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SAFE OPERATION

Careful operation is your best insurance against an accident. Read and understand this manual carefully before operating the machine. All operators, no matter how much experience they may have had, should read this and other related manuals before operating the machine or any implement attached to it. It is the owner's obligation to instruct all operators in safe operation.

This mowing machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in serious injury or death.

1. BEFORE OPERATING

1. The ZERO TURN MOWING MACHINE has different steering characteristics than other machines with a steering wheel and does not have a service brake pedal (but, has a parking brake lock pedal that can be used to stop the machine in an emergency. Normal slowing down and stopping is done with the motion control levers.). Read and understand the operators manual before operating the machine. Practice operating machine at low engine speed without mower engaged in an unobstructed area.
2. Know your equipment and its limitations. Read all instructions in this manual before attempting to start and operate the machine.
3. Pay special attention to the warning, caution and danger labels on the machine itself.
4. KUBOTA recommends the use of a Roll Over Protective Structures (ROPS) and seat belt in almost all applications. This combination will reduce the risk of serious injury or death, should the machine be upset.

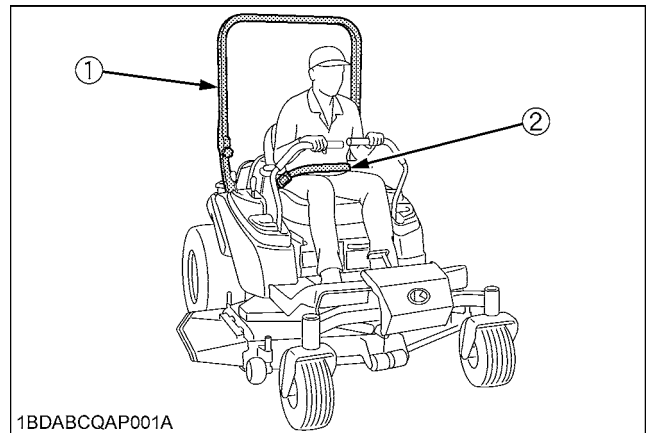
The machine is equipped with a Foldable ROPS, which may be temporarily folded down only when absolutely necessary for areas with height constraints. (There is no operator protection provided by the ROPS in the folded position. For operator safety the ROPS should be placed in the upright and locked position and the seat belt fastened for all other operations.)

If the ROPS is loosened or removed for any reason, make sure that all parts are reinstalled correctly before operating the machine.

Never modify or repair a ROPS because welding, bending, drilling, grinding, or cutting may weaken the structure.

A damaged ROPS structure must be replaced, not repaired or revised.

If any structural member of the ROPS is damaged, replace the entire structure at your local KUBOTA Dealer.



- (1) ROPS
(2) Seat belt

5. Always use the seat belt when the ROPS are upright. Do not use the seat belt if the ROPS is down or if there is no ROPS. Check the seat belt regularly and replace if frayed or damaged.
6. Do not operate the machine or any attachments while under the influence of alcohol, medication, controlled substances or when fatigued.
7. Do not wear loose, torn, or bulky clothing around machine. The clothing may catch on moving parts or controls, leading to the risk of accident. Wear and use any additional safety items such as hard hat, safety boots or shoes, eye and hearing protection, gloves, etc. As appropriate or required.
8. Do not wear radio or music headphones while operating the machine. Safe operation requires your full attention.
9. Carefully check the vicinity before operating machine or any implement attached to it. Clear the work area of objects (wires, rocks, etc.) that might be picked up and thrown. Check for overhead clearance which may interfere with a grass catcher.
10. Check brakes and other mechanical parts for correct adjustment and wear. Replace worn or damaged parts promptly. Check the tightness of all nuts and bolts regularly. (For further details, see "PERIODIC SERVICE" and "ADJUSTMENT" section.)
11. Keep all shields and guards in place. Replace any that are damaged or missing.
12. Before allowing other people to use your machine, explain how to operate and have them read this manual before operation.
13. Do not allow any bystanders around or near machine during operation.

14. Do not allow passengers, children or non-qualified operators on the machine at any time. The operator must remain in the machine seat throughout operation.
15. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, and prudence of personnel involved in the operation, transport, maintenance of facilities.
16. Keep the machine and attachments in good operating condition and keep safety devices in place and in proper working condition.
17. Do not modify the machine. Unauthorized modification may affect the function of the machine, which may result in personal injury.
18. Use only implements recommended by KUBOTA. Use proper ballast to front or rear of machine to reduce the risk of upsets. Follow the "Safe Operation" procedures, specified in the manuals with equipment.
19. Keep your machine clean. Accumulations of dirt, grease, and trash can contribute to fires and lead to personal injury.
20. The exhaust gas from the muffler is very hot. To prevent fire, do not expose dry grass, mowed grass, oil and any other combustible materials to exhaust gas. Use a spark arrester where required. Also keep the engine and muffler clean all the time.
6. Know what is behind you before backing up. Look to the rear before and when backing. Do not mow while in reverse unless absolutely necessary and make sure the area immediately behind you is clear of obstructions or holes and small children. Use extra caution when machine is equipped with Grass Catcher. Your view to the rear is restricted.
7. When working in groups, always let others know what you are doing ahead of time.
8. Do not drive machine on streets or highways. Watch for traffic when you cross roads or operate near roads.
9. Be aware of the mower discharge direction and do not point it at anyone.
10. When using any attachments, never direct discharge material toward bystanders. Do not allow anyone near the attachments while in operation. Do not mow when bystanders are present in the mowing area.
11. To reduce fire hazards, keep the engine exhaust area free of grass or leaves.
12. Be sure rotating blades and engine are stopped and the key is removed before placing hands or feet near blades and cleaning blockages or unclogging chute.
13. Shut the engine off and wait for all movement to stop before removing grass catcher or unclogging chute.
14. Always inspect the mower for damage after striking a foreign object. Repair or replace any damaged parts before restarting.
15. Operate during daylight or in bright artificial light.

2. OPERATING

◆ Starting

1. Always sit in the operator's seat when starting engine or operating levers or controls.
2. Before starting the engine make sure that the motion control levers are in neutral lock, the parking brake is applied, and Power Take Off (PTO) is disengaged (OFF).
3. Do not start engine by shorting across starter terminals. The machine may start in gear and move if normal starting circuitry is bypassed.
4. Do not operate or idle engine in a non-ventilated area. Carbon monoxide gas is colorless, odorless, and deadly.
5. Do not start engine while tilting deck.

◆ Working

1. Do not turn sharply when driving at high speed.
2. To avoid tip over, slow down when turning on uneven terrain or before stopping.
3. Do not operate near ditches, holes, embankments, or other terrain, which may collapse under the machine weight. The risk of machine tip over increases when the ground is loose or wet.
4. Park the machine on the firm and level surface.
5. Watch where you are going at all times. Watch for and avoid obstacles. Be alert at curbs, near trees, and other obstructions and hidden hazards.

◆ Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are attracted to the machine and the mowing activity.

Never assume that children will remain where you last saw them.

1. Keep children out of the mowing area and under the watchful care of another responsible adult.
2. Be alert and turn machine off if children enter the area.
3. Before and when backing, look behind and down for small children.
4. Never carry children. They may fall off and be seriously injured or interfere with safe machine operation.
5. Never allow children to operate the machine, even under adult supervision. Local regulation can restrict the age of the operator.
6. Use extra care when approaching blind corners, shrubs, trees, or other obstructions that might hide children from sight.
7. Do not mow in reverse unless it is absolutely necessary.

◆ Operators, age 60 years and above

Data indicates that operators, age 60 years and above, are involved in a large percentage of machine-related injuries. These operators should evaluate their ability to operate the machine safely enough to protect themselves and others from serious injury.

◆ Operation on slopes

Slopes are major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution.

If you cannot back up the slope or if you feel uneasy on it, do not mow it.

If the engine stops when operating on a slope apply the parking brake immediately to prevent machine run away.

DO

1. To avoid tip over, operate across the slopes not up and down. Stay off hills and slopes too steep for safe operation.
2. Remove obstacles such as rocks, tree limbs, etc.
3. Stay alert for holes in the terrain and other hidden hazards. Keep away from drop-offs. Uneven terrain could overturn the machine. Tall grass can hide obstacles.
4. Follow the manufacturer's recommendations for wheel weight or counterweights to improve stability.
5. Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction.
6. Avoid starting or stopping on a slope. If tires lose traction, disengage PTO and proceed slowly straight down the slope.
7. Reduce speed and exercise extreme caution on slopes and in sharp turns to prevent tip-over or loss of control.
8. Use special caution when changing direction on slopes. Slow down, and use extra caution when changing direction on a slope.

DO NOT

1. Do not turn on slopes unless necessary. If necessary, turn uphill slowly and gradually.
2. Do not mow near drop-offs, ditches, or embankments. The mower could suddenly turn over if a wheel is over the edge of cliff or ditch, or if an edge caves in.
3. Do not mow on wet grass. Reduced traction could cause sliding and loss of control.
4. Do not try to stabilize the machine by putting your foot on the ground.
5. Do not use grass catcher on steep slopes.
6. Do not start or stop suddenly when going uphill or downhill. Avoid sudden start and stops on slopes.
7. Never "freewheel". Do not let the machine travel downhill with motion control levers at neutral lock position or in neutral.
8. Do not operate machine without the mower deck installed.

◆ Stopping

1. Park the machine on level ground.
2. Make sure that the machine and all attachments have come to a complete stop before dismounting.
3. Before dismounting, apply parking brake, place the motion control levers in their neutral lock positions, disengage the PTO, lower all attachments to the ground, turn off the engine, and remove the key.
4. Do not park the machine on dry grass or leaves.

3. USING THE PTO

1. Before installing or using PTO-driven equipment, read the manufacturer's manual and review the safety labels attached to the equipment.
2. Wait until all moving components have completely stopped before connecting, disconnecting, adjusting, cleaning, or servicing any PTO-driven equipment.
3. Use the PTO with KUBOTA approved attachments.

The speed of PTO:

ZD321 / ZD326 2530 rpm at 3200 engine rpm

ZD331 2538 rpm at 3000 engine rpm

4. USING THE LIFT LINK

1. Use lift link only with authorized attachments designed for lift link usage.

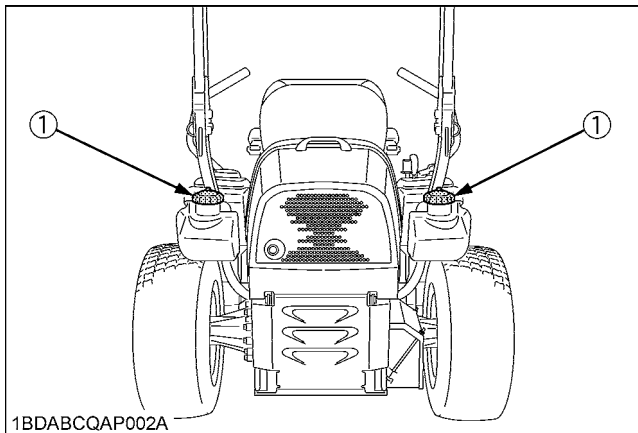
5. TRANSPORTING

1. Disengage power to attachment(s) when transporting or not in use.
2. Do not tow this machine. Use a suitable truck or trailer when transporting on public roads.
3. Use extra care when loading or unloading the machine into a trailer or truck.
4. This machine is not allowed to be used on public roads.

6. SERVICING AND STORAGE

◆ Servicing

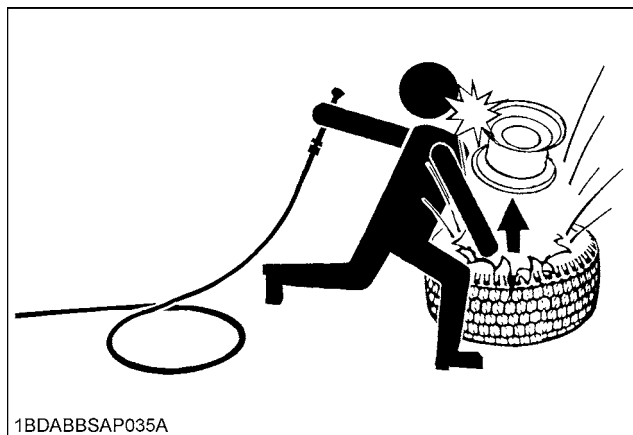
1. Before servicing, park the machine on a firm, level surface and apply the parking brake. Remove the key to prevent accidental start-up.
2. Allow the machine time to cool before touching the engine, muffler, radiator, etc.
3. Always stop the engine before refueling. Avoid spills and overfilling. Wipe up spilled fuel immediately.



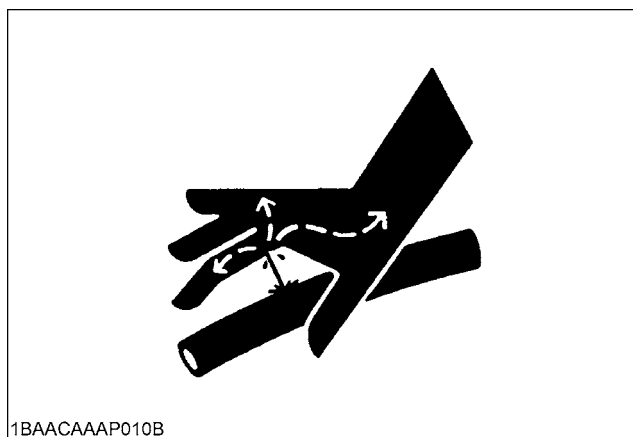
(1) Fuel tank cap

4. Use extra care in handling diesel fuels. They are flammable.
 - (1) Use only an approved container.
 - (2) Do not remove fuel cap or refuel with the engine running. Allow engine to cool before refueling. Do not smoke while refueling or when standing near fuel.
 - (3) Do not refuel the machine indoors and always clean up spilled fuel or oil.
 - (4) Do not store the machine or fuel container inside where there is an open flame, such as in a water heater.
5. Do not smoke when working around battery or when refueling. Keep all sparks and flames away from battery and fuel tank.
A battery, especially when charging, will give off hydrogen and oxygen gases, which can explode and cause serious personal injury.
6. Before "jump starting" a dead battery, read and follow all the instructions.
7. Disconnect the battery's ground cable before working on or near electric components.
8. 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 the fluid level regularly and add distilled water as required so that the fluid level is between the UPPER and LOWER levels.

9. Keep first aid kit and fire extinguisher handy at all times.
10. Do not remove the radiator cap while coolant is hot. When cool, slowly rotate cap to the first stop and allow sufficient time for excess pressure to escape before removing the cap completely. If the machine has a coolant recovery tank, add coolant there instead of the radiator.
11. Do not attempt to mount a tire on a rim unless qualified to do so and all proper safety precautions are followed.
12. Always maintain the correct tire inflation pressure. Do not inflate tires above the recommended pressure shown in the Operator's Manual.

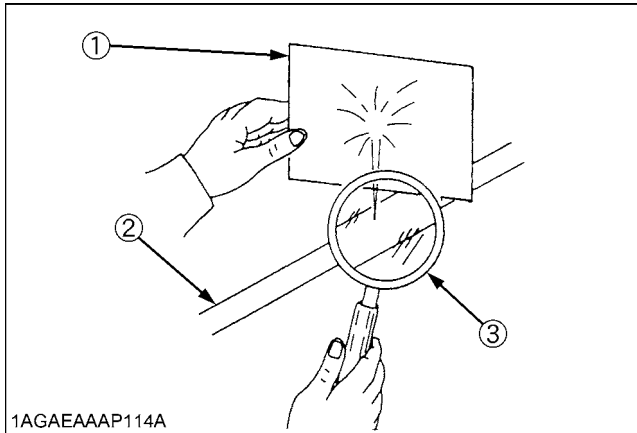


13. Provide adequate support when changing wheels.
14. Make sure that wheel nuts and bolts have been tightened to the specified torque.
15. Escaping hydraulic fluid under pressure has sufficient force to penetrate the skin causing serious personal injury. Before disconnecting lines, be sure to relieve all pressure. Before applying pressure to the system, make sure all connections are tight and that lines, pipes, and hoses are not damaged.



16. Fluid escaping from pinholes may be invisible. Use a piece of cardboard or wood to search for suspected leaks: do not use hands. Use safety goggles or other eye protection.

If injured by escaping fluid, see a medical doctor at once. Serious infection or reaction will result if proper medical treatment is not administered immediately. This fluid can produce gangrene or severe allergic reaction.



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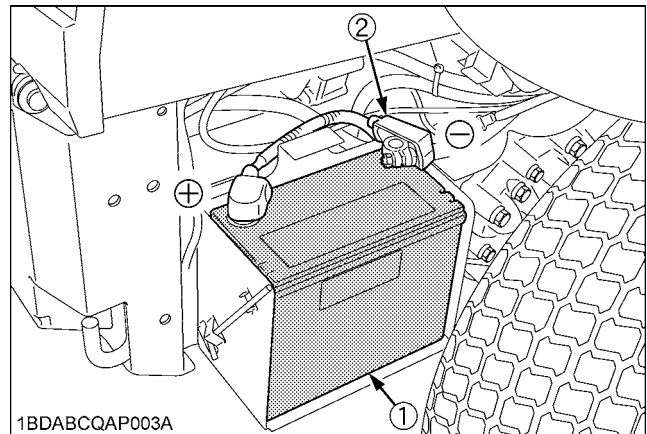
- (1) Cardboard
- (2) Hydraulic line
- (3) Magnifying glass

17. Do not make adjustments or repairs with the engine running.
18. Keep machine free of grass, leaves, or other debris build-up.
19. Do not change the engine governor setting or overspeed the engine.
20. Do not run a machine inside a closed area.
21. Mower blades are sharp and can cut your hands. Wrap the blade(s) or wear gloves, and use extra caution when servicing them.
22. Keep nuts and bolts, especially blade attachment bolts, tight and keep equipment in good condition.
23. Never tamper with safety devices. Check their operation for proper function regularly.
24. Waste products such as used oil, fuel, coolant, brake fluid, and batteries, can harm the environment, people, pets and wildlife. Please dispose of properly.
25. Do not use beverage containers for waste fluids or other products. Someone, particularly children, may drink them by mistake.
26. Securely support machine or any machine elements with stands or suitable blocking before working underneath. For your safety do not rely on hydraulically supported devices, they may leak down, suddenly drop or be accidentally lowered.
27. See your local Recycling Center or KUBOTA Dealer to learn how to recycle or get rid of waste products.

- A Material Safety Data Sheet (MSDS) provides specific details on chemical products; physical and health hazards, safety procedures, and emergency response techniques. The seller of the chemical products used with your machine is responsible for providing the MSDS for that product upon request.

◆ Storage

1. Keep the machine and supply of fuel in locked storage and remove the ignition key to prevent children or others from playing or tampering with them.
2. To avoid sparks from an accidental short circuit, always disconnect the battery's ground cable (-) first and reconnect it last.

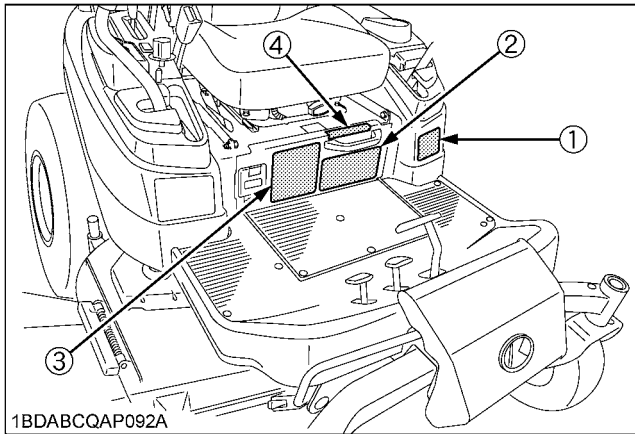


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- (1) Battery
- (2) Ground cable
- (+): Positive terminal
- (-): Negative terminal

3. To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without adequate ventilation.
4. To reduce fire hazards, clean the machine thoroughly before storage. Dry grass and leaves around the engine and muffler may ignite.

7. DANGER, WARNING AND CAUTION LABELS



(1) Part No. K3181-6585-1

<p>⚠ WARNING</p> <p>TO AVOID SERIOUS INJURY OR DEATH</p> <ol style="list-style-type: none"> 1. Park the machine on level ground. 2. If necessary to park on an incline. <ol style="list-style-type: none"> ① Stop the machine. ② Apply the parking brake. ③ Stop the engine. <p>If you stop the engine on an incline without applying the parking brake, the machine could move and runaway.</p> <ol style="list-style-type: none"> 3. If the engine stops suddenly during operation, apply the parking brake immediately to prevent machine runaway. 	<p>⚠ ADVERTENCIA</p> <p>PARA EVITAR LESIONES PERSONALES GRAVES O LA MUERTE</p> <ol style="list-style-type: none"> 1. Estacione la máquina en la tierra del nivel. 2. Si es necesario estacionar en una cuesta. <ol style="list-style-type: none"> ① Apagar la máquina. ② Aplique el freno de estacionamiento. ③ Luego apague el motor. <p>Si apaga el motor en una cuesta sin aplicar el freno de estacionamiento, la máquina puede moverse sin control.</p> <ol style="list-style-type: none"> 3. Si la máquina se detiene repentinamente durante la operación, enganche el freno de estacionamiento inmediatamente para evitar la pérdida de control.
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1BDABCQAP093A

(2) Part No. K3181-6584-1

	<p>⚠ WARNING</p> <p>TO AVOID SERIOUS INJURY OR DEATH</p> <ol style="list-style-type: none"> 1. Mow across slopes-Not up and down. 2. Use extreme caution when operating on slopes. 3. Loss of traction may occur when operating on slopes. 4. Drive slowly on slopes. 5. Do not operate on wet slopes. 6. Avoid sudden starts. 7. Execute turns slowly. 	<p>⚠ ADVERTENCIA</p> <p>PARA EVITAR LESIONES PERSONALES GRAVES O LA MUERTE</p> <ol style="list-style-type: none"> 1. Corte el césped de manera transversal en las colinas - No de arriba hacia abajo. 2. Tenga mucho cuidado durante la operación en colinas. 3. Se pueda perder tracción durante la operación en colinas. 4. Conduzca lentamente en las colinas. 5. No use la máquina en colinas húmedas. 6. Evite arranques súbitos. 7. Realice las vueltas lentamente.
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(3) Part No. K3181-6582-1

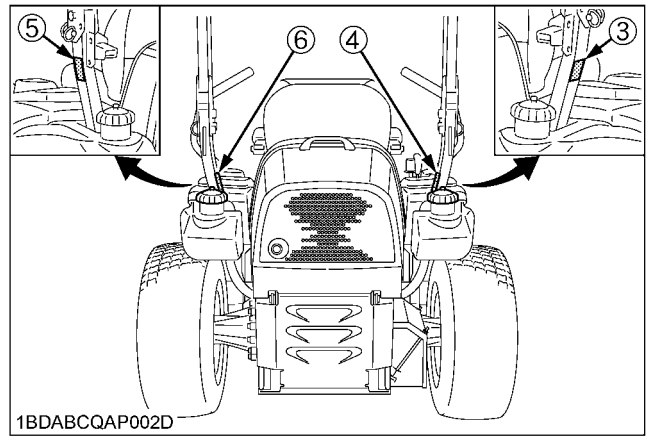
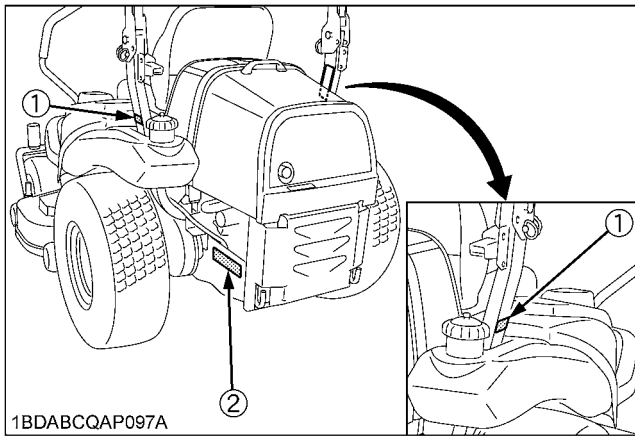
<p>⚠ CAUTION</p> <p>TO AVOID PERSONAL INJURY</p> <ol style="list-style-type: none"> 1. Read and understand the operator's manual before operation. 2. Do not operate this machine unless you are trained. 3. Before allowing other people to use the machine, have them read the operator's manual. 4. Check the tightness of all nuts and bolts regularly. 5. Before starting the engine, make certain that everyone is at a safe distance from the machine, PTO is disengaged and motion control levers are in neutral lock. 6. Remove objects that could be thrown by the blade. 7. Do not operate the machine when children and/or others are around. 8. Do not carry children or others on the machine at any time. 9. Before dismounting, disengage PTO clutch, lower the implement, place motion control levers in neutral lock position, set the parking brake, stop the engine and remove the key. 10. Keep safety devices (guards, shields and switches) in place, and working. 11. To reduce the fire hazard, keep the exhaust clear of dry grass, dry leaves or other combustible materials. 12. This machine is not for street or highway use. 13. Securely support the machine and implement before working underneath. 	<p>⚠ PRECAUCIÓN</p> <p>PARA EVITAR LESIONES PERSONALES</p> <ol style="list-style-type: none"> 1. Lea y entienda el manual del operador antes de efectuar la operación. 2. No ponga en funcionamiento la máquina a menos que esté capacitado para hacerlo. 3. Antes de permitir que otras personas usen la máquina, indíqueles que lean el manual del operador. 4. Verifique con regularidad el apriete de todas las tuercas y pernos. 5. Antes de arrancar el motor, asegúrese de que todos estén a una distancia segura de la máquina. La toma de fuerza debe estar desactivada y las palancas de control de movimiento bloqueadas en neutro. 6. Retire los objetos que pueden ser lanzados por la cuchilla. 7. No opere la máquina cuando hayan niños u otras personas alrededor. 8. No lleve a niños ni a otras personas en la máquina en ningún momento. 9. Antes de desmontar, desenganche el embrague de la toma de fuerza, baje el implemento, cambie a neutro, aplique el freno de estacionamiento, apague el motor y retire la llave. 10. Mantenga los dispositivos de protección (guardas, barreras de protección e interruptores) en su lugar y en buen estado de funcionamiento. 11. Para reducir los riesgos de incendio, mantenga el escape exento de hierba seca, hojas secas u otros materiales combustibles. 12. Esta máquina no está diseñada para uso en calles ni carreteras. 13. Use un soporte seguro para la máquina y el implemento antes de trabajar debajo de los mismos.
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1BDABCQAP095A

(4) Part No. K3181-6596-1

<p>⚠ CAUTION</p> <p>When Engine is running, do not open this cover.</p>	<p>⚠ PRECAUCIÓN</p> <p>Nunca abra el capó mientras el motor está en funcionamiento.</p>
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1BDABCQAP1460



- (1) Part No. K3181-6587-2
Diesel fuel No fire only



LOW SULFUR FUEL OR ULTRA LOW SULFUR FUEL ONLY

COMBUSTIBLE CON BAJO CONTENIDO DE AZUFRE O COMBUSTIBLE CON CONTENIDO ULTRABAJO DE AZUFRE SOLAMENTE

1BDAIATAP001A

- (3) Part No. K3181-6564-1

⚠ WARNING
Never modify or repair a ROPS because welding, grinding, drilling or cutting any portion may weaken the structure.

⚠ CAUTION
TO AVOID PERSONAL INJURY WHEN RAISING OR FOLDING ROPS.
1. Set parking brake and stop engine.
2. Remove any obstruction that may prevent raising or folding of the ROPS.
3. Do not allow any bystanders.
4. Always perform function from a stable position at the rear of the tractor.
5. Hold the top of the ROPS securely when raising or folding.
6. Make sure all pins are installed and locked.

1BDABCQAP100A

1BDABCQAP150A

- (2) Part No. K3181-6583-2

⚠ DANGER
TO AVOID POSSIBLE INJURY OR DEATH FROM A MACHINE RUNAWAY.
1. Do not start engine by shorting across starter terminals or bypassing the safety start switch. Machine may start in gear and move if normal starting circuitry is bypassed.
2. Start engine only from operator's seat with motion control levers in neutral lock position and PTO OFF. Never start engine while standing on the ground.

1BDABCQAP103A

⚠ PELIGRO
PARA EVITAR POSIBLES LESIONES O LA MUERTE PROVOCADAS POR UN ARRANQUE SÚBITO DE LA MÁQUINA.
1. No ponga en marcha el motor con un cortocircuito en los terminales de arranque o evitando el interruptor de arranque de seguridad. La máquina puede ponerse en marcha engranada y moverse si se evita el uso de los circuitos de arranque normales.
2. Ponga en marcha el motor sólo desde el asiento del operador con las palancas de control de movimiento y la toma de fuerza apagadas. Nunca ponga en marcha el motor mientras esté de pie en el suelo.

- (4) Part No. K3181-6563-1

⚠ WARNING

TO AVOID PERSONAL INJURY OR DEATH FROM ROLL-OVER:
1. Keep Roll-Over Protective Structures (ROPS) in the upright and locked position.
2. Fasten SEAT BELT before operating.

THERE IS NO OPERATOR PROTECTION WHEN THE ROPS IS IN THE FOLDED POSITION.
1. Check the operating area and fold the ROPS only when absolutely necessary.
2. Do not wear SEAT BELT if ROPS is folded.
3. Raise and lock ROPS as soon as vertical clearance allows.
4. Read ROPS related instructions and warnings.

1BDABCQAP101A

- (5) Part No. K3181-6566-1

⚠ ADVERTENCIA
Nunca modifique ni repare una estructura de protección contra volcaduras (ROPS, por sus siglas en inglés) porque soldar, esmerillar, perforar o cortar cualquier parte puede debilitar la estructura.

⚠ PRECAUCIÓN
PARA EVITAR LESIONES PERSONALES AL ELEVAR O PLEGAR LA ESTRUCTURA DE PROTECCIÓN CONTRA VOLCADURAS:
1. Ponga el freno de estacionamiento para detener el motor.
2. Retire cualquier obstrucción que pueda impedir la elevación o plegado de la estructura de protección contra volcaduras.
3. No permita la presencia de otras personas.
4. Siempre realice la función desde una posición estable en la parte posterior del tractor.
5. Mantenga fija de manera segura la parte superior de la estructura de protección contra volcaduras durante la elevación o plegado.
6. Asegúrese de que todos los pines estén instalados y bloqueados.

1BDABCQAP135A

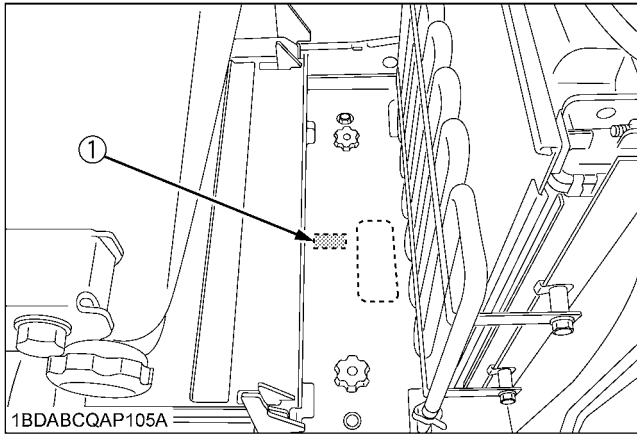
- (6) Part No. K3181-6565-1

⚠ ADVERTENCIA

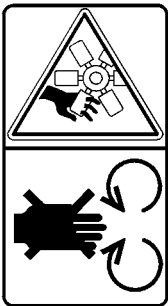
PARA EVITAR LESIONES PERSONALES O LA MUERTE PRODUCIDAS POR VOLCADURAS:
1. Mantenga las estructuras de protección contra volcaduras (ROPS por sus siglas en inglés) en posición vertical y bloqueada.
2. Póngase el CINTURÓN DE SEGURIDAD antes de la operación.

EL OPERADOR NO TIENE PROTECCIÓN CUANDO LA ESTRUCTURA DE PROTECCIÓN CONTRA VOLCADURAS ESTÁ EN LA POSICIÓN PLEGADA
1. Revise el área de operación y plegue la estructura de protección contra volcaduras sólo cuando sea absolutamente necesario.
2. No use el CINTURÓN DE SEGURIDAD si la estructura de protección contra volcaduras está plegada.
3. Eleve y bloquee la estructura de protección contra volcaduras tan pronto como lo permita el espacio libre vertical.
4. Lea las instrucciones y advertencias relacionadas a la estructura de protección contra volcaduras.

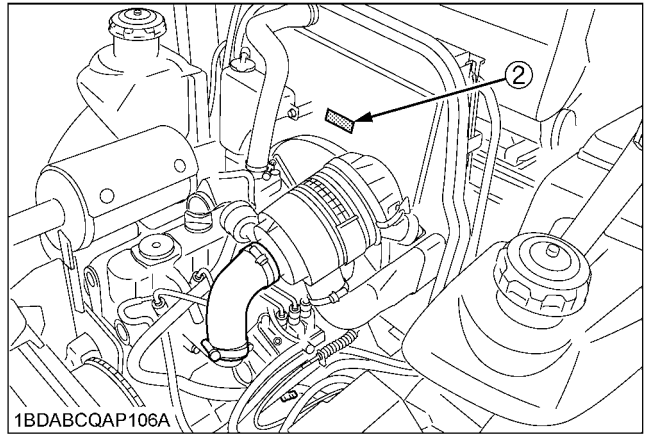
1BDABCQAP134A



(1) Part No. K3111-6591-1
Do not get your hands close to fan belt.



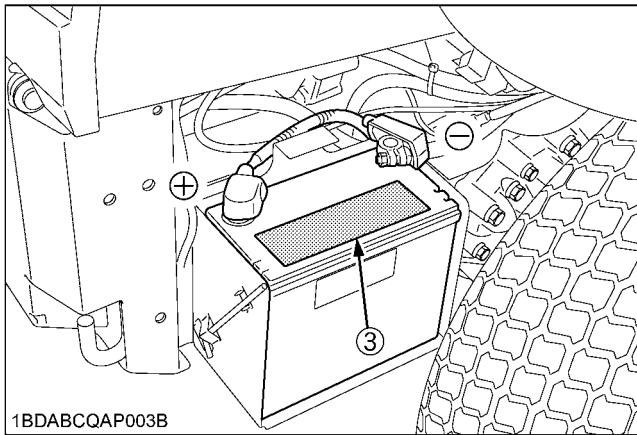
1BDABCQAP107A



(2) Part No. K3181-6586-1
Do not get your hands close to engine fan and fan belt



1BDABCQAP108A



(3) Part No. K3181-6115-1

MAINTENANCE-FREE BATTERY

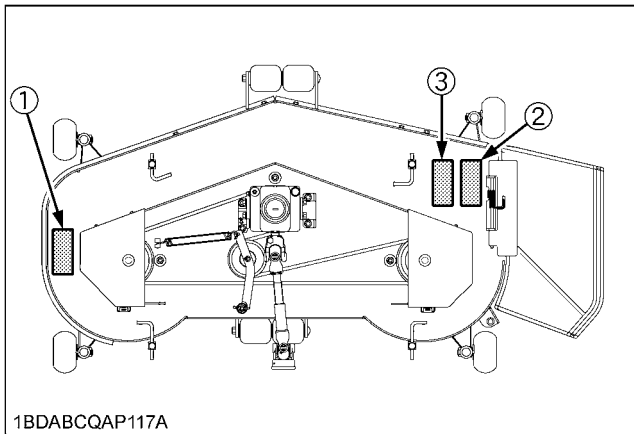
PART NO.

<p>SHIELD EYES. EXPLOSIVE GASES CAN CAUSE BLINDNESS OR INJURY.</p>	<p>NO SPARKS FLAMES SMOKING</p>	<p>SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS.</p>	<p>FLUSH EYES IMMEDIATELY WITH WATER. GET MEDICAL HELP FAST.</p>
---	--	--	---

**KEEP OUT OF REACH OF CHILDREN.
DO NOT TIP. DO NOT OPEN BATTERY.**

Pb

1BDABCQAP124A



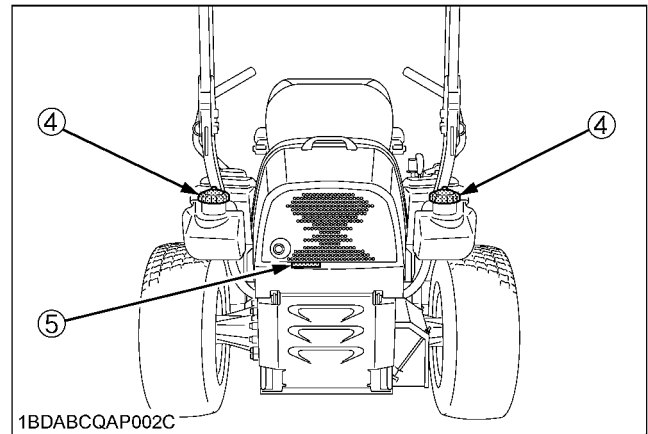
(1) Part No. K5681-7312-1



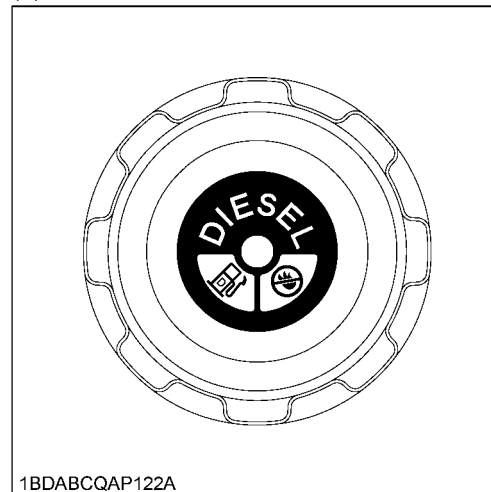
(2) Part No. K5681-7311-1



(3) Part No. K5681-7310-1



(4) Part No. K3181-2481-1



(5) Part No. K3181-6532-1



8. CARE OF DANGER, WARNING, AND CAUTION LABELS

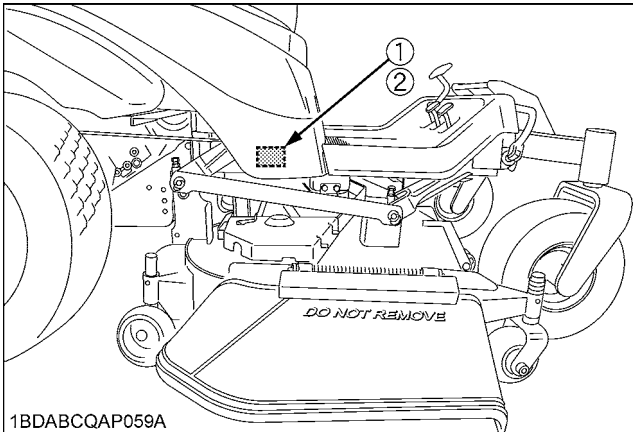
1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, and dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your local KUBOTA Dealer.
4. If a component with danger, warning and caution label(s) affixed is replaced with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

SERVICING OF MACHINE

After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself. Your dealer is interested in helping you get the best performance from your new machine and wants to help you get the most value from it. When in need of parts or major service, be sure to see your KUBOTA Dealer. When in need of parts, be prepared to give your dealer the machine, engine and mower serial numbers.

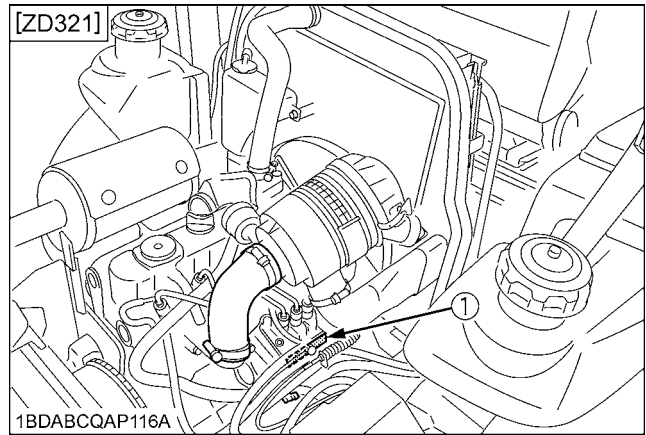
Locate the serial numbers now and record them in the space provided.

	Type	Serial No.
Machine		
Engine		
Mower		
Date of Purchase		
Name of Dealer		
(To be filled in by purchaser)		

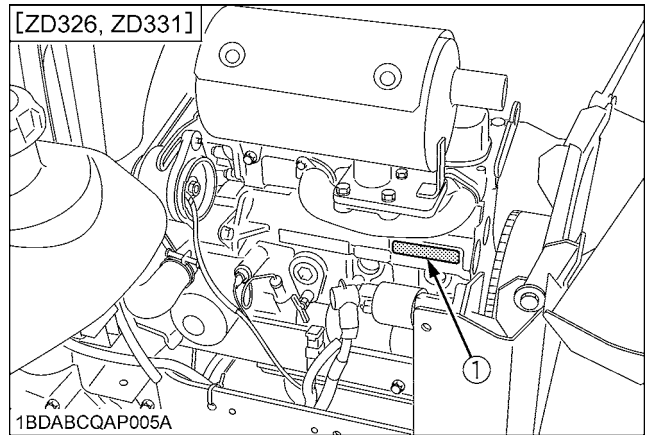


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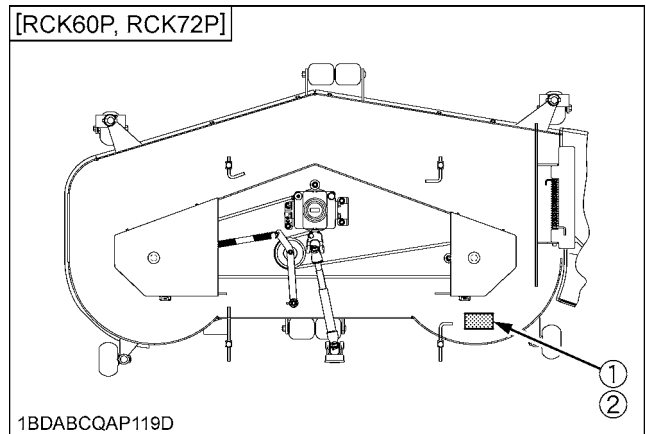
(1) Machine identification plate
(2) Machine serial No.



(1) Engine serial No.

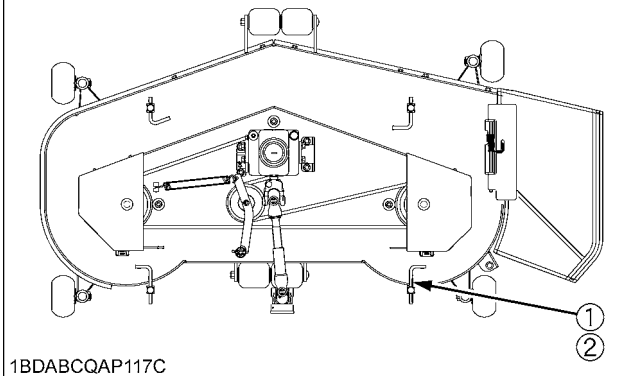


(1) Engine serial No.



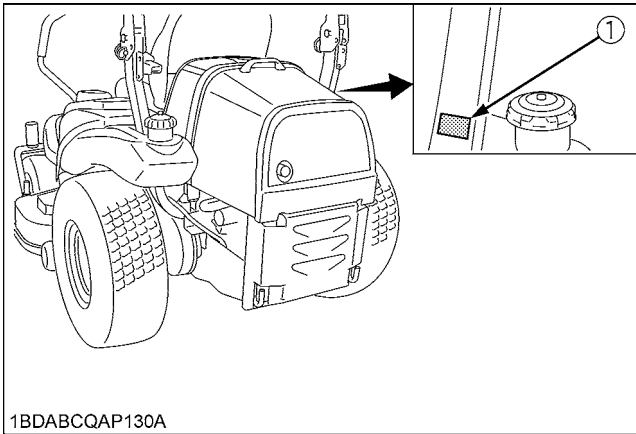
(1) Mower identification plate
(2) Mower serial No.

[RCK54P]



1BDABCQAP117C

- (1) Mower identification plate
- (2) Mower serial No.



1BDABCQAP130A

- (1) ROPS serial No.

SPECIFICATIONS

Model		ZD321N	ZD321	ZD326S	ZD326P	ZD331P	ZD331LP	
Engine	Model		D782-E3-ZD		D1005-E3-ZD-2		D1305-E3-ZD	
	Max. engine power (Gross)	kW (HP)	15.7 (21) (*1)		19.4 (26) (*1)		23.1 (31) (*1)	
	Type		Liquid-cooled					
	Number of cylinders		3					
	Bore and stroke	mm (in.)	67 x 73.6 (2.64 x 2.80)		76 x 73.6 (2.99 x 2.90)		78 x 88.0 (3.07 x 3.46)	
	Total displacement	cm ³ (cu. in.)	778 (47.5)		1001 (61.1)		1261 (77.0)	
	Rated revolution	rpm	3200				3000	
	Fuel		Diesel fuel No.1 [below -10 °C (14 °F)] Diesel fuel No.2 [above -10 °C (14 °F)]					
	Starter		Electric starter with battery, glow plug, 12V, 1.1kW					
	Lubrication		Forced lubrication by gear pump					
	Cooling		Liquid with pressurized radiator					
	Battery		51R (12V, RC:70min, CCA:450A)					
Capacities	Fuel tank	L (U.S.gals.)	49 (12.9)					
	Engine crankcase (with filter)	L (U.S.qts.)	3.5 (3.70)		3.9 (4.1)		5.7 (6.0)	
	Engine coolant	L (U.S.qts.)	2.7 (2.85)		3.5 (3.70)			
	Recovery tank	L (U.S.qts.)	0.25 (0.26)					
	Transmission case including Rear axle gear case	L (U.S.qts.)	12.1 (12.8) (*3)					
Dimensions	Overall length		mm (in.)	2185 (86.0)		2220 (87.4)		2335 (91.9)
	Overall width w/o mower deck		mm (in.)	1365 (53.7)		1460 (57.5)		
	Overall height	With ROPS upright	mm (in.)	1915(75.4)				
		With ROPS folded	mm (in.)	1555 (61.2)				
	Wheelbase		mm (in.)	1410 (55.5)				1525 (60.0)
	Min. ground clearance		mm (in.)	130 (5.12) W/54",W/60"		130 (5.12) W/60"		130 (5.12) W/60",W/72"
	Tread	Front	mm (in.)	975 (38.4)				1070 (42.1)
		Rear	mm (in.)	1100 (43.3)		1150 (45.3)		
Weight (W/MOWER DECK)		kg (lbs.)	730 (1609) with 54"	755 (1664) with 60"	798 (1759) with 60"	813 (1792) with 60"	820 (1808) with 60"	845 (1863) with 72"

4 SPECIFICATIONS

Model				ZD321N	ZD321	ZD326S	ZD326P	ZD331P	ZD331LP
Traveling system	Tires	Front		15 x 6.0 - 6 (4PR) Rib			15 x 6.0 - 6 (Semi-pneumatic Non Flat Tire) Rib		
		Rear		26 x 10.5 - 12 (4PR) Turf	26 x 12.0 - 12 (4PR) Turf				
	Traveling speeds	Forward	mph (km/h)	0 to 9.3 (0 to 15.0)			0 to 10.6 (0 to 17.0) (*2)		
		Reverse	mph (km/h)	0 to 5.2 (0 to 8.3)			0 to 5.3 (0 to 8.5) (*2)		
	Steering		2 - Hand levers						
	Transmission		2 - HST w / Gear						
	Parking brake		Wet multi disk / Foot applied, released						
	Min. turning radius		mm (in.)	0 (0)					
PTO	Revolution		1 speed (2530 rpm at 3200 engine rpm)				1 speed (2538 rpm at 3000 engine rpm)		
	Drive system		Shaft drive, KUBOTA 10 tooth involute spline						
	Clutch type		Wet multi disks						
	PTO brake		Wet single disk						

(Specifications and design subject to change without notice)

NOTE:

*1: Manufacturer's estimate

*2: At 3200 engine rpm [ZD321, ZD326] At 3000 engine rpm [ZD331]

*3: Oil amount when the oil level is at the upper level.

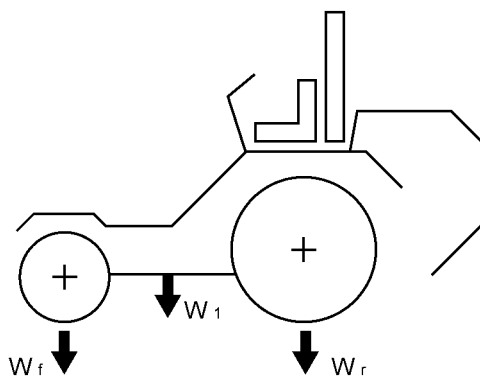
Model			RCK54P-321Z	RCK60P-331Z	RCK72P-331Z	
PRO Commercial Deck (Fabricated deck)	Suitable machine		ZD321N	ZD321, ZD326S, ZD326P, ZD331P	ZD331LP	
	Mounting method		Quick joint, Parallel linkage			
	Adjustment of cutting height		Dial gauge			
	Cutting width	mm (in.)	1375 (54)	1524 (60.0)	1829 (72.0)	
	Cutting height	mm (in.)	25 to 127 (1.0 to 5.0)			
	Weight (Approx.)	kg (lbs.)	128 (281)	148 (327)	169 (373)	
	Blade spindle speed	r/s (rpm)	58.8 (3530) *1	56.0 (3360) *1	47.2 (2830) *1	
	Blade tip velocity	m/s (fpm)	87.8 (17300)*1	92.0 (18100)*1	92.6 (18200)*1	
	Blade length	mm (in.)	475 (18.7)	523 (20.6)	625 (24.6)	
	Number of blades		3			
	Dimensions	Total length	mm (in.)	940 (37.0)	1002 (39.4)	1170 (46.1)
		Total width	mm (in.)	1704 (67.1)	1911 (75.2)	2224 (87.6)
Total height		mm (in.)	353 (13.9)	358 (14.1)		

*1: Engine Max rpm

IMPLEMENT LIMITATIONS

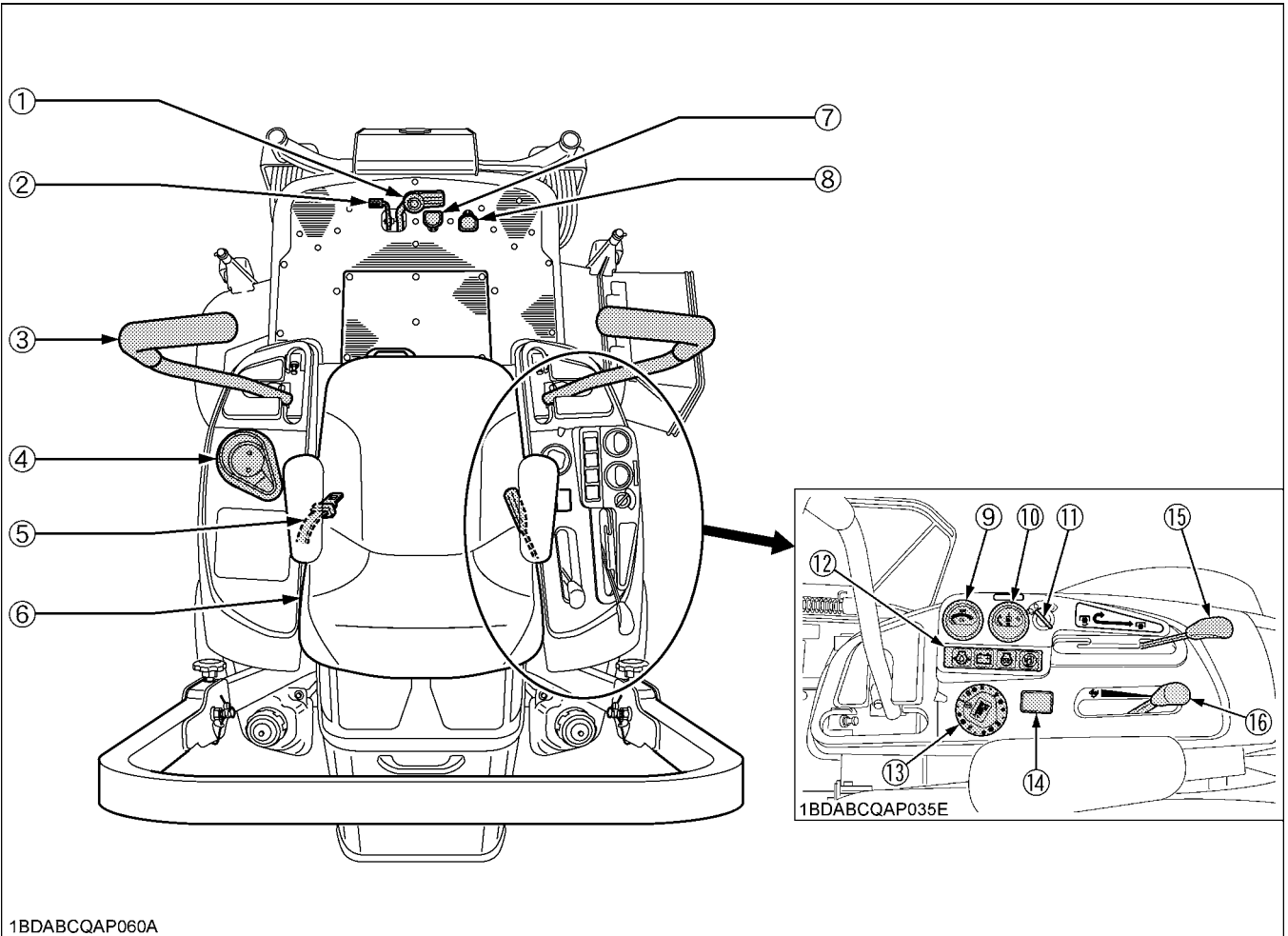
The KUBOTA Machine has been thoroughly tested for proper performance with implements sold or approved by KUBOTA. Use with implements which are not sold or approved by KUBOTA and which exceed the maximum specifications listed below, or which are otherwise unfit for use with the KUBOTA Machine may result in malfunctions or failures of the machine, damage to other property and injury to the operator or others. [Any malfunctions or failures of the machine resulting from use with improper implements are not covered by the warranty.]

	Maximum loading weight		Implement weight W_1	Maximum total weight
	Front axle W_f	Rear axle W_r		
ZD321 [N]	200 kg (440 lbs.)	920 kg (2028 lbs.)	200 kg (440 lbs.)	1120 kg (2468 lbs.)
ZD326P [S]				
ZD331P [L]				



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INSTRUMENT PANEL AND CONTROLS

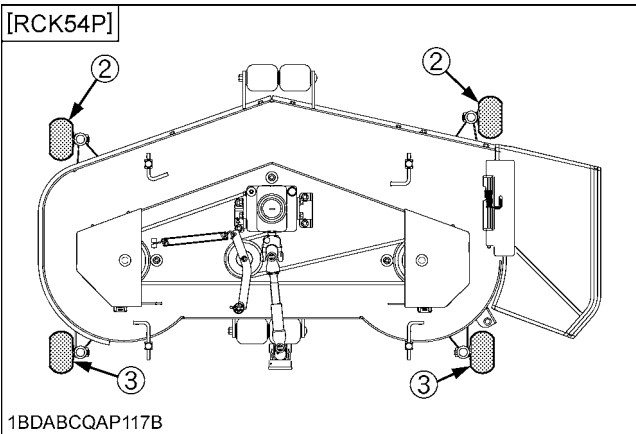
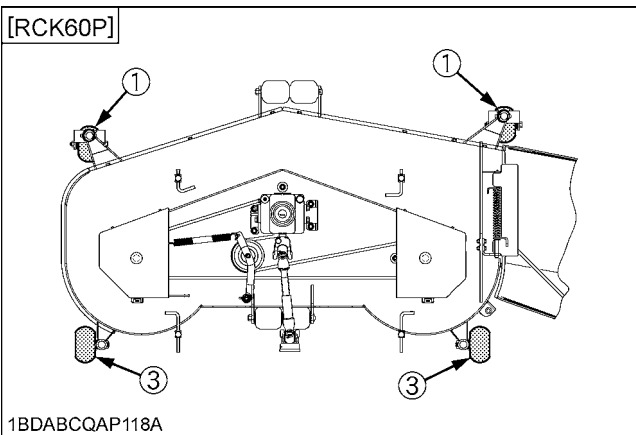
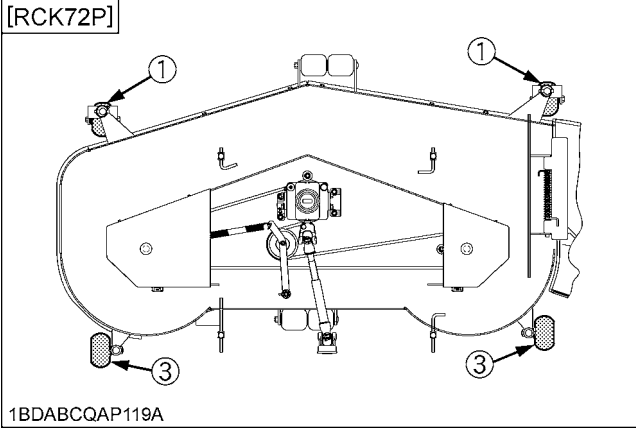


ILLUSTRATED CONTENTS

(1) Parking brake pedal.....	11, 24
(2) Parking brake lock pedal.....	11, 24
(3) Motion control lever.....	11, 24
(4) Cup holder.....	-
(5) Seat belt.....	23
(6) Operator's seat.....	22
(7) Hydraulic lift control pedal (DOWN).....	23
(8) Hydraulic lift control pedal (UP).....	23

ILLUSTRATED CONTENTS

(9) Coolant temperature gauge.....	15
(10) Fuel gauge (LH tank only).....	14
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(12) Easy checker (TM).....	14
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ILLUSTRATED CONTENTS

(1) Anti-scalp roller (Front, swivel type).....	29
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(3) Anti-scalp roller (Rear).....	29

MOWER MOUNTING

MOUNTING THE MOWER DECK

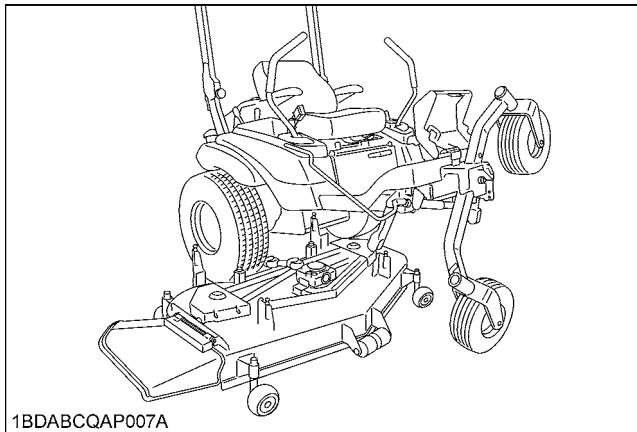


CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Stop the engine and remove the key.

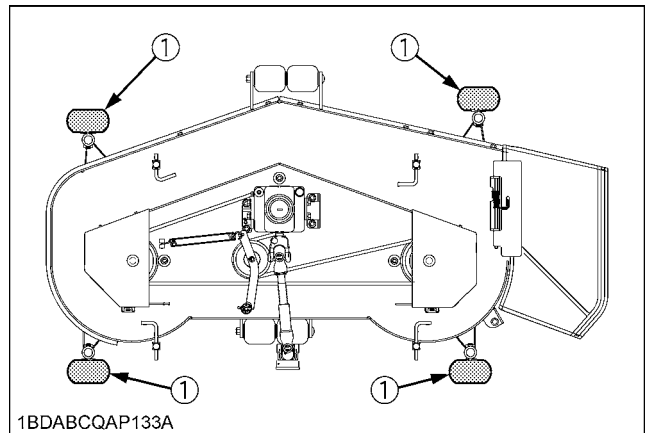
1. Before mounting the mower deck, raise the lift links to the full up position.
2. Adjust the cutting height control dial to 1 in. position.
3. Tilt-up the machine with the maintenance lift system. (See "HOW TO TILT UP THE MACHINE" in "PERIODIC SERVICE" section.)
4. Place the mower deck at the right side of the machine.



5. Slide the mower deck under the machine, and make sure that the mower gear case is placed properly in the center of the machine, lower the axle from the tilt-up position to the normal position.

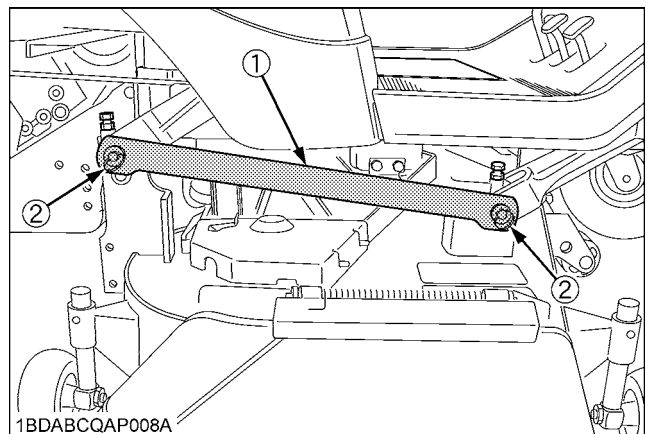
NOTE :

- For easy installation set the anti scalp roller as shown below.
54" mower: Four places
60", 72" mower: Two places rear



(1) Anti scalp roller

6. Place 50 mm (2 in.) wood blocks under each side of the mower deck.
7. Depress the hydraulic lift control pedal (DOWN) and pull down the lift links.
8. Attach the lift links to the mower deck with attaching hardware.

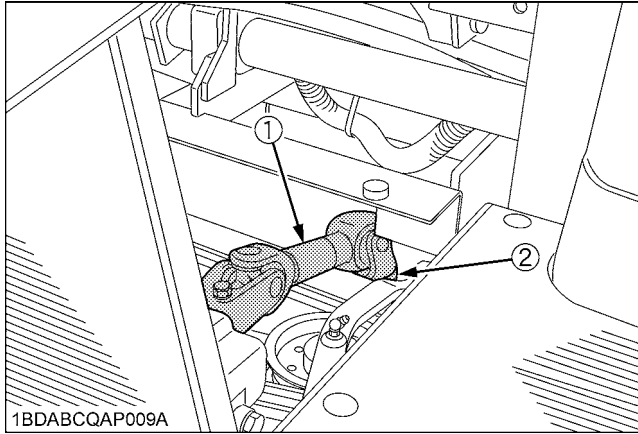


(1) Lift link
(2) Clevis pin, Plain washer, Snap ring

9. Install universal joint.
Pull back the coupler of the universal joint.
Push the universal joint onto the PTO shaft until the coupler locks.

IMPORTANT :

- Tug the universal joint backward and forward to make sure it is locked securely.

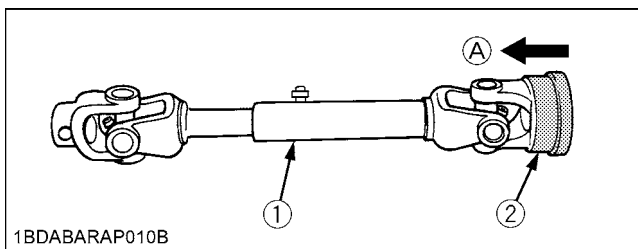


ADJUSTING THE MOWER

See "OPERATING THE MOWER" section.

DISMOUNTING THE MOWER DECK

For dismounting the mower deck, reverse the above procedures.



(1) Universal joint
(2) Coupler

(A) "PULL"

10. After mounting the mower, check the mower level. If necessary, adjust the mower level and anti-scalp rollers.

OPERATING THE ENGINE



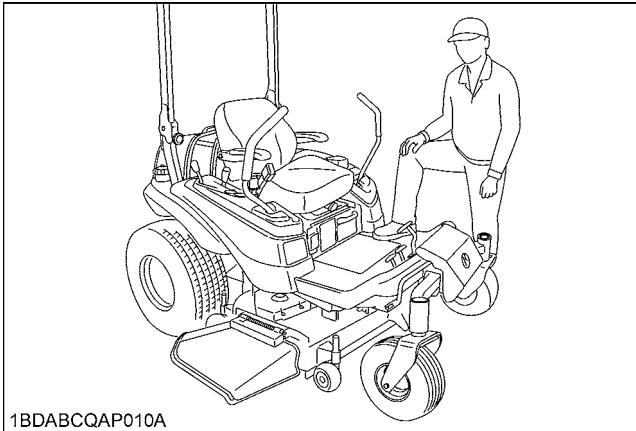
CAUTION

To avoid personal injury:

- Read "SAFE OPERATION" in the front of this manual.
- Read the danger, warning and caution labels located on the machine.
- To avoid danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- Never start the engine while standing on the ground. Start the engine only from operator's seat.

MOUNT AND DISMOUNT MACHINE SAFELY

DO NOT step on either side of the mower deck when mounting and dismounting the machine. When mounting the machine from either side, step over the mower deck.

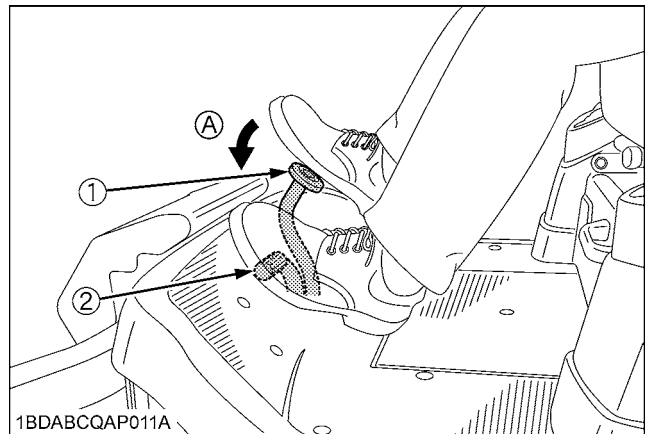


STARTING THE ENGINE

1. Sit on the operator's seat.
2. Apply the parking brake.

To apply the parking brake:

Depress the parking brake pedal firmly with your right foot and the parking brake lock pedal simultaneously with your left foot. Then release the parking brake pedal while holding the parking brake lock pedal down.



(1) Parking brake pedal

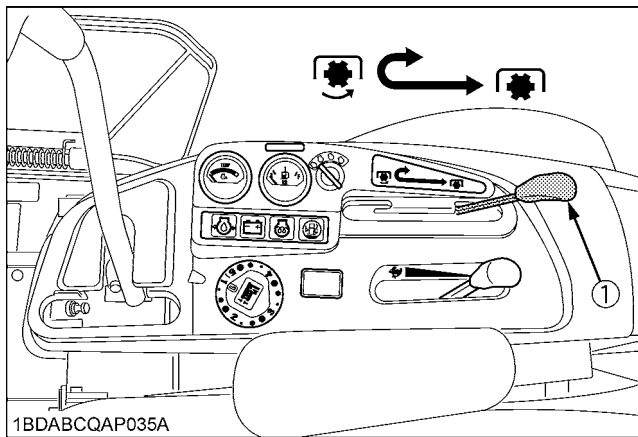
(2) Parking brake lock pedal

(A) "DEPRESS"

To release the parking brake:

Depress the brake pedal and release slowly with your right foot without pressing the parking brake lock pedal.

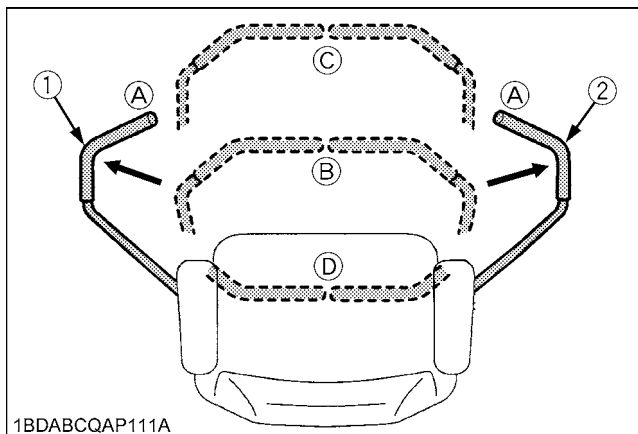
3. Make sure that the PTO lever is in the "DISENGAGED" (OFF) position.



(1) PTO lever

-  "ENGAGED" (ON)
-  "DISENGAGED" (OFF)

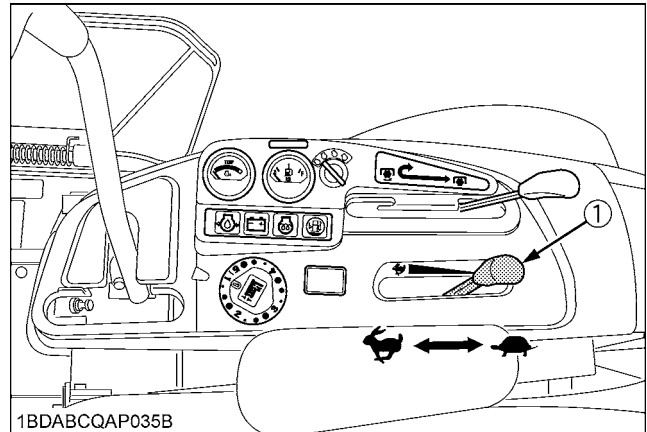
4. Place the motion control levers in the "NEUTRAL LOCK" position.





(1) Motion control lever (LH)
(2) Motion control lever (RH)

- (A) "NEUTRAL LOCK" Position
- (B) "NEUTRAL" Position
- (C) "FORWARD"
- (D) "REVERSE"

5. Set the throttle lever 1/2 way forward.



(1) Throttle lever





-  "FAST"
-  "SLOW"

6. Insert the key into the key switch and turn clockwise one notch. Make sure the Easy Checker (TM) lights are ON.

IMPORTANT :

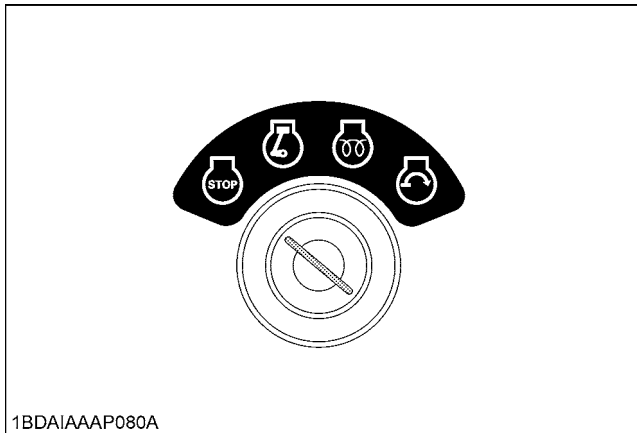
- Do not depress the hydraulic lift control pedal. When the engine is off, depressing the hydraulic lift control pedal (UP or DOWN) will lower the implement.


■ Key Switch

-  OFF..... The position where the key can be inserted into or removed from the key switch. [When the key is turned this position, the engine shuts off.]
-  ON..... The engine keeps running.
-  PREHEAT... The super glow plug is heated.
-  START..... Apply the parking brake and turn the key switch to this position to start the engine.

IMPORTANT :

- Because of the safety devices, the engine may not be started except when the PTO clutch is "DISENGAGED" (OFF), the parking brake lock pedal is applied, motion control levers are in "NEUTRAL LOCK" position and the operator is sitting in the seat.

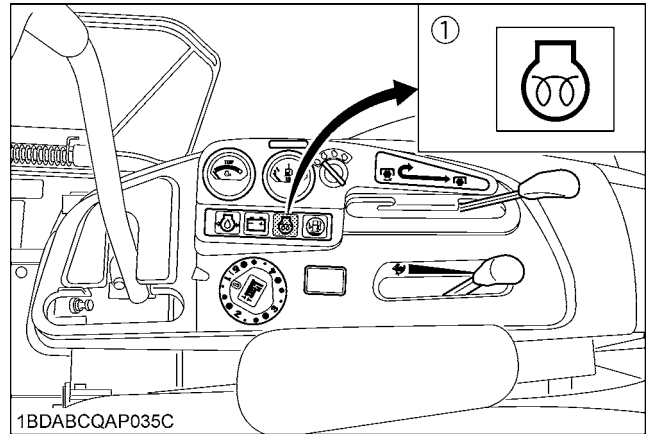


-  : "OFF"
-  : "ON"
-  : "PREHEAT"
-  : "START"

7. Turn the key switch clockwise, and hold it for about 5 seconds. (at the "PREHEAT" position)

For the appropriate preheating time, refer to the table below:

Temperature	Preheating Time
Over 0 °C (32 °F)	5 sec.
Below 0 °C (32 °F)	10 sec.



(1) Glow plug indicator

NOTE :

- Glow plug indicator (1) comes on while the engine is being preheated.

8. Turn the key switch to the "START" position and release the key to the "ON" position when the engine starts.

IMPORTANT :

- Do not use starting fluid or ether.
- To protect the battery and the starter, make sure that the starter is not continuously turned for more than 10 seconds.
- Do not turn the key switch while the engine is running.
- When the temperature is below 0 °C (32 °F), run the engine at medium speed to warm up the lubricant of the engine and transmission for at least 10 minutes. If the machine is operated before the lubricant is warm enough, the machine life will be shortened.
- Do not operate the machine under full load until it is sufficiently warmed up.
- When the ambient temperature is less than -15 °C (5 °F), remove the battery from the machine and store it somewhere warm until next operation.

9. Make sure that the Easy Checker (TM) lights have gone off. If the light is still on, immediately stop the engine and check the remedy following the instruction. (See "CHECK DURING OPERATING" in "OPERATING THE ENGINE" section.)

10. Warm the engine by running at medium speed.

CHECK DURING OPERATING

While operating, make the following checks to see that all the parts are functioning normally.

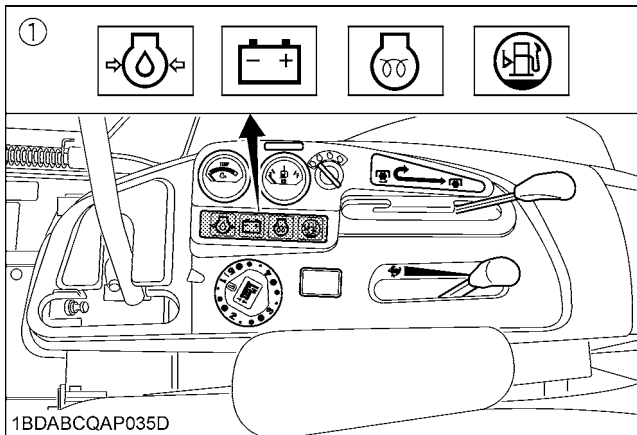
■ Immediately Stop the Engine if:

- The engine suddenly slows down or accelerates.
- Unusual noises are suddenly heard.
- Exhaust fumes suddenly become discolored.

■ Easy Checker (TM)

If the warning lamps in the Easy Checker (TM) come on during operation, stop the engine immediately, and find the cause as shown below.

Never operate the machine while Easy Checker (TM) lamp is "ON".



(1) Easy checker (TM)

⚠ Engine oil pressure

If the oil pressure in the engine goes below the prescribed level, the warning lamp in the Easy Checker (TM) will come on.

If this should happen during operation, stop the engine immediately and check level of engine oil.

⚡ Electrical charge

If the alternator is not charging the battery, the warning lamp in the Easy Checker (TM) will come on.

If this should happen during operation, check the electrical charging system or consult your local KUBOTA Dealer.

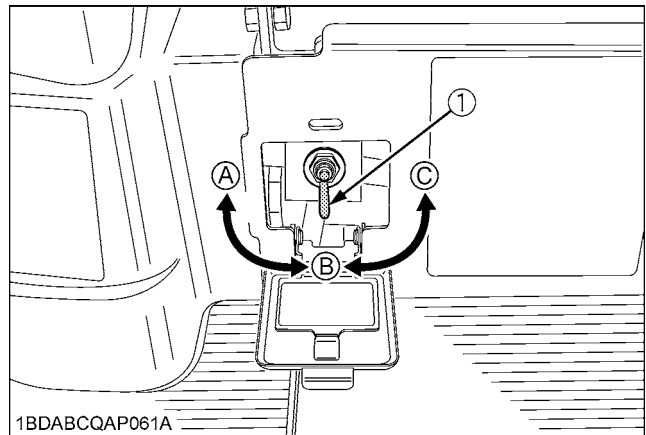
⛽ Fuel level [RH tank (primary tank) only]

If the fuel in the RH tank (primary tank) goes below the prescribed level, the warning lamp in the Easy Checker (TM) will come on. (less than 9.0 L (2.38 U.S. gals.) in the RH tank)

If this should happen during operation, switch to the LH tank (secondary tank).

■ Fuel Valve, Fuel Gauge and Warning Lamp

1. There are three switch positions in the fuel valve. (See "Fuel valve position" below.)

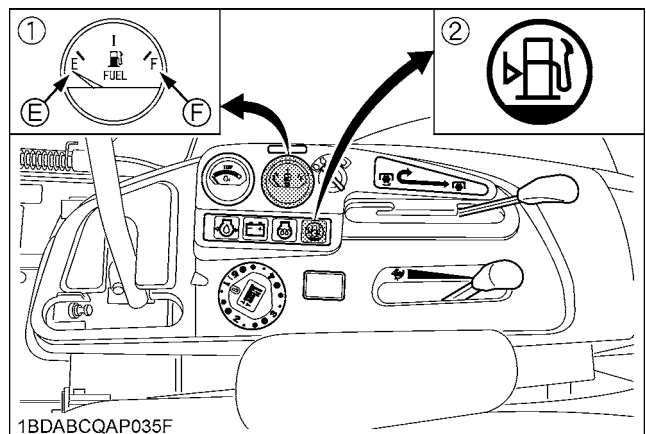


(1) Fuel valve

- (A) "OFF"
- (B) RH (Primary tank)
- (C) LH (Secondary tank)

Fuel valve position

Rightward	OFF
Downward	RH (Primary tank)
Leftward	LH (Secondary tank)



(1) Fuel gauge for LH tank (Secondary tank)

- (E) "EMPTY"
- (F) "FULL"

(2) Fuel level warning lamp for RH tank (Primary tank)

2. The fuel gauge shows the amount of fuel left in the LH tank (secondary tank).
3. Use the fuel in the RH tank (primary tank) first.
4. When the warning lamp in the Easy Checker (TM) comes on, switch to the LH tank (secondary tank).

5. After switching to the LH tank, if the fuel gauge indicates "E", the fuel in the LH tank (secondary tank) is empty (less than 3.4 L (0.9 U.S. gals.) in the LH tank). Refuel as soon as possible. (See "Checking Amount of Fuel and Refueling" in "DAILY CHECK" in "PERIODIC SERVICE" section.)

IMPORTANT :

- Fill the fuel tank only to bottom of the filler neck.
- Use the fuel from the RH tank (primary tank) first. Before the RH tank (primary tank) becomes empty (less than 9.0 L (2.38 U.S. gals.) in the RH tank), switch to the LH tank (secondary tank).
- Be careful not to empty the fuel tank. Otherwise air may enter the fuel system. Should this happen, the system should be bled. (See "Bleeding Fuel System" in "SERVICE AS REQUIRED" in "PERIODIC SERVICE" section.)

■ Coolant Temperature Gauge**CAUTION**

To avoid personal injury:

- Do not remove radiator cap until coolant temperature is well below its boiling point. Then loosen cap slightly to the stop to relieve any excess pressure before removing cap completely.

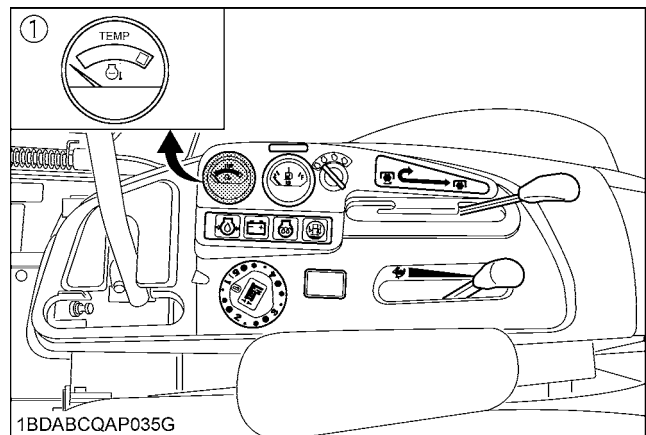
If the indicator reaches red zone, or horn sounds.

1. Place the PTO lever in the "DISENGAGE" (OFF) position.
2. Move the machine to the level surface, and apply the parking brake.
3. Place the throttle lever in the engine idle position, and let the engine run for a few minutes.
4. Check the Cooling System, after it has sufficient time to cool down.

Check the following items:

1. Shortage or leakage of the coolant.
2. Foreign matter on the radiator net or dust and dirt between the radiator fins.
3. Looseness of fan belt.
4. Blockage in the radiator tube.

(See "PERIODIC SERVICE" section.)



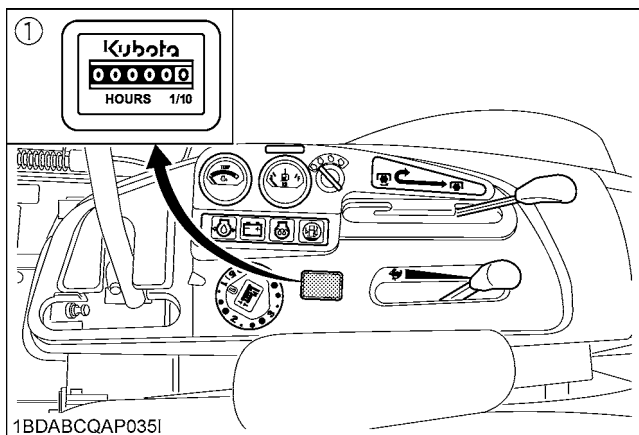
(1) Coolant temperature gauge

Hour Meter

This meter gives readings for the hours the machine has been operated for.

NOTE :

- As the hour meter works electrically, it starts to work when the key switch is turned to "ON", regardless of the engine running or not.



(1) Hour meter

COLD WEATHER STARTING

When the ambient temperature is below -5°C (23°F) and the engine is very cold. (If the engine fails to start after 10 seconds, turn off the key for 30 seconds. Then repeat steps 8, 9 and 10. To protect the battery and the starter, make sure that the starter is not continuously turned for more than 30 seconds.)

BLOCK HEATER (OPTION)

A block heater is available as an option from your local dealer. It will assist you in starting your machine when the ambient temperature is below freezing.

WARMING UP



CAUTION

To avoid personal injury:

- Be sure to apply the parking brake during warm-up.

For 5 minutes after engine start-up, allow the engine to warm up without applying any load. This is to allow oil to reach every engine part. If load should be applied to the engine without this warm-up period, the troubles such as seizure, breakage or premature wear may develop.

Warm-up and Transmission Oil in the Low Temperature Range

Hydraulic oil serves as transmission oil. In cold weather, the oil may be cold with increased viscosity. This can cause delayed oil circulation or abnormally low hydraulic pressure for some time after engine start-up. This in turn can result in a trouble in the hydraulic system or a damage to the hydraulic clutch.

To prevent the above, observe the following instructions: Warm up the engine at about 50% of rated rpm according to the table below:

Ambient temperature	Warm-up time requirement
Higher than 0°C (32°F)	Approx. 5 minutes
0 to -10°C (32 to 14°F)	5 to 10 minutes
-10 to -20°C (14 to -4°F)	10 to 15 minutes
Below -20°C (-4°F)	More than 15 minutes

IMPORTANT :

- Do not operate unless the engine is well warmed up. If operation is attempted while the engine is still cold, the hydraulic mechanism will not function properly and its service life will be shortened.
- If noises are heard after the hydraulic control lever has been activated and the implement is lifting, the hydraulic mechanism is not adjusted properly. Unless corrected, the unit will be damaged. Contact your local KUBOTA Dealer for adjustment.

JUMP STARTING



WARNING

To avoid personal injury:

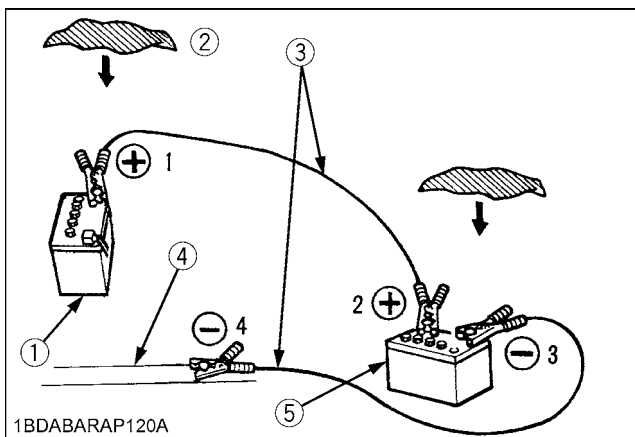
- Battery gases can explode. Keep cigarettes, sparks, and flames away from battery.
- If the machine battery is frozen, do not jump start the engine.
- Do not connect the other end of negative jumper cable to the negative terminal of the machine battery.

When jump starting engine, follow the instructions below to start the engine safely.

1. Bring a helper vehicle with a battery of the same voltage as a disabled machine within easy cable reach. "THE VEHICLES MUST NOT TOUCH".
2. Apply the parking brakes of both vehicles and put the shift levers in neutral. Shut the engine off.
3. Put on safety goggles and rubber gloves.
4. Ensure vent caps are securely in place (if equipped).
5. Cover vent caps with damp rags. Do not allow the rag to touch the battery terminals.
6. Attach the red clamp to the positive (red, (+) or pos.) terminal of the dead battery and clamp the other end of the same cable to the positive (red, (+) or pos.) terminal of the helper battery.
7. Clamp the other cable to the negative (black, (-) or neg.) terminal of the helper battery.
8. Clamp the other end to the engine block or the frame of the disabled machine as far from the dead battery as possible.
9. Start the helper vehicle and let its engine run for a few moments. Start the disabled machine.
10. Disconnect the jumper cables in the exact reverse order of attachment. (Steps 8, 7 and 6)
11. Remove and discard the damp rags.

IMPORTANT :

- This machine has a 12 volt negative (-) ground starting system.
- Use only same voltage for jump starting.
- Use of a higher voltage source on a machine could result in severe damage to the machine electrical system.
Use only matching voltage source when "jump-starting" a low or dead battery condition.

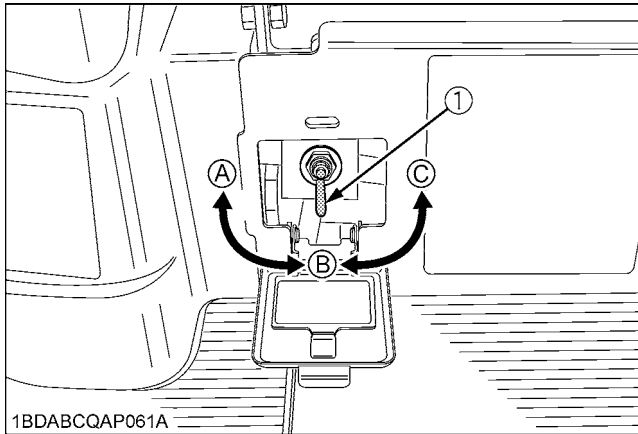


- (1) Dead battery
 (2) Lay a damp rag over the vent caps
 (3) Jumper cables
 (4) Engine block or frame
 (5) Helper battery

Connect cables in numerical order.
 Disconnect in reverse order after use.

STOPPING THE ENGINE

1. After idling the engine, turn the key switch to "OFF" position.
2. Remove the key.
3. Do not leave the key switch "ON" (key in the "ON" position) as the battery will discharge when the engine is not running.
4. Apply the parking brake.
5. Turn the fuel valve to the "OFF" position.



(1) Fuel valve
 (A) "OFF"
 (B) RH (Primary tank)
 (C) LH (Secondary tank)

Fuel valve position

Rightward	OFF
Downward	RH (Primary tank)
Leftward	LH (Secondary tank)

■ Engine Stop Lever (Inside the Hood)

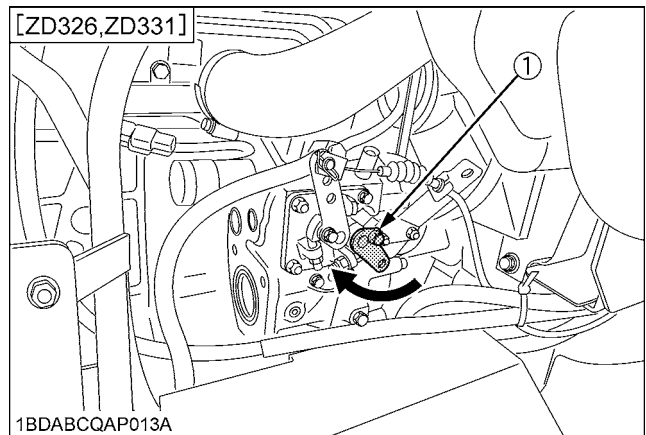
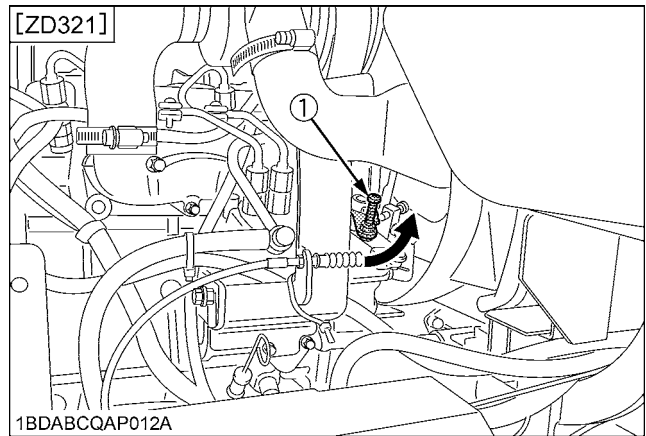
The engine stops when the key switch is turned "OFF". If the engine does not stop, make sure the motion control levers are in the "NEUTRAL LOCK" position, the PTO lever is "OFF", the mower lowered to the ground and apply the parking brake, then carefully get off the machine. Then open the hood and pull engine stop lever (Red mark) and hold it until the engine stops. Then contact your local KUBOTA Dealer immediately.



CAUTION

To avoid personal injury:

- Do not operate the machine until the engine stop system is repaired.



(1) Engine stop lever

OPERATING THE MACHINE

OPERATING NEW MACHINE

How a new machine is operated and maintained determines the life of the machine.

A new machine just off the factory production line has been, of course, tested, but the various parts are not accustomed to each other, so care should be taken to operate the machine for the first 50 hours at a slower speed and avoid excessive work or operation until the various parts become "broken-in." The manner in which the machine is handled during the "breaking-in" period greatly affects the life of your machine. Therefore, to obtain the maximum performance and the longest life of the machine, it is very important to properly break-in your machine. In handling a new machine, the following precautions should be observed.

■ Changing Lubricating Oil for New Machines

The lubricating oil is especially important in the case of a new machine. The various parts are not "broken-in" and are not accustomed to each other; small metal grit may develop during the operation of the machine; and this may wear out or damage the parts. Therefore, care should be taken to change the lubricating oil a little earlier than would ordinarily be required.

For further details of change interval hours.

(See "SERVICE INTERVALS" in "MAINTENANCE" section.)

■ Engine Break-in

After the first 50 hours of operation, change the engine oil and filter. (See "EVERY 200 HOURS" in "PERIODIC SERVICE" section.)

■ Machine Break-in

After the first 400 hours of operation, change the transmission fluid. (See "EVERY 400 HOURS" in "PERIODIC SERVICE" section.)

After the first 50 hours of operation, change the oil filter cartridge. (See "EVERY 200 HOURS" "EVERY 400 HOURS" in "PERIODIC SERVICE" section.)



DANGER

To avoid serious injury or death:

- Do not operate the mower without the deflector shield in the down position.



WARNING

To avoid personal injury:

- The machine relies upon the engine driven transmission for speed, direction and steering control. If the engine is not running, the machine cannot be driven or controlled. If the engine stops when operating on a slope, apply the parking brake immediately to prevent machine runaway.
- Do not allow any person other than the driver to ride on the machine.
- 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.
- When turning the machine, be sure to reduce the travel speed and operate motion control levers carefully.
- To avoid tip over, operate across slopes, not up and down. Avoid sudden starts and stops on slopes. Slow down, and use extra caution when changing direction on a slope. Park the machine on a firm and level surface.
- Watch where you are going at all times. Watch for and avoid obstacles. Be alert at curbs, near trees, and other obstructions and hidden hazards.
- Do not drive machine on streets or highways. Watch for traffic when you cross roads or operate near roads.
- Look to the rear before and when backing. Make sure the area immediately behind you is clear of obstructions or holes and small children. Use extra caution when machine is equipped with Grass Catcher.



CAUTION

To avoid personal injury:

- Clear the work area of objects which might be picked up and thrown by blades.
- Do not direct the opening of the chute at bystanders or animals. Ejected objects may cause injury. Plan your mowing carefully before starting operation.
- Keep bystanders especially children and animals away from the mowing area.
- Be sure to disengage the PTO and sit on the operator's seat before starting the engine.

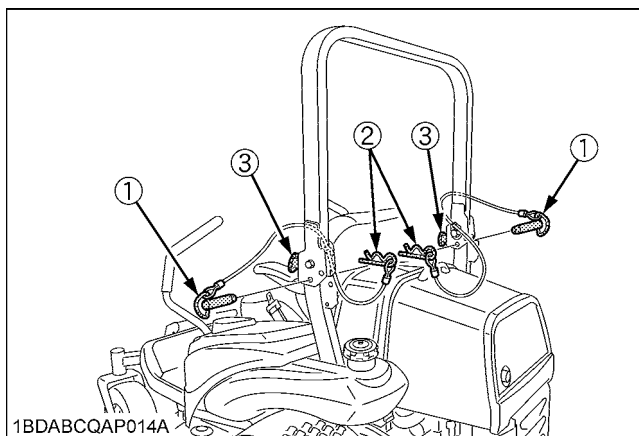
OPERATING FOLDABLE ROPS

CAUTION

- When raising or folding the ROPS, apply parking brake, stop the engine and remove the key. Always perform function from a stable position from the rear of the machine.
- Fold the ROPS down only when absolutely necessary and fold it up and lock it again as soon as possible.
- Before proceeding to fold the ROPS, check for any possible interference with installed implements and attachments.
if interference occurs, contact your KUBOTA Dealer.

■ To Fold the ROPS

1. Unscrew the knob bolts 1 to 2 turns.
2. Remove both lock pins.



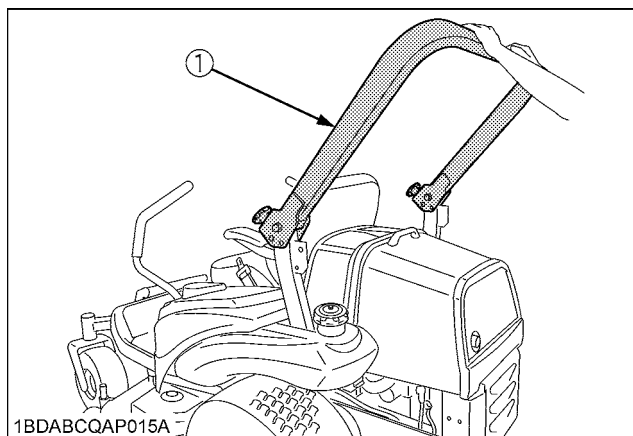
- (1) Lock pin
(2) Hair pin
(3) Knob bolt

3. Fold the ROPS.

CAUTION

To avoid personal injury:

- Hold the ROPS tightly with both hands and fold the ROPS slowly and carefully.



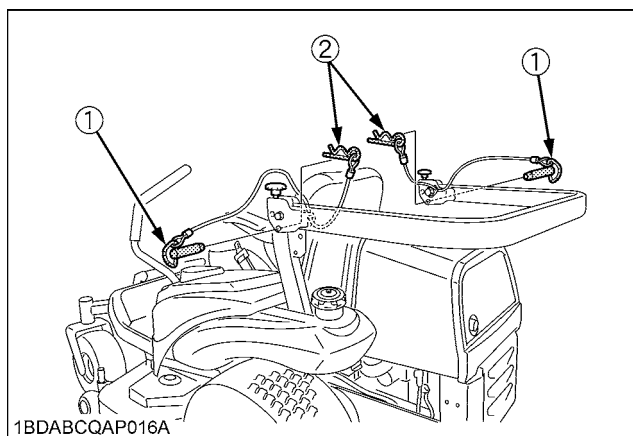
(1) ROPS

4. Align lock pin holes and insert both lock pins and secure them with the hair pins.

CAUTION

To avoid personal injury:

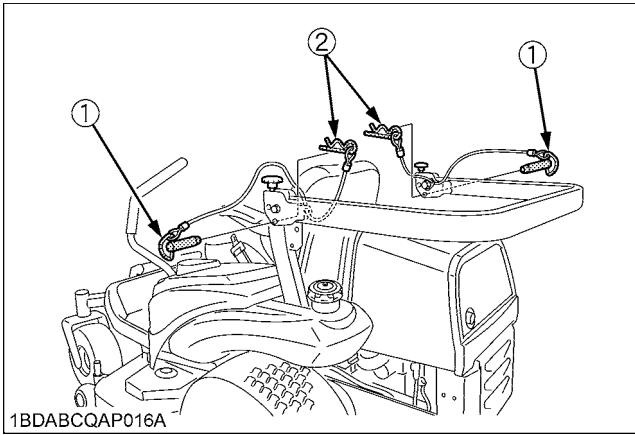
- Make sure that both lock pins are properly installed and secured with the hair pins.



- (1) Lock pin
(2) Hair pin

■ To Raise the ROPS to Upright Position

1. Remove both hair pins and lock pins.



- (1) Lock pin
- (2) Hair pin

2. Raise ROPS to the upright position.



CAUTION

To avoid personal injury:

- Raise the ROPS slowly and carefully.

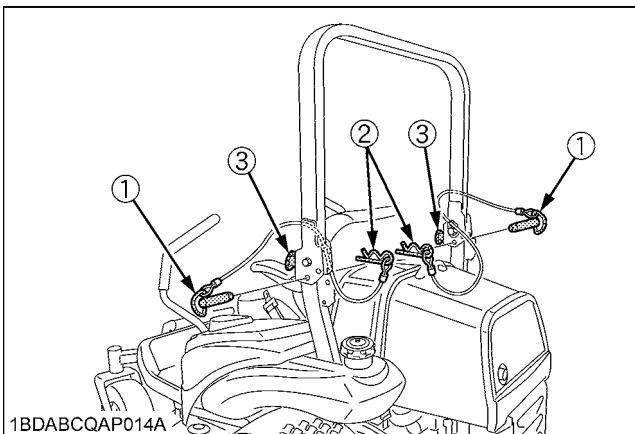
3. Align lock pin holes, insert both lock pins and secure them with the hair pins.
4. Tighten the knob bolts slightly.



CAUTION

To avoid personal injury:

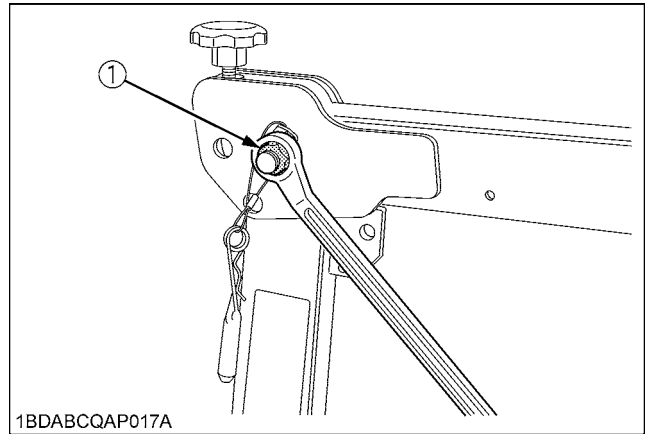
- Make sure that both lock pins are properly installed as soon as the ROPS is in the upright position and secured with the hair pins.



- (1) Lock pin
- (2) Hair pin
- (3) Knob bolt

■ Adjustment of Foldable ROPS

- Adjust free fall of the ROPS upper frame regularly.
- If you feel less friction when folding the ROPS, tighten the nut (1) until you feel the right friction in the movement and then replace the cotter pin.



- (1) Nut

STARTING

1. Adjust the operator's position.

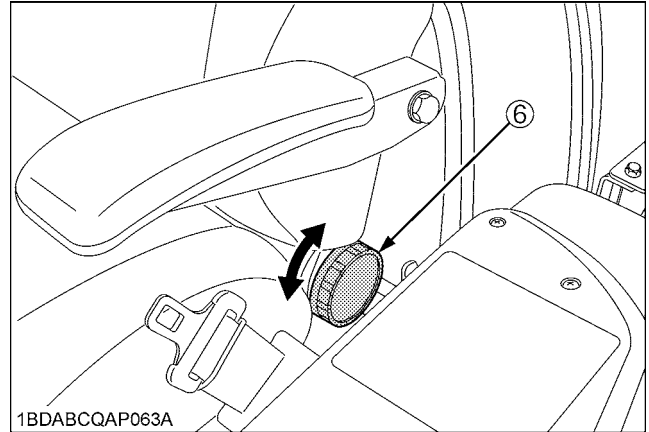
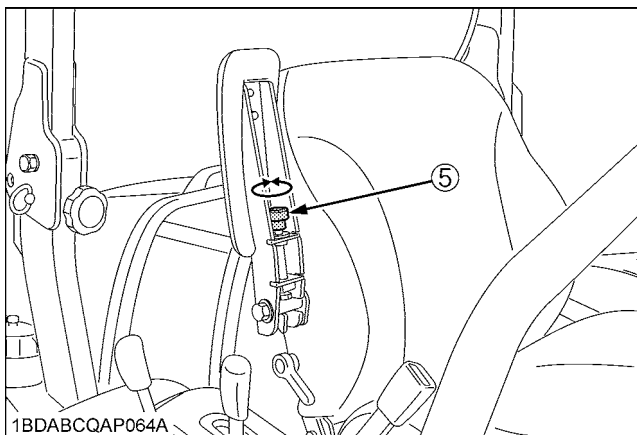
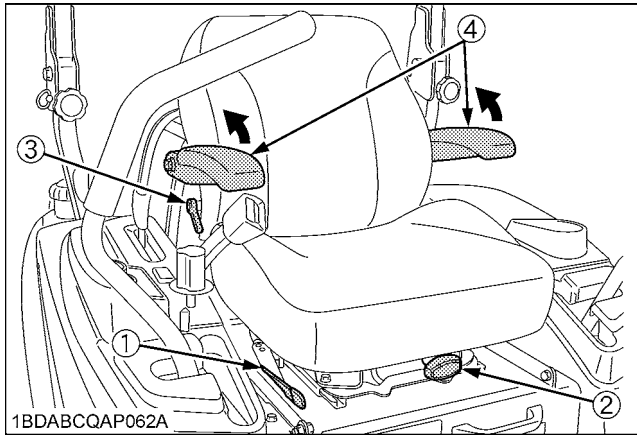
■ Operator's Seat



CAUTION

To avoid personal injury:

- Make adjustments to the seat only while the machine is stopped.
- Make sure that the seat is completely secured after each adjustment.
- Do not allow any person other than the driver to ride on the machine.



- (1) Travel adjust lever
- (2) Suspension adjust knob
- (3) Lumbar support adjust lever
- (4) Arm rest
- (5) Arm rest angle adjust knob
- (6) Backrest tilt adjust knob

◆ Travel adjustment

Unlock the travel adjust lever and slide the seat backward or forward, as required. The seat will lock in position when the lever is released.



CAUTION

To avoid personal injury:

- Use extra caution when unlocking the travel adjust lever because the seat might slide forward by itself.

◆ Suspension adjustment

Pull the suspension adjust knob and turn it to achieve the optimum suspension setting. After setting, push back the knob.

◆ Lumbar support adjustment

Turn the lumbar support adjust lever to the desired position.

◆ Arm rest

Arm rest may be set at upright position if desired.

◆ Arm rest angle adjustment

Turn the arm rest angle adjust knob to the desired angle.

◆ Backrest tilt adjustment

Turn the backrest tilt adjust knob to the desired angle.

IMPORTANT :

- After adjusting the operator's seat, be sure to check to see that the seat is properly locked.

■ Seat Belt

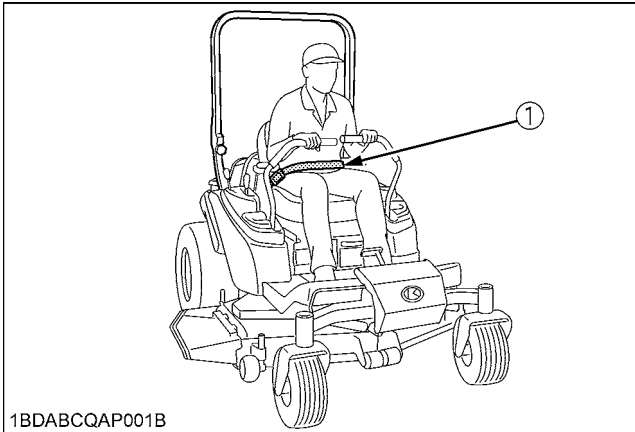


CAUTION

To avoid personal injury:

- Always use the seat belt when the ROPS is installed.
- Do not use the seat belt if a foldable ROPS is down or there is no ROPS.

Adjust the seat belt for proper fit and connect to the buckle. The seat belt is auto-locking retractable type.



1BDABCQAP001B

(1) Seat belt

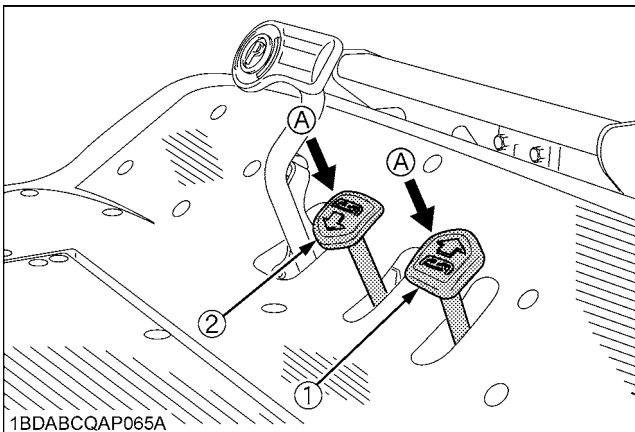
2. Raise the implement.

■ Hydraulic Lift Control Pedal

The hydraulic lift control pedal is used to raise and lower the implement used with the machine (ex. Mower).

To lower the implement, depress the hydraulic lift control pedal (DOWN).

To raise it, depress the hydraulic lift control pedal (UP).



1BDABCQAP065A

(1) Hydraulic lift control pedal (UP) (A) "DEPRESS"
 (2) Hydraulic lift control pedal (DOWN) (A) "UP"
 "DOWN"

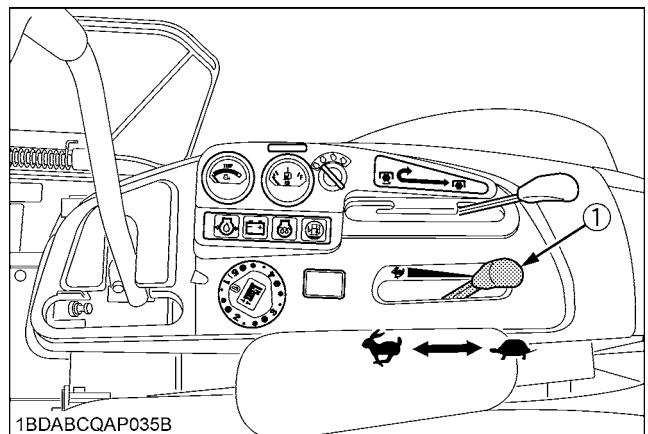
IMPORTANT :

- Do not operate until the engine is warmed up. If operation is attempted when the engine is still cold, the hydraulic system may be damaged.
- Do not operate at slow Engine rpm. Move the throttle lever above 1/2.
- If noises are heard when implement is lifting after the hydraulic lift control pedal has been activated, the hydraulic mechanism is not adjusted properly. Contact your local KUBOTA Dealer for adjustment.
- Do not depress the hydraulic lift control pedal. When the engine is off, depressing the hydraulic lift control pedal (UP or DOWN) will lower the implement.

3. Accelerate the engine.

■ Throttle Lever

Moving the throttle lever backward decreases the engine speed and moving it forward increases the engine speed.



1BDABCQAP035B

(1) Throttle lever

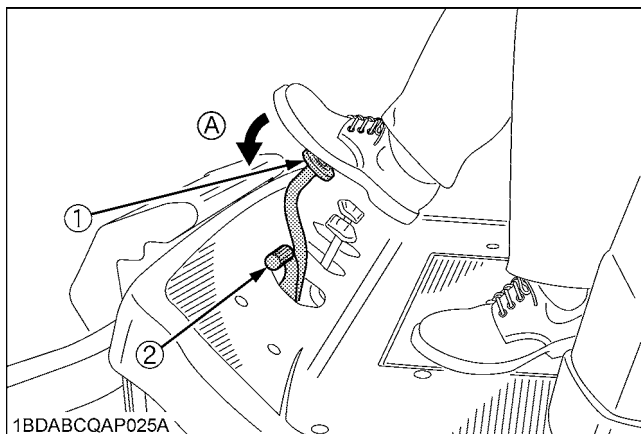
← "INCREASE"
 → "DECREASE"

4. Unlock the parking brake.

■ Parking Brake Pedal

To release the parking brake:

Depress the brake pedal and release slowly with your right foot, without pressing the parking brake lock pedal.



(1) Parking brake pedal
(2) Parking brake lock pedal

(A) "DEPRESS"

5. Operate the machine.

■ Motion Control Lever



CAUTION

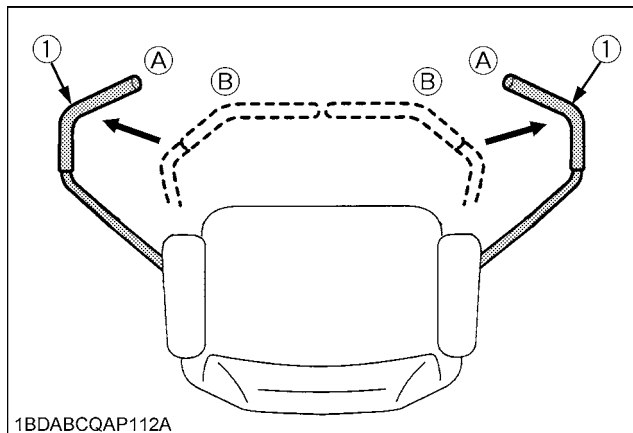
To avoid personal injury:

- Understand how to use the motion control levers and practice in an unrestricted area at a little more than an idle speed without the mower engaged until becoming proficient in the operation of the machine.
- Do not move motion control levers from forward to reverse or reverse to forward position rapidly. Sudden direction changes could cause loss of control or damage to the machine or property.
- Do not make sharp turns at high speeds. Fast and sharp turns could cause loss of control.
- Motion control levers must be in "NEUTRAL LOCK" position to safely enter and exit the operator's seat or to carry out maintenance and safety checks.

Stop position

◆ Neutral lock position

- Forward and reverse movement of the motion control levers are prevented when levers are in "NEUTRAL LOCK" position. (Engine can only be started with levers in this position.)



(1) Motion control levers

(A) "NEUTRAL LOCK" position
(B) "NEUTRAL" position

Operating position

Machine speed and steering is controlled by the motion control levers, when the engine is running and the parking brake is released.



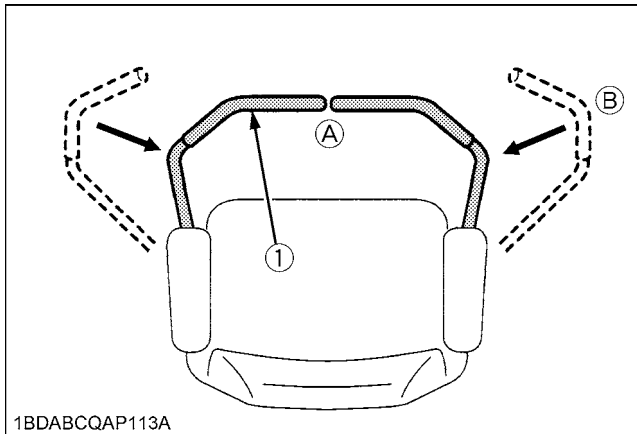
CAUTION

To avoid personal injury:

- No control is provided by the motion control levers when the engine is off.

◆ Neutral position

- Grasp the motion control levers and move them inward from the "NEUTRAL LOCK" position so that the machine is in "NEUTRAL". (Engine cannot be restarted.)



(1) Motion control levers

(A) "NEUTRAL" position

(B) "NEUTRAL LOCK" position

◆ Forward and Reverse Motion:

1. Move throttle lever to the "FAST" position.
2. Release the parking brake.
3. Move both motion control levers from the "NEUTRAL LOCK" position inward to the "NEUTRAL" position.
4. Push the control levers slowly forward to begin forward motion.

To move reverse:

Pull both control levers slowly rearward at the same time to begin reverse motion.

To stop:

Move by hand and hold both motion control levers to the "NEUTRAL" position until the machine comes to a stop.



CAUTION

To avoid personal injury:

- The motion control lever adjustment is important to ensure the machine operates properly.

NOTE :

- The motion control linkages are adjustable. If adjustment is required, see "ADJUSTMENT" section. We recommend you to contact your local KUBOTA Dealer.

◆ Re-start on the slopes



CAUTION

To avoid personal injury:

- Do not stop or change directions on the slopes. These operations could cause loss of the machine traction or control. Starting procedure on the slopes is different from the usual start mode on a flat surface, understand how to re-start on the slopes and use extra caution.

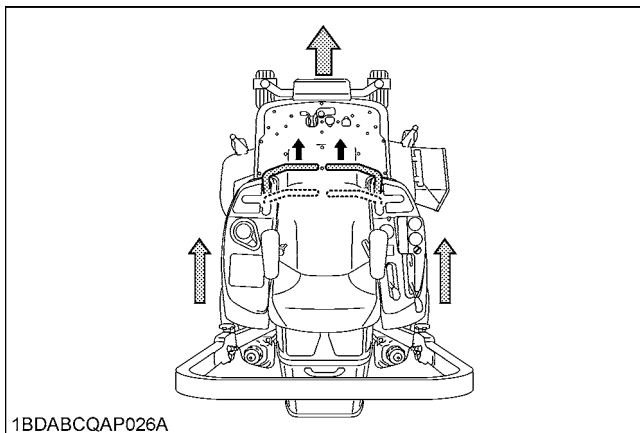
If a situation occurs where it is necessary to stop and re-start on a slope, refer to the following operational steps.

How to re-start on the slopes:

1. Firmly apply parking brake (enough to prevent movement).
2. Start the engine.
3. Set the throttle lever to the middle position.
4. Place the control levers inward to the "NEUTRAL" position gradually.
5. Release the parking brake within about 3 seconds. If you take more time, the engine will suddenly stop because of a safety device. (This is to prevent the machine from being operated with the parking brake applied.) When the engine stops, start over by firmly reapplying the parking brake, and repeat steps 2 through 5 and then 6.
6. Move the machine slowly and carefully.

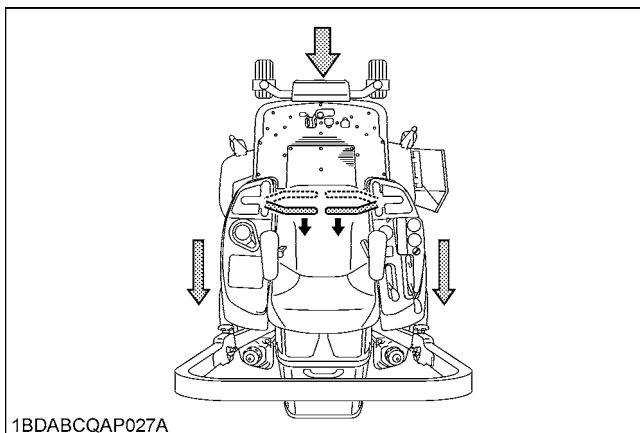
FORWARD:

- Push both motion control levers forward equally at the same time. For travel forward in a straight line.



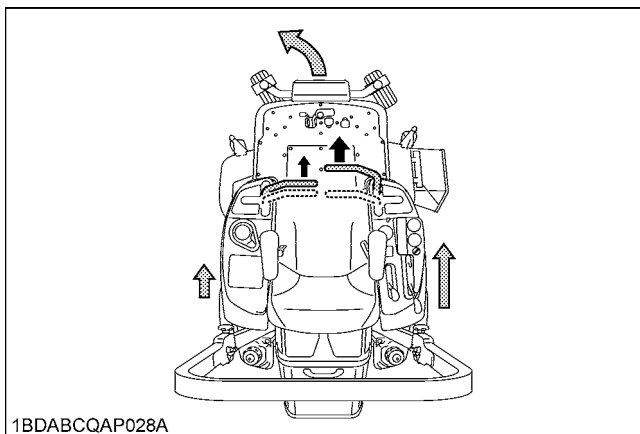
REVERSE:

- Pull both motion control levers past center rearward equally at the same time. For rearward travel in a straight line.



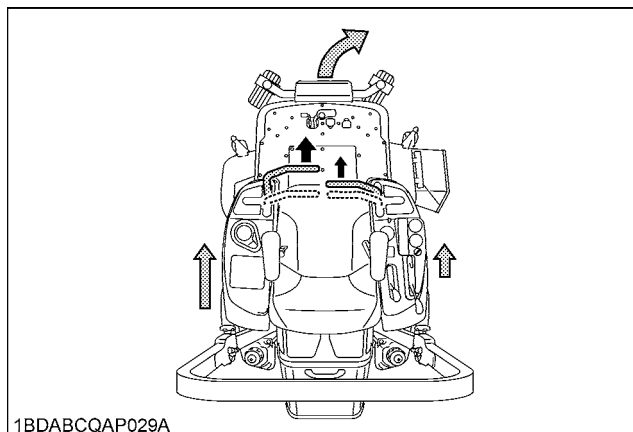
GENERAL LEFT TURN:

- Push right motion control lever further forward than the left motion control lever. For forward travel to the left.



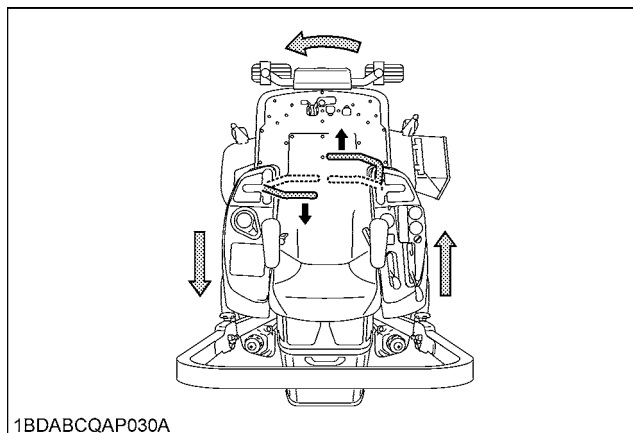
GENERAL RIGHT TURN:

- Push left motion control lever further forward than the right motion control lever. For forward travel to the right.



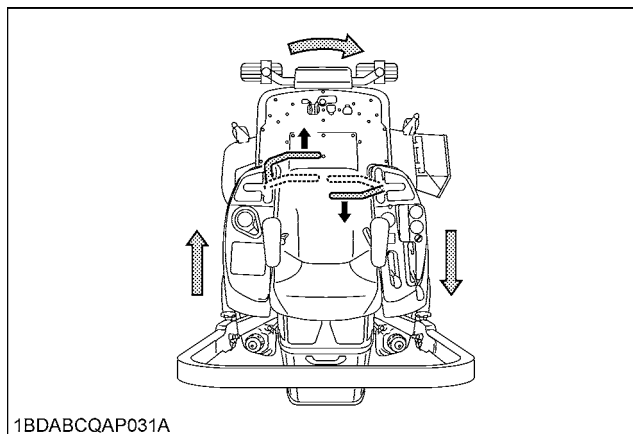
SHARP (ZERO) LEFT TURN:

- Push right motion control lever forward and pull left motion control lever rearward at the same time.



SHARP (ZERO) RIGHT TURN:

- Push left motion control lever forward and pull right motion control lever rearward at the same time.



FIXING FRONT AXLE



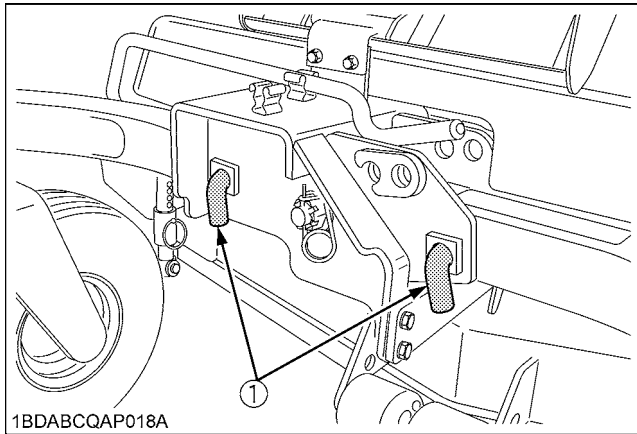
CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
- Stop the engine, remove the key and engage the parking brake.

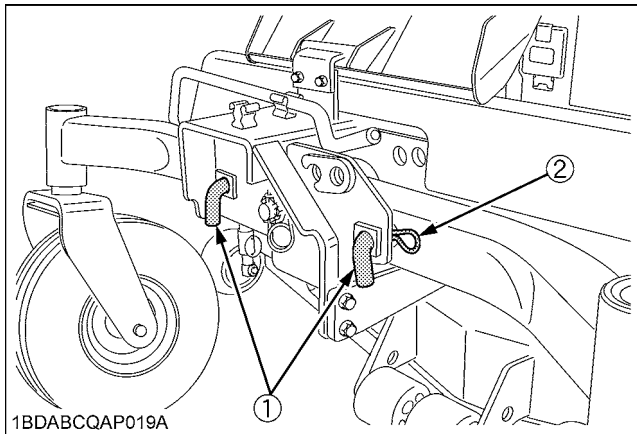
A rigid front axle is recommended for a more even cut under mowing the rough terrain.

1. Open the front cover.
2. Remove two L-pins from their original position.
3. Insert L-pins into the holes on the front axle as shown below.



(1) L-pin

4. Install the hairpins between the axle mount frame and the front axle.



(1) L-pin

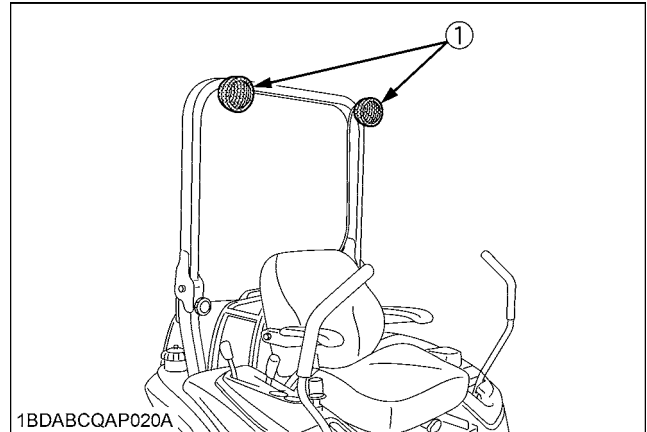
(2) Hairpin

OSCILLATING FRONT AXLE

For oscillating the front axle, reverse the above procedures.

The oscillating front axle provides a smoother ride than the rigid front axle and oscillates with the terrain.

WORK LIGHT (OPTIONAL KIT)



(1) Work light

STOPPING



CAUTION

To avoid personal injury:

- Park the machine on level ground.
If necessary to park on an incline,
(1) Stop the machine,
(2) Apply the parking brake, then
(3) Stop the engine.
- If you stop the engine on an incline without applying the parking brake, the machine could move and run away.

IMPORTANT :

- The parking brake pedal is for parking and emergency use only. If the parking brake is applied when the motion control levers are not in "NEUTRAL LOCK" position, the engine will stop within approximately 3 seconds. This feature is to prevent brake and transmission damage during operation.

1. Move both motion control levers to the "NEUTRAL" position to stop the machine.
2. Apply parking brake.
3. Move both motion control levers to "NEUTRAL LOCK" position.
4. Throttle lever in slow position and shift PTO lever to the "DISENGAGE" (OFF) position.
5. Lower all implements to the ground.
6. Turn off the engine and remove the key.

PARKING

TO LOCK:

Depress the parking brake pedal firmly with your right foot, and the parking brake lock pedal simultaneously with your left foot. Then release the parking brake pedal while handling the parking brake lock pedal down.

TO UNLOCK:

Depress the parking brake pedal and release slowly with your right foot, without pressing the parking brake lock pedal.



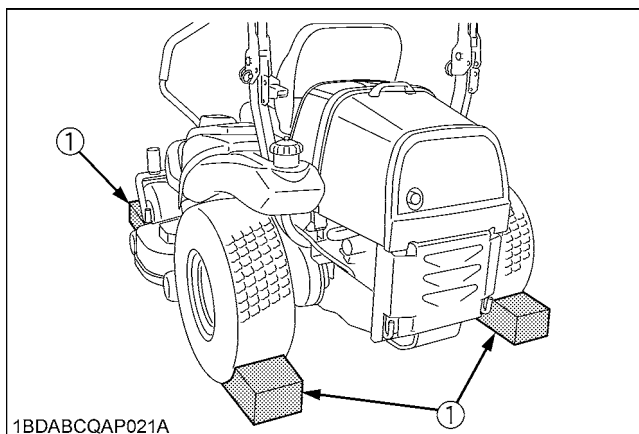
CAUTION

To avoid personal injury:

Before leaving the operator's position,

- Apply parking brake.
- Lower all implements to the ground.
- Shut off the engine.
- Remove the key.
- Place the motion control levers in the "NEUTRAL LOCK" position.

If necessary to park on an incline, be sure to chock the wheels on the downhill side to prevent accidental rolling of the machine.



1BDABCQAP021A

(1) Chocks

TRANSPORTING

IMPORTANT :

1. Transport the machine on a trailer.
 - Turn the fuel valve to the "OFF" position.
 - Fasten the machine to the trailer.
 - To prevent the hood from opening by wind while in transit, it is necessary to either load the machine backward or use a suitable tie down for the hood.
2. Do not attempt to tow this machine, or damage to the transmission may result.

OPERATING THE MOWER

MAKING THE MOST OF YOUR MOWER

1. When using your mower for the first time, choose a smooth level area and cut in straight and slightly overlapping strips.
2. The size and type of the area to be mowed will determine the proper mowing pattern. Take into account obstructions, such as trees, fences and buildings. To keep grass clippings off fences, sidewalks, etc., it is advisable to go over the outside of the area to be mowed several times in a clockwise direction. To mow the area remaining, work in a counterclockwise direction so that the clippings are dispersed onto the previously cut area.
3. Always keep the left side of the mower toward trees, posts or other obstacles on the first trip around the obstacle.
4. Most lawns should be mowed to keep the grass approximately 50 to 80 mm (2 to 3 in.) high. Best results are obtained by cutting often and not too short. To keep a green lawn, never mow more than one third of the height of the grass or a maximum of 25 mm (1 in.) in one mowing.
For extremely tall grass, set the cutting height at maximum cutting height for the first mowing, then reset to the desired height and mow again. Allow the grass to grow to 80 mm (3 in.), then cut off only the top inch.
5. For best appearance, grass should be cut in the afternoon or evening when it is free of moisture.

ADJUSTING CUTTING HEIGHT

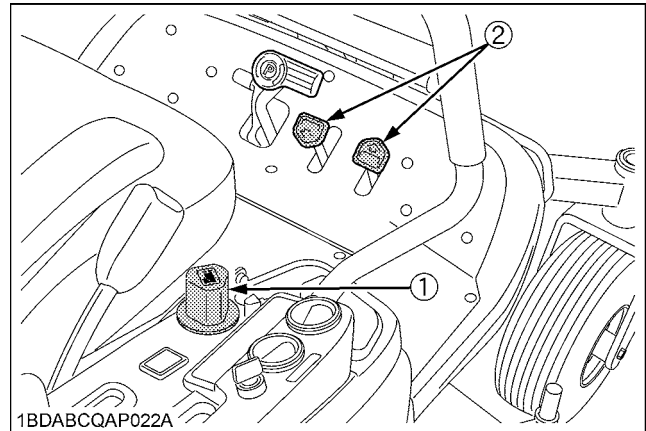


DANGER

To avoid serious injury or death:

- Do not engage the mower in the transport position.

1. Before adjusting cutting height, check that all tire pressures are correct. If necessary adjust to the correct tire pressure.
2. To set the cutting height, depress the hydraulic lift control pedal (UP) to raise mower deck to the top position. Adjust the cutting height control dial to desired height.
Lower the mower deck by depressing the hydraulic lift control pedal (DOWN).
Then the mower deck will be set to the cutting height.
3. Use the higher settings for mowing in a rough area or when mowing tall grass. Lower settings should be used only for smooth lawns where short grass is desired.

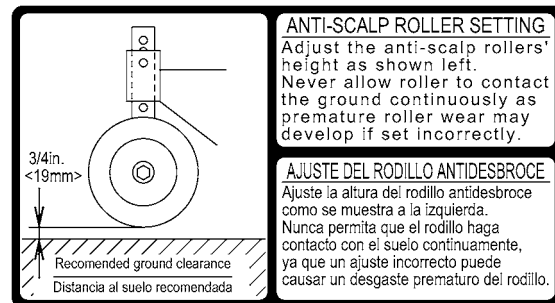


- (1) Cutting height control dial
(2) Hydraulic lift control pedal

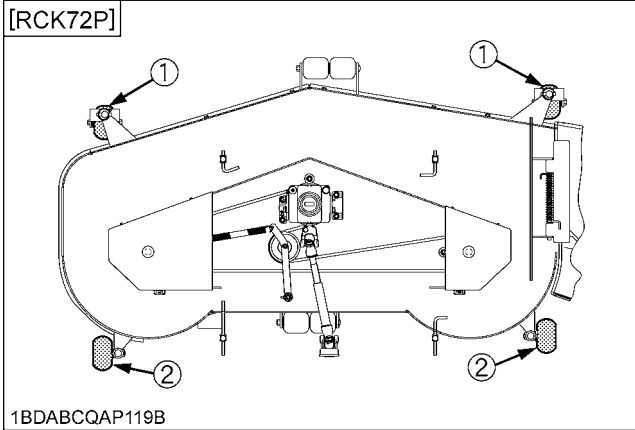
4. Lower the mower deck by depressing the hydraulic lift control pedal (DOWN). This lowers the mower deck from the "TRANSPORT" position to the "OPERATING" position.
5. Adjust the anti-scalp rollers' height as recommended below for normal operating condition. To minimize gouging and roller damage or wear, the anti-scalp rollers will maintain the ground clearance of 19 mm (3/4 in.).

IMPORTANT :

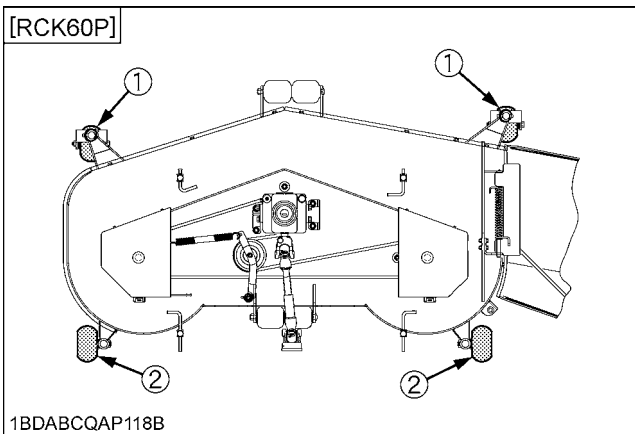
- Never allow roller to contact the ground continuously as premature roller wear may develop if set incorrectly.
- Anti-scalp rollers must maintain a minimum clearance of 6 mm (1/4 in.) to the ground.



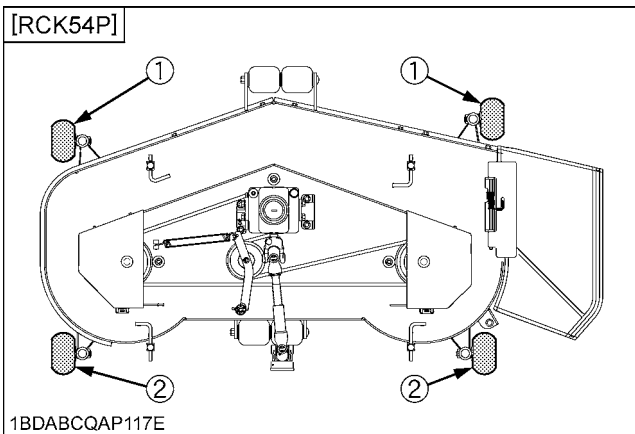
1BDABCQAP136A



(1) Anti-scalp roller (Front, swivel type)
(2) Anti-scalp roller (Rear)



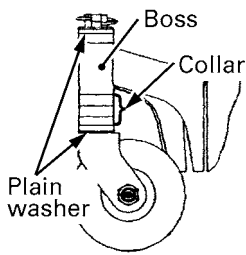
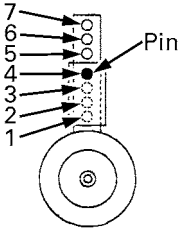
(1) Anti-scalp roller (Front, swivel type)
(2) Anti-scalp roller (Rear)



(1) Anti-scalp roller (Front)
(2) Anti-scalp roller (Rear)

Reference

- Set position for recommended ground clearance 19 mm (3/4 in.).
(Figure shows setting position of cutting height 3")

Cutting height	The number of collars under the boss	Position of pins	Ground clearance
	 1BDABARAP130A	 1BDABARAP131A	
1.00"	0	1	6 mm
1.25"	0	2	13 mm
1.50"	0	1	19 mm
1.75"	1	3	13 mm
2.00"	1	2	19 mm
2.25"	2	4	13 mm
2.50"	2	3	19 mm
2.75"	3	5	13 mm
3.00"	3	4	19 mm
3.25"	4	6	13 mm
3.50"	4	5 *2	19 mm
3.75"	4	7 *3	13 mm
4.00"	4	6 *3	19 mm
4.25"	4	7 *3	13 mm
4.50"	4	7 *3	19 mm
4.75"	4	7 *3	25 mm
5.00"	4	7 *3	31 mm

*1. Marked dimension shows ground clearance of bolt shift type.

*2. For cutting heights above 3.5". The anti-scalp rollers will still be effective against scalping.

*3. Use it if necessary.

- Only at cutting height 1" is ground clearance 6 mm.

OPERATING MOWER



DANGER

To avoid serious injury or death:

- Do not operate the mower without the discharge deflector being in place properly.



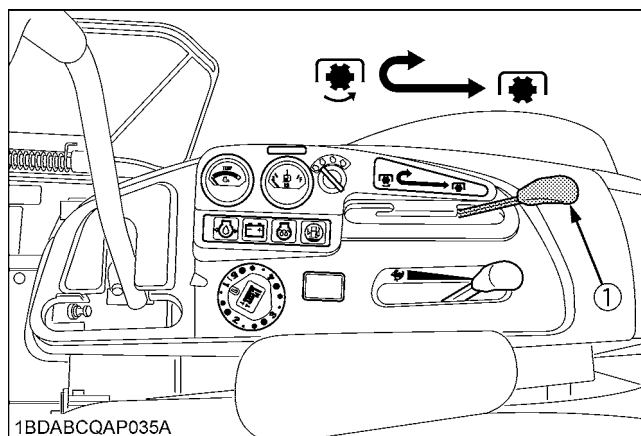
CAUTION

To avoid personal injury:

- Clear the work area of objects which might be picked up and thrown.
- Do not direct the opening of the deflector at bystanders especially children or animals. Ejected objects may cause injury. Plan your mowing carefully before starting operations.
- Keep bystanders and animals away from the mowing area.
- Be sure to disengage the PTO clutch of the mower before attempting to start the engine.

PTO Lever

To engage the PTO, move the PTO lever to the "ENGAGED" (ON) position.



(1) PTO lever

 "ENGAGED" (ON)

 "DISENGAGED" (OFF)

1. If you get off the seat while the PTO is running, the engine will stop automatically. (Operator presence control)
2. Before starting the engine, pull the PTO lever to the "DISENGAGED" (OFF) position. If it is at the "ENGAGED" (ON) position, the engine will not start.

NOTE :

- These safety features are built-in.

Starting



WARNING

To avoid serious injury or death:

- Engine components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the engine is running, or immediately after it is turned off.
Never operate the engine without heat shields or guards.

1. Sit on the operator's seat.
2. Start the engine.
3. Engage the PTO lever.
4. Disengage the parking brake.
5. Speed up the engine by moving the throttle lever forward.
6. Push or pull the motion control levers to move forward or backward.

IMPORTANT :

- Never attempt to move the machine with the parking brake "ON".

NOTE :

- Keep the engine running at full throttle for best results. Control travel speed with the motion control levers.
- During heavy duty use, operate the machine at a slower ground speed or go over the area twice.
- Keep the mower deck in the raised position when the mower is disengaged.
- The mower will not cut cleanly if the ground speed is too high or if the blade speed drops due to an overload.
- To prevent the engine from overheating, keep the radiator and radiator screen clean.

TIRES AND WHEELS

TIRES

WARNING

To avoid personal injury:

- Do not attempt to mount a tire. This should be done by a qualified person with the proper equipment.
- Always maintain the correct tire pressure. Do not inflate tires above the recommended pressure shown in the Operator's Manual.
- Inflation pressure in front tires rises quickly when using compressed air.

CAUTION

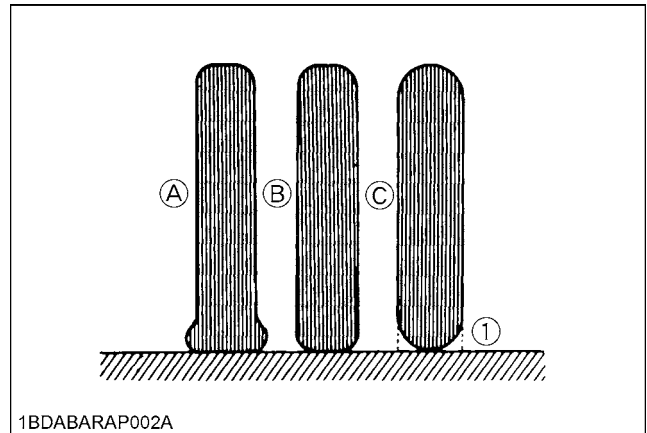
Never operate machine with a loose rim, wheel, or axle.

- Whenever bolts are loosened, retighten to specified torque.
- Check all bolts frequently and keep them tightened.

■ Inflation Pressure

Though the inflation pressure is factory-set to the prescribed level, it naturally drops slowly in the course of time. Thus, check it everyday and inflate as necessary.

	Tire sizes	Recommended Inflation Pressure
Front	15 x 6.0 - 6, (Semi-pneumatic Non Flat Tire) Rib	---
	15 x 6.0 - 6, 4PR Rib	160 kPa (1.6 kgf/cm ² , 23psi)
Rear	26 x 10.5 - 12, 4PR Turf	120 kPa (1.2 kgf/cm ² , 17psi)
	26 x 12.0 - 12, 4PR Turf	

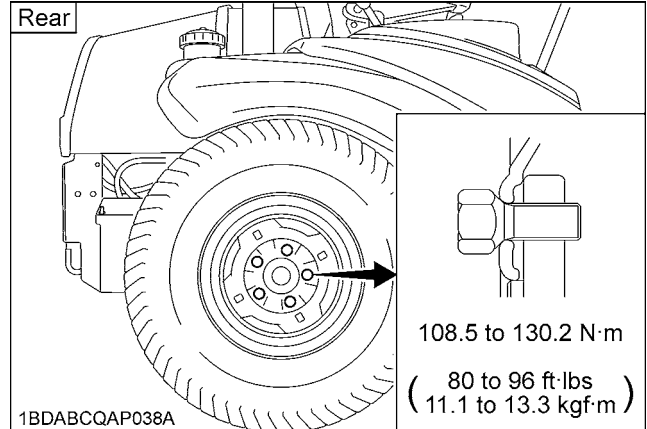


(1) Ground (A) "INSUFFICIENT" (B) "NORMAL" (C) "EXCESSIVE"

WHEELS

IMPORTANT :

- When re-fitting a wheel, tighten the wheel bolt to the following torques then recheck after traveling 200 m (200 yards) changing directions several times.



Wheels with beveled or tapered holes: Use the tapered wheel bolt.

■ Remove and Install Front Caster Wheels

◆ Removing

1. Park the machine on a firm and level surface.
2. Stop the engine and apply parking brake.
3. Lift the front of machine with a safe lifting device.
4. Remove the lock nut with nylon sleeve and wheel bolt.
5. Remove the wheel from assembly yoke.

◆ Installing

1. Install the replacement wheel.
2. Install the wheel bolt and lock nut with nylon sleeve.
3. Install the nut.

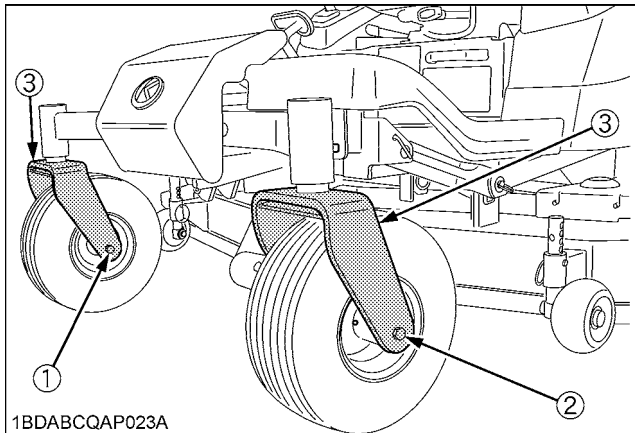
IMPORTANT :

- Insert the wheel bolt from the outside of the yoke.
- Tighten the nut gradually until wheel bearing play is eliminated and wheel turns freely by hand.

Reference

Tightening torque	20 to 25 N-m (14.8 to 18.4 ft-lbs) (2 to 2.5 kgf-m)
-------------------	---

4. Lower machine.



- (1) Lock nut
(2) Wheel bolt
(3) Yoke

MAINTENANCE

SERVICE INTERVALS

The following servicing tasks should be carried out on the machine at the stated running-time intervals.

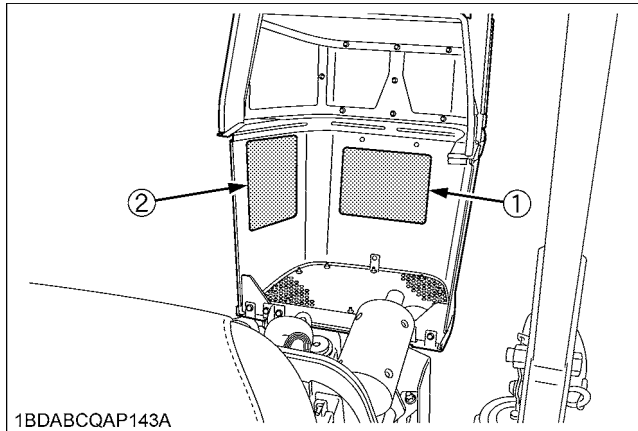
No.	Items		Indication hour meter (Hr)												Ref. Page			
			50	100	150	200	250	300	350	400	450	500	550	600				After since
1	Engine oil	Change	☉			○					○			○	every 200Hr	58		
2	Engine oil filter	Replace	☉			○					○			○	every 200Hr	58		
3	Transmission fluid and Rear axle gear case (RH & LH) fluid	Change									☉				every 400Hr	61		
4	HST transmission oil filter	Replace	☉			○					○			○	every 200Hr	60		
5	Hydraulic oil filter	Replace	☉								○				every 400Hr	62		
6	Motion control lever pivot	Adjust				○					○			○	every 200Hr	60		
7	Front axle pivot	Adjust		☉		○					○			○	every 200Hr	61		
8	Safety device	Check	○	○	○	○	○	○	○	○	○	○	○	○	every 50Hr	49		
9	Mower gear box oil	Check	○	○	○	○	○	○	○	○	○	○	○	○	every 50Hr	50		
		Change			○			○			○			○	every 150Hr	57		
10	Greasing (without mower)	-	○	○	○	○	○	○	○	○	○	○	○	○	every 50Hr	51		
11	Throttle Cable	Oil	○	○	○	○	○	○	○	○	○	○	○	○	every 50Hr	52		
12	Air cleaner primary element	Clean		○		○			○					○	every 100Hr	53	*1	@
		Replace													every 1 year	63		
	Secondary element	Replace													every 1 year	63		
13	Fuel filter element	Check		○		○			○					○	every 100Hr	53		@
		Replace									○				every 400Hr	63	*2	
14	Fuel line	Check		○		○			○					○	every 100Hr	53		@
		Replace													every 2 years	66	*2	
15	Fan belt	Adjust		○		○			○					○	every 100Hr	54		

No.	Items		Indication hour meter (Hr)												Ref. Page			
			50	100	150	200	250	300	350	400	450	500	550	600				After since
16	Parking brake	Adjust		○		○		○		○		○		○	every 100Hr	54	*2	
17	Battery condition	Check		○		○		○		○		○		○	every 100Hr	56		
18	Radiator hose and clamp	Check				○				○				○	every 200Hr	59		
		Replace													every 2 years	66	*2	
19	Hydraulic hose	Check				○				○				○	every 200Hr	59		
		Replace													every 2 years	66	*2	
20	Intake air line	Check				○				○				○	every 200Hr	61		@
		Replace													every 2 years	66	*4	
21	Fuel injection nozzle injection pressure	Check													every 1500Hr	63	*3	@
22	Injection pump	Check													every 3000Hr	63	*3	@
23	Radiator	Clean													every 1 year	64		
24	Coolant	Change													every 1 year	64		
25	Mower gear box oil seal	Replace													every 2 years	66	*2	
26	Fuel system	Bleed													Service as required	69		
27	Fuse	Replace												66				
28	Blade	Replace												67				
29	Mower belt	Replace												69				

IMPORTANT :

- The jobs indicated by ○ must be done initially.
 - *1 This maintenance should be done daily more often in dusty condition than in normal conditions. Suggested cleaning interval is every 100 hours in normal conditions.
 - *2 These items should be serviced by an authorized KUBOTA Dealer, unless the owner has the proper tools and is mechanically proficient.
 - *3 Consult your local KUBOTA Dealer for this service.
 - *4 Replace only if necessary.
- The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S.EPA non-road emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction. Please see the Warranty Statement in detail.

PERIODIC SERVICE CHART LABEL



1BDABCQAP143A

(1) Part No. K3181-6552-3 (ENGLISH)

PERIODIC SERVICE CHART		RECOMMENDED SERVICE ※	
INTERVAL	RECOMMENDED SERVICE ※	INTERVAL	RECOMMENDED SERVICE ※
DAILY	1. Tire pressure, wear, or damage. 2. Oil and water leakage from machine and mower. 3. Engine and transmission oil, radiator and recovery tank condition and fuel level. 4. Damage to machine body, tightness of all bolts, nuts and pins, etc. 5. Mower blades and belt for wear or damage. 6. Parking brake, speed control levers, all safety switches and easy check functions. 7. Color of the exhaust fumes, abnormal noise and vibrations.	50 Hr.	CHECK • Mower gear box oil / Safety device • Throttle cable(2 places) / Motion control lever pivot bushing and contact position(2 places each) GRASS • Front axle and wheel(3 places) / Universal joint(3 places) / Seat adjuster(2 places)
	CHECK • Fuel filter element / Fuel line / Battery condition	100 Hr.	CHECK • Air cleaner primary element ★
	CLEAN • Fan belt / Parking brake ※	150 Hr.	CHECK • Radiator hose and clamp / Hydraulic hose / Intake Air Line ADJUST • Mower gear box oil
	CHECK • Radiator screen and core, panel screen, air cleaner primary element and mower deck.	200 Hr.	CHECK • Engine oil ADJUST • Front axle pivot / Motion control lever pivot
	CLEAN • Mower U-joint (3 places) / Spindle shaft (3 places) / Belt tension pulley (1 place) / Belt tension pivot (1 place)	400 Hr.	RPLAZE • Fuel filter element / Hydraulic oil filter ADJUST • Transmission & Rear axle gear case(RH & LH) fluid
	PREPARE • Engine oil	1500 Hr. ★	CHECK • Fuel Injection Nozzle Injection Pressure
	FIRST 50 Hr. (REPAIR) (MUST BE DONE.)	3000 Hr. ★	CLEAN • Injection Pump
	FIRST 100 Hr. (MUST BE DONE.)	1 year	CLEAN • Radiator RPLAZE • Air cleaner both elements
	FIRST 400 Hr. (MUST BE DONE.)	2 year	CHECK • Coolant RPLAZE • Radiator hose and clamp / Hydraulic hose / Fuel line / Mower gear box oil seal / Intake Air Line (if necessary)
	※ - See Operator's Manual in details. ★ - Should be serviced by KUBOTA Dealer. ★ - Required more often in dusty conditions.	Tire pressure and tightening torque recommendation.	
Approximate fluid capacities.			
	ZD32(D782) / ZD326(D1005) / ZD331(D1305)		
Engine	3.5L(3.70qts.) / 3.5L(4.1qts.) / 5.7L(6.0qts.)	Front	15x 6.0-6 (160 KPa (23 psi) Ensure smooth rotation of wheel <Do not over tighten.>
Radiator	2.7L(2.85qts.) / 3.5L(3.70qts.) / 3.5L(3.70qts.)	Rear	26x12.0-12 120 KPa (17 psi) 106.5-130.2 Nm(80.0-96.0 ft · lbs)
Transmission	12.1L(12.8qts.)		
Reserve tank	0.25L(0.26qts.)		
Mower gear box	0.4L(0.42qts.)		

1BDABCQAP144A

(2) Part No. K3181-6553-3 (SPANISH)

TABLA DE SERVICIO PERIÓDICO			
INTERVALO	SERVICIO RECOMENDADO ※	INTERVALO	SERVICIO RECOMENDADO ※
DIARIO	1. Presión, desgaste y daño de los neumáticos. 2. Fugas de aceite y agua de la máquina y del cortacésped. 3. Aceite del motor, fluido de transmisión, refrigerante del tanque de recuperación y nivel de combustible. 4. Daño a la carrocería de la máquina, ajuste de todos los pernos, tuercas y pines, etc. 5. Hojas de cortar, desgaste o daño de la corona del cortacésped. 6. Freno de estacionamiento, palancas de control de velocidad, todos los interruptores de seguridad y funciones para una fácil inspección. 7. Color del humo del escape, ruido y vibraciones anormales.	50 hr.	REVISAR • Aceite de la caja de cambios del cortacésped / Dispositivo de seguridad • Cable de estacionamiento(2 lugares) / Bujes de pivote de la palanca de control de movimiento / Posición de contacto(2 lugares cada uno) ENCOSAR • Eje frontal y rueda(2 lugares) / Junta universal(3 lugares) / Refrigerador del asiento(2 lugares)
	REVISAR • Elemento primario del filtro de aire ★	100 hr.	REVISAR • Elemento primario del filtro de aire ★
	CLEAN • Correa del ventilador / Freno de estacionamiento ※	150 hr.	REVISAR • Aceite de la caja de cambios del cortacésped
	CHECK • Radiador y abrazadera del radiador / Manguera del sistema hidráulico / Líneas de toma de aire	200 hr.	REVISAR • Elemento de filtro de combustible / Línea de combustible / Filtro de aceite de la transmisión(HST)
	CLEAN • Mower U-joint (3 places) / Spindle shaft (3 places) / Belt tension pulley (1 place) / Belt tension pivot (1 place)	400 hr.	REVISAR • Pivote del eje frontal / Pivote de la palanca de control de movimiento
	PREPARE • Engine oil	1500 hr. ★	REVISAR • Filtro de aceite del motor
	FIRST 50 Hr. (REPAIR) (MUST BE DONE.)	3000 hr. ★	REVISAR • Aceite del motor
	FIRST 100 Hr. (MUST BE DONE.)	1 year	REVISAR • Elemento de filtro de combustible / Filtro del aceite hidráulico
	FIRST 400 Hr. (MUST BE DONE.)	2 year	REVISAR • Fluido de la caja de transmisión y cambio del eje posterior (DER. e IZQ.)
	※ - Consulte el Manual del Operador para obtener más información. ★ - Se requiere más seguido en condiciones polvorosas.	Recomendación de presión para neumáticos y par de ajuste.	
Capacidades de fluido(aproximadas).			
	ZD32 (D782) / ZD326(D1005) / ZD331(D1305)		
Motor	3.5L (3.70cuarts de galón) / 3.5L (4.1cuarts de galón) / 5.7L (6.0cuarts de galón)	Frontal	15x 6.0-6 160 KPa (23 psi) Asegure rotación libre de la rueda <No apriete en exceso >
Radiador	2.7L (2.85cuarts de galón) / 3.5L (3.70cuarts de galón) / 3.5L (3.70cuarts de galón)	Posterior	26x12.0-12 120 KPa (17 psi) 106.5-130.2 Nm(80.0-96.0 pes · lbs)
Transmisión	12.1L (12.8cuartos de galón)		
Tanque de reserva	0.25L (0.26cuartos de galón)		
Caja de cambios (del cortacésped)	0.4L (0.42cuartos de galón)		

1BDABCQAP145A

LUBRICANTS

Place	Capacities			Lubricants	
	ZD321 [N]	ZD326P [S]	ZD331P [LP]		
Fuel	49 L (12.9 U.S. gals.)			<ul style="list-style-type: none"> No.2-D diesel fuel No.1-D diesel fuel if temperature is below -10 °C (14 °F) 	
Coolant	2.7 L (2.85 U.S.qts.)	3.5 L (3.70 U.S.qts.)		Fresh clean water with anti-freeze	
Recovery tank	0.25 L (0.26 U.S.qts.)				
Engine crankcase	3.5 L (3.70 U.S.qts.)*	3.9 L (4.1 U.S.qts.)*	5.7 L (6.0 U.S.qts.)*	<ul style="list-style-type: none"> Engine oil: API service Classification CF or better Above 25 °C ...SAE30, SAE10W-30 or 15W-40 (77 °F) 0 to 25 °CSAE20, SAE10W-30 or 15W-40 (32 to 77 °F) Below 0 °CSAE10W, SAE10W-30 or 15W-40 (32 °F) 	
Transmission case with filter & hose Rear axle gear case (RH & LH)	12.1 L (12.8 U.S.qts.)			<ul style="list-style-type: none"> KUBOTA UDT or SUPER UDT fluid*1 	
Mower gear box	0.4 L (0.4 U.S.qts.)			SAE90 gear oil (API service classification: more than GL-3)	
Greasing	No. of greasing points			Capacity	Type of grease
Motion control lever pivot bushing, and contact position	6			Until grease overflows	<ul style="list-style-type: none"> Multipurpose Grease NLGI-2 OR NLGI-1 (GC-LB).
King Pin	2				
Center Pin	1				
Front wheel	2				
Front lift arm	2				
Universal joint	3				
Seat adjuster	2				
Cable (throttle)	2			Moderate amount	<ul style="list-style-type: none"> Oil
[MOWER]				Until grease overflows	<ul style="list-style-type: none"> Multipurpose Grease NLGI-2 OR NLGI-1 (GC-LB).
Universal joint	3				
Three spindle shafts	3				
Belt tension pulley	1				
Belt tension pivot	1				
Front anti scalp roller	2				
Front anti scalp roller pivot boss	2				

Note * Oil amount when the oil level is at the upper level of the oil level gauge.

IMPORTANT :

- To prevent serious damage to hydraulic systems, use only KUBOTA genuine fluid or its equivalent.

NOTE :

◆ Engine Oil:

- Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperatures as shown above:
- With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel on on-road vehicle engines. When an off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the "CF or better" lubricating oil with a high Total Base Number (TBN). **If the "CF-4, CG-4, CH-4 or CI-4" lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals. (approximately half)**
- Lubricating oil recommended when a low-sulfur or high-sulfur fuel is employed.

○ : Recommendable X : Not Recommendable

Lubricating oil class	Fuel		Remark
	Low-sulfur	High-sulfur	
CF	○	○	TBN ≥ 10
CF-4	○☆	X	
CG-4	○☆	X	
CH-4	○☆	X	
CI-4	○	X	

☆: Class CF-4, CG-4 and CH-4 engine oils cannot be used on EGR (Exhaust Gas Re-circulation) type engines.

- The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines, and cannot be used on this machine.

◆ Fuel:

- Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below -20 °C or elevations above 1500 m.
- If diesel fuel with sulfur content greater than 0.5% sulfur content is used, reduce the service interval for engine oil and filter by 50%.
- DO NOT use diesel fuel with sulfur content greater than 1.0%.
- Diesel fuels specified to EN 590 or ASTM D975 are recommended.
- No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)
- Since this engine adopts EPA Tier 4 and Interim Tier 4 standards, the use of low sulfur fuel or ultra low sulfur fuel is mandatory in EPA regulated area (North America). Therefore, please use No.2-D S500 or S15 diesel fuel as an alternative to No.2-D, or use No.1-D S500 or S15 diesel fuel as an alternative to No.1-D if outside air temperature is below -10 °C .

◆ Transmission oil:

The oil used to lubricate the transmission is also used as hydraulic fluid. To insure proper operation of the hydraulic system and to complete lubrication of the transmission, it is important that a multi-grade transmission fluid is used in this system. We recommend the use of **KUBOTA UDT or SUPER UDT fluid** for optimum protection and performance. (Consult your local KUBOTA Dealer for further detail.)

Do not mix different brands together.

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

PERIODIC SERVICE

HOW TO OPEN THE HOOD, FRONT COVER & STEP



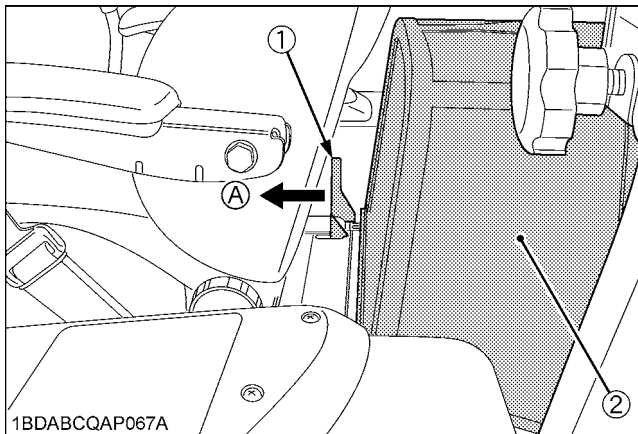
CAUTION

To avoid personal injury from contact with moving parts:

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

■ Hood

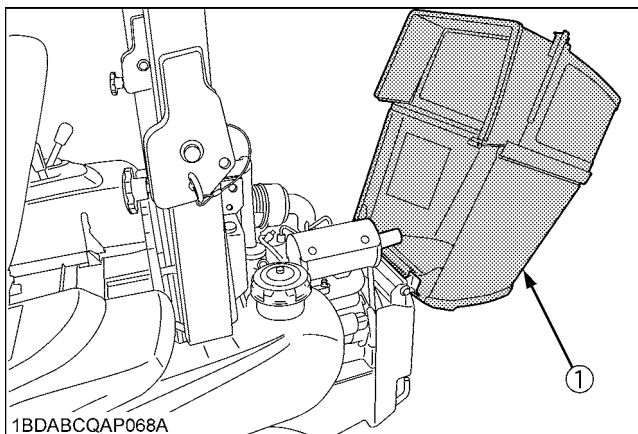
To open the hood, pull the latch lever frontward.



1BDABCQAP067A

- (1) Latch lever
(2) Hood

(A) "RELEASE"

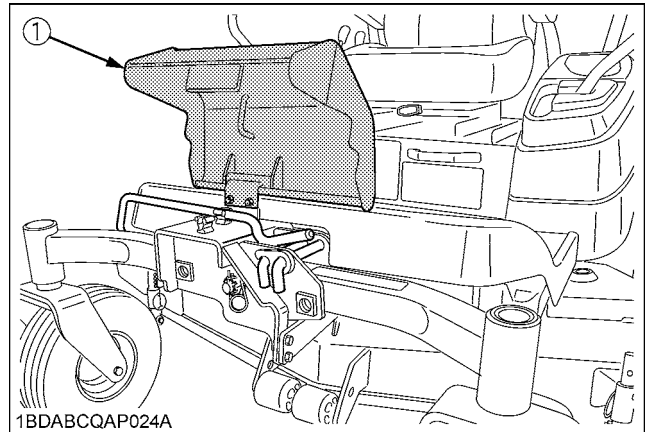


1BDABCQAP068A

- (1) Hood

■ Front Cover

To open the front cover, pull the bottom edge of the front cover.

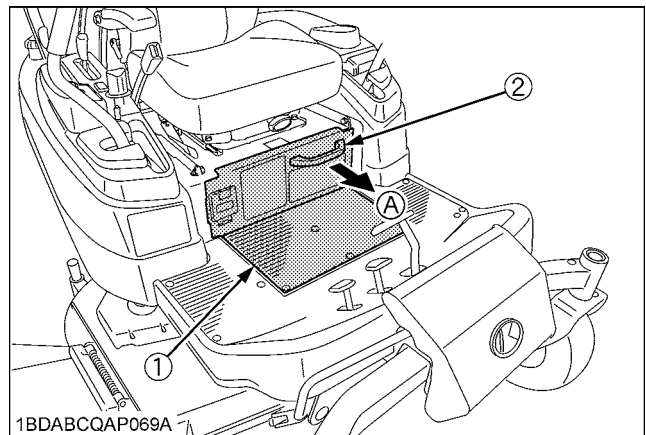


1BDABCQAP024A

- (1) Front cover

■ Step

To open the step, pull the grip.



1BDABCQAP069A

- (1) Step
(2) Grip

(A) "PULL"

HOW TO RAISE THE OPERATOR'S SEAT

◆ Raise

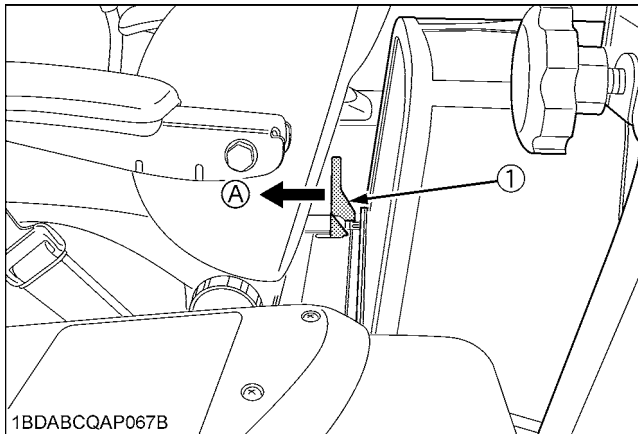


CAUTION

To avoid personal injury:

- Fully raise the operator's seat.
(To the locked position)
Do not keep the seat halfway.

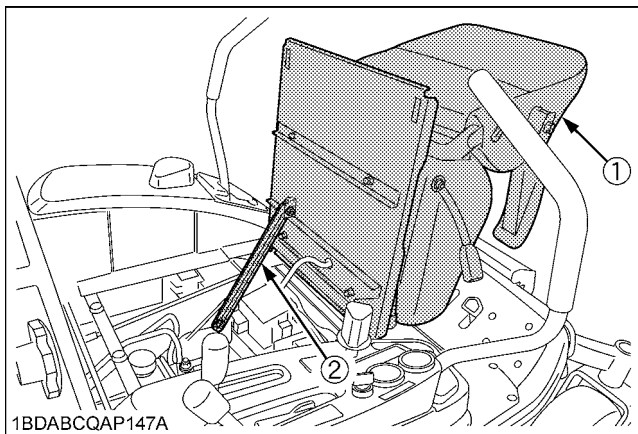
1. Seat must be all the way back before raising.
2. Pull the latch lever on the seat panel forward.



(1) Latch lever

(A) "PULL"

3. Raise the operator's seat to the "LOCK" position.



(1) Operator's seat

(2) Seat support rod

◆ Lower



CAUTION

To avoid personal injury:

- Do not drop the seat to close it.
- Watch your hands. Do not place your hands under the seat, when closing.

1. Pull up the seat support rod and release the "LOCK".
2. Lower the seat slowly to lock.
3. Slide the seat to proper position.

HOW TO TILT UP THE MACHINE

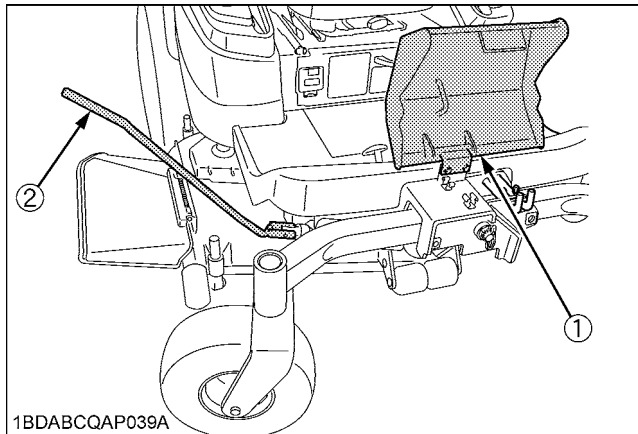


WARNING

To avoid personal injury or death:

- Park the machine on a firm and level surface.
- Set the mower deck height to 5 inch.
- Stop the engine, remove the key and engage the parking brake.
- Be sure to chock the wheels.
- Lock the raised axle with an L-pin and Hairpin cotter before working under the machine.

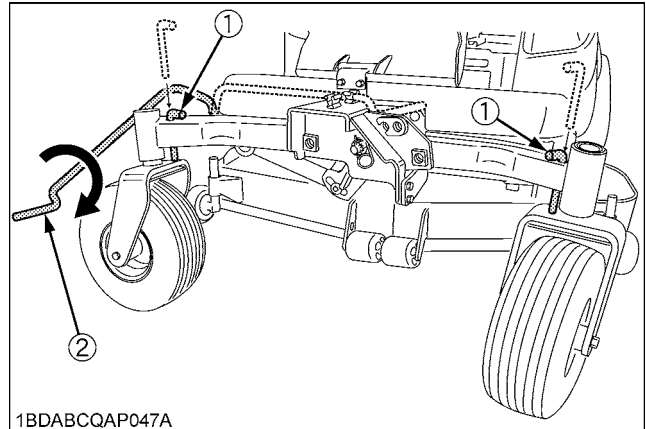
1. Lower the forward right anti-scalp roller to the lowest position. [RCK72, RCK60 only]
2. Fully open the front cover.
3. Unfold the tilt lever.



- (1) Front cover
(2) Tilt lever

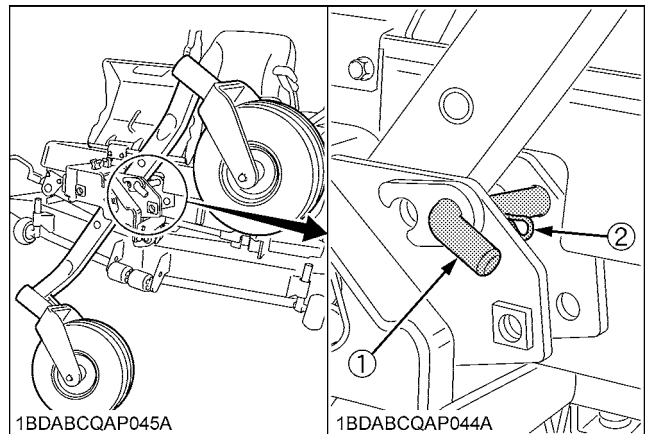
4. Keep the front cover opened.
5. Remove two L-lips.

6. Insert L-pins to both sides of the front axle to position the front wheels. As shown below.



- (1) L-pin
(2) Tilt lever

7. Turn the tilt lever clockwise to raise the axle to the stop.
8. Remove the L-pin of the raised wheel and insert it to the outside hole of the frame.
9. Insert the hairpin cotter.

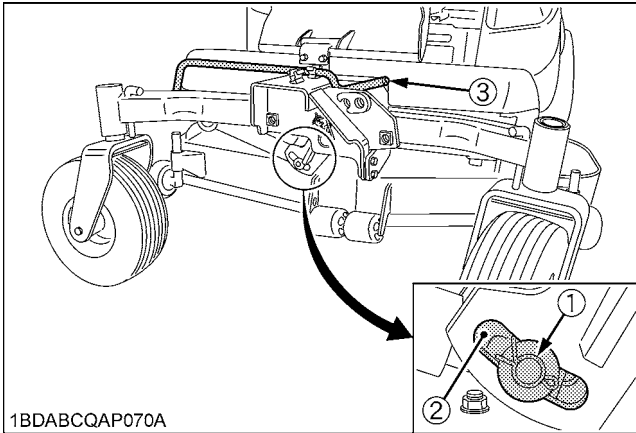


- (1) L-pin
(2) Hairpin cotter

- ◆ **Return to the normal position.**
Reverse to the above procedure.

IMPORTANT :

- To ensure equal oscillation of the axle and prevent loss of parts.
Be sure the clevis pin returns to the center position of the front axle arm slot.
And be sure to install removed parts.



- (1) Clevis pin
- (2) Slot
- (3) Tilt lever

HOW TO OPEN THE LEVER GUIDE



CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
- Stop the engine, remove the key and apply the parking brake.

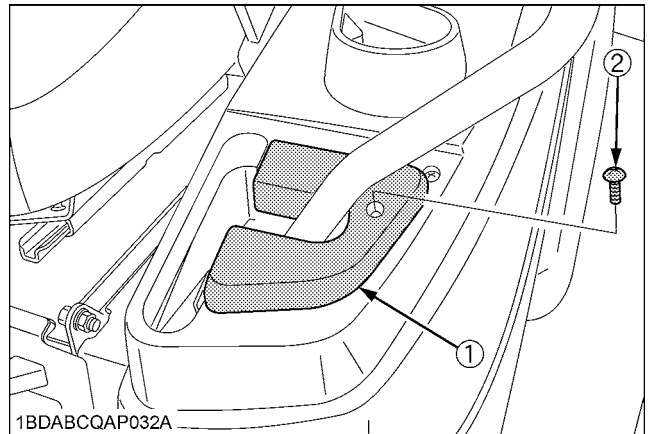
1. Remove the screw of the lever guide.
2. Pull up the lever guide.

How to install the lever guide.

1. Install the lever guide.
2. Tighten the screw.

IMPORTANT :

- If the lever guide is out of alignment with the motion lever, move the lever guide to align it with the motion lever.



- (1) Lever guide
- (2) Screw

LIFT-UP POINT



WARNING

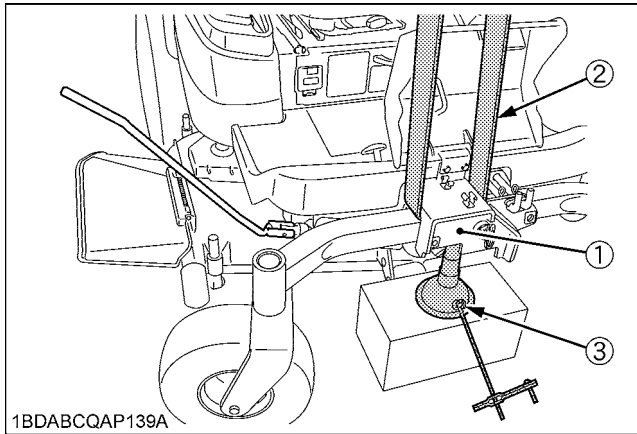
To avoid personal injury, death or machine damage:

- Do not work under the machine unless it is secured by safe stands or suitable blocking.

■ Front side:

Hoist the front axle support with nylon sling. Or jack up the front axle support.

Never lift up the mower deck.

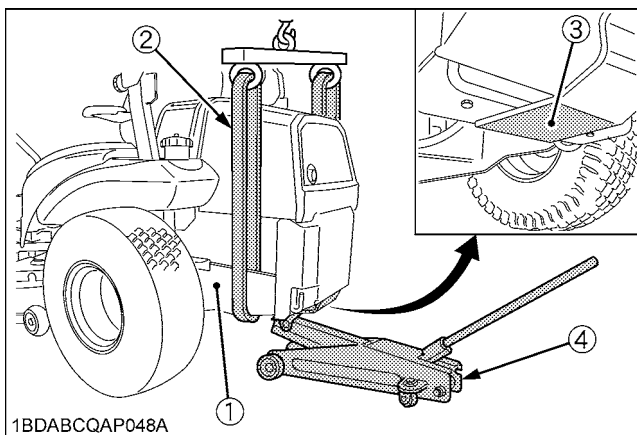


- 1BDABCQAP139A
- (1) Front axle support
 - (2) Nylon sling
 - (3) Jack

■ Rear side:

Hoist the rear frame with nylon slings. Or jack up the bottom plate.

Never lift up the engine oil pan or battery support.



- 1BDABCQAP048A
- (1) Rear frame
 - (2) Nylon sling
 - (3) Bottom plate
 - (4) Jack

DAILY CHECK

To prevent trouble from occurring, it is important to know the condition of the machine. Check it before starting.



CAUTION

To avoid personal injury:

- Be sure to check and service the machine on a level surface with the engine shut off, the key removed and the parking brake securely set or chock the rear wheels.

	No.	Check item	Ref. Page
Walking around the machine	1	Tire pressure, wear and damage	33 47
	2	Oil and water leak	-
	3	Engine oil level	45
	4	Transmission fluid level	48
	5	Coolant level in the radiator and the recovery tank	48
	6	Damage of machine body, tightness of all bolts and nuts	-
	7	Radiator screen	46
	8	Bonnet screen	46
	9	Brake play	54
	10	Oiling	52
	11	Fuel level	46
	12	Air cleaner primary element	53
Mower	1	Oil leak	50
	2	Make sure blade cap screws are tight	67
	3	Blades wear or damage	67
	4	Check all hardware.	-
	5	Make sure all pins are in place	-
	6	Mower deck cleaning	-
	7	Greasing <ul style="list-style-type: none"> ● Universal joint ● Three spindle shafts ● Belt tension pulley ● Belt tension pivot ● Front anti-scalp roller ● Front anti-scalp roller bracket boss 	49

	No.	Check item	Ref. Page
While sitting in the operator's seat	1	Motion control lever	-
	2	Parking brake	-
Turning the key switch "ON"	1	Performance of the Easy Checker (TM) light	14
Starting the engine	1	Color of the exhaust fumes	-
	2	Safety start switch, seat safety control and other safety devices. If either of these do not operate properly, contact your local KUBOTA Dealer immediately.	49
	3	Check for abnormal noise and vibration.	-
Others	1	Check the areas where previous trouble was experienced.	-

■ Checking Engine Oil Level

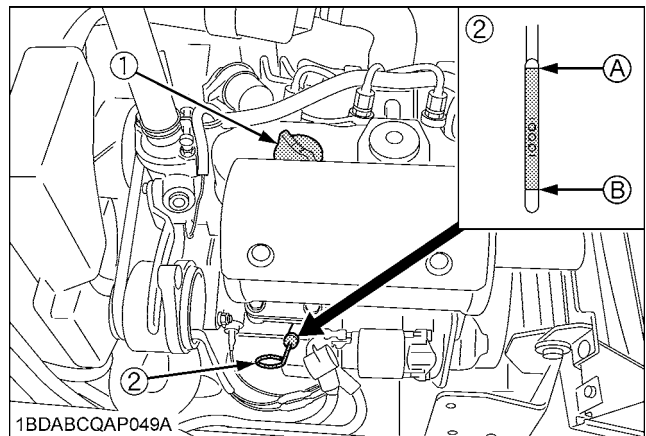


CAUTION

To avoid personal injury:

- Always stop the engine and remove the key before checking oil.

1. Check engine oil before starting and 5 minutes or more after the engine has stopped.
2. Wipe dipstick area clean.
3. To check the oil level, remove the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level is between the two notches.
4. Add new oil to the prescribed level at the oil port if necessary.



(1) Engine oil port
(2) Oil level dipstick

(A) "UPPER LEVEL"
(B) "LOWER LEVEL"

5. When using a different brand or viscosity oil from the previous one, remove all of the old oil and oil filter. Never mix two different types of oil.
6. Use the proper Engine Oil SAE according to the ambient temperatures. (See "LUBRICANTS" in "MAINTENANCE" section.)

■ Checking Amount of Fuel and Refueling

CAUTION

To avoid personal injury:

- Handle fuel carefully. If the engine is running, do not fill the fuel tank. If engine is hot, let engine cool several minutes before adding fuel. Do not smoke while filling the fuel tank or servicing the fuel system. Fill fuel tank only to bottom of filler neck.



Check the fuel level. Take care that the fuel tank does not become empty.

Fuel tank capacity	49L (12.9 U.S.gals.)
--------------------	----------------------

IMPORTANT :

- Use Diesel Fuel Only

1. Use No.2 diesel fuel.
2. Use No.1 diesel fuel if the temperature is below -10 °C (14 °F).
3. Always use a strainer when refueling to prevent fuel injection pump contamination.

NOTE :

- No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)
Grade of Diesel Fuel Oil according to ASTM D975.

Flash point °C (°F)	Water and Sediment, volume %	Carbon Residue on, 10 percent Residuam, %	Ash, weight %
Min	Max	Max	Max
52 (125)	0.05	0.35	0.01

Distillation Temperature s °C (°F) 90% Point		Viscosity Kinematic cSt or mm ² /s at 40 °C		Viscosity saybolt, SUS at 100 °F		Sulfur, weight %	Copper strip Corrosion	Cetane Number
Min	Max	Min	Max	Min	Max	Max	Max	Min
282 (540)	338 (640)	1.9	4.1	32.6	40.1	0.50	No.3	40

■ Checking and Cleaning Radiator Screen and Bonnet Screen to Prevent Overheating

CAUTION

To avoid personal injury:

- Be sure to stop the engine and remove the key before cleaning.

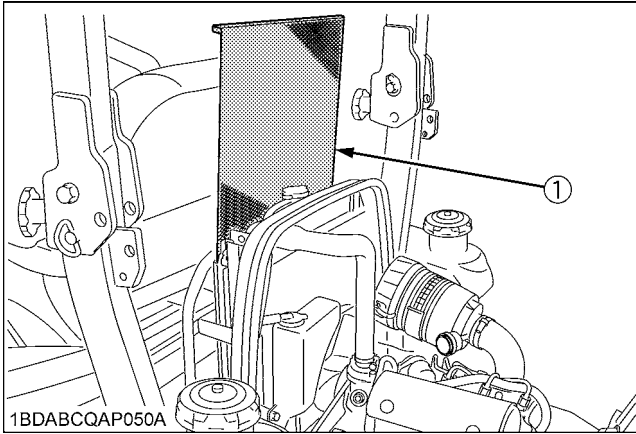
IMPORTANT :

- The air intake area must be clear of debris to prevent the engine from overheating.

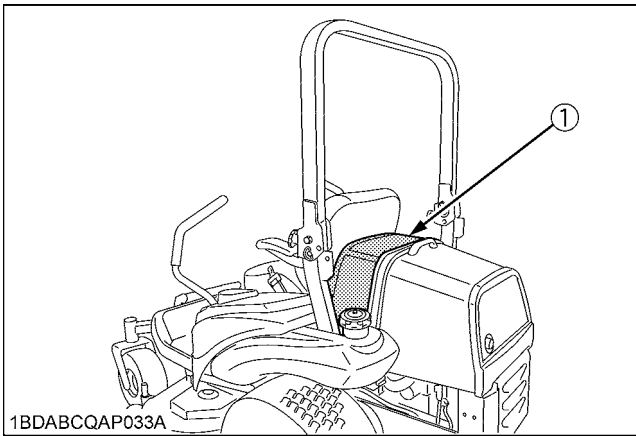
Daily or after every 5 hours of operation, check to be sure the radiator screen and the bonnet screen are clean.

Dirt or chaff on the radiator screen or bonnet screen decrease cooling performance.

1. Remove the radiator screen and the bonnet screen, and remove all foreign material.
2. Remove the dust from between the fins and the tube.
3. Tighten the fan drive belt as necessary. For this, refer to "EVERY 100 HOURS" in "PERIODIC SERVICE" section.
4. If the scale forms in the tube, clean with the scale inhibitor or its equivalent.
5. Each time the bonnet screen is covered with grass during operation, rub it off the screen with the hand. Check the radiator screen from time to time if grass accumulates.
6. If the dust or chaff has accumulated inside of the bonnet, remove the radiator screen and clean inside completely.
After cleaning, replace the radiator screens properly.



(1) Radiator screen



(1) Bonnet screen

■ Checking Tire Pressure



WARNING

To avoid personal injury:

- Do not attempt to mount a tire on a rim. This should be done by a qualified person with the proper equipment.
- Always maintain the correct tire pressure. Inflation pressure in front tires rises quickly when using compressed air. Do not inflate tires above the recommended pressure shown in the Operator's Manual.

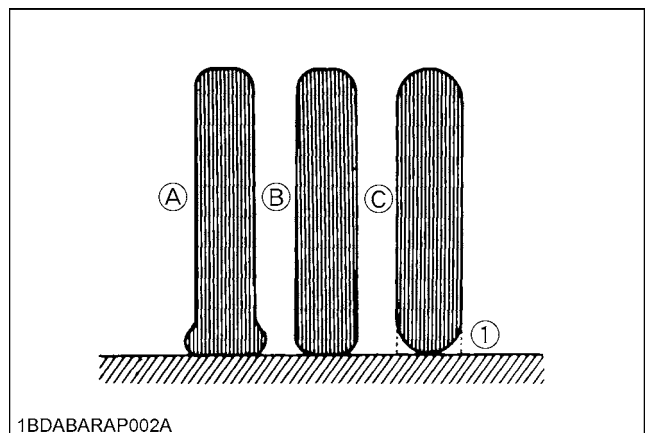
IMPORTANT :

- Do not use tires larger than specified.

■ Inflation Pressure

Though the inflation pressure is factory-set to the prescribed level, it naturally drops slowly in the course of time. Thus, check it and inflate as necessary.

	Tire sizes	Recommended Inflation Pressure
Front	15 x 6.0 - 6, (Semi-pneumatic Non Flat Tire) Rib	---
	15 x 6.0 - 6, 4PR Rib	160 kPa (1.6 kgf/cm ² , 23psi)
Rear	26 x 10.5 - 12, 4PR Turf	120 kPa (1.2 kgf/cm ² , 17psi)
	26 x 12.0 - 12, 4PR Turf	

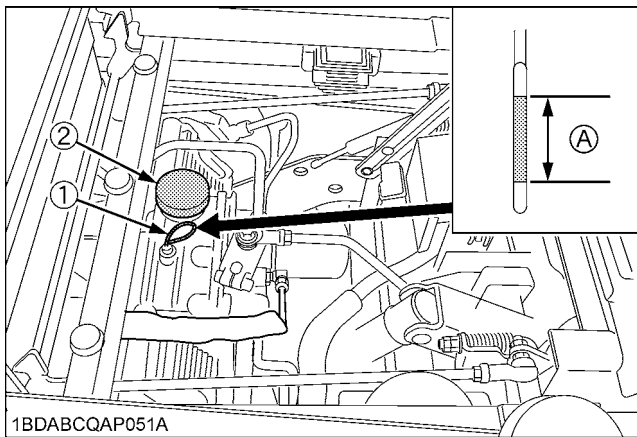


(1) Ground

- (A) "INSUFFICIENT"
- (B) "NORMAL"
- (C) "EXCESSIVE"

■ Checking Transmission Fluid Level

1. Park the machine on a flat surface, lower the implement to the ground and shut off the engine and remove the key.
Allow the machine to idle for 1-3 minutes, and then check fluid.
2. Raise and lock the operator's seat.
3. To check the oil level, draw out the dipstick, wipe it clean, replace it, and draw it out again. Check to see that the oil level lies between the two notches.
If the level is too low, add the new oil to the prescribed level at the oil inlet.
(See "LUBRICANTS" in "MAINTENANCE" section.)



(1) Oil level dipstick (A) Oil level is acceptable
(2) Oil plug and breather cup within this range.

IMPORTANT :

- If oil level is low, do not run engine.

■ Checking Coolant Level



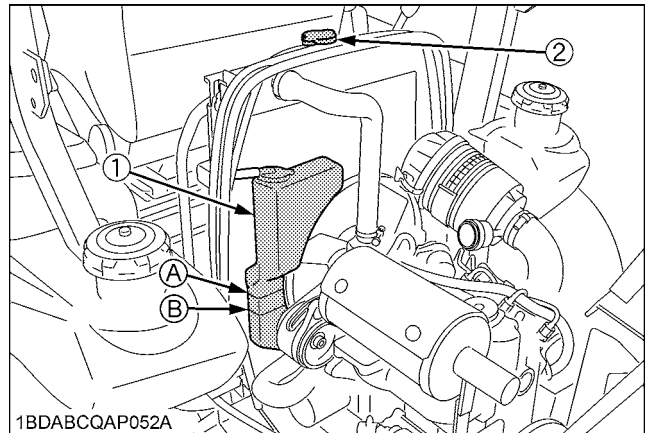
CAUTION

To avoid personal injury:

- Do not remove the radiator cap when the engine is hot. Then loosen cap slightly to the stop to relieve any excess pressure before removing cap completely.

Check the coolant level daily both the radiator and the recovery tank before starting engine.

1. Remove the radiator cap and check to see that the coolant level is just below the fill port.
2. Check to see that the coolant level is between the "FULL" and "LOW" marks of recovery tank.
3. When the coolant level drops due to evaporation, add water only up to just below the fill port of the radiator and the full level of the recovery tank.
In case of leakage, add anti-freeze and water in the specified mixing ratio up to the full level.
(See "Flush Cooling System and Changing Coolant" in "EVERY 1 YEAR" in "PERIODIC SERVICE" section.)



(1) Recovery tank (A) "FULL"
(2) Radiator cap (B) "LOW"

IMPORTANT :

- If the radiator cap has to be removed, follow the caution above and securely retighten the cap.
- Use clean, distilled water and anti-freeze to fill the radiator and the recovery tank.
- If water should leak, consult your local KUBOTA Dealer.

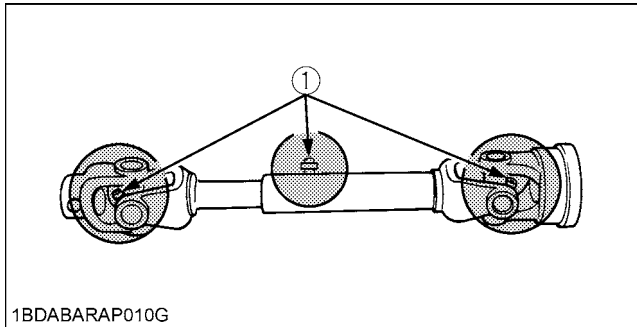
■ Lubricating All Grease Fittings

CAUTION

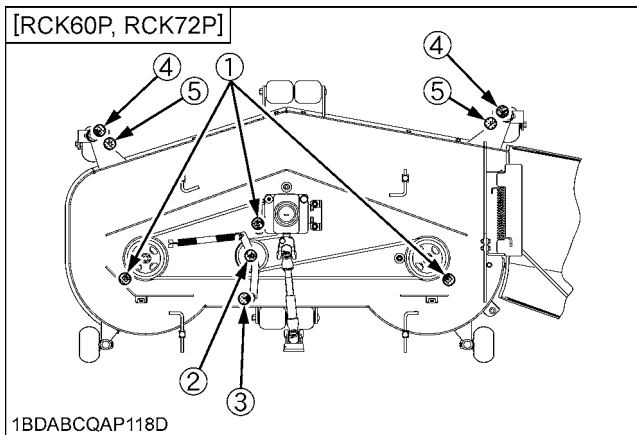
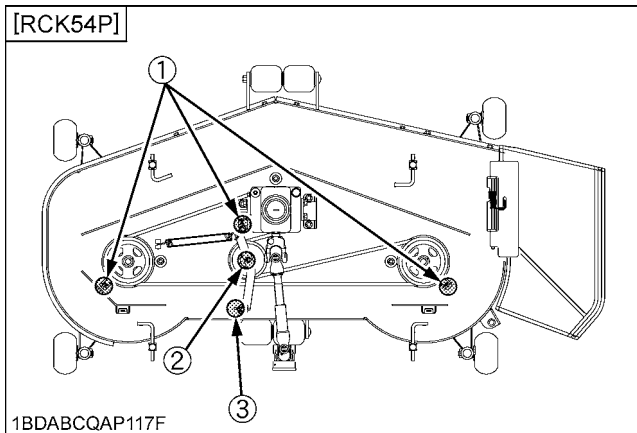
To avoid personal injury:

- Be sure to stop the engine and remove the key before greasing.

Grease the following location.



(1) Mower universal joint



- (1) Spindle shaft
- (2) Belt tension pulley
- (3) Belt tension pivot
- (4) Front side anti-scalp roller bracket
- (5) Front side anti-scalp roller

EVERY 50 HOURS

■ Safety Devices

The Safety Devices in your machine are designed to protect you while operating. Please check these Safety Devices periodically - daily is best - to test function of the Safety Devices before operation.

CAUTION

To avoid personal injury:

- Do not allow anyone near the machine while testing.
- If the machine does not pass one of the following tests, do not operate the machine. See your local KUBOTA Dealer.
- Sit on operator's seat for all tests except for Test 1.

IMPORTANT :

- Check the following tests before operating the machine.

◆ Check the safety switches

Test 1 (OPERATOR NOT ON THE SEAT)

1. Securely set the parking brake.
2. Shift the PTO lever to "DISENGAGE" (OFF) position.
3. Set the motion control levers to the "NEUTRAL LOCK" position.
4. Turn the key switch to "START" position.
5. The engine must not crank.

Test 2 (OPERATOR ON THE SEAT)

1. Do not set the parking brake. (release it from test 1)
2. Shift the PTO lever to "DISENGAGE" (OFF) position.
3. Set the motion control levers to the "NEUTRAL LOCK" position.
4. Turn the key switch to "START" position.
5. The engine must not crank.

Test 3 (OPERATOR ON THE SEAT)

1. Securely set the parking brake.
2. Shift the PTO lever to "DISENGAGE" (OFF) position.
3. Grasp the motion control levers and move them inward from "NEUTRAL LOCK" position to "NEUTRAL" position and then release the levers.
4. Turn the key switch to "START" position.
5. The engine must not crank.

Test 4 (OPERATOR ON THE SEAT)

1. Securely set the parking brake.
2. Shift the PTO lever to "ENGAGE" (ON) position.
3. Set the motion control levers to the "NEUTRAL LOCK" position.
4. Turn the key switch to "START" position.
5. The engine must not crank.

Test 5 (OPERATOR ON THE SEAT)

1. Start the engine.
2. Keep the parking brake securely set.
3. Shift the PTO lever to "DISENGAGE" (OFF) position.
4. Grasp the motion control levers and move them inward from "NEUTRAL LOCK" position to "NEUTRAL" position and then release the levers.
5. The engine must shut off after a short time delay.

IMPORTANT :

- For this test only, the engine will shut off in a few seconds.

Test 6 (OPERATOR ON THE SEAT)

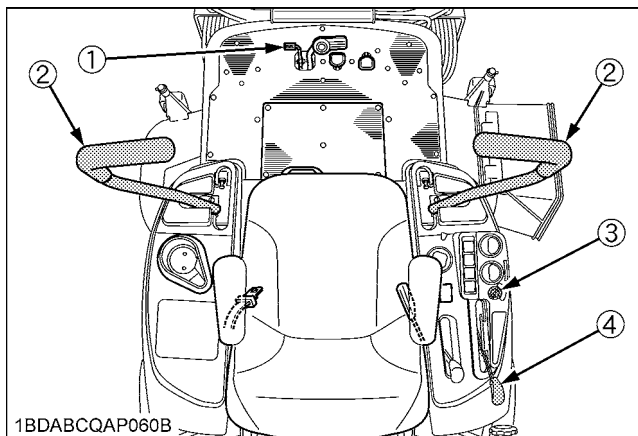
1. Start the engine.
2. Do not set the parking brake.
3. Shift the PTO lever to "DISENGAGE" (OFF) position.
4. Grasp the motion control levers and move them inward from "NEUTRAL LOCK" position to "NEUTRAL" position and then release the levers.
5. Stand up. (Do not get off the machine.)
6. The engine must shut off.

Test 7 (OPERATOR ON THE SEAT)

1. Start the engine.
2. Do not set the parking brake.
3. Shift the PTO lever to "ENGAGE" (ON) position.
4. Stand up. (Do not get off the machine.)
5. The engine must shut off.

NOTE :

- If the engine cranks Test 1 through 4, consult your local KUBOTA Dealer to have the unit checked before operation.



- (1) Parking brake lock pedal
- (2) Motion control lever
- (3) Key switch
- (4) PTO lever

Checking Gear Box Oil Level

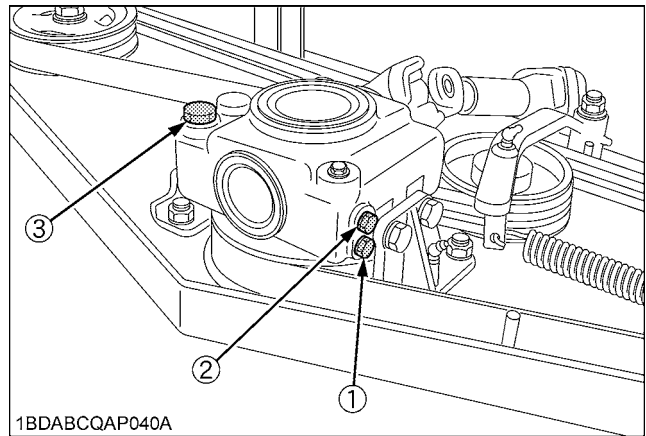


CAUTION

To avoid personal injury:

- Always stop the engine and remove the key before checking oil.

1. Park the machine on a flat surface and lower the mower to the ground.
To check the oil level, loosen check plug bolt and check to see that the oil level is just below the check plug port.
If the level is too low, add new oil to the prescribed level at the oil inlet.
(See "LUBRICANTS" in "MAINTENANCE" section.)



- (1) Drain plug (Bolt)
- (2) Check plug (Bolt)
- (3) Oil filler plug

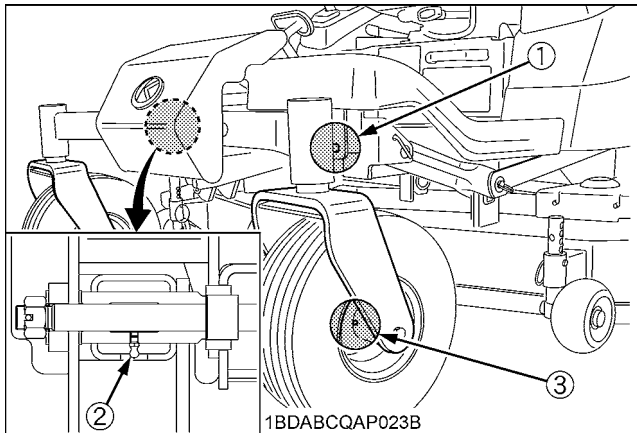
■ Greasing

CAUTION

To avoid personal injury:

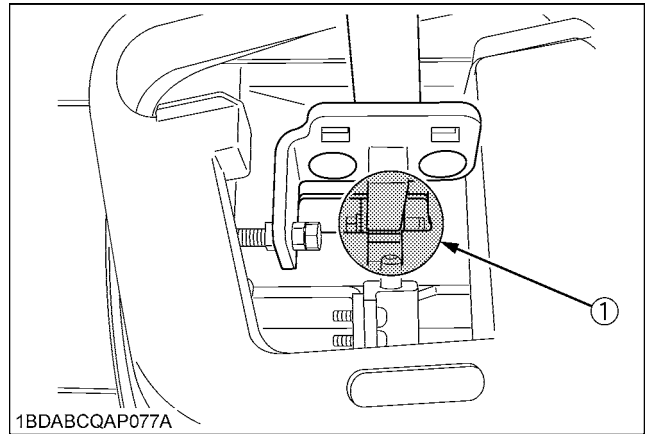
- Be sure to stop the engine and remove the key before greasing.

Grease the following location.

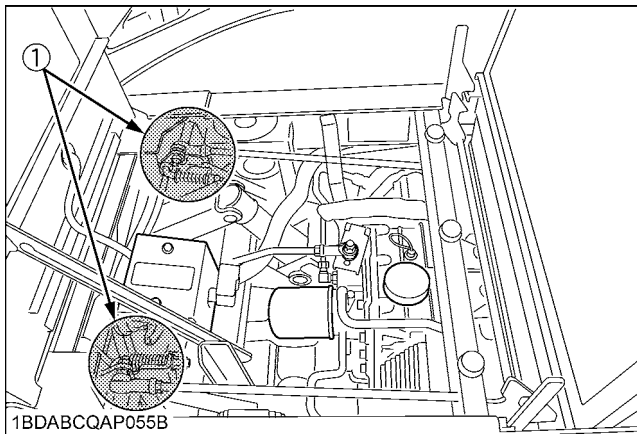


(1) King pin (LH, RH)
(2) Center pin

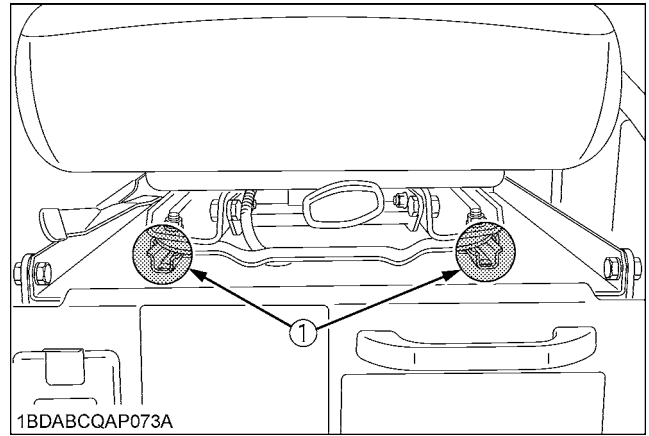
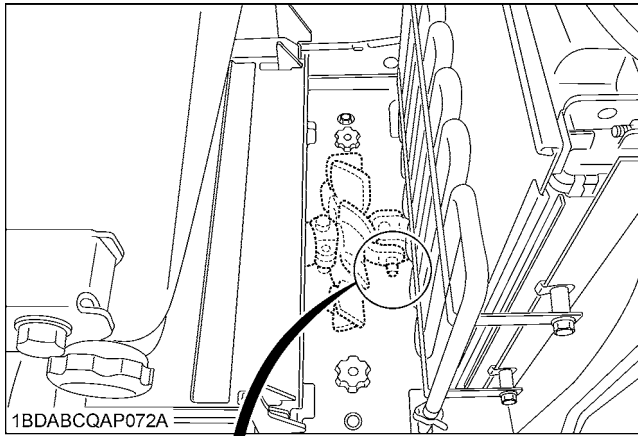
(3) Front wheel (LH, RH)



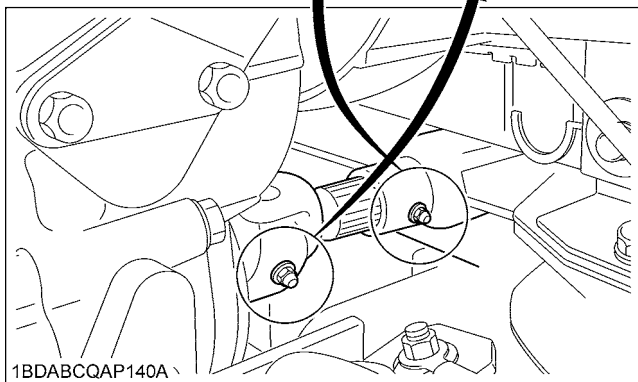
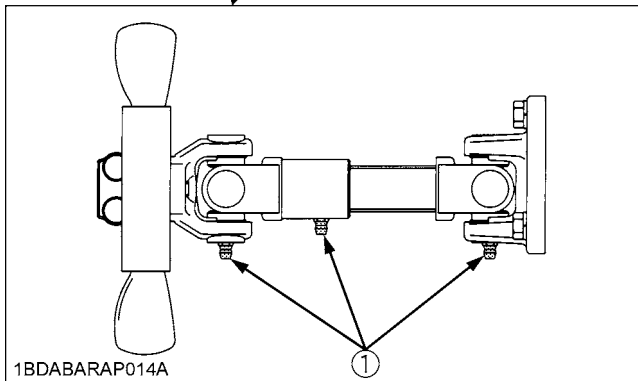
(1) Motion control lever contact position (LH, RH)



(1) Motion control lever pivot bushing (LH, RH)

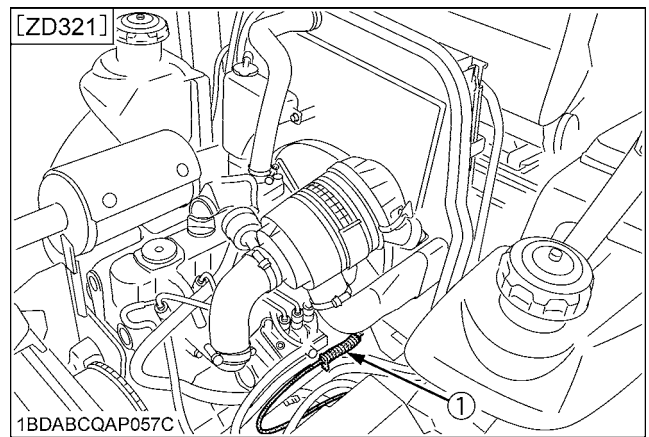


(1) Seat adjuster

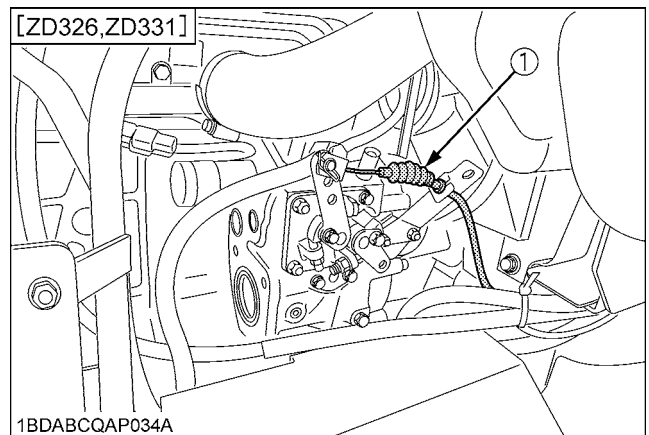


(1) Machine universal joint

■ Oiling



(1) Throttle cable (Oil)



(1) Throttle cable (Oil)

EVERY 100 HOURS

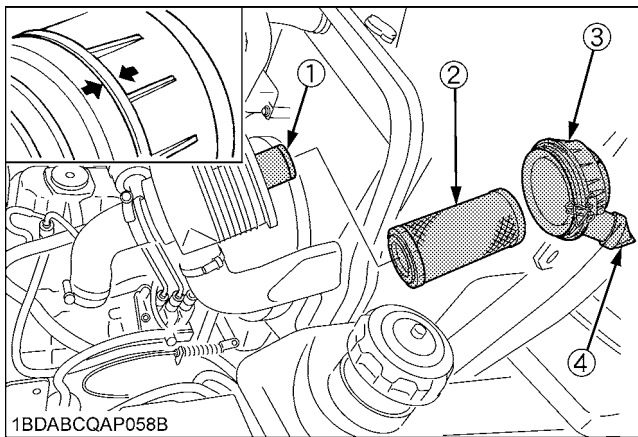
■ Cleaning Air Cleaner Primary Element

1. Remove the air cleaner cover and primary element.
2. Clean the primary element:
 - When dry dust adheres to the element, blow compressed air from the inside, turning the element. Pressure of compressed air must be under 205kPa (2.1kgf/cm², 30 psi).
3. Replace air cleaner primary element:

Once yearly or after every sixth cleaning, whichever comes first.

NOTE :

- Check to see if the evacuator valve is blocked with dust.



- (1) Secondary element
- (2) Primary element
- (3) Cover
- (4) Evacuator valve

NOTE :

- The air cleaner uses a dry element, never apply oil.
- Do not run the engine with filter element removed.
- Operating in dusty conditions requires more frequent maintenance.
- Align the arrow marks when reinstalling the air cleaner cover.
- Do not touch the secondary element except in cases where replacing is required.
(See "Replacing Air Cleaner Primary Element and Secondary Element" in "EVERY 1 YEAR" in "PERIODIC SERVICE" section.)

◆ Evacuator Valve

Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place - to get rid of large particles of dust and dirt.

■ Checking Fuel Lines and Fuel Filter



CAUTION

To avoid personal injury:

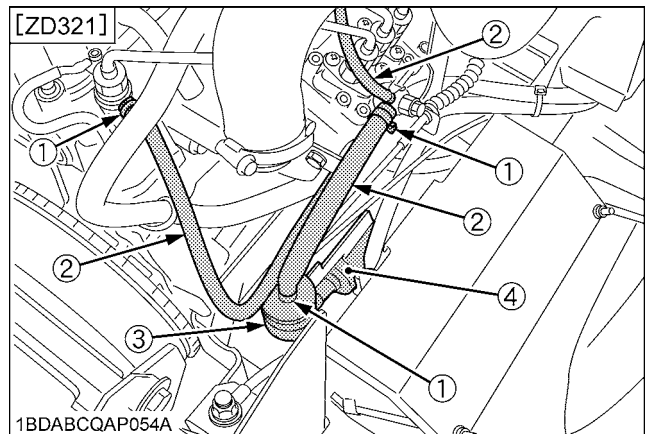
- Be sure to stop the engine and remove the key when attempting to make the following checks and changes.
- Never fail to check the fuel lines periodically. The fuel lines are subject to wear and aging. Fuel may leak out onto the running engine, causing a fire.

The fuel line connections should be checked annually or every 100 service hours, whichever comes first.

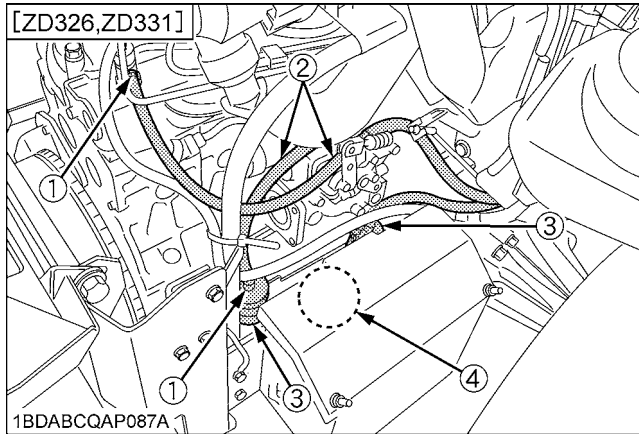
1. The fuel line is made of rubber and ages regardless of service period.
2. If the fuel line and clamps are found damaged or deteriorated, replace them.
3. Check fuel filter, if it is clogged by debris or contaminated with water, replace it.

IMPORTANT :

- When the fuel line is disconnected for maintenance or repair, close both ends of the fuel line with a piece of clean cloth or paper to prevent dust and dirt from entering. In addition, particular care must be taken not to admit dust and dirt into the fuel pump. Entrance of even a small amount dust or dirt cause premature wear and malfunction of the fuel pump and injector components.



- (1) Pipe clamps
- (2) Fuel line
- (3) Fuel filter
- (4) Fuel pump



- (1) Pipe clamps
- (2) Fuel line
- (3) Fuel filter
- (4) Fuel pump

■ Adjusting Fan Drive Belt Tension



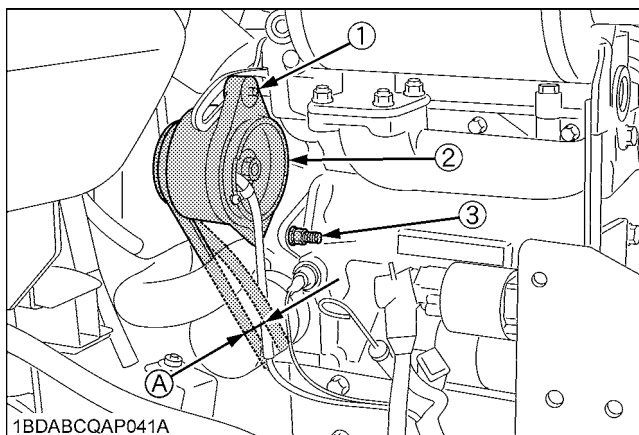
CAUTION
To avoid personal injury:

- Be sure to stop the engine and remove the key before checking belt tension.

If the fan drive belt becomes loose, the engine may overheat. To adjust, loosen bolts and move the alternator outward to tighten the belt. After adjustment, securely tighten the bolts.

Moderate belt tension:

The belt should deflect approx. 10 mm (0.4 in.) when the center of the belt is depressed with finger pressure of 98N (10kgf, 22 lbs).



- (1) Tension bolt
 - (2) Alternator
 - (3) Adjusting bolt
- (A) 10 mm (0.4 in.)

■ Adjusting Parking Brake



CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
- Stop the engine and chock the wheels before checking or adjusting.

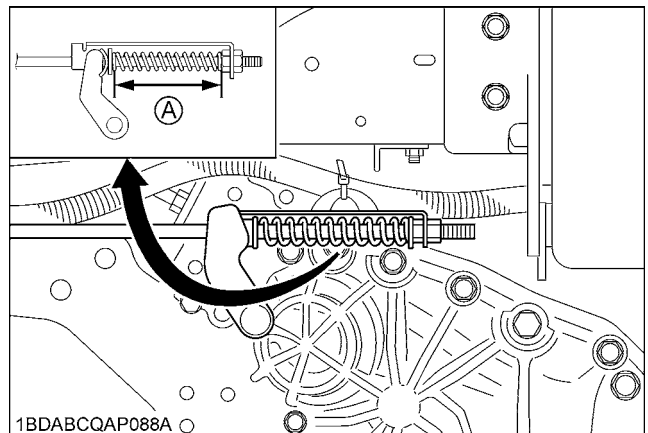
IMPORTANT :

- Wrong adjustment may cause machine damage.

(1) ◆ Check brake spring

1. Place the motion control levers to the "NEUTRAL LOCK" position.
2. Be sure to chock the rear wheels.
3. Apply the parking brake to the lock position.
4. Check the length of the brake springs on both sides.

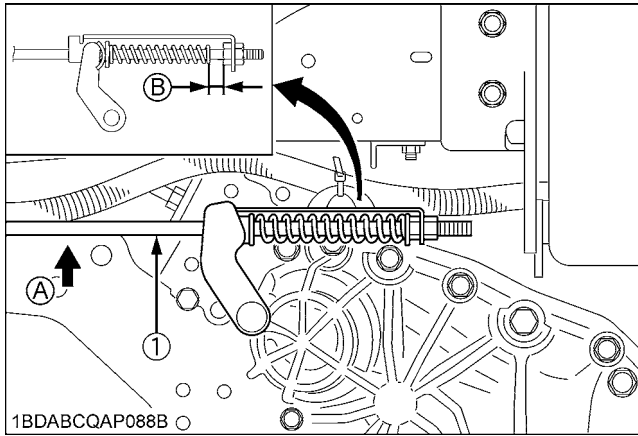
(A): Proper brake spring length with the brake applied to the lock position	115 to 117 mm (4.53 to 4.61 in.)
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(A) "Parking brake spring length"

5. Release the parking brake completely.
6. Hold the brake rod lightly.
7. Check the brake spring play.

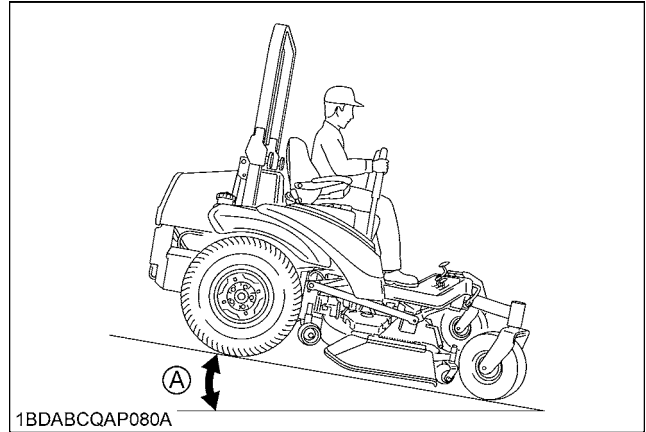
(B): Proper brake spring play	The spring must have play. Reference: 0.5 to 1.0 mm (0.02 to 0.04 in.)
-------------------------------	--



(1) Brake rod

(A) "Hold the brake rod"

(B) "Parking brake spring play"



(A) 17° ramp

8. If these dimensions are not correct, adjust them.

◆ **Adjustment of brake spring play**

1. Place the motion control lever to the "NEUTRAL LOCK" position.
2. Be sure to chock the rear wheels.
3. Release the parking brake completely.
4. Loosen the lock nuts.
5. Hold the brake rod by hand.
6. Tighten the nut to the correct space between the end of the spring and the nut.
7. Lock the nuts.
8. Adjust the other side spring to the same dimension.

◆ **Adjustment of brake length**

1. Place the motion control lever to the "NEUTRAL LOCK" position.
2. Apply the parking brake to the lock position.
3. Loosen the lock nuts.
4. Adjust the spring length to the recommendation.
5. Lock the nuts.
6. Check the brake spring play to the recommendation. If there is no play, adjust the brake spring play again.
7. Adjust the other side spring to the same dimension.

(2) ◆ **Check on the slope**

1. Place the machine on a 17° ramp.
2. Apply the parking brake.
3. Place the motion control levers in "NEUTRAL LOCK" position and shut off the engine.
4. Check that the machine does not move.

NOTE :

- For parking brake test purposes, only use 17° ramp.

■ Battery Condition



DANGER

To avoid the possibility of battery explosion:
For the refillable type battery, follow the instructions below.

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



CAUTION

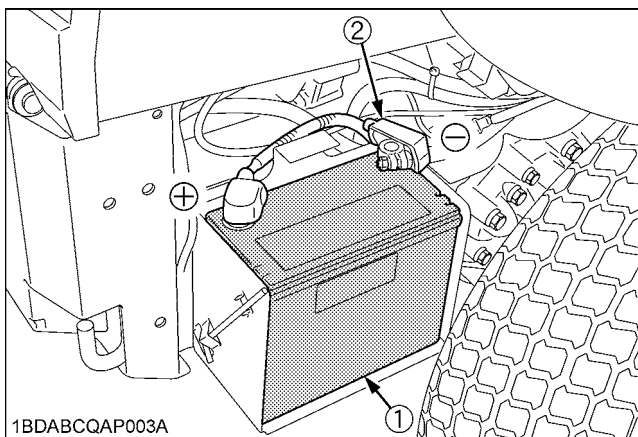
To avoid personal injury:

- Never remove the vent cap while the engine is running.
- Keep electrolyte away from eyes, hands and clothes. If you are splattered with it, wash it away completely with water immediately and get medical attention.
- Wear eye protection and rubber gloves when working around battery.

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

The original battery is a maintenance-free, non-accessible type battery.

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



1BDABCQAP003A
(1) Battery
(2) Ground cable

(+): Positive terminal
(-): Negative terminal

◆ Battery Charging



DANGER

To avoid serious 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.



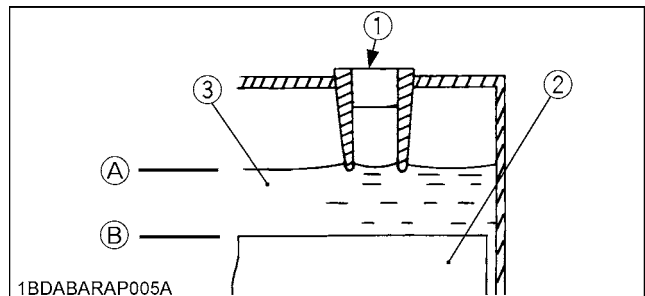
CAUTION

To avoid personal injury:

- When charging battery, ensure that the vent caps are securely in place (if equipped).
- When disconnecting the cables from the battery, start with the negative terminal first. When connecting the cables to the battery, start with the positive terminal first.
- Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

(For accessible maintainable type batteries with removable vent caps.)

1. Make sure each electrolyte level is at the bottom of vent wells, if necessary add distilled water in a well-ventilated area.



1BDABARAP005A

- (1) Vent well
(2) Separator
(3) Electrolyte

(A) "HIGHEST LEVEL"
(B) "LOWEST LEVEL"

2. The water in the electrolyte evaporates during recharging. Liquid shortage damages the battery. Excessive liquid spills over and damages the machine body.
3. To slow charge the battery, connect the battery positive terminal to the charger positive terminal and the negative to the negative, then recharge in the standard fashion.
4. A boost charge is only for emergencies. It will partially charge the battery at a higher rate and in a short time. When using a boost-charged battery, it is necessary to recharge the battery as soon as possible. Failure to do this will shorten the battery's service life.
5. When the specific gravity of electrolyte reaches 1.27-1.29 charge has completed.

6. When exchanging an old battery with new one, use a battery of equal specification shown in.

Battery type	Volts (V)	Reserve capacity (min)	Cold cranking Amps
51R	12	70	450

(For non-accessible maintenance-free type batteries.)
 Maintenance-free, non-accessible batteries are designed to eliminate the need to add water. Yet the volume of electrolyte above plates may eventually become depleted due to abnormal conditions such as high heat or improper regulator setting. Use a voltmeter to check the state of charge. (See reference chart below to determine if charging is necessary.)

Battery voltage	Reference state of charge
12.6	100% (Full charge)
12.4	75%
12.2	50%
12.0	25%
11.8	0%

EVERY 150 HOURS

■ Changing Gear Box Oil

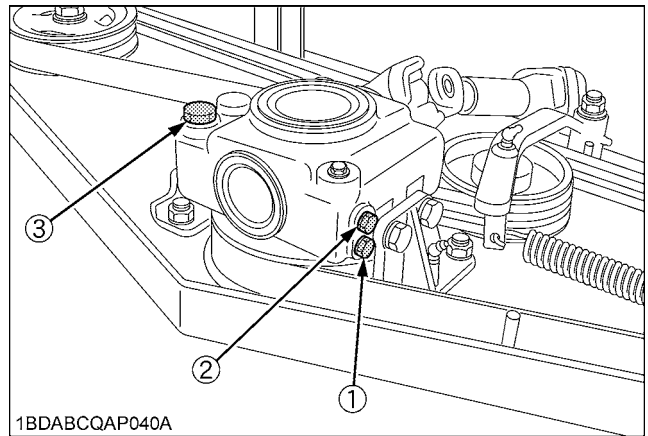


CAUTION

To avoid personal injury:

- Be sure to stop the engine and remove the key before changing the oil.

1. To drain the used oil, remove the drain plug and filler plug at the gear box and drain the oil completely into the oil pan.
2. After draining reinstall the drain plug.
3. Remove the oil level check plug.
4. Fill with the new oil up to the check plug port.
(See "LUBRICANTS" in "MAINTENANCE" section.)
5. After filling reinstall the check and filler plugs.



1BDABCQAP040A

- (1) Drain plug (Bolt)
- (2) Check plug (Bolt)
- (3) Oil filler plug

EVERY 200 HOURS

■ Changing Engine Oil

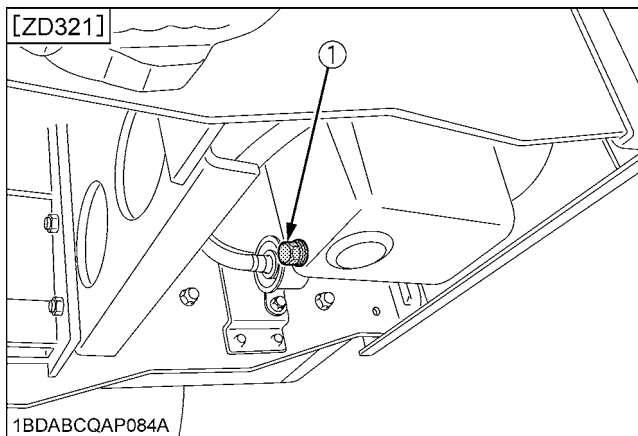


CAUTION

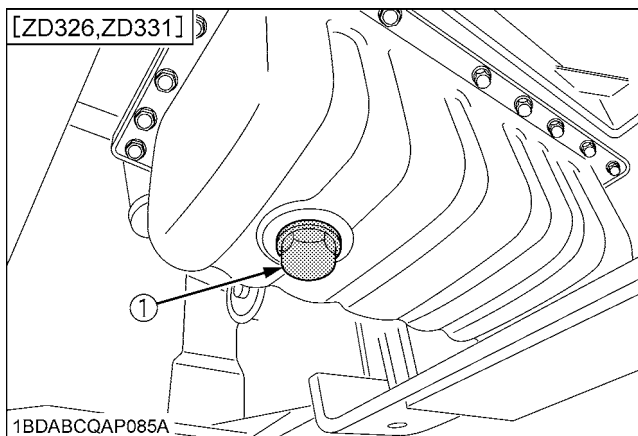
To avoid personal injury:

- Be sure to stop the engine and remove the key before changing the oil.
- Allow engine to cool down sufficiently; oil can be hot and may cause burns.

1. To change the used oil, remove the drain plug at the bottom of the engine and drain the oil completely. The used oil can be drained out more easily if the engine is warm.
2. Fill with the new oil up to the upper notch on the dipstick.



(1) Drain plug



(1) Drain plug

3. To check the oil level. Remove the dipstick, wipe it clean, insert it and draw it out again. Check to see that the oil level is between the two marks.

■ Replacing Engine Oil Filter Cartridge



CAUTION

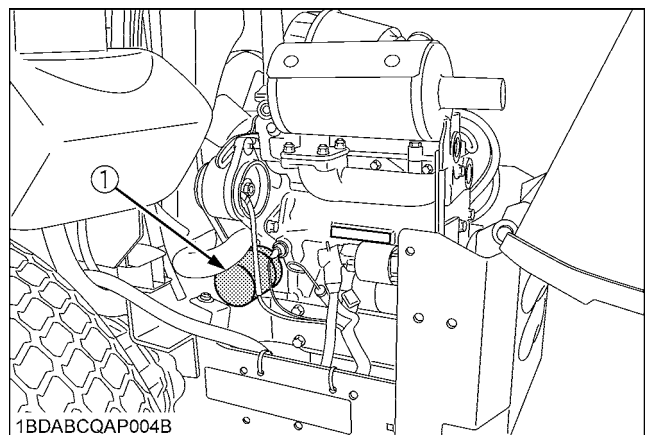
To avoid personal injury:

- Be sure to stop the engine and remove the key before changing the oil and the oil filter cartridge.
- Allow engine to cool down sufficiently; oil can be hot and may cause burns.

1. The oil filter cartridge must be changed every 200 service hours.
2. Apply a slight coat of oil onto the rubber gasket of new cartridge.
3. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
4. After the new cartridge has been replaced, the engine oil level normally lowers a little. Add engine oil to proper level. Check for oil leaks around filter gasket.

IMPORTANT :

- To prevent serious damage to the engine, replacement element of the recommended type must be used. Use only a genuine KUBOTA filter or its equivalent.

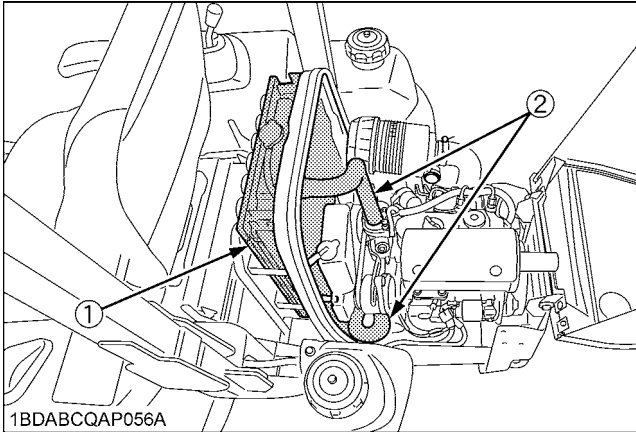


(1) Engine oil filter cartridge

■ Checking Radiator Hose and Clamp

Check to see if radiator hoses are properly fixed every 200 hours of operation or six months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten clamps securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.



- (1) Radiator core
(2) Radiator hose

■ Checking Hydraulic Hose



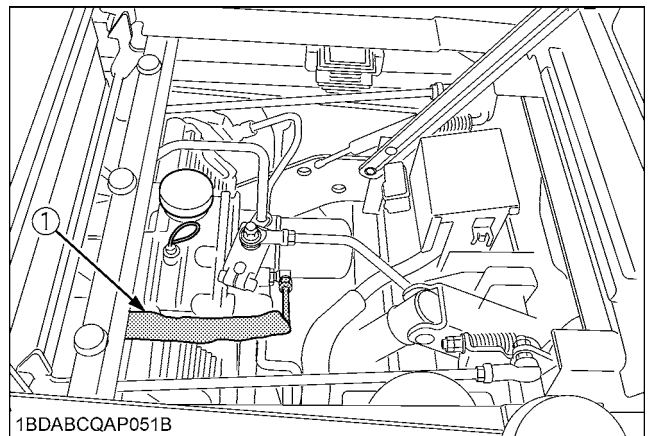
CAUTION

To avoid personal injury:

- Be sure to stop the engine and remove the key before checking and replacing the hydraulic hose.
- Allow the transmission case to cool down sufficiently; oil can be hot and may cause burns.

Check to see if hydraulic hoses are properly fixed every 200 hours of operation.

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



- (1) Mower lift cylinder hose

■ Replacing HST Transmission Oil Filter Cartridge

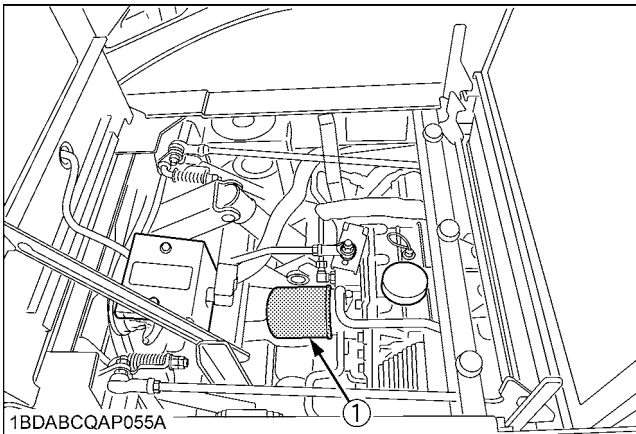


CAUTION

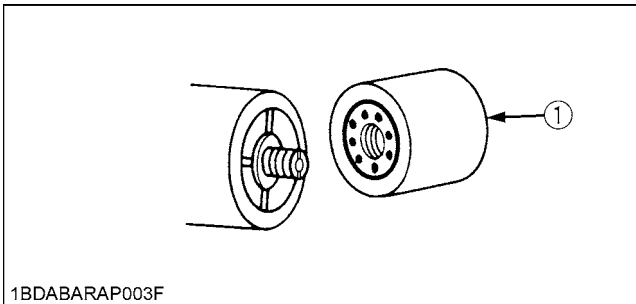
To avoid personal injury:

- Be sure to stop the engine and remove the key before changing the oil filter cartridge.
- Allow transmission case to cool down sufficiently; oil can be hot and may cause burns.

1. The oil filter cartridge must be changed every 200 service hours.



(1) Oil filter cartridge



(1) Oil filter cartridge

2. Place an oil pan underneath the oil filter cartridge. (Do not drain oil.)
3. Remove the oil filter cartridge by using the filter wrench.
4. Apply a slight coat of oil onto the cartridge gasket.
5. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
6. After the new cartridge has been replaced, the transmission fluid level normally lowers a little. Add fluid to proper level. Check for oil leaks around filter gasket.

IMPORTANT :

- To prevent serious damage or premature failure to the hydraulic system, use only a KUBOTA genuine filter.

■ Adjusting the Motion Control Lever Pivot



CAUTION

To avoid personal injury:

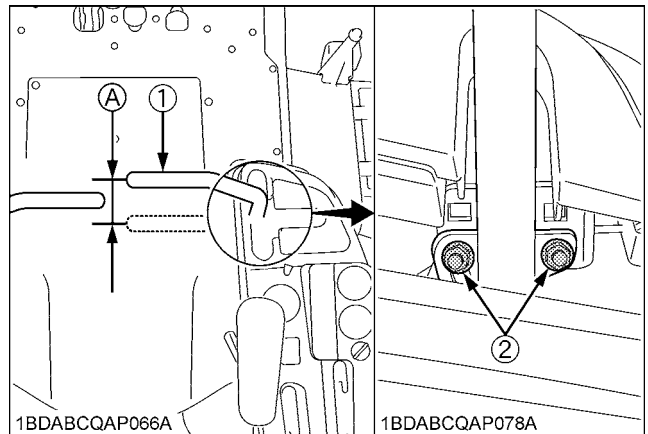
- Be sure to stop the engine and set the parking brake to "ON" before checking.

Proper lever free travel	2 to 15 mm (0.08 to 0.59 in.) on the lever
--------------------------	--

1. Set the motion control lever in "NEUTRAL" position.
2. Slightly move the lever back and forth and measure the free travel at the top of lever stroke.
3. If the proper free travel limits are exceeded, remove the fender and retighten the nut to specified torque.

NOTE :

- If the motion control lever pivot bolt is maladjusted, motion control may be difficult.



(1) Motion control lever
(2) Bolt, Nut

(A) "FREE TRAVEL"

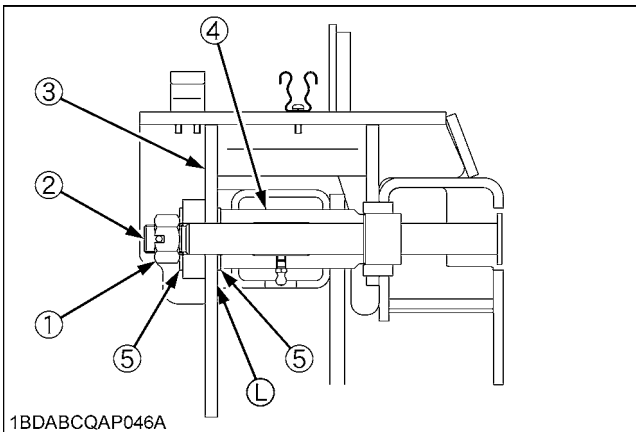
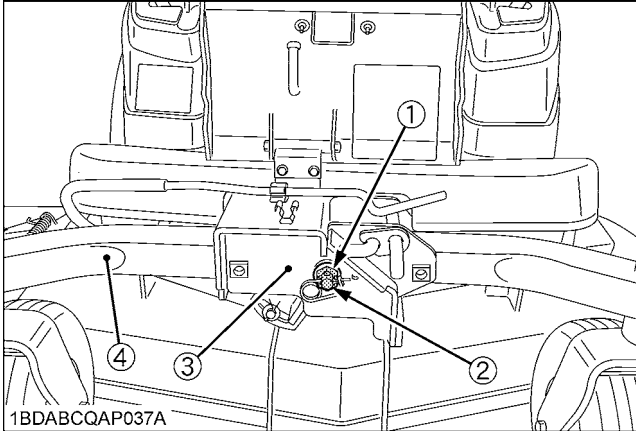
Tightening torque	18.6 to 20.6 N-m (1.9 to 2.1 kgf-m, 13.7 to 15.2 ft-lbs)
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■ Adjusting Front Axle Pivot

If the front axle pivot pin adjustment is not correct, vibration in the front wheel can occur.

◆ Check and Adjustment of the Front Axle End Play

1. Lift up and securely block the front of the machine.
2. Measure the clearance (L) between the front axle (4) and front axle support (3).
3. If the measurement exceeds the allowable limit, adjust the nut (1).



- (1) Nut
 - (2) Center pin
 - (3) Front axle support
 - (4) Front axle
 - (5) Plain washer
- (L) Front axle end play

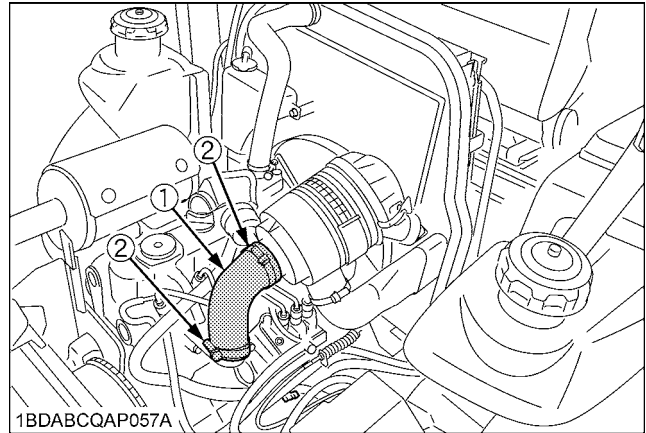
NOTE :

- When fastening the center pin (2), tighten the nut so that the front axle may be oscillated smoothly by hand.

Front axle end play (L)	Factory spec.	0 to 0.2 mm (0 to 0.008 in.)
	Allowable limit	0.5 mm (0.02 in.)

■ Checking Intake Air Line

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



- (1) Hose
- (2) Clamp

EVERY 400 HOURS

■ Changing Transmission Fluid and Rear Axle Gear Case Oil (RH & LH)



CAUTION

To avoid personal injury:

- Be sure to stop the engine and remove the key before changing or checking the oil.
- Allow transmission case to cool down sufficiently; oil can be hot and may cause burns.

The fluid in the transmission case is also used for the hydrostatic drive system.

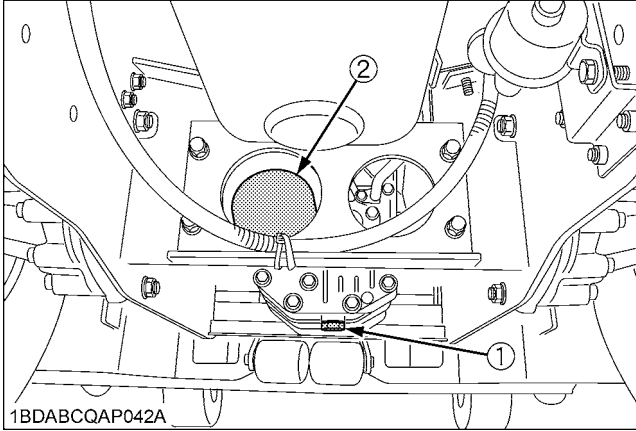
1. To drain the transmission oil, place oil pan underneath the transmission case and the rear axle gear case (RH&LH) and remove the drain plug at the bottom of the transmission case and the rear axle gear case (RH&LH).
2. After draining, reinstall the drain plugs.
3. Fill with UDT or SUPER UDT hydrostatic transmission fluid or its equivalent up to the upper line of the gauge.

IMPORTANT :

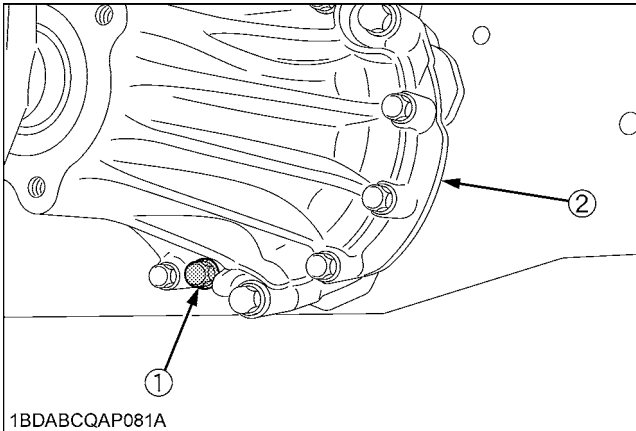
- It takes time to have the oil poured from the transmission case reach the rear axle case (RH&LH). Pour the regulated amount of oil slowly.
4. After running the engine for a few minutes, stop it and check the oil level again; add oil to the prescribed level.

IMPORTANT :

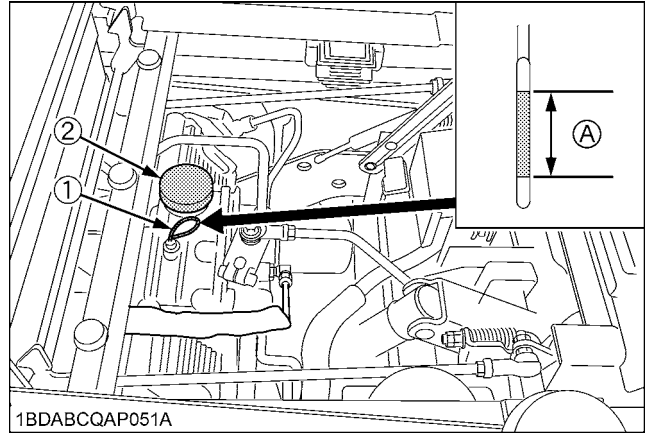
- Operate only at low RPM's immediately after changing the transmission fluid and filter cartridge. Keep the engine at medium speed for a few minutes to insure proper lubrication of all parts so there is no damage to transmission.



(1) Drain plug
(2) Transmission oil filter



(1) Drain plug
(2) Rear axle gear case LH



(1) Oil level dipstick
(2) Oil plug and breather cup
(A) Oil level is acceptable within this range.

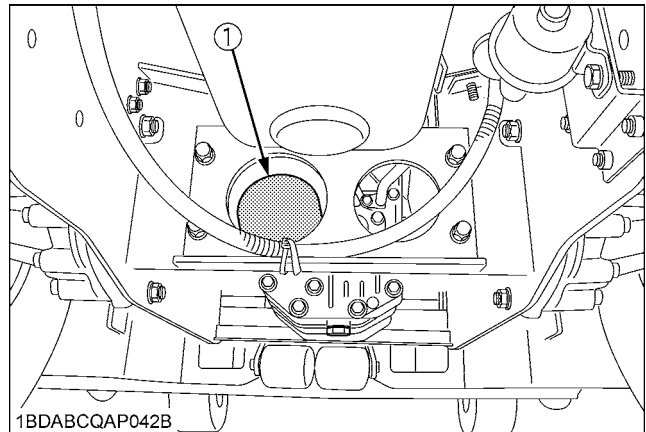
Replacing Hydraulic Oil Filter Cartridge

CAUTION

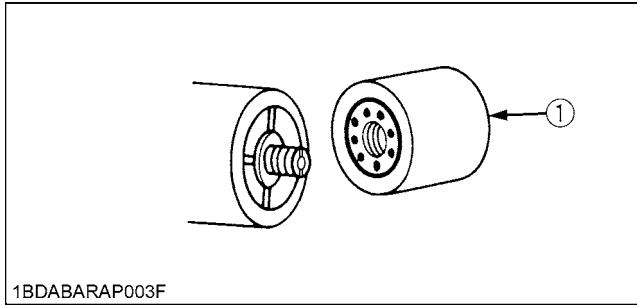
To avoid personal injury:

- Be sure to stop the engine and remove the key before changing the oil filter cartridge.
- Allow transmission case to cool down sufficiently; oil can be hot and may cause burns.

1. The oil filter cartridge must be changed every 400 service hours.



(1) Oil filter cartridge



1BDABARAP003F

(1) Oil filter cartridge

2. To drain the transmission oil, place oil pan underneath the transmission case and the rear axle gear case (RH&LH) and remove the drain plug at the bottom of the transmission case and the rear axle gear case (RH&LH).
3. After draining, reinstall the drain plugs.
4. Remove the oil filter cartridge by using the filter wrench.
5. Apply a slight coat of oil onto the cartridge gasket.
6. Tighten the filter quickly until it contacts the mounting surface. Tighten filter by hand an additional 1/2 turn only.
7. After the new cartridge has been replaced, the transmission fluid level normally lowers a little. Add fluid to proper level. Check for oil leaks around filter gasket.

IMPORTANT :

- To prevent serious damage or premature failure to the hydraulic system, use only a KUBOTA genuine filter.

■ Replacing Fuel Filter

Consult your local KUBOTA Dealer for this service.

EVERY 1500 HOURS

■ Checking Fuel Injection Nozzle (Injection Pressure)

Consult your local KUBOTA Dealer for this service.

EVERY 3000 HOURS

■ Checking Injection Pump

Consult your local KUBOTA Dealer for this service.

EVERY 1 YEAR

■ Replacing Air Cleaner Primary Element and Secondary Element

(See "Cleaning Air Cleaner Primary Element" in "EVERY 100 HOURS" in "PERIODIC SERVICE" section.)

IMPORTANT :

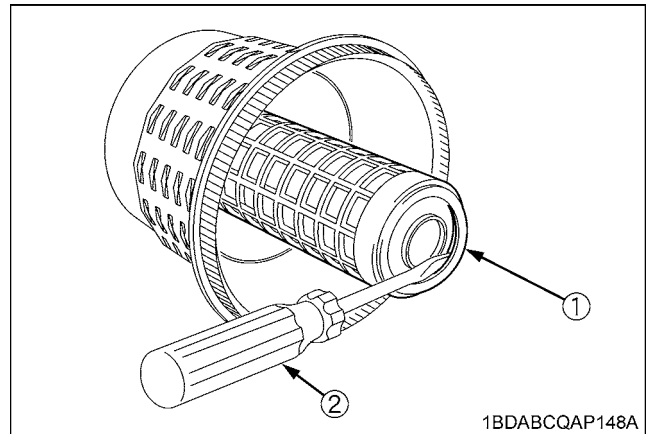
- To prevent serious damage to the engine, use only a KUBOTA genuine filter.

[How to remove the secondary element (ZD326P[S], ZD331P[LP])]

1. Pull out the two tabs of the secondary element using a suitable tool (e.g. Flat-blade screwdriver) as shown in the figure.

IMPORTANT :

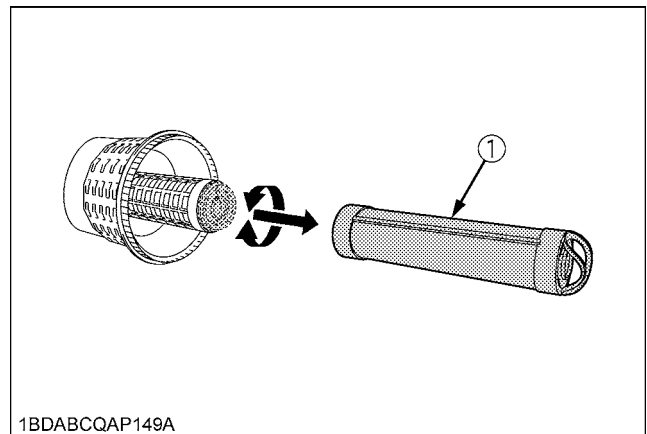
- Pull out the tabs only when replacing the secondary element.



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- (1) Tab
- (2) Flat-blade screwdriver

2. While turning slightly, pull out the secondary element.



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- (1) Secondary element

■ Flush Cooling System and Changing Coolant

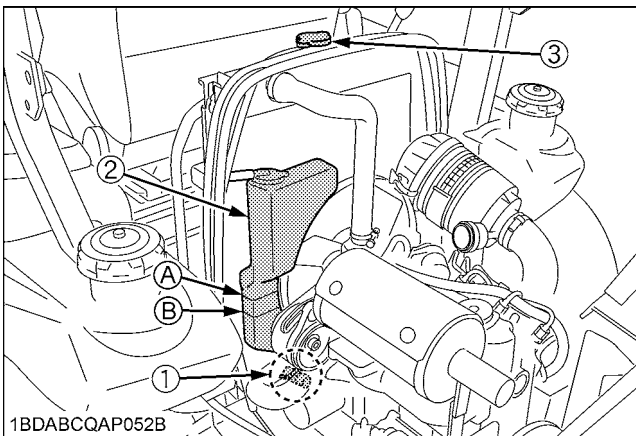


CAUTION

To avoid personal injury:

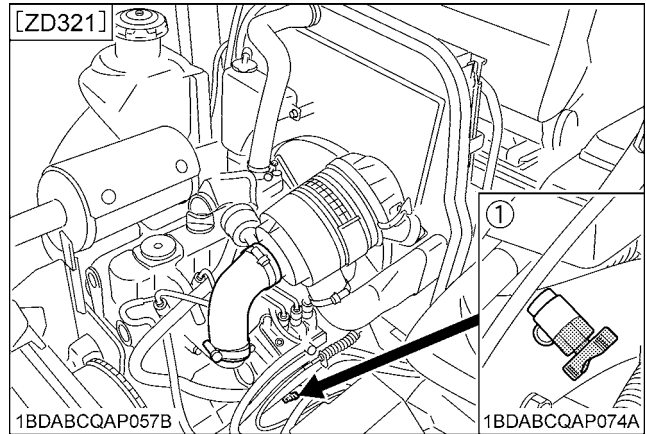
- Do not remove the radiator cap when the engine is hot. Then loosen cap slightly to the stop to relieve any excess pressure before removing cap completely.

1. Stop the engine and let cool down.
2. To drain the coolant, open the radiator drain cock and remove the radiator drain plug and remove radiator cap. The radiator cap must be removed to completely drain the coolant.
3. After all coolant is drained, close the drain cock and install the drain plug.
4. Fill with clean water and cooling system cleaner.
5. Follow directions of the cleaner instruction.
6. After flushing, fill with clean water and anti-freeze until the coolant level is just below the fill port on the radiator.
- Install the radiator cap securely.
7. Fill with coolant up to the "FULL" mark on the recovery tank.
8. Start and operate the engine for a few minutes.
9. Stop the engine and let cool.
10. Check coolant level of recovery tank, add coolant if necessary, and install the drain plug.

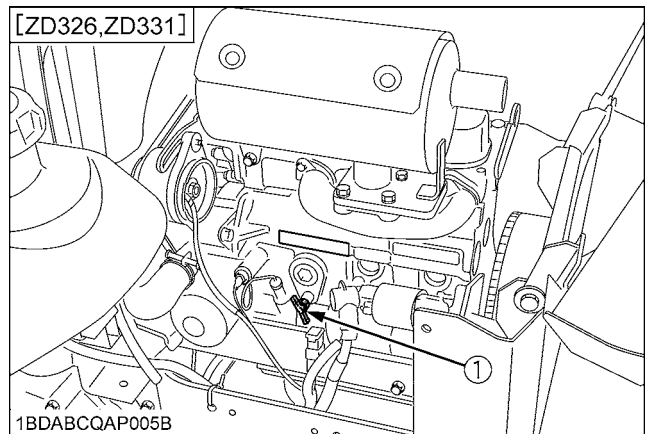


- (1) Drain plug
 (2) Recovery tank
 (3) Radiator cap

- (A) "FULL"
 (B) "LOW"



(1) Drain cock



(1) Drain cock

IMPORTANT :

- Do not start engine without coolant.
- Use clean, distilled water and anti-freeze to fill the radiator and recovery tank.
- When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%.
- Securely tighten radiator cap. If the cap is loose or improperly fitted, water may leak out and the engine could overheat.

■ **Anti-freeze**



CAUTION

To avoid personal injury:

- When using anti-freeze, put on some protection such as rubber gloves (Anti-freeze contains poison.).
- If should drink anti-freeze, throw up at once and take medical attention.
- When anti-freeze comes in contact with the skin or clothing, wash it off immediately.
- Do not mix different types of Anti-freeze. The mixture can produce chemical reaction causing harmful substances.
- Anti-freeze is extremely flammable and explosive under certain conditions. Keep fire and children away from anti-freeze.
- When draining fluids from the engine, place some container underneath the engine body. If swallowed anti-freeze is harmful.
- Do not pour waste onto the grounds, down a drain, or into any water source.
- Also, observe the relevant environmental protection regulations when disposing of anti-freeze.

If it freezes, coolant can damage the cylinders and radiator. If the ambient temperature falls below 0 °C (32°F) or before a long-term storage, let out cooling water completely, or mix fresh water with long-life coolant and fill the radiator and reserve tank with the mixture.

1. Long-life coolant (hereafter LLC) comes in several types. Use ethylene glycol (EG) type for this engine.
2. Before employing LLC-mixed cooling water, fill the radiator with fresh water and empty it again. Repeat this procedure 2 or 3 times to clean up the inside.
3. Mixing the LLC
Put the LLC in cooling water in the percentage (%) for a target temperature. When mixing, stir it up well, and then fill into the radiator.
4. The procedure for the mixing of water and anti-freeze differs according to the make of the anti-freeze and the ambient temperature. Refer to SAE J1034 standard, more specifically also to SAE J814c.

IMPORTANT :

- When the anti-freeze is mixed with water, the anti-freeze mixing ratio must be less than 50%.

Vol % Anti-freeze	Freezing Point		Boiling Point *	
	°C	°F	°C	°F
40	-24	-12	106	222
50	-37	-34	108	226

* At 1.013 x 10⁵Pa (760mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

5. Adding the LLC
 - (1) Add only water if the mixture reduces in amount by evaporation.
 - (2) If there is a mixture leak, add the LLC of the same manufacturer and type in the same mixture percentage.
*Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
6. When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anti-corrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
7. Kubota's genuine long-life coolant has a service life of 2 years. Be sure to change the coolant every 2 years.

NOTE :

- The above data represent industry standards that necessitate a minimum glycol content in the concentrated anti-freeze.
- When the coolant level drops due to evaporation, add water only to keep the anti-freeze mixing ratio less than 50%. In case of leakage, add anti-freeze and water in the specified mixing ratio before filling in to the radiator.

EVERY 2 YEARS

■ Replacing Hydraulic Hose

Consult your local KUBOTA Dealer for this service.

■ Replacing Fuel Lines

Consult your local KUBOTA Dealer for this service.

■ Replacing Radiator Hose

See "Checking Radiator Hose and Clamp" in "EVERY 200 HOURS" in "PERIODIC SERVICE" section.

■ Replacing Mower Gear Box Oil-Seal

Consult your local KUBOTA Dealer for this service.

■ Replacing Intake Air Line

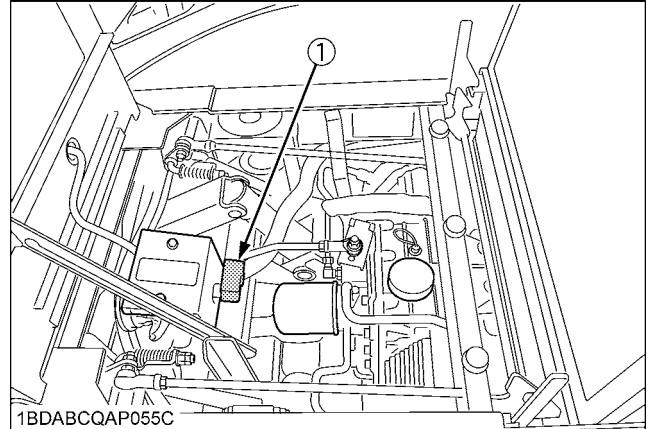
See "Checking Intake Air Line" in "EVERY 200 HOURS" in "PERIODIC SERVICE" section.

SERVICE AS REQUIRED

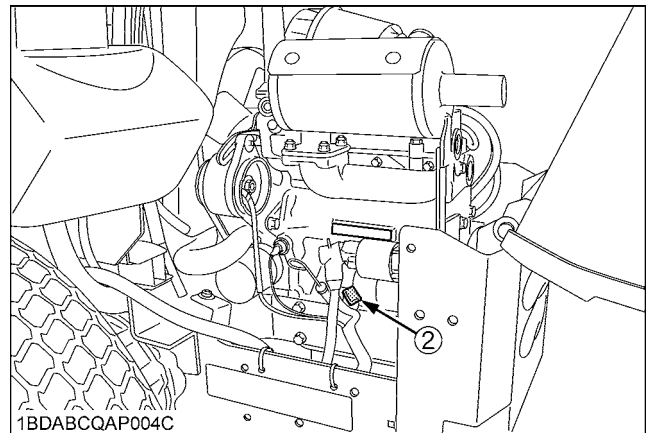
■ Replacing Fuses

Replacement of the fuse

1. Raise the operator's seat.
2. Remove the blown fuse.
3. Place a new fuse of the same capacity in position.



(1) Fuse location



(2) Slow blow fuse

IMPORTANT :

- If the new fuse happens to blow out within a short time, contact your dealer for inspection and repair. Never "jump" the fuse with wire or foil, or install a larger capacity fuse than is recommended.

◆ Protected circuit

FUSE NO.	CAPACITY (A)	Protected circuit
(1)	20 A	Engine stop
	15 A	Charge system
	15 A	Main system
	15 A	Aux. outlet
	10 A	Control system
	(20 A)	*(Work light)
(2)	Slow blow fuse 40 A	Check circuit against wrong battery connection

*Option: The fuse should be in only when the work light is attached.

■ Checking and Replacing Blade



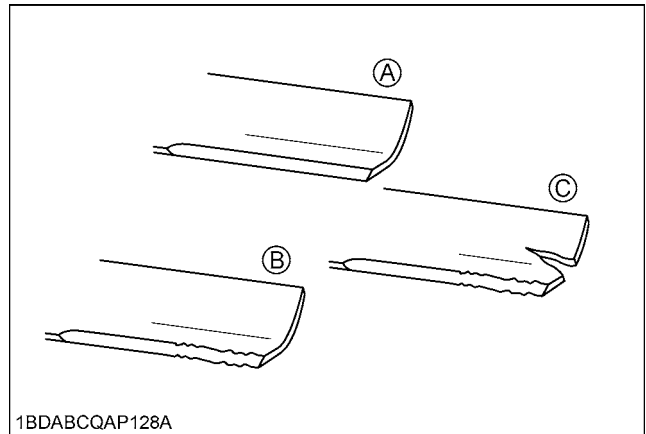
CAUTION

To avoid personal injury:

- Be sure to stop the engine and remove the key.
- Blades may be sharp. When you handle blades, wear heavy gloves or wrap end of blade with a rag.

◆ Checking

The blade cutting edges should be kept sharp at all times. Sharpen the cutting edges, if they resemble blade (B). Replace the blades if they appear similar to blade (C).



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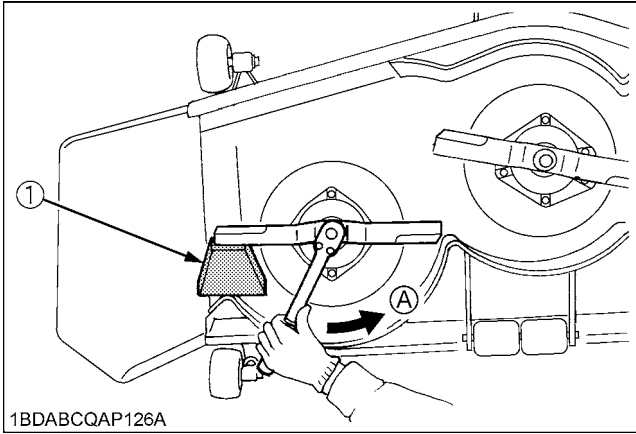
- (A) New blade
- (B) Worn blade
- (C) Cracked blade

◆ Replacing

1. Tilt up the mower deck.
(See "HOW TO TILT UP THE MACHINE" in "PERIODIC SERVICE" section.)
2. Wedge a block of wood between the blade and mower housing or use a box wrench over the pulley nut to prevent the spindle from rotating while removing the blade bolts; loosen the blade bolt as illustrated.

IMPORTANT :

- Use the proper metric size box or socket wrench to tighten or loosen the blade mounting bolt.

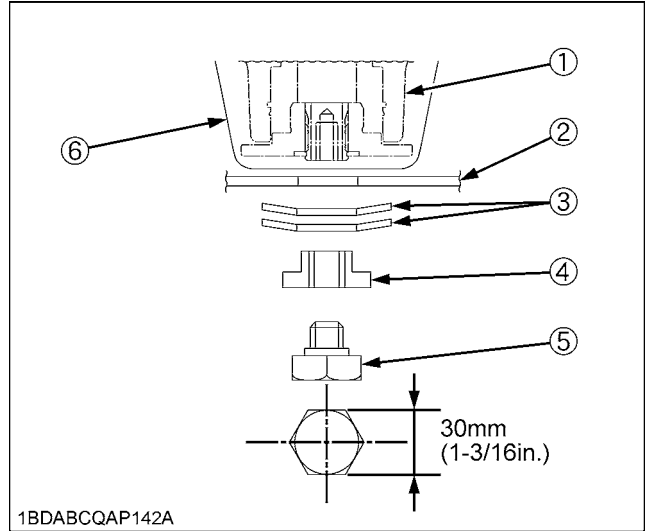


(1) Block (A) "LOOSEN"

3. To sharpen the blades yourself, clamp the blade securely in a vise. Use a large mill file and file along the original bevel until sharp.
4. To check the blade for balance, place a small rod through the center hole. If the blade is not balanced, file the heavy side of the blade until balance is achieved.
5. Pass the spline boss through the blade and 2 cup washers, and tighten the bolt.

NOTE :

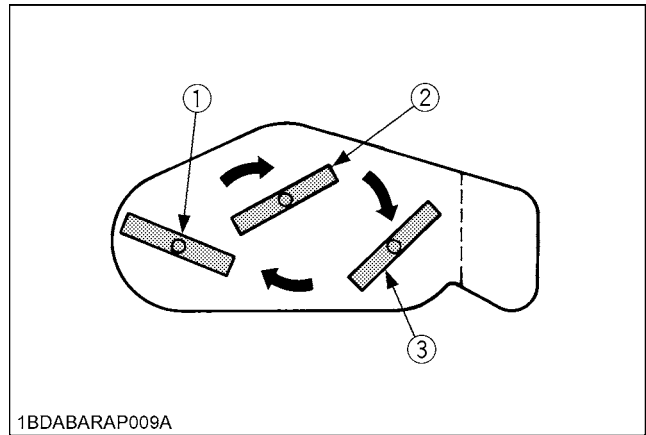
- Make sure that the cup washer is not flattened out or worn; this cause blade to slip excessively. Replace the 2 cup washers if either is damaged.
6. Before checking or replacing the blade, wipe grass and mud off the top and inside of the mower. Especially clean up the inside of the belt cover, because otherwise the belt life will be reduced.



(1) Spindle holder
 (2) Blade
 (3) 2-Cup washers
 (4) Lock washer
 (5) Bolt
 (6) Spindle guard

IMPORTANT :

- Tighten the three blade bolts to 98 to 117.6 N-m (10 to 12 kgf-m, 72 to 87 ft-lbs) of torque.
- The blade bolts have Right hand threads. Turn them counterclockwise to loosen.
- To prolong the service life of the blades, reposition them as shown in the figure below periodically.



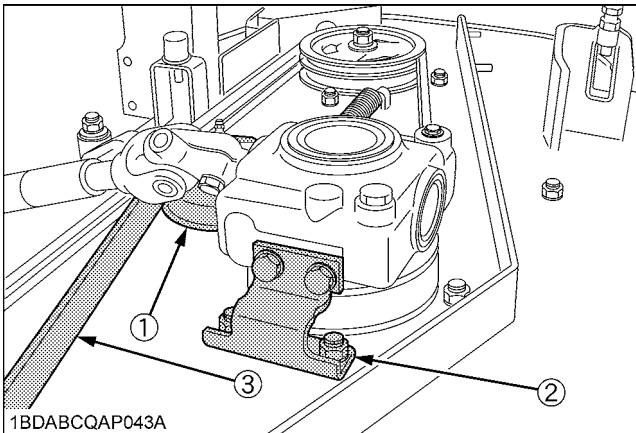
(1) LH blade
 (2) Center blade
 (3) RH blade

■ Mower Belt Replacement

1. Remove the mower deck from the machine according to the procedure "DISMOUNTING THE MOWER DECK".
2. Remove the left and right hand shield from the mower deck.
3. Clean around the gear box.
4. Remove the belt from the tension pulley.
5. Remove the right hand bracket which mounts the gear box to the mower deck and slip the belt over the top of the gear box.
6. To install a new belt, reverse the above procedure.

NOTE :

- Tighten bracket bolts securely 77.6 to 90.2 N-m (8.0 to 9.2 kgf-m, 57.1 to 66.5 ft-lbs.).



- (1) Tension pulley
 (2) Bracket (RH)
 (3) Belt

■ Bleeding Fuel System

Air must be removed:

1. When the fuel filter or lines are removed.
2. When tank is completely empty.
3. After the machine has not been used for a long period of time.

◆ Bleeding procedure is as follows:

1. Fill the fuel tank with fuel.
2. Start the engine and run for about 30 seconds, and then stop the engine.

ADJUSTMENT

MOTION CONTROL LEVER



CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
 - If it is necessary to run engine in an enclosed area, use a gas tight exhaust pipe extension to remove the fumes.
 - Always try to work in a well-ventilated area.
 - Lift up and secure with jack stands or block the rear of the machine, do not run the machine while adjusting.
- Remove rear wheels.

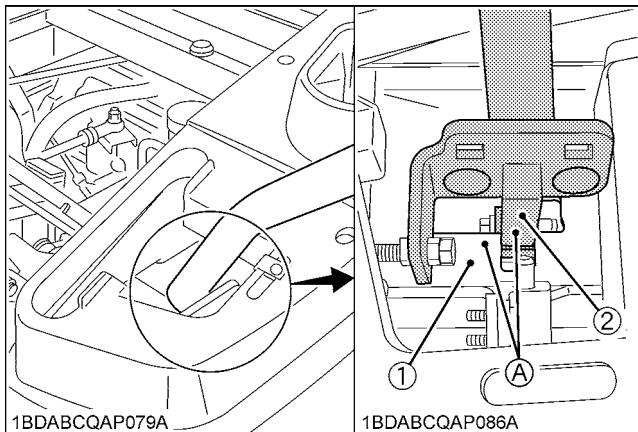
IMPORTANT :

- Right and left motion control levers can be adjusted independently.

■ HST NEUTRAL

1. Lift-up and secure with jack stands or blocking the rear of the machine frame.
2. Remove both rear wheels.
3. Place the motion control lever in the "NEUTRAL LOCK" position.
4. Check that the lever is touching the front side of its guide plate.

If the lever is not in the correct position, adjust the speed control spring. (See "MOTION CONTROL LEVER NEUTRAL POSITION" in "ADJUSTMENT" section.)



(1) Guide plate
(2) Motion control lever

(A) The lever is in contact with plate.

5. Pull the latch lever and raise the operator's seat.
6. Remove the connector from the seat safety switch, then **temporarily** install a jumper wire across the terminals in the connector of the wire harness.

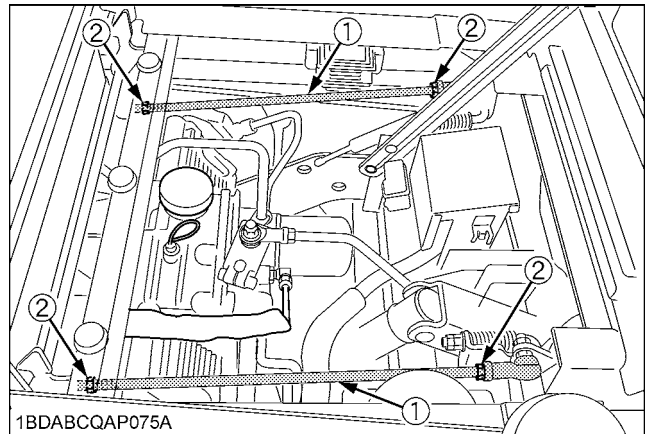


CAUTION

To avoid personal injury:

- Do not operate the machine with a jumper wire.
- If you feel you are unable to make the following adjustments correctly and safely, please contact your local KUBOTA Dealer.

7. Loosen the lock nut of the motion control rod.
Adjust the motion control rod until axle rotation stops.



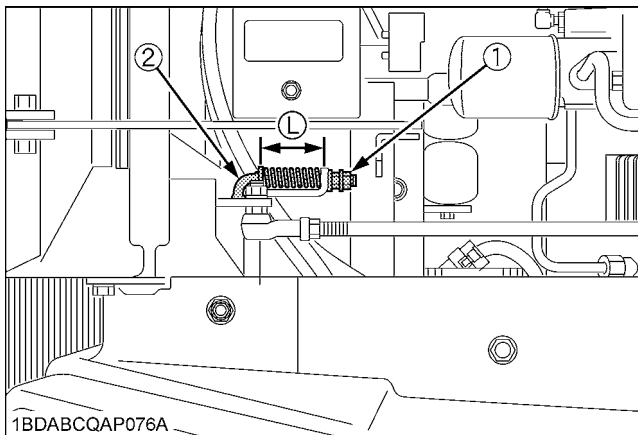
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(1) Motion control rod
(2) Lock nut

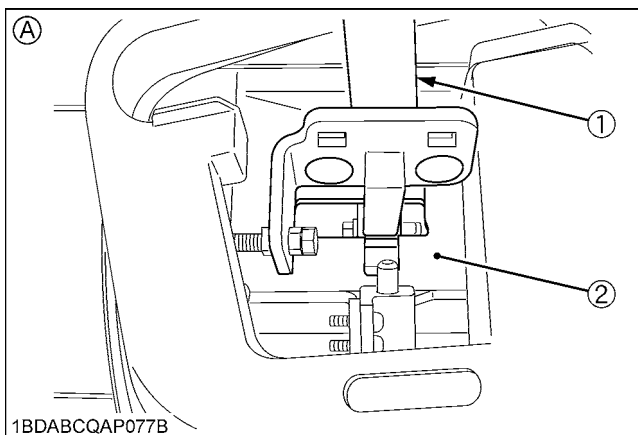
8. Lengthen the rod by 1/2 turn and then tighten the lock nut.
Place the motion control lever to the reverse position, and move them to the forward slowly.
9. Place the lever in the "NEUTRAL LOCK" position, and check that the rear axle does not rotate.
If the axle have not stopped rotating, adjust the "HST NEUTRAL" again.
10. After adjustment, be sure to stop the engine immediately.
11. Adjust the other side "HST NEUTRAL" equally.

■ MOTION CONTROL LEVER NEUTRAL POSITION

1. Lift-up and secure with jack stands or blocking the rear of the machine frame.
2. Remove both rear wheels.
3. Start the engine, and run at maximum speed.
4. Place the lever in the "NEUTRAL" position.
5. Pull the lever to the reverse maximum position and release the lever.
6. Measure the axle rotation.
7. Loosen the lock nut and adjust the speed control bolt length so that the axle rotation would stop.
8. Tighten the lock nut.
9. Check the axle rpm again.
If it is not correct, adjust again.
10. Adjust the other side equally.
11. After adjustment, be sure to stop the engine immediately.



(1) Lock nut
(2) Speed control bolt
(L) 50 mm (2.0 in.)



(1) Motion control lever
(2) Guide plate
(A) "NEUTRAL" position
(hands off)

■ MAXIMUM SPEED (FORWARD)

Consult your local KUBOTA Dealer for this service.

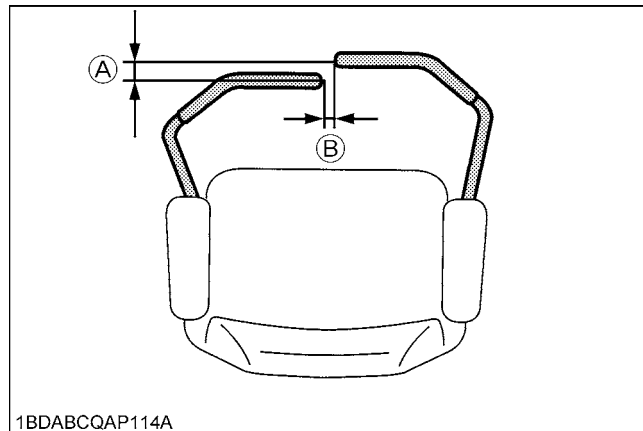
■ MOTION CONTROL LEVER ALIGNMENT

◆ Check the alignment

Check the gap and space between the levers, at the maximum forward position.

Recommendation	Gap: 0 to 2 mm (0 to 0.08 in.)
	Space: 10 to 20 mm (0.4 to 0.8 in.)

If positions of the control levers are unequal, an adjustment is necessary.



(A) "GAP"
(B) "SPACE"



CAUTION

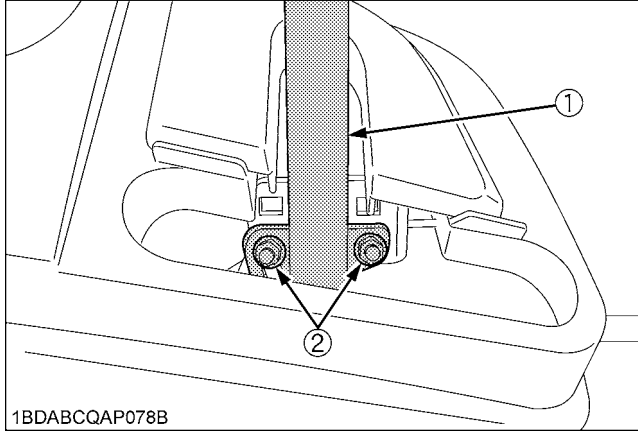
To avoid personal injury;

- Park the machine on a firm and level surface.
- Stop the engine, remove the key and apply the parking brake.

◆ Aligning the control levers

Lever position (High or Low)

1. Remove the nut and select the motion control lever position, high or low.
2. Tighten the nut.



- (1) Motion control lever
(2) Nut

Lever alignment (Right and Left)

3. Loosen the nut.
4. Slide both levers forward or rearward to desired position within tab slots until levers are aligned.
5. Tighten the nut.

NOTE :

- If the ends of the levers strike against each other while in the "NEUTRAL" position, move the levers outward to the "NEUTRAL LOCK" position and carefully bend them outward. Move them back to the "NEUTRAL" position and check for the recommended space.

MOWER DECK LEVEL

■ ANTI-SCALP ROLLERS



CAUTION

To avoid personal injury;

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Stop the engine and remove the key.
- Wait for all moving parts to stop.

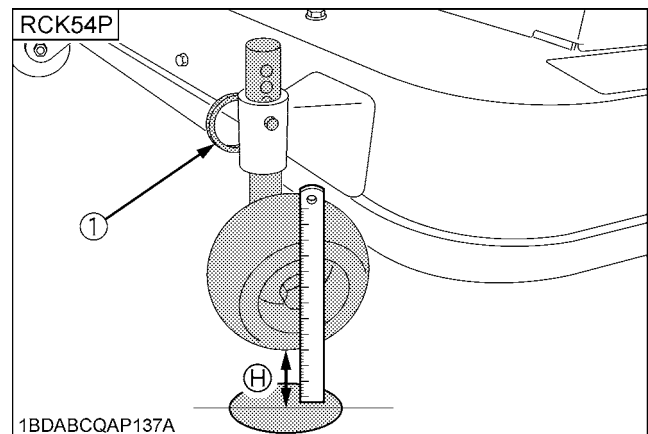
IMPORTANT :

- The flattest cut can be achieved by having the anti-scalp rollers adjusted off the ground. Check anti-scalp roller adjustments each time the mower deck cutting height is changed. It is recommended that all the anti-scalp rollers be kept off the ground to minimize scuffing.

1. Check the machine tire pressure. Inflate tires to the correct pressure. (See "TIRES AND WHEELS" section.)
2. Start the engine.
3. Raise up the mower deck to the transport position. (Also the top end of the lift.)
4. Turn the cutting height control dial to adjust height.
5. Lower the mower deck.

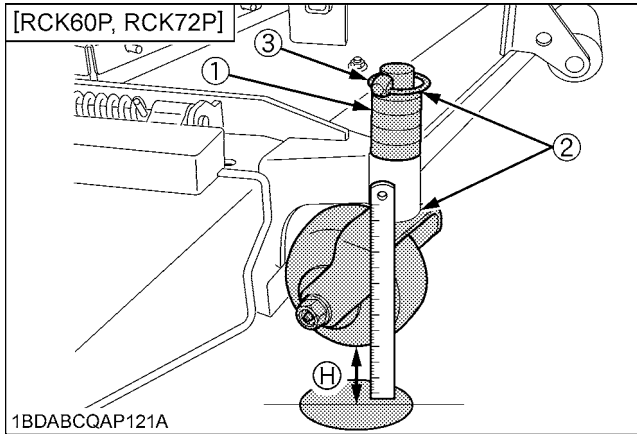
Front side anti-scalp roller

6. Adjust height of the front side anti-scalp roller by replacing the collar (collar is raised and lowered) to approximately 19 mm (3/4 in.) between rollers and ground. Adjust both side rollers to the same height.



(1) Set pin

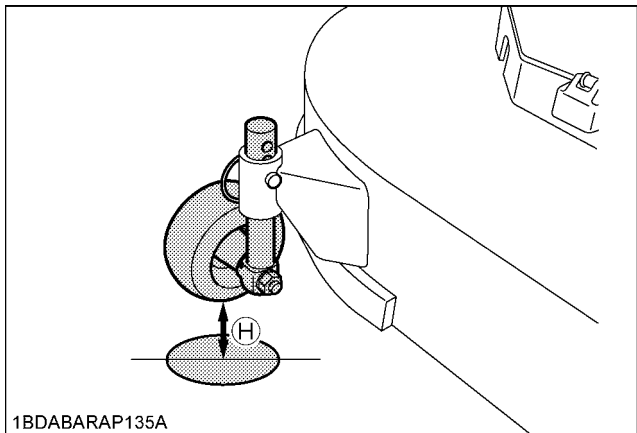
(H) 19 mm (3/4 in.)



- (1) Collar
 (2) Washer
 (3) Set pin
- (H) 19 mm (3/4 in.)

Rear side anti-scalp roller

7. Adjust height of the rear side anti-scalp roller to one of seven positions to approximately 19 mm (3/4 in.) between rollers and ground. Adjust both side rollers to the same height.



(H) 19 mm (3/4 in.)

■ LEVEL MOWER DECK (Side-to-Side)



CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Disengage PTO (OFF).
- Stop the engine, remove the key and remove the mower u-joint while checking or adjusting the level of the mower deck.

IMPORTANT :

- Check the machine tire pressure. Inflate tires to the correct pressure. (See "TIRES AND WHEELS" section.)

◆ Checking level (Side-to-Side)

NOTE :

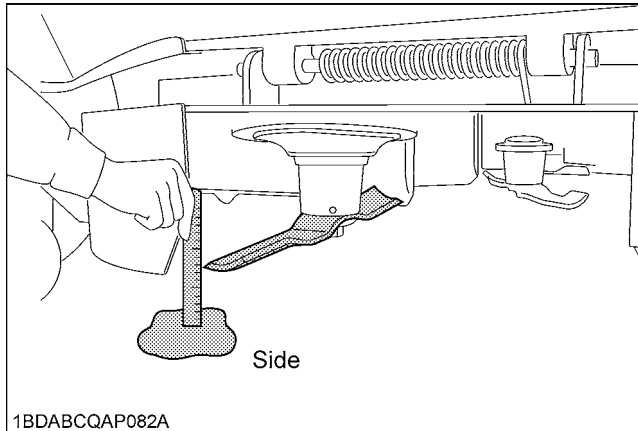
- Mower deck anti-scalp rollers should not contact the ground.
1. Raise the mower deck to the transport position. (Also the top end).
 2. Turn the cutting height set dial to the 3 in. cutting height position.
 3. Lower the mower deck.
 4. Position the right mower blade in the Side-to-Side position.
 5. Measure from outside blade tip to the level surface with a short ruler or leveling gauge.

Reference

Height of the blade at the concrete surface	76 mm (3 in.)
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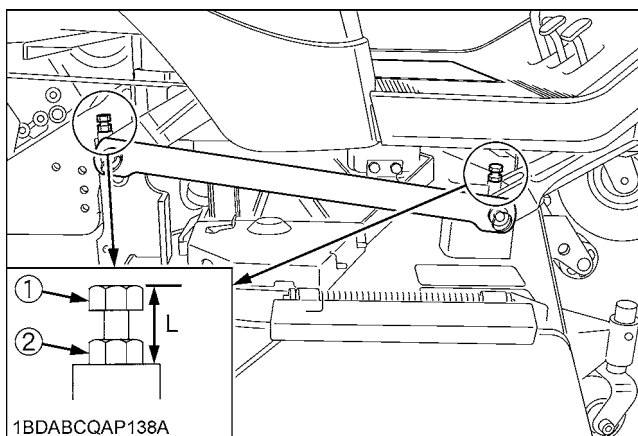
NOTE :

- There is a difference of the blade height between on the concrete and ground.
6. Check that the left side blade is same height. The difference between both measurements should be less than 3 mm (1/8 in.).
 7. If the Side-to-Side adjustment is not within the given tolerance, adjustment necessary.



◆ Adjusting level (Side-to-Side)

1. Raise up the mower deck to the transport position. (Also the top end).
2. Turn the cutting height set dial to the 3 in. cutting height position.
3. Place 51 mm (2 in.) height wood blocks under each side of the mower deck. Anti-scalp rollers must not rest on the wood block.
4. Lower the mower deck.
5. Position mower blade in the Side-to-Side position.
6. Loosen the lock nuts of the right side of the machine.
7. Adjust the cutting height fine tuning bolts to set 76 mm (3 in.) height. Front and rear side bolts must be adjusted.
8. Lock the nuts.
9. Adjust the left side equally.
10. Check the side-to-side level and if it is not level, adjustment necessary.



- (1) Cutting height fine tuning bolt
(2) Lock nut

■ LEVEL MOWER DECK (Front-to-Rear)

⚠ CAUTION

To avoid personal injury:

- Park the machine on a firm and level surface.
- Engage the parking brake.
- Disengage PTO.
- Stop the engine, remove the key and remove the mower u-joint while checking or adjusting the level of the mower deck.

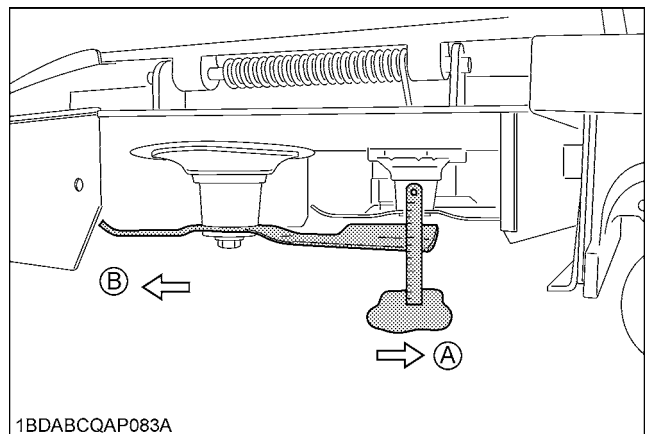
IMPORTANT :

- Check the machine tire pressure. Inflate tires to the correct pressure. (See "TIRES AND WHEELS" section.)

◆ Checking level (Front-to-Rear)

NOTE :

- Mower deck anti-scalp rollers should not contact the ground.
1. Raise the mower deck to the transport position. (Also the top end).
 2. Turn the cutting height set dial to the 3 in. cutting height position.
 3. Lower the mower deck.
 4. Position the right mower blade in the Front-to-Rear position.
 5. Measure from the right front blade tip to the level surface with a short ruler or leveling gauge.
 6. Turn the blade 180° and measure from right rear blade tip to the level surface.
 7. Check that the left side blade has the same dimension. The difference between both measurements should be less than 6 mm (1/4 in.). Front side must be lower than rear side.
 8. If the Front-to-Rear adjustment is not within the given tolerance, adjustment is necessary.



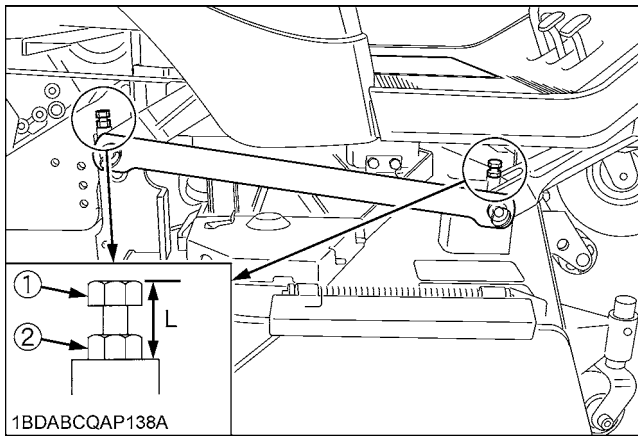
- (A) Front
(B) Rear

◆ Adjusting level (Front-to-Rear)

1. Raise up the mower deck to the transport position.
(Also the top end).
2. Turn the cutting height set dial to the 3 in. cutting height position.
3. Place 51 mm (2 in.) height wood blocks under each side of the mower deck.
Anti-scalp rollers must not rest on the wood block.
4. Lower the mower deck.
5. Loosen the lock nuts of the front side of the machine.
6. Adjust the cutting height fine tuning bolts to set 76 mm (3 in.) height.
Both front side bolts must be adjusted.
7. Lock the nuts.
8. Adjust the other side equally.





IMPORTANT :

- The difference between both measurements should be less than 6 mm (1/4 in.).
Front side must be lower than rear side.
9. Check the front-to-rear level and if it is not level, adjustment necessary.



- (1) Cutting height fine tuning bolt
(2) Lock nut

GENERAL TORQUE SPECIFICATION

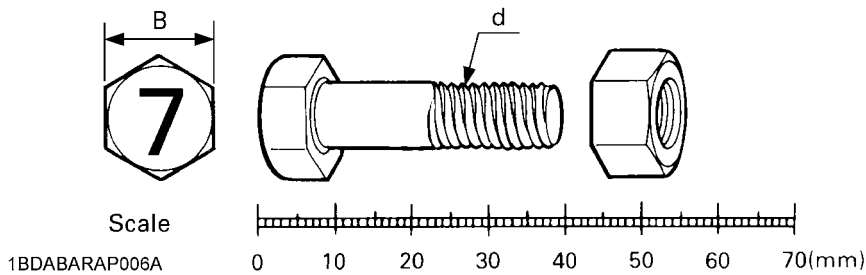
American standard cap screws with UNC or UNF threads			Metric cap screws		
SAE grade No.	GR.5 	GR.8 	Property class	Class 8.8 	Class 10.9 
1/4	(ft-lbs) 8 - 9.6 (N-m) 10.7 - 12.9 (kgf-m) 1.11 - 1.33	12 - 14.4 16.1 - 19.3 1.66 - 1.99	M6	(ft-lbs) 7.2 - 8.3 (N-m) 9.81 - 11.3 (kgf-m) 1.0 - 1.15	
5/16	(ft-lbs) 17 - 20.5 (N-m) 23.1 - 27.8 (kgf-m) 2.35 - 2.84	24 - 29 32.5 - 39.3 3.31 - 4.01	M8	(ft-lbs) 17.4 - 20.2 (N-m) 23.6 - 27.4 (kgf-m) 2.4 - 2.8	21.7 - 25.3 29.4 - 34.3 3.0 - 3.5
3/8	(ft-lbs) 35 - 42 (N-m) 47.5 - 57.0 (kgf-m) 4.84 - 5.82	45 - 54 61.0 - 73.2 6.22 - 7.47	M10	(ft-lbs) 35.5 - 41.2 (N-m) 48.1 - 55.8 (kgf-m) 4.9 - 5.7	44.9 - 52.1 60.8 - 70.5 6.2 - 7.2
1/2	(ft-lbs) 80 - 96 (N-m) 108.5 - 130.2 (kgf-m) 11.07 - 13.29	110 - 132 149.2 - 179.0 15.22 - 18.27	M12	(ft-lbs) 57.2 - 66.5 (N-m) 77.5 - 90.1 (kgf-m) 7.9 - 9.2	76.0 - 86.8 103 - 117 10.5 - 12.0
9/16	(ft-lbs) 110 - 132 (N-m) 149.2 - 179.0 (kgf-m) 15.22 - 18.27	160 - 192 217.0 - 260.4 22.14 - 26.57	M14	(ft-lbs) 91.2 - 108 (N-m) 124 - 127 (kgf-m) 12.6 - 15.0	123 - 144 167 - 196 17.0 - 20.0
5/8	(ft-lbs) 150 - 180 (N-m) 203.4 - 244.1 (kgf-m) 20.75 - 24.91	220 - 264 298.3 - 358.0 30.44 - 36.53	M16	(ft-lbs) 145 - 166 (N-m) 196 - 225 (kgf-m) 20.0 - 23.0	192 - 224 260 - 303 26.5 - 31.0

TIGHTENING TORQUE CHART

Thread size d (mm)	Hexa-Bolt Head size B (mm)	No mark			7T		
		ft-lbs	N-m	kgf-m	ft-lbs	N-m	kgf-m
M8	12 or 13	13.0 - 15.2 (14.1 ± 1.1)	17.8 - 20.6 (19.2 ± 1.4)	1.9 - 2.1 (2.0 ± 0.1)	17.5 - 20.3 (18.9 ± 1.4)	23.5 - 27.5 (25.5 ± 2.0)	2.4 - 2.8 (2.6 ± 0.2)
M10	14 or 17	28.9 - 33.3 (31.1 ± 2.2)	39.3 - 45.1 (42.2 ± 2.9)	4.0 - 4.6 (4.3 ± 0.3)	35.4 - 41.2 (38.3 ± 2.9)	48.1 - 55.9 (52.0 ± 3.9)	4.9 - 5.7 (5.3 ± 0.4)
M12	17 or 19	46.3 - 53.5 (49.9 ± 3.6)	62.8 - 72.6 (67.7 ± 4.9)	6.4 - 7.4 (6.9 ± 0.5)	57.1 - 66.5 (61.8 ± 4.7)	77.6 - 90.2 (83.9 ± 6.3)	8.0 - 9.2 (8.6 ± 0.6)
M14	19 or 22	79.6 - 92.6 (86.1 ± 6.5)	107.9 - 125.5 (116.7 ± 8.8)	11.0 - 12.8 (11.9 ± 0.9)	91.1 - 108.5 (99.8 ± 8.7)	123.6 - 147.0 (135.3 ± 11.7)	12.6 - 15.0 (13.8 ± 1.2)

NOTE :

- Figure "7" on the top of the bolt indicates that the bolt is of special material.
- Before tightening, check the figure on the top of bolt.



STORAGE



CAUTION

To avoid personal injury:

- Do not clean the machine with engine running.
- To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- When storing, remove the key to avoid unauthorized persons from operating the machine and getting injured.

MACHINE STORAGE

If you intend to store your machine for an extended period of time, follow the procedures outlined below. These procedures will insure that the machine is ready to operate with minimum preparation when it is removed from storage.

1. Check for loose bolts and nuts, and tighten if necessary.
2. Apply grease to machine areas where bare metal will rust also to pivot areas.
3. Inflate the tires to a pressure a little higher than usual.
4. Change the engine oil and run the engine to circulate oil throughout the engine block and internal moving parts for about five minutes.
5. With all implements lowered to the ground, coat any exposed hydraulic cylinder piston rods with grease.
6. Remove the battery from the machine. When disconnecting the cables from the battery, start with the negative terminal first. When connecting the cables to the battery, start with the positive terminal first.
7. Keep the machine in a dry place where the machine is sheltered from rain. Cover the machine.
8. Store the machine indoors in a dry area that is protected from sunlight and excessive heat. If the machine must be stored outdoors, cover it with a waterproof tarpaulin.
9. Jack the machine up and place blocks under the front and rear axles so that all four tires are off the ground. Keep the tires out of direct sunlight and extreme heat.

IMPORTANT :

- When washing the machine, be sure to stop the engine. Allow sufficient time for the engine to cool before washing.
- Cover the machine after the muffler and the engine have cooled down.

REMOVING THE MACHINE FROM STORAGE

1. Check the tire air pressure and inflate the tires if they are low.
2. Jack the machine up and remove the support blocks.
3. Install the battery. Before installing the battery, make sure it is fully charged.
4. Check the fan belt tension.
5. Check all fluid levels (engine oil, transmission/hydraulic oil, engine coolant and any attached implements).
6. Check all control levers and the brake for proper function free up or lubricate as necessary.
7. Start the engine. Observe all gauges. If all gauges are functioning properly and reading normal, move the machine outside.
8. Once outside, park the machine securely set the parking brake, place the control levers in the neutral lock position and let the engine idle for at least five minutes.
9. Shut the engine off and walk around machine and make a visual inspection looking for evidence of oil or water leaks.
10. With the engine fully warmed up, release the parking brake and test the brakes for proper adjustment as you move forward. Adjust the brakes as necessary.

TROUBLESHOOTING

ENGINE TROUBLESHOOTING

If something is wrong with the engine, refer to the table below for the cause and its corrective measure.

Trouble		Cause	Countermeasure
Engine is difficult to start or won't start		<ul style="list-style-type: none"> ● No fuel flow. 	<ul style="list-style-type: none"> ● Check the fuel valve position. ● Check the fuel tank and the fuel filter. Replace filter if necessary.
		<ul style="list-style-type: none"> ● Air or water is in the fuel system. 	<ul style="list-style-type: none"> ● Check to see if the fuel line coupler bolt and nut are tight. ● Bleed the fuel system. (See "SERVICE AS REQUIRED" in "PERIODIC SERVICE" section.)
		<ul style="list-style-type: none"> ● In winter, oil viscosity increases, and engine revolution is slow. 	<ul style="list-style-type: none"> ● Use oils of different viscosities, depending on ambient temperatures.
		<ul style="list-style-type: none"> ● Battery becomes weak and the engine does not turn over quick enough. 	<ul style="list-style-type: none"> ● Clean battery cables and terminals. ● Charge the battery. ● In cold weather, always remove the battery from the engine, charge and store it indoors. Install it on the machine only when the machine is going to be used.
Insufficient engine power.		<ul style="list-style-type: none"> ● Insufficient or dirty fuel. ● The air cleaner is clogged. 	<ul style="list-style-type: none"> ● Check the fuel valve position. ● Check the fuel system. ● Clean the element.
Engine stops suddenly.		<ul style="list-style-type: none"> ● Insufficient fuel. 	<ul style="list-style-type: none"> ● Check the fuel valve position. ● Refuel. ● Bleed the fuel system if necessary.
Exhaust fumes are colored.	Black	<ul style="list-style-type: none"> ● Fuel quality is poor. ● Too much oil. ● Engine is overloaded. 	<ul style="list-style-type: none"> ● Change the fuel and fuel filter. ● Check the proper amount of oil. ● Reduce engine load.
	Blue white	<ul style="list-style-type: none"> ● The inside of exhaust muffler is dumped with fuel. ● Injection nozzle trouble. ● Fuel quality is poor. 	<ul style="list-style-type: none"> ● Heat the muffler by applying load to the engine. ● Check the injection nozzle. ● Change the fuel and fuel filter.
Engine overheats.		<ul style="list-style-type: none"> ● Engine overloaded. 	<ul style="list-style-type: none"> ● Lower speed or reduce load.
		<ul style="list-style-type: none"> ● Low coolant level. 	<ul style="list-style-type: none"> ● Fill cooling system to the correct level; check radiator and hoses for loose connections or leaks.
		<ul style="list-style-type: none"> ● Loose or defective fan belt. 	<ul style="list-style-type: none"> ● Adjust or replace fan belt.
		<ul style="list-style-type: none"> ● Dirty radiator core or grille screens. 	<ul style="list-style-type: none"> ● Remove all trash.
		<ul style="list-style-type: none"> ● Coolant flow route corroded. 	<ul style="list-style-type: none"> ● Flush cooling system.

If you have any questions, contact your local KUBOTA Dealer.

BATTERY TROUBLESHOOTING

Trouble	Cause	Remedy	Preventive measure
Starter does not function.	● Battery overused until lights are dim.	● Charge battery sufficiently.	● Charge the battery properly.
	● Battery has not been recharged.		
	● Poor terminal connection.	● Clean the terminal and tighten securely.	● Keep the terminal clean and tight. Apply grease and treat with anti-corrosives.
	● Battery life expired.	● Renew battery.	
From beginning starter does not function, and lights soon become dim.	● Insufficient charging.	● Charge battery sufficiently.	● Battery must be serviced properly before initial use.
When viewed from top, the top of plates look whitish.	● Battery was used with an insufficient amount of electrolyte.	● Add distilled water and charge the battery.	● Regularly check the electrolyte level.
	● Battery was used too much without recharging.	● Charge battery sufficiently.	● Charge the battery properly.
Recharging is impossible.	● Battery life expired.	● Replace battery.	
Terminals are severely corroded and heat up.	● Poor terminal connection.	● Clean the terminal and tighten securely.	● Keep the terminal clean and tight. Apply grease and treat with anti-corrosives.
Battery electrolyte level drops rapidly.	● There is a crack or pin holes in the electrolytic cells.	● Replace battery.	
	● Charging system trouble.	● Contact your local KUBOTA Dealer.	

If you have any questions, contact your local KUBOTA Dealer.

MACHINE TROUBLESHOOTING

Trouble	Cause	Remedy
Machine operation is not smooth.	● Hydrostatic transmission fluid is insufficient.	● Replenish oil.
	● Filter is clogged.	● Replace the filter.
Machine does not move while engine is running.	● Parking brake is on.	● Release the parking brake.
	● Transmission fluid level is insufficient.	● Replenish oil.
Machine moves when motion control levers are in the "NEUTRAL LOCK" position. (Engine is operated.)	● Hydrostatic lever linkage is not correctly adjusted.	● Ask your dealer for hydrostatic lever linkage adjustment or pressure adjustment.
	● Control linkage pivots are sticking.	● Full up and lubricate linkage.

If you have any questions, contact your local KUBOTA Dealer.

MOWER TROUBLESHOOTING

Trouble	Cause	Remedy
Discharge chute plugged.	● Grass too wet.	● Wait for grass to dry.
	● Grass too long.	● Raise cutting height and cut grass twice.
	● Cutting too low.	● Raise cutting height.
	● Engine r.p.m. too low.	● Mow at full throttle.
	● Ground speed too fast.	● Slow down.
Streaking of grass uncut.	● Ground speed too fast.	● Slow down.
	● Engine r.p.m. too low.	● Mow at full throttle, check and reset engine r.p.m..
	● Grass too long.	● Cut grass twice.
	● Blades dull or damaged.	● Replace blades or have blades sharpened.
	● Debris in mower deck.	● Clean mower deck.
Uneven cut.	● Mower deck not level.	● Level mower deck.
	● Ground speed too fast.	● Slow-down.
	● Blades dull.	● Have blades sharpened.
	● Blades worn.	● Replace blades.
	● Low tire inflation.	● Add air to correct pressure.
	● Anti-scalp rollers not adjusted correctly.	● Adjust anti-scalp rollers.
	● Wheels pressure not adjusted correctly.	● Set both tire pressures to the correct pressure. (See "TIRES" in "TIRES AND WHEELS" section.)
Blades scalping grass.	● Cutting height too low.	● Raise cutting height.
	● Turning speed too fast.	● Reduce speed on turns.
	● Ridges in terrain.	● Change mowing pattern.
	● Rough or uneven terrain.	● Adjust wheels pressure and anti scalp rollers.
	● Anti-scalp rollers not adjusted correctly.	● Adjust wheels pressure and anti scalp rollers.
	● Bent blade(s).	● Replace blade(s).
Belt slipping.	● Mower deck plugged.	● Unplug and clean mower deck.
	● Debris in pulleys.	● Clean pulleys.
	● Worn belt.	● Replace belt.
Excessive vibration.	● Debris on mower deck or in pulleys.	● Clean mower deck and pulleys.
	● Damaged drive belt.	● Replace drive belt.
	● Damaged pulleys.	● Replace pulleys.
	● Pulleys out of alignment.	● See your KUBOTA Dealer.
	● Blades out of balance.	● Have blades balanced.

Trouble	Cause	Remedy
Mower loads down machine.	● Engine r.p.m. too low.	● Mow at full throttle, check and reset engine r.p.m..
	● Ground speed too fast.	● Slow down.
	● Debris wrapped around mower spindles.	● Clean mower.
	● Front of deck lower than rear.	● Adjust deck. (See "MOWER DECK" in "ADJUSTMENT" section.)

If you have any questions, contact your local KUBOTA Dealer.