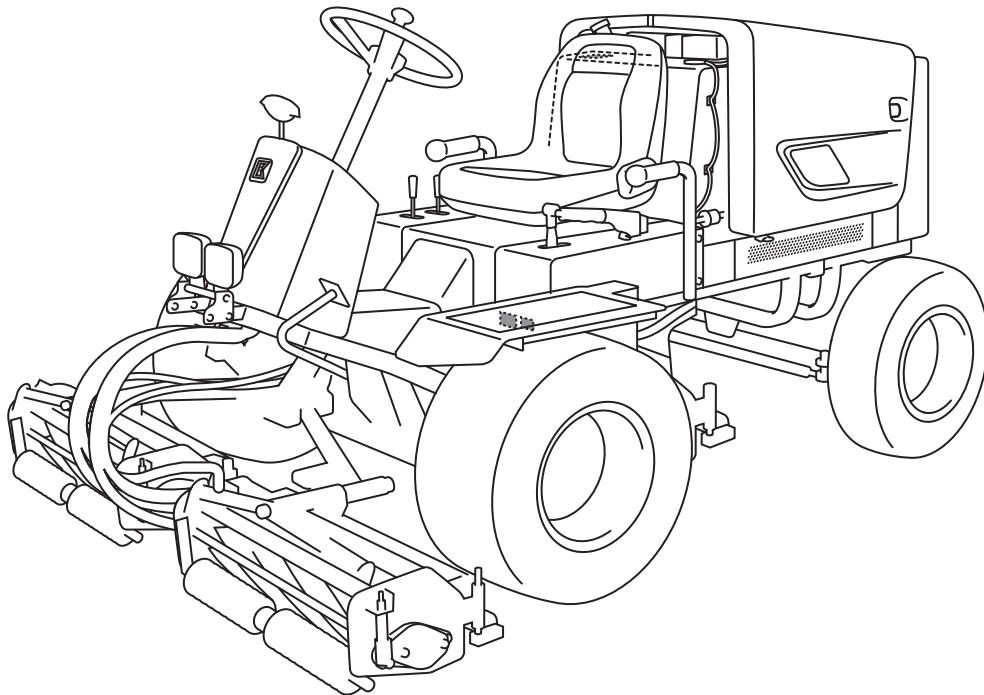


BARONESS
Quality on Demand

LM283

3-Unit Reel Mower

Owner's operating manual



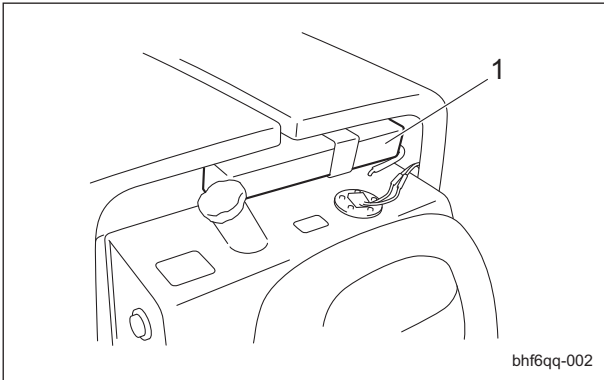
"Required reading" Read this manual and the owner's manual for the engine before using the machine.

Greeting

Thank you for purchasing the Baroness machine. This manual explains proper handling, adjustment, and inspection of your machine. Prior to use, carefully read this manual to thoroughly understand the contents for safe and correct operation. We hope you will use the machine safely, and take advantage of its best performance.

Keeping the Owner's Operating Manual

Keep this Owner's Operating Manual in the box located in the rear of the seat.



Keeping the Owner's Operating Manual_001

1	Box
---	-----

Read this manual carefully to ensure that you thoroughly understand how to properly operate and maintain this machine, and to avoid causing injury to yourself or others.

The operator is responsible for operating the machine properly and safely.

Do not perform maintenance on the machine other than that described in this manual.

Be sure to also read the operating manuals for the engine, battery, etc.

Maintenance should only be performed by a certified specialist.

When making inquiries about this machine, please specify the machine's model designation and serial number.

When loaning or transferring this machine, please also provide the Owner's Operating Manual together with the machine.

Caution

The information described in this manual is subject to change for improvement without prior notice. Note that the Baroness product warranty may not apply to defects caused by the use of parts from other companies.

Warning Symbols

This manual uses the following warning symbols for handling precautions that are important for your safety.



696cq5-001

Warning symbol

This symbol indicates the articles regarding “Danger,” “Warning,” or “Caution.”

Those articles describe important safety precautions and so read them carefully to understand completely before operating the machine.

Failure to adequately follow these safety precautions may cause an accident.

Danger

This symbol indicates that serious injury or death will occur if the warning is ignored.

Warning

This symbol indicates that serious injury or death may occur if the warning is ignored.

Caution

This symbol indicates that injury or damage to property may occur if the warning is ignored.

Important

This symbol indicates precautions on the mechanism of the machine.

Introduction

Purpose

This machine is intended for cutting turf grass at golf courses.

Do not use this machine in any way other than its intended purpose, and do not modify the machine.

Operating this machine for other purposes and modifying it may be very dangerous and may cause damage to the machine.

In addition, this machine is not authorized for operation as a special motor vehicle. Do not operate it on public roads.

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Safety

Failure to adequately follow these safety precautions may cause an accident resulting in injury or death.

Danger

This machine is designed to ensure safe operation and has been tested and inspected thoroughly before shipment from the factory. The machine is equipped with safety devices to prevent accidents.

However, whether the machine demonstrates its original performance level depends on the manner in which it is operated and handled, as well as the manner in which it is managed on a daily basis.

Inappropriate use or management of the machine may result in injury or death.

Observe the following safety instructions to ensure safe operation.

Safe Operating Practices

The following instructions include the ones from CEN standard EN 836: 1997, ISO standard 5395: 1990, and ANSI B71.4-2004.

Training

1. Read the Owner's operating Manual and other training material carefully. Be familiar with the controls, safety signs, and the proper use of the equipment.
2. If the operator or mechanic can not read English it is the owner's responsibility to explain this material to them.
3. All operators and mechanics should seek and obtain professional and practical instruction.

The owner is responsible for training the users.

Such instruction should emphasize.

- [1] The need for care and concentration when working with ride-on machines.
- [2] Control of a ride-on machine sliding on a slope will not be regained by the application of the brake.
The main reasons for loss of control are
 - Insufficient wheel grip
 - Being driven too fast
 - Inadequate braking
 - The type of machine is unsuitable for its task

- Lack of awareness of the effect of ground conditions, especially slopes
- Incorrect hitching and load distribution

4. Never allow children or people unfamiliar with these instructions to use or service the machine.
Local regulations may restrict the age of the operator.
5. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people, or property.
6. Keep in mind that the owner, operator, and mechanic are responsible for accidents or hazards occurring to other people or their property.

Preparation

1. Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
2. While operating, always wear substantial footwear, long trousers, hard hat, safety glasses, and ear protection. Long hair, loose clothing, or jewelry may get tangled in moving parts. Do not operate the equipment when barefoot or wearing open sandals.
3. Inspect the area where the equipment is to be used and remove all objects such as rocks, toys and wire which can be thrown by the machine.
4. Exercise care in the handling of fuel.

Warning

Warning-Fuel is highly flammable. Take the following precautions.

- [1] Store fuel in containers specifically designed for this purpose.
- [2] Add fuel before starting the engine. Never remove the cap of the fuel tank or add fuel while the engine is running or when the engine is hot.
- [3] Refuel outdoors only and do not smoke while refueling.
- [4] If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until petrol vapours have dissipated.

- [5] Replace all fuel tanks and container caps securely.
- 5. Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.
- 6. If the brake operation is faulty or the parking brake lever has noticeable play, be sure to adjust or repair them before operating the machine.
- 7. Replace faulty mufflers.
- 6. Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed may increase the hazard of personal injury.
- 7. Do the following before leaving the operator's position.
 - [1] Stop on level ground.
 - [2] Disengage the power take-off and lower the attachments.
 - [3] Change into neutral and set the parking brake.
 - [4] Stop the engine and remove the key.

Operation

- 1. Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- 2. Only operate in good light, keeping away from holes and hidden hazards.
- 3. Before attempting to start the engine, disengage all attachments, shift into neutral, and engage the parking brake. Only start engine from the operator's position. Use seat belts if provided.
- 4. Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care. To guard against overturning:
 - [1] Do not stop or start suddenly when going up or downhill.
 - [2] Engage clutch slowly, always keep machine in gear, especially when traveling downhill.
 - [3] Machine speeds should be kept low on slopes and during tight turns.
 - [4] Stay alert for humps and hollows and other hidden hazards.
 - [5] Never operate across the face of the slope, unless the machine is designed for this purpose.
 - [6] Never drive the machine on a slope with an angle of gradient that is greater than that specified or in a place where there is a danger of the machine slipping.
- 5. Never operate the machine with damaged guards, shields, or without safety protective devices in place. Be sure all interlocks are attached, adjusted and functioning properly.
- 8. Disengage the drive to attachments, stop the engine, and remove the ignition key in the following conditions.
 - [1] Before refueling.
 - [2] Before removing the grass catcher/catchers.
 - [3] Before making height adjustment unless adjustment can be made from the operator's position.
 - [4] Before cleaning blockages.
 - [5] Before checking, cleaning, or working the machine.
 - [6] After striking a foreign object or if an abnormal vibration occurs. Inspect the machine for damage and make repairs before restarting and operating the equipment.
- 9. Keep hands and feet away from the cutting units and the rotating parts.
- 10. Look behind and down before backing up to be sure of a clear path.
- 11. Do not carry passengers.
- 12. Never operate while people, especially children, or pets are nearby.
- 13. Slow down and use caution when making turns and crossing roads and sidewalks.
- 14. Stop the blades rotating before crossing surfaces other than grass.
- 15. Disengage drive to attachments when transporting or not in use.
- 16. When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
- 17. Do not operate the machine under the influence of alcohol or drugs.

Safety

18. Take care when loading or unloading the machine into a trailer or a truck. Load or unload the machine in a flat and safe place. Before loading or unloading, set the parking brake on the truck or trailer, stop the engine, and chock the wheels.
When transporting the machine on a truck or a trailer, set the parking brake, stop the engine, and fasten the machine to the truck with a rope or other suitable restraining device that has sufficient strength.
When using a running board, select one with sufficient strength, length, and width and that will not cause the machine to slip.
19. Close the fuel valve before transporting the machine.
20. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
21. Do not take your eyes off the road ahead. Do not operate the machine with no hands.
22. Reduce the throttle setting during engine run-out and, if the engine is provided with a shut-off valve, turn the fuel off at the conclusion of operation.
9. Never allow untrained personnel to service machine.
10. Allow the engine/muffler to cool before checking/maintenance.
11. Appropriately manage and correctly use the tools necessary for servicing or adjusting the machine.
12. Use jack stands to support components when required.
13. Carefully release pressure from components with stored energy.
14. Be sure to depressurize the hydraulic system before performing maintenance operations on it such as removing hydraulic equipment.
15. Check whether line connectors in the hydraulic system are properly tightened. Before applying hydraulic pressure, check the connections of the hydraulic pressure lines and the condition of the hoses.
16. When checking the hydraulic circuit for pinhole leaks or oil leakage from nozzles, do not use your hands. Use items such as paper or corrugated cardboard to find leakage points. Be extremely careful with high-pressure oil as it may pierce your skin, resulting in an injury.
If fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

Maintenance and storage

1. Disengage drives on level ground, lower the attachments, set parking brake, stop engine and remove key from ignition. Wait for all movement to stop before adjusting, cleaning or repairing.
2. When machine is to be parked, stored, or left unattended, lower the cutting units unless a positive mechanical lock is provided.
3. To reduce the fire hazard, keep the engine, silencer/muffler, battery compartment fuel storage area, cutting unit and drives free of grass, leaves, or excessive grease. Clean up oil or fuel spillage.
4. Allow the engine to cool before storing in any enclosure.
5. Only cover the machine with a sheet after hot parts have sufficiently cooled down.
6. Never store the equipment with fuel in the tank inside a building where fumes may reach an open flame or spark.
7. If the engine is provided with a shut-off valve, shut off valve while storing or transporting.
8. Do not store fuel near flames.
17. Disconnect battery before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
18. Make sure that parts such as wires are not touching each other and that their covers have not come off.
19. Use care when checking the cylinders/reels and bed knives.
 - [1] Wear gloves and use caution when servicing them.
 - [2] Be careful during adjustment of the machine to prevent entrapment of the fingers between moving blades and fixed parts of the machine.
20. On multi-cylinder/multi-reel machines take care as rotating one cylinder/reel can cause other cylinder/reels to rotate.
21. Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.

22. Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.
23. Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.
24. Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
25. Check the grass catcher frequently for wear or deterioration.
26. If the fuel tank has to be drained, do this outdoors.

Waste Disposal..... Page 2-2

About the Waste disposal..... Page 2-2

Disposal

Waste Disposal

About the Waste disposal

Make sure that waste generated when servicing or repairing the machine is disposed of in accordance with local regulations. (e.g. waste oil, antifreeze batteries, rubber products, and wires etc.)

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Product Overview

Specifications

Specifications

Model		LM283	
Dimensions	Total length	Mower roller type	265 cm
		Mower wheel type	276 cm
	Total width	During operation	203 cm
		During transport	203 cm
Total height		133 cm	
Weight		1,080 kg	
Minimum turning radius		277 cm	
Engine	Model		Kubota D1105-T
	Type		Water-cooled 4-cycle diesel engine
	Total displacement		1,123 cm ³ (1.123 L)
	Maximum output		24.5 kW (33.3PS)/3,000 rpm
Fuel tank capacity		Diesel 38.0 dm ³ (38.0 L)	
Fuel consumption		255 g/kW·h (rated output)	
Engine oil capacity		3.1 dm ³ (3.1 L)	
Operating width (Mowing width)		180 cm	
Operating height (Mowing height)	Mower roller type	10 - 60 mm	
	Mower wheel type	19 - 68 mm	
Drive		HST full time 4-wheel drive	
Speed (HST)	Forward	0 - 14.4 km/h	
	Reverse	0 - 8.5 km/h	
Speed (Mechanical)		-	
Efficiency		11,520 m ² /h (8.0 km/h x operating width x 0.8)	
Maximum inclination for operation		20 degrees	
Tire size	Front wheel	23 x 10.50 - 12 4P	
	Rear wheel	23 x 8.50 - 12 4P	
Tire pneumatic pressure	Front wheel	120 kPa (1.2 kgf/cm ²)	
	Rear wheel	150 kPa (1.5 kgf/cm ²)	
Battery		75D23L	

* The factory default maximum engine rpm is 3,100 rpm.

Sound pressure level

Sound pressure level

This machine was confirmed to have a continuous A-weighted sound pressure level of 89 dB by measuring identical machines in accordance with the procedure specified in ISO5395-1:2013.

Sound power level

Sound power level

This machine was confirmed to have a sound power level of 103 dB by measuring identical machines in accordance with the procedure specified in directive 2000/14/EC.

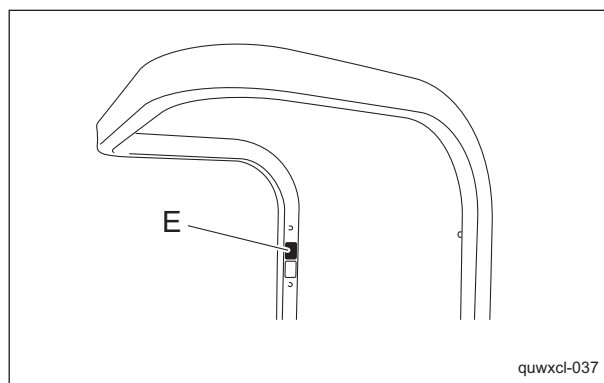
Vibration level

Hand-arm vibration

This machine was confirmed to transmit a maximum vibration level of 3.81 m/s² to hands and arms by measuring identical machines in accordance with the procedure specified in ISO5349-1:2001,ISO5349-2:2001.

Whole body vibration

This machine was confirmed to transmit a maximum vibration level of 0.99 m/s² to the whole body by measuring identical machines in accordance with the procedure specified in ISO2631-1:1997,ISO2631-2:2003.

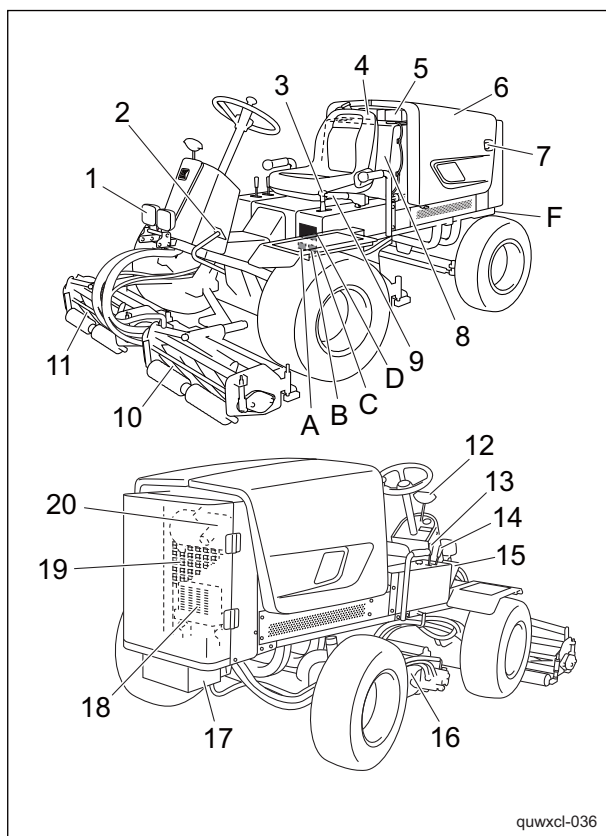


quwxcl-037

Names of Each Section_002

1	Headlight
2	Brake pedal
3	Throttle lever
4	Seat
5	Box
6	Hood
7	Muffler
8	Fuel tank
9	Parking brake lever
10	Mower unit #3
11	Mower unit #2
12	Angle meter
13	Reel rotation lever
14	Mower unit up/down lever
15	Traveling pedal
16	Mower unit #1
17	Battery
18	Oil cooler
19	Radiator
20	Air cleaner
A	Serial number plate
B	Specification decal
C	Noise emission decal
D	Year of manufacture decal
E	ROPS compliance decal
F	Battery specifications decal

Names of Each Section



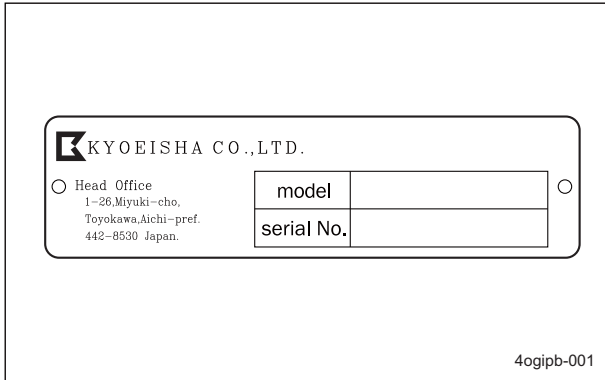
quwxcl-036

Names of Each Section_001

Product Overview

Serial Number Plate

The serial number plate indicates the name and serial number of the machine.



Serial Number Plate_001

Year of Manufacture Decal

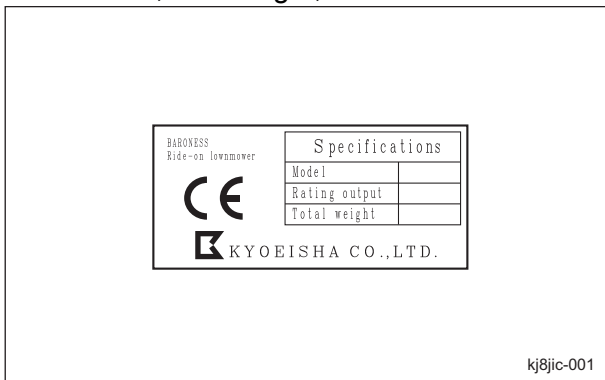
The year of manufacture decal indicates the year when this machine was manufactured.



Year of Manufacture Decal_001

Specification Decal

The Specification decal indicates the CE logo, model name, and weight, etc.



Decal, Specifications_001

ROPS compliance decal

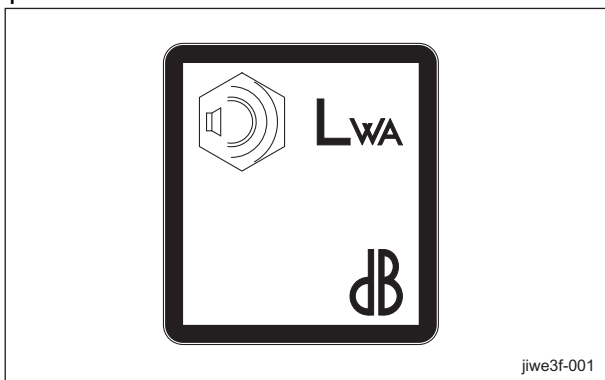
ROPS compliance decal indicates the manufacturer of the fitted machine, the model, etc. in accordance with ISO21299:2009.



ROPS compliance decal_001

Noise Emission Decal

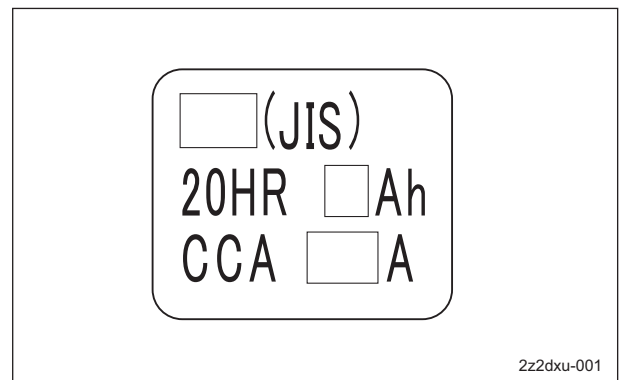
The noise emission decal indicates the sound power level determined by measuring identical machines in accordance with the procedure specified in the EC directives.



Noise Emission Decal_001

Battery capacity decal

The battery capacity decal indicates the capacity in accordance with Directive 2006/66/EC.



Battery capacity decal_001

Safety Signs and Instruction Signs

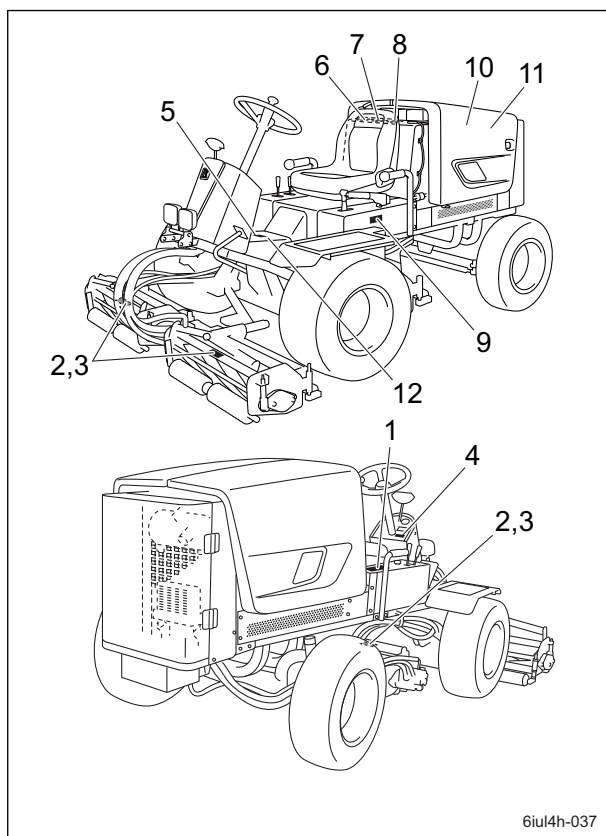
About Safety Signs and Instruction Signs

Warning

Safety decals and instruction decals are attached to this machine. Make sure that they are preserved in their entirety. If they are damaged, become dirty, or peel off, replace them with new ones.

Part numbers for decals that need to be replaced are listed in the parts catalog.


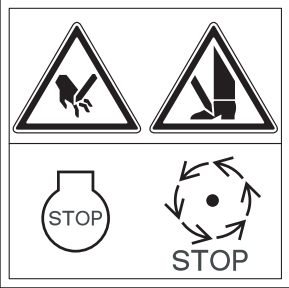
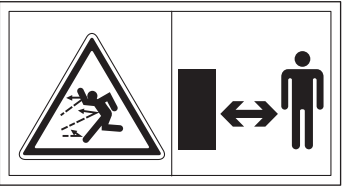

Positions of Safety Decals and Instruction Decals



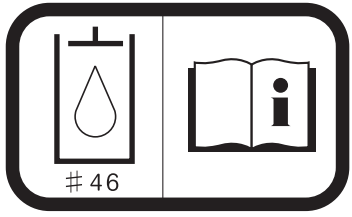
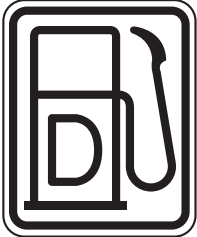


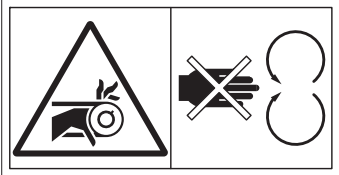

Positions of Safety Decals and Instruction Decals_001

Product Overview



Description of Safety Decals and Instruction Decals

<p>1</p>	 <p>qigqnx-019</p>	<p>LM283--0967Z0 Decal, lever operation</p> <ol style="list-style-type: none"> Warning Read the Owner's Operating Manual. Warning Apply the parking brake, stop the engine, remove the ignition key, and then leave the machine. Danger Flying objects - All persons other than the operator must keep a safe distance from the machine. Danger May cut your hand or leg - Keep hands and feet away from moving parts. Danger Rollover - Do not work on slopes of 20 degrees or more. When you descend a slope, lower the mower units and drive at low speed.
<p>2</p>	 <p>qigqnx-010</p>	<p>K4205001600 Decal, caution to mutilation</p> <p>Danger</p> <p>May cut your hand or leg - Stop the cutter rotation and engine. Otherwise you may be injured.</p>
<p>3</p>	 <p>qigqnx-011</p>	<p>K4205001650 Decal, caution for flying object</p> <p>Danger</p> <p>Caution for flying object - When the blades are rotating, keep away from the machine. All bystanders must keep a safe distance from the machine.</p>
<p>4</p>	 <p>K 4 2 0 5 0 0 1 9 5 0 qigqnx-039</p>	<p>K4205001950 Decal, caution to exhaust gas</p> <p>Warning</p> <p>Be careful of exhaust emissions.</p>

Product Overview

<p>5</p>	 <p># 46</p> <p>K4209000980</p> <p>qigqnx-020</p>	<p>K4209000980</p> <p>Decal, hydraulic oil</p> <p>Read the Owner's Operating Manual.</p>
<p>6</p>	 <p>K4209001000</p> <p>qigqnx-021</p>	<p>K4209001000</p> <p>Diesel fuel filler icon</p> <p>Use No. 2 diesel fuel. (Low sulfur or ultra-low sulfur diesel fuel only)</p>
<p>7</p>	 <p>K4205001940</p> <p>qigqnx-041</p>	<p>K4205001940</p> <p>Decal, fire prohibited</p> <p>⚠ Danger</p> <p>Keep away from fire.</p>
<p>8</p>	<p>LOW SULFUR OR ULTRA LOW SULFUR DI ESEL FUEL ONLY</p> <p>K4209001330</p> <p>qigqnx-045</p>	<p>K4209001330</p> <p>Decal, diesel instructions</p> <p>Use No. 2 diesel fuel. (Low sulfur or ultra-low sulfur diesel fuel only)</p>
<p>9</p>	 <p>K4205001540</p> <p>qigqnx-022</p>	<p>K4205001540</p> <p>Decal, caution for high temperature</p> <p>⚠ Caution</p> <p>High temperature - Do not touch. Otherwise, you will be burned.</p>
<p>10</p>	 <p>K4205001530</p> <p>qigqnx-012</p>	<p>K4205001530</p> <p>Decal, caution for rotating object</p> <p>⚠ Danger</p> <p>Watch for rotating parts - Keep your hands away from the belts while the engine is running.</p>
<p>11</p>	 <p>K4205001970</p> <p>qigqnx-045</p>	<p>K4205001970</p> <p>Decal, caution for spouting coolant</p> <p>⚠ Caution</p> <p>Caution for spouting coolant - Do not open while hot.</p>

Product Overview

12	 <p>qigqnx-036</p>	<p>K4209001340 Decal, caution "DO NOT STEP"</p>  <p>Do not step here.</p>
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Handling Instructions

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Handling Instructions

Inspection Before Use

Be sure to perform an inspection before you start using the machine so that you will be able to take advantage of its optimum performance for a long period of time.

Reel Cutter (Cutting Cylinder) and Bed Knife (Bottom Blade)

Inspection of Reel Cutter (Cutting Cylinder) and Bed Knife (Bottom Blade)

The reel cutter (cutting cylinder) and bed knife (bottom blade) may become dull due to frequent use, objects crushed during mowing, or damage caused during transportation. Inspect the reel cutter (cutting cylinder) and bed knife (bottom blade), and if necessary, adjust the blade engagement, perform back lapping, or sharpen or replace the reel cutter (cutting cylinder) and the bed knife (bottom blade).

1. Check to see whether or not the edge of the reel cutter (cutting cylinder) and the bed knife (bottom blade) are too blunt to cut.
2. Make sure that the reel cutter (cutting cylinder) and the bed knife (bottom blade) are not cracked.
3. Check to see how much the reel cutter (cutting cylinder) and the bed knife (bottom blade) are worn.
4. Make sure that the reel cutter (cutting cylinder) and the bed knife (bottom blade) have not changed color due to heat from grinding.
5. Check to see whether or not the second edge face remains at the point of reel cutter (cutting cylinder).
6. Make sure that the welding between the reel cutter (cutting cylinder) and the disc has not come off.

Radiator Cover

Inspection of Radiator Cover

1. Make sure that there is no damage to the radiator cover.
2. Make sure that the radiator cover is not contaminated.

Cleaning of Radiator Cover

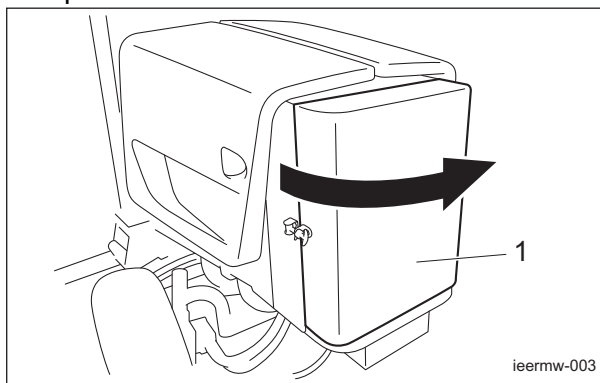
Important

An unclean radiator cover may cause overheating or damage to the engine. It may also cause malfunction of the hydraulic system.

If the radiator cover has been contaminated with dust, be sure to clean it.

After operating the machine in a dusty environment, it is important to remove dust from the cover as soon as possible.

1. Open the radiator cover.



Cleaning of Radiator Cover_001

1	Radiator cover
---	----------------

2. Carefully clean the front and back of the radiator cover with water or compressed air.

Radiator

Inspection of Radiator

For details on handling the engine, please refer to the separate Engine Operating Manual.

1. Make sure that there is no damage to the radiator.
2. Make sure that the radiator is not contaminated.

Handling Instructions

Cleaning of Radiator

For details on handling the engine, please refer to the separate Engine Operating Manual.

Important

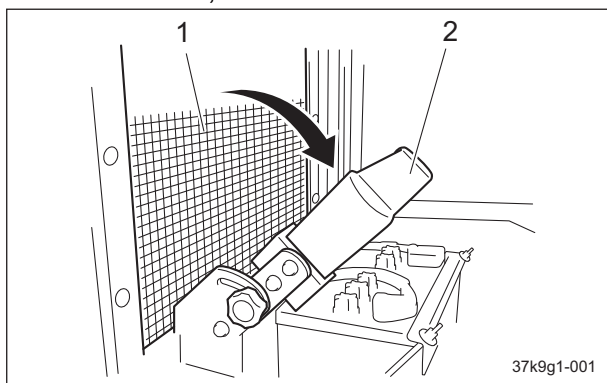
An unclean radiator may cause overheating or damage to the engine. It may also cause malfunction of the hydraulic system.

Important

Do not use solid objects, such as a spatula or screwdriver, or high-pressure water to clean the radiator or oil cooler. Otherwise, special fins or tubes may be damaged, possibly resulting in reduced cooling performance or coolant leakage.

If the radiator has been contaminated with dust, be sure to clean it. After operating the machine in a dusty environment, it is important to remove dust as soon as possible.

1. Open the radiator cover.
2. Loosen the knobs on the left and right of the oil cooler, and then tilt the oil cooler.



Cleaning of Radiator_001

1	Radiator
2	Oil cooler

3. Carefully clean the front and back of the radiator with water or compressed air.

Coolant

Inspection of Coolant

For details on handling the engine, please refer to the separate Engine Operating Manual.

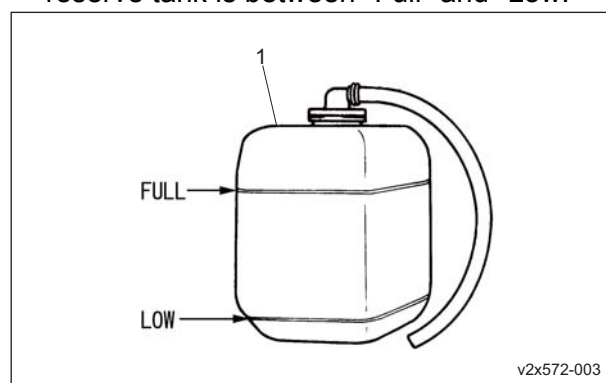
Warning

Do not touch the radiator or coolant during engine operation or right after the engine has been turned off. Due to high temperatures, doing so could cause burns.

Caution

Inspection should take place after the engine has well cooled down.

1. Make sure that the coolant level in the reserve tank is between "Full" and "Low."



Inspection of Coolant_001

1	Reserve tank
---	--------------

Handling Instructions

Coolant Supply

For details on handling the engine, please refer to the separate Engine Operating Manual.

Warning

Do not touch the radiator or coolant during engine operation or right after the engine has been turned off. Due to high temperatures, doing so could cause burns. After the radiator has well cooled down, open the radiator cap.

Caution

Supply coolant after the engine has well cooled down.

Caution

The radiator cap is pressurized. If you remove the radiator cap while the engine is overheated, hot steam will burst out, possibly resulting in burns. Make sure that the water temperature and pressure are reduced, and then grab the cap with a thick cloth and gradually open the cap.

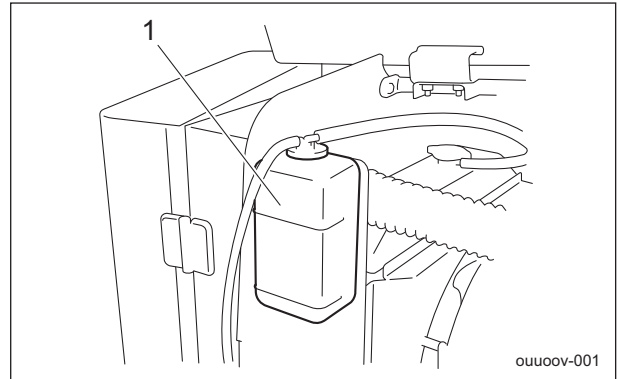
Important

When you supply coolant, be sure to use clean water, such as tap water. During winter, remove coolant. Alternatively, mix long-life coolant and clean water, and then pour it into the radiator and reserve tank.

Relationship between concentration of long-life coolant (LLC) and freezing temperature

Freezing temperature	LLC concentration (volume %)
Down to -10 °C (14 °F)	20%
Down to -15 °C (5 °F)	30%
Down to -20 °C (-4 °F)	35%
Down to -25 °C (-13 °F)	40%

1. If the coolant level in the reserve tank is lower than the "LOW" mark, open the reserve tank cap and fill the tank with clean water up to the "FULL" mark.

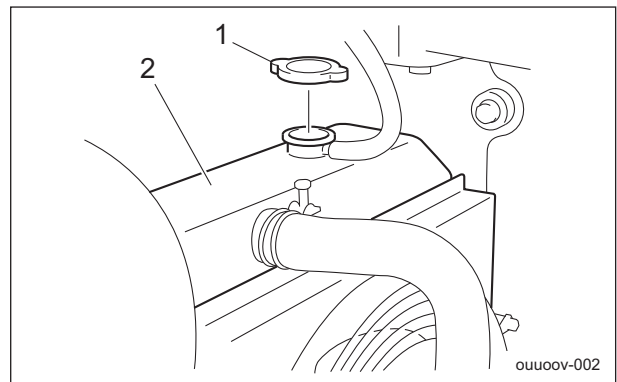


Coolant Supply_001

1	Reserve tank
---	--------------

2. If no coolant is in the reserve tank, follow the steps below to fill the tank with clean water.

- [1] Open the radiator cap, and then supply clean water up to the opening.
- [2] Open the reserve tank cap, and then supply clean water up to the "FULL" mark.



Coolant Supply_002

1	Pressurized cap
2	Radiator

Handling Instructions

Change of Coolant

For details on handling the engine, please refer to the separate Engine Operating Manual.

Warning

When you change the coolant, be sure to drain it into a bowl and discard it in accordance with local laws and regulations.

Warning

Do not touch the radiator or coolant during engine operation or right after the engine has been turned off.

Due to high temperatures, doing so could cause burns.

After the radiator has well cooled down, open the radiator cap.

Caution

Change coolant after the engine has well cooled down.

Important

When you change coolant, be sure to use clean water, such as tap water. During winter, remove coolant. Alternatively, mix long-life coolant and clean water, and then pour it into the radiator and reserve tank.

For details on changing coolant, please refer to the separate Engine Operating Manual.

Coolant quantity, including the reserve tank, is 6.0 dm³ (6.0 L).

Oil cooler

Inspection of Oil Cooler

1. Make sure that there is no damage to the oil cooler.
2. Make sure that the oil cooler is not contaminated.

Cleaning of Oil Cooler

Caution

An unclean oil cooler may cause malfunction of the hydraulic system.

Important

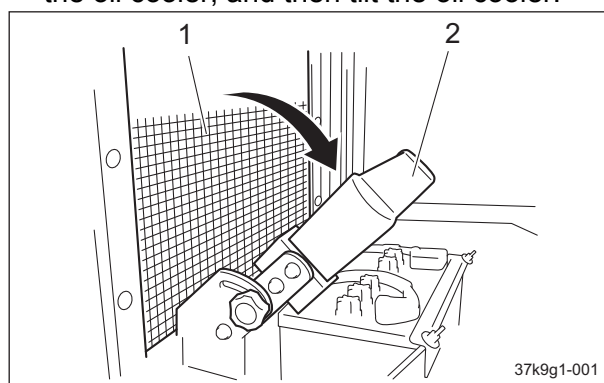
Do not use solid objects, such as a spatula or screwdriver, or high-pressure water to clean the radiator or oil cooler.

Otherwise, special fins or tubes may be damaged, possibly resulting in reduced cooling performance or coolant leakage.

If the oil cooler has been contaminated with dust, be sure to clean it.

After operating the machine in a dusty environment, it is important to remove dust as soon as possible.

1. Open the radiator cover.
2. Loosen the knobs on the left and right of the oil cooler, and then tilt the oil cooler.



Cleaning of Oil Cooler_001

1	Radiator
2	Oil cooler

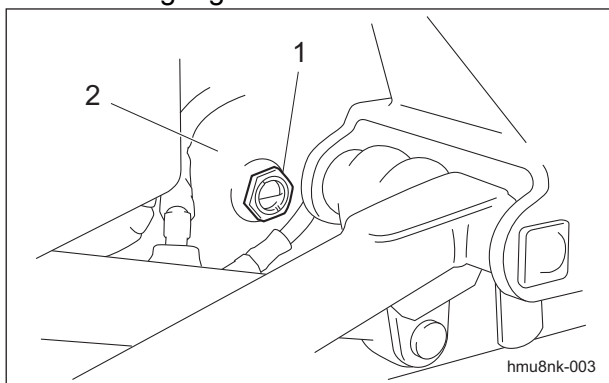
3. Carefully clean the front and back of the oil cooler with water or compressed air.

Handling Instructions

Hydraulic Oil

Inspection of Hydraulic Oil

1. Raise the mower units and maintain that position on a level surface.
2. Make sure that the oil level is at the middle of the oil gauge.



Inspection of Hydraulic Oil_001

1	Oil gauge
2	Hydraulic tank

3. Check underneath the machine for oil leakage.

Hydraulic Oil Supply

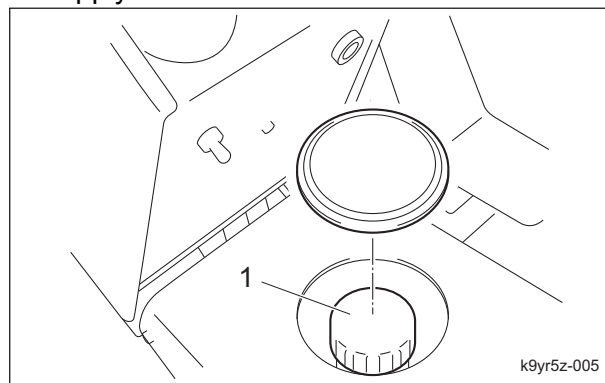
Important

Do not mix different types of oil.

Important

Use Shell Tellus S2M46 (or equivalent) as hydraulic oil.

1. If the oil level is low, open the tank cap and supply oil.



Hydraulic Oil Supply_001

1	Tank cap
---	----------

2. Tighten the tank cap securely.
3. Start the engine, raise and lower the mower units, and turn the steering wheel left and right. Move forward and reverse repeatedly several times.
4. Raise the mower units and maintain that position on a level surface, and then check to see if the oil level is at the middle of the oil gauge. If necessary, supply oil.
5. Check underneath the machine for oil leakage.

Handling Instructions

Change of Hydraulic Oil

Warning

When you change the hydraulic oil, be sure to drain it into a bowl and discard it in accordance with local laws and regulations.

Caution

If the oil emulsifies or if it becomes even slightly less transparent, change the oil immediately.

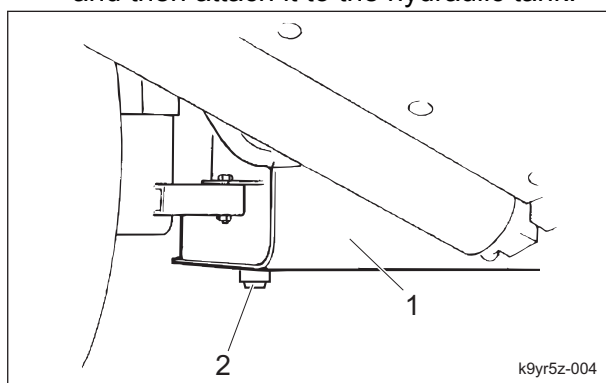
Caution

Be careful with hot oil, which could cause burns if it contacts your skin.

Important

Use Shell Tellus S2M46 (or equivalent) as hydraulic oil.

1. Follow the steps below to remove the old oil.
 - [1] Start and run the engine to warm up the oil.
 - [2] On a level surface, lower the mower units, and then stop the engine.
 - [3] Remove the drain plug of the hydraulic tank, and then drain the old oil into a container.
 - [4] Wind new sealing tape on the drain plug, and then attach it to the hydraulic tank.

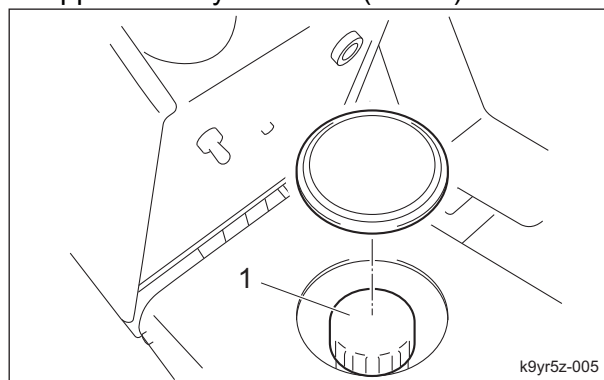


Change of Hydraulic Oil_001

1	Hydraulic tank
2	Drain plug

2. Open the tank cap, and then pour new oil from the fill port until the oil level reaches the middle of the oil gauge on the hydraulic tank.

The hydraulic tank capacity is approximately 24.0 dm³ (24.0 L).



Change of Hydraulic Oil_002

1	Tank cap
---	----------

3. Tighten the tank cap securely.
4. Start the engine, raise and lower the mower units, and turn the steering wheel left and right. Move forward and reverse repeatedly several times.
5. Raise the mower units and maintain that position on a level surface, and then check to see if the oil level is at the middle of the oil gauge. If necessary, supply oil.
6. Check underneath the machine for oil leakage.

Air Cleaner

Inspection of Air Cleaner

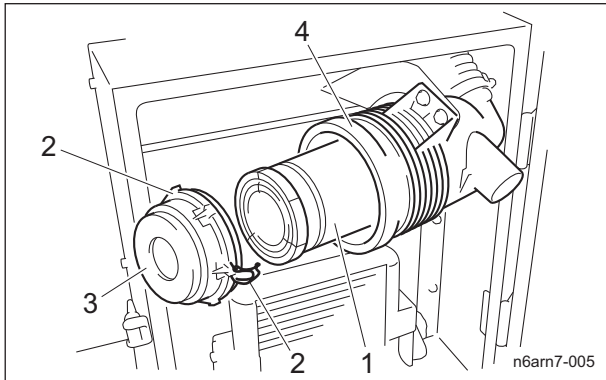
For details on handling the engine, please refer to the separate Engine Operating Manual.

The air cleaner is a component that removes dirt from the intake air to prevent wear of the cylinder liners and piston rings so that the engine will always operate smoothly. A contaminated air cleaner element may cause malfunction of the engine.

1. Make sure that there is no damage to the air cleaner.

Handling Instructions

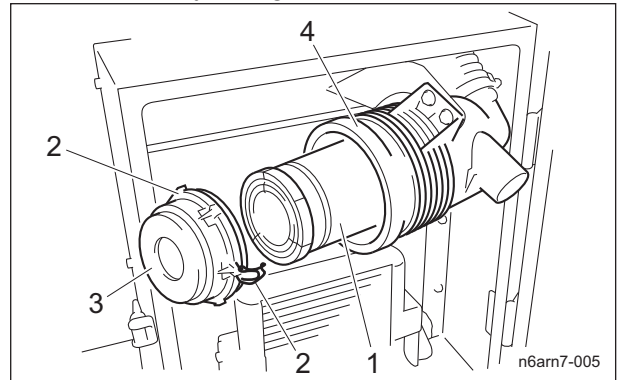
2. Make sure that the air cleaner element is not contaminated.



Inspection of Air Cleaner_001

1	Air cleaner element
2	Clip
3	Air cleaner cap
4	Air cleaner body

- [4] Re-place the air cleaner cap, and then fix it securely using the clips.



Cleaning of Air Cleaner_001

1	Air cleaner element
2	Clip
3	Air cleaner cap
4	Air cleaner body

Cleaning of Air Cleaner

For details on handling the engine, please refer to the separate Engine Handling Manual. A contaminated air cleaner element may cause malfunction of the engine. To maximize the life of the engine, clean the air cleaner properly.

- Follow the steps below to clean the air cleaner.
 - [1] Remove the clips from the two locations, remove the air cleaner cap, and then remove the air cleaner element.
 - [2] While paying close attention not to damage the air cleaner element, tap a solid portion of the air cleaner element or blow compressed air from its inside to remove dust and dirt. If the air cleaner element is extremely contaminated, replace it with a new one.
 - [3] Attach the air cleaner element to the air cleaner body.

Change of Air Cleaner

- For details on handling the engine, please refer to the separate Engine Operating Manual. A contaminated air cleaner element may cause malfunction of the engine. To maximize the life of the engine, replace the air cleaner element at the appropriate times.
- The timing for replacing the air cleaner element is described below.
 - [1] Replace the air cleaner element in accordance with the Maintenance Schedule.
 - [2] If it is significantly contaminated, replace it, even if the hours of operation do not exceed the specified time.
 - [3] Even if the hours of operation do not exceed the specified time, change it at least once per year.
 - Replace the air cleaner element in the same manner as cleaning the air cleaner. (See "Cleaning of Air Cleaner" (Page 4-8) .)

Handling Instructions

Battery

Inspection of Battery

For details on handling the battery, please refer to the separate Battery Instruction Manual.

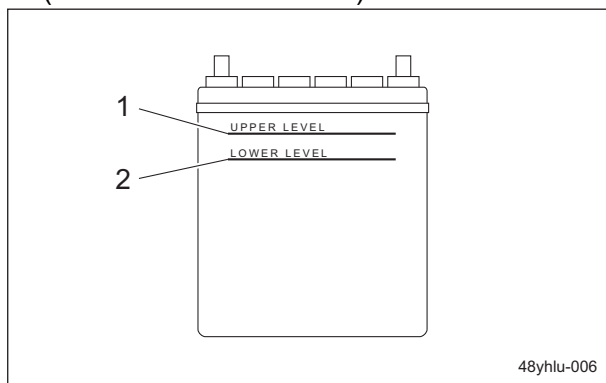
⚠ Danger

Keep fire away while inspecting or charging the battery.
The battery may explode.

⚠ Warning

Do not allow the battery fluid level to become lower than the LOWER LEVEL (minimum fluid level line).
The battery may explode if it is used or charged while the battery fluid level is at the LOWER LEVEL (minimum fluid level line).

1. Clean the areas around the battery fluid level lines using a cloth dampened with water.
2. Make sure that the battery fluid level is between the UPPER LEVEL (maximum fluid level line) and the LOWER LEVEL (minimum fluid level line).



Inspection of Battery_001

1	UPPER LEVEL
2	LOWER LEVEL

Supply of Battery Fluid

For details on handling the battery, please refer to the separate Battery Instruction Manual.

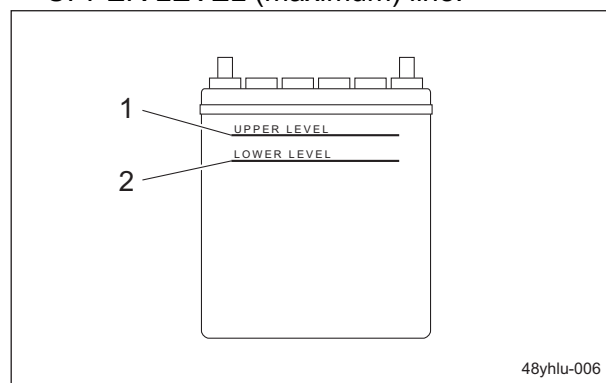
⚠ Danger

Be careful not to let your skin, eyes or clothes, etc., come into contact with the battery fluid or accidentally swallow the fluid.
Should your skin or clothes come into contact with the battery fluid, immediately wash them away with water.

⚠ Warning

When you supply battery fluid, wear protective garments and safety glasses, etc.

1. If the battery fluid level is lower than halfway between the UPPER LEVEL (maximum) line and LOWER LEVEL (minimum) line, add purified water up to the UPPER LEVEL (maximum) line.



Supply of Battery Fluid_001

1	UPPER LEVEL
2	LOWER LEVEL

Tire

Inspection of Tires

1. Check the pneumatic pressure of the tires.
2. Make sure that there are no cracks, damage or abnormal wear on the tires.

Tire size	Pneumatic pressure
Front wheel (23 x 10.50 - 12 4P)	120 kPa (1.2 kgf/cm ²)
Rear wheel (23 x 8.50 - 12 4P)	150 kPa (1.5 kgf/cm ²)

Handling Instructions

Brake

Inspection of Brake

While traveling, depress the brake pedal firmly to make sure that the brake is applied effectively.

Inspection of Parking Brake

1. Make sure that the brake is not applied any longer when you pull the parking brake lever.
2. Make sure that the brake is not applied even slightly when you press the push button to release the parking brake lever.

Belt

Inspection of Belt

Caution

The engine must be stopped when the belt is inspected.

Caution

If you have removed the cover during inspection, make sure that you replace it in the original position securely. If the cover remains removed, the operator may come in contact with the rotating objects or belt, possibly resulting in injuries.

Important

A slacking or damaged belt or damaged fan may cause overheating or lack of a battery charge.

1. Press the middle of the belt with your finger to check the belt tension.
2. Make sure that there are no cracks, damage or abnormal wear.

Around the Engine

Inspection of Engine-Associated Parts

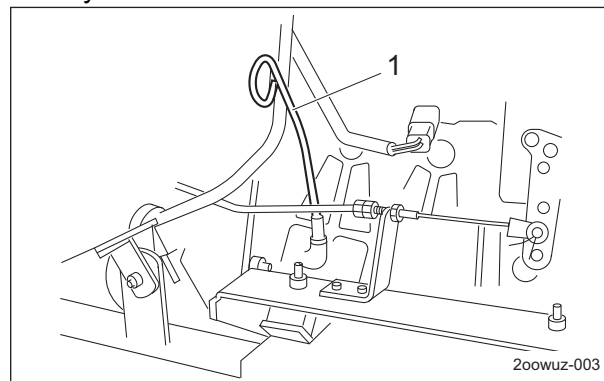
For details on handling the engine, please refer to the separate Engine Operating Manual.

1. Check the fuel system parts for loosened or cracked joints and leakage. Replace the parts if necessary.
2. Blow compressed air to clean any grass or flammable materials that may be attached inside or around the muffler.

Engine Oil

Inspection of Engine Oil

1. Stop the engine, wait for 10 to 20 minutes for the engine to cool down, then check the oil level.
2. Position the machine so that the engine will be level, then insert the oil gauge all the way to check the oil level.

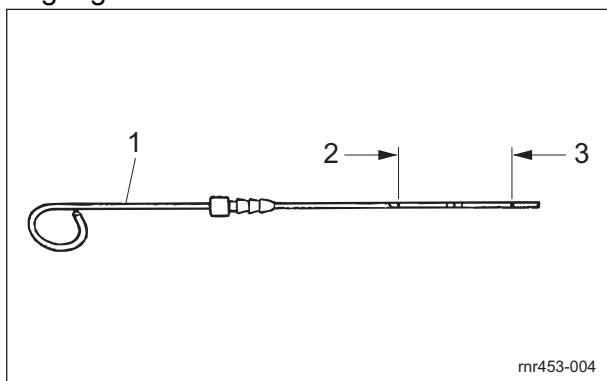


Inspection of Engine Oil_001

1	Oil gauge
---	-----------

Handling Instructions

3. The appropriate oil level should be between the upper and lower limit lines on the gauge.



Inspection of Engine Oil_002

1	Oil gauge
2	Upper limit
3	Lower limit

Supply of Engine Oil

For details on handling the engine, please refer to the separate Engine Handling Manual.

Important

Do not supply too much engine oil. Otherwise, the engine may be damaged.

Important

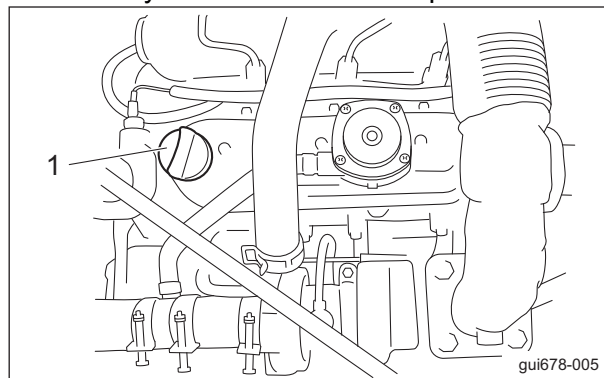
Do not mix different types of engine oil.

Important

Be sure to use engine oil that is classified as API Service Grade CF or higher, with an SAE Viscosity that is appropriate for the operating environment (ambient temperature).

1. Engine oil is supplied through the oil filling port.
Remove the oil filler cap, and then supply new engine oil until the oil reaches a level in between the upper and lower limit lines on the oil level gauge.

2. Securely install the oil filler cap.



Supply of Engine Oil_001

1	Oil filler cap
---	----------------

3. It will take a while for the supplied engine oil to descend into the oil pan.
Check the oil level again 10 to 20 minutes after supplying the oil.

Change of Engine Oil

For details on handling the engine, please refer to the separate Engine Handling Manual.

Warning

When you change the engine oil, be sure to drain it into a bowl and discard it in accordance with local laws and regulations.

Caution

Be careful with hot oil, which could cause burns if it contacts your skin.

Important

Be sure to use engine oil that is classified as API Service Grade CF or higher, with an SAE Viscosity that is appropriate for the operating environment (ambient temperature).

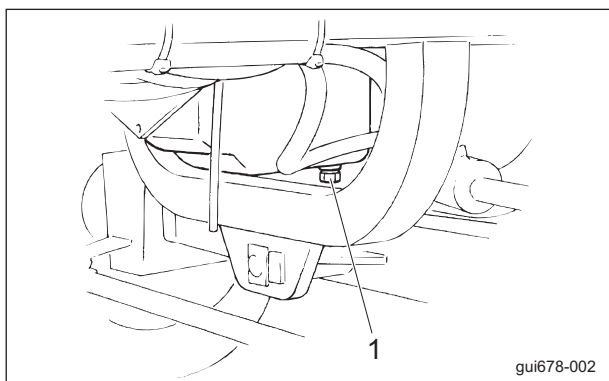
Change the engine oil more frequently if the engine oil is contaminated, and especially if you use the machine in dusty areas or operate the engine at high loads or in high temperatures.

1. Follow the steps below to remove the old engine oil.

[1] Start and run the engine to warm up the engine oil.

Handling Instructions

- [2] On a level surface, remove the drain plug, and then drain the old engine oil into a container.



Change of Engine Oil_001

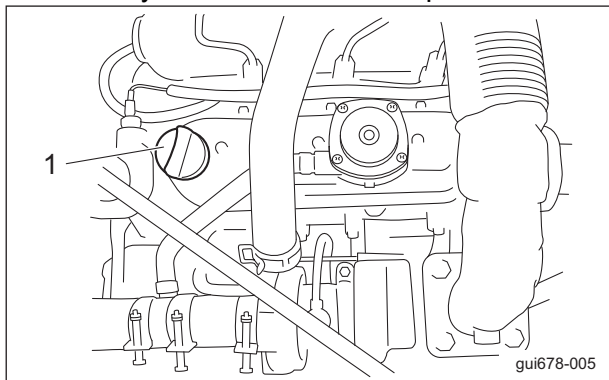
1	Drain plug
---	------------

- [3] Re-place the drain plug.

2. Remove the oil filler cap, and then supply new engine oil until the oil reaches a level in between the upper and lower limit lines on the oil level gauge.

Engine oil quantity is approximately 0.34 yd³ (3.1 L).

3. Securely install the oil filler cap.



Change of Engine Oil_002

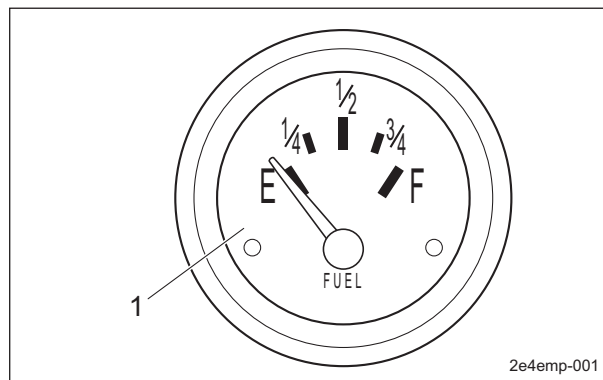
1	Oil filler cap
---	----------------

4. It will take a while for the supplied engine oil to descend into the oil pan. Check the oil level again 10 to 20 minutes after supplying the oil.

Fuel

Inspection of Fuel Quantity

With the machine on a level surface, observe the fuel gauge in the operation panel to check the fuel level.



Inspection of Fuel Quantity_001

1	Fuel gauge
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Handling Instructions

Fuel Supply

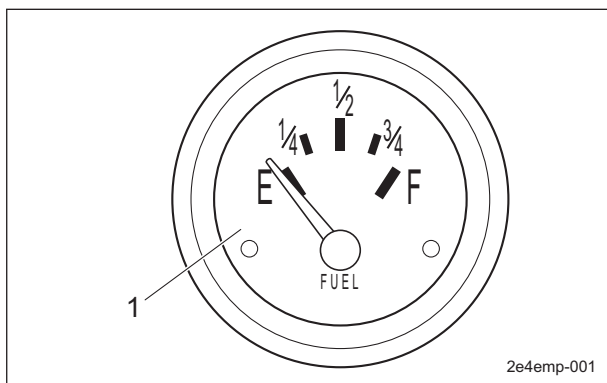
⚠ Danger

Do not supply fuel above the middle (marked in red) of the fuel gauge.
If you supply too much fuel, it might overflow from the fuel cap when you travel or work on a slope.

⚠ Warning

Keep fire away while refueling.
Do not smoke while refueling.

If the fuel gauge located in the operation panel indicates a level close to E (EMPTY), supply fuel (diesel) at your earliest convenience.

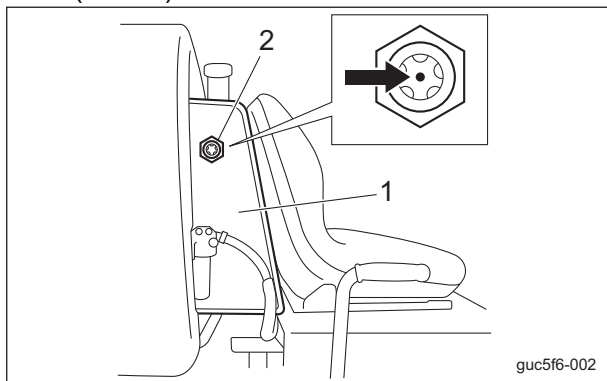


Fuel Supply_001

1	Fuel gauge
---	------------

Refuel up to the middle (marked in red) of the fuel gauge.

The fuel tank capacity is approximately 38.0 dm³ (38.0 L).



Fuel Supply_002

1	Fuel tank
2	Fuel gauge

Oil Leakage

Inspection of Oil Leakage

⚠ Caution

When performing maintenance on the hydraulic system, lower the mower units.

After approximately 50 hours of operation, some joints may be loosened and oil may leak.

Check the bottom of the machine for oil leakage.

Handling Instructions

Tightening torques

Standard tightening torques

Bolts and Nuts

Important

A number of bolts are used in each part of this machine.
Be sure to re-tighten the bolts and nuts, because they may be loosened at the earlier stage of the use.

As to the bolts and nuts without any special instruction, tighten them in appropriate tightening torque with proper tool.

Too much tightening may cause the looseness or damage of the screw.

The strength of tightening is determined by types of screws, strength, the friction of thread face or base face and others.

The table below is for the galvanized or parkerized bolts.

In case that the strength of internal thread is weak, it is not applied.

Do not use rusty or sand attached "screw."

Otherwise, it may cause insufficient tightening even if you apply the specified tightening torque.

The friction of the screw face becomes higher and the tightening torque is canceled out by the friction, therefore sufficient tightening cannot be applied.

If "screw" is wet by water or oil, do not tighten it with normal tightening torque.

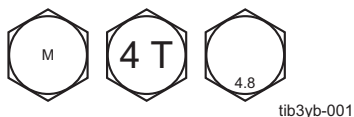
If the screw is wet, the torque coefficient will get smaller and it may result in too much tightening.

Too much tightening may cause looseness by the screw stretched or result in damage.

Do not use a bolt experienced too much burden.

Using the impact wrench requires the skill.

Do exercise as much as possible for steady tightening.

Nominal diameter	General bolt		
	Strength classification 4.8		
			
	N-m	kgf-cm	lb-in
M5	3 - 5	30.59 - 50.99	26.55 - 44.26
M6	7 - 9	71.38 - 91.77	61.96 - 79.66
M8	14 - 19	142.76 - 193.74	123.91 - 168.17
M10	29 - 38	295.71 - 387.49	256.68 - 336.34
M12	52 - 67	530.24 - 683.20	460.25 - 593.02
M14	70 - 94	713.79 - 958.52	619.57 - 831.99
M16	88 - 112	897.34 - 1142.06	778.89 - 991.31
M18	116 - 144	1,182.85 - 1,468.37	1,026.72 - 1,274.54
M20	147 - 183	1,498.96 - 1,866.05	1,301.10 - 1,619.73
M22	295	3,008.12	2,611.05
M24	370	3,772.89	3,274.87
M27	550	5,608.35	4,868.05
M30	740	7,545.78	6,549.74

Handling Instructions

Nominal diameter	Heat-treated bolt					
	Strength classification 8.8			Strength classification 10.9		
	N-m	kgf-cm	lb-in	N-m	kgf-cm	lb-in
M5	5 - 7	50.99 - 71.38	44.26 - 61.96	7 - 10	71.38 - 101.97	61.96 - 88.51
M6	8 - 11	81.58 - 112.17	70.81 - 97.36	14 - 18	142.76 - 183.55	123.91 - 159.32
M8	23 - 29	234.53 - 295.71	203.57 - 256.68	28 - 38	285.52 - 387.49	247.83 - 336.34
M10	45 - 57	458.87 - 581.23	398.30 - 504.51	58 - 76	591.43 - 774.97	513.36 - 672.68
M12	67 - 85	683.20 - 866.75	593.02 - 752.34	104 - 134	1,060.49 - 1,366.40	920.50 - 1186.03
M14	106 - 134	1,080.88 - 1,366.40	938.21 - 1,186.03	140 - 188	1,427.58 - 1,917.04	1,239.14 - 1,663.99
M16	152 - 188	1,549.94 - 1,917.04	1,345.35 - 1,663.99	210 - 260	2,141.37 - 2,651.22	1,858.71 - 2,301.26
M18	200 - 240	2,039.40 - 2,447.28	1,770.20 - 2,124.24	280 - 340	2,855.16 - 3,466.98	2,478.28 - 3,009.34
M20	245 - 295	2,498.27 - 3,008.12	2,168.50 - 2,611.05	370 - 450	3,772.89 - 4,588.65	3,274.87 - 3,982.95
M22	-	-	-	530	5,404.41	4,691.03
M24	-	-	-	670	6,831.99	5,930.17
M27	-	-	-	1,000	10,197.00	8,851.00
M30	-	-	-	1,340	14,628.78	11,860.34

Note:
The same values are applied to "fine screw thread."

Handling Instructions

Handling Instructions

Principal tightening torques

Tightening Torque by Model

LM283

Tighten the following bolts and nuts at the torque specified in the table.

For thread locking adhesive, apply a middle strength thread locker (ThreeBond 1322 anaerobic adhesives).

Location		Code	Part name	Tightening torque			Thread locking adhesive
				N-m	kgf-cm	lb-in	
Front wheel	Motor	K0013120602	Bolt, 11T, heat-treated M12-60	104 - 134	1,060.49 - 1,366.40	920.50 - 1,186.03	—
	Wheel mounting base	K0160000492	24 special nut P1.5	180 - 200	1,835.46 - 2,039.40	1,593.18 - 1,770.20	○
	Wheel	K0011120302	Bolt, 11T, heat-treated M12-30P1.5	67 - 85	683.20 - 866.75	593.02 - 752.34	—
Rear wheel	Wheel mounting base	K0138240002	24 slotted nut high P1.5	180 - 200	1,835.46 - 2,039.40	1,593.18 - 1,770.20	—
	Wheel	K0011120302	Bolt, 11T, heat-treated M12-30P1.5	67 - 85	683.20 - 866.75	593.02 - 752.34	—
Tie rod		K1610000020	Tie rod end right ass'y	45	458.87	398.30	—
		K1611000020	Tie rod end left ass'y	45	458.87	398.30	—
Lever damper		K0144080002	8U nut	—	—	—	○
Engine		K0017100252	Bolt, heat-treated, small, 10-25 P1.25	45 - 57	458.87 - 581.23	398.30 - 504.51	—
				Since it may be difficult to tighten bolts and nuts in the upper front left area of the engine, the strength category should be 4.8 torque. (See "Standard tightening torques" (Page 4-14) .)			
		K4040000150	Nut for attaching anti-vibration rubber	28 - 38	285.57 - 387.49	247.83 - 336.34	○
Coupling		K0024100351	Bolt, 12T, w/hexagon hole, M10-35	60 - 70	611.82 - 713.79	531.06 - 619.57	—
		K0013100352	Bolt, 11T, heat-treated M10-35	45 - 76	458.87 - 774.97	398.30 - 672.68	—
		K0010100202	Bolt, 11T, heat-treated M10-20	45 - 76	458.87 - 774.97	398.30 - 672.68	○
		K0010080202	Bolt, 11T, heat-treated M8-20	23 - 38	234.53 - 387.49	203.57 - 336.34	○
Bed knife (bottom blade)		K0071000092	Screw, heat-treated flathead M10-20	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Arm frame Roll bar		K0013120302	Bolt, 11T, heat-treated M12-45	52 - 67	530.24 - 683.20	460.25 - 593.02	—

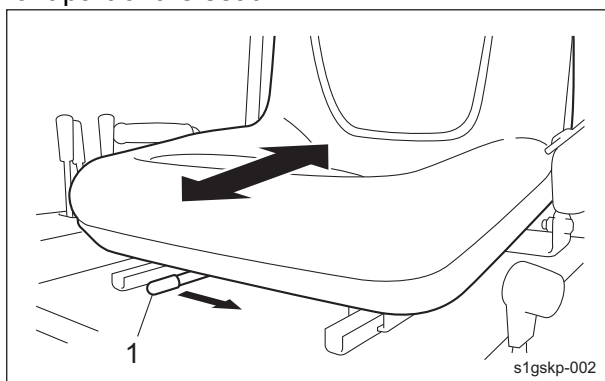
Adjustment Before Operating

Adjustment of Seat

Use the seat adjustment lever to adjust the seat back and forth.

Adjust the position according to the operator's body size.

The adjustment lever is located beneath the front part of the seat.



Adjustment of Seat_001

1	Adjustment lever
---	------------------

Adjustment of Blade Engagement

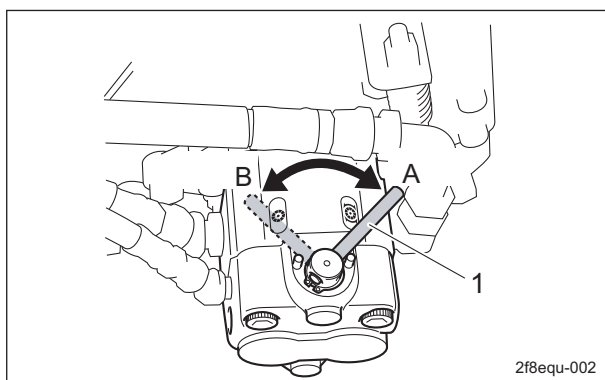
⚠ Caution

Before cutting newspaper as a test, be sure to stop the engine and wear gloves to protect your hands.

Pay attention not to let the reel cutter (cutting cylinder) catch your gloves. Otherwise, you may injure your hand or fingers.

⚠ Caution

Before adjusting the blade engagement, be sure to set the reel rotation/stop switching lever for the reel motor (attached to the mower unit) to the "Stop" position.



Adjustment of Blade Engagement_001

1	Reel rotation/stop switching lever
A	Rotate
B	Stop

With the adjustment nut, adjust the engagement between the reel cutter (cutting cylinder) and the bed knife (bottom blade) so that newspaper (two to three sheets) will be cut by the edge of both blades when the blades in their entirety come slightly into contact with each other.

Insert two or three strips of newspaper into the space between the reel cutter (cutting cylinder) and the bed knife (bottom blade) at an angle of 90 degrees. Then, rotate the reel cutter (cutting cylinder) counter-clockwise (when you face the mower unit from the left) to check the sharpness of the blades.

Check the sharpness of the entire range (three or four points from left edge to right) of the reel cutter (cutting cylinder).

1. If a gap is created between edges:

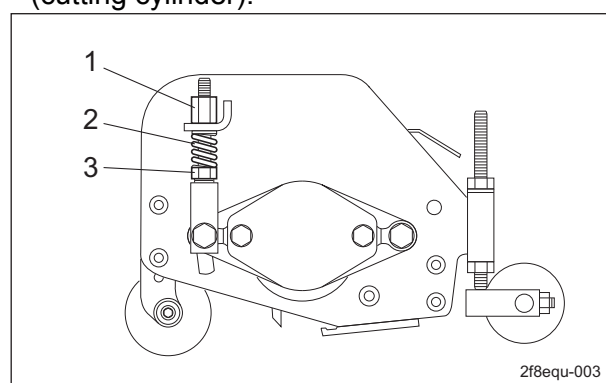
Loosen the cutter adjustment nut to apply more contact pressure between the reel cutter (cutting cylinder) and the bed knife (bottom blade).

2. If the reel cutter (cutting cylinder) is too tight to turn:

Tighten the cutter adjustment nut to reduce the contact pressure between the reel cutter (cutting cylinder) and the bed knife (bottom blade).

3. If the blades still cannot cut well:

Perform back lapping of the reel cutter (cutting cylinder).



Adjustment of Blade Engagement_002

1	Cutter adjustment nut
2	Spring
3	Pipe with cutter adjusting screw

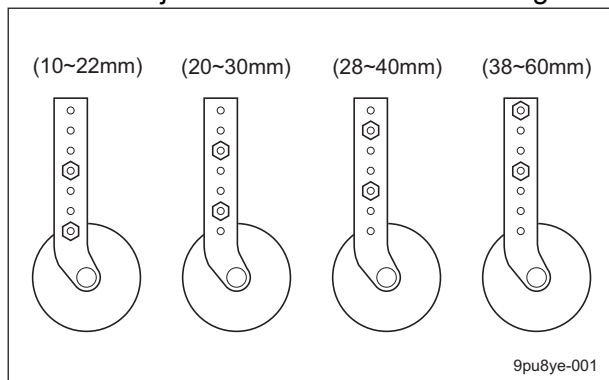
Handling Instructions

Adjustment of Cutting Height

Roller (Roller Type)

Adjust the cutting height to fit your cutting work.

You can adjust the front roller in four stages.



Roller (Roller Type)_001

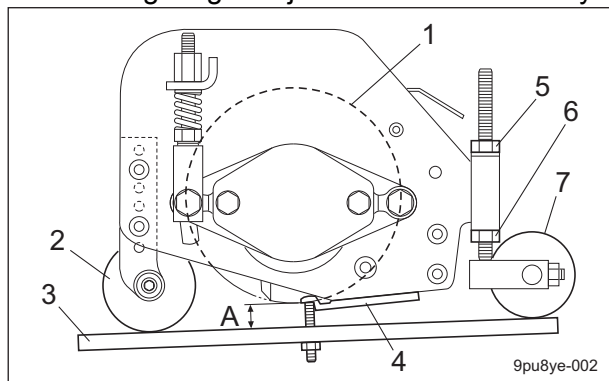
Attach the front roller in a position within the range of cutting height that suits your work requirements.

1. To increase cutting height:

- [1] Loosen cutting height adjustment nut A, tighten cutting height adjustment nut B, then lower the rear roller.
- [2] Use the cutting height gauge to determine the position, then tighten cutting height adjustment nut A securely.

2. To decrease cutting height:

- [1] Loosen cutting height adjustment nut B, tighten cutting height adjustment nut A, then raise the rear roller.
- [2] Use the cutting height gauge to determine the position, then tighten cutting height adjustment nut B securely.



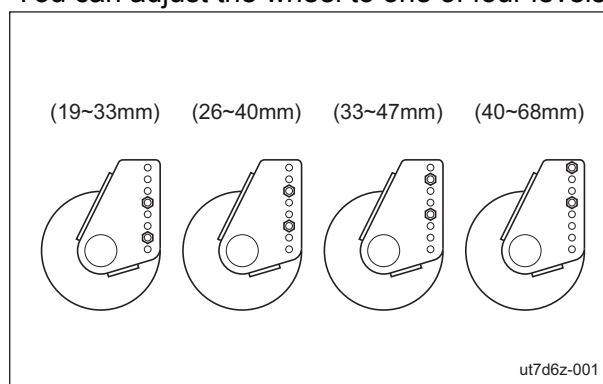
Roller (Roller Type)_002

1	Reel cutter (cutting cylinder)
2	Front roller
3	Cutting height gauge
4	Bed knife (Bottom blade)
5	Cutting height adjustment nut A
6	Cutting height adjustment nut B
7	Rear roller
A	Cutting height

Front Wheel Type

Adjust the cutting height to fit your cutting work.

You can adjust the wheel to one of four levels.



Front Wheel Type_001

Attach the wheel in a position within the range of cutting height that suits your work requirements.

1. To increase cutting height:

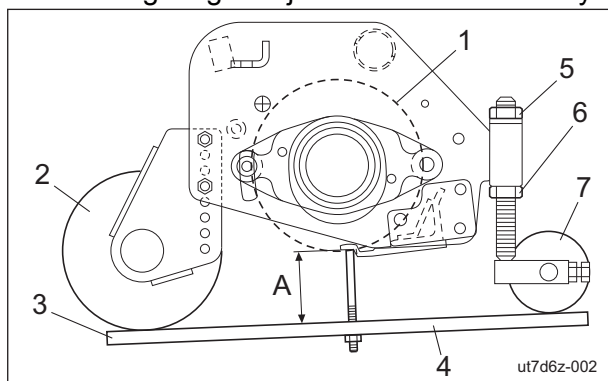
- [1] Loosen cutting height adjustment nut A, tighten cutting height adjustment nut B, then lower the rear roller.
- [2] Use the cutting height gauge to determine the position, then tighten cutting height adjustment nut A securely.

2. To decrease cutting height:

- [1] Loosen cutting height adjustment nut B, tighten cutting height adjustment nut A, then raise the rear roller.

Handling Instructions

- [2] Use the cutting height gauge to determine the position, then tighten cutting height adjustment nut B securely.



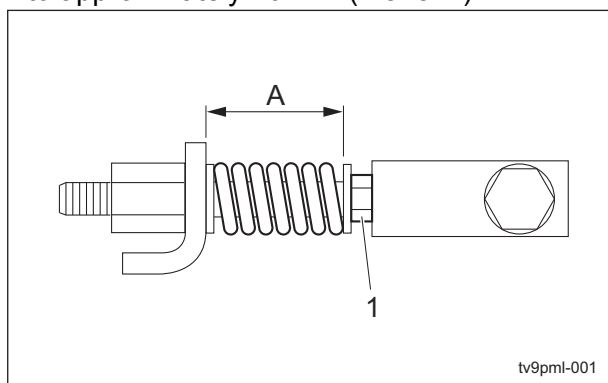
Front Wheel Type_002

1	Reel cutter (cutting cylinder)
2	Front Wheel
3	Cutting height gauge
4	Bed knife (bottom blade)
5	Cutting height adjustment nut A
6	Cutting height adjustment nut B
7	Rear roller
A	Cutting height

Adjustment of Cutter Adjustment Spring

If the diameter of the reel cutter (cutting cylinder) becomes smaller, adjust the cutter adjustment spring.

1. Adjust the blade engagement.
2. Loosen the pipe with cutter adjusting screw, and then adjust the length of the spring coil to approximately 40 mm (1.575 in).



Adjustment of Cutter Adjustment Spring_001

1	Pipe with cutter adjusting screw
A	40 mm (1.575 in)

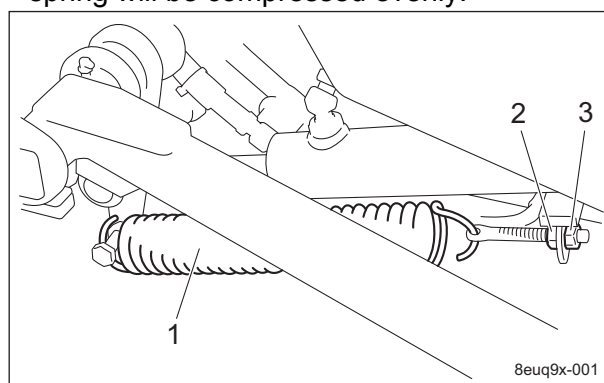
Adjustment of Lift Arm Spring

Important

Adjust the spring if the front wheels slip on an ascending slope.

1. Raise the mower units.
2. Loosen lock nut A, then tighten lock nut B to adjust the spring.
3. Perform the same procedure for both left and right.

Make an adjustment so that the lift arm spring will be compressed evenly.



Adjustment of Lift Arm Spring_001

1	Lift arm spring
2	Lock nut A
3	Lock nut B

Handling Instructions

Procedure to Start / Stop Engine

Start / Stop of Engine

Procedure to Start Engine

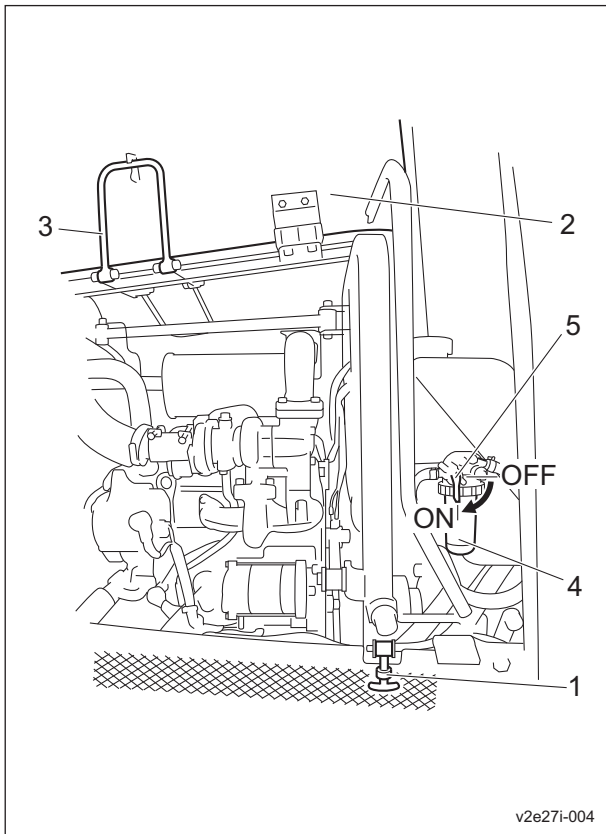
Warning

Before starting the engine, make sure that there are no other people or obstacles around the machine.

Important

Starter operation must take 15 seconds or less.
If the engine does not start, stop using the battery for 30 to 60 seconds to avoid exhausting the battery.

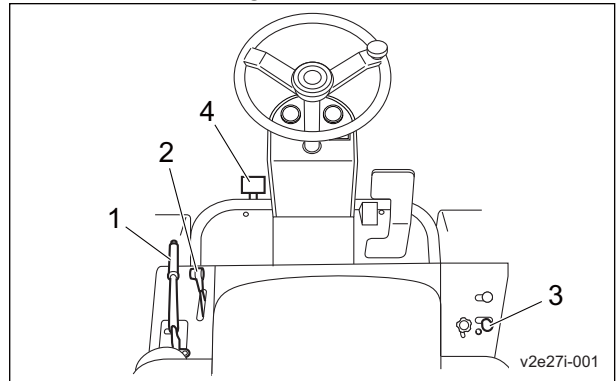
1. Open the fuel cock.
The fuel cock is located by the side of the fuel tank.



Procedure to Start Engine_001

1	Rubber catch, small
2	Hood COMP, right
3	Hood support rod
4	Fuel filter
5	Fuel cock

2. Sit on the seat.
3. Make sure that you have depressed the brake pedal and applied the parking brake.
4. Shift the reel rotation lever to the "Stop" position.
5. Make sure that the traveling pedal is in the neutral position.
6. Shift the throttle lever halfway from the "Low" to the "High" position.



Procedure to Start Engine_002

1	Parking brake lever
2	Throttle lever
3	Reel rotation lever
4	Brake pedal

Important

The thermo-start lamp turns off at the specified time. However, the lamp turning off is not related to the glow plug generating heat. If the ignition key is left in the "GLOW" position after the lamp is turned off, the plug will still generate heat. The thermo-start lamp will stay illuminated for five seconds.

7. Switch the ignition key to the "GLOW" position.
8. Make sure that the glow plug is generating heat and the thermo-start lamp is turned on.

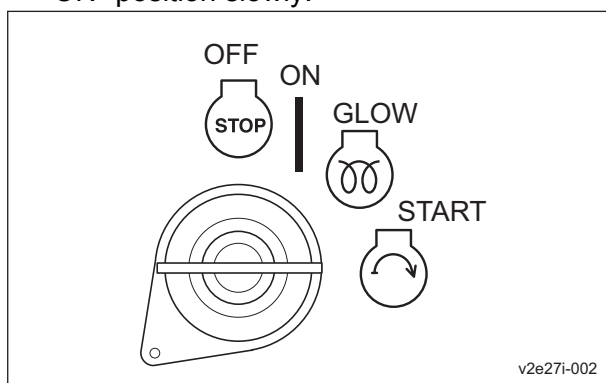
Caution

Quickly returning the ignition key from the "START" position to the "ON" position may result in damage to the machine.

9. After the thermo-start lamp turns off, immediately set the ignition key to the "START" position.

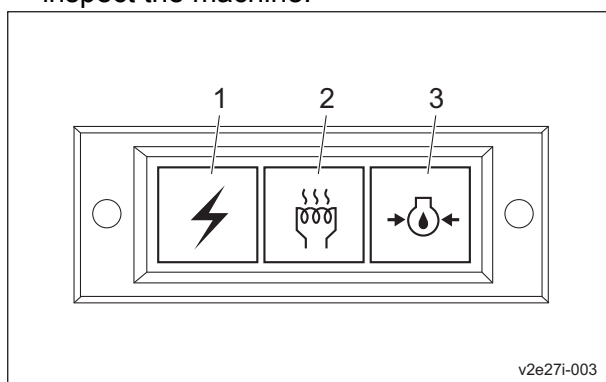
Handling Instructions

10. When the starter starts rotating and the engine starts, return the ignition key to the "ON" position slowly.



Procedure to Start Engine_003

11. Make sure that the charge lamp and engine oil pressure lamp turn off. If they do not turn off, stop the engine and inspect the machine.



Procedure to Start Engine_004

1	Charge lamp
2	Thermo-start lamp
3	Oil pressure lamp

12. Shift the throttle lever to the "Low" position, and then warm up the engine for 1 to 2 minutes.
13. Gradually move the throttle lever to the "High" position.

Procedure to Stop Engine

1. Set the traveling pedal to the neutral position.
2. Depress the brake pedal, and then pull the parking brake lever.
3. Shift the reel rotation lever to the "Stop" position.
4. Move the throttle lever to "Low", and continue idling for 1-2 minutes.
5. Switch the ignition key to the "OFF" position.

6. Make sure that the engine has stopped.
7. Remove the ignition key.
8. Leave the driver's seat.
9. Close the fuel cock.
The fuel cock is located by the side of the fuel tank.

Safety Mechanisms

This machine features a safety device for starting/stopping the engine.

1. As for starting the engine, the safety device prevents the engine from starting unless it meets each of the following four conditions.
 - An operator is sitting on the seat.
 - The parking brake lever is pulled.
 - The reel rotation lever is shifted to the "Stop" position.
 - The traveling pedal is set to the neutral position.
2. The safety device will be activated and will stop the engine under any of the following conditions:
 - The operator leaves the seat without applying the parking brake.
 - The operator leaves the seat while the reel cutter (cutting cylinder) is positively rotating.
 - The traveling pedal is moved when the operator leaves the seat while the parking brake is applied.

Warning Mechanisms

This machine features a warning mechanism for overheating.

1. If water temperature inside the engine exceeds 105 degrees Celsius, a buzzer will sound. (intermittent tone)

Handling Instructions

Operation of Each Section

Precautions for Operating the Machine

Caution

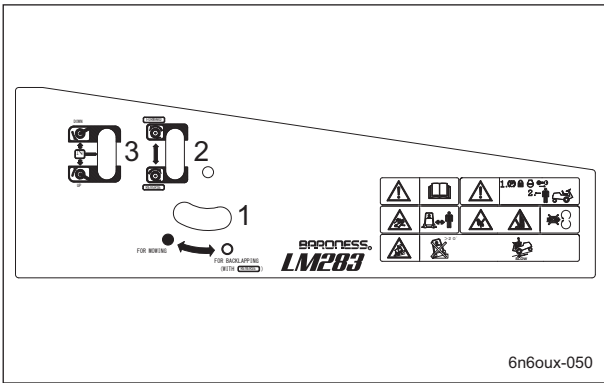
Under any circumstances drive the machine at such a speed that you can stop it immediately for emergencies.

Cautions for when You Leave the Machine

Caution

If the brakes are not sufficiently effective, use the wheel stoppers to secure the machine.

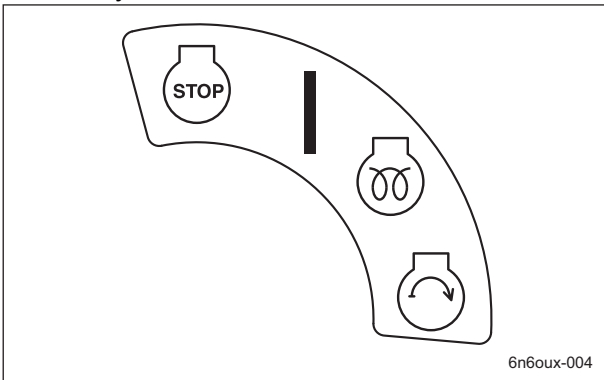
Instruction Decals



Instruction Decals_001

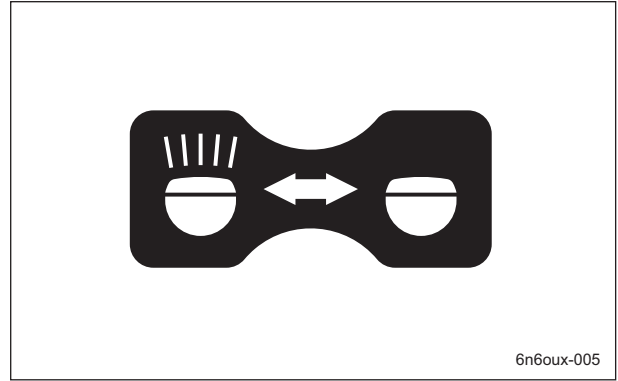
1	Anti-reverse reel rotation stopper
2	Reel rotation lever
3	Mower unit up/down lever

K4209001190
Decal, key switch



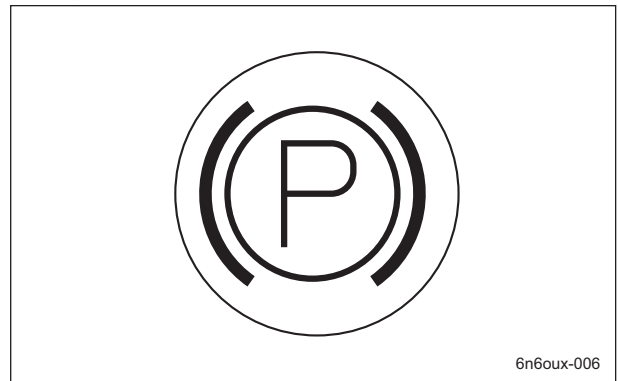
Instruction Decals_002

K4203001410
Decal, light switch



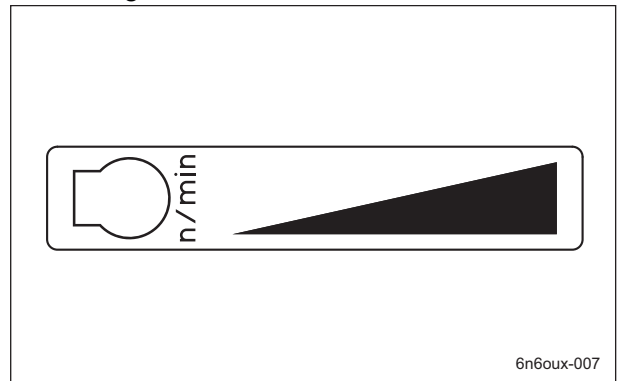
Instruction Decals_003

K4209001200
Decal, brake



Instruction Decals_004

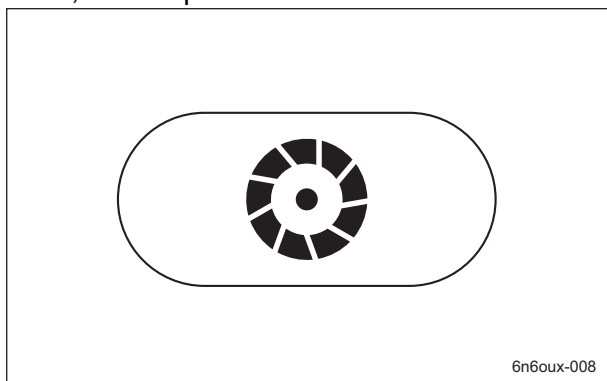
K4203001220
Decal, engine rotation



Instruction Decals_005

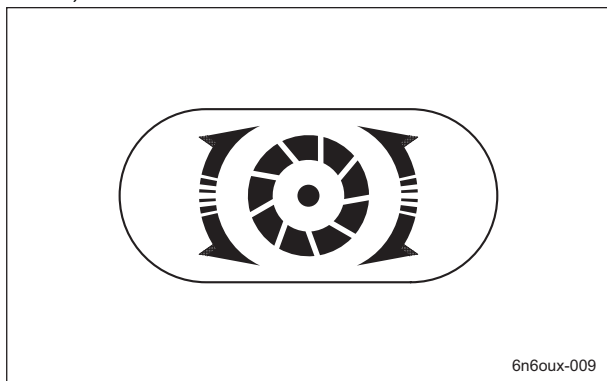
Handling Instructions

K4203001310
Decal, reel stop



Instruction Decals_006

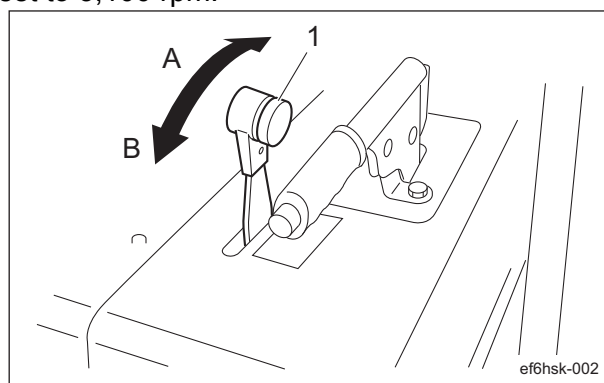
K4203001300
Decal, reel rotation



Instruction Decals_007

Throttle Lever

The throttle lever is located to the left of the driver's seat and enables you to adjust the engine rpm. Move the throttle lever toward "High" to increase the engine rpm, and toward "Low" to reduce the rpm.
Note:
The factory default engine rpm (maximum) is set to 3,100 rpm.

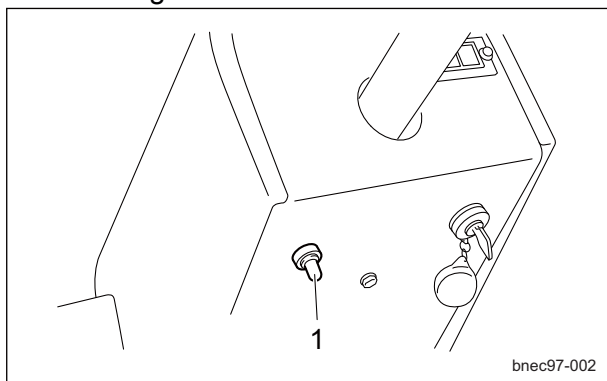


Throttle Lever_001

1	Throttle lever
A	High
B	Low

Light Switch

The light switch is located beneath the left side of the meter panel. Flip the switch up to turn the light on, and down to turn the light off.



Light Switch_001

1	Light switch
---	--------------

Handling Instructions

Mower Unit Up/Down Lever

Caution

Before raising or lowering the mower units, make sure that there are no people around the machine.

Caution

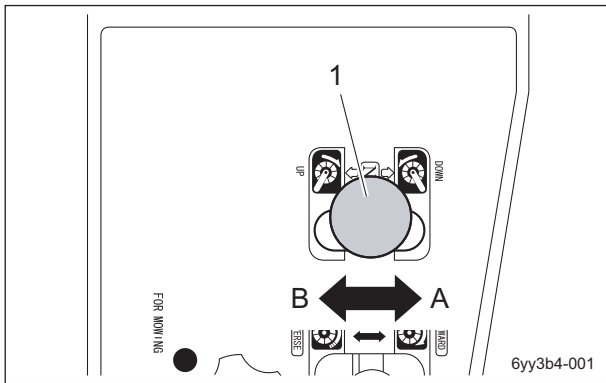
Be careful since shifting the mower unit up/down lever to the "DOWN" position lowers the mowers, even while the engine is stopped.

Caution

Before operating the mower unit up/down lever, be sure to set the stop valve to the "Open" position.

The mower unit up/down lever is located on the right side of the driver's seat and raises or lowers the mower units.

Shift the lever to the "DOWN" position to lower all mowers, and shift it to the "UP" position to raise all mowers.



Mower Unit Up/Down Lever_001

1	Mower unit up/down lever
A	Down
B	Up

Note:

When the mower units are raised, the reels stop rotating, even if the reel rotation lever is set to "FORWARD".

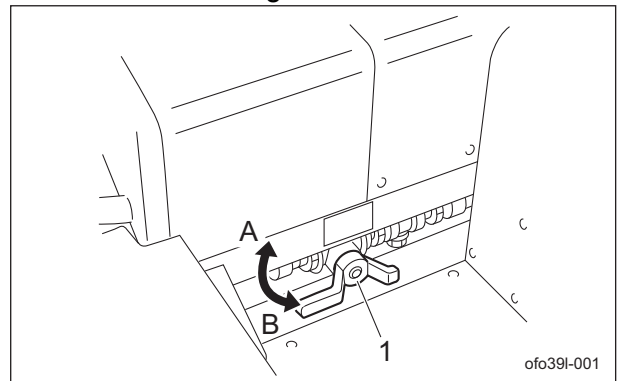
Stop Valve

Caution

When you move the machine, or if you stop the engine with the mower units raised, be sure to set the stop valve to the "Stop" position.

The stop valve is located underneath the right side of the driver's seat.

This valve prevents the raised mower units #1, #2 and #3 from falling.



Stop Valve_001

1	Stop valve
A	Stop
B	Open

Handling Instructions

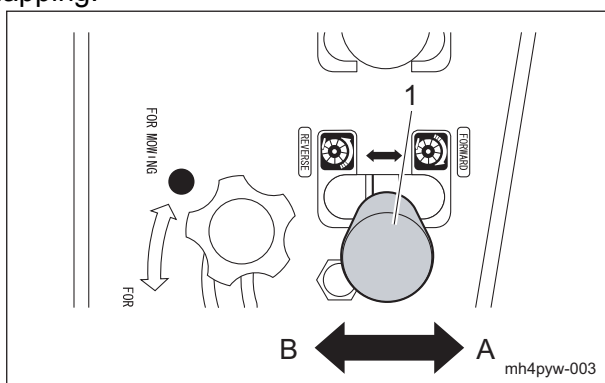
Reel Rotation Lever

Caution

The reel rotation lever must be shifted to the appropriate position just before you start cutting work or back lapping. In all other cases, it must be returned to the neutral position.

The reel rotation lever is located on the right side of the driver's seat and operates rotation of the reel cutters (cutting cylinders) of the mower units.

If you shift the reel rotation lever to the "FORWARD" position, the reel cutters (cutting cylinders) on all mower units will rotate forward for cutting work. If you shift the reel rotation lever to "REVERSE," the reel cutters (cutting cylinders) will rotate in reverse for back lapping.



Reel Rotation Lever_001

1	Reel rotation lever
A	Cutting motion (FORWARD)
B	Back lapping motion (REVERSE)

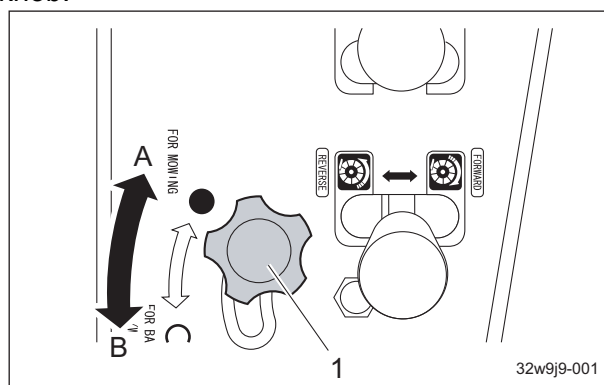
Anti-reverse Reel Rotation Stopper

Caution

Before you start cutting work, make sure that the stopper knob is tightened.

The anti-reverse reel rotation stopper is located on the right side of the driver's seat. It prevents the reel cutters (cutting cylinders) from rotating in reverse during cutting work.

Except for back lapping operations, be sure to loosen the stopper knob, shift the stopper to the "FOR MOWING" position, then tighten the knob.



Anti-reverse Reel Rotation Stopper_001

1	Anti-reverse reel rotation stopper
A	FOR MOWING
B	FOR BACKLAPPING

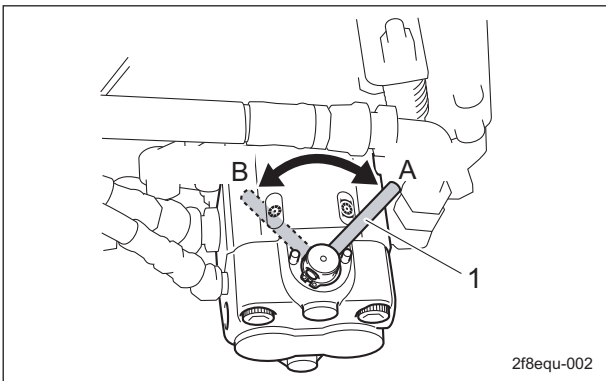
Handling Instructions

Reel Rotation/Stop Switching Lever

⚠ Caution

Before operating the reel rotation/stop switching lever, be sure to shift the reel rotation lever to the "Stop" position.

The reel rotation/stop switching lever is located on the reel motor attached to each mower unit. It is used during cutting and back lapping. You must shift only the lever(s) for the mower unit(s) that you plan to use for cutting or back lapping to the "Rotate" position. Leave the lever(s) for other mower units in the "Stop" position.



Reel Rotation/Stop Switching Lever_001

1	Reel rotation/stop switching lever
A	Rotate
B	Stop

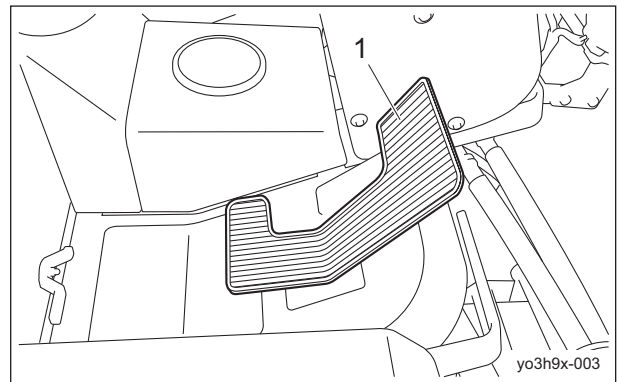
Traveling Pedal

⚠ Warning

This machine is not authorized as a special motor vehicle. Do not drive it on public roads.

The traveling pedal is located in the right foot area.

When depressed forward, the machine travels forward. When depressed backward, the machine travels in reverse.

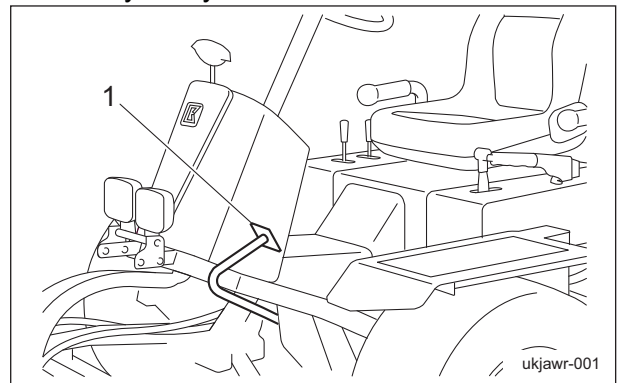


Traveling Pedal_001

1	Traveling pedal
---	-----------------

Brake Pedal

The brake pedal is located in the left foot area. To stop the machine, depress the brake pedal all the way firmly.



Brake Pedal_001

1	Brake pedal
---	-------------

Handling Instructions

Parking Brake Lever

Caution

Be sure to release the parking brake before driving. It may result in the brakes or hydraulic system malfunction.

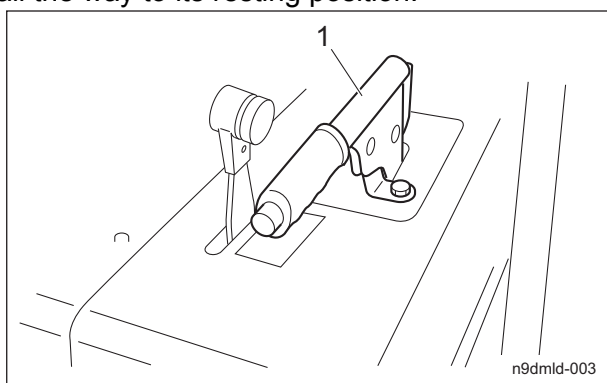
Caution

Never park the machine on a slope.

The parking brake lever is located to the left of the driver's seat.

To park the machine, depress the brake pedal, and pull the parking brake lever completely.

To release the parking brake, press the push button while lowering the parking brake lever all the way to its resting position.



Parking Brake Lever_001

1	Parking brake lever
---	---------------------

Hood

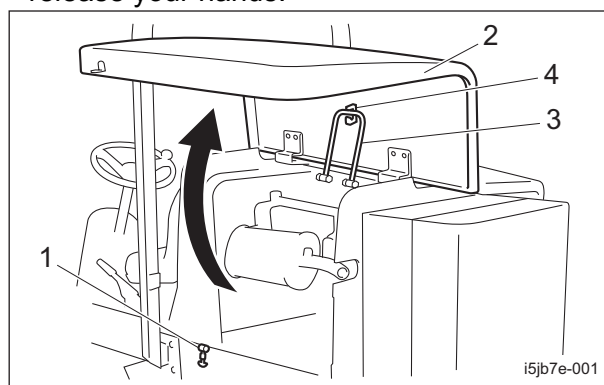
Caution

Do not open the hood in strong winds.

Caution

Be careful not to pinch your fingers when you open or close the hood.

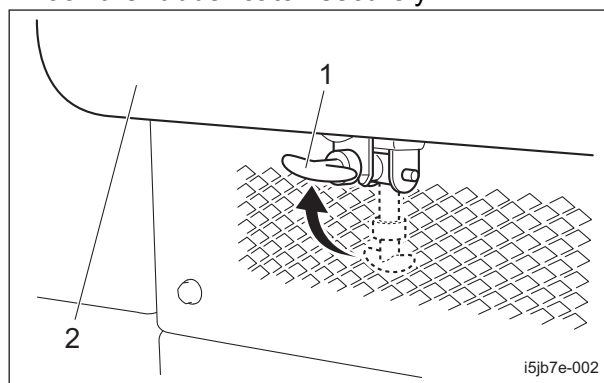
1. Unlock the rubber catch, then lift up the hood.
2. Hook the hood support rod to the latch inside the hood.
Make sure that the hood will not close, then release your hands.



Hood_001

1	Rubber catch
2	Hood
3	Hood support rod
4	Latch

3. To close the hood, release the hood support rod from the latch, then lower the hood slowly.
4. Lock the rubber catch securely.



Hood_002

1	Rubber catch
2	Hood

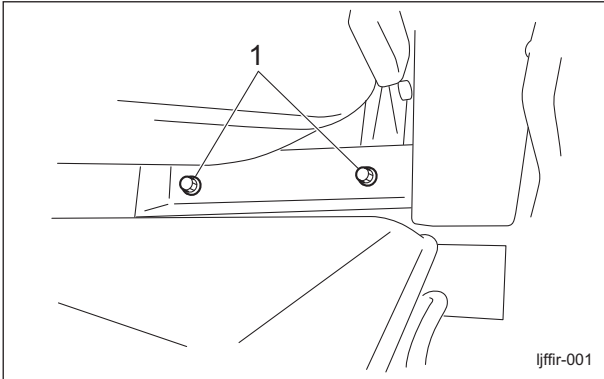
Handling Instructions

Underseat Cover

Caution

Be careful not to pinch your fingers when you open or close the underseat cover.

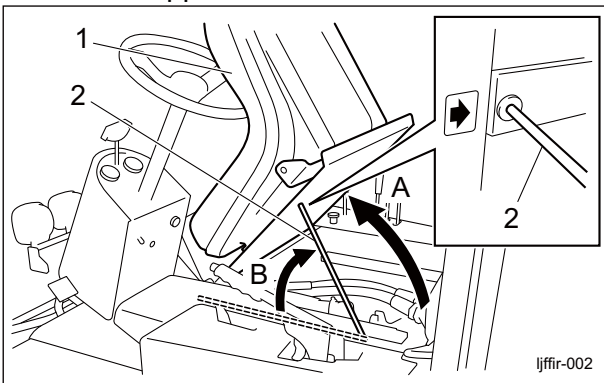
1. Bring the seat to the most front position.
2. Remove two bolts located on the rear of the seat.



Underseat Cover_001

1	Bolt
---	------

3. Bring the seat to the backmost position.
4. Lift the seat.
5. Securely support the underseat cover with the seat support rod.

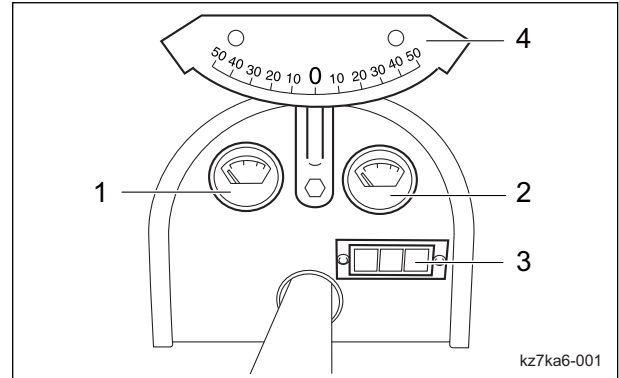


Underseat Cover_002

1	Seat
2	Seat support rod
A	Step 1
B	Step 2

Instruments

Instruments on the Operation Panel



Instruments on the Operation Panel_001

1	Water temperature gauge
2	Fuel gauge
3	Pilot lamps (charge lamp, thermo-start lamp, oil pressure lamp)
4	Angle meter

Hour meter

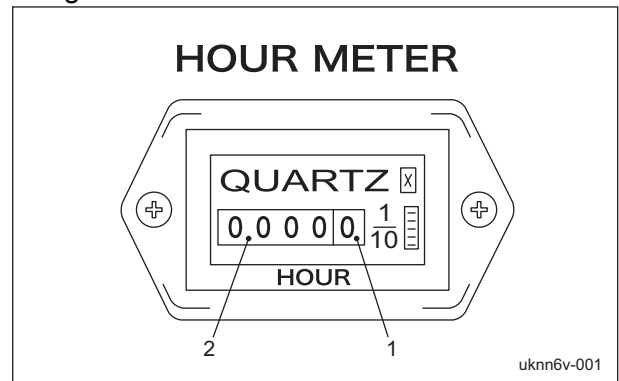
The hour meter is located at the back of the operation panel, and indicates the total operation time of the engine.

Every six minutes of engine operation will increase the number at the first digit (black number on a white background) by one. Every one hour of engine operation will increase the number at the next digit (white number on a black background) by one.

Odometer

1/10 digit: Black number on white background

Hour digits: White number on black background



Hour Meter_001

1	1/10 digit
2	Hour digits

Handling Instructions

Water Temperature Gauge

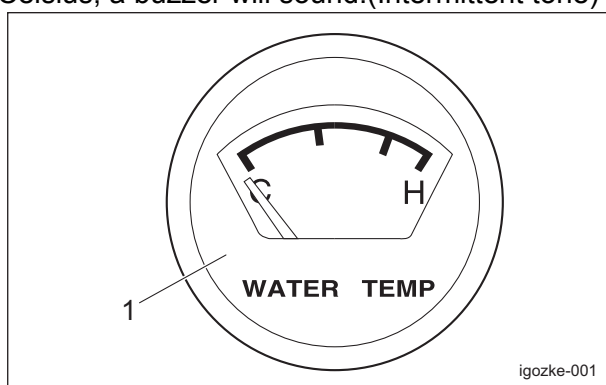
The water temperature gauge is located in the operation panel.

This instrument indicates the water temperature inside the engine.

If the water temperature gauge indicates a level close to "H" during operation, the machine is overheated.

Remove the load from the engine, idle the machine for five minutes, stop the engine, and then inspect the machine and perform any necessary maintenance.

If the water temperature exceeds 105 degrees Celsius, a buzzer will sound. (Intermittent tone)



Water Temperature Gauge_001

1	Water temperature gauge
---	-------------------------

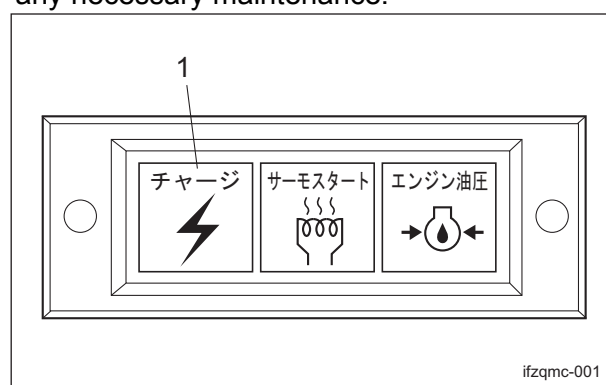
Pilot Lamps

Charge Lamp

The charge lamp is the left pilot lamp located in the operation panel.

It turns on when the ignition key is set to the "ON" position before the engine starts. It turns off when the engine starts and the alternator starts operating properly.

If this lamp illuminates while you are operating the machine, stop the engine immediately, and then inspect the machine and perform any necessary maintenance.



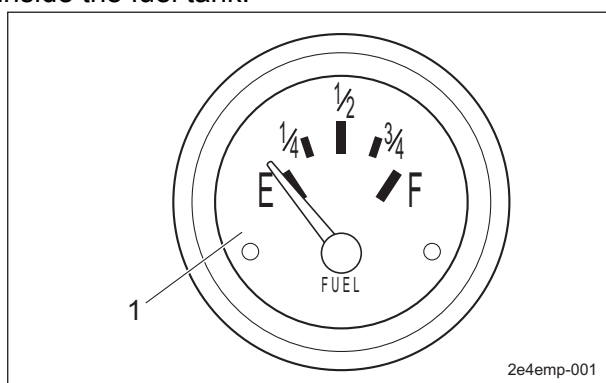
Charge Lamp_001

1	Charge lamp
---	-------------

Fuel Gauge

The fuel gauge is located in the operation panel.

This instrument indicates the quantity of fuel inside the fuel tank.



Fuel Gauge_001

1	Fuel gauge
---	------------

Handling Instructions

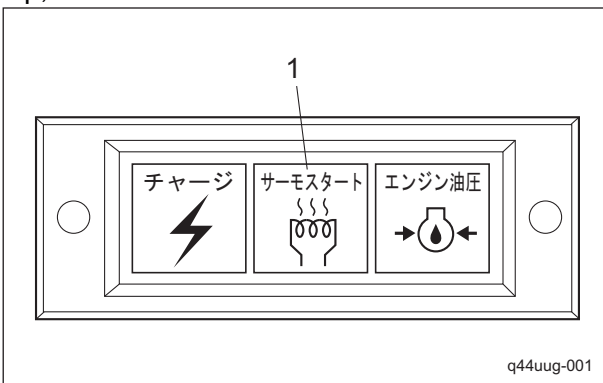
Thermo-start Lamp

The thermo-start lamp is the middle pilot lamp located in the operation panel.

When the ignition key is set to the "GLOW" position, it illuminates as the glow plug generates heat.

Illumination of the thermo-start lamp is controlled by the glow lamp timer, and the lamp is turned off after a specified amount of time passes.

The duration of illumination indicates an approximate period of time required for warm-up, and has been fixed at five seconds.



Thermo-start Lamp_001

1	Thermo-start lamp
---	-------------------

Overheat Warning Buzzer

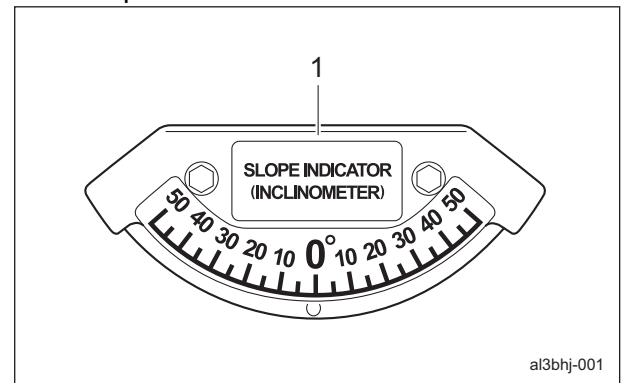
If the water temperature inside the engine exceeds 105 degrees Celsius, a buzzer will sound. (intermittent tone)

Remove the load from the engine, idle the machine for five minutes, stop the engine, and then inspect the machine and perform any necessary maintenance.

Angle Meter

The angle meter is located in the operation panel.

This instrument indicates the angle of the machine position.



Angle Meter_001

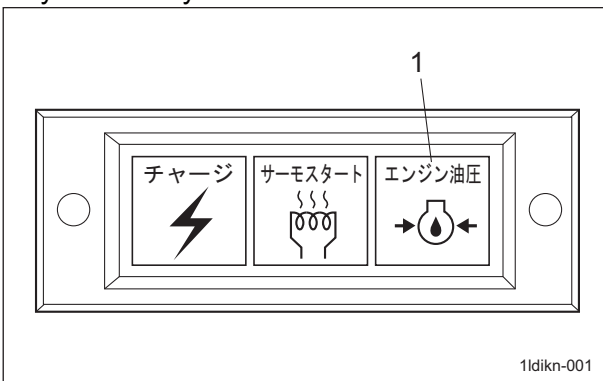
1	Angle meter
---	-------------

Oil Pressure Lamp

The oil pressure lamp is the right pilot lamp located in the operation panel.

It turns on when the ignition key is set to the "ON" position before the engine starts. It turns off when the engine starts and engine oil pressure is generated properly.

If this lamp illuminates while you are operating the machine, stop the engine immediately, and then inspect the machine and perform any necessary maintenance.



Oil Pressure Lamp_001

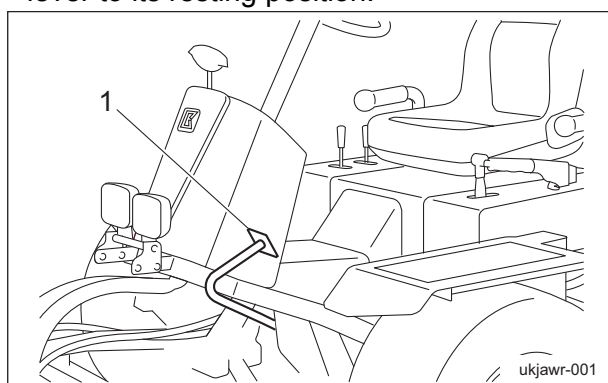
1	Oil pressure lamp
---	-------------------

Handling Instructions

Travel of Machine

Traveling Procedure

1. Start the engine. (See "Procedure to Start Engine" (Page 4-20) .)
2. Raise all mower units, and set the anti-falling stop valve to the "Stop" position.
3. Depress the brake pedal, and while pressing the push button, return the parking brake lever to its resting position.



Traveling Procedure_001

1	Brake pedal
---	-------------

4. Slowly depress the traveling pedal.
5. The machine will start to move.

Towing the Machine

If the machine does not travel due to engine trouble, etc., you can move it in the following ways:

Caution

Do not touch the unload valve except when towing the machine.

Caution

When towing the machine, travel at a speed no more than 3.0 km/h.

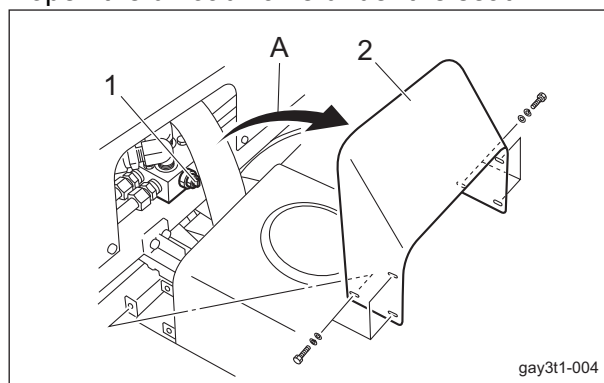
In addition, do not tow the machine for more than 3 minutes.

If the towing speed is too fast or the machine is towed too much, the pump or motor will be damaged.

Caution

Before restarting the engine, be sure to close the unload valve.

1. Stop the engine. (See "Procedure to Stop Engine" (Page 4-21) .)
2. Pull the parking brake lever and chock the wheels.
3. Remove the rear center cover, and then open the unload valve under the seat.

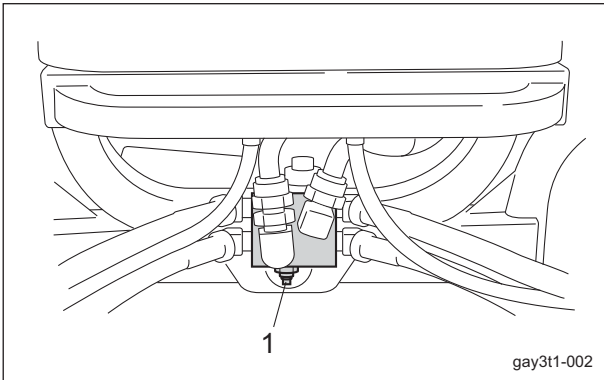


Towing the Machine_001

1	Unload valve
2	Rear center cover
A	Remove

Handling Instructions

4. Open the unload valve located on the rear frame.



Towing the Machine_002

1	Unload valve
---	--------------

1	Needle valve
2	Lock nut
A	Tighten
B	Loosen

Important

Before towing, be sure to open the unload valves in two locations.

5. While pressing the push button, release the parking brake lever and remove the wheel stopper.
6. Tow the machine slowly.

Opening and Closing the Unload Valve

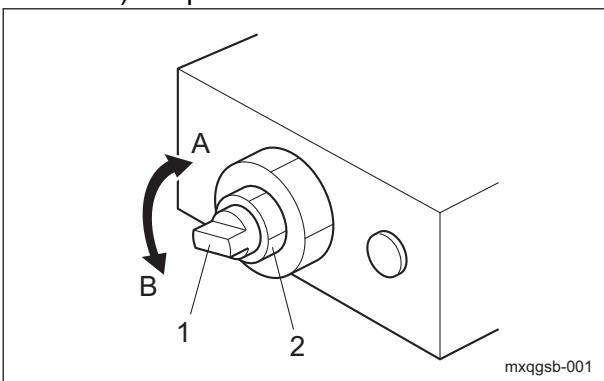
Caution

Unless you plan to tow the machine, tighten the needle valve of the unload valve securely and tighten the lock nut firmly.

Important

Do not rotate the needle valve of the unload valve more than once.

1. Loosen the lock nut.
2. Loosen the needle valve (located in the center) to open the unload valve.



Opening and Closing the Unload Valve_001

Cutting Work

Cutting Operation

Warning

Do NOT start to move or stop the machine abruptly. To do so is very dangerous. In addition, it may damage the hydraulic system or result in oil leakage.

Caution

Cutting work must be performed at an appropriate speed for the site and location. When cutting bumpy surfaces, keep the engine rpm steady, and slow down the cutting speed.

Caution

Reel rotation will be turned on or off based on the sensor-detected position of the mower units. Please note that if you stop operating the mower unit up/down lever before the mower units are raised completely, reel rotation may not stop.

1. Start the engine. (See "Procedure to Start Engine" (Page 4-20) .)
2. Raise all mower units, and set the anti-falling stop valve to the "Stop" position.
3. Depress the brake pedal, and while pressing the push button, return the parking brake lever to its resting position.
4. Shift the throttle lever to "High", and rev up the engine to MAX (3,100 rpm).
5. Right before starting cutting work, set the anti-falling stop valve to the "Open" position.
6. Shift the mower unit up/down lever to the "DOWN" position to lower the mower units.
7. Shift the reel rotation lever to "FORWARD" to rotate the reel cutters (cutting cylinders) for all mower units in cutting (positive) motion.

8. Depress the traveling pedal to start cutting work.

Note:

During the work, the reel cutters (cutting cylinders) will rotate or stop in sync with the up and down motion of the mower units.

Transporting

Transporting Procedure

When loading the machine into a trailer or a truck to transport it, drive the machine in reverse. When unloading, drive the machine forward.

If the roof is installed on the machine, remove it.

The roof may be damaged by wind pressure.

Maintenance Precautions..... Page 5-2

Maintenance Schedule..... Page 5-3

Specified Values..... Page 5-4

Main Consumable Parts..... Page 5-5

Jacking up the machine..... Page 5-6

About the Jacking up the machine..... Page 5-6

Jack-up Points..... Page 5-6

Greasing..... Page 5-7

About Greasing..... Page 5-7

Greasing Points..... Page 5-7

Maintenance (Mower)..... Page 5-10Back Lapping of Reel Cutter
(Cutting Cylinder)..... Page 5-10**Maintenance (Main Body)..... Page 5-12**

Removing/Installing Tires..... Page 5-12

Adjustment of Belt Tension..... Page 5-13

Adjustment of Parking Brake..... Page 5-13

Adjustment of Brake..... Page 5-14

Adjusting the Neutral Position of the
Piston Pump..... Page 5-14

Change of Constant Velocity Joint..... Page 5-15

Change of Fuse..... Page 5-15

Long-Term Storage..... Page 5-16

Before Long-Term Storage..... Page 5-16

Maintenance

Maintenance Precautions

 Caution

First, learn well the maintenance operations you plan to perform.

 Caution

Use tools appropriate for each maintenance operation.

 Caution

For the safe and best performance of your machine, use Baroness genuine parts for replacement and accessories.
Please note that our product warranty may be void if you use non-genuine parts for replacement or accessories.

Maintenance Schedule

LM281/283/285

Follow the maintenance schedule below.

○ . . . Inspect, adjust, supply, clean

● . . . Replace (first time)

△ . . . Replace

Maintenance item		Before work	After work	Every 8 hrs.	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 500 hrs.	Every year	Every 2 years	Every 4 years	Remarks	
Engine	Tightening the parts	○													
	Fuel	○													
	Air cleaner	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Engine oil	○		●	△									8 hrs. (first time)	
	Engine oil filter	○			●	△								50 hrs. (first time)	
	Ignition plug	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Radiator	○													
	Oil cooler	○													
	Coolant	○			△										
	Fan belt	○									△				
	Battery	○										△			
	Battery fluid	○													
	Cleaning the exterior	○													
Main body	Tightening the parts	○													
	Interlock system	○													
	Emergency switch	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Electrical wiring										○				
	Knife	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Steering chain	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cutting (or brush) height	○													
	Greasing, oiling				○										
	Tire	○													
	Rubber crawler	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V-belt	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Brake	○													
	Wire	○					△								
	Cover	○													
	Oil leakage	○													
	Hydraulic oil	○				●					△				100 hrs. (first time)
	Hydraulic oil filter					●					△				100 hrs. (first time)

Maintenance

Maintenance item		Before work	After work	Every 8 hrs.	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 500 hrs.	Every year	Every 2 years	Every 4 years	Remarks
Main body	Hydraulic motor oil	-	-	-	-	-	-	-	-	-	-	-	-	-
	Power unit oil	-	-	-	-	-	-	-	-	-	-	-	-	-
	Transmission oil	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hydraulic hose (moving part)	○										△		
	Hydraulic hose (fixed part)	○											△	
	Air cleaner	○					△				△			Change of Air Cleaner Reference
	Electromagnetic pump filter	○					△							
	Fuel strainer					○					△			
	Fuel pipe	○												
	Cleaning the exterior	○												

The values for consumables are not guaranteed.
Replace the steering cylinder hoses every 2 years.

Specified Values

Fuel tank capacity	38.0 dm ³ (38.0 L)	
Hydraulic tank capacity	24.0 dm ³ (24.0 L)	Shell Tellus S2M46
Engine oil capacity	3.1 dm ³ (3.1 L)	Summer: SAE30, Winter: SAE20
Coolant capacity	6.0 dm ³ (6.0 L)	Including reserve tank (1.0 L)
Front tire	120 kPa (1.2 kgf/cm ²)	23 x 10.50 - 12 4P
Rear tire	150 kPa (1.5 kgf/cm ²)	23 x 8.50 - 12 4P
Cutter adjustment spring	1.57 in (1.575 in)	Length of spring coil

Main Consumable Parts

Part name	Code
Fan belt	PF16241-9701-0
Oil element	PF15241-3209-4
Air cleaner element	PFT0270-1632-0
Fuel filter element	PF1G313-4356-0
Suction filter element	K3413000020
Hydraulic cartridge filter	K3412000060
Hydraulic oil (20 L can)	K2913100200
Brake wire, left	K1120107000
Brake wire, right	K1120125000
Side brake wire	K1120141010
Throttle wire	K1110101000
Brake shoe, front right	P741-8005-00
Brake shoe, rear right	P741-8007-00
Brake shoe, front left	P741-8006-00
Brake shoe, rear left	P741-8008-00

Maintenance

Jacking up the machine

About the Jacking up the machine

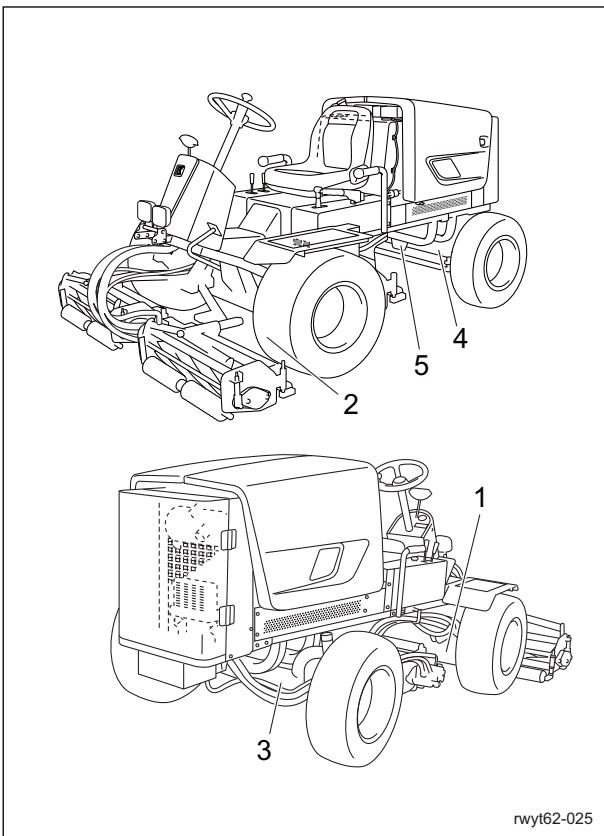
Warning

When replacing a tire or beginning any other maintenance or repairs, be sure to chock the wheels to prevent the machine from moving. Before jacking up the machine, park it on a hard, flat surface such as a concrete floor and remove any obstacles that could prevent you from performing the work safely. When necessary, use an appropriate chain block, hoist, or jack. Support the machine securely with jack stands or appropriate blocks. Failure to do so may cause the machine to move or fall, resulting in injury or death.

Use the jack-up points identified in this manual when jacking up the machine.

Only place a jack under the jack-up points specified. Placing a jack at any other point could result in damage to the frame or other parts.

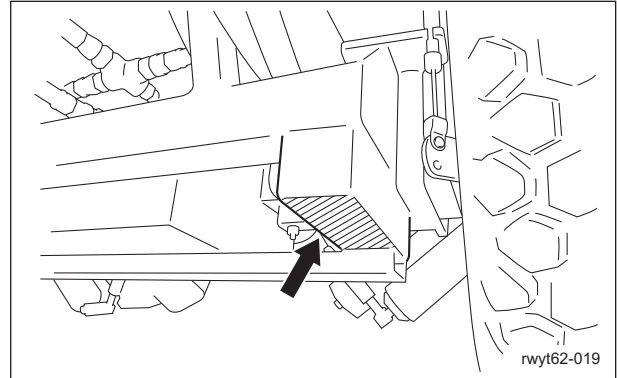
Jack-up Points



Jack-up Points_001

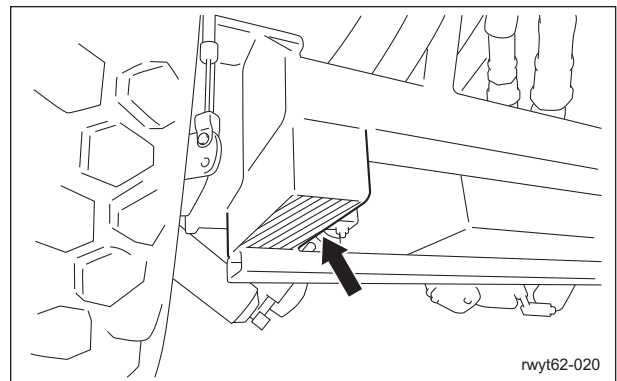
1	Front right frame
2	Front left frame
3	Rear right pivot
4	Rear left pivot
5	Rear center frame

1. Front right frame



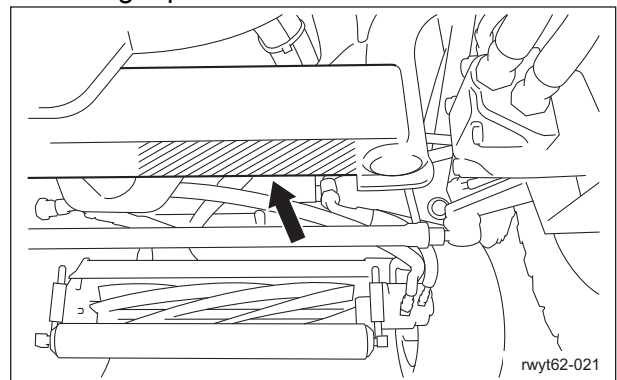
Jack-up Points_002

2. Front left frame



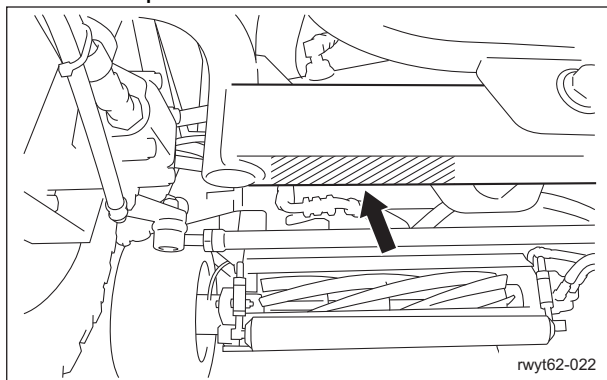
Jack-up Points_003

3. Rear right pivot



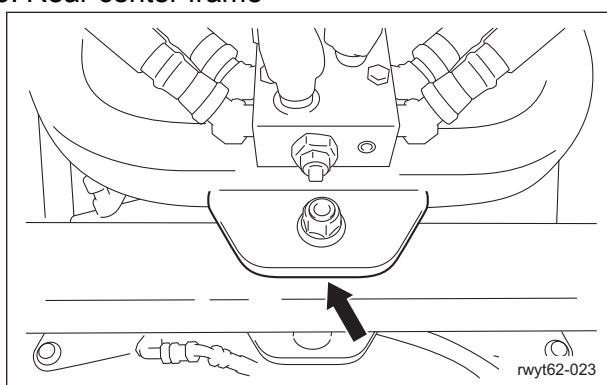
Jack-up Points_004

4. Rear left pivot



Jack-up Points_005

5. Rear center frame

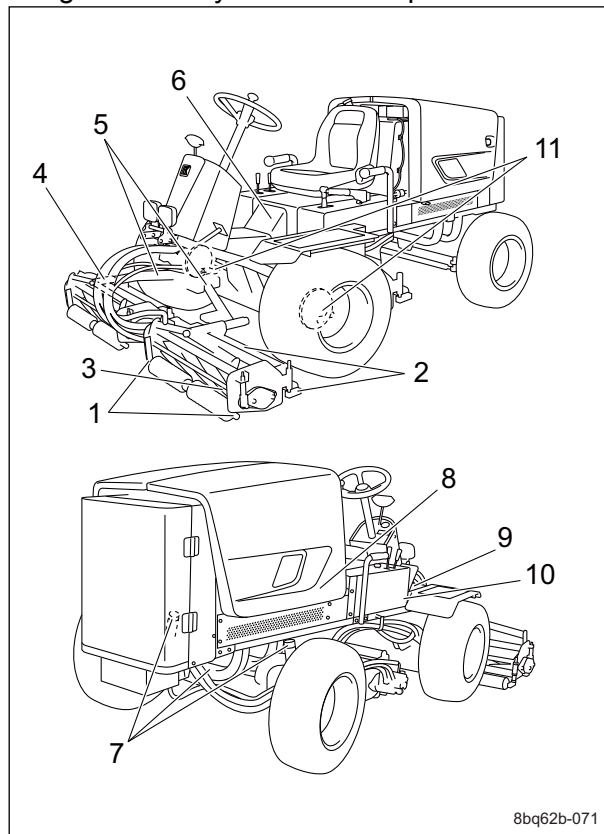


Jack-up Points_006

Greasing Points

Grease nipples are installed in the following locations.

Add grease every 50 hours of operation.



Greasing Points_001

Greasing

About Greasing

Since there may be adhesion or damage due to lack of grease on moving parts, they must be greased.

Add urea-based No. 2 grease in accordance with the Maintenance Schedule.

Other locations where the specified grease or lubricant is used are indicated in "Greasing Points".

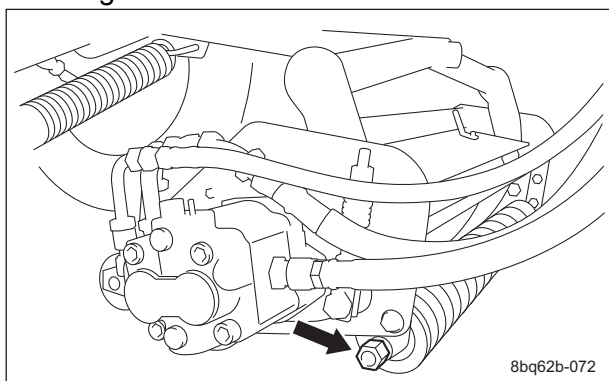
Add grease using the specified grease or lubricant.

	Portion	No. of Greasing Points
1	Front roller	6
2	Rear roller	6
3	Reel housing	3
4	Mower arm fulcrum	3
5	Lift arm fulcrum	3
6	Idle lever fulcrum	1
7	Pivot	3
8	Piston pump	2
9	Traveling pedal fulcrum	1
10	Traveling pedal shaft fulcrum	1
11	Brake lever shaft	2

Maintenance

1. Front roller

There is one greasing point each on the left and right of each mower unit.

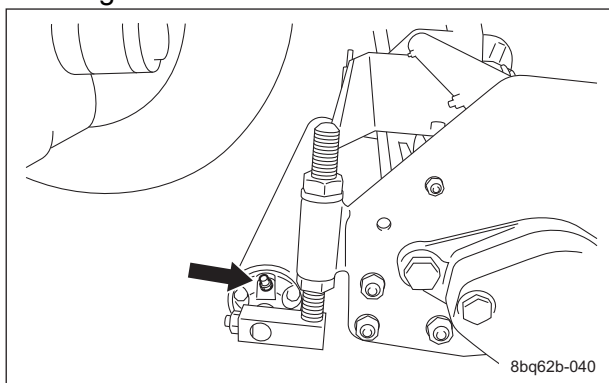


8bq62b-072

Greasing Points_002

2. Rear roller

There is one greasing point each on the left and right of each mower unit.

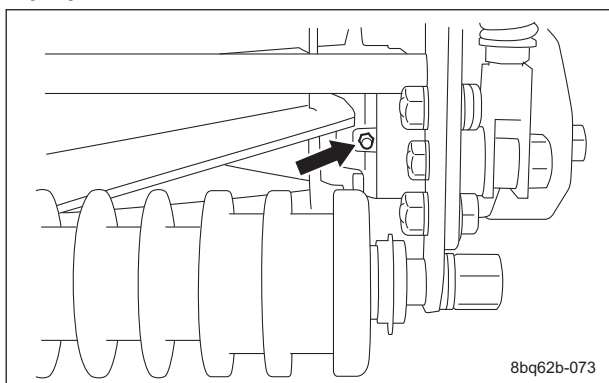


8bq62b-040

Greasing Points_003

3. Reel housing

There is one greasing point on each mower unit.

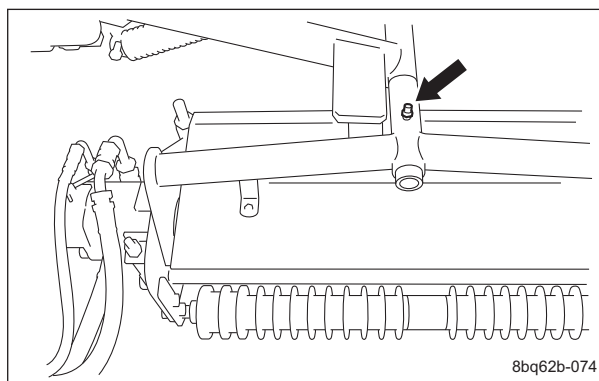


8bq62b-073

Greasing Points_004

4. Mower frame fulcrum

There is one greasing point on each mower unit.



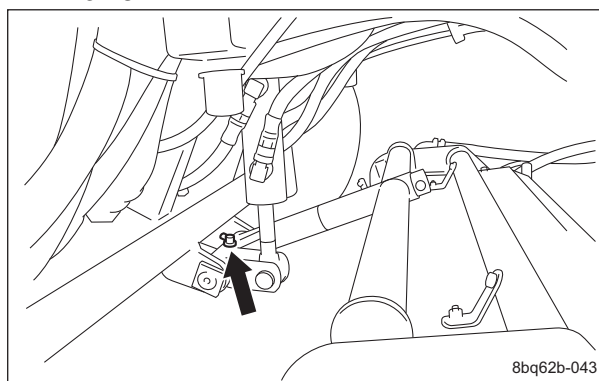
8bq62b-074

Greasing Points_005

5. Lift arm fulcrum

There is one greasing point each on the left and right mower units.

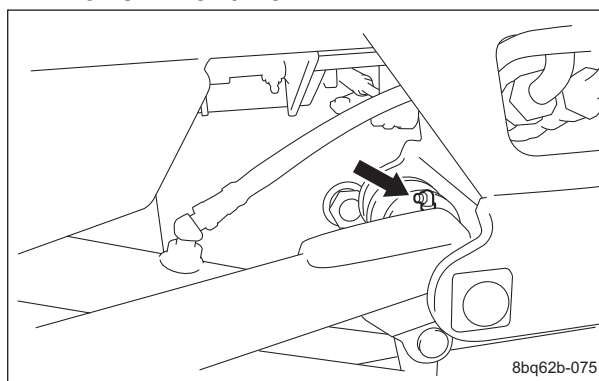
Mower #1



8bq62b-043

Greasing Points_006

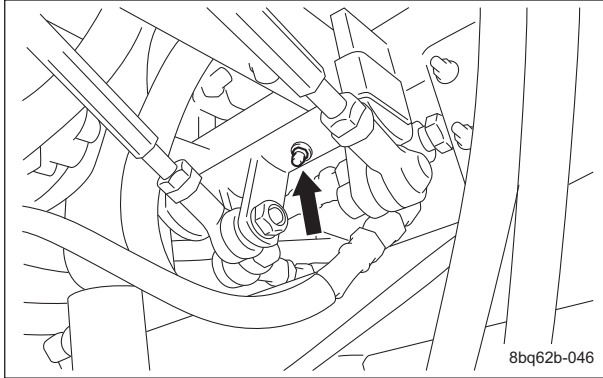
Mower #2 and #3



8bq62b-075

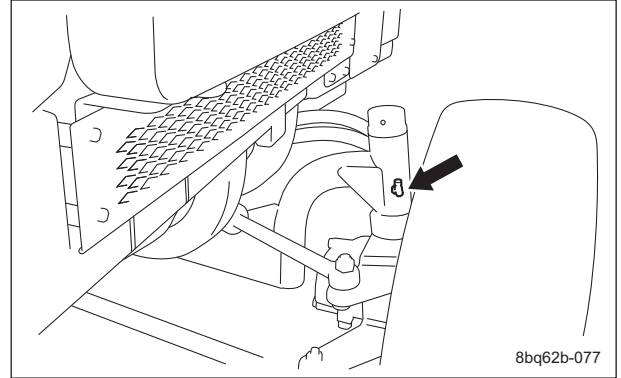
Greasing Points_007

6. Idle lever fulcrum



Greasing Points_008

Rear left wheel

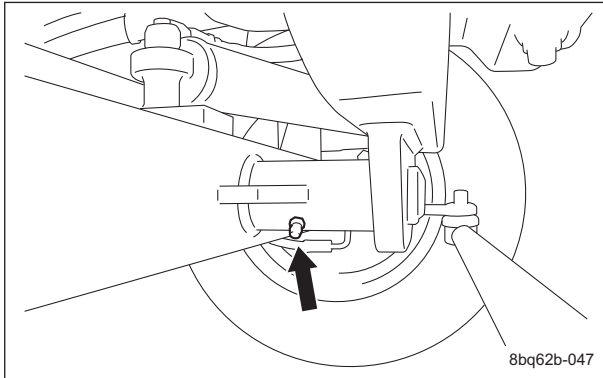


Greasing Points_011

7. Pivot

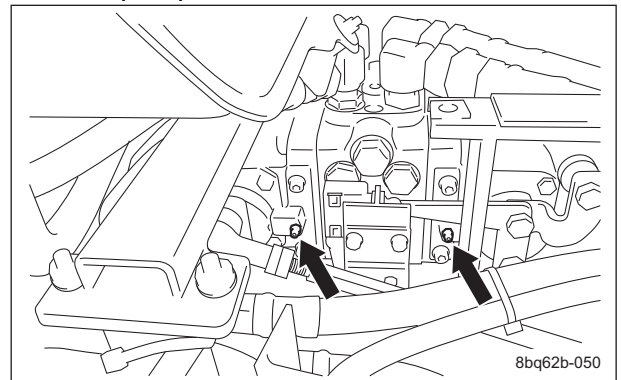
Use jack stands to support the machine and apply grease.

Middle between the rear wheels



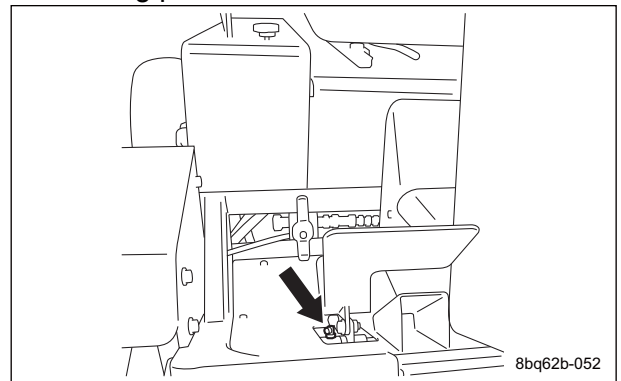
Greasing Points_009

8. Piston pump



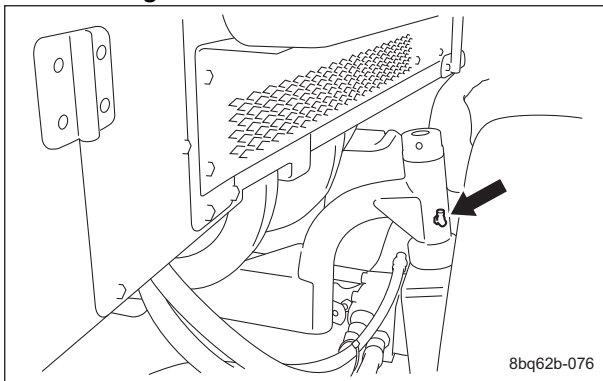
Greasing Points_012

9. Traveling pedal fulcrum



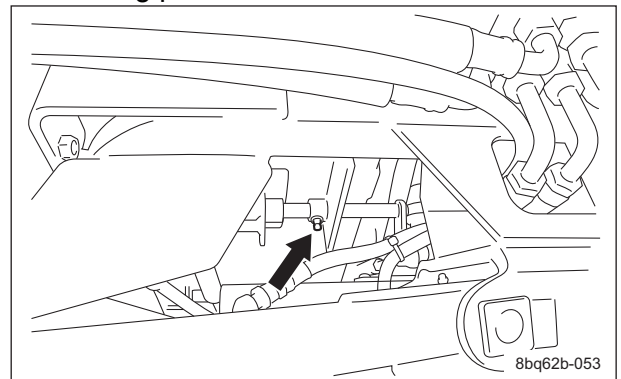
Greasing Points_013

Rear right wheel



Greasing Points_010

10. Traveling pedal shaft fulcrum

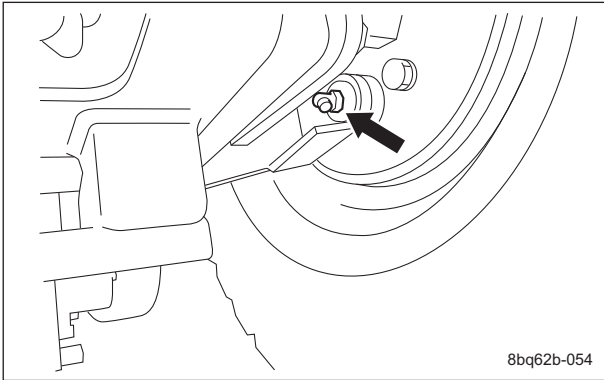


Greasing Points_014

Maintenance

11. Brake lever shaft

There is one greasing point each in the left and right brake areas.



Greasing Points_015

Maintenance (Mower)

Back Lapping of Reel Cutter (Cutting Cylinder)

Back lapping is work similar to sharpening a cooking knife. If the edges of the reel cutter (cutting cylinder) and the bed knife (bottom blade) become blunt and make cutting difficult, both the reel cutter (cutting cylinder) and the bed knife (bottom blade) should be simultaneously sharpened by reversing the reel cutter (cutting cylinder) with an abrasive paste applied.

However, back lapping is a temporary measure and would not restore the sharpness completely.

If the edges of the reel cutter (cutting cylinder) and the bed knife (bottom blade) become blunt and make cutting difficult, follow the steps below to perform back lapping.

Caution

Both the reel cutter (cutting cylinder) and the bed knife (bottom blade) are edged tools. Handle them carefully, since they could cut your hands or legs.

Caution

Be careful not to inhale exhaust gas during back lapping.

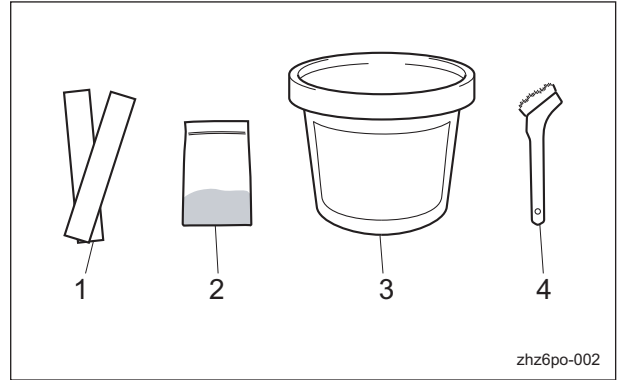
Caution

During back lapping, the reel cutter (cutting cylinder) rotates. Keep hands and feet away from moving parts.

Caution

Do not perform lapping with any other persons.

1. Have the following items ready: Strips of newspaper, Abrasive [Back lapping powder mixed with oil; or gel compound (Baroness genuine abrasive)], Brush.



Back Lapping of Reel Cutter (Cutting Cylinder)_001

1	Newspaper
2	Back lapping powder
3	Gel compound
4	Brush

Note:

The mixing ratio for the abrasive, in volume, is one part back lapping powder to three or four parts oil.

Caution

Before cutting newspaper as a test, be sure to stop the engine and wear gloves to protect your hands.

Pay attention not to let the reel cutter (cutting cylinder) catch your gloves. Otherwise, you may injure your hand or fingers.

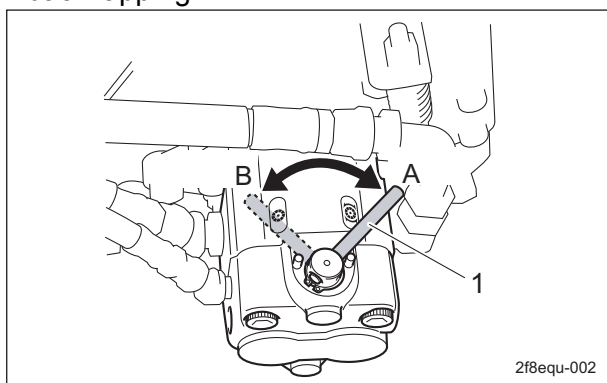
Caution

Before adjusting the blade engagement, be sure to set the reel rotation/stop switching lever for the reel motor (attached to the mower unit) to the "Stop" position.

Important

For checking the sharpness of the blade, adjust the blade engagement after cutting grass.

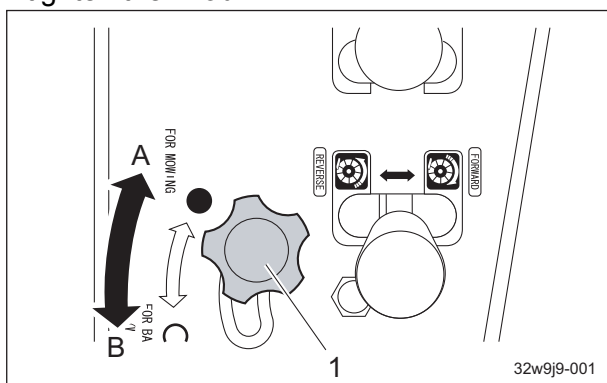
- Insert two or three strips of newspaper into the space between the reel cutter (cutting cylinder) and the bed knife (bottom blade) at an angle of 90 degrees. Then, rotate the reel cutter (cutting cylinder) counter-clockwise (when you face the mower unit from the left) by hand to check the sharpness of the blades.
- Check the sharpness at entire range (three or four points from left edge to right one) of the reel cutter (cutting cylinder).
- Using a piece of chalk, mark locations on the blade that are sharp.
- Shift only the reel rotation/stop switching levers of the hydraulic motors in the mower units to be used for back lapping to the "Rotate" position. Shift the levers to the "Stop" position for the mower units for which you will not perform back lapping.



Back Lapping of Reel Cutter (Cutting Cylinder)_002

1	Reel rotation/stop switching lever
A	Rotate
B	Stop

- Loosen the anti-reverse reel rotation stopper knob, shift the stopper all the way to the "FOR BACKLAPPING" position, and then tighten the knob.



Back Lapping of Reel Cutter (Cutting Cylinder)_003

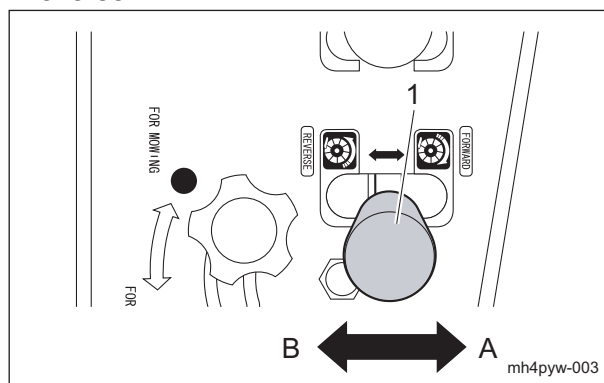
1	Anti-reverse reel rotation stopper
A	FOR MOWING
B	FOR BACKLAPPING

- Start the engine, and run it at a low rpm.

Important

If you shift the reel rotation lever to the "REVERSE" position while the anti-reverse reel rotation stopper knob is not completely shifted to the "FOR BACKLAPPING" position, the safety device will be activated and will stop the engine.

- Shift the reel rotation lever to the "REVERSE" (back lapping motion) position to rotate the reel cutter (cutting cylinder) in reverse.



Back Lapping of Reel Cutter (Cutting Cylinder)_004

1	Reel rotation lever
A	Cutting motion (FORWARD)
B	Back lapping motion (REVERSE)

- Apply the abrasive evenly with the brush on the top side of reel cutter (cutting cylinder) where the newspaper was cut well or of chalk-marked locations. (Never apply to blunt areas.) Use an abrasive of one part back lapping powder (#150 - #200) to three or four parts oil.
- Idle the machine for a while, and when contact noise is no longer heard, return the reel rotation lever to the neutral position to stop reel cutter (cutting cylinder).
- Stop the engine.
- Wash off or wipe off with cloth etc. the abrasive from the reel cutter (cutting cylinder), then check it for sharpness.

Maintenance

13. Repeat steps 2 to 12 until the entire range (three or four points from left edge to right one) of the reel cutter (cutting cylinder) will be uniformly sharpened.
14. Finally, apply abrasive to the entire blade width of the reel cutter (cutting cylinder) and perform final back lapping.
15. Stop the rotation of the reel cutter (cutting cylinder), stop the engine, and then carefully and thoroughly wash off any remaining abrasive.
16. While checking the blade for sharpness, adjust blade engagement.

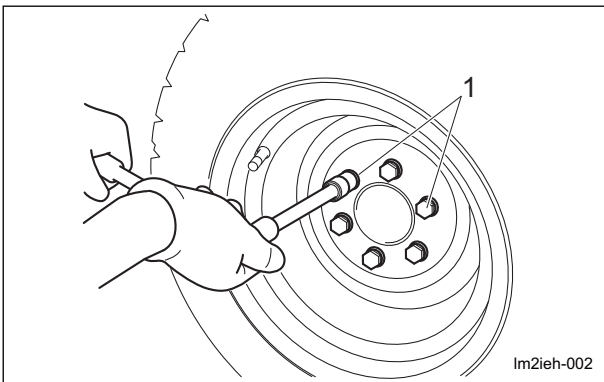
Maintenance (Main Body)

Removing/Installing Tires

Front Tires

Follow the steps below to remove the front tires:

1. Loosen the bolts.



Front Tires_001

1	Heat-treated bolt
---	-------------------

2. Securely place the jack beneath the jack-up point of the front left/right frame area, and then raise it until the tire lifts off the ground. (See "Jack-up Points" (Page 5-6) .)
3. Remove the bolts.
4. Remove the tire from the wheel mounting seat.

⚠ Caution

Refer to the Tightening Torque table. Note that the Baroness product warranty may not apply to defects caused by incorrect or overtorque tightening etc.

Important

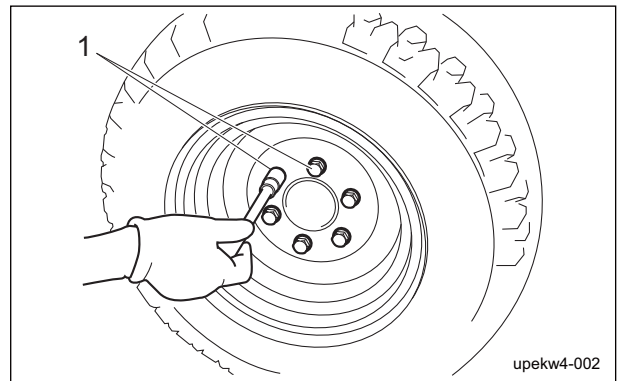
Tighten the bolts in the tightening order (diagonally).

For installing the front tires, reverse the removing procedure.

Rear Tire

Follow the steps below to remove the rear tires:

1. Loosen the bolts.



Rear Tires_001

1	Heat-treated bolt
---	-------------------

2. Securely place the jack beneath the jack-up point of the rear frame area, and then raise it until the tire lifts off the ground. (See "Jack-up Points" (Page 5-6) .)
3. Remove the bolts.
4. Remove the tire from the wheel mounting seat.

⚠ Caution

Refer to the Tightening Torque table. Note that the Baroness product warranty may not apply to defects caused by incorrect or overtorque tightening, etc.

Important

Tighten the bolts in the tightening order (diagonally).

For installing the rear tires, reverse the removing procedure.

Adjustment of Belt Tension

Caution

Be sure to stop the engine before adjusting the belts.

Important

Make sure that the belt has the specified amount of tension.

If the belt becomes slack due to frequent use, it may jump or slip.

In addition, if it is overtightened, it may wear prematurely.

If necessary, adjust it, and always check the belt for appropriate tension.

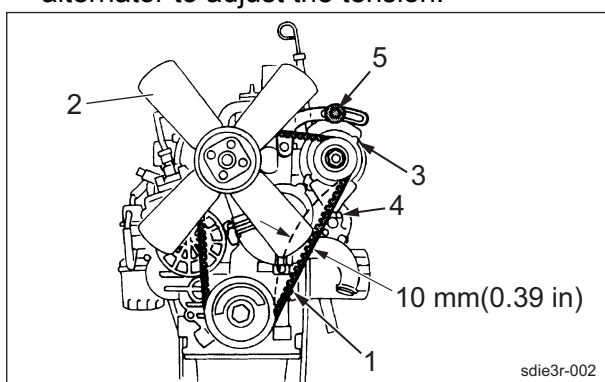
Fan Belt

Caution

Be sure to stop the engine before adjusting the belts.

For details on handling the engine, please refer to the separate Engine Operating Manual.

1. Press the middle of the belt with your finger to check the belt tension.
2. If the belt is too slack, loosen bolts A and B (that affix the alternator), then move the alternator to adjust the tension.



Fan Belt_001

1	Fan belt
2	Blade
3	Alternator
4	Bolt A
5	Bolt B

Adjustment of Parking Brake

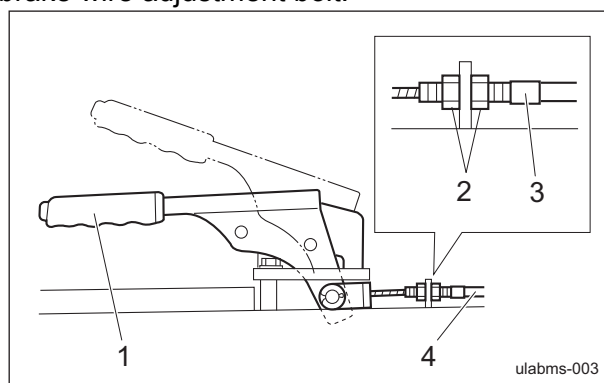
Danger

If the brake wire is cut, the machine will be unable to stop. This would be extremely dangerous.

If the brake wire is cracked or damaged, replace it with a new one immediately.

If the parking brake is not sufficiently effective when you pull the parking brake lever, adjust the brake wire.

Adjust the parking brake by tightening the brake wire adjustment bolt.



Adjustment of Parking Brake_001

1	Parking brake lever
2	Lock nut
3	Adjustment bolt
4	Brake wire

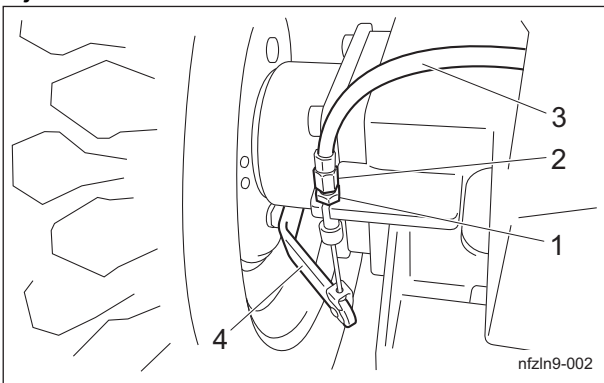
Maintenance

Adjustment of Brake

Danger

If the brake wire is cut, the machine will be unable to stop. This would be extremely dangerous.
 If the brake wire is cracked or damaged, replace it with a new one immediately.
 If the brake is not sufficiently effective, adjust the brake wire.

Adjust the brake by tightening the brake wire adjustment bolt.



Adjustment of Brake_001

1	Lock nut
2	Adjustment bolt
3	Brake wire
4	Brake lever

Break-in of Brakes

If the brake shoes or brake pads are worn, replace them with new ones.
 Immediately after replacement, drive to break in the brakes if the effectiveness of the brakes is low.
 While driving, lightly operate the brakes to break in the contact areas.

Adjusting the Neutral Position of the Piston Pump

Caution

Make sure not to touch rotating tires.

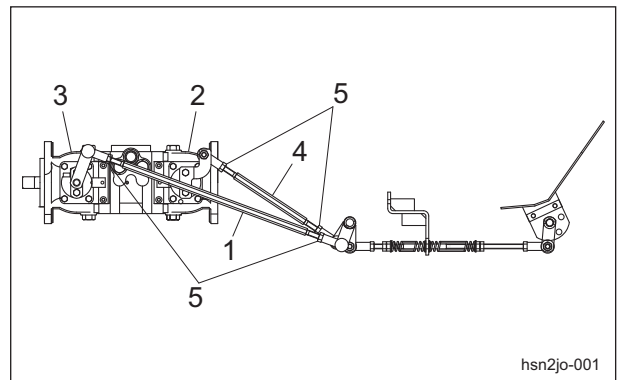
Caution

When adjusting the neutral position, pay close attention to abrupt start of the machine.
 Place the jacks beneath the jack-up points, and then lift the machine until all the tires get off the ground.

If the machine moves forward or backward while the traveling pedals are released, they are not set to the neutral position.

Follow the steps below to make adjustments.

1. Stop the engine.
2. Place the jacks beneath the jack-up points, and then lift the machine off the ground. Use stable jack stands, and raise the machine until the tires lift off the ground. (See "Jack-up Points" (Page 5-6) .)
3. Start the engine, and rev it up to the maximum rpm.
4. Adjust the neutral position.
 - [1] If the front tires rotate forward, loosen the lock nuts, then turn the front wheel rod to shorten it.
 - [2] If the front tires rotate in reverse, loosen the lock nuts, then turn the front wheel rod to extend it.

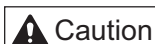


Adjusting the Neutral Position of the Piston Pump_001

1	Rear wheel rod
2	Front wheel pump
3	Rear wheel pump
4	Front wheel rod
5	Lock nut

5. Find the position where the front wheels stop, and then tighten the lock nuts.
6. Follow the same steps to adjust the rear wheels.

Change of Constant Velocity Joint

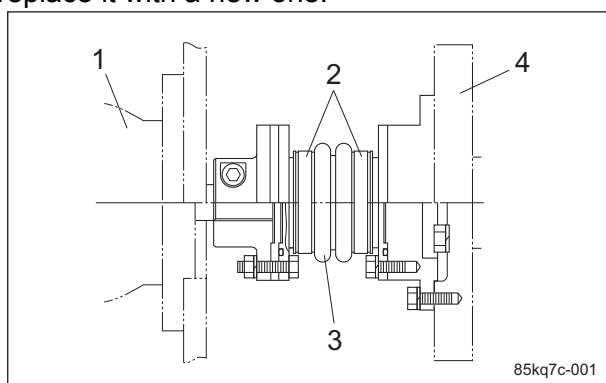


Caution

Do not use any other grease than the grease for the NTN constant velocity joint.

If grease leaks from the joint and attaching portion or boot band attaching portion, replace the boot and O-ring etc.

You cannot reuse the boot band. Be sure to replace it with a new one.



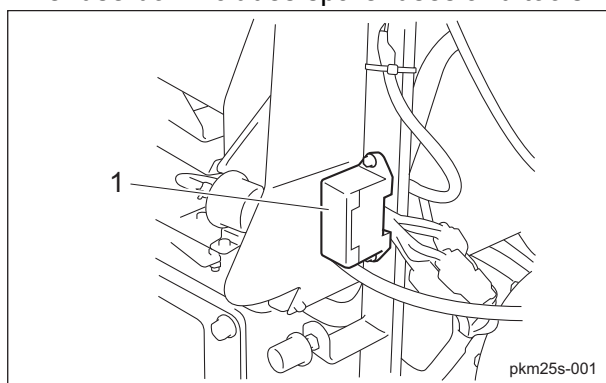
Change of Constant Velocity Joint_001

1	Hydraulic pump
2	Boot band
3	Boot
4	Engine

Change of Fuse

Fuse Box

The fuse box includes spare fuses and tools.

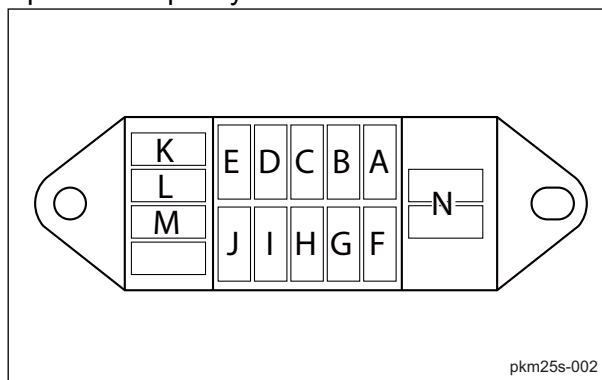


Fuse Box_001

1	Fuse box
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The machine uses a mini fuse for automobiles.

Replace an old fuse with a new fuse of the specified capacity.



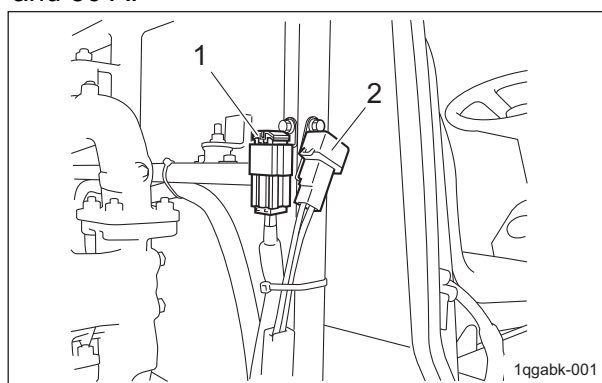
pkm25s-002

Fuse Box_002

A		Proximity sensor, reel rotation stop solenoid
B		Charge lamp, oil pressure lamp (engine oil pressure lamp), water temperature gauge, buzzer, hour meter, fuel gauge
C		Fuel pump
D	5A	Glow lamp (thermo-start lamp)
E		Glow lamp timer
F		Starter relay
G		Engine stop solenoid
H		Alternator (IG)
I		Glow lamp timer
J	15 A	Lights
K		Spares (5 A x 2, 15 A x 1)
L		
M		
N		Tool

Fusible Link

Fuse capacities of the fusible links are 30 A and 50 A.



Fusible Link_001

1	Fusible link (50 A)
2	Fusible link (30 A)

Long-Term StorageBefore Long-Term Storage

- Remove dirt, grass clippings, debris, oil stains etc. completely.
- Supply oil and apply grease to appropriate parts.
- Remove the battery.

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