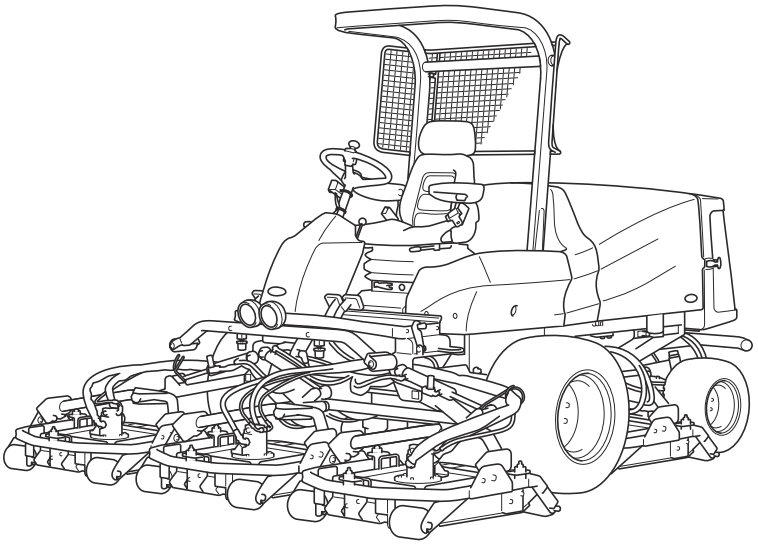
GM2810A

5-Unit Rotary Mower

Owner's Operating Manual



Serial No.　GM2810A：11374-

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

BARONESS®
Quality on Demand

Original Instructions　Ver.2.4

Regulations

California Proposition 65

(For California, USA)

⚠ WARNING:

Operating, servicing and maintaining a passenger vehicle or off-road vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

318yi8-005

California Proposition 65_001

California Spark Arrester

(For California, USA)

⚠ Warning

Operation of this equipment may create sparks that can start fires around dry vegetation.
A spark arrester may be required.
The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.
The DPF installed on the engine of this machine meets requirements of California Public Resource Code Section 4443.

EU Regulations

(For EU)
This product complies with all relevant EU Regulations.
For more information, please refer to the Declaration of Conformity attached.

EU Emission Control (Stage Ⅴ)

(For EU)

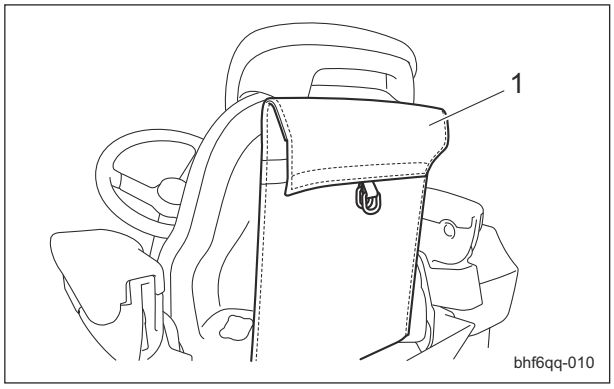
Important

No deliberate tampering with or misuse of the engine emissions control system should take place.
Make repairs immediately if the fault codes of PCD (Particulate Control Diagnostic) and NCD (NOx Control Diagnostic) appear.
Tampering with and use without effect of the engine emissions control system are regulatory infringements and they are penalized.

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

Keeping The Owner's Operating Manual

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

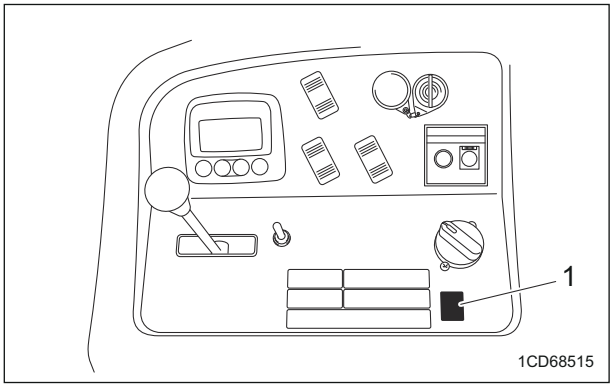


Keeping The Owner's Operating Manual_001

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/GM2810A

QR Code_002

Introduction

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.

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.

Introduction

Contents

Contents

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. Before using, always visually inspect to see that the rotary knives, rotary knife bolts, and cutter assembly are not worn or damaged.
Replace worn or damaged rotary knives and bolts in sets to preserve balance.
10. On multi-rotary knife machines, take care as rotating one rotary knife can cause other rotary knives 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 making height or depth adjustment unless adjustment can be made from the operator's position.
    [3] Before clearing blockages.
    [4] Before checking, cleaning or working on the machine.
    [5] After striking a foreign object or if an abnormal vibration occurs.
    Inspect the machine for damage and make repairs before restarting and operating the equipment.
22. Reduce the throttle setting during engine run-out.
23. Never raise mower deck with the rotary knives running.
24. Do not mow in reverse unless absolutely necessary.
25. Do not direct discharge material toward anyone.
    Avoid discharging material against a wall or obstruction.
    Material may ricochet back toward the operator.
26. 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.
27. 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 rotary knives. Wrap the rotary knives or wear gloves, and use caution when servicing them.
    Only replace rotary knives.
    Never straighten or weld them.
17. On multi-rotary knife machines, take care as rotating one rotary knife can cause other rotary knives to rotate.
18. 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.
19. 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.

Disposal

Disposal

Recycle and Waste Disposal

About Recycle

Recycling battery etc. is recommended for environmental conservation and economical use of resources.
It may be required by local laws.

About 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.)

Specifications

Specifications

Model			GM2810A	
Name			5-Unit Rotary Mower	
Dimensions	Total length		370 cm	145.67 in
	Total width	During operation	300 cm	118.11 in
		During transport	230 cm	90.55 in
	Total height	Roof	230 cm	90.55 in
		Steering wheel	165 cm	64.96 in
Weight	Machine (empty fuel tank)	with ROPS, Roof	2,080 kg	4585.54 lb
Minimum turning radius			320 cm	125.98 in
Engine	Model		Kubota V2403-CR-TE5B	
	Type		Vertical water-cooled 4-cycle diesel engine with turbocharger	
	Total displacement		2,434 cm^3 (2.434 L)	148.51 cu.in.
	Maximum output		-	
	Rated output		43.2 kW (58.7 PS)/2,400 rpm	
Fuel tank capacity			Diesel 51.0 dm^3 (51.0 L)	Diesel 13.47 U.S.gals
Fuel consumption			248 g/kW・h (rated output)	182 g/PS・h (rated output)
Engine oil capacity			9.7 dm^3 (9.7 L)	2.56 U.S.gals
Coolant volume			12.0 dm^3 (12.0 L)	3.17 U.S.gal.
Hydraulic tank capacity			44.0 dm^3 (44.0 L)	11.62 U.S.gal.
Transmission oil capacity			-	
Operating width (Mowing width)			280 cm	110.24 in
Operating height (Mowing height)			20.0 - 91.5 mm	0.787 - 3.602 in
Number of Blades			5	
Drive	Traveling		HST (2WD/4WD selectable)	
	Mowing		Hydraulic	
Speed (HST)	Forward	2WD	0 - 16.0 km/h	0 - 9.94 mph
		4WD	0 – 10.5 km/h	0 - 6.53 mph
	Reverse		0 - 6.0 km/h	0 - 3.73 mph
Speed (Mechanical)			-	
Efficiency			20,160 m^2/h (9.0 km/h (4WD) x mowing width x 0.8)	4.98 acres/hour (5.59 mph (4WD) x mowing width x 0.8)
Maximum inclination for operation			15 degrees	
Tire size	Front wheel		29 x 14.00 - 15	
	Rear wheel		20 x 12.00 - 10	
Tire pneumatic pressure	Front wheel		150 kPa (1.5 kgf/cm^2)	22 psi
	Rear wheel		140 kPa (1.4 kgf/cm^2)	20 psi

Battery	105D31R
Engine plug	-

The factory default maximum engine rpm is 2,600 rpm.

Sound Pressure Level

Sound Pressure Level

This machine was confirmed to have a continuous A-weighted sound pressure level of 90dB by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.

Sound Power Level

Sound Power Level

This machine was confirmed to have a sound power level of 105dB by measuring identical machines in accordance with the procedure specified in ISO5395-1:2013.

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.

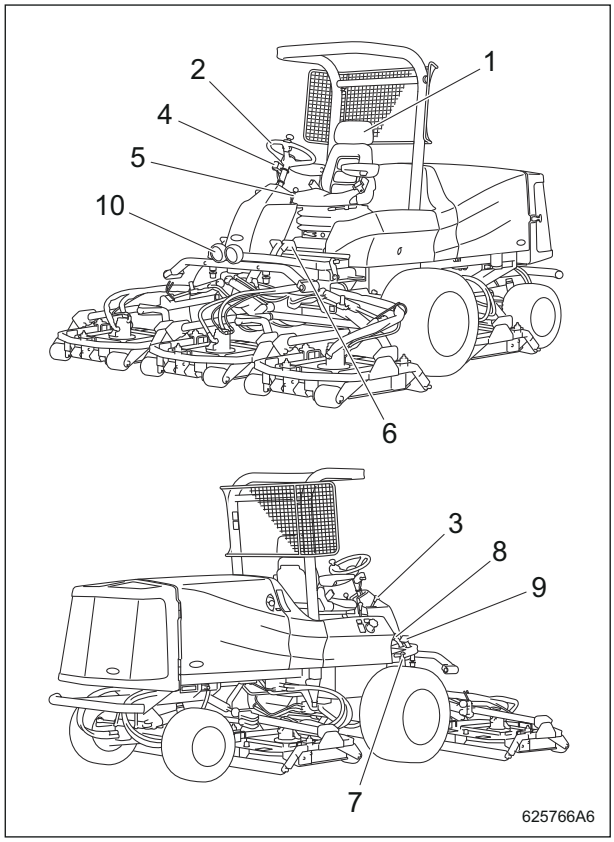
Carbon Dioxide (CO_2) Emissions

For the CO_2 value on the engine of this machine, refer to the engine's owner's manual.

Product Overview

Names of Each Section

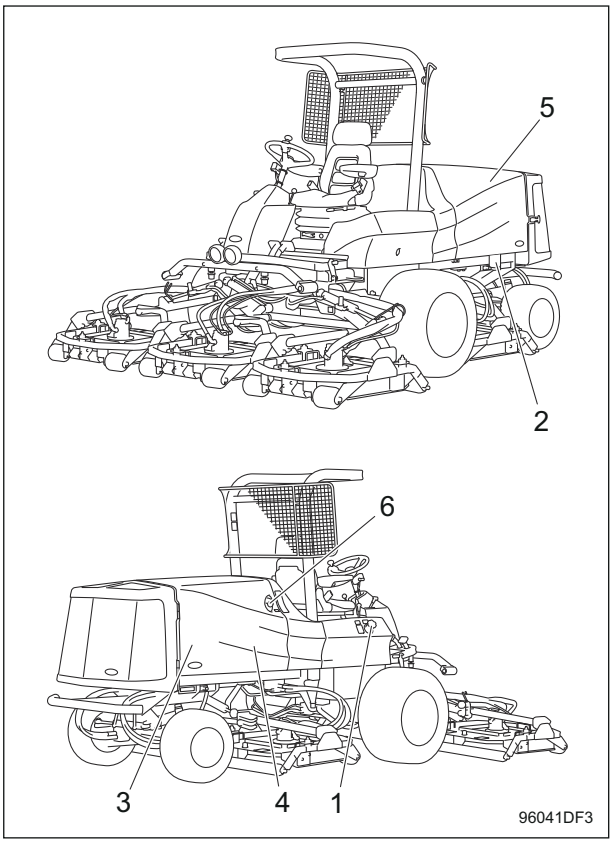
Overall view A



Names of Each Section_001

1	Seat
2	Steering wheel
3	Tilt lever
4	Diff-lock switch
5	Parking brake lever
6	Brake pedal
7	Mower lock lever
8	Forward pedal
9	Reverse pedal
10	Light

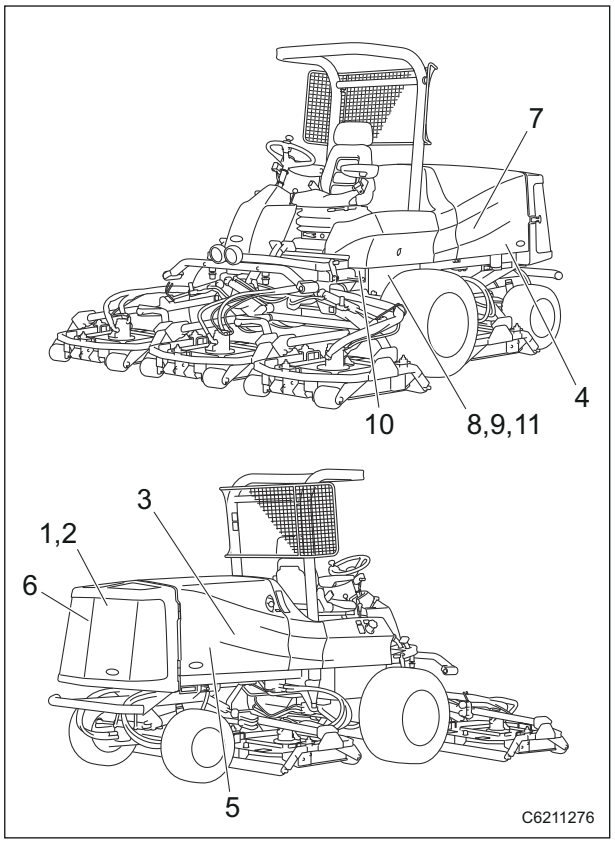
Overall view B



Names of Each Section_002

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

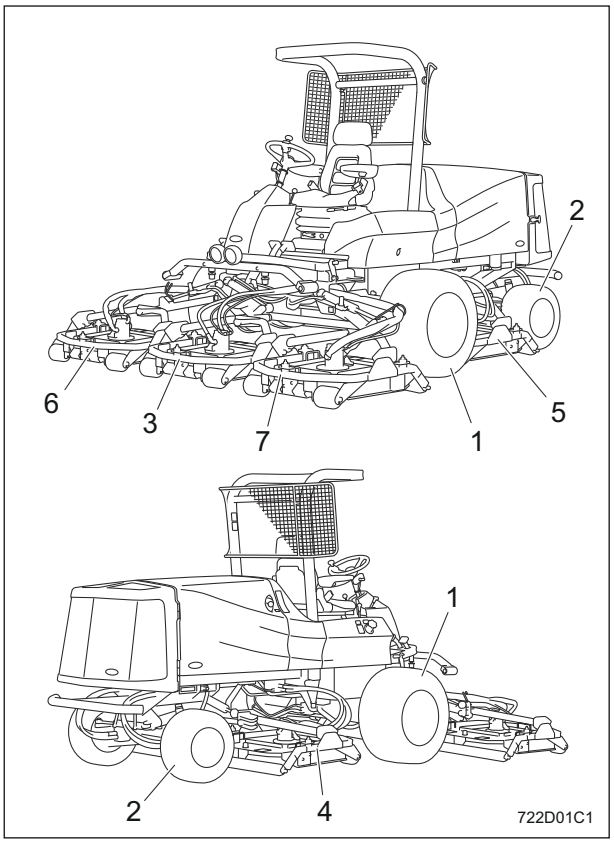
Overall view C



Names of Each Section_003

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

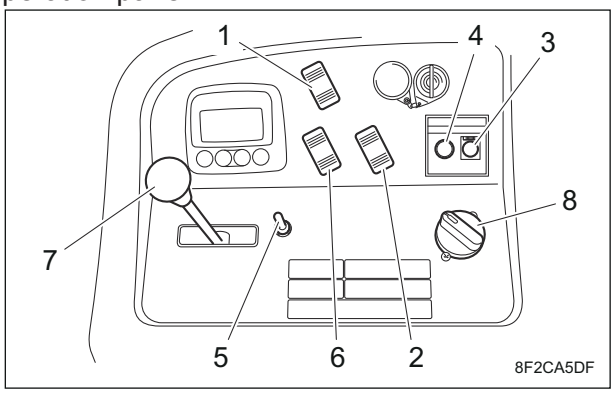
Overall view D



Names of Each Section_004

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

Operation panel



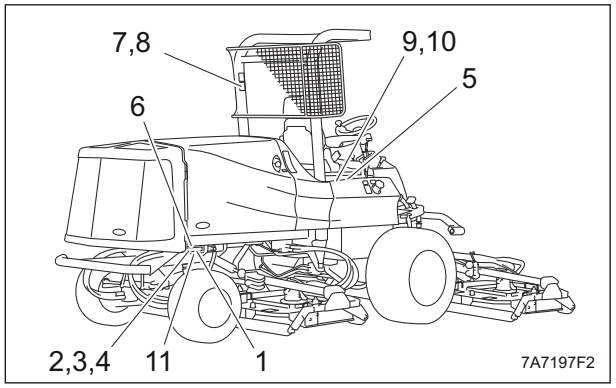
Names of Each Section_005

1	Knife rotation switch
2	2WD/4WD selector switch
3	DPF auto regeneration inhibit switch
4	DPF parked regeneration switch
5	Light switch
6	Traction assist switch
7	Mower deck up/down lever
8	Throttle knob

Regulation Decals

Positions of Regulation Decals

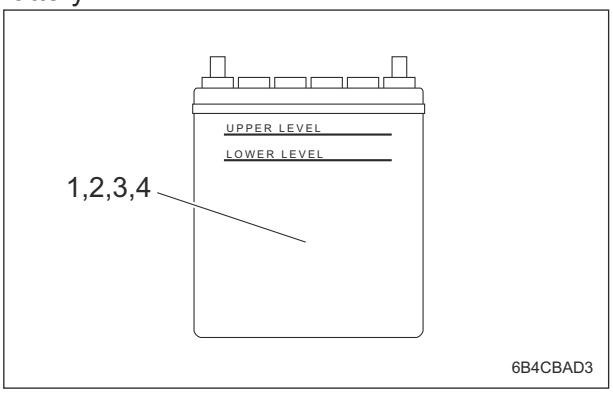
Main vehicle



Positions of Regulation Decals_001

1	Serial number plate
2	Specification decal
3	CE mark
4	UKCA mark (#11152 - 11355)
5	Noise emission decal
6	Year of manufacture decal
7	ROPS compliance decal
8	ROPS caution decal
9	California proposition 65 decal (riding type)
10	Spark arrester warning decal
11	ISED compliance decal (#11489-)

Battery



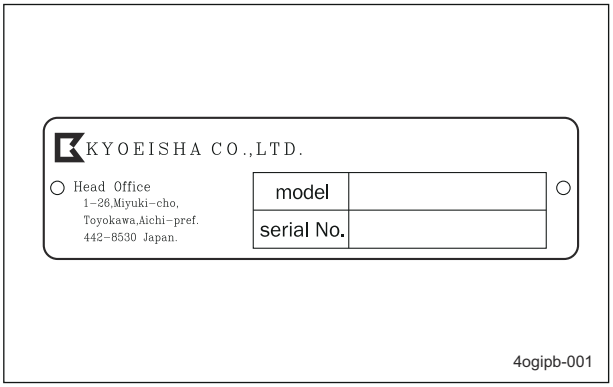
Positions of Regulation Decals_002

1	Battery capacity decal
2	EU battery regulation decal
3	Recycle decal
4	Battery danger decal

Description of Regulation Decals

Serial Number Plate

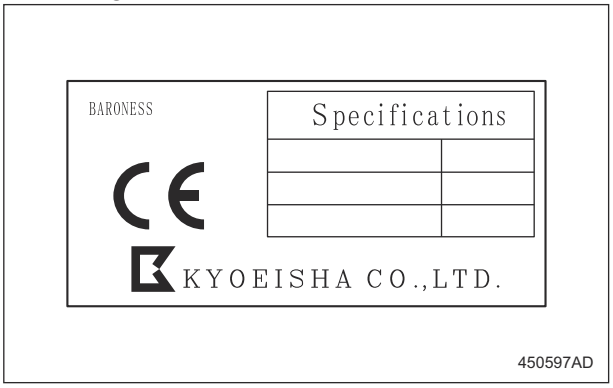
The serial number plate indicates the model and serial number of the machine.



Serial Number Plate_001

Specification Decal

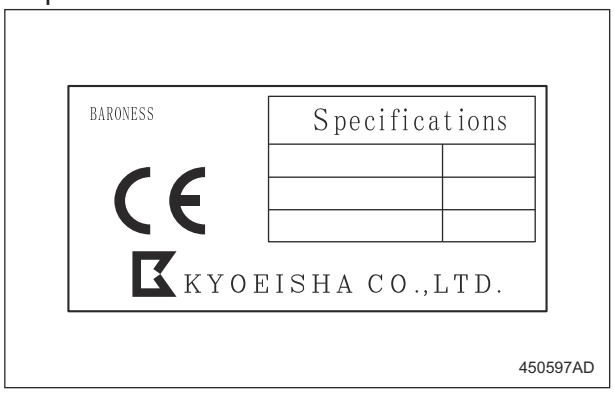
(For EU)
The Specification decal indicates the model and weight, etc.



Specification Decal_001

CE Mark

(For EU)
CE mark indicates that the machine sold in the EU nations complies with the EU requirements.



CE Mark_001

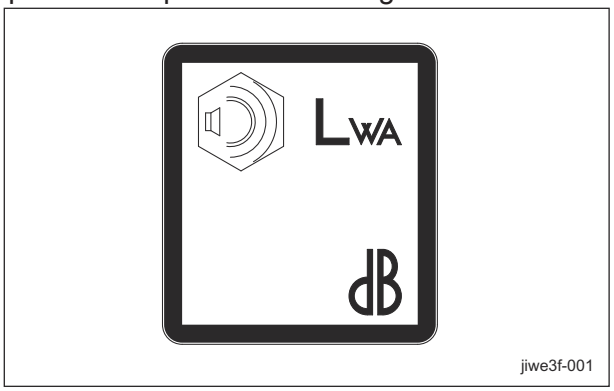
UKCA Mark

(For UK)
UKCA mark indicates that the machine sold in the UK complies with the UK requirements.

UKCA Mark_001

Noise Emission Decal

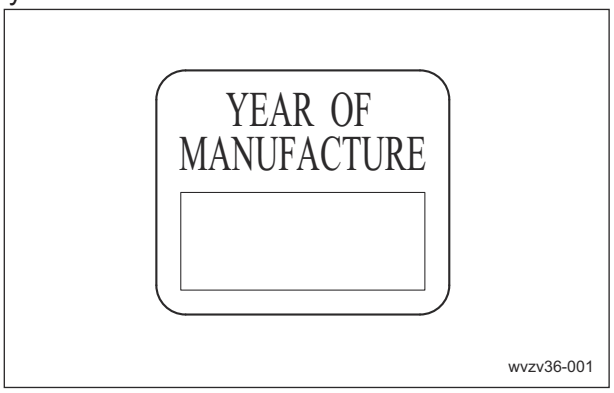
(For EU)
The noise emission decal indicates the sound power level determined by measuring identical machines in accordance with the procedure specified in the regulations of EU.



Noise Emission Decal_001

Year of Manufacture Decal

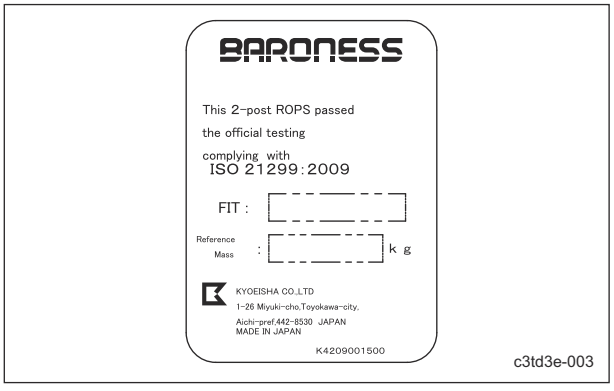
(For EU)
The year of manufacture decal indicates the year when this machine was manufactured.



Year of Manufacture Decal_001

ROPS Compliance Decal

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



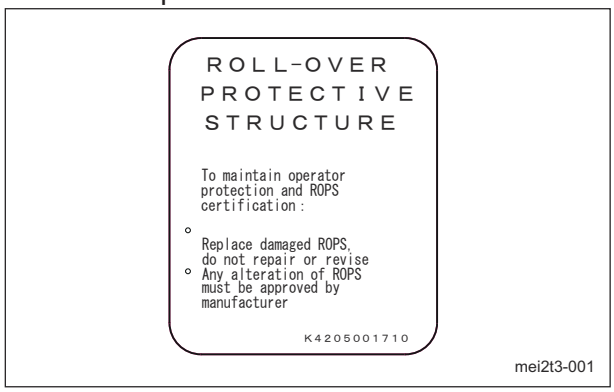
ROPS Compliance Decal_001

Product Overview

ROPS Caution Decal

ROPS caution decal describes the following caution messages.

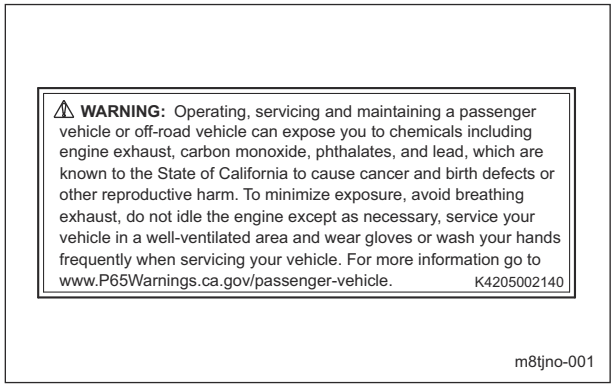
- Replace damaged ROPS.
- Do not repair or revise.



ROPS Caution Decal_001

California Proposition 65 Decal (Riding Type)

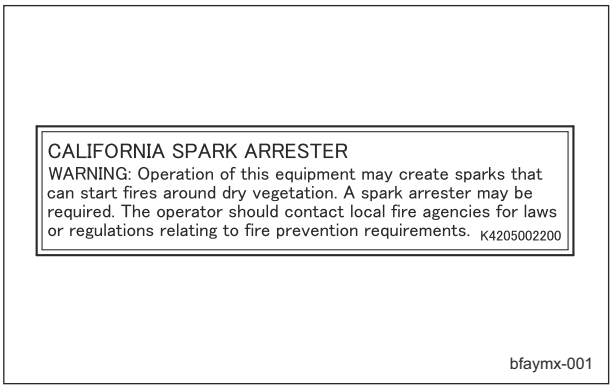
(For the State of California, USA)
California Proposition 65 decal describes the warning messages as required by California Proposition 65.



California Proposition 65 Decal (Riding Type)_001

Spark Arrester Warning Decal

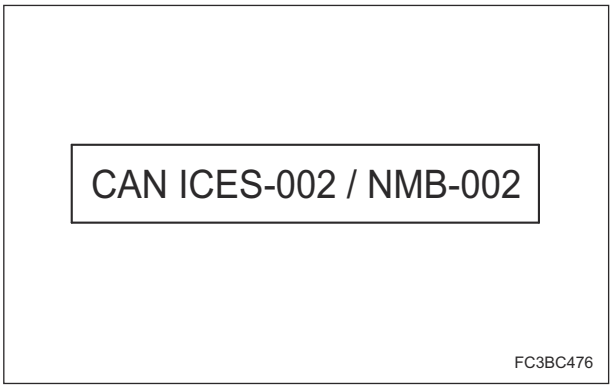
(For the State of California, USA)
Spark arrester warning decal describes the warning messages as required by California Public Resources Code.



Spark Arrester Warning Decal_001

ISED Compliance Decal

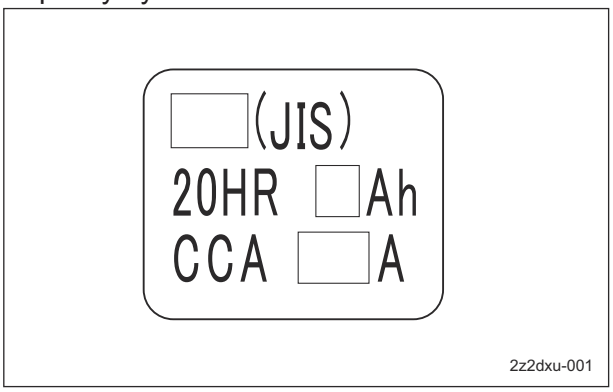
(For Canada)
The ISED compliance decal indicates that the product marketed in Canada meets Canadian standard.



ISED Compliance Decal_001

Battery Capacity Decal

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

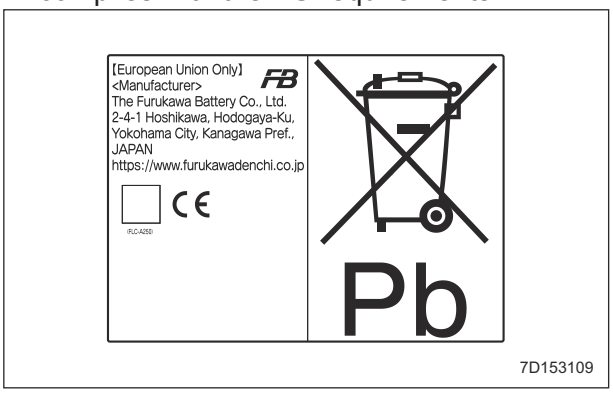


Battery Capacity Decal_001

EU Battery Regulation Decal

(For EU)
The EU battery regulation decal indicates compliance with the EU battery regulation.

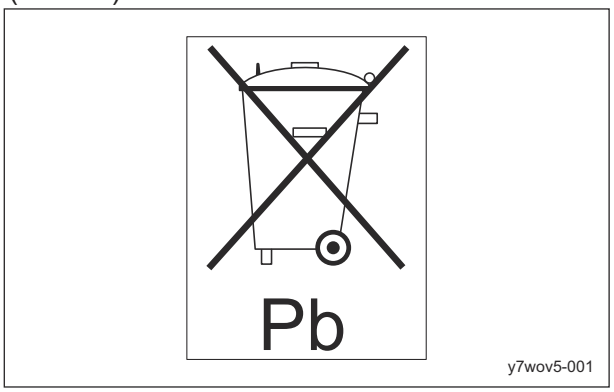
1. The following information about the battery manufacturing company is written in the decal.
   - Company name
   - Address
   - Website URL
2. You can scan the QR code with your smartphone to access the corresponding battery information.
   (*QR Code is a registered trademark of DENSO WAVE INCORPORATED.)
3. CE mark indicates that the battery installed in a machine sold in the EU nations complies with the EU requirements.



EU Battery Regulation Decal_001

Recycle Decal

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



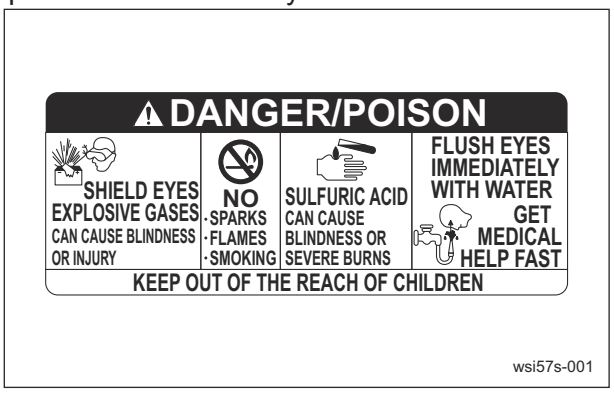
Recycle Decal_001

(For USA)

Recycle Decal_002

Battery Danger Decal

(For USA)
Battery Danger Decal describes handling precautions for battery.



Battery Danger Decal_001

Safety Signs and Instruction Signs

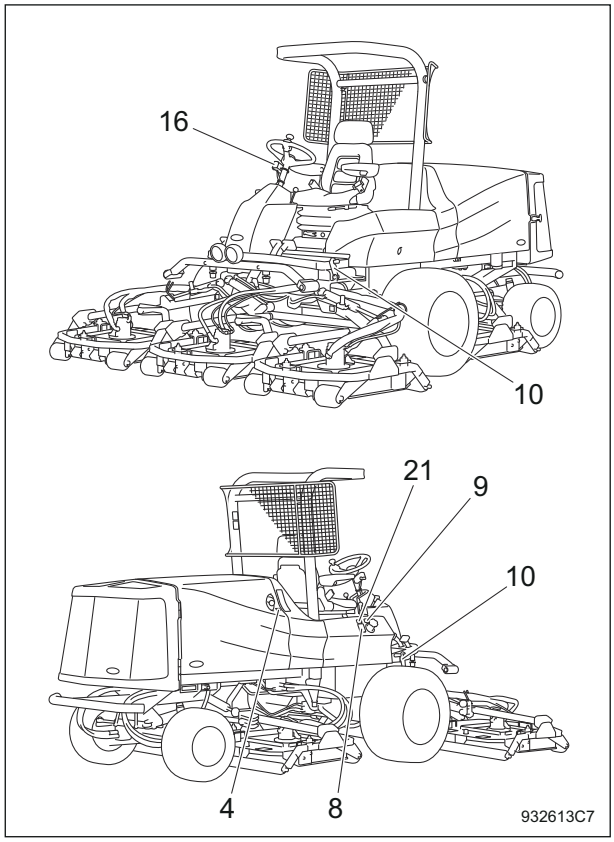
About Safety Signs and Instruction Signs

Important

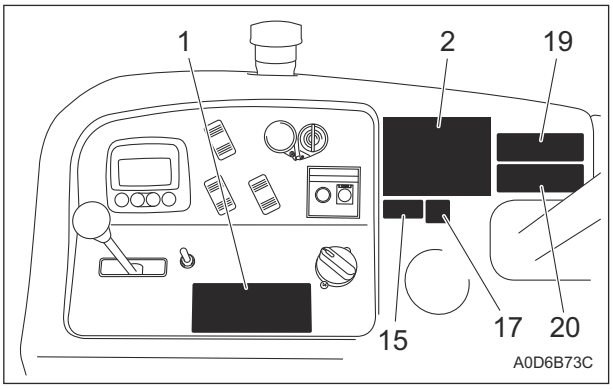
Safety decals and instruction decals are attached to this product.
Make sure that they are preserved in their entirety. If they are damaged, become dirty, or peel off, replace them with new ones.

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

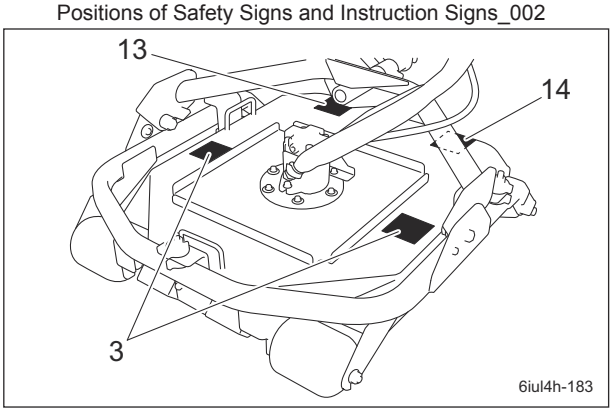
Positions of Safety Signs and Instruction Signs



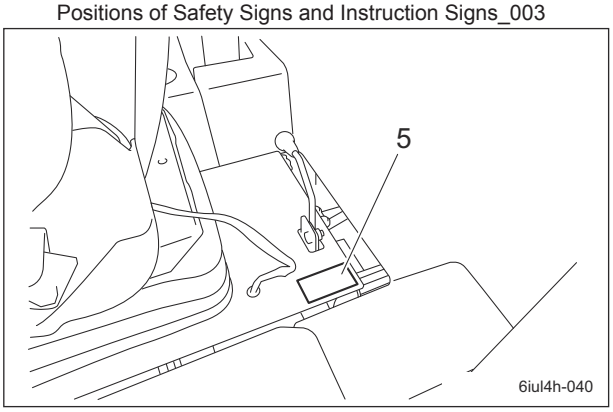
Positions of Safety Signs and Instruction Signs_001



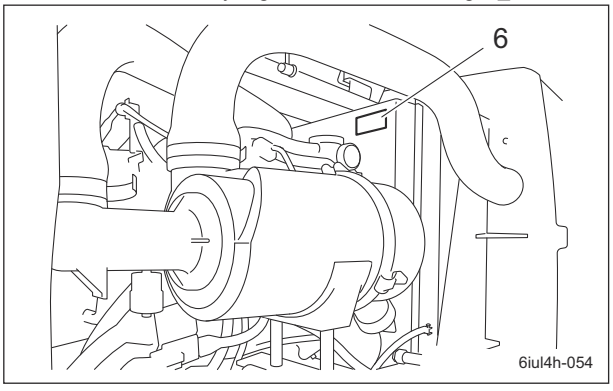
Positions of Safety Signs and Instruction Signs_002



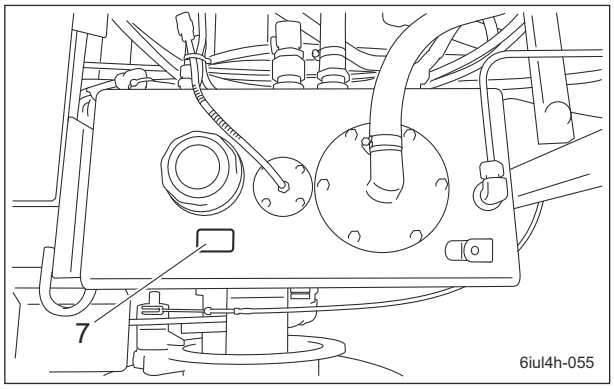
Positions of Safety Signs and Instruction Signs_003



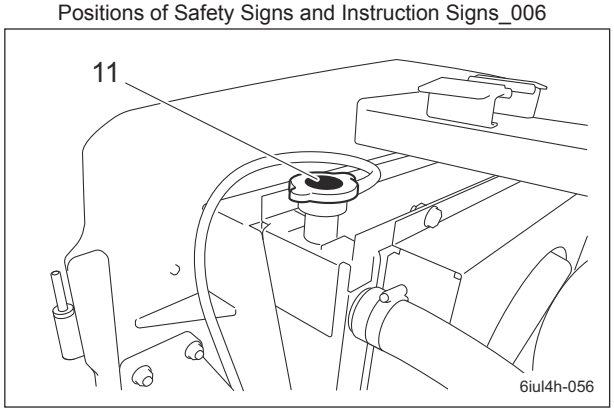
Positions of Safety Signs and Instruction Signs_004



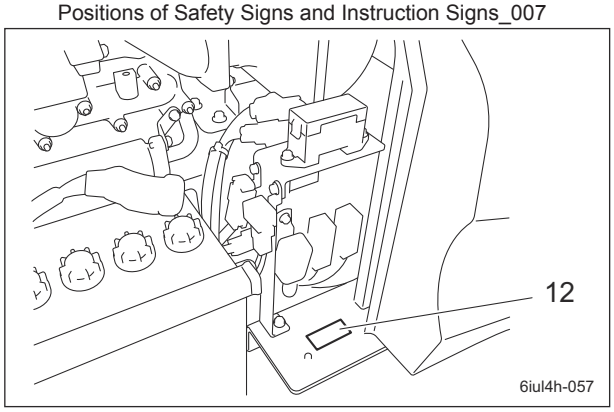
Positions of Safety Signs and Instruction Signs_005



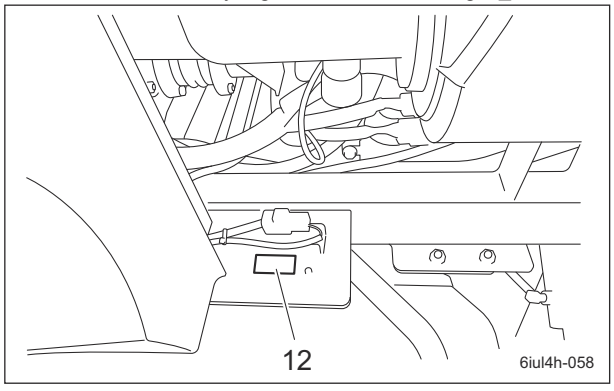
Positions of Safety Signs and Instruction Signs_006



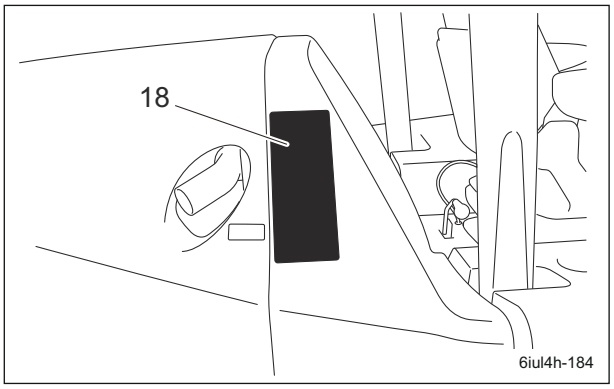
Positions of Safety Signs and Instruction Signs_007



Positions of Safety Signs and Instruction Signs_008



Positions of Safety Signs and Instruction Signs_009



Positions of Safety Signs and Instruction Signs_010

1	Operation decal
2	Engine start/stop decal
3	Caution to mutilation decal
4	Caution for high temperatures decal
5	Caution for getting caught decal
6	Caution to rotating object decal
7	Hydraulic oil decal
8	Diesel fuel filler port decal
9	Fire prohibited decal
10	Caution for mower lock decal
11	Caution for spouting coolant decal
12	Caution for getting pinched decal
13	Caution to thrown object decal
14	Caution for hand or leg injury decal
15	Caution exhaust gas decal
16	Engine warning lamp decal (EN)
17	Caution to noise decal
18	Maintenance decal
19	2WD/4WD selector important decal
20	Knife rotation important decal
21	Indicating diesel fuel decal

Description of Safety Decals and Instruction Decals

Operation Decal

GM2810A0902Z0
Decal, operation

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.

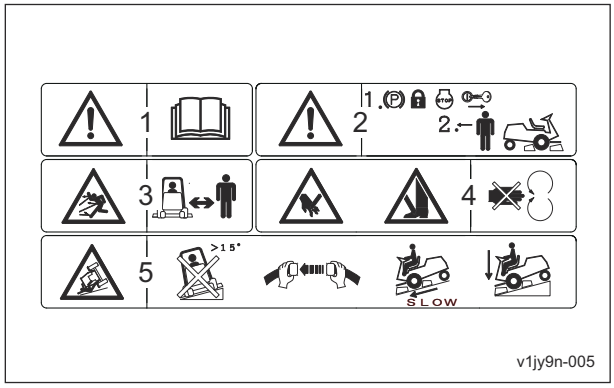
Warning

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

5.

Caution

Rollover - Do not work on slopes of 15 degrees or more.
When you descend a slope, lower the mower decks and then drive at low speed.
For ROPS equipped machine, fasten your seatbelt.



Operation Decal_001

Engine Start/Stop Decal

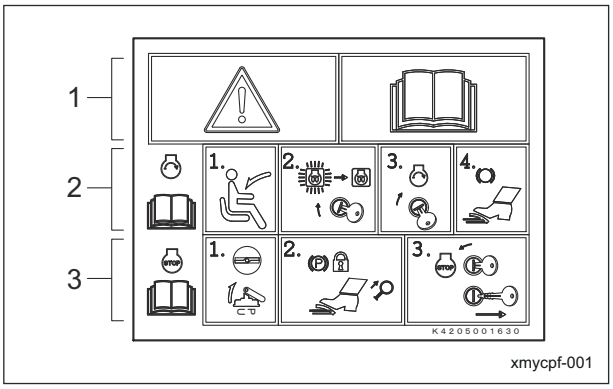
K4205001630
Decal, start/stop engine

1.

Warning

Read the Owner's Operating Manual.

2. Procedure to Start Engine
   Read the Owner's Operating Manual.
   [1] Sit on the seat.
   [2] Turn the key to the "ON (GLOW)" position, and then wait for the logo "BARONESS" to be turned off.
   [3] Turn the key to the "START" position.
   [4] Depress the brake pedal to release the parking brake.
3. Procedure to Stop Engine
   Read the Owner's Operating Manual.
   [1] Set the knife rotation switch to the "Stop" position, and then raise the mower decks.
   [2] Apply the parking brake.
   [3] Turn the key to the "STOP" position, and then remove it.



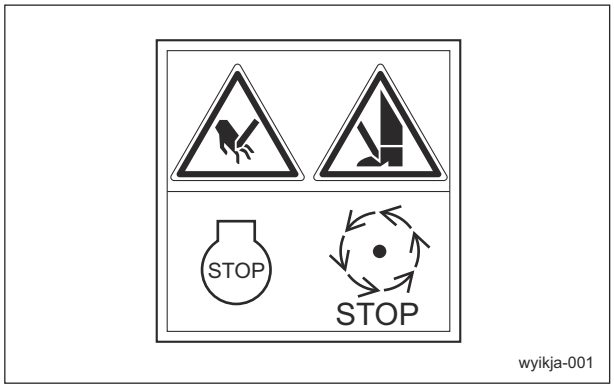
Engine Start/Stop Decal_001

Caution to Mutilation Decal

K4205001600
DECAL, CAUTION TO MUTILATION

Warning

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



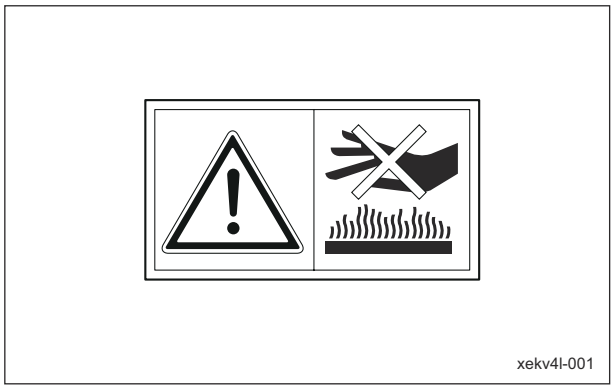
Caution to Mutilation Decal_001

Caution for High Temperatures Decal

K4205001920
Decal, caution for high temperatures

Caution

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



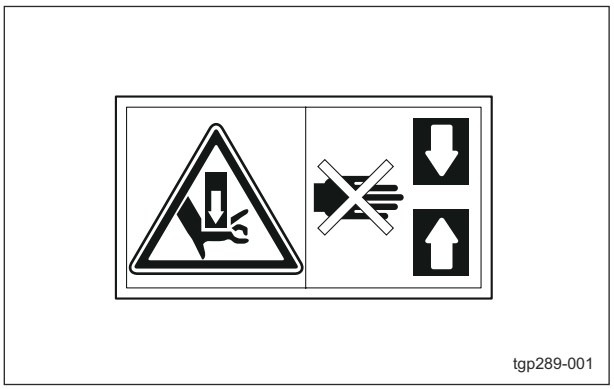
Caution for High Temperatures Decal_001

Caution for Getting Caught Decal

K4205001580
DECAL, CAUTION TO GET CAUGHT

Caution

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



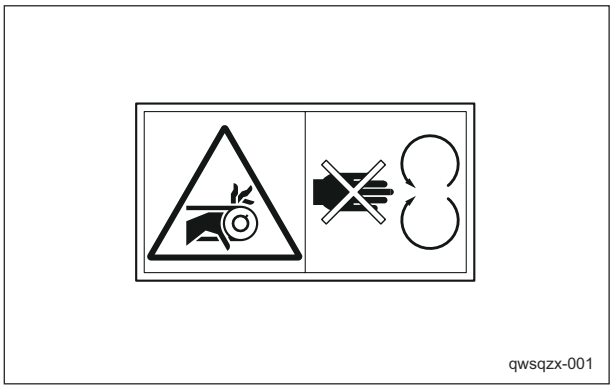
Caution for Getting Caught Decal_001

Caution to Rotating Object Decal

K4205001530
Decal, caution to rotating object

Warning

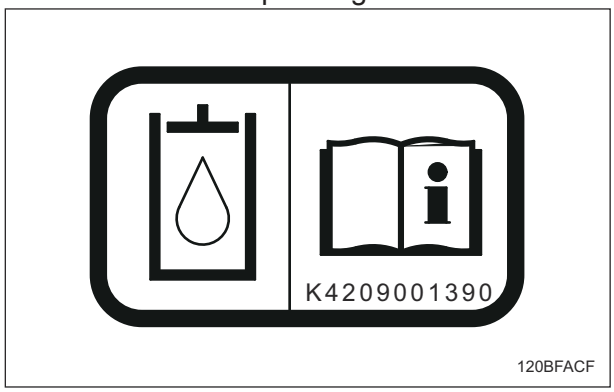
Watch for rotating parts - Keep your hands away from the belts while the engine is running.



Caution to Rotating Object Decal_001

Hydraulic Oil Decal

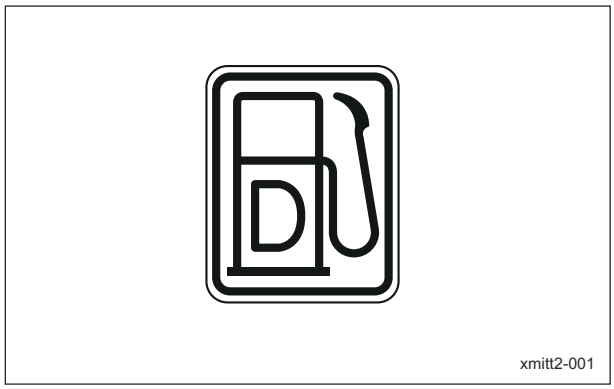
K4209001390
Decal, hydraulic oil
Read the owner's operating manual.



Hydraulic Oil Decal_001

Diesel Fuel Filler Port Decal

K4209001000
DECAL, DIESEL OIL FILLER PORT
Use diesel fuel.



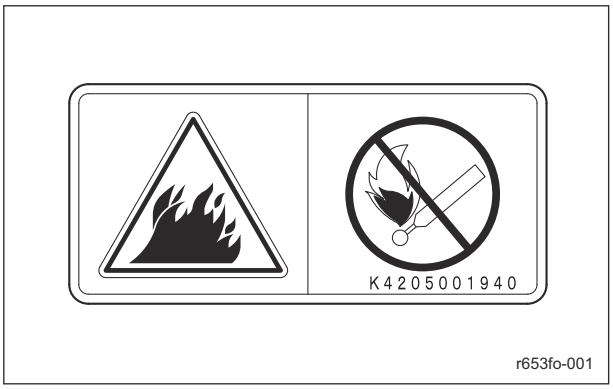
Diesel Fuel Filler Port Decal_001

Fire Prohibited Decal

K4205001940
Decal, fire prohibited

Warning

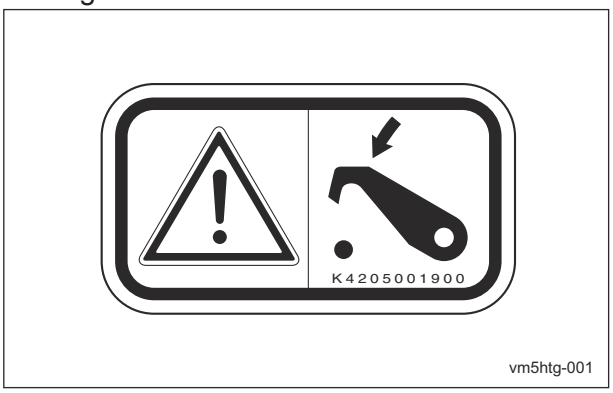
Keep away from fire.



Fire Prohibited Decal_001

Caution for Mower Lock Decal

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



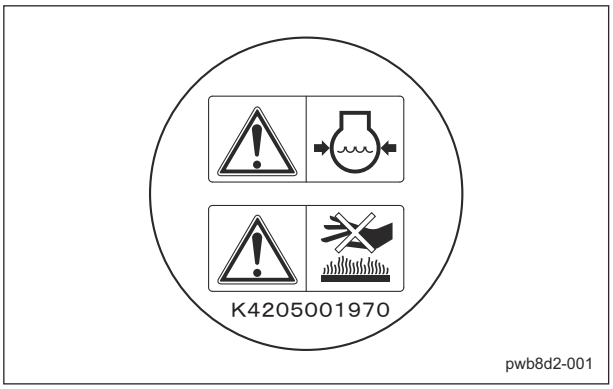
Caution for Mower Lock Decal_001

Caution for Spouting Coolant Decal

K4205001970
Decal, caution for spouting coolant

Caution

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



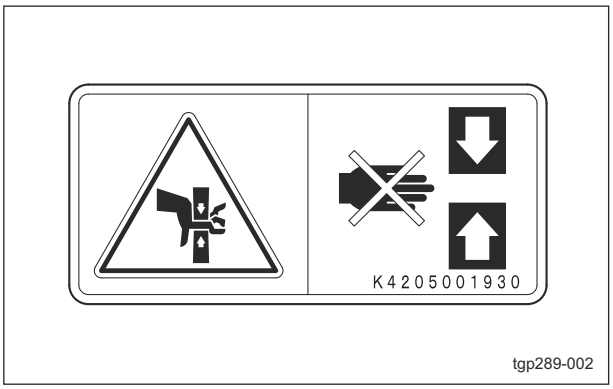
Caution for Spouting Coolant Decal_001

Caution for Getting Pinched Decal

K4205001930
DECAL, CAUTION GETTING CAUGHT HANDS/FEET

Caution

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



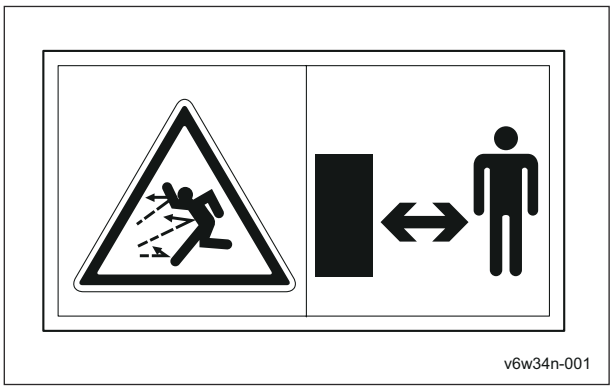
Caution for Getting Pinched Decal_001

Caution to Thrown Object Decal

K4205001650
DECAL, SCATTERING OBJECT

Caution

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



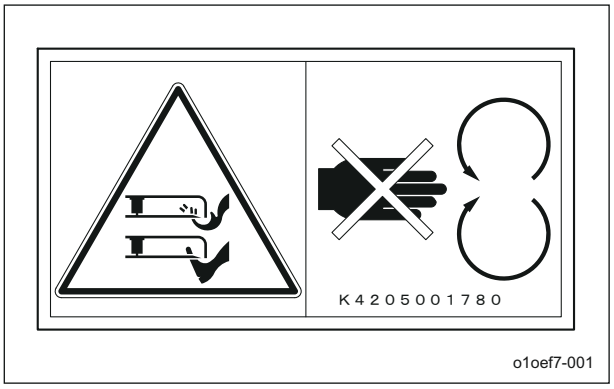
Caution to Thrown Object Decal_001

Caution for Hand or Leg Injury Decal

K4205001780
Decal, caution for hand or leg injury

Warning

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

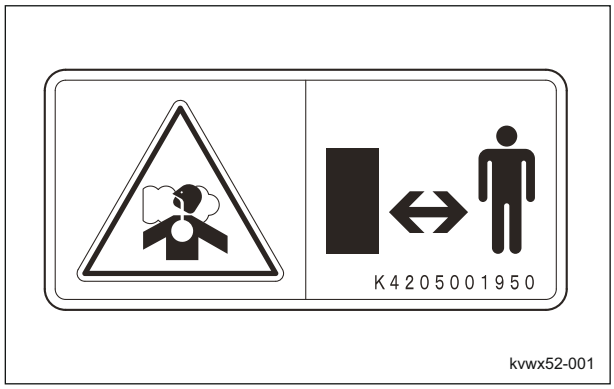


Caution for Hand or Leg Injury Decal_001

Caution Exhaust Gas Decal

K4205001950
Decal, caution exhaust gas

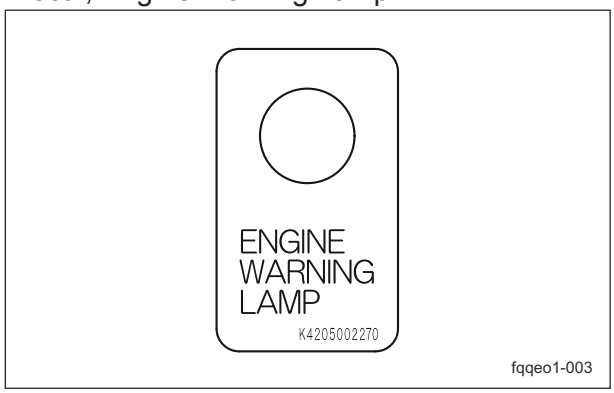
> **Warning**
>
> Caution for exhaust gas



Caution Exhaust Gas Decal_001

Engine Warning Lamp Decal

K4205002270
Decal, Engine Warning Lamp



Engine Warning Lamp Decal_001

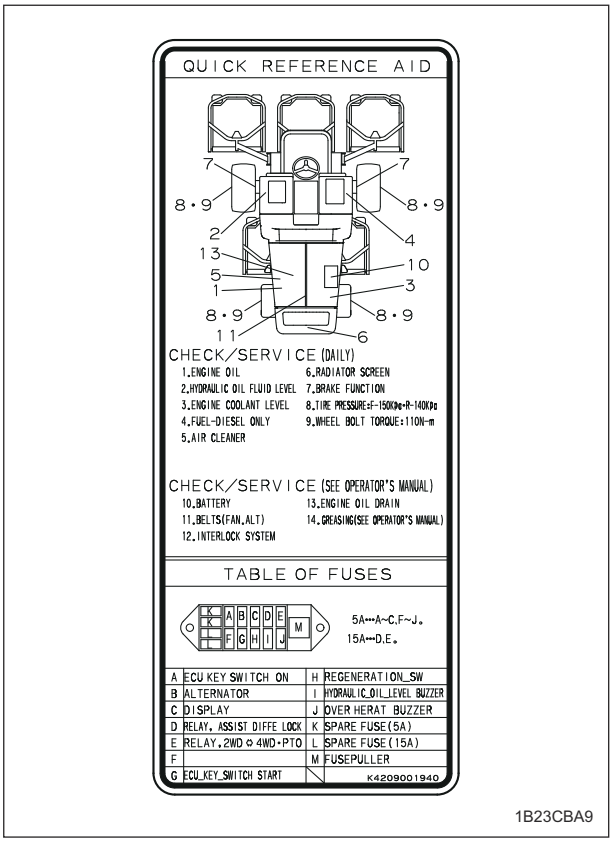
Caution to Noise Decal

K4205002090
Decal, caution to noise

Caution to Noise Decal_001

Maintenance Decal

K4209001940
Maintenance decal
The maintenance decal indicates the necessary inspection and maintenance items for this machine.



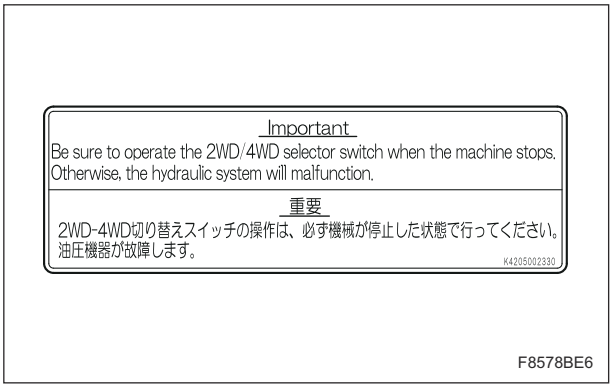
Maintenance Decal_001

2WD/4WD Selector Important Decal

K4205002330
DECAL, IMPORTANT 2WD/4WD SELECTOR

Important

Be sure to operate the 2WD/4WD selector switch when the machine stops.
Otherwise, the hydraulic system will malfunction.



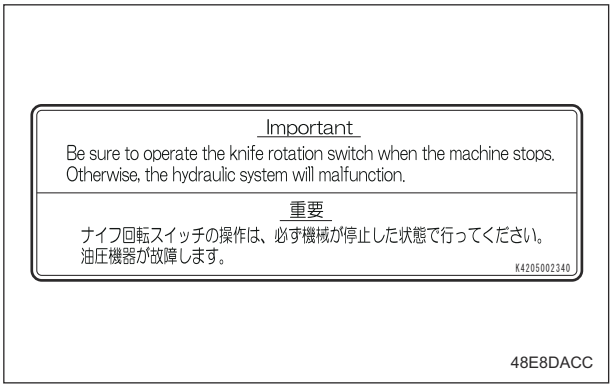
2WD/4WD Selector Important Decal_001

Knife Rotation Important Decal

K4205002340
DECAL, IMPORTANT KNIFE ROTATION

Important

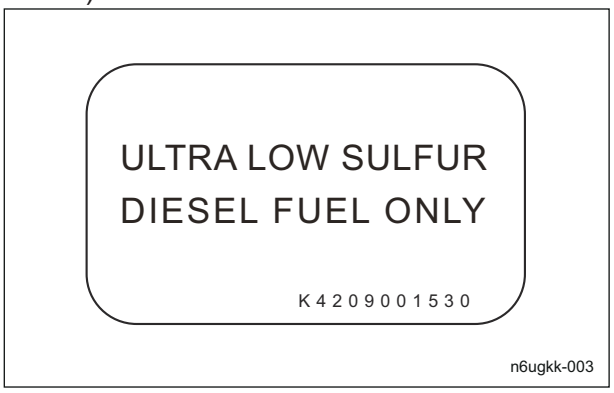
Be sure to operate the knife rotation switch when the machine stops.
Otherwise, the hydraulic system will malfunction.



Knife Rotation Important Decal_001

Indicating Diesel Fuel Decal

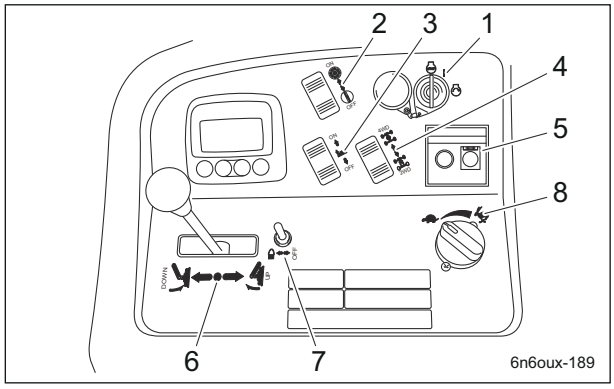
K4209001530
DECAL, INDICATING DIESEL FUEL
Indicating diesel fuel decal describes the type of fuel to be used.
Use Ultra Low Sulfur Diesel Fuel (sulfur-free diesel).



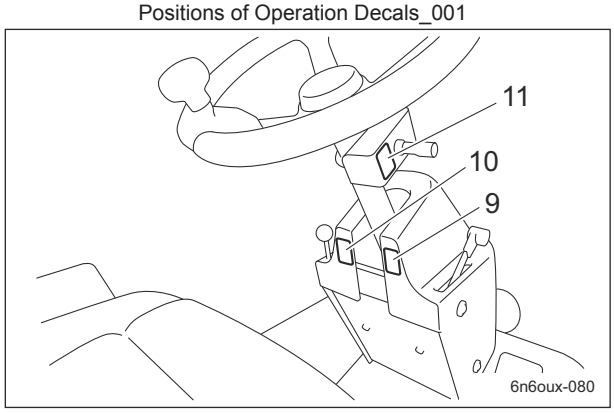
Indicating Diesel Fuel Decal_001

Operation Decals

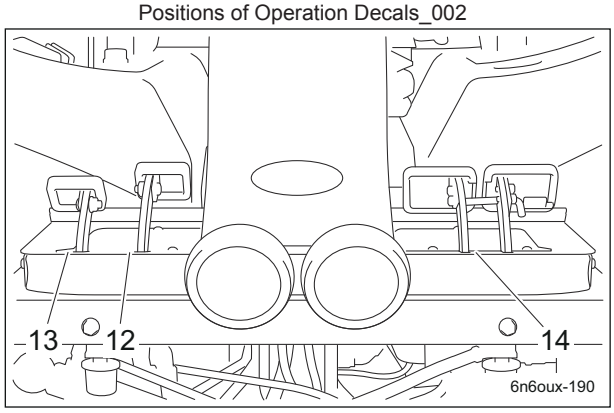
Positions of Operation Decals



Positions of Operation Decals_001



Positions of Operation Decals_002



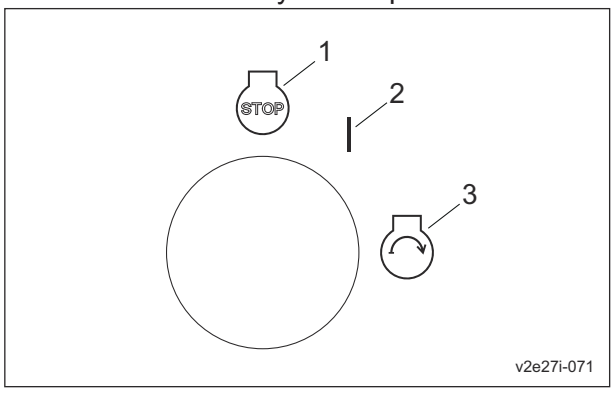
Positions of Operation Decals_003

1	Key switch decal
2	Knife rotation mark
3	Traction assist mark
4	2WD/4WD selector mark
5	DPF regeneration mark (EN)
6	Mower deck up/down mark
7	Light switch mark
8	Engine rotation mark
9	Tilt Steering decal
10	Parking brake decal
11	Differential lock decal
12	FORWARD decal
13	BACKWARD decal
14	BRAKE Decal

Description of Operation Decals

Key Switch Decal

Decal, key switch
This indicates the key switch positions.

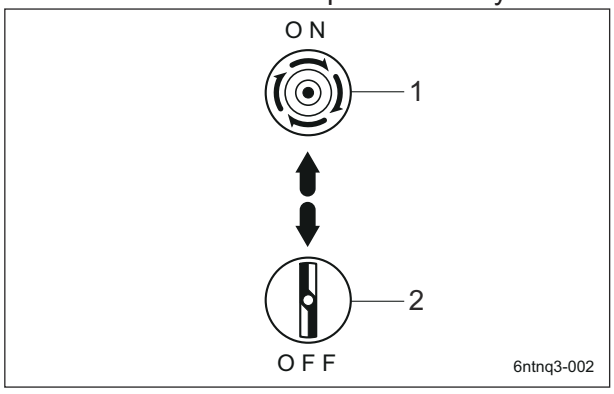


Key Switch Decal_001

1	OFF
2	ON (GLOW)
3	START

Knife Rotation Mark

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

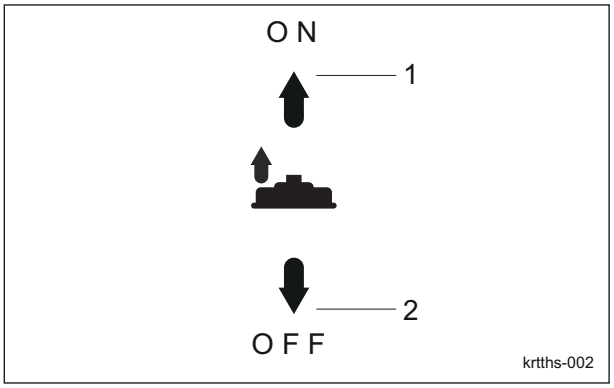


Knife Rotation Mark_001

1	Rotation
2	Stop

Traction Assist Mark

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

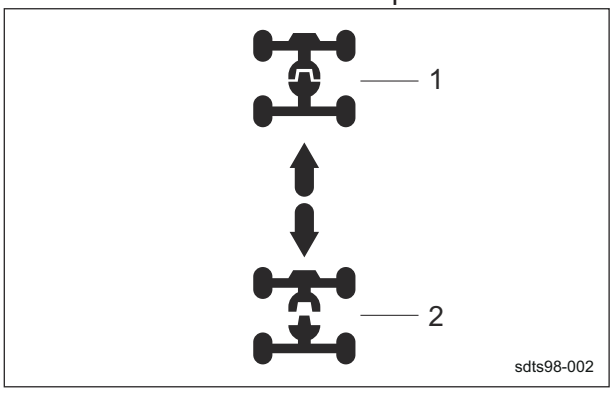


Traction Assist Mark_001

1	Activate
2	Deactivate

2WD/4WD Selector Mark

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

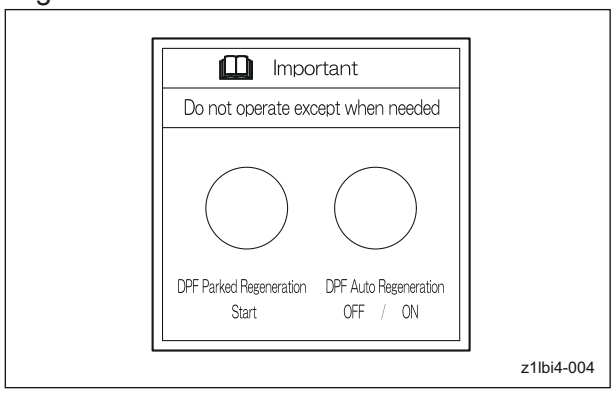


2WD/4WD Selector Mark_001

1	4WD
2	2WD

DPF Regeneration Mark (EN)

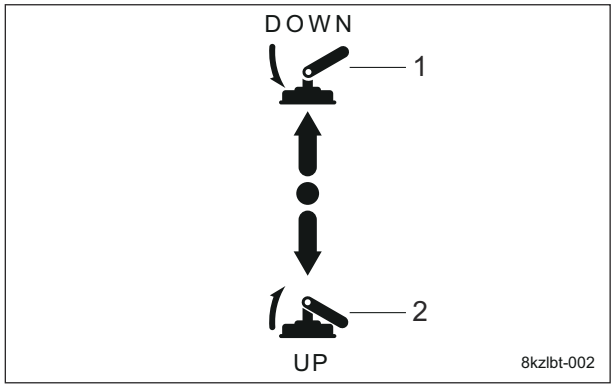
-
DPF regeneration mark (EN)
This indicates the changeover of DPF regeneration.



DPF Regeneration Mark (EN)_001

Mower Deck Up/Down Mark

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

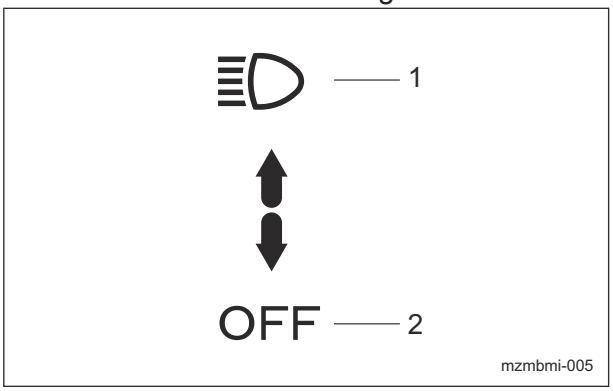


Mower Deck Up/Down Mark_001

1	Down
2	Up

Light Switch Mark

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

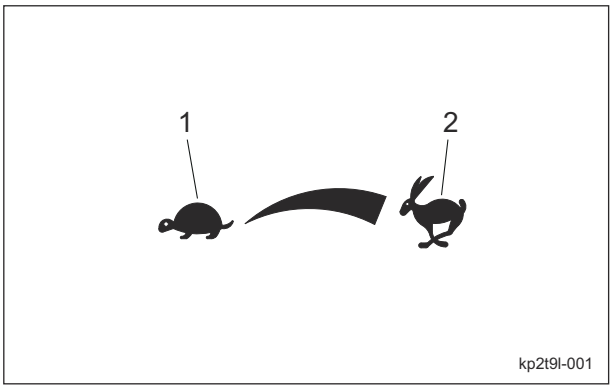


Light Switch Mark_001

1	ON
2	OFF

Engine Rotation Mark

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

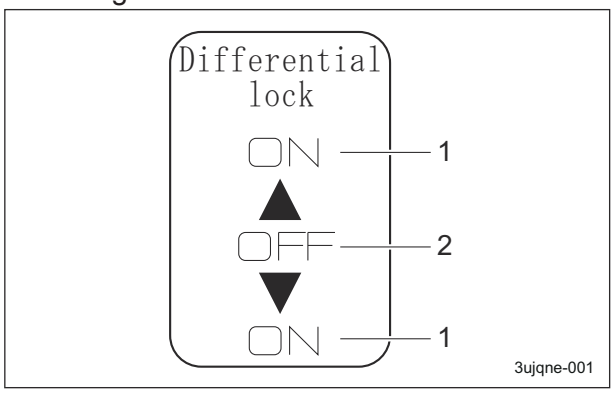


Engine Rotation Mark_001

1	Low speed
2	High speed

Differential Lock Decal

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

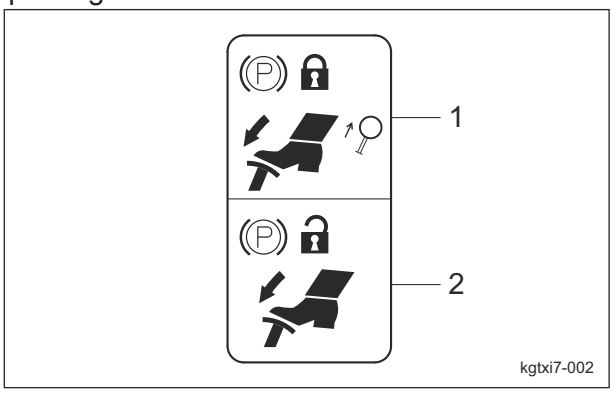


Differential Lock Decal_001

1	Engage
2	Release

Parking Brake Decal

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

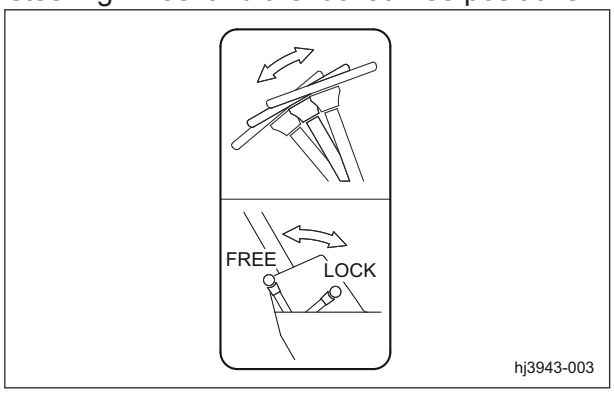


Parking Brake Decal_001

1	Lock
2	Release

Tilt Steering Decal

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



Tilt Steering Decal_001

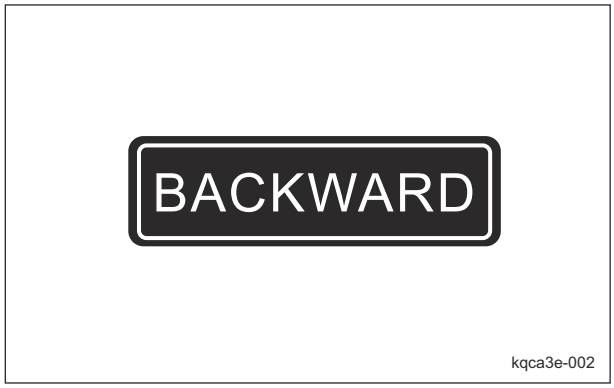
FORWARD Decal

K4203001430
Decal, FORWARD
This indicates forward travel.

FORWARD Decal_001

BACKWARD Decal

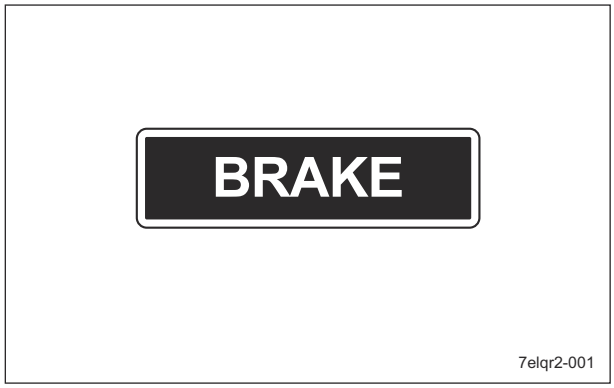
K4203001440
Decal, BACKWARD
This indicates backward travel.



BACKWARD Decal_001

BRAKE Decal

K4203001450
Decal, BRAKE
This indicates brake.

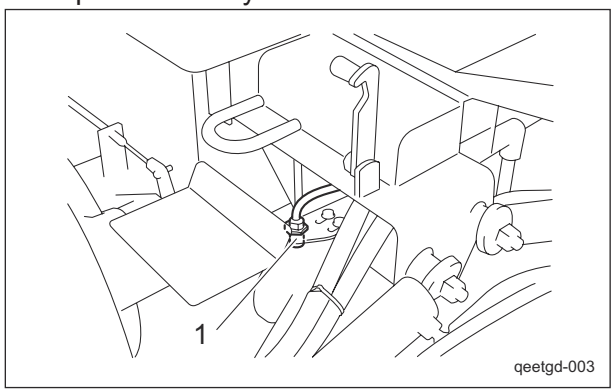


BRAKE Decal_001

Description of Functions

Proximity Sensors

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



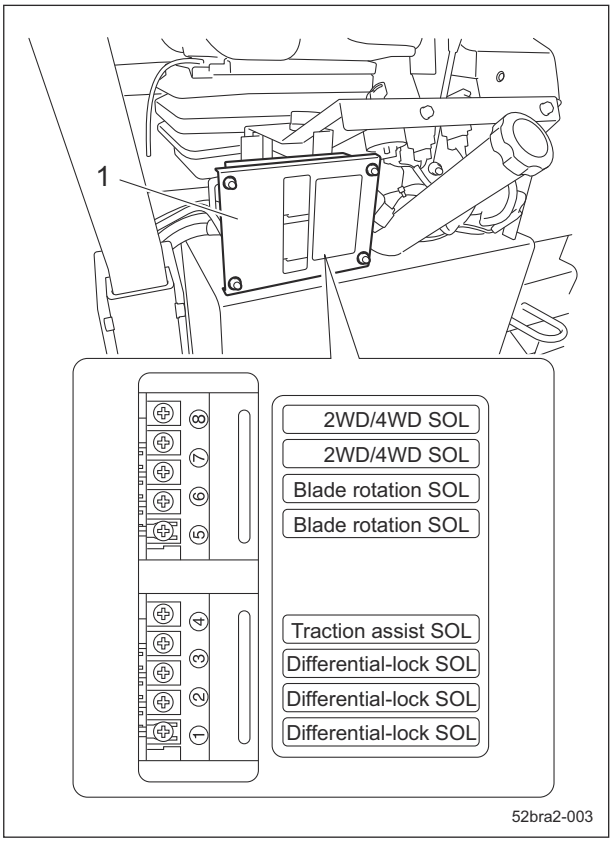
Proximity Sensors_001

1	Proximity sensors

Relays

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

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

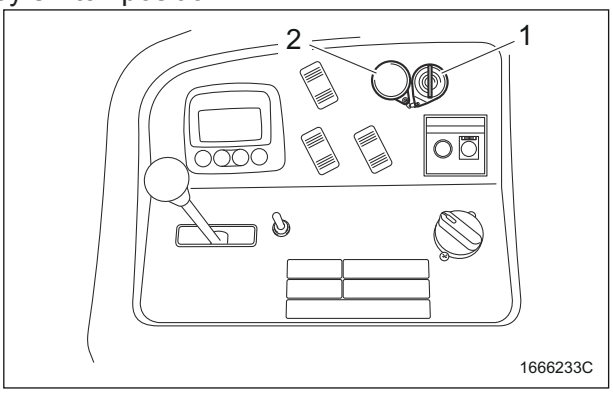


Relays_001

1	Relay box

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

Knife Rotation Switch

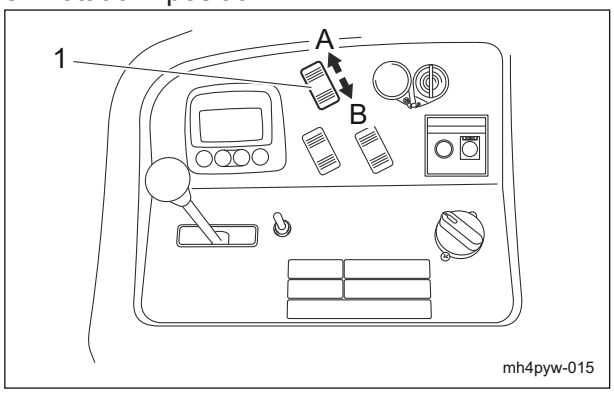
Caution

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

Important

Be sure to switch when the machine stops. Otherwise, the hydraulic system will malfunction.

The knife rotation switch is located in the operation panel and operates rotation of the rotary knives of the mower decks.
When the knife rotation switch is set to the "Rotation" position, the rotary knives of all mower decks will rotate.
When the knife rotation switch is set to the "Stop" position, the rotary knives will stop.
Note:
When the mower decks are raised, the rotary knives do not rotate, even if the switch is set to the "Rotation" position.



Knife Rotation Switch_001

1	Knife rotation switch
A	Rotation
B	Stop

2WD/4WD Selector Switch

Caution

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

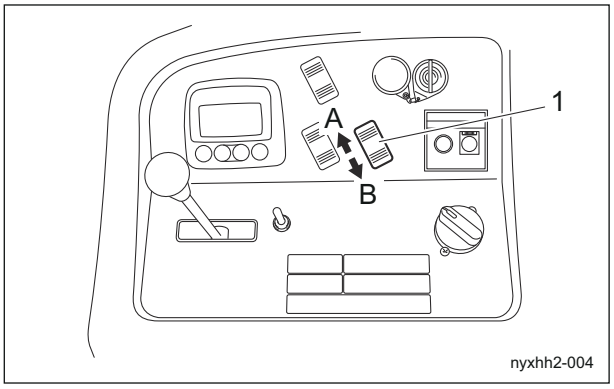
Caution

When traveling, be sure to stop the rotation of the rotary knives and raise the mower decks.

Important

Be sure to switch when the machine stops. Otherwise, the hydraulic system will malfunction.

The 2WD/4WD selector switch is located in the operation panel.
When the switch is set to the "2WD" position, the machine will be in two-wheel drive (front-wheel drive). When it is set to the "4WD" position, the machine will be in four-wheel drive.
Note:
When the knife rotation switch is set to the "Rotation" position, the machine enters 4WD, regardless of the position that the 2WD/4WD selector switch is set to.



2WD/4WD Selector Switch_001

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

DPF Auto Regeneration Inhibit Switch

Caution

Normally, set the DPF auto regeneration inhibit switch to "Auto regeneration mode". However, when operating in a location where fires may occur, set the DPF auto regeneration inhibit switch to "Auto regeneration inhibit mode".

Important

The DPF auto regeneration inhibit switch is reset to "Auto regeneration mode" when the engine is started even if the engine was stopped with the DPF auto regeneration inhibit switch set to "Auto regeneration inhibit mode".

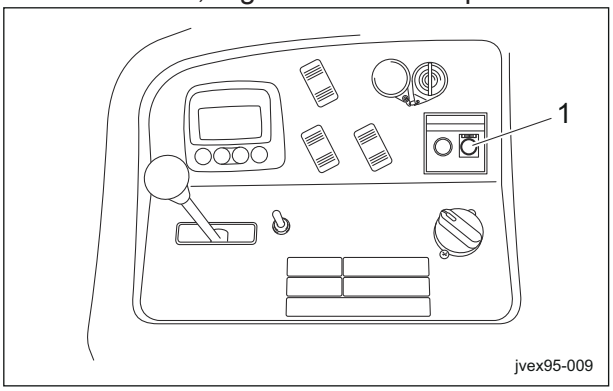
Important

In "Auto regeneration inhibit mode" any DPF regeneration of "Auto regeneration", "Parked regeneration" and "Manual regeneration" is inhibited.
For DPF regeneration, deactivate "Auto regeneration inhibit mode".

The DPF auto regeneration inhibit switch is located in the operation panel.
The DPF auto regeneration inhibit switch is the switch for shifting between "Auto regeneration mode" and "Auto regeneration inhibit mode".
With the engine running, press this switch to shift between "Auto regeneration mode" and "Auto regeneration inhibit mode".

- Auto regeneration mode:
  The DPF auto regeneration inhibit switch is reset to "Auto regeneration mode" when the engine is started.
  In "Auto regeneration mode" regeneration is automatically performed regardless of the main vehicle's travel and stop on the condition that a specific amount of PM is accumulated and the requirements for DPF regeneration are fulfilled.
- Auto regeneration inhibit mode:
  In order to set to "Auto regeneration inhibit mode", press the DPF auto regeneration inhibit switch after the engine is started.

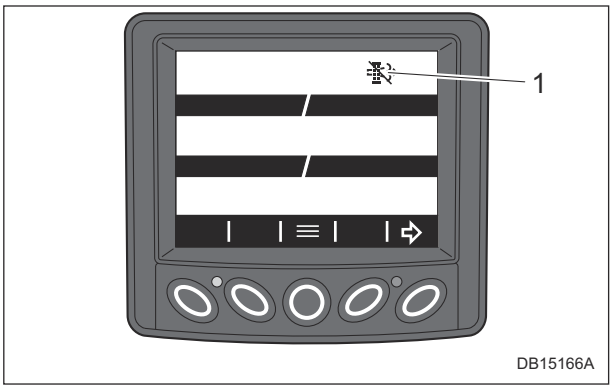
In "Auto regeneration inhibit mode" PM accumulates in the DPF and PM accumulation level increases.
Unless the operator implements regeneration on his own will, regeneration is not performed.



DPF Auto Regeneration Inhibit Switch_001

1	DPF auto regeneration inhibit switch

When the DPF auto regeneration inhibit switch is pressed and set to "Auto regeneration inhibit mode", the monitor displays Auto regeneration inhibit icon.



DPF Auto Regeneration Inhibit Switch_002

1	Auto regeneration inhibit icon

DPF Parked Regeneration Switch

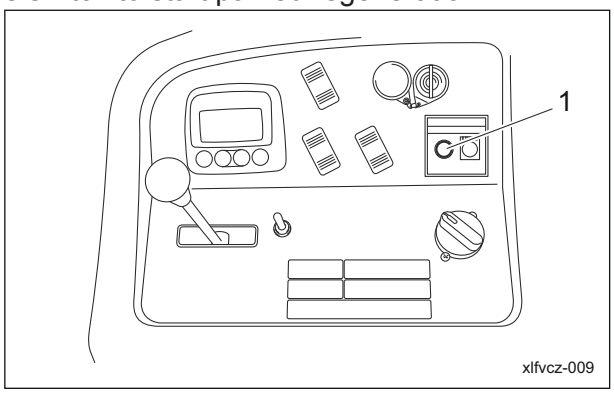
⚠ Danger

Do not perform DPF regeneration in a location where fires may occur since it will become extremely hot around the exhaust outlet during DPF regeneration.

Important

If parked regeneration is not required, it will not start even if the switch is pressed.

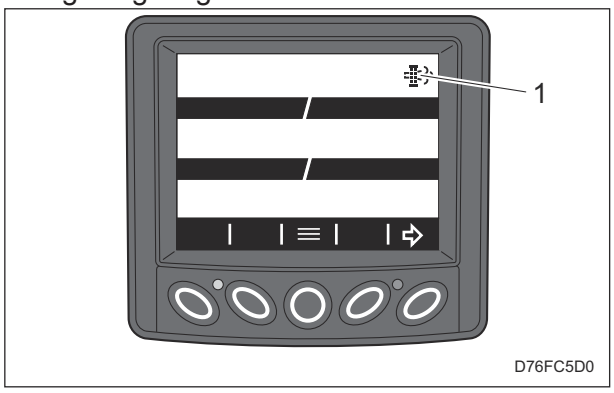
The DPF parked regeneration switch is located in the operation panel.
The DPF parked regeneration switch is the switch for actuating parked regeneration.
When the regeneration icon is blinking, press the switch to start parked regeneration.



DPF Parked Regeneration Switch_001

1	DPF parked regeneration switch

When parked regeneration starts, Regeneration icon in the monitor display changes from blinking to lighting.



DPF Parked Regeneration Switch_002

1	Regeneration icon

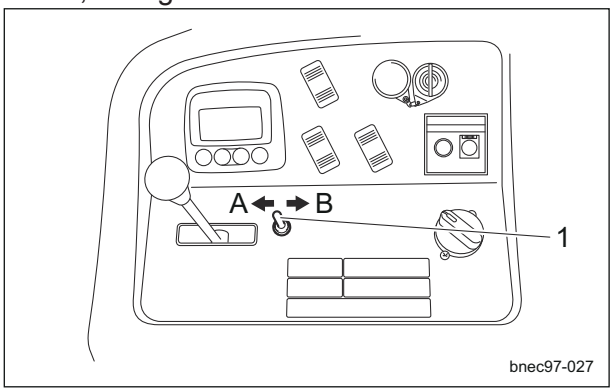
Light Switch

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

⚠ 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 (turn on)
B	OFF (turn off)

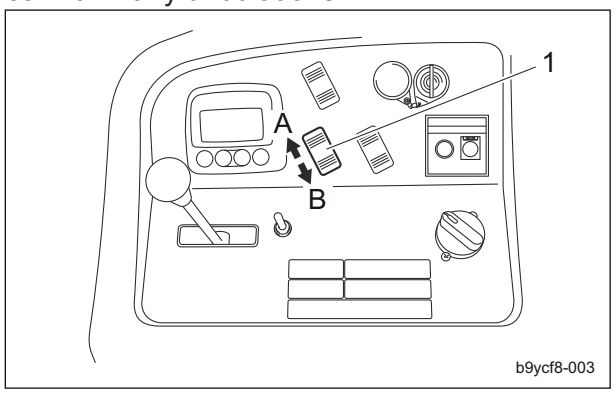
Description of Functions

Traction Assist Switch

The traction assist switch is located in the operation panel.
This switch is effective to increase climbing ability when this machine is in cutting operation (4WD).

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

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



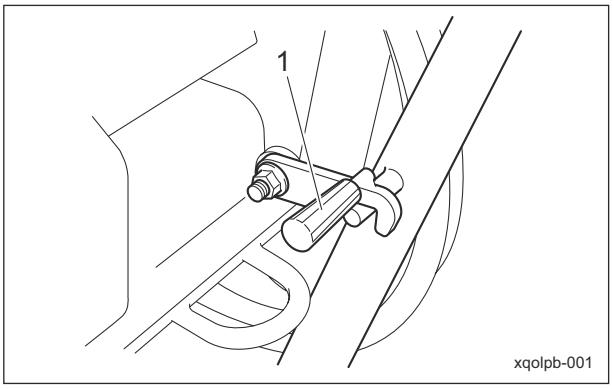
Traction Assist Switch_001

1	Traction assist switch
A	ON
B	OFF

Mower Lock Lever (Latch)

The mower lock levers (latches) are located in the foot area on the left and right sides.
Hook the mower lock levers (latches) on the arms to keep the mower decks #4 and #5 raised.
The mower lock levers (latches) may be used for the following operations.

- Moving by the machine
- Transporting the machine
- Storing the machine



Mower Lock Lever (Latch)_001

1	Mower lock lever (latch)

Mower Deck Up/Down Lever

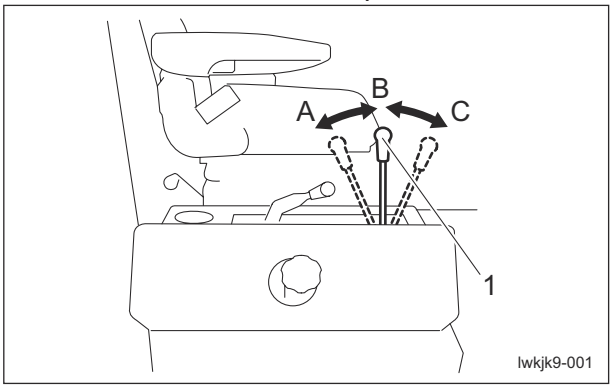
Caution

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

Important

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

The mower deck up/down lever is located in the operation panel and raises or lowers the mower decks.
When the lever is shifted to the "Lower" position, the mower decks are lowered. When the lever is shifted to the "Raise" position, the mower decks are raised.
Release the lever to return it to the neutral position.
Note:
When the mower decks are raised, the rotary knives stop rotating, even if the knife rotation switch is set to the "Rotation" position.

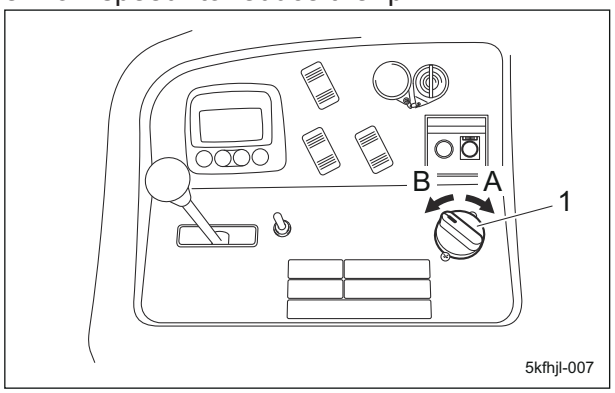


Mower Deck Up/Down Lever_001

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

Throttle Knob

The throttle knob is located to the right of the driver's seat and enables you to adjust the engine rpm.
Move the throttle knob toward the "High speed" position to increase the engine rpm, and toward the "Low speed" to reduce the rpm.



Throttle Knob_001

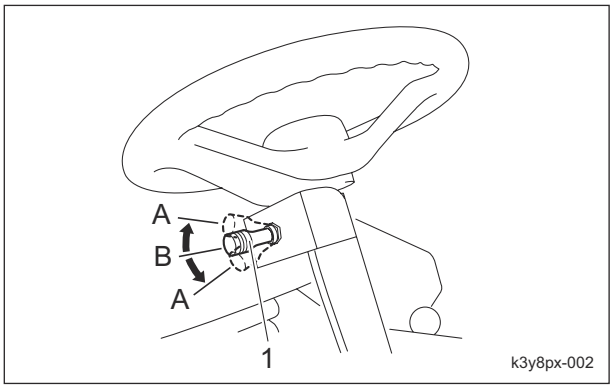
1	Throttle knob
A	High speed
B	Low speed

Diff-Lock Switch

Important

Do not operate the diff-lock switch unless it is necessary.

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



Diff-Lock Switch_001

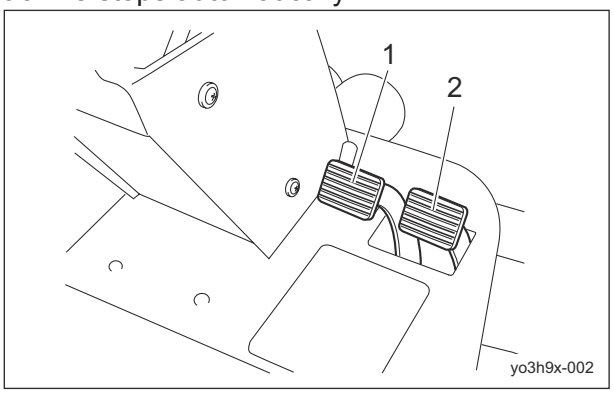
1	Diff-lock switch
A	ON (Lock)
B	OFF (Release)

Traveling Pedal

Caution

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

The traveling pedals are located in the right foot area and control forward and reverse operation of the machine.
When the forward pedal (inside) is depressed, the machine travels forward. When the reverse pedal (outside) is depressed, the machine travels in reverse.
The speed changes in accordance with how much the pedal is depressed.
When you take your foot off the pedal, the machine stops automatically.



Traveling Pedal_001

1	Forward pedal
2	Reverse pedal

Brake Pedal

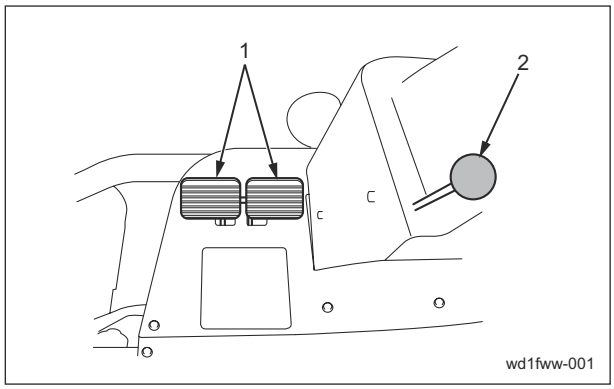
Warning

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

Important

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

The brake pedals are located in the left foot area and operate the left and right brakes independently.
By depressing the brake pedal on the side in which the turn will be made, the machine can make turns with a small radius.
If the front wheel on the upward side of a slope slips, depress the brake pedal for the wheel on the upward side in order to increase the traction of the wheel on the downward side and stabilize travel.



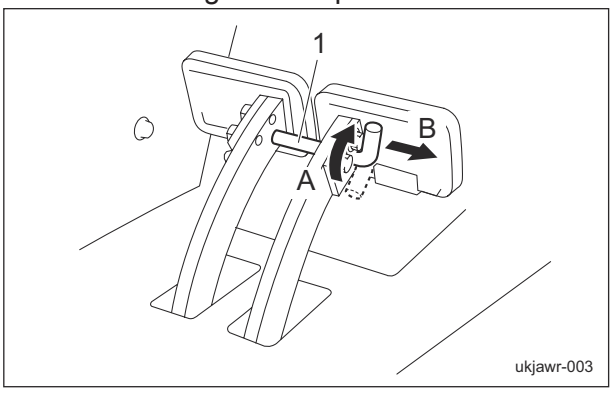
Brake Pedal_001

1	Brake pedals
2	Parking brake lever

Change of Braking Method

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

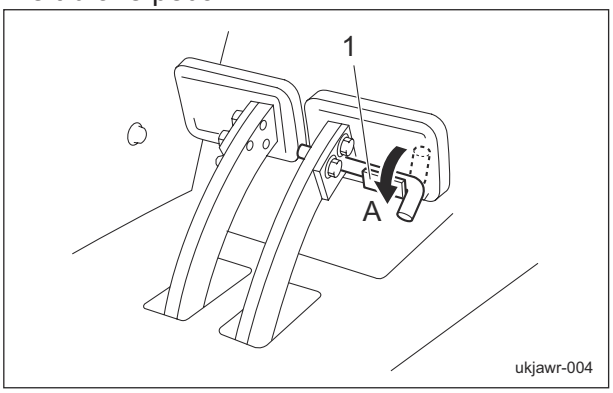
1. Swing up the pedal link bar, and then pull it out from the right brake pedal.



Change of Braking Method_001

1	Pedal link bar
A	Swing up
B	Pull out

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



Change of Braking Method_002

1	Holder
A	Secure

Parking Brake Lever

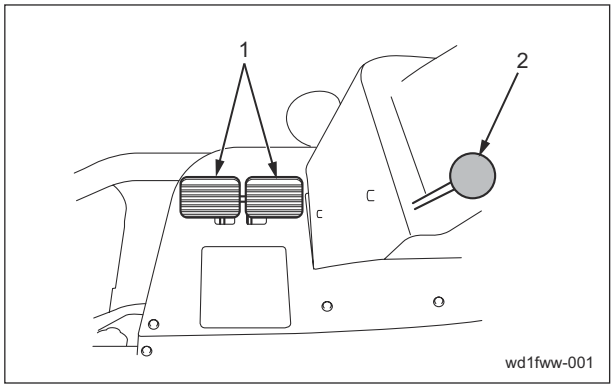
Caution

Never park the machine on a slope.

Important

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

The parking brake lever is located to the left of the front cover.
When parking, link the left and right brake pedals by using the pedal link bar, depress both brake pedals, and then pull the parking brake lever completely.
To release the parking brake, depress the brake pedals.



Parking Brake Lever_001

1	Brake pedals
2	Parking brake lever

Safety Device

Interlock System

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

1. As for starting the engine, the safety device prevents the engine from starting unless it meets each of the following four conditions.
   - An operator is sitting on the seat.
   - The parking brake is applied.
   - The knife rotation switch is set to the "Stop" position.
   - The traveling pedal is set to the neutral position.

Important

When you restart the engine after the safety device stops the engine, be sure to return the ignition key to the "OFF" position first, and then restart it.
Otherwise, the engine does not start.

2. When 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 knife rotation switch is set to the "Rotation" position.

Warning Mechanisms

Warning Buzzer

Important

When the buzzer (intermittent tone) sounds, be sure to stop operation since the engine is overheated.
Do not stop the engine without idling. Allow the engine to cool down, first. Keep the engine idling for about 5 minutes before stopping.
Remove dust that is jamming in the radiator, air cleaner, and etc.

This machine is equipped with warning mechanisms for overheating and the hydraulic oil.

1. Overheat Warning Buzzer
   If the water temperature in the engine exceeds 110 °C (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.

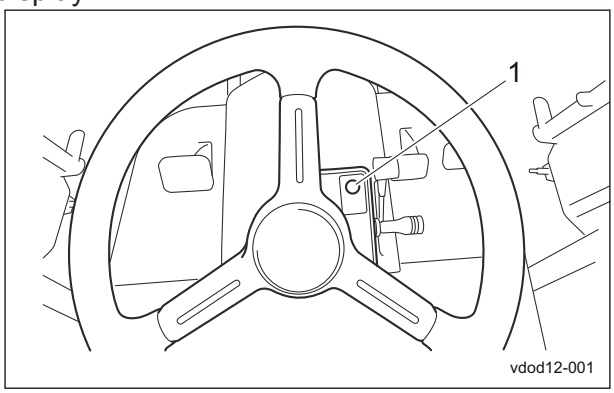
2. Hydraulic Oil Level Warning Buzzer
   If the oil level in the hydraulic tank declines from the specified level by approximately 2.0 dm^3 (2.0 L), a buzzer will sound. (continuous tone)
   When the buzzer sounds, stop the engine immediately, and then inspect the machine and perform any necessary maintenance.

Engine Warning Lamp

Important

Make repairs immediately if the fault codes of PCD (Particulate Control Diagnostic) and NCD (NOx Control Diagnostic) appear.

Engine warning lamp (LED) lights up or blinks when a failure occurs on the function of engine. Check the fault code (DTC) in the monitor display.

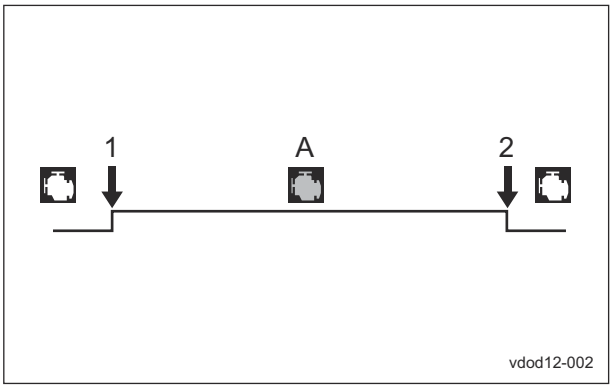


Engine Warning Lamp_001

1	Engine warning lamp

The lighting patterns of engine warning lamp are as follows.
Note :
PCD means fault codes relevant to Particulate Control Diagnostic.
NCD means fault codes relevant to NOx Control Diagnostic.

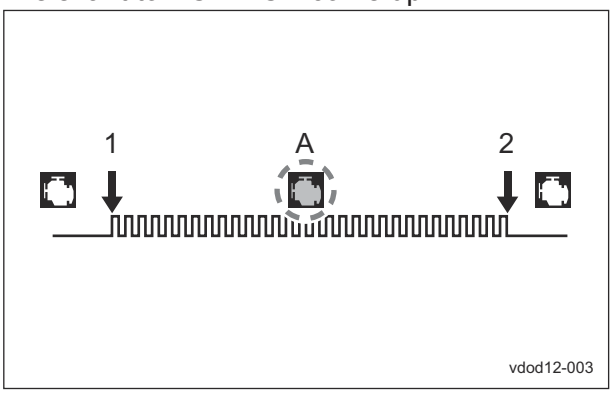
1. Engine warning lamp lights up when only DTC other than PCD/NCD come up.



Engine Warning Lamp_002

1	Fault detected
2	Recovery
A	Lighting

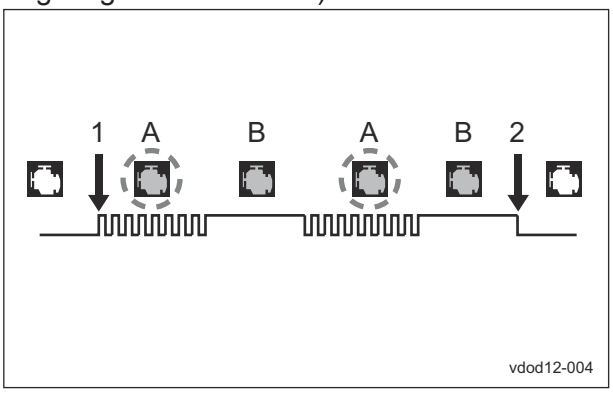
2. Engine warning lamp blinks when only DTC relevant to PCD/NCD come up.



Engine Warning Lamp_003

1	Fault detected
2	Recovery
A	Blinking

3. Engine warning lamp repeats blinking and lighting alternately when DTC relevant to/ other than PCD/NCD come up at the same time. (It repeats blinking three times and lighting three seconds.)



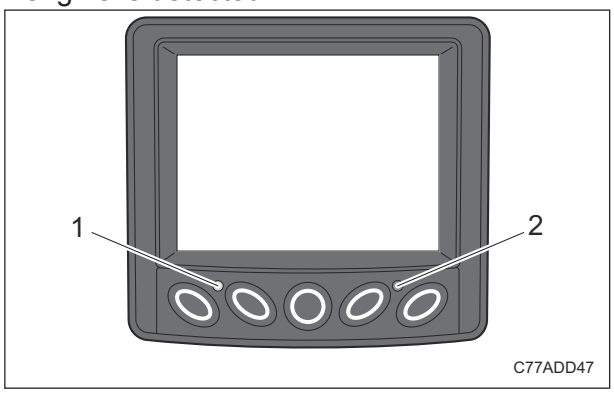
Engine Warning Lamp_004

1	Fault detected
2	Recovery
A	Blinking
B	Lighting

Monitor LED

Monitor (LED) turns on when a failure occurs on the function of engine.
Check the message in the monitor display when Monitor (LED) turns on.

1. LED (yellow)
   Lights up when a malfunction is detected, indicating warning and/or caution on the engine.
   Also lights up when “Service reminder” or “DPF cleaning alarm” is advised in the monitor display.
2. LED (red)
   Lights up when a critical malfunction on the engine is detected.

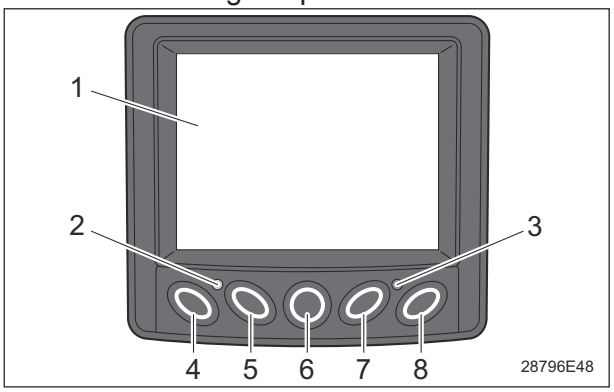


Monitor LED_001

1	LED (yellow)
2	LED (red)

Monitor (PV380)

The monitor displays various information about the machine, such as the operating status and fault conditions.
The information of desired items can be confirmed according to operation of the buttons.



Monitor_001

1	Monitor display
2	LED (yellow)
3	LED (red)
4	Button 1
5	Button 2
6	Button 3
7	Button 4
8	Button 5

1. Monitor display
   Displays machine conditions and items.
2. LED (yellow)
   Lights up when a malfunction is detected, indicating warning and/or caution on the engine and also lights up when SERVICE REMINDERS or DPF CLEANING ALARM advised.
3. LED (red)
   Lights up when a critical malfunction on the engine is detected.
4. Button
   The monitor has buttons 1 to 5, and their functions vary depending on the displayed screen information.

Description of Functions

Opening Screen

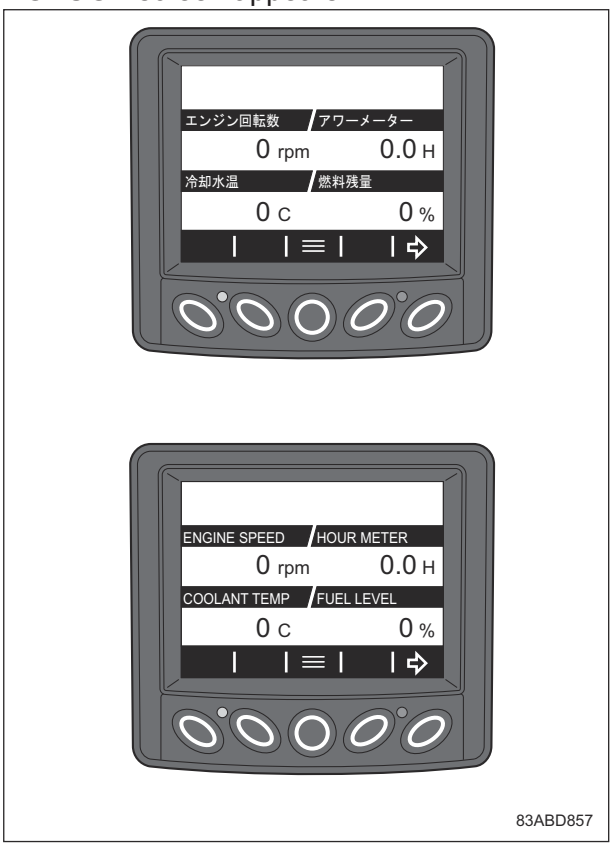
1. Set the ignition key to the "ON" position.
2. One or two seconds after activating the monitor, LOGO screen appears.

Opening Screen_001

Note:
When preheat required, LOGO and the message "Wait to Start...Preheating" appear at the same time and preheat automatically starts.

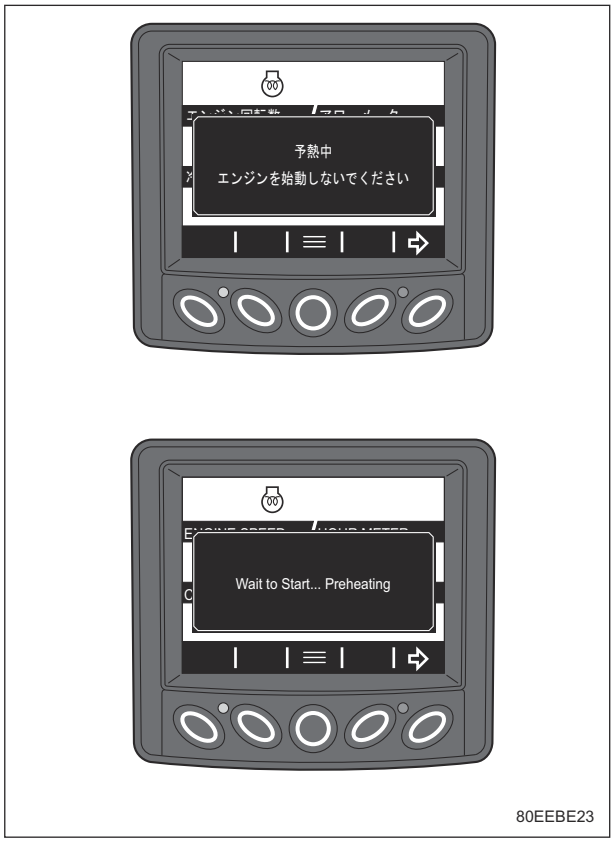
Opening Screen_002

3. Three seconds after activating the monitor, GAUGE screen appears.



Opening Screen_003

Note:
While preheating, the message "Wait to Start...Preheating" is displayed.
When the preheat completed, "Wait to Start...Preheating" disappears and GAUGE screen appears.

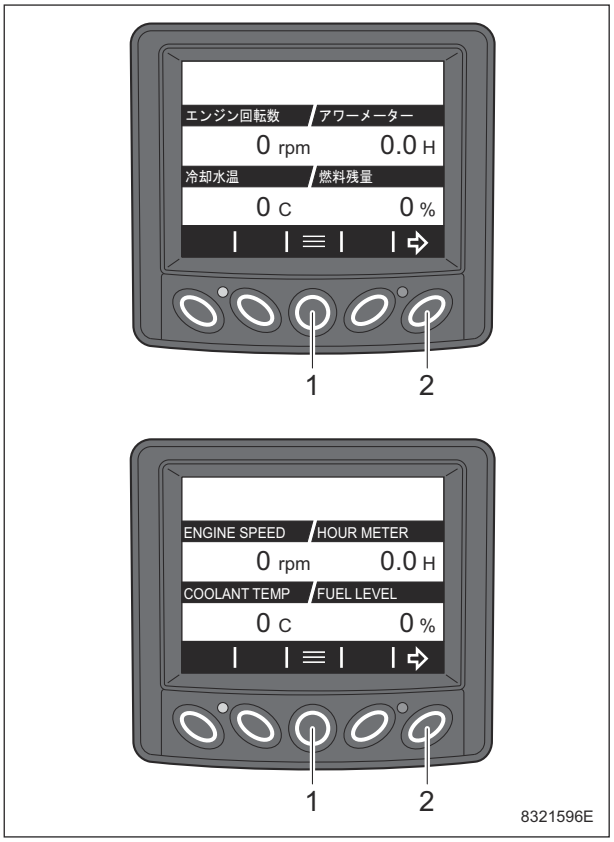


Opening Screen_004

Gauge Screen

Gauge screen appears after the monitor activation.
It shows the status of the engine and the vehicle.
Move to another screen or page with pressing your desired button.

- "Button 5": Move to another page of GAUGE screen.
- "Button 3": Move to MENU screen.

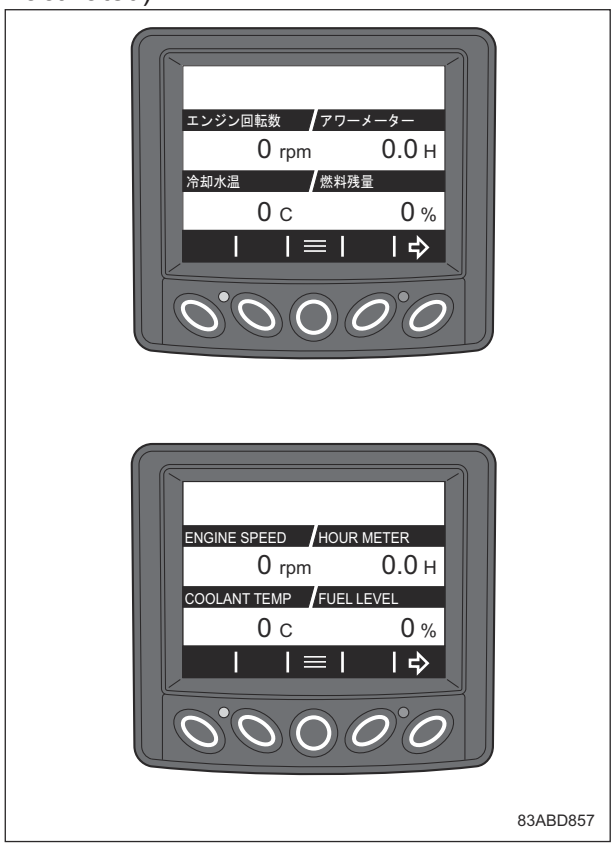


Gauge Screen_001

1	Button 3
2	Button 5

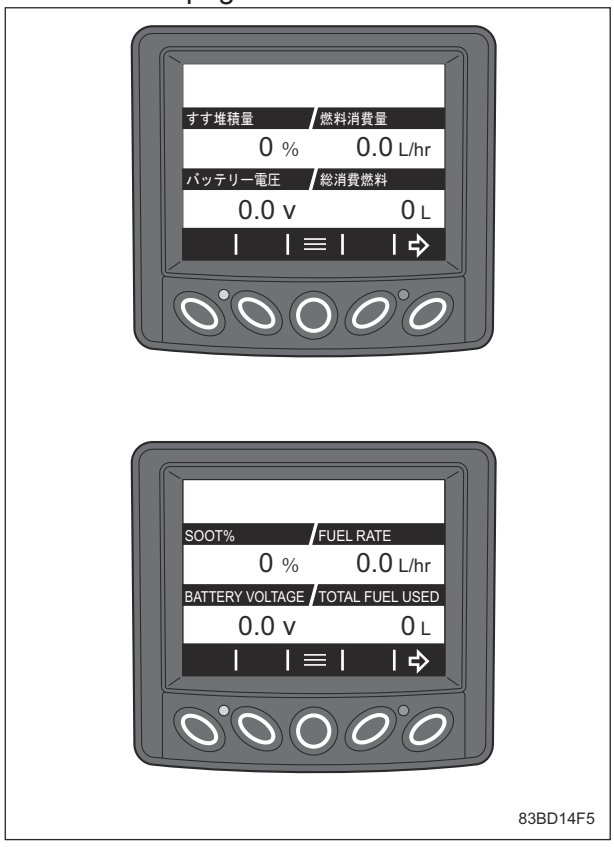
Description of Functions

1. The first page (displayed when the monitor activated)



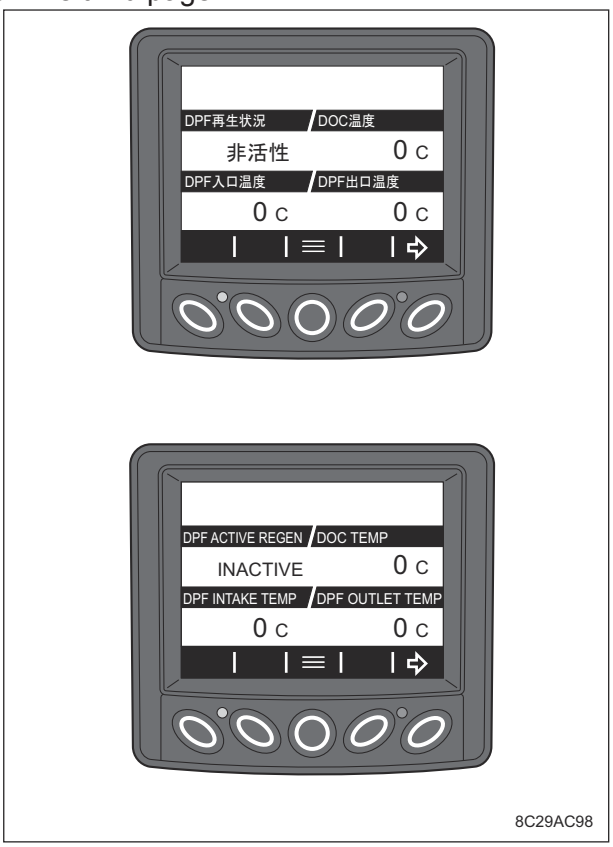
Gauge Screen_002

2. The second page



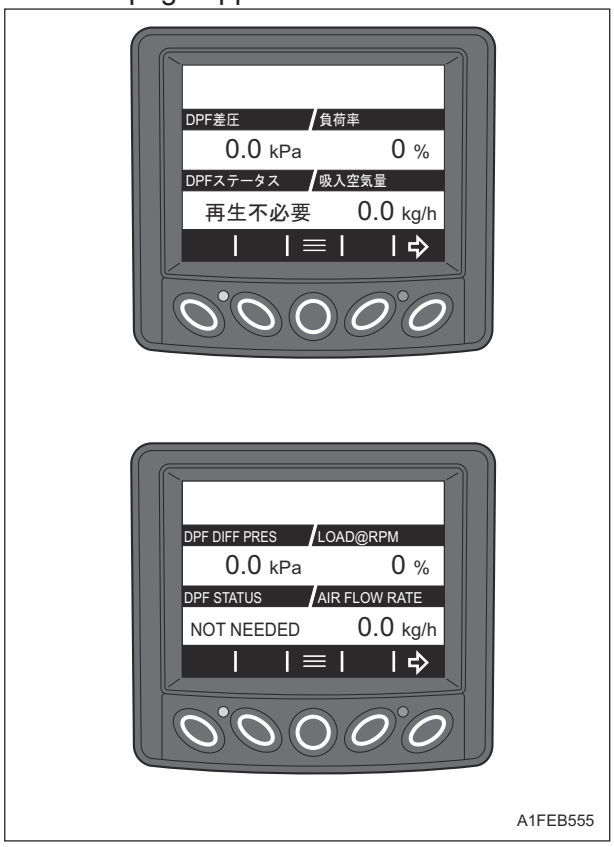
Gauge Screen_003

3. The third page



Gauge Screen_004

4. The fourth page
   Note:
   If "Button 5" is pressed on the fourth page, the first page appears in the screen.

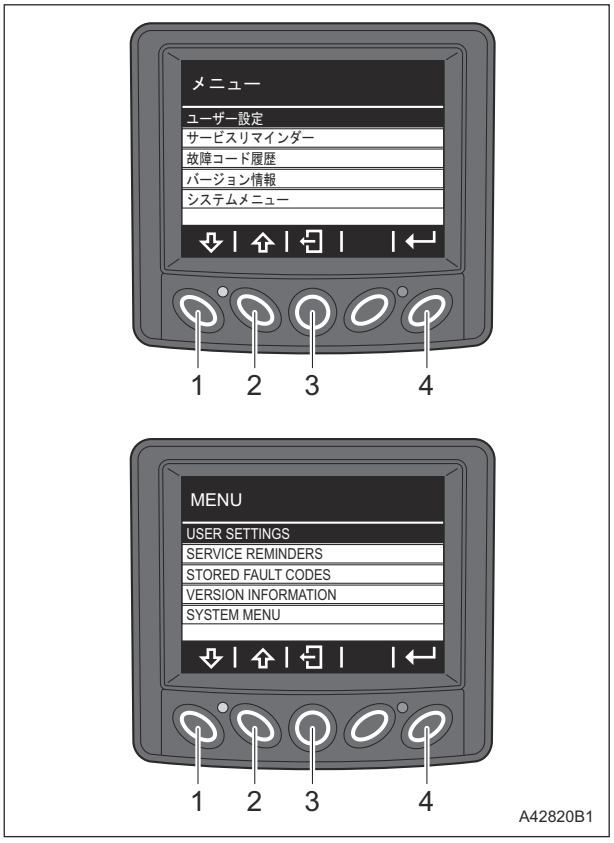


Gauge Screen_005

Menu Screen

MENU screen displays a variety of information like the engine and vehicle status, etc. and the setting menu.
Press your desired button to select an item and move to the screen for checking the information or settings.

- "Button 1" or "Button 2": Select an item.
- "Button 5": Determine the selected item (or the highlighted item).
- "Button 3": Move to GAUGE screen.



Menu Screen_001

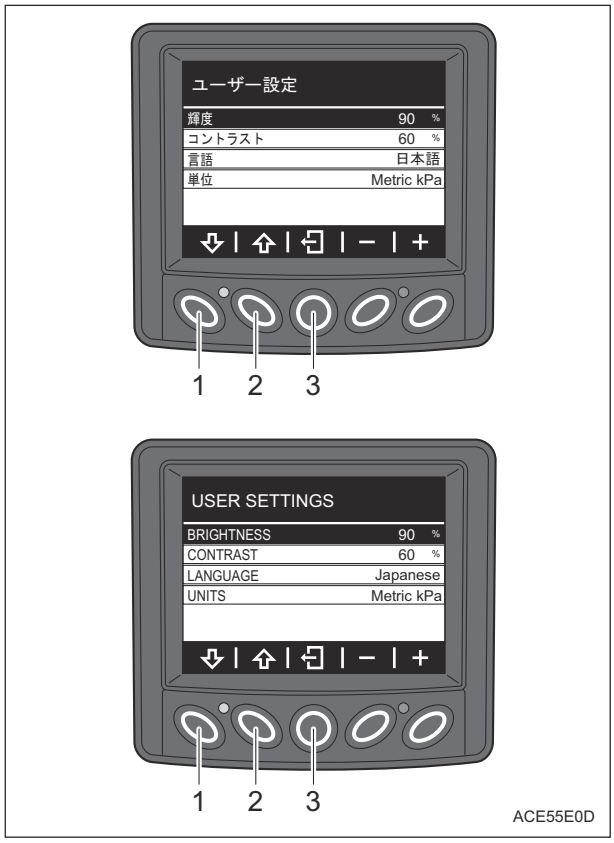
1	Button 1
2	Button 2
3	Button 3
4	Button 5

Description of Functions

User Settings

Press your desired button to select an item and set each item.

- "Button 1" or "Button 2": Select an item to highlight it.
- "Button 3": Move to GAUGE screen.



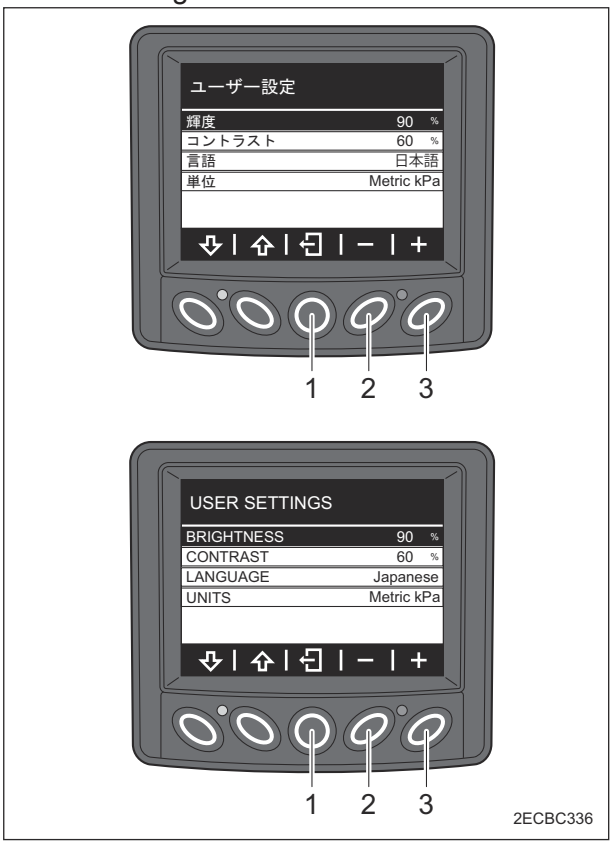
User Settings_001

1	Button 1
2	Button 2
3	Button 3

■Brightness

With "BRIGHTNESS", the brightness of the monitor display can be adjusted.

1. In USER SETTINGS screen, select "BRIGHTNESS" to highlight it.
2. "-" and "+" appear in the bottom of the screen.
   Press the button 4 of minus sign to decrease the brightness or the button 5 of plus sign to increase it for your desired brightness.
3. Press the button 3 to move to MENU screen and save the setting.
   If you turn the ignition key to the "OFF" position before moving to MENU screen, the setting will not be saved.



Brightness_001

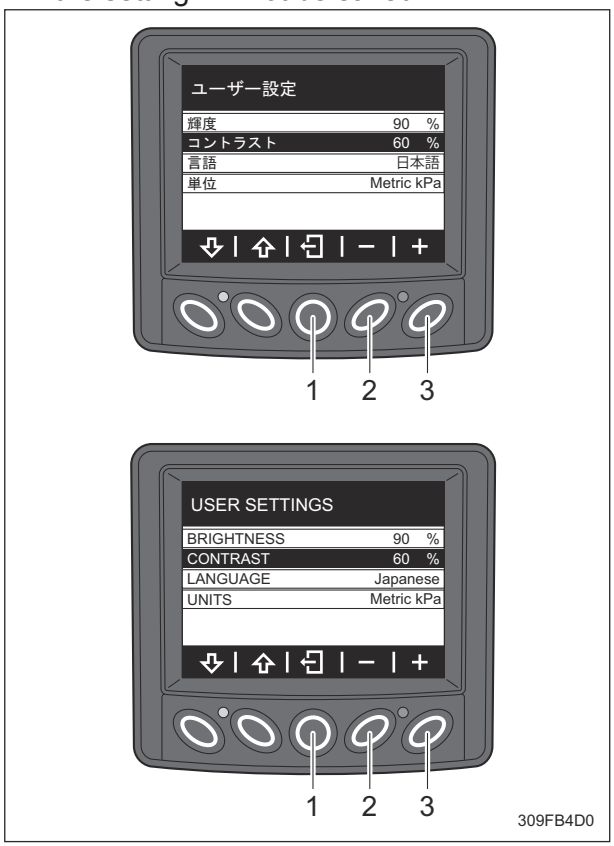
1	Button 3
2	Button 4
3	Button 5

■Contrast

With "CONTRAST", the contrast of the monitor display can be adjusted.

1. In USER SETTINGS screen, select "CONTRAST" to highlight it.
2. "-" and "+" appear in the bottom of the screen.
   Press the button 4 of minus sign to decrease the contrast or the button 5 of plus sign to increase it for your desired brightness.

3. Press the button 3 to move to MENU screen and save the setting.
   If you turn the ignition key to the "OFF" position before moving to MENU screen, the setting will not be saved.



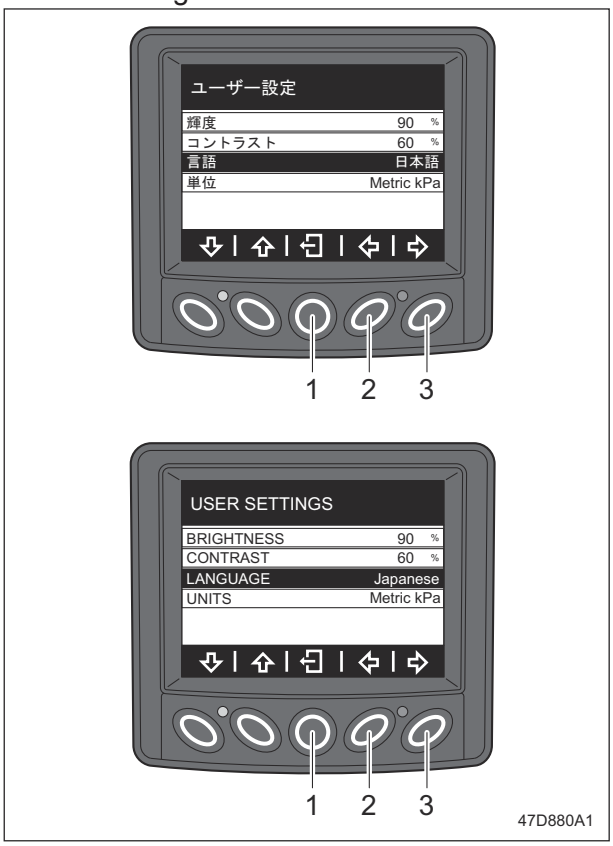
Contrast_001

1	Button 3
2	Button 4
3	Button 5

■Language

With " LANGUAGE", the language used in the monitor display can be set.

1. In USER SETTINGS screen, select "LANGUAGE" to highlight it.
2. Arrows of "←" and "→" appear in the bottom of the screen.
   Press the button 4 or the button 5 to set your desired language.
   One of the following languages can be set.
   - English
   - Japanese
   - German
   - Spanish
   - Danish
   - Swedish
   - French
   - Italian
   - Portuguese
   - Dutch
3. Press the button 3 to move to MENU screen and save the setting.
   If you turn the ignition key to the "OFF" position before moving to MENU screen, the setting will not be saved.



Language_001

1	Button 3
2	Button 4
3	Button 5

Description of Functions

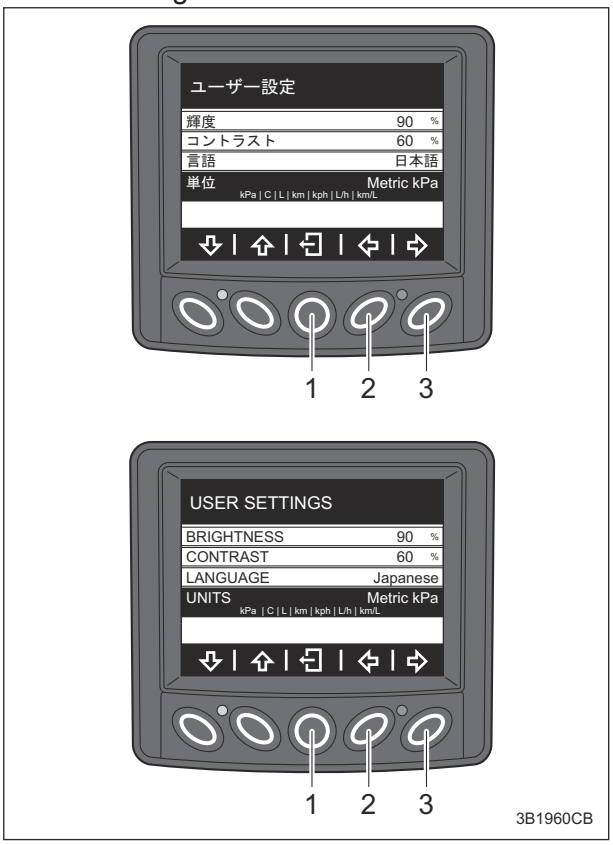
■Units

With "UNITS", the units of parameter values can be set.

1. In USER SETTINGS screen, select "UNITS" to highlight it.
2. Arrows of "←" and "→" appear in the bottom of the screen.
   Press the button 4 or the button 5 to set your desired unit.
   The following units can be set.
   The factory default unit is set to the "Metric kPa".

Item	Units		
	Metric kPa	Metric BAR	US STD
ENGINE SPEED	rpm	rpm	rpm
HOUR METER	H	H	H
COOLANT TEMP	C	C	F
FUEL LEVEL	%	%	%
SOOT%	%	%	%
FUEL RATE	L/h	L/h	gal/h
BATTERY VOLTAGE	V	V	V
TOTAL FUEL USED	L	L	gal
DOC TEMP	C	C	F
DPF INTAKE TEMP	C	C	F
DPF OUTLET TEMP	C	C	F
DPF DIFF PRES	kPa	bar	psi
LOAD@RPM	%	%	%
AIR FLOW RATE	kg/h	kg/h	kg/h

3. Press the button 3 to move to MENU screen and save the setting.
   If you turn the ignition key to the "OFF" position before moving to MENU screen, the setting will not be saved.



Units_001

1	Button 3
2	Button 4
3	Button 5

Service Reminders

"SERVICE REMINDERS" functions to notify the operator of the appropriate timing of service for the following items.

- Engine oil: Notification of timely replacement of the engine oil
- Engine oil filter: Notification of timely replacement of the engine oil filter
- Hydraulic oil: Notification of timely replacement of the hydraulic oil
- Hydraulic oil filter: Notification of timely replacement of the hydraulic oil filter
- Air cleaner: Notification of timely replacement of the air cleaner element

The factory default settings are as follows. These service interval hours are recommended by the manufacturer.

Machine	Service interval	Engine oil	Engine oil filter	Hydraulic oil	Hydraulic oil filter	Air cleaner
LM551B	Initial	50	50	100	100	600
	Periodical	250	400	500	500	600
GM2810A	Initial	50	50	100	100	600
	Periodical	400	400	500	500	600
LM3210A	Initial	50	50	100	100	600
	Periodical	400	400	500	500	600
LM2710	Initial	50	50	100	100	600
	Periodical	400	400	500	500	600
FS1710	Initial	50	50	100	100	600
	Periodical	400	400	500	500	600
HM5500	Initial	50	50	100	100	300
	Periodical	200	400	500	500	300

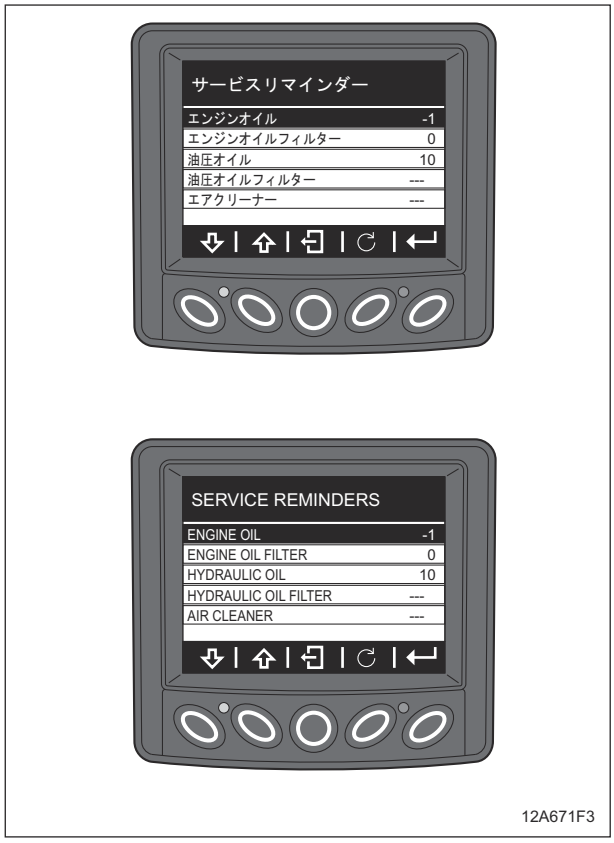
Description of Functions

The hours calculated based on the expiry of the setup service interval hours appears as a positive or negative number on the right side of the items in "SERVICE REMINDERS".

- Negative number: The elapsed hours from the expiry of the setup service interval hours.
- "0": The setup service interval hours have now expired.
- Positive number: The remaining hours until the expiry of the setup service interval hours.
- "---": Service interval hours are not set.

Example

- "-1": One hour has elapsed from the expiry of the setup service interval hours.
- "0": The setup service interval hours have now expired.
- "10": Ten hours remain until the expiry of the setup service interval hours.
- "---": Service interval hours are not set.



Service Reminders_001

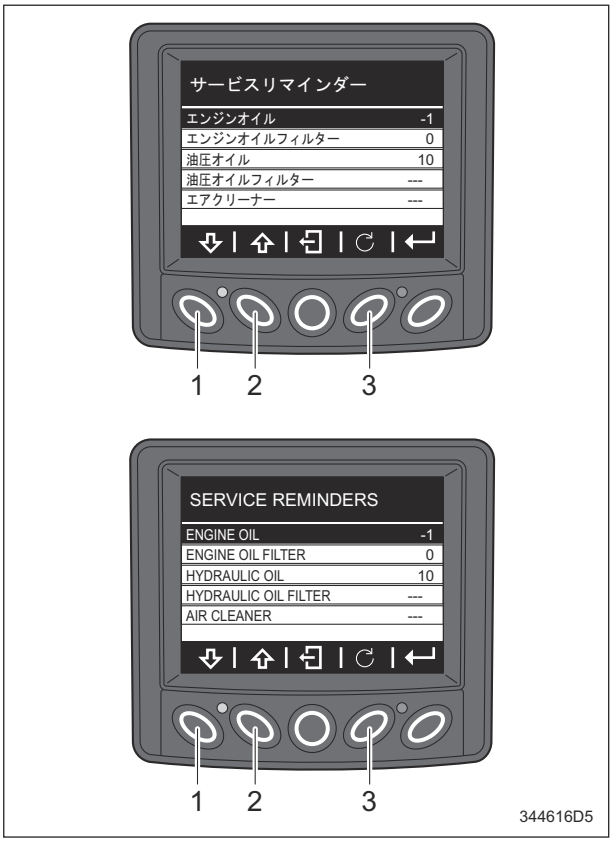
■Service Reminders Reset

With "SERVICE REMINDERS", the displayed hours can be reset.

Important

The number in the service reminders can not be reset while the engine is running.
Switch on the machine (set the ignition key to the "ON" position) after the engine is stopped (set the ignition key to the "OFF" position) when resetting the service reminders.

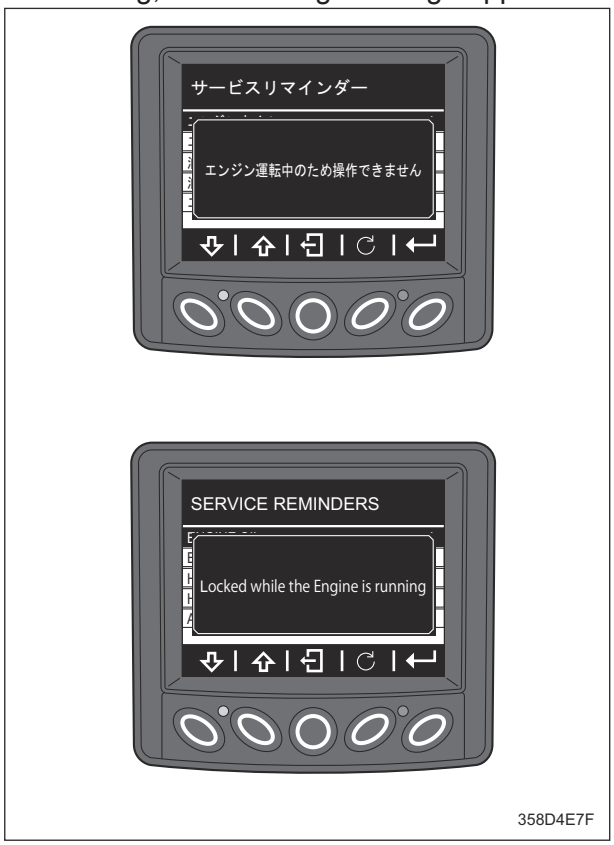
1. With the button 1 or the button 2, select an arbitrary item to highlight it.
2. Press the button 4 for reset.



Service Reminders Reset_001

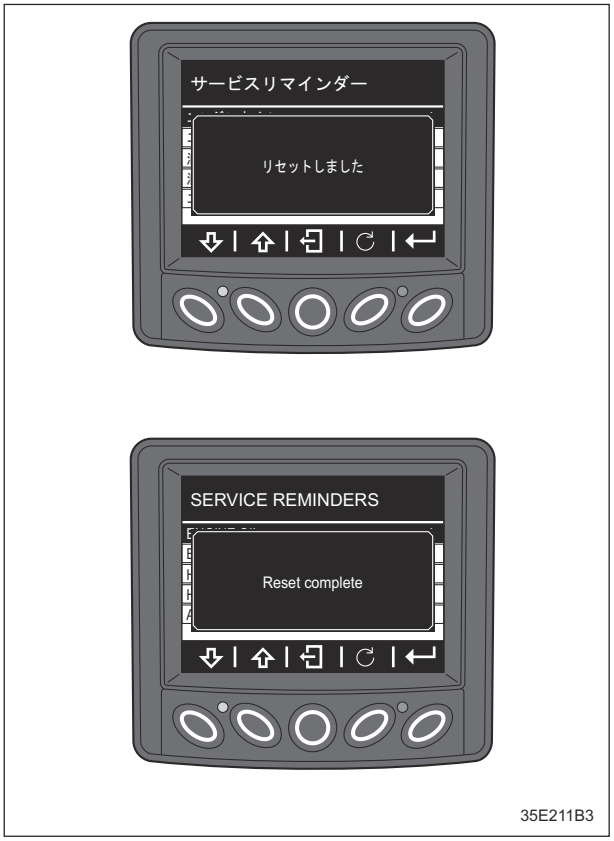
1	Button 1
2	Button 2
3	Button 4

Note:
If the button 4 is pressed while the engine running, the following message appears.



Service Reminders Reset_002

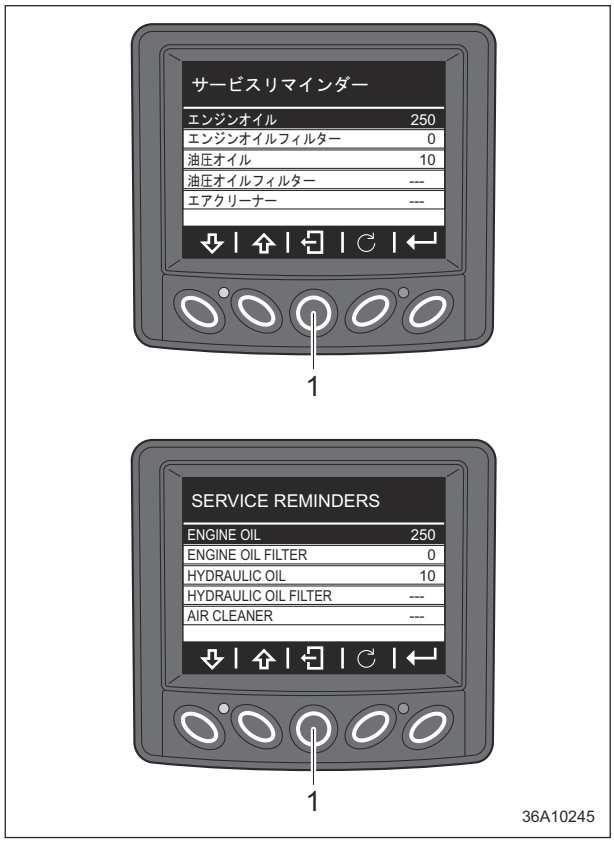
3. The message "Reset complete" appears when the setting saved.
   Note:
   Once the displayed number reset, it appears as calculated based on the "periodical service interval hours".



Service Reminders Reset_003

4. The setup hours appear after the reset completed.

5. Press the button 3 to move to MENU screen.



Service Reminders Reset_004

1	Button 3

■Service Reminders Setting Change

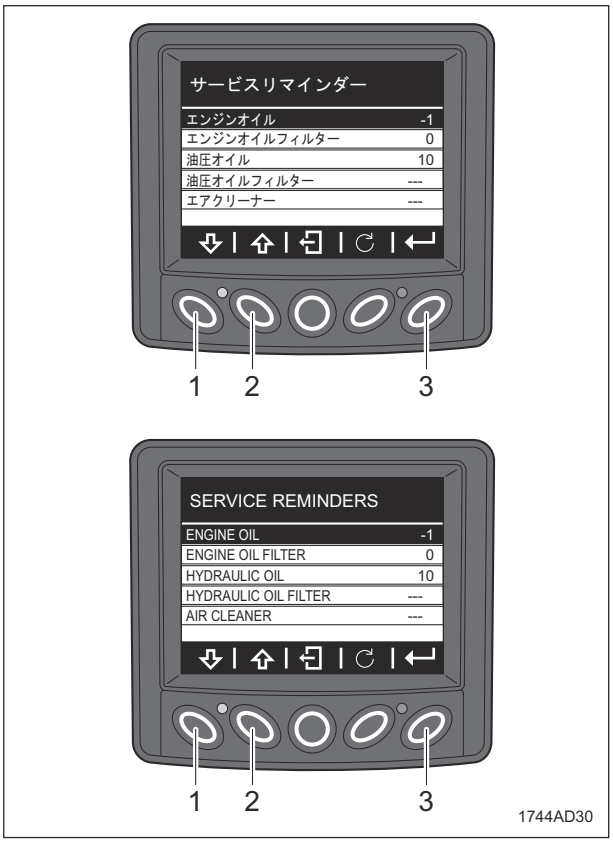
With "SERVICE REMINDERS", the setup service interval hours can be changed into an arbitrary time.

Important

The setting of the service reminders can not be changed while the engine is running. Switch on the machine (set the ignition key to the "ON" position) after the engine is stopped (set the ignition key to the "OFF" position) when changing the service reminders setting.

1. With the button 1 or the button 2, select an arbitrary item to highlight it.

2. Press the button 5 to move to SERVICE REMINDERS SETTING screen.



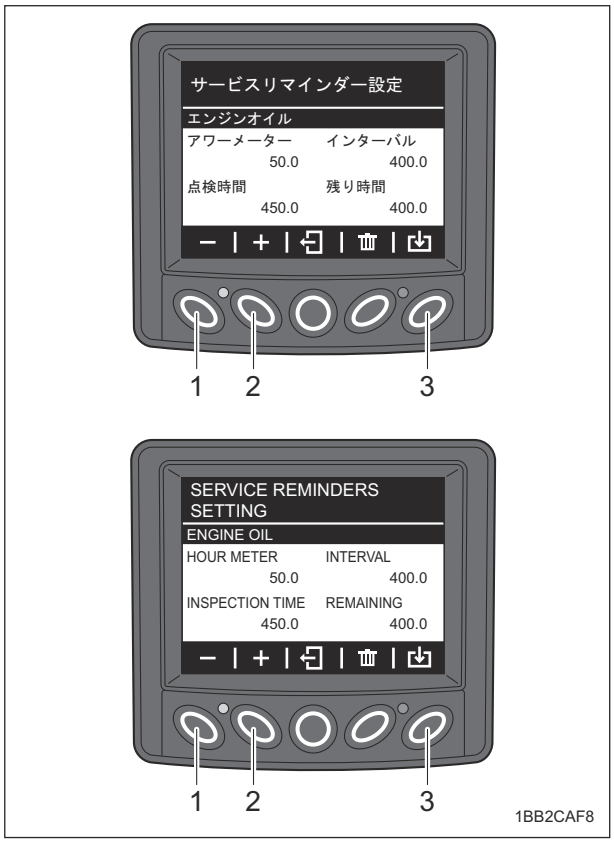
Service Reminders Setting Change_001

1	Button 1
2	Button 2
3	Button 5

3. Change the INTERVAL of the selected item with the button 1 of minus sign or the button 2 of plus sign.
   - With one press of the button, the number increases by the hour.
   - With long press of the button, the number increases by the ten hours.

   Note:
   If the INTERVAL set to "0", the service reminders are deleted.

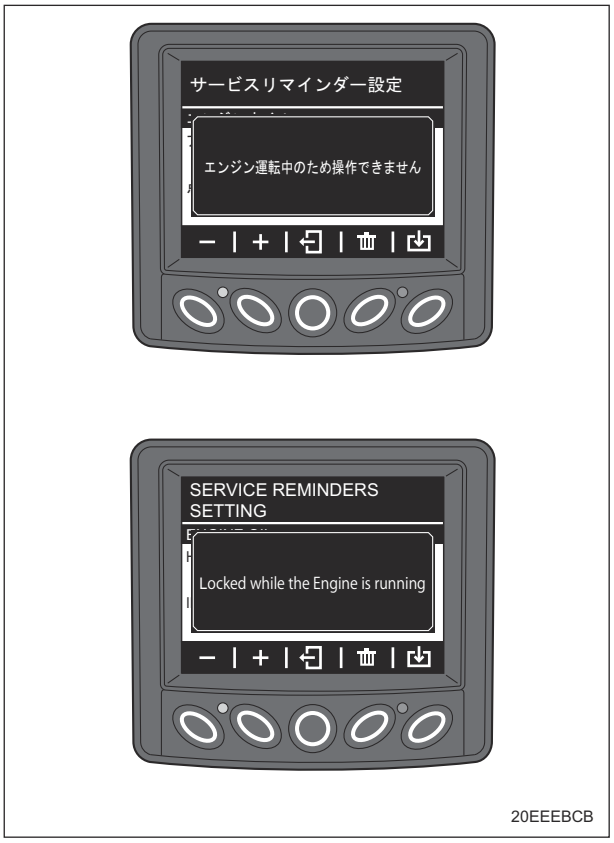
4. Press the button 5 to determine the setup hours.



Service Reminders Setting Change_002

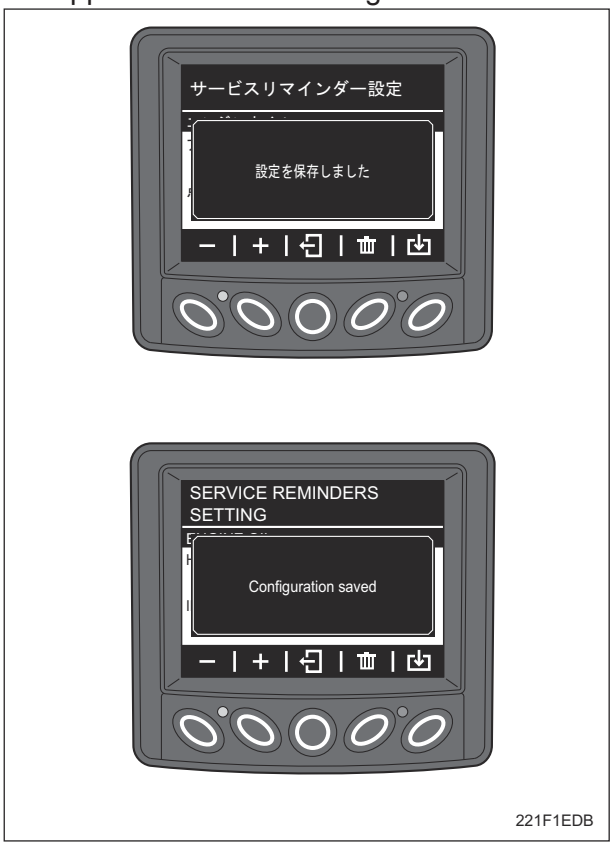
1	Button 1
2	Button 2
3	Button 5

Note:
If the button 5 is pressed while the engine running, the following message appears.



Service Reminders Setting Change_003

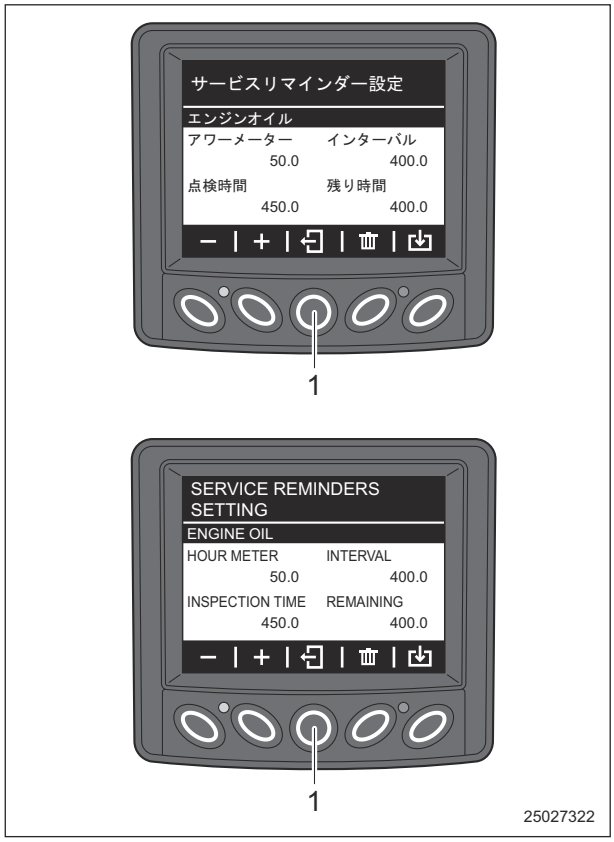
5. The message "Configuration saved" appears when the setting saved.



Service Reminders Setting Change_004

Description of Functions

6. The interval hours after configuration saved appear in SERVICE REMINDERS SETTING screen.
7. Press the button 3 to move to SERVICE REMINDERS screen.

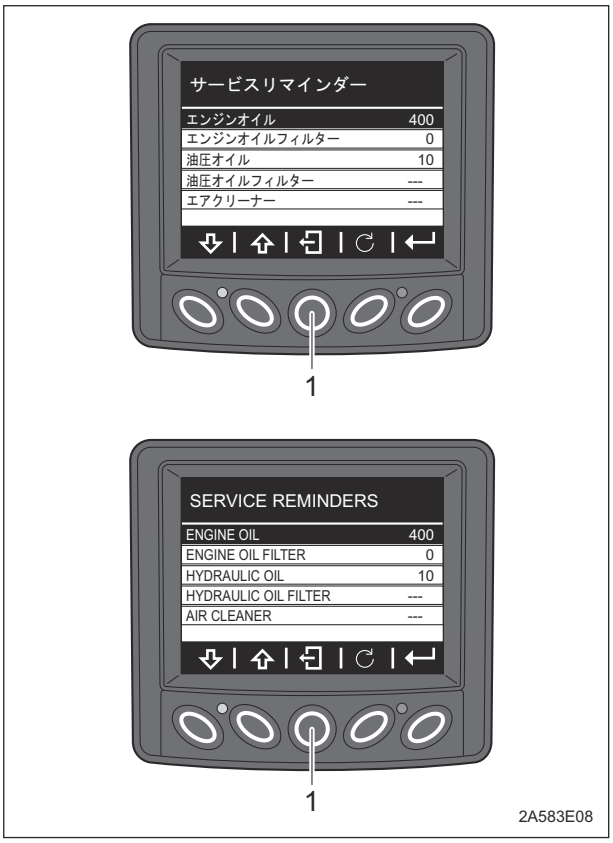


Service Reminders Setting Change_005

1	Button 3

8. The displayed hours are changed in SERVICE REMINDERS screen. Make sure that the setup hours are displayed.

9. Press the button 3 to move to MENU screen.



Service Reminders Setting Change_006

1	Button 3

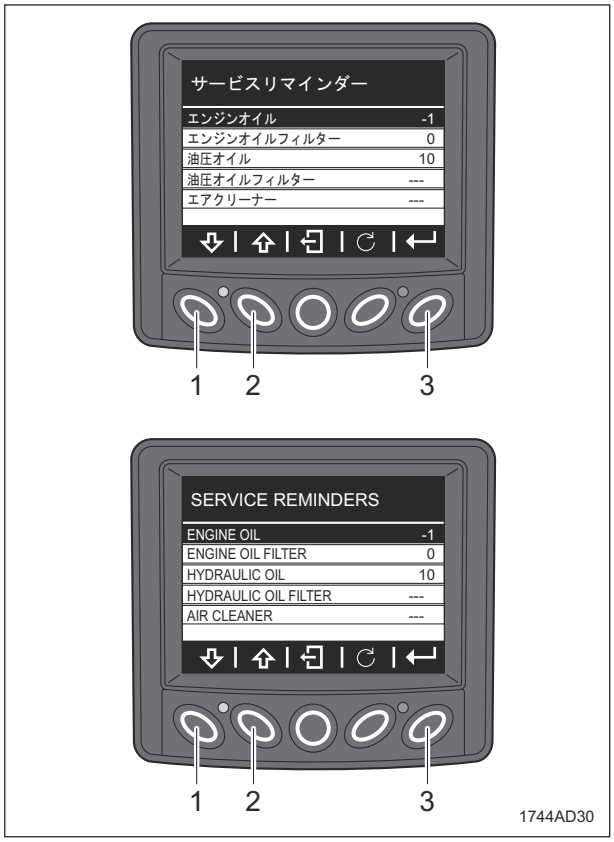
■Service Reminders Setting Deletion

With "SERVICE REMINDERS", the setup hours can be deleted.

Important

The setting of the service reminders can not be changed while the engine is running. Switch on the machine (set the ignition key to the "ON" position) after the engine is stopped (set the ignition key to the "OFF" position) when changing the service reminders setting.

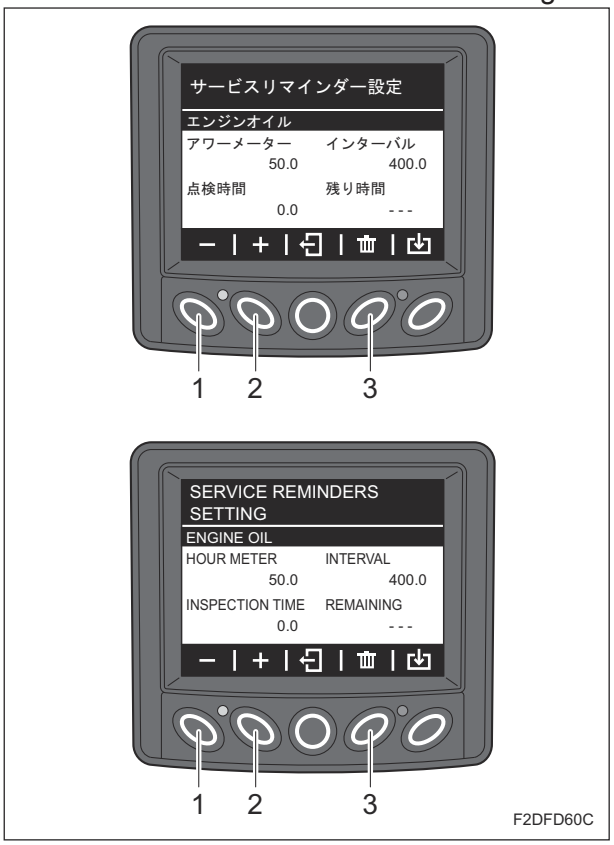
1. With the button 1 or the button 2, select an arbitrary item to highlight it.
2. Press the button 5 to move to SERVICE REMINDERS SETTING screen.



Service Reminders Setting Deletion_001

1	Button 1
2	Button 2
3	Button 5

3. Press the button 4 to delete the settings.

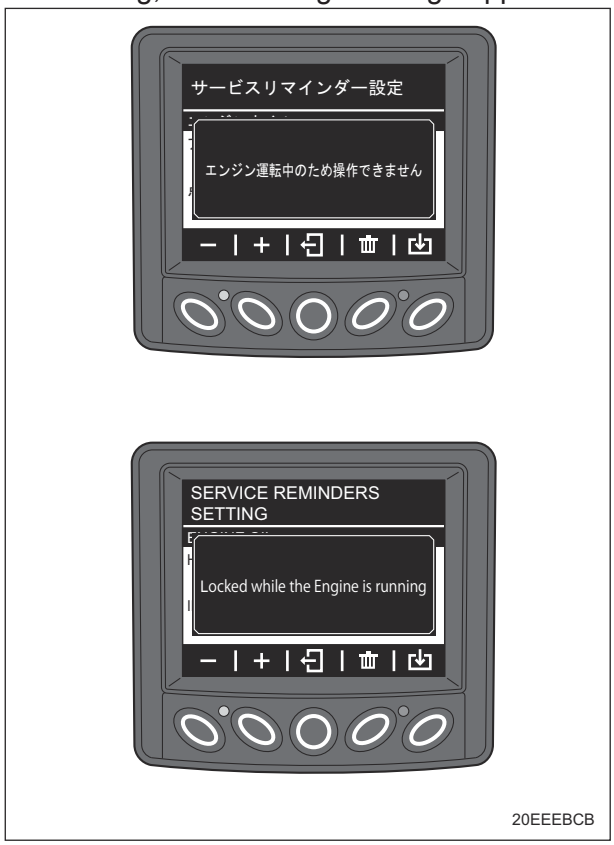


Service Reminders Setting Deletion_002

1	Button 1
2	Button 2
3	Button 4

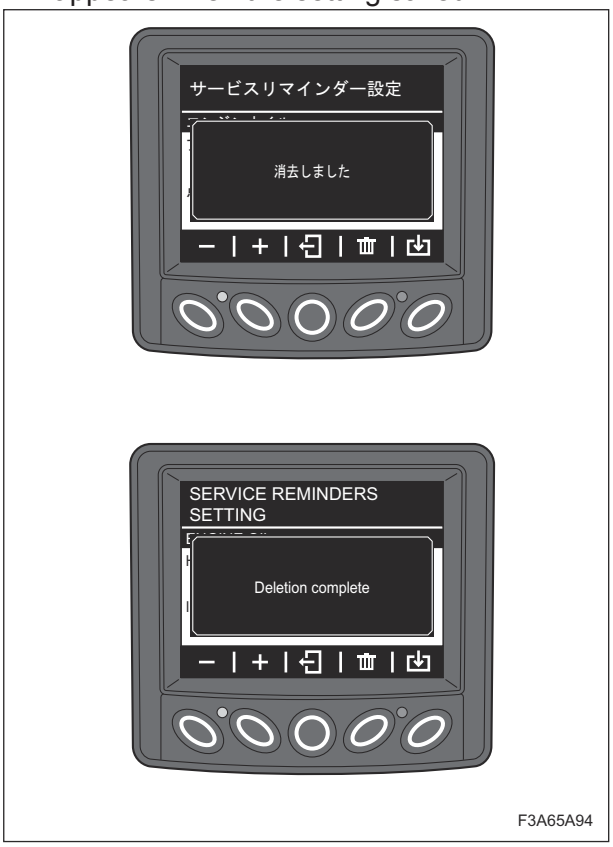
Description of Functions

Note:
If the button 4 is pressed while the engine running, the following message appears.



Service Reminders Setting Deletion_003

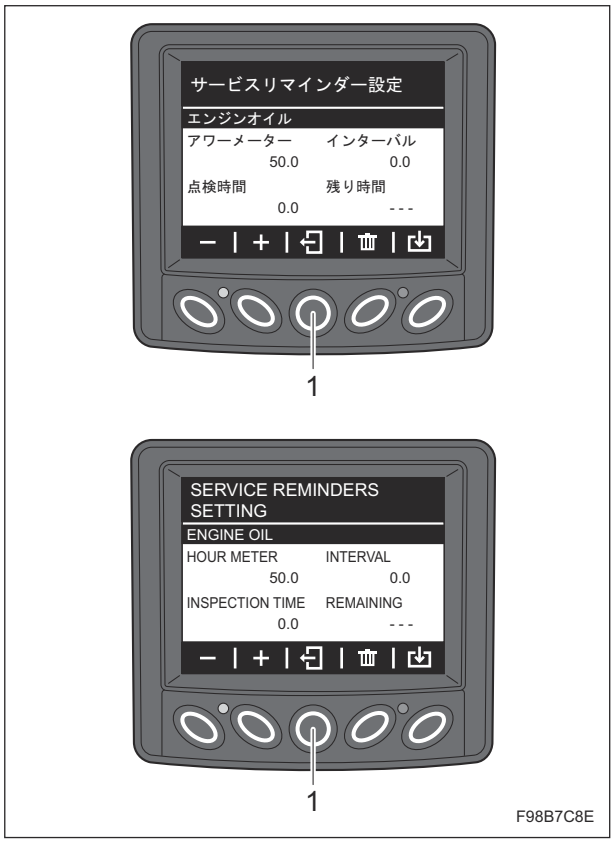
4. The message "Deletion complete" appears when the setting saved.



Service Reminders Setting Deletion_004

5. The interval hour "0.0" appears after deletion complete in SERVICE REMINDERS SETTING screen.

6. Press the button 3 to move to SERVICE REMINDERS screen.

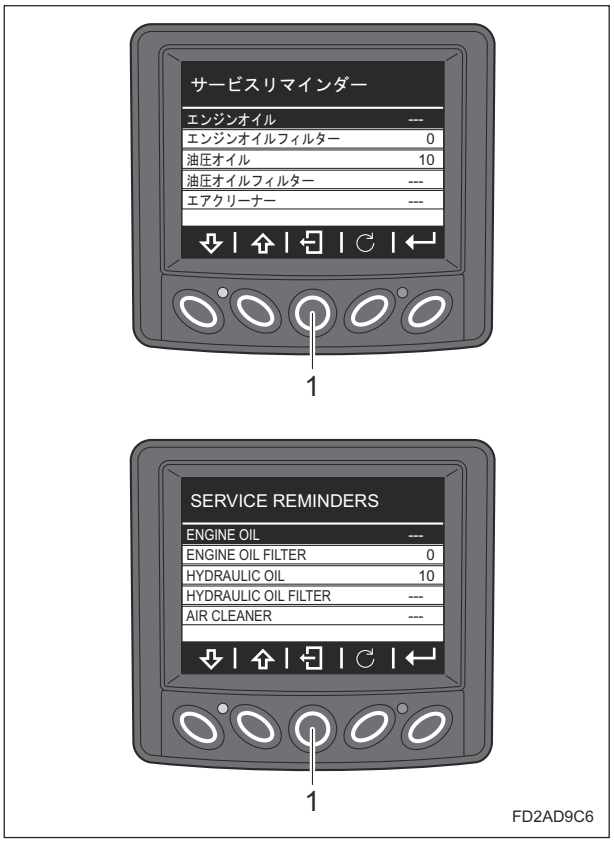


Service Reminders Setting Deletion_005

1	Button 3

7. The hours in SERVICE REMINDERS screen are changed.
   Make sure that "---" appears instead of hours.

8. Press the button 3 to move to MENU screen.



Service Reminders Setting Deletion_006

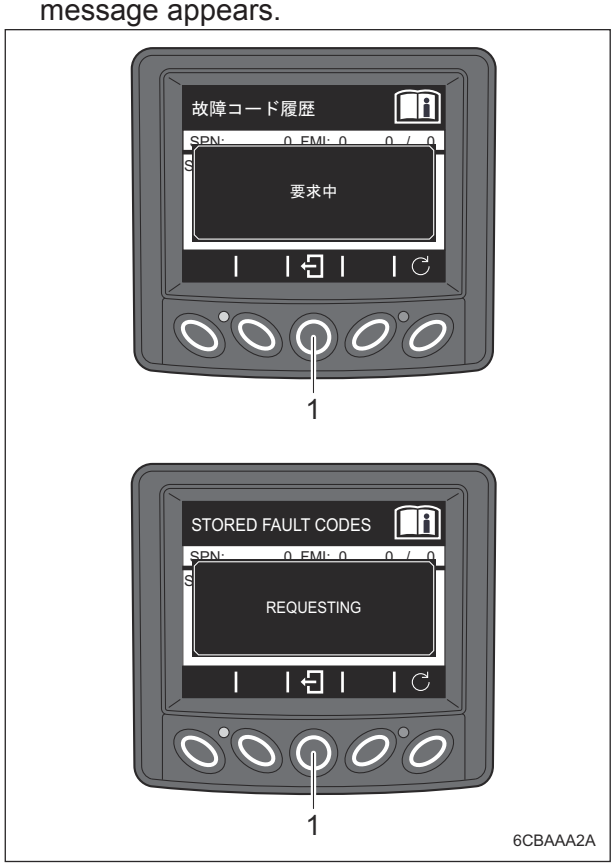
1	Button 3

Description of Functions

Stored Fault Codes

With "STORED FAULT CODES", the past fault codes can be checked.

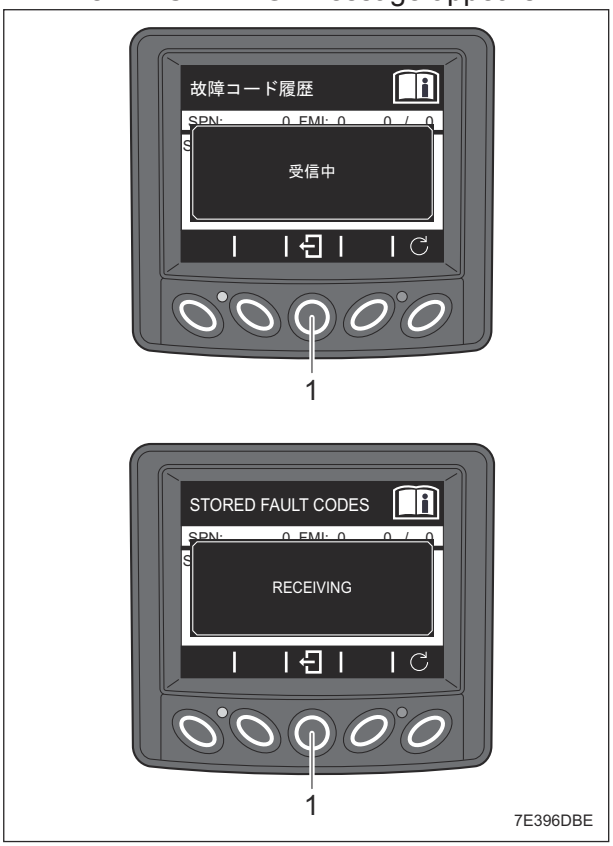
1. Once "STORED FAULT CODES" is selected, the monitor automatically requests the engine ECU to send the stored fault codes while "REQUESTING" message appears.



Stored Fault Codes_001

1	Button 3

2. The monitor receives the stored fault codes while "RECEIVING" message appears.

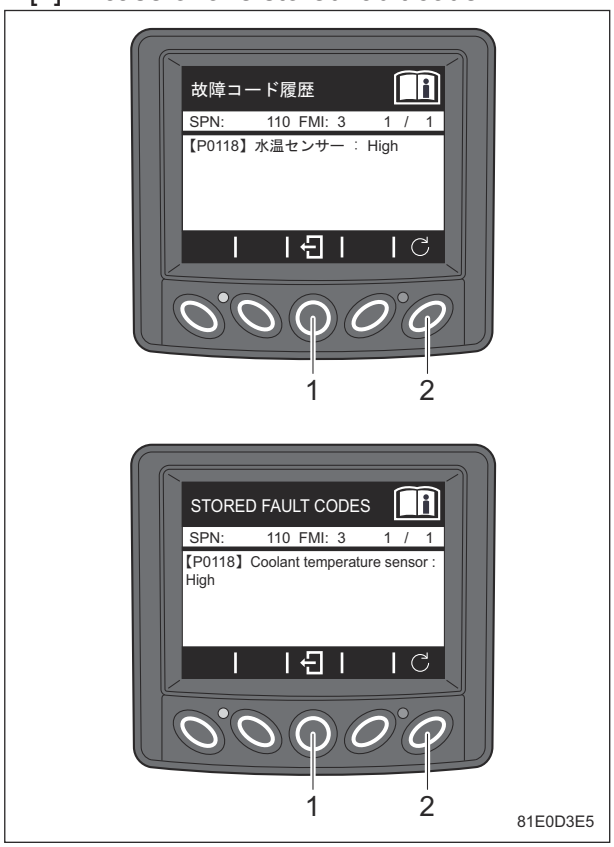


Stored Fault Codes_002

1	Button 3

3. The stored fault codes appear after the reception completed.
   Note:
   Press "Button 5" if you would like to receive "STORED FAULT CODES" again.

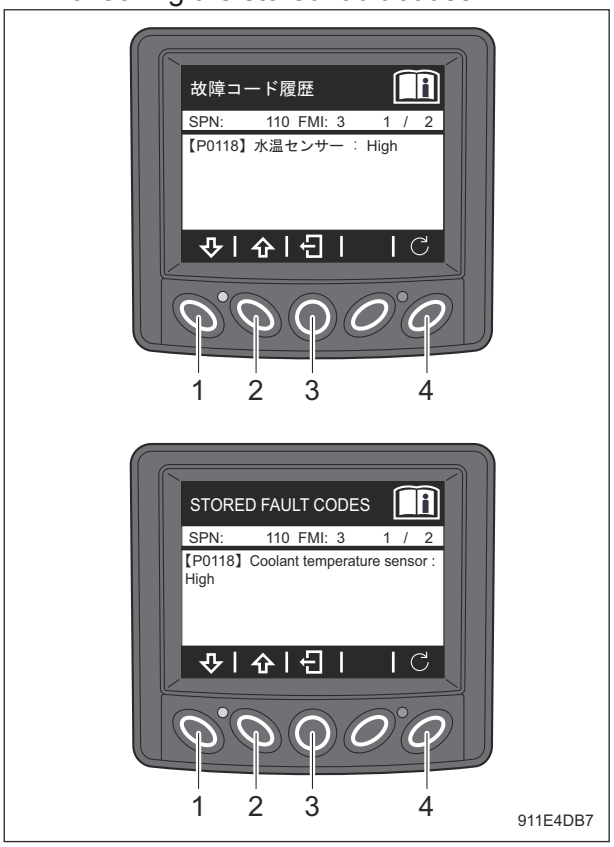
[1] In case of one stored fault code



Stored Fault Codes_003

1	Button 3
2	Button 5

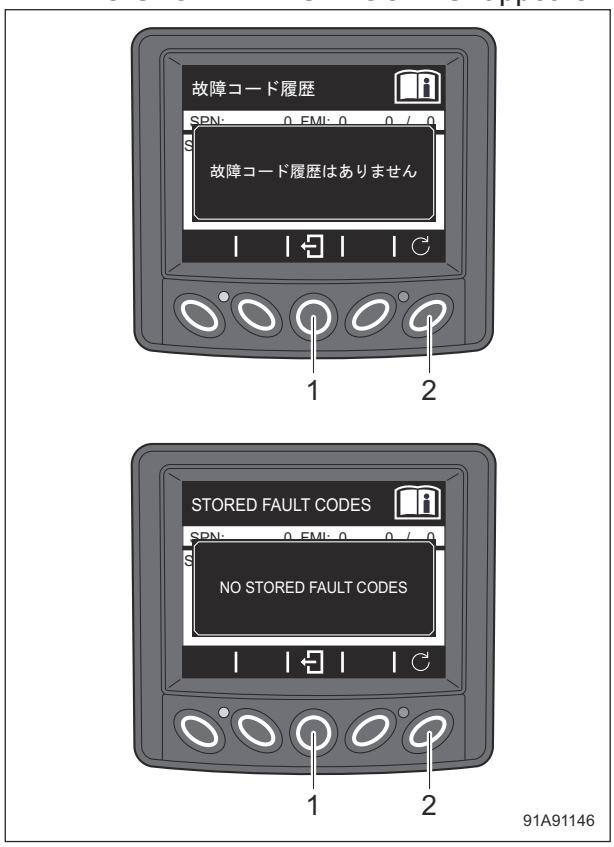
[2] In case of plural stored fault code
   The arrows of "↓" and "↑" appear in the bottom of the monitor display.
   Press "Button 1" or "Button 2" for checking the stored fault codes.



Stored Fault Codes_004

1	Button 1
2	Button 2
3	Button 3
4	Button 5

[3] In case of no stored fault code
"NO STORED FAULT CODES" appears.



Stored Fault Codes_005

1	Button 3
2	Button 5

4. Press "Button 3" to move to MENU screen.

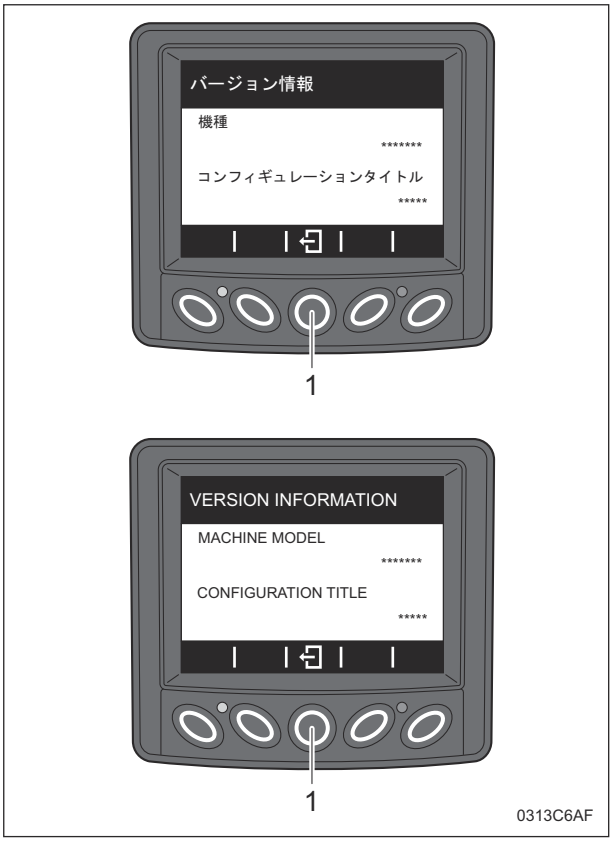
Version Information

With "VERSION INFORMATION", the following information can be confirmed.

1. Selected "MACHINE MODEL"

2. Installed "CONFIGURATION TITLE"

・"Button 3": Move to the MENU screen.



Version Information_001

1	Button 3

System Menu

"SYSTEM MENU" is used when the manufacturer specifies factory default settings or when the dealer reconfigures.

Important

No adjustments by the operator are necessary.

Descriptions of Displayed Icons

1. The following icons appear in the GAUGE screen.

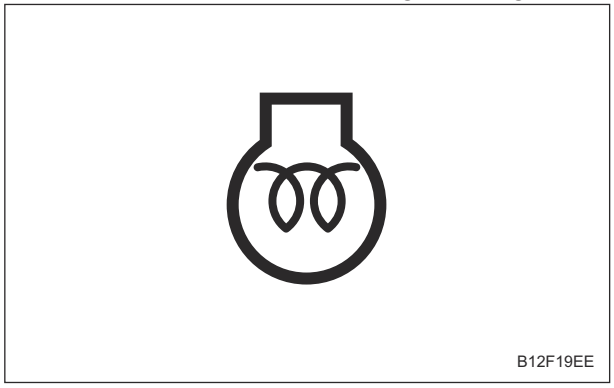
[1] Cleaning index icon
The icon appears when the cleaning index is 50 %, 75 % or 100 %. The number in the icon changes depending on the index. The icon appears only for the machine mounted with EU Stage V engine.

Descriptions of Displayed Icons_001

[2] Service icon
The icon appears when the deadline expires on a service reminder.

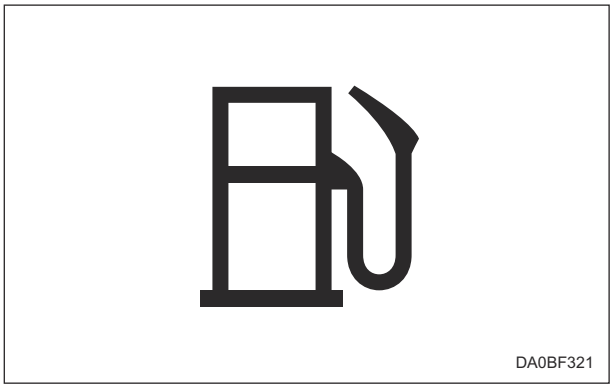
Descriptions of Displayed Icons_002

[3] Preheat icon
The icon appears when preheating the engine.
It appears with a preheating message.



Descriptions of Displayed Icons_003

[4] Refuel icon
The icon appears and blinks when the remaining fuel decreases to less than 10 %.



Descriptions of Displayed Icons_004

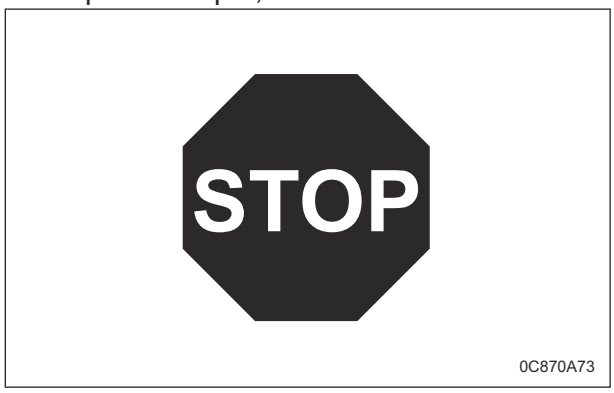
[5] Warning icon
The icon appears when the fault code (DTC) advised.

Descriptions of Displayed Icons_005

[6] STOP icon
The icon appears when the fault code (DTC) including engine stop advised.

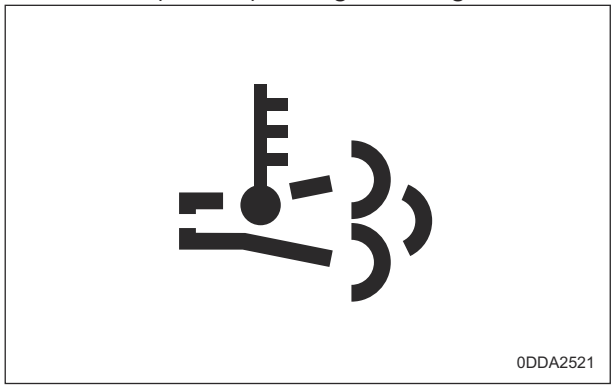
- Lighting: The engine is forcibly stopped with the engine ECU processing.
- Fast blinking (Repeat of lighting up and off every 0.1 seconds): It recommends the operator to stop the engine.

・Slow blinking (Repeat of lighting up and off every 2 seconds): The engine may be stopped in the end due to decreasing power output, etc.



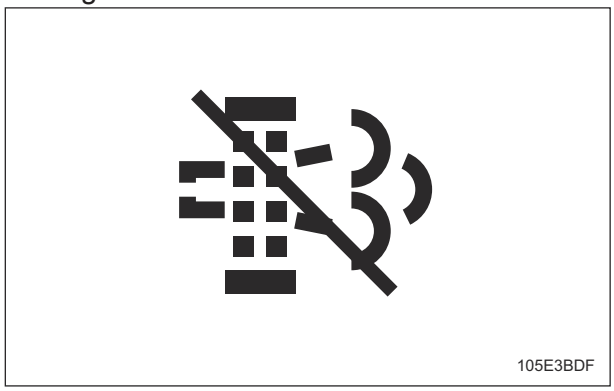
Descriptions of Displayed Icons_006

[7] High exhaust temperature icon
The high exhaust temperature icon lights up when the exhaust temperature reaches 450 °C (842 °F) during DPF regeneration.



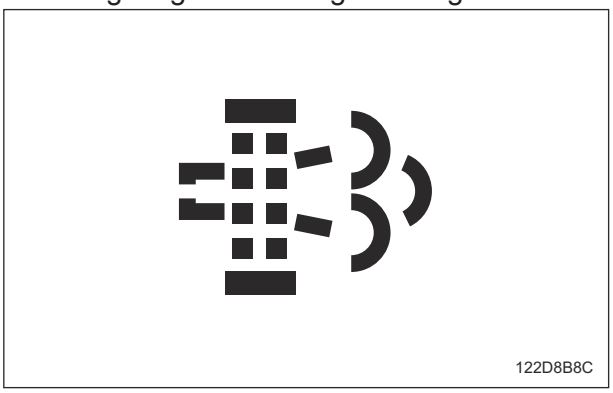
Descriptions of Displayed Icons_007

[8] DPF auto regeneration inhibit icon
The DPF auto regeneration inhibit icon lights up when the DPF auto regeneration inhibit switch is set to the "Auto regeneration inhibit mode".



Descriptions of Displayed Icons_008

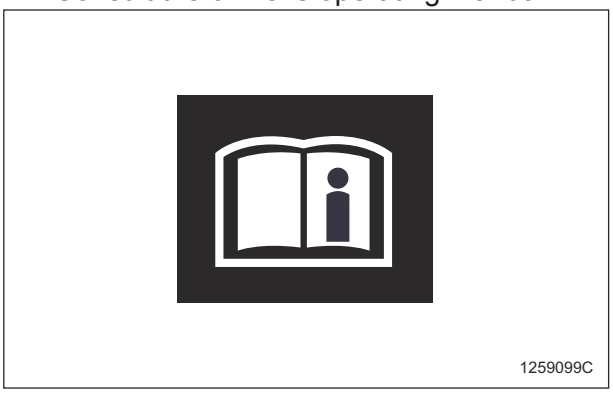
[9] DPF regeneration icon
The DPF regeneration icon appears with DPF regeneration request or during DPF regeneration.
・Blinking: Requesting DPF regeneration
・Lighting: Performing DPF regeneration



Descriptions of Displayed Icons_009

2. The following icon appears in the message screens except the GAUGE screen.

[1] Consulting manual icon
Consult the owner's operating manual.



Descriptions of Displayed Icons_010

Descriptions of Pop-up Messages

These pop-up messages appear in the monitor display.

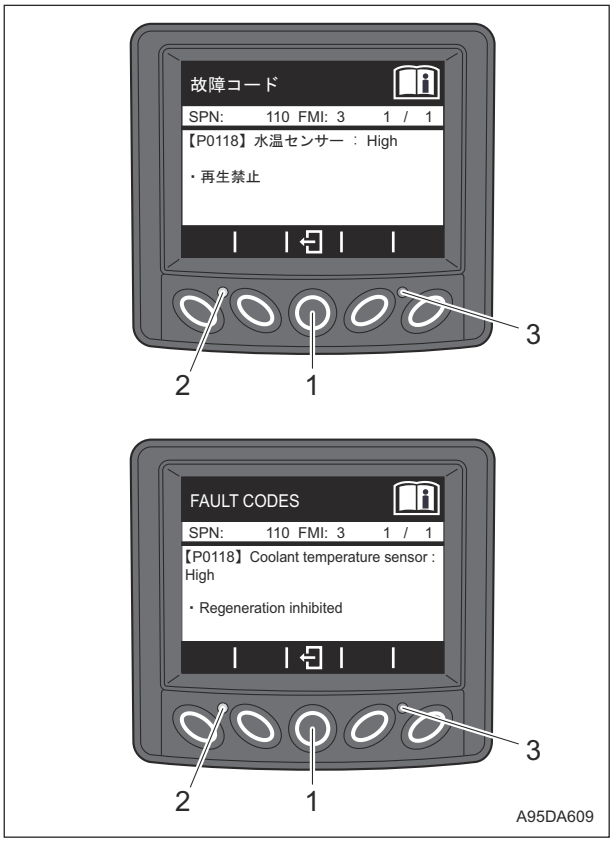
- FAULT CODES
- SERVICE REMINDERS
- DPF CLEANING ALARM

Fault Codes

Important

When the fault code (DTC) appears in the monitor display, contact your dealer.

1. A fault code (DTC) appears in the monitor display and the red or yellow LED lights up when a failure occurs on the function of engine.
   ■ These are the pop-up messages and display examples in brackets.
   [1] SPN: (110)
   [2] FMI: (3)
   [3] Page number of the displayed fault code/ Total number of pages of fault codes for the current failures: (1/1)
   [4] P-code and fault code name: (【P0118】 Coolant temperature sensor: High)
   [5] Limitation of the engine ECU and recommended action: (Regeneration inhibited)

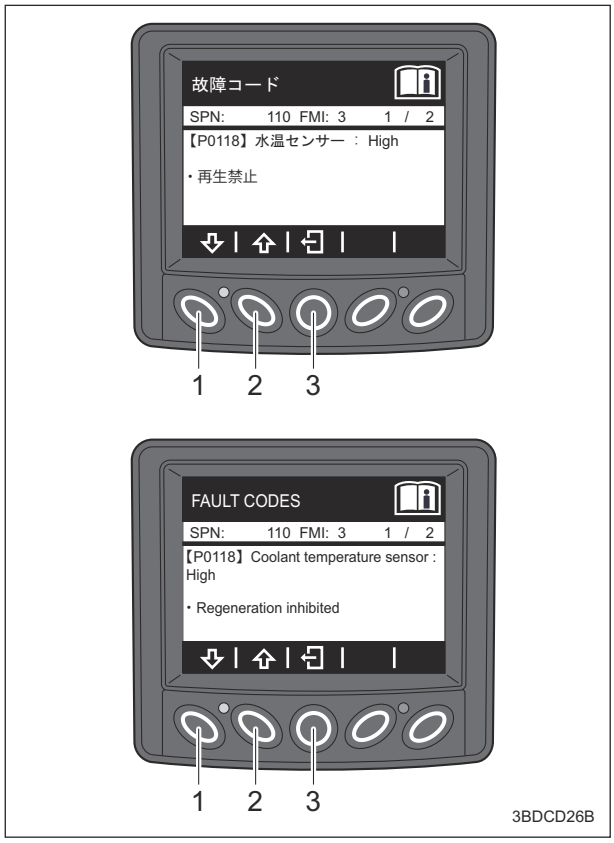


Fault Codes_001

1	Button 3
2	Yellow LED
3	Red LED

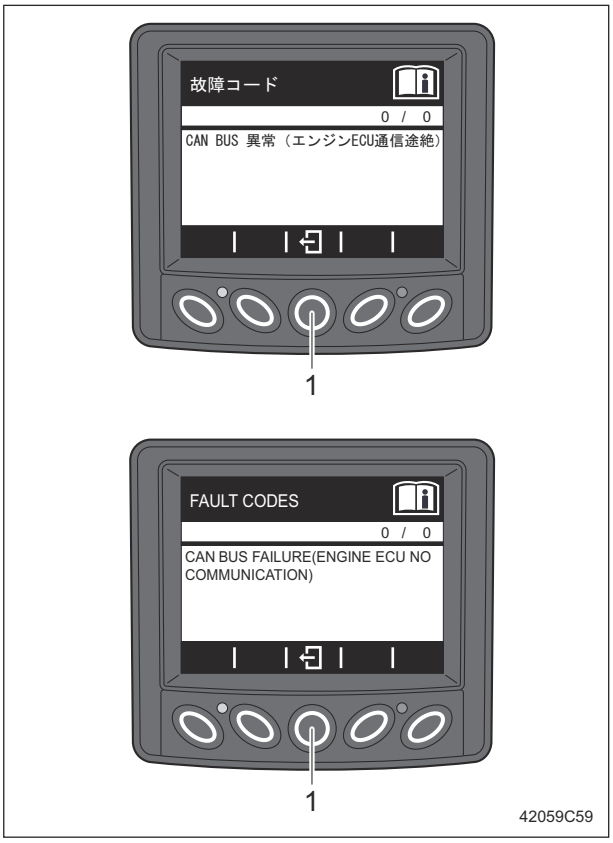
Note 1:
Each fault code is displayed in one page. When the total number of the fault codes appearance is two or more, the arrows "↓" and "↑" appear in the bottom left of the monitor screen.
You can move to another page with pressing Button 1 or 2 for checking all of the current fault codes.

Description of Functions



Fault Codes_002

1	Button 1
2	Button 2
3	Button 3



Fault Codes_003

1	Button 3

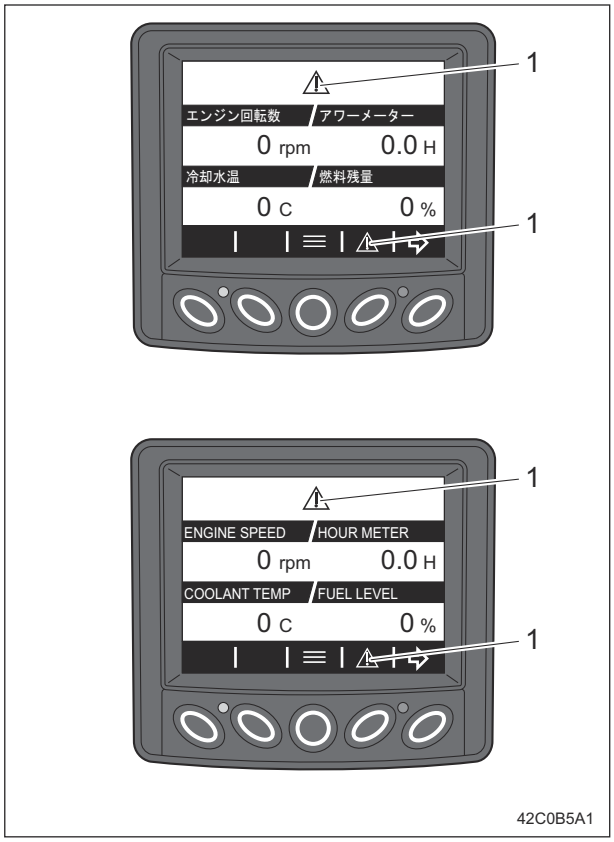
Note 2:
When the monitor is out of communication with the engine ECU, the message "CAN BUS FAILURE (ENGINE ECU NO COMMUNICATION)" appears.
Possible causes are "Engine ECU is switched off" or "CAN line is disconnected", etc.

2. Follow the instruction from "Recovery from error" of "List of Fault Codes."

Important

When "FAULT CODES" and "SERVICE REMINDERS" are advised at the same time, "SERVICE REMINDERS" appears with pressing "Button 3".

3. When the fault code (DTC) appears, move to GAUGE screen with pressing "Button 3". Warning icons appear in the GAUGE screen.



Fault Codes_004

1	Warning icon

4. Turn the ignition key to the "OFF" position.
5. If the cause of the fault code (DTC) has been resolved, the warning icon disappears when the ignition key is set to the "ON" position again.

Service Reminders

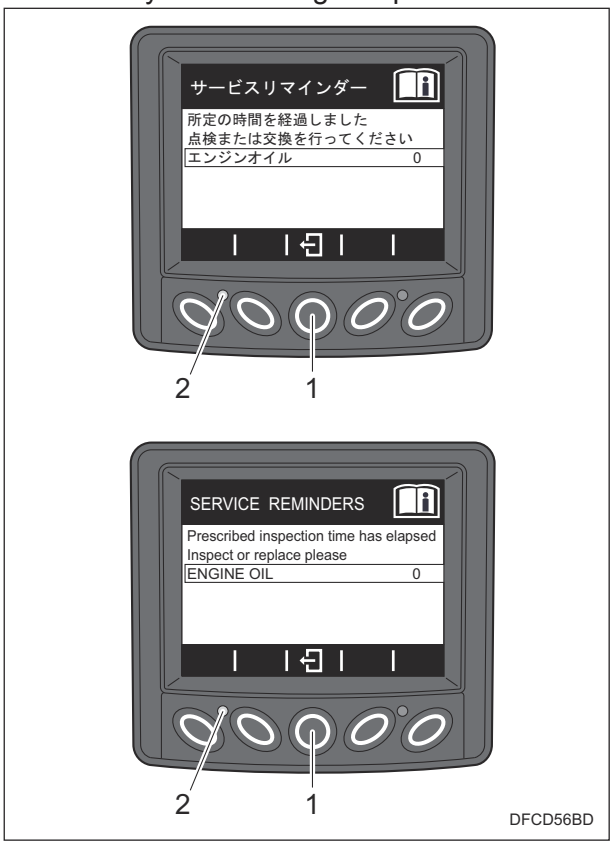
Important

When the service reminder advised, immediately perform inspection or replacement.

Important

When "SERVICE REMINDERS" and "FAULT CODES" or "DPF CLEANING ALARM" are advised at the same time, "SERVICE REMINDERS" appears with pressing "Button 3".

1. When the setup time in SERVICE REMINDERS has elapsed, the pop-up message appears in the monitor display and the yellow LED lights up.



Service Reminders_001

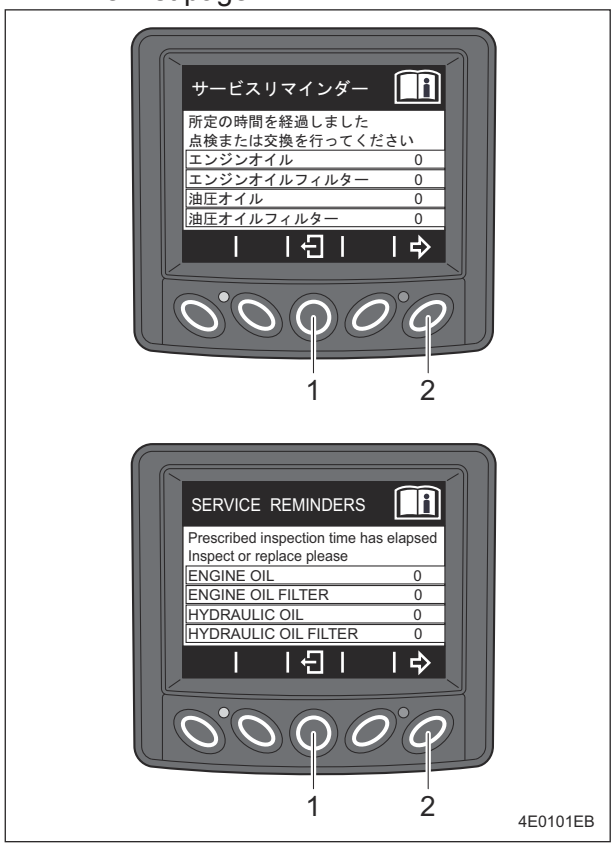
1	Button 3
2	Yellow LED

Note:
All of the items of the appropriate service reminders appear when two or more of service reminders should be advised.

Description of Functions

When five items should be advised for example, they appear in two pages. In that case, the arrows "←" and "→" appear in the bottom of the monitor display.
You can move to another page with pressing "Button 1" or "Button 5" to check all of the advised items.

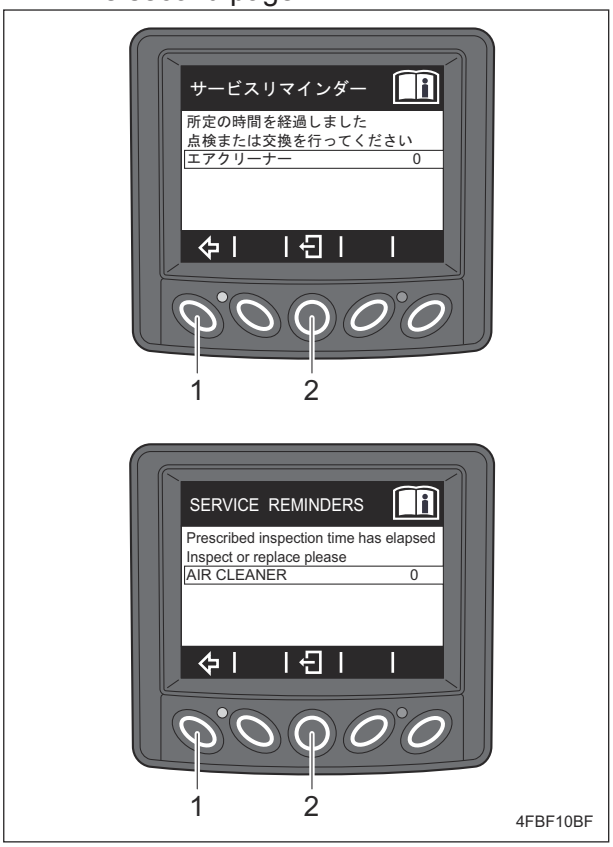
・The first page



Service Reminders_002

1	Button 3
2	Button 5

・The second page

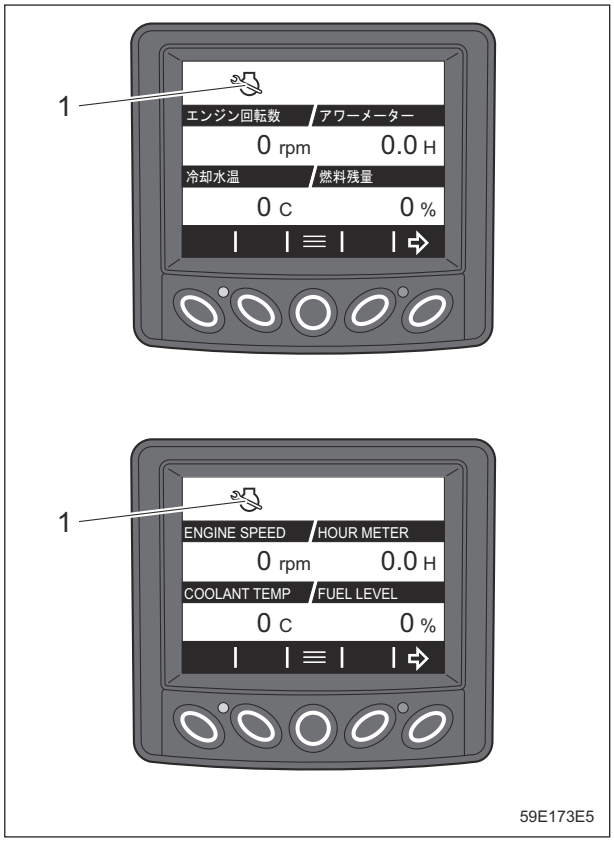


Service Reminders_003

1	Button 1
2	Button 3

2. Inspect or replace on the advised item of SERVICE REMINDERS.

3. Move to GAUGE screen with pressing "Button 3" when the message displayed. The service icon appears in GAUGE screen.



Service Reminders_004

1	Service icon

4. The pop-up message and the service icon will disappear if resetting the service reminder or changing the setup time.

DPF Cleaning Alarm

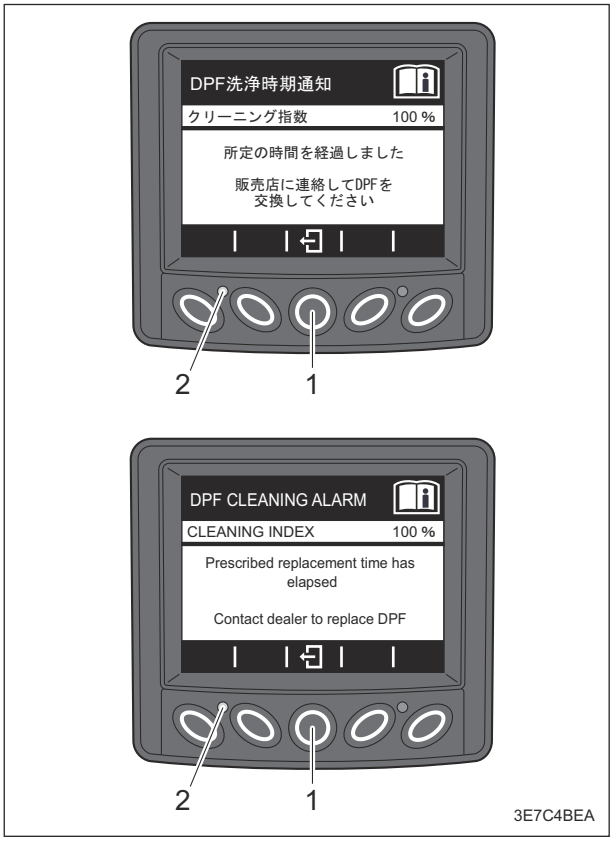
Note:
This function is appropriate only for the machine mounted with EU Stage V engine.

Important

When DPF CLEANING ALARM appears, contact your dealer.

1. When the prescribed time of Ash Timer has elapsed, the pop-up message appears in the monitor display and the yellow LED lights up.

[1] When the prescribed time of Ash Timer has elapsed



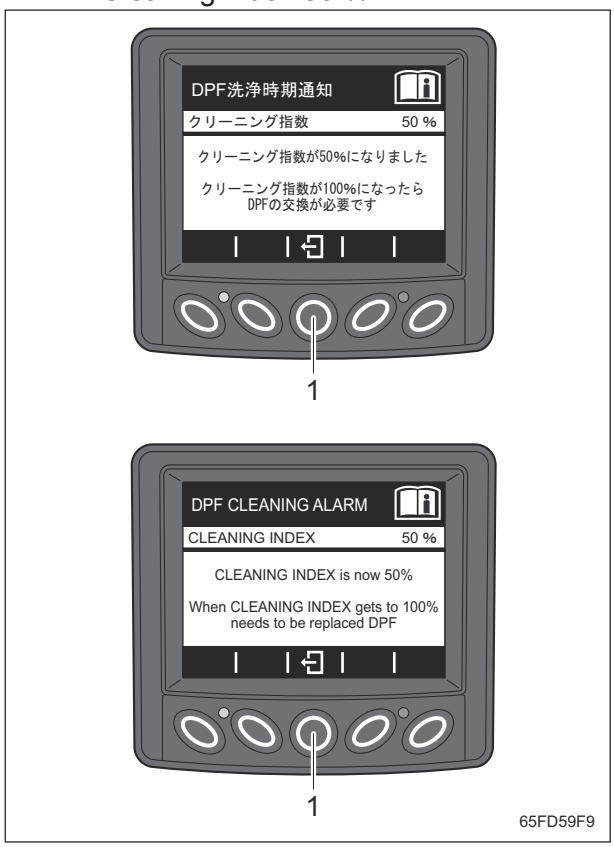
DPF Cleaning Alarm_001

1	Button 3
2	Yellow LED

Description of Functions

[2] When the prescribed time of Ash Timer has not elapsed yet and the cleaning index is 50 % or more

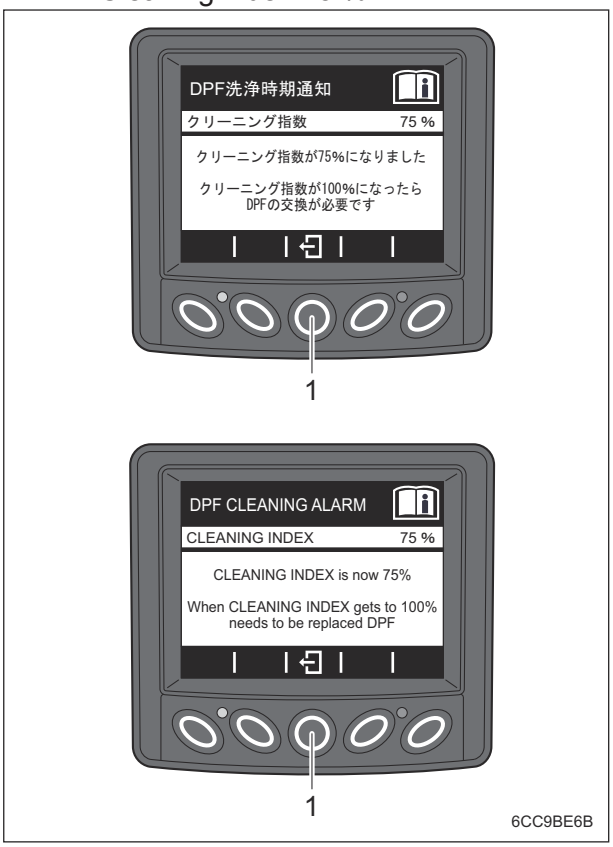
・Cleaning index 50 %



DPF Cleaning Alarm_002

1	Button 3

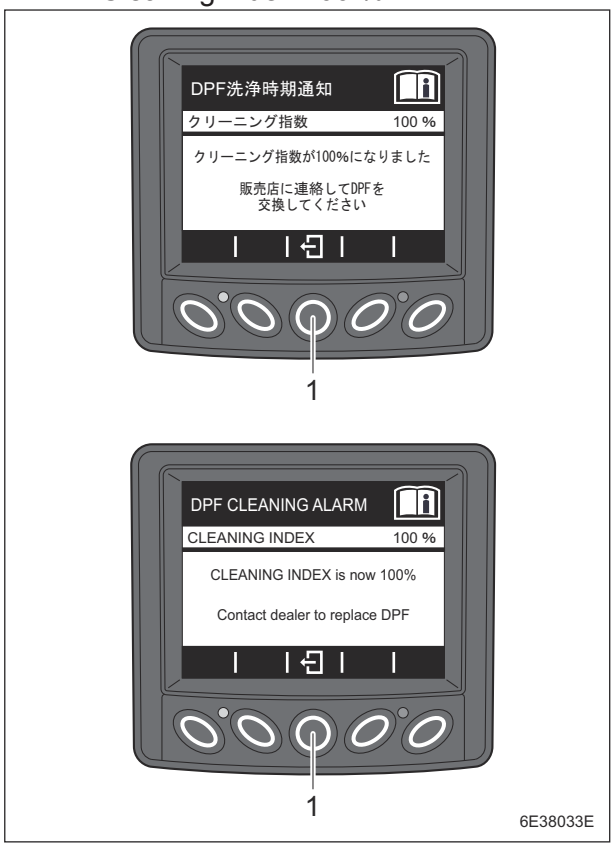
・Cleaning index 75 %



DPF Cleaning Alarm_003

1	Button 3

・Cleaning index 100 %



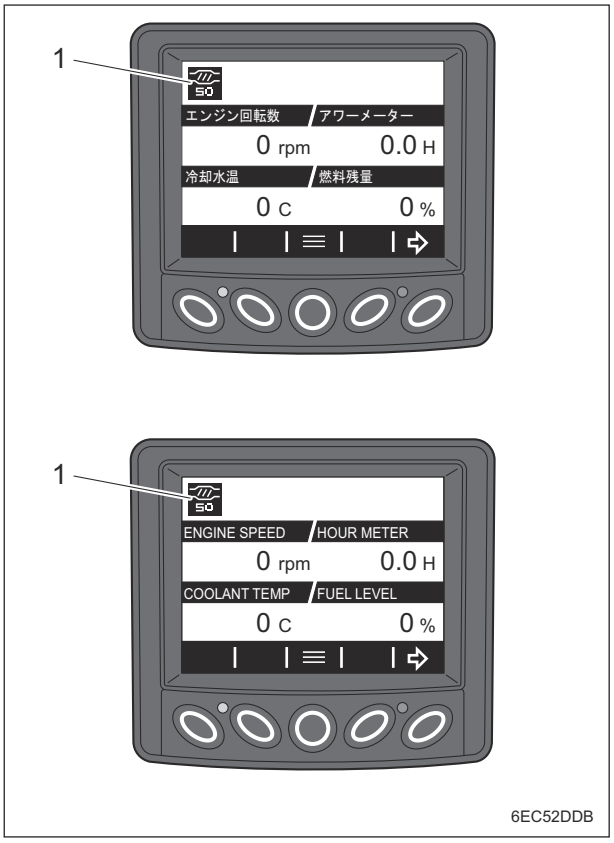
DPF Cleaning Alarm_004

1	Button 3

Important

When "DPF CLEANING ALARM" and "SERVICE REMINDERS" are advised at the same time, "SERVICE REMINDERS" appears with pressing "Button 3".

2. Move to GAUGE screen with pressing "Button 3" when the message displayed. The cleaning index icon appears in GAUGE screen.



DPF Cleaning Alarm_005

1	Cleaning index icon

3. Replace DPF.
4. The pop-up message and the cleaning index icon will disappear if resetting Ash Timer with the Diagmaster after replacing DPF.

Description of Functions

Engine

Handling Emission Control Compliant Engine

Important

When performing maintenance or repairs on this engine, only use dedicated replacement parts specified in the relevant Kubota "Illustrated Parts List," and only perform the maintenance work described in the Kubota "Operator's Manual", " Workshop Manual" or "Diagnosis Manual."
Using incorrect replacement parts or parts that comply with different levels of emission control may result in incompliance with emission control as follows.

The engine installed in this vehicle meets emission control as follows for "non-road emission regulation."
○: Compliant
×: Incompliant
—: Not applicable

		Tier 4 emission control	EU Stage ⅢB	EU Stage Ⅴ	US EPA Tier4
LM	LM2710	○	-	x	○
	LM3210	○	○	x	○
	LM3210A	○	-	○	○
	LM551A	○	-	x	○
	LM551B	○	-	○	○
GM	GM2810	○	○	x	○
	GM2810A	○	-	○	○
Machines for maintenance	FS1710	○	-	x	x
HM	HM5500	○	-	x	x
U	ULM270	○	-	x	x
	ULM271	○	-	x	x
	ULM272	○	-	x	x

DPF

Precautions for DPF

⚠ Danger

Since it will become hot around the exhaust outlet during DPF regeneration, do not perform DPF regeneration in a location where fires may occur.

⚠ Caution

Normally, set to "Auto regeneration mode". Accordingly, DPF auto regeneration inhibit icon disappears.
However, when operating in a location where fires may occur, set to "Auto regeneration inhibit mode".

Important

When the system enters the level where DPF regeneration is required, perform the regeneration immediately.
Interrupting the regeneration or ignoring the warning may cause the engine and DPF to malfunction.

Important

Do not repeat unnecessary DPF regeneration or interrupting regeneration.
If repeating them, the measured level of engine oil may increase since the engine oil is mixed with a slight amount of fuel, accompanied by quality degradation.

Important

Perform DPF regeneration when the engine is sufficiently warmed up.

DPF Regeneration and Replacement

The DPF is a purifying filter that collects PM (soot) from exhaust gas.
When a certain amount of PM (soot) has accumulated, DPF regeneration must be performed automatically or manually in order to restore the filtering function.
DPF regeneration is to burn the PM (soot) which the DPF collects at high temperature of exhaust with the engine ECU controlling intake air mass and fuel injection.
In case that the PM or ash accumulates excessively in the DPF, the DPF is not allowed to be regenerated, but required to be replaced.

■Conditions for DPF Regeneration

Important

If DPF regeneration is interrupted before it is completed, the next regeneration may be requested soon since not all of the PM (soot) was removed.

Important

DPF regeneration is interrupted when any condition of regeneration is not met or the ignition key is turned to the "OFF" position during DPF regeneration.

1. DPF auto regeneration does not start unless both of the following two conditions are met.
   - The DPF auto regeneration inhibit switch is set to the "Auto regeneration mode".
     Accordingly, DPF auto regeneration inhibit icon disappears.
   - The coolant temperature is 50 °C (122 °F) or more.
2. DPF parked regeneration and manual regeneration do not start unless all of the following five conditions are met.
   - The DPF auto regeneration inhibit switch is set to the "Auto regeneration mode".
     Accordingly, DPF auto regeneration inhibit icon disappears.
   - The parking brake is applied.
   - The traveling pedal is in the neutral position.
   - The engine rotation speed is minimum or idling speed.
   - The coolant temperature is 50 °C (122 °F) or more.

Description of Functions

■PM Accumulation Level

The following table shows the regeneration method and the machine status in each PM accumulation level.

PM accumulation level	DPF regeneration method	Displayed fault code	Monitor LED	Engine output limit
Level 0	Not required	No fault code	No light	No limit
Level 1	Auto/Parked	No fault code	No light	No limit
Level 2	Auto/Parked	No fault code	No light	No limit
Level 3	Parked	Excessive PM3	Yellow light	50 %
Level 4	Manual	Excessive PM4	Yellow light	50 %
Level 5	DPF replacement	Excessive PM5	Red light	50 %

■DPF Auto Regeneration

Important

During DPF auto regeneration, you can operate this machine for the other work.

Important

DPF auto regeneration is activated only in "Auto regeneration mode". DPF auto regeneration inhibit icon disappears.

Important

Keep engine rotation at 2200 rpm or more during DPF auto regeneration.
If auto regeneration is activated continuously below the specified speed of engine rotation, the engine and DPF will malfunction.

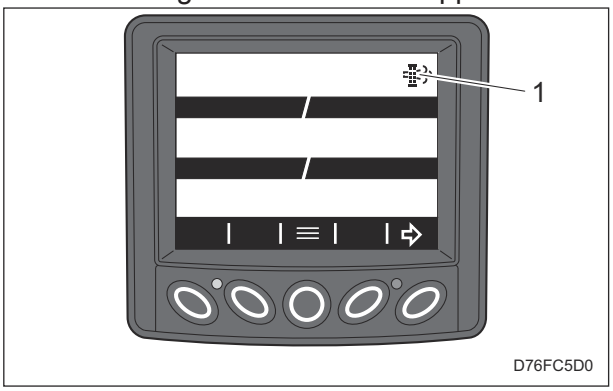
"Auto regeneration" is the automatic control of increasing the exhaust temperature for DPF regeneration.
DPF auto regeneration is activated when PM accumulation level is "Level 1" or "Level 2". However, it may be activated in "Level 0" depending on the other condition.

Important

If DPF regeneration remains uncompleted even after 30 minutes have passed since the start of auto regeneration in PM accumulation "Level 1", PM accumulation level enters "Level 2".

These are the procedures of DPF auto regeneration.

1. In "Auto regeneration mode" or when DPF auto regeneration inhibit icon disappears
   [1] When the conditions for auto regeneration are met, DPF auto regeneration starts with DPF regeneration icon lighting in the monitor display.
   [2] Set the engine rotation speed to 2,200 rpm or more.
   [3] When DPF regeneration completed, DPF regeneration icon disappears.



DPF Auto Regeneration_001

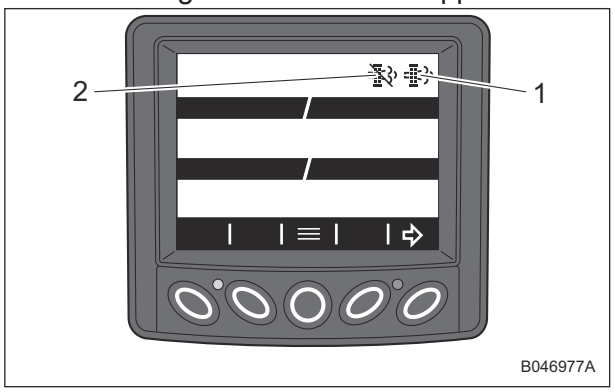
1	DPF regeneration icon

2. In "Auto regeneration inhibit mode" or when DPF auto regeneration inhibit icon appears
   [1] When PM accumulation level enters "Level 1" or "Level 2", the blinking DPF regeneration icon appears in the monitor display.
   [2] Set to the "Auto regeneration mode". DPF auto regeneration inhibit icon disappears.

[3] When the conditions for auto regeneration are met, DPF auto regeneration starts and DPF regeneration icon changes from blinking to lighting.

[4] Set the engine rotation speed to 2,200 rpm or more.

[5] When DPF regeneration completed, DPF regeneration icon disappears.



DPF Auto Regeneration_002

1	DPF regeneration icon
2	DPF auto regeneration inhibit icon

■DPF Parked Regeneration

Important

You can operate this machine to perform DPF parked regeneration.

Important

During DPF parked regeneration, you cannot operate this machine for the other work.

Important

DPF parked regeneration can not be performed in "Auto regeneration inhibit mode". Set to "Auto regeneration mode" to perform it.

"Parked regeneration" is the DPF regeneration forcibly performed, parking this machine in a safe location, when auto regeneration does not reduce the amount of accumulated PM to the specified value. These are the conditions for activating DPF parked regeneration.

- The machine is set in "Auto regeneration mode". DPF auto regeneration inhibit icon disappears.
- The parking brake is applied.
- The traveling pedal is in neutral.
- The engine rotation speed is minimum or idling speed.
- The coolant temperature is 50 °C (122 °F) or more.

Perform DPF parked regeneration in the following statuses.

- PM accumulation level is "Level 1" or "Level 2".
- Fault code "Excessive PM3" appears in the monitor display.

These are the procedures of DPF parked regeneration.

1. In "PM accumulation Level 1" or "Level 2":

Important

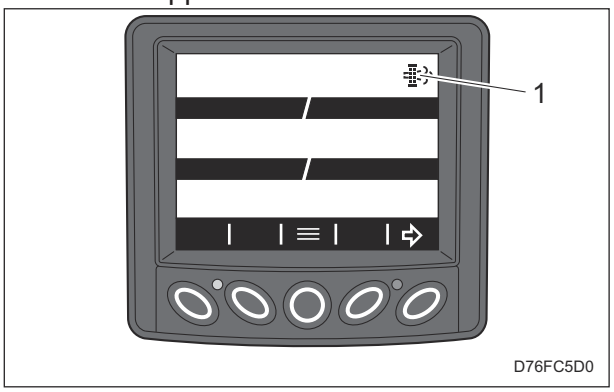
If DPF regeneration remains uncompleted in auto regeneration, parked regeneration is required with the blinking DPF regeneration icon.

Important

If you continue to ignore the parked regeneration requirement in PM accumulation "Level 1" or "Level 2", PM accumulation level enters "Level 3".

[1] The blinking DPF regeneration icon appears.

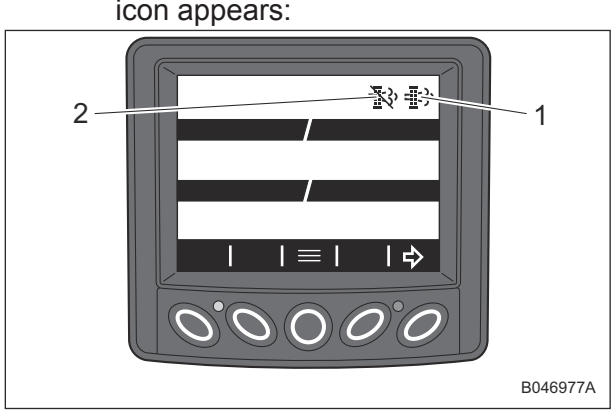
- In "Auto regeneration mode" or when DPF auto regeneration inhibit icon disappears:



DPF Parked Regeneration_001

1	DPF regeneration icon

・In "Auto regeneration inhibit mode" or when DPF auto regeneration inhibit icon appears:



DPF Parked Regeneration_002

1	DPF regeneration icon
2	DPF auto regeneration inhibit icon

[2] Park this machine in a safe location immediately.
[3] Apply the parking brake.
[4] Set the engine to minimum rotation speed or idling speed.
[5] If the machine is set in "Auto regeneration inhibit mode," set it to the "Auto regeneration mode."
[6] Set to "Parked regeneration (Engaged)."
[7] Parked regeneration starts and DPF regeneration icon changes from blinking to lighting.
[8] When DPF regeneration completed, DPF regeneration icon disappears.

2. When fault code "Excessive PM3" appears:

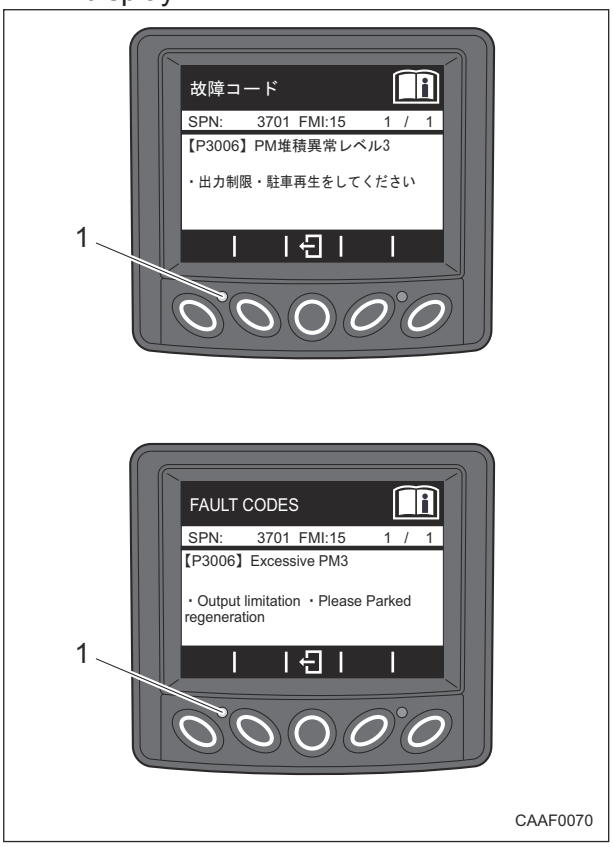
Important

If you continue to ignore the parked regeneration requirement in PM accumulation "Level 3", PM accumulation level enters "Level 4".
If you still continue to ignore the requirement, you will not be able to operate this machine for DPF regeneration.

Important

DPF auto regeneration can not be activated in PM accumulation "Level 3".
Perform parked regeneration immediately.

[1] The engine output is limited at 50 %.
[2] The Monitor LED (yellow) lights up.
[3] "Excessive PM3" appears in the monitor display.



DPF Parked Regeneration_003

1	LED (yellow)

[4] Park this machine in a safe location immediately.
[5] Apply the parking brake.
[6] Set the engine to minimum rotation speed or idling speed.
[7] If the machine is set in "Auto regeneration inhibit mode," set it to the "Auto regeneration mode."
[8] Set to "Parked regeneration (Engaged)."
[9] DPF parked regeneration starts and DPF regeneration icon changes from blinking to lighting.
[10] When DPF regeneration is completed, DPF regeneration icon disappears.

■DPF Manual Regeneration

Important

You cannot perform DPF manual regeneration.
Contact your dealer for DPF manual regeneration.

The expert performs "DPF Manual regeneration" with the fault diagnostic tool when normal auto regeneration or parked regeneration can not complete regeneration since large amount of PM accumulates.
DPF manual regeneration is activated when the following condition met.

- When replacing DPF in any PM accumulation level
- When replacing ECU in any PM accumulation level
- When fault code "Excessive PM4" appears

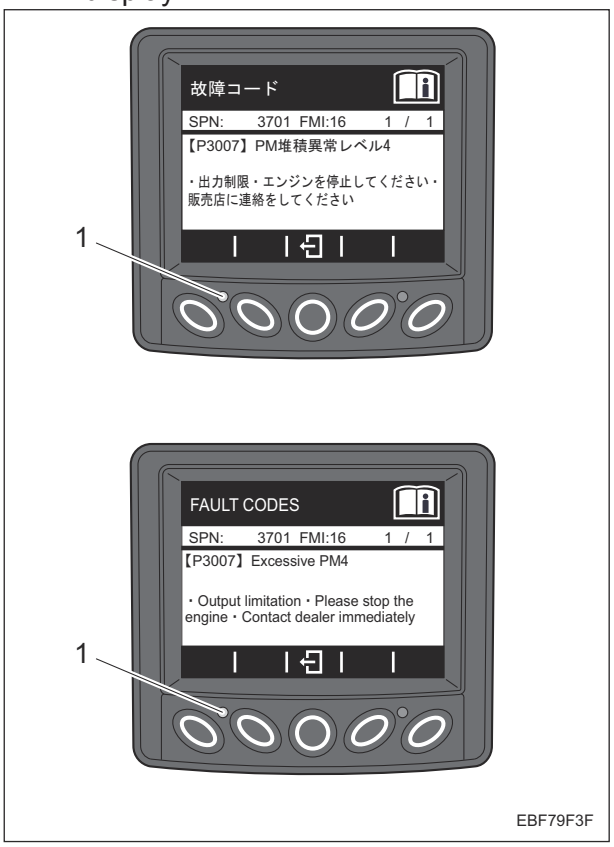
Follow these procedures to request DPF manual regeneration.

1. When replacing DPF:
   Contact your dealer for manual regeneration.
2. When replacing ECU:
   Contact your dealer for manual regeneration.
3. When fault code "Excessive PM4" appears:

Important

If you continue to ignore the manual regeneration requirement in PM accumulation "Level 4", PM accumulation level enters "Level 5".
If you still continue to ignore the requirement, serious troubles will occur on the engine and DPF.

[1] The engine output is limited at 50 %.
[2] The Monitor LED (yellow) lights up.
[3] "Excessive PM4" appears in the monitor display.



DPF Manual Regeneration_001

1	LED (yellow)

[4] Park this machine in a safe location immediately.
[5] Apply the parking brake.
[6] Stop the engine.
[7] Contact your dealer for manual regeneration.

Description of Functions

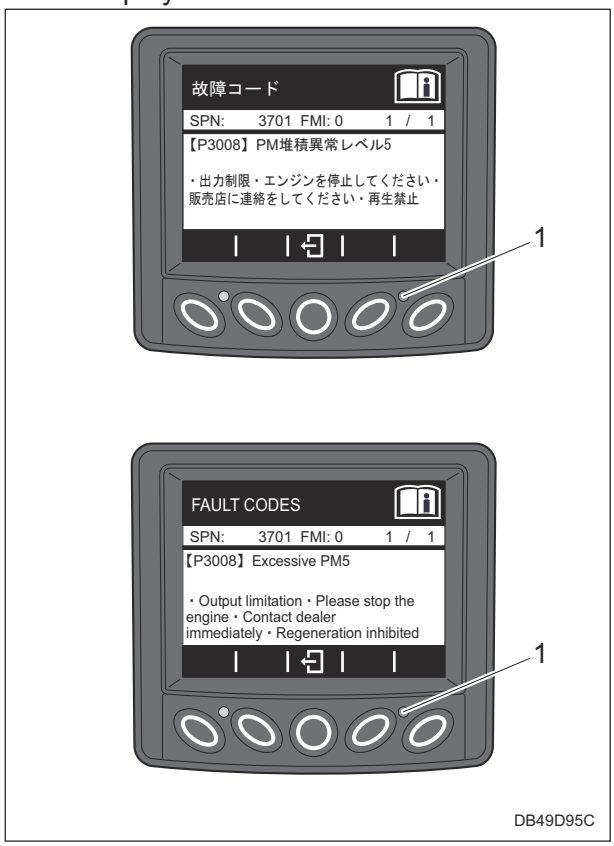
■Replacement of DPF

Note:
This machine features a function of "DPF Cleaning Alarm".
When PM and ash accumulate excessively in the DPF, the DPF is required to be replaced since DPF regeneration is prohibited.
DPF is replaced in the following statuses.

- When cleaning index of "DPF Cleaning Alarm" reaches to 100 %
- When fault code "Excessive PM5" appears in the monitor display
- When fault code "High frequency of regeneration" appears in the monitor display

Follow these procedures to request DPF replacement.

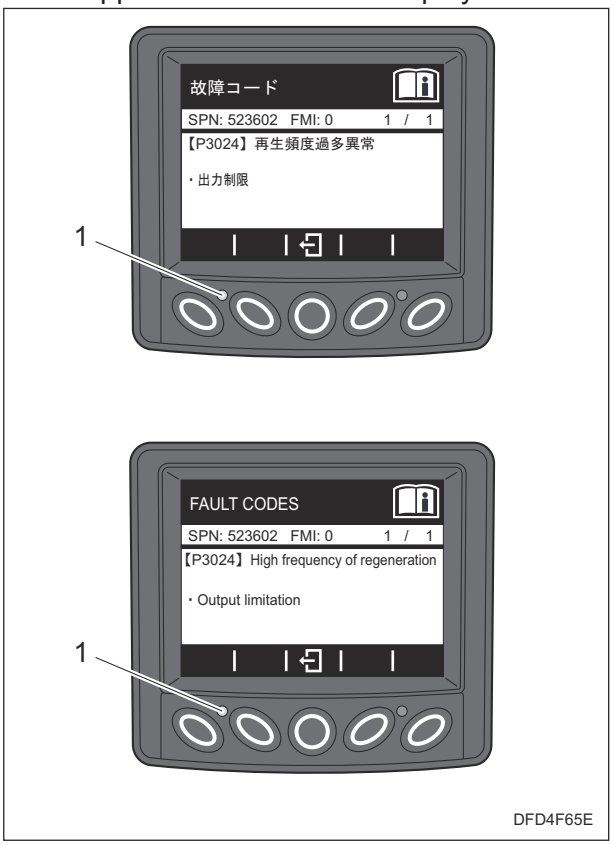
1. When cleaning index of "DPF Cleaning Alarm" reaches to 100 %:
   Contact your dealer for DPF replacement.
2. In PM accumulation "Level 5":
   [1] The engine output is limited at 50 %.
   [2] The Monitor LED (red) lights up.
   [3] "Excessive PM5" appears in the monitor display.



Replacement of DPF_001

1	LED (red)

   [4] Park this machine in a safe location immediately.
   [5] Apply the parking brake.
   [6] Stop the engine.
   [7] Contact your dealer for DPF replacement.
3. When fault code "High frequency of regeneration" appears in the monitor display:
   [1] The engine output is limited at 50 %.
   [2] The Monitor LED (yellow) lights up.
   [3] "High frequency of regeneration" appears in the monitor display.



Replacement of DPF_002

1	LED (yellow)

   [4] Park this machine in a safe location immediately.
   [5] Apply the parking brake.
   [6] Stop the engine.
   [7] Contact your dealer for DPF replacement.

Relationship between PM Accumulation Level and DPF Regeneration

Important

In "Auto regeneration inhibit mode", any DPF regeneration of "Auto", "Parked" and "Manual" is prohibited.
Cancel "Auto regeneration inhibit mode" to perform DPF regeneration.

In "Auto regeneration mode" or when DPF auto regeneration inhibit icon disappears:

	Level 0	Level 1		Level 2		Level 3	Level 4	Level 5
DPF auto regeneration inhibit icon	Disappear	Disappear	Disappear	Disappear	Disappear	Disappear	Disappear	Disappear
DPF regeneration icon	Disappear	Lighting	Blinking → Lighting	Lighting	Blinking → Lighting	Blinking → Lighting	Blinking → Lighting	Blinking
Displayed fault code	No fault code	No fault code	No fault code	No fault code	No fault code	Warning	Warning	Warning
Monitor LED	No light	No light	No light	No light	No light	Yellow light	Yellow light	Red light
Engine output limit	No limit	No limit	No limit	No limit	No limit	50 %	50 %	50 %
Auto regeneration	Not required	Required	Not available	Required	Not available	Not available	Not available	DPF regeneration impossible
	Available	Available		Available				
Parked regeneration	Not required	Not available	Required	Not available	Required	Required	Not available	DPF regeneration impossible
	Available		Available		Available	Available		
Manual regeneration	Not required	Not required	Not required	Not required	Not required	Not required	Required	DPF regeneration impossible
	Available	Available	Available	Available	Available	Available	Available	
Remedy	-	-	DPF parked regeneration switch OFF → ON	-	DPF parked regeneration switch OFF → ON	DPF parked regeneration switch OFF → ON	Manual regeneration with fault diagnostic tool	Replacement of DPF
Continuous work	Possible	Possible	Impossible	Possible	Impossible	Impossible	Impossible	Impossible

Operations before Service

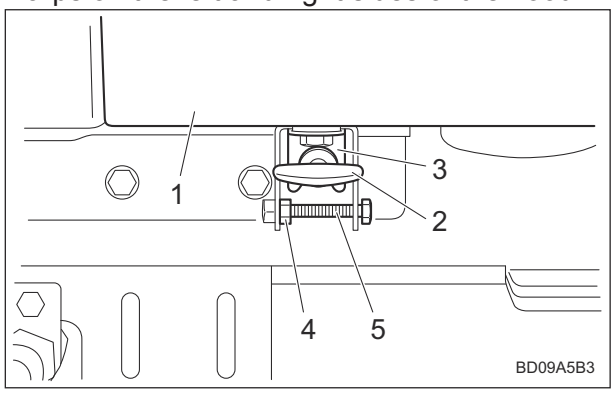
The following sections describe the preparatory works required before performing the services including inspection, adjustment, cleaning. maintenance and repair.

Procedure to Open/Close 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.

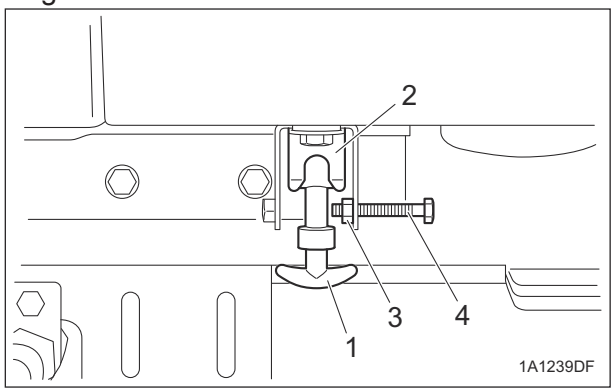
1. Remove the nuts and bolts locking the catch clips on the left and right sides of the hood.



Procedure to Open/Close Hood_001

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

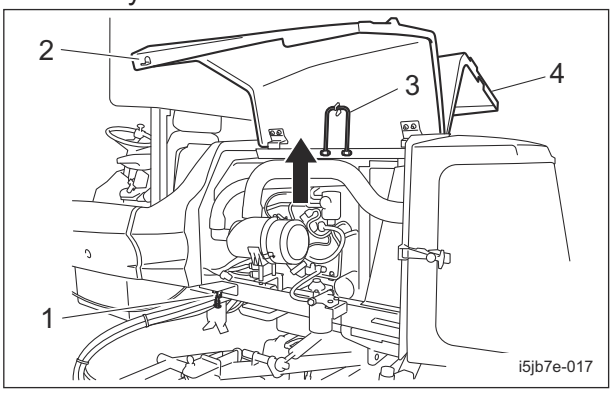
2. Release the rubber catches on the left and right sides.



Procedure to Open/Close Hood_002

1	Rubber catch
2	Catch clip
3	Nut
4	Bolt

3. Lift up the hood.
4. Hook the hood stay on the receiver on the back side of the hood.
   Make sure that the hood is fixed, and then release your hands.



Procedure to Open/Close Hood_003

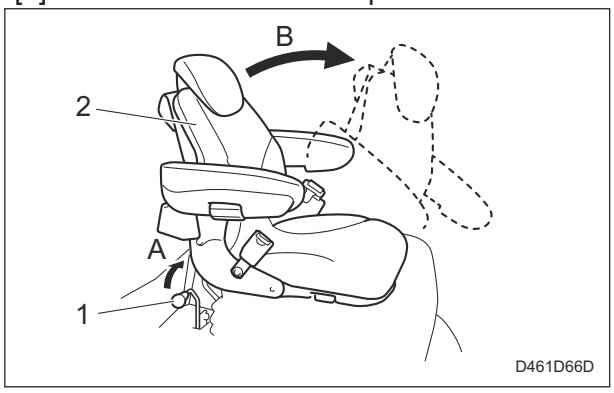
1	Hood stay
2	Hood cover (LH)
3	Hood cover (RH)

5. Release the hood stay, and then 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 underseat cover.

1. Procedure to open the underseat cover
   [1] Make sure that the steering wheel is raised completely.
   [2] Bring the seat to the backmost position.
   [3] Pull up the lever behind the seat to unlock it.
   [4] Tilt the seat forward to open the cover.



Procedure to Open/Close Underseat Cover_001

1	Lever
2	Seat
A	Pull up
B	Tilt forward

2. Procedure to close the underseat cover
   [1] Slowly set the seat to its original position, and then slowly close the underseat cover.

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.

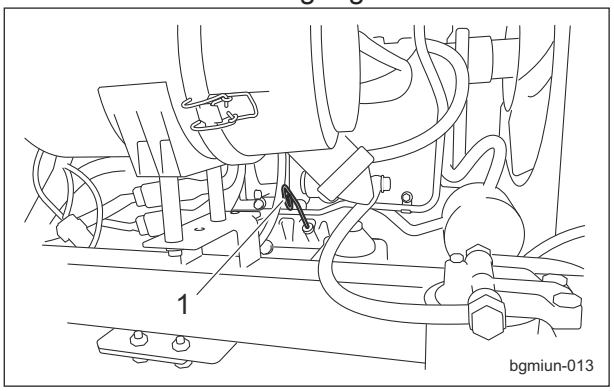
Engine

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.

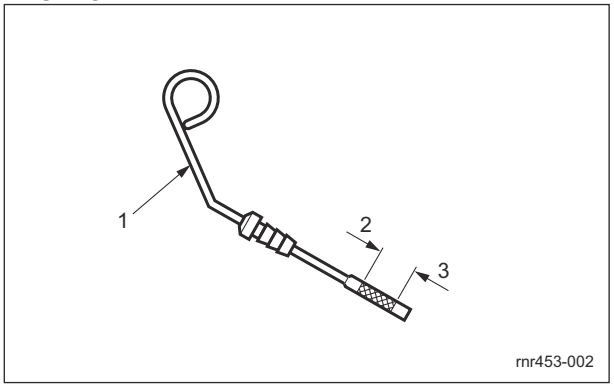
1. Place the machine so that the engine is level.
2. Stop the engine.
3. Open the hood.
4. Pull out the oil level gauge.



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.



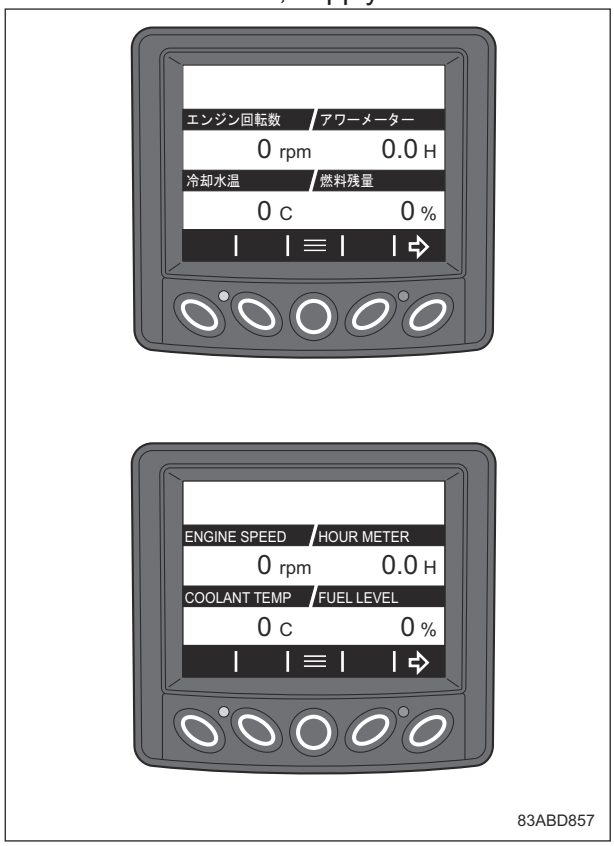
Inspection of Engine Oil_002

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

With the machine on a level surface, check “FUEL LEVEL” in the monitor.
If the fuel level is low, supply diesel fuel.



Inspection of Fuel_001

Supply of Fuel

Warning

Do not supply additional fuel after "FUEL LEVEL" indicates 100 %.
If you supply too much fuel, it might overflow from the fuel cap when you travel or work on a slope.

Warning

Keep fire away while refueling.
Do not smoke.

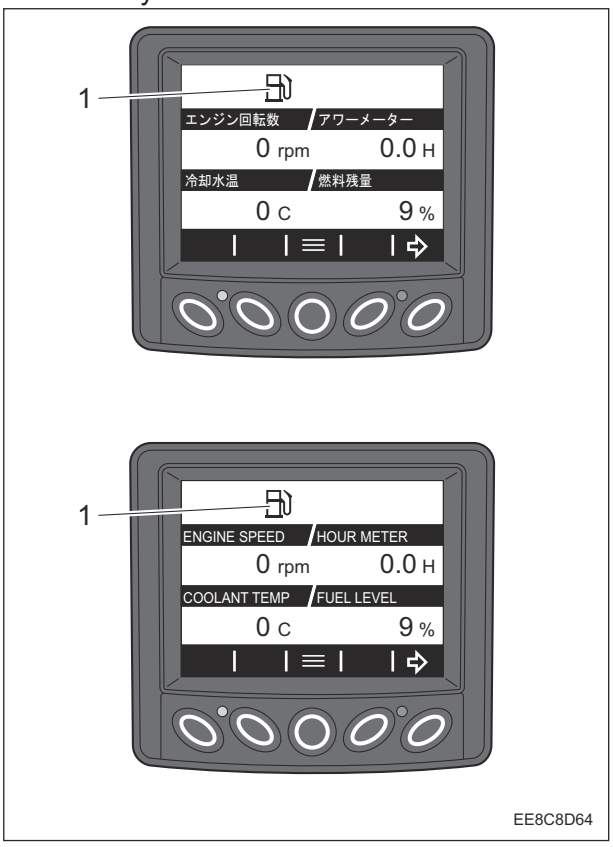
Important

Use ultra-low sulfur diesel fuel (sulfur-free diesel fuel).

Important

In case of lack of fuel, DPF regeneration can not be performed.

If the monitor displays "Supply fuel icon" and starts blinking, immediately stop operation, and then supply fuel (diesel).
The fuel tank capacity is approximately 51.0 dm^3 (51.0 L).
Note:
The factory default low fuel level is 10 %.

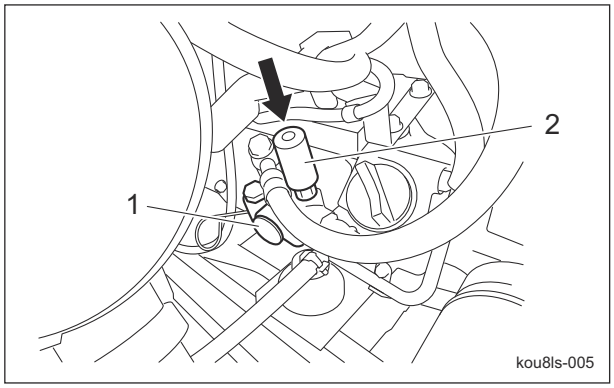


Supply of Fuel_001

1	Supply fuel icon

Air Bleeding of Fuel System

1. Open the hood.
2. Set the key switch to the "ON" position and then start the electromagnetic pump.
3. A priming pump is installed on the feed pump.
   Repeatedly press the top of the priming pump with your finger until resistance is felt, to bleed air.
4. Set the key switch to the "OFF" position.
5. Close the hood.



Air Bleeding of Fuel System_001

1	Feed pump
2	Priming pump

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

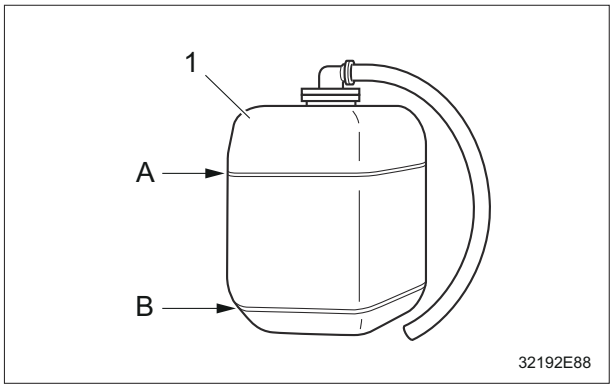
Caution

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.



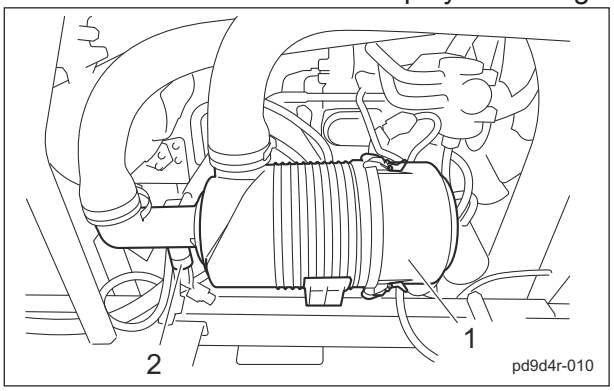
Inspection of Coolant_001

1	Reserve tank
A	Full
B	Low

Inspection of Air Cleaner

Liners and piston rings so that the engine will always operate smoothly.
A contaminated air cleaner element may cause malfunction of the engine.
Clean or replace the air cleaner element as necessary.

1. Make sure that there is no damage to the air cleaner.
2. Make sure that the air cleaner element is not contaminated.
   Check the air cleaner contamination by using 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

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/DPF-Associated Parts

> ⚠ Caution
>
> Implement after the engine and DPF etc. have well cooled down.
> Otherwise, you may suffer burns.

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 DPF 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.

> ⚠ Warning
>
> Implement after the engine and DPF 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

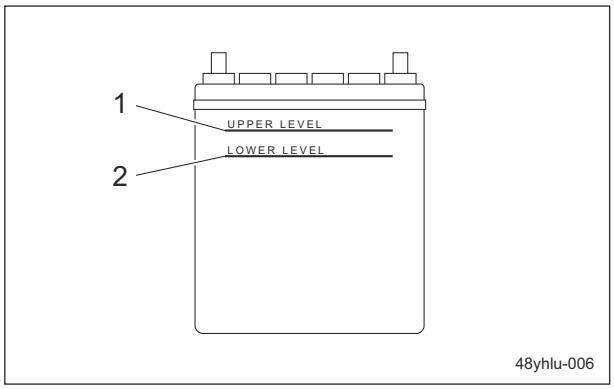
Warning

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.



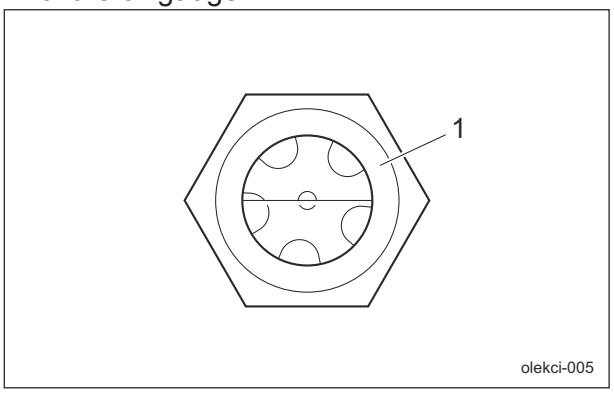
Inspection of Battery_001

1	UPPER LEVEL line
2	LOWER LEVEL line

Inspection of Hydraulic Oil

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

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



Inspection of Hydraulic Oil_001

1	Oil gauge

3. Check underneath the machine for oil leakage.

Inspection of Tires

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

Tire size	Pneumatic pressure	
Front wheel (29 x 14.00 - 15)	150 kPa (1.5 kgf/cm^2)	22 psi
Rear wheel (20 x 12.00 - 10)	140 kPa (1.4 kgf/cm^2)	20 psi

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 or the mechanic 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 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 Lever

1. Make sure that the brake pedal is locked after depressing the brake pedal completely and pulling the parking brake lever completely.
2. Make sure that the brake pedal is released after depressing the brake pedal again.

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 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

> ⚠ Caution
>
> When performing maintenance on the hydraulic system, lower the mower decks.

> 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.

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.
   Ignoring leakage will cause further trouble.

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 Monitor

1. Make sure that the monitor is clean.
2. Make sure that the monitor is not damaged or broken.
3. Make sure that the monitor turns on.
4. Make sure that the display appears on the monitor screen.

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 4-9)
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.

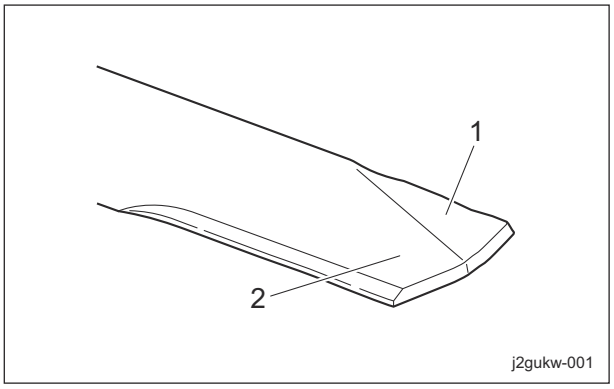
Mower Deck

Inspection of Rotary Knife

> **⚠ Caution**
>
> When touching edged tools, wear gloves since they could cut your hands.

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

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



Inspection of Rotary Knife_001

1	Sail
2	Flat part

Inspection of Rollers

1. Make sure that there is no abrasion nor adhesion of the roller.
2. Make sure that there is no wear of the roller shaft.
3. Make sure that there is no wear nor damage of the oil seal.
4. Make sure that there is no wear nor rust of the bearing.
5. Make sure that there is no play in the roller shaft.

Inspection of Covers

Warning

If you have removed the shield during inspection, make sure that you re-attach it in the original position securely.
If the shield remains removed, foreign objects may fly off, and the operator or the mechanic can be injured.

1. Make sure that there is no wear or deterioration in the rotary cover or shield, etc.
2. Make sure that there is no damage to the rotary cover or shield, etc.
3. Make sure that there is no interference to moving parts due to deformation of the rotary cover or shield, etc.
4. Make sure that the shield, etc., are installed in the specified locations.

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.

Adjustment before Work

Adjustment of Steering Wheel Position

Warning

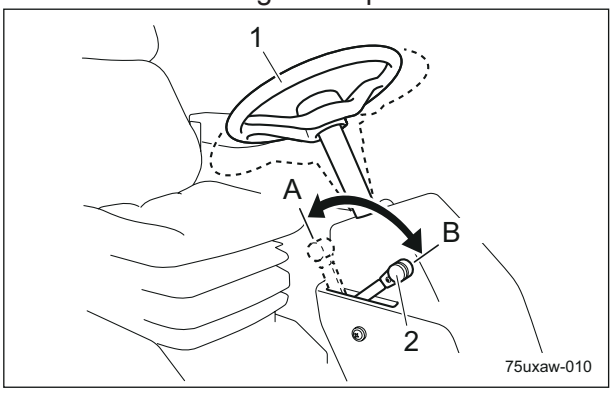
Since it is dangerous, do not adjust the steering wheel while traveling.

Caution

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

The steering wheel position can be adjusted up or down according to the operator's body size.

1. Shift the tilt lever to the "FREE" position.
2. Adjust the steering wheel position.
3. Shift the tilt lever to the "LOCK" position to secure the steering wheel position.



Adjustment of Steering Wheel Position_001

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

Adjustment of Seat Position

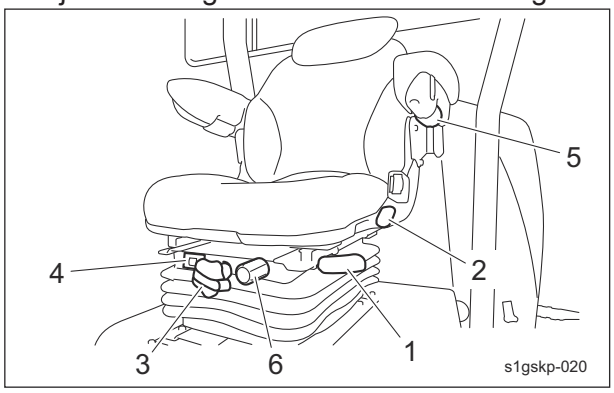
Warning

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.



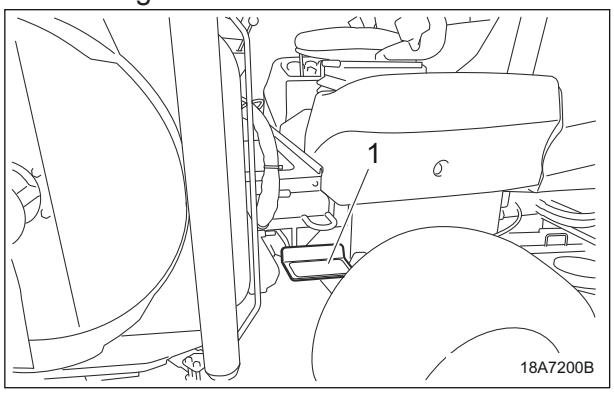
Adjustment of Seat Position_001

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 when mounting and dismounting the machine.



Procedure to Mount/Dismount_001

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.

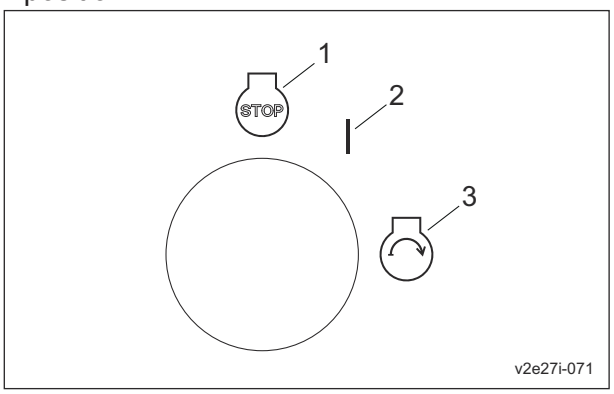
Important

When restarting the engine after it has been turned off, wait until the electromagnetic pump has fully stopped before restarting the engine. The electromagnetic pump will stop approximately 7 seconds after the key switch is turned to the "OFF" position.

Important

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

1. Sit on the seat.
2. Make sure that the parking brake is applied.
3. Make sure that the knife rotation switch is in the "Stop" position.
4. Make sure that the traveling pedal is in the neutral position.
5. Move the throttle knob halfway from the "Low speed" position toward the "High speed" position.
6. Switch the ignition key to the "ON (GLOW)" position.



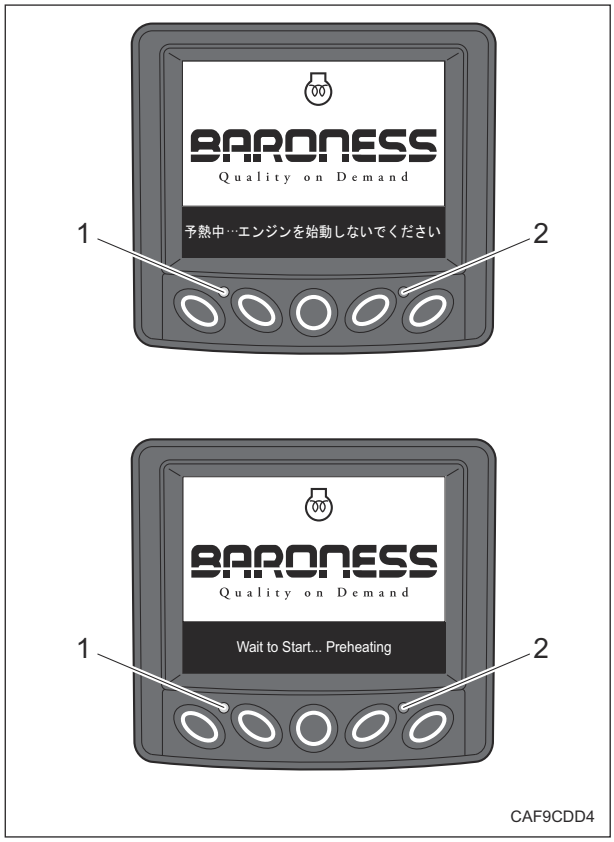
Procedure to Start Engine_001

1	OFF
2	ON (GLOW)
3	START

Important

When the ignition key is switched to the "ON" position, "Warming up" may appear in the monitor display.
Do not start the engine until the message disappears.

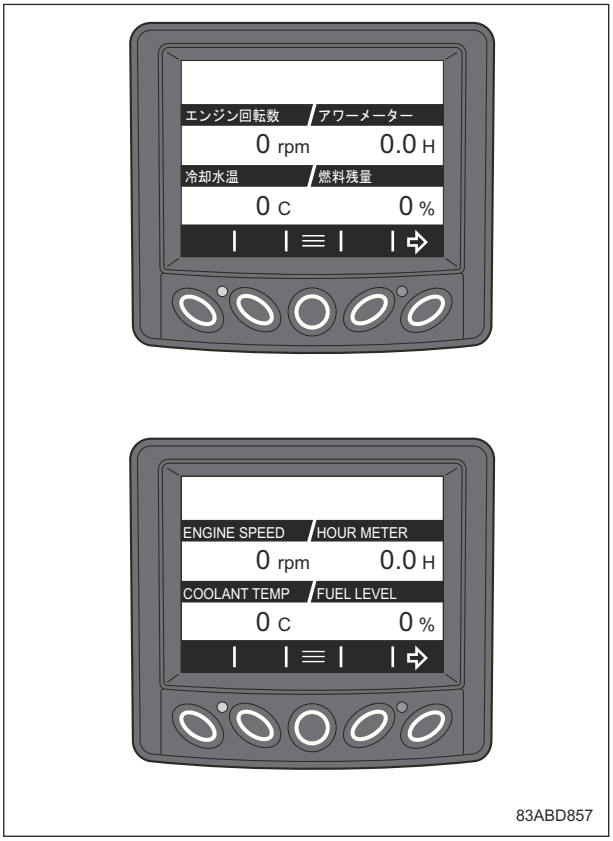
7. Monitor activates.
   Make sure that the "BARONESS" logo or "Warming up" message appears in the monitor display, and the yellow and red LEDs are turned on.



Procedure to Start Engine_002

1	LED (yellow)
2	LED (red)

8. GAUGE screen appears in the monitor display.
   Make sure that the "BARONESS" logo or "Warming up" message disappeared in the monitor display, and the yellow and red LEDs are turned off.



Procedure to Start Engine_003

Important

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

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

Important

Be sure to warm up the engine.
Otherwise, a hydraulic system malfunction will occur.

11. Move the throttle knob to the "Low speed" position, and then warm up the engine so that the engine coolant temperature exceeds 50 °C (122 °F).

Procedure to Stop Engine

1. Set the traveling pedal to the neutral position.
2. Apply the parking brake.
3. Set the knife rotation switch to the "Stop" position.
4. Raise the mower decks.
5. Shift the throttle knob 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 decks #4 and #5.
7. Leave the driver's seat.

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 stop the rotary knives and raise the mower decks.

> 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.
2. Make sure that all the mower decks are raised and that the mower lock levers (latches) for mower decks #4 and #5 are hooked.
3. Gradually move the throttle lever toward the "High speed" position.
4. Depress the brake pedal to release the parking brake.
5. Release the brake pedal.
6. Slowly depress the traveling pedal.
7. The machine starts traveling.
8. The machine stops slowly when the traveling pedal released.

Cutting Work

Cutting Procedure

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

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

> ⚠ Caution
>
> Please note that if you stop operating the mower deck up/down lever before the mower decks are raised completely, knife rotation may not stop.
> Knife rotation will be turned on or off depending on the sensor-detected position of the mower decks.

> ⚠ Caution
>
> Be sure that people around the machine keep a safe distance away.

> 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 for mower decks #4 and #5 just before cutting operation.
2. Start the engine.
   "Procedure to Start Engine" (Page 5-11)
3. Set the 2WD-4WD selector switch to the "4WD".
4. Shift the throttle knob to rev the engine up to the maximum rpm.
5. Depress the brake pedal to release the parking brake.
6. Shift the mower deck up/down lever to the "Lower" position to lower the mower decks.
7. Set the knife rotation switch to the "Rotation" position to rotate the rotary knives of all mower decks.
8. Depress the traveling pedal to start cutting work.

Note:
During the work, the rotary knives will rotate or stop in sync with the up and down motion of the mower decks.

Transporting

Transporting Procedure

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

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.

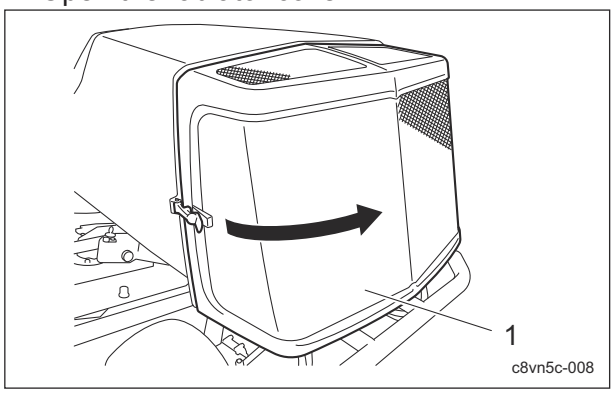
Engine

Cleaning of Radiator Cover

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

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

1. Open the radiator cover.



Cleaning of Radiator Cover_001

1	Radiator cover

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

Cleaning of Radiator

Important

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

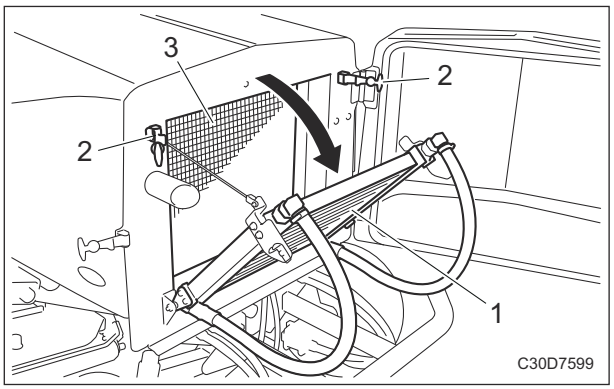
Important

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

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

1. Open the radiator cover.

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



Cleaning of Radiator_001

1	Oil cooler
2	Rubber catch
3	Radiator

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

Cleaning of Engine/DPF-Associated Parts

⚠ Caution

Implement after the engine and DPF etc. have well cooled down.
Otherwise, you may suffer burns.

1. Clean clippings and remove dirt.
   Remove clippings and dust in a gap thoroughly due to the intricately shaped engine.
2. Blow compressed air to clean any grass or flammable materials that may be attached on or around the DPF.

Main Vehicle

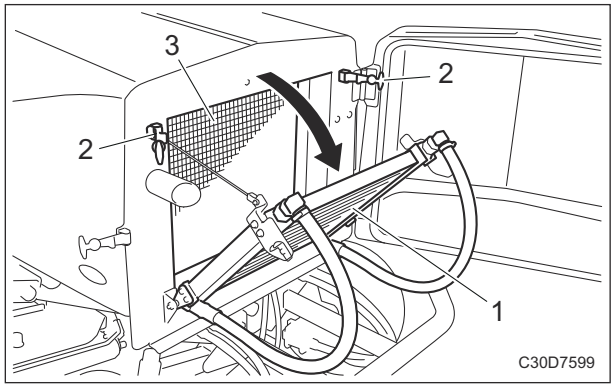
Cleaning of Oil Cooler

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

1. Open the radiator cover.
2. Unlock the rubber catches on the left and right of the oil cooler, and then tilt the oil cooler.



Cleaning of Oil Cooler_001

1	Oil cooler
2	Rubber catch
3	Radiator

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

Mower Deck

Cleaning of Mower Deck

Be sure to clean the mower deck after use.

1. Stop the engine, and then remove the key.
2. Carefully clean the front and back of the mower deck with water or compressed air.
3. Remove any grass wrapped around the rotary knife.

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 this machine.

1. Cleaning
   - Remove dirt, grass clippings, oil stains etc. completely from the main vehicle and engine.
2. Mower decks
   - When storing this machine, lower all the mower decks 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

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.

Operations before Maintenance

Swiveling Mower Decks #2 and #3

Caution

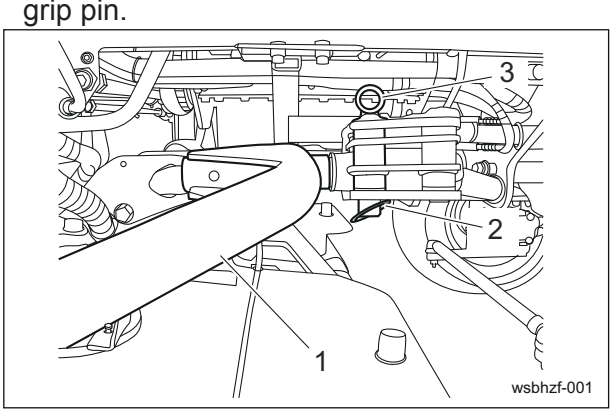
The rotary knife is an edged tool.
Take extra care in handling since they could cut your hands or legs.

Caution

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

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

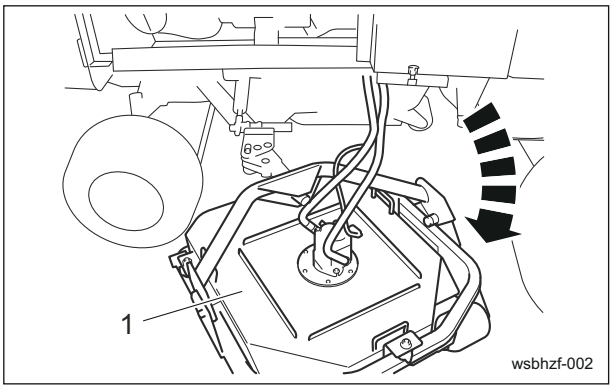
1. Lower the mower decks, and then stop the engine.
2. Remove the clip pin, and then remove the grip pin.



Swiveling Mower Decks #2 and #3_001

1	Mower arm
2	Clip pin
3	Grip pin

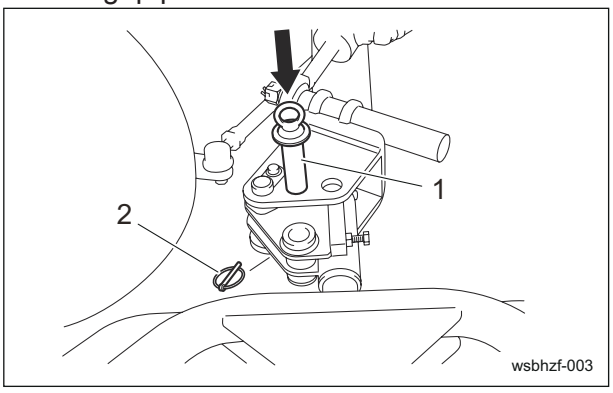
3. Swivel the mower deck toward the outside of the main vehicle.



Swiveling Mower Decks #2 and #3_002

1	Mower deck

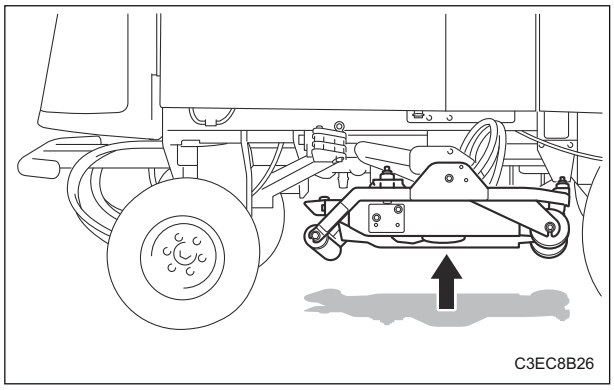
4. Fully insert the grip pin into the locking hole for maintenance, and then install the clip pin in the grip pin.



Swiveling Mower Decks #2 and #3_003

1	Grip pin
2	Clip pin

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



Swiveling Mower Decks #2 and #3_004

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

Jacking Up The Machine

About Jacking Up The Machine

Warning

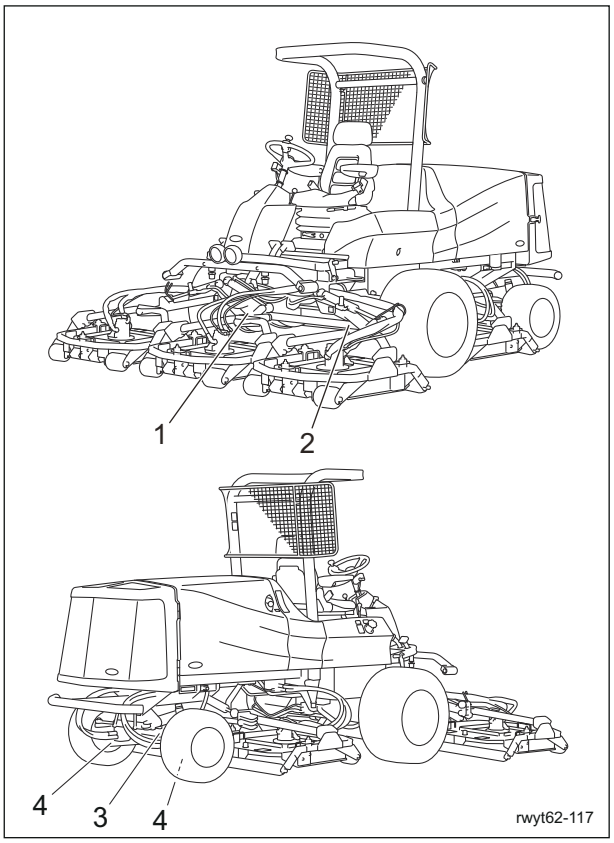
When replacing a tire or beginning any other maintenance or repairs, be sure to chock the wheels to prevent the machine from moving.
Before jacking up the machine, park it on a hard, flat surface such as a concrete floor and remove any obstacles that could prevent you from performing the work safely.
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.

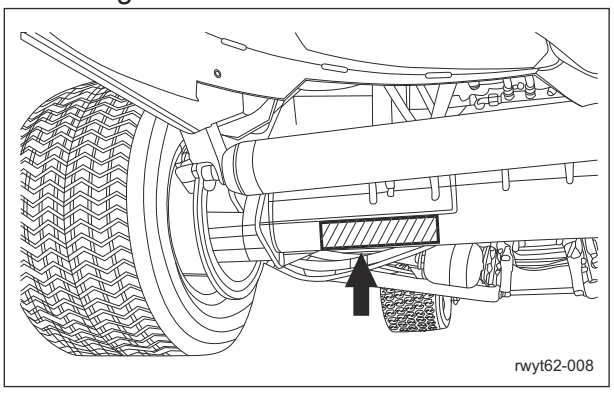
Jack-Up Points



Jack-Up Points_001

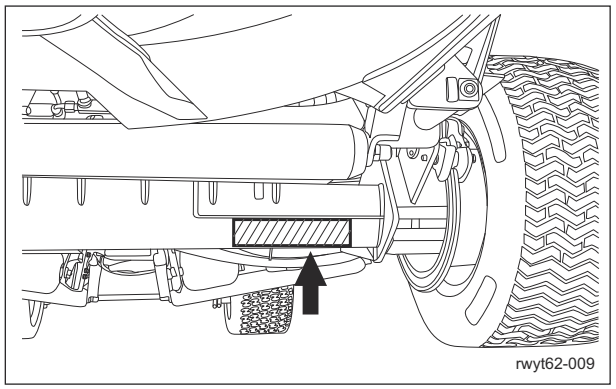
	Jack-up points
1	Front right frame
2	Front left frame
3	Center of pivot
4	Below rear wheel motors

1. Front right frame



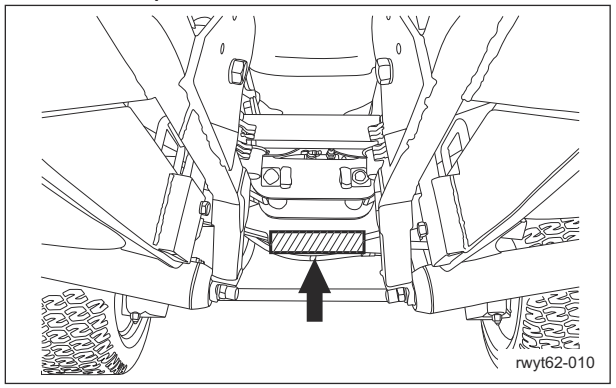
Jack-Up Points_002

2. Front left frame



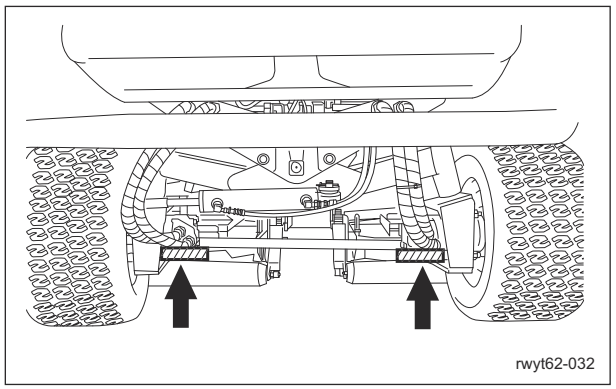
Jack-Up Points_003

3. Center of pivot



Jack-Up Points_004

4. Below rear wheel motors
Two locations



Jack-Up Points_005

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.

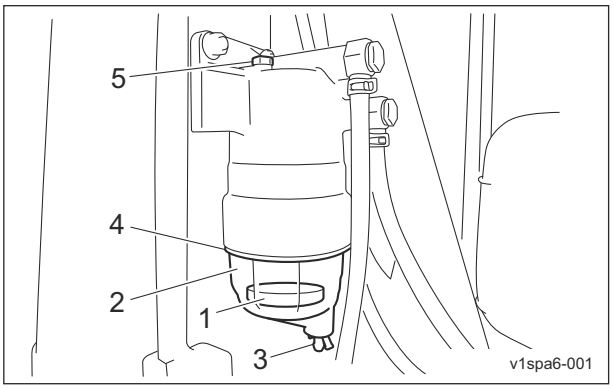
1. Check the belt tension.
2. Make sure that there are no cracks and damage on the belt.
3. Make sure that there is no abnormal wear on the belt.

Inspection of Water Separator

> **Important**
> If water contaminates the fuel, the supply pump and injector will seize due to heat.

The water separator removes water from the fuel.

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



Inspection of Water Separator_001

1	Float
2	Cup
3	Water drain plug
4	Element
5	Air-bleeding bolt

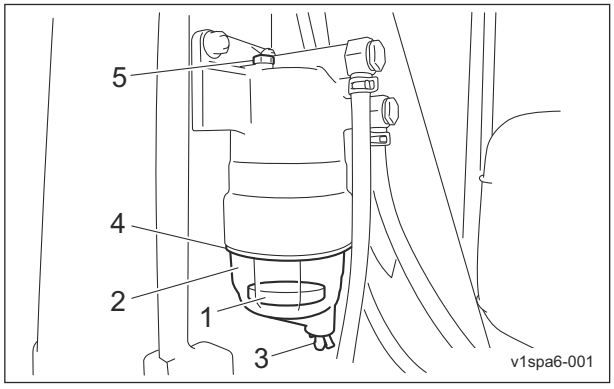
Draining of Water Separator

Important

If water contaminates the fuel, the supply pump and injector will seize due to heat.

Drain the water in accordance with the Maintenance Schedule.
However, when the float is raised by water, drain the water even before the schedule.

1. Follow the steps below to drain the water.
   [1] Stop the engine, and then turn the key switch to the "OFF" position.
   [2] Place a container under the water separator.
   [3] Loosen the water drain plug and air-bleeding bolt to drain the water into the container.



Draining of Water Separator_001

1	Float
2	Cup
3	Water drain plug
4	Element
5	Air-bleeding bolt

   [4] Tighten the water drain plug and air-bleeding bolt.
   [5] Bleed air from the fuel system.

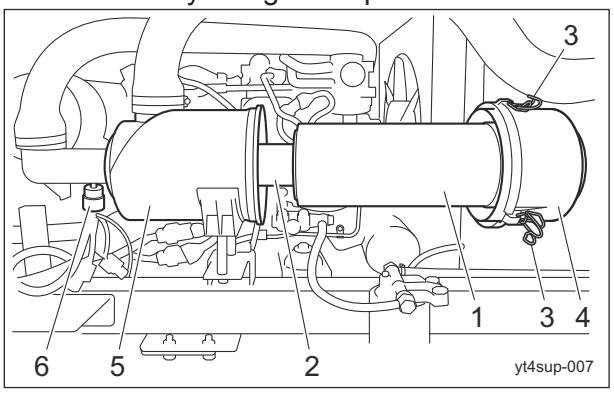
Cleaning of Air Cleaner Element

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

Important

The inner element cannot be cleaned.

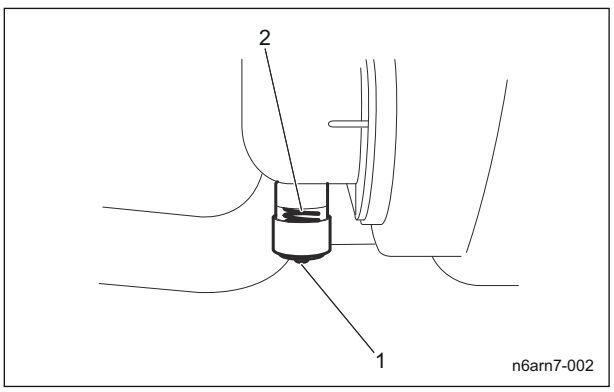
1. Follow the steps below to clean the outer element.
   [1] Remove the clips, and remove the air cleaner cap, and then remove the outer element.
   [2] While paying close attention not to damage the outer element, tap a solid portion of the outer element or blow compressed air from its inside to remove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



Cleaning of Air Cleaner Element_001

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

2. Press the reset button for the vacuum indicator.



Cleaning of Air Cleaner Element_002

1	Reset button
2	Vacuum indicator

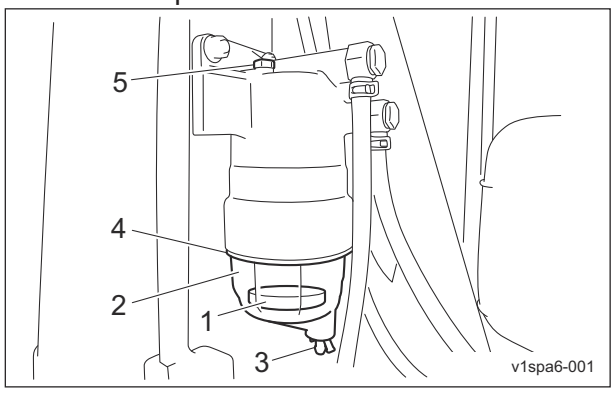
Cleaning of Water Separator

Important

If water contaminates the fuel, the supply pump and injector will seize due to heat.

Clean the water separator in accordance with the Maintenance Schedule.
However, when debris has accumulated in the cup, clean it even before the schedule.

1. Follow the steps below to clean the water separator.
   [1] Stop the engine, and then turn the key switch to the "OFF" position.
   [2] Place a container under the water separator.
   [3] Remove and clean the cup, element and float.
   Replace the element with a new one when replacement needed.



Cleaning of Water Separator_001

1	Float
2	Cup
3	Water drain plug
4	Element
5	Air-bleeding bolt

   [4] Install the cup, element and float in their original positions.
   [5] Bleed air from the fuel system.

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

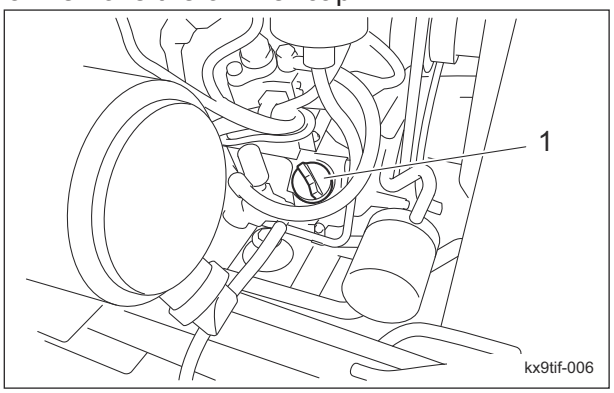
Be sure to use engine oil that is classified as JASO DH-2 or API Service Grade CJ-4, with SAE viscosity that is appropriate for the operating environment (ambient temperature).

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. Remove the oil filler cap.



Supply of Engine Oil_001

1	Oil filler cap

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

Supply of Coolant

Caution

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

Caution

Supply coolant after the engine has well cooled down.

Caution

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

Important

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

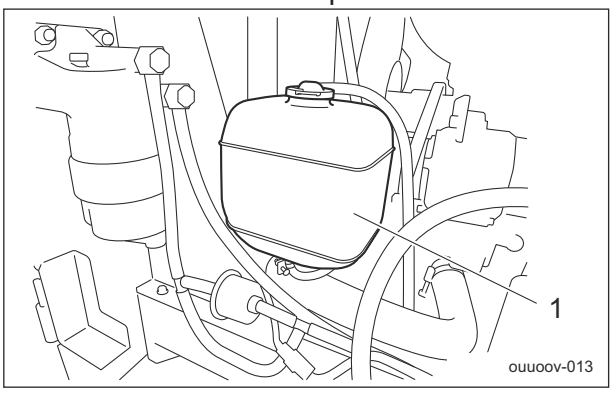
Important

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%

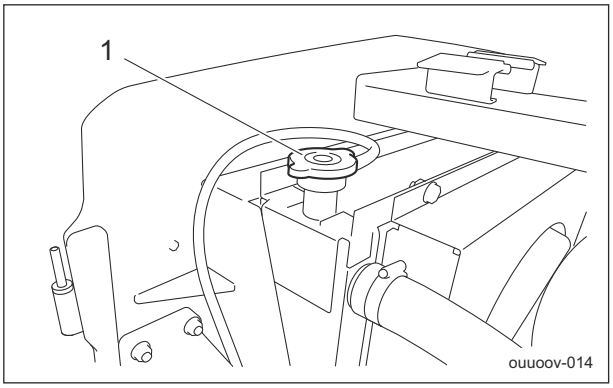
1. If the coolant level in the reserve tank is lower than the "LOW" mark, open the reserve tank cap and fill the tank with clean water and antifreeze up to the "FULL" mark.



Supply of Coolant_001

1	Reserve tank

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



Supply of Coolant_002

1	Radiator cap

Main Vehicle

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.

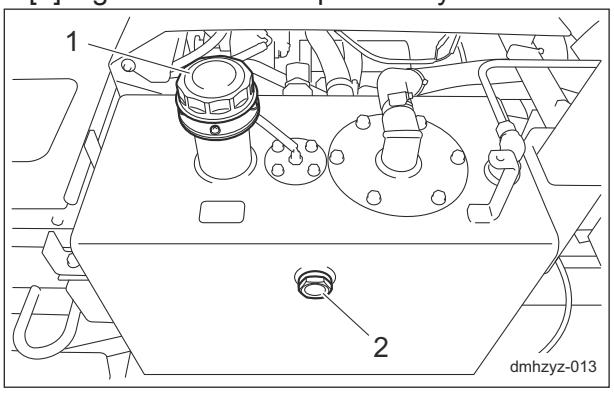
1. Remove the left tank cover.
2. If the oil level is low, follow the steps below to supply oil.

■ #11001 - 11393

[1] Open the tank cap.

[2] Supply hydraulic oil through the oil filling port until the oil level reaches the middle of the oil gauge on the hydraulic tank.

[3] Tighten the tank cap securely.



Supply of Hydraulic Oil_001

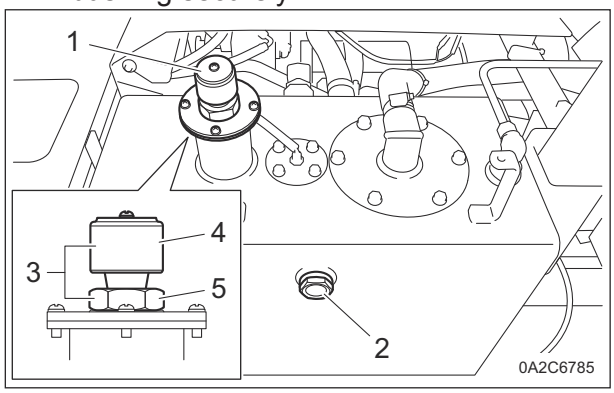
1	Tank cap
2	Oil gauge

■ #11394-

[1] Loosen the bushing with a wrench and remove the oil filler plug.

[2] Supply hydraulic oil through the oil filling port until the oil level reaches the middle of the oil gauge on the hydraulic tank.

[3] Install the oil filler plug and tighten the bushing securely.



Supply of Hydraulic Oil_002

1	Tank cap
2	Oil gauge
3	Oil filler plug
4	Air breather
5	Bushing

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 decks and maintain that position on a level surface, check to see if the oil level is at the middle of the oil gauge. If the hydraulic oil level is low, supply oil again until it reaches the specified level.
5. Check underneath the machine for oil leakage.
6. Install the left 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

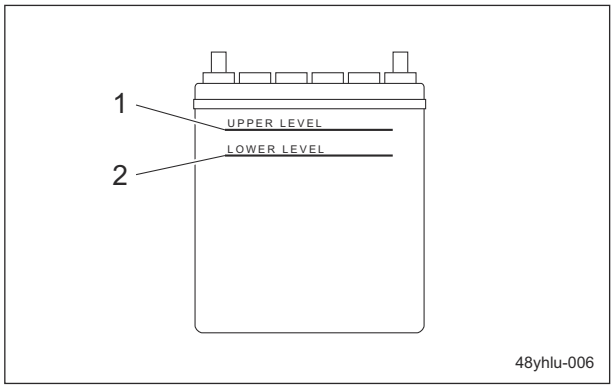
Implement after the engine and muffler etc. have well cooled down.
Otherwise, you may get burned.

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

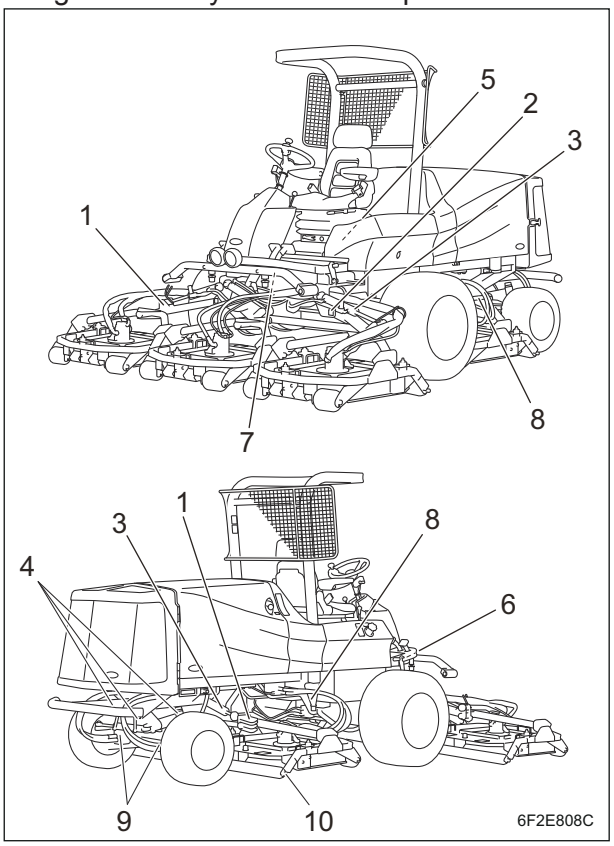
Greasing

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.

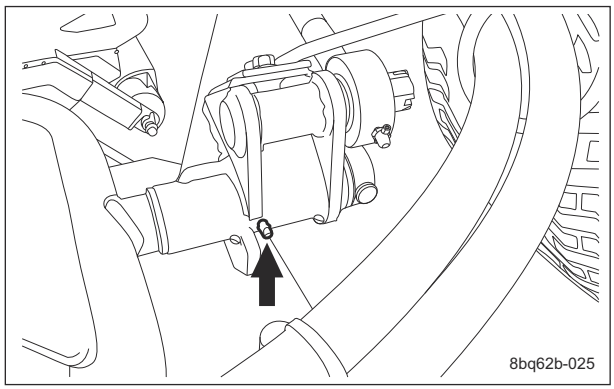


Greasing Points_001

	Portion	No. of Greasing Points
1	Mower arm fulcrum	5
2	Lift arm fulcrum	5
3	Lift arm cylinder fulcrum	12
4	Pivot	3
5	Neutral position area	2
6	Traveling pedal shaft fulcrum	2
7	Foot brake	3
8	Pin for swiveling rear mower deck	2
9	Tie rod end (#11599-)	2
10	Rear roller (#11651-)	10

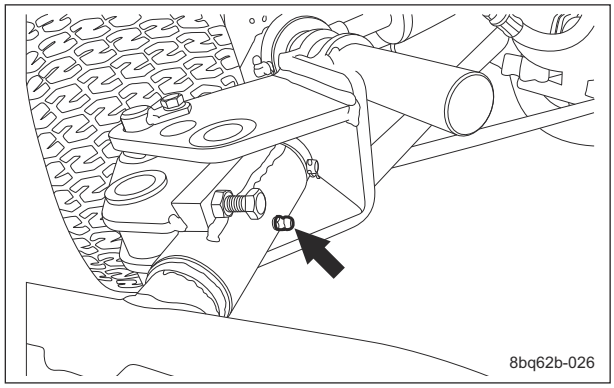
1. Mower arm fulcrum
   There is one greasing point on the arm connected to each mower deck.
   Grease mower decks #2 and #3 in the swiveled position.

   Mower decks #1, #4 and #5



Greasing Points_002

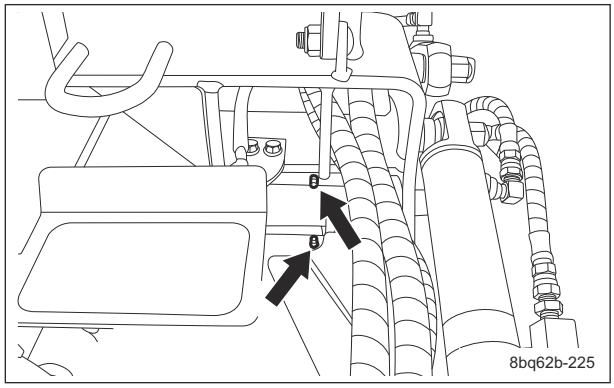
   Mower decks #2 and #3



Greasing Points_003

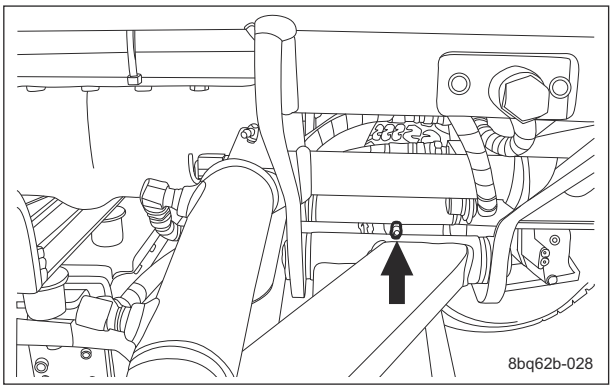
2. Lift arm fulcrum
   There is one greasing point on the arm connected to each mower deck.
   Lower the mower decks before greasing the lift arm fulcrums.

   Mower decks #1 and #4



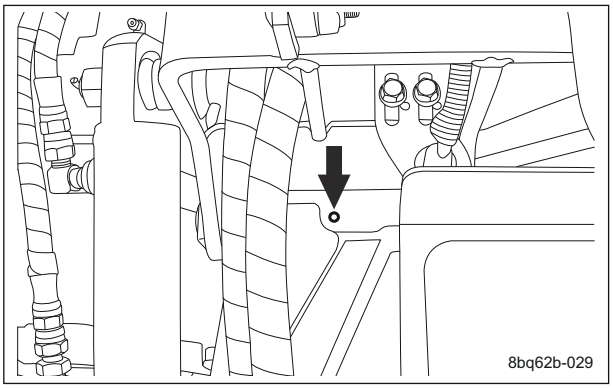
Greasing Points_004

   Mower decks #2 and #3



Greasing Points_005

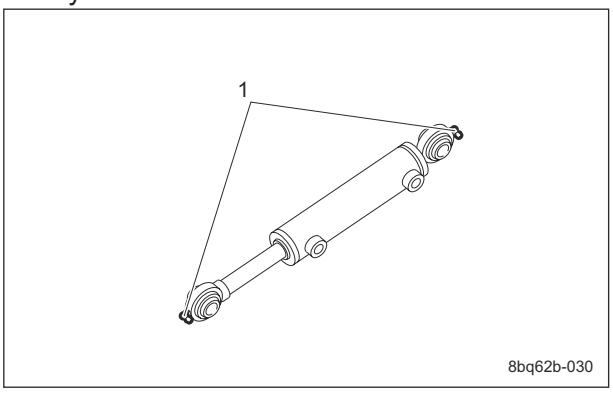
   Mower deck #5



Greasing Points_006

3. Lift arm cylinder fulcrum
   This is on each cylinder of the arms connected to each mower deck.

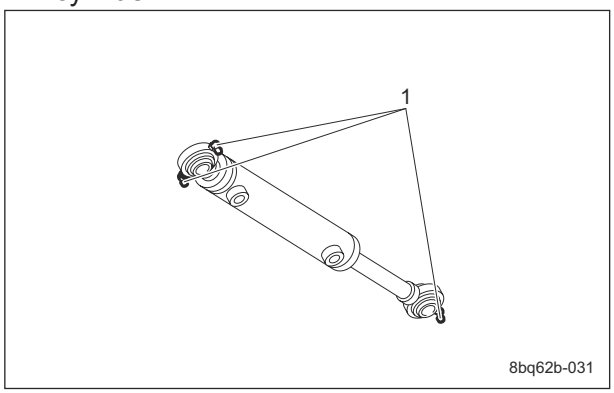
   Mower decks #1, #4 and #5
   There are two greasing points on each cylinder.



Greasing Points_007

1	Grease nipple (2 locations)

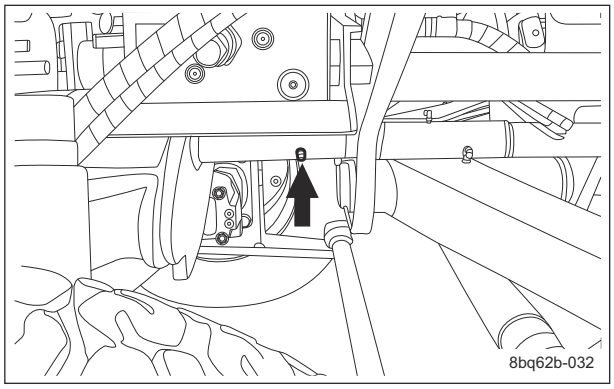
Mower decks #2 and #3
There are three greasing points on each cylinder.



Greasing Points_008

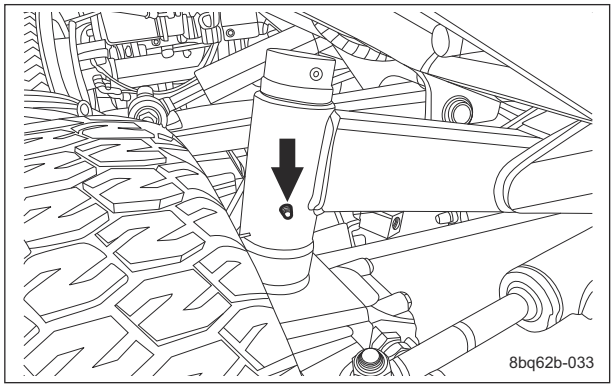
1	Grease nipple (3 locations)

4. Pivot
Middle between the rear wheels



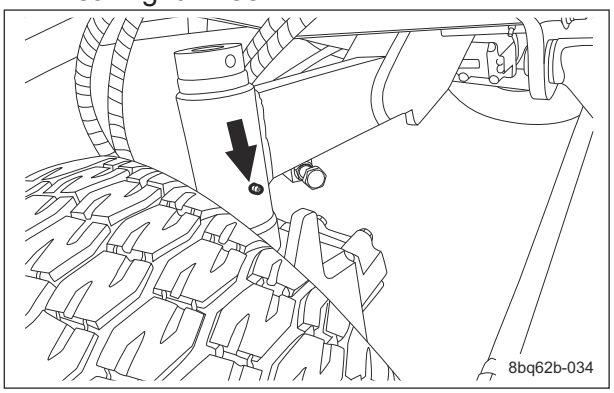
Greasing Points_009

Rear left wheel



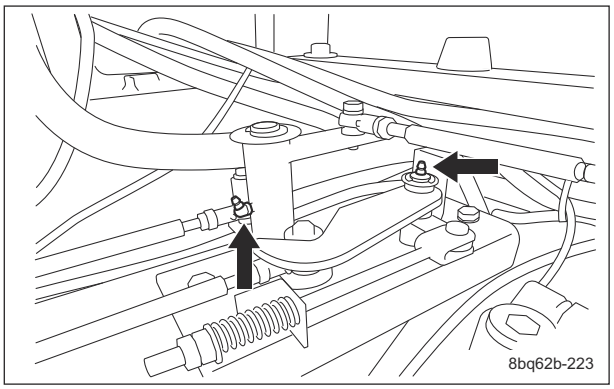
Greasing Points_010

Rear right wheel



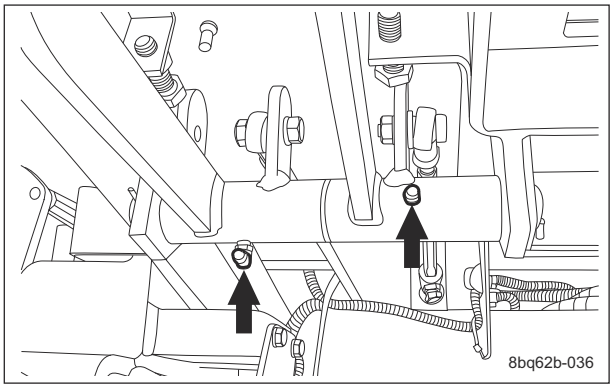
Greasing Points_011

5. Neutral position area
There are two locations.



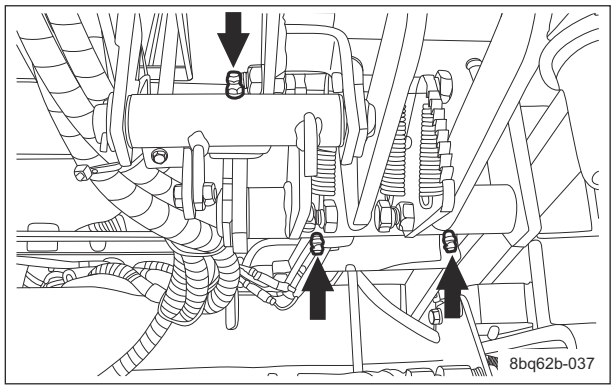
Greasing Points_012

6. Traveling pedal shaft fulcrum
There are two locations.



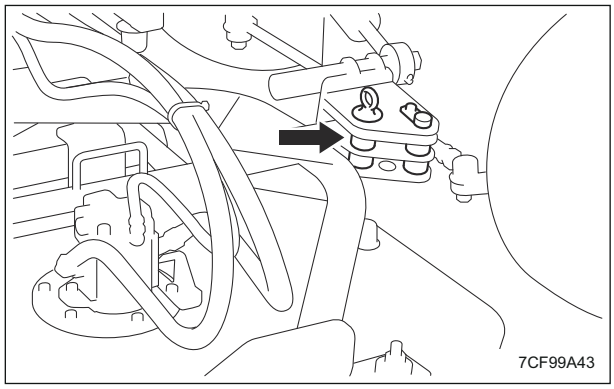
Greasing Points_013

7. Foot brake
There are three locations.



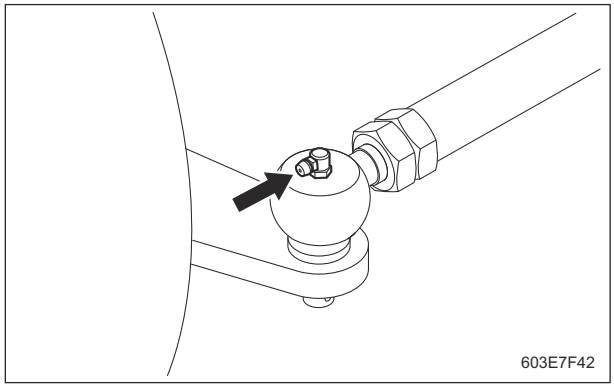
Greasing Points_014

8. Pin for swiveling rear mower deck
There is one greasing point each on the mower decks #2 and #3.



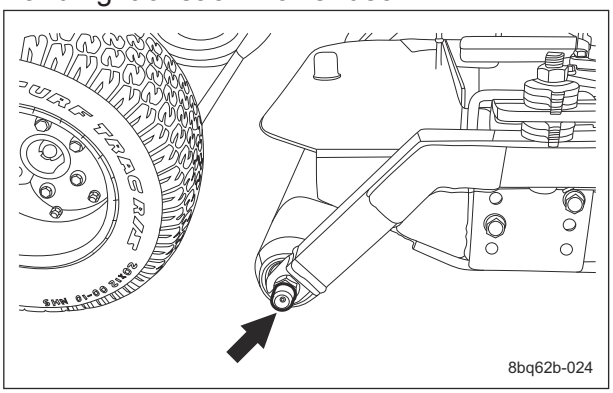
Greasing Points_015

9. 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_016

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



Greasing Points_017

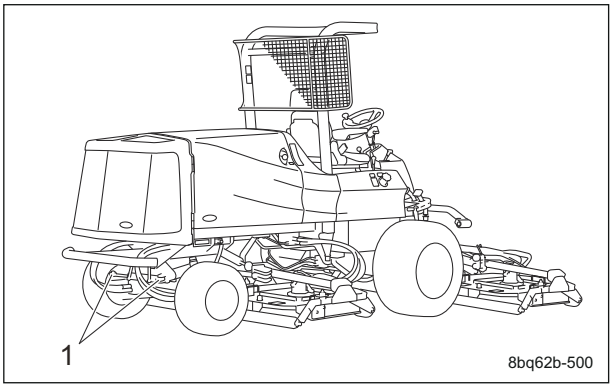
Lubrication

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

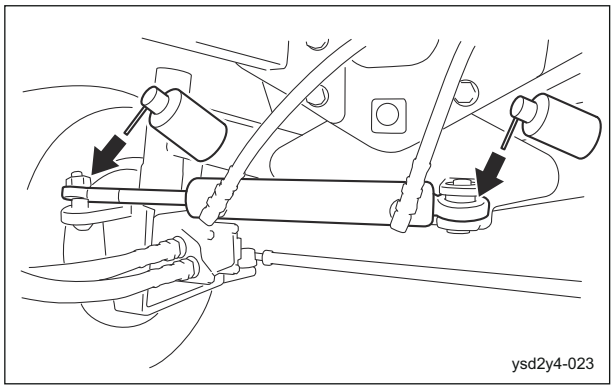
Apply lubricant at the following locations every 50 hours of operation.



Lubricating Points_001

	Location	No. of lubricating points
1	Steering cylinder spherical bearing	2

1. Steering cylinder spherical bearing
   There are two locations.



Lubricating Points_002

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

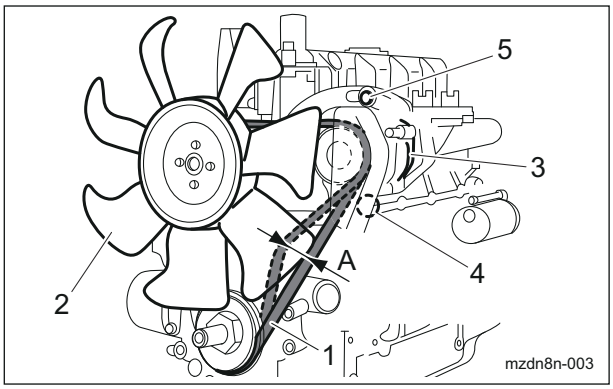
If a cover is removed due to inspection or adjustment, be sure to reinstall it in its original location.

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 - 12 mm (0.39 - 0.47 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 inappropriate, loosen bolts A and B for securing the alternator, and then move the alternator to adjust the tension.
   [3] Be sure to tighten the bolts A and 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	Bolt B
A	10 - 12 mm (0.39 - 0.47 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.

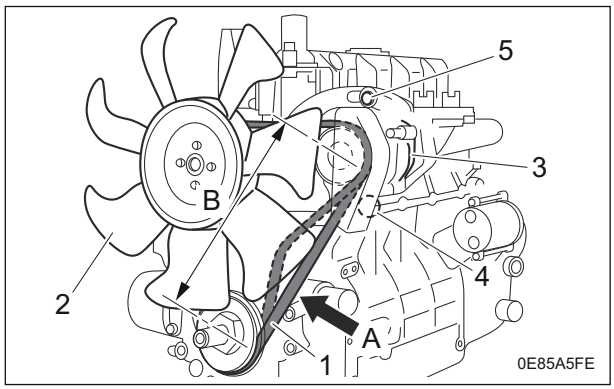
[1] Measure belt tension force by using a sonic type tension meter.
For measurement position and distance between pulleys, see diagram below.
Here is the suitable belt tension force.

Adjustment	237 - 403 N (24.17 - 41.09 kgf)
Replacement	460 - 680 N (46.91 - 69.34 kgf)

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

[3] Be sure to tighten the bolts A and 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

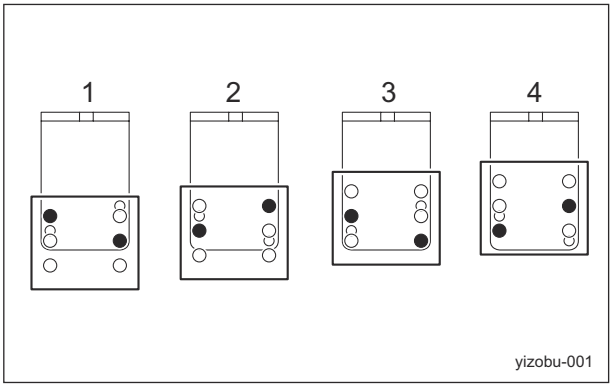
1	Fan belt
2	Blade
3	Alternator
4	Bolt A
5	Bolt B
A	Measurement position
B	Distance between pulleys

Mower Deck

Adjustment of Cutting Height

■Cutting Height Table

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



Cutting Height Table_001

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

Adjusting Plate Position	1	2	3	4
Adjusting Collars Inserted Under Cutting Height Adjusting Plate (Qty)	Cutting Height			
0	20.0 mm (0.79 in)	30.0 mm (1.18 in)	45.5 mm (1.79 in)	55.5 mm (2.19 in)
1	26.0 mm (1.02 in)	36.0 mm (1.42 in)	51.5 mm (2.03 in)	61.5 mm (2.42 in)
2	32.0 mm (1.26 in)	42.0 mm (1.65 in)	57.5 mm (2.26 in)	67.5 mm (2.66 in)
3	38.0 mm (1.50 in)	48.0 mm (1.89 in)	63.5 mm (2.50 in)	73.5 mm (2.89 in)
4	44.0 mm (1.73 in)	54.0 mm (2.13 in)	69.5 mm (2.74 in)	79.5 mm (3.13 in)
5	50.0 mm (1.97 in)	60.0 mm (2.36 in)	75.5 mm (2.97 in)	85.5 mm (3.67 in)
6	56.0 mm (2.20 in)	66.0 mm (2.60 in)	81.5 mm (3.21 in)	91.5 mm (3.60 in)

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

■Adjustment with Adjusting Collars

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

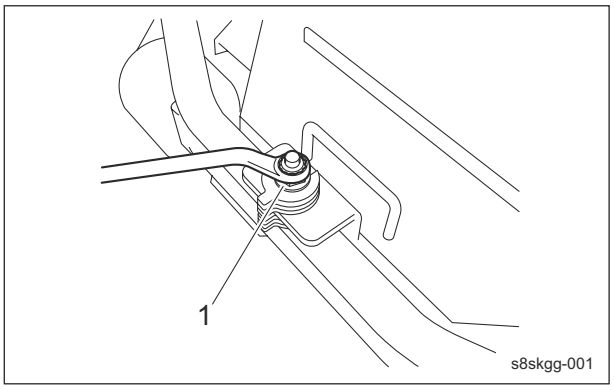
Important

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

Important

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

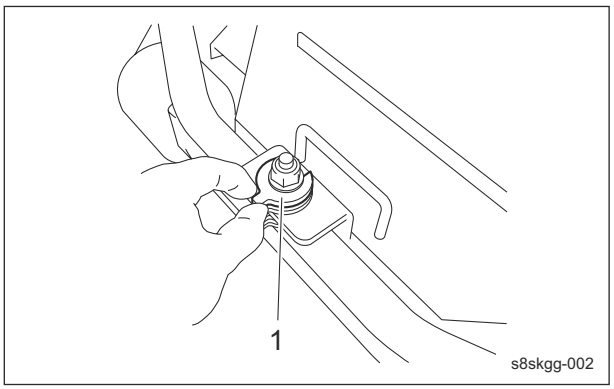
1. Apply the parking brake, and then lower all mower decks.
2. Stop the engine, and then remove the key.
3. Loosen the nuts securing the adjusting collars at the three locations.



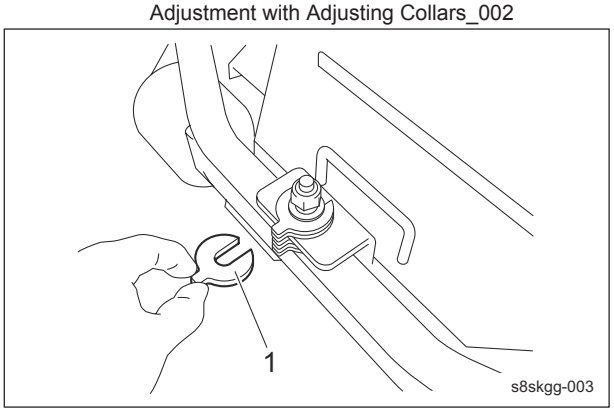
Adjustment with Adjusting Collars_001

1	Nut

4. Refer to the Cutting Height Table, and then adjust the number of adjusting collars at the three locations.
   [1] To increase cutting height:
   Remove an upper adjusting collar and insert it below.
   [2] To decrease cutting height:
   Remove a lower adjusting collar and insert it above.



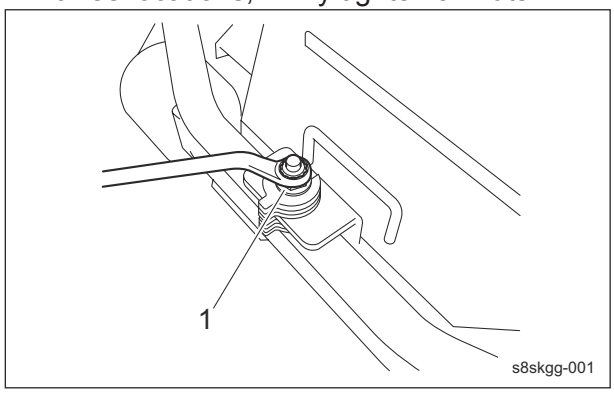
Adjustment with Adjusting Collars_002



Adjustment with Adjusting Collars_003

1	Adjusting collar

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



Adjustment with Adjusting Collars_004

1	Nut

■Adjustment with Cutting Height Adjusting Plates

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

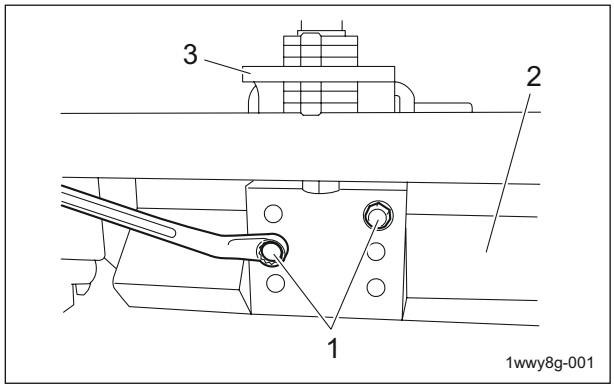
Important

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

Important

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

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



Adjustment with Cutting Height Adjusting Plates_001

1	Bolt
2	mower deck
3	Cutting height adjusting plate

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

[1] To increase cutting height:

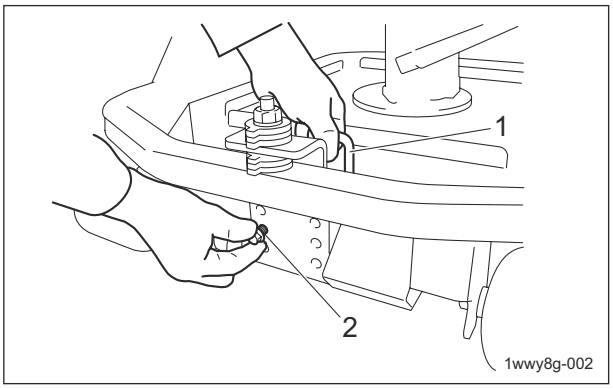
a. While lifting the handle at each location on the mower deck, remove the two bolts.

b. Raise the mower deck to change the hole positions, and then temporarily secure it with the two bolts.

[2] To decrease cutting height:

a. While lifting the handle at each location on the mower deck, remove the two bolts.

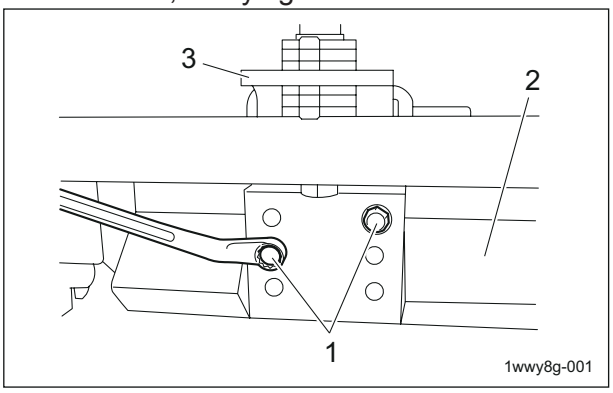
b. Lower the mower deck to change the hole positions, and then temporarily secure it with the two bolts.



Adjustment with Cutting Height Adjusting Plates_002

1	Handle
2	Bolt

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



Adjustment with Cutting Height Adjusting Plates_003

1	Bolt
2	mower deck
3	Cutting height adjusting plate

Grinding of Rotary Knife

Caution

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

Caution

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

Caution

If the rotary knife becomes worn or damaged, cracks or tears will occur between the sail and flat part.
Broken pieces of the rotary knife may fly out while it is rotating.

Caution

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

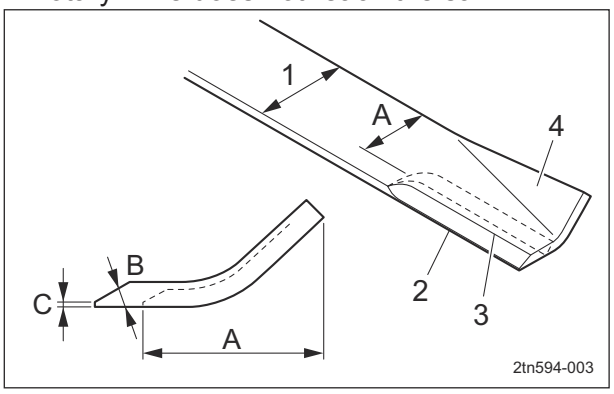
Important

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

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

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

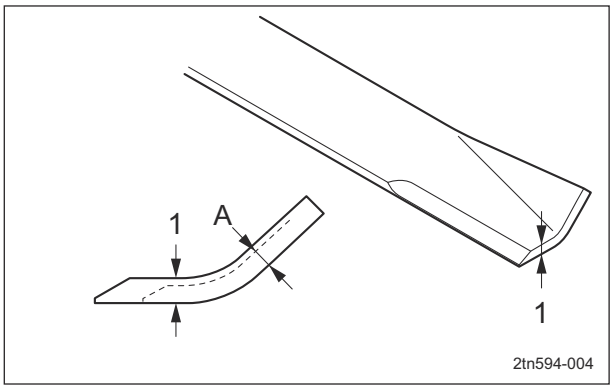
2. When, after grinding, the blade base of the rotary knife does not reach the sail



Grinding of Rotary Knife_001

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

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



Grinding of Rotary Knife_002

1	Thickness
A	1/3 or more

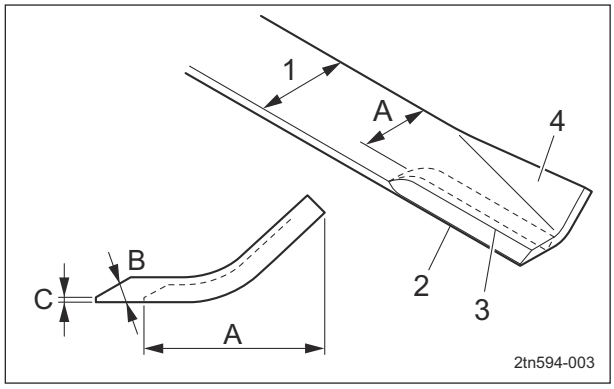
Follow the steps below to grind the rotary knife.

1. Remove the rotary knife from the mower deck.
"Replacement of Rotary Knife" (Page 6-31)

Important

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

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



Grinding of Rotary Knife_003

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

3. Balance the rotary knife.
   "Balancing of Rotary Knife" (Page 6-20)
4. If it is not balanced, repeat steps 2. - 3.

Balancing of Rotary Knife

Caution

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

Caution

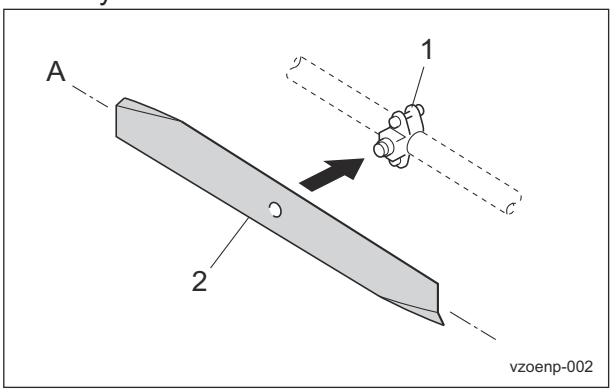
When touching edged tools, wear gloves since they could cut your hands.

Important

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

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

1. Remove the rotary knife from the mower deck.
   "Replacement of Rotary Knife" (Page 6-31)
2. Install the balancer equipment in an appropriate location.
3. Fit the hole at the center of the rotary knife onto the balancer equipment, and then balance the left and right ends so that the rotary knife is level.



Balancing of Rotary Knife_001

1	Balancer equipment
2	Rotary knife
A	Level

Replacement

Engine

Replacement of Engine Oil

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

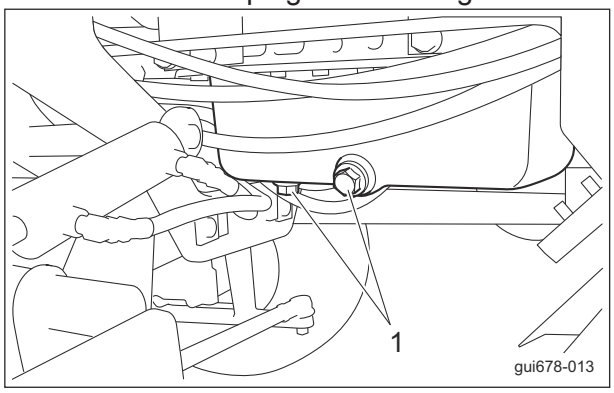
> **Important**
>
> When you change the engine oil, be sure to drain it into a bowl and discard it in accordance with local laws and regulations.

> **Important**
>
> Be sure to use engine oil that is classified as JASO DH-2 or API Service Grade CJ-4, with 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 the engine oil is contaminated, or if you use the machine in dusty areas or operate the engine at high loads or in high temperatures.

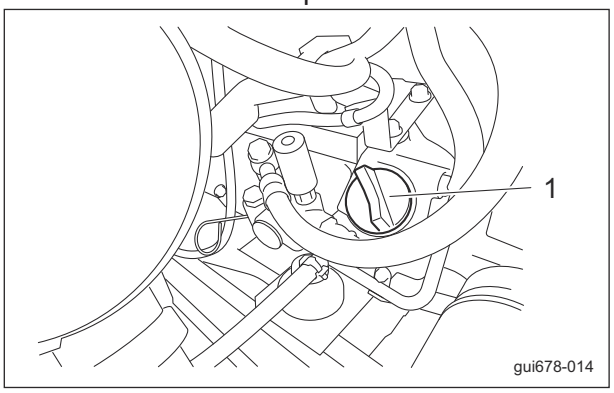
1. Move the machine onto a level surface, stop the engine, remove the drain plug while the engine oil is warm, and then drain the oil into a bowl.
2. Install the drain plug onto the engine.



Replacement of Engine Oil_001

1	Drain plug

3. Remove the oil filler cap, supply new engine oil until it reaches a level in between the upper and lower limit lines on the oil level gauge.
   Engine oil quantity is approximately 9.7 dm^3 (9.7 L).
4. Install the oil filler cap.



Replacement of Engine Oil_002

1	Oil filler cap

5. It will take a while for the supplied engine oil to descend into the oil pan.
   Check the oil level again 10 to 20 minutes after supplying the oil.
6. 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.

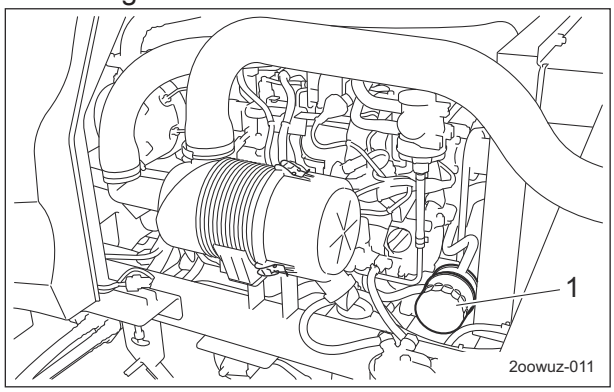
Important

Be sure to use engine oil that is classified as JASO DH-2 or API Service Grade CJ-4, with 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

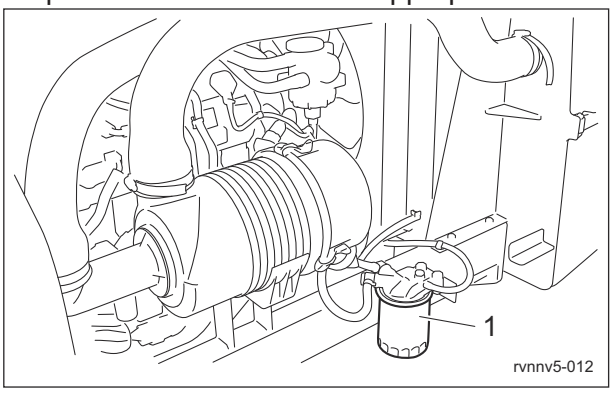
2. Lightly coat the packing of the new filter cartridge with engine oil.
3. Hand-tighten the filter cartridge until the packing contacts the sealing surface, and then firmly hand-tighten (without using a filter wrench).
4. Supply engine oil until it reaches the specified level.
"Supply of Engine Oil" (Page 6-7)
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.

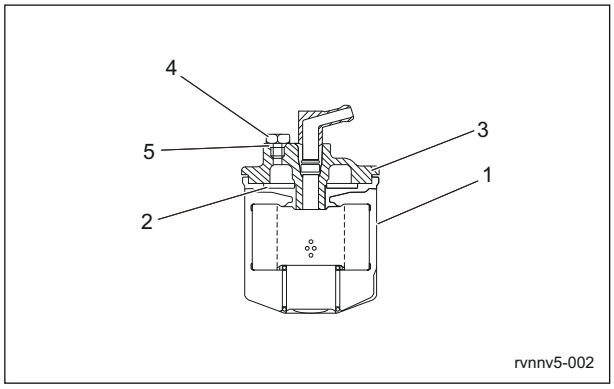


Replacement of Fuel Filter_001

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. Remove air after replacement.

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 6-5)

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.

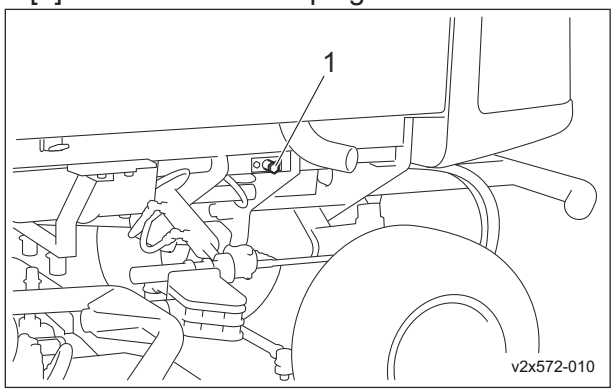
Important

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 %

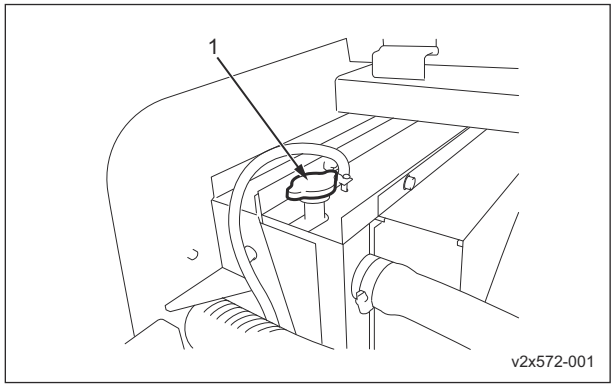
1. Stop the engine, and then allow the radiator to cool.
2. Open the hood.
3. Follow the steps below to drain the coolant.
   [1] Position a container to drain the coolant into.
   [2] Remove the drain plug from the radiator.



Replacement of Coolant_001

1	Radiator drain plug

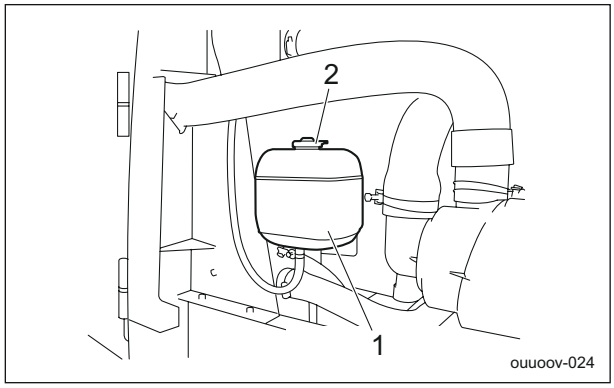
   [3] Remove the radiator cap.



Replacement of Coolant_002

1	Radiator cap

   [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 bowl and discard it in accordance with local laws and regulations.

Important

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

Important

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

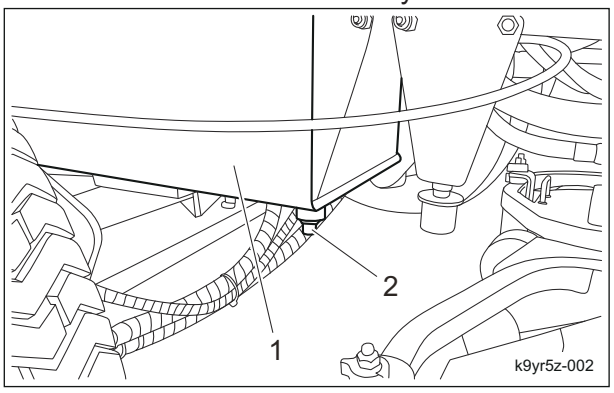
■ Characteristics of Hydraulic Oil with conditions of use
Hydraulic oil of ISO viscosity grade VG68 can be used only if the following condition is met:

・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] Lower the mower decks on a level surface, and then stop the engine.
   [3] Remove the drain plug of the hydraulic tank, and then drain the old oil into a container.
   [4] Wind new sealing tape on the drain plug, and then attach it to the hydraulic tank.



Replacement of Hydraulic Oil_001

1	Hydraulic tank
2	Drain plug

2. Remove the left tank cover.

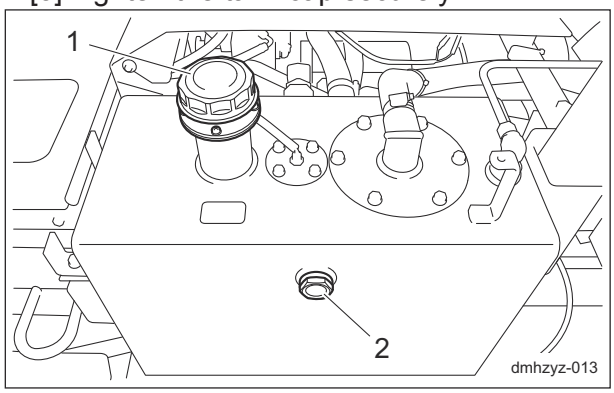
3. Follow the steps below to supply new oil. The hydraulic tank capacity is approximately 44.0 dm^3 (44.0 L).

■ #11001 - 11393

[1] Open the tank cap.

[2] Supply hydraulic oil through the oil filling port until the oil level reaches the middle of the oil gauge on the hydraulic tank.

[3] Tighten the tank cap securely.



Replacement of Hydraulic Oil_002

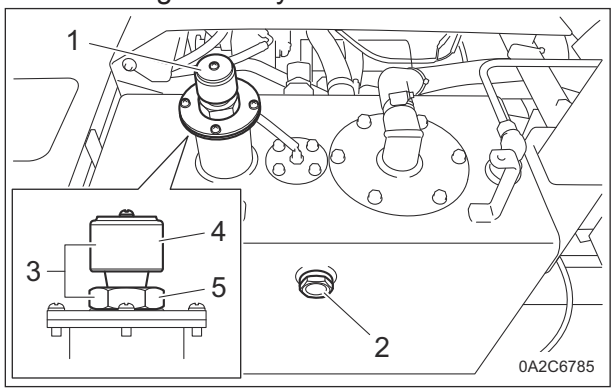
1	Tank cap
2	Oil gauge

■ #11394-

[1] Loosen the bushing with a wrench and remove the oil filler plug.

[2] Supply hydraulic oil through the oil filling port until the oil level reaches the middle of the oil gauge on the hydraulic tank.

[3] Install the oil filler plug and tighten the bushing securely.



Replacement of Hydraulic Oil_003

1	Tank cap
2	Oil gauge
3	Oil filler plug
4	Air breather
5	Bushing

4. 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.
5. Lower the mower decks and maintain that position on a level surface, check to see if the oil level is at the middle of the oil gauge. If the hydraulic oil level is low, supply oil again until it reaches the specified level.
6. Check underneath the machine for oil leakage.
7. Install the left 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

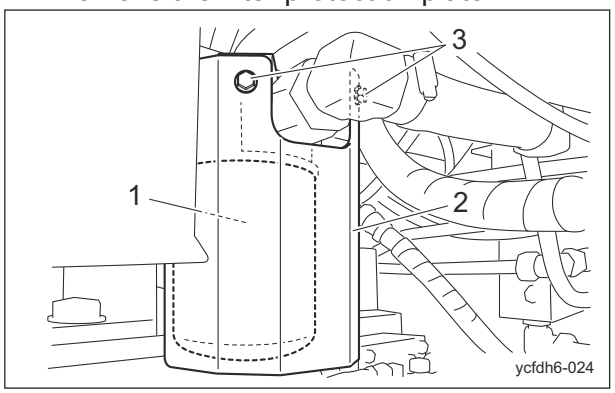
If the hydraulic oil emulsifies or if it becomes even slightly less transparent, change the oil immediately.

Important

Use hydraulic oil whose specification meets the requirements.

1. Lower the mower decks on a level surface, and then stop the engine.

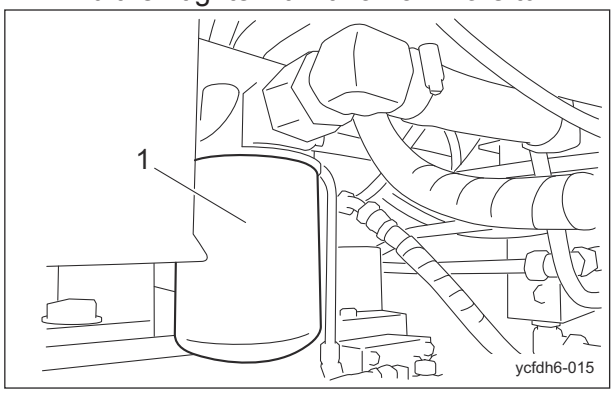
2. Remove the filter protection plate.



Replacement of Hydraulic Oil Line Filter_001

1	Filter cartridge
2	Filter protection plate
3	Bolt

3. Loosen the old filter cartridge by hand and remove it.
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 until the packing contacts the mounting surface.
   And then tighten it with a half more turn.



Replacement of Hydraulic Oil Line Filter_002

1	Filter cartridge

6. Supply hydraulic oil until it reaches the specified level.
   "Supply of Hydraulic Oil" (Page 6-9)
7. Start the engine and stop it after hydraulic oil warmed.
8. Check underneath the machine for hydraulic oil leakage.
9. Install the filter protection plate.

■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

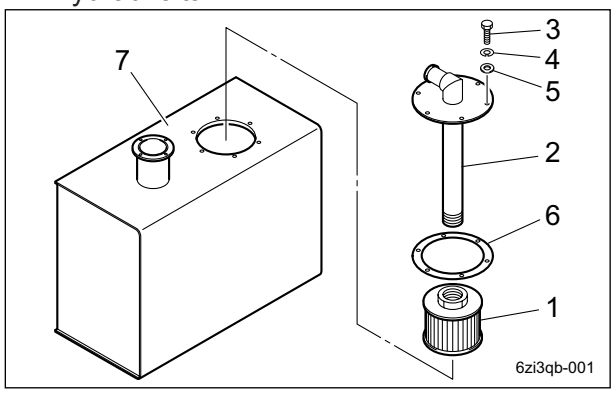
Use hydraulic oil whose specification meets the requirements.

Important

Replace the intake port packing with a new one.

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

10. Install the intake hose joint fitting to the hydraulic tank.



Replacement of Hydraulic Oil Suction Filter_001

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

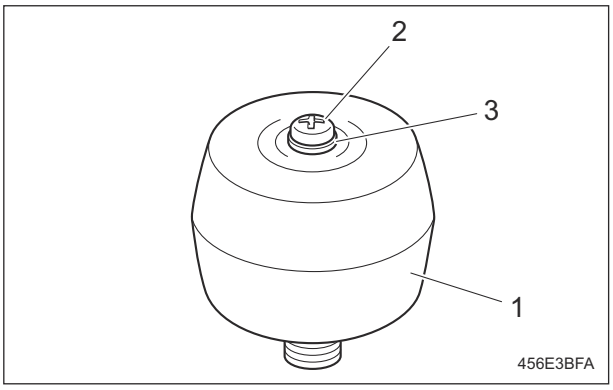
11. Supply hydraulic oil until it reaches the specified level.
"Supply of Hydraulic Oil" (Page 6-9)
12. Start the engine and stop it after hydraulic oil warmed.
13. Check underneath the machine for hydraulic oil leakage.
14. Install the left tank cover.

Replacement of Air Breather Element

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

#11394-

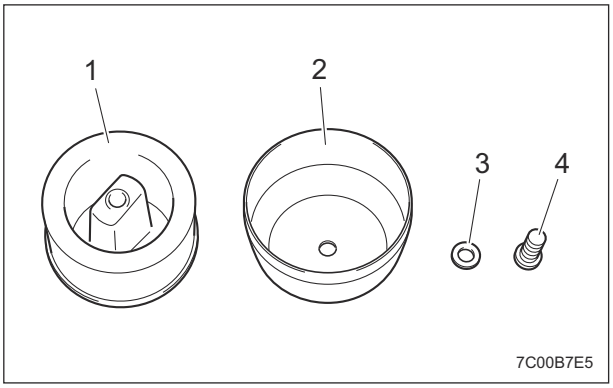
1. Lower the mower decks on a level surface, and stop the engine.
2. Remove the left tank cover.
3. Loosen the air breather screw and remove the seal washer.



Replacement of Air Breather Element_001

1	Air breather
2	Screw
3	Seal washer

4. Remove the top cover of the air breather.
5. Remove the old element.



Replacement of Air Breather Element_002

1	Element
2	Top cover
3	Seal washer
4	Screw

6. Install the new element.

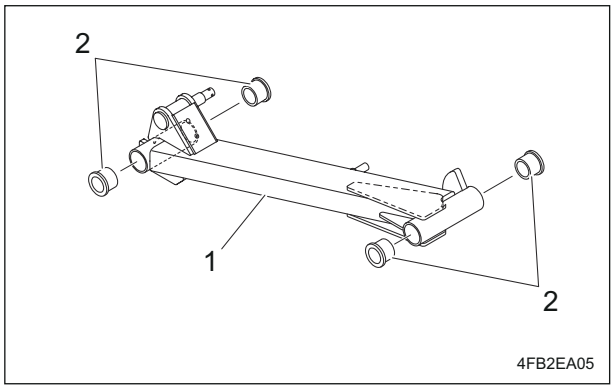
> **Important**
>
> If the seal washer is damaged, replace it with a new one.

7. Install the top cover of the air breather.
8. Install the seal washer and tighten the screw.
9. Install the left tank cover.

Replacement of Resin Bushing

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

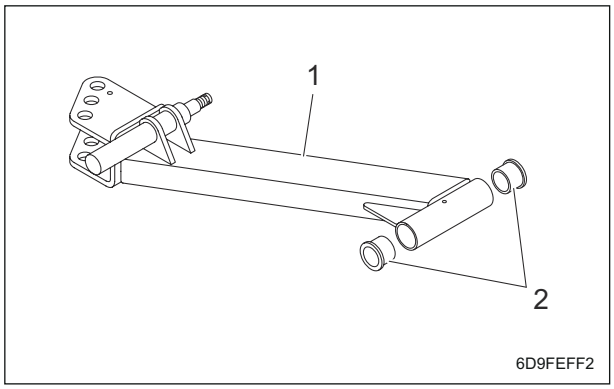
1. Lift arm (#1, #4, #5)
   Note:
   The illustration shows the lift arm #4.



Replacement of Resin Bushing_001

1	Lift arm
2	Resin bushing

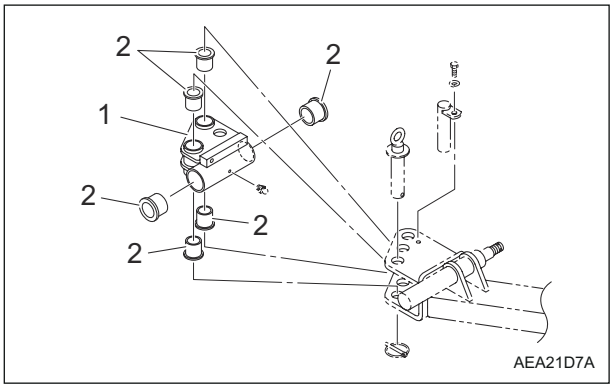
2. Lift arm (#2, #3)
   Note:
   The illustration shows the lift arm #2.



Replacement of Resin Bushing_002

1	Lift arm
2	Resin bushing

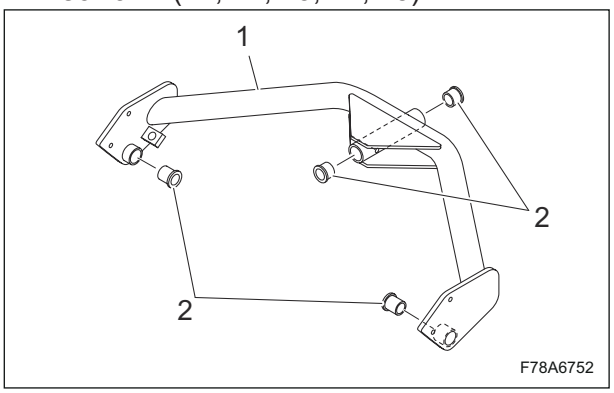
3. Swiveling bracket (#2, #3)
   Note:
   The illustration shows the swiveling bracket #2.



Replacement of Resin Bushing_003

1	Swiveling bracket
2	Resin bushing

4. Deck arm (#1, #2, #3, #4, #5)



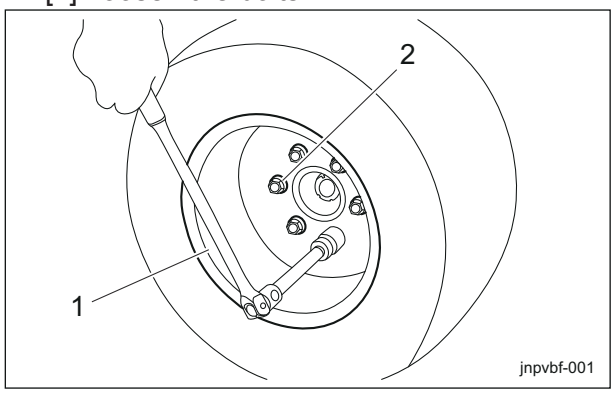
Replacement of Resin Bushing_004

1	Deck 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	Front tire
2	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 6-3)
   [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 (crosswise).

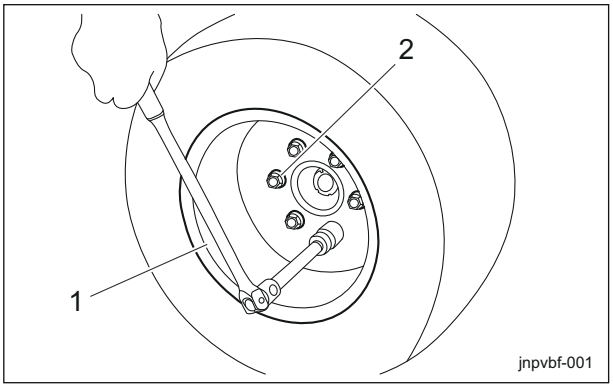
Important

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	Rear tire
2	Bolt

   [2] Securely place the jack beneath the jack-up point below the rear wheel motor, and then raise it until the tire lifts off the ground.
   "Jack-Up Points" (Page 6-3)
   [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.

Mower Deck

Replacement of Rotary Knife

Caution

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

Caution

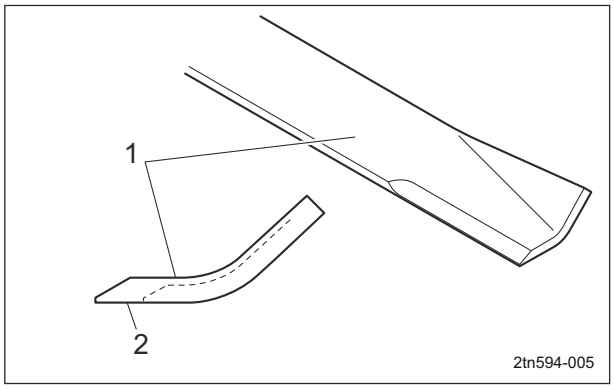
If the rotary knife becomes worn or damaged, cracks or tears will occur between the sail and flat part.
Broken pieces of the rotary knife may fly out while it is rotating.

Caution

Wear gloves when touching edged tools since they could cut your hands.

Important

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



Replacement of Rotary Knife_001

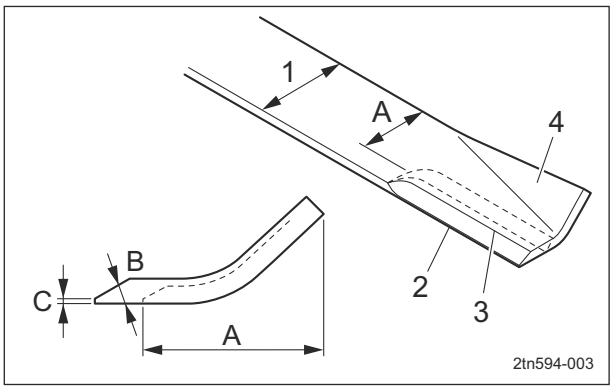
1	Rotary knife top side
2	Rotary knife bottom side

Important

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

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

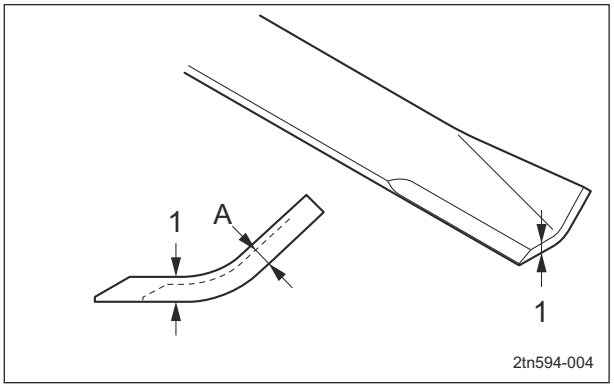
1. When the narrowest part of the rotary knife has a width of less than 2/3 of the width of a new knife



Replacement of Rotary Knife_002

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

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

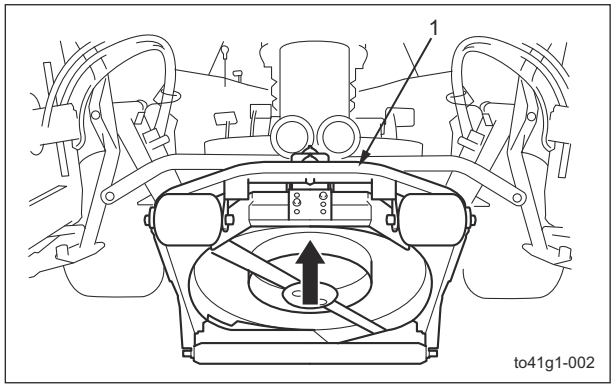


Replacement of Rotary Knife_003

1	Thickness
A	less than 1/3

■Mower Deck #1

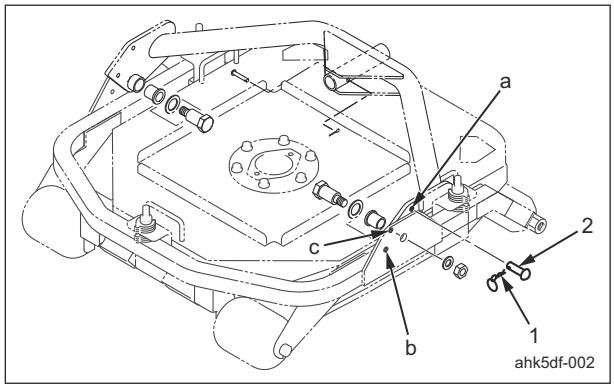
1. Start the engine, and then raise the mower decks.
2. Stop the engine, and then remove the key.
3. Lift the mower deck at the front.



Mower Deck #1_001

1	Mower deck

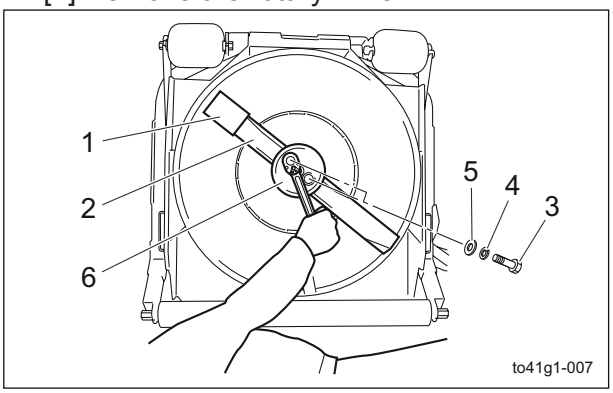
4. Remove the cotter pin and hardened roundhead pin inserted at a, and then insert them at b.



Mower Deck #1_002

1	Cotter pin
2	Hardened roundhead pin

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



Mower Deck #1_003

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

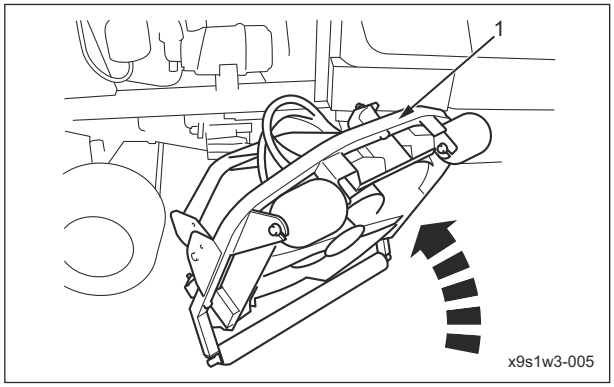
Important

The tightening torque for the knife mounting bolt is 104 - 134 N-m (1,060.49 - 1,366.40 kgf-cm).

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

■Mower Decks #2/#3

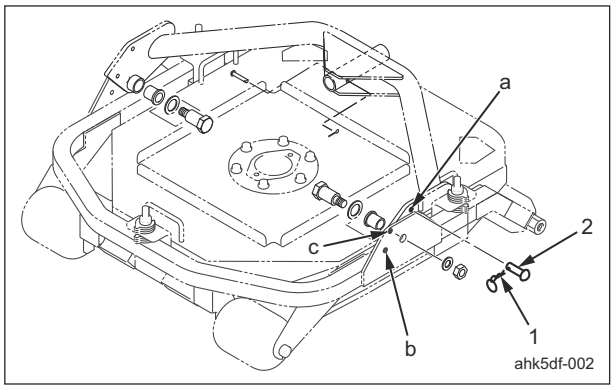
1. Swivel the mower deck.
2. Start the engine, and then raise the mower decks.
3. Stop the engine, and then remove the key.
4. Lift the mower deck at the front.



Mower Decks #2/#3_001

1	Mower deck

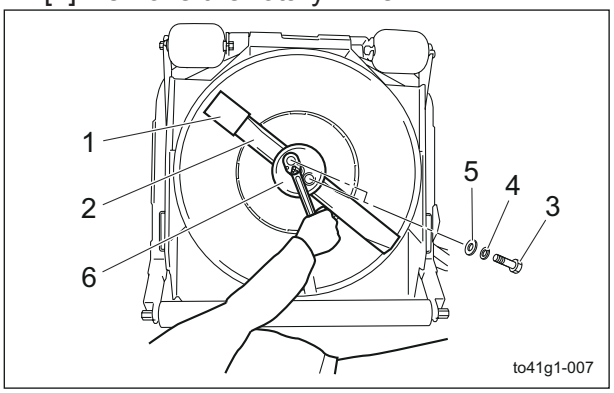
5. Remove the cotter pin and hardened roundhead pin inserted at a, and then insert them at b.



Mower Decks #2/#3_002

1	Cotter pin
2	Hardened roundhead pin

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



Mower Decks #2/#3_003

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

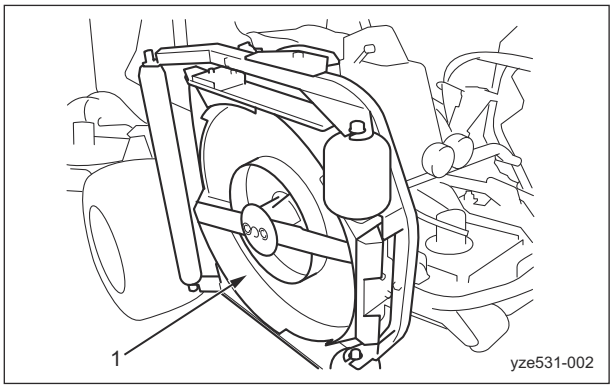
Important

The tightening torque for the knife mounting bolt is 104 - 134 N-m (1,060.49 - 1,366.40 kgf-cm).

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

■Mower Decks #4/#5

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

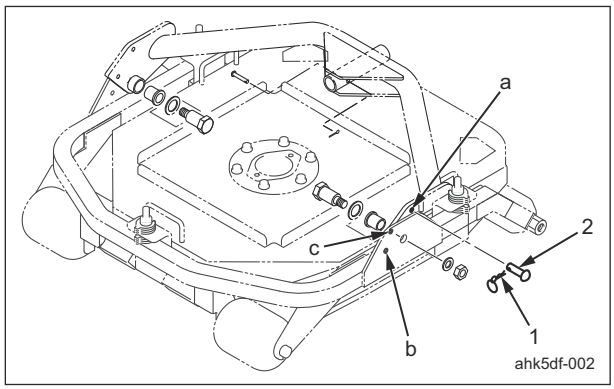


Mower Decks #4/#5_001

1	Mower deck

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

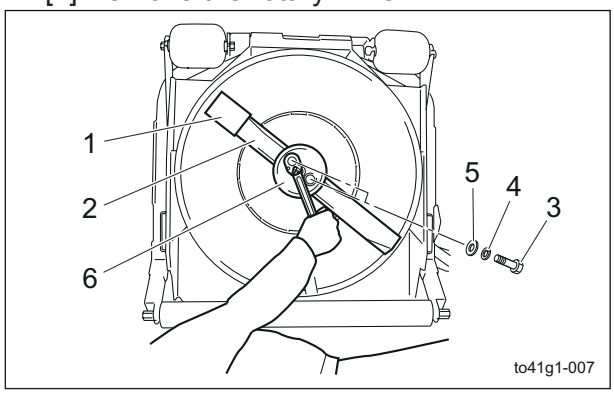
3. Remove the cotter pin and hardened roundhead pin inserted at a, and then insert them at c.



Mower Decks #4/#5_002

1	Cotter pin
2	Hardened roundhead pin

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



Mower Decks #4/#5_003

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

Important

The tightening torque for the knife mounting bolt is 104 - 134 N-m (1,060.49 - 1,366.40 kgf-cm).

5. Install the rotary knife.
   For installing the rotary knife, 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 decks
   - When storing this machine, lower all the mower decks 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

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 Brake

Caution

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

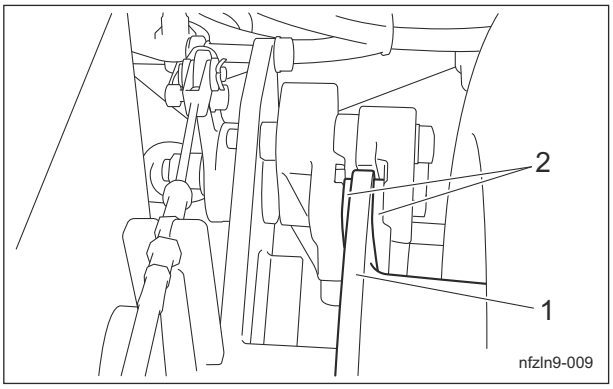
Important

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

Important

Adjust the brake with the brake pads.

The brake pad wear limit is 3 mm (0.12 in).



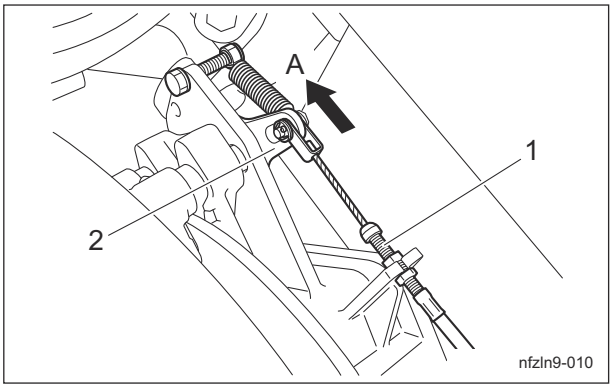
Adjustment of Brake_001

1	Brake disc
2	Brake pad

Important

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

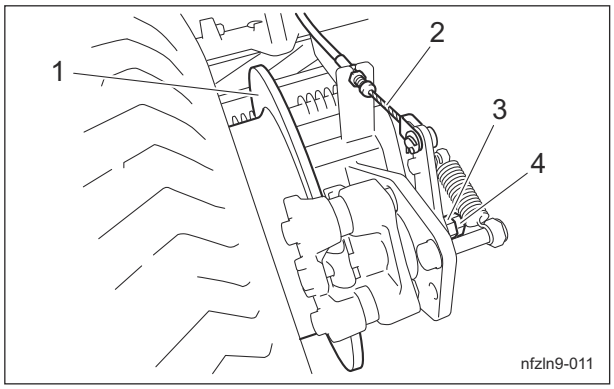
1. For each wheel, fully tighten the adjustment bolt on the brake disc side.



Adjustment of Brake_002

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

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



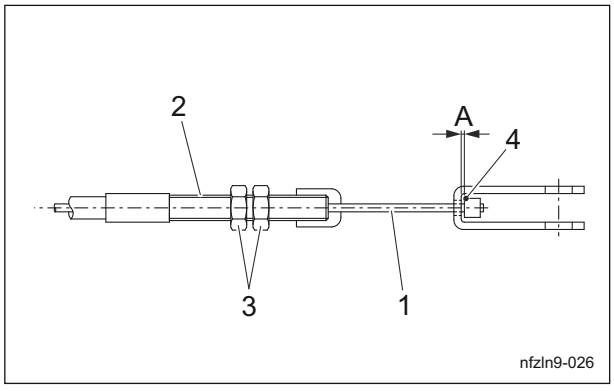
Adjustment of Brake_003

1	Brake disc
2	Wire
3	Adjustment nut
4	Lock nut

Warning

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

3. Loosen the adjustment nut to adjust the clearance between the brake disc and the pad to about 0.2 mm (0.0079 in).
4. Securely place the jack beneath the jack-up point of the front left/right frame area, and then raise it until both tires lift off the ground.
5. Check that the disc rotates freely.
6. Tighten the lock nut, and then fully tighten it while holding the adjustment nut in place.
7. With the brake pedal released, obtain a play of 1 mm (0.039 in) at the connection of the inner wire.



Adjustment of Brake_004

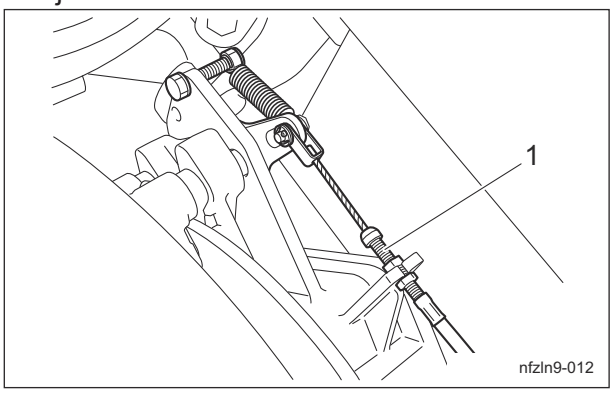
1	Inner wire
2	Adjustment bolt
3	Lock nut
4	Connection
A	1 mm (0.039 in)

8. Use a wrench to loosen the lock nut and tighten it after making the adjustment with the adjustment bolt.
9. Drive, and then check the following.
   - Make sure that heat is not generated in the brake area.
   - Make sure that the left and right brakes are equally effective.

Caution

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

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



Adjustment of Brake_005

1	Adjustment bolt (on brake disc side)

Break-In of Brakes

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

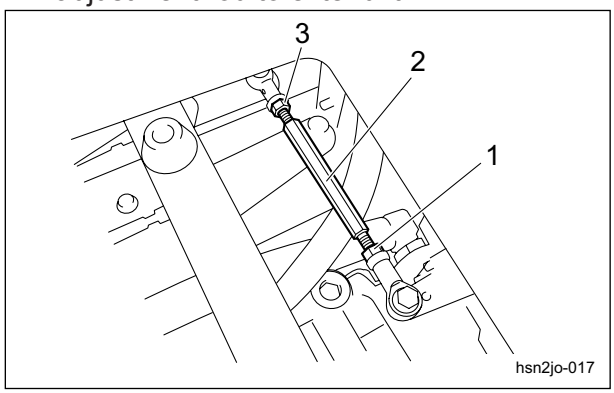
Adjustment of The Neutral Position of The Piston Pump

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

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

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

1. Stop the engine.
2. Place the jacks beneath the jack-up points, and then lift the machine off the ground.
3. Make sure that no tires come into contact with the jack stand.
4. Open the underseat cover.
   "Procedure to Open/Close Underseat Cover" (Page 5-3)
5. Start the engine, and rev it up to the maximum rpm.
6. Set the 2WD/4WD selector switch to the "2WD" position.
7. Adjust the neutral position.
   [1] If the front tires rotate forward, loosen the lock nuts, and then turn the neutral adjustment rod to shorten it.
   [2] If the front tires rotate in reverse, loosen the lock nuts, and then turn the neutral adjustment rod to extend it.



Adjustment of The Neutral Position of The Piston Pump_001

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

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

Replacement

Replacement of Fuse

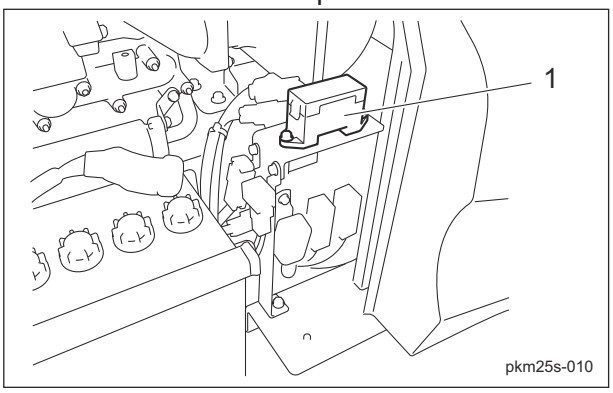
> **Important**
>
> When performing maintenance on the electrical system, be sure to remove the negative battery wire.

> **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

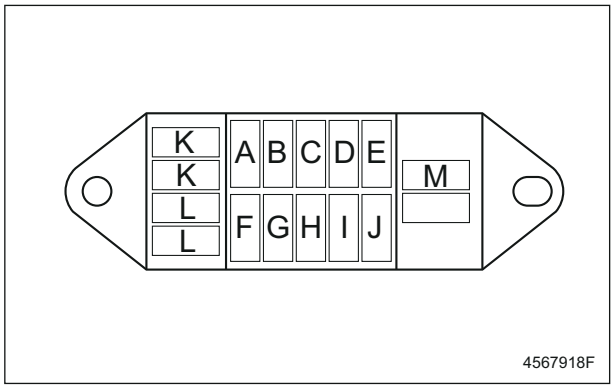
The fuse box includes spare fuses and tools.



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.

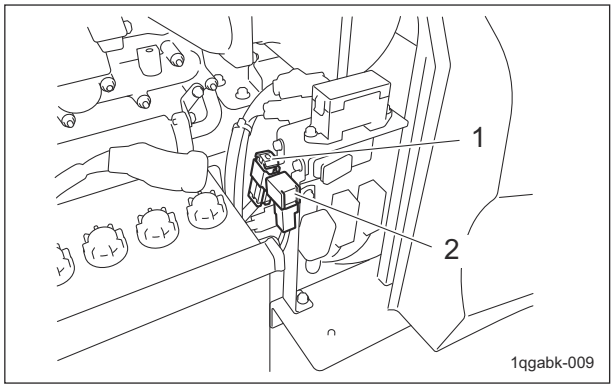


Fuse Box_002

A	5 A	ECU_KeySwitch_ON
B	5 A	Alternator
C	5 A	Display
D	15 A	Relay box 1(differential lock switch, assist switch)
E	15 A	Relay box 2 (2WD/4WD selector switch, #4/#5 proximity switches)
F	-	-
G	5 A	ECU_KeySwitch_Start
H	5 A	ECU_Parked Regeneration Switch/Auto Regeneration Inhibit Switch
I	5 A	Hydraulic oil buzzer
J	5 A	Water temperature buzzer
K	5 A	Spare
L	15 A	
M	Fuse removal tool	

Fusible Link

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



Fusible Link_001

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

Towing

Towing The Machine in An Emergency

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

Caution

Before towing, check the brake is applied effectively.

Caution

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

Important

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

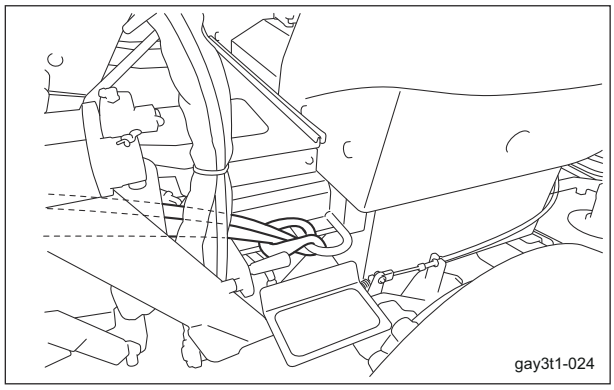
Important

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.

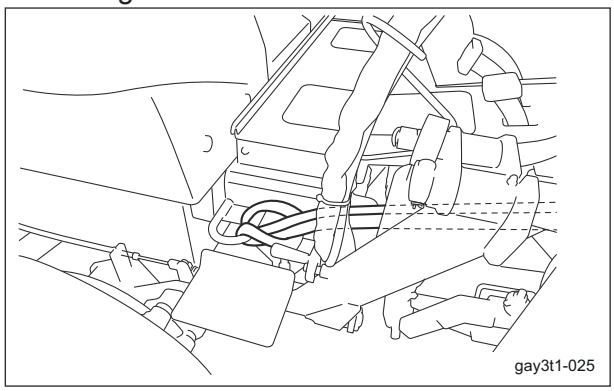
1. Stop the engine.
   "Procedure to Stop Engine" (Page 5-13)
2. Apply the parking brake.
3. Chock the wheels.

4. Secure the machine with ropes.
   Front left side



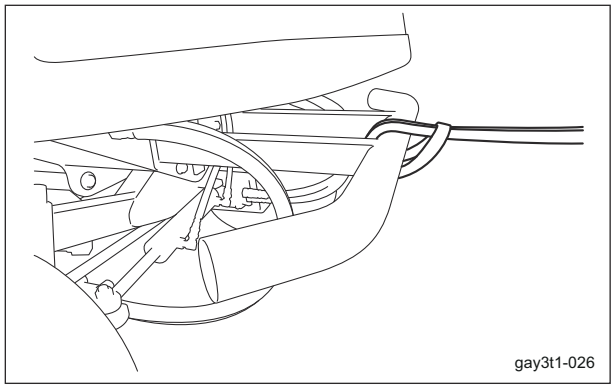
Towing The Machine in An Emergency_001

   Front right side



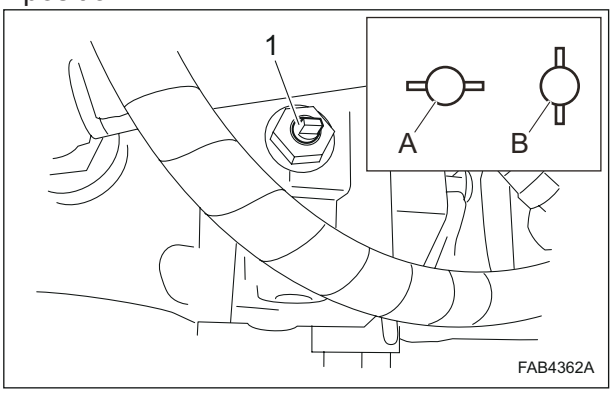
Towing The Machine in An Emergency_002

   Rear side



Towing The Machine in An Emergency_003

5. Set the 2WD/4WD selector switch to the "2WD" position.
6. Open the underseat cover.
   "Procedure to Open/Close Underseat Cover" (Page 5-3)
7. Open the bypass.
   Turn the needle valve of the unload valve 90 degrees (so that it is vertical) located beside the hydraulic pump to set it to the "Unload" position.



Towing The Machine in An Emergency_004

1	Unload valve
A	Onload
B	Unload

8. Close the underseat cover.
9. Remove the wheel stopper.
10. Release the parking brake.

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

11. Tow the machine slowly.
12. After towing is completed, close the bypass.
    Turn the needle valve of the unload valve 90 degrees (so that it is horizontal) to set it to the "Onload" position.

Appended Table

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

GM2810A
Tighten the following bolts and nuts at the torque specified in the table.
For thread locking adhesive, apply a middle strength thread locker (ThreeBond 1322 or equivalent anaerobic sealant).

Location		Code	Part name	Tightening torque			Thread locking adhesive
				N-m	kgf-cm	lb-in	
Front wheel	Motor housing	K0014160402	Bolt, heat-treated M16-40P1.5	152 - 188	1549.94 - 1917.04	1345.35 - 1663.99	—
	Motor	K0013140502	Bolt, heat-treated M14-50	100	1019.70	885.10	—
	Wheel mounting base	1 1/4-18UNF	Slotted nut (Hydraulic motor)	400 - 430	4078.80 - 4384.71	3540.40 - 3805.93	—
	Disc brake	K001A080401	Bolt, w/hexagon hole, M8-40	28 - 38	285.52 - 387.49	247.83 - 336.34	—
	Wheel	K0014120652	Bolt, heat-treated M12-65P1.5	110	1121.67	973.61	—
Rear wheel	Wheel mounting base	K0138240002	24 slotted nut high P1.5	180 - 200	1835.46 - 2039.40	1593.18 - 1770.20	—
	Wheel	K0014120652	Bolt, heat-treated M12-65P1.5	110	1121.67	973.61	—
Front axle		K0015200702	Bolt, heat-treated M20-70P1.5	370 - 450	3772.89 - 4588.65	3274.87 - 3982.95	—
Brake ass'y		K1720000260 K1720000270	M12 nut (accessories)	50 - 70	509.85 - 713.79	442.55 - 619.57	○
Engine		K0012120352	Bolt, heat-treated M12-35P1.25	67 - 85	683.20 - 866.75	593.02 - 752.34	—
		K0015120552	Bolt, heat-treated M12-55P1.25	67 - 85	683.20 - 866.75	593.02 - 752.34	—
		K0011100502	Bolt, heat-treated M10-50P1.25	58 - 76	591.43 - 774.97	513.36 - 672.68	—
		K0013121102	Bolt, heat-treated M12-110	67 - 85	683.20 - 866.75	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	—
Flywheel adapter		K0011100302	Bolt, heat-treated M10-30P1.25	58 - 76	591.43 - 774.97	513.36 - 672.68	—
		K0010100352	Bolt, heat-treated M10-35	45 - 76	458.87 - 774.97	398.30 - 672.68	—

Appended Table

Location	Code	Part name	Tightening torque			Thread locking adhesive
			N-m	kgf-cm	lb-in	
Joint	K001A100401	Bolt, w/hexagon hole, M10-40	80	815.76	708.08	○
	K0013100352	Bolt, heat-treated M10-35	45 - 76	458.87 - 774.97	398.30 - 672.68	—
Kingpin stopper	K0010120502	Bolt, heat-treated M12-50	52 - 67	530.24 - 683.20	460.25 - 593.02	—
Tie rod	K1610000020	Slotted nut of tie rod end RH	45	458.87	398.30	—
	K1611000020	Slotted nut of tie rod end LH	45	458.87	398.30	—
Piston pump	K0010120502	Bolt, heat-treated M12-50	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
Tandem gear pump	K0069000251	Bolt, 3/8-16 UNC 31.8	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Pedal stopper	K0013101202	Bolt, heat-treated M10-120	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Diff-lock valve	K001A100151	Bolt, w/hexagon hole, M10-15	29 - 38	295.71 - 387.49	256.68 - 336.34	—
Knife and knife guide	K0010120302	Bolt, heat-treated M12-30	104 - 134	1060.49 - 1366.40	920.50 - 1186.03	—
Shoulder bolt	GM2800-0207Z2	Shoulder bolt	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
Bumper	K0010120302	Bolt, heat-treated M12-30	67 - 134	683.20 - 1366.40	593.02 - 1186.03	—
Cover mounting bracket	K0000080202	Bolt, M8-20	9 - 14	91.77 - 142.76	79.66 - 123.91	—
ROPS	K0013121102	Bolt, heat-treated M12-110	104 - 134	1060.49 - 1366.40	920.50 - 1186.03	—
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

GM2810A
● ・ ・ ・ 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 and DPF area	○		
		Clean radiator cover		○	
		Clean radiator		○	
		Clean engine and DPF area		○	
Main vehicle		Check oil cooler	○		
	*2	Check battery	○		
		Check hydraulic oil	○		
		Check tire	○		
		Check cover	○		
		Check brake pedal	○		
		Check parking brake lever	○		
		Check traveling pedal	○		
		Check wire	○		
		Check liquid leakage	○		
		Check ball proof net	○		
		Clean machine exterior	○		
		Check bolts and nuts	○		
		Check monitor	○		
		Check interlock system	○		
		Check steering wheel	○		
		Check lighting	○		
		Clean oil cooler		○	
		Clean machine exterior		○	
Mower deck		Check rotary knife	○		
		Check roller	○		
		Check cover	○		
		Check bolts and nuts	○		
		Check cutting height	○		

Appended Table

Maintenance Item			Before Work	After Work	Remarks
Mower deck		Clean mower deck		○	

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

Maintenance Schedule

GM2810A
● ・ ・ ・ 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 250 hrs.	Every 500 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	*4	Check fan belt	○																
	*4	Open air cleaner evacuator valve to remove dust		○	○														Open valve every week or daily in dusty conditions
	*4	Check fuel hoses and clamp bands				○													
	*4	Check water separator				○													
	*4	Draining of water separator				○													
	*4	Clean air cleaner outer element					○												Air cleaner should be cleaned more often in dusty conditions than in normal conditions
	*4	Check radiator hoses and clamp bands						○											
	*4	Check intake air line (air cleaner hose)						○							○				Every 250 hours or every year whichever comes earlier
	*4	Adjust fan belt tension						○											
	*4	Clean water separator							○										
	*2.*4	Clean fuel tank interior							○										
	*2.*4	Clean water jacket and radiator interior							○										
	*2.*4	Check valve clearance								○									
	*2.*3.*4	Check injector									○								
	*2.*3.*4	Check EGR cooler									○								

Appended Table

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 250 hrs.	Every 500 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.*3.*4	Check PCV (Positive Crankcase Ventilation) valve in the oil separator body									○								
	*2.*3.*4	Check turbocharger										○							
	*2.*3.*4	Check EGR system										○							
	*2.*4	Check DPF differential pressure pipes and hoses													○				
	*2.*4	Check EGR piping													○				
	*4	Check exhaust manifold (crack, gas leakage and mounting screw)													○				
	*4	Replace engine oil				▲			△						△				Initial 50 hours, thereafter every 500 hours or every year whichever comes earlier
	*4	Replace oil filter cartridge				▲			△						△				Initial 50 hours, thereafter every 500 hours or every year whichever comes earlier
	*1.*4	Replace fuel filter cartridge							△										
	*2.*4	Replace fan belt							△							△			Every 500 hours or 2 years whichever comes earlier
	*3.*4	Replace oil separator element									△								
	*2.*3.*4	Replace DPF filters										△							
	*4	Replace air cleaner outer element													△				Replace every 6 cleanings or every year whichever comes earlier

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 250 hrs.	Every 500 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.*4	Replace air cleaner inner element													△				The secondary (inner) element should be removed only if it is to be replaced.
	*2.*4	Replace oil separator rubber hose														△			
	*2.*4	Replace rubber hose of DPF differential pressure sensor														△			
	*2.*4	Replace intake hose (for turbocharger)														△			
	*2.*4	Replace rubber hose of boost pressure sensor														△			
	*2.*4	Replace EGR cooler hose														△			
	*2.*4	Replace water hose														△			
	*2.*4	Replace lubricant hose														△			
	*4	Replace radiator coolant														△			
	*2.*4	Replace radiator hoses and clamp bands														△			
	*1.*2.*4	Replace fuel hoses and clamps														△			
	*2.*4	Replace intake air line (air cleaner hose)														△			
Main vehicle		Check hydraulic hoses (Moving part)	○																
		Grease and Lubricate				○								○					Maintenance schedules differ according to greasing points
		Grease rear mower deck swing out pins				○													
		Check electrical wiring				●	○												

Appended Table

Maintenance Item			Before Work	After Work	Every Week	Every 50 hrs.	Every 100 hrs.	Every 250 hrs.	Every 500 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 wheel mounting bolts				●	○												
		Check hydraulic hose (Fixed part) condition					○						○						Every 100 hours or every month whichever comes earlier
		Replace hydraulic oil					▲		△										
		Replace hydraulic oil suction filter					▲		△										
		Replace hydraulic oil line filter					▲		△										
		Replace air breather element					▲		△										
		Replace plastic bushing														△			
	*5	Replace battery														△			
	*2	Replace hydraulic hoses (Moving part)														△			
	*2.*6	Replace hydraulic hoses (Moving part) relating to steering														△			
	*2	Replace hydraulic hoses (Fixed part)															△		
	*2	Replace brake cables																△	
	*2	Replace brake pads																△	
Mower deck		Adjust cutting height																○	
		Sharpen and balance rotary knife																○	Sharpen/Balance/ Replace rotary knife if needed.

- *1: When biodiesel fuel is used, replace the fuel filter cartridge, fuel hose and clamp bands with new ones at intervals half of the usual ones.
- *2: Consult your local Baroness Dealer or local KUBOTA Dealer for this service.
- The items above (*3 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.
- *4: Refer to the Engine's Owner's Manual.
- *5: Refer to the Battery's Owner's Manual.
- The values for consumables are not guaranteed.

・*6: 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 - 12 mm (0.39 - 0.47 in)	Slack when applying 98 N (10 kgf) force to the belt at the middle point
	Adjustment: 237 - 403 N (24.17 - 41.09 kgf) Replacement: 460 - 680 N (46.91 - 69.34 kgf)	Measurement of belt tension by using a sonic type tension meter
Brake	0.2 mm (0.0079 in)	Clearance between the brake disc and the pad
	1 mm (0.039 in)	Play at the connection of the inner wire

Appended Table

List of Fault Codes

03StageV

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0016	636	7	【P0016】NE-G phase shift	• Output limitation• Regeneration inhibited	• Large phase shift between NE (crankshaft position sensor) pulse and G (camshaft position sensor) pulse	(Invalid G signal) • Engine hesitates at start-up	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0072	171	4	【P0072】Intake air temperature built-in MAF sensor: Low	• Regeneration inhibited	• Ground short circuit of sensor/ harness	• None	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0073	171	3	【P0073】Intake air temperature built-in MAF sensor: High	• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• None	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0087	633	7	【P0087】 Pressure limiter emergency open	• Output limitation• Speed limitation• Regeneration inhibited	• Pressure limiter emergency open	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF		○
P0088	157	0	【P0088】High rail pressure	• Output limitation• Speed limitation• Regeneration inhibited	• Actual pressure exceeds the command pressure	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0089	1347	7	【P0089】SCV stuck	• Output limitation• Speed limitation• Engine stops in some case• Regeneration inhibited	• SCV stuck at open position (Actual rail pressure continuously exceeds the command rail pressure)	• Insufficient output • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF		○

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0093	1239	1	【P0093】Pressure abnormality in high pressured fuel system	• Output limitation• Speed limitation• Engine stops in some case• Regeneration inhibited	• Lack of fuel (This error occurs when the engine stalls due to lack of fuel and air gets mixed in the fuel line) • Fuel leak from high pressured fuel system (Fuel consumption is calculated from the difference of fuel pressure of before and after the injection, and the error will be detected when excess fuel consumption is found)	• Insufficient output • Worsening exhaust gas emissions • Engine stops in some cases	• Key switch turn OFF		○
P0101	132	1	【P0101】Intake air volume: Low	• Output limitation• Regeneration inhibited	• Engine inlet air mass flow rate lacking (Disconnect turbo blower intake hose)	• Insufficient output	• Key switch turn OFF	○	
P0102	132	4	【P0102】MAF sensor: Low (NCD)	• Output limitation• Please stop the engine• Regeneration inhibited	• Open circuit or ground short circuit of sensor/ harness	• Insufficient output • Worsening exhaust gas performance	• Diagnostic counter = 0 (returns when error is resolved)	○	○
P0103	132	3	【P0103】MAF sensor: High	• Output limitation• Please stop the engine• Regeneration inhibited	• +B short circuit of sensor/ harness	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF		○
P0112	172	4	【P0112】Intake air temperature: Low	• Regeneration inhibited	• Ground short circuit of sensor/ harness	• Amount of white smoke increases at low temperature	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0113	172	3	【P0113】Intake air temperature: High	• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• Amount of white smoke increases at low temperature	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0117	110	4	【P0117】Coolant temperature sensor: Low	• Regeneration inhibited	• Ground short circuit of sensor/ harness	• Amount of white smoke increases at low temperatures • Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0118	110	3	【P0118】Coolant temperature sensor: High	• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• Amount of white smoke increases at low temperatures • Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0192	157	4	【P0192】Rail pressure sensor: Low	• Output limitation• Speed limitation• Engine forcibly stopped 60 sec. later• Regeneration inhibited	• Ground short circuit of sensor/ harness Failure of sensor	• Insufficient output • Worsening exhaust gas performance • Worsening running noise • Increase in white smoke • Engine forcibly stopped 60 sec. later	• Key switch turn OFF		○

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0193	157	3	【P0193】Rail pressure sensor: High	• Output limitation• Speed limitation• Engine forcibly stopped 60 sec. later• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness Failure of sensor	• Insufficient output • Worsening exhaust gas performance • Worsening running noise • Increase in white smoke • Engine forcibly stopped 60 sec. later	• Key switch turn OFF		○
P0200	523535	0	【P0200】Injector charge voltage: High	• Output limitation• Engine forcibly stopped 60 sec. later• Regeneration inhibited	• Injector charge voltage: High	• Insufficient output • Worsening exhaust gas performance • Engine forcibly stopped 60 sec. later	• Key switch turn OFF		○
P0201	651	3	【P0201】Open circuit of harness/coil in 1st cylinder injector	• Output limitation• Regeneration inhibited	• Open circuit of harness • Open circuit of injector coil	• Insufficient output • Large vibration • Worsening exhaust gas performance	• Key switch turn OFF		○
P0202	653	3	【P0202】Open circuit of harness/coil in 3rd cylinder injector	• Output limitation• Regeneration inhibited	• Open circuit of harness • Open circuit of injector coil	• Insufficient output • Large vibration • Worsening exhaust gas performance	• Key switch turn OFF		○
P0203	654	3	【P0203】Open circuit of harness/coil in 4th cylinder injector	• Output limitation• Regeneration inhibited	• Open circuit of harness • Open circuit of injector coil	• Insufficient output • Large vibration • Worsening exhaust gas performance	• Key switch turn OFF		○
P0204	652	3	【P0204】Open circuit of harness/coil in 2nd cylinder injector	• Output limitation• Regeneration inhibited	• Open circuit of harness • Open circuit of injector coil	• Insufficient output • Large vibration • Worsening exhaust gas performance	• Key switch turn OFF		○

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0217	110	0	【P0217】Engine overheat	• Output limitation• Regeneration inhibited	• Overheat of engine coolant temperature	• Insufficient output • Overheat	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF		○
P0219	190	0	【P0219】Engine overrun	• Regeneration inhibited	• Engine speed exceeds threshold speed	• Overrun	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF		○
P0237	102	4	【P0237】Boost pressure sensor: Low	• Regeneration inhibited	• Ground short circuit of sensor/ harness • Failure of sensor	• Insufficient output	• Key switch turn OFF	○	
P0238	102	3	【P0238】Boost pressure sensor: High	• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness • Failure of sensor	• Insufficient output	• Key switch turn OFF	○	
P0335	636	8	【P0335】No input of NE sensor pulse	• Output limitation• Regeneration inhibited	• Open circuit or short circuit of sensor/harness • Failure of sensor	(Running only with G signal) • Faulty starting • Vibration is slightly large • Insufficient output	• Diagnostic counter = 0 (returns when error is resolved)	○	
P0336	636	2	【P0336】NE sensor pulse number error	• Output limitation• Regeneration inhibited	• Open circuit or short circuit of sensor/harness • Failure of sensor	(Running only with G signal) • Faulty starting • Vibration is slightly large • Insufficient output	• Diagnostic counter = 0 (returns when error is resolved)	○	
P0340	723	8	【P0340】No input of G sensor pulse	• Regeneration inhibited	• Open circuit or short circuit of sensor/harness • Failure of sensor	(Invalid G signal) • Engine hesitates at start-up	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0341	723	2	【P0341】G sensor pulse number error	• Regeneration inhibited	• Open circuit or short circuit of sensor/harness • Failure of sensor	(Invalid G signal) • Engine hesitates at start-up	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0380	523544	3	【P0380】+Battery short of glow relay driving circuit	• Regeneration inhibited	• +B short of glow relay driving circuit	(At low temperature) • Faulty starting • Increase in white smoke	• Key switch turn OFF	○	
P0380	523544	4	【P0380】Ground short of glow relay driving circuit	• Regeneration inhibited	• Ground short of air glow relay driving circuit	(At low temperature) • Faulty starting • Increase in white smoke	• Key switch turn OFF	○	
P0380	676	5	【P0380】Open circuit of glow relay driving circuit	• Regeneration inhibited	• Open circuit of air glow relay	(At low temperature) • Faulty starting • Increase in white smoke	• Key switch turn OFF	○	
P0381	676	0	【P0381】Glow heater relay driving circuit overheat	• Regeneration inhibited	• Overheat of glow plug driving circuit	(At low temperature) • Faulty starting • Increase in white smoke	• Key switch turn OFF	○	
P0403	523574	3	【P0403】EGR actuator open circuit	• Output limitation• Regeneration inhibited	• EGR actuator open circuit	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0404	523574	4	【P0404】EGR actuator coil short	• Output limitation• Regeneration inhibited	• EGR actuator coil short	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0409	523572	4	【P0409】EGR position sensor failure	• Output limitation• Regeneration inhibited	• EGR position sensor failure	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0524	100	1	【P0524】Engine oil pressure error	• Engine stops in some case• Regeneration inhibited	• Oil pressure switch	• Engine stops	• Key switch turn OFF		○
P0543	3242	4	【P0543】Exhaust gas temperature sensor T1: Low	• Output limitation• Regeneration inhibited	• Ground short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P0544	3242	3	【P0544】Exhaust gas temperature sensor T1: High	• Output limitation• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P0546	4765	4	【P0546】Exhaust gas temperature sensor T0: Low	• Output limitation• Regeneration inhibited	• Ground short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P0547	4765	3	【P0547】Exhaust gas temperature sensor T0: High	• Output limitation• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P0562	168	4	【P0562】Battery voltage: Low	• Output limitation• Engine stops in some case• Regeneration inhibited	• Open circuit, short circuit or damage of harness • Failure of battery	• Faulty starting • Insufficient output • Worsening exhaust gas performance • Engine stops in some case	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0563	168	3	【P0563】Battery voltage: High	• Output limitation• Regeneration inhibited	• Open circuit, short circuit or damage of harness • Failure of battery	• Faulty starting • Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0602	523538	2	【P0602】QR (IQA) data error	• Output limitation• Regeneration inhibited	• QR data read error	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0602	523538	7	【P0602】No QR (IQA) data	• Output limitation• Regeneration inhibited	• QR data is unwritten	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P0605	628	2	【P0605】ECU FLASH ROM error	• Engine forcibly stop• Regeneration inhibited	• ECU FLASH ROM error	• Engine stops	• Key switch turn OFF		○
P0606	1077	2	【P0606】ECU CPU (Main IC) error	• Engine forcibly stop• Regeneration inhibited	• Failure of CPU and/or IC	• Engine stops	• Key switch turn OFF		○
P0607	523527	2	【P0606】ECU CPU (Monitoring IC) error	• Engine forcibly stop• Regeneration inhibited	• Failure of monitoring IC of CPU	• Engine stops	• Key switch turn OFF		○
P0611	523525	1	【P0611】Injector charge voltage: Low	• Output limitation• Engine stops in some case• Regeneration inhibited	• Injector charge voltage: Low • Failure of charge circuit of ECU	• Insufficient output • Worsening exhaust gas performance • Engine stops	• Key switch turn OFF		○
P0627	1347	5	【P0627】Open circuit of SCV	• Output limitation• Speed limitation• Engine forcibly stopped 60 sec. later• Regeneration inhibited	• Open circuit of SCV	• Insufficient output • Worsening exhaust gas performance • Engine forcibly stopped 60 sec. later	• Key switch turn OFF		○
P0628	1347	4	【P0628】SCV drive system error	• Engine forcibly stop• Regeneration inhibited	• Ground short circuit of SCV	• Insufficient output • Worsening exhaust gas performance • Engine stop	• Key switch turn OFF		○

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0629	1347	3	【P0629】+Battery short circuit of SCV	• Output limitation• Speed limitation• Engine forcibly stopped 60 sec. later• Regeneration inhibited	• +B short circuit of SCV	• Insufficient output • Worsening exhaust gas performance Engine forcibly stopped 60 sec. later	• Key switch turn OFF		○
P062B	1077	12	【P062B】Injector drive IC error or Open circuit	• Engine forcibly stop• Regeneration inhibited	• Injector drive IC error or open circuit of No.1 and 4 cylinder injector or open circuit of No.2 and 3 cylinder injector	• Engine Stop	• Key switch turn OFF		○
P062D	523605	6	【P062D】Short circuit in injector drive IC	• Output limitation• Engine stops in some case• Regeneration inhibited	• Short circuit in Injector driver IC	• Insufficient output • Large vibration • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF		○
P0642	3509	4	【P0642】Sensor supply voltage 1: Low	• Forced Idle• Engine stops in some case• Regeneration inhibited	• Sensor supply voltage 1 error or recognition error	• Faulty starting • Insufficient output • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF	○	
P0643	3509	3	【P0643】Sensor supply voltage 1: High	• Forced Idle• Engine stops in some case• Regeneration inhibited	• Sensor supply voltage 1 error or recognition error	• Faulty starting • Insufficient output • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF	○	

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P0652	3510	4	【P0652】Sensor supply voltage 2: Low	• Output limitation• Regeneration inhibited	• Sensor supply voltage 2 error or recognition error	• Faulty starting • Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0653	3510	3	【P0653】Sensor supply voltage 2: High	• Output limitation• Regeneration inhibited	• Sensor supply voltage 2 error or recognition error	• Faulty starting • Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P0662	3511	4	【P0662】Sensor supply voltage 3: Low	• Output limitation• Regeneration inhibited	• Sensor supply voltage 3 error or recognition error	• Faulty starting	• Key switch turn OFF	○	
P0663	3511	3	【P0663】Sensor supply voltage 3: High	• Output limitation• Regeneration inhibited	• Sensor supply voltage 3 error or recognition error	• Faulty starting	• Key switch turn OFF	○	
P0687	1485	2	【P0687】Main relay is locked in closed position	• Regeneration inhibited	• Failure of main relay	• Battery goes dead	• Key switch turn OFF	○	
P081A	677	4	【P081A】Ground short of starter relay driving circuit	• Regeneration inhibited	• Ground short of starter relay driving circuit	• Faulty starting	• Key switch turn OFF	○	
P1990	523700	13	【P1990】EEPROM check sum error	• Regeneration inhibited	• KBT-EEPROM check sum error	• None	• Key switch turn OFF	○	
P1A28	3936	7	【P1A28】Removal of DPF (PCD)	---	• Removal of DPF	• None	• -	○	○
P2108	523580	2	【P2108】Intake throttle feedback error	• Output limitation• Regeneration inhibited	• Intake throttle feedback error	• None	• Key switch turn OFF	○	
P2122	91	4	【P2122】Accelerator position sensor 1: Low	• Forced Idle• Regeneration inhibited	• Ground short circuit or open circuit of sensor/ harness	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P2123	91	3	【P2123】 Accelerator position sensor 1: High	• Forced Idle• Regeneration inhibited	• Battery short circuit out of sensor/harness	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P2127	29	4	【P2127】 Accelerator position sensor 2: Low	• Forced Idle• Regeneration inhibited	• Ground short circuit or open circuit of sensor/ harness	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P2128	29	3	【P2128】 Accelerator position sensor 2: High	• Forced Idle• Regeneration inhibited	• Battery short circuit out of sensor/harness	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P2131	523543	2	【P2131】 Accelerator position sensor error (CAN)	• Regeneration inhibited	• Accelerator position sensor signal error (sensor/harness open circuit, ground short circuit etc)	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF (CAN signal recovers)	○	
P2135	91	2	【P2135】 Accelerator position sensor correlation error	• Forced Idle• Regeneration inhibited	• Deviation from designed correlation in 2 sensors	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved)	○	
P2146	523523	2	【P2146】 Injector actuation circuit disconnection (COM1 or 1&4 cylinders simultaneously)	• Output limitation• Engine stops in some case• Regeneration inhibited	• Wiring harness open circuit	• Insufficient output • Large vibration • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF		○

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P2147	523523	4	【P2147】Ground short at injector drive circuit (COM1 or 1&4 cylinders simultaneously)	• Output limitation• Engine stops in some case• Regeneration inhibited	• Wiring harness ground short	• Insufficient output • Engine Vibration increases • Worsening exhaust gas emissions • Engine stops in some cases	• Key switch turn OFF		○
P2148	523523	3	【P2148】+Battery short at injector drive circuit (COM1 or 1&4 cylinders simultaneously)	• Output limitation• Engine stops in some case• Regeneration inhibited	• Wiring harness short to +B or wiring harness short to ground	• Insufficient output • Large vibration • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF		○
P2149	523524	2	【P2149】Injector actuation circuit disconnection (COM2 or 2&3 cylinders simultaneously)	• Output limitation• Engine stops in some case• Regeneration inhibited	• Wiring harness open circuit	• Insufficient output • Large vibration • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF		○
P2150	523524	4	【P2150】Ground short at injector drive circuit (COM2 or 2&3 cylinders simultaneously)	• Output limitation• Engine stops in some case• Regeneration inhibited	• Wiring harness ground short	• Insufficient output • Engine Vibration increases • Worsening exhaust gas emissions • Engine stops in some cases	• Key switch turn OFF		○

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P2151	523524	3	【P2151】+Battery short at injector drive circuit (COM2 or 3&3 cylinders simultaneously)	• Output limitation• Engine stops in some case• Regeneration inhibited	• Wiring harness short to +B or Wiring harness short to ground	• Insufficient output • Large vibration • Worsening exhaust gas performance • Engine stops in some case	• Key switch turn OFF		○
P2228	108	4	【P2228】 Barometric pressure sensor error: Low	• Regeneration inhibited	• Sensor/ECU internal circuit short to ground	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P2229	108	3	【P2229】 Barometric pressure sensor error: High	• Regeneration inhibited	• Sensor/ECU internal circuit short to +B	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P2293	679	7	【P2293】 Pressure limiter not open	• Engine forcibly stop• Regeneration inhibited	• Rail pressure value is sticking or too low engine power not to open pressure limiter valve forcibility	• Engine stop	• Key switch turn OFF		○
P2293	679	16	【P2293】Rail pressure failure after pressure limiter open	• Engine forcibly stop• Regeneration inhibited	• Rail pressure value is too high or low despite the existence of response that the pressure limiter opened	• Engine stop	• Key switch turn OFF		○
P2413	523575	7	【P2413】EGR actuator valve stuck	• Output limitation• Regeneration inhibited	• EGR actuator valve stuck	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P2414	523576	2	【P2414】EGR (DC motor) overheat	• Output limitation• Regeneration inhibited	• EGR (DC motor) overheat	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P2415	523577	2	【P2415】EGR (DC motor) temperature sensor failure	• Output limitation• Regeneration inhibited	• EGR (DC motor) temperature sensor failure	• Insufficient output • Worsening exhaust gas performance	• Key switch turn OFF	○	
P242C	3246	4	【P242C】Exhaust gas temperature sensor T2: Low	• Output limitation• Regeneration inhibited	• Ground short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P242D	3246	3	【P242D】Exhaust gas temperature sensor T2: High	• Output limitation• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P2454	3251	4	【P2454】 Differential pressure sensor 1: Low	• Output limitation• Regeneration inhibited	• Ground short circuit of sensor/ harness	• None	• Key switch turn OFF	○	
P2455	3251	3	【P2455】 Differential pressure sensor 1: High (PCD)	• Output limitation• Regeneration inhibited	• Open circuit or +B short circuit of sensor/ harness	• None	• Diagnostic counter = 0 (returns when error is resolved)	○	○
P2470	4772	4	【P2470】Exhaust gas temperature sensor Te: Low	• Output limitation• Regeneration inhibited	• Exhaust gas Heating Catalyst outlet temp. (Te) low	Temperature rise control invalid	• Key switch turn OFF	○	
P2471	4772	3	【P2471】Exhaust gas temperature sensor Te: High	• Output limitation• Regeneration inhibited	• Exhaust gas Heating Catalyst outlet temp. (Te) high	Temperature rise control invalid	• Key switch turn OFF	○	
P2621	523582	4	【P2621】Intake throttle lift sensor: Low	• Output limitation• Regeneration inhibited	• Intake throttle lift sensor low	• None	• Key switch turn OFF	○	
P2622	523582	3	【P2622】Intake throttle lift sensor: High	• Output limitation• Regeneration inhibited	• Intake throttle lift sensor high	• None	• Key switch turn OFF	○	
P3001	3252	0	【P3001】 Emission deterioration	• Output limitation• Speed limitation• Regeneration inhibited	• DOC is heated up due to unburned fuel	• Insufficient output	• Key switch turn OFF		○

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P3002	4765	0	【P3002】Emergency Exhaust gas temperature sensor T0: High	• Engine forcibly stop• Regeneration inhibited	• DOC inlet temperature (T0) high	• Engine stops • Inhibit cranking until down to 300 °C (572 °F)	• Under 300 °C (572 °F) & key switch turn OFF		○
P3003	3242	0	【P3003】Emergency Exhaust gas temperature sensor T1: High	• Engine forcibly stop• Regeneration inhibited	• DPF inlet temperature (T1) high	• Engine stops • Inhibit cranking until down to 300 °C (572 °F)	• Under 300 °C (572 °F) & key switch turn OFF		○
P3004	3246	0	【P3004】Emergency Exhaust gas temperature sensor T2: High	• Engine forcibly stop• Regeneration inhibited	• DPF outlet temperature (T2) high	• Engine stops • Inhibit cranking until down to 300 °C (572 °F)	• Under 300 °C (572 °F) & key switch turn OFF		○
P3006	3701	15	【P3006】Excessive PM3	• Output limitation• Please Parked regeneration	• PM accumulation level 3	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P3007	3701	16	【P3007】Excessive PM4	• Output limitation• Please stop the engine• Contact dealer immediately	• PM accumulation level 4	• Insufficient output	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P3008	3701	0	【P3008】Excessive PM5	• Output limitation• Please stop the engine• Contact dealer immediately• Regeneration inhibited	• PM accumulation level 5	• Insufficient output	• Key switch turn OFF (Reset by Service tool)		○
P3011	132	15	【P3011】Boost pressure low	• Output limitation• Speed limitation• Regeneration inhibited	• Disconnect the hose between the turbo blower out and intake flange • Boost pressure sensor error	• Insufficient output	• Key switch turn OFF	○	

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P3012	523589	17	【P3012】Low coolant temperature in parked regeneration	• Regeneration inhibited	• During regeneration mode, engine warm-up condition is not satisfied (coolant temperature is low)	• None	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF (Leaving from parked active regeneration status)	○	
P3013	523590	16	【P3013】Parked regeneration time out	• Regeneration inhibited	• Time out error: regeneration incomplete due to low temperature of DPF	• None	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF (Leaving from parked active regeneration status)	○	
P3015	3936	2	【P3015】Loss of function of DPF (PCD)	---	• Loss of function of DPF (PCD)	• None	• -	○	○
P3018	523599	0	【P3018】All exhaust gas temperature sensor failure	• Output limitation• Regeneration inhibited	• All exhaust gas temperature sensor failure simultaneously	• None	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P3023	523601	0	【P3023】High exhaust gas temperature after emergency high temperature DTC	• Engine forcibly stop• Regeneration inhibited	• Exhaust gas temperature sensor (T0), (T1), (T2) output	• Engine stop	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF		○
P3024	523602	0	【P3024】High frequency of regeneration	• Output limitation	• Time interval from the end time to the start time of the regeneration	• Worsening exhaust gas emissions (NOx)	• Key switch turn OFF (Reset by Service tool)	○	

Appended Table

P code	J1939-73		English		English			LED ON	
	SPN	FMI	Description	Limp home action by engine ECU (System action)	Detection item	Behavior During Malfunction	DTC recovery from error	Yellow	Red
P3025	523603	15	【P3025】Over heat pre-caution	• Regeneration inhibited	• Coolant temperature	• Worsening exhaust gas performance (NOx)	• Diagnostic counter = 0 (returns when error is resolved) or Key switch turn OFF	○	
P340C	523637	12	【P340C】Exhaust throttle valve error	• Regeneration inhibited	• Abnormality of exhaust throttle valve	•Temperature rise control invalid	• Key switch turn OFF (Turn off main relay)	○	
U0075	523547	2	【U0075】CAN2 Bus off (No communication)	• Forced Idle• Regeneration inhibited	• CAN2 B (+)/ ground short circuit or high traffic error	• Insufficient output • Transmitted data is invalid	• Key switch turn OFF		○
U0076	523578	2	【U0076】No communication with EGR (NCD)	• Output limitation• Regeneration inhibited	• No communication with EGR	• Insufficient output • Worsening exhaust gas performance	• Diagnostic counter = 0 (returns when error is resolved)	○	○
U0077	523604	2	【U0077】CAN1 Bus off (No communication)	• Output limitation• Regeneration inhibited	• CAN1 +B/GND short circuit or high traffic error	• Insufficient output • Transmitted data is invalid	• Key switch turn OFF		○
U0081	523548	2	【U0081】CAN KBT frame error	• Forced Idle• Regeneration inhibited	• CAN-KBT original frame open circuit error	• Insufficient output	• Key switch turn OFF		○
U0082	523591	2	【U0082】CAN CCVS frame error	• Regeneration inhibited	• CAN_CCVS communication stopping	• None	• Key switch turn OFF	○	
U0083	523592	2	【U0083】CAN CM1 frame error	• Regeneration inhibited	• CAN_CM1 communication stopping	• None	• Key switch turn OFF	○	
U0084	523593	2	【U0084x】CAN DDC1 frame error	• Regeneration inhibited	• CAN_DDC1 communication stopping	• None	• Key switch turn OFF	○	
U0085	523594	2	【U0085x】CAN ETC2 frame error	• Regeneration inhibited	• CAN_ETC2 communication stopping	• None	• Key switch turn OFF	○	
U0086	523595	2	【U0086】CAN ETC5 frame error	• Regeneration inhibited	• CAN_ETC5 communication stopping	• None	• Key switch turn OFF	○	
U1000	523637	2	【U1000】No communication with exhaust throttle valve	• Regeneration inhibited	• CAN_EXTHR communication stopping	• Temperature rise control invalid	• Key switch turn OFF	○	

Daily Check Records

GM2810A
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 and DPF area										
	Clean radiator cover										
	Clean radiator										
	Clean engine and DPF area										

Items											
Main vehicle	Check oil cooler										
	Check battery										
	Check hydraulic oil										
	Check tire										
	Check cover										
	Check brake pedal										
	Check parking brake lever										
	Check traveling pedal										
	Check wire										
	Check liquid leakage										
	Check ball proof net										
	Clean machine exterior										
	Check bolts and nuts										
	Check monitor										

Records

Items											
Main vehicle	Check interlock system										
	Check steering wheel										
	Check lighting										
	Clean oil cooler										
	Clean machine exterior										
Mower deck	Check rotary knife										
	Check roller										
	Check cover										
	Check bolts and nuts										
	Check cutting height										
	Clean mower deck										

Maintenance Records

GM2810A
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 water separator										
	Draining of water separator										
	Clean air cleaner outer element										
	Check radiator hoses and clamp bands										
	Check intake air line (air cleaner hose)										
	Adjust fan belt tension										
	Clean water separator										
	Clean fuel tank interior										
	Clean water jacket and radiator interior										

Records

Items											
Engine	Check valve clearance										
	Check injector										
	Check EGR cooler										
	Check PCV (Positive Crankcase Ventilation) valve in the oil separator body										
	Check turbocharger										
	Check EGR system										
	Check DPF differential pressure pipes and hoses										
	Check EGR piping										
	Check exhaust manifold (crack, gas leakage and mounting screw)										
	Replace engine oil										
	Replace oil filter cartridge										
	Replace fuel filter cartridge										
	Replace fan belt										

Items											
Engine	Replace oil separator element										
	Replace DPF filters										
	Replace air cleaner outer element										
	Replace air cleaner inner element										
	Replace oil separator rubber hose										
	Replace rubber hose of DPF differential pressure sensor										
	Replace intake hose (for turbocharger)										
	Replace rubber hose of boost pressure sensor										
	Replace EGR cooler hose										
	Replace water hose										
	Replace lubricant hose										
	Replace radiator coolant										
	Replace radiator hoses and clamp bands										
	Replace fuel hoses and clamps										

Records

	Items										
Engine	Replace intake air line (air cleaner hose)										
Main vehicle	Check hydraulic hoses (Moving part)										
	Grease and Lubricate										
	Grease rear mower deck swing out pins										
	Check electrical wiring										
	Check wheel mounting bolts										
	Check hydraulic hose (Fixed part) condition										
	Replace hydraulic oil										
	Replace hydraulic oil suction filter										
	Replace hydraulic oil line filter										
	Replace air breather element										
	Replace plastic bushing										
	Replace battery										
	Replace hydraulic hoses (Moving part)										

Items											
Main vehicle	Replace hydraulic hoses (Moving part) relating to steering										
	Replace hydraulic hoses (Fixed part)										
	Replace brake cables										
	Replace brake pads										
Mower deck	Adjust cutting height										
	Sharpen and balance rotary knife										

Records

BARONESS®

Quality on Demand

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