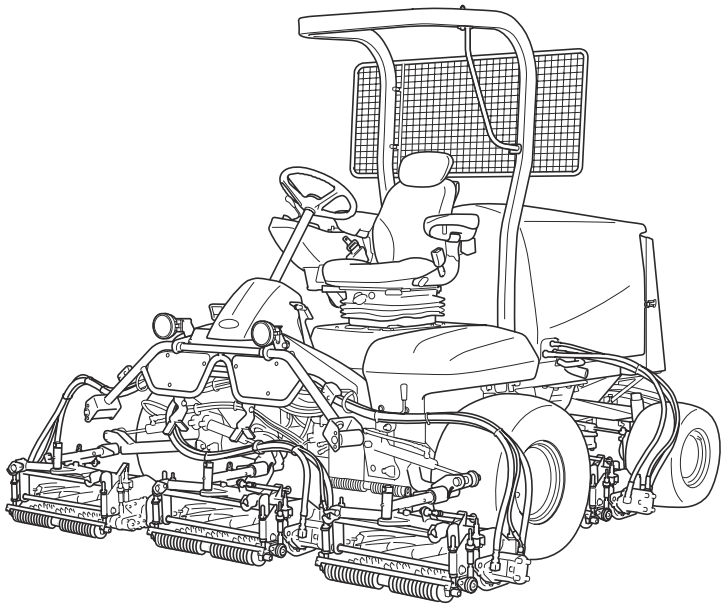
LM551

5-Unit Reel Mower

Owner's Operating Manual



Serial No.　LM551：10180-

"Required reading"
Read this manual before using the machine.

BARONESS®
Quality on Demand

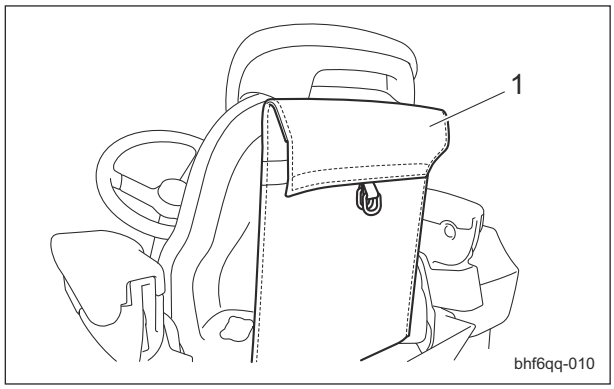
Ver.2.5

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.
For details on the handling, adjustment and inspection of the attachments, refer to the Owner's Operating Manual for the attachments.

Keeping The Owner's Operating Manual

Keep this Manual in the bag located in the rear of the seat.

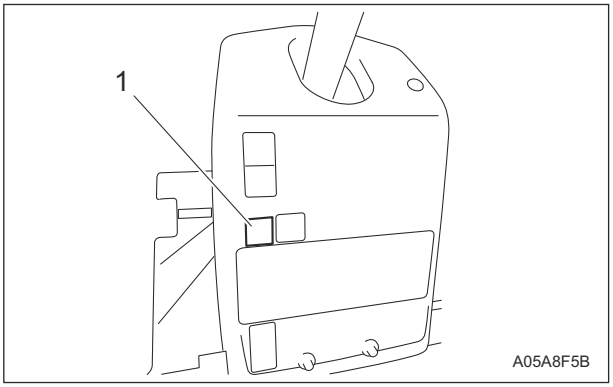


Keeping The Owner's Operating Manual_001

1	Bag

QR Code

(*QR Code is a registered trademark of DENSO WAVE INCORPORATED.)
A QR code label is affixed on the machine.



QR Code_001

1	QR code label

Scan the QR code with your smartphone for easy access to Baroness Manual Reference Service where you can browse Owner's Operating Manual and Parts Catalog.
https://doc.baroness-international.com/manuals/LM551



QR Code_002

Note:
A QR code for mower unit is printed on the serial number plate.

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 service for this machine should be performed by a mechanic with expertise.

If you have any questions concerning maintenance or genuine parts, please contact a Baroness dealer or Kyoeisha.

When making inquiries about your product, please specify the model 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 Kyoeisha.
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 the language used in this manual, it is the owner's responsibility to explain this material to them.
3. All operators and mechanics should seek and obtain professional and practical instruction.
   The owner is responsible for training the users.
   Such instruction should emphasize:
   [1] The need for care and concentration when working with ride-on machines.
   [2] Control of a ride-on machine sliding on a slope will not be regained by the application of the brake.
   The main reasons for loss of control are
   - Insufficient wheel grip
   - Being driven too fast
   - Inadequate braking
   - The type of machine is unsuitable for its task
   - Lack of awareness of the effect of ground conditions, especially slopes
   - Incorrect hitching and load distribution
4. Never allow children or people unfamiliar with these instructions to use or service the machine.
   Local regulations may restrict the age of the operator.
5. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people, or property.
6. Keep in mind that the owner, operator, and mechanic are responsible for accidents or hazards occurring to other people or their property.
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, mask, 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

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, be sure to adjust or repair them before operating the machine.
8. Replace faulty mufflers.
9. On multi-cylinder/multi-reel machines, take care as rotating one cylinder/reel can cause other cylinders/reels to rotate.

Operation

1. Do not operate the machine under the influence of alcohol or drugs.
2. Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
3. Be sure all drives and shift are in neutral and parking brake is engaged before starting engine.
Only start engine from the operator's position.
Use seat belts if provided.
4. Do not change the engine governor settings or overspeed the engine.
Operating the engine at excessive speed may increase the hazard of personal injury.
5. Never operate the machine with damaged guards, shields, or without safety protective devices in place.
Be sure all interlocks are attached, adjusted properly, and functioning properly.
6. Keep hands and feet away from the rotating parts.
7. Do not carry passengers.
8. Never operate while people, especially children, or pets are nearby.
9. Only operate in good light, keeping away from holes and hidden hazards.
10. Do not operate the machine when there is the risk of lightning.
11. Do not stop or start suddenly.
12. Look behind and down before backing up to be sure of a clear path.
13. Slow down and use caution when making turns and crossing roads and sidewalks.
14. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
15. Do not take your eyes off the road ahead.
Do not operate the machine with no hands.
16. Remember there is no such thing as a safe slope.
Travel on grass slopes requires particular care.
To guard against overturning, follow these instructions.

[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 turns.

[4] Stay alert for humps and hollows and other hidden hazards.

17. Never use 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.
18. Use extra care while operating machine with a grass catcher or other attachments.
They can affect the stability of the machine.
19. Disengage drive to the cutting unit(s), when other than operating.
20. Do the following before leaving the operator's position.

[1] Stop on level ground.

[2] Disengage the all drives.

[3] Set the parking brake.

[4] Stop the engine.

[5] Remove the ignition key.

21. Stop the engine in the following conditions.

[1] Before refuelling.

[2] Before removing the grass catcher.
[3] Before making height or depth adjustment unless adjustment can be made from the operator's position.
[4] Before clearing blockages.
[5] Before checking, cleaning or working on the machine.
[6] After striking a foreign object or if an abnormal vibration occurs.
Inspect the machine for damage and make repairs before restarting and operating the equipment.

22. Reduce the throttle setting during engine run-out.
23. Do not direct discharge material toward anyone.
Avoid discharging material against a wall or obstruction.
Material may ricochet back toward the operator.
24. 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.
25. Close the fuel valve before transporting the machine.

Maintenance

1. Never allow untrained personnel to service machine.
2. Implement the following work before adjusting, cleaning or repairing.
[1] Stop the machine on level ground.
[2] Disengage drive to the cutting unit(s).
[3] Lower the cutting unit(s) and/or attachment(s).
[4] Set the parking brake.
[5] Stop the engine.
[6] Remove the ignition key.
[7] Wait for all movement to stop.
3. Allow the engine/muffler to cool before checking/maintenance.
4. To reduce the fire hazard, keep hot parts such as the engine and silencer/muffler, battery compartment and fuel storage area free of grass, leaves, or excessive grease. Clean up oil or fuel spillage.
5. Appropriately manage and correctly use the tools necessary for servicing or adjusting the machine.
6. Disconnect battery before making any repairs.
Disconnect the negative terminal first and the positive last.
Reconnect positive first and negative last.
7. Use jack stands to support components when required.
8. Keep hands and feet away from moving parts.
If possible, do not make adjustments with the engine running.
9. Make sure that parts such as wires are not touching each other and that their covers have not come off.
10. Keep all parts in good working condition and all hardware tightened.
Replace all worn or damaged decals.
11. Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
12. Carefully release pressure from components with stored energy.
13. Be sure to depressurize the hydraulic system before performing maintenance operations on it such as removing hydraulic equipment.
14. 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.

15. When checking the hydraulic circuit for pinhole leaks or oil leakage from nozzles, do not use your hands.
    Use items such as paper or corrugated cardboard to find leakage points.
    Be extremely careful with high-pressure oil as it may pierce your skin, resulting in an injury.
    If fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.
16. Use care when checking the cylinders/reels and bed knives.
    Wear gloves and use caution when servicing them.
17. Be careful during adjustment of the machine to prevent entrapment of the fingers between moving blades and fixed parts of the machine.
18. On multi-cylinder/multi-reel machines, take care as rotating one cylinder/reel can cause other cylinders/reels to rotate.
19. Check the grass catcher frequently for wear or deterioration.
20. 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.
21. If the fuel tank has to be drained, do this outdoors.

Storage

1. When machine is to be parked, stored, or left unattended, lower the cutting unit(s) and/or attachment(s) unless a positive mechanical lock is provided.
2. Allow the engine to cool before storing in any enclosure.
3. Only cover the machine with a sheet after hot parts have sufficiently cooled down.
4. Never store the equipment with fuel in the tank inside a building where fumes may reach an open flame or spark.
5. If the engine is provided with a shut-off valve, shut off valve while storing or transporting.
6. Do not store fuel near flames.
7. Swallowing engine coolant can cause injury or death; keep out of reach from children and pets.

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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 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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Specifications

Specifications

Model				LM551			
Name				5-Unit Reel Mower			
Mower unit type				22 in		26 in	
Dimensions	Total length			295 cm	116.14 in	←	←
	Total width	LH52	During operation	292 cm	114.96 in	-	-
			During transport	220 cm	86.61 in	-	-
		LH62・66	During operation	294 cm	115.75 in	322 cm	126.77 in
			During transport	220 cm	86.61 in	←	←
		LS62・66	During operation	292 cm	114.96 in	319 cm	125.59 in
			During transport	220 cm	86.61 in	←	←
	Total height		Roof	239 cm	94.09 in	←	←
			Steering wheel	160 cm	62.99 in	←	←
Weight	Machine (empty fuel tank)	LH52	with Groomer, CR brush, ROPS, Light and Ball proof net without Grass catcher	1439 kg	3172.45 lb	-	-
		LH62・66	with Groomer, CR brush, ROPS, Light and Ball proof net without Grass catcher	1530 kg	3373.07 lb	1584 kg	3492.06 lb
		LS62・66	with CR brush, ROPS, Light and Ball proof net without Grass catcher	1469 kg	3238.59 lb	1484 kg	3271.60 lb
	Grass catchers (for one machine)			23.0 kg	50.71 lb	25.0 kg	55.11 lb
Minimum turning radius		LH52	Front wheel (outer wheel) outside	306 cm	120.47 in	-	-
			Outer side of unit	347 cm	136.61 in	-	-
		LH62・66	Front wheel (outer wheel) outside,	306 cm	120.47 in	←	←
			Outer side of unit	347 cm	136.61 in	356 cm	140.16 in
		LS62・66	Front wheel (outer wheel) outside,	306 cm	120.47 in	←	←
			Outer side of unit	345 cm	135.83 in	354 cm	139.37 in
Engine		Model		Kubota V1505-T-E3B		←	
		Type		Vertical water-cooled 4-cycle diesel engine		←	
		Total displacement		1498 cm^3(1.498 L)	91.41 cu.in.	←	←

Engine	Maximum output	-		←	
	Rated output	33.0 kW (44.9 PS)/3000 rpm		←	
Fuel tank capacity		Diesel 51.0 dm3 (51.0 L)	Diesel 13.47 U.S.gals	←	←
Fuel consumption		276 g/kW・h (rated output)	203.0 g/PS・h (rated output)	←	←
Engine oil capacity		6.0 dm^3 (6.0 L)	1.59 U.S.gals	←	←
Coolant volume		12.0 dm^3 (12.0 L)	3.17 U.S.gals	←	←
Hydraulic tank capacity		30.3 dm^3 (30.3 L)	8.01 U.S.gals	←	←
Transmission oil capacity		-		←	
Operating width (Mowing width)		254 cm	100.00 in	282 cm	111.02 in
Operating height (Mowing height)	LH52	5.0 - 20.0 mm	0.197 - 0.787 in	-	-
	LH62･66	8.0 - 45.0 mm	0.315 - 1.772 in	←	←
	LS62・66	10.0 - 46.0 mm	0.394 - 1.811 in	←	←
Number of Blades		9・11		7	
Drive	Traveling	HST (Full time 4WD)		←	
	Mowing	Hydraulic (Gear motor drive)		←	
Speed (HST)	Forward	16.0 km/h	9.94 mph	←	←
	Reverse	8.0 km/h	4.97 mph	←	←
Speed (Mechanical)		-		-	
Efficiency		24,384 m^2/h (12.0 km/h x mowing width x 0.8)	6.03 acres/ hour (7.46 mph x mowing width x 0.8)	27,072 m^2/h (12.0 km/h x mowing width x 0.8)	6.69 acres/ hour (7.46 mph x mowing width x 0.8)
Maximum inclination for operation		15 degrees		←	
Tire size	Front wheel	26.5 x 14.00-12		←	
	Rear wheel	20 x 12.00-10		←	
Tire pneumatic pressure	Front wheel	120 kPa (1.2 kgf/cm^2)	17 psi	←	←
	Rear wheel	140 kPa (1.4 kgf/cm^2)	20 psi	←	←
Battery		105D31L		←	
Engine plug		-		←	

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

Product Overview

Mower Units

Baroness mower unit that can fit this machine is the model marked with a circle in the "Attachable unit" column.
LM551/LM551B

Model		Attachable unit	Remarks
LH52	22 in	○	
LH62	22 in	○	
LH66	26 in	○	
LS60	30 in	-	
LS62	22 in	○	
LS66	26 in	○	
VM60	30 in	-	
VM62	22 in	○	
VM66	26 in	○	

Sound Pressure Level

Sound Pressure Level

This machine was confirmed to have a continuous A-weighted sound pressure level of 84 dB by measuring identical machines in accordance with the procedure specified in ISO5395-1:2013.

Sound Power Level

Sound Power Level

This machine was confirmed to have a sound power level of 103 dB by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.

Vibration Level

Hand-Arm Vibration

This machine was confirmed not to exceed a vibration level of 2.5 m/s^2 to hands and arms by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.

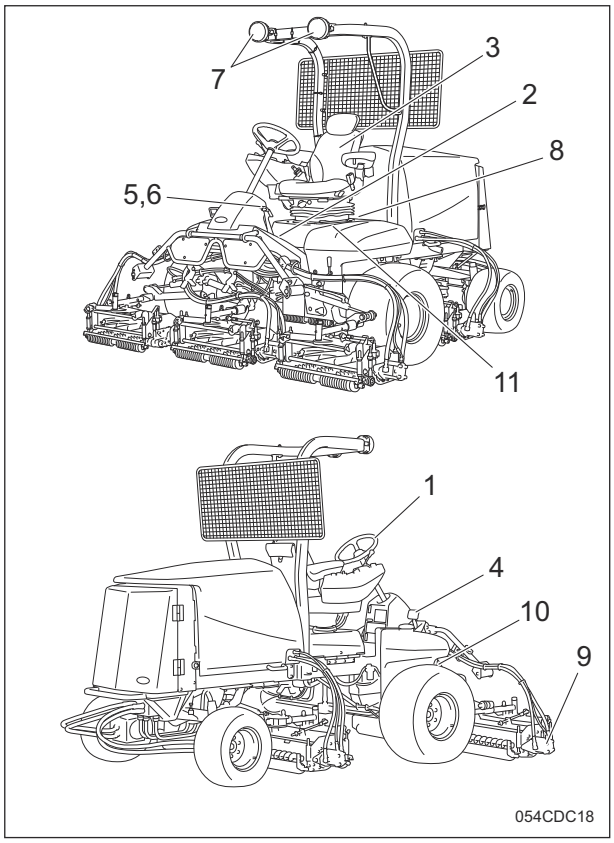
Whole Body Vibration

This machine was confirmed not to exceed a vibration level of 0.5 m/s^2 to the whole body by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.

Names of Each Section

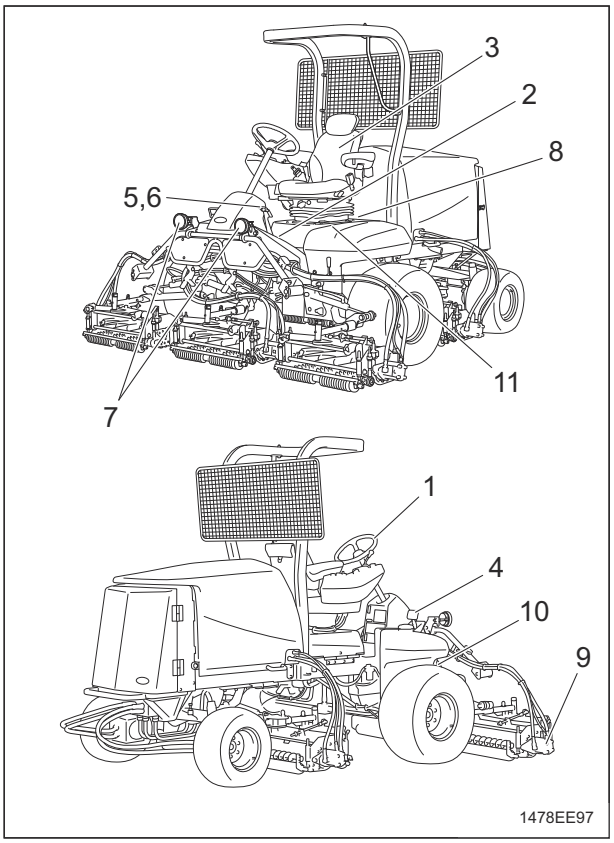
Overall view A

■ #10180 – 10349



Names of Each Section_001

■ #10350–



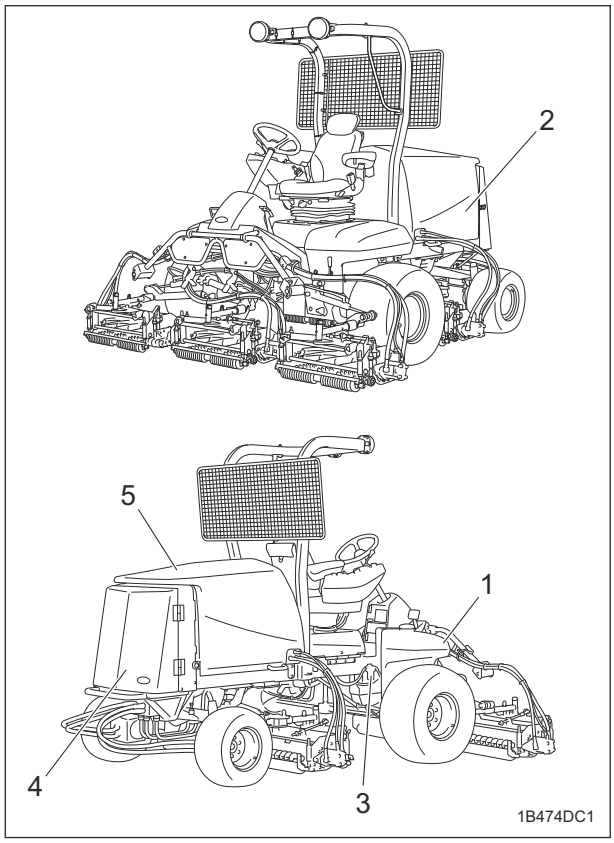
Names of Each Section_002

1	Steering wheel
2	Tilt lever
3	Seat
4	Traveling pedal
5	Brake pedal
6	Pedal stopper
7	Light
8	Reel forward/reverse switch
9	Reel rotation/stop switching lever
10	Mower lock lever (latch)
11	Open-Close lever

Product Overview

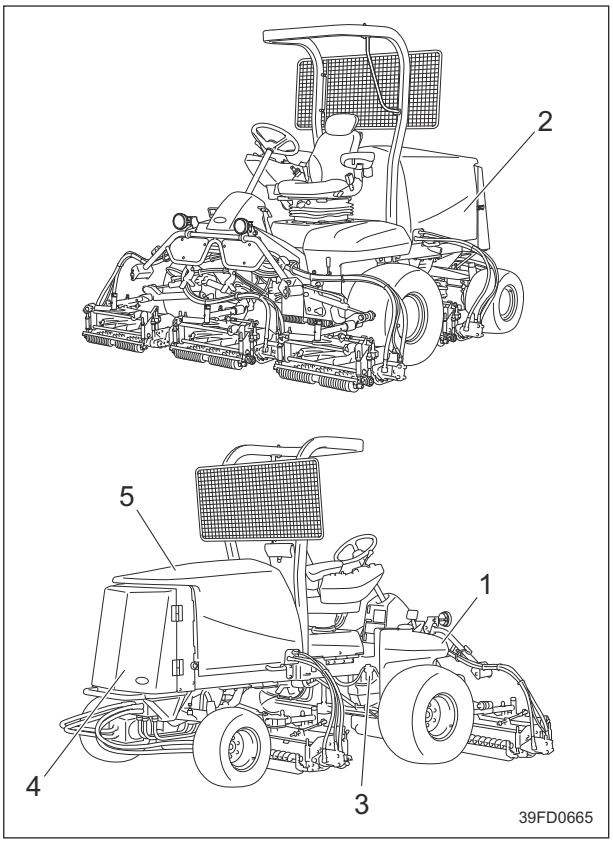
Overall view B

■ #10180 – 10349



Names of Each Section_003

■ #10350–

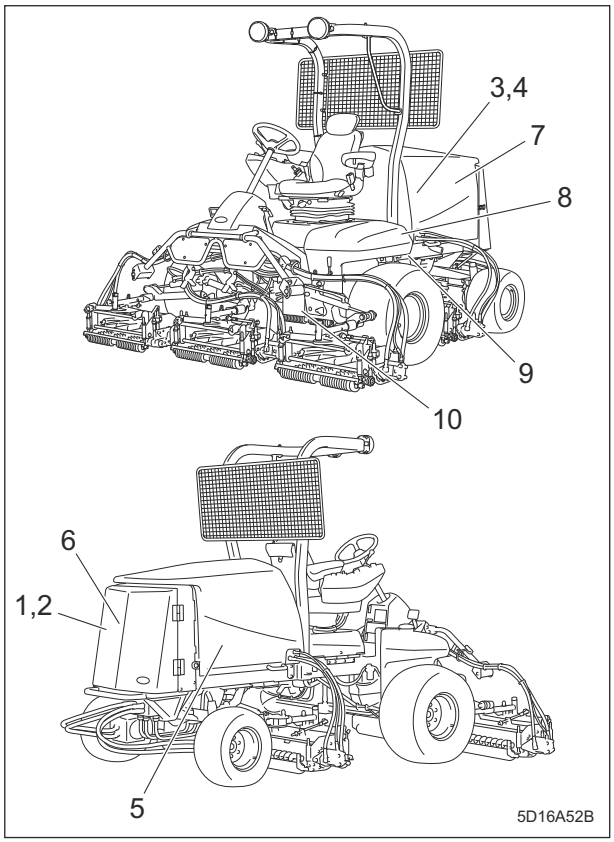


Names of Each Section_004

1	Fuel tank
2	Fuel filter
3	Water separator
4	Battery
5	Hood

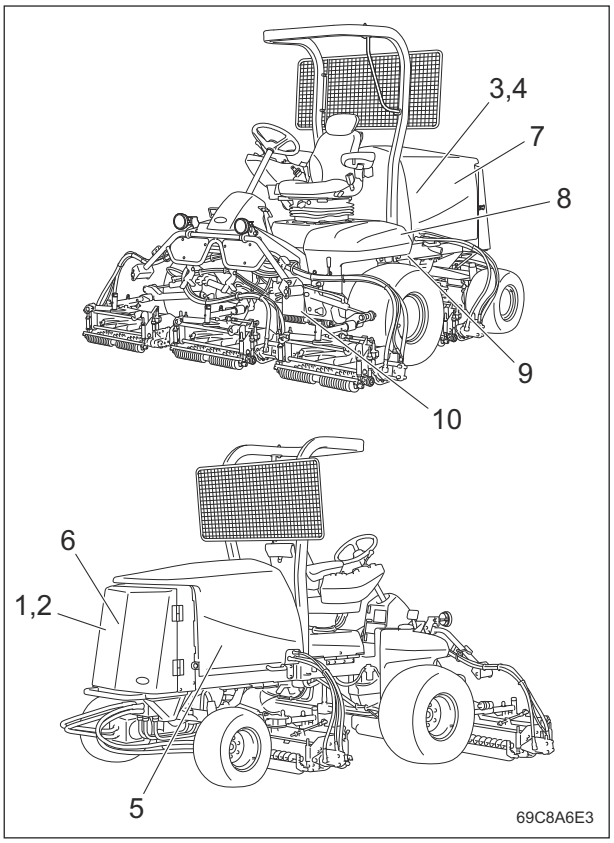
Overall view C

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Names of Each Section_005

■ #10350–



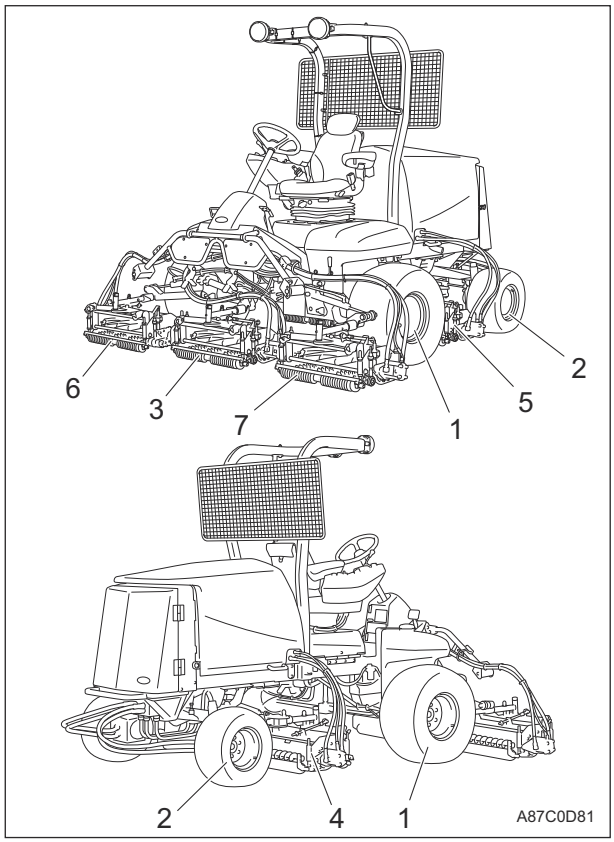
Names of Each Section_006

1	Radiator
2	Radiator cover
3	Engine
4	Engine oil filter
5	Reserve tank
6	Oil cooler
7	Air cleaner
8	Hydraulic tank
9	Hydraulic oil line filter
10	Hydraulic oil suction filter

Product Overview

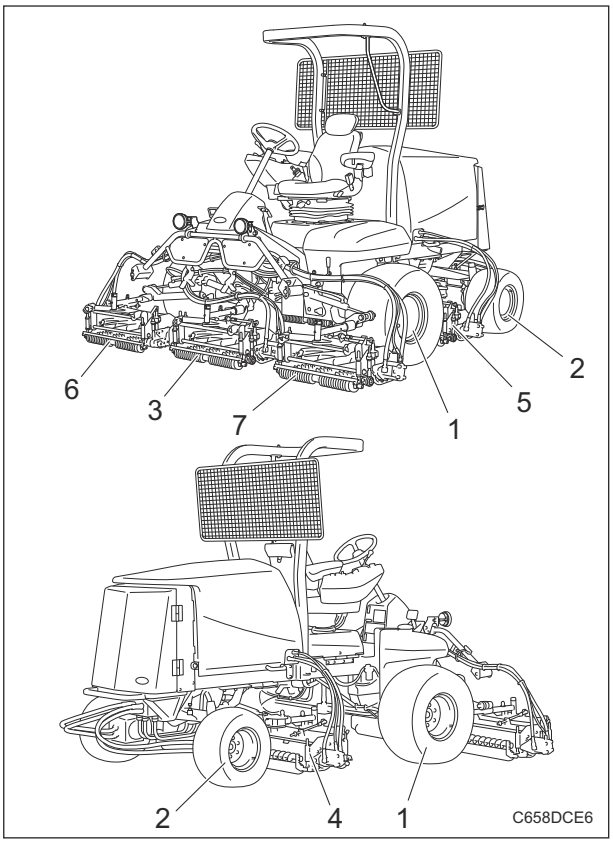
Overall view D

■ #10180 – 10349



Names of Each Section_007

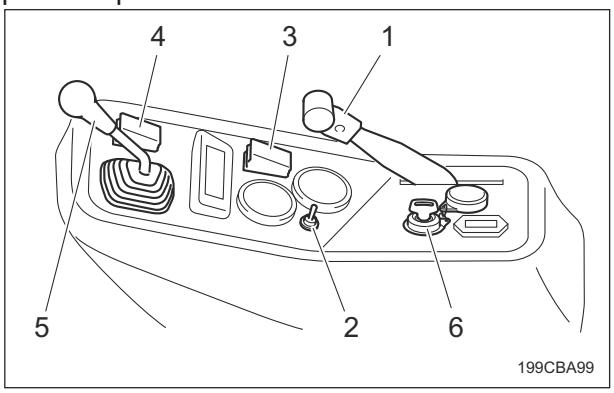
■ #10350–



Names of Each Section_008

1	Front tire
2	Rear tire
3	Mower unit #1
4	Mower unit #2
5	Mower unit #3
6	Mower unit #4
7	Mower unit #5

Operation panel



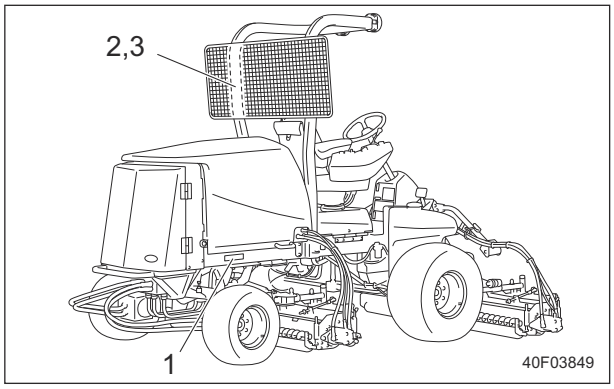
Names of Each Section_009

1	Throttle lever
2	Light switch
3	Reel rotation switch
4	Traveling/working selector switch
5	Mower unit up/down lever
6	Key switch

Regulation Decals

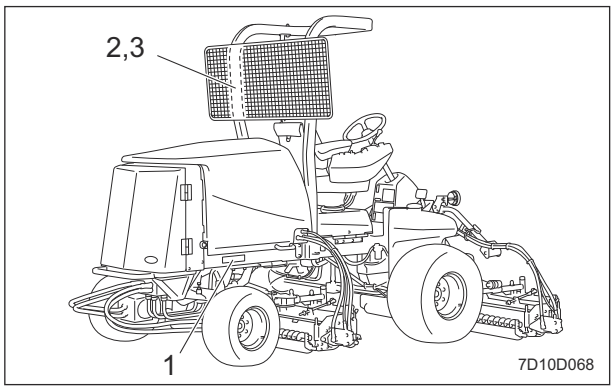
Positions of Regulation Decals

■ #10180 – 10349



Positions of Regulation Decals_001

■ #10350-



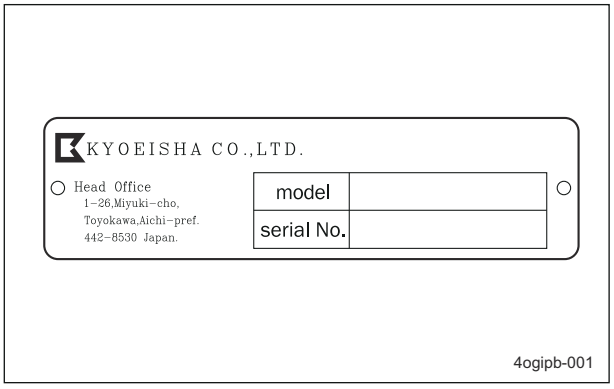
Positions of Regulation Decals_002

1	Serial number plate
2	ROPS compliance decal
3	ROPS caution decal

Description of Regulation Decals

Serial Number Plate

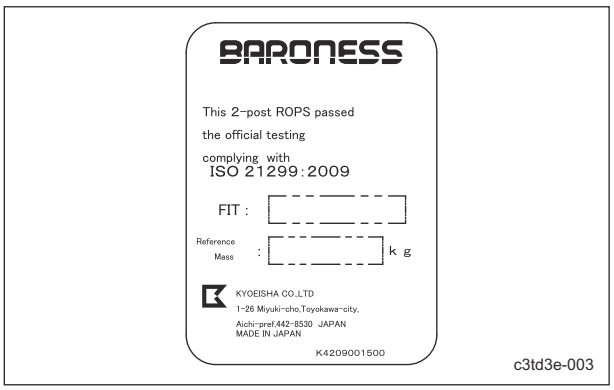
The serial number plate indicates the model and serial number of the machine.



Serial Number Plate_001

ROPS Compliance Decal

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

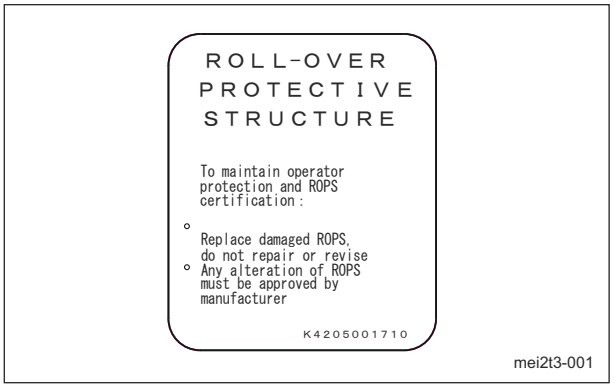


ROPS Compliance Decal_001

ROPS Caution Decal

ROPS caution decal describes the following caution messages.

- Replace damaged ROPS.
- Do not repair or revise.



ROPS Caution Decal_001

Safety Signs and Instruction Signs

About Safety Signs and Instruction Signs

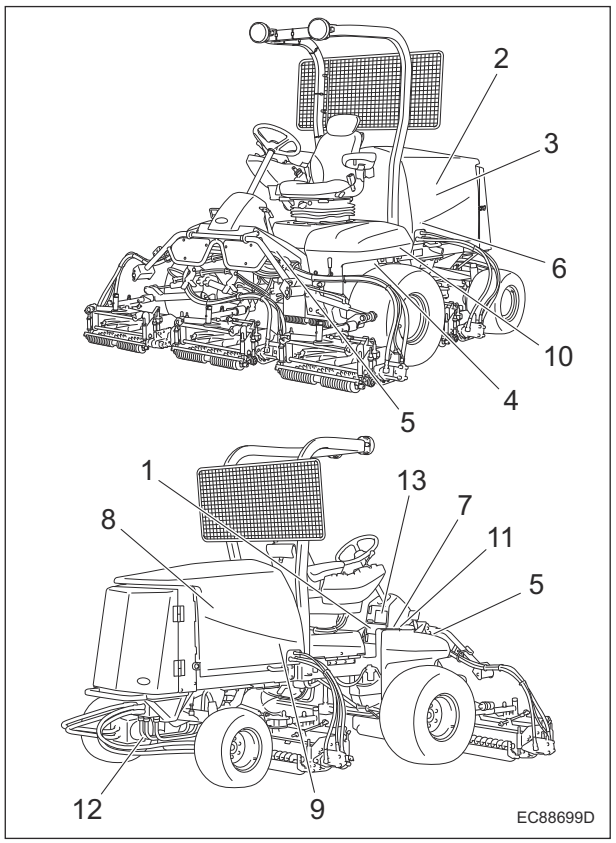
Important

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 Kyoeisha.

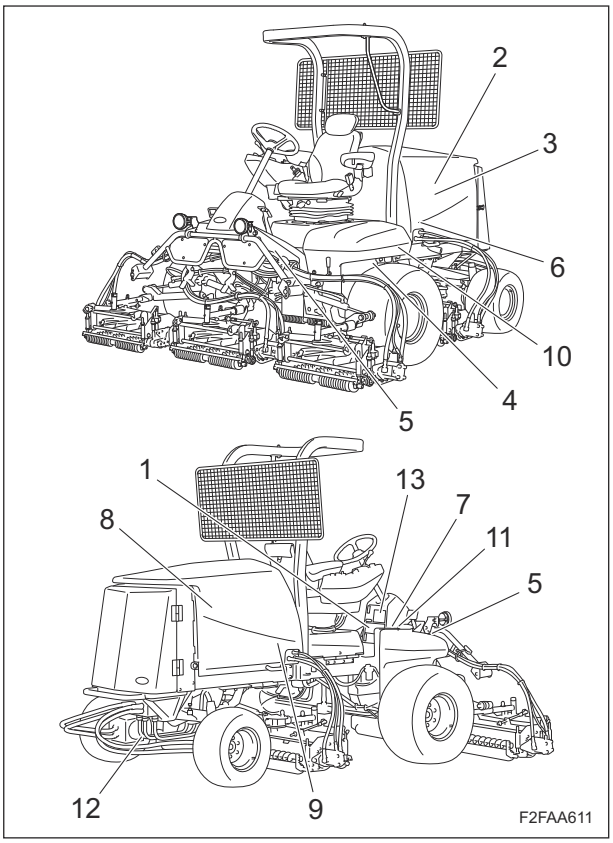
Positions of Safety Decals and Instruction Decals

■ #10180 – 10349

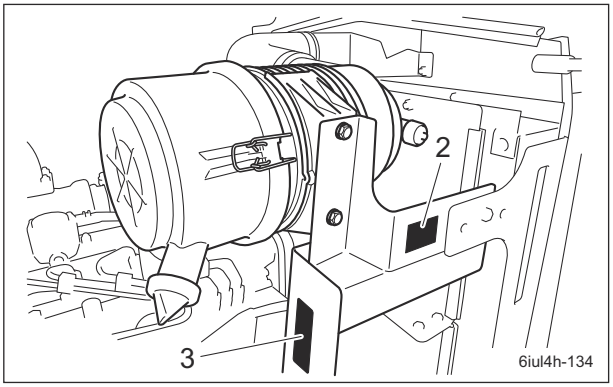


Positions of Safety Decals and Instruction Decals_001

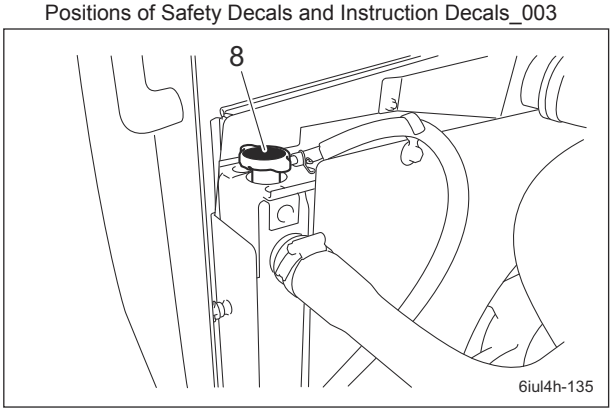
■ #10350-



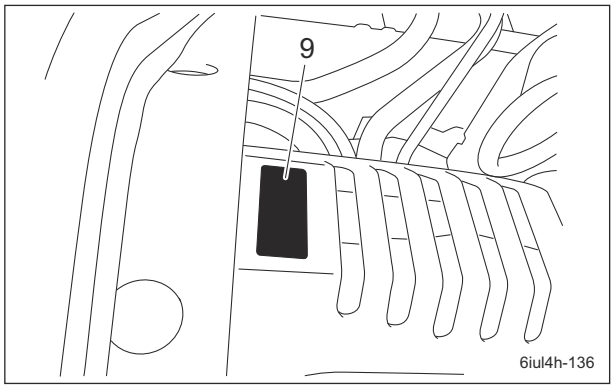
Positions of Safety Decals and Instruction Decals_002



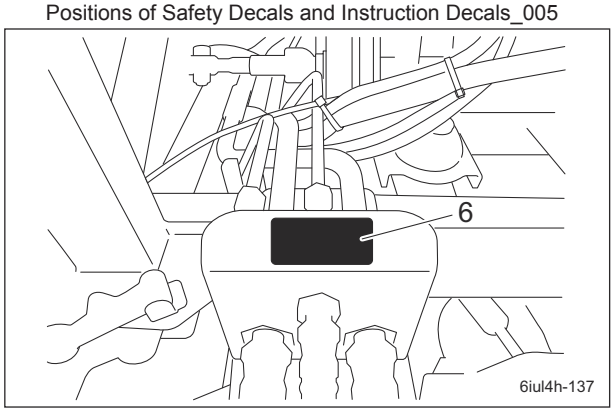
Positions of Safety Decals and Instruction Decals_003



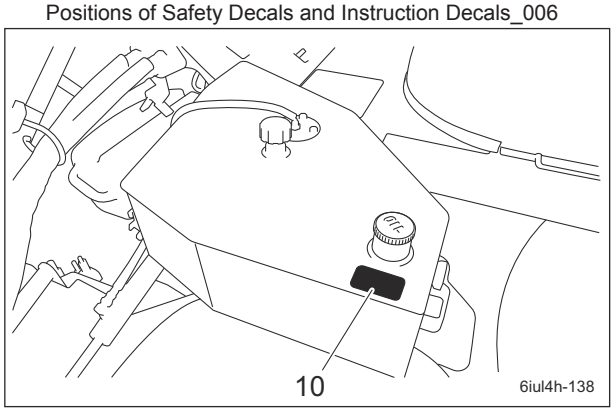
Positions of Safety Decals and Instruction Decals_004



Positions of Safety Decals and Instruction Decals_005



Positions of Safety Decals and Instruction Decals_006



Positions of Safety Decals and Instruction Decals_007

1	Decal for operation 2
2	Caution to rotating object decal
3	Caution to hot parts decal
4	Caution for getting caught decal
5	Caution for mower lock decal
6	Caution for getting pinched decal
7	Fire prohibited decal
8	Caution for spouting coolant decal
9	PTO caution decal
10	Hydraulic oil decal
11	Diesel fuel filler port decal
12	DO NOT JACK UP decal
13	Caution to noise decal

Description of Safety Decals and Instruction Decals

Decal for Operation 2

Decal for operation 2
LM2400-0918Z0

1.

Warning

Read the Owner's Operating Manual.

2.

Warning

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

3.

Caution

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

4.

Warning

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

5.

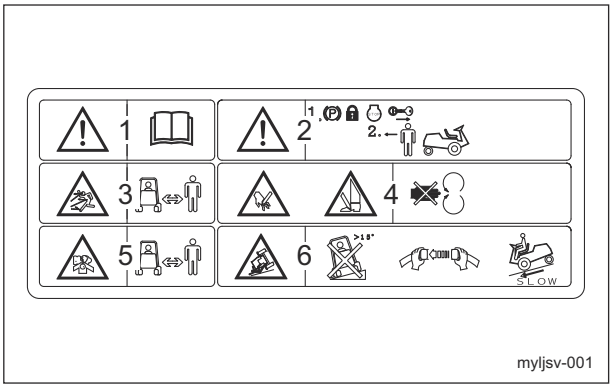
Warning

Be careful of exhaust emissions.

6.

Caution

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.



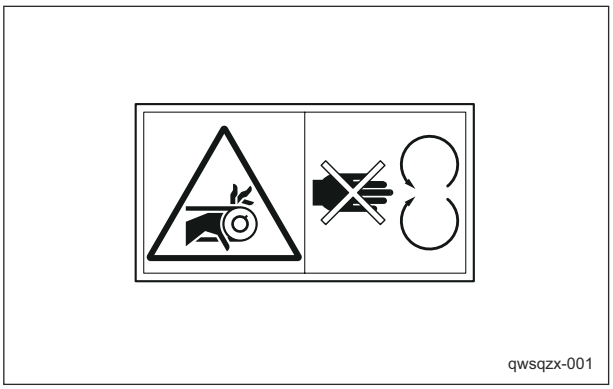
Decal for Operation 2_001

Caution to Rotating Object Decal

K4205001530
Decal, caution to rotating object

Warning

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



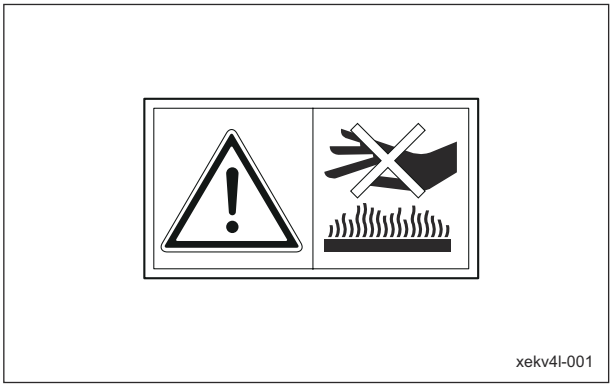
Caution to Rotating Object Decal_001

Caution to Hot Parts Decal

K4205001540
Decal for caution to hot parts

Caution

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



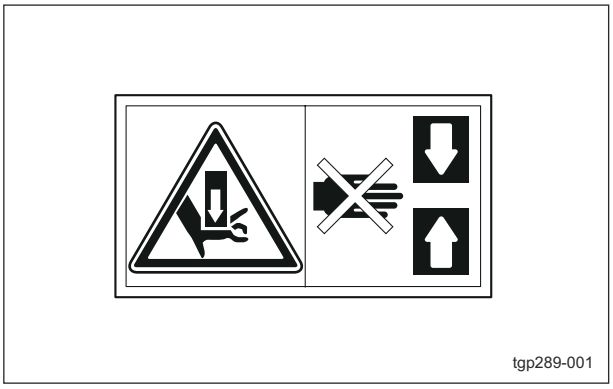
Caution to Hot Parts Decal_001

Caution for Getting Caught Decal

K4205001580
DECAL, CAUTION TO GET CAUGHT

Caution

May get pinched - There is a risk of being pinched.



Caution for Getting Caught Decal_001

Caution for Mower Lock Decal

K4205001900
Decal, caution for mower lock
Lock the mower units when traveling or storing with the mower units #4 and 5 raised.



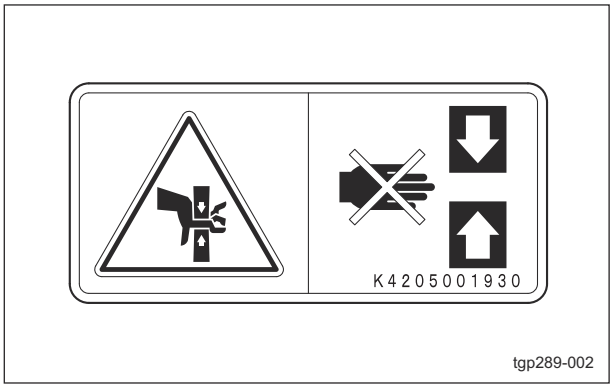
Caution for Mower Lock Decal_001

Caution for Getting Pinched Decal

K4205001930
DECAL, CAUTION GETTING CAUGHT HANDS/FEET

Caution

May get pinched - There is a risk of being pinched.



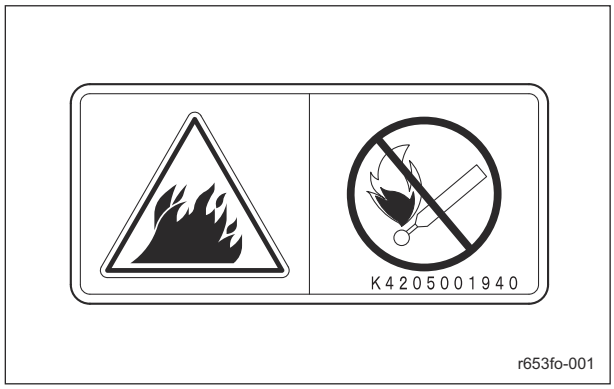
Caution for Getting Pinched Decal_001

Fire Prohibited Decal

K4205001940
Decal, fire prohibited

Warning

Keep away from fire.



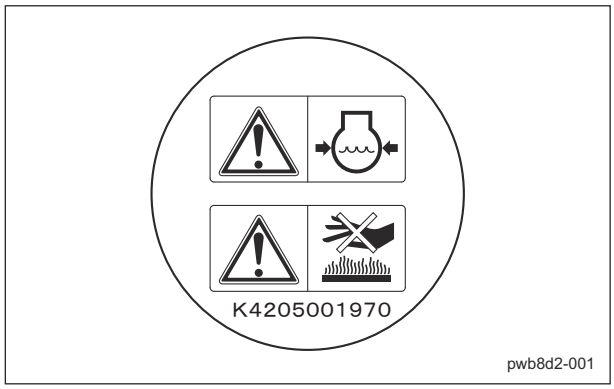
Fire Prohibited Decal_001

Caution for Spouting Coolant Decal

K4205001970
Decal, caution for spouting coolant

Caution

Caution for spouting coolant - Do not open while hot.
High temperature - Do not touch. Otherwise, you will get burned.



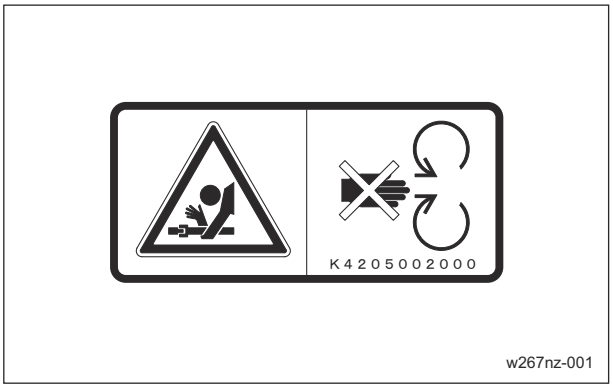
Caution for Spouting Coolant Decal_001

PTO Caution Decal

K4205002000
Decal, caution PTO

Warning

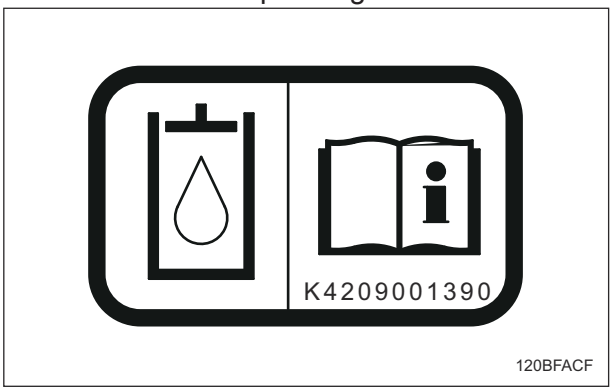
Watch for rotating parts - Keep your hands away from the joints while the engine is running.



PTO Caution Decal_001

Hydraulic Oil Decal

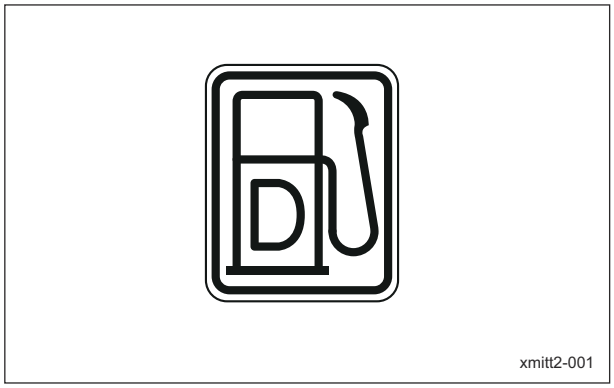
K4209001390
Decal, hydraulic oil
Read the owner's operating manual.



Hydraulic Oil Decal_001

Diesel Fuel Filler Port Decal

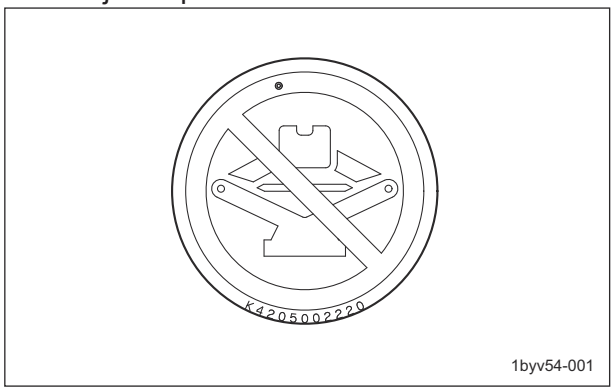
K4209001000
DECAL, DIESEL OIL FILLER PORT
Use diesel fuel.



Diesel Fuel Filler Port Decal_001

DO NOT JACK UP Decal

K4205002220
Decal, DO NOT JACK UP
Do not jack up.



DO NOT JACK UP Decal_001

Caution to Noise Decal

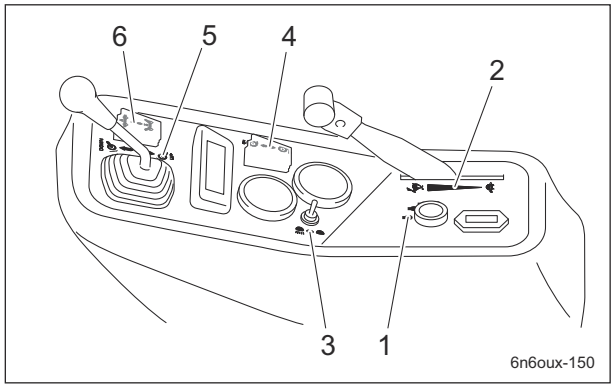
K4205002090
Decal, caution to noise



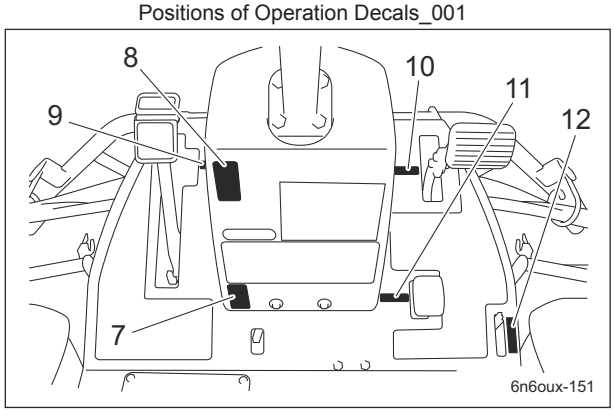
Caution to Noise Decal_001

Operation Decals

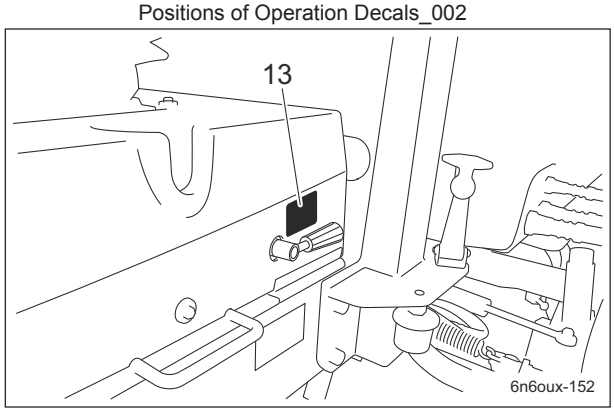
Positions of Operation Decals



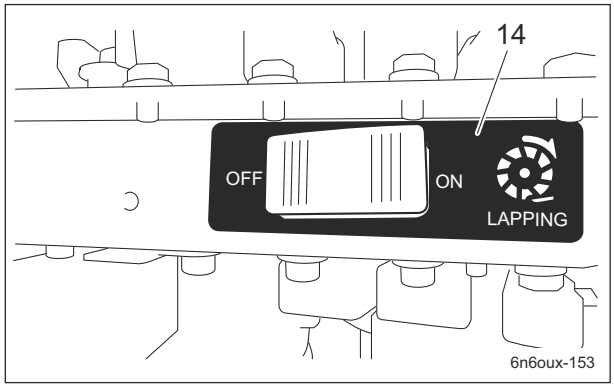
Positions of Operation Decals_001



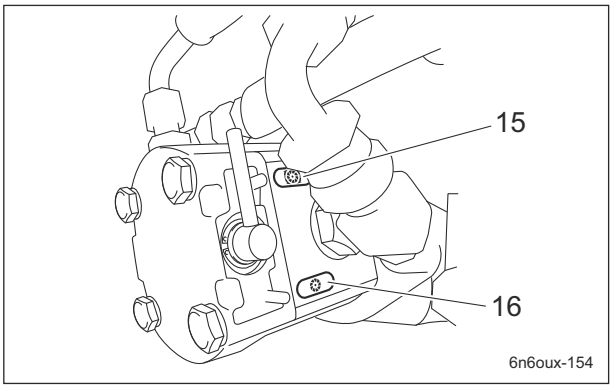
Positions of Operation Decals_002



Positions of Operation Decals_003



Positions of Operation Decals_004



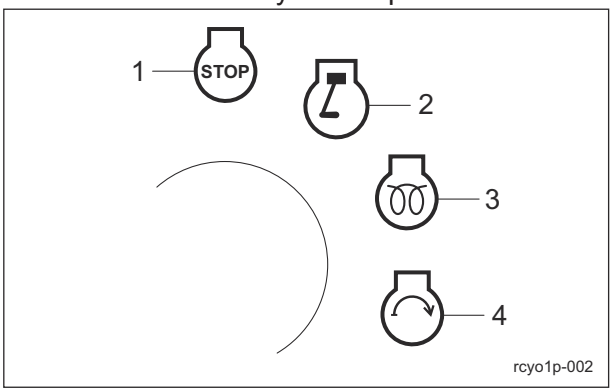
Positions of Operation Decals_005

1	Key switch decal
2	Engine rotation decal
3	Light switch mark
4	Reel rotation mark
5	Mower unit up/down decal
6	Traveling/working selector mark
7	Tilt steering decal
8	Parking brake decal
9	BRAKE decal
10	FORWARD decal
11	BACKWARD decal
12	Driving mode shift decal
13	Lever open/close decal
14	Lapping decal
15	Reel rotation decal
16	Reel stop decal

Description of Operation Decals

Key Switch Mark

Key switch mark
This indicates the key switch positions.

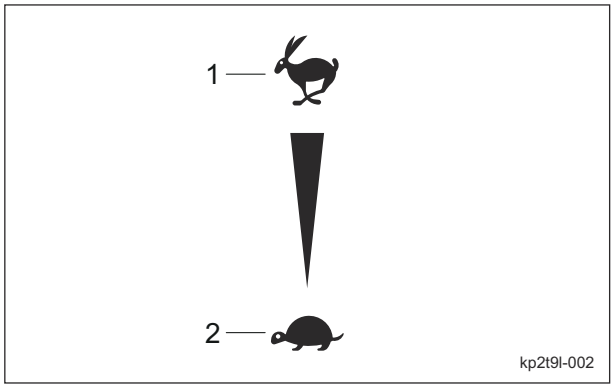


Key Switch Mark_001

1	OFF
2	ON
3	GLOW
4	START

Engine Rotation Decal

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

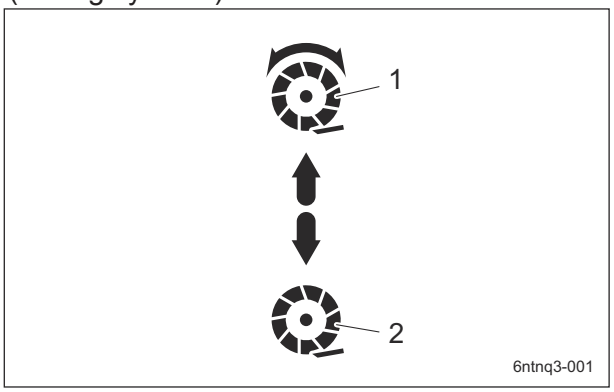


Engine Rotation Decal_001

1	High speed
2	Low speed

Reel Rotation Mark

Reel rotation mark
It illustrates Rotation/Stop of the reel cutter (cutting cylinder).

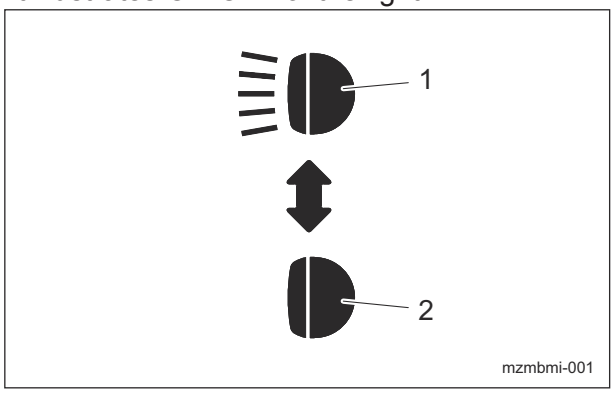


Reel Rotation Mark_001

1	Rotation
2	Stop

Light Switch Mark

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

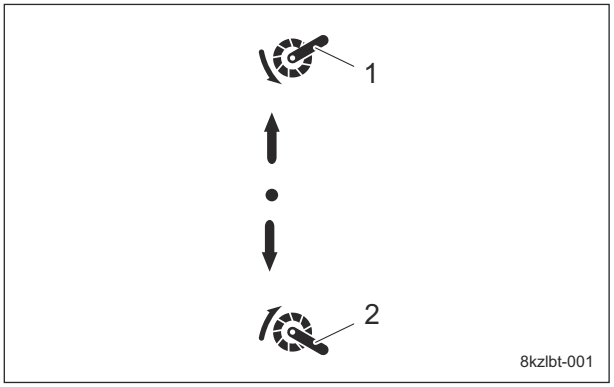


Light Switch Mark_001

1	ON
2	OFF

Mower Unit Up/Down Decal

Decal, mower unit up/down
This indicates the Up/Down positions of the mower unit.

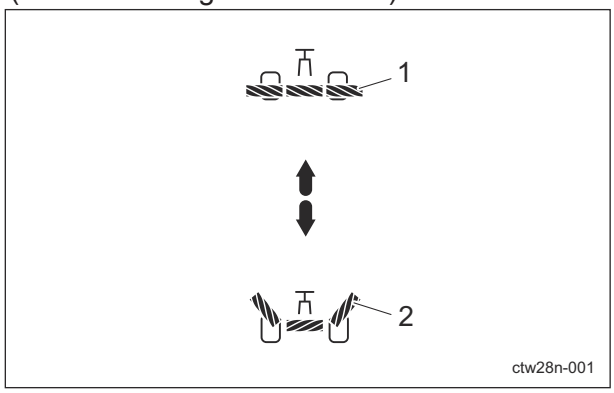


Mower Unit Up/Down Decal_001

1	Down
2	Up

Traveling/Working Selector Mark

Traveling/working selector mark
It illustrates the positions where mower units #4 and #5 stop when they are raised.
(ON/OFF of slight lift function)

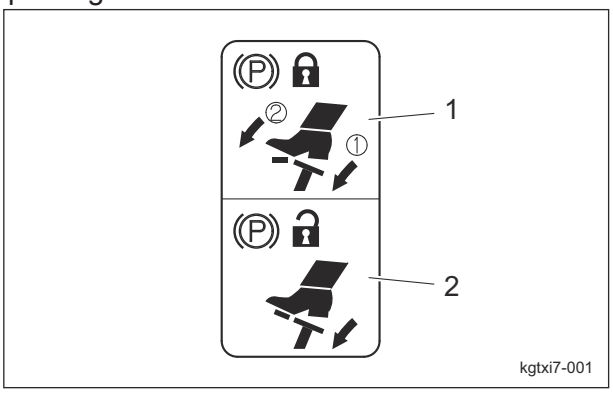


Traveling/Working Selector Mark_001

1	Working
2	Traveling

Parking Brake Decal

K4203001700
Decal, parking brake
This shows how to lock and release the parking brake.



Parking Brake Decal_001

1	Lock
2	Release

Tilt Steering Decal

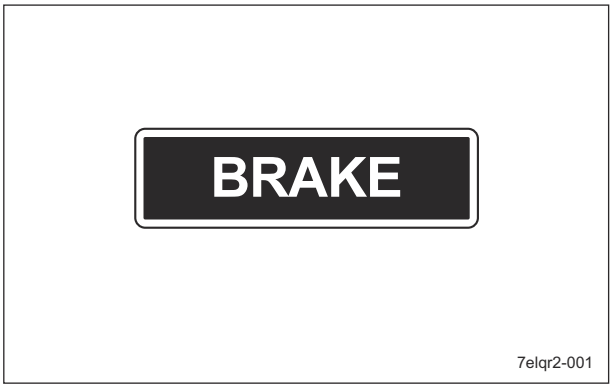
K4203001710
Decal, tilt steering
This illustrates the tilt directions of the steering wheel and the locked/free positions.



Tilt Steering Decal_001

BRAKE Decal

K4203001450
Decal, BRAKE
This indicates brake.



BRAKE Decal_001

FORWARD Decal

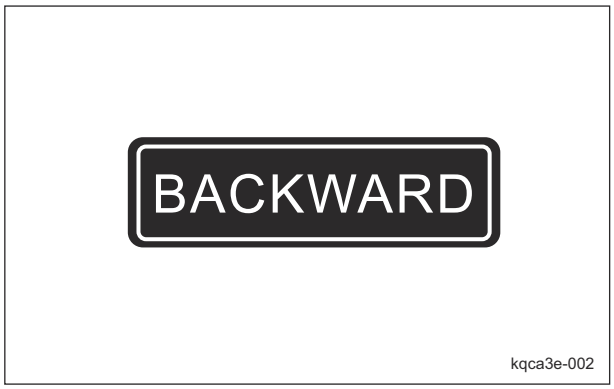
K4203001430
Decal, FORWARD
This indicates forward travel.



FORWARD Decal_001

BACKWARD Decal

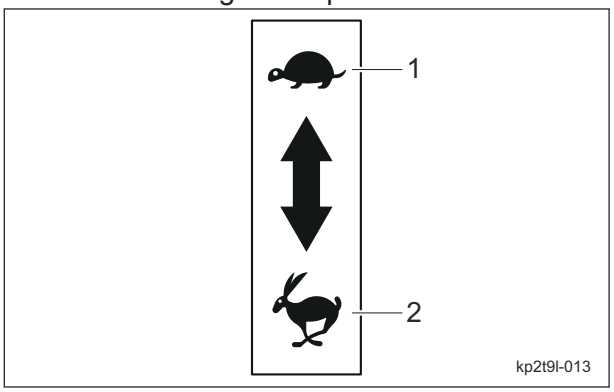
K4203001440
Decal, BACKWARD
This indicates backward travel.



BACKWARD Decal_001

Driving Mode Shift Decal

K4203001740
Decal, shifting driving mode
This indicates high/low speed.

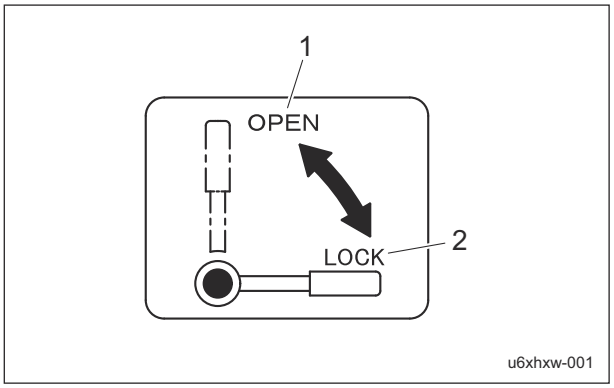


Driving Mode Shift Decal_001

1	Working speed
2	Traveling speed

Lever Open/Close Decal

K4203001720
Decal, open/close lever
This indicates lock/release of open/close lever.

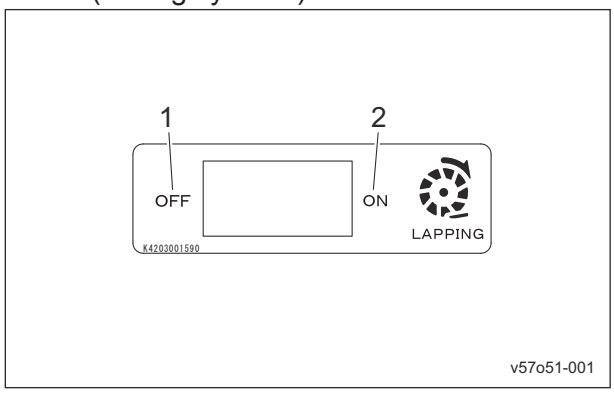


Lever Open/Close Decal_001

1	Release
2	Lock

Lapping Decal

K4203001590
Decal, lapping
This indicates rotational direction of the reel cutter (cutting cylinder).

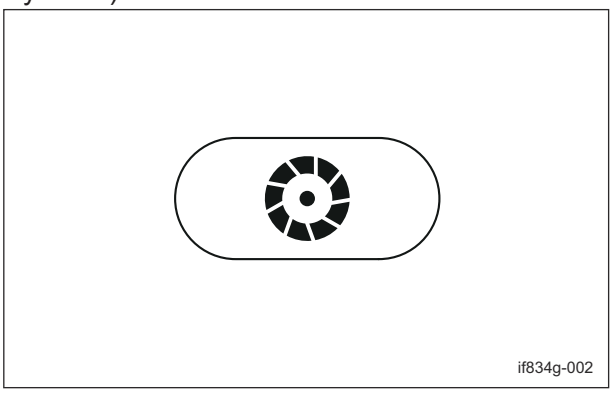


Lapping Decal_001

1	Normal rotation (cutting rotation)
2	Reverse rotation (back lapping rotation)

Reel Stop Decal

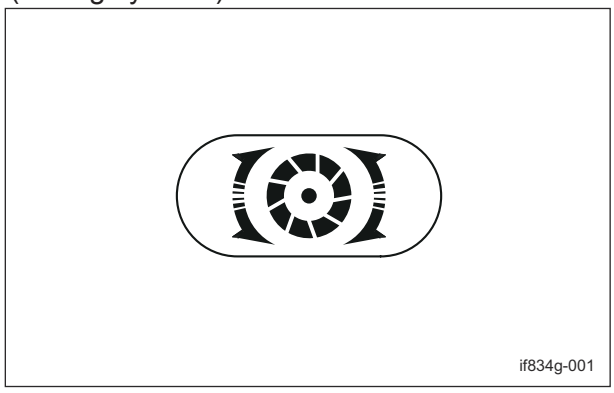
K4203001310
Decal, reel stop
This indicates stop of the reel cutter (cutting cylinder).



Reel Stop Decal_001

Reel Rotation Decal

K4203001300
Decal, reel rotation
This indicates rotation of the reel cutter (cutting cylinder).



Reel Rotation Decal_001

Proximity Sensor ..... Page 4-2

Relays ..... Page 4-2

Light Switch ..... Page 4-3

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Mower Lock Lever (Latch) ..... Page 4-5

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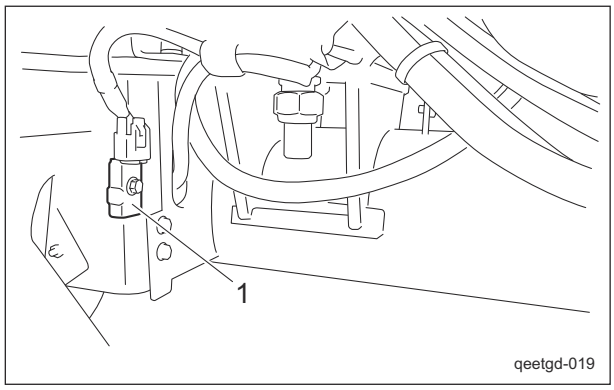
Warning Buzzer ..... Page 4-11

Description of Functions

Proximity Sensor

There are four proximity sensors on #1, #2, #4 and #5 mower arm fulcrums.
These sensors detect the raised or lowered positions of mower units #1, #2, #4 and #5.
The information is related to controlling rotation and stop of the reel cutter (cutting cylinder).

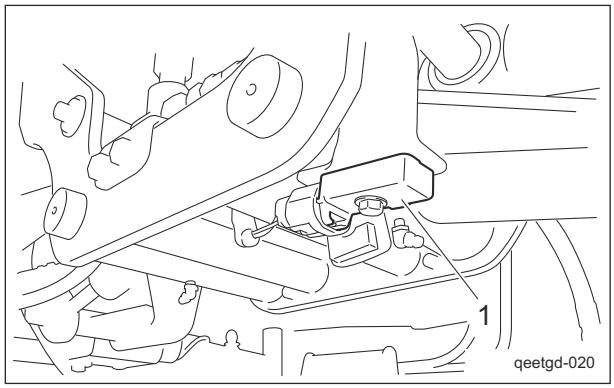
・Mower unit #1



Proximity Sensor_001

1	Proximity sensor

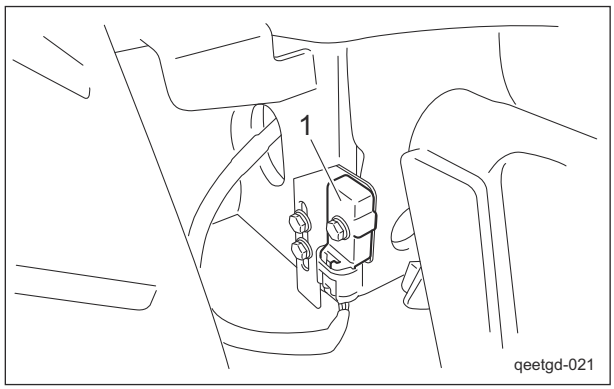
・Mower unit #2



Proximity Sensor_002

1	Proximity sensor

・Mower units #4 and #5



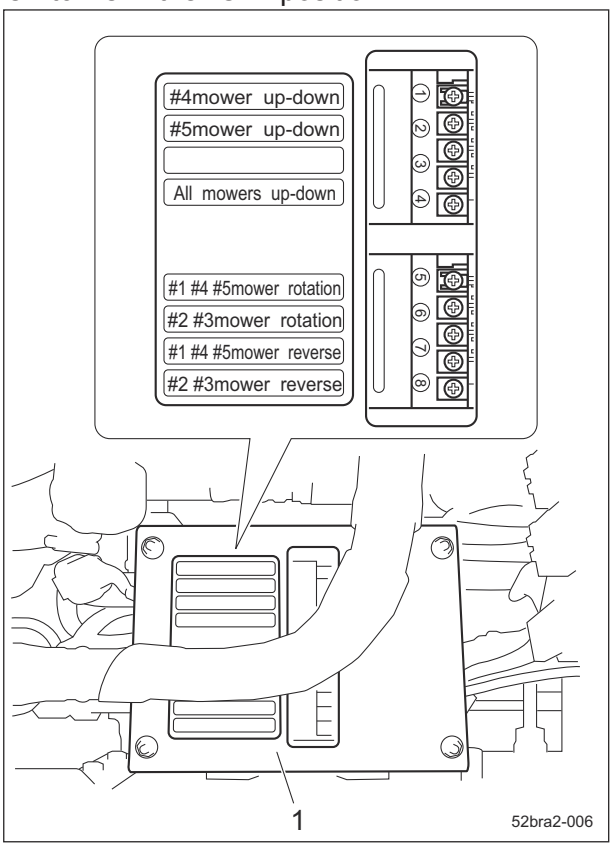
Proximity Sensor_003

1	Proximity sensor

Relays

The relay box is located inside the underseat cover.
These relays control traveling/working selection, rotation of the reel cutters (cutting cylinders), and mower unit lowering selection.
The operating condition can be checked by the illumination of the LEDs.

・LEDs ① and ② light up when the traveling/working selector switch is in the "Working" position and mower units #4 and #5 are raised.
・LED ③ is not used.
・LED ④ lights up when the mower unit up/down lever is in the "Down" position and the traveling/working selector switch is in the "Working" position.
・LEDs ⑤ and ⑥ light up when the reel rotation switch is in the "ON" position and the mower units are lowered.
・LEDs ⑦ and ⑧ light up when the reel reverse switch is in the "ON" position.



Relays_001

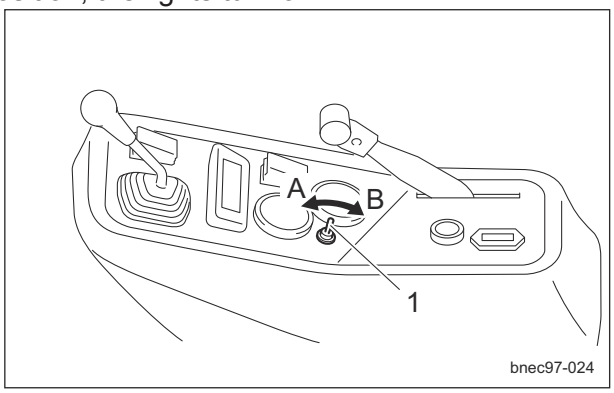
1	Relay box

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

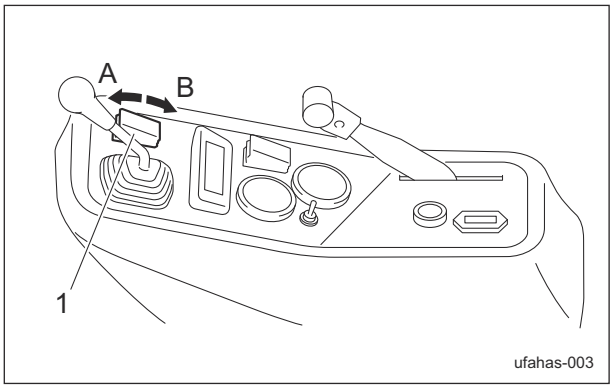
1	Light switch
A	ON
B	OFF

Traveling/Working Selector Switch

Important

Set the traveling/working selector switch to the "Working" position before lowering the mower units.
The mower units cannot be lowered with the switch set to the "Traveling" position.

The traveling/working selector switch is located in the operation panel.
This can change the positions where mower units #4 and #5 stop when they are raised.

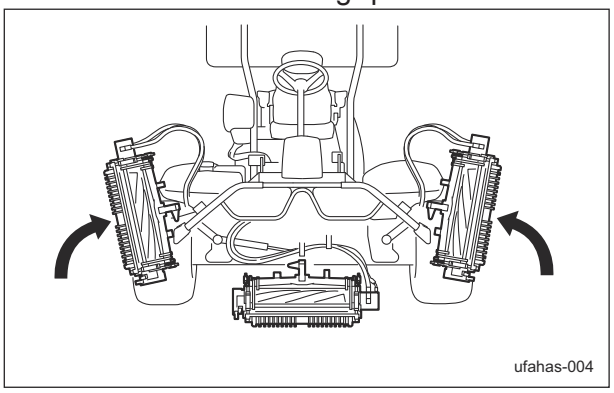


Traveling/Working Selector Switch_001

1	Traveling/working selector switch
A	Working
B	Traveling

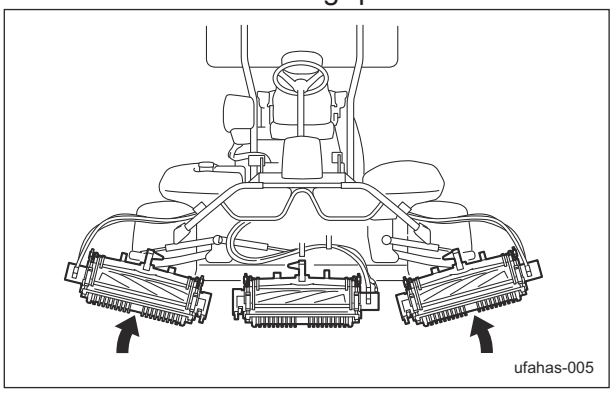
When the switch is set to the "Traveling" position, mower units #4 and #5 are raised to their highest positions.
When the switch is set to the "Working" position, mower units #4 and #5 are only raised halfway.

When set to the "Traveling" position



Traveling/Working Selector Switch_002

When set to the "Working" position

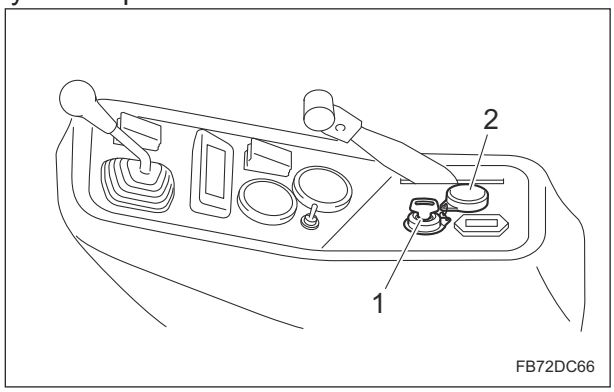


Traveling/Working Selector Switch_003

Description of Functions

Key Switch

The key switch is a lock for inserting the ignition key.
This is used for starting, running or stopping the engine by turning the ignition key to change the key switch position.



Key Switch_001

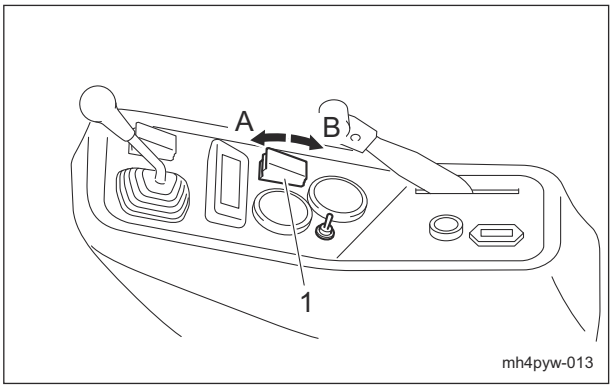
1	Key switch
2	Cap

Reel Rotation Switch

⚠ Caution

Set the reel rotation switch to the "Rotation" position immediately before starting cutting work. At all other times, be sure to leave the reel rotation switch set to the "Stop" position.

The reel rotation switch is located in the operation panel and operates rotation of the reel cutters (cutting cylinders) of the mower units. When the reel rotation switch is set to the "Rotation" position, the reel cutters (cutting cylinders) of all mower units will rotate for cutting work. When the reel rotation switch is set to the "Stop" position, the reel cutters (cutting cylinders) will stop.
Note:
When the mower units are raised, the reel cutters (cutting cylinders) do not rotate, even if the switch is set to the "Rotation" position.



Reel Rotation Switch_001

1	Reel rotation switch
A	Rotation
B	Stop

Reel Forward/Reverse Switch

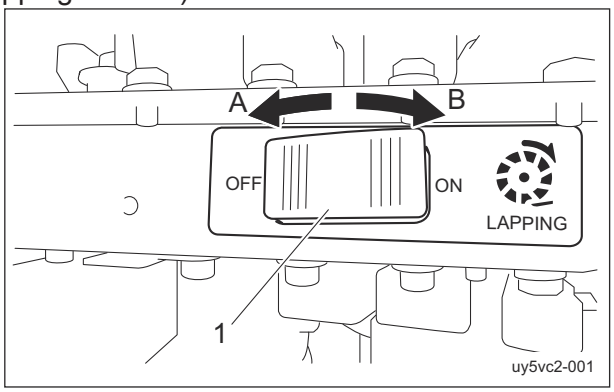
Important

Do not switch between “Forward” and “Reverse” while the reel cutter (cutting cylinder) is rotating.
Otherwise, the hydraulic system will malfunction.

Important

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

The reel forward/reverse switch is located inside the underseat cover and switches the rotation direction of the reel cutters (cutting cylinders). When the reel forward/reverse switch is set to the "Forward" position, the reel cutters (cutting cylinders) of all mower units will rotate for cutting work. When the reel forward/reverse switch is set to the "Reverse" position, the reel cutters (cutting cylinders) will rotate in reverse (back lapping rotation).



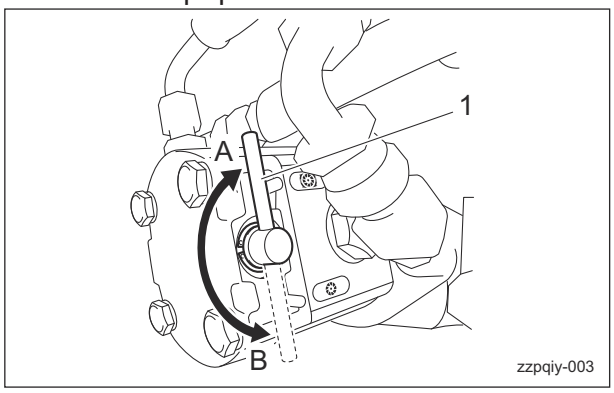
Reel Forward/Reverse Switch_001

1	Reel forward/reverse switch
A	Forward
B	Reverse

Reel Rotation/Stop Switching Lever

> **Caution**
>
> Before operating the reel rotation/stop switching lever, be sure to set the reel rotation switch to the "Stop" position.

The reel rotation/stop switching lever is located on the reel motor attached to each mower unit. It is used during cutting and back lapping.
Shift the lever(s) to the "Rotation" position only for the mower unit(s) to be used for cutting or back lapping. Leave the lever(s) for other mower units in the "Stop" position.

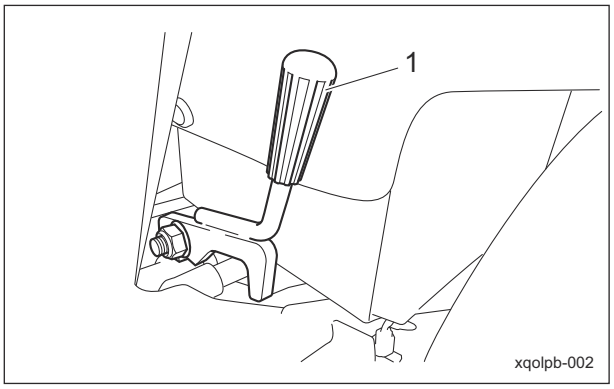


Reel Rotation/Stop Switching Lever_001

1	Reel rotation/stop switching lever
A	Rotation
B	Stop

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 traveling or storing this machine, hook the mower lock levers (latches) on the arms.



Mower Lock Lever (Latch)_001

1	Mower Lock Lever (Latch)

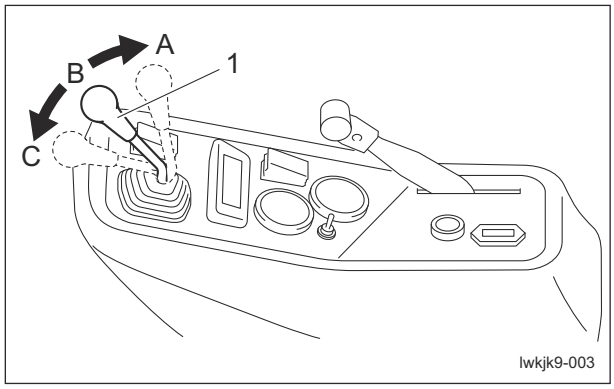
Mower Unit Up/Down Lever

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

> **Caution**
>
> Be careful of the mower units lowering when the mower unit up/down lever is shifted to the "Down" position and the key switch is turned to the "ON" position while the engine is stopped with the traveling/working selector switch set to the "Working" position.

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

The mower unit up/down lever is located in the operation panel and raises or lowers the mower units.
When the lever is shifted to the "Down" position, the mower units are lowered. When the lever is shifted to the "Up" position, the mower units are raised.
When the lever is shifted to the "UP" position and then released from the hand, the lever returns to the neutral position.



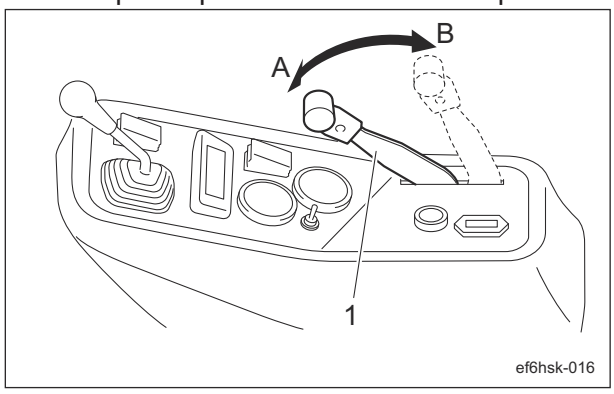
Mower Unit Up/Down Lever_001

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

Note:
When the mower units are raised, the reel cutters (cutting cylinders) stop rotating even if the reel rotation switch is set to the "Rotation" position.

Throttle Lever

The throttle lever is located in the operation panel and enables you to adjust the engine rpm. Move the throttle lever toward the "High speed" position to increase the engine rpm, and toward the "Low speed" position to reduce the rpm.

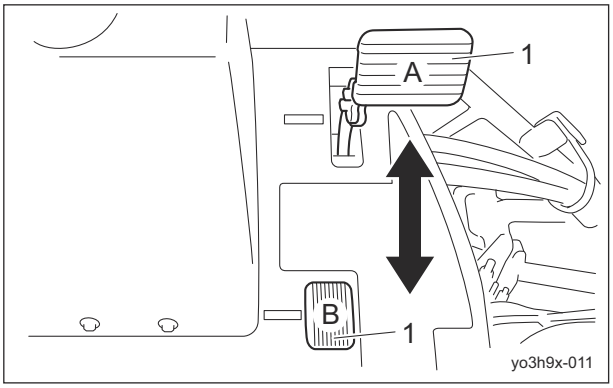


Throttle Lever_001

1	Throttle lever
A	High speed
B	Low speed

Traveling Pedal

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



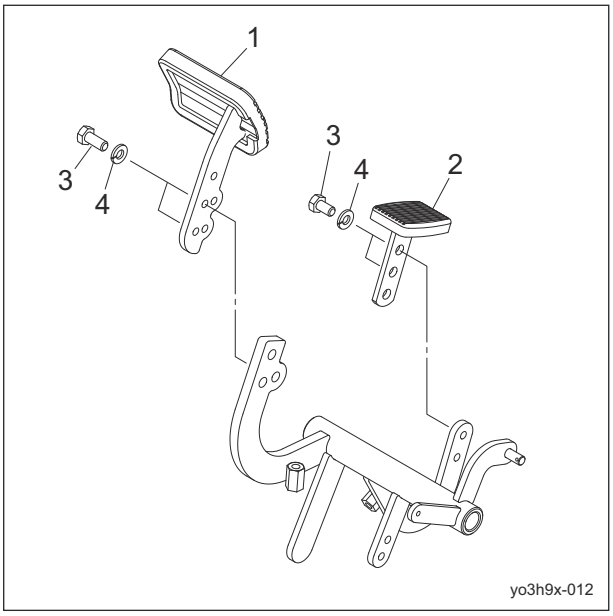
Traveling Pedal_001

1	Traveling pedal
A	Forward
B	Backward

The height and angle of the traveling pedal can be adjusted to fit the operator.

Forward:
The height and angle can be adjusted by changing the installation position of the bolt and spring washer.

Backward:
The height can be adjusted by changing the installation position of the bolt and spring washer.



Traveling Pedal_002

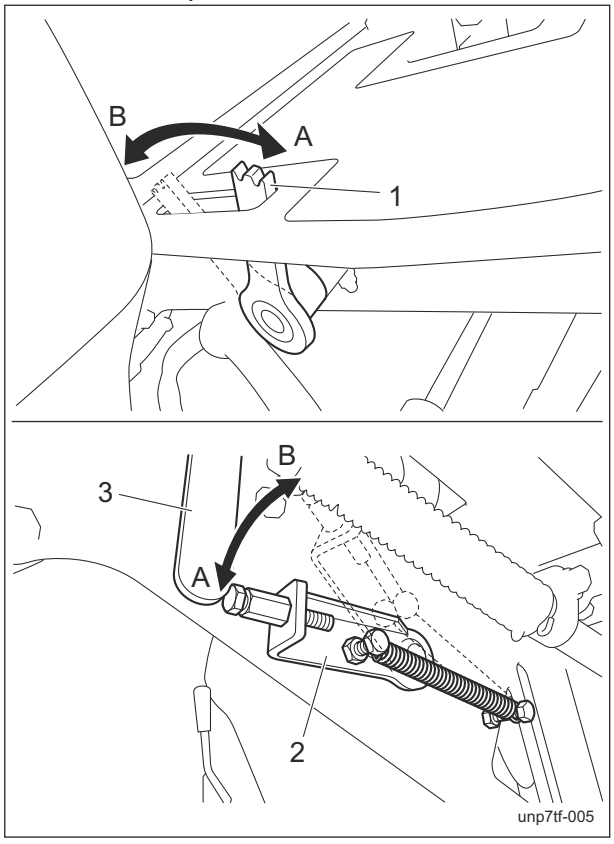
1	Traveling pedal (forward)
2	Traveling pedal (backward)
3	Bolt
4	Spring washer

Pedal Stopper

Important

When the traveling speed exceeds 12.0 km/h during cutting operation, a buzzer will sound. If the operation continues, the engine and hydraulic equipments will be damaged.

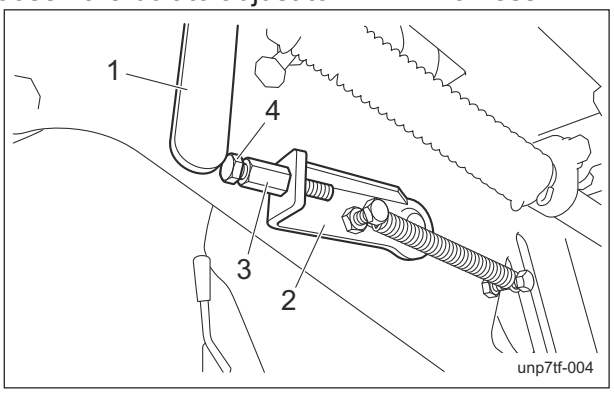
The pedal stopper is located in the right foot area.
This lever changes the amount that the forward pedal can be depressed.



Pedal Stopper_001

1	Pedal stopper
2	Operating speed lock lever
3	Traveling pedal
A	Working
B	Traveling

Be sure to set the pedal stopper to the "Working" position during operation.
You can adjust the amount that the forward pedal can be depressed.
Loosen the bolt to adjust to 12 km/h or less.



Pedal Stopper_002

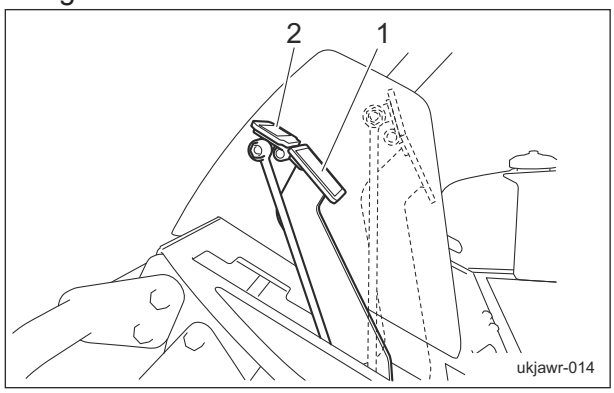
1	Traveling pedal
2	Operating speed lock lever
3	Lock nut
4	Bolt

Brake Pedal

> **Caution**
>
> When leaving the driver's seat, park the machine on a stable, flat surface and be sure to apply the parking brake.

> **Caution**
>
> Never park the machine on a slope.

The brake pedal is located in the left foot area.
To stop the machine, firmly depress the brake pedal.
When parking, depress the locking pedal while firmly depressing the brake pedal to lock it.
To release the brake pedal, firmly depress the brake pedal to release the locking pedal.
Note:
Locking the brake pedal can be used as a parking brake.

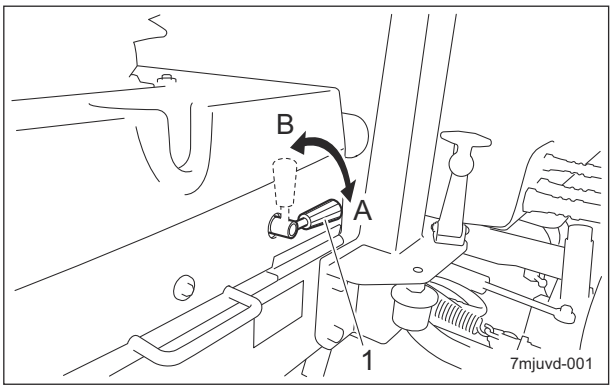


Brake Pedal_001

1	Brake pedal
2	Locking pedal

Open-Close Lever

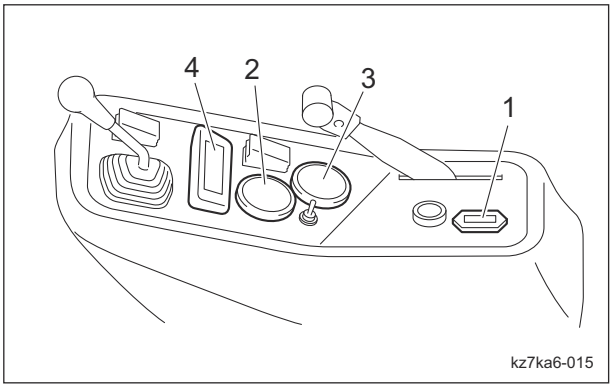
The open-close lever is located at the lower-left side of the seat.
This is used when opening and closing the underseat cover.
When opening the underseat cover, raise the open-close lever to unlock. After closing the underseat cover, lock it.



Open-Close Lever_001

1	Open-close lever
A	Lock
B	Unlock

Instruments on The Operation Panel

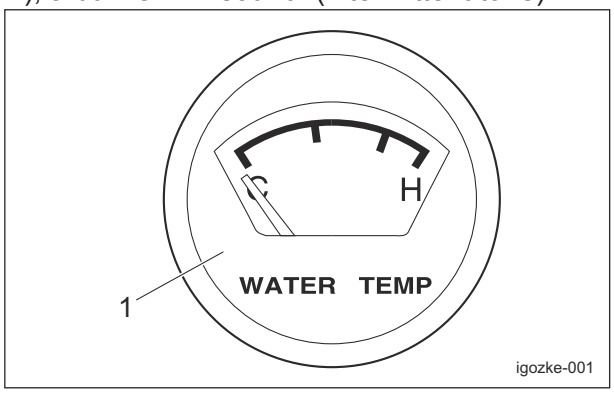


Instruments on The Operation Panel_001

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

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 110 °C (230 °F), a buzzer will sound. (intermittent tone)

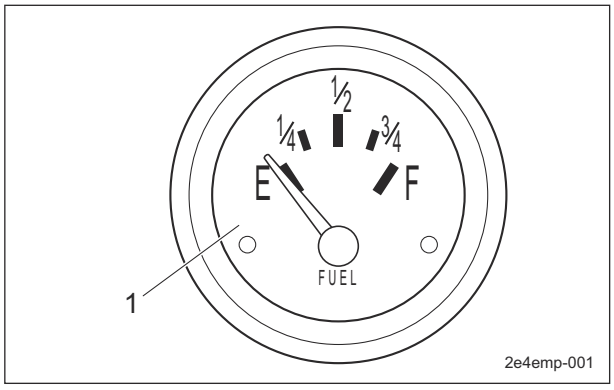


Water Temperature Gauge_001

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.



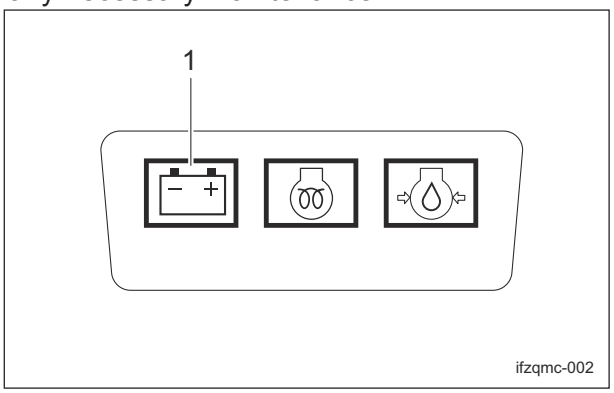
Fuel Gauge_001

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.

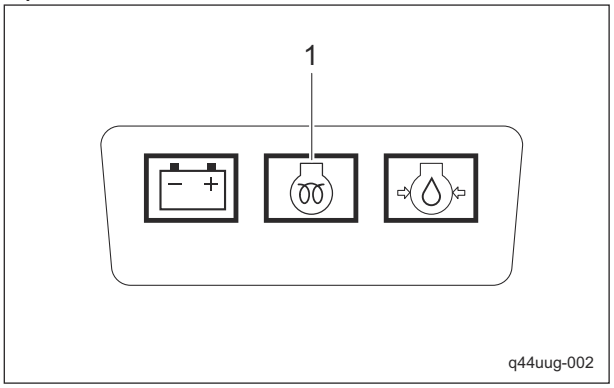


Charge Lamp_001

1	Charge lamp

Thermo-Start Lamp

The thermo-start lamp is the middle pilot lamp located in the operation panel.
When the ignition key is set to the "GLOW" position, it illuminates as the glow plug generates heat.
Illumination of the thermo-start lamp is controlled by the glow lamp timer, and the lamp is turned off after a specified amount of time passes.
The duration of illumination indicates an approximate period of time required for warm-up, and has been fixed at five seconds.

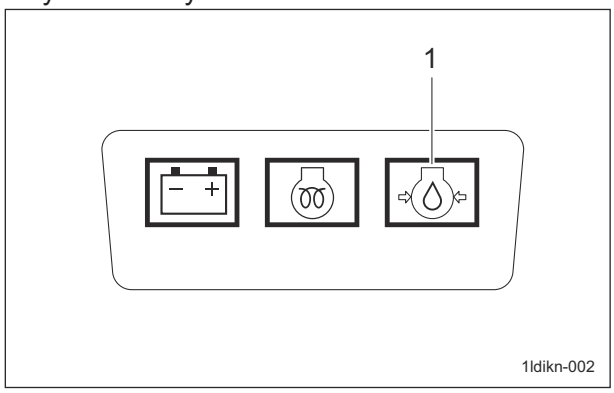


Thermo-Start Lamp_001

1	Thermo-start lamp

Oil Pressure Lamp

The oil pressure lamp is the right pilot lamp located in the operation panel.
It turns on when the ignition key is set to the "ON" position before the engine starts. It turns off when the engine starts and engine oil pressure is generated properly.
If this lamp illuminates while you are operating the machine, stop the engine immediately, and then inspect the machine and perform any necessary maintenance.

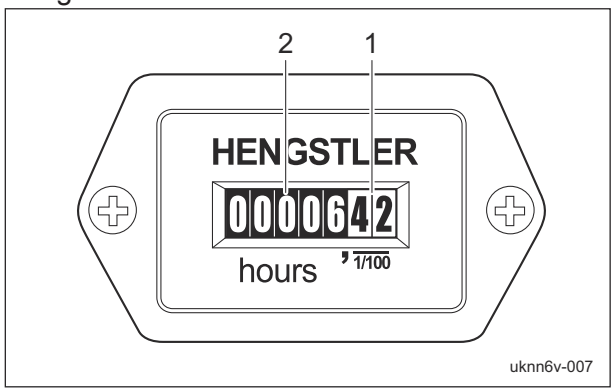


Oil Pressure Lamp_001

1	Oil pressure lamp

Hour Meter

The hour meter indicates the accumulated operation time of the engine.
The number in red figures on a white background is incremented every thirty-six seconds.
The number in white figures on a black background is incremented every hour.
1/100 wheel … red figures on a white background
Hour wheel … white figures on a black background



Hour Meter_001

1	1/100 wheel
2	Hour wheel

Safety Device

Interlock System

This machine features an interlock system for starting and stopping the engine.

1. As for starting the engine, the safety device prevents the engine from starting unless it meets each of the following four conditions.
   - An operator is sitting on the seat.
   - The parking brake is applied.
   - The reel rotation switch is set to the "OFF" position.
   - The traveling pedal is set to the neutral position.
2. In the event the operator leaves the seat with the parking brake not applied and the engine running, the safety device will be activated and will stop the engine.
3. In the event the operator leaves the seat with the parking brake applied and the engine running, the safety device will be activated and will stop the engine under any of the following conditions:
   - The traveling pedal is not set to the neutral position. (The operator has depressed the traveling pedal.)
   - The reel rotation switch is set to the "Rotate" position.
     However, when the reel forward/reverse switch is set to the "ON" position (reverse rotation), the engine does not stop.

Warning Mechanisms

Warning Buzzer

There are two warning buzzers, which indicate four warnings.

- Warning buzzer 1 & 3
- Warning buzzer 2 & 4

1. Overheat Warning Buzzer
   If the water temperature inside the engine exceeds 110 degrees Celsius (230 °F), a buzzer will sound. (intermittent tone)
   When the buzzer sounds, stop the engine immediately after idling, and then inspect the machine and perform any necessary maintenance.
2. Hydraulic Oil Level Warning Buzzer
   If the oil level in the hydraulic tank decreases by approximately 3.0 dm^3 (3.0 L) from the specified level, a buzzer will sound. (continuous tone)
   When the buzzer sounds, stop the engine immediately, and then inspect the machine and perform any necessary maintenance.
3. Engine Overload Warning Buzzer
   If the traveling pedal is depressed and the speed exceeds 12.0 km/h while the pedal stopper is in the "Traveling" position and the reel cutters (cutting cylinders) are rotating, a buzzer will sound. (intermittent tone)
   When the buzzer sounds, stop the engine immediately and set the pedal stopper to the "Working" position.
4. Warning Buzzer for Traveling With Brake Applied
   If the traveling pedal is depressed while the brake pedal is locked with the locking pedal, a buzzer will sound. (continuous tone)
   When the buzzer sounds, firmly depress the brake pedal to release the locking pedal.

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Procedure to Open/Close Hood ..... Page 5-2
Procedure to Open/Close Underseat Cover ..... Page 5-3
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Adjustment of Seat Position ..... Page 5-10

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Procedure to Mount/Dismount ..... Page 5-11

Start/Stop of Engine ..... Page 5-11

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Operations before Service

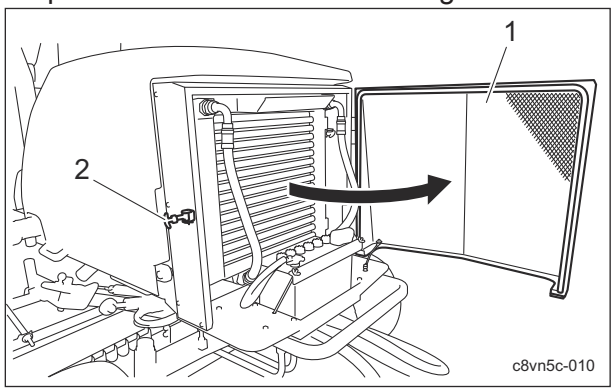
The following sections describe the preparatory works required before performing the services including inspection, adjustment, cleaning. maintenance and repair.

Procedure to Open/Close Radiator Cover

> **Caution**
>
> Do not open the radiator cover in strong winds.

> **Caution**
>
> Be careful not to pinch your fingers when you open or close the cover.

1. Release the rubber catch.
2. Open the radiator cover to the right.



Procedure to Open/Close Radiator Cover_001

1	Radiator cover
2	Rubber catch

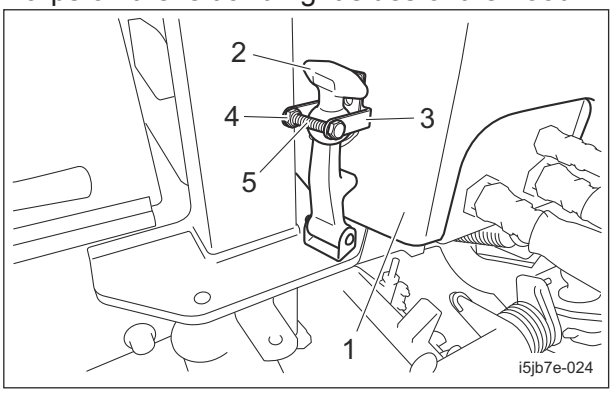
3. Close the radiator cover slowly.
4. Lock the rubber catch securely.

Procedure to Open/Close Hood

> **Caution**
>
> Do not open the hood in strong winds.

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

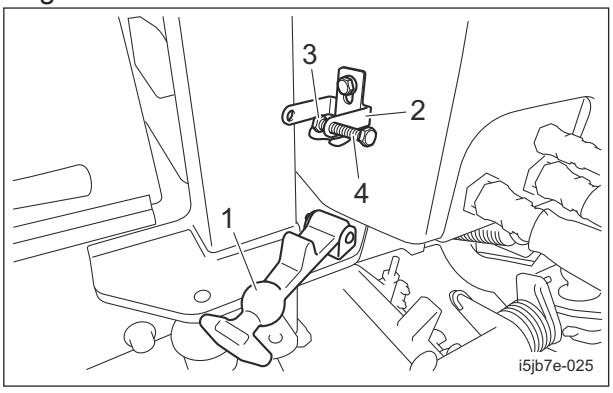
1. Remove the nuts and bolts locking the catch clips on the left and right sides of the hood.



Procedure to Open/Close Hood_001

1	Hood
2	Rubber catch
3	Catch clip
4	Nut
5	Bolt

2. Release the rubber catches on the left and right sides.

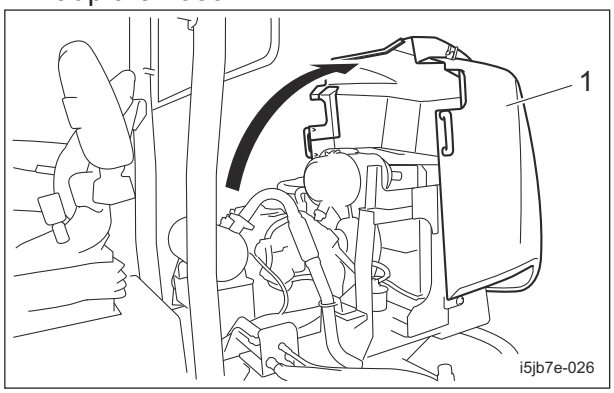


Procedure to Open/Close Hood_002

1	Rubber catch
2	Catch clip
3	Nut
4	Bolt

3. Make sure that the radiator cover is closed.

4. Lift up the hood.



Procedure to Open/Close Hood_003

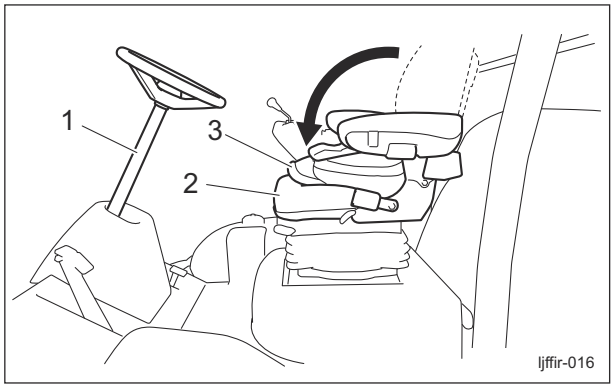
1	Hood

5. Close the hood slowly.
6. Securely engage the left and right rubber catches.
7. Install the nuts and bolts locking the left and right catch clips.

Procedure to Open/Close Underseat Cover

> **Caution**
>
> Be careful not to pinch your fingers when you open or close the cover.

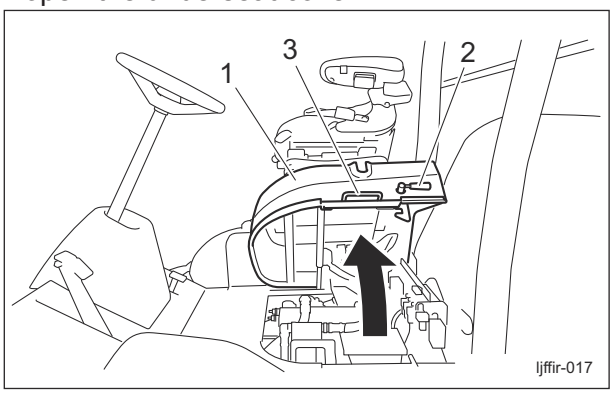
1. Make sure that the steering wheel is raised completely.
2. Move the seat to the center between the forward and backward positions.
3. Tilt the seat backrest forward.



Procedure to Open/Close Underseat Cover_001

1	Steering wheel
2	Seat
3	Backrest

4. While unlocking with the open-close lever, grab the grip and tilt the seat to the right to open the underseat cover.



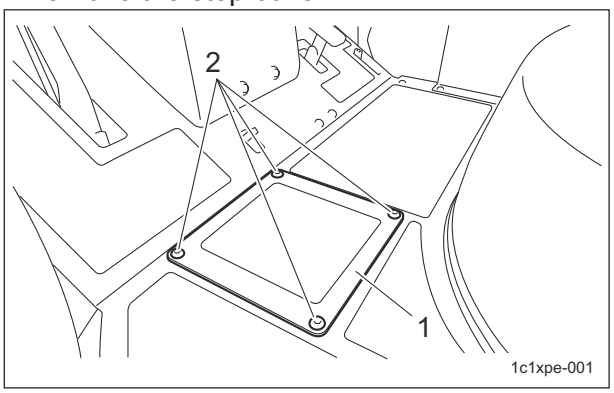
Procedure to Open/Close Underseat Cover_002

1	Underseat cover
2	Open-close lever
3	Grip

5. For closing the underseat cover, close it slow with holding the grip.
6. Lock the underseat cover with the open-close lever.

Procedure to Remove/Install Step Cover

1. Remove the button head bolts.
2. Remove the step cover.



Procedure to Remove/Install Step Cover_001

1	Step cover
2	Button head bolt

3. For installing the step cover, reverse the removing procedure.

Inspection before Use

The purpose of the machine inspection is to:

- Prevent accidents
- Prevent damage to the machine
- Maintain machine performance

Detecting machine malfunctions early helps prevent unexpected problems from occurring. If you detect any abnormalities with the machine, immediately perform maintenance or repairs.

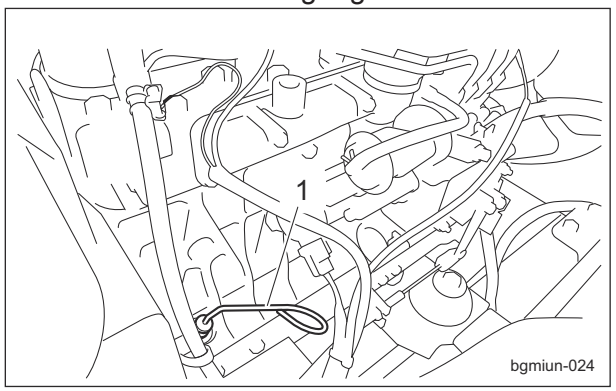
Engine

Inspection of Engine Oil

> Important
>
> Securely insert the oil level gauge.

Check the contamination of oil and engine oil level to inspect the engine oil.
Inspect the engine oil level 10 to 20 minutes after stopping the engine.

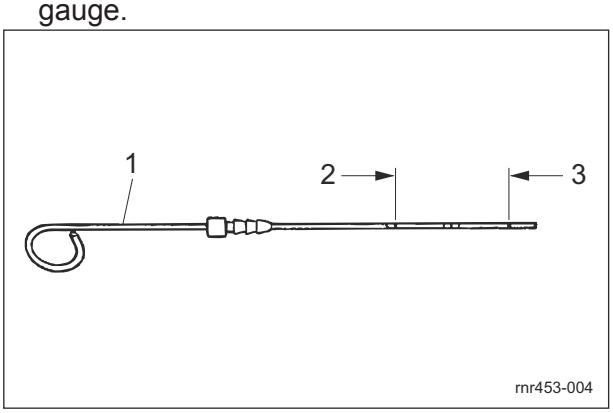
1. Place the machine so that the engine is level.
2. Stop the engine.
3. Open the hood.
4. Pull out the oil level gauge.



Inspection of Engine Oil_001

1	Oil level gauge

5. Wipe the oil off the oil level gauge cleanly with papers or cloths.
6. After wiping the oil off the oil level gauge, check the contamination.
7. Return the oil level gauge to its original position, insert tightly, and pull out again.
8. Check the engine oil level.
   The appropriate oil level should be between the upper and lower limit lines on the gauge.



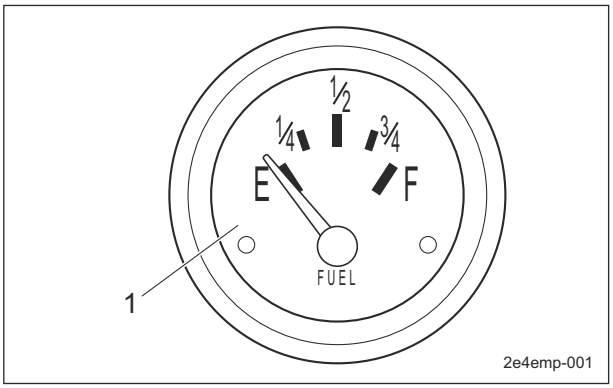
Inspection of Engine Oil_002

1	Oil level gauge
2	Upper limit
3	Lower limit

9. Return the oil level gauge to its original position, and insert it tightly.
10. Close the hood.

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

Supply of Fuel

Warning

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

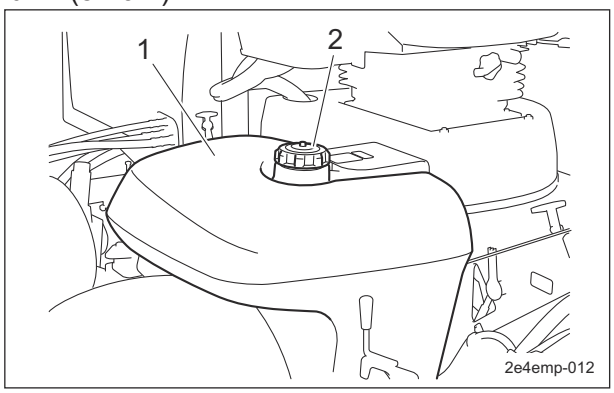
Warning

Keep away from fire while fueling.
Do not smoke while fueling.

Warning

Supply fuel after stopping the engine and allowing it to cool down completely.

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 dm^3 (51.0 L).



Supply of Fuel_001

1	Fuel tank
2	Tank cap

Air Bleeding of Fuel System

Important

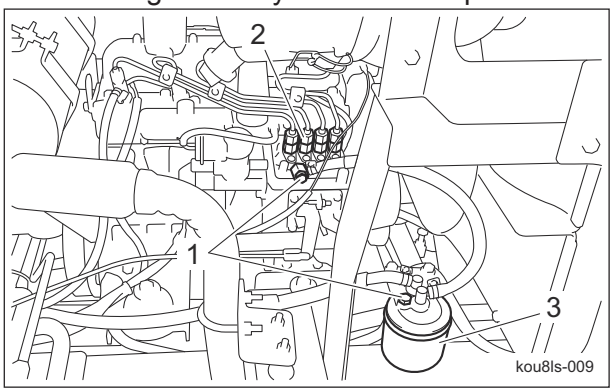
The air-bleed plug should always be in the closed position except during the air bleeding operation.
Using the machine with the air-bleed plug in the open position may cause the engine to stall.

This machine has a function of automatic air bleeding.
However, depending on the mechanical structure, it may not bleed air completely.
If the automatic air bleeding does not work well, follow the steps below to perform manual air bleeding.

Warning

Do not perform air bleeding when the engine is hot since the fuel may spill on the hot exhaust manifold and a fire might occur.

1. Set the ignition key to the "ON" position.
2. Turn the air-bleed plug on the fuel filter several times to loosen it.
3. When a bubble no longer arises, screw the air-bleed plug to the original position.
4. Open the air-bleed plug on the injection pump.
5. When a bubble no longer arises, screw the air-bleed plug to the original position.
6. Set the ignition key to the "OFF" position.



Air Bleeding of Fuel System_001

1	Air-bleed plug
2	Injection pump
3	Fuel filter

Inspection of Fuel Filter

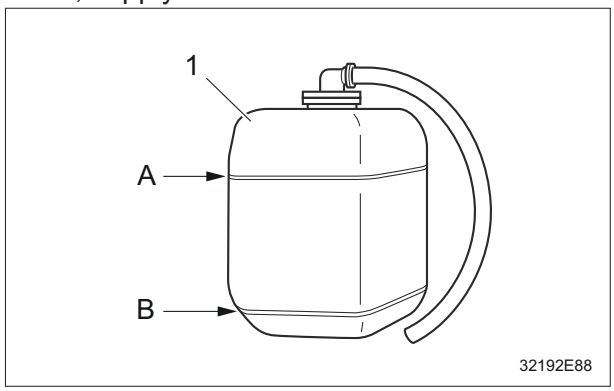
1. Make sure that there is no fuel leakage.
2. Make sure that the filter is not damaged.
3. Make sure that the filter is not contaminated.

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.

Make sure that the coolant level in the reserve tank is between "FULL" and "LOW".
If the coolant level is lower than the "LOW" mark, supply clean water and antifreeze.



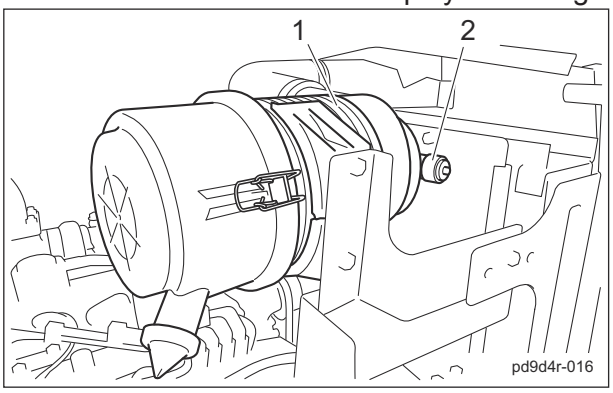
Inspection of Coolant_001

1	Reserve tank
A	Full
B	Low

Inspection of Air Cleaner

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 element is not contaminated.

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.

Inspection of Radiator

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

Inspection of Engine-Associated Parts

> **Caution**
>
> Perform operations after the muffler, engine and other parts have sufficiently cooled.
> Otherwise, you may get burned.

1. Check for damages and dirt.
2. Check the mount for looseness and cracks.
3. Check for liquid leakage.
4. Check on and around the muffler for grass clippings and flammable materials.

Main Vehicle

Inspection of Oil Cooler for Hydraulic Oil

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

Inspection of Battery

⚠ Danger

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

⚠ Caution

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

Important

Be sure to stop the engine before inspecting or charging the battery.

Battery inspection items are described below.

1. Inspecting the exterior
   Visually inspect the exterior of the battery, and check that there are no cracks, splits, missing sections, or abnormal deformation in the battery case, and that there is no electrolyte leaking.
   If abnormalities are found, immediately replace the battery.
2. Cleaning the exterior

⚠ Warning

Do not clean the battery with a dry cloth.
Cleaning the battery with a dry cloth may cause it to catch fire or explode due to static electricity.

Use a wet cloth for cleaning.
Inspect the vent plugs or vent holes on the side of the battery, and if they are blocked by dirt wash them with water to remove the blockage.
Continuing to use the battery with the vent holes blocked may cause the battery to rupture from increased internal pressure due to gases generated inside the battery.

3. Inspecting the mounting bracket
   Inspect whether the battery is secured firmly with the mounting bracket.
   If the bracket is loose, tighten the mounting bracket nuts until the battery is secured firmly.
   An improperly mounted battery may cause damage to the battery case or electrolyte leaks due to the battery moving with vibrations while traveling.
4. Inspecting the cable terminals
   If the connection between the battery terminals and vehicle's cable terminals are loose, tighten the nuts until the cable terminals are secured firmly.
   Insufficiently tightened terminals may result in poor battery charging, damage to the terminals due to poor contacts, or an explosion.
   If the terminals are corroded, rub them clean with a wire brush or fine grit sandpaper, and lightly apply anti-rust grease.
5. Inspecting the electrolyte level and refilling

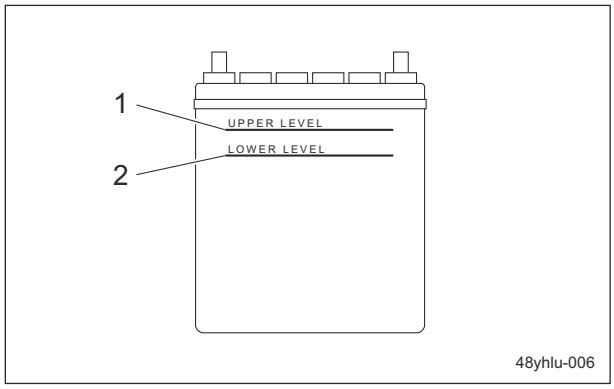
⚠ Warning

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).

⚠ Warning

When refilling, do not fill purified water above the UPPER LEVEL line.
Doing so may result in electrolyte leaks.

Clean the areas around the battery fluid level lines using a cloth damped with water to check the electrolyte level from the side of the battery.
Make sure that the battery fluid level is between the UPPER LEVEL (maximum fluid level line) and the LOWER LEVEL (minimum fluid level line).
Refill with purified water up to the UPPER LEVEL line if the level is lower than halfway between the UPPER LEVEL and LOWER LEVEL lines.



Inspection of Battery_001

1	UPPER LEVEL line
2	LOWER LEVEL line

Inspection of Covers

Warning

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

1. Make sure that there is no wear or deterioration of covers.
2. Make sure that there is no damage to covers.
3. Make sure that there is no interference with moving parts due to deformation of covers.
4. Make sure that covers are installed in their appropriate positions.

Inspection of Traveling Pedal

1. Make sure that there is no play in the pedal.
2. Make sure that the pedal moves smoothly.
3. Make sure that there is no abnormal sound when the pedal is depressed.

Inspection of Brake Pedal

1. Make sure that there is no play in the pedal.
2. Make sure that the pedal moves smoothly.
3. Make sure that there is no abnormal sound when the pedal is depressed.
4. Make sure that the pedal does not touch the floorboard when the pedal is depressed.

Inspection of Parking Brake

1. Depress the locking pedal while firmly depressing the brake pedal to lock it and check that the brake is applied effectively.
2. Firmly depress the brake pedal and release the locking pedal to release the brake pedal, and then check that the brake is not applied.

Inspection of Wire

1. Make sure that the wire is not cracked or damaged.
2. Make sure that the wire is not worn.
3. Make sure that the wire is not crushed.
4. Make sure that the wire is not bent.
5. Make sure that the wire is not corroded or rusted.

Inspection of Liquid Leakage

Important

After approximately 50 hours of operation, some tightened portions may be loosened and liquid such as oil may leak.
Be sure to retighten the parts.

Important

Repair the machine before operation if liquid leakage found.
Ignoring leakage will cause further trouble.

1. Check the bottom of the machine for leakage of liquid such as oil, water, fuel, etc.
2. Locate the leakage and identify the type of liquid.

Inspection of Ball Proof Net

1. Check the ball proof net is not deteriorated.
2. Check there is no damage nor deformation of the ball proof net.

Inspection of Bolts and Nuts

Important

The bolts and nuts may be loosened at the earlier stage of the use.
Be sure to retighten or replace before operating the machine whenever there is any abnormality.

1. Check the bolts and nuts for looseness and coming off.
2. Check the bolts and nuts for cracks and damages.
3. Check the bolts and nuts for rust.
4. Check around the bolts and nuts for traces of rust fluid.
5. Check for unequal bolt length.
6. Check the bolts and nuts for stripped threads and abrasion.

Inspection of Hour Meter

1. Check the hour meter is not damaged.
2. Check the hour meter operates correctly.
   [1] Switch the ignition key to the "ON" position.
   [2] Check the displayed number increases correctly.
   [3] Switch the ignition key to the "OFF" position.

Inspection of Water Temperature Gauge

1. Check the water temperature is not damaged.
2. Check the water temperature operates correctly.
   [1] Switch the ignition key to the "ON" position.
   [2] Check the water temperature needle swings.
   [3] Switch the ignition key to the "OFF" position.

Inspection of Fuel Gauge

1. Check the fuel gauge is not damaged.
2. Check the fuel gauge operates correctly.
   [1] Switch the ignition key to the "ON" position.
   [2] Check the fuel gauge needle swings.
   [3] Switch the ignition key to the "OFF" position.

Inspection of Pilot Lamps

1. Check the pilot lamps are clean.
2. Check the pilot lamps are not damaged.

Inspection of Safety Device

Repair the machine before operation whenever there is any abnormality.

1. Interlock system
   Make sure that the interlock system operates correctly.
   "Interlock System" (Page 4-10)
2. ROPS
   (If the machine is equipped with ROPS and a seat belt)
   Make sure that the ROPS is not damaged or broken.
3. Seat belt
   (If the machine is equipped with ROPS and a seat belt)
   Make sure that the seat belt is not damaged or broken.

Inspection of Steering Wheel

1. Make sure that there is no play in the steering wheel.
2. Make sure that the steering wheel turns smoothly when it is turned.
3. Make sure that there is no abnormal sound when the steering wheel is turned.
4. Check the direction of tires when the steering wheel is turned.
   [1] Start the engine.
   [2] Make sure that the rear tire turns left when the steering wheel is turned right.
   [3] Make sure that the rear tire turns right when the steering wheel is turned left.
   [4] Stop the engine.

Inspection of Light

1. Check the lights are not damaged.
2. Check the lights turn on/off.
   [1] Switch the ignition key to the "ON" position.
   [2] Set the light switch to the "ON" position.
   [3] Check the lights have turned on.
   [4] Set the light switch to the "OFF" position.
   [5] Check the lights have turned off.

[6] Switch the ignition key to the "OFF" position.

Inspection of Grass Catcher

1. Make sure that there is no wear or deterioration of the grass catcher.
2. Make sure that there is no damage to the grass catcher.
3. Make sure that there is no interference to moving parts due to deformation of the grass catcher.

Adjustment before Work

Adjustment of Steering Wheel Position

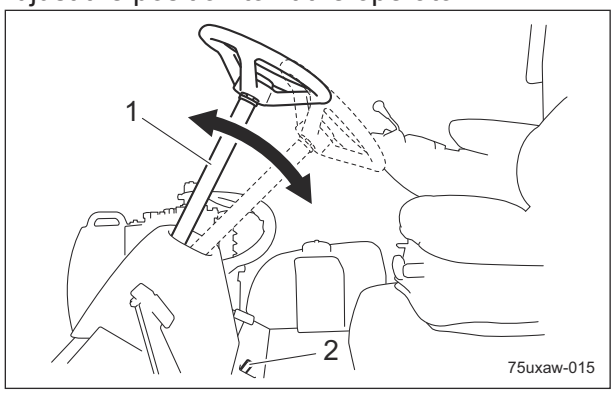
Warning

Do not make adjustments while traveling since doing so is dangerous.

Caution

Be sure the steering wheel position is securely locked.
If it becomes loose while traveling, an unexpected accident may occur.

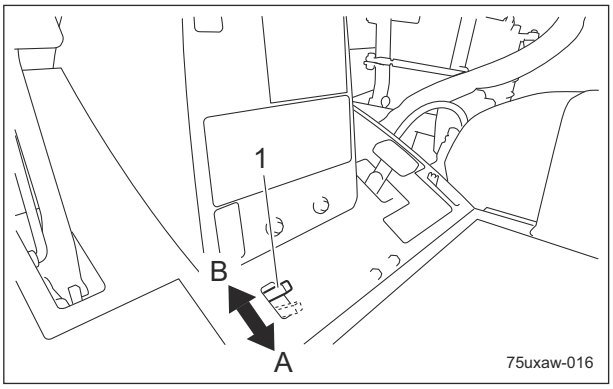
The steering wheel position can be adjusted up or down.
Adjust the position to fit the operator.



Adjustment of Steering Wheel Position_001

1	Steering wheel
2	Tilt lever

Shift the tilt lever to the "FREE" position, move the steering wheel to the position that suits the 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 driver's left foot area.



Adjustment of Steering Wheel Position_002

1	Tilt lever
A	FREE (released)
B	LOCK (locked)

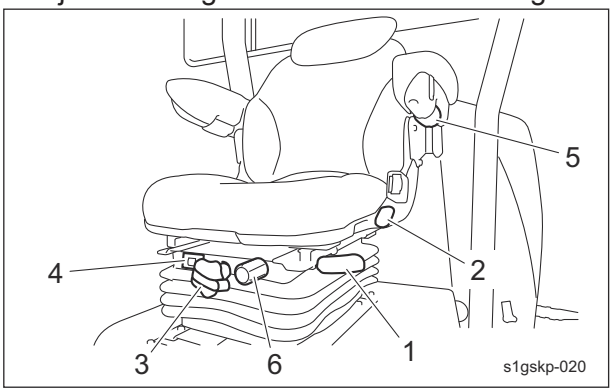
Adjustment of Seat Position

Warning

Do not make an adjustment while traveling since it is dangerous.

Use the adjustment levers to adjust the seat position.
Adjust the position to fit the operator.

1. Use the forward/backward adjustment lever to adjust the seat back and forth.
2. Use the tilt adjustment lever to adjust the angle of the backrest.
3. 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)]
4. Turn the armrest adjustment knob to adjust the angle of the armrests.
5. Turn the seat height adjustment knob to adjust the height of the seat steplessly. [0 to 60 mm (0 to 2.36 in)]
   Adjust the height of the seat while sitting in it.



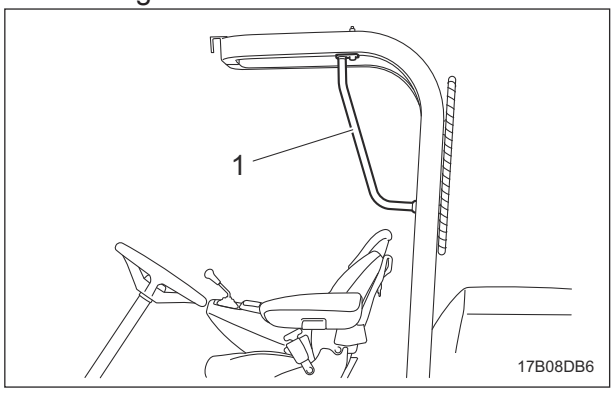
Adjustment of Seat Position_001

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

Mounting and Dismounting

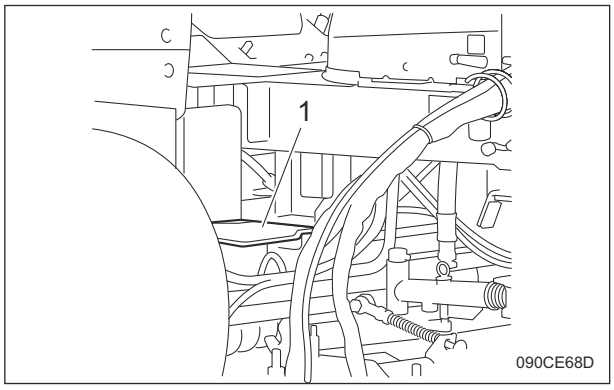
Procedure to Mount/Dismount

This machine is equipped with a step for mounting/dismounting.
Place your foot on the step and grip the supporting bar when mounting and dismounting the machine.



Procedure to Mount/Dismount_001

1	Supporting bar



Procedure to Mount/Dismount_002

1	Step

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.

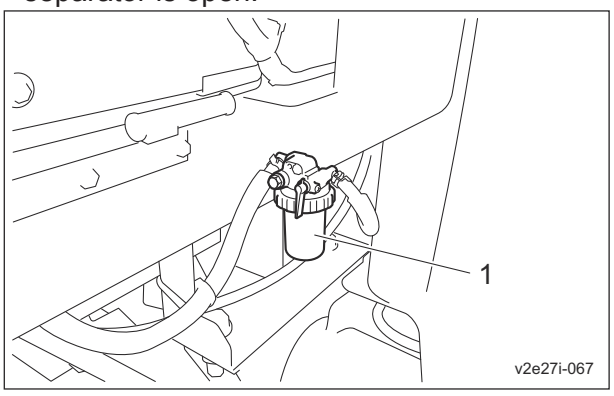
⚠ Caution

Be careful of the mower units lowering when the mower unit up/down lever is shifted to the "Down" position and the key switch is turned to the "ON" position while the engine is stopped with the traveling/working selector switch set to the "Working" position.

Important

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

1. Make sure that the fuel cock of the water separator is open.



Procedure to Start Engine_001

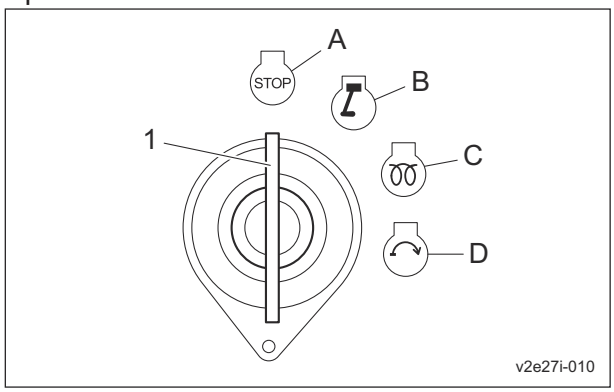
1	Water Separator

2. Sit on the seat.
3. Make sure that you have depressed the brake pedal and applied the parking brake.
4. Make sure that the reel rotation switch is set to the "Stop" position.
5. Make sure that the mower unit up/down lever is set to the "Neutral" position.
6. Make sure that the traveling pedal is in neutral position.
7. Move the throttle lever from the "Low speed" position halfway toward the "High speed" position.

Important

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

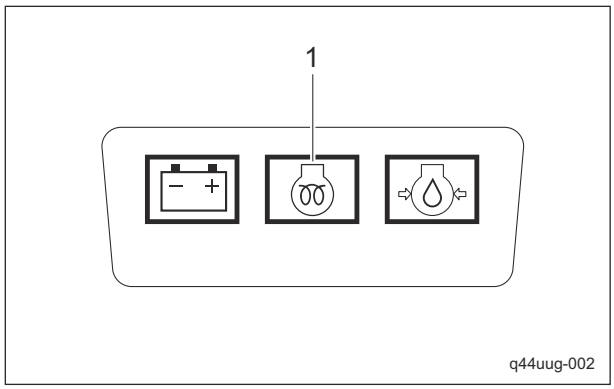
8. Switch the ignition key to the "GLOW" position.



Procedure to Start Engine_002

1	Ignition key
A	OFF
B	ON
C	GLOW
D	START

9. Make sure that the thermo-start lamp is turned on.



Procedure to Start Engine_003

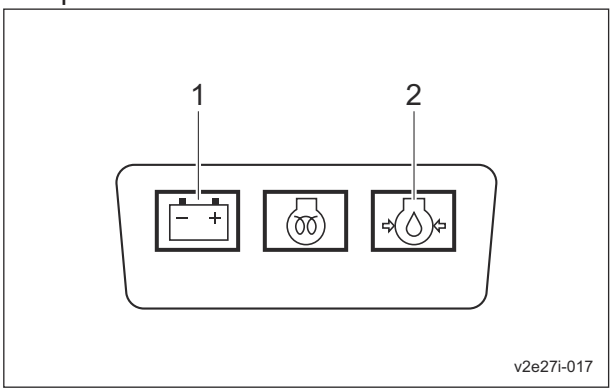
1	Thermo-start lamp

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

Important

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

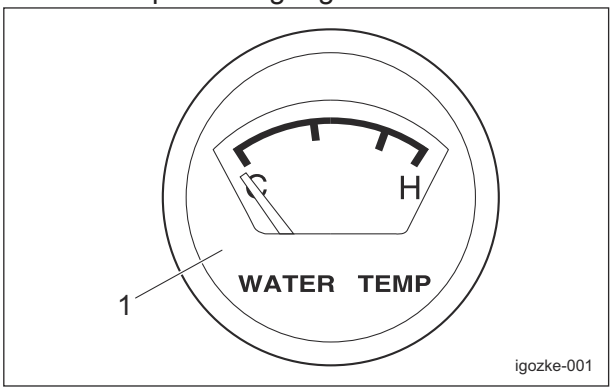
11. When the starter starts rotating and the engine starts, slowly return the ignition key to the "ON" position.
12. Make sure that the charge lamp and oil pressure lamp turn off.
If they do not turn off, stop the engine and inspect the machine.



Procedure to Start Engine_004

1	Charge lamp
2	Oil pressure lamp

13. Move the throttle lever to the "Low speed" position, and then warm up the engine so that the needle points above "C" on the water temperature gauge.



Procedure to Start Engine_005

1	Water temperature gauge

Procedure to Stop Engine

1. Set the traveling pedal to the neutral position.
2. Apply the parking brake.
3. Set the reel rotation switch to the "Stop" position.
4. Raise all the mower units.
5. Shift the throttle lever to the "Low speed" position, and then idle the machine for 1-2 minutes.
6. Switch the ignition key to the "OFF" position.
7. Make sure that the engine has stopped.

Parking and Stopping

Procedure to Leave The Machine

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

> ⚠ Caution
>
> Never park the machine on a slope.

1. Park the machine on level ground.
2. Apply the parking brake.
3. Stop the engine.
4. Remove the ignition key.
5. Install the cap to the key switch.
6. Hook the mower lock levers (latches) for the mower units #4 and #5.
7. Step off the machine to leave.

Move

Traveling Procedure

> ⚠ 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 push the reel rotation switch to the "Stop" side and raise the mower units.

> Important
>
> Do NOT start to move or stop the machine abruptly.
> It will damage the hydraulic system or result in oil leakage.

1. Start the engine.
   "Procedure to Start Engine" (Page 5-11)
2. Make sure that all mower units are raised and that the mower lock levers (latches) for mower units #4 and #5 are engaged.
3. Gradually move the throttle lever toward the "High speed" side.
4. Release the parking brake.
5. Take your foot off the brake pedal.
6. Slowly depress the traveling pedal.
7. The machine starts traveling.
8. When you take your foot off the traveling pedal, the machine stops slowly.

Cutting Work

Cutting Procedure

⚠ Caution

Be sure to operate at an appropriate speed for the mowing site.
When cutting over bumpy surfaces, keep the engine rpm steady, and slow down the cutting speed.

⚠ Caution

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

⚠ Caution

After sand topdressing, close the reel cover. Otherwise, sand may fly out and get in your eyes.

Important

Mow with the lever shifted to the "Down" position.
When the lever is returned to the neutral position, the cylinders are fixed, preventing mowing on undulations.

Important

Do NOT start to move or stop the machine abruptly.
It will damage the hydraulic system or result in oil leakage.

1. Release the mower lock levers (latches) for mower units #4 and #5 just before cutting work.
2. Start the engine.
   "Procedure to Start Engine" (Page 5-11)
3. Release the parking brake.
4. Shift the throttle lever to the "High speed" side to rev the engine up to the maximum rpm.
5. Set the traveling/working selector switch to the "Working" position.
6. Shift the mower unit up/down lever to the "Down" position to lower the mower units.
7. Set the reel rotation switch to the "Rotation" position to rotate the reel cutters (cutting cylinders) of all mower units.

Important

When the traveling speed exceeds 12.0 km/h during cutting operation, a buzzer will sound.
If the operation continues, the engine and hydraulic equipments will be damaged.

8. Set the pedal stopper to the "Working" position.
9. Depress the traveling pedal to start cutting work.

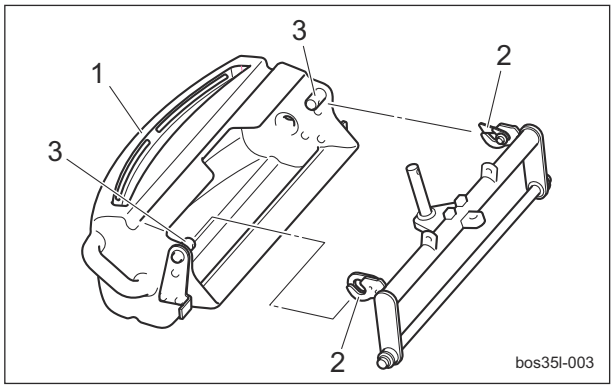
Note:
During the work, the reel cutters (cutting cylinders) will rotate or stop in sync with the up and down motion of the mower units.

Procedure to Remove/Install Grass Catcher

⚠ Caution

Stop the engine before removing or installing the grass catcher.

1. Set the reel rotation switch to the "Stop" position.
2. Lower the mower units.
3. Apply the parking brake.
4. Stop the engine.
5. Remove or install the grass catcher.
   - Removal of grass catcher:
     Lift up the grass catcher, and remove the mounting pins on the left and right sides of the grass catcher from the grass catcher mounting brackets.
   - Installation of grass catcher:
     Install the mounting pins on the left and right sides of the grass catcher into the grass catcher mounting brackets.



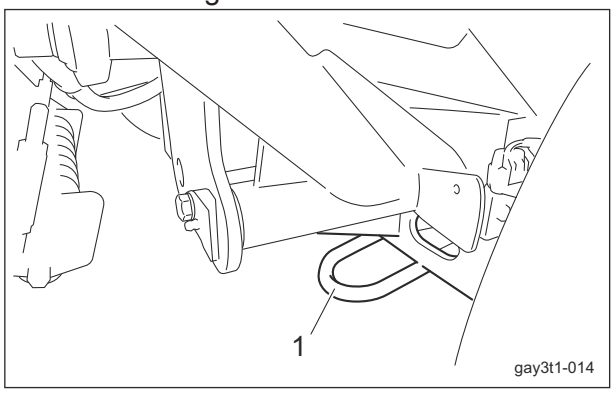
Procedure to Remove/Install Grass Catcher_001

1	Grass catcher
2	Grass catcher mounting bracket
3	Mounting pin

Transporting

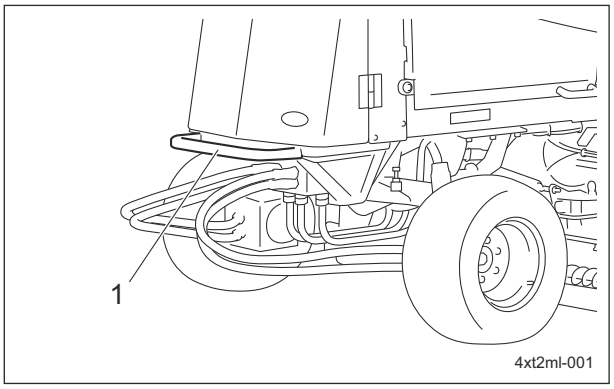
Transporting Procedure

When using a truck or trailer for transporting, drive the machine forward to load it and in reverse to unload it.
If the roof is installed on the machine, remove it.
Otherwise, the roof may be damaged by wind pressure.
Note:
When tying down the machine, secure the rope at the following locations.
At the front of the machine, use the tow hooks on the left and right of the front axle.



Transporting Procedure_001

1	Tow hook



Transporting Procedure_002

1	Bumper

Cleaning after Use

The purpose of the machine cleaning is to:
- Prevent accidents
- Prevent damage to the machine
- Maintain machine performance

Properly clean the machine to maintain its functionality and performance.
If you detect any abnormalities with the machine, immediately perform maintenance or repairs.

Engine

Cleaning of Engine-Associated Parts

> **⚠ Caution**
>
> Perform operations after the muffler, engine and other parts have sufficiently cooled. Otherwise, you may get burned.

1. Clean clippings and remove dirt.
2. Blow compressed air to clean any grass or flammable materials that may be attached on or around the muffler.

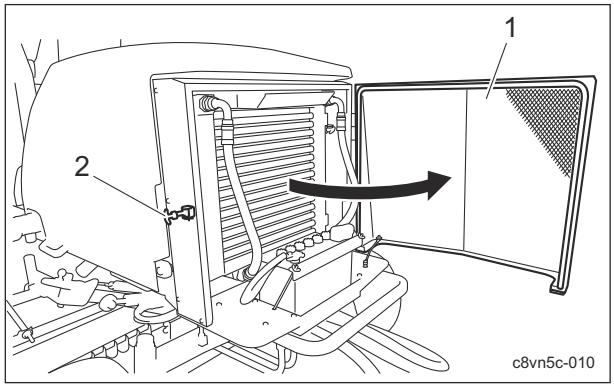
Cleaning of Radiator Cover

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	Rubber catch

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

Cleaning of Radiator

Important

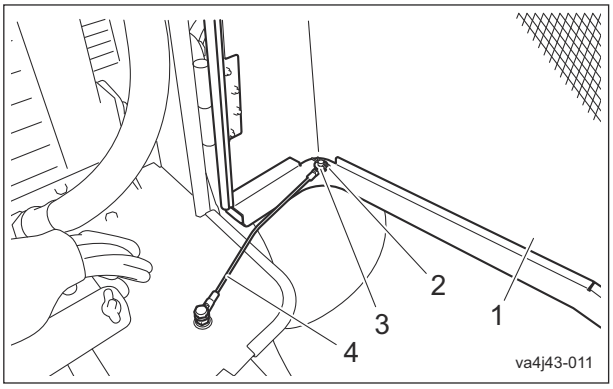
An unclean radiator may cause the engine to overheat or seize.
It may also cause malfunction of the hydraulic system.

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

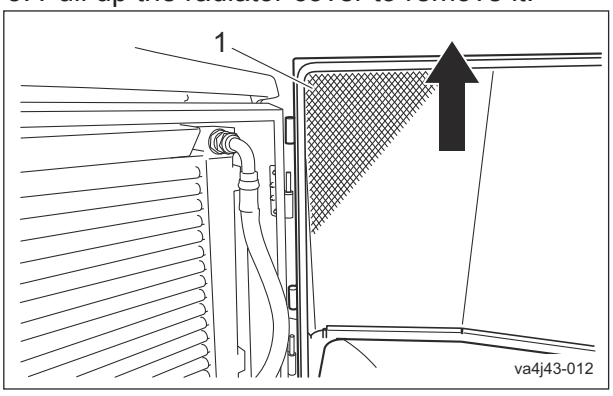
1. Open the radiator cover.
2. Remove the cotter pin and washer, and then remove the cable.



Cleaning of Radiator_001

1	Radiator cover
2	Cotter pin
3	Washer
4	Cable

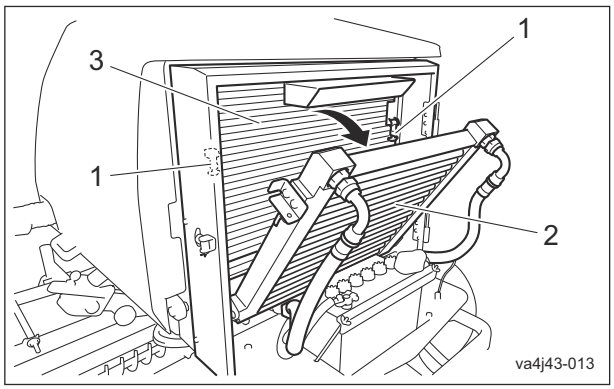
3. Pull up the radiator cover to remove it.



Cleaning of Radiator_002

1	Radiator cover

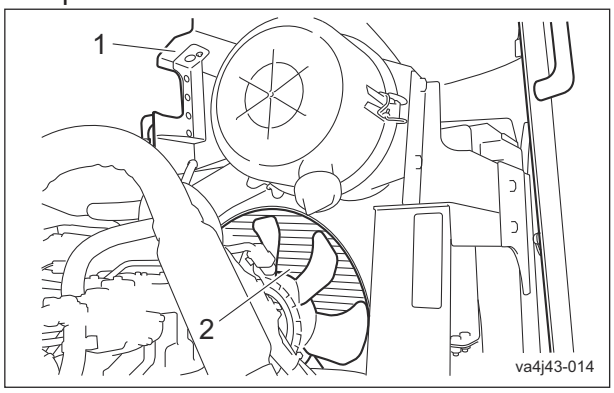
4. Unlock the rubber catches on the left and right of the oil cooler, and then tilt the oil cooler.



Cleaning of Radiator_003

1	Rubber catch
2	Oil cooler
3	Radiator

5. Carefully clean the radiator with water or compressed air.
6. Open the hood.



Cleaning of Radiator_004

1	Hood
2	Radiator

7. Carefully clean the radiator with water or compressed air.

Main Vehicle

Cleaning of Oil Cooler

Important

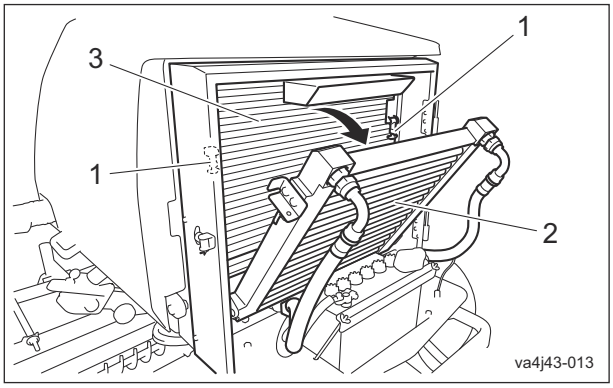
An unclean oil cooler may cause malfunction of the hydraulic system.

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.
Especially 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	Rubber catch
2	Oil cooler
3	Radiator

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

Storage

Short-Term Storage

Short-term storage means that the machine is temporarily stored (within 1 month) without use.
Follow the instructions below for short-term storage of the machine.

1. Cleaning
   - Remove dirt, grass clippings, oil stains etc. completely from the main vehicle and engine.
2. Mower units
   - When storing this machine, lower all the mower units unless a positive mechanical lock is provided.
3. Storage location
   - Cover the machine and store it in a dry place where it will not be exposed to rain.

Precautions for Maintenance .....Page 6-2

Jacking Up The Machine .....Page 6-2

About Jacking Up The Machine .....Page 6-2
Jack-Up Points .....Page 6-2

Inspection and Cleaning ..... Page 6-4

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Long-Term Storage .....Page 6-46

Precautions for Maintenance

Warning

The chapter "Maintenance" in this manual describes practical measures which should be performed by a mechanic with expertise.
The owner should instruct the mechanic with expertise to perform maintenance service for this machine.

Caution

First, learn well the operations you plan to perform.

Important

Use tools appropriate for each operation.

Important

Use Baroness genuine parts for replacement and accessories.
Our product warranty may be void if you use non-genuine parts for replacement or accessories.

Jacking Up The Machine

About 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.

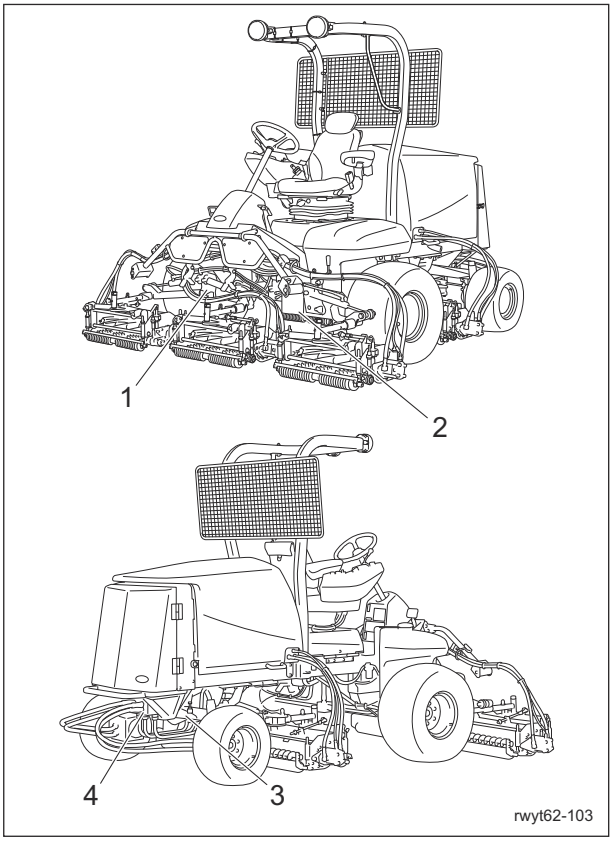
Important

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

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

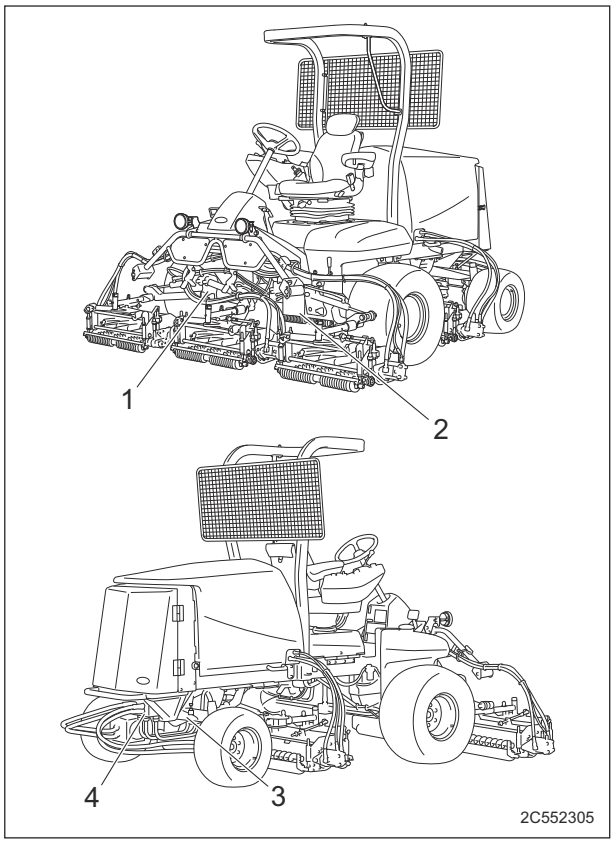
Jack-Up Points

■ #10180 – 10349



Jack-Up Points_001

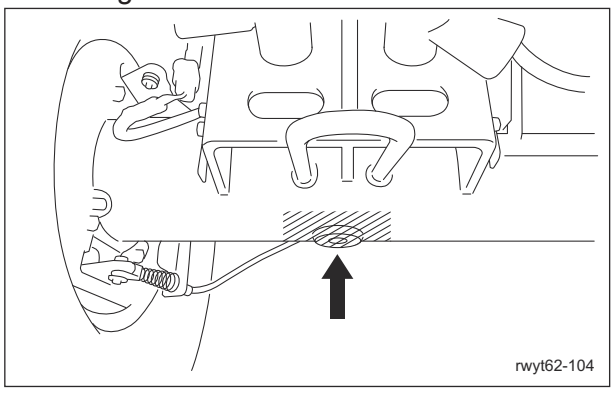
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Jack-Up Points_002

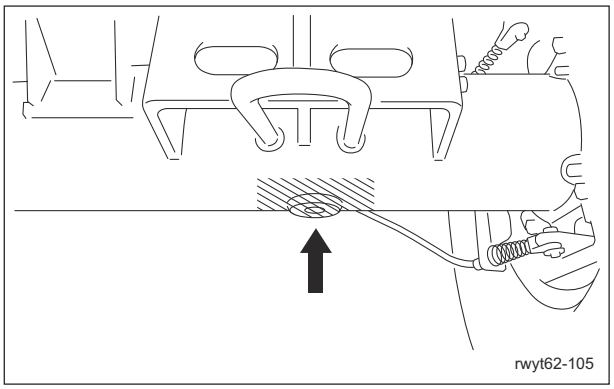
	Jack-up points
1	Front right frame
2	Front left frame
3	Right pivot
4	Left pivot

1. Front right frame



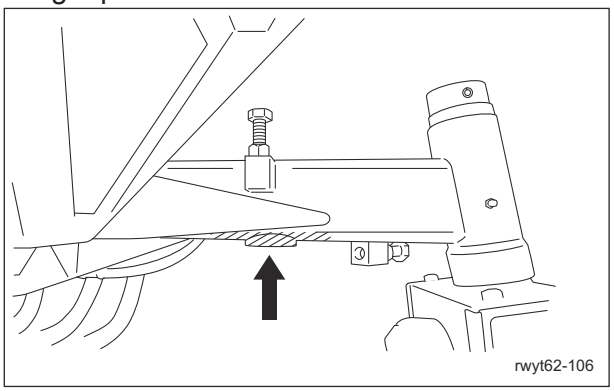
Jack-Up Points_003

2. Front left frame



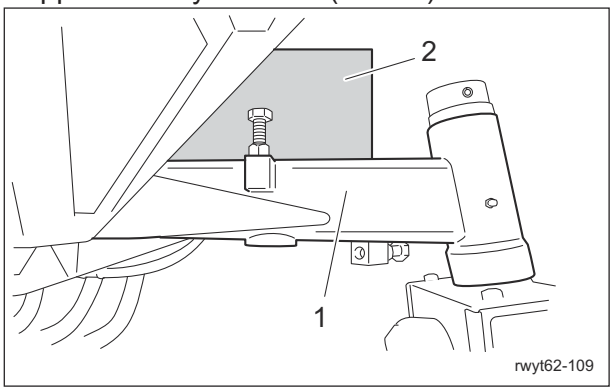
Jack-Up Points_004

3. Right pivot



Jack-Up Points_005

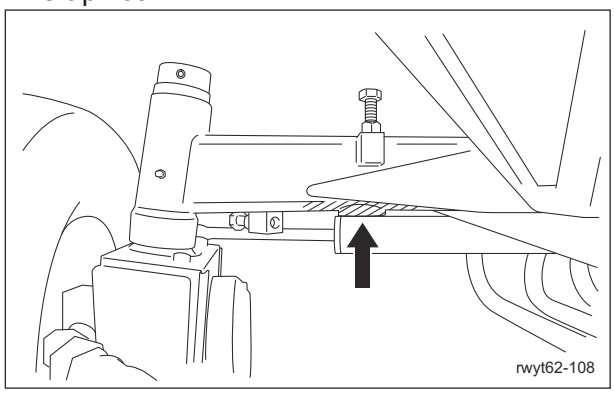
When jacking up the machine at the right pivot, place a block of wood between the right pivot and the frame.
Note:
Use a block of wood with a height of approximately 130 mm (5.12 in).



Jack-Up Points_006

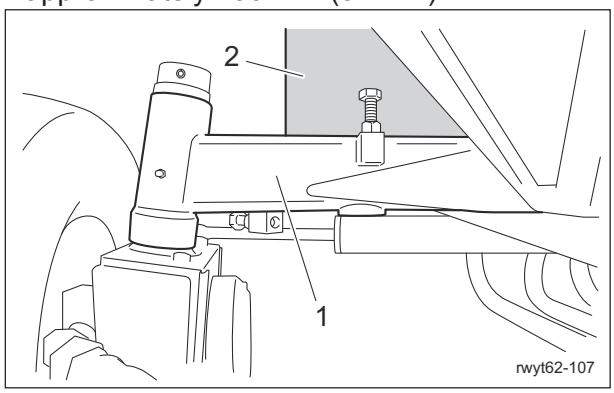
1	Pivot
2	Block of wood

4. Left pivot



Jack-Up Points_007

When jacking up the machine at the left pivot, place a block of wood between the left pivot and the frame.
Note:
Use a block of wood with a height of approximately 130 mm (5.12 in).



Jack-Up Points_008

1	Pivot
2	Block of wood

Inspection and Cleaning

Inspect and clean the machine with the goals of the followings.

- Accident prevention
- Failure prevention
- Performance retention

Make efforts for early detection of the machine failure and prevention of the sudden occurrence of trouble.
Perform maintenance and repair works immediately if any abnormality is found in the machine.

Engine

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. Check the belt tension.
2. Make sure that there are no cracks and damage on the belt.
3. Make sure that there is no abnormal wear on the belt.

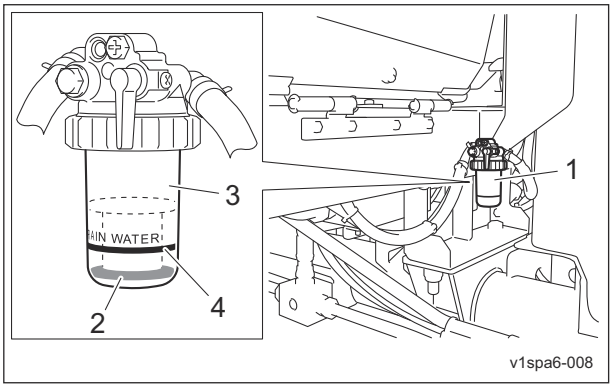
Inspection of Water Separator

Important

Water-contaminated fuel may impair engine startability, decrease output or damage engine parts.

The water separator removes water from the fuel.

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



Inspection of Water Separator_001

1	Water Separator
2	Float
3	Cup
4	Drain level

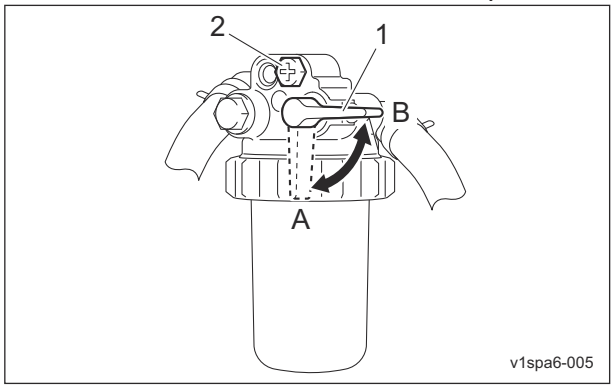
Draining of Water Separator

Important

Water-contaminated fuel may impair engine startability, decrease output or damage engine parts.

Drain the water after at least the number of hours in the Maintenance Schedule and whenever the float is raised by water.

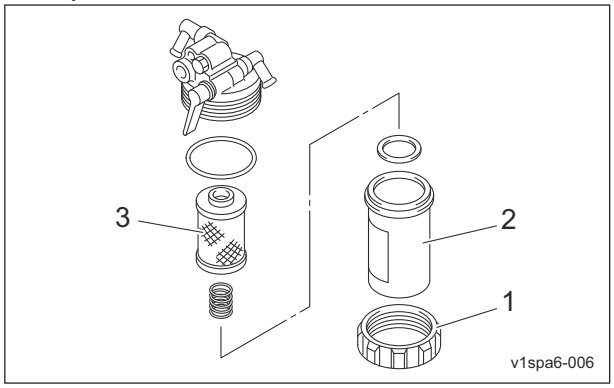
1. Stop the engine, and then turn the key switch to the "OFF" position.
2. Place a container under the water separator.
3. Close the fuel cock of the water separator.



Draining of Water Separator_001

1	Fuel cock
2	Air-bleeding plug
A	ON (open)
B	OFF (close)

4. Remove the ring nut, and then remove the cup.



Draining of Water Separator_002

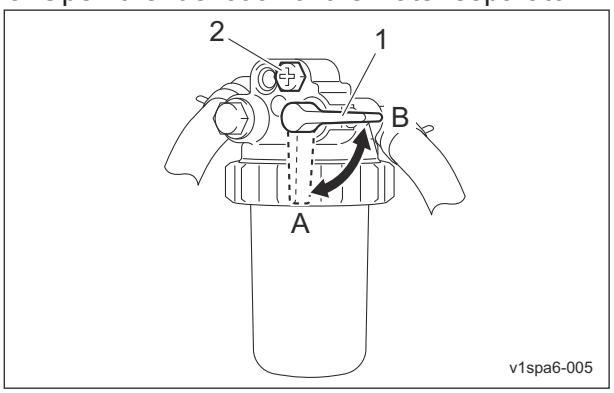
1	Ring nut
2	Cup
3	Element

5. Drain the water from the cup.

Important

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

6. Correctly install all parts in their original positions.
7. Fill up the fuel tank with fuel.
8. Open the fuel cock of the water separator.



Draining of Water Separator_003

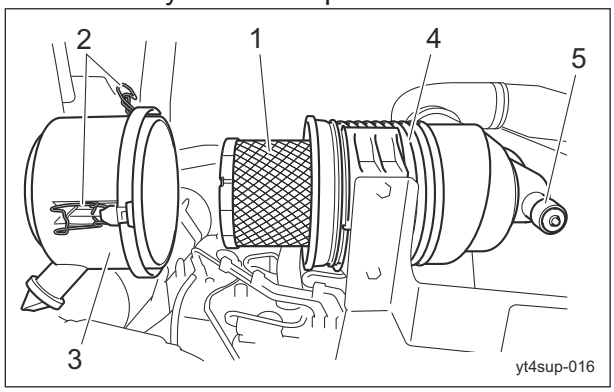
1	Fuel cock
2	Air-bleeding plug
A	ON (open)
B	OFF (close)

9. Set the ignition key to the "ON" position.
10. Loosen the air-bleed plug to bleed the air.
11. When the cup is filled with fuel, close the air-bleed plug.
12. Set the ignition key to the "OFF" position.
13. If the engine does not start within 15 seconds after switching the ignition key to the "START" position, wait at least 30 seconds, and then repeat the same operation.
    If there is still air in the cup after starting the engine, bleed the air again.

Cleaning of Air Cleaner Element

A contaminated air cleaner element may cause malfunction of the engine.
To maximize the life of the engine, clean the air cleaner properly.

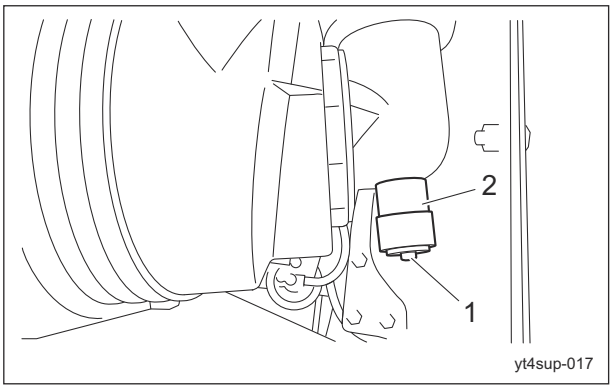
1. Follow the steps below to clean the air cleaner.
   [1] Release the clips, remove the air cleaner cap, and then remove the air cleaner filter.
   [2] While paying close attention not to damage the air cleaner filter, tap a solid portion of the air cleaner filter or blow compressed air from its inside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



Cleaning of Air Cleaner Element_001

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

2. Press the reset button for the vacuum indicator.



Cleaning of Air Cleaner Element_002

1	Reset button
2	Vacuum indicator

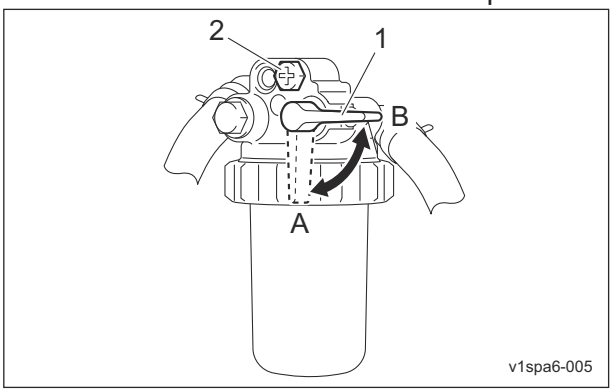
Cleaning of Water Separator

Important

Water-contaminated fuel may impair engine startability, decrease output or damage engine parts.

Clean the water separator after at least the number of hours in the Maintenance Schedule and whenever debris has accumulated in the cup.

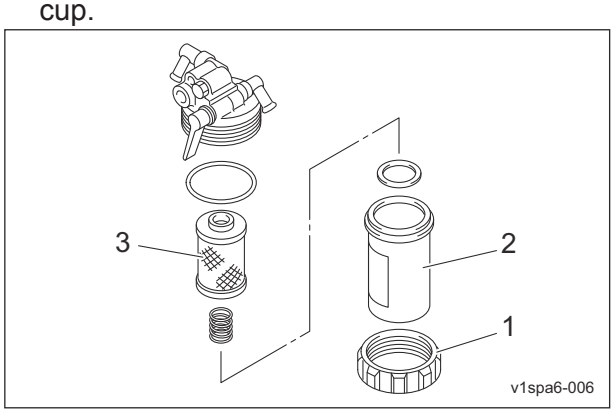
1. Stop the engine, and then turn the key switch to the "OFF" position.
2. Place a container under the water separator.
3. Close the fuel cock of the water separator.



Cleaning of Water Separator_001

1	Fuel cock
2	Air-bleeding plug
A	ON (open)
B	OFF (close)

4. Remove the ring nut, and then remove the cup.



Cleaning of Water Separator_002

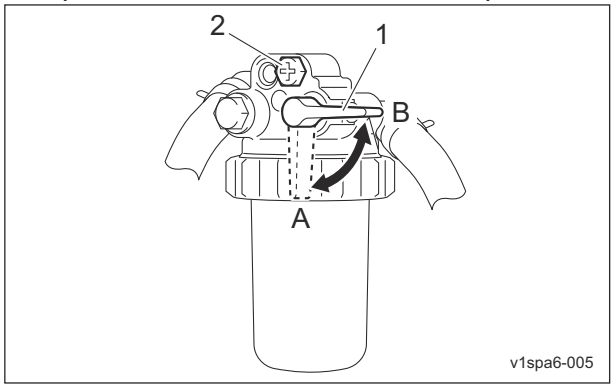
1	Ring nut
2	Cup
3	Element

5. Drain the water from the cup.
6. Clean the cup and element with diesel fuel.

Important

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

7. Correctly install all parts in their original positions.
8. Fill up the fuel tank with fuel.
9. Open the fuel cock of the water separator.



Cleaning of Water Separator_003

1	Fuel cock
2	Air-bleeding plug
A	ON (open)
B	OFF (close)

10. Set the ignition key to the "ON" position.
11. Loosen the air-bleeding plug to bleed the air.
12. When the cup is filled with fuel, close the air-bleeding plug.
13. Set the ignition key to the "OFF" position.
14. If the engine does not start within 15 seconds after switching the ignition key to the "START" position, wait at least 30 seconds, and then repeat the same operation.
    If there is still air in the cup after starting the engine, bleed the air again.

Main Vehicle

Inspection of Hydraulic Hoses and Pipes

Warning

When checking the hydraulic circuit for pinhole leaks or oil leakage from nozzles, do not use your hands. Use items such as paper or corrugated cardboard to find leakage points.
Be extremely careful with high-pressure oil as it may pierce your skin, resulting in personal accidents.
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.

1. Make sure that there is no wear, deterioration or damage in the hydraulic hoses and pipes.
2. Make sure that there is no looseness in the connecting portion of the hydraulic hoses and pipes.
3. Check underneath the machine for hydraulic oil leakage.

Inspection of Electrical Wiring

Important

Electrical short circuit will cause fire, electrical leakage and malfunction of electrical equipments.

1. Make sure that there is no defacement in wires and terminals.
2. Make sure that there is no deterioration or damage in wires and terminals.
3. Make sure that there is no looseness in wiring connections.
4. Make sure that there is no poor terminal connection.

Inspection of Wheel Mounting Bolt

Important

Tighten the wheel mounting bolts on the specified torque by using a torque wrench.

1. Check the wheel mounting bolts and wheel nuts for looseness and coming off.
2. Check the wheel mounting bolts and wheel nuts for cracks and damages.
3. Check the wheel mounting bolts and wheel nuts for rust.
4. Check around the wheel mounting bolts and wheel nuts for traces of rust fluid.
5. Check the wheel mounting bolts for unequal bolt length.
6. Check the wheel mounting bolts and wheel nuts for stripped threads and abrasion.

Supplying Fluids

Engine

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

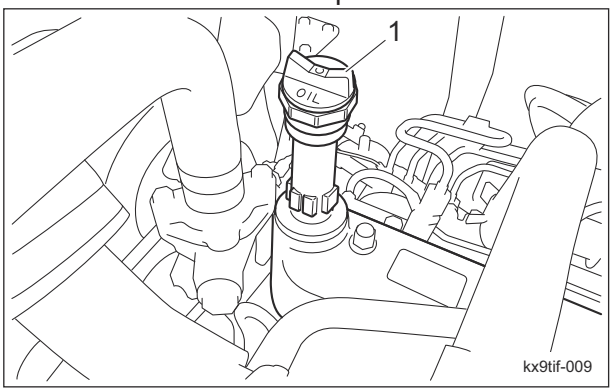
Be sure to use engine oil that is classified as API Service Grade CF or higher, with an SAE Viscosity that is appropriate for the operating environment (ambient temperature).

Important

Securely install the oil level gauge and oil filler cap.

If the engine oil level is lower than the lower limit line on the oil level gauge, supply engine oil.
Supply engine oil through the oil filler port.

1. Place the machine so that the engine is level.
2. Stop the engine.
3. Open the hood.
4. Remove the oil filler cap.



Supply of Engine Oil_001

1	Oil filler cap

5. Supply new engine oil through the oil filler port.
   Supply oil until it reaches a level in between the upper and lower limit lines on the oil level gauge.
6. Install the oil filler cap.
7. 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 replenishment.
   If the engine oil level is low, supply oil until it reaches the specified level.
8. Close the hood.

Supply 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

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

Important

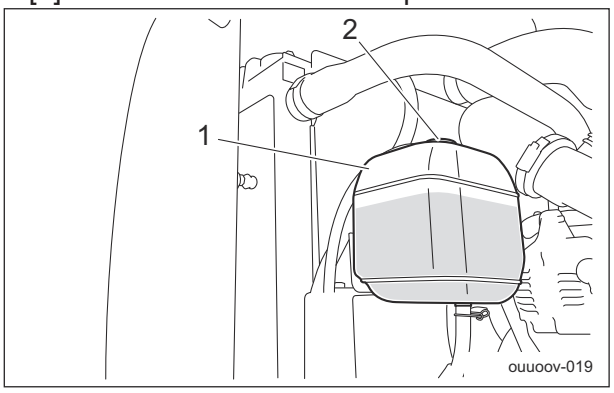
Tightly close the radiator cap.
If the cap is loose or incorrectly installed, the engine will be overheated due to water leakage, resulting in engine damage.

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%

If the coolant in the reserve tank is low, fill the tank with clean water and antifreeze.

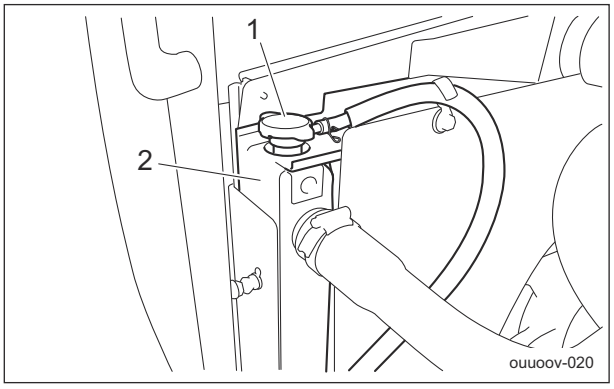
1. If the coolant level in the reserve tank is lower than the "LOW" mark, follow the steps below to fill the tank.
   [1] Remove the reserve tank cap.
   [2] Supply clean water and antifreeze up to the "FULL" mark.
   [3] Install the reserve tank cap.



Supply of Coolant_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 and antifreeze.
   [1] Remove the radiator cap.
   [2] Supply clean water and antifreeze up to the opening.
   [3] Install the radiator cap.
   [4] Remove the reserve tank cap.
   [5] Supply clean water and antifreeze up to the "FULL" mark.
   [6] Install the reserve tank cap.



Supply of Coolant_002

1	Radiator cap
2	Radiator

Supply of Hydraulic Oil

Important

Do not mix different types of oil.

Important

For the hydraulic oil to be used, consult Characteristics of Hydraulic Oil and use the oil whose characteristics are equivalent or superior to those specified there.
Especially regarding kinematic viscosity and viscosity index, use of hydraulic oil whose figures are less than those of the specified hydraulic oil will cause a malfunction in the hydraulic circuit.

Important

Supply hydraulic oil after checking the oil in the hydraulic tank has been sufficiently cooled down.
Oil level changes depending on the hydraulic oil temperature.

■Characteristics of Hydraulic Oil

ISO Viscosity Grade		ISO VG46
Density	15 °C (59 °F)	0.873 g/cm^3 (0.0315 lb/in^3)
API Gravity		30.6
Flash Point (Open Cup)		230 °C (446 °F)
Pour Point		-30 °C (-22 °F)
Kinematic Viscosity	40 °C (104 °F)	46 mm^2/s (46 cSt)
	100 °C (212 °F)	7 mm^2/s (7 cSt)
Viscosity Index		109

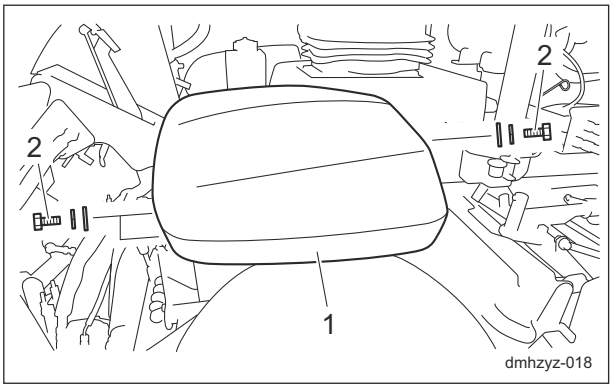
■Characteristics of Hydraulic Oil with conditions of use
Hydraulic oil of ISO viscosity grade VG68 can be used only if the following condition is met:

・The outside temperature must be 20 °C (68 °F) or more during engine operation.

ISO Viscosity Grade		ISO VG68
Density	15 °C (59 °F)	0.878 g/cm^3 (0.0318 lb/in^3)
API Gravity		29.7
Flash Point (Open Cup)		252 °C (486 °F)
Pour Point		-30 °C (-22 °F)
Kinematic Viscosity	40 °C (104 °F)	68 mm^2/s (68 cSt)
	100 °C (212 °F)	9 mm^2/s (9 cSt)
Viscosity Index		107

Note:
In Japan, "Shell Tellus S2M46 (ISO VG46)" and "Shell Tellus S2M68 (ISO VG68)" meet the characteristics described above.
However, in other countries, the specification of Shell Tellus S2M46 and Shell Tellus S2M68 can be below what is required.
Please check the product data sheet to ensure that it meets the requirements before using.

1. Remove the screws from the tank cover, and then remove the tank cover.

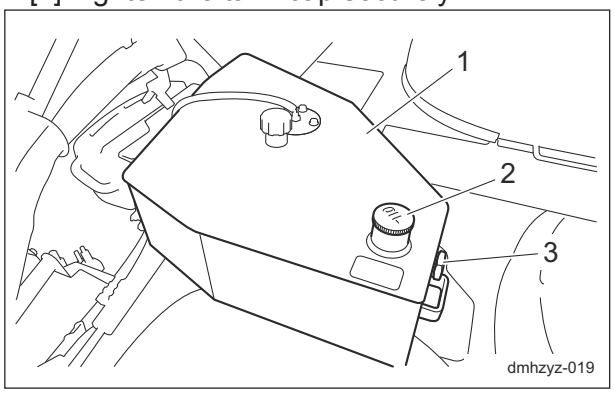


Supply of Hydraulic Oil_001

1	Tank cover
2	Screw

2. If the hydraulic oil level is low, follow the steps below to supply oil.
   [1] Open the tank cap, and then supply hydraulic oil through the oil filling port until the oil level reaches the middle of the oil gauge on the hydraulic tank.

[2] Tighten the tank cap securely.



Supply of Hydraulic Oil_002

1	Hydraulic tank
2	Tank cap
3	Oil gauge

3. Start the engine, and then repeat the steps below a few times.
   - Raise and lower the mower units.
   - Turn the steering wheel left and right.
   - Move forward and reverse.
4. Lower the mower units and maintain that position on a level surface, and then check to see if the oil level is at the middle of the oil gauge. If necessary, supply oil.
5. Check underneath the machine for hydraulic oil leakage.
6. Install the tank cover.

Supply of Battery Fluid

⚠ Danger

If battery fluid comes into contact with eyes, it may result in blindness. Immediately flush with plenty of water and take medical care from an ophthalmologist.

⚠ Danger

Do not drink battery fluid.
If battery fluid enters the mouth or is swallowed, it may result in burns inside the mouth. Immediately and repeatedly gargle with plenty of water, then drink plenty of water, and take medical care.

⚠ Danger

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

⚠ Warning

If battery fluid adheres to the skin or clothing, it may cause burns or damage clothing.
Immediately flush with plenty of water, then wash thoroughly with soap.

⚠ 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).

⚠ Warning

When refilling, do not fill purified water above the UPPER LEVEL (maximum fluid level line).
Doing so may result in electrolyte leaks.

⚠ Caution

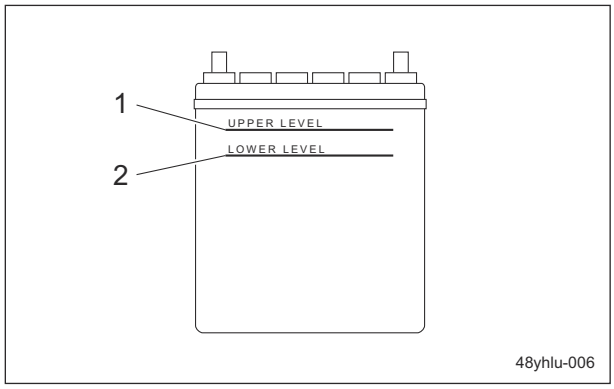
Implement after the engine and muffler etc. have well cooled down.
Otherwise, you may get burned.

Important

If battery fluid adheres to the vehicle, it may cause corrosion.
Wipe it off with a cloth dampened with water, and then flush with water.

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

1. Loosen the vent plug and remove it.
2. Add purified water up to the UPPER LEVEL (maximum fluid level line)
3. Tighten the vent plug securely.



Supply of Battery Fluid_001

1	Maximum fluid level line
2	Minimum fluid level line

Greasing

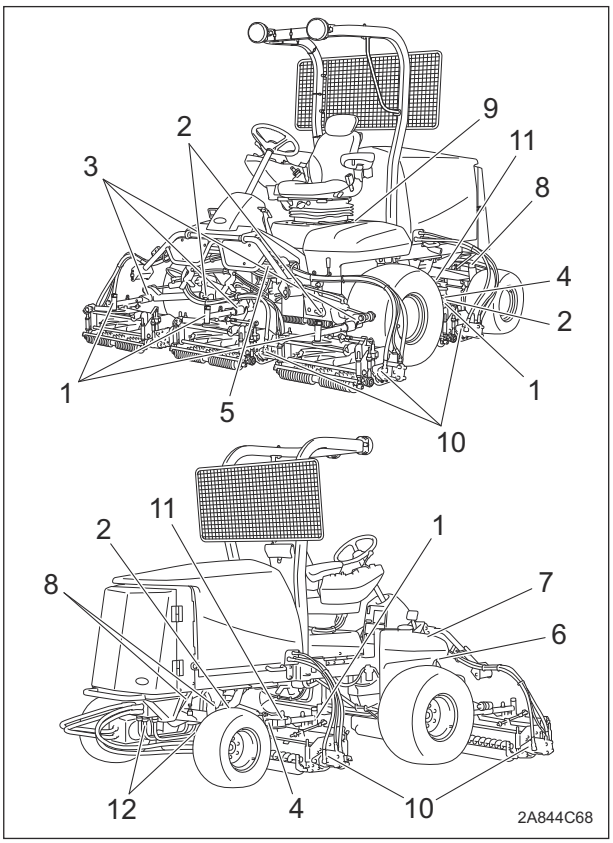
About Greasing

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

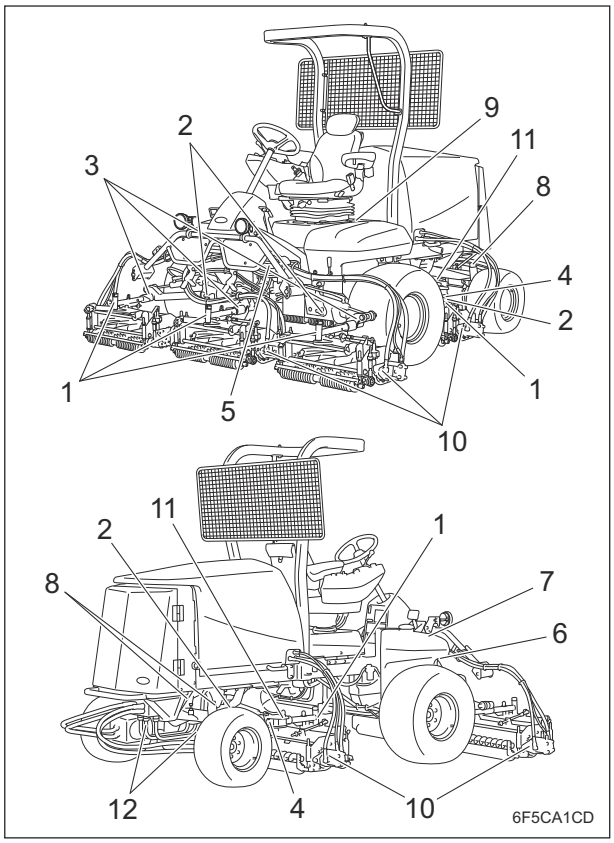
Grease nipples are installed in the following locations.
Add grease every 50 hours of operation.
If specified locations, periods and grease are additionally described below, follow the instructions.

■ #10180 - 10349



Greasing Points_001

■ #10350-

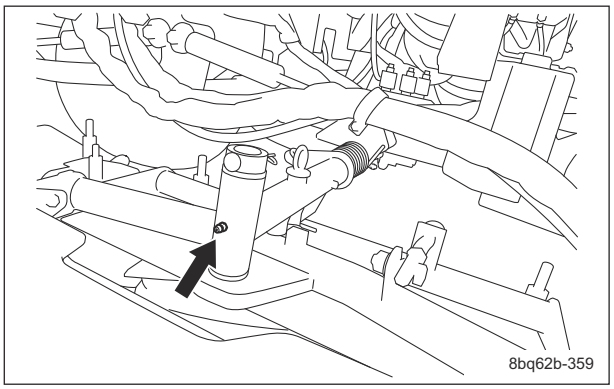


Greasing Points_002

	Location	No. of greasing points
1	Mower arm fulcrum	5
2	Lift arm fulcrum	5
3	Lift arm fulcrum shaft	3
4	Swiveling bracket fulcrum	2
5	Brake pedal shaft fulcrum	1
6	Traveling pedal shaft fulcrum	1
7	Pedal stopper	1
8	Pivot	3
9	Joint	1
10	Reel motor shaft	5
11	Rear mower unit swivel pin	2
12	Tie rod end (#10403-)	2

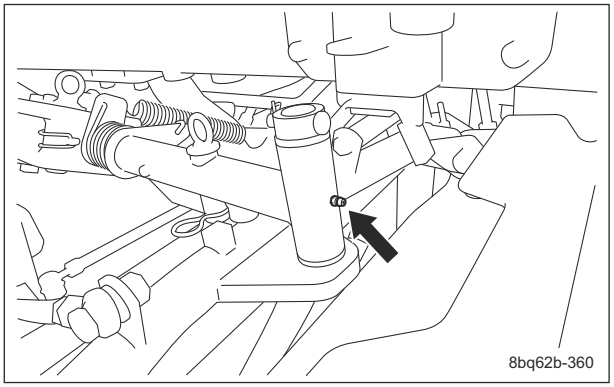
1. Mower arm fulcrum
   There is one greasing point on each mower arm fulcrum.

Mower unit #1



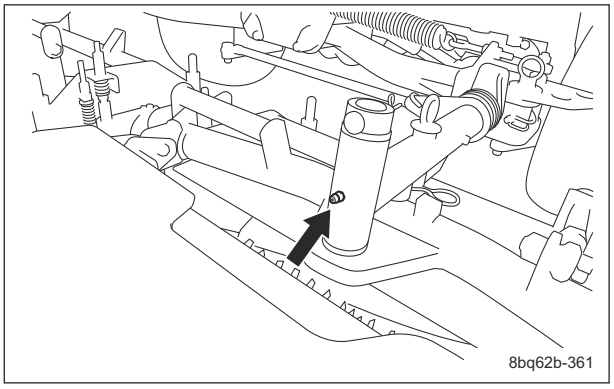
Greasing Points_003

Mower unit #2



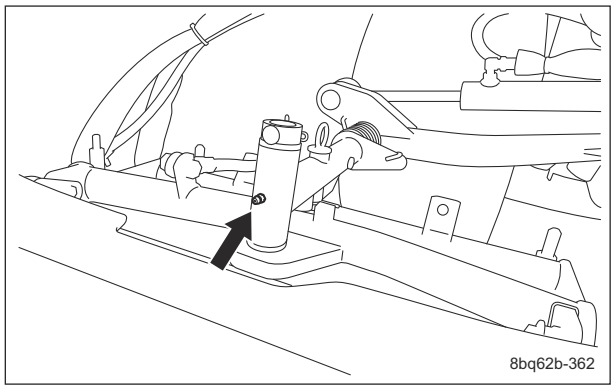
Greasing Points_004

Mower unit #3



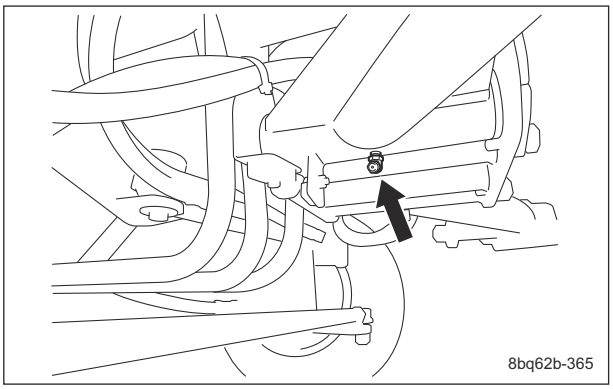
Greasing Points_005

Mower unit #4



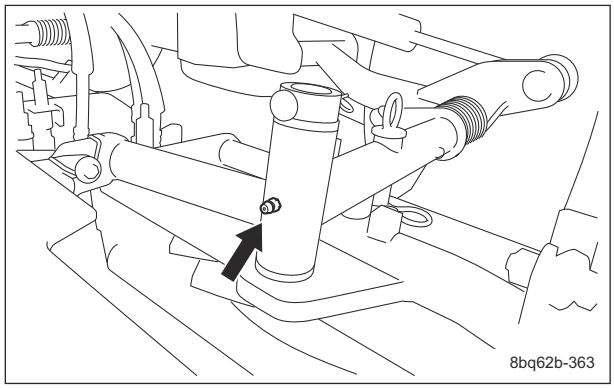
Greasing Points_006

Mower unit #2



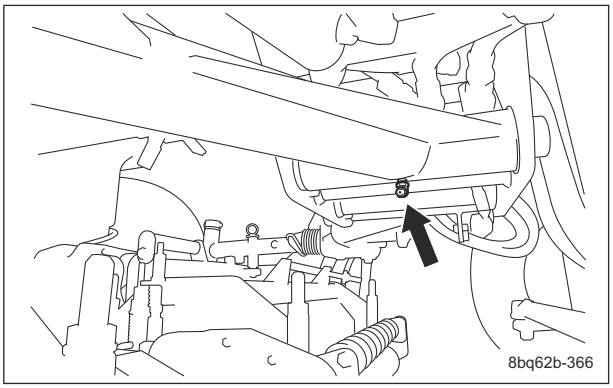
Greasing Points_009

Mower unit #5



Greasing Points_007

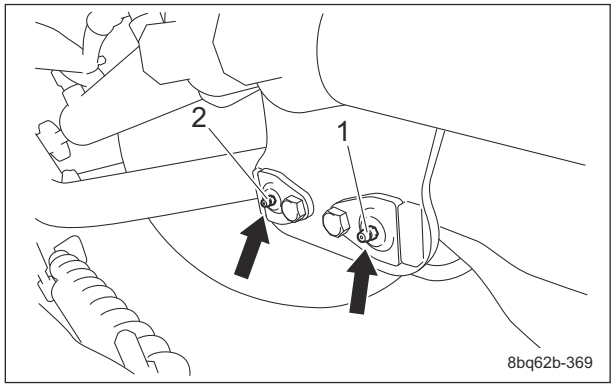
Mower unit #3



Greasing Points_010

2. Lift arm fulcrum
   There is one greasing point on each lift arm fulcrum (on the main vehicle side) connected to the mower unit.

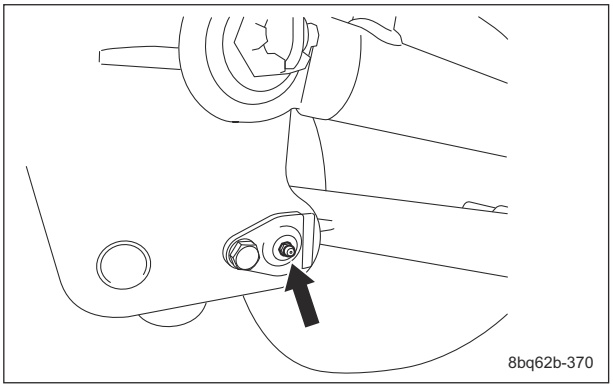
   Mower units #1 and #4



Greasing Points_008

1	Mower unit #1
2	Mower unit #4

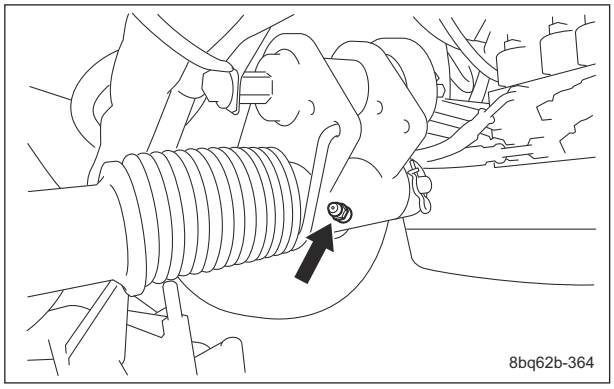
Mower unit #5



Greasing Points_011

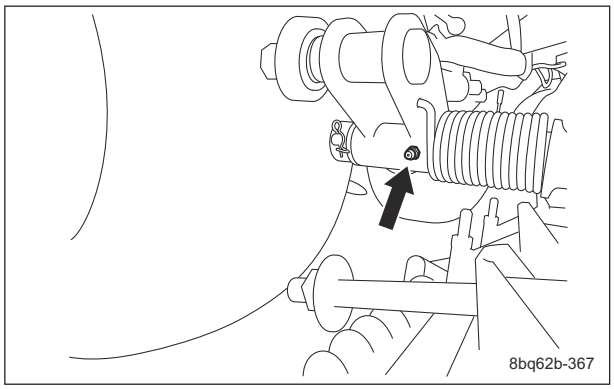
3. Lift arm fulcrum shaft
   There is one greasing point on each lift arm fulcrum shaft (on the mower arm side) connected to the mower unit.

Mower unit #1



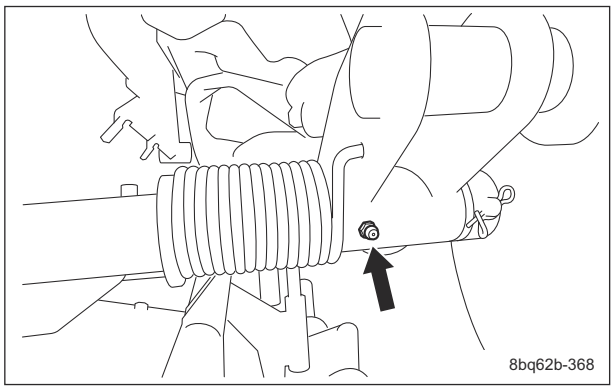
Greasing Points_012

Mower unit #4



Greasing Points_013

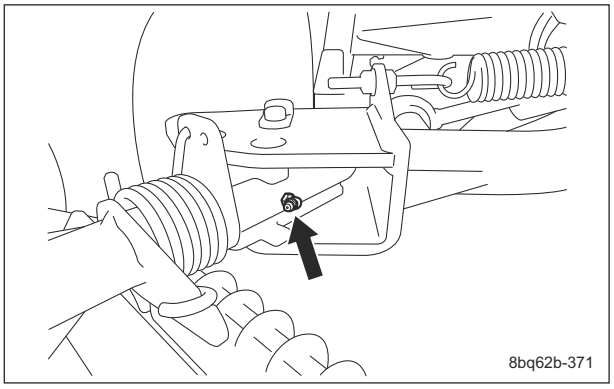
Mower unit #5



Greasing Points_014

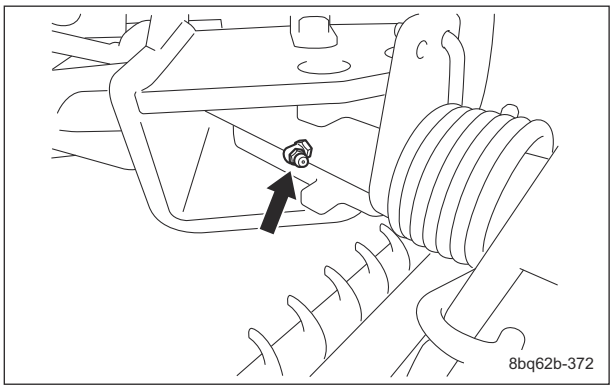
4. Swiveling bracket fulcrum
   There is one greasing point on each swiveling bracket fulcrum connected to the mower unit.

Mower unit #2



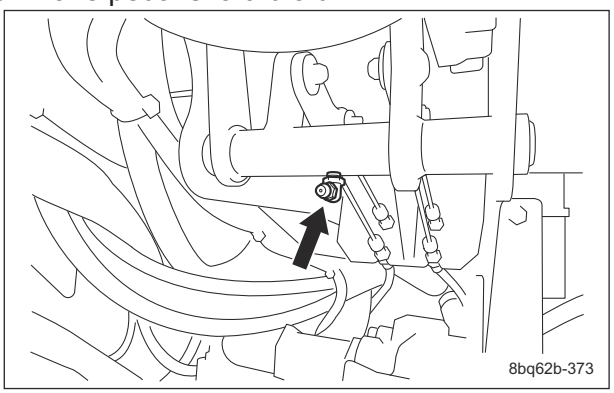
Greasing Points_015

Mower unit #3



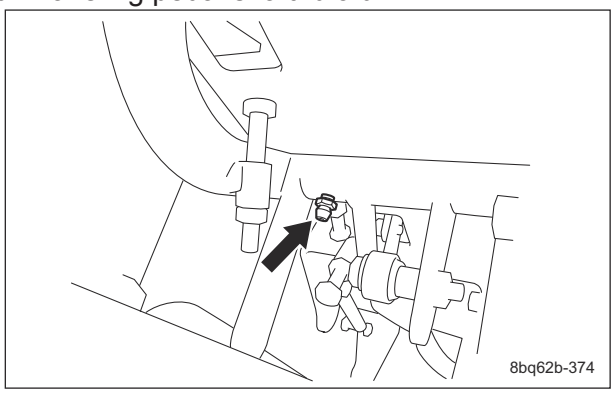
Greasing Points_016

5. Brake pedal shaft fulcrum



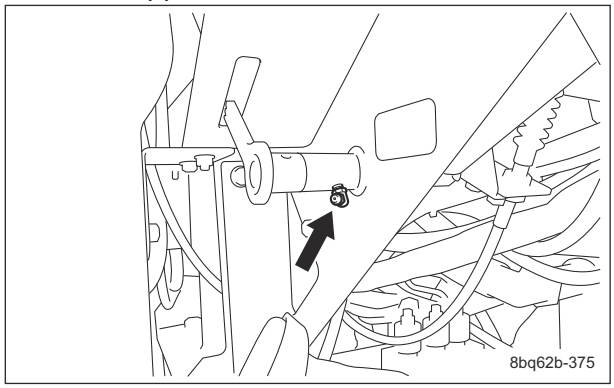
Greasing Points_017

6. Traveling pedal shaft fulcrum



Greasing Points_018

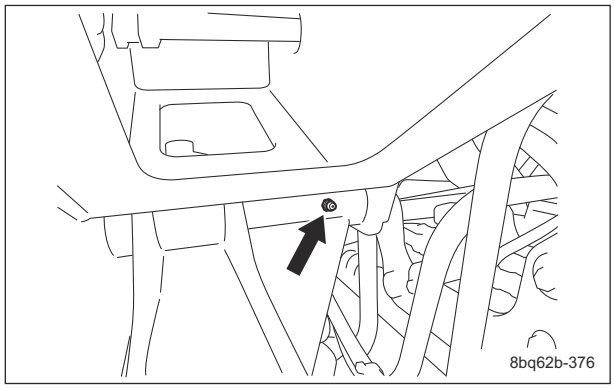
7. Pedal stopper



Greasing Points_019

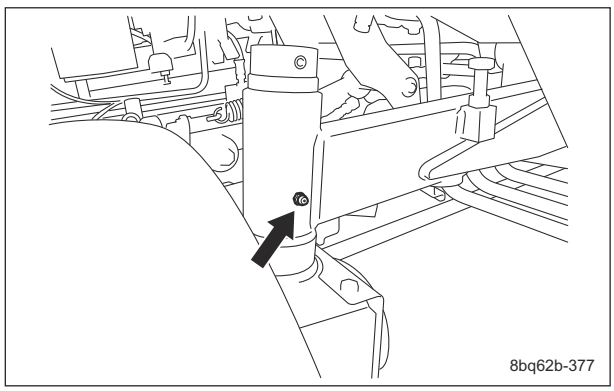
8. Pivot

Rear wheel Middle



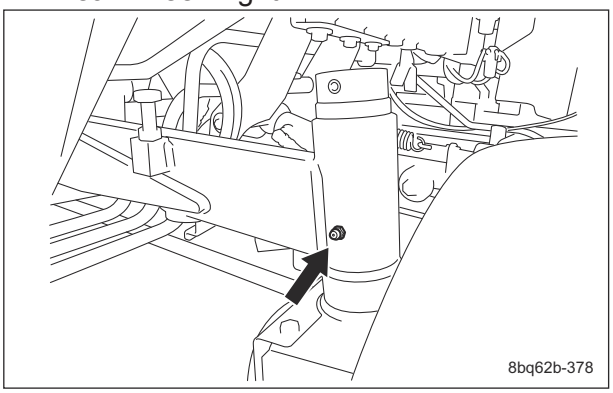
Greasing Points_020

Rear wheel Left



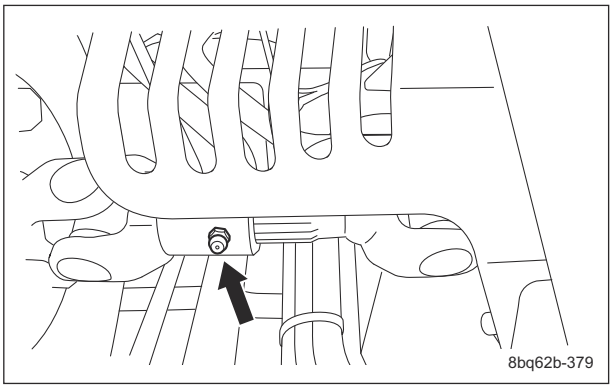
Greasing Points_021

Rear wheel Right



Greasing Points_022

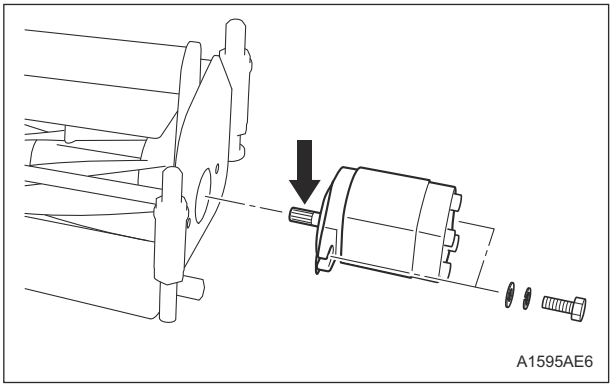
9. Joint



Greasing Points_023

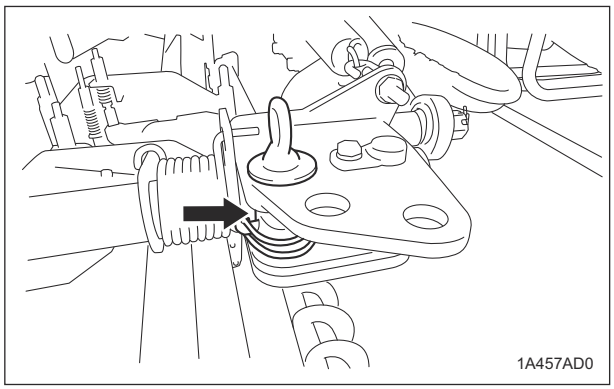
10. Reel motor shaft

Apply 2 g (0.004 lb) of MOLY SPEED GREASE NO.2 to the reel mower shaft mounted on each mower unit every 250 hours.



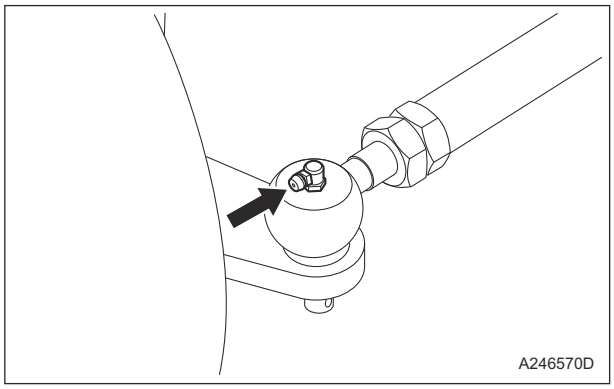
Greasing Points_024

11. Rear mower unit swivel pin
    Apply grease to the pins on mower unit #2 and #3.



Greasing Points_025

12. Tie rod end
    There is one point each on the left and right tie rod ends.
    Add 9 g (0.02 lb) of DYNAMAX GREASE EP NO.1 every 3 months of operation.
    Note:
    Add grease with the steering wheel turned to the left/right completely.
    The appropriate greasing amount is that it sticks out a little from the tie rod end rubber boot.



Greasing Points_026

Lubrication

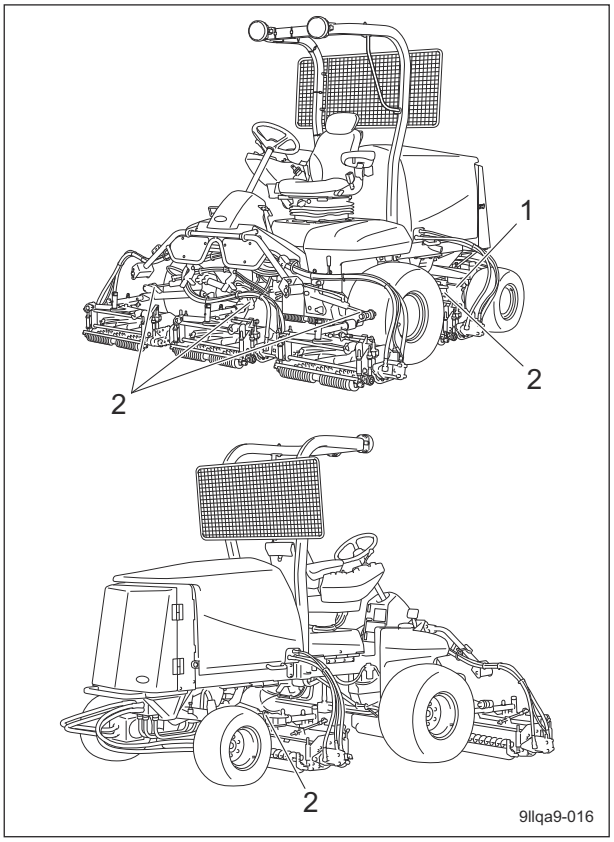
About Lubrication

It is necessary to lubricate moving parts so that they will not become stuck or damaged.
The locations where lubricant is used are indicated in "Lubricating Points".
Apply the lubricant.

Lubricating Points

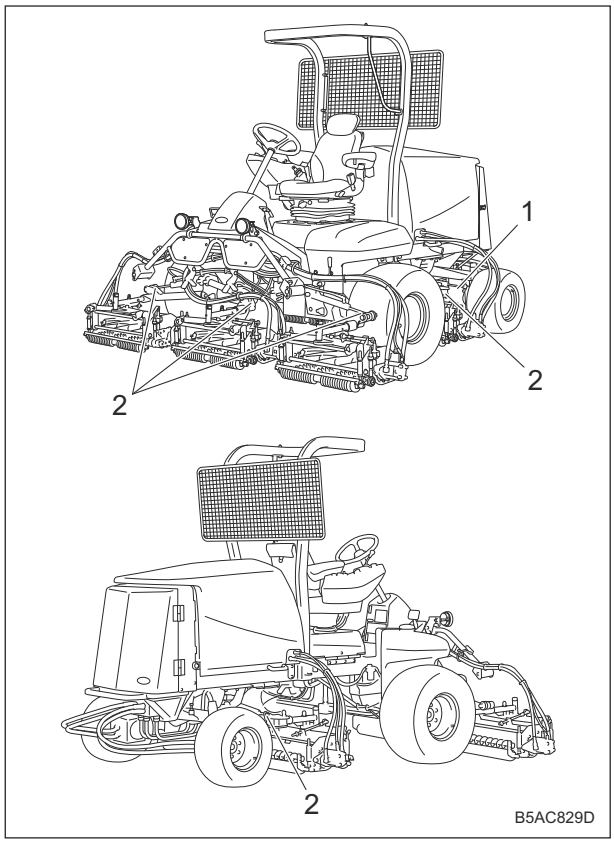
Apply lubricant at the following locations every 50 hours of operation.

■ #10180 – 10349



Lubricating Points_001

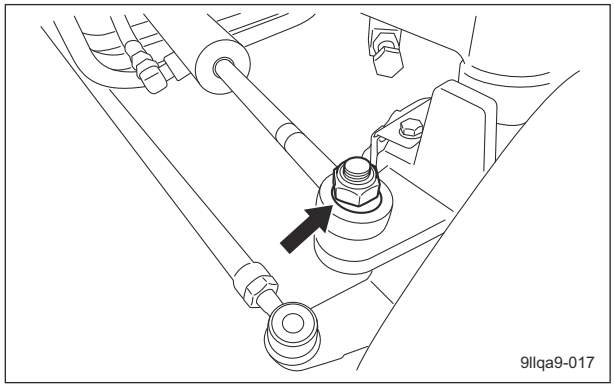
■ #10350-



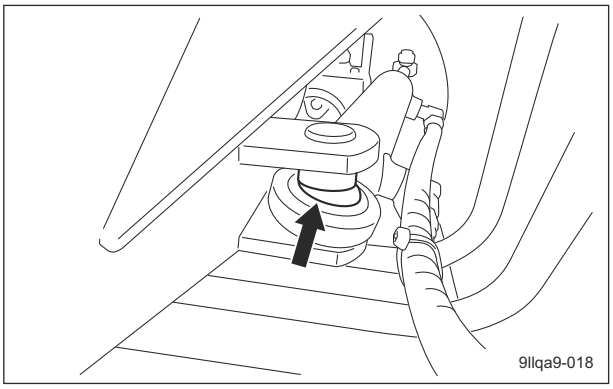
Lubricating Points_002

	Location	No. of greasing points
1	Steering cylinder spherical bearing	2
2	Mower cylinder spherical bearing	10

1. Steering cylinder spherical bearing
   There are two locations.



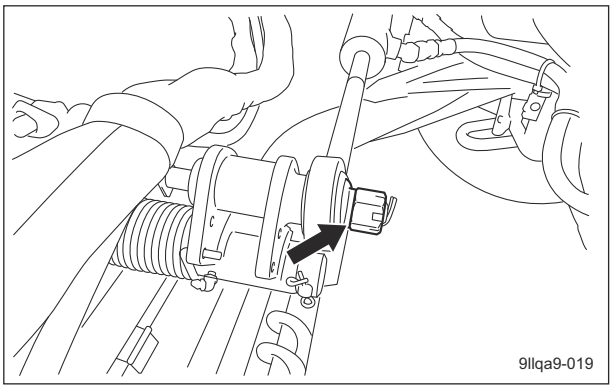
Lubricating Points_003



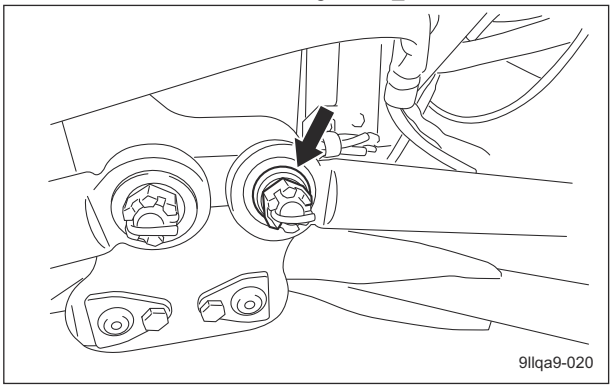
Lubricating Points_004

2. Mower cylinder spherical bearing
   There are two locations on each mower cylinder.

   Mower unit #1

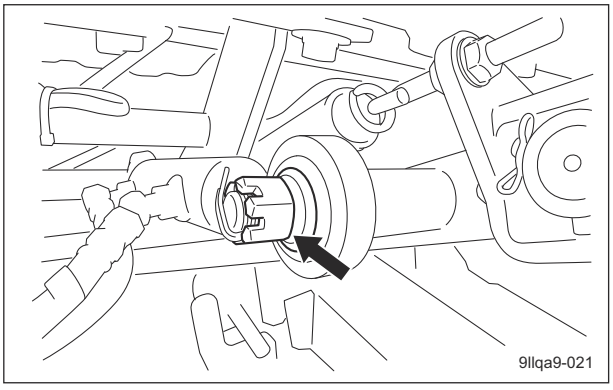


Lubricating Points_005

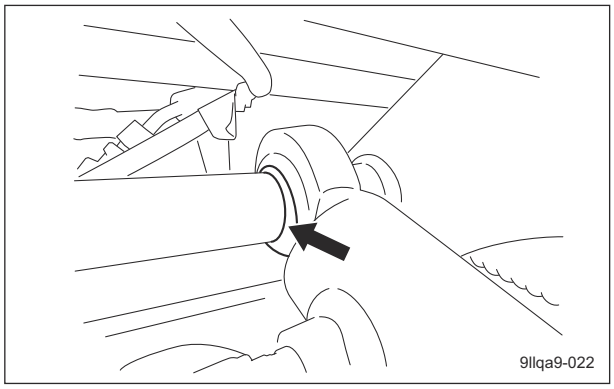


Lubricating Points_006

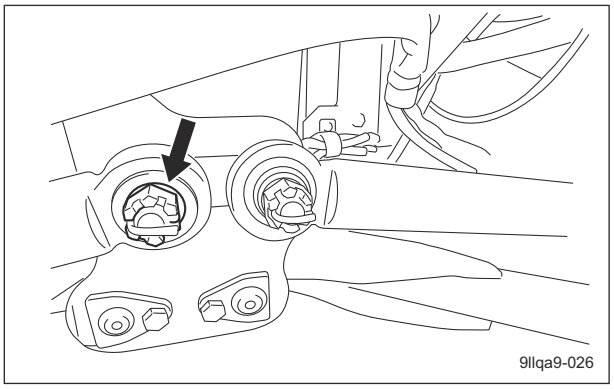
   Mower unit #2



Lubricating Points_007

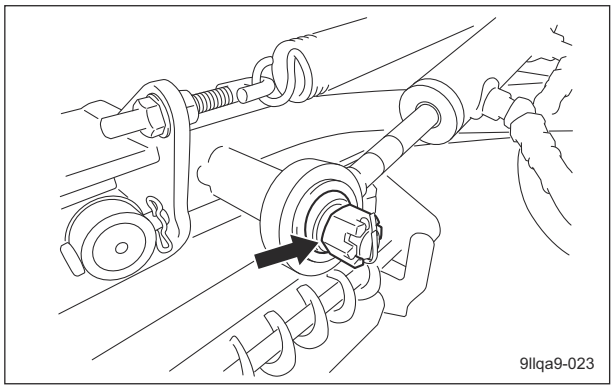


Lubricating Points_008

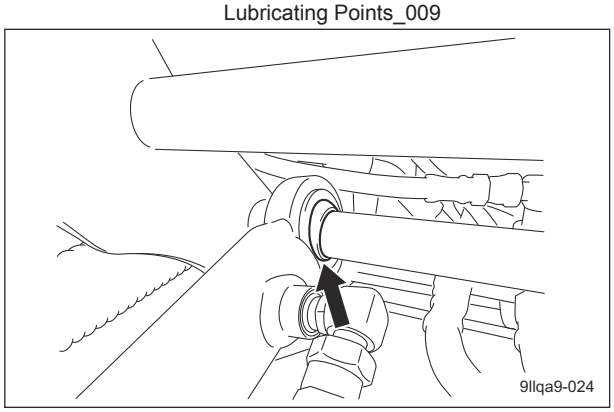


Lubricating Points_012

Mower unit #3

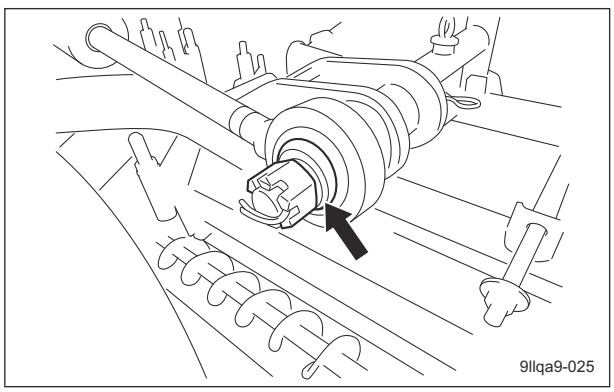


Lubricating Points_009



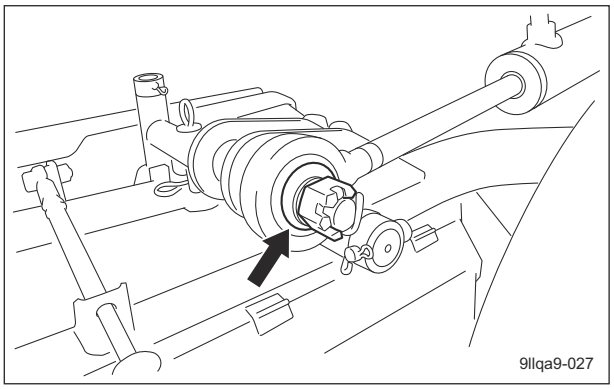
Lubricating Points_010

Mower unit #4

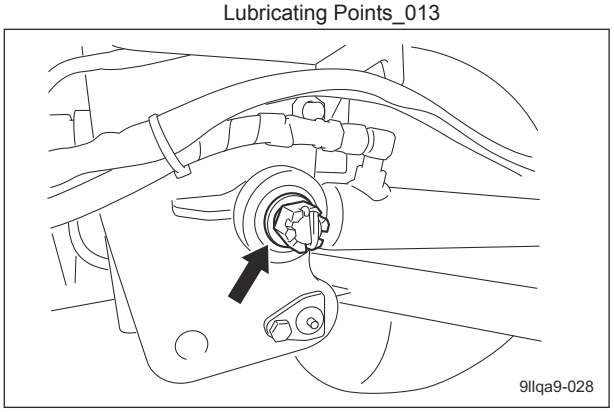


Lubricating Points_011

Mower unit #5



Lubricating Points_013



Lubricating Points_014

Operations before Maintenance

Swiveling Mower Units #2 and #3

Caution

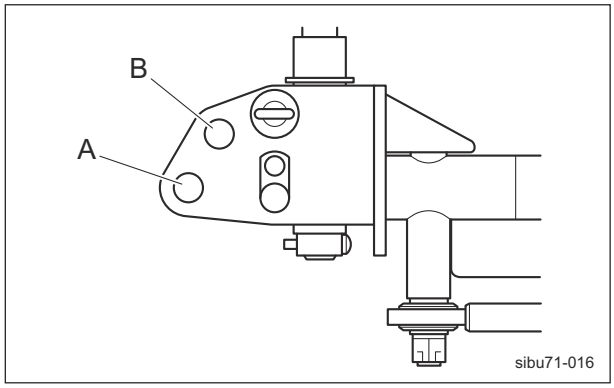
Both the reel cutter (cutting cylinder) and the bed knife (bottom blade) are edged tools. Handle them carefully, since they could cut your hands or legs.

Caution

Be careful not to inhale exhaust gas while swiveling the mower units.

Important

With the mower units LH66 installed, they can not swivel 90 degrees.

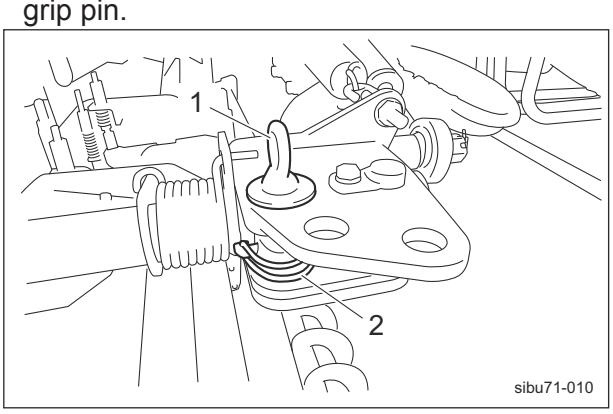


Swiveling Mower Units #2 and #3_001

A	Mower unit swivel angle 90 °
B	Mower unit swivel angle 45 °

Maintenance can be performed more easily with mower units #2 and #3 swiveled.

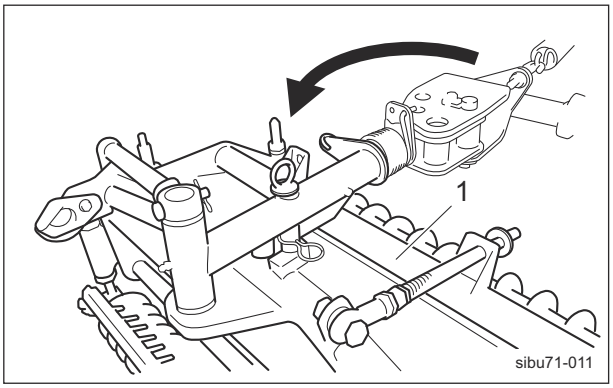
1. Lower the mower units, and then stop the engine.
2. Remove the pipe pin, and then remove the grip pin.



Swiveling Mower Units #2 and #3_002

1	Grip pin
2	Pipe pin

3. Swivel the mower unit toward the outside of the main vehicle.

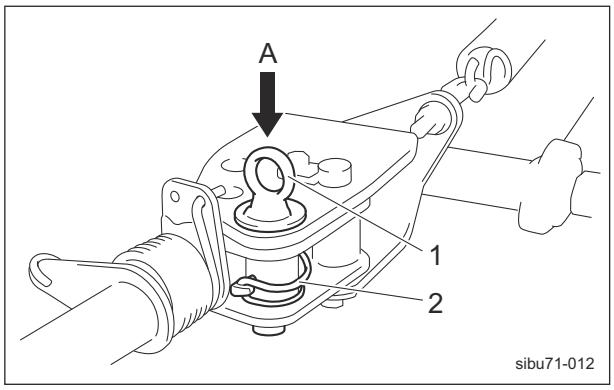


Swiveling Mower Units #2 and #3_003

1	Mower unit

4. Fully insert the grip pin into the locking hole for maintenance, and then install the pipe pin in the grip pin.
   The installation location for the locking hole for maintenance differs depending on whether the mower unit is installed in the front or rear position.

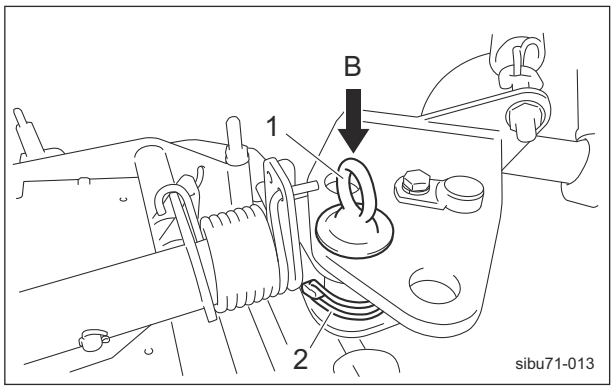
   Mower unit position: Front
   Use the rear locking hole (A) for maintenance.



Swiveling Mower Units #2 and #3_004

1	Grip pin
2	Pipe pin

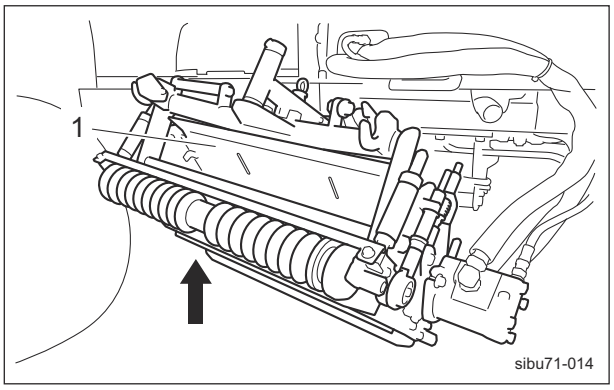
   Mower unit position: Rear
   Use the center locking hole (B) for maintenance.



Swiveling Mower Units #2 and #3_005

1	Grip pin
2	Pipe pin

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



Swiveling Mower Units #2 and #3_006

1	Mower unit

6. After the maintenance is completed, reverse the procedure to return the machine to its original condition.

Adjustment

Engine

Adjustment of Belt Tension

Warning

Be sure to stop the engine before adjusting the belts.

Important

For the specified value of belt tension, refer to Adjusted Values.
Before making sure of belt tension, rotate the belt several times.

▪Adjustment of Fan Belt

Warning

Be sure to stop the engine before inspecting or adjusting the fan belt.

Warning

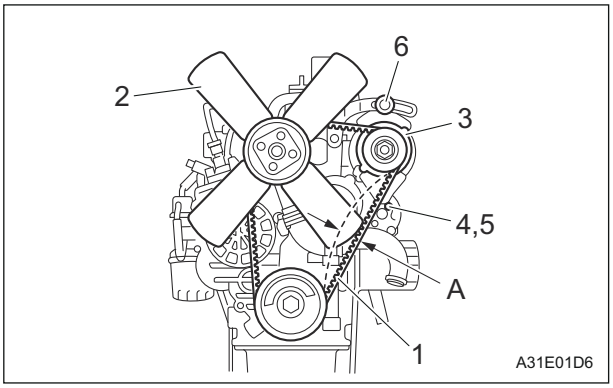
If a cover is removed due to inspection or adjustment, be sure to reinstall it in its original location.

Important

A slacking or damaged fan belt will cause overheating or lack of battery charge.
Adjust or replace the belt.

For fan belt adjustment, follow either of the methods below.

1. Adjustment on the basis of belt slack deviation when applying a specified load to a specified place
   [1] Press the middle of the belt with your finger to check the belt tension.
   The belt tension is appropriate when the belt slacks by approximately 10 mm (0.39 in) when you apply a force of 98 N (10 kgf) to the belt at the middle point between the pulleys.
   [2] If the belt tension is incorrect, loosen bolt A, nut and bolt B for securing the alternator, and then move the alternator to adjust the tension.
   [3] Be sure to tighten bolt A, nut and bolt B securely after adjustment.
   [4] After adjustment of belt tension, check the belt tension again.
   If the belt tension is still not at the appropriate value after repeating the adjustment several times, replace the belt with a new one.



Adjustment of Fan Belt_001

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

2. Adjustment to suitable belt tension force by using sonic type tension meters at a specified point

Important

Perform correct measurement in accordance with the operations manual of the equipment being used for tension measurement.

Important

Perform measurement immediately after mounting the belt, when the pulley is not rotating.

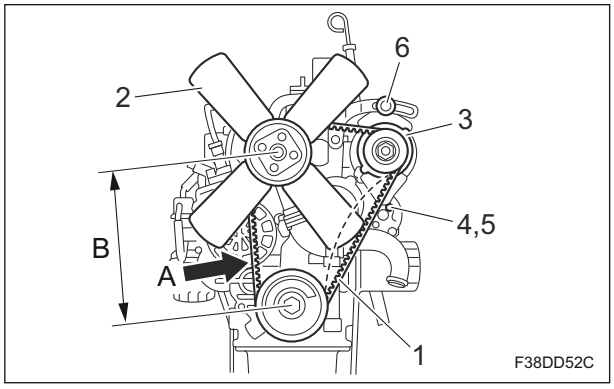
[1] Measure belt tension force by using a sonic type tension meter.
For measurement position and distance between pulleys, see diagram below.
Here is the suitable belt tension force.

Adjustment	200 – 300 N (20.39 - 30.59 kgf)
Replacement	267 – 361 N (27.23 - 36.81 kgf)

[2] If the belt tension is inappropriate, loosen bolt A, nut and bolt B for securing the alternator, and then move the alternator to adjust the tension.

[3] Be sure to tighten bolt A, nut and bolt B securely after adjustment.

[4] After adjustment of belt tension, check the belt tension again.
If the belt tension is still not at the appropriate value after repeating the adjustment several times, replace the belt with a new one.



Adjustment of Fan Belt_002

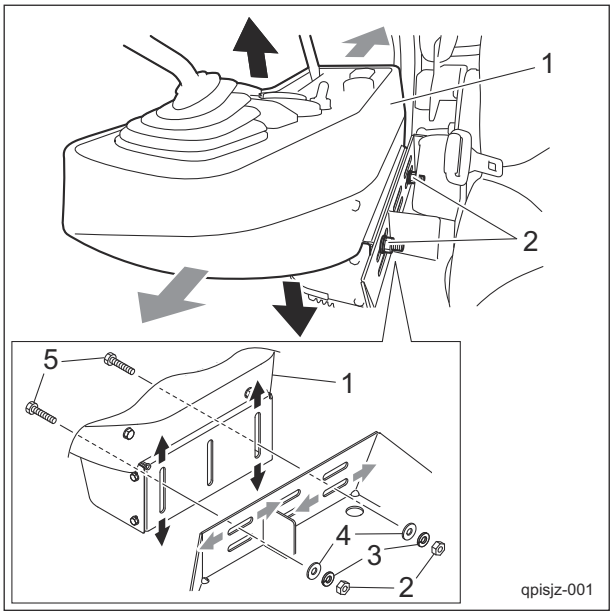
1	Fan belt
2	Blade
3	Alternator
4	Bolt A
5	Nut
6	Bolt B
A	Measurement position
B	Distance between pulleys

Main Vehicle

Adjustment of Control Arm

The control arm can be adjusted up or down and forward or backward.
Adjust the position to fit the operator.

1. Loosen the nut.
2. Slide the control arm up or down and forward or backward to the appropriate position.
3. Tighten the nut.



Adjustment of Control Arm_001

1	Control arm
2	Nut
3	Spring washer
4	Washer
5	Bolt

Adjustment of Reel Rotation Control Valves

The reel rotation control valves adjust the rotation speeds of the reel cutters (cutting cylinders).
Adjust according to the operating conditions.
A label listing dial settings for corresponding reel rotation speeds is attached.
Adjust the reel rotation control valve to the setting for the reel rotation speed listed on the reel rotation indicating decal.
"TURNS" means the rotation number of the dial's counterclockwise rotation started from the state where the dial is fully tightened clockwise.
"POS" means the dial decal number pointed by the indicating screw.
Note:
The factory default reel rotation speed is set to 1,450 rpm.

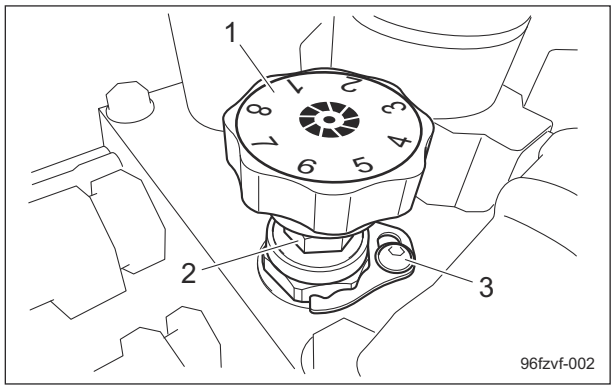
LH6* / LS6*			LH52		
TURNS	POS	REEL SPEED	TURNS	POS	REEL SPEED
2	6	1,150	1	7	1,250
	8	1,250		8	1,350
3	2	1,350	2	1	1,450
	4	1,450		2	1,550
	6	1,500		3	1,700

FOR 0 (STARTING POS) TURN CW TO MAX POS

96fzvf-005

Adjustment of Reel Rotation Control Valves_001

1. Stop the engine.
2. Open the underseat cover.
3. Use the specialized wrench (accessory) to loosen the lock nut for the dial.
   Note:
   Raise the lock nut to a position where it will not interfere when the dial is turned.



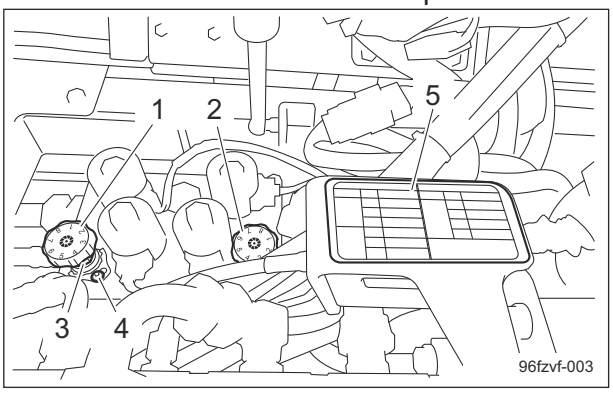
Adjustment of Reel Rotation Control Valves_002

1	Dial
2	Lock nut
3	Indicating screw

Important

In order to maintain mowing quality, the reel rotation speed must be the same for all mower units.

4. Turn the dial to set it to your desired position.
   Set the two dials to the same position.



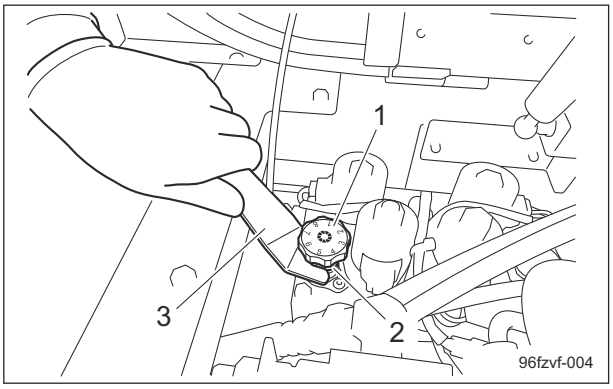
Adjustment of Reel Rotation Control Valves_003

1	Dial (mower units #1, #4 and #5)
2	Dial (mower units #2 and #3)
3	Lock nut
4	Indicating screw
5	Reel rotation indicating decal

5. Tighten the lock nut for the dial.

If you lost count of the dial rotation number, follow the steps below to adjust the dial.

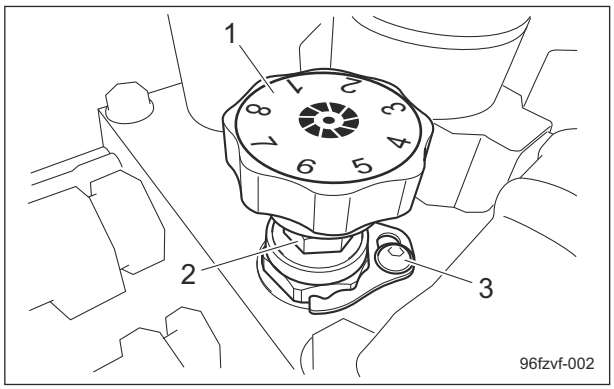
1. Stop the engine.
2. Open the underseat cover.
3. Use the specialized wrench (accessory) to loosen the lock nut for the dial.



Adjustment of Reel Rotation Control Valves_004

1	Dial (mower units #1, #4 and #5)
2	Lock nut
3	Specialized wrench (accessory)

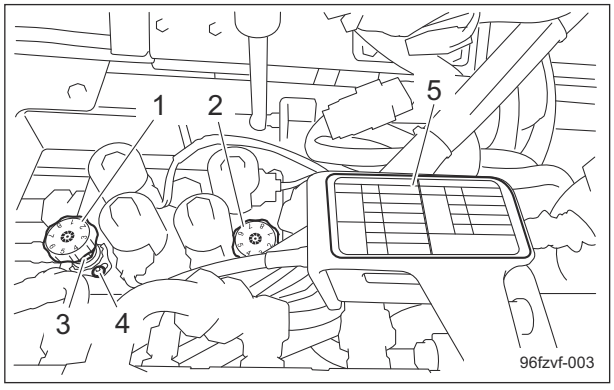
Note:
Raise the lock nut to a position where it will not interfere when the dial is turned.



Adjustment of Reel Rotation Control Valves_005

1	Dial
2	Lock nut
3	Indicating screw

4. Turn the dial clockwise until it stops.
5. Turn the dial counterclockwise to set it to your desired position.
   The amount that the dial is turned differs depending on the mower unit.
   For example, the following procedures show the steps to set the reel rotation speed to 1,450 rpm.
   [1] When mower unit LS62 or LS66/LH62・LH66 is installed:
   Turn the dial counterclockwise three times, then an additional 180 degrees.
   Position "4" on the dial sticker should be aligned with the center of the indicating screw.
   [2] When mower unit LH52 is installed:
   Turn the dial counterclockwise two times, then an additional 45 degrees.
   Position "1" on the dial sticker should be aligned with the center of the indicating screw.



Adjustment of Reel Rotation Control Valves_006

1	Dial (mower units #1, #4 and #5)
2	Dial (mower units #2 and #3)
3	Lock nut
4	Indicating screw
5	Reel rotation indicating decal

6. Use the specialized wrench (accessory) to tighten the lock nut for the dial.

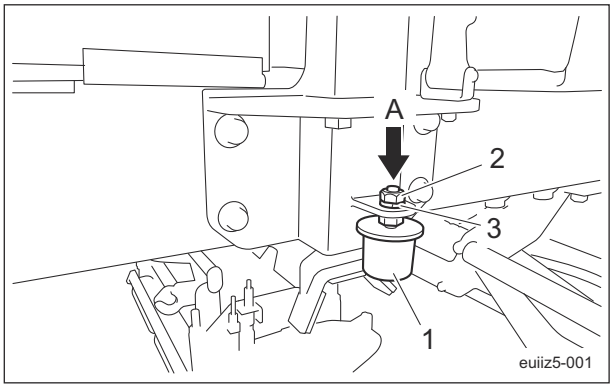
Adjustment of Stoppers

Important

The installation method and installation position of the stoppers differ depending on the mower unit model.

The stopper is installed to prevent the mower arm from interfering with the frame when swiveling the mower units #2 and #3.
Install in the appropriate position.
Note:
The stopper is not used when the mower units LS66/LH66 installed.
The stopper installation position for each mower unit model is shown below.

A: Installed at the lower position
・LS62
・LH52

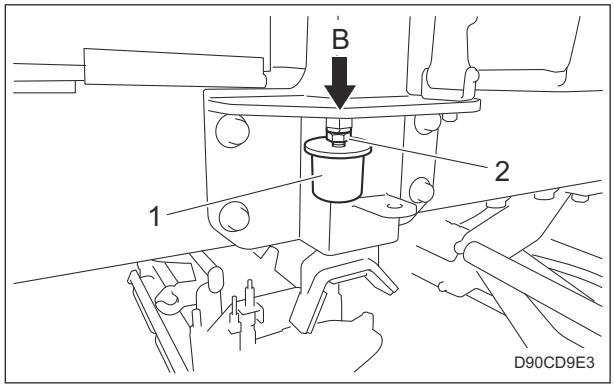


Adjustment of Stoppers_001

1	Stopper
2	Nut
3	Spring washer

B: Installed at the upper position

・LH62



Adjustment of Stoppers_002

1	Stopper
2	Nut

Adjustment of Mower Locking Pin

The mower locking pin can prevent or allow tilting of the mower units.
Adjust according to the operating conditions.
Fixed:

・The mowing line while traveling straight ahead is a straight line. (The mowing line is easy to see.)

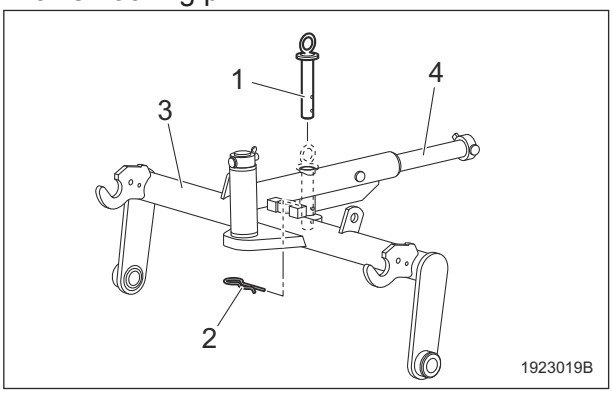
・The mower units do not tilt while operating on slopes, and incomplete mowing can be reduced.

Released:

・It is appropriate when turning while mowing or it is easy to follow undulations.

1. On a level surface, lower all mower units.
2. Apply the parking brake, and then stop the engine.
3. Adjust the position of the mower locking pin, and then insert the cotter pin.

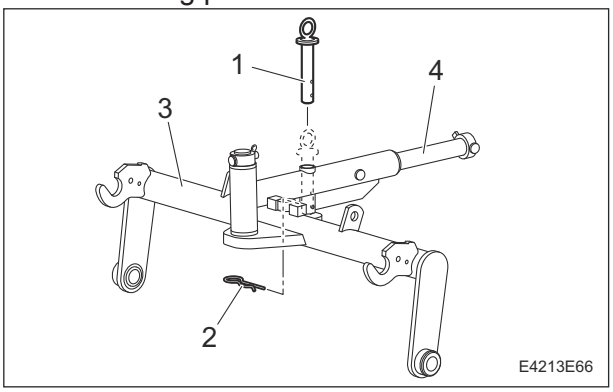
To fix:
Insert the cotter pin into the upper hole in the mower locking pin.



Adjustment of Mower Locking Pin_001

1	Mower locking pin
2	Cotter pin
3	Mower arm
4	Mower coupling

To release:
Insert the cotter pin into the lower hole in the mower locking pin.



Adjustment of Mower Locking Pin_002

1	Mower locking pin
2	Cotter pin
3	Mower arm
4	Mower coupling

Adjustment of Mower Stabilizer

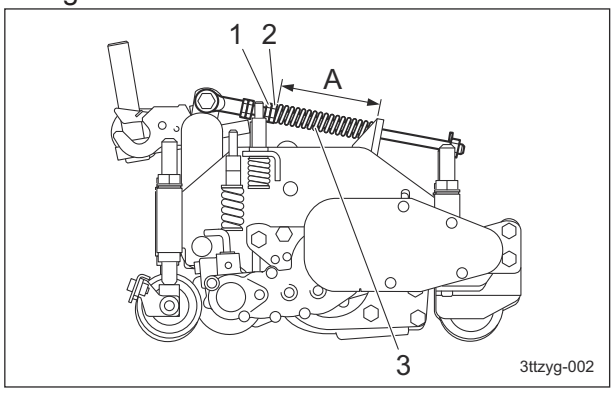
Note:
Depending on the specifications, this function may not be available.

Important

After adjusting the cutting height, adjust the mower stabilizer.

The mower stabilizer stabilizes the mower units and prevents an undulating finish (a phenomenon called Marcelling).

1. On a level surface, lower all mower units.
2. Apply the parking brake, and then stop the engine.
3. Loosen the lock nut.
4. Tighten the nut to adjust the length of the spring (compression).
   - Mower #1 to #5: 140 mm (5.51 in)
5. Tighten the lock nut.



Adjustment of Mower Stabilizer_001

1	Lock nut
2	Nut
3	Spring
A	140 mm (5.51 in)

Adjustment of Stopper Nuts

Note:
Depending on the specifications, this function may not be available.
The stopper nut adjusts the movement range of the mower unit.

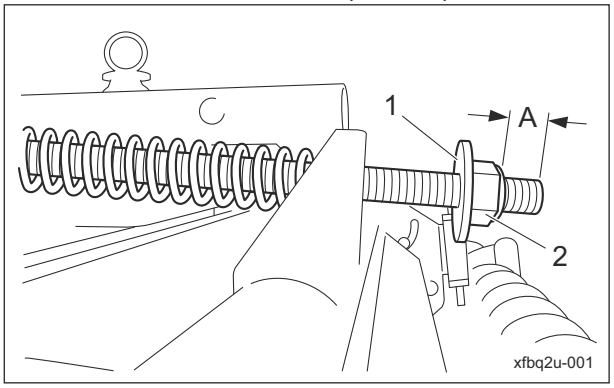
1. Apply the parking brake, and then stop the engine.
2. Turn the nut to adjust the length of A.
   Adjusted Values are shown below:

[1] LH62・66
- #1, #4 and #5: 15 mm (0.59 in)
- #2 and #3: 40 mm (1.57 in)

Important

When a grass catcher is installed on LH52, a large movement range of the mower will cause the grass catcher to come into contact with the front roller when the mower unit is raised.
Be careful of the position of the stopper nut.

[2] LH52
- #1, #4 and #5: 15 mm (0.59 in)
- #1, #4 and #5 (when a grass catcher is installed): 30 mm (1.18 in)
- #2 and #3: 40 mm (1.57 in)



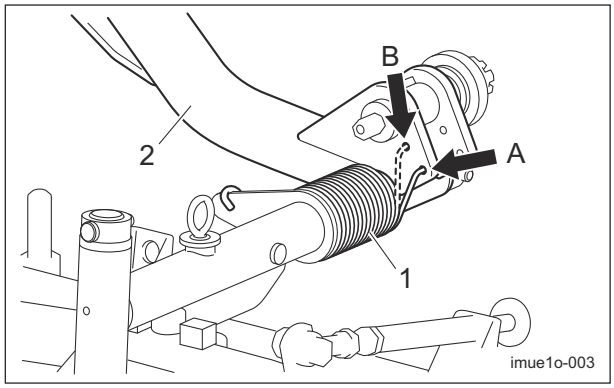
Adjustment of Stopper Nuts_001

1	Washer
2	Nut
A	Length

Adjustment of Mower Unit Leveling Spring

A coil spring is installed on the mower unit coupling.
This keeps the mower unit level.
Adjust the coil spring with the holes in the lift arm.

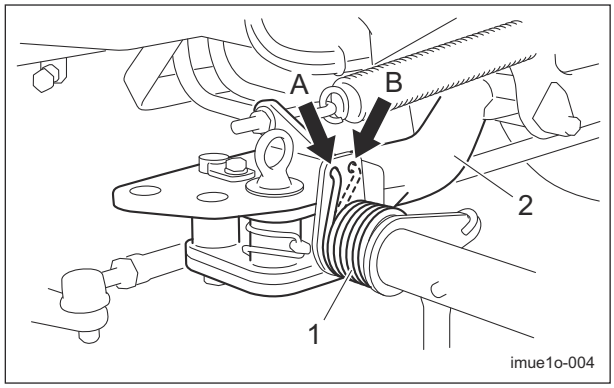
Mower unit #1



Adjustment of Mower Unit Leveling Spring_001

1	Coil spring
2	Lift arm
A	22 in mower unit
B	26 in mower unit

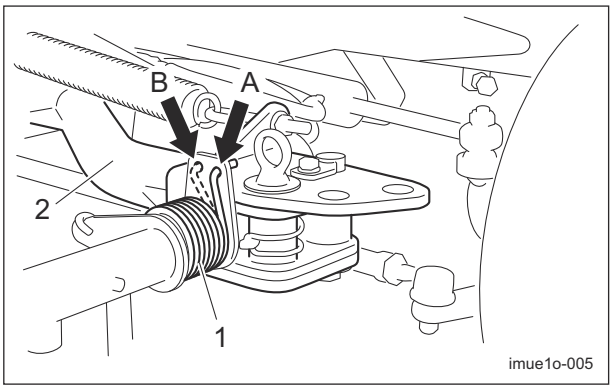
Mower unit #2



Adjustment of Mower Unit Leveling Spring_002

1	Coil spring
2	Lift arm
A	22 in mower unit
B	26 in mower unit

Mower unit #3

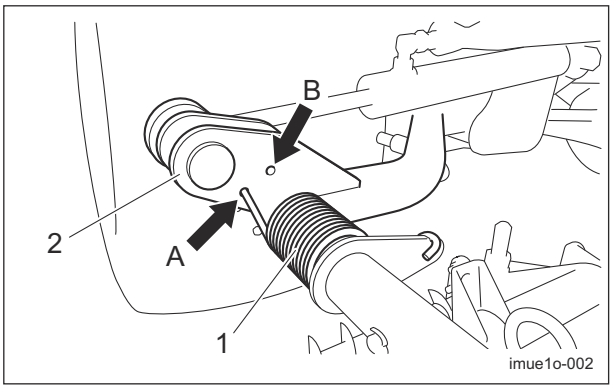


Adjustment of Mower Unit Leveling Spring_003

1	Coil spring
2	Lift arm
A	22 in mower unit
B	26 in mower unit

Mower unit #4

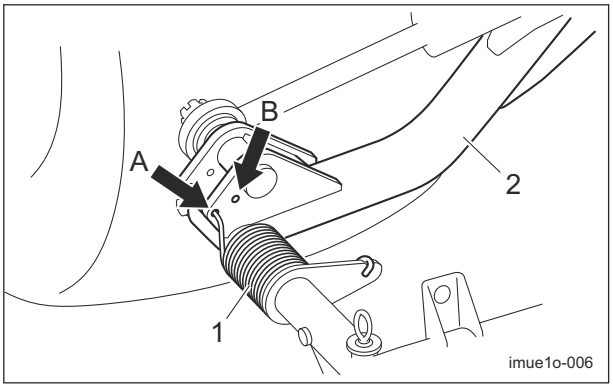
22 in mower unit



Adjustment of Mower Unit Leveling Spring_004

1	Coil spring
2	Lift arm
A	Light spring load (standard position)
B	Heavy spring load

26 in mower unit

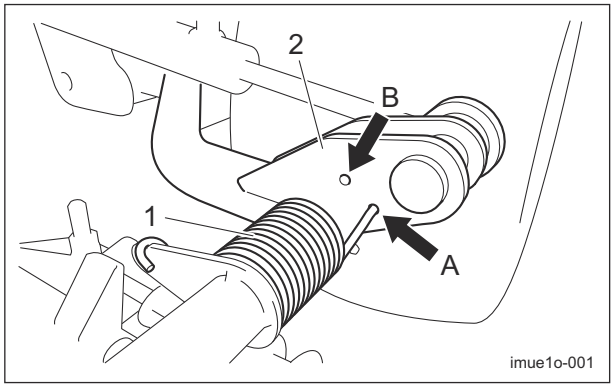


Adjustment of Mower Unit Leveling Spring_005

1	Coil spring
2	Lift arm
A	Light spring load (standard position)
B	Heavy spring load

Mower unit #5

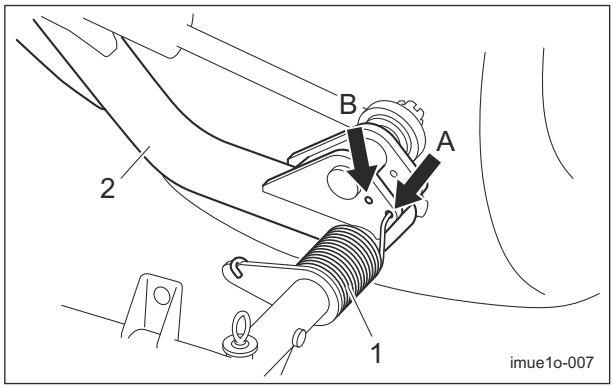
22 in mower unit



Adjustment of Mower Unit Leveling Spring_006

1	Coil spring
2	Lift arm
A	Light spring load (standard position)
B	Heavy spring load

26 in mower unit



Adjustment of Mower Unit Leveling Spring_007

1	Coil spring
2	Lift arm
A	Light spring load (standard position)
B	Heavy spring load

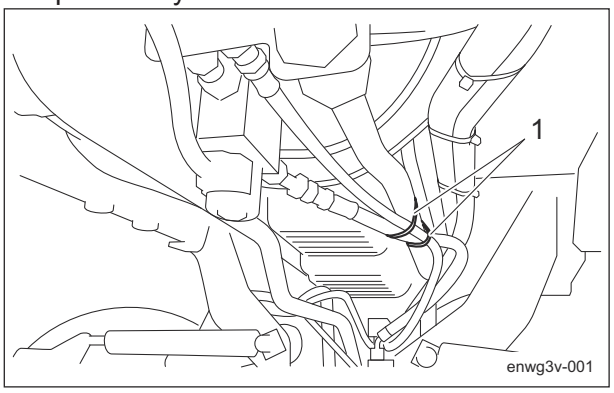
Adjustment of Positions of Mower Units #2 and #3

Important

When the grass catcher is installed, move the mower units to the rear position.

Mower units #2 and #3 can be slid to the front position or rear position. The slide distance is 200 mm (7.87 in).

1. On a level surface, lower all mower units.
2. Move the mower unit up/down lever to the neutral position.
3. Depress the locking pedal while firmly depressing the brake pedal to lock it.
4. Stop the engine.
5. Remove the clamps from the mower unit up/down cylinder hoses.



Adjustment of Positions of Mower Units #2 and #3_001

1	Clamp

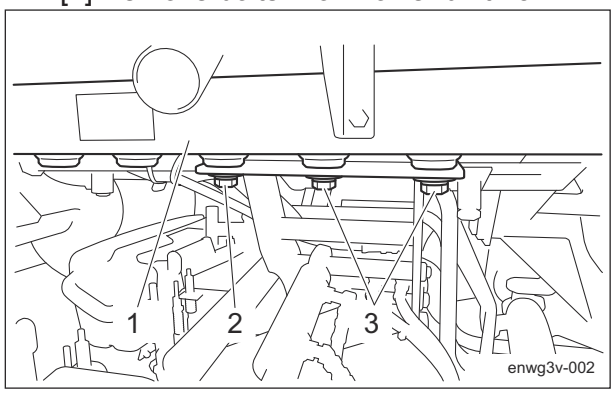
Important

Since mower units #2 and #3 are connected, slide them at the same time.

6. Follow the steps below to slide the mower units.
   - When moving to the front position:

   [1] Loosen bolt A of mower unit #3.

[2] Remove bolts B of mower unit #3.

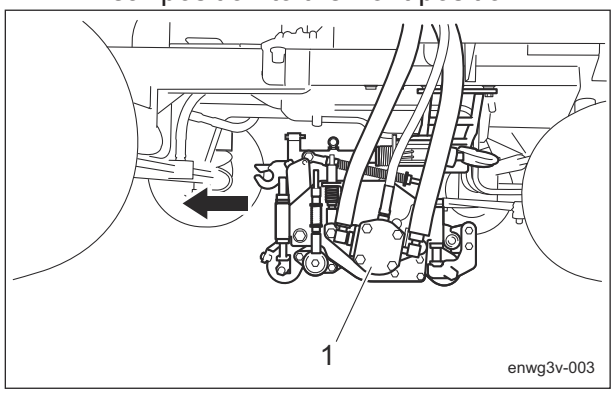


Adjustment of Positions of Mower Units #2 and #3_002

1	Frame
2	Bolt A
3	Bolt B

[3] In the same way, loosen bolt A and remove bolts B of mower unit #2.

[4] Slide mower units #2 and #3 from the rear position to the front position.



Adjustment of Positions of Mower Units #2 and #3_003

1	Mower unit

[5] Install bolts B of mower unit #3.

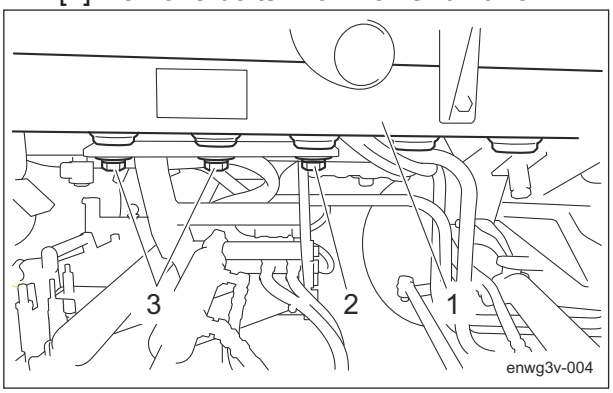
[6] In the same way, install bolts B of mower unit #2.

[7] Tighten bolt A and bolts B on both sides.

・When moving to the rear position:

[1] Loosen bolt A of mower unit #3.

[2] Remove bolts B of mower unit #3.

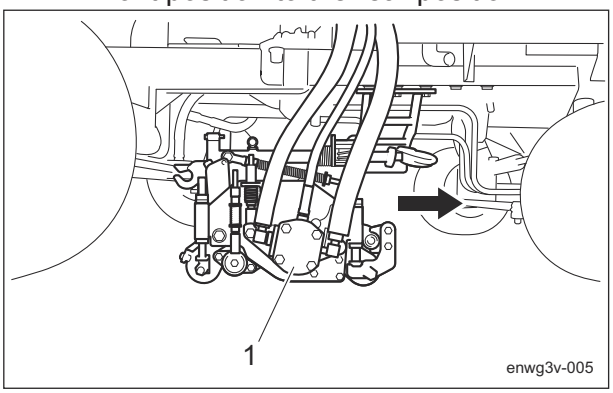


Adjustment of Positions of Mower Units #2 and #3_004

1	Frame
2	Bolt A
3	Bolt B

[3] In the same way, loosen bolt A and remove bolts B of mower unit #2.

[4] Slide mower units #2 and #3 from the front position to the rear position.



Adjustment of Positions of Mower Units #2 and #3_005

1	Mower unit

[5] Install bolts B of mower unit #3.

[6] In the same way, install bolts B of mower unit #2.

[7] Tighten bolt A and bolts B on both sides.

7. Adjust the mower stoppers of mower units #2 and #3.
"Adjustment of Mower Stoppers for Mower Unit #2 and #3" (Page 6-31)
8. Re-secure the mower unit up/down cylinder hoses with clamps.

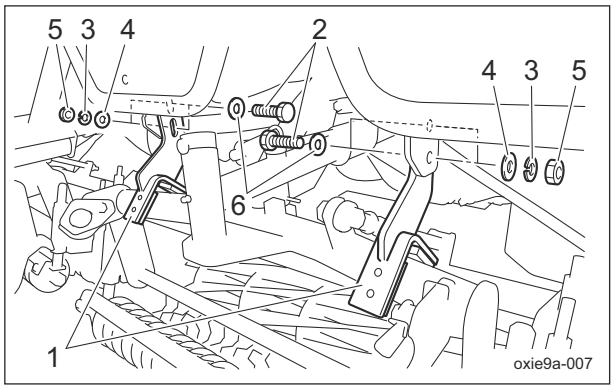
Adjustment of Mower Stopper

■Adjustment of Mower Stoppers for Mower Unit #1

The mower stopper is installed to prevent the mower unit from interfering with the frame. The attaching direction of the mower stopper for mower unit #1 differs according to the type of mower unit.
Install in the appropriate direction.

1. Loosen the nuts of the right and left mower stoppers.
2. Place the right and left mower stoppers to the highest position and attach them temporarily.
3. On a level surface, raise all mower units.
4. Depress the locking pedal while firmly depressing the brake pedal to lock it.
5. Stop the engine.
6. Tighten the nuts of the right and left mower stoppers in a position where the mower unit is leveled and the mower arm contacts the center of the mower stopper.

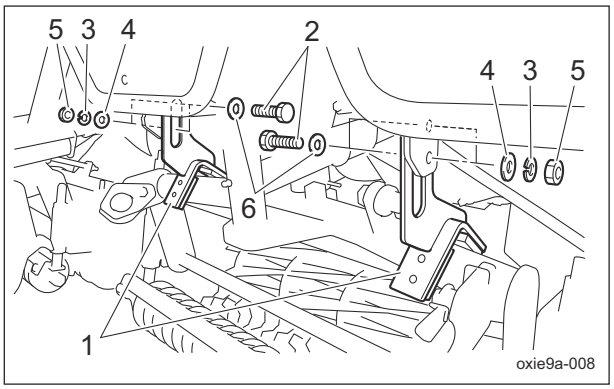
LH62



Adjustment of Mower Stoppers for Mower Unit #1_001

1	Mower stopper
2	Bolt
3	Spring washer
4	Washer
5	Nut
6	Washer

LH66・LH52・LS62・LS66



Adjustment of Mower Stoppers for Mower Unit #1_002

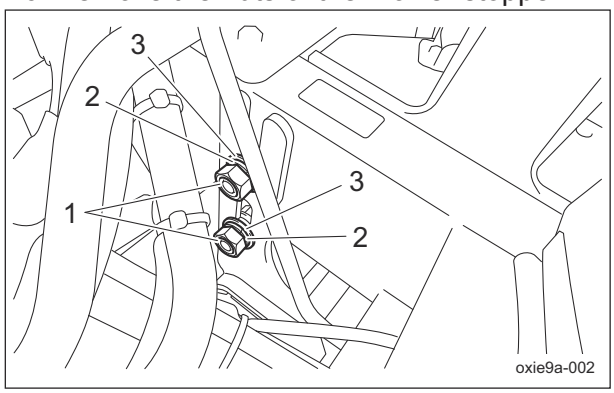
1	Mower stopper
2	Bolt
3	Spring washer
4	Washer
5	Nut
6	Washer

■Adjustment of Mower Stoppers for Mower Unit #2 and #3

The mower stopper is installed to prevent the mower unit from interfering with the frame. The type and attaching direction of the mower stopper for mower unit #2 and #3 differ according to the type of mower unit. And adjust the attaching position of the mower stopper for mower unit #2 and #3 according to the attaching position (front or rear) of the mower unit.
Install in the appropriate direction.

1. On a level surface, lower all mower units.
2. Depress the locking pedal while firmly depressing the brake pedal to lock it.
3. Stop the engine.
4. Open the hood.
5. Open the underseat cover.

6. Remove the nuts of the mower stopper.

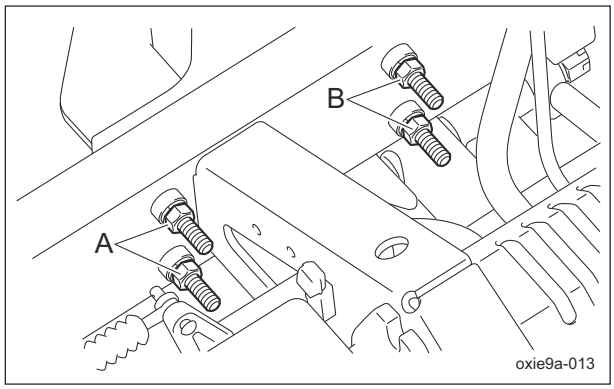


Adjustment of Mower Stoppers for Mower Unit #2 and #3_001

1	Nut
2	Spring washer
3	Washer

7. Adjust the mower stopper position.
   - To set the mower unit in the front position, attach the mower stopper in the "front position".
   - To set the mower unit in the rear position, attach the mower stopper in the "rear position".

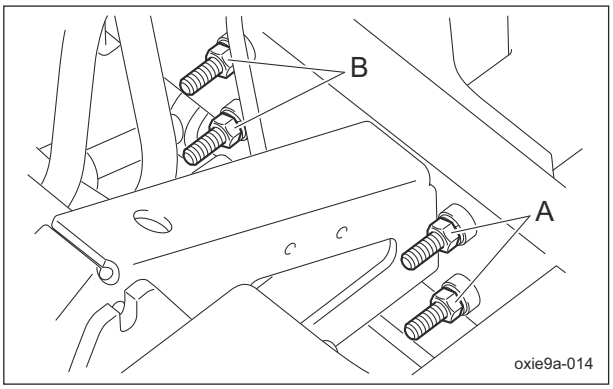
   Mower unit #2



Adjustment of Mower Stoppers for Mower Unit #2 and #3_002

A	Mower stopper front position
B	Mower stopper rear position

Mower unit #3



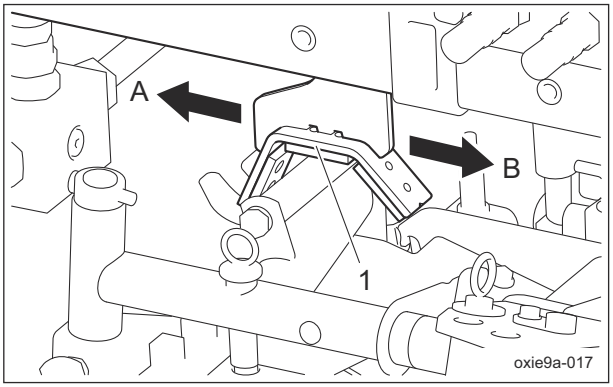
Adjustment of Mower Stoppers for Mower Unit #2 and #3_003

A	Mower stopper front position
B	Mower stopper rear position

8. Attach the mower stoppers temporarily.
9. Start the engine.
10. Raise all mower units.
11. Tighten the mower stopper nuts previously attached in a position where the mower unit is leveled and the mower stopper contacts the mower arm.

Note:
The relationship between the mower unit type and the mower stopper is as follows.

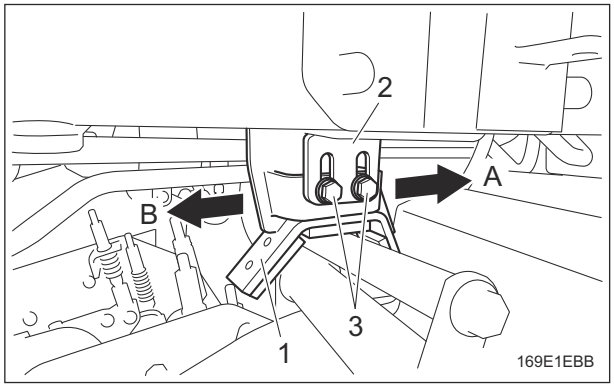
LH62



Adjustment of Mower Stoppers for Mower Unit #2 and #3_004

1	Mower stopper
A	Front
B	Rear

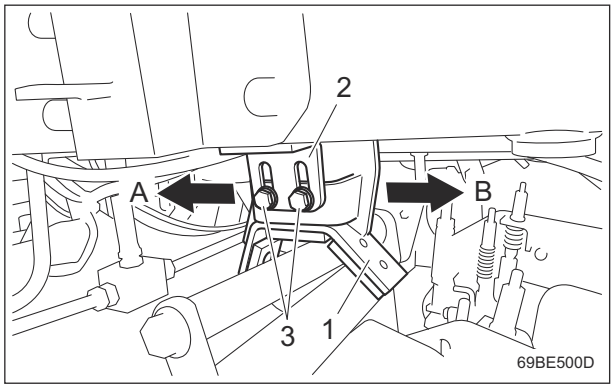
LH66
Mower unit #2
After installing the mower stoppers, press the stopper auxiliary fitting COMP firmly against the bottom side of the frame and secure it with the bolts.



Adjustment of Mower Stoppers for Mower Unit #2 and #3_005

1	Mower stopper
2	Stopper auxiliary fitting COMP
3	Bolt
A	Front
B	Rear

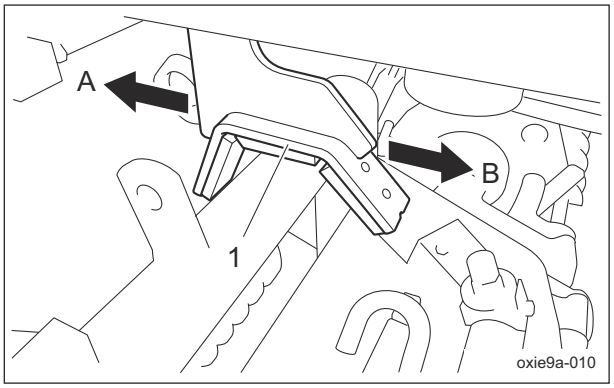
LH66
Mower unit #3
After installing the mower stoppers, press the stopper auxiliary fitting COMP firmly against the bottom side of the frame and secure it with the bolts.



Adjustment of Mower Stoppers for Mower Unit #2 and #3_006

1	Mower stopper
2	Stopper auxiliary fitting COMP
3	Bolt
A	Front
B	Rear

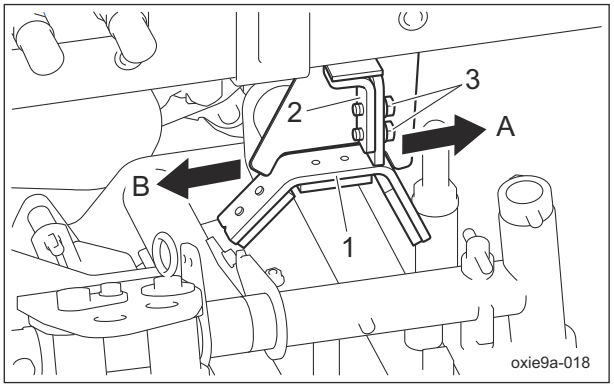
LH52・LS62



Adjustment of Mower Stoppers for Mower Unit #2 and #3_007

1	Mower stopper
A	Front
B	Rear

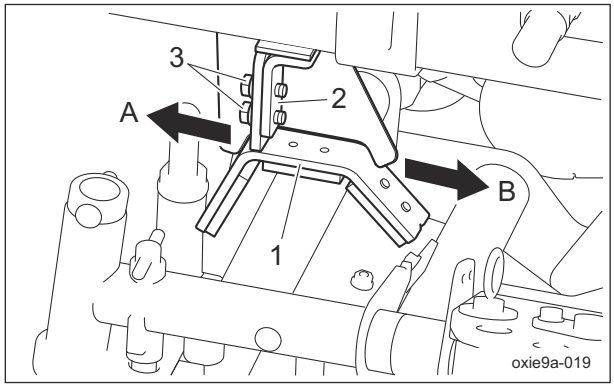
LS66
Mower unit #2
After installing the mower stoppers, press the stopper auxiliary fitting COMP firmly against the bottom side of the frame and secure it with the bolts.



Adjustment of Mower Stoppers for Mower Unit #2 and #3_008

1	Mower stopper
2	Stopper auxiliary fitting COMP
3	Bolt
A	Front
B	Rear

LS66
Mower unit #3
After installing the mower stoppers, press the stopper auxiliary fitting COMP firmly against the bottom side of the frame and secure it with the bolts.



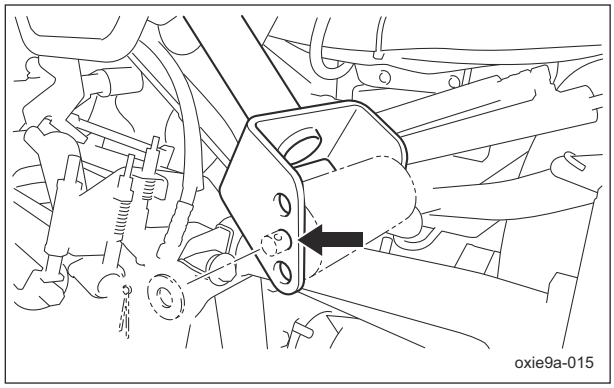
Adjustment of Mower Stoppers for Mower Unit #2 and #3_009

1	Mower stopper
2	Stopper auxiliary fitting COMP
3	Bolt
A	Front
B	Rear

■Adjustment of Mower Stoppers for Mower Unit #4 and #5

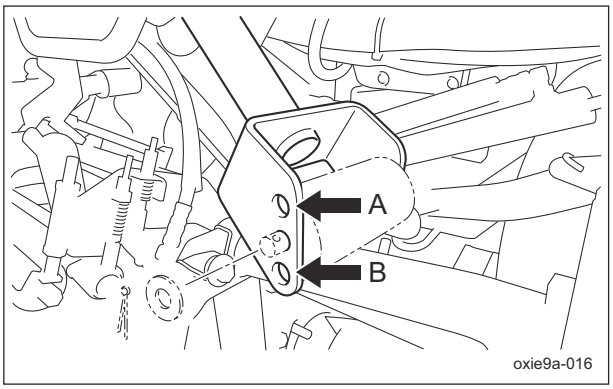
The mower stopper is installed to prevent the mower unit from interfering with the frame.
The attaching position of the mower stopper for mower unit #4 and #5 differs according to the type of mower unit.
Install in the appropriate direction.
The relationship between the mower unit type and the mower stopper attaching position.

LH62



Adjustment of Mower Stoppers for Mower Unit #4 and #5_001

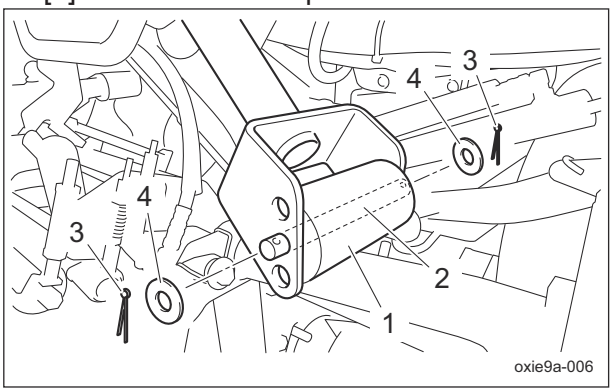
LH52・LS62



Adjustment of Mower Stoppers for Mower Unit #4 and #5_002

A	LS62
B	LH52

1. On a level surface, lower all mower units.
2. Depress the locking pedal while firmly depressing the brake pedal to lock it.
3. Stop the engine.
4. Follow the steps below to adjust the mower stopper position.
   [1] Remove the cotter pin and washer.
   [2] Install the roller shaft and rubber roller in the specified position.
   [3] Attach the cotter pin and washer.



Adjustment of Mower Stoppers for Mower Unit #4 and #5_003

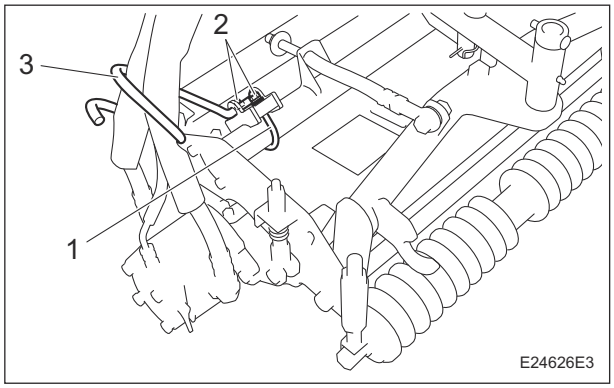
1	Rubber roller
2	Roller shaft
3	Cotter pin
4	Washer

LH66・LS66
For the mower unit LH66・LS66, the adjustment is not required.

Adjustment of #4 and 5 Hydraulic Hose Guides

The hose guide is installed to prevent the hydraulic hose from interfering with the front tire.
The mounting positions of the hose guides for mower units #4 and #5 differ according to the type of mower units.
Install in the appropriate mounting position.

1. Lower all the mower units on a level place.
2. Apply the parking brake.
3. Stop the engine.
4. Loosen the nuts on the U-shaped bracket.
5. Install the hose guide in its appropriate position.
   For the fixing position and angle, refer to the following "Note" of the mounting position.
6. Tighten the nuts on the U-shaped bracket to fix the hose guide.
   Fix the hose guide so that the hydraulic hose can go just above the hydraulic motor when seeing the mower unit from the motor side.



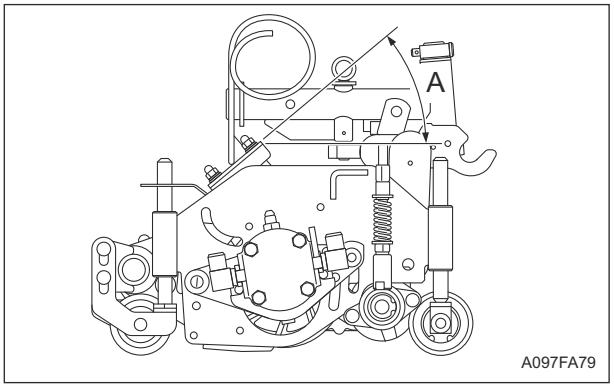
Adjustment of #4 and 5 Hydraulic Hose Guides_001

1	U-shaped bracket
2	Nut
3	Hose guide

Note：
These are the related information about each type of the mower units and the hose guide mounting position.

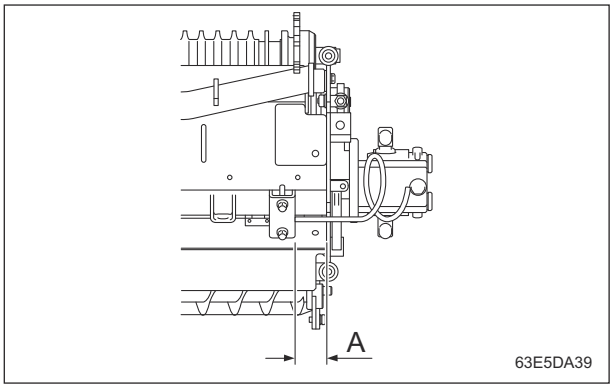
- The parts of hose guide for #4 mower unit are different from those for #5.
- #4 and 5 mower units are symmetrically planned. The following figures for attaching the hose guide show those of #4 mower unit.
- The angle for attachment is shown as that between the hose guide surface in contact with the nuts and horizontal surface.
- The position for attachment is shown as the distance between the inside surface of the frame side plate and the hose guide attaching portion's side surface toward the side of the hydraulic motor.

LH62・LH66



Adjustment of #4 and 5 Hydraulic Hose Guides_002

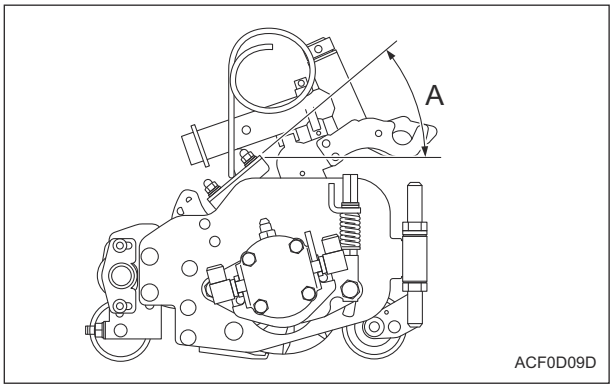
A	40 °



Adjustment of #4 and 5 Hydraulic Hose Guides_003

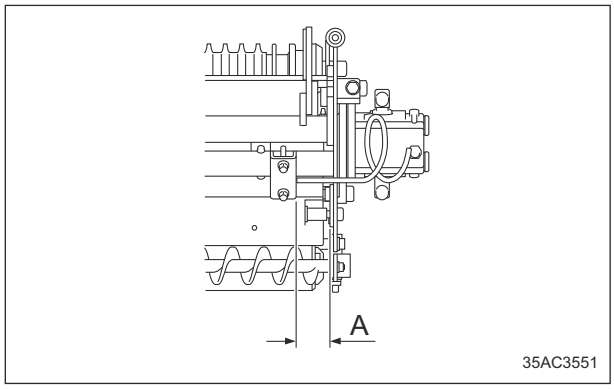
A	50 mm（1.97 in）

LS62・LS66



Adjustment of #4 and 5 Hydraulic Hose Guides_004

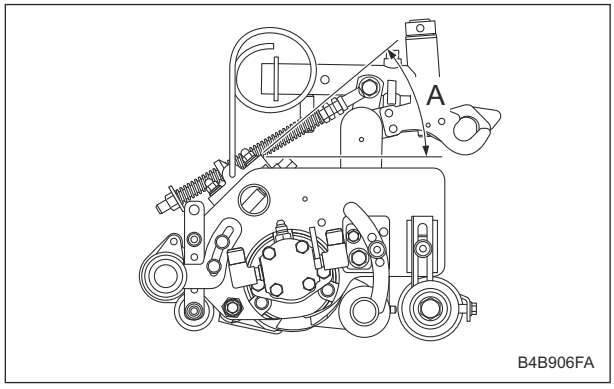
A	40 °



Adjustment of #4 and 5 Hydraulic Hose Guides_005

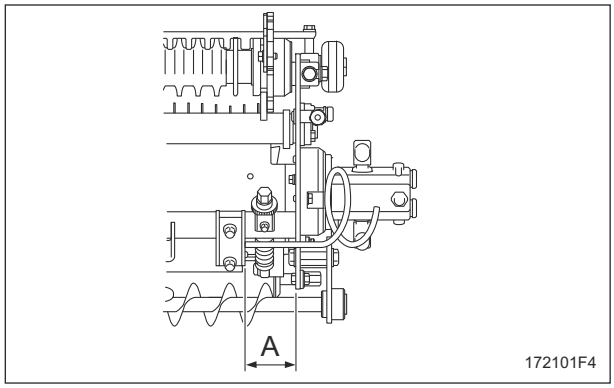
A	60 mm（2.36 in）

LH52



Adjustment of #4 and 5 Hydraulic Hose Guides_006

A	40 °



Adjustment of #4 and 5 Hydraulic Hose Guides_007

A	70 mm（2.76 in）

Replacement

Engine

Replacement of Engine Oil

Caution

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

Important

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

Important

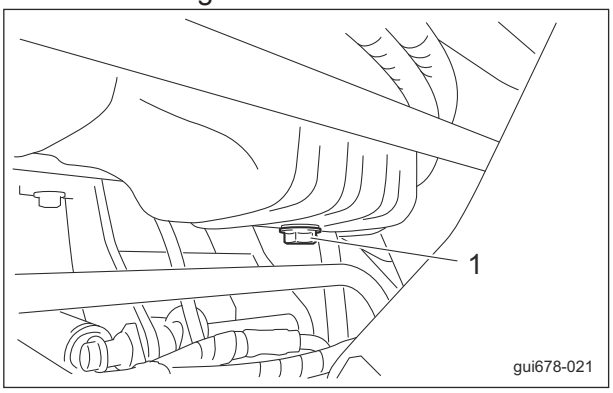
Be sure to use engine oil that is classified as API Service Grade CF or higher, with an SAE Viscosity that is appropriate for the operating environment (ambient temperature).

Important

Securely install the oil level gauge and oil filler cap.

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

1. Follow the steps below to remove the old engine oil.
   [1] Start and run the engine to warm up the engine oil.
   [2] With the machine on a level surface, stop the engine.
   [3] Remove the drain plug, and then drain the old engine oil into a container.

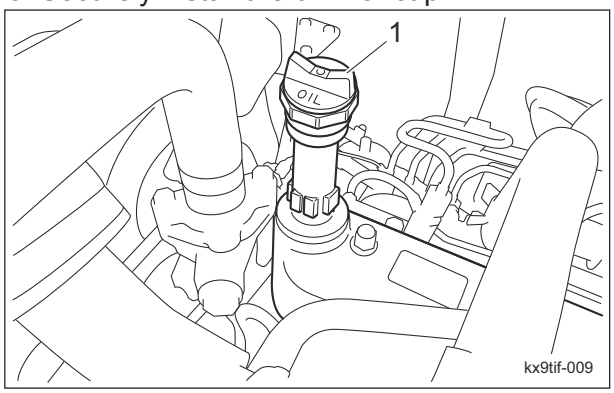


Replacement of Engine Oil_001

1	Drain plug

   [4] Re-place the drain plug.
2. Remove the oil filler cap, and then supply new engine oil until the oil reaches a level in between the upper and lower limit lines on the oil level gauge.
   The engine oil quantity is approximately 6.0 dm^3 (6.0 L).

3. Securely install the oil filler cap.



Replacement of Engine Oil_002

1	Oil filler cap

4. It will take a while for the supplied engine oil to descend into the oil pan.
   Check the oil level again 10 to 20 minutes after replenishment.
5. Check underneath the machine for oil leakage.

Replacement of Engine Oil Filter

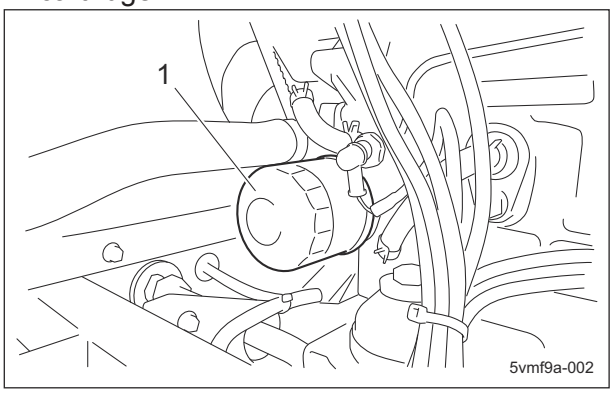
> ⚠ Caution
>
> Be careful with hot oil, which could cause burns if it contacts your skin.

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

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

> Important
>
> Securely install 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

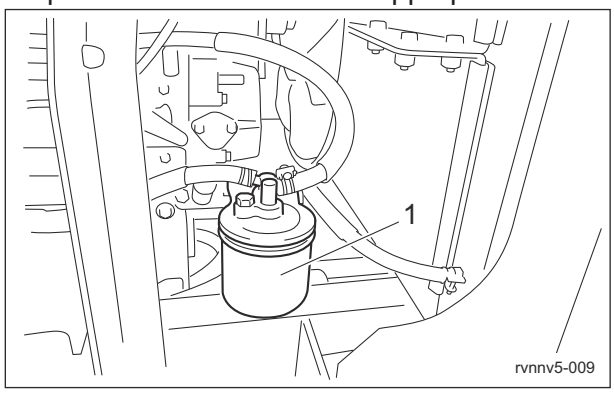
2. Lightly coat the packing of the new filter cartridge with engine oil.
3. Hand-tighten the filter cartridge until the packing contacts the sealing surface, and then firmly hand-tighten (without using a filter wrench).
4. Supply engine oil until it reaches the specified level.
   "Supply of Engine Oil" (Page 6-8)
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

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

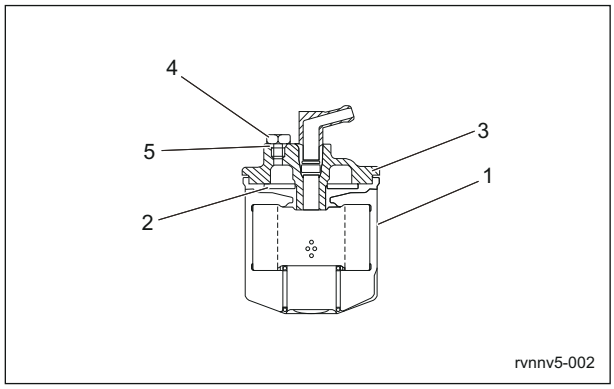
Since the fuel filter is a cartridge, it cannot be disassembled or cleaned.
If dust or dirt accumulates in the fuel filter, the fuel flow will become insufficient.
Replace the fuel filter at the appropriate times.



Replacement of Fuel Filter_001

1	Fuel filter

1. Follow the steps below to replace the fuel filter.
   [1] Using a filter wrench, remove the fuel filter cartridge.
   [2] Lightly coat the packing of the new cartridge with fuel, and then firmly 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. When the ignition key is set to the "ON" position and the fuel pump is operated after replacement, air bleeding will occur automatically.
   If the automatic air bleeding is not available, remove air manually.

Replacement of Air Cleaner Element

Important

A contaminated air cleaner element may cause malfunction of the engine.

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 element.
   "Cleaning of Air Cleaner Element" (Page 6-6)

Replacement 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.

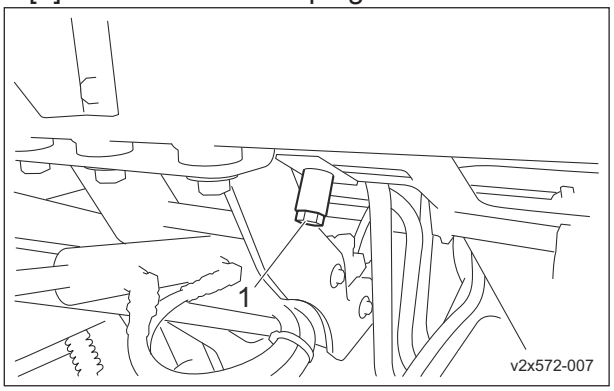
Important

Tightly close the radiator cap.
If the cap is loose or incorrectly installed, the engine will be overheated due to water leakage, resulting in engine damage.

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 %

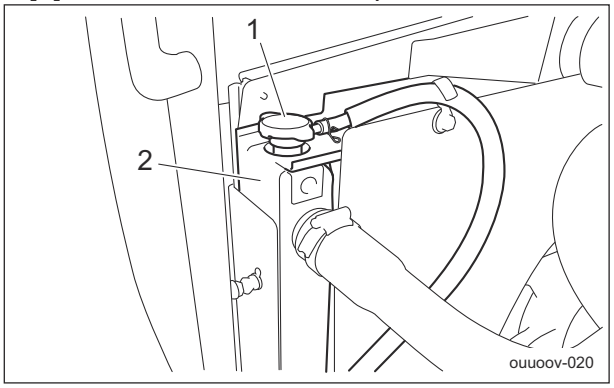
1. Stop the engine, and then allow the radiator to cool.
2. Open the hood.
3. Follow the steps below to drain the coolant.
   [1] Position a container to drain the coolant into.
   [2] Remove the drain plug from the radiator.



Replacement of Coolant_001

1	Radiator drain plug

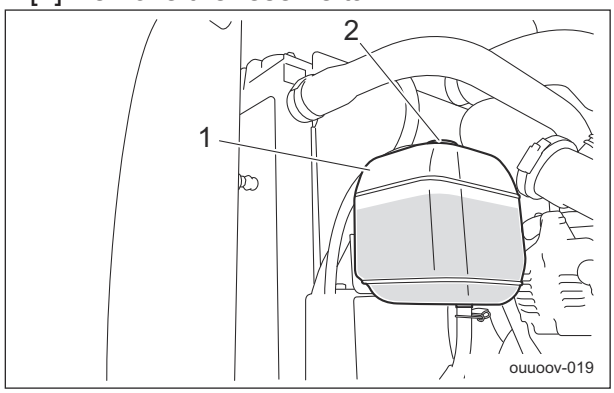
[3] Remove the radiator cap.



Replacement of Coolant_002

1	Radiator cap
2	Radiator

[4] Remove the reserve tank.



Replacement 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 dm^3 (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.

Main Vehicle

Replacement 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 container and discard it in accordance with local laws and regulations.

Important

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

Important

For the hydraulic oil to be used, consult Characteristics of Hydraulic Oil and use the oil whose characteristics are equivalent or superior to those specified there.
Especially regarding kinematic viscosity and viscosity index, use of hydraulic oil whose figures are less than those of the specified hydraulic oil will cause a malfunction in the hydraulic circuit.

■Characteristics of Hydraulic Oil

ISO Viscosity Grade		ISO VG46
Density	15 °C (59 °F)	0.873 g/cm^3 (0.0315 lb/in^3)
API Gravity		30.6
Flash Point (Open Cup)		230 °C (446 °F)
Pour Point		-30 °C (-22 °F)
Kinematic Viscosity	40 °C (104 °F)	46 mm^2/s (46 cSt)
	100 °C (212 °F)	7 mm^2/s (7 cSt)
Viscosity Index		109

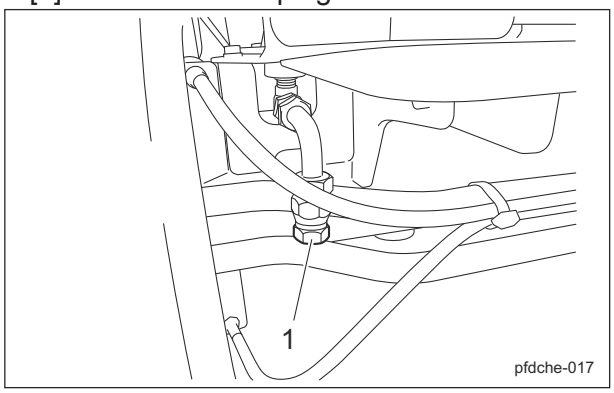
■Characteristics of Hydraulic Oil with conditions of use
Hydraulic oil of ISO viscosity grade VG68 can be used only if the following condition is met:

・ The outside temperature must be 20 °C (68 °F) or more during engine operation.

ISO Viscosity Grade		ISO VG68
Density	15 °C (59 °F)	0.878 g/cm^3 (0.0318 lb/in^3)
API Gravity		29.7
Flash Point (Open Cup)		252 °C (486 °F)
Pour Point		-30 °C (-22 °F)
Kinematic Viscosity	40 °C (104 °F)	68 mm^2/s (68 cSt)
	100 °C (212 °F)	9 mm^2/s (9 cSt)
Viscosity Index		107

Note:
In Japan, "Shell Tellus S2M46 (ISO VG46)" and "Shell Tellus S2M68 (ISO VG68)" meet the characteristics described above.
However, in other countries, the specification of Shell Tellus S2M46 and Shell Tellus S2M68 can be below what is required.
Please check the product data sheet to ensure that it meets the requirements before using.

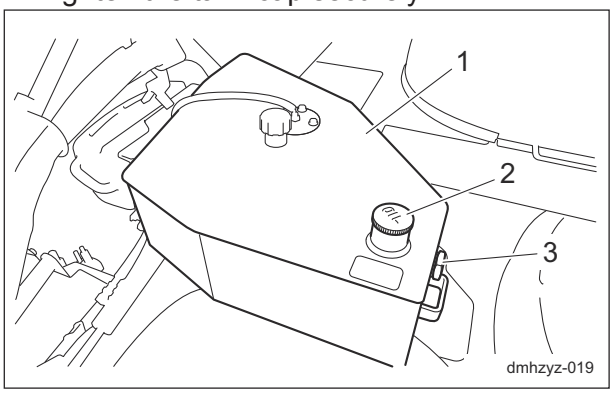
1. Follow the steps below to remove the old oil.
   [1] Start and run the engine to warm up the oil.
   [2] On a level surface, lower the mower units, and then stop the engine.
   [3] Remove the drain plug of the hydraulic tank and drain the old oil into a bowl.
   [4] Install the drain plug.



Replacement of Hydraulic Oil_001

1	Drain plug

2. Remove the tank cover.
3. 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 30.3 dm^3 (30.3 L).
4. Tighten the tank cap securely.



Replacement of Hydraulic Oil_002

1	Hydraulic tank
2	Tank cap
3	Oil gauge

5. Start the engine, and then repeat the steps below a few times.
   ・Raise and lower the mower units.
   ・Turn the steering wheel left and right.
   ・Move forward and reverse.
6. Lower the mower units and maintain that position on a level surface, and then check to see if the oil level is at the middle of the oil gauge. If necessary, supply oil.
7. Check underneath the machine for hydraulic oil leakage.
8. Install the tank cover.

Replacement of Hydraulic Oil Filter

■Replacement of Hydraulic Oil Line Filter

Caution

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

Important

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

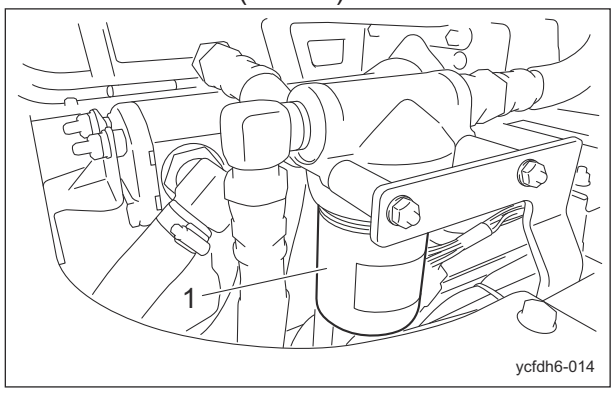
Important

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

Important

Use hydraulic oil whose specification meets the requirements.

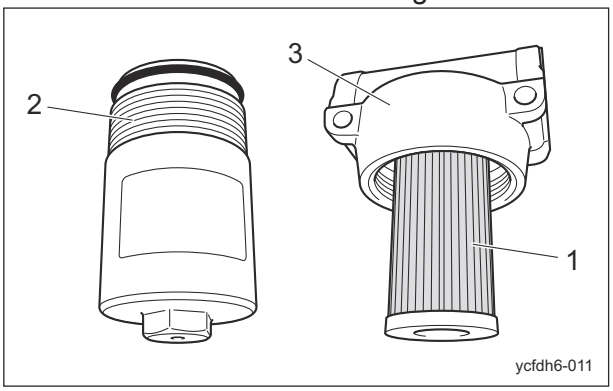
1. Lower the mower units on a level surface, and then stop the engine.
2. Loosen the filter case and remove it.
   Note:
   Use a 24 mm (0.94 in) socket wrench.



Replacement of Hydraulic Oil Line Filter_001

1	Filter case

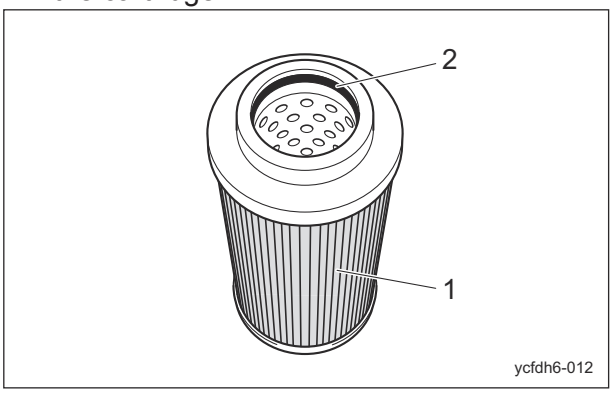
3. Remove the old filter cartridge.



Replacement of Hydraulic Oil Line Filter_002

1	Filter cartridge
2	Filter case
3	Body

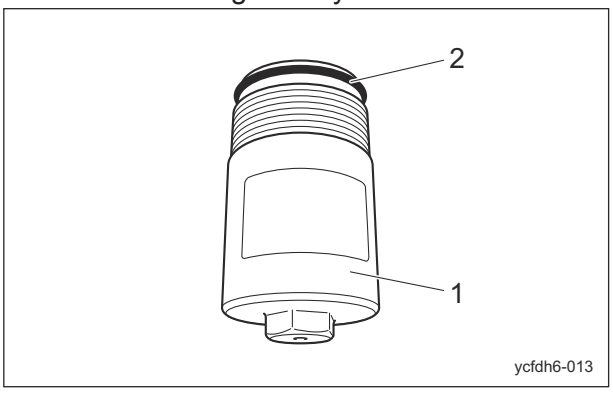
4. Lightly coat the O-ring of the new filter cartridge with hydraulic oil, and then install the cartridge.



Replacement of Hydraulic Oil Line Filter_003

1	Filter cartridge
2	O-ring

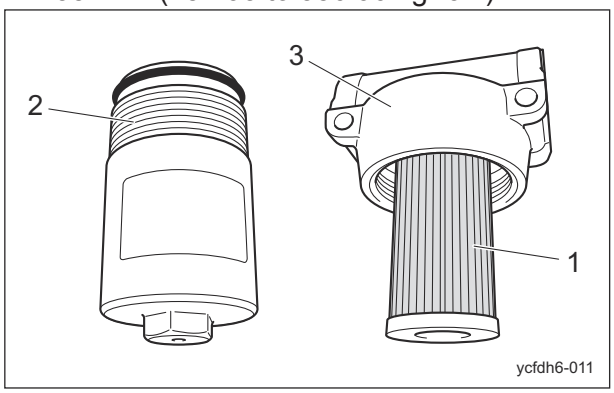
5. Clean the inside of the filter case.
6. Make sure that there is no damage to the O-ring of the filter case, and then lightly coat the O-ring with hydraulic oil.



Replacement of Hydraulic Oil Line Filter_004

1	Filter case
2	O-ring

7. Install the filter case onto the body, firmly hand-tighten it, and then tighten it to 25 to 35 N·m (254.93 to 356.90 kgf-cm).



Replacement of Hydraulic Oil Line Filter_005

1	Filter cartridge
2	Filter case
3	Body

8. Supply hydraulic oil until it reaches the specified level.
"Supply of Hydraulic Oil" (Page 6-10)
9. Start the engine, and then after the hydraulic oil has warmed up, stop the engine.
10. Check underneath the machine for hydraulic oil leakage.

■Replacement of Hydraulic Oil Suction Filter

⚠ Caution

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

Important

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

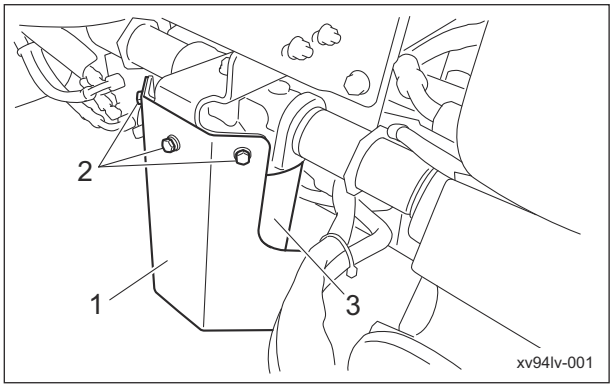
Important

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

Important

Use hydraulic oil whose specification meets the requirements.

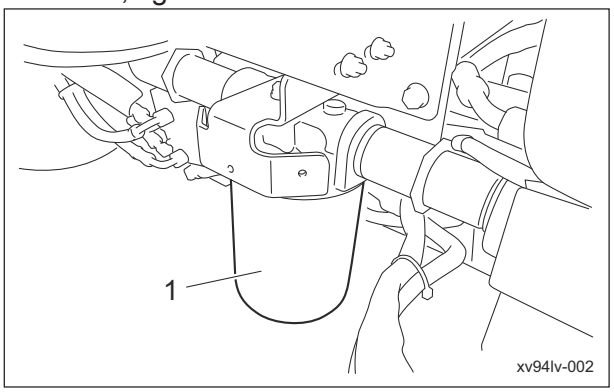
1. Lower the mower units on a level surface, and then stop the engine.
2. Remove the filter protection plate.



Replacement of Hydraulic Oil Suction Filter_001

1	Filter protection plate
2	Bolt
3	Filter cartridge

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



Replacement of Hydraulic Oil Suction Filter_002

1	Filter cartridge

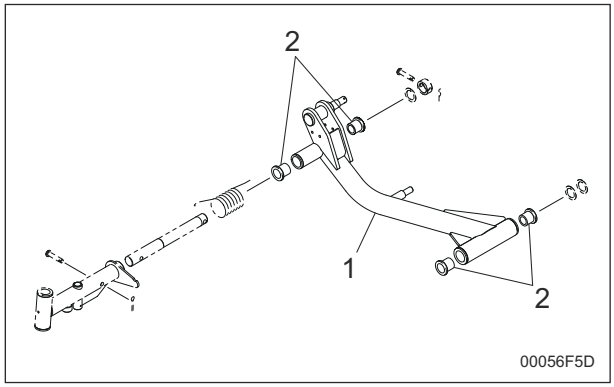
6. Supply hydraulic oil until it reaches the specified level.
"Supply of Hydraulic Oil" (Page 6-10)
7. Start the engine, and then after the hydraulic oil has warmed up, stop the engine.

8. Check underneath the machine for hydraulic oil leakage.
9. Install the filter protection plate.

Replacement of Resin Bushing

Resin bushings are installed in the following locations.
Replace resin bushings according to the maintenance schedule.

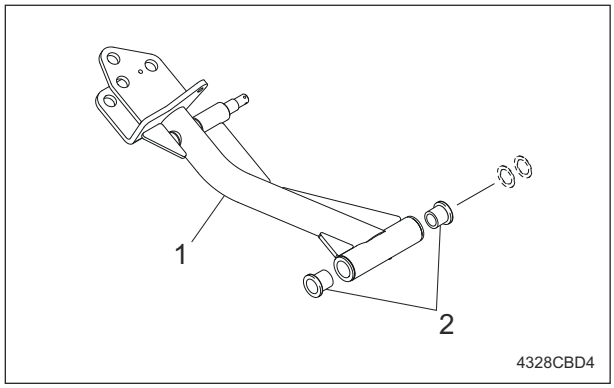
1. Lift arm (Mower unit #1, #4, #5)
   Note:
   The illustration shows the lift arm for mower unit #4.



Replacement of Resin Bushing_001

1	Lift arm
2	Resin bushing

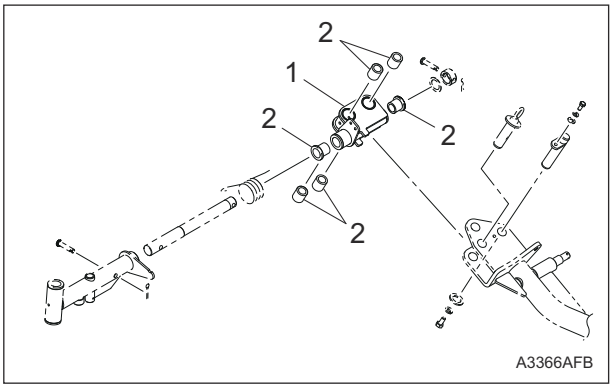
2. Lift arm (Mower unit #2, #3)
   Note:
   The illustration shows the lift arm for mower unit #2.



Replacement of Resin Bushing_002

1	Lift arm
2	Resin bushing

3. Swiveling bracket (Mower unit #2, #3)
   Note:
   The illustration shows the swiveling bracket for mower unit #2.

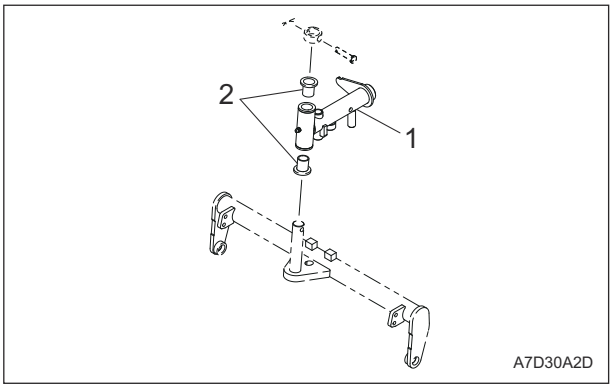


Replacement of Resin Bushing_003

1	Swiveling bracket
2	Resin bushing

4. Mower coupling (Mower unit #1, #2, #3, #4, #5)

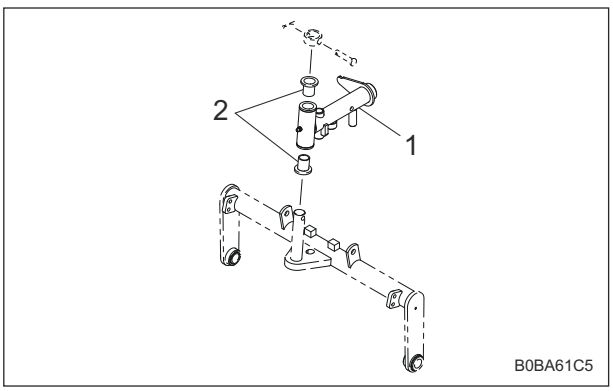
■ LS62・LS66



Replacement of Resin Bushing_004

1	Mower coupling
2	Resin bushing

■ LH52

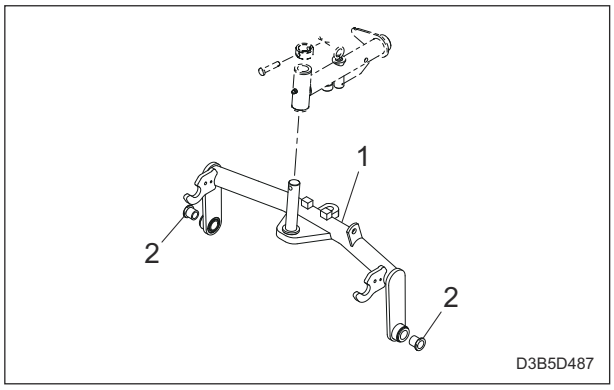


Replacement of Resin Bushing_005

1	Mower coupling
2	Resin bushing

5. Mower arm (Mower unit #1, #2, #3, #4, #5)

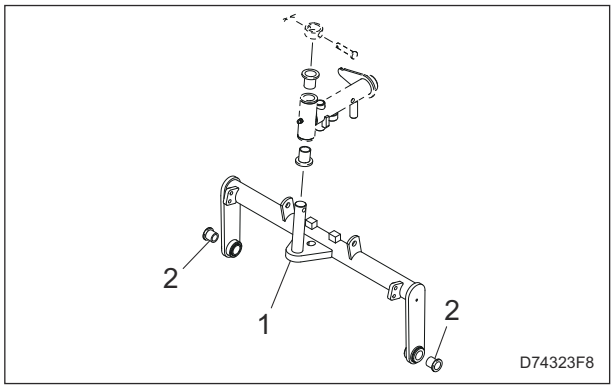
■ LH62・LH66



Replacement of Resin Bushing_006

1	Mower arm
2	Resin bushing

■ LH52



Replacement of Resin Bushing_007

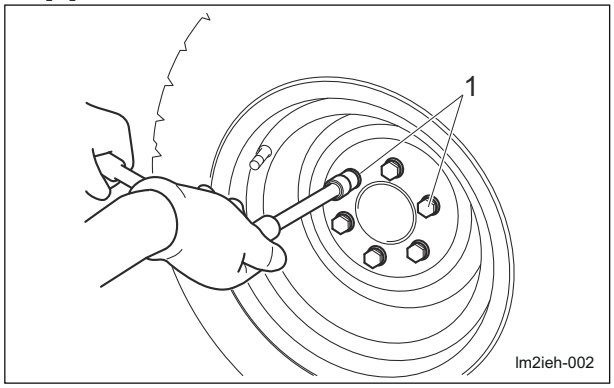
1	Mower arm
2	Resin bushing

Replacement of Tires

■Replacement of Front Tires

1. Removing front tires
   Follow the steps below to remove the front tires:

[1] Loosen the bolts.



Replacement of Front Tires_001

1	Heat-treated bolt

[2] Securely place the jack beneath the jack-up point of the front left/right frame area, and then raise it until the tire lifts off the ground.
"Jack-Up Points" (Page 6-2)

[3] Remove the bolts.

[4] Remove the tire from the wheel mounting seat.

2. Installing front tires

Important

Tighten the bolts in the tightening order (diagonally).

Important

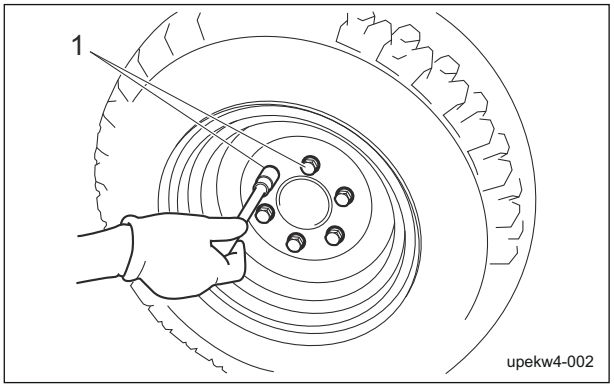
Tighten the wheel mounting bolts on the specified torque by using a torque wrench.

For installing the front tires, reverse the removing procedure.

■Replacement of Rear Tire

1. Removing rear tires
   Follow the steps below to remove the rear tire.

[1] Loosen the bolts.



Replacement of Rear Tire_001

1	Bolt, heat-treated

[2] Securely place the jack beneath the jack-up point of the pivot, and then raise it until the tires lift off the ground.
"Jack-Up Points" (Page 6-2)

[3] Remove the bolts.

[4] Remove the tire from the wheel mounting base.

2. Installing rear tires

> Important
>
> Tighten the bolts in the tightening order (diagonally).

> Important
>
> Tighten the wheel mounting bolts on the specified torque by using a torque wrench.

For installing the rear tire, reverse the removing procedure.

Storage

Long-Term Storage

Follow the instructions below for long-term storage of the machine.

1. Cleaning
   - Remove dirt, grass clippings, oil stains etc. completely from the main vehicle and engine.
2. Replacing oil
   - Inspect and replace the engine oil, hydraulic oil and element.
3. Greasing and lubricating
   - Supply oil and apply grease to appropriate parts.
4. Battery
   - Remove the negative battery wire.
5. Fuel
   - Remove the fuel from the fuel tank.
6. Tire pneumatic pressure
   - Set the tire air pressure slightly higher than normal, and then place the machine on a board to avoid humidity.
7. Mower units
   - When storing this machine, lower all the mower units unless a positive mechanical lock is provided.
8. Storage location
   - Cover the machine and store it in a dry place where it will not be exposed to rain.

Precautions for Repair ..... Page 7-2

Adjustment ..... Page 7-2

Adjustment of Parking Brake ..... Page 7-2
Adjustment of Brake ..... Page 7-3
Adjustment of The Neutral Position of The Piston Pump ..... Page 7-4

Replacement ..... Page 7-5

Replacement of Fuse ..... Page 7-5

Towing .....Page 7-6

Towing The Machine in An Emergency .....Page 7-6

Precautions for Repair

Warning

The chapter "Repair" in this manual describes practical measures which should be performed by a mechanic with expertise.
The owner should instruct the mechanic with expertise to perform repair service for this machine.

Caution

First, learn well the operations you plan to perform.

Important

Use tools appropriate for each operation.

Important

Use Baroness genuine parts for replacement and accessories.
Our product warranty may be void if you use non-genuine parts for replacement or accessories.

Adjustment

Adjustment of Parking Brake

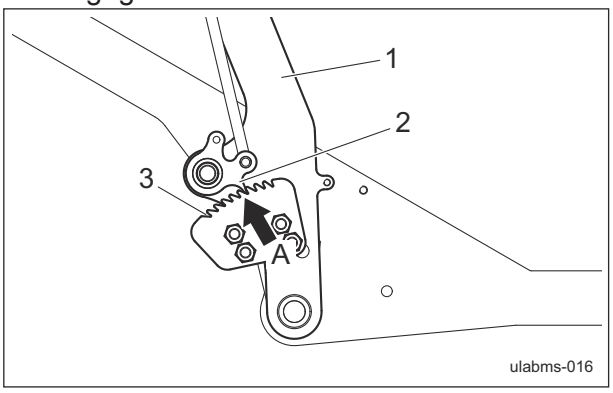
Caution

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

Important

Make sure that the brake is effective on slopes and that it is not applied any longer when you release it.
Adjust the parking brake whenever there is any abnormality.

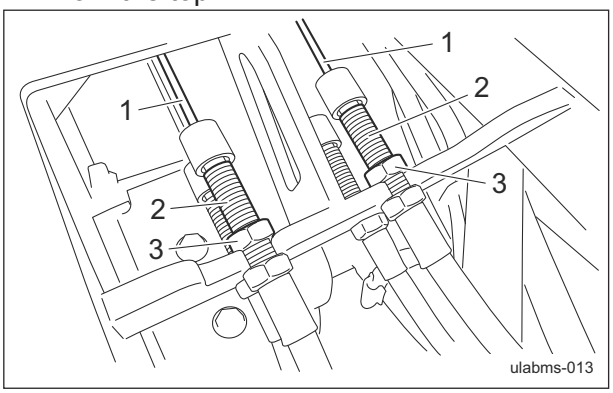
1. Stop the engine.
2. Remove the step cover.
3. Follow the steps below to adjust the parking brake.
   [1] Depress the locking pedal while firmly depressing the brake pedal to lock it and engage the latch in a notch.



Adjustment of Parking Brake_001

1	Brake pedal
2	Latch
3	Notch
A	Fourth or fifth notch

   [2] Adjust the adjustment bolt so that the latch is positioned in the fourth or fifth notch from the top.



Adjustment of Parking Brake_002

1	Brake wire
2	Adjustment bolt
3	Lock nut

Adjustment of Brake

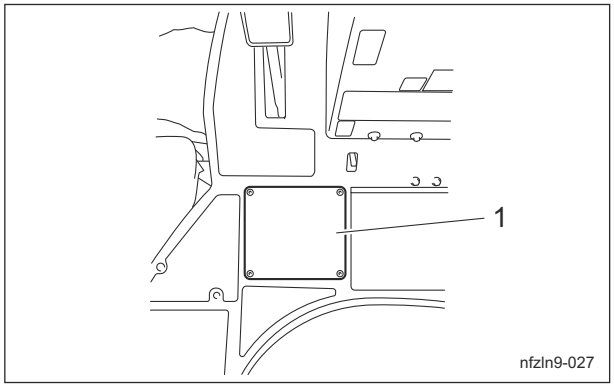
Caution

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

Important

Make sure that the brake is effective on slopes and that it is not applied any longer when you release it.
Adjust the parking brake system whenever there is any abnormality.

1. Stop the engine.
2. Remove the step cover.

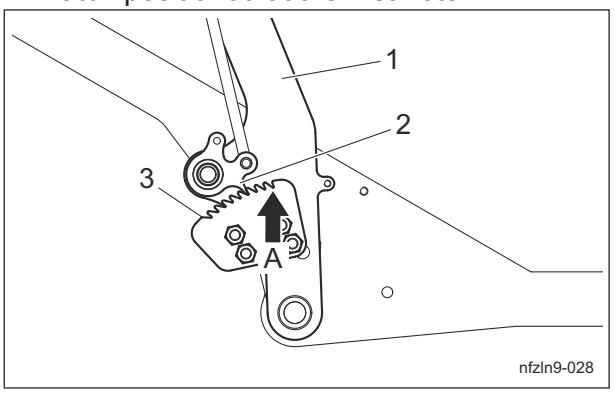


Adjustment of Brake_001

1	Step cover

3. Follow the steps below to adjust the brake. Adjust it so that the play of brake wire will be as small as possible with the latch positioned at the first notch from the top.

[1] Push the locking pedal while applying mild pressure to the brake pedal with a hand so that the brake pedal will be locked with the latch positioned at the first notch.

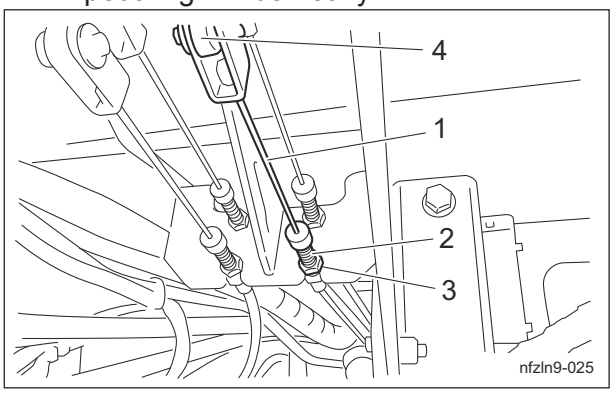


Adjustment of Brake_002

1	Brake pedal
2	Latch
3	Notch
A	First notch

[2] Adjust the travel of the brake pedal by tightening the brake wire adjustment bolt.

- If the brake pedal play is too large, the braking power will be decreased and the pedaling will be light.
- If the brake pedal play is too small, the braking power will be increased and the pedaling will be heavy.



Adjustment of Brake_003

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

4. Install the step cover.
5. Start the engine.

6. Drive the machine to check the following.
   - Make sure that the brake is effective when depressing the brake pedal all the way firmly.
   - Make sure that heat is not generated in the brake area.
   - Make sure that the left and right brakes are equally effective.

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

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

Break-In of Brakes

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

Adjustment of The Neutral Position of The Piston Pump

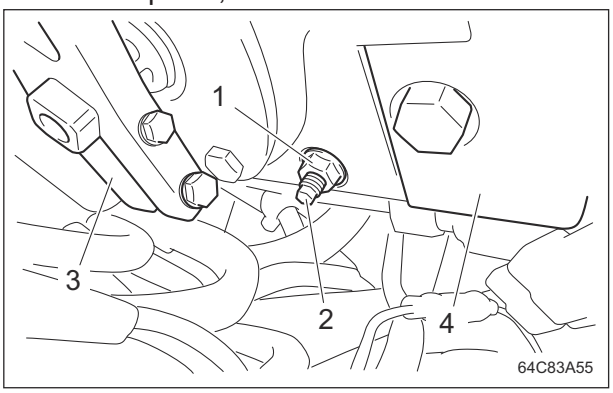
> ⚠ Caution
>
> Make sure not to touch rotating tires.

> ⚠ Caution
>
> While adjusting the neutral position, the machine may start to move.
> Securely place jacks beneath the jack-up points, and then raise the machine until all tires lift 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. Securely place jacks beneath the jack-up points, and then lift the machine off the ground.
   "Jack-Up Points" (Page 6-2)
3. Make sure that no tires get contact with the jack stand.
4. Open the underseat cover.
5. Start the engine, and rev it up to the maximum rpm.
6. Adjust the neutral position.
   Note:
   The lock nut uses a 1/2 inch wrench, and the traction adjusting cam uses a 1/4 inch wrench.
   Follow the steps below to adjust the neutral position.
   [1] Loosen the lock nuts.
   [2] Slowly rotate the traction adjusting cam until all tires stop.
   - If the tires move in the direction of forward travel, rotate the traction adjusting cam clockwise.
   - If the tires move in the direction of backward travel, rotate the traction adjusting cam counterclockwise.

   Find the position where all tires stop, and then, while holding the traction adjusting cam in place, secure it with the lock nut.



Adjustment of The Neutral Position of The Piston Pump_001

1	Lock nut
2	Traction adjusting cam
3	Cam lever
4	Piston pump

7. Check that the tires do not move.

Replacement

Replacement of Fuse

Important

When performing maintenance on the electrical system, be sure to remove the negative battery wire.

Important

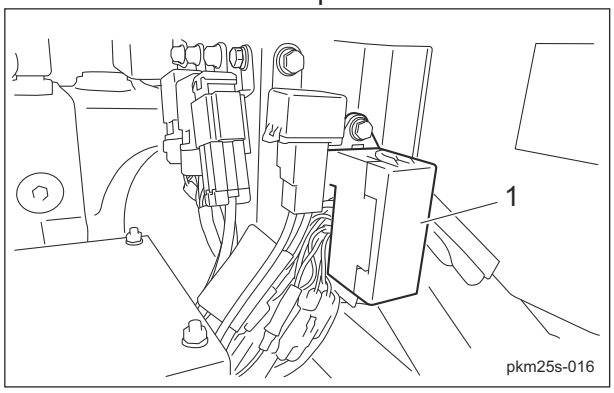
If a fuse blows, a short may have occurred within the electrical circuit.
Check for the cause, such as faulty terminal connections, damaged wiring or terminals, or incorrect wiring.

Important

For fuse replacement, clean the fuse mounting area with use of compressed air before mounting the fuse.

Fuse Box

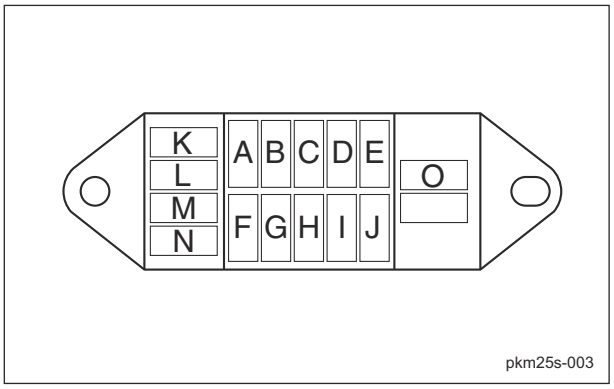
The fuse box includes spare fuses and tools.



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.



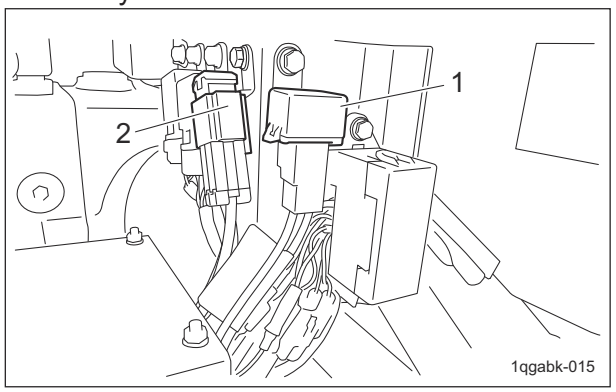
Fuse Box_002

A	5 A	Timer unit
B	5 A	Thermo-start lamp
C	5 A	Fuel gauge, water temperature gauge, charge lamp, oil pressure (engine oil pressure) lamp, water temperature buzzer, hydraulic oil buzzer, hour meter
D	15 A	Relay box L, #4 proximity sensor, #5 proximity sensor, proximity sensor (operation lever), proximity sensor (traveling pedal position detection), delay timer (mower units #2 & #3 lowering)
E	15 A	Relay box R, proximity switch, delay timer (seat), #2 proximity sensor, reel forward/reverse switch
F	-	(Unused)
G	5 A	Timer unit
H	5 A	Alternator
I	5 A	Fuel pump, reel rotation switch
J	5 A	Neutral sensor, parking brake sensor
K	5 A	Spare
L	5 A	
M	15 A	
N	15 A	
O	Tool	

Fusible Link

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

- Engine stop solenoid: 30 A
- Battery: 50 A

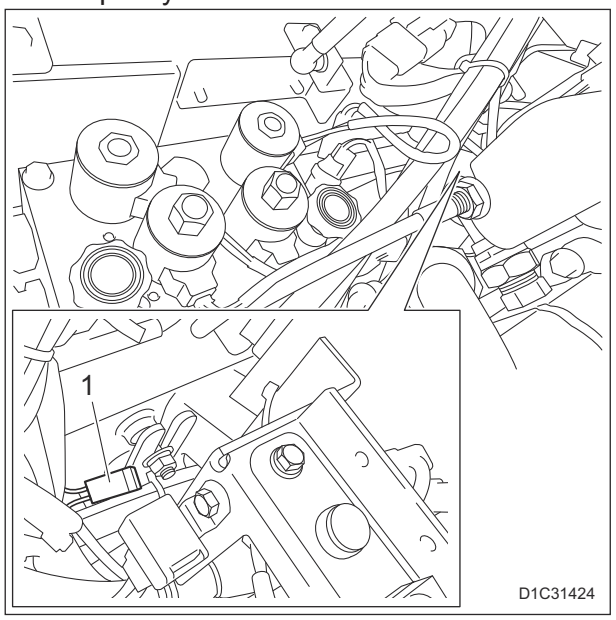


Fusible Link_001

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

Fuse

The fuse in the main harness is for LED work lamp.
Depending on the specifications, the LED work lamp may not be available.
The capacity of the mini blade fuse is 15 A.



Fuse_001

1	Mini blade fuse

Towing

Towing The Machine in An Emergency

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

Caution

Before starting the engine, be sure to close the bypass.

Important

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

Important

When towing the machine, obey the following restrictions.
Obey the speed and the time restrictions to prevent damaging the pump or motor.

- Speed: Do not travel at a speed more than 3.0 km/h.
- Time: Do not tow the machine for more than 3 minutes.

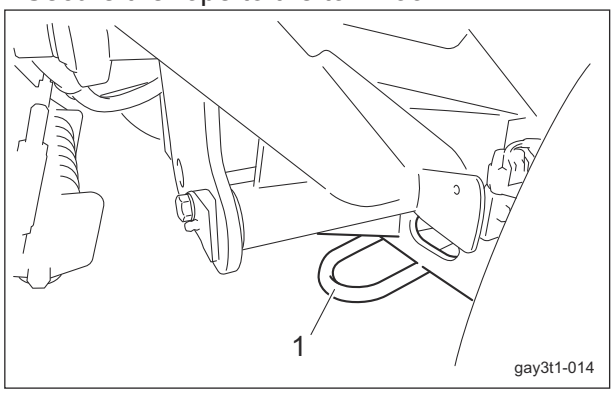
When towing the machine for more than 3 minutes, start the engine and circulate the hydraulic oil in the hydraulic circuit. Therefore, do not tow the machine until restart the engine after completed repairs.

Important

Do not loosen the unload valve three turns or more.

1. Stop the engine.
   "Procedure to Stop Engine" (Page 5-13)
2. Depress the locking pedal while firmly depressing the brake pedal to lock it.
3. Chock the wheels.

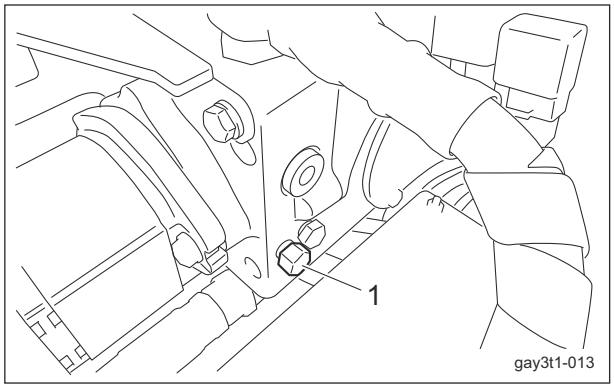
4. Secure the rope to the tow hook.



Towing The Machine in An Emergency_001

1	Tow hook

5. Open the underseat cover.
   "Procedure to Open/Close Underseat Cover" (Page 5-3)
6. Turn the unload valve under the seat 1 to 1.5 turns counterclockwise.



Towing The Machine in An Emergency_002

1	Unload valve

7. Close the underseat cover.
8. Remove the wheel stoppers.
9. Firmly depress the brake pedal to release the locking pedal.

Warning

While towing, always keep your foot on the brake pedal to make sure you can depress it at any time to stop.

10. Tow the machine slowly.

Appended Table

Tightening Torques .....Page 8-2

Standard Tightening Torques .....Page 8-2
Principal Tightening Torques ..... Page 8-5

Daily Check List ..... Page 8-6

Maintenance Schedule ..... Page 8-8

List of Adjusted Values ..... Page 8-12

Appended Table

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.

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	13,663.98	11,860.34

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

Appended Table

Hydraulic Hose

The tightening torques for union joints and union adaptors with parallel pipe threads (G, PF) are shown in the table below.
A union joint or adaptor will not become loose or leak as long as it is tightened by the specified torque.
If fluid leaks from the sealed portion, do not attempt to tighten the union joint or adaptor forcibly. Examine whether any foreign matter or scratches are present on the seat surface.
Tightening a union joint or adaptor forcibly could damage the connection of the joints.
When tightening a union joint or adaptor, use a torque wrench where possible and firmly tighten it by an appropriate torque.

Nominal diameter of the hose size	Nominal diameter of the parallel pipe threads (G, PF)	Tightening torque		
		N-m	kgf-cm	lb-in
6	1/4	25	254.93	221.28
9	3/8	50	509.85	442.55
12	1/2	60	611.82	531.06
15	3/4	120	1,223.64	1,062.12
19	3/4	120	1,223.64	1,062.12
25	1	140	1,427.58	1,239.14
32	1-1/4	170	1,733.49	1,504.67
38	1-1/2	210	2,141.37	1,858.71
50	2	250	2,549.25	2,212.75

Fittings with Parallel Threads (O-Ring Seal Type)

The tightening torques for fittings with parallel threads (O-ring seal method) are shown in the table below.
Tightening the fitting forcibly with a spanner or other such tool to secure it to a set position could damage the fitting, its washers, and other parts.
When tightening an adjustable elbow, use a torque wrench where possible and firmly tighten it by an appropriate torque.

Nominal diameter of thread	Tightening torque		
	N-m	kgf-cm	lb-in.
1/4	34.32 - 49.03	349.96 – 499.96	303.77 – 433.96
3/8	68.65 - 78.45	700.02 – 799.95	607.62 – 694.36
1/2	98.07 - 117.68	1,000.02 – 1,199.98	868.02 – 1,041.59
3/4	147.10 - 176.52	1,499.98 – 1,799.97	1,301.98 – 1,562.38
1	245.17 - 274.59	2,500.00 – 2,799.99	2,170.00 – 2,430.40
1-1/4	294.20	2,999.96	2,603.96
1-1/2	294.20	2,999.96	2,603.96
2	392.27	3,999.98	3,471.98

Principal Tightening Torques

Tightening Torque by Model

LM551
LM551A
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	K0013120702	BOLT, HT M12-70	104 - 134	1,060.49 - 1,366.40	920.50 - 1,186.03	-
	Wheel mounting base	-	Slotted nut 1-20UNEF of hydraulic motor	280 - 300	2,855.16 - 3,059.10	2,478.28 - 2,655.30	-
	Wheel	K0011120352	BOLT, P1.5 M12-35	110	1,121.67	973.61	-
Rear wheel	Motor	K0010120602	BOLT, HT M12-60	104 - 134	1,060.49 - 1,366.40	920.50 - 1,186.03	-
	Wheel mounting base	-	Slotted nut 1-20UNEF of hydraulic motor	280 - 300	2,855.16 - 3,059.10	2,478.28 - 2,655.30	-
	Wheel	K0011120352	BOLT, P1.5 M12-35	110	1,121.67	973.61	-
Engine		K0017100252	BOLT, SMALL HT P1.25 M10-25	58 - 76	591.43 - 774.97	513.36 - 672.68	-
		K0010121201	BOLT, HT M12-120	67 - 85	683.20 - 886.75	593.02 - 752.34	-
		K3680000030	M3.5 Screw (accessories)	0.78 - 1.18	7.95 - 12.03	6.90 - 10.44	-
Electric components for engine		-	Starter B terminal (M8)	5.9 - 11.7	60.16 - 119.30	52.22 - 103.56	-
		-	Alternator B terminal (M6)	5.9 - 9.8	60.16 - 99.93	52.22 - 86.74	-
		-	Glow plug connection terminal nut (M4)	1.0 - 1.8	10.20 - 18.35	8.85 - 15.93	-
Joint		K001A100401	BOLT, 13T W/HEX HOLE M10-40	62 - 72	632.21 - 734.18	548.76 - 637.27	○
		K0011100252	BOLT, HT P1.25 M10-25	58 - 76	591.43 - 774.97	513.36 - 672.68	-
Tie rod		- (K1610000020)	Slotted nut(END ASSY, TIE-ROD MALE (RH))	45	458.87	398.30	-
		- (K1611000020)	Slotted nut(END ASSY, TIE-ROD MALE (LH))	45	458.87	398.30	-
Piston pump		K0013140452	BOLT, HT M14-45	106 - 134	1,080.88 - 1,366.40	938.21 - 1,186.03	-
Cross valve		K0013101202	BOLT, HT M10-120	29 - 38	295.71 - 387.49	256.68 - 336.34	-
Seat		- (K1700000430)	M8 Bolt and Nut (accessories)	-	-	-	○

Appended Table

Location	Code	Part name	Tightening torque			Thread locking adhesive
			N-m	kgf-cm	lb-in	
Mower stopper	K0041060122	SCREW, + FLAT HEAD M6-12	-	-	-	○
Proximity switch NO V-in	K0100050002	NUT, M5	2.5	25.49	22.13	-
	K0000050202	BOLT, M5-20	2.5	25.49	22.13	-
Proximity switch NO V-out	K0000050202	BOLT, M5-20	2.5	25.49	22.13	-
Proximity switch NC V-in	K0100050002	NUT, M5	2.5	25.49	22.13	-
	K0000050202	BOLT, M5-20	2.5	25.49	22.13	-
ROPS	K001A121101	BOLT, 13T W/HEX HOLE M12-110	104 - 134	1,060.49 - 1,366.40	920.50 - 1,186.03	-
Battery terminal	K3612000070	TERMINAL, BATTERY (+) 4013-D-8-1	9	91.77	79.66	-
	K3612000080	TERMINAL, BATTERY (-) 4013-D-8-2	9	91.77	79.66	-

Daily Check List

LM551

● ・ ・ ・ Inspect, adjust, supply, clean (first time)
○ ・ ・ ・ Inspect, adjust, supply, clean
▲ ・ ・ ・ Replace (first time)
△ ・ ・ ・ Replace

Maintenance Item			Before Work	After Work	Remarks
Engine	*1	Check engine oil	○		
	*1	Check fuel	○		
		Check fuel filter	○		
	*1	Check coolant	○		
	*1	Check air cleaner	○		
		Check radiator cover	○		
		Check radiator	○		
		Check engine area	○		
		Clean engine area		○	
		Clean radiator cover		○	
		Clean radiator		○	
Main vehicle		Check oil cooler	○		
	*2	Check battery	○		
		Check hydraulic oil	○		
		Check tire	○		
		Check cover	○		
		Check traveling pedal	○		
		Check brake pedal	○		

Maintenance Item			Before Work	After Work	Remarks
Main vehicle		Check wire	○		
		Check liquid leakage	○		
		Check ball proof net	○		
		Check machine exterior	○		
		Check bolts and nuts	○		
		Check hour meter	○		
		Check water temperature gauge	○		
		Check fuel gauge	○		
		Check pilot lamp	○		
		Check interlock system	○		
		Check steering wheel	○		
		Check light	○		
		Clean oil cooler		○	
		Clean machine exterior		○	

・*1: Refer to the Engine's Owner's Manual.
・*2: Refer to the Battery's Owner's Manual.

Appended Table

Maintenance Schedule

LM551

● ・ ・ ・ Inspect, adjust, supply, clean (first time)
○ ・ ・ ・ Inspect, adjust, supply, clean
▲ ・ ・ ・ Replace (first time)
△ ・ ・ ・ Replace

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 500 hrs.	Every 800 hrs.	Every 1000 hrs.	Every 1500 hrs.	Every 3000 hrs.	every month	every 3 months	Every year	Every 2 years	Every 4 years	When Required	Remarks
Engine	*3	Check fan belt	○																			
	*3	Open air cleaner evacuator valve to remove dust		○	○																	Open valve every week or daily in dusty conditions
	*2.*3	Check fuel hoses and clamp bands				○																
	*3	Check fan belt tension					○															
	*3	Check cooling fan					○															
		Check water separator					○															
		Draining of water separator					○															
	*2.*3	Clean air cleaner element					○															Air cleaner should be cleaned more often in dusty conditions than in normal conditions
	*3	Check radiator hoses and clamp bands						○														
	*2	Check intake air line (air cleaner hose)						○														
	*2	Check closed breather hoses						○														

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 500 hrs.	Every 800 hrs.	Every 1000 hrs.	Every 1500 hrs.	Every 3000 hrs.	every month	every 3 months	Every year	Every 2 years	Every 4 years	When Required	Remarks
Engine		Clean water separator								○												
		Clean fuel tank interior									○											
	*3	Clean water jacket and radiator interior									○											
		Adjust valve clearance										○										
	*1.*2	Check injection nozzle												○								
	*1.*2	Check turbocharger													○							
	*1.*2	Check injection pump													○							
	*3	Replace engine oil				▲	△															
						▲		△														Every 200 hours possible in the area where the ambient temperature is below 35 °C (95 °F).
	*2	Replace oil filter cartridge				▲		△														
	*3	Replace fuel filter cartridge								△												
	*3	Replace fan belt									△								△			Every 500 hours or 2 years whichever comes earlier

Appended Table

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 500 hrs.	Every 800 hrs.	Every 1000 hrs.	Every 1500 hrs.	Every 3000 hrs.	every month	every 3 months	Every year	Every 2 years	Every 4 years	When Required	Remarks
Engine	*2	Clean air cleaner element																△				Replace every 6 cleanings or every year whichever comes earlier
	*3	Replace radiator coolant																	△			
	*3	Replace radiator hoses and clamp bands																	△			
	*1.*2.*3	Replace fuel hoses and clamps																	△			
	*2	Replace intake air line (air cleaner hose)																	△			
	*2	Replace closed breather hoses																	△			
Main vehicle		Check hydraulic hoses (Moving part)	○																			
		Grease and Lubricate				○											○					Maintenance schedules differ according to greasing points
		Grease rear mower unit swing out pins				○																
		Check electrical wiring				●	○															
		Check wheel mounting bolt				●	○															

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 400 hrs.	Every 500 hrs.	Every 800 hrs.	Every 1000 hrs.	Every 1500 hrs.	Every 3000 hrs.	every month	every 3 months	Every year	Every 2 years	Every 4 years	When Required	Remarks
Main vehicle		Check hydraulic hoses (Fixed part)					○									○						Every 100 hours or every month whichever comes earlier
		Grease mower unit hydraulic motor shafts							○													
		Replace hydraulic oil					▲				△											
		Replace hydraulic oil line filter					▲				△											
		Replace hydraulic oil suction filter					▲				△											
		Replace resin bushing																	△			
	*4	Replace battery																	△			
	*1	Replace hydraulic hoses (Moving part)																	△			
	*1	Replace hydraulic hoses (Moving part) relating to steering																	△			
	*1	Replace hydraulic hoses (Fixed part)																		△		
	*1	Replace brake cable																			△	
	*1	Replace cables for traveling																			△	
	*1	Replace throttle wire																			△	
	*1	Replace brake pads																			△	

Appended Table

- *1: Consult your local Baroness Dealer or local KUBOTA Dealer for this service.
- The items above (*2 marked) are registered as emission related critical parts by KUBOTA in the U.S. EPA nonroad emission regulation.
  As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.
  Please see the Engine's Warranty Statement in detail.
- *3: Refer to the Engine's Owner's Manual.
- *4: Refer to the Battery's Owner's Manual.
- The values for consumables are not guaranteed.
- Be sure to replace hydraulic hoses for steering cylinder and hydraulic hoses for hydraulic motor of wheel relating to steering every two years.

List of Adjusted Values

Fan belt			10 mm (0.39 in)	Slack when applying 98 N (10 kgf) force to the belt at the middle point
			Adjustment: 200 - 300 N (20.39 – 30.59 kgf) Replacement: 267 - 361 N (27.23 – 36.81 kgf)	Measurement of belt tension by using a sonic type tension meter
Mower stabilizer spring		#1 - 5	140 mm (5.51 in)	Total length of spring
Location of stopper nut	LH62・66	#1, 4, 5	15 mm (0.59 in)	
		#2, 3	40 mm (1.57 in)	
	LH52	#1, 4, 5	15 mm (0.59 in)	
			30 mm (1.18 in)	With grass catcher
		#2, 3	40 mm (1.57 in)	

Daily Check Records ..... Page 9-2

Maintenance Records .....Page 9-5

Daily Check Records

LM551
Use this table freely for your records of the daily check.

Model		Serial Number	

Items											
Engine	Check engine oil										
	Check fuel										
	Check fuel filter										
	Check coolant										
	Check air cleaner										
	Check radiator cover										
	Check radiator										
	Check engine area										
	Clean engine area										
	Clean radiator cover										
	Clean radiator										

Items											
Main vehicle	Check oil cooler										
	Check battery										
	Check hydraulic oil										
	Check tire										
	Check cover										
	Check traveling pedal										
	Check brake pedal										
	Check wire										
	Check liquid leakage										
	Check ball proof net										
	Check machine exterior										
	Check bolts and nuts										
	Check hour meter										
	Check water temperature gauge										

Records

Items											
Main vehicle	Check fuel gauge										
	Check pilot lamp										
	Check interlock system										
	Check steering wheel										
	Check light										
	Clean oil cooler										
	Clean machine exterior										

Maintenance Records

LM551
Use this table freely for your records of the maintenance.

Model		Serial Number	

Items											
Engine	Check fan belt										
	Open air cleaner evacuator valve to remove dust										
	Check fuel hoses and clamp bands										
	Check fan belt tension										
	Check cooling fan										
	Check water separator										
	Draining of water separator										
	Clean air cleaner element										
	Check radiator hoses and clamp bands										
	Check intake air line (air cleaner hose)										
	Check closed breather hoses										
	Clean water separator										

Records

Items											
Engine	Clean fuel tank interior										
	Clean water jacket and radiator interior										
	Adjust valve clearance										
	Check injection nozzle										
	Check turbocharger										
	Check injection pump										
	Replace engine oil										
	Replace oil filter cartridge										
	Replace fuel filter cartridge										
	Replace fan belt										
	Clean air cleaner element										
	Replace radiator coolant										
	Replace radiator hoses and clamp bands										
	Replace fuel hoses and clamps										

Items											
Engine	Replace intake air line (air cleaner hose)										
	Replace closed breather hoses										
Main vehicle	Check hydraulic hoses (Moving part)										
	Grease and Lubricate										
	Grease rear mower unit swing out pins										
	Check electrical wiring										
	Check wheel mounting bolt										
	Check hydraulic hoses (Fixed part)										
	Grease mower unit hydraulic motor shafts										
	Replace hydraulic oil										
	Replace hydraulic oil line filter										
	Replace hydraulic oil suction filter										
	Replace resin bushing										
	Replace battery										

Records

Items											
Main vehicle	Replace hydraulic hoses (Moving part)										
	Replace hydraulic hoses (Moving part) relating to steering										
	Replace hydraulic hoses (Fixed part)										
	Replace brake cable										
	Replace cables for traveling										
	Replace throttle wire										
	Replace brake pads										

BARONESS®

Quality on Demand

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