



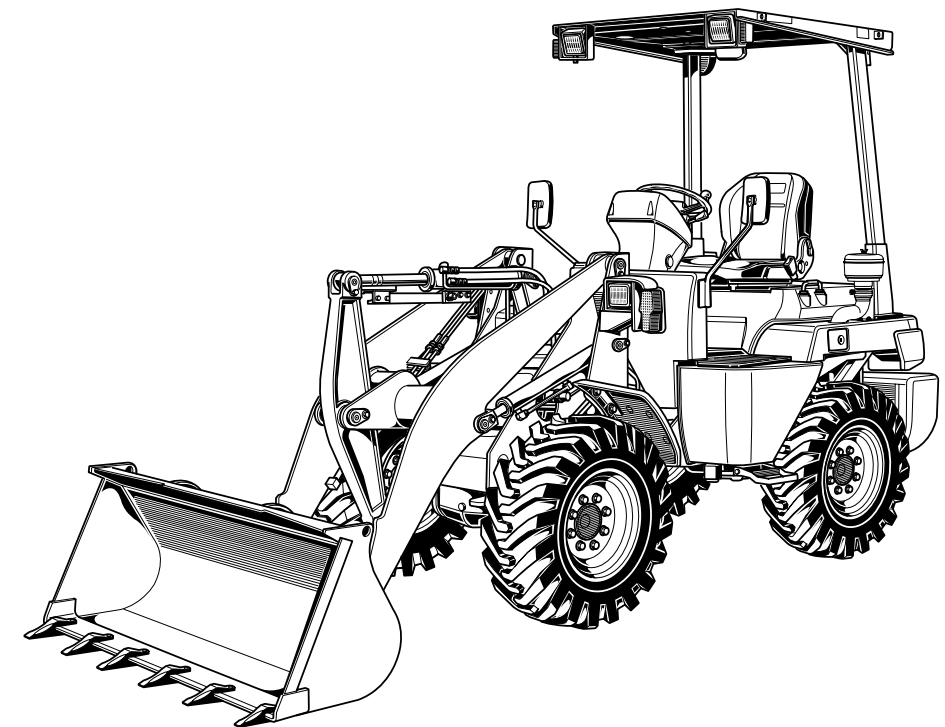
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OPERATOR'S MANUAL

KUBOTA WHEEL LOADER

MODEL R430



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READ AND SAVE THIS MANUAL



ABBREVIATION LIST

Abbreviations	Definitions
API	American Petroleum Institute
ASTM	American Society for Testing and Materials, USA
DIN	Deutsches Institut für Normung, GERMANY (German Institute for Standardization)
EN	European Standard
FOPS	Falling Objects Protective Structures
ISO	International Organization for Standaridization
JIS	Japanese Industry Standard
LST	Load Sensing Transmission
MIL	Militaly Standard
ROPS	Roll-Over Protective Structures
rpm	Revolutions Per Minute
rps	Revolutions Per Second
SAE	Society of Automotive Engineers, USA
SMV	Slow Moving Vehicle

UNIVERSAL SYMBOLS

As a guide to the operation of your machine, various universal symbols have been utilized on the instruments and controls. The symbols are shown below with an indication of their meaning.

	Safety Alert Symbol		Lock
	Engine Oil-Pressure		Unlock
	Diesel Preheat/Glow Plugs		Bucket Up
	Water separator fill-up		Bucket Down
	Horn		Bucket Tilt
	Engine Warning		Bucket Dump
	Coolant Temperature		Bucket Float
	LST Temperature		Working Light
	LST Oil-Pressure		High-beam
	Diesel Fuel		Hazard Switch
	Hydraulic Oil		Hazard / Turn signal
	Low Travel Speed		Clearance light
	High Travel Speed		Rotary Beacon
	Parking Brake		Display Selector Switch
	Neutral		User Setting Switch
	Travel Forward		Set Clock Indicator
	Travel Backward		Periodic Check Indicator
	Read the Operating Instructions		

FOREWORD

You are now the proud owner of a KUBOTA wheel loader. This wheel loader is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system. It will give you long, satisfactory service. To obtain the best use of your wheel loader, please read this manual carefully. It will help you become familiar with the operation of the wheel loader and contains many helpful hints about wheel loader maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.

SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

**DANGER :**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING :**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION :**

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

IMPORTANT :

Indicates that equipment or property damage could result if instructions are not followed.

NOTE :

Gives helpful information.

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SAFE OPERATION

Careful operation is your best insurance against an accident.

Read and understand the *Safe operation* section carefully, before operating the wheel loader.

All operators, no matter how much experience they may have had, should read this and other related manuals before operating the machine or any attachment. It is the owner's obligation to instruct all operators in safe operation.

PRECAUTIONS BEFORE OPERATING THE WHEEL LOADER

1. General precautions

Know your equipment and its limitations. Read and understand this entire manual before starting and operating the machine.

- If using an attachment on the machine, read the attachment operator's manual to ensure the safe operating procedures.
- Pay special attention to the safety labels on the machine and the attachments.
- Do not start or operate an unsafe machine. Before working the machine, be sure that any unsafe condition has been satisfactorily remedied. Check brakes, steering, and attachment controls before moving. Consult a proper maintenance authority if any malfunctioning part of the system is observed. Be sure all safety appliances are in the right place and in good operating condition.
- Wear and use safety gear such as non-slip safety shoes or boots, safety glasses, and safety hardhats as appropriate for the job. Do not operate or work around the machine, when wearing loose, bulky clothing.
- Never operate the machine or any equipment while under the influence of alcohol or other drugs, or while fatigued.
- Before allowing other people to use your machine, give instruction to the operator on safe and correct use of the machine and make sure that the operator reads and understands the Operator's Manual for the machine.
- Inspect your seat belt daily for signs of fraying, wear or other weakness that could endanger your safety.
- Do not use the loader bucket or an attachment to lift or carry a person.
- Do not use the bucket or any other working attachment of the machine for crane work.

Otherwise, the machine may lose its balance and overturn.

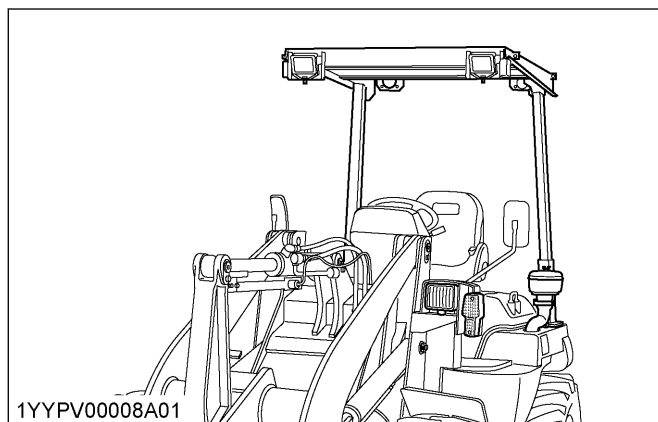
- Use the following precautions when changing the attachment.
 1. Position the machine and attachment on level ground.
 2. Make sure that no persons are in the immediate vicinity of the machine.
 3. When actuating the machine to change the front attachment:
 - a. Lower the bucket and attachment to the ground.
 - b. Actuate the parking brake switch.
 - c. Stop the engine (for machines with mechanical quick coupler).
 - d. Release the hydraulic pressure in the hydraulic system by operating the appropriate control levers (for machines with mechanical quick coupler).
 - e. Lock all control levers in neutral.
 4. After changing the front attachment, make sure that the installed attachment is securely attached to the quick coupler.

2. Precautions of ROPS and FOPS

Know your equipment and its limitations. Read and understand this entire manual before starting and operating the machine with the ROPS and FOPS.

- For your safety, KUBOTA installs a ROPS (roll-over-protective-structure) and a FOPS (falling-objects-protective-structure) with a seat belt. Always use the seat belt when the machine is equipped with canopy.

OSHA regulations and SAE standard require the ROPS and FOPS on wheel loaders, bulldozers, truck type loaders, graders, and scrapers.



SAFE OPERATION

- Never modify structural members of ROPS by welding, drilling, bending, grinding, or cutting because modifying may weaken the structure. If any component is damaged, replace it. Do not attempt repairs. If ROPS is loosened or removed for any reason, reinstall all parts correctly. Tighten mounting bolts to proper torque.
- Do not install any ballast, including water, and calcium chloride that is added into the tires, that exceed the specified maximum weight shown under “*MAXIMUM GROSS MACHINE WEIGHT*” space on the ROPS label.

PRECAUTIONS FOR OPERATING THE MACHINE

- Get on and off safely when entering or leaving the machine. Face the machine. Always maintain a three-point-contact with the steps and handrails. Do not use control levers as handles.
Do not jump on or off the machine. Never try to get on or off a moving machine.
- Do not start the engine or operate levers from anywhere other than the operator's seat.
- Before starting the engine, fasten the seat belt, make sure that the shuttle-change-lever is set in the neutral position, the parking-brake-switch is actuated and the bucket is lowered to the ground.
- Do not start engine by shorting across starter terminals.
- Watch where you are going at all times. Watch for and avoid obstacles.
- Never permit passengers on the machine. Keep bystanders away from the machine during operation.
- When working around other machines, let the other operators know what you are performing at all times.
- Never allow anyone to get under or near the bucket or attachment when it is raised.
- When raising the bucket or attachment, take extra caution to prevent it from touching overhead wires or other obstacles. Contact with wires may cause fatal injuries.
- Keep away from the muffler while the engine is running and immediately after it has stopped.
- Hazardous operation such as on dangerous terrain, beyond the load capacity or contrary to the intended use of the machine must be avoided as it may cause the machine to tip over.
- Do not drive the machine close to edges of ditches or banks which may collapse under the weight of the machine, especially when the ground is loose or wet.
- Slow down for turns, uneven terrain, and slopes to avoid tipping over.
- When transporting a load, keep the loader bucket as low as possible to avoid tipping over. Be extremely careful when working on inclines.
- Operation on slopes can be dangerous. Rain, snow, gravel soft ground, and so on will change the ground conditions. Do not operate the machine in questionable ground conditions. If operating on a slope or ramp, always slow down, travel straight up, and down the incline and not across. Keep the bucket as low as possible. If you do not follow these instructions, the machine can go out of control and tip over.
- Avoid turning on a slope.
- Never perform digging or shoveling with the machine in the articulated condition, or the machine may tip over.
- Never dig or shovel at high speed. Digging or shoveling at high speed can cause the machine to lose stability and its rear wheels to lift off the ground, which may lead to serious personal injury or fatal accidents.
- Do not go up or down a 30 degrees or steeper hill. Otherwise, the machine may skid sideways or turn on its side. If the ground is ungraded or is soft, limit the slope below 15 degrees.
- To avoid tipping over, do not operate the machine on any site where the terrain cannot be ascertained, such as ground covered with seeds or snow and check for hidden projections, dips, road shoulders, and so on beforehand, and take care not to approach them during work.
- Be sure to ease off the accelerator at the end of backfilling grooves, or areas at the edge of cliffs or pond banks, or at the end of an ascent. Upon removal of the external load, the machine speed will automatically increase, reduce speed to avoid entering grooves or tipping over.
- To avoid the machine slipping or tipping over, do not operate the machine on ungraded or soft terrain, such as land fills. Grade and compact the site beforehand at all times.
- Avoid running the engine for a long time indoors. When the engine must be run indoors, be sure to open the windows and doors.
Carbon monoxide gas from exhaust is colorless, odorless and deadly.
- Check that no one is near the muffler exhaust before starting the engine. If exposed to exhaust fume, he or she may get burned or poisoned. Check that there is no flammable objects, such as dead leaves, sheets of paper, or pieces of cloth, attached to areas around the engine before starting the engine.
- To avoid the danger of exhaust fume poisoning, do not operate the engine, in a closed building without proper ventilation. Carbon monoxide is odorless, colorless, and deadly.

- Be especially careful when reversing and watch the area behind the loader carefully before starting to drive.
- When parking your machine if at all possible, park on a firm, flat, and level surface. If not, park across a slope. Set the parking brake, lower the implements to the ground, remove the starter key from the ignition, and chock the wheels.

1. Safety for children

Serious accidents can occur if the operator does not pay attention to children in the vicinity of the machine. Children are unpredictable.

- Always keep an eye on children because they change their location continuously.
- Make sure that no children are within the working range of the machine.
- Be extremely cautious when children approach the working area. Stop working, if necessary.
- Do not carry children on the machine.
- Do not allow children to operate the machine.
- Do not allow children to play around the machine.

PRECAUTIONS FOR TRAVELING

- Before traveling on the public road, follow all local and state-traffic-regulations.
- **Traveling on the public road**
Please note the following points:
 - Raise the lift arm.
 - Fully tilt the bucket.
 - Lock the control lever and the auxiliary-port-lever by pressing the control-lever-lock-knob and the auxiliary-port-lever-lock-knob.
- When traveling on a public road, lock the bucket and attachments securely so that they cannot lower, even if any control lever is operated. Lift the bucket about 40 cm above the ground and set it in the proper position for travel, then lock the control lever.
- First check the area around the machine, then gradually increase the engine rpm and slowly move the machine. Do not move the machine abruptly. To move the machine on a steep slope, press the accelerator pedal gradually while releasing the inching and brake pedal so that the machine does not move backwards.
- The steering wheel for this machine will not return to the starting position after turning a bend. Be sure to turn the wheel to the starting position by yourself.
- When operating the machine, obey all safety signals and traffic signs.
- Use the brake when the machine begins to accelerate by itself.

- If the engine should stall on a slope, apply the brake to hold the machine in a present position and then set the parking brake switch to the parking position, lower the bucket to the ground to prepare for the next start.
- When operating over an obstacle such as a rock, cross slowly at a right angle. Trying to cross over obstacle diagonally or at high speed may tip the machine over.
- If there is the risk of the machine slipping excessively on frozen ground, install chains on the front wheels. For operation on snow, install the chains on both front and rear wheels or change into winter tires.
- Do not turn sharply at high speed, or the machine may tip over.
- Steering effort will increase if the engine stops. Do not stop the engine during travel.
- If a tire has blown, the machine may slip or turn over. If a tire blows, do not brake or steer hard, brake slowly to stop the machine gradually.

1. Operating the engine at overheating

Take the proper actions in this section in the event which the coolant temperature increases too much.

The condition which the coolant temperature increases too much is called “Overheating”.

1. Park the machine in a safe place and keep the engine unloaded idling.
2. Do not stop the engine suddenly, but stop it after about 5 minutes of unloaded idling.
3. Keep yourself well away from the machine for a further 10 minutes or while the steam blows out.
4. When there is no longer any danger of scalding, try to find the cause of overheating according to the manual, see TROUBLESHOOTING OF THE ENGINE AND OTHER SYSTEMS on page 99 and then start again the engine.

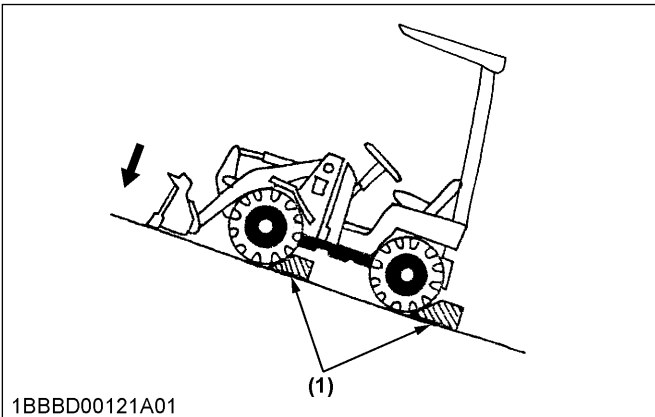
PRECAUTIONS AFTER OPERATION OF THE WHEEL LOADER

- When getting off the machine, always stop the engine, follow the following procedure.
 1. Set the parking brake.
 2. Lower the bucket and attachment to the ground.
 3. Release the hydraulic pressure in the hydraulic system by operating the control levers.
(For details, see RELEASING THE PRESSURE TRAPPED IN THE HYDRAULIC SYSTEM on page 51)
 4. Lock all control levers in neutral.

! SAFE OPERATION

5. Remove the key.

If the machine has to be parked on a slope, be sure to block the wheels securely.



(1) Wheel chock

- All equipment left unattended at night adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, shall have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors to identify the location of the equipment.
- For storage, be sure not to cover the machine until after all the heated parts have cooled down.
- Before storing the machine for long periods of time, do the following.
 1. Set the parking brake.
 2. Stop the engine.
 3. Lower the bucket and attachments to the ground.
 4. Release the hydraulic pressure in the hydraulic system by operating the control levers. Lock all control levers in neutral.
 5. Remove the key.

PRECAUTIONS FOR SAFELY LOADING AND TRANSPORTING THE MACHINE

- When loading or unloading the machine on or from a truck or trailer, be sure to use strong ramps. Never use wet lumber, and so on.
- Keep the ramps at an angle such that the machine cannot slip. Never try to change direction while on the ramps.

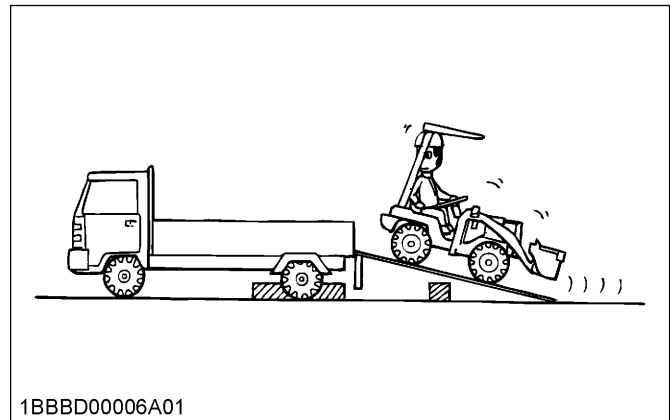
Angle of ramps	10 degrees to 15 degrees
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- When loading or unloading the machine on or from a truck, keep the bucket about 40 cm up from the ground and reverse the machine at low speed to load it, or advance it at the same speed to unload it.
- It is dangerous to alter the direction once already on the ramps. If direction needs correction, bring

the machine down off the ramps first and make the directional correction.

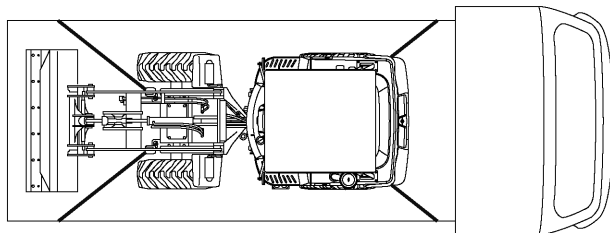
- If you operate a steering handle while the machine is loaded or unloaded, the machine may move at an angle. Be sure to stop the machine before using another control.

While loading or unloading the machine, block the truck wheels and apply the truck parking brake. If necessary, place a support under the truck bed behind the rear wheels to prevent the truck front from lifting.

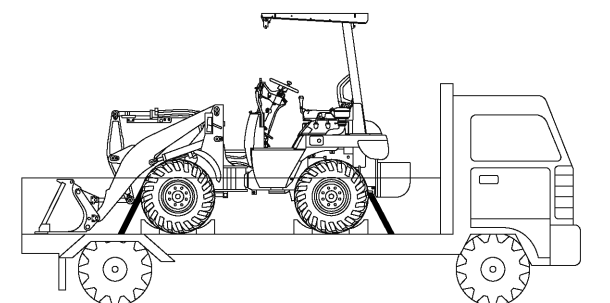


- After loading the machine on the truck bed, perform the following.
 1. Check to see that the center of gravity of the machine aligns with that of the truck bed.
 2. Secure the steering frame lock on the machine.
 3. Set the parking brake.
 4. Stop the engine.
 5. Lower the bucket and attachment to the truck bed.
 6. Release the hydraulic pressure in the hydraulic system by operating the control levers.
 7. Lock all control levers in neutral.
 8. Remove the key.
 9. Block the wheels of the machine.
 10. Secure the machine with chains or belts.

! SAFE OPERATION



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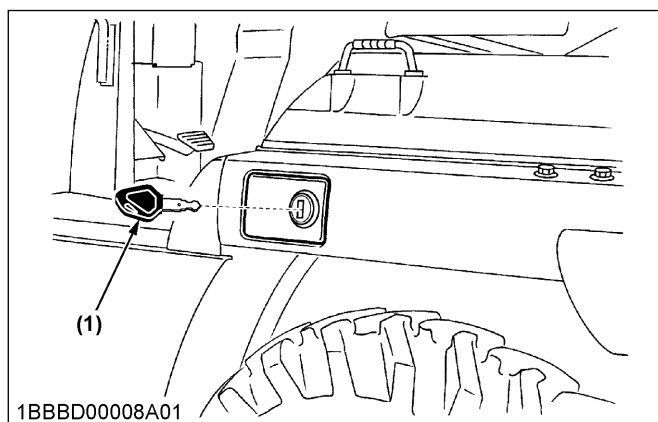
1YYPV00010A01

- While traveling with the machine loaded, do not start with a jerk, stop suddenly or turn sharply on curves so as to prevent the machine from shifting on the truck bed.

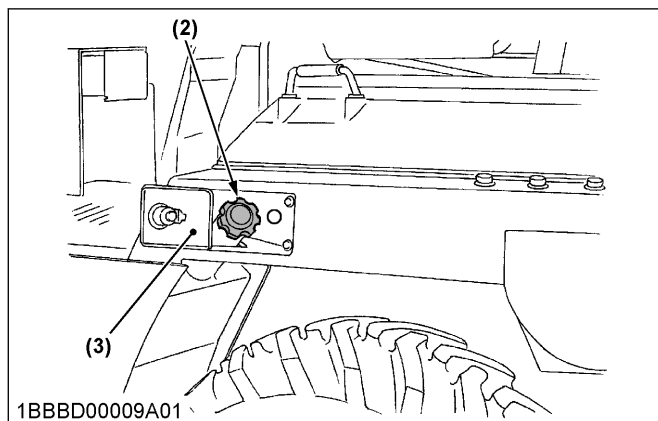
PRECAUTIONS FOR SERVICING THE MACHINE SAFELY

- Before checking, adjusting, or cleaning the machine parts, or leaving the machine, follow the following items.
 1. Set the parking brake.
 2. Stop the engine.
 3. Lower the bucket and attachment to the ground.
 4. Release the hydraulic pressure in the hydraulic system by operating the control levers. (For details, see **RELEASING THE PRESSURE TRAPPED IN THE HYDRAULIC SYSTEM** on page 51)
 5. Lock all control levers in neutral.
 6. Remove the key.
- Never be under the machine while it is being lifted with only the bucket. If servicing or checking underneath, support it firmly with strong jackstands.
- Secure the articulated steering with the steering frame lock.
- Keep clear of articulation area when servicing.
- When checking or servicing the electrical system, disconnect the battery cables.

- It is dangerous to drain oil or coolant and to replace the filter just after stopping the engine. Wait for the engine to cool.
- Do not allow an unauthorized person to service or maintain the machine. Do not perform any work or equipment that is not authorized. Do not try to do any repairs that you do not understand. Follow the Maintenance and Service procedures.
- Service or check the machine after it has completely cooled off. Do not touch the muffler and the radiator until they have cooled off.
- When you drive the connecting pins in or out, guard against injury from flying pieces of metal. Use eye or face protection.
- Safety covers, shields, and guards may not be modified or removed.
- Always stop the engine before refueling. Keep away from sparks and naked flames, while refueling. Avoid fuel spills and overfilling the fuel tank. Always refuel from properly grounded fuel tank or system. Keep first aid kit and fire extinguisher nearby at all times.



1BBBD00008A01



1BBBD00009A01

- (1) Starter key
- (2) Fuel tank cap
- (3) Tank cap cover

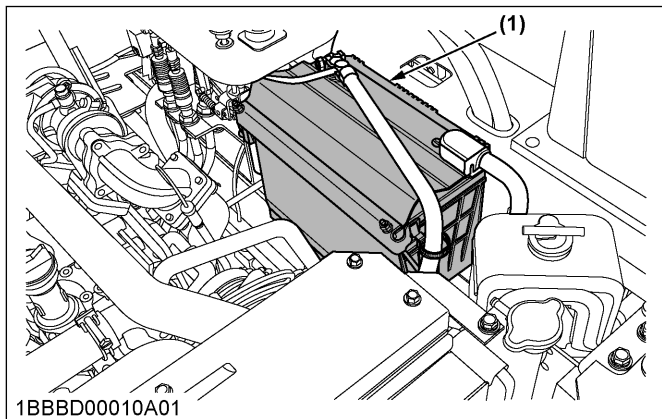
- Do not use or charge the refillable type battery if the fluid level is below the "LOWER" (lower-limit-level) mark. Otherwise, the battery component parts may prematurely deteriorate, which may shorten the battery's service life or cause an explosion. Check

⚠️ SAFE OPERATION

the fluid level regularly and add distilled water as required so that the fluid level is between the "UPPER" and "LOWER" levels.

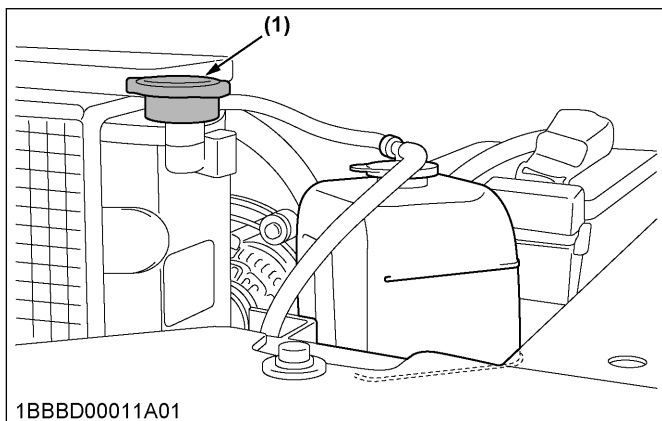
- A battery, especially when charging, will give off hydrogen and oxygen gases that are very explosive. Keep away from sparks and naked flames at all times. To avoid sparks from an accidental short circuit, always disconnect the battery ground cable first and always reconnect the ground cable last.

(See STARTING THE ENGINE WITH AN AUXILIARY BATTERY on page 43)



(1) Battery

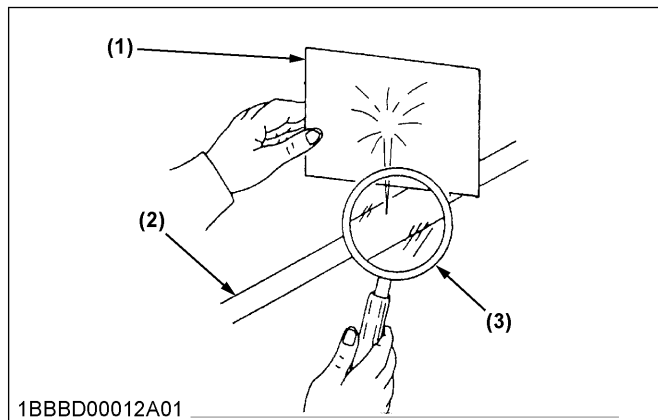
- Never remove the engine/hydraulic oil plug or the radiator cap right after the engine has been stopped, or oil or hot water may gush out. Wait for the water or oil to cool, loosen the engine/hydraulic oil plug or radiator cap just a little to release pressure, and then check the level. Releasing pressure is especially important for opening the radiator cap.



(1) Radiator cap

- Leaking hydraulic fluid has enough pressure to penetrate the skin and cause serious injuries. Leakages from pin holes can be totally invisible. Do not use the bare hand for checking on possible leakages. Always use a piece of wood or cardboard. It is strongly recommended to use a face mask or eye protection. Should injuries occur with leaking hydraulic fluid, contact a doctor

immediately. This fluid can cause gangrene or serious allergic reactions.



(1) Cardboard

(2) Hydraulic line

(3) Magnifying glass

• Towing in case of problems

If the machine breaks down and requires towing, please contact your nearest KUBOTA dealer. In case of an emergency, carry out the following procedure.

1. Preparation of towing

- Remove the 2 caps of the high pressure relief valves that are located at the top and bottom of the LST pump. Loosen the M8 nuts and tighten the adjust bolts by 6 turns. Be careful never to loosen the M8 nuts too much.
- Remove the 2 M12 bolts of the parking brake case, and remove the 2 flat washers from each (total of 4).
- Re-tighten the 2 M12 bolts.

2. Towing

- Make sure the foot brake is ready.
- The towing speed should be less than the machine recovery pin.

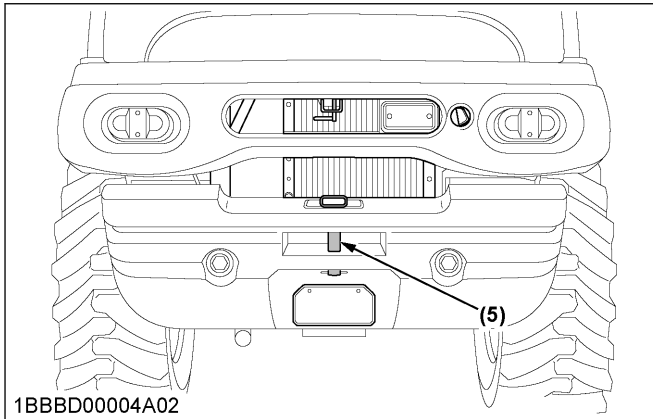
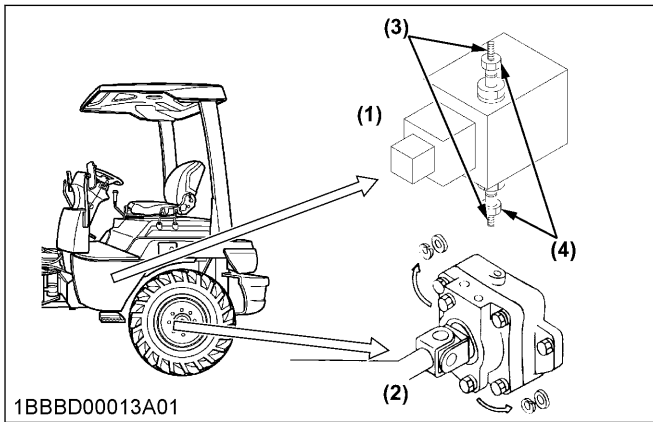
Towing speed	1 km/h
--------------	--------

- Do not perform the towing over long distance.

NOTE :

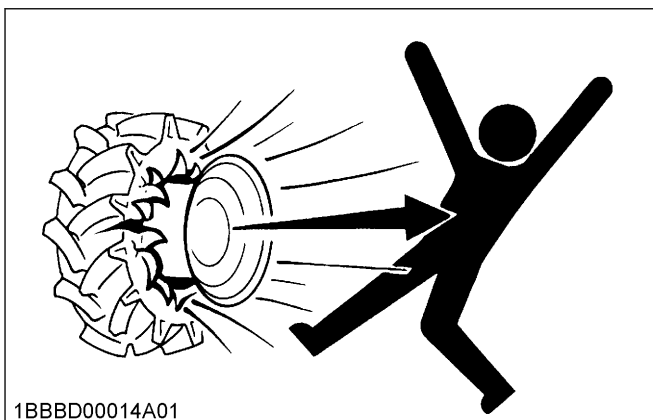
- When towing backward, pull the machine using the machine recovery pin.

! SAFE OPERATION

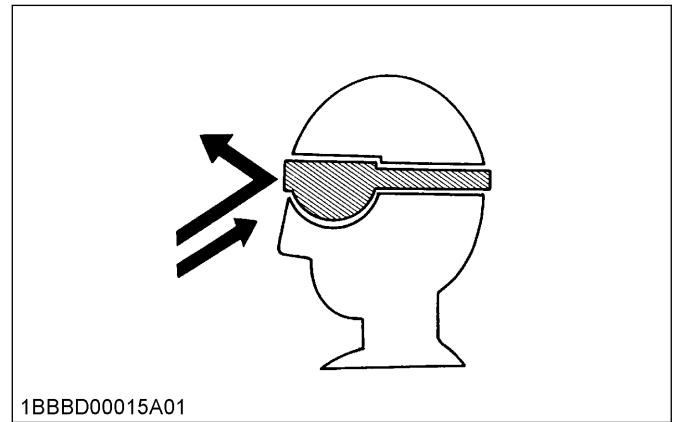


- | | |
|-------------------|--------------------------|
| (1) LST pump | (4) M8 nut |
| (2) Parking brake | (5) Machine recovery pin |
| (3) Adjust bolt | |

- Do not install any tires on the rims yourself because serious or fatal accidents could happen. Have the tires mounted by your KUBOTA dealer.



- Use a face mask or eye protection to protect the eyes and respiratory system against dust and other foreign particles.



- Refuse such as old oil, fuel, hydraulic fluid, coolant, and batteries comes under the category of toxic waste and can be a hazard to the environment, people, and animals.
- Undertake disposal in an appropriate way, according to legally prescribed pollution control and safety regulations.
- If you ask questions about the correct disposal or storage of refuse and toxic waste, contact your KUBOTA dealer or a local waste management contractor.
- Do not open high-pressure fuel system. High-pressure fluid remaining in fuel lines can cause serious injury. Do not disconnect nor repair fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with high-pressure common rail fuel system.
- To avoid hazardous high voltage, turn the key switch to the off position if it is necessary to check to repair the computer, harness, or connectors.
- Keep the wheel loader away from people, animals, or structures which may be susceptible to harm or damage from hot exhaust gases.
- Fire prevention**
Wheel loader and some attachments equip components that are at high temperatures under normal operating conditions. The primary source of high temperatures is the engine and exhaust system.
The electrical system, if damaged or incorrectly maintained, can be a source of arcing or sparks. The following fire prevention guidelines will help to keep your equipment up and running efficiently and keep the risk of fire to a minimum.
 - Blow off all accumulated debris near hot engine-exhaust-components such as turbocharger and exhaust manifold as well as EGR tube, exhaust pipes, and muffler more frequently when working in severe conditions.
 - Clean out all accumulated flammable debris such as leaves, straw, pine needles, branches, bark, small wood chips, and any other combustible materials from inside the machine

SAFE OPERATION

belly pans or lower unit structures as well as from area in proximity to the engine.

- Inspect the exhaust system daily for any signs of leakage. Check for broken pipes and muffler and also for loose or missing bolts, nuts and clamps. If any exhaust leaks or fractured parts are found, repairs must be completed prior to operation.
- Examine the electrical wiring and connectors frequently for damage. Repair any wires that are loose or frayed before operating the machine. Clean all electrical connections and tighten all electrical connections as necessary.
- Inspect the exhaust system daily for any signs of leakage. Check for broken pipes and muffler and also for loose or missing bolts, nuts, and clamps. If you find any exhaust leaks or fractured parts, please take machine to your dealer for repairs.
- Always keep a multipurpose fire extinguisher on or near the machine. Be familiar with the operation of the fire extinguisher.
- Do not park the machine anywhere there are combustible materials such as dried grass and straw.

SAFETY LABELS

(1) Part No. R2401-5758-2

WARNING

TO AVOID SERIOUS PERSONAL INJURY OR DEATH:

- Read and understand the operator's manual and all labels on the machine.
- Know how to operate all controls.
- Do not allow any bystanders around or near the machine.
- Never allow passengers on the machine.
- When parking or dismounting the machine, stop the engine, set the parking brake, lower the bucket and attachment to the ground, lock all control levers in neutral, and remove the key.
- Do not get under the machine while it is being lifted with only the bucket, backhoe, or outriggers when servicing or checking underneath, securely support with jackstands.
- Do not stand, walk or work under raised loader unless the lift arm support device is used to secure the lift arms, and the front attachment is removed.

1BBBAAAP2270

(2) Part No. R2401-5759-1

WARNING

TO AVOID SERIOUS PERSONAL INJURY OR DEATH:

- Always drive or operate straight up or down a slope. Do not cross a slope, or the machine may slip sideways and tip over.
- Slow down when turning on rough, uneven terrain and slopes to avoid tipping over.
- When transporting a load, keep the loader bucket as low as possible to avoid tipping over. Be extra careful when working on inclines.
- Never perform digging or shoveling in the articulated position, or the machine may tip over.
- Do not use loader for handling large, loose or shiftable load which could fall out of the bucket or roll down the loaders arms onto the operator.
- When the backhoe is removed, mount counterweights in place of the backhoe to ensure the stability of the machine and to avoid the danger of tipping over while operating.
- Do not dig around the outriggers or tires. The soil may collapse under the weight of the machine and may tip over.

1BBBAAAP2280

(3) Part No. R2401-5757-1

WARNING

TO AVOID SERIOUS PERSONAL INJURY OR DEATH:

- Do not start engine by shorting across starter terminals or bypassing the safety start switch.
- Start engine only from operator's seat. Never start engine while standing on the ground.

1BBBD00140A01

(4) Part No. R2401-5726-1

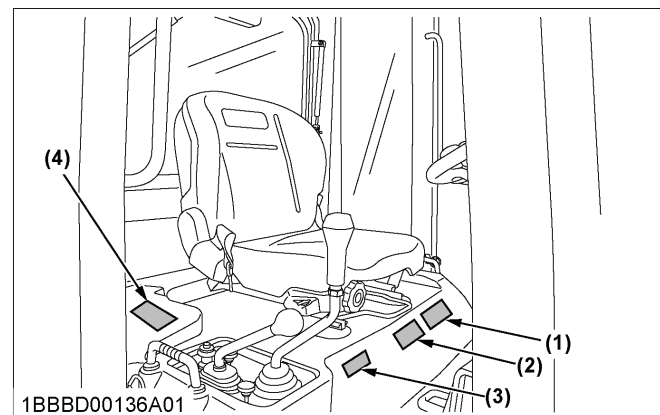
WARNING

SERVICE PORT LEVER LOCK FOR HYDRAULIC MULTI-COUPLER

TO AVOID SERIOUS PERSONAL INJURY OR DEATH:

- Make sure the attachment is securely latched to multi-coupler and service port lever lock is engaged.
- Failure to follow this procedure may result in separation of attachment from multi-coupler.

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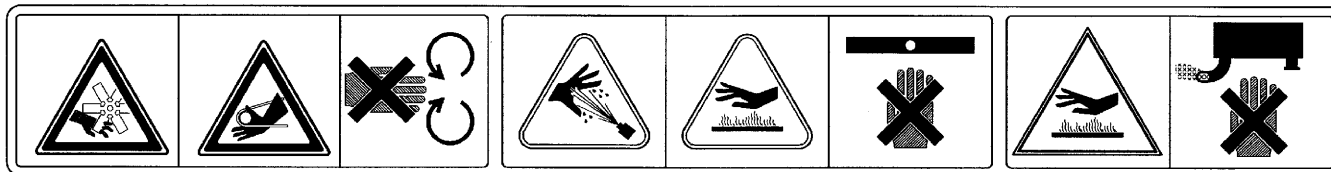
1BBBD00136A01

1BBBD00154A01enUS

SAFE OPERATION

(1) Part No. R2411-5785-1

- Keep away from fan and fan belt.
- Risk of scalding.
- Do not touch hot parts such as exhaust muffler etc.



1BBBD00142A01

(2) Part No. RD158-5323-1



1BAAADAP0800

(3) Part No. R2401-5751-1



1BBBD00143A01

(4) Part No. R2431-5752-1

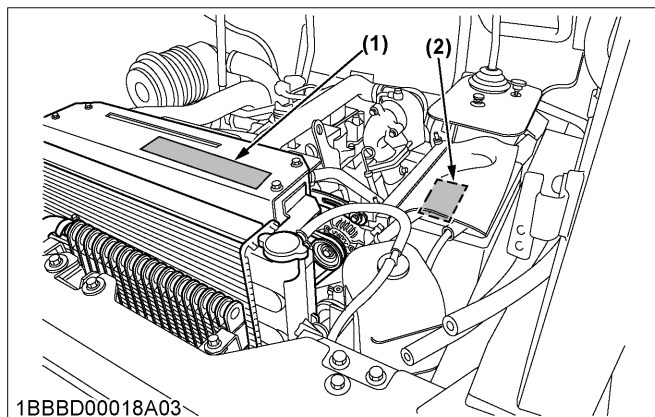


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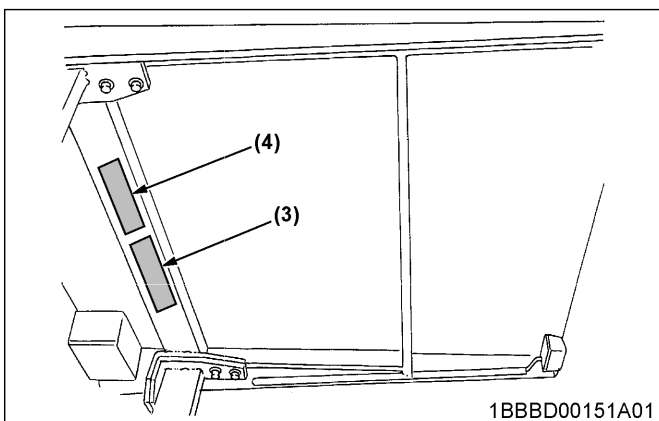
(5) Part No. R2431-5771-1



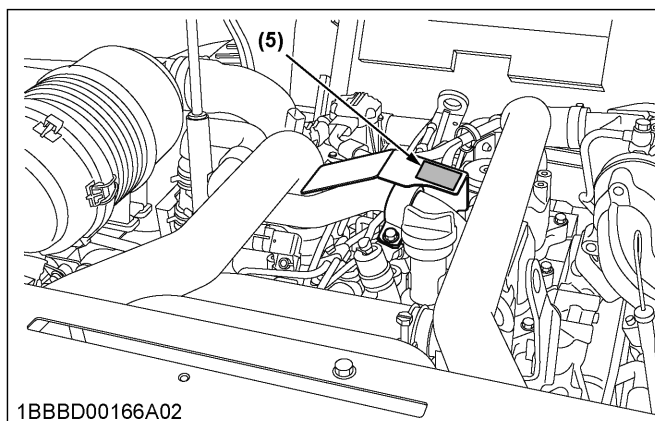
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1BBBD00018A03



1BBBD00151A01



1BBBD00166A02

1YYPV00002A01enUS

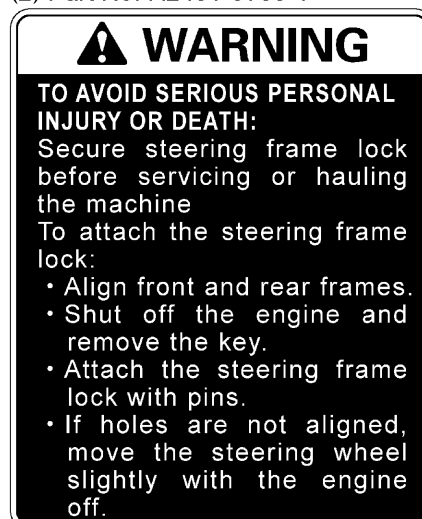
! SAFE OPERATION

(1) Part No. R2401-5756-1



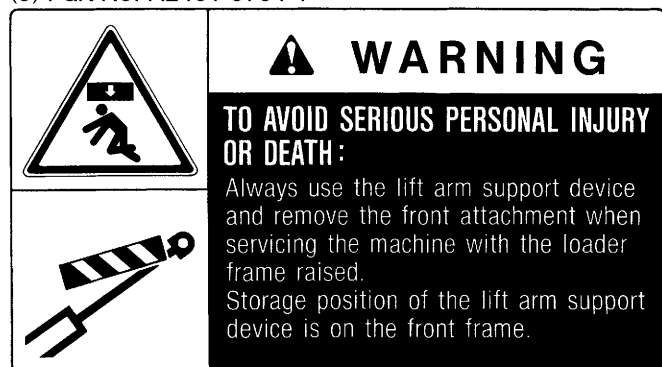
1BBBD00145A01

(2) Part No. R2431-5753-1



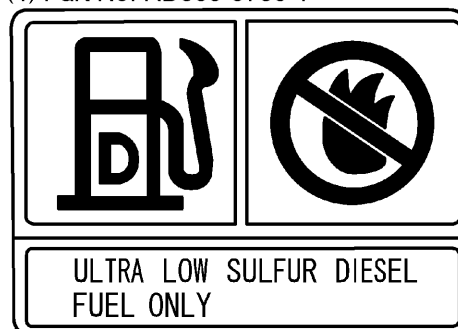
1BBBD00146A01

(3) Part No. R2401-5754-1

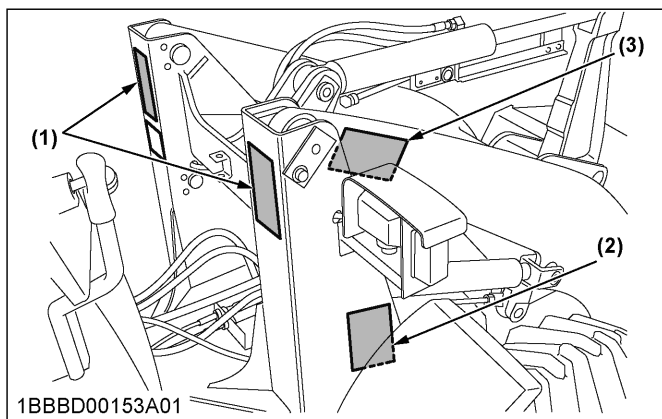


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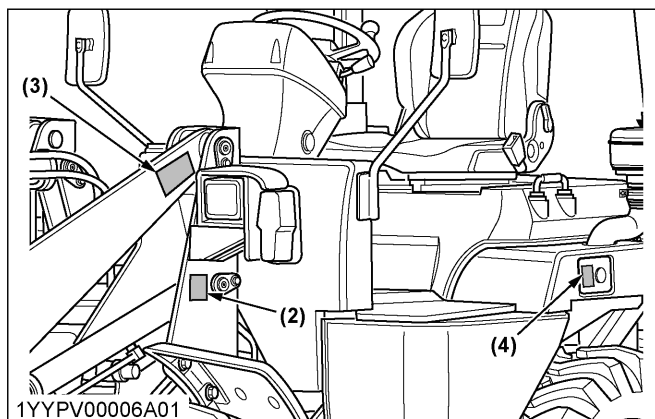
(4) Part No. RD358-5736-1



1BAAGAAAP1810



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⚠️ SAFE OPERATION

(1) Part No. R2401-5756-1 [Both sides]



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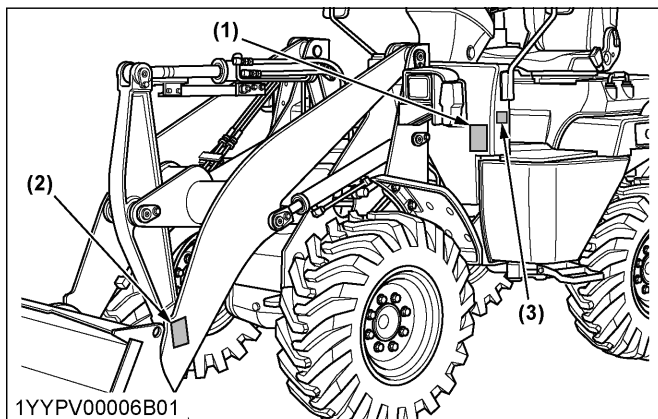
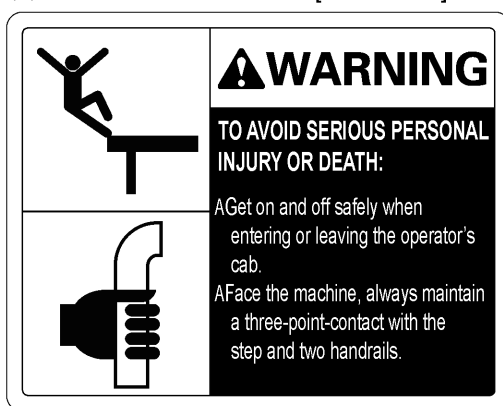
(2) Part No. R2433-5721-1 [Both sides]



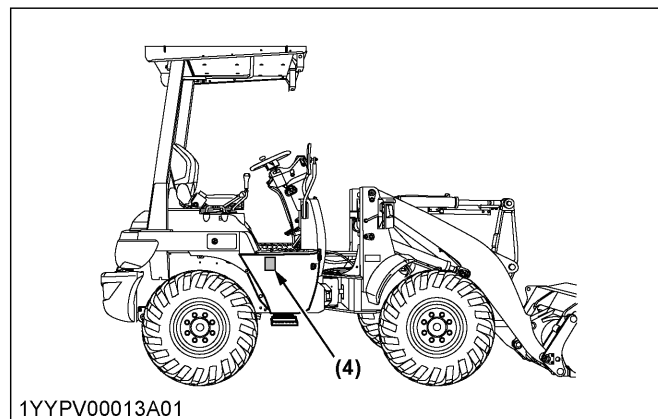
(4) Part No. RA228-5756-1



(3) Part No. R2433-5723-1 [Both sides]



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! SAFE OPERATION

(1) Part No. R2431-5755-1

! WARNING

TO AVOID SERIOUS PERSONAL INJURY OR DEATH:

Only use hydraulic oil meeting ISO VG 32 or VG22

1BBBD00149A01

(3) Part No. TC650-6597-1

California Proposition 65

! WARNING !

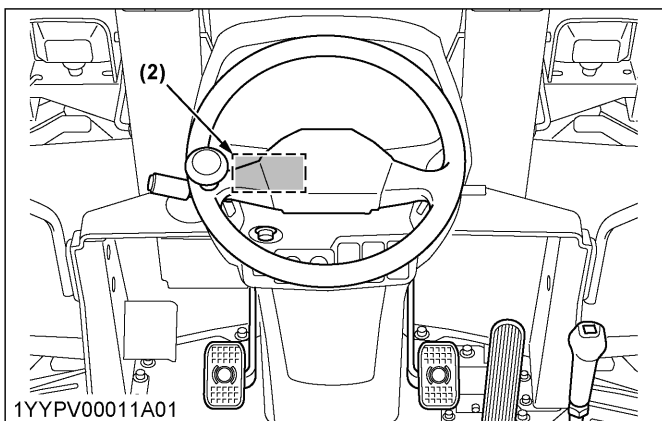
Engine exhaust, some of its constituents, certain vehicle components and fluids, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

1BBBD00148A01

(5) Part No. R2433-5722-1

! WARNING

Hearing protection must be worn.



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(2) Part No. R2401-5777-1

! WARNING

TO AVOID VEHICLE RUNAWAY PUSH HAND THROTTLE FULLY DOWN BEFORE ENGAGING SHUTTLE LEVER.

1BBBD00150A01

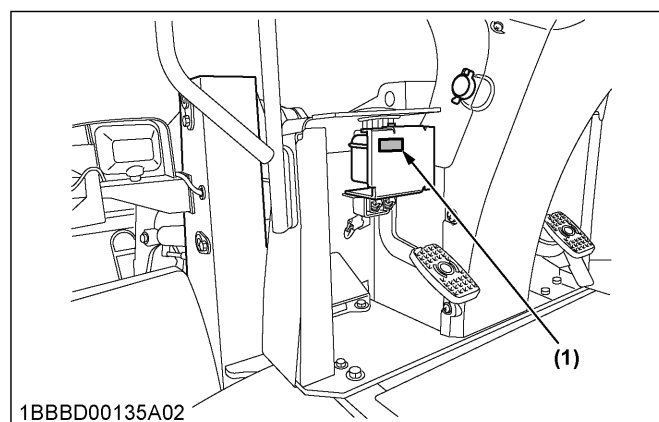
(4) Part No. 3B791-9870-1

! WARNING

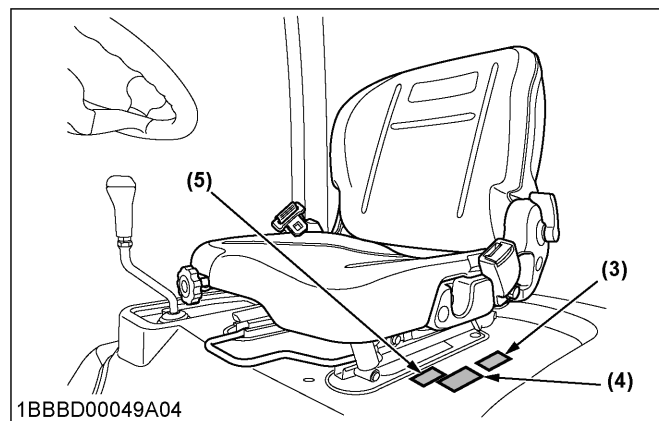
TO AVOID EXPOSURE TO DUST CONTAINING SILICA PARTICLES:

- This dust can cause serious injury to the lungs under some exposure levels.
- Be aware of and follow the OSHA (or other regulatory body) guidelines for exposure to airborne crystalline silica.
- To meet OSHA silica guidelines, use appropriate Personal Protective Equipment and dust abatement systems, such as waterspray systems.

1AGAIJHAP174A



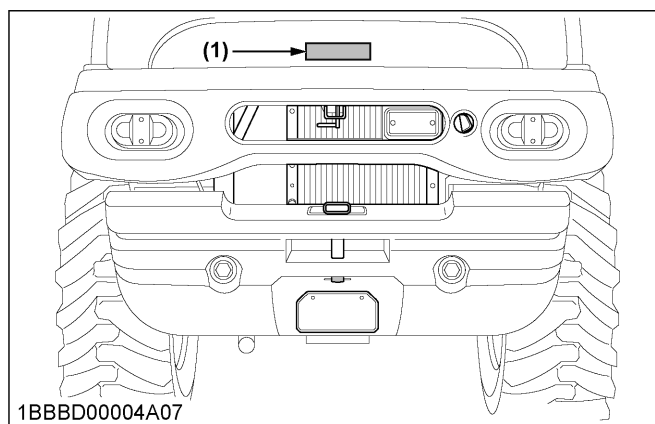
1BBBD00135A02



1BBBD00049A04

SAFE OPERATION

(1) Part No. RC488-5714-1



1YYPV00005A01enUS

1. Care for safety labels

- Keep safety labels clean and make sure that they are not obstructed by any objects.
- Clean safety labels with soap and water, dry with a soft cloth.
- Replace damaged or missing safety labels with new safety labels from your local KUBOTA dealer.
- If a component with safety label(s) affixed is replaced with new part, make sure that new safety label(s) is (are) attached in the same location(s) as the replaced component.
- Mount new safety labels by applying on a clean, dry surface and pressing any bubbles to outside edge.

SERVICING OF THE WHEEL LOADER

DEALER SERVICE

Your KUBOTA dealer is always ready to help you with problems with your wheel loader and make sure that you get the most value from it.

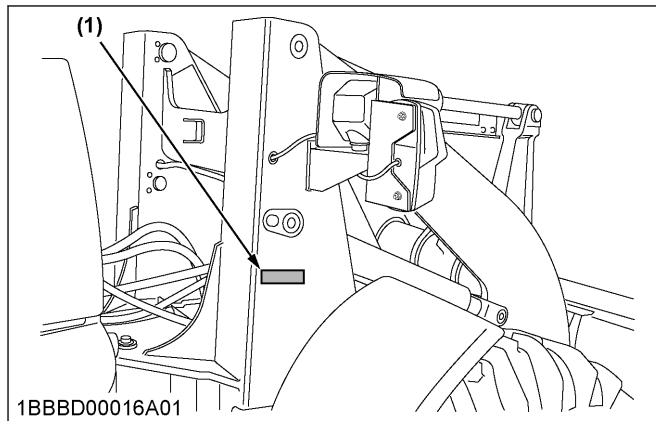
After having carefully read these instructions, you will realize that you can perform much of the routine maintenance by yourself. For service, contact the KUBOTA Dealer shop from which you purchased your product, or your local KUBOTA dealer.

When ordering spare parts from your KUBOTA dealer, always mention the product identification number of the wheel loader and the serial number of the engine.

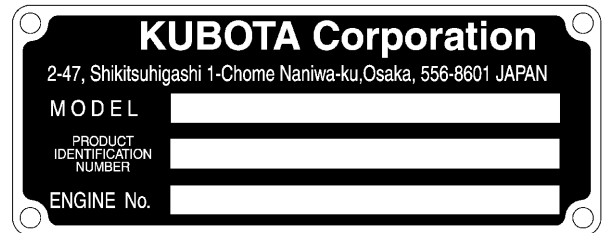
Note the product identification number of the wheel loader and the serial number of the engine right away in the supplied lines.

Machine Product identification number	
Dealer's name (To be filled in through the owner)	
Date of purchase	

	Model	Serial No.
Engine		

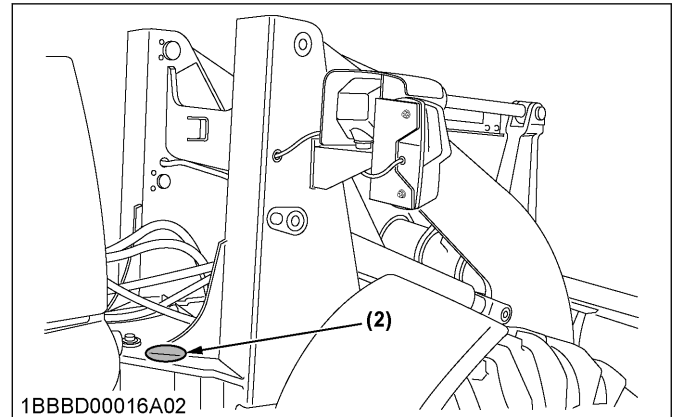


(1)

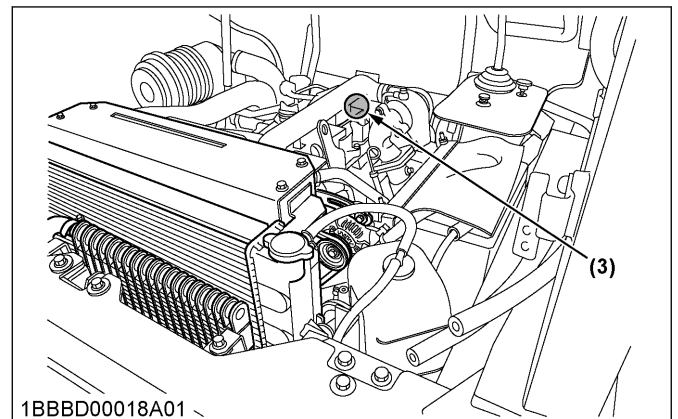


1EWEL00203A01

(1) Product identification number and engine number label



(2) Product identification number



(3) Engine serial no.

1. Warranty policy

This wheel loader is warranted under the *KUBOTA Limited Express Warranty*, a copy of which may be obtained from your selling dealer. No warranty shall, however, apply if the product has not been handled

according to the instruction given in the Operator's Manual even it is within the warranty period.

The product(s) described in this operator's manual are designed and manufactured only for the country in which they are initially wholesaled by KUBOTA or one of its affiliated companies.

Neither KUBOTA Corporation nor its affiliated companies provide warranty for any product which is re-sold or retailed in any country other than the country for which the product(s) were designed or manufactured.

2. Procedure for scrapping the wheel loader

To put the wheel loader out of service, correctly follow the local rules and regulations of the country or territory where you reside.

If you ask questions, consult your local KUBOTA Dealer.

SPECIFICATIONS

SPECIFICATION TABLE

Model				R430
Type				Canopy
*1Operating weight		kg		3080
Bucket capacity		m ³		0.38
Engine	Manufacturer			KUBOTA
	Model			Water-cooled D1803-CR-TIE4-WL5
	Horse power	SAE J1995	kW/rpm (HP/rpm)	35.5/2600 (47.6/2600)
		SAE J1349	kW/rpm (HP/rpm)	33.2/2600 (44.5/2600)
	Number of cylinders			3
	Displacement		cc	1826
	Starter		V/kW	12/1.4
	Battery		V/kW	12/52
Dimensions	Overall length		mm	4265
	Overall width (without bucket)		mm	1520
	Overall height		mm	2515
	Min. ground clearance		mm	280
	Wheel base		mm	1775
	Tread		mm	1180
	Angle of articulation		Deg	40 each
	Angle of oscillation		Deg	8 each
	Turning radius (w/QC bucket)		mm	3665
Bucket	Hinge pin height		mm	2805
	Dump height (w/teeth)		mm	2150
	Reach fully raised (w/teeth)		mm	805
	Tipping load	Straight (ISO 14397-1)	kg (kN)	2010 (19.7)
		Full turn (ISO 14397-1)	kg (kN)	1734 (17.0)
	Rated operating capacity (ISO 14397-1)		kg (kN)	868 (8.5)
	Breakout force (ISO 14397-2)		kgf (kN)	2661 (26.1)
Traveling	Drive system			4WD
	Tire			12.5/70-16-8PR
	Traveling speed	Forward	km/h	0 to 20
		Reverse	km/h	0 to 20
	Traction force		kgf (kN)	2488 (24.4)
Auxiliary	Max. flow rate (theoretical)		L/min	42.1

(Continued)

SPECIFICATIONS

Model			R430
Type			Canopy
Auxiliary	Max. pressure	MPa (kgf/cm ²)	18.6 (190)
Others	Fuel tank	L	54
	Hydraulic oil tank	L	42
	Hydraulic oil system	L	58

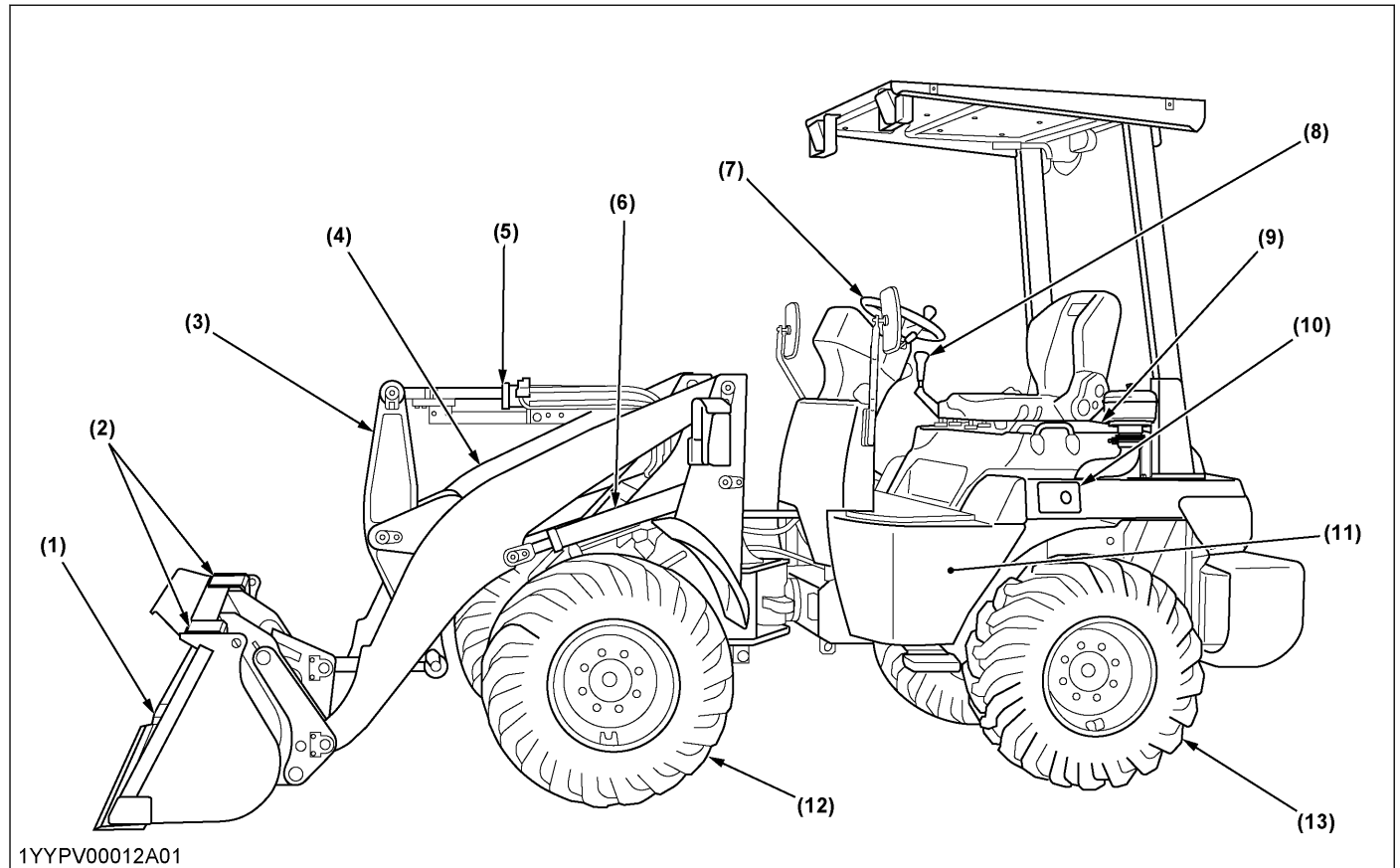
NOTE :

- The dimensions in the table are based on the machine with std. tires, skid steer type quick coupler, standard bucket, and ROPS/FOPS-canopy. Mean value and value for use on concrete roads are given for tipping load and operating capacity. Specifications subject to change without notice

*1 Operating weight is with 75 kg operator, 73 kg mechanical-quick-coupler, 137 kg general purpose bucket, and fully served.

MACHINE PARTS

DESCRIPTION OF MACHINE PARTS

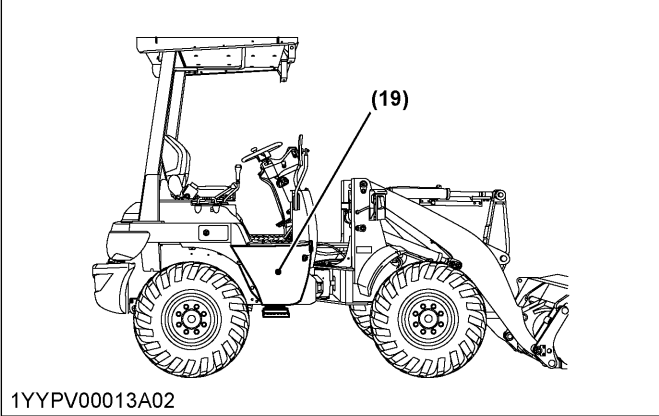
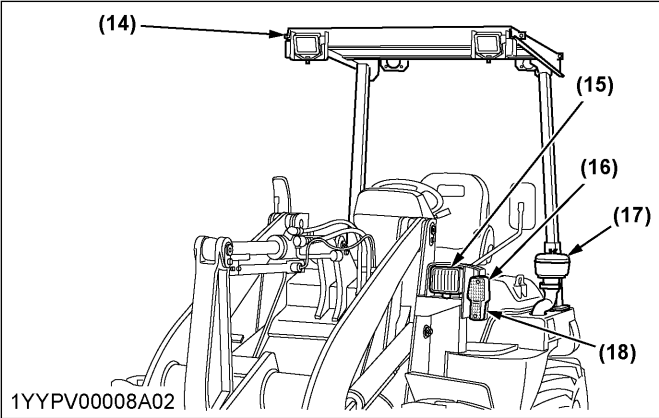


- (1) Bucket
- (2) Bucket level indicator
- (3) Bell crank
- (4) Lift arm

- (5) Bucket cylinder
- (6) Lift cylinder
- (7) Steering wheel
- (8) Control lever

- (9) Engine hood
- (10) Fuel tank cover
- (11) Fuel tank
- (12) Front wheel

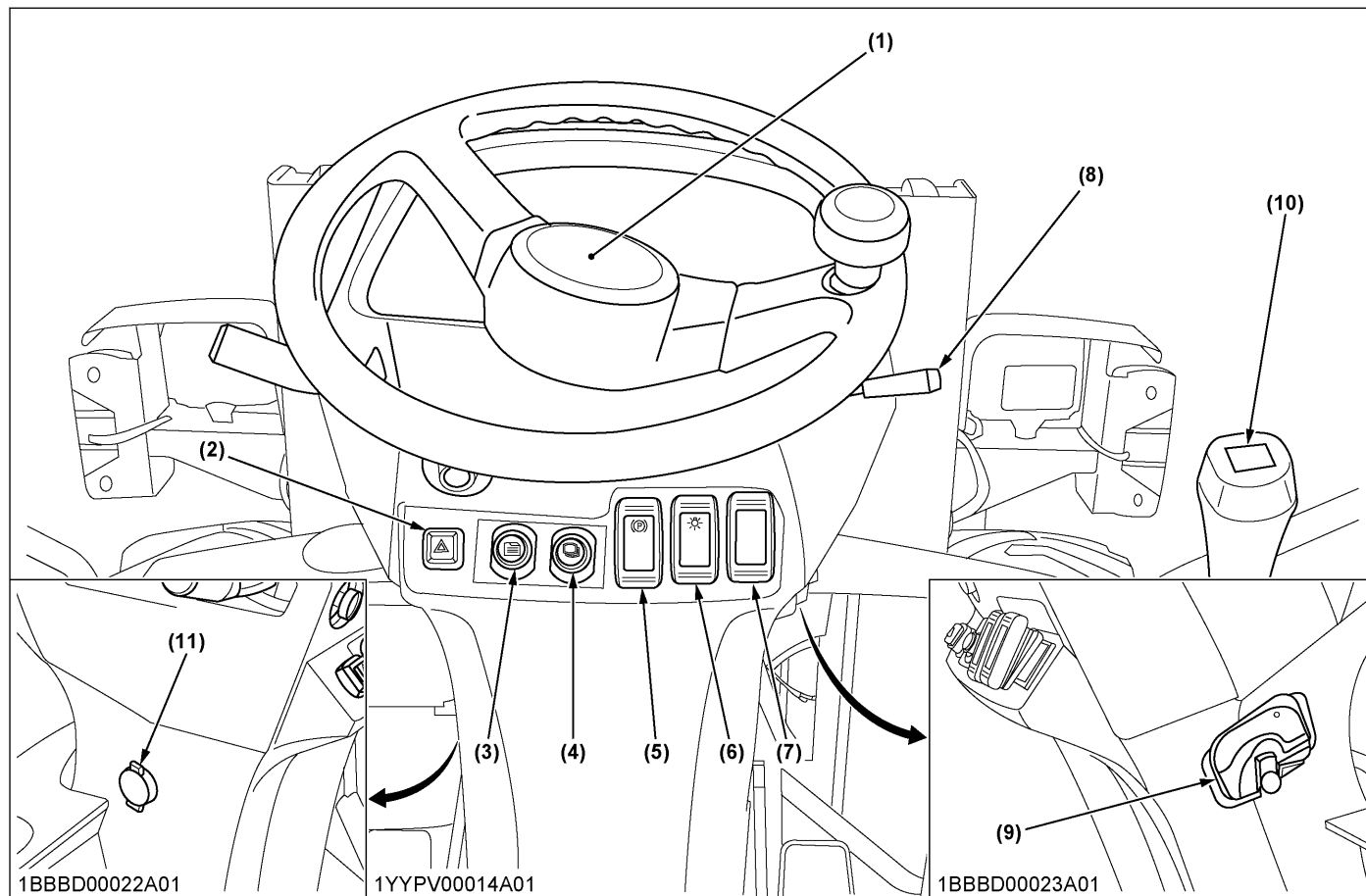
- (13) Rear wheel



(14) ROPS/FOPS canopy
(15) Head light
(16) Turn signal light
(17) Pre-cleaner
(18) Clearance light
(19) Hydraulic oil tank

INSTRUMENT PANEL AND CONTROLS

SWITCHES



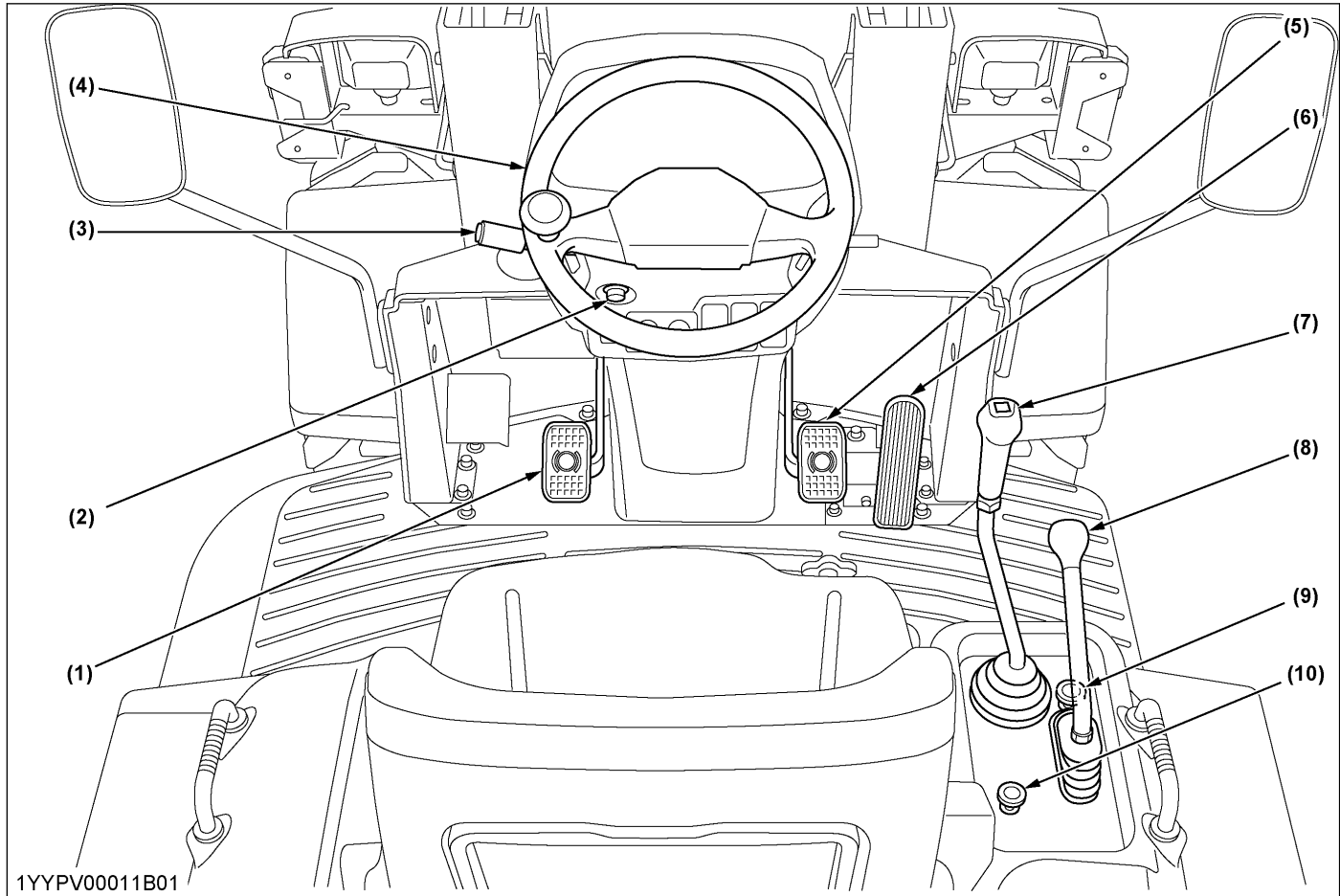
- (1) Horn switch
(2) Hazard lamp switch
(3) User setting switch

- (4) Display selector switch
(5) Parking brake switch
(6) Light switch

- (7) Working light switch [only for canopy]
(8) Turn signal switch

- (9) Starter switch
(10) Travel speed switch
(11) Electrical outlet

CONTROL PEDALS AND LEVERS



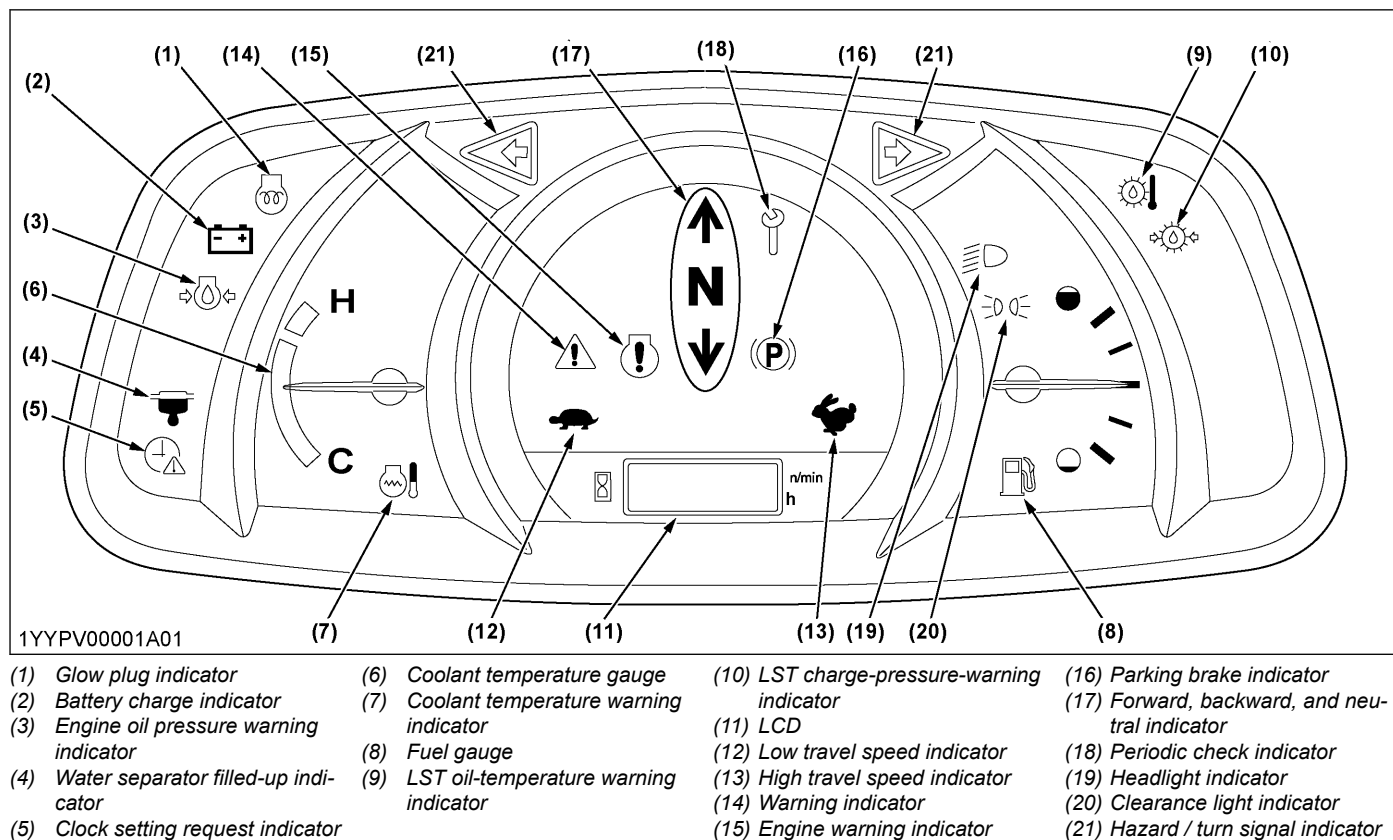
(1) Inching and brake pedal
(2) Shuttle change lever lock knob

(3) Shuttle change lever
(4) Steering wheel
(5) Brake pedal

(6) Accelerator pedal
(7) Control lever
(8) Auxiliary port lever

(9) Control lever lock knob
(10) Auxiliary port lever lock knob

INSTRUMENT PANEL



CHECKS BEFORE STARTING THE MACHINE

DAILY CHECK ITEMS

In order to avoid damage, it is important to check the condition of the machine before starting.

WARNING

To avoid personal injury or death:

- Be sure to check and service the machine on a level surface with the engine shut off.

Checks

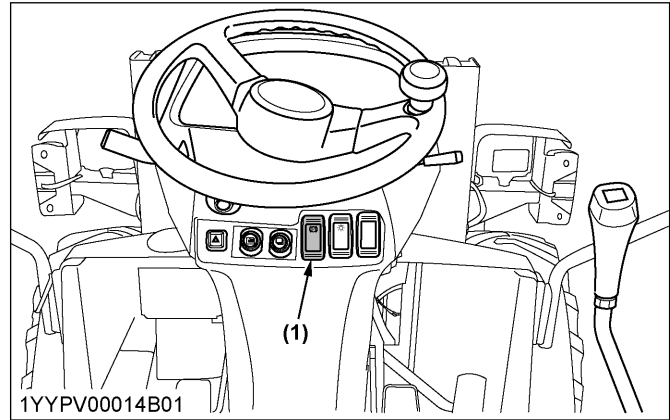
- Go around the machine and check for visual damage and wear.
- Check the coolant level.
(See Checking and replenishing the coolant on page 68)
- Check the fuel level.
- Check the engine oil level.
- Check the hydraulic fluid level.
- Check the dust indicator of air cleaner.
(See Checking the dust indicator on page 73)
- Check all control lamps, indicators, and hour meter.
- Check the light system.
- Check the seat belt and the ROPS/FOPS safety device.
- Check the condition of the pictorial safety labels.
(See SAFETY LABELS on page 15)

CHECKS FOR THE SWITCHES

1. Parking brake switch

The parking brake is to be used when parking the machine.

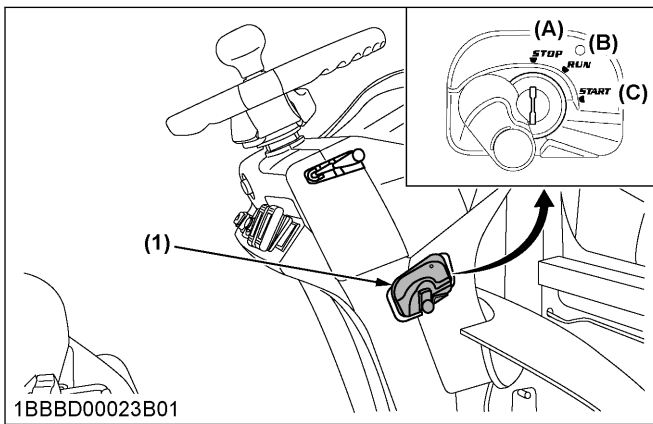
1. When the parking-brake-switch is pressed, the parking brake is applied and the (P) mark on the instrument panel appears.
2. When the parking-brake-switch is pressed again, the parking brake is released and the (P) mark on the instrument panel lights off.



(1) Parking brake switch

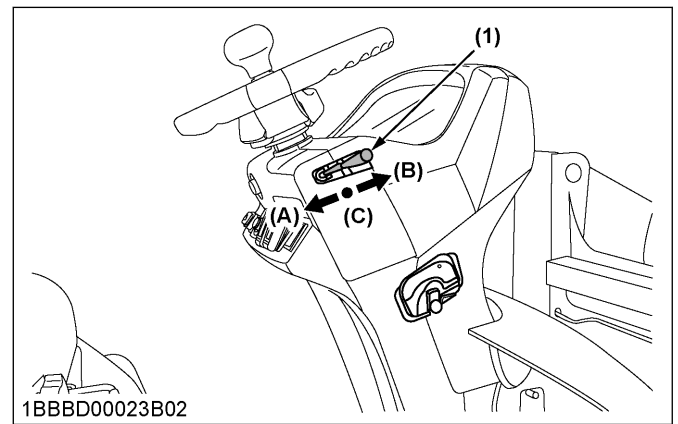
2. Starter switch

- **[STOP]**
You can insert the starter key at the **[STOP]** position.
- **[RUN]**
When turning the starter key one click from the **[STOP]** position to the **[RUN]** position, all the circuitry gets energized to start preheating and the glow-plug-indicator is displayed.
To check for breakage of any light and indicator, however, broken light or indicator lights up and stays on for about 1 second.
- **[START]**
 1. When turning the starter key from the **[RUN]** position another click to the **[START]** position, the starter motor is then activated to get the engine started.
 2. When releasing your hand from the starter key, the starter key returns itself to the **[RUN]** position.
In other words, once the engine has started, be sure to free the starter key.



(1) Starter switch

(A) STOP
(B) RUN
(C) START

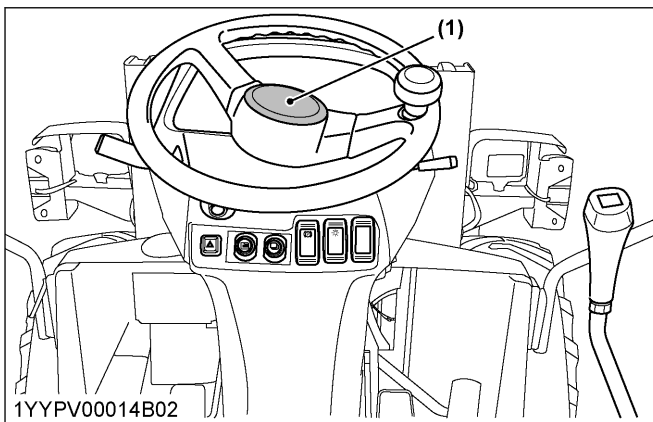


(1) Turn signal switch

(A) To blink right turn signal
(B) To blink left turn signal
(C) Neutral position

3. Horn switch

When pressing the horn switch, the horn will beep.
The horn switch is operative even when the starter key is in the **[STOP]** position.



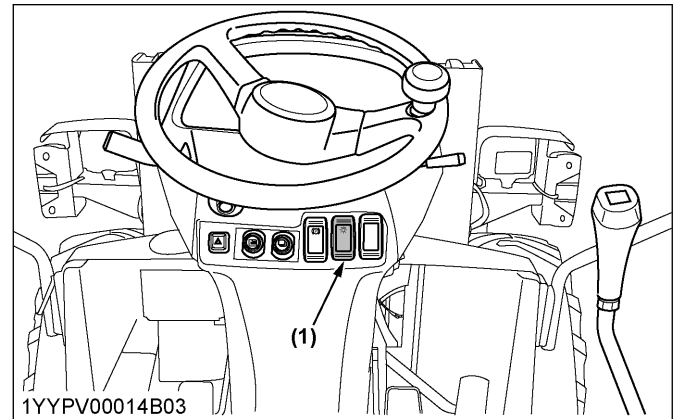
(1) Horn switch

4. Turn signal switch

Operate the turn-signal-switch to the right or left according to the direction in which the machine is to be turned. The corresponding turn signal will blink. Be sure to return the turn-signal-switch to the neutral position after the turn.

5. Light switch

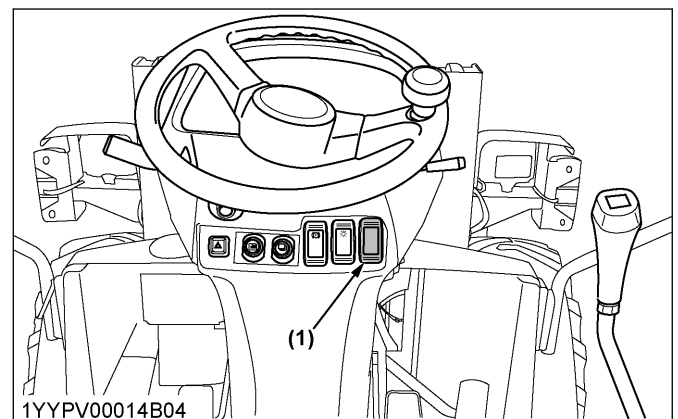
Press the light switch to turn on the headlight and clearance light, and instrument panel lights up.



(1) Light switch

6. Working light switch

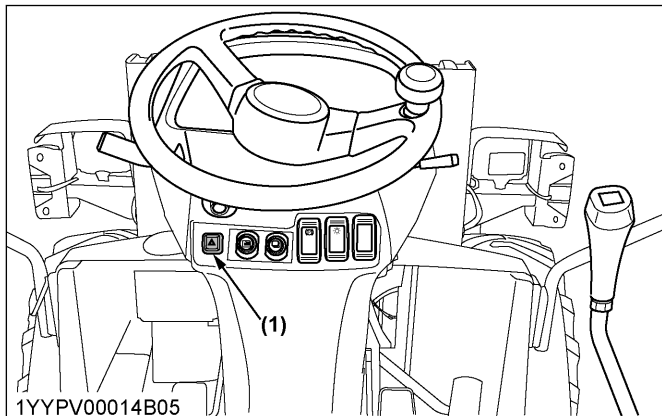
When pressing the working-light-switch with the starter switch in position **[RUN]**, the working light will be switched on.



(1) Working light switch

7. Hazard lamp switch

Press the hazard-lamp-switch for the hazard lamps to blink.

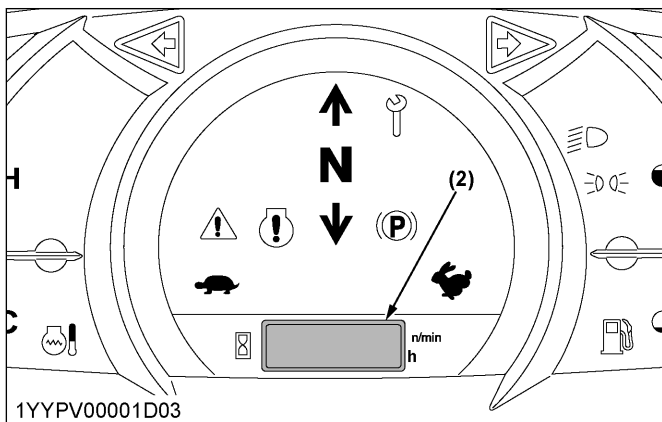
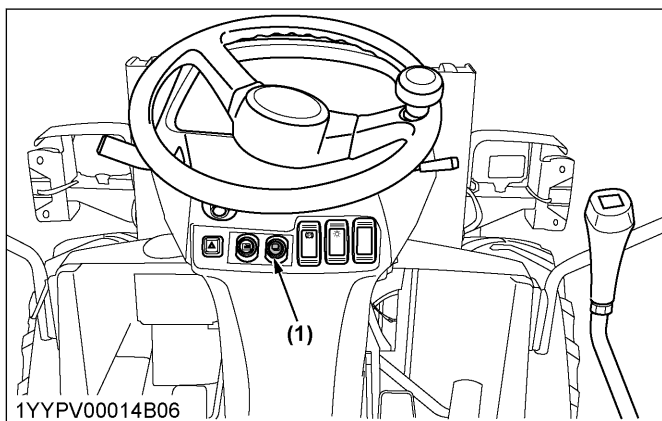


(1) Hazard lamp switch

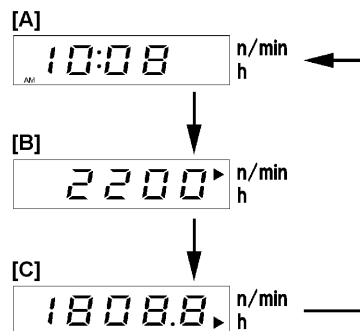
8. Display selector switch

When pressing the display-selector-switch, the LCD of the electronic meter will change from one indication mode to the other.

Change the 3-mode display according to your jobs.



(2)



1BBBD00028A01

- (1) Display selector switch
(2) LCD

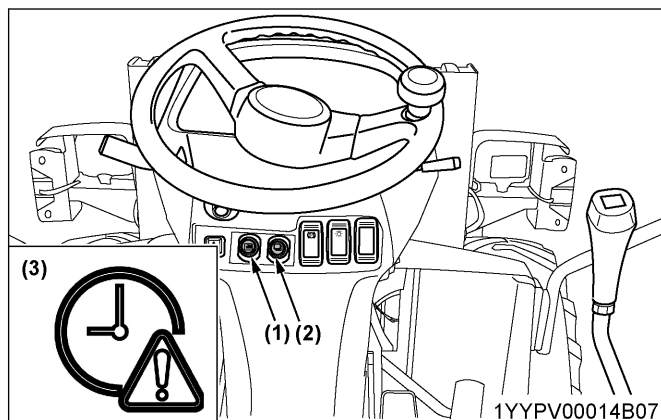
- [A] Clock
[B] Tachometer
[C] Hour meter

NOTE :

- With the starter key at the [STOP] position, press the display-selector-switch of the electronic meter, and the LCD shows the hour meter for 15 seconds.

8.1 Setting the clock

- Press the user-setting-switch.
- Select the clock-setting-mode by pressing the display-selector-switch.
The clock-setting-request-indicator  on the instrument panel lights up.



- (1) User setting switch
(2) Display selector switch

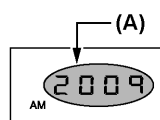
- (3) Clock setting request indicator

NOTE :

- Press the display-selector-switch for a long time and the year, month, day, hour, and minute will be selected in this order.
- While setting the clock, the clock-setting-request-indicator  on the instrument panel is blinking.

3. Set the year.

- Press the user-setting-switch and the numeric setting will be smaller.
- Press the display-selector-switch and the numeric setting will be larger.



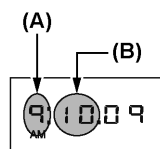
1BBBD00029A01

(A) *Blinking*

User setting switch	Display selector switch
2008 ↓	2008 ↓
2007 ↓	2009 ↓
2006	2010

4. Set the month.

- Press the user-setting-switch and the numeric setting will be smaller.
- Press the display-selector-switch and the numeric setting will be larger.



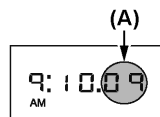
1BBBD00030A01

(A) *One's digit of the year*(B) *Blinking*

User setting switch	Display selector switch
10 ↓	9 ↓
9 ↓	10 ↓
8	11

5. Set the day.

- Press the user-setting-switch and the numeric setting will be smaller.
- Press the display-selector-switch and the numeric setting will be larger.



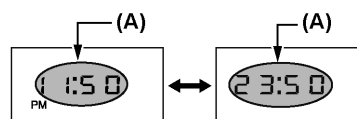
1BBBD00030B01

(A) *Blinking*

User setting switch	Display selector switch
09 ↓	09 ↓
08 ↓	10 ↓
07	11

6. Change the AM/PM system to the 24-hour system.

- a. Select the AM/PM system or 24-hour system by pressing the display-selector-switch.

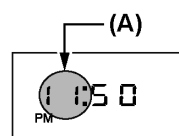


1BBBD00032A01

(A) *Blinking*

7. Set the hour.

- Press the user-setting-switch and the numeric setting will be smaller.
- Press the display-selector-switch and the numeric setting will be larger.

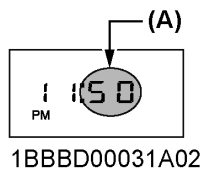


1BBBD00031A01

(A) *Blinking*

User setting switch	Display selector switch
11 ↓	10 ↓
10 ↓	11 ↓
9	12

8. Set the minute.
- Press the user-setting-switch and the numeric setting will be smaller.
 - Press the display-selector-switch and the numeric setting will be larger.



(A) Blinking

User setting switch	Display selector switch
50	50
↓	↓
49	51
↓	↓
48	52

If you press the display-selector-switch for a long time, the new settings will be decided.

NOTE :

- If the battery is disconnected, the clock-setting-request-indicator (yellow) will blink for requesting to set the clock.

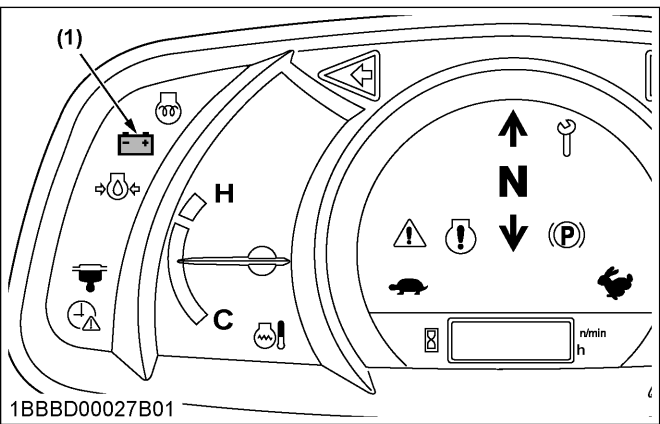
CHECKS FOR THE INDICATORS

1. Battery charge indicator

The battery-charge-indicator lights up if the charging system fails with the engine running. When the starter switch is turned to [RUN] with the engine off, the battery-charge-indicator lights up, and when the engine starts, the battery-charge-indicator goes out. If the battery-charge-indicator stays on with the engine running, stop the engine and check the fan belt.

NOTE :

- If there is disconnection or failure in the charging system when the starter key is turned to [RUN], the following symbol will appear.



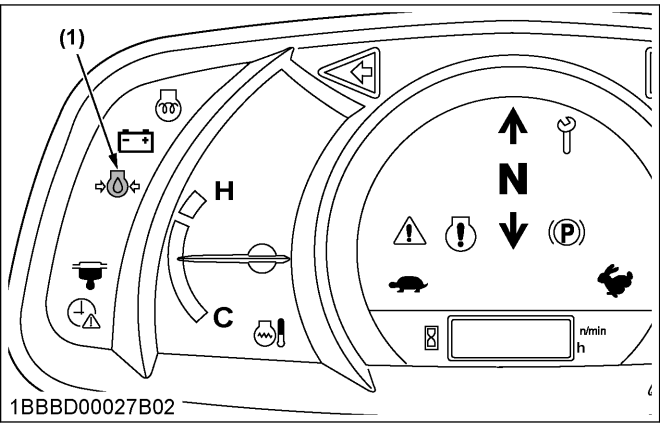
(1) Battery charge indicator

2. Engine oil pressure warning indicator

The engine-oil-pressure-warning-indicator lights up due to failure of the lubricating system with the engine running. When the starter switch is turned to [RUN] with the engine off, the engine-oil-pressure-warning-indicator lights up, and when the engine starts, the engine-oil-pressure-warning-indicator goes out. If the engine-oil-pressure-warning-indicator stays on with the engine running, stop the engine and check the level of the engine oil.

NOTE :

- If there is disconnection, failure or breakdown in the lubricating system when the starter key is turned to [RUN], the following symbol will appear.



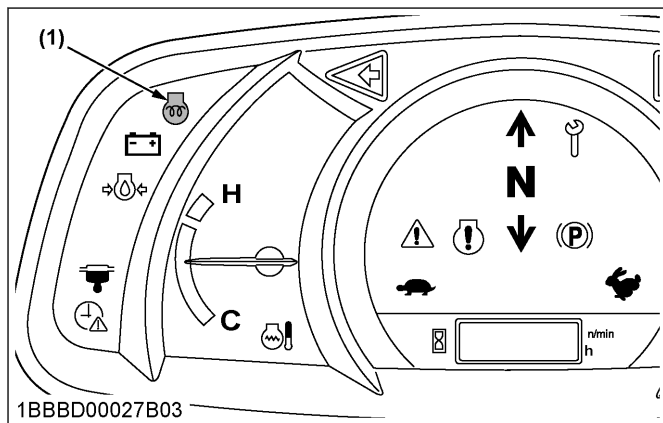
(1) Engine oil pressure warning indicator

3. Grow plug indicator

With the starter key at the [RUN] position, the preheat status of the engine is indicated.

NOTE :

- When the starter switch is turned to the [RUN] position, the engine will be preheated for a given period of time and the glow-plug-indicator will turn on.
- The indication of the glow-plug-indicator appears momentarily when the engine is started, but it does not indicate trouble. This is because the oil-charge-sensor-output fluctuates when the engine is started.
- The following symbol appears momentarily when the engine starts. This symbol appearing is not an error.

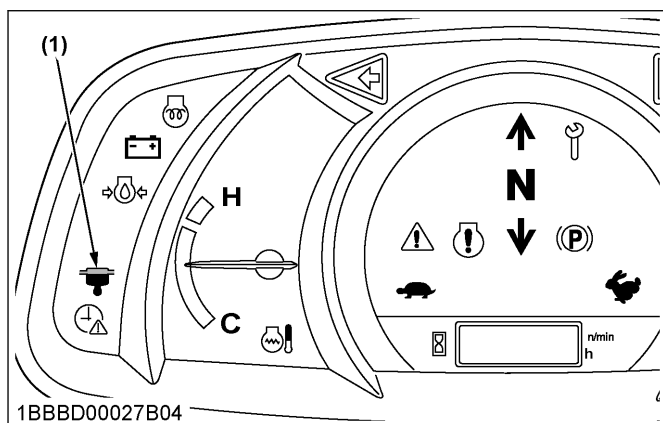


(1) Glow plug indicator

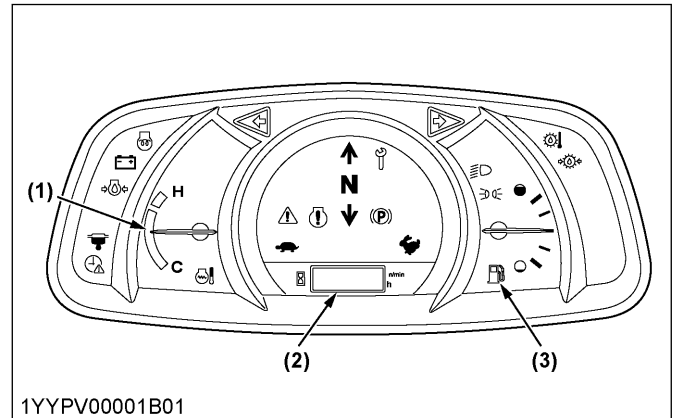
4. Water separator filled-up indicator

When the water separator is filled up, the water separator filled-up indicator lights up.

If the water separator filled-up indicator lights up, drain the water separator according to Draining the water separator on page 72.



(1) Water separator filled-up indicator

5. LCD for normal operation(1) Coolant temperature gauge (3) Fuel gauge
(2) LCD**NOTE :**

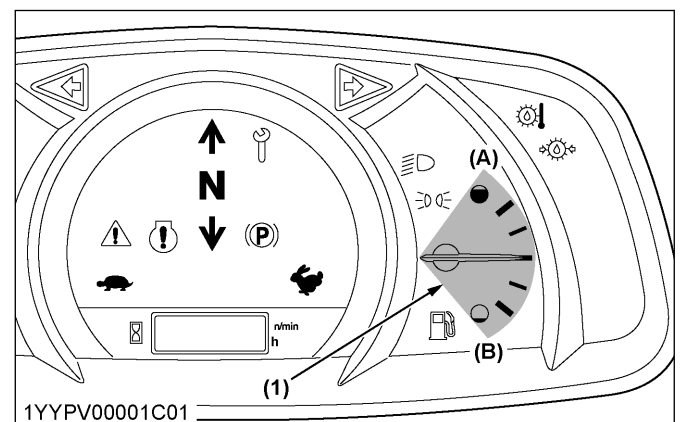
- The LCD may be illegible when viewed from a certain angle. The illegible condition is not a display failure.

5.1 Fuel gauge**! WARNING**

To avoid personal injury or death:

- Before adding the fuel, be sure to stop the engine.
- Be sure to keep the open flame away from the machine. Otherwise a fire may result.

With the starter key at the [RUN] position, the remaining fuel level is indicated.



(1) Fuel gauge

(A) Full
(B) Empty

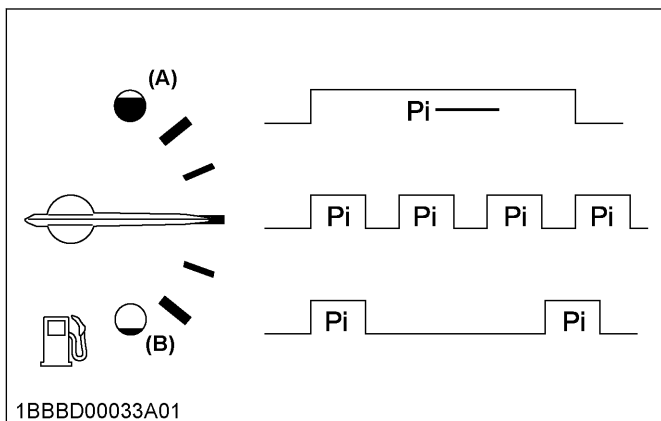
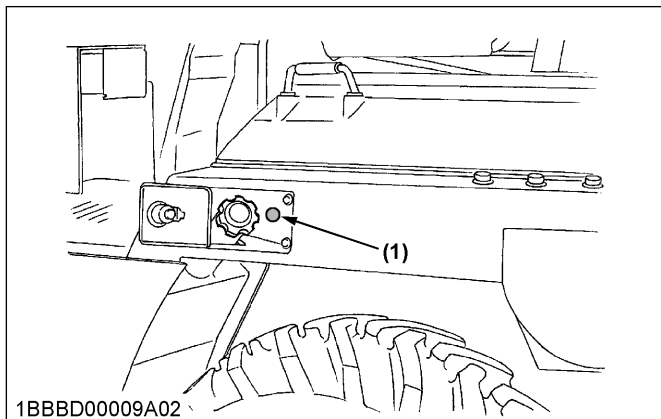
IMPORTANT :

- If the fuel-gauge-indicator is near the ○, add fuel as soon as possible. If the fuel-gauge-indicator is near ○ and the machine operates on a slope, the engine may run out of fuel.

5.1.1 How to use the fuel level audible indication switch

You can use the fuel-level-audible-indication-switch to check the fuel level when refueling.

1. With the starter key at the **[STOP]** position, press the fuel-level-audible-indication-switch. you can check the fuel level with buzzer sound.
2. Start refueling the machine.
The buzzer beeping intervals vary according to how much fuel is poured into the tank. When the fuel tank is full, the buzzer sounds almost continuously.
3. While refueling the machine, listen to the buzzer sound to know how much the fuel tank is filled. If fuel is poured too slowly, the buzzer sound gets interrupted. When it is poured again as usual, the buzzer restarts sounding.
4. To stop refueling halfway before filling up, press the fuel-level-audible-indication-switch or leave as it is (not refueling) for a while.
The buzzer stops sounding.
Always refuel from grounded tank or system.



- (1) Fuel level audible indication switch (A) Full (B) Empty

5.2 Coolant temperature gauge

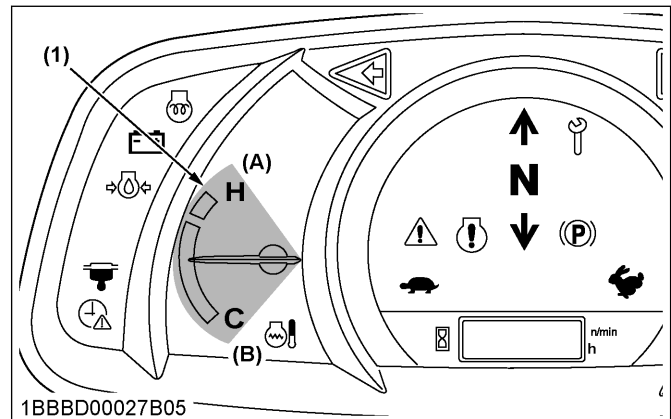
With the starter key at the **[RUN]** position, the coolant-temperature-gauge indicates the cooling water temperature.



WARNING

To avoid personal injury or death:

- Do not open the radiator cap during or just after operation. Hot coolant may gush out and scald you. Wait for the coolant to cool down before opening the radiator cap.



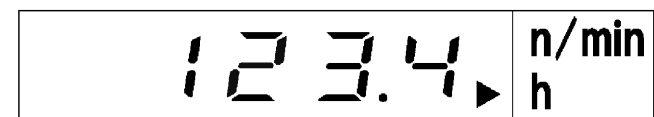
- (1) Coolant temperature gauge (A) Hot (B) Cool

5.3 Hour meter

Hour meter indicates the total operating hours of the machine.

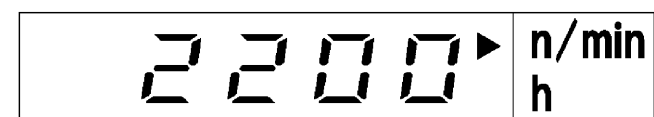
How the indicator works

The meter advances one hour after an hour of operation regardless of rpm of the engine.



5.4 Engine tachometer

Engine tachometer indicates the current rpm of the engine.



6. LCD for warning

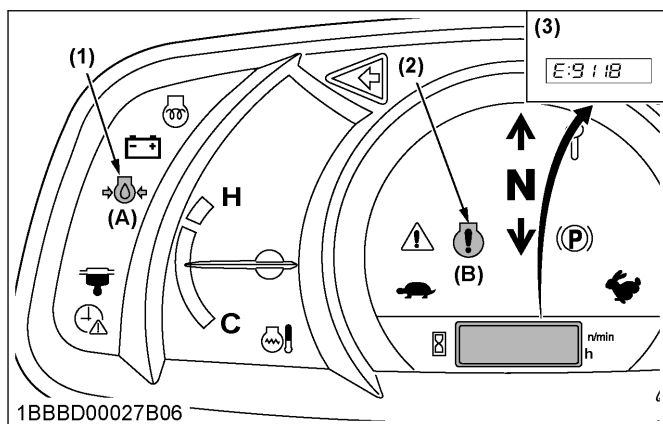
6.1 Engine oil pressure warning indicator

The engine-oil-pressure-warning-indicator lights up due to failure of the lubricating system with the engine running.

When the starter key is turned to the **[RUN]** position with the engine off, the engine-oil-pressure-warning-indicator lights up and the engine-warning-indicator blinks.

When the engine starts, the engine-oil-pressure-warning-indicator and the engine-warning-indicator go out.

If the engine-oil-pressure-warning-indicator stays on with the engine running, stop the engine and check the level of engine oil.



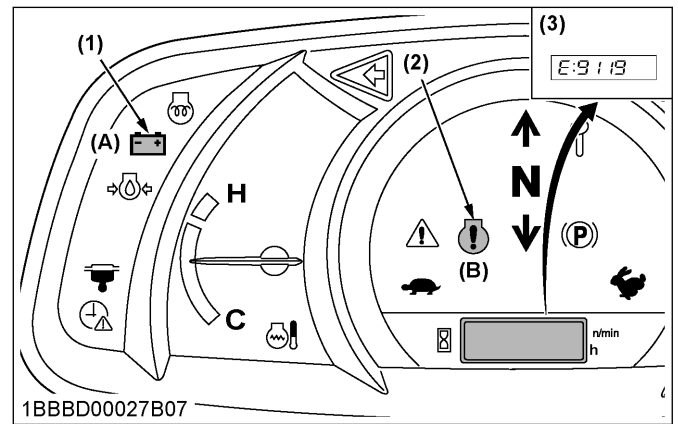
- (1) Engine oil pressure warning indicator (A) Lighting
(2) Engine warning indicator (red) (B) Blinking
(3) Warning message

6.2 Battery charge indicator

The battery-charge-indicator lights up if the charging system fails with the engine running.

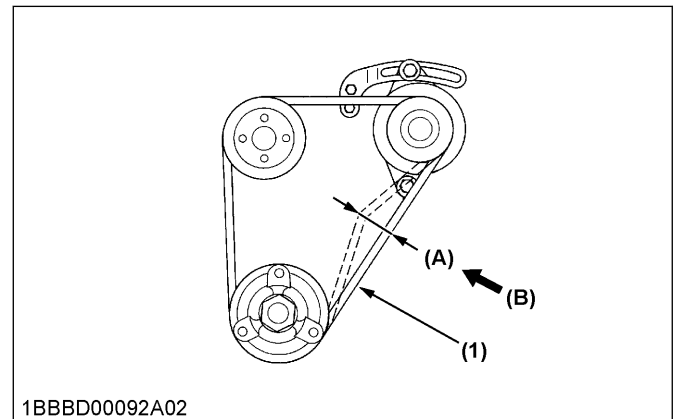
When the starter key is turned to the **[RUN]** position with the engine off, the battery-charge-indicator lights up and the engine-warning-indicator blinks.

When the engine starts, the battery-charge-indicator and the engine-warning-indicator go out.



- (1) Battery charge indicator (A) Lighting
(2) Engine warning indicator (red) (B) Blinking
(3) Warning message

If the battery-charge-indicator stays on with the engine running, stop the engine and check the V-belt.
(See 76)



- (1) V-belt
(A) Approx. 7 mm to 9 mm (0.3 inch to 0.4 inch)
(B) Approx. 6 kg to 7 kg (13.2 lbs. to 15.4 lbs.)

7. Warning indicator

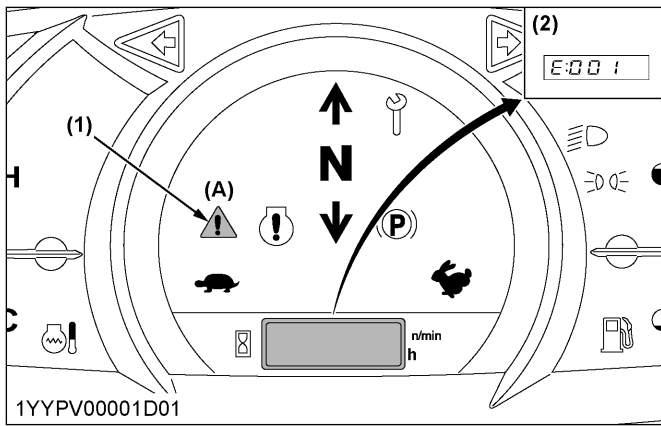
The warning indicator indicates broken wire, short-circuit, fuel shortage, and other problems.

IMPORTANT :

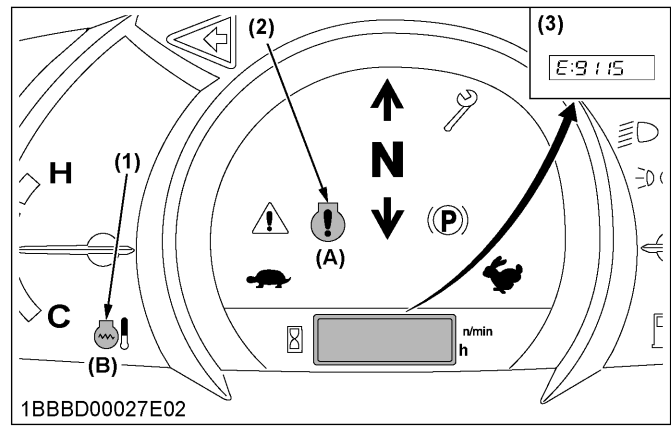
- Do not just look at the meter, but also carry out the inspection and correction accordingly.

NOTE :

- The warning indicator starts flashing in red if a serious problem occurs. If the system gets in warning signal, the warning indicator starts flashing in yellow.
- Warnings and errors are displayed and an alarm buzzer beeps.
- Let your KUBOTA dealer inform you of details concerning care and maintenance.



(1) Warning indicator (red) (A) Blinking
(2) Warning message

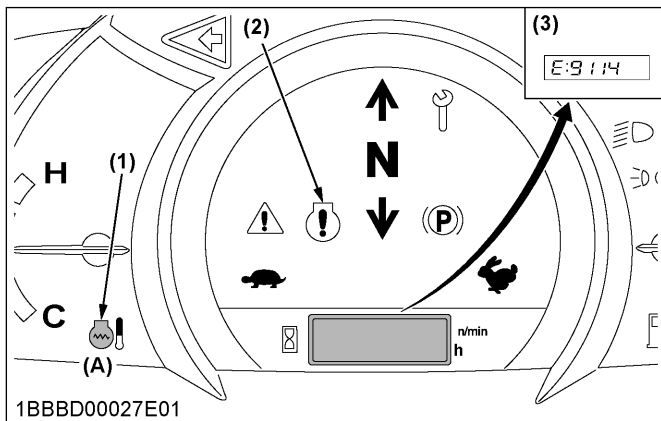


(1) Coolant temperature warning (A) Blinking indicator
(2) Engine warning indicator (B) Lighting
(3) Warning message

7.1 Overheat warning

1. If the coolant temperature becomes elevated, the coolant-temperature-warning-indicator blinks and the warning message ("E:9114") appears on LCD as long as the temperature remains elevated.
2. If the coolant temperature further increases, the coolant-temperature-warning-indicator lights up, the engine-warning-indicator blinks, and the warning message ("E:9115") appears on LCD as long as the coolant temperature remains elevated.

Operate the machine only with reduced loads until the operating temperature is normal again.



CHECKS FOR THE SAFETY LEVERS AND THE APPLIANCE

1. Safety key start system

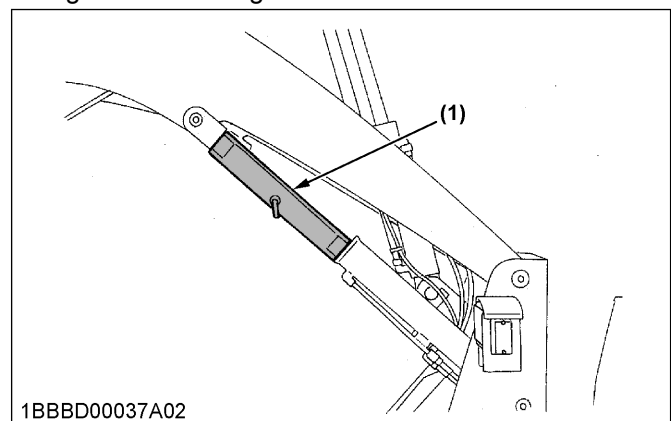
Safety-key-start-system is the safety system to prevent the machine from moving suddenly.

Set the parking-brake-switch to the parking position and the shuttle-change-lever to the neutral position before stopping the engine.

The safety-key-start-system does not allow the engine to start when the parking-brake-switch is out of the parking position, and the shuttle-change-lever and auxiliary-control-lever are out of the neutral position.

2. Lift arm support

The lift-arm-support prevents the loader-lift-arms from falling when servicing the machine.



(1) Lift arm support device

2.1 Installing the lift arm support



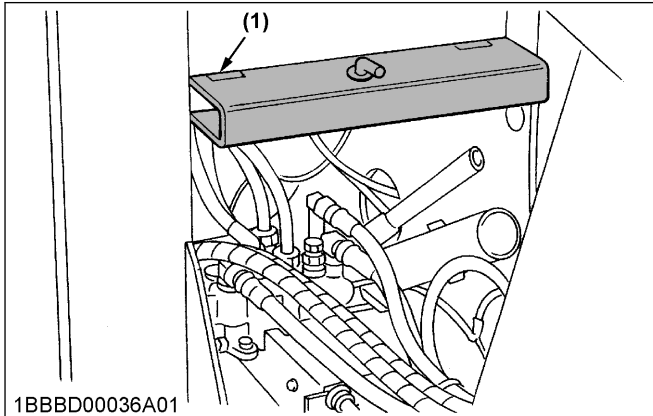
WARNING

To avoid personal injury or death:

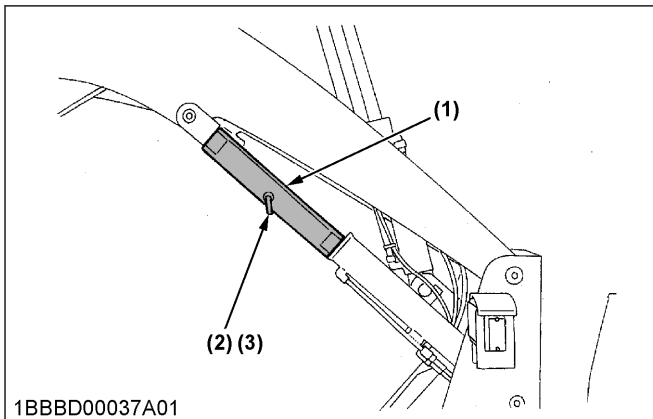
- Before installing the lift-arm-support, remove the front attachment, set the shuttle-change-lever to the neutral position, lock all control levers in neutral, and remove the starter key.

1. Remove the front attachment.
2. Raise the loader-lift-arms completely.
3. Stop the engine and remove the starter key.
4. Insert the lift-arm-support onto the lift-cylinder-rod.
5. Install the pin and snap pin in the lift-arm-support.
6. Slowly lower the loader-lift-arms onto the lift-arm-support.

Lift arm support (storage position)



Lift arm support (installed position)



- (1) Lift arm support device (3) Snap pin
(2) Pin

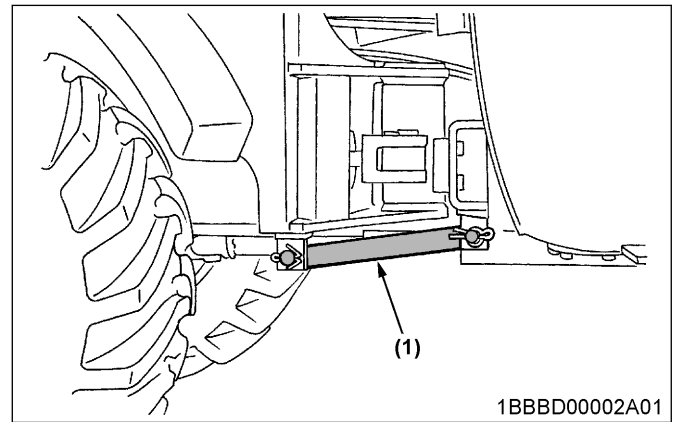
3. Steering frame lock

Steering-frame-lock locks the front and rear frames together to prevent the frames from articulating unexpectedly during servicing, hauling, or transporting the machine.

WARNING

To avoid personal injury or death:

- Secure the steering-frame-lock before servicing, hauling, or transporting the machine.



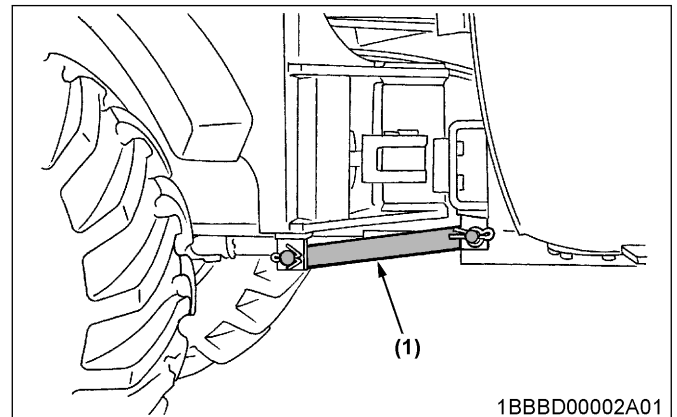
(1) Steering frame lock

IMPORTANT :

- Store the steering-frame-lock securely after use.

3.1 Attaching the steering frame lock

1. Align the front and rear frames.
2. Shut off the engine and remove the starter key.
3. Attach the steering-frame-lock with snap pins.
4. If holes are not aligned, move the steering wheel slightly with the engine off.



(1) Steering frame lock in lock position

4. Shuttle change lever lock knob

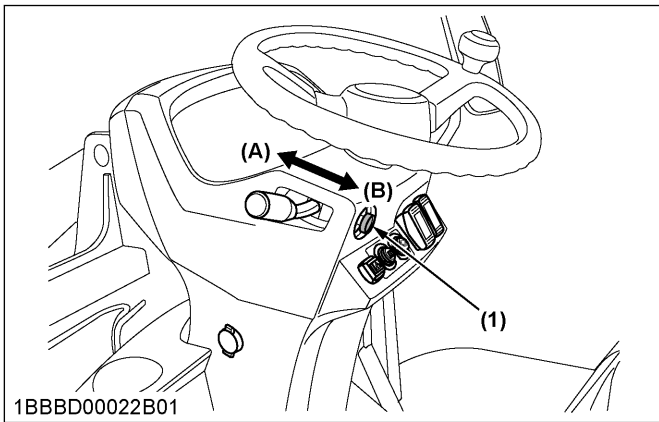
Shuttle-change-lever-lock-knob locks the shuttle-change-lever.

WARNING

To avoid personal injury or death:

- When dismantling the machine or when servicing the machine, be sure to set the parking brake, stop the engine, lower the bucket and the attachment to the ground, release the hydraulic pressure in the hydraulic system by operating control levers. Lock all control levers in neutral, and remove the starter key.

1. To lock the shuttle-change-lever, push the shuttle-change-lever-lock-knob with the shuttle-change-lever in the neutral position.
2. To unlock the shuttle-change-lever, pull the shuttle-change-lever-lock-knob.



(1) Shuttle change lever lock knob
(A) Lock
(B) Unlock

5. Control lever lock knob

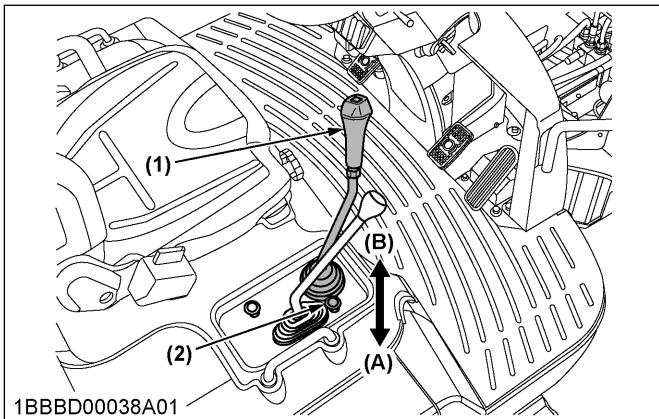
Control-lever-lock-knob locks the control lever.

! WARNING

To avoid personal injury or death:

- When dismantling the machine or when servicing the machine, be sure to set the parking brake, stop the engine, lower the bucket and the attachment to the ground, and release the hydraulic pressure in the hydraulic system by operating control levers. Lock all control levers in neutral, and remove the starter key.

1. To lock the control lever, push the control-lever-lock-knob with the control lever in the neutral position.
2. To unlock the control lever, pull the control-lever-lock-knob.



(1) Control lever
(2) Control lever lock knob
(A) Lock
(B) Unlock

6. Auxiliary port lever lock knob

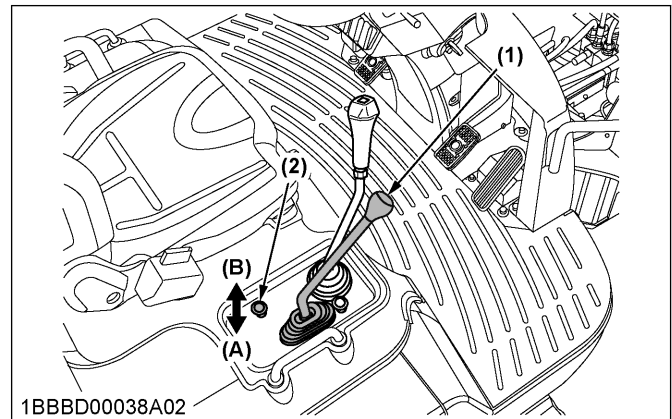
Auxiliary-port-lever-lock-knob locks the auxiliary-port-lever.

! WARNING

To avoid personal injury or death:

- When dismantling the machine or when servicing the machine, be sure to set the parking brake, stop the engine, lower the bucket and the attachment to the ground, and release the hydraulic pressure in the hydraulic system by operating control levers. Lock all control levers in neutral, and remove the starter key.
- In case of the auxiliary-port-lever is used for the hydraulic-quick-coupler, always lock the auxiliary-port-lever after installing the front attachment (bucket, and so on) to the hydraulic-quick-coupler. If the machine is operated without the lock, it causes serious injury or death.

1. To lock the auxiliary-port-lever, push the auxiliary-port-lever-lock-knob with the auxiliary-port-lever in the neutral position.
2. To unlock the auxiliary-port-lever, pull the auxiliary-port-lever-lock-knob.



(1) Auxiliary port lever
(2) Auxiliary port lever lock knob
(A) Lock
(B) Unlock

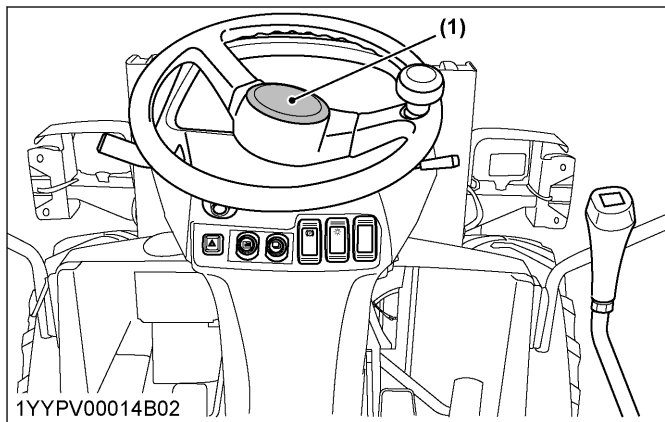
OPERATION OF THE ENGINE

PRECAUTIONS FOR OPERATING THE ENGINE

WARNING

To avoid personal injury or death:

- To avoid the danger of exhaust fumes (carbon monoxide) poisoning, do not operate the machine in a closed building or any closed area without proper ventilation.
- Always start the engine from the operator's seat. Do not start the engine while standing next to the machine. Before starting the engine, sound the horn to get the attention of persons standing nearby.



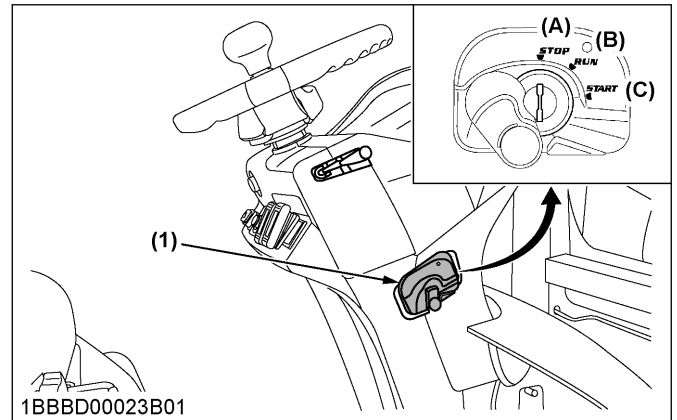
(1) Horn switch

IMPORTANT :

- Do not use starting fluid or ether.
- In order not to overload the battery and starter, avoid start-ups of more than 10 sec.
- When the engine does not start in 10 sec., please wait 20 sec. or more, before restarting.

STARTING THE ENGINE

1. Insert the starter key into the starter switch and turn it to the [RUN] position.

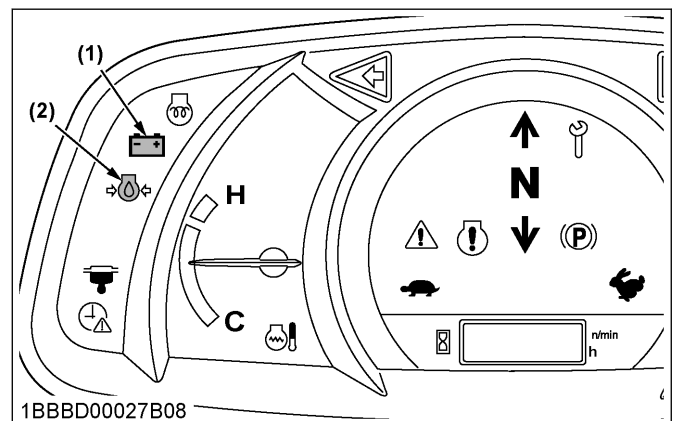


(1) Starter switch

(A) STOP
(B) RUN
(C) START

The glow-plug-indicator will light up while the engine is preheated and will go out automatically after preheating is finished.

2. Make sure that the  and  marks appear on the instrument panel.
If the  and  marks do not appear, the system is malfunctioned. Contact your local dealer.



(1) Battery charge indicator

(2) Engine oil pressure warning indicator

3. Turn the starter key to the [START] position and release after the engine has started.

- Check if all warning indicators except parking-brake-indicator have gone out. If a warning indicator still should be lit up, stop the engine then remove the starter key and check for the cause.

IMPORTANT :

- The starter motor consumes large current. Avoid running the starter motor longer than 10 seconds continuously.
If the engine fails to start within 10 seconds, once set the starter key to the [STOP] position, wait for 20 seconds or longer, and repeat the same steps.
- If the battery is dead and must be connected to another battery with jumper cable, be sure to use a 12V battery. Never use any 24V batteries.

NOTE :

- When the auxiliary-port-lever or the shuttle-change-lever is not in the neutral position, or the parking-brake-switch not in the parked position, the engine does not start.

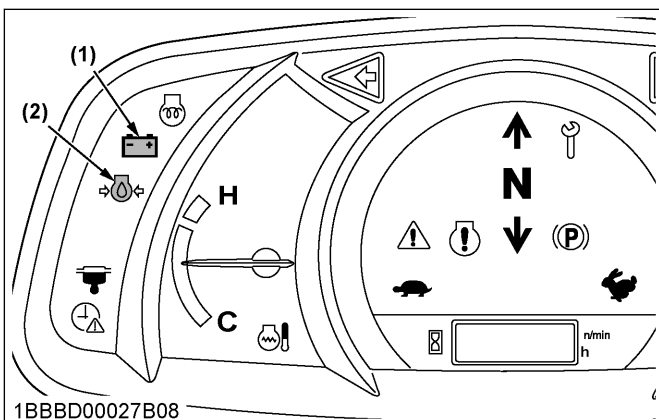
1. Checkpoints after starting the engine

After starting the engine, but before starting operation, check the following points:

- The engine idle allows the engine lubricant to warm up and penetrate every part of the engine.

NOTE :

- This idling is usually called “Warm-up”.
- Once the engine has warmed up, check:
 - The engine-oil-pressure-warning-indicator has gone out.
 - The battery-charge-indicator goes out when engine speed is increased.
 - The color of the exhaust is normal and no abnormal noises or vibrations are heard or felt.
 - No fluid is leaking from pipes or hoses.



(1) Battery charge indicator

(2) Engine oil pressure warning indicator

Conditions to stop the engine immediately

If any following conditions should occur, stop the engine immediately.

- The engine rpm increases or decreases suddenly.
- Sudden abnormal noises are heard.
- Exhaust is black.
- Warning indicator for engine oil lights up during operation.

IMPORTANT :

- In the preceding cases, check the machine and ask your local KUBOTA dealer to service.

STARTING THE ENGINE UNDER COLD CONDITIONS

Start the engine in the manner in this section in cold weather.

- Turn the starter switch to the [RUN] position (glow position) and hold until the indicator lamp has gone out.
- Move the starter switch to the [START] position to crank and start engine.
- Release the starter switch after the engine has started.
Starter switch will automatically return to the [RUN] position.

IMPORTANT :

- Let the engine warm up after start-up for approx. 10 minutes under no load conditions. If the temperature of hydraulic fluid is too low, the operations or the function of the pressure sensors will be affected.
Do not operate the machine under full load before the engine has warmed up enough.

STOPPING THE ENGINE

**WARNING**

To avoid personal injury or death:

- Do not keep the bucket or attachments in the lifted position, because a person could accidentally touch the levers and cause serious accidents.
- Place the machine on the flat ground.

IMPORTANT :

- Do not stop the engine before it cools sufficiently, or the service life of the engine parts may be shortened.
- If the engine overheats, do not stop it immediately but cool it gradually by running it at medium speed before stopping.

- **Do not stop the engine by shutting down the battery power directly with a battery switch or by other means. Doing so may cause failure or malfunction.**
1. Idle the engine for about 5 minutes to allow it to cool.
 2. Slowly operate the control lever to place the bucket on the ground.
 3. Turn the starter key to the **[STOP]** position.

The engine stops.

STARTING THE ENGINE WITH AN AUXILIARY BATTERY

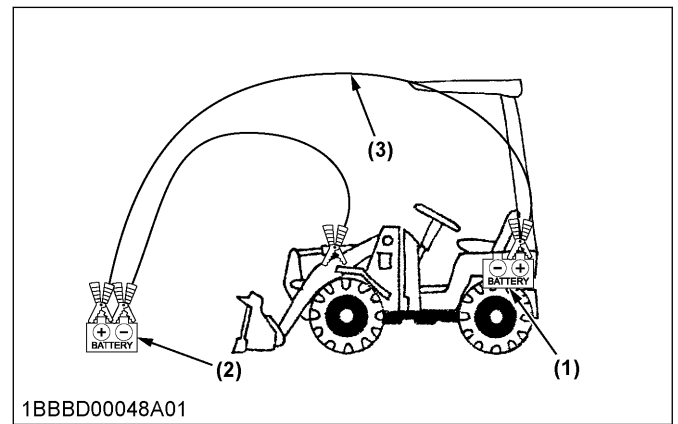
Follow the guidelines in this section when starting the engine with an auxiliary battery.



WARNING

To avoid personal injury or death:

- **Battery gases can explode. Do not smoke and keep sparks and flames away.**
 - **Do not start the engine with an auxiliary battery if machine battery is frozen.**
 - **Do not connect the black jumper cable to the negative (-) terminal of the machine battery.**
1. Bring the helping machine with the same battery voltage as near as possible to the machine.
- IMPORTANT :**
- **The machines must not come in contact with each other.**
2. Bring the levers and pedal of both machines in the neutral position.
 3. Wear eye protection and rubber gloves.
 4. Make sure that the vent caps are securely in place if equipped.
 5. Connect the terminal of the red jumper cable with the plus (+) terminal of the low battery and connect the other end of the cable to the plus (+) terminal of the auxiliary battery.
 6. Connect the black negative cable to the minus (-) terminal of the auxiliary battery.
 7. Connect the other end of the black cable coming from the auxiliary battery to the conductive part of the machine frame as far away as possible from the low battery.
 8. Start the engine of the helping machine and let it run for a while.
 9. Start the machine with the low battery.
 10. Disconnect the jumper cables in the reverse sequence.



(1) Low battery

(2) Auxiliary battery

(3) Jumper cables

IMPORTANT :

- **This machine equips a negative (-) ground 12 Volt starting system.**
- **Only use the same voltage when using an auxiliary battery.**
- **Using a higher voltage will cause serious damage to the electrical system. When using an auxiliary battery, only the compatible (same) voltage is permissible.**

OPERATION OF THE MACHINE

PRECAUTIONS FOR OPERATING THE MACHINE

WARNING

To avoid personal injury or death:

- Follow the safety instructions.
- You may only operate the wheel loader according to its approved use.
- Only trained personnel may operate the wheel loader.

(See PRECAUTIONS FOR OPERATING THE MACHINE on page 8, General precautions on page 7, and PRECAUTIONS FOR SERVICING THE MACHINE SAFELY on page 11)

GUIDE FOR THE OPERATOR

If the operator's working and driving area is obscured, a guide must support the operator.

- The guide must be capable of performing operating kind of work.
- Before starting work, the guide and the operator must agree the necessary signals.
- The guide's position must be clearly visible by the operator.
- The operator must stop the wheel loader immediately if the eye contact to the guide is interrupted.
 - As a rule, either the wheel loader or the guide may move, never both at once!.

WORKING IN THE VICINITY OF OVERHEAD POWER LINES

When working with the wheel loader in the vicinity of overhead power lines and tram lines, a minimum distance as specified in the following table must be maintained between the wheel loader and its attachments and the power line.

Rated voltage		Safe distance
	up to 1 kV	1.0 m
over 1 kV	up to 110 kV	3.0 m
over 110 kV	up to 220 kV	4.0 m
over 220 kV	up to 380 kV or when rated voltage is unknown	5.0 m

If you can not maintain the safe distances, the power lines must be switched off in coordination with their owner or provider and secured against forcing them to live again.

When approaching the overhead power lines, take any possible movements of the wheel loader into consideration.

Unevenness of the ground or sloping the wheel loader can reduce the safe distance.

Wind can cause the overhead power lines to sway, thus reducing the safe distance.

In case of a power cross-over, leave the danger zone with the wheel loader, if possible, by taking suitable measures. If leaving the danger zone with the wheel loader is not possible, do not leave the operator's place, warn any approaching persons of the danger, and have the power switched off.

RUNNING-IN OF THE MACHINE

The operation and care of the new machine influences its life span. Your new machine has been carefully checked and tested before leaving the factory. In spite of carefully check and test, all movable components must run-in during the first 50 work hours. Do not work with full rpm and full loads during first 50 work hours. It is most important to run-in your machine properly in order to achieve its full performance and longevity. During the running-in, you should adhere to the following points in all cases.

- **Do not work with full engine rpm or full loads during the first 50 working hours**
 - Let the engine warm up sufficiently in the cold season.
 - Do not let the engine rev-up more than necessary.
- **Oil change in the run-in stage**

The lubrication oil plays a specific and important role during the run-in phase of the machine. The numerous movable parts are not yet run-in, so many fine metal particles can be generated and may cause damage and shorten the life of many components. Pay attention to the oil-change intervals and complete them sooner than later. For more details on the oil-change intervals, see MAINTENANCE INTERVALS on page 63.

STARTING OF THE MACHINE

1. Precautions for starting the machine

WARNING

To avoid personal injury or death:

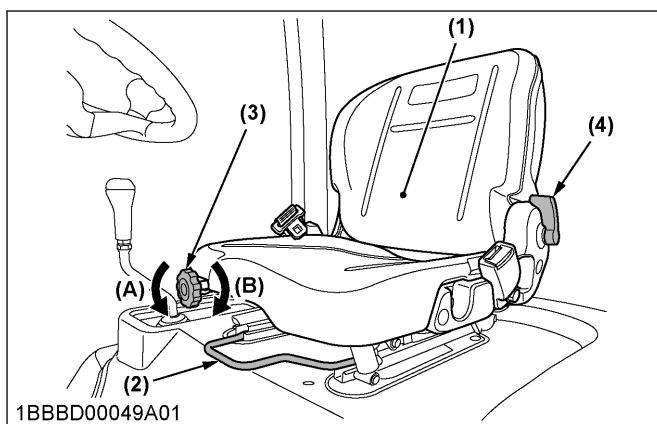
- Mount the machine and dismount the machine only at locations that have steps and/or handholds.
Before you mount the machine, clean the steps and the handholds.
- Start the engine only from the operator's seat. Never short across the starter terminals or across the batteries.
- Inspect the condition of the seat belt and the mounting hardware.
Replace any parts that are worn or damaged.
Do not use a seat belt extension on a retractable seat belt.
- Make sure that the machine is equipped with a lighting system that is adequate for the job conditions.
Make sure that all machine lights are working properly.
- Before you start the engine and before you move the machine, make sure that no one is underneath, or on, or close to the machine.

2. Adjusting the operator's seat

WARNING

To avoid personal injury or death:

- Make sure that the operator's seat is completely secured after each adjustment.



- 1BBBD00049A01
- | | |
|--------------------------------------|------------------------|
| (1) Operator's seat | (A) Turn anticlockwise |
| (2) Horizontal seat adjustment lever | (B) Turn clockwise |
| (3) Spring adjustment knob | |
| (4) Backrest adjustment lever | |

Horizontal seat adjustment

1. Pull the horizontal-seat-adjustment-lever up and move the operator's seat to the desired position by moving it forward or back.
2. Then release the horizontal-seat-adjustment-lever.

Spring adjustment (operator's weight)

You can set the operator's seat to the weight of the operator using the spring-adjustment-knob. Refer to the weight indicator when choosing your setting.

1. Adjust the seat so that a comfortable cushioning is achieved.
 - Turning the spring-adjustment-knob clockwise (B) increases spring tension (heavy-weight operator).
 - Turning the spring-adjustment-knob anticlockwise (A) reduces spring tension (light-weight operator).

Backrest adjustment

1. Take the load off the backrest and pull up the backrest-adjustment-lever.
2. Set the backrest to the desired sitting position and release the backrest-adjustment-lever.

IMPORTANT :

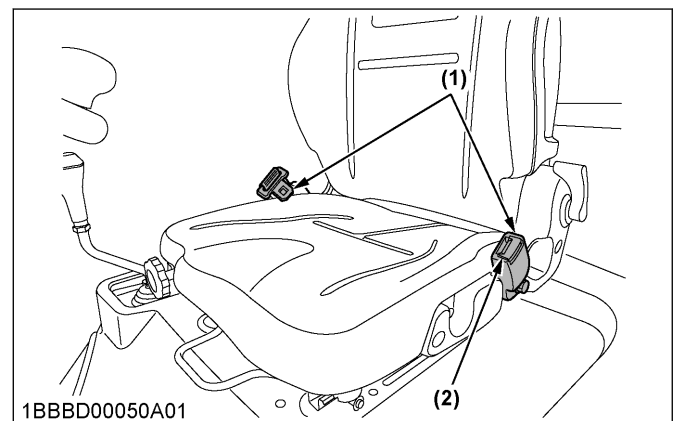
- Adjust the backrest so that the operator can safely operate the control levers with the back resting completely on the backrest.

3. How to use the seat belt

WARNING

To avoid personal injury or death:

- Always use the seat belt with a ROPS/FOPS protection structure. Adjust the operator's seat to the optimal position and buckle it up.
- Always fasten the seat belt securely before starting the engine.



- 1BBBD00050A01
- | | |
|---------------|------------|
| (1) Seat belt | (2) Button |
|---------------|------------|

Fastening the seat belt

1. Pull the seat belt from the retractable (right) side of the operator's seat.

- Insert the fixture of the seat belt into the socket at the left side of the operator's seat until the fixture clicks deep into position.

Releasing the seat belt

- Press the red button of the socket to release the seat belt.
The seat belt reels itself and gets retracted to the right side.

TRAVELING WITH MACHINE

1. Starting to travel with machine

WARNING

To avoid personal injury or death:

- Fasten the seat belt before operating the machine.
- When transporting a load, keep the loader bucket as low as possible to avoid tip over. Be extra careful when working on inclines.
- Before operating, check the operating area. Make sure that no bystanders are near the machine. Sound the horn before moving.
- To start the machine on a slope, press the accelerator pedal gradually while releasing the inching pedal so that the machine does not move backwards.
- After starting the machine, immediately check that the brake and the steering wheel work normally.
- If a tire has blown, the machine may slip or turnover. To avoid turnover, do not brake or steer hard, brake slowly to stop the machine gradually.

- Pull the control-lever-lock-knob for releasing the control lever.
- Move the control lever to lift the bucket as follows and set it in the proper position for travel.

Bucket	About 40 cm above the ground
--------	------------------------------

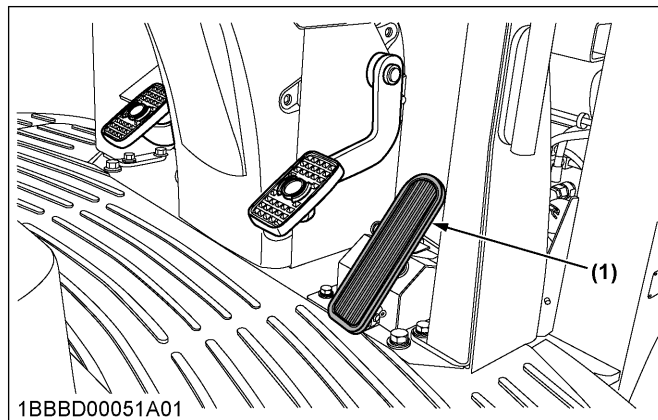
- Press the parking-brake-switch for releasing the parking brake.
When the parking brake is released, the light on the parking switch comes off.
- Pull the shuttle-change-lever-lock-knob for releasing the shuttle-change-lever-lock.
- Set the shuttle-change-lever to the desired position.
- Gradually increase the engine rpm by pressing the accelerator pedal.

The machine will move.

2. Accelerator pedal

Accelerator pedal controls the engine rpm.

The more the accelerator pedal is pressed, the greater the engine rpm.



(1) Accelerator pedal

NOTE :

- When the accelerator pedal is released, the engine speed will drop.
- Suitable engine rpm for traveling with the machine on a plain ground is as follows, though depending on the situations, that is, ground condition, weather, and so on. Press the accelerator pedal gradually when starting the machine.

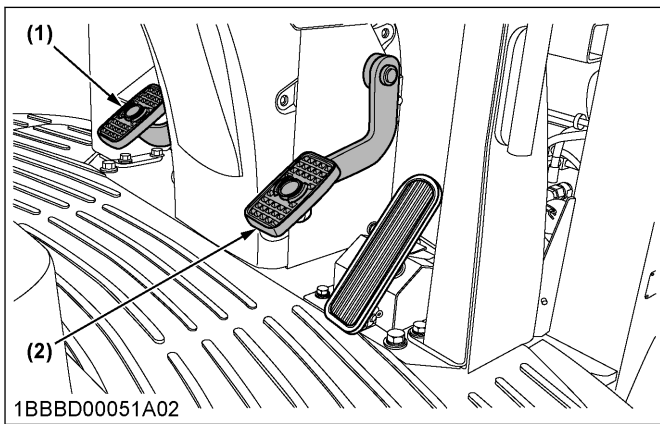
Engine rpm	About 1050 rpm to 1250 rpm
------------	----------------------------

3. Inching and brake pedal and brake pedal

Press either inching-and-brake-pedal or brake pedal down slightly, then the load-sensing-transmission (LST) pump comes in neutral and cuts off the engine power on the way of the transmission, that is so-called "dynamic brake", unique to LST.

When pressing the pedal which you press further, the disc brake acts together to obtain the strong braking effect.

For the details of inching-and-brake-pedal, see Operating the inching and brake pedal on page 52 and Using the inching and brake pedal according to the job on page 53.



(1) Inching and brake pedal (2) Brake pedal

4. Shuttle change lever

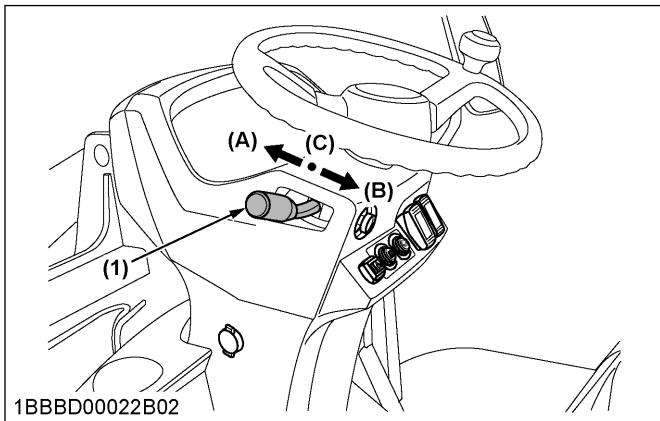
Shuttle-change-lever changes the running direction of machine, forward or back.

WARNING

To avoid personal injury or death:

- To prevent the machine from moving suddenly or unexpectedly, be sure and push the shuttle-change-lever-lock-knob to lock the shuttle-change-lever whenever getting on or off.

Push the shuttle-change-lever forward for forward direction, and pull it back for backward direction.



(1) Shuttle change lever
(A) Forward
(B) Backward
(C) Neutral

IMPORTANT :

- When unreasonable power is applied other than forward or backward direction of the shuttle-change-lever, it could cause the shuttle-change-lever to be broken.
- If the temperature of hydraulic oil is too low, the reserve alarm may start sounding when switching from the backward to the forward travel. Sounding the reserve alarm is not a problem. Just force a warm-up run, and then the temperature of hydraulic oil rises and the

reserve alarm will stop. If the reserve alarm still keeps sounding, contact your local KUBOTA dealer.

NOTE :

- When the shuttle-change-lever is in the neutral position, the neutral indicator on the instrument panel goes on.
- When the shuttle-change-lever is in the forward position, the forward indicator on the instrument panel goes on.
- When the shuttle-change-lever is in the backward position, the backward indicator on the instrument panel goes on.
- When the machine begins to travel backward, the back buzzer starts sounding.

5. Travel speed switch

Travel-speed-switch serves to change the maximum speed and low speed.

WARNING

To avoid personal injury or death:

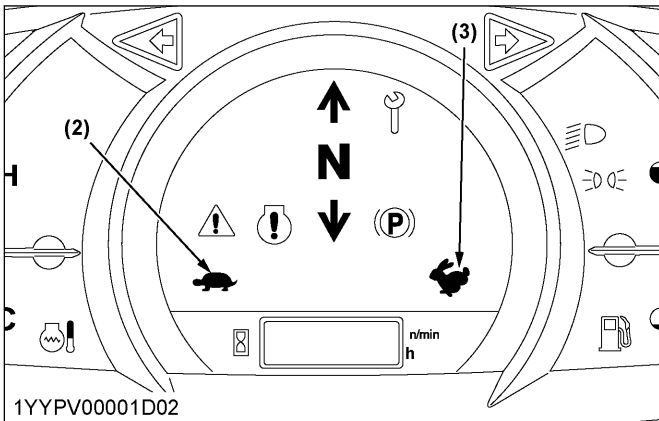
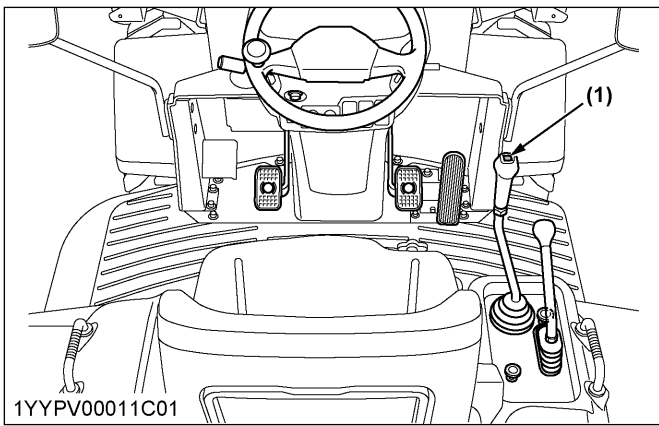
- While descending a slope in the high speed, be extremely careful when applying the travel-speed-range from the high speed, there is the risk of the rear lifting of machine which could be dangerous.
- When descending a slope, use the engine brake to slow the machine.

1. Pressing the travel-speed-switch, the high-travel-speed-indicator goes out and the low-travel-speed-indicator lights up. Then travel speed is limited to the following values.

Travel speed	4.8 km/h
--------------	----------

2. Pressing the travel-speed-switch again, the low-travel-speed-indicator goes out and the high-travel-speed-indicator lights up. Then maximum travel speed is as follows.

Travel speed	20 km/h
--------------	---------



(1) Travel speed switch (3) High travel speed indicator
(2) Low travel speed indicator

6. Precautions for turning the machine

! WARNING

To avoid personal injury or death:

- Do not turn sharply at high speeds. It is dangerous. In the worst possible case, the machine may turn over.
- The steering wheel for this machine will not return of itself to the straight ahead position after turning. Be sure to return the steering wheel to the straight ahead position.
- Steering lose will result if the engine is stopped during travel.
Do not stop the engine during travel.

To steer the machine to either side, turn the steering wheel in the intended direction.

- The front and rear frames of this machine bend at the center pin (the pin connecting the 2 frames) so that when the machine turns, the rear wheels follow the tracks of the front wheels.
- Rotate the steering wheel to follow the turn of the machine. When turning fully, never attempt to rotate the steering wheel once it reaches its full stroke.

7. Rule to decelerate on a slope

! WARNING

To avoid personal injury or death:

- Going up or down a slope diagonally is dangerous because the machine may skid. Always drive or operate straight up or down a slope, or the machine may slip side ways and tip over.
- Use the foot brake together with engine brake if the machine tends to over-run when descending a slope.
- If the engine should stall on a slope, set the parking-brake-switch to the parking position immediately for safety purpose, although the disc brake is automatically applied. Then set the shuttle-change-lever to the neutral position to prepare for the next start.
- When descending down along slope, use the engine brake. Using the foot brake alone accelerates wear of the brake pad, causes heat buildup, and will result in poor brake performance.

8. Precautions for traveling on rough roads

! WARNING

To avoid personal injury or death:

- Slow down when turning on rough uneven terrain and slopes to avoid tip over.

9. Precautions for traveling on snow

! WARNING

To avoid personal injury or death:

- There is the risk of the machine slipping excessively on frozen ground. Install chains on the front wheels. For operation on snow, install chains on both front and rear wheels.

When traveling on snow, it is important to keep the wheels and their related parts in good condition.

After traveling, be sure to remove all snow and ice from the wheels and their related parts.

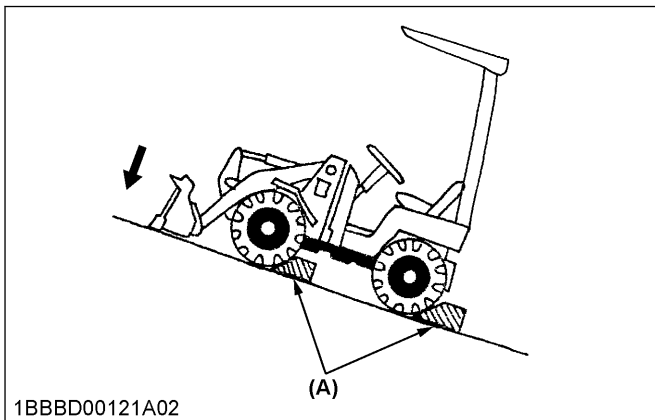
STOPPING THE MACHINE

! WARNING

To avoid personal injury or death:

- Choose flat and level ground for parking the machine. It is important to lower the bucket to the ground.
- If you must park the machine on a slope, be sure to block the tires securely.
- When dismantling the machine, set the parking brake, stop the engine, lower the bucket and attachment to the ground, release the hydraulic pressure in the hydraulic system by operating control levers, lock all control levers in neutral, and remove the starter key.

1. Remove foot from the accelerator pedal.
2. Depress the brake pedal and stop the machine.
3. Set the parking brake.
4. Stop the engine.
5. Lower the bucket and attachment to the ground.
6. Release the hydraulic pressure in the hydraulic system.
7. Lock all control levers in neutral.
8. Remove the starter key.



(A) Block the tires

OPERATION OF THE LIFT ARM AND THE BUCKET

1. Control lever

The control lever controls all the bucket and lift arm operations.

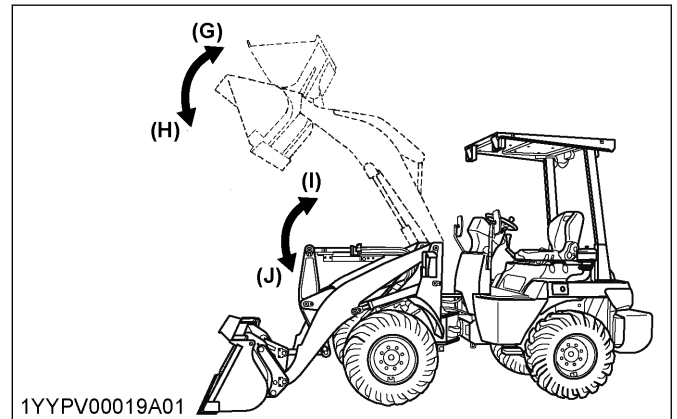
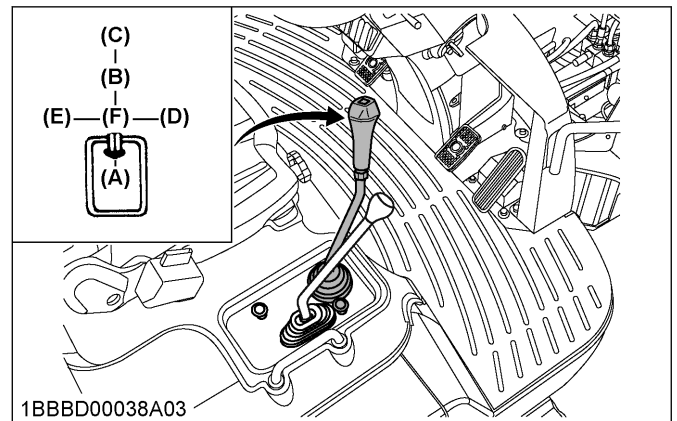


WARNING

To avoid personal injury or death:

- Do not exceed the rated operating capacity of the unit. If loads exceed the rated operating capacity, the unit can experience a hydraulic imbalance when half or medium “lift-arms-raise” command and “bucket-roll-back” or “auxiliary-hydraulic-control” command are input together, which can result in the lift arms lowering slowly. If you begin to experience the hydraulic imbalance, either place the lift arms

control in “NEUTRAL” or input full “RAISE” control, and lift arms lowering will cease.



- | | |
|--------------------------|---------------|
| (A) Raise the lift arm | (F) Neutral |
| (B) Lower the lift arm | (G) Roll back |
| (C) Float the lift arm | (H) Dump |
| (D) Dump the bucket | (I) Raise |
| (E) Roll back the bucket | (J) Lower |

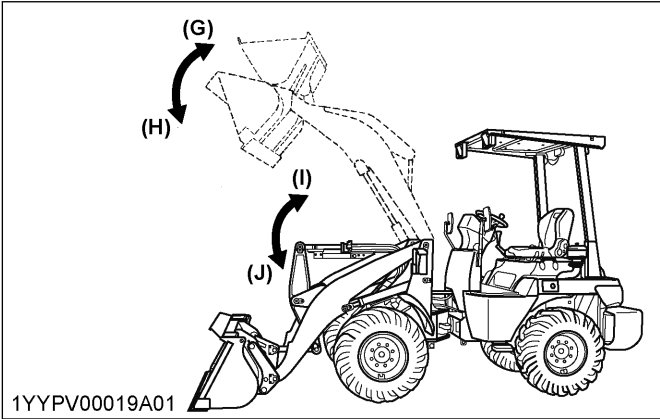
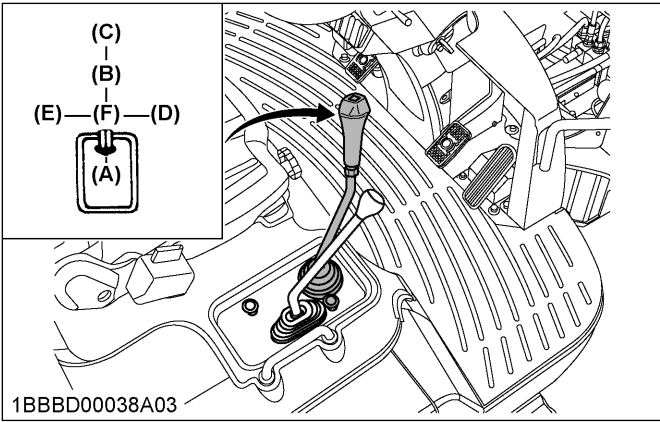
NOTE :

- To stop the operation of lift arm and bucket, return the control lever to the neutral position.

2. Auto leveler (option)

When the bucket is the dump position, tilt the control lever to the left. The control lever is held at the roll back position and the bucket is rolled back.

After the control lever back to the neutral position automatically, lower the lift arm. Then the bucket grounds horizontally.



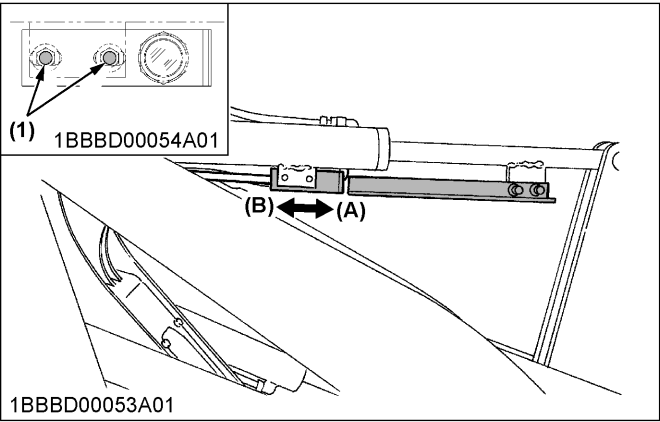
- (A) Raise the lift arm
- (B) Lower the lift arm
- (C) Float the lift arm
- (D) Dump the bucket
- (E) Roll back the bucket
- (F) Neutral
- (G) Roll back
- (H) Dump
- (I) Raise
- (J) Lower

You can adjust the grounding-bucket-angle with sliding the sensor bracket.

2.1 Adjusting the auto leveler

1. Loosen the M10 bolts
2. Slide the sensor bracket.
 - Slide to forward to upward the tip of the bucket.
 - Slide to backward to downward the tip of the bucket.
3. Tighten the M10 bolts.

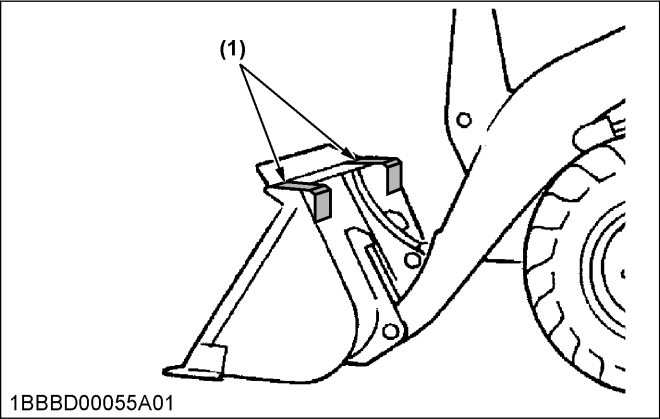
M10 bolt	Tightening torque	48.1 N · m to 55.9 N · m (4.9 kgf · m to 5.6 kgf · m)
----------	-------------------	--



- (1) M10 bolt
- (A) Upward
- (B) Downward

3. Bucket level indicator

Since the bucket-level-indicator covers almost the entire width of the bucket, you can check the condition of bucket from the side, the center, or any other angle even while working.



- (1) Bucket level indicator

AUXILIARY PORT OPERATION

1. Precautions for auxiliary port operation

! WARNING

To avoid personal injury or death:

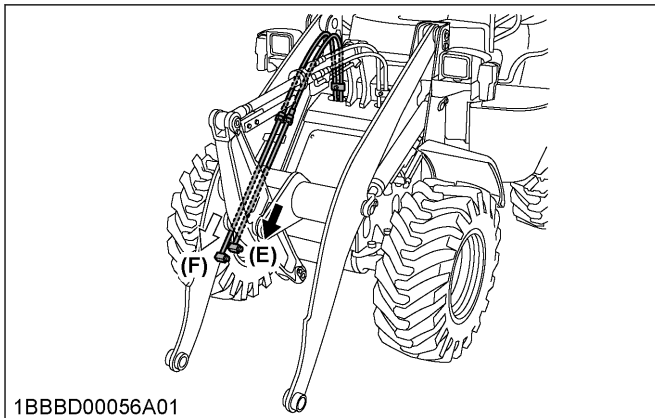
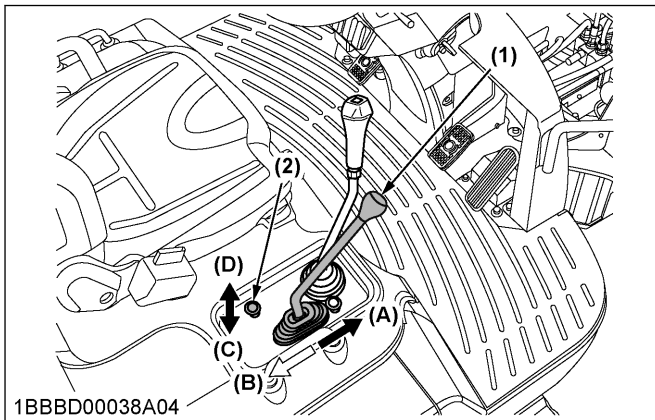
- When not using the auxiliary port, be sure to lock the auxiliary-port-lever by the auxiliary-port-lever-lock-knob.

2. Auxiliary port lever

Use the auxiliary-port-lever to operate the hydraulic attachments such as 4in1 bucket.

- Pushing the auxiliary-port-lever (A) sends oil to the pipe-A (E).

- Pulling the auxiliary-port-lever (B) sends oil to the pipe-B (F).
- Pressing the auxiliary-port-lever-lock-knob fully to the lock position (C), you can hold the position of auxiliary-port-lever.



- | | |
|------------------------------------|-------------------|
| (1) Auxiliary port lever | (A) Push |
| (2) Auxiliary port lever lock knob | (B) Pull |
| (3) Pipe-1 | (C) Lock |
| (4) Pipe-2 | (D) Unlock |
| | (E) Oil to pipe-1 |
| | (F) Oil to pipe-2 |

Max. flow volume (theoretical)	42.1 L/min.
Max. pressure	18.6 MPa (190 kgf/cm ²)

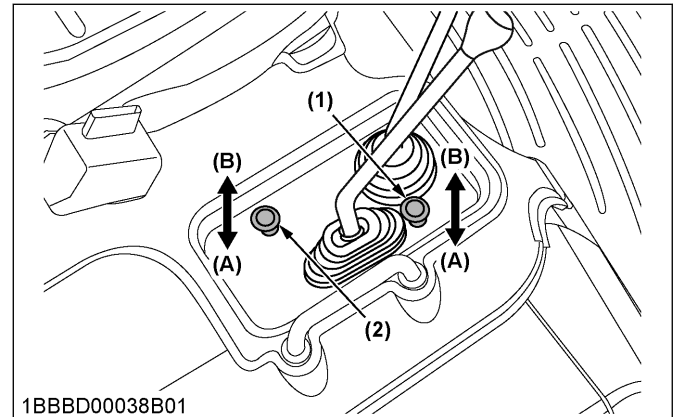
IMPORTANT :

- When you do not use the auxiliary port for a long period, dirt particles can settle in the lower part of the auxiliary-port-lines. When you remove the plugs on the auxiliary-port-lines to connect attachments, drain the following amount of oil per side before connecting.

Oil	Approx. 0.1 L
-----	---------------

RELEASING THE PRESSURE TRAPPED IN THE HYDRAULIC SYSTEM

1. Lower the attachments to the ground and push the control-lever-lock-knob and auxiliary-port-lever-lock-knob to lock.
2. Turn the starter key to the **[STOP]** position and shut off the engine.
3. Pull the control-lever-lock-knob and auxiliary-port-lever-lock-knob to unlock.



- | | |
|------------------------------------|------------|
| (1) Control lever lock knob | (A) Lock |
| (2) Auxiliary port lever lock knob | (B) Unlock |

4. Move the control lever to release the pressure in the hydraulic system.

MULTI-COUPLER TO ATTACH THE FRONT ATTACHMENT

1. Mechanical multi-coupler

This machine utilizes a mechanical multi-coupler for easy connection and disconnection of various attachments.

By replacing the front attachments, you can use this machine in agriculture, raising stock, landscaping, gardening, and snow removal as well as general civil engineering and construction work.

1.1 Attaching the front attachments to the mechanical multi-coupler

Attach the front attachments to the mechanical multi-coupler as the procedure in this section.

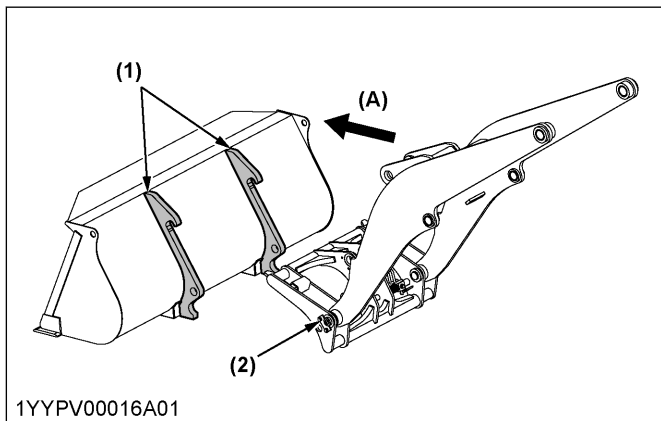
! WARNING

To avoid personal injury or death:

- After carrying out the attaching procedures of front attachments, make sure that the front attachment is securely attached to the mechanical multi-coupler, or the front attachment may be detached.

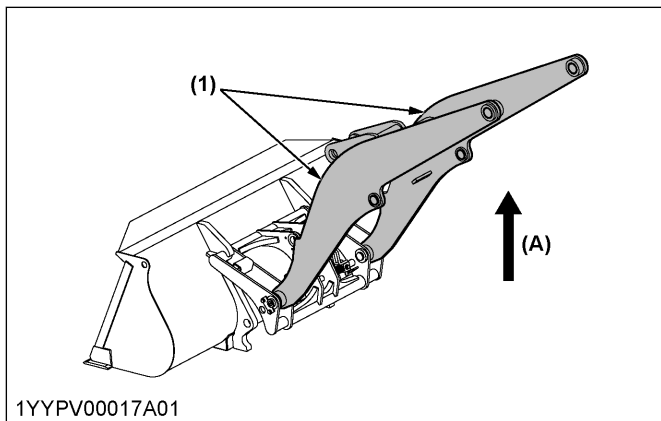
- When handling the control lever, you should carry out it after setting the shuttle-change-lever to the neutral position and the parking-brake-switch to the parking position, lowering the bucket, and locking all control levers in the neutral position.

1. Place an attachment in question on a flat ground. Slowly move the machine until the multi-coupler hook's center gets in alignment with the attachment center. At this time, keep the multi-coupler in its dumping position and the connecting pins below the level of the attachment hooks. Hold the connecting pins still in their retracted position.



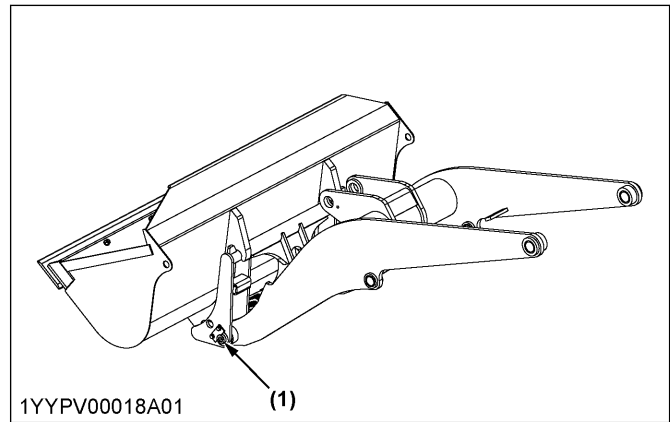
- (1) Hook (A) Forward
(2) Connecting pin

2. Make sure the attachment center and the multicoupler hook's center are in alignment with each other. Press the multi-coupler against the attachment and raise the lift arm so that all the hooks fit together.



- (1) Lift arm (A) Raise

3. Now raise the lift a little further and tilt up the bucket. Fit and secure the connecting pins in position.



- (1) Connecting pin

4. To dismount the attachment, take the reverse order of the above mounting procedure.

HOW TO USE THE INCHING AND BRAKE PEDAL

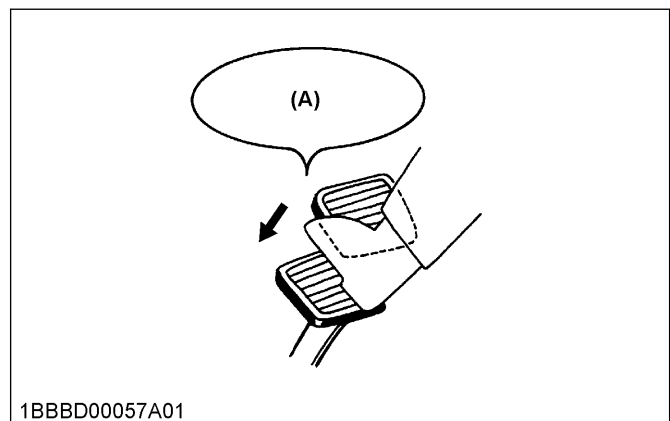
1. Operating the inching and brake pedal

Operate the inching-and-brake-pedal as the procedures in this section according to the application.

1. Stop the machine.

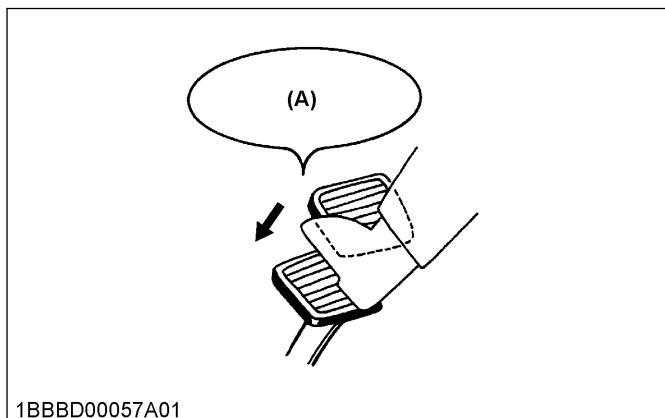
The inching-and-brake-pedal controls the LST pump and brake.

- a. To stop the machine completely during work, first press the inching-and-brake-pedal slightly. Oil flow from LST pump comes to zero and cuts the driving power to slow down or stop the machine.
- b. Press the inching-and-brake-pedal completely. The disc brake will be applied to stop the machine completely.



- (A) Press the inching and brake pedal with force

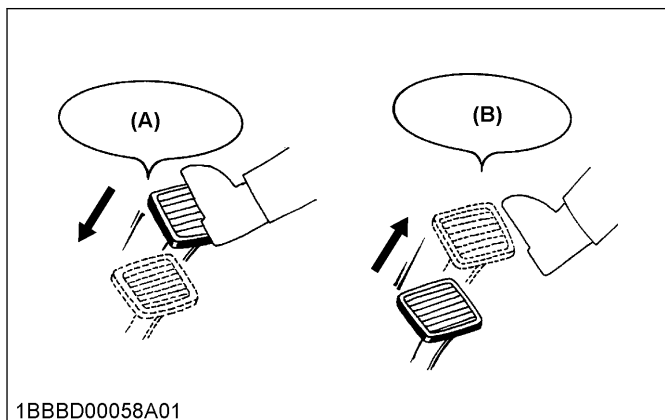
2. Approach the machine slowly
 - a. Press the inching-and-brake-pedal slightly while pressing the accelerator pedal.
The machine approaches slowly.



(A) Press the inching and brake pedal slightly

The machine can slowly approach an object by accelerator pedal regulation only, without inching-and-brake-pedal operation.

3. To scoop in case of the bucket does not raise up during digging, press the inching-and-brake-pedal. Traction force is reduced and lifting force is increased, if the inching-and-brake-pedal is pressed.



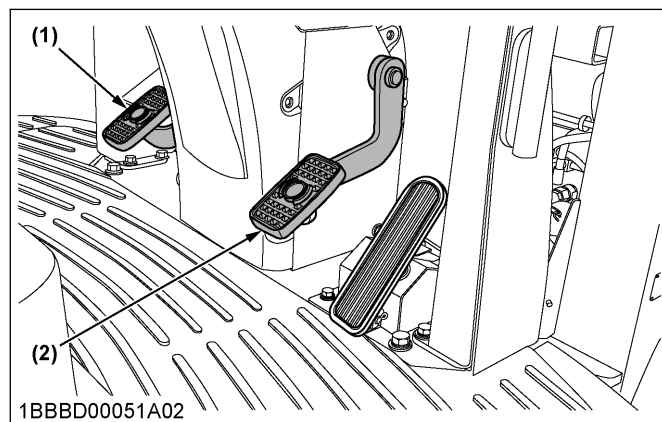
(A) Press the inching and brake pedal fully (B) Release the inching and brake pedal

2. Using the inching and brake pedal according to the job

WARNING

To avoid personal injury or death:

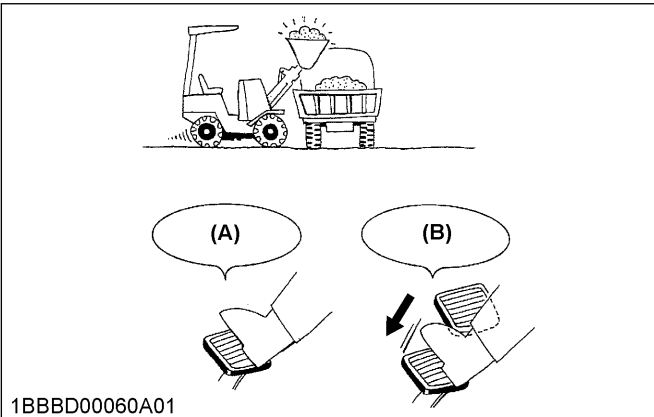
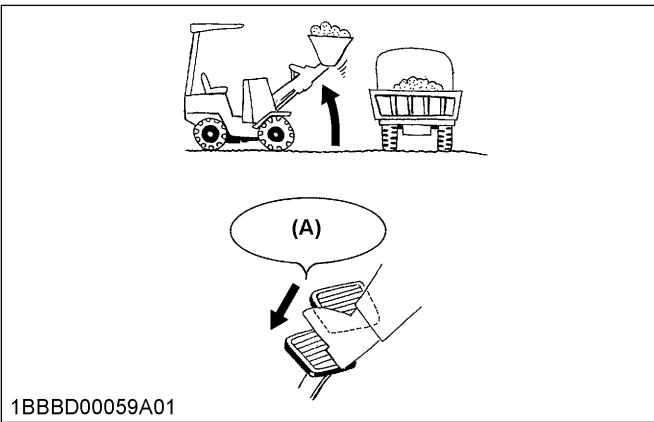
- When traveling with a fully-loaded bucket, do not press the inching-and-brake-pedal all the way. The machine will brake abruptly and cause dangerous loss of balance that may cause an accident.



(1) Inching and brake pedal (2) Brake pedal

Loading

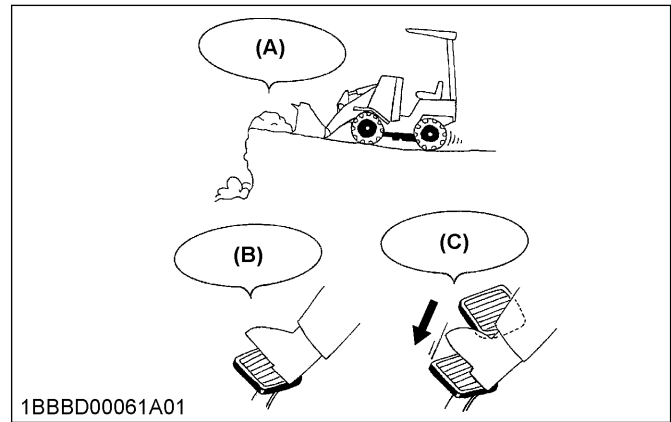
1. Press the inching-and-brake-pedal slightly while pressing the accelerator pedal to approach an object slowly.
You can also perform slow approach by regulating accelerator-pedal-operation.
2. Operate the bucket.
You can operate the bucket at the maximum engine rpm when the inching-and-brake-pedal is used to approach slowly. Bucket-operation-speed is thus maintained.
3. Press the inching-and-brake-pedal slightly to allow the machine to approach to the desired stop position.
4. Then press the inching-and-brake-pedal all the way to stop the machine completely.



(A) Press the inching and brake pedal slightly (B) Press the inching and brake pedal all the way

Refilling

1. Press the inching-and-brake-pedal slightly to approach the desired stop position.
2. Then press the inching-and-brake-pedal all the way to stop the machine at the exact position.
 - The traveling speed automatically decreases to prevent the engine stalling as the external load increases.
 - During traveling with bucket operation, the traveling speed abruptly increases at the time of dumping operation since the external load changes at that time.
3. Use the inching-and-brake-pedal and concentrate the power to the attachment operation near holes or slopes.



(A) Leave one pile (B) Press the inching and brake pedal slightly (C) Press the inching and brake pedal all the way

TYPICAL JOBS USING A WHEEL LOADER

WARNING

To avoid personal injury or death:

- When transporting a load, keep the loader bucket as low as possible to avoid tipping over. Be extremely careful when working on inclines.
- Avoid unreasonable operation such as on dangerous terrain, beyond the load capacity, or beyond the intended use of the machine because it may cause the machine to tip over.
- Slow down before entering ungraded terrain.
- Do not drive the machine close to the edges of ditches or banks which may collapse under the weight of the machine especially when the ground is loose or wet.
- Operating on slopes in rain, in snow, at loose gravel, at soft ground, and so on can be dangerous because such situations will change the ground conditions. Do not operate this machine in questionable ground conditions.
- Never perform digging or shoveling with the machine in the articulated condition.
- Never dig or shovel at high speed. Such operation can cause the machine to lose balance and its rear wheels to lift off the ground, which may cause a serious accident in turn.
- To avoid possible tip over of machine, do not operate the machine in any site whose terrain cannot be ascertained, such as ground covered with weeds or snow. Check for hidden projections, dents, road shoulders, and so on, beforehand, and take care not to approach them during work.
- Be sure to ease up on the accelerator at the end of backfilling grooves, the areas at the edge of

cliffs, the pond banks, or at the end of an ascent. Upon removal of the external load, the machine speed will automatically increase. Reduce speed to avoid entering grooves or tipping over.

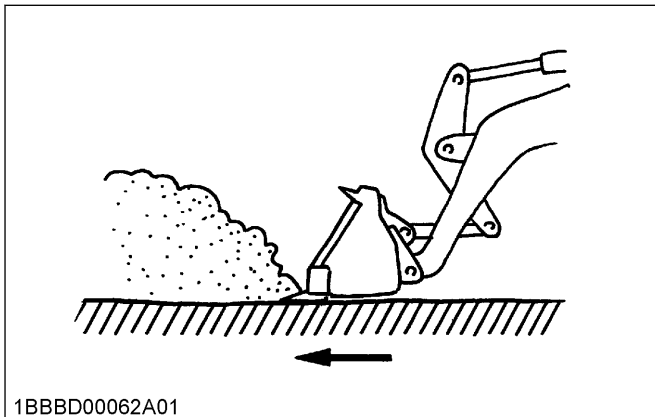
- To avoid slip or tipping over of machine, do not operate the machine on ungraded or soft terrain, such as landfills. Grade and compact the site beforehand at all times.

There are some typical jobs as follows performed using a wheel loader. You can also use the wheel loader to perform other jobs by connection with various attachments.

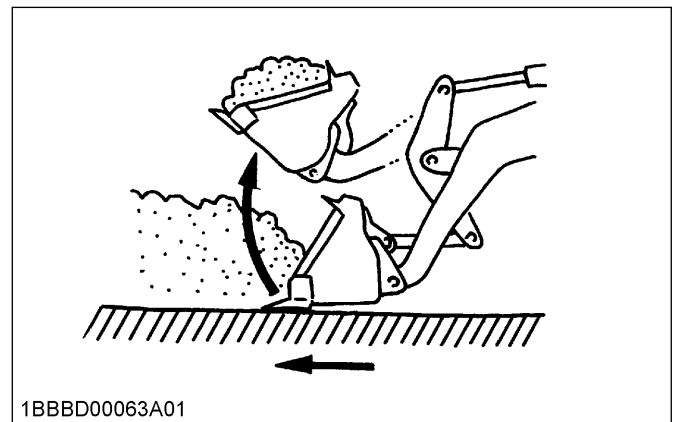
- **Digging and loading**
(See Loading a sand pile on page 55 and Digging and loading from flat ground on page 55)
- **Refilling**
(See Refilling on page 56)
- **Leveling the ground**
(See Leveling the ground on page 56)
- **Loading onto a truck**
 - Cross loading method
(See Loading onto a truck by cross loading method on page 56)
 - V-shift loading method
(See Loading onto a truck by V-shift loading method on page 57)

1. Loading a sand pile

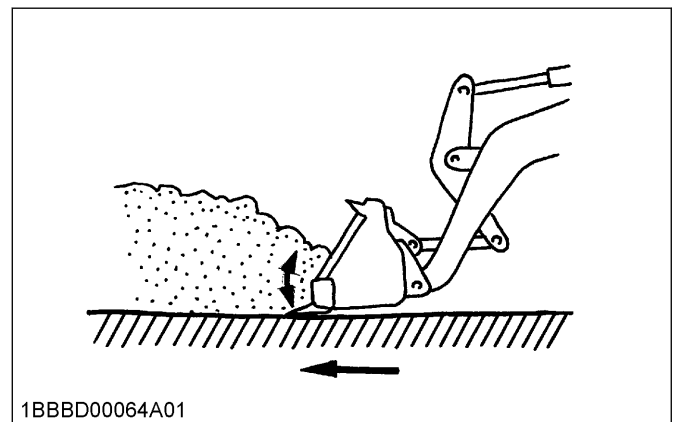
1. Direct the bucket-blade-parallel to the ground and advance the machine to drive the bucket into the sand pile.



2. When the bucket is sufficiently driven into the sand, lift the bucket while advancing the machine.

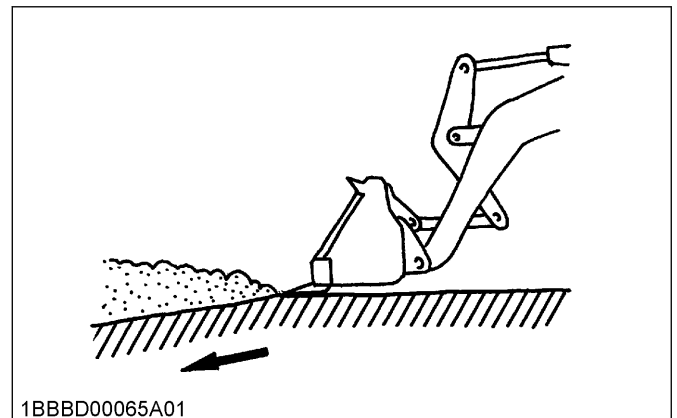


3. If the bucket is insufficiently driven into the sand, move the bucket blade up and down while moving forward.



2. Digging and loading from flat ground

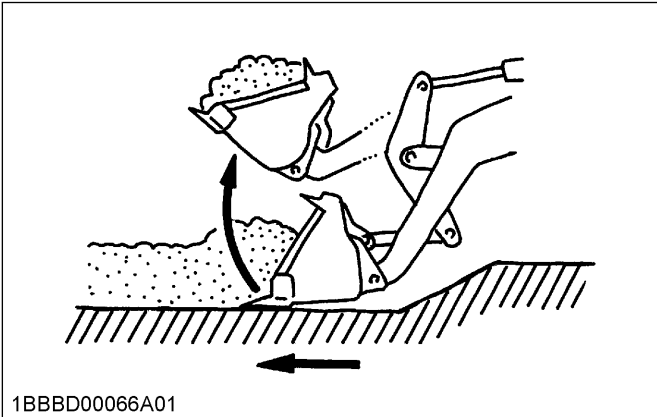
1. Direct the bucket blade slightly downward and lower the bucket as you advance the machine.



The recommended digging depth per pass is as follows.

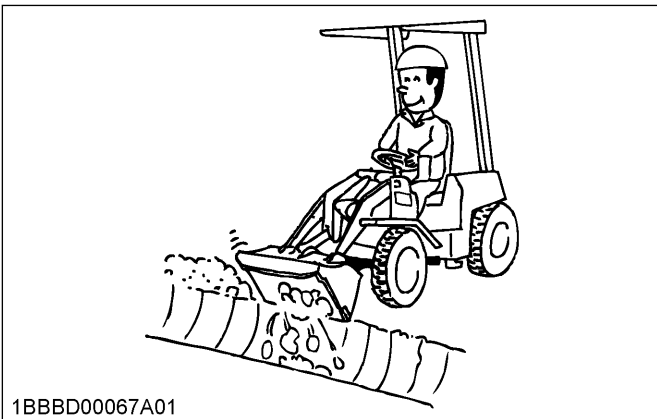
Digging depth per pass	Between 10 cm and 15 cm
------------------------	-------------------------

- While adjusting the vertical movement of the bucket, lift the bucket so that sand can be removed by layers. Continue lifting the bucket as you advance the machine.



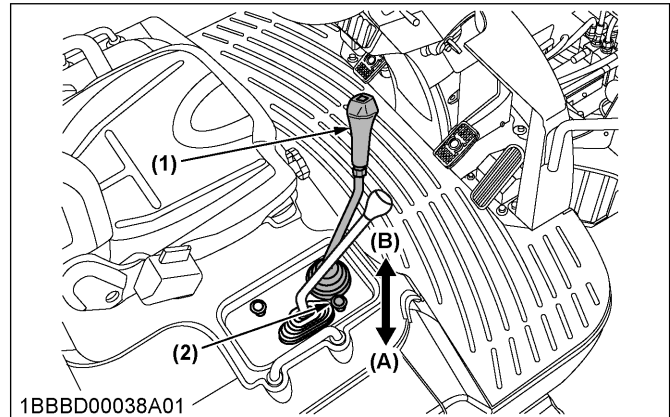
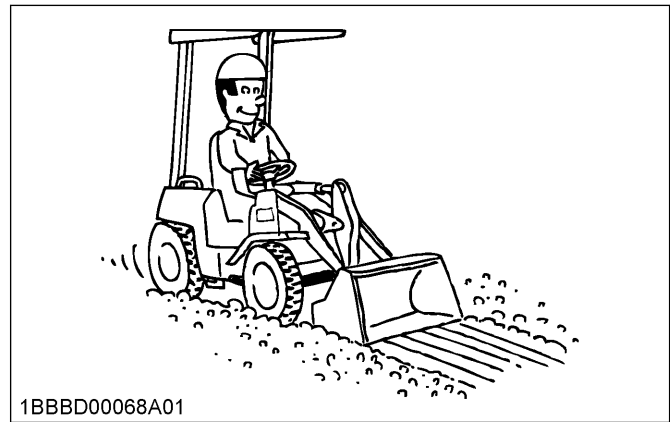
3. Refilling

- Direct the bucket horizontally and push the piled sand toward the ditch.
- When the bucket reaches the ditch, dump the bucket to discharge the sand into the ditch.



4. Leveling the ground

- Dump and tilt the bucket alternately to distribute the soil from the bucket over the ground as you move the machine backward.
- Then, dump the bucket, lower the bucket, and move the machine backward so that the blade scratches the ground surface.
- Direct the bucket horizontally, set the lift arms in the "FLOATING" position using the control lever, and level the ground while backing the machine.



- (1) Control lever
(2) Control lever lock knob
(A) Lock
(B) Unlock

5. Loading method onto a truck

Examine the job site situation and choose the efficient loading method that minimizes the swivel angle and moving distance.

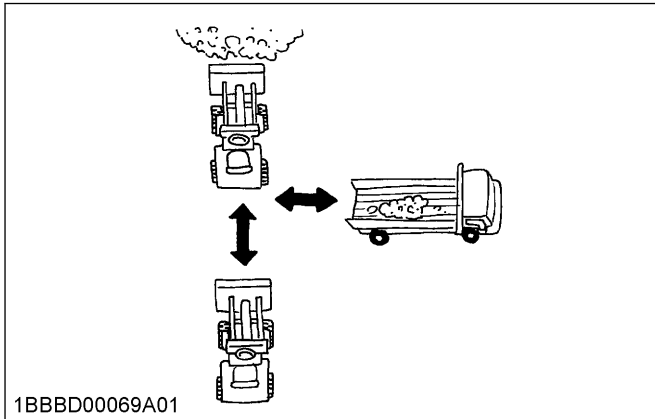
- Cross loading method**
(See Loading onto a truck by cross loading method on page 56)
- V-shift loading method**
(See Loading onto a truck by V-shift loading method on page 57)

5.1 Loading onto a truck by cross loading method

Cross-loading-method is the fastest and leads to the shortest cycle time.

- Position a truck perpendicular (90 degrees) to the shoveling direction of the machine.
- After digging and shoveling with the bucket, move the machine backward.
- Then drive the truck to a point between the machine and the piled sand.

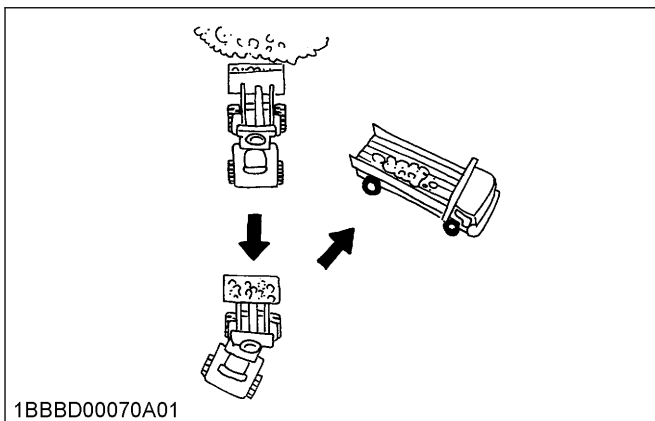
4. Then, load the sand onto the truck.



5.2 Loading onto a truck by V-shift loading method

1. Position a truck at an angle of about 60 degrees from the shoveling direction of the machine.
2. After digging and shoveling with the bucket, move the machine backward and turn the steering wheel to position the machine perpendicular (90 degrees) to the truck.
3. Then move the machine forward to load sand onto the truck.

A smaller angle between the machine and truck will provide a shorter cycle time and more efficient operation.



TRANSPORTING BY TRUCK

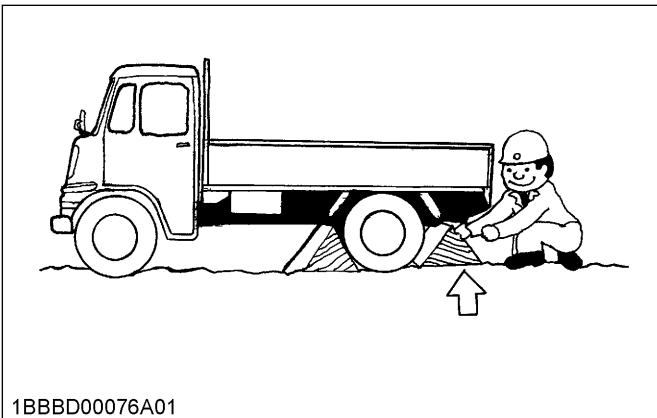
LOADING THE MACHINE ON AND FROM A TRUCK

WARNING

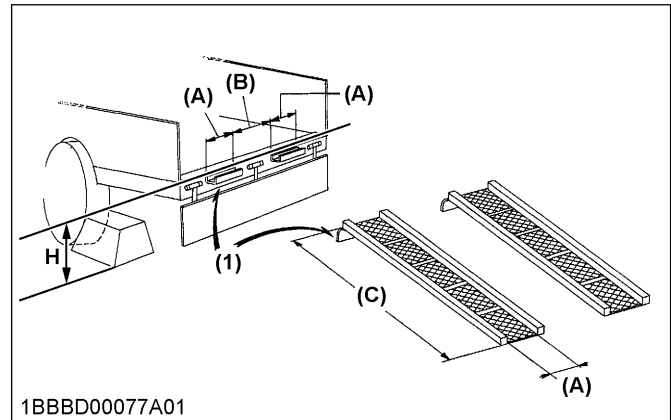
To avoid personal injury or death:

- When loading the machine on or unloading from a truck, be sure to use strong ramps. Never use wet lumber, and so on.
- Keep the ramps at an angle such that the machine can be kept stable (10 degrees to 15 degrees). Never try to change directions while on the ramps.
- Do not alter the climbing direction when the machine is already on the ramps. If direction of climb needs correcting, first bring the machine down off the ramps and correct the climbing direction.

1. Before loading the machine onto a truck, apply the parking brake of the truck and block the front and rear wheels.



2. Fix the ramps securely to the truck so that the machine and the truck cannot slip.



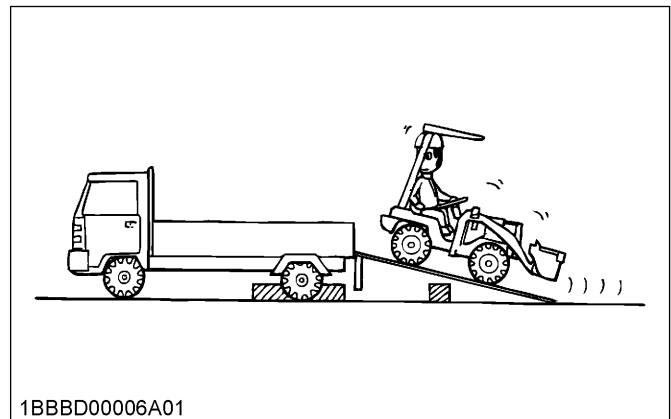
(1) Lock plate

(A) 500 mm to 600 mm

(B) 650 mm

(C) 4 x H or more

3. Support the rear end of the bed to prevent the front of truck from rising.



4. When loading or unloading the machine on or from a truck, keep the bucket about 40 cm up from the ground and reverse the machine at low speed to load it, or advance it at the same speed to unload it.

IMPORTANT :

- When advancing and reversing the machine on the truck bed, be careful not to hit the cabin and the gates.

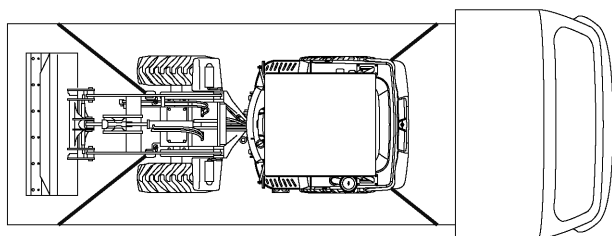
PRECAUTIONS FOR TRANSPORTING

WARNING

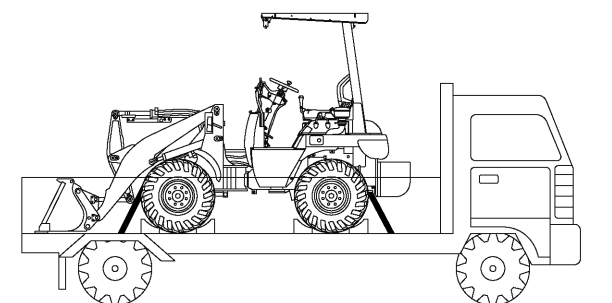
To avoid personal injury or death:

- Before transportation, perform the following to prevent the machine from moving during transportation.

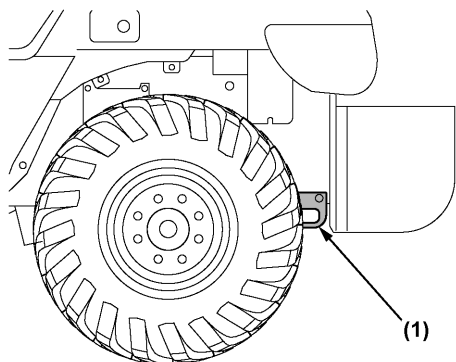
- Check to see that the longitudinal axis of machine aligns with that of the truck bed.
- Set the parking brake, stop the engine and remove the starter key.
- Lower the bucket and attachment to the truck bed.
- Release the hydraulic pressure in the hydraulic system by operating control levers.
- Lock all control levers in neutral.
- Secure the steering-frame-lock.
- Block the wheels of machine.
- Securely fasten the machine to the truck with straps or chains.



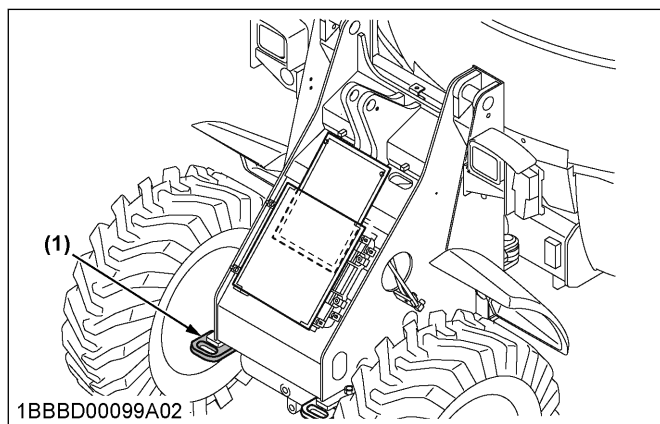
1YYPV00009A01



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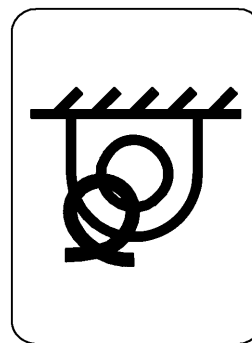
1BBBD00099A02

(1) Lug (Both sides)

⚠ WARNING

To avoid personal injury or death:

- Use the locations indicated by marks in the diagram to tie down the machine



1BBBD00078A01

HANDLING THE WHEEL LOADER IN COLD WEATHER

PREPARATION FOR OPERATION OF THE MACHINE IN COLD WEATHER

- Change the engine oil to one of low viscosity suitable for use in cold weather.
- In cold weather, battery power drops, and electrolyte may freeze if the battery is not sufficiently charged. To prevent electrolyte from freezing, be sure to keep the battery charged at 75% capacity or more. It is also recommended to keep the battery in closed or heated rooms to facilitate next starting.
If the battery electrolyte level is too low, do not add distilled water after operating, add distilled water before starting the next operation while the engine can be running.
- Add the antifreeze to cooling water in the radiator and the recovery tank while machine is out of operation if ambient temperature drops below 0 °C. The mixing ratio between water and antifreeze is determined by the ambient temperature.

Mixing ratio between water and antifreeze

Ambient temperature °C	Anti-freeze %	Water %
-5	30	70
-10	30	70
-15	30	70
-20	35	65
-25	40	60
-30	45	55
-35	50	50
-40	55	45

IMPORTANT :

- Use a permanent-type antifreeze or long-life coolant.
- Be sure to drain the cooling water and deposits completely from the radiator interior before adding a new mixture of water and antifreeze.
- Antifreeze contains anticorrosive. It is not necessary to add a cleaner to the coolant.
- Engine coolant capacity is as follows.

Coolant capacity	Radiator	9.0 L
	Recovery tank	1.1 L

TAKING CARE OF MACHINE AFTER OPERATION IN COLD WEATHER

1. After operation in cold weather, be sure to remove mud or water from the machine body.
2. Then park the machine on concrete or where ground is dry.
3. Lay the planks or the mats on the ground and park the machine on them.
If you should park the machine on the ground and the tires freeze during the night, driving will be impossible.
4. Wipe the surface of piston rod of the hydraulic cylinders carefully.
If mud should enter the seal with frozen water, it may be damaged.
5. Drain the water in the fuel system to prevent freezing at night.

MAINTENANCE

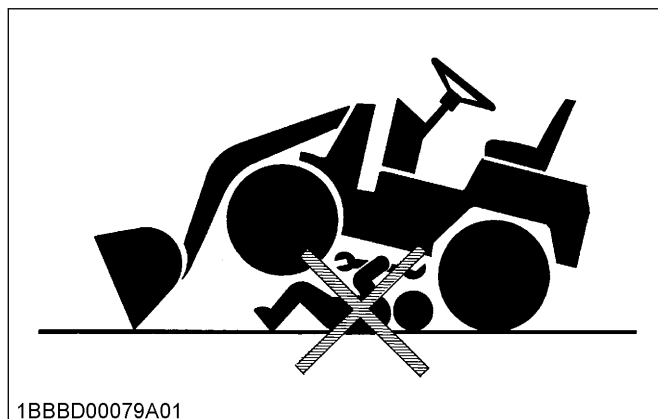
PRECAUTIONS FOR MAINTENANCE

WARNING

To avoid personal injury or death:

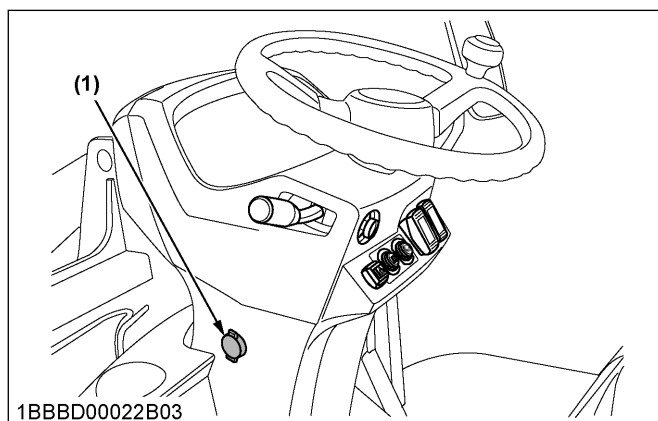
- Place the machine on the flat ground.
- Before servicing or checking the machine, perform the following procedures.
 1. Set the parking brake.
 2. Stop the engine.
 3. Set the shuttle-change-lever to the neutral position.
 4. Lower the bucket and attachment to the ground.
 5. Release the hydraulic pressure in the hydraulic system.
 6. Remove the starter key.
 7. Secure the articulation joint with the steering frame lock.
- Never get under the machine while it is being lifted with only the bucket. If servicing or checking underneath, support the machine firmly with strong blocks, and so on. If you do not follow to support the machine firmly, serious injury or death can result.
- Keep clear of articulation area when servicing.
- Keep sparks and naked flames away.
- To avoid the danger of exhaust fume poisoning, do not operate the machine in a closed building without proper ventilation.
- When servicing or checking the electrical system, disconnect the battery cables.
- Wear appropriate safety gear such as a hard hat, glasses, and safety shoes, as the job requires.
- Do not carry out any work or modifications on hydraulic components.

(For details on releasing the pressure trapped in the hydraulic system, see **RELEASING THE PRESSURE TRAPPED IN THE HYDRAULIC SYSTEM** on page 51)



1BBBD00079A01

- To safely use the machine and prevent any trouble from occurring, be sure to conduct daily inspections and periodic servicing.
- You can use the 12 V socket as a source of power for illumination if you have to check the machine at night.



1BBBD00022B03

(1) Power socket 12 V

IMPORTANT :

- If you cannot operate and must tow the machine, please contact your local KUBOTA dealer for information about correct towing procedures.
- Major maintenance and service requires a specialist, please contact your KUBOTA dealer.
- Clean the machine so that it is easy to find what is wrong.
- Clean the parts of the hydraulic system and the oil-level-gauge in particular to keep them free of dust and other foreign matter.
- When washing the machine, be careful not to get the electrical parts wet.

MAINTENANCE

- Check or replenish the oil in a place where there is little dust and use a clean oil container to prevent dust from permeating the oil.
- Check or replenish oil when the machine is level. Use the same brand when replenishing oil.
- After greasing the machine, wipe off all old grease, especially from those parts where sand and dust can accelerate wear.
- When changing the oil check whether the old oil is abnormally permeated with metal fillings or foreign matter.
- Only use commercially available, noncombustible washing agents. Only wash at the designated places such as oil and grease traps available.

MAINTENANCE INTERVALS

No.	Check points	Meas-ures	Hour meter indicator																	Inter-val	Ref. page	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	1000			
1	Engine oil	check	Daily check																		67	
		change					○					○					○		○	every 250 hrs	80	*1
2	Hydraulic oil	check	Daily check																		67	
		replace																	○	every 1000 hrs	83	*1
3	Fuel	check	Daily check																		67	
4	Coolant	check	Daily check																		68	
		change																		every 2 years	86	
5	Brake fluid	check	Daily check																		69	
6	Lubrication points	grease	Daily check																		69	
7	Tire air pressure	check	Daily check																		71	
8	Radiator and oil cooler	check	Daily check																		71	
9	Steering handle	check	Daily check																		71	
10	Parking brake	check	Daily check																		72	
11	Brake	check	Daily check																		72	
12	Engine and electrical wiring	check	Daily check																		72	
		check																		every 1 year	85	
13	Fan belt tension	check	Daily check																		72	
		adjust				○				○				○				○	○	every 200 hrs	76	
14	Water separator	drain	Daily check																		72	
15	Evacuator valve	clean	Daily check																		73	
16	Pre-Cleaner	clean	Daily check																		74	
17	Fuel tank	drain	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	every 50 hrs	74	
18	Battery condition	check	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	every 50 hrs	74	
19	Radiator hoses and clamps	check				○				○				○				○	○	every 200 hrs	77	
		replace																		every 2 years	87	
20	Air cleaner element	Outer element	clean			○				○				○				○	○	every 200 hrs	77	
		replace																	○	every 1000 hrs	84	*1
		Inner element	replace																○	every 1000 hrs	84	

(Continued)

MAINTENANCE

No.	Check points	Measures	Hour meter indicator																	Interval	Ref. page	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	1000			
21	Fuel line and intake air line	check				○				○				○				○	○	every 200 hrs	78	*2
		replace																		every 2 years	86	
22	Wheel bolts	check and tighten	◎			○				○				○				○	○	every 200 hrs	78	
23	Water separator filter element	replace					○					○					○		○	every 250 hrs	79	
24	Engine oil filter	replace					○					○					○		○	every 250 hrs	80	*1
25	Oil for front/rear axle case	check										○							○	every 500 hrs	81	
		change																	○	every 1000 hrs	83	*1
26	LST oil filter	replace										○							○	every 500 hrs	81	*1
27	Hydraulic return filter element	replace										○							○	every 500 hrs	82	*1
28	Fuel filter cartridge	replace										○							○	every 500 hrs	82	*1
29	Hydraulic suction filter element	replace																	○	every 1000 hrs	83	*1
30	Engine valve clearance	adjust																	○	every 1000 hrs	84	*3
31	Injector	check																		every 1500 hrs	84	*3
32	Oil separator element	replace																	○	every 1500 hrs	84	
33	EGR cooler	check																		every 1500 hrs	85	*3
34	Alternator and starter motor	check																		every 2000 hrs	85	
35	EGR system	check																		every 3000 hrs	85	*3
36	Turbo charger	check																		every 3000 hrs	85	*3
37	Exhaust manifold (crack, gas, leakage and mounting screw)	check																		every 1 year	85	*3

(Continued)

No.	Check points	Measures	Hour meter indicator																	Interval	Ref. page	
			50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	1000			
38	Intake air line for air leaks	check																		every 1 year	85	*3
39	AFS (Air flow sensor)	check																		every 1 year	85	*3
40	Boost sensor	check																		every 1 year	85	*3
41	EGR and piping for gas leak	check																		every 1 year	86	*3
42	Radiator system	rinse																		every 2 years	68	
43	Rubber piping related oil separator	replace																		every 2 years	87	*3
44	Intake hose and intercooler hose	replace																		every 2 years	87	*3
45	EGR cooler hose	replace																		every 2 years	87	*3

IMPORTANT :

- Perform the job indicated by © at the first operation.
- When using biodiesel, be sure to check the maintenance requirements of biodiesel fuel as the intervals will change in some of the items.

*1 This maintenance is appeared on the meter panel at each specified maintenance hours.

*2 Replace only if necessary.

*3 Consult your local KUBOTA Dealer for this service.

PERIODIC SERVICE

OPENING AND CLOSING OF COVERS

1. Precautions for opening and closing the covers

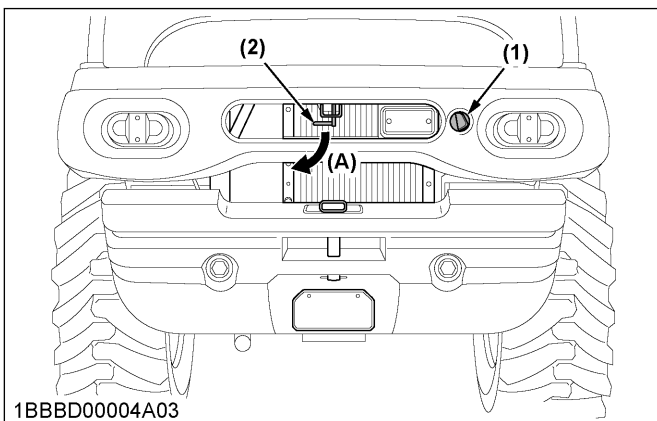
WARNING

To avoid personal injury or death from contact with moving parts:

- Never open the engine cover while the engine is running.
- Do not touch the muffler or the exhaust pipes while they are hot. Severe burns could result.

2. Opening and closing the engine cover

1. Move the operator's seat backward.
2. Insert the starter key into the lock and turn it to counter clockwise.
Then the lock is released.
3. Pull up the lever and lift the back-rest of the operator's seat.
Then the engine cover will open.
4. To close the engine cover, lower the hood and hold it down tightly.
5. Turn the starter key clockwise to lock the engine cover.



(1) Starter key
(2) Lever

(A) Pull

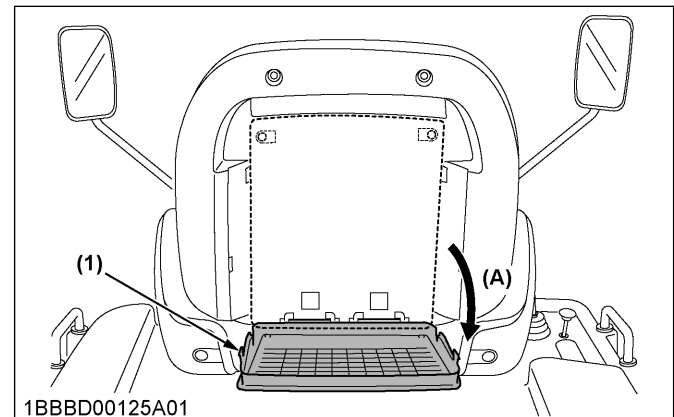
NOTE :

- When the engine cover is opened completely, it will be automatically held by gas damper.

3. Opening the document folder and the magazine rack

You can store manuals or documents.

1. Open the magazine rack as follows.



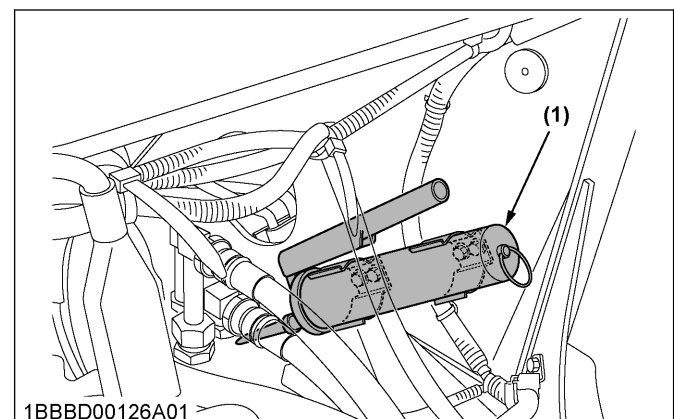
(1) Magazine rack

(A) Open

4. Opening the grease gun holder to store the grease gun

You can store the grease gun on the right in the front frame.

1. Set the body and the handle of the grease gun on the grease-gun-holder, with the tip of the grease gun facing forward.



(1) Grease gun

DAILY CHECK

It is extremely important to maintain your machine properly to prevent trouble.

- Walk around the machine and carefully check all hydraulic hoses and connections, the hydraulic

cylinders, and the fuel pipes for leaked oil, fuel, or water.

If there are any leaks, take proper measures to stop them. If repair is impossible, contact your KUBOTA dealer.

- Check for loose bolts and nuts and tighten if necessary. Especially check for the wheel bolts.
- Check the electrical circuit for any damage, shorts, or loose connections.

1. Checking and replenishing the engine oil

WARNING

To avoid personal injury or death:

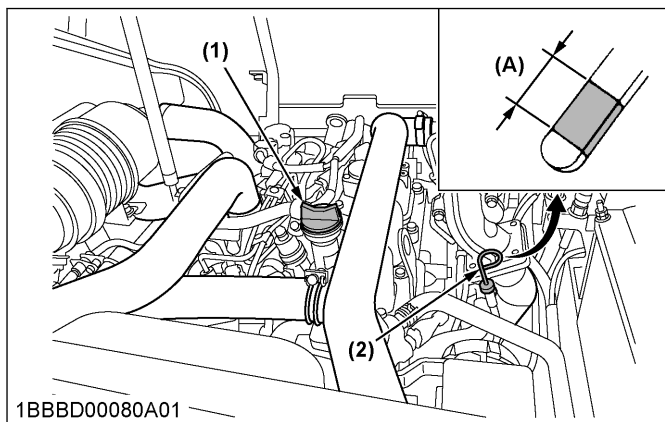
- Be sure to stop the engine before checking the level of engine oil.

When checking the level of engine oil, make sure that the machine body is level.

IMPORTANT :

- Use engine oil with the correct viscosity according to the outside temperature.
- After stopping the engine and remove the starter key, wait 5 minutes, then check the oil level. Place the machine on level ground.

1. Insert the oil dipstick all the way into the oil port.
2. Take the oil dipstick out and check the level of engine oil.
3. Add the engine oil if necessary.



(1) Oil port (A) Proper oil level
(2) Oil dipstick

Engine oil capacity	5.0 L
---------------------	-------

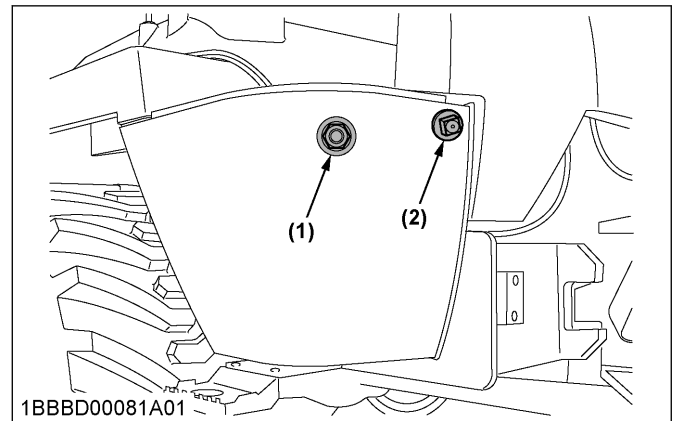
2. Checking and replenishing the hydraulic oil

NOTE :

To avoid personal injury or death:

- Never open the oil port immediately after the engine has stopped or hydraulic oil may rush out, causing scalding.

1. Stop the machine on flat ground and lower the bucket to the ground.
2. Check the level of hydraulic oil in the oil-level-gauge.
If the level of hydraulic oil is between the upper and lower marks, the amount of the oil is appropriate.
3. If the level of hydraulic oil is below the lower mark, add the hydraulic oil through the oil port.



(1) Oil level gauge (2) Oil port

IMPORTANT :

- When refilling the hydraulic oil, clean the area around the oil port and use the same brand of hydraulic oil of the same manufacturer.
- Never mix hydraulic oils of different manufacturers.

NOTE :

- Diesel engine oil is used for hydraulic system.

Hydraulic oil capacity	42 L
------------------------	------

3. Checking and replenishing the fuel

WARNING

To avoid personal injury or death:

- Before refueling, always set the parking brake, stop the engine, lower the bucket and attachment to the ground, release the hydraulic pressure in the hydraulic system by operating the control levers, lock all control levers in neutral, and remove the starter key.
- While refueling the wheel loader, smoking, naked flames, and operation of other sources of ignition are prohibited. Always refuel from

properly grounded fuel tank or system. Serious personal injury or death could result.

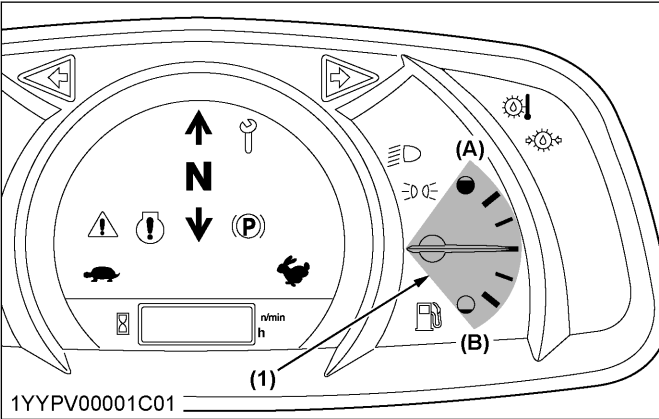
IMPORTANT :

- Use proper diesel fuel according to temperatures as follows.

Temperature	Diesel fuel
Over -5 °C	No.2-D diesel fuel
Under -5 °C	No.1-D diesel fuel

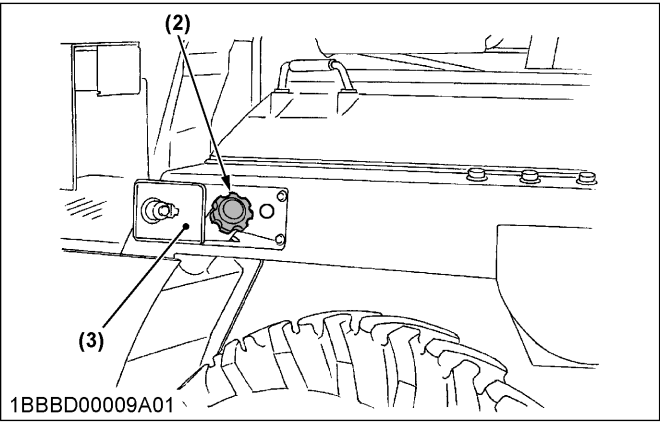
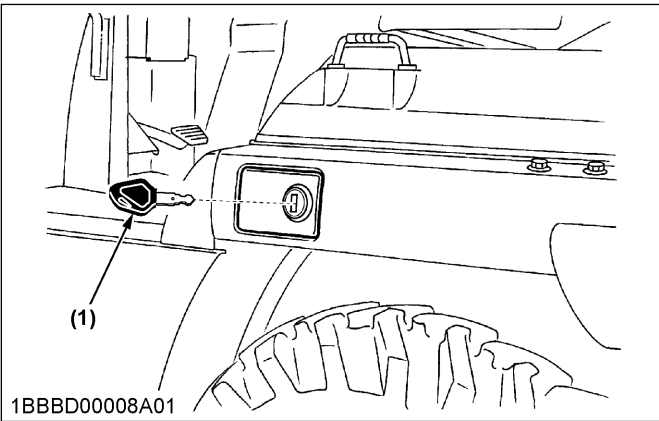
- Make sure that the fuel tank is not run empty. Air will enter the fuel system, and must be purged before restarting. (See Bleeding the fuel system on page 90)
- To prevent accumulations of condensed water in the fuel tank, fill the fuel into the fuel tank before parking overnight.

1. Turn the starter switch to the [RUN] position.
2. Check the fuel level by the fuel gauge.



(1) Fuel gauge (A) Full (B) Empty

3. Add the fuel if necessary.
 - a. Open the cover.
 - b. Remove the fuel-tank-cap.
 - c. Fill the fuel tank.



(1) Key (3) Cover (2) Fuel tank cap

Fuel tank capacity	54 L
--------------------	------

IMPORTANT :

- Avoid fuel spills and overfilling the fuel tank.
- Every time after operation is over, fill the fuel tank fully. Be sure to replace the fuel-tank-cap and tighten it up, and lock the cover.

4. Checking and replenishing the coolant

 WARNING

To avoid personal injury or death:

- Do not remove the radiator cap while the coolant is hot. When the coolant is cool, rotate the radiator cap to the first stop to allow excessive pressure to escape. Then remove the radiator cap completely.

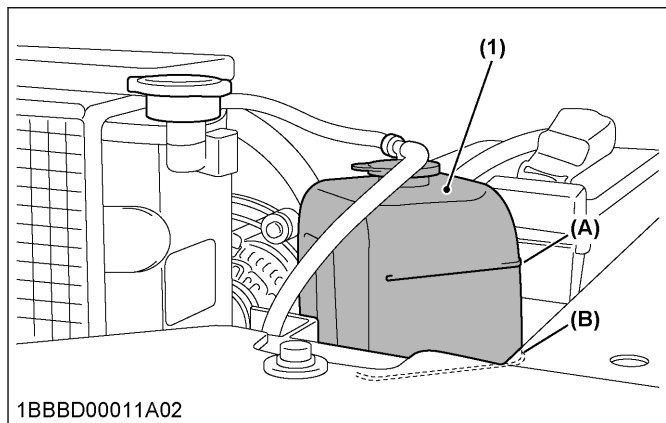
The radiator is equipped with a recovery tank. When the coolant level drops in the radiator, coolant is added automatically from the recovery tank. It is necessary to check the water level in the recovery tank and refill coolant if necessary.

1. Check the coolant level in the recovery tank. Do not disconnect the hose but remove the radiator cap. If the coolant level is between the [FULL] and the [LOW] marks, the condition is normal.

2. Refill the recovery tank with water if necessary.

IMPORTANT :

- Do not fill the recovery tank above the [FULL] mark.
- Add only coolant (mixture of water and antifreeze).



(1) Recovery tank

(A) Full
(B) Low

Coolant capacity	Radiator	9.0 L
	Recovery tank	1.1 L

3. If the coolant level drops quickly, water may be leaking somewhere, be sure to find the cause of leakage.

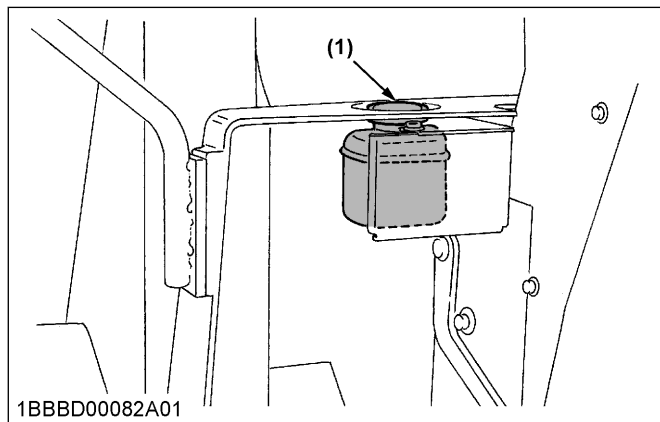
5. Checking and replenishing the oil in the brake fluid reservoir

**WARNING**

To avoid personal injury or death:

- Only use the hydraulic oil that meets *ISO VG 32* or *VG22*. Using improper oil obtains potential of brake failure and will cause damage to the brake system.

1. Check the level of brake fluid.
The level of brake fluid must be between the upper and lower marks on the brake-fluid-reservoir.



(1) Brake fluid reservoir

2. If the level of brake fluid is below the lower mark, add brake fluid.

IMPORTANT :

- If a large amount of brake fluid has to be replenished, check the brake system for leaks before using the machine again.

Brake fluid capacity	0.3 L
----------------------	-------

6. Applying the grease to the grease fittings

**DANGER**

To avoid serious personal injury or death:

- Keep clear of articulation joint during service work.

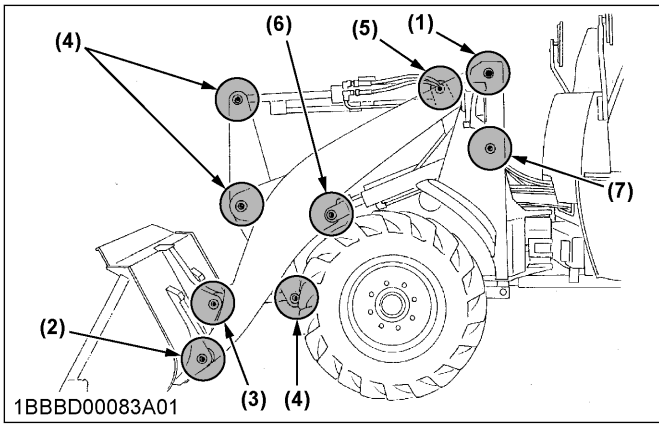
**WARNING**

To avoid personal injury or death:

- Before greasing, always set the parking brake, stop the engine, lower the bucket and attachment to the ground, release the hydraulic pressure in the hydraulic system by operating the control levers, lock all control levers in neutral, and remove the starter key.
- Always remove the bucket and attachment and use the lift-arm-support when servicing the machine with the loader-lift-arms raised.

Greasing the front attachments

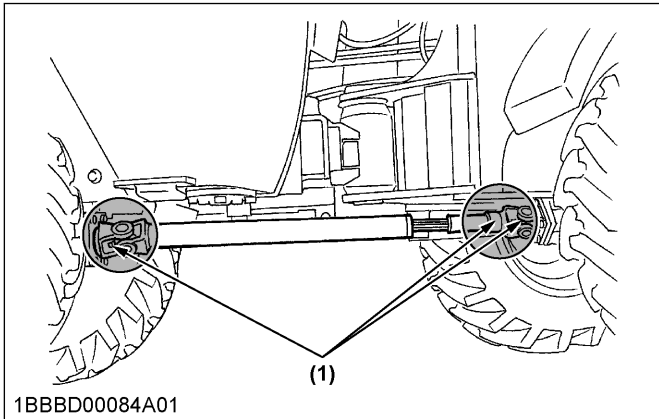
1. Apply the grease to the grease fittings on the front attachments indicated by the arrows in the following illustration.



- | | |
|--|---|
| (1) Lift arm attachment pin (2 places) | (6) Lift cylinder rod pin (2 places) |
| (2) Quick coupler pin (2 places) | (7) Lift cylinder bottom pin (2 places) |
| (3) Bucket link pin (1 place) | |
| (4) Bell crank arm pin (3 places) | |
| (5) Bucket cylinder bottom pin (1 place) | |

Greasing the universal joint

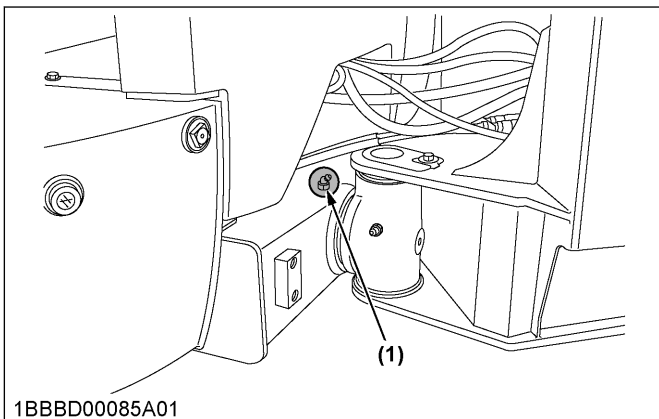
1. Apply the grease to the universal joint at three grease fittings.



- (1) Grease fitting

Greasing the rear frame

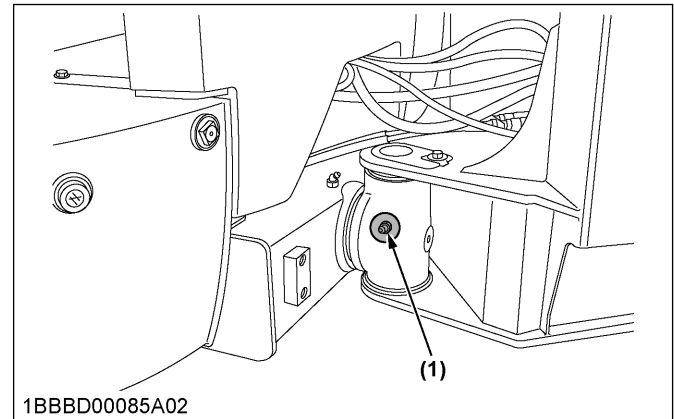
1. Apply the grease to the rear frame at one grease fitting.



- (1) Grease fitting

Greasing the articulation joint

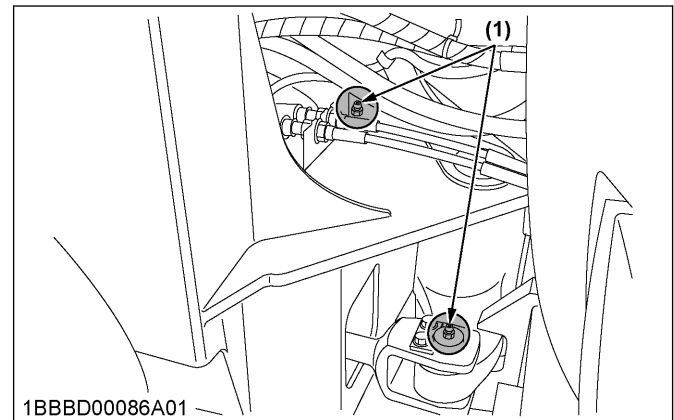
1. Apply the grease to the articulation joint at one grease fitting.



- (1) Grease fitting

Greasing the steering cylinder bearing

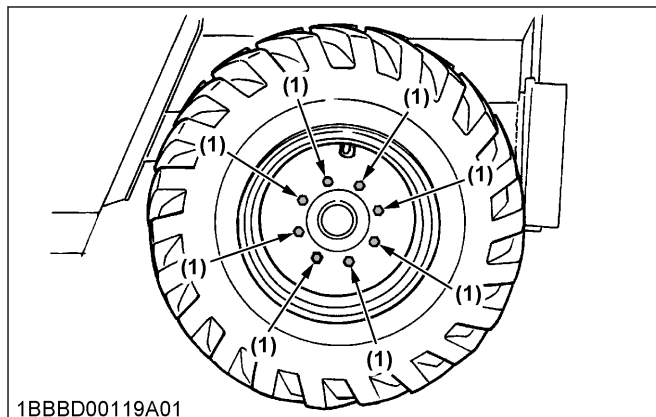
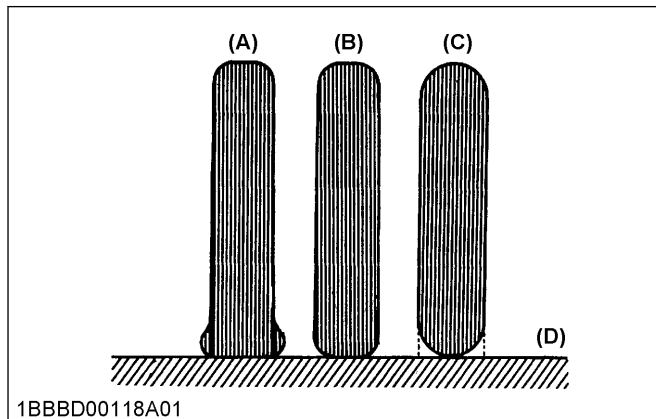
1. Apply the grease to the steering-cylinder-bearing at the two grease fittings.



- (1) Grease fitting

7. Checking the pressure and wear of tire and the wheel bolts

1. Check the pressure and wear of tire and the wheel bolts according to Checking the tire pressure on page 91 and Changing the tires on page 92.

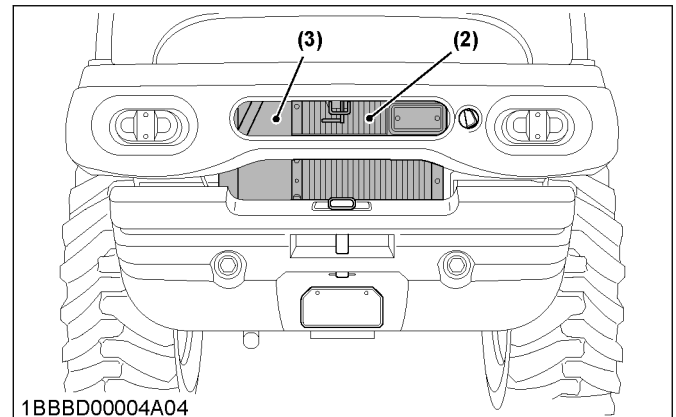
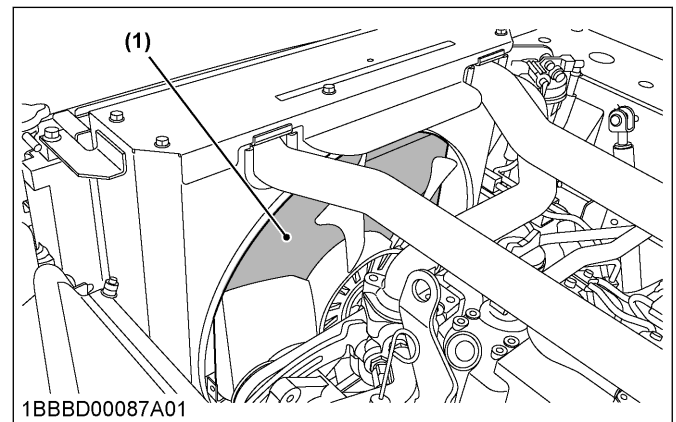


- (1) Wheel bolt
- (A) Deficient
(B) Correct
(C) Excessive
(D) Ground level

Wheel bolt (1)	Tightening torque	275 N·m to 314 N·m (28 kgf·m to 32 kgf·m)
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8. Checking and cleaning the radiator, the oil cooler, and the inter cooler

1. Open the engine cover.
2. Check the fins and ribs for clogging.
If the fins or ribs is clogged, they should be cleaned out with a jet of compressed air or water.
3. Check the cooling-water-hoses for damage.
4. If the cooling-water-hoses are broken or cracked, change them.
5. Also, check to see that the hose clamps are tight.



- (1) Inter cooler
(2) Oil cooler
(3) Radiator grill

NOTE :

- Fins and ribs of radiator and oil cooler must be clean in order not to overheat the engine and allow free flow of air through the cooling elements.
- Pressure of compressed air must be as follows.

Pressure of compressed air	Under 205 kPa (2.1 kgf/cm ²)
----------------------------	--

- When cleaning the radiator and oil cooler with compressed air, the fins can be damaged. Pay attention not to damage.

9. Checking the steering

1. Start the engine.
2. Turn the steering wheel left and right and check the operation.
3. If any abnormality is found, ask your KUBOTA dealer to inspect the steering further.

10. Checking the gear locked parking brake

WARNING

To avoid personal injury or death:

- Do not dismount the machine while checking the parking brake.

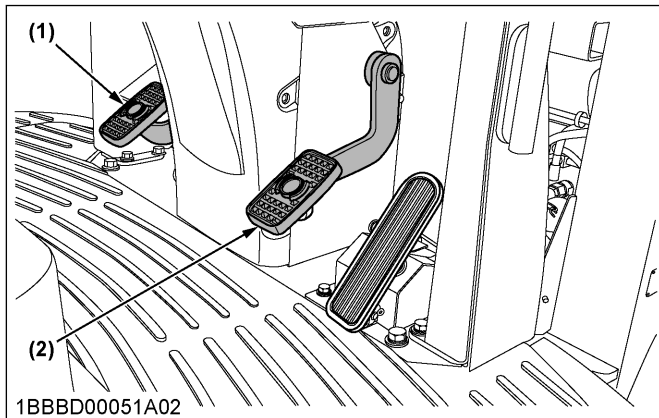
1. Confirm that the machine (wheel loader unit only) can surely be parked on the slope as follows.

Slope	About 15 degrees (Slope rises by 2.7 meters every 10 meters)
-------	--

2. If the machine moves, consult your local KUBOTA Dealer.
Always engage the parking brake before dismounting the wheel loader.

11. Checking the disc brake

1. Actuate the inching-and-brake-pedal during operation so that the disc brake of machine brakes.
2. If the disc brake fails to work effectively, ask your KUBOTA dealer to adjust it.



(1) Inching and brake pedal (2) Brake pedal

12. Checking and cleaning the engine and the electrical wiring

WARNING

To avoid personal injury or death:

- Always stop the engine and remove the starter key before cleaning the wiring, cables, and engine.

1. Before starting the engine, check whether flammable substances have gathered on the battery, the cables and wiring, the muffler, or the engine.
Remove flammable substances thoroughly.

2. Check the electrical circuitry for disconnections, shorts, or loose terminals.

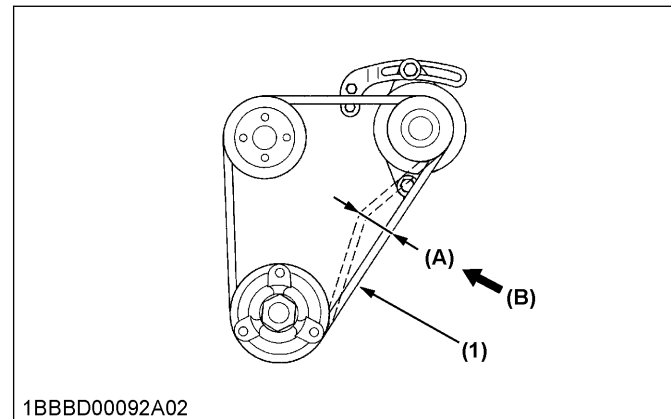
13. Checking the V-belt

WARNING

To avoid personal injury or death:

- Stop the engine and remove the starter key before checking the V-belt.

1. Check the V-belt for cracks and proper tension.
(See Checking and adjusting the V-belt tension on page 76)



(1) V-belt

(A) Approx. 7 mm to 9 mm

(B) Approx. 6 kg to 7 kg

14. Washing the whole machine

IMPORTANT :

- Do not wash the machine with the engine running. Water could enter the air cleaner and damage the engine.
Make sure that the air cleaner is kept dry.
- Remove the mud before washing the machine.

1. Wash the whole machine carefully.

15. Draining the water separator

IMPORTANT :

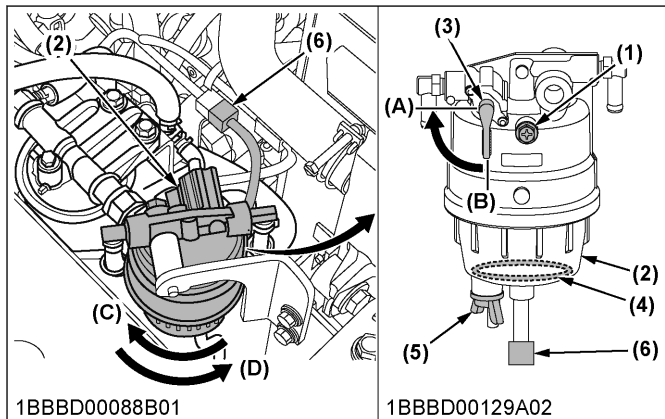
- If the water separator is full of water, the water-separator-filled-up-indicator will light up, and the alarm will sound. Water-separator-filled-up-indicator and alarm mean that there may be water in the fuel filter. In such cases, drain the fuel filter.
(See Draining the fuel filter by draining the water separator on page 89)

1. Open the engine cover.

2. Check the red float.
When the separated water is entering the sediment cup, the red float moves upwards.
3. When the red float moves upwards, close the shutoff-valve so that no fuel can run out.
4. Now loosen the drain plug, and drain the water.

IMPORTANT :

- Collect drained water in an oil pan or the like.
5. In case there are foreign substances in the cup, detach the cup and clean it.
 6. Finally, do not forget to open the shutoff-valve after drain of the water was over.



- (1) Screw
(2) Cup
(3) Shutoff-valve
(4) Red float
(5) Drain plug
(6) Connector of water level sensor

- (A) Close
(B) Open
(C) Loosen
(D) Tighten

NOTE :

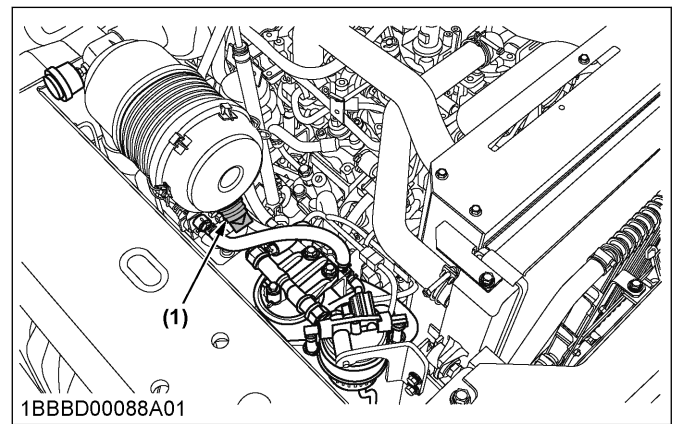
- Before detaching the cup, unplug the connector of the water-level-sensor. When the cleaning is complete, make sure to set the connector of the water-level-sensor.

IMPORTANT :

- Use light oil or wash oil for cleaning.
- In reattaching the water separator, be careful to keep off dust and dirt.
- Be sure to purge the fuel system before getting the machine restarted.
(See Bleeding the fuel system on page 90)

16. Cleaning the evacuator valve

1. Open the evacuator valve to get rid of large particles of dust and dirt.

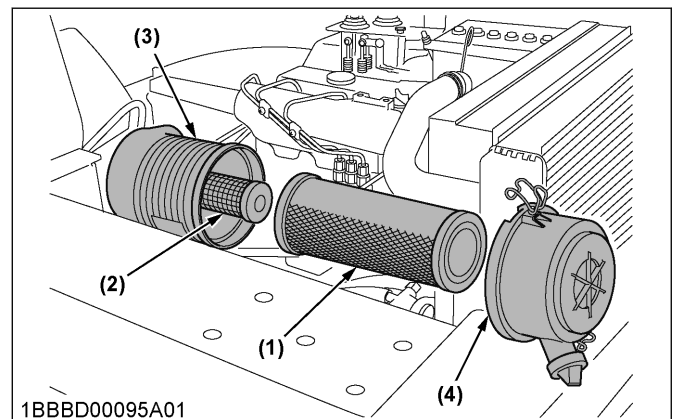


(1) Evacuator valve

17. Checking the dust indicator

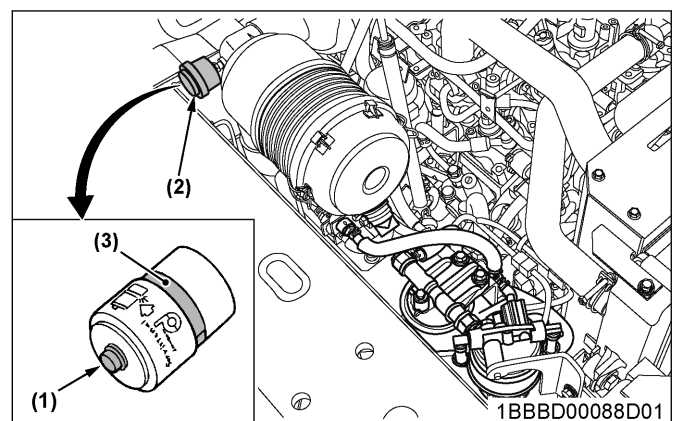
There is a dust indicator on the body of air cleaner.

1. If the red signal on the dust indicator is visible, clean the air-cleaner-element immediately.
(See Cleaning and checking the air cleaner element on page 77)



- (1) Outer filter element
(2) Inner element
(3) Case
(4) Cover

2. Reset the red signal by pushing a **[RESET]** button after cleaning.



- (1) Reset button
(2) Dust indicator
(3) Red signal

18. Checking and tightening the loose bolts and the nuts

1. Check the bolts and nuts and tighten them if necessary.

19. Checking the electrical wiring for short-circuits and loose terminals

WARNING

To avoid personal injury or death:

- Never wear metal rings or metal watch bands. You can be as a ground for the electric circuit and get a burn on your hand or arm.
- Know the electrical circuit before you connect or disconnect an electrical component. A wrong connection can cause injury or damage. Only qualified electricians are allowed to work on the electrical system.

1. Check the electrical system carefully because any faults will cause malfunctions or serious damage.

20. Checking the lamps and the instruments

1. Check that the lamps flash and light normally.
2. Check that the instruments, alarm lamps, and warning lights work normally.

21. Testing the horn

1. Check that the horn works.

22. Checking the machine for leaks

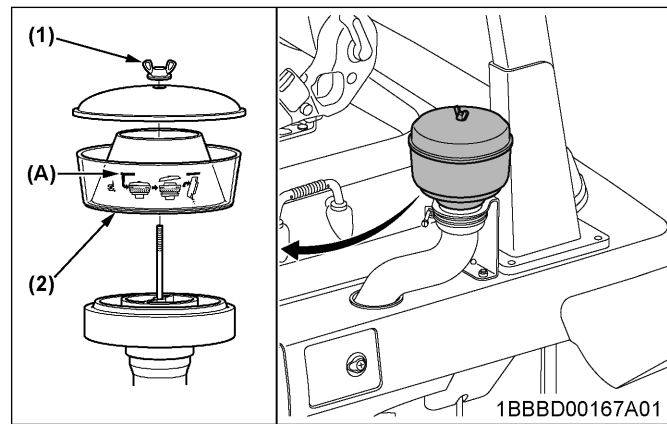
1. Check the machine for leaks in the fuel system, the radiator, the hydraulic system, and the engine.

23. Checking and cleaning after operating in muddy areas

1. If the machine is used in muddy areas, immediately wash it with water to remove the mud and dirt.
2. After washing the machine, check and lubricate the universal joint.

24. Cleaning the pre-cleaner

To clean the pre-cleaner, remove the wing nut and remove the pre-cleaner bowl.



- (1) Wing nut
(2) Pre-cleaner bowl

(A) Dust level

SERVICE EVERY 50 HOURS

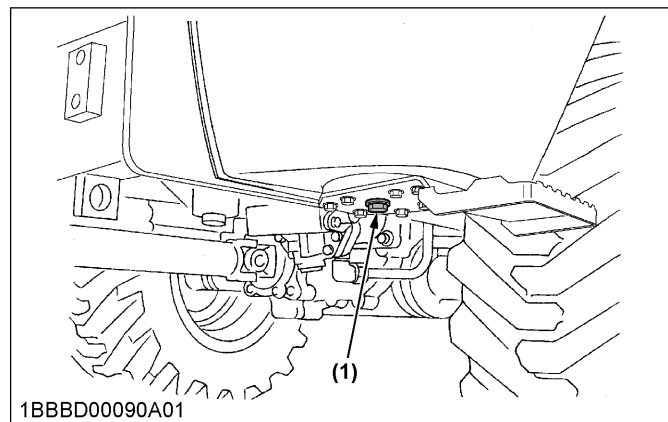
1. Draining water from the fuel tank

WARNING

To avoid personal injury or death:

- Always stop the engine before draining water from the fuel tank.
- Smoking and naked flames and other sources of ignition are prohibited during draining. Serious personal injury or death can result.

1. Slightly open the drain plug on the bottom of fuel tank to discharge water that has accumulated in the bottom.
2. Tighten the drain plug again.



- (1) Drain plug

2. Checking the battery condition

DANGER

To avoid the possibility of a battery explosion:

For refillable type battery, follow the following instructions.

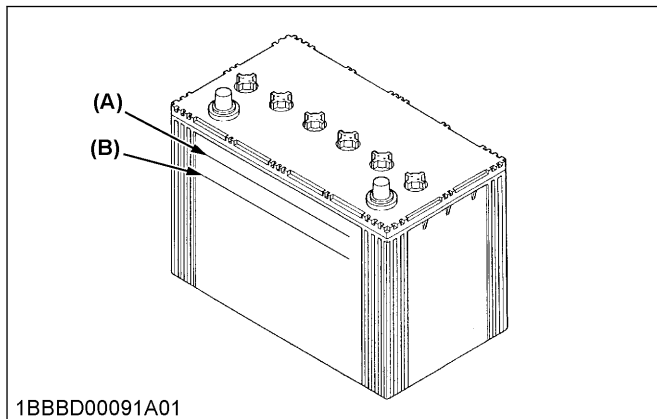
- Do not use or charge the refillable type battery if the fluid level is below the "LOWER" (lower-limit-level) mark. Otherwise, the component

parts of battery may prematurely deteriorate, which may shorten the service life of battery or cause an explosion. Check the fluid level regularly and add distilled water as required so that the fluid level is between the “UPPER” and “LOWER” levels.

WARNING

To avoid personal injury or death:

- Never remove the vent caps while the engine is running.
- Keep the electrolyte away from eyes, hands, and clothes. If you are splattered with the electrolyte, wash it away completely with water immediately and get medical attention.
- Wear the eye protection and rubber gloves when working around the battery.
- Before inspecting or dismantling the battery, be sure to turn off the engine and turn the starter switch to the [STOP] position.
- When removing the battery, always disconnect the negative ground cable first. When installing a battery, always connect the ground cable last. Proper order to connect the ground cables prevents a possible explosion caused by sparks.
- Always wear eye protection when working with the battery.



1BBBD00091A01

(A) Upper level

(B) Lower level

Mishandling the battery shortens the service life and adds to maintenance costs.

The original battery is maintenance free, but needs some servicing.

If the battery is weak, the engine will be difficult to start and the lights will be dim. It is important to check the battery periodically.

1. Check the battery condition by reading the indicator.

State of indicator display

Green	Specific gravity of electrolyte and quality of electrolyte are both in good condition.
Black	Needs charging battery.
White	Needs replacing battery.

IMPORTANT :

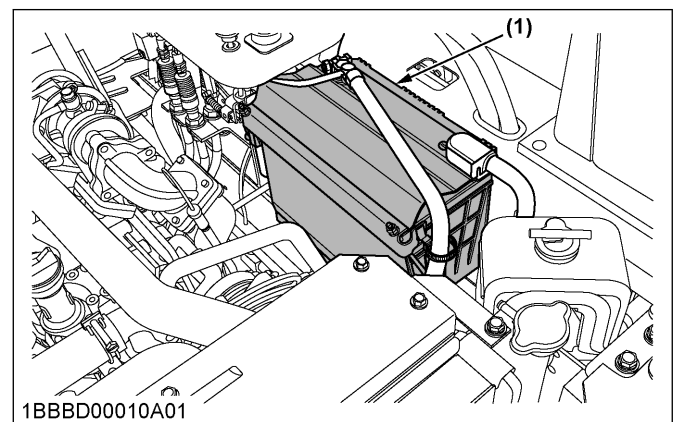
- The factory-installed battery is of non-refillable type. If the indicator turns white, do not charge the battery but replace it with new one.

2.1 Charging the battery

WARNING

To avoid personal injury or death:

- When the battery is being activated, hydrogen and oxygen gases in the battery are extremely explosive. Keep open sparks and flames away from the battery at all times, especially when charging the battery.
- When charging the battery, make sure that the vent caps are securely in place if equipped.
- When disconnecting the cable from the battery, start with the negative terminal first. When connecting the cable to the battery, start with the positive terminal first.
- Never check the battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.



1BBBD00010A01

(1) Battery

1. To slow charge the battery, connect the positive terminal of battery to the positive terminal of charger and the negative to the negative, then recharge in the standard fashion.

A boost charge is only for emergencies. It will partially charge the battery at a high rate and in a short time. When using a boost-charged battery, it is necessary to recharge the battery as early as possible.

Failure to recharge the battery will shorten the service life of battery.

The battery is charged if the indicator display turns green from black.

When exchanging an old battery for a new one, a battery of equal specification.

Battery type	Volts (V)	Capacity
GP24 (90D26L)	12	52 (at 5H.R (A.H))

Battery type	Reserve capacity (min)	Cold cranking amps	Normal charging rate (A)
GP24 (90D26L)	125	680	6.5

2.2 Storing the battery

When storing the machine for long periods of time, follow the procedure in this section.

1. Remove the battery from machine.
2. Adjust the electrolyte to the proper level.
3. Store the batter in a dry place out of direct sunlight.

The battery self-discharges while it is stored. Recharge it once every 3 months in hot seasons and once every 6 months in cold seasons.

SERVICE EVERY 200 HOURS

Perform inspection and servicing for every 50 hours of operation at the same time.

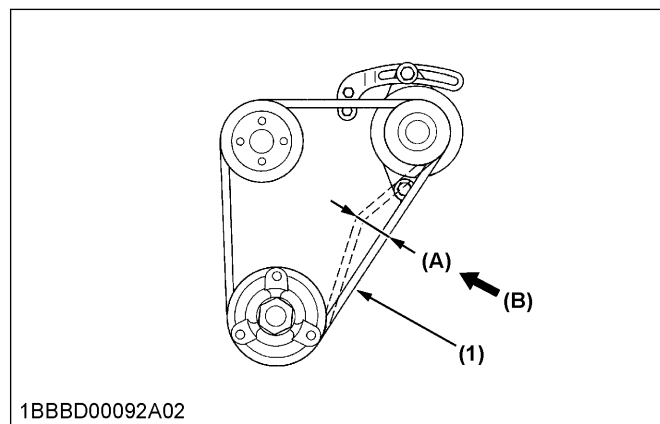
1. Checking the fan belt tension

WARNING

To avoid personal injury or death:

- Only check the fan belt with the engine off and the starter key removed.

1. Check and adjust the tension of V-belt.
(See Checking and adjusting the V-belt tension on page 76)



(1) V-belt

(A) Approx. 7 mm to 9 mm

(B) Approx. 6 kg to 7 kg

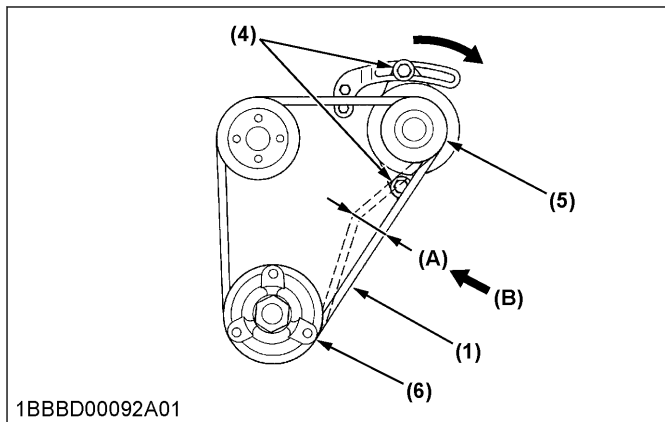
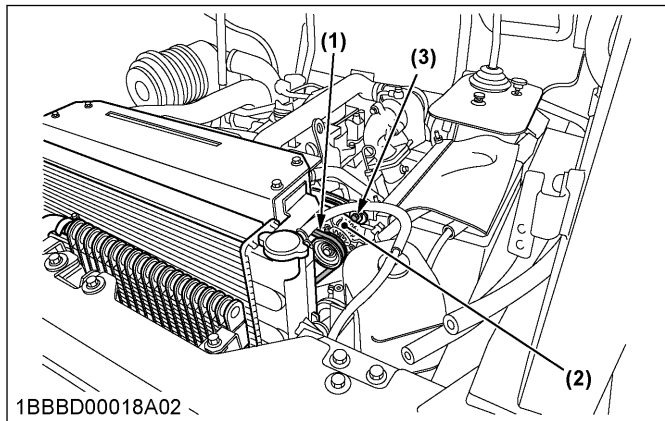
1.1 Checking and adjusting the V-belt tension

1. Press the fan belt in the middle with a fingertip by a force as follows.
The tension of fan belt is proper if the fan belt deflects the following length.

Fingertip force	About 6 kg to 7 kg
Fan belt tension	About 7 mm to 9 mm

2. If the tension of fan belt is improper, adjust the tension of fan belt by loosening the bolts and shifting the alternator in the direction shown by the arrow (A) in the following figure.
3. Check the pulleys and the V-belts for damage and wear.
Carefully check to see if the V-belts fit snugly into the V-belt grooves.

- If the V-belt has been stretched too much, nicked, or cracked, replace it.



- | | |
|-----------------------|--------------------------|
| (1) Fan belt | (A) Shift |
| (2) Alternator | (B) Approx. 7 mm to 9 mm |
| (3) Bolt | (C) Approx. 6 kg to 7 kg |
| (4) Alternator bolt | |
| (5) Alternator pulley | |
| (6) Pulley | |

IMPORTANT :

- If the engine is running with a loose fan belt, the belt may slip, causing engine overheating or insufficient battery recharging.
Always keep the fan belt properly tightened.
- If the fan belt should break, the battery charge lamp lights up.
Immediately stop the engine.

2. Checking the radiator hoses and the clips

Check to see if the radiator hoses are in good condition and the clips are properly fixed every 250 hours of operation or 6 months, whichever comes first.

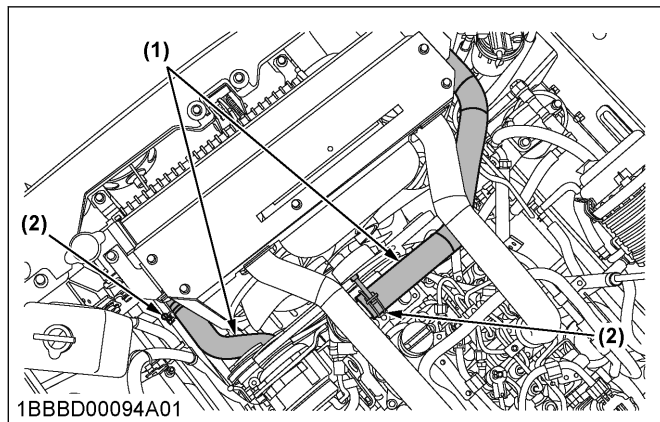


WARNING

To avoid personal injury or death:

- Do not check the radiator hoses until the engine has cooled down.

- If the clips are loose or water leaks, tighten the clips securely.
- Replace the hoses and the hose clamps every 2 years or earlier if checked and found that hoses are swollen, hardened, or cracked.



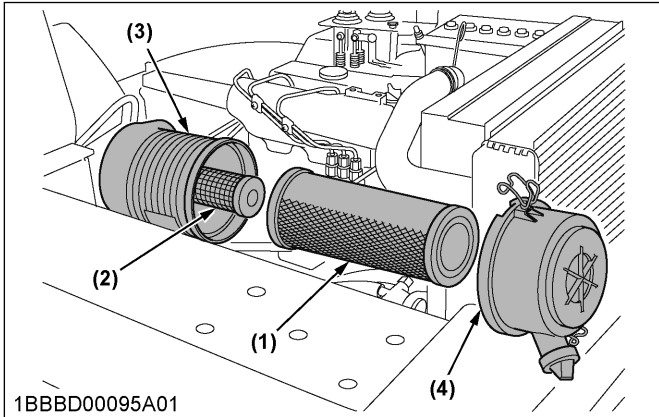
(1) Radiator hoses

(2) Clips

3. Cleaning and checking the air cleaner element

- Open the engine cover.
- Remove the engine cover and the outer-filter-element.
- Clean the outer-filter-element.
- Case the interior without removing the inner element.

5. Reassemble the outer-filter-element and the engine cover.
During reassembly, take care to install the engine cover so that its "TOP" mark (arrow) faces upwards.



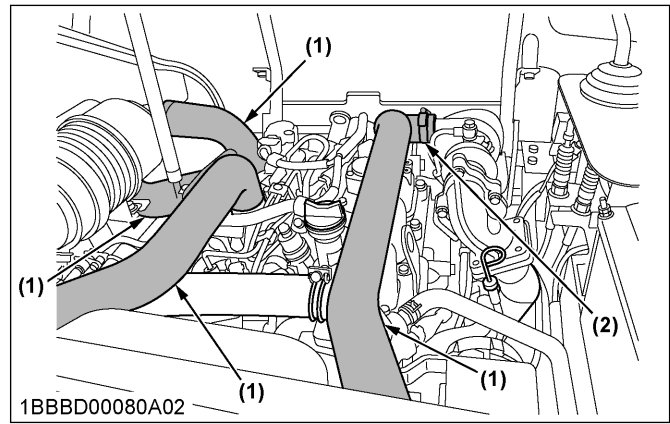
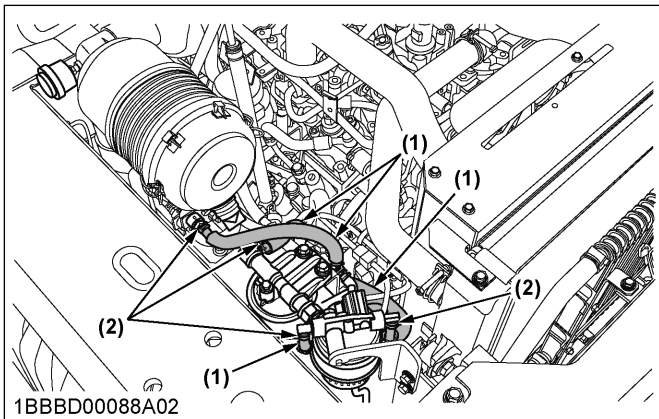
- (1) Outer filter element
(2) Inner element
(3) Case
(4) Cover

IMPORTANT :

- If you use the machine in an excessively dusty environment, inspect and clean / replace the air-cleaner-elements more often than indicated in **MAINTENANCE INTERVALS** on page 63.
- The air-cleaner-elements are dry elements. Do not oil the air-cleaner-elements.
- Do not operate the machine without the air cleaner installed.

4. Checking the fuel line and the intake air line

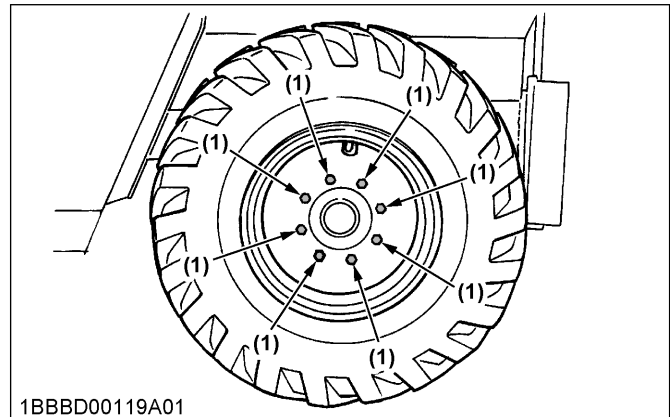
1. Check to see that all lines and hose clamps are tight and not damaged.
2. If hoses and hose clamps are found worn or damaged, replace or repair them at once.



- (1) Hose
(2) Hose clamp

5. Checking the wheel bolts

1. Check the wheel bolts according to Changing the tires on page 92.



- (1) Wheel bolt

Wheel bolt (1)	Tightening torque	275 N · m to 314 N · m (28 kgf · m to 32 kgf · m)
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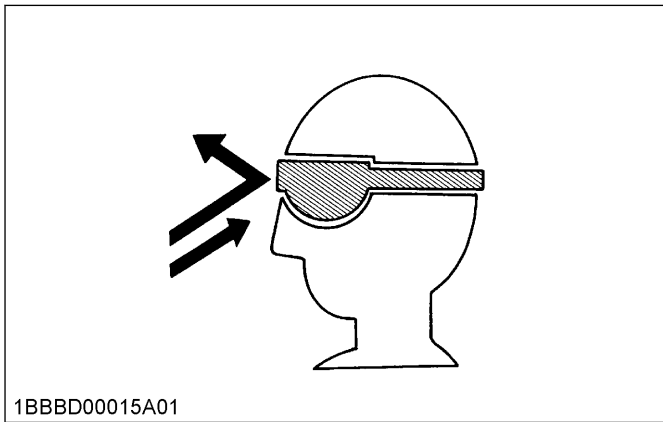
6. Cleaning the air cleaner element



WARNING

To avoid personal injury or death:

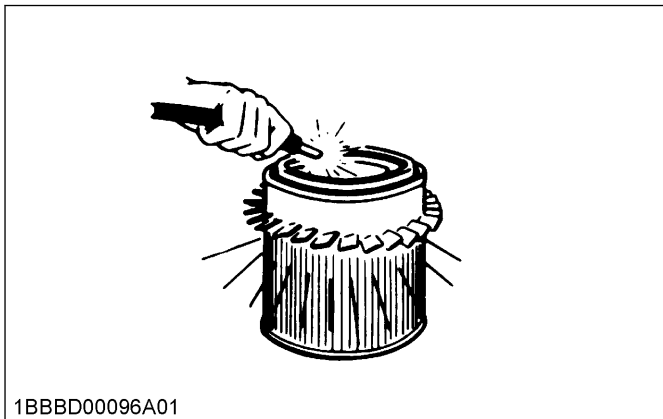
- Wear the eye protectors when cleaning with compressed air.



If the air-cleaner-element is only dusty, you can clean it with compressed air.

1. Blow the air-cleaner-elements with compressed air
The pressure of air should not exceed the following value and you should blow the cartridge to clean from inside to outside until the dust deposits are removed.

Air pressure	Under 205 kPa (2.1 kgf/cm ²)
--------------	--



2. If the air-cleaner-element is heavily clogged or oily, change it.

IMPORTANT :

- If the engine performance is still too low after cleaning the air-cleaner-elements or the exhaust is colored black, replace the air-cleaner-elements.

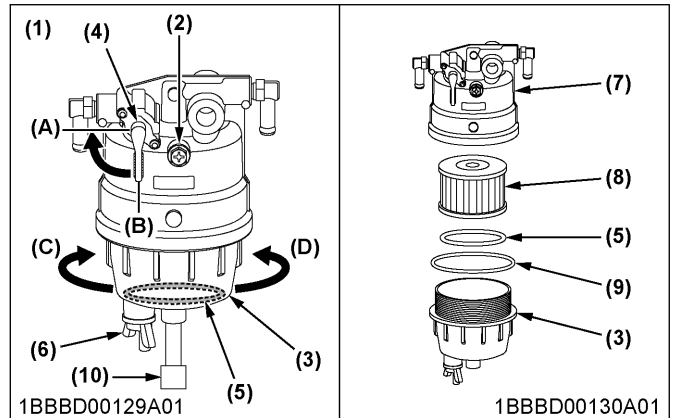
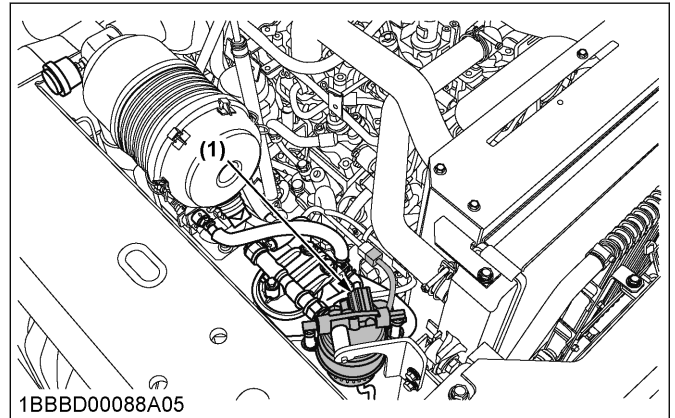
SERVICE EVERY 250 HOURS

Perform inspection and servicing for every 50 hours of operation at the same time.

1. Replacing the water separator filter element

1. Set the water shutoff-valve to the "CLOSE" position.
2. Loosen and remove the cup properly and replace the water-separator-filter-element.

3. Check the condition of the O-ring and replace if necessary.
4. Tighten up the cup properly.
5. Set the shutoff-valve to the "OPEN" position.



- (1) Water separator
- (2) Screw
- (3) Cup
- (4) Shutoff-valve
- (5) Float
- (6) Drain plug
- (7) Head cover
- (8) Water separator filter element
- (9) O-ring
- (10) Connector of water level sensor

- (A) Close
- (B) Open
- (C) Loosen
- (D) Tighten

IMPORTANT :

- In reattaching the water-separator-filter-element, be careful to keep off the dust and dirt.
- Collect drained water in an oil pan or the like.

IMPORTANT :

- After exchange of the water-separator-filter, purge the fuel system of air.
(See Bleeding the fuel system on page 90)

2. Changing the engine oil

Change the engine oil every 250 hours, or every 6 months in the case that service hour is less than 250 hours.

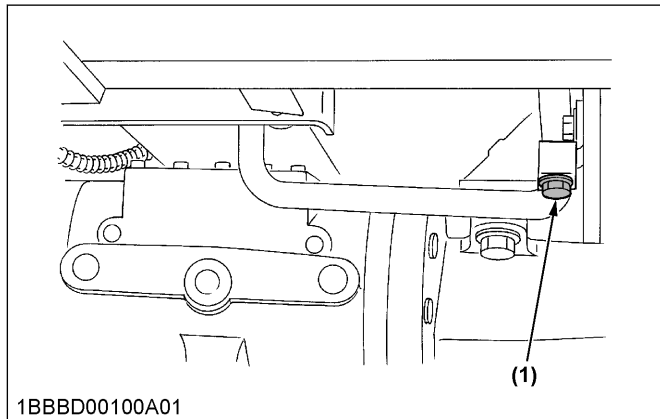
WARNING

To avoid personal injury or death:

- Always stop the engine before changing the engine oil.
- Never open the oil-drain-plug immediately after the engine has stopped, or hot engine oil may rush out, causing scalding.

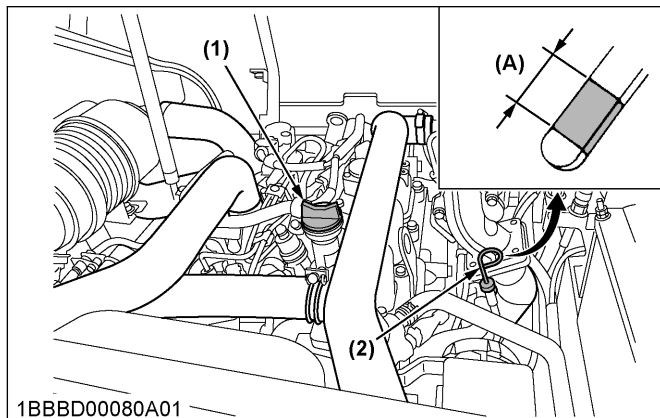
1. Remove the oil-drain-plug at the engine-oil-drain and drain the engine oil.

Oil drain plug	WOF 19 mm
----------------	-----------



(1) Oil drain plug

2. After the engine oil is fully drained, refit the oil-drain-plug with a new seal.
3. Fill the engine oil into the oil port up to the correct level.
4. Idle the engine for a short while.
5. About 5 minutes after stopping the engine, check the level of engine oil with the oil dipstick.



(1) Oil port
(2) Oil dipstick

(A) Proper oil level

Engine oil capacity

5.0 L

IMPORTANT :

- Use the engine oil of appropriate viscosity according to ambient temperature.
- Change the engine oil once every 6 months regardless of the running time on the machine.
- Change the oil filter when you change the engine oil.

3. Replacing the engine oil filter cartridge

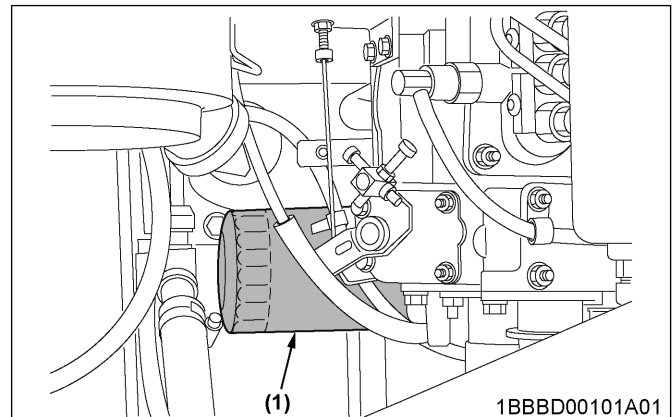
Change the engine oil filter every 250 hours, or every 6 months in the case that service hour is less than 250 hours.

WARNING

To avoid personal injury or death:

- Always stop the engine before replacing the engine-oil-filter-cartridge.
- Never remove the oil filter immediately after the engine has stopped, or hot engine oil may rush out, causing scalding.

1. Replace the engine-oil-filter-cartridge at the same time engine oil is changed.
2. Use the supplied filter wrench to remove the oil filter.



(1) Engine oil filter cartridge

3. Apply a thin layer of engine oil to the gasket of the oil filter and firmly tighten it in place by hand.
4. Top up the engine oil if necessary.
5. Idle the engine briefly.
6. Check the level of engine oil about 5 minutes after switching off the engine with the oil dipstick.

SERVICE EVERY 500 HOURS

Perform inspection and servicing for every 50 and 250 hours of operation at the same time.

1. Checking and replenishing the oil in the front and the rear axle case



WARNING

To avoid personal injury or death:

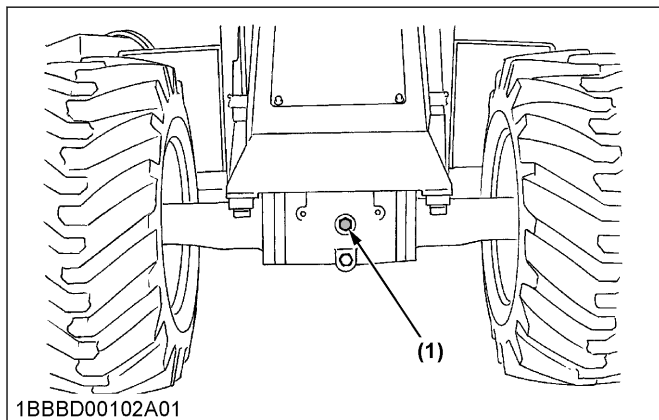
- Before changing the oil in the front and rear differential axle cases, always stop the engine and lock the shuttle-change-lever in neutral.
- Always remove the bucket and attachment, and use the lift-arm-support-device when servicing the machine with the loader-lift-arms raised to avoid serious personal injury.

1. Remove the oil-port-plug, check the oil level in the front and the rear axle case.
The oil level in the axle cases must be at the lower rim of the thread.

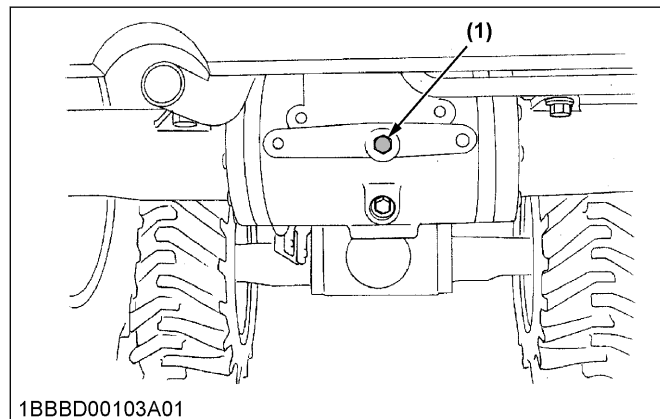
Oil port plug	WOF 10 mm
---------------	-----------

2. Add the axle-cases-oil if necessary.
3. Screw in and tighten the oil-port-plug.

Front



Rear



(1) Oil port plug

Axle case oil capacity	Front	3.0 L
	Rear	

2. Replacing the LST oil filter



WARNING

To avoid personal injury or death:

- Never remove the filter immediately after the engine has stopped, or hot hydraulic oil may rush out, causing scalding.

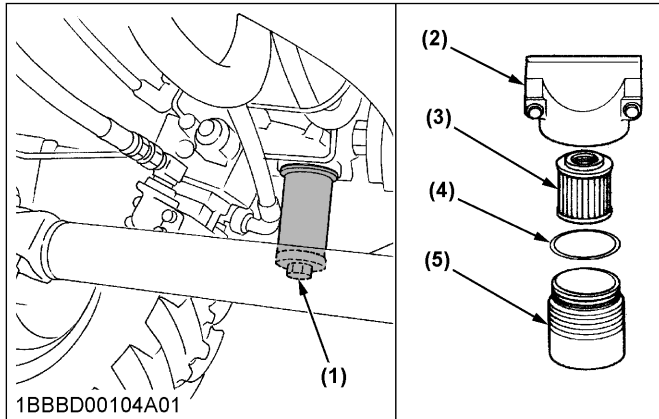
1. Loosen the nut located the bottom of the LST-oil-filter and remove the LST-oil-filter.

Hexagon nut	24 mm
-------------	-------

2. Change to an new LST-oil-filter-cartridge and reinstall the LST-oil-filter.

Hexagon nut	Tightening torque	73.6 N · m to 83.4 N · m (7.5 kgf · m to 8.5 kgf · m)
-------------	-------------------	--

3. Tighten the LST-oil-filter about 2/3 turn by hand after its sealing face touches the gasket.



- | | |
|--------------------|------------|
| (1) LST oil filter | (4) O-ring |
| (2) Head cover | (5) Case |
| (3) Element | |

IMPORTANT :

- After changing the LST-oil-filter, start the hydraulic system briefly and then check the oil level.
Do not use a wrench to tighten the new LST-oil-filter since it can distort the LST-oil-filter. Be sure to tighten the LST-oil-filter by hand.

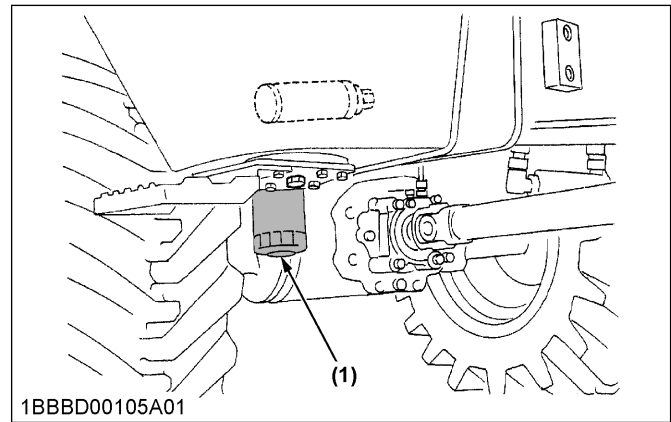
3. Replacing the return filter

! WARNING

To avoid personal injury or death:

- Never remove the filter immediately after the engine has stopped, or hot hydraulic oil may rush out, causing scalding.

1. Loosen the return filter with a filter wrench and remove the return filter.
2. When installing the new return filter, apply a light coat of hydraulic oil to the gasket.
3. Tighten the return filter about 2/3 turn by hand after its sealing face touches the gasket.



- (1) Return filter

IMPORTANT :

- After changing the return filter, be sure to check the oil level.
- Do not use a wrench to tighten the new return filter since it can distort the return filter. Be sure to tighten the return filter by hand.

4. Replacing the fuel filter cartridge

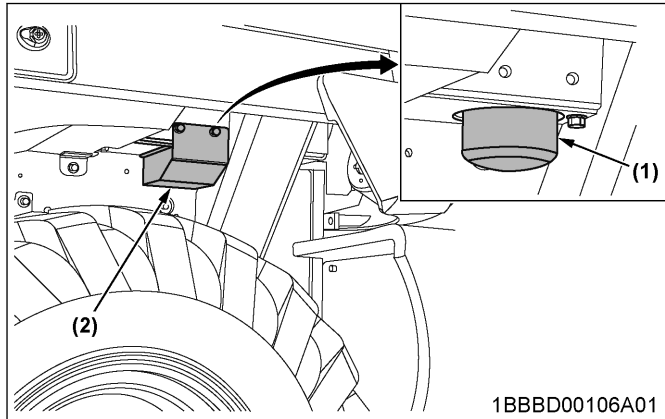
! WARNING

To avoid personal injury or death:

- Always stop the engine before changing the fuel filter.
- Keep sparks and flames away from the diesel fuel, or serious personal injury results. Allow the engine to cool completely.

1. Remove the cover, and remove the fuel filter with a filter wrench.
2. Apply a light film of fuel to the gasket of the new fuel filter and turn in tightly by hand.
3. Attach the cover.

4. Purge the fuel system.
(See Bleeding the fuel system on page 90)



(1) Fuel filter cartridge (2) Cover

IMPORTANT :

- In reattaching new fuel filter, be careful to keep off dust and dirt.

5. Replacing the fan belt

- Consult your local KUBOTA dealer for replacing the fan belt.

SERVICE EVERY 1000 HOURS

Perform inspection and servicing for every 50, 250, and 500 hours of operation at the same time.

1. Changing the oil for the front and the rear axle case

WARNING

To avoid personal injury or death:

- Before changing the oil in the front and rear differential axle cases, always stop the engine and lock the shuttle-change-lever in neutral.
- Always remove the bucket and attachment, and use the lift-arm-support-device when servicing the machine with the loader-lift-arms raised to avoid serious personal injury.

1. Place a collection vessel under the axle.

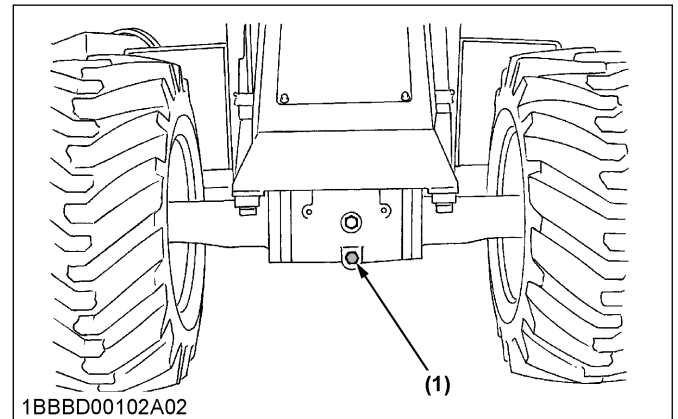
Collection vessel capacity	5 liters
----------------------------	----------

2. Remove the drain plug and drain the oil.

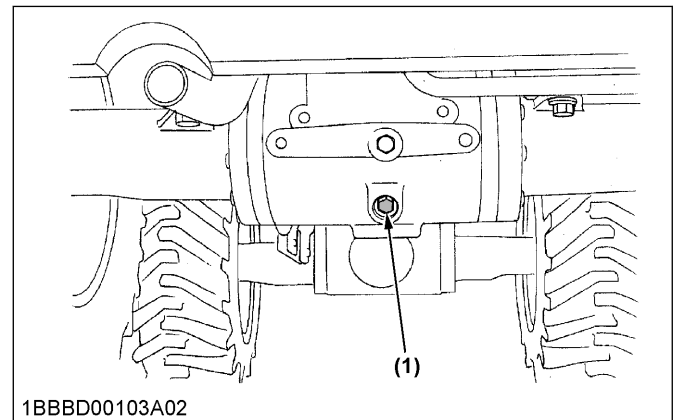
Drain plug	10 mm socket head
------------	-------------------

3. Screw in and tighten the drain plug.

Front



Rear



(1) Drain plug

4. Fill in oil to the bottom edge of the thread hole on the oil port.
5. Screw in and tighten the oil-port-plug.

Axle case oil capacity	Front	3.0 L
	Rear	

2. Changing the hydraulic oil and the suction filter

NOTE :

To avoid personal injury or death:

- Always stop the engine before changing the hydraulic oil.
- Never open the drain plug immediately after the engine has stopped, hot hydraulic oil may rush out, causing scalding.

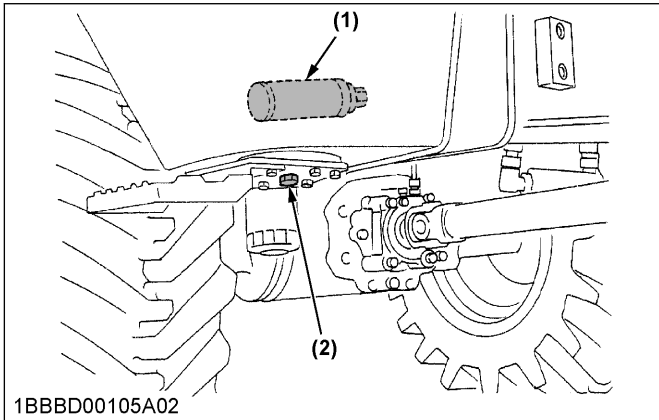
1. Remove the drain plug from the bottom of the hydraulic-oil-tank and drain the oil.

Drain plug	Hexagon head screws 22 mm
------------	---------------------------

2. Then retighten the drain plug completely.

3. Remove the bolt from the tank-bottom-cover and then remove the tank-bottom-cover.
4. Replace the suction filter.

Suction filter	Hexagon nut 50 mm
----------------	-------------------

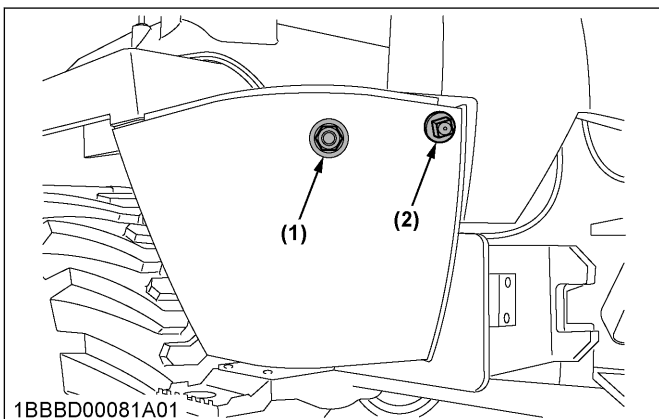


(1) Suction filter (2) Drain plug

5. Check the gasket for damage and replace it if necessary.
6. Attach the tank-bottom-cover.
7. Remove the oil-port-plug for the hydraulic-oil-tank and fill hydraulic oil up to the specified amount.

Oil port plug	Hexagon head screws 36 mm
---------------	---------------------------

8. Then attach the oil-port-plug.
9. Run the engine at idle speed and set the shuttle-change-lever to the neutral position.
10. Then operate the control lever and the steering wheel fully for about 5 minutes.
11. Stop the engine and make sure that the quantity of hydraulic oil is sufficient through the oil-level-gauge.



(1) Oil level gauge (2) Oil port

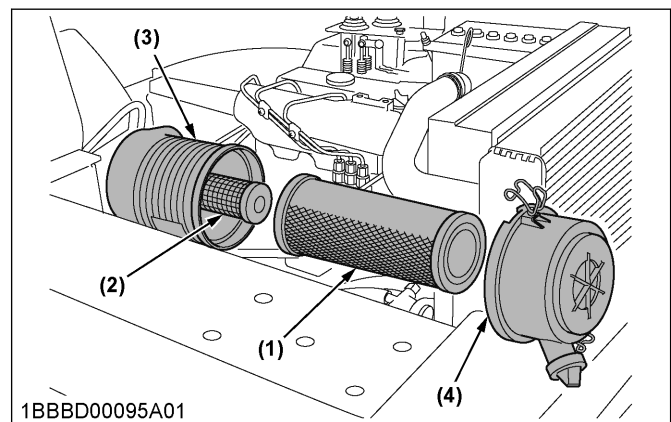
Hydraulic oil capacity	Hydraulic tank	42 L
	Whole oil volumes	58 L

IMPORTANT :

- If there are deposits in the hydraulic-oil-tank, wipe them all with a clean rag and diesel oil.
- Use great caution not to admit any foreign particles into the hydraulic-oil-tank.

3. Replacing the air cleaner element

1. Open the hood, and remove the cover and both air-cleaner-elements.
2. Change both air-cleaner-elements and clean the inside of the case.
3. Reinstall the air-cleaner-elements and the cover being careful to install the cover so that its "TOP" mark (arrow) faces upwards.



(1) Outer element (2) Inner element (3) Case (4) Cover

4. Adjusting the engine valve clearance

- Consult your local KUBOTA dealer for adjusting the engine valve clearance.

SERVICE EVERY 1500 HOURS

Perform all 50, 100, and 500 hour servicing at the same time.

1. Checking the injector

- Consult your local KUBOTA dealer for checking the injector.

2. Replacing the oil separator element

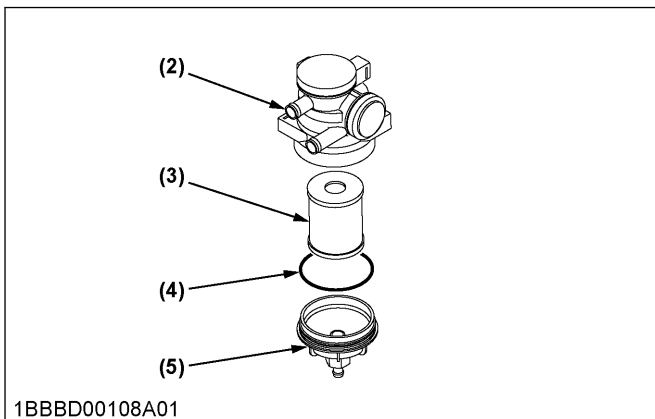
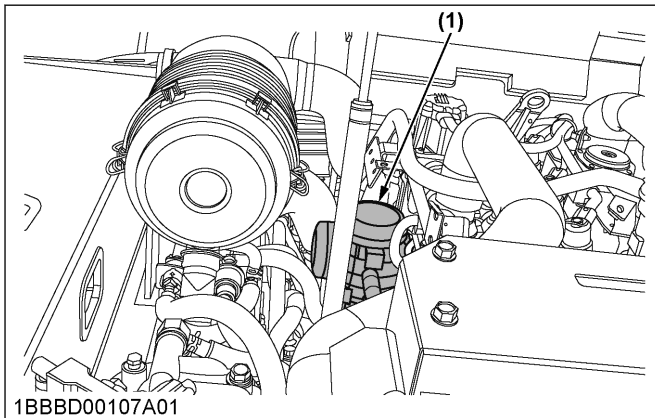


WARNING

To avoid personal injury or death:

- **Be sure to stop the engine before replacing the oil-separator-element.**

1. Remove the cover and remove the oil-separator-element.
2. Wipe off the oil and the carbon in the case with a clean rag.
3. Fit a new oil-separator-element and O-ring.
4. Tighten the cover until a cover comes in contact with body.



- | | |
|---------------------------|------------|
| (1) Oil separator | (4) O-ring |
| (2) Body | (5) Cover |
| (3) Oil separator element | |

3. Checking the EGR cooler

- Consult your local KUBOTA dealer for checking the EGR cooler.

SERVICE EVERY 2000 HOURS

Perform inspection and servicing for every 50, 250, 500 and 1000 hours of operation at the same time.

1. Checking the alternator and the starter motor

1. After every 2000 hours of use, check and maintain the alternator and the starter motor.
It is just about the time the brushes would become worn.

It is recommended to ask your KUBOTA dealer to test and overhaul the alternator and the starter motor.

If you often use the lights during work, inspect the alternator every 1000 hours.

SERVICE EVERY 3000 HOURS

Perform all 50, 250, 500, 1000, and 1500 hour servicing at the same time.

1. Checking the EGR system

- Consult your local KUBOTA dealer for checking the EGR system.

2. Checking the turbocharger

- Consult your local KUBOTA dealer for checking the turbocharger.

ANNUAL SERVICING

1. Checking the electrical leads and the terminals

1. Check if all accessible electrical leads, connectors, and terminals are the good condition and fit firmly.
2. Repair or replace damaged parts.
3. Check the fuse box and the fuse holders for oxidation and soiling and clean if necessary.

2. Checking the exhaust manifold for cracks, gas, leakage, and mounting screw

- Consult your local KUBOTA dealer for checking the exhaust manifold for cracks, gas, leakage, and mounting screw.

3. Checking the intake air line for air leaks

- Consult your local KUBOTA dealer for checking the intake-air-line for air leaks.

4. Checking the boost sensor and the air-flow-sensor (AFS)

- Consult your local KUBOTA dealer for checking the boost sensor and the air-flow-sensor (AFS).

5. Checking the EGR piping for gas leak

- Consult your local KUBOTA dealer for checking the EGR piping for gas leak.

BIENNIAL SERVICING

Perform inspection and servicing for annual operation at the same time.

1. Replacing the fuel hoses and the clamps

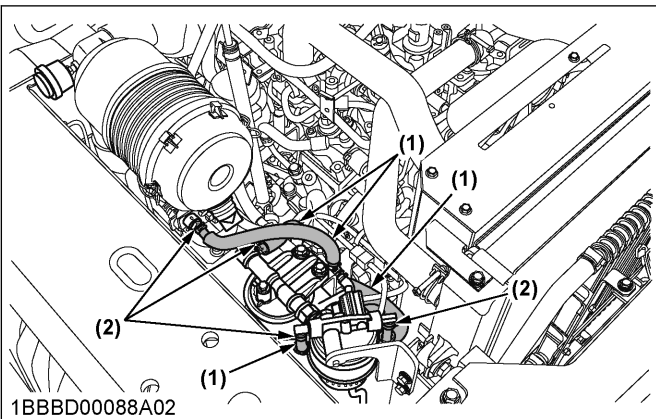
WARNING

To avoid personal injury or death:

- A broken fuel line will cause the fuel to leak. Be sure to check the fuel line. Fire or injuries may result if a fuel line is leaking.
- Make sure that the engine is cool before disconnecting fuel lines.

Rubber parts like the fuel lines are likely to age even if the engine is not used regularly. Therefore, it is necessary to replace fuel lines with new ones once every 2 years or sooner if they are damaged.

- Regularly check that the fuel lines and clamps are not loose or damaged.
- When the fuel line has been replaced, be sure to bleed air from the fuel line.



(1) Hose

(2) Hose clamp

IMPORTANT :

- When replacing the fuel lines, take special care to prevent dirt and other foreign matter from entering the fuel system. Entry of foreign matter in the fuel system will likely cause serious damage.

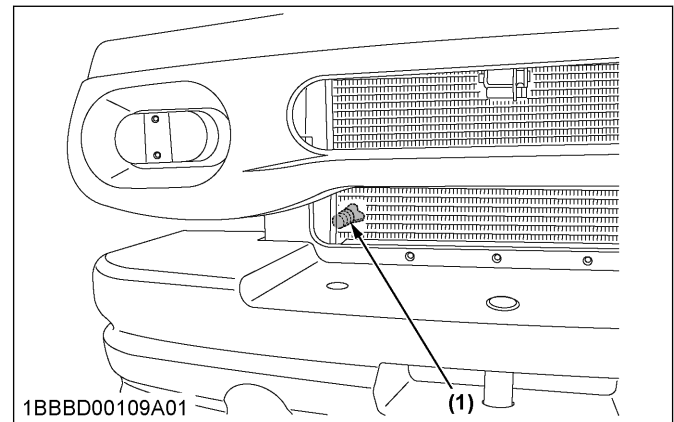
2. Changing the coolant

WARNING

To avoid personal injury or death:

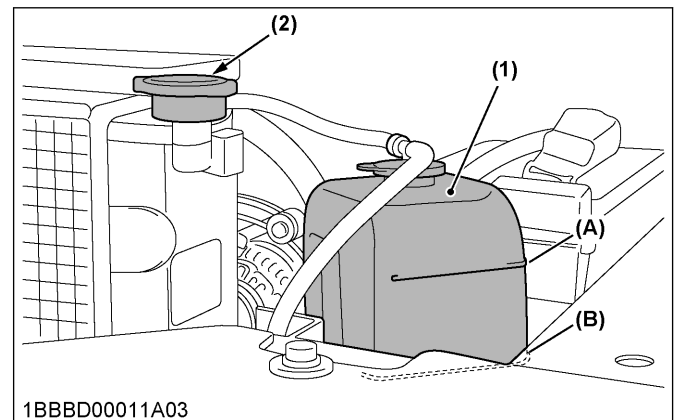
- Never open the plug immediately after the engine has stopped, or hot coolant may rush out, causing scalding.

- Open the plug under the radiator to drain the coolant.



(1) Plug

- To drain the recovery tank, disconnect the pipe at the bottom of the recovery tank.
- Clean the radiator interior by pouring the water into the supply port and keeping the plug open until clean water flows out of it.
- Close the plug and fill the radiator and recovery tank with a mixture of antifreeze and water (50%/50%).
- After filling, idle the engine for about 5 minutes, stop the engine, and make sure that the coolant level is up to the filling nozzle of the radiator.



(1) Recovery tank

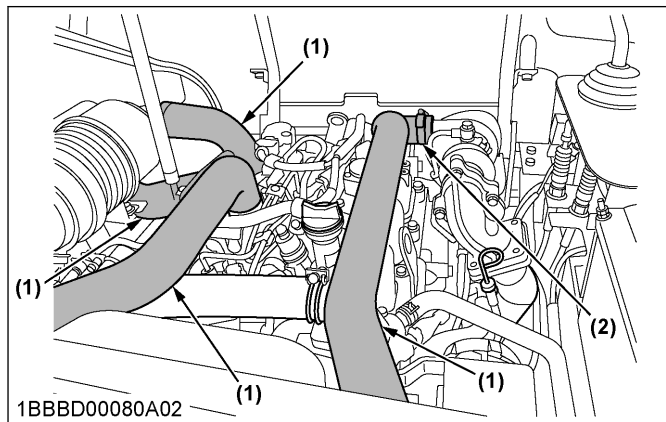
(2) Radiator cap

(A) Full

(B) Low

3. Replacing the intake air line

1. Replace the hoses and clamps, if necessary.
(See Checking the fuel line and the intake air line on page 78)



(1) Hoses (2) Hose clamps

4. Replacing the rubber piping related oil separator

- Consult your local KUBOTA dealer for replacing the rubber-piping-related-oil-separator.

5. Replacing the intake hose and intercooler hose

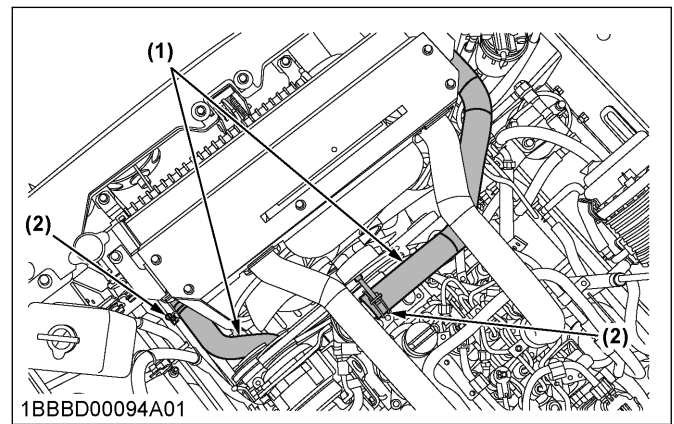
- Consult your local KUBOTA dealer for replacing the intake hose and intercooler hose.

6. Replacing the EGR cooler hose

- Consult your local KUBOTA dealer for replacing the EGR-cooler-hose.

7. Replacing the radiator hoses (water pipes)

1. Replace the radiator hoses and the clips.
(See Checking the radiator hoses and the clips on page 77)



(1) Radiator hose (2) Clip

SERVICE AS REQUIRED

1. Replacing and repairing the electrical system

Damage to cables and loose connections of the electrical system cause malfunctioning and lead to short circuits, leakage, and fires.

1. Replace and repair the electrical system as quickly as possible if necessary.

1.1 Replacing the fuses

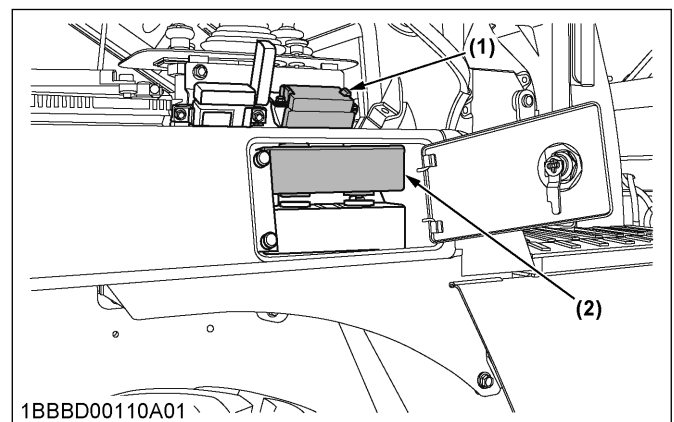
! WARNING

To avoid personal injury or death:

- Before replacing a fuse, be sure to turn off the starter switch.

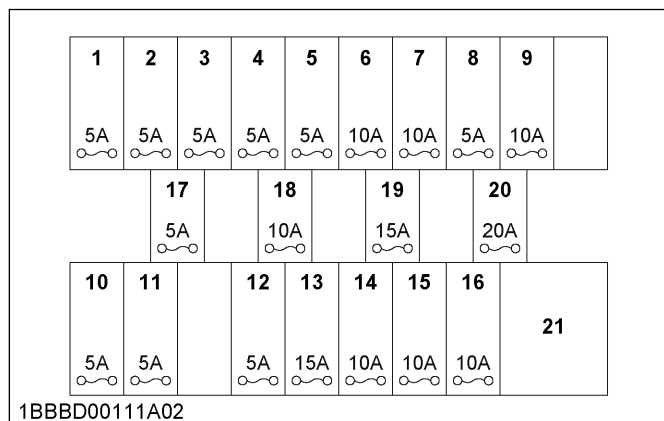
1. Remove the cover of the fuse box.
2. Replace the blown fuse using a new one of the same capacity.

Fuse capacities and their circuits are as follows.



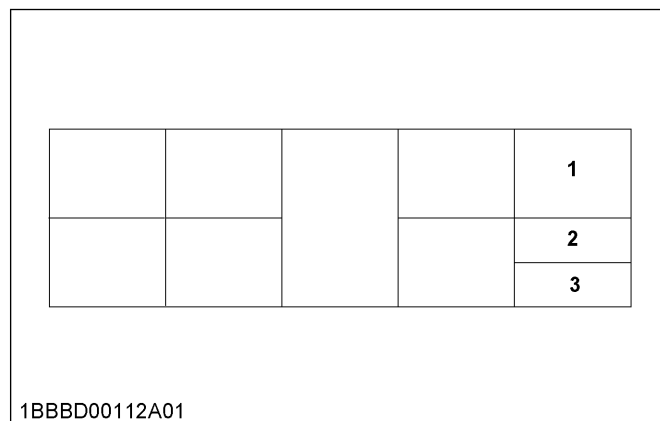
(1) Fuse box A (2) Fuse box B

• Fuse box A



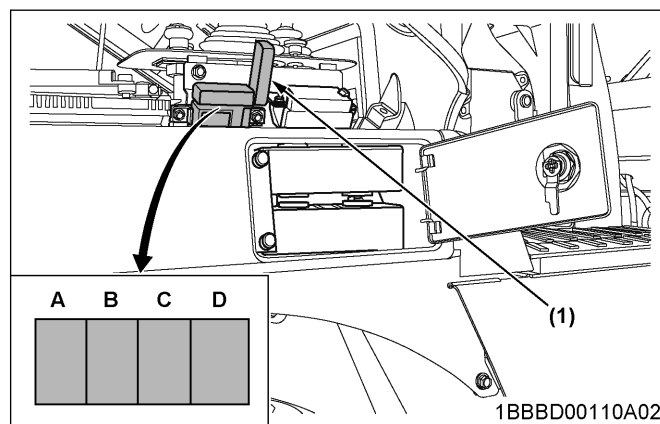
	Applied circuit
1	Fuel pump
2	Flasher
3	Main ECU (AC)
4	Head lamp switch
5	Clearance lamp
6	Stop lamp
7	Alternator
8	Travel speed switch (Low hold switch)
9	Working lamp
10	Starter signal
11	Engine ECU
12	Auto leveler
13	Electrical outlet
14	Head lamp
15	Hazard
16	Shuttle change lever
17	Spare
18	Spare
19	Spare
20	Spare
21	Fuse puller

• Fuse box B



	Rating	Applied Circuit
1	30A	Engine ECU
2	10A	Horn
3	10A	Main ECU (+B)

Slow blow fuse box



(1) Slow blow fuse box

	Rating	Applied circuit
A	80A	Alternator
B	60A	Main 1
C	60A	Main 2
D	50A	Main 3

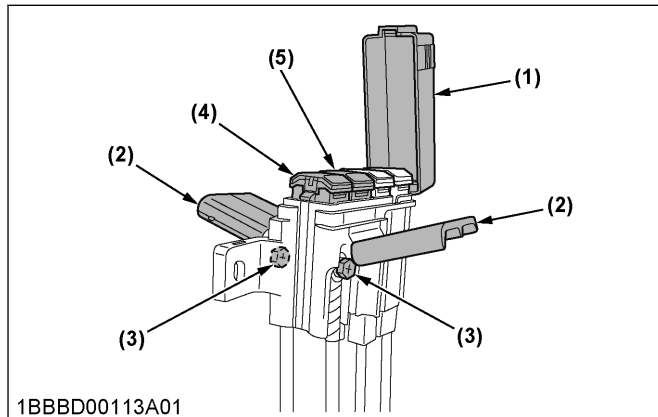
(To replace the slow-blow-fuse, see Replacing the slow blow fuses on page 89)

IMPORTANT :

- The main fuse protects the entire electrical system. If the main fuse or another fuse has blown, determine why it blew and repair anything necessary. Never bridge the fuses, always replace them with a new fuse of the same rating.

1.2 Replacing the slow blow fuses

1. Disconnect the negative cord of the battery.
2. Remove the slow-blow-fuse-case.
3. Open the slow-blow-fuse-case-cap and the cover then remove the bolts and draw out the slow-blow-fuse A and B.

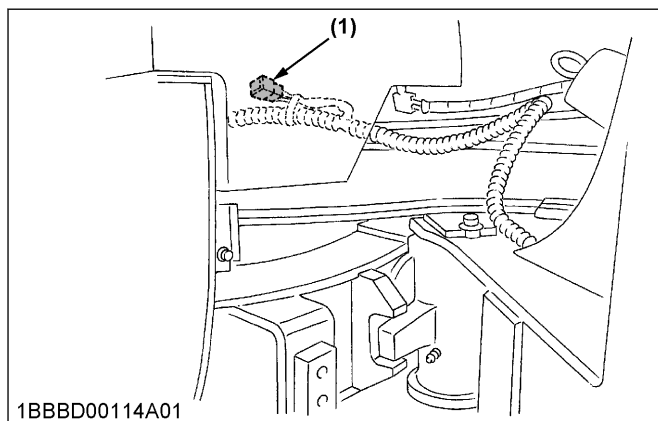


- (1) Slow blow fuse case cap (4) Slow blow fuse A
(2) Cover (5) Slow blow fuse B
(3) Bolt

Slow blow fuse	Rating	Applied circuit
A	80A	Alternator
B	60A	Main 1

2. Branching the auxiliary electric

1. Branch the wire harness of auxiliary electric as the following figure if required.



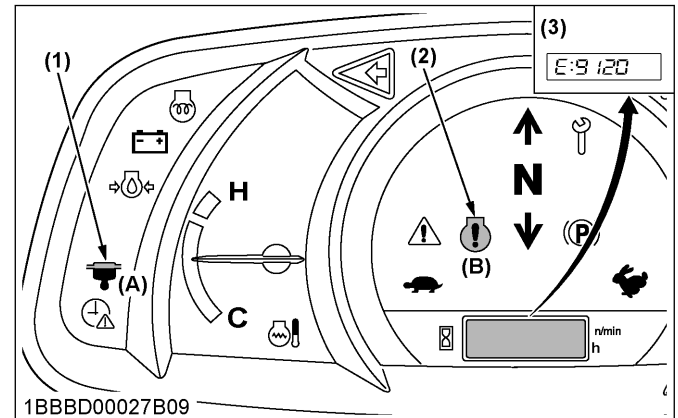
- (1) Auxiliary electric

The branched wire harness allows up to 20 A in use when the starter switch in the **[RUN]** position.

3. Draining the fuel filter by draining the water separator

If the water separator filled-up indicator lights up and the error code "E:9120" appears on the meter panel,

immediately take the steps in this section to drain the fuel filter after stopping the engine.



- (1) Water separator filled-up in- (A) Lighting
dicator (B) Blinking
(2) Engine warning indicator
(3) Warning message

IMPORTANT :

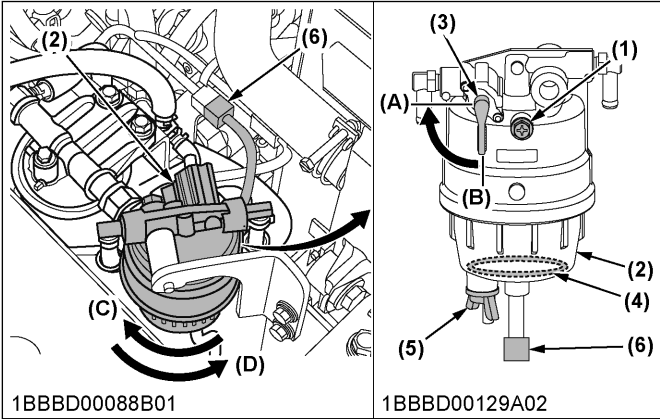
- If you do not drain the fuel filter immediately after the alarm, the engine may be seriously damaged.

1. Open the engine cover.
2. Check the red float.
When the separated water is entering the sediment cup, the red float moves upwards.
3. When the float moves upwards, close the shutoff-valve so that no fuel can run out.
4. Now loosen the drain plug, and drain the water.

IMPORTANT :

- Collect drained water in an oil pan or the like.
5. In case there are foreign substances in the cup, detach the cup and clean it.

6. Finally, do not forget to open the shutoff-valve after drain of the water has been over.



- (1) Screw

(2) Cup

(3) Shutoff-valve

(4) Float

(5) Drain plug

(6) Connector of water level sensor
- (A) Close

(B) Open

(C) Loosen

(D) Tighten

NOTE :

- Before detaching the cup, unplug the connector of the water-level-sensor. When the cleaning is complete, make sure to set the connector of the water-level-sensor.

IMPORTANT :

- Use light oil or wash oil for cleaning.
- In reattaching the water separator, be careful to keep off dust and dirt.
- Be sure to purge the fuel system before getting the machine restarted.
(See Bleeding the fuel system on page 90)

IMPORTANT :

- After draining the fuel filter, bleed the fuel system as soon as possible.
(See Bleeding the fuel system on page 90)

4. Bleeding the fuel system

**WARNING**

To avoid personal injury or death:

- Keep sparks and flames away from the fuel, or serious personal injury may result.

After the fuel tank has been run empty or maintenance and service work has been carried out, the engine cannot be started again after refueling. This is because air has entered the fuel system. It is thus necessary to bleed the fuel system in the procedure in this section. Also after replacing the fuel filter, bleed the fuel system.

1. Fill the fuel tank with fuel.

2. Turn the starter switch to the **[RUN]** position.
The fuel pump starts working to supply fuel into the line. About 10 seconds later, the air will be bled out from the line.
3. Start the engine.

NOTE :

- The engine may sometimes stall after starting if air bleeding was not complete. If engine stalling should occur, repeat step 2 and step 3.
- If it is not easy to bleed the air, press the priming pump of engine repeatedly until it feels heavy.

5. Bleeding the air from the brake fluid system

**WARNING**

To avoid personal injury or death:

- For bleeding the air from the brake fluid system, stop the engine, set the parking-brake-switch to the parking position, lower the bucket and attachment to the ground, release the hydraulic pressure in the hydraulic system by operating control levers, lock all control levers in neutral, and remove the starter key.
- Only use the hydraulic oil that meets *ISO VG 32 or VG 22*. Use of incorrect hydraulic oil obtains potential of brake failure and will cause damage of brake parts.

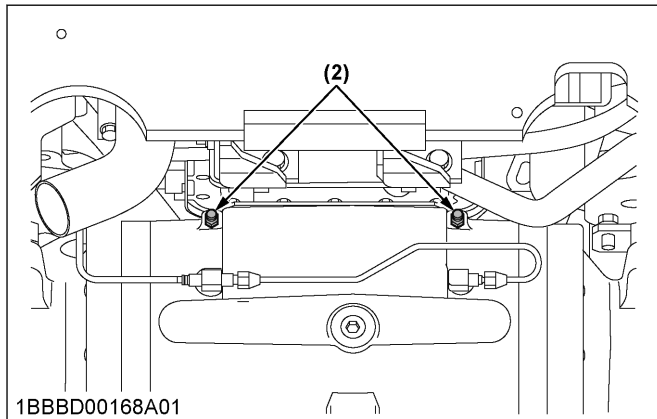
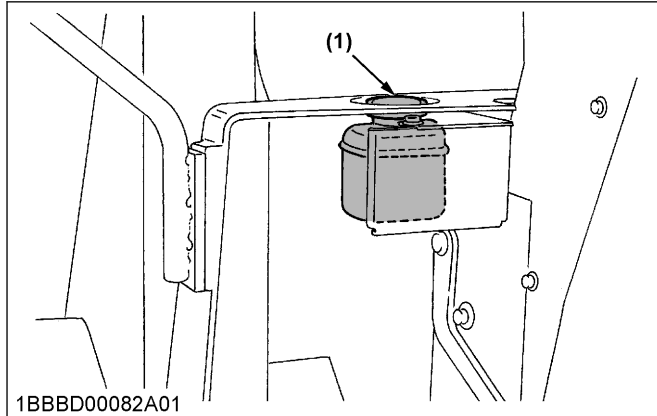
Bleed the air from the brake circuit after disassembling and repairing the brake or when the brake fluid falls too low, allowing air inside the brake system. Bleeding the air from the brake circuit requires two workers.

1. Fill the brake-fluid-reservoir with only the following hydraulic oil.

Hydraulic oil	ISO VG 32 or VG22
---------------	-------------------

- Make sure that the brake-fluid-reservoir is always half full or more during air-bleeding.
2. Remove the cap from the air-bleeding plugs located on the axle housing.
3. Connect a vinyl tube about 1 meter long to the air-bleeding plugs and place the other end of the vinyl tube in an oil catcher.
4. Loosen the air-bleeding plugs with a wrench and press the brake pedal gradually to bleed the air.
5. Repeat step 4. until bubbles no longer emerge from the vinyl tube, then slowly release the brake pedal.
6. If air is not fully bled by one operation, repeat step 4. and step 5.

7. After the bubbles are completely removed, retighten the air-bleeding plugs and replace the caps.
8. Refill the brake-fluid-reservoir with the preceding hydraulic oil to the specified level.
The properties of brake fluid are different from manufacturer to manufacturer. Use the same brand of hydraulic oil.



(1) Brake fluid reservoir

(2) Air-bleeding plug

SERVICE FOR TIRES

1. Precautions for handling the tires

WARNING

To avoid personal injury or death:

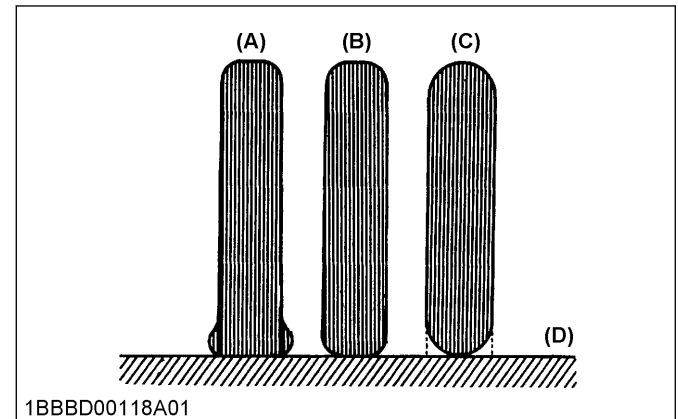
- Before changing the tires, set the parking brake, stop the engine, lower the bucket and attachment to the ground, release the hydraulic pressure in the hydraulic system by operating the control levers, lock all control levers in neutral, and remove the starter key.
- To change the tires, place the machine on blocks suitable for the weight of the machine.
- Before adding the air, install the tire correctly on the machine or put the tire in a retaining device (tire-inflation-cage). Do not blow up the tires with greater pressure than specified in the following table because a blown tire can cause serious injury.

2. Checking the tire pressure

Check the tires and rims for damage and eliminate problems before starting operation.

If the air pressure in the tire is too high or too low, the life of the tire will be shortened. Check the air pressure in tires routinely.

1. Check the tire pressure.



(A) Deficient

(B) Correct

(C) Excessive

(D) Ground level

- **Insufficient low tire pressure**

Too small amount of air in the tire can cause the tire to obtain excessive slack, which makes for faster wearing down of the tread.

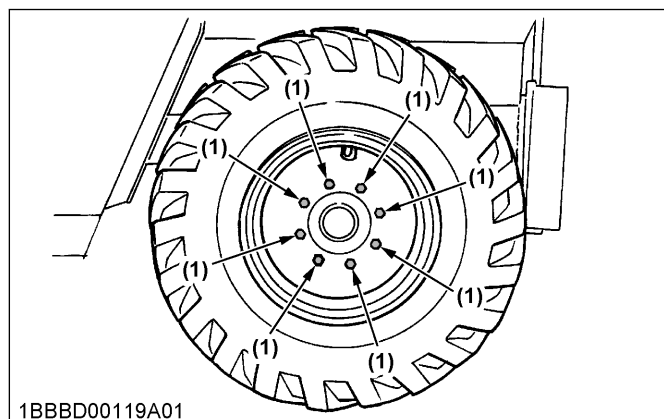
- **Excessively high tire pressure**

Too high tire pressure causes the tractive force of the machine to decrease or the tire to slip. There is also the risk of a blow out.

2. Correct the tire pressure if necessary.

Type		R430
Tire size		12.5/70-16-8PR
Bucket	front	0.25 MPa to 0.27 MPa
	rear	
Pallet forks	front	
	rear	

3. Changing the tires



(1) Wheel bolt

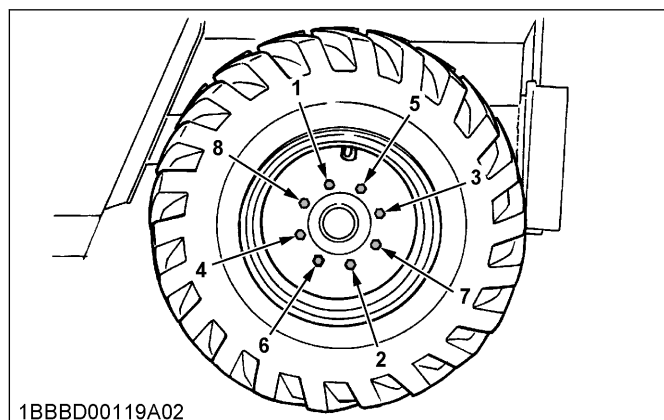
Removal

1. Loosen the wheel bolts, each by one turn on the wheel to be removed.
2. Lift the machine so that the wheel to be removed is just raised off the ground.
3. Place the machine on jackstands.
4. Then remove the wheel bolts and remove the wheel from the axle.

Fitting

1. Mount the wheel on axle and lightly tighten the wheel bolts.
2. Lower the machine to the ground, and tighten the wheel bolts to the specified torque in the order shown in the following table and figure.

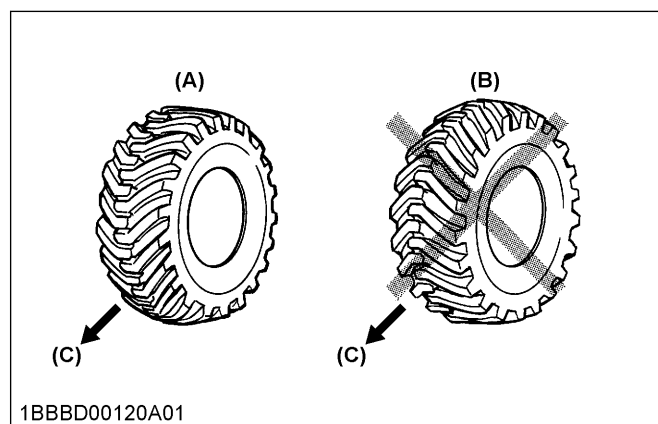
Wheel bolt (1)	Tightening torque	275 N·m to 314 N·m (28 kgf·m to 32 kgf·m)
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4. Mounting the tires

Off-road tires are used to provide strong traction and buoyancy on soft ground.

1. When mounting the tires, take care to position their tread pattern in the proper direction.
Tires must be mounted by a qualified personnel.



(A) Correct
(B) Incorrect

(C) Forward

PERIODIC REPLACEMENT OF IMPORTANT COMPONENT PARTS

To ensure safety in operation, you are strongly requested to inspect and service the machine at regular intervals. For added safety, ask your KUBOTA dealer to replace the following important component parts.

The following parts are prone to degradation in material or subject to wear and tear with time. It is difficult to judge how much the following parts have been affected at regular inspection. It is therefore necessary to replace the following parts with new ones, whether wear is visible or not after a specified time of use.

If you find that any of the following parts are worn even before the specified use, repair or replace the same way as other parts.

If you find that any of the hose clamps are deformed or cracked, also replace the hose clamp.

List of important component parts

No.	Component parts	Quantity	Period
1	Brake rubber hose	3	Every year
2	Fuel hose	-	Every 2 years or 4000 hours
3	Rubber parts (piston packing of brake master cylinder, and so on)	-	
4	Brake fluid (hydraulic oil ISO VG 32 or VG 22)	-	
5	Hydraulic hose (suction)	2	
6	Hydraulic hose (delivery)	2	
7	Hydraulic hose (travel motor)	2	
8	Hydraulic hose (steering cylinder)	4	
9	Hydraulic hose (lift cylinder)	2	
10	Hydraulic hose (bucket cylinder)	2	
11	Hydraulic hose (auxiliary port)	2	

(Continued)

No.	Component parts	Quantity	Period
12	Radiator hose	2	Every 2 years or 4000 hours
13	Intake hose and intercooler hose	1	
14	Packing of steering cylinder, seal, and O-ring	-	Every 4 years

For the hydraulic hoses other than the preceding parts to be replaced periodically, inspect the hydraulic hoses for the following points. If you find that the hydraulic hoses are unusual condition, tighten them up or replace them.

When replacing the hydraulic hoses, change their O-rings and sealings with new ones.

For replacement of the important parts, contact your KUBOTA dealer.

- At the following periodic inspections, check the fuel hoses and hydraulic hoses as well.

Inspection interval	Check points
Daily checks	Oil leak at fuel and hydraulic hose connections and points
Every month	Oil leak at fuel and hydraulic hose connections and points Damages at fuel and hydraulic hose such as cracks or chafing
Every year	Oil leak at fuel and hydraulic hose connections and points Interference, deformation, degradation, twist, and other damages such as cracks or chafing of fuel and hydraulic hoses

To prevent serious damage to the hydraulic system, use only a KUBOTA genuine hydraulic hose.

TAKING OUT OF OPERATION AND STORING

STORING THE MACHINE

NOTE :

To avoid personal injury or death:

- Before storing, perform the following procedure.
 1. Set the parking brake.
 2. Stop the engine.
 3. Lower the bucket and attachment to the ground.
 4. Release the hydraulic pressure in the hydraulic system by operating the control levers.
 5. Lock all control levers in neutral.
 6. Remove the starter key.

Measures prior to taking out of operation

1. Wash and clean each part of the machine, and store the machine indoors.
Never leave the machine outdoors.
If you must store the machine outdoors, choose a flat place, lay planks, park the machine, and cover it completely.
2. Add oil and grease, and change oil.
3. Apply grease sufficiently to the piston rods of the hydraulic cylinders where they are exposed.
4. Remove and store the battery separately.
5. Check the antifreeze in the coolant.
Add the antifreeze for adequate protection down to the following temperatures.

Temperature	-25°C
-------------	-------

Measures during storing

1. Recharge the battery regularly.

Restarting after storing

1. Remove the grease applied to the piston rods of the hydraulic cylinders.
2. Check all oil levels, the sediment trap of the fuel system, the tire pressure and the functioning of the disc brake, and the parking brake.
3. Run the engine with no load and operate all the functions of the hydraulic system.

CAUTION WHEN WASHING THE MACHINE

- Stop the engine before washing the machine. If you wash the machine while running the engine, splashing water will get into the air cleaner through its intake and cause engine trouble.

RECOMMENDED OILS

RECOMMENDED OIL LIST

IMPORTANT :

- Before delivery, the hydraulic oil used is JXTG Nippon Oil and Energy Diesel DH-1/CF.
- Use the engine oil of API service classification CJ-4.
- Use SAE 80W (API, GL-4, GL-5) as drive unit oil for all seasons.

	Application	Viscosity	Shell	ExxonMobil
Gear oil	All-weather gear oil	SAE 80W	Shell Donax TD	
Hydraulic oil	In winter or by low temperatures	SAE 5W-30 SAE 10W-30		
	In summer or by high ambient temperatures	SAE 10W-30 SAE 15W-40		
Grease			Shell Alvania EP2	Mobilux EP2
Fuel			Diesel Fuel No.2-D S15	
Fuel under -5 °C			Diesel Fuel No.1-D S15	

NOTE :

- **Engine oil**
 - Use the engine oil of suitable American-petroleum-institute (API) service classification and with proper SAE-engine-oil-standards according to the ambient temperatures.

Above 25 °C	SAE 30 or SAE 10W-30, SAE 15W-40
0 °C to 25 °C	SAE 20 or SAE 10W-30, SAE 15W-40
Below 0 °C	SAE 10W or SAE 10W-30, SAE 15W-40

- See the following table for the suitable API classification engine oil and the fuel.

Fuel used	Engine oil classification (API classification)
	Oil class of engines except external DPF
Ultra Low Sulfur Fuel [< 0.0015% (15 ppm)]	CJ-4

- **Fuel**
 - Use the ultra-low-sulfur-diesel-fuel of the following concentrations only for these engines.

Ultra low sulfur diesel fuel	Below 0.0015% (15 ppm)
------------------------------	------------------------

- Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for the following temperatures or elevations.

Temperatures	Below -20 °C
Elevations	Above 1500 m

- Diesel fuels specified to the following are recommended.

Diesel fuel	EN 590 or ASTM D975
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- The following is a distillate fuel of lower volatility for engines in industrial and heavy mobile service (SAE J313 JUN87).

Distillate fuel	No. 2-D
-----------------	---------

RECOMMENDED OILS

- Indicated capacities of water and oil are manufacture's estimate.

IMPORTANT :

- Filters must trap fuel and lubricant sulfate additives (Zn, Pb, Na, K, Ca, Mg, Cu, Ba, P, and so on) as ash during combustion.

Control the fuel carefully to prevent the additives being mixed into fuel such as the fuel tank anti-oxidants, the water remover, the antifreeze, and so on.

BIODIESEL FUEL (BDF)

B0-B20 Biodiesel fuels (BDF): mixed diesel fuels containing 20% or less biodiesel can be utilized under the following conditions.

IMPORTANT :

- **Refueling and handling fuel should be done with caution in order to avoid contact with the fuel and spillage that could create a potential environmental or fire hazard. Wear appropriate protective equipment when refueling.**

Applicable BDF:

1. Blended diesel fuels containing 6% thru 20% BDF (B6 - B20) which comply with American Society for Testing and Materials (ASTM) D7467 Standard, as revised, can be used without adversely affecting the performance and durability of the engine and fuel system components.
2. Any mineral oil diesel fuel, if used, must conform to ASTM D975 (or the European EN590) Standard, as revised. B100 fuel used to make Biodiesel blended fuels must meet ASTM D6751 (or EN14214) Standard, as revised. The final blended fuel B20 must conform to ASTM D7467 Standard, as revised. Straight vegetable oil is NOT allowed in any blended fuel.
3. Allowable blended fuel is mineral oil diesel fuel blended with B100 (i.e. 100% BDF). The blended fuel ratio shall be less than 20% B100 and 80% or more diesel fuel. The B100 source used for Biodiesel blends must be purchased from an accredited BQ-9000 marketer or producer. More information about qualified marketer(s) and producer(s) can be found at <http://www.bq-9000.org>.

Preparation:

1. Before using BDF concentrations greater than B5, you are advised to replace the engine oil, engine oil filter and fuel filter with new oil and filters. For replacement procedures, refer to the "PERIODIC SERVICE" section.

Product Warranty, Emission and Other Precautions:

1. The engine emission control system was certified according to current regulations based on the use of non-BDF. When using BDF, the owner is advised to check applicable local and federal emission regulations and comply with all of them.
2. BDF may cause restricted or clogged fuel filters during cold weather conditions, resulting in the engine not operating properly.
3. BDF encourages the growth of microorganisms which may cause degradation of the fuel. This in turn may cause fuel line corrosion or reduce fuel filter flow earlier than expected.
4. BDF inherently absorbs moisture which may cause degradation of the fuel earlier than expected. To

avoid this, drain the water separator and fuel filter port often.

5. Do not use Biodiesel concentrations higher than 20% (i.e. greater than B20). Engine performance and fuel consumption will be affected, and degradation of the fuel system components may occur.
6. Do not readjust the engine fuel control system as this will violate emission control levels for which the equipment was approved.
7. Compared with soybean-based and rapeseed-based feedstock, palm oil-based feedstock has a thicker consistency (i.e. higher viscosity) at lower temperatures. Consequently, fuel filter performance may be reduced, particularly during cold weather conditions.
8. The Kubota Warranty, as specified in the Owner's Warranty Information Guide, only covers defects in product materials and workmanship. Accordingly, any problems that may arise due to the use of poor quality fuels that fail to meet the above requirements, whether biodiesel or mineral oil based, are not covered by the Kubota Warranty.

Routine handling:

1. Avoid spilling BDF onto painted surfaces as this may damage the finish. If fuel is spilled immediately wipe clean and flush with soapy water to avoid permanent damage.
2. When using BDF, you are advised to maintain a full tank of fuel, especially overnight and during short term storage, to reduce condensation within the tank. Be sure to tighten the fuel cap after refueling to prevent moisture build up within the tank. Water in the Biodiesel mixture will damage fuel filters and may damage engine components.

Maintenance Requirements when using BDF B0 thru B5:

Follow the oil change intervals recommended by referring to the "MAINTENANCE" section. Extended oil change intervals may result in premature wear or engine damage.

Maintenance Requirements when using BDF B6 thru B20:

The maintenance interval for fuel related parts changes.

See the table below for the new maintenance interval.

RECOMMENDED OILS

Items		Interval	Remarks
Water separator filter element	Replace	Every 125 hrs	
Fuel filter cartridge	Replace	Every 250 hrs	
Fuel line	Check	Every 100 hrs	
	Replace	Every 1 year	Consult your local KUBOTA Dealer for this service.

Long Term Storage:

1. BDF easily deteriorates due to oxygen, water, heat and foreign substances. Do not store B6 thru B20 longer than 1 month and B5 longer than 3 months.
2. When using B6 thru B20 and storing the machine longer than 1 month, drain the fuel from the tanks and replace with light mineral oil diesel fuel. Subsequently, run the engine at least 30 minutes to remove all of the Biodiesel from the fuel lines.
3. When using B5 fuel and storing machine longer than 3 months, drain the fuel from the tanks and replace with light mineral oil diesel fuel. Subsequently, run the engine at least 30 minutes to remove all of the Biodiesel from the fuel lines.

TROUBLESHOOTING

TROUBLESHOOTING OF THE ENGINE AND OTHER SYSTEMS

If the machine does not show the desired performance, or when trouble arises, see the following table and undertake appropriate measures.

Trouble		Cause	Countermeasure
Engine	Starting difficulties	Fuel is too viscous.	- Check the fuel tank and the filter. - Remove the impurities and the water. - If necessary, replace the filter and the fuel.
		Air or water in the fuel system	- Remove the water from the fuel tank. - Check the bolts and nuts of the fuel-pipe-joint for looseness. - Purging of the fuel system. For fuel filter and supply pump, see Bleeding the fuel system on page 90.
		Fuse is blown out.	Check the fuse and replace it with a same-capacity one as required.
		Oil viscosity is too high the engine runs sluggishly in winter.	Use the engine-block-heater (option).
		Battery is almost dead and insufficient compression.	Recharge or replace battery.
	Insufficient engine power	Low fuel level	Check the fuel and add if necessary.
		Clogged air cleaner	Clean the air-cleaner-element.
	Engine suddenly stops.	Low fuel level	- Check the fuel and add if necessary. - Purge the fuel system.
	Abnormal exhaust gas color	Poor fuel	Use high quality fuel.
		Too much engine oil	Drain the engine oil to prescribed oil level.
	Water temperature in red zone (overheating)	Damaged seal of the water pump	Replace.
		Worn or torn V-belt	Adjust or replace.
		Thermostat is damaged.	Replace.
		Coolant level too low	Fill to prescribed level.
		Radiator grill or fins are clogged.	Clean.
		Coolant is contaminated with rust from the cylinder head or crank case.	Replace the coolant fluid and add anti-rust.
		Damaged radiator cap (Evaporation)	Replace.
		Corroded coolant pipes	Clean.
		Continuous operation under full load	Reduce the load.
		Cylinder-head-gasket is damaged (Coolant loss).	Replace.
		Engine-oil-level is too low.	Fill to prescribed level.
		Maladjustment of fuel injection	Readjust ignition timing.
		Use of poor fuel	Purge and use prescribed fuel.
Hydraulic system	Lift arms, bucket, or drive unite power is too low.	Hydraulic-oil-level is too low.	Add oil.
		Leakages of hoses and / or joints	Replace hose or joint.
		Hydraulic-unlock-lever is not pressed.	Press the hydraulic-unlock-switch.
Electric system	 mark appears in the instrument panel.	Electric system is malfunction.	Check the error-code-number of LIST OF ERROR CODE NUMBERS on page 100 and contact your local dealer.

LIST OF ERROR CODE NUMBERS

Error code number	Problem or Failure	Machine condition				Provisional measure and Correction
		Engine performance			Machine performance	
		Acceleration limited	Engine out-put limited	Engine stop-ped		
E:001	Meter CAN commu-nication	-	-	-	The engine may get started and the machine may move. But do not try any jobs.	Immediately contact your local dealer.
E:014	Hydraulic-oil-temper-ature has reached a specified level.	-	-	-	---	Operate with the load a little lessened.
E:016	Fuel sensor system	-	-	-	The LST-oil-temperature-warn-ing-indicator does not appear on the meter. Press the dis-play-selector-switch, and the normal display is switched back. The other functions of machine are still operative.	Immediately contact your local dealer.
E:018	Hydraulic oil temper-ature sensor	-	-	-	The LST-oil-temperature-warn-ing-indicator does not appear on the meter. The other func-tions of machine are still oper-ative.	Move the machine to a place suited for repair. Immediately contact your local dealer.
E:025	Parking brake	-	-	-	Parking brake is not active. The machine would be in neu-tral.	Immediately contact your local dealer.
E:028	Shuttle change lever	-	-	-	The machine is locked in neu-tral.	Immediately contact your local dealer.
E:033	Electrical power sup-ply	-	-	-	---	Immediately interrupt the en-gine if with a 24 V battery. When the engine gets restart-ed and is running with no mes-sage appearing, it means there is no problem. If this message still appears, imme-diately ask for repair.
E:034	The 5 V power sup-ply of sensor is short.	-	-	-	The majority of systems fail. The engine may be started and the machine may move. But do not try any jobs. Just move the machine to a safe place.	Immediately contact your local dealer.
E:036	CRS CAN communi-cation	⊙	-	-	Engine speed is at idling and it is not possible to drive at any speed.	Immediately contact your local dealer.
E:037	Braking system	-	-	-	The machine will be in neutral and parking brake is activated to prevent dragging.	Immediately contact your local dealer.
E:039	Neutral relay	-	-	-	The machine will be in neutral. The other functions of machine are still operative.	Immediately contact your local dealer.
E:9100	Rpm sensor system	○	○	-	The engine may get started and the machine may move. But do not try any jobs.	Move the machine to a place suited for repair. Immediately contact your local dealer.
E:9101	Fuel or rail pressure system	⊙	⊙	⊙	The engine fails to start.	Immediately contact your local dealer.
E:9102	SCV system	⊙	⊙	-	The engine may get started. But the engine rpm and output is limited.	Immediately contact your local dealer.

(Continued)

Error code number	Problem or Failure	Machine condition				Provisional measure and Correction
		Engine performance			Machine performance	
		Acceleration limited	Engine out-put limited	Engine stop-ped		
E:9103	Intake air tempera-ture sensor system	-	-	-	The engine may get started and the machine may move. But do not try any jobs.	Immediately contact your local dealer.
E:9104	Coolant temperature system	⊙	⊙	-	The meter does not show wa-ter temperature. Press the dis-play-selector-switch, and the normal display is switched back. The other functions of machine are operative, but an overheat and other problems cannot be detected.	Immediately contact your local dealer.
E:9106	Injector system	⊙	⊙	○	The engine may be stopped, and engine rpm and output is limited.	Immediately contact your local dealer.
E:9107	Intake air pressure sensor system	-	○	-	The engine rpm may be limit-ed. The machine may move. But do not try any jobs.	Immediately contact your local dealer.
E:9108	Battery voltage sys-tem	⊙	⊙	○	The engine may be stopped. The engine rpm and output is limited.	Immediately contact your local dealer.
E:9109	Sensor voltage sys-tem	⊙	⊙	○	The engine may be stopped. The engine rpm and output is limited.	Immediately contact your local dealer.
E:9110	Main relay system	-	-	-	The engine may get started and the machine may move. But do not try any jobs.	Immediately contact your local dealer.
E:9112	Atmospheric pres-sure sensor system	-	○	-	The engine output may be lim-ited. The other functions of machine are still operative.	Immediately contact your local dealer.
E:9113	EGR valve system	-	⊙	-	The engine output is limited. The other functions of machine are still operative.	Immediately contact your local dealer.
E:9114	Coolant temperature warning	-	-	-	---	1. For correction, see the Coolant temperature gauge on page 36. 2. If “E:9114” still appears, immediately contact your local dealer.
E:9115	Engine overheat warning	-	⊙	-	The engine automatically re-duces rpm's to avoid an over-heat.	1. For correction, see the Coolant temperature gauge on page 36. 2. If “E:9115” still appears, immediately contact your local dealer.
E:9117	Air heater system	-	-	-	The engine may get started and the machine may move. But do not try any jobs.	Immediately contact your local dealer.
E:9118	Engine oil pressure system	-	-	-	The engine-lubricating-system-oil-pressure is too low.	1. Stop the engine and check the engine-oil-level. 2. If “E:9118” still appears, immediately contact your local dealer.
E:9119	Charging system fail-ure	-	-	-	Charging system is in trouble. The battery is not charging.	1. Stop the engine and check the V-belt. 2. If “E:9119” still appears, immediately contact your local dealer.

(Continued)

TROUBLESHOOTING

Error code number	Problem or Failure	Machine condition				Provisional measure and Correction
		Engine performance			Machine performance	
		Acceleration limited	Engine out-put limited	Engine stop-ped		
E:9120	Fuel filter water warning	-	-	-	The water separator is full with water and water may be in the fuel filter.	1. Stop the engine and check and drain the fuel filter. 2. If “E:9120” still appears, immediately contact your local dealer.
E:9121	Engine ECU	○	○	○	The engine fails to start.	Immediately contact your local dealer.
E:9122	ECU communication failure	○	○	-	The engine may get started. But the engine output may be limited. The machine fails to move.	Immediately contact your local dealer.
E:9123	Accel sensor	⊙	-	-	Engine speed is at idling and it is not possible to drive at any speed.	Immediately contact your local dealer.
E:9200	Mass air flow sensor system	-	○	-	The engine output may be limited. The other functions of machine are still operative.	Immediately contact your local dealer.
E:9215	Engine-oil-temperature has reached a specified level.	-	-	-	---	Operate with the load a little lessened.
E:9300	Engine fuel system (P/L)	⊙	⊙	-	The engine may get started. But the engine output is limited. The machine fails to move.	1. Check the fuel level and see if the fuel filter is clogged. 2. If “E:9300” still appears, immediately contact your local dealer.
E:9301	Engine fuel system (rail pressure)	⊙	⊙	-	The engine may get started. But the engine output is limited. The machine fails to move.	1. Check the fuel level and see if the fuel filter is clogged. 2. If “E:9301” still appears, immediately contact your local dealer.
E:9302	Engine fuel system (leakage)	⊙	⊙	-	The engine may get started. But the engine output is limited. The machine fails to move.	1. Check the fuel level and see if the fuel filter is clogged. 2. If “E:9302” still appears, immediately contact your local dealer.
E:9303	Engine fuel system (SCV)	⊙	⊙	-	The engine may get started. But the engine output is limited. The machine fails to move.	1. Check the fuel level and see if the fuel filter is clogged. 2. If “E:9303” still appears, immediately contact your local dealer.
E:9305	Engine air intake system (poor air intake)	⊙	⊙	-	The engine may get started. But the engine output is limited. The machine fails to move.	1. Check to see if any air-intake hose is disconnected and if the air cleaner element is clogged. 2. If “E:9305” still appears, immediately contact your local dealer.

(Continued)

Error code number	Problem or Failure	Machine condition				Provisional measure and Correction
		Engine performance			Machine performance	
		Acceleration limited	Engine output limited	Engine stopped		
E:9306	Engine air intake system (boost pressure too low)	◎	◎	-	The engine may get started. But the engine output is limited. The machine fails to move.	1. Check to see if any air-intake hose is disconnected and if the air-cleaner-element is clogged. 2. If “E:9306” still appears, immediately contact your local dealer.
E:9400	Other failures	○	○	○	---	Immediately contact your local dealer.

◎ Sure to happen

○ May happen

APPENDIX

SERVICE HOUR METER

When the hour meter reaches the hours circled in the following maintenance list, a maintenance message appears.



No.	Check points		Measures	Hour meter indicator						Intervals		
				50	100	250	500	600	750		1000	
1	Engine oil		change			○	○		○	○	every 250 hrs	
2	Hydraulic oil									○	every 1000 hrs	
3	Air cleaner element	Outer element	replace							○	every 1000 hrs	
		Inner element								○	every 1000 hrs	
4	Fuel filter cartridge		replace				○			○	every 500 hrs	
5	Engine oil filter					○	○		○	○	every 250 hrs	
6	Front/rear axle oil		change							○	every 1000 hrs	
7	Hydraulic return filter		replace				○			○	every 500 hrs	
8	Hydraulic suction filter										○	every 1000 hrs
9	LST oil filter						○				○	every 500 hrs

NOTE :

- The maintenance (periodic check) message can be automatically disappeared.

The maintenance message reappears on the hour meter when the hour meter reaches next designated hour in the preceding table.

IMPORTANT :

- In case that the service-hour-meter replaced due to any trouble with it, the meter is set to "0". Contact your KUBOTA dealer for details.

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