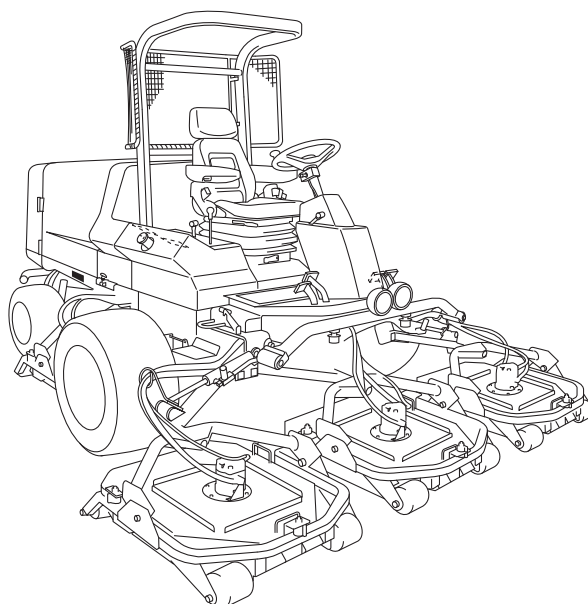


GM2800B

5-Unit Rotary Mower

Owner's Operating Manual



Serial No. GM2800B : 12370-

"Required reading"

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

BARONESS[®]
Quality on Demand

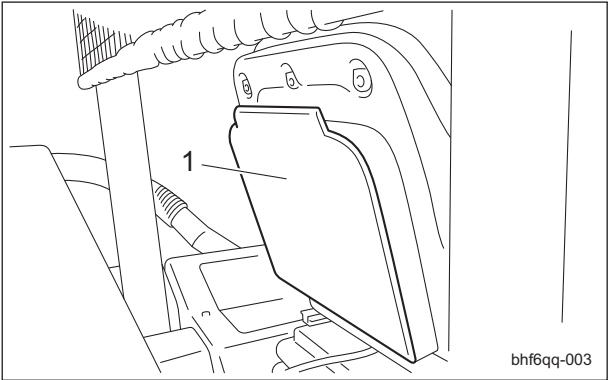
Ver.1.4

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 located in the rear
of the seat.



Keeping the Owner's Operating Manual_001

1	Box
---	-----

Read this manual carefully to ensure that you thoroughly understand how to properly operate and maintain 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 Kyoeisha.

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.

Kyoeisha Co., Ltd.

Warning Symbols

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

 696cq5-001	Warning symbol
This symbol indicates the articles regarding “Danger,” “Warning,” or “Caution.” Those articles describe important safety precautions and so read them carefully to understand completely before operating the machine. Failure to adequately follow these safety precautions may cause an accident.	
 Danger This symbol indicates that serious injury or death will occur if the warning is ignored.  Warning This symbol indicates that serious injury or death may occur if the warning is ignored.  Caution This symbol indicates that injury or damage to property may occur if the warning is ignored. Important This symbol indicates precautions on the mechanism of the machine.	

Introduction

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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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. Before using, always visually inspect to see that the blades, blade bolts, and cutting assembly are not worn or damaged.
Replace worn or damaged blades and bolts in sets to preserve balance.
- 10. On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
- [2] Engage clutch slowly, always keep machine in gear, especially when traveling downhill.
- [3] Machine speeds should be kept low on slopes and during tight turns.
- [4] Stay alert for humps and hollows and other hidden hazards.
- [5] Never operate across the face of the slope, unless the machine is designed for this purpose.
- [6] Never drive the machine on a slope with an angle of gradient that is greater than that specified or in a place where there is a danger of the machine slipping.
- 5. Use extra care while operating machine with a grass catcher or other attachments. They can affect the stability of the machine.
- 6. Never raise deck with the blades running.
- 7. Never operate the machine with damaged guards, shields, or without safety protective devices in place.
Be sure all interlocks are attached, adjusted and functioning properly.
- 8. Do not change the engine governor settings or overspeed the engine.
Operating the engine at excessive speed may increase the hazard of personal injury.
- 9. Do the following before leaving the operator's position.

Operation

- 1. Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- 2. Only operate in good light, keeping away from holes and hidden hazards.
- 3. Before attempting to start the engine, disengage all attachments, shift into neutral, and engage the parking brake.
Only start engine from the operator's position.
Use seat belts if provided.
- 4. Remember there is no such thing as a safe slope.
Travel on grass slopes requires particular care.
To guard against overturning:
 - [1] Do not stop or start suddenly when going up or downhill.
 - [2] Engage clutch slowly, always keep machine in gear, especially when traveling downhill.
 - [3] Machine speeds should be kept low on slopes and during tight turns.
 - [4] Stay alert for humps and hollows and other hidden hazards.
 - [5] Never operate across the face of the slope, unless the machine is designed for this purpose.
 - [6] Never drive the machine on a slope with an angle of gradient that is greater than that specified or in a place where there is a danger of the machine slipping.
- 5. Use extra care while operating machine with a grass catcher or other attachments. They can affect the stability of the machine.
- 6. Never raise deck with the blades running.
- 7. Never operate the machine with damaged guards, shields, or without safety protective devices in place.
Be sure all interlocks are attached, adjusted and functioning properly.
- 8. Do not change the engine governor settings or overspeed the engine.
Operating the engine at excessive speed may increase the hazard of personal injury.
- 9. 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.
- 10. 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.

Safety

11. Keep hands and feet away from the cutting units and the rotating parts.
12. Do not mow in reverse unless absolutely necessary.
Always look down and behind before and while backing.
13. Do not carry passengers.
14. Never operate while people, especially children, or pets are nearby.
15. Slow down and use caution when making turns and crossing roads and sidewalks.
16. Stop the blades rotating before crossing surfaces other than grass.
17. Disengage drive to attachments when transporting or not in use.
18. When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the machine while in operation.
19. Do not operate the machine under the influence of alcohol or drugs.
20. Take care when loading or unloading the machine into a trailer or a truck.
Load or unload the machine in a flat and safe place.
Before loading or unloading, set the parking brake on the truck or trailer, stop the engine, and chock the wheels.
When transporting the machine on a truck or a trailer, set the parking brake, stop the engine, and fasten the machine to the truck with a rope or other suitable restraining device that has sufficient strength.
When using a running board, select one with sufficient strength, length, and width and that will not cause the machine to slip.
21. Close the fuel valve before transporting the machine.
22. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
23. Do not take your eyes off the road ahead.
Do not operate the machine with no hands.
24. 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.
25. Do not operate the machine when there is the risk of lightning.

Maintenance and storage

1. Disengage drives on level ground, lower the attachments, set parking brake, stop engine and remove key from ignition. Wait for all movement to stop before adjusting, cleaning or repairing.
2. When machine is to be parked, stored, or left unattended, lower the cutting units unless a positive mechanical lock is provided.
3. To reduce the fire hazard, keep the engine, silencer/muffler, battery compartment fuel storage area, cutting units 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, result.

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.
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 blades.
[1] Wrap the blades or wear gloves, and use caution when servicing them.
[2] Only replace blades.
[3] Never straighten or weld them.
20. On multi-bladed machines, take care as rotating one blade can cause other blades 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.

Safety

Recycle and Waste Disposal Page 2-2

About RecyclePage 2-2

About the Waste disposal Page 2-2

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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SignsPage 3-6

Positions of Safety Decals and
Instruction Decals Page 3-6

Description of Safety Decals and
Instruction Decals Page 3-7

Product Overview

Specifications

Specifications

Model			GM2810	
Dimensions	Total length		145.67 in	370 cm
	Total width	During operation	118.11 in	300 cm
		During transport	90.55 in	230 cm
	Total height	Roof	90.55 in	230 cm
		Steering wheel	64.96 in	165 cm
Weight	Machine (empty fuel tank)	with ROPS, Roof	4,354.06 lb	1,975 kg
Minimum turning radius			125.98 in	320 cm
Engine	Model		Kubota V2403-M-T	
	Type		Vertical water-cooled 4-cycle diesel engine with turbocharger	
	Total displacement		148.51 cu.in.	2,434 cm³ (2.434 L)
	Maximum output		41.7 kW (56.7 PS) /2,600 rpm	
Fuel tank capacity			Diesel 13.47 U.S.gals	Diesel 51.0 dm³ (51.0 L)
Fuel consumption			200 g/PS · h (rated output)	272 g/kW · h (rated output)
Engine oil capacity			2.56 U.S.gals	9.7 dm³ (9.7 L)
Operating width (Mowing width)			110.24 in	280 cm
Operating height (Mowing height)			0.787 - 3.602 in	20.0 - 91.5 mm
Blades			5	
Drive	Traveling		HST (2WD/4WD selectable)	
	Mowing		Hydraulic	
Speed (HST)	Forward		0 - 9.94 mph	0 - 16.0 km/h
	Reverse		0 - 3.73 mph	0 - 6.0 km/h
Speed (Mechanical)			-	
Efficiency			4.98 acres/hour (5.59 mph x mowing width x 0.8)	20,160 m²/h (9.0 km/h x mowing width x 0.8)
Maximum inclination for operation			15 degrees	
Tire size	Front wheel		29 x 14.00 - 15	
	Rear wheel		20 x 12.00 - 10	
Tire pneumatic pressure	Front wheel		21.75 psi	150 kPa (1.5 kgf/cm²)
	Rear wheel		20.30 psi	140 kPa (1.4 kgf/cm²)
Battery			105D31R	

* The factory default maximum engine rpm is 2,400 rpm.

Product Overview

Sound pressure level

Sound pressure level

This machine was confirmed to have a continuous A-weighted sound pressure level of 89dB by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.

Sound power level

Sound power level

This machine was confirmed to have a sound power level of 105dB by measuring identical machines in accordance with the procedure specified in directive 2000/14/EC.

Vibration level

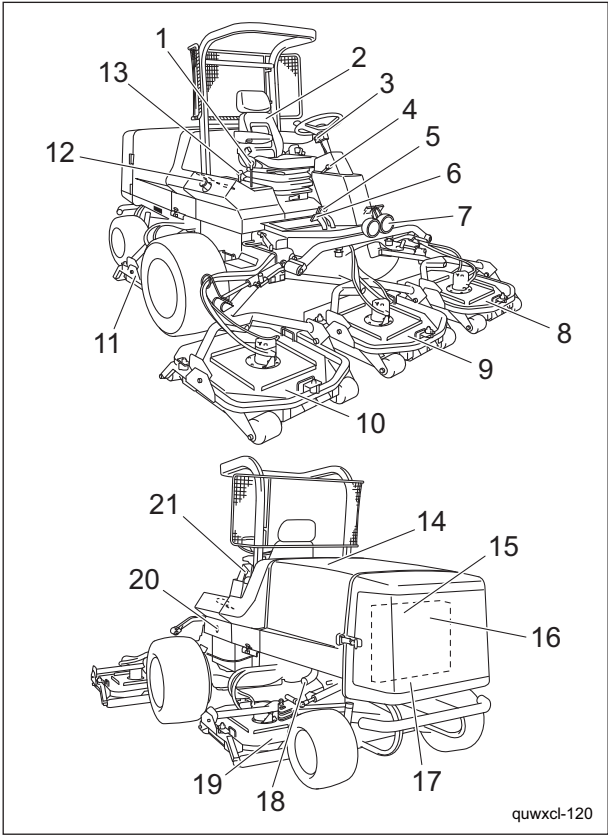
Hand-arm vibration

This machine was confirmed not to exceed a vibration level of 2.5 m/s² to hands and arms by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.

Whole body vibration

This machine was confirmed to transmit a vibration level of 1.27 m/s² 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

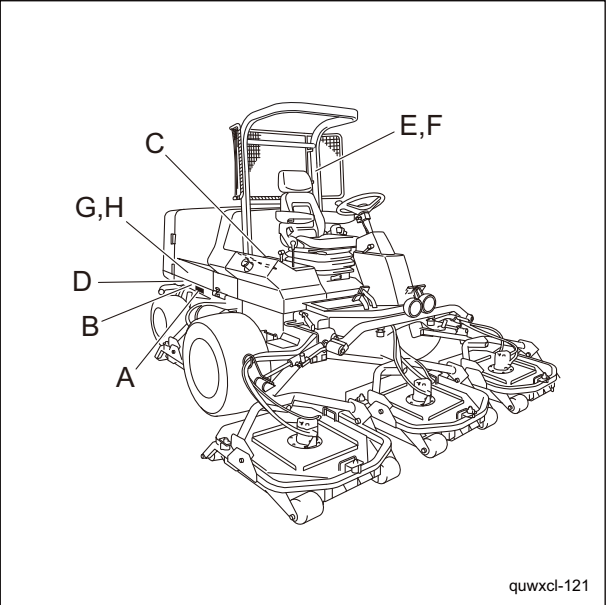


Names of Each Section_001

1	Mower unit up/down lever
2	Seat
3	Diff-lock switch
4	Tilt lever
5	Forward pedal
6	Reverse pedal
7	Lights
8	Mower unit #5
9	Mower unit #1
10	Mower unit #4
11	Mower unit #2
12	Fuel filler
13	Throttle lever
14	Hood
15	Radiator
16	Oil cooler
17	Radiator cover
18	Muffler
19	Mower unit #3
20	Oil gauge
21	Parking brake lever

Regulation Decals

Positions of Regulation Decals



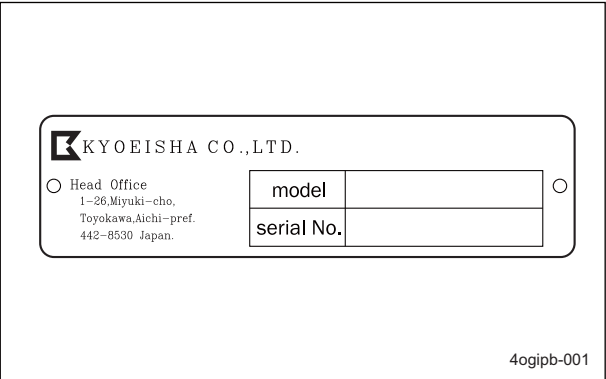
Positions of Regulation Decals_001

A	Serial number plate
B	Specification decal
C	Noise emission decal
D	Year of manufacture decal
E	ROPS compliance decal
F	ROPS caution decal
G	Battery capacity decal
H	Recycle Decal

Description of Regulation Decals

Serial number plate

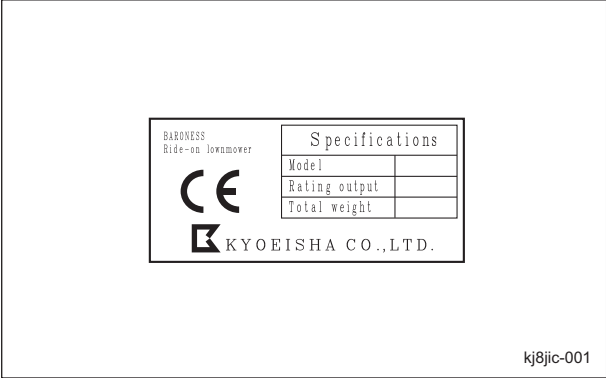
The serial number plate indicates the model and serial number of the machine.



Serial number plate_001

Specification decal

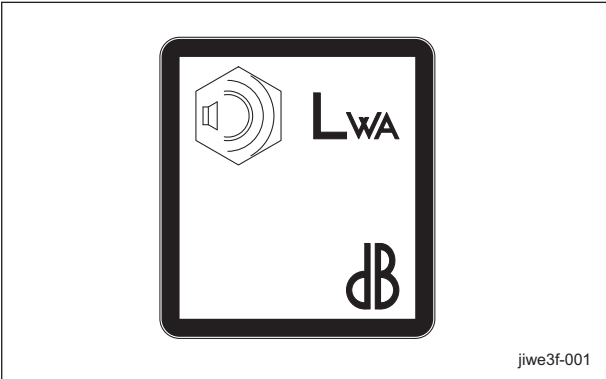
(For Europe)
The Specification decal indicates the CE marking, model , and weight, etc.



Specification decal_001

Noise emission decal

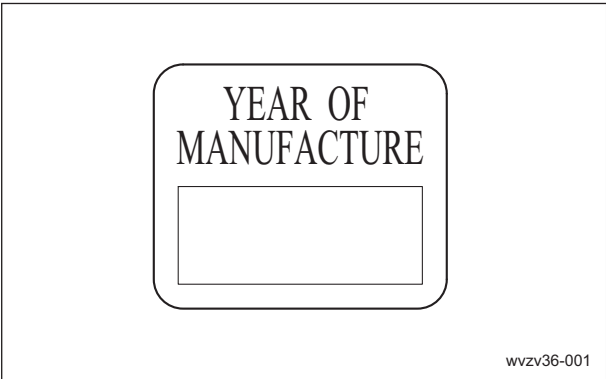
(For Europe)
The noise emission decal indicates the sound power level determined by measuring identical machines in accordance with the procedure specified in the EC directives.



Noise emission decal_001

Year of manufacture decal

(For Europe)
The year of manufacture decal indicates the year when this machine was manufactured.

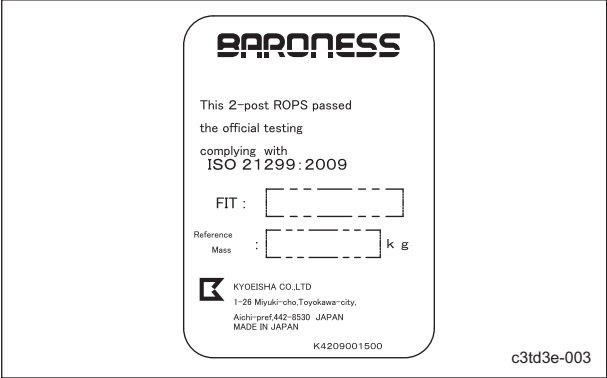


Year of manufacture decal_001

Product Overview

ROPS compliance decal

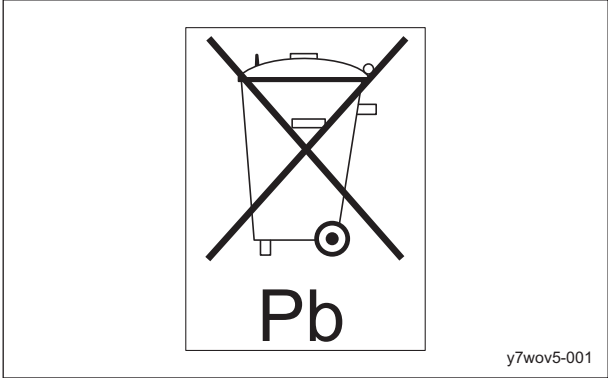
The ROPS compliance decal indicates the manufacturer, model, etc., in accordance with International Standard ISO 21299:2009.



ROPS compliance decal_001

Recycle decal

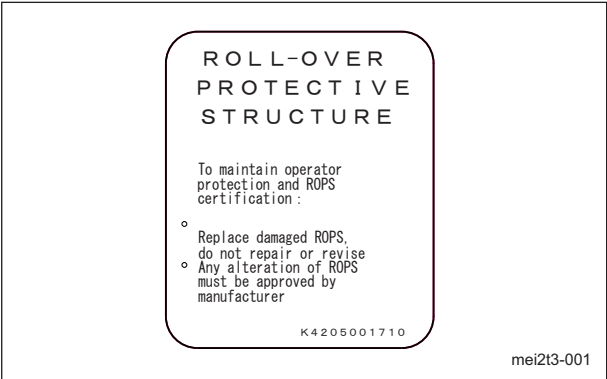
Recycle Decal illustrates Recycle Mark in accordance with local regulation. (For Europe)



Recycle decal_001

ROPS caution decal

ROPS caution decal describes the caution messages compliant with ISO 21299:2009. Replace damaged ROPS. Do not repair or revise. (Only if equipped with ROPS)



ROPS caution decal_001

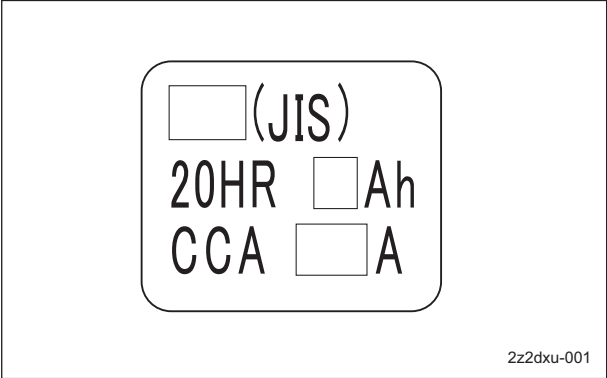
(For USA)



Recycle decal_002

Battery capacity decal

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



Battery capacity decal_001

Safety Signs and Instruction Signs

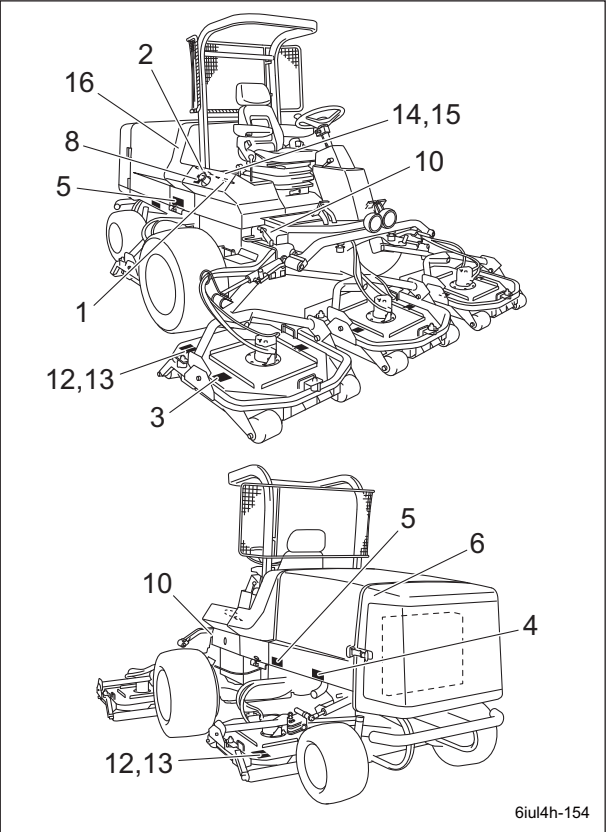
About Safety Signs and Instruction Signs

Important

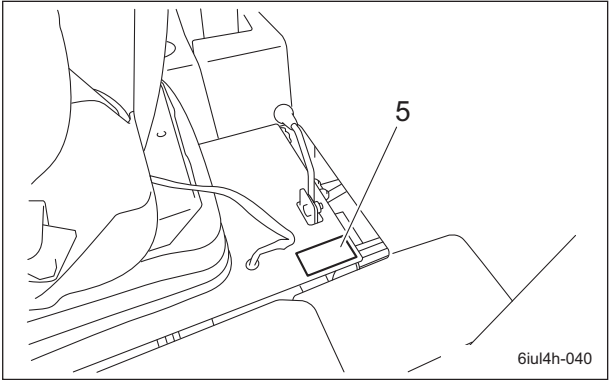
Safety decals and instruction decals are attached to this product. Make sure that they are preserved in their entirety. If they are damaged, become dirty, or peel off, replace them with new ones.

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

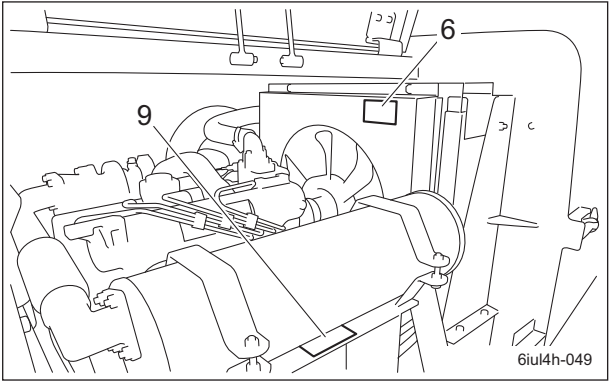
Positions of Safety Decals and Instruction Decals



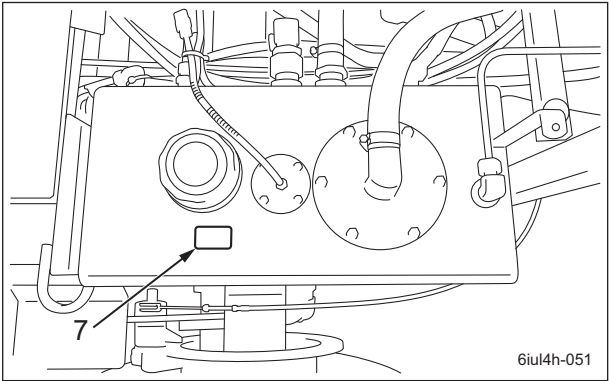
Positions of Safety Decals and Instruction Decals_001



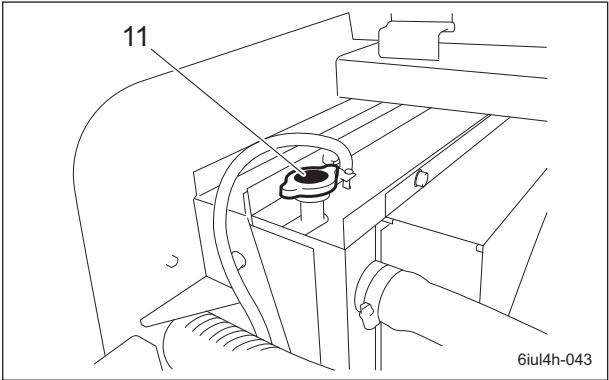
Positions of Safety Decals and Instruction Decals_002



Positions of Safety Decals and Instruction Decals_003



Positions of Safety Decals and Instruction Decals_004



Positions of Safety Decals and Instruction Decals_005

1	Operation decal
2	Engine start/stop decal
3	Caution to mutilation decal
4	Caution to hot parts decal
5	Caution to injury decal
6	Caution to rotating object decal
7	Hydraulic oil icon
8	Diesel fuel icon
9	Fire prohibited decal
10	Caution for mower lock decal
11	Caution for spouting coolant decal
12	Caution to flying object decal
13	Caution for hand or leg injury decal
14	Caution exhaust gas decal
15	Caution to noise decal
16	Maintenance decal

Description of Safety Decals and Instruction Decals

Operation decal

GM2800-0941Z0

Decal, operation

1.



Read the Owner's Operating Manual.

2.



Apply the parking brake, stop the engine, remove the ignition key, and then leave the machine.

3.



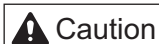
Flying objects - Be sure that people around the machine keep a safe distance away.

4.



May cut your hand or leg - Keep hands and feet away from moving parts.

5.



Rollover - Do not work on slopes of 15 degrees or more.

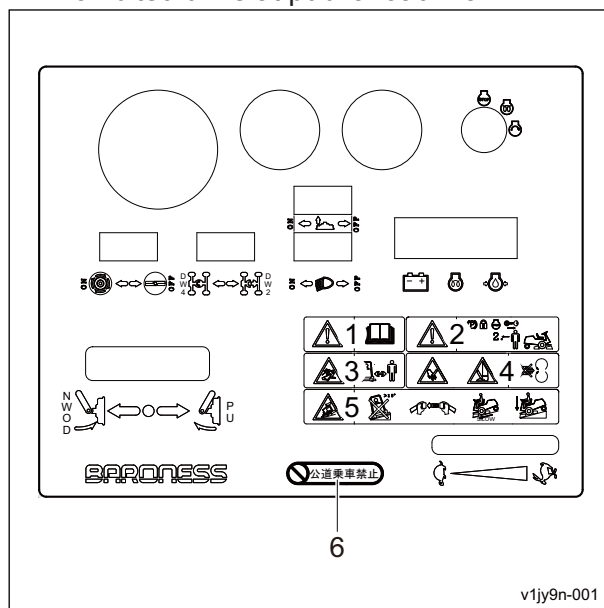
When you descend a slope, lower the mower units and then drive at low speed.

For ROPS equipped machine, fasten your seatbelt.

6.

(for Japan)

Prohibited drive at public road mark



Operation decal_001

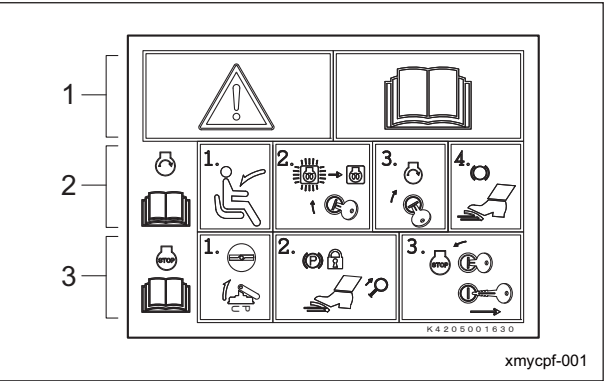
Engine start/stop decal

K4205001630
Decal, start/stop engine

1.

 **Warning**
Read the Owner's Operating Manual.

2. Procedure to Start Engine
Read the Owner's Operating Manual.
- [1] Sit on the seat.
 - [2] Turn the key to the "GLOW" position, and then wait for the thermo-start lamp to turn off.
 - [3] Turn the key to the "START" position.
 - [4] Depress the brake pedal to release the parking brake.
3. Procedure to Stop Engine
Read the Owner's Operating Manual.
- [1] Set the knife rotation switch to the "OFF" position, and then raise the mower units.
 - [2] Apply the parking brake.
 - [3] Turn the key to the "STOP" position, and then remove it.

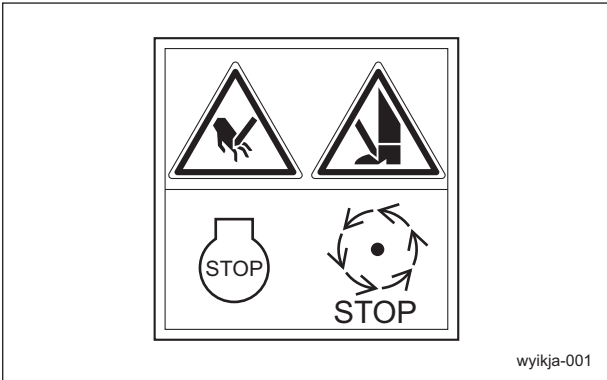


Engine start/stop decal_001

Caution to mutilation decal

K4205001600
DECAL, CAUTION TO MUTILATION

 **Warning**
May cut your hand or leg - Stop the cutter rotation and engine. Otherwise you may get injured.



Caution to mutilation decal_001

Caution to hot parts decal

K4205001540
Decal for caution to hot parts

 **Caution**
High temperature - Do not touch. Otherwise, you will get burned.

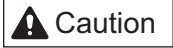


Caution to hot parts decal_001

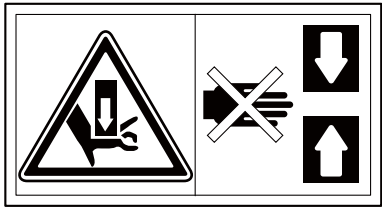
Product Overview

Caution to injury decal

K4205001580
Decal, caution to injure



May pinch - There is a risk of being pinched.

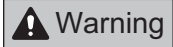


tgp289-001

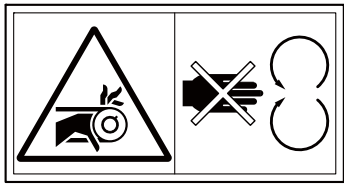
Caution to injury decal_001

Caution to rotating object decal

K4205001530
Decal, caution to rotating object



Watch for rotating parts - Keep your hands away from the belts while the engine is running.

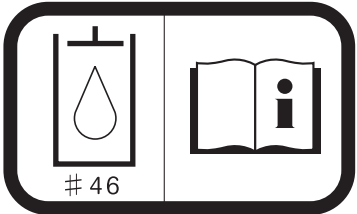


qwsqzx-001

Caution to rotating object decal_001

Hydraulic oil icon

K4209000980
Hydraulic oil icon
Read the Owner's Operating Manual.

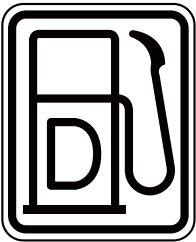


i77xz6-001

Hydraulic oil icon_001

Diesel fuel icon

K4209001000
Diesel fuel icon
Use diesel fuel.



xmitt2-001

Diesel fuel icon_001

Fire prohibited decal

K4205001940
Decal, fire prohibited



Warning

Keep away from fire.



Fire prohibited decal_001

Caution for mower lock decal

K4205001900
Decal, caution for mower lock
Caution for mower lock



Caution for mower lock decal_001

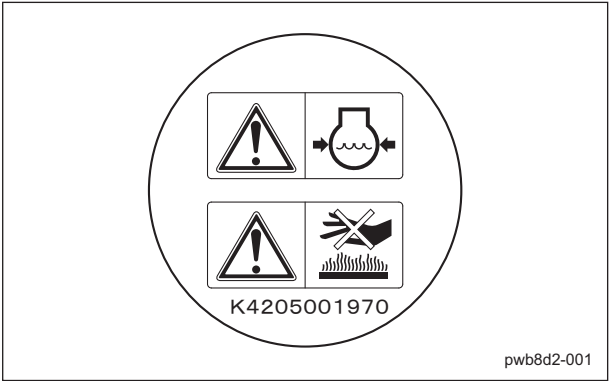
Caution for spouting coolant decal

K4205001970
Decal, caution for spouting coolant



Caution

Caution for spouting coolant - Do not open while hot.



Caution for spouting coolant decal_001

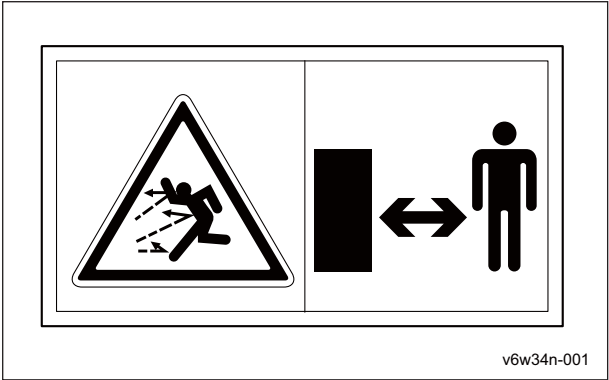
Caution to flying object decal

K4205001650
Decal, caution to flying object



Caution

Caution to flying object - Be sure that people around the machine keep a safe distance away.

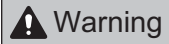


Caution to flying object decal_001

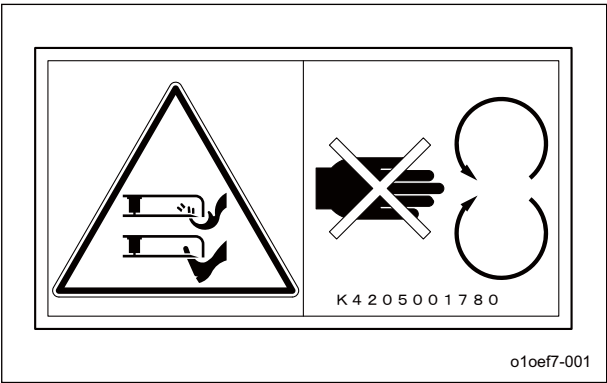
Product Overview

Caution for hand or leg injury decal

K4205001780
Decal, caution for hand or leg injury



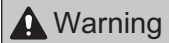
May cut your hand or leg - When the blades are rotating, keep away from the machine.



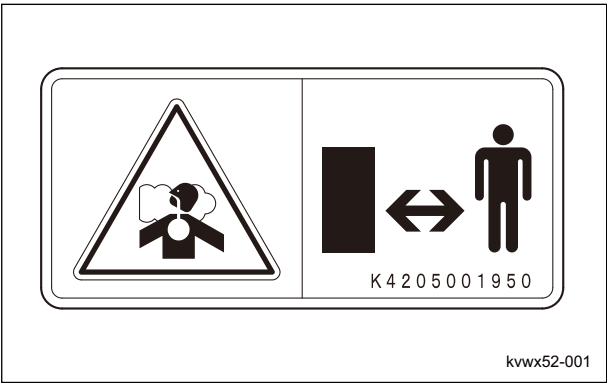
Caution for hand or leg injury decal_001

Caution exhaust gas decal

K4205001950
Decal, caution exhaust gas



Caution for exhaust gas



Caution exhaust gas decal_001

Caution to noise decal

K4205002090
Decal, caution to noise

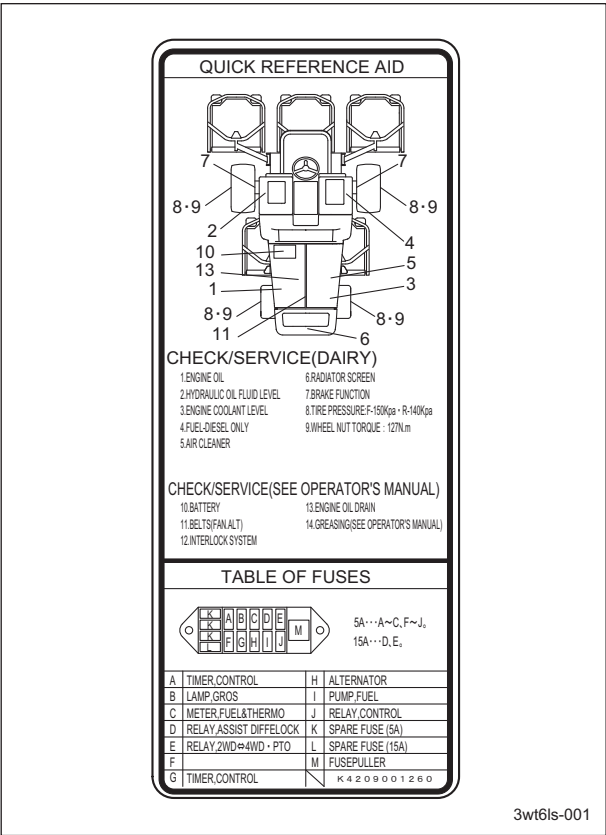


bwu9po-001

Caution to noise decal_001

Maintenance decal

K4209001260
Maintenance decal
The maintenance decal indicates the necessary inspection and maintenance items for this machine.



Maintenance decal_001

Product Overview

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Radiator	Page 4-3	Mower Unit Up/Down Lever	Page 4-27
Coolant	Page 4-3	Throttle Lever	Page 4-27
Oil cooler	Page 4-5	Diff-Lock Switch	Page 4-28
Hydraulic Oil	Page 4-5	Traveling Pedal	Page 4-28
Air Cleaner	Page 4-6	Brake Pedal	Page 4-29
Battery	Page 4-7	Parking Brake Lever	Page 4-30
Tire	Page 4-8	Hood	Page 4-30
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Principal tightening torques	Page 4-14	Cutting Work	Page 4-35
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Adjustment of Seat	Page 4-16	Transporting Procedure	Page 4-36
Adjustment of Cutting Height	Page 4-17		
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Warning Mechanisms	Page 4-21		
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Cautions for when You Leave the Machine	Page 4-21		
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2WD/4WD Selector Switch	Page 4-26		

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.

Rotary Knife

Inspection of Rotary Knife

Caution

The rotary knife is an edged tool. Handle them carefully, since they could cut your hands or legs.

Caution

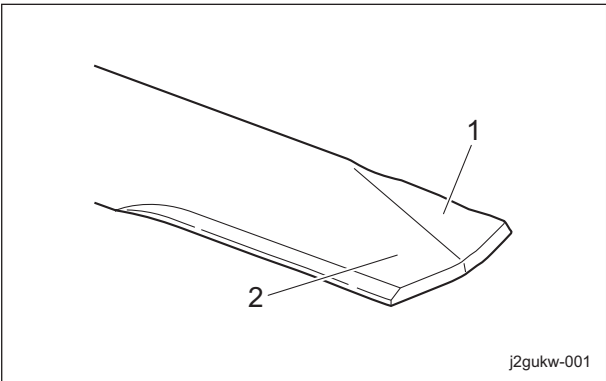
When touching edged tools, wear gloves, since they could cut your hands.

Due to frequent use, objects crushed during mowing, or damage during transportation and so forth, the rotary knife may vibrate from imbalance or become dull. Inspect the rotary knife, and if necessary, sharpen, balance or replace it.

Important

Frequently inspect the rotary knife since it may become dull quickly if the machine is operated in an environment of dry soil or sand.

- 1. Make sure that the rotary knife is not bent.
- 2. Make sure that the rotary knife is not chipped.
- 3. Check to see how much the rotary knife is worn.
- 4. Make sure that the rotary knife is not worn asymmetrically.
- 5. Make sure that the mounting bolt for the rotary knife is not loose.
- 6. Make sure that there are no cracks or tears between the sail and flat part of the rotary knife.



Inspection of Rotary Knife_001

1	Sail
2	Flat part

Radiator Cover

Inspection of Radiator Cover

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

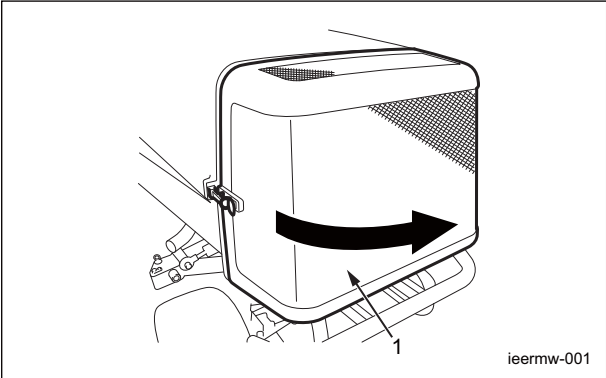
Cleaning of Radiator Cover

Important

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

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

- 1. Open the radiator cover.



Cleaning of Radiator Cover_001

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

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

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

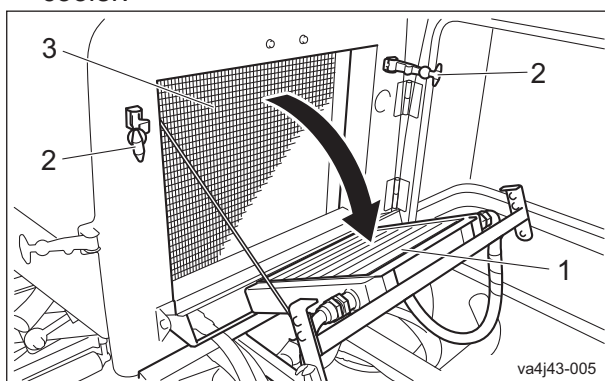
An unclean radiator may cause overheating or damage to the engine. It may also cause malfunction of the hydraulic system.

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. Unlock the rubber catches on the left and right of the oil cooler, and then tilt the oil cooler.



Cleaning of Radiator_001

1	Oil cooler
2	Rubber catch
3	Radiator

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

Coolant

Inspection of Coolant

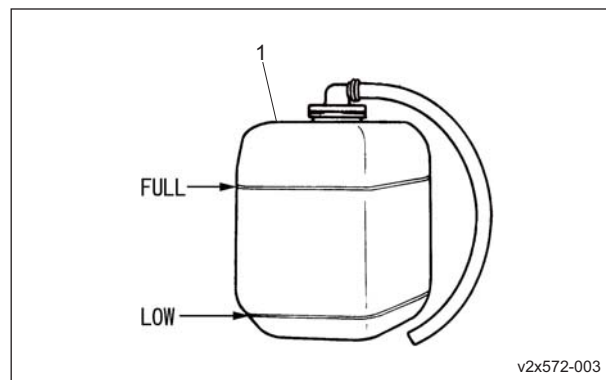
Caution

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 during engine operation or right after the engine has been turned off.
Due to high temperatures, doing so could cause burns.
After the radiator has well cooled down, open the radiator cap.

 Caution

Supply coolant after the engine has well cooled down.

 Caution

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

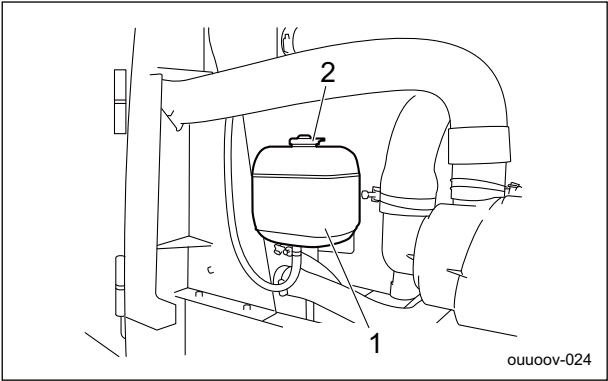
Important

When you supply coolant, be sure to use clean water, such as tap water.

Important

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

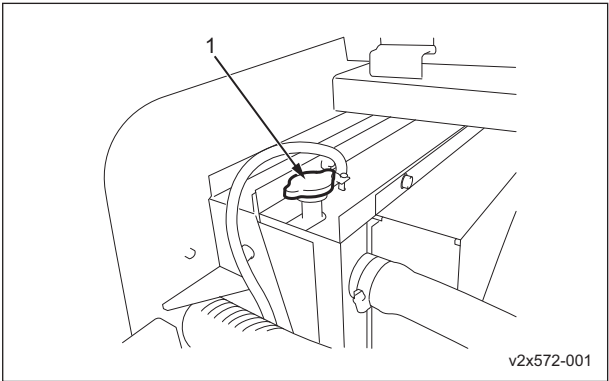
1. If the coolant level in the reserve tank is lower than the "LOW" mark, open the reserve tank cap and fill the tank with clean water up to the "FULL" mark.



Coolant Supply_001

1	Reserve tank
2	Reserve tank cap

2. If no coolant is in the reserve tank, follow the steps below to fill the tank with clean water.
- [1] Open the radiator cap, and then supply clean water up to the opening.
- [2] Open the reserve tank cap, and then supply clean water up to the "FULL" mark.



Coolant Supply_002

1	Radiator cap
---	--------------

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

Important

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

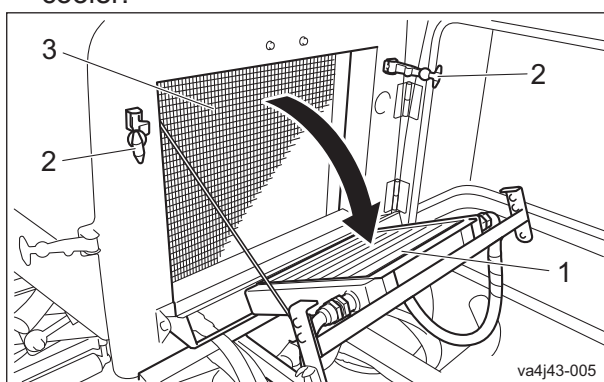
Important

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. Unlock the rubber catches on the left and right of the oil cooler, and then tilt the oil cooler.



Cleaning of Oil Cooler_001

1	Oil cooler
2	Rubber catch
3	Radiator

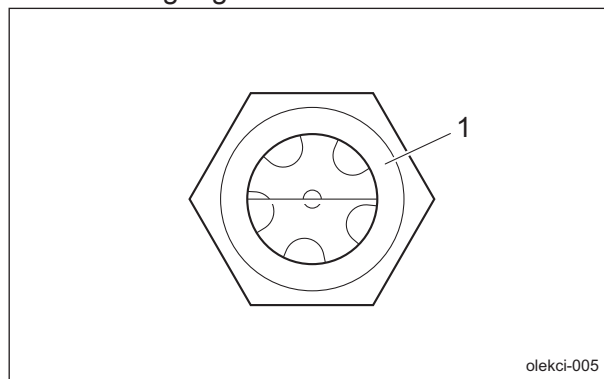
3. Carefully clean the front and back of the oil cooler with water or compressed air.

Hydraulic Oil

Inspection of Hydraulic Oil

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

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



olekci-005

Inspection of Hydraulic Oil_001

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

3. Check underneath the machine for oil leakage.

Hydraulic Oil Supply

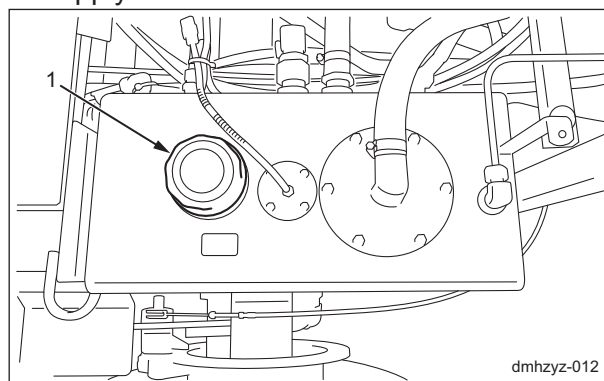
Important

Do not mix different types of oil.

Important

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

1. If the oil level is low, remove the left tank cover, and then open the tank cap and supply oil.



dmhzyz-012

Hydraulic Oil Supply_001

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

Handling Instructions

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

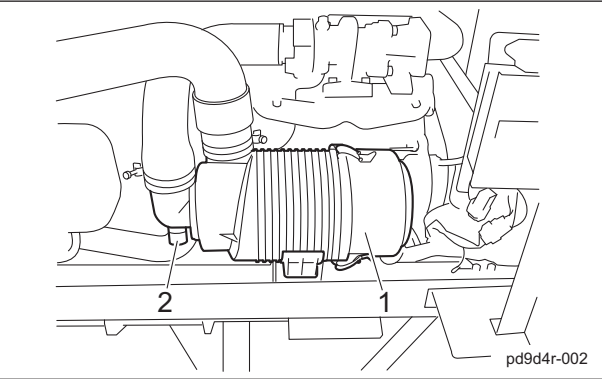
Air Cleaner

Inspection of Air Cleaner

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

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

1. Inspect the air cleaner by checking the vacuum indicator.
If the air cleaner element is contaminated, the vacuum indicator will display a red ring.



Inspection of Air Cleaner_001

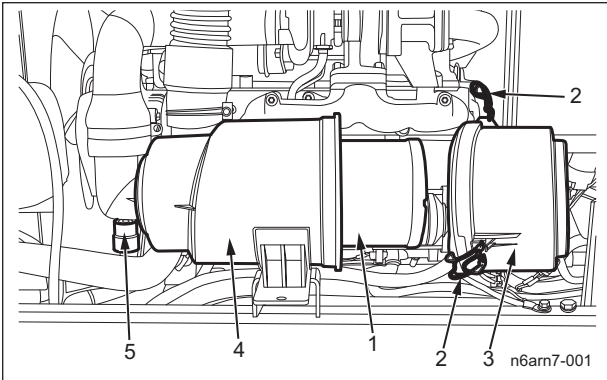
1	Air cleaner
2	Vacuum indicator

- 2. Make sure that there is no damage to the air cleaner.
- 3. Make sure that the air cleaner is not contaminated.

Cleaning of Air Cleaner

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

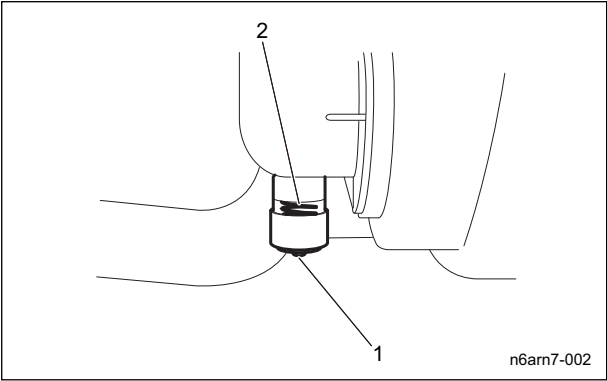


Cleaning of Air Cleaner_001

1	Air cleaner element
2	Clip
3	Air cleaner cap
4	Air cleaner body
5	Vacuum indicator

Handling Instructions

2. Press the reset button for the vacuum indicator.



Cleaning of Air Cleaner_002

1	Reset button
2	Vacuum indicator

Battery

Inspection of Battery

⚠ Danger

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

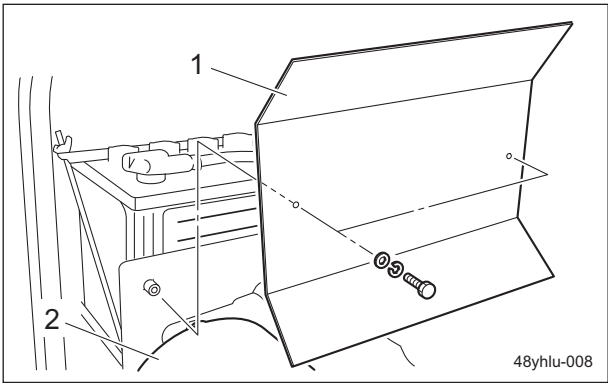
⚠ Warning

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

Perform operations after the muffler and engine have sufficiently cooled.
Otherwise, you may suffer burns.

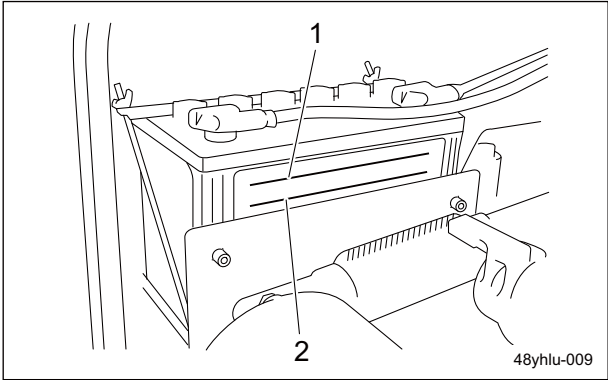
1. Remove the heat shield plate.



Inspection of Battery_001

1	Heat shield plate
2	Muffler

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



Inspection of Battery_002

1	UPPER LEVEL
2	LOWER LEVEL

Handling Instructions

Supply of Battery Fluid

 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.

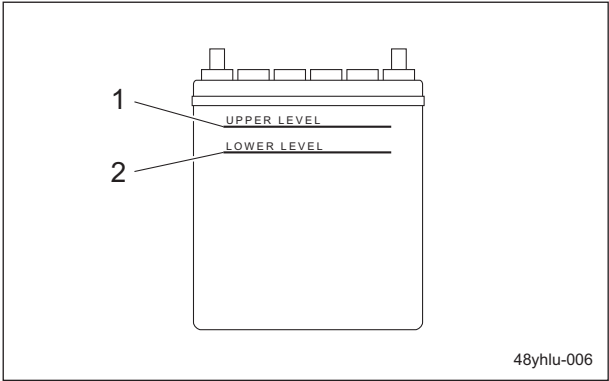
 Danger

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

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 (29 x 14.00 - 15)	150 kPa (1.5 kgf/cm ²)
Rear wheel (20 x 12.00 - 10)	140 kPa (1.4 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 pulling the parking brake lever.
2. Make sure that the parking brake is not applied even slightly after depressing the brake pedal to release the parking brake lever.

Belt

Inspection of Belt

 Warning

The engine must be stopped when the belt is inspected.

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.

Handling Instructions

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.

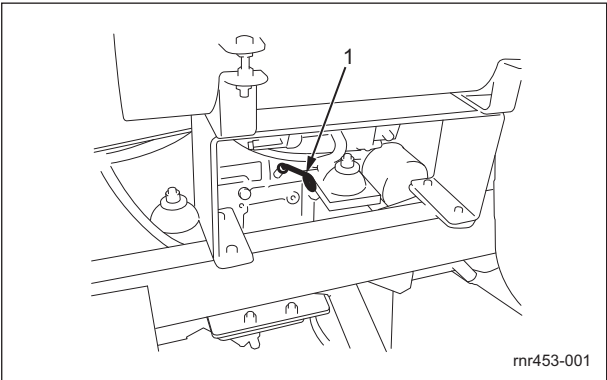
Engine Oil

Inspection of Engine Oil

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, and then check the oil level.
- 2. Position the machine so that the engine will be level, and then insert the oil level gauge all the way to check the oil level.

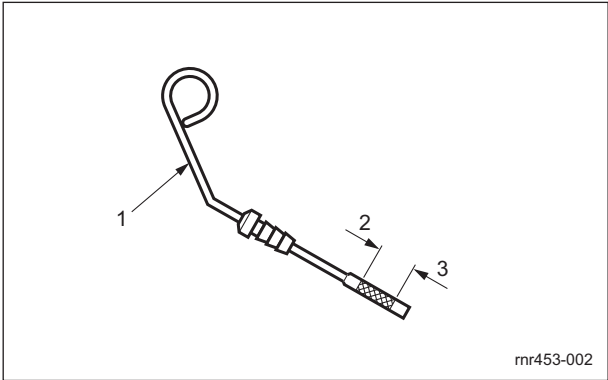


mr453-001

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.



mr453-002

Inspection of Engine Oil_002

1	Oil level gauge
2	Upper limit
3	Lower limit

Handling Instructions

Supply of Engine Oil

Important

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

Important

Do not mix different types of engine oil.

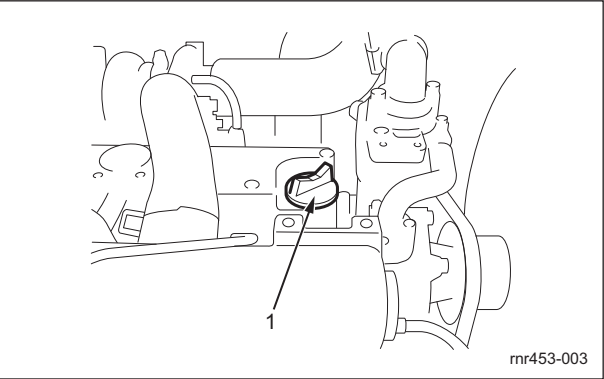
Important

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. If the engine oil level is lower than the lower limit line on the oil level gauge, supply engine oil through the oil filling port. Remove the oil filler cap.
2. Supply new engine oil until the oil reaches a level in between the upper and lower limit lines on the oil level gauge.
3. Replace the oil filler cap.



Supply of Engine Oil_001

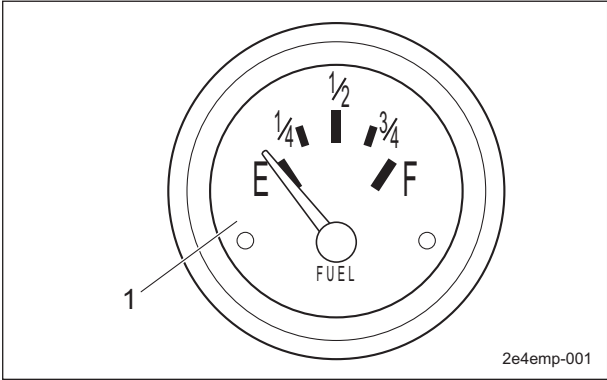
1	Oil filler cap
---	----------------

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

Fuel

Inspection of Fuel Quantity

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



Inspection of Fuel Quantity_001

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

Fuel Supply

 Warning

Do not supply fuel above F (FULL) level 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

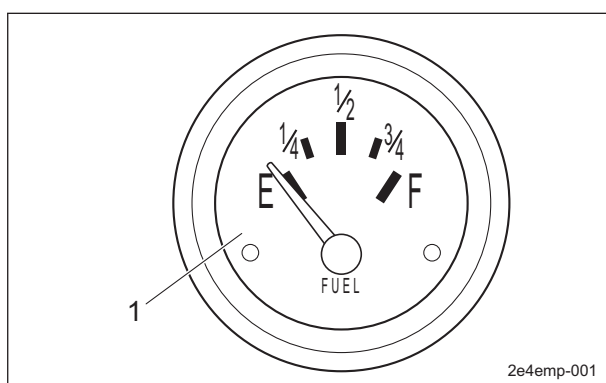
Keep fire away while refueling.
Do not smoke while refueling.

 Warning

Supply fuel after the engine is stopped and has well cooled down.

If the fuel gauge located in the operation panel indicates a level close to E (EMPTY), supply fuel (diesel) at your earliest convenience.
The fuel tank capacity is approximately 51.0 dm³ (51.0 L).

Handling Instructions



Fuel Supply_001

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

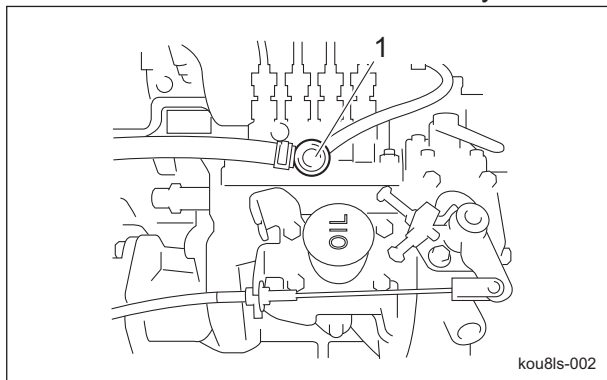
Air Bleeding of Fuel System

Important

The air-bleed plug should always be in the closed position except during the air bleeding operation.

Using the machine with the air-bleed plug in the open position may cause the engine to stall.

Air bleeding is not a required operation for this machine since it occurs automatically.



Air Bleeding of Fuel System_001

1	Air-bleed plug
---	----------------

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

GM2800B

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 housing	K0014160402	Bolt, heat-treated M16-40P1.5	152 - 188	1549.94 - 1917.04	1345.35 - 1663.99	—
	Motor	K0013140502	Bolt, heat-treated M14-50	100	1019.7	885.1	—
	Wheel mounting base	1 1/4-18UNF	Slotted nut (Hydraulic motor)	400 - 430	4078.80 - 4384.71	3540.40 - 3805.93	—
	Disc brake	K001A080401	Bolt, w/hexagon hole, M8-40	28 - 38	285.52 - 387.49	247.83 - 336.34	—
	Wheel	K0014120652	Bolt, heat-treated M12-65P1.5	67 - 85	683.20 - 833.75	593.02 - 752.34	—
Rear wheel	Motor	K0010120502	Bolt, heat-treated M12-50	52 - 67	530.42 - 683.20	460.25 - 593.02	—
	Wheel mounting base	K0138240002	24 slotted nut high P1.5	180 - 200	1835.46 - 2039.40	1593.18 - 1770.20	—
	Wheel	K0014120652	Bolt, heat-treated M12-65P1.5	67 - 85	683.20 - 866.75	593.02 - 752.34	—
Front axle		K0015200702	Bolt, heat-treated M20-70P1.5	370 - 450	3772.89 - 4588.65	3274.87 - 3982.95	—
Brake ass'y		K1720000190	Bolt, heat-treated M12P1.75	150 ± 15	1529.55 ± 152.96	1327.65 ± 132.77	○
Engine		K0012120352	Bolt, heat-treated M12-35P1.25	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
		K0015120552	Bolt, heat-treated M12-55P1.25	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
		K0011100502	Bolt, heat-treated M10-50P1.25	45 - 76	458.87 - 774.97	398.30 - 672.68	—
		K0013121102	Bolt, heat-treated M12-110	67 - 134	683.20 - 1366.40	593.02 - 1186.03	○
Flywheel adapter		K0011100302	Bolt, heat-treated M10-30P1.25	45 - 76	458.87 - 774.97	398.30 - 672.68	—
		K0011100202	Bolt, heat-treated M10-20P1.25	45 - 76	458.87 - 774.97	398.30 - 672.68	○
Joint		K001A100401	Bolt, w/hexagon hole, M10-40	80	815.76	708.08	—
		K0013100352	Bolt, heat-treated M10-35	45 - 76	458.87 - 774.97	398.30 - 672.68	○
Kingpin stopper		K0013120552	Bolt, heat-treated M12-45	52 - 67	530.24 - 683.20	460.25 - 593.02	—

Handling Instructions

Location	Code	Part name	Tightening torque			Thread locking adhesive
			N-m	kgf-cm	lb-in	
Tie rod	K1610000020	Tie rod end slotted nut	45	458.87	398.30	—
	K1611000020	Tie rod end slotted nut	45	458.87	398.30	—
Piston pump	K0013120502	Bolt, heat-treated M12-50	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
Tandem pump	Accessories	3/8-24 UNC 11T 10	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Mower rotating fitting	K0011100302	Bolt, heat-treated M10-30P1.25	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Pedal stopper	K0013101202	Bolt, heat-treated M10-120	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Rotation sensor	K0015120351	Bolt, heat-treated M12-35P1.25	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
Diff-lock valve	K001A100151	Bolt, w/hexagon hole, M10-15	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Knife guide	K0010120302	Bolt, heat-treated M12-30	67 - 85	683.20 - 866.75	593.02 - 752.34	—
Shoulder bolt	GM2800-0207Z2	Shoulder bolt	52 - 67	530.24 - 683.20	460.25 - 593.02	—
Arm guide	K0013101002	Bolt, heat-treated M10-100	45 - 76	458.87 - 774.97	398.30 - 672.68	—
Bumper	K0010120302	Bolt, heat-treated M12-30	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
Cover mounting bracket	K0000080202	Bolt, M8-25	9 - 14	91.77 - 142.76	61.96 - 123.91	—
Valve V5267	K0013080902	Bolt, heat-treated M8-90	14 - 19	142.76 - 193.74	123.91 - 168.17	—
Solenoid valve V5266	K0013101202	Bolt, heat-treated M10-90	29 - 38	295.71 - 387.49	256.68 - 336.34	—

Handling Instructions

Adjustment Before Operating

Adjustment of Steering Wheel

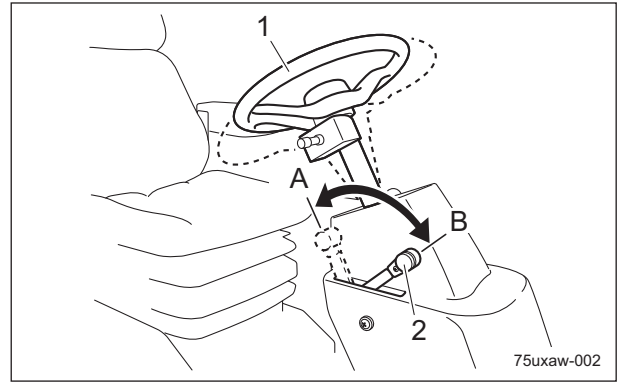
**Warning**

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

**Caution**

Be sure the steering wheel position is securely locked.
It may result in an unexpected accident if it becomes loose while traveling.

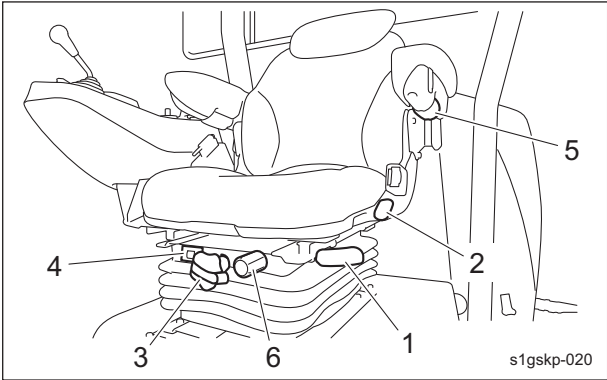
The steering wheel can be adjusted up or down.
Adjust the position according to the operator's body size.
Shift the tilt lever to the "FREE" position, move the steering wheel to the position that suits your work requirements, and then shift the tilt lever to the "LOCK" position to secure the steering wheel in place.
The tilt lever is located in the right front of the driver' s position.



Adjustment of Steering Wheel_001

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

- Turn the suspension adjustment handle to adjust the firmness of the seat suspension. Refer to the suspension indicator while making adjustments. [45 to 130 kg (99.2 to 286.6 lb)]
- Turn the armrest adjustment knob to adjust the angle of the armrests.
- Turn the seat height adjustment knob to adjust the height of the seat steplessly. [0 to 60 kg (0 to 132.3 lb)]
Adjust the height of the seat while sitting in it.



Adjustment of Seat_001

1	Forward/backward adjustment lever
2	Tilt adjustment lever
3	Suspension adjustment handle
4	Suspension indicator
5	Armrest adjustment knob
6	Seat height adjustment knob

Adjustment of Seat

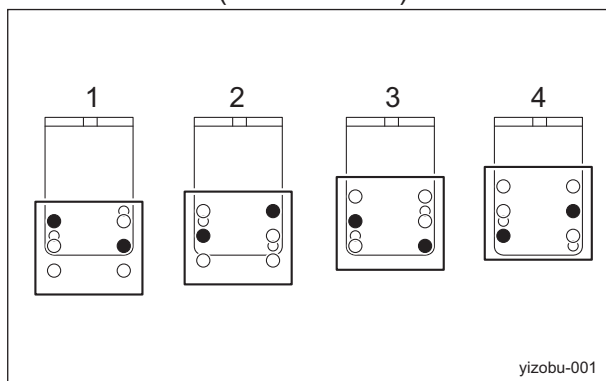
- Use the adjustment levers to adjust the seat.
Adjust the position to fit the operator.
- Use the forward/backward adjustment lever to adjust the seat back and forth.
 - Use the tilt adjustment lever to adjust the angle of the backrest.

Handling Instructions

Adjustment of Cutting Height

Cutting Height Table

The adjustment range for the cutting height is 20.0 - 91.5 mm (0.79 - 3.60 in).



Cutting Height Table_001

1	Adjusting plate position 1
2	Adjusting plate position 2
3	Adjusting plate position 3
4	Adjusting plate position 4

Adjusting Plate Position	1	2	3	4
Adjusting Collars Inserted Under Cutting Height Adjusting Plate (Qty)	Cutting Height			
0	20.0 mm (0.79 in)	30.0 mm (1.18 in)	45.5 mm (1.79 in)	55.5 mm (2.19 in)
1	26.0 mm (1.02 in)	36.0 mm (1.42 in)	51.5 mm (2.03 in)	61.5 mm (2.42 in)
2	32.0 mm (1.26 in)	42.0 mm (1.65 in)	57.5 mm (2.26 in)	67.5 mm (2.66 in)
3	38.0 mm (1.50 in)	48.0 mm (1.89 in)	63.5 mm (2.50 in)	73.5 mm (2.89 in)
4	44.0 mm (1.73 in)	54.0 mm (2.13 in)	69.5 mm (2.74 in)	79.5 mm (3.13 in)
5	50.0 mm (1.97 in)	60.0 mm (2.36 in)	75.5 mm (2.97 in)	85.5 mm (3.37 in)
6	56.0 mm (2.20 in)	66.0 mm (2.60 in)	81.5 mm (3.21 in)	91.5 mm (3.60 in)

Note:

The factory default cutting height is 48.0 mm (1.89 in).

Adjustment With Adjusting Collars

Adjusting collars are installed at three locations on each mower unit.

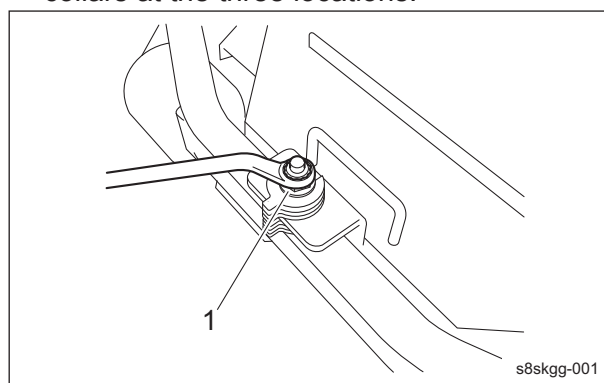
Important

The length of grass cut off at any one time must be no more than 30.0 mm (1.18 in).

Important

Do not cut off more than 1/3 of the grass height.

1. Apply the parking brake, and then lower all mower units.
2. Stop the engine, and then remove the key.
3. Loosen the nuts securing the adjusting collars at the three locations.



Adjustment With Adjusting Collars_001

1	Nut
---	-----

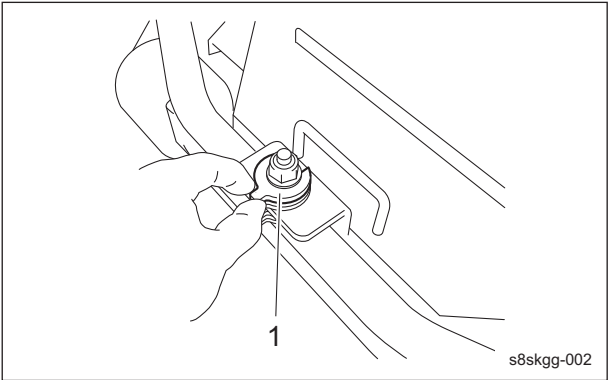
4. Refer to the Cutting Height Table, and then adjust the number of adjusting collars at the three locations.

[1] To increase cutting height:

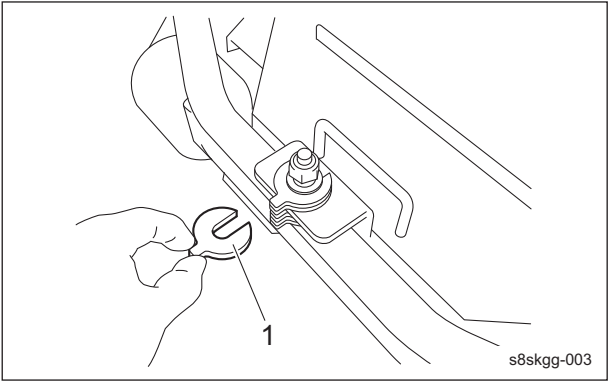
Remove an upper adjusting collar and insert it below.

Handling Instructions

[2] To decrease cutting height:
Remove a lower adjusting collar and
insert it above.



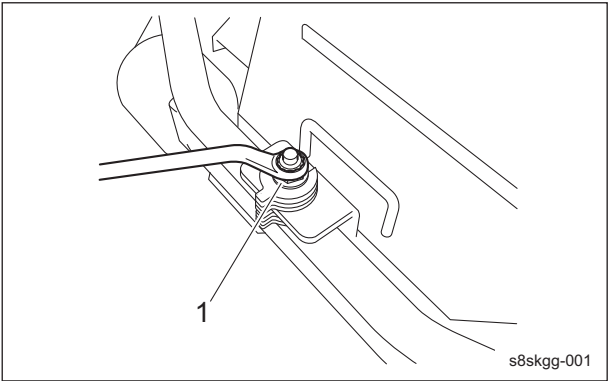
Adjustment With Adjusting Collars_002



Adjustment With Adjusting Collars_003

1	Adjusting collar
---	------------------

5. After adjusting the adjusting collars at the
three locations, firmly tighten all nuts.



Adjustment With Adjusting Collars_004

1	Nut
---	-----

Adjustment With Cutting Height Adjusting Plates

Cutting height adjusting plates are installed at
three locations on each mower unit.

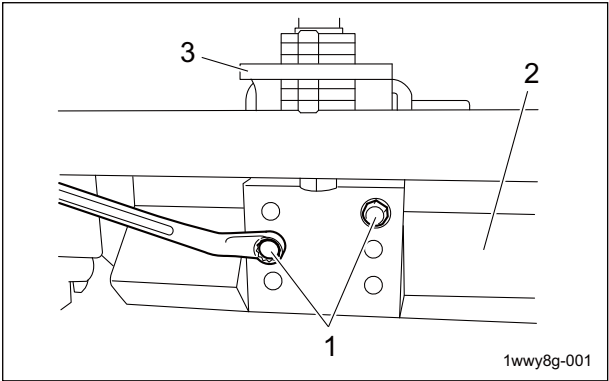
Important

The length of grass cut off at any one time
must be no more than 30.0 mm (1.18 in).

Important

Do not cut off more than 1/3 of the grass
height.

1. Apply the parking brake, and then lower all
mower units.
2. Stop the engine, and then remove the key.
3. Loosen the six bolts securing the cutting
height adjusting plates at the three
locations on the mower unit.



Adjustment With Cutting Height Adjusting Plates_001

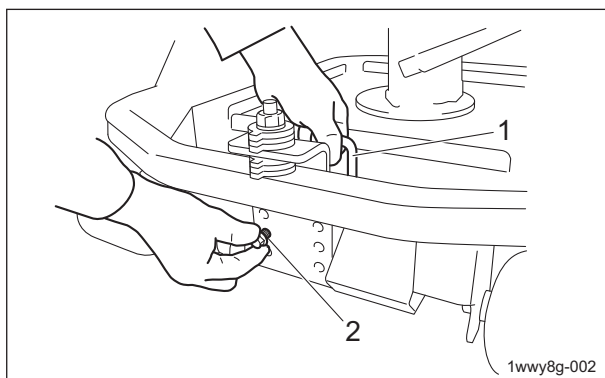
1	Bolt
2	Mower unit
3	Cutting height adjusting plate

4. Refer to the Cutting Height Table, and then
change the hole positions.

- [1] To increase cutting height:
- a. While lifting the handle at each location
on the mower unit, remove the two
bolts.
 - b. Raise the mower unit to change the
hole positions, and then temporarily
secure it with the two bolts.
- [2] To decrease cutting height:
- a. While lifting the handle at each location
on the mower unit, remove the two
bolts.

Handling Instructions

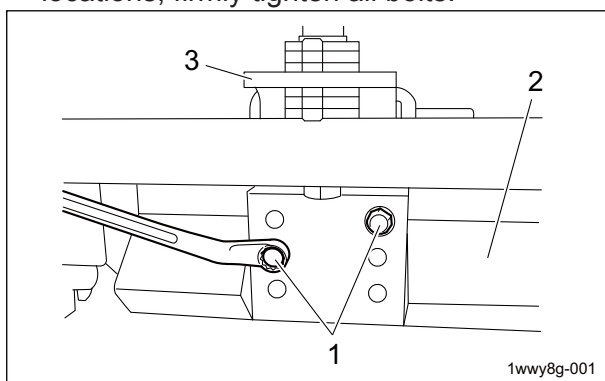
- b. Lower the mower unit to change the hole positions, and then temporarily secure it with the two bolts.



Adjustment With Cutting Height Adjusting Plates_002

1	Handle
2	Bolt

5. After making adjustments at the three locations, firmly tighten all bolts.



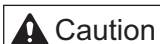
Adjustment With Cutting Height Adjusting Plates_003

1	Bolt
2	Mower unit
3	Cutting height adjusting plate

Procedure to Start / Stop Engine

Start / Stop of Engine

Procedure to Start Engine



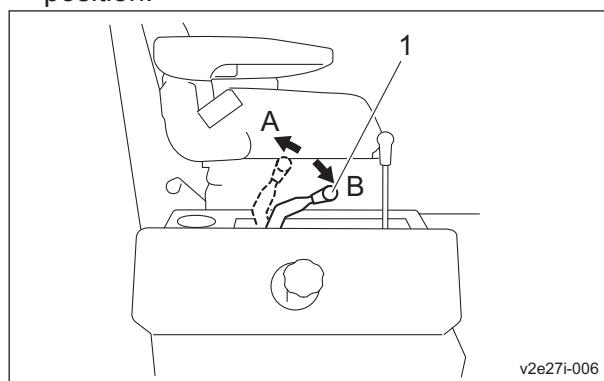
Caution
Before starting the engine, make sure that there are no other people or obstacles around the machine.

Important

Starter operation must take 15 seconds or less.

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

1. Sit on the seat.
2. Make sure that the parking brake is applied.
3. Make sure that the knife rotation switch is in the "OFF" position.
4. Make sure that the traveling pedal is in the neutral position.
5. Shift the throttle lever from the "Low speed" position halfway to the "High speed" position.



Procedure to Start Engine_001

1	Throttle lever
A	High speed
B	Low speed

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 lamp will stay illuminated for five seconds.

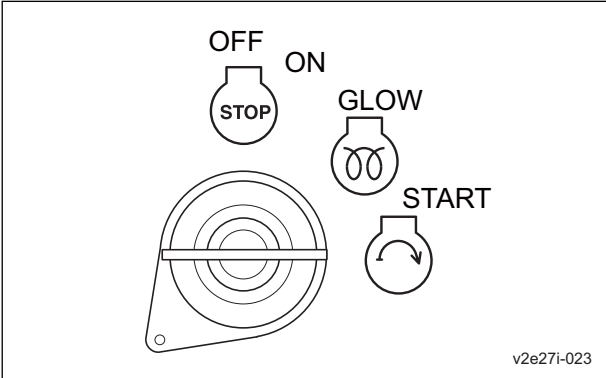
6. Switch the ignition key to the "GLOW" position.
7. Make sure that the glow plug is generating heat and the thermo-start lamp is turned on.

Handling Instructions

Important

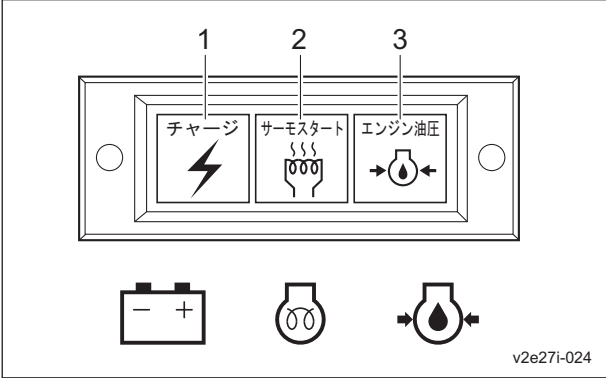
Quickly returning the ignition key from the "START" position to the "ON" position may result in damage to the machine.

- 8. After the thermo-start lamp turns off, immediately set the ignition key to the "START" position.
- 9. When the starter starts rotating and the engine starts, slowly return the ignition key to the "ON" position.



Procedure to Start Engine_002

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



Procedure to Start Engine_003

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

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

Procedure to Stop Engine

- 1. Set the traveling pedal to the neutral position.

- 2. Apply the parking brake.
- 3. Set the knife rotation switch to the "OFF" 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.

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 knife 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 knife rotation switch is set to the "ON" position.

Handling Instructions

Warning Mechanisms

Important

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 the engine water temperature exceeds 115 degrees Celsius, a buzzer will sound. (intermittent tone)
2. If the oil level in the hydraulic tank declines from the specified level by approximately 2.0 dm³ (2.0 L), a buzzer will sound. (continuous tone)

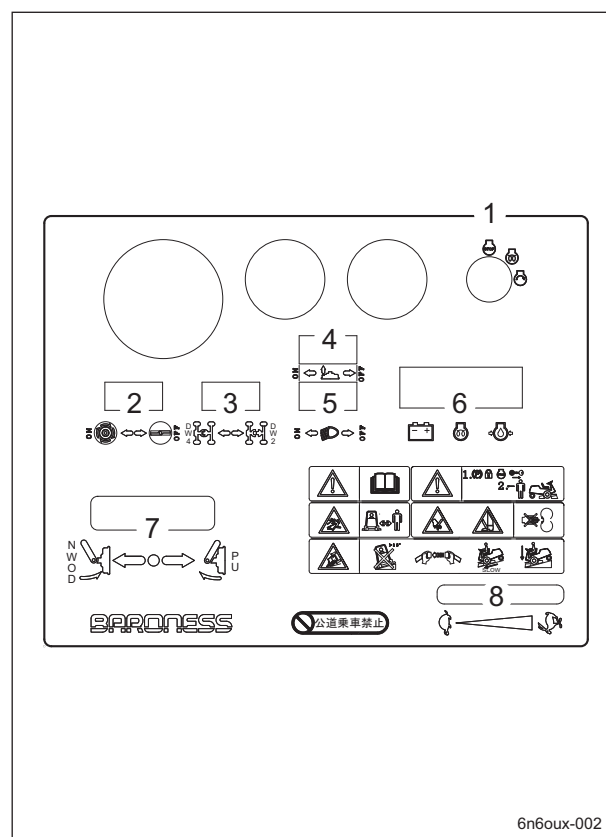
Operation of Each Section

Cautions for when You Leave the Machine

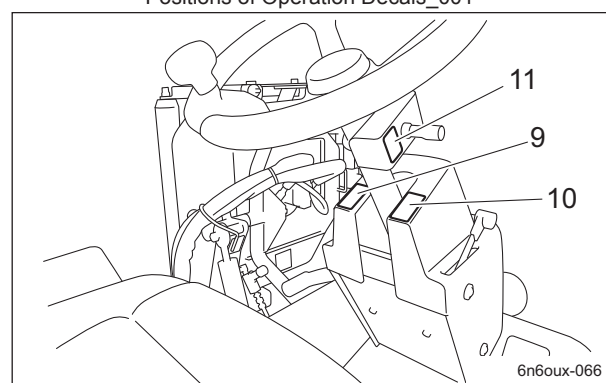
⚠ Caution

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

Positions of Operation Decals



Positions of Operation Decals_001



Positions of Operation Decals_002

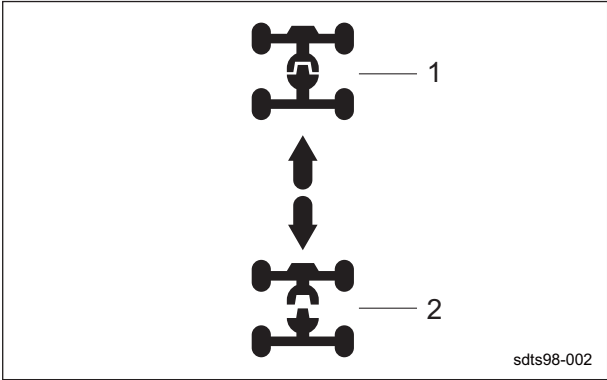
Handling Instructions

1	Key switch mark
2	Knife rotation switch mark
3	2WD/4WD selector mark
4	Traction assist switch mark
5	Light switch mark
6	Pilot lamp mark
7	Mower unit up/down lever mark
8	Engine rotation mark
9	Parking brake decal
10	Tilt steering decal
11	Differential lock decal

1	Rotation
2	Stop

2WD/4WD selector mark

2WD/4WD selector mark
This indicates the 2WD/4WD positions.



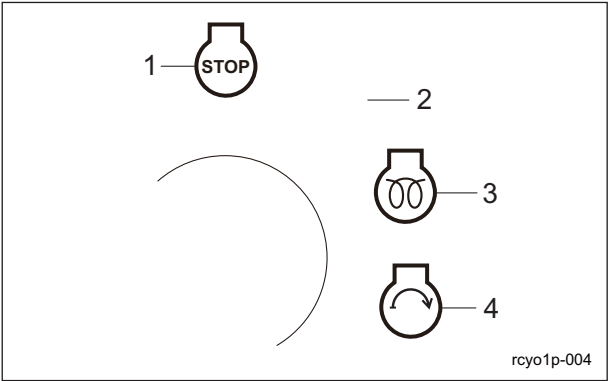
2WD/4WD selector mark_001

1	4WD
2	2WD

Description of Operation Decals

Key switch mark

Key switch mark
This indicates the key switch positions.

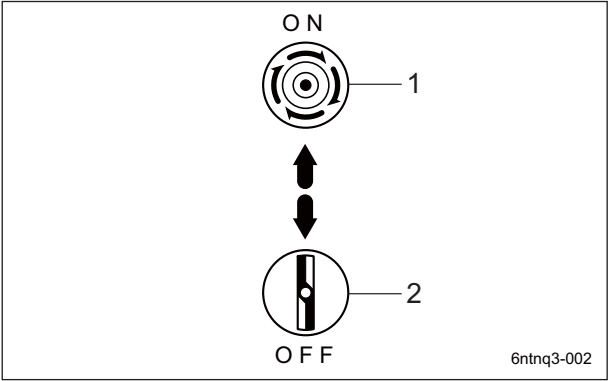


Key switch mark_001

1	OFF
2	ON
3	GLOW
4	START

Knife rotation switch mark

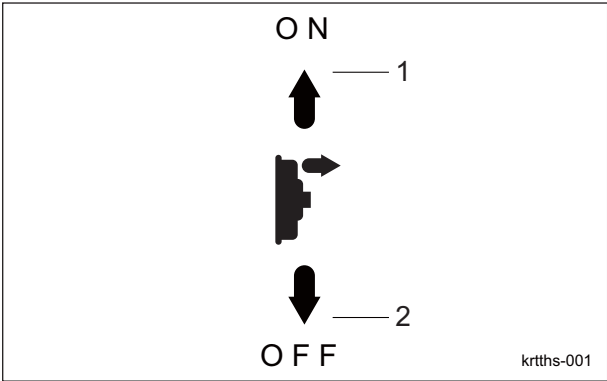
Knife rotation switch mark
It illustrates Rotation/Stop of the rotary knife.



Knife rotation switch mark_001

Traction assist switch mark

Traction assist switch mark
It illustrates Activate/ Deactivate of the traction assist.



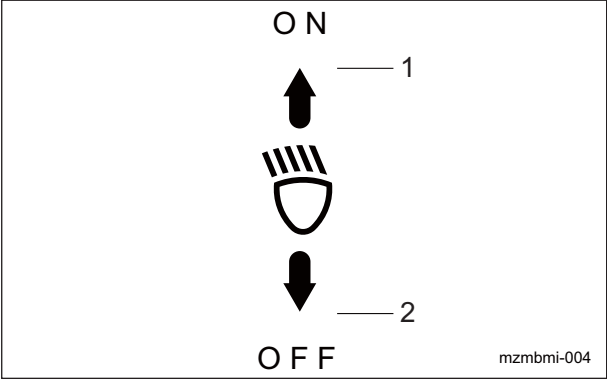
Traction assist switch mark_001

1	Activate
2	Deactivate

Handling Instructions

Light switch mark

Note:
Depending on the specifications, this function may not be available.
Light switch mark
It illustrates ON/OFF of the light.

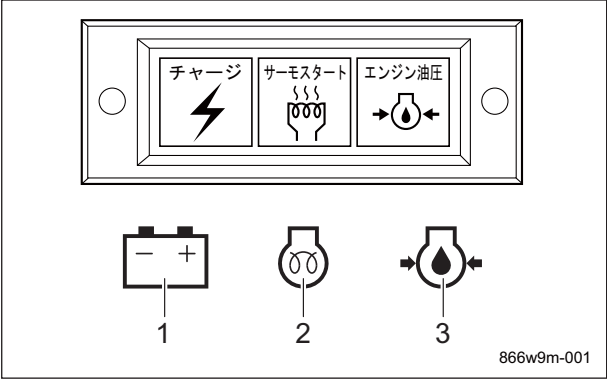


Light switch mark_001

1	ON
2	OFF

Pilot lamp mark

Pilot lamp mark
This illustrates the positions of the pilot lamp.

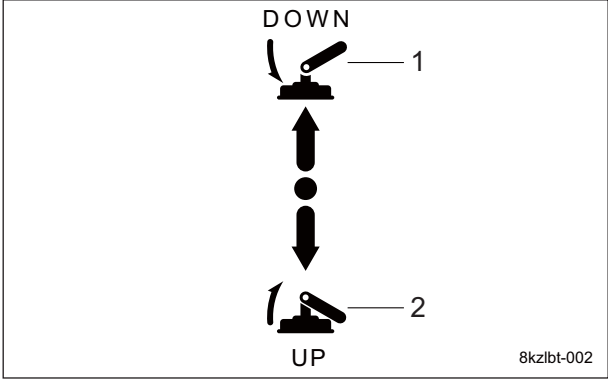


Pilot lamp mark_001

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

Mower unit up/down lever mark

Mower unit up/down lever mark
This indicates the Up/Down positions of the mower unit.

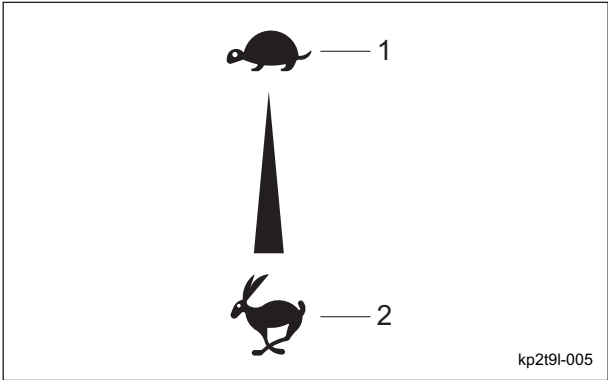


Mower unit up/down lever mark_001

1	Down
2	Up

Engine rotation mark

Engine rotation mark
This indicates high/low speed of the engine rotation.



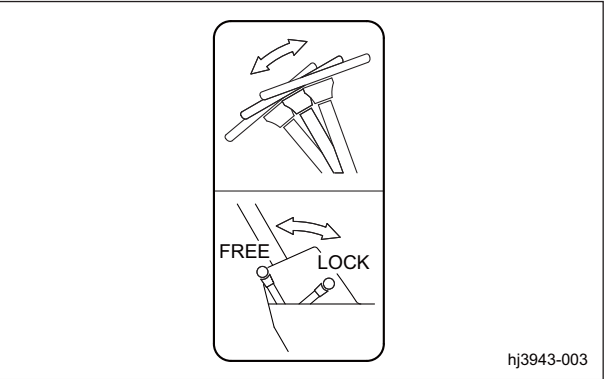
Engine rotation mark_001

1	Low speed
2	High speed

Handling Instructions

Tilt steering decal

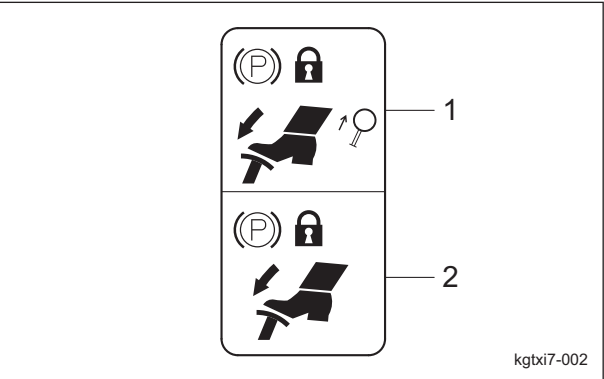
K4203001350
Decal, tilt steering
This illustrates the tilt directions of the steering wheel and the locked/free positions.



Tilt steering decal_001

Parking brake decal

K4203001340
Parking brake decal
This shows how to lock and release the parking brake.

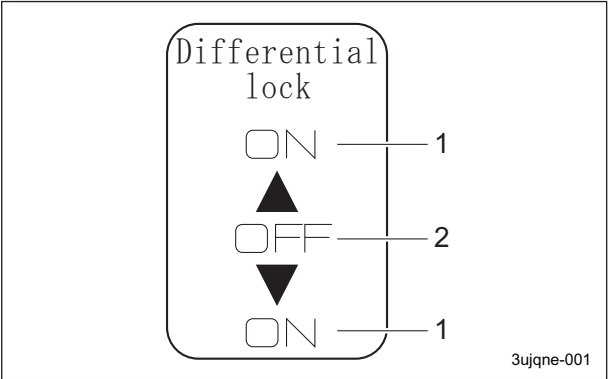


Parking brake decal_001

1	Lock
2	Release

Differential lock decal

K4203001420
Decal, differential lock
This indicates the positions for engaging or releasing the differential lock.

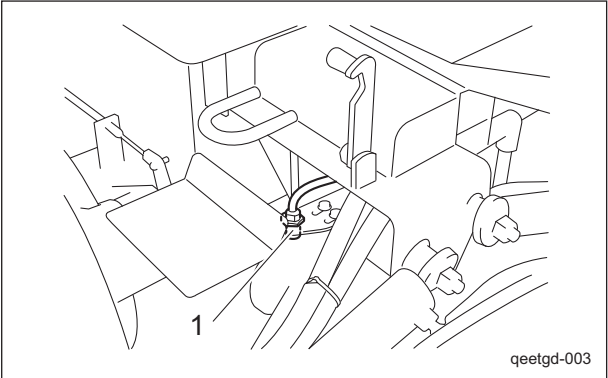


Differential lock decal_001

1	Engage
2	Release

Proximity Sensors

There are two proximity sensors on mower arm fulcrums #4 and #5. These sensors detect the raised or lowered positions of mower units #4 and #5. The information is related to controlling rotation and stop of the rotary knives.



Proximity Sensors_001

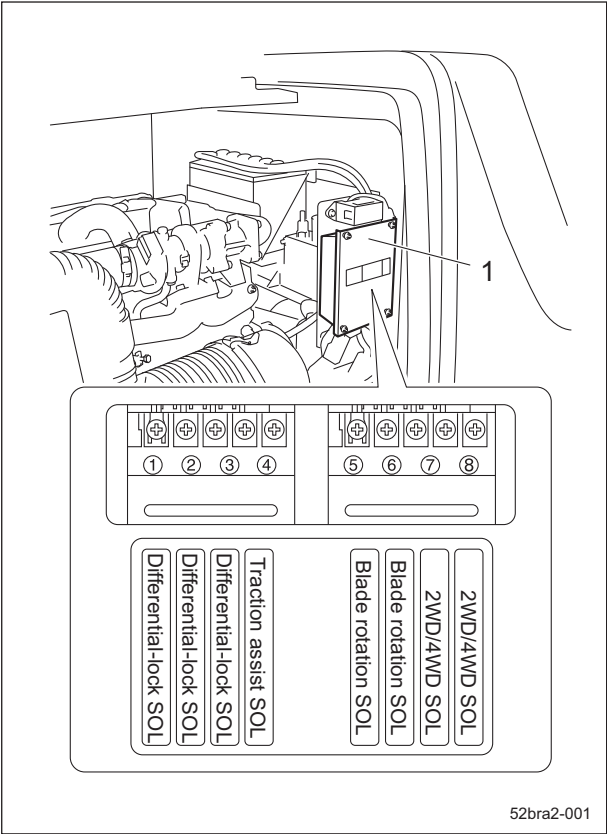
1	Proximity sensors
---	-------------------

Handling Instructions

Relays

The relay box is at the front of the right hood. These relays control operation of the diff-lock valve, rotation of the rotary knives, 2WD/4WD selection and traction assist selection. The operating condition can be checked by the illumination of the LEDs.

- LEDs ①, ② and ③ light up when the diff-lock valve is in the "ON" position.
- LED ④ lights up when the traction assist switch is in the "ON" position.
- LEDs ⑤ and ⑥ light up when the knife rotation switch is in the "ON" position and the mower deck is lowered.
- LED ⑦ lights up when the knife rotation switch is in the "ON" position, and then the machine enters 4WD.
- LED ⑧ lights up when the 2WD/4WD selector switch is in the "4WD" position, and then the machine enters 4WD.



Relays_001

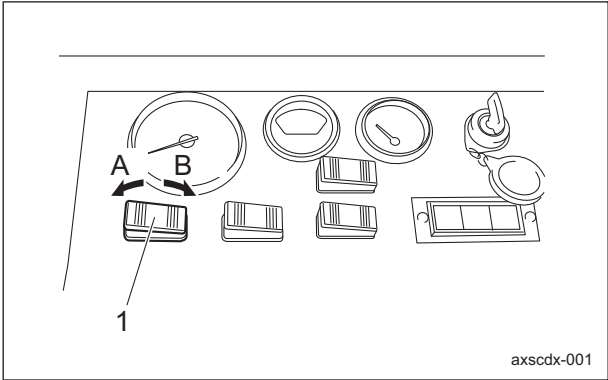
1	Relay box
---	-----------

Knife Rotation Switch

⚠ Caution

Before you start cutting work, set the knife rotation switch to the "ON" position. At all other times, make sure it is set to the "OFF" position.

The knife rotation switch is located in the operation panel and controls the rotation of the rotary knives. When the knife rotation switch is set to the "ON" position, the rotary knife in all mower units rotates. When the knife rotation switch is set to the "OFF" position, the rotary knives stop. When the mower units are raised, the rotary knives do not rotate, even if the switch is set to the "ON" position.



Knife Rotation Switch_001

1	Knife rotation switch
A	ON
B	OFF

Note:
When the knife rotation switch is set to the "ON" position, the machine enters 4WD, regardless of the position that the 2WD/4WD selector switch is set to.

Handling Instructions

2WD/4WD Selector Switch

 **Caution**

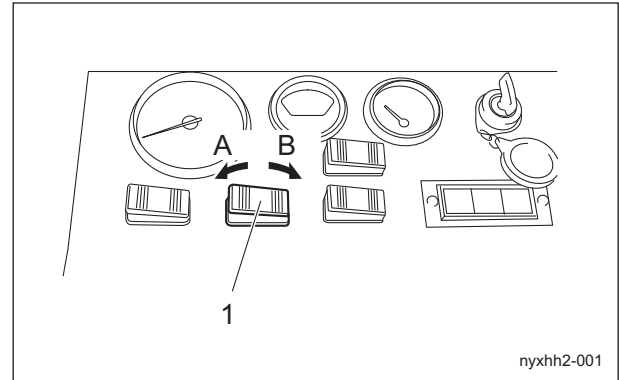
When working on a slope, be sure to use the machine in 4WD.

 **Caution**

When traveling, be sure to stop the knives and raise the mower units.

The 2WD/4WD selector switch is located in the operation panel.

When the switch is set to the "2WD" position, the machine will be in two-wheel drive (front-wheel drive). When it is set to the "4WD" position, the machine will be in four-wheel drive.



2WD/4WD Selector Switch_001

1	2WD/4WD selector switch
A	4WD
B	2WD

Note:

When the knife rotation switch is set to the "ON" position, the machine enters 4WD, regardless of the position that the 2WD/4WD selector switch is set to.

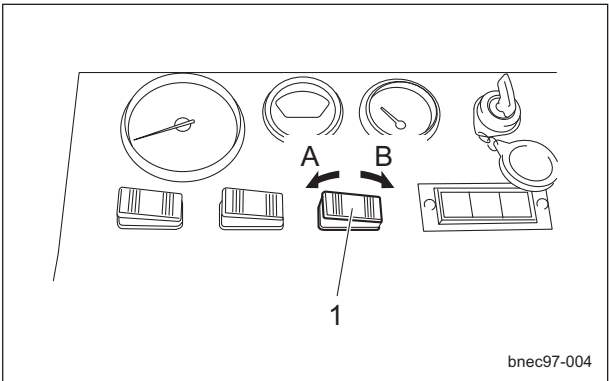
Light Switch

 **Caution**

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

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

Traction Assist Switch

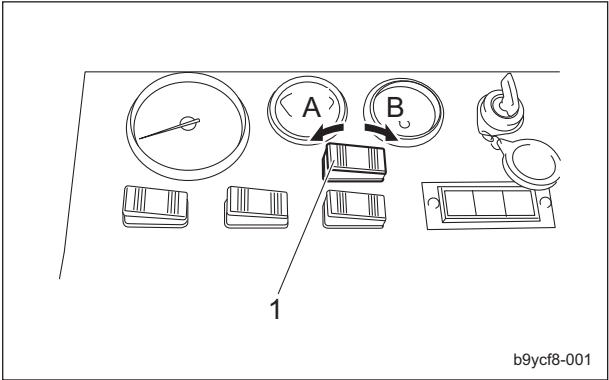
The traction assist switch is located in the operation panel.

This switch is effective to increase climbing ability when this machine is in cutting operation (4WD).

- The cylinders are pressurized even with the switch set to the "OFF" position and so the mower units are a little raised.
- When the switch is set to the "ON" position, the traction assist mode is automatically switched and the power lifting the mower units and climbing ability are increased.
- When the switch is set to the "ON" position and the machine is in cutting operation on a slope of 13 degrees or more, the power lifting the mower units and climbing ability are further increased.

Note:

Tracking may be impaired if the machine is used with the switch set to the "ON" position in an area with many undulations.



Traction Assist Switch_001

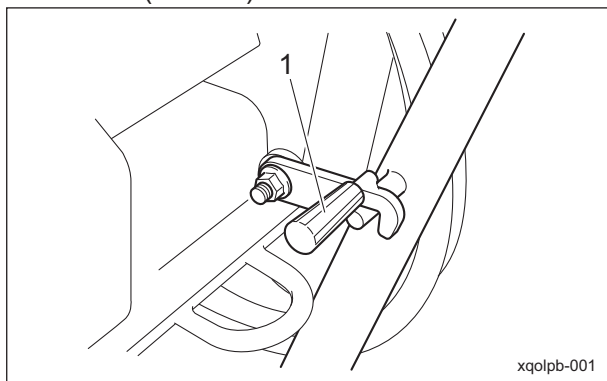
Handling Instructions

1	Traction assist switch
A	ON
B	OFF

Mower Lock Lever (Latch)

The mower lock levers (latches) are located in the foot area on the left and right sides and are used when traveling or storing the machine with mower units #4 and #5 raised.

When storing the machine, hook the mower lock levers (latches) on the arms.



Mower Lock Lever (Latch)_001

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

Mower Unit Up/Down Lever

Caution

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

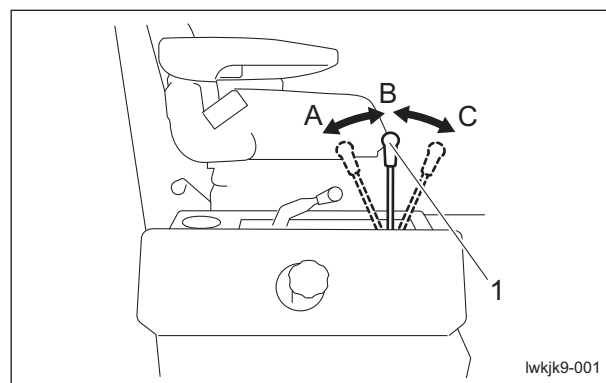
Important

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.

When the lever is shifted to the "Lower" position, the mower units are lowered. When the lever is shifted to the "Raise" position, the mower units are raised.

Release the lever to return it to the neutral position.



Mower Unit Up/Down Lever_001

1	Mower unit up/down lever
A	Raise
B	Neutral
C	Lower

Note:

When the mower units are raised, the knives stop rotating, even if the knife rotation switch is set to the "ON" position.

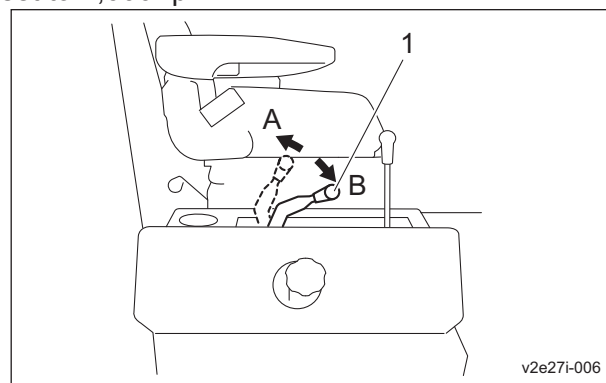
Throttle Lever

The throttle lever is located to the right of the driver's seat 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 2,600 rpm.



Throttle Lever_001

1	Throttle lever
A	High speed
B	Low speed

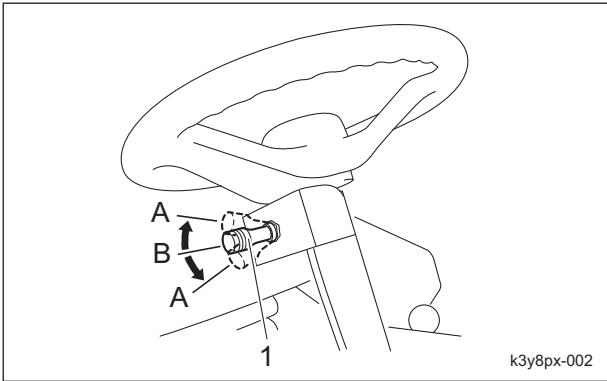
Handling Instructions

Diff-Lock Switch

Important

Do not operate the diff-lock switch unless it is necessary.
It may result in the hydraulic system malfunction.

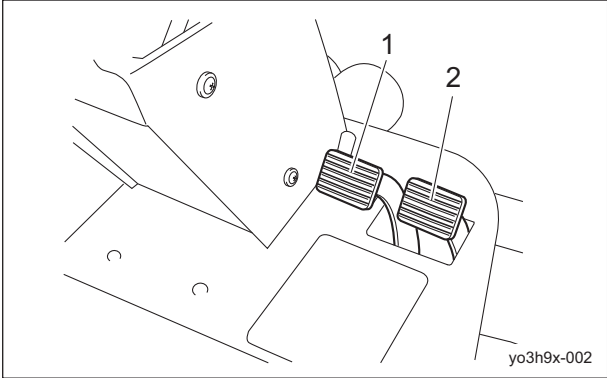
The diff-lock switch is located below the right side of the steering wheel and engages the differential lock for the left and right front wheels.
Tilt the switch lever up or down to turn "ON" to engage the differential lock for the front wheels.
Release the switch lever to return it to the neutral position ("OFF" position) and disengage the differential lock.



Diff-Lock Switch_001

1	Diff-lock switch
A	ON (Lock)
B	OFF (Release)

The speed changes in accordance with how much the pedal is depressed.
When you take your foot off the pedal, the machine stops automatically.



Traveling Pedal_001

1	Forward pedal
2	Reverse pedal

Traveling Pedal

Caution

When the machine is traveling at a high speed, it will not stop immediately after you take your foot off the traveling pedal.
If necessary, also use the brake.

The traveling pedals are located in the right foot area and control forward and reverse operation of the machine.
When the forward pedal (inside) is depressed, the machine travels forward. When the reverse pedal (outside) is depressed, the machine travels in reverse.

Handling Instructions

Brake Pedal

⚠ Warning

Link the brake pedals, except when operating the machine.
Using the brake pedals without linking them may result in the machine overturning.

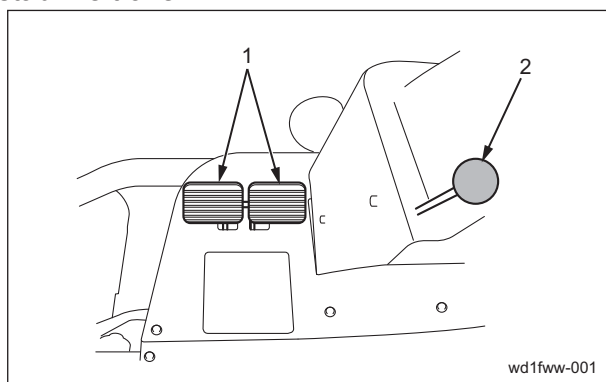
⚠ Caution

When depressing the brake pedals to make turns with a small radius, obtain a sufficient awareness of the lawn and ground conditions. This may damage the lawn.

The brake pedals are located in the left foot area and operate the left and right brakes independently.

By depressing the brake pedal on the side in which the turn will be made, the machine can make turns with a small radius.

If the front wheel on the upward side of a slope slips, depress the brake pedal for the wheel on the upward side in order to increase the traction of the wheel on the downward side and stabilize travel.



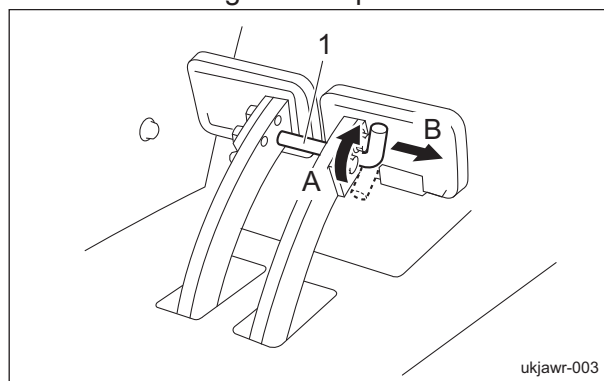
Brake Pedal_001

1	Brake pedals
2	Parking brake lever

Change of Braking Method

Follow the procedure below to change the braking method from linked to independent.

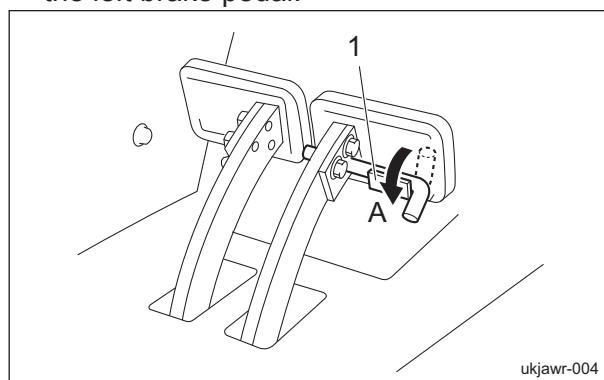
1. Swing up the pedal link bar, and then pull it out from the right brake pedal.



Change of Braking Method_001

1	Pedal link bar
A	Swing up
B	Pull out

2. Secure the pedal link bar in the holder on the left brake pedal.



Change of Braking Method_002

1	Holder
A	Secure

Parking Brake Lever

 **Caution**

Never park the machine on a slope.

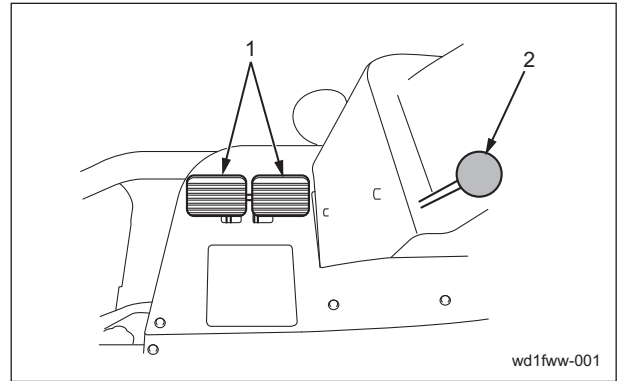
 **Important**

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

The parking brake lever is located to the left of the front cover.

When parking, link the left and right brake pedals by using the pedal link bar, depress both brake pedals, and then pull the parking brake lever completely.

To release the parking brake, depress the brake pedals.



wd1fw-001

Parking Brake Lever_001

1	Brake pedals
2	Parking brake lever

Hood

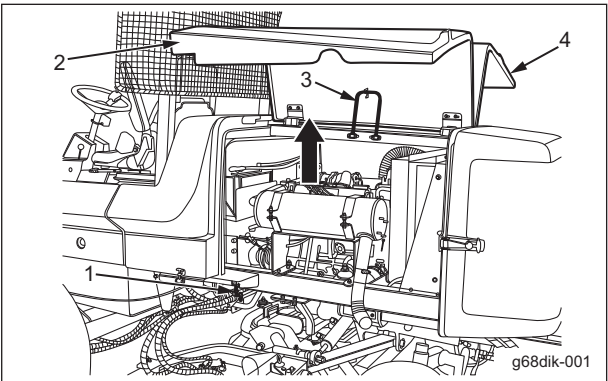
 **Caution**

Do not open the hood in strong winds.

 **Caution**

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

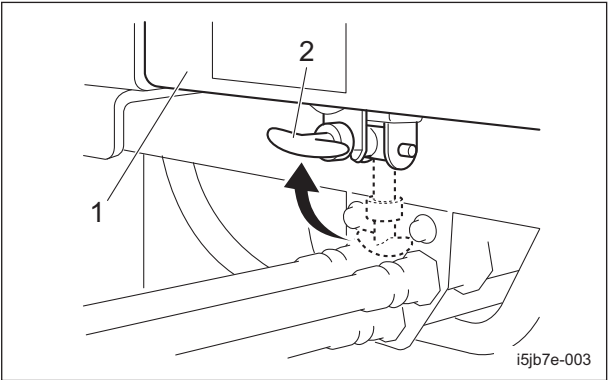
1. Unlock the rubber catch, and then lift up the hood.
2. Hook the hood support rod onto the latch inside the hood.
Make sure that the hood will not close, and then remove your hands.



Hood_001

1	Rubber catch
2	Left hood
3	Hood support rod
4	Right hood

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



i5jb7e-003

Hood_002

1	Hood
2	Rubber catch

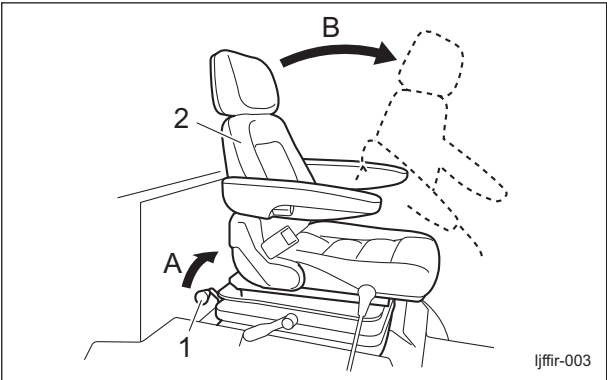
Handling Instructions

Underseat Cover



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

- 1. Make sure that the steering wheel is raised completely.
- 2. Bring the seat to the backmost position.
- 3. Pull up the lever behind the seat to unlock it.



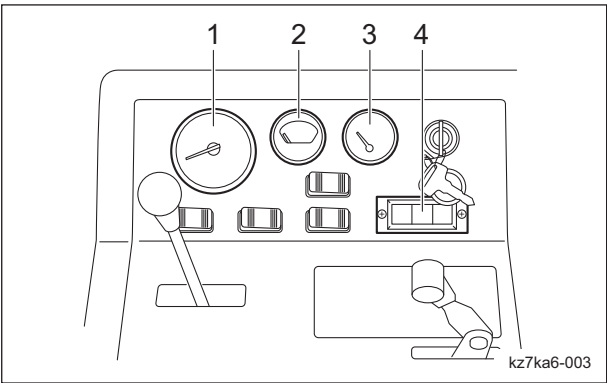
Underseat Cover_001

1	Lever
2	Seat
A	Pull up
B	Tilt forward

- 4. Tilt the seat forward to open the cover.
To close the cover, slowly lower the seat.

Instruments

Instruments on the Operation Panel



Instruments on the Operation Panel_001

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

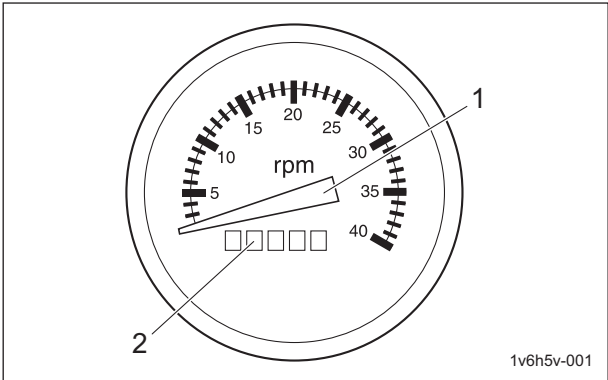
Tachometer/Hour Meter

The tachometer and hour meter are located in the operation panel.

The tachometer indicates the engine rpm. It is connected to a rotation sensor in the engine flywheel area, and converts the signal output from the rotation sensor into an rpm value.

The hour meter indicates 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.



Tachometer/Hour Meter_001

1	Tachometer
2	Hour meter

Handling Instructions

Water Temperature Gauge

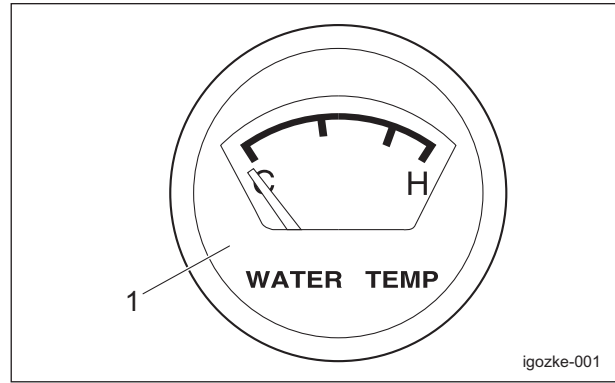
The water temperature gauge is located in the operation panel.

This instrument indicates the water temperature inside the engine.

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

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

If the water temperature exceeds 115 degrees Celsius, a buzzer will sound. (intermittent tone)



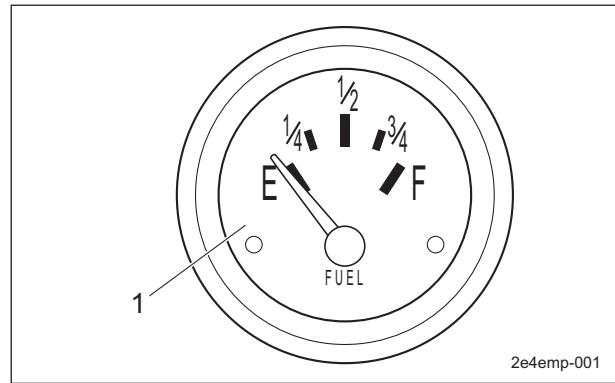
Water Temperature Gauge_001

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

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

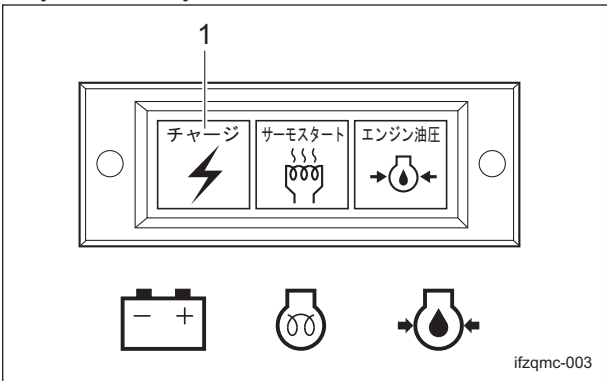
Pilot Lamps

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

Handling Instructions

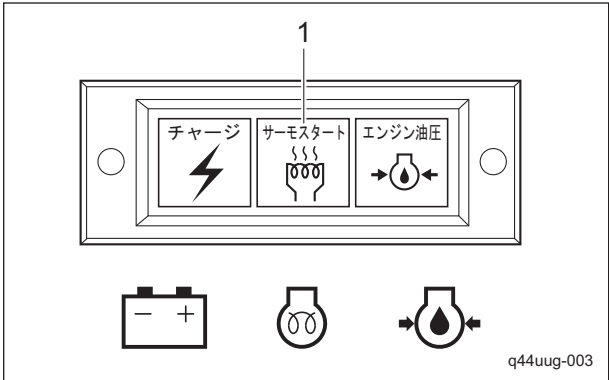
Thermo-start Lamp

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

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

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

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



Thermo-start Lamp_001

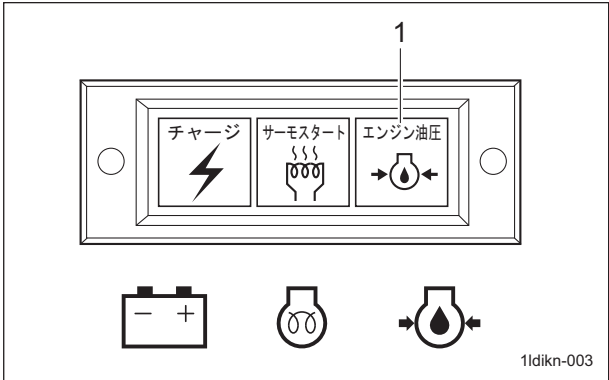
1	Thermo-start lamp
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Oil Pressure Lamp

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

Travel of Machine

Moving the Machine

⚠ Caution

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

⚠ Caution

When traveling, be sure to stop the rotary knives and raise the mower units.

1. Start the engine.
"Procedure to Start Engine" (Page 4-19)
2. Raise all mower units, and then engage the mower lock levers (latches) for mower units #4 and #5.
3. Depress the brake pedal to release the parking brake.
4. Slowly depress the traveling pedal.
5. The machine will start to move.

Handling Instructions

Towing the Machine

If the machine does not travel due to engine trouble, etc., you can move it by towing it.

⚠ Caution

Before towing, check that the brake is applied effectively.

⚠ Caution

Before starting the engine, be sure to close the unload valves.

Important

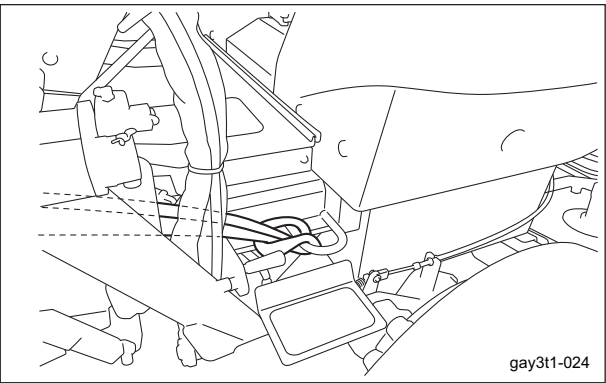
Do not touch the unload valve except when towing the machine.

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 there is excessive movement, the pump or motor will be damaged.

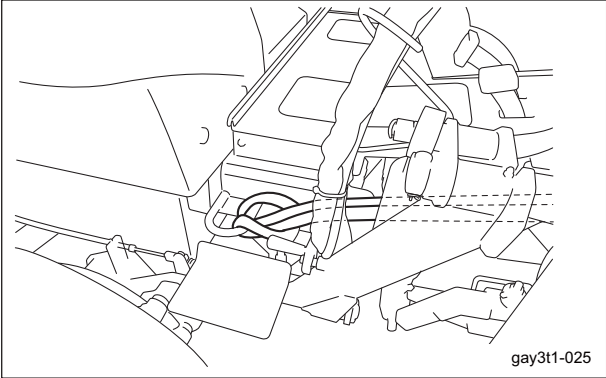
- 1. Stop the engine.
"Procedure to Stop Engine" (Page 4-20)
- 2. Apply the parking brake.
- 3. Chock the wheels.
- 4. Secure the machine with ropes.

Front left side



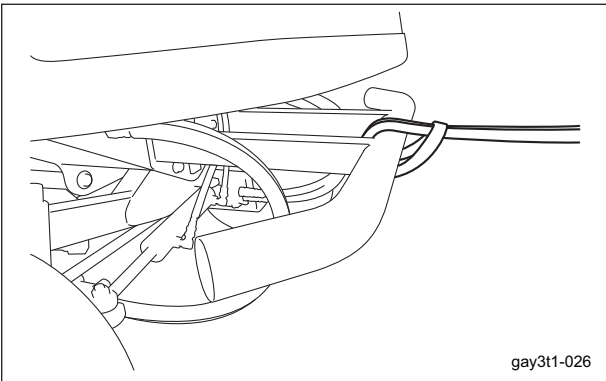
Towing the Machine_001

Front right side



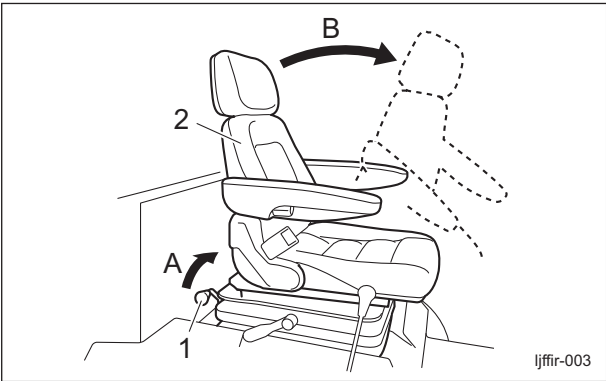
Towing the Machine_002

Rear side



Towing the Machine_003

- 5. Set the 2WD/4WD selector switch to the "2WD" position.
- 6. Make sure that the steering wheel is raised completely, and then bring the seat to the backmost position.
- 7. Pull up the lever behind the seat to unlock it, and then tilt the seat forward to open the cover.

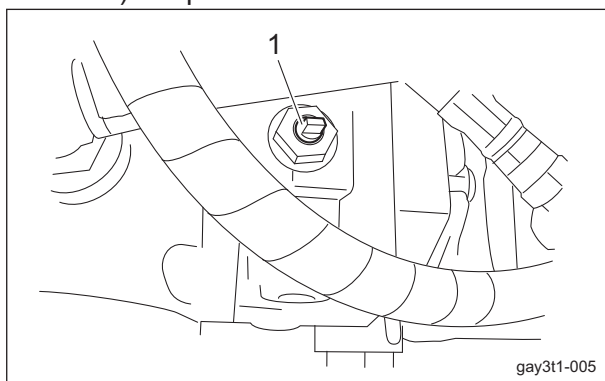


Towing the Machine_004

1	Lever
2	Seat
A	Pull up
B	Tilt forward

Handling Instructions

8. Turn the unload valve, located beside the hydraulic pump, 90 degrees (so that it is vertical) to open it.



Towing the Machine_005

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

9. Replace the seat and close the cover.
 10. Remove the wheel stopper.
 11. 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.

12. 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

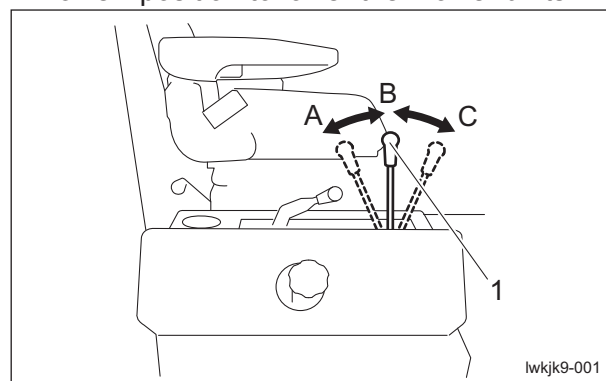
Cutting work must be performed at an appropriate speed for the site and location. When cutting bumpy surfaces, keep the engine rpm steady, and slow down the cutting speed.

Caution

Knife rotation will be turned on or off based on the sensor-detected position of the mower units.

Please note that if you stop operating the mower unit up/down lever before the mower units are raised completely, knife rotation may not stop.

1. Start the engine.
"Procedure to Start Engine" (Page 4-19)
2. Raise all mower units.
3. Depress the brake pedal to release the parking brake.
4. Shift the throttle lever to the "High speed" position to run the engine at the maximum rpm.
5. Right before starting cutting work, release the mower lock levers for mower units #4 and #5.
6. Shift the mower unit up/down lever to the "Lower" position to lower the mower units.

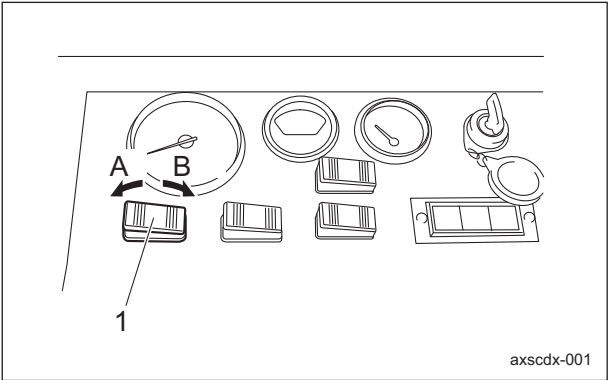


Cutting Operation_001

1	Mower unit up/down lever
A	UP
B	Neutral
C	DOWN

Handling Instructions

7. Set the knife rotation switch to the "ON" position to rotate the knives of all mower units.



Cutting Operation_002

1	Knife rotation switch
A	ON
B	OFF

8. Depress the traveling pedal to start cutting work.
- Note:
During the work, the knives will rotate or stop in sync with the up and down motion of the mower units.

Transporting

Transporting Procedure

When loading the machine into a trailer or a truck to transport it, drive the machine forward. When unloading, drive the machine in reverse. If the roof is installed on the machine, remove it. The roof may be damaged by wind pressure.

Maintenance Precautions Page 5-2**Maintenance Schedule Page 5-2**

Specified Values Page 5-4

Jacking up the machine Page 5-4

About the Jacking up the machine Page 5-4

Jack-up Points Page 5-4

Greasing Page 5-5

About Greasing Page 5-5

Greasing Points Page 5-6

Maintenance Work Page 5-9

Change of Rotary Knife Page 5-9

Grinding of Rotary Knife Page 5-13

Balancing of Rotary Knife Page 5-14

Removing/Installing Tires Page 5-15

Adjustment of Belt Tension Page 5-16

Adjustment of Brake Page 5-16

Adjusting the Neutral Position of the
Piston Pump Page 5-18

Change of Coolant Page 5-19

Change of Hydraulic Oil Page 5-20

Change of Hydraulic Oil Filter Page 5-21

Change of Fuse Page 5-25

Long-Term StoragePage 5-26

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 Barons 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

GM2800B

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 500 hrs.	Every 1 years	Every 2 years	Every 4 years	Remarks
Engine	Tightening the parts	○													
	Fuel	○													
	Fuel filter cartridge										△				
	Engine oil	○				●	△								50 hrs (first time)
	Engine oil filter	○				●	△								
	Radiator	○													
	Oil cooler	○													
	Coolant	○				△									
	Fan belt	○										△			
	Battery	○											△		
	Battery fluid	○													
Main body	Cleaning the exterior		○												
	Tightening the parts	○													
	Interlock system	○													
	Electrical wiring											○			

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 500 hrs.	Every 1 years	Every 2 years	Every 4 years	Remarks
Main body	Knife (blade)	○													Refer to "Inspection of Rotary Knife"
	Operating height (Mowing height)	○													
	Greasing, oiling					○									Refer to "greasing point"
	Tire	○													Refer to "Inspection of Tires"
	Brake	○													Refer to "Inspection of Brake"
	Brake wire	○						△							Refer to "Inspection of Wire"
	Throttle wire	○						△							Refer to "Inspection of Wire"
	Oil leakage	○													
	Hydraulic oil	○					●				△				
	Hydraulic oil filter						●				△				
	Hydraulic hose (moving part)	○											△		
	Hydraulic hose (fixed part)	○												△	
	Air cleaner	○													
	Outer element							△				△			Whichever comes first
	Inner element											△			
	Electromagnetic pump filter	○						△							
	Fuel strainer						○					△			
	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.

Air cleaner should be cleaned more often in dusty conditions than in normal conditions.

Specified Values

Fuel tank capacity	51.0 dm ³ (51.0 L)	
Hydraulic tank capacity	44.0 dm ³ (44.0 L)	Shell Tellus S2M46 or equivalent
Quantity of engine oil	9.7 dm ³ (9.7 L)	
Coolant volume	12.0 dm ³ (12.0 L)	Including reserve tank (1.0 L)
Front tires	150 kPa (1.5 kgf/cm ²)	29 × 14.00 - 15
Rear tires	140 kPa (1.4 kgf/cm ²)	20 × 12.00 - 10

Jacking up the machine

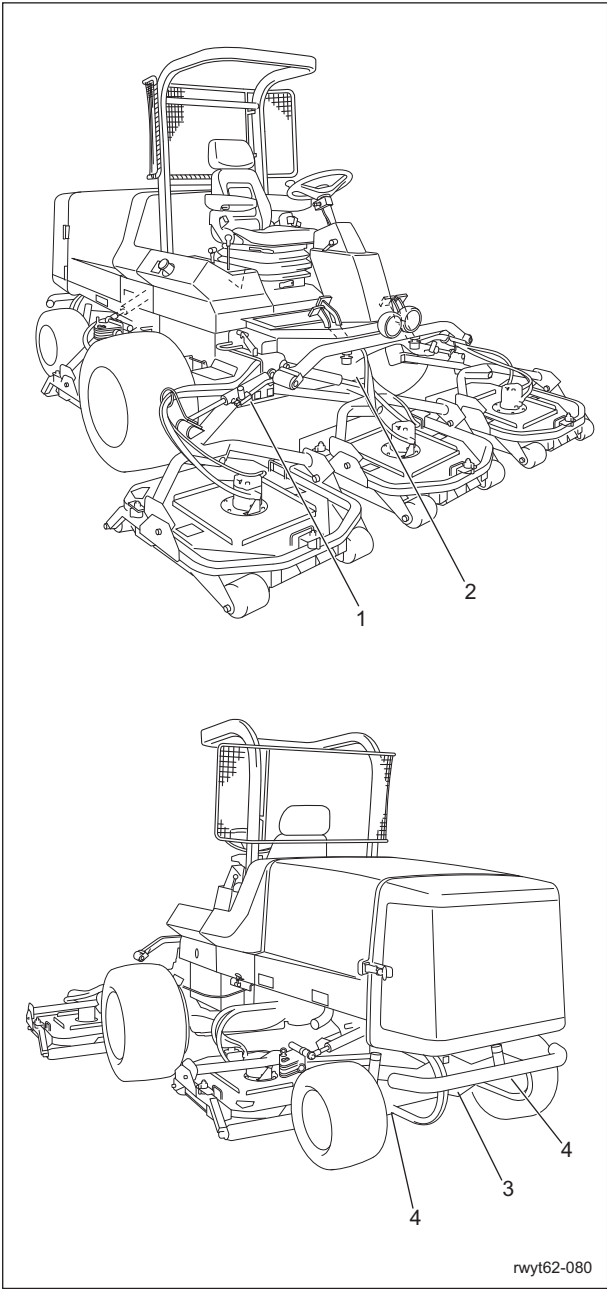
About the Jacking up the machine

 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.

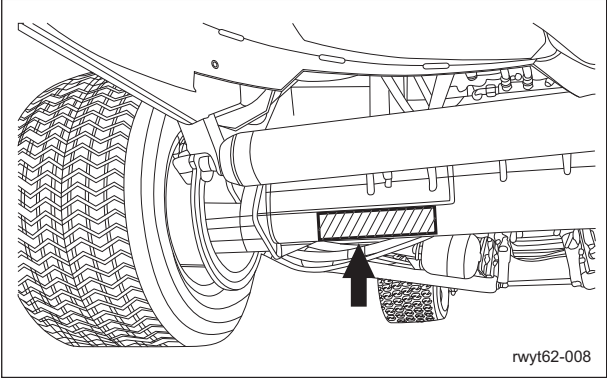
Jack-up Points



Jack-up Points_001

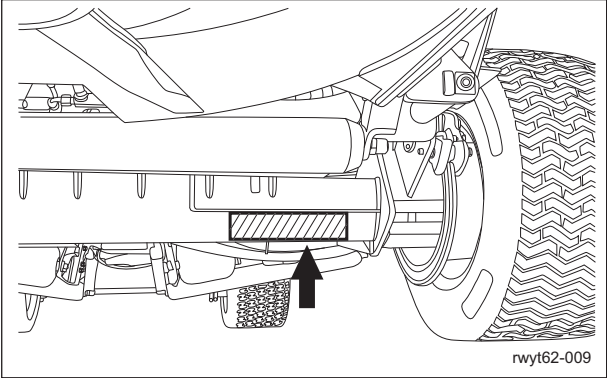
	Jack-up points
1	Front right frame
2	Front left frame
3	Center of pivot
4	Below rear wheel motors

1. Front right frame



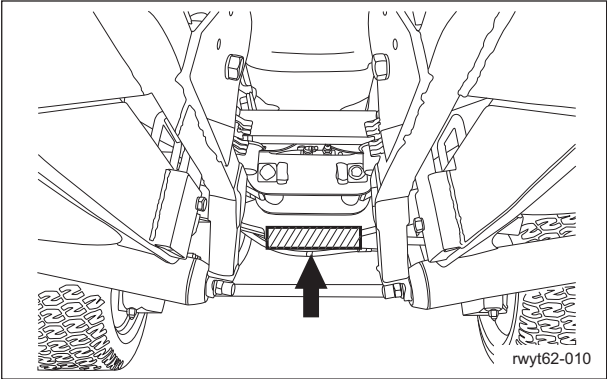
Jack-up Points_002

2. Front left frame



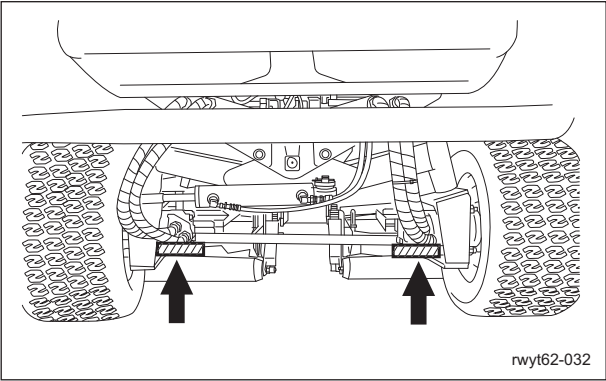
Jack-up Points_003

3. Center of pivot



Jack-up Points_004

4. Below rear wheel motors
Two locations



Jack-up Points_005

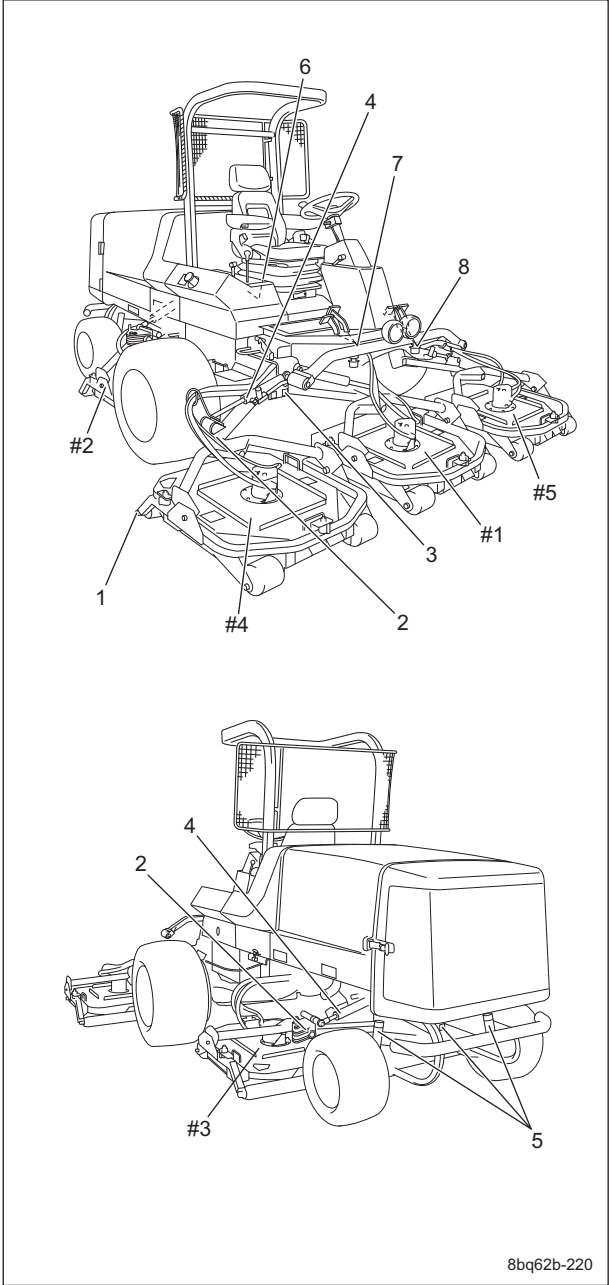
Greasing

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

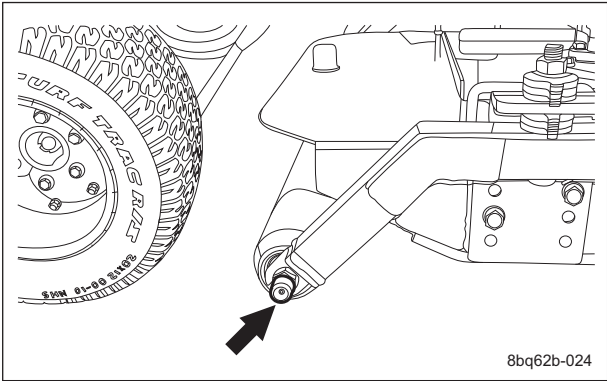
Grease nipples are installed in the following locations.
Add grease every 50 hours of operation.



Greasing Points_001

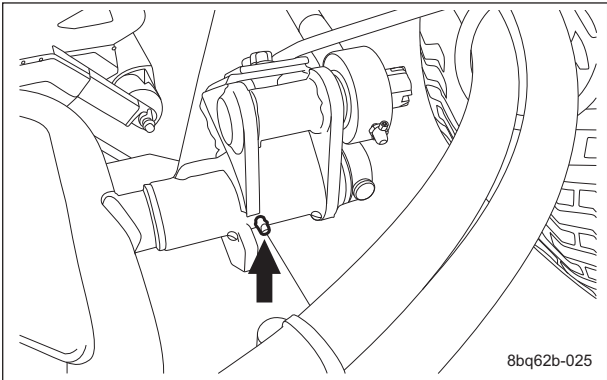
	Portion	No. of Greasing Points
1	Rear roller	10
2	Mower arm fulcrum	5
3	Lift arm fulcrum	5
4	Lift arm cylinder fulcrum	12
5	Pivot	3
6	Neutral position area	2
7	Traveling pedal shaft fulcrum	2
8	Foot brake	3

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



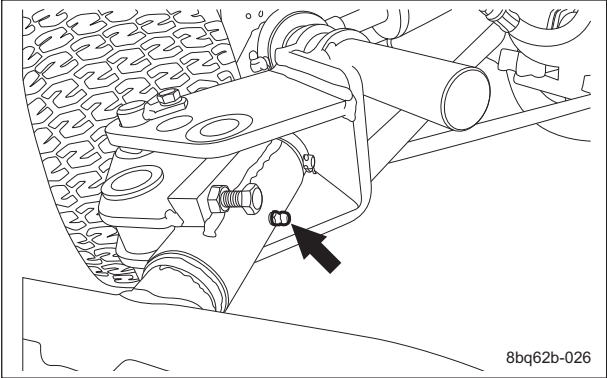
Greasing Points_002

2. Mower arm fulcrum
There is one greasing point on the arm connected to each mower unit.
Mower units #1, #4 and #5



Greasing Points_003

Mower units #2 and #3

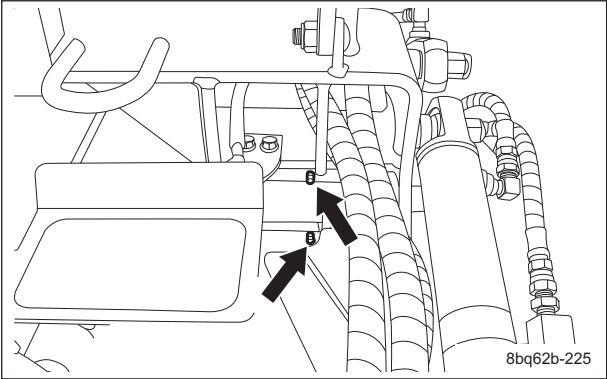


Greasing Points_004

3. Lift arm fulcrum

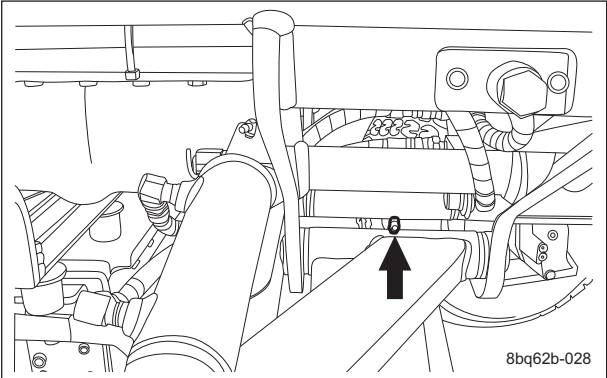
There is one greasing point on the arm connected to each mower unit.
Lower the mower units before greasing the lift arm fulcrums.

Mower units #1 and #4



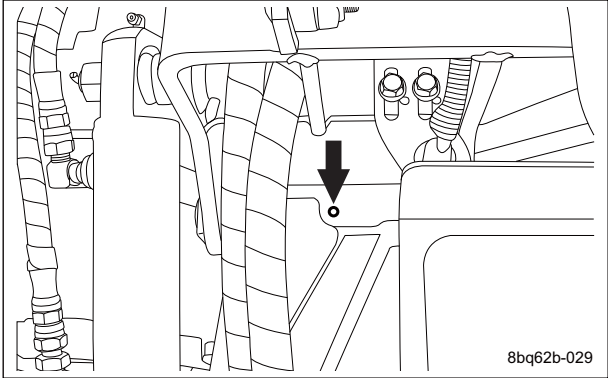
Greasing Points_005

Mower units #2 and #3



Greasing Points_006

Mower unit #5



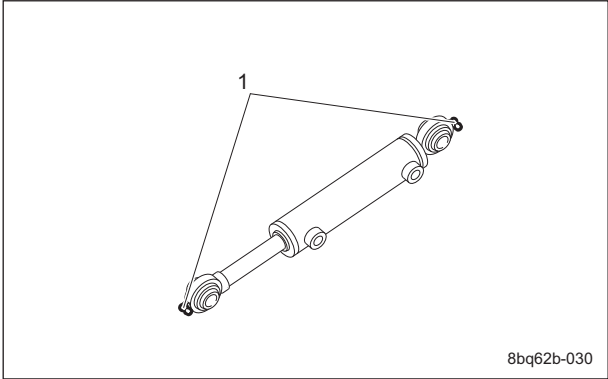
Greasing Points_007

4. Lift arm cylinder fulcrum

This is on each cylinder of the arms connected to each mower unit.

Mower units #1, #4 and #5

There are two greasing points on each cylinder.

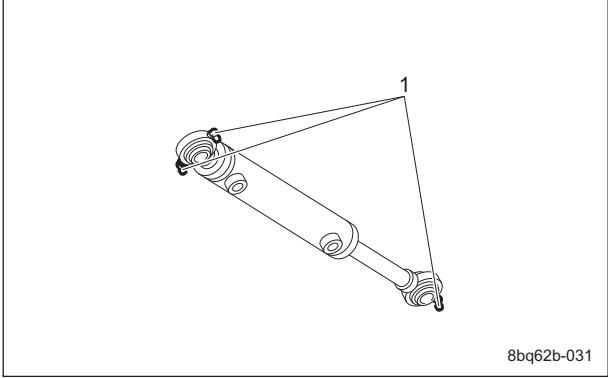


Greasing Points_008

1	Grease nipple (2 locations)
---	-----------------------------

Mower units #2 and #3

There are three greasing points on each cylinder.

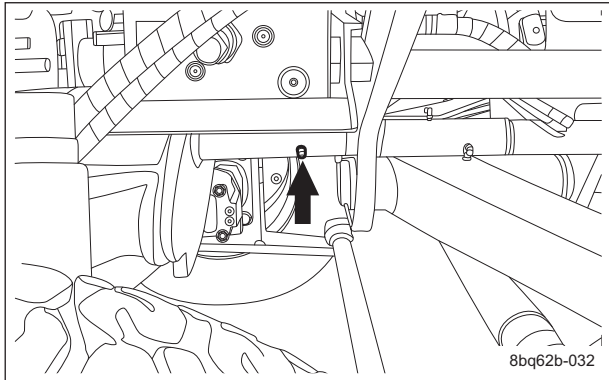


Greasing Points_009

1	Grease nipple (3 locations)
---	-----------------------------

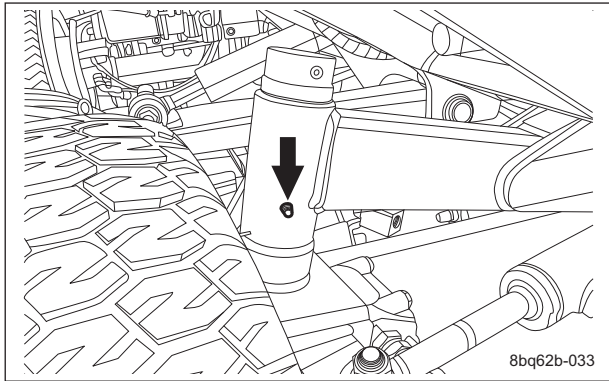
5. Pivot

Middle between the rear wheels



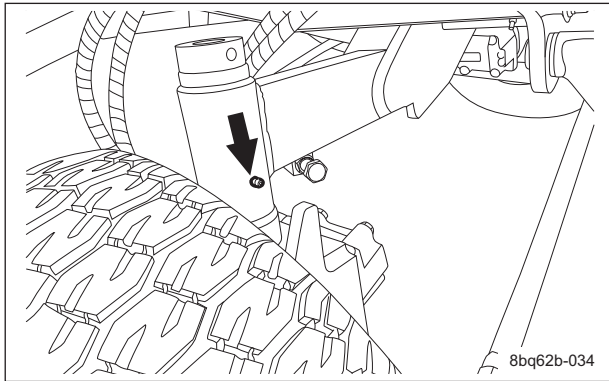
Greasing Points_010

Rear left wheel



Greasing Points_011

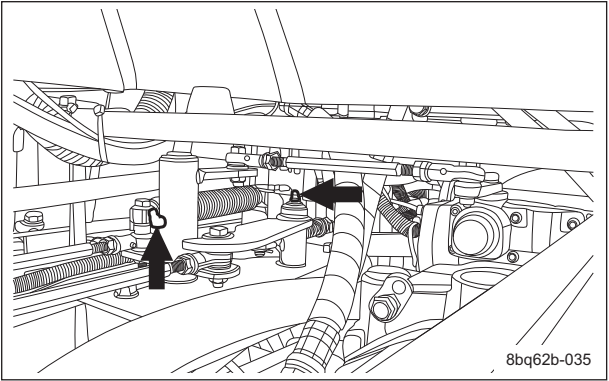
Rear right wheel



Greasing Points_012

6. Neutral position area

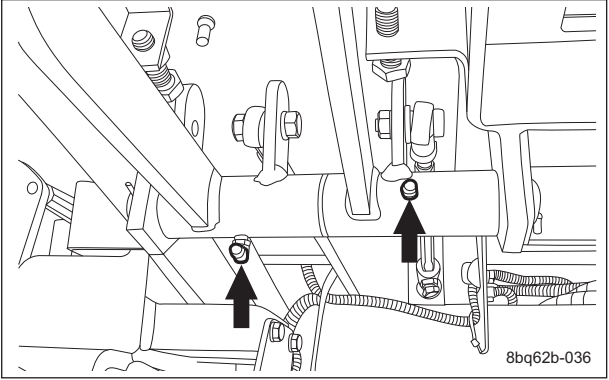
There are two locations.



Greasing Points_013

7. Traveling pedal shaft fulcrum

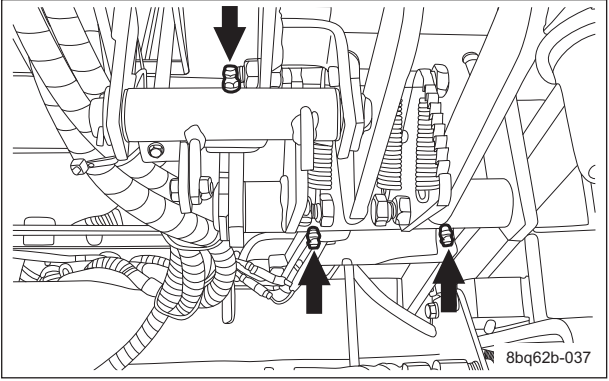
There are two locations.



Greasing Points_014

8. Foot brake

There are three locations.



Greasing Points_015

Maintenance Work

Change of Rotary Knife

Caution

The rotary knife is an edged tool. Take extra care in handling since they could cut your hands or legs.

Caution

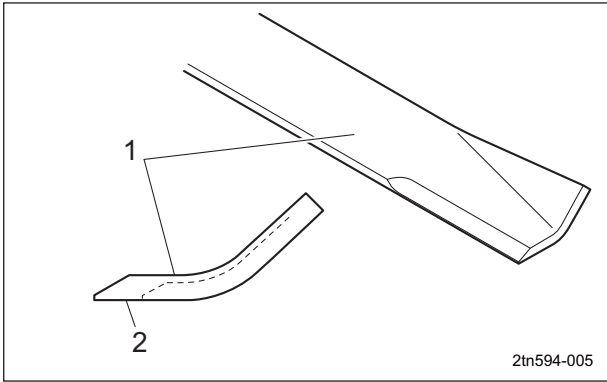
If the rotary knife becomes worn or damaged, a crack or tear between the sail and flat part will result. Take extra care since a broken piece of the rotary knife may fly off while it is rotating.

Caution

When touching edged tools, wear gloves, since they could cut your hands.

Important

The rotary knife has a specific installation direction. Do not install it facing the wrong direction.



Change of Rotary Knife_001

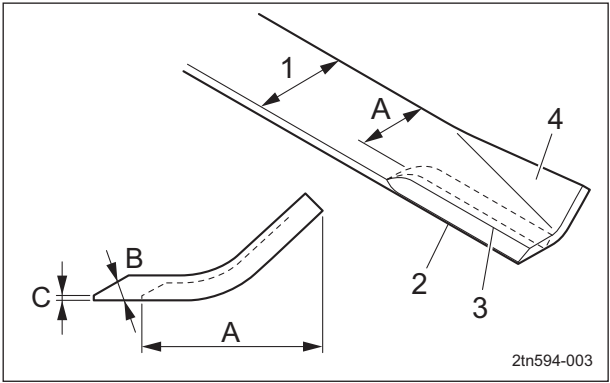
1	Rotary knife top side
2	Rotary knife bottom side

Important

Before installing the rotary knife, make sure that it is balanced.

If the edge of the rotary knife becomes chipped or thin, replace it with a new one. The criteria for replacing the rotary knife are described below.

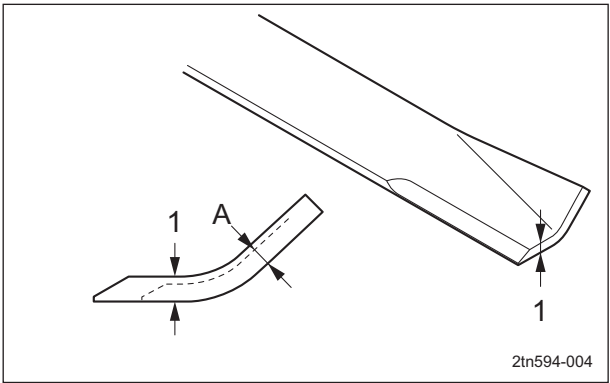
1. When the narrowest part of the rotary knife has a width of less than 2/3 of the width of a new knife



Change of Rotary Knife_002

1	Total width
2	Blade edge
3	Blade base
4	Sail
A	less than 2/3
B	30 - 40°
C	0.5 - 1.0 mm (0.02 - 0.04 in)

2. When the thinnest part of the rotary knife has a thickness of less than 1/3 of the thickness of a new knife

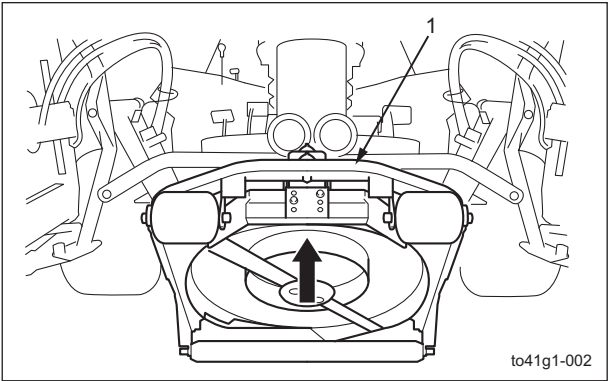


Change of Rotary Knife_003

1	Thickness
A	less than 1/3

Mower unit #1

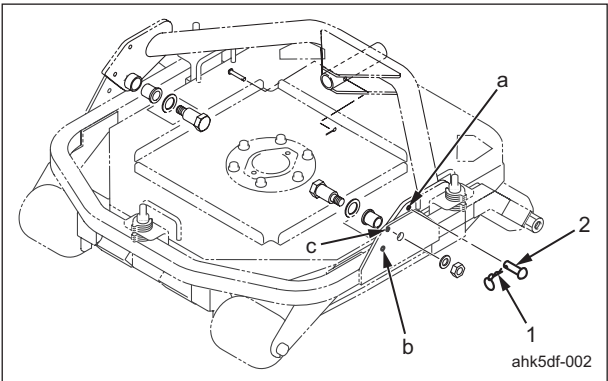
- 1. Start the engine, and then raise the mower units.
- 2. Stop the engine, and then remove the key.
- 3. Lift the mower unit at the front.



Mower unit #1_001

1	Mower unit
---	------------

- 4. Remove the cotter pin and hardened roundhead pin inserted at a, and then insert them at b.

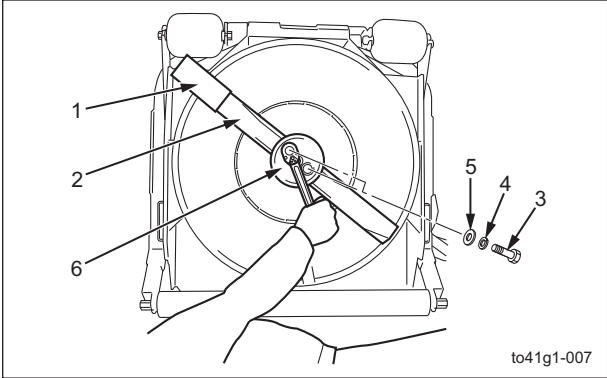


Mower unit #1_002

1	Cotter pin
2	Hardened roundhead pin

- 5. Follow the steps below to remove the rotary knife.
 - [1] Use the square pipe from the included tools to secure the rotary knife so that it does not turn.
 - [2] Remove the two bolts, spring washers and washers used to install the rotary knife.
 - [3] Remove the knife guide.

[4] Remove the rotary knife.



Mower unit #1_003

1	Square pipe
2	Rotary knife
3	Bolt
4	Spring washer
5	Washer
6	Knife guide

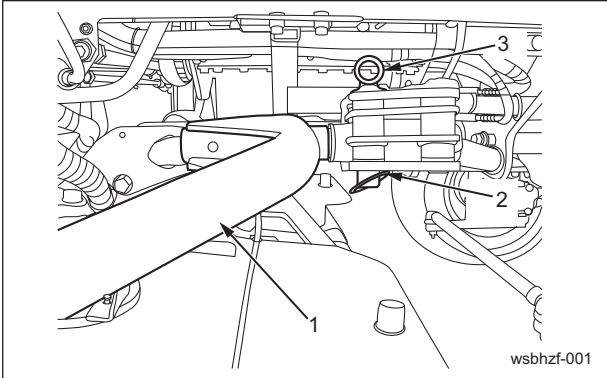
Important

The tightening torque for the knife mounting bolt is 67 - 85 N-m (683.20 - 866.75 kgf-cm).

- 6. Install the rotary knife.
For installing the rotary knife, reverse the removing procedure.

Mower Units #2/#3

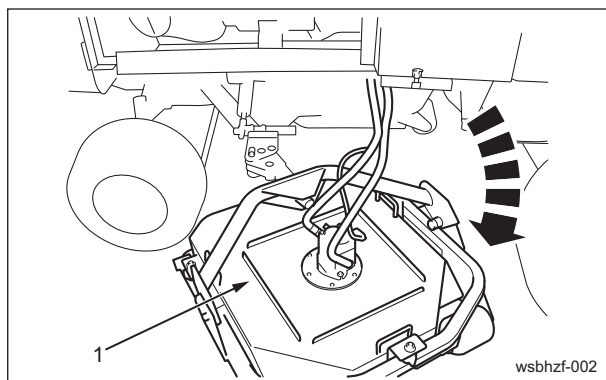
- 1. Remove the clip pin installed on the mower arm, and then pull out the grip pin.



Mower Units #2/#3_001

1	Mower arm
2	Clip pin
3	Grip pin

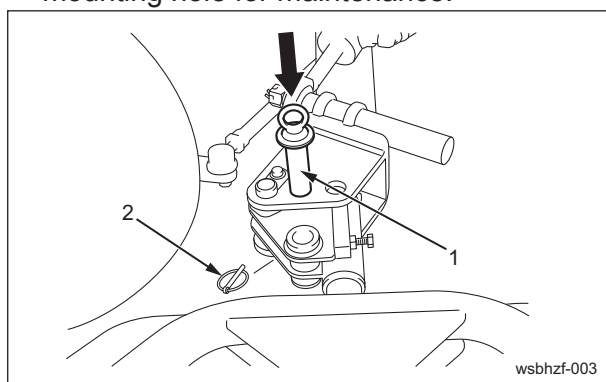
2. Pull out the mower unit.



Mower Units #2/#3_002

1	Mower unit
---	------------

3. Install the grip pin and clip pin in the mounting hole for maintenance.



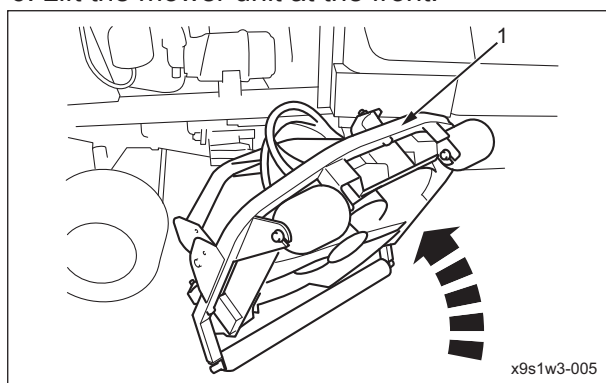
Mower Units #2/#3_003

1	Grip pin
2	Clip pin

4. Start the engine, and then raise the mower units.

5. Stop the engine, and then remove the key.

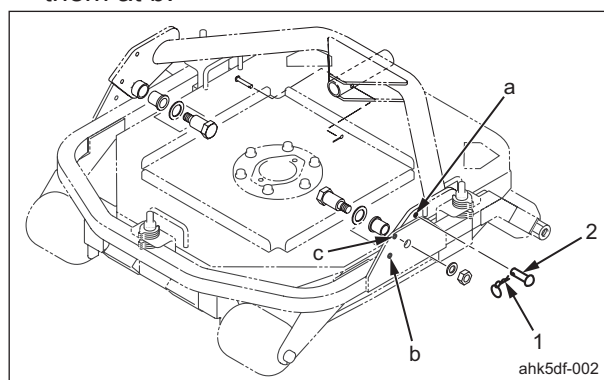
6. Lift the mower unit at the front.



Mower Units #2/#3_004

1	Mower unit
---	------------

7. Remove the cotter pin and hardened roundhead pin inserted at a, and then insert them at b.



Mower Units #2/#3_005

1	Cotter pin
2	Hardened roundhead pin

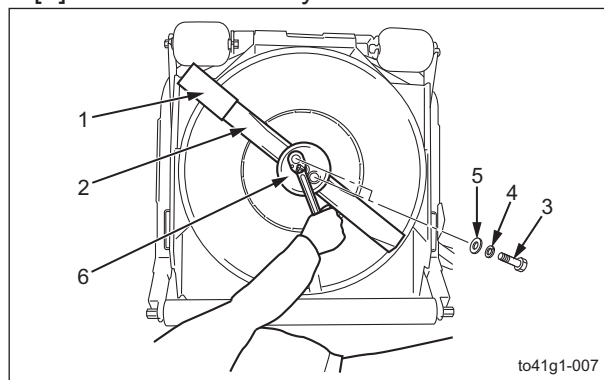
8. Follow the steps below to remove the rotary knife.

[1] Use the square pipe from the included tools to secure the rotary knife so that it does not turn.

[2] Remove the two bolts, spring washers and washers used to install the rotary knife.

[3] Remove the knife guide.

[4] Remove the rotary knife.



Mower Units #2/#3_006

1	Square pipe
2	Rotary knife
3	Bolt
4	Spring washer
5	Washer
6	Knife guide

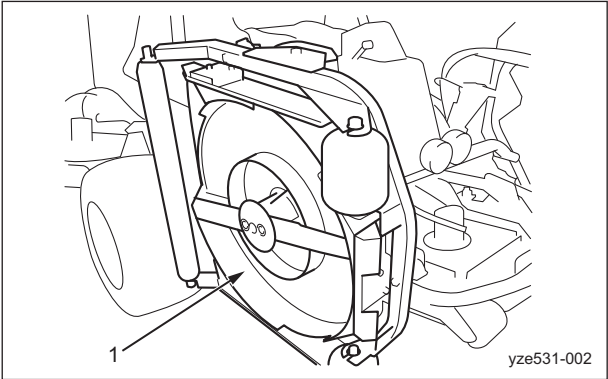
Important

The tightening torque for the knife mounting bolt is 67 - 85 N-m (683.20 - 866.75 kgf-cm).

9. Install the rotary knife.
For installing the rotary knife, reverse the removing procedure.

Mower Units #4/#5

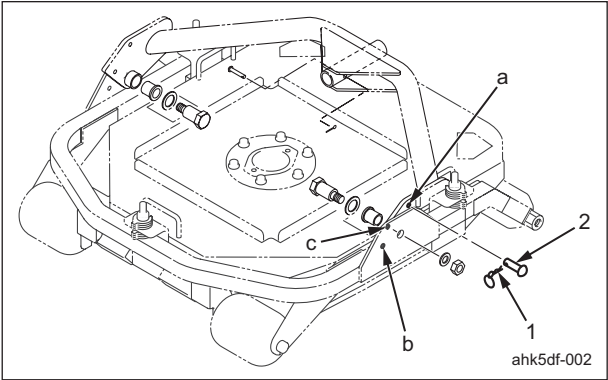
1. Start the engine, and then raise the mower units.



Mower Units #4/#5_001

1	Mower unit
---	------------

2. Stop the engine, and then remove the key.
3. Remove the cotter pin and hardened roundhead pin inserted at a, and then insert them at c.

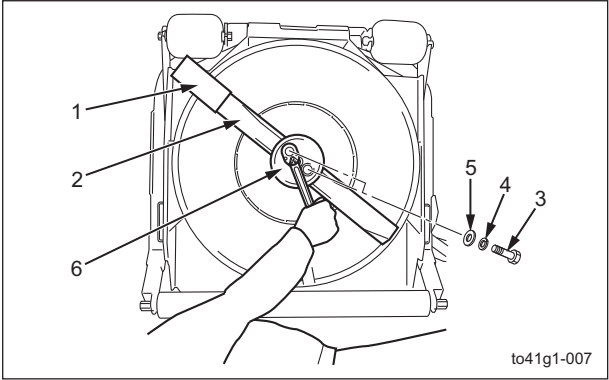


Mower Units #4/#5_002

1	Cotter pin
2	Hardened roundhead pin

4. Follow the steps below to remove the rotary knife.
- [1] Use the square pipe from the included tools to secure the rotary knife so that it does not turn.
- [2] Remove the two bolts, spring washers and washers used to install the rotary knife.

- [3] Remove the knife guide.
- [4] Remove the rotary knife.



Mower Units #4/#5_003

1	Square pipe
2	Rotary knife
3	Bolt
4	Spring washer
5	Washer
6	Knife guide

Important

The tightening torque for the knife mounting bolt is 67 - 85 N-m (683.20 - 866.75 kgf-cm).

5. Install the rotary knife.
For installing the rotary knife, reverse the removing procedure.

Grinding of Rotary Knife

⚠ Caution

The rotary knife is an edged tool. Take extra care in handling since they could cut your hands or legs.

⚠ Caution

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

⚠ Caution

If the rotary knife becomes worn or damaged, a crack or tear between the sail and flat part will result. Take extra care since a broken piece of the rotary knife may fly off while it is rotating.

⚠ Caution

When grinding the rotary knife, be sure to wear safety glasses and gloves.

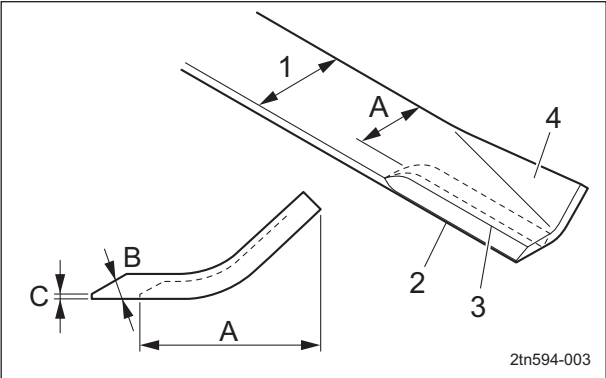
Important

Using an imbalanced rotary knife may cause vibrations, resulting in damage to the machine.

When the edge of the rotary knife becomes rounded and no longer cuts well, sharpen the worn cutting edge with a grinder or sander. If the edge of the rotary knife becomes chipped or thin, replace it with a new one. The criteria for grinding the rotary knife is described below.

1. When, after grinding, the width of the rotary knife to the blade edge is 2/3 or more of the total width of a new knife

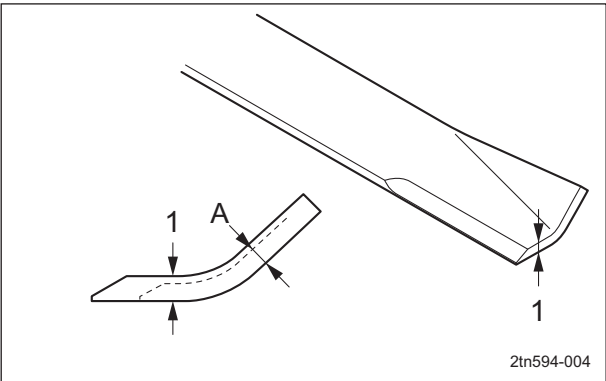
2. When, after grinding, the blade base of the rotary knife does not reach the sail



Grinding of Rotary Knife_001

1	Total width
2	Blade edge
3	Blade base
4	Sail
A	2/3 or more
B	30 - 40°
C	0.5 - 1.0 mm (0.02 - 0.04 in)

3. When the thinnest part of the rotary knife has a thickness of 1/3 or more of the thickness of a new knife



Grinding of Rotary Knife_002

1	Thickness
A	1/3 or more

Follow the steps below to grind the rotary knife.

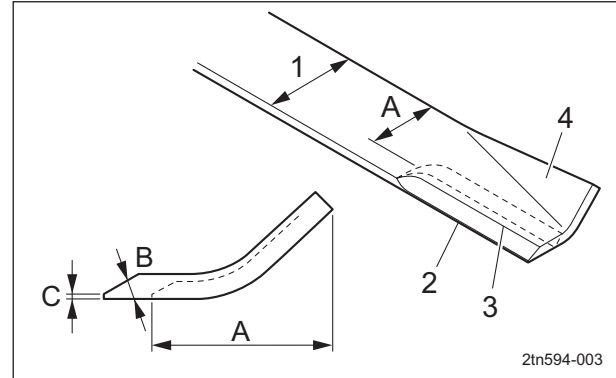
1. Remove the rotary knife from the cutter deck.

"Change of Rotary Knife" (Page 5-9)

Important

Grind only the top surface of the edge, and be sure to maintain the original angle. By equally grinding the left and right ends of the rotary knife, it can be sharpened without becoming imbalanced.

2. Grind the cutting edge of the rotary knife. Grind so that the edge angle is 30 - 40 degrees, the point thickness is 0.5 - 1.0 mm (0.02 - 0.04 in), and the blade base does not reach the sail.



Grinding of Rotary Knife_003

1	Total width
2	Blade edge
3	Blade base
4	Sail
A	2/3 or more
B	30 - 40°
C	0.5 - 1.0 mm (0.02 - 0.04 in)

3. Balance the rotary knife.
"Balancing of Rotary Knife" (Page 5-14)
4. If it is not balanced, repeat steps 2. - 3.

Balancing of Rotary Knife

Caution

The rotary knife is an edged tool. Take extra care in handling since they could cut your hands or legs.

Caution

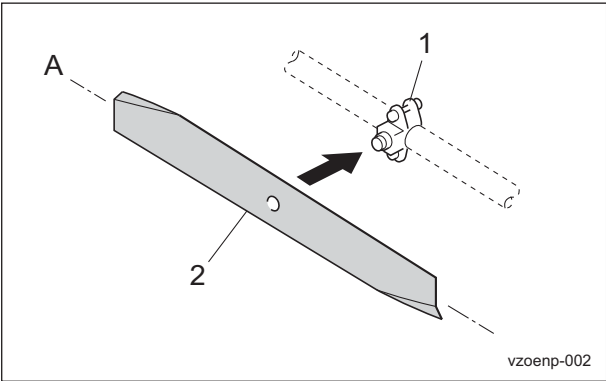
When touching edged tools, wear gloves, since they could cut your hands.

Important

Using an imbalanced rotary knife may cause vibrations, resulting in damage to the machine.

When the rotary knife is worn asymmetrically, causing vibrations, or when it becomes dull or worn, remove the rotary knife from the cutter deck and balance it. Follow the steps below to balance the rotary knife.

1. Remove the rotary knife from the cutter deck.
"Change of Rotary Knife" (Page 5-9)
2. Install the balancer equipment in an appropriate location.
3. Fit the hole at the center of the rotary knife onto the balancer equipment, and then balance the left and right ends so that the rotary knife is level.



Balancing of Rotary Knife_001

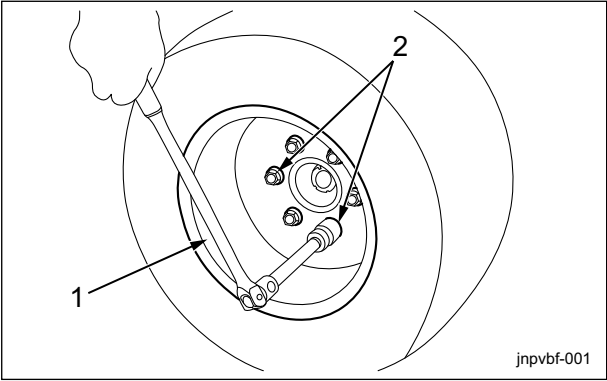
1	Balancer equipment
2	Rotary knife
A	Level

Removing/Installing Tires

Front Tires

Follow the steps below to remove the front tires:

- 1. Loosen the bolts.



Front Tires_001

1	Front tire
2	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 5-4)
- 3. Remove the bolts.
- 4. Remove the tire from the wheel mounting seat.

Important

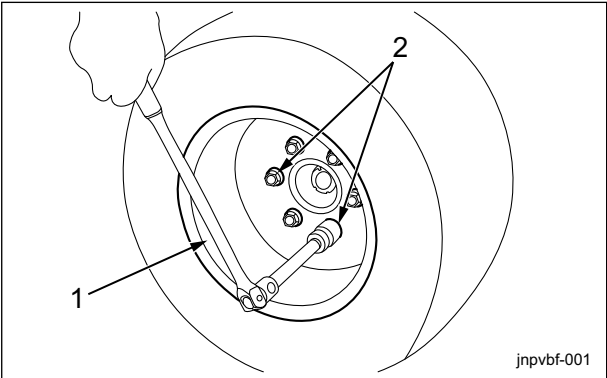
Tighten the bolts in the tightening order (crosswise).

For installing the front tires, reverse the removing procedure.

Rear Tire

Follow the steps below to remove the rear tire.

- 1. Loosen the bolts.



Rear Tire_001

1	Rear tire
2	Heat-treated bolt

- 2. Securely place the jack beneath the jack-up point below the rear wheel motor, and then raise it until the tire lifts off the ground. "Jack-up Points" (Page 5-4)
- 3. Remove the bolts.
- 4. Remove the tire from the wheel mounting base.

Important

Tighten the bolts in the tightening order (diagonally).

For installing the rear tire, reverse the removing procedure.

Adjustment of Belt Tension

 **Warning**

Be sure to stop the engine before adjusting the belts.

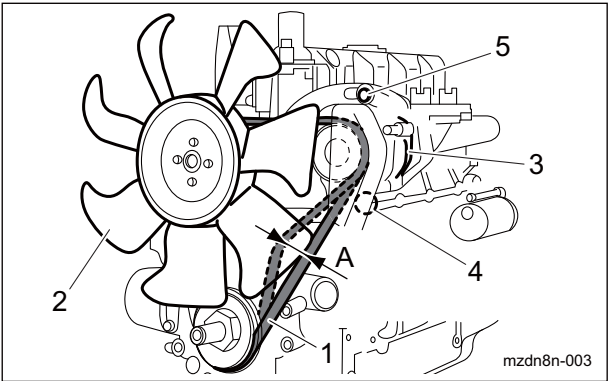
Important

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 inappropriate, loosen bolts A and B (that affix 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	7.0 - 9.0 mm (0.28 - 0.35 in)

Adjustment of Brake

 **Caution**

Make sure that the brake wire is not cracked or damaged.

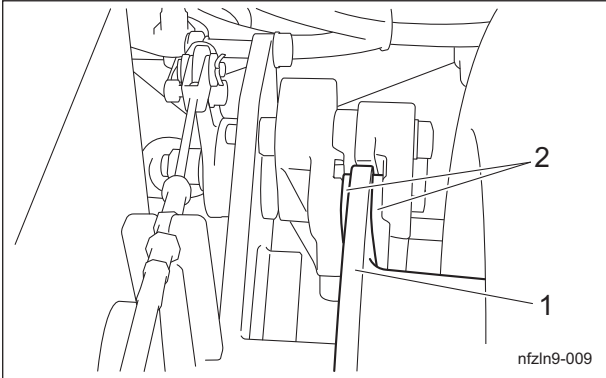
Important

If the brake is not sufficiently effective due to a larger clearance between the brake disc and the pad, adjust the clearance.
The wire is used for fine adjustments.

Important

Adjust the brake with the brake pads.

The brake pad wear limit is 3.0 mm (0.12 in).



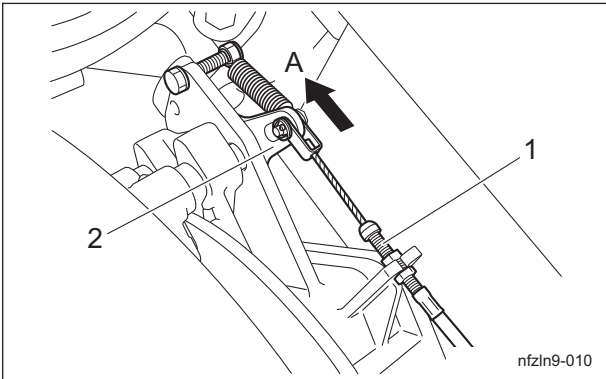
Adjustment of Brake_001

1	Brake disc
2	Brake pad

Important

Make sure that the lever is maintained in the open position (neutral).

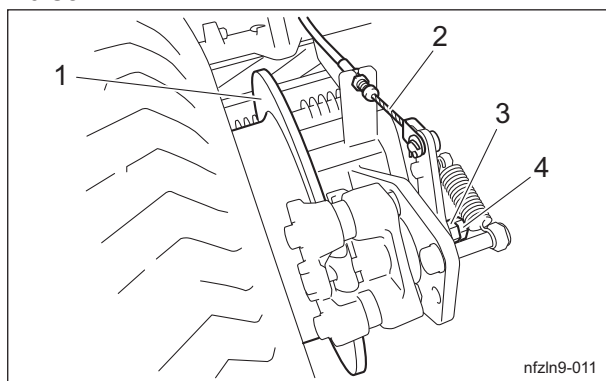
1. For each wheel, fully tighten the adjustment bolt on the brake disc side.



Adjustment of Brake_002

1	Adjustment bolt (on brake disc side)
2	Lever
A	Open (neutral)

2. Reduce the clearance by loosening the lock nut, then tightening the adjustment nut. Tighten the adjustment nut until the friction material contacts the friction surface of the disc.



Adjustment of Brake_003

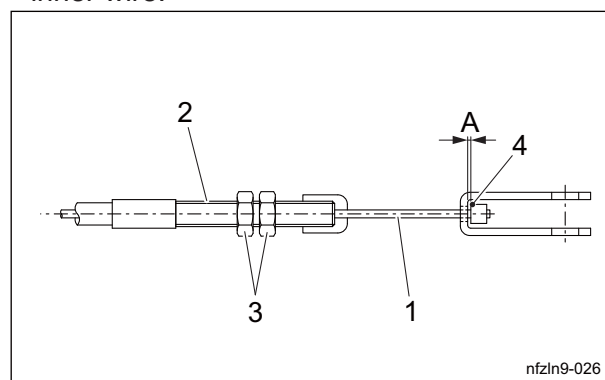
1	Brake disc
2	Wire
3	Adjustment nut
4	Lock nut

Warning

A clearance between the brake disc and the pad that is too small may result in heat generation or fire.

3. Loosen the adjustment nut to adjust the clearance between the brake disc and the pad to about 0.2 mm (0.0079 in).
4. Securely place the jack beneath the jack-up point of the front left/right frame area, and then raise it until both tires lift off the ground.
5. Check that the disc rotates freely.
6. Tighten the lock nut, and then fully tighten it while holding the adjustment nut in place.

7. With the brake pedal released, obtain a play of 1.0 mm (0.039 in) at the connection of the inner wire.



Adjustment of Brake_004

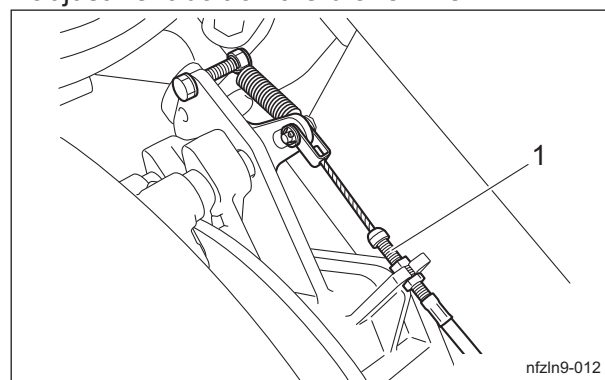
1	Inner wire
2	Adjustment bolt
3	Lock nut
4	Connection
A	1.0 mm (0.039 in)

8. Use a wrench to loosen the lock nut and tighten it after making the adjustment with the adjustment bolt.
9. Drive, and then 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.

Caution

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

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



Adjustment of Brake_005

1	Adjustment bolt (on brake disc side)
---	--------------------------------------

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**

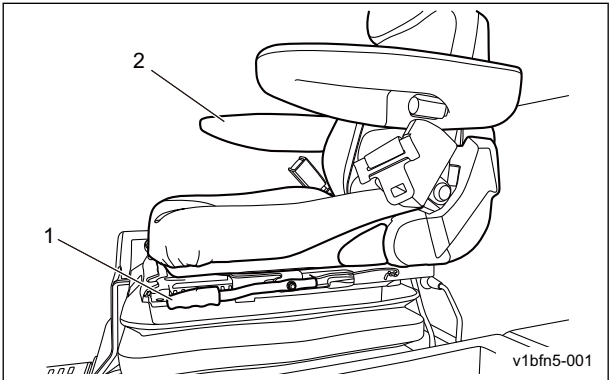
Make sure not to touch rotating tires.

 **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.

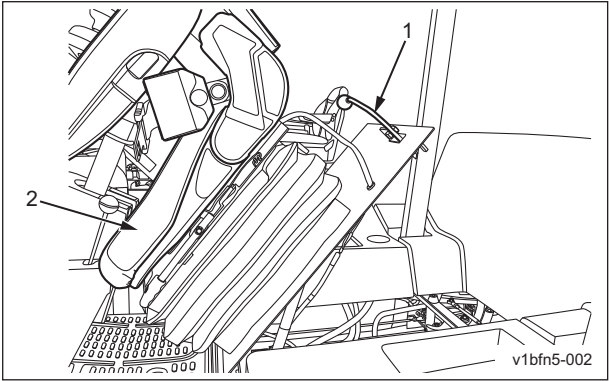
1. Stop the engine.
2. Place the jacks beneath the jack-up points, and then lift the machine off the ground.
3. Make sure that no tires come into contact with the jack stand.
4. Make sure that the steering wheel is raised completely.
5. Pull up the forward/backward adjustment lever, and then slide the seat backward completely.



Adjusting the Neutral Position of the Piston Pump_001

1	Forward/backward adjustment lever
2	Seat

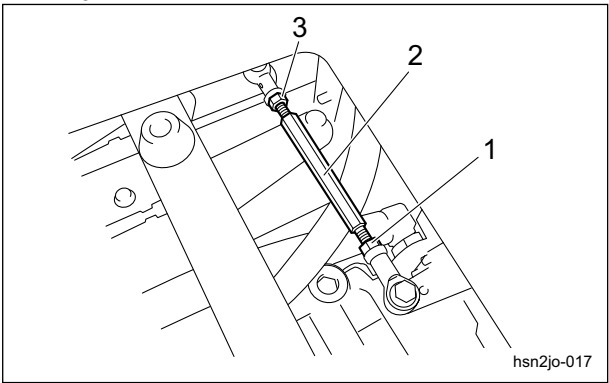
6. While pulling up the lever, tilt the seat upward.



Adjusting the Neutral Position of the Piston Pump_002

1	Lever
2	Seat

7. Start the engine, and rev it up to the maximum rpm.
8. Set the 2WD/4WD selector switch to the "2WD" position.
9. Adjust the neutral position.
[1] If the front tires rotate forward, loosen the lock nuts, and then turn the neutral adjustment rod to shorten it.
[2] If the front tires rotate in reverse, loosen the lock nuts, and then turn the neutral adjustment rod to extend it.



Adjusting the Neutral Position of the Piston Pump_003

1	Lock nut A (Left-hand thread)
2	Neutral adjustment rod
3	Lock nut B (Right-hand thread)

10. Find the position where the front wheels stop, and then tighten the lock nuts.

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 and antifreeze (long-life coolant), and then pour it into the radiator and reserve tank.

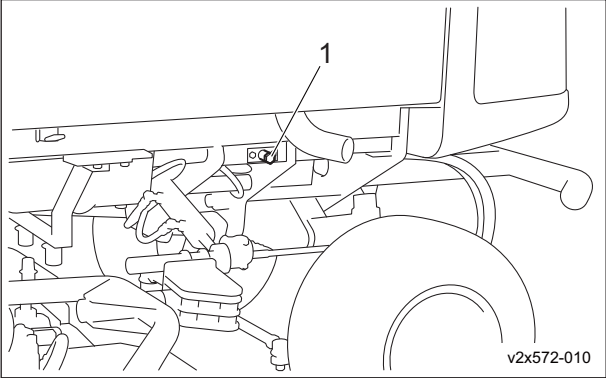
Important

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, 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 %

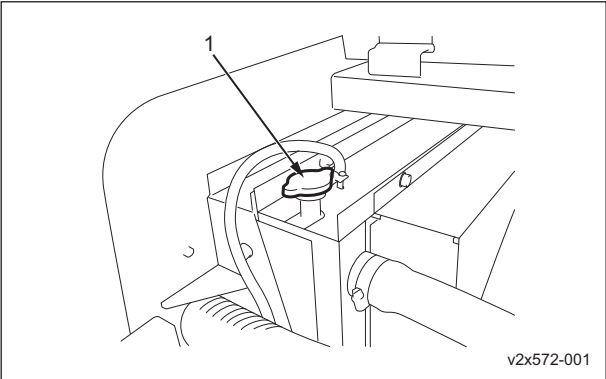
- 1. Stop the engine, and then allow the radiator to cool.
- 2. Open the hood.
- 3. Follow the steps below to drain the coolant.
 - [1] Position a container to drain the coolant into.
 - [2] Remove the drain plug from the radiator.



Change of Coolant_001

1	Radiator drain plug
---	---------------------

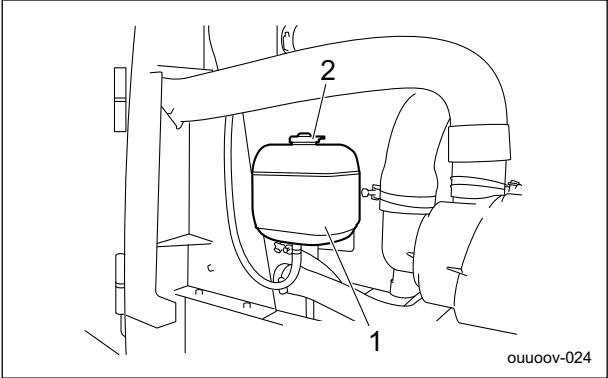
- [3] Remove the radiator cap.



Change of Coolant_002

1	Radiator cap
---	--------------

[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 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 12.0 dm³ (12.0 L).
 - [1] Install the drain plug.
 - [2] Supply clean water and antifreeze into the radiator up to the radiator cap opening.
 - [3] Close the radiator cap.
 - [4] Supply clean 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

⚠ Caution

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

Important

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

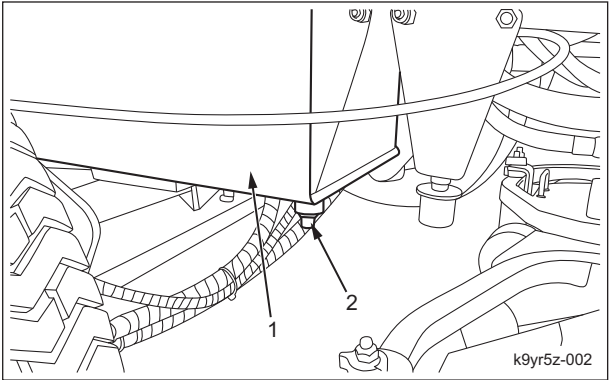
Important

If the 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. 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.

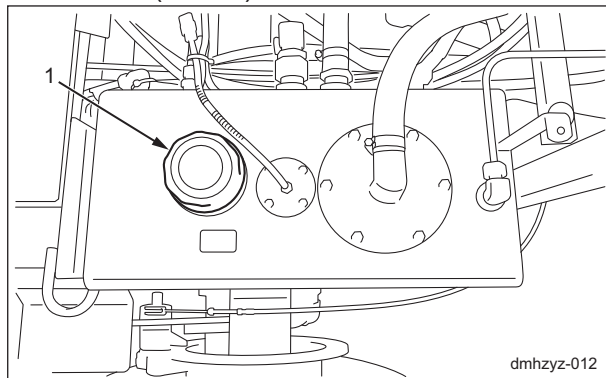


Change of Hydraulic Oil_001

1	Hydraulic tank
2	Drain plug

2. Remove the left tank cover.

- Open the tank cap, and then pour new oil from the fill port until the oil level reaches the middle of the oil gauge on the hydraulic tank. The hydraulic tank capacity is approximately 44.0 dm³ (44.0 L).



Change of Hydraulic Oil_002

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

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

Change of Hydraulic Oil Filter

Change of Hydraulic Oil Line Filter

Warning

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.

Caution

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

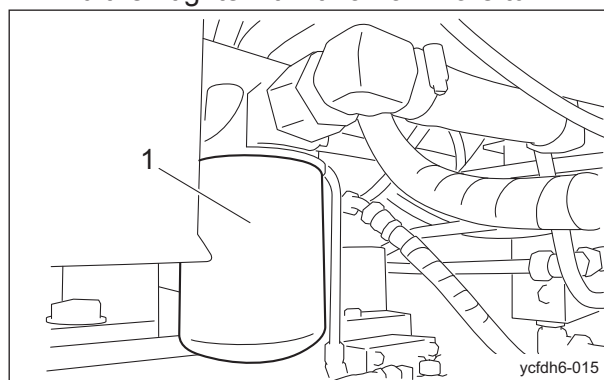
Caution

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

Important

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

- On a level surface, lower the mower units, and then stop the engine.
- Loosen the old filter cartridge by hand and remove it.
- Lightly coat the packing of the new filter cartridge with hydraulic oil, and then install the cartridge.
- Firmly tighten the filter cartridge by hand until the packing contacts the mounting surface. And then tighten it with a half more turn.



Change of Hydraulic Oil Line Filter_001

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

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

Maintenance

Change of Hydraulic Oil Suction Filter

 **Warning**

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.

 **Caution**

If the hydraulic 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

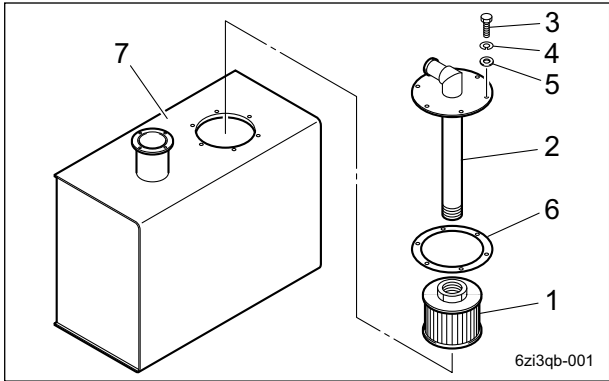
Use Shell Tellus S2M46 (or equivalent) as hydraulic oil.

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 left tank 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 Oil 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 left tank 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.

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

Caution

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

Important

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

Important

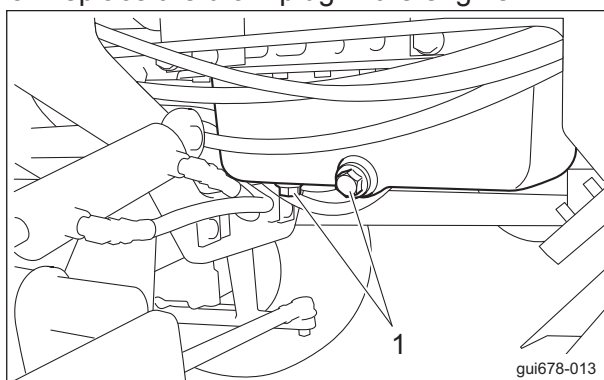
Be sure to use engine oil that is classified as API Service Grade CF or higher, with an SAE Viscosity that is appropriate for the operating environment (ambient temperature).

Important

Securely tighten the oil level gauge and oil filler cap.

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.

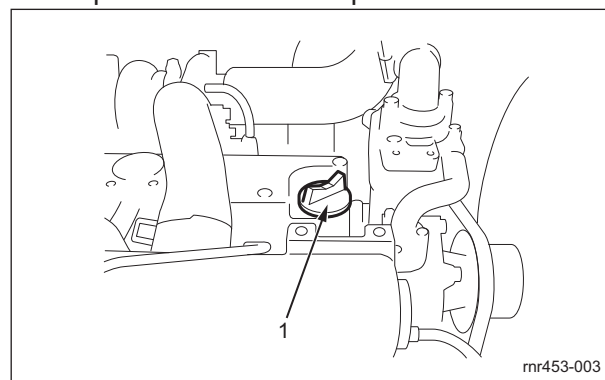
1. Move the machine onto a level surface and stop the engine.
2. Remove the drain plug while the engine oil is warm, and then drain the oil into a bowl.
3. Replace the drain plug in the engine.



Change of Engine Oil_001

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

4. Through the oil filling port, 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 9.7 dm³ (9.7 L).
5. Re-place the oil filler cap.



Change of Engine Oil_002

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

6. 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.
7. Check underneath the machine for oil leakage.

Replacement of Engine Oil Filter

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

Warning

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.

Caution

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

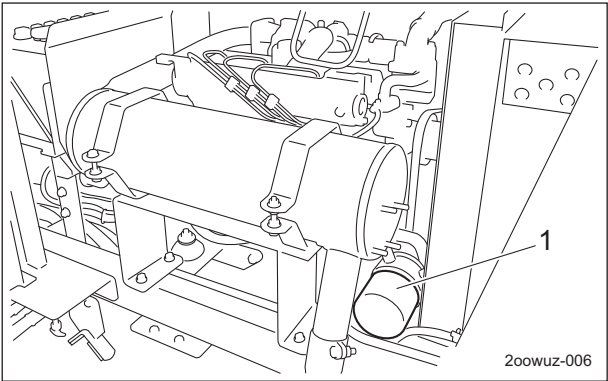
Important

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.

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



Replacement 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 4-10)

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.

Replacement of Fuel Filter

Important

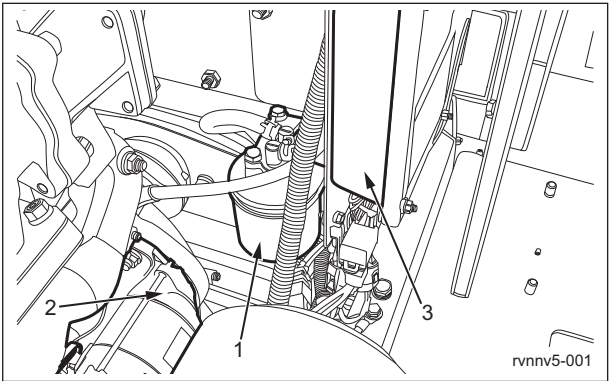
When installed, be careful that it is not contaminated with dirt or dust.

If the fuel is contaminated with dirt or dust etc., the fuel injection pump and injection nozzle will become worn.

Since the fuel filter is a cartridge, it cannot be disassembled or cleaned.

If dust or dirt accumulates in the fuel filter, the fuel flow will become insufficient.

Replace the fuel filter at the appropriate times.

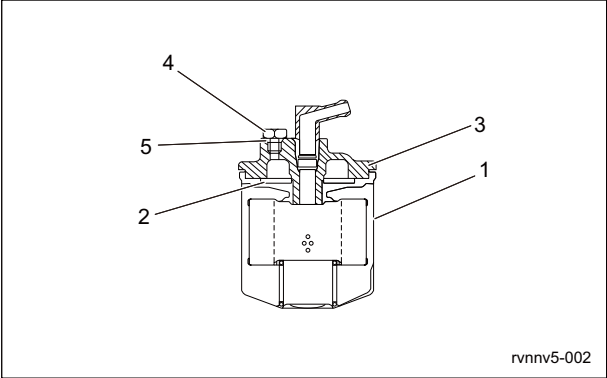


Replacement of Fuel Filter_001

1	Fuel filter
2	Starter
3	Relay box

1. Follow the steps below to replace the fuel filter.
- [1] Using a filter wrench, remove the fuel filter cartridge.

[2] Lightly apply fuel to the packing of the new cartridge, and then properly hand-tighten the cartridge, without using the filter wrench.



Replacement of Fuel Filter_002

1	Cartridge
2	Packing
3	Cover
4	Air-bleeding plug
5	O-ring

2. If the key is turned to the "ON" position and the fuel pump is operated after replacement, air bleeding will occur automatically.

Change of Fuse

Fuse Box

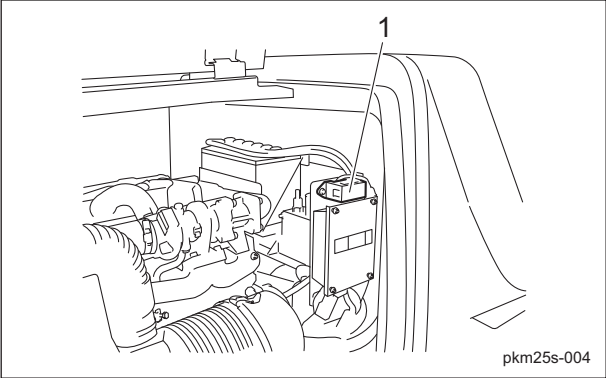
Warning

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

Important

If a fuse blows, a short may have occurred within the electrical circuit. Check for the cause, such as faulty terminal connections, damaged wiring or terminals, or incorrect wiring.

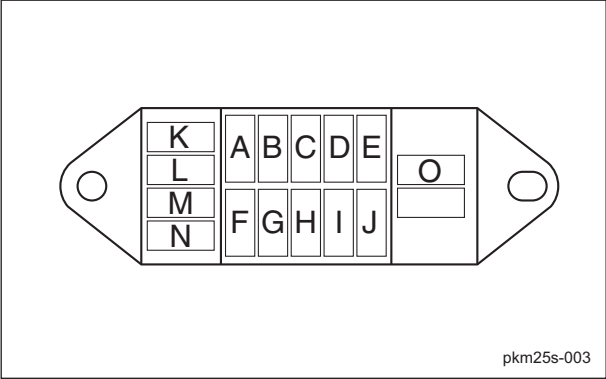
The fuse box includes spare fuses and tools.



Fuse Box_001

1	Fuse box
---	----------

The machine uses a mini fuse for automobiles. Replace an old fuse with a new fuse of the specified capacity.



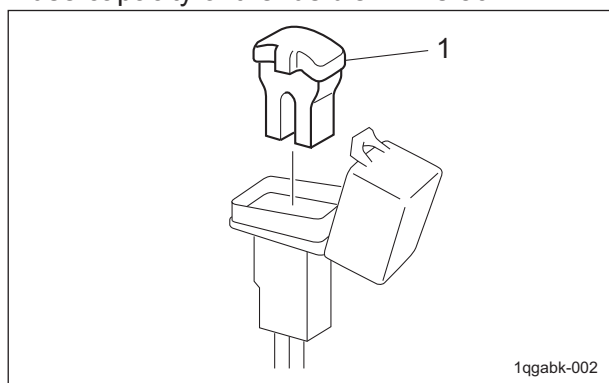
Fuse Box_002

A	5 A	Timer
B	5 A	Thermo-start lamp
C	5 A	Tachometer, fuel gauge, water temperature gauge, charge lamp, oil pressure (engine oil pressure) lamp, water temperature buzzer, hydraulic oil buzzer
D	15 A	Relay box 1, differential lock, (assist switch)
E	15 A	Relay box 2, 2WD/4WD selection, #4/#5 proximity switches
F	-	-
G	5 A	Timer
H	5 A	Alternator
I	5 A	Fuel pump, safety relay, stop solenoid
J	5 A	Relay (starter)
K	5 A	Spare
L	5 A	
M	15 A	
N	15 A	
O	Fuse removal tool	

Maintenance

Fusible Link

Fuse capacity of the fusible link is 50 A.



Fusible Link_001

1	Fusible link
---	--------------

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.

