

DOOSAN

K1014999CE
July 2014

EXCAVATOR

**Operation &
Maintenance
Manual**

DX380LC

Serial Number 10023 and Up

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Learn Signal Words Used with Safety Alert Symbol

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

CAUTION

This word is used on safety messages and safety labels and indicates potential of a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against a generally unsafe practice.

WARNING

This word is used on safety messages and safety labels and indicates potential threat of a hazardous situation that, if not avoided, could result in serious injury or death. It may also be used to alert against highly unsafe practice.

DANGER

This word is used on safety messages and safety labels and indicates an imminent hazard of a situation that, if not avoided, is very likely to cause death or extremely serious injury. It may also be used to alert against equipment that may detonate or explode if handled or treated carelessly.

Other Signal Words

In addition to safety signal words, the following signal words are used to indicate proper and effective use of machine.

IMPORTANT

This signal word identifies procedures which must be followed to avoid damage to machine.

NOTE: *The word "NOTE" identifies information for effective use.*

15. ISO Control Pattern (950205-03860)



AVOID INJURY OR DEATH

Read and understand the Operation & Maintenance Manual for more information.

Refer to the "Operating Instructions" section of this manual for detailed information regarding the work levers (joysticks) control functions.

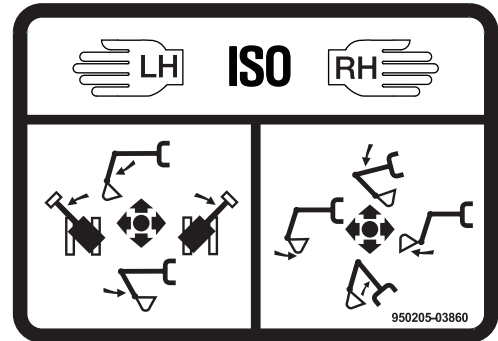
BHL Control Pattern (US Only) (950205-03868)



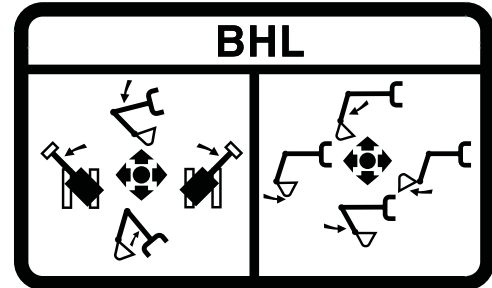
AVOID INJURY OR DEATH

Read and understand the Operation & Maintenance Manual for more information.

Refer to the "Operating Instructions" section of this manual for detailed information regarding the work levers (joysticks) control functions.



EX1301191



EX1301192

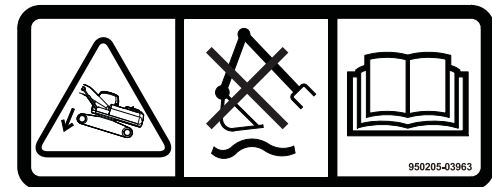
16. Impact Hazard (Optional) (950205-03963)



AVOID DEATH OR SERIOUS INJURY

- Activating the Intelligent Floating Boom Control with the tracks raised up can cause the machine to drop suddenly.
- Do not activate Intelligent Floating Boom Control when tracks are raised.
- Do not raise tracks when control is activated.

Refer to "Intelligent Floating Boom Control (Optional)" section of this manual for more information.



EX1301193

6. Keep the machine on terrain where working and traveling conditions are good.
 - Remove any large rocks or obstacles.
 - Fill any ditches and holes.
 - Provide machines for and schedule time to maintain good terrain conditions.
7. Travel over longer distances (e.g. on public roads) at adjusted (medium) speed.
 - Always adjust the speed to prevent bouncing.

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.

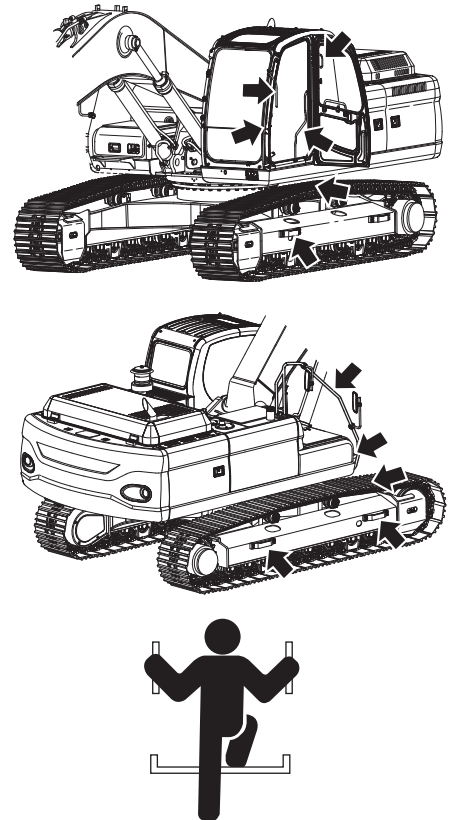


Figure 6

FG000355

MACHINE OPERATION

When Swinging or Changing Direction of Travel

Before operating the machine or the work equipment, always observe the following precautions to prevent serious injury or death.

- Start and operate the machine only while seated.
- When changing travel direction from forward to reverse or from reverse to forward, reduce speed early and stop the machine before changing travel direction.
- Sound the horn to warn people in the area.
- Check that there is no one in the area around the machine. There are blind spots behind the machine, so if necessary, swing the upper structure to check that there is no one behind the machine before traveling in reverse.
- When operating in areas that may be hazardous or have poor visibility, designate a person to direct work site traffic.
- Ensure that no unauthorized person can come within the turning radius or direction of travel.

Be sure to observe the above precautions even if a travel alarm or mirrors are installed.

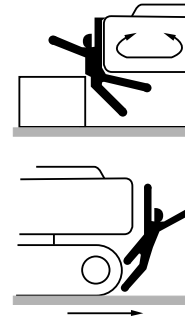


Figure 20

HAOA190L

Travel Precautions

Never turn the starting switch to "O" (OFF) position when traveling. It is dangerous if the engine stops while the machine is traveling. It will be impossible to operate the steering.

Attachment control levers should not be operated while traveling.

Do not change selected travel mode (FAST/SLOW) while traveling.

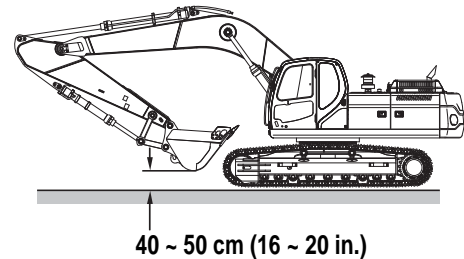
Fold in work equipment so the outer end of the boom is as close to the machine as possible, and is 40 - 50 cm (16 - 20 in) aboveground.

Never travel over obstacles or slopes that will cause the machine to tilt severely. Travel around any slope or obstacle that causes the machine to tilt 10 degrees or more to the right or left, or 30 degrees or more from front to rear.

Do not operate the steering suddenly. The work equipment may hit the ground and cause the machine to lose its balance, and this can damage the machine or structures in the area.

When traveling on rough ground, travel at low speed, and avoid sudden changes in direction.

TRAVEL POSTURE



INCORRECT

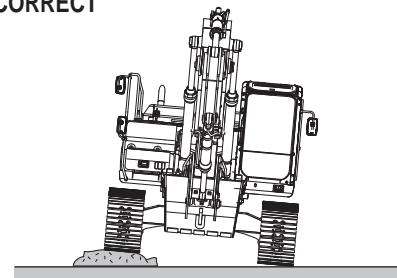


Figure 21

FG000349

Preparation for Electrical Welding on Body Structure

To prevent damage to ECU by electrical welding, please observe the following procedures:

1. Open the door of the battery cover.
2. Detach the cover after loosening the bolts on the battery.
3. Detach the positive and negative terminal cables from the battery.
4. Detach the undercover, and after that detach the connector (1) from the ECU that are installed at the engine.
5. Proceed with welding.
6. After welding, carefully reassemble the connector(1).
7. Connect the battery terminal cables.
8. Reassemble the undercover under the engine.
9. Reassemble the cover over the battery.
10. Close the cover of the battery.

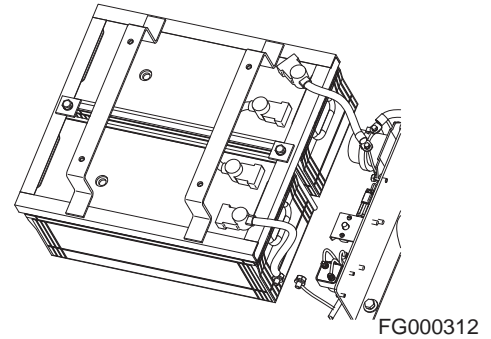


Figure 39

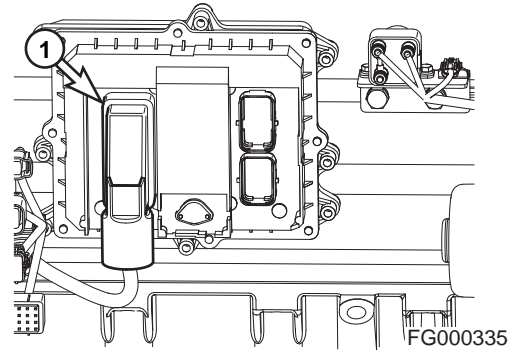


Figure 40

Warning for Counterweight and Front Attachment Removal

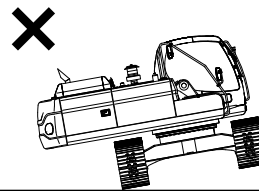
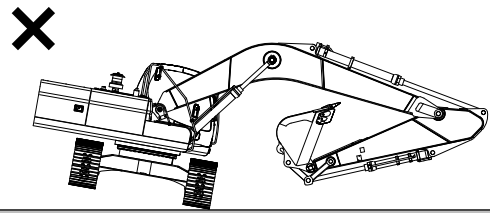


AVOID DEATH

DOOSAN warns any user, that removal of the counterweight from the machine, front attachment or any other part, may affect the stability of the machine. This could cause unexpected movement, resulting in death or serious injuries. DOOSAN is not liable for any misuse.

Never remove counterweight or front attachment unless the upper structure is in-line with the lower structure.

Never rotate the upper structure once the counterweight or front attachment has been removed.



FG000371

Figure 41

- Keep the bucket hook point directly over the load. Tag lines on opposite sides of the load can help maintain greater stability against side loads and wind gusts.

Avoid traveling with a suspended load. Before swinging (or if required, traveling), bring the load into an arm position (radius and height) that has a safer weight capacity rating and adequate movement clearance. The operator and all work site personnel must be thoroughly familiar with safety instructions and procedures within this Operation and Maintenance Manual.

The following weight loads are in compliance with ISO 10567 and ISO applicable, recommended standards for hydraulic excavators performing lifting operation on a firm supporting surface. An asterisk (*) next to the lift rating indicates rated load does not exceed 87% of hydraulic capacity. All other ratings have been determined not to exceed 75% of tipping capacity.

Do not attempt to lift or hold any load that exceeds rated load capacity at the specified distances (from the machine's rotation centerline and height - see "lift radius" and "lift height" in the reference drawing, Figure 52).

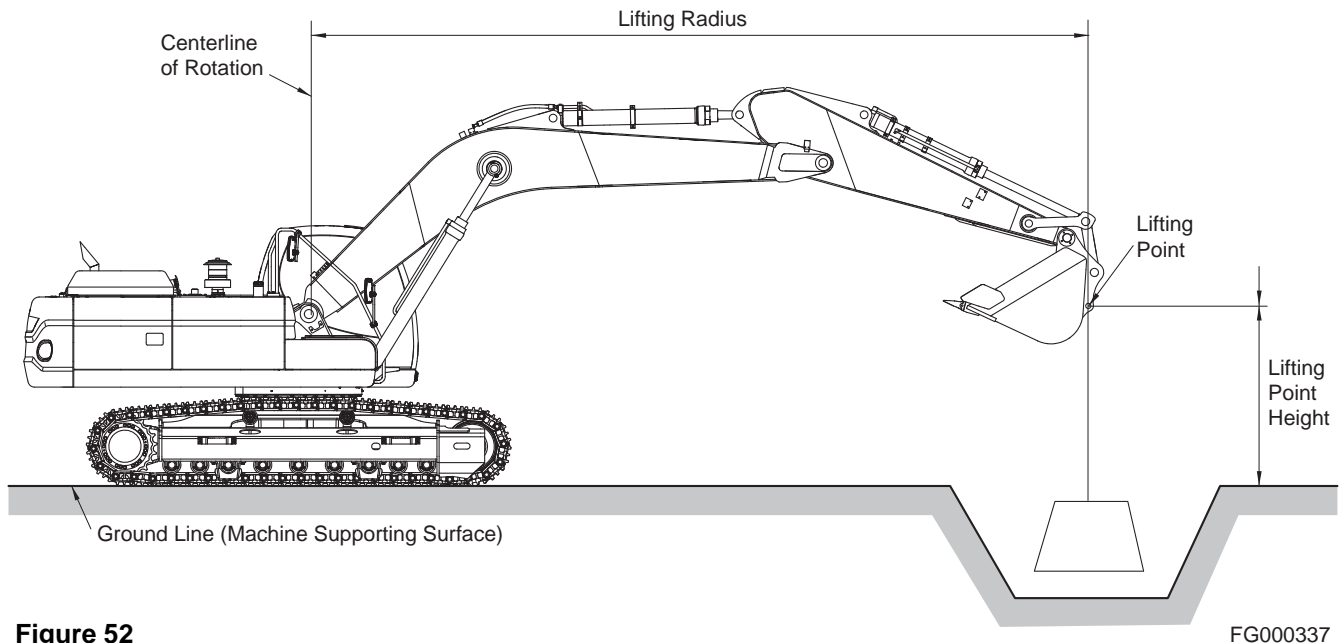


Figure 52

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 must be on the back of the bucket, as shown in Figure 52.

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.

Reference Number	Description
1	Instrument Panel (See page 2-20)
2	Cigarette Lighter (See page 2-15)
3	Ashtray (See page 2-65)
4	Travel Levers (See page 3-16)
5	Right-hand Work Lever (Joystick) (See page 3-24)
6	Storage Tray (See page 2-65)
7	Engine Speed Control Dial (See page 2-8)
8	Heater and Air Conditioner Control Panel (See page 2-48)
9	Starter Switch (See page 2-8)
10	Seat (See page 2-57)

Reference Number	Description
11	Storage Compartment (See page 2-65)
12	Heater and Air Conditioner Unit
13	Stereo (See page 2-54)
14	Fuse Box (See page 2-56)
15	Left-hand Work Lever (Joystick) (See page 3-23)
16	Safety Lever (See page 3-13)
17	Storage Compartment (See page 2-65)
18	DMS Laptop Computer Connector
19	Cup Holder (See page 2-67)
20	Hour Meter (See page 2-23)

15. Cigarette Lighter

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

NOTE: *This cigarette lighter is for 24V only. Never connect a 12V electrical device to the lighter.*

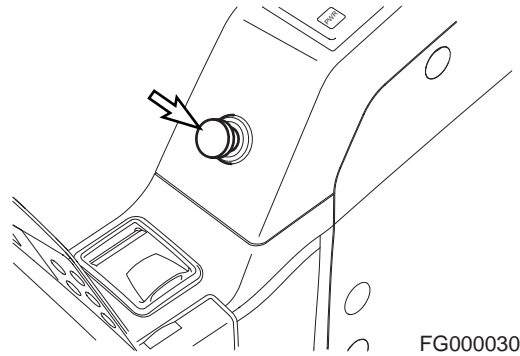


Figure 25

16. Power Socket for 12 Volt

This is a power socket for only 12V DC devices.

This socket can be used for charging a cellular phone or powering a small 12V DC electrical device.

Open the cap when using it.

NOTE: *This socket is designed for small electrical capacity devices. Do not use this socket for large electrical capacity devices. Thus, damage can be avoided.*

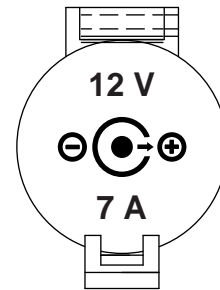


Figure 26

17. Travel/Swing Alarm Switch (Optional)

If unit is equipped with a travel/swing alarm buzzer, push this switch to active it, whenever swinging or traveling.

- O. In this position, the travel/swing alarm system is turned "OFF".
- I. In this position, the travel alarm will only sound, when the machine is moving.
- II. In this position, the travel/swing alarm will sound while swinging and traveling, if equipped with a swing alarm device.

NOTE: *If machine is only equipped with a travel alarm device, the alarm will not sound when swinging although the switch is in the "II" position.*

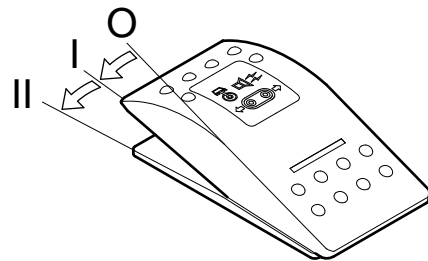


Figure 27

10. Engine Check Warning

This symbol indicates when the engine needs to be checked.

NOTE: *If this light turns "ON" stop the machine and repair the cause of the fault.*

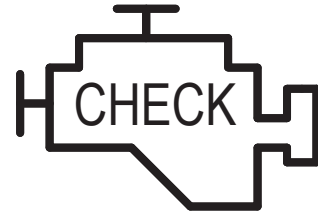


Figure 49

FG000045

11. Preheating Indicator

In cold weather this symbol indicates that engine preheat function is operating.

When this indicator symbol turns "OFF", it means that engine preheat cycle has been completed.

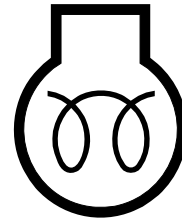


Figure 50

HAAE2000

12. Work Light Indicator

The indicator symbol indicates that work lights are turned "ON".



Figure 51

HB4O2003

13. Warning Light

This warning light appears when the machine or engine needs to be checked.

NOTE: *If warning light appears, Stop the machine and repair the cause of the fault*

If camera mode is being used, Move to the main screen and check the fault



Figure 52

FG017012

2. Down Arrow Button

Down arrow button (▼), is used to move a menu item "Down" or to "Right".



Figure 77

FG013897

3. Display Selector Button (ESC - Escape)

Display selector button (☰), is used to change the displayed information on the screen. Each time the display selector button is pressed, the digital readout changes.

NOTE: When setting the main menu, this button is used as the menu/exit button (ESC). To access the menus the button must be pressed and held for three seconds.

NOTE: When this button is used for menu/exit button, it is used to access to main menu or return to a previous screen from each submenu.



Figure 78

FG000070

4. Selection Button

Selection button (↵), is used to set a menu or clear the operating hour of filter/oil.



Figure 79

FG013898

5. Home Button

Home button (HOME), is used to access to the default screen from each submenu.



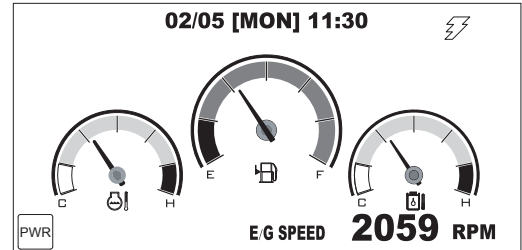
Figure 80

FG013713

OPERATION SELECTION DISPLAY

In the monitor you can see the application that is currently selected.

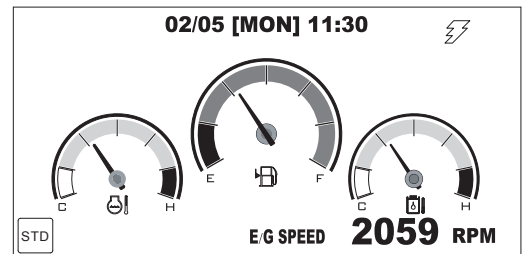
Power Mode Selection



FG013720

Figure 105

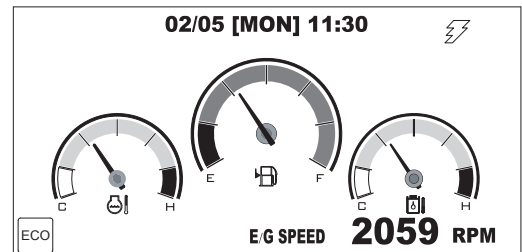
Standard Mode Selection



FG013721

Figure 106

Economy Mode Selection



FG013722

Figure 107

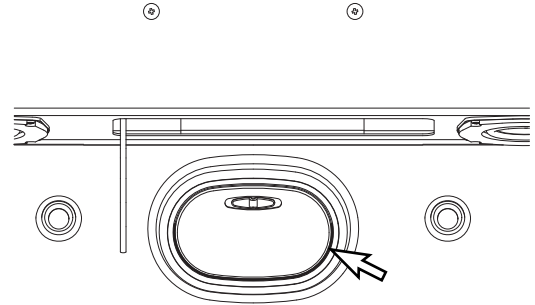
MISCELLANEOUS ELECTRICAL DEVICES

Cabin Light

A light is installed on the top of the operator's cabin.

The light will work despite starter switch position.

NOTE: *If light is left "ON" for a long time while the engine is not running, the battery will be discharged.*

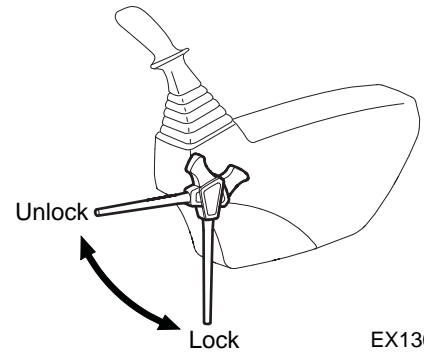


FG000417

Figure 133

Pilot Cutoff Switch

When the safety lever is put into "LOCK" position, the switch deactivates the work and travel levers. With the work and travel levers deactivated, no digging/operational work can be done.



EX1300566

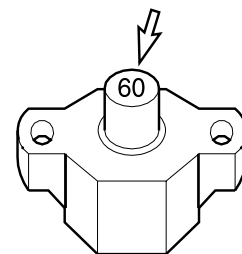
Figure 134

Circuit Breaker

A main circuit breaker is in the battery box. It will automatically cut off in case of an electrical short circuit or overload. This will prevent the electrical wiring and components from being burned or damaged.

If the circuit breaker is cut off, check all related circuits, this means something is wrong in the electrical circuit.

After maintenance, press the red button for normal operation of circuit breaker.



HAAE2110

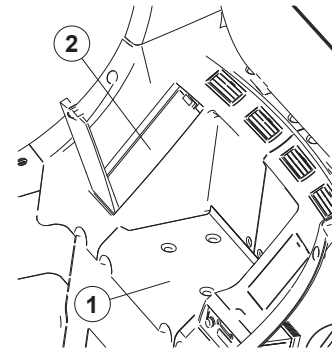
Figure 135

CABIN STORAGE COMPARTMENTS

There are two storage compartments behind the operator's seat.

The large compartment (1, Figure 154) is for storing nonperishable items.

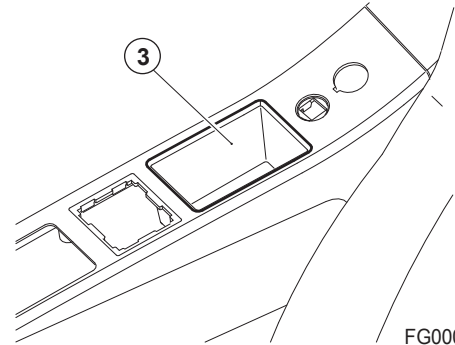
The covered other one (2, Figure 154) is interconnected with the air conditioner. So, it can be supplied with either warm or cool air when air conditioner is turned "ON".



FG000209

Figure 154

There is a separate small tray (3, Figure 155) on the right side of operator's seat.

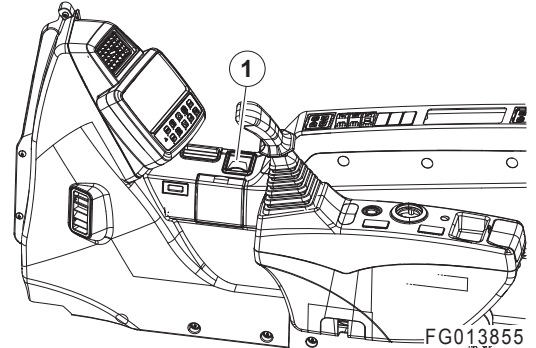


FG000675

Figure 155

ASHTRAY

An ashtray (1, Figure 156) is to the right side of the operator's seat on the side of cabin. Always close ashtray after putting out a cigarette.



FG013855

Figure 156

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5. After the preheat completion, immediately turn starter switch to "I" (START) position (Figure 10). Engine should start in approximately five seconds.



WARNING

AVOID DEATH OR SERIOUS INJURY

If the engine does not start after approximately fifteen seconds of cranking, release the starter switch. Wait about five minutes and repeat above step.

6. After engine has started, release key. Key will return to "I" (ON) position (Figure 10).
7. After the engine starts, 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, stop engine.
8. Follow "Hydraulic System Warm-up" procedures in this section. (See page 3-9)

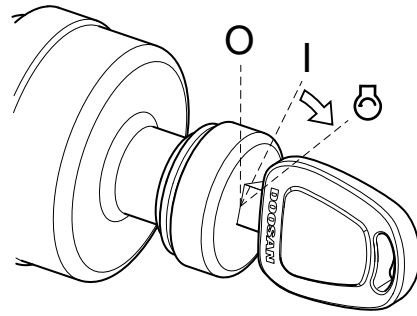


Figure 10

FG000085

Starting Engine with a Booster Cable



WARNING

AVOID DEATH OR SERIOUS INJURY

1. An explosive gas is produced while batteries are in use or being charged. Keep flames or sparks away from the battery area.
 2. Charge batteries in a well ventilated area.
 3. Always wear eye protection when starting a machine with jumper cables.
 4. Improper jump starting procedures can cause an explosion resulting in personal injury.
 5. Jump start vehicles on dry ground or concrete. Do not jump start the machine on a steel floor, because the floor is always grounded.
 6. When starting from another machine, make sure the machines do not touch.
 7. Always connect the auxiliary battery positive (+) terminal too depleted battery positive (+) terminal first. Then connect auxiliary battery negative (-) terminal to the frame of the depleted battery machine second.
 8. Connect positive cable first when installing cables and disconnect the negative cable first when removing.
-

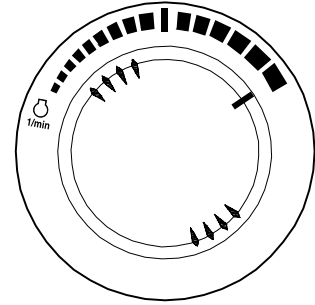


Figure 11

HAO440L

General Travel Instructions

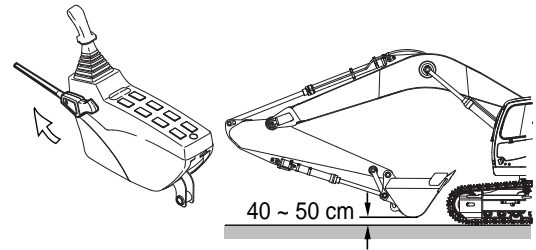
1. Set engine speed control dial (Figure 31) on desired speed.



HAOB550L

Figure 31

2. Move safety lever to "UNLOCK" position, and folding the front, raise it 40 - 50 cm (16 - 20 in) above ground. See Figure 32.



FG000123

Figure 32

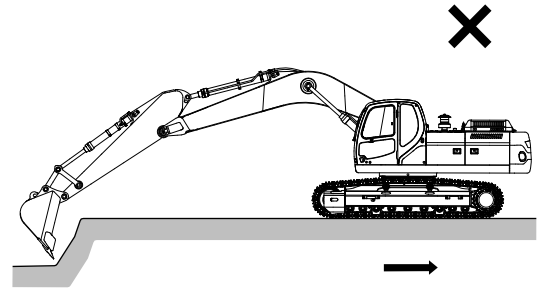
3. When possible, travel on firm and level ground. Avoid sudden movements and sharp turns.
4. When traveling on rough ground, travel at a slow speed [1.0 - 1.5 km/h (0.62 - 0.93 MPH)]. Reduced engine speed, to avoid shock loading the equipment. Be careful that an excessive force is not added to equipment by touching or climbing on rocks.



FG000423

Figure 33

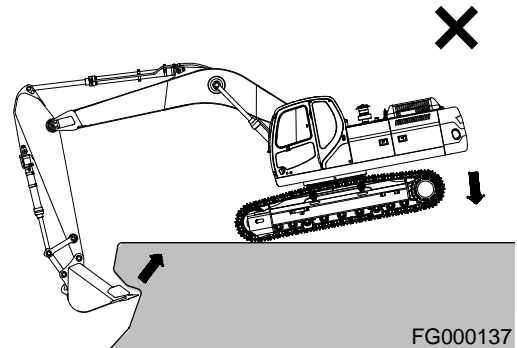
6. Do not use machine travel or swing when the bucket is in the ground to provide additional breakout force. See Figure 56.



FG000134

Figure 56

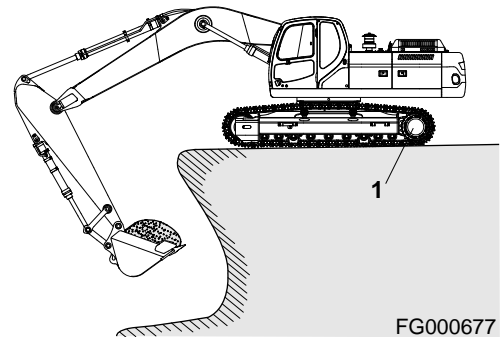
7. Do not use weight of machine to provide additional breakout force. See Figure 57.
8. When working on soft or muddy ground, make sure that the machine is not sinking.



FG000137

Figure 57

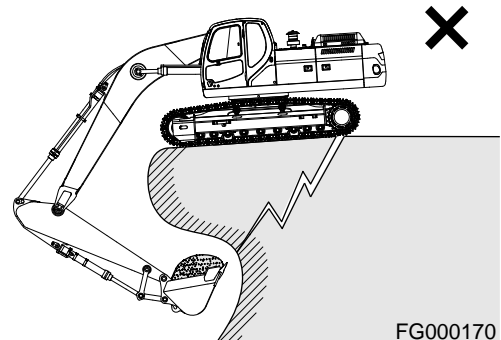
9. When working close to the excavated edge, make sure that ground the machine is sitting on is solid. Keep the travel motors (1, Figure 58) to the rear. See Figure 58.



FG000677

Figure 58

10. Do not excavate underneath the machine. See Figure 59.



FG000170

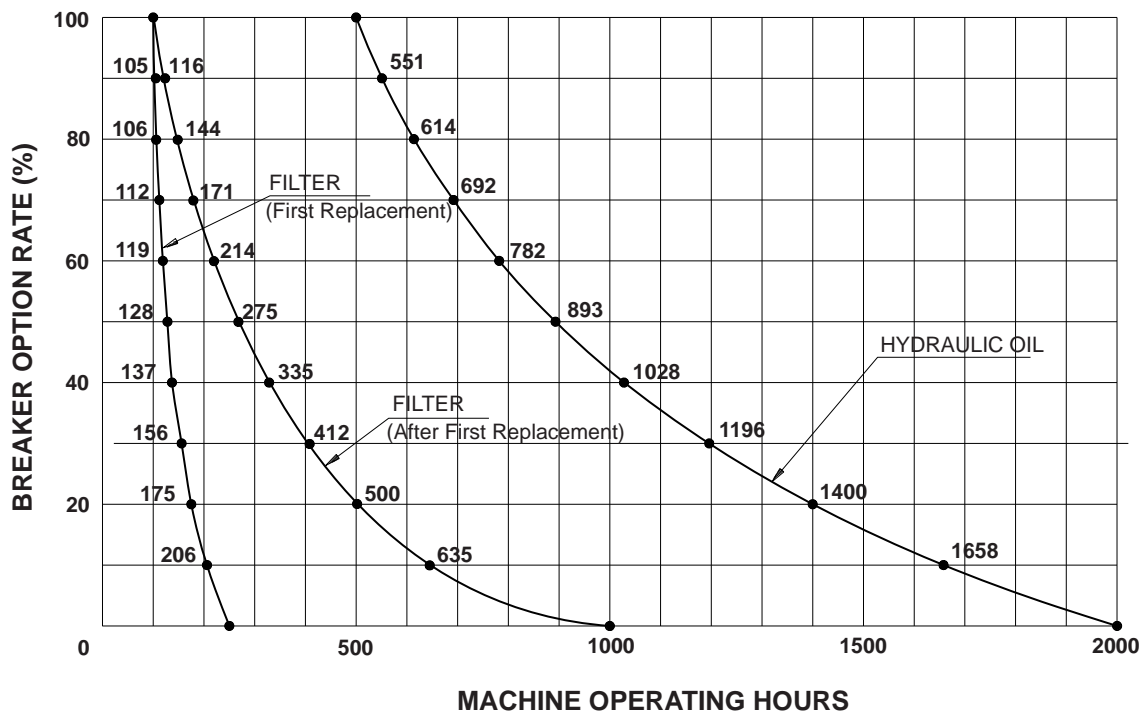
Figure 59

Hydraulic Oil and Filter Service Intervals

When using a hydraulic breaker, the viscosity breakdown and contamination of hydraulic oil is faster because the work condition is more severe than during normal digging work. To prevent the hydraulic components (especially pump) from having a shortened life cycle, replace the hydraulic oil and main hydraulic oil return filter using the following schedule.

Attachment	Operation Rate	Hydraulic Oil	Filter
Bucket Work	100%	2,000 Hours	250 Hours (First Replacement) 1,000 Hours (After First Replacement)
Hydraulic Breaker Work	100%	500 Hours	100 Hours

* These service intervals only apply, when a genuine DOOSAN oil and filter are used. If any other brands are used, the guaranteed changed interval must be reduced in half.



FG000767

Figure 81

NOTE: The replacement intervals of hydraulic oil and filter depend upon the amount of time the hydraulic breaker is being used. These intervals must be followed as opposed to regularly scheduled maintenance.

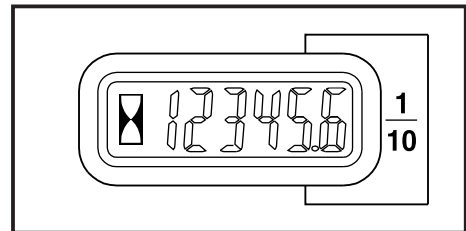
Inspection, Maintenance and Adjustment

PREVENTIVE MAINTENANCE

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

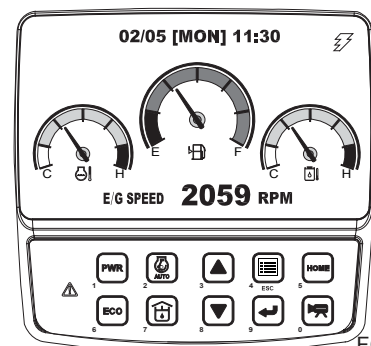
NOTE: *The following pages list the service checks and their required intervals. The service cycles may need to be shortened depending on the working conditions. Extremely hot or dusty conditions will require more frequent service. Operational hours are determined by the amount of time accumulated on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

NOTE: *Besides the normal hour meter, the multifunction gauge can be used to keep track of the hours on individual filters. See "Filter/Oil Info" on page 2-38.*



HAOA601L

Figure 1



FG013662

Figure 2

SERVICE DATA									
No.	Items to Check	Service	Qty.	Service Interval					
				10	50	250	500	1000	2000
1	Arm, Bucket Joint Pin	Grease	6	F100	W10				
2	Boom, Arm Joint Pin	Grease	11	F100		W10			
3	Swing Bearing	Grease	3		W10				
4	Swing Gear and Pinion	Grease	1						
5	Swing Reduction Gear	Grease	1					W10	
6	Swing Reduction Device	Gear Oil (80W90)	6 l	V		F			
7	Track Spring	Grease	2				W10		
8	Travel Reduction Device	Gear Oil (80W90)	2 x 7 l				F, V		
9	Engine Oil	Engine Oil (10W40)	33 l	V	F				
10	Hydraulic Oil Tank (Full)	Hydraulic Oil	380 l	V					
11	Fuel Tank	Diesel	550 l	V					
12	Fuel Prefilter	Cartridge	1	V					
13	Radiator	Coolant (Antifreeze)	34 l	V					
14	Hydraulic Oil Return Filter	Element	2			F			
15	Pilot Filter	Element	1			F			
16	Hydraulic Oil Suction Strainer	Strainer	1						C
17	Engine Oil Filter	Cartridge	1		F				
18	Fuel Filter	Cartridge	1						
19	Air Cleaner (Outer)	Element	1				C		
	Air Cleaner (Inner)	Element	1						
20	Air Conditioner Filter (Outer)	Cartridge	1				C		
	Air Conditioner Filter (Inner)	Cartridge	1				C		
21	Air Breather Filter*	Element	1						
22	Fuel Cap Filter	Element	1						

V: Maintenance and 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 - Doosan Genuine Antifreeze Solution (Drain and replace using this interval.) See "Engine Cooling System" on page 4-78, for further explanation.

PG: Propylene Glycol - Doosan Genuine Antifreeze Solution (Drain and replace using this interval.) See "Engine Cooling System" on page 4-78, for further explanation.

█: Replacement On Every Interval.

NOTE: For additional service items see list of "Maintenance Intervals" on page 4-12.

*: When the machine is operated under dusty work sites, the air breather filter needs to be cleaned or replaced on a regular basis even before the expected replacement date.

3. Observe the level of coolant in the coolant recovery tank. The normal cold engine fluid level must be between "FULL" and "LOW" marks on tank.
4. If the coolant is below the "LOW" mark, add coolant to this tank.

Check Level of Window Washer Liquid

1. Open left front access door and check fluid level in windshield washer tank.
2. Open fill cap and add fluid.

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

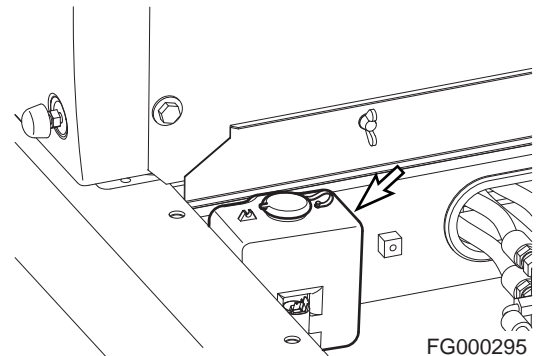
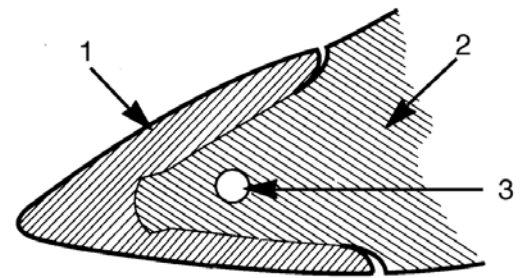


Figure 30

Inspect Bucket Teeth and Side Cutters for Signs of Wear

1. Daily, inspect the bucket teeth to make sure that tooth wear or breakage has not developed.
2. Do not allow the replaceable bucket teeth to wear down to the point that bucket adapter is exposed. See Figure 31.

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



HAOE870P

Figure 31

Reference Number	Description
1	Point
2	Adapter
3	Pin

Check Engine Fan Belt Tension

IMPORTANT

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

1. Inspect every 250 hours. (Inspect after first 50 hours of operation.)
2. With the engine shut off, check the tension of the fan belt by pressing downwards on the belt, midway between the fan pulley and alternator pulley. The belt should flex approximately 10 mm (0.4 in). See Figure 46. To adjust the belt, loosen the alternator adjustment plate bolts, adjust the belt tension and retighten the bolts.

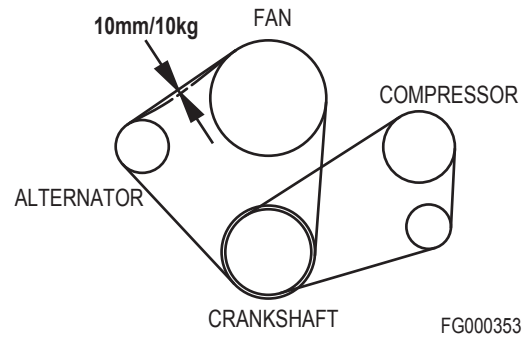


Figure 46

- Clean the outer filter (4, Figure 63) by blowing compressed air from the inside of the filter towards the outside. Do not use more than 205 kPa (30 psi) air pressure.



Figure 64

HAOC570L

- Check outer filter by shining a light through it. If small holes or thinner parts are found on the element after cleaning it, replace the filter.
- Clean the inside of the air cleaner body and the inside of the air cleaner cover. Do not use compressed air.
- Properly install the air filter and cover.
- After filter service be sure to install cover with arrows pointing "UP".

NOTE: *If after cleaning the outer filter, the air cleaner clogged indicator remains "ON", replace the outer and inner filters. Do not clean inner filter.*

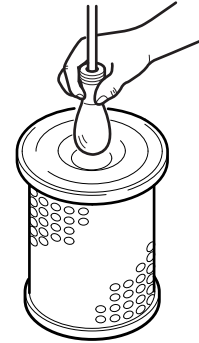


Figure 65

FG000412

Change Fuel Cap Filter



WARNING

AVOID DEATH OR SERIOUS INJURY

External shock or damages to fuel cap may lead to permanent damage to filter.

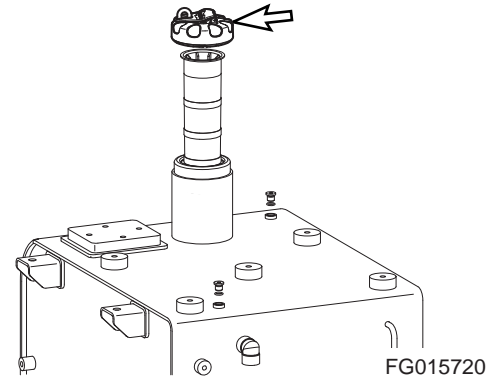


Figure 87

1. See under the fuel cap as shown on (Figure 88). Rotate bolt to CCW direction to loosen.

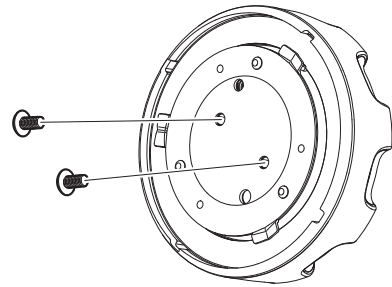


Figure 88

2. After disengaging it as shown on (Figure 89), carefully lay it on floor.

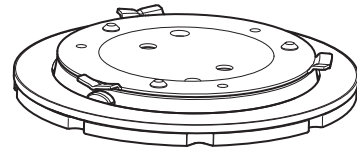


Figure 89

3. After disengaging (Figure 89), disengage rubber as shown on (Figure 90).

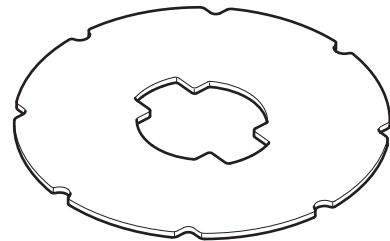


Figure 90

AIR-CONDITIONING SYSTEM

NOTE: See "Clean Air-Conditioning Outer Filter" on page 4-37.

Check Control Panel

When a function switch is pushed, the last setting has to be displayed on the LCD display.

When the light switch is turned to "I" position, the LED for illumination in the control panel has to turn "ON".

Check Air Conditioner Hoses

Check the hose for cracking and damage.



CAUTION

AVOID INJURY

When a leak occurs, dirt will accumulate in the area where the leak is. Consult a DOOSAN distributor or sales agency.

Check Condenser

Inspect the condenser for dust and debris. Clean if necessary.

NOTE: See "Clean Radiator, Oil Cooler, Intercooler, Fuel Cooler and Air Conditioner Condenser Core" on page 4-39.

Check Magnetic Clutch

Check the magnetic clutch for dirt and interference.

Push the "A/C" switch in order to energize magnetic clutch and check the magnetic clutch.

Check Belt Tension

NOTE: See "Check Engine Fan Belt Tension" on page 4-31.

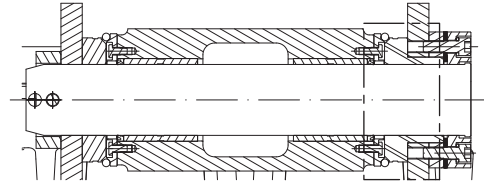
Bucket O-ring Replacement

WARNING

AVOID DEATH OR SERIOUS INJURY

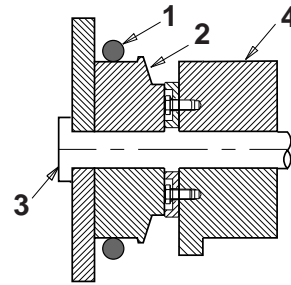
Due to possibility of flying metal objects, always wear safety helmet, protective gloves and eye protection when changing pins.

1. Inspect bucket O-rings on a routine basis. If worn or damaged, replacement is necessary.
2. Roll old O-ring (1, Figure 135) onto boss (2) around bucket pin (3). Remove bucket pin and move arm or bucket link (4) out of way.



FG000502

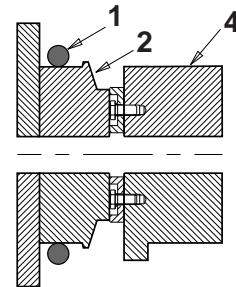
Figure 134



ARO1390L

Figure 135

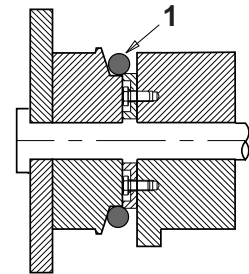
3. Remove old O-ring and temporarily install new O-ring (1, Figure 136) onto bucket boss (2). Make sure that O-ring groove on both bucket link (4) and boss have been cleaned.
4. Realign arm or link with bucket pin hole and insert bucket pin (3, Figure 135).



ARO1391L

Figure 136

5. Roll new O-ring (1, Figure 137) into O-ring groove.



ARO1392L

Figure 137

FUEL TRANSFER PUMP (OPTIONAL)

IMPORTANT

Dry operating fuel pump for more than fifteen seconds can cause wear and/or damage to pump.

- Cooling and lubrication of pump is achieved by fuel passing through pump. If pump is dry operated, heat generated by moving parts will cause damage to pump rotors, vanes and seals.

Do not operate pump for more than fifteen minutes at a time.

- Continuous usage of pump over recommended time interval will cause overheating of motor and will result in motor damage.

Do not use fueling pump for other types of fuel or fluids. (Use only for diesel fuel)

- Do not use fueling pump for other types of fuel which have a low flash point.
- Do not use fueling pump for fuel contaminated with water or high humidity. Moisture in pump mechanism can cause rust and can create pump failure.

Always operate pump using strainer installed on inlet hose. This will prevent any foreign materials from being introduced into pump. Always maintain pump and all of its components in a clean condition.

- If dirt or other foreign materials enter pump, they can become lodged between the rotor and/or vanes and generate heat which can cause pump damage.
- Do not remove strainer or use a strainer with larger mesh to increase flow of fuel.

Be careful not to overfill or spill fuel.

Make sure direction of check valve is in line with flow direction of fuel.

Any pump parts or components that become lost, damaged or inoperable must be immediately replaced.

MAINTENANCE IN SPECIAL CONDITIONS

NOTE: See "Operation Under Unusual Conditions" on page 3-43 for other recommendations.

Conditions	Maintenance Required
Operating in mud, water or rain.	Perform a walk around inspection to check for any loose fittings, obvious damage to the machine or any fluid leakage.
	After completing operations, clean mud, rocks or debris from the machine. Inspect for damage, cracked welds or loosened parts.
	Perform all daily lubrication and service.
	If the operations were in salt water or other corrosive materials, make sure to flush the affected equipment with fresh water.
Operating in an extremely dusty or hot environment.	Clean the air intake filters on a more frequent basis.
	Clean the radiator and oil cooler fins to remove embedded dirt and dust.
	Clean the fuel system intake strainer and fuel filter more frequently.
	Inspect and clean as required the starter and alternator.
Operating in rocky terrain.	Check the undercarriage and track assemblies for damage or excessive wear.
	Inspect for loose or damaged fittings or bolts.
	Relax track tension.
	On a more frequent basis, inspect the front end attachments for damage or excessive wear.
	Install a top guard and front guard as required for protection against falling rock.
Operating in extreme cold.	Use the proper fuel for the temperature conditions.
	Using a hydrometer, check the antifreeze to make sure that it is providing the proper cold weather freeze protection.
	Verify the condition of the batteries. In extremely cold weather remove the batteries at night and store them in a warmer area.
	Remove mud buildup as soon as possible to prevent it from freezing to the undercarriage and causing damage.

Problem	Cause	Remedy
Engine runs hot.	Low coolant level.	Add coolant.
	Thermostat faulty.	Replace thermostat.
	Radiator cap faulty.	Replace radiator cap.
	Radiator core plugged.	Clean radiator.
	Oil cooler core plugged.	Clean oil cooler.
	Fan belt loose or damaged.	Tighten or replace as required.
	Temperature sensor faulty.	Replace sensor.

HYDRAULIC SYSTEM

Problem	Cause	Remedy
None of the controls function (loud noise from pumps).	Hydraulic pump failed.	Contact your DOOSAN dealer.
	Low hydraulic oil level.	Add hydraulic oil as required.
	Suction line plugged or damaged.	Clean or replace as required.
None of the controls function (no noise from pumps).	Pilot pump failure.	Contact your DOOSAN dealer.
	Cut off solenoid valve failed.	Replace solenoid.
	Pilot cutoff switch is ON.	Adjust pilot cutoff switch clearance.
All actuators have low power.	Low hydraulic oil level.	Add hydraulic oil as required.
	Suction filter clogged.	Clean filter.
	Hydraulic pumps faulty.	Contact your DOOSAN dealer.
	Main relief pressure too low.	Contact your DOOSAN dealer.
	Hydraulic pumps excavating.	Bleed air from hydraulic pumps.
Only one or two actions have little or no power.	Overload relief pressure too low.	Reset pressure.
	Makeup check valve leaking.	Clean or replace as required.
	Control valve spool faulty.	Replace valve spool.
	Dirt in valve spool.	Clean or replace as required.
	Actuator failed.	Repair or replace as required.
	Cylinder seal failed.	Repair or replace as required.
	Cylinder rod damaged.	Repair or replace as required.
	Remote control valve failed.	Replace control valve.
	Wrong pilot line connection.	Reconnect pilot lines.
Oil temperature too high.	Oil cooler faulty.	Contact your DOOSAN dealer.
	Fan belt loose.	Tighten fan belting as required.

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