DOOSAN

K1024537EE
July 2014

WHEEL LOADER

Operation & Maintenance Manual

DL200 / DL200TC

Serial Number 5001 and Up

Other Signal Words

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

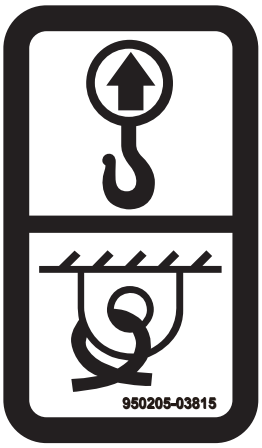
IMPORTANT

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

The word "NOTE" identifies information for effective use.

19. Lift/Tie down (950205-03815)

Identifies lift point and tie down point location.

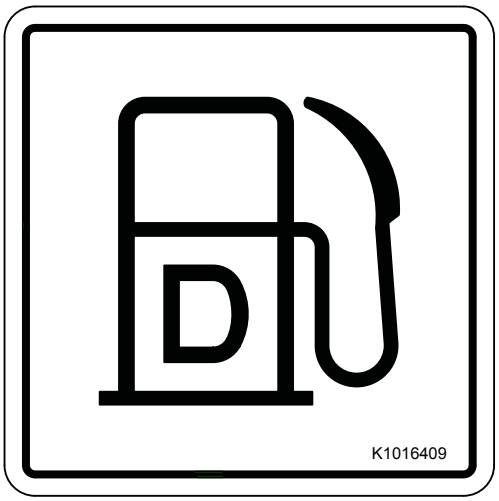


EX1301201

20. Diesel (K1016409)

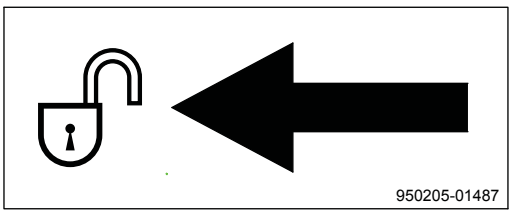
IMPORTANT

- **Only use diesel fuel.**



WL1400818

21. Unlock (950205-01487)



WL1400819

Attachment Precautions

Option kits are available through your dealer. Contact DOOSAN for information on available one-way (single-acting) and two-way (double-acting) piping / valving / auxiliary control kits. Because DOOSAN cannot anticipate, identify or test all the attachments that owners may wish to install on their machines, please contact DOOSAN for authorization and approval of attachments, and their compatibility with optional kits.

Accumulator

The pilot control system is equipped with an accumulator. For a brief period of time after the engine has been shut down, the accumulator will store a pressure charge that may enable hydraulic controls to be activated. Activation of any controls may enable the selected function to operate under force of gravity.

When performing maintenance on the pilot control system, the hydraulic pressure in the system must be released as described in “Handling of Accumulator” on page 4-87.

The accumulator is charged with high-pressure nitrogen gas, so it is extremely dangerous if it is handled in the wrong way. Always observe the following precautions:

- Do not drill or make any holes in the accumulator or expose it to any flames, fire or heat source.
- Do not weld on the accumulator, or try attaching anything to it.
- When carrying out disassembly or maintenance of the accumulator, or when disposing of the accumulator, the charged gas must be properly released. Contact your DOOSAN distributor.
- Wear safety goggles and protective gloves when working on an accumulator. Hydraulic oil under pressure can penetrate the skin and cause serious injuries.

Engine Ventilation

Engine exhaust gases can cause loss of judgment, loss of alertness, and loss of motor control. These gases can also cause unconsciousness, serious injury, fatal accidents and death.

Make sure there is adequate ventilation before starting the engine in any enclosed area.

You should also be aware of open windows, doors or ductwork where exhaust may be carried, or blown by the wind, exposing others to danger.

ARO1770L

Figure 14

Operate Carefully on Snow and Ice, In Very Cold Temperatures

In icy cold weather avoid sudden travel movements and stay away from even very slight slopes. The machine could skid off to one side very easily.

Snow accumulation could hide or obscure potential hazards. Use care while operating or while using the machine to clear snow.

Warming up the engine for a short period may be necessary, to avoid operating with sluggish or reduced working capacity. The jolting shocks and impact loads caused by bumping or bottoming the boom or attachment are more likely to cause severe stress in very cold temperatures. Reducing work cycle rate and workload may be necessary.

When the temperature rises, frozen road surfaces become soft, and machine travel becomes unstable.

In cold weather, do not touch metal surfaces with your bare hands. If you touch a metal surface in extremely cold weather, your skin may freeze to the metal surface.

Parking Machine

Avoid making sudden stops, or parking the machine wherever it happens to be at the end of the workday. Plan so the wheel loader will be on firm and level ground away from traffic and away from high walls, cliff edges and any area of potential water accumulation or runoff. If parking on inclines is unavoidable, block the wheels to prevent movement. Lower the bucket or other working attachment completely to the ground, or to an overnight support saddle. There must be no possibility of unintended or accidental movement.

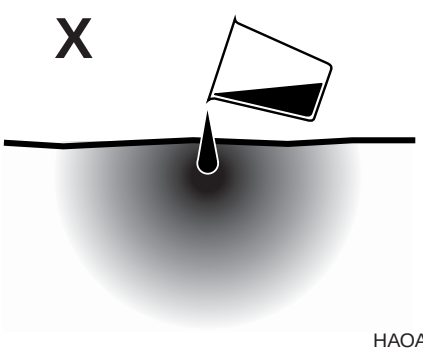
When parking on public roads, provide fences, signs, flags, or lights, and put up any other necessary signs to ensure that passing traffic can see the machine clearly. Park the machine so the machine, flags, and fences do not obstruct traffic.

Dispose of All Petroleum Based Oils and Fluids Properly

Physical contact with used motor oil may pose a health risk. Wipe oil from your hands promptly and wash off any remaining residue.

Used motor oil is an environmental contaminant and may only be disposed of at approved collection facilities. To prevent pollution of the environment, always do the following:

- Never dump waste oil in a sewer system, rivers, etc.
- Always put oil drained from your machine in containers. Never drain oil directly onto the ground.
- Obey appropriate laws and regulations when disposing of harmful materials such as oil, fuel, solvent, filters, and batteries.



HAOA470L

Figure 35

Check Tire Pressure and Condition

Maintain tire pressure but do not overinflate. Inspect tires and wheels daily. When inflating tires, follow procedures in Maintenance Section, which include using an extension to allow you to avoid standing in front of or over a tire. Do not change a tire unless you have both experience and proper equipment.

NOTE: *Refer to "Recommended Air Pressure" on page 4-96*

Decreasing Risk of Injuries or Death From Boom and Bucket

DANGER

AVOID DEATH

When operating machine or making repairs, never allow bystanders in the operational zone or repair area. Operation and service personnel must be careful when working around the machine, especially around the boom and bucket.

An unexpected fall of the front structure can cause injuries or death.

Reference Number	Description
1	Bucket Teeth
2	Bucket
3	Air Conditioner Condenser
4	Rear Wheel Cover
5	Battery Box
6	Rear Light
7	Counterweight
8	Fan Motor
9	Towing Pin
10	Muffler Tail Pipe
11	Oil Tank
12	Lever
13	Front Wheel Cover
14	Tilt Cylinder
15	Headlight Support
16	Ladder
17	Work Light
18	Operator's Cabin
19	Air Cleaner
20	Engine Air Intake Precleaner
21	Engine
22	Muffler
23	CAC Cooler
24	Radiator

Reference Number	Description
25	Grille
26	Fan
27	Fuel Tank
28	Engine Oil Fill Cap
29	Engine Oil Filter
30	Engine Oil Level Dipstick
31	Rear Axle Pivot
32	Rear Axle
33	Drive Shaft (Rear)
34	Transmission
35	Transmission Oil Filter
36	Drive Shaft (Center)
37	Center Pin
38	Steering Wheel Cylinder
39	Lift Cylinder
40	Drive Shaft (Front)
41	Parking Brake
42	Front Axle
43	Loader Arm
44	Link
45	Link
46	Lever
47	Quick Coupler (Optional)

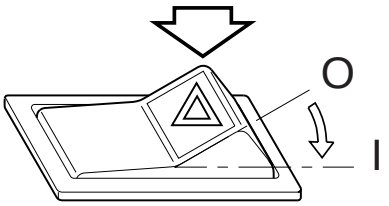
12. Hazard Warning Light Switch

This warning light is used when the equipment is stopped because of a malfunction or when an emergency occurs. When this switch is pressed the directional indicator lights in front and back of the machine light up and flash, warning others in the area. At the same time the directional indicator lights on the instrument panel will turn "ON" to warn the operator. The hazard warning lights operate independent of the starter switch.

O. In this position, this switch turns "OFF" hazard warning lights.

I. In this position, this switch turns "ON" all turn signals and they flash simultaneously.

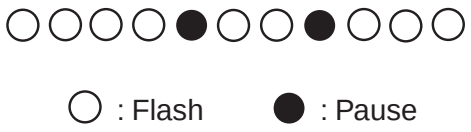
NOTE: *Hazard warning lights will function with starter switch in "OFF" position.*



2665C

Figure 23

Fault Code 423 (example)

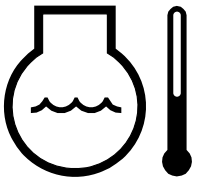


AQO0010L

Figure 47

21. Engine Coolant Temperature Warning Symbol

If engine coolant overheats, this symbol appears on the screen an alarm will sound, and the engine speed will be automatically reduced, until coolant temperature drops. Do not turn engine "OFF" because this will cause coolant temperature to rise and can cause engine to seize up because of heat surge.



HAOD350L

Figure 48

NOTE: *Check the engine coolant temperature gauge. If the gauge pointer moves into the red zone, the engine coolant temperature warning light will turn "ON", a warning buzzer will sound, and the engine speed will be automatically reduced. Allow the engine to run at "LOW IDLE" until temperature gauge registers in the white zone again. When the white zone is reached, allow the engine to idle for an additional three - five minutes before stopping the engine. If not allowed to idle, heat surge may develop which will damage the engine. Allowing the engine to idle will dissipate heat. Check the coolant level, look for a loose fan belt, inspect for debris around radiator, etc.*

When the temperature reaches the normal range, the engine speed will automatically recover.

CAUTION

AVOID INJURY

The washer pump can be damaged if it is activated while there is no fluid in the tank.

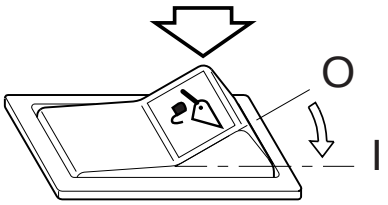
The fluid level must be checked regularly and refilled as necessary.

Using soap or other solvents instead of the recommended washer can damage the wiper blades and the paint finish. Only use the recommended washer fluid or equivalent.

11. Pilot Cutoff Switch

O. In this position the operator cannot operate the pilot control valve lever (joystick).

I. In this position the operator can fully control the movement of the pilot control valve lever (joystick).



HBOI110L

Figure 71

CAUTION

AVOID INJURY

When driving or parking, the pilot cutoff switch must be changed to "O" (OFF) position.

12. Parking Brake switch

This switch is used to park the machine.

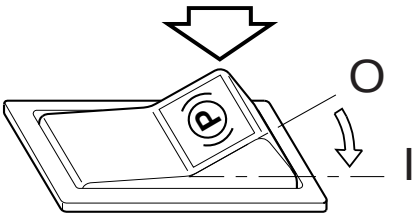
O. In this position, parking brake is "RELEASED" and the monitor light on the front display monitor turns "OFF".

I. In this position, parking brake is "APPLIED" and the monitor light on the front display monitor turns "ON".

NOTE: *If parking brake is released, the engine can not be started. To start the engine, engage parking brake first.*

NOTE: *When starting the engine parking brake is engaged automatically.*

To release parking brake, turn parking brake switch "ON" then "OFF" once more although parking brake may look not to be engaged

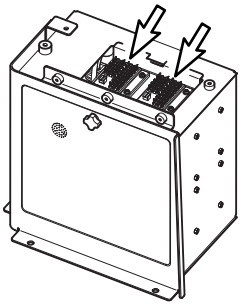


HA0O2019

Figure 72

8. Fuse Box

The fuse box is on the upper side of electric box. For a detailed explanation of fuses see “Fuse Box/Relay/Engine Emergency Stop Switch” on page 2-57.



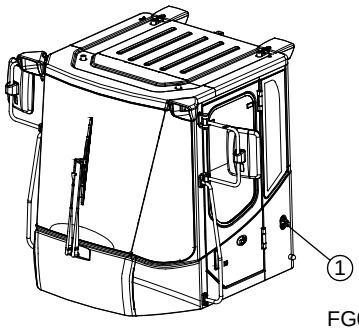
FG003959

Figure 94

DOOR SIDE LATCH

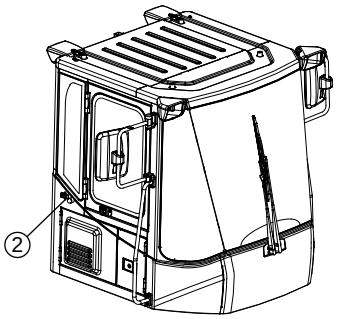
1. Door side latches (1. LH, Figure 111) and (2. RH, Figure 112) are used to secured the doors (RH, LH) to the side of the cabin when they are opened.

   NOTE: *Keep the door closed and locked when machine is not in use.*



FG003894

Figure 111



FG003895

Figure 112

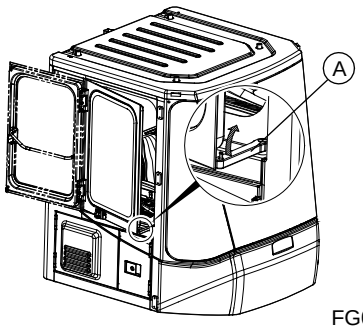
2. The RH side door, which is emergency exit from the cabin, can be opened in two positions.

   Position 1. (ventilation position)

   - Open the window and secured it with the lock bar. (A, Figure 113)

   Position 2. (full opened position)

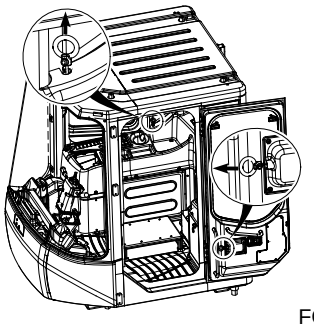
   - Open the window and push it to backward



FG003896

Figure 113

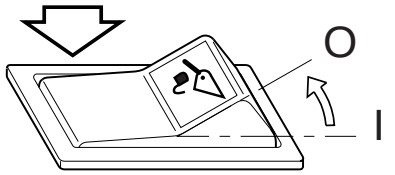
3. To release doors from both sides of the cabin. Pull the handles (Figure 114) in the direction of arrows. The handles are located on both sides of the operator's seat.



FG003897

Figure 114

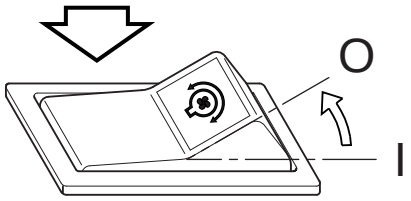
4. Set pilot cutoff switch to "O" (LOCK) position. This will "LOCK" pilot control valve lever (joystick).



HBOI111L

Figure 4

5. Set reverse fan switch to "O" (OFF) position. This will prevent damage to the cooling system during normal operation.

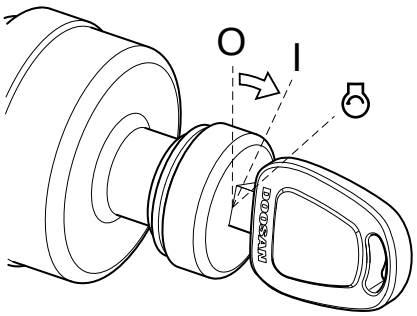


HAAH0040

Figure 5

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

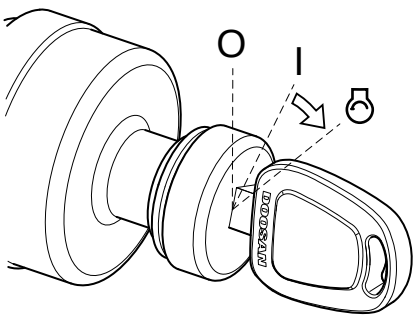
   NOTE: *If unit is equipped with and emergency steering system. Test system before starting engine. If system does not function properly, do not start unit. Follow test procedure given with test switch.*



FG000084

Figure 6

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



FG000085

Figure 7

7. Place transmission lever in desired gear. Shift gears one by one. Do not skip from 1st to 3rd, for example.
8. Shift transmission lever to "FORWARD" position.

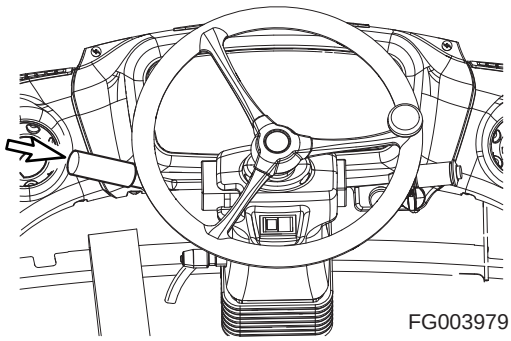


Figure 30

9. Release the brake pedal while slowly pressing the accelerator pedal.

WARNING

AVOID DEATH OR SERIOUS INJURY

When traveling at high speed or on a steep hill, do not make sharp changes in direction. This could cause vehicle to overturn.

When traveling or changing direction, always look carefully to be certain that no one is in path of vehicle.

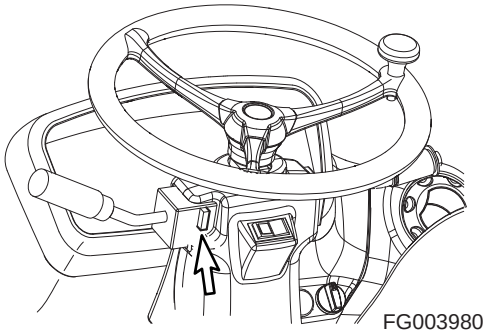


Figure 31

5. Always keep the fuel tank fully filled after completion of the operation. Always drain water from the fuel tank before and after the operation. In addition, check the water separator, and drain it if required. The fuel filter, if frozen, may interrupt the flow of fuel. Periodically remove water from the fuel tank, drain water from the filter, and replace the filter upon regular basis. To prevent fuel from being clogged due to formation of wax in fuel, make sure that wax formation point of fuel is lower than atmospheric temperature.

WARNING

AVOID DEATH OR SERIOUS INJURY

Explosion of the fuel tank may cause serious injury or death. Never attempt to directly heat the fuel tank with open fire.

6. Lubricate entire machine according to Periodic Service Table and Chart Section 4, in this manual, or lubrication chart on machine.

7. Start engine and allow it to reach normal operating temperature before operating.

   - If mud and ice collects and freezes on any of moving parts while machine is idle, apply heat to thaw frozen material before attempting to operate machine.
   - Operate hydraulic units with care until they have reached a temperature which enable them to operate normally.
   - Check all machine controls and functions to be sure they are operating correctly.

8. At an oil temperature in the shifting circuit < -12°C, the transmission must be warmed-up for some minutes (about 5 min).
   This must be carried out in neutral with an increased engine speed (about 1,500 min).
   Until this oil temperature is reached, the electronics remains in neutral, and the symbol of the cold start phase will be indicated on ZF-display.

   Indication on the display: **

   After the indication on the ZF-display is extinguished, the full driving program can be utilized out of "NEUTRAL".

9. An extra outer air filter must be kept in operator's cabin to replace filter that could become iced and cause restricted airflow to engine.

10. Clean off all mud, snow and ice to prevent freezing. Cover machine with a tarp if possible and keep ends of tarp from freezing to ground.

- The installation of two-way radio, lever steering or similar equipment must be carried out by a skilled person, as faulty installation can cause interference with the electronic components controlling vital machine functions.
- When carrying out service work below raised lifting arm system, the lifting arms must first have been secured (lifting arm support). In addition the control lever lockout and the parking brake must be applied.
- Take care when changing oil in engine, hydraulic system or transmission as the oil may be hot and cause burns.
- When emptying/draining oil or fuel, use a pump or a hose and collect the liquids in a suitable vessel. Spillage will damage the environment and can cause a fire. Waste oil and other contaminating liquids must be taken care of by a firm especially authorized to carry out such work.
- When operating in an area which is contaminated or dangerous to one's health, the machine must be especially equipped for this purpose. Special local safety regulations apply within such areas and also when servicing the machine.
- Stop engine before opening engine covers etc. Make sure that no tools or other objects, which can cause damage, have been forgotten in or on the machine.
- Check that the equipment you are using for lifting or supporting parts of the machine, e.g. straps, slings, ratchet blocks and ground support, can safely cope with the strain they are exposed to and meet applicable regulations.
- Release the pressure in pressure vessels, components and systems carefully and in the prescribed way, so that the excess pressure is released without risk.
- When connecting hydraulic hoses, check that the desired effect has been achieved, that is, check that the hydraulic function operates in the expected way.
- Hoses, pipes and quick-connect couplings may be pressurized even if the machine is stationary and the engine turned "OFF". Such pipes and hoses should therefore only be disconnected by trained personnel.
- When looking for leaks, use a piece of paper or wood, not your hand.

- Vehicles which are prone to high levels of ingested water in the axle, or water as a result of condensation, should not use extended drain intervals.
- Severe applications* - 85W140 or 80W140 lubricants that meet the requirements of API GL-5 or MIL-PRF-2105E. Before using a synthetic lubricant in severe applications, the customer must check with the lubricant supplier on the issue of high-pressure lubricant applications.
- Vehicle warm-up procedure should be utilized when machine is at temperatures lower than oil operating range.
- Friction modifiers for Posi-torq (limited slip) differentials can be used to minimize operational noise or in liquid-cooled brakes to reduce brake noise. 2% to 5% by weight is recommended.

DANGER

AVOID DEATH

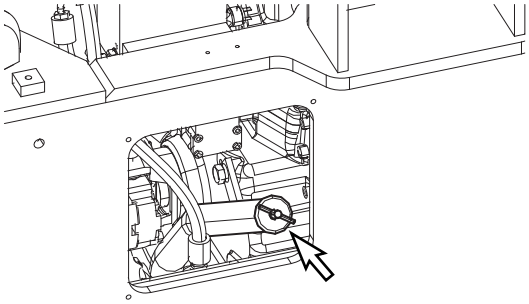
After the additives are placed into the oil, verify service brake and parking brake performance after a few hours of work. Also verify brake noise has been eliminated. If brake performance is insufficient or noise is still occurring, flush with washing oil, refill with new oil, and check again.

- It is important to consult the applicable axle Service Manual as it may have unique lubrication requirements not outlined in this bulletin.

Check Transmission Oil Level

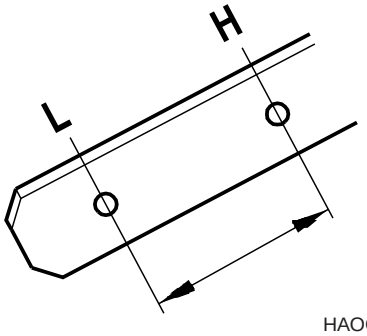
NOTE: *When checking level using a dipstick always remove and wipe it clean before making final level check.*

1. Use two people to perform this operation.
2. Start machine and drive it until transmission fluid has warmed to 80°C (176°F). Park machine on firm and level ground. Lower bucket or work tool to ground.
3. Place transmission lever in "NEUTRAL". Apply parking brake. Stop engine.
4. Block tires. Once tires are blocked, start engine and have a person remain in the cabin.
5. Allow engine to idle until transmission temperature is to 80°C (176°F).
6. Remove transmission dipstick (Figure 17). Wipe dipstick clean and then insert it back into transmission.
7. Remove dipstick and check oil level mark. Oil level must be between "LOW" and "FULL" marks.
8. To add oil, remove transmission fill cap (Figure 16) from transmission oil filter pipe.
9. Stop engine when done.



FG008085

Figure 16



HAOC280L

Figure 17

Check Hydraulic System Oil Level

WARNING

AVOID DEATH OR SERIOUS INJURY

The hydraulic oil will be hot after normal machine operation. Allow system to cool before attempting to service any of the hydraulic components.

The hydraulic tank is pressurized. Turn breather cap slowly to allow pressurized air to vent. After the pressure has been released, it is safe to remove either the fill cap or service covers.

HAOA060L

Figure 18

C. Bucket cylinder rod end, 1 location. (Figure 39).

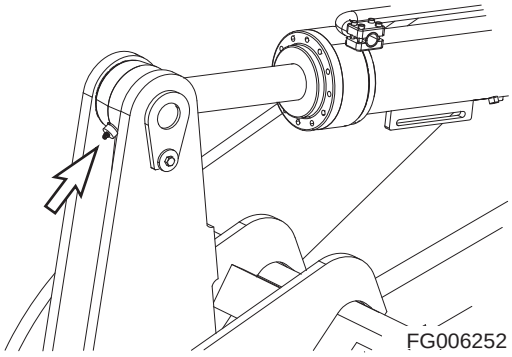


Figure 39

D. Lift cylinder heads (left, right), 2 locations (Figure 40).

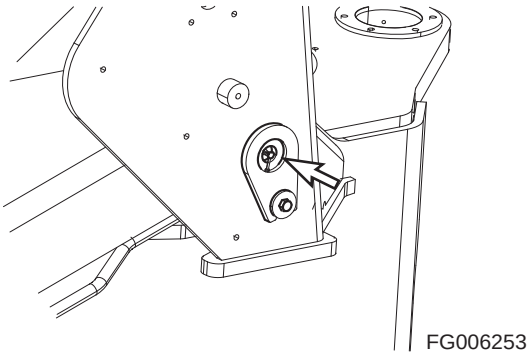


Figure 40

Lift cylinder rod ends, 2 locations. (Figure 41).

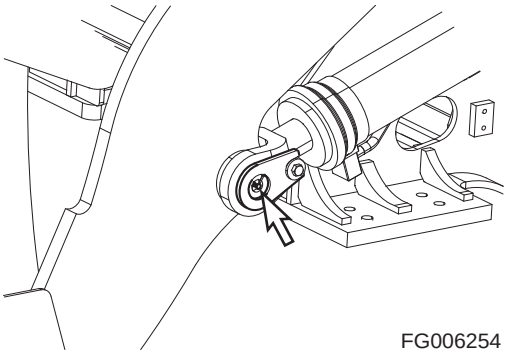


Figure 41

E. Remote location points.

Remote fittings for bucket cylinder head (50 HOUR), (1, Figure 42).

Remote fittings for loader arm foot end (50 HOUR), (2, Figure 42).

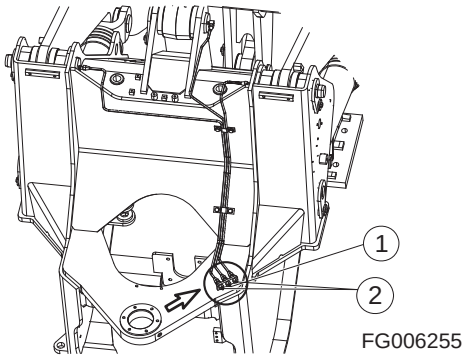


Figure42

9. Stop engine. Remove key.

If the machine moved during the test, contact your dealer for a brake inspection. Make any necessary repairs before the machine is returned to operation.

Parking Brake Test

Refer to the Operation & Maintenance Manual, "Operating Controls" section for more information.

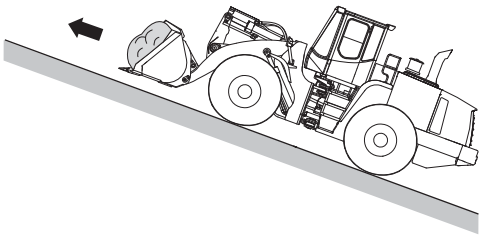
1. Start the engine.
2. Attach the heaviest approved attachment. If using a bucket, fill the bucket with material. **DO NOT** exceed the rated operating load of the wheel loader.
3. Move the machine to an area with a dry, hard surface with a slope equivalent to the maximum authorized slope on the work site where the machine will be operated.

WARNING

AVOID DEATH OR SERIOUS INJURY

- **Keep the heavy end of the machine uphill.**
- **Do not travel on slopes greater than 30 degrees.**
- **Do not exceed Rated Operating Capacity (ROC).**
- **Check for adequate traction.**

4. Drive the wheel loader up the incline with the heavy end of the machine facing uphill. (Figure 64)



WL1400681

Figure 64

5. Apply the service brake. (Figure 65)

WL1400677

Figure 65

Clean Air Conditioner Inner Filter

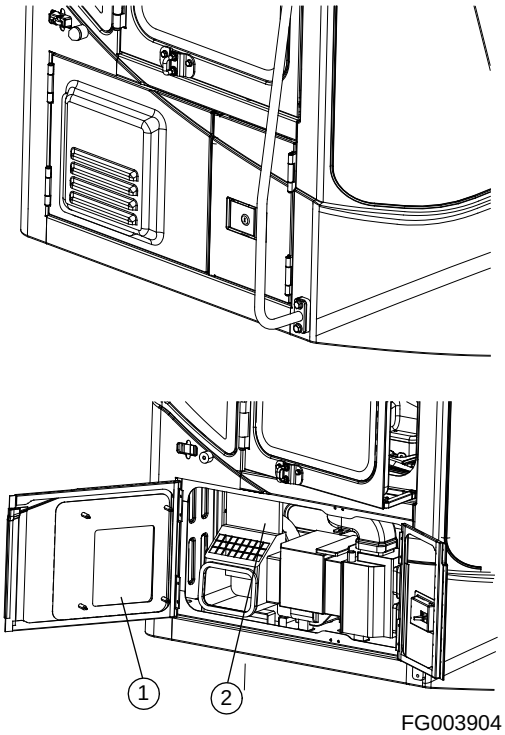
This unit is equipped with an air-conditioning system. There are two filters (1 and 2, Figure 91) for air conditioner. The filters out dirt and dust particles from air being circulated into operator's cabin. They are located under the right side control panel.

1. Open access cover on the lower right side of cabin on the outside to gain access filter.
2. Remove filter (2, Figure 91) and inspect it for damage.
3. Use compressed air to clean filter. If element is very dirty use a mild soap and water solution to clean it.

NOTE: *Clean air-conditioning filter every 500 hours and replace with a new one every 1,000 hours of service.*

NOTE: *If water was used to clean filter be sure it is completely dry before installation.*

NOTE: *In the event that the unit it being operated in a dusty environment, the cleaning and replacement must be performed more frequently if filter is damaged, replace damaged with a new one.*



FG003904

Figure 91

WARNING

AVOID DEATH OR SERIOUS INJURY

All service and inspection of the air-conditioning system must be performed with the starter switch in the "O" (OFF) position.

Change Engine Oil and Filter

CAUTION

AVOID INJURY

Never attempt to change oil or filter on a hot engine. Hot oil could splash and cause burns. Allow engine to cool down before changing oil or filter.

NOTE: *Change engine oil and filter after first 50 hours on a new machine and every 500 hours thereafter. Refer to "DL 06 Industrial Engines Oil Drain Intervals by Duty Cycle (Hours)" (See page 4-19).*

Check and Adjust Engine

Contact your nearest DOOSAN loader dealer.
Contact engine manufacturer for checking and adjusting the following items:

- Engine Compression Pressure.
- Injection Pressure.
- Injection Timing.

Change Air Breather Filter

1. Position the machine on firm and level ground. Lower the front attachment to the ground and stop engine.
2. Lift the breather cap(2. Figure 110) slightly to release the internal pressure.
3. Unscrew the bolt (1, Figure 110) and take off the breather cap (2, Figure 110).
4. Change a filter cartridge (3, Figure 110) and assemble the breather cap by tighting the bolt.

   NOTE: *Used filter should always be disposed of according to local regulations.*

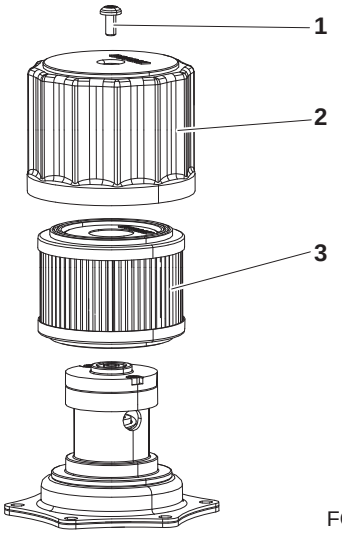
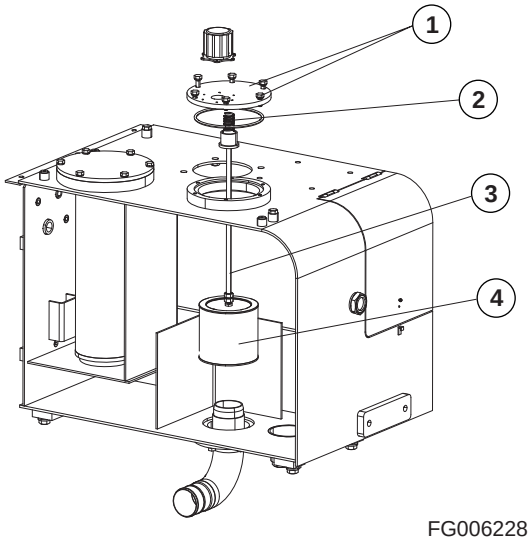


Figure 110

5. Remove and clean pump inlet strainer (Figure 125) inside hydraulic tank.
   A. Carefully remove bolts and cover (1), from top of hydraulic oil tank. There is a spring (2) under the cover that will force the cover up.
   B. Remove spring (2, Figure 125) and suction filter (4) by pulling on rod (3).
   C. Clean inside and outside of strainer. Replace strainer if it is broken.
   D. Position strainer on boss portion of suction pipe.
   E. Fill hydraulic oil tank. Check level using sight gauge on side of tank.
6. Install tank drain plug. Refill tank by pouring oil in through breather cap opening. Install and tighten breather cap.



FG006228

Figure 125

7. Start engine and operate controls to raise and lower bucket a few times. (Figure 126). Raise and lower boom a few times. (Figure 127). Lower bucket or work tool to ground.
8. Check tank sight gauge. (See Figure 19 on page 4-28). Oil level must be between upper limit and lower limit on sight gauge. Remove breather cap and add oil if necessary.

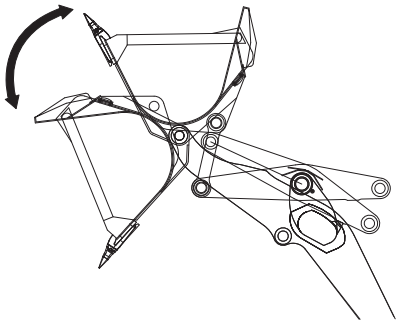

FG014464

Figure 126

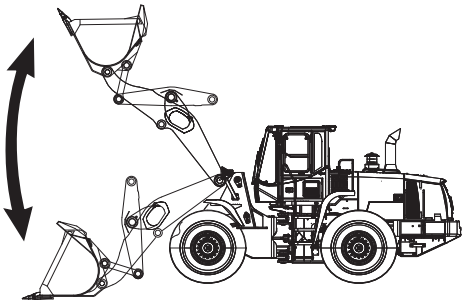

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Figure 127

Bleed Brakes

When brake hoses or brake tubes are replaced, air can be introduced into brake hydraulic system. Air can cause brakes to operate intermittently, which is a dangerous condition. Never operate machine with air in brake hydraulic system. A spongy feel when pressing brake pedal is a sign that air is present in brake hydraulic system.

HANDLING OF ACCUMULATOR

WARNING

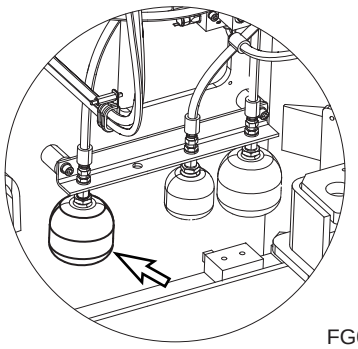
AVOID DEATH OR SERIOUS INJURY

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 starter switch to "I" (ON) position and operate pilot control valve lever and brake pedal. Even though the engine is shut down, hydraulic actuated components may move while releasing pilot pressure. Keep all personnel away from machine while performing this operation.

- **Set pilot cutoff switch to "O" (OFF) 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, or try attaching anything to it.**
- **When replacing an accumulator, contact a DOOSAN 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) to ground.
2. Stop engine.
3. Set pilot cutoff switch on "I" (ON) position.
4. Turn starter switch to "I" (ON) position.
5. Fully move pilot control valve lever in all directions.
6. Repeatedly press brake until brake oil pressure warning light turns "ON". Press the pedal another eight to nine times.
7. Set pilot cutoff switch on "O" (OFF) position.
8. Turn key to "O" (OFF) position and remove from starter switch.
9. Remove accumulator by unscrewing it slowly.



FG008106

Figure 130

Transportation

When transporting the machine, observe all laws regarding weight, width, height and length of towing vehicle, trailer and load. Use a towing vehicle and trailer of adequate length and capacity.

Check the travel route for road width, overpass clearances, weight restrictions. Special approval or permits may be required.

TRANSPORTING MACHINE

WARNING

AVOID DEATH OR SERIOUS INJURY

When transporting the machine, know the width, height, length, and weight.

When loading or unloading the machine, make sure to run the engine at the lowest speed setting and travel at the slowest speed possible.

Machine must be operated by a qualified operator.

Make sure that ramp being used can handle the weight of the machine. If required, add blocking under the ramp for additional support.

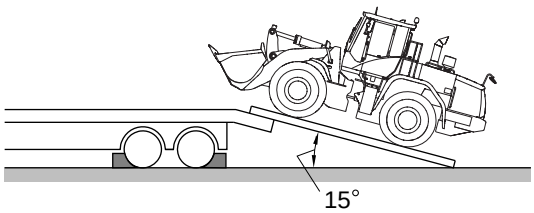
Make sure that the ramp surface is free of grease, debris, or mud that could cause the machine to slip or slide.

Make sure that trailer is parked on firm, and level ground before attempting to load/unload the machine.

Never correct your steering on the ramps. There is a danger that the machine may tip over. If necessary, drive off the ramps or back on to the bed of the trailer and correct the direction.

Make sure to secure the machine onto the trailer as required by local transportation laws and regulations.

1. Make sure that trailer is parked on firm and level ground. See Figure 1.
2. Make sure that ramps that are being used are designed to handle the weight of the machine. If required, add blocking under the ramp to provide additional support.
3. The ramp angle must be less than a 15° angle. Ramps steeper than this can cause traction or stability problems when loading or unloading.



FG028819

Figure 1

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 distributor.
	Cutoff solenoid valve failed.	Replace solenoid.
	Relief cartridge of pilot parking valve stuck.	Clean or replace as required.
	Safety Limit Switch is ON.	Adjust Limit Switch clearance.
All actuators have low power.	Low hydraulic oil level.	Add hydraulic oil as required.
	Suction filter clogged.	Clean filter.
	Hydraulic pumps faulty.	Contact your DOOSAN distributor.
	Main relief pressure too low.	Contact your DOOSAN distributor.
	Hydraulic pumps cavitating.	Bleed air from hydraulic pumps.
Only one or two actuators have little or no power.	Overload relief pressure too low.	Reset pressure.
	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.	Debris in exterior of cooler.	Clean exterior of cooler.
	Oil cooler faulty.	Contact your DOOSAN distributor.
	Fan belt loose.	Tighten fan belting as required.

DL200TC + Quick Coupler	
Item	**Specification**
Standard Bucket Capacity (BOT / BOC)	1.9 m^3 (2.5 yd^3) / 2.0 m^3 (2.62 yd^3)
Vehicle Weight	11,880 kg (26,191 lb)
Engine (SAE J1995 Gross)	
Emission	U.S EPA Tier3 (EU Stage IIIA)
Maker and Model	DOOSAN DL06
Type	Turbo Charged, Air to Air Intercooled Direct Injection
Injection System	Common-rail Controlled by Electronic ECM
Max. Gross Power	118 kw (160 ps) / 1800 rpm
Rated Gross Power	107 kw (145 ps) / 2100 rpm
Max. Torque	70 kg•m (686 N.m) / 1400 rpm
Transmission	
Full Automatic Power -Shift	Full Automatic Power Shift
Speeds	4 Forward, 3 Reverse
Brake Systems	
Service Brakes	Full Hydraulic, Separate Dual Line Wet Discs
Parking Brake	Spring Applied / Oil Released on Front Axle, Wet Disc
Performance	
Travel Speed	6.6 (4.1) /12.1 (7.5) / 22.6 (14) / 35 (21.7) km/h (MPH)
Steering Angle	±40°
Min. Tire Turning Radius * (Out Tire Edge)	5,210 mm (17' 1")
Rated Operating Load	3,420 kg (7,540 lb)
Max. Breakout Force	10,000 kg (22.046 lb)
Boom Rise Time	5.8 ±0.5Sec.
Bucket Dump Time	1.2 ±0.4 Sec.
Boom Down Time	4.1 ±0.4 Sec.
Maximum Gradeability	30° (58%)

* Based on 20.5R25 tire