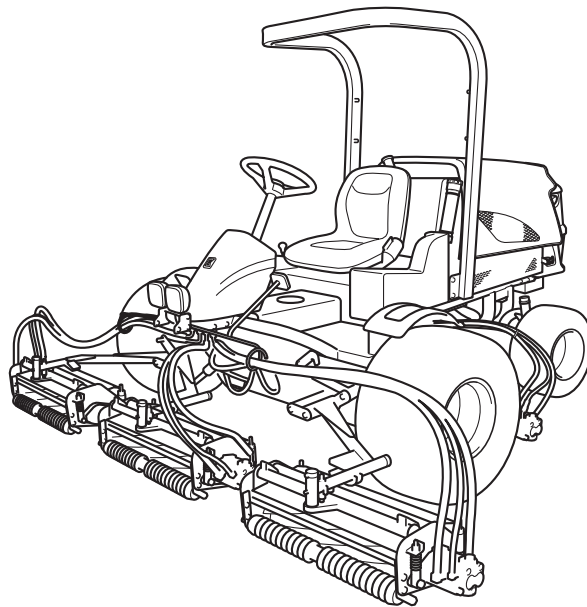


LM2400

5-Unit Reel Mower

Owner's Operating Manual



Serial No. LM2400 : 10237-

"Required reading"

Read this manual and the Owner's Manual for the engine before using the machine.

BARONESS[®]
Quality on Demand

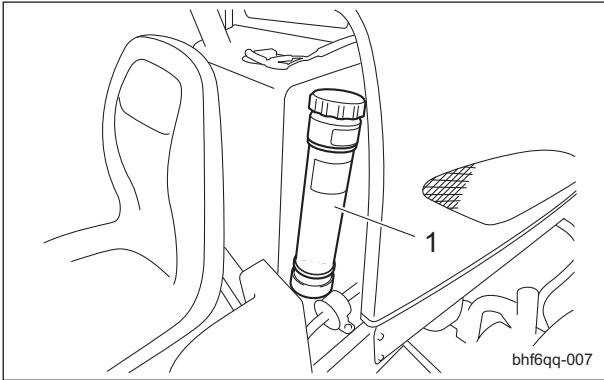
Original Instructions Ver.2.3

Greeting

Thank you for purchasing the Baroness product. This manual describes the proper handling, adjustment, and inspection of your product. We hope you will use the product safely, and take advantage of its best performance.

Keeping the Owner's Operating Manual

Keep this Manual in the box on the left side of the fuel tank.



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 the product, and to avoid causing injury to yourself or others.

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

Maintenance should only be performed by a certified specialist.

If you have any questions concerning maintenance or genuine parts, please contact your local Baroness dealer or Kyoisha.





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

When loaning or transferring the product, please also provide this manual together with the product.

Kyoisha Co., Ltd.

Warning Symbols

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

 <small>696cq5-001</small>	Warning symbol
<p>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.</p> <p>Failure to adequately follow these safety precautions may cause an accident.</p>	
<p> Danger</p> <p>This symbol indicates that serious injury or death will occur if the warning is ignored.</p> <p> Warning</p> <p>This symbol indicates that serious injury or death may occur if the warning is ignored.</p> <p> Caution</p> <p>This symbol indicates that injury or damage to property may occur if the warning is ignored.</p> <p>Important</p> <p>This symbol indicates precautions on the mechanism of the machine.</p>	

Introduction

Precautionary Statement

 **Caution**

The information described in this manual is subject to change for improvement without prior notice.

When replacing parts, be sure to use genuine Baroness parts or parts designated by Kyoisha.

Note that the Baroness product warranty may not apply to defects caused by the use of parts from other companies.

Prior to use, carefully read the following manuals to thoroughly understand the contents for safe and correct operation.

- Baroness Owner's Operating Manual
- The Engine's Owner's Manual
- The Battery's Owner's Manual

Purpose

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

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

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

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

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LM2400

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Safety

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

Danger

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

However, whether the product 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 product may result in injury or death.

Observe the following safety instructions to ensure safe operation.

Safe Operating Practices

Training

1. Read this 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 manual 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.

7. The ROPS is an integral and effective safety device.

Do not remove or alter the ROPS.

8. Replace a damaged ROPS.

Do not repair or alter.

9. You can find additional safety information where needed throughout this manual.

10. Determine the left and right sides of the machine from the normal operating position.

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. Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.

5. 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.
- 6. Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.
- 7. 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.
- 8. Replace faulty mufflers.
- 9. On multi-cylinder/multi-reel machines take care as rotating one cylinder/reel can cause other cylinder/reels to rotate.
- [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. Use extra care while operating machine with a grass catcher or other attachments. They can affect the stability of the machine.
- 6. 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.
- 7. Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed may increase the hazard of personal injury.
- 8. 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.
- 9. Disengage the drive to attachments, stop the engine, and remove the ignition key in the following conditions.
 - [1] Before refueling.
 - [2] Before making height adjustment unless adjustment can be made from the operator's position.
 - [3] Before cleaning blockages.
 - [4] Before checking, cleaning, or working the machine.
 - [5] 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.
- 10. Keep hands and feet away from the cutting units and the rotating parts.
- 11. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing.
- 12. Do not carry passengers.
- 13. Never operate while people, especially children, or pets are nearby.

Safety

14. Slow down and use caution when making turns and crossing roads and sidewalks.
15. Stop the blades rotating before crossing surfaces other than grass.
16. Disengage drive to attachments when transporting or not in use.
17. When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
18. Do not operate the machine under the influence of alcohol or drugs.
19. 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 loading ramp, select one with sufficient strength, length, and width and that will not cause the machine to slip.
20. Close the fuel valve before transporting the machine.
21. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
22. Do not take your eyes off the road ahead. Do not operate the machine with no hands.
23. 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.
24. Do not operate the machine when there is the risk of lightning.
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.
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.
17. Disconnect battery before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.

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.
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. If the fuel tank has to be drained, do this outdoors.
26. Swallowing engine coolant can cause injury or death; keep out of reach from children and pets.

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About the Waste disposal Page 2-2

Disposal

Disposal

Recycle and Waste Disposal

About Recycle

Recycling battery etc. is recommended for environmental conservation and economical use of resources.

It may be required by local laws.

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, rubber products, and wires etc.)

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SpecificationsPage 3-2

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Description of Safety Decals and

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Product Overview

Specifications

Specifications

Model		LM2400	
Dimensions	Total length	119.29 in	303 cm
	Total width	During operation	125.20 in 318 cm
		During transport	88.98 in 226 cm
	Total height	Steering wheel	52.36 in 133 cm
ROPS		77.17 in 196 cm	
Weight	Machine (empty fuel tank)	with Slight lift, ROPS 2905.64 lb	1,318 kg
Minimum turning radius		114.17 in	290 cm
Engine	Model	Kubota D1105-T (Diesel Turbo)	
	Type	Vertical Water-cooled 4-cycle diesel engine	
	Total displacement	68.52 cu.in.	1,123 cm ³ (1.123 L)
	Maximum output	24.5 kW (33.3 PS)/3,000 rpm	
Fuel tank capacity		Diesel 10.04 U.S.gal.	Diesel 38.0 dm ³ (38.0 L)
Fuel consumption		188 g/PS · h (rated output)	255 g/kW · h (rated output)
Engine oil capacity		0.82 U.S.gal.	3.1 dm ³ (3.1 L)
Operating width (Mowing width)		109.06 in	277 cm
Operating height (Mowing height)		0.394 - 2.362 in	10 - 60 mm
Blades		9	
Drive	Traveling	HST (Full time 4WD)	
	Mowing	Hydraulic	
Speed (HST)	Forward	0 - 9.94 mph	0 - 16.0 km/h
	Reverse	0 - 4.97 mph	0 - 8.0 km/h
Speed (Mechanical)		-	
Efficiency		5.4 acres/hour (6.22 mph x mowing width x 0.8)	22,160 m ² /h (10.0 km/h x mowing width x 0.8)
Maximum inclination for operation		15 degrees	
Tire size	Front wheel	26.5 x 14.00 - 12	
	Rear wheel	20 x 10.00 - 10	
Tire pneumatic pressure	Front wheel	20.30 psi	140 kPa (1.4 kgf/cm ²)
	Rear wheel	14.50 psi	100 kPa (1.0 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 88 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.

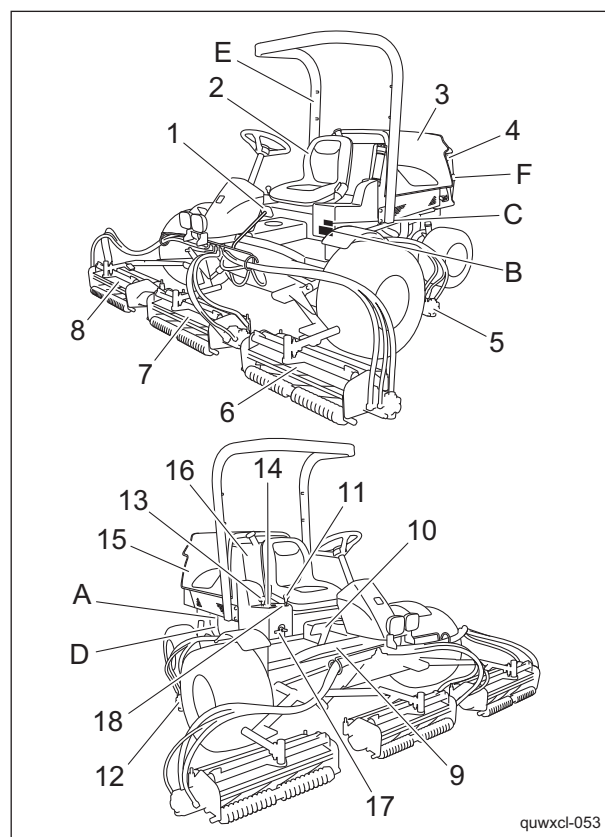
Vibration level

Hand-arm vibration

This machine was confirmed to transmit a vibration level of 2.90 m/s^2 to hands and arms by measuring identical machines in accordance with the procedure specified in ISO 5349-1:2001, ISO 5349-2:2001.

Whole body vibration

This machine was confirmed to transmit a vibration level of 0.97 m/s^2 to the whole body by measuring identical machines in accordance with the procedure specified in ISO 2631-1:1997, ISO 2631-2:2003.

Names of Each Section

Names of Each Section_001

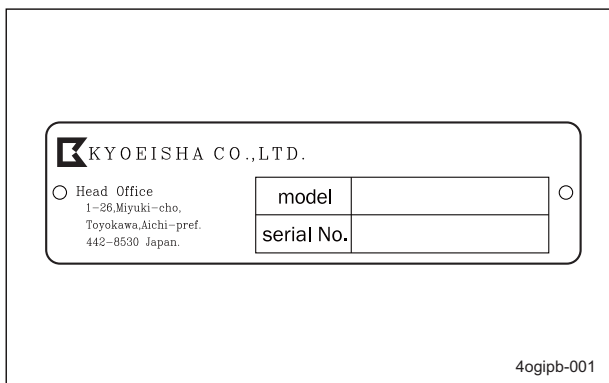
quwxcl-053

Product Overview

1	Brake pedal
2	Seat
3	Hood
4	Muffler
5	Mower unit #3
6	Mower unit #5
7	Mower unit #1
8	Mower unit #4
9	Parking brake lock lever
10	Traveling pedal
11	Mower unit up/down lever
12	Mower unit #2
13	Throttle lever
14	Reel rotation switch
15	Battery
16	Fuel tank
17	Stop valve
18	Light switch
A	Serial number plate
B	Specification decal
C	Noise emission decal
D	Year of manufacture decal
E	ROPS compliance decal
F	Battery capacity decal

Serial Number Plate

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

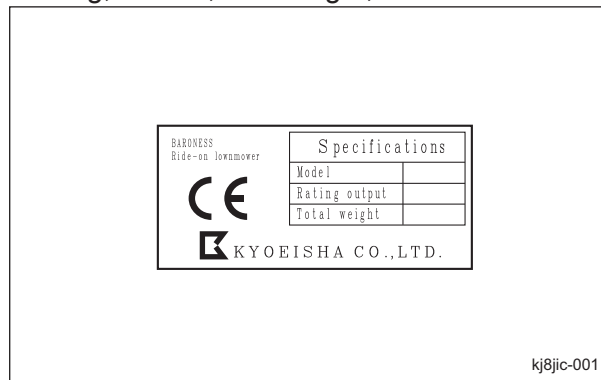


Serial Number Plate_001

Specification Decal

(For Europe)

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

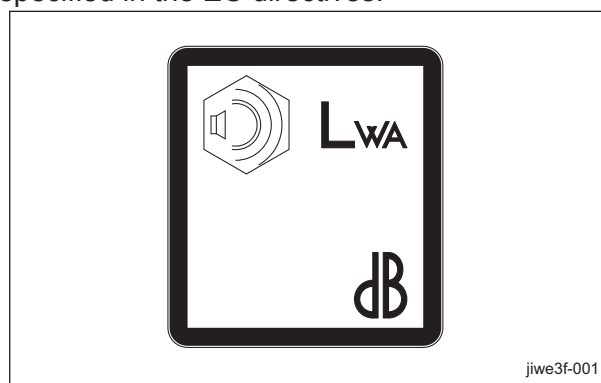


Specification Decal_001

Noise Emission Decal

(For Europe)

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

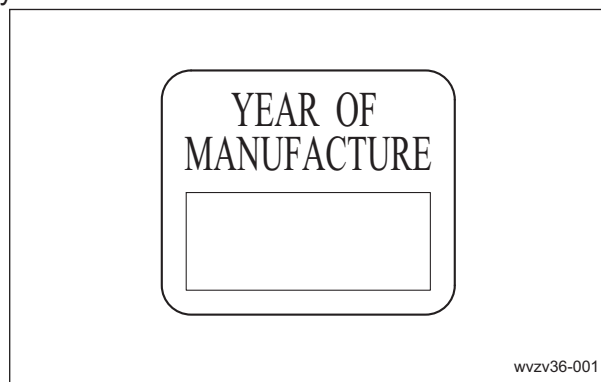


Noise Emission Decal_001

Year of Manufacture Decal

(For Europe)

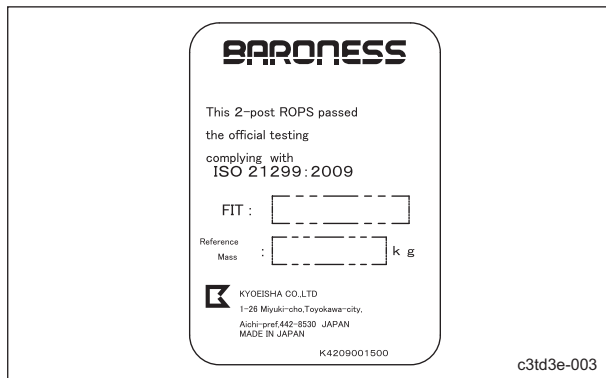
The year of manufacture decal indicates the year when this machine was manufactured.



Year of Manufacture Decal_001

ROPS Authentication Decal

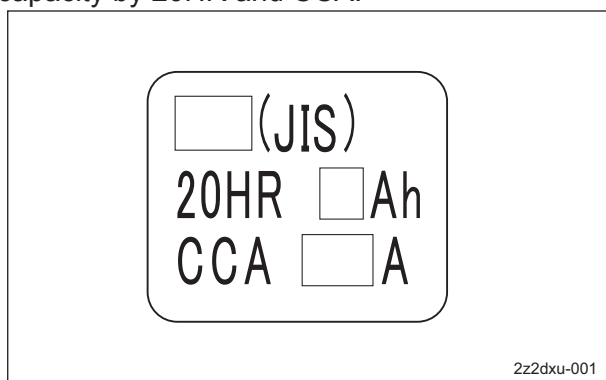
The ROPS authentication decal indicates the manufacturer, model, etc., in accordance with International Standard ISO 21299:2009.



ROPS Authentication Decal_001

Battery capacity decal

(For Europe)
The battery capacity decal indicates the capacity by 20HR and CCA.

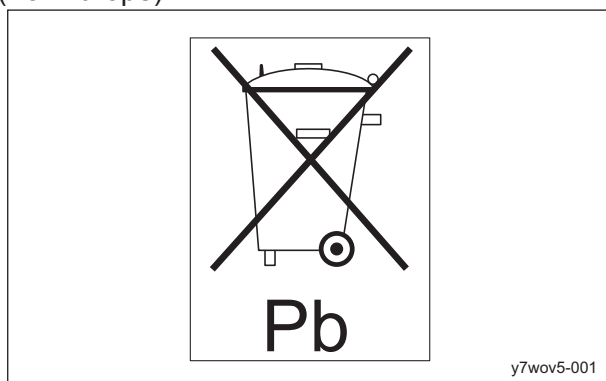


Battery capacity decal_001

Recycle Decal

Recycle Decal illustrates Recycle Mark in accordance with local regulation.

(For Europe)



Recycle Decal_001

(For USA)



Recycle Decal_002

Safety Signs and Instruction Signs

About Safety Signs and Instruction Signs

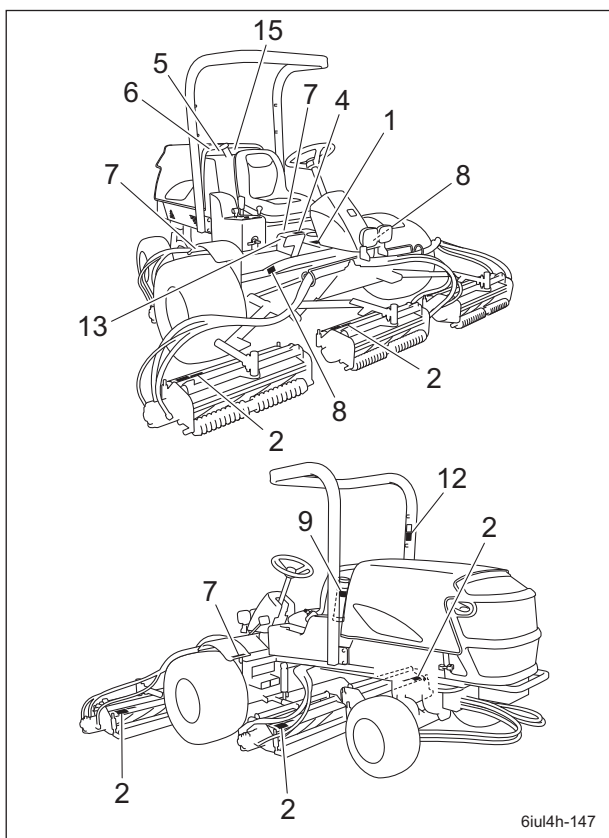
Important

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

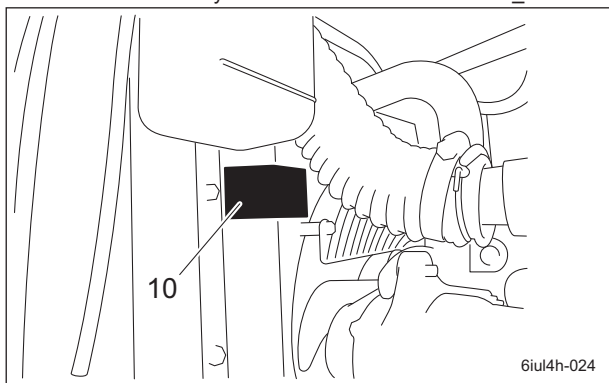
Part numbers for decals that need to be replaced are listed in the parts catalog. Order them from a Baroness dealer or Kyoisha.

Product Overview

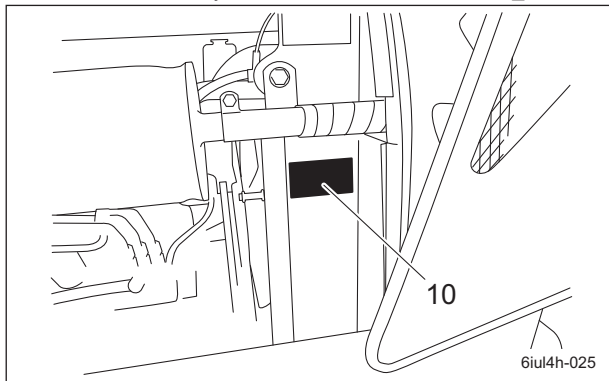
Positions of Safety Decals and Instruction Decals



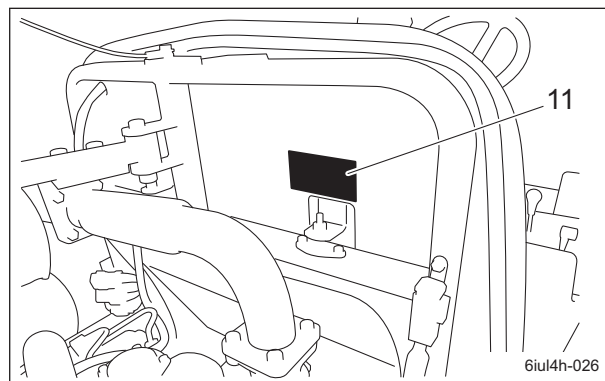
Positions of Safety Decals and Instruction Decals_001



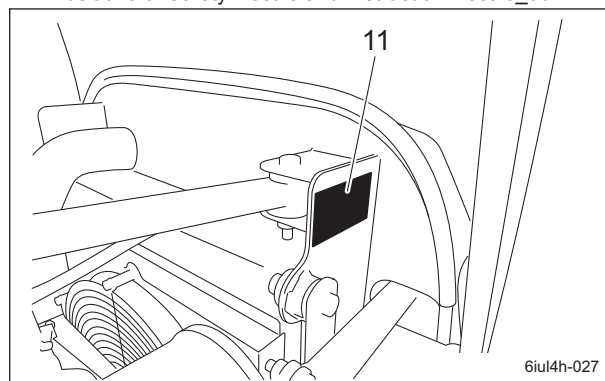
Positions of Safety Decals and Instruction Decals_002



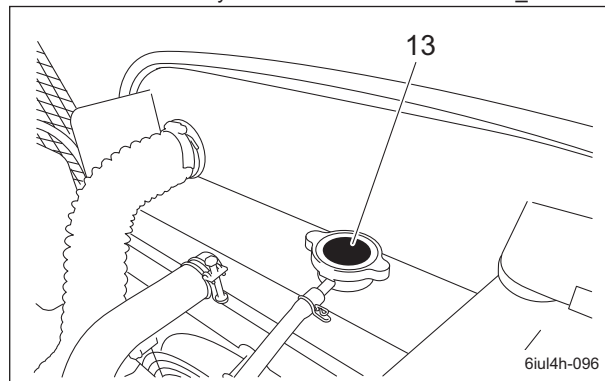
Positions of Safety Decals and Instruction Decals_003



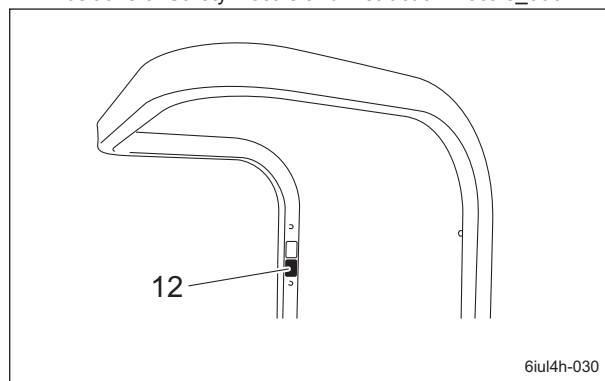
Positions of Safety Decals and Instruction Decals_004



Positions of Safety Decals and Instruction Decals_005


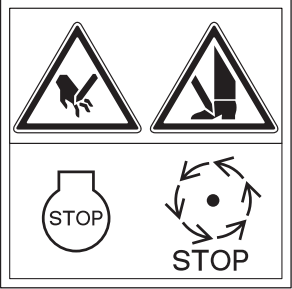


Positions of Safety Decals and Instruction Decals_006

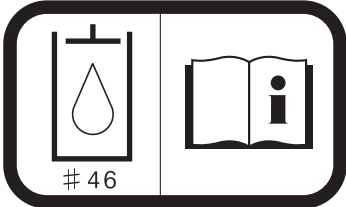


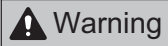

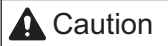



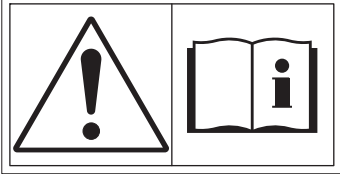

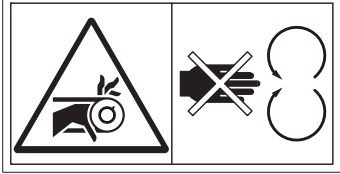






Positions of Safety Decals and Instruction Decals_007

Description of Safety Decals and Instruction Decals

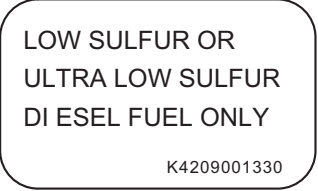
<p>1</p>	 <p>qiqqnx-066</p>	<p>LM2400-0918Z0 Decal for operation 2</p> <ol style="list-style-type: none"> <p>Warning</p> <p>Read the Owner's Operating Manual.</p> <p>Warning</p> <p>Apply the parking brake, stop the engine, remove the ignition key, and then leave the machine.</p> <p>Warning</p> <p>Flying objects - Be sure that people around the machine keep a safe distance away.</p> <p>Warning</p> <p>May cut your hand or leg - Keep hands and feet away from moving parts.</p> <p>Warning</p> <p>Be careful of exhaust emissions.</p> <p>Caution</p> <p>Rollover - Do not work on slopes of 15 degrees or more. When you descend a slope, lower the mower units and then drive at low speed. For ROPS equipped machine, fasten your seatbelt.</p>
<p>2</p>	 <p>qiqqnx-010</p>	<p>K4205001600 Decal for caution to mutilation</p> <p>Warning</p> <p>May cut your hand or leg - Stop the cutter rotation and engine. Otherwise you may get injured.</p>

Product Overview

3	<p>Blank</p>	<p>Blank</p>
4	 <p># 46</p> <p>K4209000980 qigqnx-020</p>	<p>K4209000980 Hydraulic oil icon Read the Owner's Operating Manual.</p>
5	 <p>K4209001000 qigqnx-021</p>	<p>K4209001000 Diesel fuel icon Use diesel fuel.</p>
6	 <p>K4205001940 qigqnx-041</p>	<p>K4205001940 Decal, fire prohibited</p> <p> Warning</p> <p>Keep away from fire.</p>
7	 <p>K4209001340 qigqnx-036</p>	<p>K4209001340 Decal, caution "DO NOT STEP"</p> <p> Caution</p> <p>Do not step here.</p>
8	 <p>K4205001900 qigqnx-067</p>	<p>K4205001900 Decal, caution for mower lock</p>

<p>9</p>	 <p style="text-align: right; font-size: small;">qigqnx-017</p>	<p>K4205001560 Decal, read Owner's manual</p> <p> Warning</p> <p>Read the Owner's Operating Manual.</p>
<p>10</p>	 <p style="text-align: right; font-size: small;">qigqnx-012</p>	<p>K4205001530 Decal, caution to rotating object</p> <p> Warning</p> <p>Watch for rotating parts - Keep your hands away from the belts while the engine is running.</p>
<p>11</p>	 <p style="text-align: center; font-size: small;">K4205001540 qigqnx-022</p>	<p>K4205001540 Decal for caution to hot parts</p> <p> Caution</p> <p>High temperature - Do not touch. Otherwise, you will get burned.</p>
<p>12</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>ROLL-OVER PROTECTIVE STRUCTURE</p> <p>To maintain operator protection and ROPS certification:</p> <ul style="list-style-type: none"> ◦ Replace damaged ROPS, do not repair or revise ◦ Any alteration of ROPS must be approved by manufacturer <p style="font-size: x-small;">K4205001710</p> </div> <p style="text-align: right; font-size: small;">qigqnx-072</p>	<p>K4205001710 Decal, caution for ROPS Replace a damaged ROPS. Do not repair or alter. (Only if equipped with ROPS)</p>
<p>13</p>	 <p style="text-align: right; font-size: small;">qigqnx-015</p>	<p>K4205001330 Decal, caution to noise</p>
<p>14</p>	 <p style="text-align: center; font-size: x-small;">K4205001970 qigqnx-045</p>	<p>K4205001970 Decal, caution for spouting coolant</p> <p> Caution</p> <p>Caution for spouting coolant - Do not open while hot.</p>

Product Overview

15	 <p>LOW SULFUR OR ULTRA LOW SULFUR DIESEL FUEL ONLY</p> <p>K4209001330</p> <p>qigqnx-076</p>	<p>K4209001330 Decal, diesel instructions Use low sulfur or ultra-low sulfur diesel fuel only.</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 (relief) 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

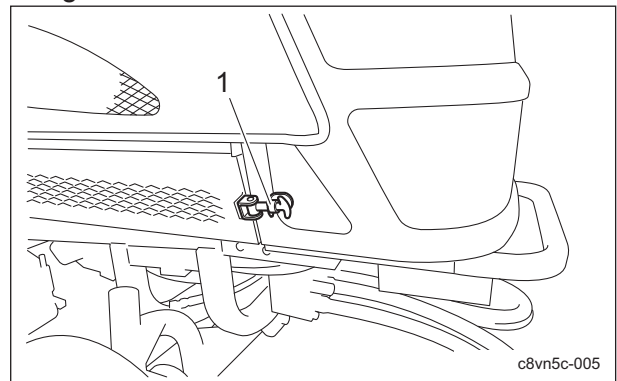
Important

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.

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

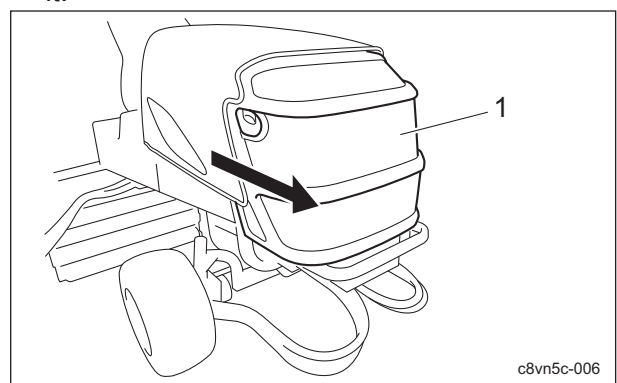
1. Unlock the rubber hooks on the left and right sides.



Cleaning of Radiator Cover_001

1	Rubber hook
---	-------------

2. Pull the radiator cover to the back to open it.



Cleaning of Radiator Cover_002

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

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

Handling Instructions

Radiator

Inspection of Radiator

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

Cleaning of Radiator

Important

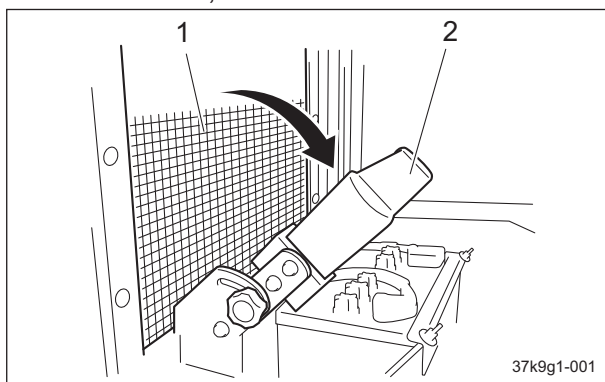
An unclean radiator may cause overheating or damage to the engine. It may also cause malfunction of the hydraulic system.

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

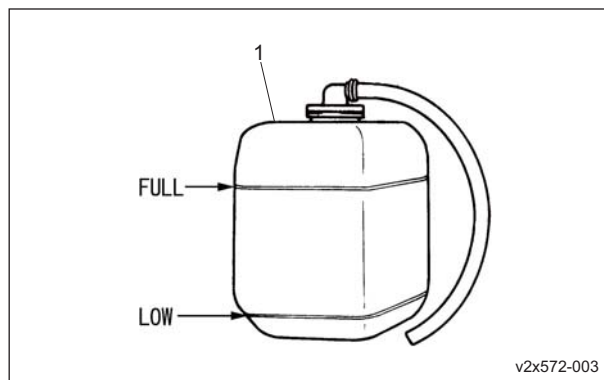
Caution

Do not touch the radiator or coolant during engine operation or immediately after the engine has been turned off. Otherwise, you may get burned.

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

Caution

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

Caution

Supply coolant after the engine has well cooled down.

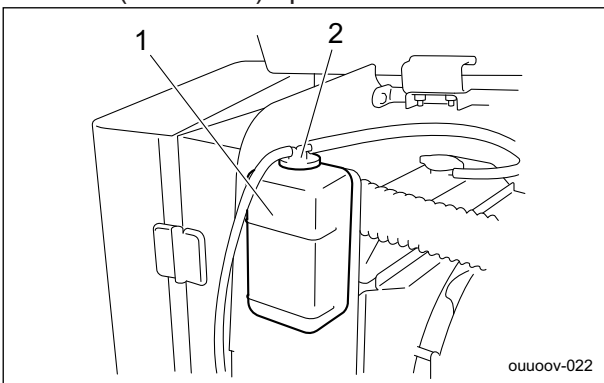
Caution

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 (soft water), such as tap water.

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 (soft water) up to the "FULL" mark.

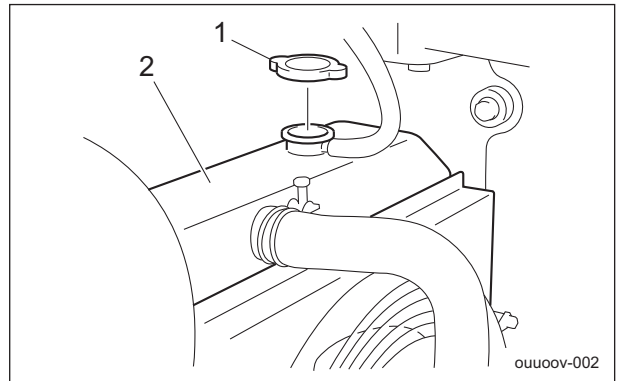


Coolant Supply_001

1	Reserve tank
2	Reserve tank cap

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

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



Coolant Supply_002

1	Radiator cap
2	Radiator

Handling Instructions

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

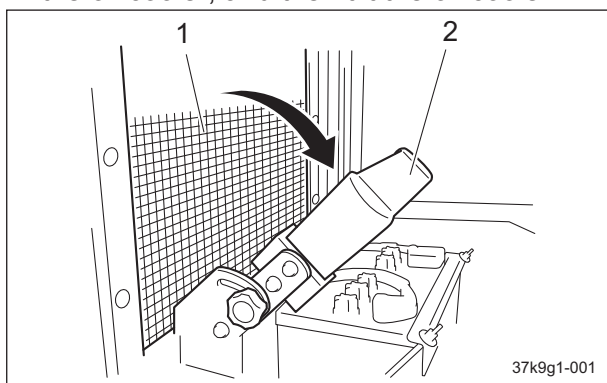
An unclean oil cooler may cause malfunction of the hydraulic system.

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

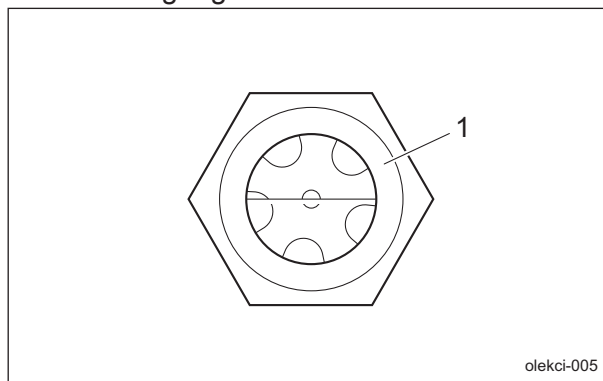
3. Carefully clean the front and back of the oil cooler with water or compressed air.

Hydraulic Oil

Inspection of Hydraulic Oil

The oil gauge is on the side of the hydraulic tank.

1. Lower 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.



olekci-005

Inspection of Hydraulic Oil_001

1	Oil gauge
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3. Check underneath the machine for oil leakage.

Hydraulic Oil Supply

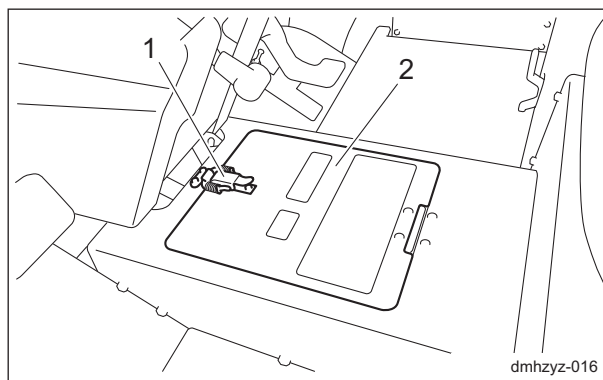
Important

Do not mix different types of oil.

Important

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

1. Follow the steps below to supply hydraulic oil if the oil level is low.
 - [1] Release the catch clip and open the center cover.



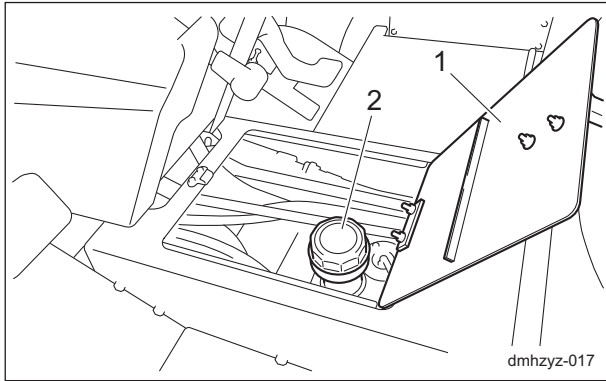
dmhzyz-016

Hydraulic Oil Supply_001

Handling Instructions

1	Catch clip
2	Center cover

- [2] Open the tank cap and pour hydraulic oil from the fill port until the oil level reaches the middle of the oil gauge on the hydraulic tank.



Hydraulic Oil Supply_002

1	Center cover
2	Tank cap

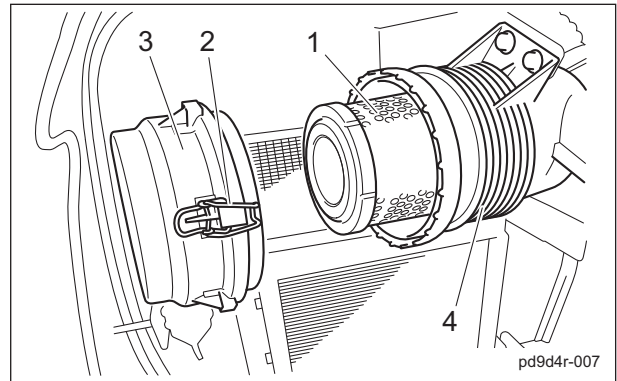
- [3] Tighten the tank cap securely.
- [4] Close the center cover and fasten with the catch clip.
2. Start the engine, raise and lower the mower units, and turn the steering wheel left and right. Move forward and reverse repeatedly several times.
 3. Lower the mower units and maintain that position on a level surface, and then check to see if the oil level is at the middle of the oil gauge. If necessary, supply oil.
 4. 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 Handling 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.
2. Make sure that the air cleaner element is not contaminated.



Inspection of Air Cleaner_001

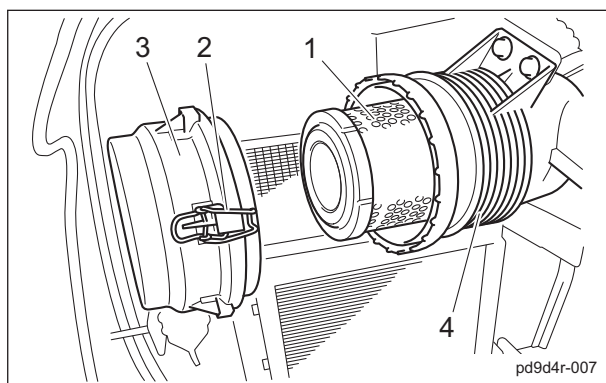
1	Air cleaner element
2	Clip
3	Air cleaner cap
4	Air cleaner body

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.

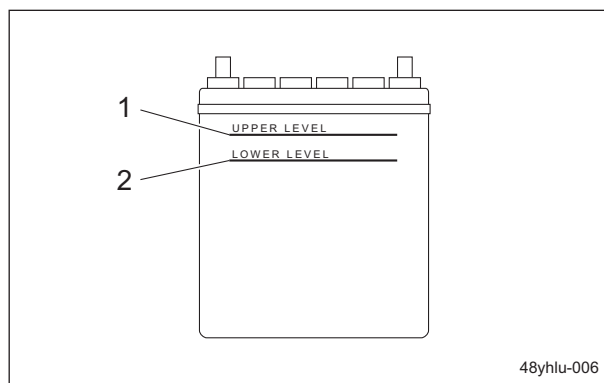
1. Follow the steps below to clean the air cleaner.
 - [1] Remove the clips from the two locations, remove the air cleaner cap, and then remove the air cleaner element.
 - [2] While paying close attention not to damage the air cleaner element, tap a solid portion of the air cleaner element or blow compressed 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.
 - [4] Replace the air cleaner cap, and then fix it securely with the clips.

Handling Instructions



Cleaning of Air Cleaner_001

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



Inspection of Battery_001

1	UPPER LEVEL
2	LOWER LEVEL

Battery

Inspection of Battery

⚠ 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).

⚠ Caution

Implement after the engine and muffler etc. have well cooled down.
Otherwise you may get burned.

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).

⚠ 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.

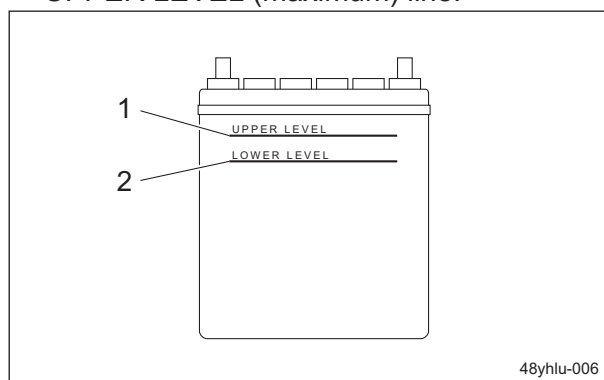
⚠ Danger

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

⚠ Caution

Implement after the engine and muffler etc. have well cooled down.
Otherwise you may get burned.

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

Handling Instructions

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.

	Tire size	Pneumatic pressure
Front wheel	(26.5 x 14.00 - 12)	140 kPa (1.4 kgf/cm ²)
Rear wheel	(20 x 10.00 - 10)	100 kPa (1.0 kgf/cm ²)

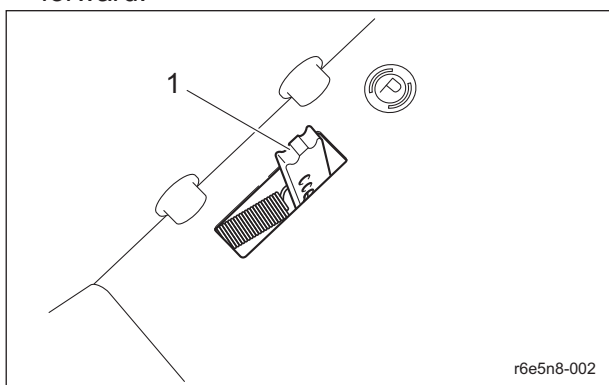
Brake

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 parking brake is applied after depressing the brake pedal and moving the parking brake lock lever forward.



Inspection of Parking Brake 001

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

2. Make sure that the brake is not applied even slightly after you depress the brake pedal to release it.

Belt

Inspection of Belt

Warning

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.

Wire

Inspection of Wire

1. Make sure that the wire is not cracked or damaged.
2. If the wire is cracked or damaged, replace it with a new one immediately.

Around the Engine

Inspection of Engine-Associated Parts

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 on or around the muffler.

Handling Instructions

Engine Oil

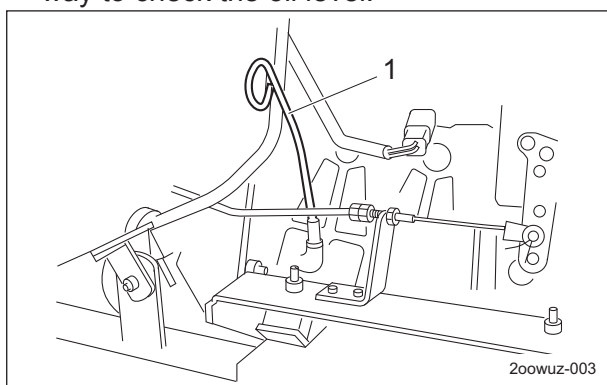
Inspection of Engine Oil

For details on handling the engine, please refer to the Owner's Manual for the engine.

Important

Securely tighten the oil level gauge and oil filler cap.

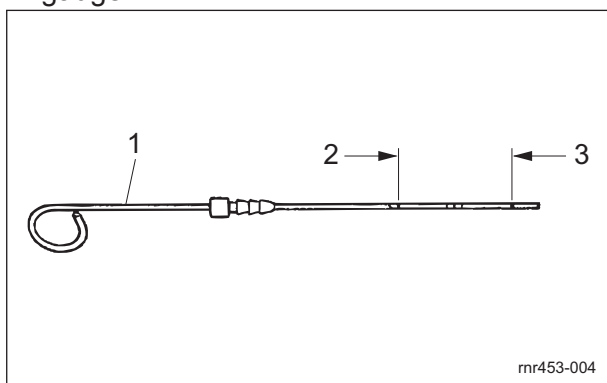
1. Stop the engine, wait for 10 to 20 minutes for the engine to cool down, then check the oil level.
2. Position the machine so that the engine will be level, then insert the oil gauge all the way to check the oil level.



Inspection of Engine Oil_001

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

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 Owner's Manual for the engine.

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).

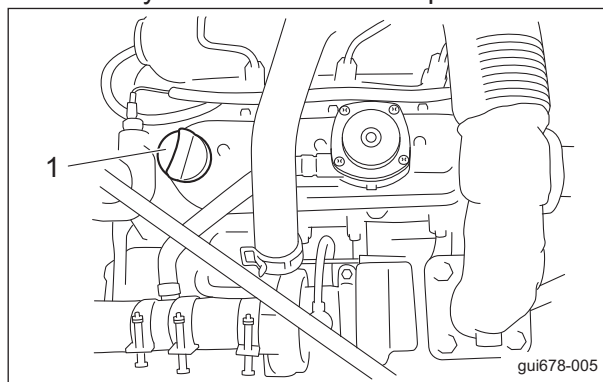
Important

Securely tighten the oil level gauge and oil filler cap.

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.

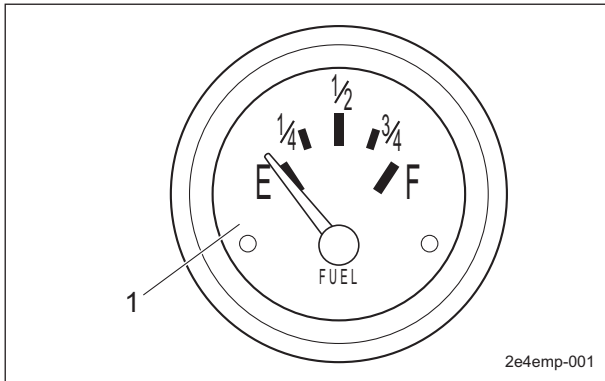
Check the oil level again 10 to 20 minutes after supplying the oil.

Handling Instructions

Fuel

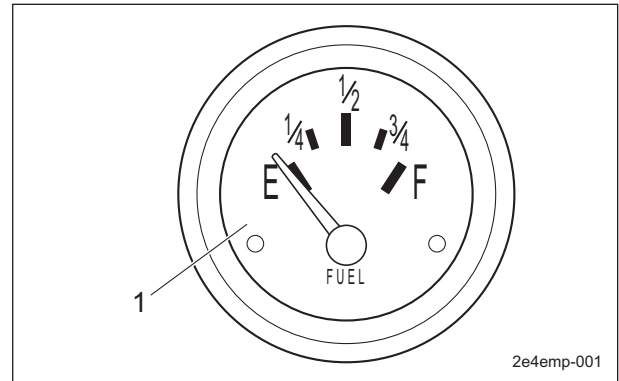
Inspection of Fuel Quantity

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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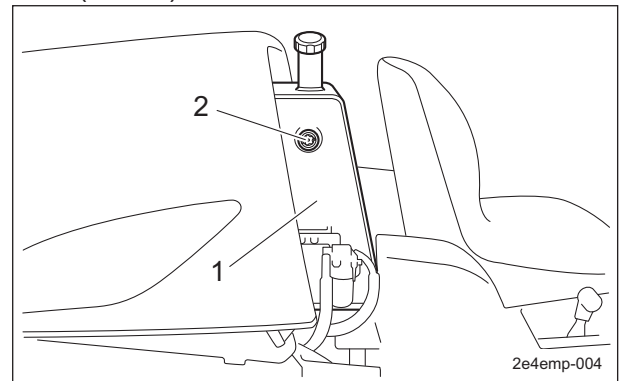


Fuel Supply_001

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

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.

⚠ Caution

Supply fuel before starting the engine.
Never remove the tank cap or supply fuel while the engine is running.
When opening the tank cap, wait at least 1 minute after stopping the engine, and then slowly open the cap to release the pressure in the tank.
Opening the tank cap quickly may cause fuel to burst out.

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

Handling Instructions

Water Separator

Inspection of Water Separator

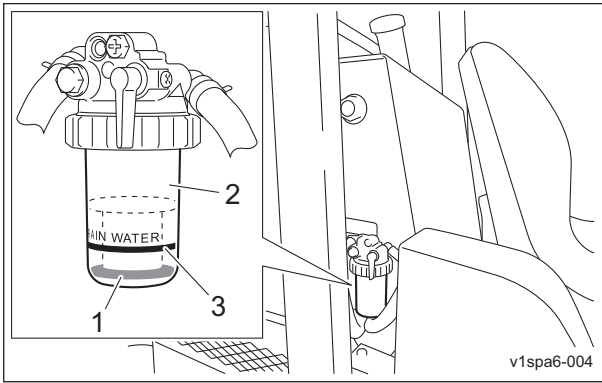
For details on handling the engine, please refer to the Engine's Owner's Manual.

Important

Water contamination in the fuel may decrease the engine starting performance and power output and may result in breakage of engine parts.

The water separator removes water from the fuel.

1. Make sure that debris and water have not accumulated in the cup. With the float raised, water incorporation is confirmed. When the float reaches the discharge level, discharge water.



Inspection of Water Separator_001

1	Float
2	Cup
3	Discharge level

Draining of Water Separator

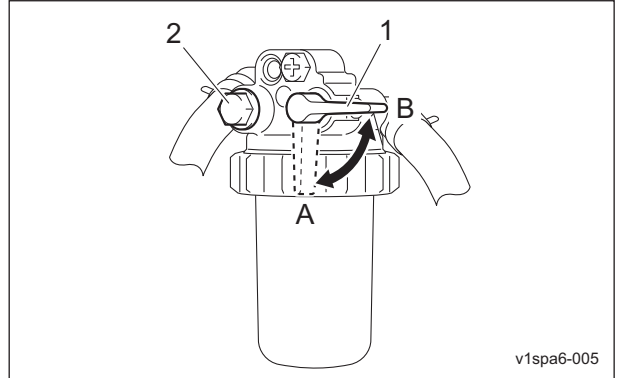
Important

Water contamination in the fuel may decrease the engine starting performance and power output and may result in breakage of engine parts.

Drain water from the water separator according to the maintenance schedule. And drain water whenever the float is raised by water.

1. Stop the engine, and then turn the key switch to the "OFF" position.
2. Place a container under the water separator.

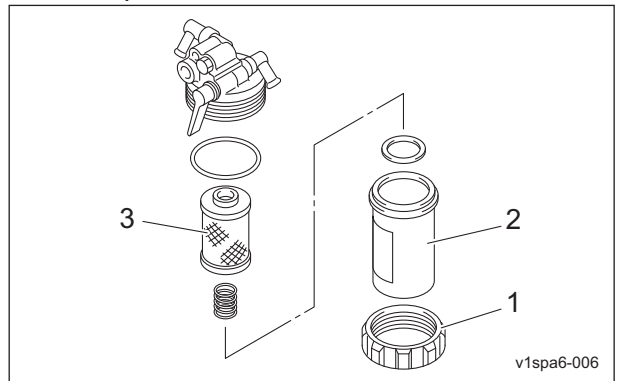
3. Close the fuel filter cock.
4. Close the fuel cock of water separator.



Draining of Water Separator_001

1	Fuel cock
2	Air-bleeding plug
A	ON (Open)
B	OFF (Close)

5. Remove the retaining ring and then remove the cup.



Draining of Water Separator_002

1	Retaining ring
2	Cup
3	Element

6. Discharge water from the cup.

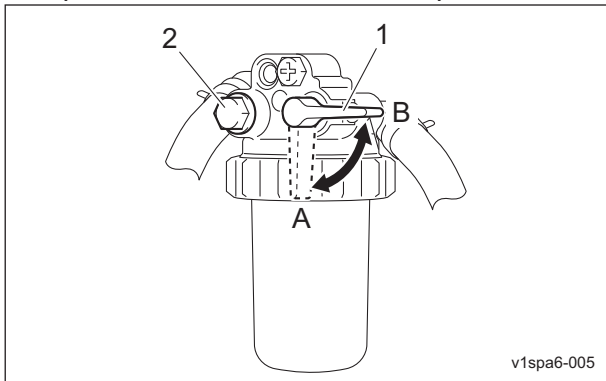
Important

When installed, be careful that it is not contaminated with dirt or dust. If the fuel is contaminated with dirt or dust etc., the fuel injection pump and injection nozzle will become worn.

7. Put the parts back together.
8. Fill up the fuel tank with fuel and open the fuel cock.

Handling Instructions

9. Open the fuel cock of water separator.



Draining of Water Separator_003

1	Fuel cock
2	Air-bleeding plug
A	ON (Open)
B	OFF (Close)

10. The key is turned to the "ON" position. The fuel pump is operated after replacement, air bleeding will occur automatically.
11. Turn the key to the "START" position and remove air out of the fuel line.
12. In the case that there are still air bubbles in the fuel from air-bleeding plug even after 15 seconds or more pass after setting the ignition key to "START", pause for 30 seconds or more and then repeat the same steps.

Cleaning of Water Separator

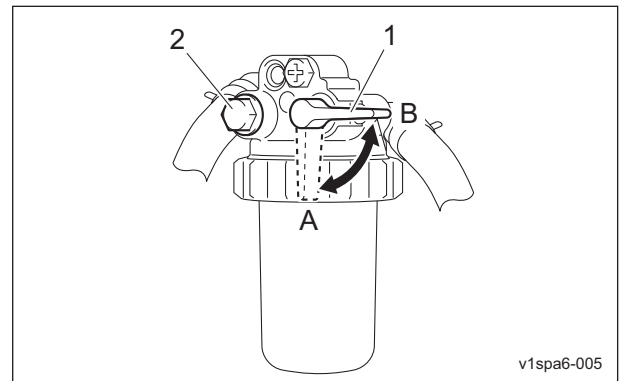
Important

Water contamination in the fuel may decrease the engine starting performance and power output and may result in breakage of engine parts.

Clean the water separator according to the maintenance schedule.

And clean it whenever debris has accumulated in the cup.

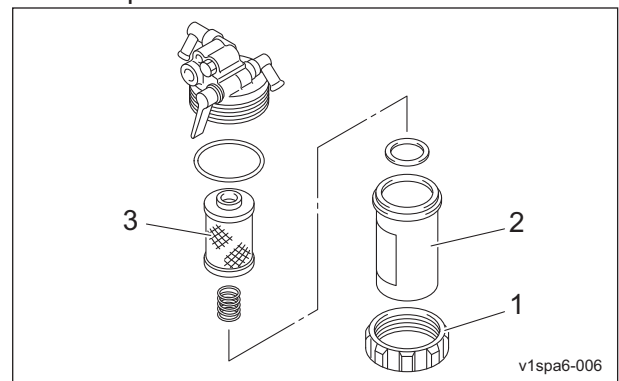
1. Stop the engine, and then turn the key switch to the "OFF" position.
2. Place a container under the water separator.
3. Close the fuel filter cock.
4. Close the fuel cock of water separator.



Cleaning of Water Separator_001

1	Fuel cock
2	Air-bleeding plug
A	ON (Open)
B	OFF (Close)

5. Remove the retaining ring and then remove the cup.



Cleaning of Water Separator_002

1	Retaining ring
2	Cup
3	Element

6. Discharge water from the cup.
7. Clean the cup and element with light oil. Replace the element with new one as necessary.

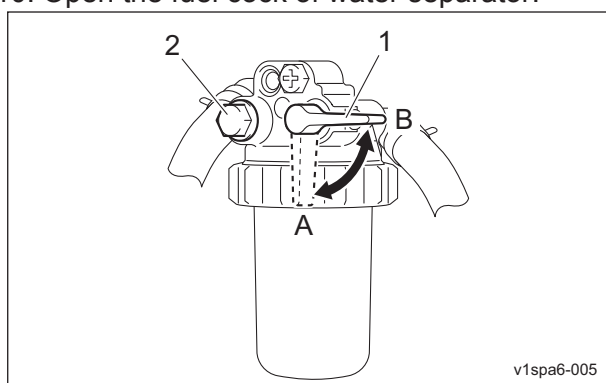
Important

When installed, be careful that it is not contaminated with dirt or dust. If the fuel is contaminated with dirt or dust etc., the fuel injection pump and injection nozzle will become worn.

8. Put the parts back together.
9. Fill up the fuel tank with fuel and open the fuel cock.

Handling Instructions

10. Open the fuel cock of water separator.



Cleaning of Water Separator_003

1	Fuel cock
2	Air-bleeding plug
A	ON (Open)
B	OFF (Close)

11. The key is turned to the "ON" position. The fuel pump is operated after replacement, air bleeding will occur automatically.
12. Turn the key to the "START" position and remove air out of the fuel line.
13. In the case that there are still air bubbles in the fuel from air-bleeding plug even after 15 seconds or more pass after setting the ignition key to "START", pause for 30 seconds or more and then repeat the same steps.

Fuel filter

Inspection of Fuel Filter

The fuel filter is positioned between the fuel strainer and the engine, and cleans the fuel flowing into the carburetor.

When the fuel flow becomes insufficient, replace the fuel filter if necessary.

1. Make sure that there is no fuel leakage.
2. Make sure that the fuel filter is not damaged or dirty.

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 tightened portions may be loosened and oil and grease may leak.

Be sure to retighten the parts.

Check the bottom of the machine for oil and grease leakage.

Handling Instructions

Tightening torques

Important

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

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.

Handling Instructions

Nominal diameter	General bolt		
	Strength classification 4.8		
	 tib3yb-001		
	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

Nominal diameter	Heat-treated bolt					
	Strength classification 8.8			Strength classification 10.9		
	 tib3yb-002			 tib3yb-003		
	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

Principal tightening torques

Tightening Torque by Model

LM2400

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 or equivalent anaerobic sealant).

Location	Code	Part name	Tightening torque			Thread locking adhesive
			N-m	kgf-cm	lb-in	
Front wheel	Motor	K0010120902 Bolt, heat-treated M12-90	104 - 134	1,060.49 - 1,366.40	920.50 - 1,186.03	—
	Wheel mounting base	1-20UNEF Slotted nut for hydraulic motor	280 - 300	2,855.16 - 3,059.10	2,478.28 - 2,655.30	—
	Wheel	K0034120352 Bolt, heat-treated M12-35P1.5	67 - 85	683.20 - 866.75	593.02 - 752.34	—
Rear wheel	Motor	K0013120702 Bolt, heat-treated M12-70	104 - 34	1,060.49 - 1,366.40	920.50 - 1,186.03	—
	Wheel mounting base	1-20UNEF Slotted nut for hydraulic motor	180 - 200	1,835.46 - 2,039.40	1,593.18 - 1,770.20	○
	Wheel	K0034120352 Bolt, heat-treated M12-35P1.5	67 - 85	683.20 - 833.75	593.02 - 752.34	—
Tie rod	K1610000020	Tie rod end right ass'y	45	158.87	398.30	—
	K1611000020	Tie rod end left ass'y	45	158.87	398.30	—
Engine	K0017100252	Bolt, heat-treated, small, 10-25 P1.25	45 - 57	158.87 - 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. "Standard tightening torques" (Page 4-14)			
	K0100080002	Nut, M8	28 - 38	285.57 - 387.49	247.83 - 336.34	○
Bed knife (bottom blade)	K0071001182	Screw, heat-treated flathead M10-16	29 - 38	295.71 - 387.49	256.68 - 336.34	—
ROPS	K0010120402	Bolt, heat-treated M12-40	52 - 67	530.24 - 683.20	460.25 - 593.02	—
Kingpin stopper	K0000100252	Bolt, M10-25	52 - 67	530.24 - 683.20	460.25 - 593.02	—
Cross valve	K0013101302	Bolt, heat-treated M10-130	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Universal Joint	K001A100401	Bolt, w/hexagon hole, M10-40	62 - 72	632.21 - 734.18	548.76 - 637.27	—
	K0011100252	Bolt, heat-treated M10-25P1.25	55 - 71	560.84 - 723.99	486.81 - 628.42	○

Handling Instructions

Adjustment Before Operating

Adjustment of Steering Wheel

⚠ Warning

Since it is dangerous, do not adjust the steering wheel while traveling.

⚠ Caution

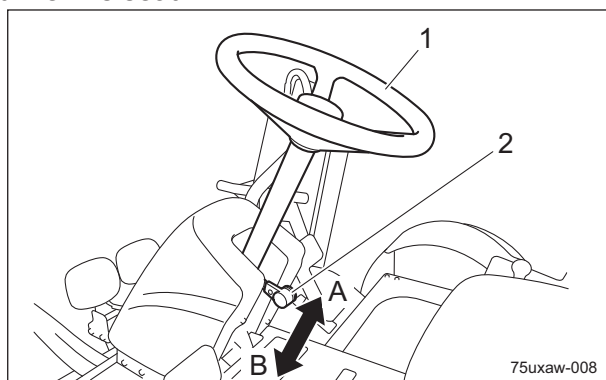
Be sure the steering wheel position is securely locked. It would be extremely dangerous if it becomes loose while traveling.

The steering wheel can be adjusted up or down.

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

Shift the tilt lever to the "FREE" position, move the steering wheel to the position that suits your work requirements, and then shift the tilt lever to the "LOCK" position to secure the steering wheel in place.

The tilt lever is located at the left in front of the driver's seat.



Adjustment of Steering Wheel_001

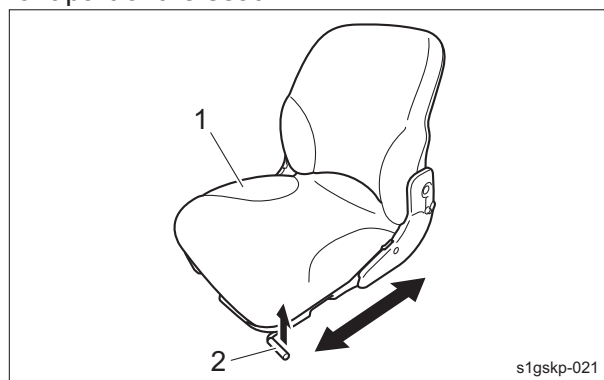
1	Steering wheel
2	Tilt lever
A	FREE (released)
B	LOCK (locked)

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	Seat
2	Adjuster lever

Adjustment of Blade Engagement

⚠ Warning

Make sure that the parking brake is firmly applied before performing the operation.

⚠ Caution

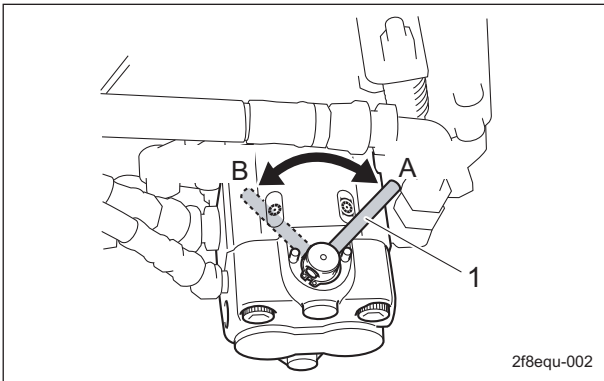
Be sure to perform this operation on your own.

⚠ Caution

When handling the reel cutter (cutting cylinder) or bed knife (bottom blade), 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.

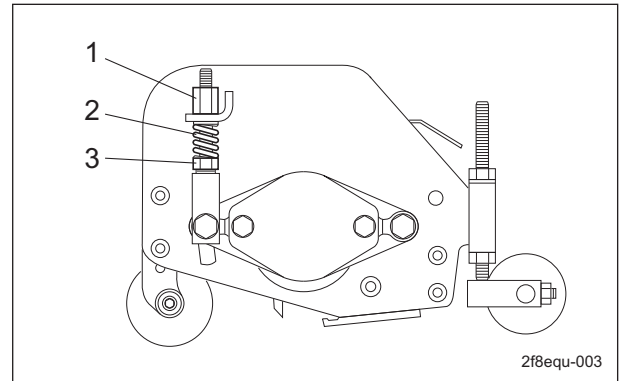
1. Stop the engine.
2. Set the reel rotation/stop switching lever to the "Stop" position.

Handling Instructions



Adjustment of Blade Engagement_001

1	Reel rotation/stop switching lever
A	Rotate
B	Stop



Adjustment of Blade Engagement_002

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

3. With the cutter 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.

4. 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) of the reel cutter (cutting cylinder).

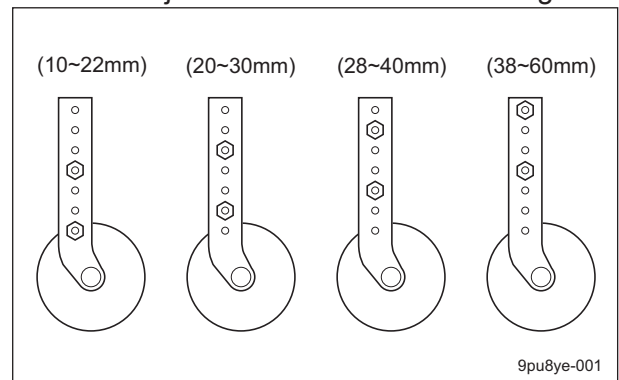
- If a gap is created between edges: Loosen (rotate counter-clockwise) the cutter adjustment nut to apply more contact pressure between the reel cutter (cutting cylinder) and the bed knife (bottom blade).
- If the reel cutter (cutting cylinder) is too tight to turn: Tighten (rotate clockwise) the cutter adjustment nut to reduce the contact pressure between the reel cutter (cutting cylinder) and the bed knife (bottom blade).
- If the blades still cannot cut well: Perform back lapping of the reel cutter (cutting cylinder).

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:

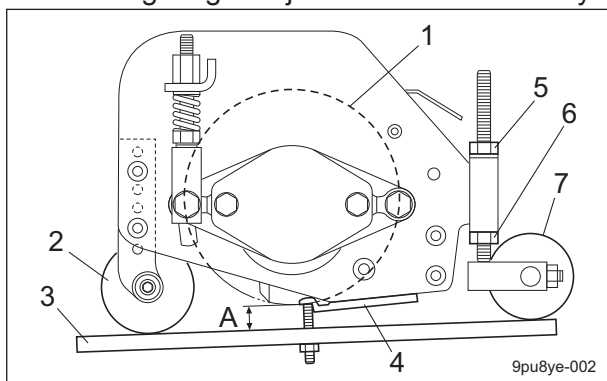
- [1] Loosen cutting height adjustment nut A, tighten cutting height adjustment nut B, then lower the rear roller.
- [2] Use the cutting height gauge to determine the position, then tighten cutting height adjustment nut A securely.

2. To decrease cutting height:

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

Handling Instructions

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



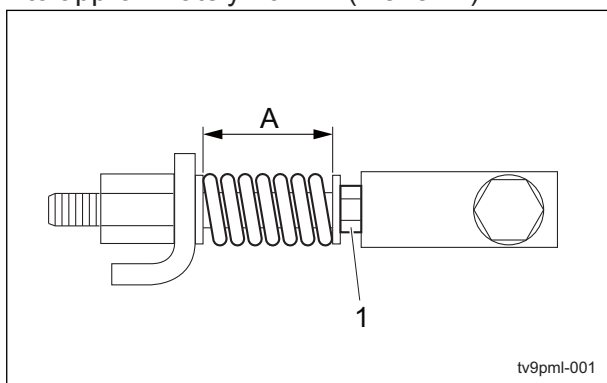
Roller (Roller Type)_002

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

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 Reel Cover

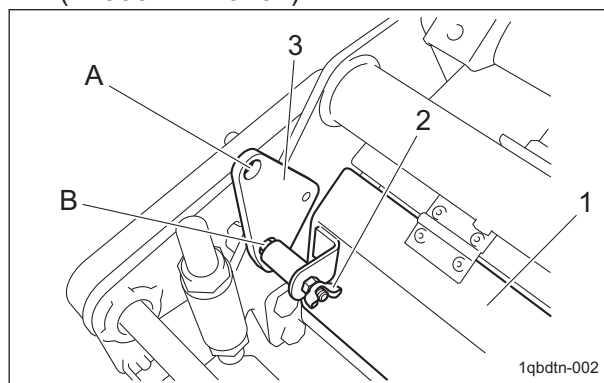
Note:

Depending on the specifications, this function may not be available.

The angle of the reel cover can be adjusted.

1. Pull the right and left knobs securing the reel cover to release it.

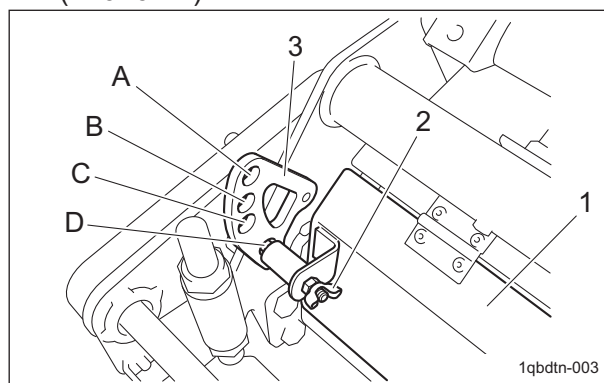
(#10001 - #10161)



Adjustment of Reel Cover_001

1	Reel cover
2	Knob
3	Cover adjustment plate
A	Fully open
B	Fully closed

(#10162 -)



Adjustment of Reel Cover_002

1	Reel cover
2	Knob
3	Cover adjustment plate
A	Fully open
B	15 degrees closed
C	30 degrees closed
D	Fully closed

2. Select the hold position of the cover adjustment plate and secure the reel cover.

Handling Instructions

Adjustment of CR Brush

Note:
Depending on the specifications, this function may not be available.

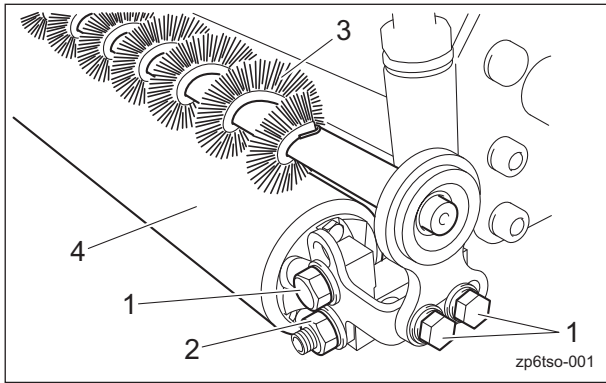
Caution

Pressing the brush against the roller too tightly could cause the belt to slip or break.

Important

CR brush prevents clippings etc. from adherence to the rear roller owing to rotating brush.

1. Loosen the bolts and nuts attached to the both ends of CR brush.



Adjustment of CR Brush_001

1	Bolts
2	Nuts
3	Brush
4	Rear roller

2. Securely tighten the loosened bolts and nuts as the gap between the brush and rear roller is adjusted to between 0 and 1.0 mm (0 - 0.039 in).

Procedure to Start / Stop Engine

Start / Stop of Engine

Procedure to Start Engine

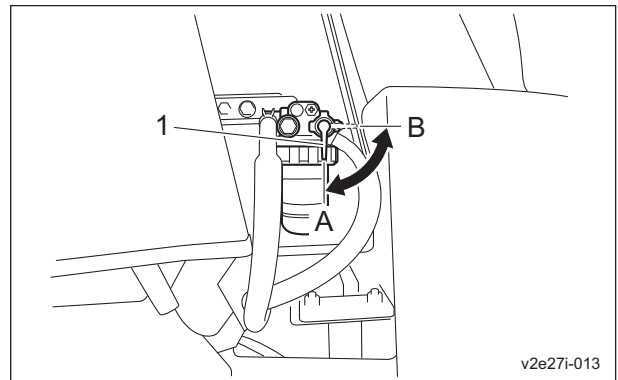
Warning

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 still does not start, stop using the battery for 30 to 60 seconds to avoid exhausting the battery.

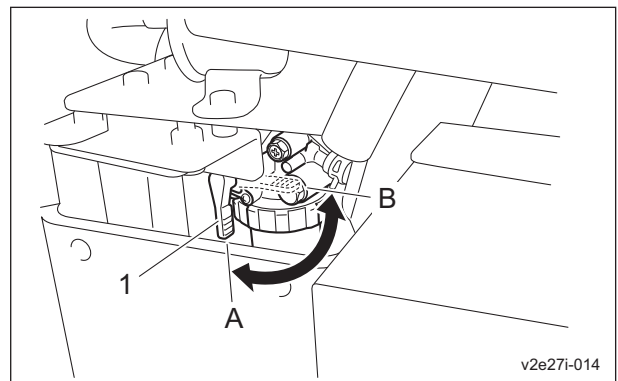
1. Open the fuel cock of the water separator. The water separator is located on the right side of the fuel tank.



Procedure to Start Engine_001

1	Fuel cock
A	ON (Open)
B	OFF (Close)

2. Open the fuel cock of the fuel filter. The fuel filter is located on the left under the hood.



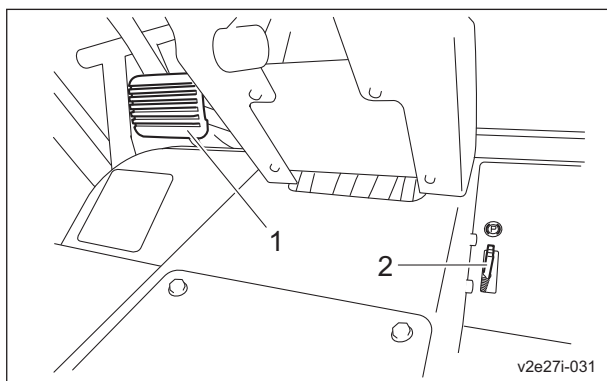
Procedure to Start Engine_002

1	Fuel cock
A	ON (Open)
B	OFF (Close)

3. Sit on the seat.

Handling Instructions

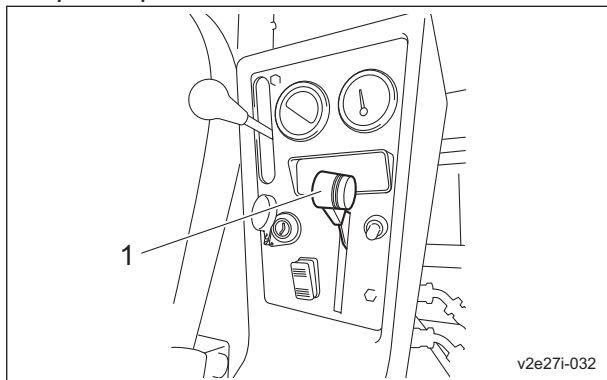
- Depress the brake pedal and move the parking brake lock lever forward to lock the brake.



Procedure to Start Engine_003

1	Brake pedal
2	Parking brake lock lever

- Set the reel rotation switch to the "Stop" position.
- Move the mower unit up/down lever to the neutral position.
- Move the throttle lever halfway from the "Low speed" position toward the "High speed" position.



Procedure to Start Engine_004

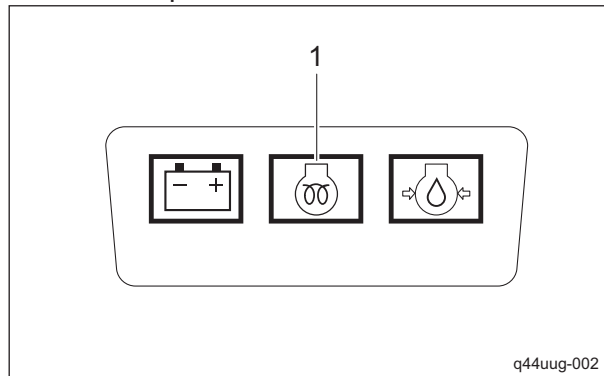
1	Throttle lever
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Important

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.

- Switch the ignition key to the "GLOW" position.

- Make sure that the glow plug is generating heat and the thermo-start lamp is turned on.
- After the thermo-start lamp turns off, immediately set the ignition key to the "START" position.



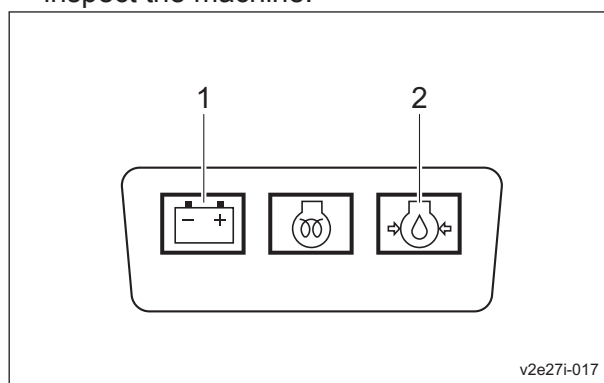
Procedure to Start Engine_005

1	Thermo-start lamp
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Important

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

- When the starter starts rotating and the engine starts, return the ignition key to the "ON" position slowly.
- Make sure that the charge lamp and oil pressure lamp turn off. If they do not turn off, stop the engine and inspect the machine.



Procedure to Start Engine_006

1	Charge lamp
2	Oil pressure lamp

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

Handling Instructions

Procedure to Stop Engine

1. Set the traveling pedal to the neutral position.
2. Depress the brake pedal and move the parking brake lock lever forward to lock the brake.
3. Set the reel rotation switch to the "Stop" position.
4. Shift the throttle lever to the "Low speed" position, and then idle the machine 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 of the fuel filter.
10. Close the fuel cock of the water separator.

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 is applied.
 - The reel rotation switch is set to the "OFF" position.
 - The traveling pedal is set to the neutral position.
2. In the event the operator leaves the seat with the parking brake applied and the engine running, the safety device will be activated and will stop the engine under any of the following conditions:
 - The traveling pedal is not set to the neutral position. (The operator has depressed the traveling pedal.)
 - The reel rotation switch is set to the "ON" position.

Warning Mechanisms

Caution

When the buzzer (intermittent tone) sounds, be sure to stop operation since the engine is overheated.

Do not stop the engine without idling. Allow the engine to cool down, first. Keep the engine idling for about 5 minutes before stopping. Remove dust that is jamming in the radiator, air cleaner, and etc.

This machine features warning mechanisms for overheating and for the hydraulic oil level.

1. If water temperature inside the engine exceeds 105 degrees Celsius, a buzzer will sound. (intermittent tone)
2. If the oil level in the hydraulic tank declines from the specified level by approximately 4.2 dm³ (4.2 L), a buzzer will sound. (intermittent tone)

Operation of Each Section

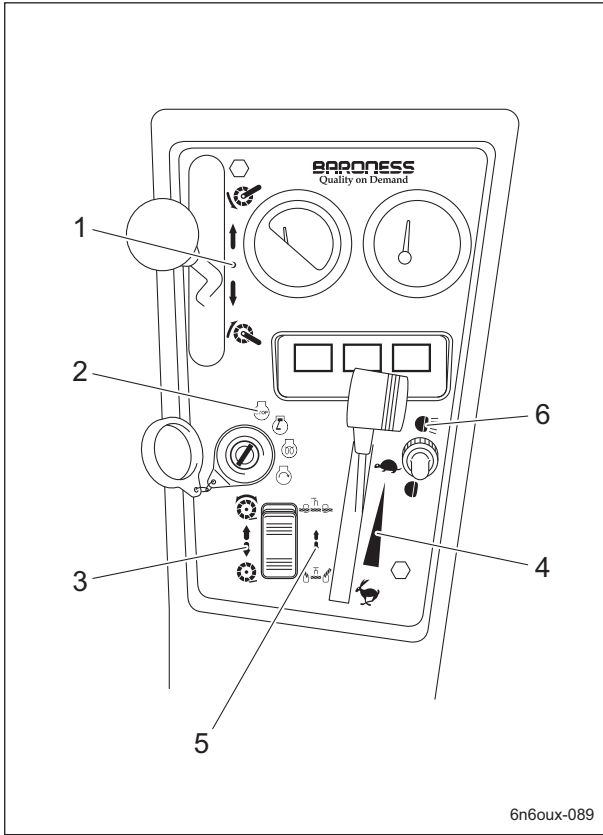
Cautions for when You Leave the Machine

Caution

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

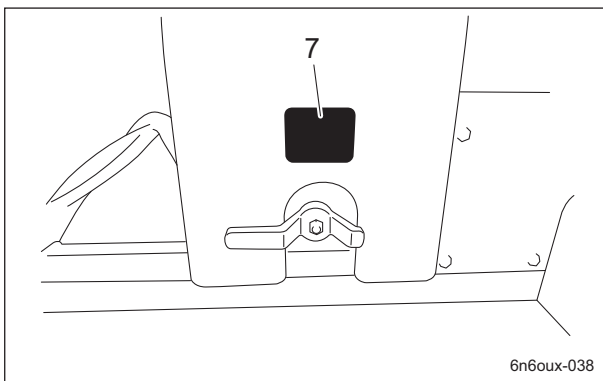
Handling Instructions

Operation Decals



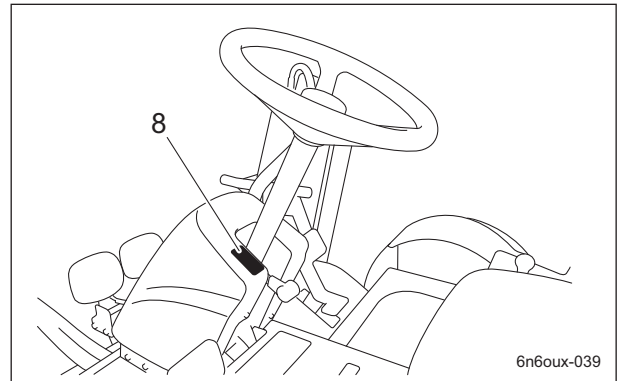
Operation Decals_001

1	Decal, mower unit up/down lever
2	Decal, key switch
3	Decal, reel rotation switch
4	Decal, engine rotation
5	Decal, slight lift switch
6	Decal, light switch



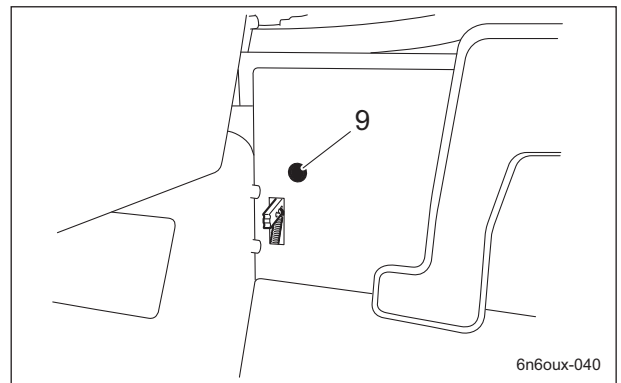
Operation Decals_002

7	Decal, stop valve
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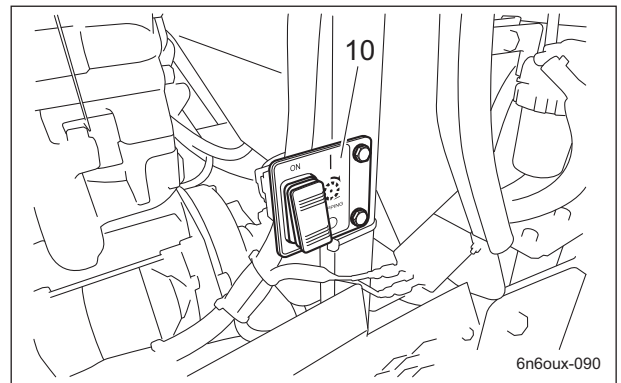
Operation Decals_003

8	Decal, tilt steering
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Operation Decals_004

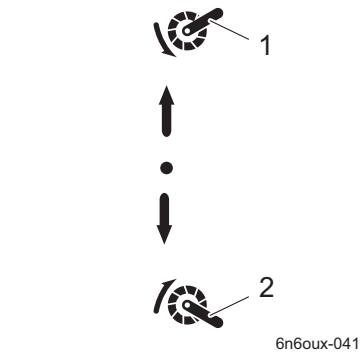
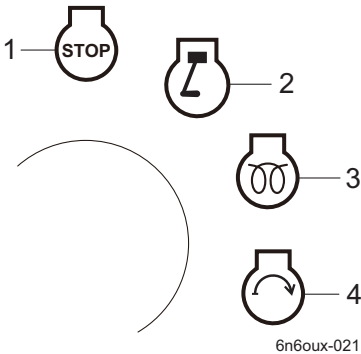
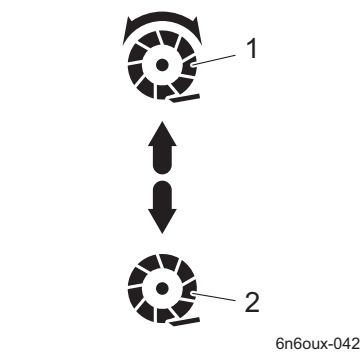
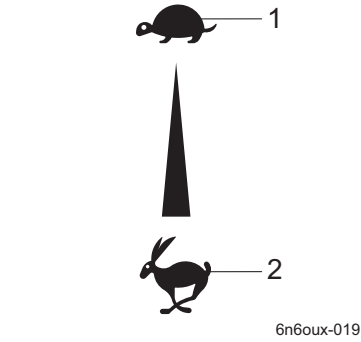
9	Decal, parking brake
---	----------------------





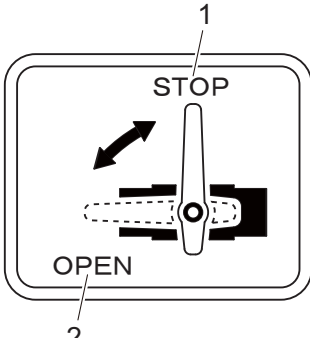

Operation Decals_005

10	Decal, lapping switch
----	-----------------------

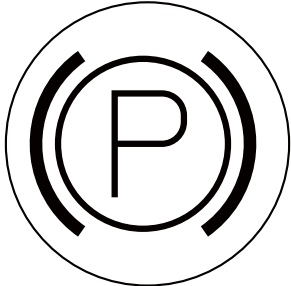
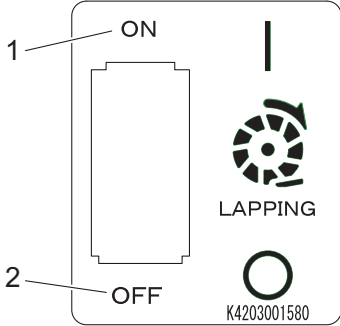
Handling Instructions

<p>1</p>	<p>Decal, mower unit up/down lever It illustrates Up/Down of the mower unit. 1. Down 2. Up</p>	
<p>2</p>	<p>Decal, key switch It illustrates the position of the key switch. 1. OFF 2. ON 3. GLOW 4. START</p>	
<p>3</p>	<p>Decal, reel rotation switch It illustrates Rotate/Stop of the reel cutter (cutting cylinder). 1. Rotate 2. Stop</p>	
<p>4</p>	<p>Decal, engine rotation It illustrates Low/High of the engine rotation speed. 1. Low 2. High</p>	

Handling Instructions

<p>5</p>	<p>Decal, slight lift switch Note: Depending on the specifications, this function may not be available. It illustrates ON/OFF of the slight lift function. 1. ON 2. OFF</p>	 <p>6n6oux-043</p>
<p>6</p>	<p>Decal, light switch Note: Depending on the specifications, this function may not be available. It illustrates ON/OFF of the light. 1. ON 2. OFF</p>	 <p>6n6oux-044</p>
<p>7</p>	<p>K4203001290 Decal, stop valve It illustrates Stop/Open of the stop valve. 1. Stop 2. Open</p>	 <p>6n6oux-045</p>
<p>8</p>	<p>K4203001560 Decal, tilt steering It illustrates the tilt direction of the steering wheel and its LOCK/FREE position.</p>	 <p>6n6oux-022</p>

Handling Instructions

<p>9</p>	<p>K4209001200 Decal, brake It illustrates the locking position for the parking brake.</p>	 <p>6n6oux-092</p>
<p>10</p>	<p>K4203001580 Decal, lapping switch It illustrates ON/OFF change-over of backlapping operation. 1. ON (backlapping rotation) 2. OFF (cutting rotation)</p>	 <p>6n6oux-093</p>

Handling Instructions

Light Switch

⚠ Caution

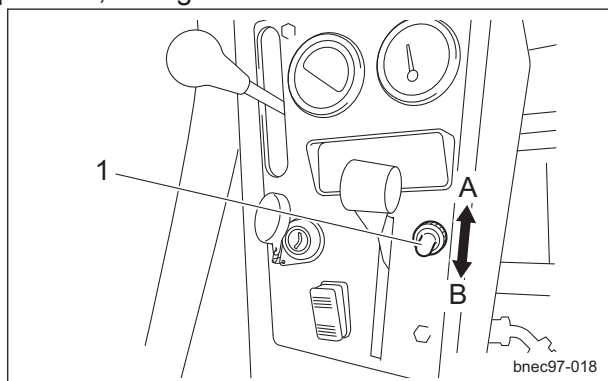
The lights provide auxiliary lighting. Do not travel or operate the machine at night or under poor visibility.

Note:

Depending on the specifications, this function may not be available.

The light switch is located in the operation panel.

When the switch is set to the "ON" position, the lights turn on. When it is set to the "OFF" position, the lights turn off.



Light Switch_001

1	Light switch
A	ON
B	OFF

Note:

The lights will not turn on when the ignition key is switched to the "OFF" position.

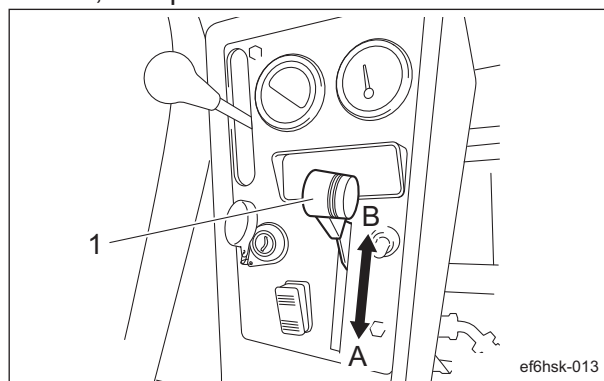
Throttle Lever

The throttle lever is located in the operation panel and enables you to adjust the engine rpm.

Move the throttle lever toward the "High speed" position to increase the engine rpm, and toward the "Low speed" position 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 speed
B	Low speed

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.

Important

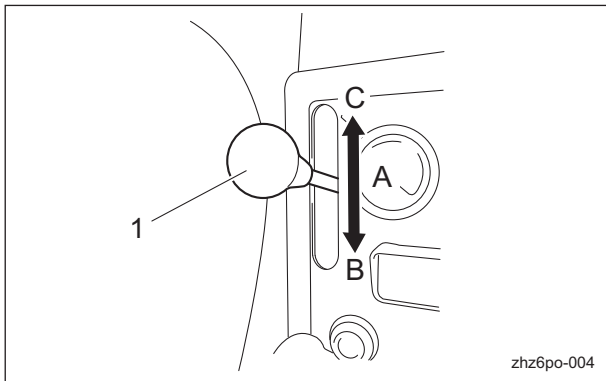
Before operating the mower unit up/down lever, be sure to set the stop valve to the "Open" position.

Important

When the mower lock levers (latches) are engaged, do not operate the mower unit up/down lever.

The mower unit up/down lever is located in the operation panel and raises or lowers the mower units.

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



Mower Unit Up/Down Lever_001

1	Mower unit up/down lever
A	Neutral
B	Up
C	Down

Note:

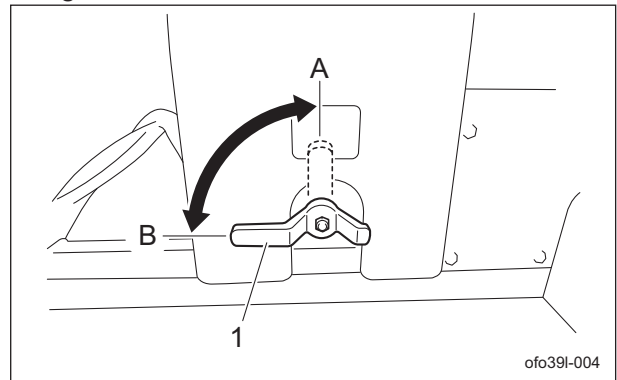
Even if the reel rotation switch is set to the "Rotate" position, the reel cutter (cutting cylinder) stops rotating when the mower unit up/down lever is moved to the neutral position or the mower units are raised.

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 all raised mower units from falling.



Stop Valve_001

1	Stop valve
A	Stop
B	Open

Mower Lock Lever (Latch)

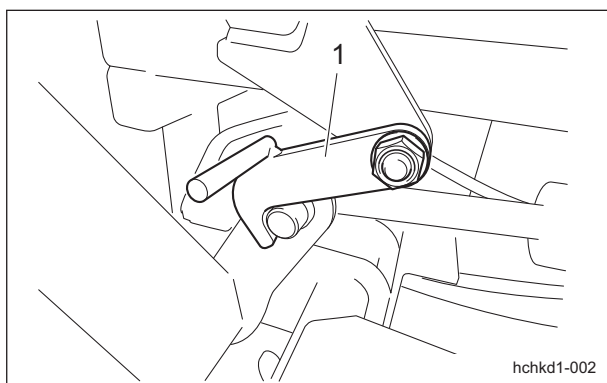
Caution

When the mower lock levers (latches) are engaged, do not operate the mower unit up/down lever.

The mower lock levers (latches) are located on the fulcrums of mower units #4 and #5 and are used when storing the machine with the mower units raised.

When storing the machine, secure the mower lock levers (latches).

Handling Instructions



Mower Lock Lever (Latch)_001

1	Mower lock lever (latch)
---	--------------------------

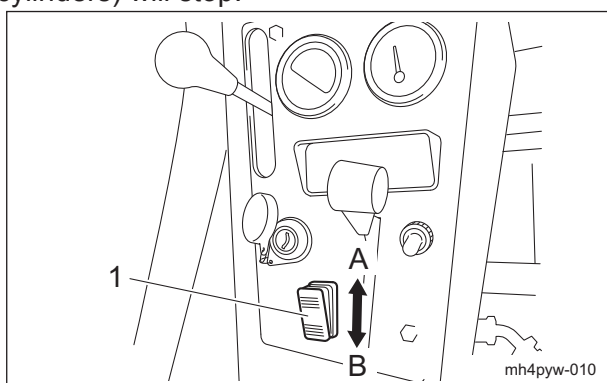
Reel Rotation Switch

! Caution

The reel rotation switch must be set just before you start cutting work. In cases other than those cases, it must be returned to the "Stop" position.

The reel rotation switch is located in the operation panel and operates rotation of the reel cutters (cutting cylinders) of the mower units.

If you set the reel rotation switch to the "Rotate" position, the reel cutters (cutting cylinders) of all mower units will rotate for cutting work. If you set the reel rotation switch to the "Stop" position, the reel cutters (cutting cylinders) will stop.



Reel Rotation Switch_001

1	Reel rotation switch
A	Rotate
B	Stop

Slight Lift Function

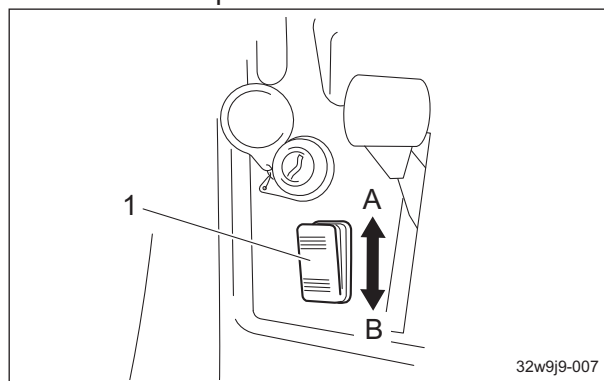
Note:

Depending on the specifications, this function may not be available.

! Caution

When the mower lock levers (latches) are engaged, do not operate the mower unit up/down lever.

When the reel rotation switch is shifted to the "Rotate" side, the slight lift becomes functional and the mower units are raised only to a fixed height when the mower units are raised with the mower unit up/down lever.



Slight Lift Function_001

1	Reel rotation switch
A	Rotate (Slight lift function "ON")
B	Stop (Slight lift function "OFF")

Handling Instructions

Reel Reverse Switch

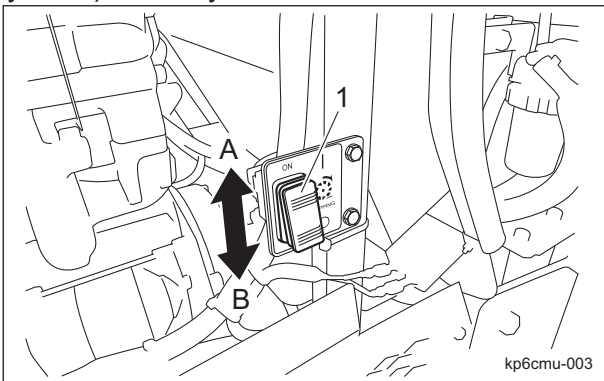
Caution

Do not switch the reel reverse switch to the "ON" or "OFF" position while the reel cutter (cutting cylinder) is rotating. Otherwise, a hydraulic system malfunction may result.

Important

If the reel rotation switch is not set to the "Rotate" position, the reel cutter (cutting cylinder) will not rotate.

The reel reverse switch is located under the hood. This switches the rotation direction of the reel cutter (cutting cylinder). When the reel reverse switch is set to the "ON" position, the reel cutters (cutting cylinder) of all mower units rotate in reverse (back lapping motion). When the reel reverse switch is set to the "OFF" position, the reel cutters (cutting cylinder) normally rotate.



Reel Reverse Switch_001

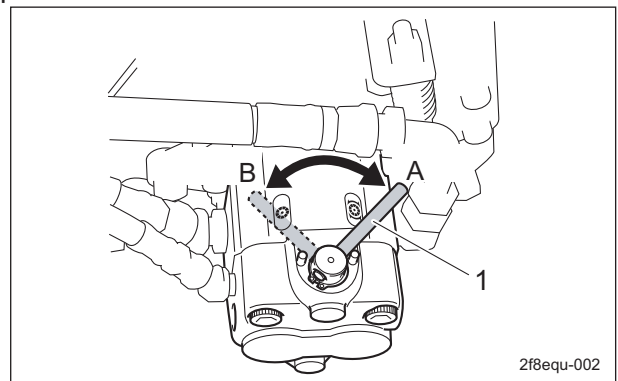
1	Reel reverse switch
A	ON (reverse)
B	OFF (normal rotation)

Reel Rotation/Stop Switching Lever

Caution

Before operating the reel rotation/stop switching lever, be sure to shift the reel rotation switch 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.



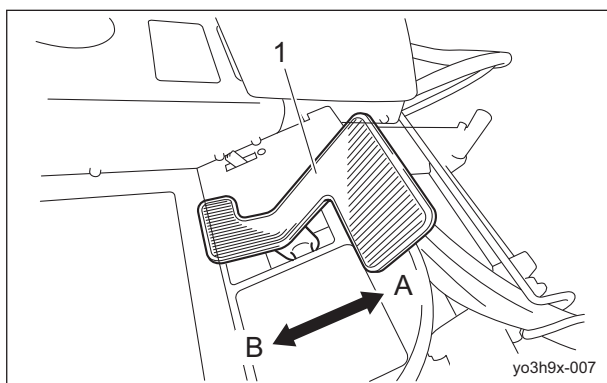
Reel Rotation/Stop Switching Lever_001

1	Reel rotation/stop switching lever
A	Rotate
B	Stop

Traveling Pedal

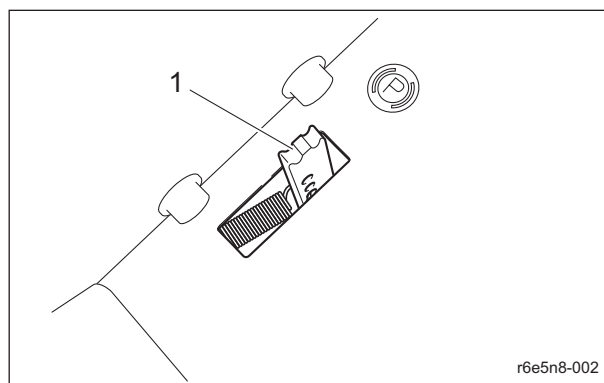
The traveling pedal is located in the right foot area. When the forward side depressed, the machine travels forward. When the backward side depressed, the machine travels backward.

Handling Instructions



Traveling Pedal_001

1	Traveling pedal
A	Forward
B	Backward

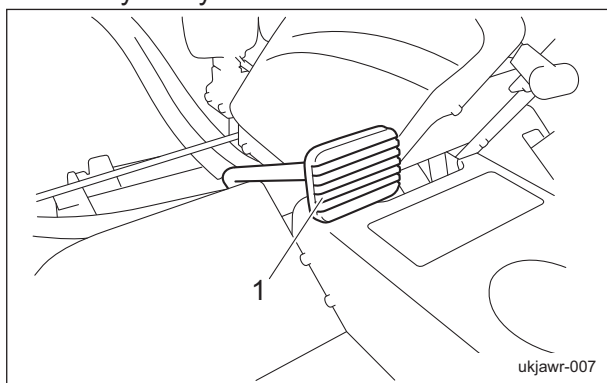


Parking Brake Lock Lever_001

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

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
---	-------------

Parking Brake Lock Lever

⚠ Caution

Be sure to release the parking brake before driving. Otherwise, it may cause the malfunction of the brake or hydraulic system.

⚠ Caution

Never park the machine on a slope.

The parking brake lock lever is located in the right foot area. When parking, depress the brake pedal and move the parking brake lock lever forward. To release the parking brake, depress the brake pedal.

Hood

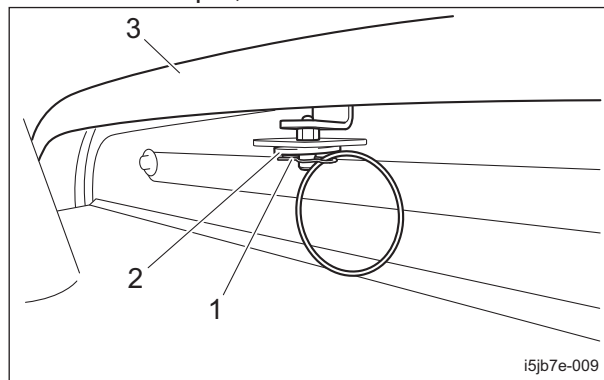
⚠ Caution

Do not open the hood in strong winds.

⚠ Caution

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

1. Remove the pin, then the washer.

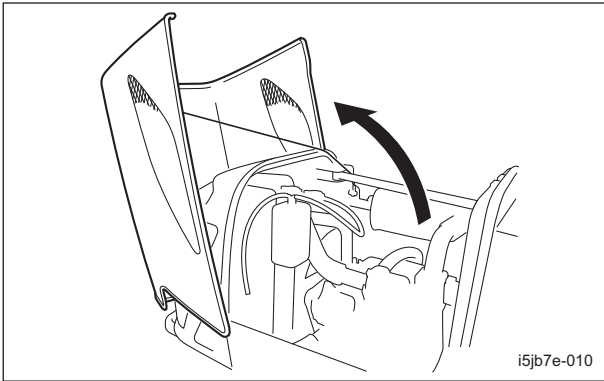


Hood_001

1	Pin
2	Washer
3	Hood

Handling Instructions

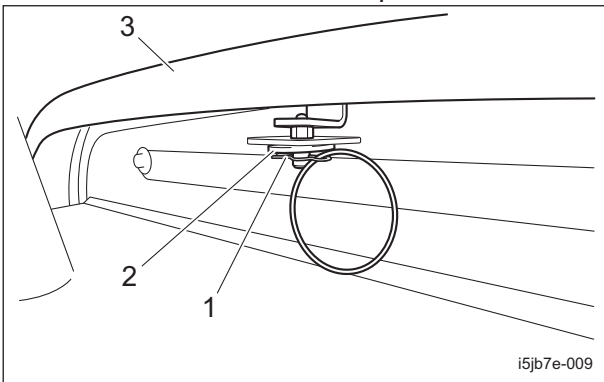
2. Lift up the hood.



Hood_002

3. When closing the hood, do the operation slowly.

4. Insert the washer, then the pin.



Hood_003

1	Pin
2	Washer
3	Hood

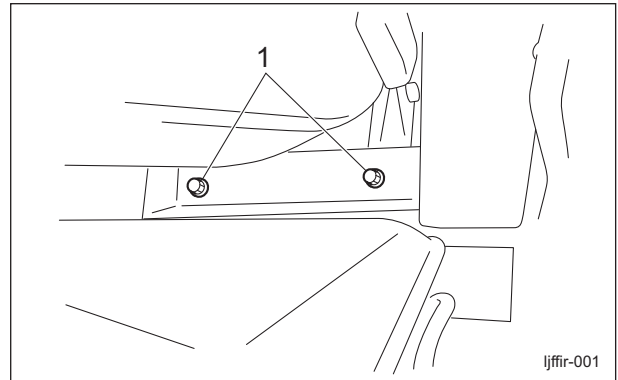
Underseat Cover

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.



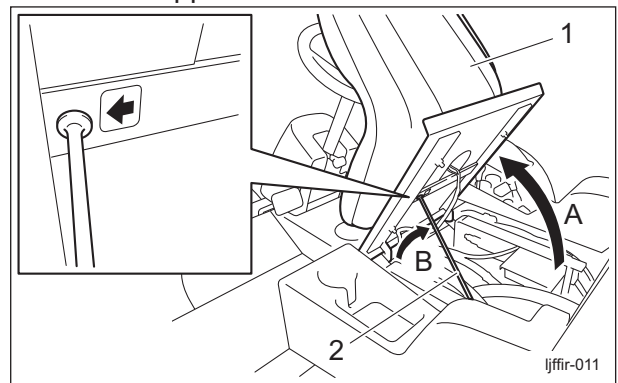
Underseat Cover_001

1	Bolt
---	------

3. Bring the seat to the backmost position.

4. Lift the seat.

Securely support the underseat cover with the seat support rod.



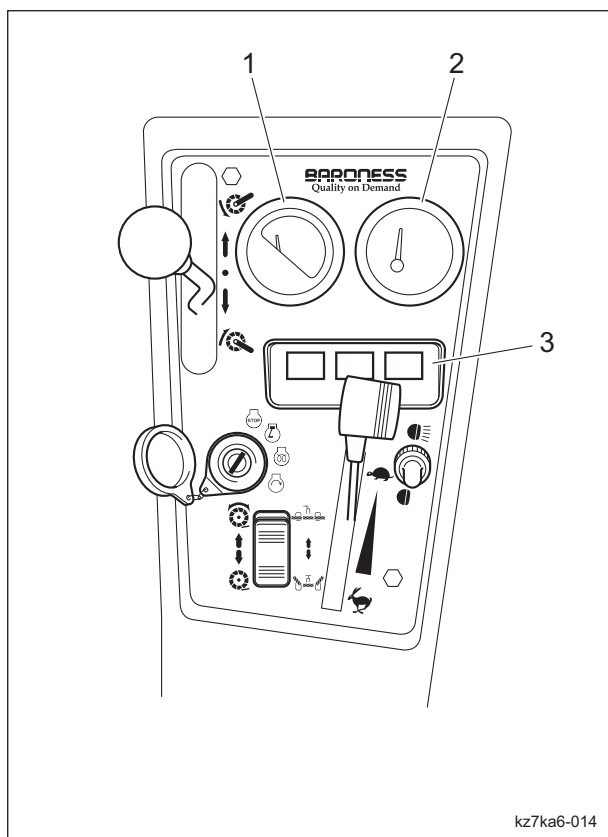
Underseat Cover_002

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

Handling Instructions

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)

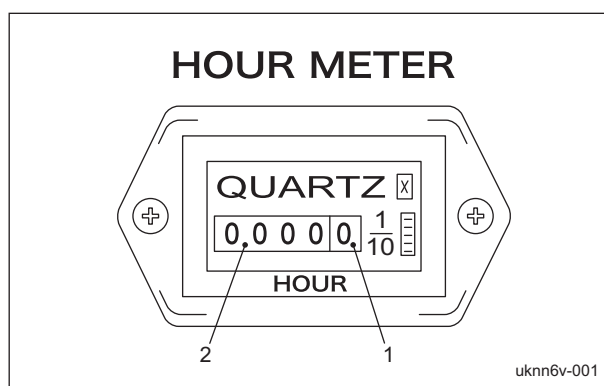
Hour Meter

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.

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

Water Temperature Gauge

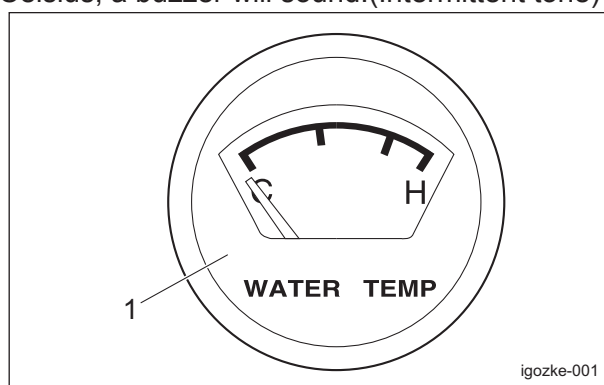
The water temperature gauge is located in the operation panel.

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

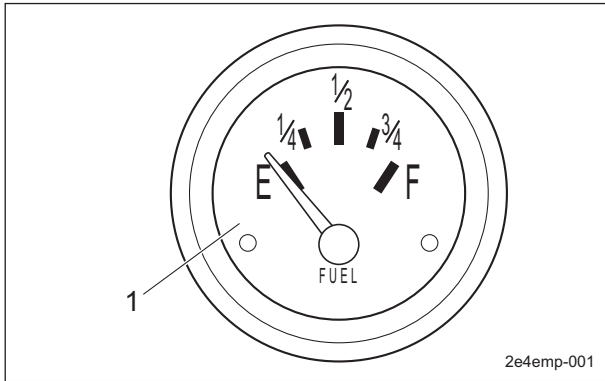
1	Water temperature gauge
---	-------------------------

Handling Instructions

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
---	------------

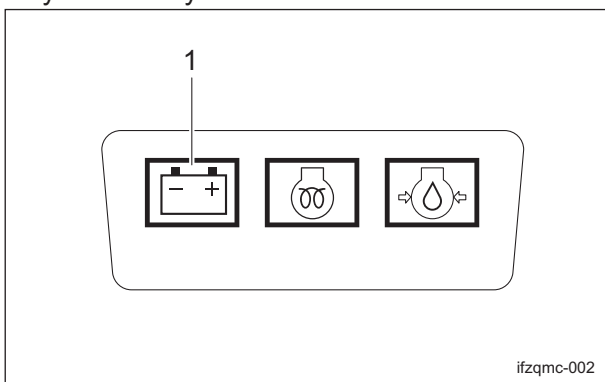
Pilot Lamps

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
---	-------------

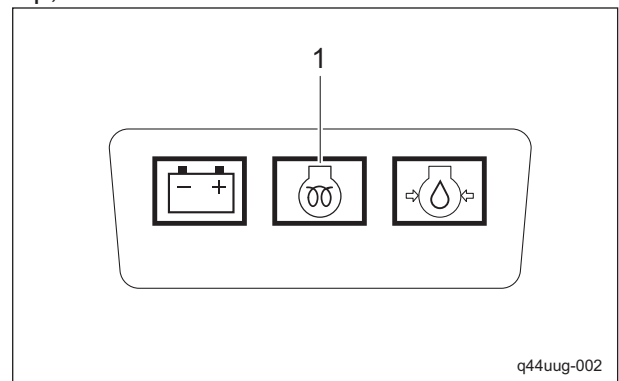
Thermo-start Lamp

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

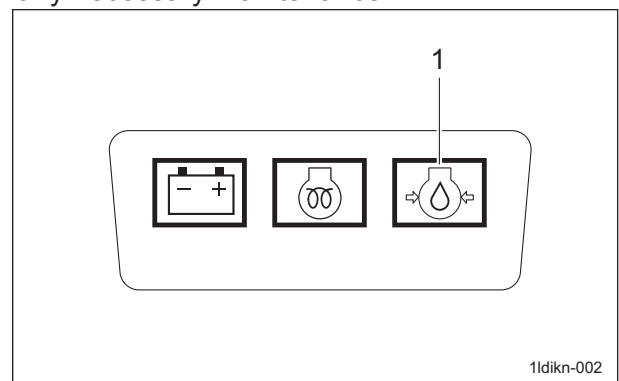
1	Thermo-start lamp
---	-------------------

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

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.

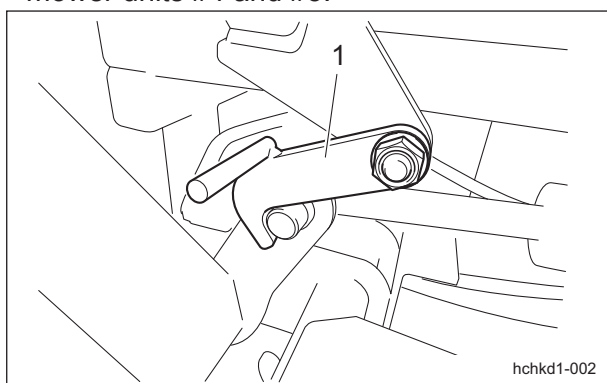
Travel of Machine

Traveling Procedure

Caution

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

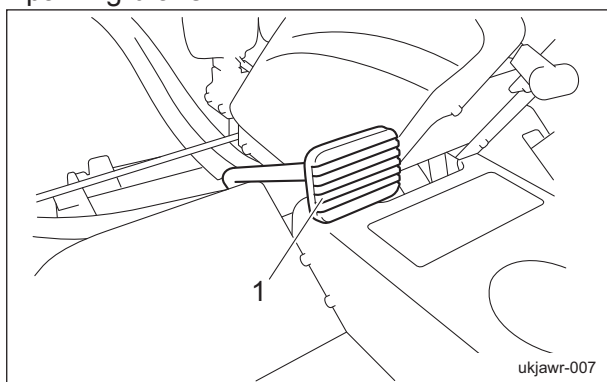
1. Start the engine.
 "Procedure to Start Engine" (Page 4-20)
2. Raise all mower units, and set the anti-falling stop valve to the "Stop" position.
3. Engage the mower lock levers (latches) for mower units #4 and #5.



Traveling Procedure_001

1 Mower lock lever (latch)

4. Depress the brake pedal to release the parking brake.



Traveling Procedure_002

1 Brake pedal

5. Slowly depress the traveling pedal.
6. The machine starts traveling.

Towing the Machine

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

Caution

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

Important

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

Important

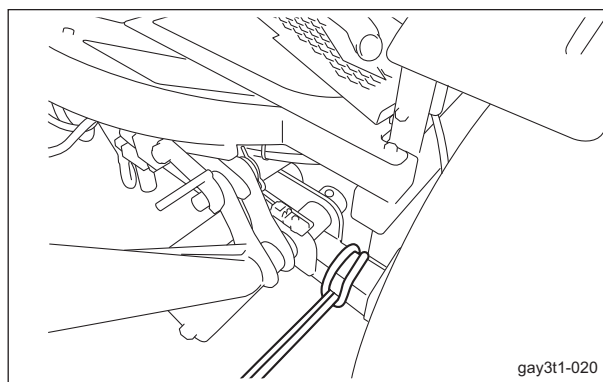
When towing the machine, travel at a speed no more than 3.0 km/h.
 In addition, do not tow the machine for more than 3 minutes.
 If the towing speed is too fast or the machine is towed too much, the pump or motor will be damaged.

Important

Do not loosen the unload valve three turns or more.

1. Stop the engine.
 "Procedure to Stop Engine" (Page 4-22)
2. Apply the parking brake.
3. Chock the wheels.
4. Secure the machine with ropes.

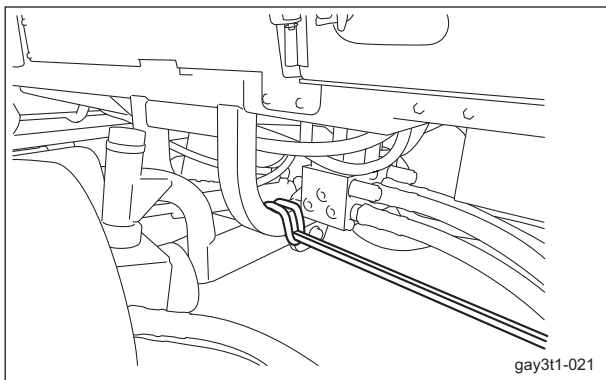
Front side



Towing the Machine_001

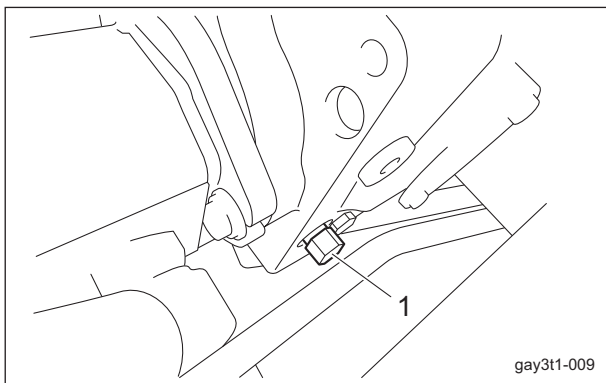
Handling Instructions

Rear side



Towing the Machine_002

5. Lift up the underseat cover.
"Underseat Cover" (Page 4-32)
6. Rotate the unload valve under the seat 1 to 1.5 turns counterclockwise.



Towing the Machine_003

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

7. Close the underseat cover.
8. Remove the wheel stoppers.
9. Depress the brake pedal to release the parking brake.

Warning

While towing, always keep your foot on the brake pedal and depress the brake pedal at any time to stop.

10. Tow the machine slowly.

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.

Important

Reel rotation will be turned on or off based on the sensor-detected position of the mower units.
During the work, the reel cutters (cutting cylinders) will rotate or stop in sync with the up and down motion of the mower units.

Important

Perform cutting work with the mower unit up/down lever shifted to the "DOWN" position. Reel rotation will be turned off if the mower unit up/down lever shifted to the "NEUTRAL" or "UP" position.

1. Shift the reel rotation/stop switching levers of all mower units to the "Rotate" position.
2. Start the engine.
"Procedure to Start Engine" (Page 4-20)
3. Raise all mower units, and set the anti-falling stop valve to the "Stop" position.
4. Engage the mower lock levers (latches) for mower units #4 and #5.
5. Depress the brake pedal to release the parking brake.
6. Shift the throttle lever to the "High speed" position, and rev up the engine to MAX (3,100 rpm).
7. Right before starting cutting work, set the anti-falling stop valve to the "Open" position.

8. Release the mower lock levers (latches) for mower units #4 and #5.
9. Shift the mower unit up/down lever to the "DOWN" position to lower the mower units.
10. Set the reel rotation switch to the "Rotate" position to rotate the reel cutters (cutting cylinders) for all mower units.
11. Depress the traveling pedal to start cutting work.

Transporting

Transporting Procedure

When loading this 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.

Handling Instructions

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Maintenance Schedule	Page 5-3
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Jacking up the machine	Page 5-6
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Jack-up Points	Page 5-6
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About Greasing	Page 5-7
Greasing Points	Page 5-7
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Sharpening of Reel Cutter (Cutting Cylinder)	Page 5-13
Replacement of Reel Cutter (Cutting Cylinder)	Page 5-14
Replacement of Bed Knife (Bottom Blade)	Page 5-15
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Adjustment of Parking Brake	Page 5-17
Adjustment of Brake	Page 5-17
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Change of Hydraulic Oil	Page 5-22
Change of Air Cleaner	Page 5-23
Change of Engine Oil	Page 5-23
Change of Engine Oil Filter	Page 5-24
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Before Long-Term Storage	Page 5-26

Maintenance

Maintenance Precautions

 Caution

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

Important

Use tools appropriate for each maintenance operation.

Important

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

LM2400
 Follow the maintenance schedule below.
 ○ . . . Inspect, adjust, supply, clean
 ● . . . Replace (first time)
 △ . . . Replace

Maintenance item		Before work	After work	Every 8 hrs.	Every 10 hrs.	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 450 hrs.	Every 500 hrs.	Every year	Every 2 years	Every 4 years	Remarks
Engine	Tightening the parts	○														
	Fuel	○														
	Engine oil	○		●		△										50 hrs (first time)
	Engine oil filter	○				●		△								
	Radiator	○														
	Oil cooler	○														
	Coolant	○				△										
	Fan belt	○												△		
	Battery	○													△	
	Battery fluid	○														
	Cleaning the exterior	○														
Main body	Tightening the parts	○														
	Interlock system	○														
	Electrical wiring												○			
	Reel cutter (Cutting cylinder)	○														Refer to "Inspection of Reel Cutter (Cutting Cylinder)"
	Bedknife (Bottom blade)	○														Refer to "Inspection of Reel Cutter (Cutting Cylinder) and Bed Knife (Bottom Blade)"
	Operating height (Mowing height)	○														
	Blade engagement	○														
	Greasing, oiling					○										
Tire	○															

Maintenance

Maintenance

Maintenance item		Before work	After work	Every 8 hrs.	Every 10 hrs.	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 450 hrs.	Every 500 hrs.	Every year	Every 2 years	Every 4 years	Remarks	
Main body	Brake	○														Refer to "Inspection of Brake"	
	Brake wire	○						△								Refer to "Inspection of Wire"	
	Throttle wire	○						△									
	Reel cover	○															
	Oil leakage	○															
	Hydraulic oil	○					●					△					
	Hydraulic oil filter						●					△					
	Hydraulic hose (moving part)	○												△			
	Hydraulic hose (fixed part)	○													△		
	Air cleaner	○															
	Air cleaner element								△				△				
	Electromagnetic pump filter	○							△								
	Water separator						○	○									50 hrs (first time), Every 100hrs. Refer to "Inspection of Water Separator", "Draining of Water Separator"
												○					Refer to "Cleaning of Water Separator"
	Fuel filter							○						△			
Fuel pipe	○																
Cleaning the exterior		○															

For the maintenance schedule of the items unlisted above, refer to the Engine's Owner's Manual.

The values for consumables are not guaranteed.

Replace the steering cylinder hoses every 2 years.

Specified Values

Fuel tank capacity	Approx. 38.0 dm ³ (38.0 L)	
Hydraulic tank capacity	Approx. 35.0 dm ³ (35.0 L)	Shell Tellus S2M46 (or equivalent)
Engine oil capacity	Approx. 3.1 dm ³ (3.1 L)	Summer: SAE30, Winter: SAE20
Coolant capacity	Approx. 6.0 dm ³ (6.0 L)	Including reserve tank
Front tires	140 kPa (1.4 kgf/cm ²)	26.5 × 14.00 - 12
Rear tires	100 kPa (1.0 kgf/cm ²)	20 × 10.00 - 10
Cutter adjustment spring	40.0 mm (1.575 in)	Length of spring coil

Maintenance

Jacking up the machine

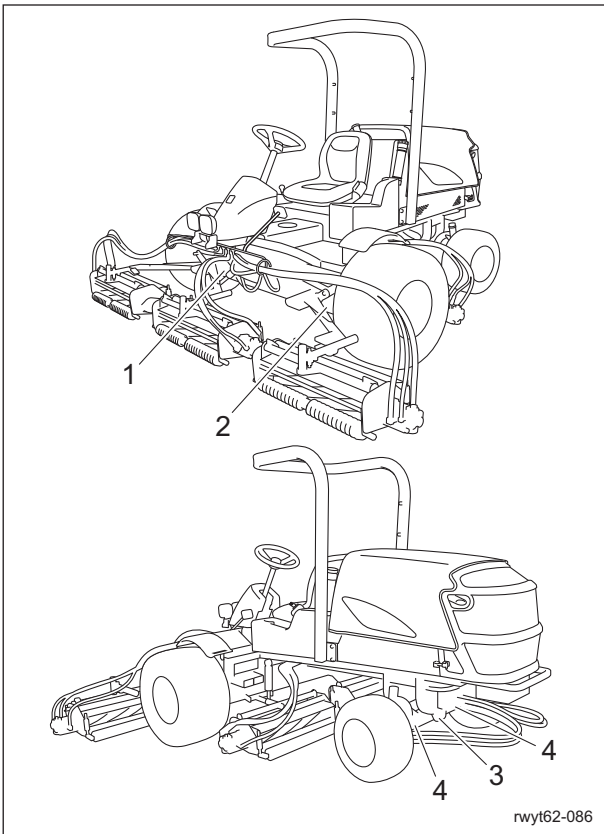
About the Jacking up the machine

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.

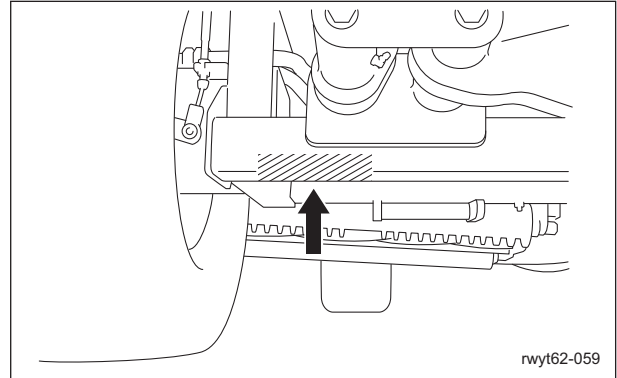
Jack-up Points



Jack-up Points_001

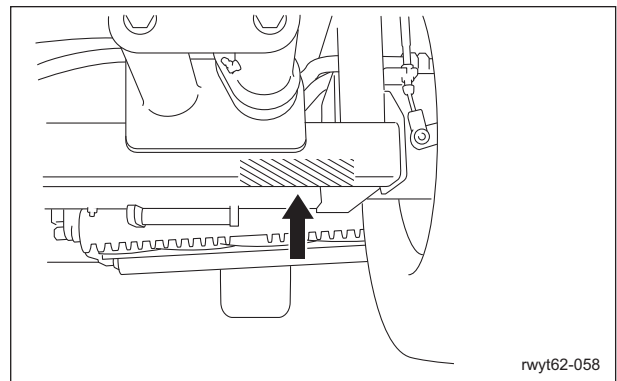
	Jack-up Points
1	Front right frame
2	Front left frame
3	Rear frame
4	Pivot

1. Front right frame



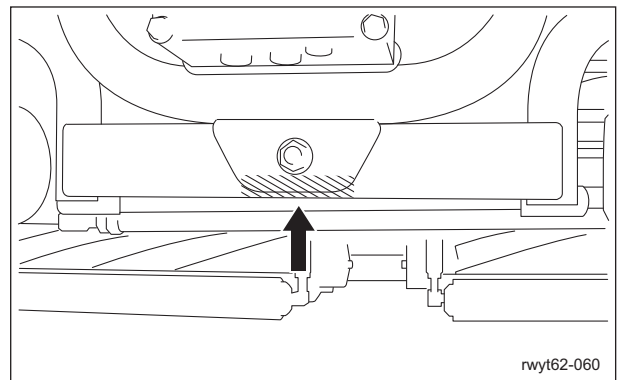
Jack-up Points_002

2. Front left frame



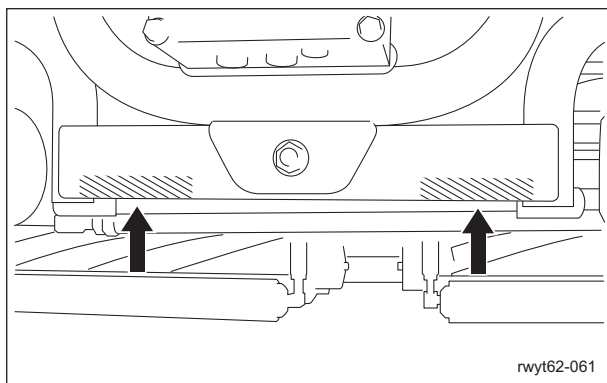
Jack-up Points_003

3. Rear frame



Jack-up Points_004

4. Pivot
There are two locations.



Jack-up Points_005

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.

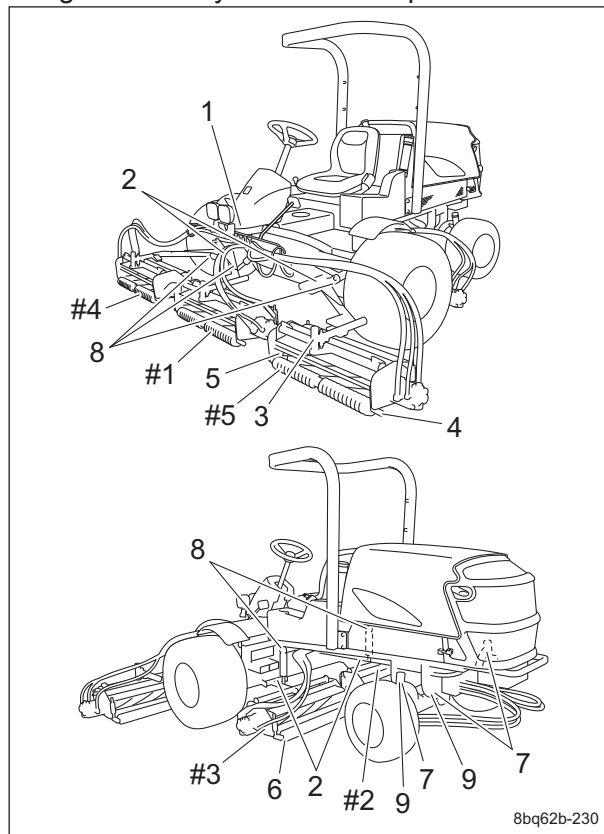
Other locations where the specified grease or lubricant is used are indicated in "Greasing Points".

Add grease using the specified grease or lubricant.

Greasing Points

Grease nipples are installed in the following locations.

Add grease every 50 hours of operation.

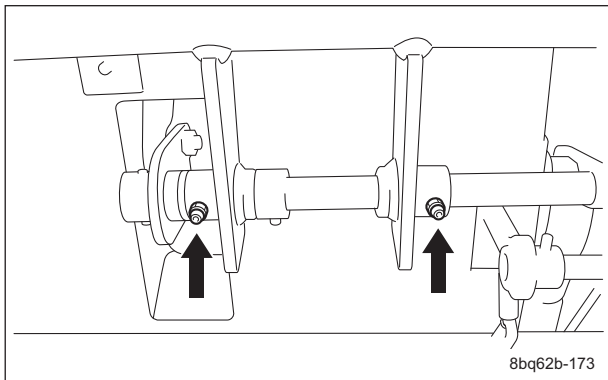


Greasing Points_001

	Location	No. of greasing points
1	Pedal shaft fulcrum	2
2	Lift arm fulcrum	5
3	Mower unit fulcrum	5
4	Front roller	10
5	Housing	10
6	Rear roller	10
7	Pivot	3
8	Cylinder shaft	8
9	Power steering cylinder shaft	2

Maintenance

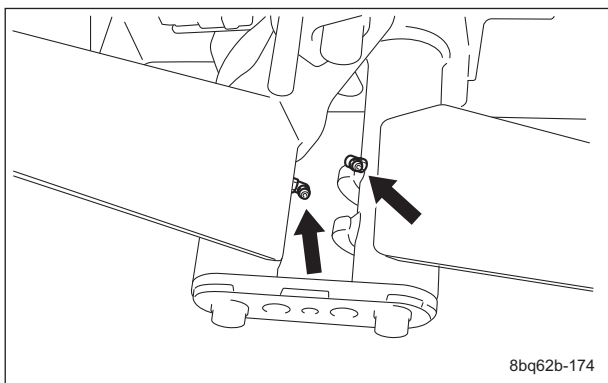
1. Pedal shaft fulcrum
There are two locations.



Greasing Points_002

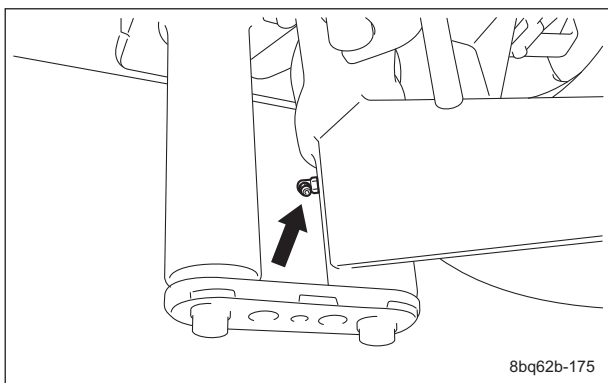
2. Lift arm fulcrum
There is one greasing point on the lift arm fulcrum connected to each mower unit.
Lower the mower units before greasing the lift arm fulcrums.

Mower units #1/#4



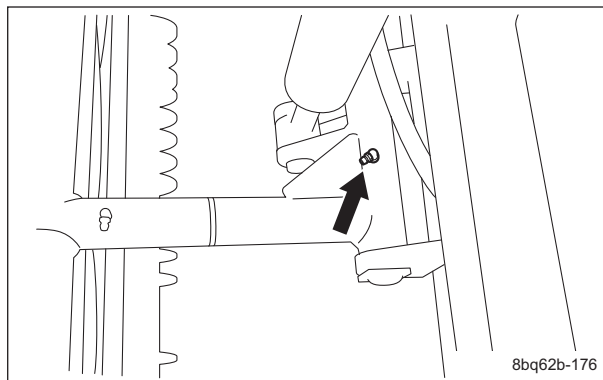
Greasing Points_003

Mower unit #5



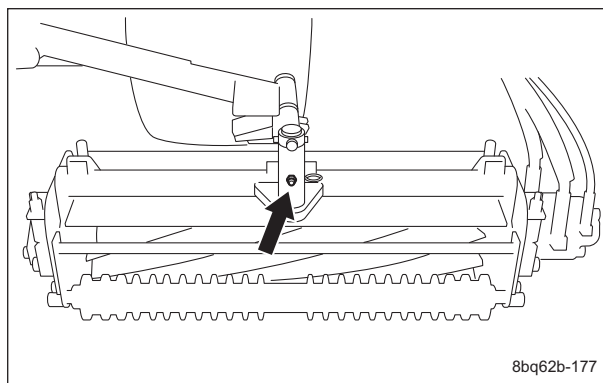
Greasing Points_004

Mower units #2/#3



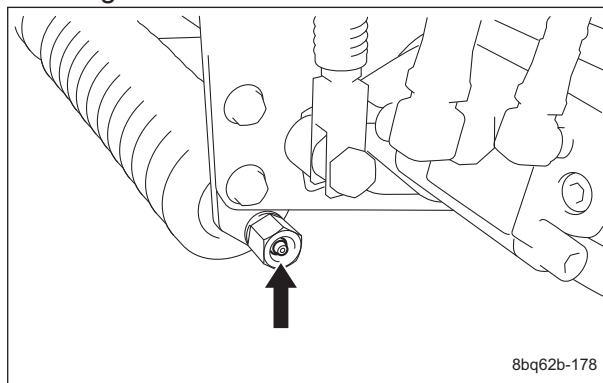
Greasing Points_005

3. Mower unit fulcrum
There is one greasing point on each mower unit.



Greasing Points_006

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

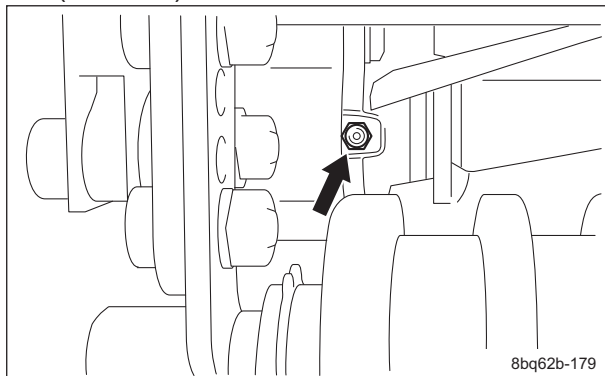


Greasing Points_007

5. Housing

There is one greasing point on the housing of each mower unit.

Hydraulic motor housing
(#10237-)



Greasing Points_008

⚠ Caution

Always use a hand operated grease gun and only add a maximum of 2 pumps of grease every 50 hours.

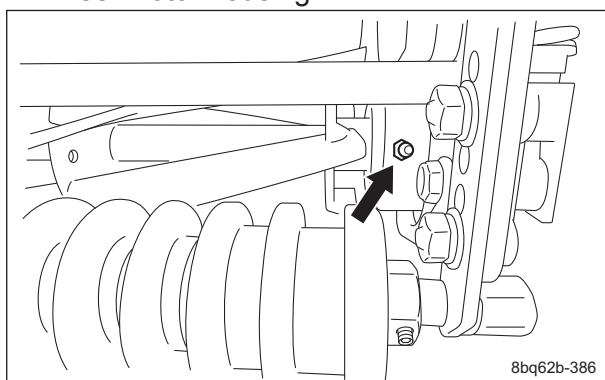
Using a power assisted grease gun should be avoided.

The grease capacity inside the reel housing on the CR brush mount side is approximately 25 g (0.05 lb).

If you repeat greasing by 2g (0.004 lb) twelve times for 600 hours of operation, the grease amount inside the housing will almost reach its full capacity.

In case that the grease exceeds its capacity, the brush frame may project outward. Therefore, remove the brush frame and discard the grease inside the reel housing when it reaches the capacity.

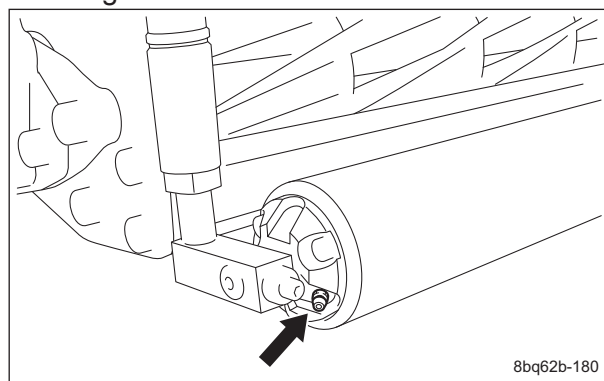
Reel motor housing



Greasing Points_009

6. Rear roller

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

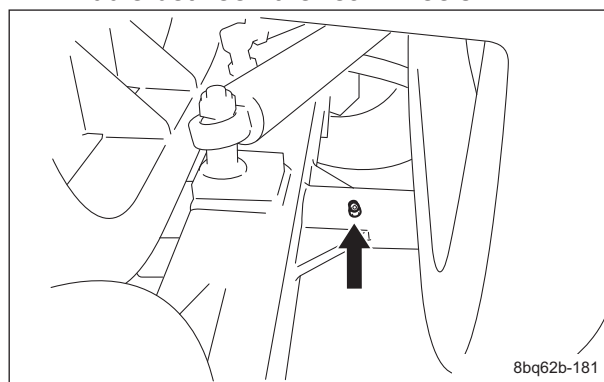


Greasing Points_010

7. Pivot

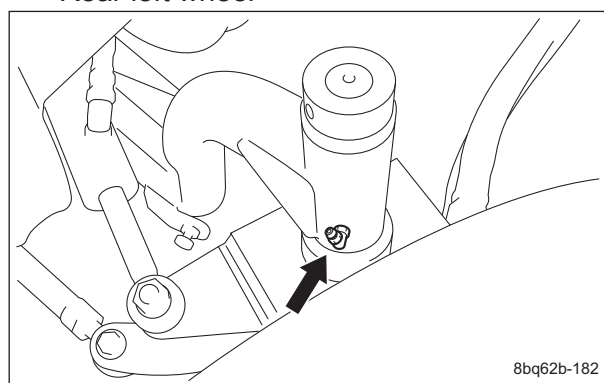
There are three locations.

Middle between the rear wheels



Greasing Points_011

Rear left wheel



Greasing Points_012

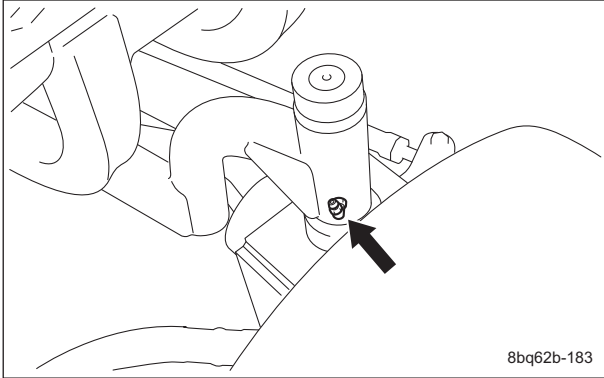
8bq62b-180

8bq62b-181

8bq62b-182

Maintenance

Rear right wheel

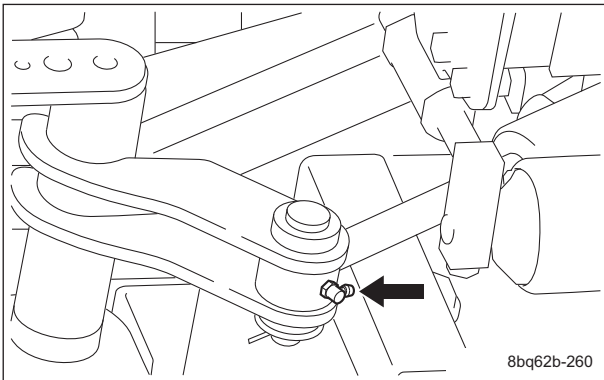


Greasing Points_013

8. Cylinder shaft

#1 cylinder shaft

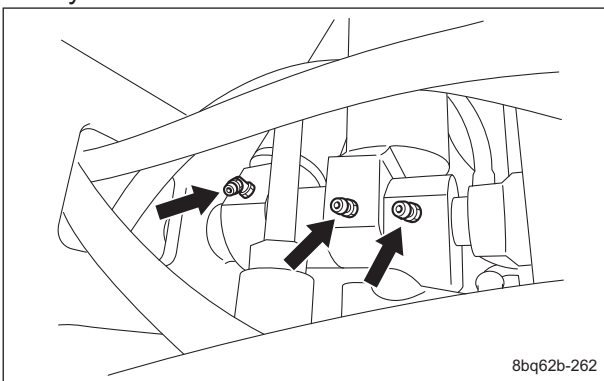
There is one greasing point on the cylinder shaft.



Greasing Points_014

#1, #4 and #5 cylinder shafts

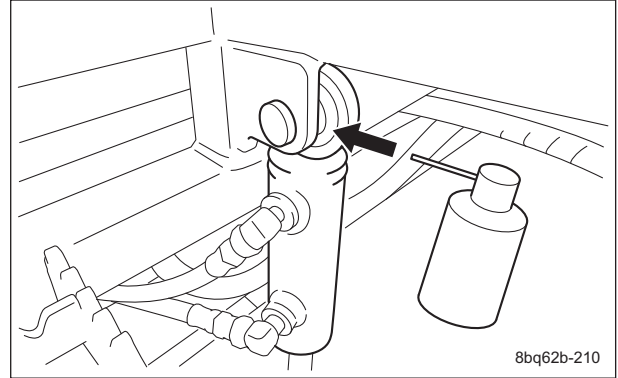
There are three greasing points on the cylinder shaft.



Greasing Points_015

#2 and #3 cylinder shafts

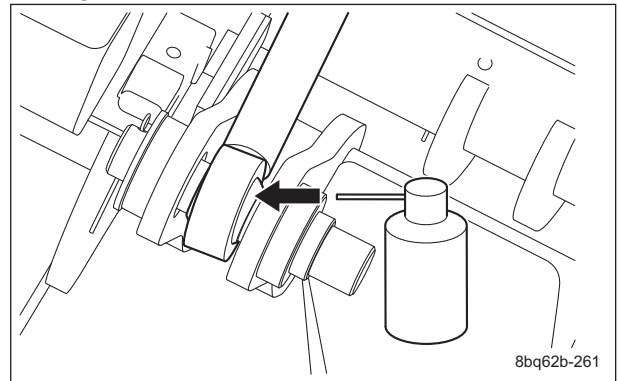
Apply lubricant to the round end of the cylinder (one point each on the left and right).



Greasing Points_016

#4 and #5 cylinder shafts

Apply lubricant to the round end of the cylinder (one point each on the left and right).

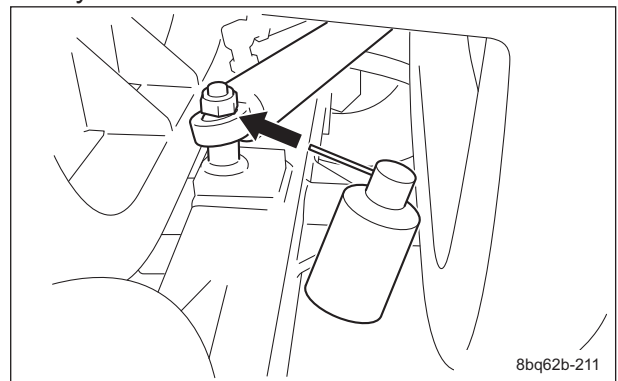


Greasing Points_017

9. Power steering cylinder shaft

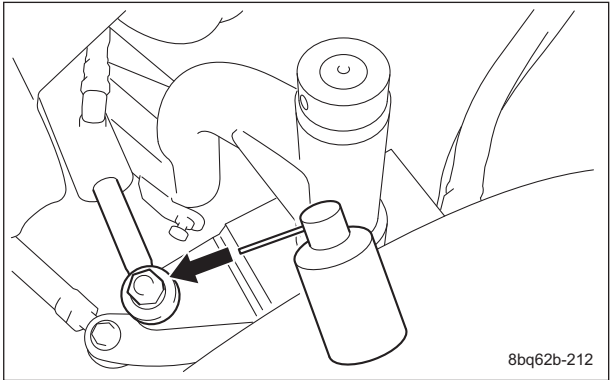
Middle between the rear wheels

Apply lubricant to the round end of the cylinder.



Greasing Points_018

Rear left wheel
Apply lubricant to the round end of the cylinder.



Greasing Points_019

Maintenance Work

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.

Warning

Be careful not to inhale exhaust gas during back lapping.

Warning

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

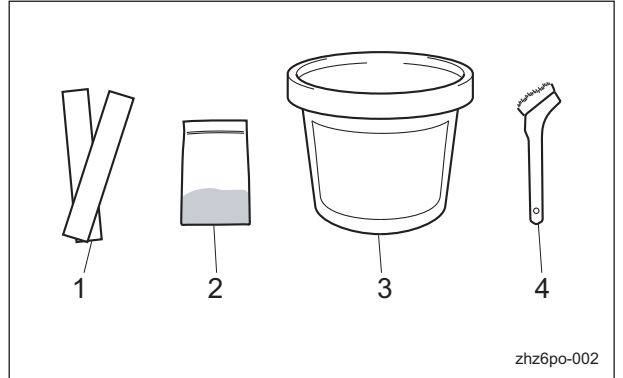
Caution

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

Caution

Do not perform back 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 (#150 - #200) to three or four parts oil.

Caution

When handling the reel cutter (cutting cylinder) and the bed knife (bottom blade), 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.

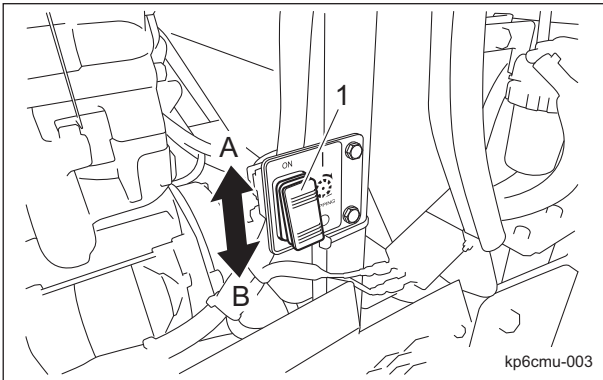
Important

Check the sharpness of the blade by checking the blade engagement after cutting grass.

2. Stop the engine.

Maintenance

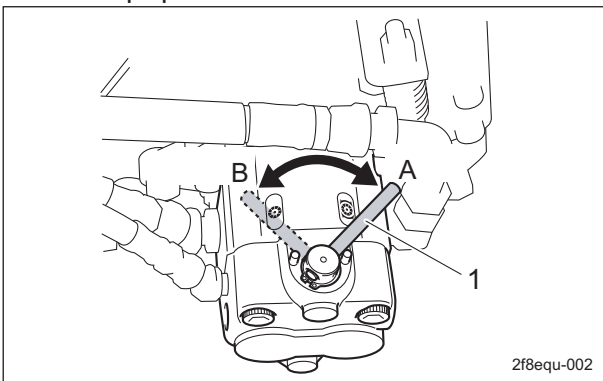
3. Open the hood, and then set the reel reverse switch to the "ON" position.



Back Lapping of Reel Cutter (Cutting Cylinder)_002

1	Reel reverse switch
A	ON (reverse)
B	OFF (normal rotation)

4. Set the reel rotation/stop switching lever to the "Stop" position.



Back Lapping of Reel Cutter (Cutting Cylinder)_003

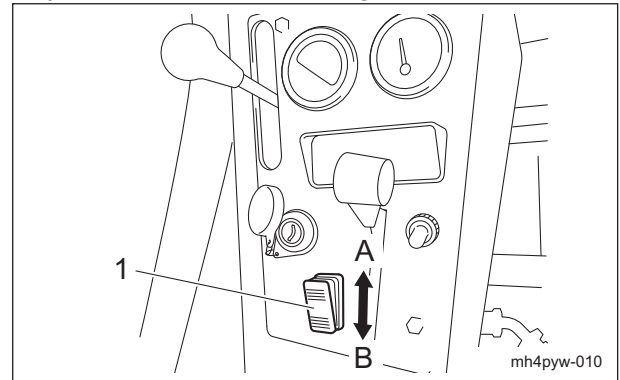
1	Reel rotation/stop switching lever
A	Rotate
B	Stop

5. 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.
6. Check the sharpness of the entire range (three or four points) of the reel cutter (cutting cylinder).
7. Using a piece of chalk, mark locations on the blade that are sharp.

8. 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.

9. Lower all mower units to the ground, and then stop the engine.
10. Sit on the seat, apply the parking brake, and then start the engine.
11. Run the engine at a low rpm.
12. Set the reel rotation switch to the "Rotate" position to rotate the reel cutters (cutting cylinders) for back lapping.

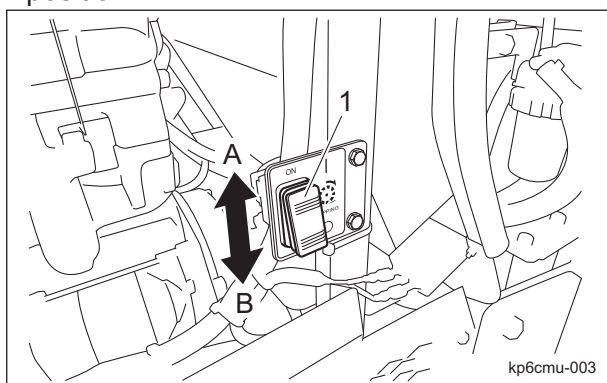


Back Lapping of Reel Cutter (Cutting Cylinder)_004

1	Reel rotation switch
A	Rotate
B	Stop

13. With the reel rotation/stop switching lever, adjust the rotation speed of the reel cutter (cutting cylinder).
14. 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.)
15. Idle the machine for a while and, when contact noise is no longer heard, set the reel rotation switch to the "Stop" position to stop the reel cutter (cutting cylinder).
16. Stop the engine.
17. Wash off or wipe off with a cloth, etc., the abrasive from the reel cutter (cutting cylinder), and then check it for sharpness.
18. Repeat steps 4 to 17 until the entire range (three or four points) of the reel cutter (cutting cylinder) will be uniformly sharpened.

19. Finally, apply abrasive to the entire blade width of the reel cutter (cutting cylinder) and perform final back lapping.
20. Set the reel rotation switch to the "Stop" position to stop the rotation of the reel cutter (cutting cylinder), stop the engine, and then carefully and thoroughly wash off any remaining abrasive.
21. Set the reel reverse switch to the "OFF" position.



Back Lapping of Reel Cutter (Cutting Cylinder)_005

1	Reel reverse switch
A	ON (reverse)
B	OFF (normal rotation)

22. Shift the reel rotation/stop switching lever to the "Stop" position.
23. While checking the blade for sharpness, adjust blade engagement.

Sharpening of Reel Cutter (Cutting Cylinder)

⚠ 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 and feet.

⚠ Caution

Wear gloves when touching edged tools to avoid cutting your hands.

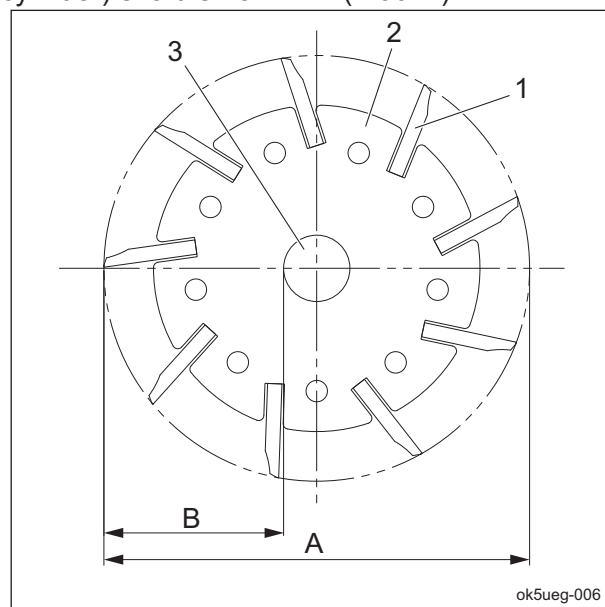
The sharpening of the reel cutter (cutting cylinder) consists in maintaining its roundness and creating a relief (second edge face). This work should be performed if the sharpness cannot be restored, even after back lapping, or if the relief (second edge face) has worn away.

Sharpen the reel cutter (cutting cylinder) when the sharpness cannot be restored, even after back lapping, or when the relief (second edge face) has worn away, there is full contact or back lapping takes too much time. In addition, if the reel cutter (cutting cylinder) becomes worn and its shape conical, perform cylindrical grinding to return it to a cylindrical shape.

For sharpening the reel cutter (cutting cylinder), contact your dealer or Baroness. If the outer diameter of the reel cutter (cutting cylinder) after sharpening is more than the usage limit, the reel cutter (cutting cylinder) can be sharpened.

New		Usage limit	
Dimension A (Outer diameter of reel cutter (cutting cylinder))	Dimension B (Distance from blade edge to outer edge of reel cutter (cutting cylinder) shaft)	Dimension A (Outer diameter of reel cutter (cutting cylinder))	Dimension B (Distance from blade edge to outer edge of reel cutter (cutting cylinder) shaft)
163 mm (6.42 in)	68.8 mm (2.71 in)	143 mm (5.63 in)	58.8 mm (2.31 in)

Note:
The outer diameter of the reel cutter (cutting cylinder) shaft is 25.4 mm (1.00 in).



Sharpening of Reel Cutter (Cutting Cylinder)_001

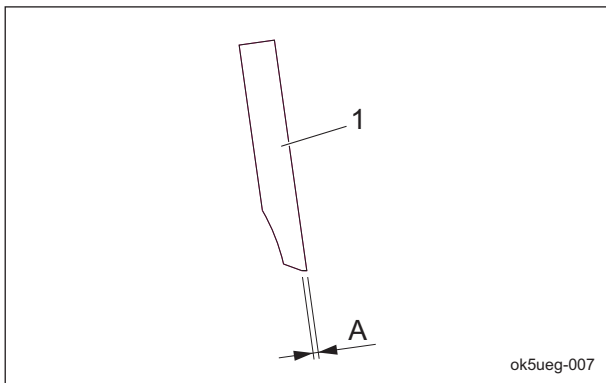
Maintenance

1	Reel cutter (cutting cylinder) blade
2	Reel cutter (cutting cylinder) disc
3	Reel cutter (cutting cylinder) shaft
A	Outer diameter of reel cutter (cutting cylinder)
B	Distance from blade edge to outer edge of reel cutter (cutting cylinder) shaft

Sharpening is necessary when the reel cutter (cutting cylinder) reaches a condition described below.

1. When the sharpening width (length of contacting surface of bed knife (bottom blade)) for the outer diameter of the reel cutter (cutting cylinder) is greater than the usage limit.

Outer diameter of reel cutter (cutting cylinder) (new part)	Usage limit of sharpening width for outer diameter of reel cutter (cutting cylinder)
163 mm (6.42 in)	3.0 mm (0.12 in) (factory-recommended)



Sharpening of Reel Cutter (Cutting Cylinder)_002

1	Reel cutter (cutting cylinder) blade
A	Sharpening width for outer diameter of reel cutter (cutting cylinder)

2. When the edges become blunt or the blade edge cannot be formed with back lapping
3. When the reel cutter (cutting cylinder) becomes worn and its shape conical, or when blade engagement adjustment cannot be performed

Replacement of Reel Cutter (Cutting Cylinder)

⚠ 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 and feet.

⚠ Caution

Wear gloves when touching edged tools to avoid cutting your hands.

The criteria for replacing the reel cutter (cutting cylinder) are described below.

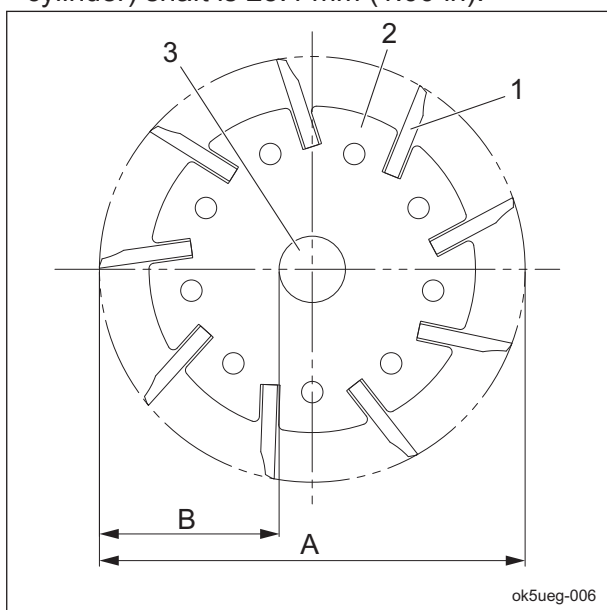
However, these criteria are only a reference and do not guarantee performance like that of a new reel cutter (cutting cylinder).

1. When the outer diameter of the reel cutter (cutting cylinder) is less than the usage limit

New		Usage limit	
Dimension A (Outer diameter of reel cutter (cutting cylinder))	Dimension B (Distance from blade edge to outer edge of reel cutter (cutting cylinder) shaft)	Dimension A (Outer diameter of reel cutter (cutting cylinder))	Dimension B (Distance from blade edge to outer edge of reel cutter (cutting cylinder) shaft)
163 mm (6.42 in)	68.8 mm (2.71 in)	143 mm (5.63 in)	58.8 mm (2.31 in)

Note:

The outer diameter of the reel cutter (cutting cylinder) shaft is 25.4 mm (1.00 in).



Replacement of Reel Cutter (Cutting Cylinder)_001

1	Reel cutter (cutting cylinder) blade
2	Reel cutter (cutting cylinder) disc
3	Reel cutter (cutting cylinder) shaft
A	Outer diameter of reel cutter (cutting cylinder)
B	Distance from blade edge to outer edge of reel cutter (cutting cylinder) shaft

Replacement of Bed Knife (Bottom Blade)

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 and feet.

Caution

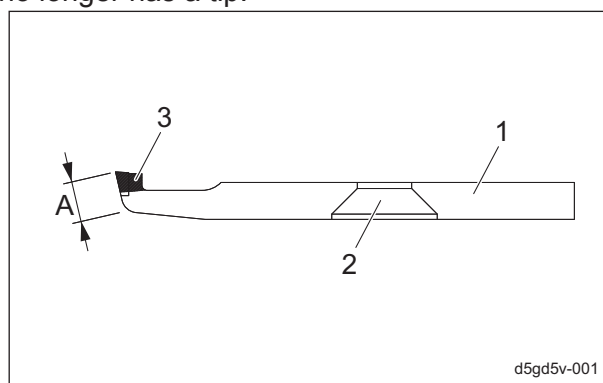
Wear gloves when touching edged tools to avoid cutting your hands.

The criteria for replacing the bed knife (bottom blade) are described below.

1. When the reel cutter (cutting cylinder) is ground
2. When the reel cutter (cutting cylinder) is replaced
3. When the bed knife (bottom blade) is worn

High-speed-steel-tipped blade

Replace the bed knife (bottom blade) before it no longer has a tip.



Replacement of Bed Knife (Bottom Blade)_001

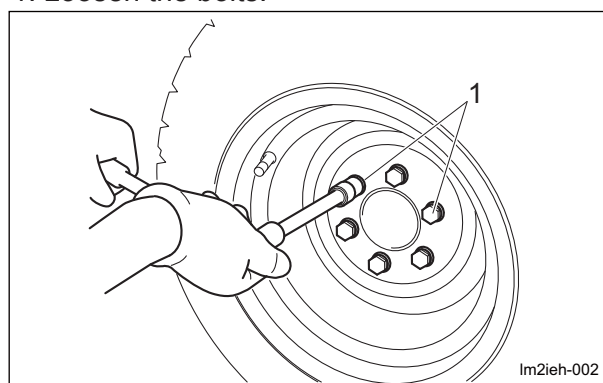
1	Bed knife (bottom blade)
2	Mounting hole
3	Tip
A	Front face

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. "Jack-up Points" (Page 5-6)
3. Remove the bolts.
4. Remove the tire from the wheel mounting seat.

Maintenance

Important

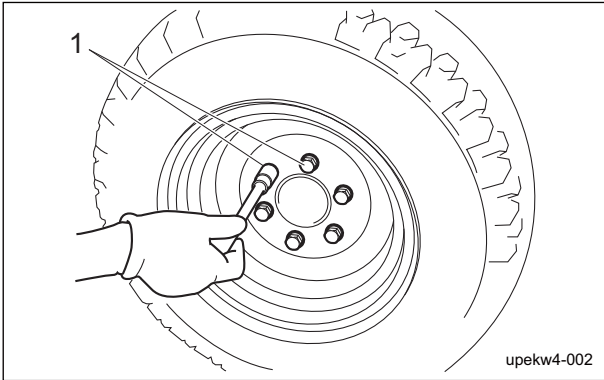
Tighten the bolts in the tightening order (diagonally).

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 Tire_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. "Jack-up Points" (Page 5-6)
3. Remove the bolts.
4. Remove the tire from the wheel mounting seat.

Important

Tighten the bolts in the tightening order (diagonally).

For installing the rear tires, reverse the removing procedure.

Adjustment of Belt Tension

Warning

Be sure to stop the engine before adjusting the belts.

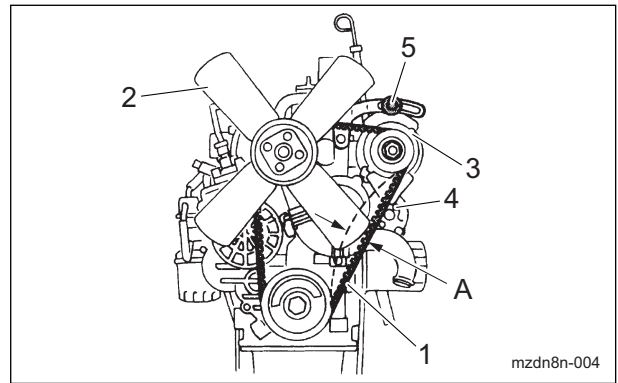
Important

Make sure that the belt has the specified amount of tension. Before making sure of its specified tension, rotate the belt several times.

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

1. Press the middle of the belt with your finger to check the belt tension.
2. If the belt tension is incorrect, loosen bolt A and bolt B (securing the alternator), and then move the alternator to adjust the tension.



Fan Belt_001

1	Fan Belt
2	Blade
3	Alternator
4	Bolt A
5	Bolt B
A	10 mm (0.39 in)

Adjustment of Parking Brake

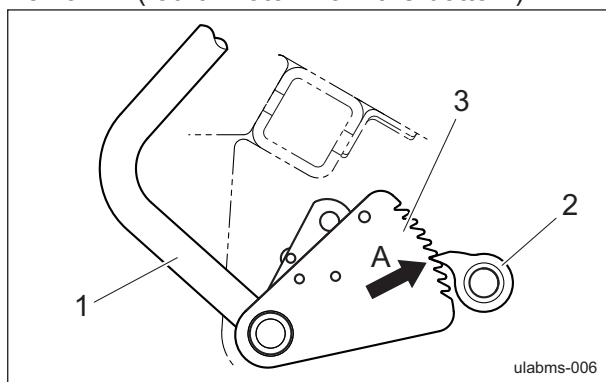
⚠ Danger

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 brake is not sufficiently effective, adjust the brake wire.

1. Check position of the notch of the parking brake.
2. Depressing the brake pedal firmly, move the parking brake lock lever forward with a foot. Make adjustments with the adjustment bolt inside of the tire so that the latch of the parking brake lock lever is positioned at arrow A (fourth notch from the bottom).



Adjustment of Parking Brake_001

1	Brake pedal
2	Latch
3	Notch

Adjustment of Brake

⚠ Danger

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

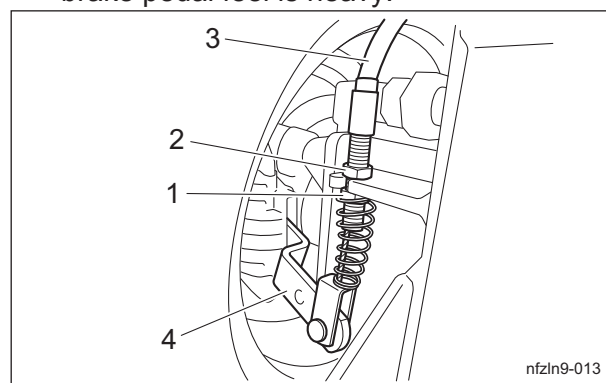
If the brake wire is cracked or damaged, replace it with a new one immediately.

If the brake is not sufficiently effective, adjust the brake wire.

Important

Adjust to reduce the play in the brake lever as much as possible so that the brake does not drag when the lever is released.

1. Adjust the brake by tightening the brake wire adjustment bolt.
 - If there is too much play in the brake lever, the braking power is reduced and the brake pedal feel is light.
 - If there is too little play in the brake lever, the braking power is increased and the brake pedal feel is heavy.



Adjustment of Brake_001

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

2. Start the engine and drive to check the following.
 - Make sure that heat is not generated in the brake area.
 - Make sure that the left and right brakes are equally effective.

Maintenance

⚠ Danger

It would be extremely dangerous and may result in an unexpected accident if the left and right brakes are not equally effective.

3. If the left and right brakes are not equally effective, make fine adjustments with the adjustment bolt on the brake wire.

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.

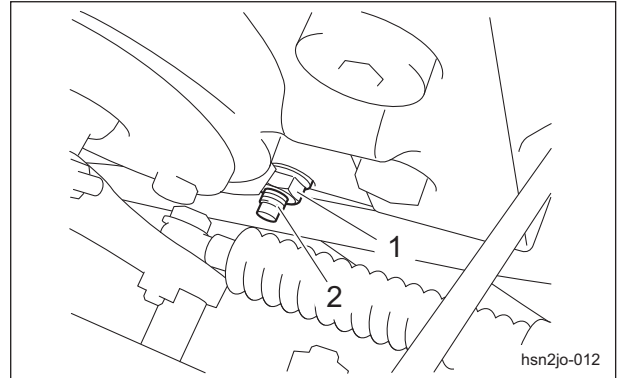
Follow the steps below to make adjustments.

1. Stop the engine.
2. Place the jacks beneath the jack-up points, and then lift the machine off the ground.
"Jack-up Points" (Page 5-6)
3. Make sure that no tires get contact with the jack stand.
4. Start the engine, and rev it up to the maximum rpm.
5. Adjust the neutral position.

[1] Loosen the lock nuts.

[2] Rotate the traction adjusting cam slowly until all wheels stop.

Find the position where all wheels stop and lock the traction adjusting cam with the lock nut.



Adjusting the Neutral Position of the Piston Pump_001

1	Lock nut
2	Traction adjusting cam

Change of Coolant

⚠ Caution

Do not touch the radiator or coolant during engine operation or immediately after the engine has been turned off. Otherwise, you may get burned.

⚠ Caution

Change 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 changing the coolant, be sure to drain it into a container and discard it in accordance with local laws and regulations.

Important

When changing the coolant, be sure to mix clean water (soft water) and antifreeze (long-life coolant), and then pour it into the radiator and reserve tank.

Important

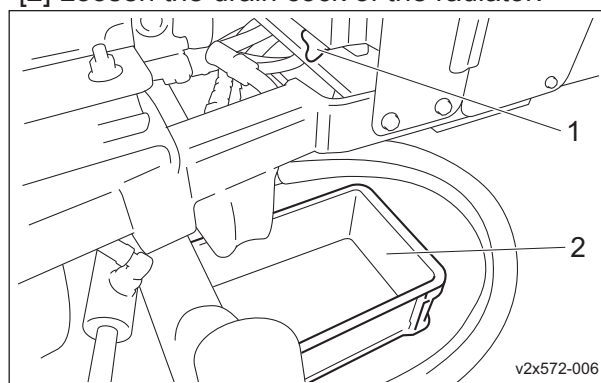
Tightly close the radiator cap. If the cap is loose or incorrectly installed, water may leak and the engine may overheat.

When mixing antifreeze and clean water (soft water), refer to "Relationship between concentration of long-life coolant (LLC) and freezing temperature" below for the mixing ratio.

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 %

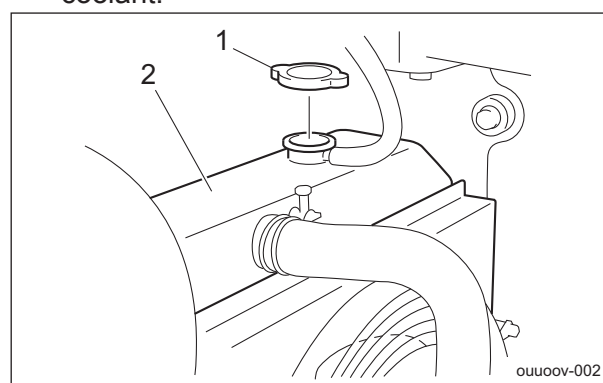
1. Stop the engine, and then allow the radiator to cool.
2. Open the hood.
3. Follow the steps below to drain the coolant.
 - [1] Position a container to drain the coolant into.
 - [2] Loosen the drain cock of the radiator.



Change of Coolant_001

1	Radiator drain cock
2	Container

- [3] Remove the radiator cap and drain the coolant.

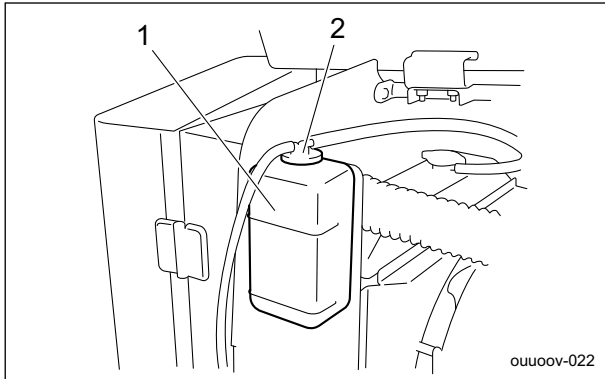


Change of Coolant_002

1	Radiator cap
2	Radiator

Maintenance

[4] Remove the reserve tank.



Change of Coolant_003

1	Reserve tank
2	Reserve tank cap

[5] Open the reserve tank cap, and then drain the coolant.

4. Install the reserve tank.
5. Clean the radiator with clean water (soft water) to remove any debris or rust.
6. Drain all water from the radiator.
7. Follow the steps below to fill with coolant. The coolant quantity, including the reserve tank, is 6.0 dm³ (6.0 L).
 - [1] Install the drain plug.
 - [2] Supply clean water (soft water) and antifreeze into the radiator up to the radiator cap opening.
 - [3] Close the radiator cap.
 - [4] Supply clean water (soft water) and antifreeze into the reserve tank up to the "FULL" mark.
 - [5] Close the reserve tank cap.
8. Start the engine, and then idle for several minutes to bleed air from the system.
9. Stop the engine, and then allow the radiator to cool.
10. Check if the coolant level in the reserve tank is between "FULL" and "LOW", and then supply coolant if necessary.
11. Close the hood.

Change of Hydraulic Oil Filter

Change of Hydraulic Oil Line Filter

⚠ Caution

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

Important

When replacing the hydraulic oil filter, be sure to drain the oil into a container and discard it in accordance with local laws and regulations.

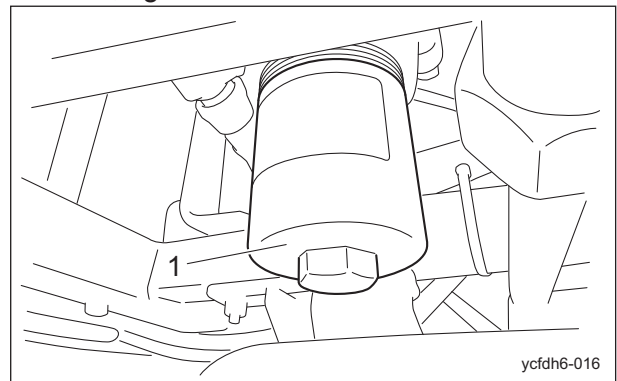
Important

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

Important

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

1. On a level surface, lower the mower units, and then stop the engine.
2. Remove the old filter cartridge.
3. Lightly coat the packing of the new filter cartridge with hydraulic oil, and then install the cartridge.
4. Firmly tighten the filter cartridge by hand so that the packing contacts the mounting surface. Then, tighten it an additional 1/2 turn.



Change of Hydraulic Oil Line Filter_001

1	Cartridge filter
---	------------------

5. Supply hydraulic oil until it reaches the specified level. "Hydraulic Oil Supply" (Page 4-5)
6. Start the engine, and then after the hydraulic oil has warmed up, stop the engine.
7. Check underneath the machine for hydraulic oil leakage.

Change of Hydraulic Suction Filter

Caution

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

Important

When replacing the hydraulic oil filter, be sure to drain the oil into a container and discard it in accordance with local laws and regulations.

Important

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

Important

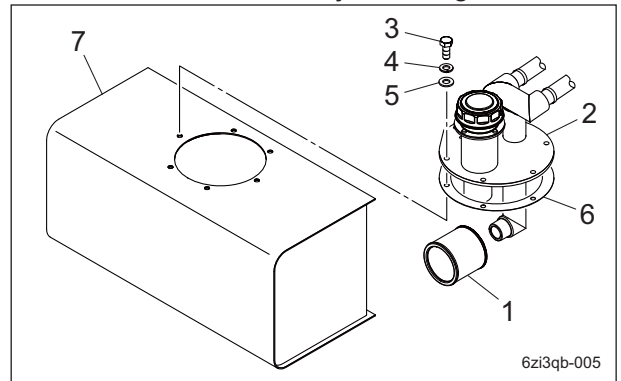
Use Shell Tellus S2M46 (or equivalent) as hydraulic oil.

Important

Replace the intake port packing with a new one.

1. On a level surface, lower the mower units, and then stop the engine.
2. Remove the center cover.
3. Remove bolts, spring washers and washers, and then remove the intake hose joint fitting.
4. Remove the old suction filter and intake port packing.
5. Remove all of the old liquid gasket from the hydraulic tank.
6. Remove all of the old liquid gasket and the intake port packing from the intake hose joint fitting.
7. Wash and clean the intake hose joint fitting.
8. Apply liquid gasket to the new intake port packing and then install it to the intake hose joint fitting.
9. Install the new suction filter to the intake hose joint fitting.

10. Install the intake hose joint fitting.



Change of Hydraulic Suction Filter_001

1	Suction filter
2	Intake hose joint fitting
3	Bolt
4	Spring washer
5	Washer
6	Intake port packing
7	Hydraulic tank

11. Install the center cover.
12. Supply hydraulic oil until it reaches the specified level.
"Hydraulic Oil Supply" (Page 4-5)
13. Start the engine and stop it after hydraulic oil warmed.
14. Check underneath the machine for hydraulic oil leakage.

Maintenance

Change of Hydraulic Oil

⚠ Caution

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

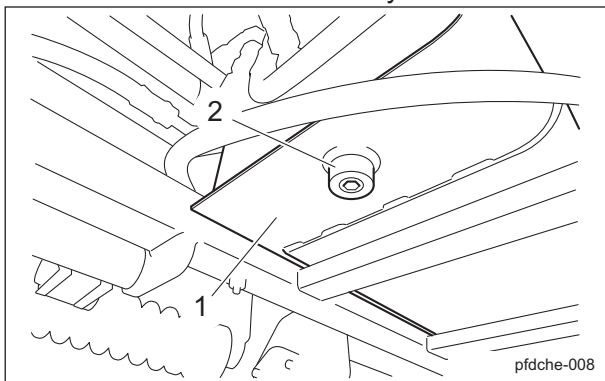
Be careful with hot oil, which could cause burns if it contacts your skin.

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.



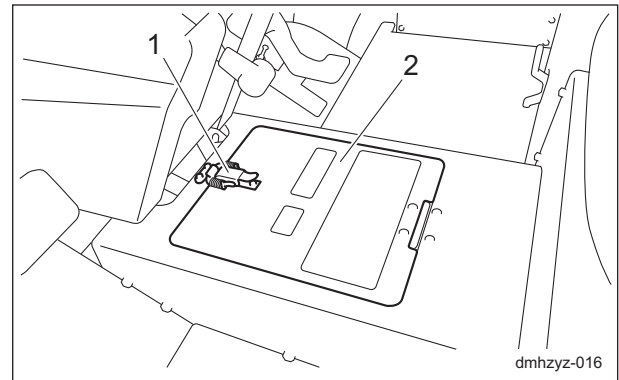
Change of Hydraulic Oil_001

1	Hydraulic tank
2	Drain plug

2. Follow the steps below to pour new oil.

The hydraulic tank capacity is approximately 35.0 dm³ (35.0 L).

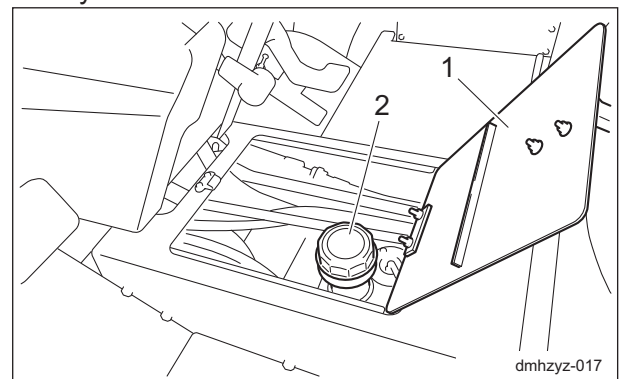
- [1] Release the catch clip and open the center cover.



Change of Hydraulic Oil_002

1	Catch clip
2	Center cover

- [2] Open the tank cap and pour hydraulic oil from the fill port until the oil level reaches the middle of the oil gauge on the hydraulic tank.



Change of Hydraulic Oil_003

1	Center cover
2	Tank cap

- [3] Tighten the tank cap securely.

- [4] Close the center cover and fasten with the catch clip.

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. Lower 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.

Change of Air Cleaner

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.

1. 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.
2. Replace the air cleaner element by following the same steps as for cleaning the air cleaner. "Cleaning of Air Cleaner" (Page 4-6)

Change of Engine Oil

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

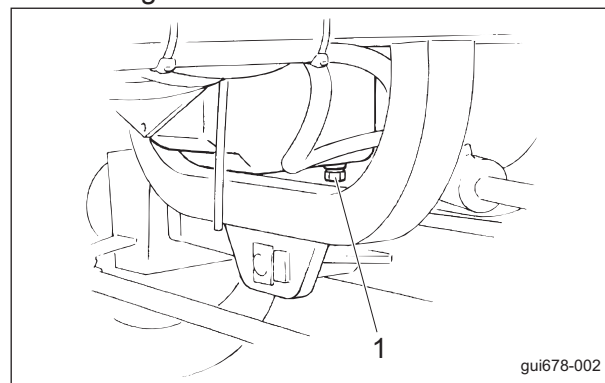
Be sure to use engine oil that is classified as API Service Grade CF or higher, with an SAE Viscosity that is appropriate for the operating environment (ambient temperature).

Important

Securely tighten the oil level gauge and oil filler cap.

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.

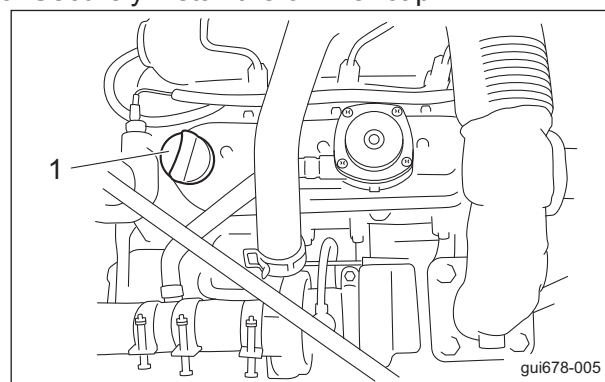
1. Follow the steps below to remove the old engine oil.
 - [1] Start and run the engine to warm up the engine oil.
 - [2] Stop the engine on a level place.
 - [3] Remove the drain plug and then drain the old engine oil into a container.



Change of Engine Oil_001

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

- [4] 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 3.1 dm³ (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.
5. Check underneath the machine for hydraulic oil leakage.

Maintenance

Change of Engine Oil Filter

⚠ Caution

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

Important

When replacing the engine oil filter, be sure to drain the engine oil into a container and discard it in accordance with local laws and regulations.

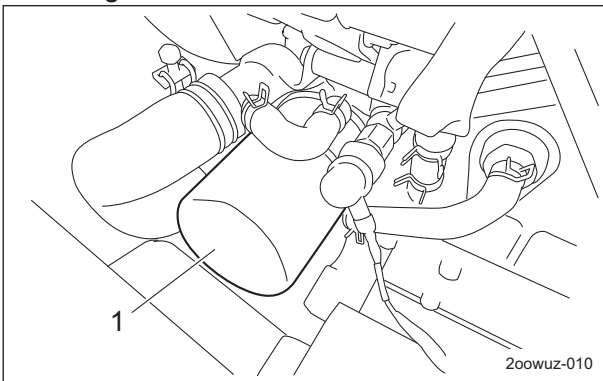
Important

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).

Important

Securely tighten the oil level gauge and oil filler cap.

1. With the filter wrench, remove the old filter cartridge.



Change of Engine Oil Filter_001

1	Filter cartridge
---	------------------

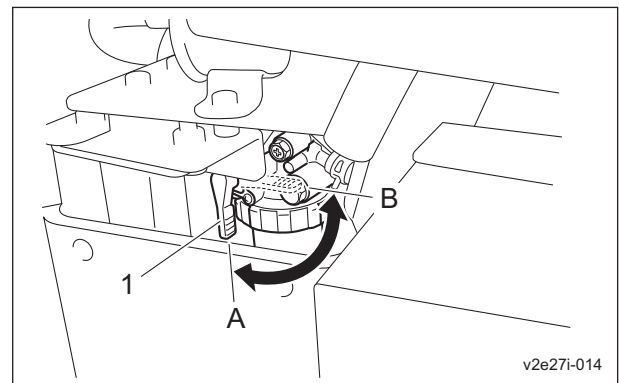
2. Lightly coat the packing of the new filter cartridge with engine oil.
3. Hand-tighten the filter cartridge until the packing contacts the sealing surface, and then firmly hand-tighten (without using a filter wrench).
4. Supply engine oil until it reaches the specified level.
"Supply of Engine Oil" (Page 4-9)
5. Start the engine, and then stop it after 10 to 20 minutes.

6. Make sure that there is no oil leakage at the sealing surface of the filter cartridge.
7. Check the engine oil level.
If it is low, supply engine oil until it reaches the specified level.

Change of Fuel Filter Element

If dust or dirt accumulates in the fuel filter, the fuel flow will become insufficient. Replace the fuel filter at the appropriate times. The fuel filter is located on the left under the hood.

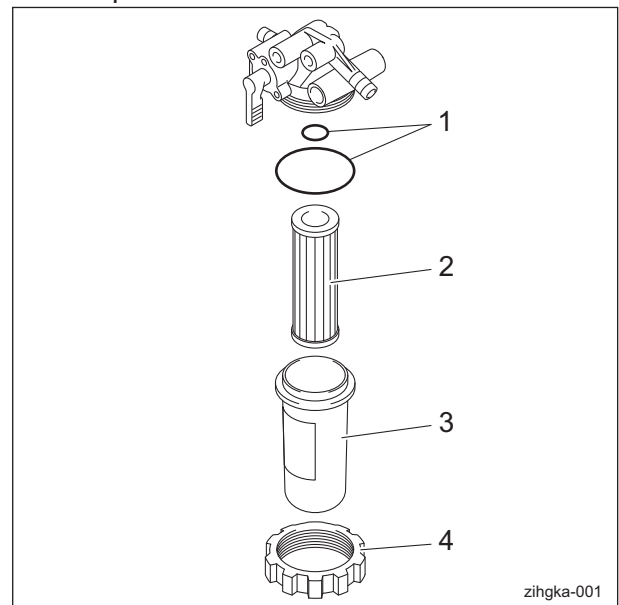
1. Close the fuel filter cock.



Change of Fuel Filter Element_001

1	Fuel filter
A	ON (Open)
B	OFF (Close)

2. Remove the retaining ring and then remove the cup.



Change of Fuel Filter Element_002

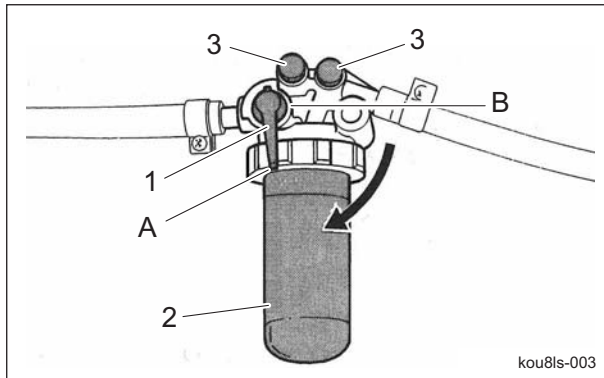
1	O-ring
2	Element
3	Cup
4	Retaining ring

3. Clean the inside of the cup with light oil.

Important

When installed, be careful that it is not contaminated with dirt or dust. If the fuel is contaminated with dirt or dust etc., the fuel injection pump and injection nozzle will become worn.

4. Install a new element and put the parts back together.
5. Fill up the fuel tank with fuel and open the fuel cock.



Change of Fuel Filter Element_003

1	Fuel cock
2	Fuel filter
3	Air-bleeding plug
A	ON (Open)
B	OFF (Close)

6. The key is turned to the "ON" position. The fuel pump is operated after replacement, air bleeding will occur automatically.
7. Turn the key to the "START" position and remove air out of the fuel line.
8. In the case that there are still air bubbles in the fuel from air-bleeding plug even after 15 seconds or more pass after setting the ignition key to "START", pause for 30 seconds or more and then repeat the same steps.

Change of Fuse

Fuse Box

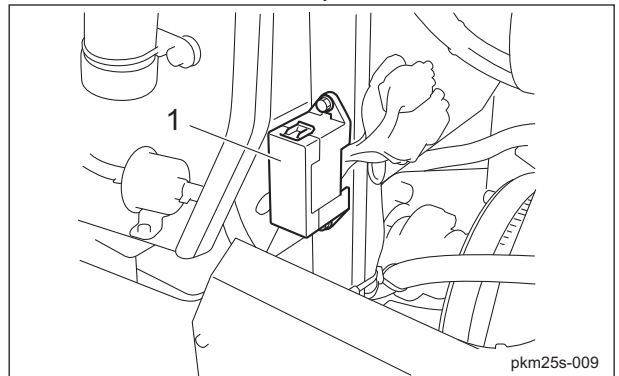
Warning

Before performing maintenance on the electrical system, be sure to disconnect the negative terminal of the battery.

Caution

If a fuse is blown, the electrical circuit may be shorted. Check to identify the cause, such as a bad terminal connection, damaged wiring or terminals, or incorrect wiring.

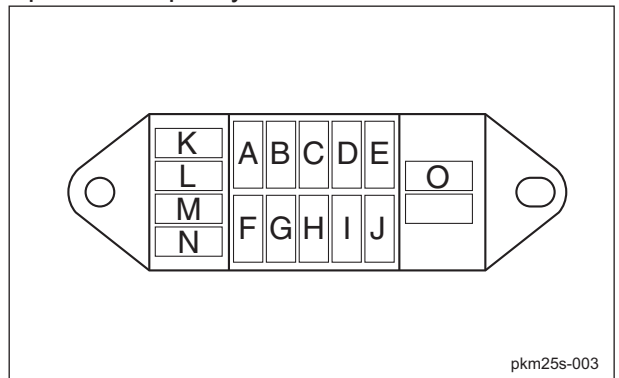
The fuse box includes spare fuses and tools.



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.



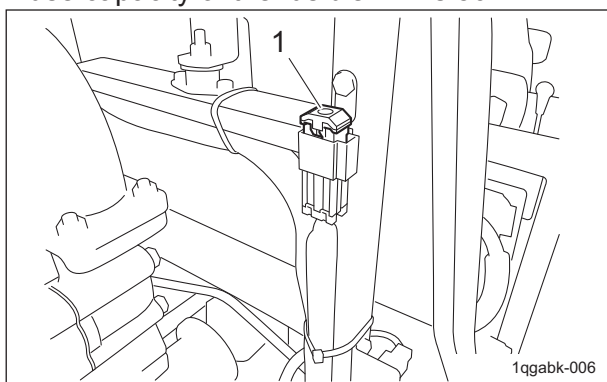
Fuse Box_002

Maintenance

A	5 A	Glow lamp timer
B	5 A	Glow lamp
C	5 A	Fuel pump
D	5 A	Charge lamp, oil pressure lamp (engine oil pressure lamp), water temperature gauge, buzzer, hour meter, fuel gauge
E	15 A	Reel normal rotation solenoid, reel reverse rotation solenoid, slight lift check valve
F	15 A	Light
G	5 A	Relay (starter)
H	5 A	Alternator (IG)
I	5 A	#4/#5 proximity switch relay, #4/#5 proximity switches, stop solenoid(for backlapping), relay box
J	5 A	Starter relay, safety relay, stop solenoid, reel rotation ON relay, lever down relay, normal/reverse rotation relay, unit down proximity switch, pump neutral proximity switch, brake proximity switch
K	5 A	Spare
L	5 A	Spare
M	15 A	Spare
N	15 A	Spare
O		Tool

Fusible Link

Fuse capacity of the fusible link is 50 A.



Fusible Link_001

1	Fusible link
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Long-Term Storage

Before Long-Term Storage

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

EU Declaration of Conformity

Product Identification

Product : Lawnmower
Make : BARONESS
Type : LM2400
Version(s) : Not Applicable
Starting Serial No. : 10200
Measured Sound Power Level : LWA 100.21 dB
Guaranteed Sound Power Level : LWA 103 dB
Manufacturer Name : Kyoisha Co., Ltd.
Address : 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Conforms to the following Directives

2006/42/EC Machinery (MD)
2014/30/EU Electromagnetic compatibility (EMC)
2000/14/EC Noise emissions from outdoor equipment

We has been designed and manufactured using the following specifications

ISO 12100 : 2010 (2006/42/EC)
ISO 5395-1 : 2013 (2006/42/EC)
ISO 5395-3 : 2013 (2006/42/EC)
ISO 14982 : 1998 (2014/30/EU)

Technical Documentation

Keeper's Name : Kyoisha Co., Ltd.
Keeper's Address : 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Compiler of the technical file (2006/42/EC)

Name : Kyoisha U.K.Ltd.
Address : Unit 5 Hatch Industrial Park Grewell Road, Basingstoke Hampshire RG24 7NG, the United Kingdom

Conformity assessment procedures

Internal production control : Module A (2006/42/EC)
EC-type examination : Module B (2014/30/EU)
Internal control of production with assessment of technical documentation and periodical checking (2000/14/EC)

Involved Notified Body (2000/14/EC)

Name : SNCH
Address : 11, Route de Sandweiler 5230 Sandweiler Luxembourg
Certificate / Technical Documentation No. : SNCH*2000/14*2005/88*2409*02/TCLM2400-02

Place : Japan
Date : 27 February 2018

Signature : 
Name : Kimiya Kaneko
Position : Quality Dept. Manager

(fr)

Déclaration de conformité UE

Identification du produit

Produit : Tondeuse à gazon
Fabricant : BARONESS
Type : LM2400
Version(s) : Non applicable
Numéro de série de début : 10200
Niveau de puissance acoustique mesuré : LwA 100.21 dB
Niveau de puissance acoustique garanti : LwA 103 dB
Fabricant Nom : Kyoisha Co., Ltd.
Adresse : 1-26, Miyuki-cho, Toyokawa, préfecture d'Aichi, Japon

Conforme aux directives suivantes :

2006/42/CE Machine (MD)
2014/30/UE Compatibilité électromagnétique (CEM)
2000/14/CE Émissions sonores de l'équipement de plein air

Conception et fabrication en respect des spécifications suivantes :

ISO 12100 : 2010 (2006/42/CE)
ISO 5395-1 : 2013 (2006/42/CE)
ISO 5395-3 : 2013 (2006/42/CE)
ISO 14982 : 1998 (2014/30/UE)

Fiche technique

Marque : Kyoisha Co., Ltd.
Adresse de la marque : 1-26, Miyuki-cho, Toyokawa, préfecture d'Aichi, Japon

Compilateur de la fiche technique (2006/42/CE)

Nom : Kyoisha U.K. Ltd.
Adresse : Unit 5 Hatch Industrial Park Greywell Road, Basingstoke Hampshire RG24 7NG, Royaume-Uni

Procédures d'évaluation de la conformité

Contrôle de production interne : module A (2006/42/CE)
Examen de type CE : module B (2014/30/UE)
Contrôle interne de la production avec évaluation de la fiche technique et vérification périodique (2000/14/CE)

Organisme notifié impliqué (2000/14/CE)

Nom : SNCH
Adresse : 11, Route de Sandweiler 5230 Sandweiler, Luxembourg
N° de certificat/Documentation technique : SNCH*2000/14*2005/88*2409*02/TCLM2400-02

Declaración de conformidad de la UE

Identificación del producto

Producto: Cortacésped
 Marca: BARONESS
 Tipo: LM2400
 Versión: No aplicable
 N.º de serie inicial: 10200
 Nivel de potencia sonora medido: LWA 100.21 dB
 Nivel de potencia sonora garantizado: LWA 103 dB
 Fabricante Nombre: Kyoeshisa Co., Ltd.
 Dirección: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japón

Cumple las siguientes Directivas

2006/42/CE Maquinaria (MD)
 2014/30/UE Compatibilidad electromagnética (EMC)
 2000/14/CE Emisiones sonoras de máquinas de uso al aire libre

Se ha diseñado y fabricado utilizando las siguientes especificaciones

ISO 12100 : 2010 (2006/42/CE)
 ISO 5395-1 : 2013 (2006/42/CE)
 ISO 5395-3 : 2013 (2006/42/CE)
 ISO 14982 : 1998 (2014/30/UE)

Documentación técnica

Nombre del responsable: Kyoeshisa Co., Ltd.
 Dirección del responsable: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japón

Compilador del archivo técnico (2006/42/CE)

Nombre: Kyoeshisa U.K. Ltd.
 Dirección: Unit 5 Hatch Industrial Park Greywell Road, Basingstoke Hampshire RG24 7NG, Reino Unido

Procedimientos de evaluación de conformidad

Control de fabricación interno: Módulo A (2006/42/CE)
 Examen de tipo CE: Módulo B (2014/30/UE)
 Control interno de fabricación con evaluación de documentación técnica y comprobaciones periódicas (2000/14/CE)

Organismo notificado implicado (2000/14/CE)

Nombre: SNCH
 Dirección: 11, Route de Sandweiler 5230 Sandweiler Luxemburgo
 Certificado/Documentación técnica n.º: SNCH*2000/14*2005/88*2409*02/TCLM2400-02

EU-Konformitätserklärung

Produktbeschreibung

Produkt: Rasenmäher
 Marke: BARONESS
 Modell: LM2400
 Version(en): Nicht zutreffend
 Startseriennummer: 10200
 Gemessener Schalleistungspegel: LWA 100.21 dB
 Garantierter Schalleistungspegel: LWA 103 dB
 Hersteller Name: Kyoeshisa Co., Ltd.
 Adresse: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Entspricht den folgenden Richtlinien

2006/42/EG Maschinenrichtlinie
 2014/30/EU Elektromagnetische Verträglichkeit (EMV)
 2000/14/EG Geräuschemission von im Freien betriebenen Geräten

Unter Anwendung der folgenden Bestimmungen entwickelt und hergestellt

ISO 12100 : 2010 (2006/42/EG)
 ISO 5395-1 : 2013 (2006/42/EG)
 ISO 5395-3 : 2013 (2006/42/EG)
 ISO 14982 : 1998 (2014/30/EU)

Technische Dokumentation

Name des Halters: Kyoeshisa Co., Ltd.
 Adresse des Halters: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Technische Unterlagen erstellt von (2006/42/EG)

Name: Kyoeshisa U.K.Ltd.
 Adresse: Unit 5 Hatch Industrial Park Grewell Road, Basingstoke Hampshire RG24 7NG, Großbritannien

Konformitätsbewertungsverfahren

Interne Produktionskontrolle : Modul A (2006/42/EG)
 EG-Baumusterprüfung : Modul B (2014/30/EU)
 Interne Produktionskontrolle mit Bewertung der technischen Unterlagen und regelmäßiger Überprüfung (2000/14/EG)

Beteiligte benannte Stelle (2000/14/EG)

Name: SNCH
 Adresse : 11, Route de Sandweiler 5230 Sandweiler Luxemburg
 Bescheinigung/Technische Dokumentation Nr. : SNCH*2000/14*2005/88*2409*02/TCLM2400-02

EU-försäkran om överensstämmelse

Produktidentifikation

Produkt :	Gräsklippare
Märke:	BARONESS
Typ:	LM2400
Version(er):	Ej aktuellt
Serienummer startar på:	10200
Uppmätt ljudeffektivå:	LWA 100.21 dB
Garanterad ljudeffektivå:	LWA 103 dB
Tillverkare	Namn: Kyoisha Co., Ltd.
	Adress: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Uppfyller följande direktiv

2006/42/EG	Maskindirektivet
2014/30/EU	Elektromagnetisk kompatibilitet (EMC)
2000/14/EG	Bulleremission från utomhusutrustning

Följande kravspecifikationer har följts vid konstruktion och tillverkning

ISO 12100 : 2010 (2006/42/EG)
 ISO 5395-1 : 2013 (2006/42/EG)
 ISO 5395-3 : 2013 (2006/42/EG)
 ISO 14982 : 1998 (2014/30/EU)

Teknisk dokumentation

Innehavarens namn:	Kyoisha Co., Ltd.
Innehavarens adress:	1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Den tekniska filen(2006/42/EG) har tagits fram av

Namn:	Kyoisha U.K.Ltd.
Adress:	Unit 5 Hatch Industrial Park Grewell Road, Basingstoke Hampshire RG24 7NG, Storbritannien

Förfarande för bedömning av överensstämmelse

Intern produktionskontroll: Modul A (2006/42/EG)
 EG-typprovning: Modul B (2014/30/EU)
 Intern kontroll av produktion med fastställande av teknisk dokumentation och periodiska kontroller (2000/14/EG)

Anmält organ (2000/14/EG)

Namn:	SNCH
Adress:	11, Route de Sandweiler 5230 Sandweiler Luxembourg
Certifikat/Teknisk dokumentation nummer:	SNCH*2000/14*2005/88*2409*02/TCLM2400-02

BARONESS[®]
Quality on Demand

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