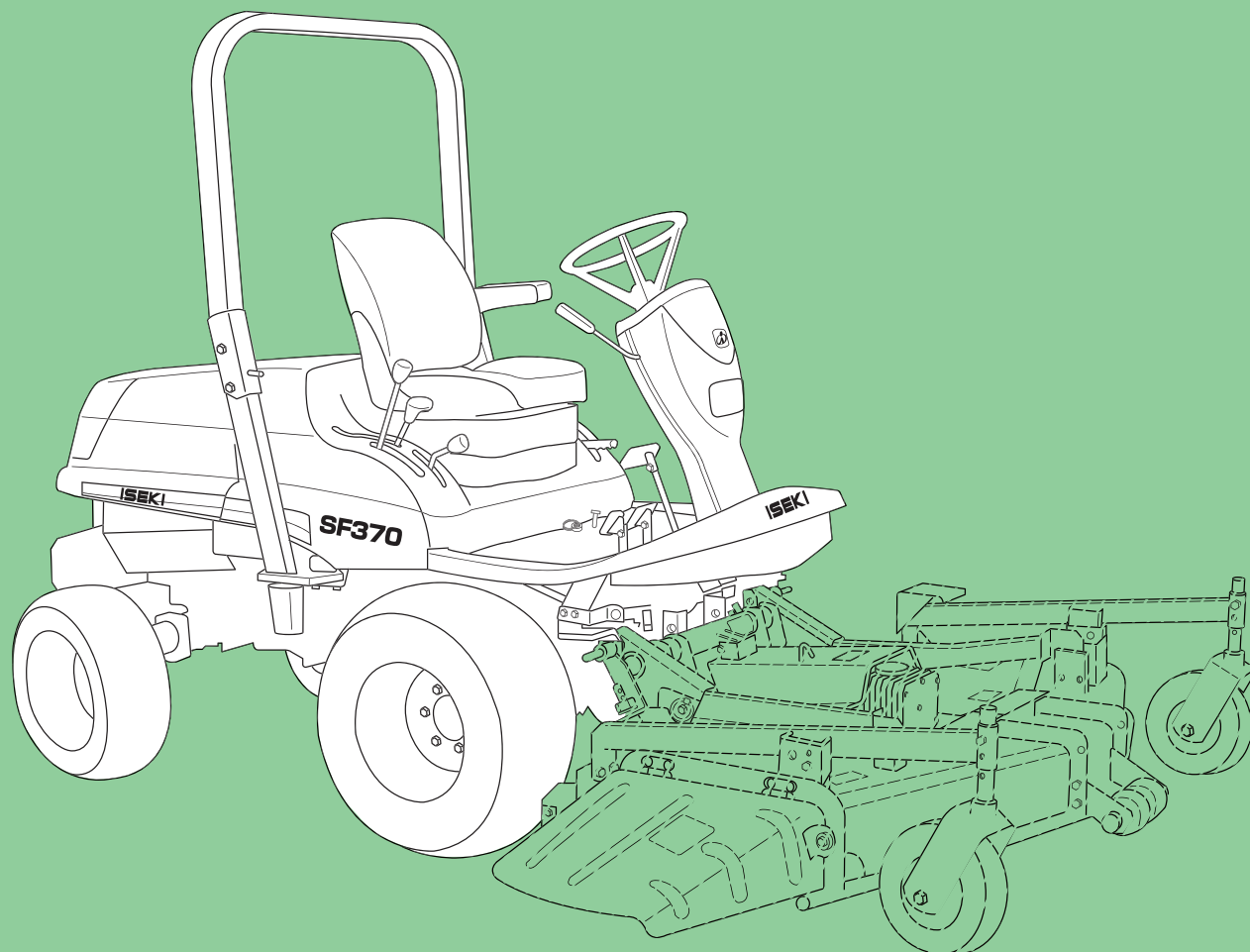


ISEKI FRONT MOWERS



Operator's Manual

MODELS:

SF310

SF370



ISEKI

ENGLISH
-Original Instructions-

INTRODUCTION

Thank you very much for purchasing an ISEKI front mower.

This operator's manual provides the information necessary for operating and maintaining your front mower safely and properly. The contents are mainly composed of the following two items:

SAFETY INSTRUCTION: Essential items which you should observe while operating the front mower.

TECHNICAL INSTRUCTION: Items which are necessary to operate, adjust, and service the front mower properly.

Every time you see the words and symbols shown below in the manual and on the safety decals, you must take note of their instructions and warning.



DANGER: This symbol together with the words DANGER indicates an imminently hazardous situation that, if not avoided, will result in VERY SERIOUS INJURY OR EVEN DEATH.



WARNING: This symbol together with the word WARNING indicates a potentially hazardous situation that, if not avoided, could result in SERIOUS INJURY OR EVEN DEATH.



CAUTION: This symbol together with the word CAUTION is used to indicate a potentially hazardous situation that, if not avoided, may result in MINOR INJURY.

***IMPORTANT:** The word IMPORTANT is used to provide instructions or advice in order to let the front mower provide the optimum performance.*

***NOTE:** The word NOTE is used to indicate points of particular interest for more efficient and convenient repair or operation.*

Before starting to operate the front mower for the first time, you should read this operator's manual thoroughly and carefully until you are sufficiently familiar with the operation of the front mower in order to do jobs safely and properly. You are advised to refer to it from time to time to refresh your understanding of the front mower.

The manual should be kept in a handy place so you can refer to it when required.

The parts employed in this front mower may be modified without notice for better performance and quality and for safety purposes, which may lead to some inconsistency found on your front mower with the contents of this manual.

The front mower is designed to be used on well-kept lawns. Using the front mower in other places is not authorized. Besides, the manufacturer will not pay for any damage caused by unauthorized use and the risk is only borne by the user. Proper use of the front mower also implies that the user follows the operational, adjusting, and servicing instructions indicated in the operator's manual.

When you have any question about your front mower, you are always welcome to ask your dealers.

All information, illustrations, and specifications contained in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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ABBREVIATION LIST

Abbreviations	Definitions
PTO	Power Take Off
PT	Permanent Type
RH / LH	Right - hand and Left - hand sides are determined by facing in the direction of forward travel
ROPS	Roll - Over Protective Structure
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
SSM	Side discharge Mower

UNIVERSAL SYMBOLS



Safety Alert Symbol



Operator's manual



Preheat



Engine - Stop



Engine - Run



Starter Control



Engine - Revolution



Fast



Slow



Mower - deck



Mower - Lowered position



Mower - Raised position



Cutting Height



Power Take - Off Clutch Control - Off position



Power Take - Off Clutch Control - On position



Battery



Diesel Fuel



Parking Brake

CHAPTER 1. FOR SAFE OPERATION



DANGER : Failure to observe the following safety instructions can result in serious injury or death. As the owner or operator of the front mower, you are responsible for preventing accidents or injuries.

1. HOW TO BE A SAFE OPERATOR

- 1.1. Follow all the safety signs on the front mower and all the manufacturer's instructions before starting the front mower. If you do not, it may result in body injuries.
- 1.2. Pay attention to the caution labels on the front mower and mower deck and observe the instructions they give to avoid physical injuries.
- 1.3. Ensure that all operators are responsible individuals who have read the instructions or been fully trained on the safe operation of the front mower.
- 1.4. All operators should evaluate their health and ability to operate a front mower safely enough to protect themselves and others from serious injury. Do not operate the front mower while you are under the influence of alcohol or drugs.
- 1.5. Understand how to properly and safely operate and maintain the front mower. Seek and obtain practical instruction on how to operate and maintain the front mower properly.
- 1.6. Be sure to use necessary protective devices such as headgear, safety glasses, safety shoes, ear plugs, gloves, etc.
- 1.7. Wear appropriate protective clothing and equipment when you are operating, adjusting, or servicing the front mower, such as safety glasses, long pants, substantial footwear, and ear protection. Long hair, loose clothing, or jewellery can get tangled in moving parts.
- 1.8. Never permit the following persons to operate the front mower:
 - Persons not properly trained to operate the front mower
 - Persons who cannot understand the instructions mentioned in this operator's manual and on the caution labels
 - Pregnant women
 - Children
 Local regulations may restrict the age of the operator.

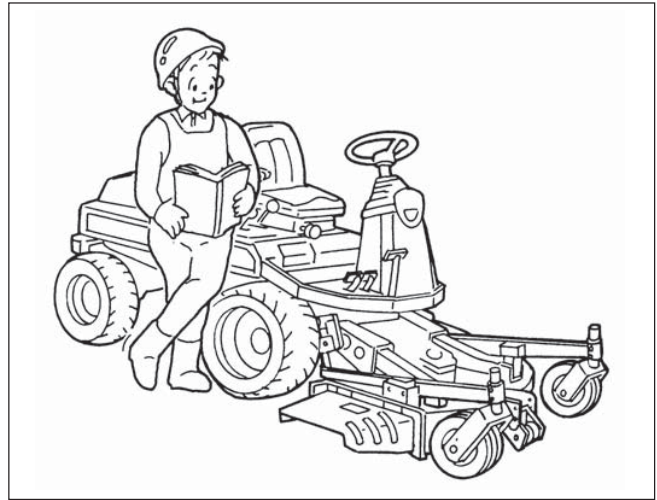


FIG. 1



FIG. 2

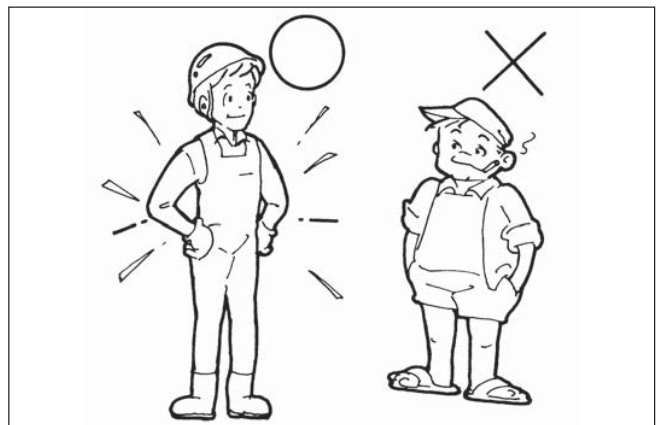


FIG. 3

- 1.9. Inspect the front mower periodically. If not, this may not only shorten the front mower's service life but also make safe and efficient operation impossible.
- 1.10. Never use the front mower out of normal usage even if it is not mentioned at this operator's manual.

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2. BEFORE STARTING THE FRONT MOWER

- 2.1. Set up an operation plan with sufficient time allowance. A tight plan may result in unexpected accidents. Especially when operating the front mower under extremely hot, cold, or humid circumstances, set up an operation schedule or method which will ensure operational safety.
- 2.2. Mow only in daylight or good artificial light. Mowing in the dark may cause unexpected accidents.
- 2.3. Thoroughly inspect the mowing area and remove all objects from the mowing area that the front mower can throw, such as stones, toys, sticks, and wires, which may lead to serious accidents.
- 2.4. Ensure that there are no people or pets in the area where you will mow. Keep children out of the mowing area and under the watchful care of a responsible adult.
- 2.5. Do not operate the front mower unless the operator's presence controls, safety switches, and guards are attached and functioning properly.
- 2.6. Start the engine from the operating or designated starting position.
- 2.7. Before starting the engine, make sure that everything is safe around the front mower and put the traction drive in neutral, set parking brake, and disengage the cutting unit(s). Otherwise, unexpected accidents may occur.
- 2.8. Start the engine with the starter switch only. Never attempt to start the engine by shorting the terminals, or the front mower may move abruptly, and result in unexpected accidents.
- 2.9. Do not run the engine in an enclosed area where dangerous carbon monoxide fumes can collect. Sufficient ventilation should be provided when starting the engine in an enclosed area.
- 2.10. Make sure of safety around the front mower and move slowly when starting. Abrupt starting may cause unexpected accidents.
- 2.11. Become familiar with the operation, particularly, the stopping of the front mower. You should be skilful enough to be able to stop the front mower at will.
- 2.12. Use only attachments and accessories approved by the manufacturer and install and operate them as directed.



FIG. 4

- 2.13. When your front mower is equipped with an implement other than a standard mower deck, such as a collector, a cabin, etc., never fail to ask your dealers about machine balance. Always follow their advice.
- 2.14. Keep in mind that the operator or user is responsible for the accidents or hazards caused by the front mower to other people or their property.
- 2.15. Inspect the front mower for wear or damage. Replace any worn or damaged parts.
- 2.16. Especially before starting the mower, be sure to perform advised pre-operation inspections especially on the brakes and inspect visually to see that the blade and blade tightening nuts are not worn, damaged or loose. Replace worn or damaged blade and nuts as an assembly to preserve blade balance. Otherwise, poor braking or scattered broken blades may result, which is very dangerous.

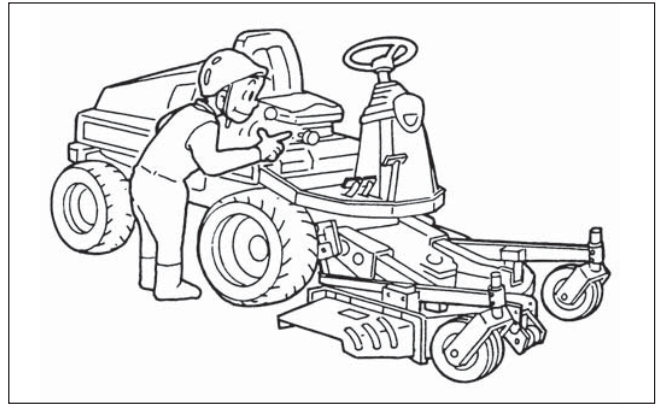


FIG. 5

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3. OPERATION OF THE FRONT MOWER

- 3.1. When the front mower is running, stay away from the discharge opening, the cutting unit(s), and all moving parts.
- 3.2. During operation, never allow anyone, especially children, and animals to be in the vicinity of the front mower. Do not direct the discharge at anyone.
- 3.3. When you are working with co-workers, be sure to alert them by signalling before you take a new action.
- 3.4. When operating the front mower, you should be seated in the operator's seat properly, hold the steering wheel by both hands, and look in the direction in which the front mower advances. Avoid looking a side or holding the steering wheel by one hand during operation.
- 3.5. Always be sure to operate the front mower from the driver's seat with seat belt. Never attempt to get on or off the front mower while it is travelling.
- 3.6. Do not mow on wet grass. The front mower may slide.
- 3.7. Slow down before turning the front mower. Turning at high speed may cause the front mower to turn over.
- 3.8. Never attempt to depress the dif-lock pedal while turning around the front mower. Turning with the dif-lock on may cause the front mower to turn over.
- 3.9. Connect the independent brake pedal except necessary situation. Never operate the independent brake pedal during travelling as this will cause the front mower to skid sideways or turn over. When stopping, be sure to use the master brake pedal. (E6 type)
- 3.10. Look down and behind you and ensure a clear path before you move the front mower backward.
- 3.11. Do not mow while moving backward unless it is absolutely necessary.

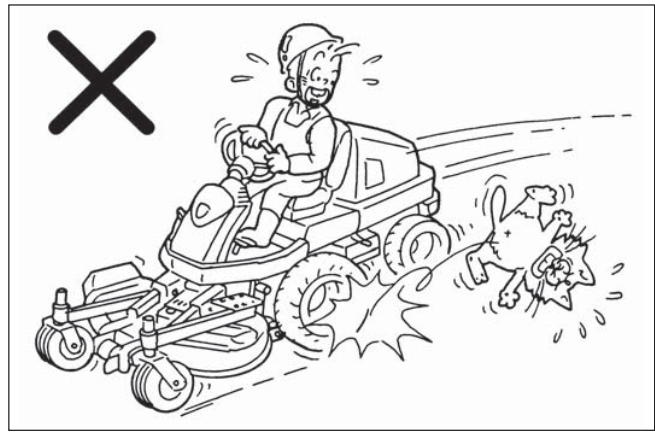


FIG. 6

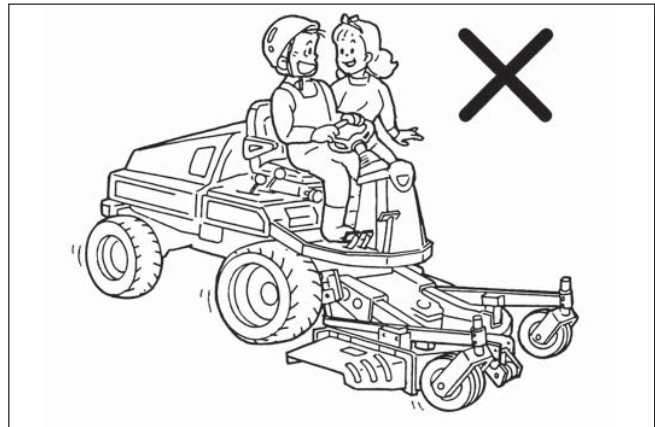


FIG. 7

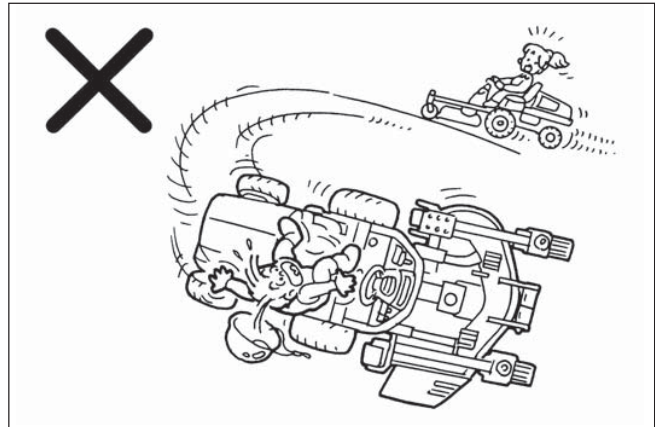


FIG. 8

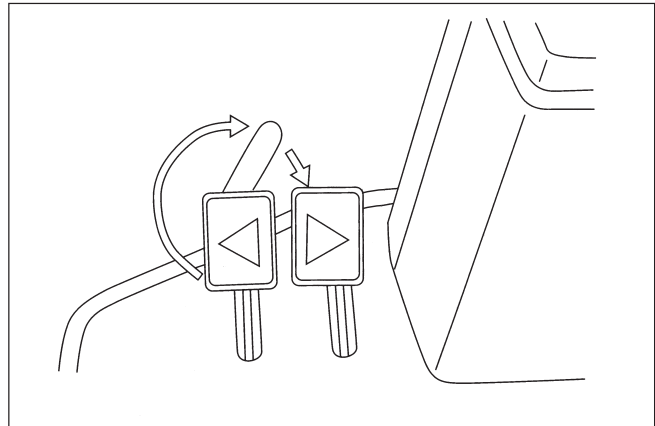


FIG. 9

- 3.12. Never operate the front mower in terrain where there are ditches, holes, or steps easy to collapse. In such a place, the front mower could turn over or fall.
- 3.13. Before making access to moving parts, stop the engine, and keep your hands, feet, clothing, accessories and etc. away so as not to be caught in the moving parts of the front mower.
- 3.14. Be alert when you approach blind corners and objects that may obscure your vision. Watch for holes, ruts, or bumps. Tall grass can hide obstacles.
- 3.15. Never rest a foot on the brake pedal. If so, the brakes disc wear rapidly, which may lead to serious accidents.
- 3.16. Travelling set with the cruise lever should be restricted only to operations in specious, flat areas with an unobstructed view and used with the range shift lever always kept in the low speed position.
- 3.17. Never attempt to do the mowing operation without the discharge cover in place or with the cover left open.
- 3.18. Never attempt to operate without the drive shaft cover in place.
- 3.19. Do not attempt to adjust the cutting height while the engine is running.
- 3.20. Adjust the cutting height with the gauge wheels in accordance with the condition of the ground surface at the working site. Mowing on rough ground with low cutting height may cause the blades to hit soil or stones, which is very dangerous.
- 3.21. If you strike an object or if the front mower vibrates abnormally, stop the front mower immediately, wait for all moving parts to stop, and inspect the cutting unit(s). Make all repairs before you resume operation.
- 3.22. Be sure to keep the grass discharging part clean. A clogged discharging part may cause the discharge cover to open, resulting in scattering of grass and stones, which is very dangerous.
- 3.23. Never allow grass or leaves to accumulate around heated parts such as the engine and the muffler, or this may cause a fire.
- 3.24. Before moving the front mower to another place, be sure to stop the mower blades and lift up the mower deck. Otherwise, they may hit stones and scatter them around, which is very dangerous.

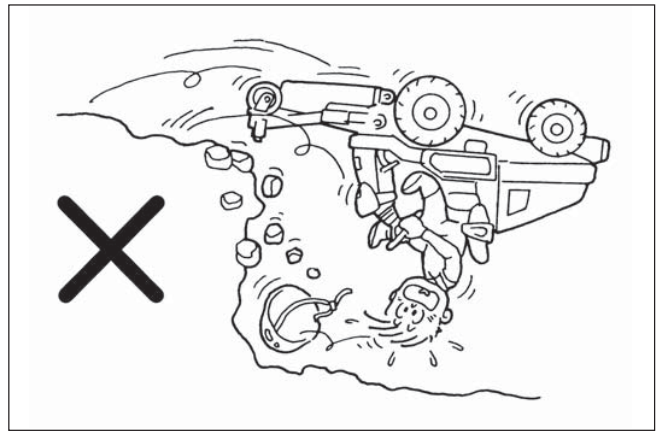


FIG. 10

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- 3.25. When driving over a levee or step, stop the mower blades, lift up the mower deck, and move the front mower straight to the levee and make it climb over slowly. Avoid climbing over a levee too high, or the front mower may fall sideways or turn over.
- 3.26. Stop the cutting unit(s) when you are crossing gravel areas.
- 3.27. Watch for traffic when you are operating the front mower near a roadway or when crossing a roadway.
- 3.28. Never attempt to use the front mower to draw an implement or a trailer. It is not designed to draw a load.
- 3.29. Stay alert and stop the front mower if people or pets enter the area.
- 3.30. Do not carry passengers.
- 3.31. Never carry children, even when the cutting means are not moving. Children may fall off the front mower and become seriously injured or prevent you from operating the front mower safely. Children who have been given rides in the past may suddenly appear in the mowing area for another ride and be run over or backed over by the front mower.
- 3.32. If you use the lawn mower for long time, make sure to take rest every 2 or 3 hours.
- 3.33. When you hear thunder, stop the lawn mower and move indoors immediately. If you cannot move indoors, get to low place. Otherwise, you can be struck by lightning.
- 3.34. Before stopping the engine, be sure to lower the mower deck onto the ground, apply the parking brakes, shift the range shift lever in neutral and turn the PTO switch to the OFF position.
- 3.35. Before leaving the operating position of the front mower for any reason, always do the following:
 - Stop the front mower on level ground.
 - Stop the cutting unit(s), disengage PTO, and lower the attachment(s).
 - Disengage the drive(s).
 - Set the parking brake.
 - Stop the engine and wait for all moving parts to stop.

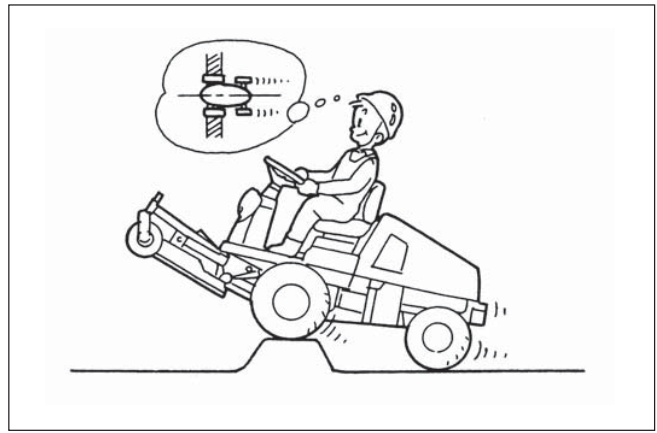


FIG. 11

4. OPERATION ON A SLOPE



DANGER : Slopes are a major factor related to accidents with front mowers, resulting in severe injuries.

We cannot recommend the front mower with mower deck be operated on a slope. All slopes require extra caution; no slope is safe.

You can lose control of the front mower on a slope because of one of the following:

- the wheels lack traction; you are driving the front mower too fast.
- you are not braking properly; the front mower type is not suited for the task.
- you are unaware of the ground conditions (especially slopes).
- you incorrectly hitch an attachment or distribute a load.

If the front mower has to be used on a slope, Never use it on a slope of more than "10°". Even if using it on a slope of less than "10°", be sure to abide by the following instructions.

A slope angle of 10° is specified with the front mowers equipped with the attachments mentioned respectively.

- The front mower is not equipped with any attachments or a cabin.
- The front mower is equipped with a standard mower deck.

Grass catchers and other attachments can change the stability of the front mower. Follow the instructions for adding weight to improve the stability of the front mower.

When your front mower is equipped with an implement other than standard, such as a collector, a cabin, etc., never fail to ask your dealers about machine balance. Always follow their advice.

The ROPS is a safety device.

- Keep the ROPS in the vertical and locked position. Always use the seat belt when you operate the mower. Make sure the seat belt can be released quickly in an emergency.
- The ROPS should only be folded if absolutely necessary for storage. Do not operate the mower with the ROPS in the folded position. There is no roll over protection with the ROPS in the folded position.
- Do not use the seat belt with the ROPS in the folded position.
- Do not remove the ROPS from the mower.
(Recommended seat: MSG83/521/GRAMMER)

4.1. Be sure to wear a helmet during operation.

4.2. If you feel uneasy operating your front mower on a slope, do not mow it.

4.3. Evaluate the terrain to determine what accessories and attachments you will need to be safe.

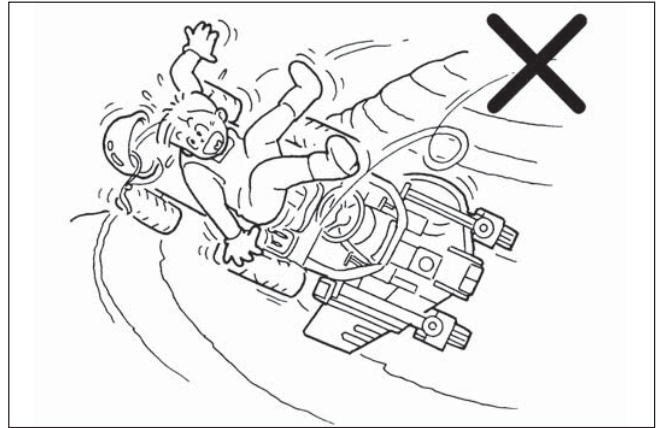


FIG. 12

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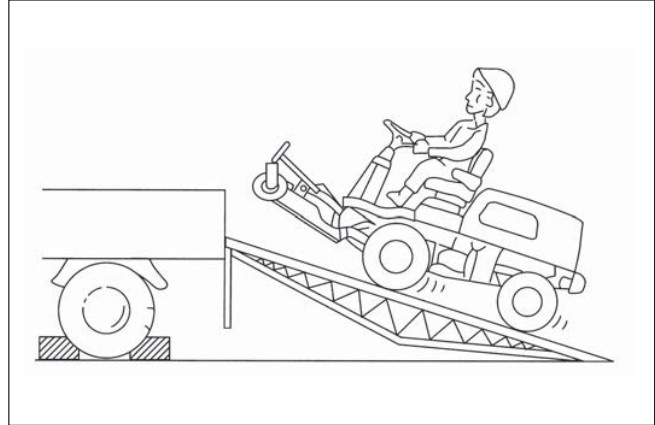
- 4.4. Do not mow near drop-offs, ditches, or embankments. You can tip the front mower over if a wheel is over the edge of a drop-off or if an edge caves in. Uneven terrain can cause the front mower to overturn.
- 4.5. Never perform mowing operation on wet grass.
- 4.6. Be sure to shift the 4WD lever to the 4WD position.
- 4.7. Never use the cruise control during mowing operation.
- 4.8. Choose a low gear to prevent the need to stop or shift gears on a slope.
- 4.9. Avoid sudden starting and stopping.
- 4.10. Mow up and down a slope; do not mow across it.
- 4.11. Mow a slope by moving slowly. Do not suddenly change your speed or direction.
- 4.12. Do not turn on a slope unless it is necessary, and then, turn slowly downhill, if possible.
- 4.13. If the tyres lose traction, disengage the cutting unit(s) and proceed slowly, straight down the slope. Do not apply the brake on a front mower that is sliding down a slope. Engage the clutch slowly and always keep the front mower in gear, especially when travelling downhill.
- 4.14. Do not use the grass catcher(s) while you are mowing a steep slope.
- 4.15. Do not try to stabilize the front mower by putting your foot on the ground.
- 4.16. Avoid stopping the front mower on a slope.

5. DRIVING ON PUBLIC ROADS

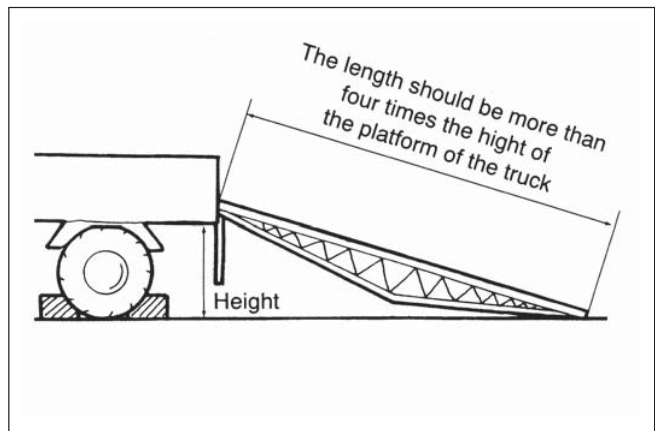
- 5.1. This front mower cannot be driven on a public road without authorization by a local government agency, etc. Therefore it may be illegal for the front mower not only to travel on but also to cross a public road.
- 5.2. When transporting the front mower on a public road, load it on a truck or trailer.

6. LOADING ONTO OR UNLOADING FROM A TRUCK

- 6.1. When loading the front mower onto a truck, turn off the truck's engine, apply the parking brakes to the truck, and chock the wheels to avoid unexpected moving of the truck or trailer.
- 6.2. Pay sufficient attention to safety conditions around the front mower and have it guided by someone to assist the operator. Never allow other persons to approach the front mower, especially in front of or behind it.
- 6.3. When loading the front mower onto a truck, lift up the mower deck fully and advance it straight at sufficiently low speeds. Drive it rearward when unloading it from the truck or trailer.
- 6.4. If the engine stalls unexpectedly on the ramps, depress the brake pedals immediately and roll the front mower to the ground by releasing the brakes gradually. Then start the engine and try again.
- 6.5. Use ramps with the same or better specifications mentioned below. When the front mower is equipped with the attachments other than those included in the specifications mentioned below, ask your dealers for advice.

**FIG. 13****Specifications of the ramps**

- Length more than 4 times the height of the platform of the truck
 - Width (effective width) more than 30 cm
 - Required quantity 2 ramps
 - Capacity (one ramp)..... more than 750 kg
 - Ramps should have anti-skid surfaces.
- The above specifications are effective with the front mower with the following configurations.
- The front mower is not equipped with any attachments or a cabin.
 - The front mower is equipped with a standard mower deck.

**FIG. 14**

- 6.6. Park the truck on hard level ground. Hook the ramps securely on the platform of the truck with the top of the ramp level with the platform.
- 6.7. Drive the front mower carefully at the moment the front mower moves from the ramps onto the platform, for it changes angles abruptly.
- 6.8. When the front mower is loaded on the truck, lower the mower deck onto the truck bed, stop the engine, apply parking brakes, and withdraw the starter key, chock the wheels, and rope it securely to the truck. Refrain from unnecessary abrupt starting, stopping, and turning during transportation, or the front mower may shift position on the truck, which is very dangerous.

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7. WHEN FILLING WITH FUEL



DANGER : Fuel is highly flammable and explosive. Take the following precautions.

- 7.1. Do not add or drain fuel indoors, while smoking, or near a source of flame.
- 7.2. Do not remove the fuel tank cap or add fuel to the tank while the engine is running or hot. Wait until the engine cools down sufficiently.
- 7.3. Do not completely fill the fuel tank. Add fuel to the tank until the level inside the tank is just below the bottom of the filler neck. The empty space allows the fuel to expand.
- 7.4. If you spill fuel, clean it up and do not attempt to start the engine until the vapour has dissipated.
- 7.5. When fuelling under certain circumstances, a static charge may develop and ignite the fuel.
- 7.6. Use only an approved fuel container to store fuel.
- 7.7. Do not store the front mower or the fuel container near a source of open flame, such as a water heater.
- 7.8. Replace all fuel tank and container caps securely.
- 7.9. To prevent personal injury and property damage, do the following:
 - Always place fuel containers on the ground and away from the vehicle before fuelling.
 - Do not fill the fuel container(s) inside a vehicle or on a truck or trailer bed.
 - When practical, remove a fuel-powered the front mower from the truck or trailer and refuel it with its wheels on the ground.
 - If it is not practical to do this, refuel the front mower on a truck or trailer from a portable container, not fuel dispenser nozzle.
 - If you must use a fuel dispenser nozzle, keep the nozzle in contact with the rim of the fuel tank or fuel container opening until you have completed fuelling.

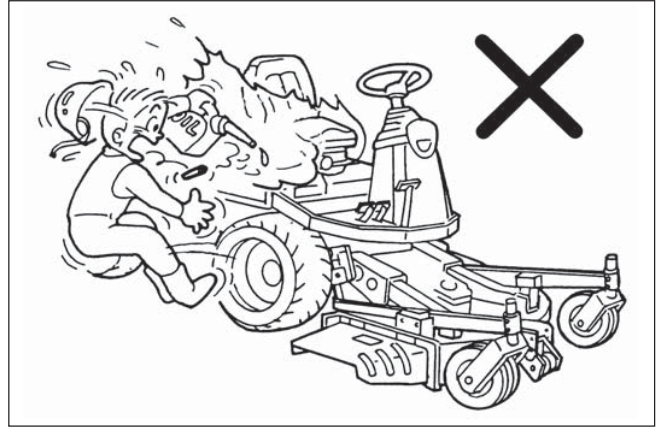


FIG. 15

8. MOUNTING AND DISMOUNTING OF THE MOWER DRIVE SHAFT

The mower gear box is driven through a drive shaft with universal joints from the front mower. When connecting or disconnecting the shaft, follow the next instructions.

- 8.1. Lower the mower deck onto the ground, stop the engine, draw the engine key, and apply the parking brakes before mounting or dismounting the drive shaft.

- 8.2. Turn the PTO switch to the OFF position (OFF).
- 8.3. Make sure that the PTO shaft and mower blades stop completely.
- 8.4. The drive shaft should be mounted or dismounted at the front mower side. Never leave the shaft connected only at the mower side. If the PTO shaft be driven unexpectedly, the shaft will be swung around and damage the front mower or cause serious accidents.

9. INSPECTION AND MAINTENANCE

- 9.1. Never start the engine in a closed place. Exhaust fumes contain poisonous carbon monoxide, so sufficient ventilation should be provided when starting the engine indoors.
- 9.2. Be sure to wear safety glasses and gloves when servicing the front mower.
- 9.3. When servicing the front mower or mounting or dismounting the mower deck, place the front mower on level, hard ground.
- 9.4. Service the front mower in a place sufficiently illuminated, or darkness may cause unexpected accidents.
- 9.5. Do not adjust or repair the front mower while the engine is running.
- 9.6. When servicing the front mower or mounting or dismounting the mower deck, stop the engine and Remove the key (if applicable) to prevent someone from accidentally starting the engine and apply the parking brakes
- 9.7. The engine, muffler, radiator, etc. are very hot just after operation, so wait until those heated parts cool down sufficiently to avoid burns.
- 9.8. Never remove the radiator cap while the engine is hot or running. Wait until the engine cools down and then relieve the radiator pressure by releasing the radiator cap. Carelessly pouring cooling water into the heated radiator can cause serious damage to the radiator and the engine. Careless removal of the radiator cap can cause serious injury because of superheated water vapor.
- 9.9. Before servicing the front mower, be sure to turn the PTO switch to the OFF position (OFF) and make sure that the mower blades have stopped completely. Rotating blades may cause serious accidents.
- 9.10. While adjusting the front mower, keep your fingers away from all pinch points.

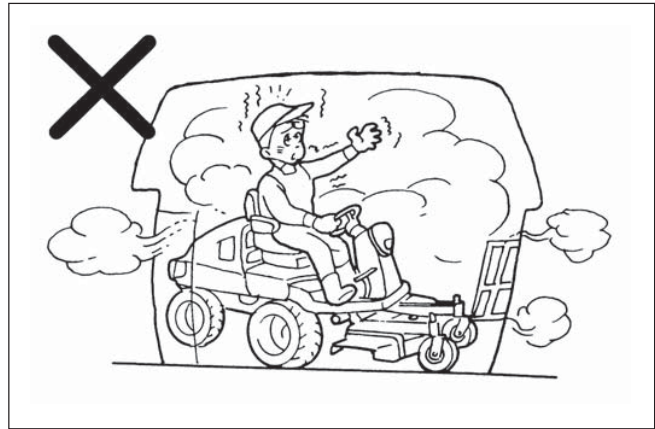


FIG. 16



FIG. 17

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- 9.11. When servicing the front mower, use proper tools. Using makeshift tools may lead to injuries or poor service, which may result in unexpected accidents during operation.
- 9.12. When removing a tire, chock other tires and support the front mower securely. When installing tires, be sure to tighten the wheel nuts to the specified torque. Loose nuts may cause serious accidents.
- 9.13. When raising up the mower deck for service, raise up it fully and apply the lift lock of hydraulic cylinder to avoid lowering.
- 9.14. The cutting means(s) are sharp and can cut you. Wrap the cutting means(s) or wear leather gloves when you service them. On the front mower with two or more cutting means, rotating one cutting means may cause the other cutting means(s) to rotate.
- 9.15. Never step on the mower deck, or the mower deck may be damaged or deformed, which may lead to breakdown or accidents.
- 9.16. A first aid kit and a fire extinguisher should be kept in a place always in instant access.
- 9.17. On the front mowers with hydraulic devices, hydraulic fluid escaping under pressure can penetrate and seriously damage the skin, requiring immediate medical assistance. Do not use your hand to check for a hydraulic leak; use a piece of cardboard. Be sure to consult your dealer about the hydraulic and fuel injection system troubles.
- 9.18. If any hydraulic fluid is injected accidentally into the skin, it must be removed within a few hours by a doctor familiar with this type of injury.
- 9.19. Never allow grass or leaves to accumulate around heated parts such as the engine and the muffler, or this may cause a fire.
- 9.20. Replace any worn or damaged parts with the manufacturer's recommended parts.
- 9.21. To reduce the fire hazard, keep the engine, muffler (silencer), battery area, and fuel storage area free of debris.
- 9.22. If fuel has to be drained, this should be done outdoors.
- 9.23. Check the brake(s) on the front mower frequently and adjust and service the brake(s) as required.
- 9.24. Replace faulty mufflers (silencers).

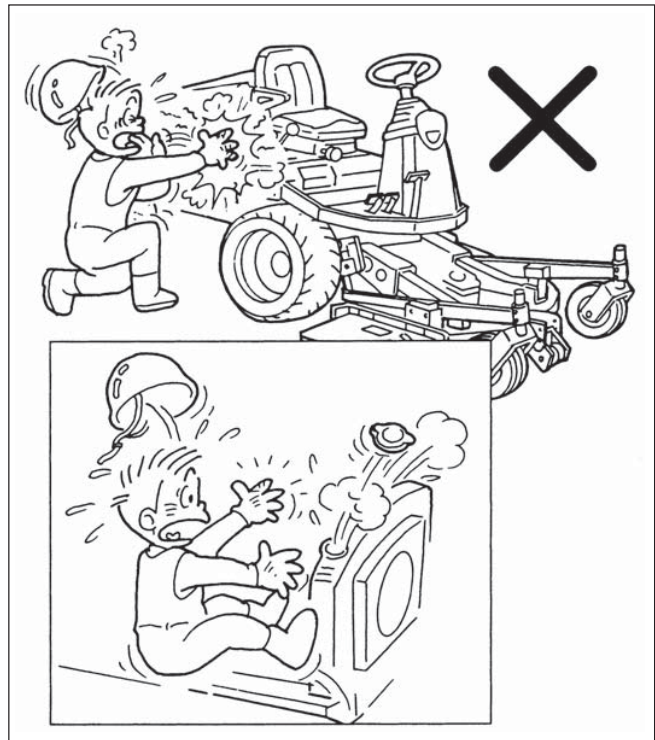


FIG. 18

9.25. Do not change the engine governor settings or over-speed the engine. Operating an engine at an excessive speed can increase the risk of personal injury.

9.26. The grass catcher components are subject to wear and damage, exposing you to moving parts or thrown objects. Frequently check and replace them with the manufacturer's recommended parts when necessary.

9.27. Be sure to reinstall the removed parts in place. Never attempt to start the engine with any parts removed.

9.28. Never attempt unauthorized modification of the front mower as this could be very hazardous. Damaged or worn parts should be replaced with ISEKI genuine spare parts. Unauthorized parts may cause breakdown of the front mower, accidents, and ISEKI warranty to expire.

	Parts code of blade	Punched ID
SSM60	8654-306-006-10	⊕8654 C
SSM72	8655-306-003-10	⊕8655 C

9.29. Keep all fasteners tight, especially those that hold the cutting means(s).

9.30. Check that all safety devices are in place and operating properly.

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10. MAINTENANCE OF THE ELECTRIC SYSTEM

10.1. TO MAINTAIN ELECTRIC WIRING

- (1) When servicing the electric wiring, stop the engine without fail. Otherwise your hands or clothes may be caught in or sandwiched between rotating parts.
- (2) Before manipulating electric parts, be sure to disconnect the earth battery cable (-), or you may get an electric shock or be injured by sparks.
- (3) Loose electric terminals or connectors may not only lower electrical performance but also cause short circuit or leakage of electricity, which may lead to a fire. Promptly repair or replace damaged wiring.
- (4) Remove chaff or dust from the battery, wiring, muffler or engine. Otherwise it could result a fire.

10.2. TO HANDLE THE BATTERY

- (1) When working around the battery, avoid smoking. The battery generates explosive hydrogen and oxygen gases when it is being charged. Keep the battery away from sparks or open flames.
- (2) The battery should be inspected before starting the engine. Be careful not to touch the electrolyte makes contact with the skin or clothing, wash it off immediately with water and then consult a doctor.
- (3) When replacing or inspection the battery stop the engine and turn the main switch off, or electrical parts may be damaged or unexpected accident may occur.
- (4) When disconnecting the battery cables, disconnect the earth cable (-) first without fail. When connecting the battery cables, connect the positive cable (+) first. Disconnecting or connecting in wrong order may lead to a short circuit or sparks.

10.3. TO HANDLE BOOSTER CABLES

When using booster cables, pay attention to the following items for safe operation:

- (1) Before connecting cables, remove the vent plugs. This will lower the force in case of explosion.
- (2) Before connecting cables, be sure to stop the engines. Otherwise unexpected accidents may occur.
- (3) Use booster cables with sufficient electrical capacity. A cable of inadequate capacity will cause generation of heat, which may lead to a fire.

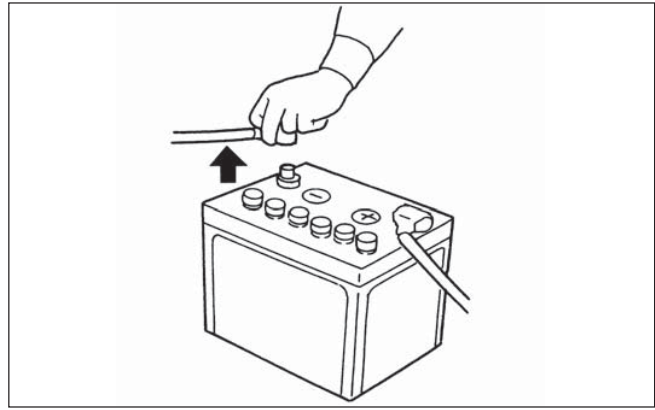


FIG. 19

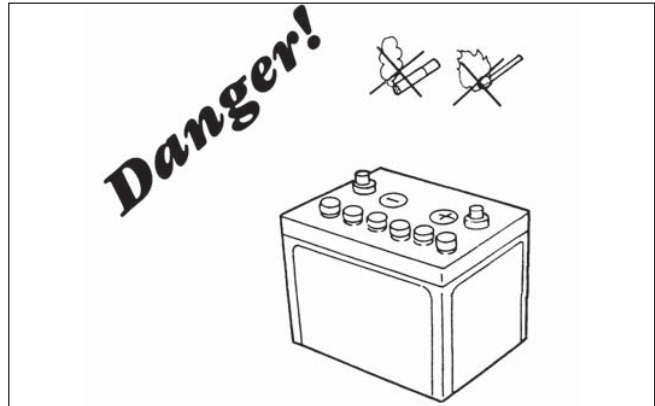


FIG. 20

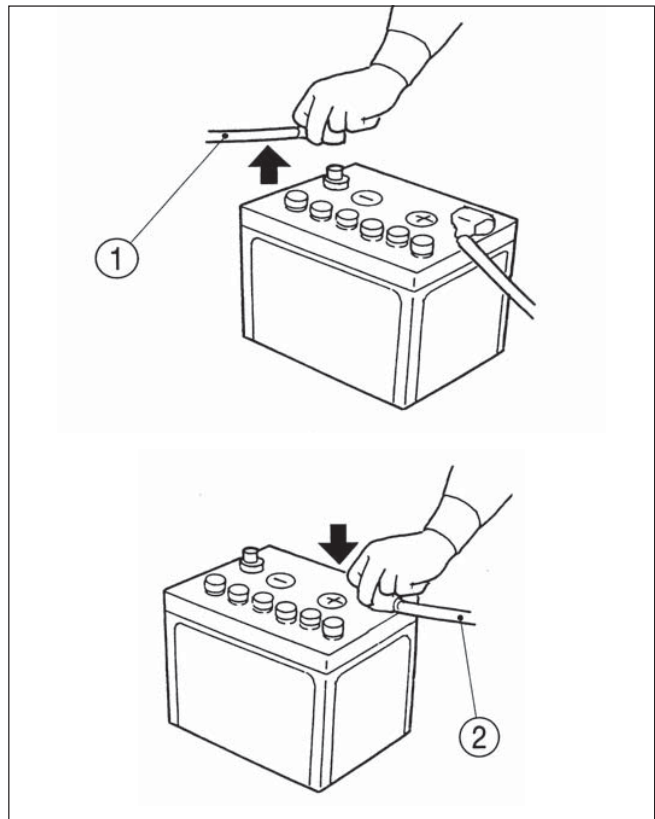


FIG. 21

(1) Negative cord

(2) Positive cord

11. TIRES AND WHEELS

- 11.1. Be sure to keep tire pressures at the levels specified in this manual. Excessively high tire pressure may result in explosion, which may lead to physical accidents.
- 11.2. If a cut is found in a tire and the cut reaches the cords, do not use it. Such a tire may explode.
- 11.3. Before replacing or repairing tires, tubes, or rims, consult your dealers ahead of time. Such operation should be performed by trained mechanics.

12. BEFORE STORING THE FRONT MOWER

- 12.1. After operation, be sure to close the fuel cock to prevent fuel from spilling, as spilled fuel may catch fire.
- 12.2. Never allow grass or leaves to accumulate around heated parts such as the engine and the muffler, or this may cause a fire.
- 12.3. Be sure to remove the ignition key to prevent unexpected accidents caused by engine starting by untrained persons or children.
- 12.4. When storing the front mower with the mower deck attached, be sure to lower the mower deck on the ground. Otherwise manipulation of the lift lever by untrained person or children may cause unexpected accidents.
- 12.5. Store the front mower in a place provided with sufficient illumination. Inspection and moving of the front mower in a dark place may lead to unexpected accidents.
- 12.6. When the front mower is to be stored in a closed place like a garage or a barn, provide sufficient ventilation for exhaust gases. Exhaust fumes can be lethal.
- 12.7. To avoid fire hazard, keep the engine, muffler, battery, and fuel storage area free of grass, leaves, or excessive grease.
- 12.8. Never cover a hot front mower just after operation with a tarpaulin or the like, or the heated engine and related parts may cause a fire.

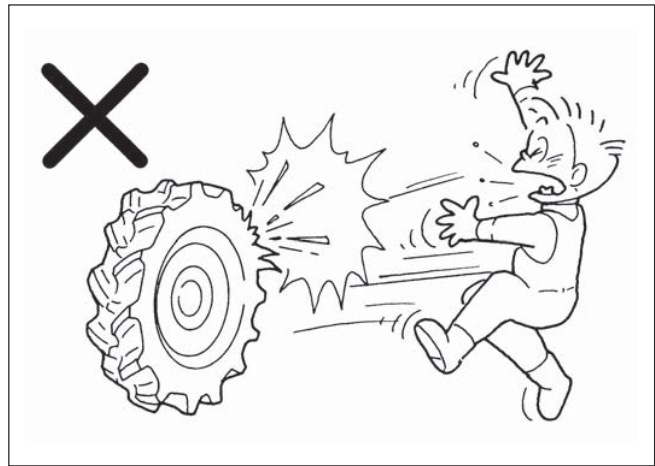


FIG. 22

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13. LONG TERM STORAGE

- 13.1. Never store the mower with fuel in the tank inside a building where fumes can reach an open flame or spark.
- 13.2. Lower the cutting unit(s) when you store the front mower, unless you lock the cutting unit(s) into position.
- 13.3. Allow the engine to cool before storing the front mower in any enclosure.
- 13.4. Before storing the front mower for a long period of time, disconnect the battery cables to prevent them, in case they are gnawed by rats, from causing a short circuit, which may lead to a fire. When disconnecting the battery, disconnect the negative (-) cable first, while connecting the positive (+) cable first when connecting the battery. Wrong order of disconnecting or connecting the battery will cause sparks, which is very dangerous.

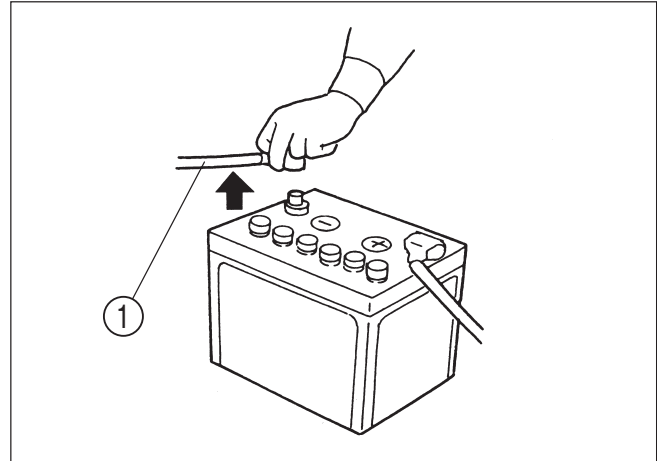
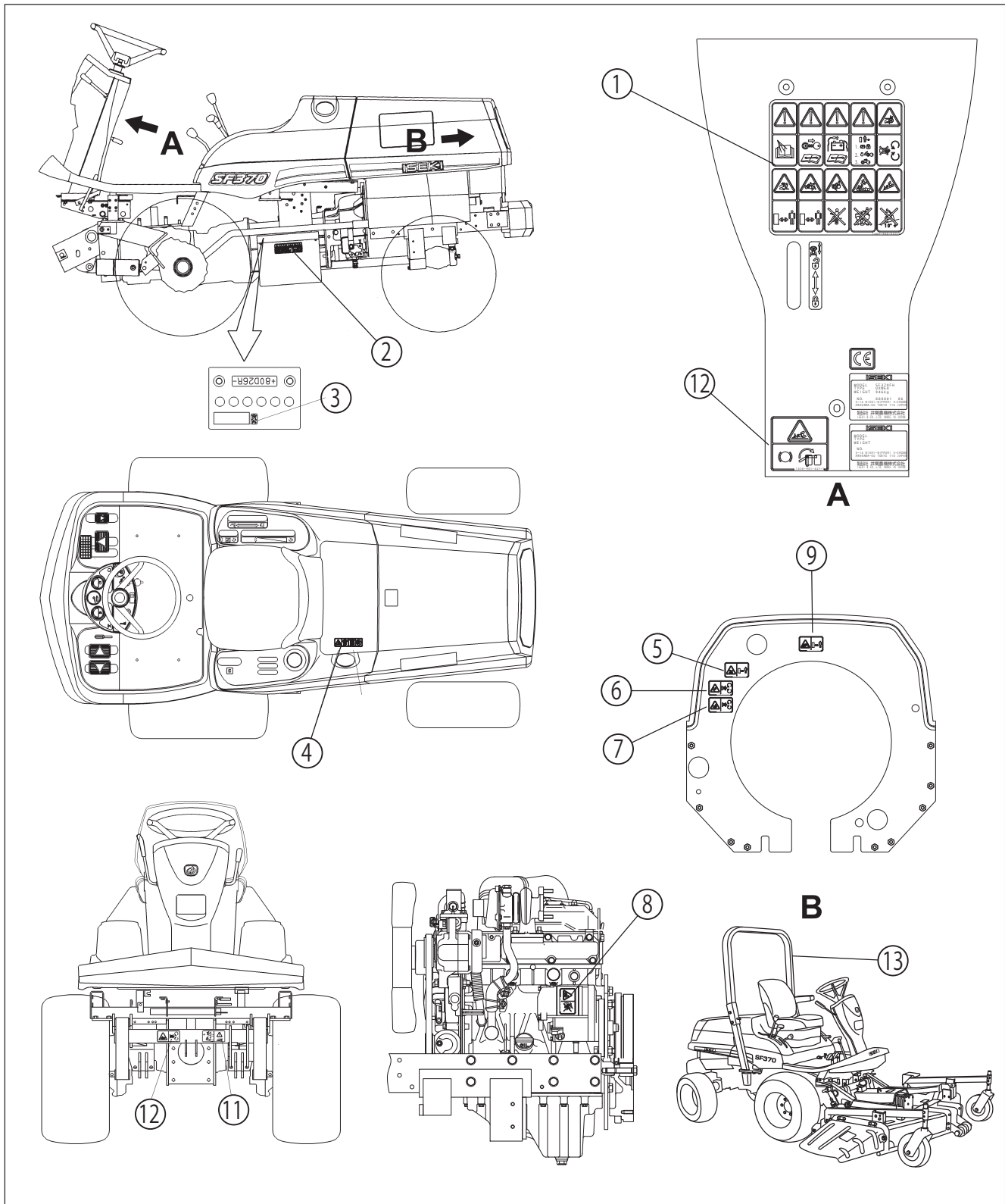


FIG. 23

(1) Negative cord

14. CAUTION LABELS & THEIR POSITIONS

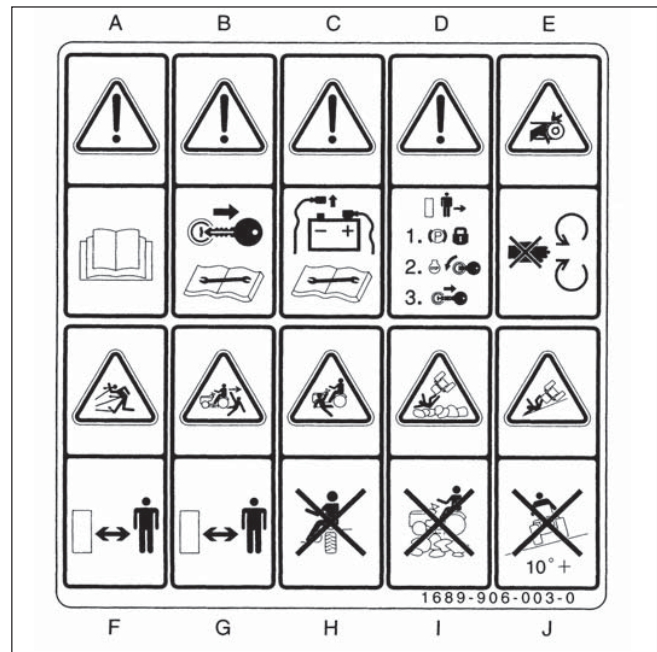
The following labels are stuck on the front mower and mower deck. You should of course read the caution instructions in the manual. But never fail to read the labels on the front mower as well. Their respective code numbers are also mentioned below, so order them from your dealer if any of them are lost or damaged.



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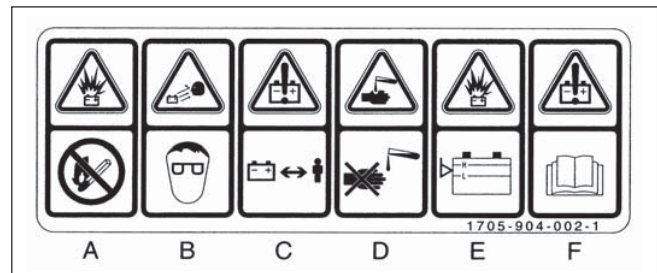
(1) Caution label
(Code No. 1689-906-003-0)

- A. WARNING: BEFORE OPERATION
Read the safety and operating instructions in the operator's manual before operating the front mower.
- B. WARNING: BEFORE SERVICING
Read the technical instructions in the operator's manual before servicing the front mower. Remove the starter key before servicing.
- C. WARNING: RISK OF ELECTRIC SHOCK
When disconnecting the battery, detach the negative terminal first and attach the positive terminal first when connecting the battery.
- D. WARNING: RISK OF ABRUPT MOVING
Before leaving the front mower unattended, apply the parking brake, lower the implement, turn off the engine and remove the starter key to avoid unexpected moving of the front mower.
- E. WARNING: RISK OF ENTANGLEMENT
Stay clear of the belt while it is running.
- F. WARNING: RISK OF INJURY
Stay away of the discharge opening of the mower deck because stones or other hard objects ejected from the mower may hit you.
- G. WARNING: RISK OF RUNNING OVER A PERSON
Watch behind before reversing the front mower and keep people from around the front mower before starting it.
- H. WARNING: RISK OF RUNNING OVER A PERSON
Don't allow any other person to ride on a wheel fender or any place other than the driver's seat of the front mower.
- I. WARNING: RISK OF OVERTURNING OR CRUSHING
Do not operate the front mower in any place where it could slip or tip over.
- J. WARNING: RISK OF OVERTURNING OR CRUSHING
Avoid operating the front mower on a slope of over 10°.



(2) Battery label
(Code No. 1705-904-002-1)

- A. WARNING: RISK OF EXPLOSION
Keep away from sparks of flames, which could cause explosion.
- B. WARNING: WEAR AN EYE PROTECTION DEVICE
Battery electrolyte (sulphuric acid) may cause blindness. Wear an eye protector to prevent contact with the eyes.



C. WARNING: KEEP OUT OF REACH OF CHILDREN

D. WARNING: RISK OF BURNS

Battery electrolyte (sulphuric acid) may cause burns. Avoid contact with skin or clothing. In case of an accident, flush affected part immediately with plenty of water.

E. WARNING: RISK OF EXPLOSION

Never use the battery with the electrolyte surface below the "LOWER" limit, or it may explode. Never replenish exceeding "UPPER" limit or electrolyte may leak out.

F. WARNING: READ OPERATOR'S MANUAL

Read the safety and operating instructions in the operator's manual before operating the front mower.

Take care of handling the battery.
Improper handling may lead to explosion.
Never short the poles.
Charge the battery in well ventilated place.

(3) Battery disposal label
(Code No. 1728-903-003-0)

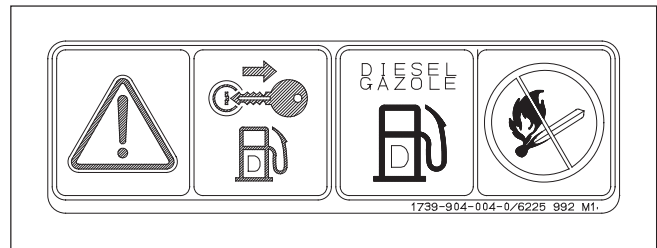
WARNING: Don't throw away the battery to the garbage can. Recycle it with observing the law of your community.



(4) Fuel label
(Code No. 1739-904-004-0)

DANGER: RISK OF EXPLOSION AND BURNS

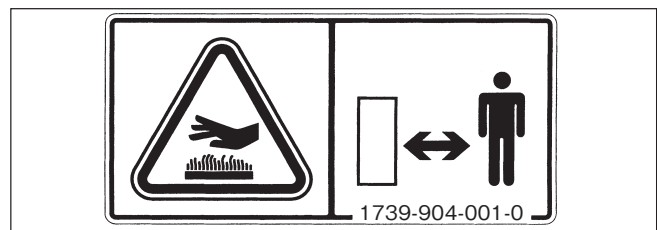
Use only diesel fuel.
Before replenishing fuel, be sure to stop the engine and wait until the engine and heated parts cool down sufficiently. Keep sparks, open flames, etc. away from the fuel tank. No smoking!



(5) Hot-part warning label
(Code No. 1739-904-001-0)

WARNING: HOT SURFACES, RISK OF BURNS ON HANDS AND FINGERS

Stay clear of the heated parts until they cool down sufficiently.



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(6) Fan warning label
(Code No. 1705-902-006-0)

WARNING: RISK OF ENTANGLEMENT
Stay clear of the fan while it is turning.



(7) Belt warning label
(Code No. 1674-904-008-0)

WARNING: RISK OF ENTANGLEMENT
Stay clear of the belt while it is running.



(8) Starter warning label
(Code No. 1705-902-007-0)

DANGER: RISK OF ELECTRIC SHOCK
Start the engine only from the seat using the key.



(9) Radiator warning label
(Code No. 1705-902-008-0)

WARNING: HIGH PRESSURE STEAM AND HOT WATER
Never remove the radiator cap during or just after operation. The water in the radiator is very hot and highly pressurized, which could cause burns.



(10) Lift lock label
(Code No. 1720-906-001-0)

WARNING: When raising up the mower deck for service, apply the lift lock of hydraulic cylinder.



(11) PTO label
(Code No. 8654-901-002-0)

WARNING: Stay clear of the PTO shaft while the engine is running.



(12) Brake warning label (E6 type)
(Code No. 1636-901-021-0)

WARNING: Do not use individual wheel brakes for transporting or operating at high speed. Always latch pedals together using interlocking.



(13) ROPS label
(Code No. 1674-904-005-1)

WARNING: RISK OF INJURY

- Keep the ROPS in the upright position and fasten the seat belt at all times. Do not jump from the seat if the tractor starts to overturn, or you could be crushed under the tractor. The ROPS should usually be kept in the upright position during operation.
- However, when the ROPS has to be lowered, do not wear the seat belt and operate the tractor with extreme caution.
- Do not operate the tractor with a damaged or modified ROPS.



• **Maintenance of the caution labels**

- The labels should always be clearly seen, that is, nothing should obscure them.
- When they have become dirty, wash them with soapy water and wipe off with soft cloth.
- If any of them are torn or lost, order new labels from your dealer.
- A new label should be placed in the same place where the old one was located.
- When sticking on a new label, clean the place to enable the label to stick and squeeze out all air bubbles trapped under it.
- When replacing a part with a caution label stuck on, a new caution label should also be ordered.

CHAPTER 2. WARRANTY AND AFTER-SALE CARE

1. WARRANTY

On the warranty of this front mower and mower deck, refer to the warranty policy attached.

2. AFTER-SALE CARE

As for breakdown or question about the front mower and mower deck, consult with your dealers identifying the model and serial number of your front mower.

3. SERIAL NUMBER PLATE

The model name and serial number for both machine and engine are found in the serial number plates on the back of the steering post.

This manual explains about several types of the front mowers as listed below. Please confirm the type of yours by referring to the name plate.

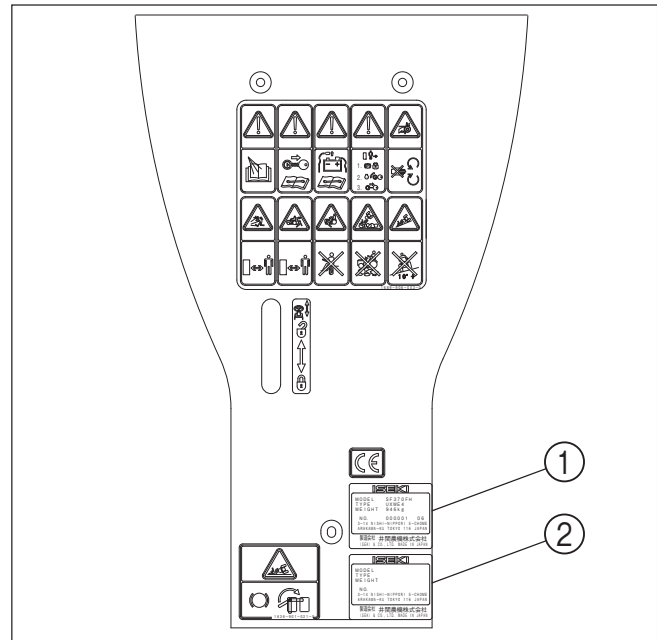


FIG. 24

- (1) Machine model name and serial number
(2) Engine model name and serial number

Model	Type	RH/LH independent brake pedal	Road homologation	For France
SF310FH	UXWE4			
	UXWE6	○		
SF370FH	UXWGE4		○	
	GE4F2		○	○

4. SUPPLY LIMIT OF SPARE PARTS

- The supply time limit of the spare parts for this model is 12 years after manufacture of the model is stopped. Even within the supply limit, the delivery date of some parts have to be determined after negotiation.
- The supply of spare parts terminates when the limit mentioned above is exceeded. But orders for parts after the limit may be met after negotiation about the delivery date, price etc.

CHAPTER 3. SPECIFICATIONS

Model				SF310		SF370	
Dimensions	Overall length		mm(in.)	2450 (96.5)			
	Overall width		mm(in.)	1230/1330 wide (48.4/52.4 wide)			
	Overall height		mm(in.)	2180/2200 wide (85.8/86.6 wide) * ¹			
Weight			kg(lbs.)	935/945 wide (2061/2083 wide) * ² 895/905 wide (1975/1997 wide) * ³			
Engine	Model			E3CD-VG03		E3CD-VTG	
	Type			Vertical Water-cooled, 4-cycle Diesel			
	No. of cylinders			3			
	Total displacement		cm3(cu.in)	1498 (91.5)			
	Output (net)		kw(ps)	21.8(30)		26.0(35)	
	Rated revolution		rpm	2500			
Generator capacity			amp.	60			
Battery				80D26R			
Fuel				Diesel fuel			
Fuel tank capacity			liter(gal)	48 (12.7)			
Transmission	Main transmission			HST (hydrostatic transmission)			
	Transmission range			Manual shift, 2 stages			
	Travelling speeds	Forward	km/hr(mph)	22.4/22.8 wide (14.0/14.2 wide)			
		Reverse	km/hr(mph)	12.1/12.3 wide (7.5/7.6 wide)			
Wheel base			mm(in)	1250 (49.2)			
Wheel tread	Front		mm(in)	1000/1025 wide (39.4/40.4 wide)			
	Rear		mm(in)	960/1010 wide (37.8/39.8 wide)			
Driving system				2/4WD automatic shift - Permanent 4WD			
Steering system	Mechanism			Power			
	Steered wheels			Rear wheels			
Min. un-cut radius			mm(in)	1050 (41.3)			
Brake system				Wet,multi-disk			
Min. ground clearance			mm(in)	175/200 wide (6.9/7.9 wide)			
Tyre size	Front			23x10.5-12/26x12.0-12wide			
	Rear			20x8.0-10/22x8.50-12wide			
PTO	Location			Front			
	Type			Wet multi disks			
	Drive			Shaft drive			
	On-Off			Switch			
	Revolution		mm(in)	2050			

*¹ At the top of ROPS*² When equipped with wide tire, seat, ROPS and full fuel tank*³ When equipped with wide tire, seat, and ROPS, and without full fuel tank
(Specifications and design subject to change without notice)

1. OPTIONAL PARTS

PARTS NAME	PARTS CODE
CYLINDER/DOUBLE SET	1770-501-320-00

CHAPTER 4. NAME OF MAJOR COMPONENTS

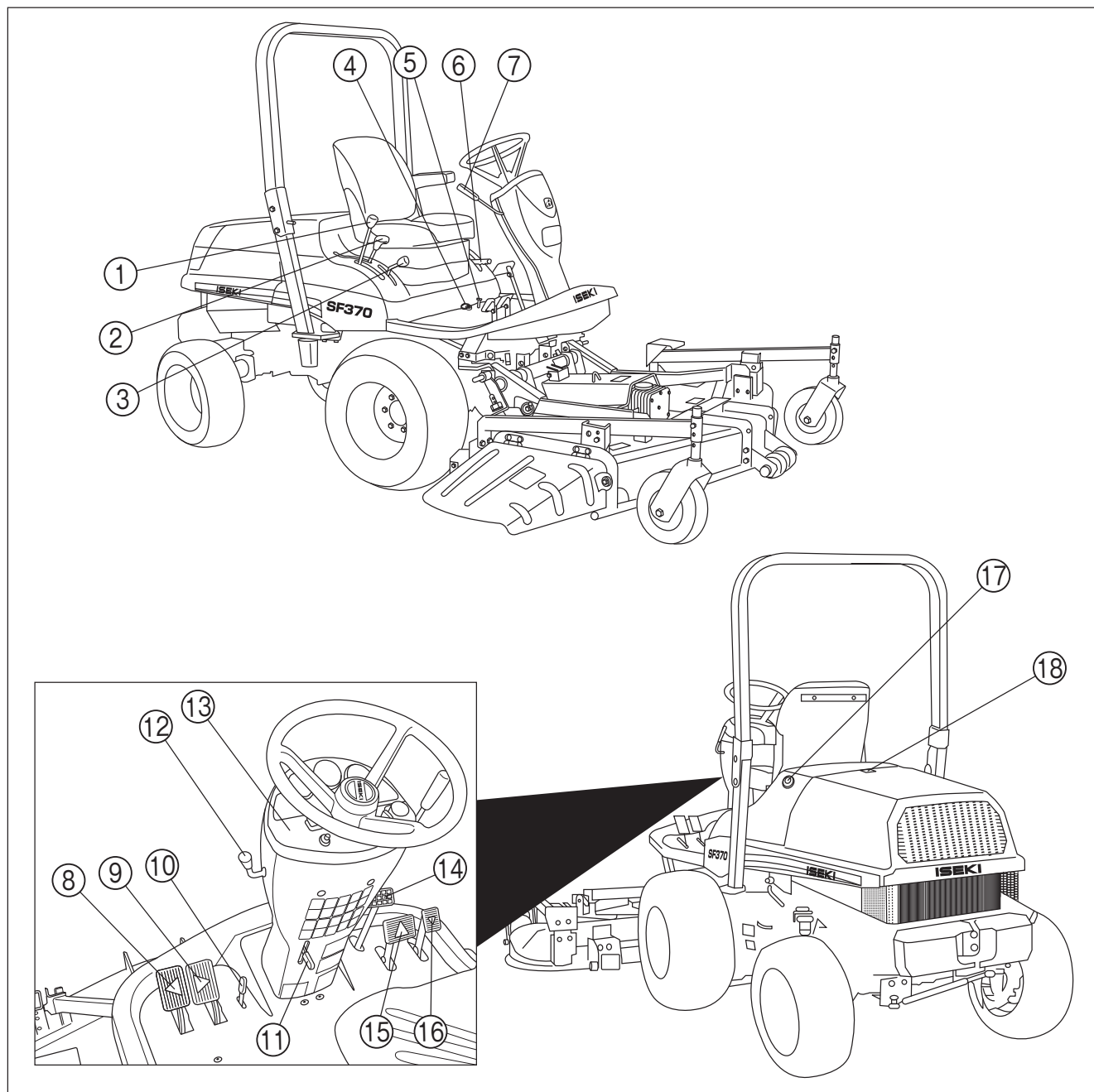


FIG. 25

- | | |
|--|---|
| (1) Lift lever | (10) Parking brake lever (Except G type) |
| (2) Cruise control lever | (11) Tilt lock lever |
| (3) Transmission range shift lever | (12) Auto / 4WD changeover lever |
| (4) Floor open lever | (13) Control panel |
| (5) Dif-lock pedal | (14) Master brake pedal |
| (6) Parking brake lever (G type) | (15) HST forward travel pedal (Forward control) |
| (7) Throttle lever | (16) HST reverse travel pedal (Reverse control) |
| (8) Independent brake pedal (LH) (E6 type) | (17) Fuel tank filler |
| (9) Independent brake pedal (RH) (E6 type) | (18) Hood lock lever |

CHAPTER 5. CONTROLS AND METERS

1. CONTROL PANEL

Except G type

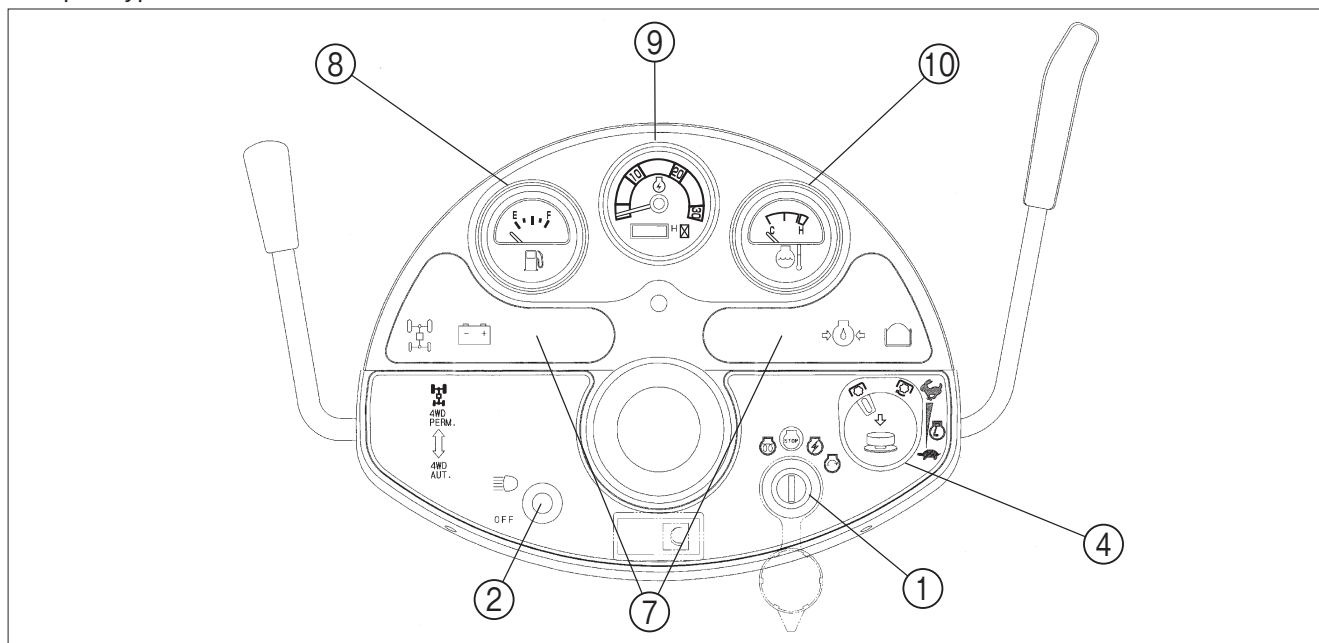


FIG. 26

G type

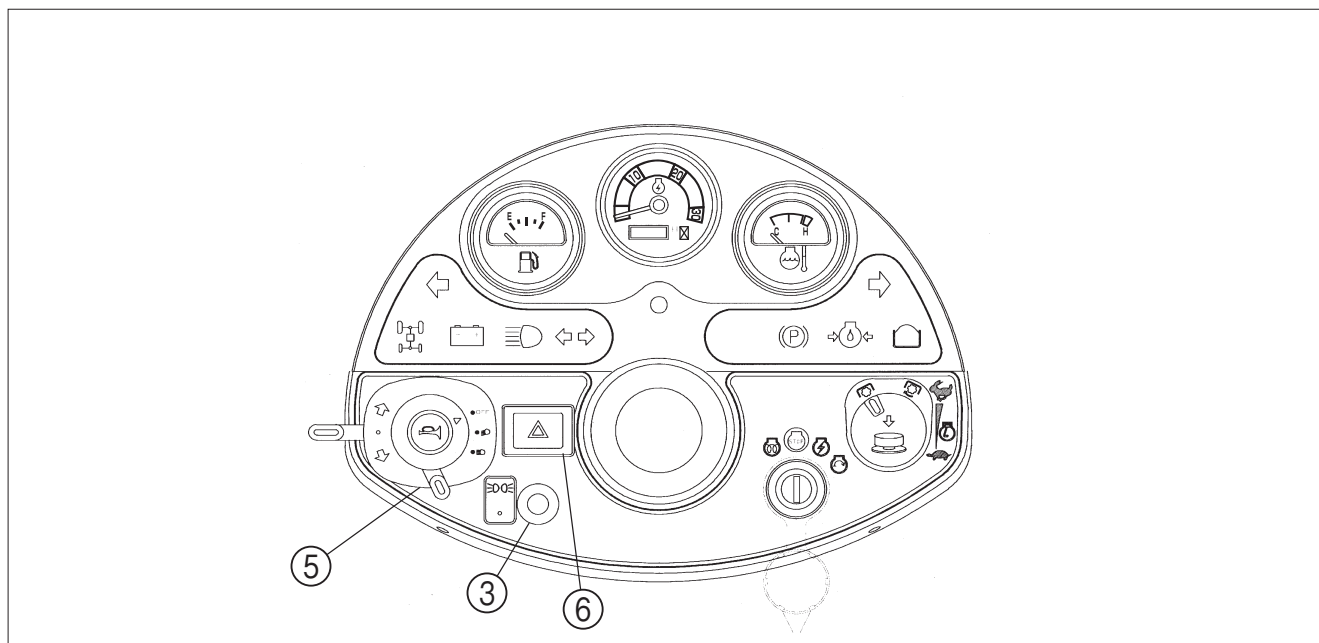


FIG. 27

- | | |
|------------------------|--------------------------------|
| (1) Starter switch | (6) Hazard switch |
| (2) Work lamp switch | (7) Monitor lamp array |
| (3) Position switch | (8) Fuel gauge |
| (4) PTO switch | (9) Hour / Tachometer |
| (5) Combination switch | (10) Coolant temperature gauge |

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1.1. STARTER SWITCH

- : Glow position: the engine is pre-heated.
- : OFF position: the engine stops and all electric circuits are turned off.
- : ON position: the key turns to this position after starting the engine and remains there during operation.
- : START position: the starter motor is switched on.

1.2. WORK LAMP SWITCH

This switch turns the work lamp on and off.

 **ON:** Turn the switch lever towards this mark, and the work lamps turn on and vice versa.

OFF: Off

1.3. POSITION SWITCH (G type)

The position light in combination lamp (Option) lights up while this switch is ON.

 **ON**

 **Off**

1.4. PTO SWITCH

With this switch the PTO can be either engaged to spin or disengaged to stop.

 **ON:** Turn the switch to the position indicated by this mark, and the PTO shaft starts spinning. To engage PTO, first turn switch clockwise and then pull up it.

 **OFF:** Turn the switch to the position indicated by this mark, and the PTO shaft stops spinning. Turn the switch counter clockwise to disengage.

IMPORTANT: This front mower is equipped with UP-STOP device for safety. PTO automatically stops when the mower deck is raised while the PTO switch is in the ON () position. When the PTO stops by UP-STOP device, lower the mower deck and reset the PTO switch to the ON () position to restart.

1.5. COMBINATION SWITCH (G type)

This switch incorporates the head lamp switch, turn signal switch and horn button.

Head Lamp Switch

OFF: Off

: Low beam

: High beam

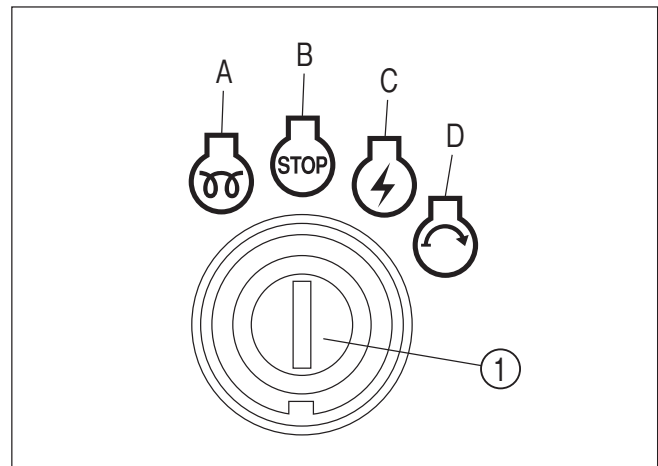


FIG. 28

- (1) Starter switch
- A: Glow position
- B: OFF position
- C: ON position
- D: START position

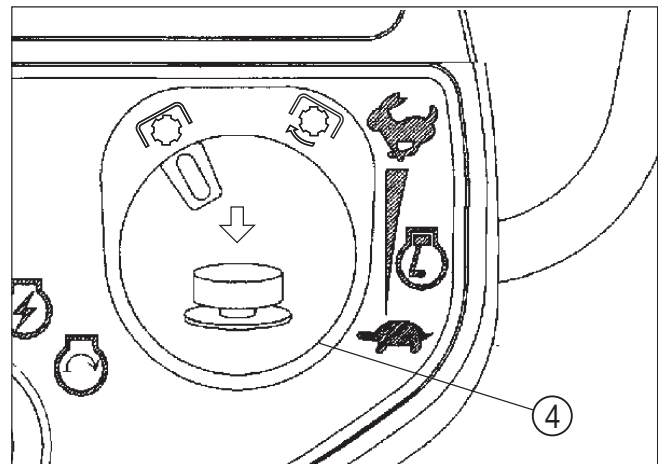


FIG. 29

- (4) PTO switch

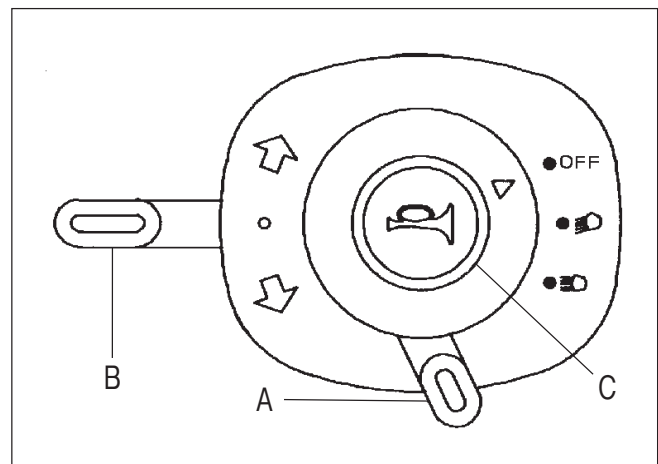


FIG. 30

- (5) Combination switch
- A: Head lamp switch
- B: Turn signal switch
- C: Horn switch

Turn Signal Switch

- ↑ : Right-hand turn signal
- : Off
- ↓ : Left-hand turn signal

NOTE: *Turning indicator lamps will not self-cancel. Return the turn signal switch lever to the center position after completing turn.*

Horn Switch

The horn is activated by pushing the horn mark with the main switch is in the ON (⚡) position.

1.6. HAZARD SWITCH (G type)

The turning signal lamps (Option) blink while hazard switch is pushed on.

1.7. MONITOR LAMP ARRAY

 **4WD:** The lamp lights up while 4WD lever is in the LOCK (PERM) position and turns off while it is in the AUTO (AUT.) position.

 **Battery charge:** The lamp lights up while the battery is not being charged. It also lights up when the key turns to the ON (⚡) position or the START (🔑) position while the engine stops, but turns off as soon as the engine starts.

 **Oil pressure:** The lamp lights up when the engine oil is not circulating normally. It also lights up when the key turns to the ON (⚡) position or the START (🔑) position while the engine stops, but turns off as soon as the engine starts.

 **Grass collector:** The lamp works only when the machine is equipped with the grass collector. It lights up and the buzzer also sounds when the collector is filled with grass with the PTO switch being ON (🔌). These turn off when the PTO switch is turned to the OFF (🔌) position. When the collector is emptied, these turn off, too.

 **High beam (G type):** The lamp lights up while high beam light of combination switch is ON.

 **Trailer (G type):** The lamp blinks when turn signal switch is ON or when hazard switch is ON with flasher lamps of trailer connected.

 **Parking (G type):** The lamp lights up with key switch ON (⚡) while parking lever is pulled upward to lock brakes.

IMPORTANT: *Always disengage the parking brake lever and confirm that the lamp is OFF before driving the front mower to prevent abnormal brake wear.*

 **Turning signal (G type):** The lamp blinks while turning signal switch is ON. Both lamps blink while hazard switch is ON.

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1.8. FUEL GAUGE

The gauge indicates fuel level in the fuel tank when the main switch is in the ON (⚡) position.

E: Empty

F: Full

NOTE: The gauge can not indicate an accurate fuel level when the front mower is on an incline. It takes a little time to indicate an accurate level after the front mower recovers its horizontal position.

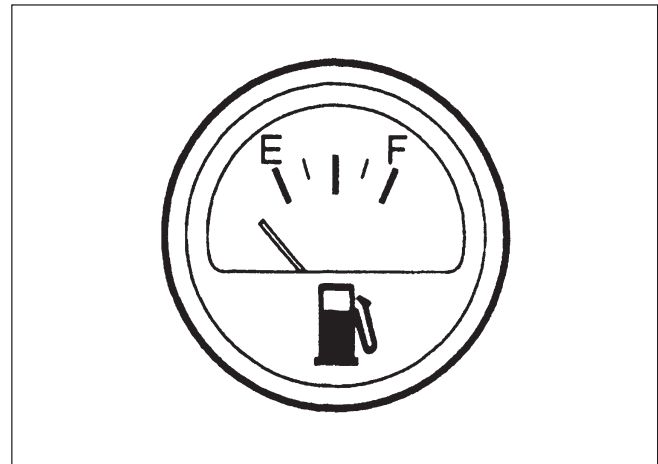


FIG. 31

(8) Fuel gauge

1.9. HOUR / TACHOMETER

The hourmeter, A, counts operation hours of the front mower and show them in 5-digit number. The least significant figure shows one tenth hour of operation.

The tachometer, B, shows current running speed of the engine by one hundredth of engine speed (x 100).

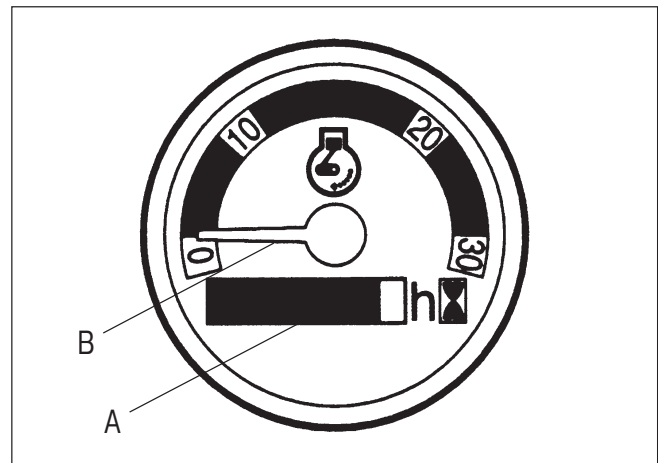


FIG. 32

(9) Hour / Tachometer A: Hourmeter
B: Tachometer

1.10. COOLANT TEMPERATURE GAUGE

Gauge indicates engine coolant temperature when starter switch is selected to ON (⚡).

C: - Shows too cool temperature for severe work. Allow to warm (needle in mid position) before applying heavy load.

H: - Indicates overheating. Reduce engine speed to idle, allow to run at no load several minutes and investigate cause (refer to "Troubleshooting").

IMPORTANT: When the engine coolant is over-heated, the buzzer sounds while the PTO switch is in the ON (⚡) position. The buzzer turns off when the PTO switch is turned to the OFF (⚡) position.

When the buzzer sounds, turn the PTO switch to the OFF (⚡) position, decelerated the engine to idling, and wait until the buzzer turns off.

When the buzzer turns off, stop the engine and correct the trouble (clogged grass or dust around engine, radiator, etc.). Then re-start operation.

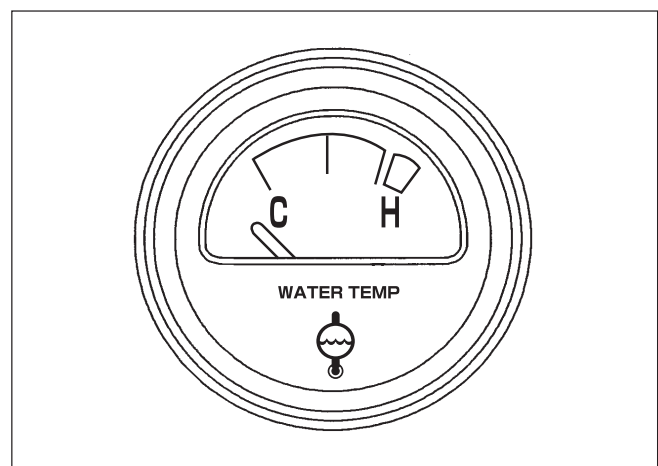


FIG. 33

(10) Coolant temperature gauge



WARNING: When inspecting the radiator, be sure that the engine cools down sufficiently. Never release the radiator cap while the coolant is hot, or boiling water will gush out.

2. STEERING POST

2.1. THROTTLE LEVER

With this lever, the engine speed is controlled.

: **LOW:** Shift (Pull) the lever towards the “turtle” mark, the engine decelerates.

: **HIGH:** Shift (Push) the lever towards the “rabbit” mark, the engine accelerates.

This front mower is equipped with Auto throttle system, it raises up engine speed by depressing HST forward/reverse travel pedal.

IMPORTANT: Don't use Auto throttle for mowing operation. Set rated engine speed by hand throttle lever.

2.2. AUTO / 4WD CHANGEOVER LEVER (4WD LEVER)

With this lever, 2WD/4WD automatic change-over and permanent 4WD is selectable.

: **4WD PERM:** Shift (push) the lever forward to engage permanent 4WD mode.

4WD AUT: Shift (pull) the lever rearward to engage AUTO 4WD mode.

In AUTO 4WD mode, 2WD and 4WD is selected automatically during operation on a level ground, so the lever operation is not required.

When operating on a slope, shift the changeover lever to the 4WD position without fail.

IMPORTANT: Be sure to shift the 4WD lever to the “AUTO” position when operating on level ground, as level ground operation with the 4WD selected leads to a larger turning radius and may cause turf damage.

IMPORTANT: When shifting the 4WD lever, slow down the travelling speed below 1 km/h and make the machine go straight.



WARNING: When operating the front mower on a slope, be sure the 4WD lever is locked in the 4WD position from the reasons mentioned below:

In the AUTO position the mechanism shifts to 2WD automatically when the peripheral speed of the front wheels exceeds that of the rear wheels, which means loss of rear wheel driving power.

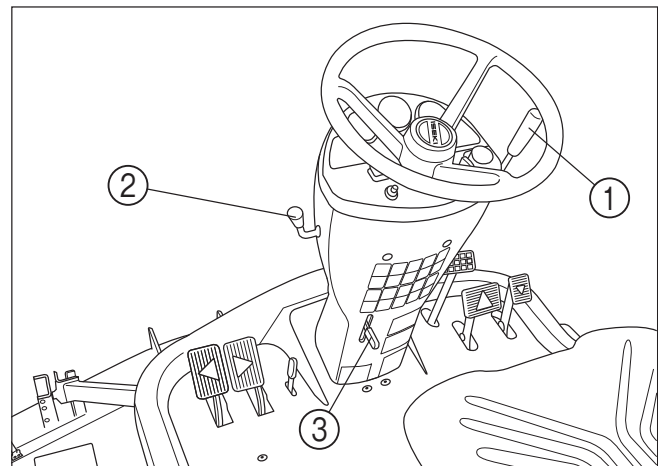


FIG. 34

(1) Throttle lever (2) 4WD lever (3) Tilt lock lever

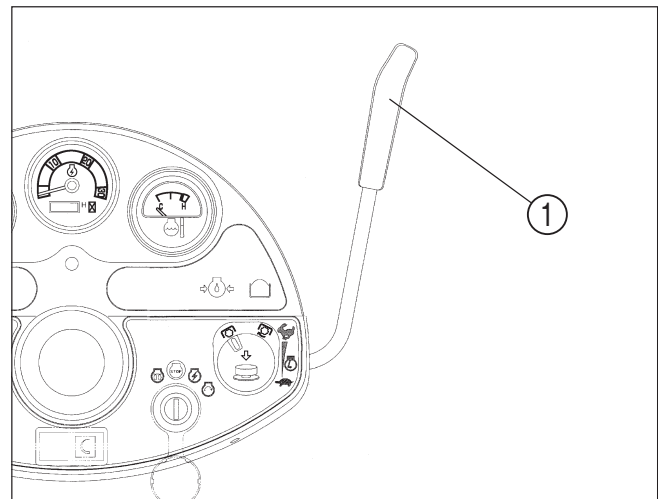


FIG. 35

(1) Throttle lever

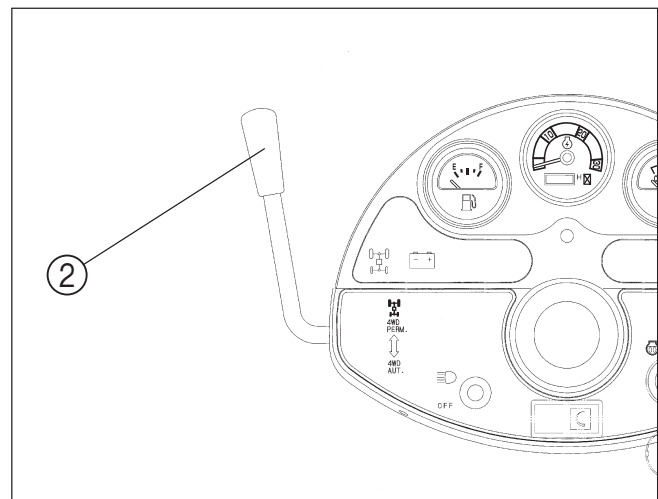


FIG. 36

(2) 4WD lever

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For example, when moving uphill if the front wheels slip, the mechanism stays in 4WD. But moving downhill if the front wheels slip and lose grip, and begin to slip down the slope, it shifts to 2WD, that is, braking effect of the HST unit is lost, which means loss of front mower control. From another point of view, when you try to turn the front mower on a slope, rear wheel driving power is lost and the front mower may slip down the slope, which is also very dangerous.

2.3. TILT LOCK LEVER

The steering wheel column is tiltable to gain the optimum wheel angles. To adjust the angles, pull up the tilt lock lever while holding the steering wheel with the other hand, and the lock is released. Select the most adequate angle within the four setting position. Then push down the lever securely to lock the steering wheel column.

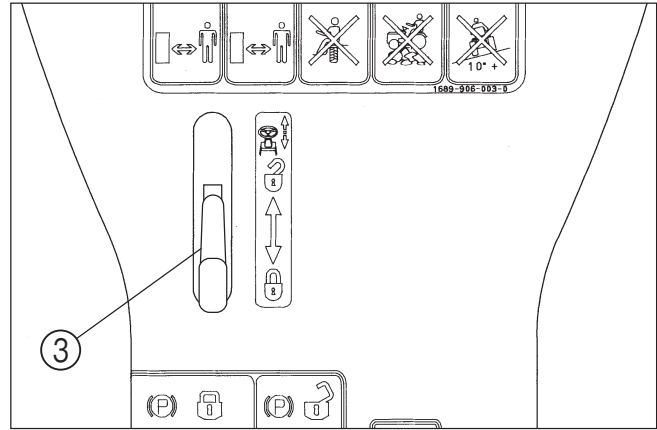


FIG. 37

(3) Tilt lock lever



CAUTION: Only adjust steering tilt when the machine is parked.

3. FLOOR PEDALS AND LEVERS

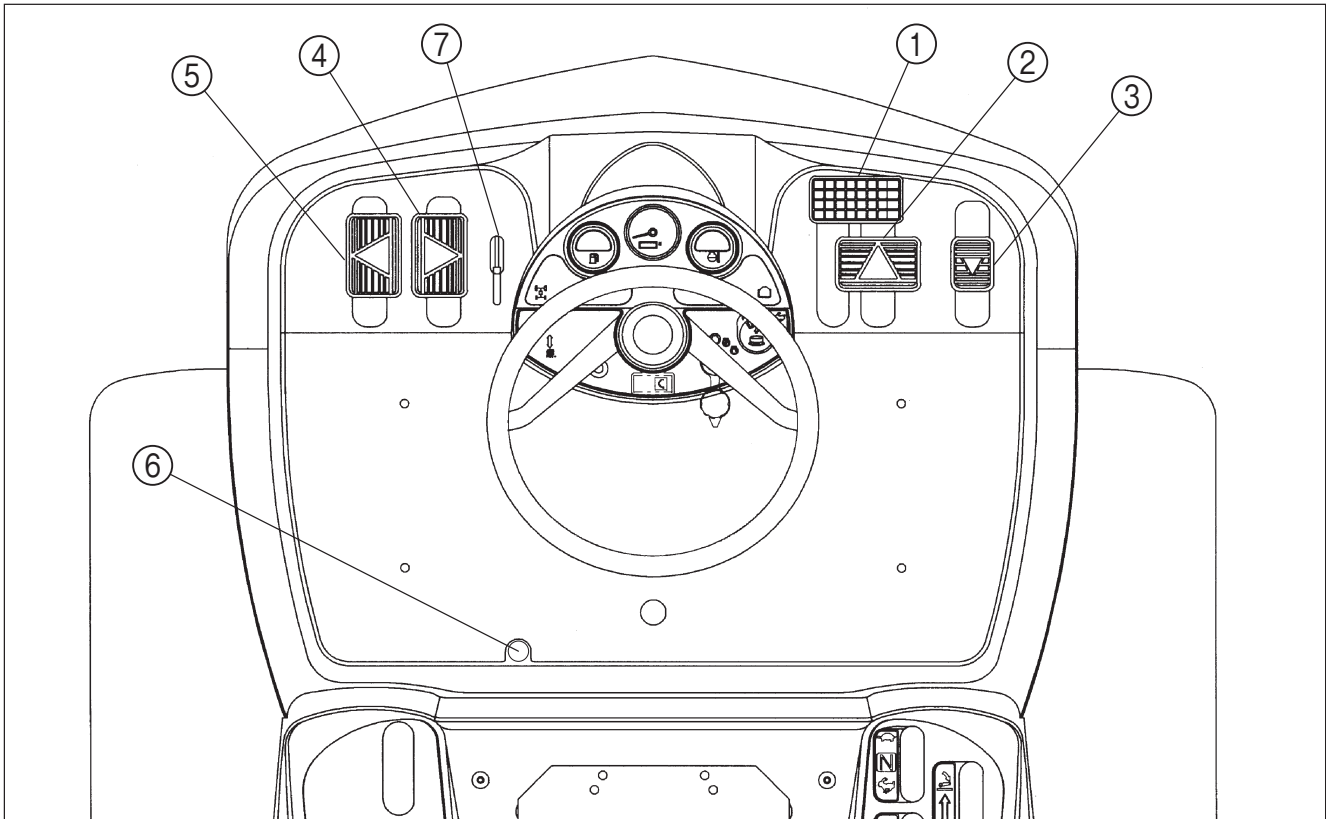


FIG. 38

- (1) Master brake pedal
- (2) HST forward travel pedal
- (3) HST reverse travel pedal
- (4) Independent brake pedal (RH) (E6 type)
- (5) Independent brake pedal (LH) (E6 type)
- (6) Dif-lock pedal
- (7) Parking brake lever (Except G type)

3.1. MASTER BRAKE PEDAL

The front mower stops travelling by depressing this pedal, which engage the right and left brakes at the same time.

3.2. HST FORWARD TRAVEL PEDAL

Depress this pedal, and the front mower starts moving forward. Forward travelling speed is controlled only by depressing it: forward travel accelerates and decelerates by the extent the pedal is depressed.

3.3. HST REVERSE TRAVEL PEDAL

Depress this pedal, and the front mower starts reversing. Reverse travelling speed is controlled only by depressing it: reverse travel accelerates and decelerates by the extent the pedal is depressed.

3.4. INDEPENDENT BRAKE PEDAL (RH)(E6 type)

This pedal affects the right-hand front wheel brake alone.

3.5. INDEPENDENT BRAKE PEDAL (LH)(E6 type)

This pedal affects the left-hand front wheel brake alone.



WARNING:

- Never operate the independent brake pedal during travelling as this will cause the front mower to skid sideways or turn over. When stopping, be sure to use the master brake pedal.
- Connect the independent brake pedal except necessary situation.

IMPORTANT:

- Use of the independent brake may damage the turf, so don't use it during operation on turfs.
- When making a quick turn within a garage or a barn, do this at sufficiently slow speed.

3.6. DIF-LOCK PEDAL

To minimize the turning radius of the front mower, the differential is installed, which causes the right and left driving wheels to turn at different speed when turning. On the other hand, it causes the wheels to slip on wet grass or soft ground. In such a case, lower engine speed and depress the dif-lock pedal, and then the differential is locked and both wheels turn at the same speed, which results in straighter travelling.



WARNING:

- Never use the dif-lock when travelling at high speeds.
- It is very dangerous to attempt to turn the front mower with the dif-lock pedal depressed. When turning the front mower, be sure to release the dif-lock pedal.
- When the dif-lock is not released despite releasing the dif-lock pedal, stop the front mower immediately and ask your dealer to repair.

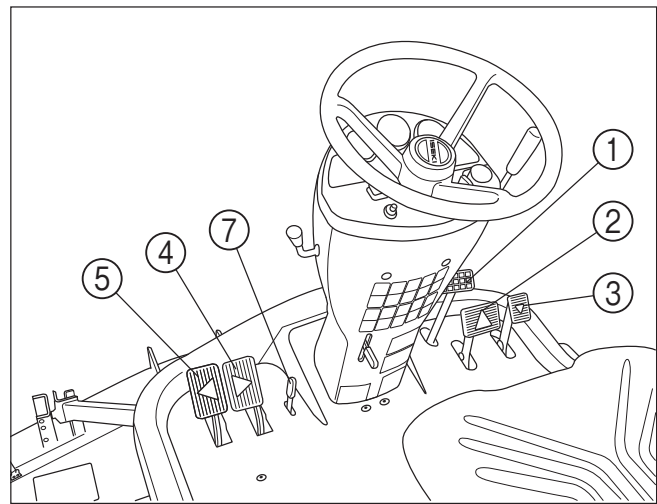


FIG. 39

- (1) Master brake pedal
- (2) HST forward travel pedal
- (3) HST reverse travel pedal
- (4) Independent brake pedal (RH) (E6 type)
- (5) Independent brake pedal (LH) (E6 type)
- (7) Parking brake lever (Except G type)

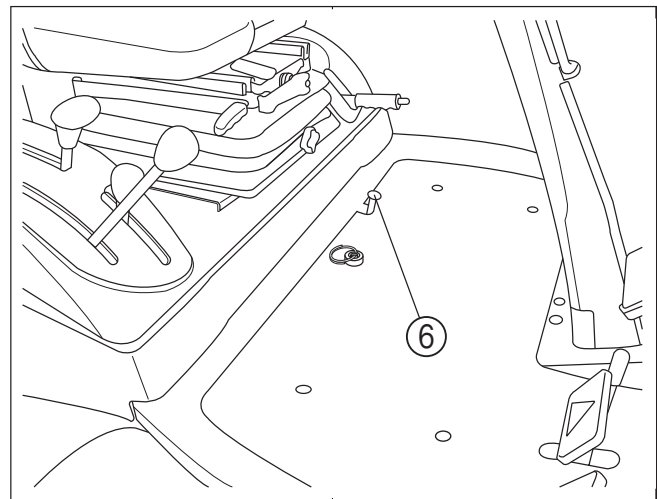


FIG. 40

- (6) Dif - lock pedal

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3.7. PARKING BRAKE LEVER (Except G type)

While depressing the master brake pedal fully, move the lever rearward and the parking brake is applied. To release the parking brake, depress the master brake pedal again.

IMPORTANT: Never start travelling with the parking brake applied, or the brake performance will deteriorate soon or, even worse, the brake system could break down.



CAUTION: When leaving the front mower, be sure to apply the parking brake.

4. FENDER (WING) PANEL

4.1. TRANSMISSION RANGE SHIFT LEVER

This lever shifts the transmission range into HIGH and LOW speed ranges.

LOW: Shift the lever forward, and the transmission is shifted to the low speed range.

HIGH: Shift the lever rearward, and the transmission is shifted to the high speed range.



NEUTRAL: The transmission is at the neutral position.

IMPORTANT: Before shifting the range shift lever, be sure to stop the front mower from travelling.

4.2. LIFT LEVER

With this lever, the lift link (mower deck) is raised or lowered.



DOWN: Shift the lever forward to this mark, the lift is lowered.



UP: Shift the lever rearward to this mark, the lift is raised.



CAUTION: When servicing or leaving the front mower, be sure to lower the mower deck to the ground.

IMPORTANT: Do not hold the lift lever too long in the UP position(), or it may damage the hydraulic system.

LIFT LOCK: The lift cylinder is equipped with a lift locking device.



WARNING: Be sure to raise the lift to its uppermost position and engage the lift lock when servicing the mower deck.

IMPORTANT: Use the lift lock when servicing only with the mower deck raised. Do not use when travelling or transporting by truck, or it may damage itself and hydraulic system.

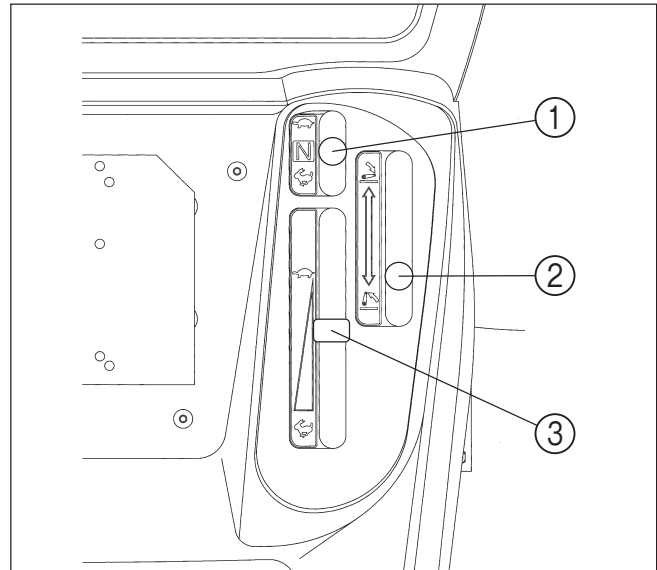


FIG. 41

- (1) Transmission range shift lever
- (2) Lift lever
- (3) Cruise control lever

Released

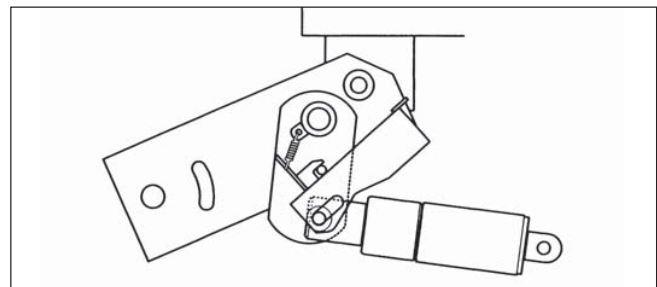


FIG. 42

Locked

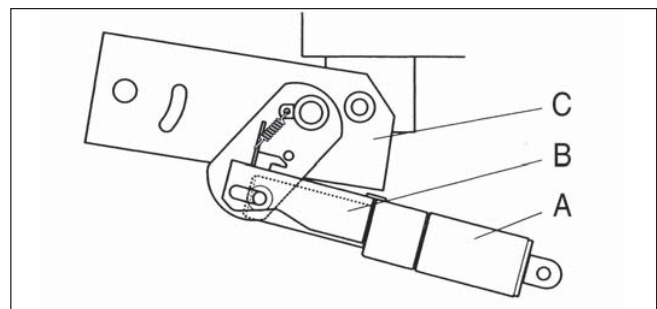


FIG. 43

- A: Hydraulic cylinder
- B: Lift lock
- C: Lift link

4.3. CRUISE CONTROL LEVER

When this lever is shifted in the required position, the cruising speed is held there without operating the HST forward travel pedal.

 **LOW:** Shift the lever forward, cruising speed becomes slow.

 **HIGH:** Shift the lever rearward, cruising speed becomes fast.

4.4. PARKING BRAKE LEVER (G type)

Use this lever when parking the front mower. Pull up the lever, and the parking brakes are applied. Push in the top button and lower the lever to disengage the brakes.

IMPORTANT: *Never start travelling with the parking brake applied, or the brake performance will deteriorate soon or, even worse, the brake system could break down.*

The parking lamp light up with key switch ON while parking lever is pulled upward. Relieve the parking lever before starting the front mower and confirm the parking lamp is OFF.



CAUTION: When leaving the front mower, be sure to apply the parking brake.

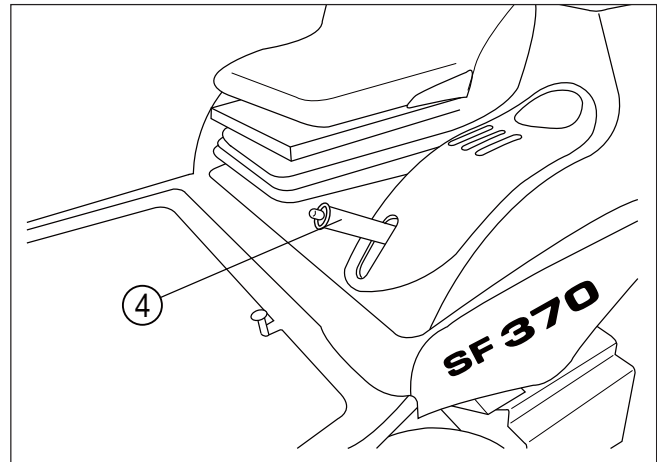


FIG. 44

(4) Parking brake lever (G type)

5. SAFETY SWITCHES

5.1. SAFETY SWITCHES (except F Type)

The operator's seat, master brake pedal and PTO switch are equipped with a safety device respectively. Before starting the engine, the operator should be seated in the operator's seat, keep the master brake depress position and turn the PTO switch to the OFF (OFF) position.

5.2. SAFETY SWITCHES (F Type)

The operator's seat, master brake pedal and PTO switch and engine hood are equipped with a safety device respectively. Before starting the engine, the operator should be seated in the operator's seat, keep the master brake depress position and turn the PTO switch to the OFF (OFF) position.



CAUTION: When the engine does not start due to a defective safety switch or does not stop when the operator has left the operator's seat, consult your dealer at once without fail.
(E6 type) The engine keeps running even when the operator has left the operator's seat, provided that the PTO switch is in the OFF (OFF) position and the parking brake is applied.

CHAPTER 6. PRE-OPERATIONAL ROUTINE INSPECTION

It is essential for avoiding accidents or breakdown during operation to keep the front mower in good condition. The following pre-operational checks should be performed without fail before starting daily operation.



WARNING:

- **Before inspection, be sure to park the front mower on a level and hard ground, stop the engine, lower the mower deck onto the ground, turn the PTO switch to the OFF position (OFF), and check to see that the mower blades have completely ceased rotating.**
- **Machine weight balance is a very important factor for safe operation. When your machine is equipped with an implement such as a cabin, etc., never fail to ask your dealers about machine balance. Always follow their advice.**

1. INSPECTION ITEMS

(1) Anything that was abnormal in the previous operations.

(2) While walking around the front mower.

- Tire inflation
- Exterior parts (broken or deformed covers or the like)
- Oil leakage (engine oil, transmission oil, fuel, etc.)
- Inspection and cleaning of air-intake port
- Inspection of engine oil level
- Inspection of coolant level
- Inspection of fan belt
- Inspection of fuel level
- Inspection of fuel filter
- Inspection of transmission oil level
- Inspection of front and rear wheel tightening bolts and nuts
- Cleaning of radiator and radiator screen
- Inspection of electrical apparatus
- Inspection of mower blades
- Inspection of mower blade driving belt
- Inspection of mower exterior parts like covers for damage and deformation
- Oil leakage from mower gear case
- Inspection and cleaning of gauge wheels
- Inspection for loose, broken or lost pins and clips

(3) While sitting in the operator's seat:

- Inspection of brakes
- Adjustment of seat

(4) After having started the engine:

- Confirmation of the operation of safety switches

2. WAY OF INSPECTION AND MAINTENANCE

Refer to the section of "MAINTENANCE."

CHAPTER 7. OPERATION

1. BEFORE STARTING THE ENGINE


CAUTION:

- Before starting the engine, be sure to carry out the pre-operation inspection in accordance with the periodical inspection table.
- Follow instructions given in "I. FOR SAFE OPERATION."
- Observe instructions given on the caution labels on the front mower and mower deck.

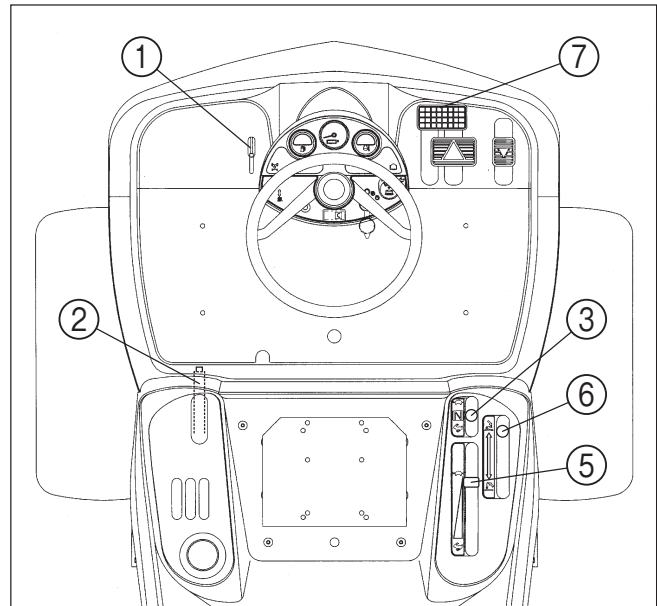
2. STARTING THE ENGINE


WARNING:

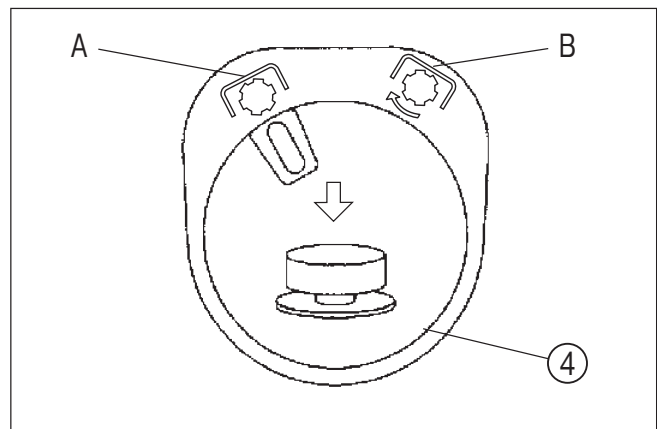
- Never attempt to start the engine in an enclosed place with poor ventilation. Be sure to provide sufficient ventilation, for exhaust fumes can be lethal.

IMPORTANT: Before starting the engine, close the engine hood securely, sit down in the operator's seat properly, depress the master brake pedal, and turn the PTO switch to the OFF position (A), or the engine cannot be started.

- Close the engine hood securely.
- Sit in the operator's seat properly.
- Apply the parking brakes, 1 or 2, securely.
- Shift the transmission range shift lever, 3, to the neutral position (N).
- Turn the PTO switch, 4, to the OFF position (A).
- Make sure the cruise control lever, 5, is returned to the LOW position (LOW).
- Shift the lift lever, 6, to the DOWN position (DOWN).
- Depress the master brake pedal, 7, fully.
- Insert the starter key into the starter switch, 8, and turn the key to the ON position (ON). Make sure that the charge lamp and oil pressure lamp are both lit.


FIG. 45

- (1) Parking brake lever (Except G type)
- (2) Parking brake lever (G type)
- (3) Range shift lever
- (5) Cruise control lever
- (6) Lift lever
- (7) Master brake pedal


FIG. 46

- (4) PTO switch A: OFF B: ON

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- i. Shift the throttle lever, 9, to the high speed position (↗).
- j. Turn the key to the GLOW position (⏻) and hold it there about five to ten seconds.

IMPORTANT: Never keep on pre-heating more than 10 seconds, or the glow plugs may burn out.

- k. Turn the starter key to the START position (⏻), and the starter is activated to crank the engine.

IMPORTANT: Do not hold the starter key more than 10 seconds in the START position (⏻). When the engine fails to start, return the key to the STOP (⏻) position and wait at least 20 seconds before the next attempt. If you do not, the battery will be discharged too fast.

- l. As soon as the engine starts, release the starter key. The key will return automatically to the ON position (⏻).

- m. Release the master brake pedal gradually.

- n. Make sure that the charge lamp and oil pressure lamp turn off.

IMPORTANT: If the oil pressure should remain lit, stop the engine immediately and check the engine lubrication system.

- o. When the engine starts, shift the throttle lever to an intermediate speed position, that is, between the high speed and low speed positions (↗ and ↘). Let the engine idle for about 5 minutes at least.

IMPORTANT: • Never turn the starter key to the START position (⏻) after the engine starts, or the starter motor will be damaged.

- Insufficient idling time will cause poor lubrication of the engine due to high viscosity of engine oil, which will lead to a shorter life of the engine.



CAUTION:

- During engine warming up, be sure to apply the effect to the brakes to avoid the front mower from travelling unexpectedly.

Note: Warming up criteria and atmospheric temperatures:

Atmospheric temperatures	Required warming up
Higher than 0°C (32°F)	5 to 10 minutes
0°C to -10°C (32°F to 14°F)	10 to 20 minutes
-10°C to -20°C (14°F to -4°F)	20 to 30 minutes
Lower than -20°C (-4°F)	more than 30 minutes

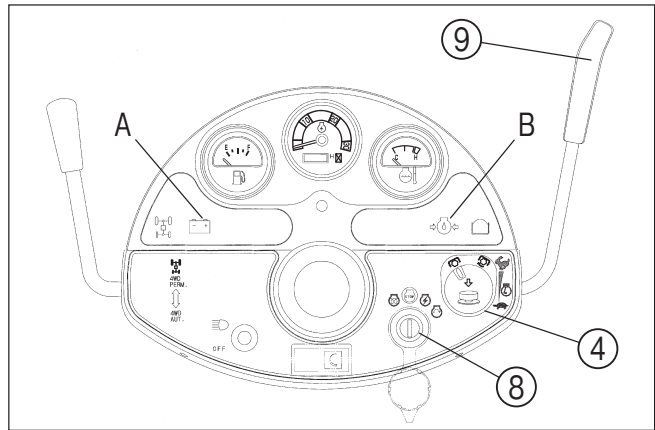


FIG. 47

- (4) PTO switch
- (8) Starter switch
- (9) Throttle lever
- A: Charge lamp
- B: Oil pressure lamp

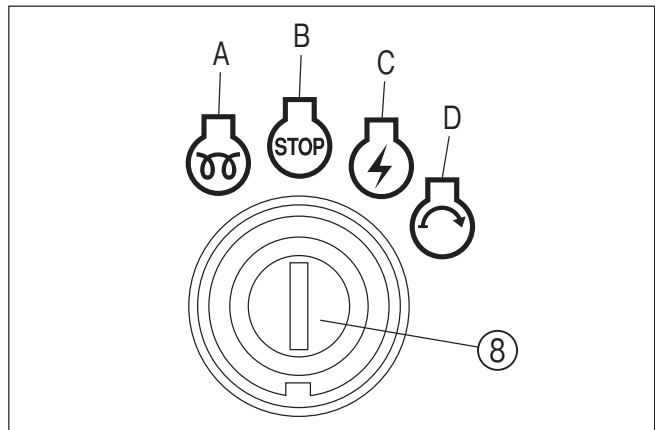


FIG. 48

- (8) Starter key
- A: GLOW
- B: STOP position
- C: ON position
- D: START position

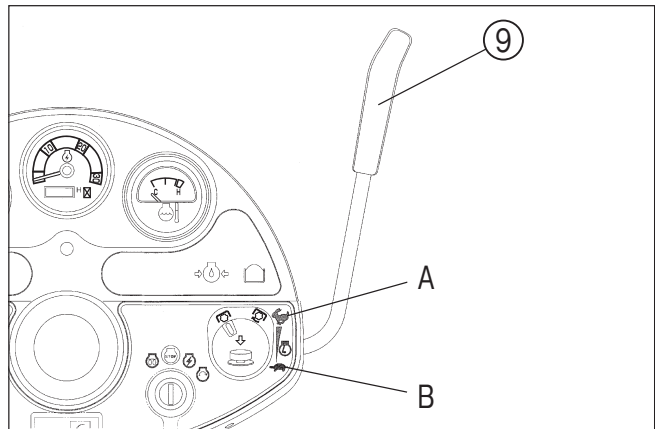


FIG. 49

- (9) Throttle lever
- A: High speed
- B: Low speed

3. STOPPING THE ENGINE

- Shift the throttle lever,1, to the low speed position () to reduce engine speeds.
- Depress the master brake pedal,2, and apply the parking brake lever,3 or 4, securely.



CAUTION: Park the front mower on level, hard ground and make sure that the parking brake lever are applied securely.

- Turn the key switch,5, to the STOP () position to stop the engine.

IMPORTANT:

- Never attempt stopping the engine abruptly when it is running at high speeds.
- Be sure to let the engine idle for about 5 minutes after a longtime operation and then stop the engine. Abrupt engine stopping may lead to overheating causing seizure.

- Remove the starter key and cap,6, the key hole without fail.

IMPORTANT: Be sure to cap the key hole after having removed the starter key. Otherwise, water or dust may enter into the switch which may cause trouble.



CAUTION: When you leave the front mower, be sure to stop the engine and remove the starter key to prevent the front mower from being started unexpectedly by children or unauthorised people.

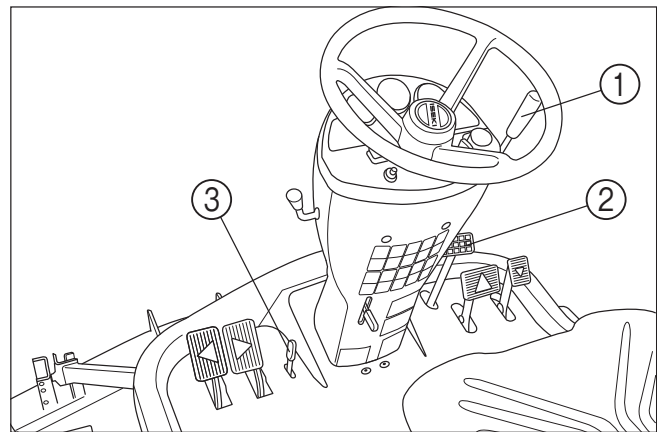


FIG. 50

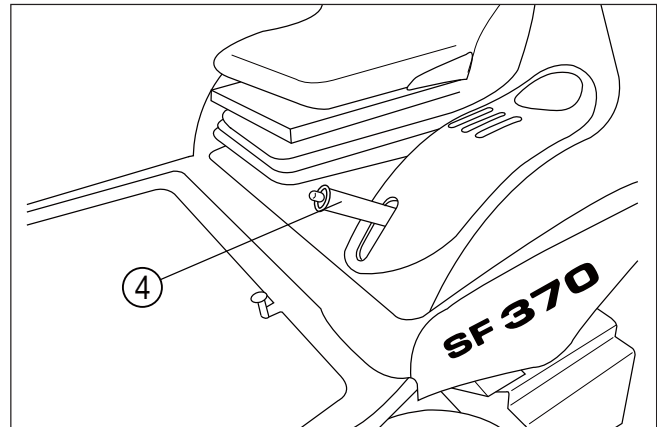


FIG. 51

- (1) Throttle lever
- (2) Master brake pedal
- (3) Parking brake lever (Except G type)
- (4) Parking brake lever (G type)

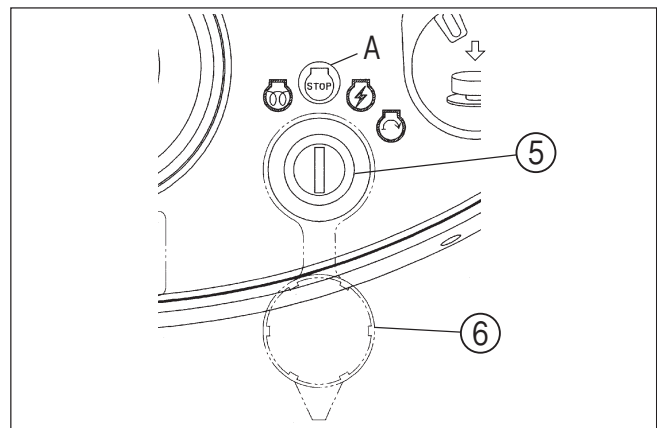


FIG. 52

- (5) Starter switch
- (6) Cap
- A: STOP position

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4. TRAVELLING



CAUTION:

- Before having become sufficiently familiar with the operation of the front mower, be sure to operate it in a place spacious and flat without obstacles and having an unobstructed view and confirm the functioning of each control.
- Check the place to mow for bumps, detaches, mounds, steps, inclination, softness, water hole, etc. Ahead of time to avoid accidents such as turn-over, fall, side-sliding of the front mower.

- Start the engine. (Refer to Chapter 7.2)
- Depress the master brake pedal, 1, fully.
- Shift the transmission range shift lever, 2, to the LOW speed position (↲) or the HIGH speed position (↳).



CAUTION:

- Before having become sufficiently familiar with the operation of the front mower, operate it at the LOW speed position (↲).
- When travelling on bumps, detaches, mounds, steps, inclination softness, waterhole, etc, select the transmission range shift lever at the LOW speed position (↲).

When mowing (Not using Auto throttle);

- Shift the throttle lever, 3, to the HIGH speed position (↗) to accelerate the engine.

When travelling (Auto throttle available);

- Shift the throttle lever to the LOW speed position (↘).

IMPORTANT: This front mower is equipped with Auto throttle system, but don't use it for mowing operation in order to let front mower provide the optimum performance.

- Shift the lift lever, 4, to UP position (↗) to lift up the mower deck from the ground.



CAUTION: Starting to travel at high speeds without lifting up the mower deck will cause the mower blades to hit stones or stocks, which may result in break-down of the front mower or serious accidents.

- Release the parking brake lever, 5 or 6.
- Release the master brake pedal gradually.

IMPORTANT: For your safety, before moving forward the front mower, check the conditions in front of and around the front mower.

- The steering wheel, 7, is very light to turn, for the steering system is assisted hydraulically. Naturally the front mower turns to right when the steering wheel is turned clockwise and vice versa.

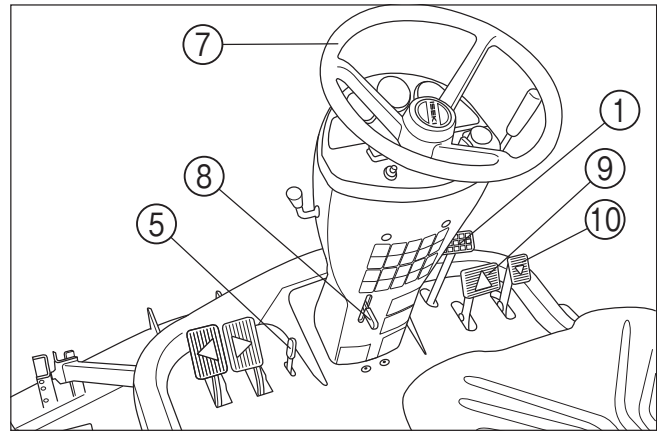


FIG. 53

- | | |
|---|-------------------------------|
| (1) Master brake pedal | (8) Tilt lock lever |
| (5) Parking brake lever (Except G type) | (9) HST forward travel pedal |
| (7) Steering wheel | (10) HST reverse travel pedal |

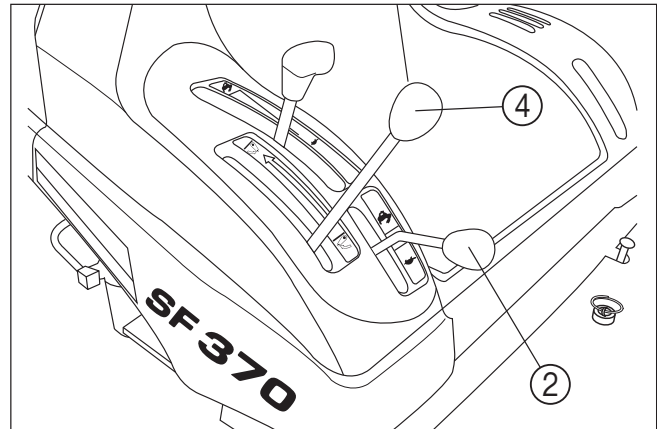


FIG. 54

- | |
|------------------------------------|
| (2) Transmission range shift lever |
| (4) Lift lever |

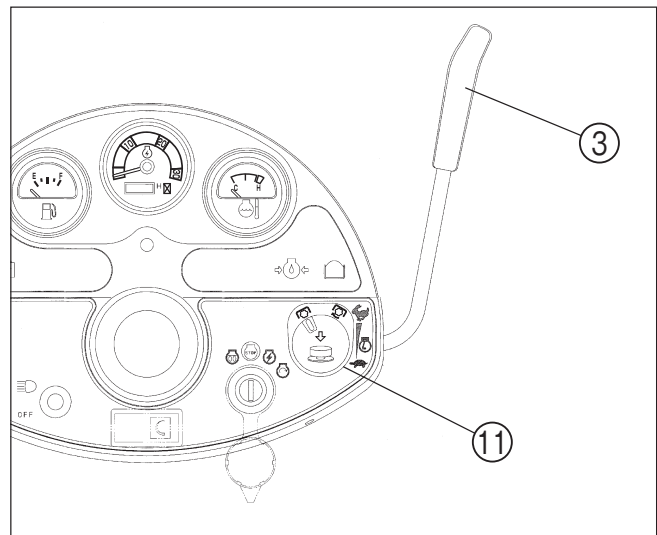


FIG. 55

- | |
|--------------------|
| (3) Throttle lever |
| (11) PTO switch |

**WARNING:**

- Never attempt to turn the steering wheel abruptly when travelling at high speed, which is very dangerous.
- Never attempt to make a sharp turn on a slope, but slow down sufficiently and turn the steering wheel slowly to prevent the mower from turning over or falling down.

The steering wheel is tiltable in 4 steps,8, so choose the optimum angle to suit the operating position.

- Depress the HST forward travel pedal,9, softly, and the front mower starts travelling. When reversing the front mower, depress the HST reverse travel pedal,10, softly, and then the front mower starts reversing slowly.

**CAUTION:**

- Never attempt to depress the HST pedal abruptly, or the front mower will dash, which is very dangerous.
- Before changing travelling directions, be sure that the front mower has stopped travelling completely.
- When reversing, be sure of the safety conditions behind the front mower.

**WARNING:**

- When transporting or moving the front mower to another place, never turn the PTO switch,11, to the ON position (☐) to allow the mower blades to turn. Rotating the blades during transportation or moving is very dangerous.

5. CRUISE CONTROL**a. How to set**

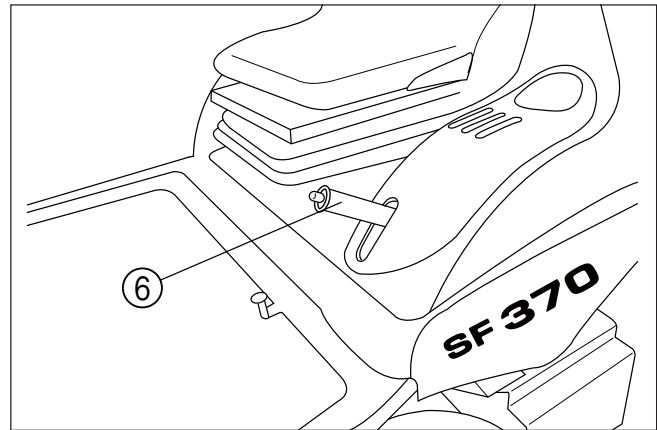
When a required speed is attained with the HST forward travel pedal, move the cruise control lever,1, from LOW speed position (↶) to HIGH speed position (↷) until the movement feels heavy and release the HST pedal, and then the attained travel speed is held.

When slowing down during cruise travel, shift the lever towards the LOW speed position (↶), and then the control is released and the travel speed is controllable with the lever or the HST forward travel pedal. When speeding up during cruise travel, depress the HST forward travel pedal and shift the lever towards the HIGH speed position (↷).

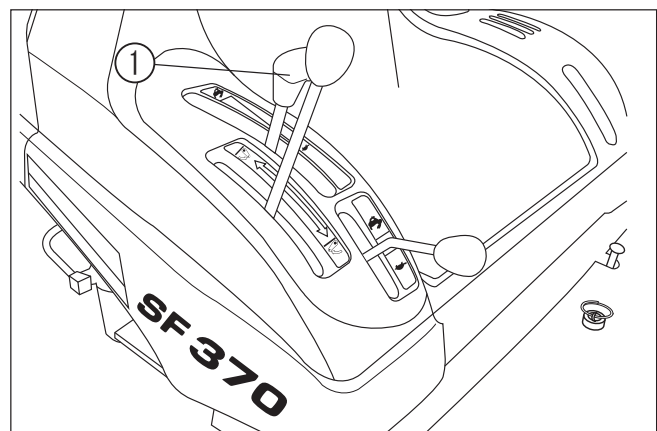
b. How to release

The cruise control is released by depressing the master brake pedal or shift the lever to the LOW speed position (↶).

With this lever, reverse travel speed is not controlled.

**FIG. 56**

(6) Parking brake lever (G type)

**FIG. 57**

(1) Cruise control lever

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**WARNING:**

Use the cruise control only;

- When the transmission range is shifted in the LOW speed position (↖). Never use it in the HIGH speed position (↗). It is very difficult to avoid hazards quickly if the travelling speed is fixed at high rate.
- Operations in specious, flat areas with an unobstructed view.
- After having become sufficiently familiar with the way of releasing it. Otherwise, unexpected accidents may occur, which is very dangerous.

6. STOPPING

- a. Release the HST pedal,1 or 2.

When mowing (Not using Auto throttle)

- b. Shift the throttle lever,3, to the LOW speed (↖) position to slow down the engine.

When travelling (using Auto throttle)

- b. The throttle lever automatically returns to the LOW speed position (↖).
- c. Depress the master brake pedal,4, and lock the parking brakes,5 or 6, securely.



CAUTION: Park the front mower on flat, level ground and make sure that the parking brakes are applied securely.

- d. Shift the transmission range shift lever,7, to the Neutral position (N).

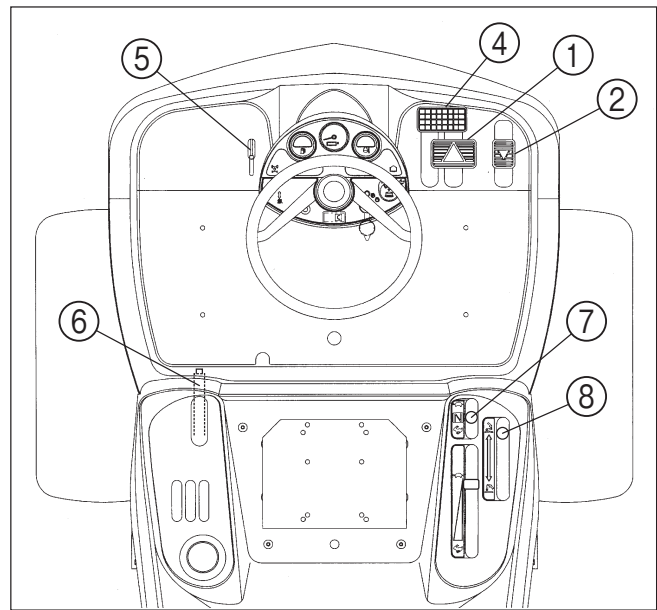


CAUTION: Be sure to shift the transmission range shift lever to the Neutral position (N) after stopping the front mower, or if the engine runs unexpectedly, the front mower may move abruptly.

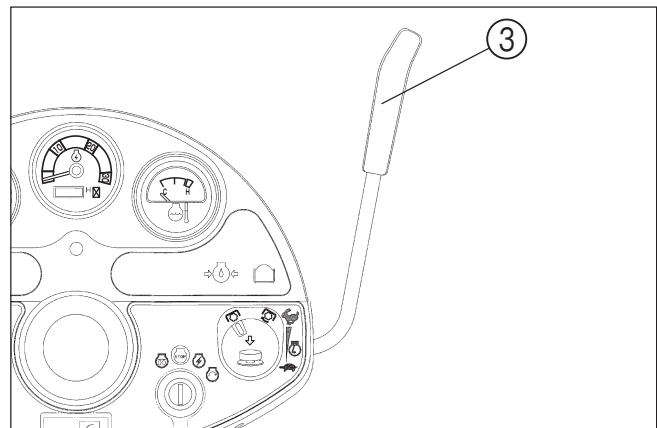
- e. Shift the lift lever,8, to DOWN position (↘) to lower the mower deck onto the ground.



CAUTION: When stopping the front mower, lower the mower deck onto the ground without fail to avoid accidents unexpectedly.

**FIG. 58**

- (1) HST forward travel pedal
- (2) HST reverse travel pedal
- (4) Master brake pedal
- (5) Parking brake lever (Except G type)
- (6) Parking brake lever (G type)
- (7) Transmission range shift lever
- (8) Lift lever

**FIG. 59**

- (3) Throttle lever

7. MOWING

**CAUTION:**

- Before moving the front mower into the working site, investigate the whole site and get rid of all obstacles such as stones, wood, empty tins, bottles, wires, etc for operation safety.
- Also investigate the site for pits, mounds, steps, slope angles, ground softness, water pools, etc to avoid turning over, falling down, and side-shifting.

- Start the engine and turn the throttle lever,1, to the intermediate position between the LOW speed (🐢) and HIGH speed (🐇) positions.
- Shift the transmission range shift lever,2, to the LOW speed position (🐢).
- Turn the lift lever,3, to the UP position (📈) to raise the mower deck.
- Release the parking brake,4 or 5.
- Push down the HST forward travel pedal,6, gradually to drive the front mower into the working site.
- Depress master brake pedal,7, to stop the front mower.
- Turn the lift lever to the DOWN position (📉) to lower the mower deck on the ground.
- Turn the PTO switch,8, to the ON position (🔌) and the mower blades start rotating.

IMPORTANT: The lift height and PTO switch are inter-connected with UP - STOP device.

**CAUTION:**

- Make sure that the UP - STOP device works properly before starting operation.
- Keep the mower height to a minimum to avoid accidents while the blades are rotating. Before raising the mower, be sure to turn the PTO switch to the OFF position (🔌). Never attempt to turn the PTO switch while the mower is raised high.

**WARNING:**

- When the blades start rotating, grass and pebbles start being ejected from the grass discharge. So before starting the mower blades, be sure of the safety around the mower.

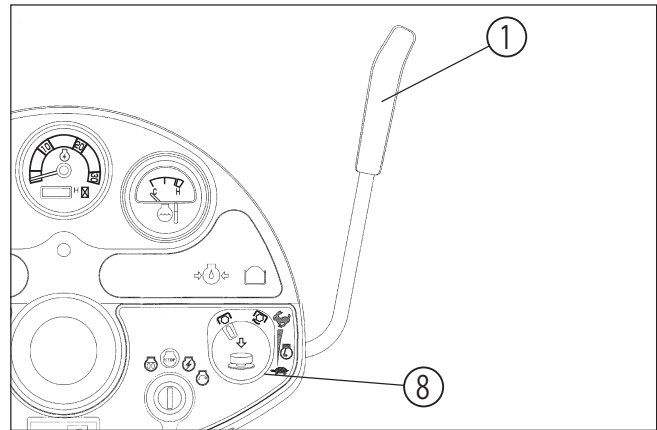


FIG. 60

- (1) Throttle lever
- (8) PTO switch

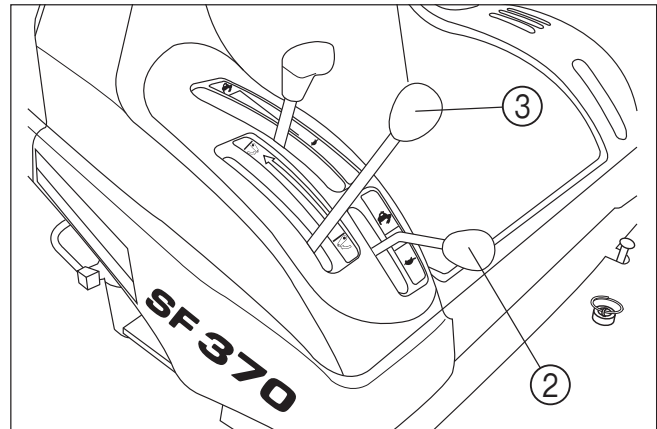


FIG. 61

- (2) Transmission range shift lever
- (3) Lift lever

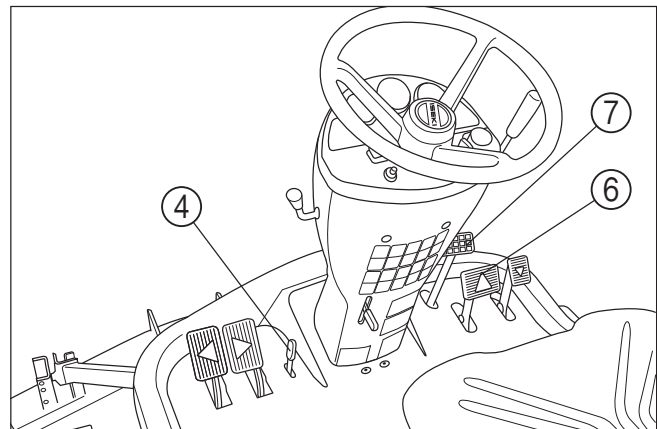


FIG. 62

- (4) Parking brake lever (Except G type)
- (6) HST forward travel pedal
- (7) Master brake pedal

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- i. Turn the throttle lever to the HIGH speed position (H) to accelerate the engine.
- j. Release the master brake and push down the HST forward travel pedal slowly, and then the front mower starts travelling.

IMPORTANT: When the screens of the air-intakes provided on, both sides, rear and under the hood, under the fuel tank and radiator are clogged with dust and grass, clean them at once. Never keep on operating the machine with clogged screens, or the engine will over-heat.



CAUTION:

- When there are abnormal noises and vibrations, stop immediately and locate the source of the trouble. Never start operation without correcting the trouble, or serious trouble may result.
- When the source of the trouble is not located, consult your dealers.

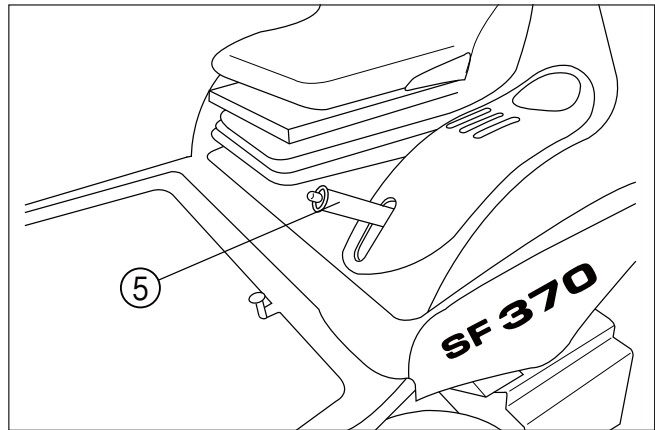


FIG. 63

(5) Parking brake lever (G type)

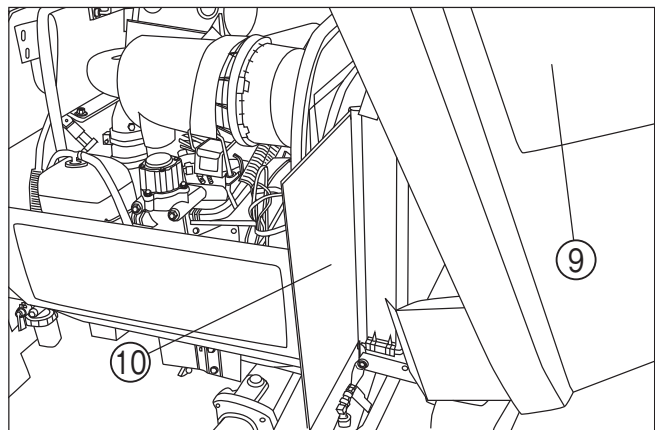


FIG. 64

(9) Air intake screen
(10) Radiator screen

CHAPTER 8. MAINTENANCE

What are explained hereunder are the maintenance items which you can cope with. When you encounter any abnormality or trouble which is not mentioned in this manual, please ask your dealer for service.



WARNING: When lubrication or servicing the front mower:

- Place it on level, hard ground.
- Stop the engine and remove the starter key.
- Apply the parking brake securely.
- Shift the lift lever to DOWN position () to lower the mower deck onto the ground.
- Turn the PTO switch to the OFF position ().
- Service the front mower after the engine has cooled down sufficiently.

With these items in mind, confirm the safety conditions for maintenance operation without fail ahead of time.

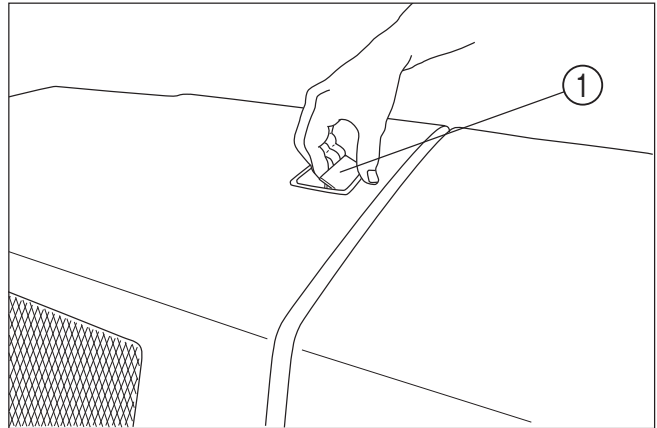


FIG. 65

(1) Hood open/close lever

1. SERVICE ACCESS

Opening / Closing hood

To unlock the hood, pull the open/close lever,1, to forward.

Open the hood by grasping and lifting up the front of the hood.



WARNING: When opening / closing the hood, be sure to stop the engine and remove the starter key.

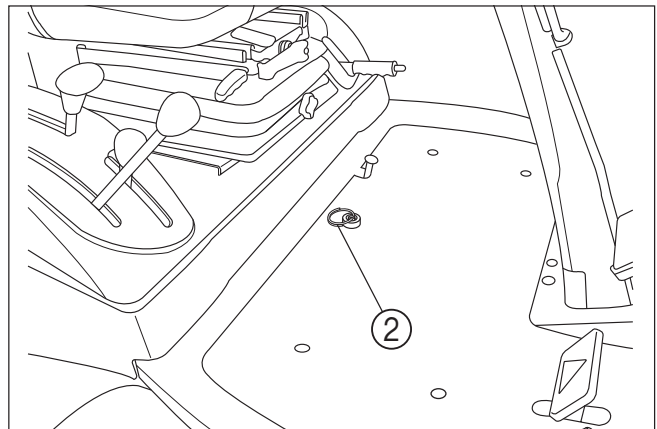


FIG. 66

(2) Floor open/close ring

Opening / closing step floor

Pull up the ring,2, at rear-middle of the step floor and open the floor forward.

Raise the front of hook rod,3, and insert it to the hole on reverse side of the step floor to lock.

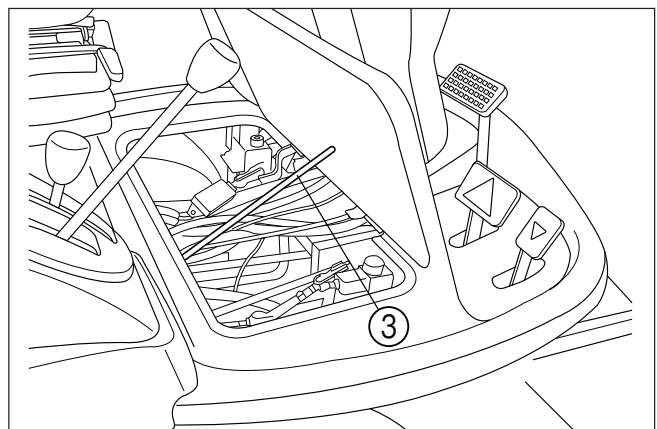


FIG. 67

(3) Hook rod

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2. ENGINE OIL LEVEL

- Draw out the engine oil level gauge (dipstick),1, which is located on the right sidewall of the engine by opening the window plate.
- Wipe the end of the dipstick with dry cloth.
- Then insert it into the engine properly.
- Draw it again. Make sure that the oil level is between the upper and lower limits.
- If the level is lower than the lower limit, replenish through the engine oil filler,2, to the upper limit with the same kind of oil as that in the engine.



CAUTION: Stop the engine and wait around 5 minutes at least before checking the oil level. Engine oil is so hot just after operation as to cause burns and it takes some time as well for all the oil to return to the oil pan.

IMPORTANT:

- Never replenish with a different kind of oil. The addition of different kind of oil will deteriorate the quality of the original oil.
- The oil level should not exceed the upper limit. Excessive oil will cause engine trouble.
- Use oil of the quality recommended by ISEKI or 10W-30 CC grade of SAE classification or higher quality.
- Use oil of proper viscosity in accordance with the atmospheric temperature.

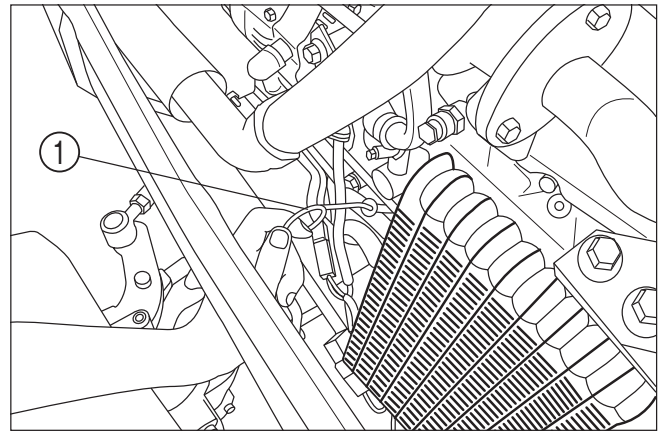
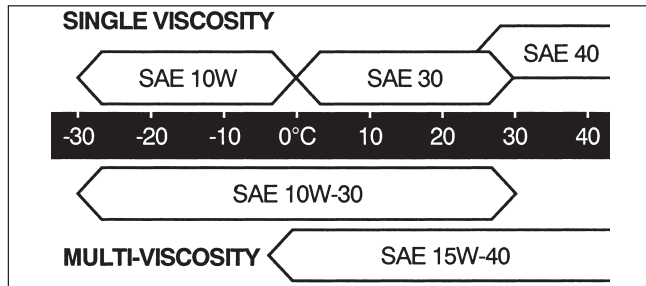


FIG. 68

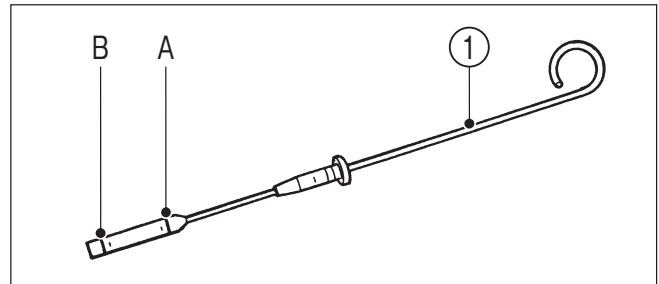


FIG. 69

(1) Engine oil level gauge

A: Upper limit

B: Lower limit

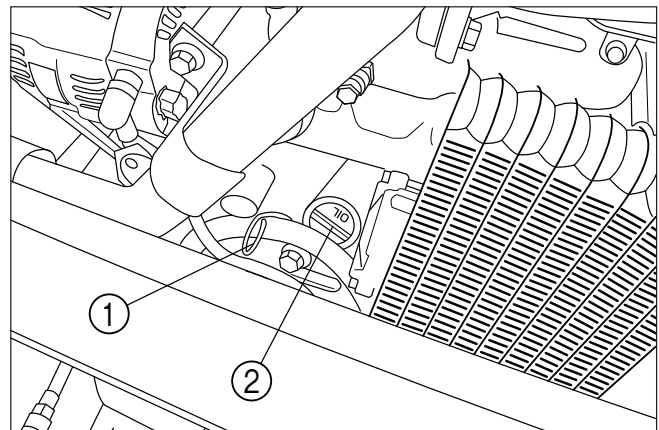


FIG. 70

(1) Engine oil level gauge

(2) Engine oil filler

3. TRANSMISSION OIL LEVEL

- You can make access to the transmission oil level gauge (dipstick),1, on the transmission case by opening the step floor.
- Remove the transmission oil filler.
- Wipe the tip with dry cloth.
- Insert the dipstick into the oil filler opening completely.
- Remove it again. Make sure that the level is between the upper and lower limits.
- When the oil level is lower than the lower limit, replenish with fresh hydrostatic transmission oil up to the level between the upper and lower limits.

IMPORTANT: The transmission oil is common with oil for the hydrostatic transmission (HST) and the hydraulic lift cylinder, so pay sufficient attention not to allow dust, water, and other foreign matter to be trapped in the oil.

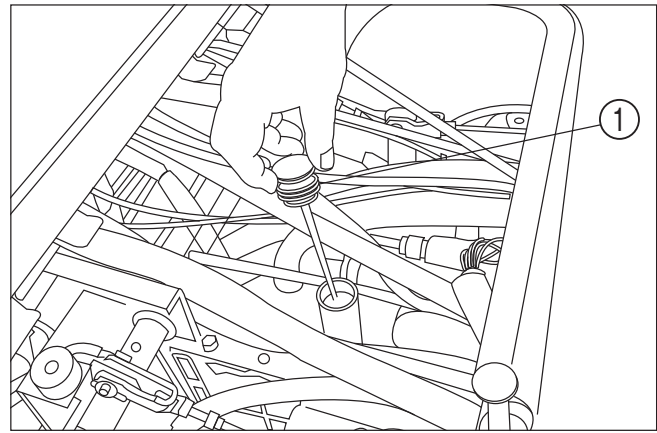


FIG. 71

(1) Transmission oil filler with oil level gauge

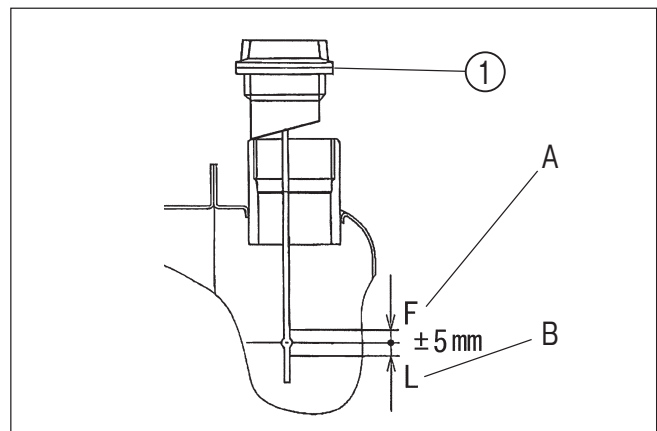


FIG. 72

(1) Transmission oil filler with oil level gauge

A: Upper limit

B: Lower limit

4. REDUCTION GEAR CASE OIL LEVEL

The level plug,1, is located on the right side wall of the clutch housing. Remove the plug with a spanner or wrench and check if oil overflows through the plug hole. If so, the level is normal.

No oil overflowing shows low oil level. Replenish with fresh gear oil (SAE80) of the same kind as that in the gear case through the oil filler,2, which is located on the right-hand side of the front mower and above the hydraulic oil filter.

IMPORTANT: Before re-installing the oil level plug, wrap the threads of the plug with sealing tape, or oil may leak out.

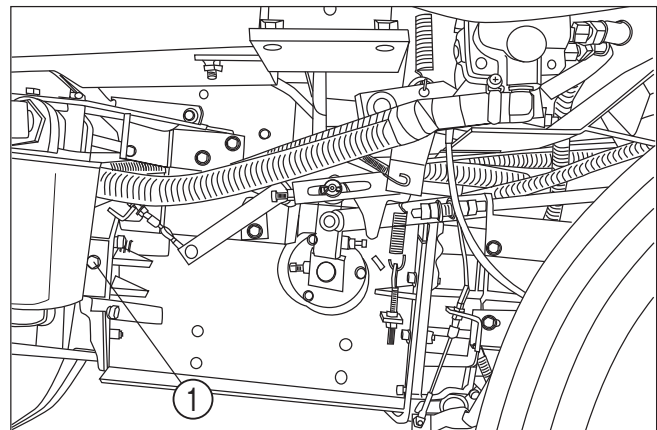


FIG. 73

(1) Reduction gear case oil level plug

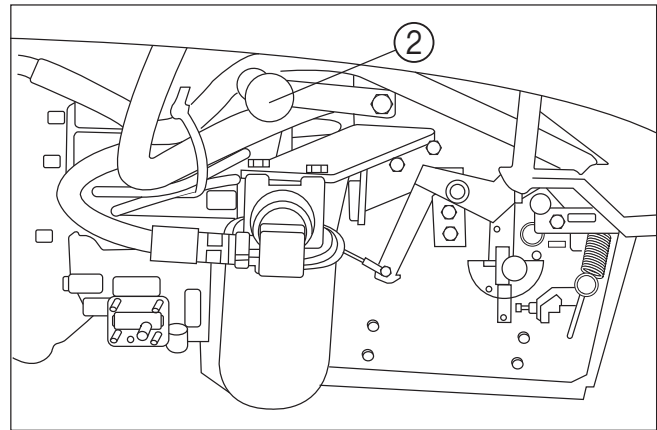


FIG. 74

(2) Reduction gear case oil filler

5. REAR AXLE OIL LEVEL

A level plug,1, is provided on the top side wall of the bevel gear case respectively of the right and left. Remove the plug with a spanner or wrench and check to see if the oil overflows through the level plug hole. If a small amount of oil flows from the hole, the oil level is normal.

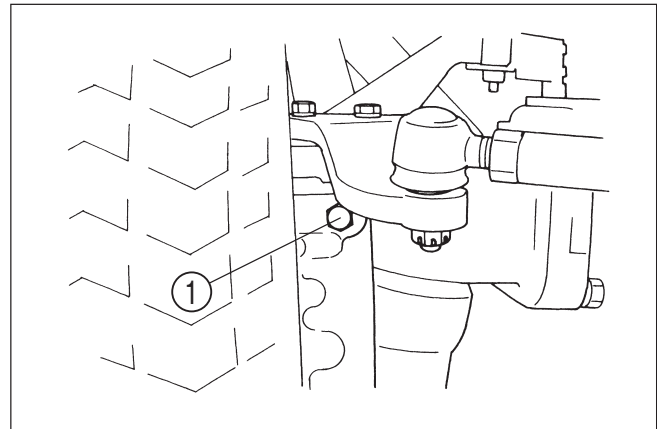


FIG. 75

(1) Rear axle oil level plug

If no oil overflows through the level plug hole, it shows the oil level is lower than specified. So replenish with the same kind of oil as that in the case through the oil filler,2, located on the top wall of the rear axle on the left side of the front mower until the oil starts overflowing through the level hole. Use gear oil of SAE80.

IMPORTANT: Before re-installing the oil level plug, wrap the threads of the plug with sealing tape, or oil may leak out.

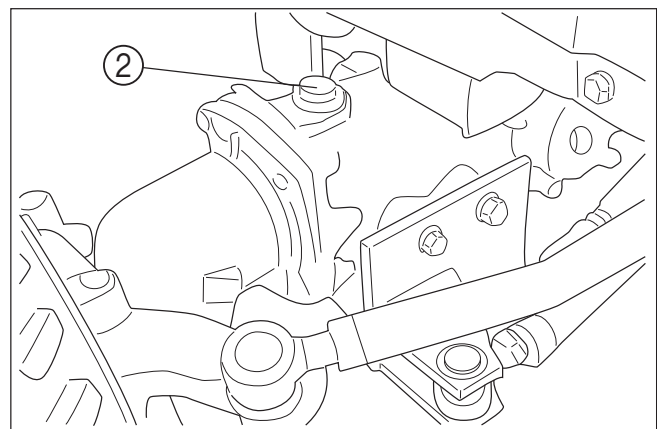


FIG. 76

(2) Rear axle oil filler

6. COOLANT LEVEL



WARNING: Never remove the radiator cap and reserve tank cap during or just after operation. The water in the radiator is very hot and highly pressurized, so it may cause burns. Allow the engine to cool down sufficiently before inspecting coolant level.

- a. Open the engine hood.
- b. Make sure that the coolant level in the reserve tank, 1, is between the upper and lower limits. If the level is lower than the lower limit, replenish the reserve tank with fresh clean soft water.

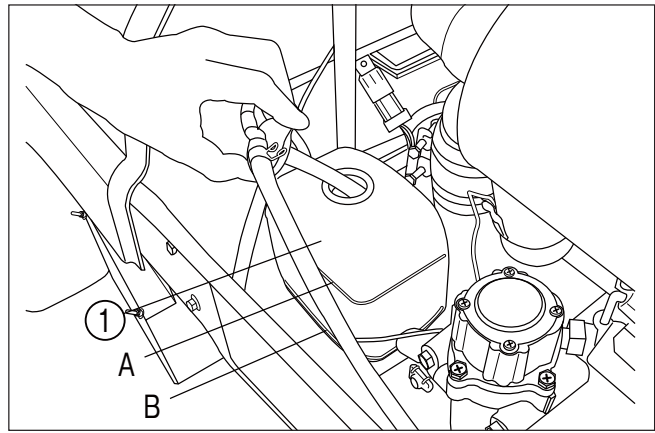


FIG. 77

- (1) Reserve tank
A: Upper limit
B: Lower limit

7. FUEL LEVEL

Check to see the fuel level with the fuel gauge, 1, on the control panel.

The letter "F" shows the upper limit.
The letter "E" shows the lower limit.

Fuel replenishment should be done before operation if required.

Fuel capacity: 48 litres (12.7 imp. gal.)



DANGER: When replenishing fuel, abide by the following items, or a fire may be caused.

- Before replenishing with fuel, be sure to stop the engine and wait until the engine and heated parts cool down sufficiently.
- Keep sparks, open flames, etc. away from the fuel tank.
- No smoking!
- Spilt fuel should be wiped away immediately.

IMPORTANT:

- As soon as the fuel gauge shows "E", replenish with fuel. Never attempt to keep on operating with fuel level lower than E, or air may be trapped in the fuel system, which will cause hard engine starting and poor engine power.
- Use diesel fuel. Never use heavy oil or gasoline (petrol). Use of fuel other than diesel fuel will cause fuel injection pump trouble.

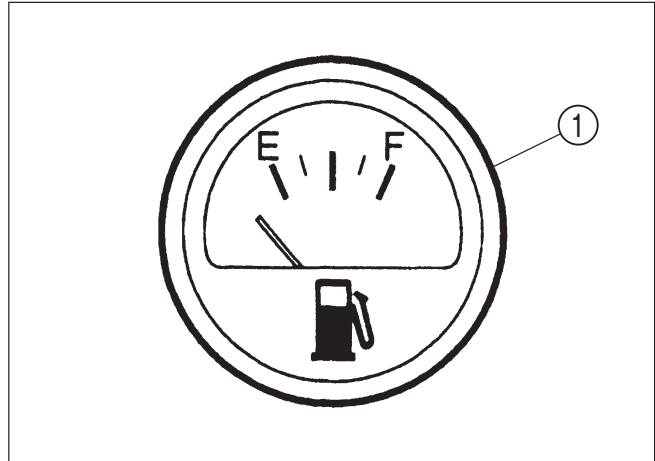


FIG. 78

- (1) Fuel gauge

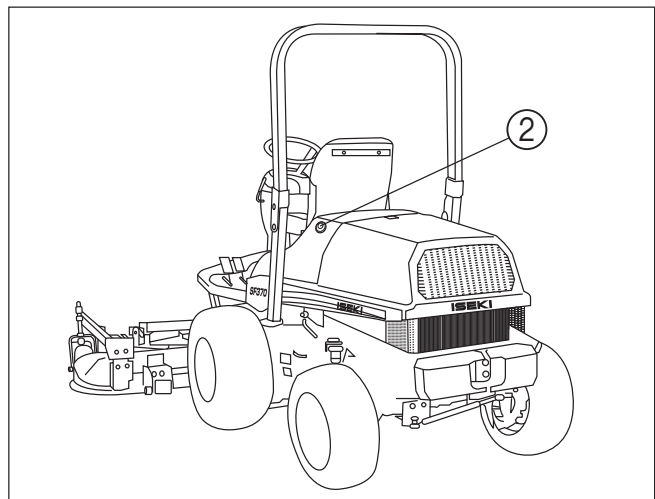


FIG. 79

- (2) Fuel filler

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8. AIR-CLEANER

- The air-cleaner,1, is held on the engine with the rubber band. Untie this band and pick up the air-cleaner by hand.
- Pinch the vacuum valve,2, to eject the dust accumulated inside. When the dust is wet, wipe it off with dry cloth.
- Draw the element,3, out of the air-cleaner.
- Dust it off by patting lightly while holding it with the other hand.
- When the element does not become clean only by patting, blow dust off the element with compressed air. Apply compressed air from inside to outside of the element.
- When the element does not become sufficiently clean only by blowing, dip it in neutral detergent solution for about 30 minutes and then rinse it in fresh water. Then dry it in the atmospheric temperature.
- After cleaning install the element in reverse order of disassembly.

IMPORTANT:

- Never hit the element against a hard object like a concrete wall.
- An element which has already been washed five times or is damaged should be replaced with a new one.
- Never attempt to start the engine without the air-cleaner element. Such operation will cause engine trouble.

9. FUEL STRAINER

The fuel strainer,1, is located at middle lower on the left side of the front mower. Check the strainer for accumulated dust or water in the bottom of the strainer cup.

- When dust or water is found accumulated in the bottom, turn the fuel cock lever,2, by 180 degrees towards the bolt to stop fuel flowing.
- Remove the ring nut,3, to remove the strainer cup and element.
- Wash the inside of the strainer cup and element in diesel fuel.



DANGER:

- Smoking is prohibited when the fuel strainer is being cleaned or inspected.
- Keep away sparks and open flames from the strainer.
- Spilt fuel should be wiped away immediately.

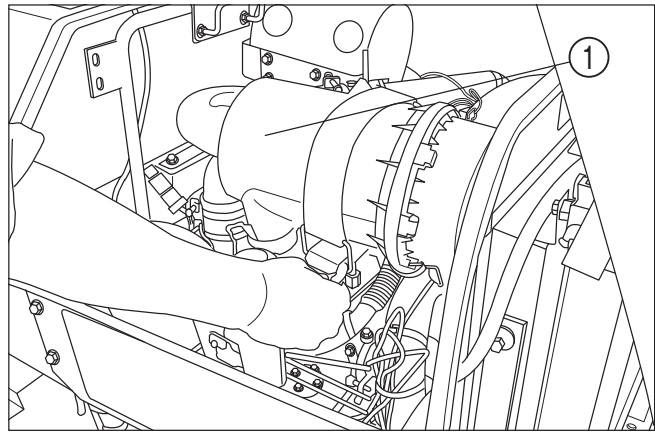


FIG. 80

(1) Air-cleaner

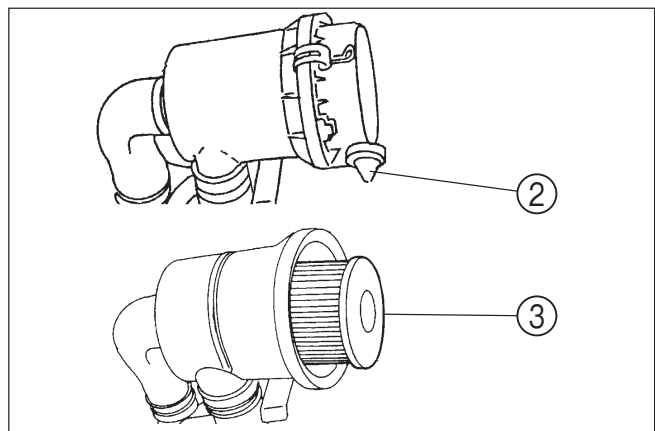


FIG. 81

(2) Vacuum valve (3) Element

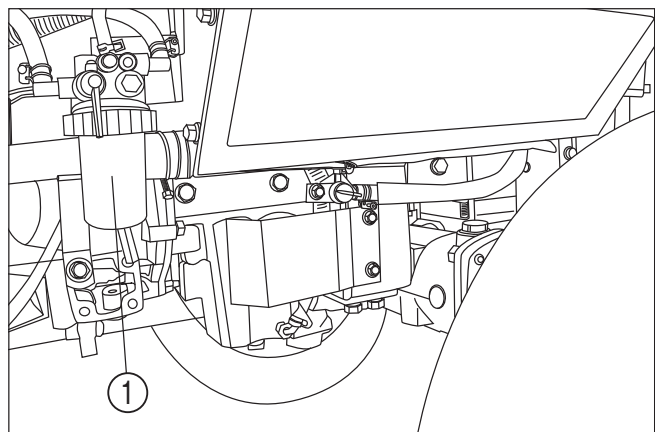


FIG. 82

(1) Fuel strainer

IMPORTANT:

- Be sure to install the O-ring when re-installing the strainer.
- When the fuel tank is emptied and air is trapped in the fuel system, bleed the air as follows:
 - Close the fuel filter cock and loosen the strainer cup. Then open the fuel cock and evacuate trapped air completely along with fuel out of the strainer cup. Re-tighten the strainer cup. The air trapped between the fuel pump and injectors is evacuated automatically when the starter switch is turned to the ON position (4).

10. FUEL HOSES

Check the fuel hoses for cracks and fuel leak after every 100 hours of operation. A damaged hose should be replaced with a new one.

11. FAN BELT**WARNING:**

- Before checking the fan belt, stop the engine and remove the starter key without fail.
- Wait until the engine and accessories cool down completely to prevent burns.

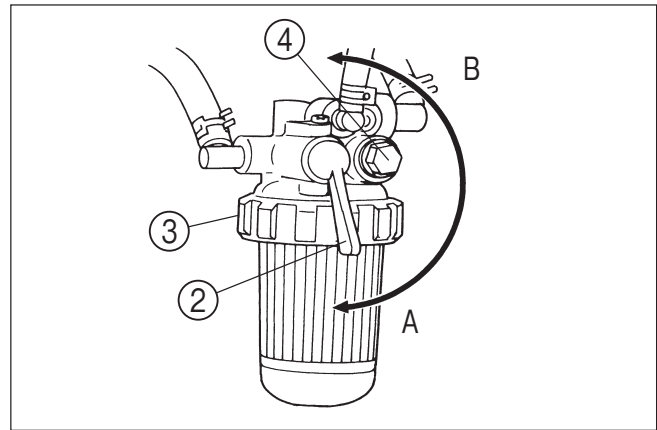
The fan belt, 1, is accessible from the right rear of the engine room by opening the engine hood. Check the belt for tension and damage.

Push down the belt with a finger at the intermediate point between the alternator, 2, and crankshaft pulley, 3, with a force of 10 kgf (22 lb) and see its deflection, A. If it deflects by about 10 mm (0.4 in.), the tension is proper.

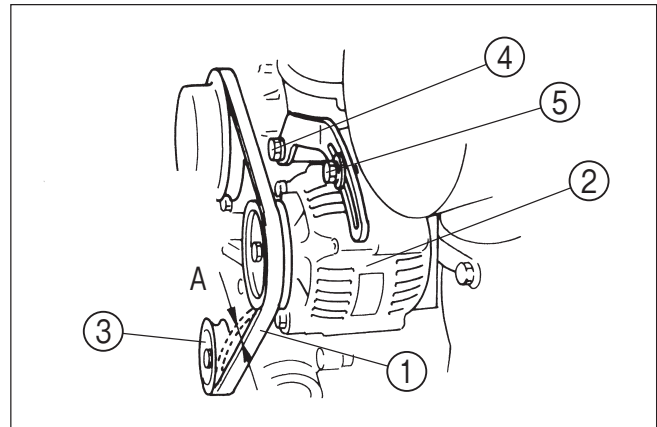
When the belt deflection is improper, correct in the following procedure:

- Loosen the lock bolt, 4, and adjust bolt, 5, of the alternator.
- Pull the alternator outward to apply more tension to the belt. Tighten the lock bolt and adjust bolt temporarily while pulling the alternator.
- Check for the belt deflection to see if the tension is proper. If so, tighten the lock bolt and adjust bolt securely.

IMPORTANT: When the belt is found to be defective, ask your dealer for replacement.

**FIG. 83**

- | | |
|------------------------|------------------|
| (2) Fuel cock lever | (3) Ring nut |
| (4) Air-bleeding screw | A: Open B: Close |

**FIG. 84**

- | | |
|-----------------------|-----------------|
| (1) Fan belt | (4) Lock bolt |
| (2) Alternator | (5) Adjust bolt |
| (3) Crankshaft pulley | |

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12. MASTER BRAKE PEDAL PLAY

The specified play of the master brake pedal,1, is 20 to 30 mm (0.8 to 1.2 in.) .



DANGER:

- As the front mower is used, the master brake pedal play becomes larger. Excessive play will affect the proper brake performance, which is very dangerous.
- Before operation, be sure to check the master brake system.

- Loosen the 4 lock nuts,2, and turn both the brake rods,3 & 4, so as for the master brake pedal to have the specified play. The longer the effective length of the rods, the larger the pedal play, and vice versa.
- After pedal play adjustment, be sure to tighten the 4 lock nuts.



WARNING:

- When the brake rod (LH) is manipulated in effective length, the play of the independent brake pedal (LH) also changes. So the play should also be corrected (E6 type).

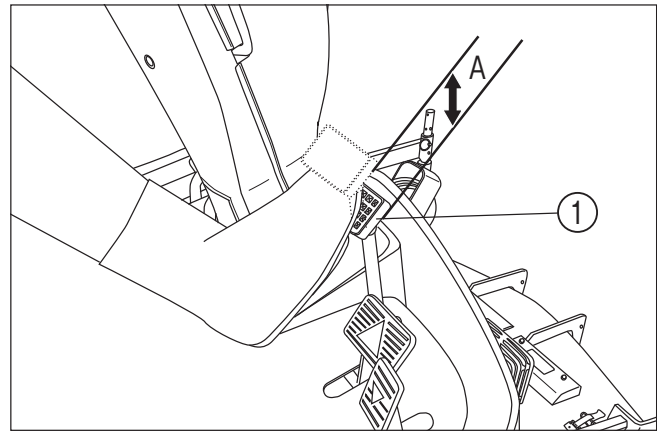


FIG. 85

(1) Master brake pedal

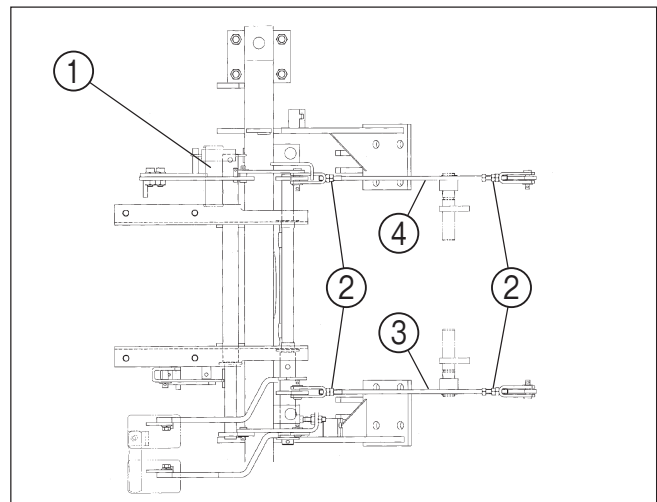


FIG. 86

(1) Master brake pedal

(3) Brake rod (LH)

(2) Lock nuts

(4) Brake rod (RH)

13. NEUTRAL POSITION OF HST



WARNING:

- After a long time of use, the neutral position of the HST unit can shift, which will cause various troubles such as difficulty in stopping the from mower, changing over between forward travel and reverse travel, etc., which is very dangerous.

IMPORTANT:

- When the HST unit is out of order, ask your dealers to repair it. But when there is no alternative but for the user to adjust it, follow the next instructions.

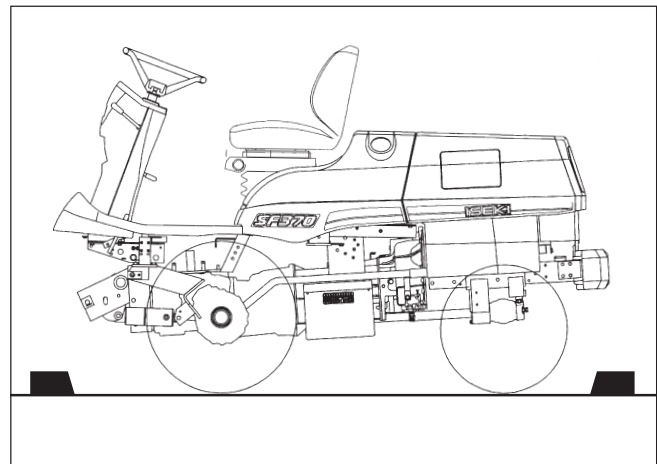


FIG. 87

The neutral arm,1, of the HST unit is located around the center on the right side of the front mower. With this arm the neutral position can be adjusted.

- a. Detach the mower deck from the front mower.
- b. Place the front mower on level, hard ground. Put tire chocks in the positions a little apart from the front wheels and rear wheels.
- c. Turn the PTO switch to the OFF position (OFF).
- d. Stop the engine and remove the starter key.
- e. Shift the transmission range shift lever to the neutral position (N).
- f. Apply the parking brake.
- g. Loosen the lock bolt,2, and adjust bolt,3, of the adjust plate,4.
- h. When the front mower creeps forward, tilt the trunnion arm,5, slightly toward A and when creeps reverse, tilt toward B. Then tighten it temporarily with the lock bolt and adjust bolt.
- i. Start the engine and hold the throttle lever in an intermediate position between the HIGH speed position (H) and the LOW speed position (L).
- j. Shift the transmission range shift lever to the LOW speed position (L).
- k. Release the parking brake.
- l. When the front mower does not start moving, it shows that the neutral position is properly set.
- m. Stop the engine and apply the parking brake. Tighten the temporarily tightened lock and adjust bolt securely.
- n. Next, align both HST pedals,6-7, in height by loosening the adjust bolt,8, of respective pedal. Be sure to tighten the adjust bolts securely after adjustment.

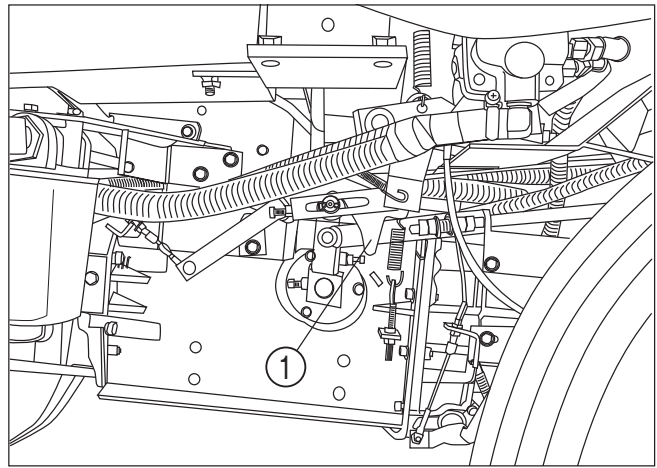


FIG. 88

(1) Neutral arm

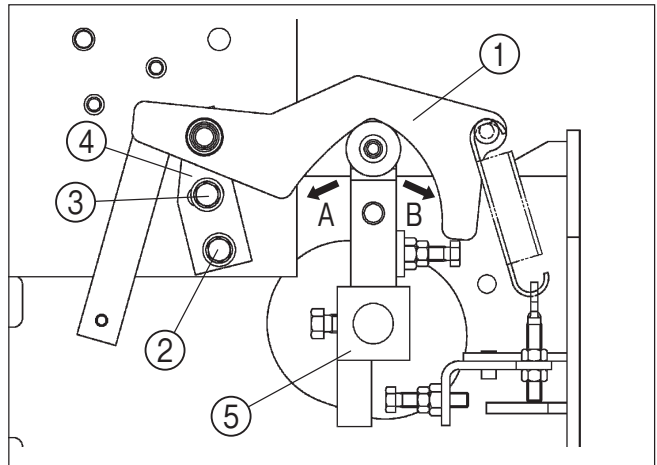


FIG. 89

(1) Neutral arm
(2) Lock bolt
(3) Adjust bolt
(4) Adjust plate
(5) Trunnion arm

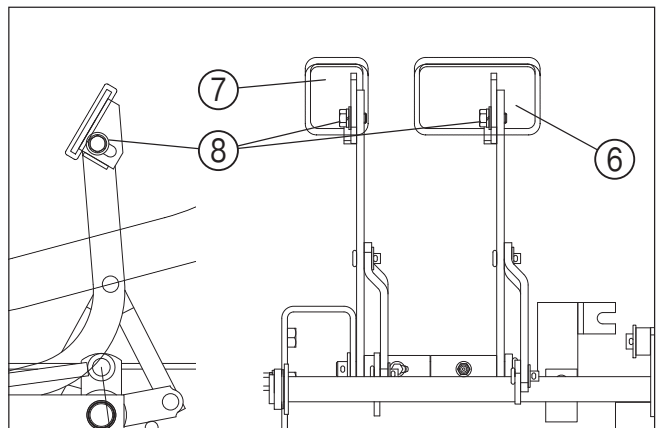


FIG. 90

(6) HST forward travel pedal
(7) HST reverse travel pedal
(8) Adjust bolt

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- o. Loosen the lock nut,9, of the trunnion arm stopper bolt,10, and screw in the bolt slightly to shorten the effective length.
- p. Remove the spring,11, and then lift up the neutral arm and turn the trunnion arm toward B until it stops.
- q. Then adjust the effective length of the stopper bolt until the head comes into contact with the stopper,12.
- r. Lock the reverse stopper,13, in a position where the trunnion arm comes into contact with it when the arm turns half the forward turn.
- s. Reinstall the spring. The specified spring length,A, is 98 mm when the trunnion arm is in neutral condition. Readjust the length if the difference is over +2/-0mm.

NOTE: If the neutral arm does not move smoothly, lubricate it.

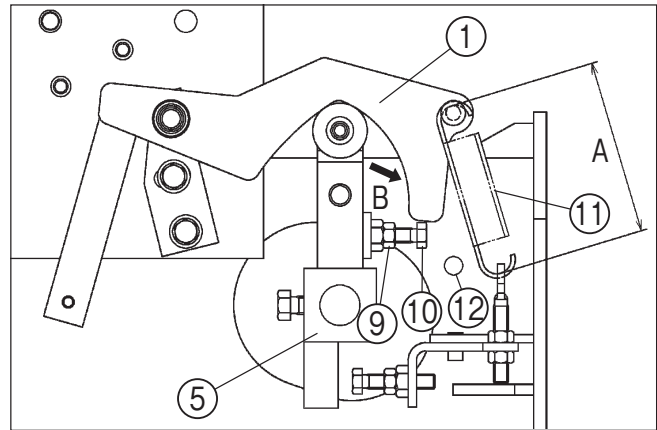


FIG. 91

- | | |
|----------------------|-------------------|
| (1) Neutral arm | (5) Trunnion arm |
| (9) Lock nut | (10) Stopper bolt |
| (11) Spring | (12) Stopper |
| (13) Reverse stopper | |

14. INDEPENDENT BRAKE PEDALS (E6 type)

Adjustment of the master brake pedal play may affect the height of both pedal tops. If so, correct the height of the left-hand pedal top,1, to align with the right-hand pedal top,2, by adjusting the effective length of the stopper bolt,3.

- a. Loosen the lock nut,4, of the stopper bolt behind the pin,5.
- b. Adjust the effective length of the stopper bolt so that the left hand pedal top aligns with the right hand pedal top.

IMPORTANT: Never fail to tighten the lock nut of the stopper bolt securely after adjustment.

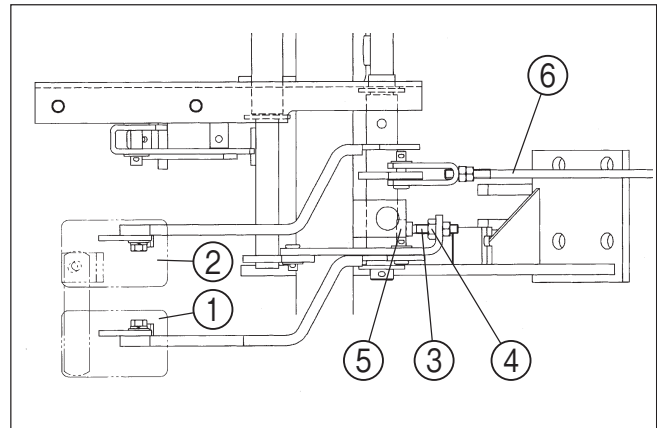


FIG. 92

- | | |
|----------------------------------|--------------------|
| (1) Independent brake pedal (LH) | |
| (2) Independent brake pedal (RH) | |
| (3) Stopper bolt | (4) Lock nut |
| (5) Pin | (6) Brake rod (LH) |

15. WHEEL TIGHTENING BOLTS AND NUTS

Check the wheel tightening bolts and nuts for looseness. All loose bolts should be tightened to the specified level.

Specified tightening torque:

Front wheel:	1,000~1,200 kgf•cm
--------------	--------------------

Rear wheel:	900~1,100 kgf•cm
-------------	------------------

16. BATTERY

**DANGER:**

- The battery generates very explosive gases, so avoid smoking and keep sparks and open flames away from the battery. Charging the battery should be done in a place well ventilated to disperse explosive gases as quickly as possible.
- Battery electrolyte is very corrosive and will cause burns, so if it splashes on skin or clothes, wash it off immediately. If acid contacts eyes, flush immediately with clean water and get medical attention.
- When using booster cables, take sufficient safety measures.

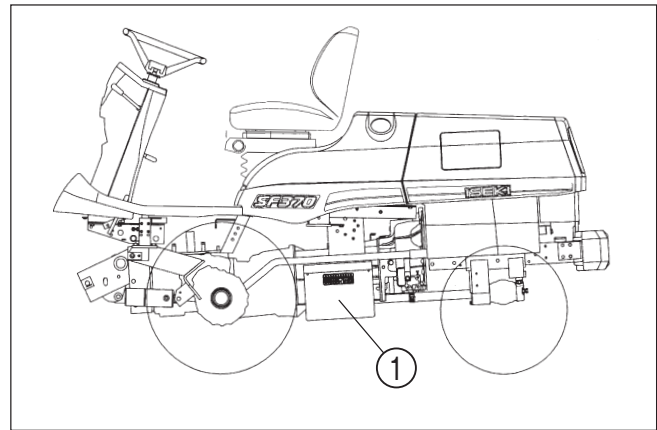


FIG. 93

(1) Battery

■ INSPECTION OF ELECTROLYTE LEVEL

The battery, 1, is installed on the middle of the left hand side of the front mower. Check to see if the electrolyte level is between the upper and lower limits.

When the level is near to the lower limit or below, raise the level with distilled water to the upper limit.

**WARNING:**

Never attempt to keep on using or charging the battery with a electrolyte level lower than the limit, or the battery may explode or its service life be shortened due to deterioration inside the casing.

IMPORTANT: The electrolyte level should always be kept between the upper and lower limits. A too high level will cause the electrolyte to overflow and corrode other parts.

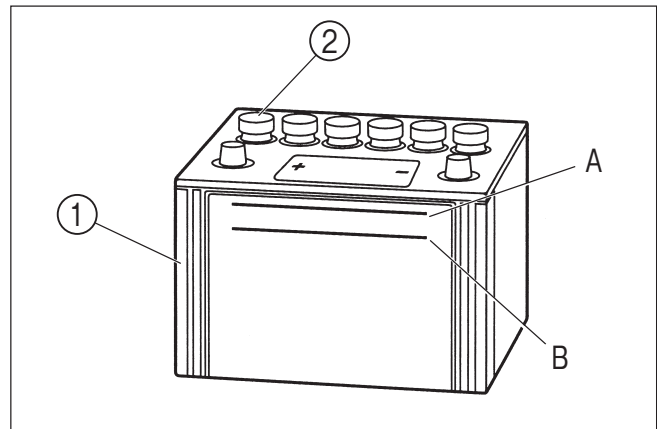


FIG. 94

(1) Battery
(2) Filler plug

A: Upper limit
B: Lower limit

■ HANDLING OF THE BATTERY

**WARNING:**

- Be sure to connect the battery terminals correctly.
- The wiring from the battery should be kept clean and connectors tight. Dirty or loose wiring may cause a fire.
- When disconnecting the battery, disconnect the negative terminal first and vice versa when connecting.
- When replacing the battery, use a battery of the same capacity as that of the current on (80D 26R).

- a. As atmospheric temperature lowers, the performance of the battery also lowers. Consequently the battery should be serviced with special care in wintertime.

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- b. As the battery discharges even when it is not used, it should be charged every or every other month at the maximum.
- c. When the front mower is not used for a long time, remove the battery from the front mower and store it in a place dry and shaded from direct sunshine.

IMPORTANT: Avoid quick charge of battery. Or it will shorten the service life of the battery.

IMPORTANT: When storing front mower for long period without operation, self discharge of battery will happen (especially in winter). If the front mower is stored for more than 1 month, the battery minus terminal should be disconnected. When operating for the first time or after long term storage, check if the battery charge level is enough. (If measurement of battery voltage is available, check if the voltage is more than 12.5V.) When the front mower is stored more than 6 months, charge the battery.

IMPORTANT: Don't throw away the battery to the garbage can. Recycle it with observing the law of your community.

17. TIRE PRESSURE (INFLATION)

Improper tire pressure causes the tires to wear abnormally and affects the front mower performance. Too high pressure causes the front mower to bounce too much and too low pressure increases travelling resistance, which leads to power loss.

Tire pressure should be checked everyday.

		Tire size	Pressure
Standard	Front	23X10.50-12	1.4 kgf•cm ²
	Rear	20X8.00-10	1.6 kgf•cm ²
Wide	Front	26X12.00-12	1.4 kgf•cm ²
	Rear	22X8.50-12	1.6 kgf•cm ²

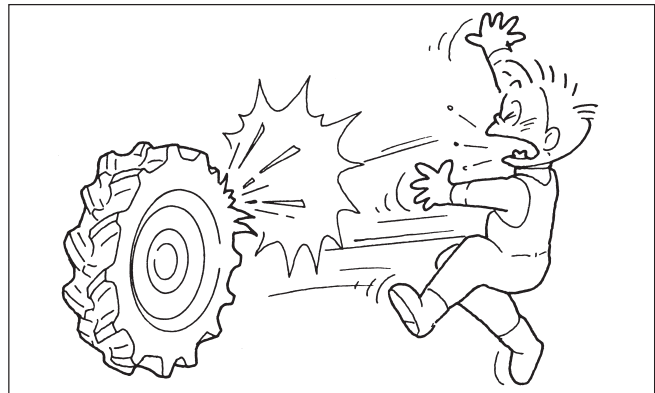


FIG. 95



WARNING:

- Tire inflation should be set to the values specified in this manual. Excessive inflation may cause certain types to explode, which may result in serious accidents.
- Never use a tire with a cut or crack which reaches tire cords as such a tire may explode.
- When a tire, tube, or rim is required for replacement, ask your dealer. Such operation should be done by a mechanic trained especially for tire handling.
- Insufficient pressure in the tires causes uneven tire friction that can shorten tire life-time.

18. STEERING WHEEL (TOE-IN)

Start the engine and turn the steering wheel lightly in both directions to check to see the wheel turns smoothly.

Make sure that the tire toe-in is properly set. Improper toe-in causes unstable steering of the front mower: the front mower has a tendency to turn in one direction, right or left or the steering wheel turns unexpectedly.

Proper toe-in: $A - B = 1$ to 10mm (0 to 0.4 in.)

19. ENGINE OIL REPLACEMENT**IMPORTANT:**

- The engine oil should be replaced with fresh oil in accordance with operation hours. If not, overly used oil will cause engine troubles.
- The first replacement should be done after the initial 50 hours of operation and then after every 150 hours of operation.

When replacing engine oil, place the front mower on level, hard ground. The engine oil drain is located bottom of the engine oil pan, which is accessible from the left side of the front mower. SF370 has 2 drains on both left and right side.

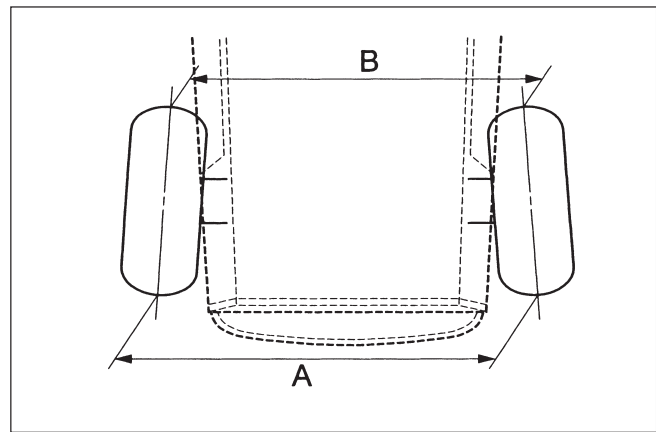
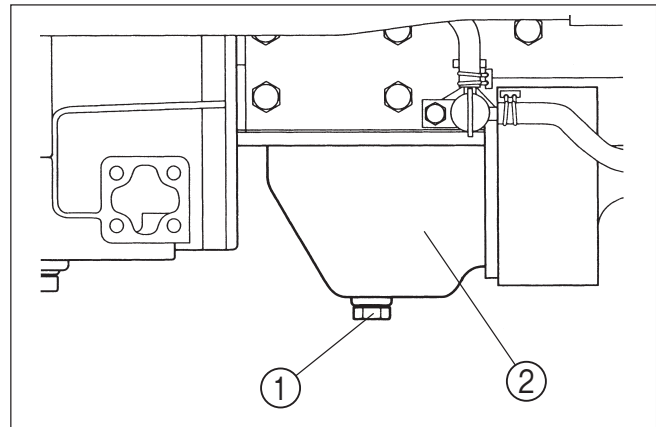
- Place a tray or the like under the oil drain to receive drained oil.
- The engine should be warmed up for 10 minutes or so ahead of time to heat the oil to lower its viscosity for complete drainage.
- Remove the drain plug, 1, allowing the used oil drain out completely.
- When the used oil has drained out completely, screw the drain plug back in securely.
- Remove the oil filler cap, 3, at the right sidewall of engine and pour in fresh engine oil through the oil filler. Be sure to use oil recommended by ISEKI. Refer to "2. ENGINE OIL LEVEL".

Engine oil capacity	SF310	2.8 litres (0.6 imp.gal)
	SF370	3.3 litres (0.7 imp.gal)

- After engine oil replacement, start the engine and let it idle for a while.
- Then stop it and wait for a while until the engine oil comes down into the oil pan, 2. Now check the oil level to check to see if it is at the upper limit or not. When the level is low, replenish until the level reaches the upper limit.

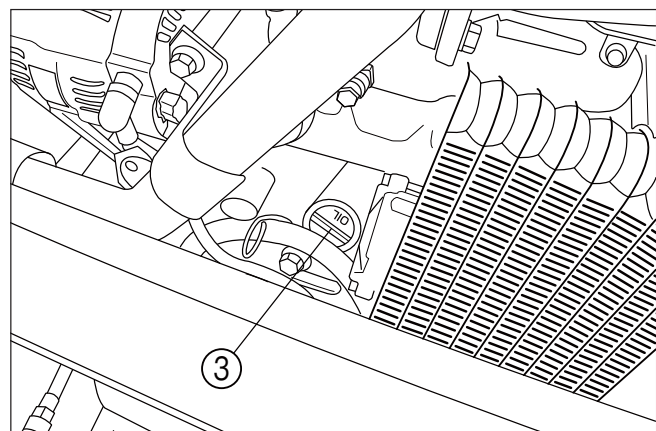
IMPORTANT: Never fill over the upper limit, or it may cause engine trouble.

- Make sure that there is no oil leakage through the drain plug and oil filter.

**FIG. 96****FIG. 97**

(1) Drain plug

(2) Oil pan

**FIG. 98**

(3) Engine oil filler

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20. ENGINE OIL FILTER

IMPORTANT:

- The engine oil filter should be replaced after the initial 50 hours of operation and then after every 300 hours of operation.
- It is recommended to ask your dealer to replace the engine oil filter, because this operation requires a special tool. But when there is no alternative but to replace the filter by yourself, observe following instructions.

The engine oil filter, 1, is located on the left-hand wall of the cylinder block.

- a. Drain engine oil completely following the instructions of "9. ENGINE OIL REPLACEMENT."
- b. Place some rags under the engine oil filter to receive dripping oil when the filter is replaced.
- c. Loosen the filter using a filter spanner and remove it.
- d. Install a new filter with the O-ring lubricated with fresh engine oil. Screw in the filter until its packing comes into contact with the sealing surface of the engine and then tighten it by a 2/3 turn with the filter spanner.
- e. Pour the drained oil back in referring to "9. ENGINE OIL REPLACEMENT."

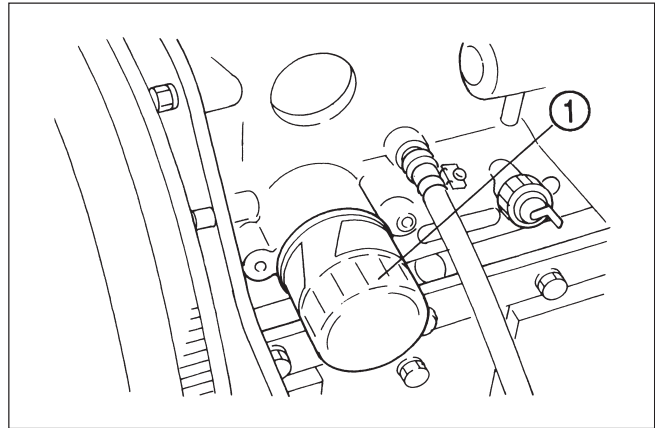


FIG. 99

(1) Engine oil filter

21. TRANSMISSION OIL REPLACEMENT

IMPORTANT:

- The transmission oil should be replaced after the initial 50 hours of operation and then after every 300 hours of operation.
- It is recommended to ask your dealer to replace the transmission oil, because this operation also requires replacement of the hydraulic oil filter and washing or replacement of the suction filter.
But when there is no alternative but to replace the filter by yourself, observe the following instructions.

The transmission oil drain is located under the center of transmission case.

- a. Place a tray under the drain plug, 1.
- b. Remove the drain plug and let the oil drain out.
- c. Reinstall the drain plug and tighten it securely.
- d. Pour fresh transmission oil through the oil filler on top of the transmission case until the level reaches the upper limit on the level gauge (dipstick) in referring to "3. TRANSMISSION OIL LEVEL".

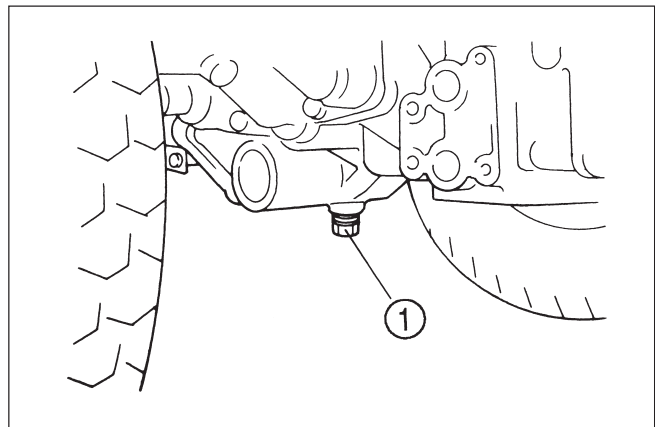


FIG. 100

(1) Drain plug

Transmission oil	SHELL DONAX TD
Capacity	17 liters (3.7 imp-gal.)

- e. After replacement, start the engine and let it idle for a while. Then stop it and wait for a while until the oil comes down into the oil pan. Now check the oil level to check to see if it is at the upper limit or not. When the level is low, replenish until the level reaches the upper limit.
- f. Make sure that there is no oil leaking through the oil filter, suction filter, rubber hoses, or drain plug.

22. HYDRAULIC OIL FILTER

IMPORTANT:

- The hydraulic oil filter should be replaced after the initial 50 hours of operation and then after every 300 hours of operation. It should also be changed every time the transmission oil is replaced.
- It is recommended to ask your dealer to replace the hydraulic oil filter. But when there is no alternative but to replace the filter by yourself, observe the following instructions.

The hydraulic oil filter, 1, is located center of the right-hand side of the front mower.

- a. After the transmission oil has drained out completely, remove the filter using the filter spanner. When removing the filter, a small amount of oil may spill, so place waste cloth under the filter to receive spilt oil.
- b. Apply thin coat of oil to the O-ring of the new oil filter cartridge ahead of time. Then install the filter. Screw in the filter by hand until the rubber packing comes into contact with the sealing surface, and then screw in it by a 2/3 turn with the filter spanner.

Oil: SHELL DONAX TD oil

23. SUCTION FILTER

IMPORTANT:

- The suction oil filter should be cleaned after the initial 50 hours of operation and then after every 200 hours of operation. It should also be cleaned every time the transmission oil is replaced.
- It is recommended to ask your dealer to replace the suction filter. But when there is no alternative but to replace the filter by yourself, observe the following instructions.

The suction filter, 1, is located bottom left of the transmission case.

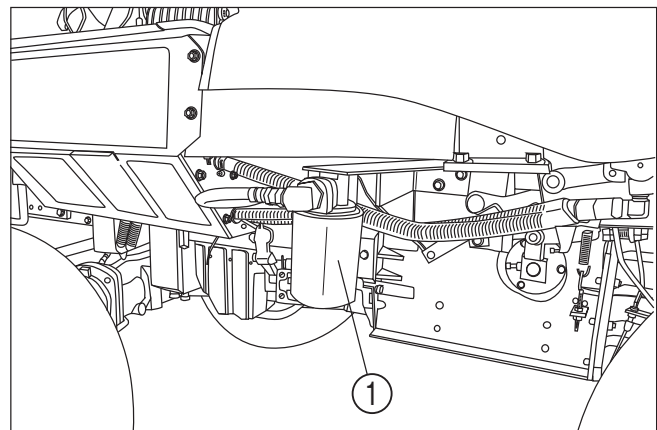


FIG. 101

(1) Hydraulic oil filter

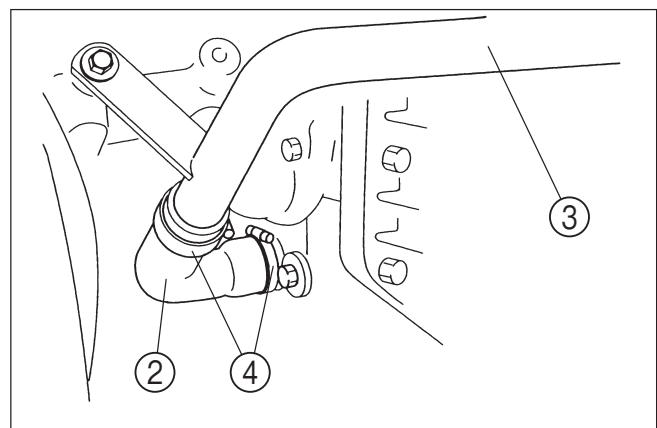


FIG. 102

(2) Rubber hose

(3) Suction pipe

(4) Hose clips

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- After draining out the transmission oil, detach the rubber hose,2, connecting the suction filter and the suction pipe,3, by removing the hose clips,4.
- Draw the suction filter out of the transmission case.
- Wash the filter in fresh cleansing oil.

IMPORTANT: *The inside of the removed hose should also be cleaned.*

- Install the cleaned suction filter into the transmission case, taking care not to deform the O-ring,5.
- Connect the rubber hose and tighten both ends with the hose clips.

IMPORTANT:

- If a suction filter is found damaged during washing, it should be replaced with a new one

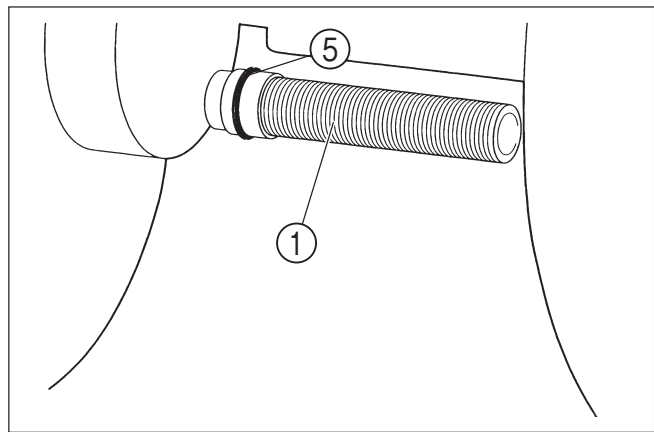


FIG. 103

(1) Suction filter

(5) O-ring

24. REDUCTION GEAR CASE OIL REPLACEMENT

IMPORTANT:

- The oil in the reduction gear case should be replaced after the initial 50 hours of operation and then after every 300 hours of operation.

The reduction gear case drain is located on the bottom of the case on the left-hand side of the front mower.

- Place a tray under the drain plug,1.
- Remove the drain plug using a spanner or wrench.
- After the oil has drained out completely, wrap the threads of the drain plug with sealing tape and screw the drain plug back in securely.

IMPORTANT: *Before re-installing the level plug, wrap the threads of the plug with sealing tape. If not, oil may leak out through the plug.*

- Pour fresh gear oil through the filler located below the fuel tank in referring to "4. REDUCATION GEAR CASE OIL LEVEL".

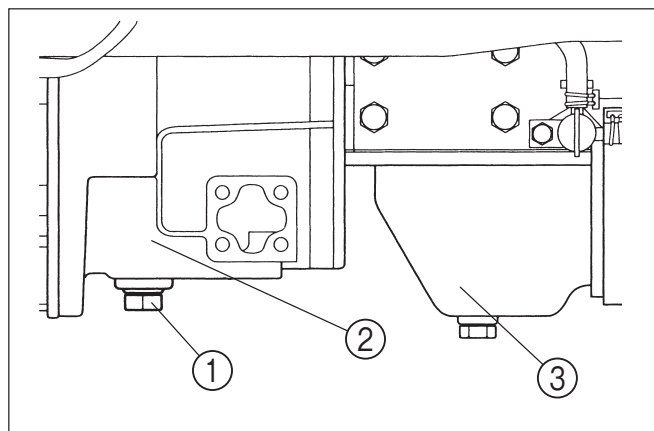


FIG. 104

(1) Drain plug

(2) Reduction gear case

(3) Engine oil pan

Oil	Gear oil SAE 80
Capacity	0.7 litre (0.15 Imp. gal.)

25. REAR AXLE OIL REPLACEMENT

IMPORTANT:

- The rear axle oil should be replaced after the initial 50 hours of operation and after 600 hours of operation.

The rear axle drain is located on the bottom of the right and left gear cases.

- Place a tray under the drain plug,1.
- Remove the drain plug using a spanner or wrench.
- Let all oil drain out from both the gear cases.
- Wrap the threads of the drain plug with sealing tape and screw it back in securely.

IMPORTANT: Before re-installing the level plug, wrap the threads of the plug with sealing tape. If not, oil may leaks through the plug.

- Pour fresh gear oil through the oil filler on the top of the left-hand rear axle in referring to "5. REAR AXLE OIL LEVEL".

Oil	Gear oil SAE 80
Capacity	4.1 litres (0.9 Imp. gal.)

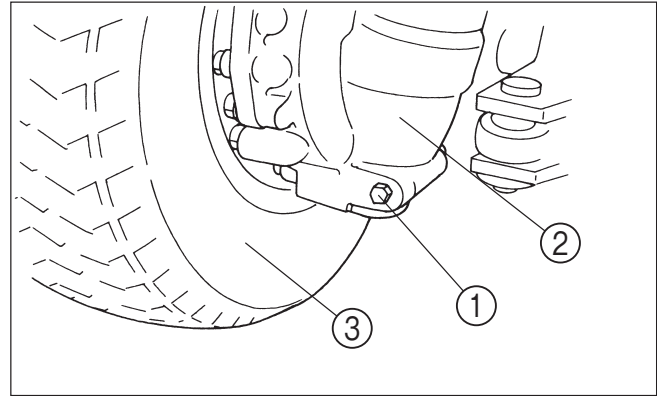


FIG. 105

- (1) Drain plug (2) Gear case
(3) Rear wheel

26. AIR-INTAKE OPENINGS

IMPORTANT:

- Air-intake openings clogged with dust or dirt causes overheating of the engine due to deteriorated cooling efficiency of the radiator. The air-intake screens should be checked for clogging everyday before operation.
- When mowing dead grass or operating under extremely dusty conditions, check the air-intake openings several times a day to avoid clogging.

- Hood screens (LH, RH and rear),1.
- Under cover screens (LH, RH and rear),2.

Open the engine hood and dust the screens and net using a piece of cloth or the like.

- Plate (base) screen,3

Open the engine hood and dust the screen of the plate (base) under the fuel tank from inside and outside using a piece of cloth or the like.

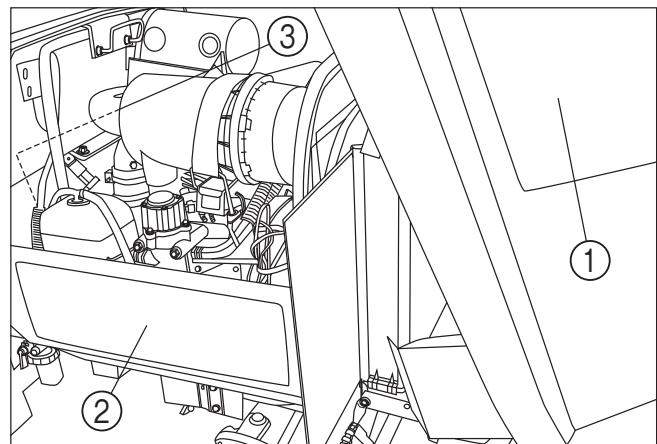


FIG. 106

- (1) Hood screen (2) Under cover screen
(3) Plate (base) screen

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27. RADIATOR

IMPORTANT:

- The radiator screen and radiator clogged with dust or dirt causes overheating of the engine due to deteriorated cooling efficiency of the radiator.
The radiator and radiator screen should be checked for clogging everyday before operation.
- When mowing dead grass or operating under extremely dusty conditions, check the radiator screen and radiator several times a day to avoid clogging.

The radiator,1, is located behind the engine and the radiator screen,2, is located between cooling fan and the radiator.

- The radiator screen is held on the left side of the radiator with two wing bolts. Remove the wing bolts and draw out the radiator screen.
- Dust off the radiator screen with a soft brush.
- The clogged radiator fins should be cleaned by applying compressed air or water from both sides alternatively.
- Re-install the radiator screen and tighten the wing bolts.

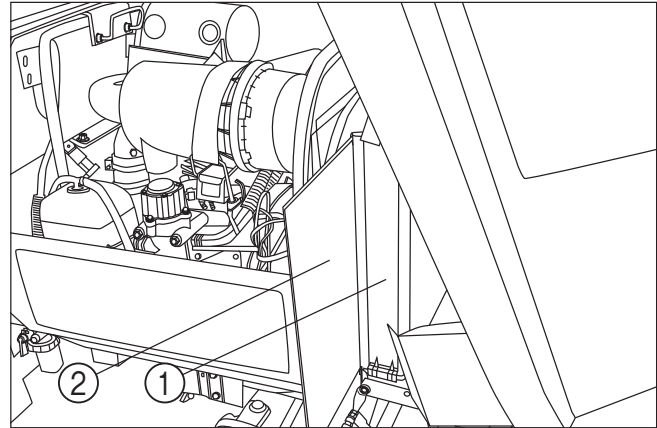


FIG. 107

(1) Radiator

(2) Radiator screen

IMPORTANT:

- Avoid using excessively compressed air or water, which may deform the cooling fan blades.
- Avoid applying water directly to the wiring and electric apparatus.
- After washing the radiator using water from a tap, let it dry by itself.

28. COOLANT REPLACEMENT



WARNING: Never attempt to remove the radiator cap during or just after operation, or pressurized vapor and hot water will gush out, which may cause burns. So wait until the engine cools down sufficiently.

The drain plug of the engine coolant is located under the reserve tank of the left side of the engine.

- Place a coolant receiver under the drain plug,1.
- Remove the radiator cap,2, and the drain plug to let all coolant drain out of the radiator and engine cylinder block.
- When all coolant completely drained out, wash the inside of the radiator and tighten the drain plug securely.

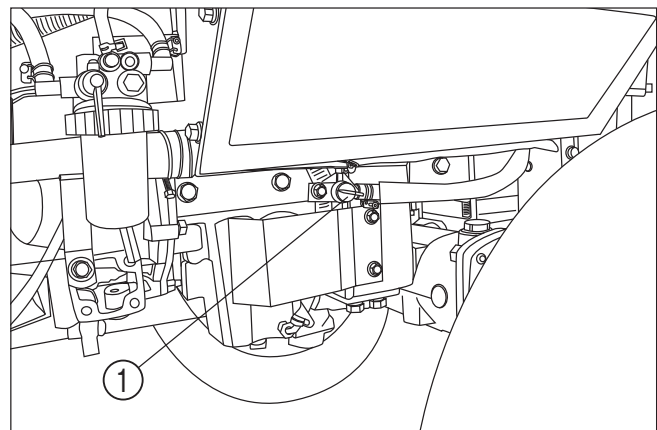


FIG. 108

(1) Drain plug

- d. Pour the coolant which has a specified antifreeze concentration until it starts overflowing through the coolant filler. Retighten the radiator cap securely.

Coolant capacity

Radiator	5.2 litres (1.1 Imp. gal.)
Reserve tank	1.1 litres (0.2 Imp. gal.)



WARNING: Be sure to tighten the radiator cap securely, or boiling coolant may shoot out, which is very dangerous.

IMPORTANT:

- Frozen coolant may damage the engine.
- Mixing ratio of water and antifreeze is different by anti-freeze manufacturers and atmospheric temperatures.
- Water and antifreeze should be blended sufficiently ahead of time.

- e. After filling, start the engine and let it idle for 5 minutes or so. Then check the coolant level. If the level is low, replenish the reserve tank with coolant in referring to "6. COOLANT LEVEL".

IMPORTANT:

- Never attempt to run the engine without coolant, or the engine will seize, leading to its complete damage.

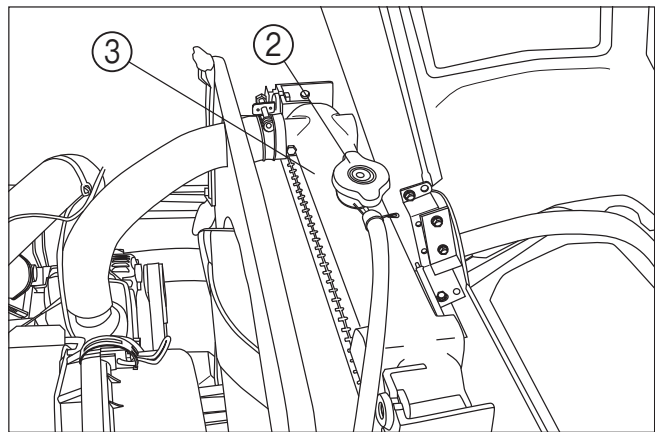
29. FUSES AND WIRING

The fuse box, 1, is located rearward inside the step floor.

Ref	Fuse capacity	Application	Ref	Fuse capacity	Application
A	15A	Hazard and Stop lamps(G type)	G	15A	Head lamps (G type)
B	15A	Option DC12V (B: Battery direct)	H	5A	Horn
C	10A	Meter and Monitor lamps	I	10A	Engine start parts
D	15A	Flashing lamps (G type)	J	10A	PTO control parts
E	10A	Option DC12V (AC: Accessory)	K	10A	Work lamp (and position lamps)
F	3A	Fuel pump	L		Spare

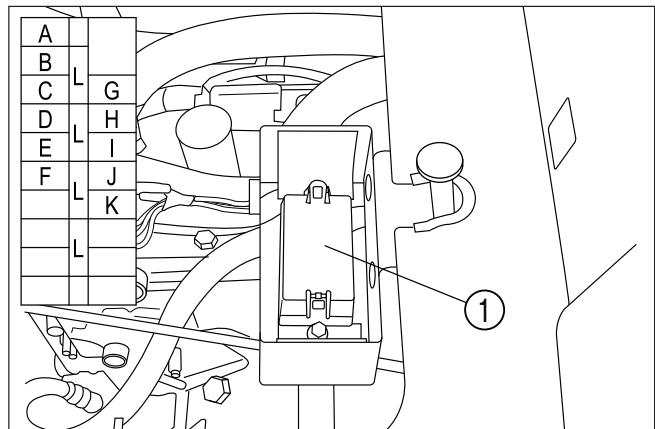
**CAUTION:**

- Never replace blown fuses or slow-blow fuse with wire.

**FIG. 109**

(2) Radiator cap

(3) Radiator

**FIG. 110**

(1) Fuse box

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IMPORTANT:

- When a fuse or a slow-blow fuse is blown, be sure to locate the trouble and correct it. When the cause is not clear, consult your dealers.
- Be sure to use specified fuses. Larger-capacity fuses will cause burn-out of electric accessories and wiring.
- When a slow-blow fuse has been burnt out, use genuine slow-blow fuse.

Slow - blow fuse	Parts code
50A	1614-690-202-0
40A	1650-650-222-0

**WARNING:**

- Damaged wire covers should be mended with insulation tape immediately.

**CAUTION:**

- The wiring of the front mower should be checked every year at your dealers to avoid electrical fires.
- Grass and dust around the battery, wiring, muffler and engine should be removed. Otherwise they may catch fire.

IMPORTANT:

- When a wire harness has come off its clamp, it should be re-clamped immediately.

30. HYDRAULIC SYSTEM PARTS

When hydraulic system parts such as the HST unit, hydraulic pump, control valve, hydraulic cylinder, piping, etc. are required to be adjusted or repaired, consult your ISEKI dealers. Users are advised not to adjust or repair hydraulic system parts by themselves.

31. SAFETY SWITCHES

Safety devices are installed for safe operation. Make certain that each device works properly before operation following the next procedures.



CAUTION: When the engine does not start due to a defective safety switch or does not stop when the operator has left the operator's seat, consult your dealer at once without fail. (E6 type) The engine keeps running even when the operator has left the operator's seat, provided that the PTO switch is in the OFF (OFF) position and the parking brake is applied.

INSPECTION 1

- Be seated in the operator's seat.
- Turn the PTO switch to the OFF (OFF) position.

- Turn the key switch to the START (START) position without depressing the master brake pedal.

Make sure that the engine is not cranked.

INSPECTION 2

- Be seated in the operator's seat.
- Turn the PTO switch to the ON (ON) position.
- Depress the master brake pedal fully.
- Turn the key switch to the START (START) position.

Make sure that the engine is not cranked

INSPECTION 3

- Be seated in the operator's seat.
- Turn the PTO switch to the OFF (OFF) position.
- Depress the master brake pedal fully.
- Turn the key switch to the START (START) position.

Make sure that the engine is cranked and started.

- Leave from the operator's seat.

Make sure that the engine should stop.

(E6 type)

- Restart the engine by repeating above a. to d..
- Apply the parking brake.

- Leave from the operator's seat.

Make sure that the engine keeps running.

INSPECTION 4 (F type)

- Open the engine hood.
- Be seated in the operator's seat.
- Turn the PTO switch to the OFF (OFF) position.
- Depress the master brake pedal fully.
- Turn the key switch to the START (START) position.

Make sure that the engine is not cranked and started.

32. FILLING DIAGRAM

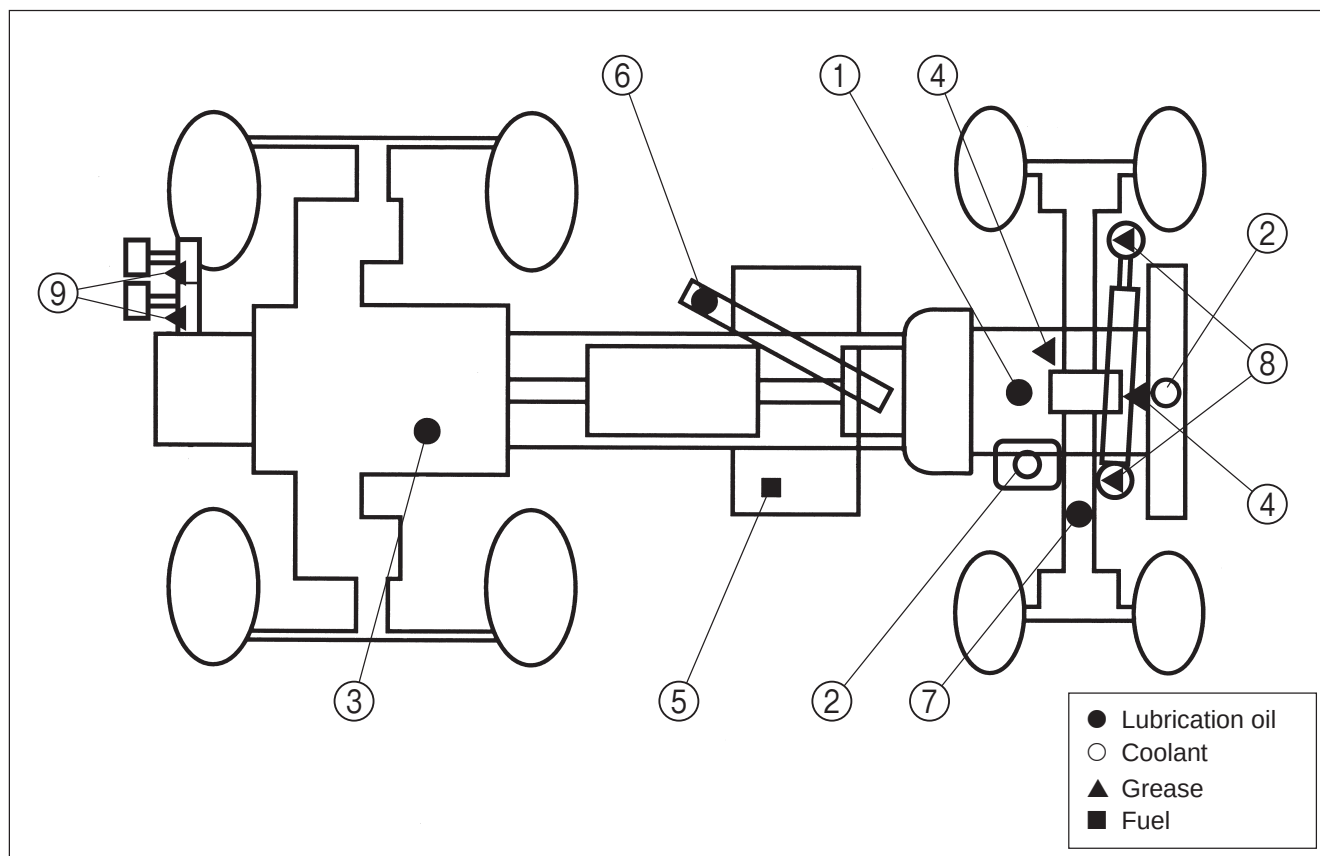


FIG. 111

Ref. NO.	Filling points	Lubricants	Quantity: liter (IMP gal.)	
			SF310	SF370
1	Engine	Engine oil	2.8 (0.6)	3.3 (0.7)
2	Radiator	Coolant (Soft water + antifreeze)	5.2 (1.1)	
	Reserve tank		1.1 (0.2)	
3	Transmission case	HST oil (SHELL DONAX TD)	17.0 (3.7)	
4	Center pivot (2 points)	Grease	As required	
5	Fuel tank	Diesel fuel	48.0 (12.7)	
6	Reduction gear case	Gear oil (SAE 80)	0.7 (0.15)	
7	Rear axle		4.1 (0.9)	
8	Power steering cylinder end	Grease	As required	
9	HST pedal pivot			
	Other lubrication points marked with yellow paint	Gear oil or grease	As required	

- Use oil of better than class CC.
- Use ISEKI's recommended oil.

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33. PERIODICAL INSPECTION TABLE

○:Inspection, replenishment, and adjustment
●:Replacement

△:Cleaning and washing
★:Consult your dealer.

Check points	Pre-operation	Inspection and servicing intervals hours of operation								Intervals after that	Judgement criteria	Ref. page
		50	100	150	200	250	300	350	400			
Engine oil	○	●		●			●			Replace after initial 50 hr and then every 150 hr.	Maintain the specified level.	49 60
Air cleaner		△	△	△	△	△	△	△	△	Clean after every 50hr.		53
Engine coolant	○									Replace every 2 year.	Maintain the specified level.	52 65
Fuel	○										Keep fuel tank always full.	52
Fuel strainer	○		△		△		●		△	Clean after every 100hr. Replace element after every 300hr or once a year.	There should be no dust or water in filter.	53
Fan belt	○										10mm (0.4 in.) deflection	54
Electrolyte level		○	○	○	○	○	○	○	○	Inspect after every 50hr.	Maintain the specified level	58
Engine oil filter		●					●			Replace after initial 50hr. Replace after every 300hr.		61
Transmission oil	○	●					●			Replace after initial 50hr. Replace after every 300hr..	Maintain the specified level.	50 61
Transmission oil filter		●					●			Replace after initial 50hr. Replace after every 300hr.		62
Suction filter		★				△				Replace after initial 50hr. Clean after every 200hr.		62
Master brake pedal play	○										20 to 30 mm (0.8 to 1.2in.)	55
Steering wheel	○						★			Inspect after every 300hr.	There should be no abnormality.	59
Tire pressure	○										Front: 1.4 kgf / cm2 Rear: 1.6 / 1.5 (wide) kgf / cm2	59
Toe-in							★			Adjust after every 300hr.	0 to 10 mm (0 to 0.4 in.)	60
Wheel tightening bolts	○										There should be no loose.	57
Reduction gear case oil	○	●					●			Replace after initial 50hr. and then every 300hr.	Maintain the specified level.	50 63
Rear axle oil	○	●								Replace after initial 50hr. and then every 600hr.	Maintain the specified level.	51 64
Grease-up		○	○	○	○	○	○	○	○	Inject grease after every 50hr.		68
Engine hood and rear cover	△										There should be no clogging.	64
Radiator screen	△										There should be no clogging.	65
Radiator	△										There should be no clogging.	65
Electrical apparatus	○										All should work properly.	66
Safety switches	○										All should work properly.	67
Air intake openings	△										There should be no clogging	64
Bolts and nuts	○										There should be no loose ones.	—
Rubber pipes			○		○		○		○	Check after every 100hr.		—

IMPORTANT:

- Above mentioned service intervals should be regard as reference creteria. If working conditions are harder, earlier service is recommended.
- When special technique or special tools is required, consult your dealers.

34. WASHING THE MACHINE



CAUTION: If you use high pressure washer, be sure to use in accordance with operator's manual and safety label of washer. In case of irregular using. It may cause that personal injury and damaging of machine.



CAUTION: Set the nozzle of hose 'spread' and keep the distance more than 60cm in order to avoid damaging of machine. Especially, be care for not to hit the water to electrical parts and label.

Unsuitable washing may cause that

1. Fire by short circuit and damaging of electrical parts.
2. Flowing of oil by damaging of hydraulic hose.
3. Damaging and accident of machine.
 - (1) Coming off of label.
 - (2) Accident of electrical parts, engine, radiator, and interior.
 - (3) Damaging of lubber parts (tyre, seal) and resin parts.
 - (4) Coming off of paint.

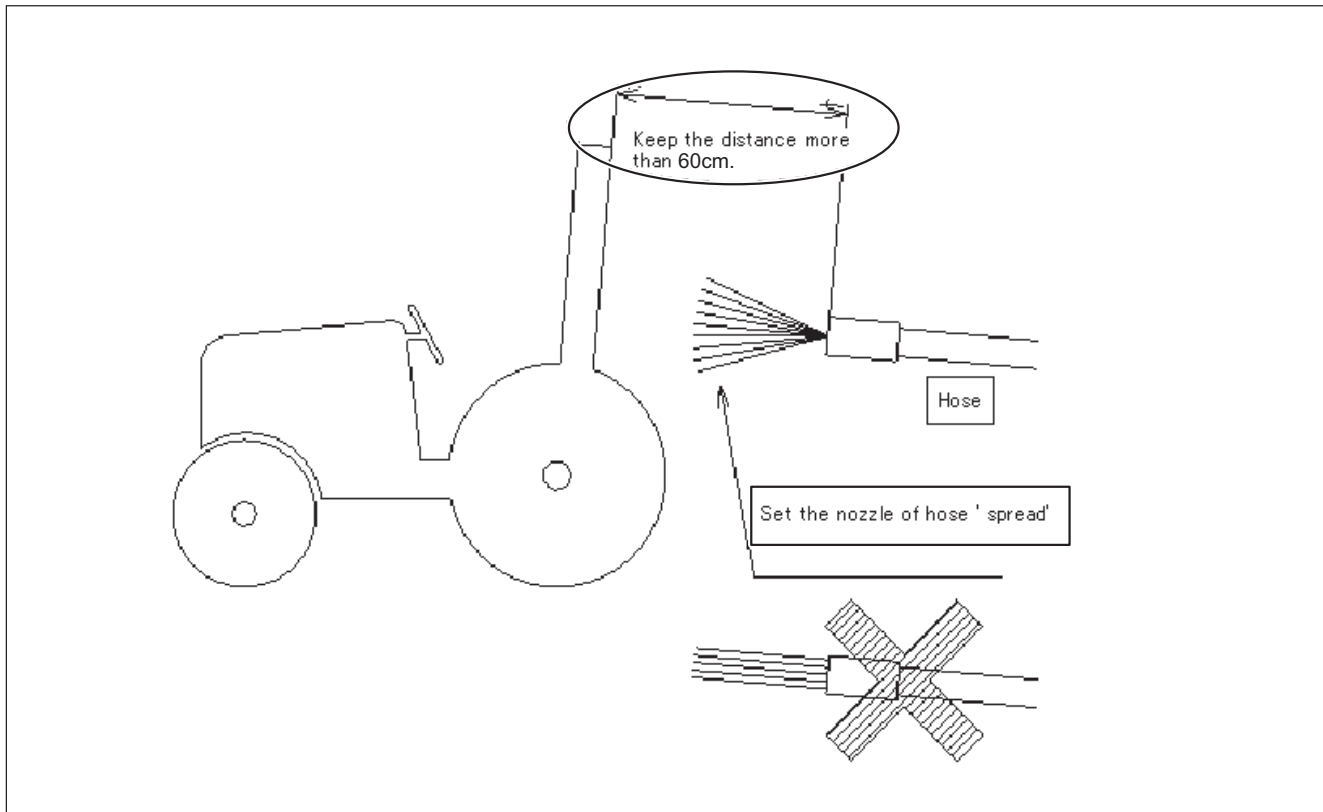


FIG. 112

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35. MAJOR CONSUMABLES LIST

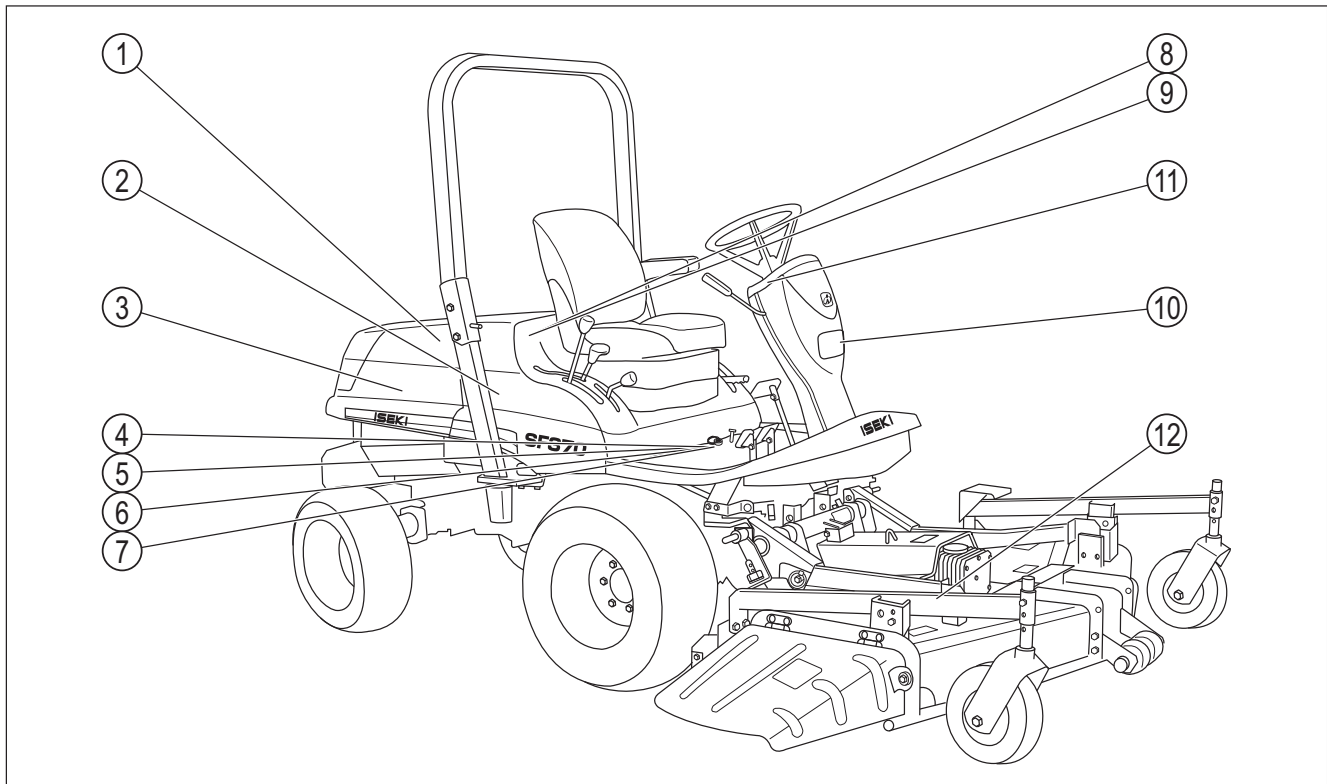
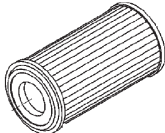
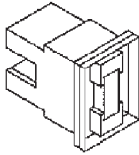
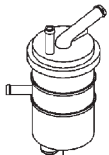
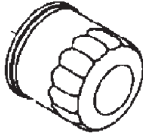
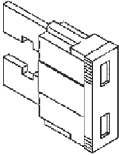
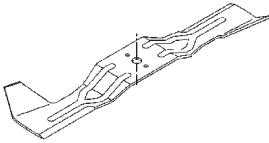


FIG. 113

1	AIR CLEANER ELEMENT ASSY		8	SLOW BLOW FUSE 50A	
			9	SLOW BLOW FUSE 40A	
2	FUEL FILTER		10	HEADLAMP BULB/12V25/25W	
3	ENGINE OIL FILTER CARTRIDGE		11	MONITOR LAMP BULB	
4	FUSE BLADE 32V05A		12	BLADE	
5	FUSE BLADE 32V03A				
6	FUSE BLADE 32V10A				
7	FUSE BLADE 32V15A				

REF	PARTS NAME	PARTS CODE
1	ELEMENT ASSY	1650-104-203-10
2	FILTER/FUEL	1729-111-006-10
3	CARTRIDGE/OIL FILTER (for SF310)	6213-240-002-20
	CARTRIDGE/OIL FILTER (for SF370)	6213-240-005-10
4	FUSE/BLADE/32V05A	1560-664-264-00
5	FUSE/BLADE/32V03A	1575-623-009-00
6	FUSE/BLADE/32V10A	1575-623-010-00
7	FUSE/BLADE/32V15A	1575-623-011-00
8	FUSE/SLOWBLOW/50A	1614-690-202-00
9	FUSE/SLOWBLOW/40A	1650-650-222-00
10	BULB/12V25/25W	1444-621-251-00
11	BULB	3650-270-214-00
12	BLADE/60x528/C (for SSM60)	8654-306-006-10
	BLADE/60x630/C (for SSM72)	8655-306-003-10

CHAPTER 9. STORAGE

■ DAILY AND SHORT TERM STORAGE

- a. Clean the front mower.

IMPORTANT: When washing the front mower, avoid applying compressed water directly to the electric apparatus, oil and fuel fillers. Remove the starter key and cap the switch key hole to prevent short circuits.

- b. Lower the mower deck on the ground.



CAUTION: A lifted up mower deck may go down unexpectedly if the lift lever is manipulated by children or unauthorised people, which may lead to serious accidents.

- c. The front mower should be stored indoors if possible. When it has to be left outdoors, cover it with tarpaulin or the like.



WARNING: When covering the front mower with tarpaulin, wait until heated components such as the engine, muffler, etc. have cooled down completely. Otherwise a fire may be caused.

- d. When the ambient temperature is very low, remove the battery and store it in a warm shaded dry place. This will contribute greatly to easy starting of the engine the following morning.



CAUTION: Remove the starter key without fail before storage.

■ LONG TERM STORAGE

- a. Clean the front mower and correct all troubles such as repair, replacement of defective parts, readjustment, etc.
- b. Top up the fuel tank and close the fuel cock.
- c. Replace the engine oil with new and let the engine idle for about 5 minutes to lubricate every part sufficiently.
- d. Lubricate all lubrication points.
- e. Grease up all greasing points.
- f. Check bolts and nuts for looseness and re-tighten loose ones.
- g. Inflate each tire a little higher than specified.

- h. Dismount the mower deck or lower it to the ground.



CAUTION: A lifted up mower deck may go down unexpectedly if the lift lever is manipulated children or unauthorised people, which may lead to serious accidents.

- i. Cover the front mower with tarpaulin or the like in order to protect it from rainfall and dust.



WARNING: When covering the front mower with tarpaulin, wait until heated components such as the engine, muffler, etc. have cooled down completely. Otherwise a fire may be caused.

- j. Remove the battery, charge it, and store it in a shaded dry place with no access to children.

- k. Charge the battery completely every month.



CAUTION: Remove the starter key without fail before storage.

■ OPERATION AFTER A LONG TIME OF STORAGE

- a. Perform the pre-operation inspection without fail.

- b. Let the engine idle for about 30 minutes before applying any load, to ensure maximum engine performance and service life.



WARNING: Provide sufficient ventilation for exhaust fumes when starting the engine, because such fumes are very poisonous.

CHAPTER 10. TROUBLESHOOTING

1. ENGINE

Troubles	Presumable causes	Remedies
• Starter motor does not work.	• Master brake pedal is not depressed. • PTO switch is not in OFF (OFF) position. • Battery is not charged fully. • Battery terminals are poorly connected. • Defective internal wiring in connector • Defective safety switch of seat • Broken starter switch • Broken starter motor	• Depress it fully. • Turn it to OFF position. • Charge it. • Clean the terminal posts and connect them securely. • Rewire. • Consult your dealer. • Consult your dealer. • Consult your dealer.
• Starter motor works but engine does not start.	• Cock of fuel strainer is closed. • No fuel • Water trapped in fuel • Air trapped in fuel • Clogged fuel hoses • Clogged fuel strainer • Slow cranking speed • Insufficient pre-heating • Throttle lever is in low speed (LOW) position. • Too high engine oil viscosity • Clogged air-cleaner • Insufficient compression • Incorrect injection timing • Clogged injection nozzles • The engine hood is not closed.	• Open it. • Replenish with fuel. • Drain trapped water from fuel strainer. • Bleed injection pump. • Clean fuel hose inside. • Wash or replace it. • Charge battery. • Preheat for specified time. • Shift it to high speed position. • Replace it with one of lower viscosity. • Clean element. • Consult your dealer. • Consult your dealer. • Consult your dealer. • Close the engine food securely.
• Engine runs at irregular speeds or stalls soon.	• Air trapped in fuel system • Improper earthing • Clogged fuel strainer • Leaking fuel system • Defective injection pump	• Locate cause of air-trapping and bleed system of air. • Polish earthing points and re-connect. • Clean or replace it. • Tighten joints securely or replace damaged hose. • Consult your dealer.
• Engine knocks.	• Too low engine oil level • Engine is overheated. • Coolant temperature does not rise. • Defective injection pump	• Add oil to upper limit. • Consult your dealer. • Consult your dealer. • Consult your dealer.

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Troubles	Presumable causes	Remedies
• Engine knocks.	• Defective injection nozzles • Incorrect valve clearances	• Consult your dealer. • Consult your dealer.
• Engine output is insufficient.	• No fuel • Clogged air cleaner • Engine is overloaded. • Improper fuel • Engine is overheated. • Throttle lever is not in the high speed (H) position. • Insufficient compression • Improper valve clearances • Defective injection pump • Defective injection nozzles • Incorrect injection timing	• Supply with fuel. • Clean element. • Raise cutting height or slow down front mower. • Use proper diesel fuel. • Cool down engine. • Shift it there securely. • Consult your dealer. • Consult your dealer. • Consult your dealer. • Consult your dealer. • Consult your dealer.
• Engine is overheated.	• Low engine coolant level • Loose fan belt • Clogged radiator fins and screen • Low engine oil level • Clogged air-intake openings • Engine is overloaded. • Clogged engine oil filter	• Replenish • Tighten it properly. • Clean them. • Replenish engine oil to upper limit. • Clean air-intake. • Raise cutting height or slow down front mower. • Ask your dealer to replace it with a new one.
• Oil pressure lamp is blinking	• Low engine oil level • Low engine oil viscosity • Clogged engine oil filter • Defective oil pump • Defective oil pressure switch	• Add oil to upper limit. • Replace with oil of higher viscosity. • Ask your dealer to replace it with a new one. • Consult your dealer. • Consult your dealer.
• Exhaust fumes are white.	• Clogged air cleaner • Too high engine oil level • Insufficient fuel injection	• Clean element. • Drain oil to upper limit. • Consult your dealer.
• Exhaust fumes are black.	• Defective fuel • Clogged intake system	• Use proper fuel. • Clean air cleaner element.

Troubles	Presumable causes	Remedies
Exhaust fumes are black.	- Clogged exhaust system - Excessive fuel injection rate - Insufficient injection nozzle pressure - Incorrect injection timing	- Check muffler for clogging and clean it. - Consult your dealer. - Consult your dealer. - Consult your dealer.
Engine stalls at low speed.	- Defective injection pump - Defective injection nozzles - Incorrect valve clearance	- Consult your dealer. - Consult your dealer. - Consult your dealer.
Engine races.	- Clogged governor - Engine oil leaks into cylinder.	- Consult your dealer. - Consult your dealer.
Excessive fuel consumption	- Defective fuel - Clogged air-intake line - Engine is overloaded. - Fuel leaks - Incorrect valve clearances	- Use proper fuel. - Clean air cleaner and air-intake hose inside. - Raise cutting height or slow down front mower. - Replace damaged parts with new ones and tighten joints securely. - Consult your dealer.
Charge lamp is blinking.	- Defective wiring - Lower electrolyte level - Loose fan belt - Defective alternator - Defective regulator	- Correct loose, dirty, short, improperly earthed terminals. - Replenish with distilled water to upper limit. - Tighten it properly. - Consult your dealer. - Consult your dealer.

2. BRAKE SYSTEM

Defective braking effect or uneven braking	- Excessive master brake pedal play - Worn brake linings - Improperly adjusted brake rods	- Correct pedal play. - Consult your dealer. - Correct rod length.
Master brake pedal does not return smoothly.	- Fatigued or broken return spring - Defective lubrication of linkage	- Replace it. - Lubricate lubrication points.

3. LIFT SYSTEM

Lift does not rise.	- Low transmission oil level - Air trapped inside hydraulic piping	- Fill up to upper limit. - Consult your dealer.
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Troubles	Presumable causes	Remedies
Lift does not rise.	- Clogged hydraulic oil filter - Clogged suction filter - Defective hydraulic pump - Defective control valve - Defective hydraulic cylinder	- Consult your dealer. - Consult your dealer. - Consult your dealer. - Consult your dealer. - Consult your dealer.
Lift does not lower.	- Lift lock is engaged - Defective control valve - Seized lift shaft	- Release it. - Consult your dealer. - Consult your dealer.

4. STEERING SYSTEM

Steering wheel is very heavy to turn.	- Low tire pressure - Low transmission oil level - Air trapped inside hydraulic piping - Clogged hydraulic oil filter - Clogged suction filter - Defective hydraulic pump - Defective power-steering unit	- Correct it as specified. - Fill up to upper limit. - Consult your dealer. - Consult your dealer. - Consult your dealer. - Consult your dealer. - Consult your dealer.
Steering wheel has a tendency to turn in one direction.	- Uneven tire inflation - Improper toe-in - Excessively worn tie-rod ends	- Inflate both front and rear tires to specified pressure. - Consult your dealer. - Consult your dealer.
Excessive steering wheel play	- Excessively worn tie-rod ends - Excessively worn steering wheel column shaft - Defective power-steering unit	- Consult your dealer. - Consult your dealer. - Consult your dealer.

5. HST (Hydrostatic transmission)

Front mower does not start travelling.	- Parking brake is applied. - Too low engine speed - Low transmission oil level - Air trapped inside hydraulic piping - Improperly adjusted HST pedals - Clogged hydraulic oil filter - Clogged suction filter - Defective HST unit	- Release it. - Accelerate engine. - Fill to upper limit. - Consult your dealer. - Consult your dealer. - Consult your dealer. - Consult your dealer. - Consult your dealer.
Front mower creeps without HST pedals being operated	- Stuck neutral arm - Incorrect neutral point of HST - Improperly positioned neutral arm - Defective HST unit	- Lubricate. - Consult your dealer. - Consult your dealer. - Consult your dealer.

6. ELECTRICAL ACCESSORIES

Troubles	Presumable causes	Remedies
• Battery is not charged.	• Melted slow-blow fuse • Defective wiring • Loose fan belt • Defective battery • Defective alternator	• Locate and repair cause of trouble, and install a new slow-blow fuse. • Check wiring for loose terminals and earth, and short circuit. Repair defective parts. • Tighten belt as specified. • Correct loose terminals, corroded parts, and electrolyte level. Otherwise, install a new battery. • Consult your dealer.
• Head lamps are dim.	• Low battery capacity • Defective contact of switch or wiring	• Charge battery. • Clean contact points and earthing point, and tighten them.
• Head lamps do not light up.	• Burnt-out bulb • Blown fuse • Defective contact	• Replace the burnt-out bulb. • Check the wiring and replace the blown fuse with a new one. • Clean each contact and tighten securely.
• Monitor lamps do not light up.	• Defective contact	• Re-connect connector.
• Fuel pump does not work.	• Blown fuse • Defective fuel pump	• Check the wiring and replace the blown fuse with a new one. • Consult your dealer.
• Fuel cut-off solenoid does not work.	• Blown fuse • Defective solenoid	• Check the wiring and replace the blown fuse with a new one. • Consult your dealer.

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NOISE & VIBRATION

NOISE:

		SF310+SSM60	SF310+SSM72	SF370+SSM60	SF370+SSM72
Sound power level	dB(A)	105			
Speed of rotation	Engine	2500			
	Blade	2840	2385	2840	2385
Test code		2000/14/EC amended by 2005/88/EC			

VIBRATION:

	SF310	SF370
Weighted root mean square acceleration less than value to which the arms are subjected	Max. 4.06 m/s ²	
Weighted root mean square acceleration less than value to which the body is subjected	Max. 0.77 m/s ²	
Speed of rotation of the engine	2750 min ⁻¹ (rpm)	2800 min ⁻¹ (rpm)
Test code	ISO 5395-1	

82

EU DECLARATION OF CONFORMITY

Original Declaration

ISEKI & CO., LTD.

5-3-14, Nishi-Nippori, Arakawa-ku
116-8541 Tokyo Japan

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Generic denomination: Lawnmower
Function: Ground care

SF310FH
SF310FH

SF370FH
SF370FH

SSM60

SSM72

SRM72

SF-F370

from and after serial number

SF310FH-U : 001100
SF310FH-G : 100346

SF370FH-U : 001472
SF370FH-G : 100470

SSM60-SF370E4F : 100001

SSM72-SF370E4F : 100001

SRM72-SF370 : 000001

SF-F370 : 000001

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

2006/42/EC Machinery Directive

Reference to the relevant harmonized standards: EN ISO 5395-1: 2013
EN ISO 5395-3: 2013
EN ISO 5395-3: 2013 /A1:2017

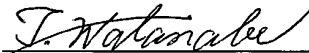
2014/30/EU EMC Directive

Reference to the relevant harmonized standards: EN ISO14982: 2009

The authorized compiler for the technical file in EU:

N.V. ISEKI EUROPE S.A.
Planet II, Leuvensesteenweg 542-C1
1930 Zaventem Belgium

Place and date of issue
Tokyo 10/08/2017

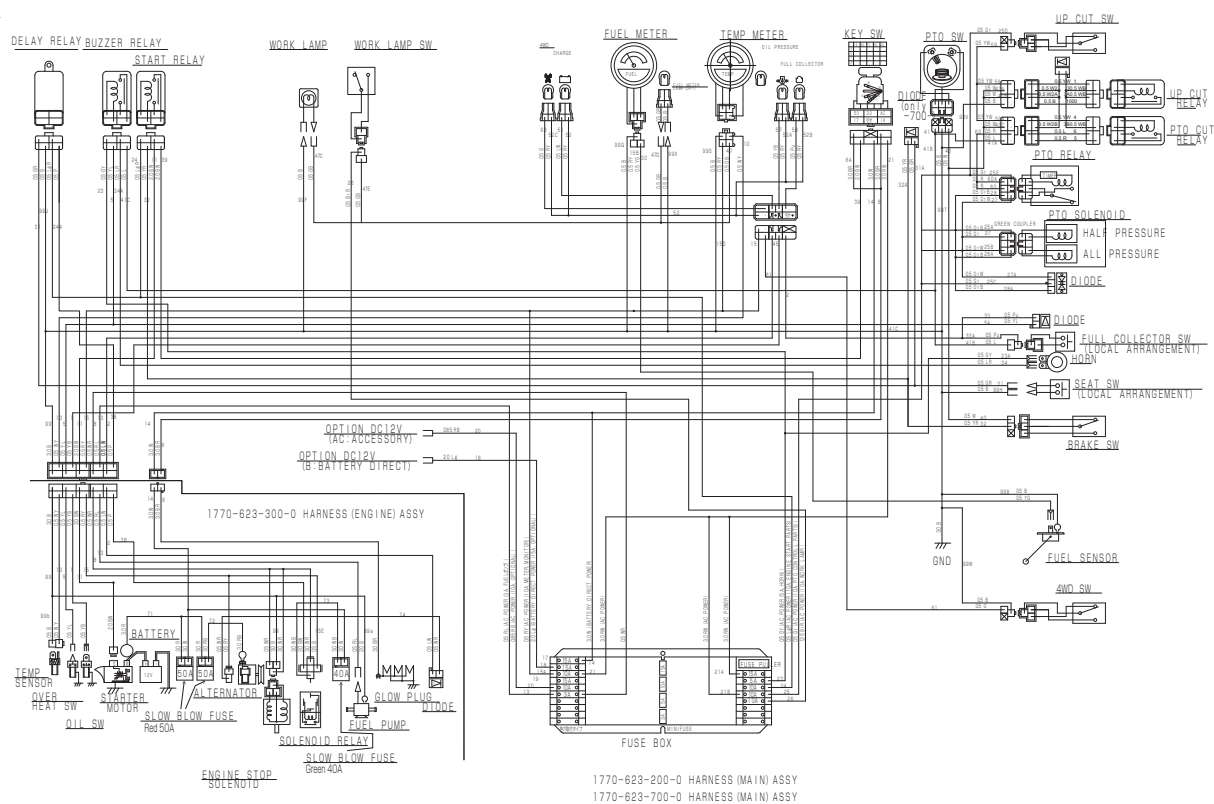


Tsutomu WATANABE
General Manager
Tractor Engineering Department
ISEKI & Co. Ltd.

This declaration of conformity becomes invalid if machines are modified without the manufacturer's prior consent.

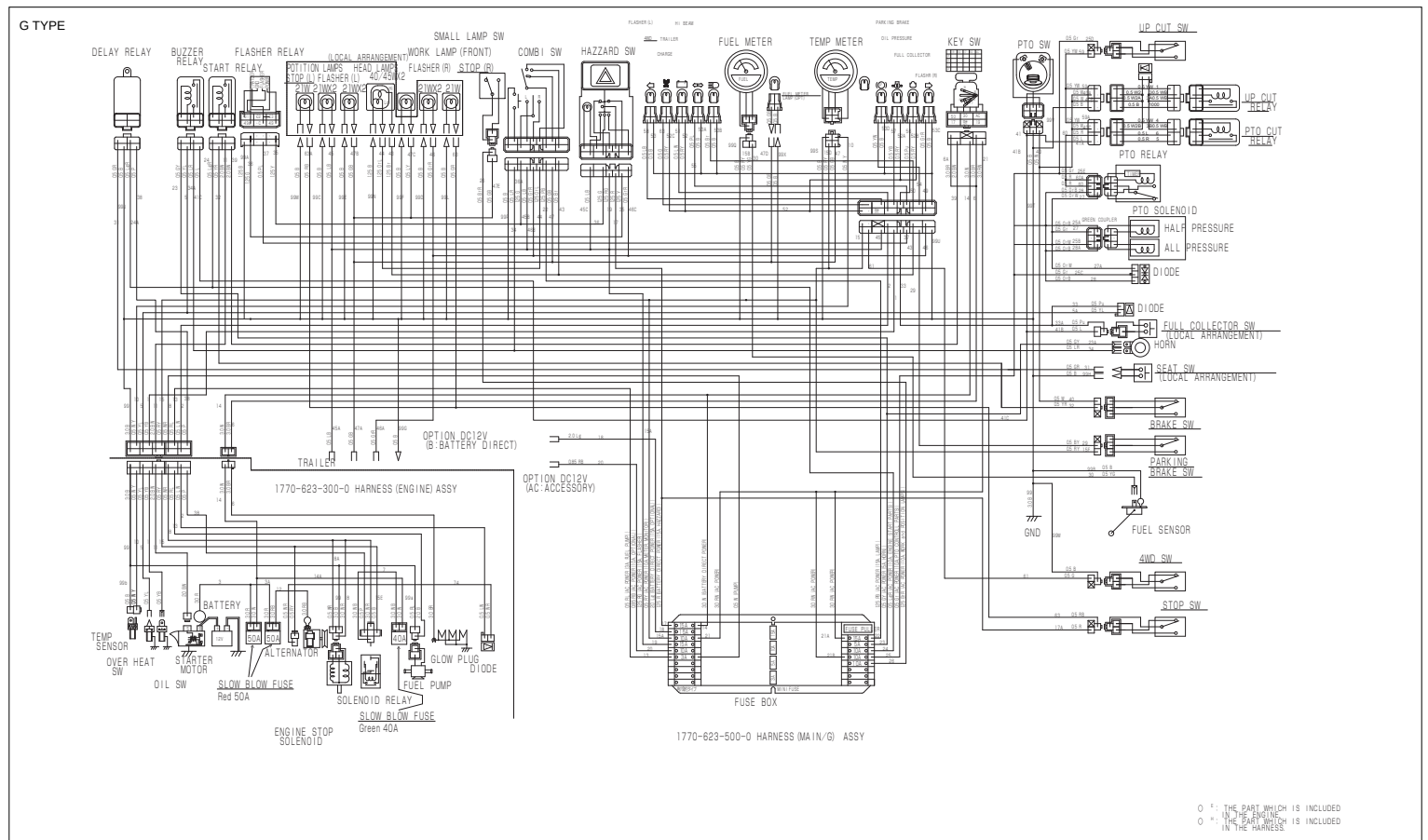
WIRING HARNESS CABLE

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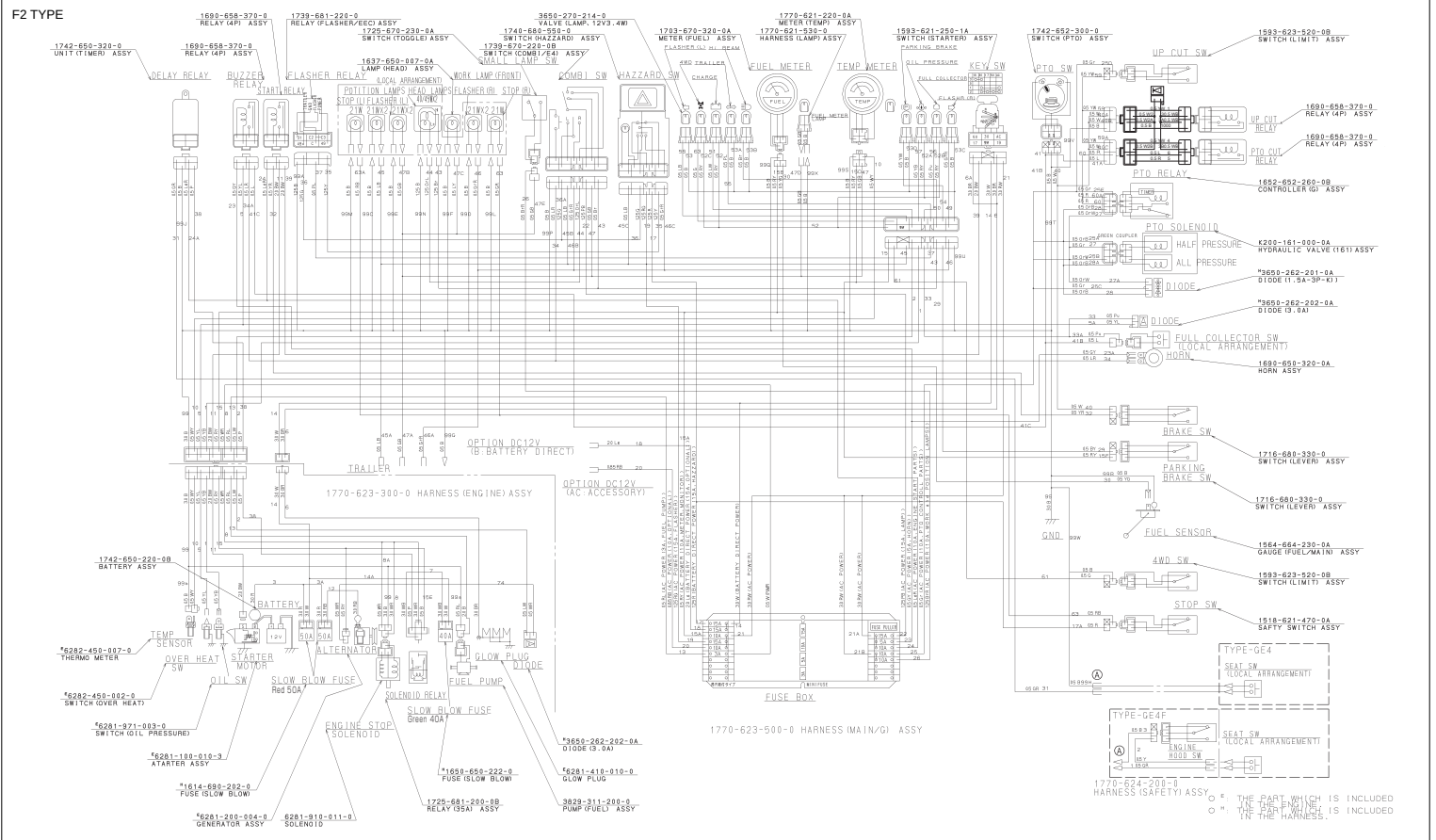


O¹: THE PART WHICH IS INCLUDED
O²: THE PART WHICH IS INCLUDED
IN THE HARNESS

SF310,370



WIRING HARNESS CABLE



SF310
SF370

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