

Mega 250-V

Operation and Maintenance Manual

K1000896E

Serial Number 3001 thru 4000

Serial Number 4001 and Up

August 2004

Daewoo reserves the right to improve our products in a continuing process to provide the best possible product to the market place. These improvements can be implemented at any time with no obligation to change materials on previously sold products. It is recommended that consumers periodically contact their distributors for recent documentation on purchased equipment.

This documentation may include attachments and optional equipment that is not available in your machine's package. Please call your distributor for additional items that you may require.

Illustrations used throughout this manual are used only as a representation of the actual piece of equipment, and may vary from the actual item.

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SAFETY

TO THE OPERATOR OF A DAEWOO WHEEL LOADER



DANGER!

Improper use of wheel loader could cause serious injury or death. Before operating wheel loader, or performing maintenance, operator or technician must read and understand entire Operation and Maintenance Manual.

Any operation, maintenance, traveling or shipping methods that do not follow safety guidelines printed in this manual could cause serious injury or death.

Please respect the importance of taking responsibility for your own safety, and that other people who may be affected by your actions.

Safety information on the following pages is organized into the following topics.

1. "General Safety Essentials" on page 1-2
2. "Location of Safety Labels" on page 1-3
3. "Unauthorized Modifications" on page 1-11
4. "Work Site Precautions" on page 1-11
5. "Operation" on page 1-13
6. "Equipment" on page 1-18
7. "Maintenance" on page 1-22
8. "Shipping and Transportation" on page 1-25



SAFETY ALERT SYMBOL



Be Prepared – Get to Know All Operating and Safety Instructions.

This is the Safety Alert Symbol. Wherever it appears – in this manual or on safety signs on the machine – you should be alert to potential for personal injury or accidents. Always observe safety precautions and follow recommended procedures.

LEARN SIGNAL WORDS USED WITH SAFETY ALERT SYMBOL

Words "**CAUTION**," "**WARNING**," and "**DANGER**" used throughout this manual and on labels on machine indicate hazards or unsafe practices. All three statements indicate that safety is involved. Observe precautions indicated whenever you see the Safety Alert "Triangle," no matter which signal word appears next to the "Exclamation Point" symbol.



CAUTION!

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against a generally unsafe practice.



WARNING!

Indicates a hazardous situation that, if not avoided, could result in serious injury or death. It may also be used to alert against a highly unsafe practice.



DANGER!

Indicates a hazardous situation that, if not avoided, is very likely to cause death or extremely serious injury. It may also be used to alert against equipment that may explode or detonate if handled or treated carelessly.

GENERAL SAFETY ESSENTIALS

ACCESSORY APPLICATIONS

Wheel loader has been designed primarily for moving earth with a bucket. For use as a grapple or for other object handling, contact Daewoo. Lifting-work applications are permitted in approved lift configuration, to rated capacity only, with no side-loading (unless prohibited by local regulation). Do not use machine for activities for which it was not intended. Do not use bucket for lifting work, unless lift slings are used in approved configuration.

LOCATION OF SAFETY LABELS

Always keep these labels clean. If they are lost or damaged, attach them again or replace them with a new label. Make sure replacement parts have current labels.

There are other labels in addition to safety labels that follow so handle them in the same way. Safety labels may be available in languages other than English. To find out what labels are available, contact your Daewoo distributor.

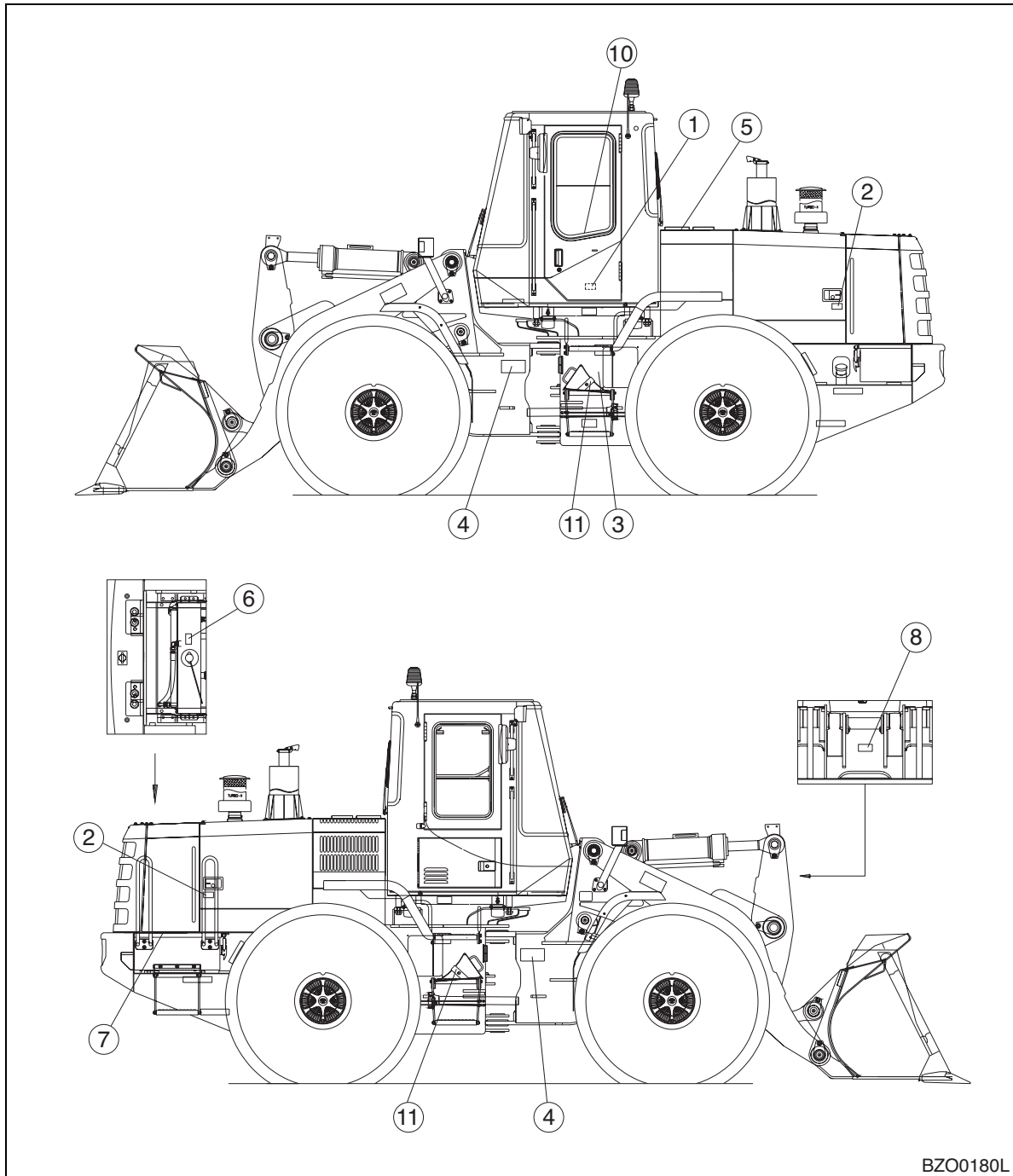
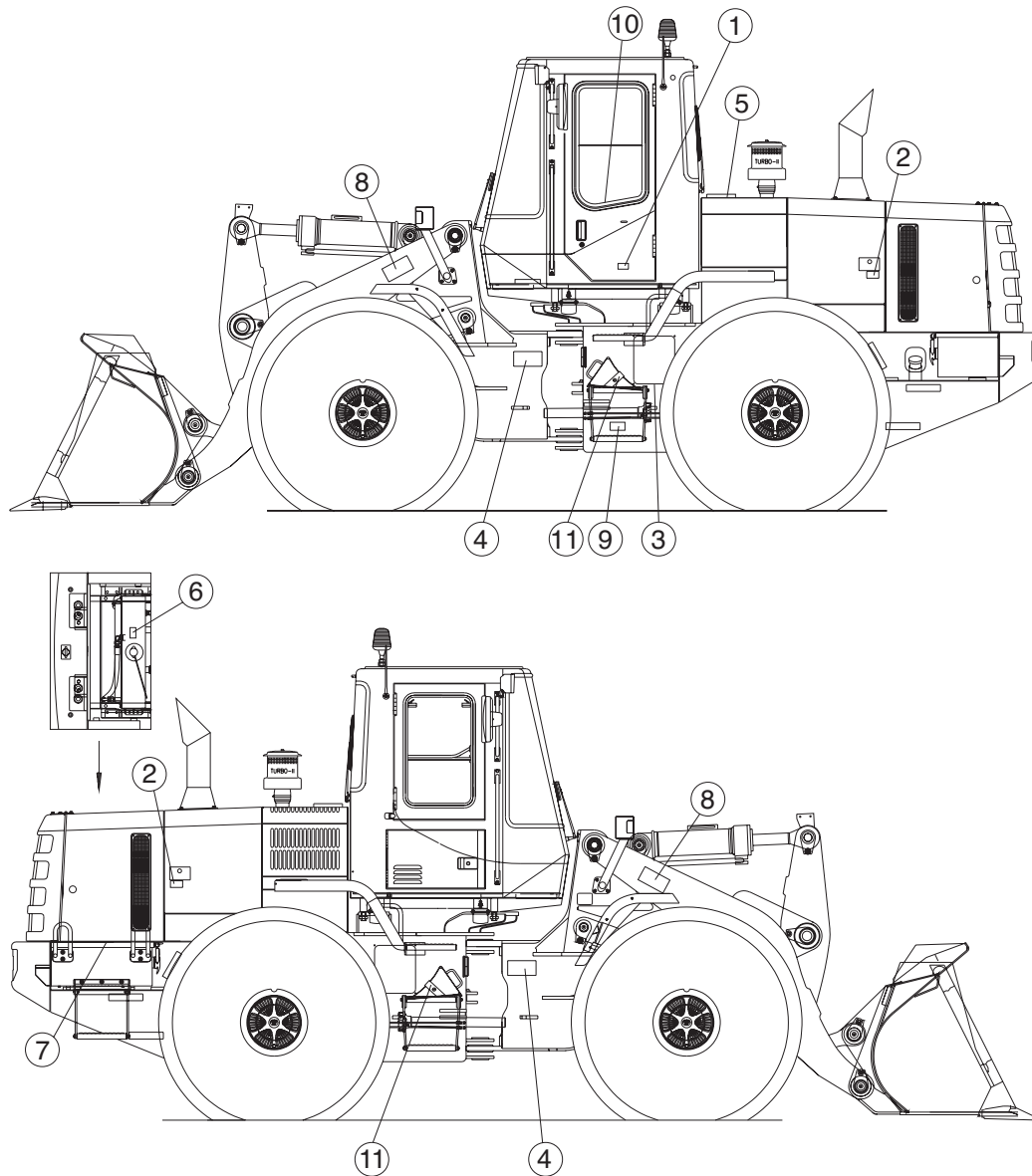


Figure 1 (S/N 3001 thru 4000)



BZO0190L

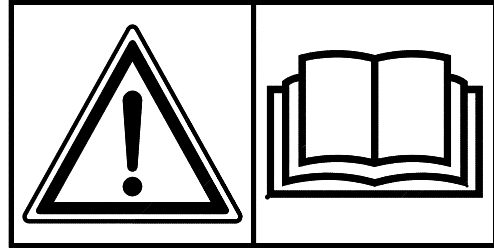
Figure 2 (S/N 4001 and Up)

1. WARNING FOR OPERATION, INSPECTION AND MAINTENANCE (4190-2545A, 190-00092)



CAUTION!

- Read manual and labels before operation and maintenance. Follow instructions and warnings in manual and on labels on machine.
- Sound horn to alert people nearby before operating, and make sure all persons are clear of area.
- Always make sure when leaving operator's seat to:
 - Lower bucket or other working tools to ground.
 - "LOCK" transmission selector in "NEUTRAL."
 - Set park brake.
 - Turn starter switch "OFF." Remove key from switch.
- If hydraulic components and units are ABNORMAL, consult nearest DAEWOO dealer or authorized service shop. Do not attempt to make an overhaul.



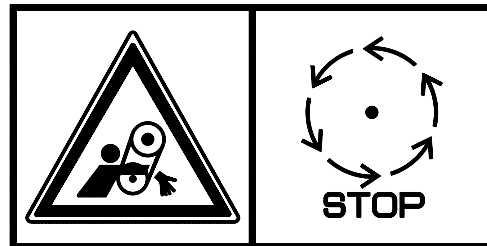
ACO1360L

2. WARNINGS WHEN OPENING ENGINE HOOD (190-00095)



WARNING!

Before opening hood, shut down engine.



ACO1420L

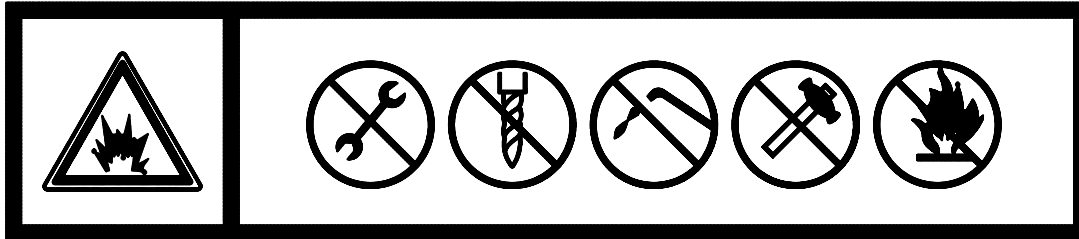
3. WARNING FOR HANDLING ACCUMULATOR (190-00703, 190-00099)



WARNING!

Explosion hazard:

- Keep away from flame.
- Do not weld or drill.



ACO1480L

Accumulator

Wheel loader pilot control system is equipped with an accumulator. Accumulator will store a pressure charge that may enable hydraulic controls to be activated for a brief period of time after engine has been shut down. Activation of any controls may enable selected function to operate under force of gravity.



CAUTION!

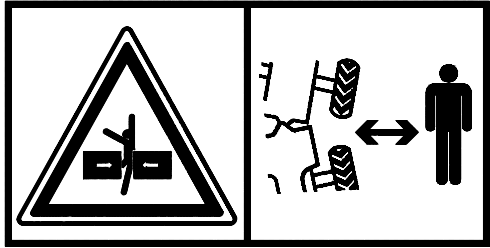
Any raised attachment will lower to ground if accumulator holds a charge.

When shutting machine down, lower front attachment to ground. After engine has been shut down, turn key to "ON" position and move joystick controls to release pressure in accumulator. Remove key.

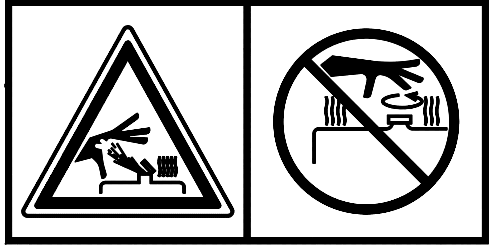
IMPORTANT

Refer to Shop Manual for service procedures. Do not release any pilot lines until pressure within accumulator has been released.

4. KEEP OUT OF STEERING TURN AREA (4190-1992A, 190-00120)

 DANGER!	
Keep out of steering turn area.	 AMO0410L

5. WARNING FOR HIGH TEMPERATURE HYDRAULIC OIL (190-00691, 190-00097)

 WARNING!	
HYDRAULIC OIL To prevent hot oil from spurting out: • Turn engine off. • Allow oil to cool. • Slowly loosen cap to relieve pressure before removing.	 ACO1410L

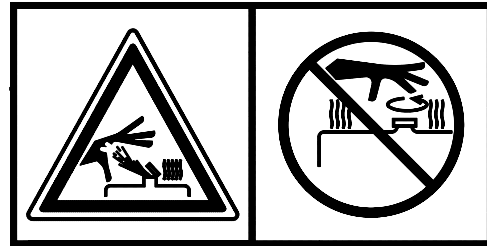
6. WARNING FOR HIGH TEMPERATURE COOLANT (190-00692, 190-00097)



WARNING!

To prevent hot water from spurting out:

- Turn engine "OFF."
- Allow water to cool.
- Slowly loosen cap to relieve pressure before removing.



ACO1410L

7. WARNING FOR BATTERY MAINTENANCE (2190-2533A, 190-00100)



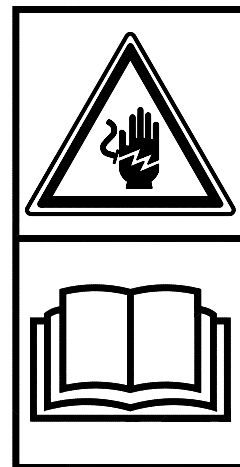
DANGER!

- Battery fumes can explode. Keep sparks and flames away from batteries.
- Always avoid storing metals like tools or inflammable materials around or on batteries. Explosion or fire can be caused by short circuiting batteries.
- Sulfuric acid in battery is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed in eyes.

If you spill acid on yourself:

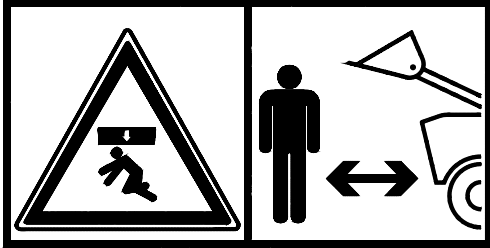
1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize acid.
3. Flush your eyes with water for 10-15 minutes.

Get medical attention immediately.

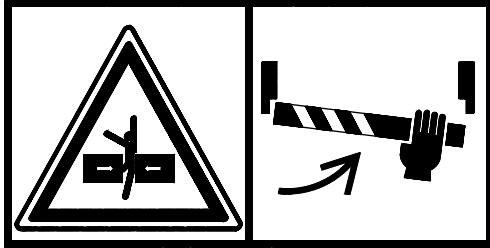


ACO1400L

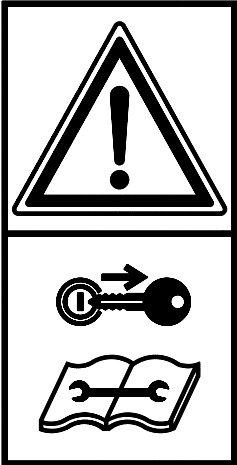
**8. WARNING FOR PERFORMING MAINTENANCE ON FRONT ATTACHMENT
(4190-2546A, 190-00105)**

 DANGER!	
To avoid injury, securely brace lift arm before disassembly of valve or piping.	 AM00430L

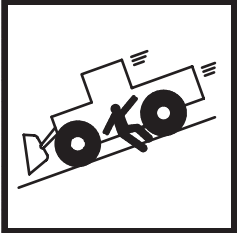
9. WARNING TO USE SAFETY LOCK (190-00121)

 WARNING!	
Safety lock must be in "LOCK" position when servicing pivot area or transporting machine.	 AM00440L

10. WARNING TAG (190-00695, 190-00098)

 WARNING!	
Do not touch when performing inspection or maintenance.	 ACO1450L

11. WARNING FOR WHEEL BLOCK (4190-2547A, 190-00207)

 WARNING!	
Block wheels to prevent machine movement before disengaging park brake.	 BZO0170L

UNAUTHORIZED MODIFICATIONS

IMPORTANT

If you need more information or have any questions or concerns about safe operating procedures or working wheel loader correctly in a particular application or in specific conditions of your individual operating environment, please consult your local Daewoo representative.

Any modification made without authorization or written approval from Daewoo can create a safety hazard, for which machine owner must be held responsible.

For safety's sake, replace all OEM parts with correct authorized or genuine Daewoo part. For example, not taking time to replace fasteners, bolts or nuts with correct replacement parts could lead to a condition in which safety of critical assemblies is dangerously compromised.

WORK SITE PRECAUTIONS

ATTACHMENT PRECAUTIONS

Options kits are available through your dealer. Contact Daewoo for information on available one-way (single-acting) and two-way (double-acting) piping / valving / auxiliary control kits. Because Daewoo cannot anticipate, identify or test all attachments that owners may wish to install on their machines, please contact Daewoo for authorization and approval of attachments, and their compatibility with options kits.

AVOID HIGH VOLTAGE CABLES

Serious injury or death can result from contact or proximity to high voltage electric lines. The bucket does not have to make physical contact with power lines for current to be transmitted.

Use a spotter and hand signals to stay away from power lines not clearly visible to operator.

Voltage	Minimum Safe Distance
6.6 kV	3 m (9' 10")
33.0 kV	4 m (13' 1")
66.0 kV	5 m (16' 5")
154.0 kV	8 m (26' 3")
275.0 kV	10 m (32' 10")

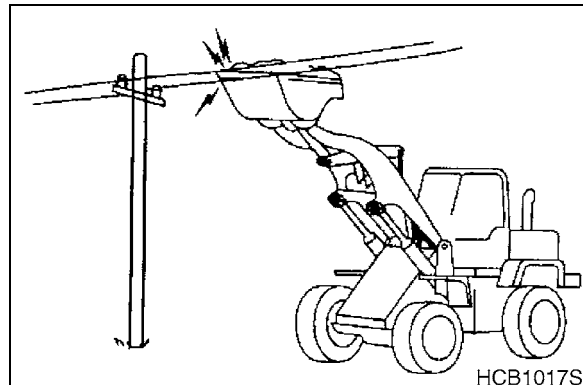


Figure 3

Use these minimum distances as a guideline only. Depending upon voltage in line and atmospheric conditions, strong current shocks can occur with boom or bucket as far away as 4 - 6 m (13 - 20 ft) from power line. Very high voltage and rainy weather could further decrease that safety margin.

NOTE: *Before starting any type of operation near power lines (either above ground or buried cable type) you should always contact power utility directly and work out a safety plan with them.*

BEFORE STARTING TO DIG, CONTACT AUTHORITIES

Below ground hazards also include natural gas lines, water mains, tunnels and buried foundations. Know what's underneath work site before starting to dig.

BE AWARE OF HEIGHT OBSTACLES

Any type of object in vicinity of boom could represent a potential hazard, or cause operator to react suddenly and cause an accident. Use a spotter or signal person working near bridges, phone lines, work site scaffolds, or other obstructions.

USE CARE ON LOOSE SUPPORT

Working heavy loads over loose, soft ground or uneven, broken terrain can cause dangerous side load conditions and possible tipover and injury. Travel without a load or balanced load may also be hazardous.

If temperatures are changing, be cautious of dark and wet patches when working or traveling over frozen ground. Stay away from ditches, overhangs and all other weak support surfaces. Halt work and install support mats or blocking if work is required in an area of poor support.

USE SOLID SUPPORT BLOCKING

Never rely on lift jacks or other inadequate supports when work is being done. Block wheels fore and aft to prevent any movement.

DIGGING BENEATH OVERHANGS

Digging beneath an overhang is dangerous. Overhang could collapse on top of operator and cause serious injury or death. Go onto another digging area before steep overhangs are formed. Know height and reach limits of wheel loader and plan ahead while working. Park wheel loader away from overhangs before work shut down.

DIGGING BENEATH WHEEL LOADER

Digging beneath wheel loader is dangerous. Earth beneath could collapse. This could cause wheel loader to tip, which could cause serious injury or death to operator. Working around deep pits, trenching or along high walls may require support blocks, especially after heavy rainfalls or during spring thaws.

SLOPING TERRAIN REQUIRES CAUTION

Dig evenly around work site whenever possible, trying to gradually level any existing slope. If it's not possible to level area or avoid working on a slope, reducing size and cycling rate workload is recommended.

On sloping surfaces, use caution when positioning wheel loader before starting a work cycle. Stay alert for unstable situations to avoid getting into them. For example, you should always avoid working bucket over downhill side of machine when parked perpendicular to slope. Avoid full extensions of bucket in a downhill direction. Lifting bucket too high, too close to machine, while wheel loader is turned uphill can also be hazardous.

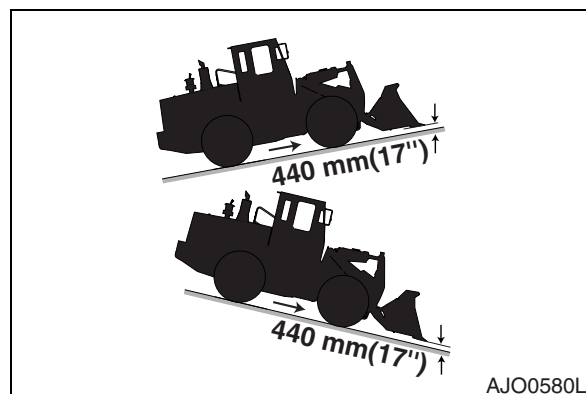


Figure 4

STAY ALERT FOR PEOPLE MOVING THROUGH WORK AREA

When loading a truck you should always know where the driver is.

Avoid loading over the cab of a truck even if the driver is in a safe spot. Someone else could have gone inside, for any number of reasons. Avoid working where unseen passersby might be.

Slow down work cycle and use slower travel speeds in congested or populated areas. Use a commonly understood signal so that other members of work crew can warn operator to slow or halt work in an impending hazardous situation.

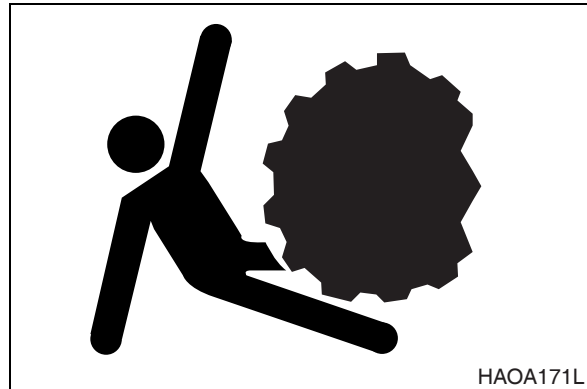


Figure 5

BE AWARE OF AND CONFORM TO LOCAL REGULATIONS

Minimum levels of insurance coverage, work permits or certification, physical barriers around work site or restricted hours of operation may be mandated by governing authorities. There may also be guidelines, standards or restrictions on equipment that may be used to perform certain kinds of work. Check and follow all local requirements, which may also be related to below ground hazards and power lines.

OPERATION

OPERATE WHILE SEATED AT OPERATOR'S STATION ONLY

Never reach in through a window to work a control. Do not try to operate wheel loader unless you're in command position – seated at controls. You should stay alert and focused on your work at all times but Do not twist out of seat if job activity behind you (or to the side) requires your attention.

Use a spotter or signal person if you can't see clearly and something is happening behind you.

Replace damaged safety labels and lost or damaged operator's manuals.

Do not let anyone operate machine unless they've been fully and completely trained, in safety and in operation of machine.



Figure 6

BEFORE STARTING ENGINE, DO A "PRESTART" SAFETY CHECK:

- Walk around your machine before getting in operator's cab. Look for evidence of leaking fluid, loose fasteners, misaligned assemblies or any other indications of possible equipment hazard.
- All equipment covers and machinery safety guards must be in place, to protect against injury while machine is being operated.
- Look around work site area for potential hazards, or people or property that could be at risk while operation is in progress.
- Never start engine if there is any indication that maintenance or service work is in progress, or if a warning tag is attached to controls in cab.
- A machine that has not been used recently, or is being operated in extremely cold temperatures, could require a warm-up or maintenance service before start-up.
- Check gauges and monitor displays for normal operation before starting engine. Listen for unusual noises and remain alert for other potentially hazardous conditions at start of work cycle.
- Check tire inflation and check tires for damage or uneven wear. Perform maintenance before operation.

NEVER USE ETHER STARTING AIDS

An electric grid type manifold heater is used for cold starting. Glowing heater element can cause ether or other starting fluid to detonate, causing injury.



Figure 7

MOUNTING AND DISMOUNTING

Never get on or off a moving machine. Do not jump on/off. Entry/egress path should be clear of mud, oil and spills and mounting hardware must be kept tight and secure.

Always use handholds or steps and maintain at least 3-point contact of hands and feet. Never use controls as handholds.

Never get up from operator's seat or leave operator's station and dismount machine if engine is running.

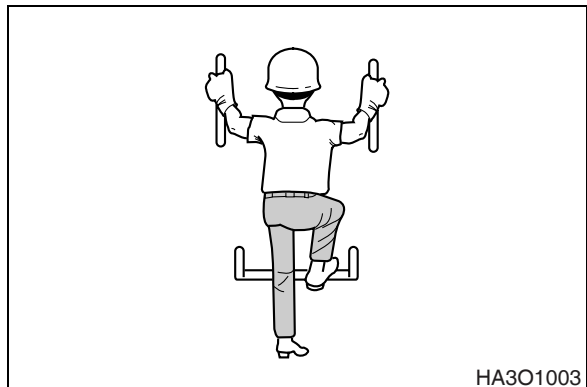


Figure 8

OBSERVE GENERAL SAFETY RULES

Only trained and authorized personnel, with a good knowledge and awareness of safe procedures, may be allowed to operate or perform maintenance or service on wheel loader.

All personnel at work site should be aware of assigned individual responsibilities and tasks. Communication and hand signals used should be understood by everyone.

Terrain and soil conditions at work site, approaching traffic, weather related hazards and any above or below ground obstacles or hazards should be observed and monitored by all work crew members.

ENGINE VENTILATION

Engine exhaust gases can cause loss of judgment, loss of alertness, and loss of motor control. These gases can also cause unconsciousness, serious injury and fatal accidents.

Make sure of adequate ventilation before starting engine in any enclosed area.

You should also be aware of open windows, doors or ductwork into which exhaust may be carried, or blown by wind, exposing others to danger.

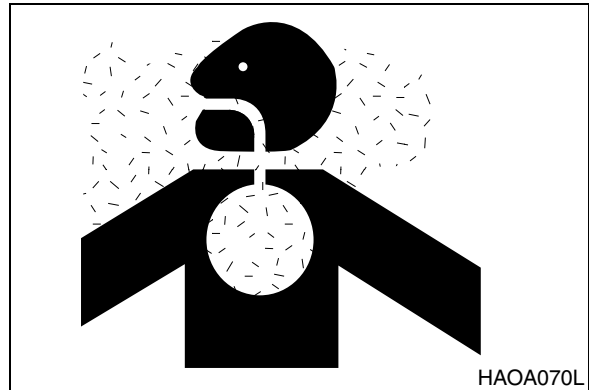


Figure 9

TAKE TIME TO PROVIDE GOOD VISIBILITY

Halt work if visibility is poor. Strong rains, snow, fog and extremely dusty conditions can all obscure visibility so badly that it is best to wait for weather to change or dust to settle before continuing operation.

Night work in areas of limited visibility should be halted if installation of extra work lights on machine (or work area) is necessary.

Keep dirt and dust off of windows and off lens surfaces of work lights. Stop working if lights, windows or mirrors need cleaning or adjustment.

FUEL, OIL AND HYDRAULIC FLUID FIRE HAZARDS

Add fuel, oil, antifreeze and hydraulic fluid to machine only in a well ventilated area. Machine must be parked with controls, lights and switches turned "OFF." Engine must be "OFF" and any flames, glowing embers, auxiliary heating units or spark causing equipment must be doused, turned "OFF" and/or kept well clear of machine.

Static electricity can produce dangerous sparks at fuel filling nozzle. In very cold, dry weather or other conditions that could produce static discharge, keep tip of fuel nozzle in constant contact with neck of fuel filling nozzle, to provide a ground.

Keep fuel and other fluid reservoir caps tight and do not start engine until caps have been secured.



Figure 10

BOOST STARTING OR CHARGING ENGINE BATTERIES

Turn "OFF" all electrical equipment before connecting leads to battery. This includes electrical switches on battery charger or boost starting equipment.

When boost starting from another machine or vehicle do not allow two machines to touch. Wear safety glasses or goggles while required parallel battery connections – positive to positive and negative to negative – are made.

24 volt battery units consisting of two series connected twelve volt batteries have a cable connecting one positive terminal on one of the 12 volt batteries to a negative terminal on the other battery. Booster or charger cable connections must be made between nonseries connected positive terminals and between negative terminal of booster battery and metal frame of machine being boosted or charged. Refer to procedure and illustration in "Starting with Auxiliary Batteries" on page 3-8.

Connect positive cable first when installing cables and disconnect negative cable first when removing them. Final cable connection, at metal frame of machine being charged or boost started, should be as far away from batteries as possible.

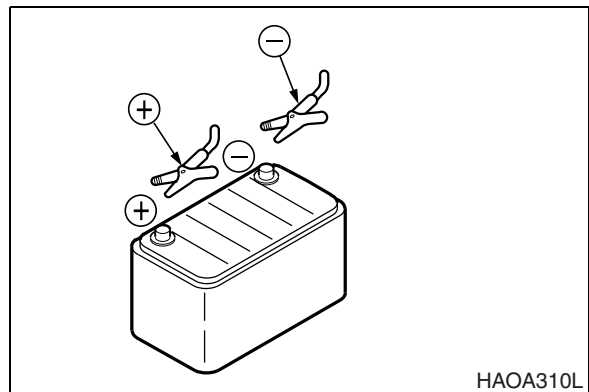


Figure 11

KEEP "PINCH POINT" AREAS CLEAR – USE CAUTION IN REVERSE

Use a signal person in high traffic areas and whenever operator's view is not clear, such as when traveling in reverse.

Anyone standing near wheels, or working assemblies of the attachment, is at risk of being caught between moving parts of machine.

Never allow anyone to ride on any part of machine or attachment, including any part of operator's cab.

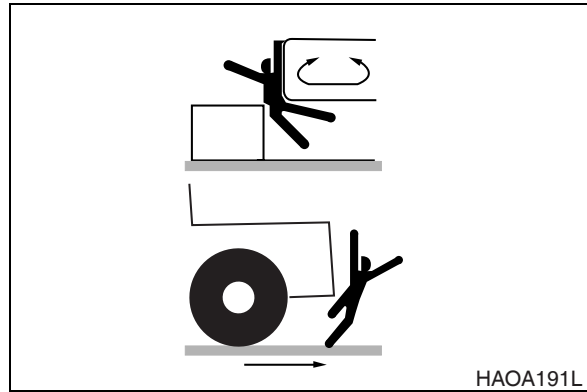


Figure 12

TRAVEL PRECAUTIONS

Engage frame lock for long-distance travel. When traveling, wheel loader always keeps lights on; make sure that you are in compliance with all state and local regulations concerning warning flags and signs.

Attachment control levers should not be operated while traveling.

Fold in work equipment so that outer end of boom is as close to machine as possible, and is about 440 mm (17") above ground.

Never travel over obstacles or slopes that will cause machine to tilt severely. Travel around any slope or obstacle that causes 10 degrees tilt, or more.

OPERATE CAREFULLY ON SNOW AND ICE AND IN VERY COLD TEMPERATURES

In icy cold weather avoid sudden travel movements and stay away from even very slight slopes. Machine could skid off to one side very easily.

Snow accumulation could hide or obscure potential hazards. Use care while operating or while using machine to clear snow.

Warming up engine for a short period may be necessary, to avoid operating with sluggish or reduced working capacity. Jolting shocks and impact loads caused by bumping or bottoming boom or attachment are more likely to cause severe stress in very cold temperatures. Reducing work cycle rate and work load may be necessary.

PARKING MACHINE

Avoid making sudden stops, or parking machine wherever it happens to be at the end of the work day. Plan ahead so that the wheel loader will be on firm, level ground away from traffic and away from high walls, cliff edges and any area of potential water accumulation or runoff. If parking on inclines is unavoidable, block wheels to prevent movement. Lower bucket or other working attachment completely to ground, or to an overnight support saddle. There should be no possibility of unintended or accidental movement.

SHUTDOWN CONTROL FUNCTIONS

After bucket has been lowered to overnight storage position, move all switches and controls to "OFF" position. Move parking brake switch to "LOCK" position. This will apply parking brake. Move pilot cutoff switch to "LOCK" position. This will disable bucket control lever. Move key in starter switch to "OFF" position, and remove key from switch.

Engage all lock-down security equipment that may have been installed on machine.

IMPORTANT

When hydraulic system maintenance or service work must be performed, be aware that accumulators in system store fluid under pressure after system has been shut down. To release hydraulic pressure in accumulators, operate control with engine "OFF" until accumulator pressure is completely dissipated.

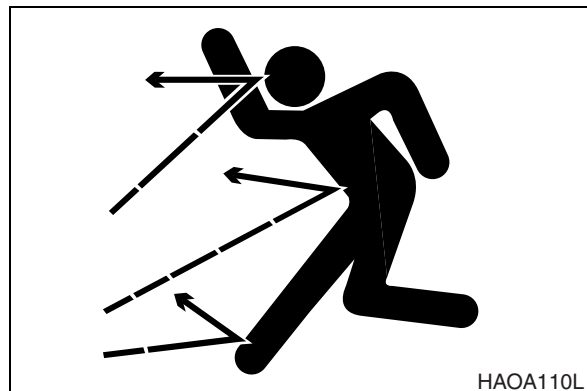
EQUIPMENT

ROUGH OPERATION MAY REQUIRE USE OF CERTIFIED SAFETY EQUIPMENT

Work in mines, tunnels, deep pits or on loose or wet surfaces could produce danger of falling rock, roll over or hazardous flying objects. Additional protection for operator's cab could be required in form of a FOPS/Falling Object Protective Structure and/or ROPS/Roll Over Protective Structure reinforcement system.

Any reinforcement system that is installed on machine must pass safety and certification standards and carry appropriate labeling and rating information. For example, most often added type of reinforcement system, FOPS, must meet or exceed Society of Automotive Engineers standard SAE J1356, "Performance Criteria for Falling Object Guards for Wheel loaders."

Never attempt to alter or modify any type of protective structure reinforcement system, by drilling holes, welding or remounting or relocating fasteners. Any serious impact or damage to system requires a complete integrity reevaluation. Reinstallation, recertification and/or replacement of system may be necessary.



HAOA110L

Figure 13



HAOA100L

Figure 14

INSTALL ADDITIONAL SAFETY EQUIPMENT IF CONDITIONS REQUIRE

Laminate glass protection for the front, side or rear windows may also be recommended depending upon particular site conditions.

Contact your Daewoo distributor for available safety guards and/or recommendations if there is any danger of getting hit by objects that could strike the operator's cab. Make sure that all other work site crew members are kept well away from wheel loader and safe from potential hazards.

MOVEMENT ALARMS

If wheel loader is equipped with an audible travel movement alarm, test alarm on a daily basis. Audible alarm should sound as soon as travel system is engaged.

SEAT BELTS SHOULD BE USED AT ALL TIMES

Whenever engine is running, operator should be seated at the control station with seat belt properly engaged.



Figure 15

KEEP A FIRE EXTINGUISHER AT HAND

It is recommended that an appropriately sized (2.27 kg [5 lb.] or larger) multipurpose "A/B/C" fire extinguisher be mounted in cab. Check and service fire extinguisher at regular intervals and make sure that all work site crew members are adequately trained in its use.

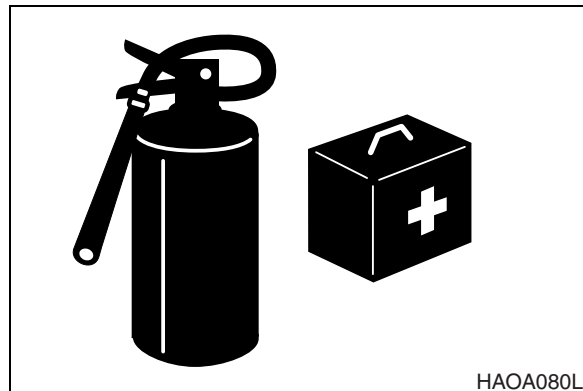


Figure 16

MAINTAIN STANDARD SAFETY EQUIPMENT IN GOOD CONDITION

Machinery guards and body panel covers must be in place at all times. Keep well clear of rotating parts. Pinch point hazards such as cooling fan and alternator drive belts could catch hair, jewelry or oversize or very loose clothing.

Safety labels must be replaced if they are damaged or become unreadable. Information on labels gives work crew members an important safety reminder. Part numbers for each decal and required mounting locations are shown on pages 1-2 through 1-4 of this section.

SAFETY CRITICAL PARTS MUST BE REPLACED PERIODICALLY

Replace following fire related components as soon as they begin to show any sign of wear, or at regular periodic intervals, whether or not deterioration is visible:

- Fuel system flexible hoses, the tank overflow drain hose and the fuel fill cap.
- Hydraulic system hoses, especially the pump outlet lines and front and rear pump branch hoses.
- Keep mounting brackets and hose and cable routing straps tight. Hose routing should have gradual bends.

HYDRAULIC CYLINDER SEALS REQUIRE PERIODIC REPLACEMENT

Check cylinder drift rate at regular intervals. Overhaul seal kits are available through Daewoo.

HIGH-PRESSURE HYDRAULIC LINES CAN STORE A GREAT DEAL OF ENERGY

Exposed hydraulic hoses on arm or boom could react with explosive force if struck by a falling rock, overhead obstacle or other work site hazard. Extra safety guards may be required. NEVER allow hoses to be hit, bent or interfered with during operation.

OPERATOR'S CAB SHOULD BE KEPT CLEAN

Clean grease and dirt from pedals and controls. This contributes to safe operation. Cleaning also provides an opportunity to inspect equipment. Minor damage can be repaired or corrected before major problems result.

Keep cab floor and consoles free of tools and personal items.

CLOTHING AND PERSONAL PROTECTIVE ITEMS

Contain long hair, and avoid loose clothing and jewelry. They can catch on controls or in protruding parts and cause serious injury or death.

Do not wear oily clothes. They are highly flammable.

Full eye protection, a hard hat, safety shoes and gloves may be required at the work site.

While working on the machine, never use inadequate tools. They could break or slip, causing injury, or they may not adequately perform intended functions.



Figure 17

BREATHING MASKS, EAR PROTECTION MAY BE REQUIRED

Do not forget that some risks to your health may not be immediately apparent. Exhaust gases and noise pollution may not be visible, but these hazards can cause disabling or permanent injuries.

NOTE: *The equivalent continuous A-weighted sound pressure level at the workstation for this machine is 76 dB(A).*

Measurement is obtained on a dynamic machine following the procedures and cab conditions as described in ISO 6396.

NOTE: *The guaranteed sound power level emitted by the machinery for this machine is 107 dB(A).*

Measurement is obtained on a dynamic machine with the procedures as described in 2000/14/EC.

VIBRATION LEVEL INFORMATION

Hands/Arms: The weighted root mean square acceleration to which the hands/arms are subjected, is less than 2.5 m/s^2 .

Whole Body: The weighted root mean square acceleration to which the whole body is subjected, is less than 0.5 m/s^2 .

Measurements are obtained on a representative machine, using measuring procedures as described in the following standard: ISO 2631/1, ISO 5349, and SAE J1166.

ASBESTOS DUST HAZARD PREVENTION

Asbestos dust can be **HAZARDOUS** to your health if it is inhaled. Materials containing asbestos fiber can be present on work site. Breathing air that contains asbestos fiber can ultimately cause serious or fatal lung damage. To prevent lung damage from asbestos fiber, observe following precautions;

- Use a respirator that is approved for use in an asbestos-laden atmosphere.
- Never use compressed air for cleaning.
- Use water for cleaning to keep down the dust.
- Work on the machine or component with the wind at your back whenever possible.
- Always observe any rules and regulations related to the work site and working environment.

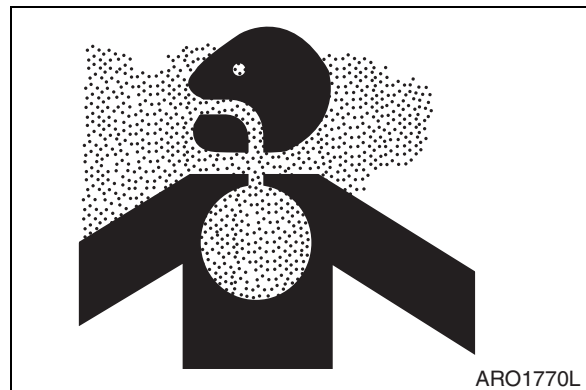


Figure 18

BATTERY ELECTROLYTE AND EXPLOSIVE GASES CAN BE LETHAL

Flush eyes with water for 10-15 minutes if acid is splashed in face. Anyone who swallows acid must have **immediate** medical aid. *Call Poison Control listed in the front cover of the telephone directory.*

Explosive battery gas can be set off by sparks from incidental contact or static discharge. Turn "OFF" all switches and engine when working on batteries. Keep battery terminals tight. Contact between a loose terminal and post can create an explosive spark.



Figure 19

DISCONNECT BATTERIES BEFORE ELECTRICAL SERVICE OR ELECTRICAL WELDING

Remove cable to negative terminal first when disconnecting cable. Connect positive terminal cables first when installing a battery.

USE LOW HEAT PORTABLE LIGHTING

Hot surfaces on trouble lights or portable work lights can set off fuel or battery explosive gases.

MAINTENANCE

USE WARNING TAG DURING SERVICE

Alert others that service or maintenance is being performed and tag operator's cab controls – and other machine areas if required – with a warning notice.

Warning tags for controls are available from Daewoo distributors; see Figure 20.



Figure 20

DO NOT RUN ENGINE IF REPAIRS OR WORK ARE BEING PERFORMED ALONE

You should always have at least two people working together if engine must be run during service. One person needs to remain in operator's seat, ready to work controls or stop machine and shut "OFF" engine.

ALWAYS USE ADEQUATE EQUIPMENT SUPPORTS AND BLOCKING

Do not allow weight or equipment loads to remain suspended. Lower everything to ground before leaving operator's seat. Do not use hollow, cracked or unsteady, wobbling weight supports. Do not work under any equipment supported solely by a lift jack.

DO NOT WORK ON HOT ENGINES OR HOT COOLING OR HYDRAULIC SYSTEMS

Wait for engine to cool off after normal operation. Park wheel loader on firm, level ground and lower all equipment before shutting down and switching "OFF" controls. When engine lube oil, gearbox lubricant or other fluids require change, wait for fluid temperatures to decrease to a moderate level before removing drain plugs.

NOTE: *Oil will drain more quickly and completely if it is warm. Do not drain fluids at temperatures exceeding 95°C (203°F), however do not allow full cool down.*

COOL DOWN IS REQUIRED BEFORE RADIATOR OR RESERVOIR CHECKS

Shut down engine and allow heat to dissipate before performing service on engine radiator or hydraulic fluid reservoir. Both assemblies have air vent levers at or near fill cap for venting built-up air pressure. Release levers before trying to take off fill caps and **LOOSEN CAPS SLOWLY**, before removal.

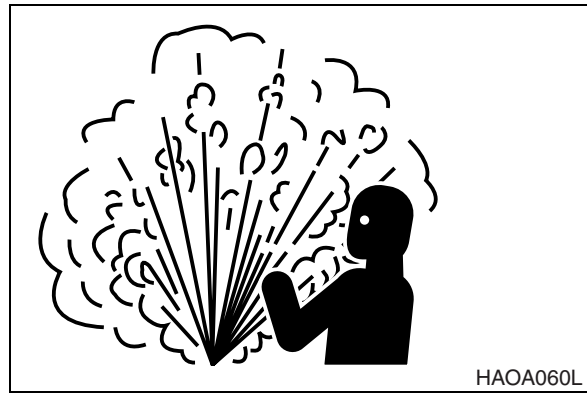


Figure 21

PRECAUTIONS WITH HIGH-PRESSURE LINE, TUBES AND HOSES

When inspecting or replacing high-pressure piping or hoses, check that the pressure has been released from the circuit. Failure to release the pressure may lead to serious injury. Always do the following;

- Wear protective glasses and leather gloves.
- Fluid leaks from hydraulic hoses or pressurized components can be difficult to see but pressurized oil has enough force to pierce the skin and cause serious injury. Always use a piece of wood or cardboard to check for suspected hydraulic leaks. Never use your hands or expose your fingers.
- Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install lines, tubes or hoses that are bent or damaged.
- Make sure that all clamps, guards and heat shields are installed correctly to prevent vibration, rubbing against other parts, and excessive heat during operation.
 - If any of the following conditions are found, replace the part.
 - Damage or leakage from hose end.
 - Wear, damage, cutting of covering, or exposure of strengthening wire layer.
 - Cover portion is swollen in places.
 - There is twisting or crushing at movable parts of hose.
 - Foreign material is embedded in the covering.
 - Hose end is deformed.

NOTE: *Refer to "Hose In-service Lifetime Limit (European Standard ISO 8331 and EN982 CEN)" on page 4-56, for additional European regulations.*

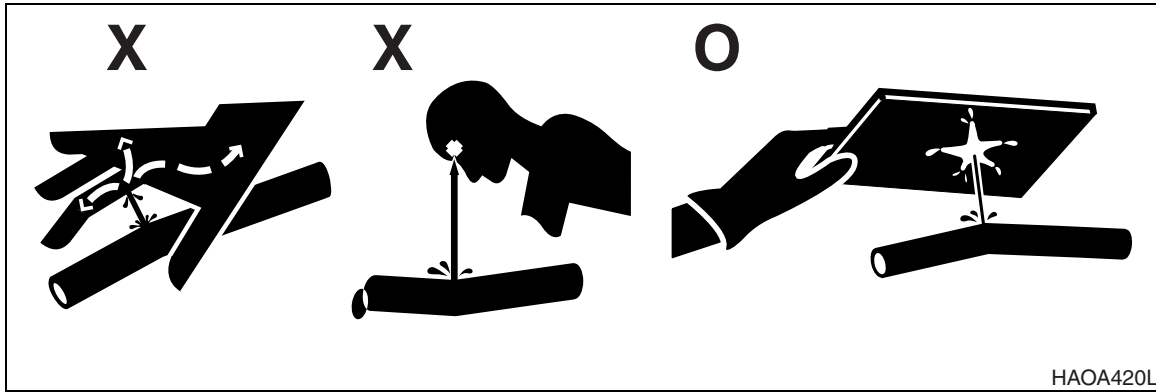


Figure 22

OBTAIN IMMEDIATE MEDICAL ATTENTION IF PRESSURIZED OIL PIERCES SKIN



WARNING!

Failure to obtain prompt medical assistance could result in gangrene or other serious damage to tissue.

USE CORRECT REPLACEMENT FASTENERS TIGHTENED TO PROPER TORQUE

Refer to "General Maintenance" section of Shop Manual for information on tightening torques and recommended assembly compounds and always use correct part.

Poor or incorrect fastener connections can dangerously weaken assemblies.

DISPOSE OF ALL PETROLEUM BASED OILS AND FLUIDS PROPERLY

Physical contact with used motor oil may pose a health risk. Wipe oil from your hands promptly and wash off any remaining residue.

Used motor oil is an environmental contaminant and may only be disposed of at approved collection facilities. Never drain any petroleum based product on ground or dispose of old oil in municipal waste collection containers, or in metropolitan sewer systems or rural landfills.

Check state and local regulations for other requirements.

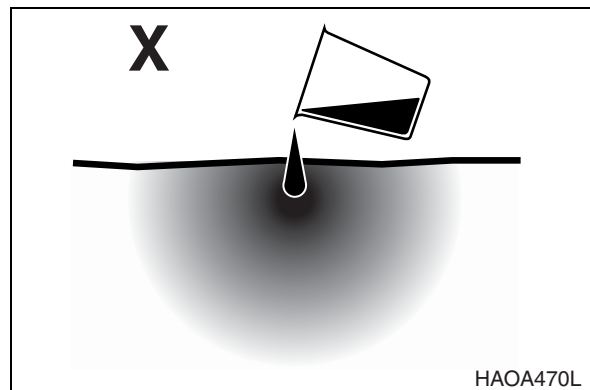


Figure 23

CHECK TIRE PRESSURE AND CONDITION

Maintain tire pressure but do not overinflate. Inspect tires and wheels daily. When inflating tires, follow procedures in Maintenance Section, which include using an extension to allow you to avoid standing in front of or over a tire. Do not change a tire unless you have both experience and proper equipment.

SHIPPING AND TRANSPORTATION

OBEY STATE AND LOCAL OVER-THE-ROAD REGULATIONS

Check state and local restrictions regarding weight, width and length of a load before making any other preparation for transport.

Hauling vehicle, trailer and load must all be in compliance with local regulations governing intended shipping route.

Partial disassembly or tear-down of wheel loader may be necessary to meet travel restrictions or particular conditions at work site. See "Transportation" on page 5-1.

OPERATING CONTROLS

"Operating Controls" section presented here consists of the following groups:

1. "Component Locations" on page 2-2
2. "Control Identification" on page 2-6
3. "Steering Console and Pedals" on page 2-7
4. "Transmission Display" on page 2-15
5. "Front Instrument Panel" on page 2-16
6. "Right Side Switch Panel" on page 2-25
7. "Pilot Control Valve Lever (Joystick)" on page 2-34
8. "Various Cabin Locations" on page 2-36
9. "Heater and Air Conditioner Operation" on page 2-40
10. "Stereo" on page 2-45
11. "Seat Adjustment" on page 2-49
12. "Seat Belt" on page 2-51
13. "Door Side Latch" on page 2-52
14. "Fuse Box/Relay" on page 2-53

Each group is explained with a point location drawing or photo and a brief description of each control, switch, gauge or valve.

Indicator lights work in addition to gauges on instrument panel. Operators should monitor machine pressure on instrument panel along with indicator lights. These lights will only give operators an indication that there is a problem.



WARNING!

Warning lights. When any one or more of the warning lights on the control console come "ON," immediately discontinue operation and shut down unit. Investigate and correct problem before proceeding with operation.

COMPONENT LOCATIONS

The following figure identifies the location of major machine components.

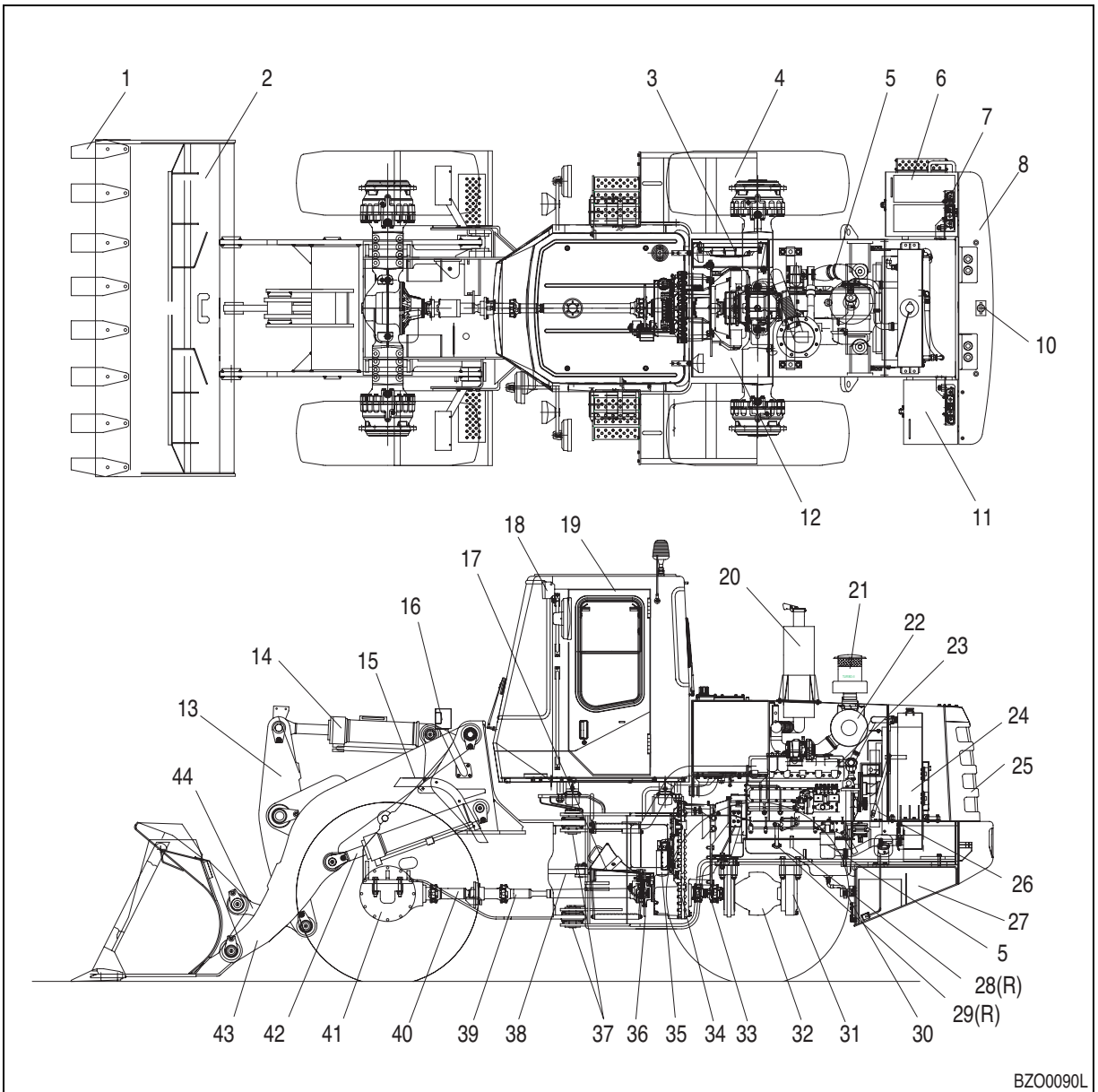


Figure 1 (S/N 3001 thru 4000)

- | | |
|------------------------------|---|
| 1. BUCKET TOOTH | 24. RADIATOR |
| 2. BUCKET | 25. GRILLE |
| 3. AIR CONDITIONER CONDENSER | 26. FAN |
| 4. REAR WHEEL COVER | 27. FUEL TANK |
| 5. ENGINE OIL FILTER | 28. ENGINE OIL LEVEL GAUGE (RIGHT SIDE) |
| 6. BATTERY BOX | 29. ENGINE OIL FILLER PIPE (RIGHT SIDE) |
| 7. REAR LIGHT | 30. REMOTE ENGINE OIL DRAIN PORT |
| 8. COUNTERWEIGHT | 31. REAR AXLE PIVOT |
| 10. TOWING PIN | 32. REAR AXLE |
| 11. TOOL BOX / FUEL PUMP | 33. DRIVE SHAFT (REAR) |
| 12. OIL TANK | 34. TRANSMISSION |
| 13. TILT LEVER | 35. TRANSMISSION OIL FILTER |
| 14. BUCKET CYLINDER | 36. PARKING BRAKE |
| 15. FRONT WHEEL COVER | 37. CENTER PIN |
| 16. HEADLIGHT SUPPORT | 38. STEERING WHEEL CYLINDER |
| 17. LADDER | 39. DRIVE SHAFT (CENTER) |
| 18. WORKING LIGHT | 40. DRIVE SHAFT (FRONT) |
| 19. OPERATOR'S CAB | 41. FRONT AXLE |
| 20. MUFFLER | 42. BOOM CYLINDER |
| 21. ENGINE AIR PRECLEANER | 43. LOADER ARM |
| 22. AIR CLEANER | 44. LINK |
| 23. ENGINE | |

The following figure identifies the location of major machine components.

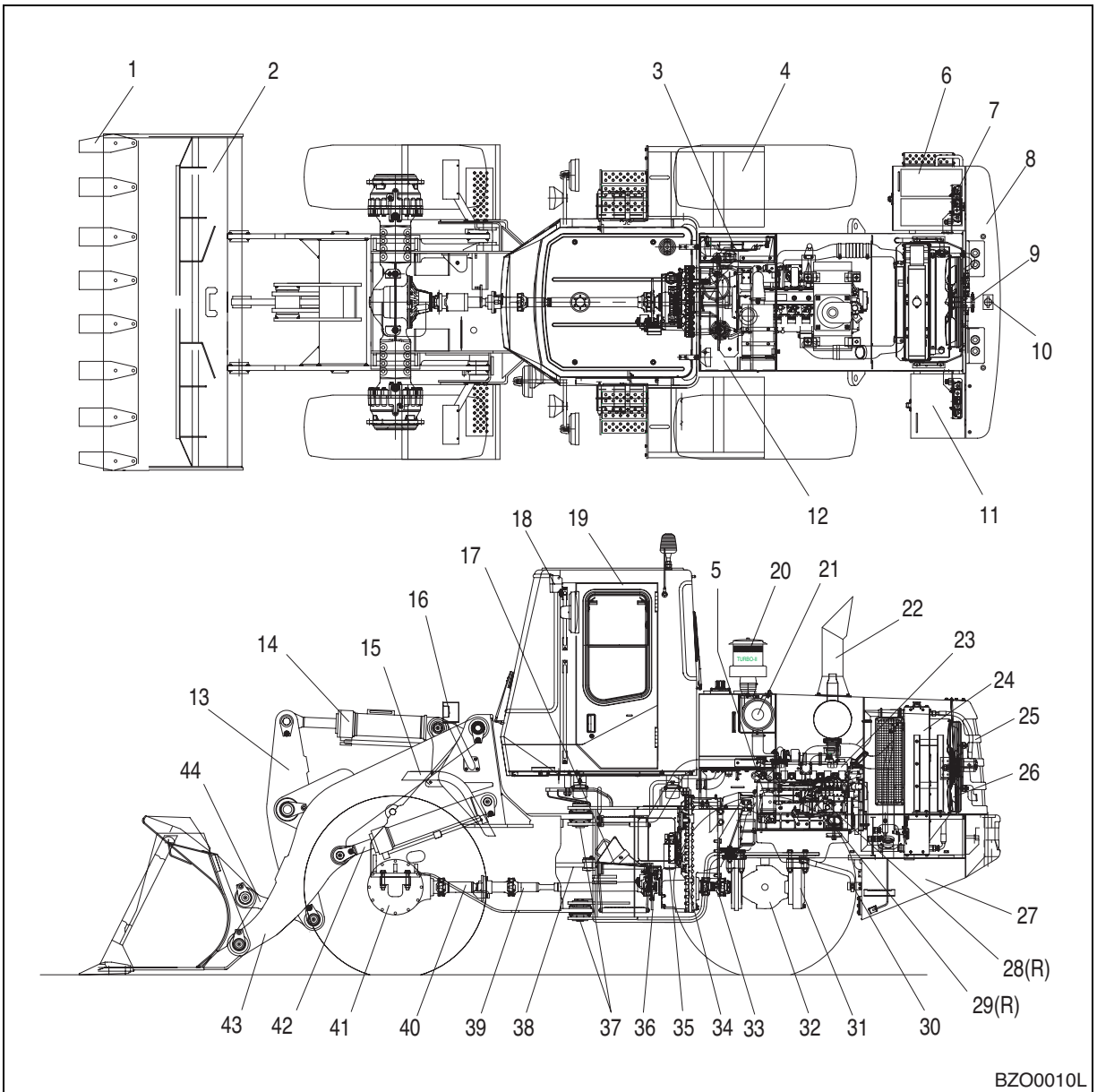


Figure 2 (S/N 4001 and Up)

- | | |
|------------------------------|---|
| 1. BUCKET TOOTH | 24. RADIATOR |
| 2. BUCKET | 25. GRILLE |
| 3. AIR CONDITIONER CONDENSER | 26. FAN |
| 4. REAR WHEEL COVER | 27. FUEL TANK |
| 5. ENGINE OIL FILTER | 28. ENGINE OIL LEVEL GAUGE (RIGHT SIDE) |
| 6. BATTERY BOX | 29. ENGINE OIL FILLER PIPE (RIGHT SIDE) |
| 7. REAR LIGHT | 30. REMOTE ENGINE OIL DRAIN PORT |
| 8. COUNTERWEIGHT | 31. REAR AXLE PIVOT |
| 9. FAN MOTOR | 32. REAR AXLE |
| 10. TOWING PIN | 33. DRIVE SHAFT (REAR) |
| 11. TOOL BOX / FUEL PUMP | 34. TRANSMISSION |
| 12. OIL TANK | 35. TRANSMISSION OIL FILTER |
| 13. TILT LEVER | 36. PARKING BRAKE |
| 14. BUCKET CYLINDER | 37. CENTER PIN |
| 15. FRONT WHEEL COVER | 38. STEERING WHEEL CYLINDER |
| 16. HEADLIGHT SUPPORT | 39. DRIVE SHAFT (CENTER) |
| 17. LADDER | 40. DRIVE SHAFT (FRONT) |
| 18. WORKING LIGHT | 41. FRONT AXLE |
| 19. OPERATOR'S CAB | 42. BOOM CYLINDER |
| 20. PRECLEANER | 43. LOADER ARM |
| 21. AIR CLEANER | 44. LINK |
| 22. MUFFLER | |
| 23. ENGINE | |

CONTROL IDENTIFICATION

Figure 3, identifies controls in operator's cab.

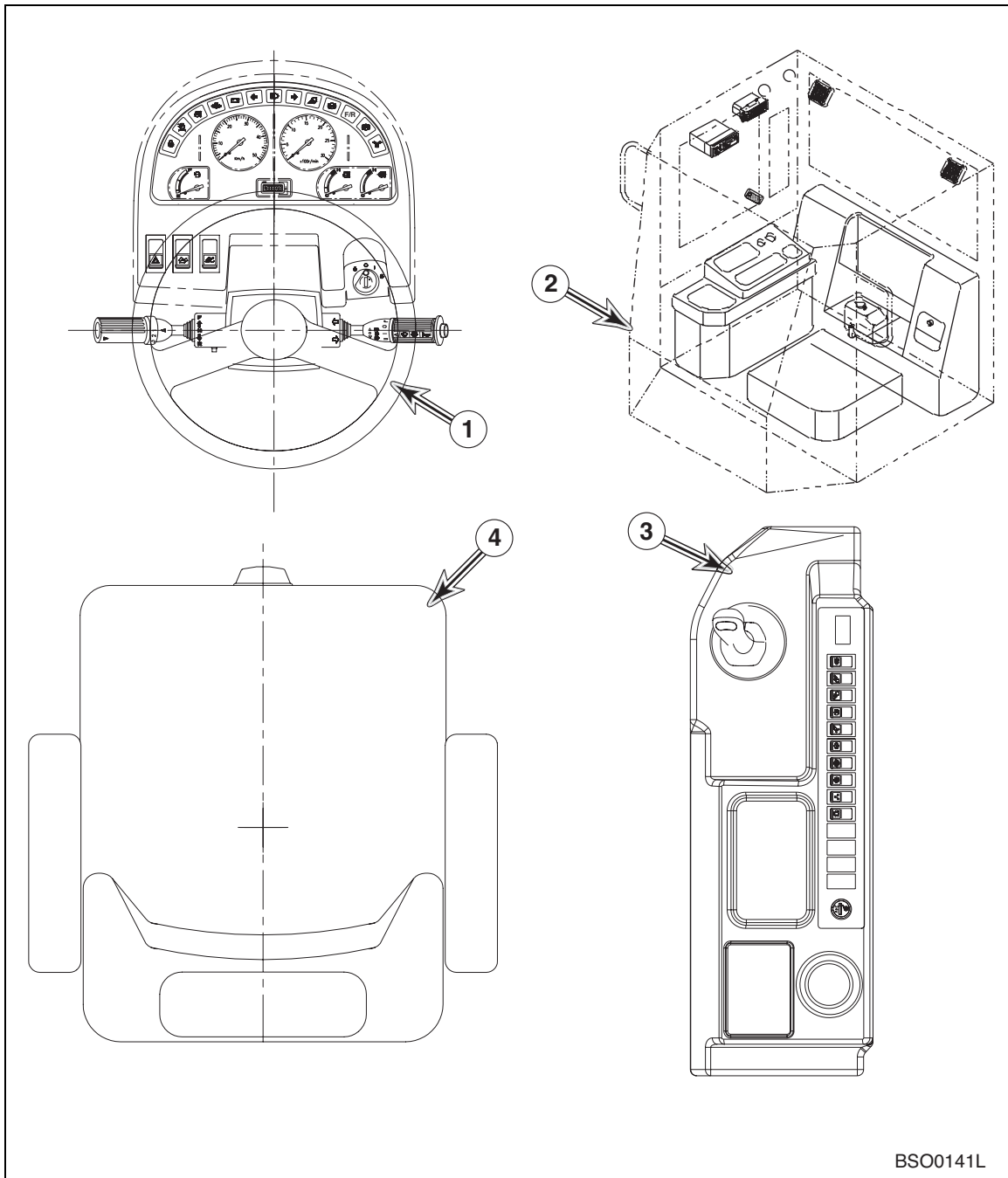


Figure 3

- | | |
|---|--|
| 1. STEERING CONSOLE AND PEDALS (See page 2-7) | 3. RIGHT SIDE SWITCH PANEL (See page 2-39) |
| 2. VARIOUS CABIN LOCATIONS (See page 2-36) | 4. SEAT ADJUSTMENT (See page 2-49) |

STEERING CONSOLE AND PEDALS

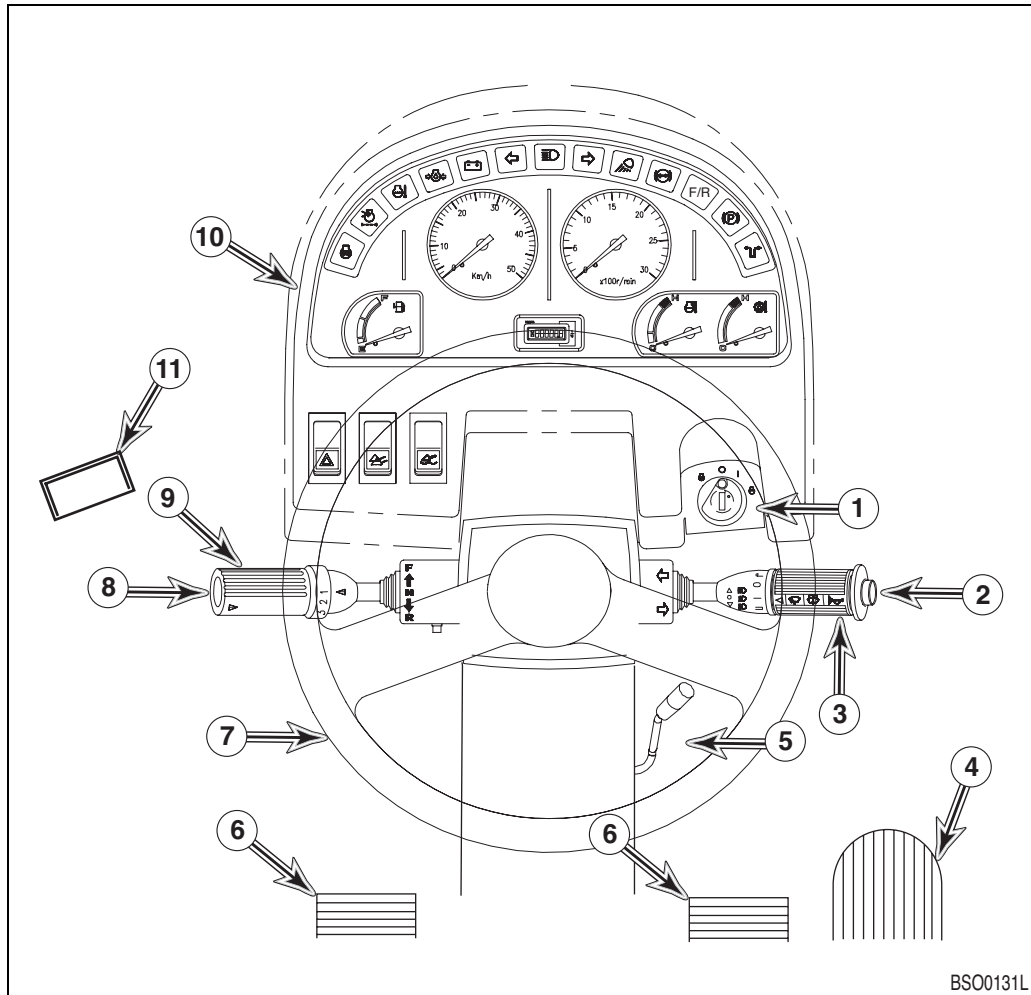


Figure 4

- | | |
|------------------------------------|--|
| 1. STARTER SWITCH | 7. STEERING WHEEL |
| 2. HORN BUTTON | 8. KICK-DOWN SWITCH |
| 3. COMBINATION SWITCH LEVER | 9. TRANSMISSION LEVER |
| 4. ACCELERATOR PEDAL | 10. FRONT INSTRUMENT PANEL (See page 2-16) |
| 5. STEERING WHEEL ADJUSTMENT LEVER | 11. TRANSMISSION DISPLAY (See page 2-15) |
| 6. BRAKE PEDALS | |

1. STARTER SWITCH

A four-position starter switch is used to start or shut down engine for operation.

- O. "OFF" position. Key can be inserted or removed at this position. When key is moved to this position, engine will stop running.
- I. In this position, with engine "OFF," alternator light and engine oil light will turn "ON." In this position with engine running, electrical circuits controlled by this switch are closed.

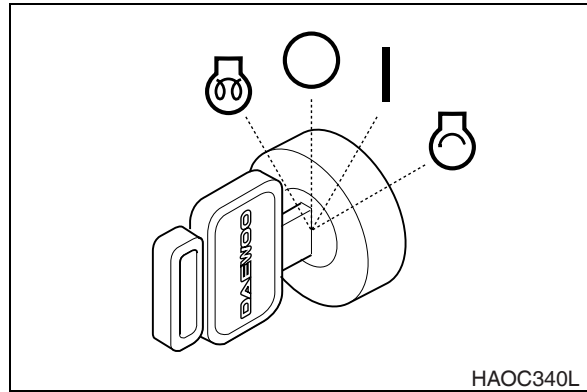


Figure 5

- ⚠. Moving switch to this position will crank engine. When engine starts, release key and allow it to return to "I" (ON) position. Do not crank engine for more than 15 seconds at a time; this could damage starter motor.



WARNING!

DO NOT USE STARTING FLUIDS. The preheat system could cause the starting fluid to explode. Starting fluids should never be used.

- ⚠. Preheat position. Used to aid engine starting in cold weather. When key is in this position, engine preheater is operating. When preheat indicator light turns "ON" engine preheat cycle is complete. Immediately turn key to crank position and start engine.

2. HORN BUTTON (TWO PLACES)

Pressing the button at the end of the combination switch (Figure 6) or the left button at the tip of the pilot control valve lever (joystick) (Figure 7), the horn will sound.

NOTE: Starter switch must be "ON."

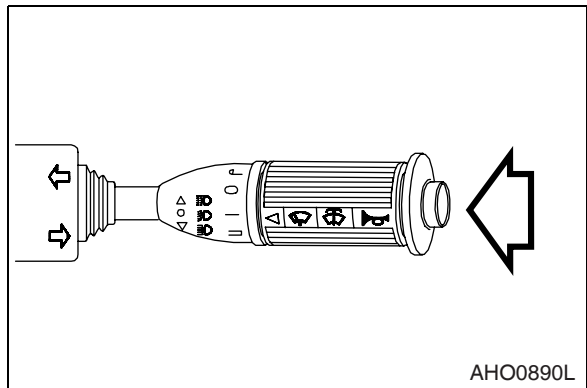


Figure 6



Figure 7

3. COMBINATION SWITCH

- A. Left Side Directional Switch - Pushing lever forward, activates left outside directional lights and directional indicator light on instrument panel.
- B. Right Side Directional Switch - Pulling lever back, activates right outside directional lights and directional indicator light on instrument panel.

NOTE: When turn is completed the lever automatically returns to the "NEUTRAL" position. Should it not, it can be manually returned by hand.

NOTE: Turn signals will function with starter switch in "OFF" position.

- C. Window Washer Switch - When the outside area of the lever is pressed, it activates the washer pump and sprays fluid on the windshield. (Only while being pressed.)

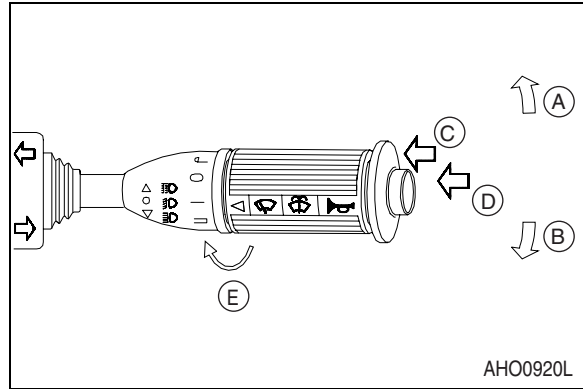


Figure 8



CAUTION!

The washer pump can be damaged if it is activated while there is no fluid in the tank. The fluid level should be checked regularly and refilled if necessary.

Using soap or other solvents instead of the recommended washer fluid may damage the wiper blades and the paint finish.

Only use recommended washer fluid or equivalent.

- D. Horn Button - The center button on end of lever activates horn. (Only while being pressed.)
- E. Wiper Switch - Activates wipers when outside area of lever is rotated.
- J: Intermittent Mode - wiper every 5 seconds.
- 0: Stop (Off).
- I: Normal Speed Mode.
- II: High Speed Mode.

- F. Push Down - Locks into position and light turns "ON" the high beams.
- G. Neutral Position - Normal low beams.
- H. Pull Up - Momentarily turns "ON" both the low beams and high beams. (Returns to "NEUTRAL" position when released.)

NOTE: *High and low beams will only function with the headlight switch in the "I" position.*

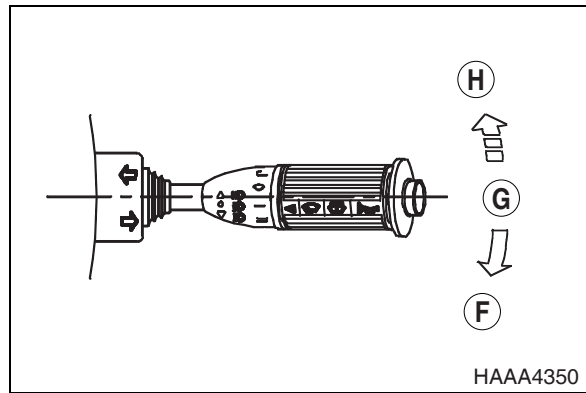


Figure 9

4. ACCELERATOR PEDAL

Controls the travel speed of loader and working speed of load handling system.

**CAUTION!**

The further the pedal is pressed, the more engine speed increases. However, do not press the pedal more than necessary; otherwise it will increase fuel consumption, cause short life on the engine, and in the worst case lead to a serious accident.

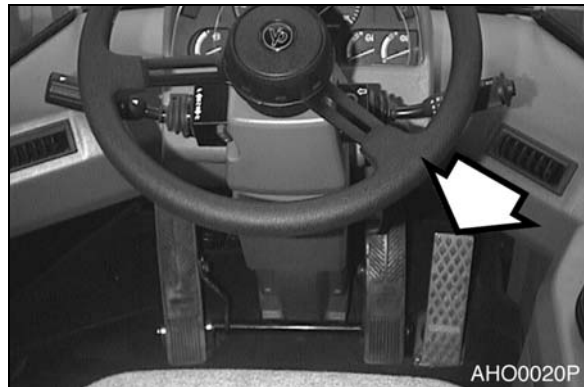


Figure 10

5. STEERING WHEEL ADJUSTMENT LEVER

This lever is used to allow steering wheel to be moved to the most convenient position for the operator.

To adjust angle of steering wheel, pull up the adjustment lever (1, Figure 11) and move the steering assembly to the desired position. Release the adjustment lever to lock the steering wheel in position.

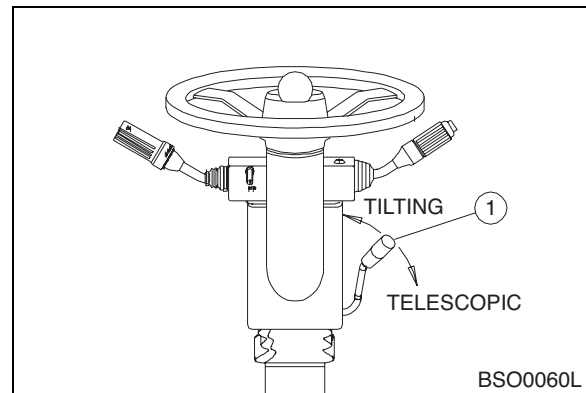


Figure 11

To adjust the steering wheel height, push down on adjustment lever (1, Figure 12) and move the steering wheel to the desired position.

Release the adjustment lever (1, Figure 12).

The steering wheel will remain in the desired position.

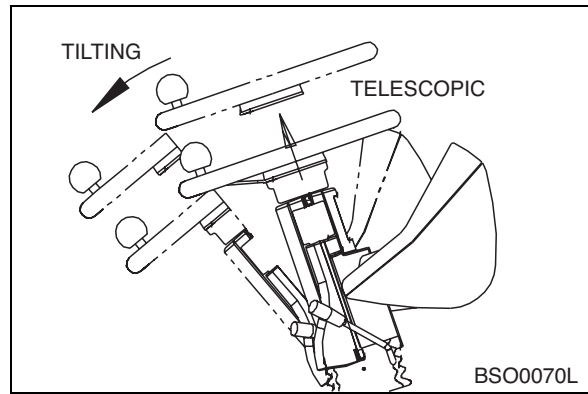


Figure 12

6. BRAKE PEDAL (RIGHT AND LEFT PEDALS)

Pressing brake pedal will apply the brakes to the loader. The brake pedal modes can be switched from "INCHING" to "NO INCHING" or vice versa, by using the transmission cutoff switch (See page 2-31).



CAUTION!

When descending on an incline, slow down the machine by using both the brake pedal and the engine brake. Using the brake pedal too often might lead to insufficient oil pressure, thus making it difficult to brake the loader.

IMPORTANT

Do not use brake pedal as a foot rest. This will cause brake disk to wear faster than normal, and this could cause brake failure.

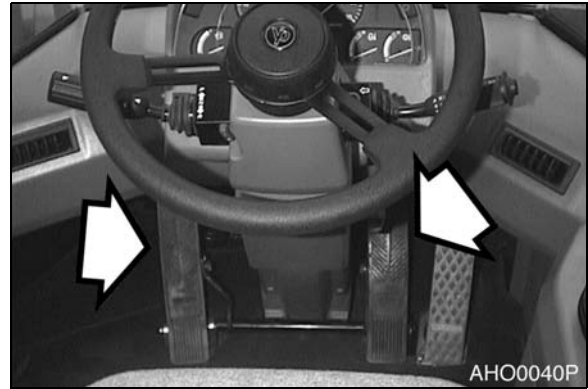


Figure 13

7. STEERING WHEEL

Rotating steering wheel controls position of front wheels and this determines direction of machine travel.

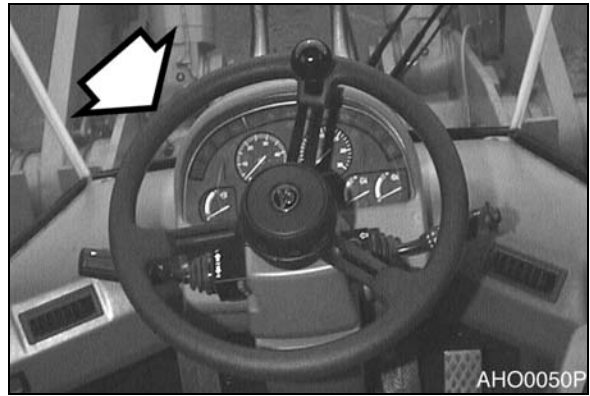


Figure 14

8. KICK-DOWN SWITCH (TWO PLACES)

When transmission is in 2nd gear, pressing this switch will shift transmission into 1st gear. This will allow the driver to perform a quick digging movement.

NOTE: *Kick-down is "RELEASED" when transmission is placed in "NEUTRAL" position or the switch is pressed again.*

Kick-down function range:

- Automatic: 2nd, 3rd, 4th.
- Manual: 2nd.

A second kick-down switch (Figure 16) is on the right button in the tip of the pilot control valve lever (joystick).

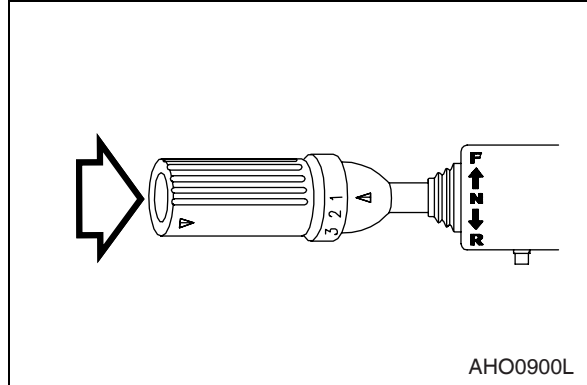


Figure 15

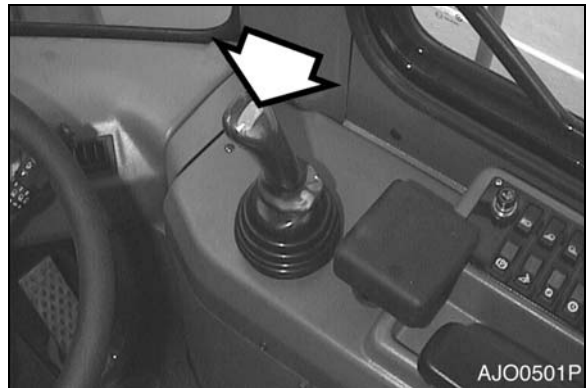


Figure 16

9. TRANSMISSION LEVER

- F Forward - When the lever is pushed forward, transmission is in "FORWARD." 1st, 2nd, 3rd and 4th are available.
- N Neutral - When the lever is returned to the center position, between forward and reverse, the transmission is in "NEUTRAL."
- R Reverse - When the lever is pulled back, transmission is in "REVERSE" 1st, 2nd and 3rd are available.

Rotating the switch shifts transmission between 1st, 2nd, 3rd, or 4th gear.

NOTE: *There is a transmission display, on the dash, that indicates, gears, direction of travel, error codes and kick-down activation. (See page 2-15)*

A transmission neutral lever lock is in base of transmission lever. This neutral lever lock prevents the transmission lever from being moved out of "NEUTRAL."

- N "NEUTRAL LOCK" position. Prevents lever from being moved out of "NEUTRAL."
- D "DRIVE" position. Allows lever to be moved from "NEUTRAL" to "FORWARD and REVERSE."



CAUTION!

"LOCK" transmission lever. When ever machine is parked, "LOCK" transmission lever in "NEUTRAL" to prevent accidental machine movement.

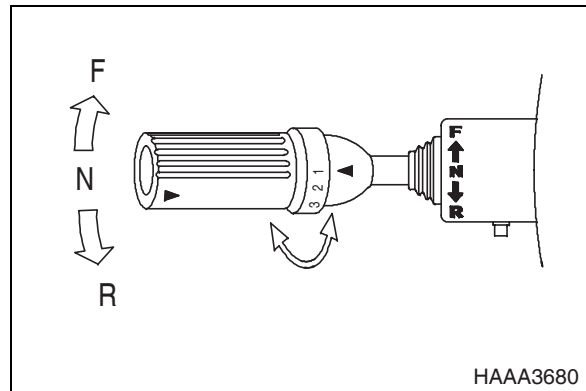


Figure 17



Figure 18

10. FRONT INSTRUMENT PANEL

See “Front Instrument Panel” on page 2-16.

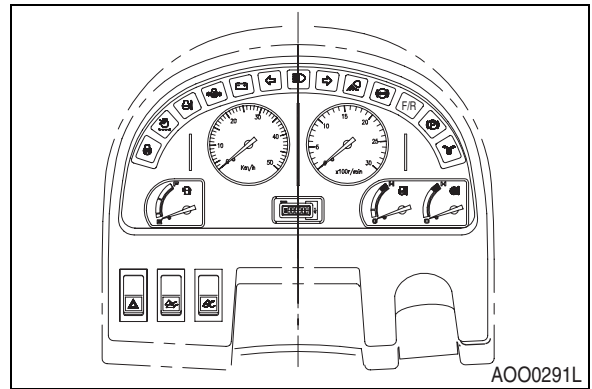


Figure 19

11. TRANSMISSION DISPLAY

See “Transmission Display” on page 2-15.

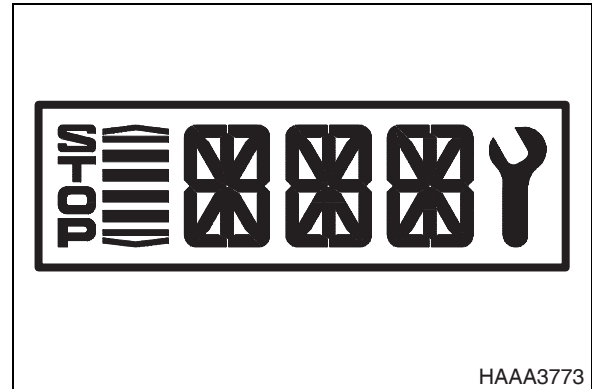


Figure 20

TRANSMISSION DISPLAY

A transmission display is to the left of the steering wheel on the dash. The LCD indicates, gears, direction of travel, error codes, and activated kick-down.

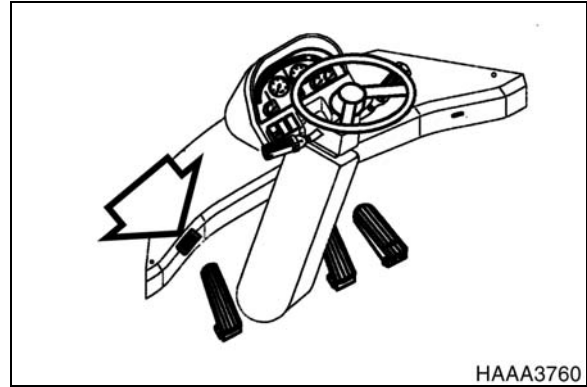


Figure 21

Figure 22, shows the transmission display in detail.

- A. Indicates travel direction and gear selection. See Figure 23 for more detailed information.
- B. Indicates normal operation and error codes. For a list of error codes. See "Transmission Error Codes" on page 6-10.

NOTE: Most codes are only two digits.

- C. Indicates that error codes have occurred and are stored.
- D. Indicates that operation must be stopped immediately to prevent damage to transmission and hazardous operating condition.

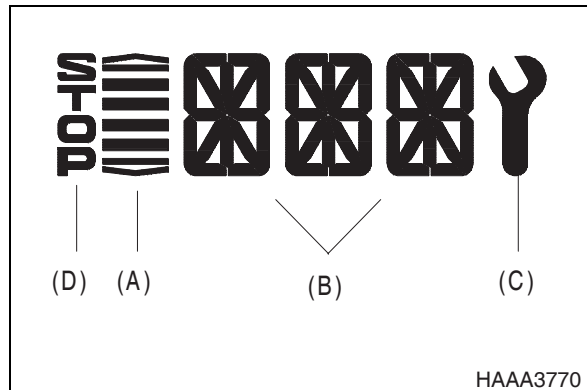


Figure 22

The gear range indicator bars will indicate which gear is selected by displaying the corresponding number of bars. The forward and reverse indicator bars will be "OFF" when the transmission is in "MANUAL MODE."

When transmission is in "AUTOMATIC MODE," all the gear range indicator bars and both travel direction indicators will be "ON."

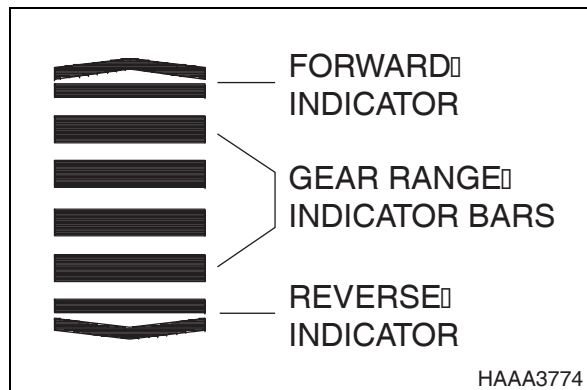


Figure 23

FRONT INSTRUMENT PANEL

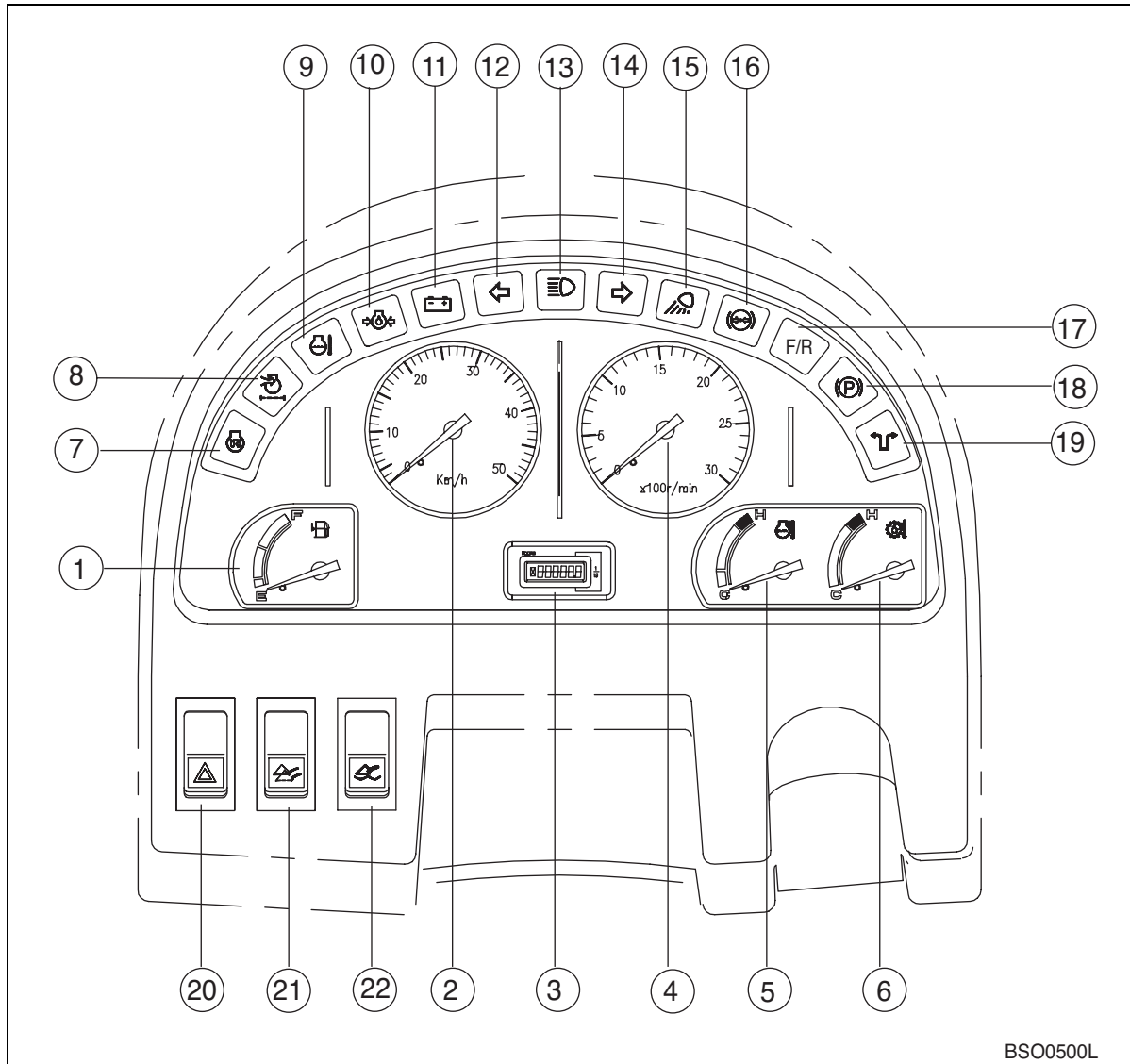


Figure 24

GAUGES

1. FUEL GAUGE
2. SPEEDOMETER
3. HOUR METER
4. TACHOMETER
5. ENGINE COOLANT TEMPERATURE GAUGE
6. TRANSMISSION OIL TEMPERATURE GAUGE

WARNING AND INDICATOR LIGHTS

7. PREHEAT INDICATOR LIGHT
8. AIR CLEANER CLOGGED WARNING LIGHT
9. ENGINE COOLANT TEMPERATURE WARNING LIGHT
10. ENGINE OIL PRESSURE WARNING LIGHT
11. BATTERY WARNING LIGHT
12. LEFT TURN AND HAZARD WARNING LIGHT
13. HIGH BEAM INDICATOR LIGHT
14. RIGHT TURN AND HAZARD WARNING LIGHT
15. WORK LIGHT INDICATOR LIGHT
16. BRAKE FLUID PRESSURE WARNING LIGHT
17. F/R (FORWARD/REVERSE) SELECTOR INDICATOR LIGHT
18. PARKING BRAKE INDICATOR LIGHT
19. EMERGENCY STEERING INDICATOR LIGHT (OPTION)

SWITCHES

20. HAZARD WARNING LIGHT SWITCH
21. LIS (LOAD ISOLATION SYSTEM) SWITCH (OPTION)
22. FLOAT KICK-OUT SWITCH (OPTION)

IMPORTANT

All of gauge and warning lights (except for the turn lights, high beam light, work light and transmission cutoff light) turn "ON" for two seconds with a warning buzzer sound when the starter switch is turned to the "I" position.

If any light fails to turn "ON" at this time, check the cause and replace.

1. FUEL GAUGE

This gauge displays amount of fuel in tank. "F" means the tank is "full"; "E" means the tank is "empty." If the pointer comes close to the "E" (red zone), add fuel as soon as possible. When the pointer comes close to the "E" (red zone), approximately 32 liters (8.5 U.S. gal.) of fuel remains.

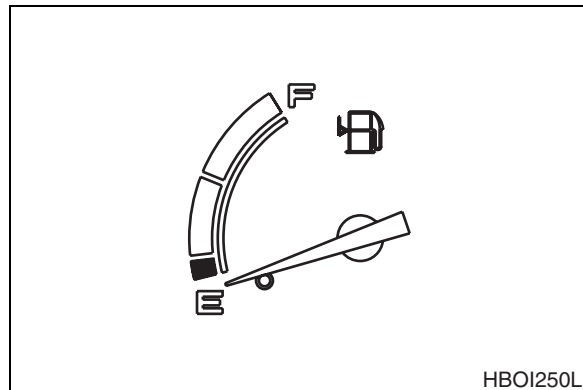


Figure 25

2. SPEEDOMETER

This meter displays speed at which vehicle is traveling.

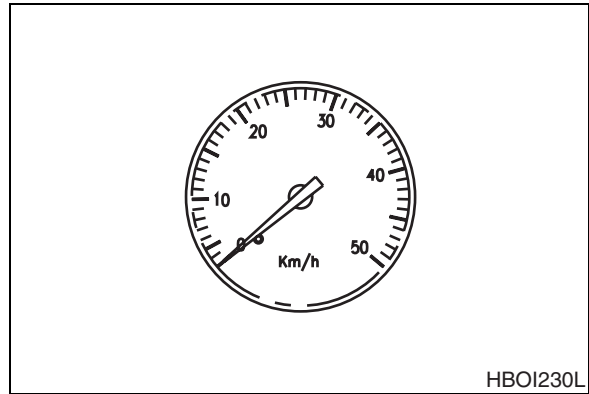


Figure 26

3. HOUR METER

A LCD meter that records total time that starter switch is turned "ON" up to 99,999.9 hours. When engine is running, the hourglass icon blinks every four seconds. This shows that the hour meter is working.

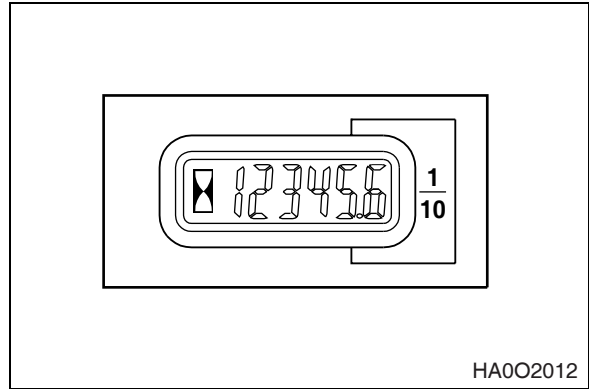


Figure 27

4. TACHOMETER

This meter displays engine speed in revolutions per minute.

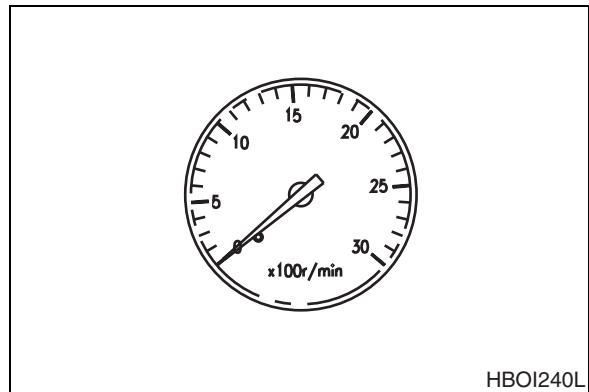


Figure 28

5. ENGINE COOLANT TEMPERATURE GAUGE

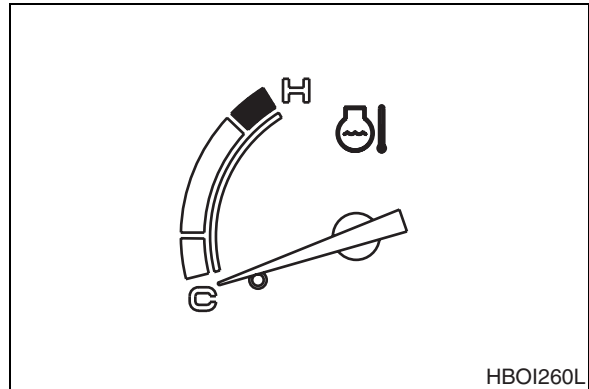
This gauge displays temperature of engine coolant.



CAUTION!

When the pointer indicates "H" mark (red zone), it means the engine is overheated. Stop the operation, let the engine run at low rpm and wait for it to cool down.

Do not shut down engine. If engine is shut down heat surge may occur.



HBOI260L

Figure 29

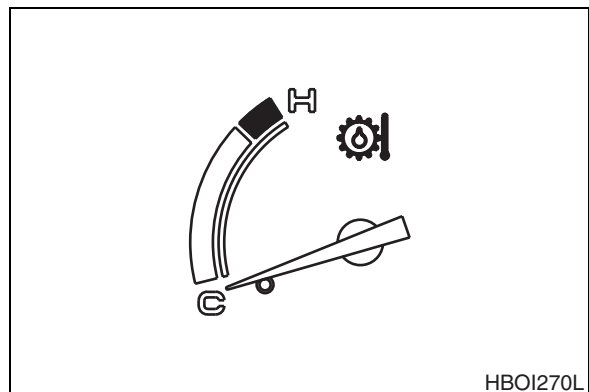
6. TRANSMISSION OIL TEMPERATURE GAUGE

This gauge displays temperature of oil in transmission converter and transmission circuit.



CAUTION!

When the pointer indicates "H" mark (red zone), it means the transmission is overheated. Stop the operation, let the engine run at low rpm and wait for transmission to cool down.



HBOI270L

Figure 30

7. PREHEAT INDICATOR LIGHT

When this light turns "ON" it means that engine preheat cycle is complete. When radiator temperature is below 10°C (-12°F), this light will turn "ON" approximately 19 seconds after starter switch is turned to preheat position.



HAOA639L

Figure 31

8. AIR CLEANER CLOGGED WARNING LIGHT

When this light turns "ON," dirt has built up in the air filter and is beginning to restrict flow of air. Clean or replace air filter before continuing to operate machine. To turn indicator light "OFF," turn starter switch "OFF" and then back "ON."

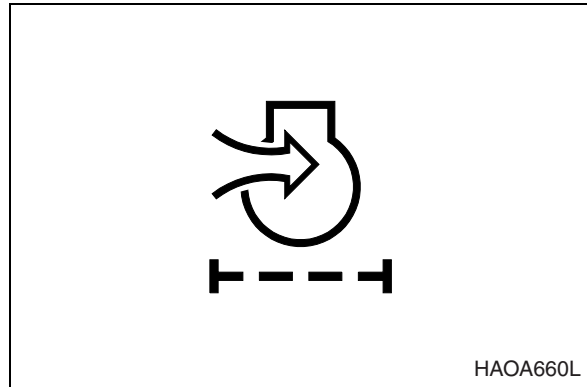


Figure 32

9. ENGINE COOLANT TEMPERATURE WARNING LIGHT

If engine coolant overheats, this light will turn "ON" and an alarm will sound. If light turns "ON," reduce engine speed until coolant temperature drops. Do not turn engine "OFF" because this will cause coolant temperature to rise and may cause engine to seize due to heat surge.

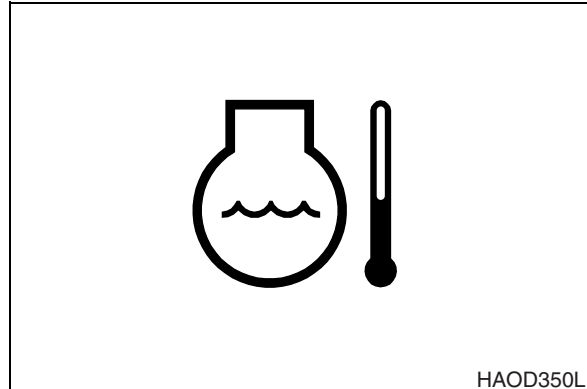


Figure 33

10. ENGINE OIL PRESSURE WARNING LIGHT

When starter switch is in "ON" position, this red light should "ON." When engine is running this red light should turn "OFF." If light remains "ON" when engine is running, an alarm will sound. This means that engine oil pressure has fallen below a safe level. Never allow engine to run if this light is "ON." Serious engine damage will result. Investigate and repair cause of low oil pressure before running engine.

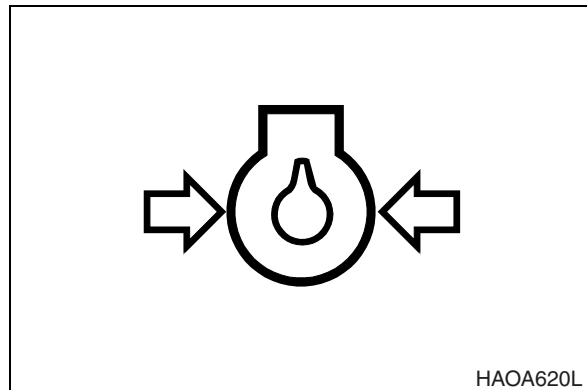


Figure 34

11. BATTERY WARNING LIGHT

When starter switch is first turned to "ON" position, this red light should turn "ON." When engine is running this red light should turn "OFF." If light remains "ON" when engine is running, alternator is defective.

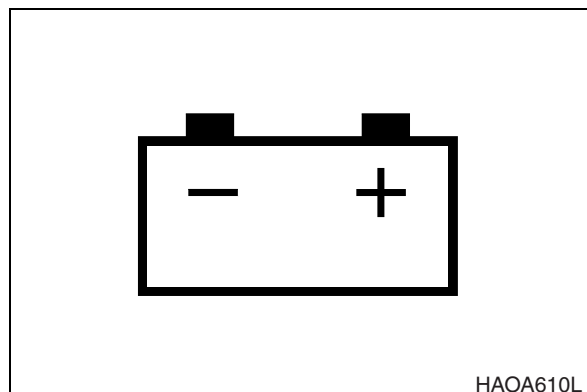


Figure 35

12. LEFT TURN AND HAZARD WARNING LIGHT

This light blinks when left turn signal is turned "ON." Both lights blink when warning lights are turned "ON."

NOTE: *If left and right turn indicators blink together, or if they blink faster than normal, a light bulb is not operating or flasher solenoid is damaged.*

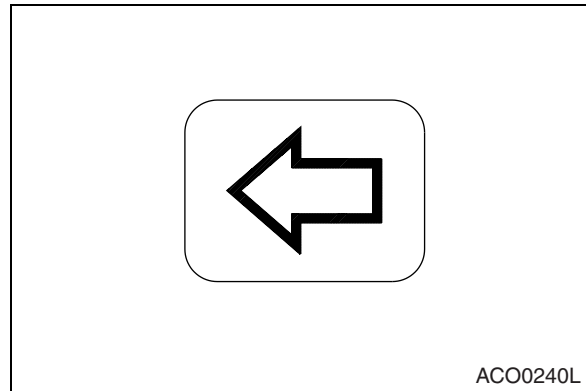


Figure 36

13. HIGH BEAM INDICATOR LIGHT

This light turns "ON" when headlights are turned to "HIGH BEAM."

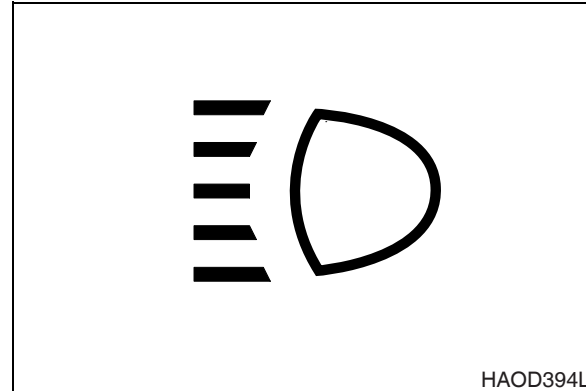


Figure 37

14. RIGHT TURN AND HAZARD WARNING LIGHT

This light blinks when right turn signal is turned "ON." Both lights blink when warning lights are turned "ON."

NOTE: *If left and right turn indicators blink together, or if they blink faster than normal, a light bulb is not operating or flasher solenoid is damaged.*

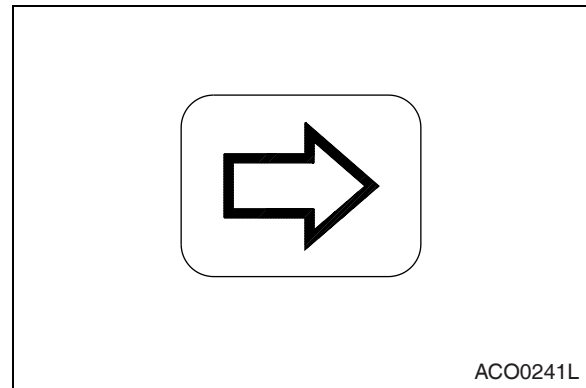


Figure 38

15. WORK LIGHT INDICATOR LIGHT

This light should turn "ON" when the front and/or rear work lights are activated.

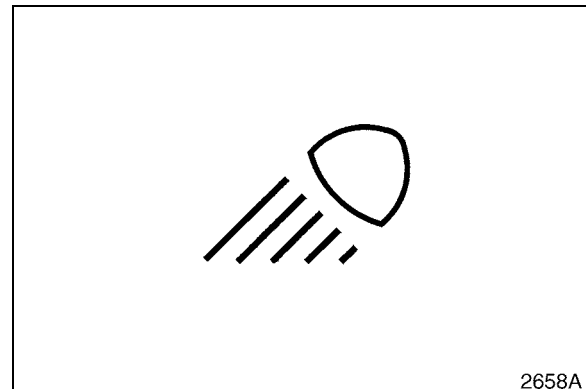


Figure 39

16. BRAKE FLUID PRESSURE WARNING LIGHT

This light turns "ON" when pressure drops in brake fluid circuit. When light turns "ON," an alarm also sounds.

	WARNING!
Never operate or travel machine when this light is "ON" or when alarm is sounding. Always investigate cause of the drop in brake fluid pressure, and repair problem before operating or traveling machine.	

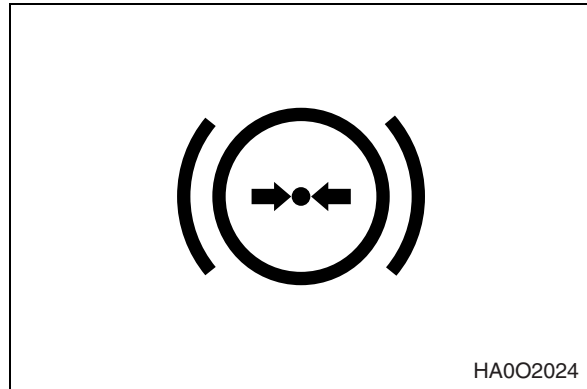


Figure 40

17. F/R (FORWARD/REVERSE) SELECTOR INDICATOR LIGHT (OPTION)

This light turns "ON" when the 2nd gear function is selected.

NOTE: See "F/R (Forward/Reverse) Travel Control System (Option)" on page 3-16 for further information.

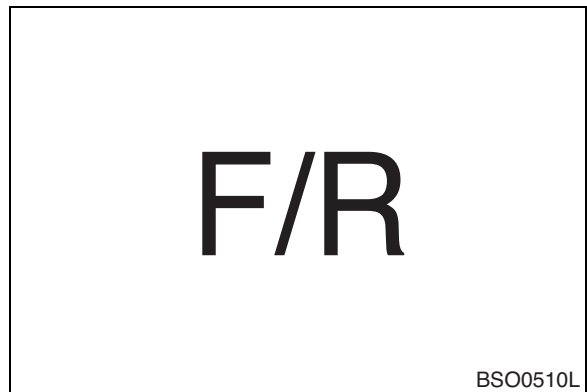


Figure 41

18. PARKING BRAKE INDICATOR LIGHT

When parking brake is "APPLIED," this light turns "ON." If vehicle is moved while parking brake is applied, a warning alarm will sound.

	WARNING!
If vehicle is moved while this light is turned "ON," it could cause premature wear or damage the brake. Always "RELEASE" parking brake and make sure this light is "OFF" before traveling machine.	

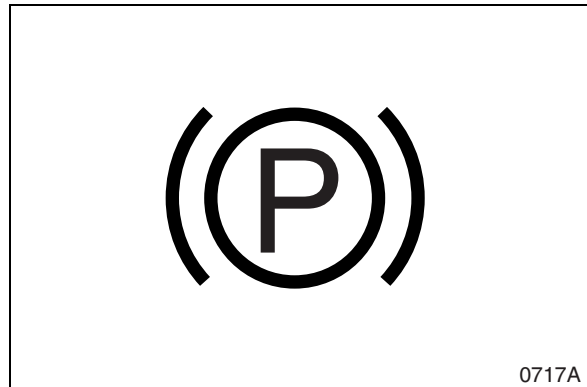
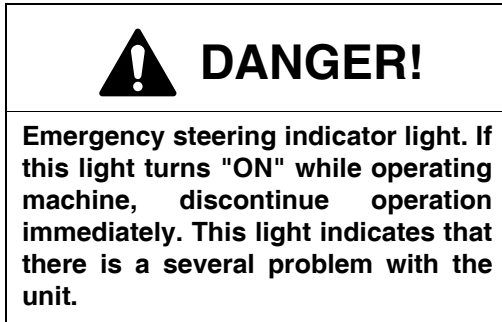


Figure 42

19. EMERGENCY STEERING INDICATOR LIGHT (OPTION)

This light turns "ON" when the emergency steering system is activated due to a hydraulic failure. Immediately stop operation, stop machine, "APPLY" parking brake, and shut down engine.



NOTE: *The light will also turn "ON" when the system is being tested.*

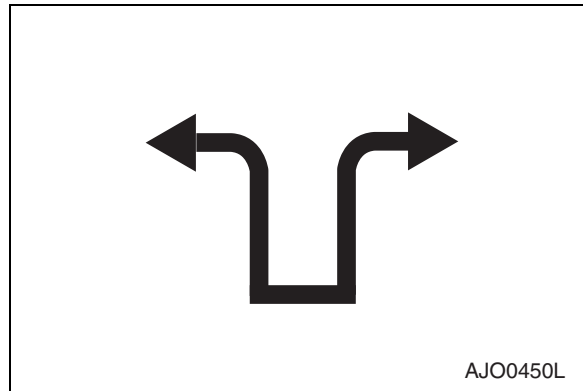


Figure 43

20. HAZARD WARNING LIGHT SWITCH

This light is used when the equipment is stopped due to a malfunction or when an emergency occurs. When this switch is pressed the directional indicator lights in front and back of the machine light up and flash, warning others in the area. At the same time the directional indicator lights on the instrument panel will turn "ON" to warn the operator. The hazard warning lights operate independent of the starter switch.

- O. In this position, this switch turns "OFF" hazard warning lights.
- I. In this position, this switch turns "ON" all turn signals and they flash simultaneously.

NOTE: *Hazard warning lights will function with starter switch in "OFF" position.*

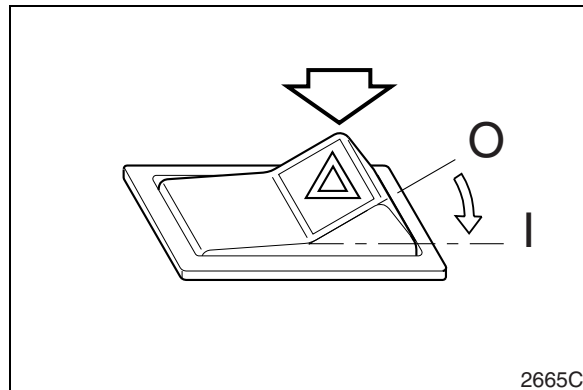


Figure 44

21. LIS (LOAD ISOLATION SYSTEM) SWITCH (OPTION)

- O. When this switch is moved to "OFF" position, it does not allow boom cylinders to act as shock absorbers.
- I. When this switch is moved to "ON" position, it causes boom cylinders to act as shock absorbers. This reduces machine bouncing when machine is traveling with a loaded bucket.

NOTE: LIS operates when traveling speed is over 8 km/h (5 MPH).

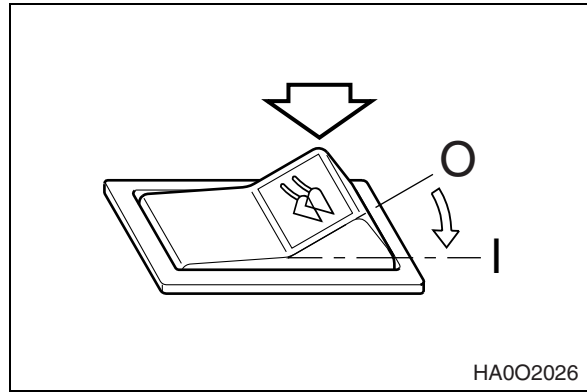


Figure 45

22. FLOAT KICK-OUT SWITCH (OPTION)

Bucket float allows the bucket to follow the contour of the ground/working surface.

When pressing this switch and setting pilot control valve lever (joystick) to floating position, lever is locked (detent) and boom is lowered. When boom is matched to setting position, lever locking is released and lever is turned to "NEUTRAL" position and boom lowering is stopped.

- O. In this position, this switch turns "OFF" bucket float.
- I. In this position, this switch turns "ON" bucket float.

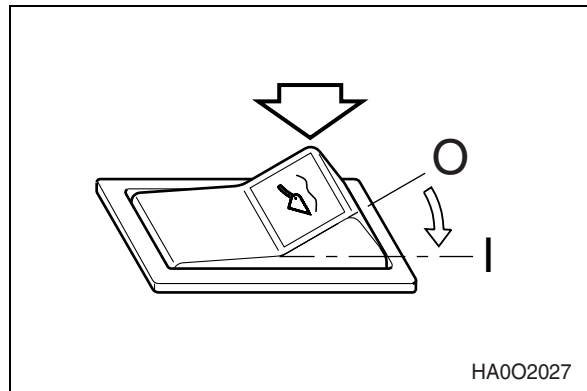


Figure 46

RIGHT SIDE SWITCH PANEL

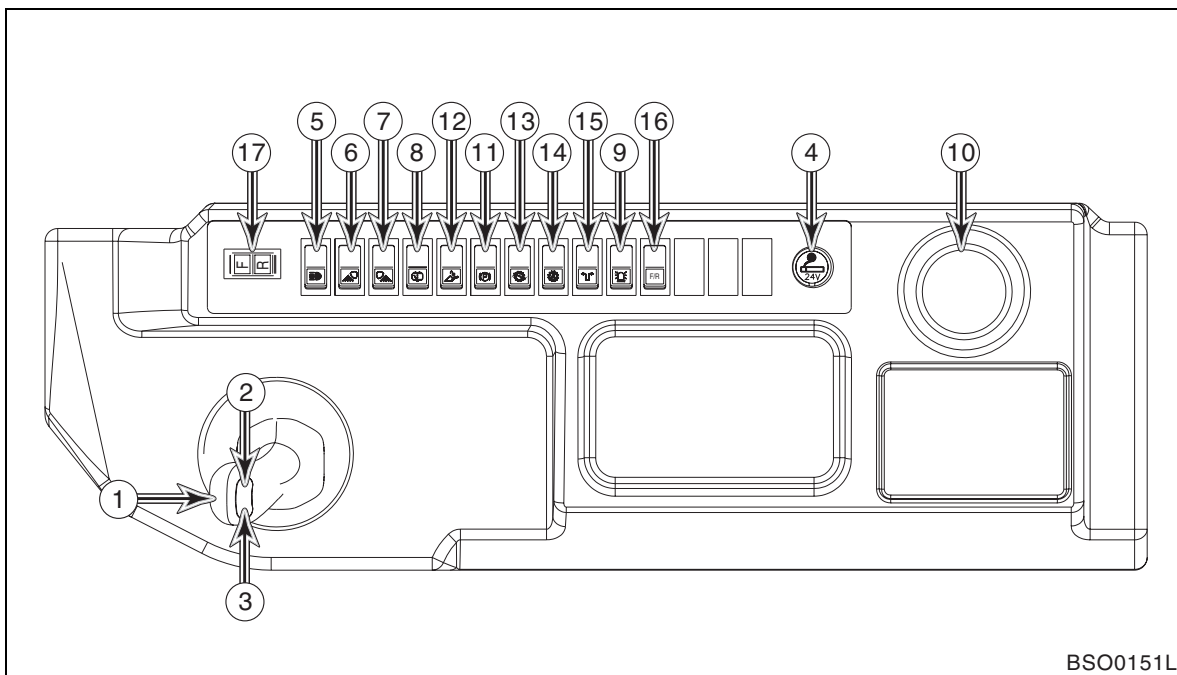


Figure 47

- | | |
|--|---|
| 1. PILOT CONTROL VALVE LEVER
(JOYSTICK) (See page 2-34) | 10. CUP HOLDER |
| 2. KICK-DOWN SWITCH | 11. PARKING BRAKE SWITCH |
| 3. HORN BUTTON | 12. PILOT CUTOFF SWITCH |
| 4. CIGAR LIGHTER | 13. TRANSMISSION CUTOFF SWITCH |
| 5. HEADLIGHT SWITCH | 14. AUTOMATIC TRANSMISSION SWITCH |
| 6. FRONT WORK LIGHT SWITCH | 15. EMERGENCY STEERING TEST SWITCH
(OPTION) |
| 7. REAR WORK LIGHT SWITCH | 16. F/R (FORWARD/REVERSE) SELECTOR
SWITCH (OPTION) |
| 8. REAR WIPER SWITCH | 17. F/R (FORWARD/REVERSE) CONTROL
SWITCH (OPTION) |
| 9. ROTATING BEACON LIGHT SWITCH
(OPTION) | |

1. PILOT CONTROL VALVE LEVER (JOYSTICK)

See "Pilot Control Valve Lever (Joystick)" on page 2-34.

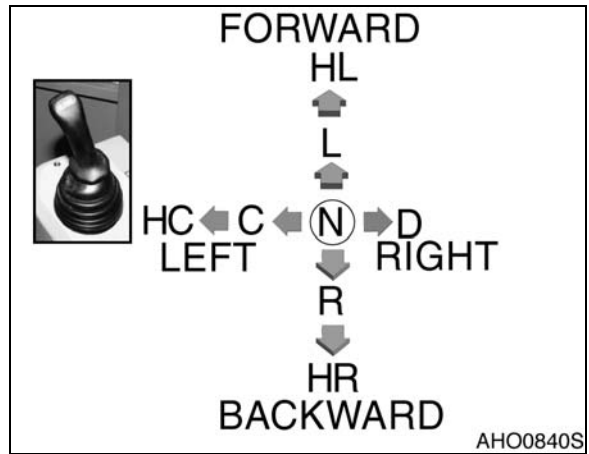


Figure 48

2. KICK-DOWN SWITCH (TWO PLACES)

Kick-down Switch Function - When transmission is in 2nd gear, pressing this switch (Figure 50) will shift transmission into 1st gear. This will allow the driver to perform a quick digging movement.

Kick-down function range:

- Automatic: 2nd, 3rd, 4th.
- Manual: 2nd.

NOTE: *Kick-down is "RELEASED" when transmission is placed in "NEUTRAL" position or the switch is pressed again.*

A second kick-down switch (Figure 49) is on the end of the transmission lever.

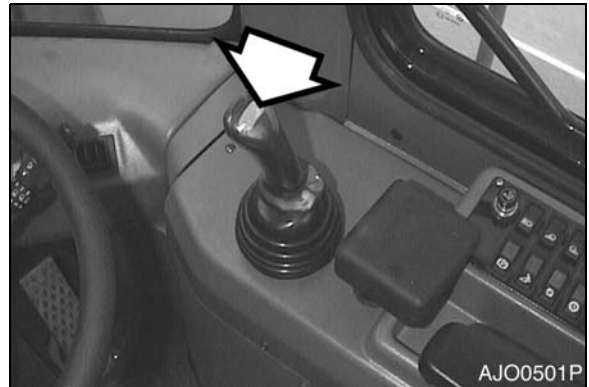


Figure 49

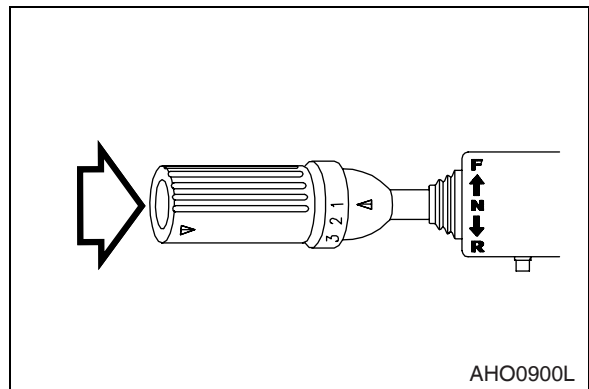


Figure 50

3. HORN BUTTON (TWO PLACES)

Pressing the left button at the tip of the pilot control valve lever (joystick) (Figure 51) or the button at the end of the combination switch (Figure 52) will sound the horn.

NOTE: *Starter switch must be "ON."*



Figure 51

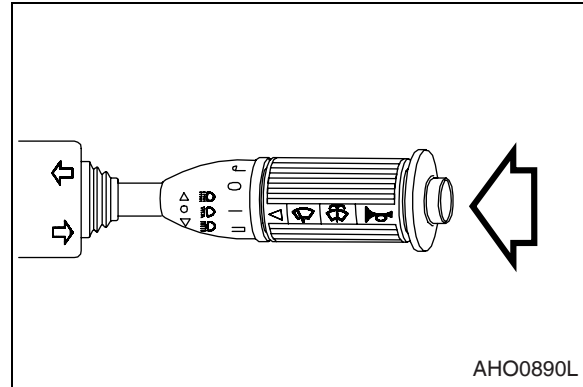


Figure 52

4. CIGAR LIGHTER

Push the lighter all the way into the socket and release your hand. After pushing it in, it will be ejected when it is heated. If it does not eject after a short time, pull it out and have it serviced.

IMPORTANT

The cigar lighter is powered by a 24 volt circuit. Never plug any 12 volt device into the cigar lighter.

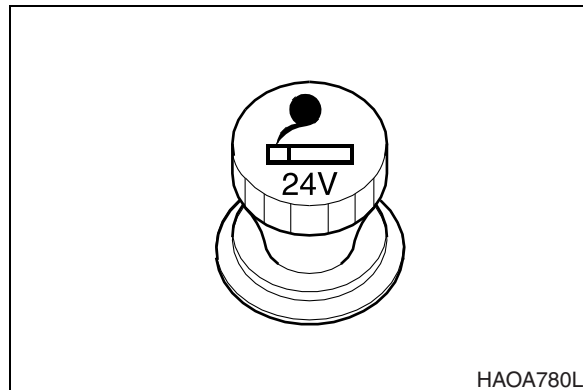


Figure 53

5. HEADLIGHT SWITCH

- O. In this position, this switch turns "OFF" clearance, tail, instrument panel, switch and headlights.

NOTE: *If the switch is not in this position with the engine not running, the pilot buzzer will sound to warn the operator that the batteries are being discharged.*

- I. In this position, this switch turns "ON" clearance, tail, instrument panel and switch lights.
- II. In this position, this switch turns "ON" clearance, tail, gauge panel, and headlights.

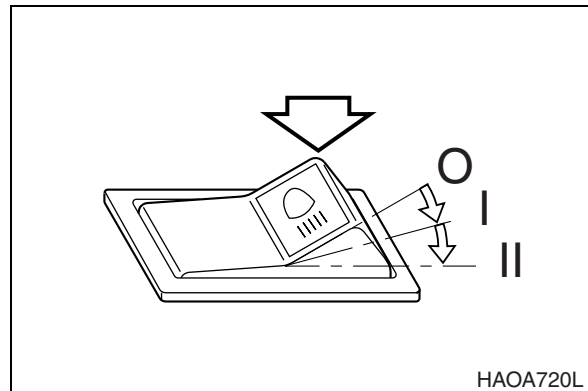


Figure 54



CAUTION!

Do not leave clearance, tail, instrument panel or headlights "ON" when the engine is not running. Leaving lights "ON" with the engine shut down will discharge batteries.

6. FRONT WORK LIGHT SWITCH

- O. In this position, this switch turns "OFF" work lights mounted on the front top of cab.
- I. In this position, this switch turns "ON" work lights mounted on the front top of cab.



CAUTION!

Do not turn "ON" the work light when traveling on public roads.

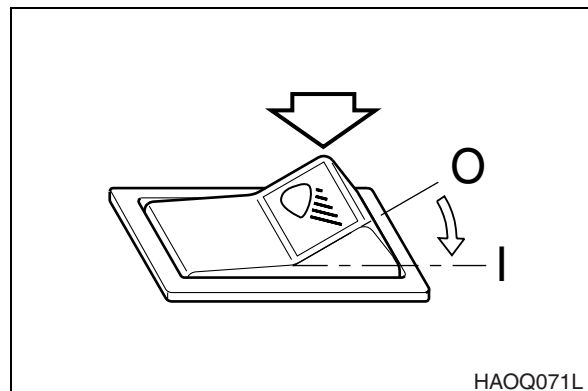


Figure 55

7. REAR WORK LIGHT SWITCH

- O. In this position, this switch turns "OFF" work lights mounted on the rear top of cab.
- I. In this position, this switch turns "ON" work lights mounted on the rear top of cab.



CAUTION!

Do not turn "ON" the work light when traveling on public roads.

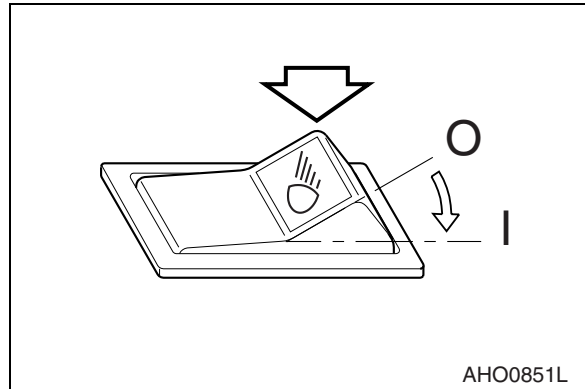


Figure 56

8. REAR WIPER SWITCH

- O. In this position, this switch turns "OFF" windshield wiper mounted on rear windshield of operator's cab.
- I. In this position, windshield washer fluid sprays onto the rear windshield while running the rear wiper. When released, the switch returns to the "O" position.
- II. In this position, this switch turns "ON" windshield wiper mounted on rear windshield of operator's cab.



CAUTION!

The washer pump can be damaged if it is activated while there is no fluid in the tank. The fluid level should be checked regularly and refilled as necessary.

Using soap or other solvents instead of the recommended washer fluid may damage the wiper blades and the paint finish. Only use the recommended washer fluid or equivalent.

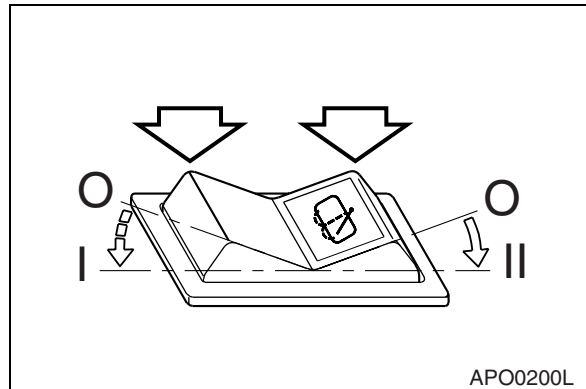


Figure 57

9. ROTATING BEACON LIGHT SWITCH (OPTION)

- O. "OFF" position.
- I. When this switch is moved to "ON" position, it activates the warning light.

10. CUP HOLDER

Place to put beverages.

11. PARKING BRAKE SWITCH

- O. In this position, the parking brake is "RELEASED" and the monitor light on the front instrument panel turns "OFF."
- I. In this position, the parking brake is "APPLIED" and the monitor light on the front instrument panel comes "ON." This brake can also be used as an emergency brake.



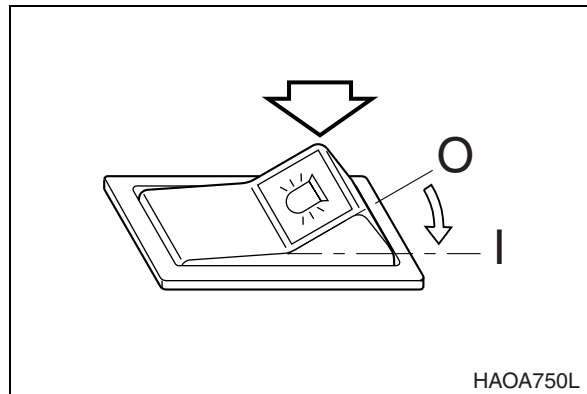
WARNING!

Set the parking brake switch in the "I" (APPLIED) position before leaving the loader. Make sure to "APPLY" the parking brake switch before trying to start the loader.



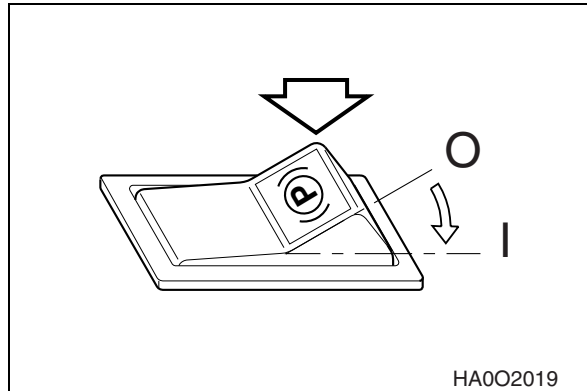
CAUTION!

Do not use the parking brake to stop the loader, except in an emergency; otherwise, it might cause premature wear or damage of the brake.



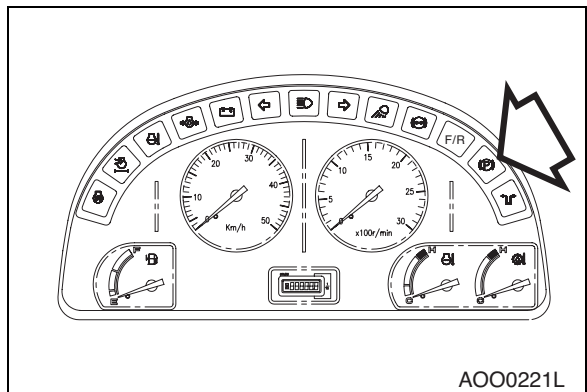
HAOA750L

Figure 58



HA002019

Figure 59



AOO0221L

Figure 60

12. PILOT CUTOFF SWITCH

- O. In this position the operator cannot operate the pilot control valve lever (joystick).
- I. In this position the operator can fully control the movement of the pilot control valve lever (joystick).


CAUTION!

When driving or parking, the pilot cutoff switch should be changed to "O" position.

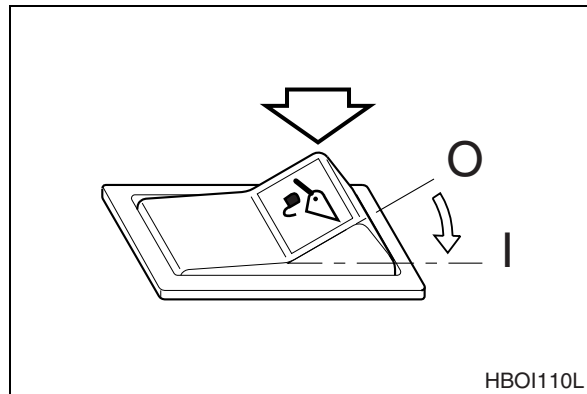


Figure 61

13. TRANSMISSION CUTOFF SWITCH

This switch changes the mode of the brake pedal from "INCHING" to "NO INCHING."

- O. In this position, the "NO INCHING" mode is selected.

In the "NO INCHING" mode, the power transmission line is still connected when the brake pedal is pressed, thus, making it easier to start off on an incline. This mode is also suitable for traveling, because both engine braking and the service brake can be used in descending grades.

- I. In this position, the "INCHING" mode is selected.

In this mode, the transmission is put in "NEUTRAL" by pressing the left brake pedal. This mode is suitable for load handling operation. When the accelerator pedal is pressed under this condition, more power is concentrated on the load handling system, to quicken the boom lifting speed.

NOTE: 1) Transmission "CUTOFF" function dose not operate at 3rd and 4th gear for protection of transmission.

2) Despite transmission "CUTOFF" switch, the right brake pedal has braking function only.

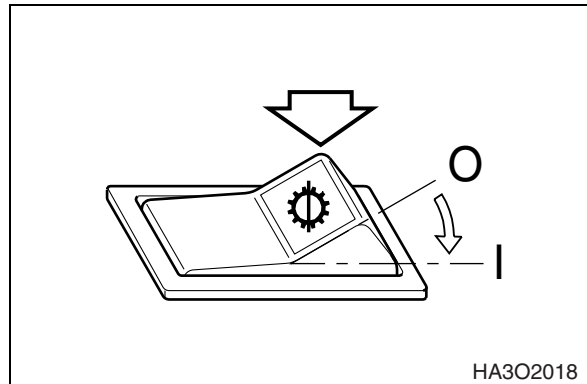


Figure 62


WARNING!

When pressing brake pedal while traveling or working on a slope, set this switch to "O" for engine brake.

14. AUTOMATIC TRANSMISSION SWITCH

Automatic speed range:

- Forward: 2nd, 3rd, 4th.
- Reverse: 2nd, 3rd.
- O. When this switch is in "O" (MANUAL) position, travel mode is switched to "MANUAL" and allows operator to choose speeds manually.
- I. When this switch is in "I" (AUTO) position, gears are "AUTOMATICALLY" changed to the appropriate speed up to the limit set by the gear lever and according to travel load and engine rpm.

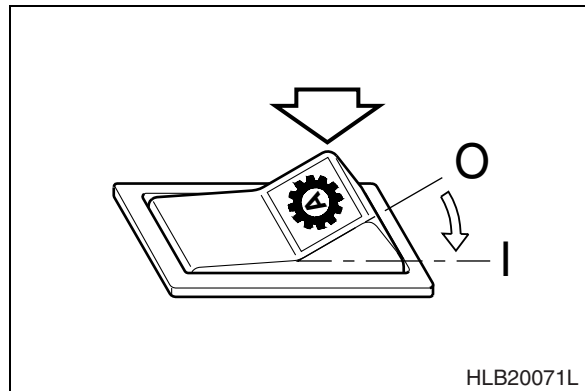


Figure 63

15. EMERGENCY STEERING TEST SWITCH (OPTION)

This switch is used to test whether the emergency steering system is properly functioning.

The system should be tested during the start-up procedure ensure that the system is functioning.

Test emergency steering system using the following procedure;

- A. Turn starter switch to "I" (ON) position.

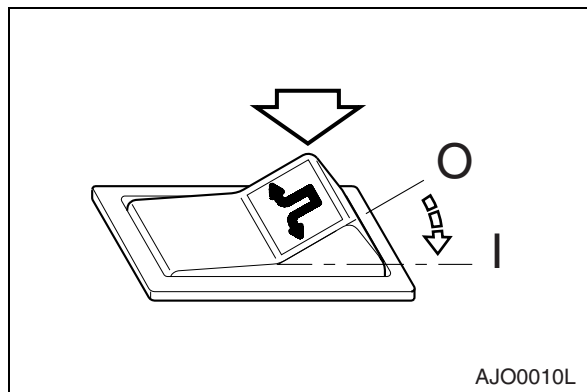


Figure 64

NOTE: Do not start engine.

- B. Press emergency steering test switch and turn steering wheel at the same time. If system is functioning properly the unit should steer. The emergency steering indicator light should turn "ON."

NOTE: If unit does not steer, do not operate unit until problem is corrected.

- C. Release switch. Switch will automatically return to "O" (OFF) position.



WARNING!

Do not press this switch continuously. Continuously pressing switch will cause heavy battery discharge. The emergency steering DC-motor uses high consumption of power.

16. F/R (FORWARD/REVERSE) SELECTOR SWITCH (OPTION)

- O. In this position, the F/R control switch is "OFF."
- I. In this position, the F/R control switch is activated. When released the switch returns to the "O" position, but the system is still activated.

NOTE: 1) When activating system, the transmission lever and F/R control switch must be in "NEUTRAL."

2) If the transmission lever is actuated (moved), the gearshift functions of the F/R control switch are deactivated, and forward/reverse travel is again controlled by the transmission lever.

3) If the starter switch is "OFF," the gearshift functions of the F/R control switch are deactivated.

NOTE: See "F/R (Forward/Reverse) Travel Control System (Option)" on page 3-16 for further information.

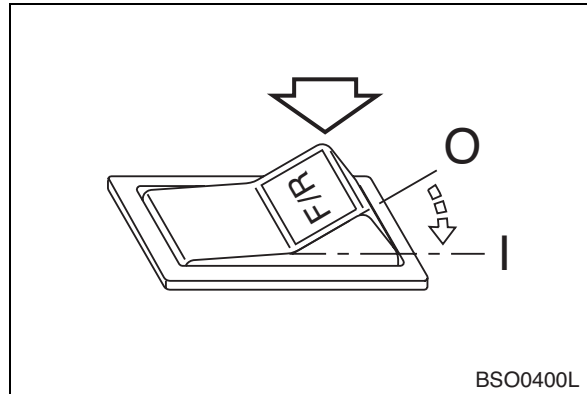


Figure 65

17. F/R (FORWARD/REVERSE) CONTROL SWITCH (OPTION)

To be able to use the forward/reverse function, the F/R selector switch must first be depressed. When the switch is activated, the F/R selector indicator light be turned "ON" in the instrument panel.

- O. In this position, the machine is in "NEUTRAL."
- I. In this position, the machine travels "FORWARD."
- II. In this position, the machine travels in "REVERSE."

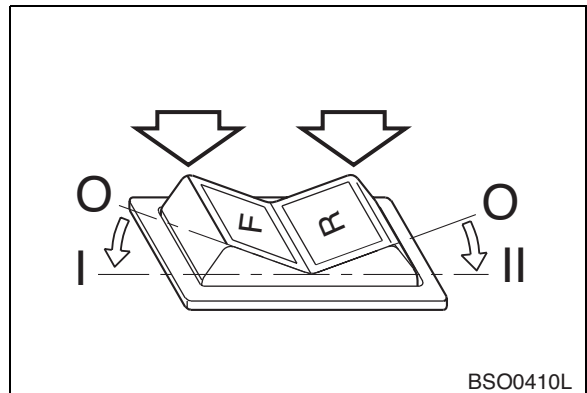


Figure 66

NOTE: If the transmission lever is moved out of "NEUTRAL" while operating the F/R control switch, the transmission lever will override the switch.

The F/R control switch system will require, that the F/R selector switch be pressed again, with the transmission lever in "NEUTRAL."

NOTE: See "F/R (Forward/Reverse) Travel Control System (Option)" on page 3-16 for further information.

PILOT CONTROL VALVE LEVER (JOYSTICK)

The machine can be equipped with several variations of a pilot control valve lever (joystick). The type of lever is dependant upon your local market. Contact your local Daewoo Dealer for the levers that are available in your area.

1. PILOT CONTROL VALVE LEVER (JOYSTICK) (S/N 3001 thru 4000)

Used to position bucket and boom. This lever is capable of raising or lowering boom, and crowding or dumping bucket. When machine is being traveled, the lever (joystick) can be "LOCKED" out, to prevent any movement of bucket or boom. To "LOCK" out lever (joystick), place pilot cutoff switch in "LOCKED" position.

Pilot control valve lever (joystick) operating pattern and description of operation.

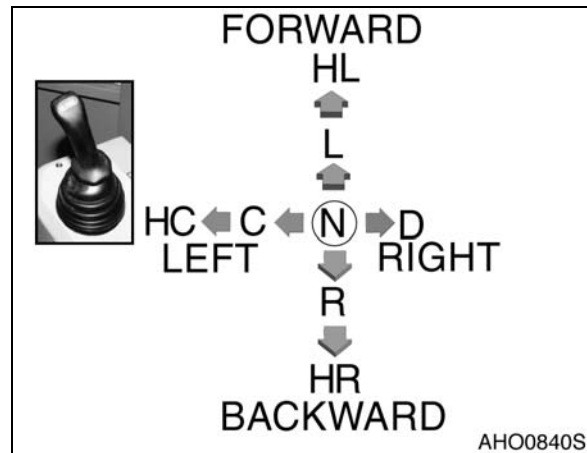


Figure 67

HL. Hold lever in lower mode

L. Lower

HC. Hold lever in Bucket Crowd

C. Bucket Crowd

N. Neutral

D. Bucket Dump

R. Raise

HR. Hold lever in Raise Mode

2. PILOT CONTROL VALVE LEVER (JOYSTICK) (S/N 4001 and Up)

If loader is equipped with log forks this lever controls boom, bucket and log forks.

The boom and bucket operating pattern of this lever is the same as above.

- When the log forks control lever (6, Figure 68) is pushed forward the log forks are allowed to open.
- When the log forks control lever (6, Figure 68) is pulled back the log forks are allowed to close.

This lever is capable of forward travel and reverse travel (2nd gear function).

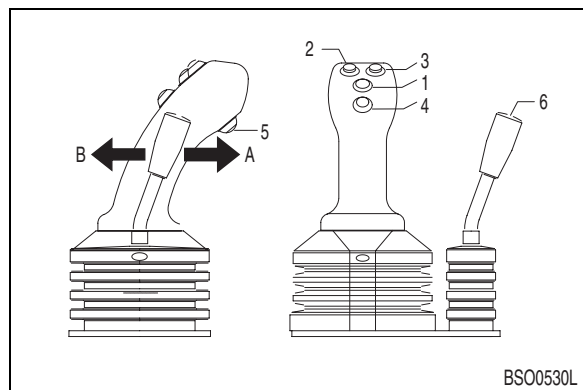


Figure 68

1. Neutral Switch

When this switch is pressed, 2nd gear function will be operated, and then 2nd gear indicator light turns "ON."

When 2nd gear function is operated, this switch is pressed, and then machine is neutral.

2. Forward Switch

When this switch is pressed at forward traveling while "KD" (5, Figure 68) switch is pressed, machine can travel forward. When machine is travelled, it can convert forward and reverse travel without pressing "KD" (5, Figure 68) switch.

3. Reverse Switch

When this switch is pressed at reverse traveling while "KD" (5, Figure 68) switch is pressed, machine can travel reverse. When machine is travelled, it can convert forward and reverse travel without pressing "KD" (5, Figure 68) switch.

4. Horn Switch

(See page 2-27)

5. Kick-down Switch

(See page 2-26)

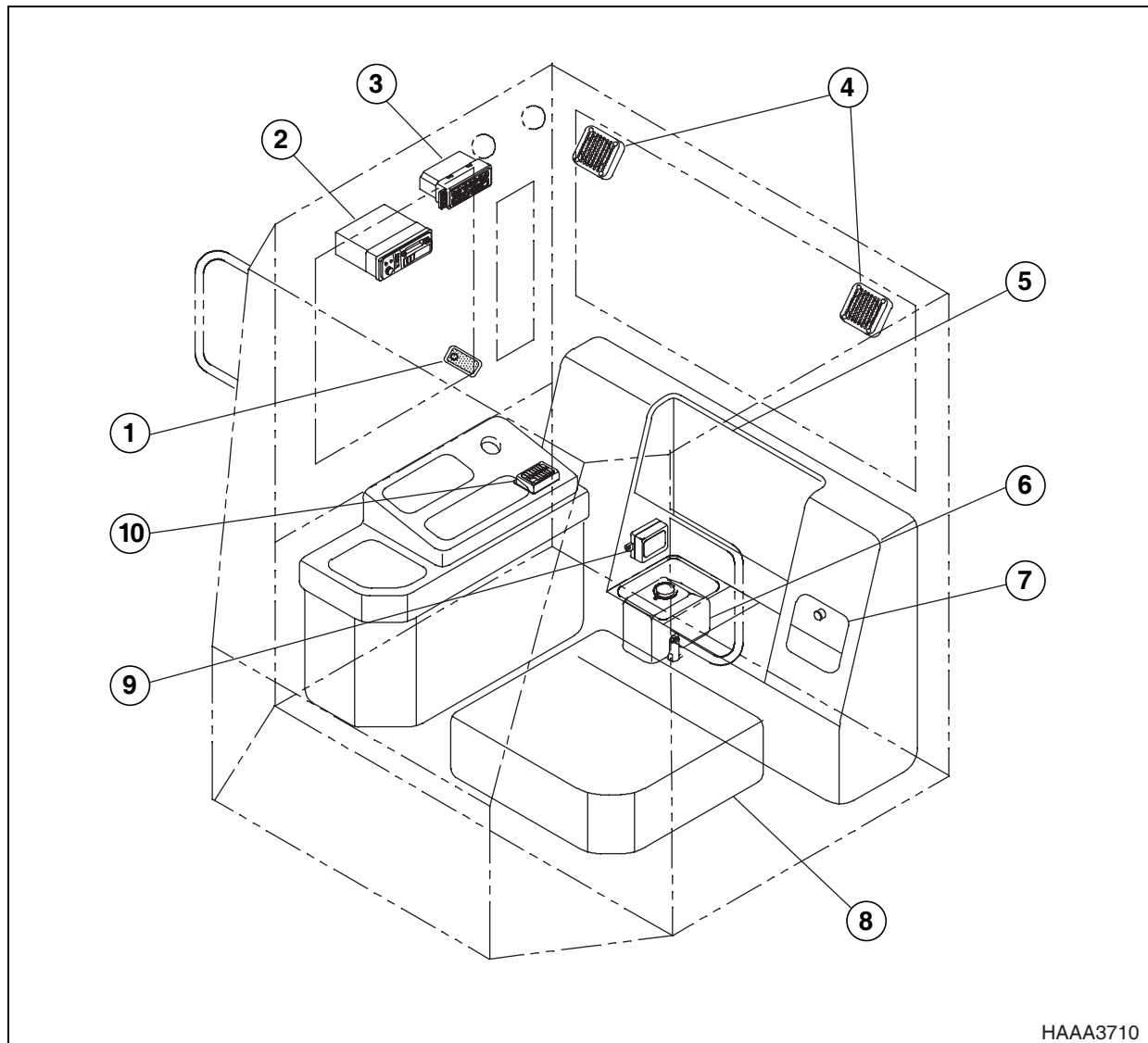
NOTE: Operating condition of 2nd gear function.

- Start a engine.
- Transmission lever is neutral.
- Parking brake switch is off (release).

NOTE: Release condition of 2nd gear function.

- When the transmission lever will be push forward or pull reverse.
- When the parking brake switch turns "ON."
- When the starter switch turns "OFF."

VARIOUS CABIN LOCATIONS



HAAA3710

Figure 69

- | | |
|--|--------------------------|
| 1. CAB LIGHT | 6. WASHER TANK |
| 2. STEREO | 7. HOT/COLD REFRIGERATOR |
| 3. HEATER AND AIR CONDITIONER
CONTROL PANEL | 8. ELECTRICAL BOX |
| 4. SPEAKERS | 9. FUSE BOX TWO |
| 5. STORAGE BOX | 10. FUSE BOX ONE |

1. CAB LIGHT

A cab light is on the front of the ceiling. You can turn the light "ON" and "OFF" by pressing its switch.

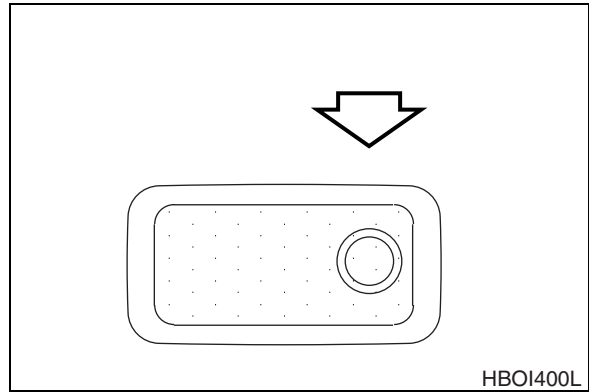


Figure 70

2. STEREO

For operation of stereo see "Stereo" on page 2-45.

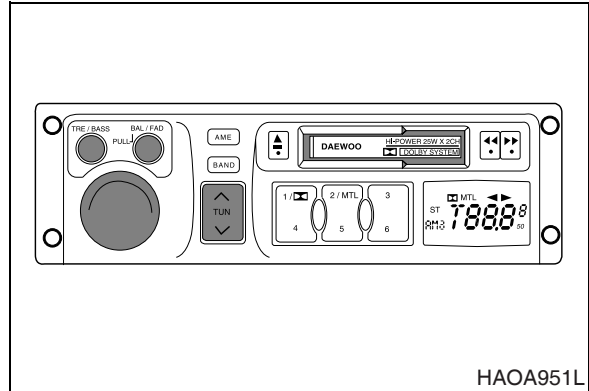


Figure 71

3. HEATER AND AIR CONDITIONER CONTROL PANEL

For operation of heater and air conditioner see "Heater and Air Conditioner Operation" on page 2-40.

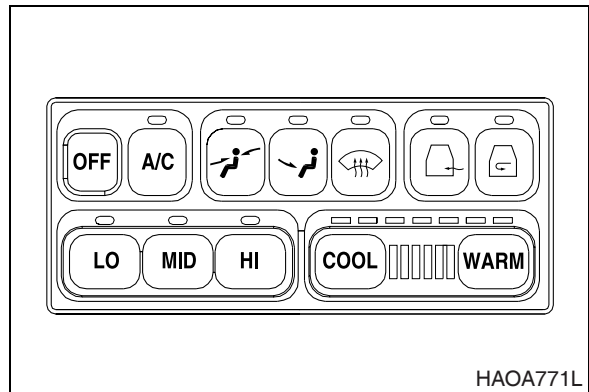


Figure 72

4. SPEAKERS

Emits sound generated by stereo.

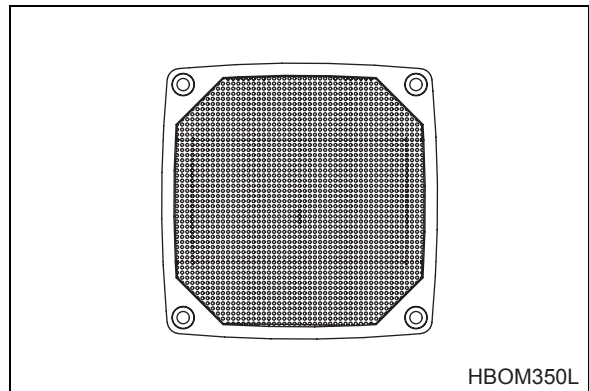


Figure 73

5. STORAGE BOX

There is a storage box (1, Figure 74) behind the seat. Keep the operation maintenance manual and other documents in this compartment.

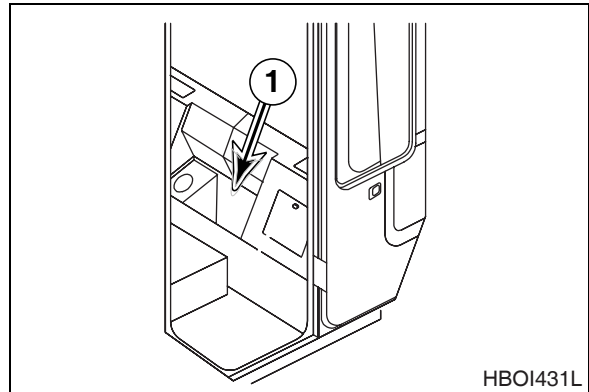


Figure 74

6. WASHER TANK

Contains windshield washer fluid.

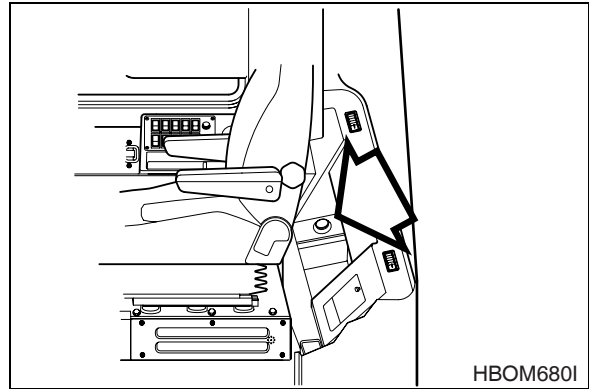


Figure 75

7. HOT/COLD REFRIGERATOR

There is a hot/cold refrigerator (1, Figure 76) behind and to the left of the seat. Air conditioner and heating unit must be operated after starting the engine for this function. Keep the cover close for proper function.

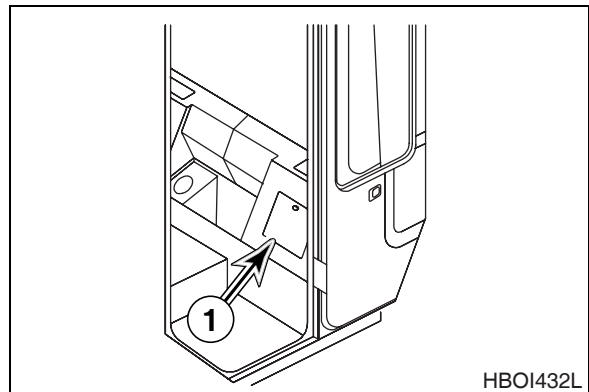


Figure 76

8. ELECTRICAL BOX

Under the seat are two pullout trays that contain relays for unit. (See "Fuse Box/ Relay" on page 2-53.)

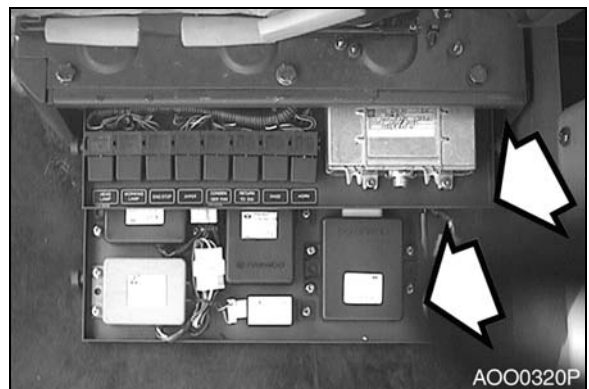


Figure 77

9. FUSE BOX TWO

Fuse box two is just above the windshield washer fluid tank. For a detailed explanation of fuses see "Fuse Box/Relay" on page 2-53.

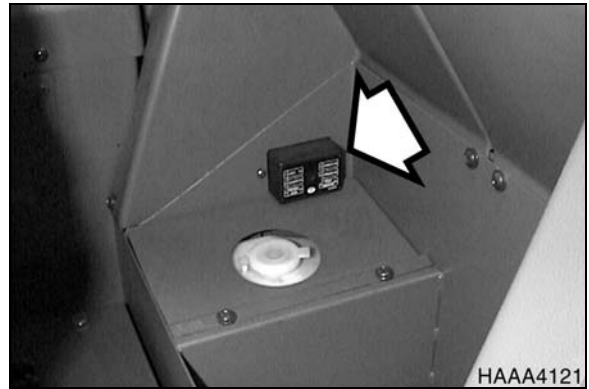


Figure 78

10. FUSE BOX ONE

The fuse box one is at the rear side of right control stand. For a detailed explanation of fuses "Fuse Box/Relay" on page 2-53

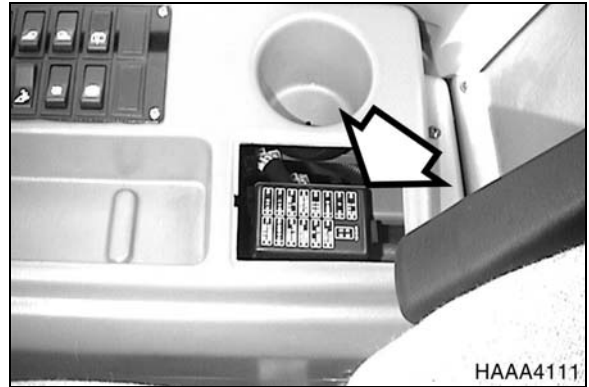


Figure 79

HEATER AND AIR CONDITIONER OPERATION

LOCATION OF CONTROLS AND VENTS

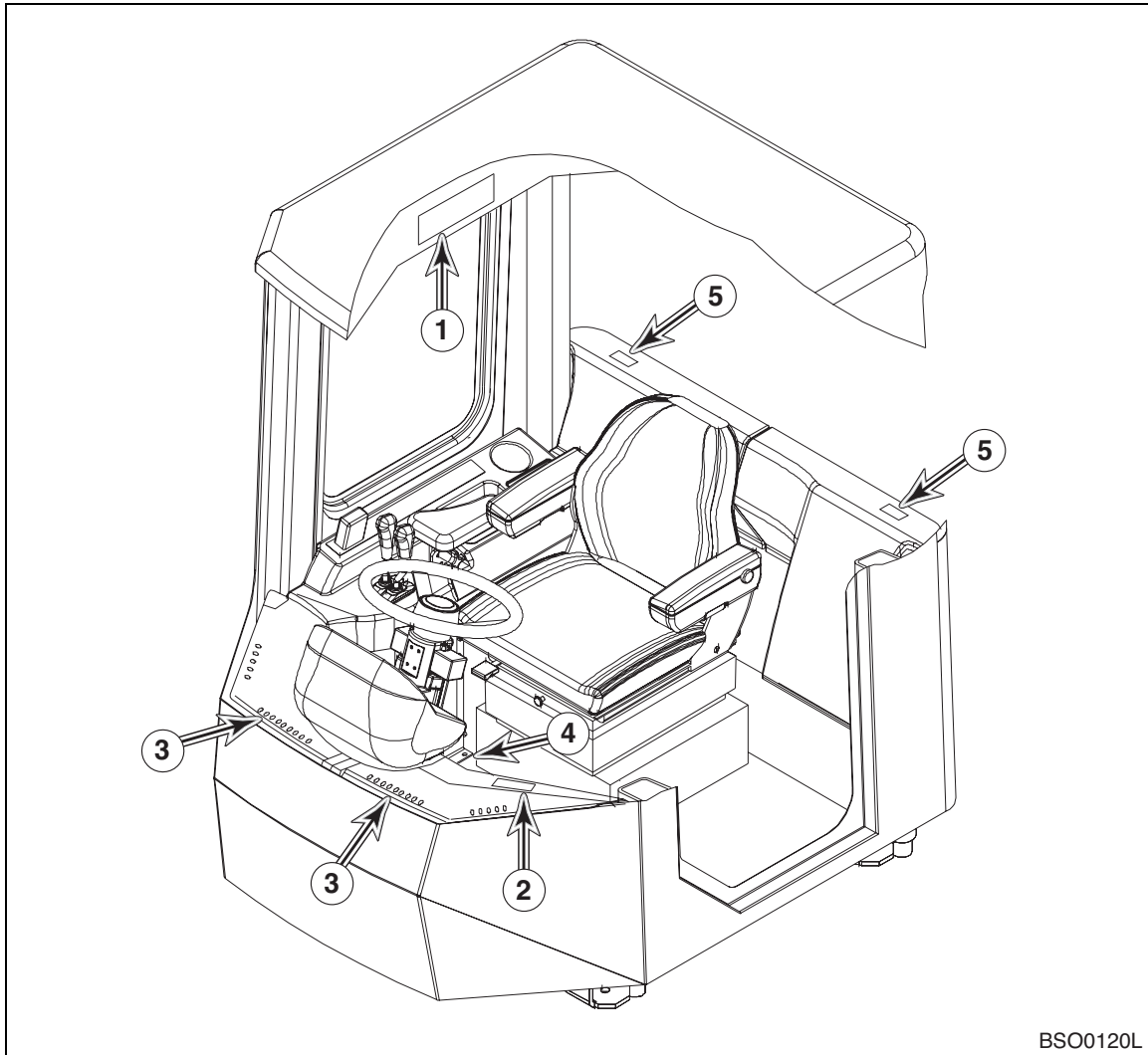


Figure 80

- | | |
|-----------------------------------|----------------|
| 1. OPERATION PANEL | 4. FOOT NOZZLE |
| 2. FRONT NOZZLE (AIR CONDITIONER) | 5. REAR NOZZLE |
| 3. FRONT NOZZLE (DEFROSTER) | |

The heater and air conditioner are combined into one unit to the right side of the operator's seat. If necessary, the operator can control inner temperature using the operation panel.

OPERATION PANEL

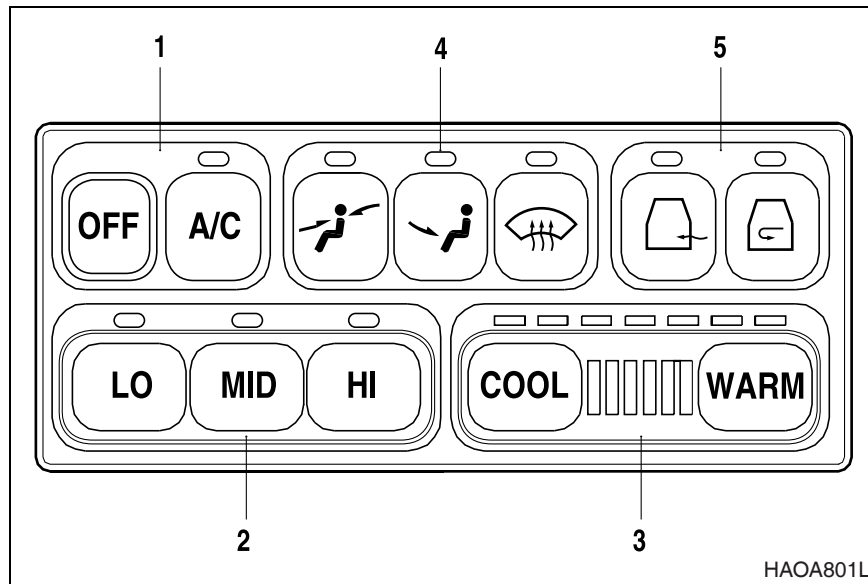


Figure 81

- | | |
|-----------------------------------|---------------------------------------|
| 1. FAN AND AIR CONDITIONER SWITCH | 4. SELECTOR SWITCH FOR WIND DIRECTION |
| 2. BLOWER FAN SWITCHES | 5. VENTILATION SELECTOR SWITCH |
| 3. TEMPERATURE CONTROL SWITCH | |

When a switch is selected, the LED above that switch will turn "ON" and give an activation sound.

When the light switch is turned "ON," the panel LED's will turn "ON."

1. FAN AND AIR CONDITIONER SWITCH

- A. "OFF" Switch - Turns "OFF" the heater and air conditioner unit.
- B. "A/C" Switch - Turns "ON" the air conditioner when one of the blower switches is activated.

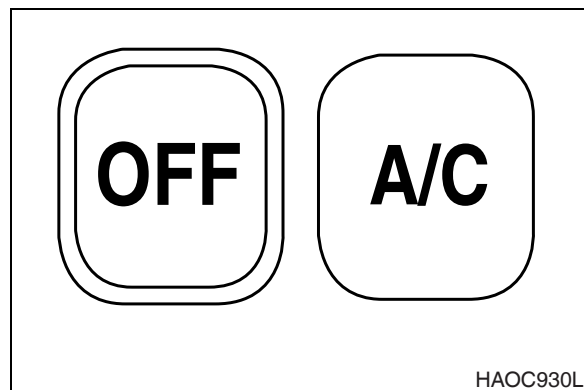


Figure 82

2. BLOWER FAN SWITCHES

These switches are used to control the speed of the blower fan.

- A. "LO" Switch - Used for low blower speed.
- B. "MID" Switch - Used for intermediate blower speed.
- C. "HI" Switch - Used for high blower speed.

NOTE: *If you do not select a blower speed the heater and air conditioner will not work.*

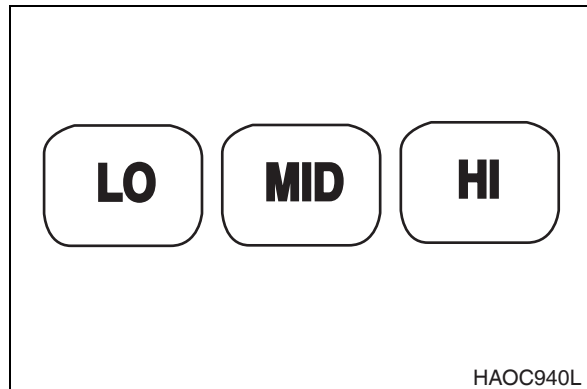


Figure 83

3. TEMPERATURE CONTROL SWITCH

The temperature control consists of 24 stages. An LED is turned "ON" for every three stages. Whenever pushing it, it changes in stages. Pushing it continuously, it changes continuously.

- A. "COOL" Switch - Lowers the temperature.
- B. "WARM" Switch - Raises the temperature.

LED COLOR STATUS

Green LED - Air conditioner. Full green, maximum operation of air conditioner.

Red LED - Heater. Full red, maximum operation of heater.

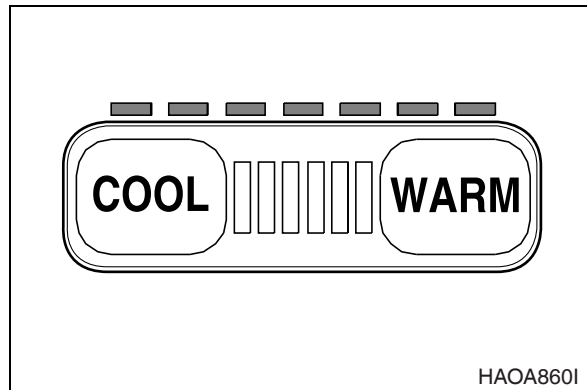


Figure 84

4. SELECTOR SWITCH FOR WIND DIRECTION

- A. Used to direct air flow to upper portion of operator's cab.

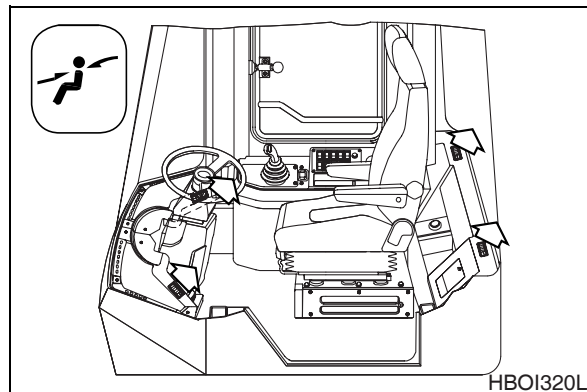


Figure 85

- B. Used to direct air flow to lower portion of operator's cab.

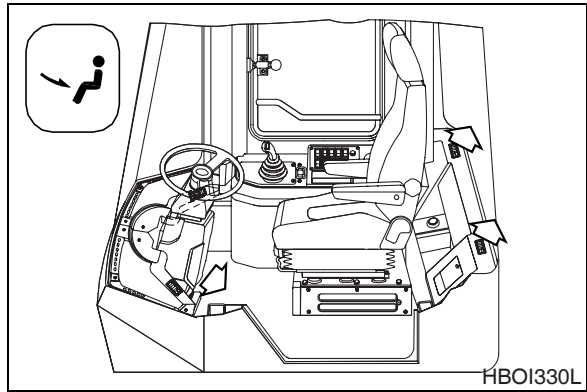


Figure 86

- C. Used to direct air flow for defrosting front window of operator's cab.

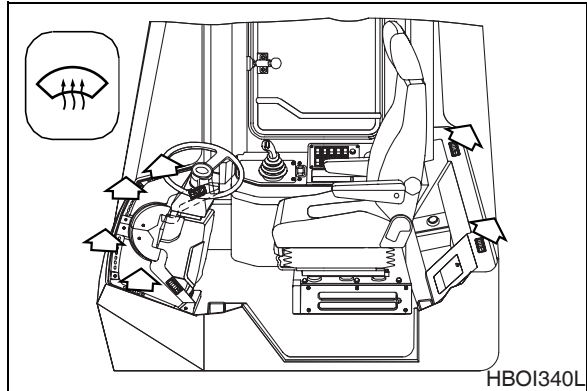


Figure 87

5. VENTILATION SELECTOR SWITCH

- A. "A" Switch - Draws fresh air into operator's compartment.
- B. "B" Switch - Recirculates air within the operator's compartment. Used to rapidly reduce condensation on windows.

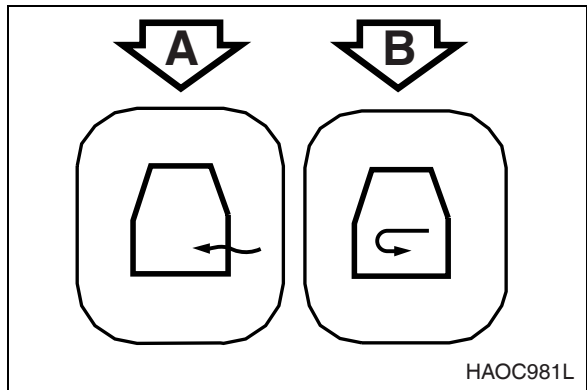


Figure 88

MEMORY FUNCTION OF USED MODE

The air conditioner panel has a memory function. When the starter switch is turned "OFF" the settings for the panel will be stored. When the excavator is started, the last setting will be used.

ADDITIONAL OPERATING INSTRUCTION

A proper indoor temperature in summer is 5 - 6° C (10 - 12°F) less than the outdoor temperature.

Operate the air conditioner from 20 - 30 minutes a week to circulate the refrigerant in the system.

NOTE: *The blower switch should be on "LO" speed.*

NOTE: *The filter should be cleaned out every 500 hours and replaced with a new one every 1,000 hours.*

NOTE: *In the event that the unit is being operated in a dusty environment, the cleaning and replacement should be performed more frequently.*

If operating the air conditioner or heater for a long time, operate the ventilation switch, and when smoking, vent the air to the outside to prevent irritation to eyes.

STEREO

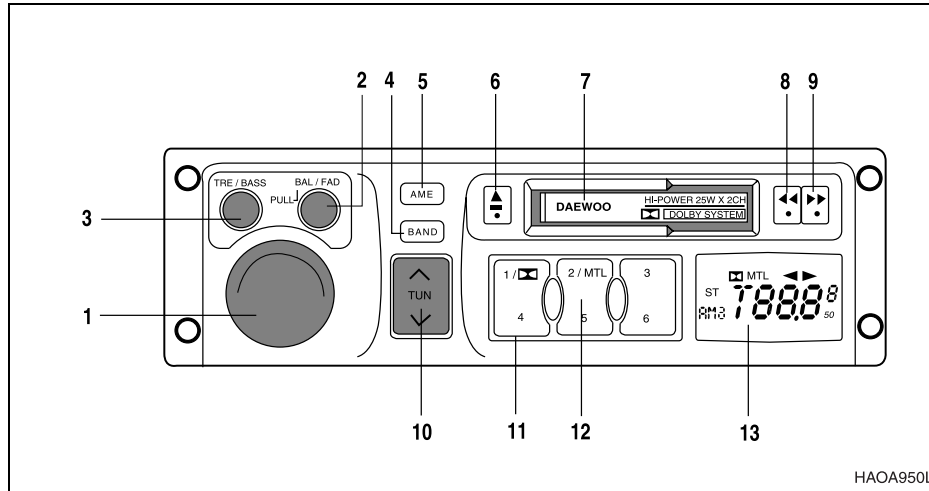


Figure 89

- | | |
|---------------------------------|-------------------------------|
| 1. ON-OFF / VOLUME CONTROL KNOB | 7. CASSETTE SLOT |
| 2. BALANCE / FADER CONTROL | 8. & 9. PLAY DIRECTION BUTTON |
| 3. BASS/TREBLE CONTROL | 10. AUTOMATIC SELECTOR |
| 4. AM/FM BAND SELECTOR | 11. DOLBY B SELECTOR |
| 5. AUTOMATIC MEMORY (AME) | 12. METAL SELECTOR |
| 6. TAPE EJECT BUTTON | 13. LCD DISPLAY PANEL |

1. ON-OFF / VOLUME CONTROL KNOB

When this button is pressed, stereo will be turned "ON."

When this button is pressed a second time, power turns "OFF."

Increase volume by rotating control clockwise.

When stereo is turned "ON," LCD display will indicate radio stations and/or tape functions.

2. BALANCE / FADER CONTROL

This control adjusts both side to side balance of stereo sound and front to back fading.

Rotating control counterclockwise will increase volume to the left speakers, clockwise increases volume to the right speakers.

Press on control and it will pop out; you can now adjust the fader (front/rear) balance.

Rotating control counterclockwise increases volume to the rear speakers, clockwise increases volume to the front speakers.

3. BASS / TREBLE CONTROL

This control adjust bass and treble tone levels.

To adjust treble tone level rotate control counterclockwise to decrease treble and clockwise to increase treble.

To adjust bass tone level press on control and it will pop out. Rotate control counterclockwise to decrease bass and clockwise to increase bass.

4. AM/FM BAND SELECTOR

This button sets radio to either AM-1, AM-2, FM-1 or FM-2 frequency bands. Each frequency bands will enable the stereo to store 6 preset radio station frequencies. Each time the button is pressed the stereo will move to the next band.

5. AUTOMATIC MEMORY (AME)

This function automatically finds the six strongest radio signals in the frequency selected and stores them in memory. Select band (AM-1, AM-2, FM-1, FM-2). Press and hold AME button for approximately two seconds and stereo will search out strongest stations in area. These stations can then be recalled by pressing buttons (1 thru 6, Figure 90).

NOTE: *To manually store radio station settings, use band selector to select frequency band to be listened to. Then use tuning control to select desired station. Press and hold any preset keys for approximately 2 seconds; a beep will sound when station has been set.*

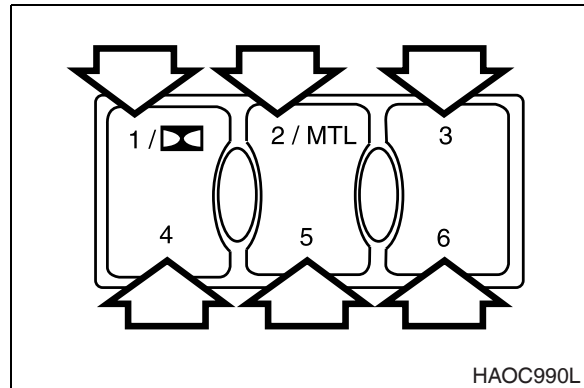


Figure 90

6. TAPE EJECT BUTTON

Eject tape from cassette deck by pressing this button. Stereo returns to tuner mode.

7. CASSETTE SLOT

Press "ON/OFF" switch for power. Insert a tape with exposed tape facing right. The tape will start to play. "TAPE" is displayed on LCD display.

8. & 9. PLAY DIRECTION BUTTON

Pressing this control button to either right or left will fast forward or rewind tape. The button will lock into this position. To stop action, press opposite side button and tape will return to normal play mode.

Pressing both control buttons at the same time will reverse direction of tape.

10. AUTOMATIC SELECTOR

Press this control to change channels manually to either higher or lower frequencies.

11. DOLBY B SELECTOR

If the tape being listened to has been recorded with Dolby B, press preset selector button 1 to turn Dolby B control "ON." Dolby symbol will appear on display. Press this control a second time to turn Dolby B control "OFF."

12. METAL SELECTOR

If tape being listened to is either a metal or chromium type of tape, press preset selector button 2 to select "MTL" setting. "MTL" will appear on display. Press this control a second time to turn this setting "OFF."

13. LCD DISPLAY PANEL

- A. Tape Reverse Direction Indicator
- B. Tape Forward Direction Indicator
- C. Preset Radio Memory Channel Indicator
- D. Radio Station Frequency
- E. AM/FM Band Indicator
- F. Stereo Radio Signal
- G. Dolby Noise Reduction Indicator
- H. Metal Tape Indicator

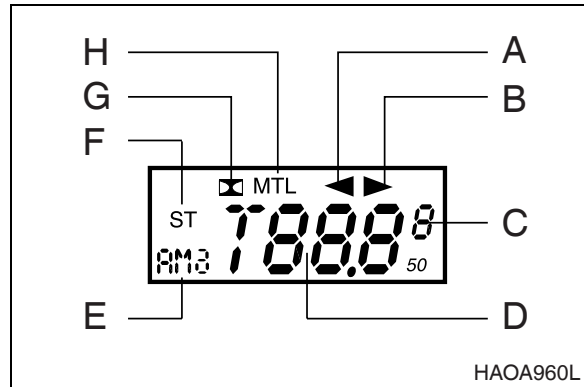


Figure 91

CARE OF STEREO

Do not use a tape that has a longer playing time than C-90 (90 minutes). Avoid use of C-120 tapes because tapes are made of a thinner material that may break and get tangled inside stereo.

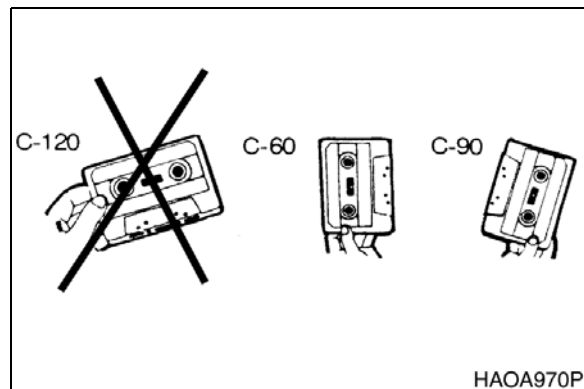


Figure 92

Make sure tapes are wound tight. If you use a loose tape, it may cause a problem in a deck. If they are loose, use a pencil or similar device to wind up slack.

Do not use poor quality tapes.

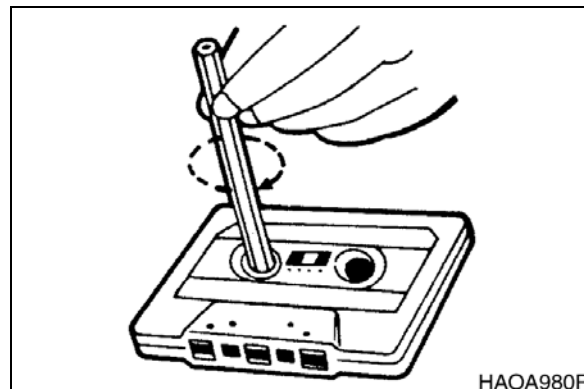


Figure 93

Do not store cassette tapes in the following places or under the following conditions. Damage to tape and stereo may result.

- Direct sunlight.
- Humid place.
- Dusty place.
- Around heater or heater vents which discharge heat.
- Around speakers and other magnet devices that generate a strong magnetic field (solenoid valves).

Clean head and pinch roller periodically. They continuously contact the tape. If they are not kept clean, stereo and tapes may be damaged. Keep them clean for optimum performance.

If head gets dirty, clean it with a soft cotton swap through cassette slot.

It is recommended to use a cassette deck cleaning tape for easy and efficient cleaning of head, capstan and pinch roller.

When you turn "OFF" power, be sure to take out cassette tape by pressing eject button.

When not using a cassette tape, keep it stored in a plastic case.

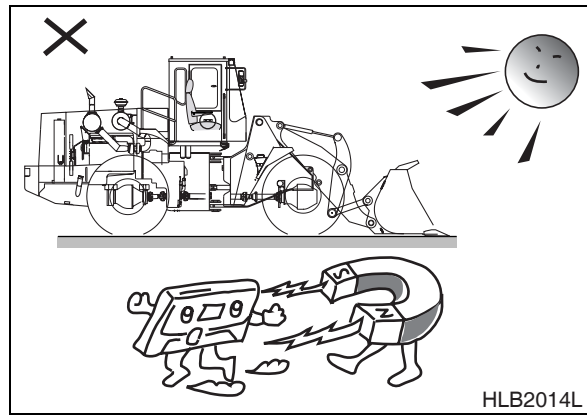


Figure 94

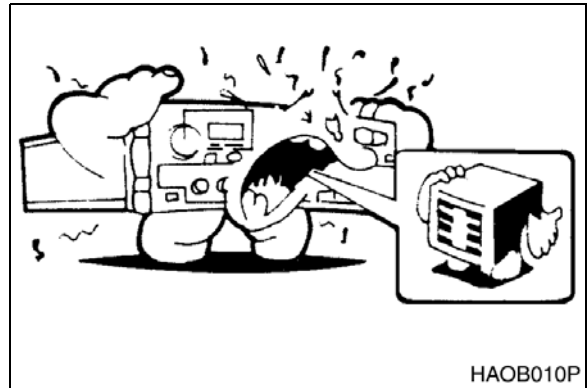


Figure 95

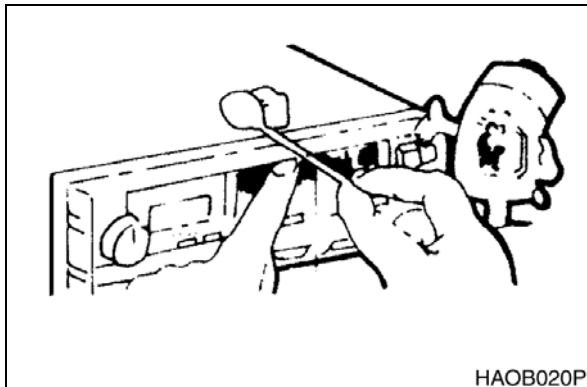


Figure 96

SEAT ADJUSTMENT



WARNING!

Whenever operator or operating condition has changed, check to see that seating position is suitable for the condition at hand. Always fasten your seat belt while operating vehicle. Adjust backrest so that the operator can fully reach and operate pedals.

1. ADJUSTING SEAT FORWARD/BACKWARD LEVER

Holding lever (3, Figure 98), raise it up, while pushing or pulling seat to desired position. Release lever once desired position is reached. Adjustment range is 160 mm (6.3 in).

2 & 3. ADJUSTING SEAT'S ANGLE AND HEIGHT LEVER

Pulling left lever (3, Figure 98) up allows rear part of seat to be moved up or down. Pulling lever (2) up allows front part of seat to be moved up or down. Adjust seat according to operator's size and work conditions. Adjustment range is 60 mm (2.36 in) for both front and rear.

4. WEIGHT ADJUSTMENT KNOB

Turning knob (4, Figure 98) to right makes suspension harder. Turning knob to left makes suspension softer. Adjust according to operator's weight by checking weight indicator dial. Adjustment range is from 50 - 120 kg (110 - 265 lb).

5. BACKREST ADJUSTMENT LEVER

Pulling up right lever (5, Figure 98) allows seat backrest to be moved forward or backward.

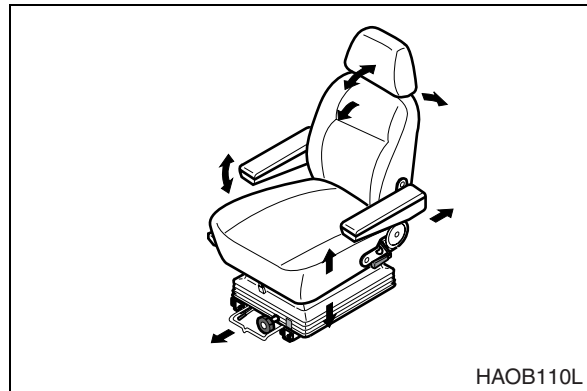


Figure 97

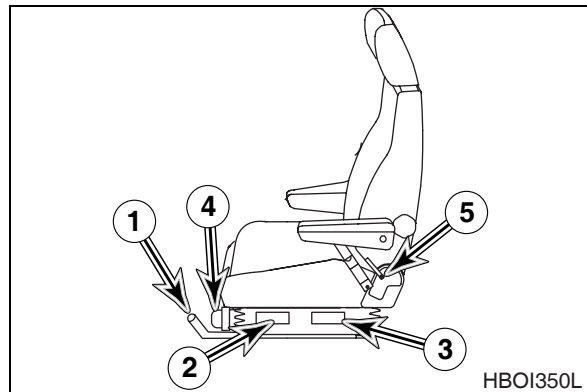


Figure 98

6. ANGLE ADJUSTMENT OF ARMREST

Adjustment angle of left and right armrest (6, Figure 99) is done by turning a dial in bottom of armrest. When you adjust angle, manually raise armrest before turning dial.

7. HEADREST

Headrest (7, Figure 99) can be adjusted forward/backward and up/down. Move it by holding both sides.

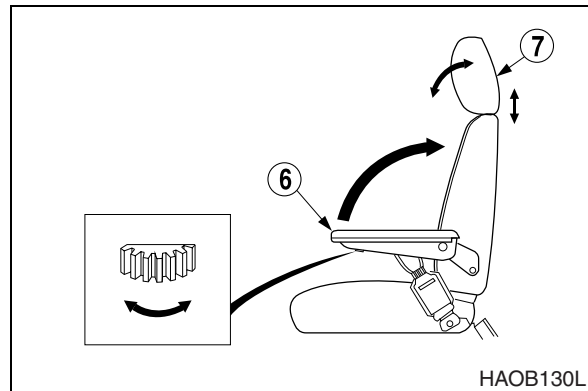


Figure 99

RECOMMENDATIONS FOR LIMITING VIBRATIONS

1. Select the right machine, equipment and attachments for a particular application.
2. Replace any damaged seat by a Daewoo genuine part. Keep the seat maintained and adjusted.
 - Adjust the seat and suspension for the weight and size of the operator.
 - Inspect and maintain the suspension and adjustment mechanisms of the seat regularly.
3. Check that the machine is properly maintained.
 - Tire pressure, brakes, steering, linkages, etc.
4. Steer, brake, accelerate, shift gears, move the attachments and load the attachments smoothly.
5. Adjust the machine speed and travel path to minimize the vibration level.
 - Slow down if it is necessary when passing rough terrain.
 - Drive around obstacles and excessive rough terrain conditions.
6. Keep the terrain on work sites where the machine is working and travelling in good condition.
 - Remove any large rocks or obstacles.
 - Fill any ditches and holes.
 - Provide machines for and schedule time to maintain the terrain conditions.
7. Travel over longer distance (e.g. on public roads) at adjusted (medium) speed.
 - Always adjust the speed for preventing bouncing.

SEAT BELT



WARNING!

Seat belt is for operator's safety and should be worn at all times. Before driving machine, adjust seat to desired position for maximum comfort and machine control, then fasten seat belt. Seat belts must be worn across pelvic region and adjusted snugly to lessen chance and severity of injury in event of an accident. Never fasten a seat belt across abdomen.

Under no circumstances should operator be standing in cab when operating wheel loader.

Do not adjust seat position while vehicle is moving because a loss of control may result. Stop machine, apply parking brake, and then adjust seat.

Always, check condition of seat belt and belt bracket before fastening it. Do not use it with twists in it. Replace belt or bracket if damaged or worn.

SEAT BELT LOCKING AND UNLOCKING

Insert belt end (1, Figure 100) into buckle (2). Pull belt to check that belt end is locked into buckle.

Adjust belt length so that it comfortably tight against operator's pelvic region (hipbone).

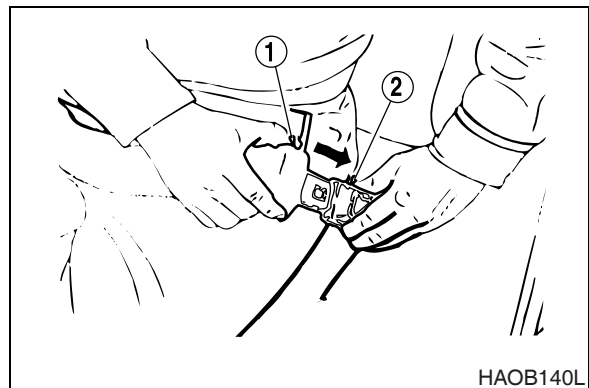


Figure 100

Press button (3, Figure 101) in center of buckle (2) and pull out belt (1) to unlock.

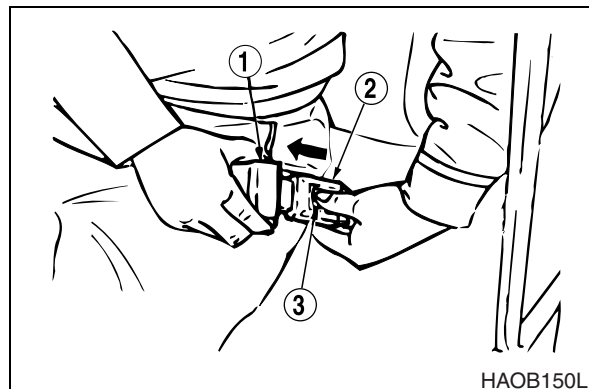


Figure 101

DOOR SIDE LATCH

1. The door side latch (1, Figure 102) is used to secure the door to the side of the cab when it is opened.

NOTE: *Keep the door closed and locked when machine is not in use.*

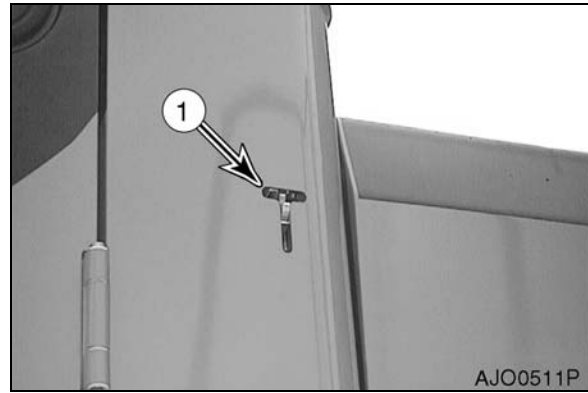


Figure 102

2. To release door from side of cab, push the latch lever (Figure 103) down. The latch lever is to the left of the operator's seat.



Figure 103

FUSE BOX/RELAY

FUSE BOXES

There are two fuse boxes inside the cab.

Fuse box one (1, Figure 104) is in the rear side of right control stand. A usage diagram of fuses is shown inside of fuse box. Spare fuses are mounted on the inside of fuse box cover (10A - Qty. 1, 15A - Qty. 1, 20A - Qty. 1 and 30A - Qty. 1).

Fuse box two (2, Figure 104) is just above the windshield washer fluid tank.



WARNING!

If any fuse is blown, turn "OFF" the starter switch and shut off the power supply. Remedy the cause if needed and replace the fuse with a new one.

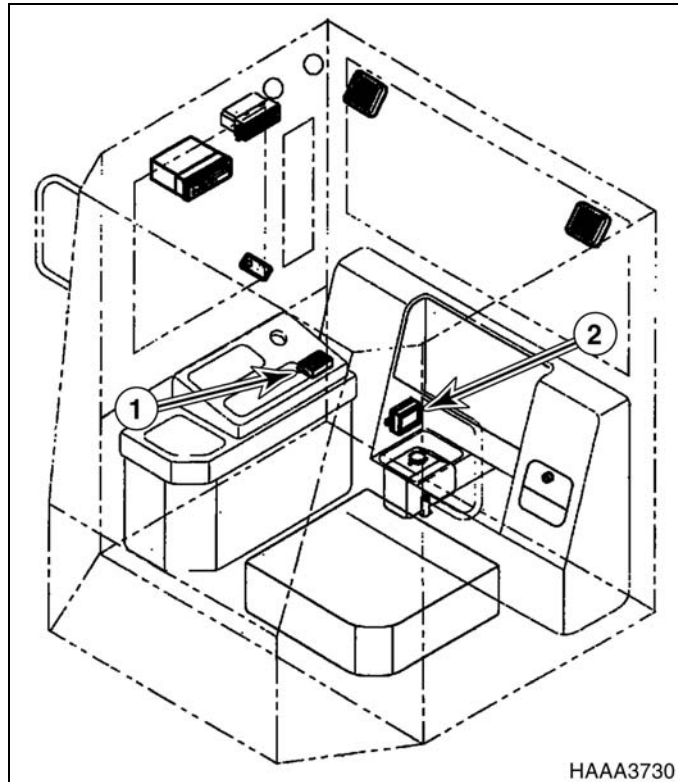


Figure 104

Fuse Box One		
No.	Name	Capacity
1	Gauge Panel	15A
2	Transmission	15A
3	Front Wiper, Horn	15A
4	Parking Brake, Pilot Cutoff, Log Fork (Option)	15A
5	Headlight, Stop Light	20A
6	Condenser Fan, Preheat	15A
7	Emergency Steer (Option), Spare	15A
8	Air Conditioner, Heater	30A
9	Working Light (Front), Rotating Beacon (Option)	15A
10	Working Light (Rear)	15A
11	Turn Signal Light, Hazard Light, Indicate Light	15A
12	Stereo, Cab Light, Fuel Pump, Engine Stop	15A
13	Memory Backup, Pilot Buzzer	10A
14	Starter Switch	10A

Fuse Box Two		
No.	Name	Capacity
1	Cigar Lighter	15A
2	Rear Wiper	15A
3	Position Light (Right)	10A
4	Position Light (Left)	10A
5	Auto-detent, LIS (Option)	15A
6	Spare	30A

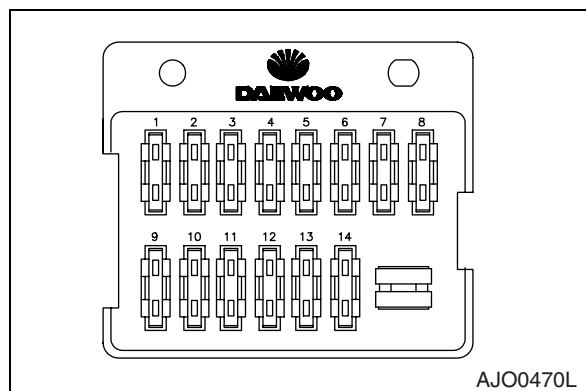


Figure 105 FUSE BOX ONE

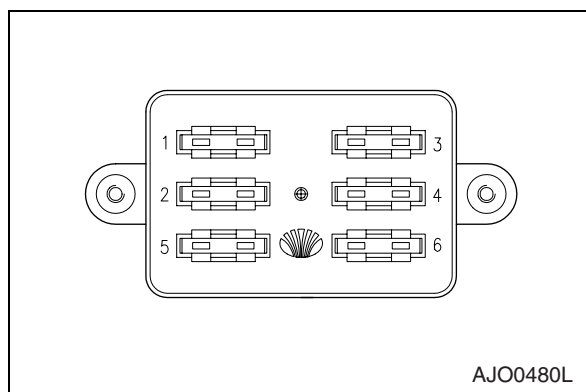


Figure 106 FUSE BOX TWO

RELAY

The relays are in the electrical box under the seat. If the problem is not solved after replacing the fuse, check the function of the relay.

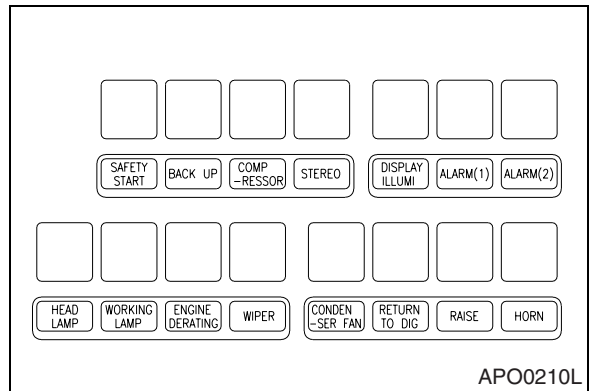


Figure 107

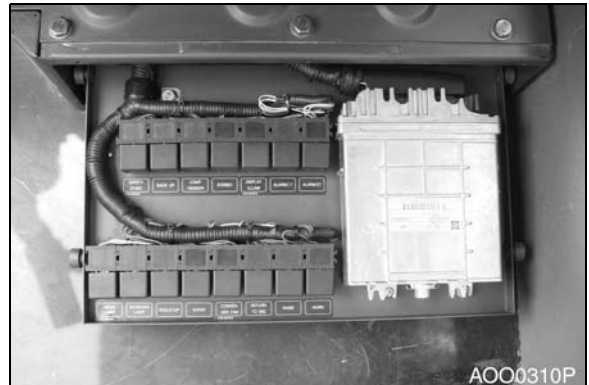


Figure 108

CIRCUIT BREAKER

A circuit breaker is next to the relay by the batteries at back of unit under engine compartment hood. When a short circuit or an overload occurs, the circuit breaker automatically cuts off current, thus preventing electrical wires from burning.

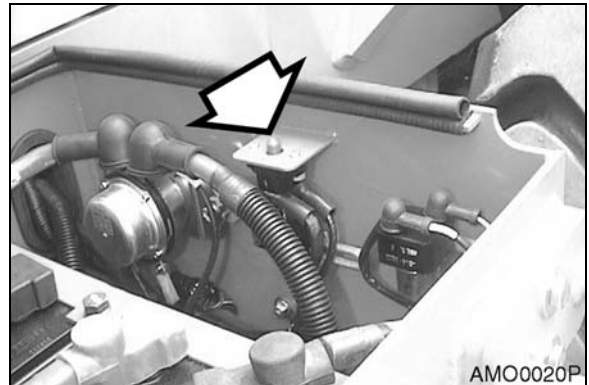


Figure 109

FUSIBLE LINK

A fusible link (Figure 110) is in the battery box.

If the engine does not crank, first check that the starter switch is turned "ON" and that no power is available (No indicator lights will light.). Check that the "A" portion (Figure 111) of the fusible link is not broken or burned through. Replace the fusible link if damage and investigate cause.

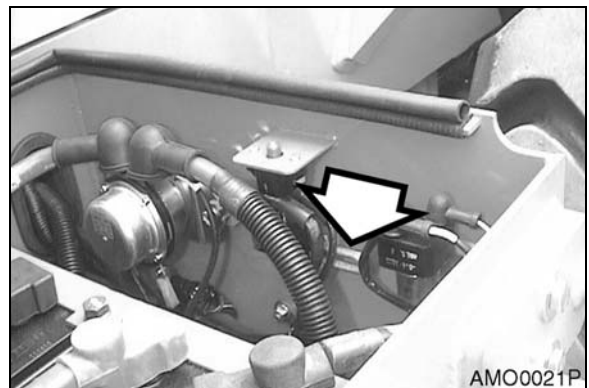
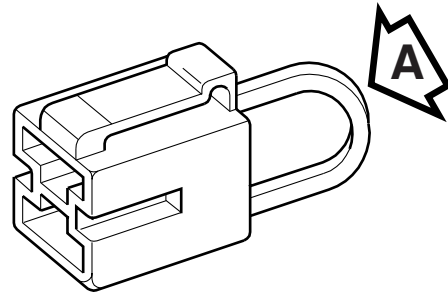


Figure 110



WARNING!

When changing the fusible link, replace the fusible link with the same capacity part. Otherwise, a fire could break out in the wiring harness and/or other components of the circuit. Always use original Daewoo parts.



HAOB100L

Figure 111

OPERATION



WARNING!

Before operating any Daewoo wheel loader, read and understand "Operating Controls" section of this manual.

INSTRUMENT PANEL CONTROL FUNCTIONS

MONITORING SYSTEM

Monitoring system uses network circuits between control system and sensors installed at various machine system locations to monitor selected conditions. This monitoring systems function is to continually inform operator of machine's condition. Displays and gauge readouts on instrument panel provide information such as engine speed, engine coolant temperature, transmission oil pressure, and electrical charge status.

NEW MACHINE BREAK-IN PROCEDURES

All Daewoo wheel loaders are inspected and adjusted before leaving the factory. However, it is required that the operator follow these steps during initial break-in period. Failure to follow these steps may result in damage to equipment or reduced performance.

1. Make sure to check all fluid levels before starting and every 8 - 10 operating hours.
2. Do all Daily maintenance and service checks.
3. For first 50 operational hours, as shown by hour meter on control console, do not exceed 80% of maximum rated engine speed.
4. At end of first 50 operational hours, drain engine oil. Replace engine oil filter and engine oil.

ENGINE START AND STOP

ENGINE START

1. Set parking brake switch to "I" (APPLIED) position. This will ensure that the parking brake is "APPLIED."

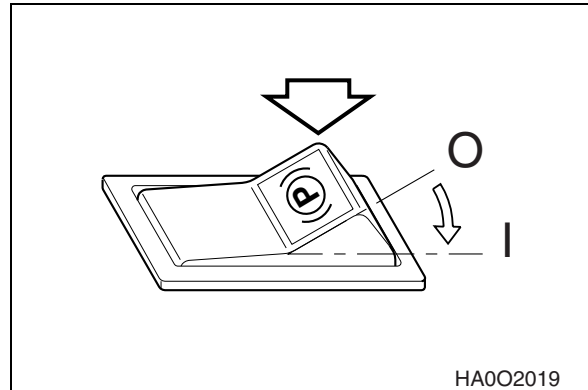


Figure 1

2. Move all control levers to "NEUTRAL" position.

IMPORTANT

If transmission lever is not in "NEUTRAL" position, engine will not start.

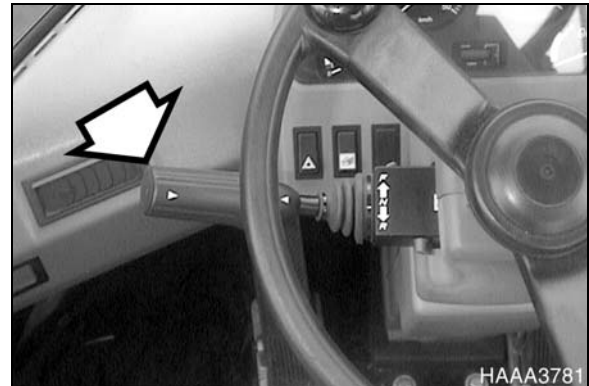


Figure 2

3. Make sure transmission neutral lock is in the "N" (NEUTRAL LOCK) position.



Figure 3

4. Set pilot cutoff switch to "O" (LOCK) position. This will "LOCK" pilot control valve lever (joystick).

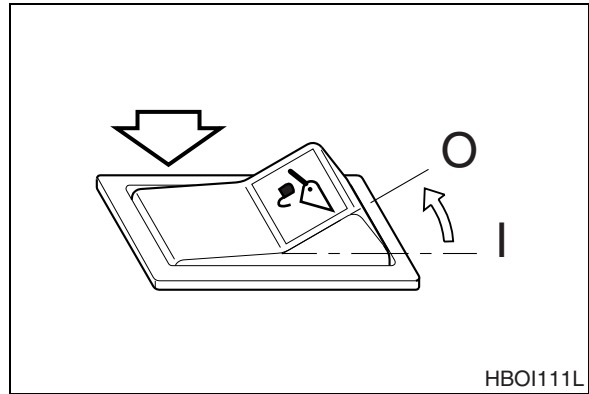


Figure 4

5. Rotate starter key to "I" (ON) position. All indicator lights should turn "ON."

NOTE: *If unit is equipped with and emergency steering system. Test system before starting engine. If system does not function properly, do not start unit. Follow test procedure given with test switch.*

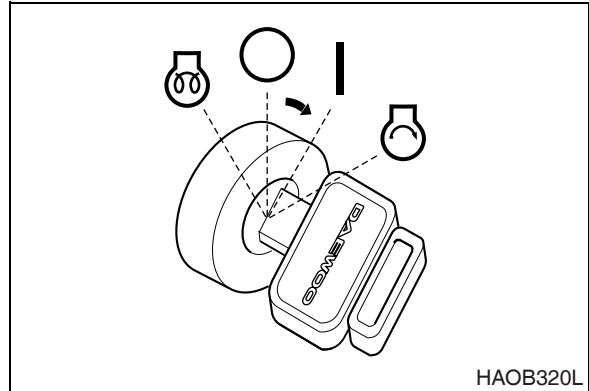


Figure 5

6. Rotate starter key to "START" position. Starter motor should crank immediately, and engine should start within a few seconds.

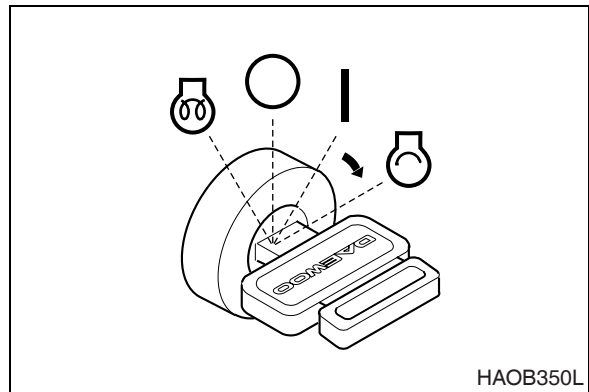


Figure 6

7. Release starter key when engine starts. Key will return to "I" (ON) position.

IMPORTANT

If engine does not start after approximately 15 seconds of cranking, release Starter Key. Wait 5 minutes for starter motor to cool down. Repeat step 6.

8. After engine starts, check all indicator lights and gauges to be certain that all

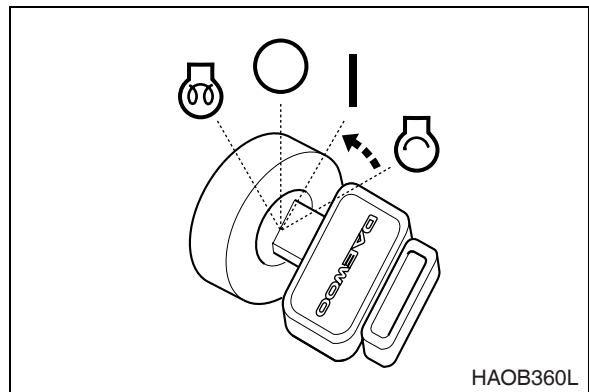


Figure 7

engine systems (oil pressure, oil temperature, coolant temperature, etc.) are in normal operating range. If any engine system is not normal, turn starter key to "OFF" position.

Instrument Panel Light or Gauge	Indicator Reading
Fuel Gauge	WHITE RANGE
Engine Coolant Temperature Gauge	
Transmission Oil Temperature Gauge	
Engine Oil Pressure Warning Light	OFF
Charging Warning Light	
Brake Oil Pressure Warning Light	
Parking Brake Light	ON

NOTE: *Parking brake indicator light turns "ON" or "OFF" according to parking brake operation regardless of engine starting.*

9. Perform "Hydraulic System Warm-up" on page 3-10
10. Check color of exhaust smoke.
 - No color or light blue - Engine is running in good condition.
 - Black - Incomplete combustion. Check cause.
 - White or dark blue - Engine is burning engine oil. Check cause.
11. Check for usual engine vibration and noises. If any are heard or felt, investigate cause.

NOTE: *If engine coolant temperature gauge shows red while running, take the following action; Discontinue work and allow engine to run at "LOW IDLE." Open engine compartment cover for good ventilation. Once engine temperature gauge returns to the green zone, shut down engine. After engine has cooled, check coolant level, look for leaks, clogged or dirty radiator fins (radiator core), and fan belt tension.*

COLD WEATHER ENGINE START

1. Set parking brake switch to the "I" (APPLIED) position. This will ensure that the parking brake is "APPLIED."

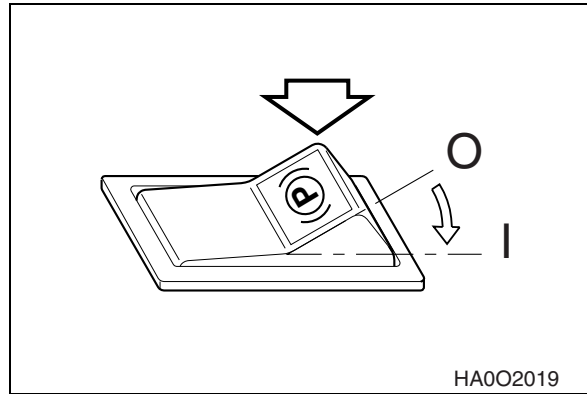


Figure 8

2. Move all control levers to "NEUTRAL" position.

IMPORTANT

If transmission lever is not in "NEUTRAL" position, engine will not start.



Figure 9

3. Make sure transmission neutral lock is in the "N" (NEUTRAL LOCK) position.



Figure 10

4. Set pilot cutoff switch to "O" (LOCKED) position. This will "LOCK" pilot control valve lever (joystick).

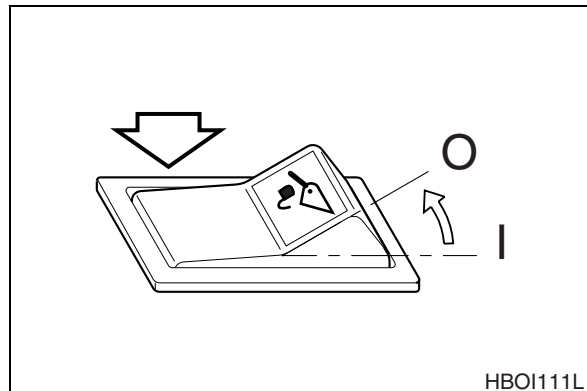


Figure 11

5. Turn starter key to "PREHEAT" position.
6. When preheater indicator light turns "ON," preheat cycle is complete.

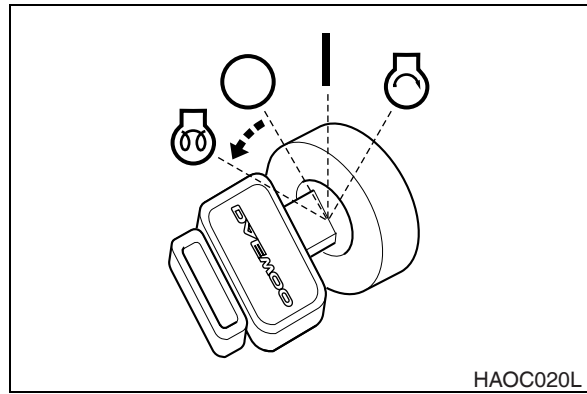


Figure 12

7. Rotate starter key to "I" (ON) position. All indicator lights should turn "ON."

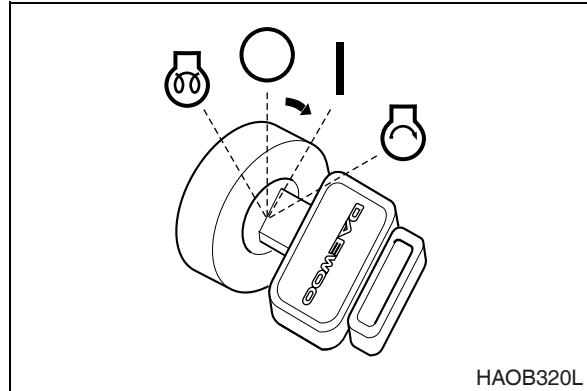


Figure 13

8. Rotate starter key to "START" position. Starter motor should crank immediately, and engine should start within a few seconds.

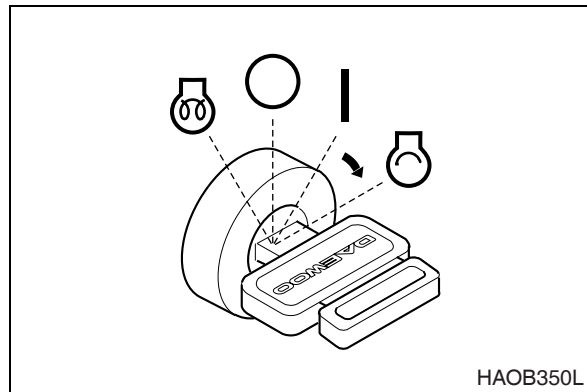


Figure 14

9. Release starter key when engine starts. Key will return to "I" (ON) position.

IMPORTANT

If engine does not start after approximately 15 seconds of cranking, release starter key. Wait 5 minutes for starter motor to cool down. Repeat step 8.

10. After engine starts, check all indicator lights and gauges to be certain that all engine systems (oil pressure, oil temperature, coolant temperature, etc.) are in normal operating range. If any engine system is not normal, turn starter key to "O" (OFF) position.
11. Perform "Hydraulic System Warm-up – Cold Weather" on page 3-10.

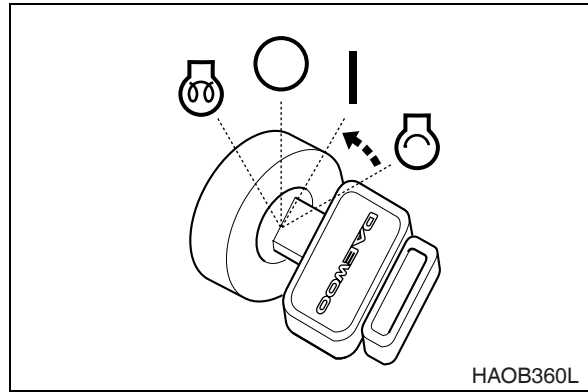


Figure 15

STARTING WITH AUXILIARY BATTERIES



WARNING!

Wear safety glasses.

Never connect negative leads to positive terminals and vice versa.

DO NOT connect auxiliary or booster battery ground terminal directly to battery terminal. Locate and use a ground point on machine frame.

Depleted batteries generate hydrogen gas. Electrical sparks around or near batteries can cause an explosion.

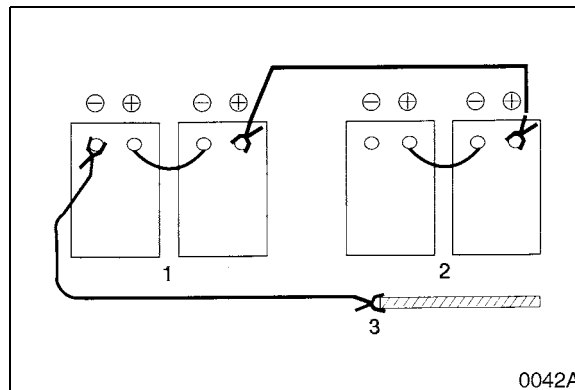


Figure 16

- | | |
|------------------------|----------------------------------|
| 1. AUXILIARY BATTERIES | 3. GROUND AUXILIARY BATTERIES TO |
| 2. DEPLETED BATTERIES | MACHINE FRAME |

If batteries are drained during starting procedures, you can jump start engine using auxiliary or booster batteries according to following procedures:

1. Connect positive jumper cable from auxiliary batteries to depleted batteries (Figure 16).
2. Connect negative jumper cable from auxiliary batteries to a ground point on machine frame. **DO NOT CONNECT DIRECTLY TO NEGATIVE BATTERY TERMINAL.**
3. Follow normal engine starting procedures.
4. After engine has started, remove negative jumper cable, and then positive cable.

ENGINE STOP

1. Move transmission lever to "NEUTRAL" position.
2. Make sure transmission neutral lock is in the "N" (NEUTRAL LOCK) position.
3. Set parking brake switch to the "I" (APPLIED) position. This will ensure that the parking brake is "APPLIED."
4. Set bucket on ground.
5. Put pilot cutoff switch to "O" (LOCK) position. This will "LOCK" pilot control valve lever (joystick).
6. Allow engine to idle for 1 - 2 minutes to cool down.

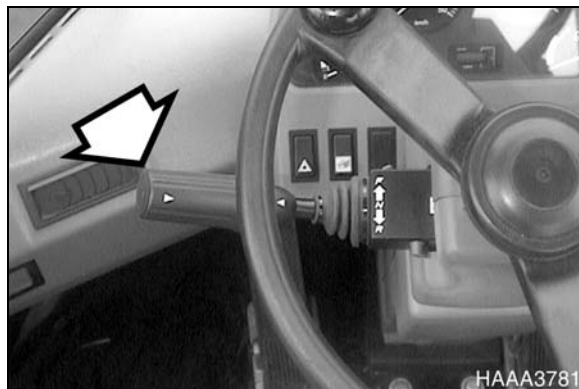


Figure 17



Figure 18

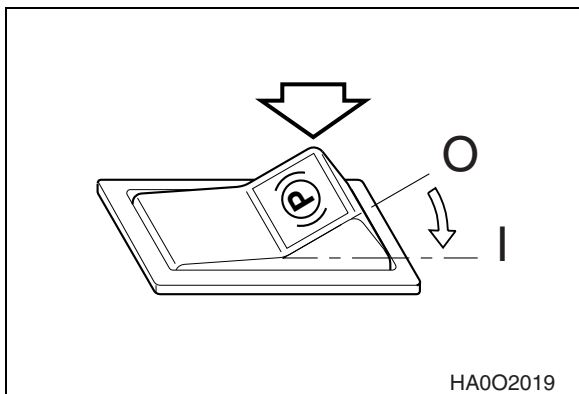


Figure 19

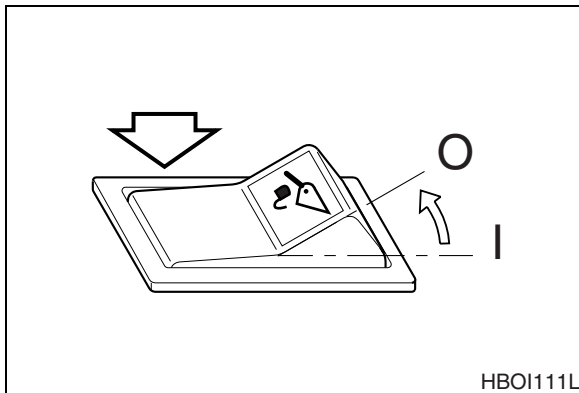


Figure 20

7. Rotate starter key to "O" (OFF) position. Remove key.

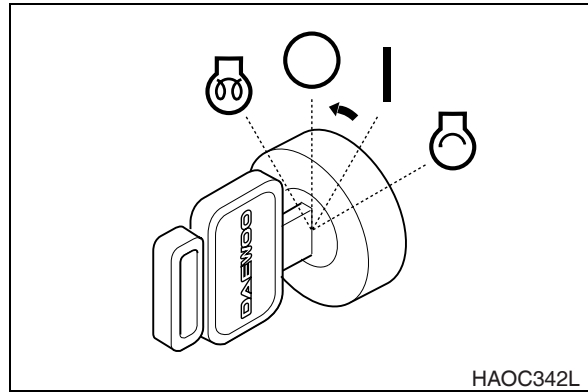


Figure 21

HYDRAULIC SYSTEM WARM-UP

1. Correct operating temperature of hydraulic oil is 50° - 80°C (120° - 175°F). Make sure to follow procedures listed below for hydraulic fluid warm-up.
2. Run engine at idle (no load) for 5 minutes.
3. Run engine for approximately 5 minutes at middle of speed range, without a load.
4. Cycle bucket until bucket cylinder bottoms out (extended and retracted) without a load to circulate the oil through the system. Do this for 5 minutes.

NOTE: *Do not allow cylinders to pass hydraulic oil over relief valve for more than twenty seconds at a time.*

5. Cycle boom, and bucket about five times without a load to circulate oil through system.

HYDRAULIC SYSTEM WARM-UP – COLD WEATHER

1. Follow Steps 1 through 3 in Hydraulic System Warm-up.
2. Do not operate machine at full speed until system has fully warmed up.
3. If working speeds continue to be slow, repeat initial hydraulic warm-up procedures again. If repeating warm-up procedures does not improve working speeds, continue to operate, but use extreme caution because machine function may be erratic.

MACHINE TRAVEL (STANDARD TRANSMISSION CONTROLS)



WARNING!

If vehicle is moved while parking brake is engaged, serious damage to parking brake disk will result.

Select a transmission gear that is appropriate for top speed that will be traveled. Choosing a gear that is too high will reduce acceleration and will unnecessarily heat transmission converter oil.

Never place transmission in "NEUTRAL" when going down a hill. Over speeding transmission can damage transmission gears.

Never change direction of vehicle travel at high speed. Serious damage to transmission will result.

1. Unlatch frame lock plate between front and rear frames before traveling. Secure lock plate to rear frame (Figure 22).

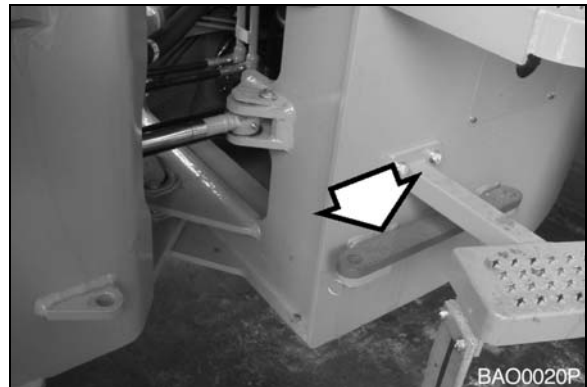


Figure 22

2. Set pilot cutoff switch to "I" (UNLOCKED) position. Raise bucket to a height of 20 -30 cm (8 - 12 in) above the ground. Tilt bucket completely back.

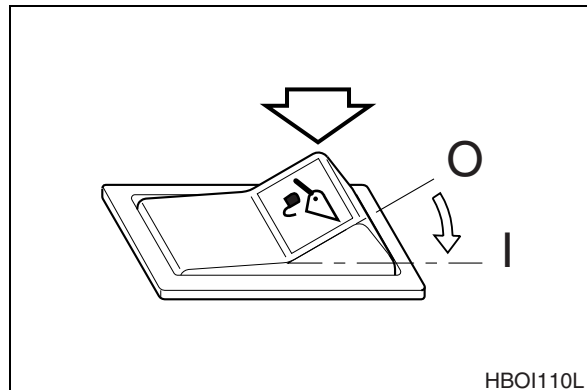


Figure 23

3. Set pilot cutoff switch to "O" (LOCKED) position. This will prevent boom and bucket from accidentally moving during travel, as a result of accidentally touching pilot control valve lever (joystick).

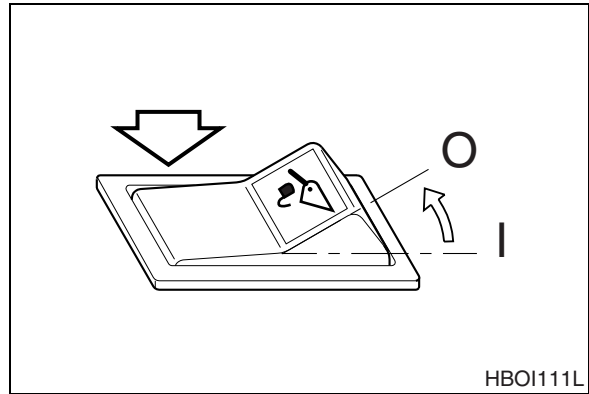


Figure 24

4. Press brake pedal.

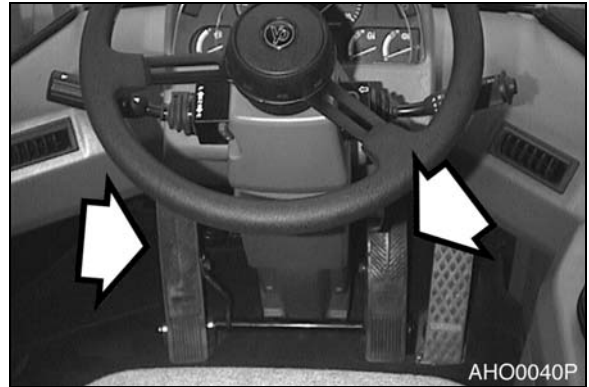


Figure 25

5. Set transmission neutral lock is in the "D" (DRIVE) position.



Figure 26

6. Set parking brake switch to the "O" (RELEASE) position. This will "RELEASE" the parking brake.

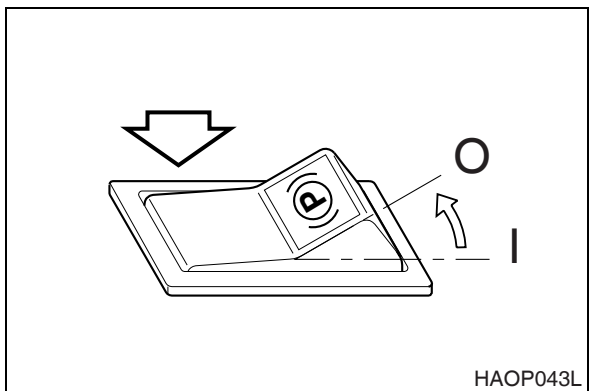


Figure 27

7. Place transmission lever in desired gear. Shift gears one by one. Do not skip from 1st to 3rd, for example.
8. Shift transmission lever to "FORWARD" position.

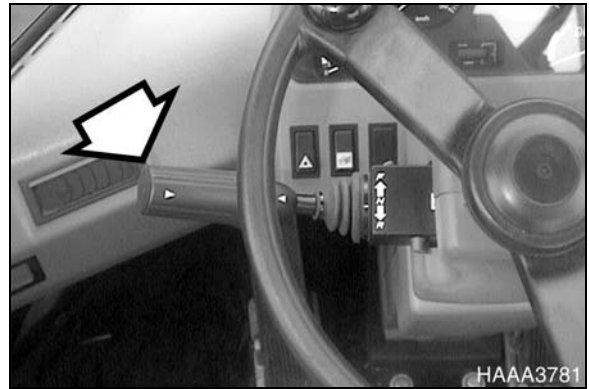


Figure 28

9. Release the brake pedal while slowly pressing the accelerator pedal.

	WARNING!
When traveling at high speed or on a steep hill, do not make sharp changes in direction. This could cause vehicle to overturn.	
When traveling or changing direction, always look carefully to be certain that no one is in path of vehicle.	

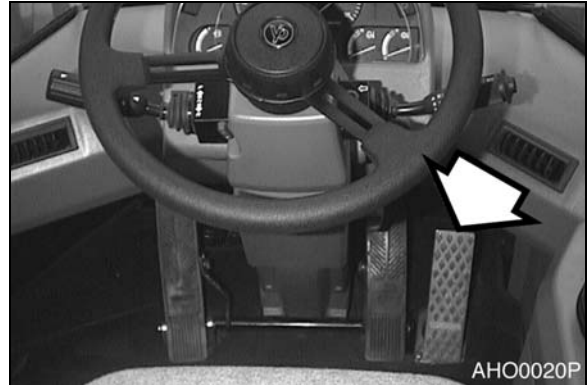


Figure 29

MACHINE SHUT DOWN

1. Ease off throttle and apply travel brakes.

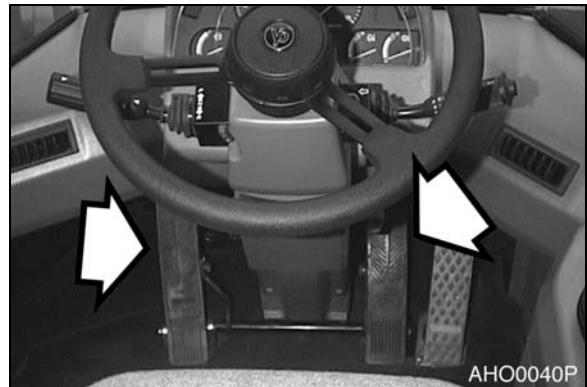


Figure 30

2. Place transmission lever in "NEUTRAL."



Figure 31

3. Set transmission neutral lock is in the "N" (NEUTRAL LOCK) position.

	CAUTION!
"LOCK" transmission lever. When ever machine is parked, "LOCK" transmission lever in "NEUTRAL" to prevent accidental machine movement.	



Figure 32

4. Set parking brake switch to the "I" (APPLIED) position. This will ensure that the parking brake is "APPLIED."

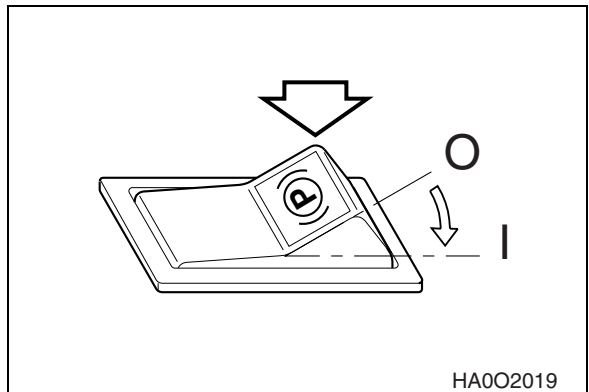


Figure 33

5. Set bucket on ground.
6. Select pilot cutoff switch to "O" (LOCKED) position. This will lock pilot control valve lever (joystick).
7. Allow engine to idle for 1 - 2 minutes to cool down. Stopping a turbocharged engine without a cool down period can seriously damage turbocharger.

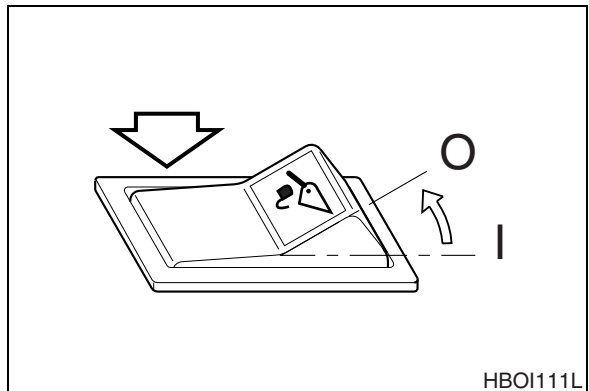


Figure 34

8. Rotate starter key to "O" (OFF) position. Remove key.

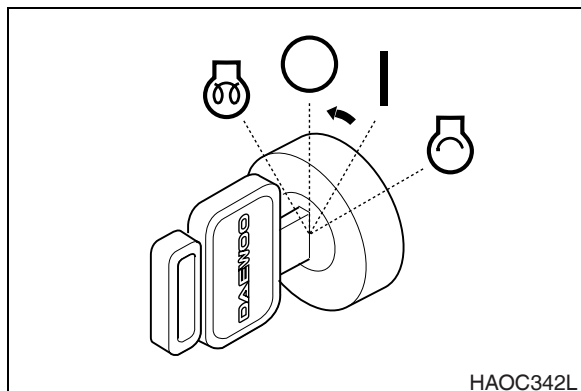


Figure 35

9. If machine is parked on a slope, install wheel chocks in front of and behind vehicle wheels.

	WARNING!
Always secure machine with wheel chocks when parked on a slope. Leaving machine in gear will provide no braking effect because transmission clutch is hydraulically operated. When engine is turned "OFF," there is no hydraulic pressure in transmission and clutch is not engaged.	

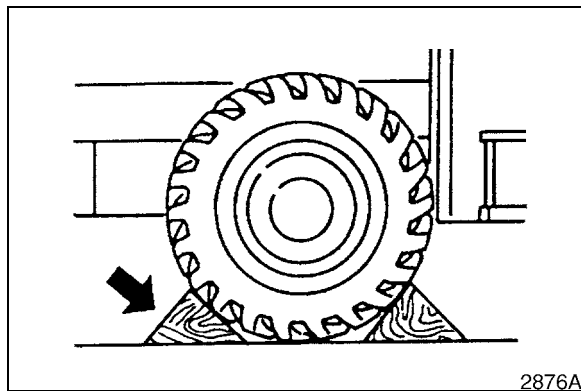


Figure 36

F/R (FORWARD/REVERSE) TRAVEL CONTROL SYSTEM (OPTION)

An optional F/R (Forward/Reverse) travel control system can be installed as an option on the machine. With this system installed, the operator's left-hand can remain on the steering wheel during operation, and not have to manually move the transmission lever between forward and reverse.

To activate system perform the following steps:

1. Place transmission lever in "NEUTRAL."

NOTE: Do not move the transmission lever out of "NEUTRAL." If the lever is moved, the system will be deactivated.

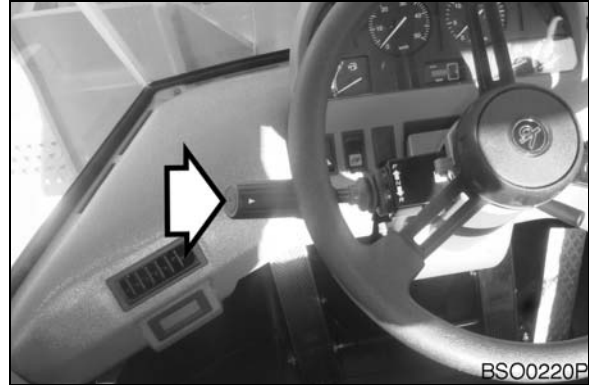


Figure 37

2. Press F/R selector switch to the "I" position, and then release. The switch will return to the "O" position, but the system will be activated. When system is activated, the F/R selector indicator light (Figure 39) will be turned "ON."

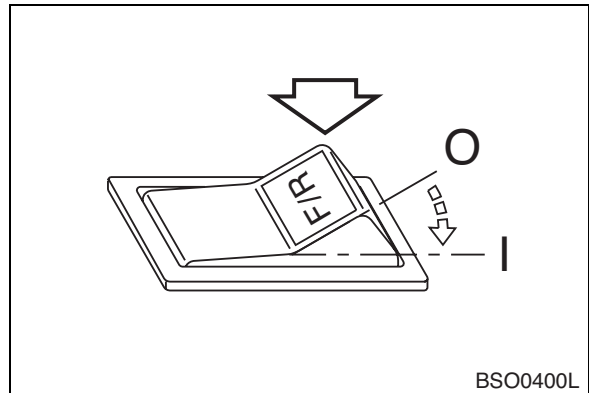


Figure 38

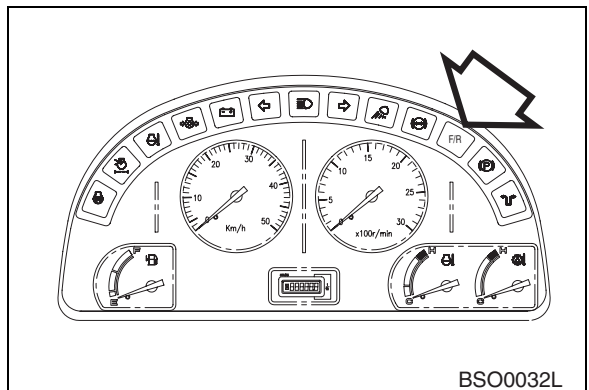


Figure 39

3. The F/R control switch is then used to control the travel direction of the machine.
 - O. In this position, the machine is in "NEUTRAL."
 - I. In this position, the machine travels "FORWARD."
 - II. In this position, the machine travels in "REVERSE."
4. The F/R travel control system will stay activated until one of two things happen.
 - A. The transmission lever is moved out of "NEUTRAL" into "FORWARD" or "REVERSE."
 - B. The starter switch is turned "OFF."

When the system is deactivated, the F/R selector indicator light (Figure 39) will be turned "OFF."

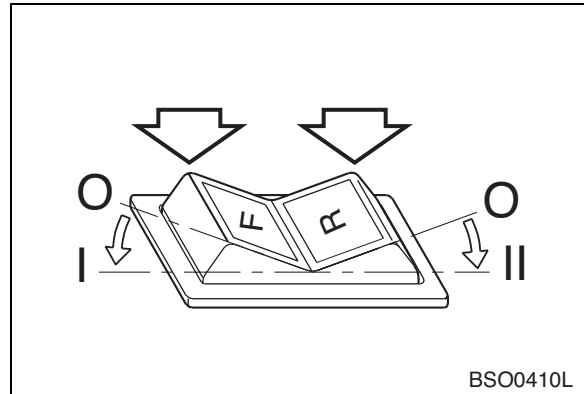


Figure 40

ADDITIONAL BRAKING

Machine hydraulic system can supply additional braking force during travel. To accomplish this, move pilot control valve lever (joystick) to crowd position and hold it there. Hydraulic pump will be driven to supply output at maximum pressure (relief pressure). Energy expended to drive pump, will slow engine speed. Additional braking, along with proper gear selection, can be used to slow a vehicle that is being driven down an incline.

BOOM RAISE KICK-OUT

Placing bucket lever in "Boom Raise Detent" position will lock bucket lever in raise boom position. Boom will raise until trip plate (1, Figure 41) makes contact with bucket height limit switch (2). When limit switch is tripped, boom will stop raising and bucket lever will automatically be returned to "NEUTRAL" position. Trip plate can be adjusted to control maximum height that boom can be raised.

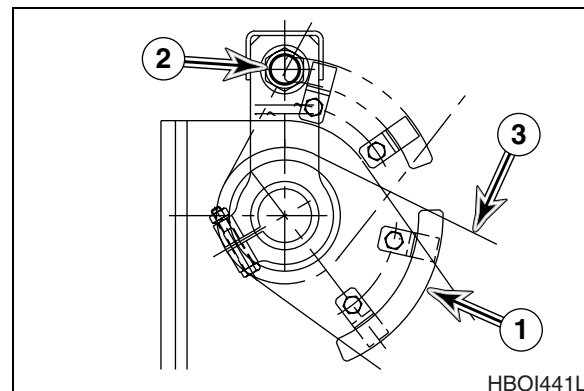


Figure 41

IMPORTANT

Trip plate (1, Figure 41) must always be set to contact limit switch (2) before boom cylinders reach maximum extension. Maximum extension causes pump to force fluid over relief valve.

To raise boom to maximum height, past preset height, hold boom and bucket lever in "Raise" or "Hold Raise" position until boom has reached maximum height. Then remove your hand from lever. Lever will automatically return to "NEUTRAL" position. This prevents hydraulic pump from working against relief valve (maximum pressure).

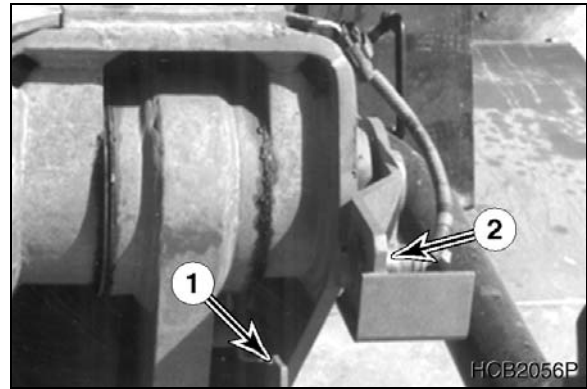


Figure 42

BUCKET ANGLE INDICATOR

Upper right side of bucket includes a bracket that indicates angle of bottom of bucket. Top of bracket is parallel with bottom of bucket. If bottom of bucket is not visible, top of bracket will be visible.

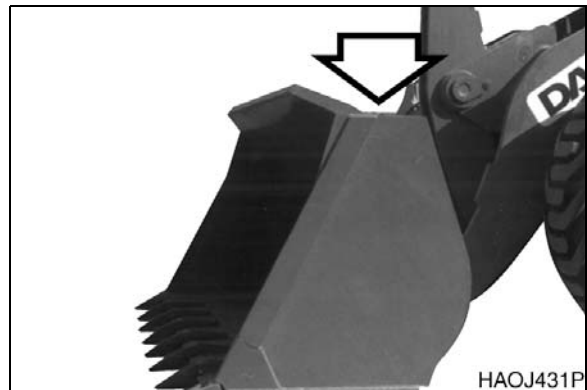


Figure 43

BOOM LOWER KICK-OUT (OPTION)

Placing bucket lever in "L" position will lock control lever in lower boom position. Boom will move downward until trip plate (2, Figure 44) makes contact with bucket lower limit switch (1). When limit switch is tripped, boom will stop lowering and bucket lever will automatically be returned to "NEUTRAL" position. Trip plate can be adjusted to control maximum height that boom can be lowered.

IMPORTANT

Trip plate must always be set to contact limit switch before boom cylinders reach maximum extension. Maximum extension causes pump to force fluid over relief valve.

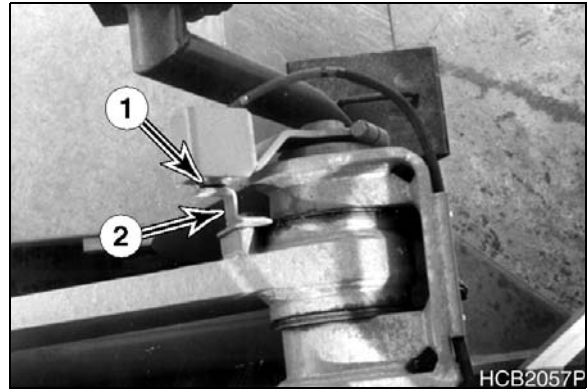


Figure 44

ADJUSTMENT OF BUCKET POSITION SWITCH

When bucket lever is held in crowd detent position, after bucket has been dumped, bucket will pivot toward crowd position. Once full crowd position has been reached, bucket lever will automatically return to "NEUTRAL" position. If bucket is lowered after lever returns to "NEUTRAL," bucket will automatically position itself to be in a preselected digging position (usually flat). To adjust bucket to desired preselected digging position, perform the following steps.

1. Operate controls to place bucket on ground and in desired digging position (usually flat). Return bucket lever to its "NEUTRAL" position.
2. Shut down engine.
3. Loosen bolts (4, Figure 45) on bracket (3).
4. Position bracket (3, Figure 45) so that end of arm (1) is aligned with center of magnetic switch (2).
5. Tighten bolts (4, Figure 45).
6. Start engine. Raise boom, dump bucket, then move bucket lever into crowd detent position. Now lower boom and check to see that bucket has stopped at required position. A small readjustment of bracket (3, Figure 45) may be necessary.

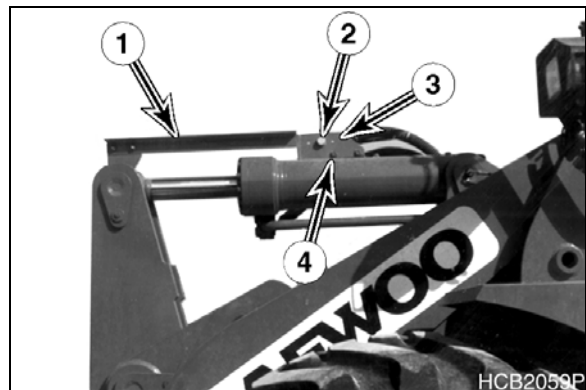


Figure 45

TOWING MACHINE

When necessary to tow another vehicle, the tow rope must be tied to the towing pin on the counterweight at the rear of vehicle.

NOTE: *The loader must be used for towing only in an emergency.*



WARNING!

Do not tow machine at a speed over 10 km/h (6 MPH) and do not tow machine farther than 10 km (6 miles). This will prevent damage to machine transmission that would result from lack of lubrication.

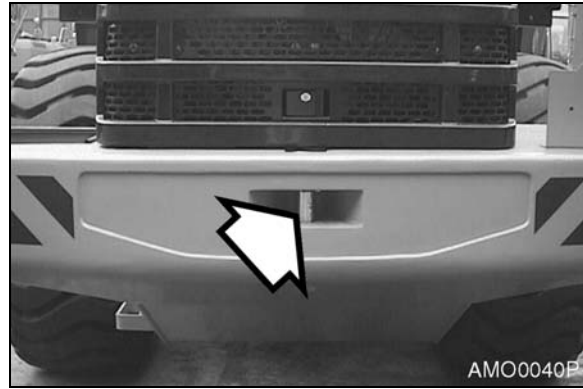


Figure 46



WARNING!

When towing another vehicle on a public road, take necessary measures to let other vehicles and people know that you are towing another vehicle. Use a flag, rotating beacon light, or hazard light.

NOTE: *There are several requirements you must abide by when towing another vehicle. Learn the regulations and rules about towing another vehicle and observe them.*

If the loader is being towed by another vehicle and the engine will not start, remove the front and rear drive shafts; otherwise the transmission will rotate without being properly lubricated, causing seizure. Before removing them, apply the parking brakes and block the wheels securely.

If the engine can be started and the steering wheel and brakes function normally, have someone get on the loader you are going to tow for steering it.

Before you tow a vehicle make sure you have checked the following:

- Check the weights of your loader and the vehicle to be towed and make sure your loader has sufficient braking capacity to stop the towed load.
- Check if the vehicle to be towed can be braked and steered. If not, do not allow anyone to ride on the towed vehicle.
- Check the tow rope or tow bar for damage and make sure it has sufficient strength for the work.
- When necessary to descend a gradient, another towing vehicle must be used in the rear to retard.

When towing make sure you are doing the following;

- Start slowly. A sudden start can lead to a broken tow rope.
- The tow line must be along the center line of both your loader and the vehicle to be towed.
- If you use any other towing device, refer to the Instruction Manual supplied with the towing device.
- If it is difficult to tow the loader, transport it by a trailer truck to your nearest repair shop.

- In addition to the above measures, release the parking brake if the engine will not start or the hydraulic pumps are defective.

IF ENGINE STALLS WHILE TRAVELING

BRAKE SYSTEM: The brakes can be applied approximately 9 times by pressing the brake pedal due to the oil pressure stored in the accumulator after engine is turned "OFF" if the engine stalls while traveling, move to an out of traffic area and park. Do not pump the brake pedal at this time; otherwise the brake oil pressure will be used up, thus causing the brakes to fail.

ALLOWABLE WATER DEPTH

The water depth is an important factor to take into consideration when the loader is working in swampy areas. Do not enter water whose depth exceeds the loader's minimum ground clearance height or is high enough to wet the bottom of the axle housing. As a rule of thumb, the allowable water depth is about 400 mm. This means that the loader should not be used in a river.

Observe the following conditions:

1. Check the water depth in advance when crossing across a river.
2. Use the same precautions before crossing across a swampy area.
3. Do not enter rivers whose river bed is steep or has a rapid flow.



CAUTION!

Avoid use of the loader in salt water. Salt water will cause the development of rust which will shorten the life of the loader.

INSPECTION, MAINTENANCE AND ADJUSTMENT

PREVENTIVE MAINTENANCE

Periodic checks and replacement of oil, grease, filters, etc. must be made at specific intervals, to keep machine in good working condition. The following pages describe items to be checked, lubricants to be used, and time interval between each check.

NOTE: *Time interval between each service check may need to be shortened if machine is operating in severe atmospheric conditions. Machines working in extremely hot or dusty conditions will require more frequent service checks. Total hours of machine operation are determined by hour meter that is on the front instrument panel.*

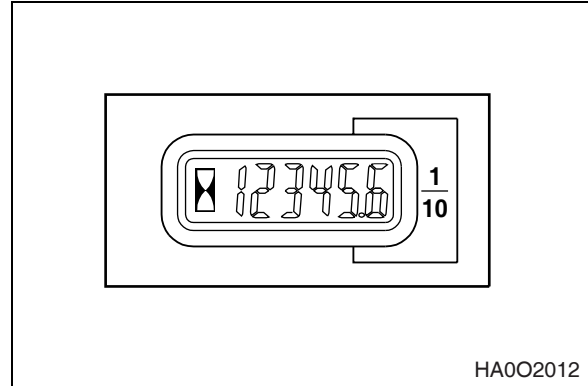


Figure 47

SERIAL NUMBERS

There are two serial number plates attached to the body of wheel loader.

Please make note of these numbers and their locations. These will be required whenever warranty service work is requested.

Machine Serial Number

The machine serial number plate is on left side of front frame above wheel cover (Figure 1).

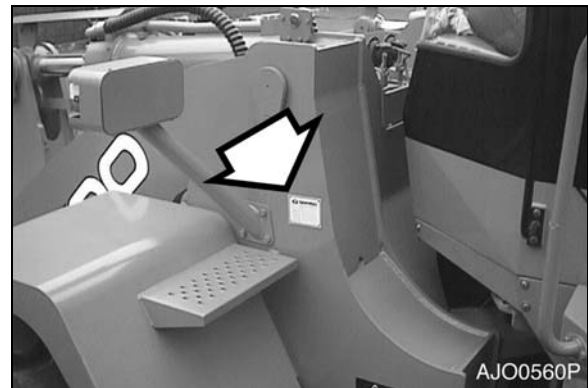


Figure 1

The number is also stamped in the rear frame on the left side just below the cab (Figure 2).

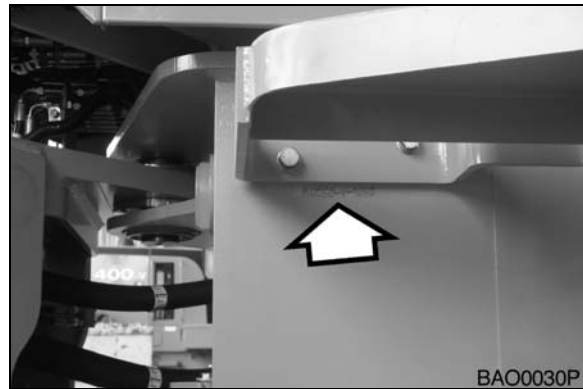


Figure 2

Engine Serial Number

The engine name plate (identification label) is attached to rocker cover (Figure 3). The engine serial number is stamped on the left rear of the engine block, under exhaust manifold.

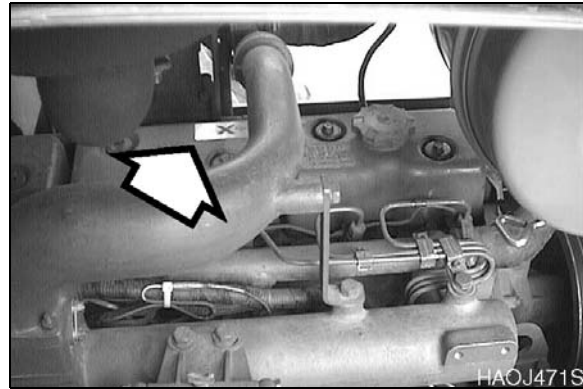


Figure 3

SAFETY PRECAUTIONS

1. Before performing any maintenance checks, move pilot cutoff switch to "LOCKED" position. Place a Warning Tag on controls so that no one begins to operate machine while maintenance checks are being performed.
2. Clean up all fuel spills. Fuel spills are hazardous, especially around engine.
3. Inspect all fuel lines for leakage. Replace any lines, fittings, O-rings, or filters that show signs of wear or damage.
4. If a test procedure requires engine to be running, use two people and keep all unnecessary personnel away from machine.

TABLE OF RECOMMENDED LUBRICANTS

IMPORTANT

Do not use lubricants other than those recommended, without prior written approval from Daewoo.

NOTE: Refer to Maintenance Intervals Table for application points.

LUBRICANT MANUFACTURER	HYDRAULIC OIL	ENGINE OIL	LUBRICANT GREASE	AXLE GEAR OIL
CALTEX	CALTEX HD32	CALTEX RPM or DELO 300	MULTIFAC EP	—
EXXON/ESSO	NUTO (ANTI-WEAR) HD 32 (BELOW 0°C (32°F)) or HD 46 (ABOVE 0°C (32°F)) or TERESSTIC (ANTI-RUST)	EXXON XD-3 STRAIGHT WEIGHT or 15W40	RONEX MP #2 or RONEX MP #1 (COLD TEMPS)	—
MOBIL	MOBIL DTE 13M (ALL-TEMP) or DTE 24 (SUMMER)	DELVAC 1300 or SUPER 15W40 or DELVAC 1 or STRAIGHT WEIGHT	MOBIL FAW #2 or MOBIL FAW #1 (COLD TEMPS)	MOBIL FLUID 424
SHELL	TELLUS 32	ROTELLA T15W40 or T30 (WINTER) or T40 (SUMMER)	ALVANIA EP #2	ASEOL MULTITRAC 85W
PENNZOIL	PENNZBELL AW 32 (BELOW 0°C (32°F)) or AW 46 (ABOVE 0°C (32°F))	LONGLIFE SAE 30 or SAE 40 or SAE 15W40	PENNZOIL 705 EP #2	—
DRYDEN	PARADENE AW 32 (BELOW 0°C (32°F)) or AW 46 (ABOVE 0°C (32°F))	DIESELALL PLUS or 30W or 40W or 15W40	EP #2 (RED)	—

LUBRICANT MANUFACTURER	HYDRAULIC OIL	ENGINE OIL	LUBRICANT GREASE	AXLE GEAR OIL
CHEVRON	AW MV 32 (BELOW 0°C (32°F)) or AW MV 46 (ABOVE 0°C (32°F))	DELO 400 15W40	DELO GREASE EP-2	—
TEXACO	RANDO HD32 (BELOW 0°C (32°F)) or HD46 (ABOVE 0°C (32°F))	URSA SUPER PLUS 15W40 or URSA PREMIUM TDX 15W40	STAR PLEX 2 STAR PLEX PREMIUM	—
IDEMITSU KOSAN	DAPHNE KOSAN 46WR	APOROIL MOTIRE S300	DAPHNE CORRONE #2	—
NIPPON SEIKIYU	SUPER HIGHLAND S26 or 32	HIGH D. S3 STRAIGHT WEIGHT	LIPANOC GREASE	—
TOTAL	TOTAL EQUIVIS ZS46-III	TOTAL XT 15W40	TOTAL MULTIS EP #2	—

LUBRICANT MANUFACTURER	TRANSMISSION GEAR OIL
Same as engine oil	SAE 15W40 API CD and above

Antifreeze	
Recommended Concentration	Manufacturers Meeting ASTM D3306
50% Antifreeze - 50% Distilled Water	Dexcool ELC by Chevron Texaco
	Alugard G48 by BASF
	Others meeting or exceeding ASTM D3306



CAUTION!

Do not mix oils from different manufacturers. Daewoo does not endorse specific brands but does suggest that owners select quality oils whose suppliers provide assurance that required standards will always be met or exceeded.

IMPORTANT

Fluctuating daily or weekly extremes of temperature, or operation in subzero freezing weather may make it impractical to use straight weight lubricants. Use good judgement in selecting lubricant types that are appropriate for climate conditions.

FLUID CAPACITIES

Component		Capacity	
		S/N 3001 thru 4000	S/N 4001 and Up
Engine	Oil Pan with Filter	21 liters (5.5 U.S. gal.)	25.4 liters (6.7 U.S. gal.)
		NOTE: The filter holds an additional 1 liter (1 qt) of oil.	
	Cooling System	50 liters (13 U.S. gal.)	31 liters (8 U.S. gal.)
Fuel Tank		270 liters (71.3 U.S. gal.)	
Hydraulic Oil Tank		195 liters (52 U.S. gal.)	166 liters (44 U.S. gal.)
Transmission		27 liters (7.1 U.S. gal.)	
Axles	Front Axle	31 liters (8.19 U.S. gal.)	
	Rear Axle	24 liters (6.34 U.S. gal.)	

LUBRICATION AND SERVICE CHART

Lubrication and service chart is on the inside of battery box cover. The symbols shown here are used in the lubrication and service chart on the next page.

Symbol	Description
	Lubrication
	Gear Oil (Swing Device, Travel Reduction Device)
	Engine Oil
	Engine Oil Filter
	Hydraulic Oil
	Hydraulic Oil Filter

Symbol	Description
	Coolant
	Air Cleaner Filter
	Fuel Filter
	Air Conditioner Filter
	Drain Water

Description of Lubrication and Service Chart

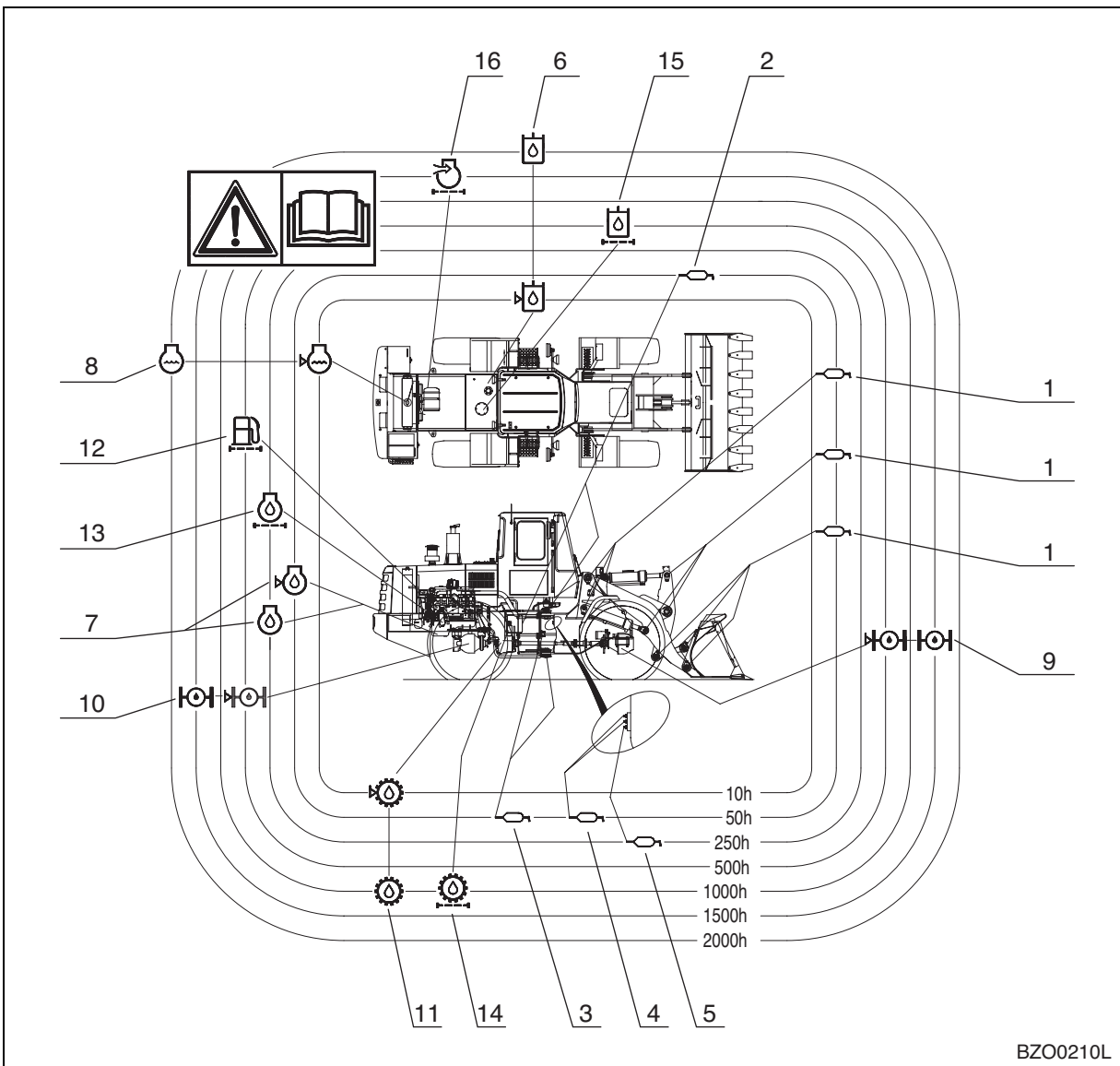


Figure 4

Service Data										
No.	Items To Check	Service	M250-V							
			Qty.	Service Interval						
				10	50	250	500	1000	1500	2000
1	Front Joint Pin	Grease	16	F100	W10					
2	Articulation Pin	Grease	2							
3	Rear Axle Pivot	Grease	2							
4	Steering Cylinder	Grease	4							
5	Front Drive Shaft Bearing	Grease	1							
6	Hydraulic Oil Tank	Hydraulic Oil	195 L	V						
7	Engine Oil Pan	Engine Oil 15W40	21 L	V	F					
8	Radiator	Coolant (Antifreeze)	50 L	V						
9	Front Axle	Axle Gear Oil (MOBIL FLUID 424)	31 L				F, V			
10	Rear Axle	Axle Gear Oil (MOBIL FLUID 424)	24 L				F, V			
11	Transmission	Engine Oil 15W40	27 L	V		F				
12	Fuel Filter	Cartridge	1							
13	Engine Oil Filter	Cartridge	1		F					
14	Transmission Filter	Cartridge	1			F				
15	Full-flow Filter	Element	1		F					
16	Air Cleaner	Element (Outer)	1			C				
		Element (Inner)	1			C				
V: Maintenance & Refill.										
C: Cleaning.										
F: First Time Exchange Only.										
F100: Every 10 Hours for First 100 Hours.										
W10: Every 10 Hours If Operating In Water.										
Gray Box: Replacement On Every Interval.										
NOTE: For additional service items see list of "Maintenance Intervals" on page 4-8.										

MAINTENANCE INTERVALS

10 HOUR / DAILY SERVICE

- Grease Front Attachment Pins (See page 4-10)*
- Inspect All Tires for Correct Tire Pressure and Signs of Damage or Abnormal Wear (See page 4-10)
- Check Engine Oil Level (See page 4-10)
- Check Hydraulic System Oil Level (See page 4-12)
- Check for Leaks in Hydraulic System (See page 4-13)
- Fill Fuel Tank (See page 4-14)
- Check for Leaks in Fuel System (See page 4-14)
- Drain Fuel Condensation (See page 4-15)
- Check Coolant Level (See page 4-16)
- Check Level of Window Washer Liquid (See page 4-17)
- Inspect the Bucket Teeth and Side Cutters for Signs of Wear (See page 4-17)
- Inspect Seat Belt for Proper Operation (See page 4-17)
- Inspect the Structure for Cracks and Faulty Welds (See page 4-17)
- Check the Operation of All Switches (See page 4-17)
- Check the Operation of All Exterior Lights, Horn and Control Console Indicator and Monitor Lights (See page 4-17)
- Start Engine, Check Starting Ability, and Observe Exhaust Color at Start-up and at Normal Operating Temperature. Listen for Any Abnormal Sounds (See page 4-18)
- Check Operation of All Controls (See page 4-18)
- Inspect Engine Fan Blade (See page 4-18)
- Check Engine Drive Belt Wear (See page 4-19)
- Check Air Intake System (See page 4-20)

50 HOUR / WEEKLY SERVICE

- Perform All Daily Service Checks (See page 4-21)
- Grease Front Attachment Pins (See page 4-21)
- Grease Steering Cylinder Rod and Head Ends (See page 4-26)
- Grease Upper and Lower Center Pins (See page 4-27)
- Change Engine Oil and Filter (See page 4-27)*
- Hydraulic Full Flow Filter Replacement (See page 4-27)*
- Check Water Pump Belt Tension (See page 4-27)*
- Clean Exterior of Radiator, Oil Cooler and Air conditioner Condenser (See page 4-27)*

250 HOUR / MONTHLY SERVICE

- Perform All Daily and 50 Hour Service Checks (See page 4-28)
- Replace Hydraulic System brake and Pilot Filter (See page 4-28)
- Check Engine Air Intake Precleaner (See page 4-29)
- Drain Water From Hydraulic Oil Tank (See page 4-29)
- Clean Air Cleaner (See page 4-29)
- Check Water Pump Belt Tension (See page 4-31)
- Grease Drive Shafts (See page 4-32)
- Change Engine Oil and Filter (Tier I engine) (See page 4-33)
- Axle Differential and Planetaries Oil Replacement (after first 250 hours) (See page 4-34)*
- Replacement Of Transmission Oil and Filter (After First 250 Hours) (See page 4-34)*

* Break-in

500 HOUR / 3 MONTH SERVICE

- Perform All Daily, 50 and 250 Hour Service Checks (See page 4-35)
- Change Engine Oil and Filter (Tier II engine) (See page 4-35)
- Replace Fuel Filter (See page 4-36)
- Hydraulic Full Flow Filter Replacement (See page 4-37)
- Clean Exterior of Radiator, Oil Cooler and Air conditioner Condenser (See page 4-38)
- Clean Air Conditioner Filter (See page 4-40)

1,000 HOUR / 6 MONTH SERVICE

- Perform All Daily, 50, 250 and 500 Hour Service Checks (See page 4-41)
- Drain and Replace Transmission Oil and filter (See page 4-41)
- Axle Brake Disk Wear Measurement (See page 4-43)
- Clean Fuel Tank and Strainer (See page 4-44)
- Clean Fuel Injection Priming Pump Strainer (See page 4-45)
- Replace Air Conditioner Filter (See page 4-45)
- Check Air Conditioner Refrigerant (See page 4-46)
- Check and Adjust Engine (See page 4-46)

1,500 HOUR / 9 MONTH SERVICE

- Perform All Daily, 50, 250 and 500 Hour Service Checks (See page 4-47)
- Axle Differential and Planetaries Oil Replacement (See page 4-47)
- Replace Outer and Inner Air Cleaner Elements (See page 4-49)

2,000 HOUR / YEARLY SERVICE

- Perform All Daily, 50, 250, 500 and 1,000 Hour Service Checks (See page 4-50)
- Check Steering, Brake, Drive Shaft, Engine, and Fuel System (See page 4-50)
- Replace Pipes and Hoses (See page 4-50)
- Bleed Brakes (See page 4-50)
- Change Radiator Coolant (See page 4-51)
- Drain and Replace Hydraulic Oil (See page 4-53)
- Check Brake Accumulator (See page 4-54)

12,000 HOUR / SIX YEAR SERVICE

- Hose In-service Lifetime Limit (European Standard ISO 8331 and EN982 CEN) (See page 4-56)

* Break-in

10 HOUR / DAILY SERVICE

GREASE FRONT ATTACHMENT PINS

NOTE: *Fittings are greased daily, or every 10 hours, for the first 100 hours of operation to comply with new machine break-in requirements. After that, greasing should be done every 50 hours. If bucket is being used in water, grease fittings immediately after machine is removed from water. Follow procedure printed under the 50 hour maintenance interval "Grease Front Attachment Pins" on page 4-21.*

INSPECT ALL TIRES FOR CORRECT TIRE PRESSURE AND SIGNS OF DAMAGE OR ABNORMAL WEAR

1. Inflate tires to proper operating pressure for working conditions. See "Tires and Wheels" on page 4-72.

CHECK ENGINE OIL LEVEL

NOTE: *When checking level using a dipstick always remove and wipe it clean before making final level check.*

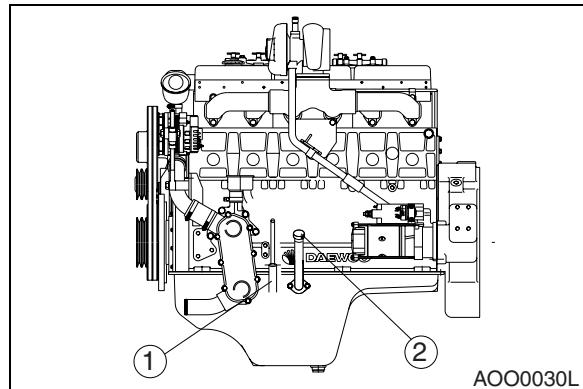


Figure 5 (S/N 3001 thru 4000)

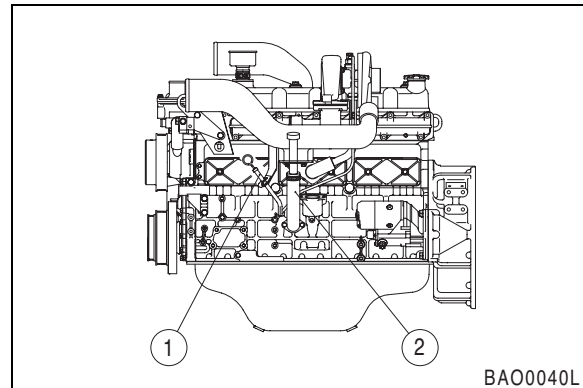


Figure 6 (S/N 4001 and Up)

1. Check level of engine oil every day before starting engine.
2. Remove engine oil dipstick (1, Figure 5). Oil level must be between "LOW" and "FULL" marks.

NOTE: *If oil is above "HIGH" mark on dipstick, some must be drained to return oil to proper level.*

3. To add oil, remove engine oil fill cap (2, Figure 5).

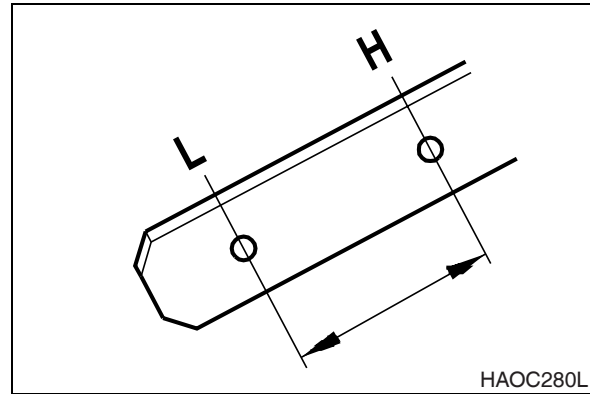


Figure 7

CHECK TRANSMISSION OIL LEVEL SIGHT GAUGE

1. Use two people to perform this operation.
2. Start machine and drive it until transmission fluid has warmed to between 82°C (180°F) and 93°C (200°F). Park machine on firm, level ground. Lower bucket to ground.
3. Place transmission lever in "NEUTRAL." Apply parking brake. Shut down engine.
4. Block tires. Once tires are blocked, start engine and have a person remain in the cab.
5. With engine running, have second person, find transmission oil level sight gauge (1, Figure 9) on transmission fill tube (2).
6. Oil level must be at "HOT" mark or above as shown in (Figure 9).

NOTE: *If oil level is above top end of sight gauge (completely filling it), drain oil until level is at "HOT" mark.*

NOTE: *If transmission cannot reach an operating temperature of 80°C (176°F), then the oil level must be visible in the sight gauge below the "HOT" mark. Periodically check oil level during the workday to ensure that oil level does not rise above top end of sight gauge.*



Figure 8 TRANSMISSION OIL FILL CAP

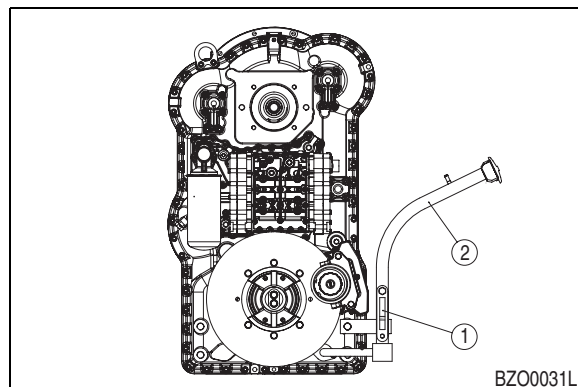


Figure 9

1. TRANSMISSION SIGHT GAUGE
2. TRANSMISSION FILL TUBE

7. To add oil, remove transmission fill cap (Figure 8) from transmission oil fill pipe. Refer to "Table of Recommended Lubricants" on page 4-3, of this manual for recommended oil for the operating conditions.
8. Shut down engine when done.

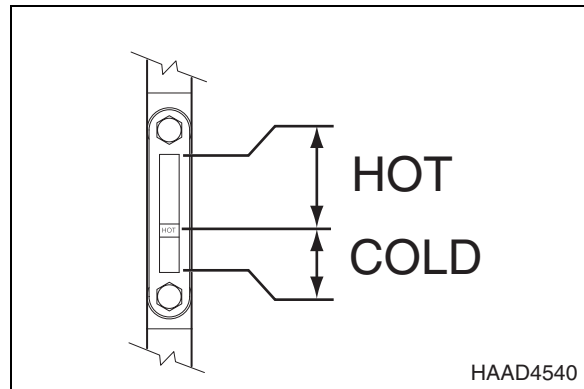


Figure 10 TRANSMISSION SIGHT GAUGE

CHECK HYDRAULIC SYSTEM OIL LEVEL

**WARNING!**

The hydraulic oil will be hot after normal machine operation. Allow system to cool before attempting to service any of the hydraulic components.

The hydraulic tank is pressurized. Turn the breather cap slowly to allow the pressurized air to vent. After the pressure has been released, it is safe to remove either the fill cap or service covers.

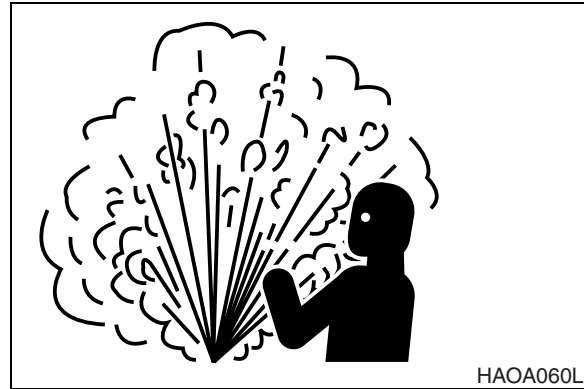


Figure 11

1. Move machine to a level area and shut down engine.
2. Apply parking brake.
3. Lower bucket to ground.
4. Check sight gauge that is attached to hydraulic reservoir. Oil level must be between upper limit (1, Figure 12) and lower limit (2) shown on gauge.

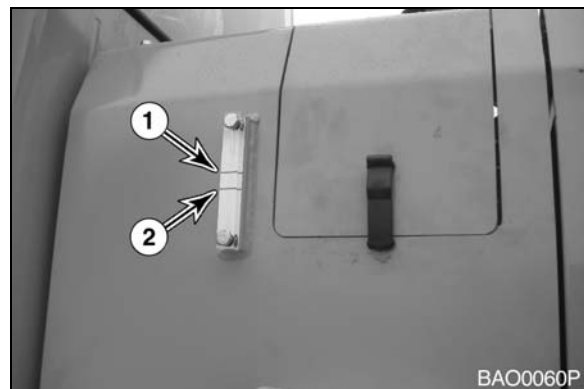


Figure 12

5. To add hydraulic oil, turn breather cap (1, Figure 13) slowly to allow pressurized air to vent.
6. Remove upper cover (2, Figure 13) from hydraulic oil tank and add oil to proper level by checking sight glass (Figure 12).

IMPORTANT

Do not fill above "H" mark on sight gauge. Overfilling can result in damage to equipment and oil leaking from hydraulic tank due to expansion.

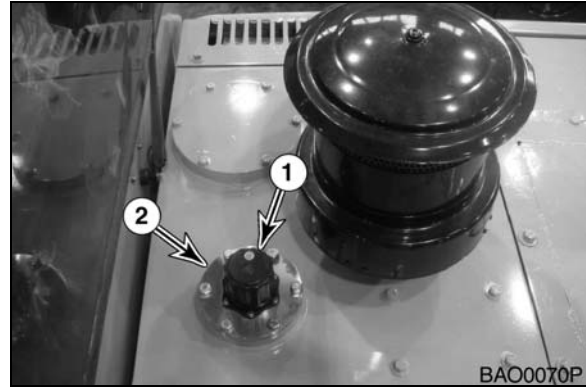


Figure 13

CHECK FOR LEAKS IN HYDRAULIC SYSTEM

1. Perform a daily walk-around inspection to make sure that the hoses, piping, fittings, cylinders and hydraulic motors are not showing any signs of leakage. If any is noted, determine the source of the leak and repair.

FILL FUEL TANK



WARNING!

Use extreme safety precautions while refueling to prevent explosions or fire.

Immediately clean up any spilt fuel.

1. At end of each work day, fill fuel tank. Add fuel through fuel fill cap (Figure 14). When working at a temperature of 0°C (32°F) or higher, use ASTM No. 2-D or its equivalent. At temperatures below 0°C (32°F) use ASTM No. 1-D or its equivalent.

NOTE: See “Fluid Capacities” on page 4-5, for capacity and “Table of Recommended Lubricants” on page 4-3, of this manual for recommended fuel for the operating conditions.

2. Securely tighten cap after fueling.

NOTE: If breather holes in cap are clogged, a vacuum may form in the tank preventing proper fuel flow to engine. Keep holes in fuel cap clean.

CHECK FOR LEAKS IN FUEL SYSTEM

1. Perform an inspection of engine compartment to verify that fuel system is not leaking. If any is noted, determine the source of leak and repair.

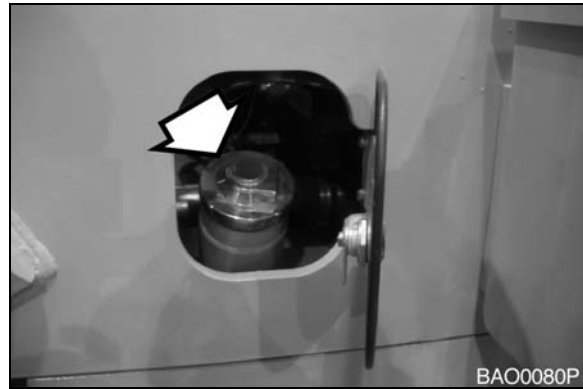


Figure 14

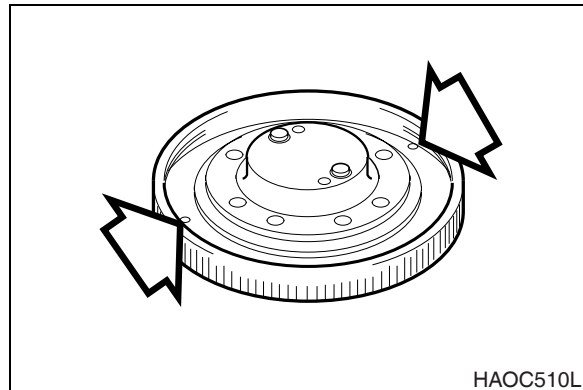


Figure 15

DRAIN FUEL CONDENSATION

1. Open fuel tank drain valve (Figure 16). Allow any condensed water or sediment to drain out of tank. Also, open drain on fuel filter and drain out any water or sediment (Figure 17 and Figure 18). Catch drained material in a container.

NOTE: *Dispose of drained fluids according to local regulations.*

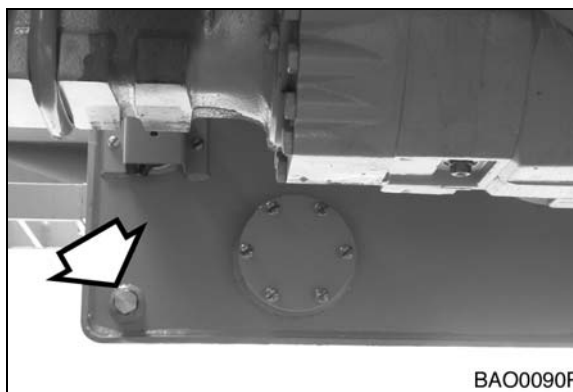


Figure 16



Figure 17 (S/N 3001 thru 4000)

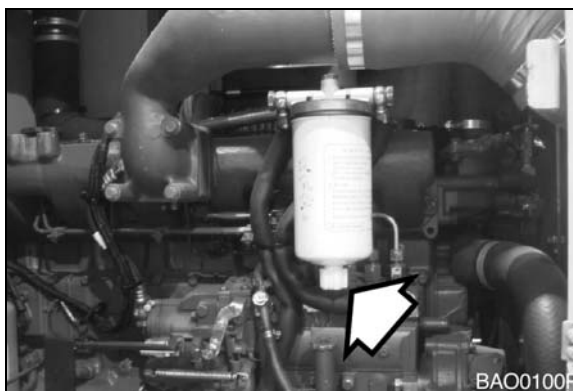


Figure 18 (S/N 4001 and Up)

CHECK COOLANT LEVEL

NOTE: Do not mix ethylene glycol and propylene glycol antifreeze together. If the two are mixed, the protection level will be reduced to the level of the ethylene glycol. See "Antifreeze Concentration Tables" on page 4-61, for further details.

NOTE: This unit was factory filled with propylene glycol.



WARNING!

Never open radiator when it is hot. Scalding liquid inside a hot radiator is under pressure. Removing cap from a hot radiator could cause a person to be sprayed and burned from liquid inside. Wait for radiator temperature to cool down before removing cap.

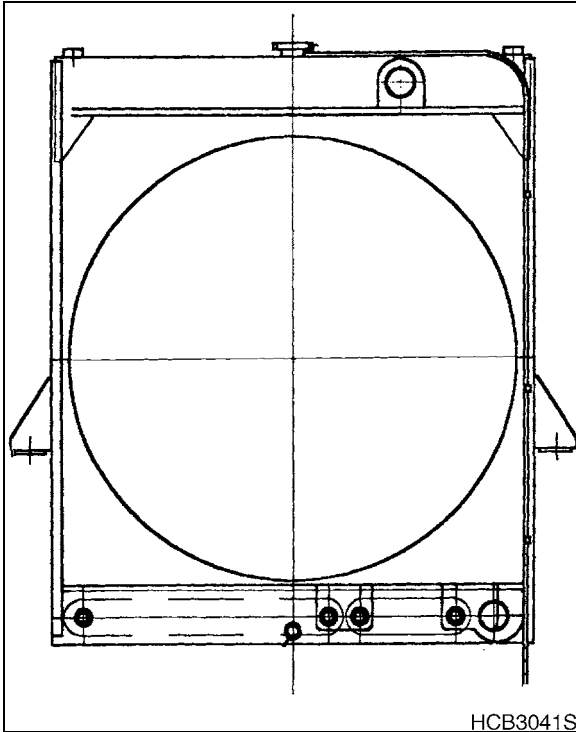


Figure 19

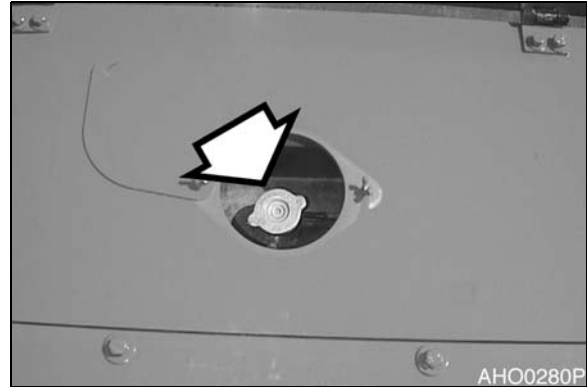


Figure 20

1. Remove fill cap from radiator (Figure 20). Check level of coolant inside radiator. If low, add coolant to fill radiator to a point that is 10 – 20 mm (1/2 – 3/4") below top of overflow pipe. If temperature is below freezing, see "Antifreeze Concentration Tables" on page 4-61 for antifreeze protection. Use the table to calculate a proper mixture of antifreeze and water to provide level of protection necessary for expected temperature.

CHECK LEVEL OF WINDOW WASHER LIQUID

1. Check fluid level in windshield washer tank, in the storage box of the rear of the seat.
2. Open fill cap and add fluid.

NOTE: Use a washer liquid that is rated for all seasons. This will prevent freezing during cold weather operation.

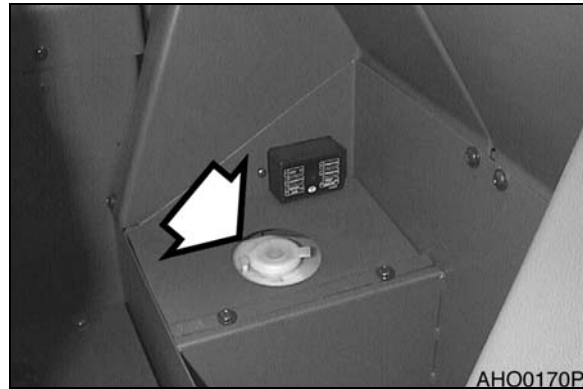


Figure 21

INSPECT THE BUCKET TEETH AND SIDE CUTTERS FOR SIGNS OF WEAR

1. On a daily basis, inspect bucket teeth to make sure that tooth wear or breakage has not developed.
2. Do not allow replaceable bucket teeth to wear down to the point that bucket adapter is exposed. (Figure 22)

NOTE: These instructions are only for Daewoo OEM buckets. If you are using other manufacturers' buckets, refer to their specific instructions.

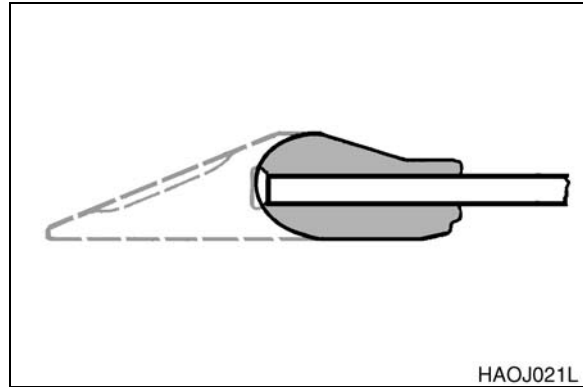


Figure 22

INSPECT SEAT BELT FOR PROPER OPERATION

INSPECT THE STRUCTURE FOR CRACKS AND FAULTY WELDS

1. During the daily walk-around inspection and when greasing the machine, look for any visible damage to the machine. Repair or replace any damaged parts before operating machine.

CHECK THE OPERATION OF ALL SWITCHES

1. Verify working condition of all switches before starting engine.

CHECK THE OPERATION OF ALL EXTERIOR LIGHTS, HORN AND CONTROL CONSOLE INDICATOR AND MONITOR LIGHTS

1. Turn engine starter switch to "ON" position and observe all indicator lights.
2. Restore operation of any light bulbs that do not turn "ON" at this time.
3. Sound the horn. Repair or replace if required.
4. Turn "ON" and inspect all exterior work lights. Replace any monitors, burned out bulbs or cracked or broken housings or lenses.

START ENGINE, CHECK STARTING ABILITY, AND OBSERVE EXHAUST COLOR AT START-UP AND AT NORMAL OPERATING TEMPERATURE. LISTEN FOR ANY ABNORMAL SOUNDS

CHECK OPERATION OF ALL CONTROLS

IMPORTANT

Cold weather operation requires that the operator fully warm up the hydraulic oil before beginning machine operation. Follow all warm up instructions listed in the Operating Instruction section of this manual. Make sure to cycle oil through all of the components, including all cylinders, both travel motors and the swing motor. Cold hydraulic oil in the lines and components needs to be warmed before beginning full operation. If this is not done, damage to the cylinders or hydraulic motors can occur.

1. With engine at rated speed, operate all of the controls.
2. Follow cold weather hydraulic system warm-up procedures.
3. Note any slow operations or unusual movements. Determine the cause and repair fault before operating.

INSPECT ENGINE FAN BLADE



WARNING!

Personal injury can result from a fan blade failure. Never pull or pry on the fan. This can damage the fan blade(s) and cause fan failure.

NOTE: *Manually rotate the crankshaft by using a wrench on the accessory drive pulley nut.*

1. An inspection of the cooling fan is required daily. Check for cracks, loose rivets, bent or loose blades, and for contact between the blade tips and the fan shroud. Check the fan to make sure it is securely mounted. Tighten the bolts if necessary. Replace any fan that is damaged.

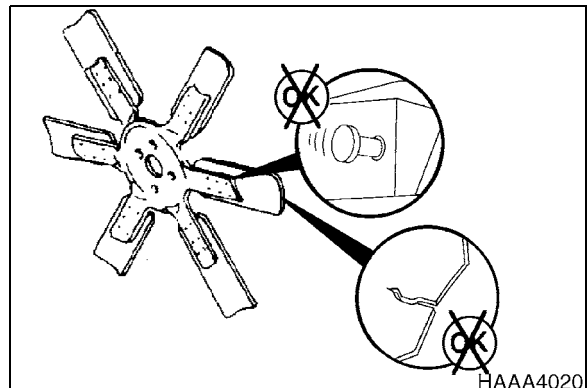


Figure 23

CHECK ENGINE DRIVE BELT WEAR



WARNING!

Keep clear of engine fan and fan drive belts when the engine is running. Rotating fan and belt contact can cause injury.



WARNING!

When checking, adjusting or replacing drive belts, care must be taken to prevent accidental cranking of the engine. Be sure the starter switch is in the "OFF" position and the controls are tagged.

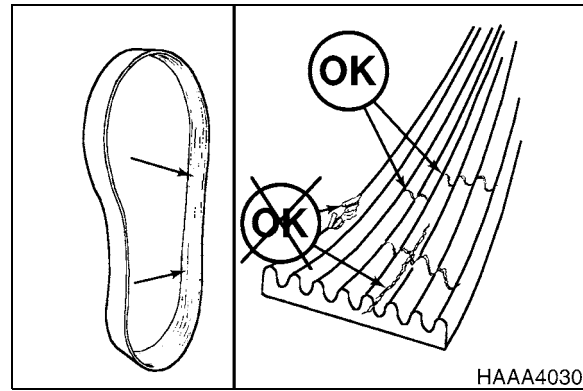


Figure 24

1. Replace badly worn, greasy or severely cracked belts immediately. These conditions prevent proper belt function. Visually inspect the belt. Check the belt for intersecting cracks. Transverse (across the belt width) cracks are acceptable. Longitudinal (direction of belt length) cracks that intersect with transverse cracks are not acceptable. Replace the belt if it is frayed or has pieces of material missing.
2. Before installing new belts, make sure all pulley grooves are clean and not worn. Replace pulley, if damaged, or if the grooves are worn.
3. All pulley support bearings, shafts, and brackets must be in working order.
4. When replacing belts and pulleys, pulley alignment must be checked with belts tensioned and brackets securely clamped. A misalignment that can be detected by the naked eye is detrimental to belt performance.
5. Do not force the belts into the pulley grooves by prying with a screwdriver or pry bar. This will damage the belt side cords which will cause the belts to turn and result in complete destruction of the belts in operation.
6. Belts on new machines and replacement belts lose their tension as they seat into the pulley grooves. Check the tension of new belts at 20 hour intervals until tension is stabilized and thereafter, every 250 hours. If the tension falls below the required minimum, the belt slips damaging the belts and pulley grooves.

NOTE: When operating in abrasive conditions, check tension every 100 hours.

CHECK AIR INTAKE SYSTEM



WARNING!

Hot engine components can cause burns.

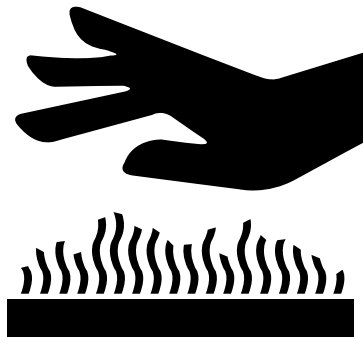
Avoid contact with hot engine components.

1. Park the machine on a level surface, apply the parking brake, lower the attachment to the ground, and shut down engine.
2. Check the engine intake hose, and hose bands for damage and tightness.
3. If damaged, wrinkled or loose, replace or retighten or contact your nearest Daewoo loader dealer.

IMPORTANT

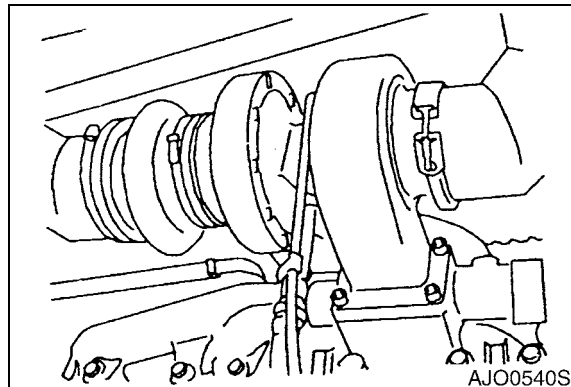
Severe engine damage will result from running with unfiltered air.

Do not operate engine if any leaks or defects are found on air intake system.



HAOA050L

Figure 25



AJO0540S

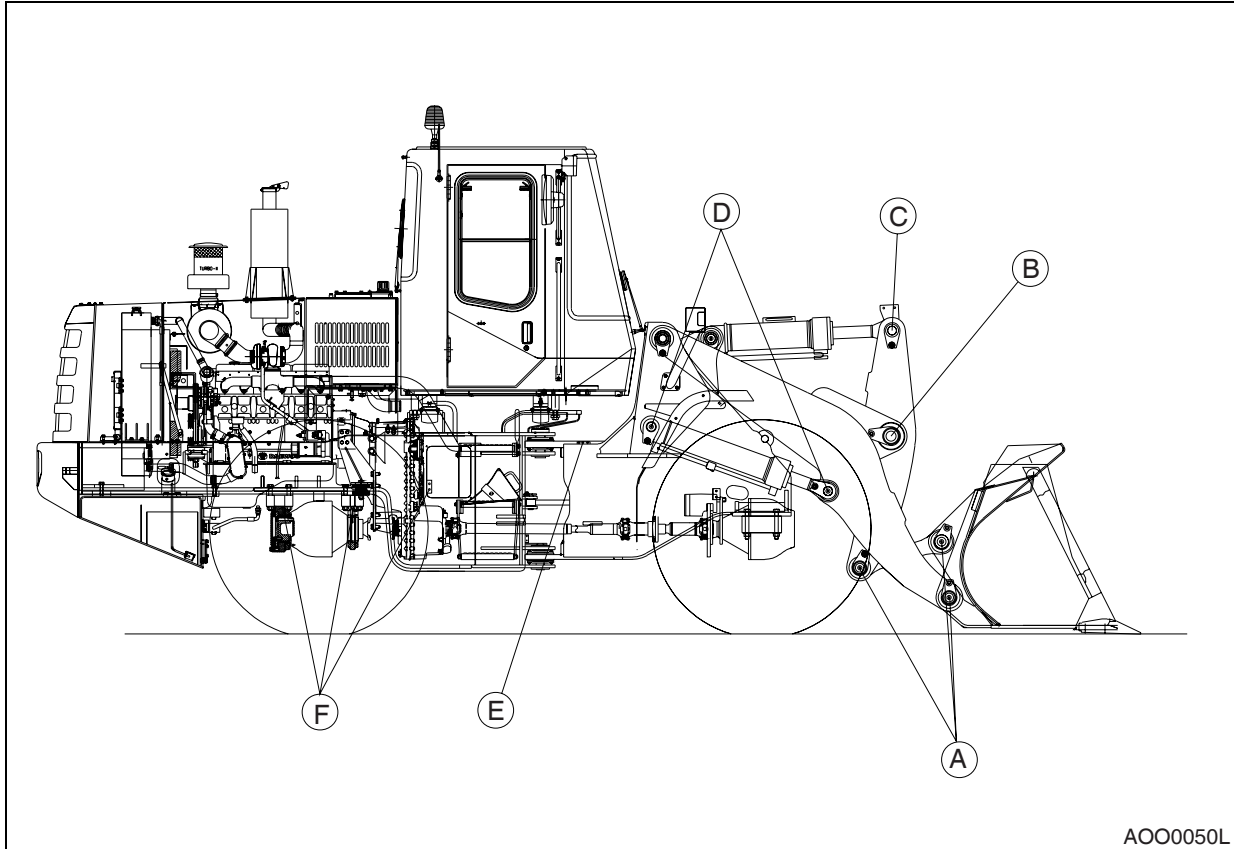
Figure 26

50 HOUR / WEEKLY SERVICE

PERFORM ALL DAILY SERVICE CHECKS

GREASE FRONT ATTACHMENT PINS

1. Following fittings are greased daily, or every 10 hours, for first 100 hours of operation to comply with new machine break-in requirements. After that, greasing should be done every 50 hours. If bucket is being used in water, grease fittings immediately after machine is removed from water.



AOO0050L

Figure 27

- A. Bucket hinge pins, 2 locations (Figure 28).

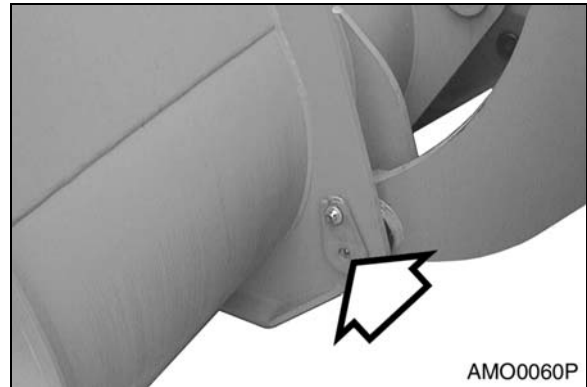


Figure 28

- Lever link connecting pin, 1 location (Figure 29).

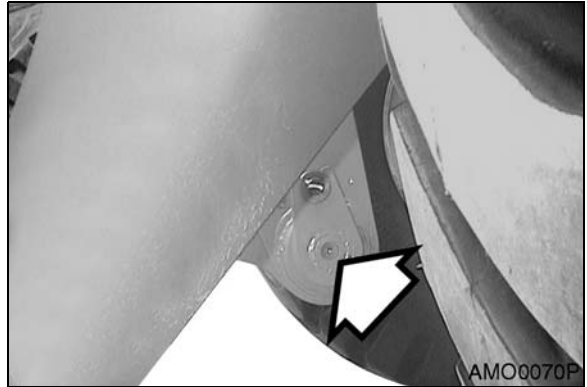


Figure 29

- Bucket link connecting pin, 1 location (Figure 30).

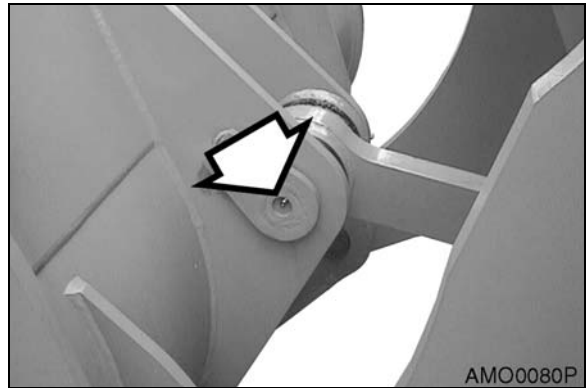


Figure 30

- B: Arm-lever connecting pin, 1 location. (Figure 31).



Figure 31

- C: Bucket cylinder rod end, 1 location.
(Figure 32).

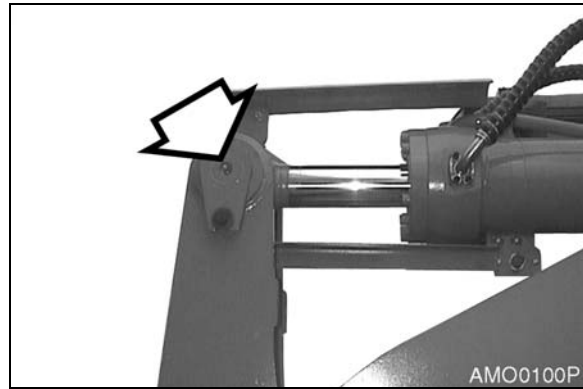


Figure 32

- D: Lift cylinder heads (left, right), 2 locations (Figure 33).

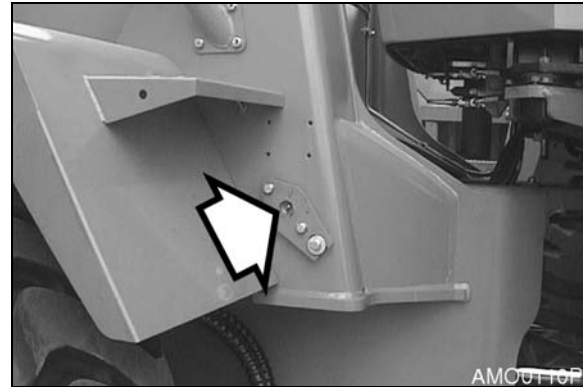


Figure 33

- Lift cylinder rod ends, 2 locations.
(Figure 34).



Figure 34

E: Remote location points.

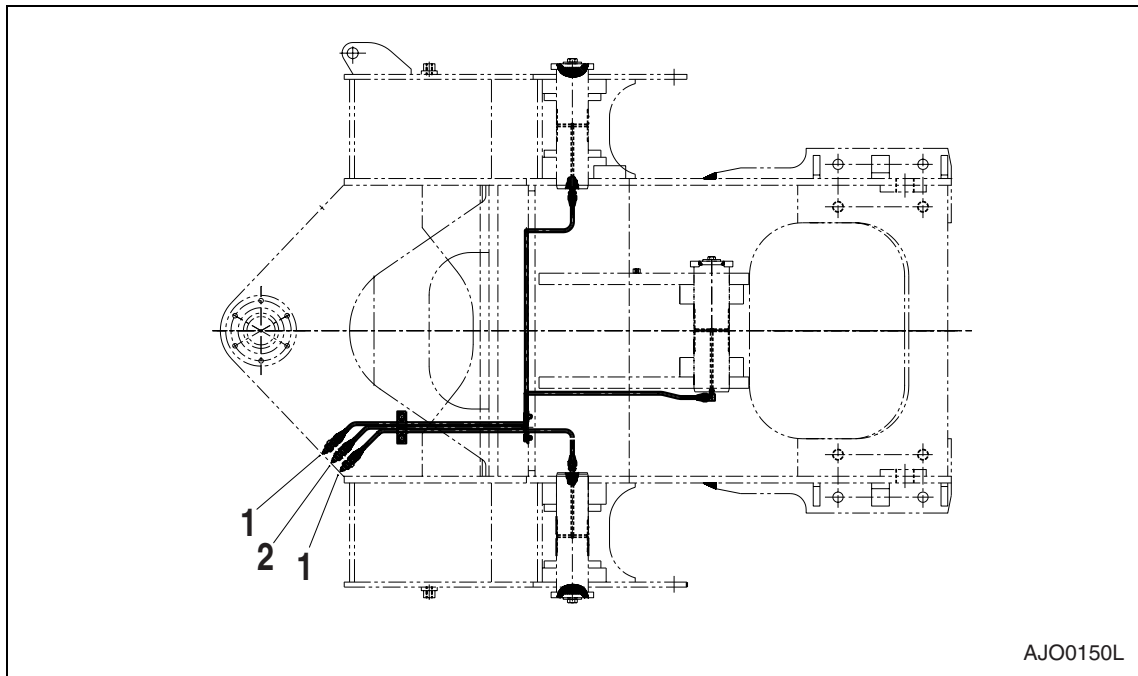


Figure 35

1. REMOTE FITTINGS FOR LOADER ARM FOOT ENDS (50 HOUR) (Figure 36 and Figure 37).
2. REMOTE FITTINGS FOR BUCKET CYLINDER HEAD (50 HOUR) (Figure 36 and Figure 38).

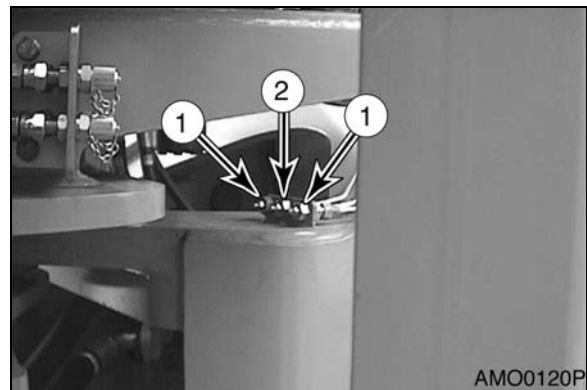


Figure 36

- 1) Loader arm foot ends, 2 locations on each side of machine. Greased from two remote grease points (1, Figure 35).

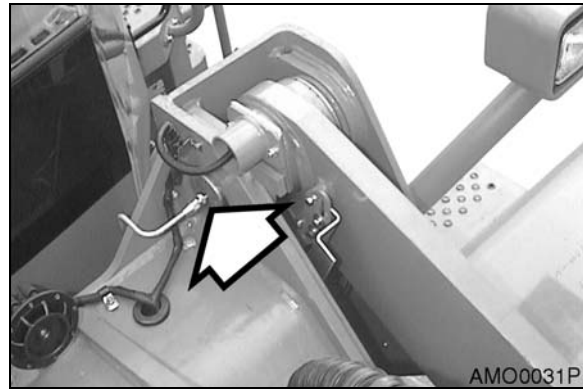


Figure 37

- 2) Bucket cylinder head, 1 point. Greased from remote grease point (2, Figure 35).

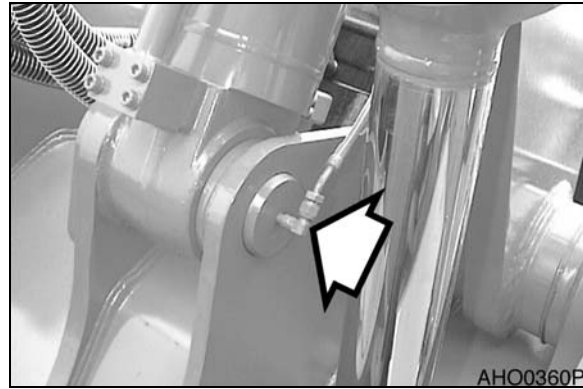


Figure 38

- F: Rear Axle pivot (1, Figure 39 and Figure 41), 2 locations on each side of machine. Use remote grease fittings mounted on frame shown in (Figure 40 and Figure 42).

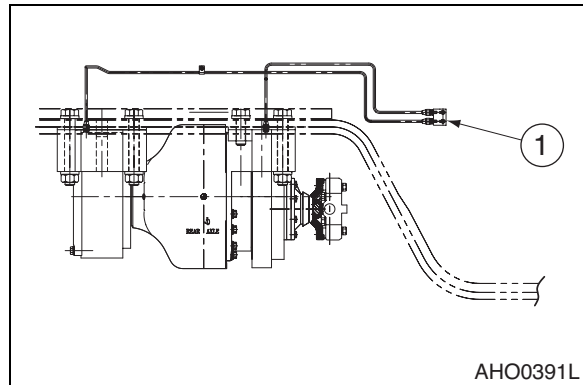


Figure 39 (S/N 3001 thru 4000)

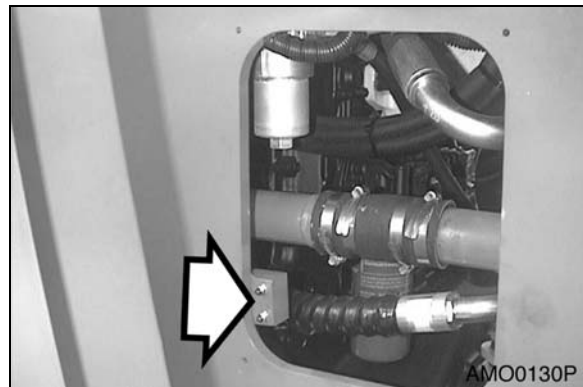


Figure 40 (S/N 3001 thru 4000)

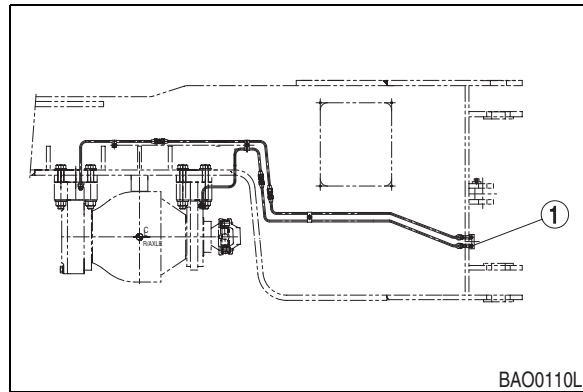


Figure 41 (S/N 4001 and Up)



Figure 42 (S/N 4001 and Up)

GREASE STEERING CYLINDER ROD AND HEAD ENDS

1. Steering cylinder rods, 2 locations, one on each side of machine.

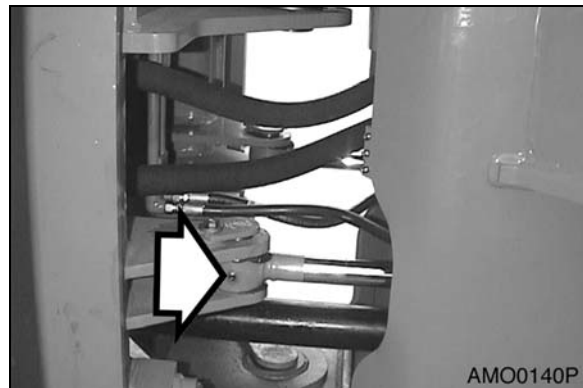


Figure 43

2. Steering cylinder head ends, 2 locations. Use remote grease fittings mounted on frame.(1,2 Figure 44).

Reference Number	Remote Grease Fittings
1 and 2 50 Hours	Steering Cylinder Head Ends
3 250 Hours	Drive Shaft Center Bearing

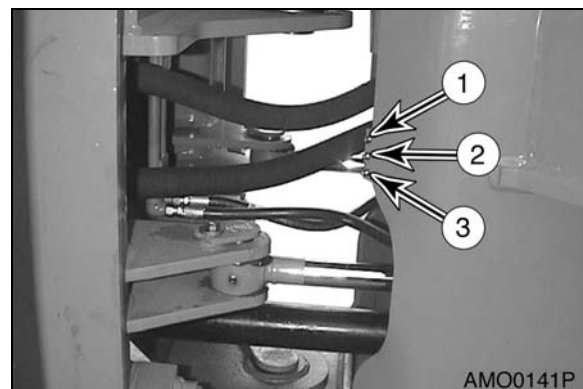


Figure 44

GREASE UPPER AND LOWER CENTER PINS

1. Center pins, Upper (Figure 45) and Lower (Figure 46). Two locations on each side of machine.

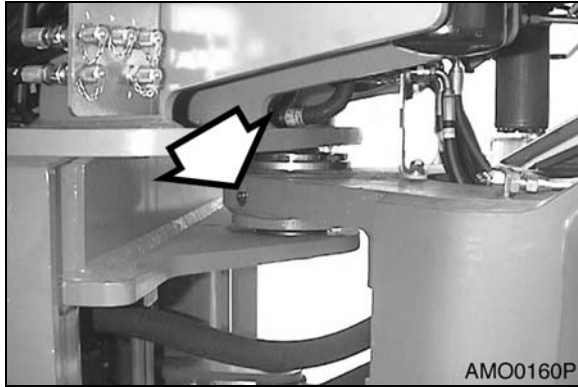


Figure 45

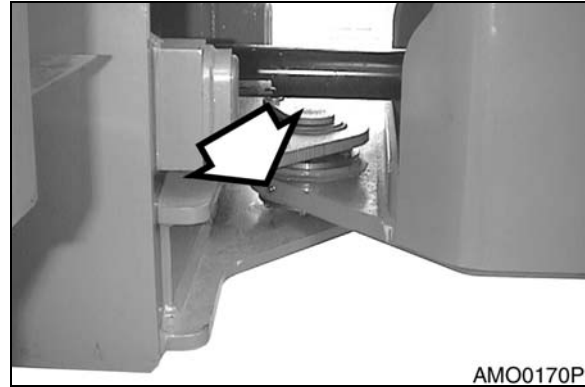


Figure 46

CHANGE ENGINE OIL AND FILTER

NOTE: *Engine oil and filter must be changed after first 50 hours of operation to comply with new machine break-in requirements. After first change, oil and filter should be changed every 250 hours for Tier I engine and 500 hours for Tier II engine. Follow procedure under 250 hour maintenance interval. (See page 4-33)*

HYDRAULIC FULL FLOW FILTER REPLACEMENT

NOTE: *Replace hydraulic full flow filter after first 50 hours of operation and every 500 Hours thereafter. Follow procedure under 500 hour maintenance interval (See page 4-37)*

CHECK WATER PUMP BELT TENSION

1. Water pump belt tension must be checked after first 50 hours of operation to comply with new machine break-in requirements. After first check, water pump belt must be checked every 250 hours. Follow procedure printed under 250 hour maintenance interval "Check Water Pump Belt Tension" on page 4-31.

CLEAN EXTERIOR OF RADIATOR, OIL COOLER AND AIR CONDITIONER CONDENSER

1. Dust and dirt accumulation on fins of radiator, oil cooler, additional transmission cooler and air conditioner condenser greatly reduce their cooling efficiency. Use compressed air, water and steam to clean fins on radiator, oil cooler, transmission cooler and air conditioner condenser.

NOTE: *On an especially dusty work site, clean fins every 50 hours. On other work sites, clean fins every 500 hours.(See page 4-38)*

250 HOUR / MONTHLY SERVICE

PERFORM ALL DAILY AND 50 HOUR SERVICE CHECKS

REPLACE HYDRAULIC SYSTEM BRAKE AND PILOT FILTER

Replace filter in pilot filter. Perform the following steps:

1. Vent hydraulic oil tank.
2. Unscrew element cover (5, Figure 48). Cover is filled with oil. Dispose of oil.
3. Remove O-ring (3, Figure 48) and filter (4).
4. Use a nonflammable, nontoxic solvent to clean out cover (5, Figure 48).
5. Insert a new filter (4, Figure 48) into cover (5). Install a new O-ring (3).
6. Screw cover (5, Figure 48) onto filter head (1).

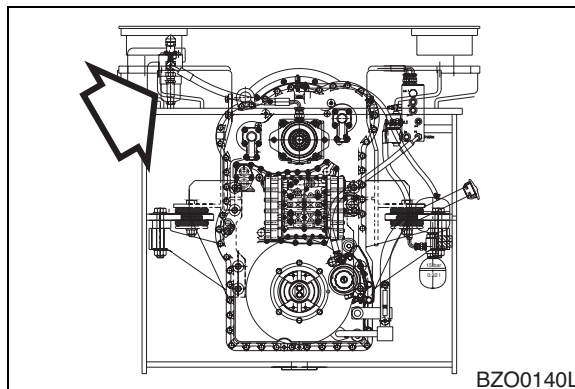


Figure 47

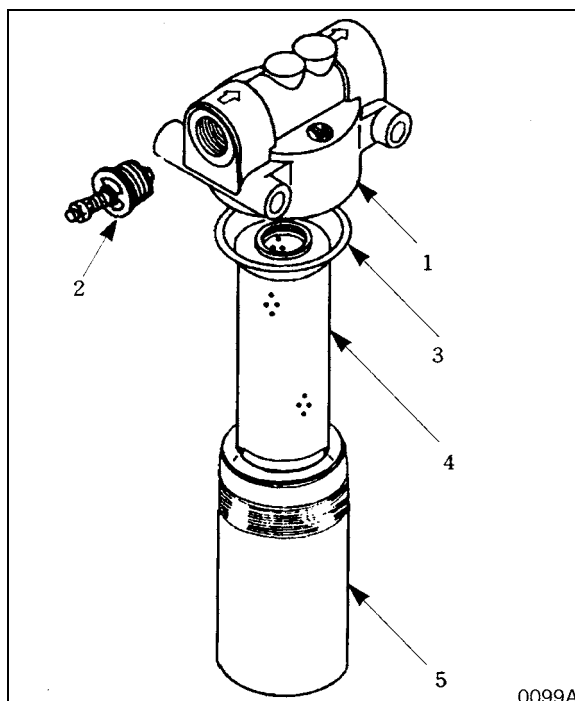


Figure 48

CHECK ENGINE AIR INTAKE PRECLEANER

1. The engine is equipped with a precleaner. Dust, insects, rainwater etc., can be present in the air. The precleaner collects this material and discharges it. This prevents material from being drawn into air cleaner. The precleaner does not need periodic cleaning or replacement.

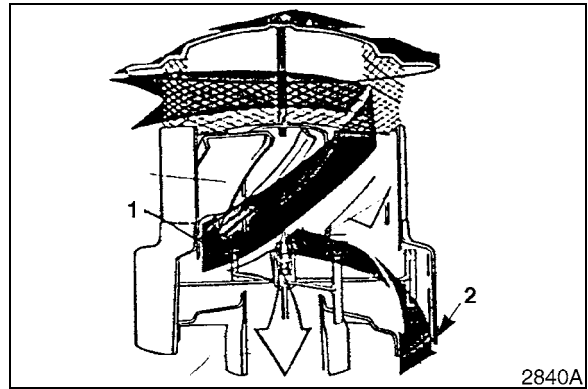


Figure 49

DRAIN WATER FROM HYDRAULIC OIL TANK



WARNING!

Be certain that hydraulic oil has cooled before draining water and sediment. Hot oil could splash and cause burns.

The hydraulic tank is pressurized. Press button in center of breather to allow pressurized air to vent. After pressure has been released, it is safe to remove either the fill cap or service covers.

1. Position machine on firm, level ground. Lower boom and position bucket on ground. Shut down engine.
2. Position a container under hydraulic reservoir drain plug. Open reservoir breather cap (See Figure 13 on page 4-13). Loosen drain valve from bottom of reservoir (Figure 50). Allow all water and sediment to drain out. Tighten drain valve.

NOTE: *Dispose of drained fluids according to local regulations.*

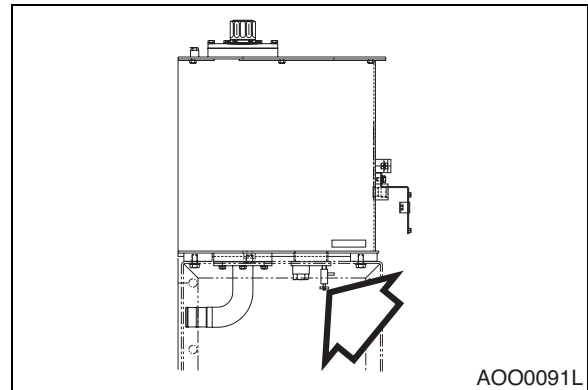


Figure 50

CLEAN AIR CLEANER



CAUTION!

Never remove air cleaner element while engine is running. This will allow dirt to be sucked into engine and cause serious engine damage. Always turn engine "OFF" before servicing air cleaner.

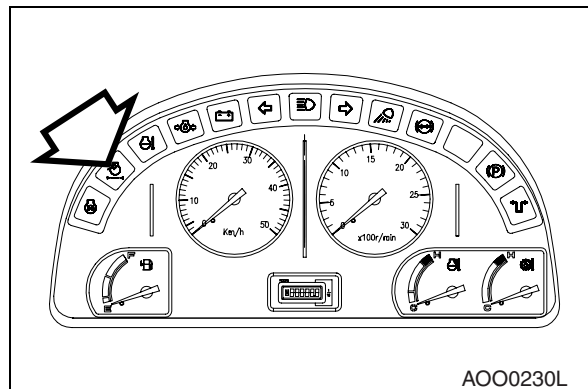


Figure 51

1. Locate the air filter assembly (Figure 52 and Figure 53). Remove access cover and remove outer filter of air filter assembly.

NOTE: *If indicator light on instrument panel comes "ON," this indicates that air cleaner needs to be serviced.*

NOTE: *Replace outer filter every 1,000 hours of service.*

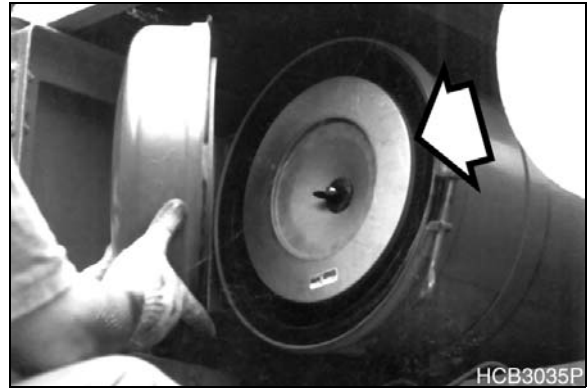


Figure 52 (S/N 3001 thru 4000)



Figure 53 (S/N 4001 and Up)

2. Clean outer filter by blowing compressed air from inside of filter towards the outside. Do not use more than 205 kPa (30 psi) air pressure.
3. Clean the inside of air filter housing and inside of air filter housing cover.



CAUTION!

Never clean the inside of air filter housing while the inner element is not installed.

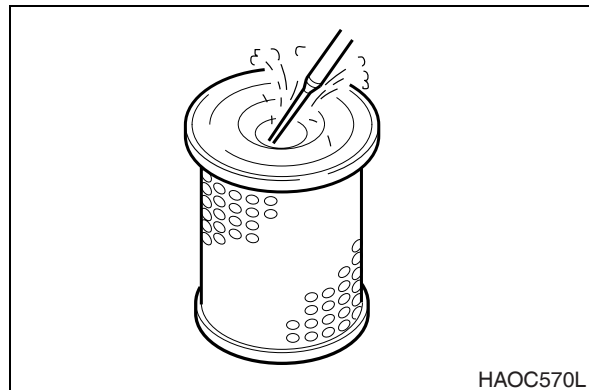


Figure 54

4. Properly reinstall air filter and cover. Tighten cover wing nut by hand. Do not use any tools to tighten wing nut.

CHECK WATER PUMP BELT TENSION

IMPORTANT

A loose water pump belt can cause engine overheating, poor charging, and/or premature belt wear. A belt that is too tight can cause damage to the water pump, alternator bearing or belt.

NOTE: *Water pump belt tension must be checked after first 50 hours of operation to comply with new machine break-in requirements.*

After first tension check, belt must be checked every 250 hours.

1. Apply 10 kg (22 lb) of force to midpoint of belt. (Figure 55 and Figure 56). The belt should deflect 10 mm (0.4"). If belt deflects more than this, loosen control link to tighten belt tension until deflection is 10 mm (0.4"). Inspect belt for damage. If belt is damaged, replace it.

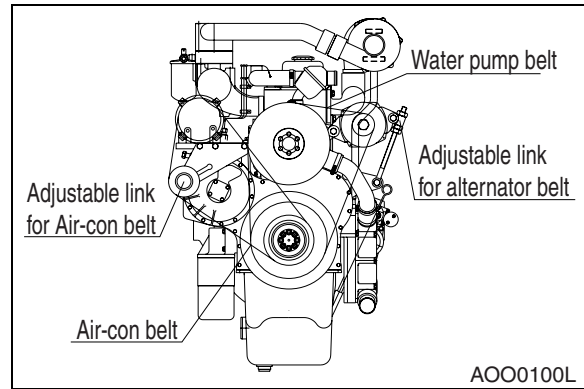


Figure 55 (S/N 3001 thru 4000)

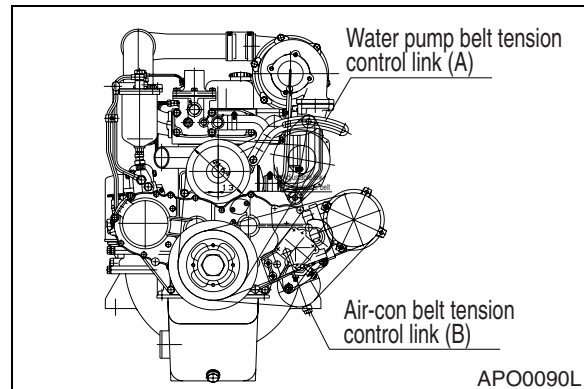


Figure 56 (S/N 4001 and Up)

GREASE DRIVE SHAFTS

Grease fitting for center bearing, 1 location.
Use remote grease fitting mounted on frame (3,
Figure 57).

Reference Number	Remote Grease Fittings
1 and 2 50 Hours	Steering Cylinder Head Ends
3 250 Hours	Drive Shaft Center Bearing

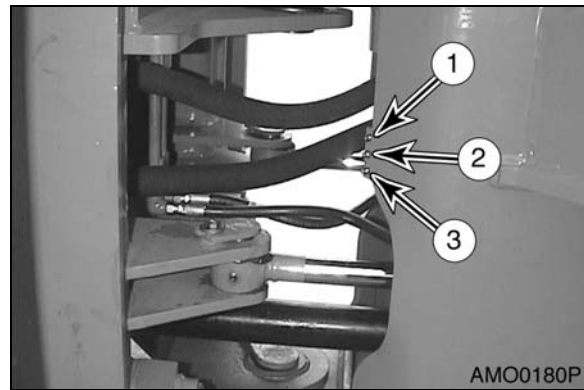


Figure 57

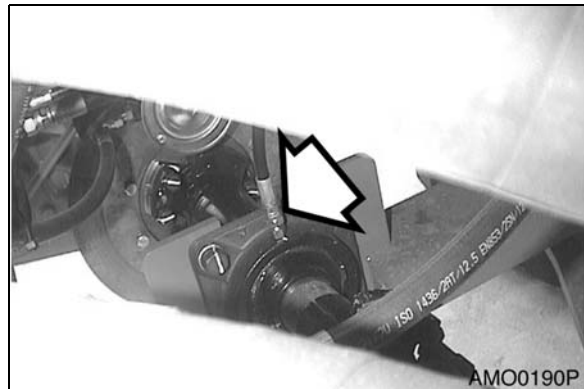


Figure 58

CHANGE ENGINE OIL AND FILTER (TIER I ENGINE)

NOTE: Change engine oil and filter after first 50 hours on a new machine and every 250 hours for Tier I engine and 500 hours for Tier II engine thereafter.



CAUTION!

Never attempt to change oil or filter on a hot engine. Hot oil could splash and cause burns. Allow engine to cool down before changing oil or filter.

1. Position a larger container under drain drain valve beside left wall of fuel tank. Loosen drain valve and allow all engine oil to drain out. Tighten drain valve.

NOTE: Oil warming is good when replacing oil. If machine is cold, operate the engine to bring the coolant temperature up to about 40°C (104°F). When the needle of the coolant temperature gauge reaches the middle of the "WHITE ZONE," the temperature is about 40°C (104°F).

NOTE: Dispose of drained fluids according to local regulations.

2. Replace engine oil filter (Figure 60). Engine oil filter is a spin-on type. Remove and discard filter.
3. Install new filter. Apply a small amount of oil around filter gasket. Screw filter on head until gasket contacts head by hand, turn filter 3/4~1 turn more with filter wrench.

NOTE: See "Fluid Capacities" on page 4-5 for capacity and "Table of Recommended Lubricants" on page 4-3, of this manual for the recommended oil for the operating conditions.

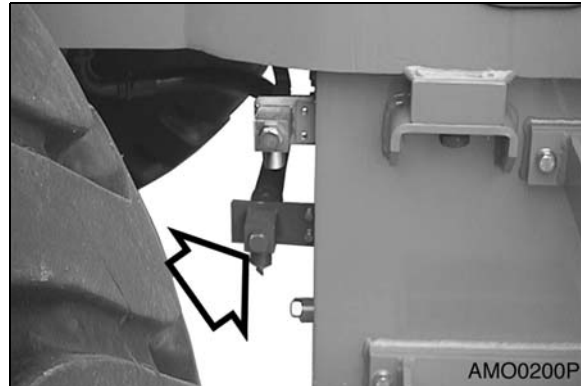


Figure 59

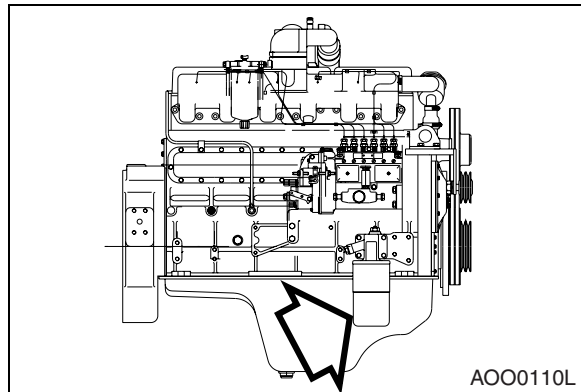


Figure 60 (S/N 3001 thru 4000)

4. Fill engine with correct oil through oil fill port (2, Figure 61).
5. Start engine and check engine oil pressure light.
6. Shut down engine. Look for signs of leaks at filter. Recheck oil level using dipstick (1, Figure 61).

AXLE DIFFERENTIAL AND PLANETARIES OIL REPLACEMENT (AFTER FIRST 250 HOURS)

NOTE: *The differential and planetaries oil should be drained and refilled after first 250 hours of operation. There after every 1,500 hours of operation. (See page 4-47)*

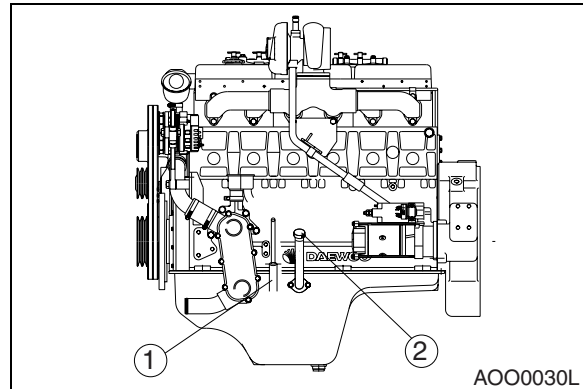


Figure 61 (S/N 3001 thru 4000)

REPLACEMENT OF TRANSMISSION OIL AND FILTER (AFTER FIRST 250 HOURS)

NOTE: *Transmission oil and filter must be changed after first 250 hours of operation to comply with new machine break-in requirements.*

NOTE: *After first change, oil and filter should be changed every 1,000 hours. Follow procedure under 1,000 hour maintenance interval. (See page 4-41)*

500 HOUR / 3 MONTH SERVICE

PERFORM ALL DAILY, 50 AND 250 HOUR SERVICE CHECKS

CHANGE ENGINE OIL AND FILTER (TIER II ENGINE)

NOTE: Change engine oil and filter after first 50 hours on a new machine and every 250 hours for Tier I engine and 500 hours for Tier II engine thereafter.



CAUTION!

Never attempt to change oil or filter on a hot engine. Hot oil could splash and cause burns. Allow engine to cool down before changing oil or filter.

1. Position a larger container under drain drain valve beside left wall of fuel tank. Loosen drain valve and allow all engine oil to drain out. Tighten drain valve.

NOTE: Oil warming is good when replacing oil. If machine is cold, operate the engine to bring the coolant temperature up to about 40°C (104°F). When the needle of the coolant temperature gauge reaches the middle of the "WHITE ZONE," the temperature is about 40°C (104°F).

NOTE: Dispose of drained fluids according to local regulations.

2. Replace engine oil filter (Figure 63). The engine oil filter is a spin-on type. Remove and discard filter.
3. Install new filter. Apply a small amount of oil around filter gasket. Screw filter on head until gasket contacts head by hand, turn filter 3/4 - 1 turn more with filter wrench.

NOTE: See "Fluid Capacities" on page 4-5 for capacity and "Table of Recommended Lubricants" on page 4-3, of this manual for the recommended oil for the operating conditions.

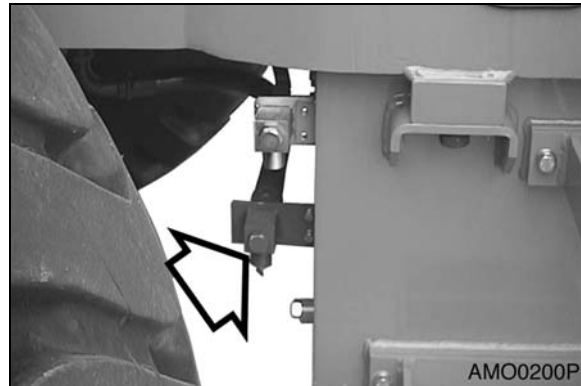


Figure 62

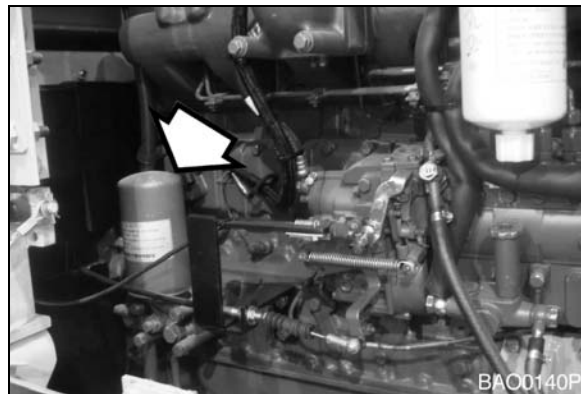


Figure 63 (S/N 4001 and Up)

4. Fill engine with correct oil through oil fill port (2, Figure 64).
5. Start engine and check engine oil pressure light.
6. Shut down engine. Look for signs of leaks at filter. Recheck oil level using dipstick (1, Figure 64).

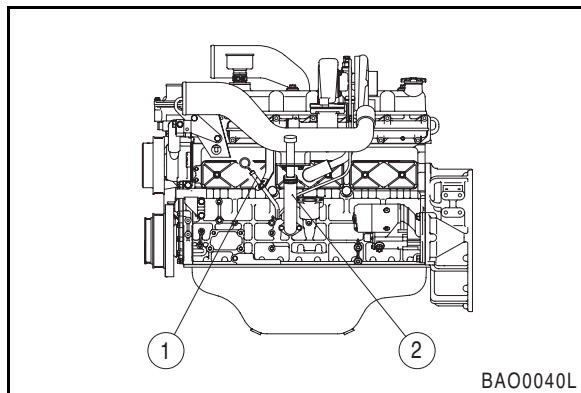


Figure 64 (S/N 4001 and Up)

REPLACE FUEL FILTER



WARNING!

Exchange filter after waiting for engine to cool. Be careful of fire hazards. Do not smoke.

1. Locate fuel filter inside engine compartment.
2. Position a small container under fuel filter. Drain filter by opening drain valve on bottom of filter (Figure 65 and Figure 66) .

NOTE: *Dispose of drained fluids according to local regulations.*

3. Unscrew fuel filter from head assembly. Discard fuel filter.
4. After cleaning filter head, install new fuel filter. Screw filter on head until gasket contacts head, turn filter 1/3-1/2 turn more.

NOTE: *Coat fuel filter gasket with fuel.*

NOTE: *Fill fuel filter with clean fuel. This will help reduce fuel system priming.*

5. Start engine. After engine has run for a couple of minutes, shut down engine and look for leaks.

If engine does not start, fuel system may need priming. Prime fuel system using the following procedure:

- A. Loosen plug on top of fuel filter head.
- B. Unscrew and pump the hand operated primer pump near fuel injection pump. Pump primer until fuel is present at plug hole in fuel filter head.



Figure 65 (S/N 3001 thru 4000)

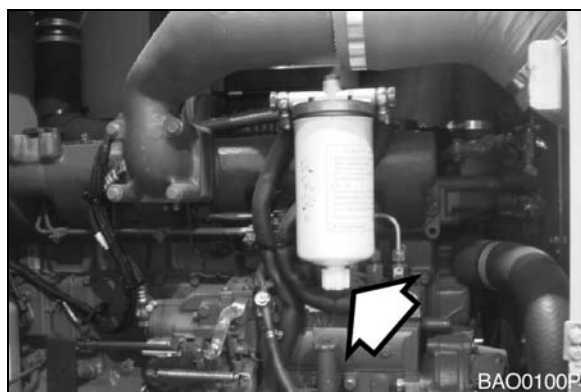


Figure 66 (S/N 4001 and Up)

- C. Tighten plug in fuel filter head.
- D. Continue to pump primer pump until a strong resistance is felt. Screw primer pump knob back into housing.
- E. Start engine and look for signs of leaks.

HYDRAULIC FULL FLOW FILTER REPLACEMENT



WARNING!

The hydraulic oil will be hot after normal machine operation. Allow system to cool before attempting to service any of the hydraulic components.

The hydraulic tank is pressurized. Loosen hydraulic oil fill cap slightly to allow pressurized air to vent. After pressure has been released, it is safe to remove either the fill cap or service covers or drain water from the tank.

IMPORTANT

Make sure to clean any dirt or water from top of the hydraulic tank, especially around fill port and filter ports.

NOTE: *Replace hydraulic full flow filter after first 50 hours of operation and every 500 Hours thereafter.*

1. Loosen breather cap on hydraulic reservoir. (See Figure 13 on page 4-13).
2. Clean filter cover (2, Figure 67) and reservoir around cover.
3. Remove bolts (1, Figure 67) from cover (2).
4. Lift cover (2, Figure 67) and O-ring (4) off reservoir. Control spring (3) that sits beneath cover. Remove spring (3).
5. Remove valve (5, Figure 67) and filter (6) from reservoir.
6. Clean underside of cover (2, Figure 67).
7. Set a new element (6, Figure 67) and valve (5) down into reservoir. Press element down onto its base until top of element is approximately 4 mm (0.157") below edge of reservoir.
8. Install a new O-ring (4, Figure 67) on cover (2). Set spring (3) into place on element (6).
9. Set cover (2, Figure 67) into place over element (6). Install bolts (1) through cover (2) and tighten them.
10. Tighten breather cap on reservoir.

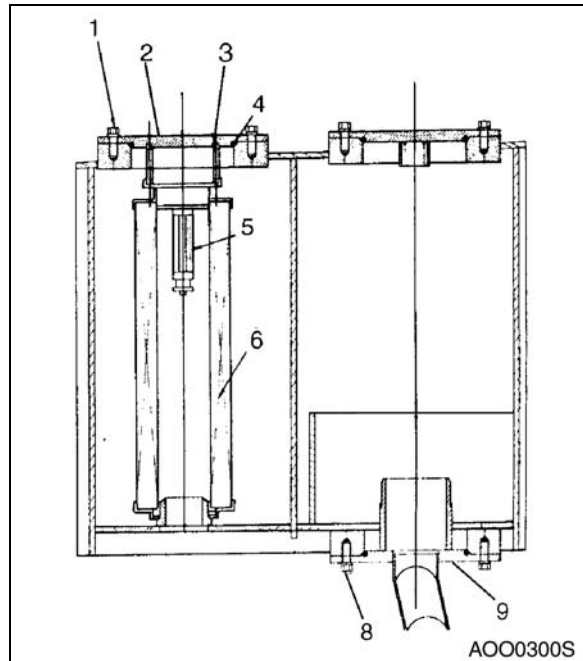


Figure 67

CLEAN EXTERIOR OF RADIATOR, OIL COOLER AND AIR CONDITIONER CONDENSER

1. Dust and dirt accumulation on fins of radiator, oil cooler, additional transmission cooler and air conditioner condenser greatly reduce their cooling efficiency. Use compressed air, water and steam to clean fins on radiator, oil cooler, and transmission cooler.

NOTE: *On an especially dusty work site, clean fins every 50 hours. On other work sites, clean fins every 500 hours.*

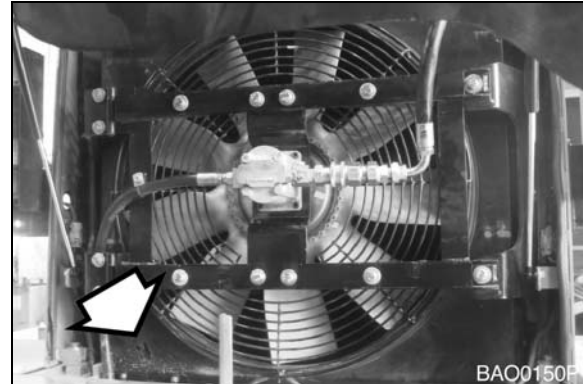


Figure 68 RADIATOR AND OIL COOLER
• S/N 4001 and Up

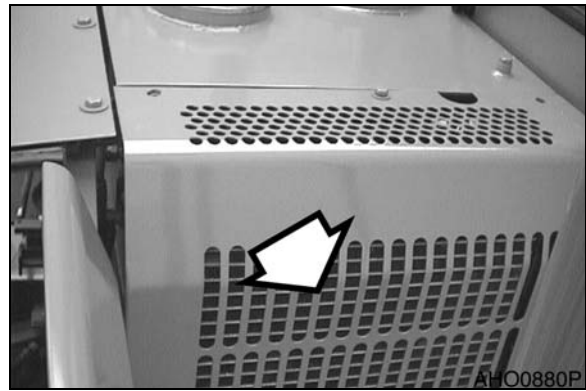


Figure 69 AIR CONDITIONER CONDENSER

CLEAN AIR CONDITIONER FILTER

The unit is equipped with an air filtration system which filters out dirt and dust particles from air being circulated into operator's cab. The air conditioner filter is in the right side switch panel console.

1. Open access cover on the lower right side of cab on the outside to gain access to filter.

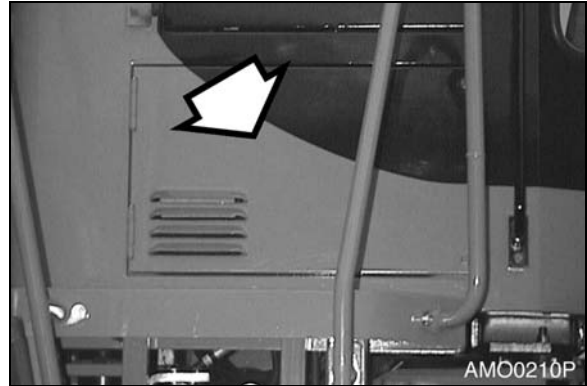


Figure 70

2. Remove filter and inspect it for damage.
3. Use compressed air to clean filter. If element is very dirty use a mild soap and water solution to clean it.

NOTE: *If water was used to clean filter be sure it is completely dry before installation.*

NOTE: *This filter should be cleaned out every 500 hours and replaced with a new one every 1,000 hours.*

NOTE: *In the event that the unit is being operated in a dusty environment, the cleaning and replacement should be performed more frequently.*

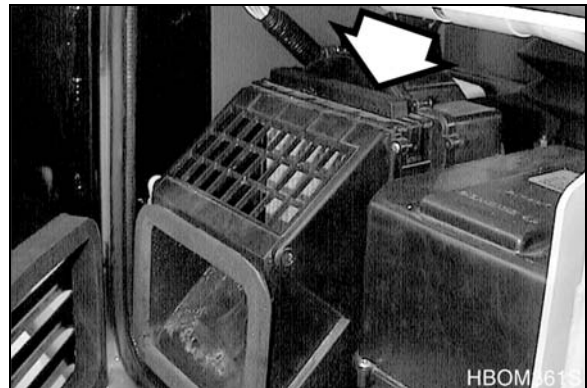


Figure 71



WARNING!

All service and inspection of the air-conditioning system should be performed with the starter switch in the "O" (OFF) position.

1,000 HOUR / 6 MONTH SERVICE

PERFORM ALL DAILY, 50, 250 AND 500 HOUR SERVICE CHECKS

DRAIN AND REPLACE TRANSMISSION OIL AND FILTER

NOTE: *Transmission oil and filter must be changed after first 250 hours of operation to comply with new machine break-in requirements. After first change, oil and filter must be changed every 1,000 hours.*

1. Use two people to perform this operation.
2. Start machine and drive it until transmission fluid has warmed to 82 – 93°C (180 – 200°F). Park machine on firm, level ground. Lower bucket to ground.
3. Place transmission lever in "NEUTRAL." Apply parking brake. Shut down engine. Block tires.

NOTE: *See "Fluid Capacities" on page 4-5 for capacity and "Table of Recommended Lubricants" on page 4-3.*

4. Remove drain plug. Allow all transmission fluid to drain into a receptacle. Clean drain plug (Figure 72).

NOTE: *Dispose of drained fluids according to local regulations.*

5. Install drain plug in transmission.
6. Remove inlet strainer. Use a nonflammable, nontoxic solvent to clean strainer.
7. Inspect gasket on inlet strainer. Replace gasket if it is damaged. Install inlet strainer.
8. Remove breather filter. Clean breather filter and install it.
9. Rotate filter (1, Figure 73) counterclockwise to remove it.
10. Clean filter head.
11. Grease filter gasket and gasket mating surface on filter head.
12. Thread filter onto filter head. Tighten filter 1/2 turn after filter gasket contacts filter head. Filter should be torque to 1.6 - 2.1 kg•m (11.5 - 15 ft lb).

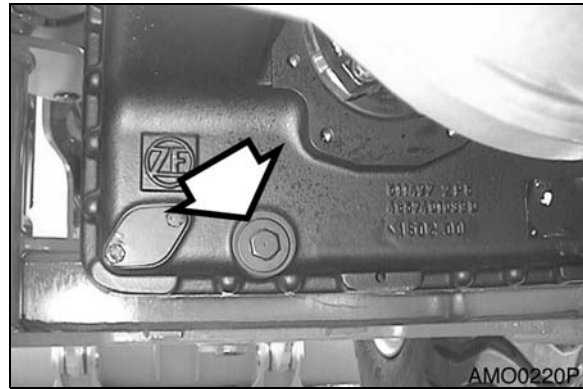


Figure 72

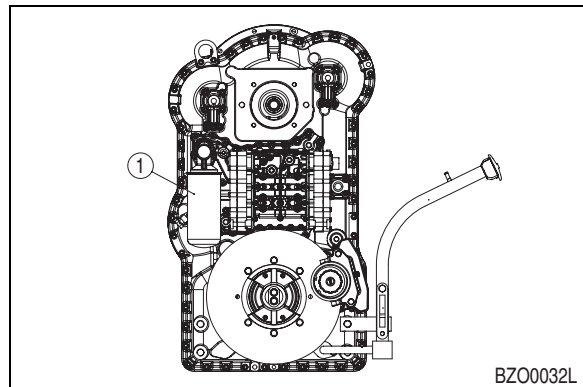


Figure 73

13. Fill transmission with fluid through transmission fill tube.



Figure 74

14. Add fluid until fluid level is visible in lower "COLD" portion of sight gauge (Figure 76).
15. Start engine. Idle engine for two minutes. Have a person remain in the cab.
16. With engine idling, have second person check transmission fluid level again. Add fluid until level reaches "HOT" mark on sight gauge.

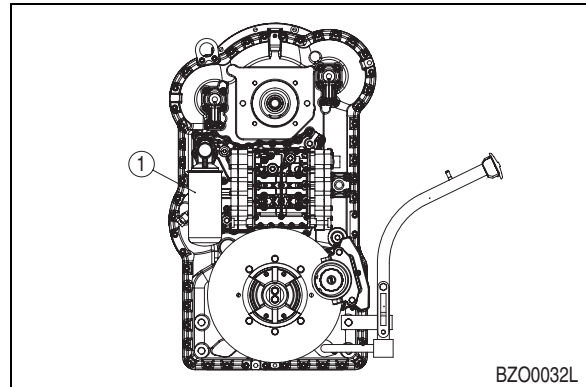


Figure 75

17. Idle engine until transmission fluid temperature reaches 82 – 93°C (180 – 200°F). Oil level must be at "HOT" mark or above as shown in (Figure 76).

NOTE: If oil level is above top end of sight gauge (completely filling it), drain oil until level is at "HOT" mark.

NOTE: If transmission cannot reach an operating temperature of 80°C (176°F), then the oil level must be visible in the sight gauge below the "HOT" mark. Periodically check oil level during the workday to ensure that oil level does not rise above top end of sight gauge.

18. Check filter for leaks while engine is running.

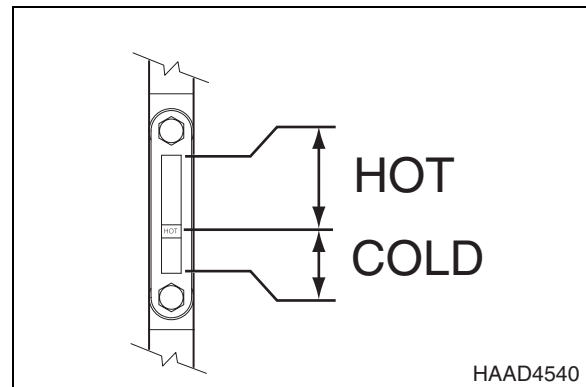


Figure 76 TRANSMISSION SIGHT GAUGE

AXLE BRAKE DISK WEAR MEASUREMENT

NOTE: A wear measurement on the multidisk brake must be made at least once a year, especially in case of a change in braking behavior like, e.g..

- Braking noise.
- Braking power reduced.
- Deceleration changed.
- Brake fluid level changed.
- Braking pressure changed.

A wear measurement must be made on both output sides.

Remove screw plug, actuate brake and determine "Dimension X" according to Figure 77 and Figure 78 using a feeler gauge. "Dimension X" corresponds with the thickness of an inner brake disk on the piston side.

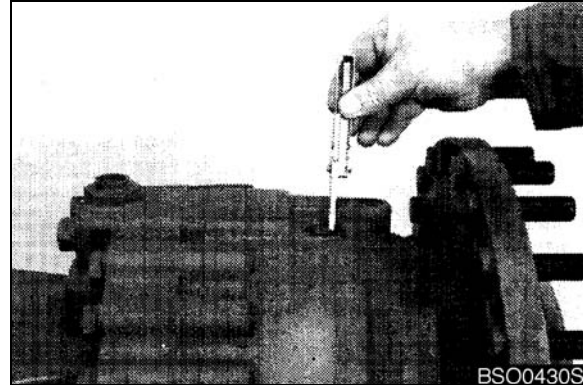


Figure 77

NOTE: If Dimension X less than or equal to 4.0 mm (0.16 in), the lined disks on both sides must be replaced.

Install level plug with a new O-ring.

NOTE: Tightening Torque: = 7.1 kg•m (51 ft lb)

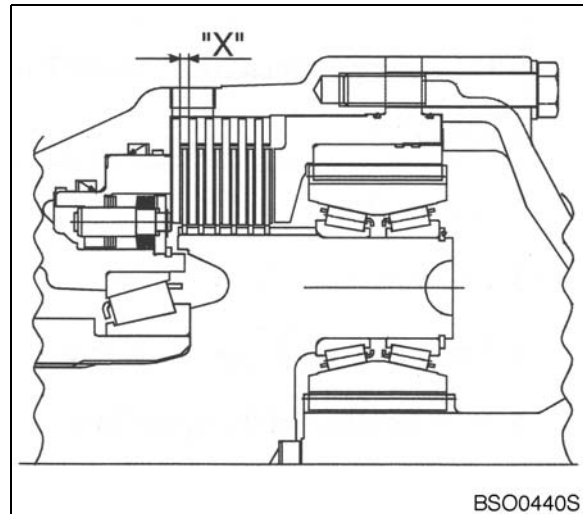


Figure 78

CLEAN FUEL TANK AND STRAINER



WARNING!

Fuel is flammable and harmful to skin.

- **Do not smoke while draining moisture and sediment from fuel tank.**
- **Do not drain fuel with engine running.**
- **Do not allow fuel to remain on skin for an extended period of time. Wash thoroughly with soap and water.**

NOTE: *It is easiest to clean the fuel tank when the fuel is almost empty.*

1. Park the machine on a level surface, apply the parking brake, lower the attachment to the ground, and shut down engine.
 2. Open the drain valve (1, Figure 79) on the bottom of the fuel tank.
 3. Drain the remaining fuel into a suitable container.
 4. Remove the nuts with a 17mm wrench to remove the inspection cover (2, Figure 79).
-
5. Clean inside of the tank and suction strainer (Figure 80).
 6. Install the inspection cover with a new gasket. Tighten the bolts. Do not overtighten.
 7. Close drain valve.
 8. Fill fuel tank.
 9. Check for any leaks at cover and plug.

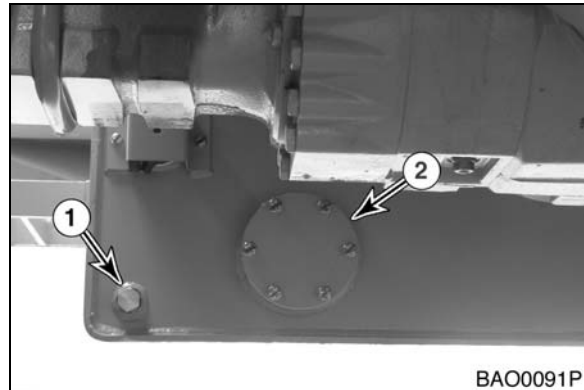


Figure 79



Figure 80

CLEAN FUEL INJECTION PRIMING PUMP STRAINER

1. Remove fitting, fuel line and strainer from bottom of priming pump.
2. Clean strainer.
3. Position strainer in priming pump and install fuel line and fitting.

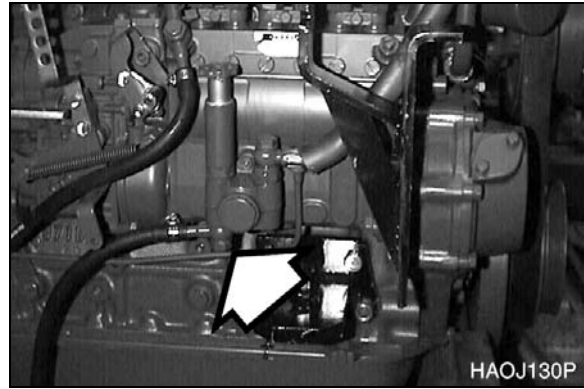


Figure 81

REPLACE AIR CONDITIONER FILTER

NOTE: *This unit is equipped with an air filtration system which filters out dirt and dust particles from air being circulated into operator's cab. This filter should be cleaned out every 500 hours and replaced with a new one every 1,000 hours. For filter replace See "Clean Air Conditioner Filter" on page 4-40.*

NOTE: *In the event that the equipment is being operated in a dusty environment, the cleaning and replacement should be performed more frequently.*

CHECK AIR CONDITIONER REFRIGERANT



WARNING!

Mixing of tobacco smoke and freon is deadly.

Do not smoke while servicing or recharging air-conditioning system.

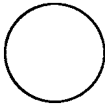
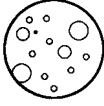
1. Apply the parking brake and lower attachment to the ground.
2. Remove the cover.
3. Press the "HI" flow control switch to set maximum air flow.
4. Set the temperature control switch fully to the cool position and fully open the cab doors.
5. Slightly accelerate the engine to about the middle speed range (compressor speed 1500-1800 rpm).
6. Compare the flow of bubbles in the sight glass with the drawings in the following table.



CAUTION!

Overfilling refrigerant may cause dangerous high-pressure and poor cooling action; and low refrigerant level may cause compressor damage.

Always maintain refrigerant at normal level.

Amount of Refrigerant	Appearance of the Sight Glass	Solutions
Normal	 Almost clear. Any bubbles disappear if the engine speed is increased to 1500 rpm.	
High	 No bubbles are seen.	Contact your local Daewoo loader dealer for inspection and recharging refrigerant.
Low	 A flow of bubbles is visible.	

CHECK AND ADJUST ENGINE

Contact your nearest Daewoo loader dealer.

Engine dealer for checking and adjusting the following items:

- Engine Compression Pressure.
- Injection Pressure.
- Injection Timing.

1,500 HOUR / 9 MONTH SERVICE

PERFORM ALL DAILY, 50, 250 AND 500 HOUR SERVICE CHECKS

AXLE DIFFERENTIAL AND PLANETARIES OIL REPLACEMENT

NOTE: *Oil in both front and rear axles must be replaced after first 250 hours of operation to comply with new machine break-in requirements. After that, axle oil check should be done every 250 hours of operation and replacement should be done every 1,500 hours.*

Each axle contains a center differential, and a planetary on each end. The same oil lubricates the center differential and planetaries. These sections of the axle are connected, but the oil flows very slowly between them. When checked, oil must be checked and refilled at the level/fill plug on the differential housing.

To drain and replace oil in an axle, perform the following steps:

1. Drive machine onto a level surface. Apply parking brake. Block wheels.
2. Clean areas around drain plugs on both ends of axle. Remove plugs and allow oil to drain into a suitable container.

NOTE: *See "Fluid Capacities" on page 4-5 for capacity and "Table of Recommended Lubricants" on page 4-3.*

NOTE: *Dispose of drained fluids according to local regulations.*

NOTE: *Plug Size: M24 x 1.5
Tightening Torque: 7.1 kg•m
(51 ft lb)*

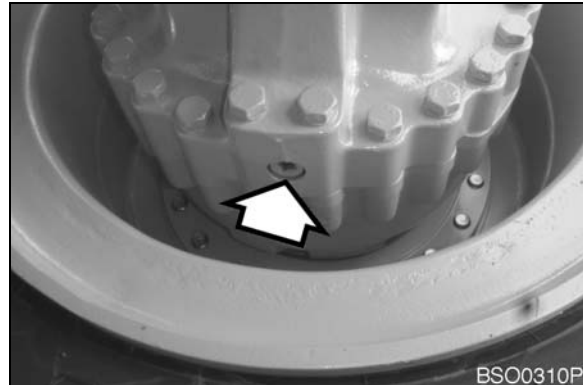


Figure 82

3. Clean area around level plug (1, Figure 83) and drain plug (2) on center differential. Remove level plug (1) and drain plug (2). Allow oil to drain into a suitable container.

NOTE: *Plug Size (1, Figure 83):
M36 x 1.5*

*Tightening Torque: 13.2 kg•m
(95 ft lb)*

*Plug Size (2, Figure 83):
M24 x 1.5*

*Tightening Torque: 7.1 kg•m
(51 ft lb)*

4. Install drain plug (2, Figure 83) into center differential, and tighten. Install drain plugs on both ends of axle, and tighten.
5. Pump oil into level plug hole on center differential. Add oil until oil level is even with bottom of plug hole. Recheck level on center differential. Add oil if necessary. When oil level is satisfactory at the level plug hole, install and tighten level plug.

NOTE: *Allow oil time to fill planetaries.*

6. Repeat procedure for other axle.

NOTE: *Plug Size (1, Figure 84):
M36 x 1.5*

*Tightening Torque: 13.2 kg•m
(95 ft lb)*

*Plug Size (2, Figure 84):
M24 x 1.5*

*Tightening Torque: 7.1 kg•m
(51 ft lb)*

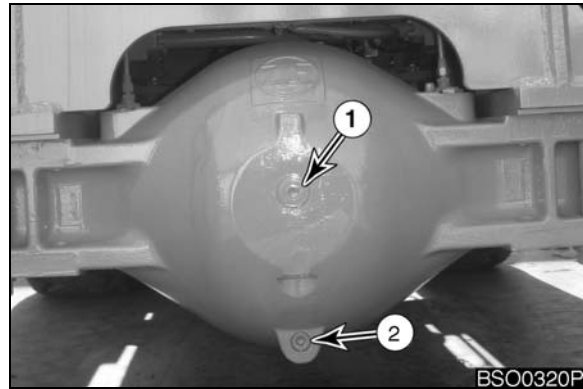


Figure 83 FRONT AXLE

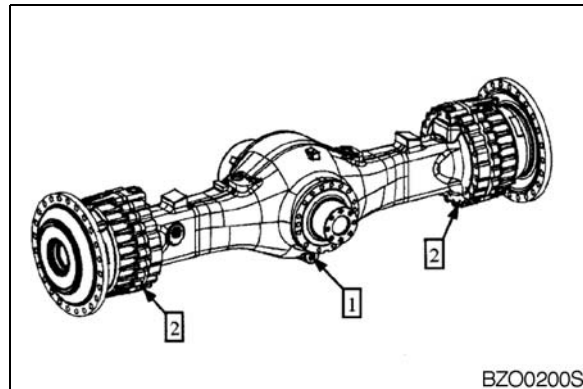


Figure 84 REAR AXLE

REPLACE OUTER AND INNER AIR CLEANER ELEMENTS



CAUTION!

Never remove air cleaner element while engine is running. This will allow dirt to be sucked into engine and cause serious engine damage. Always turn engine "OFF" before servicing air cleaner.

1. Replace inner element when outer element is replaced.
2. After removing outer element, remove wing nut and inner element.
3. Clean out inside of air cleaner housing. DO NOT use compressed air to blow out housing.
4. Install new inner element, and secure it into position with wing nut. DO NOT clean and reuse inner element.
5. Install new outer element, and secure it into position with wing nut.
6. Install air cleaner cover.

NOTE: *Make sure that all gaskets on wing nuts and cover are properly installed and seated.*

2,000 HOUR / YEARLY SERVICE

PERFORM ALL DAILY, 50, 250, 500 AND 1,000 HOUR SERVICE CHECKS

CHECK STEERING, BRAKE, DRIVE SHAFT, ENGINE, AND FUEL SYSTEM

REPLACE PIPES AND HOSES

1. Replace hoses that carry brake fluid to wheel brakes. Also, replace hoses that carry hydraulic fluid to steering cylinders.
2. It is difficult to determine condition of many hoses. The best way to ensure safe operation and to maintain maximum performance is to replace hoses on a regular basis. If any brake or steering hoses become damaged or appear defective in any way, replace them immediately despite time interval since their last replacement.

BLEED BRAKES

When brake hoses or brake tubes are replaced, air can be introduced into brake hydraulic system. Air can cause brakes to operate intermittently, which is a dangerous condition. Never operate machine with air in brake hydraulic system. A spongy feel when pressing brake pedal is a sign that air is present in brake hydraulic system.

To bleed air out of brake hydraulic system, perform the following steps:

1. Start engine and place transmission in "NEUTRAL."

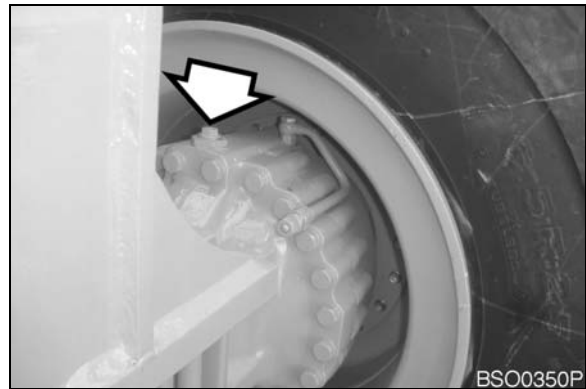


Figure 85

2. Remove plug (Figure 85) on axle. Increase the height of bleeder (1, Figure 86) by using special tool (4, Figure 86). Place one end of a plastic hose (2, Figure 86) over bleeder screw (1). Place other end of hose in a container (3) filled with brake fluid.

NOTE: *Dispose of drained fluids according to local regulations.*

3. Station one person in operator's cab, and one person at bleeder screw on axle being bled.
4. Open bleeder screw (1, Figure 86). Then press down on brake pedal until it rests on floor of cab. Hold pedal down on floor of cab. Close bleeder screw while pedal is being held down. After bleeder screw has been closed, allow brake pedal to return to upright position. Continue to open bleeder screw and press down pedal as described in this step, until fluid expelled from bleeder hose has no air bubbles present.
5. Securely close bleeder screw (1, Figure 86). Install plug in axle.
6. Perform bleeding procedure on other three locations.

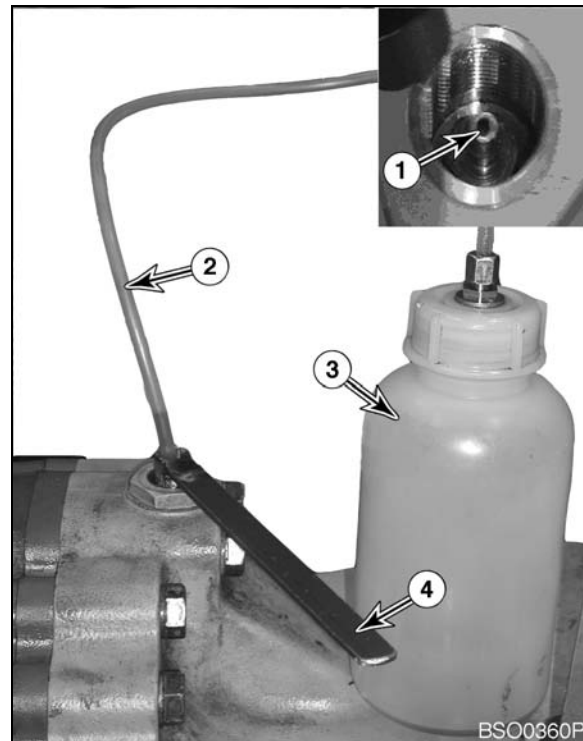


Figure 86

CHANGE RADIATOR COOLANT

NOTE: *Do not mix ethylene glycol and propylene glycol antifreeze together. If the two are mixed, the protection level will be reduced to the level of the ethylene glycol. See "Engine Cooling System" on page 4-60, for further details.*

NOTE: *This unit was factory filled with propylene glycol.*



WARNING!

Allow the engine to cool before releasing the radiator cap. Make sure to loosen the cap slowly to release any remaining pressure.

Radiator cleaning is performed while the engine is running. Take extreme caution when working on or near a running engine. Make sure to lock out and tag the controls notifying personnel that service work is being performed.

Do not remove the radiator cap unless it is required. Observe the coolant level in the coolant recovery tank.

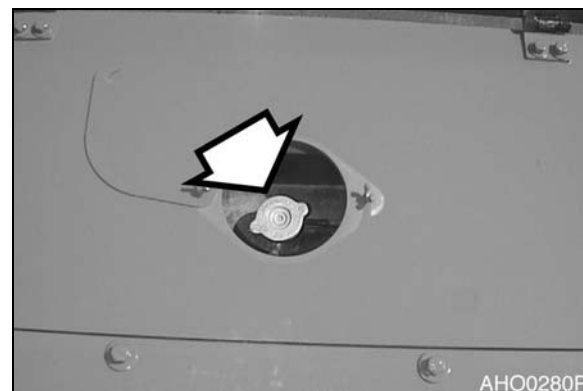


Figure 87

1. Slowly open the radiator cap (Figure 87) to allow any pressure to escape.

NOTE: See "Fluid Capacities" on page 4-5 for capacity and "Table of Recommended Lubricants" on page 4-3.

2. Place a container under the radiator and open the drain valve (Figure 88).

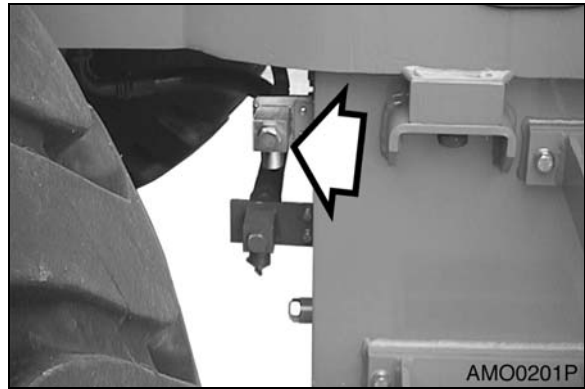


Figure 88

3. Remove coolant drain plug (Figure 89) from engine.

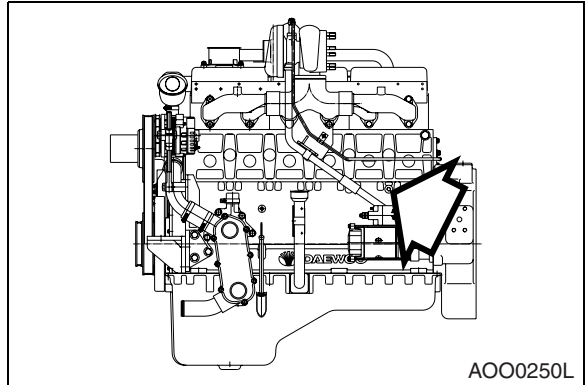


Figure 89 (S/N 3001 thru 4000)

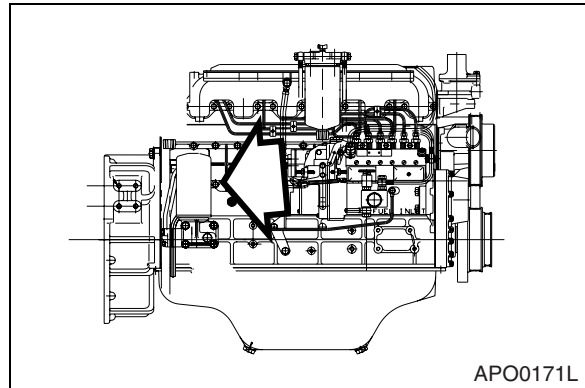


Figure 90 (S/N 4001 and Up)

4. Open heater shutoff valves (Figure 91 and Figure 92) to allow coolant to drain from heater core.
5. Install drain plug, and close drain valve after coolant has completely drained from system.
6. Fill cooling system with a flushing solution.
7. Run engine at low idle until the coolant temperature gauge reaches the "GREEN ZONE." Run engine for another 10 minutes.

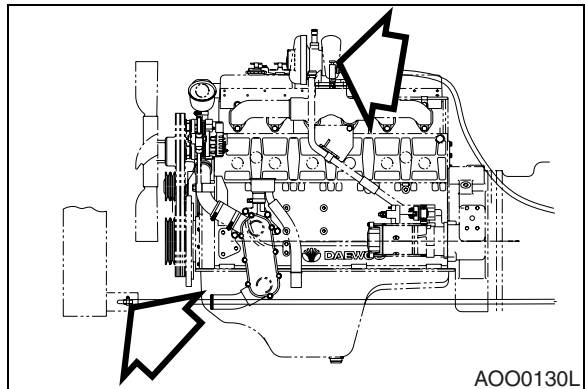


Figure 91 (S/N 3001 thru 4000)

8. Alter allowing engine to cool.
9. Drain flushing fluid and fill system with water.
10. Run engine again to allow water to completely circulate.
11. Drain water and fill system with proper antifreeze mixture for ambient temperature. Refer to coolant concentration table (See page 4-61)
12. Run engine without radiator cap installed, so that all air will be purged from system. Fill radiator to a point that is 10 - 20 mm (1/2 - 3/4") below top of overflow pipe.

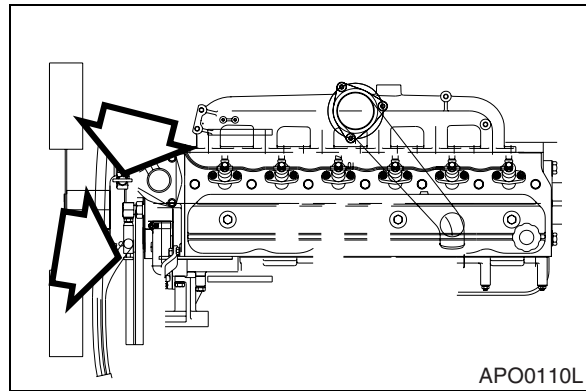


Figure 92 (S/N 4001 and Up)

DRAIN AND REPLACE HYDRAULIC OIL



CAUTION!

Be certain that hydraulic oil has cooled before draining it. Hot oil could splash and cause burns.

1. Raise boom to its highest position. Tilt bucket back as far as possible, and shut down engine.

NOTE: See "Fluid Capacities" on page 4-5 for capacity and "Table of Recommended Lubricants" on page 4-3.

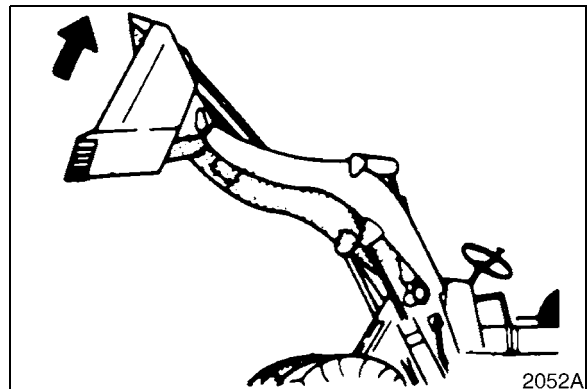


Figure 93

2. Position a catch tank beneath hydraulic reservoir drain plug. Release pressurized air from the hydraulic oil tank by rotating breather cap. (See Figure 13 on page 4-13). Remove drain plug from bottom of reservoir. (Figure 94). Allow all hydraulic oil to drain out.

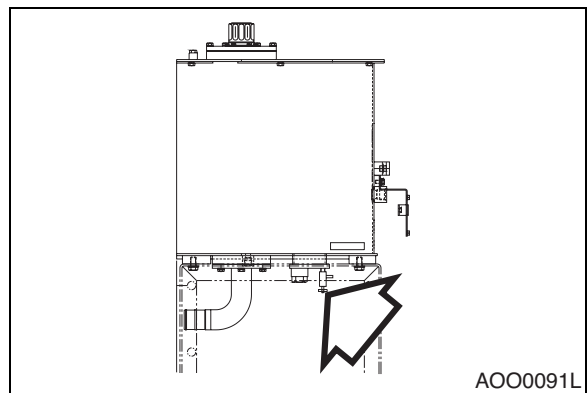


Figure 94

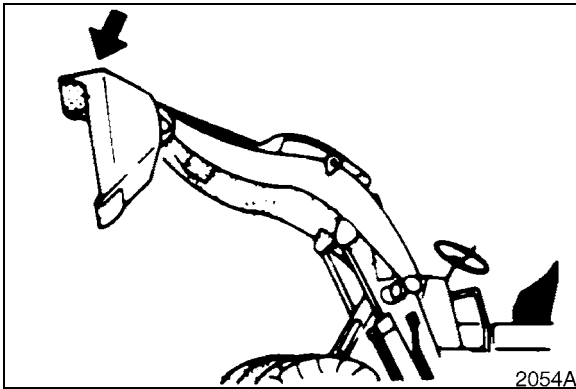


Figure 95

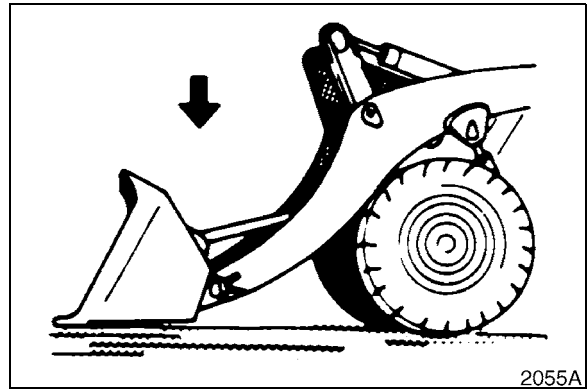


Figure 96

3.W

without starting engine, operate controls to dump bucket. (Figure 95). Then operate controls to lower boom. (Figure 96). This will drain oil out of boom and bucket cylinders.

4. Replace full flow hydraulic filters as described under "Hydraulic Full Flow Filter Replacement" on page 4-27.
5. Install reservoir drain plug. Remove the upper cover of the hydraulic oil tank. Refill reservoir by pouring oil in through the upper cover opening. Install and tighten the upper cover.

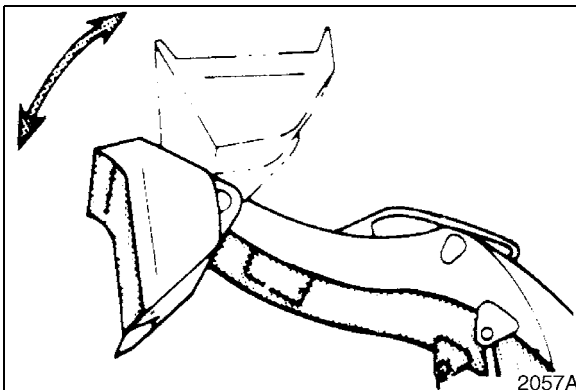


Figure 97

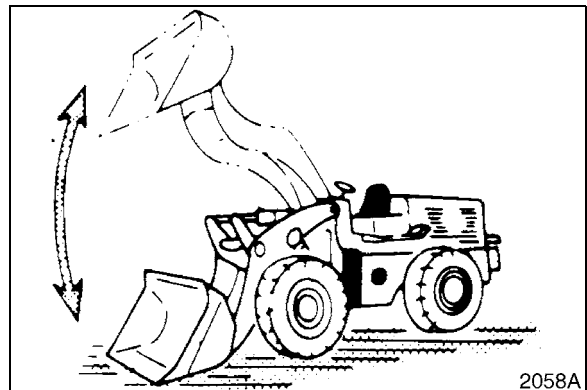


Figure 98

6. Start engine and operate controls to raise and lower bucket a few times. (Figure 97). Raise and lower boom a few times. (Figure 98). Lower bucket to ground.
7. Check reservoir sight gauge. (See Figure 12 on page 4-12). Oil level must be between upper limit and lower limit on sight gauge. Remove breather cap and add oil if necessary.

CHECK BRAKE ACCUMULATOR

Test the brake accumulator for proper precharge of Nitrogen gas:



WARNING!

Pressurized Nitrogen gas in brake accumulator may explode causing serious injury or death. Never service brake accumulator unless properly trained.

1. Park the machine on a level surface, apply the parking brake, lower the attachment to the ground.

2. Run the engine at low idle for five minutes to fill the brake accumulator with oil.
3. Shut down engine.
4. Turn starter switch to "ON" position.
5. Count the number of times you can depress the right-hand brake pedal before the brake warning light comes on.
6. If the number counted is less than five (5), there is some problem with the accumulator. Contact your nearest Daewoo dealer.

12,000 HOUR / SIX YEAR SERVICE

HOSE IN-SERVICE LIFETIME LIMIT (EUROPEAN STANDARD ISO 8331 AND EN982 CEN)

European regulations state that the in-service life of any hydraulic hose may not exceed six years. Daewoo recommends the following;

- Hoses at the customer premises cannot be stored more than 2 years before being discarded or installed on a machine.
- In-service lifetime of hoses fitted on a machine can never exceed 6 years, but replace hoses described in “Replace Pipes and Hoses” on page 4-50, every year. Always replace hoses having exceeded the allowed in-service lifetime irrespective of the external appearance/wear.
- Always store hoses in a dark place at a maximum of 65% relative humidity, between 0°C (32°F) and 35°C (95°F) but as close as possible to 15°C (59°F) and away from copper, manganese or tube generating Ozone.

SEVERE CONDITIONS MAINTENANCE

Operating Condition	Required Maintenance
Mud, Water, Rain	1. Check for loose fittings, obvious damage to machine, or any fluid leakage.
	2. After completing operations, clean mud, rocks, or debris from machine. Inspect for damage, cracked welds, or loosened parts.
	3. Perform all daily lubrication and service.
	4. If machine was working in salt water or other corrosive materials, be sure to flush equipment with fresh water.
Extremely Dusty or Hot Environment	1. Clean engine air filter on a more frequent basis.
	2. Clean radiator and oil cooler fins to remove dirt and dust.
	3. Clean fuel system intake strainer and fuel filter more frequently.
	4. Inspect starter motor and alternator, and clean as often as necessary.
Rocky Terrain	1. Check wheels, tires, rims, and valve stems for damage or excessive wear.
	2. Inspect for loose or damaged fittings and bolts.
	3. On a more frequent basis, inspect bucket and boom for damage or excessive wear.
	4. Install a top guard and front guard as necessary for protection against falling rock.
Extreme Cold	1. Use proper grade of fuel for cold temperatures.
	2. Use a gauge to check antifreeze to be sure that it will provide protection for coldest temperature expected.
	3. Use a hydrometer to check condition of batteries. In extremely cold weather, remove batteries at night and store them in a warm area.

BOLT TORQUE CHART

TIGHTENING TORQUE SPECIFICATIONS FOR METRIC BOLTS (FOR COATED THREADS, PRELUBRICATED ASSEMBLIES)

Grade	Gr. 8.8		Gr. 10.9		Gr. 12.9	
Dia.	kg•m	ft lb	kg•m	ft lb	kg•m	ft lb
5 mm x std	0.59	4.3	0.79	5.7	1.0	7.2
6 mm x std	1.00	7.3	1.38	10	1.66	12
8 mm x std	2.49	18	3.46	25	4.15	30
8 mm x 1.0	2.76	20	3.87	28	4.56	33
10 mm x std	4.84	35	6.92	50	8.30	60
10 mm x 1.0	4.84	35	7.05	51	8.30	60
12 mm x std	8.57	62	11.89	86	14.52	105
12 mm x 1.5	9.00	65	12.59	91	14.94	108
14 mm x std	13.55	98	18.95	137	23.10	167
14 mm x 1.5	14.94	108	21.02	152	24.89	180
16 mm x std	20.88	151	29.46	213	35.54	257
16 mm x 1.5	22.54	163	31.53	228	38.03	275
18 mm x std	28.90	209	40.52	293	48.41	350
18 mm x 1.5	32.50	235	45.92	332	55.04	398
20 mm x std	40.94	296	57.95	419	69.01	499
20 mm x 1.5	46.05	333	64.03	463	77.03	557
22 mm x std	54.90	397	77.86	563	93.08	673
22 mm x 1.5	61.00	441	86.02	622	105.00	759
24 mm x std	71.00	513	100.00	723	120.00	868
24 mm x 2.0	78.00	564	109.95	795	130.00	940
27 mm x 2.0	115.06	832	160.00	1157	195.00	1410

ELECTRICAL SYSTEM

CHECK BATTERY CONDITION



WARNING!

Before starting any battery service work, make sure to shut the engine off and turn the starter switch to the "OFF" position.

The batteries create hydrogen gas. An explosion hazard exists, particularly with a deeply discharged battery. Make sure that open flames, burning objects or sparks are kept away from the battery compartment.

Battery electrolyte is diluted sulfuric acid. Take extreme caution when handling the batteries. The electrolyte can cause severe chemical burns. If any electrolyte gets on your clothing or skin, wash it off immediately with large quantities of water. If the electrolyte gets into your eyes, flush them immediately with a large quantity of water and contact a doctor at once.

When installing a battery, wear safety glasses at all times.

When removing a battery, remove the Negative (-) or ground terminal first, and then the Positive (+) terminal. This will prevent sparks or arcing that could cause an explosion. When installing a battery, connect the Positive terminal first and then the Negative terminal. Make sure to fully tighten the terminal clamps.

1. In colder weather a greater drain is placed on the batteries when they are used for the preheat cycle and when starting a cold engine. Battery performance decreases as the temperature gets lower.
2. In extremely cold weather, remove the batteries at night and move them to a warm location. This will help to keep them at a higher power level.
3. Inspection of battery electrolyte level.

NOTE: *The battery installed at the factory is a Maintenance Free (MF) type. Electrolyte under normal conditions should remain at its proper level.*

4. Inspect charge condition of battery by looking at the indicator light built into battery.
 - GREEN: Normal.
 - BLACK: Insufficient charging - check alternator.
 - TRANSPARENT: Insufficient battery electrolyte - replace with new battery.

NOTE: *Colors may vary from one battery manufacturer to another. Always refer to instructions on battery.*

The batteries should always be replaced in pairs. Using an old battery with a new one will shorten the life span of the new battery.

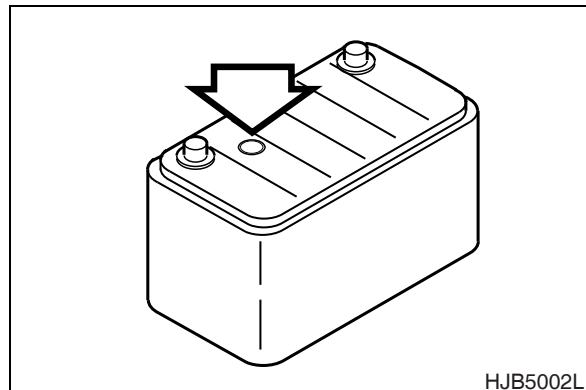


Figure 99

ENGINE COOLING SYSTEM

GENERAL

Keeping an engine's cooling system in peak operating condition, can have many benefits to keeping a machine in good operating condition. A properly functioning cooling system will; improve fuel efficiency, reduce engine wear, and extend component life.

Always use distilled water in the radiator. Contaminants in tap water neutralize the corrosion inhibitor components. If tap water must be used, it should not exceed 300 ppm hardness, or contain more than 100 ppm of either chloride or sulfate. Water that has been treated with a water softener also contains salt that will cause corrosion of components. Water from creeks and stagnant pools usually contains dirt, minerals and/or organic material that are deposited in the cooling system and impair cooling efficiency. Distilled water is the best.

Engine overheating is often caused by bent or clogged radiator fins. The spaces between the fins can be cleaned by use of air or water under pressure. When straightening bent fins, use care not to damage the tubes or break the bond between the fins and the tubes.



WARNING!

Pressure at air nozzle must not exceed 30 PSI (2.1 kg/cm²). Always wear goggles when using compressed air.

Do not pour cold water into radiator when engine is very hot and water level is below the top of the tubes. Such action could result in damage to engine cylinder heads.

Heavy duty diesel engines require a balanced mixture of water and antifreeze. Drain and replace the mixture every year or 2,000 Hours of operation, whichever comes first. This will eliminate buildup of harmful chemicals.

Antifreeze is essential in any climate. It broadens the operating temperature range by lowering the coolant's freezing point and by raising its boiling point. Do not use more than 50% antifreeze in the mixture unless additional freeze protection is required. Never use more than 68% antifreeze under any condition.

Types of Antifreeze

There are two main classifications of antifreeze available on the market today.

1. Ethylene Glycol - Standard Life Antifreeze
2. Propylene Glycol - Extended Life Antifreeze

Ethylene glycol (standard life antifreeze) has been on the market for many years. Its chemical properties do not provide the improved corrosion resistance that propylene glycol (extended life antifreeze) does. Ethylene glycol is also very hazardous to the environment, people and animals. Daewoo recommends that ethylene glycol be replaced with propylene glycol.

The newer propylene glycol antifreeze comes in many different colors. Some of the colors are pink, red, orange and yellow. There are even some that come in a blue-green color. The blue-green color makes it very difficult to tell the difference of what type of antifreeze is in a cooling system. The colors are only a dye added to the clear antifreeze. Do not rely on color. Keep careful machine records of what brand and type of antifreeze is used in the unit. If you are unsure of what type of antifreeze is in the system, drain and flush the system.

NOTE: Do not mix ethylene glycol and propylene glycol antifreeze together. If the two are mixed, the protection level will be reduced to the level of the ethylene glycol.

ANTIFREEZE CONCENTRATION TABLES

Ethylene Glycol - Standard Life Antifreeze (1,000 Hour / 6 Months)		
Ambient Temperature	Cooling Water	Antifreeze
-10°C (14°F)	80%	20%
-15°C (5°F)	73%	27%
-20°C (-4°F)	67%	33%
-25°C (-13°F)	60%	40%
-30°C (-22°F)	56%	44%
-40°C (-40°F)	50%	50%

Propylene Glycol - Extended Life Antifreeze (2,000 Hour / Yearly)		
Ambient Temperature	Cooling Water	Antifreeze
-10°C (14°F)	78%	22%
-15°C (5°F)	71%	29%
-20°C (-4°F)	65%	35%
-25°C (-13°F)	59%	41%
-30°C (-22°F)	55%	45%
-40°C (-40°F)	48%	52%

FUEL TRANSFER PUMP



WARNING!

1. Do not dry operate fuel pump for more than 15 seconds.
 - Cooling and lubrication of pump is achieved by fuel passing through the pump. If the pump is dry operated, the heat generated by the moving parts will cause damage to the pump rotors, vanes and seals. To prevent unnecessary wear and / or damage to the pump do not dry operate the fuel pump for more than 15 seconds.
2. Do not operate the pump for more than 15 minutes at a time.
 - Continuous usage of pump over the recommended time interval will cause overheating of motor result in causing motor damage.
3. Do not use refueling pump for other types of fuel. (Use only for diesel fuel.)
 - Do not use refueling pump for other types of fuel which have a low flash point.
 - Do not use refueling pump for fuel contaminated with water or high humidity. Moisture in pump mechanism can cause rust and can create pump failure.
4. Always operate pump using the strainer installed on the inlet hose. This will prevent any foreign materials from being introduced into the pump. Always maintain the pump and all of its components in a clean condition.
 - If dirt or other foreign materials enter the pump, it can become lodged between the rotor and / or vanes and generate heat which can cause pump damage.
 - Do not remove strainer or use a strainer with larger mesh to increase the flow of fuel.
5. Be careful not to overfill or spill fuel.
6. Make sure the direction of check valve is in line with the flow direction of fuel.
7. If any parts or components of the pump become lost, damaged or inoperable, immediately replace it with a new one.

IMPORTANT

If there are any sign of leakage while operating transfer pump, inspect the following components to prevent any fires or hazardous fuel spills.

- Check all hoses leading to and from the transfer pump.
- Check all hose clamps.
- Check transfer pump inlet port.

This transfer pump is used to transfer fuel from a refueling source to fuel tank. A check valve is installed in the inlet hose to prevent fuel from flowing backward from fuel tank to source. A strainer is installed in inlet hose to prevent any foreign material from being introduced into transfer pump or fuel tank.

A thermal limiter, built into motor, will automatically shut off the circuit if motor is overheating to protect it from being damaged.

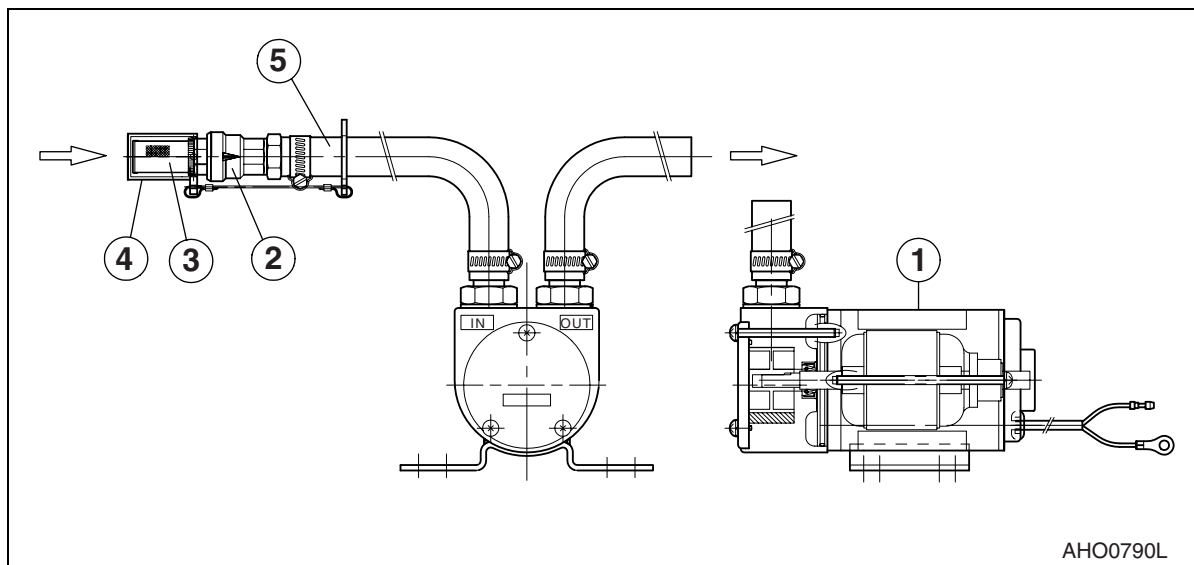


Figure 100

1. Remove strainer cap (4, Figure 100) from inlet hose.

NOTE: Keep strainer cap in a safe location to reseal strainer after refueling is complete.

2. Insert inlet hose (5, Figure 100) into refueling tank.

3. Turn fuel pump switch to "ON" position.

NOTE: The transfer pump rate of flow is approximately 20 liters / minute (5 gpm). Use extra care not to overfill fuel tank so that fuel does not over flow.

4. Once fuel transfer is completed, immediately turn switch to "OFF" position to stop pump.
5. Lift inlet hose from fueling source and turn switch to "ON" position for 2~3 seconds to drain remaining fuel from hose to fuel tank.
6. Replace strainer cap (4) to inlet strainer and return hose to storage position.

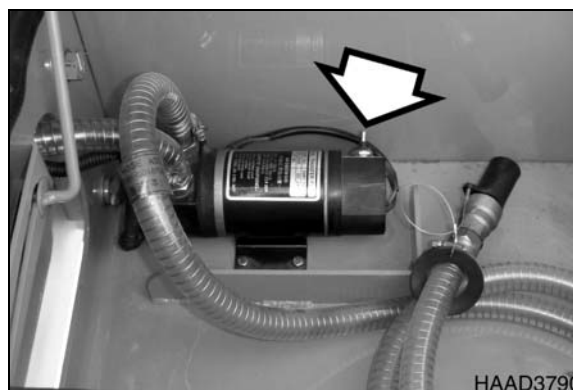


Figure 101

HYDRAULIC PRESSURE CHECKS

Hydraulic pressure for most systems can be checked by using the remote test ports shown in (Figure 102).

Reference Number	Description
1	Main Pump Pressure
2	Unloading Valve Pressure
3	Steering Pump Pressure
4	Transmission Clutch Pressure
5	Control Lever Activation Pressure
6	Brake Charge Pressure

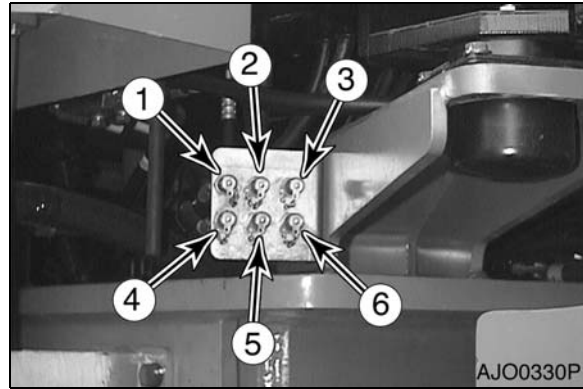


Figure 102

MAIN PUMP PRESSURE

1. Attach gauge to port (1, Figure 102).
2. Relief cartridge for main pump must open at 200^{+5} kg/cm² (2,845⁺⁷⁰ psi).
3. Adjust screw on relief valve cartridge (Figure 103). Loosen lock nut and turn screw clockwise to raise relief pressure. Turn screw counterclockwise to lower relief pressure.
4. Tighten lock nut after pressure has been adjusted.

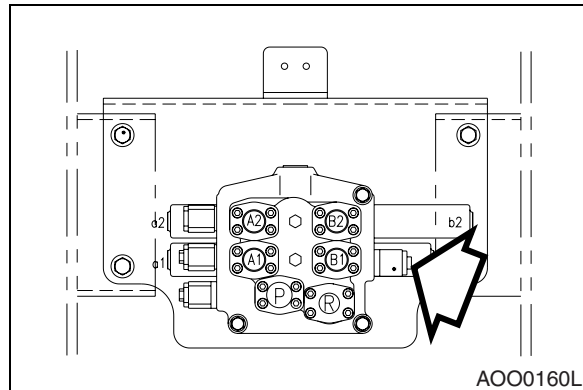


Figure 103

UNLOADING VALVE PRESSURE

1. Attach gage to port (2, Figure 102).
2. Relief pressure for unloading is 160 ± 5 kg/cm² (2,320 ± 70 psi).
3. Adjust screw on unloading cartridge (C1) (Figure 104).
4. Loosen lock nut on adjusting screw. Turn adjusting screw clockwise to raise relief pressure. Turn adjusting screw counterclockwise to lower relief pressure.
5. Tighten lock nut after adjustment has been made.

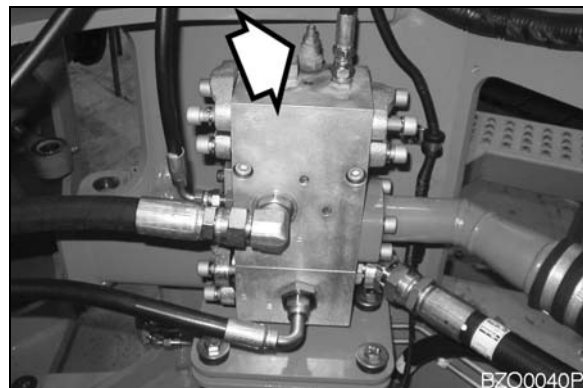


Figure 104

STEERING PUMP PRESSURE

1. Attach gauge to port (3, Figure 102).
2. Adjust relief valve cartridge on EHPS valve (Figure 105).
 - Steering pump pressure: $200 \pm 5 \text{ kg/cm}^2$ ($2,900 \pm 70 \text{ psi}$).
 - Relief pressure of EHPS: 175 ~ 180 bar (2,500 - 2,600 psi).
3. Unscrew remove plastic plug. Adjust screw that is beneath plug. Turn screw clockwise to raise relief pressure. Turn screw counterclockwise to lower relief pressure.
4. Install plastic plug after pressure has been adjusted.

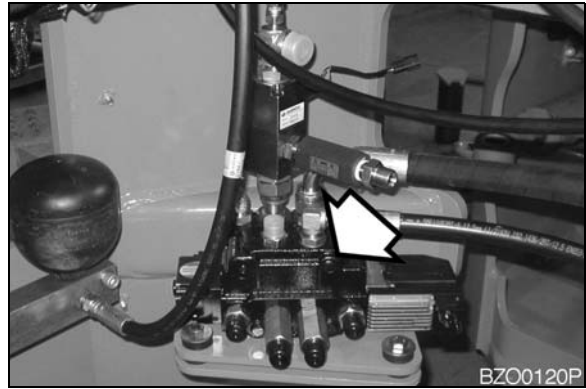


Figure 105

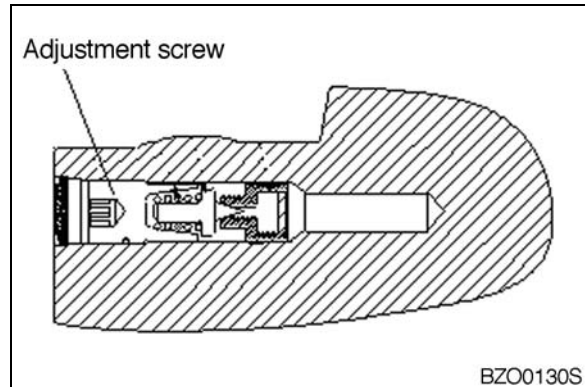


Figure 106

TRANSMISSION CLUTCH PRESSURE

1. Attach gauge to port (4, Figure 102).
2. It is not impossible to adjust pressure.
 - Transmission clutch pressure: $16^{+2}_0 \text{ kg/cm}^2$ (228^{+28}_0 psi)

BRAKE CHARGE PRESSURE (S/N 3001 THRU 4000)

1. Attach gauge to port (5, Figure 102).
2. Adjust brake charge valve cartridge (2, Figure 107) on brake and pilot supply valve (1, Figure 107). Relief pressure for brake charging is $140/120 \text{ kg/cm}^2$ (1,990/1,707 psi).

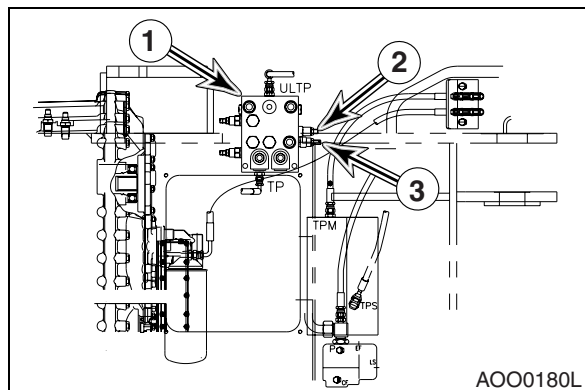


Figure 107

BRAKE CHARGE PRESSURE (S/N 4001 AND UP)

1. Attach gauge to port (5, Figure 102).
2. Adjust brake charge valve cartridge (2, Figure 108) on brake and pilot and fan motor supply valve (1, Figure 108). Relief pressure for brake charging is $120 \pm 5 \text{ kg/cm}^2$ ($1,707 \pm 70 \text{ psi}$).

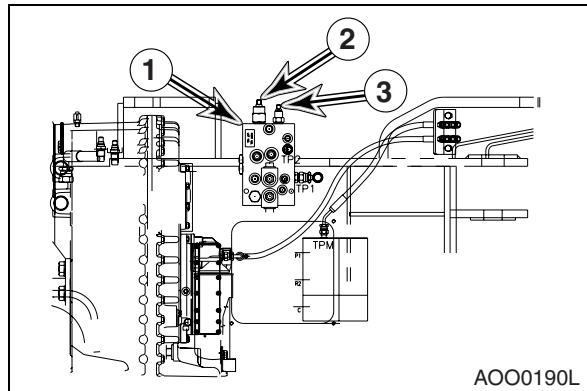


Figure 108

CONTROL LEVER ACTIVATION PRESSURE (S/N 3001 THRU 4000)

1. Attach gauge to port (6, Figure 102).
2. Adjust relief cartridge (3, Figure 109) on brake and pilot supply valve (1, Figure 109). Relief pressure should be set at $28^{+3}_{-2} \text{ kg/cm}^2$ ($398^{+43}_{-30} \text{ psi}$).
3. Loosen lock nut on adjusting screw. Turn adjusting screw clockwise to raise relief pressure. Turn adjusting screw counterclockwise to lower relief pressure.
4. Tighten lock nut after adjustment has been made.

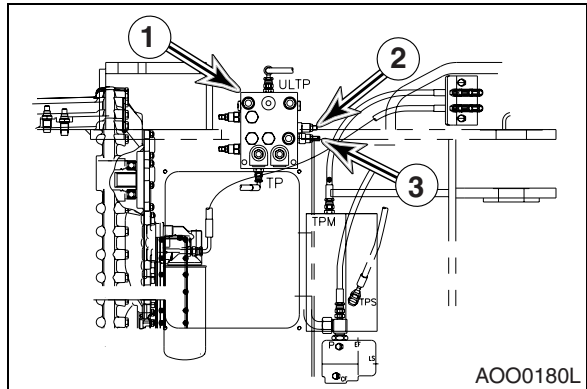


Figure 109

CONTROL LEVER ACTIVATION PRESSURE (S/N 4001 AND UP)

1. Attach gauge to port (6, Figure 102).
2. Adjust relief cartridge (3, Figure 110) on brake and pilot and fan motor supply valve (1, Figure 110). Relief pressure should be set at $28^{+3}_{-2} \text{ kg/cm}^2$ ($398^{+43}_{-30} \text{ psi}$).
3. Loosen lock nut on adjusting screw. Turn adjusting screw clockwise to raise relief pressure. Turn adjusting screw counterclockwise to lower relief pressure.
4. Tighten lock nut after adjustment has been made.

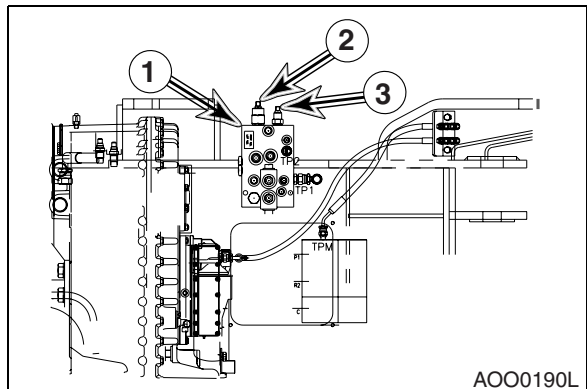


Figure 110

SERVICE BRAKE OUTLET PRESSURE

1. Attach gauge to brake pressure test port (Figure 111) on front axle.
2. Outlet pressure should be $60 \pm 3 \text{ kg/cm}^2$ ($853 \pm 43 \text{ psi}$).

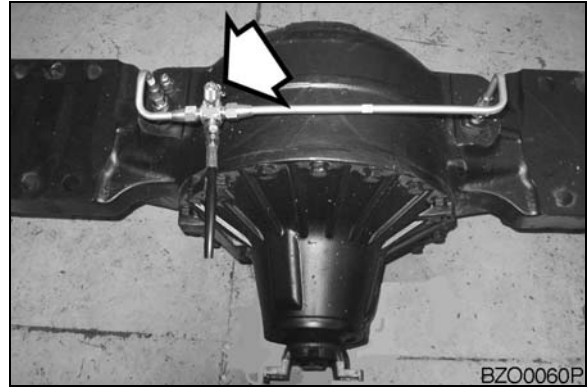


Figure 111

PARKING BRAKE RELEASE PRESSURE

1. Attach pressure gauge to parking brake port.
2. Parking brake pressure.
 - $120 \sim 140 \text{ kg/cm}^2$ ($1,707 \sim 1,991 \text{ psi}$) (S/N 3001 thru 4000)
 - $120 \sim 150 \text{ kg/cm}^2$ ($1,707 \sim 2,133 \text{ psi}$) (S/N 4001 and Up)

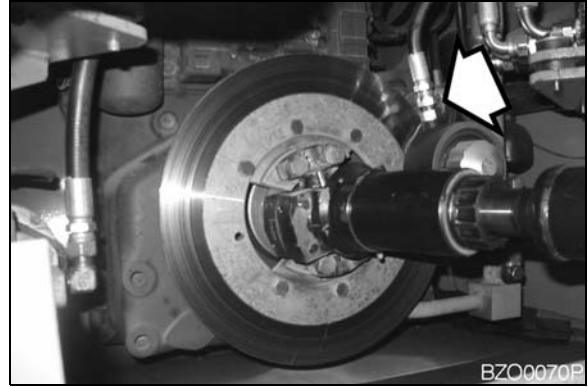


Figure 112

FAN MOTOR PRESSURE (S/N 4001 AND UP)

1. Attach gauge to inlet port of fan motor (1, Figure 113).
2. Adjust screw on relief valve cartridge (2, Figure 113).

NOTE: Outlet pressure should be $105 \pm 5 \text{ kg/cm}^2$ ($1,490 \pm 71 \text{ psi}$).

3. Loosen lock nut on adjusting screw. Turn adjusting screw clockwise to raise relief pressure. Turn adjusting screw counterclockwise to lower relief pressure.

NOTE: One turn varies pressure 16.5 kg/cm^2 (235 psi).

4. Tighten lock nut after adjustment has been made.

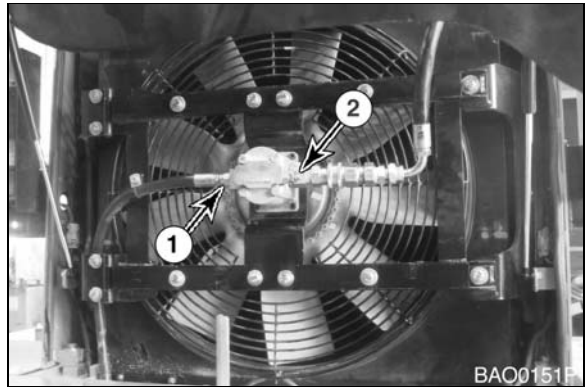


Figure 113

LONG TERM STORAGE

CLEANING

Pressure wash machine. Inspect machine for any damage or missing parts. Drive machine to check steering linkage for damage.

HYDRAULIC SYSTEM

Start engine and allow it to idle for a few minutes. Drive machine around for 2 – 3 minutes. Raise and lower boom 2 – 3 times. Crowd and dump bucket 2 – 3 times. This will circulate hydraulic fluid through all hydraulic systems.

LUBRICATION

Perform all daily maintenance procedures listed in this section (Section 4.) Grease all grease fittings in steering linkage. Apply a coating of light oil to all exposed cylinder rods. Apply a coating of light oil to all control linkages and all control valve spools. Check condition of oil coating each month and add to coating where necessary.

BATTERY

Disconnect cables from battery, or remove battery from machine. If battery is removed, fully charge battery and store it.

COOLING SYSTEM CARE

If cooling system does not need antifreeze and is filled with water only, add an anti-rust additive. If temperatures below freezing are expected, add antifreeze to protect system to level of cold expected. See antifreeze protection Table 4-1. Use a hydrometer to check level of antifreeze protection once each month. If desired, cooling system can be completely drained. If system is drained, place a sign in operator's cab to warn operator that there is no coolant in engine.

PARKING BRAKE ADJUSTMENT

EMERGENCY RELEASE OF THE PARKING BRAKE

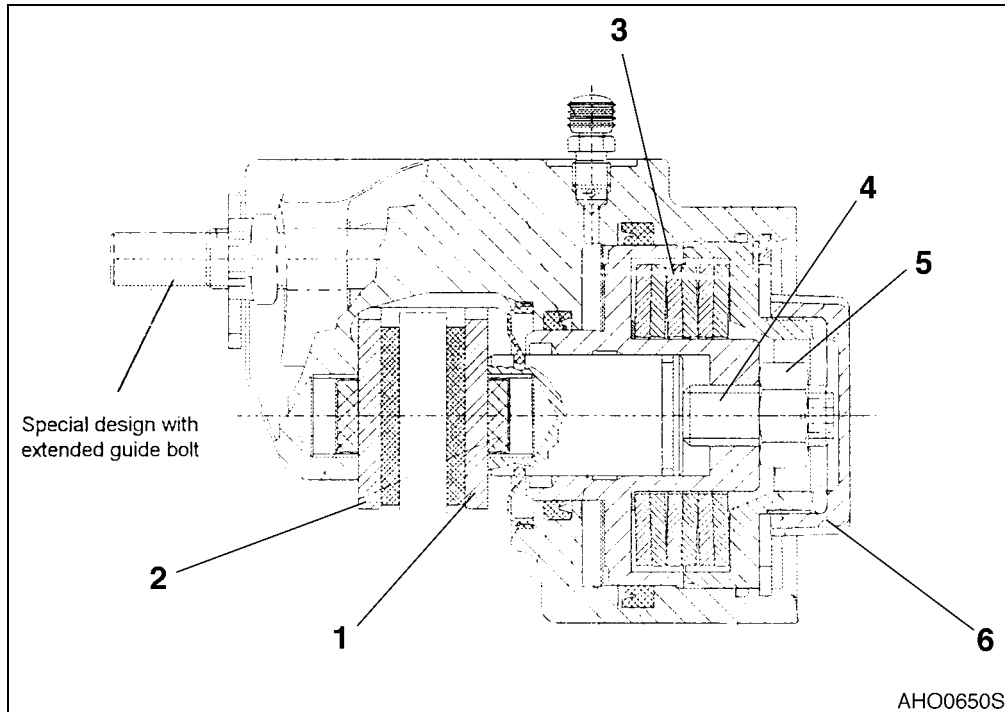


Figure 114

If the parking brake cannot be released by normal hydraulic system pressure, or if the engine will not start, it must be manually released before towing can take place.

1. Before releasing parking brake make sure that wheels have wheel chocks placed in front of and behind them, to prevent machine from moving when parking brake is released.

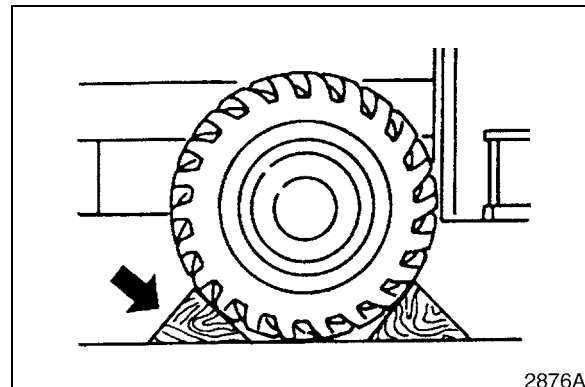


Figure 115

2. Release the screw cap (6, Figure 114 and Figure 116) and unscrew.
3. Release the lock nut (5, Figure 114) and turn the adjusting screw (4) counterclockwise until the brake disk is free.
4. Install lock nut (5, Figure 114) and screw cap (6) and tighten both as far as possible. This will protect the parking brake assembly from dirt.

NOTE: *Now, the vehicle does not have any brake function. The vehicle must be secured against moving away with proper means. Before putting the vehicle into operation again, the brake has to be adjusted according to adjusting regulations.*

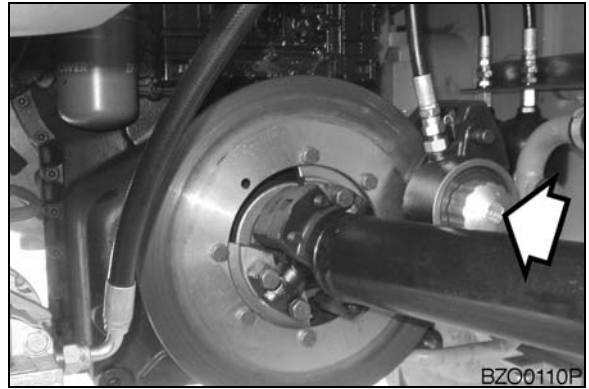


Figure 116

ADJUSTING REGULATIONS

During this adjusting process, the parking brake must be released, i.e. the bank of cup springs (3, Figure 114) must be completely pretensioned.

1. Park vehicle on an even surface and place wheel chocks in front of and behind tires. Only then, release the parking brake.
2. Release the screw cap (6, Figure 114) and unscrew.
3. Release the lock nut (5, Figure 114) (size 24 or 30) and turn the adjusting screw (4) with socket wrench (size 8 or 10) clockwise until the two brake pads (1 and 2) make contact with the brake disk.
4. Turn the adjusting screw (4, Figure 114) counterclockwise and set the clearance specified in the following table.

Type	Adjusting Screw	Clearance (mm)		Turns
Small	M 16 (size 8)	min.	0.5 mm (0.02 in)	1/4
		Rated clearance	1.0 mm (0.04 in)	1/2
		max	1.5 mm (0.06 in)	3/4
Large	M 20 (size 10)	min.	1.0 mm (0.04 in)	2/5
		Rated clearance	2.0 mm (0.08 in)	4/5
		max	3.0 mm (0.12 in)	1 1/5

5. Hold the adjusting screw (4, Figure 114) in position with the hexagonal socket wrench and lock with the lock nut (5).
6. Mount the screw cap (6, Figure 114) and tighten as far as possible manually.
7. Actuate the brake valve several times and check the braking efficiency of the parking brake on slope.

TIRES AND WHEELS

Properly inflated tire (2, Figure 117) is an important factor in determining tire performance and tire life. A tire that is under inflated (1, Figure 117) does not properly support machine, and will wear out quickly. Overinflated tires (3, Figure 117) have poor traction and puncture easily.

Use a pressure gauge to measure tire pressure. Always measure tire pressure before machine has been working, when tires are cold. Use table below to determine correct pressure for front or rear tires when driving machine, or when working machine.

Check tires for damage and embedded objects. Check valve stems for damage.

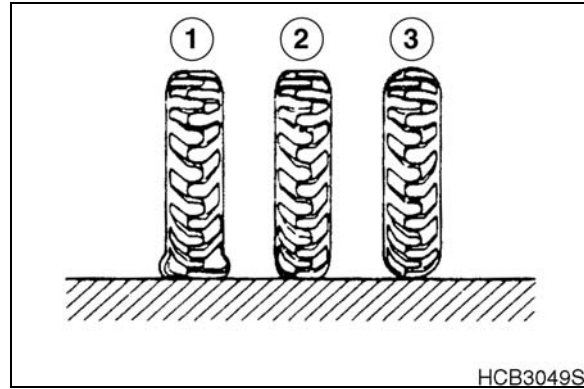


Figure 117

Tire Dimension	Working Pressure		Driving Pressure		Remarks
	Front Tire	Rear Tire	Front Tire	Rear Tire	
20.5-25-16PR (L3)	3.5 kg/cm ² (50 psi)	3.3 kg/cm ² (47 psi)	2.8 kg/cm ² (40 psi)	2.0 kg/cm ² (29 psi)	Bias Ply Tire (Standard)

WHEEL NUT TORQUE

Tighten wheel nuts to 58 - 62 kg•m (420 - 448 ft lb).

WARNING!

If a wheel and tire must be removed from machine and replaced, or if a tire must be replaced on wheel, allow this task to be performed only by experienced service personnel. A tire rim could be propelled off wheel and cause serious bodily injury or death. See Figure 118.

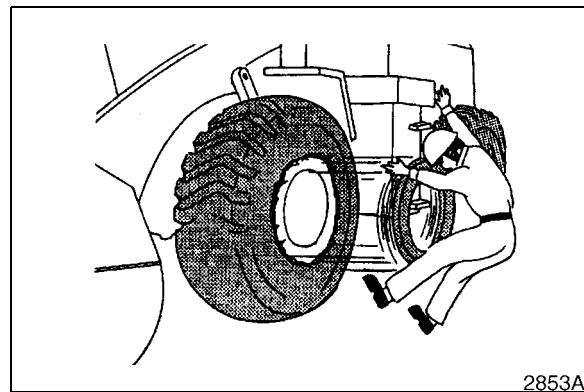


Figure 118

CHECK TIRE FOR DAMAGE



WARNING!

Improper servicing or changing tires and rims can cause explosion resulting in serious injury or death.

Do not service or change tires and rims unless properly trained and equipped.

Contact your nearest Daewoo loader dealer or tire manufacturer's local dealer for tire servicing or changing.



WARNING!

Overheated tire may explode causing serious injury or death.

If overheated tire is suspected, do not approach tire to distance of less than 15mm (50ft).

Stay away until tire and rim cool down.

If the following defects are found in tires, for safety reasons the tires should be replaced with new tires.

For the replacement contact DAEWOO loader dealer or a tire manufacturer's local dealer.

- Bead wire is broken or bent, or the tire is greatly deformed.
- Wear is excessive and the carcass ply (including breaker) is exposed for more than 1/4 of the circumference.
- Damage to the carcass exceeds 1/3 of the tire width.
- Tire layers are separated.
- Radial cracks reach the carcass.
- Deformation or damage which makes the tire unsuitable for use.

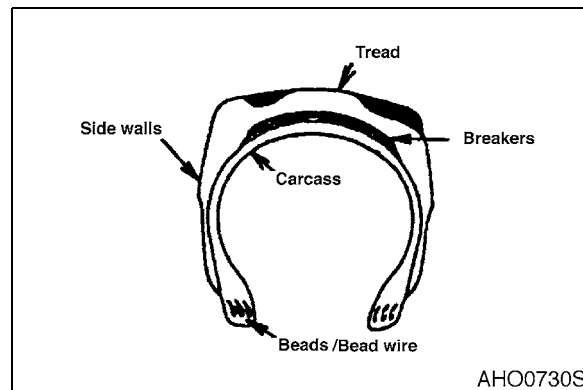


Figure 119

TRANSPORTATION

LOADING MACHINE ON A TRAILER

When transporting the machine observe the various road rules, road transportation vehicle laws and vehicle limit ordinances, etc.

It is a good idea to obtain special platform for loading and unloading the machine.

1. Park the trailer on a flat firm roadbed. Keep a fairly long distance between the road shoulder and the machine.
2. Properly apply the brakes of the trailer and place wheel chocks in front of and behind the tires to ensure that the trailer does not move.
3. Fix the ramp in line with the centers of the trailer and the machine.
4. Determine the position of ramp, then slowly load the machine onto to the specified part of the trailer.

NOTE: *Have someone in clear view and in a safe position, provide directions while loading.*

5. Lower the bucket and lock each control lever using the pilot cutoff switch.
6. Apply the parking brake and set the articulation stopper in the "LOCKED" position.
7. Tape over the exhaust stack outlet to prevent turbo "Windmilling" damage.
8. Place blocks in front of and behind the tires to prevent the machine from moving.
9. Fasten the machine to the trailer with chains or cables at lower part of the rear chassis. Additional chains or cables may be used but do not damage brake lines or cylinder rods.

IMPORTANT

Brake pipe runs on axle housing.

Do not fasten axle housing.

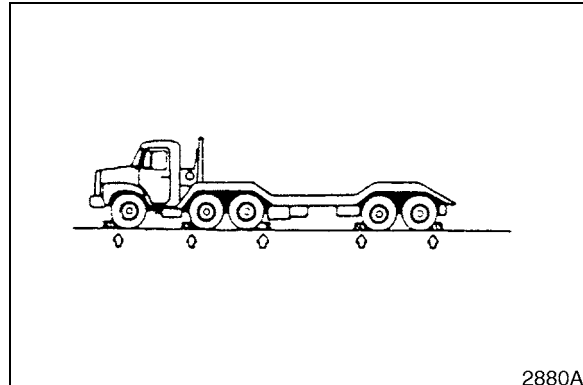


Figure 1

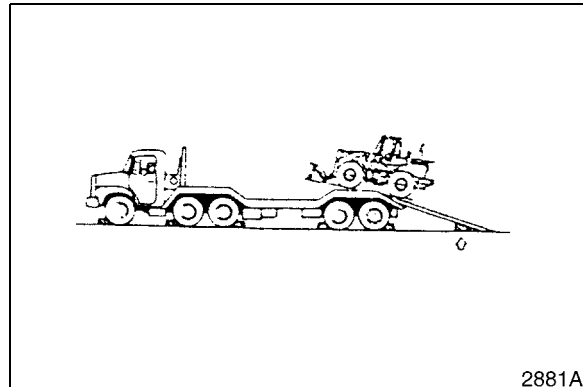


Figure 2

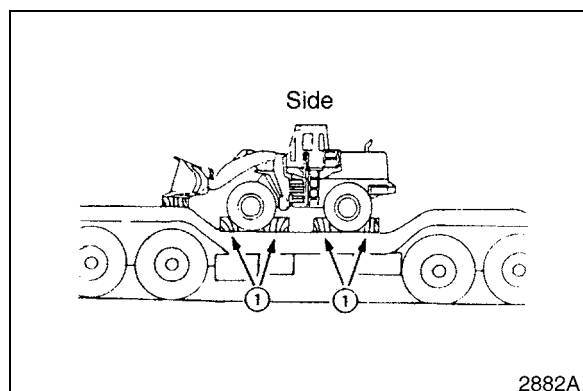


Figure 3

10. Determine the route for transporting the machine by taking into account the width, height and weight of the machine and the truck.

SUMMARY OF SAFETY PRECAUTIONS FOR LIFTING

To make safe lifts, the following items must be evaluated by operator and work site crew.

- Condition of ground support.
- Wheel loader configuration and attachments.
- Weight, lifting height and lifting radius.
- Safe rigging of load.
- Proper handling of suspended load.

Tag lines on opposite sides of load can be very helpful in keeping a suspended load secure, if they are anchored safely to control points on ground.

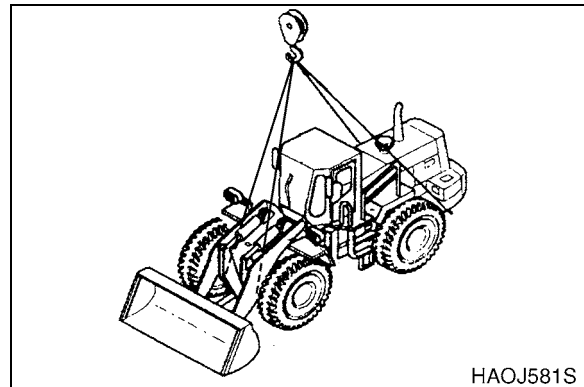


Figure 4

TROUBLESHOOTING

BRAKING

Problem	Possible Causes	Remedies
Reduced brake action.	Low secondary pressure in brake valve.	Repair or replace brake valve.
	Worn brake disks.	Replace brake disks.
	Damaged brake disks.	Replace brake disks.
	Damaged brake valve block.	Replace valve.
	Air in brake hydraulics due to leak in brake hose.	Repair leak, bleed system.
After bleeding brakes, brakes are not fully released.	Damaged brake disks.	Replace disks.
	Damaged brake disk return spring.	Replace return springs.

ELECTRICAL SYSTEM

Problem	Possible Causes	Remedies
Battery has no power and will not accept a charge.	Damaged battery plates.	Replace battery.
	Alternator not charging properly.	Repair or replace alternator.
	Bad ground.	Clean and tighten.
	Loose electrical connector.	Clean and tighten.
	Alternator belt loose or damaged.	Tighten or replace.
Battery will accept a charge but discharges soon after.	Internal battery short.	Replace battery.
	Wiring harness short.	Repair wire.

ENGINE

Problem	Possible Causes	Remedies
Starter does not operate.	Blown fuse.	Replace fuse.
	Low battery power.	Charge battery.
	Poor terminal contact.	Clean and tighten connections.
	Starter switch failed.	Replace switch.
	Starter relay failed.	Replace relay.
	Starter control failed.	Replace controller.
	Wiring harness faulty.	Replace harness.
	Battery relay failed.	Replace relay.
Starter engages, engine does not start.	Blown fuse.	Replace fuse.
	Fuel gelled in cold weather.	Replace fuel.
	Fuel filters plugged.	Replace filters.
	Water or dirt in fuel system.	Clean system and add new fuel.
	Air in fuel system.	Purge air from system.
	Engine stop control failed.	Replace stop control.
	Engine stop relay failed.	Replace relay.
Engine starts, runs only at low speed or shuts down.	Engine oil viscosity incorrect.	Change oil.
	Clogged or dirty fuel injectors.	Clean injectors.
	Fuel filters plugged.	Replace filters.
	Engine stop motor cable out of adjustment.	Readjust.
	Engine speed control cable out of adjustment.	Readjust.
Engine knocks, runs unevenly or surges.	Low engine oil.	Add oil.
	Plugged air intake system.	Clean system and replace filter.
	Injection pump out of adjustment.	Contact your Daewoo dealer.
	Plugged fuel filter.	Replace fuel filter.
	Water or dirt in fuel system.	Clean system and add new fuel.
	Clogged or dirty fuel injectors.	Clean injectors.

Problem	Possible Causes	Remedies
Engine has poor power.	Plugged air intake system.	Clean system and replace filter.
	Clogged or dirty fuel injectors.	Clean injectors.
	Fuel filters plugged.	Replace filters.
	Engine speed control cable out of adjustment.	Readjust.
	Injection pump out of adjustment.	Contact your Daewoo dealer.
	Valve backlash faulty.	Adjust backlash.
Engine runs hot.	Low coolant level.	Add coolant.
	Thermostat faulty.	Replace thermostat.
	Radiator cap faulty.	Replace radiator cap.
	Radiator core plugged.	Clean oil cooler.
	Oil cooler core plugged.	Clean oil cooler.
	Fan belt loose or damaged.	Tighten or replace as required.
	Temperature sensor faulty.	Replace sensor.
Engine oil pressure warning light turns "ON," and buzzer sounds.	Low engine oil level.	Add oil.
	Wrong grade oil for weather conditions.	change oil.
	Clogged oil filter.	Change filter and oil.
	Defective alarm switch.	Contact your Daewoo dealer.
	Oil leakage from pipe or joint.	
	Clogged suction strainer.	
	Excessive engine wear.	
	Defective oil pump.	
Coolant temp, warning light turns "ON."	Low engine coolant level.	Add coolant.
	Loose/slipping/broken fan belt.	Adjust or replace belt.
	Clogged radiator fins.	Clean.
	Scale or mineral build up inside radiator.	Flush or professionally clean.
	Defective alarm switch (gauge is in green).	Contact your Daewoo dealer.
	Low water pump flow.	
	Thermostat stuck or missing.	

Problem	Possible Causes	Remedies
Engine does not start when the starter motor is turning. (Also, see ELECTRICAL TROUBLESHOOTING.)	Fuel filter clogged.	Replace fuel filter.
	Starter motor speed too low.	Booster Battery may be used.
	Defective engine shutoff solenoid.	Contact your Daewoo dealer.
	Fuel pump failure.	
	Incorrect fuel injection timing.	
	Compression pressure too low.	
	Defective injectors.	
Unstable (rough) idling.	Air in fuel lines.	Tighten fuel connections and filter.
	Fuel filter clogged.	Replace fuel filter.
	Fuel pump failure.	Contact your Daewoo dealer.
	Incorrect fuel injection timing.	
Insufficient power.	Air cleaner filter clogged.	Clean or replace element.
	Fuel filter clogged.	Replace fuel filter.
	Throttle linkage adjustment wrong.	Check and adjust linkage.
	Engine oil level too high.	Check dipstick and correct level.
	Incorrect valve clearance.	Contact your Daewoo dealer.
	Piston ring wear.	
	Defective injectors.	
	Fuel pump failure.	

HYDRAULIC SYSTEM

Problem	Possible Causes	Remedies
None of the controls function (loud noise from pumps).	Hydraulic pump failed.	Contact your Daewoo dealer.
	Low hydraulic oil level.	Add hydraulic oil as required.
	Suction line plugged or damaged.	Clean or replace as required.

Problem	Possible Causes	Remedies
None of the controls function (no noise from pumps).	Pilot pump failure.	Contact your Daewoo dealer.
	Cutoff solenoid valve failed.	Replace solenoid.
	Relief cartridge of pilot parking valve stuck.	Clean or replace as required.
	Safety limit switch is ON.	Adjust limit switch clearance.
All actuators have low power.	Low hydraulic oil level.	Add hydraulic oil as required.
	Suction filter clogged.	Clean filter.
	Hydraulic pumps faulty.	Contact your Daewoo dealer.
	Main relief pressure too low.	Contact your Daewoo dealer.
	Hydraulic pumps cavitating.	Bleed air from hydraulic pumps.
Only one or two actuators have little or no power.	Overload relief pressure too low.	Reset pressure.
	Makeup check valve leaking.	Clean or replace as required.
	Control valve spool faulty.	Replace valve spool.
	Dirt in valve spool.	Clean or replace as required.
	Actuator failed.	Repair or replace as required.
	Cylinder seal failed.	Repair or replace as required.
	Cylinder rod damaged.	Repair or replace as required.
	Remote control valve failed.	Replace control valve.
	Wrong pilot line connection.	Reconnect pilot lines.
Oil temperature too high.	Debris in exterior of cooler.	Clean exterior of cooler.
	Oil cooler faulty.	Contact your Daewoo dealer.
	Fan belt loose.	Tighten fan belting as required.

Problem	Possible Causes	Remedies
Actuators on one side of boom have little power or do not operate.	Overload relief valve is not operating properly.	Repair valve or replace.
	Damaged hydraulic hose.	Replace hose.
	Loose hydraulic fittings.	Tighten fittings.
	Internal damage to control valve housing.	Replace control valve.
	Control valve spool damaged.	Replace control valve.
	Sediment inside control valve.	Clean and repair valve.
	Check valve internal leakage.	Repair or replace valve.
	Damaged cylinder or pump.	Repair or replace pump or cylinder.
	Cylinder internal leakage.	Repair or replace cylinder.
	Damaged cylinder rod.	Replace rod.
	Pilot valve failure.	Replace pilot valve.

STEERING

Problem	Possible Causes	Remedies
Steering Wheel is hard to turn.	Sediment blocking direction change spool orifice, inside priority valve.	Clean and repair.
	Sediment blocking amplifying spool orifice, inside priority valve.	Clean and repair.
	Sediment blocking load sensing line orifice, inside priority valve.	Clean and repair.
	Priority valve spool sticking, inside steering valve.	Clean and repair.
	Incorrect relief valve pressure drop, inside priority valve.	Adjust pressure.
	Steering pump failure.	Repair or replace.
	Leaking steering cylinder.	Repair cylinder.
	Rust on steering column bearing and spline.	Lubricate.
	Tire air pressure is low.	Inflate to proper pressure.
High initial resistance to movement of steering wheel.	Air in load sensing line, inside priority valve.	Bleed system to remove air.
	Sediment blocking orifice of load sensing line, inside priority valve.	Clean and repair.
	Sediment in direction change spool, inside priority valve.	Clean and repair.
	Damage to control spring damping inside priority valve.	Replace priority valve.
Steering wheel shakes.	Chattering bearing in axle end differential.	Replace bearing.
	Tire pressure not equal in left side and right side tires.	Equalize pressure.

TRAVEL SYSTEM

GENERAL

Problem	Possible Causes	Remedies
Machine will not travel.	Transmission clutch pressure incorrect.	Adjust pressure.
	Transmission charge pump damaged.	Replace pump.
	Damage to transmission control valve wiring harness.	Repair wiring.
	Burned travel relay or fuse.	Replace relay or fuse.
	Forward/Reverse solenoid for transmission control valve sticking.	Clean and repair.
	Damaged transmission clutch.	Repair or replace clutch.
	Damaged drive shaft.	Repair or replace.
	Damaged transmission or axle.	Repair or replace.
	Wheel brakes not releasing.	Repair brakes.
	Parking brake not releasing.	Repair parking brake.
Machine will travel but has little power.	Fluid pressure low in transmission clutch.	Repair clutch.
	Transmission fluid low.	Add fluid.
	Damage to torque converter.	Repair or replace.
	Engine malfunction.	See Engine Troubleshooting Table.
	Brake valve.	Disassemble and clean.
Unusual transmission noise.	Low transmission fluid, or low quality fluid.	Add fluid or change fluid.
	Worn transmission parts.	Replace parts.
	Broken gears or bearings.	Replace parts.
Transmission fails to operate.	Damaged transmission clutch disks.	Replace disks.
	Damaged wires in transmission control wire harness.	Repair wires.

Problem	Possible Causes	Remedies
Drive shaft vibration Noisy universal joints.	Bent drive shaft.	Replace drive shaft.
	Loose universal joints.	Tighten bolts that secure joints.
	Worn or damaged universal joint.	Replace universal joint.
	Loose universal joints.	Tighten bolts that secure universal joints.
	Lack of lubrication.	Lubricate universal joints.
	Worn slip joint spline.	Replace slip joint.
Noisy Front or Rear Axle.	Worn or broken gears.	Replace gears.
	Low oil level, poor quality oil.	Add oil, change oil.
	Worn bearings.	Replace bearings.
	Worn shaft spline.	Replace spline.

TRANSMISSION ERROR CODES

The first number of the error code is the category that it is grouped into. They are as follows for the first number.

- 1 Digital Input Signals
- 2 Analog Input Signals
- 3 Speed Signals
- 4 Speed Signals
- 7 Analog Current Output Signals
- 8 Analog Current Output Signals
- 9 Digital Output Signals
- A Digital Output Signals
- B Clutch Errors
- D Power Supply
- E High Speed Signals
- F General Errors

Error Code Number	Meaning Of Error Code	Remarks
11	Logical error at gear range signal.	
12	Logical error at direction select signal.	
21	Short circuit to battery voltage at clutch cutoff input.	
22	Short circuit to ground or open circuit at clutch cutoff input.	
23	Short circuit to battery voltage at load sensor input.	Not used.
24	Short circuit to ground or open circuit at load sensor input.	Not used.
25	Short circuit to battery voltage or open circuit at temperature sensor input.	
26	Short circuit to ground at temperature sensor input.	
31	Short circuit to battery voltage at engine speed input.	
32	Short circuit to ground or open circuit at engine speed input.	
33	Logical error at engine speed input.	
34	Short circuit to battery voltage at turbine speed input.	
35	Short circuit to ground or open circuit at turbine speed input.	
36	Logical error at turbine speed input.	
37	Short circuit to battery voltage at internal speed input.	

Error Code Number	Meaning Of Error Code	Remarks
38	Short circuit to ground or open circuit at internal speed input.	
39	Logical error at internal speed input.	
3A	Short circuit to battery voltage at output speed input.	
3B	Short circuit to ground or open circuit at output speed input.	
3C	Logical error at output speed input.	
71	Short circuit to battery voltage at clutch K1.	
72	Short circuit to ground at clutch K1.	
73	Open circuit at clutch K1.	
74	Short circuit to battery voltage at clutch K2.	
75	Short circuit to ground at clutch K2.	
76	Open circuit at clutch K2.	
77	Short circuit to battery voltage at clutch K3.	
78	Short circuit to ground at clutch K3.	
79	Open circuit at clutch K3.	
7A	Short circuit to battery voltage at converter clutch.	Not used.
7B	Short circuit to ground at converter clutch.	Not used.
7C	Open circuit at converter clutch.	Not used.
81	Short circuit to battery voltage at clutch K4.	
82	Short circuit to ground at clutch K4.	
83	Open circuit at clutch K4.	
84	Short circuit to battery voltage at clutch KV.	
85	Short circuit to ground at clutch KV.	
86	Open circuit at clutch KV.	
87	Short circuit to battery voltage at clutch KR.	
88	Short circuit to ground at clutch KR.	
89	Open circuit at clutch KR.	
91	Short circuit to battery voltage at relay reverse warning alarm.	
82	Short circuit to ground at relay reverse warning alarm.	

Error Code Number	Meaning Of Error Code	Remarks
93	Open circuit at relay reverse warning alarm.	
94	Short circuit to battery voltage at relay starter interlock.	
95	Short circuit to ground at relay starter interlock.	
96	Open circuit at relay starter interlock.	
97	Short circuit to battery voltage at park brake solenoid.	
98	Short circuit to ground at park brake solenoid.	
99	Open circuit at park brake solenoid.	
B1	Slippage at clutch K1.	
B2	Slippage at clutch K2.	
B3	Slippage at clutch K3.	
B4	Slippage at clutch K4.	
B5	Slippage at clutch KV.	
B6	Slippage at clutch KR.	
D1	Short circuit to battery voltage at power supply for sensors.	
D2	Short circuit to ground at power supply for sensors.	
D3	Low power at battery.	
D4	High power at battery.	
D5	Error at switch 1 for valve power supply.	
D6	Error at switch 2 for valve power supply.	
E1	Short circuit to battery at speedometer output.	Not used.
E2	Short circuit to ground or open circuit at speedometer output.	Not used.
E3	Short circuit to battery voltage at display output.	Not used.
E4	Short circuit to ground or open circuit at display output.	Not used.
E5	Error at communication on CAN.	
F1	General EEPROM fault.	
F2	Configuration lost.	
F3	Application error.	

SPECIFICATIONS

GENERAL SPECIFICATIONS

MEGA 250-V		
Item	Specification	
	S/N 3001 thru 4000	S/N 4001 and Up
Standard Bucket Capacity	2.4 m ³ (3.1 yd ³)	
Vehicle Weight	14,000 kg (30,865 lb)	14,200 kg (31,306 lb)
Engine		
Model	Daewoo 1146T	DB58TIS
Type	Turbo	Turbo and Charge Air Intercooler
Horsepower (SAE J 1349, net) (SAE J 1995, gross)	160 ps (158 hp) @ 2,200 rpm - Net 172 ps (170 hp) @ 2,200 rpm - Gross	Rated 155 ps (153 hp) @ 2,200 rpm - Net Max. 162 ps (160 hp) @ 2,000 rpm - Net Rated 165 ps (163 hp) @ 2,200 rpm - Gross Max. 172 ps (170 hp) @ 2,000 rpm - Gross
Max. Torque (SAE J 1349, net) (SAE J 1995, gross)	69 kg•m (500 ft lb) @ 1,300 rpm - Net 72 kg•m (521 ft lb) @ 1,300 rpm- Gross	71.5 kg•m (517 ft lb) @ 1,300 rpm- Net 75 kg•m (542 ft lb) @ 1,300 rpm- Gross
Transmission		
Type	Full Automatic Power Shift	
Speeds	4 Forward, 3 Reverse	
Brake Systems		
Service Brakes	Full Hydraulic, Separate Dual Line Wet Disks	
Parking Brake	Spring Applied / Oil Release on Transmission, Dry Disk	
Performance		
Travel Speed	7.5 - 37 km/h (4.7 - 23 MPH)	
Steering Angle	±40°	
Bucket Rise Time	5.0 Sec.	

Bucket Lower Time	3.3 Sec.
Bucket Dump Time	1.2 Sec.
Max. Breakout Force	13,200 kg (29,100 lb)
Static Tipping Load (Straight / Full Turn)	12,000 / 9,800 kg (26,455 / 21,605 lb)
Maximum Gradeability	30° (58%)

WORKING RANGE AND DIMENSIONS

Figure 1, illustrates exterior machine dimensions and working range of machine when it is equipped with a standard bucket.

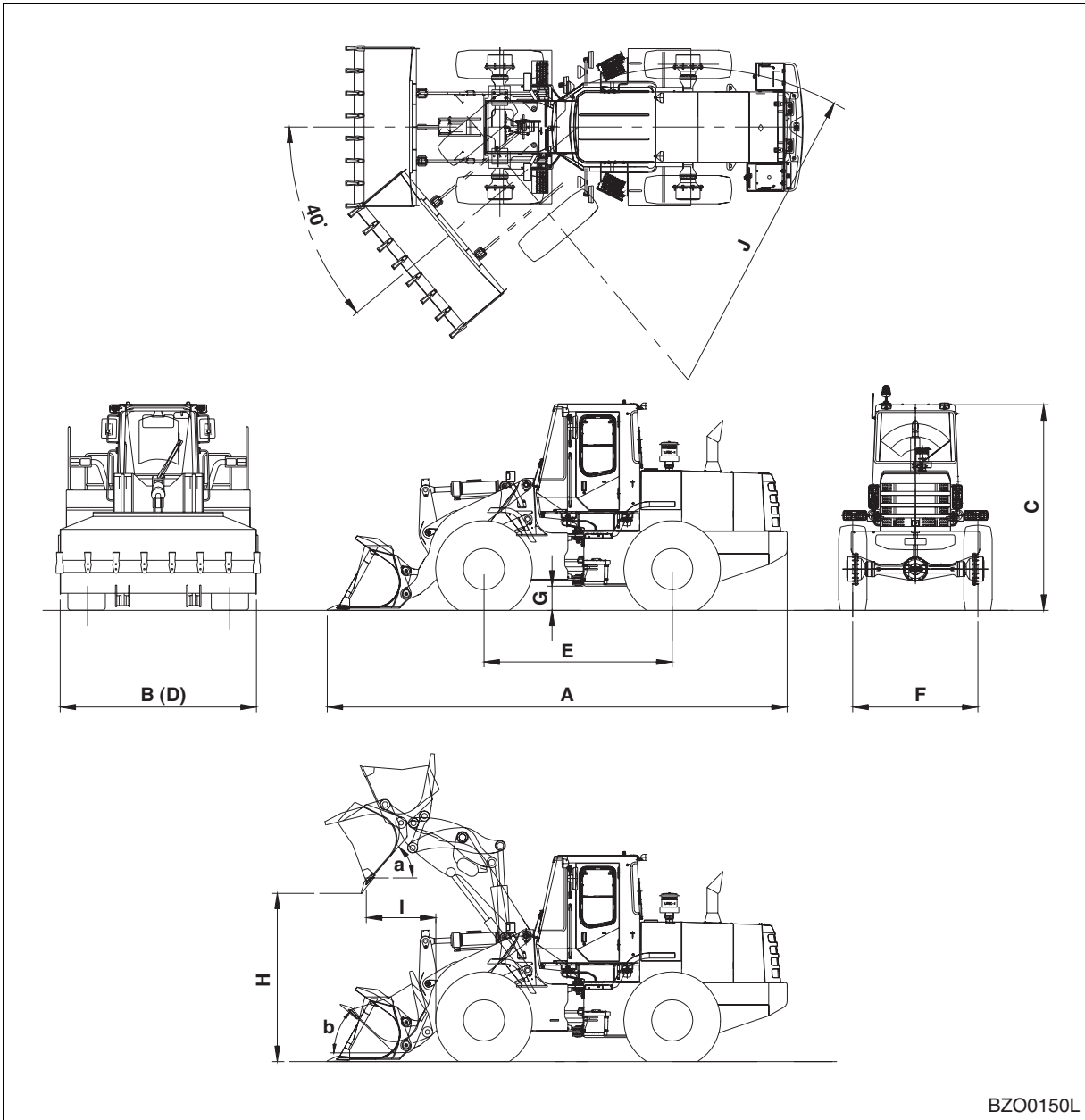


Figure 1

Category	Dimension
Overall Length (A)	7,500 mm (24' - 7")
Overall Width (B)	2,740 mm (8' - 12")
Overall Height (C)	3,320 mm (10' - 11")
Bucket Width (D)	2,740 mm (8' - 12")
Wheel Base (E)	3,020 mm (9' - 11")
Tread (F)	2,040 mm (6' - 8")
Ground Clearance (G)	430 mm (1' - 5")
Dump Height, to tooth (H)	2,760 mm (9' - 1")
Dump Distance, to Bucket Edge (I)	1,060 mm (3' - 6")
Minimum Tire Turning Radius (J)	5,166 mm (16' - 11")
Bucket Angle, Raised (a)	46°
Bucket Angle (b), Lowered (at carry)	45°
Bucket Angle (b), Lowered (on ground)	38°
Tire Size	20.5-25-16 PR 20.5R25 (Option)

WORKING CAPACITIES

BUCKET CAPACITY

Standard toothed bucket has a capacity of 2.4 m³ (3.1 yd³).

TIPPING LOAD

Static Tipping Load with bucket in Over Front position is 12,000 kg (26,455 lb). With bucket in Fully Turned position, Static Tipping Load is 9,800 kg (21,605 lb).

MATERIAL WEIGHT

The data below describes weight of a cubic meter (cubic yard) of many types of workload materials.

APPROXIMATE WEIGHT OF WORKLOAD MATERIALS

MATERIAL	LOW WEIGHT OR DENSITY 1,100 KG/M ³ (1,850 LB/YD ³), OR LESS	MEDIUM WEIGHT OR DENSITY 1,600 KG/M ³ (2,700 LB/YD ³), OR LESS	HIGH WEIGHT OR DENSITY 2,000 KG/M ³ (3,370 LB/YD ³), OR LESS
Charcoal	401 kg/m ³ (695 lb/yd ³)	-----	-----
Coke, blast furnace size	433 kg/m ³ (729 lb/yd ³)	-----	-----
Coke, foundry size	449 kg/m ³ (756 lb/yd ³)	-----	-----
Coal, bituminous slack, piled	801 kg/m ³ (1,350 lb/yd ³)	-----	-----
Coal, bituminous r. of m., piled	881 kg/m ³ (1,485 lb/yd ³)	-----	-----
Coal, anthracite	897 kg/m ³ (1,512 lb/yd ³)	-----	-----
Clay, DRY, in broken lumps	1,009 kg/m ³ (1,701 lb/yd ³)	-----	-----
Clay, DAMP, natural bed	-----	1,746 kg/m ³ (2,943 lb/yd ³)	-----
Cement, Portland, DRY granular	-----	1,506 kg/m ³ (2,583 lb/yd ³)	-----

MATERIAL	LOW WEIGHT OR DENSITY 1,100 KG/M³ (1,850 LB/YD³), OR LESS	MEDIUM WEIGHT OR DENSITY 1,600 KG/M³ (2,700 LB/YD³), OR LESS	HIGH WEIGHT OR DENSITY 2,000 KG/M³ (3,370 LB/YD³), OR LESS
Cement, Portland, DRY clinkers	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Dolomite, crushed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Earth, loamy, DRY, loose	-----	1,202 kg/m ³ (2,025 lb/yd ³)	-----
Earth, DRY, packed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Earth, WET, muddy	-----	-----	1,762 kg/m ³ (2,970 lb/yd ³)
Gypsum, calcined, (heated, powder)	961 kg/m ³ (1,620 lb/yd ³)	-----	-----
Gypsum, crushed to 3 inch size	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Gravel, DRY, packed fragments	-----	-----	1,810 kg/m ³ (3,051 lb/yd ³)
Gravel, WET, packed fragments	-----	-----	1,922 kg/m ³ (3,240 lb/yd ³)
Limestone, graded above 2	-----	1,282 kg/m ³ (2,160 lb/yd ³)	-----
Limestone, graded 1-1/ 2 or 2	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Limestone, crushed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Limestone, fine	-----	-----	1,602 kg/m ³ (2,705 lb/yd ³)
Phosphate, rock	-----	1,282 kg/m ³ (2,160 lb/yd ³)	-----
Salt	929 kg/m ³ (1,566 lb/yd ³)	-----	-----

MATERIAL	LOW WEIGHT OR DENSITY 1,100 KG/M³ (1,850 LB/YD³), OR LESS	MEDIUM WEIGHT OR DENSITY 1,600 KG/M³ (2,700 LB/YD³), OR LESS	HIGH WEIGHT OR DENSITY 2,000 KG/M³ (3,370 LB/YD³), OR LESS
Snow, light density	529 kg/m ³ (891 lb/yd ³)	-----	-----
Sand, DRY, loose	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Sand, WET, packed	-----	-----	1,922 kg/m ³ (3,240 lb/yd ³)
Shale, broken	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Sulphur, broken	529 kg/m ³ (1,620 lb/yd ³)	-----	-----

IMPORTANT

Weights are approximations of estimated average volume and mass. Exposure to rain, snow or ground water; settling or compaction due to overhead weight and chemical or industrial processing or changes due to thermal or chemical transformations could all increase value of weights listed in table.

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