DOOSAN

950106-01102NA
October 2014

EXCAVATOR

Operation & Maintenance Manual

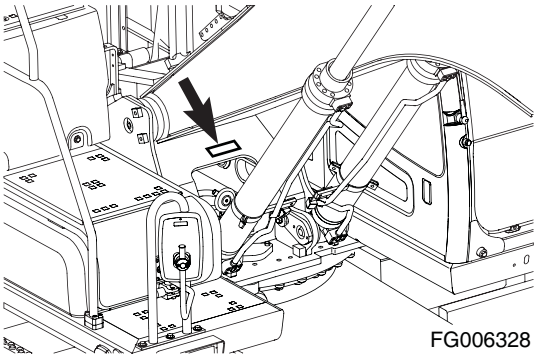
DX170W-5

Serial Number 1001 and Up

Product Identification Number (PIN)

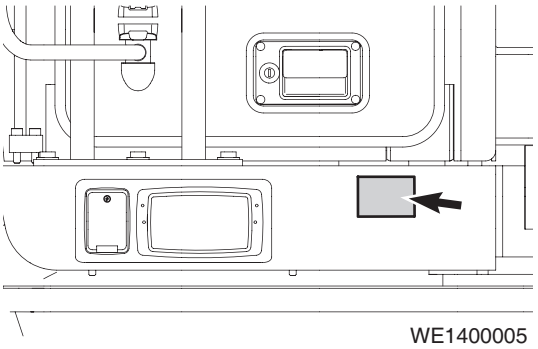
A PIN number is stamped on upper frame under boom foot (Figure 1). It is also stamped on a product identification plate (Figure 2) on outside of cabin on right-hand side.

NOTE: *Record these numbers and their locations. These will be required whenever warranty or service work is requested. Keep these numbers on file in case machine is stolen.*



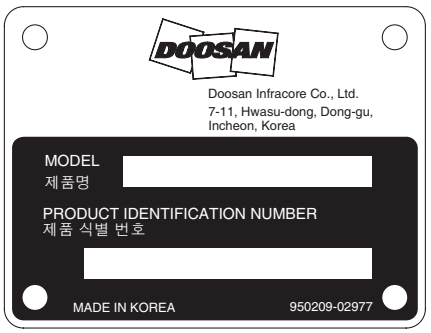
FG006328

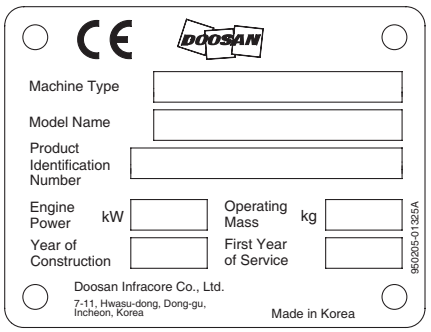
Figure 1



WE1400005

Figure 2





EX1301248

Figure 3

Component Serial Numbers

There are many serial numbers on each traceable component of the machine. Record these numbers and their locations. These will be required whenever warranty service work is requested.

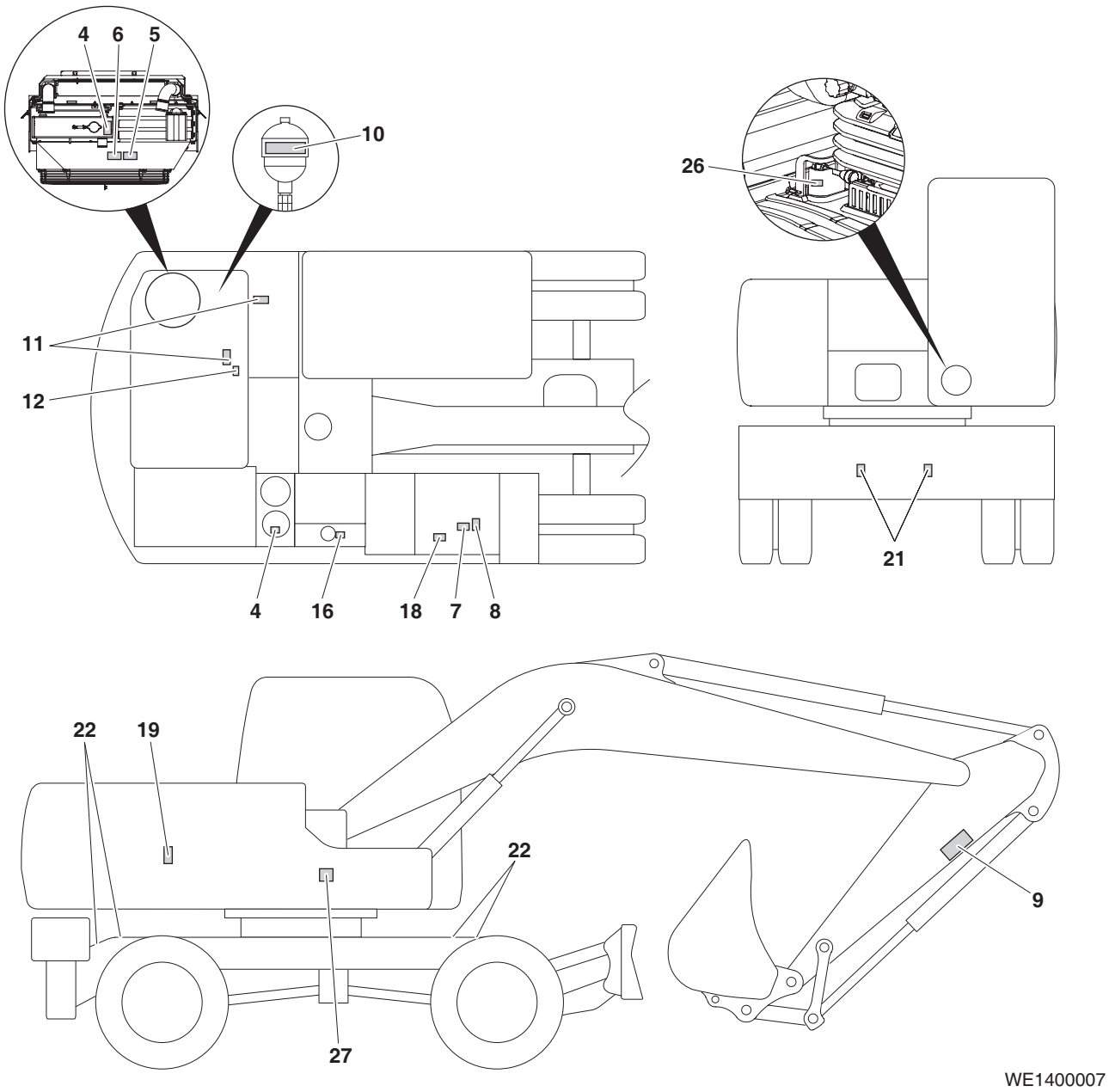
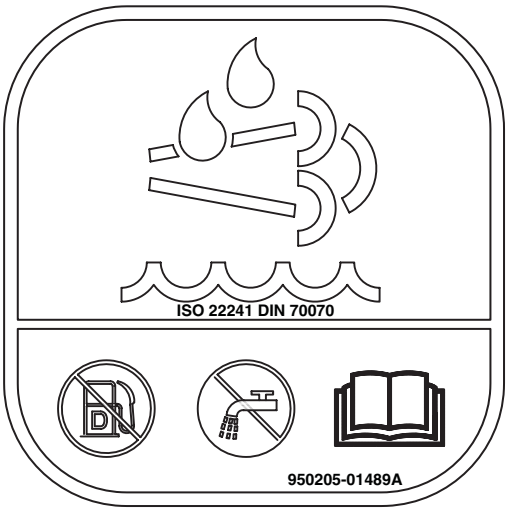


Figure 3

27. DEF (AdBlue) (950205-01489A)

IMPORTANT

- **Use only the specified diesel exhaust fluid.**
- **See the Operation & Maintenance Manual for more information.**



WL1300370

Electrical System and Electrical Shock

Never short across starter terminals or across batteries. Shorting could damage electrical system and engine neutral start system.

When engine is running or immediately after it has stopped, high voltage is generated at injector terminal and inside engine controller, so there is a potential for an electrical shock. Never touch injector terminal or inside of engine controller.

NOTE: *If it is necessary to touch injector terminal or inside engine controller, contact your DOOSAN distributor.*

Rollover Protective Structure (ROPS)

The operator's cabin is a ROPS certified structure for protecting the seat-belted operator. It absorbs the impact energy of a rollover impact. Do not allow machine weight (mass) to exceed certified value on certification plate. If weight is exceeded, the ROPS structure will not be able to fulfill its safety function.

Do not increase machine weight beyond certified value by modifying machine or by installing attachments on machine. If weight limit of protective equipment is exceeded, protective equipment will not be able to protect operator, and this can result in death or serious injury. Always observe the following:

- This machine is equipped with a protective structure. Do not remove protective structure and perform operations without it.
- Never modify the operator's cabin by welding, grinding, drilling holes or adding attachments unless instructed by DOOSAN in writing. Changes to the cabin can cause loss of operator protection from rollover and falling objects, and result in death or serious injury.
- When protective structure is damaged or deformed by falling objects or by rolling over, its strength will be reduced and it will not be able to adequately protect the operator. Contact your DOOSAN distributor if you have any questions about the ROPS. Never repair a damaged ROPS cabin.
- Always wear your seat belt when operating machine.

Seat Belt

Check seat belt daily for correct function.

Inspect seat belt system more often if machine is exposed to severe environmental conditions or applications. Conduct the following inspections and replace seat belt system as necessary:

1. Check webbing. If system is equipped with a retractor, pull webbing completely out and inspect full length of webbing. Look for cuts, wear, fraying, dirt and stiffness.
2. Check buckle and latch for correct operation.
3. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing is broken.
4. Check retractor web storage device (if equipped) by extending webbing and checking that it spools out and retracts correctly.
5. Check webbing in areas exposed to ultraviolet (UV) rays from sun or extreme dust or dirt. If original color of webbing in these areas is extremely faded and/or webbing is packed with dirt, webbing strength may be reduced.

NOTE: *Contact your DOOSAN distributor for seat belt system replacement parts.*

WARNING

AVOID DEATH OR SERIOUS INJURY

Failure to properly inspect and maintain seat belt and seat belt system can cause lack of operator restraint and can result in death or serious injury.

Before fastening seat belt, check that there is no problem in belt mounting bracket. If it is worn or damaged, replace seat belt. Fasten seat belt so it is not twisted.

Always wear seat belt when operating machine.

Parking Machine

Avoid making sudden stops, or parking machine wherever it happens to be at end of workday. Park machine on firm and level ground away from traffic and away from high walls, drop-offs and any area of potential water accumulation or runoff. If parking on inclines is unavoidable, block tires tracks to prevent movement. Lower bucket or other working attachment completely to ground, or to an overnight support saddle to prevent unintended or accidental movement. Lower dozer blade to ground, if equipped.

NOTE: *Do not lower outriggers when parking. Make sure that outriggers are "LOCKED" in place.*

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 machine clearly. Park machine so machine, flags, signs and fences do not obstruct traffic.

After front attachment has been lowered to an overnight storage position and all switches and operating controls are in "OFF" position, safety lock lever must be moved to "LOCK" position. This will disable all pilot control functions.

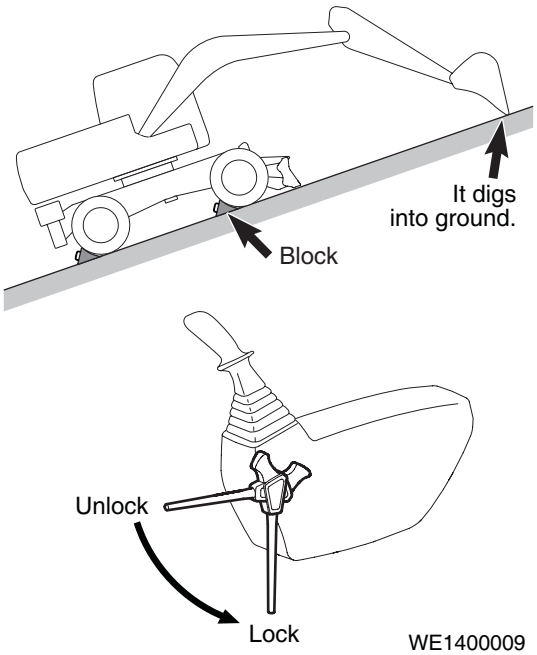


Figure 35

Always close door of operator's cabin and lock all equipment to prevent any unauthorized person from operating the machine.

The hydraulic system remains pressurized, provided accumulator, is charged even when engine is not running. Accumulator pressure should decrease in a short time (approximately one minute). While hydraulic system maintains a charge, hydraulic work tools and machine controls remain functional.

Machine movement will occur if any controls are moved. This can result in death or serious injury.

Always move hydraulic lockout control to "LOCK" position before stopping off engine or immediately after engine stops running.

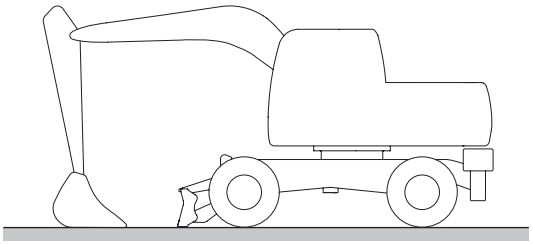


Figure 36

Rubber That Contains Fluorides

Observe extra great care when it is suspected that you may have to handle rubber that contains fluorides.

Certain seals which have to withstand high operating temperatures (e.g. in engines, transmissions, axles, hydraulic motors and pumps) may be made from rubber that contains fluorides, which, when exposed to high heat (fire), forms hydrogen fluoride and hydrofluoric acid. This acid is very corrosive and cannot be rinsed or washed off from the skin. It causes very severe burns which take a long time to heal.

It usually means that damaged tissue must be surgically removed. Several hours may pass after contact with the acid, before any symptoms appear and therefore one is not given any immediate warning. The acid may remain on the machine parts for several years after a fire.

If swelling, redness or a stinging feeling appears and one suspects that cause may be contact with heated rubber that contains fluorides, contact a medical doctor immediately. If a machine, or part of a machine, has been exposed to fire or severe heat, it must be handled by specially trained personnel. In all handling of machines after a fire, thick rubber gloves and protective goggles must be used.

The area around a part which has been very hot and which may be made of rubber that contains fluorides must be decontaminated by thorough and ample washing with limewater (a solution or suspension of calcium hydroxide, i.e. slaked lime in water). After the work has been completed, the gloves must be washed in limewater and then discarded.

Drop-off or Edge

When working at edge of an excavation or near a drop-off, the machine could tip over, which can result in death or serious injury. Always fasten your seat belt. Check ground conditions of work site before operating to prevent the machine from falling or rollover, and to prevent ground, stockpiles, or banks from collapsing.

Do not travel too close to edge of a drop-off.

Poor Visibility

For good visibility, always do the following:

- When working in dark areas, attach working lights and front lights to the machine. If necessary, set up additional lighting at work site.
- Stop operations when visibility is poor, such as in fog, mist, snow, and rain. Wait for visibility to improve before starting operation.

To avoid hitting work equipment and damaging other property, always do the following:

- When working in tunnels, on bridges, under electrical wires, or when parking the machine or performing other operations in places with limited height, be careful not to hit and damage other equipment or property.
- To prevent hitting objects, operate machine at a slow speed when working in confined spaces, indoors, or in crowded areas.
- Do not swing bucket over the top of personnel or over operator's cabin of dump truck.

Loose or Soft Ground

Do not operate on soft ground or near edge of drop-offs, overhangs, and deep ditches. The ground can collapse because of the weight of the machine causing the machine to fall or rollover.

Check ground conditions before beginning work with the machine. If ground is soft, reposition the machine before operating.

The excavated material must not be dumped too close to edge. How far away from edge of trench excavated material must be dumped depends on soil type and moisture content. If loose clay is being excavated, place it at least 5 m (16 ft) away from edge.

If excavated material is dumped too close to edge, its weight can cause a landslide.

Thawing of frozen ground, rain, traffic, piling and blasting are other factors which increase risk of landslide. The risk also increases on sloping ground. If it is not possible to dig a trench and adequately slope its sides, always install shoring equipment.

Loose ground may easily give way under weight of the machine.

Vibration

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

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

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

Recommendations for Reducing Vibrations:

1. Select proper machine, equipment and attachments for a particular application.
2. Replace any damaged seat with a genuine DOOSAN seat. Keep seat properly maintained and adjusted.
    - Adjust seat and suspension for weight and size of operator.
    - Inspect and maintain suspension and adjustment mechanisms for seat regularly.
3. Check that the machine is properly maintained.
4. Operate controls smoothly when; steering, accelerating, slowing down, loading, or moving attachments.
5. Adjust machine speed and travel path to reduce vibration level.
    - Slow down when traveling over rough terrain or long distances.
    - Avoid obstacles and rough terrain.
6. Keep machine on and maintain designated travel path when traveling.
    - Remove any large rocks or obstacles.
    - Fill any ditches and holes.
    - Use other machines to maintain the travel path for the excavator.

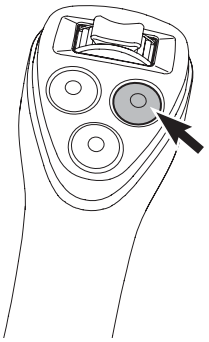
Reference Number	Description
1	Starter Switch
2	Engine Speed Control Dial
3	Quick Coupler Switch (Optional)
4	Auxiliary Mode Switch
5	Smart Power Control Switch
6	Audio Control Panel
7	Ram Lock Switch
8	Light Switch
9	Work Light Switch
10	Intelligent Floating Boom Switch (Optional)
11	Parking Brake Switch
12	Cabin Work Light Switch (Optional)
13	Travel Alarm Selector Switch
14	Heater and Air Conditioner Control Panel
15	Cigarette Lighter
16	Power Socket for 12V
17	Warning Light Switch (Optional)
18	Overload Warning Switch (Optional)
19	Lower Wiper Switch (Optional)
20	Dozer/Outrigger Selector Switch (Independent Optional)
21	Steering Console

Reference Number	Description
22	Horn Button
23	Rotating Switch
24	Breaker/Booster Switch
25	Shear Switch
26	Display Monitor
27	Safety Lever
28	Power Socket for 12V (Optional)
29	Photo Sensor
30	DeSOx Switch
31	One Touch Deceleration Button
32	Intelligent Floating Boom Temporary Reset Button
33	Jog Switch Control Panel
34	Jack Assembly
35	Hour Meter
36	Micro Phone (Optional)
37	Travel Speed Selector Switch
38	Cruise Control Switch
39	FNR Selector Switch
40	Auxiliary Travel Selector Switch
41	Auxiliary FNR Switch
42	Air Compressor Switch (Optional)

22. Horn Button (Left-hand Work Lever)

Press the lower button on the top of the left-hand work lever (joystick) to sound horn.

NOTE: *The starter switch must be "ON".*



EX1403213

Figure 32

23. Rotating Switch

For a machine equipped with an attachment that rotates, move the thumb wheel switch on top of left-hand work lever (joystick) to rotate the attachment.

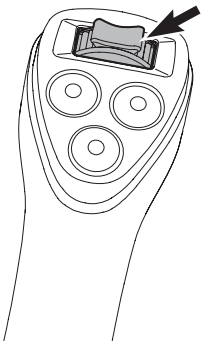
Rotating switch "RIGHT" is for "CLOCKWISE ROTATION".

Rotating switch "LEFT" is for "COUNTERCLOCKWISE ROTATION".

CAUTION

AVOID INJURY

Before using any attachment in a work application, be sure to check its functional control.
Make sure that desired movement or action is being activated by the control, e.g. opening/closing, clockwise/counterclockwise, crowd/dump, etc.



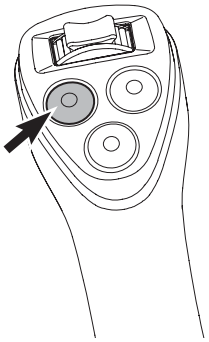
EX1403215

Figure 33

24. Breaker/Booster Button (Right-hand Work Lever)

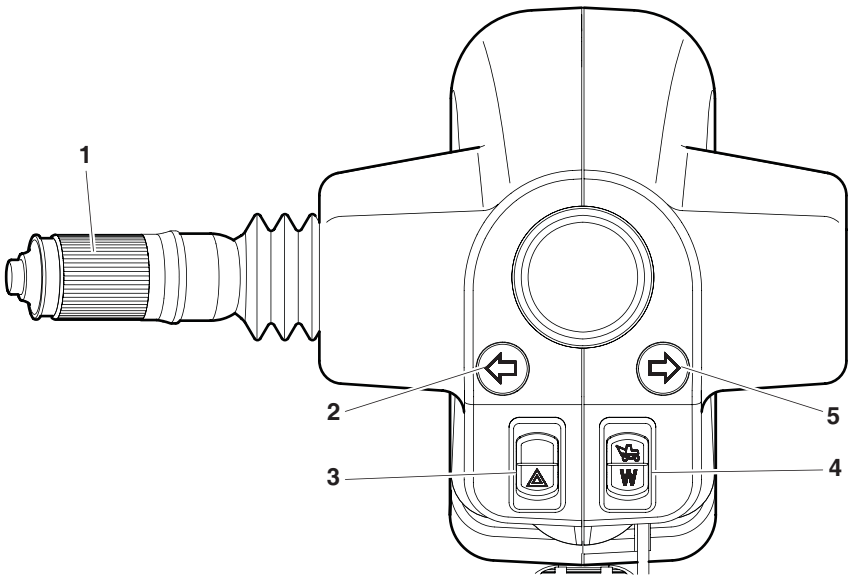
Press the lower button on the top of the right-hand work lever (joystick) to boost the hydraulic pressure. Refer to the “Boost Mode” on page 3-36.

NOTE: *This button works with the breaker/boost/shear selector switch.*



EX1403214

Figure 34



FG022317

Figure 59

Reference Number	Description
1	Combination Switch
2	Left Turn Signal Light and Hazard Warning Light
3	Hazard Warning Light Switch

Reference Number	Description
4	Work/Travel Selector Switch
5	Right Turn Signal Light and Hazard Warning Light

1. Combination Switch (LH)

A. Wiper Switch

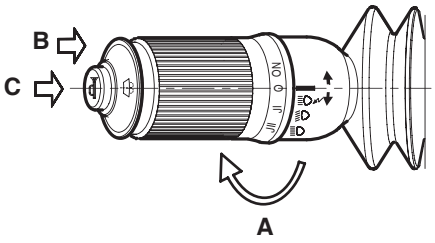
Activates the windshield wiper when the outside area of the lever is rotated.

ON: In this position, windshield wiper runs at a constant speed.

O : In this position, windshield wiper is turned "OFF"

JI : In this position, windshield wiper runs at approximately a three second intermittent cycle.

JII : In this position, windshield wiper runs at approximately a six second intermittent cycle.



FG007018

Figure 60

B. Window Washer Switch

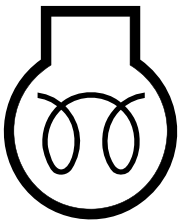
When the outside area of the lever is pressed, it activates the washer pump and sprays fluid onto the windshield. (Only while being pressed.)

NOTE: *Do not operate the windshield washer without any fluid. If operated without any fluid, the washer motor may be damaged. Check level in washer tank, and add fluid as required.*

4. Preheating Indicator Symbol

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.



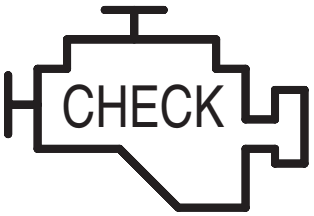
HAAE2000

Figure 85

5. Engine Check Warning Symbol

This symbol indicates when the engine needs to be check.

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

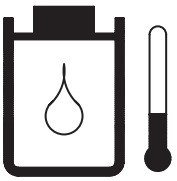


FG000045

Figure 86

6. Hydraulic Oil Overheat Warning Symbol

If the hydraulic oil temperature is too high, this symbol appears on the screen.



FG000056

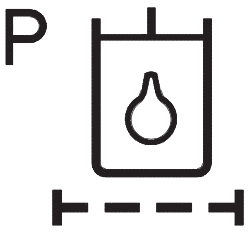
Figure 87

7. Pilot Filter Clogged Warning Symbol

This symbol indicates when the pilot filter clogged.

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

After the pilot filter has been serviced, restart machine operation to remove warning symbol.



FG000055

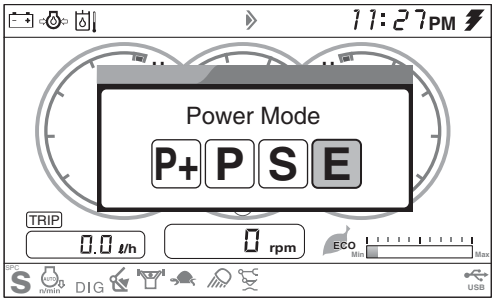
Figure 88

1B. Power Mode Selector Button

When the SPC switch (Figure 111) is pressed again, it turns "OFF" the SPC function, power plus mode, power mode, standard mode, or economy mode can be used.

Pressing power mode selector button will display available modes on main window.

Scroll through selection bar by turning jog switch and select mode by pressing jog switch.



EX1301028

Figure 113

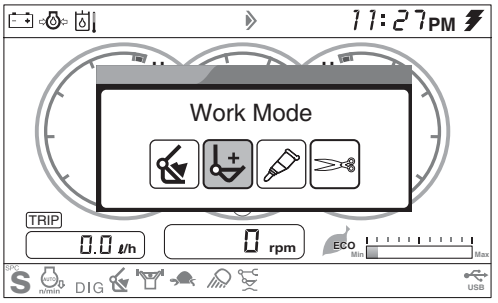
2. Work Mode Selector Button

Used to select the digging, lifting, or attachment mode.

Pressing the "Work Mode" selector button will display the available modes in the main window.

Scroll through selection bar by turning the jog switch and select the mode by pressing the jog switch.

Changing the starter switch from the "O" to "I" position will automatically reset the work mode to "Digging Mode".



EX1301027

Figure 114

3. Auto Idle Selector Button

When the auto idle system is activated, the engine will automatically reduce speed to "IDLE" approximately four seconds after all the control levers are in "NEUTRAL" position. This system is designed to reduce fuel consumption and noise.

When the auto idle selector button is pushed to "ON" position, an auto idle symbol will be displayed on the display monitor.

When the auto idle selector button is pushed again, it is turned "OFF" and the engine speed will return to the setting of the engine speed dial and will remain at this speed despite control lever position, until engine speed dial is moved.

FG018106

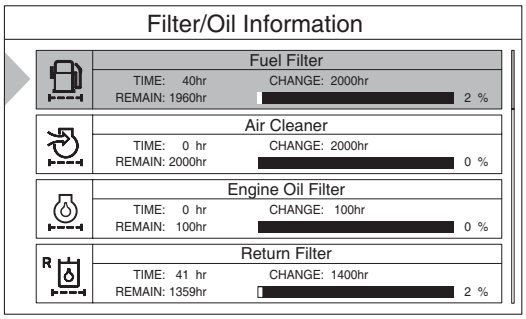
Figure 115

Reset Method/Replacement Period Change Method

Move the cursor over the filter/oil item you wish to change using the jog switch or the ◀ and ▶ buttons on the front of the dashboard and click the jog switch or press the 'Enter' button on the front of the dashboard. A window for resetting/changing the filter/oil time will pop-up.
To reset the use time, move the cursor over 'clear' and click the jog switch or press the 'Enter' button on the front of the dashboard.

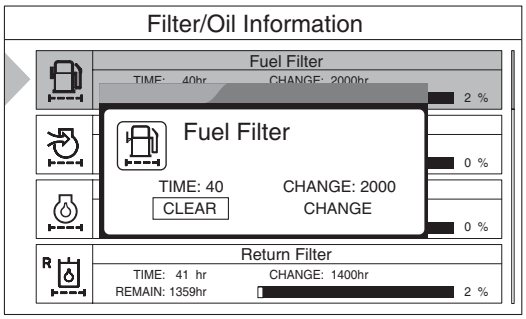
Turn the jog switch to locate it at YES. Then, click on the jog switch to reset the operation hour.

Turn the jog switch to locate it at NO. Then, click on the jog switch to allow the pop-up window to disappear without resetting the operation hour.



EX1301406

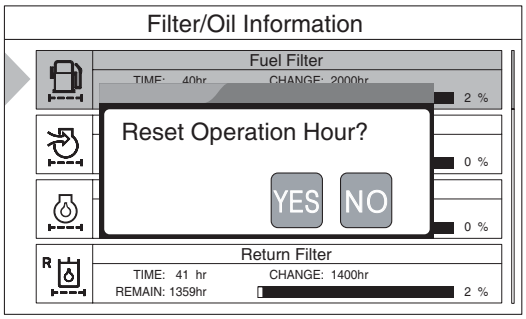
Figure 138



EX1301407

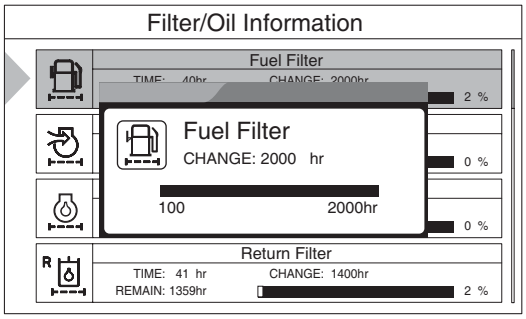
Figure 139

– The filter/oil use time shows the hours of operation after initializing the engine. It begins again with 0 hr after initialization the following the replacement of filter/oil.



EX1301408

Figure 140



EX1301409

Figure 141

Button Type ← Max Pressure ← User Setting Max Flow ← Max Pressure ← User Setting Max Flow

However, when the cursor is on the max pressure, it does not move further.

When turning the jog switch clockwise or pressing the Key 3 (▶), the cursor moves in the follows:

Button Type ← Max Pressure ← User Setting Max Flow ← Max Pressure ← User Setting Max Flow

When the cursor is on the user setting flow, it does not move further.

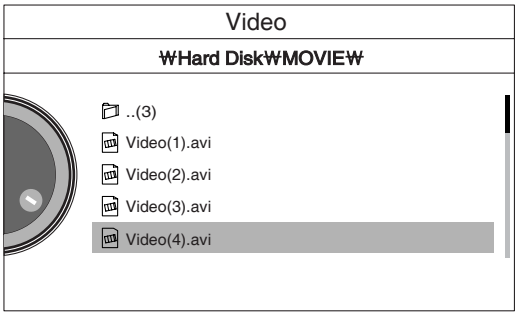
- Breaker Setting

	Max. Limit	Min. Limit
Max. E/G Limit	1,700 rpm	-
Max. Press. (ATT)	280 bar	140 bar

- Two-way Setting

	Max. Limit	Min. Limit
Max. E/G Limit	1,700 rpm	-
Max. Press. (ATT)	340 bar	140 bar

Select and replay a video.

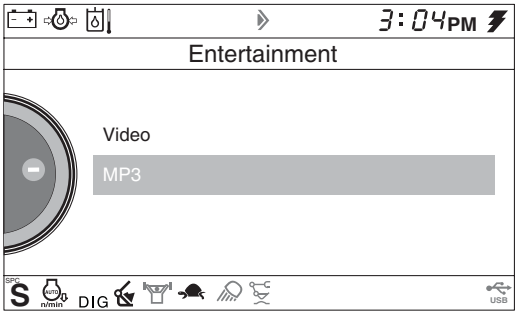


FG018557

Figure 195

B. MP3

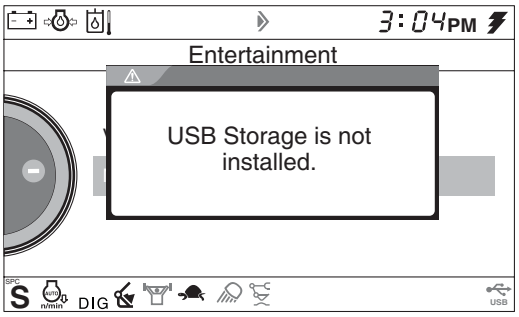
From the entertainment screen, select MP3 to access it.



EX1301053

Figure 196

If there is no USB storage system, a pop-up window is displayed for 3 seconds, saying "USB Storage is not installed". and the MP3 player is not run.

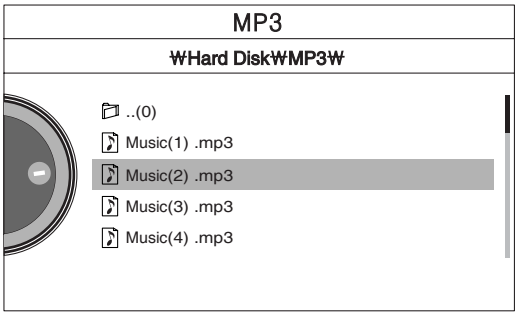


EX1301054

Figure 197

When initially accessing the MP3 player, the file tree screen of USB storage system is displayed. Operate the jog switch clockwise/counterclockwise to select and play an MP3 file.

If there is an MP3 file played last, the file will automatically be played.

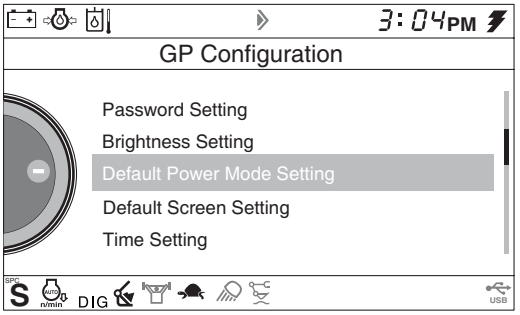


FG018560

Figure 198

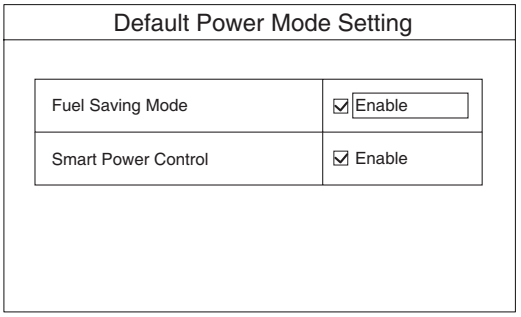
C. Default Power Mode Setting

On the GP configuration screen, when cursor is placed on default power mode setting, click on the jog switch to access the default power mode setting.



EX1402180

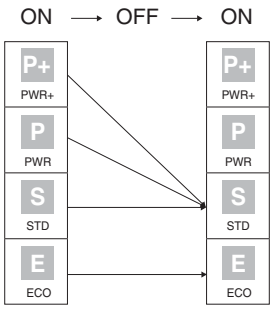
Figure 230



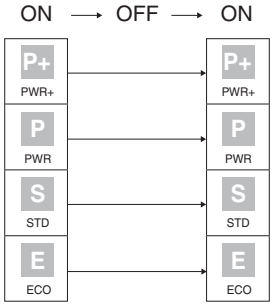
EX1301446

Figure 231

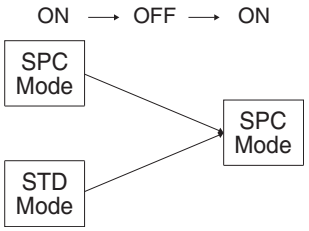
Fuel Saving Mode is Enable



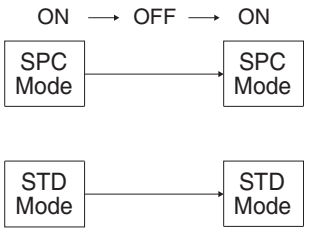
Fuel Saving Mode is Disable



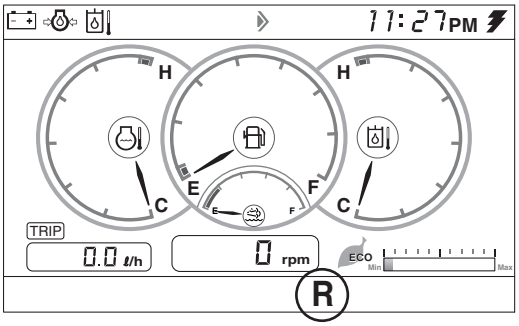
Smart Power Control is Enable



Smart Power Control is Disable



16. Reverse Travel Selection (Wheel Machine Only)



WE1400098

Figure 264

Fuse Boxes

There are two fuse boxes (Figure 291) on the left side of the heater box. The fuses prevent electrical devices from overloading or shorting.

A decal attached inside the fuse box access cover indicates the function and amperage of each fuse.

NOTE: *For a further explanation see “Fuse Boxes” on page 4-101.*

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

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

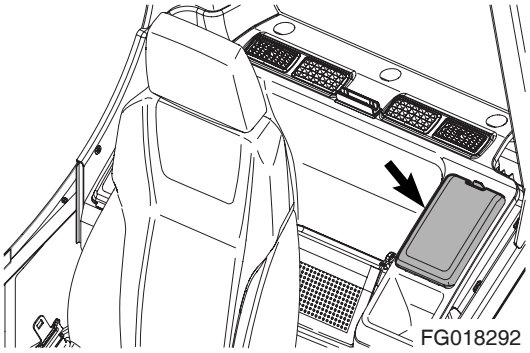


Figure 291

WARNING

AVOID DEATH OR SERIOUS INJURY

Always replace fuses with the same type and capacity fuse that was removed. Improper fuses can cause electrical damage and result in a fire, death or serious injury.

Cabin Storage Compartments

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

The large compartment (1, Figure 311) is for storing nonperishable items.

The covered other one (2, Figure 311) is interconnected with the air conditioner. It can be supplied with either warm or cool air when air conditioner is turned "ON". The small compartment (3, Figure 311) is for storing small items. A net storage bag (4, Figure 311) is added.

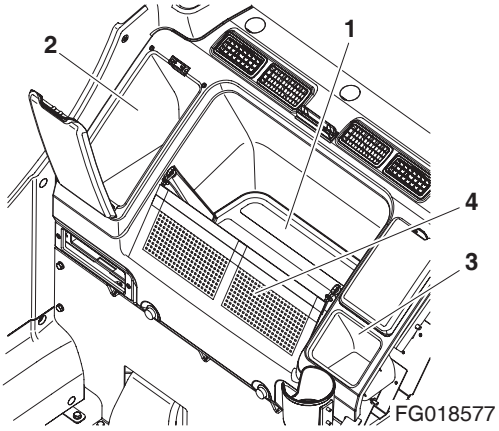


Figure 311

There is a separate small tray on right side (5, Figure 312) of operator's seat.

A document storage case (6, Figure 312) which can store up to A4-size documents is prepared.

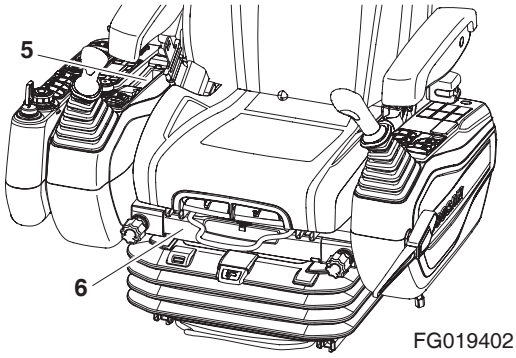


Figure 312

Sunglasses Case

The sunglass storage case (1, Figure 313) is on the center top of the rear wall of the operator cabin.

Keep this case lid closed before and after use.

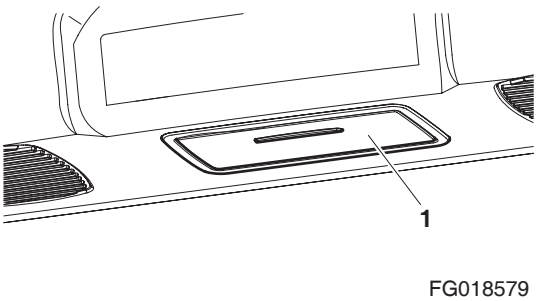


Figure 313

Operation

TO OPERATE A NEW EXCAVATOR

All DOOSAN excavators are inspected before leaving the factory. However, it is required that operator follow these steps during the initial break-in period. Failure to follow these steps can result in damage to the equipment or reduced performance.

Hour	Load
For first 50 hours of operation	Maintain about 80% load of full capacity (Engine rpm: 80% of rated rpm)
After first 50 hours of operation	Full load

If machine is used at full load before it is broken in, it could affect the overall performance and service life of the machine.

NOTE:

1. *Check daily for leakage of coolant, fuel, engine oil and hydraulic oil.*
2. *Inspect all lubricants daily and add appropriate lubricants as required.*
3. *During operation, monitor all instruments and gauges from time to time.*
4. *Avoid an extreme engine load.*
5. *Operate unit at 80% load until engine and all other components are at operating temperatures.*
6. *Check that work equipment is operating normally.*
7. *Check machine for loose parts or for damage that may have occurred during shipping.*
8. *Check for loose wiring or terminals, check gauge operation and battery electrolyte level.*

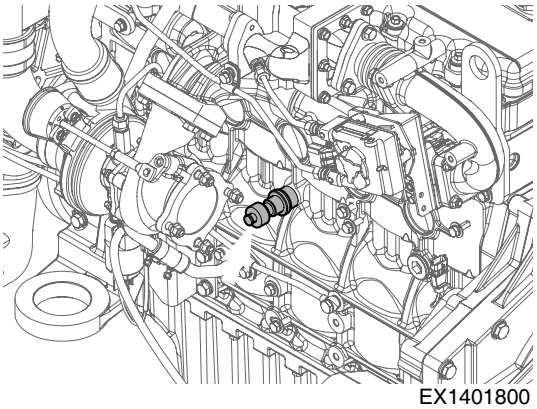
Plug Heater (Optional)

1. Mounting the plug heater

   A. Drain the cooling system.

   B. Remove existing plug. Keep the bolts and lock washers.

   C. Apply teflon tape or thread sealant to heater threads.



EX1401800

Figure 16

IMPORTANT

The element should not touch any cavity walls. Contact with the walls can cause the element to fail during operation.

NOTE: *The plug heater element is formed to fit the water passage without touching the walls.*

   D. Thread the heater into the engine opening and tighten securely.

2. Attaching the cord

   A. Align the cord and element pins on the heater. Press the cord onto the heater using even pressure across the cord cap. Place the clamp around bottom of cord cap and squeeze closed with pliers.

   B. Route the cord to any convenient point and tie cord down to prevent damage and strain. Keep cord away from hot surfaces and moving objects.

3. Testing the plug heater

   A. Refill the coolant system. Run engine until internal thermostat opens and continue running engine for 15 to 20 minutes to eliminate air pockets. Allow engine to cool. Check for leaks and proper coolant level.

CAUTION

AVOID INJURY

Do not connect plug heater to power supply before installation.

Handling the plug heater while connected to a power supply could cause burns.

   B. Connect plug heater to power supply and test for proper operation. The block near the heater should get hot.

NOTE: *Do not test plug heater before installation. This will cause the heater to fail and void the warranty.*

Over the Road Traveling Procedures

1. Make sure that brake oil pressure warning light is "OFF".
2. After making sure that front attachment is facing forward, "RELEASE" the parking brake.
3. Using the right-hand work lever (joystick), select either "FORWARD" or "REVERSE" travel direction and step on the accelerator pedal.

   NOTE: *The accelerator pedal functions in two ways. If the manual engine speed control dial is at the lowest setting, the accelerator pedal controls both engine speed and a hydraulic proportioning valve that controls the actual travel speed. If the manual engine speed control dial has been set to a higher rpm, the accelerator pedal functions only as a hydraulic proportioning valve control, enabling control of only travel speed and not engine rpm.*

4. Test the brakes before beginning over-the-road travel.
5. During forward travel the travel speed selector switch can be turned from low speed range II to high-speed range III.

   NOTE: *Downshifting from speed range III to speed range II should not be done if the machine is traveling at a high rate of speed. Damage to the transmission could result.*

IMPORTANT

Do not change to creep speed during running in low or high-speed. It can cause serious damage to equipment. Only select, creep speed after stopping machine. When normally traveling, drive in low or high-speed.

6. To stop the machine, slowly release the accelerator pedal. The dynamic braking action of the machine's momentum against the engine's back pressure will begin to slow the machine. Step on the brake to bring the machine to a full and controlled stop.

IMPORTANT

If the engine speed is controlled by the engine speed control dial, when the machine comes to a stop, the engine will continue to run at the preset rpm. If the engine speed is being controlled by the accelerator pedal, it will decrease and the machine will slow down as the pedal is released.

DeSOx

Sulfur contained in fuel and oil degrades NOx reduction performance of SCR (Selective Catalytic Reduction) catalyst after combustion. Therefore, to ensure high efficiency for NOx reduction, the temperature of exhaust gas needs to be increased periodically to eliminate sulfur content, and this process is called as DeSOx.

The DeSOx process is automatically performed by the ECU periodically based on the operating time of the machine. If the process is not successfully performed according to the operating condition, the corresponding "Warning Light" comes on.

In this case, park the vehicle in a safe place and perform the DeSOx process manually according to the following procedure. If the process is successfully performed, the warning light goes off.

WARNING

AVOID DEATH OR SERIOUS INJURY

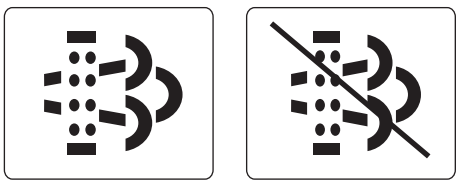
Exhaust gas temperature and exhaust system components are very hot during DeSOx. This can cause a fire or burn hazard and result in death or serious injury or property damage. Keep flammable material and explosive gases away from exhaust system during DeSOx.

WARNING

AVOID DEATH OR SERIOUS INJURY

The engine power can be degraded unless performing the DeSOx process manually after the warning light is turned on.

1. DeSOx light: light turns "ON" when DeSOx is required, or during the DeSOx process. When the operator inhibits DeSOx, the symbol will be displayed as shown in the right-hand view of Figure 51.

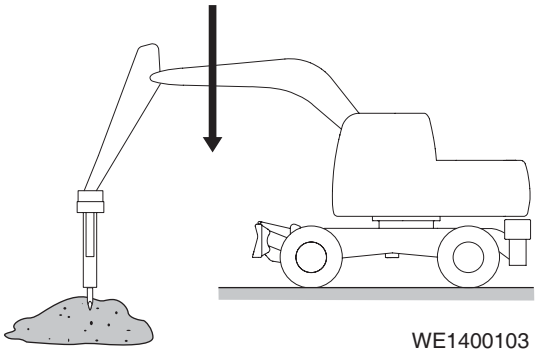


FG018399

Figure 51

Operating a Breaker

The boom can freely move "DOWN". The breaker can be operated with only the weight of the work group on the front without additional force, resulting in less shock and vibration, and extended service life of the breaker. The breaker will remain in constant contact with the object.

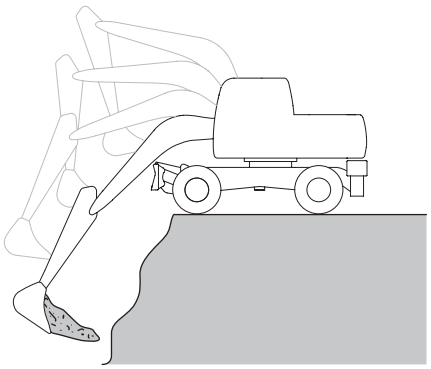


WE1400103

Figure 72

Truck Loading

Boom lowering can be controlled without hydraulic pump flow discharge, increasing productivity and fuel efficiency.



WE1400104

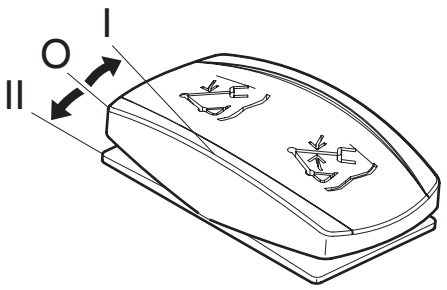
Figure 73

1. Intelligent Floating Boom Mode

   To select the Intelligent Floating Boom mode, set the Intelligent Floating Boom selector switch from "O" (NORMAL MODE) to "I" (INTELLIGENT FLOATING BOOM MODE).

   Moving joystick in boom-down direction after selecting Intelligent Floating Boom mode will lower boom by using its own weight, and the boom will move upwards naturally by external load forces.

   NOTE: *When the Intelligent Floating Boom selector switch is in "O" (NORMAL MODE) position, the Intelligent Floating Boom will not operate.*



FG018272

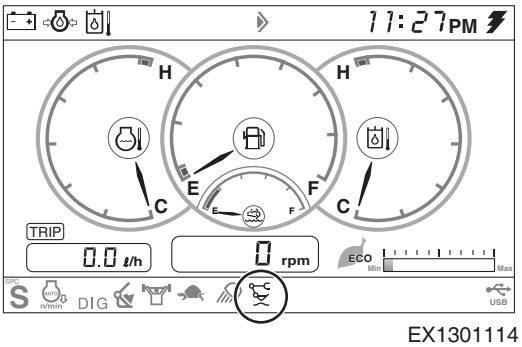
Figure 74

2. Breaker Mode

   To select the breaker mode, set the Intelligent Floating Boom selector switch from "O" (NORMAL MODE) to "II" (BREAKER MODE).
   Moving joystick in boom-down direction, the boom will be lowered by its own weight.

   However, the boom upward movement is not smooth in breaker mode where the operator must move the joystick in boom rising direction.

   NOTE: *When the Intelligent Floating Boom selector switch is in "O" (NORMAL MODE) position, the Intelligent Floating Boom will not operate.*



EX1301114

Figure 75

TOWING PROCEDURE

WARNING

AVOID DEATH OR SERIOUS INJURY

Make sure that towing machine can handle the weight of the machine being towed and that it has adequate braking capacity.

Never use a damaged wire rope or chain. They could break and cause a serious accident.

Always wear gloves when handling a wire rope or chain.

When towing excavator use a wire rope or chain capable of handling the load.

Always have one person in cabin at all times.

IMPORTANT

Parking brake is automatically "APPLIED" when engine is stopped. If engine is operational, "RELEASED" parking brake before towing machine.

If engine will not start, the parking brake will have to be "MANUALLY RELEASED" before towing machine. See “Releasing Parking Brake Manually” on page 3-52.

1. Secure equipment with wheel chocks so equipment will not move.
2. Attach wire rope to equipment and remove slack with towing machine.
3. If engine is operational, "RELEASE" the parking brake.

   NOTE: *Always have one person in cabin at all times.*

   NOTE: *If parking brake will not "RELEASE" when engine is running, parking break will have to be "MANUALLY RELEASED" before towing machine. See “Releasing Parking Brake Manually” on page 3-52.*
4. Remove wheel chocks and tow equipment.

CAUTION

AVOID INJURY

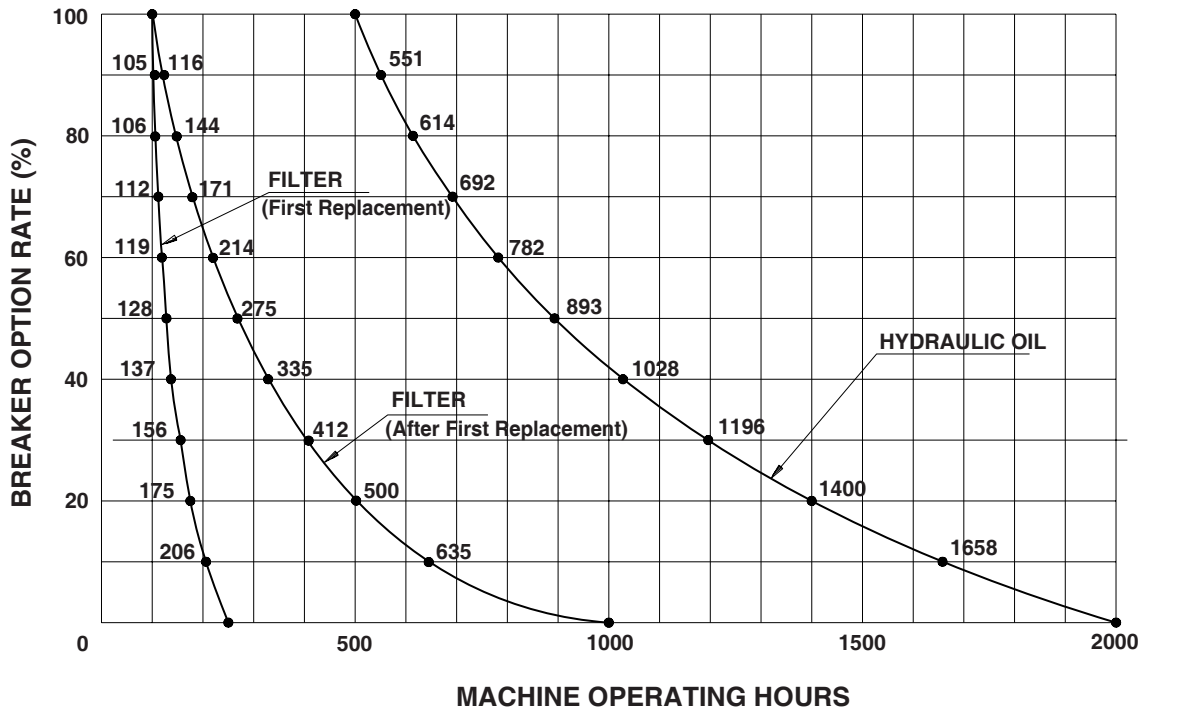
When towing machine, speed must be less than 10 km/h (6.2 MPH). Travel distance must be less than 5 km (3.1 miles). Use trailer if machine is moved over 5 km (3.1 miles).

Always have one person in cabin at all times.

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 genuine DOOSAN hydraulic oil and filter are used. If any other brands are used, the guaranteed change interval must be reduced in half.			



FG000767

Figure 122

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

LIFTING OBJECTS

IMPORTANT

There may be local or government laws or regulations governing the use of excavators for the lifting of heavy loads. Always contact local and government agencies and follow all applicable laws and regulations.

WARNING

AVOID DEATH OR SERIOUS INJURY

To prevent tipping or rollover when handling heavy loads, the ram lock switch must be in the "LOCKED" position.

When this machine is used in object handling applications, the machine must be properly configured and operated properly. Ensure the following safety working devices equipped and operated.

- Lifting eye for load hooking.
- Hose burst protection on both boom and arm.
- Overload warning devices.

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

Short slings will prevent excessive load swing.

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

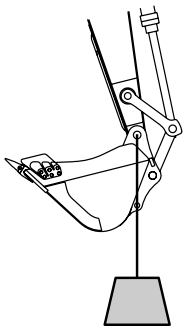
Always try to maintain the lifting eye (Figure 139) straight below the centerline of the arm and bucket pin. In this manner the weight of the load is being primarily held only by the pin, and not by the bucket cylinder, link, and link pins.

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

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

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

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



HAAD3830

Figure 139

3. Open the oil tank cover.
4. Connect an end of hose (2, Figure 146) to screw of poppet (3, Figure 146).
5. Slowly loosen screw of poppet (3, Figure 146) by 4 ~ 5 turns. This allows the hydraulic oil in the boom circuit to drain into the hydraulic tank. The boom will now start to lower.

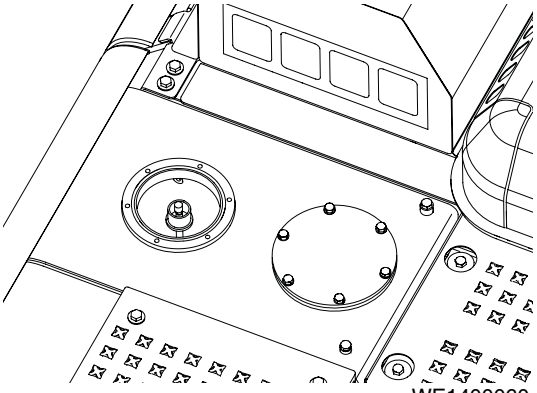

WE1400060

Figure 145

NOTE: *Refer to "Disposal of Hazardous Materials" on page 1-74 for information on containing fluid spillage.*

WARNING

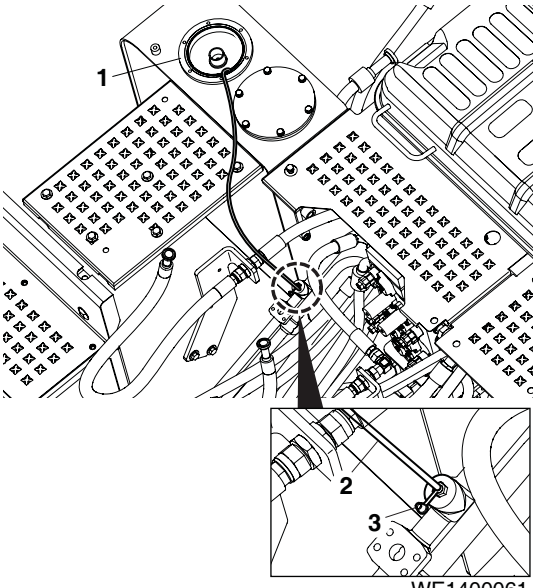
AVOID DEATH OR SERIOUS INJURY

To prevent rapid boom lowering, slowly loosen poppet screw.

6. Make sure that work tool has lowered all the way to the ground. Tighten screw of poppet (3, Figure 146) to a torque of 1.96 N.m (0.2 kg.m, 1.45 ft lb).
7. Disconnect hose (2, Figure 146) from screw of poppet (3, Figure 146). Do not allow the oil that is contained in hose (2, Figure 146) to spill.
8. Connect hose (2, Figure 146) to the original position on the hydraulic tank and install the oil tank cover (1, Figure 146).

After completion of the manual boom lowering, make necessary repairs before you operate the machine again.

NOTE: *For additional information, contact your DOOSAN distributor.*



WE1400061

Figure 146

MAINTENANCE HANDLING ACCESS

Entering/Leaving/Climbing On Machine

WARNING

AVOID DEATH OR SERIOUS INJURY

Do not jump ON/OFF a machine. Never get ON/OFF when the machine is running.

Never grasp control lever to get ON/OFF.

Use handholds and steps when entering, leaving or climbing the machine.

Use three-point grip, i.e. two hands and one foot or two feet and one hand.

Always face machine.

Always wipe mud and oil off all footboards, handrails and your footwear, especially when cleaning windows, rearview mirrors and lights.

Clean your boots and wipe your hands before getting on the machine. Always wear proper footgear.

Do not use hand grip (A, Figure 6) of cabin door as a support when entering, leaving or climbing on the machine. It is not strong enough to be used as a support. It should only be used for closing the door.

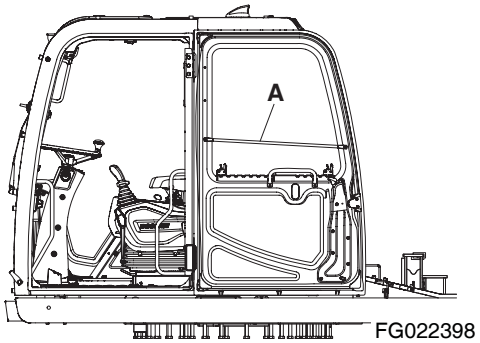


Figure 6

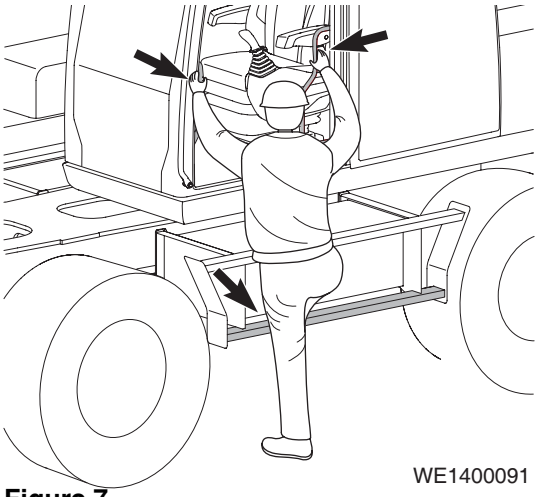


Figure 7

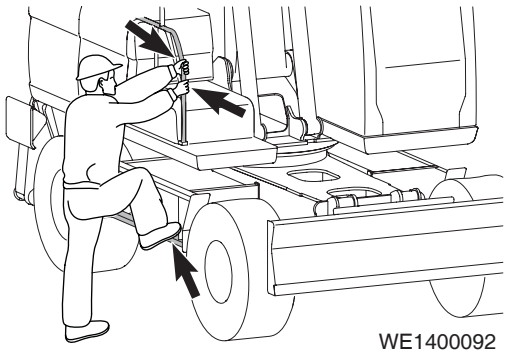


Figure 8

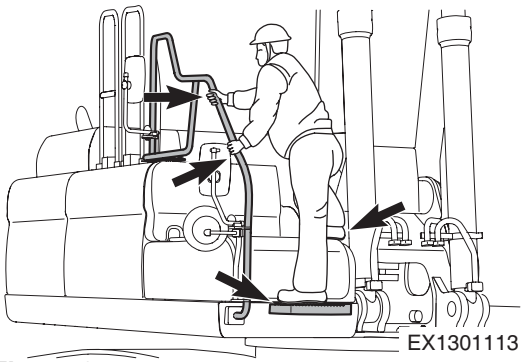
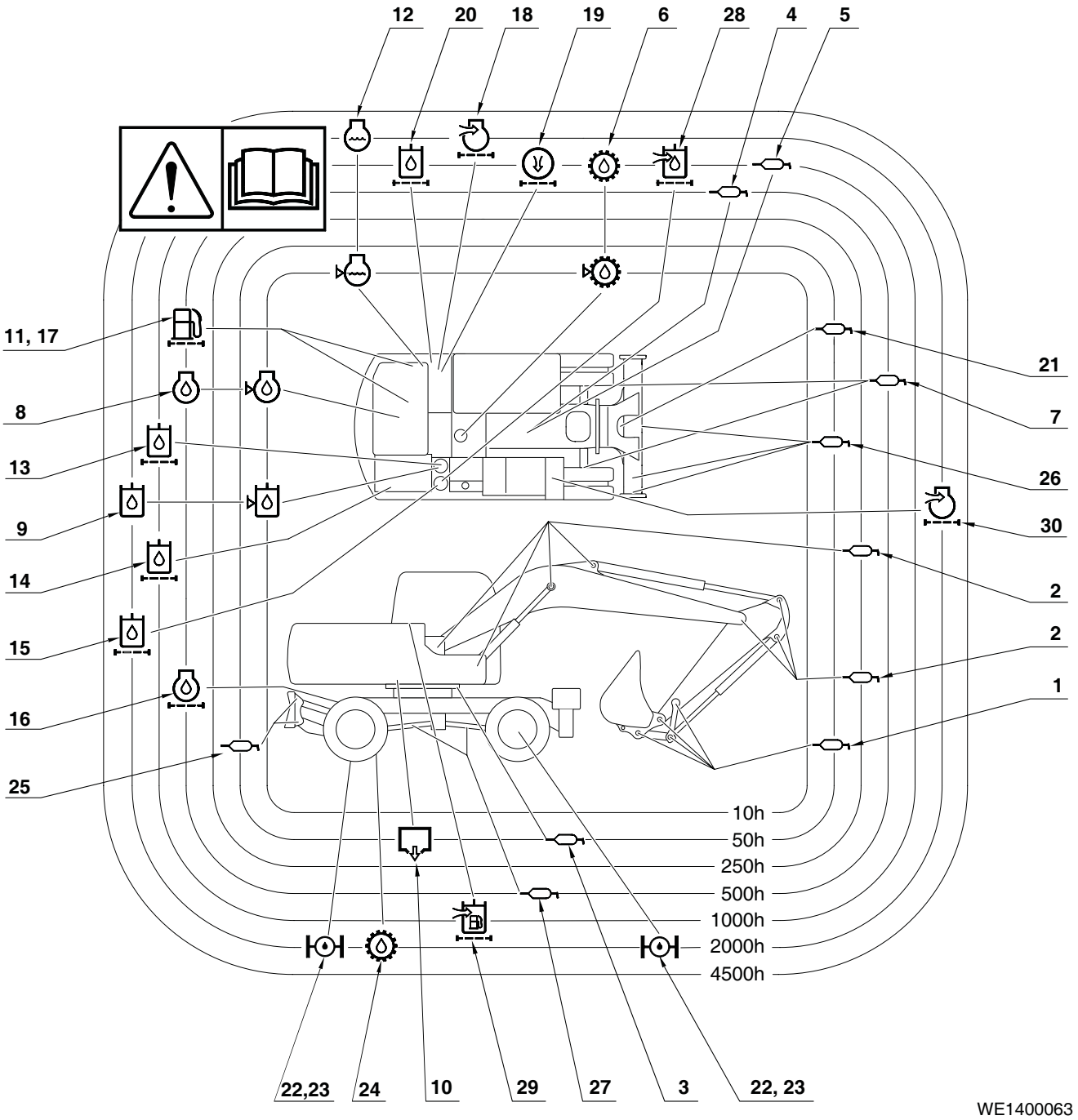


Figure 9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WE1400063

Figure 11

10 HOUR / DAILY SERVICE

Inspect All Tires for Correct Tire Pressure and Signs of Damage or Abnormal Wear

1. Inflate tires to proper operating pressure for working conditions. See “Tire Changing Procedure” on page 4-112.

Grease Dozer Blade Pins (For First 100 Hours)

1. Grease every 10 hours for first 100 hours and every 50 hours thereafter. (See page 4-43)

   NOTE: *If the unit has been running or working in water the blade must be greased daily or every 10 hours.*

Grease Outrigger Pins (For First 100 Hours)

1. Grease every 10 hours for first 100 hours and every 50 hours thereafter. (See page 4-43)

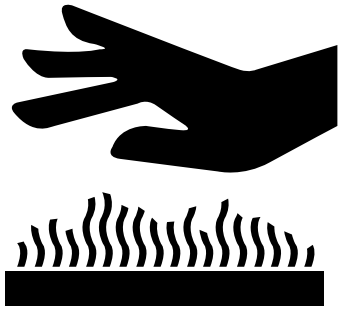
   NOTE: *If the unit has been running or working in water the outriggers must be greased daily or every 10 hours.*

Grease Boom, Arm and Front Attachment Pins (for first 100 hours)

Grease every 10 hours for first 100 hours and every 50 or 250 hours thereafter (See page 4-41).

NOTE: *If the unit has been running or working in water, the front attachment must be greased daily or every 10 hours.*

Check Air Intake System and Emission Control System Components



HAOA050L

Figure 33

WARNING

AVOID DEATH OR SERIOUS INJURY

Hot engine components can cause burns.

Avoid contact with hot engine components

1. Park the machine on a firm and level surface, lower the attachment to the ground, move safety lever to "LOCK" position, and stop engine.
2. Check the engine intake hose and hose bands for damage and tightness.
3. Check the exhaust pipe and dosing unit for regeneration, and V-clamp dosing unit gasket for damage and tightness.
4. If damaged, wrinkled, or loose, replace or retighten or contact your nearest DOOSAN distributor.

IMPORTANT

Severe engine damage will result from running with unfiltered air.

Do not operate engine if any leaks or damage are found on air intake system.

Inspect Seat Belt for Proper Operation

See “Seat Belt” on page 1-35 for further information.

Inspect Rear View Camera Proper Operation (If Equipped)

WARNING

AVOID DEATH OR SERIOUS INJURY

When access to the rear view camera, use external ladder or platform to prevent slipping and falling. The counterweight and engine hood is not an appropriate maintenance platforms.

A. Boom cylinder head pin (2 points)

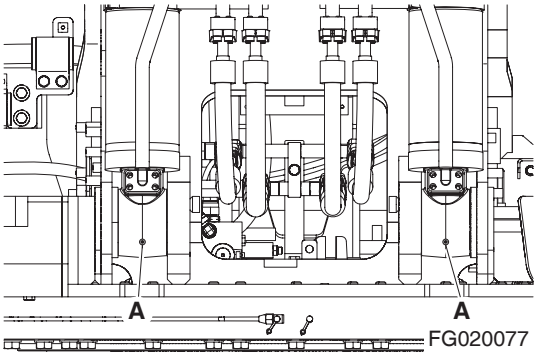


Figure 46

B. Boom foot pin (2 points)

C. Boom cylinder rod pin (2 points)

D. Arm cylinder head pin (1 point)

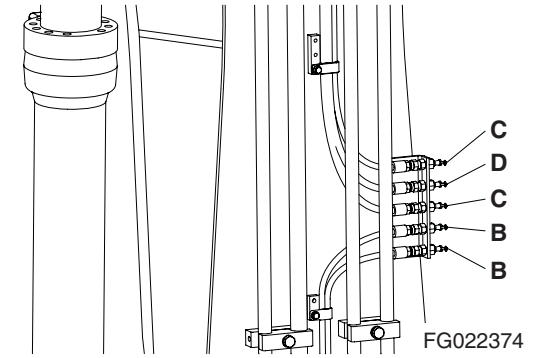


Figure 47

E. Boom arm joint pin (2 points)

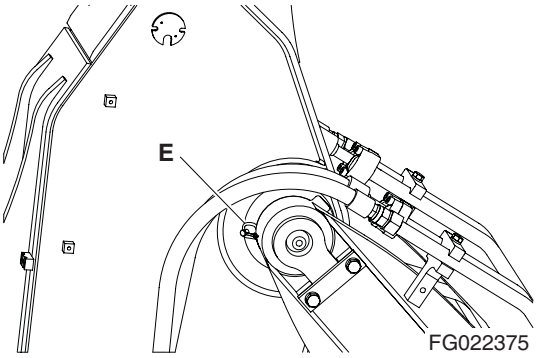


Figure 48

F. Arm cylinder rod pin (1 point)

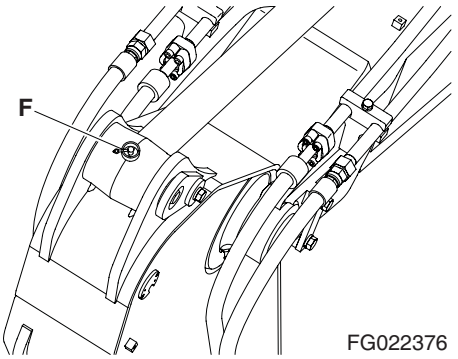


Figure 49

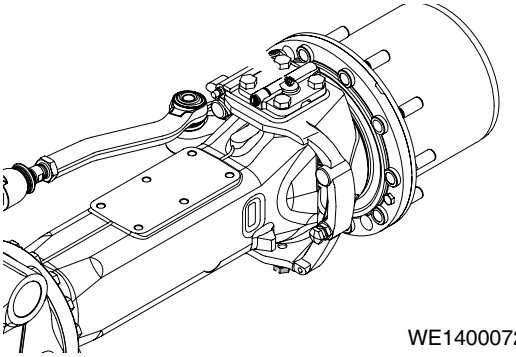
Grease Front Axle Steering Knuckle

NOTE: *If the unit has been running or working in water the front attachment must be greased 3 months or every 500 hours.*

1. Press the grease fitting and inject grease with the grease gun on the marked point.

   NOTE: *There is an upper and lower grease fitting on each end of the front axle.*

2. After greasing, clean off the old grease that has been purged.



WE1400072

Figure 71

Clean Outer Filter of Air Cleaner

NOTE: *Clean outer filter every 500 hours/3 months of service.*

NOTE: *If air cleaner clogged warning symbol (Figure 72) on display monitor comes "ON", the air cleaner must be serviced.*

NOTE: *When working in very dusty conditions, the service interval must be shortened.*

WARNING

AVOID DEATH OR SERIOUS INJURY

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

If using compressed air to clean the filter, make sure that proper eye protection is worn.

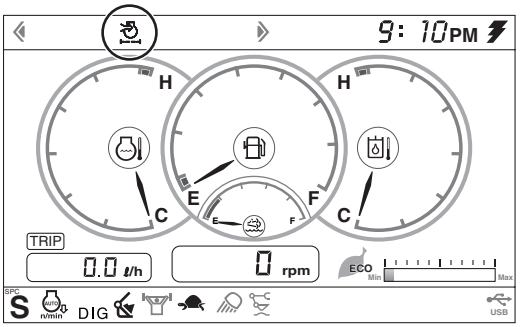
1. Locate the air cleaner assembly.

   NOTE: *When it reaches every 500 hours or If indicator symbol (Figure 72) on display monitor comes "ON" the air cleaner must be serviced.*

   NOTE: *Replace outer filter after cleaning 5 times or every 2,000 hours/1 year of service.*

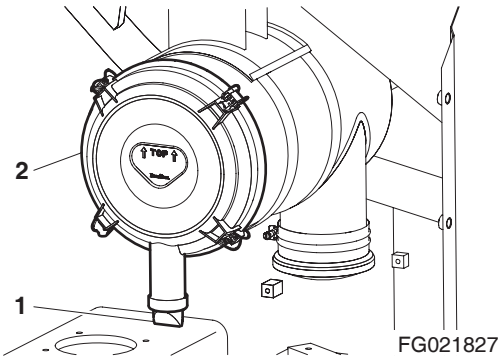
2. Remove and clean rubber evacuator valve (1, Figure 73) from bottom of air cleaner housing cover (2). Inspect seal lips for wear or damage. Replace valve if necessary.

   NOTE: *Install evacuator valve with lips parallel to the cover.*



EX1301105

Figure 72

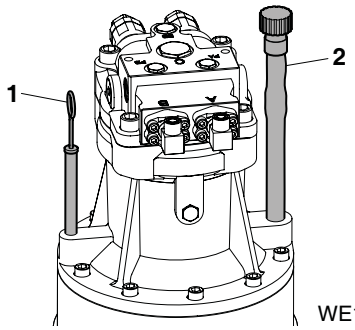


FG021827

Figure 73

Change Swing Reduction Device Oil

NOTE: *Change swing reduction device oil after first 500 hours of operation or rebuild, and every 1,000 hours thereafter.*



WE1400068

Figure 95

WARNING

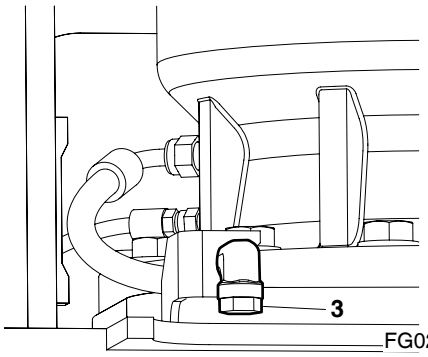
AVOID DEATH OR SERIOUS INJURY

The gear oil is very hot after the machine has been operating. Shut all systems down and allow them to cool.

1. Set a container under excavator.
2. Release the drain plug (3, Figure 96) and drain the swing reduction device oil into a container.

   NOTE: *Dispose of drained fluids in compliance with all applicable environmental laws and regulations.*

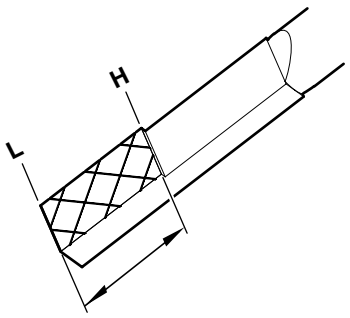
3. After draining oil, tighten the drain plug.



FG021811

Figure 96

4. Remove breather/fill cap (2, Figure 95) and add oil to "H" mark on dipstick (1).



FG000419

Figure 97

3. Remove coolant drain plug (2, Figure 119) from engine.
4. Install drain plug, and close drain valve after coolant has completely drained from system.
5. Fill cooling system with a flushing solution.
6. Run engine at "LOW IDLE" until coolant temperature gauge reaches the "WHITE ZONE". Run engine for another ten minutes.
7. Allow engine to cool.
8. Drain flushing fluid and fill system with water.
9. Run engine again to allow water to completely circulate.
10. After allowing engine to cool, drain water and fill system with proper antifreeze solution for ambient temperature. Refer to coolant concentration table. See “Antifreeze Concentration Tables” on page 4-105.
11. Run engine without radiator cap installed, so all air will be purged from system. Fill radiator to fill neck.
12. Drain and fill radiator coolant recovery tank.

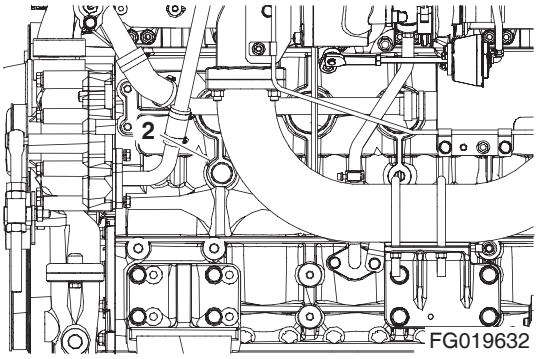


Figure 119

Change Air Compressor Filter (Optional)

1. Park machine on firm and level ground. Lower the front attachment to the ground and stop engine.
2. Open the door of the battery box on the right side of the machine.
3. Remove filter cap manually, remove air filter (1, Figure 121) in the housing, and clean the cap and inside of the housing.
4. Replace the air filter (2, Figure 120), and assemble the filter cap (1, Figure 121).

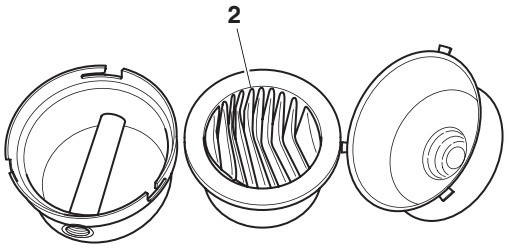


Figure 120

WARNING

AVOID DEATH OR SERIOUS INJURY

Do not try to clean or replace the filter while the air compressor is running.

Wear safety goggles to protect your eyes from flying dust when cleaning or replacing the filter.

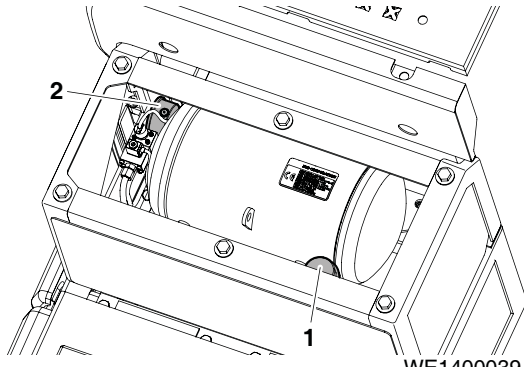


Figure 121

12,000 HOUR / 6 YEAR SERVICE

Hose In-service Lifetime Limit (European Standard ISO 8331 and EN982 CEN)

European regulations state that in-service life of any hydraulic hose may not exceed six years. DOOSAN recommends the following:

- Hoses at the customer premises cannot be stored more than 2 years before being discarded or installed on a machine.
- In-service lifetime of hoses fitted on a machine can never exceed 6 years, but replace hoses described in “Major Parts - Periodic Replacement” on page 4-83, every 2 years. Always replace hoses having exceeded the allowed in-service lifetime irrespective of the external appearance/ wear.
- Always store hoses in a dark place at a maximum of 65% relative humidity, between 0°C (32°F) and 35°C (95°F) but as close as possible to 15°C (59°F) and away from copper, manganese or tube generating Ozone.

BUCKET

Bucket Tooth Replacement

WARNING

AVOID DEATH OR SERIOUS INJURY

Due to the possibility of flying metal objects and to avoid death or serious injury, always wear safety helmet, protective gloves and eye protection when changing bucket teeth.

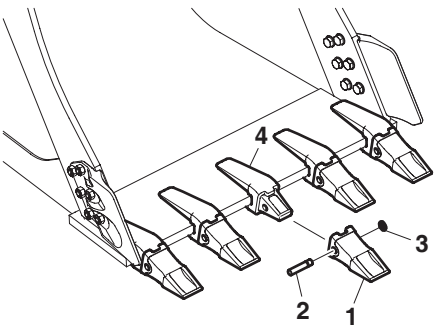
Curl the bucket upwards and place the round rear surface of the bucket firmly on the ground. Stop engine and lock out the hydraulic controls before working on the bucket.

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

HAOC680L

Figure 169

1. On a routine basis, inspect bucket teeth to make sure that tooth wear or breakage has not developed. Do not allow replaceable bucket teeth to wear down to a point that bucket adapter is exposed. See Figure 169.
2. To replace a tooth (1, Figure 170), use a hammer and punch to drive locking pin (2) and lock washer (3) out of tooth adapter (4).
3. Once worn tooth has been removed, use a putty knife to scrape adapter as clean as possible.
4. Slide new tooth into position and insert lock washer.
5. Insert locking pin into tooth and use a hammer, to drive pin in until lock washer seats in locking groove.



FG018361

Figure 170

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.

WARNING

AVOID DEATH OR SERIOUS INJURY

If there is any sign of leakage while operating transfer pump, inspect the following components to prevent fire or hazardous fuel spill:

- **Check all hoses leading to and from the transfer pump.**
- **Check all hose clamps.**
- **Check transfer pump inlet port.**

Swing Motor

IMPORTANT

If the air is not vented from the system, it will cause damage to the swing motor and bearings.

NOTE: *Perform this only when oil has been drained from swing motor.*

1. Stop engine.
2. Disconnect drain hose and fill swing motor case with hydraulic oil.
3. Connect the drain hose.
4. Start engine and set throttle at "LOW IDLE" and swing upper structure slowly two full revolutions to the left and right.

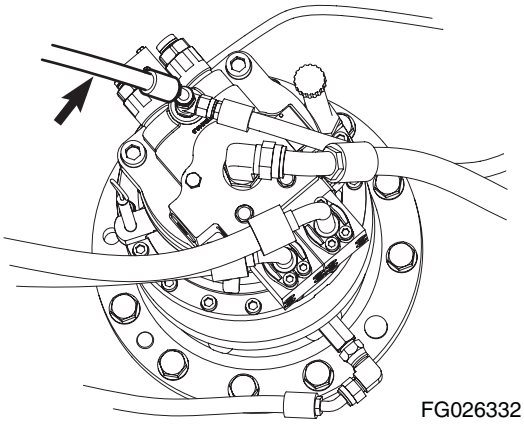


Figure 203

Transmission

IMPORTANT

Use a transparent vinyl hose for air ejection.

1. Run the engine at low rpm.
2. Shift the driving speed switch to the 3rd gear of high-speed.
3. Open bleeders A and B for about 20 seconds at the same time.
4. Close both bleeders.
5. Shift the driving speed switch to the 2nd gear of low speed.
6. Open bleeder B for about 20 seconds.
   Do not open bleeder C.
7. Close bleeder B.
8. Repeat steps 2 through 7 until hydraulic oil contains no bubble which means that air is ejected completely. If hydraulic still contains bubbles, repeat steps 2 through 7.

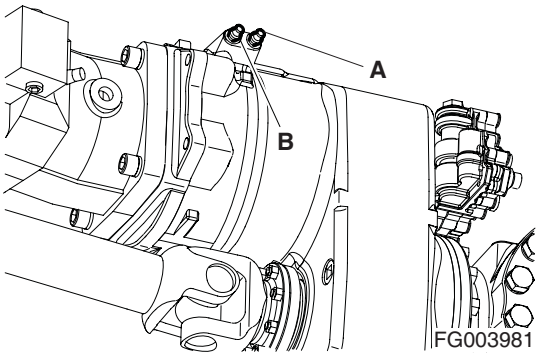


Figure 204

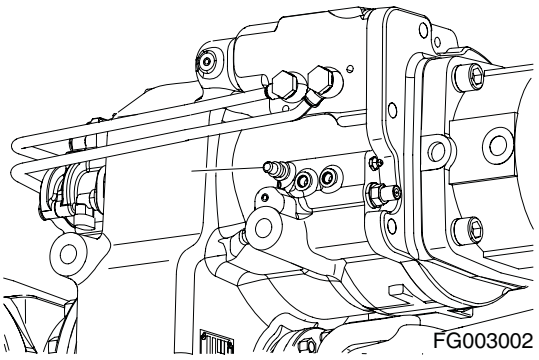


Figure 205

13. Turn battery disconnect switch to "OFF" position (Figure 13).
14. Lock all doors and access covers.
15. Adjust direction of rotating beacon and TMS antenna.

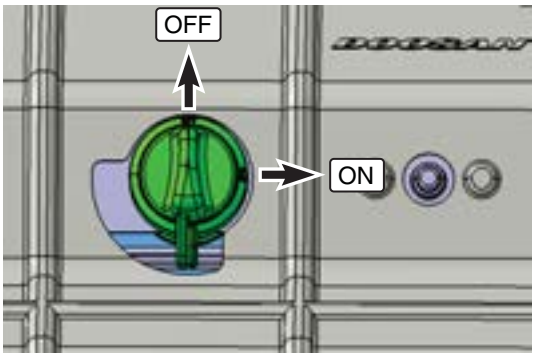


Figure 13 EX1401760

16. Before transporting the excavator, make sure that swing lock pin has been fully engaged. This will prevent the upper structure from accidentally rotating during transportation.
17. Make sure to secure the excavator onto the trailer before transporting. Use chains or cable tie-downs as required by local transportation laws. Use the wheel chocks supplied with the machine to secure machine.
18. Refer to the Dimensions for Transportation table for overall machine height and width dimensions. (See “Overall Dimensions” on page 7-3.) Make sure to position the excavator as shown. If not transported in this position, the height measurements may be different.

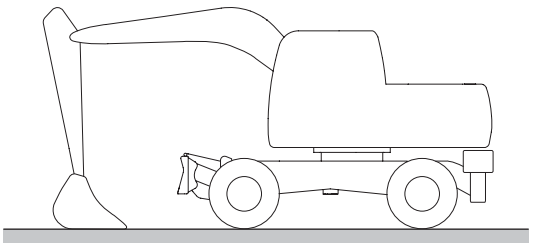


Figure 14 WE1400141

COOLING FAN

Problem	Cause	Correction
Cooling fan always runs at maximum speed.	Fan clutch harness is not connected.	Reconnect the connector.
	Fan clutch harness damaged.	Replace as required.
Fan speed is oscillating or lower than minimum speed.	Fan clutch damaged.	Replace as required.

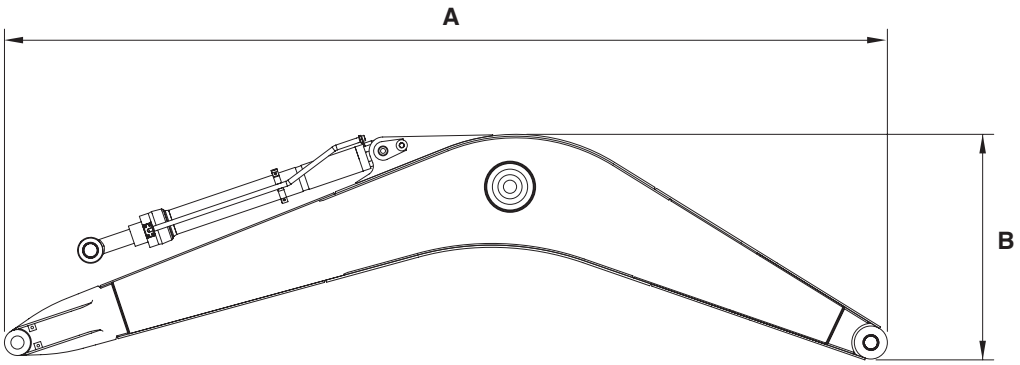
LUBRICATION SYSTEM

Problem	Cause	Correction
Oil consumption excessive.	Poor oil.	Use suggested oil.
	Oil seal or packing leaky.	Replace.
	Pistons or piston rings worn.	Replace pistons and/or piston rings.
	Cylinder liner worn.	Replace cylinder liner.
	Piston rings sticking.	Replace pistons and/or piston rings.
	Valve guide oil seals or valve guides, or valve stem worn.	Replace.
Oil pressure too low.	Poor oil.	Use suggested oil.
	Relief valve sticking.	Replace.
	Restrictions in oil pump strainer.	Clean strainer.
	Oil pump gear worn.	Replace.
	Oil pump feed pipe cracked.	Replace.
	Oil pump defective.	Correct or replace.
	Oil pressure gauge defective.	Correct or replace.
	Various bearings worn.	Replace.
Oil deteriorates quickly.	Restriction in oil filter.	Replace filter.
	Gases leaking.	Replace piston rings and cylinder liner.
	Poor oil.	Use suggested oil.

DISASSEMBLED PARTS, DIMENSION AND WEIGHT

Components

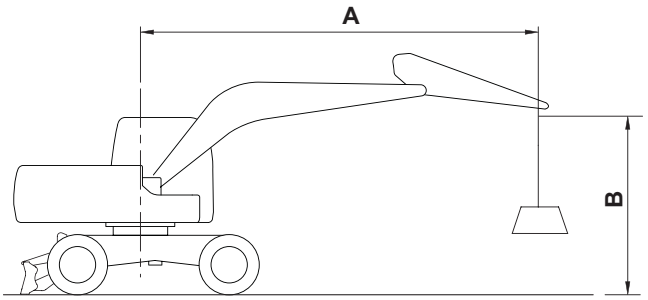
Boom



FG023276

Figure 3

Description		5.1 m (16' 9") STD Boom	5.2 m (17" 1") ARTICULATED Boom
Length (A)	mm (ft-in)	5,289 (17' 4")	5,389 (17' 8")
Length (B)		1,300 (4' 3")	1,165 (3' 10")
Width		523 (1' 9")	523 (1' 9")
Weight	kg	1,170	1,680
	lb	2,570	3,690



Boom (One-Piece) : 5.1 m (16' 9")
Arm : 2.5 m (8' 2")
Bucket : Without Bucket
Counterweight : 3,220 kg (7,099 lb)
: Rating Over Front
: Rating Over Side or 360 degree
Unit : 1,000 kg (1,000 lb)

Figure 11

WE1400145

METRIC

1,000 kg

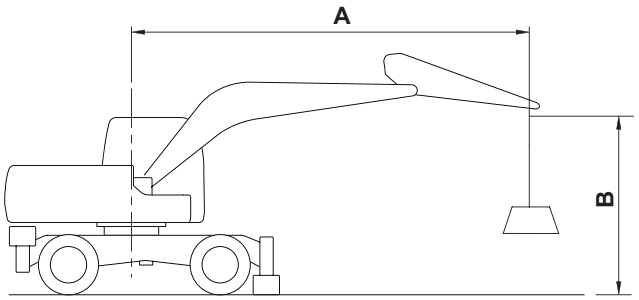
A (m) / B (m)	3		4.5		6		7.5		MAX. REACH		
											A (m)
7.5									* 2.84	* 2.84	4.83
6					* 3.37	3.05			* 2.46	* 2.46	6.22
4.5			* 5.97	4.70	* 5.19	3.00			* 2.34	2.31	7.02
3			* 7.09	4.39	* 5.61	2.88			* 2.36	2.06	7.43
1.5			* 8.07	4.09	* 6.02	2.74	* 2.74	1.99	* 2.50	1.98	7.53
0	* 6.94	* 6.94	* 8.33	3.92	5.92	2.65			* 2.79	2.03	7.32
-1.5	* 10.84	7.15	* 7.77	3.88	* 5.68	2.62			* 3.37	2.25	6.77
-3	* 8.45	7.31	* 6.22	3.95					* 4.27	2.83	5.79

FEET

1,000 lb

A (ft) / B (ft)	10		15		20		MAX. REACH		
									A (ft)
25			* 7.29	* 7.29			* 6.37	* 6.37	15.36
20					* 5.99	* 5.99	* 5.45	* 5.45	20.16
15			* 12.95	10.14	* 11.03	6.47	* 5.17	5.14	22.92
10			* 15.33	9.48	* 12.19	6.21	* 5.20	4.56	24.36
5			* 17.46	8.83	12.99	5.92	* 5.50	4.36	24.70
0	* 15.93	15.27	* 18.06	8.45	12.73	5.72	* 6.16	4.47	24.00
-5	* 23.57	15.36	* 16.82	8.36	* 12.23	5.67	* 7.45	4.98	22.18
-10	* 18.23	15.71	* 13.34	8.52			* 9.36	6.32	18.86

1. Load point is the end of the arm.
2. Capacities marked with an asterisk (*) are limited by hydraulic capacities.
3. Lift capacities shown do not exceed 75% of minimum tipping loads or 87% of hydraulic capacities.
4. The least stable position is over the side.
5. The total weight of machine is 15,900 kg (35,054 lb). Included are the; boom 5.1 m (16' 9"), arm 2.5 m (8' 2"), 3,220 kg (7,099 lb) counterweight, all operating fluids and a 75 kg (165 lb) operator.
6. Lift capacities are in compliance with ISO 10567.



Boom (One-Piece) : 5.1 m (16' 9")
Arm : 3.0 m (9' 10")
Bucket : Without Bucket
Counterweight : 3,220 kg (7,099 lb)
: Rating Over Front
: Rating Over Side or 360 degree
Unit : 1,000 kg (1,000 lb)

Figure 21

WE1400156

METRIC

1,000 kg

A (m) / B (m)	1.5		3		4.5		6		7.5		MAX. REACH		
													A (m)
7.5											* 2.64	* 2.64	5.46
6							* 3.77	* 3.77			* 2.36	* 2.36	6.71
4.5							* 4.67	* 4.67			* 2.29	* 2.29	7.45
3					* 6.60	* 6.60	* 5.32	5.18	* 3.61	* 3.61	* 2.33	* 2.33	7.85
1.5					* 7.74	* 7.74	* 5.83	5.00	* 4.36	3.58	* 2.48	* 2.48	7.94
0			* 7.80	* 7.80	* 8.27	7.57	* 6.08	4.87	* 4.18	3.53	* 2.77	* 2.77	7.74
-1.5	* 6.32	* 6.32	* 10.88	* 10.88	* 7.99	7.47	* 5.87	4.81			* 3.31	* 3.31	7.22
-3	* 10.01	* 10.01	* 9.53	* 9.53	* 6.83	* 6.83	* 4.79	* 4.79			* 4.30	* 4.30	6.32

FEET

1,000 lb

A (m) / B (m)	5		10		15		20		25		MAX. REACH		
													A (m)
25											* 5.89	* 5.89	17.47
20							* 7.91	* 7.91			* 5.24	* 5.24	21.79
15							* 10.06	* 10.06			* 5.05	* 5.05	24.38
10			* 20.68	* 20.68	* 14.28	* 14.28	* 11.57	11.15	* 7.08	* 7.08	* 5.13	* 5.13	25.72
5					* 16.76	* 16.76	* 12.65	10.78	* 8.65	7.71	* 5.45	* 5.45	26.05
0			* 17.86	* 17.86	* 17.93	16.27	* 13.19	10.49	* 7.76	7.60	* 6.10	* 6.10	25.39
-5	* 14.12	* 14.12	* 24.74	* 24.74	* 17.32	16.05	* 12.67	10.36			* 7.33	* 7.33	23.66
-10	* 22.48	* 22.48	* 20.60	* 20.60	* 14.69	* 14.69	* 10.13	* 10.13			* 9.46	* 9.46	20.59

1. Load point is the end of the arm.
2. Capacities marked with an asterisk (*) are limited by hydraulic capacities.
3. Lift capacities shown do not exceed 75% of minimum tipping loads or 87% of hydraulic capacities.
4. The least stable position is over the side.
5. The total weight of machine is 17,200 kg (37,920 lb). Included are the; boom 5.1 m (16' 9"), arm 3.0 m (9' 10"), 3,220 kg (7,099 lb) counterweight, all operating fluids and a 75 kg (165 lb) operator.
6. Lift capacities are in compliance with ISO 10567.

Material	Density 1,200 kg/m^3 (2,000 lb/yd^3), or less	Density 1,500 kg/m^3 (2,500 lb/yd^3), or less	Density 1,800 kg/m^3 (3,000 lb/yd^3), or less	Density 2,100 kg/m^3 (3,500 lb/yd^3), or less
Gypsum, crushed to 3 inch size	-	-	1,522 kg/m^3 (2,565 lb/yd^3)	-
Gravel, DRY, packed fragments	-	-	-	1,810 kg/m^3 (3,051 lb/yd^3)
Gravel, WET, packed fragments	-	-	-	1,922 kg/m^3 (3,240 lb/yd^3)
Limestone, graded above 2	-	1,282 kg/m^3 (2,160 lb/yd^3)	-	-
Limestone, graded 1-1/2 or 2	-	1,362 kg/m^3 (2,295 lb/yd^3)	-	-
Limestone, crushed	-	-	1,522 kg/m^3 (2,565 lb/yd^3)	-
Limestone, fine	-	-	1,602 kg/m^3 (2,705 lb/yd^3)	-
Phosphate, rock	-	1,282 kg/m^3 (2,160 lb/yd^3)	-	-
Salt	929 kg/m^3 (1,566 lb/yd^3)	-	-	-
Snow, light density	529 kg/m^3 (891 lb/yd^3)	-	-	-
Sand, DRY, loose	-	-	1,522 kg/m^3 (2,565 lb/yd^3)	-
Sand, WET, packed	-	-	-	1,922 kg/m^3 (3,240 lb/yd^3)
Shale, broken	-	1,362 kg/m^3 (2,295 lb/yd^3)	-	-
Sulfur, broken	529 kg/m^3 (891 lb/yd^3)	-	-	-