Solar 55-V PLUS

Operation and Maintenance Manual

022-00014BE

Serial Number 1001 and Up

December 2003

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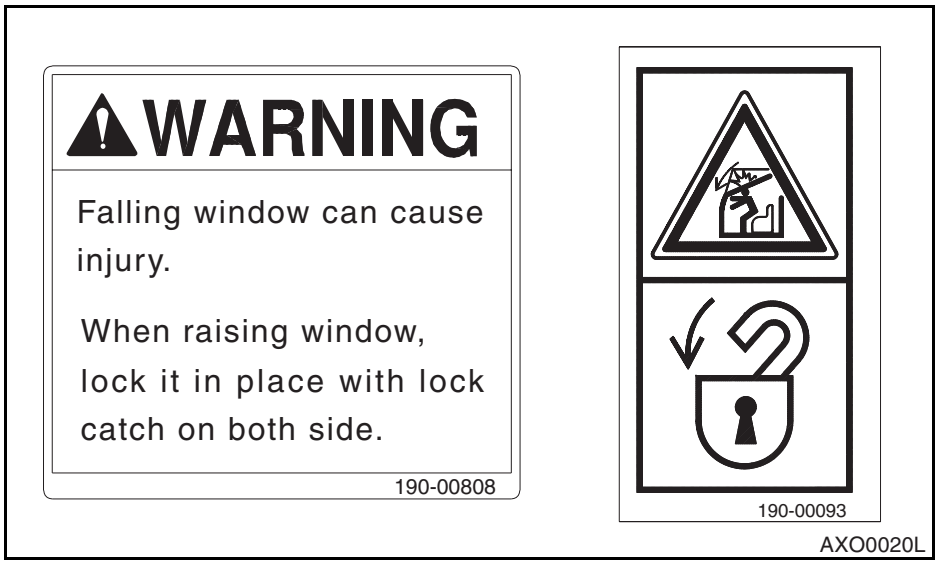
1. WARNINGS FOR OPERATION, INSPECTION AND MAINTENANCE (190-00688, 190-00092).

2. WARNINGS WHEN OPENING A FRONT WINDOW (190-00808, 190-00093).



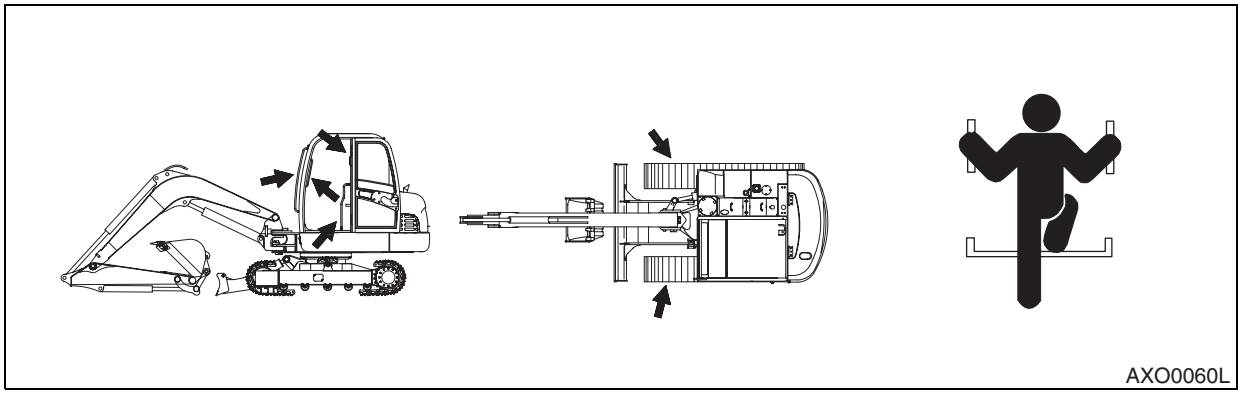


Figure 3

FUEL, OIL AND HYDRAULIC FLUID FIRE HAZARDS

Fuel, oil and antifreeze will catch fire if it is brought close to a flame. Fuel is particularly flammable and can be hazardous.

Always strictly observe the following.

Add fuel, oil, antifreeze and hydraulic fluid to the machine only in a well-ventilated area. The machine must be parked with controls, lights and switches turned "OFF." The 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 the machine.

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

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

Figure 4

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.

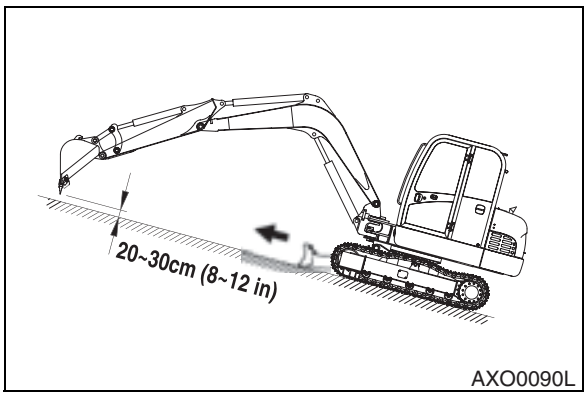


Figure 19

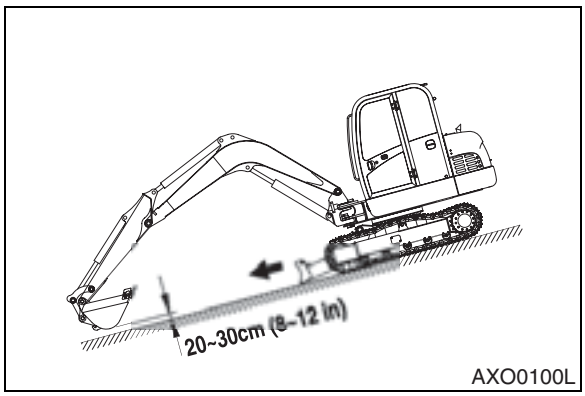


Figure 20

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.

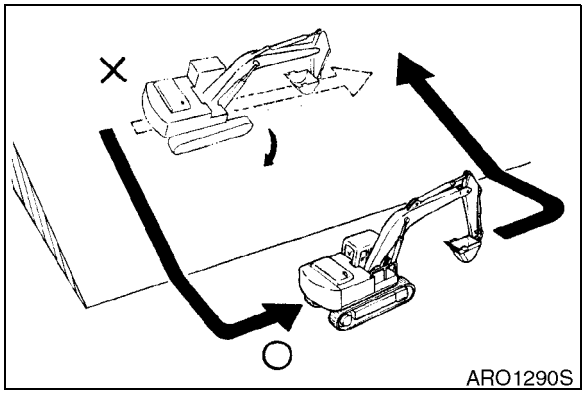


Figure 21

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 4-48, for additional European regulations.*

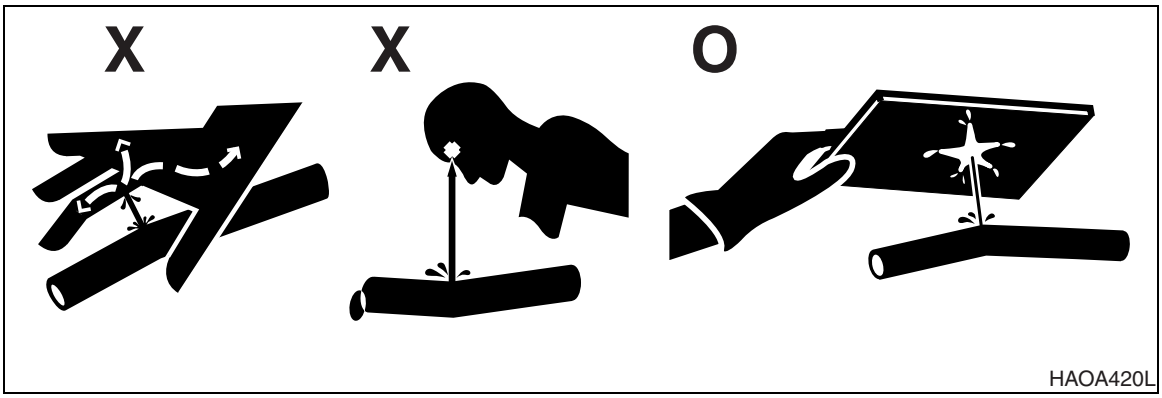
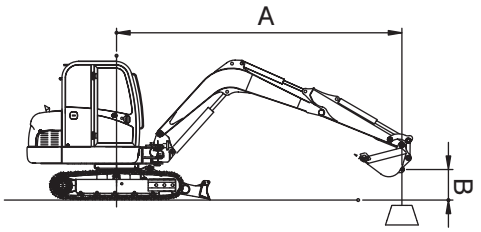


Figure 38



BOOM : 3.0m (9'10")
ARM : 1.6m (5'3")
BUCKET : PCSA 0.175m^3 (CECE 0.15m^3)
SHOE : 400mm (16")
: RATING OVER FRONT
: RATING OVER SIDE OR 360 degree
UNIT : 1,000 kg (1,000 lb)

a. WITH DOZER

FEET

A(ft) / B(ft)	7.5'		10'		12.5'		15'		MAX. REACH		
											A(ft)
15'					*1.81	*1.81			*1.81	*1.81	12.44
12.5'					*2.02	2.02			*1.75	1.52	14.68
10'					*2.26	1.99	*2.38	1.45	*1.77	1.27	16.11
7.5'			*3.11	2.75	*2.77	1.92	*2.62	1.42	*1.86	1.14	16.98
5'	*7.39	3.98	*4.45	2.59	*3.44	1.84	*2.97	1.37	*2.01	1.07	17.38
2.5'	*4.36	3.74	*5.62	2.45	*4.08	1.76	*3.34	1.33	*2.25	1.05	17.34
O(GROUND)	*5.24	3.69	*6.32	2.38	*4.56	1.71	*3.62	1.30	*2.62	1.08	16.88
-2.5'	*7.03	3.69	*6.54	2.35	*4.78	1.68	*3.74	1.28	*3.27	1.17	15.94
-5'	*9.34	3.72	*6.34	2.36	*4.67	1.69			*3.79	1.37	14.41
-7.5'	*8.10	3.79	*5.59	2.40					*4.28	1.83	12.00
-10'	*5.45	3.93							*5.38	3.87	7.57

b. WITHOUT DOZER

FEET

A(ft) / B(ft)	7.5'		10'		12.5'		15'		MAX. REACH		
											A(ft)
15'					*1.81	*1.81			*1.81	*1.81	12.44
12.5'					*2.02	2.02			*1.75	1.52	14.68
10'					*2.26	1.99	*2.38	1.45	*1.77	1.27	16.11
7.5'					*2.77	1.92	2.36	1.42	*1.86	1.14	16.98
5'	7.11	3.98	*3.11	2.75	3.08	1.84	2.32	1.37	1.83	1.07	17.38
2.5'	*4.36	3.74	4.39	2.59	3.00	1.76	2.27	1.33	1.81	1.05	17.34
O(GROUND)	*5.24	3.69	4.23	2.45	2.94	1.71	2.24	1.30	1.87	1.08	16.88
-2.5'	6.76	3.69	4.15	2.38	2.91	1.68	2.22	1.28	2.03	1.17	15.94
-5'	6.80	3.72	4.12	2.35	2.91	1.69			2.36	1.37	14.41
-7.5'	6.88	3.79	4.12	2.36					3.14	1.83	12.00
-10'	*5.45	*3.93	4.17	2.40					*5.38	3.87	7.57

1. LOAD POINT IS THE HOOK ON THE BACK OF THE BUCKET.
2. * RATED LOADS ARE BASED ON HYDRAULIC CAPACITY.
3. RATED LOADS DO NOT EXCEED 87% OF HYD. CAPACITY OR 75% OF TIPPING CAPACITY.

AXO0160L

Figure 16, shows the degrees from upper structure center line that the boom can be moved.

A. 80° to left of upper structure centerline.

B. 50° to right of upper structure centerline.

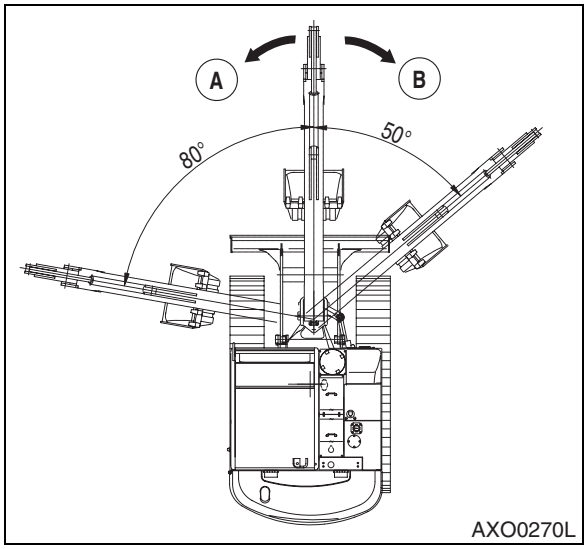


Figure 16

14. STEREO

See “Stereo” on page 2-25.

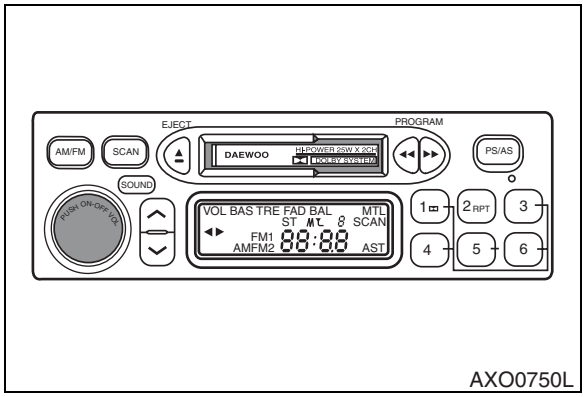


Figure 17

15. FUSE BOX

See “Fuse Boxes” on page 2-34.

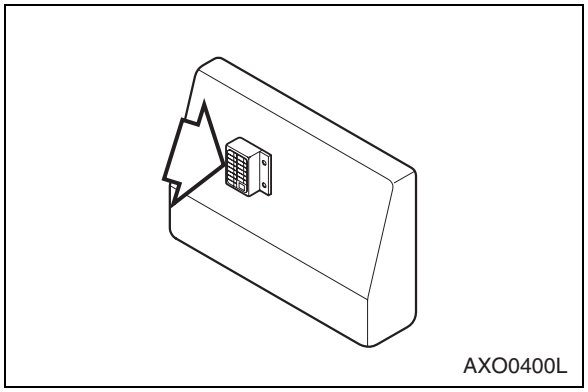


Figure 18

5. WIPER SWITCH

O. In this position, windshield wiper is "OFF."

I. In this position, windshield wiper runs at "LOW" speed.

II. In this position, windshield wiper runs at "HIGH" speed.

NOTE: *Operating wiper without washer fluid or when there is sand or dirt present will damage the window and/or wiper.*

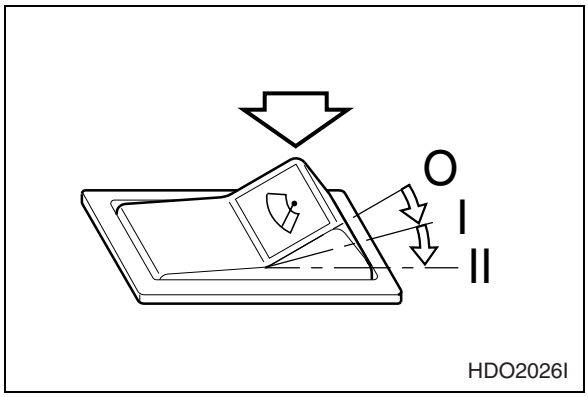


Figure 37

6. WINDSHIELD WASHER SWITCH

While the windshield wiper is running, depress the washer switch to spray windshield washer fluid onto the windshield. Use only the proper windshield washer fluid in the system.

O. In this position, the washer is "OFF."

I. In this position, the windshield washer sprays fluid. When released the switch returns to the "O" (OFF) position.

NOTE: *Do not operate the windshield washer without any fluid. If you operate it in spite of running out of fluid, the washer motor may be damaged. Check level in washer tank, and add fluid as required.*

NOTE: *If you use soapy water or synthetic detergent instead of window cleaning fluid, the wiper blade or painted surfaces may be damaged. Use standard window cleaning fluid: SSK703*

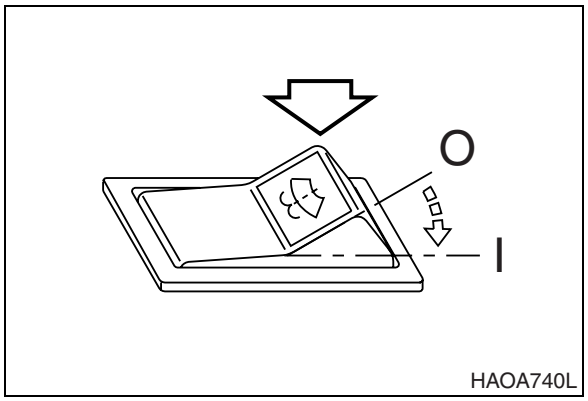


Figure 38

9. CASSETTE AND PROGRAM BUTTONS

Fast Forward

To fast wind the tape, press the fast forward button (9, Figure 49). The tape direction indicator will blink on the LCD. When the tape reaches its end, it is automatically reversed and played back from the beginning of the opposite side. To stop the fast forward movement, press the rewind button (9, Figure 49).

Rewind

To rewind the tape, press the rewind button (9, Figure 49). The tape direction indicator will blink on the LCD. When the tape is fully rewound, it is played back from the beginning of the same side. To stop the rewind movement, press the fast forward button (9, Figure 49).

Program

To play the opposite side of tape while playing one side, press the fast forward (9, Figure 49) and rewind (9, Figure 49) buttons simultaneously.

NOTE: *When the tape reaches at the end of one side, it will automatically reverse and play back the other side of tape.*

NOTE: *Press "MTL" button (metal tape button) when playing a high composition tape, like a metal tape, a chrome tape etc. The metal tape indicator "MTL" will be illuminated in the LCD. Switch off for a normal composition tape.*

10. SECURITY WARNING LED

The security warning LED will flash when the key in the starter switch is removed, and will disappear when starter switch is turned to the "ON" position.

11. SCAN

To hear each station on the current menu band in turn for about 5 seconds.

Closing the Window

> **WARNING!**
>
> **Be careful that your hands are not caught in window frame.**

1. Lower bucket to ground.
2. Set safety lever (Figure 66) on "LOCK."
3. Holding handle of front window, push release lever (1, Figure 68) (In direction of arrow) to unlock catches.
4. Slowly lower front window into position.
5. Push front window to secure it by lock catches (1, Figure 67).

FRONT BOTTOM WINDOW

The front bottom window can be removed.

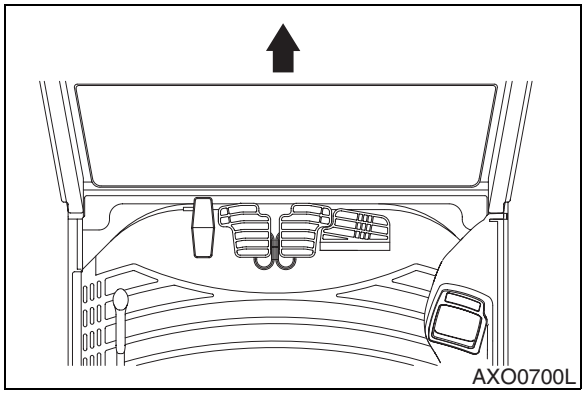


Figure 69

DOOR SIDE LATCH

1. The door side latch (Figure 70) 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.*

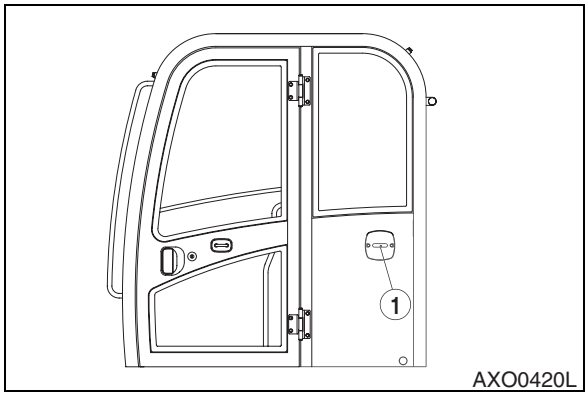


Figure 70

HYDRAULIC SYSTEM WARM-UP – COLD WEATHER

1. Run engine at "LOW IDLE" (no load) for 5 minutes (Figure 13).

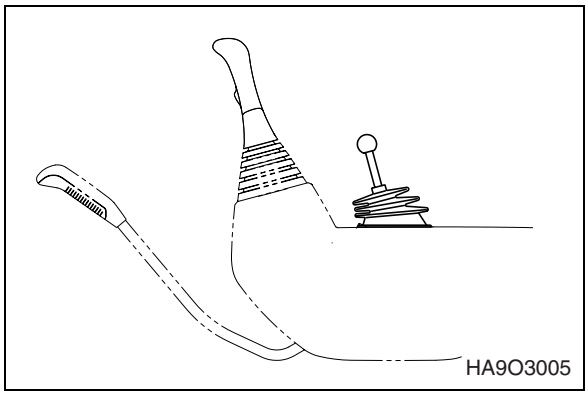


Figure 13

2. Run engine for approximately 5 minutes set at the middle of the speed range, without a load (Figure 14).

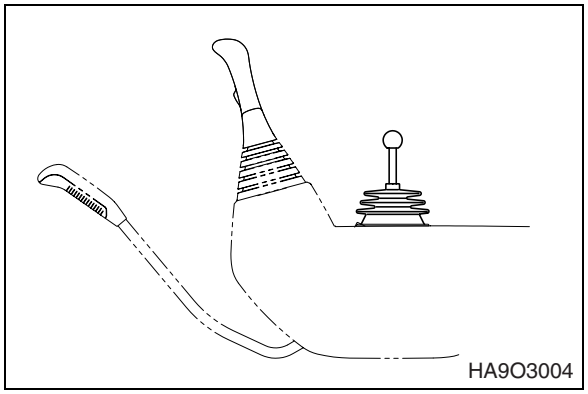


Figure 14

3. Set safety lever (1, Figure 15) on "UNLOCK" position

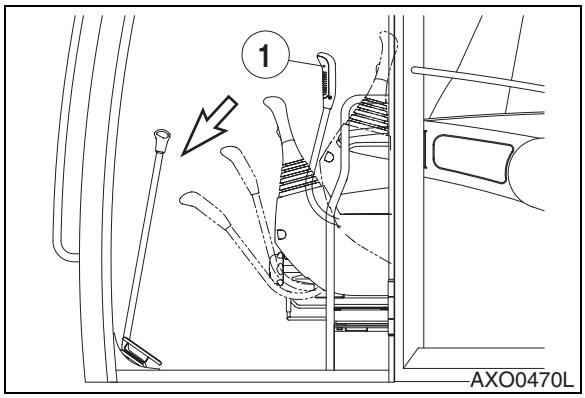


Figure 15

4. Slowly cycle boom, arm and bucket cylinders about five times 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.*

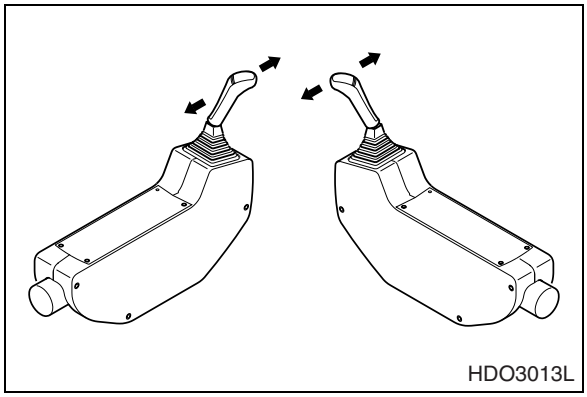


Figure 16

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TRAVEL SPEED SWITCH

WARNING!

Always use low speed when traveling down a slope.

Two travel speed ranges can be selected by using the travel speed switch.

O: In this position low travel speed and a higher torque are selected.

I: In this position high travel speed and lower torque are selected.

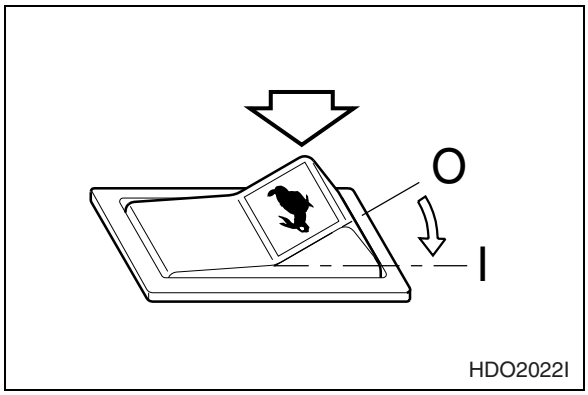

Figure 36

WORK LEVERS (JOYSTICKS) (ISO STYLE)

WARNING!

Check surrounding area before swinging. When operating a lever while in auto idle, do it carefully, because the engine speed will increase rapidly

NOTE: *When starting work, move joysticks slowly and check movement of swing and front attachment.*

This equipment is manufactured using the lever configuration described in ISO standards. Do not change valving, hoses, etc. that would change this standard.

A plate on the right side of the driver's seat shows how to operate the work levers (joysticks). See Figure 37.

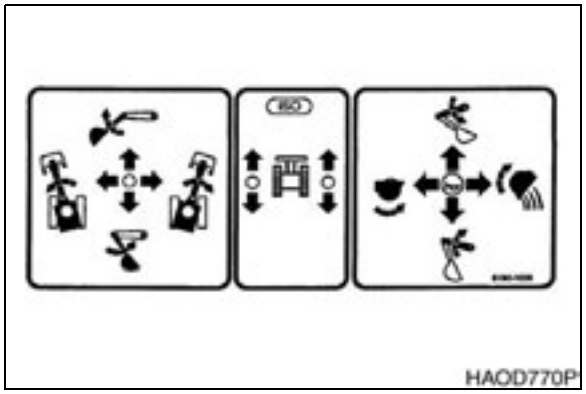

Figure 37

BE CAREFUL NOT TO HIT OBSTACLES WITH BLADE

1. Be careful not to hit obstacles with blade. This can damage blade, cylinders or other parts of machine.

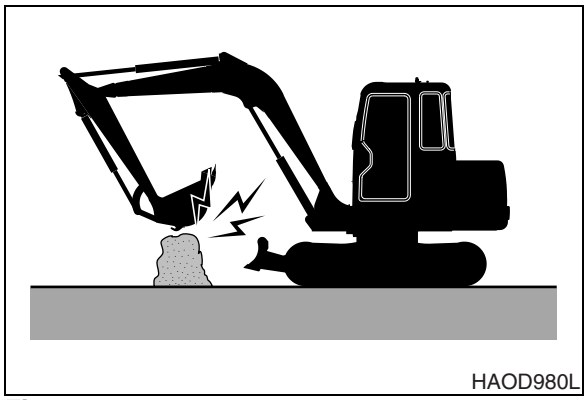

Figure 64

BE CAREFUL OF TRACK SHOES

1. During deep excavation, the boom cylinder can hit the tracks. Be careful to avoid this.

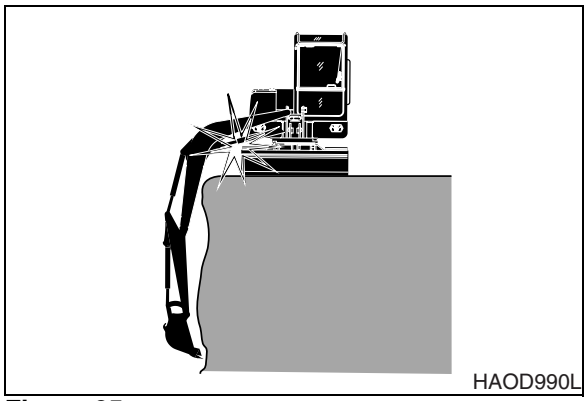

Figure 65

HANDLE RUBBER CRAWLER TRACKS CAREFULLY

IMPORTANT
As the rubber crawler is pliable on its section areas, it is inferior to steel crawler in stability. Especially, use care when you operate your machine sideways.

The tracks are designed to prevent damage to road surfaces. They can be damaged if the following precautions are not followed:

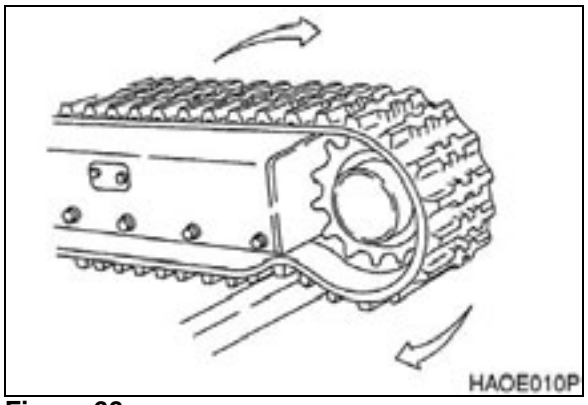

Figure 66

OPERATING TECHNIQUES

LIFTING

IMPORTANT

There may be local or government regulations, about the use of excavators for the lifting of heavy loads. Always contact your local and government agencies in regards to these regulations.

To prevent injury, do not exceed the rated load capacity of the machine. If the machine is not on level ground, load capacities will vary.

Short slings will prevent excessive load swing.

Use the lifting eye on the bucket that is provided to lift objects.

Always try to maintain the lifting eye (Figure 88) straight below the centerline of the arm and bucket pin. In this manner the weight of the load is being primarily held only by the pin, and not by the bucket cylinder, link, and link pins.

When a lifting eye is used, the sling/lifting device must be fastened to the eye in a manner that will not allow it to come loose.

The most stable position is over the corner of the machine.

For best stability, carry a load as close to the ground and machine as possible.

Lift capacity decreases as the distance from the machine swing centerline is increased.

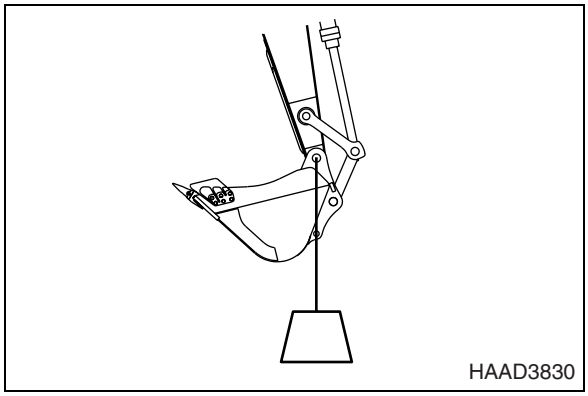

Figure 88

TABLE OF RECOMMENDED LUBRICANTS

IMPORTANT

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

NOTE: *Refer to the Maintenance Intervals Table for application points.*

LUBRICANT MANUFACTURER	HYDRAULIC OIL*	ENGINE OIL**	LUBRICANT GREASE	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 HD 80W90
SHELL	TELLUS 32	ROTELLA T15W40 or T30 (WINTER) or T40 (SUMMER)	ALVANIA EP #2	SPIRAX HD 80W90 or DONAX TD (TRANSMISSION)
PENNZOIL	PENNZBELL AW 32 (BELOW 0°C (32°F)) or AW 46 (ABOVE 0°C (32°F))	LONGLIFE SAE 30 or SAE 40 or SAE 15W40	PENNZOIL 705 EP #2	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

* Hydraulic oil change interval is 2,000 hours, only when Daewoo Genuine Oil is used. If other brands of oil is used, guaranteed change interval is 1,000 hours.

** Engine oil must meet ACEA-E2, ACEA-E3 or API-CH-4 EQUIVALENT and be SAE 15W40 or 10W40.

CHECK FUEL LEVEL

⚠ WARNING!

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

Immediately clean up any spilt fuel.

1. Make sure that the fuel fill hose is grounded to the excavator before fueling begins.
2. Check the amount of fuel in the tank by observing the fuel tank sight gauge (2, Figure 14). Fill the tank using the fill tube (1, Figure 14) with the proper fuel for the operating conditions.

   NOTE: *See "Fluid Capacities" on page 4-7. for capacity.*
3. Do not overfill the tank.
4. Securely tighten cap (1, Figure 14) after fueling.

   NOTE: *If breather holes in cap are clogged, a vacuum may form in the tank preventing proper fuel flow to engine. Keep the fuel cap clean.*
5. Check the fuel gauge (1, Figure 17) in the operator's compartment for proper operation.

   NOTE: *A low fuel warning light* (2, Figure 17) *will turn "ON" when the fuel level reaches 12 liters (13 U.S. quarts) or less.*

   NOTE: *Always fill fuel tank at end of work day. This will help prevent condensation from forming inside tank. See "Fluid Capacities" on page 4-7. for capacity.*

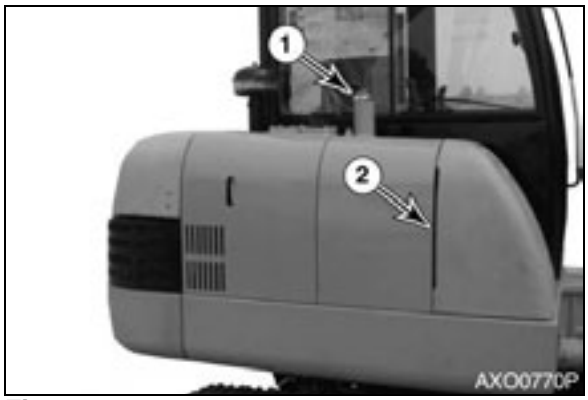

Figure 14

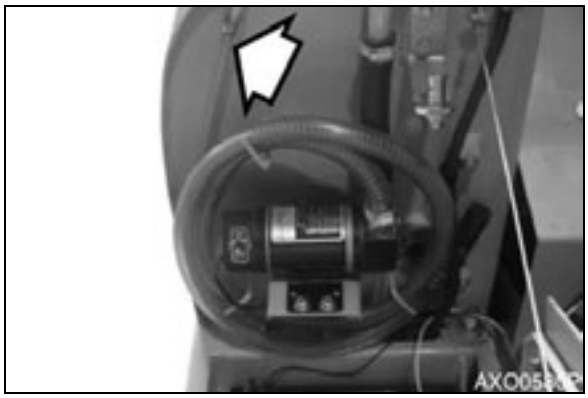

Figure 15

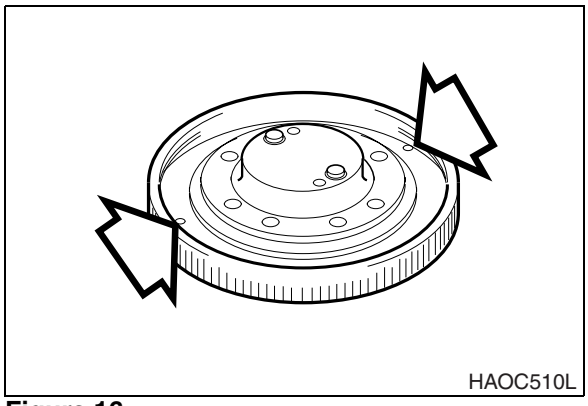

Figure 16

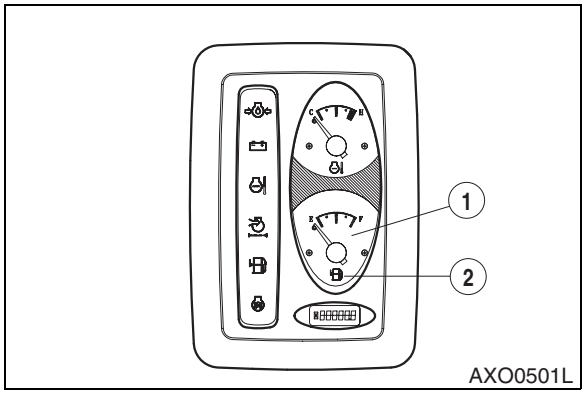

Figure 17

5. Arm Cylinder Rod Pin (1 point)

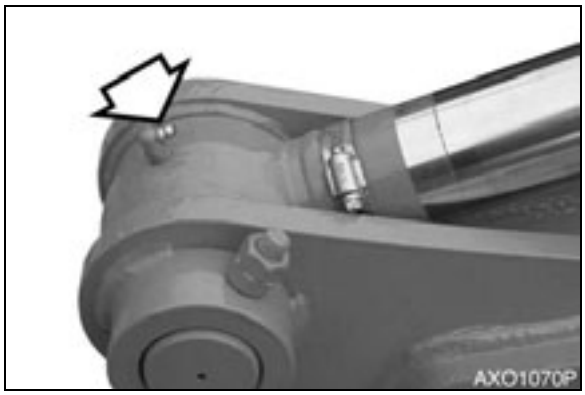

Figure 36

6. Bucket Cylinder Head Pin (1 point)

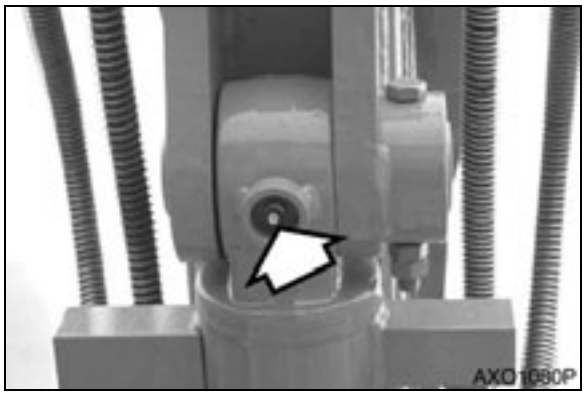

Figure 37

7. Bucket Link Pins (2 points)

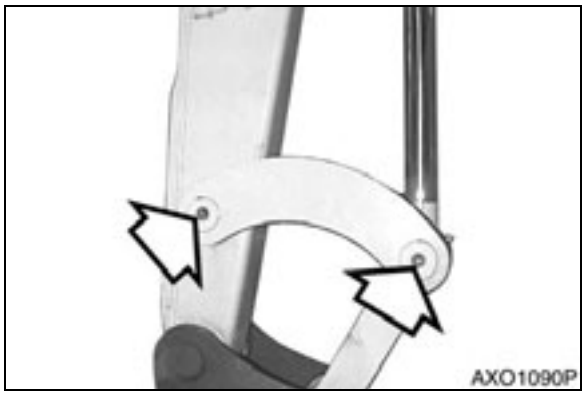

Figure 38

8. Bucket Cylinder Rod Pin (1 point)

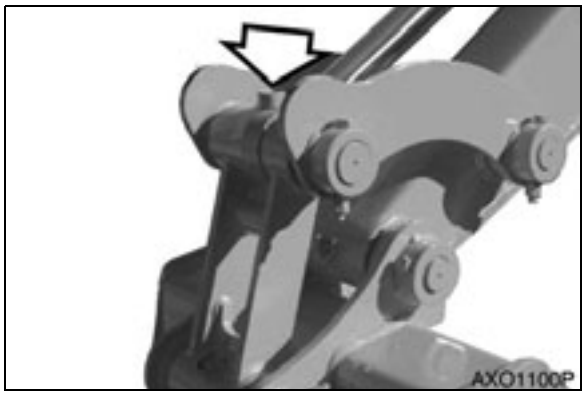

Figure 39

1. Loosen plug (1, Figure 60) on top of fuel filter.
2. Unscrew and pump the hand operated primer pump (2, Figure 60) on fuel injection pump. Pump primer until fuel is present at plug hole in fuel injection pump.
3. Install plug in fuel filter.
4. Continue to pump primer pump until a strong resistance is felt. Screw the primer pump knob back into housing.
5. Start engine and look for signs of leaks.
6. Repeat procedure if necessary.

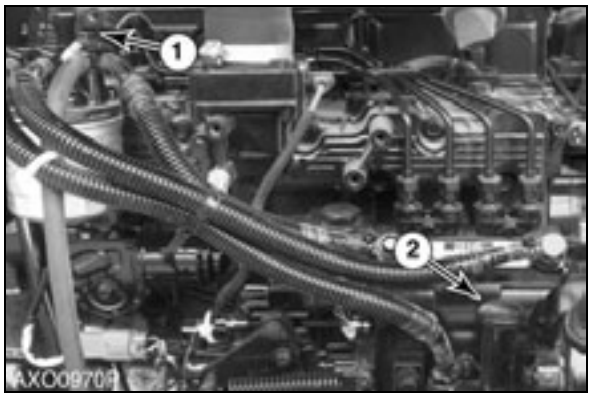

Figure 60

REPLACE OUTER AND INNER AIR CLEANER FILTERS

WARNING!

Never clean or attempt to remove the air cleaner filter if the engine is running.

NOTE: *Replace inner filter whenever a new outer filter is installed.*

1. Open the bonnet at the rear of the cabin.
2. Remove the air cleaner cover.
3. Remove the outer filter from the cleaner housing.
4. Clean the air cleaner cover and the inside of the air cleaner housing.
5. Remove inner filter.
6. Clean out inside of air cleaner housing. Do not use compressed air to blow out housing.
7. Install new inner filter, and secure it into position. Do not clean and re-use inner filter.
8. Install new outer filter, and secure it into position.
9. Install air cleaner cover.

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

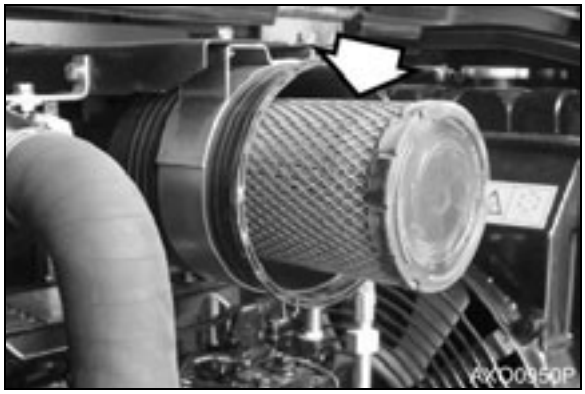
Figure 61

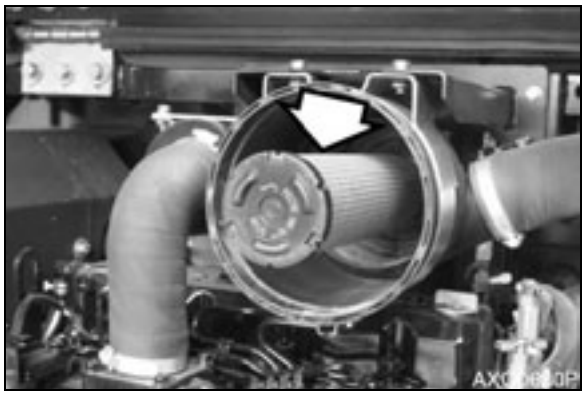
Figure 62

CHANGE RADIATOR COOLANT (PROPYLENE GLYCOL - EXTENDED LIFE ANTIFREEZE)

NOTE: *Units Serial Number 1001 thru 1189 were factory filled with ethylene glycol. It is recommended that these units be completely flushed and refilled with propylene glycol, and a 2,000 hour service interval be used thereafter. See "Engine Cooling System" on page 4-55, for further details.*

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.*

⚠ 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 recovery tank.

1. Slowly open radiator cap (1, Figure 77) to allow any pressure to escape.
2. Place a container under the radiator and open the drain valve (2, Figure 77).

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

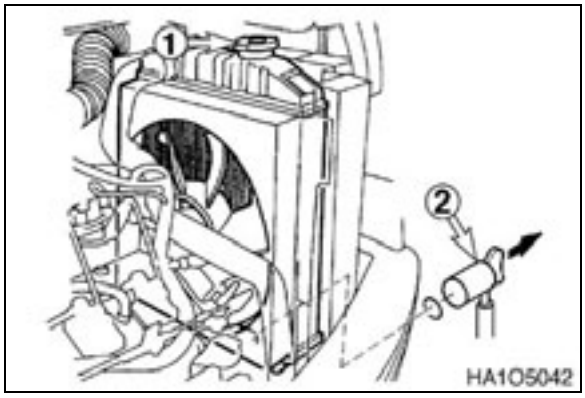

Figure 77

3. Remove engine block drain plug (Figure 78) to drain engine block.

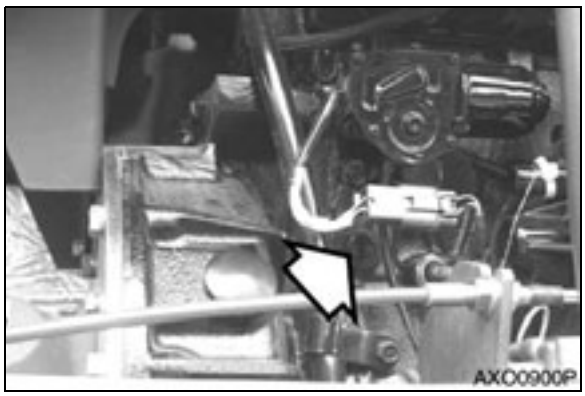

Figure 78

ENGINE COOLING SYSTEM

GENERAL

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

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

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

⚠ WARNING!

Pressure at air nozzle must not exceed 30 PSI (2.1 kg/cm^2). Always wear goggles when using compressed air.

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

Heavy duty diesel engines require a balanced mixture of water and antifreeze. Drain and replace the mixture every year or 2000 Hours of operation, which ever comes first. This will eliminate buildup of harmful chemicals.

NOTE: *Units Serial Number 1001 thru 1189 were factory filled with ethylene glycol. It is recommended that the unit be completely flushed and refilled with propylene glycol after the first 1000 hours, and a 2,000 hour service interval be used thereafter.*

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

Types of Antifreeze

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

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

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

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

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.

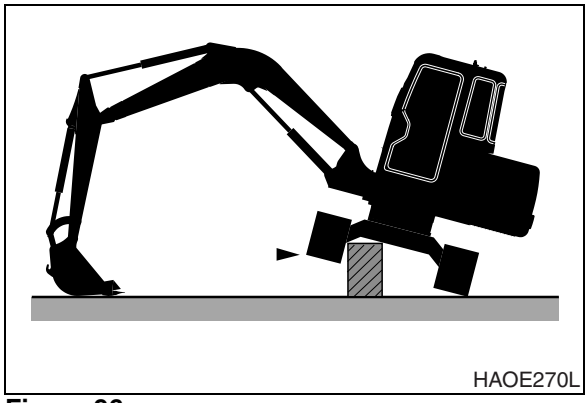

Figure 96

2. Measure clearance between track roller and track contact surfaces. Clearance should be approximately 10 - 15 mm (0.39 - 0.59 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.*

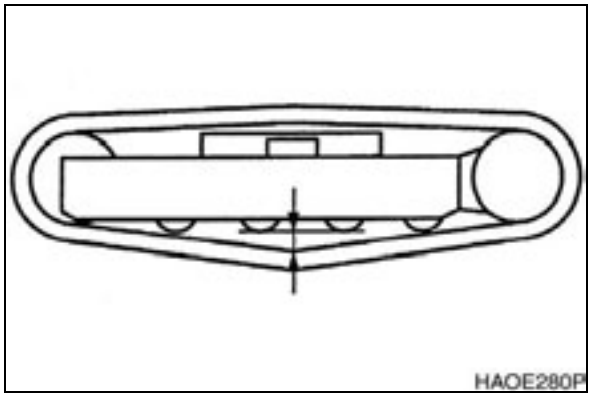

Figure 97

TROUBLESHOOTING

It is important to respond quickly to problems uncovered in troubleshooting. For adjustment or overhaul of hydraulic or electrical systems, see your nearest Daewoo dealer.

ATTACHMENTS

Problem	Cause	Remedy
Lack of power.	Lack of engine power.	Tune engine.
	Poor performance due to worn hydraulic pump.	Replace hydraulic pump.
	Bad main relief valve.	Adjust pressure or replace.
	Low level of hydraulic oil.	Add oil.
	Wrong viscosity hydraulic oil.	Replace with correct viscosity.
	Suction filter restricted.	Replace filter.
Poor overall performance.	Hydraulic pump failure.	Replace hydraulic pump.
	Hydraulic oil level low.	Add oil.
Lack of power.	Main or port relief valve pressure set too low.	Adjust pressure.
	Damaged hydraulic cylinder seal.	Replace seal.
	Hydraulic cylinder piston or rod damaged.	Replace piston or rod.
Unusual sound from attachment connections.	Lack of grease.	Add grease.
	Coupling pin worn.	Replace bushing or pin.

CENTER JOINT

Problem	Cause	Remedy
Lack of power.	Bad center joint seal.	Replace.
	Damaged center joint rotor.	Replace.
	Bad seal.	Replace seal.

CONTROL LEVER

Problem	Cause	Remedy
Lever feels "heavy" when operated.	Foreign material in control valve spool.	Clean control valve.
	Valve spool sticking.	Replace valve housing assembly.
	Lack of linkage lubrication.	Lubricate.

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