b>	<b>Drill Size (65-75% thread)</b>	<b>Dec. Equiv.</b>	<b>Drill Size</b>	<b>Dece. Equiv.</b>	<b>Drill Size</b>	<b>Dece. Equiv.</b>
52	1.50	Fine	50.50	1.9882	54.00	2.1260	62.00	2.4409
	2.00	Fine	50.00	1.9685				
	3.00	Fine	49.00	1.9291				
	4.00	Fine	48.00	1.8898				
	5.00	Coarse	47.00	1.8504				
55	1.50	Fine	53.50	2.1063				
	2.00	Fine	53.00	2.0866				
	3.00	Fine	52.00	2.0472				
	4.00	Fine	51.00	2.0079				
56	1.50	Fine	54.50	2.1457	58.00	2.2835	66.00	2.5984
	2.00	Fine	54.00	2.1260				
	3.00	Fine	53.00	2.0866				
	4.00	Fine	52.00	2.0472				
	5.50	Coarse	50.50	1.9882				

<b>Weights and Measures Conversion Factors</b>						
<b>Quantity</b>	<b>U.S. Customary</b>		<b>Metric</b>		<b>From U.S. Customary To Metric Multiply By</b>	<b>From Metric To U.S. Customary Multiply By</b>
<b>Area</b>	<b>Unit Name</b>	<b>Abbreviation</b>	<b>Unit Name</b>	<b>Abbreviation</b>		
	sq. inch	in <sup>2</sup>	sq. millimeters	mm <sup>2</sup>	645.16	0.001550
			sq. centimeters	cm <sup>2</sup>	6.452	0.155
	sq. foot	ft <sup>2</sup>	sq. meter	M <sup>2</sup>	0.0929	10.764
<b>Fuel Consumption</b>	pounds per horsepower hour	lb/hp-hr	grams per kilowatt hour	g/kW-hr	608.277	0.001645
<b>Fuel Performance</b>	miles per gallon	mpg	kilometers per liter	km/l	0.4251	2.352
	gallons per mile	gpm	liters per kilometer	l/km	2.352	0.4251
<b>Force</b>	pounds force	lbf	Newton	N	4.4482	0.224809
<b>Length</b>	inch	in	millimeters	mm	25.40	0.039370
	foot	ft	millimeters	mm	304.801	0.00328
<b>Power</b>	horsepower	hp	kilowatt	kW	0.746	1.341
<b>Pressure</b>	pounds force per sq. inch	psi	kilopascal	kPa	6.8948	0.145037
	inches of mercury	in Hg	kilopascal	kPa	3.3769	0.29613
	inches of water	in H <sub>2</sub> O	kilopascal	kPa	0.2488	4.019299
	inches of mercury	in Hg	millimeters of mercury	mm Hg	25.40	0.039370
	inches of water	in H <sub>2</sub> O	millimeters of water	mm H <sub>2</sub> O	25.40	0.039370
	bars	bars	kilopascals	kPa	100.001	0.00999
	bars	bars	millimeters of mercury	mm Hg	750.06	0.001333
<b>Temperature</b>	fahrenheit	°F	centigrade	°C	(°F-32) ÷1.8	(1.8 x °C) +32
<b>Torque</b>	pound force per foot	ft-lb	Newton-meter	N•m	1.35582	0.73756
	pound force per inch	in-lb	Newton-meter	N•m	0.113	8.850756

<b>Velocity</b>	<b>Unit Name</b>	<b>Abbreviation</b>	<b>Unit Name</b>	<b>Abbreviation</b>	<b>From U.S. Customary To Metric Multiply By</b>	<b>From Metric To U.S. Customary Multiply By</b>
	miles/hour	mph	kilometers/hour	kph	1.6093	0.6214
<b>Volume: liquid displacement</b>	gallon (U.S.)	gal.	liter	l	3.7853	0.264179
	gallon (Imp*)	gal.	liter	l	4.546	0.219976
	cubic inch	in <sup>3</sup>	liter	l	0.01639	61.02545
	cubic inch	in <sup>3</sup>	cubic centimeter	cm <sup>3</sup>	16.387	0.06102
<b>Weight (mass)</b>	pounds (avoir.)	lb	kilograms	kg	0.4536	2.204623
<b>Work</b>	British Thermal Unit	BTU	joules	J	1054.5	0.000948
	British Thermal Unit	BTU	kilowatt -hour	kW-hr	0.000293	3.414
	horsepower hours	hp-hr	kilowatt -hour	kW-hr	0.746	1.341

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