

Mega 200-V Mega 200-VTC

Operation and Maintenance Manual

022-00028AE

S/N 1001 and Up (Tier I & II)

February 2003

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 1-10
4. "Work Site Precautions" on page 1-10
5. "Operation" on page 1-12
6. "Equipment" on page 1-17
7. "Maintenance" on page 1-22
8. "Shipping and Transportation" on page 1-24



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.

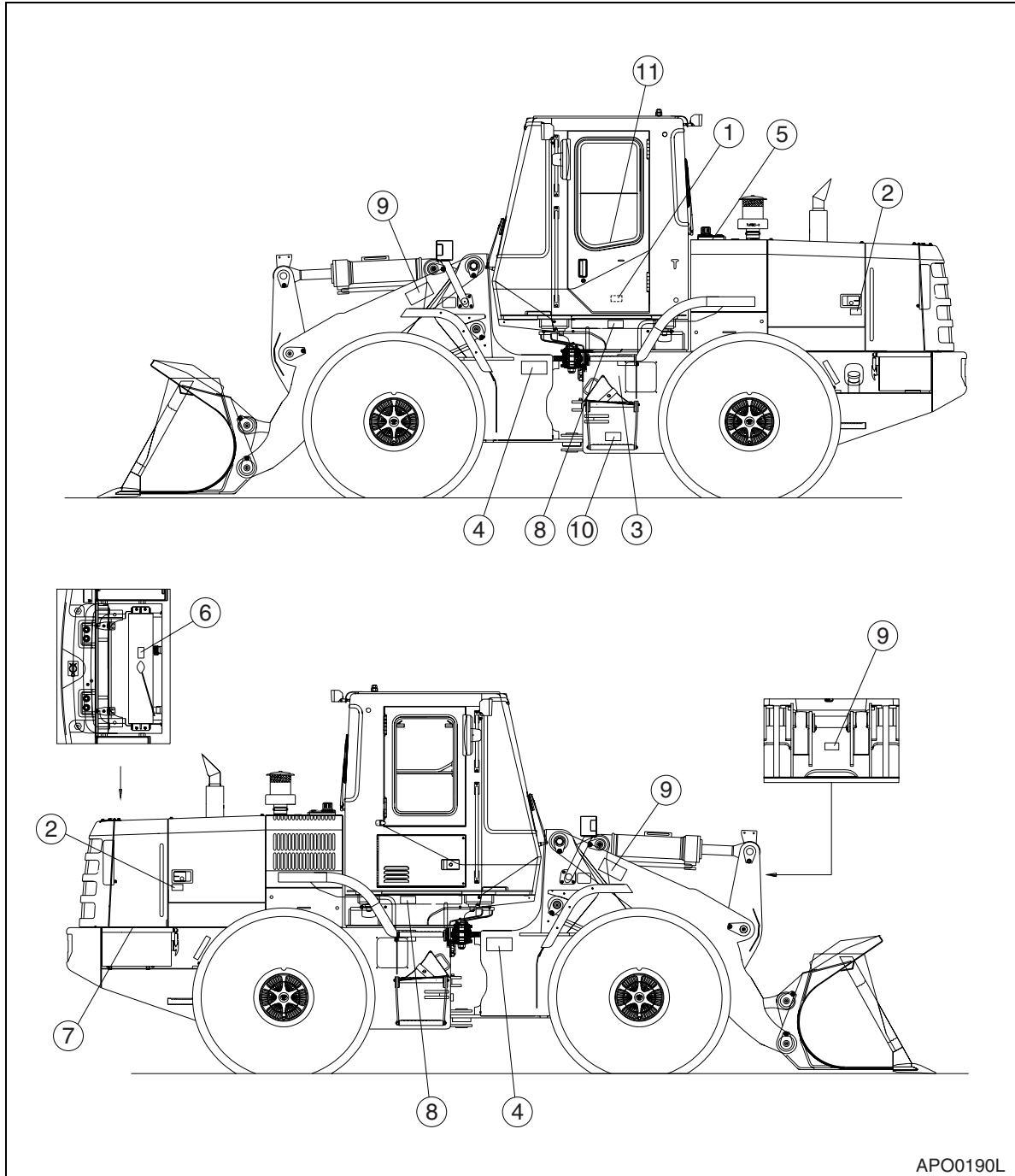


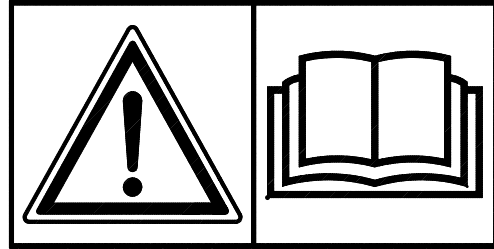
Figure 1

1. WARNING FOR OPERATION, INSPECTION AND MAINTENANCE (4190-2545, 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.



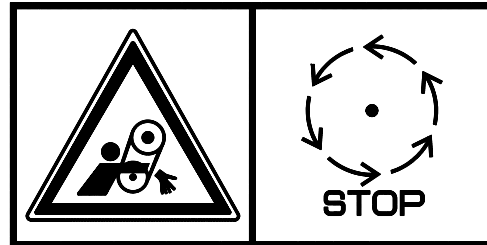
ACO1360L

2. WARNINGS WHEN OPENING ENGINE HOOD (2190-2525, 190-00095)



WARNING!

Before opening bonnet, shut down engine.



ACO1420L

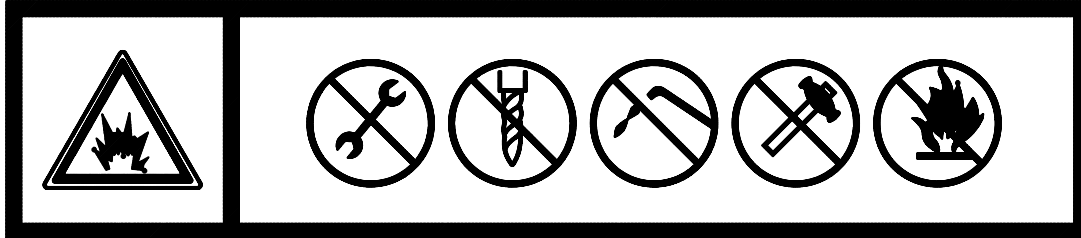
3. WARNING FOR HANDLING ACCUMULATOR (2190-2528, 190-00099)



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!

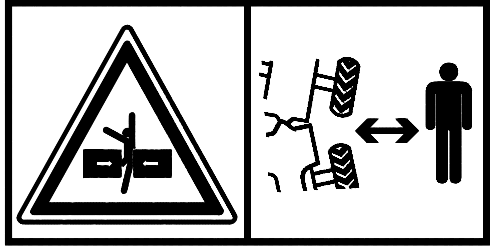
Any raised attachment will lower to ground if accumulator holds a charge.

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.

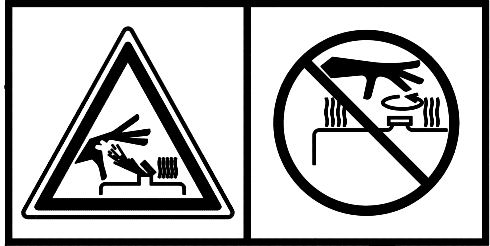
IMPORTANT

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 (4190-1992, 190-00120)

 DANGER!	
Keep out of steering turn area.	 AMO0410L

5. WARNING FOR HIGH TEMPERATURE HYDRAULIC OIL (2190-2529, 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

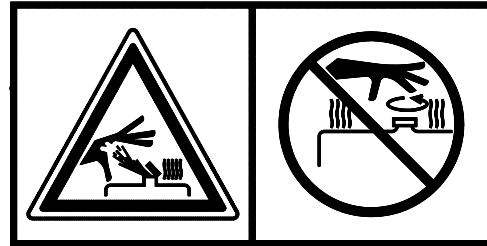
6. WARNING FOR HIGH TEMPERATURE COOLANT (2190-2531, 190-00097)



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 (2190-2533, 190-00100)



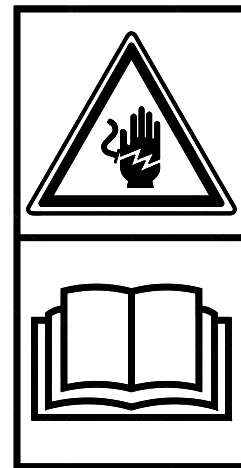
DANGER!

- 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.



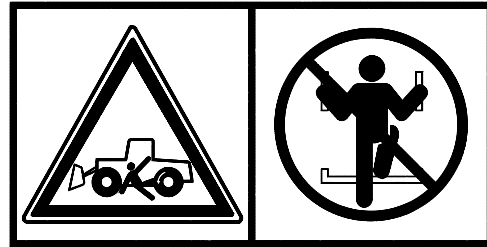
ACO1400L

8. WARNING FOR RIDING ON MACHINE (4190-1989, 190-00107)



WARNING!

For your safety, do not stand on ladder when machine is in motion.



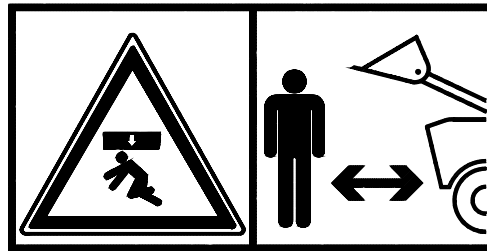
AM00420L

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



DANGER!

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



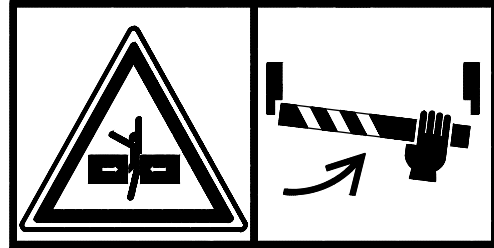
AM00430L

10. WARNING TO USE SAFETY LOCK (4190-1993, 190-00121)



WARNING!

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



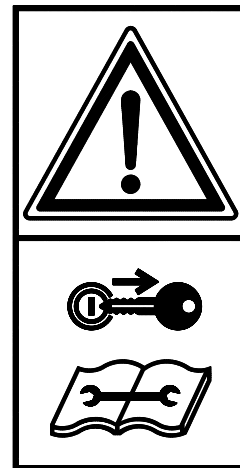
AMO0440L

11. WARNING TAG (2190-2549, 190-00098)



WARNING!

Do not touch when performing inspection or maintenance.



ACO1450L

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")

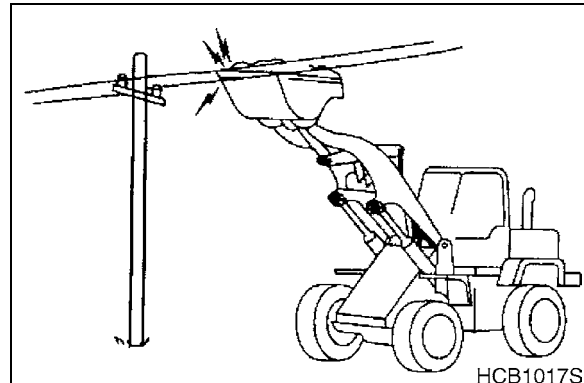


Figure 2

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.

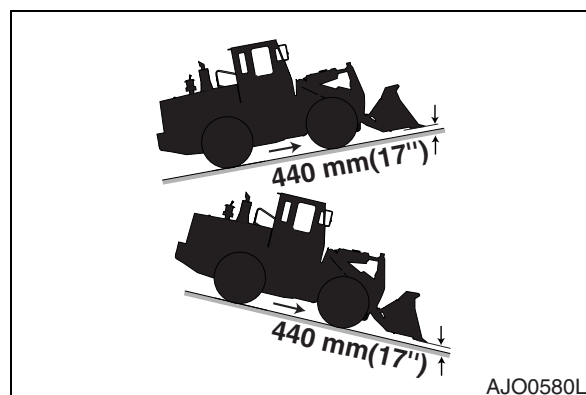


Figure 3

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.

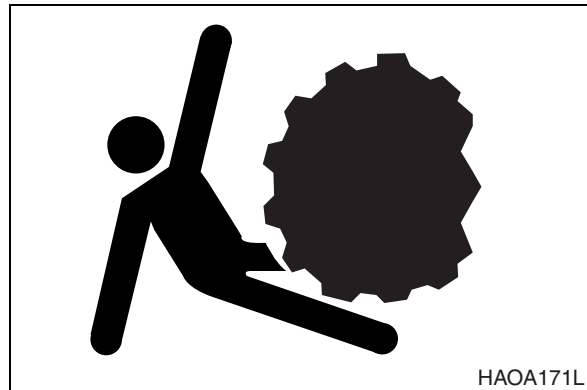


Figure 4

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 5

BEFORE STARTING ENGINE, DO A "PRE-START" 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 6

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.

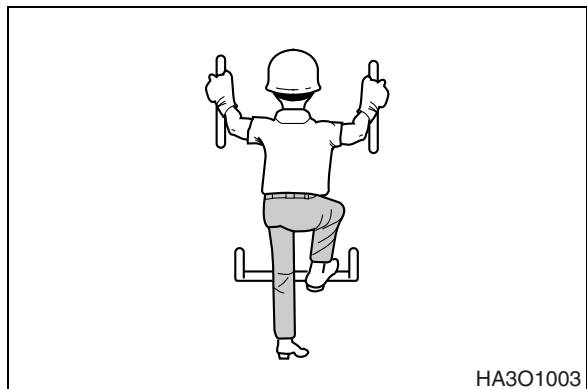


Figure 7

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.

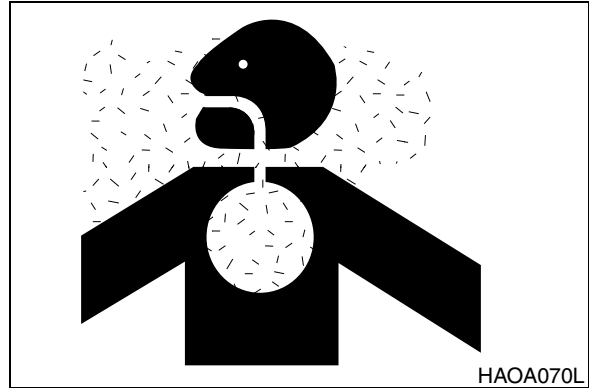


Figure 8

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.

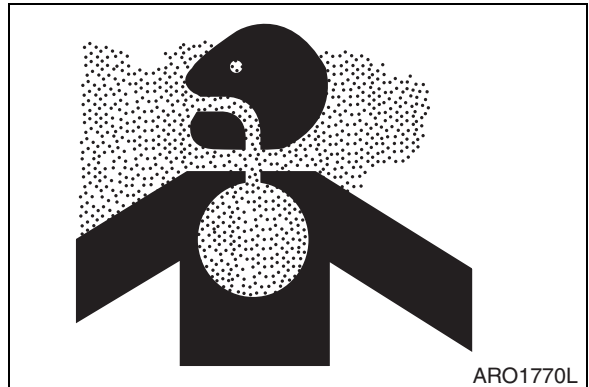


Figure 9

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.

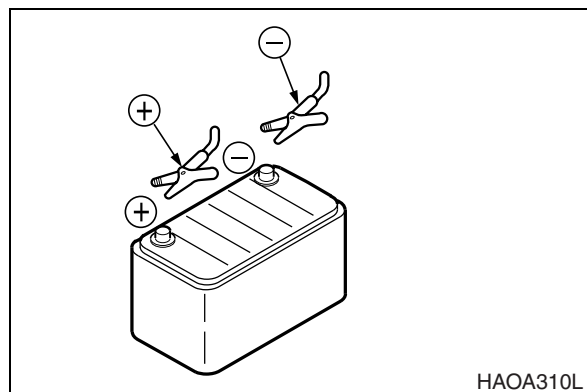


Figure 11

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.

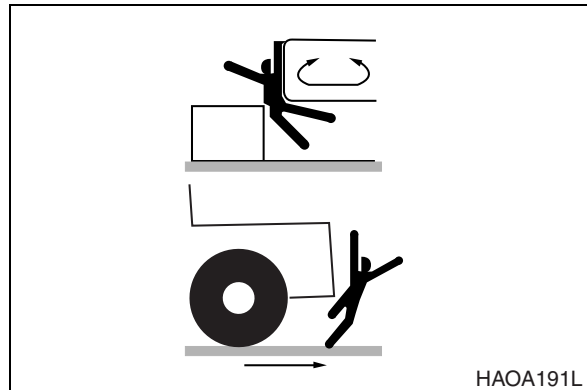


Figure 12

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.

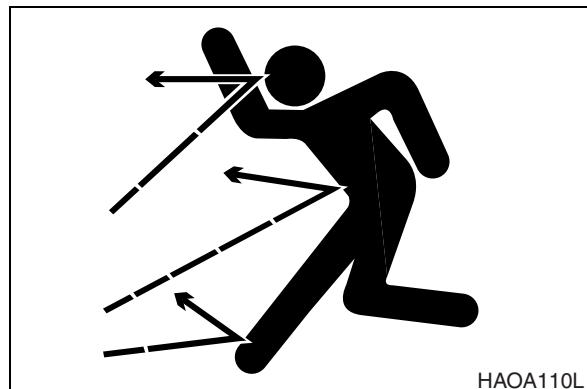


Figure 13



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

WINDOW GLASS BREAKING TOOL

This loader is equipped with a glass breaking tool. It is in the lower right side of the cab just rear of the door. This tool can be used in case of an emergency situation which requires the breaking of glass to exit from the operator's cabin. Grip the handle firmly and use the sharp point to break the glass.

	WARNING!
Protect your eyes when breaking the glass.	

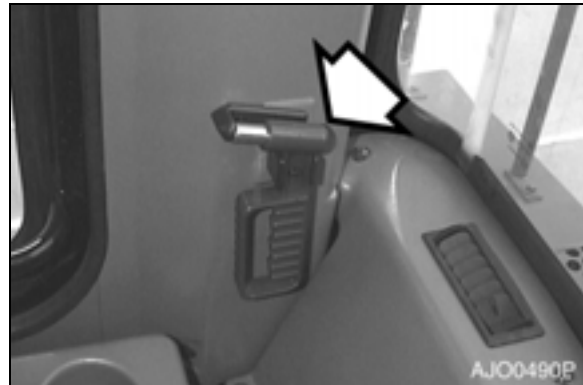


Figure 16

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.

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.

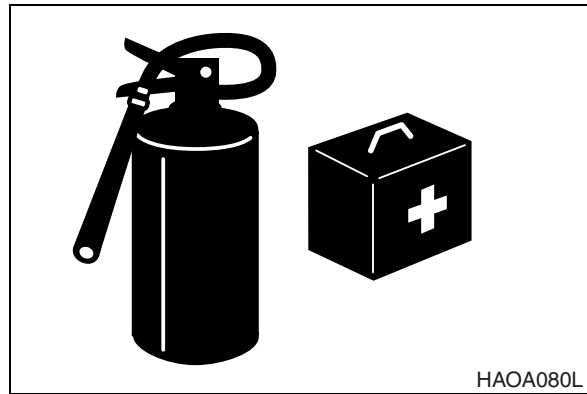


Figure 17

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 filler 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 18

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.

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.

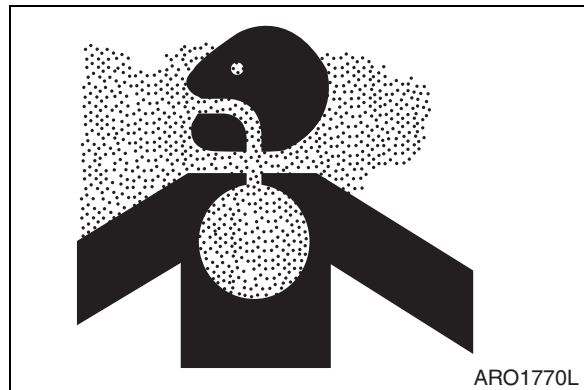


Figure 19

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 20

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 21.



Figure 21

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 PRIOR TO 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 filler cap for venting built-up air pressure. Release levers before trying to take off filler caps and LOOSEN CAPS SLOWLY, before removal.

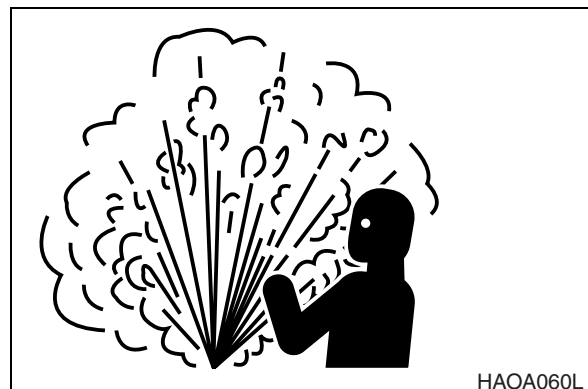


Figure 22

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 4-48, for additional European regulations.

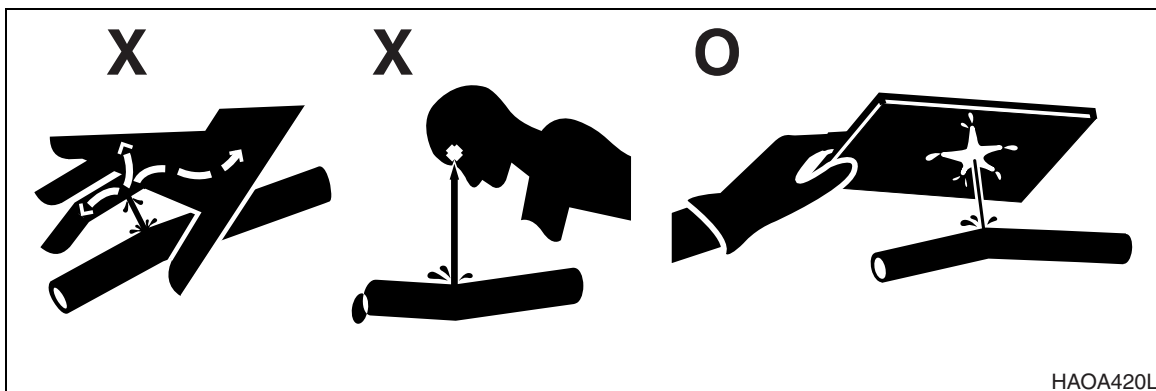


Figure 23

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.

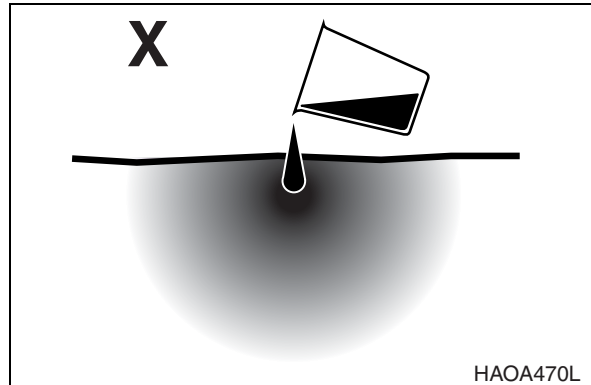


Figure 24

CHECK TIRE PRESSURE AND CONDITION

Maintain tire pressure but do not over inflate. 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 2-8
3. "Steering Console and Pedals" on page 2-9
4. "Transmission Display" on page 2-16
5. "Front Instrument Panel" on page 2-18
6. "Right Side Switch Panel" on page 2-27
7. "Various Cabin Locations" on page 2-38
8. "Heater and Air Conditioner Operation" on page 2-42
9. "Stereo" on page 2-47
10. "Seat Adjustment" on page 2-51
11. "Seat Belt" on page 2-53
12. "Door Side Latch" on page 2-54
13. "Fuse Box/Relay" on page 2-55
14. "Window Glass Breaking Tool" on page 2-58

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 turn "ON," immediately discontinue operation and shut down unit. Investigate and correct problem before proceeding with operation.

COMPONENT LOCATIONS

MEGA 200-V (Tier I)

The following figure identifies the location of major machine components.

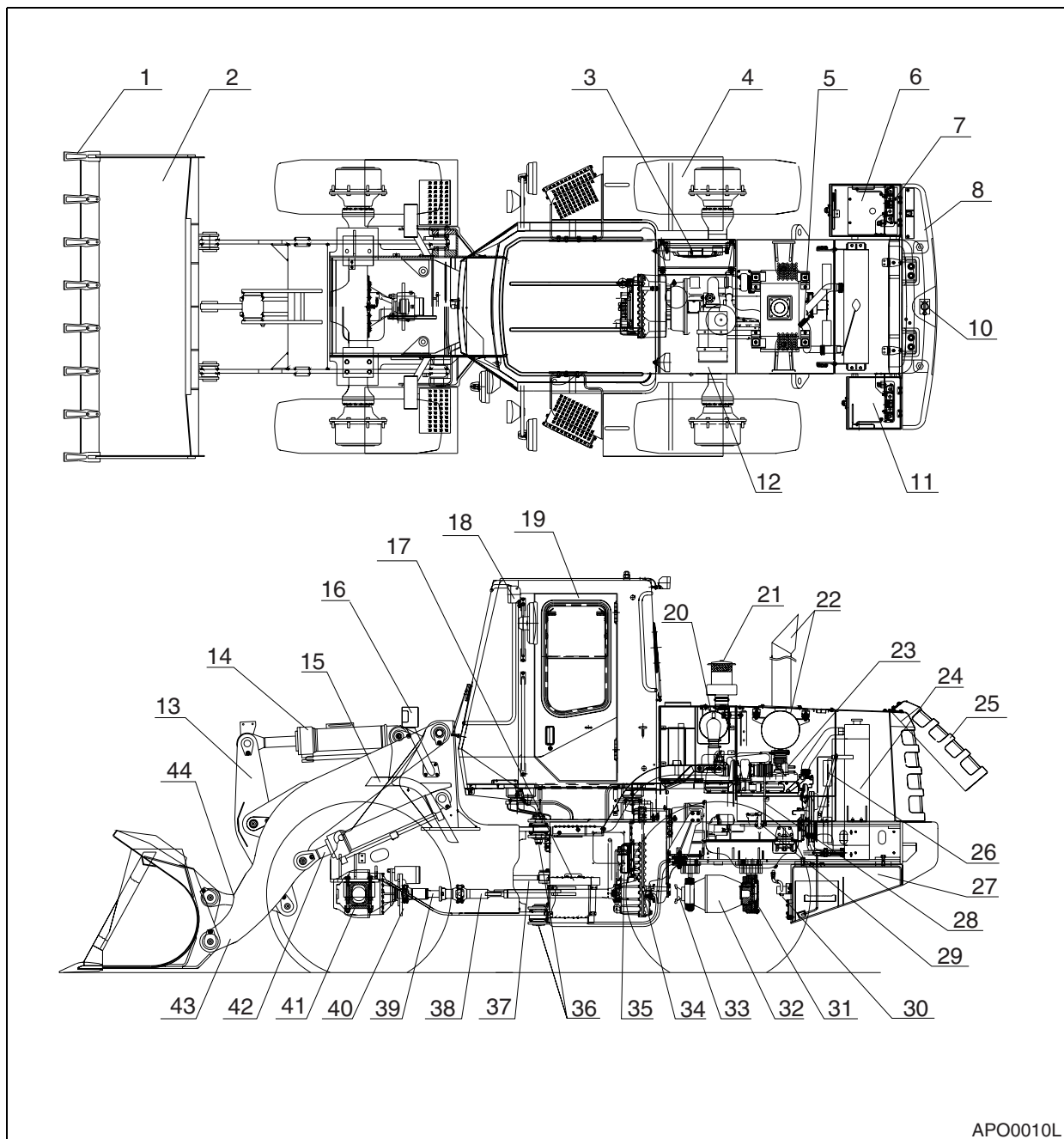


Figure 1

- | | |
|------------------------------|----------------------------------|
| 1. BUCKET TOOTH | 24. RADIATOR |
| 2. BUCKET | 25. GRILL |
| 3. AIR CONDITIONER CONDENSER | 26. FAN |
| 4. REAR WHEEL COVER | 27. FUEL TANK |
| 5. ENGINE OIL FILTER | 28. ENGINE OIL FILLER PIPE |
| 6. BATTERY BOX | 29. ENGINE OIL LEVEL GAUGE |
| 7. REAR LAMP | 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. CENTER PIN |
| 15. FRONT WHEEL COVER | 37. STEERING WHEEL CYLINDER |
| 16. HEADLIGHT SUPPORT | 38. DRIVE SHAFT (CENTER) |
| 17. LADDER | 39. DRIVE SHAFT (FRONT) |
| 18. WORKING LAMP | 40. PARKING BRAKE |
| 19. OPERATOR'S CAB | 41. FRONT AXLE |
| 20. AIR CLEANER | 42. BOOM CYLINDER |
| 21. PRE-CLEANER | 43. LOADER ARM |
| 22. MUFFLER | 44. LINK |
| 23. ENGINE | |

MEGA 200-V (Tier II)
(Tier I - European low noise kit)

The following figure identifies the location of major machine components.

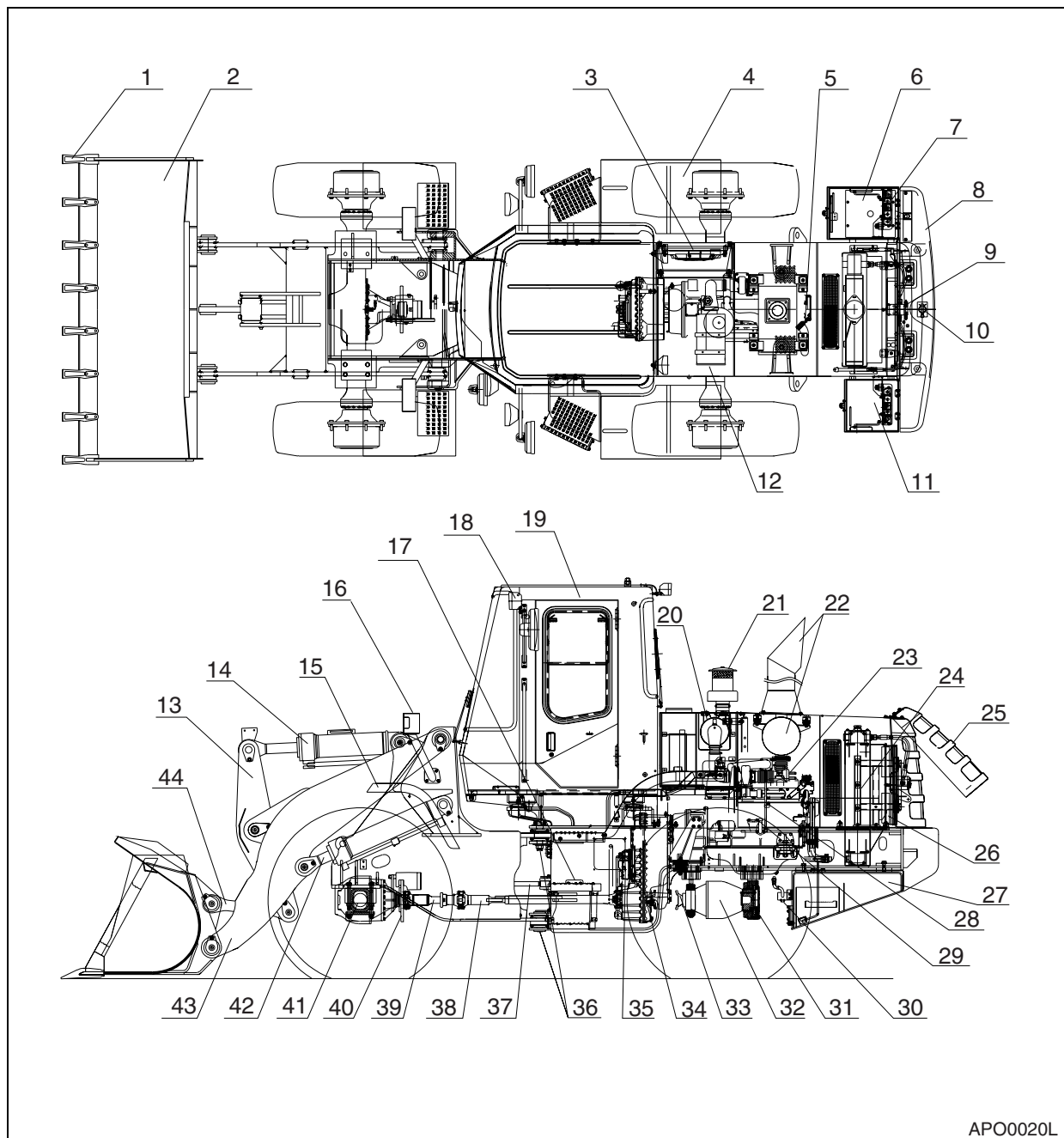


Figure 2

APO0020L

- | | |
|------------------------------|----------------------------------|
| 1. BUCKET TOOTH | 23. ENGINE |
| 2. BUCKET | 24. RADIATOR |
| 3. AIR CONDITIONER CONDENSER | 25. GRILL |
| 4. REAR WHEEL COVER | 26. FAN |
| 5. ENGINE OIL FILTER | 27. FUEL TANK |
| 6. BATTERY BOX | 28. ENGINE OIL FILLER PIPE |
| 7. REAR LAMP | 29. ENGINE OIL LEVEL GAUGE |
| 8. COUNTERWEIGHT | 30. REMOTE ENGINE OIL DRAIN PORT |
| 9. FAN MOTOR | 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. CENTER PIN |
| 15. FRONT WHEEL COVER | 37. STEERING WHEEL CYLINDER |
| 16. HEADLIGHT SUPPORT | 38. DRIVE SHAFT (CENTER) |
| 17. LADDER | 39. DRIVE SHAFT (FRONT) |
| 18. WORKING LAMP | 40. PARKING BRAKE |
| 19. OPERATOR'S CAB | 41. FRONT AXLE |
| 20. AIR CLEANER | 42. BOOM CYLINDER |
| 21. PRE-CLEANER | 43. LOADER ARM |
| 22. MUFFLER | 44. LINK |

MEGA 200-VTC

Figure 3 identifies the location of major machine components.

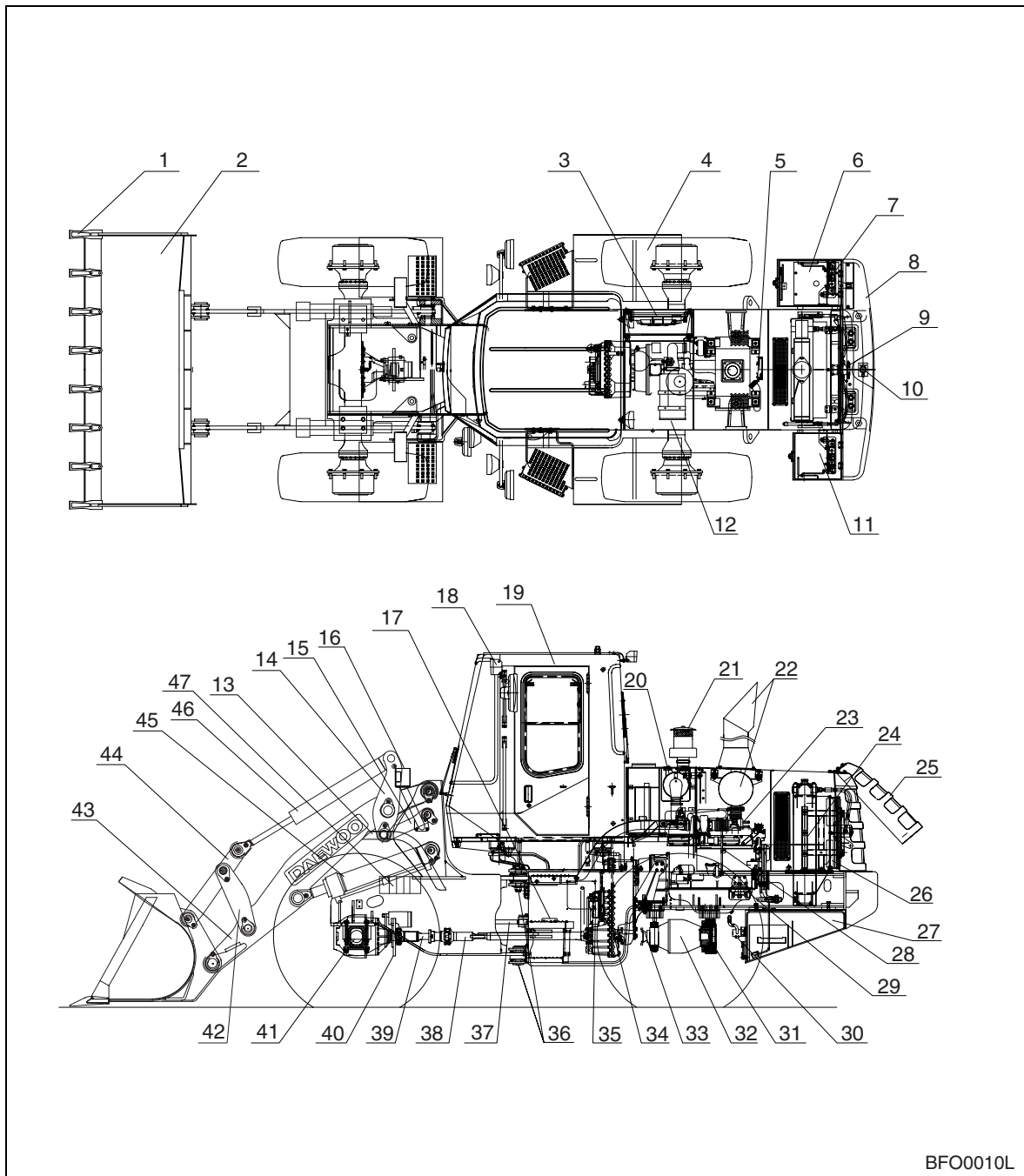


Figure 3

- | | |
|------------------------------|----------------------------------|
| 1. BUCKET TOOTH | 25. GRILL |
| 2. BUCKET | 26. FAN |
| 3. AIR CONDITIONER CONDENSER | 27. FUEL TANK |
| 4. REAR WHEEL COVER | 28. ENGINE OIL FILLER PIPE |
| 5. ENGINE OIL FILTER | 29. ENGINE OIL LEVEL GAUGE |
| 6. BATTERY BOX | 30. REMOTE ENGINE OIL DRAIN PORT |
| 7. REAR LAMP | 31. REAR AXLE PIVOT |
| 8. COUNTERWEIGHT | 32. REAR AXLE |
| 9. FAN MOTOR | 33. DRIVE SHAFT (REAR) |
| 10. TOWING PIN | 34. TRANSMISSION |
| 11. TOOL BOX / FUEL PUMP | 35. TRANSMISSION OIL FILTER |
| 12. OIL TANK | 36. CENTER PIN |
| 13. FRONT WHEEL COVER | 37. STEERING WHEEL CYLINDER |
| 14. LEVER | 38. DRIVE SHAFT (CENTER) |
| 15. LINK | 39. DRIVE SHAFT (FRONT) |
| 16. HEADLIGHT SUPPORT | 40. PARKING BRAKE |
| 17. LADDER | 41. FRONT AXLE |
| 18. WORKING LAMP | 42. LINK |
| 19. OPERATOR'S CAB | 43. LOADER ARM |
| 20. AIR CLEANER | 44. LEVER |
| 21. PRE-CLEANER | 45. LIFT CYLINDER |
| 22. MUFFLER | 46. TILT CYLINDER |
| 23. ENGINE | 47. CONTROL VALVE |
| 24. RADIATOR | |

CONTROL IDENTIFICATION

Figure 4, identifies controls in operator's cab.

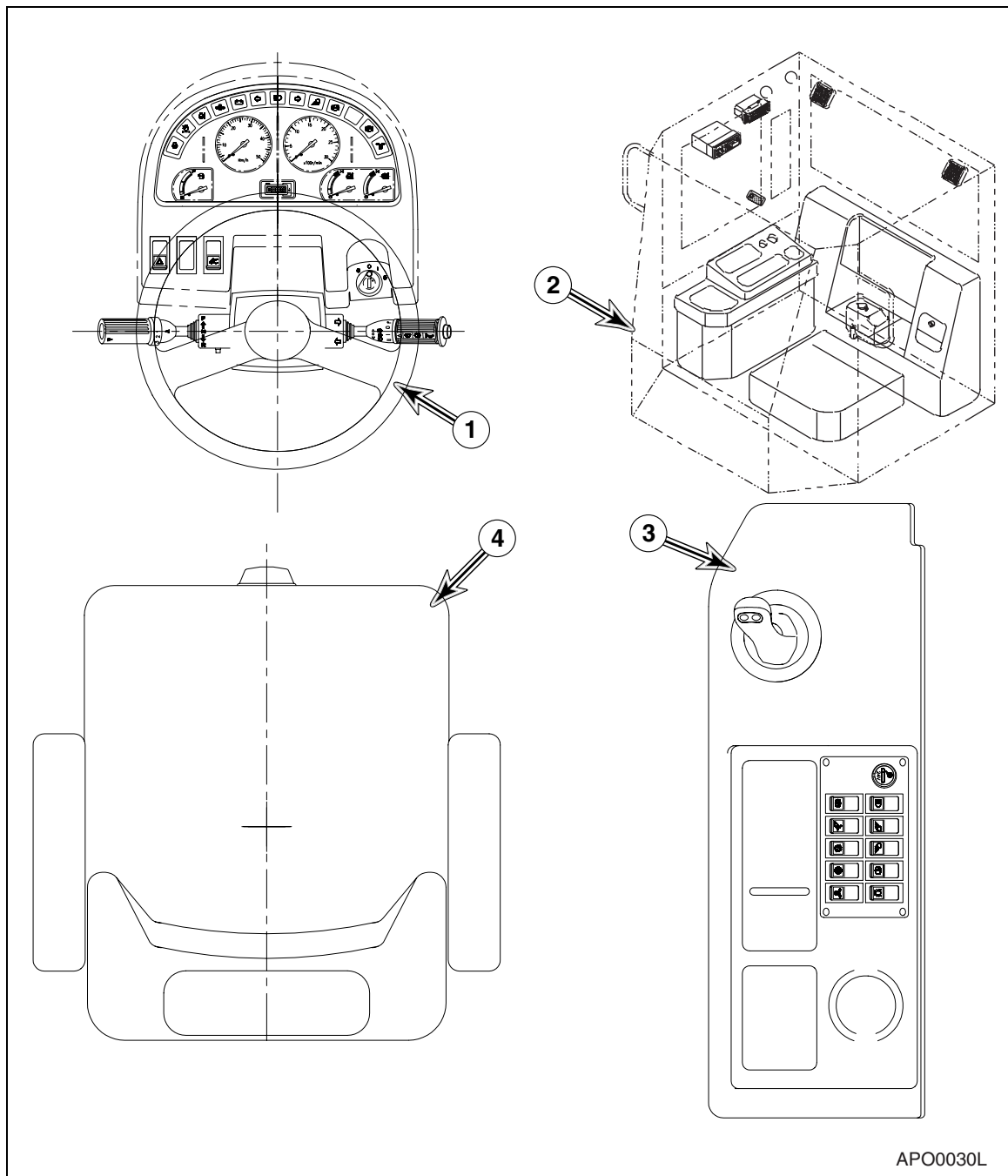


Figure 4

- | | |
|---|--|
| 1. STEERING CONSOLE AND PEDALS (See page 2-9) | 3. RIGHT SIDE SWITCH PANEL (See page 2-41) |
| 2. VARIOUS CABIN LOCATIONS (See page 2-38) | 4. SEAT ADJUSTMENT (See page 2-51) |

STEERING CONSOLE AND PEDALS

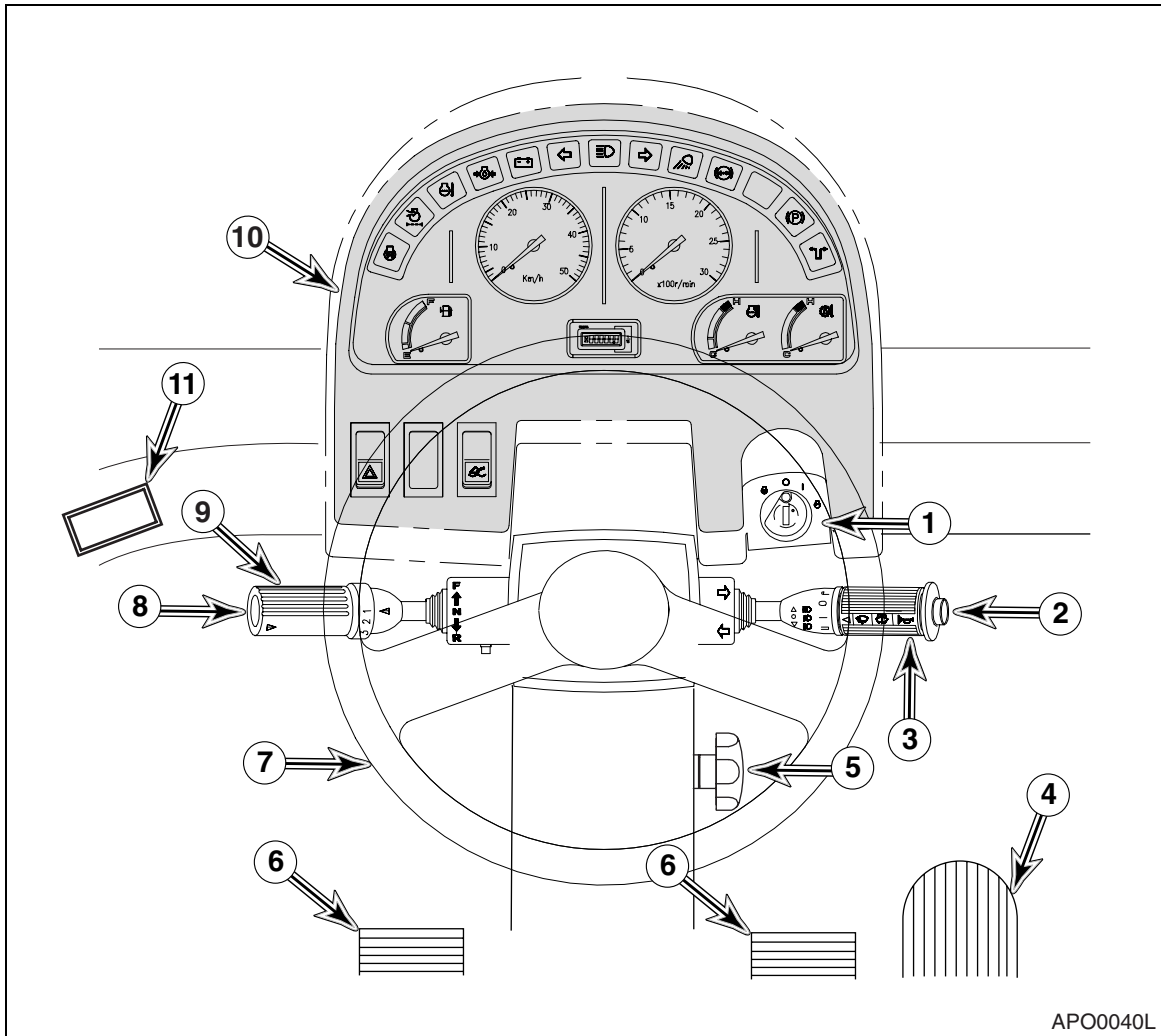


Figure 5

- | | |
|-----------------------------|--|
| 1. STARTER SWITCH | 8. KICK-DOWN SWITCH |
| 2. HORN BUTTON | 9. TRANSMISSION LEVER |
| 3. COMBINATION SWITCH LEVER | 10. FRONT INSTRUMENT PANEL (See page 2-18) |
| 4. ACCELERATOR PEDAL | 11. TRANSMISSION DISPLAY (See page 2-16) |
| 5. STEERING TILT KNOB | |
| 6. BRAKE PEDALS | |
| 7. STEERING WHEEL | |

1. STARTER SWITCH

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

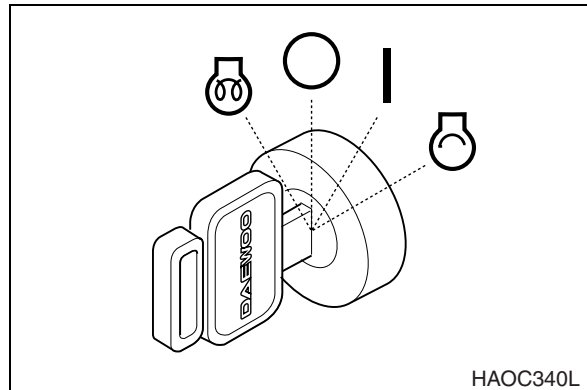


Figure 6

- 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.

- Preheat position. Used to aid engine starting in cold weather. When key is in this position, engine preheater is operating. When preheat cycle 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 7) or the left button at the tip of the pilot control valve lever (joystick) (Figure 8), the horn will sound.

NOTE: Starter switch must be "ON."

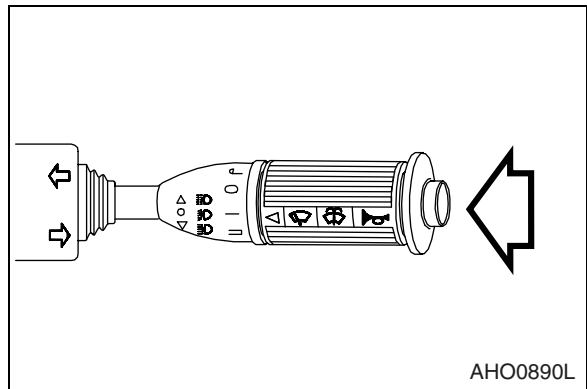


Figure 7

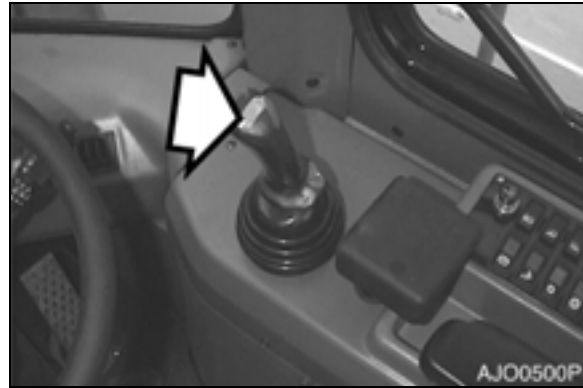


Figure 8

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.)

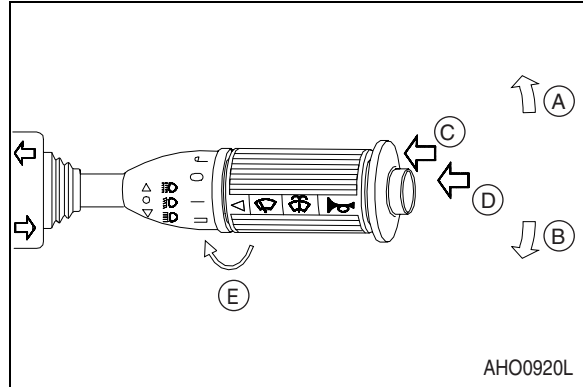


Figure 9



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 lights up 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.*

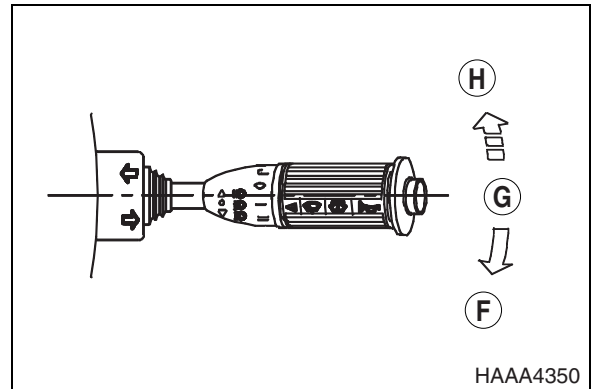


Figure 10

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 11

5. STEERING TILT KNOB

This knob is used to allow steering wheel to be moved to the most convenient position for the operator. Loosen knob (2, Figure 12), while grabbing the steering wheel (1). Once the steering wheel is in the proper place, tighten the knob.

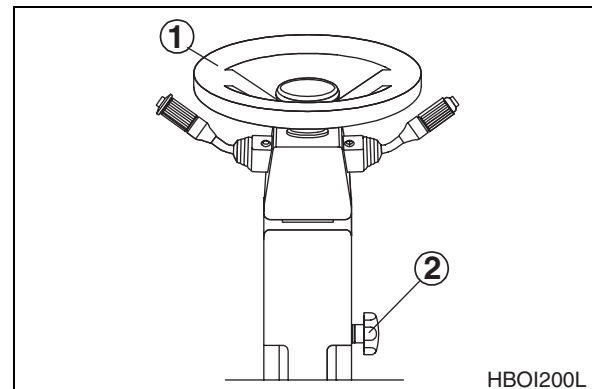


Figure 12

6. BRAKE PEDAL (RIGHT AND LEFT PEDALS)

Pressing brake pedal will apply the brakes to the loader. The brake pedal modes can be switched over from inching to no-inching or vice-versa, by using the Transmission cutoff switch (See page 2-36).



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 disc 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.

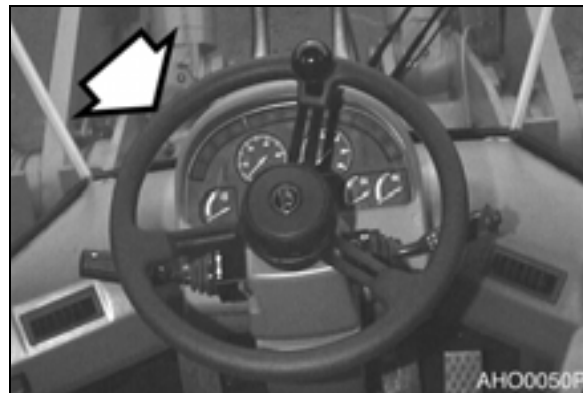


Figure 14

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).

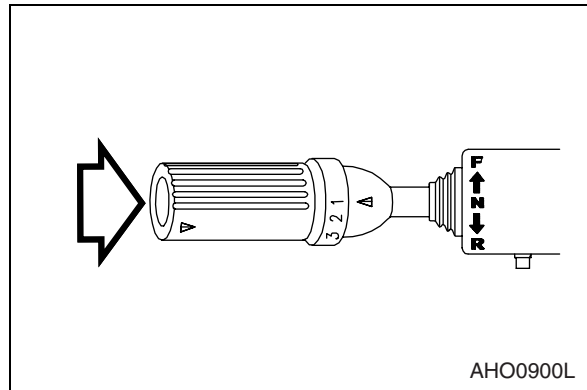


Figure 15



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 2-16)*

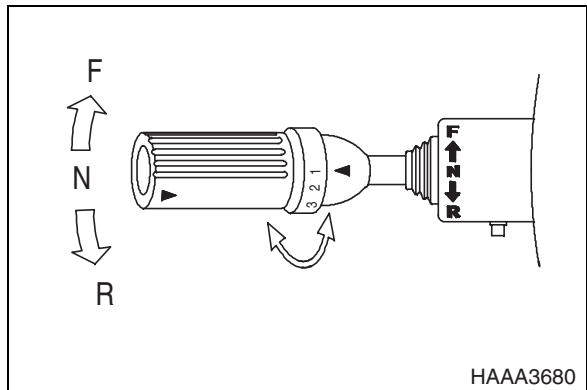


Figure 17

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."

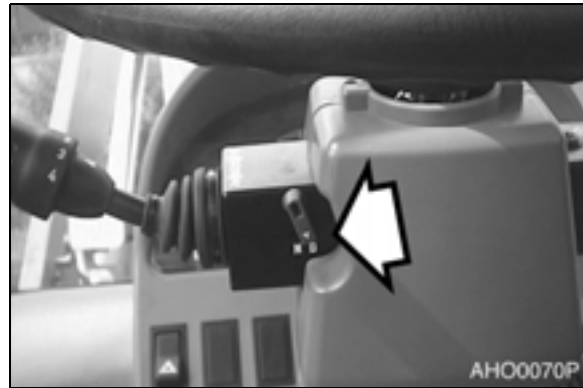


Figure 18



CAUTION!

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

10. FRONT INSTRUMENT PANEL

See "Front Instrument Panel" on page 2-18.

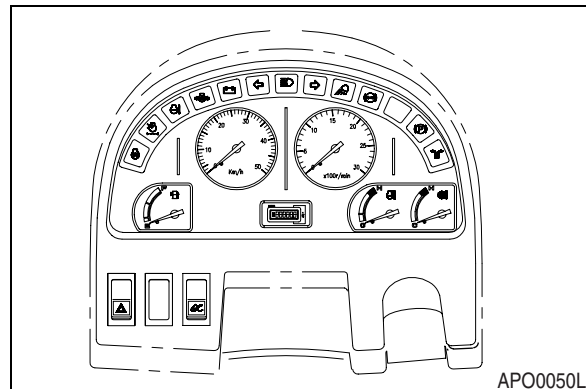


Figure 19

11. TRANSMISSION DISPLAY

See "Transmission Display" on page 2-16.

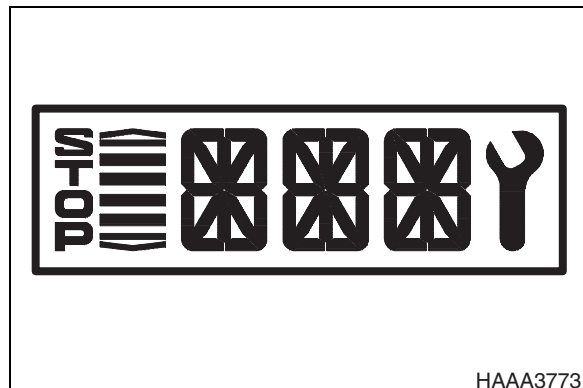


Figure 20

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.

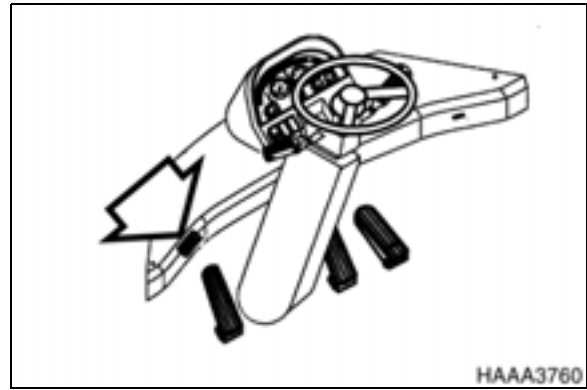


Figure 21

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 6-8.

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.

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."

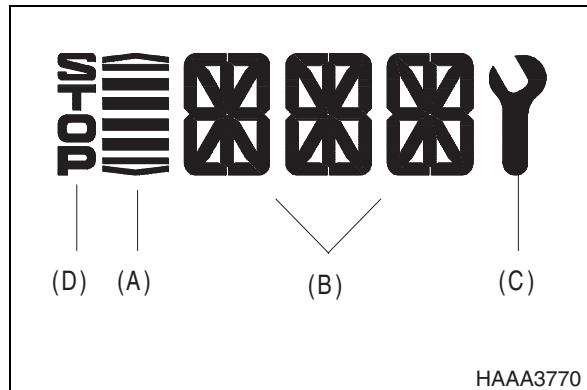


Figure 22

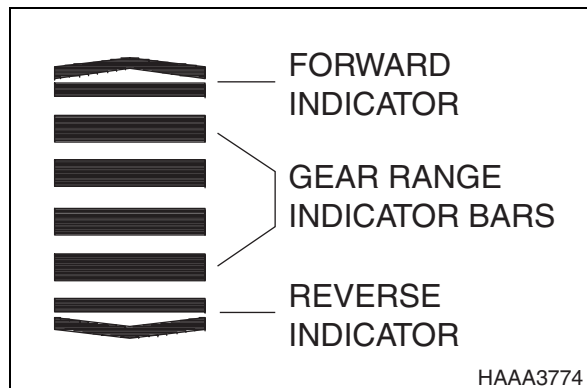


Figure 23

FRONT INSTRUMENT PANEL

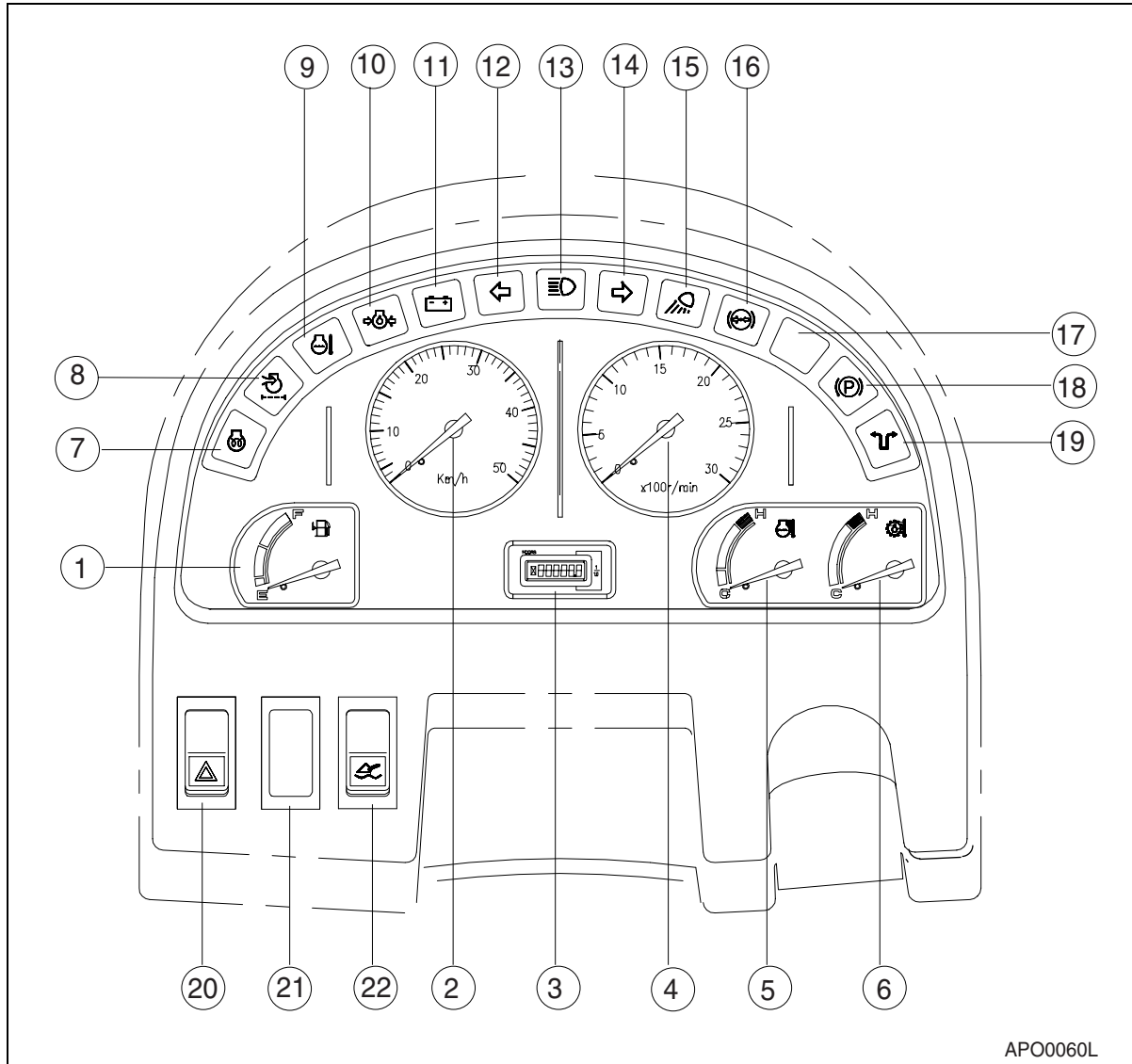


Figure 24

GAUGES

- | | |
|----------------|---------------------------------|
| 1. FUEL GAUGE | 4. TACHOMETER |
| 2. SPEEDOMETER | 5. COOLANT TEMP. GAUGE |
| 3. HOUR METER | 6. TRANSMISSION OIL TEMP. GAUGE |

WARNING AND INDICATOR LIGHTS

- | | |
|--|---|
| 7. PREHEAT CYCLE INDICATOR LIGHT | 13. HIGH BEAM INDICATOR LIGHT |
| 8. AIR FILTER INDICATOR LIGHT | 14. RIGHT TURN AND HAZARD WARNING LIGHT |
| 9. COOLANT TEMPERATURE WARNING LIGHT | 15. WORK LIGHT INDICATOR LIGHT |
| 10. ENGINE OIL PRESSURE WARNING LIGHT | 16. BRAKE FLUID WARNING LIGHT |
| 11. BATTERY WARNING LIGHT | 17. UNUSED LIGHT |
| 12. LEFT TURN AND HAZARD WARNING LIGHT | 18. PARKING BRAKE INDICATOR LIGHT |
| | 19. EMERGENCY STEERING INDICATOR LIGHT (OPTION) |

SWITCHES

- | | |
|---------------------------------|----------------------------------|
| 20. HAZARD WARNING LIGHT SWITCH | 22. BUCKET FLOAT SWITCH (OPTION) |
| 21. BLANK (EMPTY SWITCH SOCKET) | |

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 15 liters (4 U.S. gal.) of fuel remains.

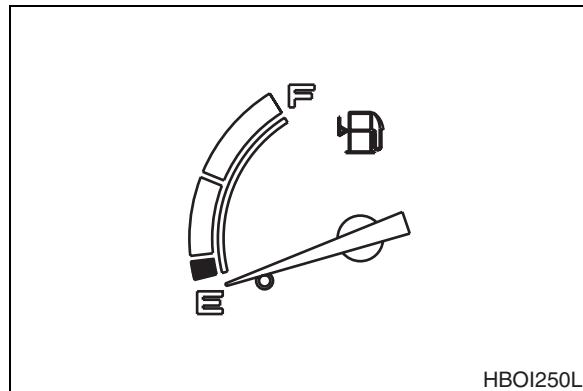


Figure 25

2. SPEEDOMETER

This meter displays speed at which vehicle is traveling.

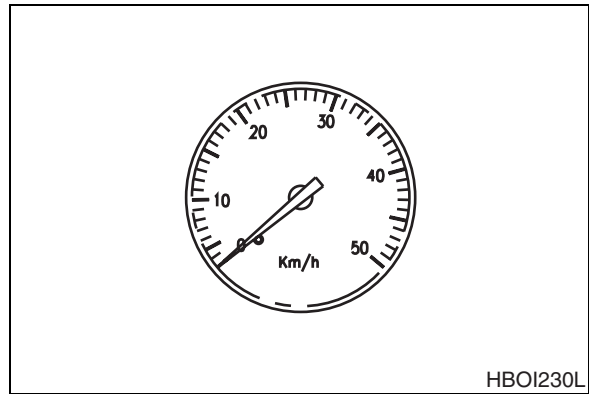


Figure 26

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.

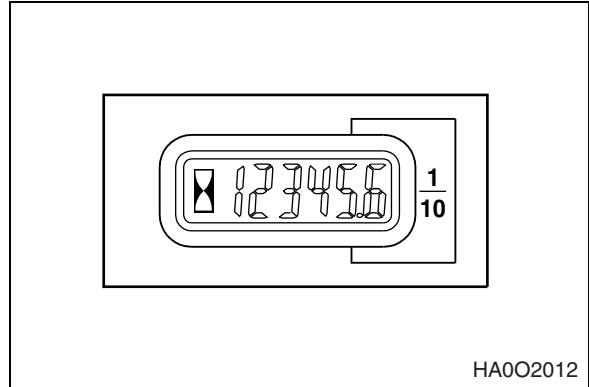


Figure 27

4. TACHOMETER

This meter displays engine speed in revolutions per minute.

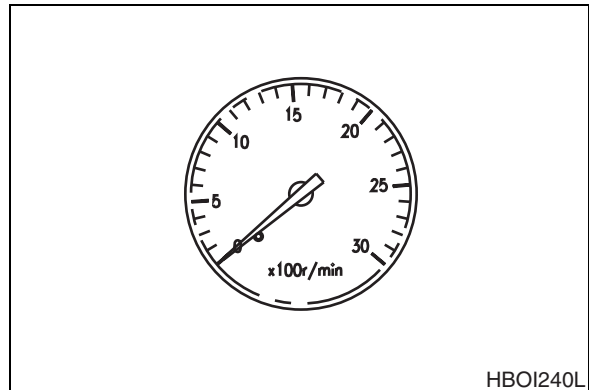


Figure 28

5. 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.	

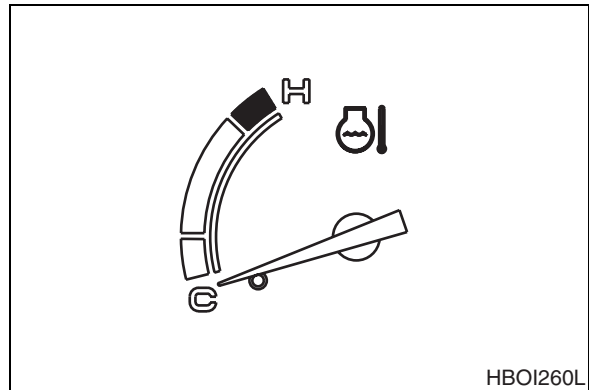


Figure 29

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.	

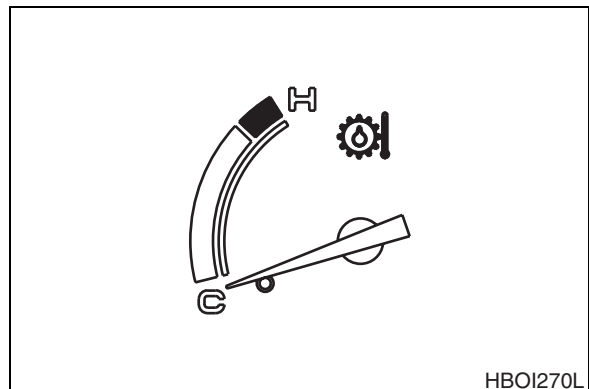


Figure 30

7. PREHEAT CYCLE 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 3.5 seconds after starter switch is turned to preheat position.

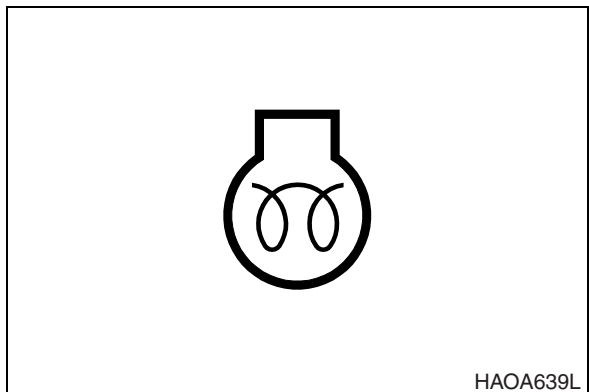


Figure 31

8. AIR FILTER INDICATOR 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 element before continuing to operate machine. To turn indicator light "OFF," turn starter switch "OFF" and then back "ON."

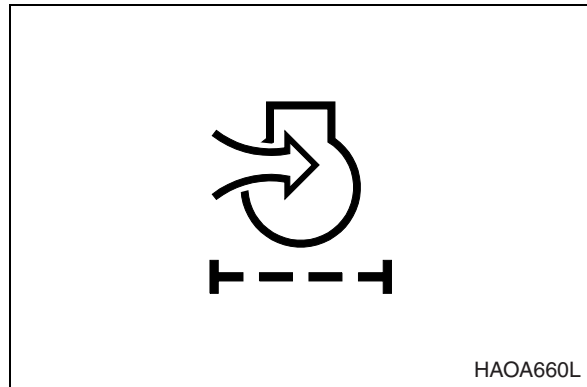


Figure 32

9. 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.

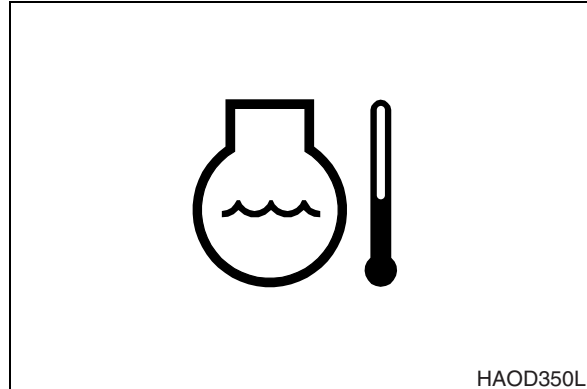


Figure 33

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.

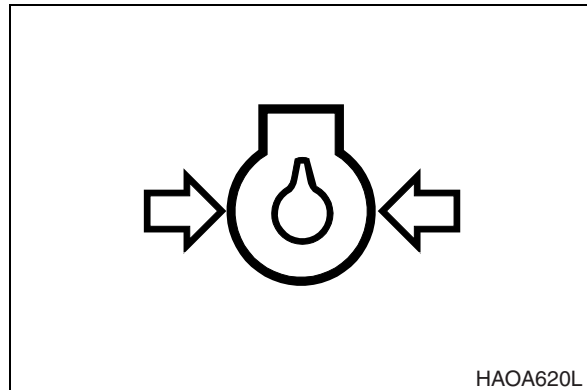


Figure 34

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.

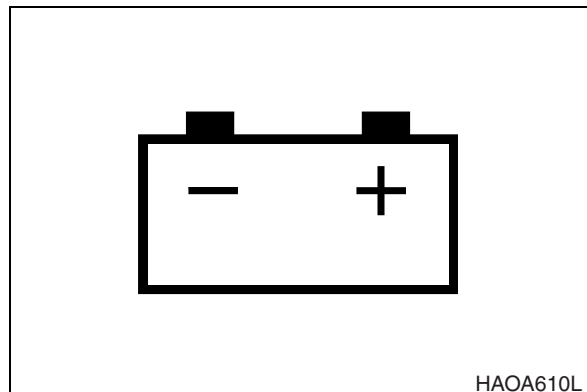


Figure 35

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.*

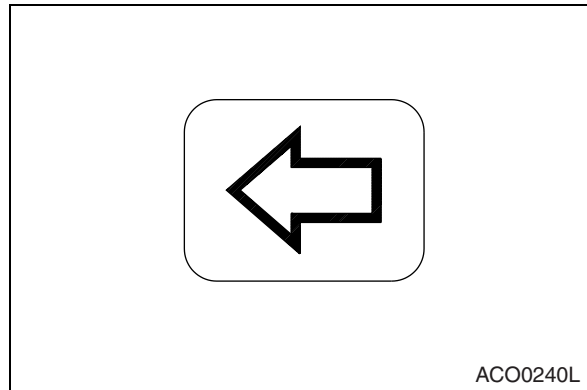


Figure 36

13. HIGH BEAM INDICATOR LIGHT

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

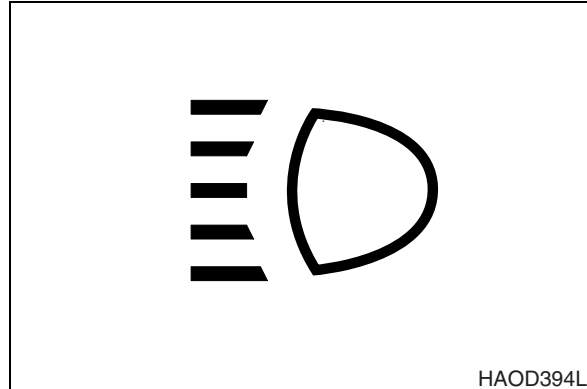


Figure 37

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.*

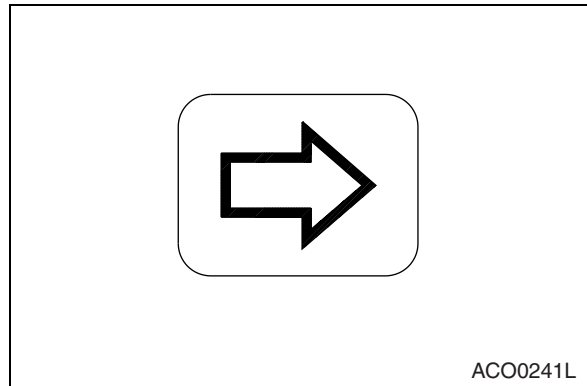


Figure 38

15. WORK LIGHT INDICATOR LIGHT

This light should turn "ON" when the front work lights are activated.

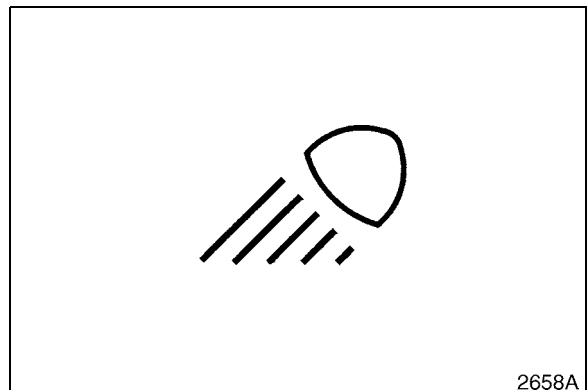


Figure 39

16. BRAKE FLUID 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.	

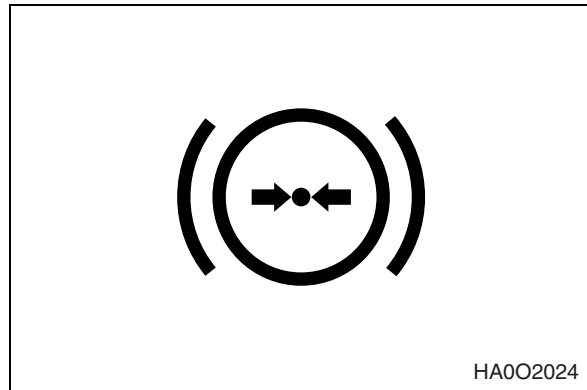


Figure 40

17. UNUSED LIGHT

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.	

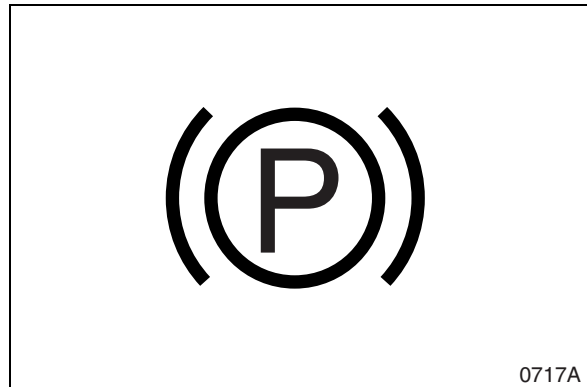
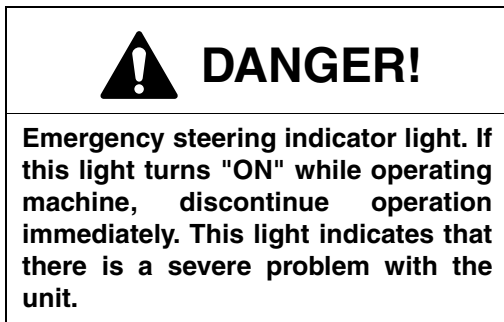


Figure 41

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.*

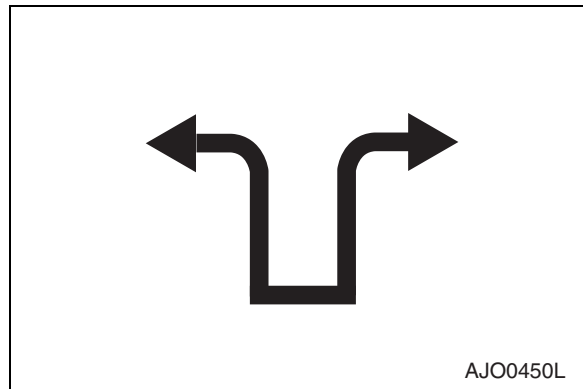


Figure 42

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.*

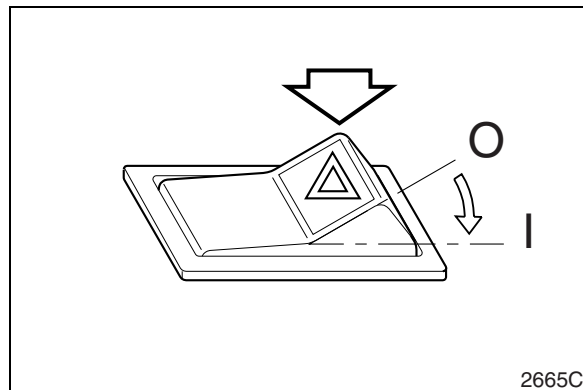


Figure 43

21. BLANK (EMPTY SWITCH SOCKET)

A blank socket is provided for addition of accessory switches.

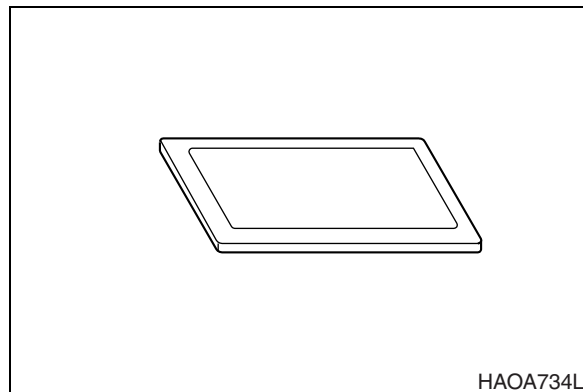


Figure 44

22. BUCKET FLOAT SWITCH (OPTION)

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

When pressing this switch and setting work lever 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.

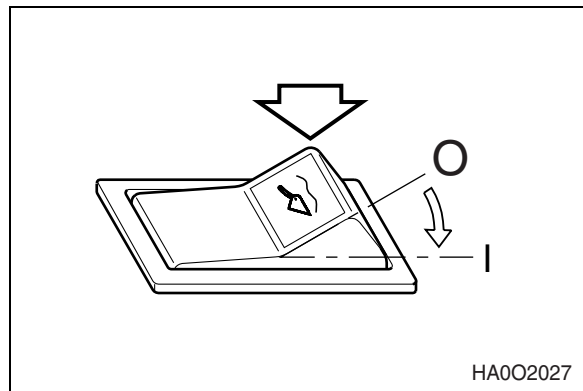


Figure 45

RIGHT SIDE SWITCH PANEL

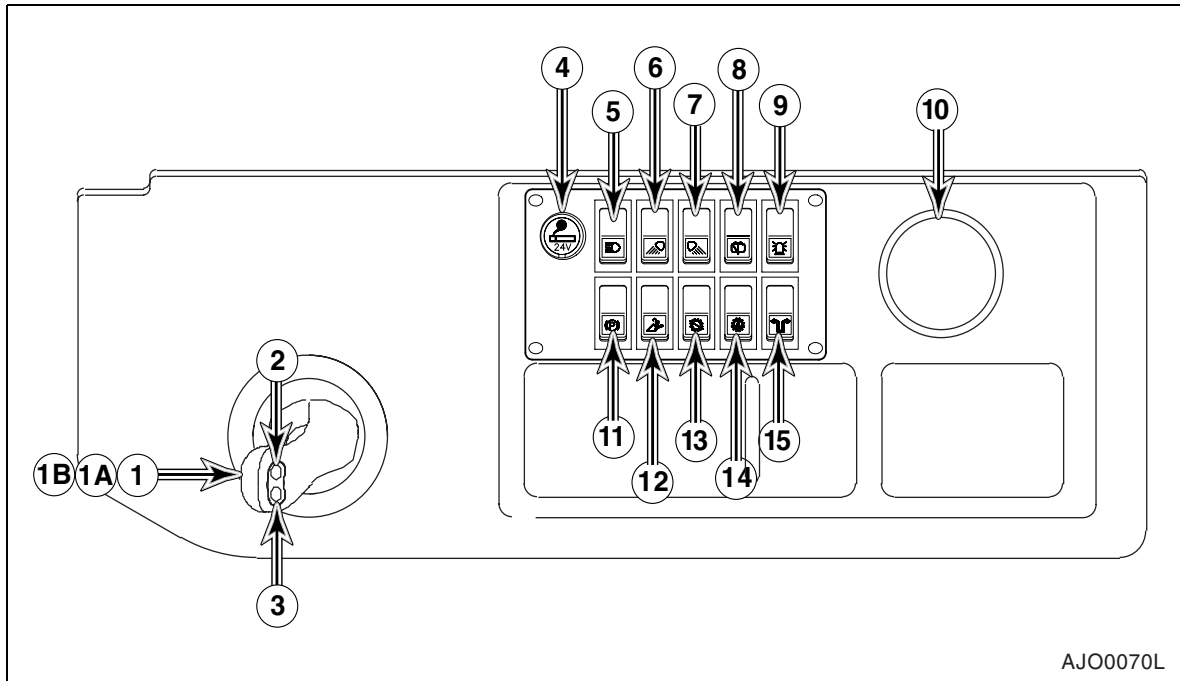


Figure 46

- | | |
|---|---|
| 1. PILOT CONTROL VALVE LEVER (JOYSTICK) | 7. REAR WORK LIGHT SWITCH |
| 1A. PILOT CONTROL VALVE LEVER (OPTION) | 8. REAR WIPER SWITCH |
| 1B. ERGO-II PILOT CONTROL VALVE LEVER (JOYSTICK) (OPTION) | 9. ROTATING BEACON SWITCH (OPTION) |
| 2. KICK-DOWN SWITCH | 10. CUP HOLDER |
| 3. HORN SWITCH | 11. PARKING BRAKE SWITCH |
| 4. CIGAR LIGHTER | 12. PILOT CUTOFF SWITCH |
| 5. HEADLIGHT SWITCH | 13. TRANSMISSION CUTOFF SWITCH |
| 6. FRONT WORK LIGHT SWITCH | 14. AUTOMATIC TRANSMISSION SWITCH |
| | 15. EMERGENCY STEERING TEST SWITCH (OPTION) |

1. PILOT CONTROL VALVE LEVER (JOYSTICK)

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.

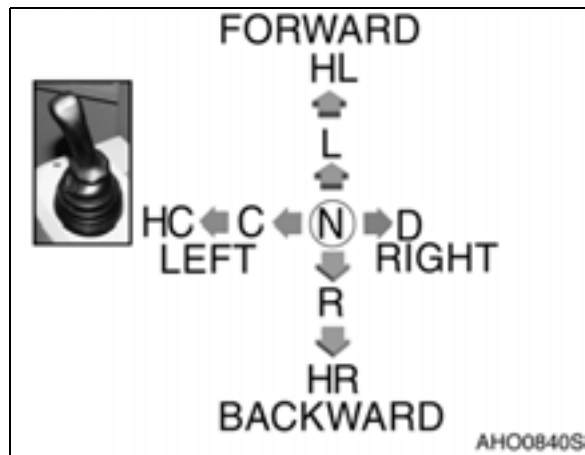


Figure 47

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

1A. PILOT CONTROL VALVE LEVER (OPTION)

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.

A. When the log forks control lever is pushed forward the log forks are allowed to open.

B. When the log forks control lever is pulled back the log forks are allowed to close.

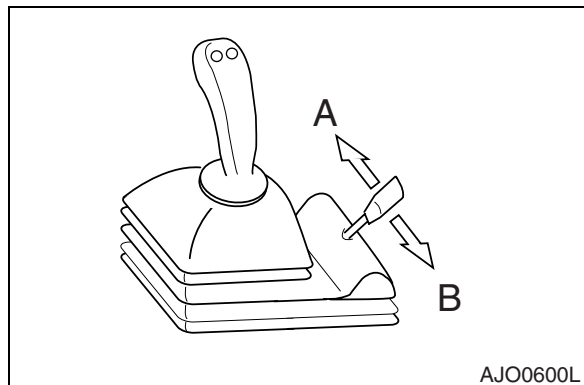


Figure 48

1B. ERGO-II PILOT CONTROL VALVE LEVER (JOYSTICK) (OPTION)

Ergo-II lever is a pilot control valve lever that incorporates transmission control functions. It is used to reduce hand and arm movement for the otherwise complex operation of machine.

A. Forward, Neutral and Reverse Switches.

"↑" Button – When pressing this switch, machine travels "FORWARD."

"N" Button – When pressing this switch, machine is in "NEUTRAL."

"↓" Button – When pressing this switch, machine travels "REVERSE."

B. Traveling Speed Changing Switches.

The transmission has 4 speeds in forward and 3 speeds in reverse.

"+" Button – When pressing this switch, machine speed increase.

"-" Button – When pressing this switch, machine speed decrease.

C. Kick-down Switch.

"KD" Button – When pressing this switch that is in the rear side, kick-down function is selected.

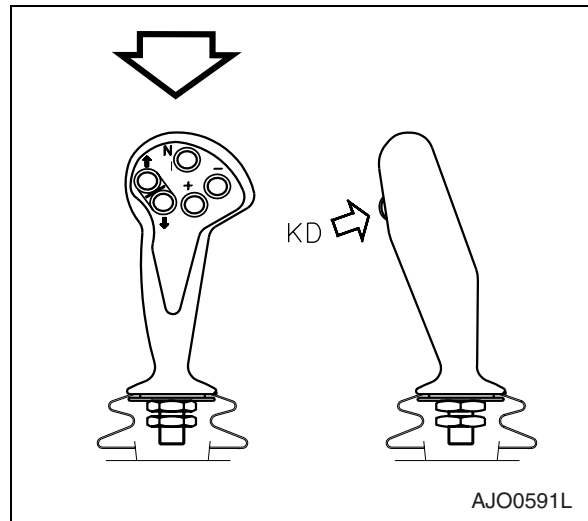


Figure 49

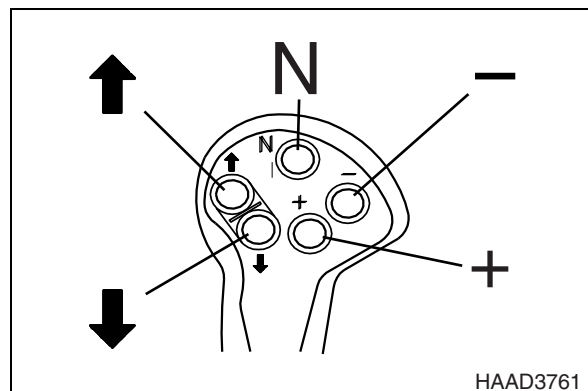


Figure 50

Ergo-II lever switch usage:

- When Rotating the starter switch to "I" (ON) position, DISPLAY indicates "NN."
- When DISPLAY indicates "N4" while "N" button of ERGO-II is pressed, start the engine.
- When DISPLAY indicates "N1" while "-" button is pressed, the machine is in the traveling ready condition.
- When "↑" button is pressed at forward traveling while "KD" button is pressed, machine can travel forward.
- When "↓" button is pressed at backward traveling while "KD" button is pressed, machine can travel backward.
- When machine is travelled, it can convert forward and backward travel without pressing "KD" button.

NOTE: Travel can be possible while "KD" button is pressed at NEUTRAL condition.

- "+" Button – Increase speed.
- "-" Button – Decrease speed.
- Kick-down switch: "KD" Button.

2. KICK-DOWN SWITCH (TWO PLACES)

Kick-down Switch Function - When transmission is in 2nd gear, pressing this switch (Figure 52) 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 51) is on the end of the transmission lever.



Figure 51

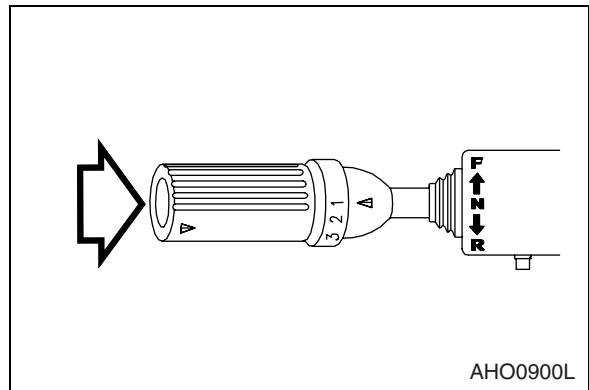


Figure 52

3. HORN BUTTON (TWO PLACES)

Pressing the left button at the tip of the pilot control valve lever (joystick) (Figure 53) or the button at the end of the combination switch (Figure 54) will sound the horn.

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

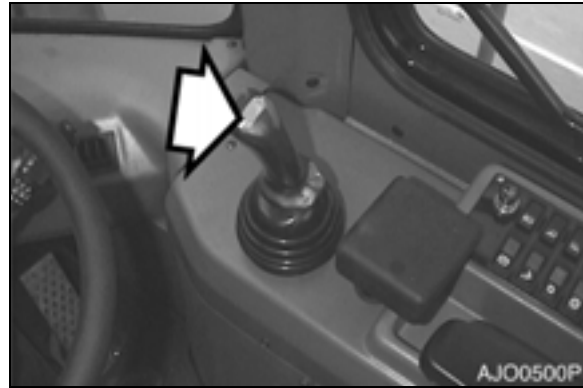


Figure 53

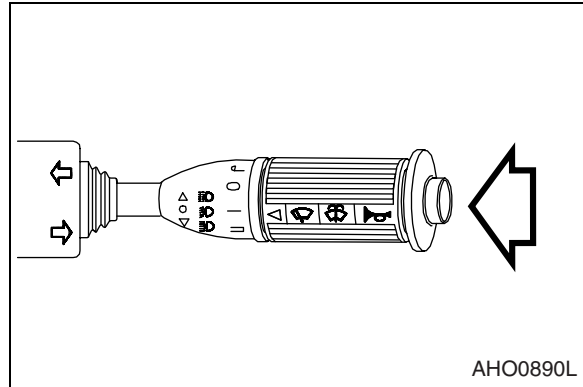


Figure 54

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.

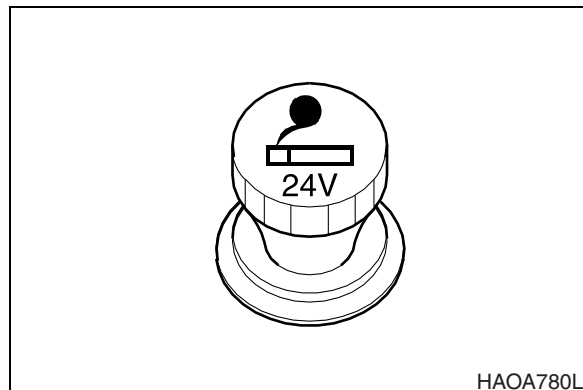


Figure 55

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.

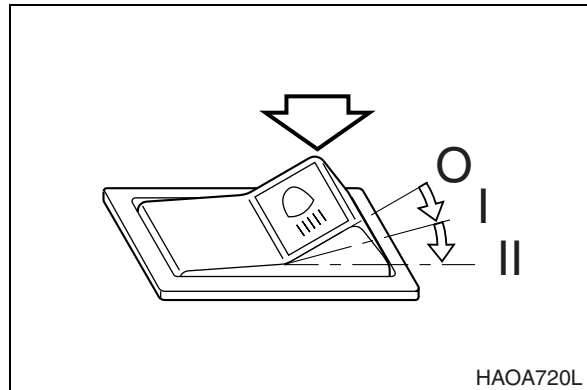


Figure 56



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.

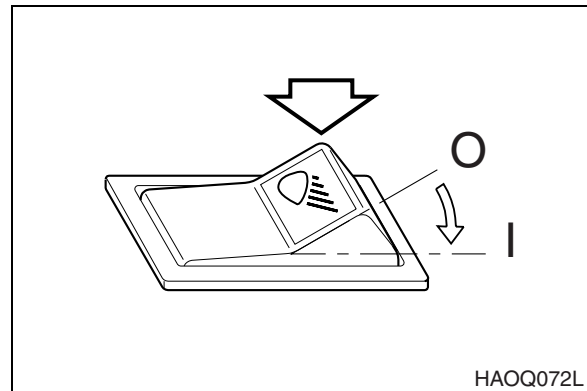


Figure 57



CAUTION!

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

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.

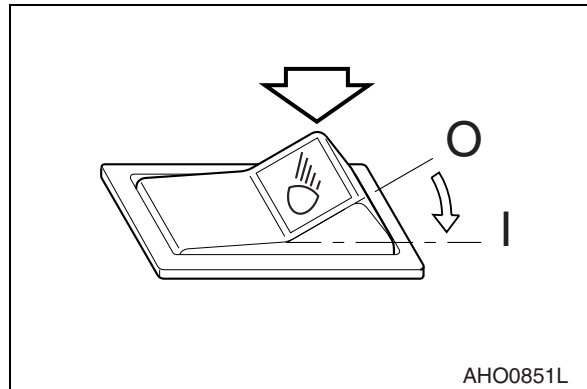


Figure 58

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.

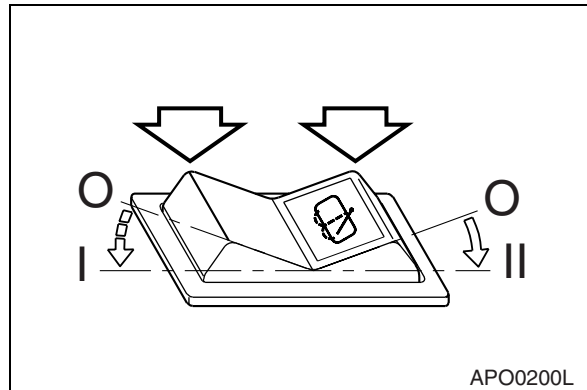


Figure 59



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.

9. ROTATING BEACON 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.

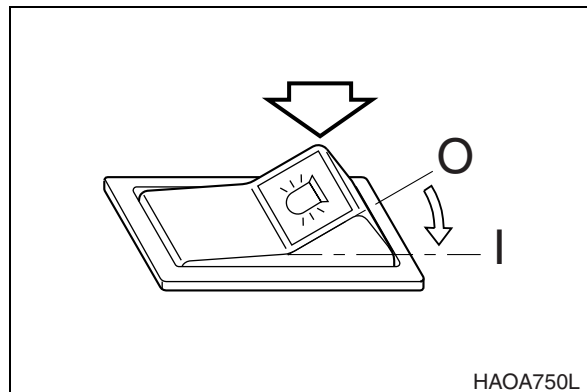


Figure 60

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.



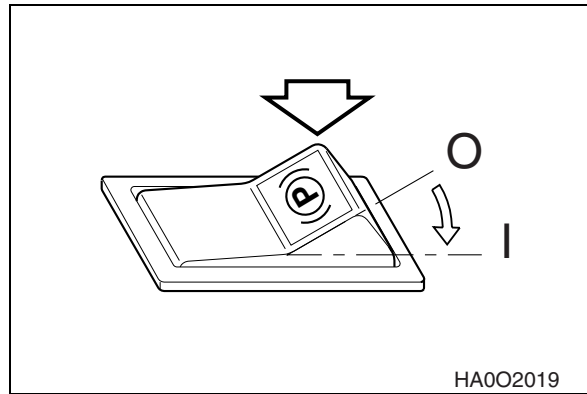
WARNING!

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.



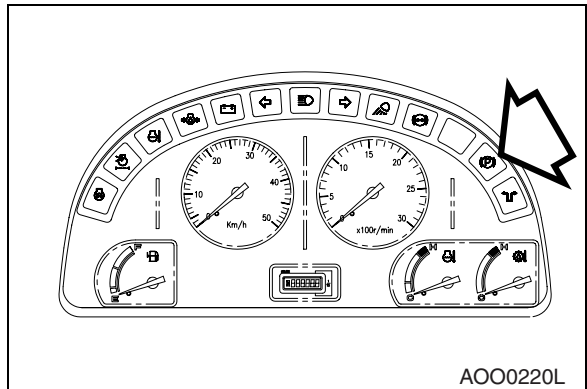
CAUTION!

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.



HA002019

Figure 61



AOO0220L

Figure 62

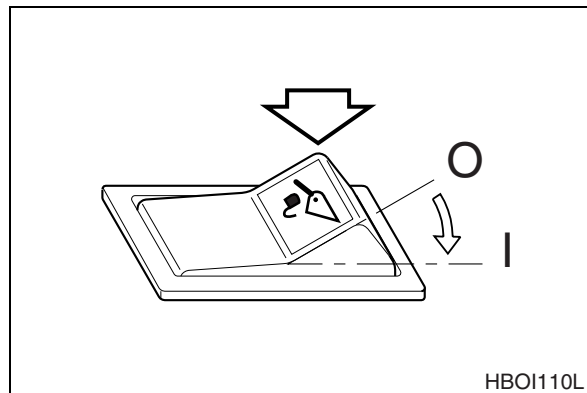
12. PILOT CUTOFF SWITCH

- 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.



HBO1110L

Figure 63

13. TRANSMISSION CUTOFF SWITCH

This switch changes over the modes of the brake pedal, inching and 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) Regardless of transmission "CUTOFF" switch, the right brake pedal has braking function only.

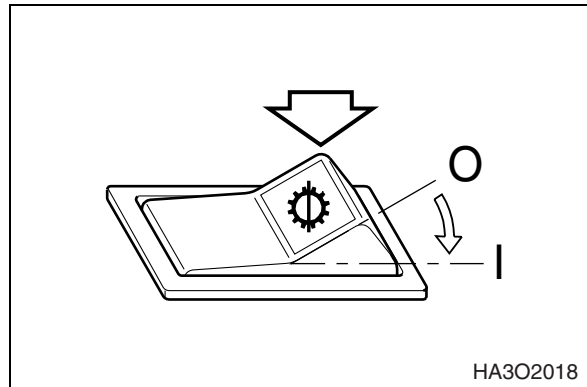


Figure 64



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.

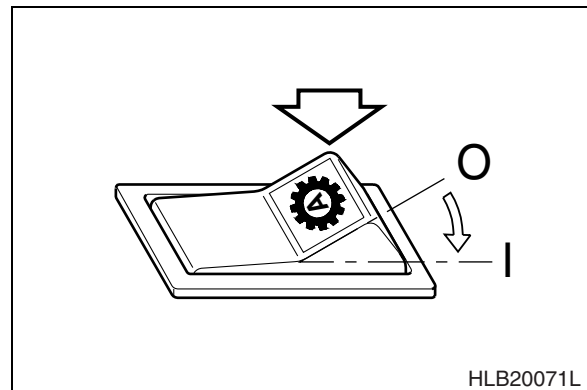


Figure 65

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.

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.

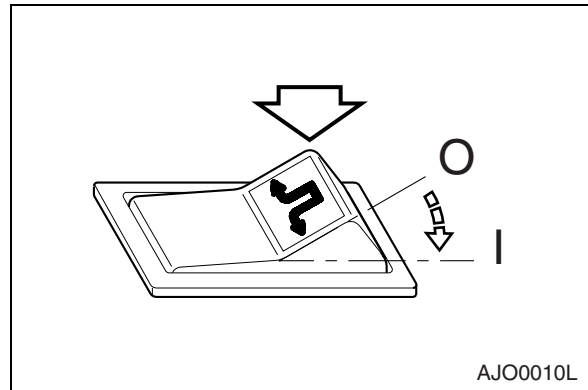


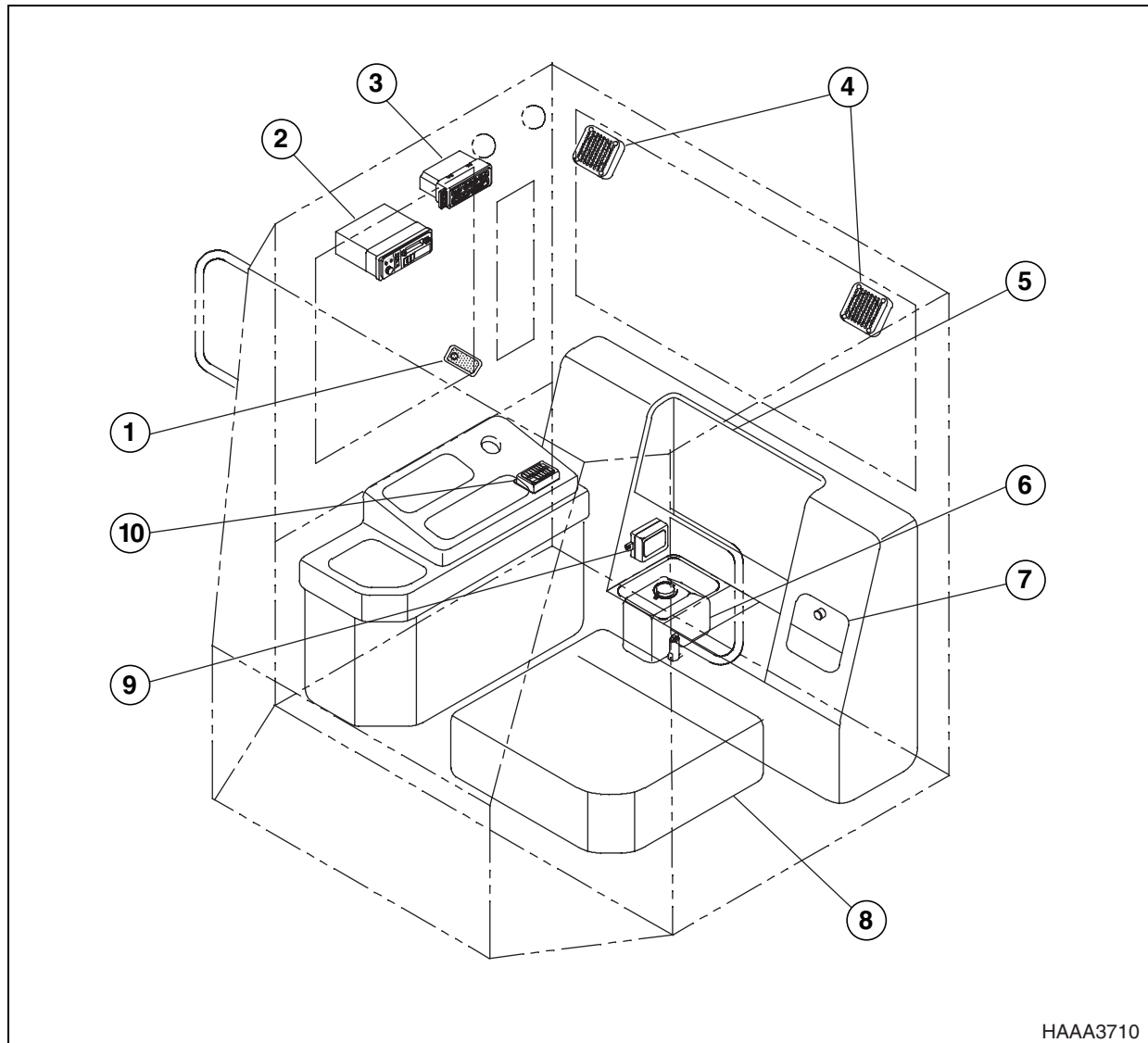
Figure 66



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.

VARIOUS CABIN LOCATIONS



HAAA3710

Figure 67

- | | |
|--|--------------------------|
| 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.

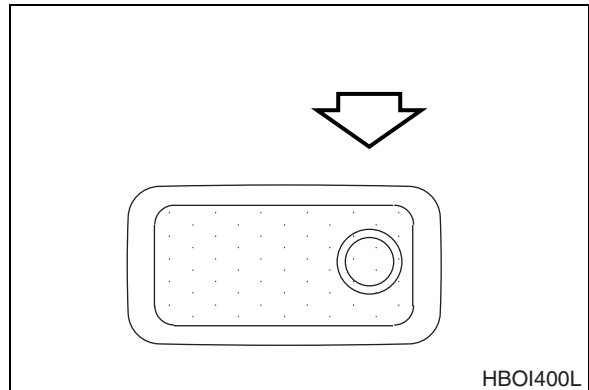


Figure 68

2. STEREO

For operation of stereo see "Stereo" on page 2-47.

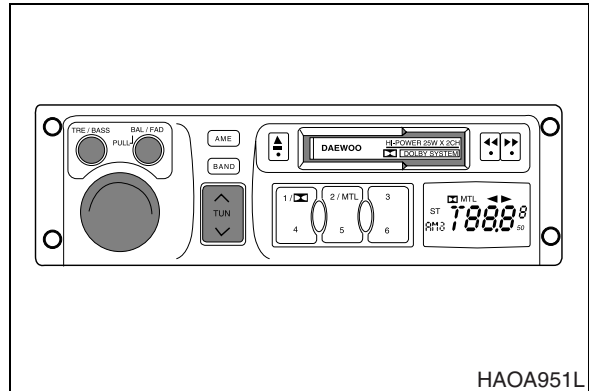


Figure 69

3. HEATER AND AIR CONDITIONER CONTROL PANEL

For operation of heater and air conditioner see "Heater and Air Conditioner Operation" on page 2-42.

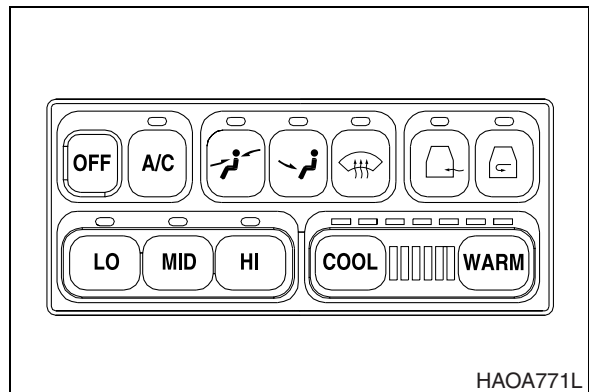


Figure 70

4. SPEAKERS

Emits sound generated by stereo.

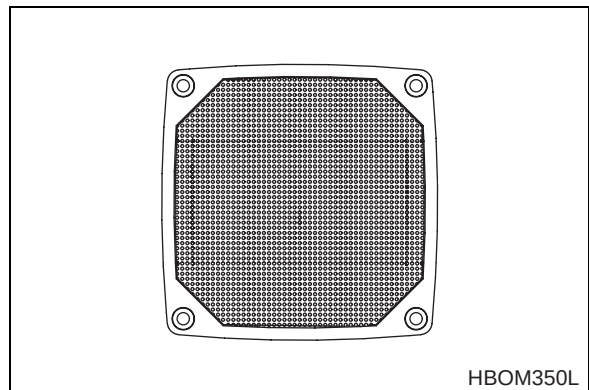


Figure 71

5. STORAGE BOX

There is a storage box (1, Figure 72) behind the seat. Keep the operation maintenance manual and other documents in this compartment.

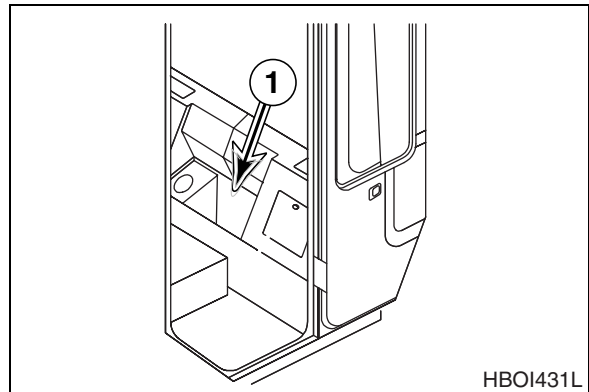


Figure 72

6. WASHER TANK

Contains windshield washer fluid.

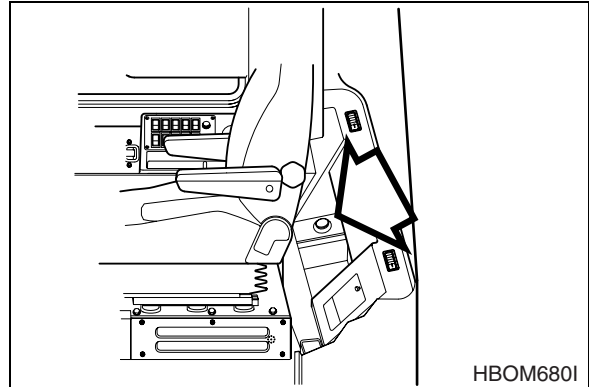


Figure 73

7. HOT/COLD REFRIGERATOR

There is a hot/cold refrigerator (1, Figure 74) 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.

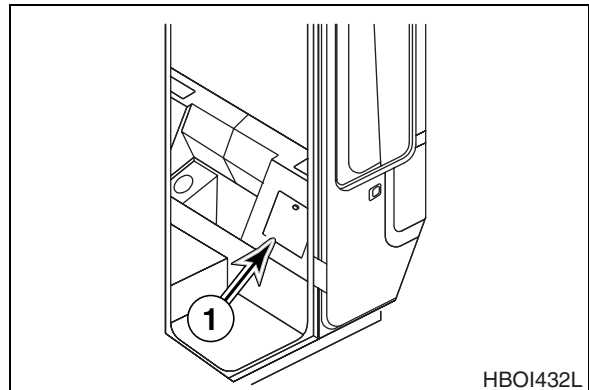


Figure 74

8. ELECTRIC BOX

Under the seat are two pullout trays that contain relays for unit. (See "Fuse Box/Relay" on page 2-55.)

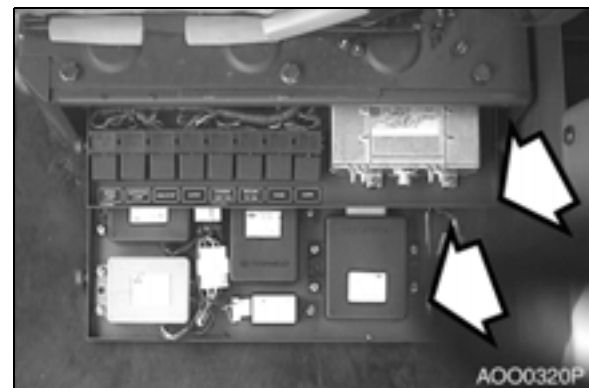


Figure 75

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 2-55.

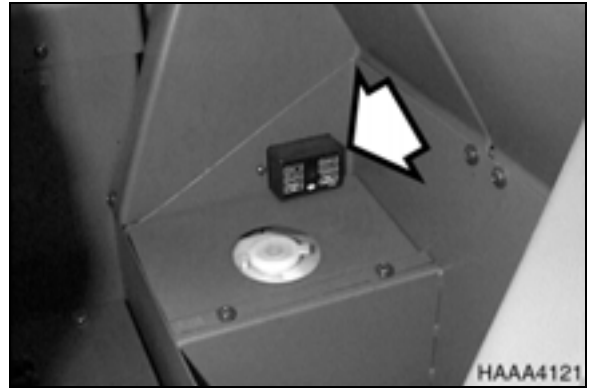


Figure 76

10. FUSE BOX ONE

The fuse box one is at the rear side of right control stand. For a detailed explanation of fuses see "Fuse Box/Relay" on page 2-55



Figure 77

HEATER AND AIR CONDITIONER OPERATION

LOCATION OF CONTROLS AND VENTS

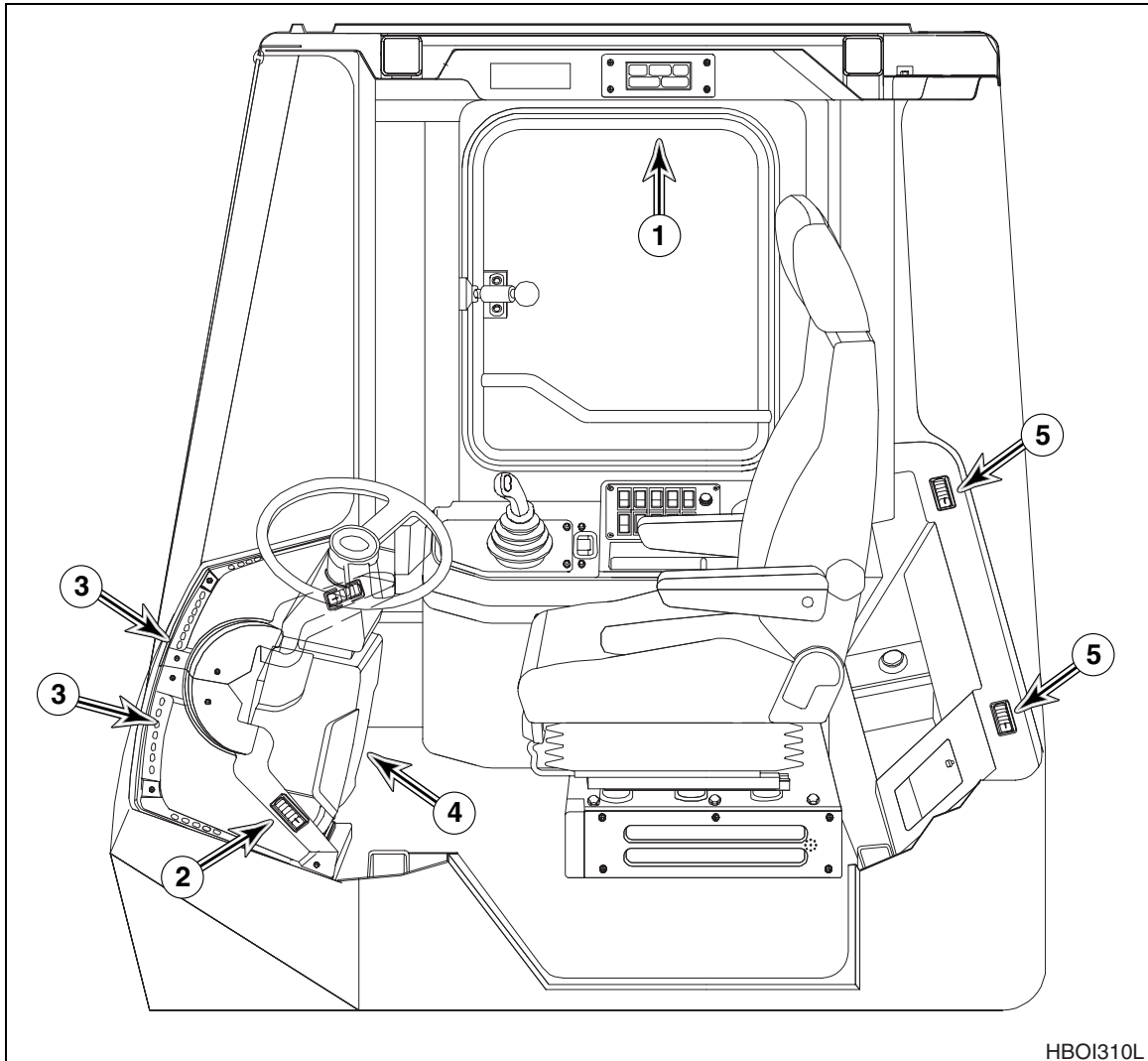


Figure 78

- | | |
|-----------------------------------|----------------|
| 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

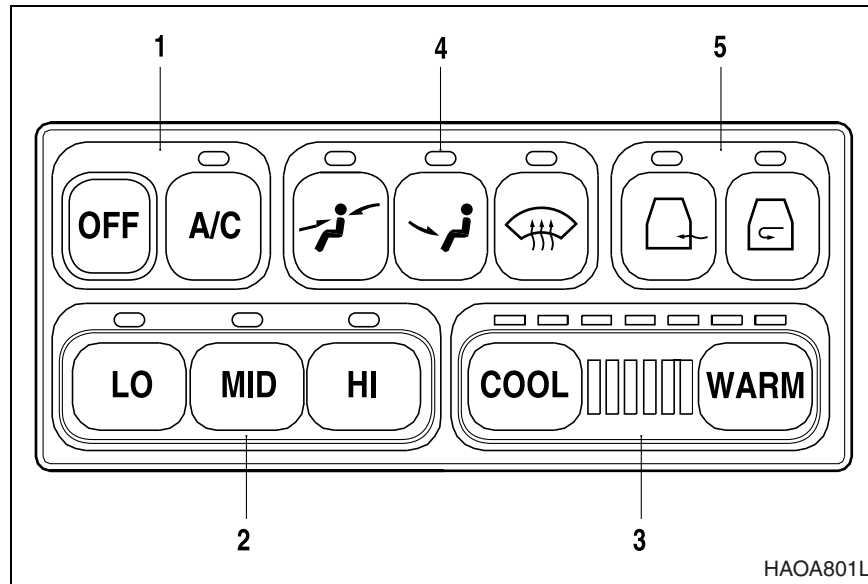


Figure 79

- | | |
|-----------------------------------|--|
| 1. FAN AND AIR CONDITIONER SWITCH | 4. SELECTION SWITCH FOR WIND DIRECTION |
| 2. BLOWER FAN SWITCHES | 5. VENTILATION SELECTION 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.

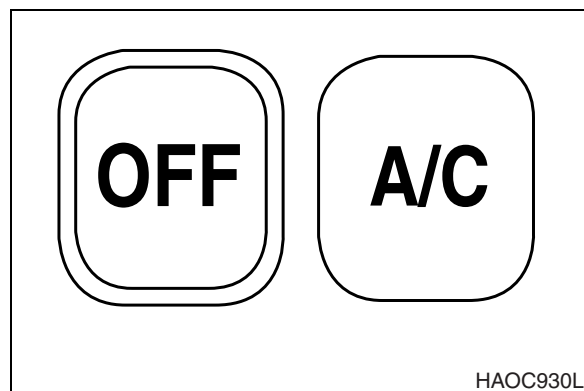


Figure 80

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.*

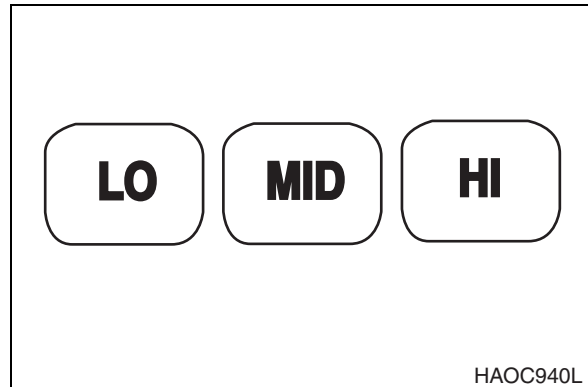


Figure 81

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.

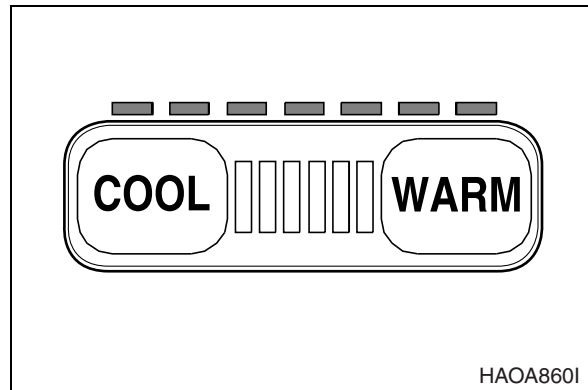


Figure 82

4. SELECTION SWITCH FOR WIND DIRECTION

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

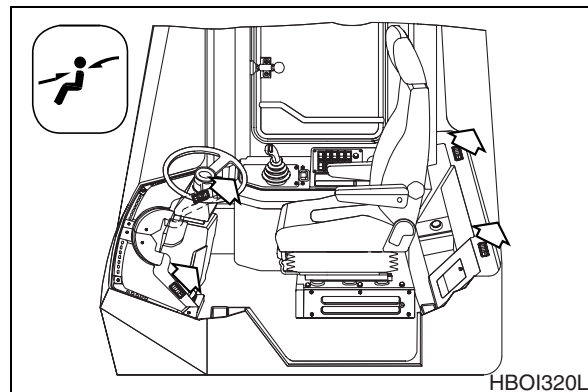


Figure 83

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

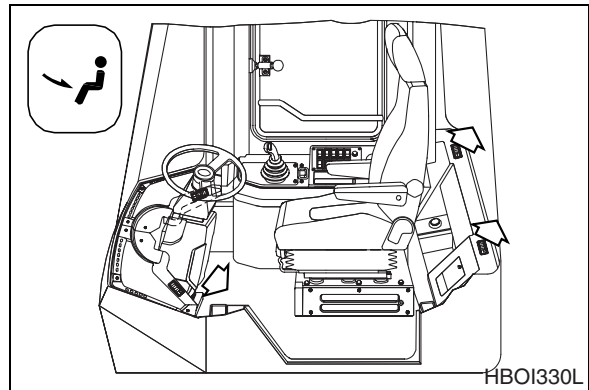


Figure 84

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

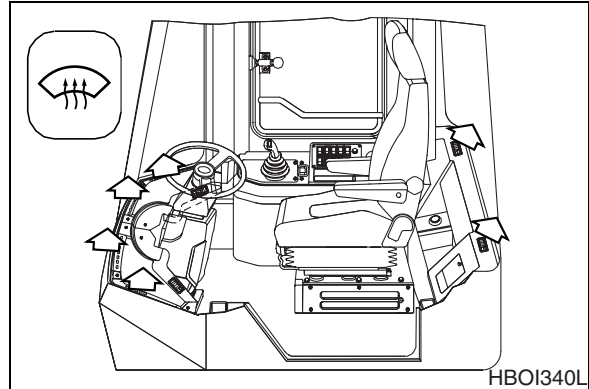


Figure 85

5. VENTILATION SELECTION 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.

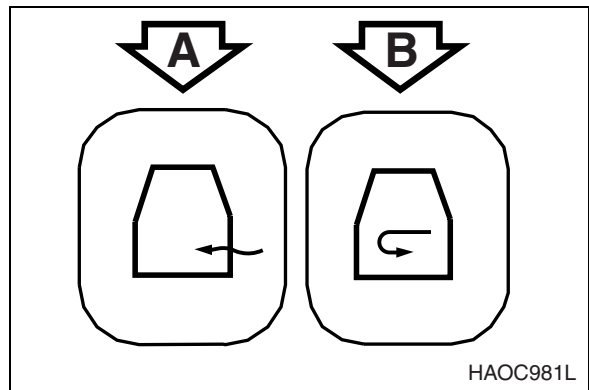


Figure 86

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

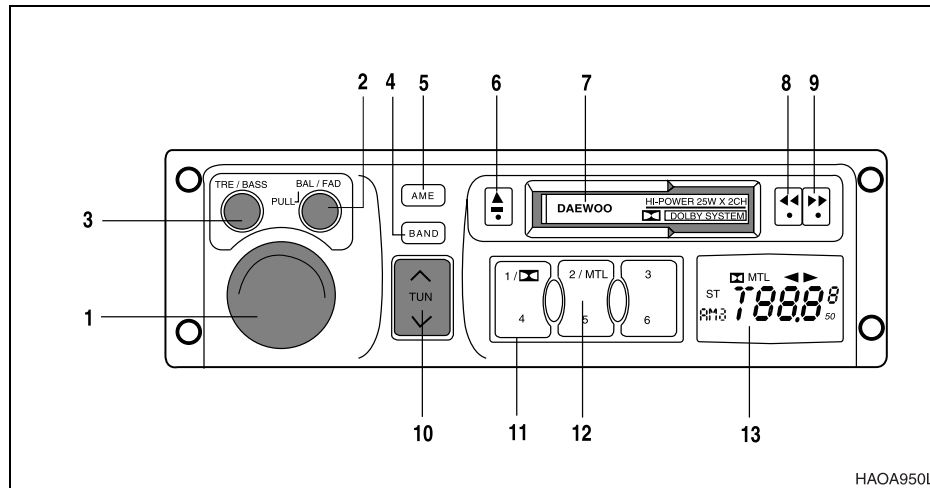


Figure 87

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

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 88).

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.*

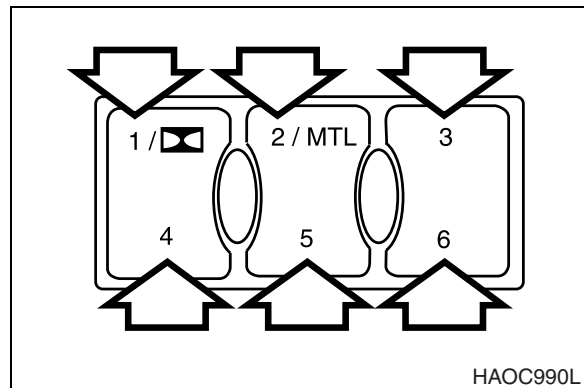


Figure 88

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 SELECTION

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

11. DOLBY B SELECTION

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 SELECTION

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

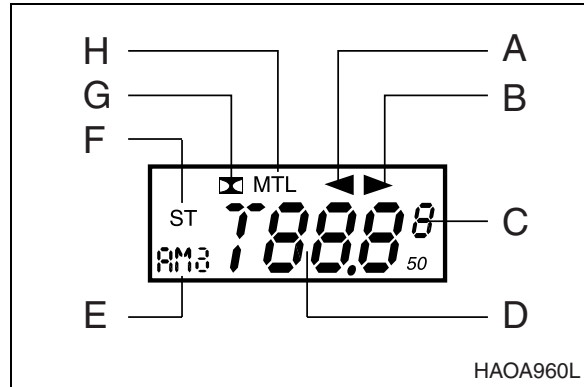


Figure 89

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.

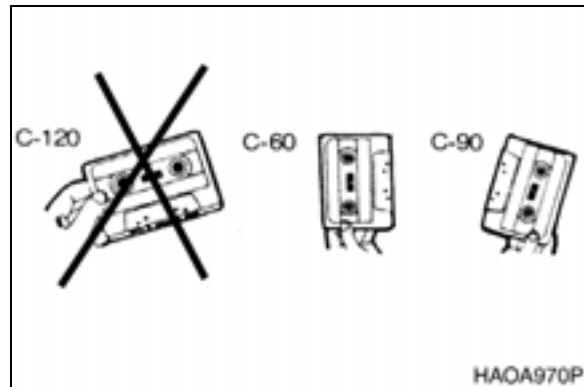


Figure 90

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.

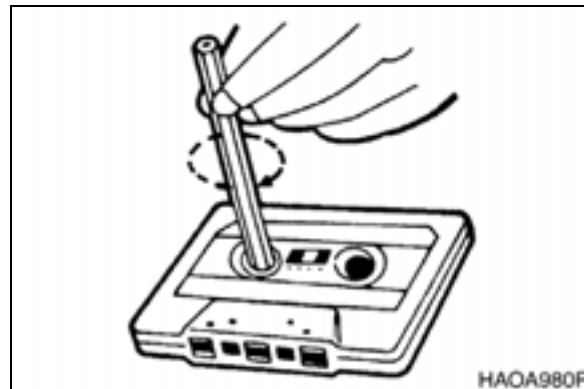


Figure 91

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.

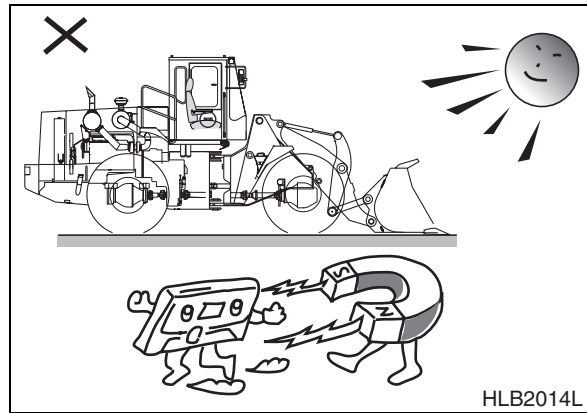


Figure 92

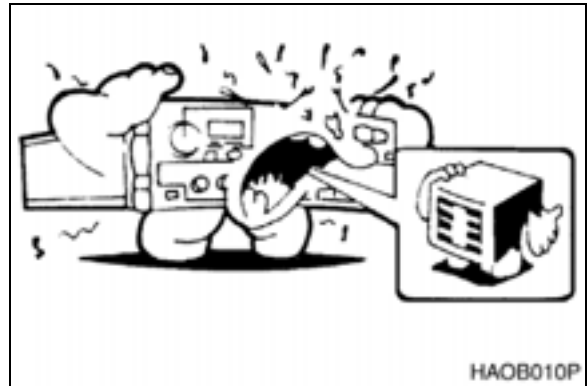


Figure 93

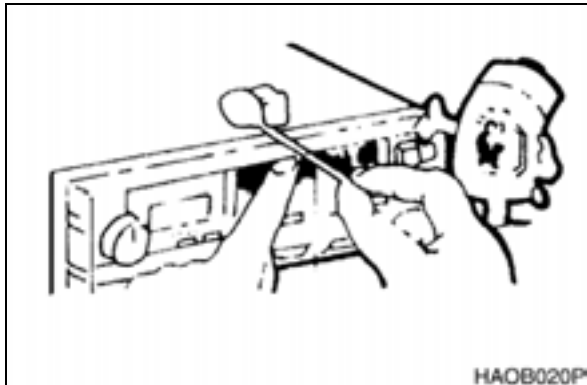


Figure 94

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 96), 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 96) 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 96) 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 96) allows seat backrest to be moved forward or backward.

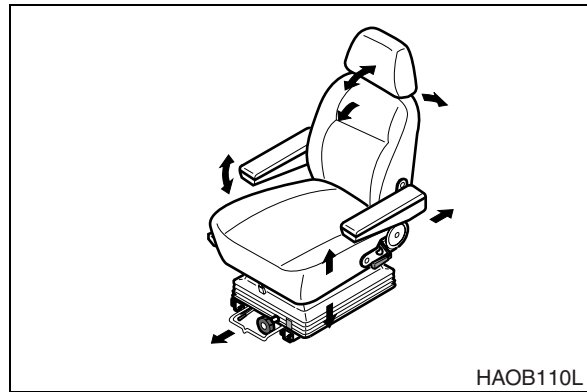


Figure 95

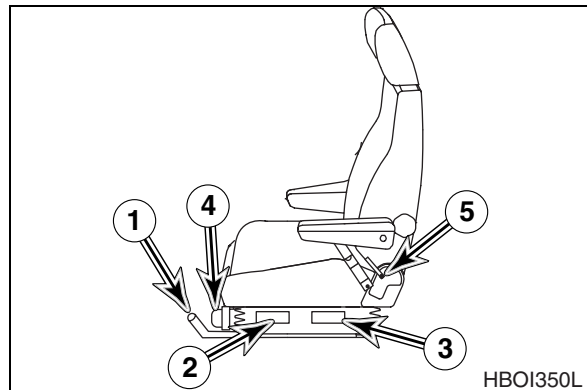


Figure 96

6. ANGLE ADJUSTMENT OF ARMREST

Adjustment angle of left and right armrest (6, Figure 97) 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 97) can be adjusted forward/backward and up/down. Move it by holding both sides.

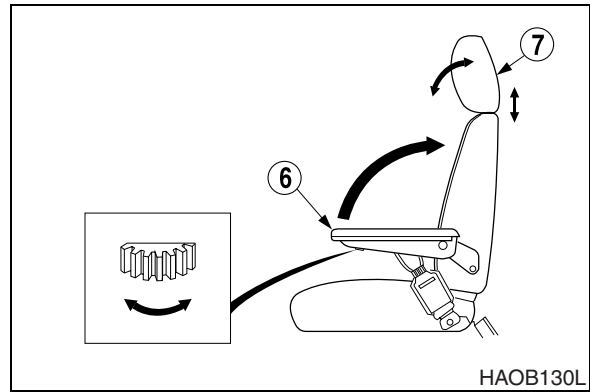


Figure 97

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 98) 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).

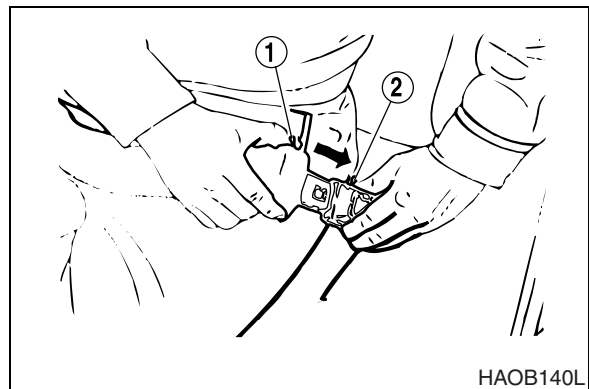


Figure 98

Press button (3, Figure 99) in center of buckle (2) and pull out belt (1) to unlock.

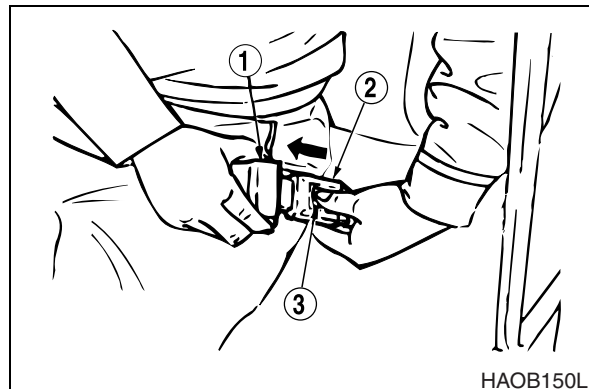


Figure 99

DOOR SIDE LATCH

1. The door side latch (1, Figure 100) is used to secured 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 100

2. To release door from side of cab, push the latch lever (Figure 101) down. The latch lever is to the left of the operator's seat.



Figure 101

FUSE BOX/RELAY

FUSE BOXES

There are two fuse boxes inside the cab.

Fuse box one (1, Figure 102) 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 102) 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.

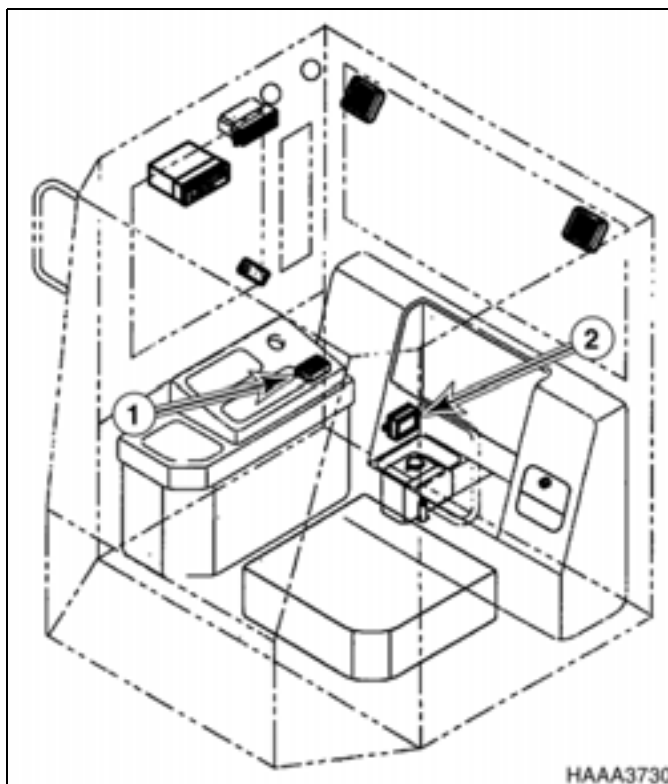


Figure 102

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

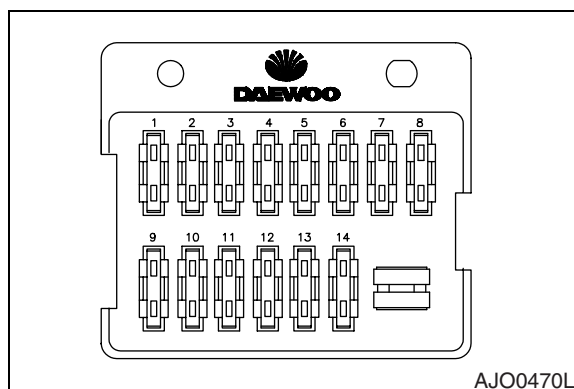


Figure 103 FUSE BOX ONE

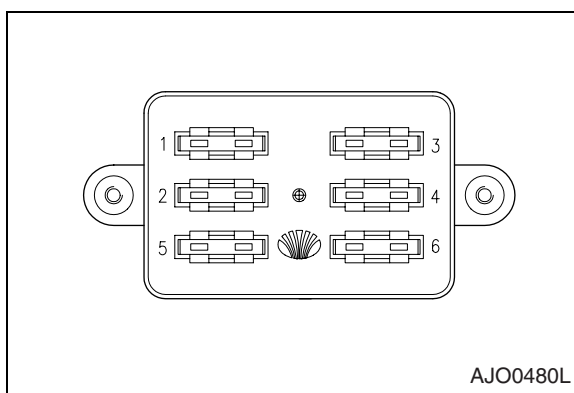


Figure 104 FUSE BOX TWO

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.

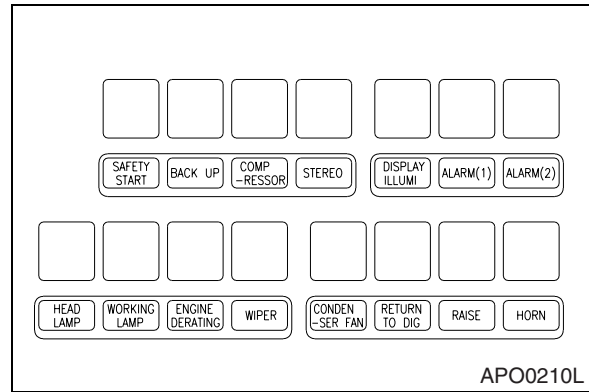


Figure 105



Figure 106

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.

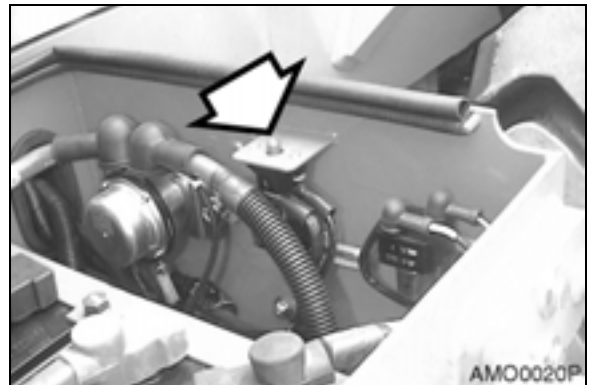


Figure 107

FUSIBLE LINK

A fusible link is in the battery box. If electric power is not present at the "I" (ON) position of the starter switch, check the fusible link first.

NOTE: If fuse wire is burnt off, replace link.

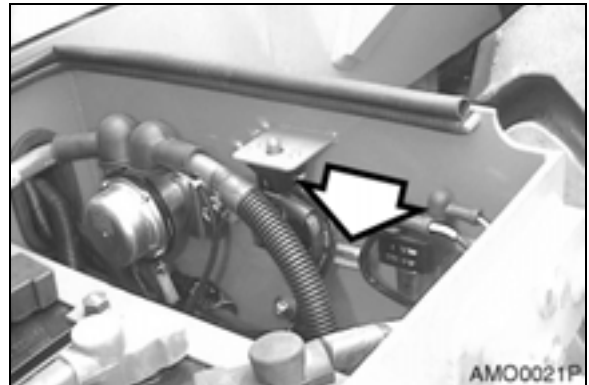


Figure 108

WINDOW GLASS BREAKING TOOL

This loader is equipped with a glass breaking tool. It is in the lower right side of the cab just rear of the door. This tool can be used in case of an emergency situation which requires the breaking of glass to exit from the operator's cabin. Grip the handle firmly and use the sharp point to break the glass.



WARNING!

Protect your eyes when breaking the glass.

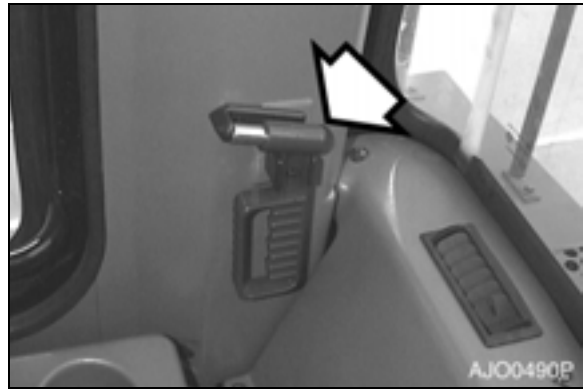


Figure 109

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 to 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."

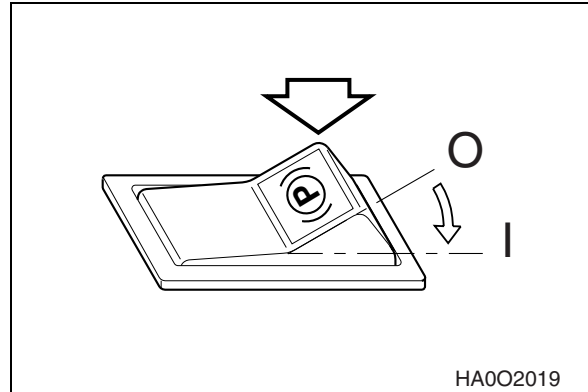


Figure 1

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).

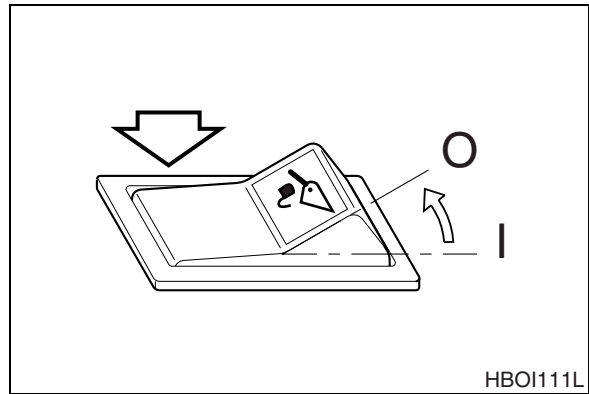


Figure 4

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.*

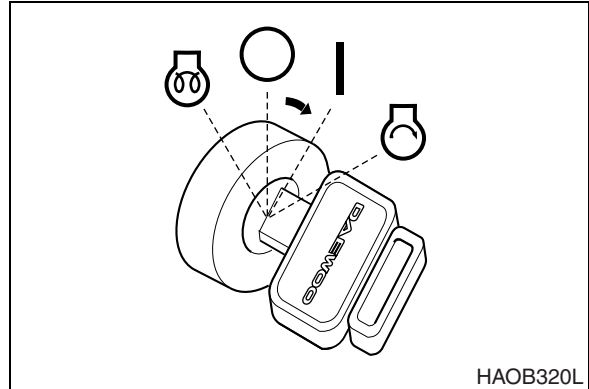


Figure 5

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

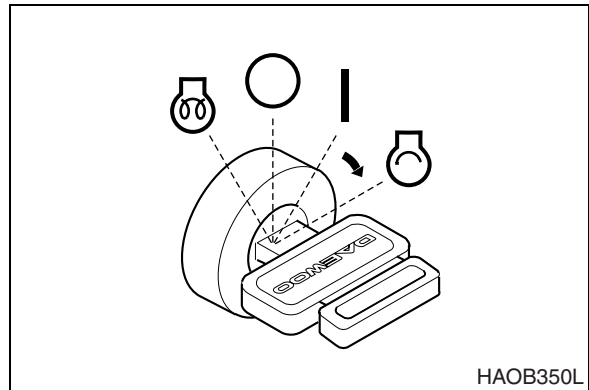


Figure 6

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

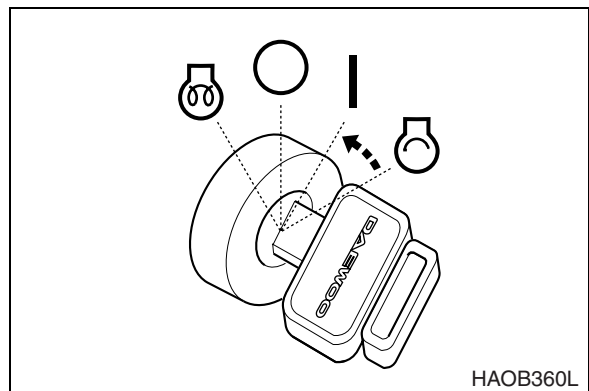


Figure 7

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.

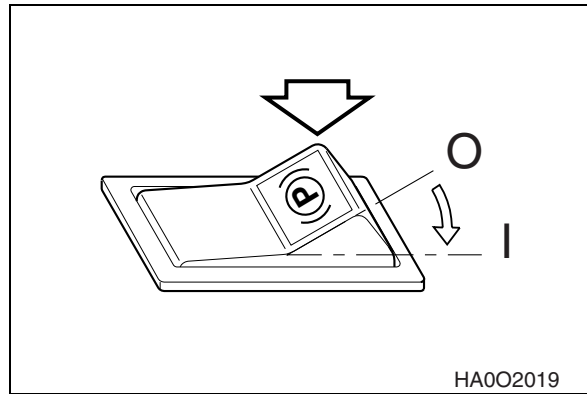
- No color or light blue - Engine is running in good condition.
- Black - Incomplete combustion. Check cause.
- White or dark blue - Engine is burning engine oil. Check cause.

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."



HA002019

Figure 8

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

IMPORTANT

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



HAAA3781

Figure 9

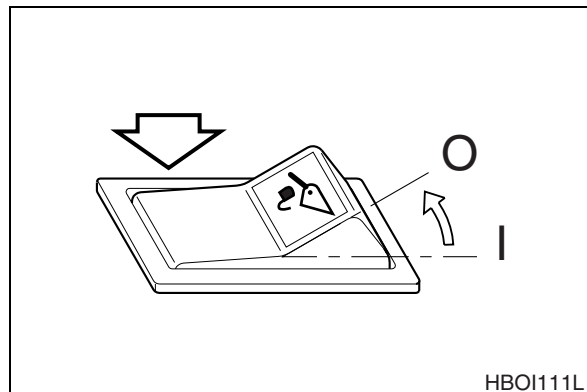
3. Make sure transmission neutral lock is in the "N" (NEUTRAL LOCK) position.



HAAA3813

Figure 10

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



HBOI111L

Figure 11

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

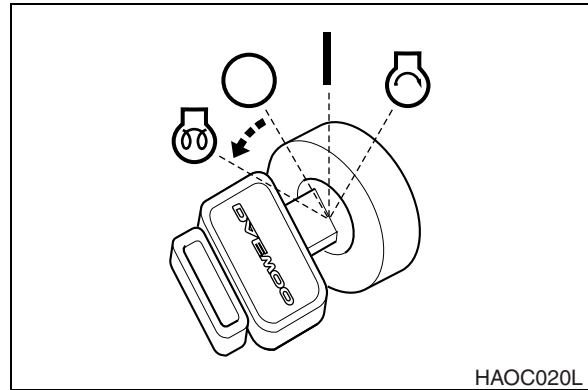


Figure 12

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

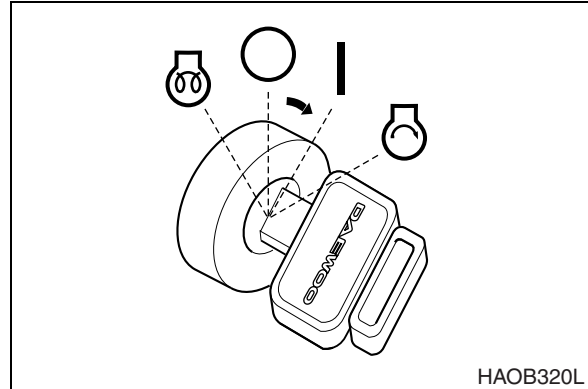


Figure 13

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

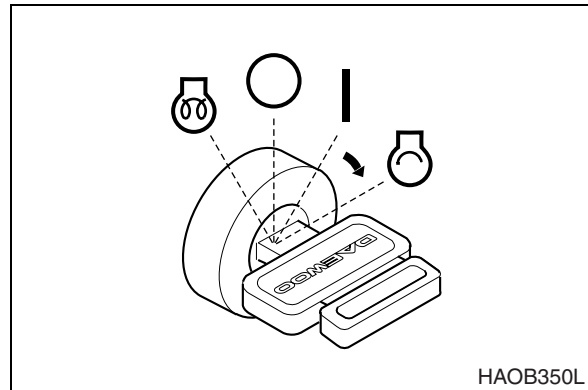


Figure 14

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.

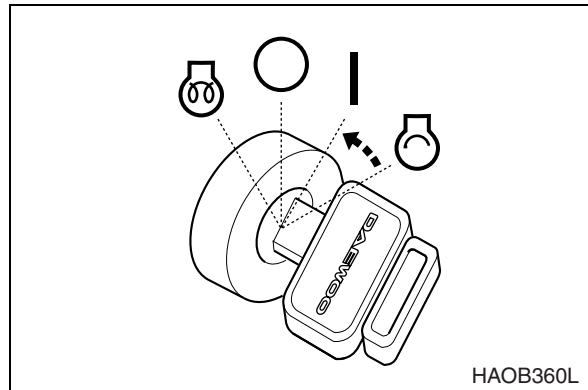


Figure 15

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.

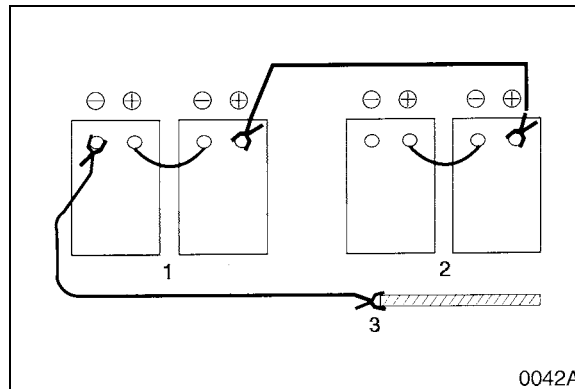


Figure 16

- | | |
|------------------------|----------------------------------|
| 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

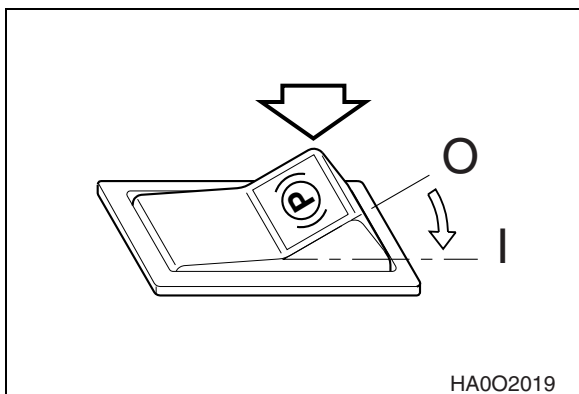


Figure 19

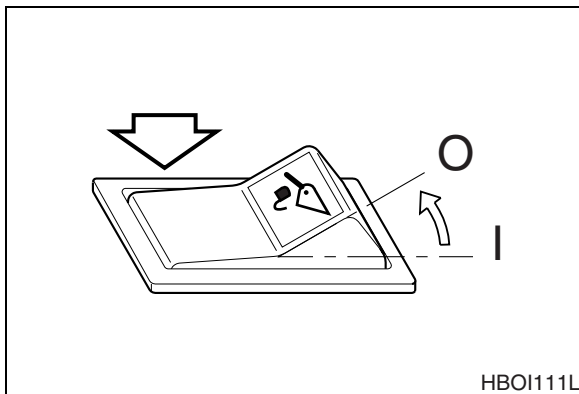


Figure 20

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

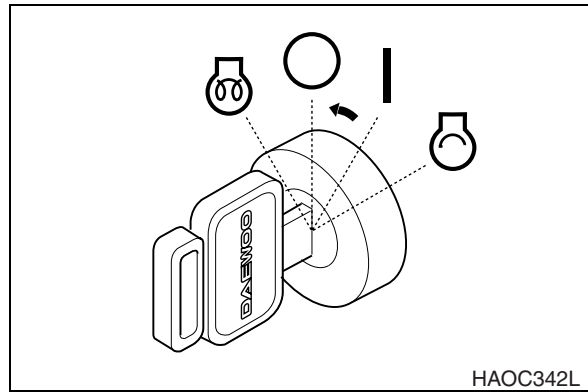


Figure 21

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



WARNING!

If vehicle is moved while parking brake is engaged, serious damage to parking brake disc 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).

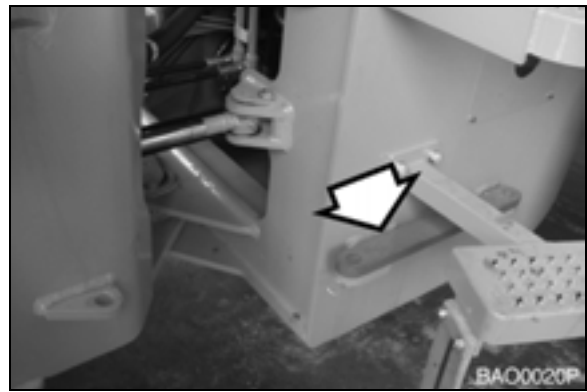


Figure 22

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.

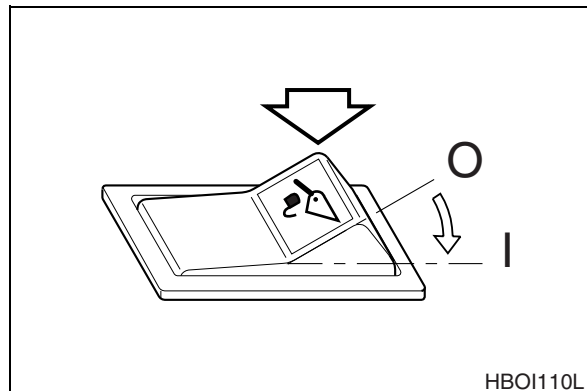


Figure 23

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).

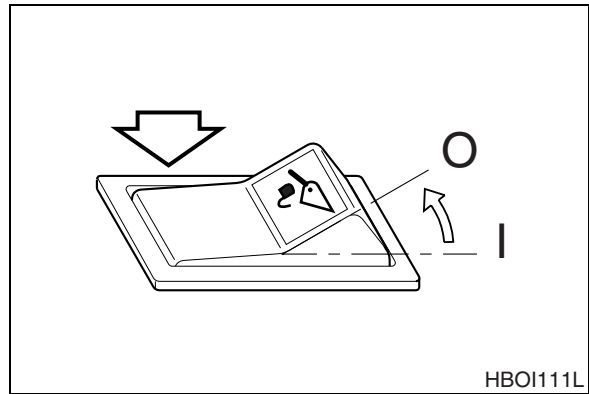


Figure 24

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.

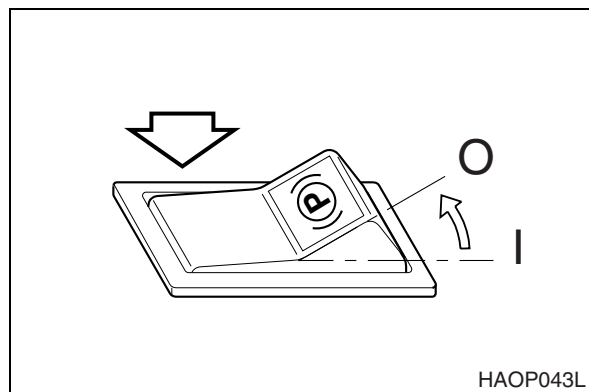


Figure 27

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

- Put transmission lever in "NEUTRAL."



Figure 31

- 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

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

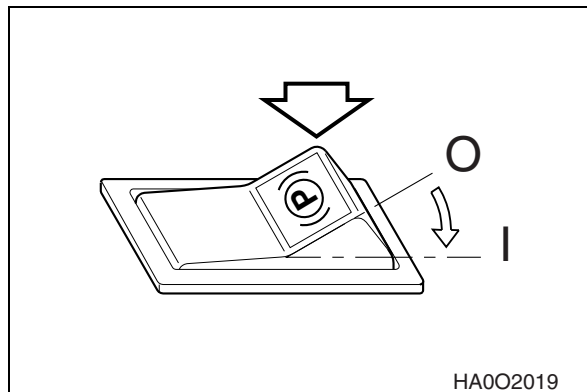


Figure 33

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

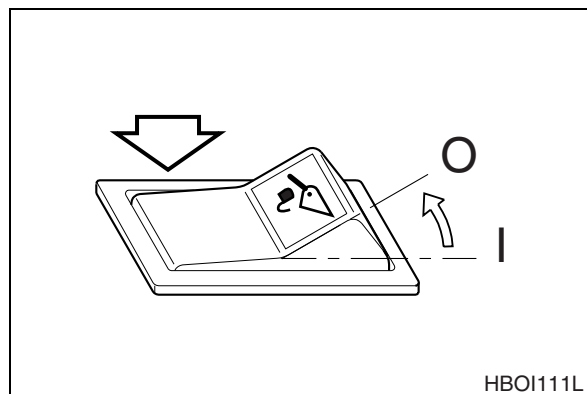


Figure 34

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

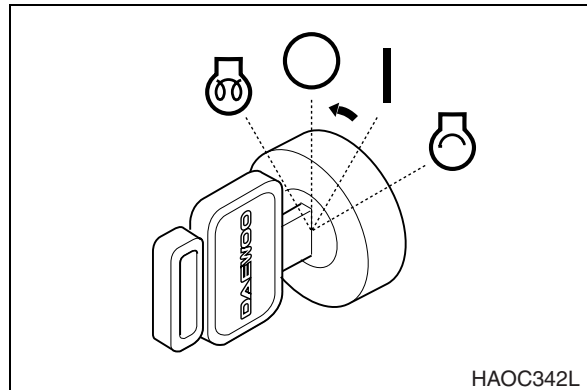


Figure 35

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.

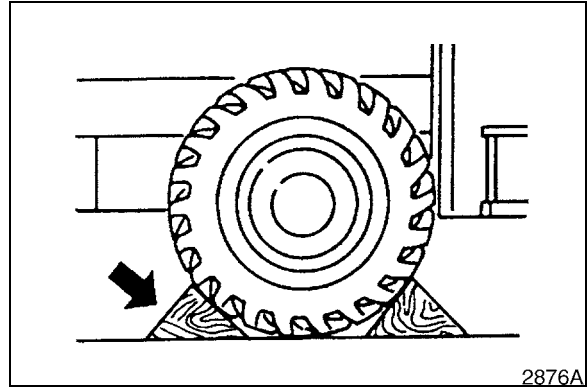


Figure 36

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 KICKOUT

Placing bucket lever in "Boom Raise Detent" position will lock bucket lever in raise boom position. Boom will raise until trip plate (1, Figure 37) 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.

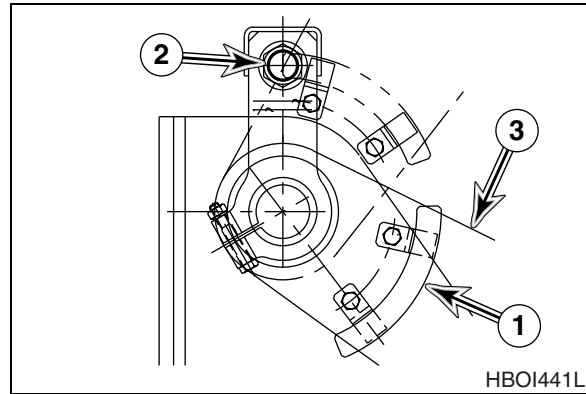


Figure 37

IMPORTANT

Trip plate (1, Figure 37) 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).

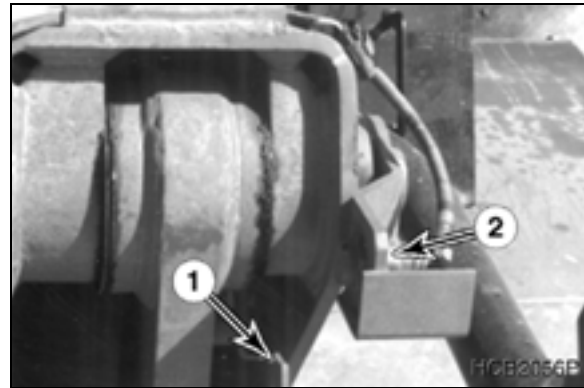


Figure 38

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.

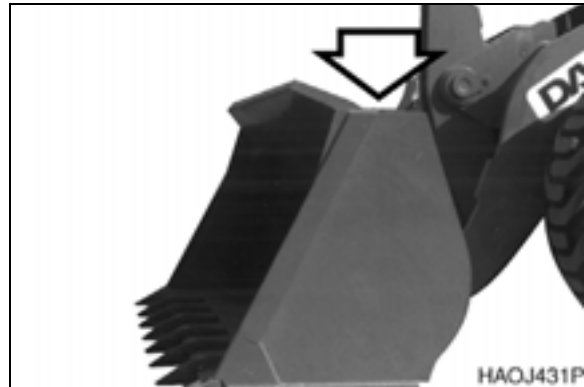


Figure 39

BOOM LOWER KICKOUT (OPTION)

Placing bucket lever in "L" position will lock control lever in lower boom position. Boom will move downward until trip plate (2, Figure 40) 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.

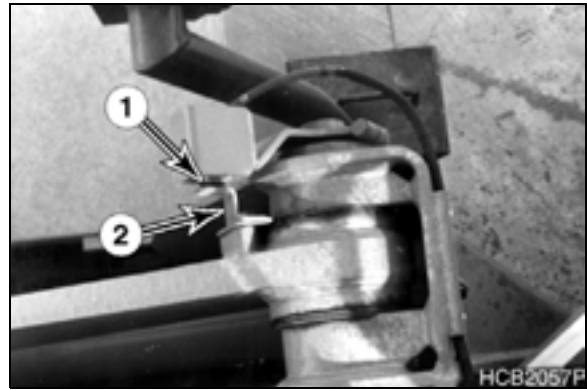


Figure 40

ADJUSTMENT OF BUCKET POSITION SWITCH

MEGA 200-V

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 41) on bracket (3).
4. Position bracket (3, Figure 41) so that end of arm (1) is aligned with center of magnetic switch (2).
5. Tighten bolts (4, Figure 41).
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 41) may be necessary.

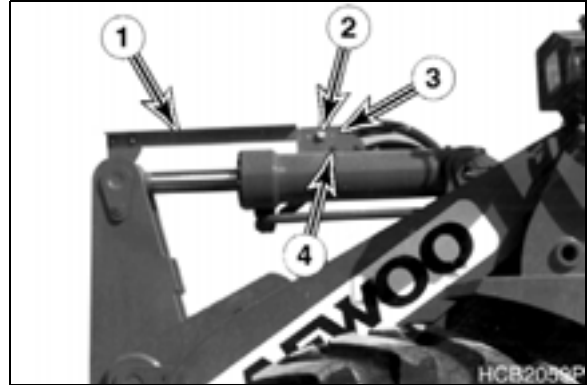


Figure 41

MEGA 200-VTC

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. Operate controls to place bucket in desired preselected digging position (usually flat). Return bucket lever to its "NEUTRAL" position.
2. Shut down engine.
3. Loosen bolts (4, Figure 42) on bracket (3).
4. Position bracket (3, Figure 42) so that end point of arm (1) is aligned with center of magnetic switch (2).
5. Tighten bolts (4, Figure 42).
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 (2, Figure 42) may be necessary.

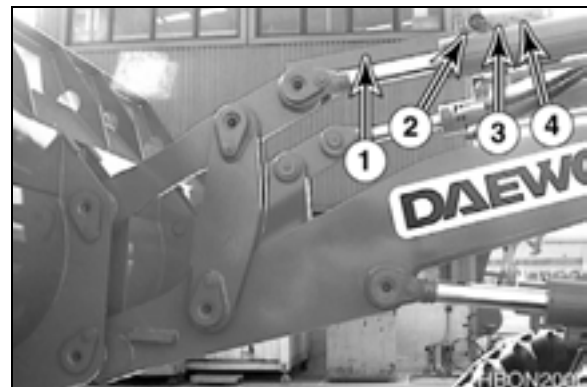


Figure 42

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.

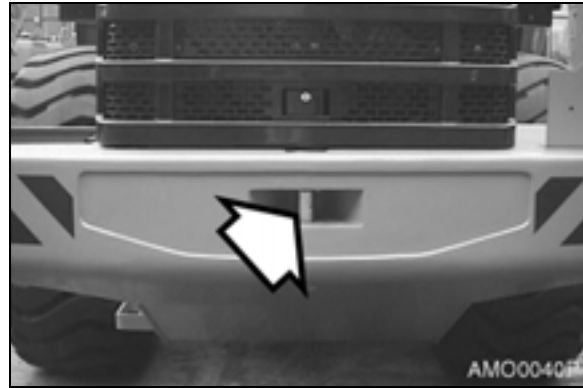


Figure 43



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 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 centerline 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

Routine maintenance and inspections are required to keep your machine in the correct operating condition. The following pages list the inspection intervals, the system or component checks and location references.

NOTE: *The following pages list the service checks and their required intervals. The service cycles may need to be shortened depending on the working conditions. Extremely hot or dusty conditions will require more frequent service. Operational hours are determined by the amount of time accumulated on the engine hour meter on the front instrument panel in the cab.*

SERIAL NUMBERS

There are two serial number plates attached to the body of wheel loader. Main serial number plate is on left side of front frame above wheel cover (Figure 1). The number is also stamped in the rear frame on the left side just below the cab (Figure 2).

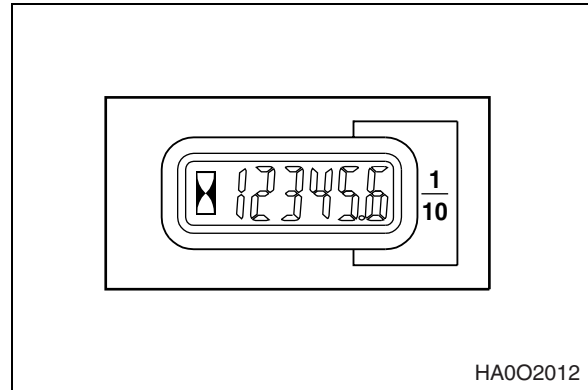


Figure 44



Figure 1



Figure 2

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.

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

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.

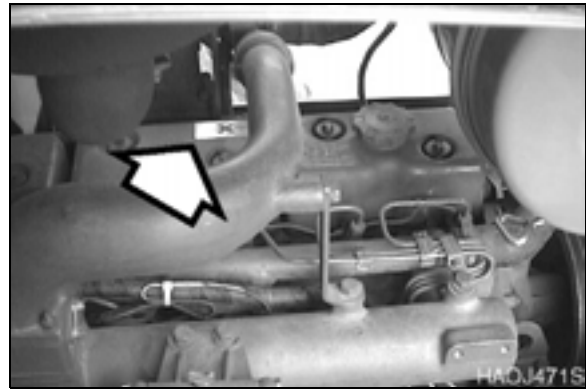


Figure 3

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	MULTIPURPOSE EP90
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)	SPARTAN EP220 or EXXON GX 80W90
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)	MOBILUBE LS 80W90
SHELL	TELLUS 32	ROTELLA T15W40 or T30 (WINTER) or T40 (SUMMER)	ALVANIA EP #2	SPIRAX HD 80W90
PENNZOIL	PENNZBELL AW 32 (BELOW 0°C (32°F)) or AW 46 (ABOVE 0°C (32°F))	LONGLIFE SAE30 or SAE40 or SAE15W40	PENNZOIL 705 EP #2	PENZOIL MULTIPUPOSE 4092 or 80W90
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)	AP80W90

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	DELO GEAR OIL or RPM UNIV GEAR 80W90
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	MULTIGEAR EPSAE 80W90
IDEMITSU KOSAN	DAPHNE KOSAN 46WR	APOROIL MOTIRE S300	DAPHNE CORRONE #2	APOROIL GEAR HE 90
NIPPON SEIKIYU	SUPER HIGHLAND S26 or 32	HIGH D. S3 STRAIGHT WEIGHT	LIPANOC GREASE	NISEKI SP90 or EP90
TOTAL	TOTAL EQUIVIS ZS46 - III	TOTAL XT 15W40	TOTAL MULTIS EP #2	
FUCHS				85W90LS

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



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 sub-zero 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
Engine	Oil Pan with Filter	21 liters (5.5 U.S. gal.) NOTE: <i>The filter holds an additional 1 liter (1 qt) of oil.</i>
	Cooling System	31 liters (8.2 U.S. gal.)
Fuel Tank		260 liters (69 U.S. gal.)
Hydraulic Oil Tank		150 liters (40 U.S. gal.)
Transmission		30 liters (7.9 U.S. gal.)
Axles	Front Differential	16 liters (4.2 U.S. gal.)
	Front Hub Reduction Gear	1.7 liters (0.4 U.S. gal.) Each end.
	Rear Differential	15 liters (4 U.S. gal.)
	Rear Hub Reduction Gear	1.7 liters (0.4 U.S. gal.) Each end.

MAINTENANCE INTERVALS

10 HOUR / DAILY SERVICE

- Grease Front Attachment Pins (See page 4-8)*
- Inspect All Tires for Correct Tire Pressure and Signs of Damage or Abnormal Wear (See page 4-8)
- Check Engine Oil Level (See page 4-8)
- Check Transmission Oil Level (See page 4-9)
- Check Hydraulic System Oil Level (See page 4-10)
- Check for Leaks in the Hydraulic System (See page 4-11)
- fill Fuel Tank (See page 4-12)
- Check for Leaks in the Fuel System (See page 4-12)
- Drain Fuel Condensation (See page 4-13)
- Check Coolant Level (See page 4-13)
- Check Antifreeze Protection Levels (See page 4-14)
- Check Level of Window Washer Liquid (See page 4-14)
- Inspect the Bucket Teeth and Side Cutters for Signs of Wear (See page 4-14)
- Inspect Seat Belt for Proper Operation (See page 4-15)
- Inspect the Structure for Cracks and Faulty Welds (See page 4-15)
- Check the Operation of All Switches (See page 4-15)
- Check the Operation of All Exterior Lights, Horn and Control Console Indicator and Monitor Lights (See page 4-15)
- Start Engine, Check Starting Ability, and Observe Exhaust Color at Start-up and at Normal Operating Temperature. Listen for Any Abnormal Sounds (See page 4-15)
- Check Operation of All Controls (See page 4-15)
- Inspect Engine Fan Blade (See page 4-16)
- Check Engine Drive Belt Wear (See page 4-16)
- Check Air Intake System (See page 4-17)

50 HOUR / WEEKLY SERVICE

- Perform All 10 Hour / Daily Service Checks (See page 4-18)
- Grease Front Attachment Pins (See page 4-18)
- Grease Steering Cylinder Rod and Head Ends (See page 4-24)
- Grease Upper and Lower Center Pins (See page 4-25)
- Change Engine Oil and Filter (See page 4-25)*
- Hydraulic Full Flow Filter Replacement (See page 4-25)*
- Check Water Pump Belt Tension (See page 4-25)*
- Clean Exterior of Radiator, Oil Cooler and Air conditioner Condenser (See page 4-26)*

250 HOUR / MONTHLY SERVICE

- Perform All 10 Hour / Daily, 50 Hour Service Checks (See page 4-27)
- Change Engine Oil and Filter (See page 4-25)
- Replace Hydraulic System brake and Pilot Filter (See page 4-28)
- Check Engine Air Pre-cleaner (See page 4-29)
- Hydraulic Full Flow Filter Replacement (See page 4-30)
- Clean Air Cleaner (See page 4-31)
- Drain Water From Hydraulic Oil Tank (See page 4-31)
- Check Water Pump Belt Tension (See page 4-32)
- Grease Drive Shafts (See page 4-33)
- Axle Differential and Planetaries Oil Replacement (after first 250 hours) (See page 4-33)*
- Replacement Of Transmission Oil and Filter (After First 250 Hours) (See page 4-33)*

* Break-In

500 HOUR / 3 MONTH SERVICE

- Perform All 10 Hour / Daily, 50, and 250 Hour Service Checks (See page 4-34)
- Replace Fuel Filter (See page 4-34)
- Clean Exterior of Radiator, Oil Cooler and Air conditioner Condenser (See page 4-35)
- Clean Air Conditioner Filter (See page 4-36)

1,000 HOUR / 6 MONTH SERVICE

- Perform All 10 Hour / Daily, 50, 250, and 500 Hour Service Checks (See page 4-37)
- Change Radiator Coolant (See page 4-37)
- Drain and Replace Transmission Oil and filter (See page 4-39)
- Clean Fuel Tank and Strainer (See page 4-40)
- Clean Fuel Injection Priming Pump Strainer (See page 4-41)
- Replace Air Conditioner Filter (See page 4-41)
- Check Air Conditioner Refrigerant (See page 4-42)
- Check and Adjust Engine (See page 4-42)

1,500 HOUR / 9 MONTH SERVICE

- Perform All 10, 50, 250, and 500 Hour Service Checks (See page 4-43)
- Replace Outer and Inner Air Cleaner Elements (See page 4-43)
- Axle Differential and Planetaries Oil Replacement (See page 4-43)

2,000 HOUR / YEARLY SERVICE

- Perform All 10 Hour / Daily, 50, 250, 500 and 1,000 Hour Service Checks (See page 4-45)
- Check Steering, Brake, Drive Shaft, Engine and Fuel System (See page 4-45)
- Replace Pipes and Hoses (See page 4-45)
- Bleed Brakes (See page 4-45)
- Drain and Replace Hydraulic Oil (See page 4-46)
- Check Brake Accumulator (See page 4-47)

12,000 HOUR / SIX YEAR SERVICE

- Hose In-service Lifetime Limit (European Standard ISO 8331 and EN982 CEN) (See page 4-48)

* 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 4-18.*

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 4-57.



Figure 4

CHECK ENGINE OIL LEVEL

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

1. Check level of engine oil every day before starting engine.



Figure 5

2. Remove engine oil dipstick. (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 (Figure 5).

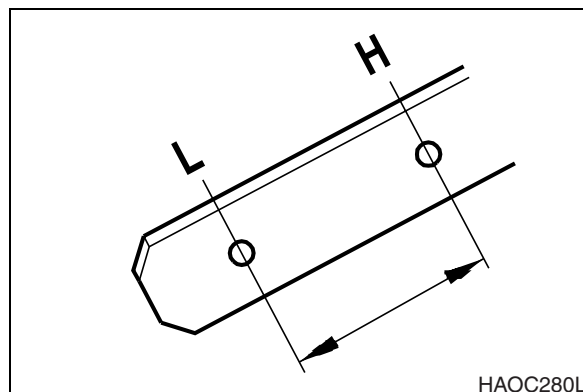


Figure 6

CHECK TRANSMISSION OIL LEVEL

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

1. Use two people to perform this operation.
2. Start engine and move machine to a level area.
3. Place transmission lever in "NEUTRAL."
4. Apply parking brake.
5. Allow engine to idle until transmission temperature is between 82°C (180°F) and 93°C (200°F).
6. Remove transmission dipstick (Figure 7). Wipe dipstick clean and then insert it back into transmission.
7. Remove dipstick and check oil level mark. Oil level must be between "LOW" and "FULL" marks (Figure 8).
8. To add oil, remove transmission fill cap (Figure 7) from transmission oil filler pipe.
9. Shut down engine when done.



Figure 7

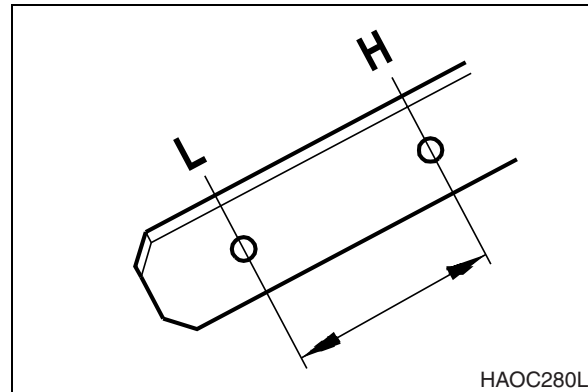


Figure 8

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.

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 10) and lower limit (2) shown on gauge.
5. To add hydraulic oil, turn the breather cap (1, Figure 11) slowly to allow the pressurized air to vent.
6. Remove the upper cover (2, Figure 11) of the hydraulic oil tank and add oil to proper level by checking sight glass (Figure 10).

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.

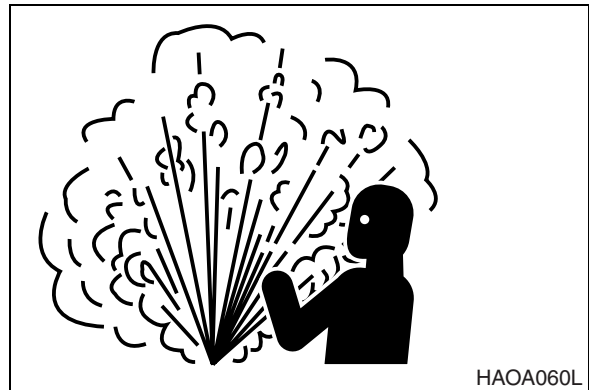


Figure 9

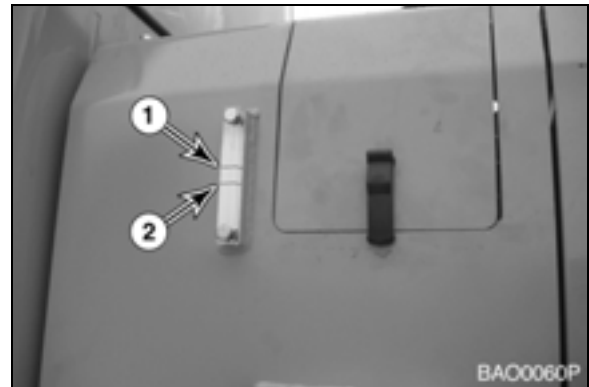


Figure 10

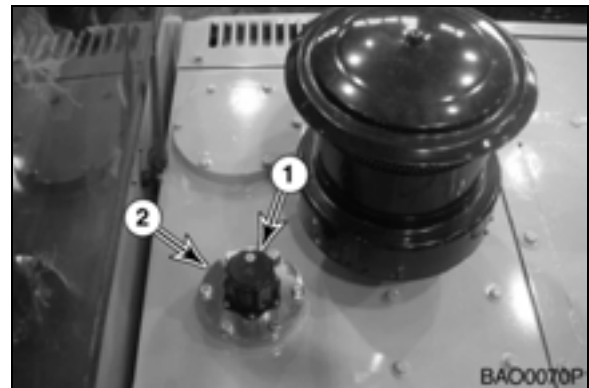


Figure 11

The hydraulic oil filler cover also serves as the hydraulic oil strainer access cover. It is important to replace this cover and the components in the proper order and alignment.

The filter element (2, Figure 12), retaining rod (2) and spring (4) are assembled as shown in Figure 12. The hole (1) in the base of the filter element fits over a circular base in the bottom of the reservoir. The retaining rod (3) screws into the top of the filter element (2), but the spring (4) slides over the top of the rod. Be certain that this spring does not fall into the tank during reassembly.

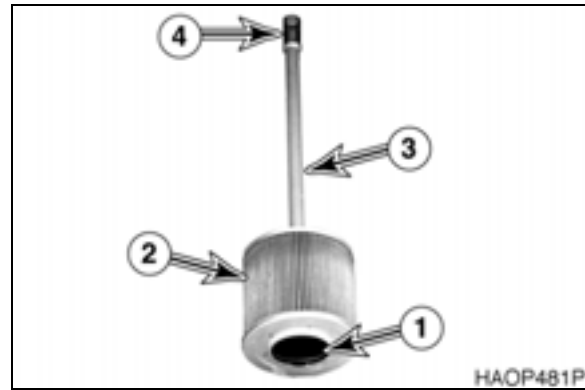


Figure 12

1. If filter assembly was removed, insert assembly into the reservoir and check to make sure it is securely in place.
2. Check O-ring for damages and replace if necessary. Check position of O-ring at surface of hole.
3. Place the cover on the access hole. Make sure the spring retaining cup (1, Figure 13) in the lower section of the cover is lined up with the spring. The filter assembly rod must be in a vertical position and perpendicular to the base of the reservoir. The cover can be rotated to align the rod into a vertical position.
4. Tighten mounting bolts to 4.84 kg•m (35 ft lb).



Figure 13

CHECK FOR LEAKS IN THE 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 filler pipe (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.

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 THE 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

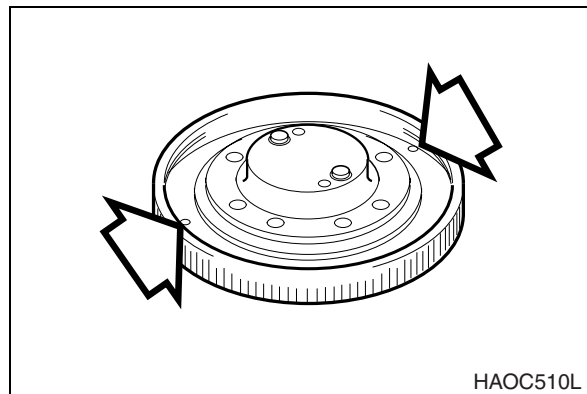


Figure 15

DRAIN FUEL CONDENSATION

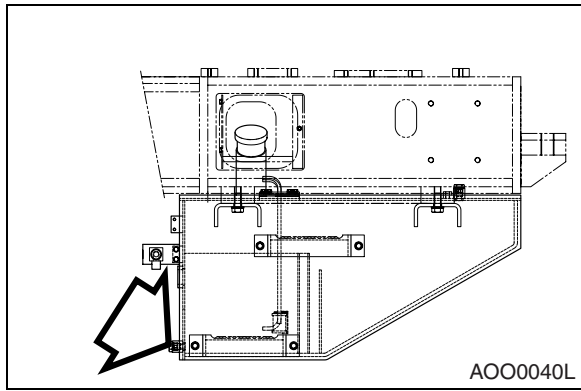


Figure 16

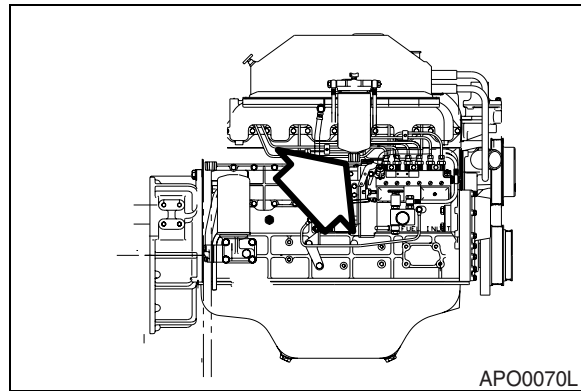


Figure 17

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). Catch drained material in a container. Properly dispose of drained material.

CHECK COOLANT LEVEL



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.

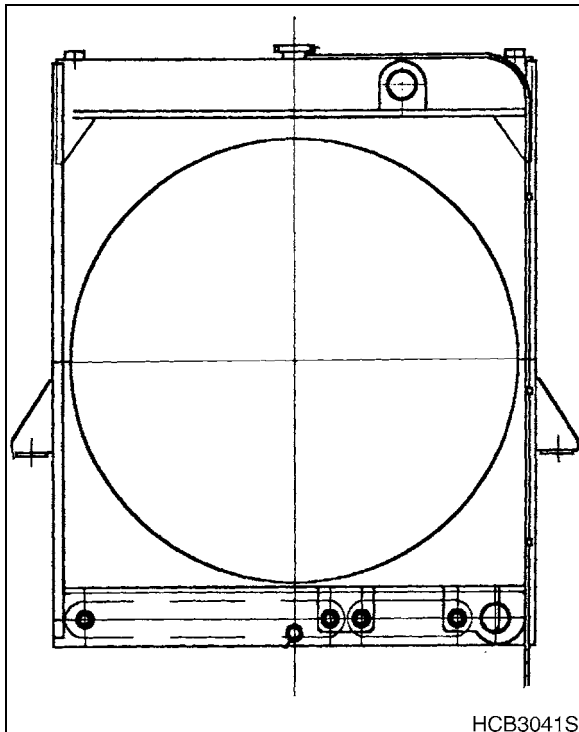


Figure 18

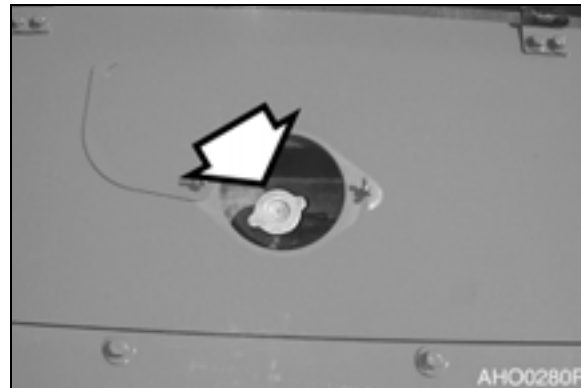


Figure 19

1. Remove fill cap from radiator (Figure 19). 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 "Check Antifreeze Protection Levels" on page 4-14 for antifreeze protection. Use the table to calculate a proper mixture of anti-freeze and water to provide level of protection necessary for expected temperature.

CHECK ANTIFREEZE PROTECTION LEVELS

Ambient Temperature	Cooling Water	Antifreeze
-10°C (15°F)	80%	20%
-15°C (5°F)	73%	27%
-20°C (-5°F)	67%	33%
-25°C (-15°F)	60%	40%
-30°C (-20°F)	56%	44%
-40°C (-30°F)	50%	50%

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.

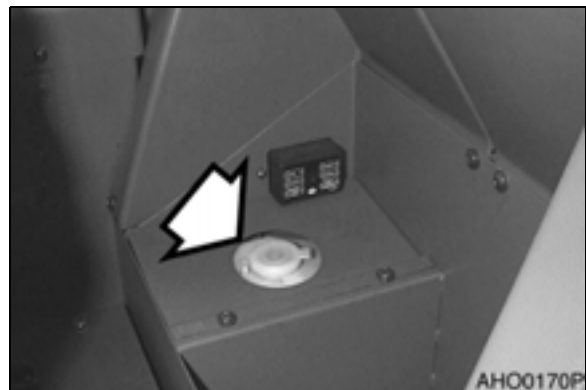


Figure 20

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 21)

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

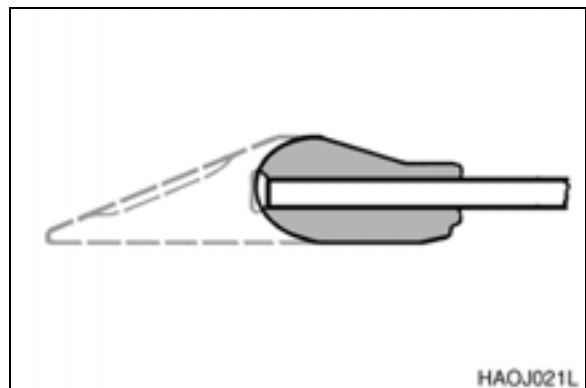


Figure 21

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 the "ON" position and observe all indicator lights.
2. Restore operation of any light bulbs that do not turn "ON" at this point.
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.

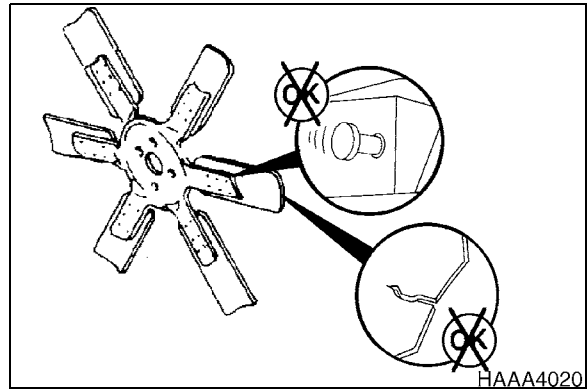


Figure 22

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.

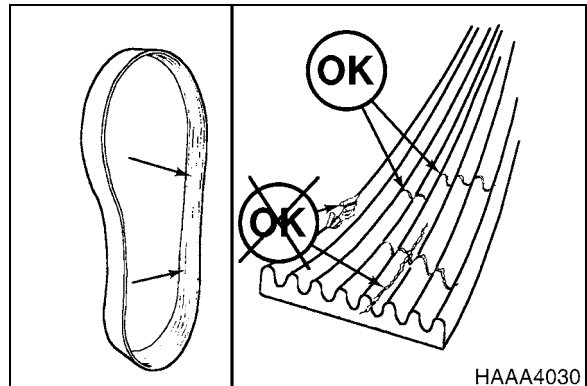


Figure 23

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.

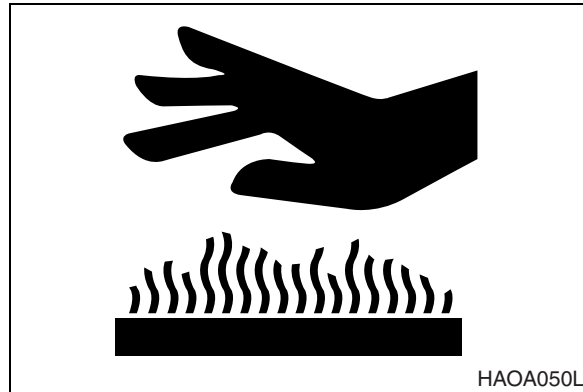


Figure 24

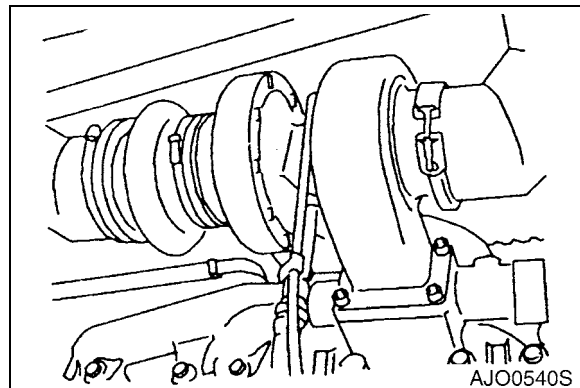


Figure 25

50 HOUR / WEEKLY SERVICE

PERFORM ALL 10 HOUR / DAILY SERVICE CHECKS

GREASE FRONT ATTACHMENT PINS

MEGA 200-V

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.

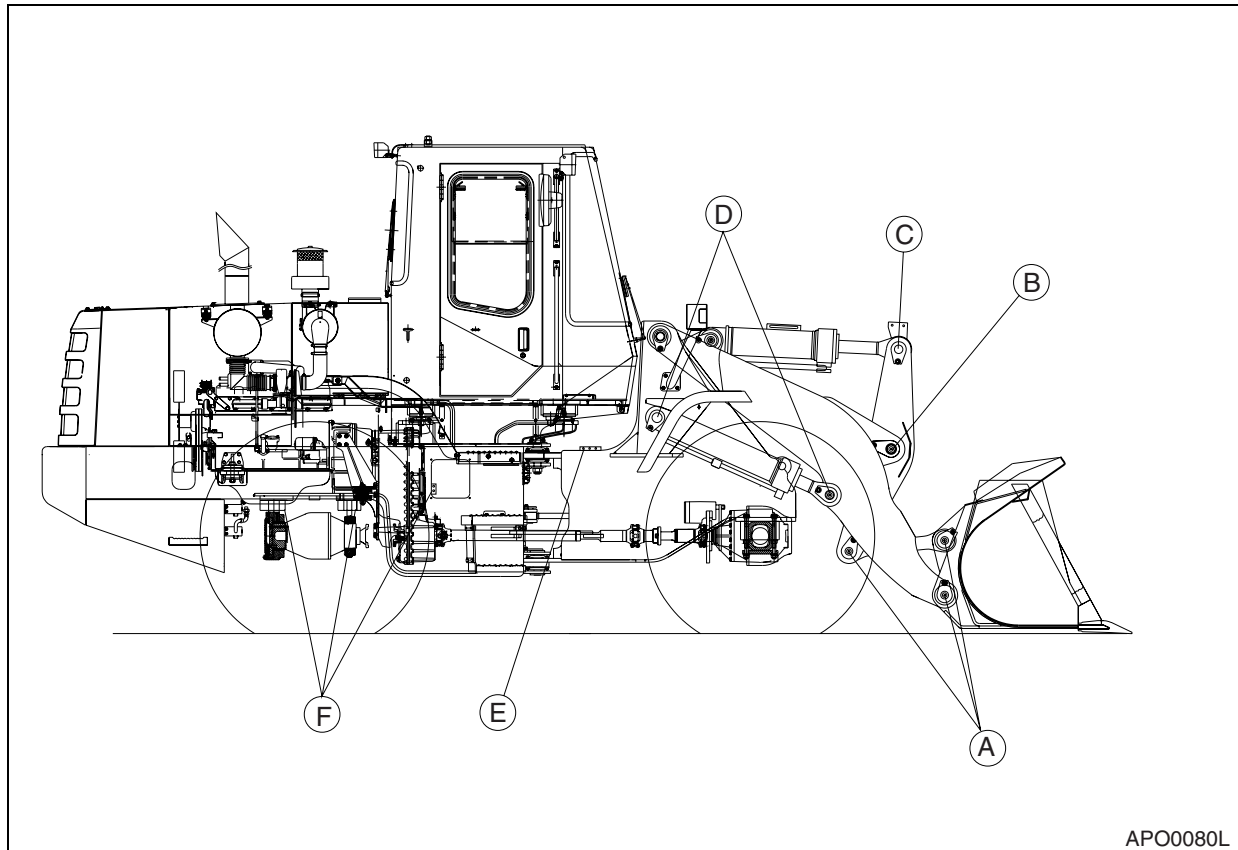


Figure 26

- A. Bucket hinge pins, 2 locations (Figure 27).

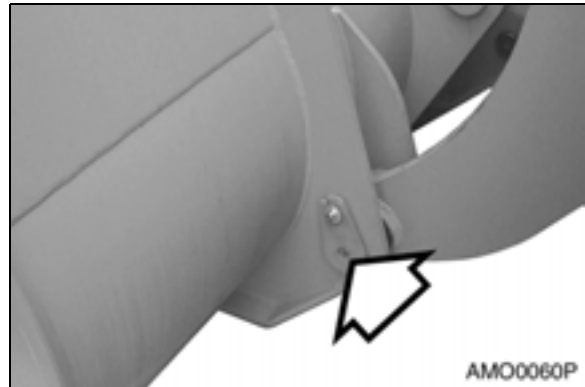


Figure 27

- Lever link connecting pin, 1 location (Figure 28).

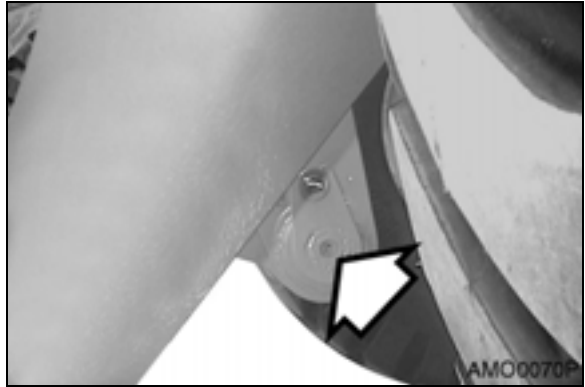


Figure 28

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

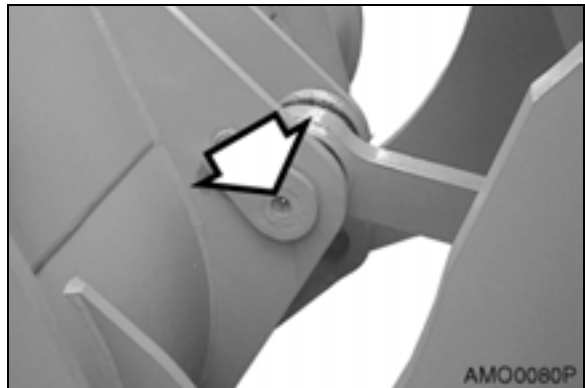


Figure 29

- B: Arm-lever connecting pin, 1 location. (Figure 30).



Figure 30

- C: Bucket cylinder rod end, 1 location.
(Figure 31).

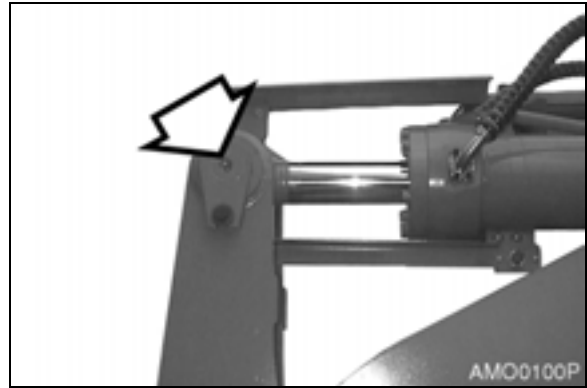


Figure 31

- D: Lift cylinder heads (left, right), 2 locations (Figure 32).

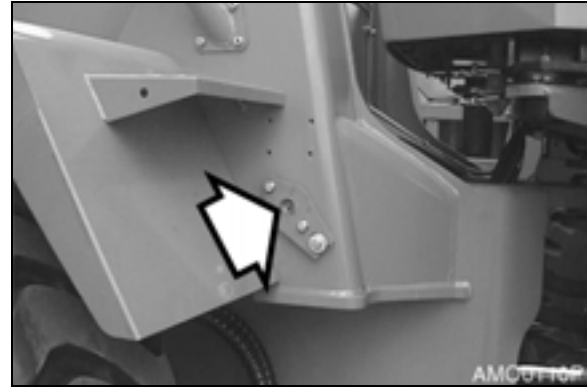


Figure 32

- Lift cylinder rod ends, 2 locations.
(Figure 33).



Figure 33

E: Remote location points.

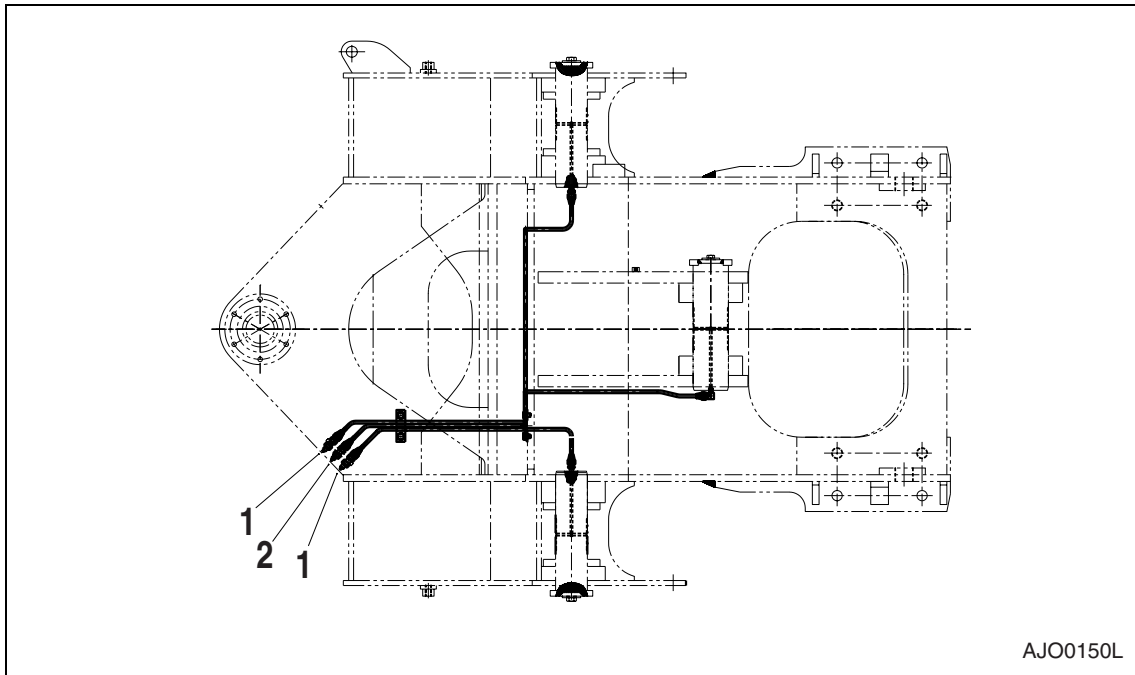


Figure 34

1. REMOTE FITTINGS FOR LOADER ARM FOOT ENDS (50 HOUR) (Figure 35 and Figure 36).
2. REMOTE FITTINGS FOR BUCKET CYLINDER HEAD (50 HOUR) (Figure 35 and Figure 37).

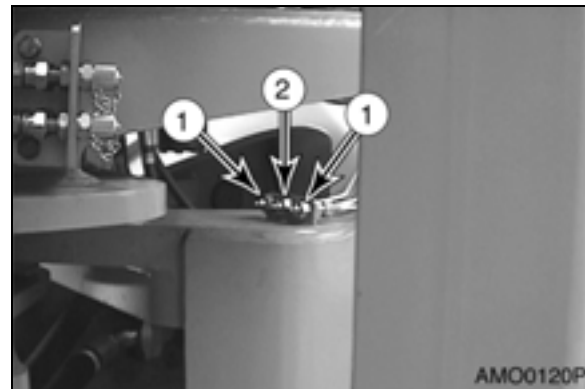


Figure 35

- 1) Loader arm foot ends, 2 locations on each side of machine. Greased from two remote grease points (1, Figure 34).

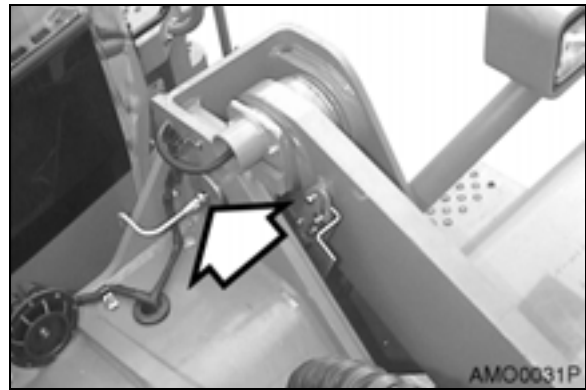


Figure 36

- 2) Bucket cylinder head, 1 point. Greased from remote grease point (2, Figure 34).

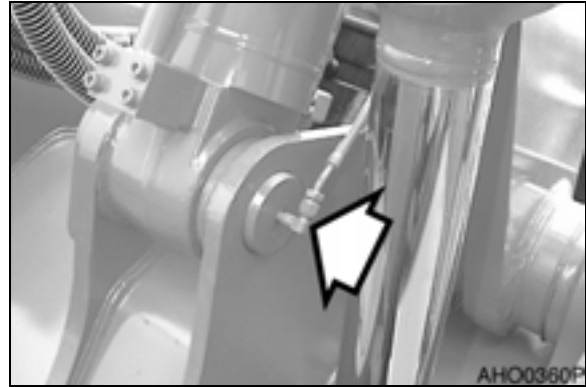


Figure 37

- F: Rear Axle pivot (1, Figure 38), 2 locations on each side of machine. Use remote grease fittings mounted on frame shown in Figure 38.

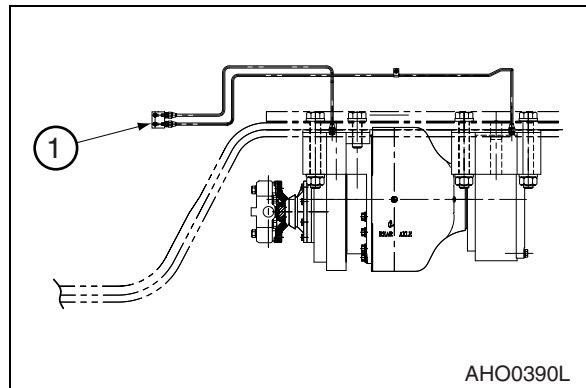


Figure 38

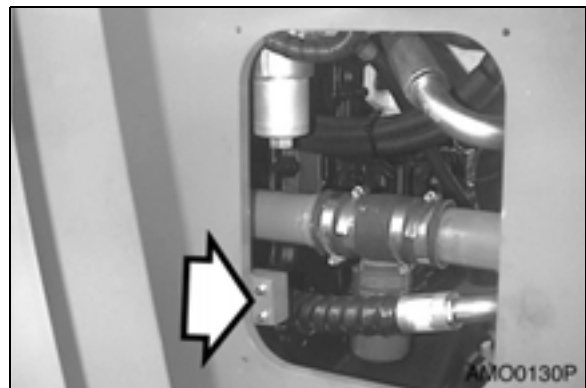


Figure 39

MEGA 200-VTC

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.

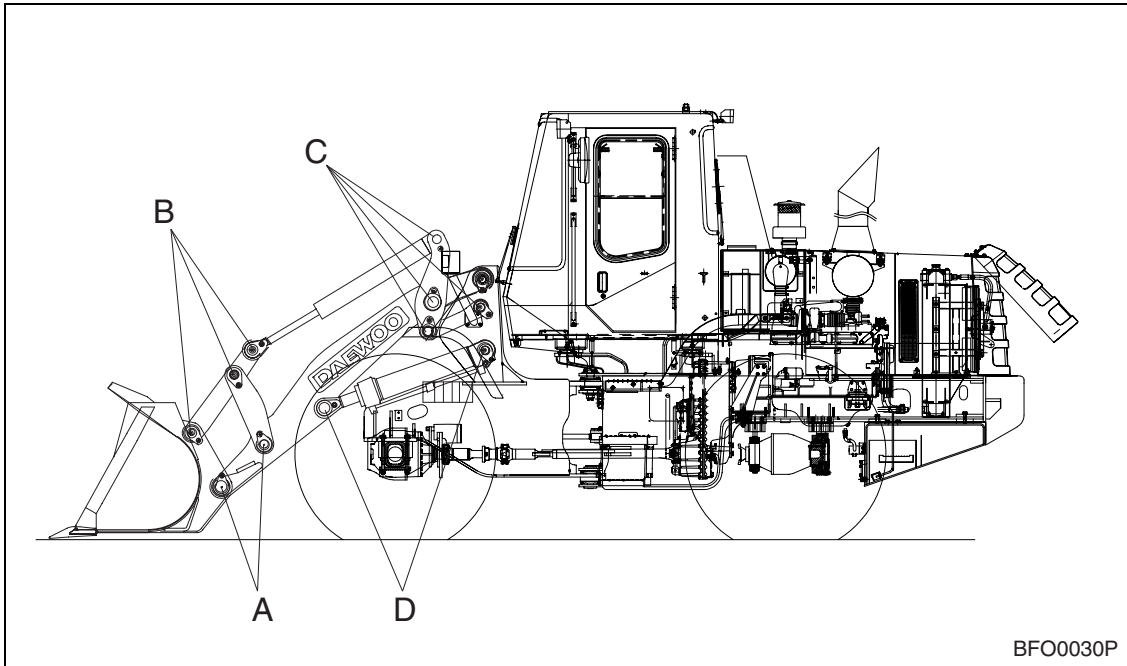


Figure 40

- A: Bucket hinge pins, 2 locations on each side of bucket. Arm link connecting pins, 2 locations. (Figure 41)

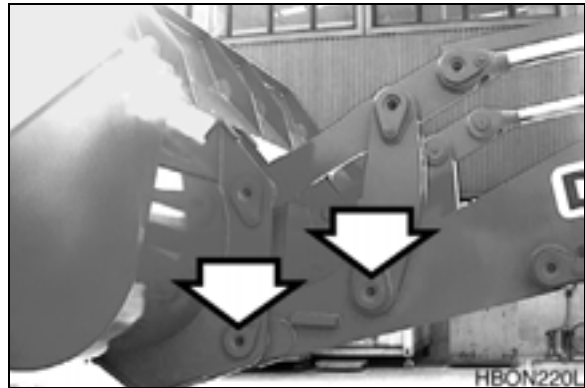


Figure 41

- B: Bucket lever connecting pins, 2 locations. Lever link connecting pins, 2 locations. Bucket cylinder rod ends, 2 locations. (Figure 42)

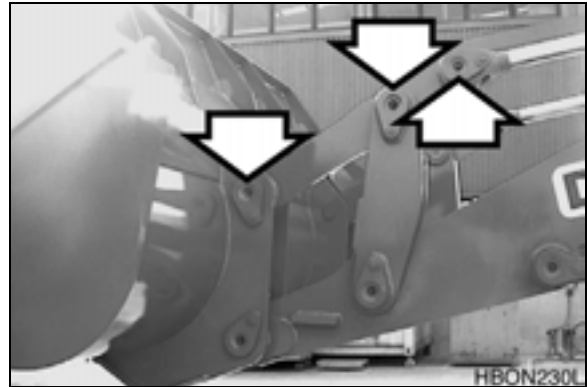


Figure 42

- C: Bucket cylinder heads, 2 locations. Arm lever connecting pins, 2 locations. Lever link connecting pins, 2 locations. (Figure 43)
Link foot pins, 2 locations.



Figure 43

- D: Lift cylinder heads (left, right), 2 locations. Lift cylinder rod ends, 2 locations. (Figure 44)

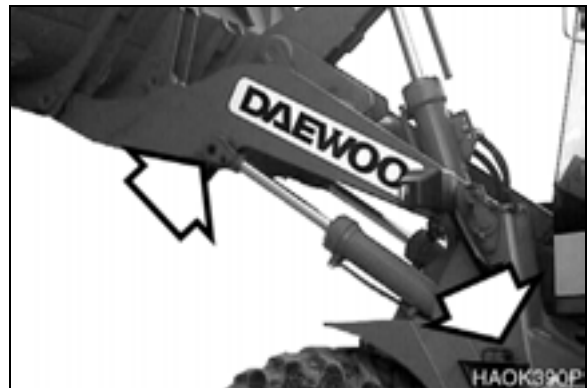


Figure 44

GREASE STEERING CYLINDER ROD AND HEAD ENDS

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



Figure 45

- Steering cylinder head ends, 2 locations. Use remote grease fittings mounted on frame.(1,2 Figure 46).

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

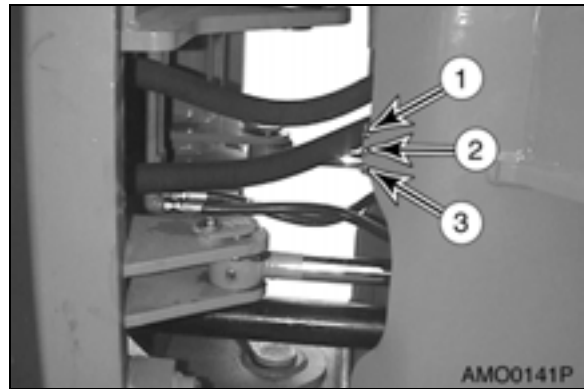


Figure 46

GREASE UPPER AND LOWER CENTER PINS

- Center pins, Upper (Figure 47) and Lower (Figure 48). Two locations on each side of machine.

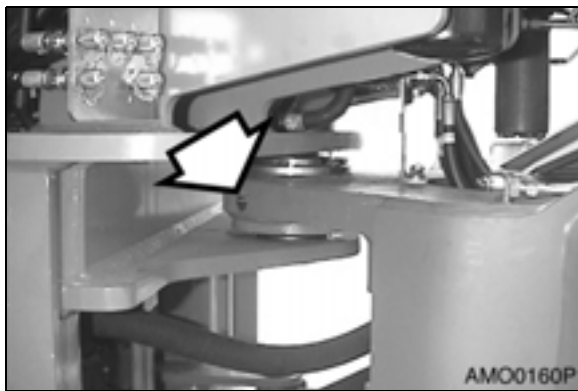


Figure 47

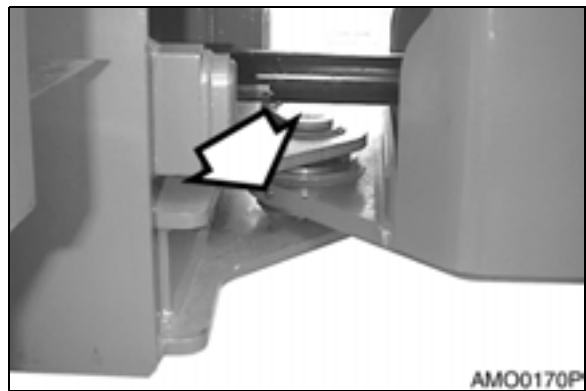


Figure 48

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. Follow procedure under 250 hour maintenance interval. (See page 4-25)

HYDRAULIC FULL FLOW FILTER REPLACEMENT

NOTE: Replace hydraulic full flow filter after first 50 hours of operation and every 250 Hours thereafter. Follow procedure under 250 hour maintenance interval (See page 4-30)

CHECK WATER PUMP BELT TENSION

- 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 4-32.

CLEAN EXTERIOR OF RADIATOR, OIL COOLER AND AIR CONDITIONER CONDENSER

1. Dust and dirt accumulation on fins of radiator, oil cooler, and 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. (See page 4-35).*

250 HOUR / MONTHLY SERVICE

PERFORM ALL 10 HOUR / DAILY, 50 HOUR SERVICE CHECKS

CHANGE ENGINE OIL AND FILTER

NOTE: *Change engine oil and filter after first 50 hours on a new machine and every 250 hours 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 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).*

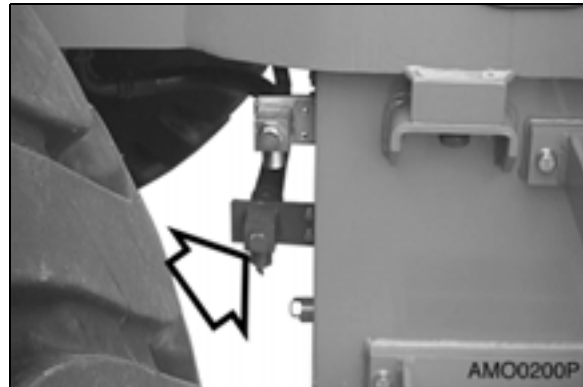


Figure 49

2. Replace engine oil filter (Figure 50). 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.*

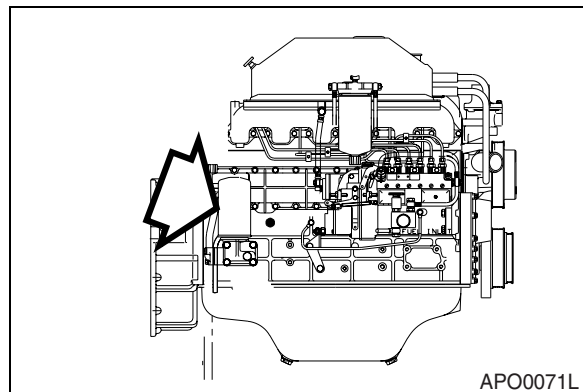


Figure 50

4. Fill engine with correct oil through oil fill port (2, Figure 51). Refer to Lubrication Table of this manual for recommended oil for the operating conditions.
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 51).

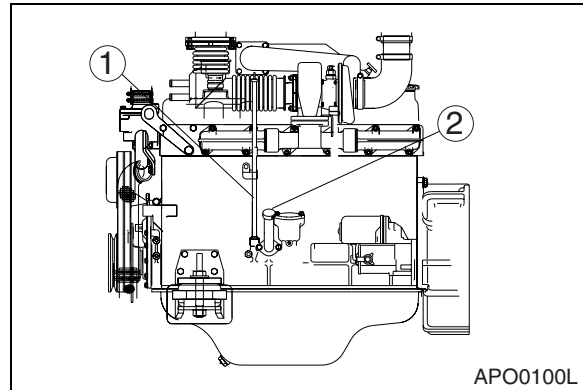


Figure 51

REPLACE HYDRAULIC SYSTEM BRAKE AND PILOT FILTER

Replace filter element in pilot filter. Perform the following steps:

1. Vent hydraulic oil tank.
2. Unscrew element cover (5, Figure 53). Cover is filled with oil. Dispose of oil.
3. Remove O-ring (3, Figure 53) and filter element (4).
4. Use a nonflammable, nontoxic solvent to clean out cover (5, Figure 53).
5. Insert a new filter element (4, Figure 53) into cover (5). Install a new O-ring (3).
6. Screw cover (5, Figure 53) onto filter head (1).

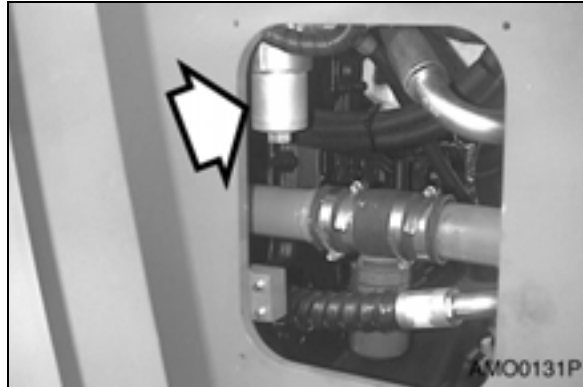


Figure 52

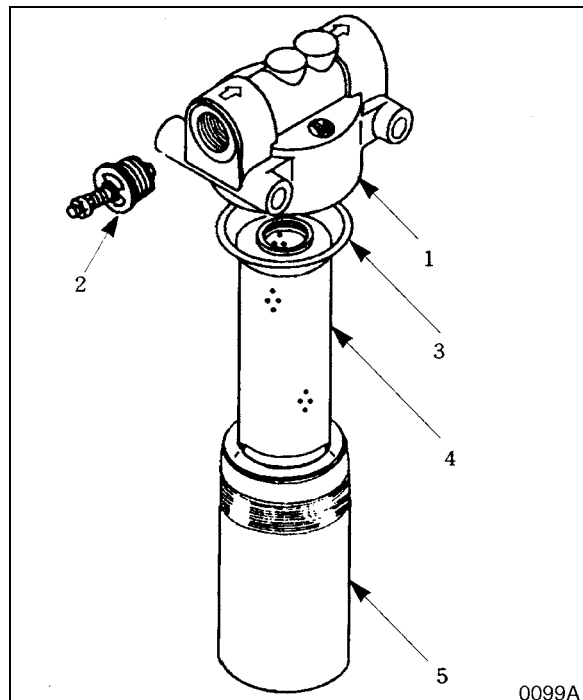


Figure 53

CHECK ENGINE AIR PRE-CLEANER

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

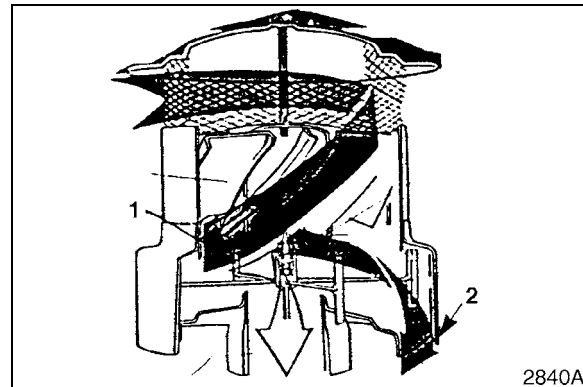


Figure 54

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 250 Hours thereafter.

1. Loosen breather cap on hydraulic reservoir. (See Figure 11 on page 4-10).
2. Clean filter cover (2, Figure 55) and reservoir around cover.
3. Remove bolts (1, Figure 55) from cover (2).
4. Lift cover (2, Figure 55) and O-ring (4) off reservoir. Control spring (3) that sits beneath cover. Remove spring (3).
5. Remove valve (5, Figure 55) and filter element (6) from reservoir.
6. Clean underside of cover (2, Figure 55).
7. Set a new element (6, Figure 55) 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 55) on cover (2). Set spring (3) into place on element (6).
9. Set cover (2, Figure 55) into place over element (6). Install bolts (1) through cover (2) and tighten them.
10. Tighten breather cap on reservoir.

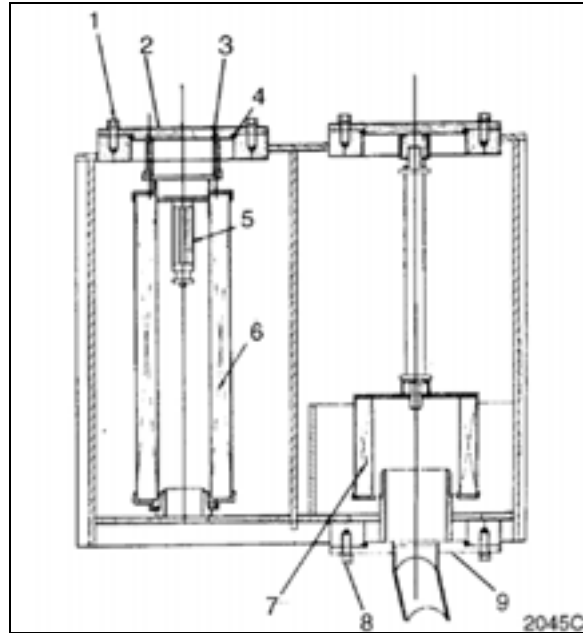


Figure 55

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. Turn "Off" engine.
2. Position a container under hydraulic reservoir drain plug. Open reservoir breather cap (See Figure 11 on page 4-10). Loosen drain valve from bottom of reservoir (Figure 56). Allow all water and sediment to drain out. Tighten drain valve.

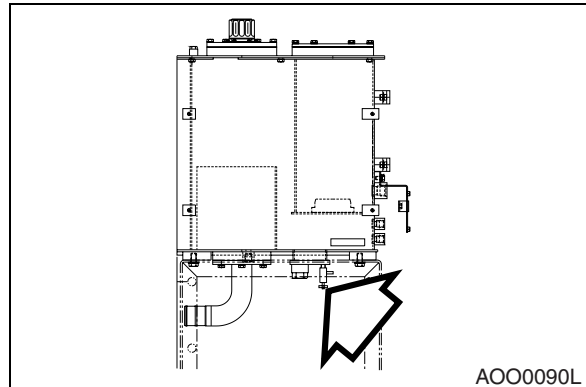


Figure 56

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.

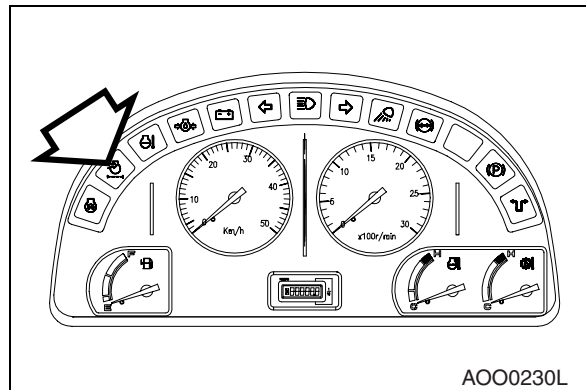


Figure 57

1. Locate the air filter assembly (Figure 58). Remove access cover and remove outer element 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 element every 1,500 hours of service.



Figure 58

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.

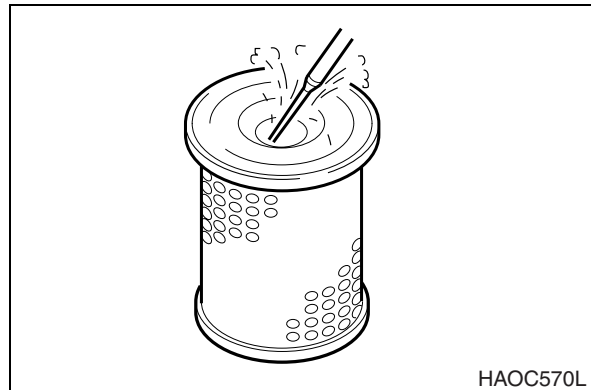
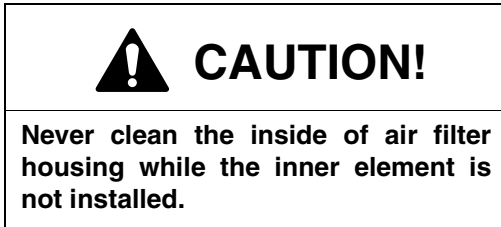
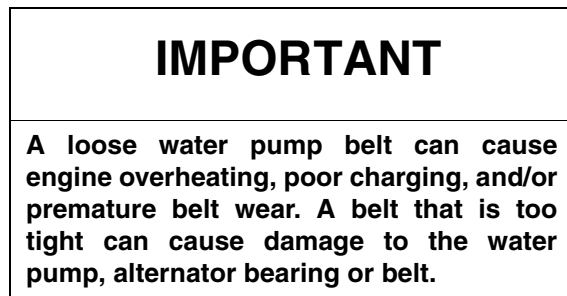


Figure 59

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



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.

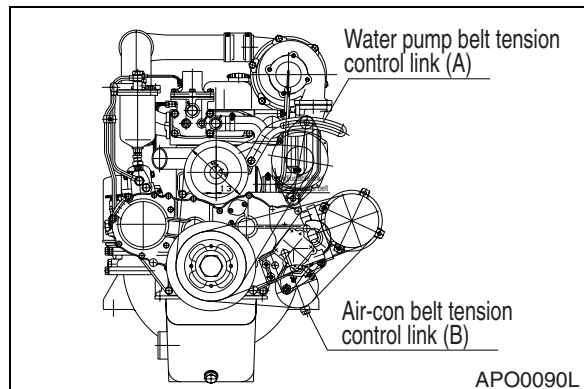


Figure 60

1. Apply 10 kg (22 lb) of force to midpoint of belt. (Figure 60). 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.

GREASE DRIVE SHAFTS

1. Grease fitting for center bearing, 1 location. Use remote grease fitting mounted on frame (3, Figure 61).

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

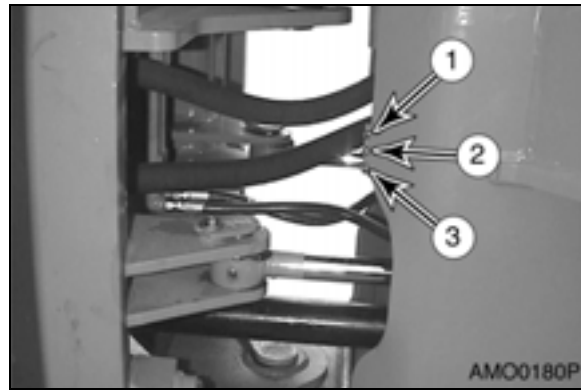


Figure 61



Figure 62

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 4-43)

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 4-39)

500 HOUR / 3 MONTH SERVICE

PERFORM ALL 10 HOUR / DAILY, 50, AND 250 HOUR SERVICE CHECKS

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.
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.

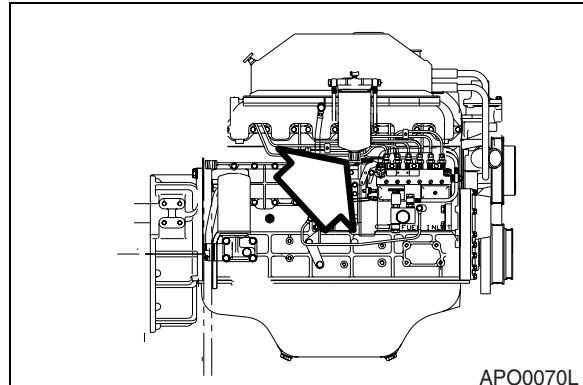


Figure 63

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.
 - 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.

CLEAN EXTERIOR OF RADIATOR, OIL COOLER AND AIR CONDITIONER CONDENSER

1. Dust and dirt accumulation on fins of radiator and oil cooler (Figure 64), and air conditioner condenser (Figure 65) 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.*

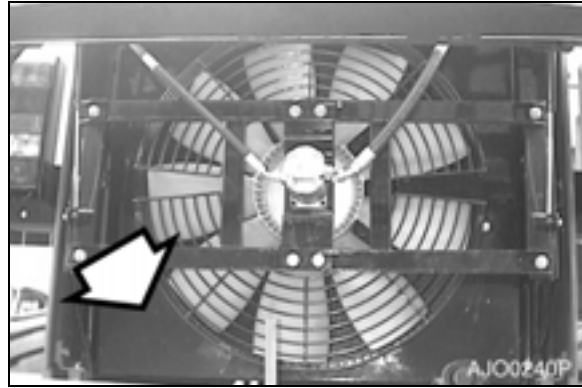


Figure 64 (S/N 1001 thru 2000 EUROPE LOW NOISE KIT) and (S/N 2001 and Up)

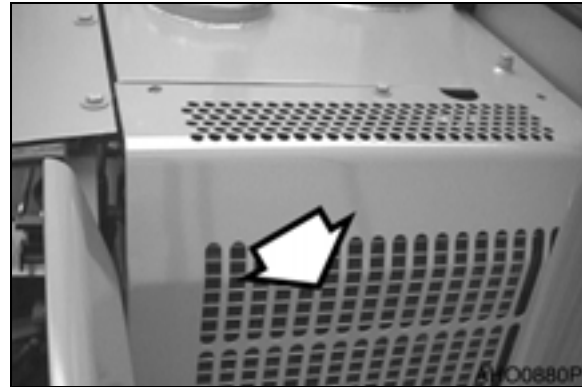


Figure 65 AIR CONDITIONER CONDENSER

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

NOTE: *If water was used to clean filter element 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.*

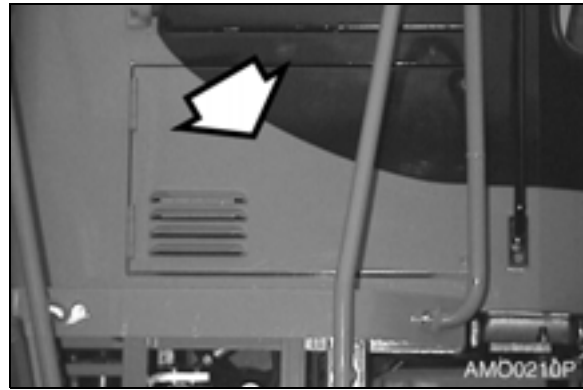


Figure 66



Figure 67



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 10 HOUR / DAILY, 50, 250, AND 500 HOUR SERVICE CHECKS

CHANGE RADIATOR COOLANT



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.

1. Slowly open the radiator cap (Figure 68) to allow any pressure to escape.

NOTE: See "Fluid Capacities" on page 4-5 for capacity.

2. Place a container under the radiator and open the drain valve (Figure 69).

3. Open vent on intercooler.

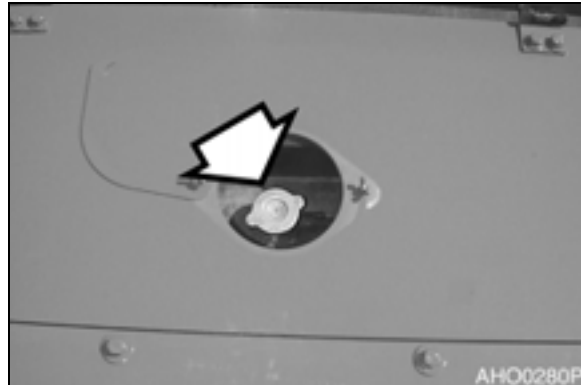


Figure 68

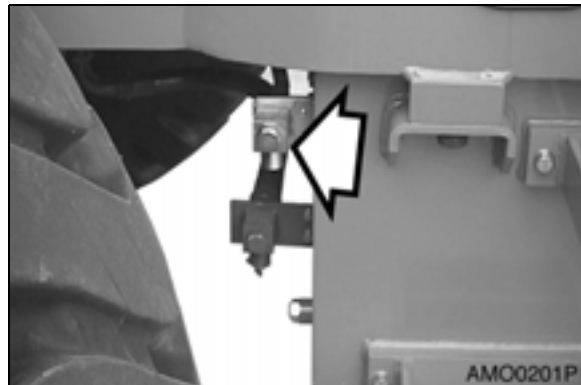


Figure 69

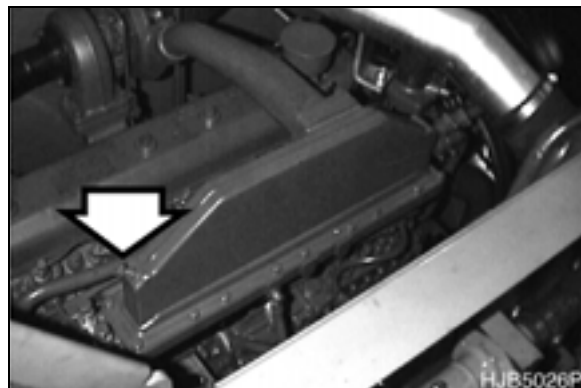


Figure 70

4. Remove coolant drain plug (Figure 71) from engine.

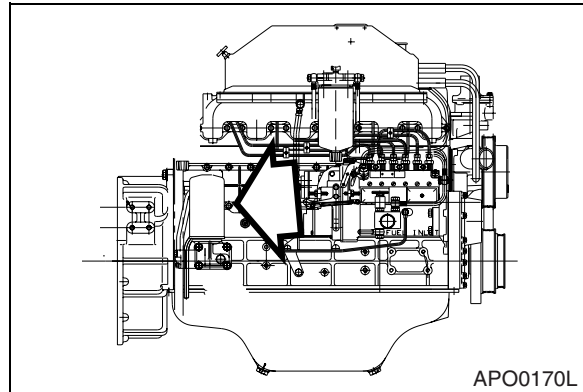


Figure 71

5. Open heater shutoff valve (Figure 72) to allow coolant to drain from heater core.
6. Install drain plug, and close drain valve after coolant has completely drained from system.
7. Fill cooling system with a flushing solution.

NOTE: When filling engine with flushing solution, open vent (Figure 70) on intercooler to allow air to escape. Close vent when solution is present.

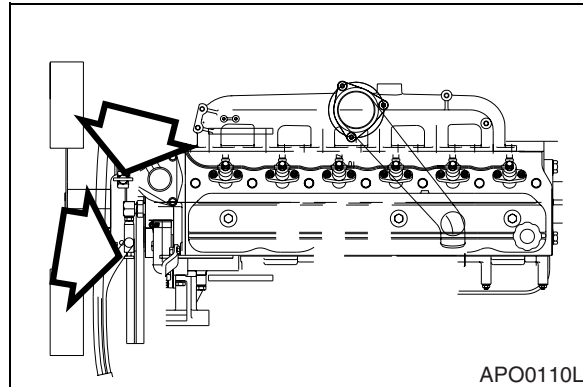


Figure 72

8. Run engine at low idle until the coolant temperature gauge reaches the "GREEN ZONE." Run engine for another 10 minutes.
 9. After allowing engine to cool.
 10. Drain flushing fluid and fill system with water.
 11. Run engine again to allow water to completely circulate.
 12. Drain water and fill system with proper anti-freeze mixture for ambient temperature. Refer to coolant concentration table (See page 4-14).
- NOTE:** When filling engine with coolant, open vent (Figure 70) on intercooler to allow air to escape. Close vent when coolant is present.
13. 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.

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. Start machine and drive it until transmission fluid has warmed to 82 – 93°C (180 – 200°F). Park machine on a level area.
2. Place transmission lever in "NEUTRAL." Apply parking brake. Shut down engine. Block tires.

NOTE: *See "Fluid Capacities" on page 4-5 for capacity.*

3. Remove drain plug. Allow all transmission fluid to drain into a receptacle. Properly dispose of drained fluid. Clean drain plug (Figure 73).
4. Install drain plug in transmission.
5. Remove inlet strainer. Use a nonflammable, nontoxic solvent to clean strainer.
6. Inspect gasket on inlet strainer. Replace gasket if it is damaged. Install inlet strainer.
7. Remove breather filter. Clean breather filter and install it.
8. Rotate filter (1, Figure 74) counterclockwise to remove it.
9. Clean filter head.
10. Grease filter gasket and gasket mating surface on filter head.
11. Thread filter onto filter head. Tighten filter 1/2 turn after filter gasket contacts filter head. Filter should be torqued to 1.6 - 2.1 kg.m (11.5 - 15 ft lb.) (Figure 74).

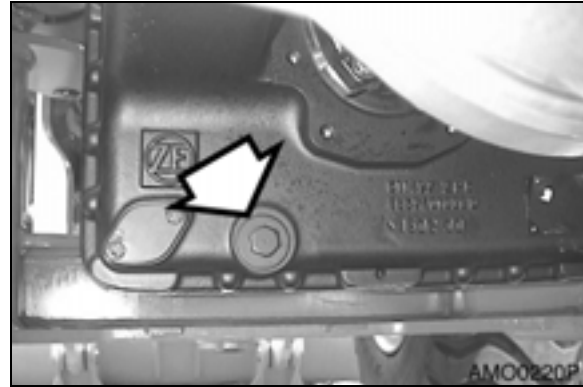


Figure 73

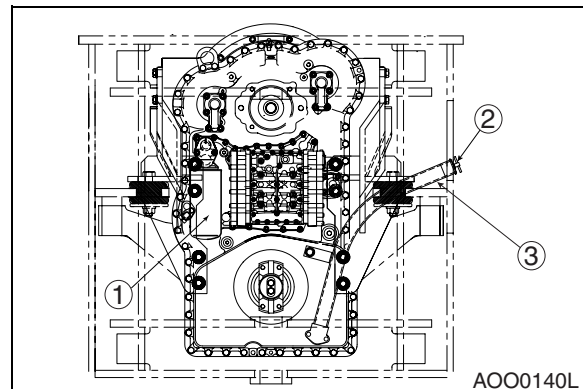


Figure 74

12. Fill transmission with fluid through fluid supply pipe (3, Figure 74). Add fluid until fluid level reaches low mark on dipstick (2, Figure 74).
13. Start engine. Idle engine for two minutes.
14. With engine idling, check transmission fluid level. Add fluid until level reaches high mark on dipstick.
15. Idle engine until transmission fluid temperature reaches 82 – 93°C (180 – 200°F). Check fluid level with engine idling. Level must reach high mark on dipstick.
16. Check filter for leaks while engine is running.



Figure 75

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 76) 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 76).
5. Clean inside of the tank and suction strainer (Figure 77).
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.

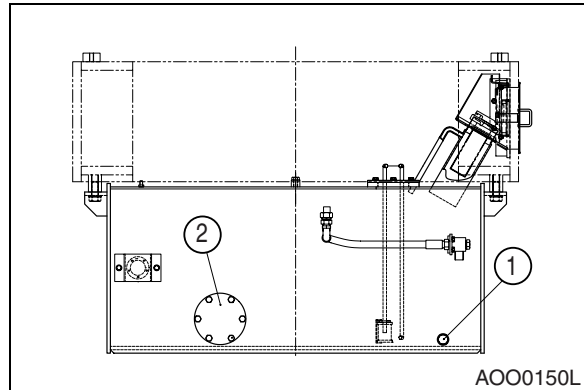


Figure 76



Figure 77

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.

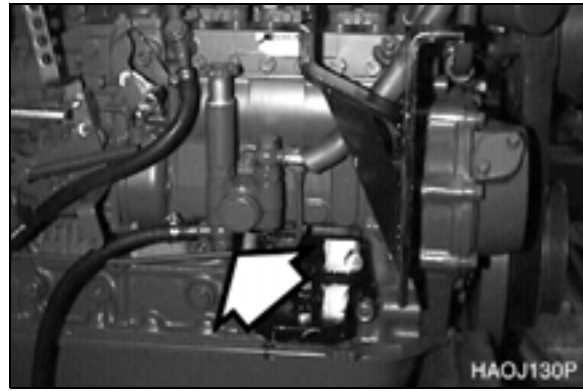


Figure 78

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 4-36.*

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.

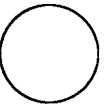
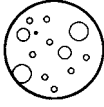
1. Apply the parking brake and lower attachment to the ground.
2. Remove the cover.
3. Press the "HI" flow control switch to set maximum air flow.
4. Set the temperature control switch fully to the cool position and fully open the cab doors.
5. Slightly accelerate the engine to about the middle speed range (compressor speed 1,500-1800 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 1,500 rpm.	
High	 No bubble is 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 10, 50, 250, AND 500 HOUR SERVICE CHECKS

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 re-use 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.

AXLE DIFFERENTIAL AND PLANETARIES OIL REPLACEMENT

NOTE: Oil in both front and rear axle 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 in each end. The same oil lubricates center differential and planetaries in axle ends, but oil flows very slowly between these points. When checked, oil must be checked and refilled at all three places at the same time. To drain and replace oil in an axle, perform the following steps:

1. Drive machine onto a level surface. Position wheels on axle being drained so that axle end level plugs (1, Figure 79) are in the lowest position. Apply parking brake. Block wheels.
2. Clean area around level plugs on both ends of axle. Remove plugs.

NOTE: See "Fluid Capacities" on page 4-5 for capacity.

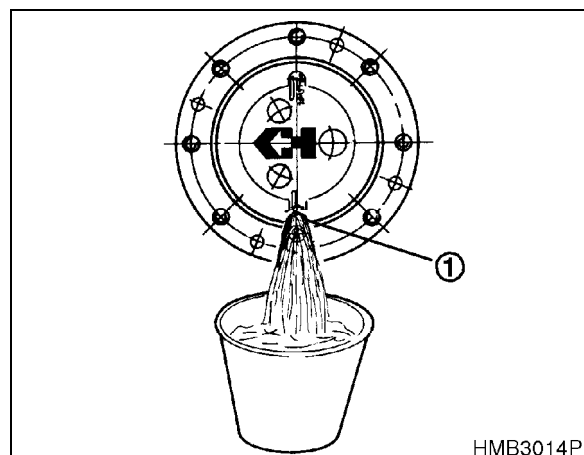


Figure 79

3. Clean area around level plug (1, Figure 80) and drain plug (2) on center differential. Remove level plug and drain plug. Allow oil to drain into a container.
4. Install drain plug into center differential, and tighten it.
5. Pump oil into plug hole for level plug on center differential. Add oil until oil level is even with bottom of plug hole.

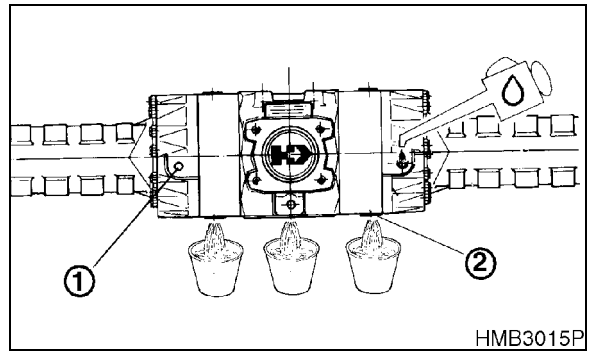


Figure 80

6. Go to level plug holes (1, Figure 81) on axle ends. Add oil to these openings 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 all three level plug holes, install and tighten level plugs at all three locations.
7. Repeat procedure for other axle.

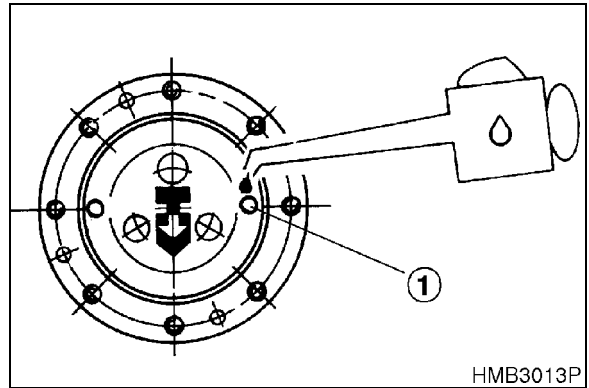


Figure 81

2,000 HOUR / YEARLY SERVICE

PERFORM ALL 10 HOUR / 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 pipes that carry brake fluid to wheel brakes i.e., service brake pipe (1, Figure 82) parking brake pipe (2). Also replace hoses that carry hydraulic fluid to steering cylinders.
2. It is difficult to determine condition of many pipes and 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 pipes and hoses become damaged or appear defective in any way, replace them immediately regardless of time interval since their last replacement.

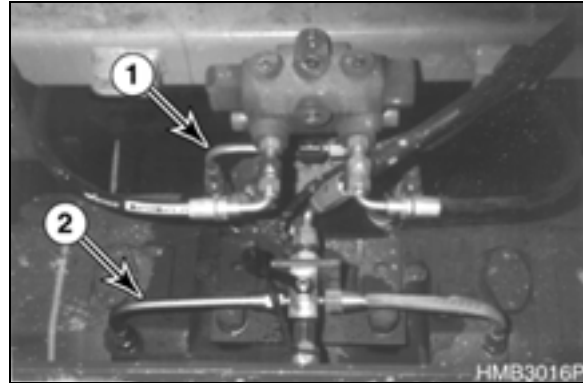


Figure 82

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: (Figure 83)

1. Start engine and place transmission in "NEUTRAL."
2. Remove rubber cap from bleeder screw on wheel.
3. Place one end of a plastic hose (2) over bleeder screw (1). Place other end of hose in a container (3) filled with brake fluid.
4. Station one person in operator's cab, and one person at bleeder screw on wheel being bled.
5. Open bleeder screw (1). 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.
6. Securely close bleeder screw (1). Install rubber cap on bleeder screw.

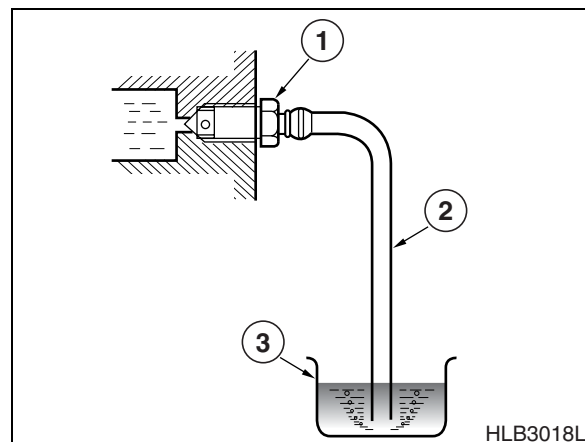


Figure 83

7. Perform bleeding procedure on other three wheels.

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.

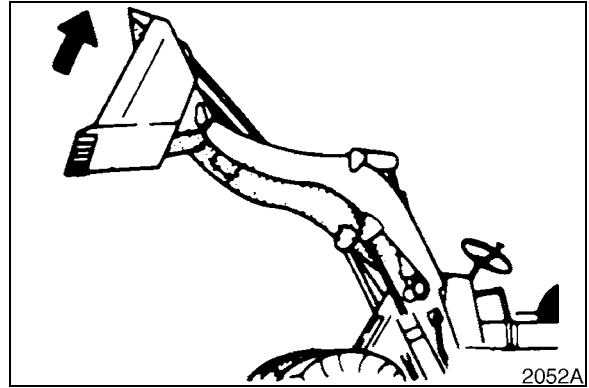


Figure 84

2. Position a catch tank beneath hydraulic reservoir drain plug. Release pressurized air from hydraulic oil tank by rotating air-breather cap. (See Figure 11 on page 4-10). Remove drain plug (Figure 85) from bottom of reservoir. Allow all hydraulic oil to drain out.

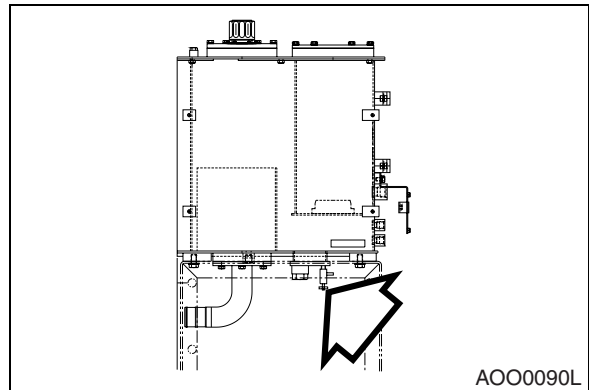


Figure 85

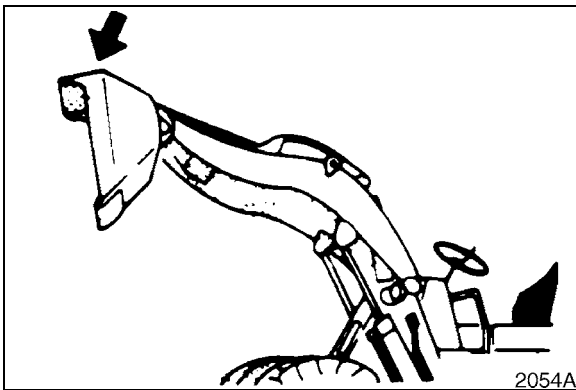


Figure 86

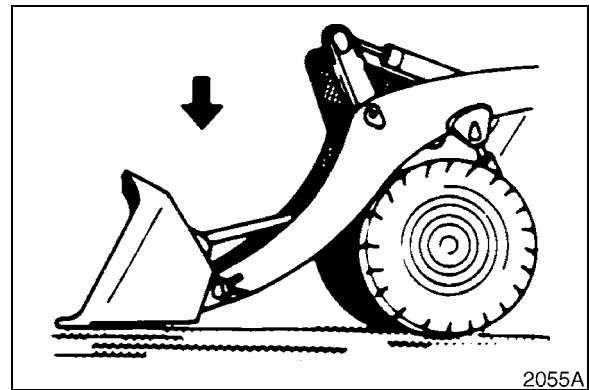


Figure 87

3. Without starting engine, operate controls to dump bucket. (Figure 86). Then operate controls to lower boom. (Figure 87). 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 4-30.
5. Install reservoir drain plug. Remove upper cover of hydraulic oil tank. Refill reservoir by pouring oil in through upper cover opening. Install and tighten upper cover.

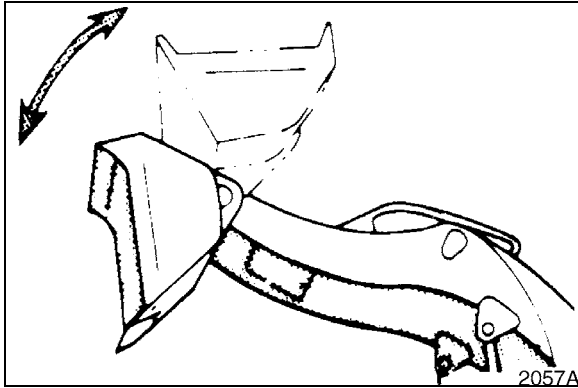


Figure 88

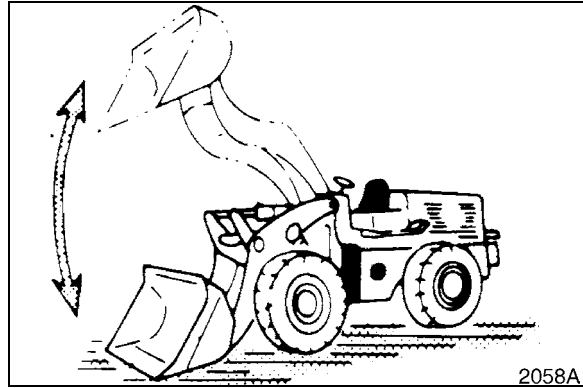


Figure 89

6. Start engine and operate controls to raise and lower bucket a few times. (Figure 88). Raise and lower boom a few times. (Figure 89). Lower bucket to ground.
7. Check reservoir sight gauge. (See Figure 10 on page 4-10). 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 the starter switch to the "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 can not 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 4-45, 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.

GENERAL MAINTENANCE

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 motor from damage.

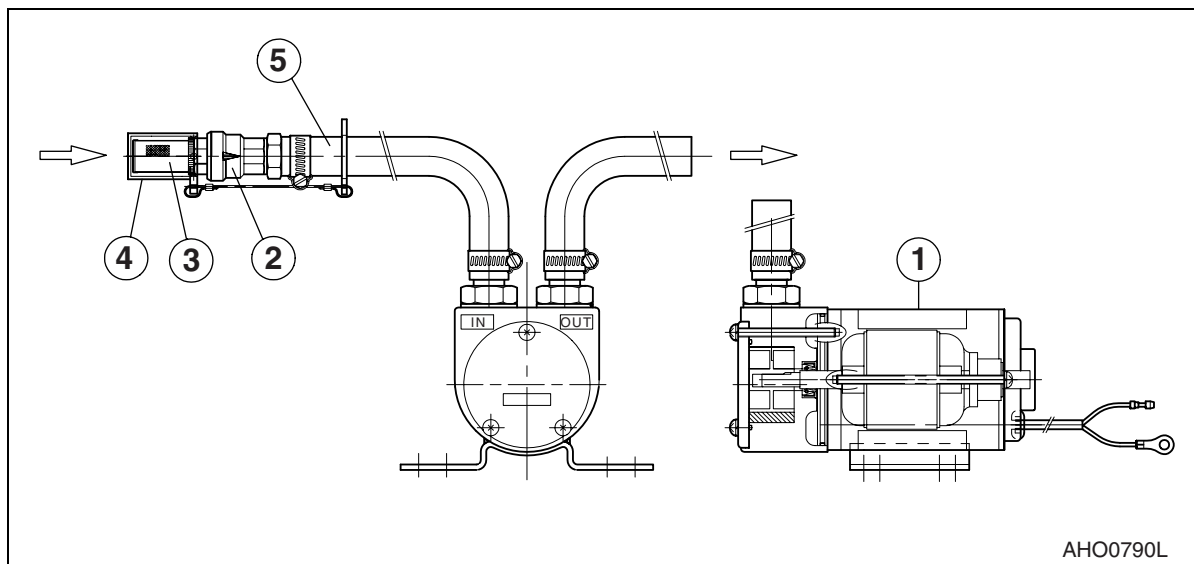


Figure 90

1. Remove strainer cap (4, Figure 90) from inlet hose.

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

2. Insert inlet hose (5, Figure 90) 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.

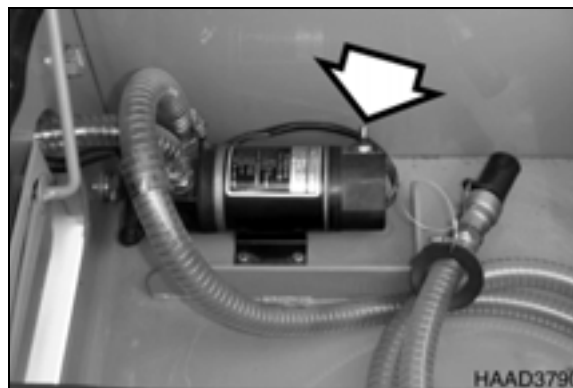


Figure 91

PARKING BRAKE ADJUSTMENT

To adjust parking brake, perform the following steps:

1. Jack up machine enough to allow tires to rotate freely.
2. Turn "OFF" engine and place transmission lever in "NEUTRAL." Turn ignition switch to "ON" position. Move parking brake switch to "UNLOCKED" position.

FRONT AXLE SERVICE BRAKES

Checking clearance between brake pad and brake disc in the front axle.

1. Locate the pinion adjusting bolt in the upper part of the differential housing.
2. Remove lock bolt (2, Figure 92) and bracket (1).
3. Rotate the square pinion adjusting bolt (3, Figure 92) in counter clockwise direction until it stops. At this time the clearance of brake disk is "0".
4. Rotate adjusting bolt (3, Figure 92) clockwise four turns (0.25 mm / rotation) to set the clearance to 1 mm (0.4 in).
5. Install lock bracket (1, Figure 92) and bolt (2).

Repeat steps 1-5 for other side.

FRONT AXLE PARKING BRAKE EMERGENCY RELEASE

1. Locate parking brake release bolt on the lower section on both sides of the housing.
2. Loosen lock nut (4, Figure 92) from adjusting bolt (5).
3. Tighten adjusting bolt (5, Figure 92) until it stops. This will manually release the parking brake so that the drive shaft will be free to turn.

The initial setting of adjusting bolt is 47 mm and should be readjusted to this length and lock nut tightened after towing is complete.

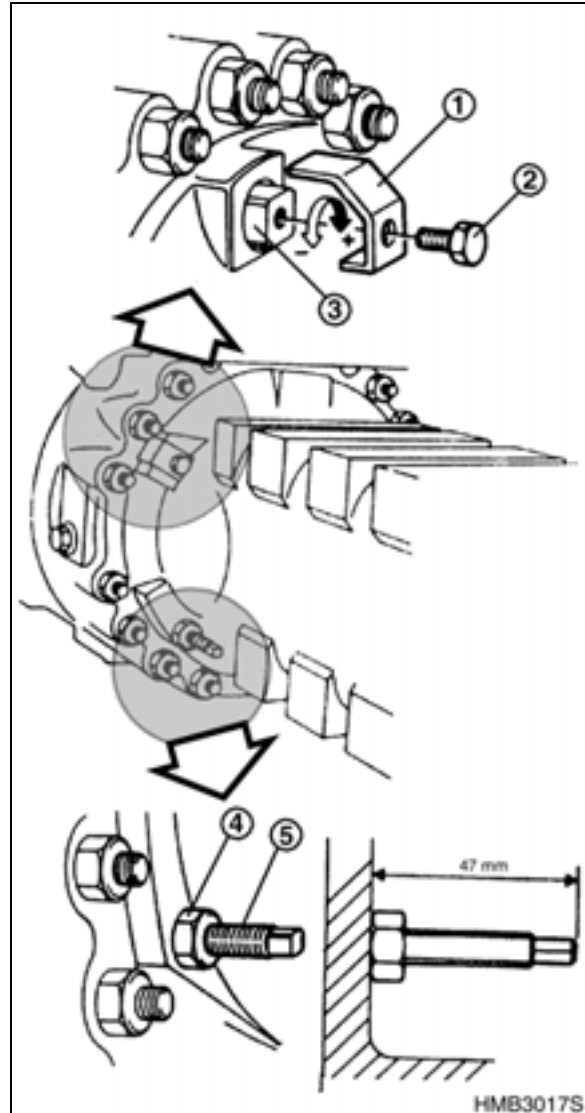


Figure 92

REAR AXLE SERVICE BRAKE

There are three adjusting bolts per side at 120° intervals for the rear axle brake adjustment. All three must be adjusted for proper operation. The adjusting procedure is same as the front brake adjustment method and must be repeated for both sides.

CHECK HYDRAULIC PRESSURES

Hydraulic pressure for most systems can be check by using the remote test ports shown in (Figure 93).

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

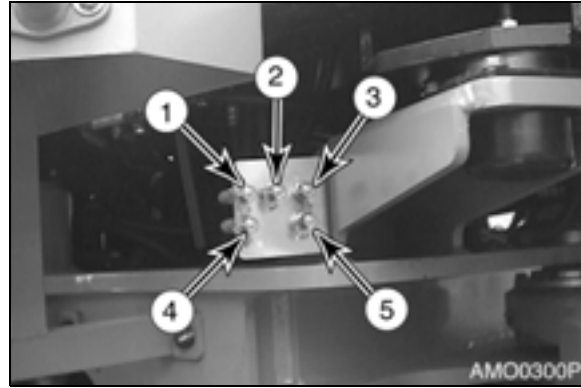


Figure 93

MAIN PUMP PRESSURE

1. Attach gauge to port (1, Figure 93).
2. Relief cartridge for main pump must open at 205^{+5}_{-5} kg/cm² ($2,915^{+70}_{-70}$ psi).
3. Adjust screw on relief valve cartridge (Figure 94). 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.

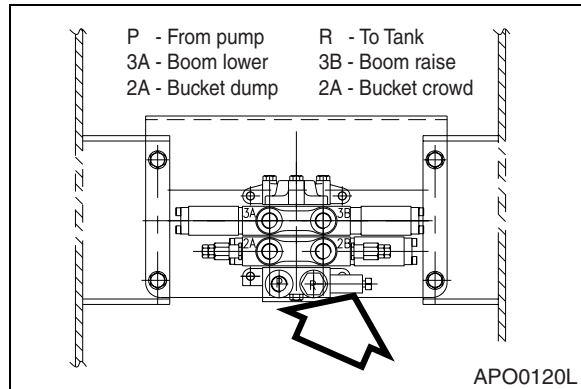


Figure 94

CONTROL LEVER ACTIVATION PRESSURE (S/N 1001 thru 2000)

1. Attach gauge to port (2, Figure 93).
2. Adjust relief cartridge (3, Figure 95) on brake and pilot supply valve (1, Figure 95). Relief pressure should be set at 28^{+3}_{-2} kg/cm² (398^{+43}_{-30} 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.

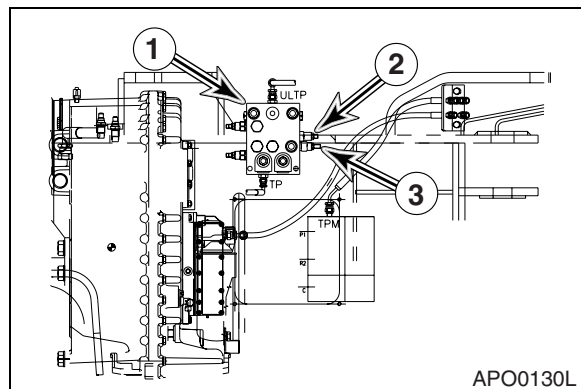


Figure 95

CONTROL LEVER ACTIVATION PRESSURE

(S/N 1001 thru 2000 Europe Low Noise Kit)

(S/N 2001 and Up)

1. Attach gauge to port (2, Figure 93).
2. Adjust relief cartridge (3, Figure 96) on brake and pilot and fan motor supply valve (1, Figure 96). Relief pressure should be set at 28^{+3}_{-2} kg/cm² (398^{+43}_{-30} 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.

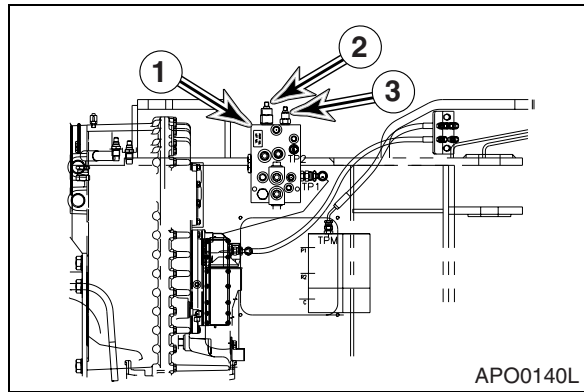


Figure 96

STEERING PUMP PRESSURE

1. Attach gauge to port (3, Figure 93).
2. Adjust relief valve cartridge on steering valve (Figure 97). Cartridge must be adjusted to open at 200 ± 5 kg/cm² ($2,845 \pm 70$ psi).
3. Unscrew remove plug and washer. Adjust screw that is beneath plug. Turn screw clockwise to raise relief pressure. Turn screw counterclockwise to lower relief pressure.
4. Install plug and washer after pressure has been adjusted.

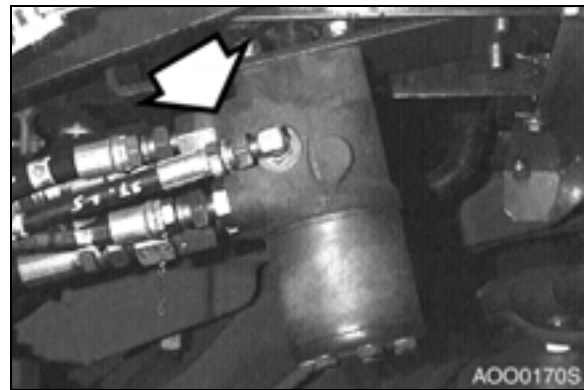


Figure 97

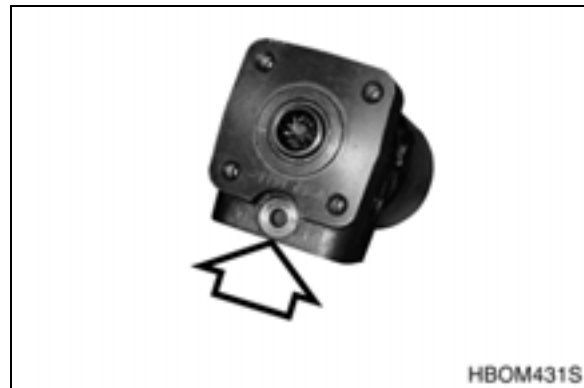


Figure 98

TRANSMISSION CLUTCH PRESSURE

1. Attach gauge to port (4, Figure 93)
2. It is not impossible to adjust pressure.
 - Transmission clutch pressure: 16^{+2}_0 kg/cm² (228^{+28}_0 psi)

BRAKE CHARGE PRESSURE (S/N 1001 thru 2000)

1. Attach gauge to port (5, Figure 93).
2. Adjust brake charge valve cartridge (2, Figure 99) on brake and pilot supply valve (1, Figure 99). Relief pressure for brake charging is $140/120 \text{ kg/cm}^2$ (1,990/1,707 psi).

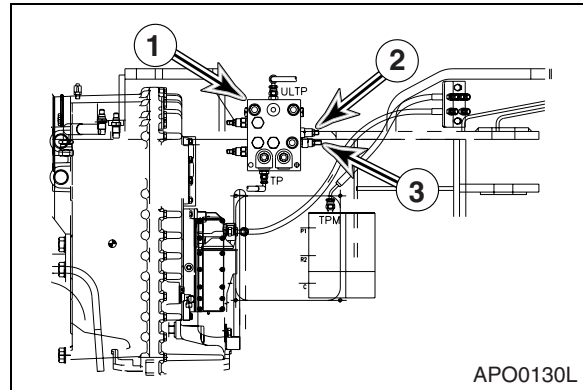


Figure 99

BRAKE CHARGE PRESSURE

(S/N 1001 thru 2000 Europe Low Noise Kit)
(S/N 2001 and Up)

1. Attach gauge to port (5, Figure 92).
2. Adjust brake charge valve cartridge (2, Figure 100) on brake and pilot and fan motor supply valve (1, Figure 100). Relief pressure for brake charging is $120 \pm 5 \text{ kg/cm}^2$ ($1,707 \pm 70 \text{ psi}$).

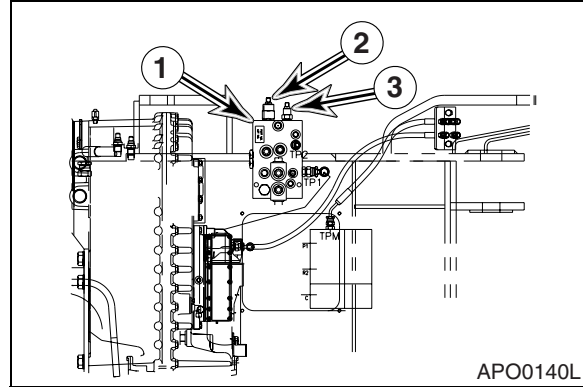


Figure 100

SERVICE BRAKE OUTLET PRESSURE

1. Attach gauge to brake pressure test port (1, Figure 101) on front axle.
2. Outlet pressure should be $45 \pm 3 \text{ kg/cm}^2$ ($640 \pm 43 \text{ psi}$).

PARKING BRAKE RELEASE PRESSURE

1. Attach pressure gauge to parking brake port (2, Figure 101).
2. Parking brake pressure should be 52 - 65 kg/cm^2 (740 - 925 psi).

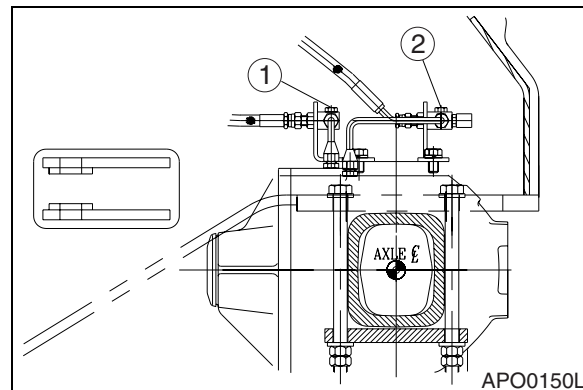


Figure 101

FAN MOTOR PRESSURE

(S/N 1001 thru 2000 Europe Low Noise Kit)

(S/N 2001 and Up)

1. Attach gauge to inlet port of fan motor (1, Figure 102).
2. Adjust screw on relief valve cartridge (2, Figure 102).

NOTE: *Outlet pressure should be $87 \pm 5 \text{ kg/cm}^2$ ($1,237 \pm 70 \text{ psi}$).*

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.

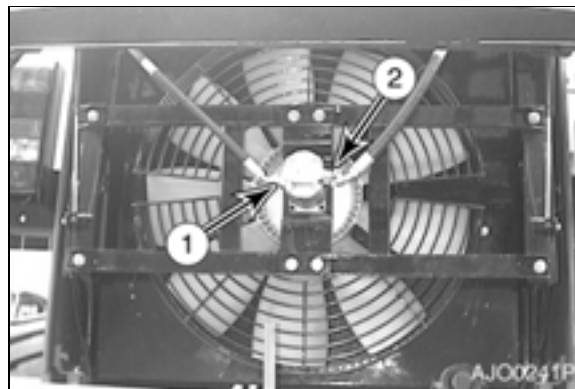


Figure 102

TIRES AND WHEELS

Properly inflated tire (2, Figure 103) is an important factor in determining tire performance and tire life. A tire that is under-inflated (1, Figure 103) does not properly support machine, and will wear out quickly. Over-inflated tires (3, Figure 103) 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.

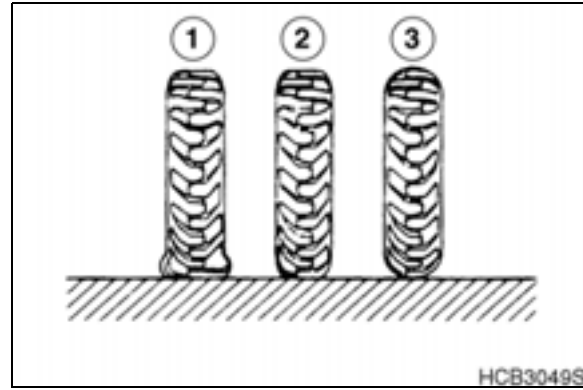


Figure 103

Tire Dimension	Working Pressure		Driving Pressure		Remarks
	Front Tire	Rear Tire	Front Tire	Rear Tire	
17.5-25-12PR (L2) (Standard)	3.25 kg/cm ² (46 psi)	3.0 kg/cm ² (43 psi)	2.5 kg/cm ² (36 psi)	2.0 kg/cm ² (29 psi)	Bias Ply Tire (Standard)
20.5-25-12PR (L2) (Option)	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 (Option)

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 104.

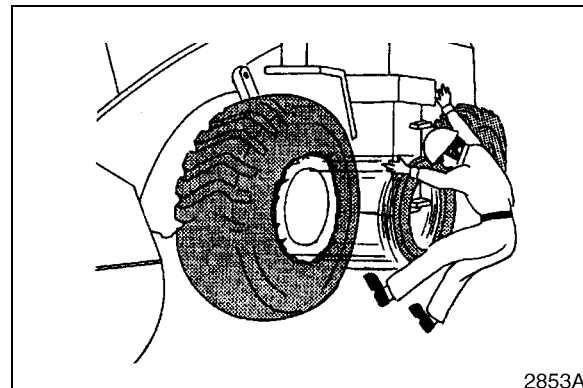


Figure 104

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.

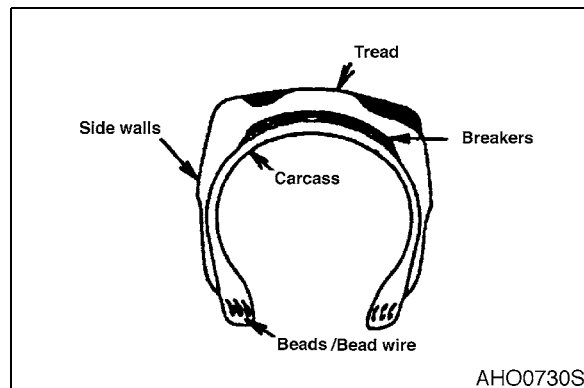


Figure 105

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 fluid - 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.

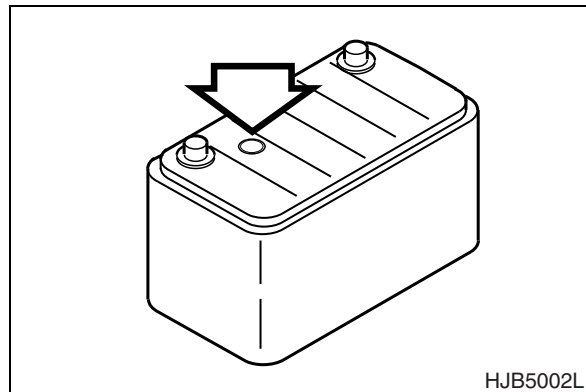


Figure 106

BOLT TORQUE CHART

TIGHTENING TORQUE SPECIFICATIONS FOR METRIC BOLTS (FOR COATED THREADS, PRE-LUBRICATED 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

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.

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 the 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 "Wind-milling" 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.

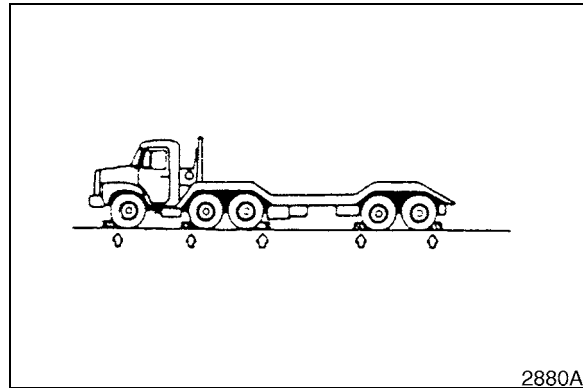


Figure 1

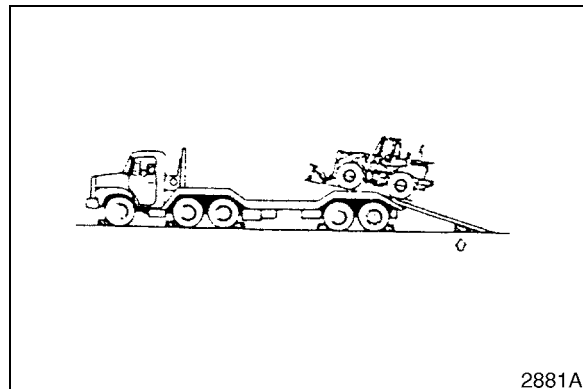


Figure 2

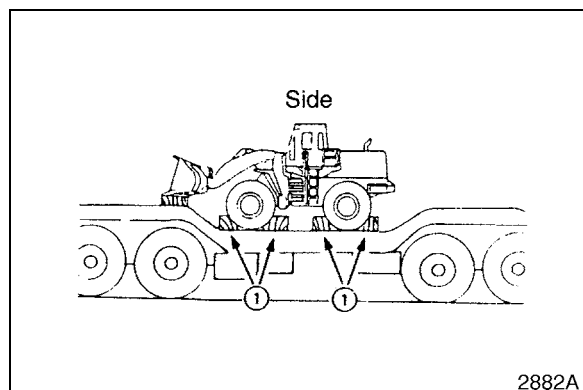


Figure 3

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.

Taglines 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.

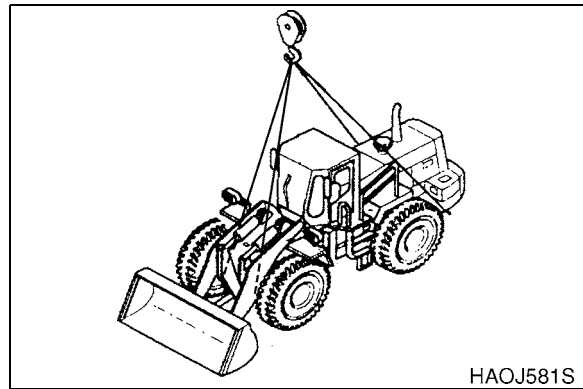


Figure 4

TROUBLESHOOTING

ENGINE

Problem	Cause	Remedy
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.

Problem	Cause	Remedy
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.
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.
	Clogging oil filter element.	Change filter and oil.
	Defective alarm switch.	Contact your Daewoo dealer.
	Oil leakage from pipe or joint.	
	Clogging suction strainer.	
	Excessive engine wear.	
	Defective oil pump.	

Problem	Cause	Remedy
Coolant temp, warning light turns "ON."	Low engine coolant level.	Add coolant.
	Loose/slipping/broken fan belt.	Adjust or replace belt.
	Clogging 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.	
Engine does not start when the starter motor is turning. (Also see ELECTRICAL TROUBLESHOOTING.)	Fuel filter element clogging.	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 element clogging.	Replace fuel filter.
	Fuel pump failure.	Contact your Daewoo dealer.
	Incorrect fuel injection timing.	
Insufficient power.	Air cleaner element clogging.	Clean or replace element.
	Fuel filter element clogging.	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	Cause	Remedy
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.
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.
	Make-up 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.

Problem	Cause	Remedy
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.
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.

TRAVEL SYSTEM

GENERAL

Problem	Cause	Remedy
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 discs.	Replace discs.
	Damaged wires in transmission control wire harness.	Repair wires.

Problem	Cause	Remedy
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	Shot 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.	

STEERING

Problem	Cause	Remedy
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.

BRAKING

Problem	Cause	Remedy
Reduced brake action.	Low secondary pressure in brake valve.	Repair or replace brake valve.
	Worn brake discs.	Replace brake discs.
	Damaged brake discs.	Replace brake discs.
	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 discs.	Replace discs.
	Damaged brake disc return spring.	Replace return springs.

ELECTRICAL SYSTEM

Problem	Cause	Remedy
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.

SPECIFICATIONS

MEGA 200-V

GENERAL SPECIFICATIONS

COMPONENT		SPECIFICATION
STD. Bucket Cap.	STD	1.8 m ³ (2.4 yd ³)
	OPT	1.9 m ³ (2.5 yd ³)
Vehicle Weight	STD	11,000 kg (24,251 lb)
	OPT	11,200 kg (24,692 lb)
Engine		
Model	DB58TI	DB58TIS
Emission	Tier I	Tier II
Type	Turbo, Intercooler	Turbo, Charge Air Intercooler
Horsepower (see note)	140 ps @ 2,200 rpm (138 hp @ 2,200 rpm) (SAE J 1349 net)	Rated. 145 ps (143 hp) @ 2,200 rpm Max. 160 ps (158 hp) @ 2,000 rpm (Gross) (SAE J1995)
Max. Torque (see note)	57 kg•m @ 1,500 rpm (412 ft lb @ 1,500 rpm) (SAE J 1349 net)	64 kg•m (463 ft lb) @ 1,600 rpm (Gross) (SAE J1995)
Transmission		
Type	Full Automatic Power Shift	
Speeds	4 Forward, 3 Reverse	
Brake Systems		
Service Brakes	Full Hydraulic, Separate Dual Line Wet Discs	
Parking Brake	Spring Applied / Oil Released on Front Axle, Dry Disc	
Performance		
Travel Speed	STD	7.3 - 36 km/h (4.5 - 22.4 MPH)
	OPT	8.2 - 39.5 km/h (5.1 - 24.5 MPH)
Steering Angle	± 40°	

NOTE: "High torque rise"

Fuel system deliveries a control increase of fuel as the engine lugs back from rated speed. This results in horsepower greater than rated power. The combination of increased torque rise and maximum horsepower improves response, provides greater rimpull, more lift

force, and faster cycle times. The maximum horsepower occurs at 2000 rpm when power is needed during the working cycle.

WORKING RANGE AND DIMENSIONS

Figure 1, illustrates exterior machine dimensions and working range of machine when it is equipped with a standard bucket.

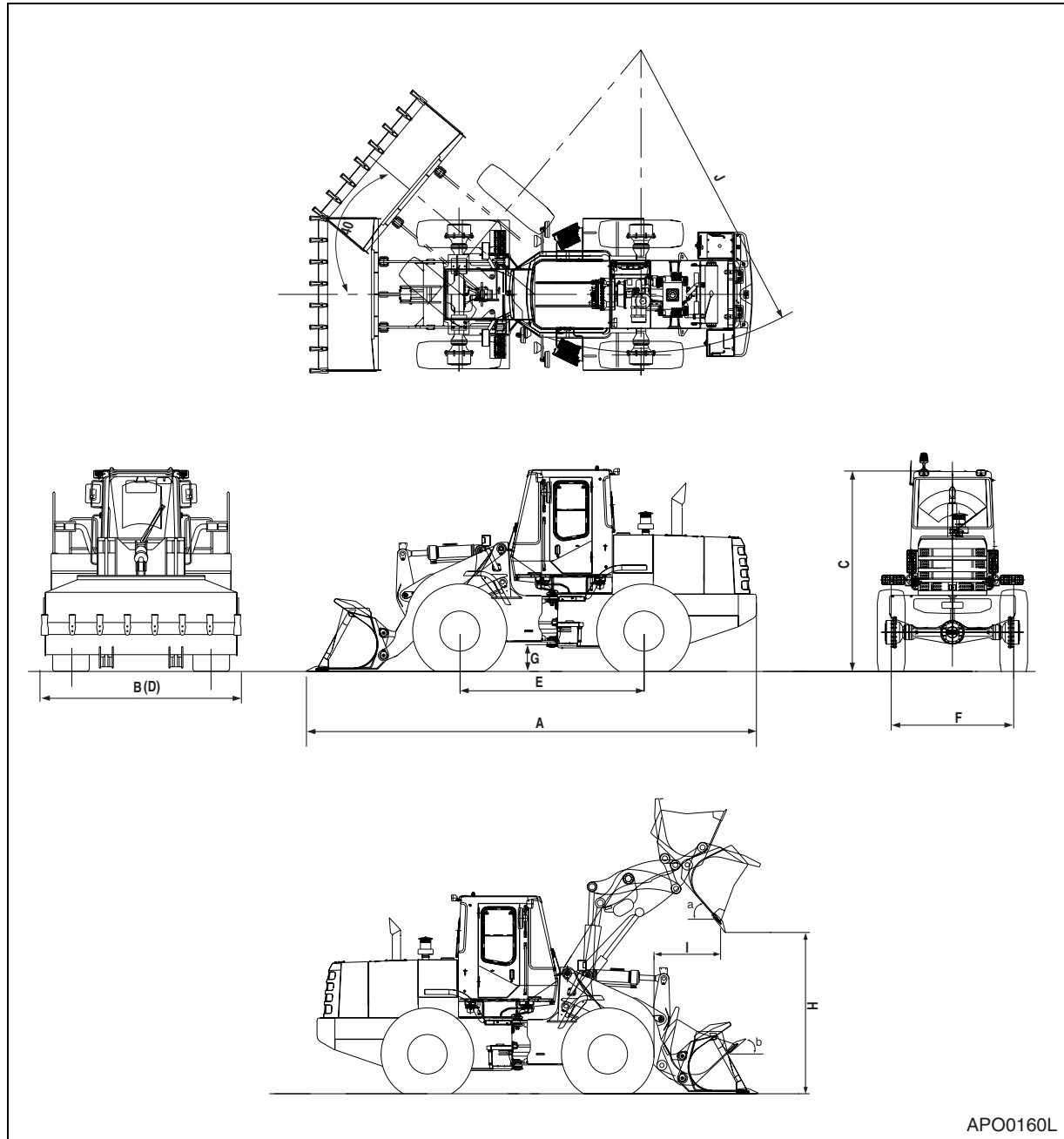


Figure 1

Category	Dimension	
	Standard	Option
Overall Length (A)	7,025 mm (23' 1")	
Overall Width (B)	2,450 mm (8' 0")	2,550 mm (8' 4")
Overall Height (C)	3,180 mm (10' 5")	3,260 mm (10' 8")
Bucket Width (D)	2,450 mm (8' 0")	2,550 mm (8' 4")
Wheel Base (E)	2,900 mm (9' 6")	
Tread (F)	1,930 mm (6' 4")	
Ground Clearance (G)	370 mm (1' 3")	450 mm (1' 6")
Dump Height, to tooth (H)	2,720 mm (8' 11")	2,730 mm (8' 11")
Dump Distance, to Bucket Edge (I)	1,000 mm (3' 3")	870 mm (2' 10")
Minimum Tire Turning Radius (J)	4,950 mm (16' 3")	
Bucket Angle, Raised (a)	46°	
Bucket Angle (b), Lowered (at carry)	45°	
Bucket Angle (b), Lowered (on ground)	40°	
Tire Size	17.5-25-12PR	20.5-25-12PR (Bias) 20.5R25 (Radial)

MEGA 200-VTC

GENERAL SPECIFICATIONS

COMPONENT		SPECIFICATION
STD. Bucket Capacity	STD	1.8 m ³ (2.4 yd ³)
	OPT	1.9 m ³ (2.5 yd ³)
Vehicle Weight	STD	11,000 kg (24,251 lb)
	OPT	11,200 kg (24,692 lb)
Engine		
Model		DB58TI DB58TIS
Emission		Tier I Tier II
Type		Turbo, Intercooler Turbo, Charge Air Intercooler
Horsepower (see note)		140 ps (138 hp) @ 2,200 rpm (Net) (SAE J1349) Rated. 145 ps (143 hp) @ 2,200 rpm Max. 160 ps (158 hp) @ 2,000 rpm (Gross) (SAE J1995)
Max. Torque (see note)		57 kg•m (412 ft lb) @ 1,500 rpm (Net) (SAE J1349) 64 kg•m (463 ft lb) @ 1,600 rpm (Gross) (SAE J1995)
Transmission		
Type		Full Automatic Power Shift
Speeds		4 Forward, 3 Reverse
Brake Systems		
Service Brakes		Full Hydraulic, Separate Dual Line Wet Discs
Parking Brake		Spring Applied / Oil Released on Front Axle, Dry Disc
Performance		
Travel Speed	STD	7.3 - 36 km/h (4.5 - 22.4 MPH)
	OPT	8.2 - 39.5 km/h (5.1 - 24.5 MPH)
Steering Angle		± 40°
Min. Tire Turning Radius		4,950 mm (16' 3")
Max. Breakout Force		10,800 kg (23,810 lb)

NOTE: "High torque rise"

Fuel system deliveries a control increase of fuel as the engine lugs back from rated speed. This results in horsepower greater than rated power. The combination of increased torque rise and maximum horsepower improves response, provides greater rimpull, more lift force, and faster cycle times. The maximum horsepower occurs at 2000 rpm when power is needed during the working cycle.

WORKING RANGE AND DIMENSIONS

Figure 2 illustrates exterior machine dimensions and working range of machine when it is equipped with a standard bucket.

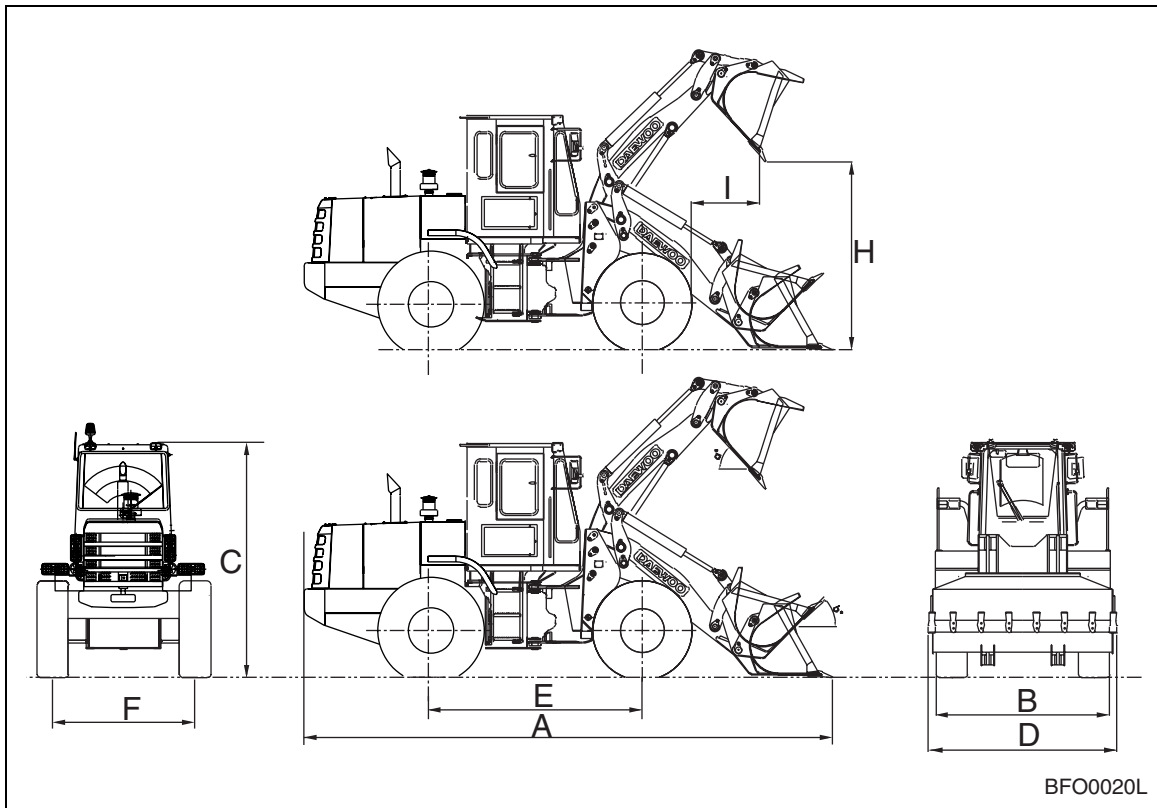


Figure 2

Category	Dimension	
	Standard	Option
Overall Length (A)	7,280 mm (23' 10")	7,280 (23' 10")
Overall Width, without bucket (B)	2,381 mm (7' 10")	
Overall Height (C)	3,180 mm (10' 5")	3,260 mm (10' 8")
Bucket Width (D)	2,450 mm (8' 0.5")	2,550 mm (8' 4")
Wheel Base (E)	2,900 mm (9' 6.1")	
Tread (F)	1,930 mm (6' 4")	
Ground Clearance (G)	370 mm (1' 3")	450 mm (1' 6")
Dump Height, to tooth (H)	2,584 mm (8' 6")	2,666 mm (8' 9")
Dump Distance, to Bucket Edge (I)	961 mm (3' 1")	890 mm (2' 11")
Dump Height to Bucket Pivot (J)	3,748 mm (12' 4")	3,828 (12' 7")
Bucket Angle, Raised (a)	46°	
Bucket Angle (b), Lowered	46°	
Tire Size	17.5 x 25-12PR	20.5-25-12PR (Bias) 20.5R25 (Radial)

WORKING CAPACITIES

BUCKET CAPACITY

Standard toothed bucket has a capacity of 1.8 m³ (2.4 yd³).

TIPPING LOAD

Static Tipping Load with bucket in Over Front position is 8,500 kg (18,740 lb). With bucket in Fully Turned position, Static Tipping Load is 7,400 kg (16,315 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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COMPANY NAME:	DATE:
STREET ADDRESS:	TELEPHONE:
CITY:	FAX:
STATE / PROVINCE:	
COUNTRY:	
NAME:	
MACHINE MODEL:	
SERIAL NUMBER:	
MANUAL NUMBER:	
SHOP MANUAL SECTION NUMBER:	
PROPOSED DESCRIPTION OF CORRECTION AND/OR SUGGESTION:	
Use additional paper if needed. Please include copy of current manual pages for reference. Attach any photos or illustrations. If digital photos are available, e-mail them to Bill.Bernhardt@dhiac.com (If possible, use 1024 x 768 resolution.).	
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