Solar 225LL

Operation and Maintenance Manual

022-00059E

Serial Number 1001 and Up

December 2003

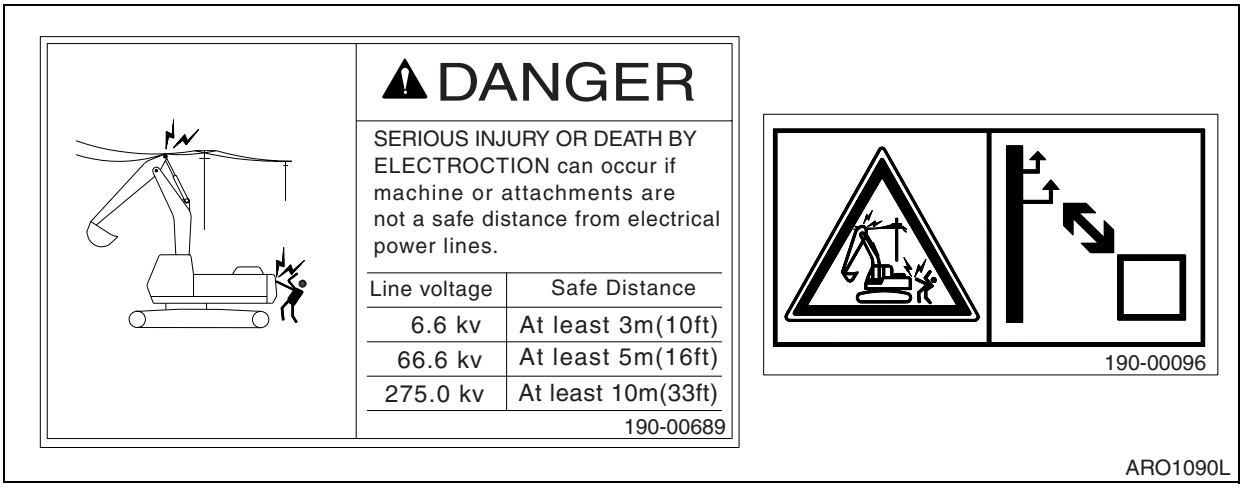
wDaewoo reserves the right to improve our products in a continuing process to provide the best possible product to the market place. These improvements can be implemented at any time with no obligation to change materials on previously sold products. It is recommended that consumers periodically contact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

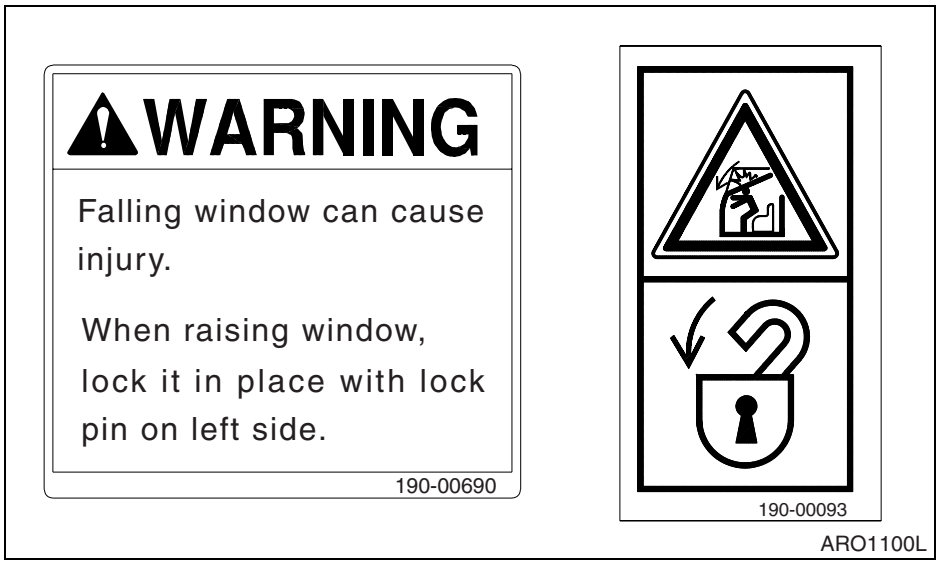
Illustrations used throughout this manual are used only as a representation of the actual piece of equipment, and may vary from the actual item.

1. WARNINGS FOR OPERATION, INSPECTION AND MAINTENANCE (190-00688, 190-00092).

2. WARNINGS FOR HIGH VOLTAGE (190-00689, 190-00096)



3. WARNINGS WHEN OPENING A FRONT WINDOW (2190-3388).



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.

VIBRATION LEVEL INFORMATION

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

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

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

MOUNTING AND DISMOUNTING

Before getting on or off the machine, if there is any oil, grease, or mud on the handrails, steps, or track shoes, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.

Never jump on or off the machine. In particular, never get on or off a moving machine. These actions may lead to serious injury.

When getting on or off the machine, always face the machine, and maintain three-point contact (both feet and one hand or one foot and both hands) with the handrails, steps, and track shoes to ensure that you support yourself securely.

Never hold any control levers when getting on or off the machine.

Apply the door lock securely. If you grip the handrail inside the door when moving on top of the track shoes, and the door lock is not applied securely, the door may move and cause you to fall.

Use the points marked by arrows in the diagram when getting on or off the machine.

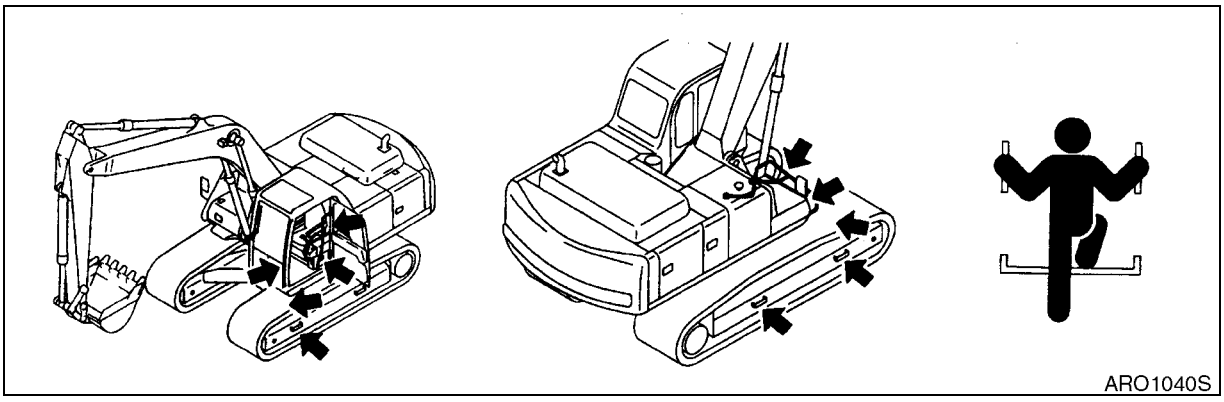


Figure 3

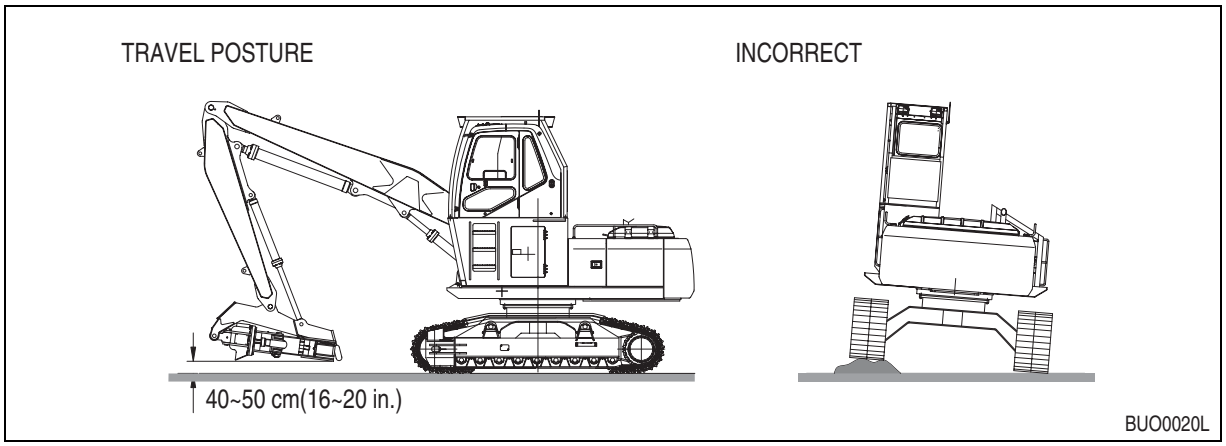


Figure 18

TRAVELING ON SLOPES

Never jump onto a machine that is running away to stop it. There is danger of serious injury.

Traveling on slopes could result in the machine tipping over or slipping.

On hills, banks or slopes, carry the bucket approximately 20 - 30 cm (8 - 12 in) above the ground. In case of an emergency, quickly lower the bucket to the ground to help stop the machine.

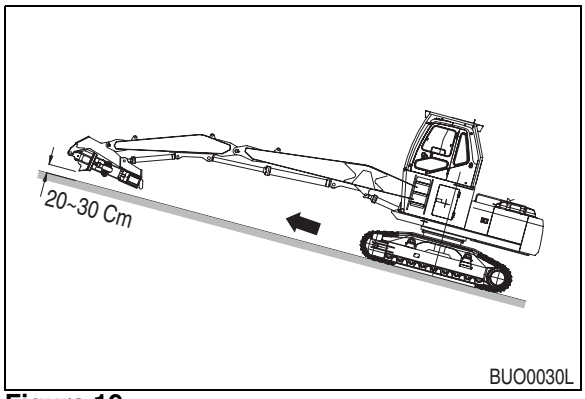


Figure 19

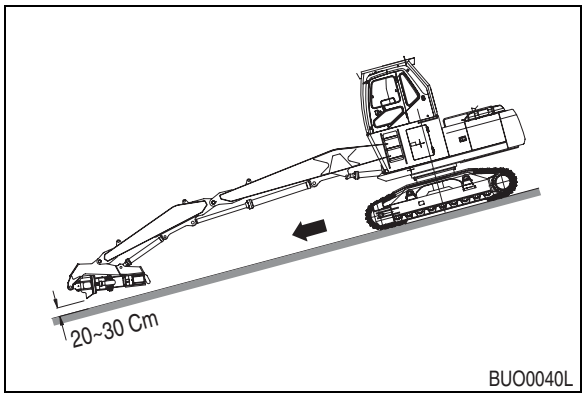


Figure 20

Do not travel on grass, fallen leaves, or wet steel plates. Even slight slopes may cause the machine to slip to the side, so travel at low speed and make sure that the machine is always traveling directly up or down the slope.

Avoid changing the direction of travel on a slope. This could result in tipping or side slipping of the machine.

When possible, operate the machine up slopes and down slopes. Avoid operating the machine across the slope, when possible.

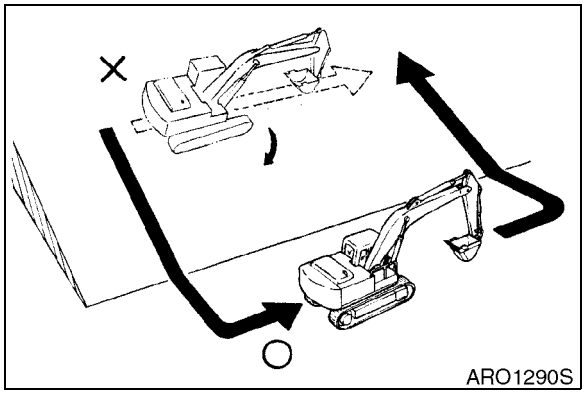


Figure 21

ACTION WHEN ABNORMALLY IS FOUND DURING INSPECTION

If any abnormality is found during inspection, always carry out repairs. In particular, if the machine is used when there are still problems with the brake or work equipment systems, it may lead to serious injury.

If necessary depending on the type of failure, please contact your Daewoo distributor for repairs.

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 4-54, for additional European regulations.*

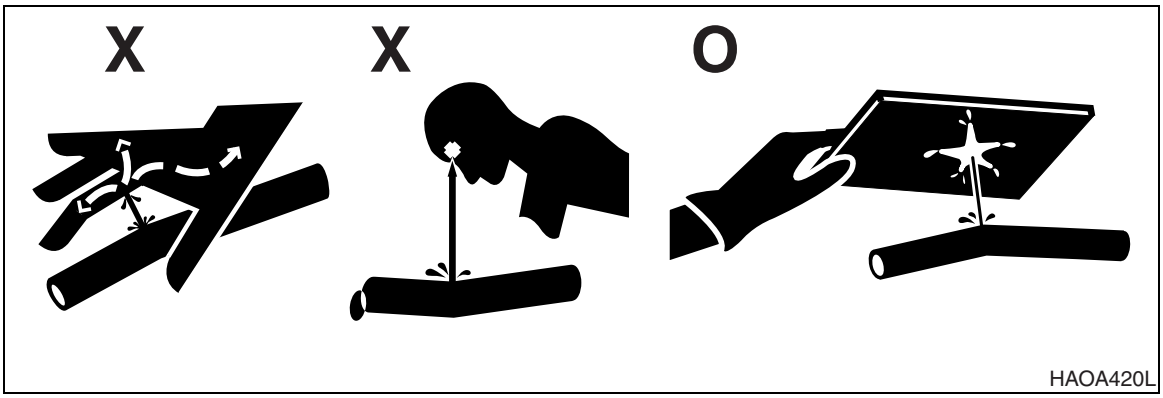


Figure 38

OPERATING CONTROLS

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

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 the gauges on the instrument panel. The operator should monitor machine pressure on the instrument panel along with indicator lights. These lights will only give the operator an indication that there is a problem.

⚠ WARNING!

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

15. LEFT-HAND WORK LEVER (JOYSTICK) WITH HORN, GRAPPLE MOTOR AND GRAPPLE CYLINDER SWITCHES)

Work lever (1, Figure 16) controls swing and stick movements. For a more detailed explanation see "Work Levers (Joysticks) (ISO Style)" on page 3-24.

Trigger (2, Figure 16) controls grapple cylinder movement. Pulling trigger "OPENS" grapple.

Pushing button (3, Figure 16) sounds horn.

Pushing button (4, Figure 16) controls grapple motor rotation. Pushing button causes grapple to "ROTATE COUNTERCLOCKWISE."

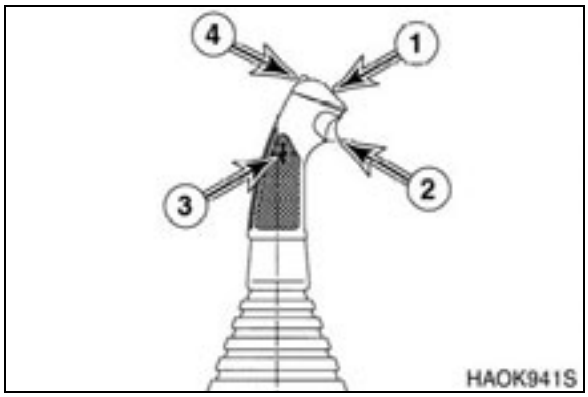


Figure 16

16. RIGHT-HAND WORK LEVER (JOYSTICK) WITH POWER BOOSTER, GRAPPLE MOTOR AND GRAPPLE CYLINDER SWITCHES

Work lever (1, Figure 16) controls boom and heel rack movements. For a more detailed explanation see "Work Levers (Joysticks) (ISO Style)" on page 3-24.

Pushing button (2, Figure 16) controls grapple motor rotation. Pushing button causes grapple to "ROTATE CLOCKWISE."

Pushing button (3, Figure 16) can increase operating pressure by about 10%. When the button is released, operating pressure returns to normal.

Trigger (4, Figure 16) controls grapple cylinder movement. Pulling trigger "CLOSES" grapple.

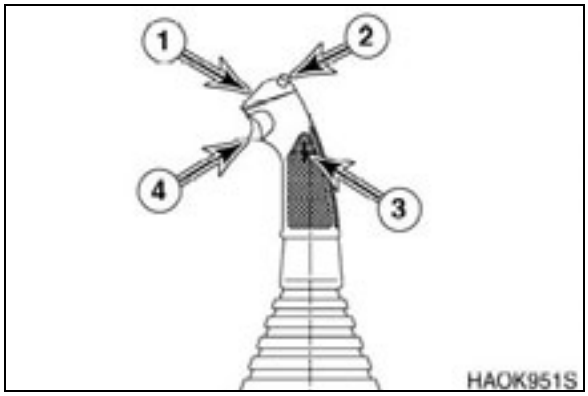


Figure 17

17. INSTRUMENT PANEL

See "Instrument Panel"' on page 2-13.

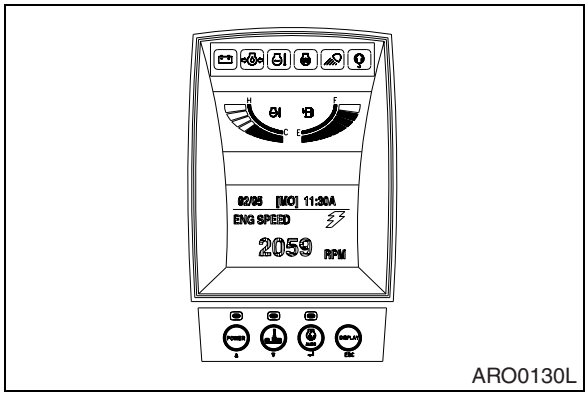


Figure 18

5. ABNORMAL STATE WARNING OF FILTERS

NOTE: *See Figure 40 thru Figure 42.*

This display indicates abnormal state of the following filters; air cleaner filter. return filter, and pilot filter.

If the abnormal state of filter is simultaneously produced more than two, the warning screen will appear "Air Cleaner Filter," "Return Filter" and "Pilot Filter" according to order and each warning screen returns after 3 seconds.

A. Air Cleaner Clogged Warning

This screen indicates when the air cleaner is clogged. When this screen appears, the air cleaner symbol on the screen will start to blink.

If this screen is displayed, immediately stop operation and replace or clean the air filter.

After the air filter has been serviced, the engine speed and a symbol of communicative state will be displayed again.

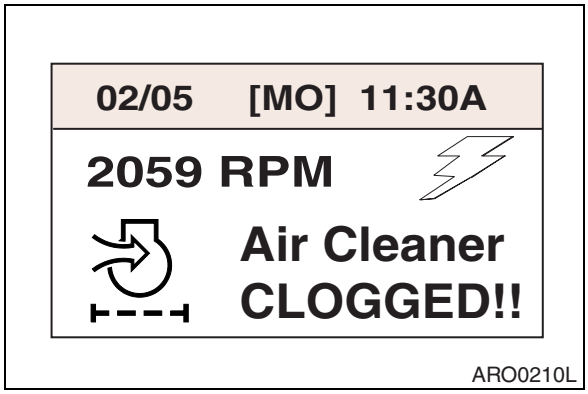


Figure 40

B. Return Filter Clogged Warning (Optional)

This screen indicates when the return filter clogged. When this screen appears, the return filter symbol on the screen will start to blink.

If this screen is displayed, immediately stop operation and replace the return filter.

After the return filter has been serviced, the engine speed and a symbol of communicative state will be displayed again.

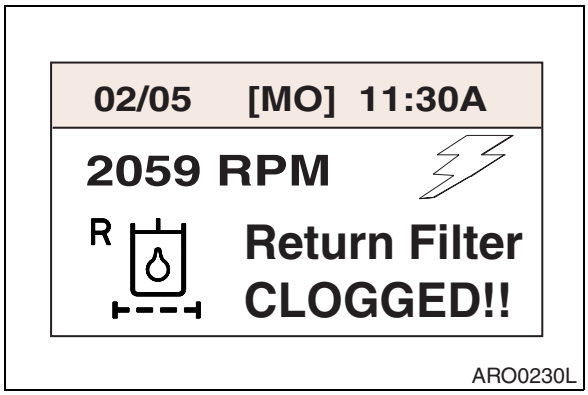


Figure 41

C. Pilot Filter Clogged Warning (Optional)

This screen indicates when the pilot filter clogged. When this screen appears, the pilot filter symbol on the screen will start to blink.

If this screen is displayed, immediately stop operation and replace the pilot filter.

After the pilot filter has been serviced, the engine speed and a symbol of communicative state will be displayed again.

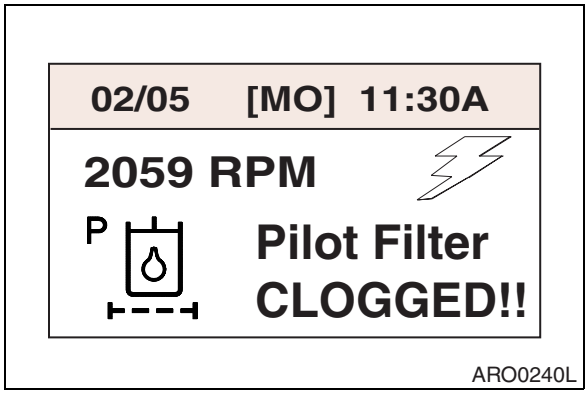


Figure 42

2. FAN SPEED SELECTOR SWITCHES

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

A. "LO" Switch - Used for low speed.

B. "MID" Switch - Used for intermediate speed

C. "HI" Switch - Used for high speed.

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

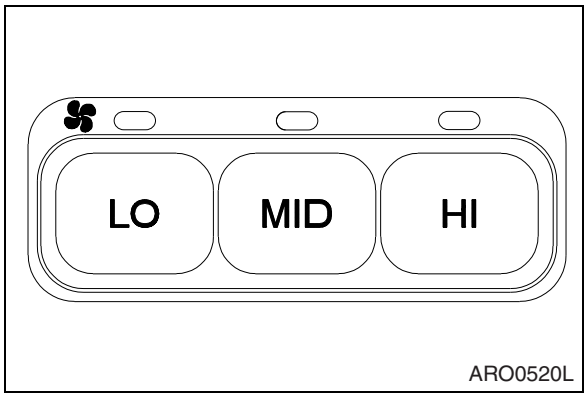


Figure 60

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.

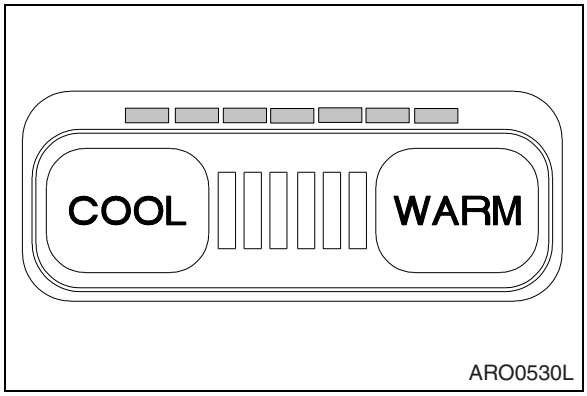


Figure 61

When the unit is used only for air-conditioning, push the "A/C" switch and make all the LEDs fully green by pressing the "COOL" switch.

When the unit is used only for heat, make the LEDs fully red by pressing the "WARM" switch. The "A⁄ C" switch has to be turned "OFF."

To set the desired temperature of air coming out of the air outlets, turn the "A/C" switch "ON" and combine red LEDs with green LEDs by pressing the temperature control switch. The more LEDs in the green range that turn "ON," the cooler the temperature will become. The more LEDs in the red range that turn "ON," the warmer the temperature will become.

FUSE BOXES

There are two fuse boxes (1 and 2, Figure 74) on the left side of the heater box. Fuses prevent electrical devices from overloading or shorting.

A decal attached to the inside of the fuse box's cover indicates the function and amperage of each fuse.

NOTE: *For a further explanation see "Fuse Boxes" on page 4-60.*

Spare fuses are mounted on the inside of fuse box's cover.

Change a fuse if the element separates. If the element of a new fuse separates, check the circuit and repair the circuit.

CAUTION!

Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

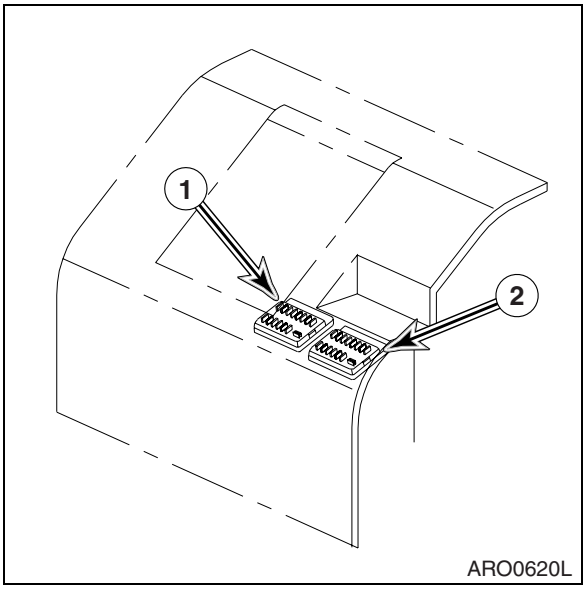


Figure 74

2. Set bottom window in rubber holders (1, Figure 96) behind operator's seat. Secure window to cab with left and right knobs (2).

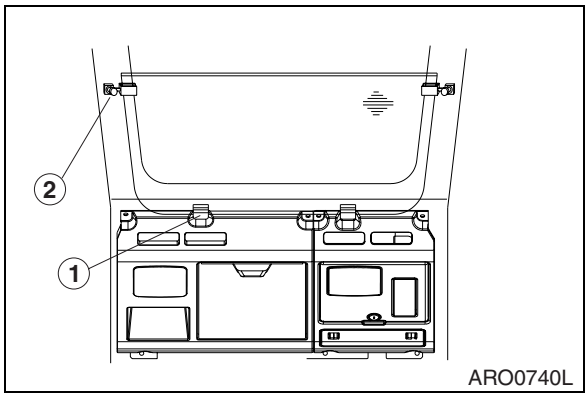


Figure 96

DOORS AND ACCESS COVERS

DOOR SIDE LATCH

1. The door side latch (1, Figure 97) 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.*

2. To release door from side of cab, push the latch lever (Figure 98) down. The latch lever is to the left of the operator's seat.

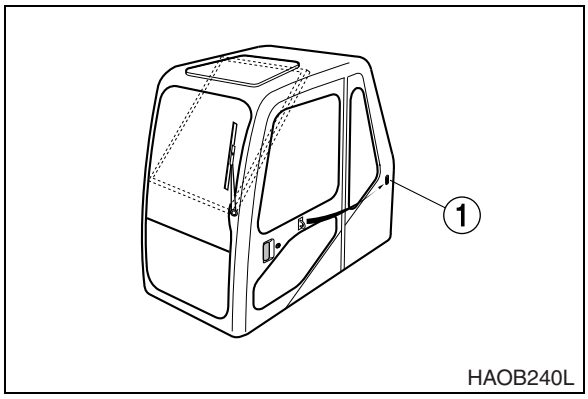


Figure 97

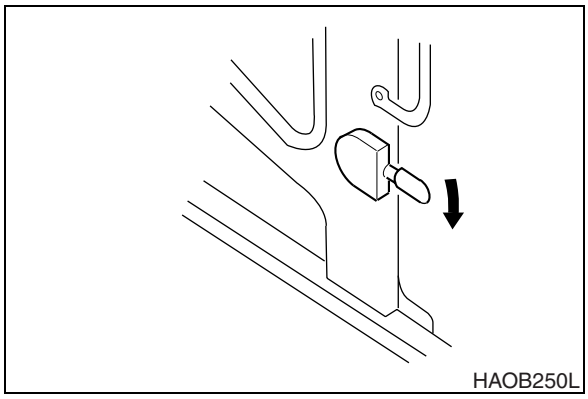


Figure 98

CABIN RISER ACCESS DOOR

This compartment allows access to tilt cab bolts and cylinder.

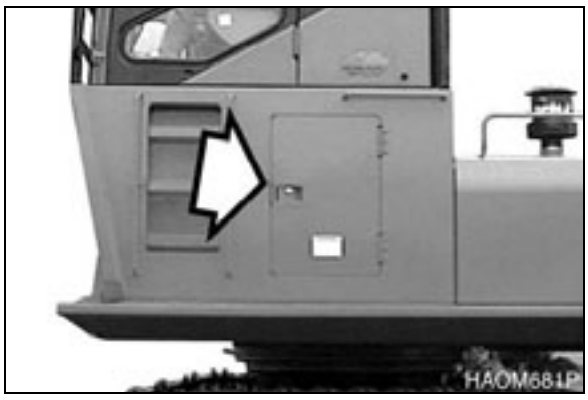


Figure 99

7. After warming unit, check all operating indicators to make sure that all engine systems (oil pressure, coolant, etc.) are in the normal operating range. If any problems are noticed, shut down engine. Normal indicators are:

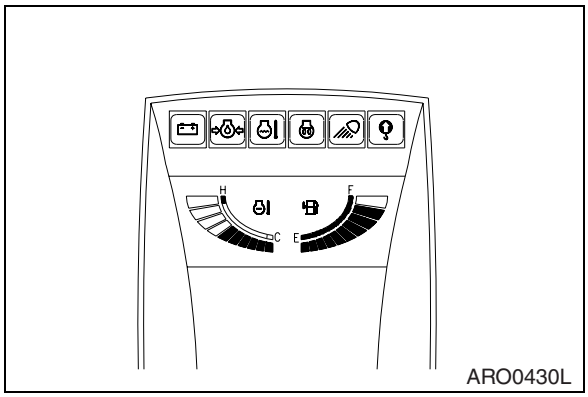


Figure 6

Instrument Panel Light or Gauge	Indicator Reading
Engine Coolant Temperature Gauge	GREEN RANGE
Fuel Gauge	GREEN RANGE
Charging Warning Light	OFF
Engine Oil Pressure Warning Light	OFF
Preheat Indicator Light	OFF
Pilot Filter Clogged Warning Light	OFF
Return Filter Clogged Warning Light	OFF
Air Cleaner Clogged Warning Light	OFF

8. 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.
9. 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.*

TRAVEL

⚠ WARNING!

1. **Before operating the travel levers, make sure that you know in which direction the machine is pointing. Look at the end of the track assemblies. If the drive motors are visible while sitting in the operator's seat, you are looking at the back end of the track assembly (therefore, you are looking backwards). In this case, the response of the travel levers will be the reverse of normal operation.**
2. **Before moving, make sure that there are no personnel in the way or on the machine. Sound the horn to alert workers that you are about to move the machine.**
3. **Be sure the path is clear during travel.**
4. **Use extreme caution when reversing travel. Be sure there is a clear path behind the machine.**
5. **Make sure to operate the travel control levers smoothly to avoid sudden starts or stops.**
6. **Before leaving the operator's seat, make sure to lock out all control systems and shut down the engine to avoid accidental activation.**

AUTOMATIC TRAVEL SPEED CONTROL

⚠ WARNING!

Do not change the travel mode while traveling. Always use speed mode "O" when traveling down a slope. It is very dangerous to change to speed modes indicated "I" or "II" while going down a slope. Only change travel mode after coming to a complete stop.

Two travel speed ranges can be selected by using the speed selector switch on the control panel (Figure 29).

"O" (LOW) - In this position low travel speed and a higher torque are selected.

"I" (HIGH) - In this position high travel speed and a lower torque are selected.

"II" (AUTOMATIC) - Setting the control at the "II" position enables the machine to automatically change to a different speed range. This change happens automatically depending on the hydraulic oil pressure in the travel circuit. When hydraulic oil pressure rises, the travel speed is automatically set to low. An example is if the machine is traveling on a flat, solid surface, the higher speed range would be used. When a slope is encountered, the speed drops and the travel circuit hydraulic pressure rises, causing the control circuit to shift to the higher torque, lower speed range.

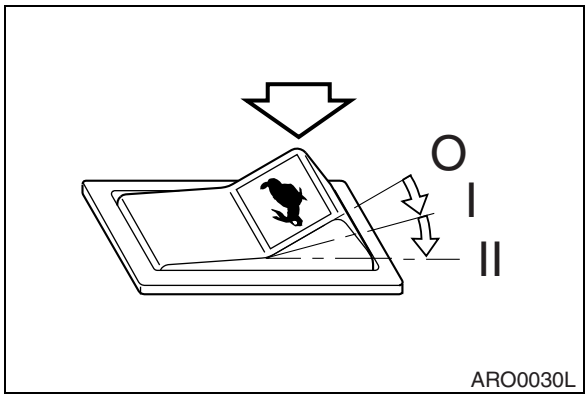


Figure 29

Left Work Lever (Figure 48 and Figure 49)

1. Stick out
2. Stick in
3. Left swing
4. Right swing

NOTE: *The swing brake is spring applied and hydraulically released. It is always engaged when the work lever (joystick) is in "NEUTRAL" or the engine is shut down.*

NOTE: *The following is not a mechanical malfunction but a proper phenomenon of the excavator. When operating the stick, it may stop momentarily. When the stick is operated, the weight of the stick may cause it to move faster than the amount of oil being supplied.*

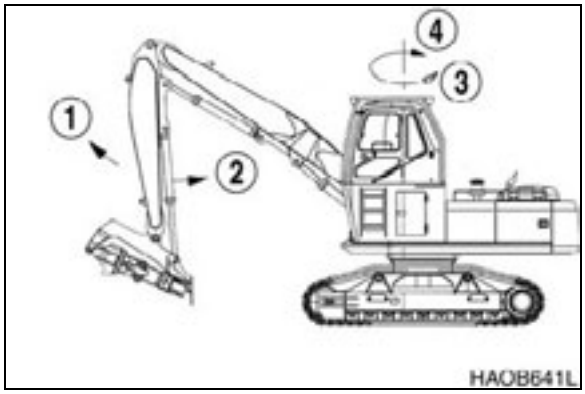


Figure 49

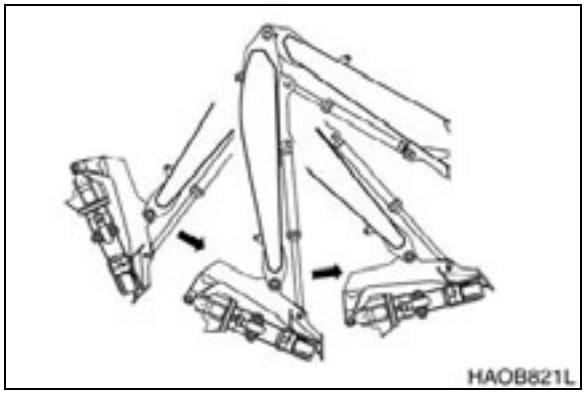


Figure 50

Right Work Lever (Figure 48 and Figure 51)

5. Boom down
6. Boom up
7. Heel rack in
8. Heel rack out

NOTE: *Even after stopping the engine, the front can be lowered to the ground by operating work lever (joystick). Set safety lever on "UNLOCK" position and turn starter switch "ON."*

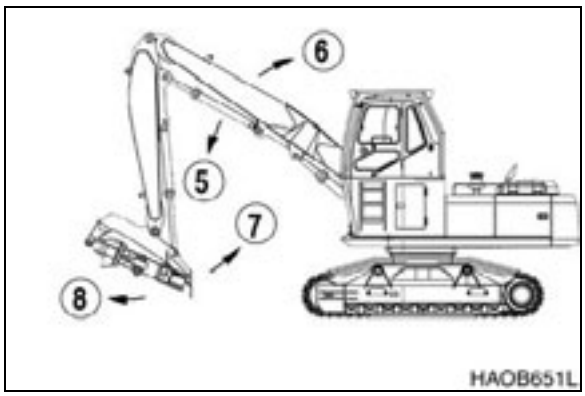


Figure 51

OPERATING PRECAUTIONS

⚠ WARNING!

DO NOT rest your feet on the travel pedals during normal machine operation. Unexpected machine travel may occur in this situation.

1. Before starting work, investigate terrain and soil condition. Level ground and drain area if necessary.

2. Check level of battery electrolyte daily. Keep electrolyte above plates preventing damage to batteries. Use a slightly weaker electrolyte solution in hot climates. Dilute 1.28 specific gravity electrolyte as issued to 1.20 - 1.24 specific gravity readings at full charge. Recharge batteries whenever they reach a 1.16 specific gravity reading. Batteries self-discharge at a higher rate if left standing for long periods at high temperatures. If machine is to stand for several days, remove batteries and store in a cool place.

> **WARNING!**
>
> **Do not store acid type storage batteries near stacks of tires; the acid fumes have a harmful affect on rubber.**

3. Service fuel system as directed in "Engine Fuel System" Section 5, of this manual. Check for water content before filling fuel tank. High temperatures and cooling off cause condensation in storage drums.
4. Lubricate as specified in "Periodic Service Chart and Table" Section 4, in this manual or Lubrication Decal on the machine.
5. Do not park machine in sun for long periods of time. When practical park machine under cover to protect it from sun, dirt and dust.
   A. Cover inactive machine with tarpaulin if no suitable shelter is available. Protect engine compartment, transmission and hydraulics from entrance of dust.
   B. In hot, damp, climates corrosive action will occur on all parts of the machine and will be accelerated during the rainy season. Rust and paint blisters will appear on metal surfaces and fungus growth on other surfaces.
   C. Protect all unfinished, exposed surfaces with a film of preservative lubricating oil. Protect cables and terminals with ignition insulation compound. Apply paint or suitable rust preventive to damaged surfaces to protect them from rust and corrosion.

OPERATION IN DUSTY OR SANDY AREAS

Operation of the machine can cause dust in almost any area. However, when in predominantly dusty or sandy areas, additional precautions must be taken.

1. Keep cooling system fins and cooling areas clean. Blow out with compressed air, if possible, as often as necessary.

> **WARNING!**
>
> **Wear goggles when using compressed air.**

2. Use care when servicing fuel system to prevent dust and sand from entering the tank.
3. Service the air cleaner at frequent intervals, check air restriction indicator daily and keep dust cup and dust valve clean. Prevent dust and sand from entering engine parts and compartments as much as possible.
4. Lubricate and perform services outlined on current lubrication chart on machine and "Lubrication Chart and Table" Section 4. Clean all lubrication fittings before applying lubricant. Sand mixed with lubricant becomes very abrasive and speeds wear on parts.

SERVICE DATA										
No.	Items To Check	Service	S225LL							
			Qty.	Service Interval						
				10	50	150	250	500	1000	2000
1	Front Joint Pin	Grease	19	F100	W10					
2	Swing Bearing	Grease	3							
3	Swing Gear	Grease	1							
4	Swing Reduction Gear	Grease	1							
5	Swing Device	Gear Oil (80W90)	5 L	V			F			
6	Travel Reduction Device	Gear Oil (80W90)	2X3.3 L				F, V			
7	Engine Oil	Engine Oil (15W40)	19 L	V	F					
8	Hydraulic Oil	Hydraulic Oil (Equivis 46)	208 L	V						
9	Fuel Tank	Diesel	310 L	V	V					
10	Radiator	Coolant (Antifreeze)	31 L	V					EG	PG
	Coolant Recovery Tank	Coolant (Antifreeze)	1	V					EG	PG
11	Water Separator		1	V						
12	Hydraulic Full-flow Filter	Filter	1				F			
13	Pilot Filter	Filter	1				F			
14	Hydraulic Oil Suction Filter	Strainer	1							C
15	Engine Oil Filter	Filter	1		F					
16	Fuel Filter	Filter	1		V					

V: Maintenance & Refill.

C: Cleaning.

F: First Time Exchange Only.

F100: Every 10 Hours For First 100 Hours.

W10: Every 10 Hours If Operating In Water.

EG: Ethylene Glycol - Standard Life Antifreeze (Drain and replace using this interval.) See "Engine Cooling System" on page 4-62, for further explanation.

PG: Propylene Glycol - Extended Life Antifreeze (Drain and replace using this interval.) See "Engine Cooling System" on page 4-62, for further explanation.

Gray Box: Replacement On Every Interval.

NOTE: *For additional service items see list of "Maintenance Intervals" on page 4-11.*

CLEAN DUST NET IN FRONT OF OIL COOLER

IMPORTANT

If running excavator in dusty area, check dust net everyday and clean it if dirty.

⚠ WARNING!

If using compressed air or water to clean the dust net, make sure that proper eye protection is worn.

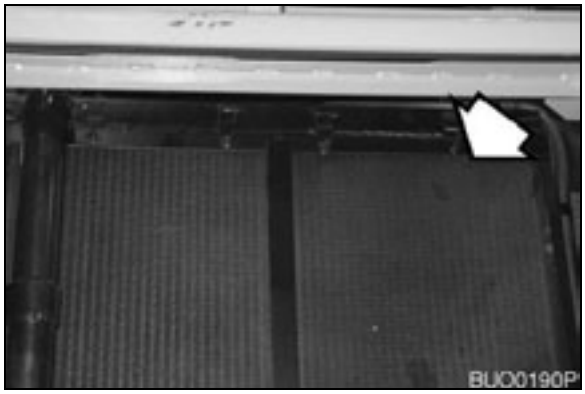


Figure 25

1. Loosen the wing nut(s) and remove dust net.
2. Clean with compressed air or a water.

CHECK COOLING SYSTEM AND REFILL AS REQUIRED

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

NOTE: *Units are factory filled with propylene glycol.*

⚠ WARNING!

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

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

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

INSPECT THE TRACK ASSEMBLIES FOR PROPER TENSION AND LOOSE, WORN OR DAMAGED PARTS (LINKS, SHOES, ROLLERS, IDLERS)

1. Do a daily walk-around inspection of all components including the track assemblies. Look for missing, damaged or excessively worn parts. See "Track Tension"' on page 4-69.
2. Jack up each track and perform the two speed travel motor test.

⚠ WARNING!

If compressed air, steam or water hit your body directly, there is danger of injury. Always wear protective glasses, mask and safety shoes. Make sure that all extra personnel are clear of the work area.

1. Make sure to wear all appropriate safety apparel (mask safety glasses, safety shoes, etc.) during the cleaning process.
2. Loosen the wing nut(s) and remove dust net from in front of oil cooler.
3. Clean the outside of the radiator and oil cooler with compressed air, steam or water. Wash from the outside of the engine compartment inwards. Repeat the cleaning process from the inside of the engine compartment outwards to remove all dirt and debris.

   NOTE: *Clean dust net and install it after cleaning radiator and oil cooler.*
4. Clean air conditioner condenser core with compressed air, steam or water.

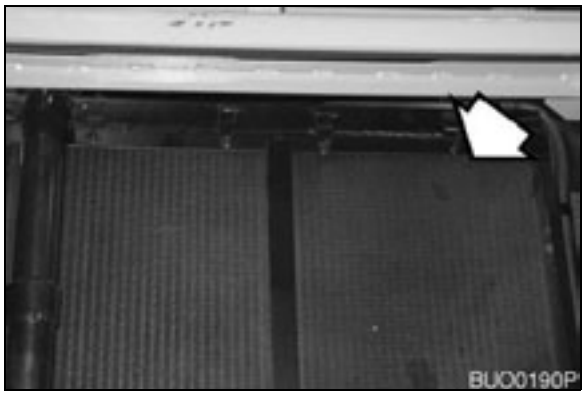


Figure 66

Figure 67

IMPORTANT

To prevent damage to the cores, apply compressed air from an appropriated distance. Damaged core may cause water leakage or overheating. In a dusty site, check the core daily, irrespective of the maintenance interval.

1. Slowly open the radiator cap to allow any pressure to escape.
2. Place a container under the radiator and open the drain valve (Figure 80).

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

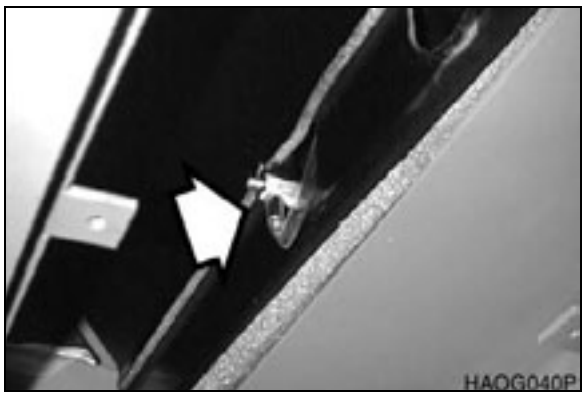


Figure 80

3. Open heater shutoff valves (Figure 81) to allow coolant to drain from heater core.

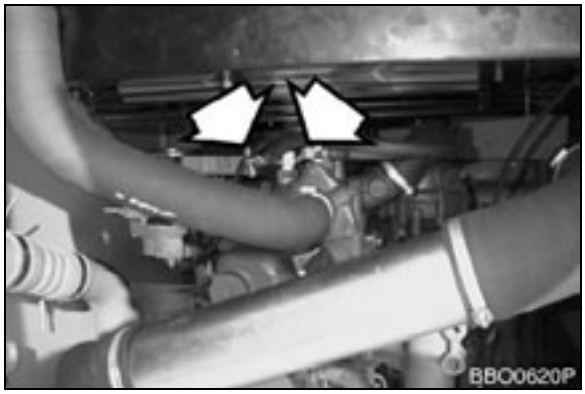


Figure 81

4. Remove coolant drain plug (1, Figure 82) from engine.
5. Install drain plug, and close drain valve after coolant has completely drained from system.
6. Fill cooling system with a flushing solution.
7. Run engine at low idle until the coolant temperature gauge reaches the "GREEN ZONE." Run engine for another 10 minutes.
8. After allowing engine to cool.
9. Drain flushing fluid and fill system with water.
10. Run engine again to allow water to completely circulate.
11. Drain water and fill system with proper antifreeze mixture for ambient temperature. Refer to coolant concentration table. (See page 4-63)
12. Run engine without radiator cap installed, so that all air will be purged from system. Fill radiator to fill neck.
13. Drain and fill radiator coolant recovery tank.

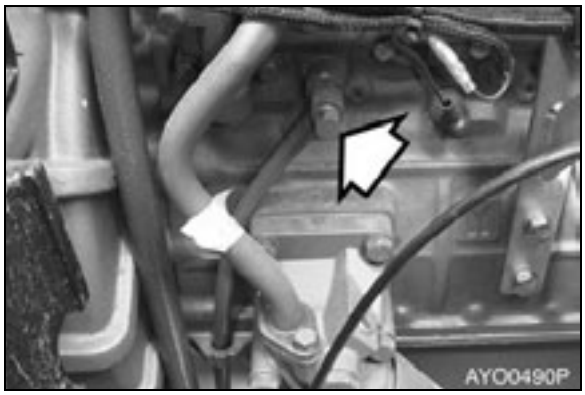


Figure 82

Inspection of Battery Electrolyte Level

This machine has two maintenance free batteries. They never require the addition to water.

When the charge indicator becomes transparency, it means low electrolyte state because of the leakage or charging system error. Determine the cause of problem and replace the batteries immediately.

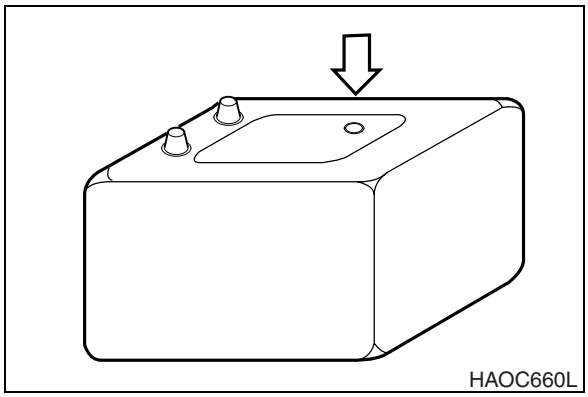


Figure 88

Check Charging State

Check charging state through the charging indicator.

- GREEN: Sufficiently charged.
- BLACK: Insufficient charged.
- TRANSPARENT: Replace battery.

Check the Battery Terminals

Be certain that the battery is held securely in its compartment. Clean the battery terminals and the battery cable connectors. A solution of baking soda and water will neutralize acid on the battery surface, terminals, and cable connectors. Petroleum jelly or grease can be applied to the connectors to help prevent corrosion.

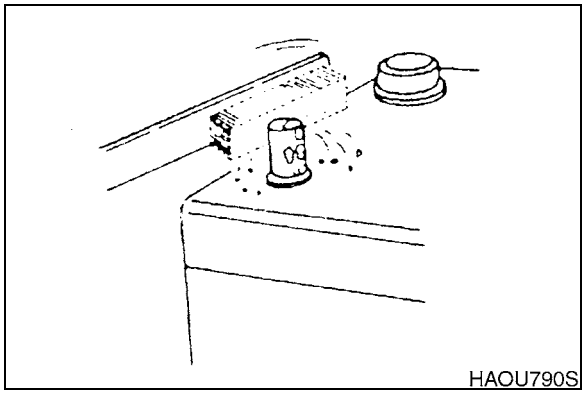


Figure 89

Battery Replacement

When the charging indicator indicates transparency state, replace the 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.

TRACK TENSION

⚠ WARNING!

Safely measuring track tension requires two people. One person must be in the operator's seat, running the controls to keep one side frame in the air, while the other person makes dimensional checks. Take all necessary precautions to make sure the machine won't move or shift position during service. Warm up the engine to prevent stalls, travel the excavator to an area that provides level, uniform ground support and/or use support blocks when necessary.

The track adjusting mechanism is under very high-pressure. NEVER release pressure too suddenly. The grease cylinder valve should never be backed off more than 1 complete turn from the fully tightened down position. Bleed off pressure slowly and keep your body away from the valve at all times.

Track shoe link pins and bushings wear with normal usage, reducing track tension. Periodic adjustment is necessary to compensate for wear and it may also be required by working conditions.

1. Track tension is checked by jacking up one side of the excavator. See Figure 96. Place blocking under frame while taking measurement.

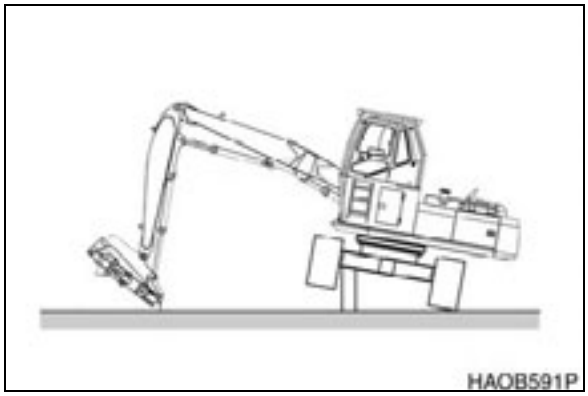


Figure 96

2. Measuring the distance (A, Figure 97) between the bottom of the side frame and the top of the lowest crawler shoe. Recommended tension for operation over most types of terrain is 320 - 340 mm (12.6 - 13.4 in)

   NOTE: *This measurement can be thrown off if there is too much mud or dirt or other material in the track assembly. Clean off the tracks before checking clearance.*

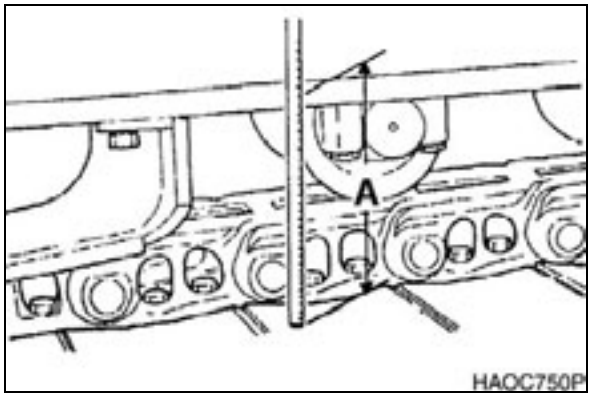


Figure 97

3. Too little sag in the crawler track (less than 320 mm (12.6 in) clearance) can cause excessive component wear. The recommended adjustment can also be too tight causing accelerated stress and wear if ground conditions are wet, marshy or muddy, or if the ground is hard and full of rocks or gravel.

TROUBLESHOOTING

Anytime that a malfunction occurs, take immediate corrective action. Check for and investigate the cause of the malfunction. A schedule maintenance program can prevent malfunctions from occurring by doing preventative maintenance. A systematic approach should be taken to troubleshooting, since several overlapping malfunctions may give the appearance of a problem that does not exist. If cause for the malfunction cannot be determined, contact your Daewoo distributor. Never perform an adjustment of or disassembly of, hydraulic components, electrical and electronic components, without first consulting a Daewoo distributor.

ELECTRICAL SYSTEM

Problem	Cause	Remedy
Battery will not hold a charge.	Low battery power.	Clean and retighten.
	Alternator belt loose or bad.	Tighten or replace belt.
	Loose or corroded terminals.	Tighten or replace as required.
	Alternator faulty.	Repair or replace as required.
Low battery power.	Internal battery short.	Replace battery.
	Short circuit in wiring.	Repair as required.
Engine speed is not controllable.	Speed control dial failed.	Replace control dial.
	Throttle controller failed.	Replace controller.
	Speed control motor failed.	Repair or replace as required.
	Blown fuse.	Replace fuse.
	Wiring harness damaged.	Repair or replace as required.
	Connector failed.	Repair or replace as required.
Power mode selector does not work.	Blown fuse.	Replace fuse.
	Power mode selector switch failed.	Replace switch.
	Connector failed.	Replace connector.
	Wiring harness damaged.	Repair or replace as required.
	e-EPOS controller failed.	Repair or replace as required.
Working mode selector does not work.	Blown fuse.	Replace fuse.
	Working mode selector switch.	Replace switch failed.
	Connector failed.	Replace connector.
	Wiring harness damaged.	Repair or replace as required.
	e-EPOS controller failed.	Repair or replace as required.