Solar 290LC-V

Operation and Maintenance Manual

2022-7144E

Serial Number 0001 and Up

April 1998

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.

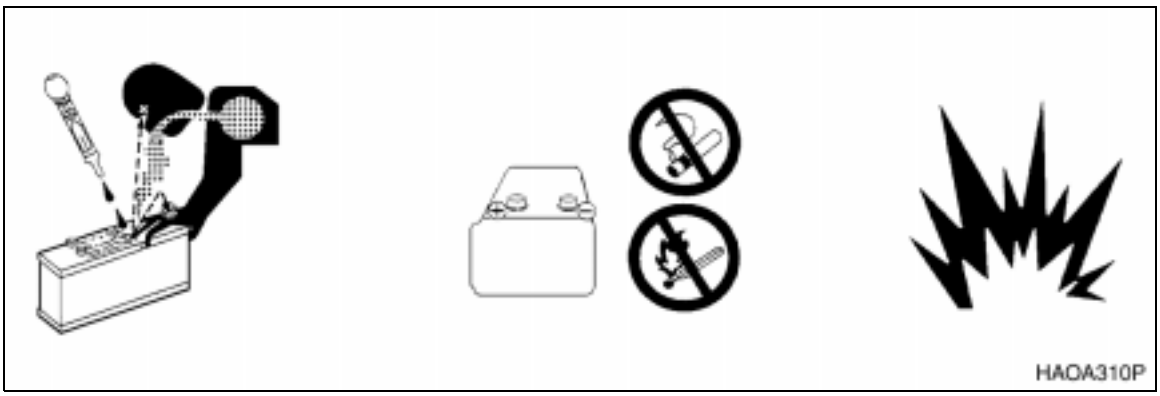
Illustrations used throughout this manual are used only as a representation of the actual piece of equipment, and may vary from the actual item.

6. WARNING FOR BATTERIES MAINTENANCE (2190 - 2533).

WARNING!

- **Battery fumes can explode. Keep sparks and flames away from batteries.**
- **Always avoid storing metals like tools or inflammable materials around or on the 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 the acid.**
  3. **Flush your eyes with water for 10-15 minutes.**

  Get medical attention immediately.



7. WARNING FOR HIGH TEMPERATURE HYDRAULIC OIL (2190 - 3318)

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WARNING!

To prevent hot oil from spurting out:

- **Turn engine off.**
- **After oil to cooled.**
- **Push button on the breather to relieve pressure before removing cover.**

BOOST STARTING OR CHARGING ENGINE BATTERIES

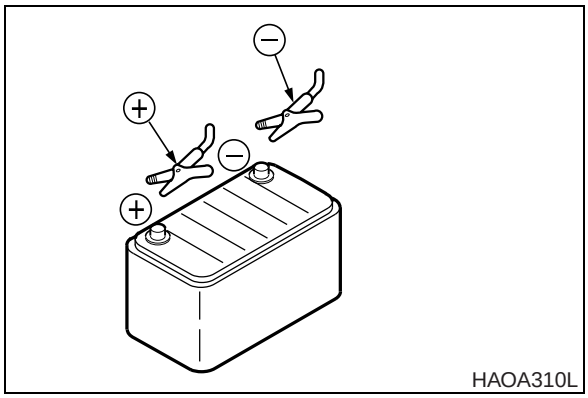


Figure 11

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

When boost-starting from another machine or vehicle do not allow the 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 the non-series-connected positive terminals and between the negative terminal of the booster battery and the metal frame of the machine being boosted or charged. Refer to the procedure and illustration in “Starting Engine Using a Booster Battery” on page 3-8 of this manual.

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

TRAVEL CONTROLS MAY PRODUCE REVERSED OPERATIONS

Before starting the machine you should always check to see which end of the track frame is under the operator’s cab. In the normal travel configuration, track frame travel motors are at the rear of the machine, under the engine and counterweight. If the operator swings the cab 180°, travel motors will be underneath the operator’s cab, toward the front of the track frame and operating travel will be reversed.

When traveling the excavator always keep lights on; make sure that you are in compliance with all state and local regulations concerning warning flags and signs and keep the operator’s cab positioned over the idler end of the track frame. That will keep travel controls in their intended configuration and at the same time, maintain the proper orientation of lights on the machine and posted flags and signs.

KEEP "PINCH POINT" AREAS CLEAR - USE CAUTION IN REVERSE & SWING

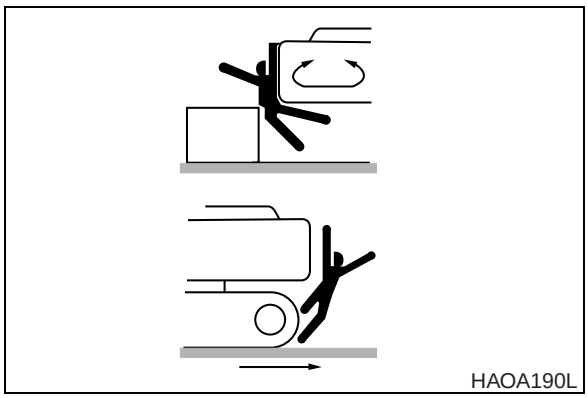


Figure 12

Use a signal person in high traffic areas and whenever the operator’s view is not clear, such as when traveling in reverse. Make sure that no one comes inside the swing radius of the machine.

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

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

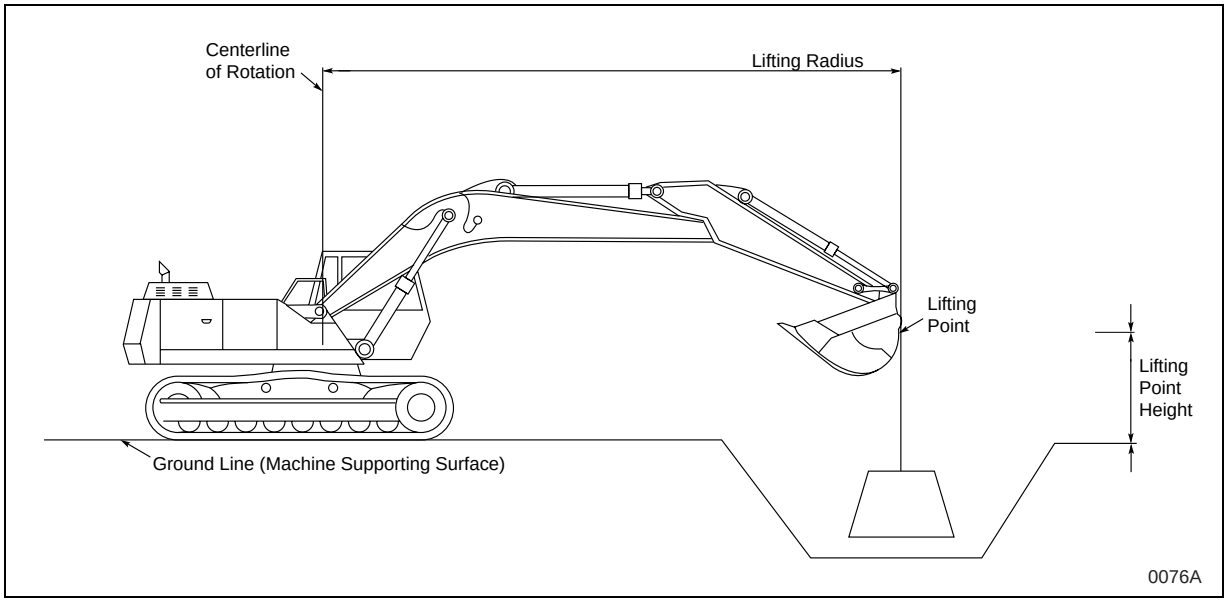


Figure 23

The weight of slings and any auxiliary lifting device (and/or the weight difference of any attachment heavier than standard configuration) must be deducted from the rated lift capacity to determine allowable net lifting load. The lift point should be located on the back of the bucket, as shown in Figure 23.

IMPORTANT!

Select the Digging Mode switch on the Instrument Panel before using the excavator for lifting work. Engine and hydraulic oil should both be fully warmed up to operating temperature before starting a lift.

1. START SWITCH

To start or stop the engine for equipment operation.

A. "I" Position (On) - Turning the switch to this position turns the engine electrical system on. The charge indicator light and the oil pressure indicator light should be "ON" at this time.

B. "O" Position (Off) - Turning the switch to this position turns the engine "OFF" along with its electrical system. In this position the engine is "OFF" but the interior cab light and fuel tank transfer pump (if equipped) are functional.

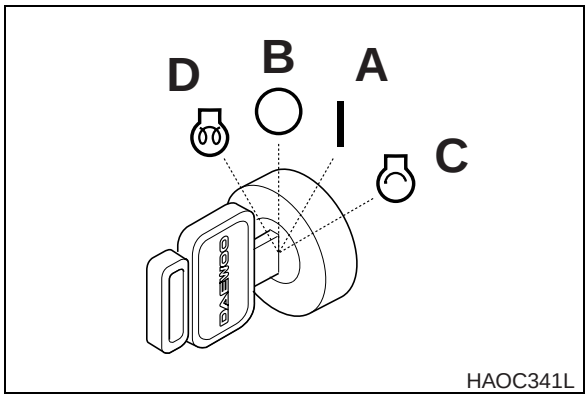


Figure 4

C. "⏻" Position (Start) - If you turn the starter switch to this position, the engine will start. When released, the key will return to the "ON" position automatically. Do not operate the starter switch over 15 seconds at a time, this will help prevent damage to starter.

⚠ WARNING!

DO NOT USE STARTING FLUIDS WHEN USING THE PREHEAT SYSTEM. The preheat system could cause the starting fluid to explode.

D. "⏻" Position (Preheating) - Use this position to start in cold weather. When preheating is completed, the preheating completion light, located on the instrument panel will light up. Start the engine immediately after the light comes "ON."

2. ENGINE SPEED CONTROL DIAL

The engine speed is controlled by the dial. Rotating it clockwise increases engine speed (RPM) and counterclockwise decreases engine speed.

A Low idle (Lowest engine speed)

B High idle (Highest engine speed)

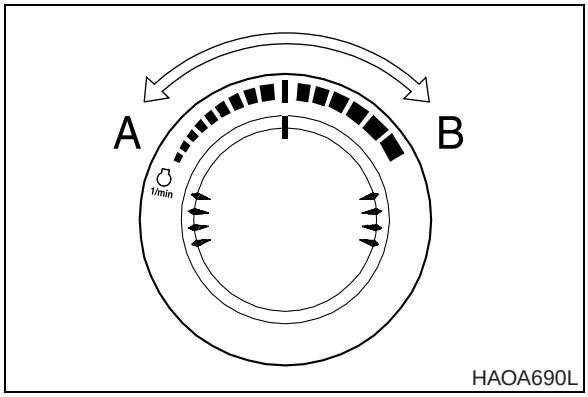


Figure 5

MODE SELECTION SWITCHES

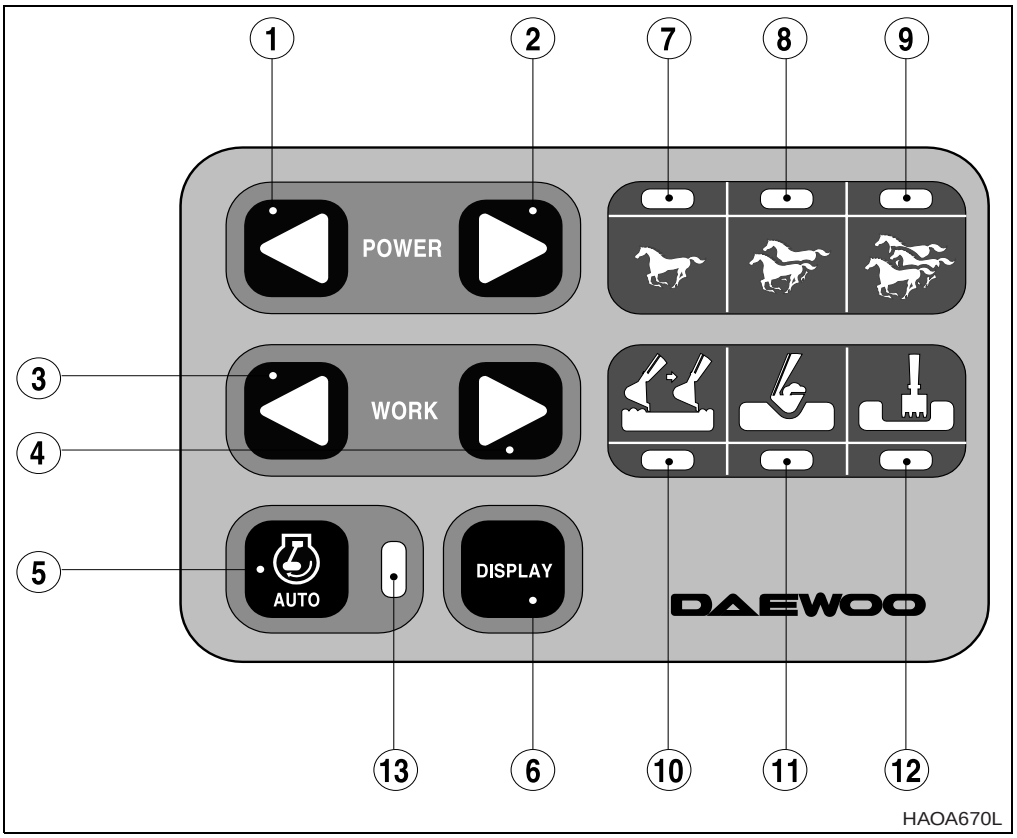


Figure 34

	POWER MODE	WORK MODE	
SWITCH	1. POWER MODE SELECTION SWITCH (1, Figure 44 on page 3-21)	3. WORK MODE SELECTION SWITCH (1, Figure 45 on page 3-22)	5. AUTO IDLE SWITCH
	2. POWER MODE SELECTION SWITCH (2, Figure 44 on page 3-21)	4. WORK MODE SELECTION SWITCH (2, Figure 45 on page 3-22)	6. MULTI-FUNCTION GAUGE DISPLAY SELECTION SWITCH
INDICATOR	7. POWER MODE - I INDICATOR	10. LEVELING MODE INDICATOR	13. AUTO IDLE INDICATOR
	8. POWER MODE - II INDICATOR	11. DIGGING WORK MODE INDICATOR	
	9. POWER MODE - III INICATOR	12. TRENCHING WORK MODE INDICATOR	

- Regarding the usage of power mode and work mode selection switch, refer to "Mode Selection" (See page 3-21).
- Regarding the usage of multi-function gauge display switch (See page 2-12).
- Regarding the usage of auto idle switch refer to "Mode Selection" (See page 3-21).

4. FUSIBLE LINK

A fusible link is located in the battery box.

If the engine does not crank, first check that the starter switch is turned "ON" and that no power is available (No indicator lights will light.). Check that the "A" portion (Figure 55) of the fusible link is not broken or burned through. Replace the fusible link if damage and investigate cause.

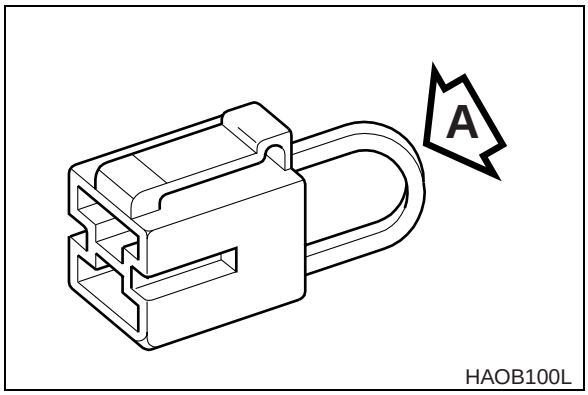


Figure 55

SEAT ADJUSTMENT

⚠ WARNING!

Whenever the operator or operating condition has changed, check to see that the seating position is suitable for the condition at hand. Always fasten your seat belt while operating vehicle. Adjust the backrest so that the operator can fully reach and operate the pedals. When setting the safety lever to the "LOCK" position, first make sure the left arm rest is completely raised to the upright position.

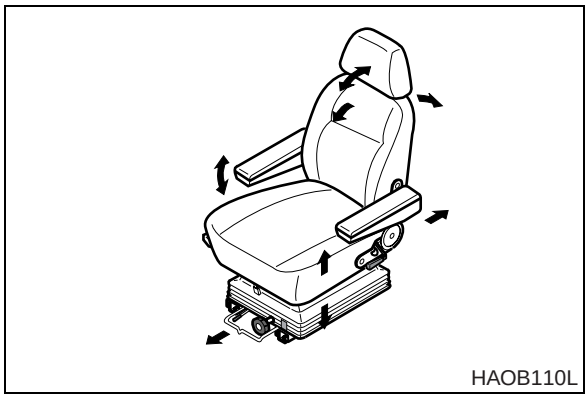


Figure 56

1. ADJUSTING THE SEAT FORWARD/ BACKWARD LEVER (FIGURE 57)

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

2. ADJUSTING THE SEAT'S ANGLE AND HEIGHT LEVER (FIGURE 57)

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

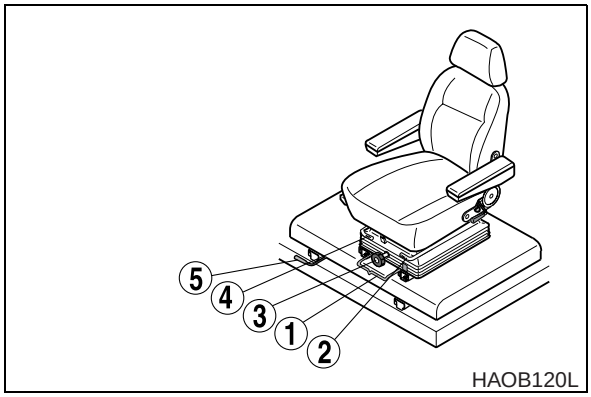


Figure 57

STARTING AND STOPPING THE ENGINE

INSPECTION BEFORE STARTING ENGINE

WARNING!

If a flammable materials such as leaves, paper, etc. are allow to accumulate on high temperature components, such as the engine muffler and turbo, a fire may occur. Fuel, lubricant and hydraulic oil leaks, may cause a fire. If there is anything wrong, perform the appropriate corrective action.

Before starting engine, inspect the following items;

1. Electric system - Check for damaged electric cables, and loose or missing connectors.
2. Fuel system - Drain water and sediment from fuel tank.
3. Hydraulic system - Check for hydraulic oil leaks, damaged tubing and hoses, and interference points of components.
4. Lubrication - Perform all daily and periodic maintenance services. Perform services according to reading shown on hourmeter.
5. Safety - Perform a machine walk-around. Make sure that no one is under the machine or performing any maintenance on it, before starting engine.
6. After starting machine - Check that all operational controls and components, are in proper operating condition, and are functioning correctly. Stop operation and correct any malfunction before continuing work.

OPERATIONAL CHECKS BEFORE STARTING ENGINE

WARNING!

When leaving operator's seat, set the safety lever to "LOCK" position, if not a serious accident could occur by accidentally moving the joysticks.

1. Set safety lever on "LOCK" (Figure 1).
2. Fasten seat belt. Check for proper operation and condition
3. Set all operation levers in "NEUTRAL."

   NOTE: *Be careful not to touch any switches when starting engine.*

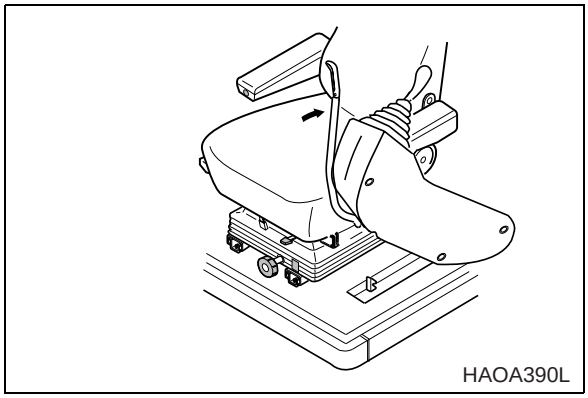


Figure 1

3. Set engine speed control dial to “LOW IDLE” (Figure 24). Allow engine to idle for 3 - 5 minutes.

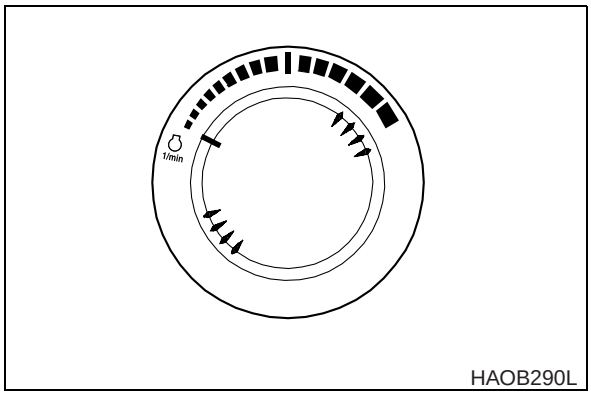


Figure 24

4. Stop engine turning by turning key to "O" - "OFF" position (Figure 25).
5. Pull key out of starter switch.

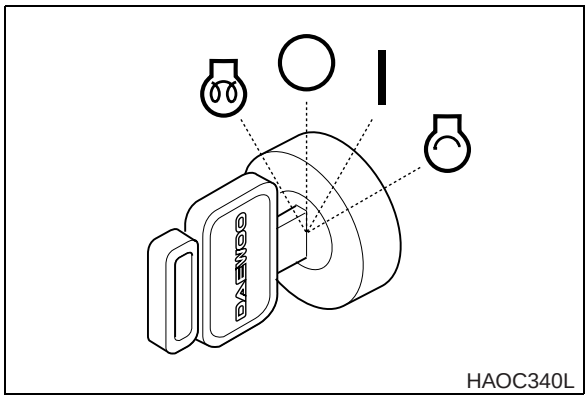


Figure 25

6. Set safety lever on "LOCK" position by pulling it up (Figure 26).

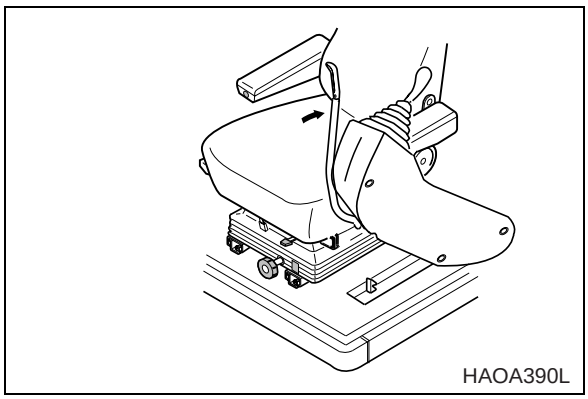


Figure 26

CHECK AND CONFIRMATION AFTER STOPPING ENGINE

1. Repair excavator, if there is any coolant or oil leaks.
2. Inspect front attachment and under carriage for abnormal appearances. Correct any problems.
3. Fill fuel tank.
4. Get rid of any accumulated ignitable material such as leaves and paper etc. in engine compartment.
5. Clean all mud, etc. from undercarriage and tracks. Make sure that all steps and hand holds are clean, and that the operator’s compartment is clean.

Work Mode

1. When the starter switch is turned "ON" the work mode is automatically defaulted to "Digging Mode."
2. Select proper power mode using switches (1 and 2, Figure 44) before starting work. When a switch is pressed, a signal sounds indicating that the mode has changed. The LED below the selected work mode will light.

   NOTE: *The control valve is set to optimum condition for each work mode.*

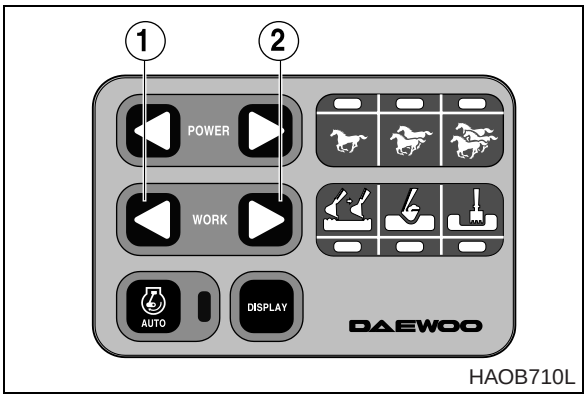
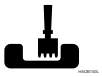


Figure 45

MODE	SELECTION POINT	FEATURE OF CONTROL
Leveling mode 	Level and drag work	The boom is faster than arm
	Fine leveling work	
	Ground leveling	
	Slope leveling	
Digging Mode 	General excavation	General standard.
	Loading dump trucks.	
	Lifting and transport of heavy objects	
	Use of hydraulic breaker.	
Trenching Mode 	Trenching	The swing is faster and stronger than boom or arm.
	Excavating of side wall	
	When work is being done that requires constant swinging.	

HYDRAULIC BREAKER

IMPORTANT

If a hydraulic breaker and piping is installed without DAEWOO's authorization, it may create a serious malfunction which will not be covered under the excavator warranty.

SELECTION OF HYDRAULIC BREAKER.

If a hydraulic breaker is installed, consider equipment's stability and suitability for such modification. Also consider hydraulic oil pressure and quantity. When selecting a hydraulic breaker consult with a DAEWOO distributor or sales agency.

HYDRAULIC HOSES AND TUBING FOR BREAKER.

1. When installing hydraulic breaker, assemble according to drawings provided with kit.
2. If breaker is taken off excavator, be sure to plug and cap all hoses and tubing to prevent contamination from entering hydraulic system.
3. Plug and cap all connectors and fittings on breaker to prevent contamination.
4. Check all hydraulic connections for signs of leaks or loose components before starting operation.

HYDRAULIC BREAKER OPERATION

NOTE: *Hydraulic pressure and flow settings may need to be changed. Refer to the Maintenance Section of this manual for further information.*

1. Make sure to read and understand the breaker users manual.
2. Inspect all mechanical and hydraulic connections.
3. DO NOT use the breaker as a hammer. See Figure 72.

   Do not drop breaker from extreme heights.

   The breaker is relatively heavy and drops fast. Do not drop breaker from extreme heights or damage to upper structure may result

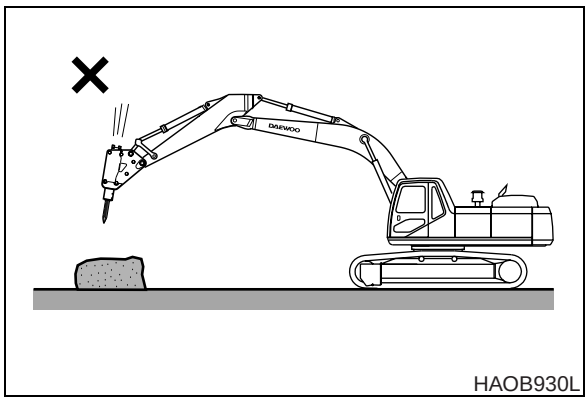


Figure 72

MAINTENANCE INTERVALS

10 HOUR / DAILY SERVICE

- Grease Boom, Arm and Front Attachment Pins (See page 4-8)
- Check Engine Oil Level (See page 4-8)
- Check Level of Hydraulic Oil Tank (See page 4-8)
- Check For Leaks in The Hydraulic System (See page 4-9)
- Check Fuel Level (See page 4-9)
- Check for Leaks in the Fuel System (See page 4-10)
- Check Oil Level of Swing Reduction Device (See page 4-10)
- Clean Dust Net in Front of Oil Cooler (See page 4-11)
- Check Cooling System and Refill As Required (See page 4-11)
- Check Level of Window Washer Liquid (See page 4-12)
- Inspect the Bucket Teeth and Side Cutters for Signs of Wear (See page 4-12)
- Inspect Seat Belt for Proper Operation (See page 4-12)
- Inspect the Structure for Cracks and Faulty Welds (See page 4-12)
- Check the Operation of All Switches (See page 4-13)
- Check the Operation of All Exterior Lights, Horn and Control Console Indicator and Monitor Lights (See page 4-13)
- Start Engine, Check Starting Ability, and Observe Exhaust Color at Start-up and at Normal Operating Temperature. Listen for Any Abnormal Sounds (See page 4-13)
- Check Operation of All Controls (See page 4-13)

50 HOUR / WEEKLY SERVICE

- Perform All 10 Hour / Daily Service Checks (See page 4-14)
- Grease Boom, Arm and Front Attachment Pins (See page 4-14)
- Grease Swing Bearing (See page 4-16)
- Drain Water and Sediment from Fuel Filter (See page 4-17)
- Drain Water and Sediment from Fuel Tank (See page 4-17)
- Check Engine Fan Belt for Cracks, Wear and Correct Tension (After First 50 Hours) (See page 4-17)
- Change Engine Oil and Filter (After First 50 Hours) (See page 4-17)
- Inspect the Track Assemblies for Proper Tension and Loose, Worn or Damaged Parts (Links, Shoes, Rollers, Idlers) (See page 4-17)

150 HOUR SERVICE

- Perform All 10 Hour / Daily and 50 Hour Service Checks (See page 4-18)
- Clean Outer Element of Two Stage Air Cleaner (See page 4-18)
- Check Engine Fan Belt For Cracks, Wear And Correct Tension (See page 4-19)

250 HOUR / MONTHLY SERVICE

- Perform All Daily, 50 and 150 Operating Hour Service Checks (See page 4-20)
- Change Engine Oil And Filter (See page 4-20)
- Change Swing Reduction Device Oil (Drain and Refill After First 250 Hours) (See page 4-20)
- Check Oil Level of Travel Reducer On Both Side Of Unit (See page 4-21)
- Replace Full Flow Hydraulic Oil Filter (See page 4-21)
- Change Pilot Filter (See page 4-22)
- Inspect Pins and Bushings of the Front End Attachments for Signs of Wear (See page 4-23)
- Check the Fluid Levels in the Batteries and the Battery Charge Levels (See page 4-23)
- Inspect for Any Loose or Missing Nuts and Bolts (See page 4-23)
- Inspect Fuel System Hose Clamps (See page 4-23)

G. Bucket cylinder bottom pin (1 point)

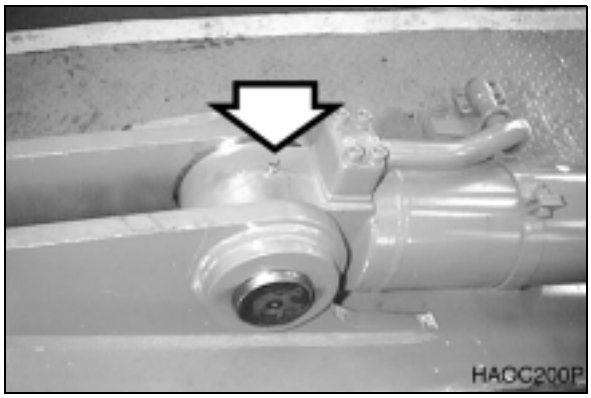


Figure 25

H. Arm link joint pin (2 points)

I. Link joint pin (2 points)

J. Arm bucket joint pin (2 points)

K. Bucket link joint pin (1 point)

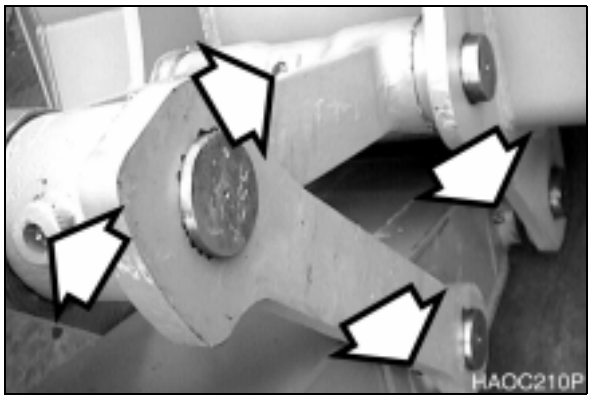


Figure 26

L. Bucket cylinder rod (1 point)

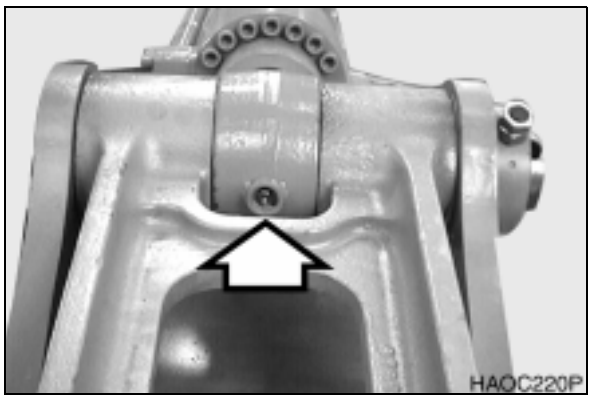


Figure 27

GREASE SWING BEARING

1. There are three grease fittings for the swing bearing. Do not over lubricate. Purge old grease with new. Remove all purged grease.

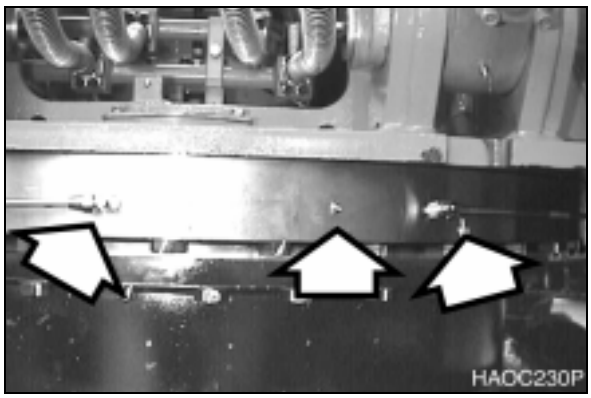


Figure 28

750 HOUR SERVICE

PERFORM ALL DAILY (10 HOUR), 50, 150, 250 AND 500 OPERATING HOUR SERVICE CHECKS

CHANGE 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 fuel by opening drain valve located 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 45

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

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

1. Loosen plug on top of fuel filter head.
2. Unscrew and pump the hand operated primer pump located by the fuel injection pump. Pump primer until fuel is present at plug hole in fuel filter head.
3. Tighten plug in fuel filter head.
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.

HANDLING OF ACCUMULATOR

⚠ WARNING!

Even though the engine is stopped, the hydraulic accumulators for the pilot system are still charged. Do not disconnect any pilot system hoses until accumulator pressure has been released from the circuit. To release pressure turn the start switch to “I” (ON) and operate all hydraulic control levers and forward/reverse travel levers. Even though the engine is shutdown hydraulic actuated components may move while releasing pilot pressure. Keep all personnel away from excavator while performing this operation.

- **Set safety lever on "LOCK" position after stopping engine.**
- **DO NOT mishandle accumulator(s). They are very dangerous because they contain high pressure nitrogen gas.**
- **DO NOT punch a hole or apply heat or fire to an accumulator.**
- **DO NOT weld on accumulator.**
- **When replacing an accumulator, contact a DAEWOO's distributor or sales agency so the gas can be properly released.**
- **Wear safety goggles and protective gloves when working on an accumulator. Hydraulic oil under pressure can penetrate the skin and cause serious injuries.**

Release pilot accumulator pressure using the following procedure;

1. Lower front attachment (bucket) on the ground.
2. Stop the engine.
3. Set safety lever on "RELEASED" position.
4. Turn starter switch "ON."
5. Fully stroke control levers in all directions.
6. Set safety lever on "LOCK" position.
7. Remove accumulator by unscrewing it slowly.

Figure 61

BOLT AND NUT INSPECTION

Inspect ALL fasteners after the first 50 hours of operation and every 250 hours thereafter. If any are loose or are missing tighten them or install new hardware. Always use a calibrated torque wrench.

IMPORTANT

Always clean fasteners before tightening.

If counterweight is loose, contact a DAEWOO distributor or sales agent.

NO.	POINT TO BE INSPECTED		BOLT DIA. MM	QTY.	BOLT HEAD SIZE	TORQUE		
						KGF/M	Nm	lbf/ft
1	Joint bolt with engine mounting bracket and engine	pump side	12	8	19	9	88	65
		fan side	-----	-----	-----	-----	-----	-----
2	Joint bolt with engine mounting rubber and frame	pump side	10	8	17	5	49	36
		fan side	10	8	17	5	49	36
3	Joint bolt & nut between engine mounting bracket and rubber	pump side	16	2	24	13.5	132	98
		fan side	16	2	24	13.5	132	98
4	Radiator mounting bolt		16	4	24	21	205	152
5	Tightening bolt for hydraulic oil tank		16	4	24	21	205	152
6	Tightening bolt for fuel tank		16	4	24	21	205	152
7	Tightening bolt for pump		20	4	S	49	440	325
8	Tightening bolt for control valve		12	4	19	9	88	65
9	Tightening bolt for swing reducer		20	14	30	55	539	398
10	Tightening bolt for swing motor		18	12	S	34	33	246
11	Tightening bolt for battery		10	2	17	5	49	36
12	Joint bolt with cab mounting rubber and frame		10	16	17	6.7	66	48
	Joint bolt with cab mounting rubber and cab		16	4	24	21	206	152
13	Joint bolt with swing bearing and upper frame		24	35	36	75	735	542
	Joint bolt with swing bearing and bottom frame		24	36	36	95	931	687
14	Tightening bolt for travel device		20	40	30	49	480	354
	Tightening bolt for sprocket		20	48	30	49	480	354