No. 3498-36490-3

⚠ **Read this handbook thoroughly and understand the whole information contained before trying to operate, inspect and service your machine!**

OPERATING & MAINTENANCE INSTRUCTIONS

VIBRATING ROLLER

MODEL
SW654 Series
SW654 SW654H
SW654B SW654ND

From SW654 → 1SW53 – 30360
SW654H → 1SW53 – 30360
SW654B → 1SW53 – 30360
SW654ND → 1SW53 – 30360

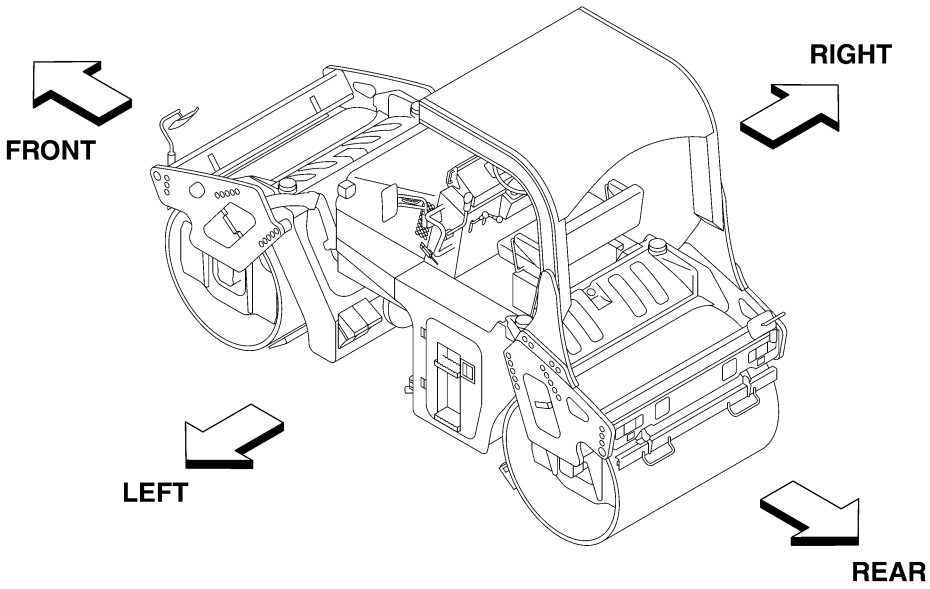
SAKAI

PREFACE

This operator's manual serves as a guide for the use of your SAKAI SW654 Series Vibrating Roller for those who are new to the machine, and also for the people who have experience in using the machine and want to refresh their knowledge for the machine.

Read this manual thoroughly and try to fully understand the information before operating your machine. Keep this handbook at hand whenever you do your work.
When an instruction manual is lost or is damaged and is not legible, replace it immediately.

The main subjects of this manual are:
(1) Basic precautions for safety, (2) Operation, (3) Daily maintenance and (4) Specifications.
For operation and maintenance of the engine, refer to the Engine Instruction Manual furnished separately. Descriptions in this manual can differ from the machine instructions of your machine due to the results of the investigation and improvement in its design. If you have any inquiry regarding your machine or this manual, contact our distributors.



CALIFORNIA
Proposition 65 Warning
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

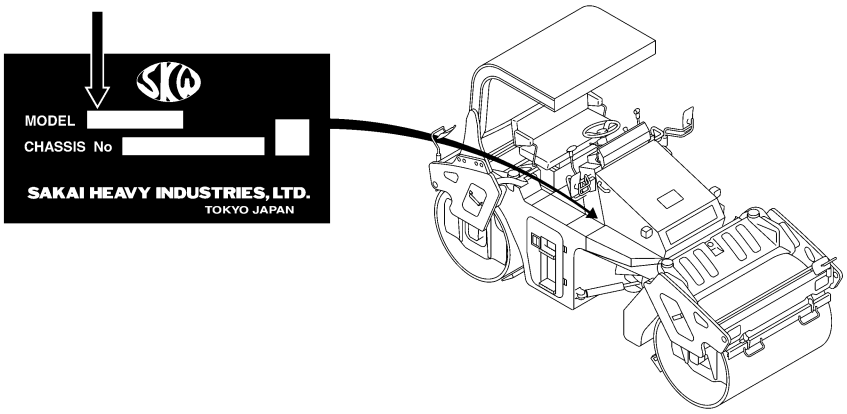
CONTENTS

MACHINE AND ENGINE IDENTIFICATION NUMBERS

When ordering parts or making inquiries about your machine, the following information is requested.

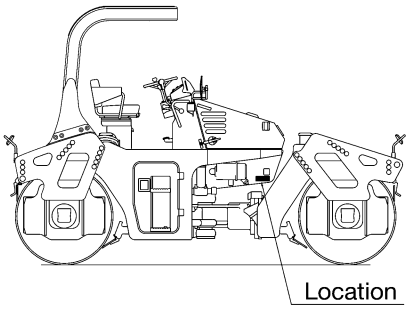
(1) Machine model

Indicated on the nameplate of the right side of the operator's station.

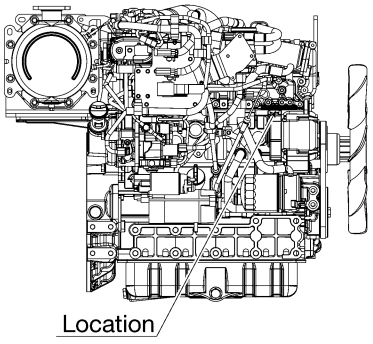


(2) Machine serial number

SW654 → 1SW53 – ○○○○○
SW654H → 1SW53 – ○○○○○
SW654B → 1SW53 – ○○○○○
SW654ND → 1SW53 – ○○○○○



(3) Engine serial number



SAFETY NOTICES

For the safe use of your machine, correct handling and periodical maintenance are of utmost importance. Thoroughly read the safety precautions described in this manual. Do not attempt to operate and maintain your machine until you gain a full understanding of these safety statements.

This manual covers the proper and safe method of driving and handling of this machine for its intended use. When this machine is used in a manner other than those covered in this manual, you must assume responsibility for your own personal safety.

In this manual and on the machine, you will find safety notices. Each safety notice starts with a signal word as shown below:

⚠ **DANGER**	**Denotes that there is an extreme hazard. If you fail to take proper precautions, it is highly likely that you could be killed or seriously injured (The color of the symbol ⚠ is red).**
⚠ **WARNING**	**Denotes that there is a hazard. If you fail to take proper precautions, you could be killed or seriously injured (Symbol ⚠ is orange).**
⚠ **CAUTION**	**Calls attention to safety practices. If you fail to take proper precautions, you could be injured or cause damage to the machine (Symbol ⚠ is yellow).**

It is almost impossible for the safety notices in this manual and on the machine to cover all the potential dangers. Keep alert to possible dangers not mentioned in this manual and on the decales.

⚠ WARNING

Do not operate your machine before you read its operator's manual thoroughly.
Incorrect operation can kill or cause injury.
It is your responsibility to operate the machine safely.

☆ Making alterations to the machine.
Please do not make alterations to the machine without permission for safety reasons.
We shall not be held responsible for injures, death or breakdowns caused by alterations.

☆ Basic precautions for safe operation of your machine are described beginning on page 4.

☆ To operate and work with your machine, you must be qualified.

1 BASIC PRECAUTIONS FOR SAFETY

1.1 General Precautions

■ Ensure proper management of health

- People under the influence of alcohol, drugs, lack of sleep or health problems must avoid driving or repairing the machine at all times, as it may lead to serious accidents.

■ Turn off cell phones

- Turn off cell phones while driving or repairing the machine. Never drive while talking on a cell phone, as it may lead to serious accidents.

■ Read the operator's manual thoroughly

- Understand the functions of the controls and gauges. Familiarize yourself with their location and how to operate them. Understand the meaning of all the symbols.

■ When an instruction manual is lost or is damaged and is not legible, replace it immediately

■ Understanding the uses for the machine

- This machine was developed and manufactured mainly for the purpose of rolling compaction in engineering works. Do not use it for any other purpose. In the case of vibratory rollers, use of vibratory operations under conditions of excessive compaction, or rock crushing operations can lead to premature wear of the rolls and damage to the machine.

■ Obey the worksite rules

- Follow noise standards and worksite rules such as matters forbidden or to be attended to, and working procedures.

■ Wear protective clothing appropriate to work

- Wear clothing, safety shoes and hard hat to suit your work.
- Do not wear clothing and accessories that tend to get caught in the controls or protruded portions of the machine. Do not wear oily clothing.
- Depending on the type of job, wear gloves, earplugs safety goggles or a mask.

■ Know the work area in advance

- Know the terrain, geology and conditions of the road surface at the worksite. Start working after securing safety such as stationing a guardsman or putting up barriers where there is a risk of falling of the machine or collapse of shoulder.

■ The operator must make prior checks when moving the machine to a hazardous area under unusual conditions

■ Provide against an accident

- Decide in advance the means of communication in an emergency. Know the location and use of an extinguisher and first-aid kit.

■ Realize the capability of the machine

- Thoroughly understand the performance of your machine and correctly operate the machine to meet the requirements of the job site. Operating the machine beyond its capabilities may lead to an accident. Use your machine within its capability.

■ The machines not equipped with ROPS must not be operated on the slope or unsafe ground

■ The machines not equipped with CABIN must not be operated in the bad weather or a harmful contaminated zone

■ Do not use a machine which has not been serviced correctly at regular intervals

- Before working, perform necessary inspections. Start operation only after making certain the machine is in good operating condition. If found to be abnormal, report to the responsible person and have the fault corrected. Operate the machine after making sure that it is safe to operate.

■ Do not allow anyone to enter the work area except for authorized personnel

- Always conduct the work paying attention to the workers around the machine.

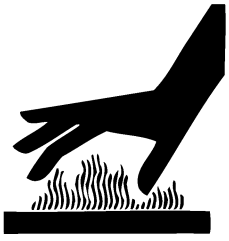
■ Beware when operating moving parts

- When operating moving parts such as covers, be sure to understand the way they move and take care not to get the hands and feet caught.

■ Operator must sit in the seat when operating the machine

■ Be careful of hot parts

- After your machine has operated for some time, the coolant, engine oil and hydraulic fluid will become hot and the pressure will build up. If, in this state, you try to remove the filler caps, drain the oil or replace the filters, you can get burned. Perform this work in accordance with the correct procedures with the machine cooled down.
- To remove the radiator cap, slowly loosen the cap to relieve the pressure with the engine stopped and the coolant cooled down (For the radiator cap with a lever, lift the lever to release the trapped pressure).
- When removing the filler cap on the hydraulic tank, release the trapped pressure by turning it out slowly to prevent the oil from gushing out (For the cap with a lever, lift the lever to release the trapped pressure).



- While the engine is running or immediately after it has been stopped, do not touch the engine, muffler, exhaust pipes, oil hydraulic pumps, oil hydraulic motors, lights, etc., as they will be hot.
- Resin and metallic parts may become hot under direct sunlight on a hot day. Direct contact with such parts may cause burns, so be sure to wear clothing and protective equipment appropriate for the job.

■ Be careful with fire

- The fuel, oil, and antifreeze will catch fire if open flames or ignition sources are used close to them. Particularly, the fuel is highly flammable.

- Do not smoke or use a match or cigarette lighter close to inflammables (combustibles).
- When refueling, stop the engine and do not smoke.
- The filler caps of the fuel and oil tanks must be kept tight.

■ Ensuring safety in a fire

- Machine fires may cause serious injuries or death, so stop the engine by turning the starter switch to the OFF position, then move away from the machine as quickly as possible.

■ While the engine is running or immediately after it has been turned off, do not touch the muffler, exhaust pipe or DPF

- While the engine is running or immediately after it has been turned off, do not touch the muffler, exhaust pipe or DPF, as they will be hot.

■ Mount on or dismount from your machine after it has come to a complete stop

- For getting on and off, face the machine and use the handrail and step.
- Watch your step when getting on or off the machine.
- Do not jump on or off a machine, particularly when it is moving.
- When getting on and off an articulated machine, straighten it out before stopping the machine. In the turned state, there is danger that personnel gets caught because the getting on and off space narrows.

■ Be careful not to fall

- Falling off the machine may cause serious injuries or death, so do not place your feet anywhere other than on the steps, and in the driver's seat.

■ Do not lock out yourself when leaving the machines

- Always bring the key with you by pulling it out from the starting switch when leaving the machine.

■ To handle the hydraulic fluid

- Wear safety goggles to protect your eyes from contact with hydraulic fluid. It can irritate your eyes.
  If the fluid contacts your eyes, flush with clean water for 15 minutes and get medical aid.
- The fluid can also irritate your skin. When handling it, wear rubber gloves to avoid contact with it. In case of skin contact, wash with soap and water.
- Be careful not to swallow the fluid. It can cause diarrhea and emesis.
  If swallowed, do not try to vomit. Get medical help immediately.

■ Do not use worn tires (Tire installed)

- Tires may be damaged when they are scratched on curb stones, when the machine runs over irregular surfaces of roads or projections on roads, and when the machine is operated suddenly.
- Continued use of damaged tires will cause them to blow out. Replace them with new ones.

1.2 Preparation for Safe Operation

■ Clean the step, operator's station and floor board and brake pedal

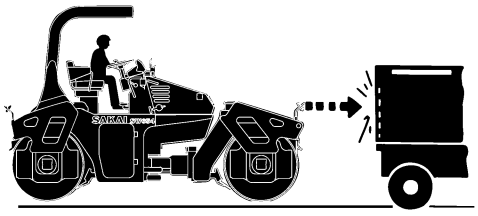
- Do not place parts, tools or unnecessary articles on the step, operator's station and floor board.
- Keep the step, floor board, brake pedal, controls and handholds free from muds, oil, ice or water, as they can cause slippage. Repair them if found to be damaged. Tighten loose bolts.
- Keep your boot soles free of oil or muds. They can slip, leading to an accident.

■ Inspect your machine before operation

- Check your machine for damage such as cracks and deformation. If found to be abnormal, operate the machine after taking a proper measure to secure safety.
- Check the level of fluids (fuel, engine oil, coolant, antifreeze and hydraulic oil). Add as necessary.
- Check the area where the machine has parked for signs of leakage of oil, fuel and water. If any leakage is noticeable, determine the cause and make corrections immediately.

■ Watch your distance

- When traveling on a road, bear in mind the stopping distance. Avoid excessive speed, and abrupt starting and stopping, and moving in a zigzag direction.



■ Understand ROPS functions (with ROPS)

- Ensure that there is no loose bolt, crack nor rust on the bodies and the attaching portions, of ROPS.
- Tighten bolts with the specified torques after ROPS are removed.
  Tightening torque : **539 N･m**
- Do not weld nor drill holes to the ROPS parts without the permissions from SAKAI, because it may decrease strengths of the ROPS.
- Be sure to wear the seatbelt during operation.

1.3 Before Starting the Engine

■ It is confirmed that hood and door is closed

- Please confirm hood and door has put it away in the confirmation before it gets on.

■ Adjust the operator's seat to your most effective operating position

- Sit on the operator's seat. Adjust the seat so that your back will make contact with the seat back when the brake pedal is pressed down to the full extent. Check to be sure that the brake pedal can be fully pressed down without difficulty when you twist your body for reverse run.
- Adjust the seat to allow proper operation of the steering wheel, levers, switches, etc.

■ Secure good visibility (with CABIN)

- Keep the windowpanel clean.
- Lock the windows and doors no matter whether they are open or closed.
- Do not leave the doors half-closed.

■ Secure forward and backward visibilities

- Adjust the rear view mirrors and under mirrors for good visibility. If dirty, clean them. If damaged, replace.

■ **Check that the horn, lamps and gauges work correctly**

■ **Before starting, make certain that each lever is in the neutral position and the parking brake is applied**

■ **When starting, sound the horn**

- Before starting the engine. Make sure there is no one in the immediate vicinity and there are no obstructions around the machine.

■ **Sit in the driver's seat and turn on the engine**

- Do not start the engine anywhere other than from the driver's seat as there is the danger of operational mistakes.

■ **Pay attention to ventilation**

- Exhaust fumes are dangerous if breathed in. When starting the engine in an enclosed area, provide good ventilation with windows and doors opened.

■ **Do not stand close to the exhaust gas pipe opening**

- The exhaust gas from the engine is dangerous.
- Exhaust fumes are harmful if breathed in.

1.4 After Starting the Engine

■ **Secure safety around the machine**

- Ensure that the area around the machine is clear of personnel and obstructions. Moreover, honk the horn, indicate your intention to move, and wait a while before moving off.

■ **Warm up the engine**

- Do not put your machine into motion immediately after the engine has started, let it idle for several minutes until it is at operating temperature.
- Check the area where the machine has parked for signs of leakage or oil, fuel and water. If any leakage is noticeable, determine the cause and make corrections immediately.

■ Have a trial run
- Make a test run in a safe place to check that there are no abnormal signs. If found to be abnormal, correct the fault before traveling again.
- Listen for unusual sounds, and check for abnormal temperature rise. If abnormal, park the machine in a safe place and find the source of trouble before operating.

1.5 During Operation

■ Strictly observe the traffic regulations
- Follow all the traffic regulations when driving on a public road.

■ Sit in the driver's seat before starting operation
- Sit in the driver's seat before starting operation. Be sure to wear the seat belt when provided.

■ Seat belt (with seat belt)
- Be sure to wear the seat belt during operation.

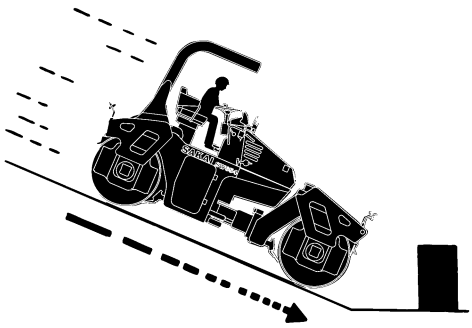
■ No other person but the operator
- This machine is a one-man roller. Do not allow anyone to get on. Only the operator is allowed on this machine while it is running or in operation.

■ Before mounting, be sure areas around the machine are safe
- Before getting on the machine, make certain that there are no obstacles around the machine and no workers under it. If some workers are present or close to the machine, tell them that the machine is about to move, warning them to stay away from it.

■ Do not try to get on or off a moving machine
- Get on or off the machine after making sure it has come to a complete stop and the parking brake is applied.

■ Do not let anyone enter the work area
- There is the danger of being run over causing serious injuries or death.
- If the driver does not have a clear field of vision, assign a conductor ensure peripheral safety.

■ To go uphill or downhill, run at a low speed. Do not attempt to shift speeds while traveling on a slope



- Shifting speeds on a slope can cause unexpected running down the slope.
- Going down hill at speeds other than low range can cause the machine to run down violently.

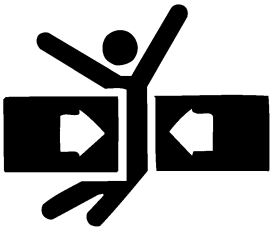
■ Refrain from inattentive driving

- Inattentive driving or driving relying on guess work can cause an accident. Use extreme care for workers present in the path of machine or around it. In case of danger, stop and sound the horn, and proceed when the area is clear of personnel or obstructions.

■ When changing the direction of travel, secure the safety on the path in the travel direction

■ Keep everyone away from the pinch points

- When making turns, do not allow anyone to come close to the pinch point.



■ At night, carefully drive the machine

- Nighttime driving tends to frustrate the sense of distance. Carefully drive the machine at a speed suited to illumination. Keep the headlamps and flood lamps lighted. If necessary, provide extra lighting in the work area.

■ Avoid long hours of continual operation

- Avoid long hours of continual operation as it may lead to loss of health.

■ Repair as soon as possible if found to be defective

- If the machine is found to be faulty, stop the machine and repair. Do not operate the machine until the problem is corrected. When any warning lamp indicates faulty operation, inspect the machine after moving it to the nearest safe location.

■ The machines not equipped with ROPS must not be operated on the slopes or unsafe ground

■ The machines not equipped with CABIN must not be operated in the bad weather or a harmful contaminated zone

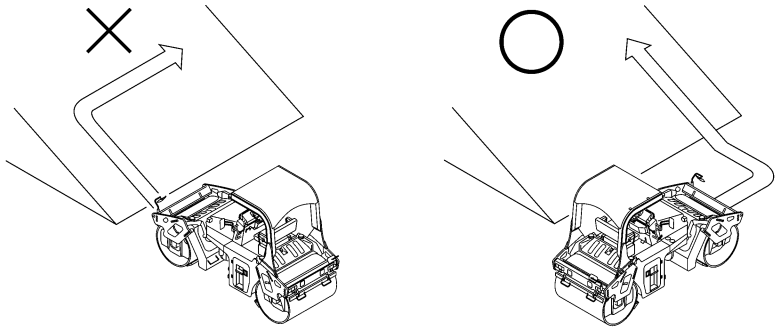
■ Do not operate the machine except from the operator's seat. Do not drive in a standing posture

- Do not throw your legs out or lean forward. Be sure to sit in the proper position while driving the machine.

■ While making turns, do not run at abnormally high speed and do not turn the steering wheel abruptly and sharply. High speed turns, especially on soft or uneven ground, could result in a rollover

■ For the traveling on structures such as a bridge, make certain that they can support your machine. Before traveling on the structure, you must know the load capacity of the structure and the load weight of the machine you are operating to insure safe travel across the structure

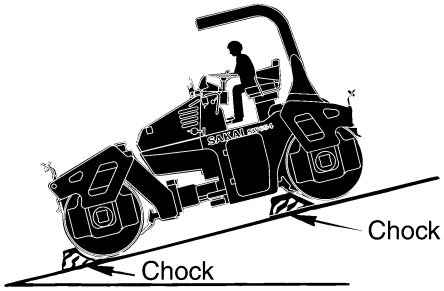
■ Do not make turns on a slope and do not travel across sidehill. If necessary to do so, go down straight along the slope to the flat ground, move sideways and go up straight to the destination



■ On a steep slope, run the machine at low speed

■ When parking

- Select level and hard ground. If necessary to park on a slope, chock the front of the drum and tire on the downside of the slope.
- When required to park on the public road, provide necessary markings such as flag, barriers and illumination. However, be sure they do not obstruct traffic.
- Stop the engine when getting off the machine. Remove the key from the starter switch, and make sure it is stored appropriately.

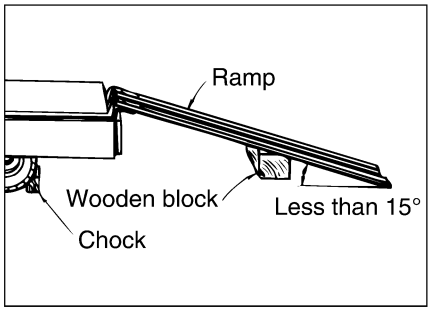


- Be sure not to get your hands caught in the chocks when handling them.

■ Beware of deformation in tires during long-term parking (if tires installed)

- The surfaces of tires in contact with the ground may become flattened, leading to their deformation (forming of flat spots) during long-term parking.
- The forming of flat spots may cause bounding or shaking during operation of the machine.
- After the forming of flat spots, driving the machine will restore the tires and remedy the situation.
- To prevent the forming of flat spots during long-term parking, inflate the tires to a higher pressure within the allowable range and drain the water from the sprinkler tank before parking. Furthermore, move the machine regularly.

1.6 Loading and Unloading



- Loading and unloading can accompany any danger. Use extreme care.
- Select level and hard ground leaving a sufficient distance from the shoulder of a road or bank.
- Use sturdy ramps with proper width, length and thickness which allow safe loading and unloading. If they deflect considerably under load, apply wooden blocks to reinforce the ramps.
- To prevent your machine from crosswise slippage, keep the ramps free from oil, mud, debris, etc. The drum must also be free from extraneous matter that can cause slippage.
- Do not steer your machine on the ramps. If the machine is facing in the wrong direction, go back off the ramp, correct the direction and try again.
- Do not use kinked, twisted or damaged wireropes for crane or winch operation. Use ones with ample strength.
- When loading is complete, fix the machine with wooden blocks placed under the drums and chains fastened to the machine.

1.7 Transportation

- Follow required regulations.
- Select a transporting route according to the overall width, overall height and gross weight of the trailer with the machine loaded.
- Know the maximum height clearance of the machine loaded on the transport trailer before hauling under bridges and other structures.

1.8 Handling the Battery

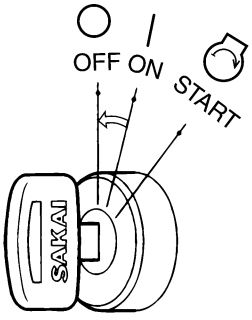
■ When handling the battery

- Battery electrolyte contains sulphuric acid. It will destroy clothing and skin. If it touches your clothing or skin, flush with large quantities of water.
- In case of eye contact, flush with clean water and get medical help.
- If swallowed, drink large amount of water, milk, beaten egg or vegetable oil, and get medical help.
- Wear safety goggles when handling the battery. Wear safety goggles, full face shield, rubber gloves and rubber apron when adding fluids to the battery.
- Keep cigarettes and flames away, and avoid recharging the battery in poorly ventilated places when there is a danger or generating sparks.

⚠ WARNING

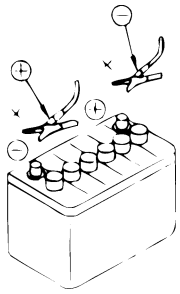
Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hand after handing.

- Inspect or handle the battery with the engine stopped and the starter switch in the OFF position.
- Turn the starter switch to the OFF position, then wait at least 30 seconds before removing the battery. An abnormality may arise in the ECM (engine control module).



- Keep metallic items such as tools away from the battery terminals.
- Tangled terminals may generate sparks due to improper connections, resulting in the danger of explosions. Make sure terminals are connected firmly.
- The battery is for starting the engine and operating electrical equipment on the machine. Do not use it for any other purpose.
- Do not charge battery when the top surfaces of the liquids are at the LOWER level (the minimum liquid level) or below. Not only the internal parts of the battery are degraded and the battery lifetime are shortened but also it can cause explosions if you continue on using the battery when the top surfaces of the liquids are at the LOWER level or below. Immediately supply water until the water level is between the UPPER and LOWER levels.

■ Jump-starting the engine



- Wear safety goggles when jump-starting the machine.
- When starting from another machine, do not allow the two machines to make contact with each other.
- When connecting the battery cables, start with the positive terminal. For disconnection, start with the negative one.
- Do not allow a tool to bridge between the positive terminal and machine body. This can generate dangerous sparks.
- Do not connect the booster cable to wrong the terminal. Never connect the positive terminal to the negative terminal or the body of the machine.
- Final connection to the engine block of the disabled machine can cause sparks. The connecting point should be as far as possible from the battery.

1.9 Towing

- Towing should only be carried out in emergencies and over short distances. A trailer should be used for long distance transport.
- The machine should not be operated while being towed.
- Follow the instructions in this manual to enable towing.
- Do not tow if the braking system has broken down, as it is dangerous.
- To tow the machine, use cables with ample strength.
- Do not perform towing on a slope.
- Be sure to attach a wire rope firmly to the towing hook.
- Do not use twisted, kinked or damaged cables when towing.
- Do not step over the wire rope.
- Keep everyone away from the space between the machine and the towing machine when connecting the two.
- Align the connection points of the disabled machine and the towing machine in a straight line when connecting the machines.

1.10 Before Servicing

■ Attach warning tags when servicing the machine

- Serious accidents can occur if the machine is unexpectedly started or controls carelessly touched by an unauthorized person.
- Attach a warning tag at a clearly visible location in the operator's station and insure the key has been removed from the starter switch.

⚠ DANGER

Do not operate.

Keep this warning tag, if not used, in tool box.

■ Setting the chocks

- Set chocks in front of and behind the roller drum (wheels) to prevent the machine from moving before beginning inspections or maintenance work.

■ Use proper tools

- It is very dangerous to use damaged or deteriorated tools or to use tools for other purposes than intended. Use correct tools for their intended use only.

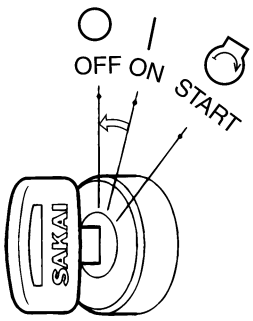
■ Change safety-related parts at regular intervals

- Change any seatbelt found to be abnormal even if it is within its recommended service interval.
- Change any ROPS found to be abnormal even if it is within its recommended service interval.
- Replace fuel hose, high pressure hydraulic hoses and liquid hoses regularly to prevent fire. Replace high pressure hoses of the power steering system every two years.

☆ Change these parts at regular intervals even if found to be normal. They will deteriorate as time goes on.

☆ Change any hose found to be abnormal even if it is within its recommended service interval.

■ Inspect or service your machine with the engine stopped



- If required to keep the engine running in such a case as radiator interior cleaning, perform the work with two persons. One of them should sit on the operator's seat getting ready for shutting down the engine. He must take care not to touch any of controls carelessly. Maintenance personnel must exercise extreme caution not to make contact with moving parts.

■ Supplying fuel, oils and grease

- Do not cover the filler port when refueling. Feeding fuel in an airtight tank might damage the fuel tank.
- Spilled fuel or oil will be slippery. Wipe up immediately. Keep the filler caps tight. Do not use fuel for flushing oil. Handle fuel and oil in a well ventilated area.

■ Check the coolant level in the radiator

- To check the coolant level, stop the engine and allow the engine and radiator to cool down before removing the radiator cap. Remove the cap by covering it with a rag before removing to prevent any fluid that could spray under pressure from causing a burn.

■ Illumination

- For inspecting the level of the fuel, oil, coolant and battery electrolyte, use explosion-proof illuminations. Failure to use this type of illumination can result in an explosion.

■ Make sure the gas dampers are properly maintained

- Before inspecting the engine room, make sure the gas dampers holding up the hood are firmly engaged. Furthermore, in machines with stays to prevent the hood from closing, make sure they are firmly in place.

■ Points to beware of when filling the sprinkler tank with water (on machine equipped with a sprinkler tank)

- Do not fill the tank with the water inlet blocked. It may damage the sprinkler tank.

1.11 During Servicing

■ Keep unauthorized persons away

- During service, do not allow persons not concerned to enter the work area, particularly when grinding or welding operation is performed or heavy hammers are being used.

■ Assume an appropriate posture while working

- An unnatural posture during maintenance work may cause injuries. Assume a posture that is appropriate for the work being carried out.

■ Keep your machine clean

- Spilled oil, grease or scattered debris are dangerous. Always keep your machine clean. Moisture that penetrates into the electrical system can cause malfunctions. Do not use water to clean sensors, connectors and the operator's station.

■ Take care not to get caught or crushed

- Be sure to fix the hood and other covers after opening them to prevent closing and avoid getting caught in them.
- If there is a need to crawl under the machine after it has been lifted, be sure to support it from underneath with a solid prop or block.

■ When repairing the electrical system

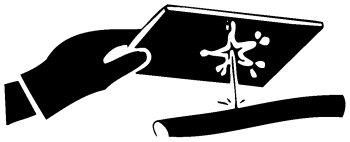
- Read the warnings in this manual regarding the handling of batteries, and make sure to have a thorough understanding in order to handle them appropriately and safely.
- When repairing the electrical system or welding, disconnect the negative cable from the battery to shut off the electricity. Carrying out work while the cables are connected to the negative terminal may cause electrocution or explosions.

■ Carefully handle high pressure hoses

- Do not try to bend or hit hoses against a hard object. Do not use hoses or pipes that are bent or damaged. They will burst.
- Replace damaged fuel hose, hydraulic hoses and liquid hoses. An oil, hydraulic and liquid fluid spill can cause a fire.

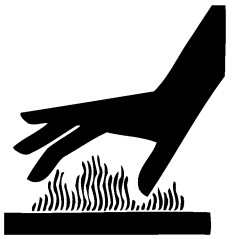
■ Be careful of high pressure hydraulic fluid

- Bear in mind that the working equipment hydraulic systems are under internal spressure. Do not perform adding, draining, inspection or servicing of the hydraulic systems until the internal pressure has been relieved. Hydraulic fluid leaking through a fine hole at high pressure can penetrate your skin and eyes. Inspect leakage by holding a hard board close to suspected leaks wearing goggles. If affected by high pressure oil, get medical help immediately.



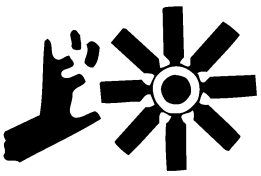
■ Be careful of hot parts

- After the machine has been operated for some time, the coolant, engine oil and hydraulic fluid will become hot.
- Removing the radiator cap or draining the coolant or oil can burn you. Perform this work in accordance with correct procedures after the systems have cooled down.



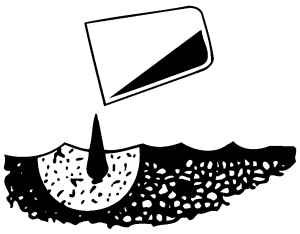
■ Use care when inspecting or servicing fan or belts in motion

- Do not wear clothing and accessories that tend to get caught in moving parts.
- Do not let your body or tools make contact with the fan blades or belts. They can be cut seriously.



■ Used oil disposal

- Do not throw used oil into a drain or waterway. Drain the oil from the machine into a proper container. Do not drain directly on the ground.
- Obey all local, state and federal environment regulations for the proper disposal of oil, fuel, coolant, battery electrolyte or any other fluids.



■ Take care in handling the gas damper

- Never dismantle it.
- Do not throw it into a fire.
- Do not damage the rod.
- Do not bend the tube or rod, or use it as a handle.
- When disposing of it, be sure to fix the gas damper, and drill a hole around 2 to 3 mm in diameter, about 20 to 30 mm from the edge on the tube bracket side. Dispose of it after releasing the gas pressure. When doing this, be sure to wear protective goggles because of the danger of oil inside or swarfs getting sprayed everywhere by the compressed gas inside.

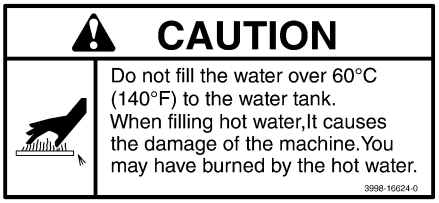
■ Exercise extreme care when replacing and repairing tires (Tire installed)

- Disassembly, repair and reassembly of tires require special facility and knowledge. Have them repaired at work shop specialized in handling tires.
- An improperly fitted tire can separate from the rim when inflating.
- When dismounting a tire, chock other tires for safety.
- When welding job is carried out near the tires, use extreme care, as this can cause an explosion of the tires.

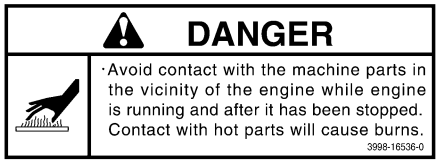
1.12 Safety Decals

Keep all decals clean. If lost, replace with new one. There are decals other than those shown below: Treat them in the same manner as the one shown here.

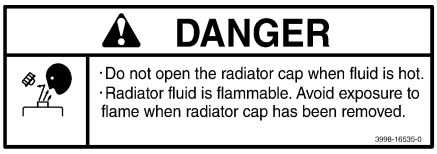
① 3998-16624-0 (4 locations)



② 3998-16536-0

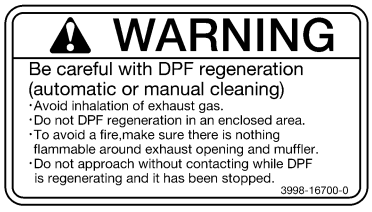


③ 3998-16535-0

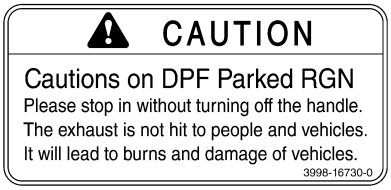


④ 3998-16534-0

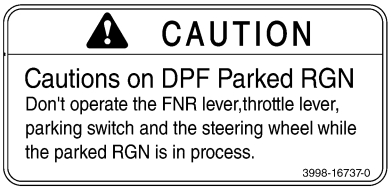
⑤ 3998-16700-0



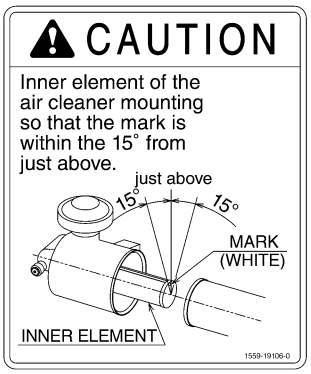
⑥ 3998-16730-0



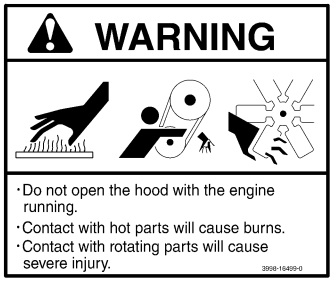
⑦ 3998-16737-0



⑧ 1559-19106-0



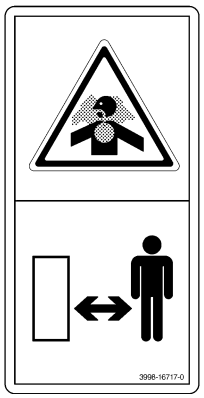
⑨ 3998-16499-0 (2 locations)



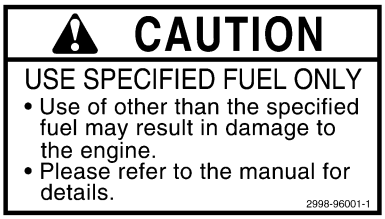
⑩ 3998-36002-0 (2 locations)

⑪ 3998-16712-0

⑫ 3998-16717-0



⑬ 2998-96001-1



⑭ 3998-16501-0

DANGER

Be Careful with Fire
- When refueling, stop the engine and do not
- The filter cap of the fuel tank must be

3998-16501-0

⑮ 3998-16489-0

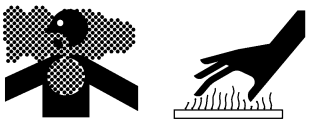
CALIFORNIA
Proposition 65 Warning

Diesel engine and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

3998-16489-0

⑯ 3998-16500-0

WARNING



- Avoid inhalation of exhaust gas.
- Avoid contact with exhaust pipe while engine is running and after it has been stopped. Contact with hot exhaust pipe will cause burns.

3998-16500-0

⑰ 3998-16504-0

WARNING

1.When Handling the Machine:
- Operate only while seated.
- Use the handrails and steps when boarding and getting off.
- Never carry passengers.
- Never attempt to board or get off the machine while it is moving.

2.Preparation for Safe Operation
- Clean the steps, operator's station and floorboards.
- Obey the worksite rules.
- Sakai accepts no responsibility for any injury or damage to the machine caused by unapproved modification.
- Do not use a machine which needs repair or maintenance.
- Sound the horn immediately prior to starting the engine to warn people in the vicinity.

3.Starting the Engine
- Check that all operating levers are in the neutral position.
- Idle the engine for about 5 minutes to warm it up prior to commencing work.

4.Parking Precautions
- When parking the machine, park it on level ground, set the parking switch and set the roller chocks.
- Allow the engine to cool off by running it for about 5 minutes before stopping.
- When getting off the machine, remove the key from the ignition switch.

3998-16504-0

⑱ 3998-16510-0

CAUTION

Refill the specified quantity of oil in the vibrator case when changing oil.

3998-16510-0

⑲ 3998-06139-0

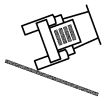
⑳ 3998-16491-2

WARNING

- Read the operator's manual thoroughly before operating the machine.
- Incorrect operation can cause severe injury or death.
- It is your responsibility to operate the machine safely.

3998-16491-2

㉑ 3998-16505-0



DANGER

Roll Over Prevention
- Do not work in the vicinity of overhanging banks, or on grades steep enough to cause the machine to slide or roll over.
- Reduce speed prior to making turns.
- Pay particular attention when operating on uneven surfaces, as the machine may become unstable.

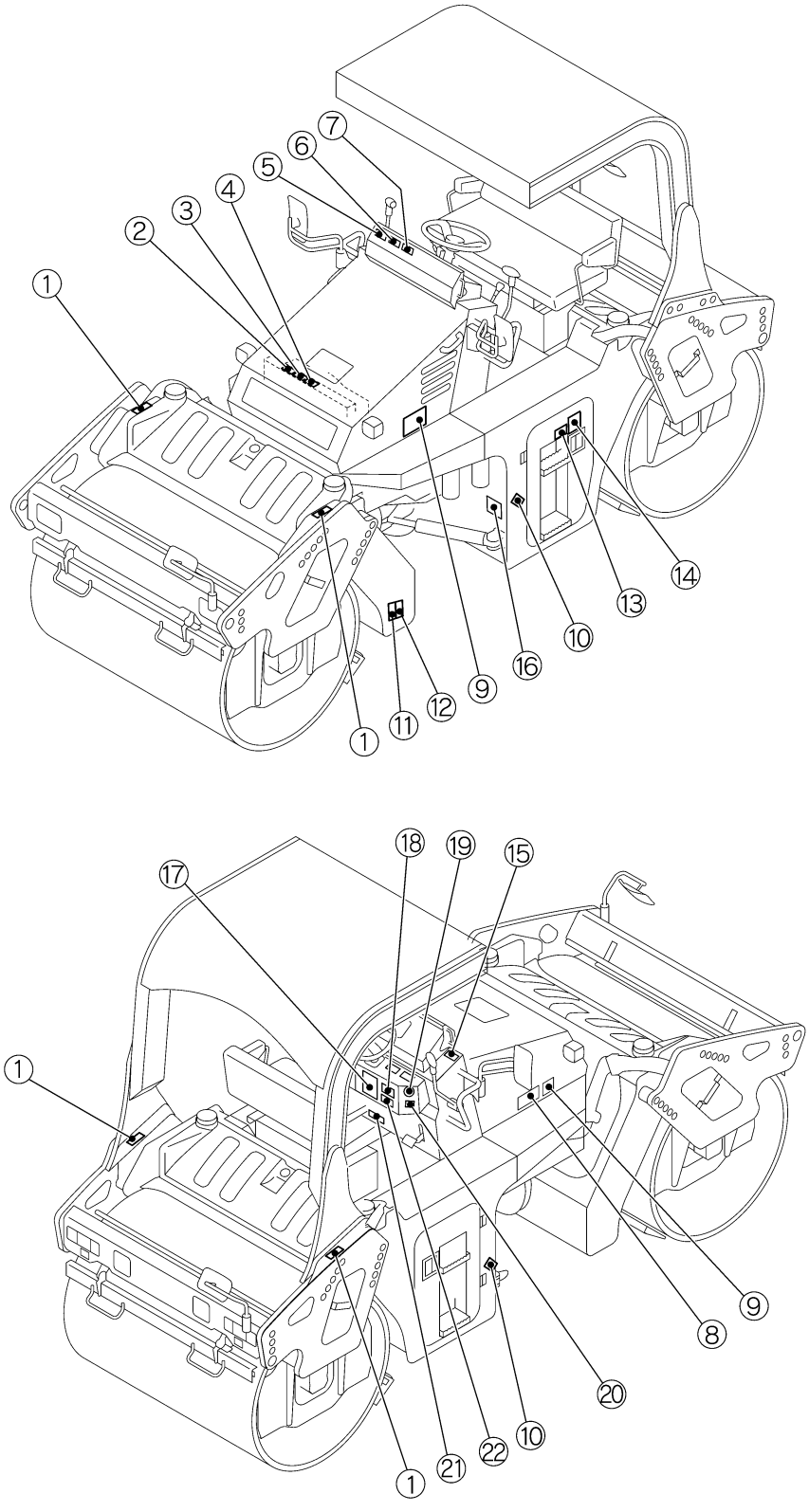
3998-16505-0

㉒ 3998-16511-0

WARNING

Replace the power steering high pressure hoses every two years.

3998-16511-0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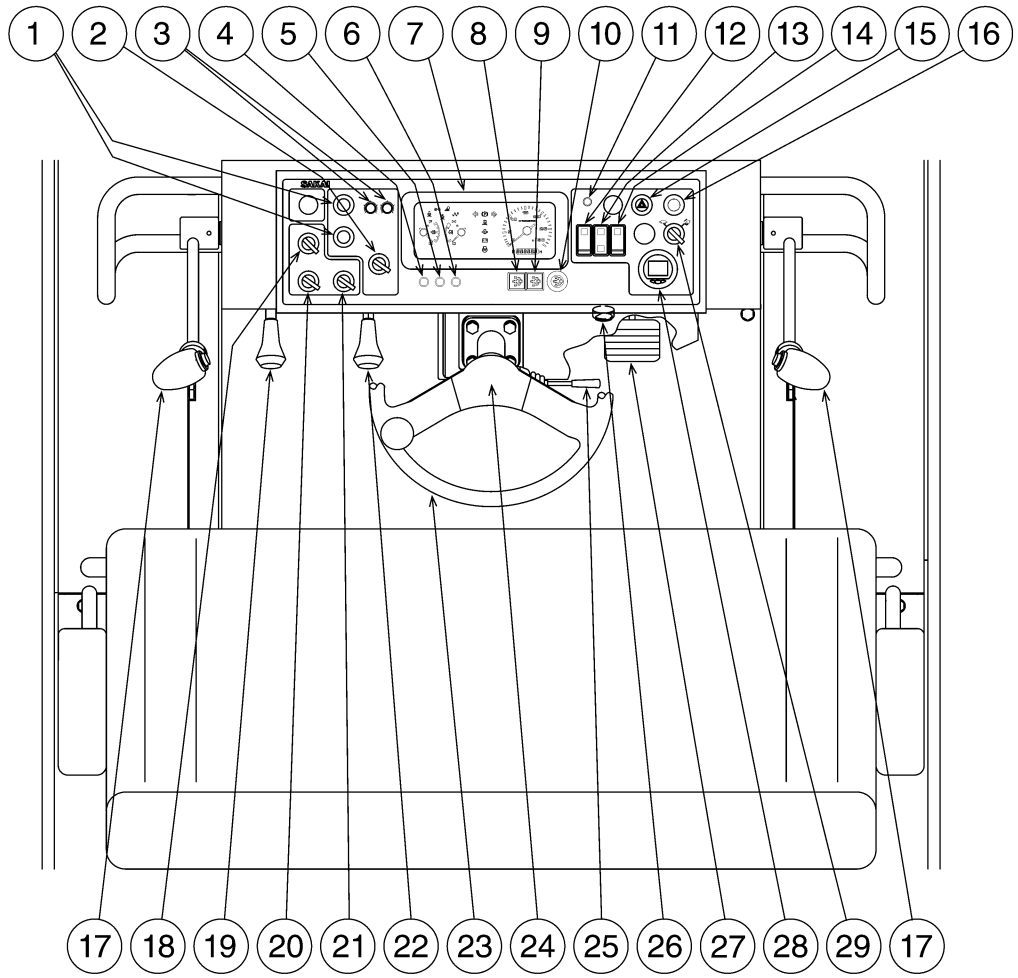
2 OPERATION

2.1 Instruments and Controls

2.1.1 Operator's station

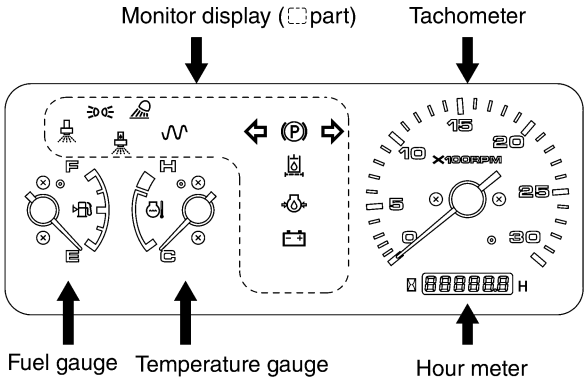


① Sprinkler switch
② Sprinkler selector switch
③ Sprinkler timer
④ Engine warning lamp
⑤ Engine stop lamp
⑥ Overheat lamp
⑦ Combination meter
⑧ Auto regeneration lamp (green)
⑨ Parked regeneration request lamp (amber)
⑩ Parked regeneration switch
⑪ ECO lamp
⑫ Flood lamp switch
⑬ Dimmer switch
⑭ Lamp switch
⑮ Hazard switch
⑯ Parking brake switch
⑰ Forward-Neutral-Reverse (F-N-R) lever with vibrator switch
⑱ Vibration selector switch
⑲ Speed shift lever
⑳ Vibration drum selector switch
㉑ Vibrator switch
㉒ Throttle lever
㉓ Steering wheel
㉔ Horn switch
㉕ Turn signal lever
㉖ Starter switch
㉗ Brake pedal
㉘ DPF meter
㉙ Speed shift switch

2.1.2 Gauges, indicator lamps and warning lamps

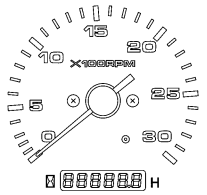
For safe execution of your job, fully understand the role and function of the systems involved.

Combination mater



Tachometer / Hour meter

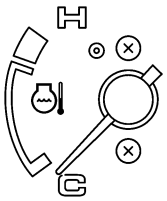
Indicates the engine RPM. The hour meter shows total operating hours. The service interval recommendation in this manual should be based upon the hour meter readings.



Tachometer / Hour meter

Temperature gauge

Indicates the coolant temperature. Zone close to symbol H indicates overheating. In case of overheating, run the engine at idling for about ten minutes before shutting it down. Then determine the cause.
The engine has been overheated also when the overheat lamp comes on. Stop the engine and look into the cause.



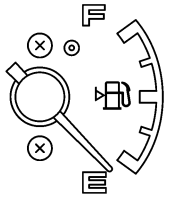
Temperature gauge

Fuel gauge

Indicates the fuel level in the tank.
E: The tank is empty.
F: The tank is full.
Replenish fuel appropriately before the fuel runs down.

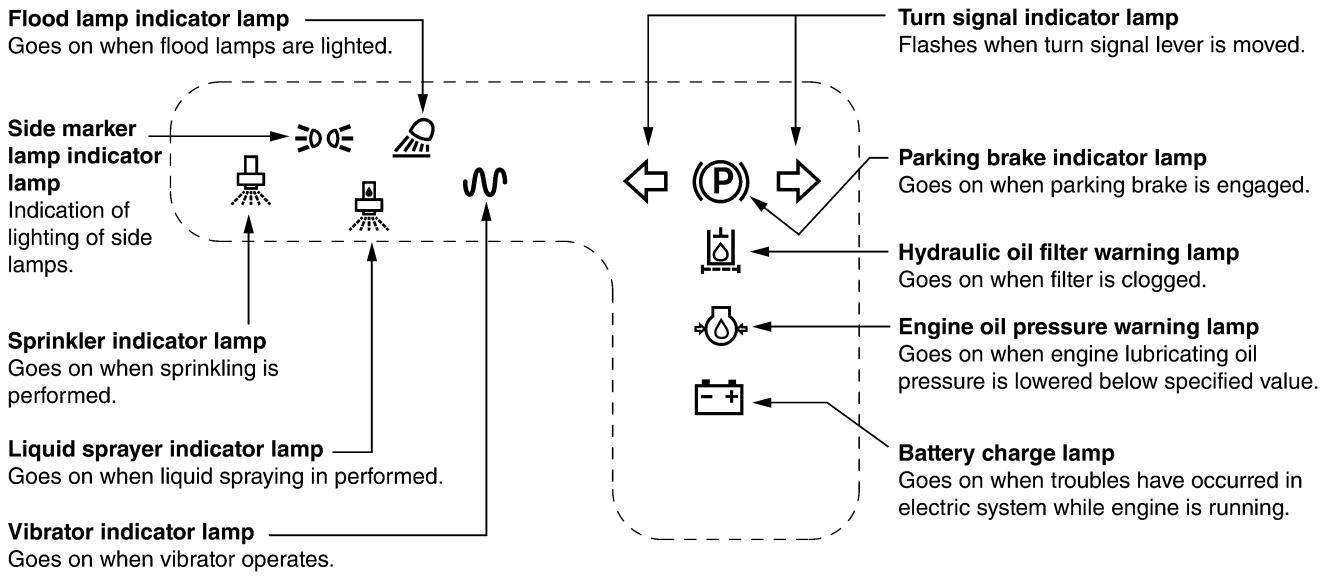
⚠ CAUTION

Be sure to use fuel recommended by SAKAI (refer to page 98).



Fuel gauge

Monitor display



★ Indicator lamps [⇦⇨]
Light up when corresponding systems have been operated.

★ Parking brake indicator lamp [Ⓟ]
It will flash once when the starter switch is turned to the ON position.
After that it will remain on while the parking brake is engaged, and turn off when it is released.

★ Hydraulic oil filter warning lamp [ ]
It will flash once when the starter switch is turned to the ON position.
After that it will turn on when the hydraulic oil filter becomes clogged. Stop the machine and carry out an inspection.

★ Engine oil pressure warning lamp [ ]
It will flash once when the starter switch is turned to the ON position.
It will turn on while the engine is running if the engine oil pressure drops below the specified value. Stop the machine and carry out an inspection.

★ Battery charge lamp [ ]
It will turn on when the starter switch is turned to the ON position, and turn off when the engine starts running.
It will turn on while the engine is running when a problem arises with the electric system. Stop the machine and carry out an inspection.

IMPORTANT

- **Hydraulic oil filter warning lamp**
  Go on when the engine rpm is increased before the engine has been warmed up enough. Keep the engine idling until the lamp goes off, before starting your work. In that case, warm up the engine sufficiently, and operate the machine after the warning light has gone out. When the warning light will not go out, the filter may be clogging up. Check the filter.
- **The window of the combination meter**
  The window of the combination meter may become invisible because of aged deterioration coused by fine sand or dust or ultraviolet. When any flaw or mist is found on the window, contact our branch offices or designated factory.
- **Checking for warning lamp and parking brake indicator lamp**
  They should turn on light when the starter switch in ON position.
  If not, there is some trouble.
  Check and repair the combination meter or wirings harness.
- **If the engine warning lamp or engine stop lamp do not turn off after starting the engine, or these lights turn on while driving, the engine has broken down or there is an error. Check to see if the problem can be identified.**

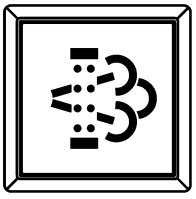
DPF meter

This meter indicates the amount of PM (particulate matter) that has accumulated on the DPF (diesel particulate filter).

DPF meter

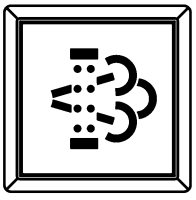
Auto regeneration lamp (green)

The auto regeneration lamp (green) will turn on when the amount of PM accumulated on the DPF reaches a specified level.


Auto regeneration lamp (green)

Parked regeneration request lamp (amber)

This lamp will flash to indicate the necessity for manual regeneration when the amount of PM accumulated on the DPF exceeds a specified level after the auto regeneration lamp (green) has turned on.


Parked regeneration request lamp (amber)

ECO lamp

This lamp will turn on during ECO-mode.

ECO lamp

Engine check lamp

When the starter switch is turned to the ON position, the engine check lamp will turn on once, then turn off.
If the engine check lamp stays on, or it turns on during driving, there is something wrong with the engine. Park the machine in a safe place and carry out an inspection.

★ ENGINE WARNING LAMP
★ ENGINE STOP LAMP

When the engine stop lamp lights, it means a serious abnormality occurs with the engine. Stop the machine and the engine, and receive proper checking / maintenance or repairing.

★ OVER HEAT LAMP

If the overheat lamp turns on, there is a possibility of overheating regardless of the temperature gauge reading. Stop the machine, put the throttle lever in the idling position and let the engine idle to gradually cool it.
If the lamp does not turn off, contact one of our sales offices or a factory designated by our company for advice.

2.1.3 Switches

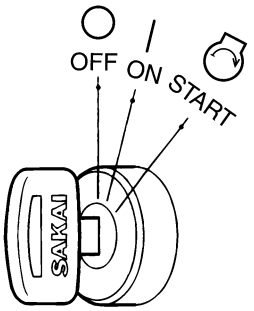
Starter switch

Starts and stops the engine.

OFF : The key can be removed in this position. All the electric systems are switched off. To shut down the engine, move the key to this position.

ON : The charging circuit and lamp circuit are charged with electricity. Let the key stay in this position after the engine has started.

START: The engine is cranked and gets started. The moment the engine has started, release the key. It will automatically return to the ON position.



⚠ CAUTION

Set the Forward-Neutral-Reverse (F-N-R) lever in the neutral position Ⓝ and press down the parking brake switch before starting the engine.
Unless these conditions are met, the engine will not start.

Lamp switch / Dimmer switch

Has three positions.

OFF : All lamps are switched off.

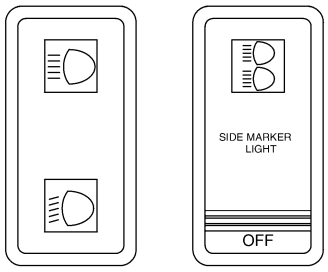
SIDE MARKER LIGHT : Side marker lamps and tail lamps come on.

: Then the head lamp lights up.

Turn on dimmer switch to switch over the upper beam and the lower beam of headlight.

: The upper beam of headlight lights up.

: The lower beam of headlight lights up.



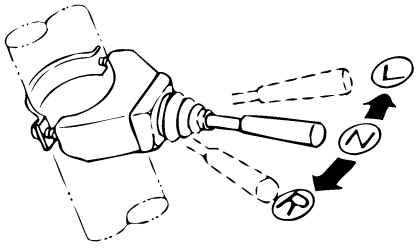
Lamp switch

Turn signal lever

Turn signal lamp flashes when the turn signal lever is operated.

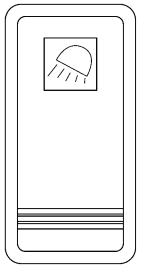
Left turn : Move the lever forward.

Right turn : Move the lever backward.



NOTE: The lever does not return to the OFF position even if the steering wheel is turned back.

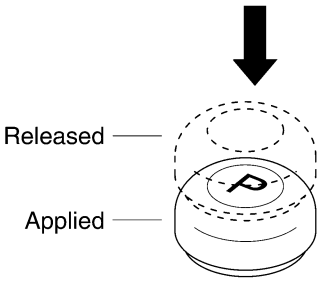
Flood lamp switch



Blank position : Flood lamps on the back of the machine turn off.

position : Flood lamps on the back of the machine turn on.

Parking brake switch



Use it as a parking brake.
Do not use while the machine is moving.
If switch Ⓟ is pressed down, the parking brake applies with the indicator lamp Ⓟ on the monitor display lighted up.
When pressed again, the brake is released and the indicator lamp goes off.

⚠ WARNING

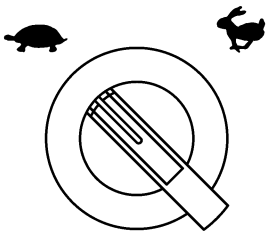
- **To disengage the brake, be sure to press the button again instead of pulling it.**
- **When dismounting from the machine, press the button to apply the brake without fail.**

⚠ CAUTION

Never pull the switch up.

Speed shift switch / Speed shift lever

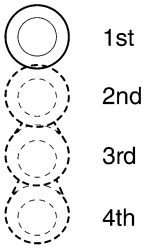
Selects three macine speed ranges.
Place the switch at the desired position.



Speed shift switch

km/h (mile/h)

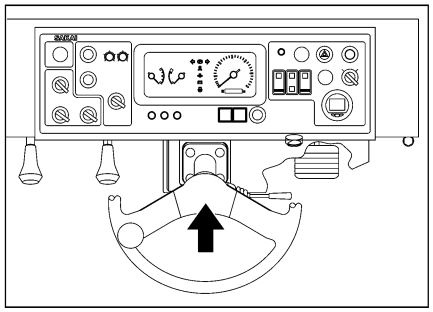
Speed shift lever / Speed shift switch	1	2	3	4
LOW	0 – 2 (0 – 1.2)	0 – 3 (0 – 1.9)	0 – 5 (0 – 3.1)	0 – 6 (0 – 3.7)
HIGH	0 – 4 (0 – 2.5)	0 – 6 (0 – 3.7)	0 – 9 (0 – 5.6)	0 – 12 (0 – 7.5)



Speed shift lever

Horn switch

Pressing the button at the center of the steering wheel makes the horn sound.

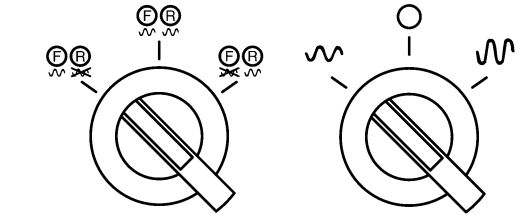


Vibrator switch / Vibration drum selector switch

= SW654, SW654H, SW654B =
Select low or high amplitude vibration and vibration ON or OFF.

Ⓕ Ⓡ : The front and rear drums (both drums) vibrate.
Ⓕ Ⓡ : The front drum vibrates.
Ⓕ Ⓡ : The rear drum vibrates.

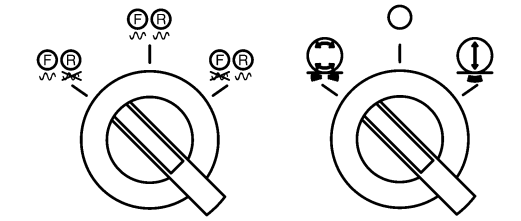
: High amplitude vibration
○ : Vibration stop
: Low amplitude vibration



= SW654ND =
Selects oscillatory or normally vibration and vibration ON or OFF.

Ⓕ Ⓡ : The front and rear drums (both drums) vibrate.
Ⓕ Ⓡ : The front drum vibrates.
Ⓕ Ⓡ : The rear drum vibrates.

: Normally vibration
○ : Vibration stop
: Oscillatory vibration

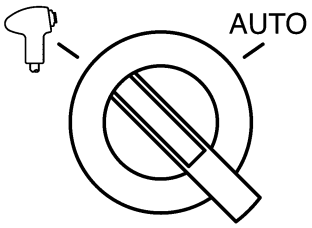


IMPORTANT

- **Do not operate the vibrator on a hard area such as cement concrete pavement surface or the ground covered by thick steel sheets.**
- **Shut off the vibrator immediately when the machine has been caught in the mud during vibratory operation.**

NOTE: • The engine speed must exceed 1,600 rpm for vibration compaction.
• The optimum vibration compaction speed is 2 – 7 km/h (1.2 – 4.4 mile/h). However, select an appropriate speed according to the actual situation of the site.

Vibration selector switch



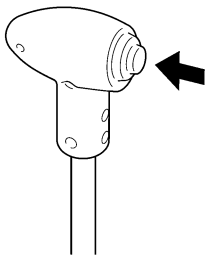
Vibration selector switch

The switch permits selection of automatic or manual vibration operation. No matter what mode the machine is in, vibration will stop when the F-N-R lever is set in the neutral position Ⓝ .

: The vibrator switch attached to the F-N-R lever permits ON and OFF. Press the switch for vibration. Press the switch again to stop vibration. Set the vibrator switch attached to the panel in the or (or for SW654ND) position before operating the vibrator switch on the F-N-R lever.

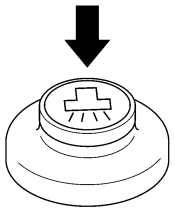
AUTO : The machine starts and vibrates simultaneously when the F-N-R lever is set in the F or R position while the vibrator switch is in the or (or for SW654ND) position.

The vibrator switch mounted on the F-N-R lever also shuts off vibration. When using this switch, set the vibration selector switch to the position.

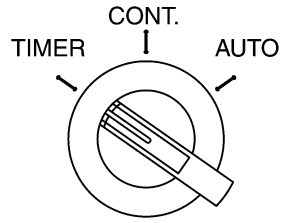

Vibrator switch

Sprinkler switch / Sprinkler selector switch / Sprinkler timer

- The sprinkler switch, sprinkler selector switch and sprinkler timer are both used for sprinkler operation.
- Sprinkler switches Ⓐ Ⓑ (PUMP1 and PUMP2) to activate the sprinkler pump for sprinkling.


Sprinkler switch ⒶⒷ

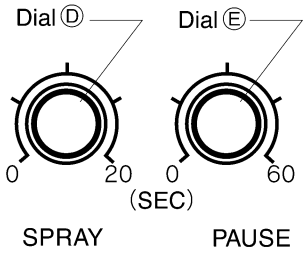
- Sprinkler selector switch Ⓒ selects sprinkler modes; continuous sprinkling mode and intermittent sprinkling mode.



Sprinkler selector switch Ⓒ

CONT. : Continuous sprinkling is performed.
AUTO : Spraying is done interlocking with forward / backward movement.
TIMER : Intermittent sprinkling takes places.

- For the intermittent sprinkling, set the sprinkler timer at the desired sprinkling duration and idling duration (SPRAY dial Ⓓ, PAUSE dial Ⓔ). Then turn sprinkler selector switch Ⓒ to the TIMER position. Sprinkling will start.



- Sprinkling duration can be adjusted within 0 – 20 seconds with dial Ⓓ . Idling duration can be set within 0 – 60 seconds by turning dial Ⓔ .

- Adjsut the dials to meet job conditions.
  The sprinkler indicator lamp stays bright as long as the sprinkling is being performed.

- The table below serves as a guide for sprinkling and idling durations.

Macine speed km/h (mile/h)	Sprinkling duration (seconds)	Idling duration (seconds)
2 (1.2)	7 – 8	35 – 40
3 (1.9)	4 – 5	30 – 35
4 (2.5)	3 – 4	25 – 30
5 (3.1)	2.5 – 3.5	20 – 25

- For normal operation (3 km/h,1.9 mile/h), use the sprinkler with a sprinkling duration of 5 seconds and an idling duration of 30 seconds. Adjust according to job requirements.

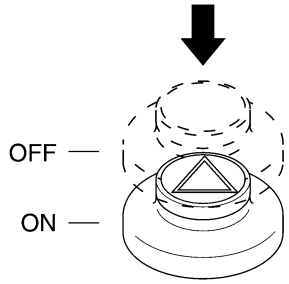
- When compacting asphalt mixes, select CONT. to fully wet the drum surface, then switch to TIMER. Follow the same procedure for starting the work after a short break.

IMPORTANT

- **When either of sprinkler switches Ⓐ and Ⓑ is selected, only either of front and rear water tanks will be consumed. Be careful for cock operation.**
- **Water may shift to the lower tank from the higher tank on sloping ground, and it will go out from the water inlet. Pay attention to cock operation.**

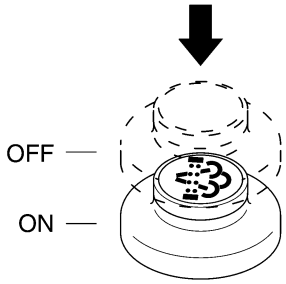
Hazard Switch

Pushing the switch causes turn signal lamp and turn signal indicator lamp start to flash simultaneously. Pushing the switch again causes the lamps to go off.



Parked regeneration switch

Press this switch when the parked regeneration request lamp (amber) is flashing to clean the DPF.



⚠ CAUTION

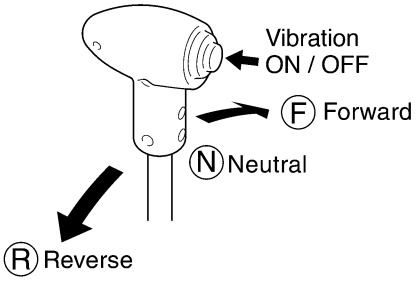
Pressing the switch when the parked regeneration request lamp (amber) is off will not clean the DPF.

NOTE: Refer to 2.2.1 Handling the DPF on page 40 for details on the conditions and points to beware of in manual regeneration.

2.1.4 Operating levers and pedals

Forward-Neutral-Reverse (F-N-R) lever with vibrator switch

Moving the F-N-R lever forward or backward makes the machine travel forward or backward respectively. The neutral position Ⓝ brings the machine to a stop. The macine speed increases or decreases in proportion to the lever displacement.
The vibrator ON-OFF control is easily made by the F-N-R lever top vibrator switch (See page 33).

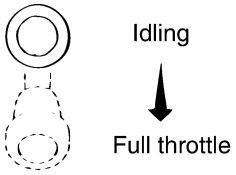


IMPORTANT

- **For normal braking, return the F-N-R lever back to neutral.**
- **In an emergency, depress the brake pedal. More powerful braking will take place.**

Throttle lever

Shifts the engine RPM.
The engine RPM increases when moved toward the operator.



Brake pedal

Use it in emergencies. Carry out inspections in accordance with “3.3 Periodical Maintenance Points” (refer to page 74) after each use.
In an emergency, push down on the pedal to the full extent, and the machine will come to a sudden stop.

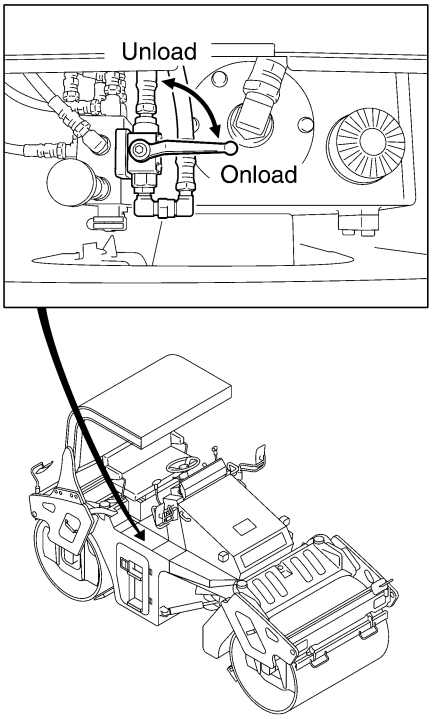
IMPORTANT

Do not use the pedal wherever practicable except for an emergency. If used during the compacting operation of ashalt pavement, this can cause damage to its surface.

NOTE: Depressing the brake pedal brings the F-N-R lever into neutral position Ⓝ.

2.1.5 Unloader valve

To gain access to the unload valve, open the cover at the right hand side of the operator's seat.
The unloader valve disengages the drive, playing a role like a clutch. Use this valve for towing the machine when the engine is disabled or when troubles have developed in the hydraulic drive.



For towing:
Turn the lever counterclockwise (Unload).
For normal traveling:
Turn the lever clockwise (Onload).

⚠ WARNING

- **On a slope, chock the wheels and use extreme care when handling the unloader valve and towing the machine.**
- **Be sure to apply the parking brake when operating the unloader valve.**
- **Unloading the unload valve will disengage the engine, so never get in front of or behind the machine.**

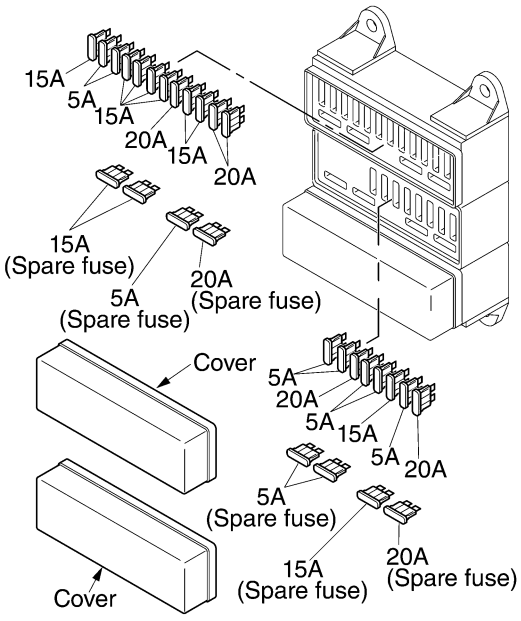
NOTE: For normal travel, be sure to hold the valve in the ONLOAD position.

2.1.6 Fuse box

⚠ WARNING

When changing a fuse, cut the power supply by turning the starter switch to the OFF position.

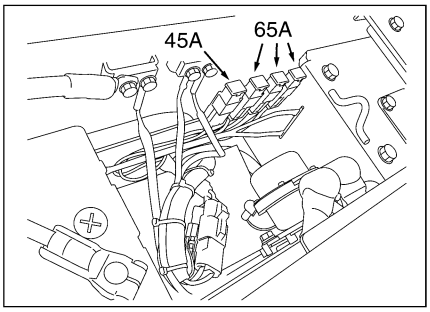
Fuses protect electrical components and wiring from burning. Change any fuse which has become powder-coated due to deterioration or which has a play between it and fuse holder. To replace fuses, take off the cover.
Be sure to use fuses of correct capacity.



2.1.7 Fusible link

⚠ WARNING

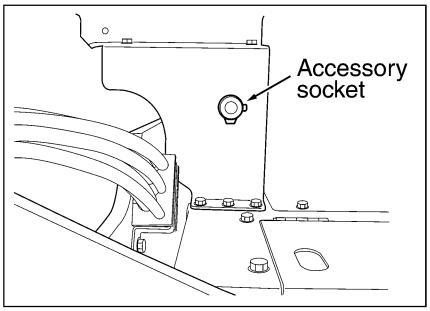
Be sure to turn off the electricity (by turning the starter switch OFF) before replacing the fusible link.



As with ordinary fuses, this protects electronic equipment and circuits from burnouts.
If the starter does not turn on when the starter switch is turned to the ON position, there is the possibility of a fusible link burnout caused by problems with the electronic equipment or circuits. Inspect and replace the fusible link after inspecting the electronic equipment and circuits.

Be sure to replace the fusible link with one of the same capacity.

2.1.8 Accessory socket



The accessory socket may be used when the starter switch is turned to the ON position.
Open the cover, and a 12 V DC can be drawn from the socket for powering electronic equipment.

⚠ WARNING

When connecting electronic equipment to the accessory socket, make sure it does not obstruct the raising and lowering of the F-N-R lever.

⚠ CAUTION

- **Use electronic equipment that consumes no more than 120 W (12 V, 10 A).**
- **Keep the cover closed when not in use to prevent foreign matter from getting inside.**
- **There is a possibility of the battery running flat when the accessory socket is used for a long time to power electronic equipment with the engine turned off or idling.**

2.2 Handling and Adjustments

2.2.1 Handling the DPF

About the DPF (diesel particulate filter)
The DPF is a filter, which collects PM (particulate matter) contained in the exhaust gas to automatically or manually burn (regenerate) it. Be sure to observe the following to maintain the performance of the DPF.

- Always use fuel and lubricants designated or recommended by our company (refer to page 98).
- Do not modify the DPF muffler or exhaust pipe in any way. It may hinder its proper performance or lead to breakdowns.
- Do not use DPFs that have been dropped. The DPF consists of a ceramic catalyst installed inside the muffler. A strong impact may damage the DPF.

Regeneration the DPF

When the amount of PM accumulated in the DPF reaches a specified level, the auto regeneration lamp (green) will turn on and the PM will be automatically burned (regenerated). If the conditions do not allow automatic regenerating, the parked regeneration request lamp (amber) will flash to enable manual regenerating.

⚠ WARNING

- **Do not carry out regenerating in enclosed spaces with poor ventilation, such as inside a garage or a room. There is the danger of carbon monoxide poisoning.**
- **Check to make sure there are no inflammables near the mouth of the exhaust pipe to prevent fires.**
- **Do not touch or let people go near the exhaust pipe or muffler, which will be hot during cleaning, and for a while after regenerating.**
- **Carrying out regenerating on painted roads may cause the paint to discolor.**
- **Carrying out regenerating in front of hedges may cause them to wither.**

Automatic regeneration

If the coolant temperature and exhaust temperature are at a specified level when the auto regeneration lamp (green) turns on, the PM accumulated in the DPF will automatically be burned (regenerated). If even one of the conditions strays from the specified level during automatic regeneration, it will stop. Furthermore, the machine can be driven as usual during automatic regeneration.
Burning (regenerating) will stop when the auto regeneration lamp (green) turns off.
* Automatic regenerating cannot be carried out when the auto regeneration lamp (green) is flashing.

Manual regeneration

The PM accumulated in the DPF can be burned (regenerated) by following the procedures outlined below, while the parked regeneration request lamp (amber) is flashing.
Failure to carry out manual regeneration may lead to breakdowns.
Follow the procedures below to carry out manual regeneration:
1) Move the machine to safe location.
2) Shift F-N-R lever into neutral.
3) Push on parking brake switch.
4) Keep engine rpm at idle.
5) Push on parked regeneration switch.

The parked regeneration request lamp (amber) will flash then turn on, after which the engine will automatically rev up and manual regeneration will begin. Manual regeneration will finish when the engine returns to idling and the parked regeneration request lamp (amber) turns off. Manual regeneration will stop if the parking brake switch, F-N-R lever, throttle lever, or accelerator pedal are operated during regeneration.

⚠ CAUTION

- **When stopping the machine during automatic regeneration, keep the steering wheel straight. After stopping, do not turn the steering until the automatic regeneration has been completed.**
- **Keep the steering wheel straight while you carry out manual regeneration. Do not turn the steering wheel until the manual regeneration has been completed.**
- **After burning (regeneration), do not turn the engine off immediately. Leave the throttle lever in the idling position for around 5 minutes, let the engine idle, and gradually let it cool. Stopping the engine suddenly without letting it cool may shorten the life span of engine parts.**
- **Continuing to drive the machine without carrying out manual regeneration, while the parked regeneration request lamp (amber) is flashing, will turn on the engine warning lamp, and the engine output will be limited. Carry out manual regeneration immediately.**

Regeneration "RGN" of DPF for Roller Operator / Engine Diagnosis

Soot accumulated at DPF can be burned and regenerated automatically and/or manually. Maintain DPF and engine properly by following this instructions and/or operator manual.

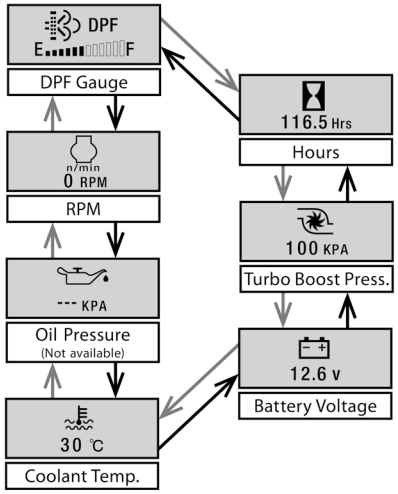
Level (Stage)	DPF E…F DPF Gauge	Green Lamp Auto RGN	Amber Lamp Parked RGN Request	Black Switch Parked RGN	Red Lamp Emission Sys. Warning	Auto RGN	Parked Manual RGN	Limit of Engine Output	Operations
0 (No RGN Needed)	**1 – 11**	Off	Off		Lamp Off	No Need	No Need	NO	RGN is not required. Normal machine operation is available.
1 (Auto RGN)	**12 (Max)** RGN may start even below level 12 according to amount of soot left at DPF.	Lamp On	Off		Lamp Off	Applicable	No Need	NO	When green lamp goes on during Auto RGN, **keep engine RPM at Max** for 30 min to perform best RGN Normal machine operation is available.
2 (Requesting Parked RGN)		Lamp On	Blinking	Start Parked RGN by pushing the switch. Amber lamp blinking changes to light-on.	Lamp Off	Applicable	Applicable	NO	Perform a Parked RGN as early as possible by following instructions, "Procedure of Parked RGN" below, when the Amber lamp starts blinking while Green lamp is on. Parked RGN may be cancelled even though Amber lamp blinks, if Max RPM can be maintained for 30 min.
3 (Parked RGN Urgent Request)		Blinking	Lamp On		Lamp On	Not Applicable	Applicable	YES	**URGENT:** If Red Warning lamp turns on while the Green and Amber lamps are blinking a Parked RGN must be performed urgently to prevent possible costly repairs. If Red lamp doesn't go off after Parked RGN, access the engine error codes at DPF Meter and contact your Sakai dealer or company Techs.
4 (RGN with Service Tools)		Blinking	Off		Lamp On	Not Applicable	Not Applicable	YES	If Green lamp is blinking and Red lamp goes on, Parked RGN by operator is impossible. In this condition DPF may only be regenerated using special service tools. Contact your Sakai dealer or company Techs.
5 (DPF Cleaning)		Blinking	Off		Lamp On	Not Applicable	Not Applicable	YES	The engine controller may shut down the engine if above request for parked RGN are ignored. The engine will not restart until the DPF unit is replaced or cleaned using special tools. Contact your Sakai dealer or company Techs.
Engine Diagnosis (DPF Meter)	Diagnostics Active DM1 Stored DM2 ✕ ✓	Blinking			Lamp On				The Red Emission System Warning Lamp also serves as Check Engine Alert. This lamp turning on may be signal problems unrelated to emission system. See the operation manual in detail.

General Cautions for Safe RGN	1. Don't perform Parked RGN in closed unventilated space. Poisoning by carbon monoxide gas can occur. 2. Don't touch and/or get close to "HOT" DPF and exhaust pipes during and after RGN to avoid burns. 3. Hot exhaust gas can ignite combustible material during RGN. Insure hot exhaust is dissipated away from combustible materials. 4. Exhaust smoke may be white during part of RGN.	**Procedure of Parked RGN**	1. Move the machine to safe location. 2. Shift FNR lever into neutral. 3. Push on the parking brake switch. 4. Keep engine rpm at idle. 5. Push on the Parked RGN black switch. With a start of RGN, Amber lamp stops blinking and goes on. 6. The engine will rev up for about 30 min, and then return to idle, and then lamps turn off when RGN is complete. 7. Idle for 5 minutes after Parked RGN. Do not shut down immediately after Parked RGN. [NOTE] If Parked RGN is cancelled by operating FNR lever or parking brake switch or throttle lever (gas pedal), you must start the Parked RGN process over.
Daily Check of Engine Oil Level and Oil Change	1. If engine oil level exceeds the upper level, change oil as soon as possible. Engine may be damaged by oil mixed with post-injected fuel during RGN. 2. Change oil when RGN interval gets shorter than 5 hours. 3. Be sure to use engine oil with grade of JASO DH-2 or API CJ-4.		

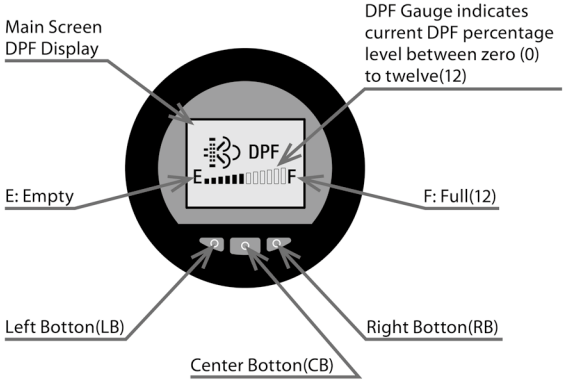
Engine Service Info in DPF Meter

Counterclockwise
Hold a right button (RB) about 10 sec.
DPF Gauge display is changed (goes down) to"RPM" as indicated by yellow arrow.
Every time pressing the RB, the display goes down as indicated by red arrows, and then comes back to DPF Gauge display.

Clockwise
Hold a left button (LB) about 10 sec.
Display is changed from DPF Gauge to "Hours" at bottom as indicated by green arrow.
Every time the LB is pressed, the display goes up as indicated by green arrows, and then comes back to DPF Gauge display.



DPF Meter

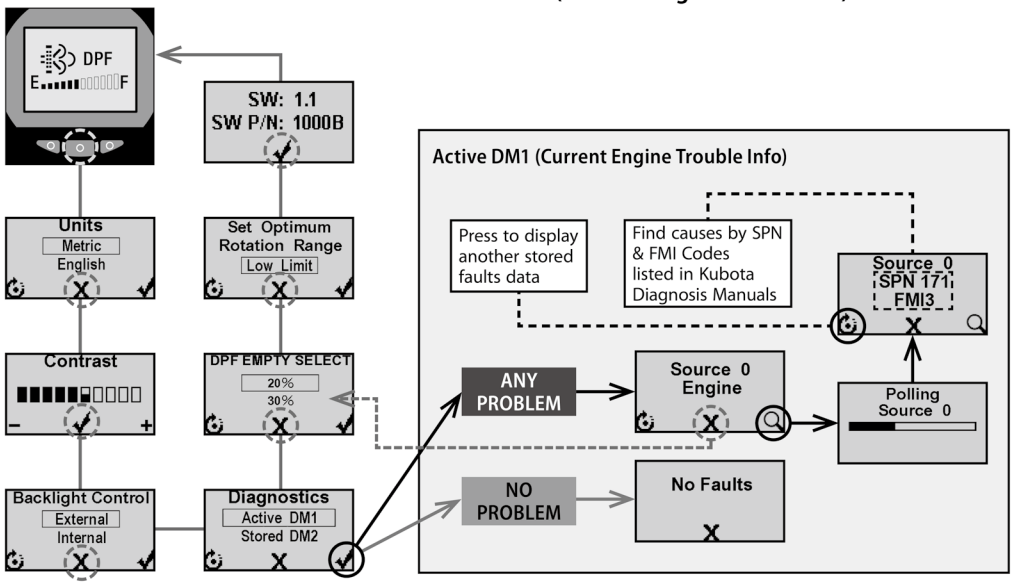


Engine Diagnosis in DPF Meter

How to access to Engine Error Codes?
When Green lamp blinks on and Red lamp goes on, check engine error codes in the Diagnosis section of DPF Meter.
Hold Center button about 10 sec until next Display is shown.
"Metric or English", Press " X " at Center button.
"Contrast", Press " ✓ " at Center button.
"Backlight Control", Press " X " at Center button.
"Diagnosis", Select "Active DM1" and press " ✓ " at Right button.
If no problem, display shows "No Faults", and then press " X " at Center button to move next display.
If there are problems, display shows "Source 0 Engine". Press " 🔍 " at Right button.
"SPN and FMI" code numbers are displayed after showing "Polling Source" with bar graph. See SPN 171 and FMI 3, as an example.
To see another error codes, press " ↻ " at Left button, then press " X " at Center button to move next display.
Contact Sakai dealer or company Techs to let them know the codes.

Engine Diagnosis

Active DM1 (Current Engine Error Code)



2.2.2 Awning (For SW654H)

1) To fold the awning:
   ① Remove the fixing bolts (two locations; right and left) by turning counterclockwise.
   ② Lift the lock pins (two locations; right and left), rotate slightly clockwise or counterclockwise to let them stay away from their lock hole.

⚠ WARNING

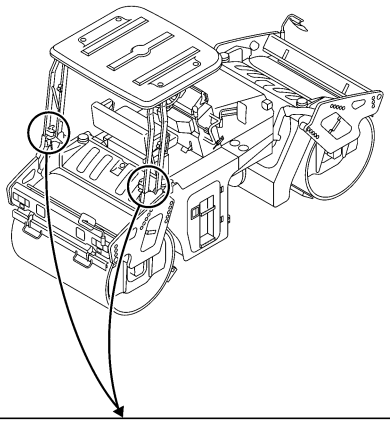
When handling the awning, keep your feet away from the folding columns.

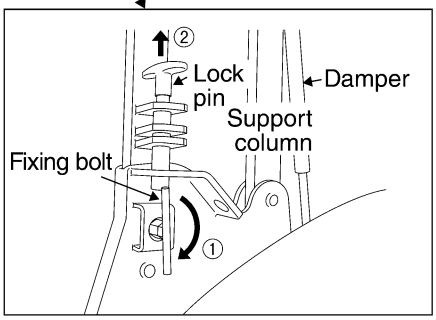
NOTE: Pushing the support column backward will facilitate lifting of lock pin.

   ③ Fold the supporting columns slowly forward.

⚠ CAUTION

When folding down the awning, use care not to bump your head against it.





   ④ Lower and put the lock pin into its lock hole by turning slightly clockwise or counterclockwise.
   ⑤ Make certain the lock pin is positively in the locking hole.

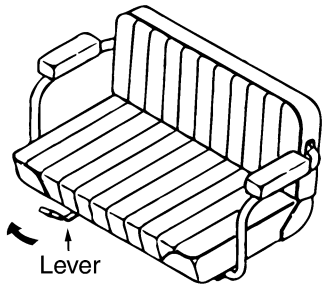
2) To set up the awning:
   ① Lift the lock pins (two locations; right and left), rotate slightly clockwise or counterclockwise to let them stay away from their lock hole.
   ② Set the columns slowly.
   ③ Rotate the lock pins slightly clockwise or counterclockwise to let them get into its lock hole.
   ④ Screw in the fixig bolt until tight by turning clockwise to fix the columns.

⚠ WARNING

- **When the awing is folded, loosen the fixing bolt, unlock the lock pin, then fold the supporting columns forward after making sure the damper to permit easy column lifting is functioning.**
- **If the damper is not working use care because the supporting columns can fold forward quickly.**
- **In case the damper fails to work, replace it with new one.**

2.2.3 Seat adjustment

Adjust the seat for your best operating position. Move the lever as shown by arrow. With the lever held in that position, slide the seat forward or backward as desired. When properly adjusted, release the lever.



⚠ WARNING

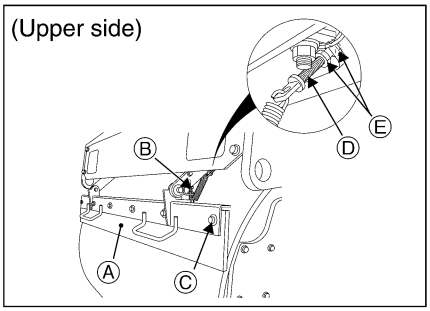
The adjustment will be necessary when operating the machine first or when operators are alternated.

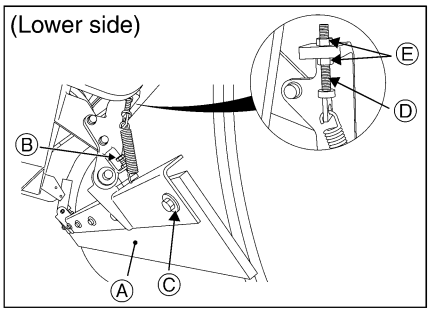
2.2.4 Adjustment and replacement of scraper

The method of adjustment and replacement of scraper is the same both for front and rear drums.

1) Adjustment of clearance between scraper blade Ⓐ and roll
   ① Loosen set bolts Ⓑ (two locations).
   ② Loosen bolts Ⓒ (six locations). Slide blade Ⓐ until it touches the roll.
   ③ When the blade touches the roll, tighten bolt Ⓒ .
   ④ Adjust the clearance between the roll and blade using set bolt Ⓑ .

2) Replacement of scraper blade
   ① Remove bolts Ⓒ (six locations).
   ② Replace blade Ⓐ with a new one.
   ③ Attach bolts Ⓒ (six locations) and tighten them.





⚠ WARNING

- **Hold blade Ⓐ and raise it slowly so that your hand will not be caught between the roll and blade.**
- **When returning raised blade Ⓐ to the original position, exercise care so that your hand will not be caught between the roll and blade.**

NOTE: • The scraper can be raised so that it will not be in contact with the roll during operation.
• The force to press the scraper blade to the roll can be adjusted by bolts Ⓓ (two locations) and nuts Ⓔ (four locations).

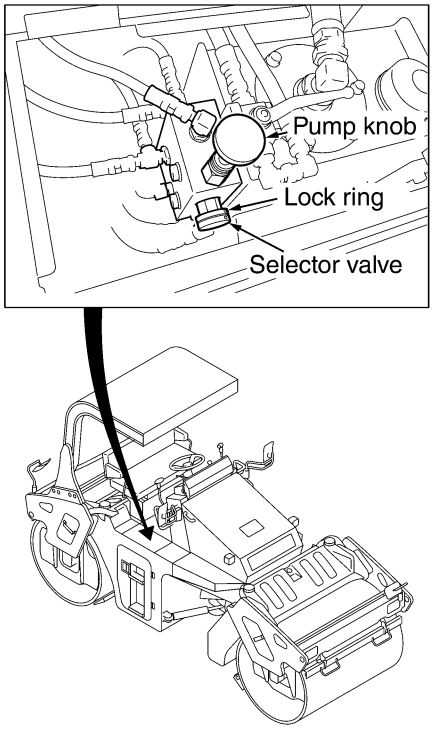
2.2.5 Disengaging the brake when towing

⚠ WARNING

On a slope, chock the drums and prepare for towing before disengaging the brake.

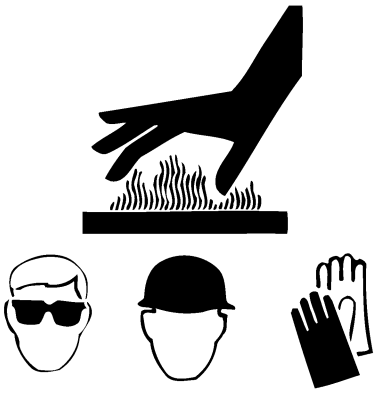
For towing the machine when the engine is disabled or when troubles have developed in the hydraulic system for propulsion, disengage the brake as instructed below:

1) Loosen the lock ring of the selector valve and turn the valve knob counterclockwise until it stops.
2) Pull up and press the knob of the pump. The parking brake can be released by pressing it about 5 times. When you feel a strong pushing force, it means the parking brakes have been released. Stop work when you feel this.
   Continuing to push may result in a breakdown of the machine.
3) After the traction is completed, be sure to turn the selector valve knob clockwise until it stops and fix it with the lock ring.



⚠ WARNING

- **Do not try to release the brake immediately after a hot engine has been stopped. Let the oil cool down.**
- **For the brake disengagement, wear hard hat and safety goggles.**



⚠ CAUTION

Traction should not exceed 2 km/h and 10 minutes.

2.3 Operation

⚠ WARNING

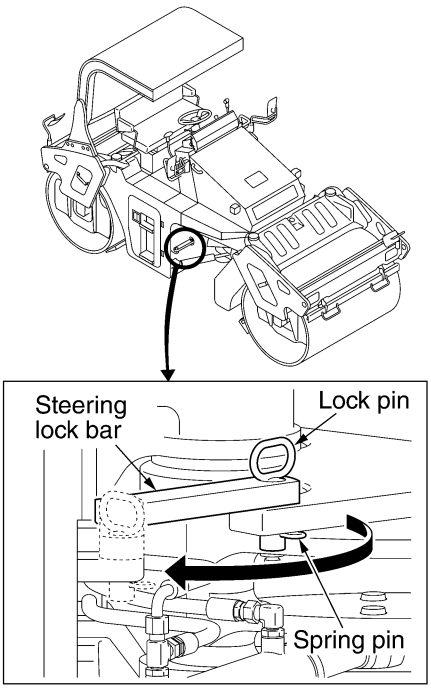
- **This machine is a one-man roller.**
- **Operate the machine from the operator's seat.**
- **Be sure to wear the seatbelt during operation.**

2.3.1 Before-starting inspection

1) Check that the steering lock bar is in the carrying position.

⚠ WARNING

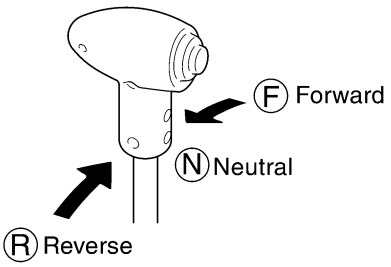
Make sure that the steering lock bar is connected in the carrying position before putting the machine in motion. Steering is impossible if the bar is in the steering lock position.



The bar is located at the left of the center of the machine.
To unlock the bar:
① Remove the spring pin.
② Pull out the lock pin.
③ Set the bar in the carrying position.

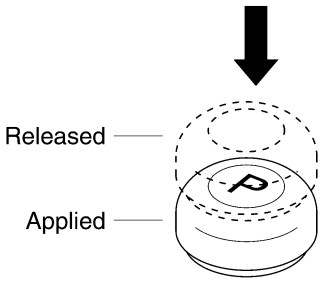
NOTE: Lock the bar by pushing in the lock pin and inserting the spring pin.

2) Check that the F-N-R lever is in the neutral position Ⓝ .



3) Confirm that the parking brake is engaged.

NOTE: When the F-N-R lever is not in the neutral position Ⓝ , or the parking brake has been released, the interlocking system goes into operation and the engine will not turn on. Be sure to confirm that the F-N-R lever is in the neutral position Ⓝ , and that the parking brake is engaged before starting the engine.

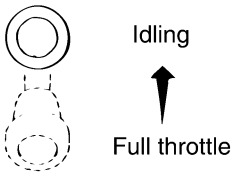


2.3.2 Starting the engine

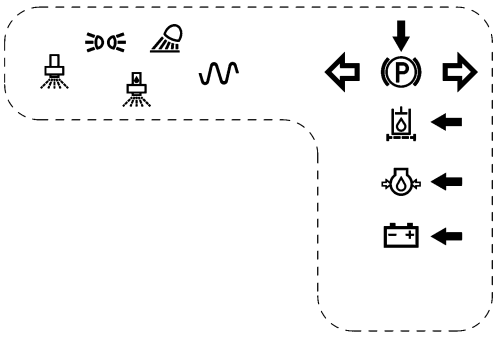
⚠ WARNING

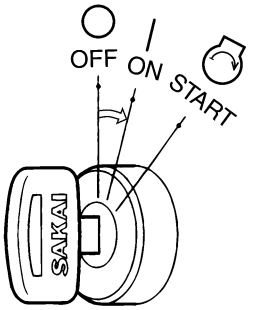
Check that the F-N-R lever is in the neutral position Ⓝ, and press down the parking brake switch and sound the horn when starting the engine after making certain that there are no one and no objects close to the machine.

1) Set the throttle lever in the idling position.

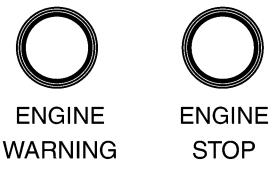


2) Turn the starter switch to the ON position and check that the warning lamps and parking brake indicator lamp on the monitor display are on.

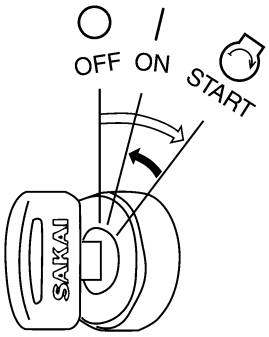




3) Start the engine after the engine warning lamp and the engine stop lamp have flashed once, then turned off.



4) Turning the key to the START position makes the engine start. Release the key the moment the engine has started. The key will automatically return to the ON position.



⚠ CAUTION

- **Do not allow the starter key to stay in the START position for more than 15 seconds.**
- **When the engine fails to start, or you want to restart the engine immediately after turning it off, wait around 30 seconds before restarting it.**
- **Check that the warning lamps on the monitor display go off immediately after the engine is started. If any of these warning lamps becomes bright while the engine is running, shut down the machine, determine the cause and rectify the fault.**

2.3.3 After starting the engine

Try not to move to operation immediately after starting but observe the following:

IMPORTANT

Avoid increasing the engine speed abruptly before warming-up run is completed.

1) Run the engine at around 1,200 rpm for about 5 minutes to warm it up. Warming-up run allows the lubricating oil to reach the vital parts of the engine and hydraulic system, gradually warm the engine, engine oil and hydraulic oil to prepare the machine for driving.
2) After the warm-up operation, check that:
   - Temperature gauge ..... Slightly above C
   - Fuel gauge ..... Pointer falls between the E and F marks
   - Charge lamp ..... Has gone off
   - Engine oil pressure warning lamp ..... Has gone off
   - Auto regeneration lamp (green) ..... Has gone off
   - Parked regeneration request lamp (amber) ... Has gone off
3) Check for the color of exhaust gas, listen for unusual sounds and vibration. If abnormal, determine the cause and correct the problem.

⚠ WARNING

Stay in the driver seat during operation.

2.3.4 Traveling

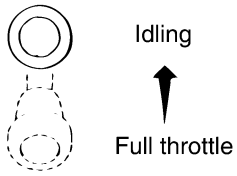
⚠ WARNING

- **When starting, operate the horn after securing the safety around the machine. Clear away obstacles on the road.**
- **Be sure to wear the seatbelt during operation.**

⚠ CAUTION

While travelling, do not turn the starter switch OFF.

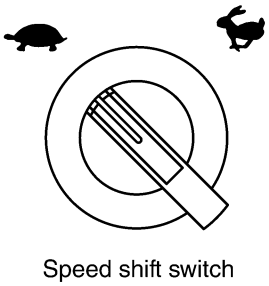
1) Put the throttle lever in the idling position.



2) Select the desired speed by the operation of speed shift lever and speed shift switch.

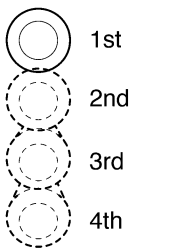
km/h (mile/h)

Speed shift lever / Speed shift switch	1	2	3	4
LOW	0 – 2 (0 – 1.2)	0 – 3 (0 – 1.9)	0 – 5 (0 – 3.1)	0 – 6 (0 – 3.7)
HIGH	0 – 4 (0 – 2.5)	0 – 6 (0 – 3.7)	0 – 9 (0 – 5.6)	0 – 12 (0 – 7.5)


Speed shift switch

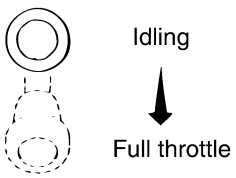
⚠ WARNING

- **Drive in a low speed on slopes and do not operate the speed shift switch or lever.**
- **Do not operate the speed shift switch or lever while driving the machine. Change the speed only when the machine is stationary.**
- **On a steep slope, run the machine at low speed.**

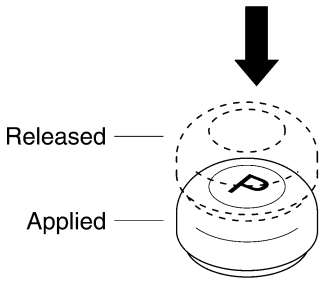


Speed shift lever

3) Push down the throttle lever to increase the engine speed.



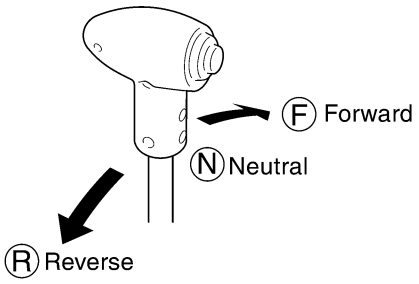
4) Press down the parking brake switch to release the brake. Check that indicator lamp (Ⓟ) on the monitor display goes off.



5) Move the F-N-R lever in the direction to travel, and the machine will begin traveling.

⚠ CAUTION

Avoid abrupt operation of the F-N-R lever.



NOTE: The travel speed can be controlled by the throttle lever and F-N-R lever.

⚠ WARNING

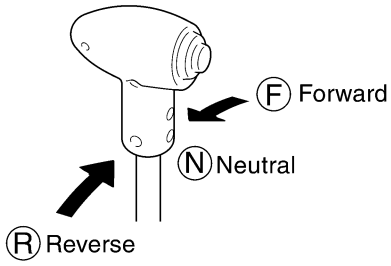
Pay extreme attention to the area behind the machine when backing, since the space just behind it tends to be a blind spot.

2.3.5 Stopping / Parking

⚠ WARNING

- **Avoid abrupt braking. Try to leave enough time for braking.**
- **Avoid parking on a grade.**
- **If necessary to park on a grade, block the wheel to prevent unexpected moving down the grade.**

1) Bring the F-N-R lever to the neutral position Ⓝ, and the machine will come to a halt.



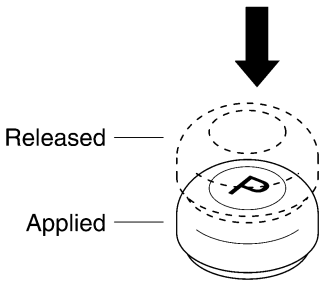
⚠ WARNING

Frequent use of the brake pedal may damage the motor.

⚠ CAUTION

For normal braking, move the F-N-R lever back to the neutral position Ⓝ . In an emergency, depress the brake pedal. The F-N-R lever is brought back to the neutral position Ⓝ .

2) Press the parking brake switch securely, and check that indicator lamp (Ⓟ) illuminates.



2.3.6 Stopping the engine

1) Gradually cool down the engine at low idling for about 5 minutes.

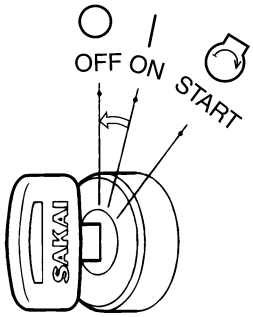
IMPORTANT

- **Do not bring a hot engine to a sudden stop except for an emergency. This will shorten the life of its component parts.**
- **Do not also allow an overheated engine to come to a sudden stop, but run it at middle idling speed for gradual cooling down.**

2) Turn the starter key to the OFF position to stop the engine.

⚠ CAUTION

While travelling, do not turn the starter switch OFF.



3) Pull off the starter switch key.

⚠ WARNING

- **When dismounting from the machine, apply the parking brake by actuating the parking brake switch. If necessary to park on a slope, chock the drums.**
- **Remove the starter switch key.**

2.3.7 Check after stopping the engine

1) Perform the walk afround checks for oil and water leakage, abnormal signs around the drums.
2) Fill the fuel tank.
3) Remove waste paper if any from the engine compartment, as this will pose a possible fire hazard.
4) Scrape mud or other materials from and around the drums.

2.4 Vibratory Operation

1) Operate the throttle lever to set the engine speed at more than 1,600 rpm.
2) Use vibrator switch Ⓐ to select low or high amplitude vibration (selection of oscillatory or nornally vibration for SW654ND) and select vibration ON or OFF.

= SW654, SW654H, SW654B =

: High amplitude vibration

○ : Vibration stop

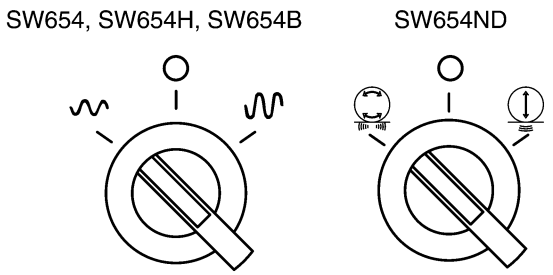
: Low amplitude vibration

= SW654ND =

: Normally vibration

○ : Vibration stop

: Oscillatory vibration



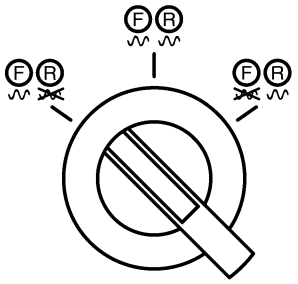
Vibrator switch Ⓐ

3) Vibration drum selector switch Ⓑ permits selection of front / rear drum vibration, front drum vibration, or rear drum vibration.

Ⓕ Ⓡ : The front and rear drums (both drums) vibrate.

Ⓕ Ⓡ : The front drum vibrates.

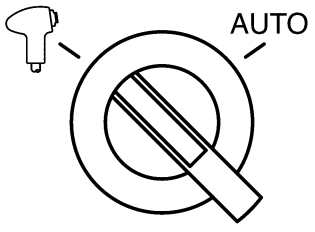
Ⓕ Ⓡ : The rear drum vibrates.



Vibration drum selector switch Ⓑ

4) The switch permits selection of automatic or manual vibration selector switch Ⓒ. No matter what mode the machine is in, vibration will stop when the F-N-R lever is set in the neutral position Ⓝ.

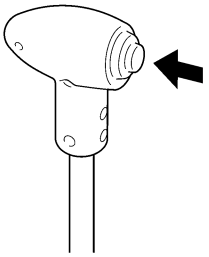
: The vibrator switch attached to the F-N-R lever permits ON and OFF. Press the switch for vibration. Press the switch again to stop vibration.
Set the vibrator switch attached to the panel in the or (or for SW654ND) position before operating the vibrator switch on the F-N-R lever.



Vibration drum selector switch Ⓒ

AUTO : The machine starts and vibrates simultaneously when the F-N-R lever is set in the Forward or Reverse position while the vibrator switch is in the ∿ or ⋀⋀ (ⓘ or ⓘ for SW654ND) position.

The vibrator switch mounted on the F-N-R lever also shuts off vibration. When using this switch, set the vibration selector switch to the ☝ position.



Vibrator switch

5) Proper travel speed for vibratory compaction is 2 – 7 km/h (1.2 – 4.4 mile/h), however, select speeds depending upon job requirements.

⚠ CAUTION

Shut off the vibrator immediately when the machine has been caught in the mud during vibratory operation.

2.5 Sprinkler

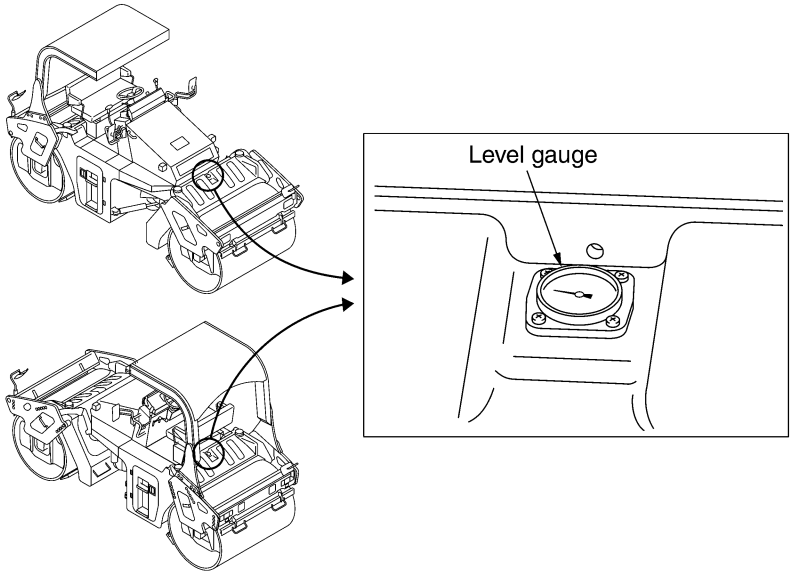
1) Before sprinkling, check for the water level in the sprinkler tank with the sight level gauge. Add water as necessary.

⚠ CAUTION

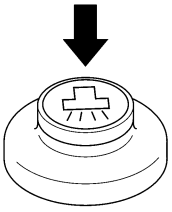
Do not fill the sprinkler tank quickly.
It may damage the tank.

IMPORTANT

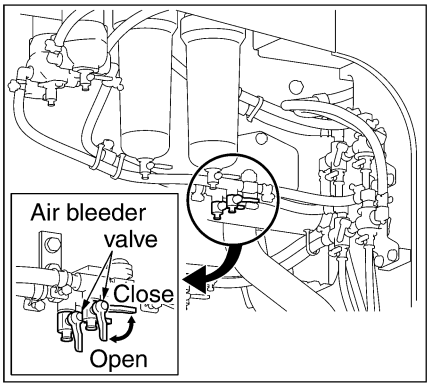
Use clean water wherever practicable.



2) Push sprinkler switches ⒶⒷ (PUMP1 and PUMP2) to activate the sprinkler pump for sprinkling.
   • When spray is started from the state that watering circuit is empty, execute air bleeding operation by opening the cocks of Air bleeder valves.

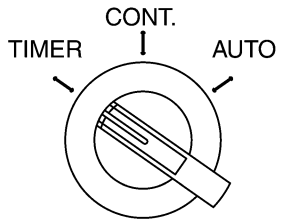


Sprinkler switch ⒶⒷ



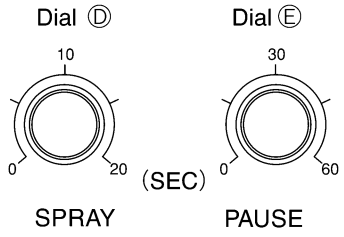
3) Sprinkler slector switch Ⓒ selects sprinkler modes; continuous sprinkling mode and intermittent sprinkling mode.

   CONT. : Continuous sprinkling
   AUTO : Spraying is done interlocking with forward / backward movement.
   TIMER : Intermittent (timer) sprinkling



Sprinkler selector switch Ⓒ

For intermittent spray, set the spray time in the following manner:
Spray time is adjustable between 0 – 20 seconds with SPRAY Dial Ⓓ and so is pause time between 0 – 60 seconds with PAUSE Dial Ⓔ respectively as desired. Adjust it according to the job requirement.
The sprinkler indicator lamp stays bright as long as the sprikling is being performed.



- The table below serves as a guide for sprinkling and idling durations.

Macine speed km/h (mile/h)	Sprinkling duration (seconds)	Idling duration (seconds)
2 (1.2)	7 – 8	35 – 40
3 (1.9)	4 – 5	30 – 35
4 (2.5)	3 – 4	25 – 30
5 (3.1)	2.5 – 3.5	20 – 25

- For normal operation (3 km/h, 1.9 mile/h), use the sprinkler with a sprinkling duration of 5 seconds and an idling duration of 30 seconds. Adjust according to job requirements.

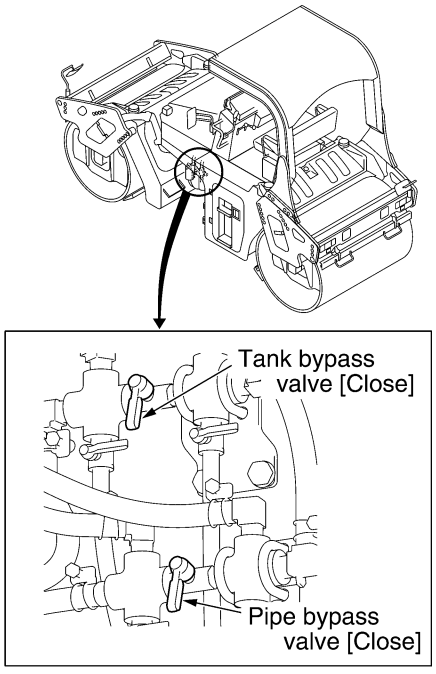
⚠ CAUTION

- **Pay attention to level of water, because turning the pump with empty tank results in trouble.**
- **Sprinkling may stop if either of the front or rear sprinkler tanks becomes empty. Check for the water level in the sprinkler tank.**
- **To avoid freezing, fully drain the sprinkler tank, pipes and filter in cold weather (See "To drain water" on page 59).**

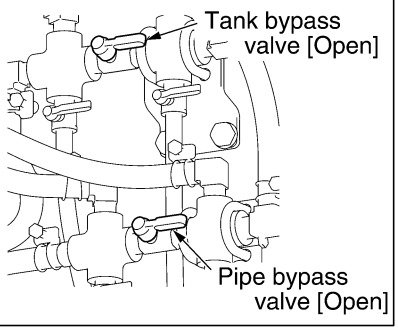
IMPORTANT

When compacting asphalt mixes, select CONT to fully wet the drum surface, then switch to TIMER. Follow the same procedure for starting the work after a short break.

4) If the valve near the filter is switched as shown at the right, independent spray circuit is formed to use the front or rear tank with the front or rear drum (Standard mode).



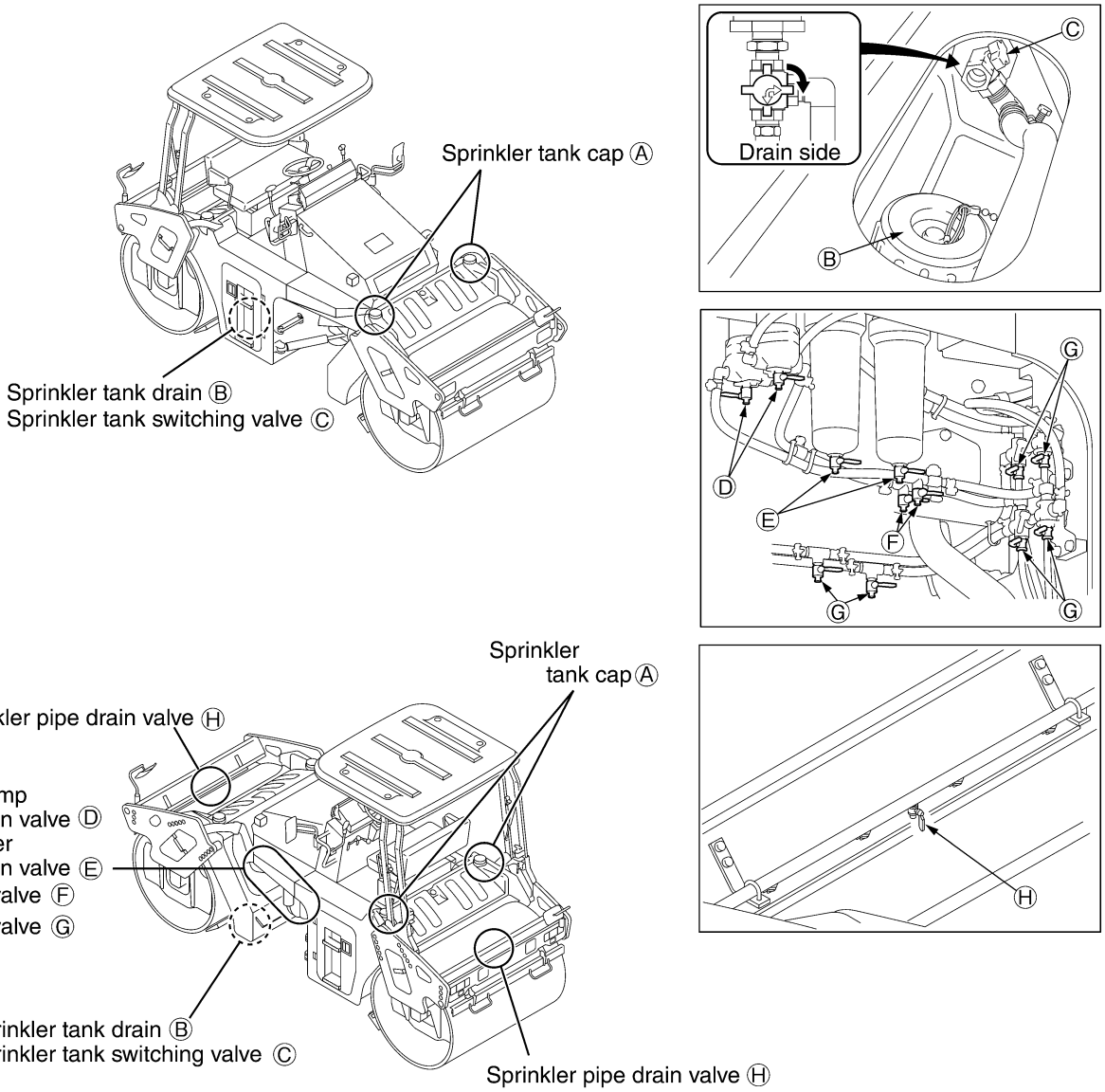
- If the valve near the filter is switched as shown at the right and one switch of either pump 1 or 2 is pressed, it becomes possible to spray to the front and rear drums with one pump (ECO mode / Back up mode).



NOTE:
- In the ECO mode, the spray quantity is smaller in comparison with the standard mode. If the spray quantity is insufficient, use the standard mode.
- If one pump becomes abnormal or fails, repair it as soon as possible by contacting our nearest office or specified factory, though the spraying in the ECO mode is possible.

IMPORTANT

In the ECO mode, tank bypass valve is opened, and on a slope, water moves from the higher tank to the lower tank and overflowing may occur from the lower tank. To prevent this, close this valve when out-of-service or parking.



To drain water:

1) Take off the caps Ⓐ of sprinkler tanks.
2) Take off the drain caps Ⓑ of the tanks and drain water from the tanks completely.
3) Switch the sprinkler tank switching valve Ⓒ to drain side.
   Open cocks of Pump drains Ⓓ, Filter drains Ⓔ, Air bleeder valves Ⓕ, and Hose drains Ⓖ to drain water completely.
4) Open cocks of sprinkler pipe drain Ⓗ to drain water completely.
5) Run sprinkler pumps approximately 30 seconds with drain cocks open to drain water from the pump.
6) Remove water also in spray nozzles.

2.6 Precautions for Work

2.6.1 Compaction operation

■ Do not operate the vibrator on hard location

- Do not work the vibrator on a hard surface such as concrete pavement, as this can cause the machine to jump and give abnormal shock load. Damage to shock isolators will result.

■ Change the direction of travel gently

- When changing the direction of travel during asphalt mix compaction, slowly shift the F-N-R lever.

■ Drive at a speed appropriate for the road surface conditions

- Drive slowly on uneven surfaces.

2.6.2 When going downhill

■ Use the F-N-R lever

- Run slowly by the operation of the F-N-R lever even if the travel distance is short.

■ Use the engine brake

- Go downhill by applying the engine brake along with the F-N-R lever operation.

⚠ WARNING

When going uphill, run at low speed. Do not attempt to shift speeds during travelling. The machine can slip down the slope.

2.6.3 On a slope

■ Working on a sidehill

- Work in an uphill / downhill direction, and avoid working on sidehill with the machine inclining sideways.

2.7 Applicable Jobs

The machines do a variety of jobs as listed below.

1) This machine is mainly used for:
   - Static compacting work
   - Vibratory compacting work

2) Road rollers do a variety of jobs as listed below.

Work

- Asphalt road paving
- Dust removal treatment for road
- Road improvement
- Embankment construction
- Dam construction
- Construction of forestry and farm roads
- Foundation building
- Construction of sidewalk, shoulder and gutter foundation

Material to be compacted

- Asphalt pavement
- Crusher run
- Cement concrete
- Sands
- Soils
- Slag
- Soft rock

⚠ CAUTION

If the compaction material is hard, the rolls may wear prematurely due to rolling pressure or scratch.

Layers to be compacted

- Surface course, Binder course
- Base course
- Subgrade
- Embankment
- Shoulder
- Sidewalk

2.8 After Operation

Check for the coolant temperature, engine oil pressure and fuel level.

Follow the procedures below to prevent the machine from falling into an unworkable condition the following morning caused by muds and other extraneous matter on the drum, or frozen drums:

1) Remove muds and water from the machine. Muds can get into the seals together with water drops on the hydraulic cylinder piston rod. Damaged seals will result.
2) Park the machine on a hard and dry surface. If such a place is not available, cover the ground with hard plates.
3) Low temperature will cause a significant reduction of battery efficiency. Cover batteries or take them off from the machine and store in a warm place for the following day's operation.
4) To prevent freezing, drain water from the sprinkler system (See page 59).

IMPORTANT

- **Drain water completely from the sprinkler system, as remaining water can cause damage to the system.**
- **Do not wash clean with high pressure water around the instrument panel or reverse side of the dash board. This can cause instrument failures.**

2.9 Loading and Unloading

⚠ WARNING

- **Use sturdy ramps with proper width, length and thickness which allow safe loading and unloading.**
- **If the ramps deflect considerably under load, apply wooden blocks to reinforce them.**
- **Loading should be conducted on a level and hard ground. Leave a sufficient distance between the machine and the shoulder.**
- **To prevent slippage on the ramps, keep the drums free from mud, oils, etc. The ramps must also be free of grease, oil and ice.**
- **Do not steer the machine on the ramps. If the machine is facing in the wrong direction, allow it to dismount from the ramps and correct the direction.**

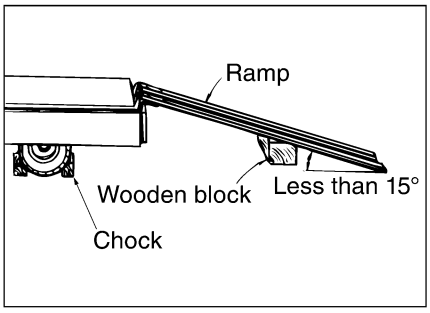
For loading and unloading, use ramps or a proper loading stand.

2.9.1 Use of a truck or trailer equipped with a winch

⚠ WARNING

Placing the unloader in UNLOAD position disrupts the power for traction. Do not enter the areas ahead of and behind the machine. It is very dangerous.

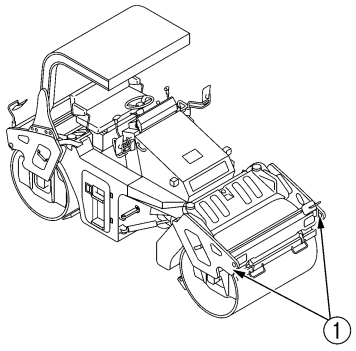
1) Engage the truck or trailer brake and chock its wheels. Fix the ramps so that the machine and truck or trailer are completely aligned.



☆ The angle between the ramps and ground must be less than 15 degrees.
☆ Leave a proper space between the ramps according to the width of the roller drum.

2) Decide the correct direction of run and make the machine run forward to the ramps.

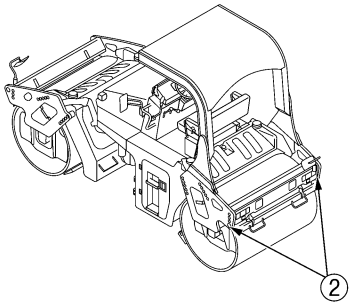
3) Draw the wire rope from the truck or trailer winch and put its hook on the hooking point ① or ② of the roller.



4) Place the unloader valve located at the operator's station to the UNLOAD position (See "Unloader valve" on page 38).

5) With the engine running at idle, perform loading by means of the truck or trailer winch.

6) When the loading is completed, set the unloader valve back in the ONLOAD position.



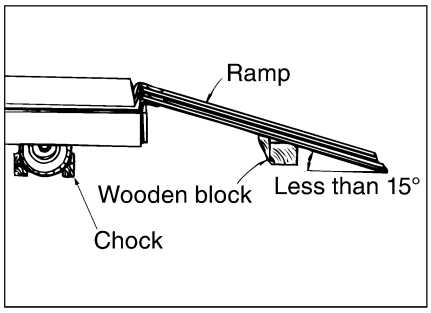
7) Locate the machine correctly on the truck or trailer.

2.9.2 Self-propelling

1) Engage the truck or trailer brake and chock its wheels. Fix the ramps so that the machine and truck or trailer are completely aligned.

☆ The angle between the ramps and ground must be less than 15 degrees.

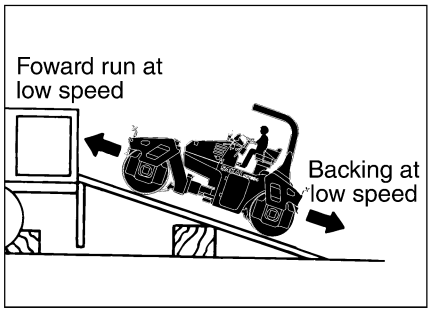
☆ Leave a proper space between the ramps according to the width of the roller drum.



2) Decide the correct direction of run and conduct loading or unloading at low speed.

   For loading, run forward at low speed.
   For unloading, run backward at low speed.

3) Locate the machine correctly on the truck or trailer.



2.10 After Loading the Machine

When the machine has been located properly on the truck or trailer, tie it down as follows:

1) Press the parking brake switch to apply the parking brake. Place wooden blocks under the drums to prevent movement.
2) Fix the machine with ropes tied at the front and rear towing hook holes. Particularly, pay attention to sidewise skidding.

2.11 Transportation

⚠ WARNING

To decide the transporting route, check the width of the road, height and weight (including the roller) of the truck or trailer. Obey relevant regulations.

For transportation, obey traffic regulations.

2.12 Operation in Cold Weather

In cold weather, take the following measures to prevent troubles such as starting difficulty and coolant freeze-up.

2.12.1 Fuel oil and grease

Use fuel and oil with low viscosity. See “Rating” on page 98.

2.12.2 Coolant

⚠ WARNING

Do not bring an open flame to the antifreeze or do not smoke when handling it. It is inflammable.

⚠ CAUTION

- **Never use methanol-, ethanol- and propanol-base antifreeze.**
- **Use ethylene glycol-base antifreeze.**

Use soft water for coolant.
In freezing weather, add antifreeze to the coolant referring to the table below. Select the most suitable mix ratio according the lowest temperature in the job location.

L (gal.)

Ambient temperature	-33°C (-27.4°F)	-26°C (-14.8°F)	-20°C (-4.0°F)	-16°C (3.2°F)	-11°C (12.2°F)
Amount of antifreeze	4.5 (1.2)	4.1 (1.1)	3.6 (1.0)	3.2 (0.8)	2.7 (0.7)
Amount of coolant	4.5 (1.2)	4.9 (1.3)	5.4 (1.4)	5.8 (1.5)	6.3 (1.7)
Ratio	50%	45%	40%	35%	30%

Long life coolant is used in our roller. Useful life of this antifreeze coolant is 2 years.
Use non-amine type long life coolant when changing coolant.

IMPORTANT

Use of a high consistency antifreeze coolant in summer time can cause the engine to overheat depending upon job conditions.
Use a coolant of 30% solution in the hot season.

2.12.3 Battery

⚠ WARNING

- **The battery contains diluted sulfuric acid, which will dissolve clothes and skin. Should you get battery fluid on your clothes or skin, wash it off immediately with copious quantities of clean water.**
- **If you get it in your eyes, rinse them straight away with clean water and immediately seek the help of a doctor.**
- **If you accidentally ingest it, drink copious quantities of water and immediately seek the help of a doctor.**
- **Always wear safely glasses when handling the battery.**
- **The battery generates hydrogen gas, so there is a danger of explosions. Avoid recharging the battery, keep cigarettes and flames away, etc., in poorly ventilated places when there is a danger of generating sparks.**
- **The inspection and handling of batteries should be carried out with the engine turned off and the starter switch in the OFF position.**
- **Turn the starter switch to the OFF position, then wait at least 30 seconds before removing the battery. An abnormality may arise in the ECM (engine control module).**
- **Be careful not to accidentally connect the two battery terminals with tools or other metallic objects.**
- **Tangled terminals may generate sparks due to improper connections, resulting in the danger of explosions. Make sure terminals are connected firmly.**
- **The battery is for starting the engine and operating electrical equipment on the machine. Do not use it for any other purpose.**

When the temperature decreases, the battery capacity will lower, possibly freezing the electrolyte.
The battery should be maintained in a good state at all times, with care taken to keep it warm in preparation for use the next morning.

Check the color of the hydrometer attached to the battery top to charge or replace the battery.

Green····· Satisfactory (Good)
White····· Charging is necessary (Charging required)
Red····· Replacement is necessary (Electrolyte insufficient)

⚠ CAUTION

The power-supply voltage of this machine is 12 V.

2.13 When the Cold Season is Over

When winter is over and the warm season has come, proceed as follows:

1) Change oil and fuel with those for use in warm season referring to “Rating” on page 98.
2) If AF antifreeze is in use, drain the coolant completely, wash clean inside the cooling system, and then fill with non-amine type long-life coolant.

2.14 For a Long Storage Period

For leaving the machine unused for longer than one month, proceed as follows:

1) Store the machine in a closed area after cleaning.
2) Conduct oiling, greasing and changing of oil.
3) Grease lubricate the exposed portion of hydraulic cylinder piston rods.
4) Cover the battery after disconnecting the negative cable or take off the battery from the machine and store in a safe place.
5) If the temperature is expected to go down below 0°C, add antifreeze to the coolant.
6) Completely drain the sprinkler system.
7) Place the F-N-R lever in the neutral position Ⓝ, turn the vibrator and sprinkler switches off and apply the parking brake.
8) Chock the machine.
9) Remove the starter switch key.

2.15 During the Storage Period

⚠ WARNING

If necessary to operate the machine for anti-corrosive purpose in closed area, ensure good ventilation keeping windows and doors open to prevent gas poisoning.

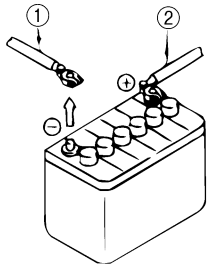
During storage, operate the machine at least once a month to prevent the oil films on the lubricated parts from deteriorating and to charge the batteries.

2.16 When the Battery Has Discharged

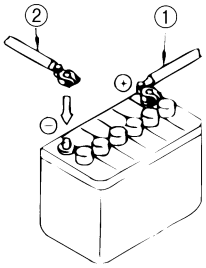
⚠ WARNING

- **To check and handle the batteries, keep the engine stopped with the starter switch in the OFF position.**
- **The batteries give off explosive gases. Do not smoke close to the batteries. Keep flames and sparks away from the batteries.**
- **The electrolyte is very corrosive and will harm your clothing or skin. If the electrolyte has come into contact with your clothing or skin, flush with sufficient amount of water. In case the electrolyte has gotten into your eyes, flush with water and get medical help.**
- **To disconnect the battery cables, start with the negative terminal (earth). When connecting, start with the positive terminal. Do not allow a metallic item to bridge between the positive terminal and machine body. This can generate sparks, causing an explosion.**
- **Loose battery terminals can cause sparks. An explosion will result. When connecting the terminals, make certain that they are tight.**

Disconnect with negative cable first



Connect with positive cable first



⚠ CAUTION

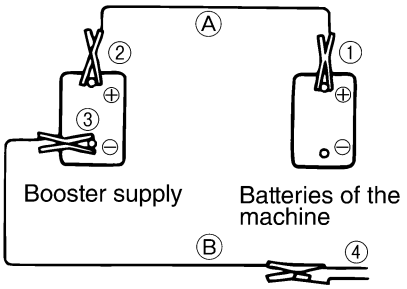
The power-supply voltage of this machine is 12 V.

2.16.1 Connection and disconnection of booster cables

When jump-starting the engine, connect the booster cables as follows:

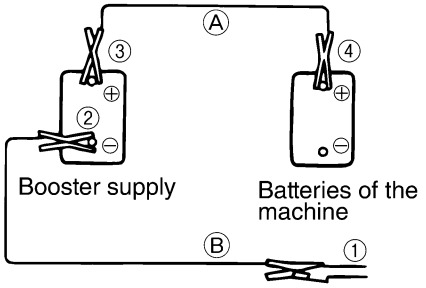
■ Connection of booster cables

1) Connect one end of the positive booster cable Ⓐ to the positive ⊕ terminal of the battery on the machine.
2) Connect the other end of the positive booster cable to the positive ⊕ terminal of the booster supply.
3) Connect the negative booster cable Ⓑ to the negative ⊖ terminal of the booster supply.
4) Connect the other end of the negative booster cable to a good earth of the engine block of the machine.



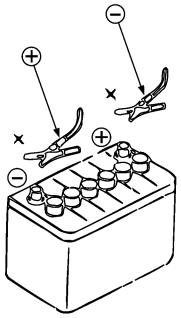
■ Disconnection of booster cables

1) Disconnect the negative booster cable Ⓑ from the engine block earth.
2) Disconnect the negative booster cable Ⓑ from the booster supply.
3) Disconnect the positive booster cable Ⓐ from the booster supply.
4) Disconnect the positive booster cable Ⓐ from the machine.



⚠ WARNING

- **Do not allow the positive ⊕ terminal to make contact with the negative ⊖ terminal when connecting the booster cables.**
- **Wear safety goggles when jump-staring the engine.**
- **Do not allow the machine to make careless contact with the booster supply.**
- **Do not make wrong connections. Connect the negative ⊖ cable to the engine block earth far away from the battery, as sparks may occur when connecting.**



⚠ CAUTION

- **Use booster cables and end clips of proper size suited to the battery capacity.**
- **Use the batteries of the equal capacity for the machine and booster supply.**
- **Check booster cables and end clips for signs of damage and corrosion.**
- **Connect the clips positively.**
- **The power-supply voltage of this machine is 12 V.**

3 PERIODICAL MAINTENANCE

3.1 Precautions

Whether or not the inspection service and lubrication are performed at the correct regular intervals exerts significant influence on the occurrence of trouble and service life of the machine. In this manual, typical intervals for inspection and service are given. However, flexibility should be introduced as to interval or type of services to enable your machine to always operate in the best condition.

⚠ WARNING

Be sure to take adequate care not to burn yourself when replacing filters, elements, oil, etc.

IMPORTANT

- **After maintenance and inspection record the result of inspection. Remember that replacement of filter elements, replenishment and change of oil and grease, and cleaning the radiator fines are important.**
  When draining a hot oil, use care not to get burned.
- **The disposal of waste oil and coolant, and used filters, elements, etc., should be handled by specialized disposal companies.**

General precautions

1) Always use SAKAI genuine parts for replacement.
2) Use lubricants recommended by SAKAI. Avoid mixing different brand lubricants.
3) For hydraulic oil replenishment, changing, level checking, filter cleaning or replacement, oiling and greasing, use extreme care to prevent dust from entering.
4) For checking oil level or changing oil, park the machine on a level and hard surface.
5) Change oil while its temperature remains high after operation.
6) For a long-term storage, fill the fuel tank, lubricate necessary points and run the machine for more than 20 minutes once a month.
7) In freezing weather, add antifreeze to the coolant according to the ambient temperature.
8) For the hydraulic pump and motor, have them serviced at authorized service shops.
9) Turn the starter switch OFF when performing services such as repairing broken wires, short circuits and tightening loose terminals.

Periodical replacement of essential maintenance parts

In order secure safety for work and travel, conduct inspection and services.
Further, for enhanced safety, following parts and components should be replaced periodically.
These parts are prone to material deterioration due to aging or physical change due to wear, while it is difficult to determine their useful limit by regular inspection, which makes it necessary to replace with new ones after certain period of service to maintain their perfect function.
If any abnormality is detected such as crack, deformation, wear or oil leakage, go ahead and replace them even if it is within scheduled replacement time.

System or Mechanism	Part name	Periodical replacement maintenance part	Replacement period	Remarks
1 Brake system	Master cylinder	Seals (rubber parts)	2 years	
	Wheel cylinder	Seals (rubber parts)	2 years	
	Brake piping parts	Brake hose	2 years	
		Air hose	2 years	
	Operating parts	Cable	4 years	
2 Steering system	Orbitrol	Seals (rubber parts)	2 years	
	Hydraulic piping parts	Hydraulic hose	2 years	
	Steering cylinder	Seals (rubber parts)	2 years	
	Hydraulic pump	Seals (rubber parts)	4 years	
3 Power transmission system (inclusive of axle)	Axle	Seals (rubber parts)	4 years	
	Travel pump	Seals (rubber parts)	4 years	
	Travel motor	Seals (rubber parts)	4 years	
	Hydraulic piping parts	Hydraulic hose	4 years	
	Isolation rubber	Isolation rubber itself	4 years	
4 Fuel system	Piping parts	Fuel hose	2 years	
5 Engine related	Engine mounting parts	Isolation rubber	4 years	
	Seals (rubber parts)	Packing and others	4 years	
	Drive parts	V-belt	2 years	or 500 hours
	Piping parts	Engine drain hose	4 years	
6 Cooling system	Piping parts	Radiator hose	2 years	
		Radiator drain hose	4 years	
7 Control related parts	Cable	Cable	4 years	
8 Intake system	Piping parts	Intake hose	2 years	
		CAC hose	2 years	
9 Hydraulic system	Hydraulic piping parts	Hydraulic hose	4 years	

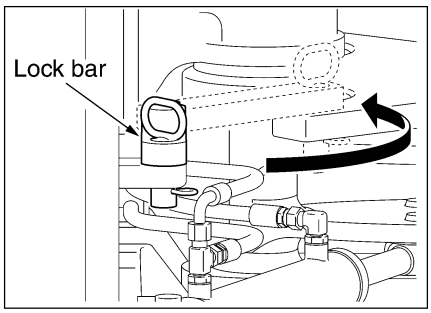
⚠ CAUTION

- **With a new machine, change the engine oil, change the engine oil filter element and fuel sedimenter after 50 hours of operation for the first time only (refer to page 80, 82).**
- **When trouble occurs in the location indicated by the indicator lamp on the monitor display, sensor will work and corresponding lamp comes on. If this occurs, conduct necessary service regardless of the periodical service interval recommendation.**
  1)The hydraulic filter (line filter) warning lamp ⇨ Replace elements
- **Check the electric wiring at a regular interval not exceeding one month, when there is abnormality, replace it.**
  If there are some trouble on the electric wiring, replace them with new one.
  1) Damage to the wire harness and loose clamps
  2) Loose sockets
  3) Function of electrical systems
- **For the parts other than listed above, if there are some trouble on the parts at periodical inspection or daily check, replace them as soon as possible.**

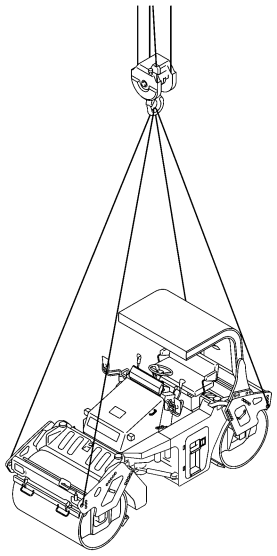
3.1.1 Lifting the machine on a hoist

⚠ WARNING

- **Get a qualified personnel to lift and lower the machine on a hoist.**
- **Use sturdy wire ropes.**
- **Lock articulation by means of lock bar located at the center of machine.**

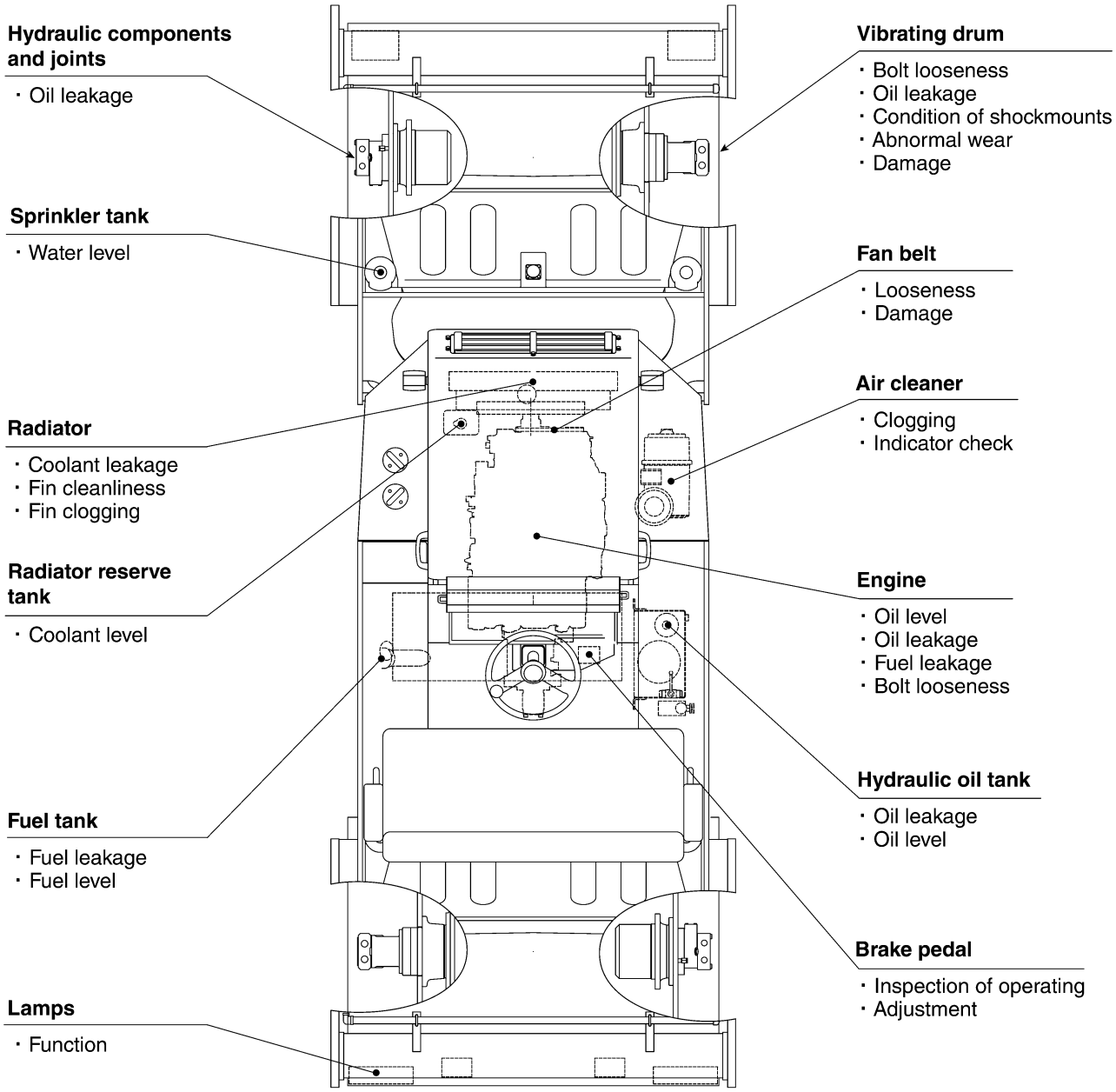


1) Put wire ropes securely on the hook and lifting points as shown.
2) If wire ropes make contact with other parts of the machine, put pieces of cloth or wooden blocks at the contact points. Carefully perform lifting.
3) When lifting, keep the machine properly balanced.
4) Load the machine at the specified position on the truck correctly.

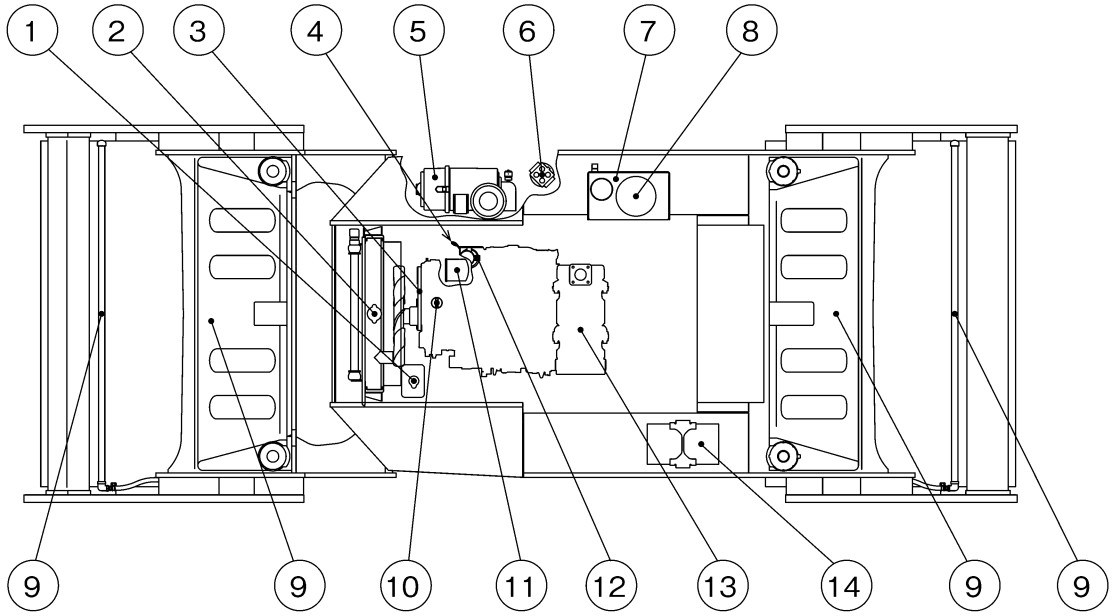


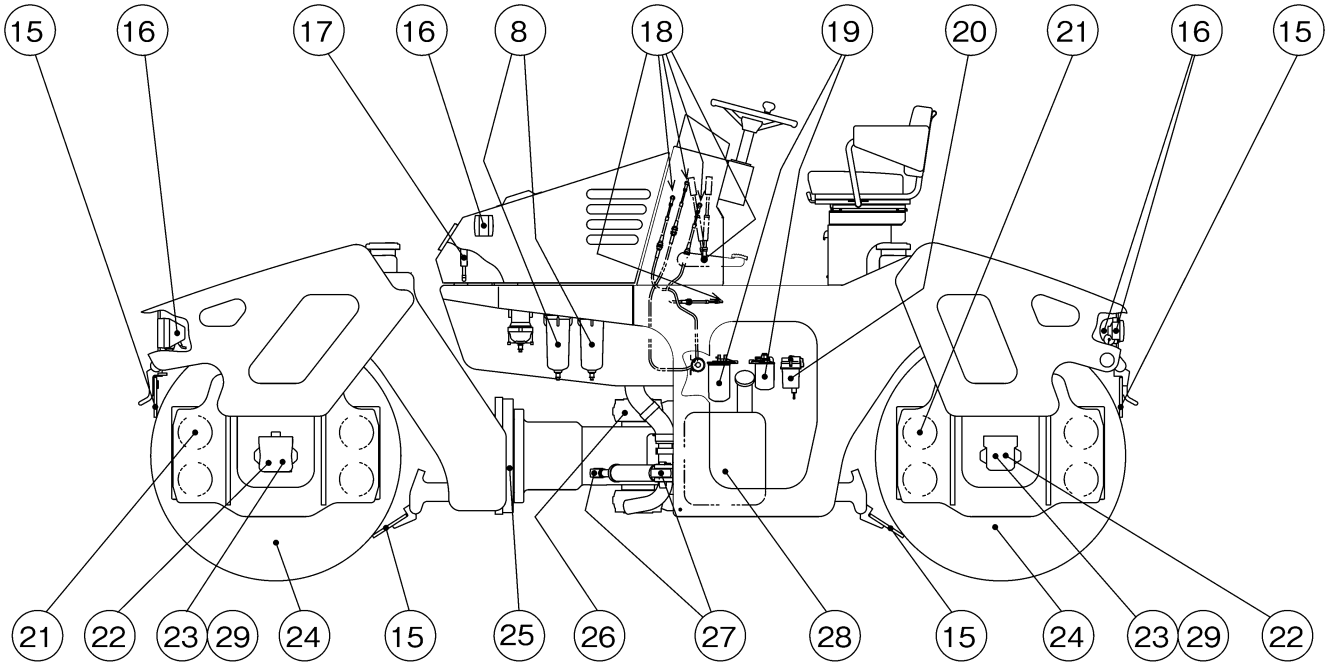
3.2 Walk-Around Checking

For efficient operation, daily, before-operation checking is very important. Before starting, perform walk-around checking for loose bolts, nuts and signs of leakage in addition to items as shown below:



3.3 Periodical Maintenance Points





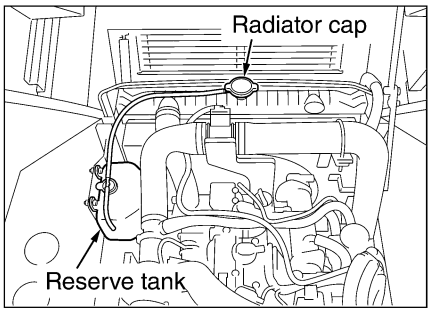
Interval	Ref. No.	Item	Service	Lubricant	Q'ty
Every 10 hours or daily	①	Radiator, Reserve tank	Check coolant level, add as necessary	Coolant	1
	③	Fan belt	Check looseness, adjust as necessary		1
	④	Engine oil level	Check oil level, add as necessary	Engine oil	1
	㉘	Fuel tank	Check oil level, add as necessary	Diesel fuel	1
Every 50 hours	⑦	Hydraulic oil tank	Check oil level, add as necessary	Hydraulic oil	1
	⑩ ⑪	Engine oil Engine oil filter	Change engine oil and filter element (First 50 service hours only)	Engine oil	1
	⑭	Battery	Check hydrometer, looseness of terminals		1
	⑳	Fuel sedimenter	Check and discharge of water and dust		1
Every 250 hours	③	Fan belt	Check tension, adjust as necessary		1
	㉑	Shock mounts	Check condition		16
	㉔	Vibrator	Check oil level, add as necessary	Gear oil	2
	㉕	Tilt pin bearing	Apply grease	Grease	4
	㉖	Center pin bearings	Apply grease	Grease	2
	㉗	Steering cylinders	Apply grease	Grease	4
Every 500 hours	⑥	Hydraulic oil line filter	Replace filter element		1
	⑩	Engine oil	Change engine oil	Engine oil	1
	⑪	Engine oil filter	Replace filter element		1
	⑱	Control links	Check looseness, adjust as necessary Apply grease		15
	⑲	Fuel filter	Replace filter cartridge		2
	⑳	Fuel sedimenter	Replace filter element		1
Every 500 hours or 3 months, or each time after brake pedal is used	㉙	Parking brake	Check function		2
Every 1000 hours	⑦	Hydraulic oil tank	Change hydraulic oil, clean inside	Hydraulic oil	1
	⑧	Hydraulic oil tank suction filter	Clean filter element, replace as necessary		1
	㉒	Gear case：Wheel motor	Change oil	Gear oil	2
	㉓	Brake	Check brake disk thickness or replace		2
	㉔	Vibrator	Change gear oil	Gear oil	2
Every 1500 hours	⑫	Engine oil separator	Replace filter element		1
Every 3000 hours	⑬	DPF	Clean inside, clean or replace filter element		1
As required	②	Radiator	Clean fins and inside		1
	⑤	Air cleaner	Clean element, replace elements as necessary		1
	⑨	Sprinkler tanks, filter, pipes, nozzles	Clean inside, replace filter elements as necessary		-
	⑮	Scrapers	Adjust blades or change		4
	⑯	Electric bulbs	Check bulbs		-
	⑰	Gas damper	Check condition, replace as necessary		1
	㉘	Fuel tank	Drain water and dirt		1

3.4 Maintenance Procedure

➡ **For servicing the engine, see the separate engine manual.**

(1) Every 10 hours or daily

①	**Radiator, Reserve tank**



1) Check to make sure that the coolant is not leaking, and that the fins are clean.
2) Remove the cap from the radiator to make sure it is filled to the top with coolant, and top it up if it is not. Moreover, let the engine idle for 2 to 3 minutes and check to make sure the coolant in the reserve tank is between Full and Low. If it is not, remove the reserve tank cap and top it up with more coolant. Use soft water for the coolant.

⚠ WARNING

Do not remove the radiator cap while the coolant is hot. Before removing, raise the lever on the cap to release the internal pressure.

⚠ CAUTION

- **With radiator cap removed, feed water nearly up to filler port, then replenish the sub-tank as well.**
- **If level is below LOW mark, remove sub-tank cover and replenish with fresh water up to FULL mark.**

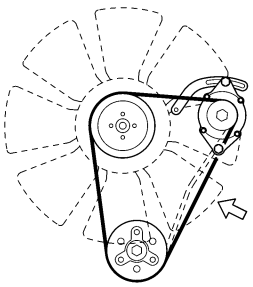
IMPORTANT

Change the cooling water every two years.

③ Fan belt

➡ **See the separate engine manual.**

Check the fan belt for wear and damage. Replace as necessary.



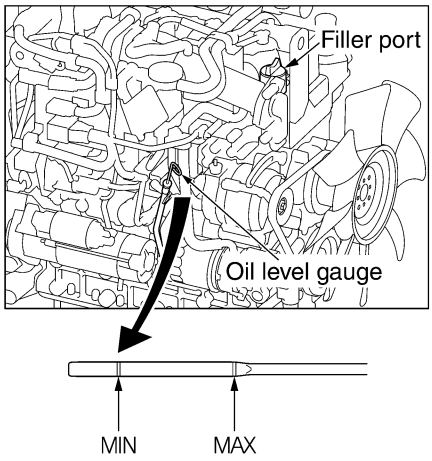
⚠ WARNING

Make certain that the engine is completely stopped to avoid any risks when checking looseness, tensions and damages for the fan belts. Also make certain that the key is removed from the starter switch.

④ Engine oil level

➡ **See the separate engine manual.**

Shut down the engine and check the engine oil level. If it is not between MAX and MIN marks, add oil through the fill hole.



The engine oil level may rise

In engines installed with DPFs, some fuel may become mixed into the engine oil during cleaning (burning) of the DPF, diluting (increasing the amount of) the engine oil. If the level rises above the maximum level on the engine oil gauge, change the oil immediately as it may cause the engine to break down.

⚠ WARNING

It may cause scald immediately after that the engine is stopped because the temperature of the parts and the oils may be raised.
Please start checking it by waiting until the temperature is dropped.

⚠ CAUTION

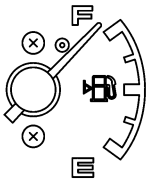
Be sure to use engine oil recommended by SAKAI (refer to page 98).

IMPORTANT

Do not remove the strainer when filling with fuel.

㉝ Fuel tank

Check the fuel level with the fuel gauge or the level gauge.
Add as necessary from fill hole.



Fuel gauge

⚠ WARNING

Park the machine on flat ground when checking the oil level.

⚠ CAUTION

Be sure to use fuel recommended by SAKAI (refer to page 98).

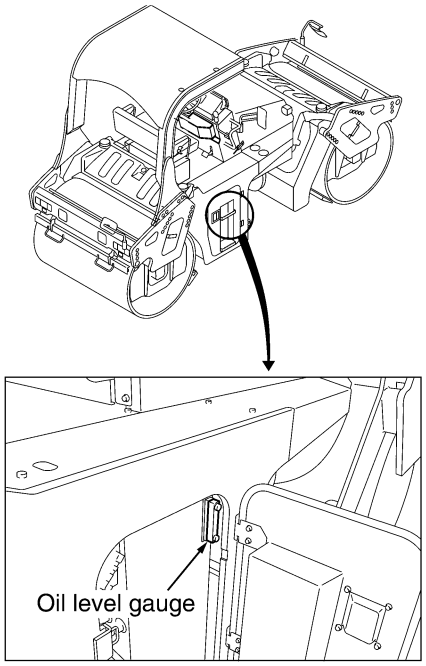
IMPORTANT

Do not remove the strainer when filling with fuel.

(2) Every 50 hours

⑦ Hydraulic oil tank

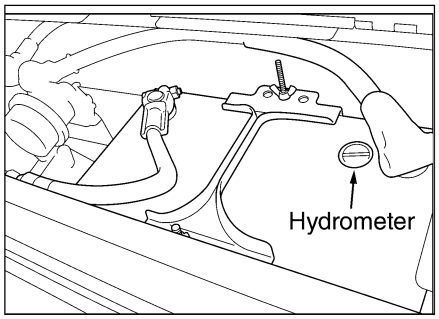
Check the oil level with the sight glass on the side of tank.
The level is proper if it is between H and L marks.
If necessary, add the hydraulic fluid from the fill port.



⚠ CAUTION

Be sure to use hydraulic oil recommended by SAKAI (refer to page 98).

⑭ Battery



1) Check the color of the hydrometer attached to the battery top to charge or replace the battery.

Green····· Satisfactory (Good)
White····· Charging is necessary (Charging required)
Red····· Replacement is necessary (Electrolyte insufficient)

⚠ WARNING

- **The battery contains diluted sulfuric acid, which will dissolve clothes and skin. Should you get battery fluid on your clothes or skin, wash it off immediately with copious quantities of clean water.**
- **If you get it in your eyes, rinse them straight away with clean water and immediately seek the help of a doctor.**
- **If you accidentally ingest it, drink copious quantities of water and immediately seek the help of a doctor.**
- **Always wear safely glasses when handling the battery.**
- **The battery generates hydrogen gas, so there is a danger of explosions. Avoid recharging the battery, keep cigarettes and flames away, etc., in poorly ventilated places when there is a danger of generating sparks.**
- **The inspection and handling of batteries should be carried out with the engine turned off and the starter switch in the OFF position.**
- **Turn the starter switch to the OFF position, then wait at least 30 seconds before removing the battery. An abnormality may arise in the ECM (engine control module).**
- **Be careful not to accidentally connect the two battery terminals with tools or other metallic objects.**
- **Tangled terminals may generate sparks due to improper connections, resulting in the danger of explosions. Make sure terminals are connected firmly.**
- **The battery is for starting the engine and operating electrical equipment on the machine. Do not use it for any other purpose.**

⚠ CAUTION

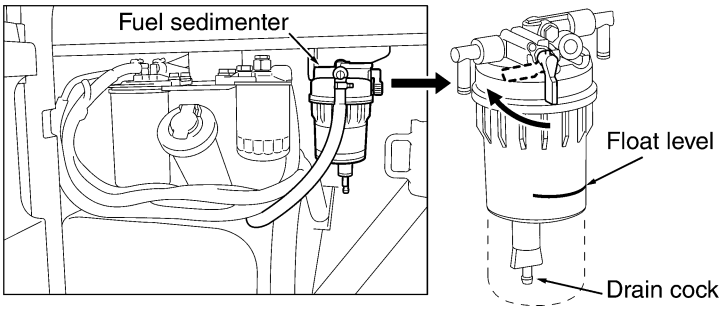
- **The power-supply voltage of this machine is 12V.**
- **Use only batteries recommended by SAKAI (refer to page 98).**

2) Retighten any loose terminal. Apply grease or vaseline to the terminals to retard rusting.

3) Be sure to tighten the battery holder if it is loose.

⑳ Fuel sedimenter

Check the float level. If it comes up to the level mark, open the drain cock at the bottom and drain water.

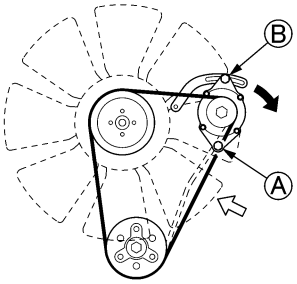


NOTE: After purchasing a new machine, drain water 50 hours after the initial operation.

(3) Every 250 hours

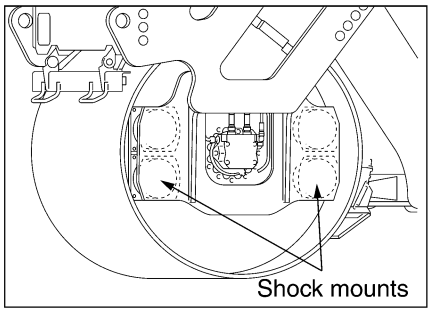
③ Fan belt

1) Check the fan belt for wear and damage. Replace as necessary.
2) Check the tension. Depress the middle of the belt with a push of about 10 kg (98 N). A properly adjusted belt deflects 10 to 12 mm.
3) To adjust, loosen alternator bracket bolt Ⓐ and plate bolt Ⓑ , and slide the alternator.



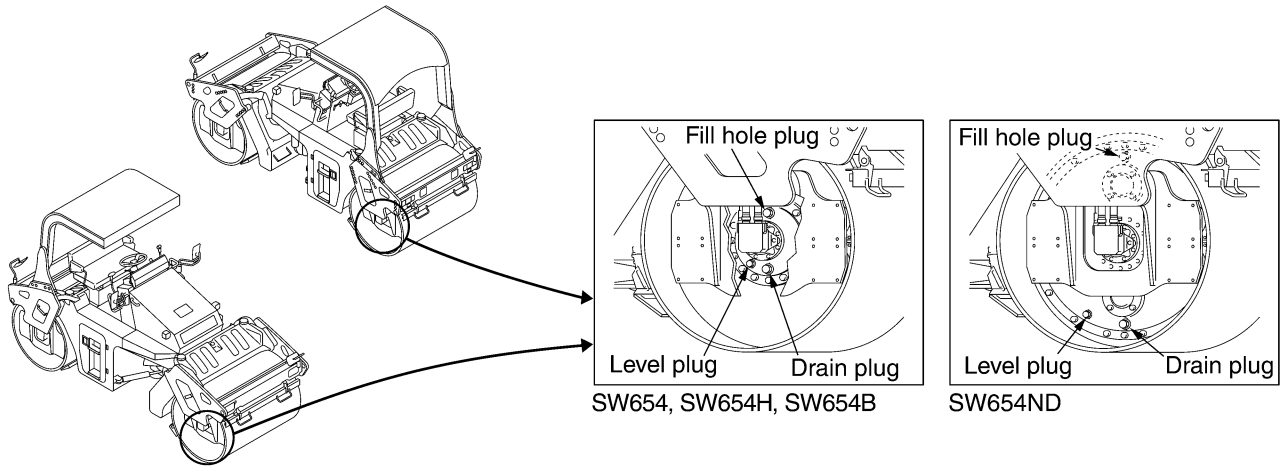
㉑ Shock mounts

Check the rubber blocks for cracks, and their mounting bolts for looseness.



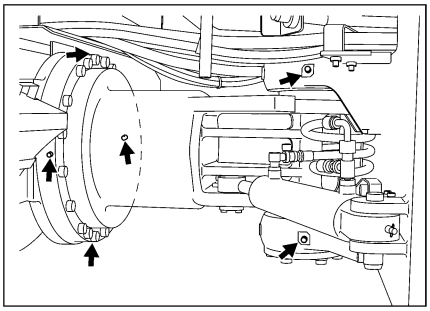
㉔ Vibrator

Check for the oil level and leakage.



㉕ Tilt pin bearing

Grease lubricate four locations.



㉖ Center pin bearings

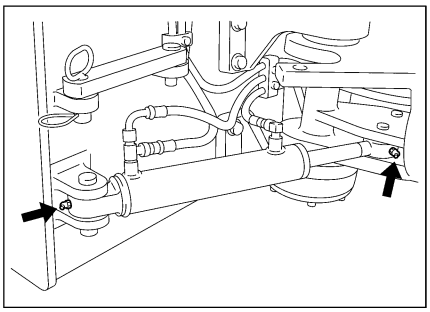
Grease lubricate two locations.

⚠ CAUTION

Be sure to use grease oil recommended by SAKAI (refer to page 98).

㉗ Steering cylinders

Grease the right / left cylinder heads and anchor pins.



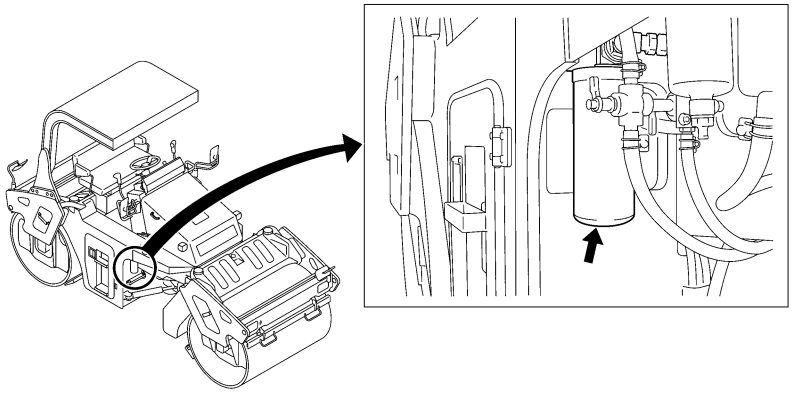
⚠ CAUTION

Be sure to use grease oil recommended by SAKAI (refer to page 98).

(4) Every 500 hours

⑥	Hydraulic oil line filter

Turn the filter elements counterclockwise and replace a new one.

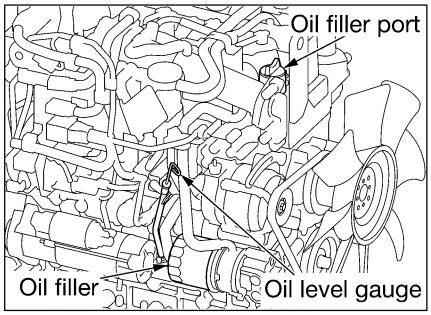


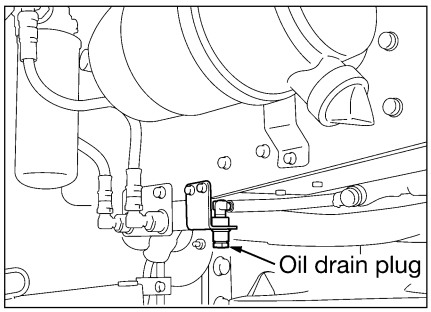
⑩	Engine oil

⑪	Engine oil filter

➡ **See the separate engine manual.**

1) After completion of operation and while the oil is warm, drain the oil with the drain plug removed.





⚠ WARNING

When draining a hot oil, use care not to get burned.

2) Refit the drain plug and fill the crankcase with the engine oil from the fill hole on the cylinder head cover.

⚠ CAUTION

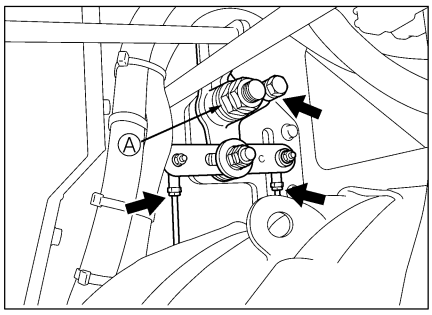
Be sure to use engine oil recommended by SAKAI (refer to page 98).

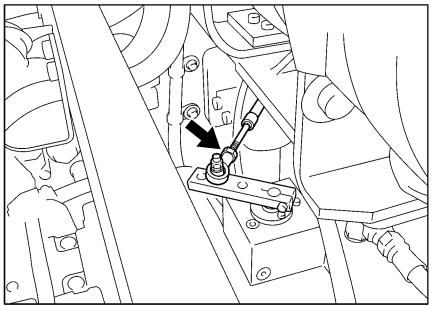
3) Change the oil filter.

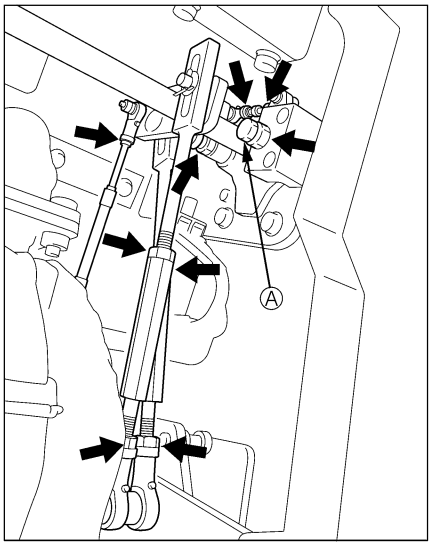
NOTE: For a new machine, change oil at 50 operating hours for the initial time only.

⑱	**Control links**

Remove the cover under the dashboard.
Check the bolts and nuts for looseness (indicated ➡ 13 places). Adjust the operating force of the F-N-R lever and speed shift lever by bolts and nuts Ⓐ.



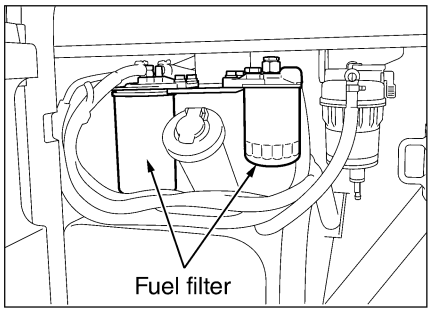




⑲ Fuel filter

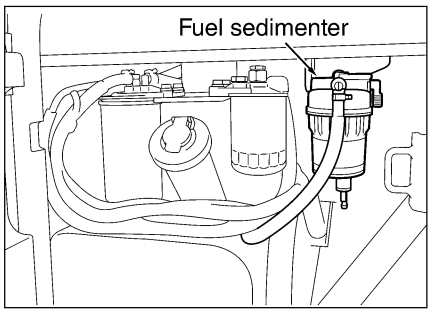
➡ **See the separate engine manual.**

Change the filter cartridge.



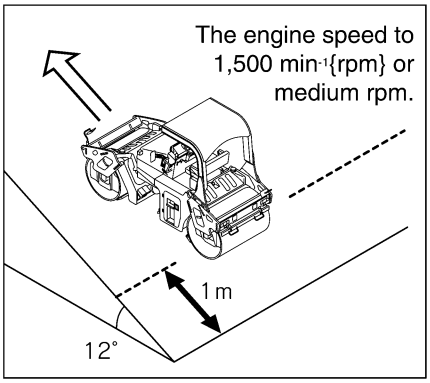
⑳ Fuel sedimenter

Change the element.



(5) Every 500 hours or 3 months, or each time after brake pedal is used

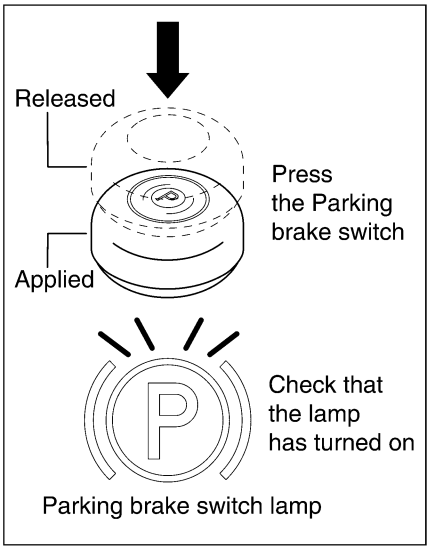
㉙ Parking brake



⚠ WARNING

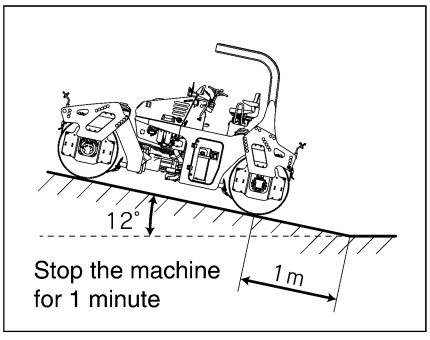
- **Ensure safety by checking to make sure there is no one and no obstacles near the machine.**
- **Keep your hands on the F-N-R lever and steering wheel during inspections.**
  The machine may move in unexpected ways during inspections, leading to accidents.

1) Adjust the engine speed to 1,500 min^{-1} {rpm} or medium rpm.
2) Be sure to move the machine onto asphalt pavement or an other hard surface with an upward inclination of 12° (20%) with the engine left on.
3) Press the Parking brake switch Ⓟ to engage the parking brake. Check that the OK monitor lamp (Ⓟ) has turned on.
   If the lamp (Ⓟ) does not turn on, contact one of our sales offices or a factory designated by our company for advice.
4) Remain seated on the machine to make sure it remains completely still for 1 minute. If it moves, move it immediately to flat ground, stop using it, contact one of our sales offices or a factory designated by our company, and have it repaired.



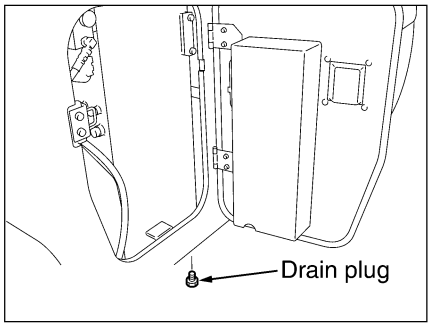
⚠ WARNING

- **This inspection must be carried out after each use of the brake pedal.**
  If the inspection is not carried out, the parking brake may malfunction when you try to use it next time causing a serious accident.
- **Making alterations to the machine.**
  Please do not make alterations to the machine without permission for safety reasons. We shall not be held responsible for injures, death or breakdowns caused by alterations.



(6) Every 1000 hours

⑦ Hydraulic oil tank



1) Remove the drain plug and drain the oil while it is warm.
2) After cleaning the inside of the tank, fill the tank to the specified level with new hydraulic oil.
3) Start and run the engine at idling for 2 – 5 minutes. When air bubbles have disappeared from the oil, stop the engine and check the oil level again.

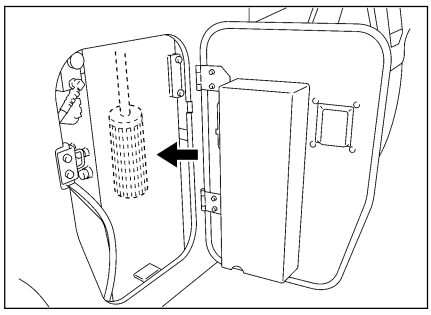
⚠ WARNING

When draining a hot oil, be careful not to get burned.

⚠ CAUTION

Be sure to use hydraulic oil recommended by SAKAI (refer to page 98).

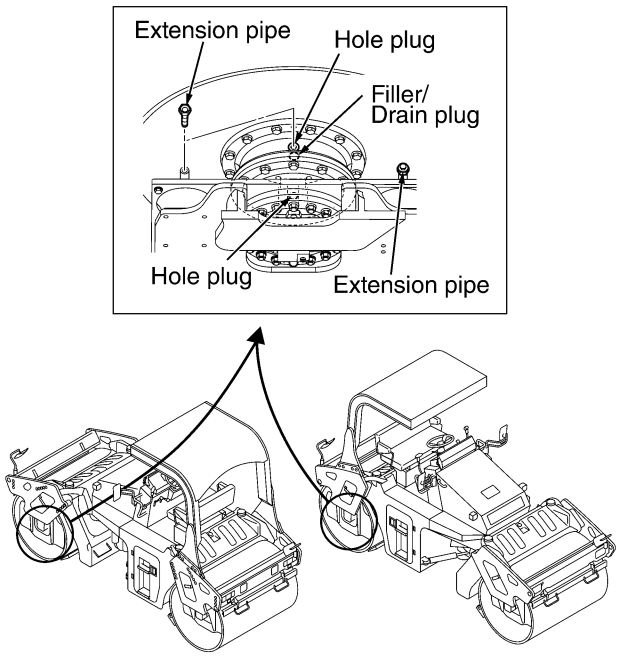
⑧ Hydraulic oil tank suction filter



Take off the hydraulic tank cover. Take out and clean the strainer, change the strainer if necessary.

㉒ Gear case : Wheel motor

1) Set the gear case so that the hole plug will be at the lowest position.
2) Remove the hole plug and drain plug at the upper and lower locations while the oil is still hot, and drain the wheel motor.
3) After attaching the drain plug wrapped up in seal tape to the port at the lowest position, attach the hole plug.
4) Remove the extension pipe, and attach it to the port at the uppermost position.
5) Supply 1.6 liters (0.4 gallons) of gear oil from the extension pipe.
6) After setting the extension pipe at the original position and attaching the drain plug wrapped up in seal tape, attach the hole plug.



⚠ WARNING

When draining a hot oil, use care not to get burned.

⚠ CAUTION

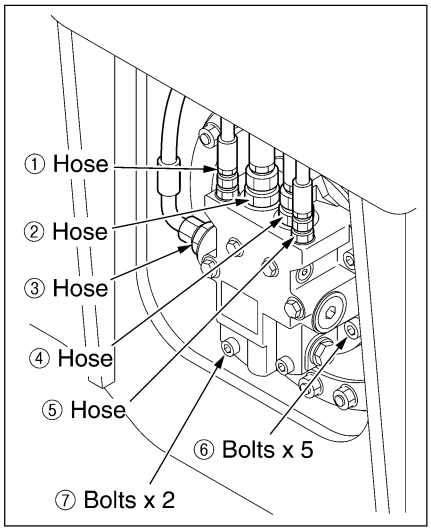
- **The quantity of oil in the gear case is 1.2 liters (0.3 gal).**
- **Be sure to use gear oil recommended by SAKAI (refer to page 98).**

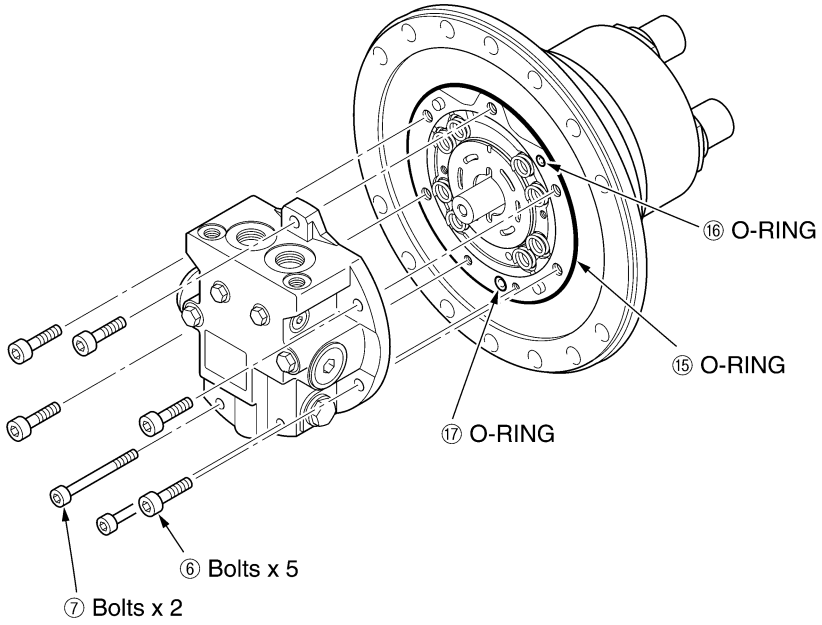
㉓ Brake

Traveling motor disassembling procedure

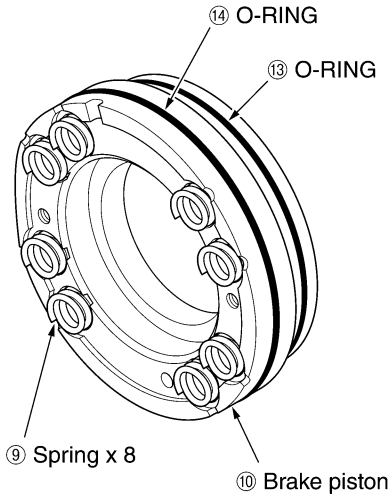
- Traveling motor part No.4223-26000-0
- Before disassembly, carefully clean the circumference so that foreign matter will not enter the traveling motor.

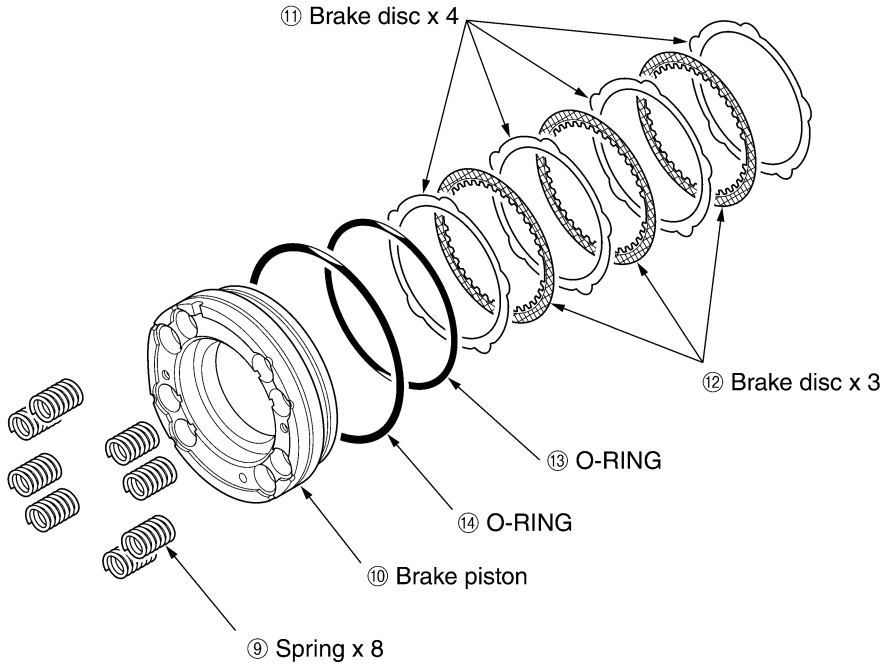
1) Hydraulic hose
   Separate hydraulic hoses ① , ② , ③ , ④ , and ⑤ from the motor.
   - Attach a blind plug to thee hoses and motor-side adaptors respectively.
2) Removal of traveling motor
   Remove five bolts ⑥ and two bolts ⑦ , and then remove the travelingmotor.
   - A small quantity of gear oil will flow out of the motor.

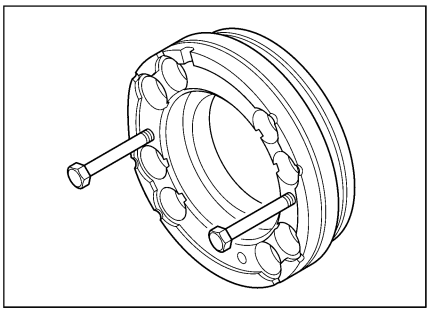




3) Removal of brake disc
   (1) Remove the O-RING ⑮ .
   (2) Remove spring ⑨, and remove brake piston ⑩.
      • Spring: 8 pcs
      • When the brake piston is difficult to remove, screw a bolt (M10 x 1.5) into the screw hole, and remove it by grabbing the bolt.
   (3) Remove the brake disk ⑪ and ⑫.
      • Disc ⑪ : 4 sheets; disc ⑫ : 3 sheets
      • Part No. Disc ⑪ : 4233-26004-0,
        disc ⑫ : 4223-26005-0





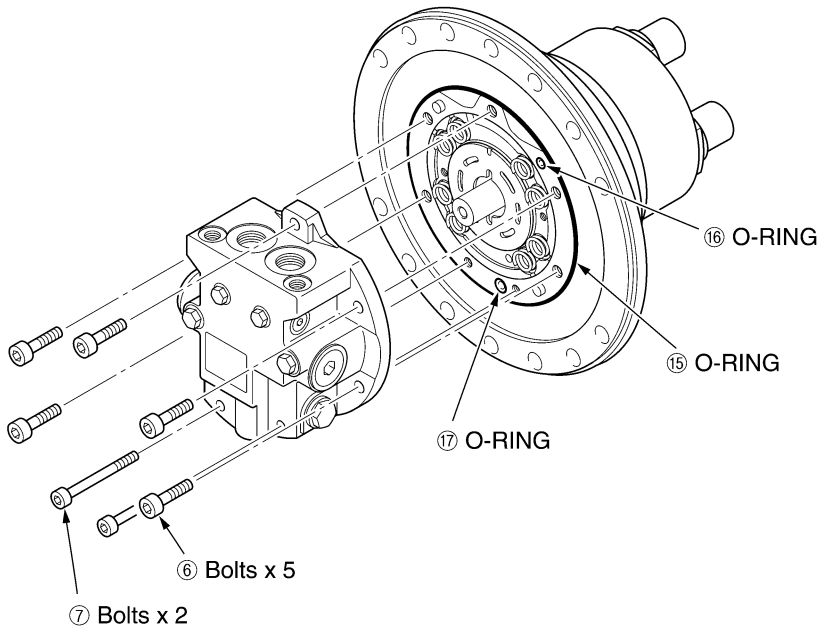


Traveling motor assembling procedure

★ Carefully clean attaching parts, and assemble the traveling motor in a manner to prevent entry of foreign matter into the motor.

1) Installation of brake disc
   Install brake disc ⑪ and then brake disc ⑫ in this order.
   • Disc ⑪ : 4 sheets; disc ⑫ : 3 sheets
2) Installation of brake piston
   Carefully install the brake piston so that the O-RING will not be clamped.
   (1) Install brake piston ⑩.
      • Carefully install the brake piston so that the O-RING will not be clamped.
   (2) Install spring ⑨ .
      • Spring: 8 pcs

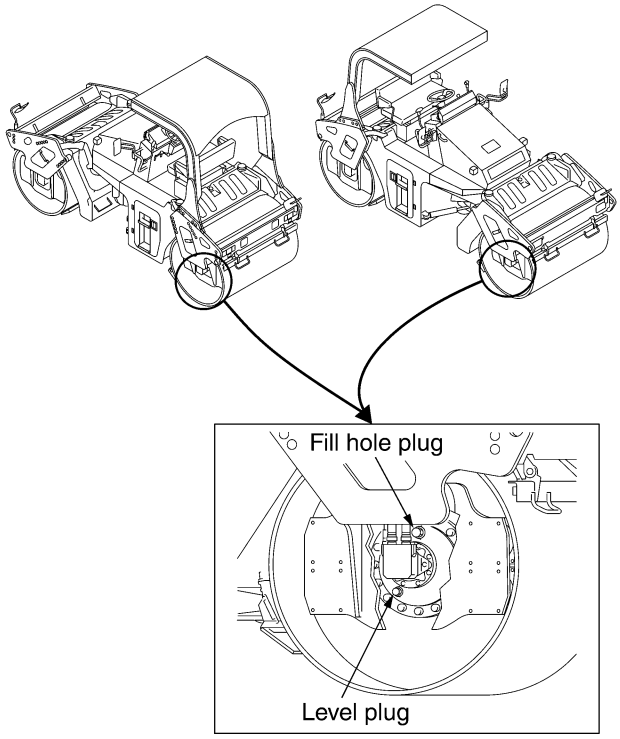
3) Installation of traveling motor
   (1) Remove the O-RING ⑮ .
      • Part No. O-RING ⑮ : 4223-26001-0
   (2) Install the traveling motor, and secure it with five bolts ⑥ and two bolts ⑦.
      • Bolt tightening torque: Bolt ⑥ : 108 [N•m]
        Bolt ⑦ : 59 [N•m]



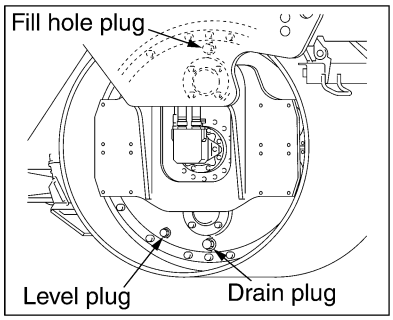
4) Installation of hydraulic hose
   Installation of hydraulic hoses ① , ② , ③ , ④ , and ⑤ from the motor.
5) Gear case : Topping up the gear oil
   (1) In the event of gear oil running low, it can be topped up as shown in "(6) ㉒ Gear case: Wheel motor" on page 87.
6) Supply of hydraulic oil
   (1) Feed oil to the hydraulic oil tank to make up for the spill, oil to the traveling motor up to the specified level.
      • Start the engine to circulate the oil through the piping, and then check the oil level again.

㉚ Vibrator

1) Rotate the drum till the drain plug comes to bottom.
2) Remove the drain, level and fill hole plugs.
3) Drain the vibrator oil.
4) Wash clean the removed plugs, and refit the drain plug.
5) Fill oil through the fill port till it overflows from the level port.
6) Refit the level plug and fill port plug.



SW654, SW654H, SW654B



SW654ND

⚠ WARNING

When draining a hot oil, use care not to get burned.

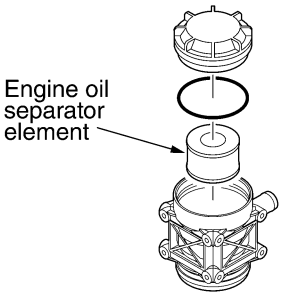
⚠ CAUTION

- **The oil quantity of the vibrator is 2,2 liters (0.6 gal.).*1 Never supply oil more than that.**
  *1 SW654B : 1.7 liters (0.4 gal.)
  SW654ND : 10.4 liters (2.7 gal.)
- **Be sure to use gear oil recommended by SAKAI (refer to page 98).**

(7) Every 1500 hours

⑫	**Engine oil separator**

Open the cover, take out the oil separator element, wipe off the oil, and replace it with a new one.



(8) Every 3000 hours

⑬	**DPF**

Ash accumulates in the filter when a DPF is used for a long time. The accumulation of too much ash will lower the performance of the DPF.
Contact one of our sales offices for advice on how to clean the DPF.

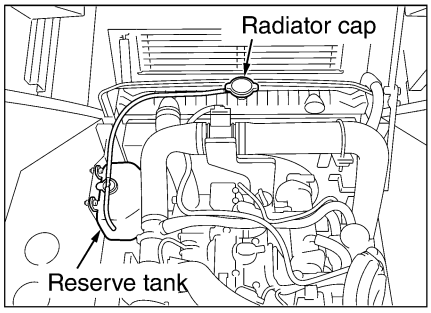
(9) As required

②	**Radiator**

Clean the cooling fins.

⚠ WARNING

Use the safety glasses or goggles during the use of compressed air.



IMPORTANT

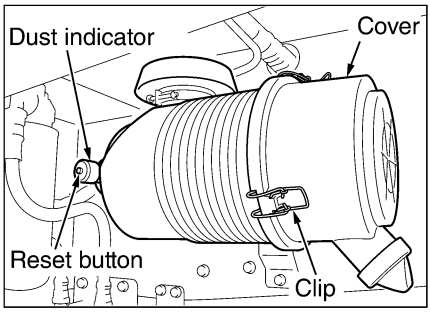
If the discharge rate of compressed air or tap water is too high, it can damage the radiator or the fins of the oil cooler. Keep a distance of 500 mm or more between the nozzle and the core surface.

In case dirt or dust is attached, clean the radiator, the oil cooler and the core with compressed air or tap water.
It is to prevent performance decline of the cooling system.

IMPORTANT

- **Don't use any driver or steel spatula (or paddle). If it rubs the fins, it can damage the tubing.**
- **Clean the inside when replacing the engine coolant, too.**

⑤ Air cleaner



When the red moving piece of the dust indicator reaches the service level (mark on the dust indicator), clean the outer element in the manner shown below.

1) Open the hood, remove the clip on the air cleaner case, and remove the cover.
2) Pull the outer element straight out of the element case so as not to damage the outer element.
3) Blow compressed air from the inside of the outer element for cleaning. The air pressure shall not exceed 686 kPa {7 kgf/cm^2}. If the element has scratches, holes, or oil spots, replace it with a new one.

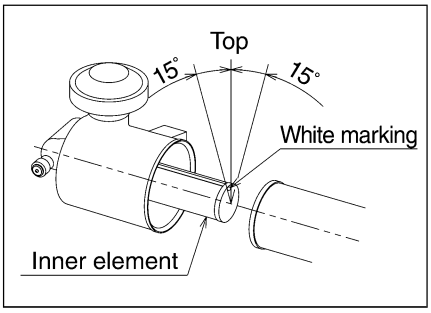
⚠ WARNING

- **Stop the engine before inspection, cleaning, or maintenance, otherwise dust will enter the engine, causing the breakdown of the engine.**
- **Wear protective goggles, a dust respirator, and other protective gear before cleaning the air cleaner and outer element in order to prevent dust from entering your eyes or nose.**

4) Attach the outer element and clamp it with a clip.
5) Press the dust indicator reset button.

⚠ CAUTION

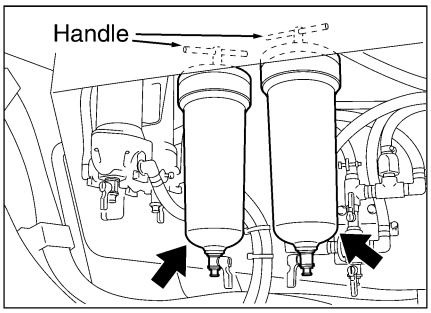
- **If the red moving piece of the dust indicator still reaches the service level after the outer element has been cleared, replace the outer element with a new one.**
- **Do not use air cleaners or elements other than those designated by our company. Failure to do so may cause deterioration in performance due to errors in the sensor.**
- **Attach the air cleaner inner element in such a position that the mark appears within 15° from the top.**



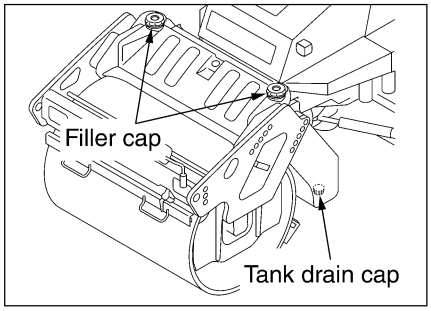
NOTE: In normal use, change the element once in every five cleanings.

⑨ Sprinkler tanks, filter, pipes, nozzles

1) Sprinkler filter
Take off the filter case by turning counterclockwise as viewed from the bottom. Clean the element.

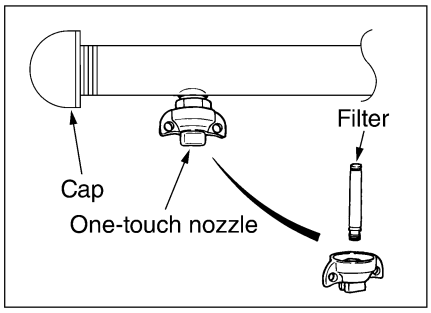


2) Sprinkler tanks
- Remove the drain cap under the sprinkling tank located at the machine front / rear and discharge dust and deposit in the tank.
- Remove the filler cap and clean the interior of the tank.
- When the necessary work is complete, refit the drain cap and filler cap.



3) Sprinkler pipes
Remove the cap from both ends of each sprinkler pipe. Operate the sprinkler pump to wash out dust from inside the pipe.

4) Sprinkler nozzles
- Turn the cap of “one-touch” nozzle to remove the cap and nozzle from sprinkler pipe.
- Turn-out the nozzle from cap and, further, turn-out filter from the nozzle.
- Clean the filter and clean the nozzle holes with needle or the like before replacing them to sprinkler pipe in the reversed order of removal.
- Turn-in the nozzle to cap so that the spray of water is directed across tire width.



⑮ Scrapers

When the blade is worn, adjust the scraper properly. See page 45 for adjustment. If the clearance is beyond the adjustable range, change the blade.

⚠ WARNING

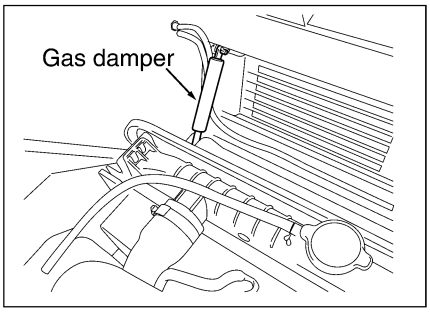
Use care not to get your fingers caught between the scraper blade and drum.

⑯ Electric bulbs

Operate the switches on control panel to confirm whether bulbs (turn signal indicator lamps, head lamps, flood lamps, rear combination lamps) flash or light up. If any lamp does not flash or light up, the bulb has burnt out; replace it with a new one.

⑰ Gas damper

Open the hood and check to make sure it is held up by the gas dampers. If it is not, replace the gas dampers.

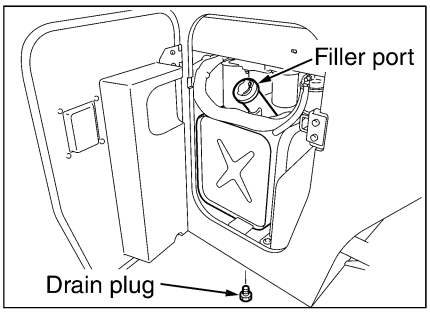


⚠ WARNING

Even if the hood is held up by the gas dampers, make sure to lock it in place using the stay to prevent it from falling when inspecting the engine room.

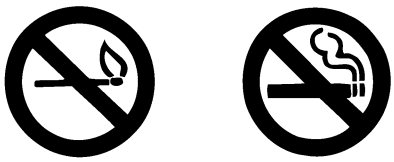
㉘ Fuel tank

1) With the drain plug removed, remove the water and sediment from the bottom of the tank.
2) If sedimentation is substantial, remove the drain plug and clean the interior of the tank.
3) When the necessary work and refueling are complete, tighten the filler cap positively.



⚠ WARNING

- **The fuel will catch fire if open flames or ignition sources are used close to it.**
- **Do not smoke or use a match or cigarette lighter close to it.**

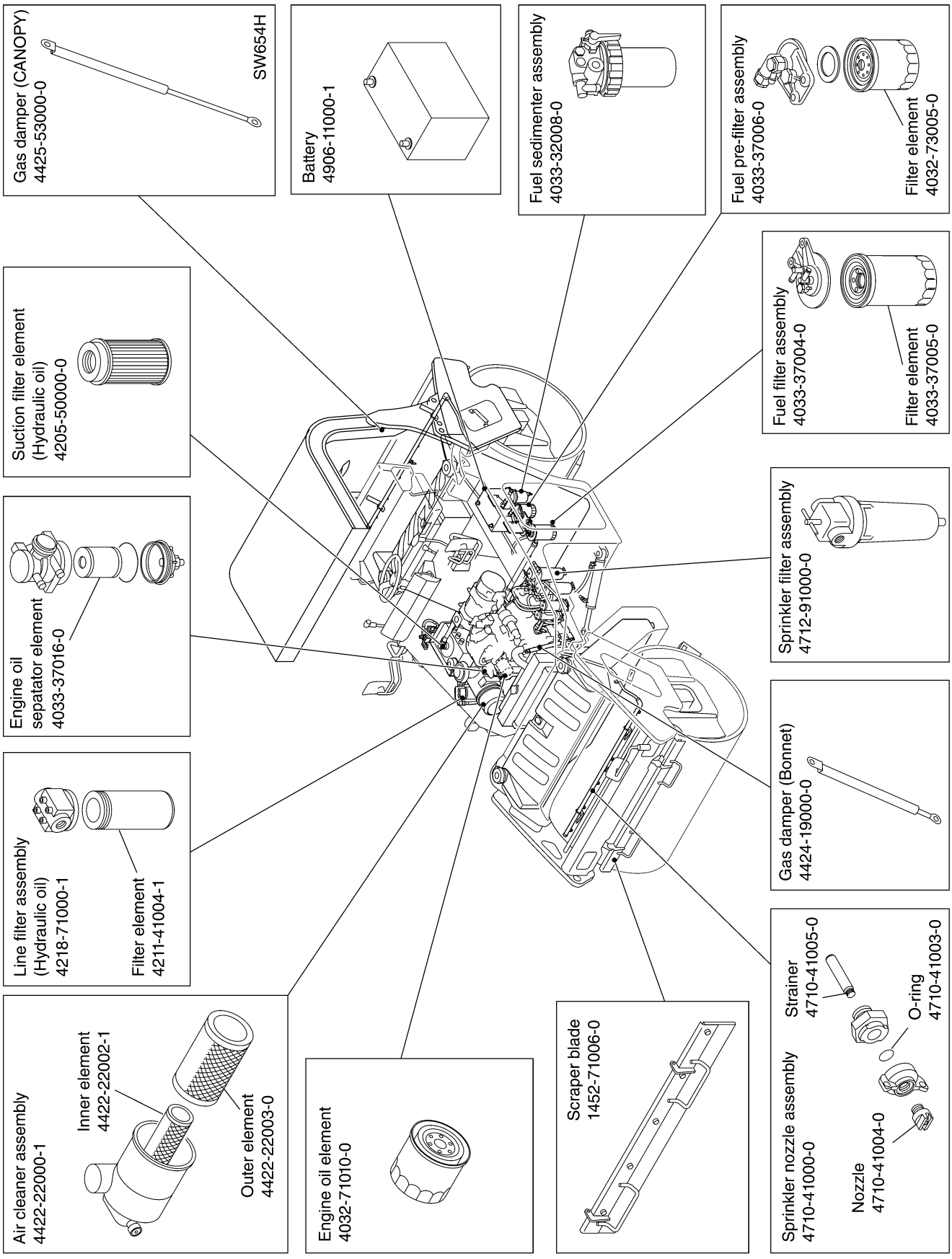


NOTE: When removing the water and sediment from the tank filled with the fuel, the fuel will gush out if the drain plug is screwed out completely.

3.5 Consumable Parts

Replace consumable parts such as filter elements and air cleaner elements during periodical maintenance or before reaching the wear limit. Proper replacement of consumable parts will improve the overall life of the machine, resulting in cost-effective operations.
Use genuine SAKAI parts as replacement parts.
The part numbers are subject to change due to the improvements to the parts. When ordering parts, make sure to obtain the latest part numbers by checking with our distributorship or one of our certified service shops of the version, model name and model number of the machine in use.

Consumable Part	Part No.	Interval		Remark
		Annual replacement (year)	Replacement per operation (hours)	
Engine oil element	4032-71010-0		500	
Engine oil separator element	4033-37016-0		1500	
Fuel pre-filter assembly	4033-37006-0		500	
Filter element	4032-73005-0		500	
Fuel filter assembly	4033-37004-0		500	
Filter element	4033-37005-0		500	
Fuel sedimenter assembly	4033-32008-0		500	
Air cleaner assembly	4422-22000-1		As required	
Inner element	4422-22002-1	1	Replacement simultaneously with the outer element	
Outer element	4422-22003-0	1	After cleaning 5 times	
Suction filter element (Hydraulic oil)	4205-50000-0		1000	Clean or replacement
Line filter assembly (Hydraulic oil)	4218-71000-1		As required	
Filter element	4211-41004-1		500	
Sprinkler filter assembly	4712-91000-0		As required	
Sprinkler nozzle assembly	4710-41000-0		As required	
Nozzle	4710-41004-0		As required	
O-ring	4710-41003-0		As required	
Strainer	4710-41005-0		As required	Clean or replacement
Scraper blade	1452-71006-0		As required	
Gas damper (Bonnet)	4424-19000-0	2		
Gas damper (Canopy)	4425-53000-0	1		
Battery	4906-11000-1		As required	115D31R


Gas damper (CANOPY)
4425-53000-0
SW654H
Battery
4906-11000-1
Fuel sedimenter assembly
4033-32008-0
Fuel pre-filter assembly
4033-37006-0
Filter element
4032-73005-0
Suction filter element
(Hydraulic oil)
4205-50000-0
Fuel filter assembly
4033-37004-0
Filter element
4033-37005-0
Engine oil
sepatator element
4033-37016-0
Sprinkler filter assembly
4712-91000-0
Line filter assembly
(Hydraulic oil)
4218-71000-1
Filter element
4211-41004-1
Gas damper (Bonnet)
4424-19000-0
Air cleaner assembly
4422-22000-1
Inner element
4422-22002-1
Outer element
4422-22003-0
Sprinkler nozzle assembly
4710-41000-0
Strainer
4710-41005-0
O-ring
4710-41003-0
Nozzle
4710-41004-0
Engine oil element
4032-71010-0
Scraper blade
1452-71006-0

3.6 Feeding Water and Lubricants

(1) General rules

1) Never feed water or lubricant with the strainer removed.
2) Use recommended lubricant and hydraulic fluid.
3) Do not use lubricants and hydraulic fluid of different brands.
4) When replacing oil, drain it completely and clean the container with flushing oil before filling new oil.
5) When fueling SAKAI machines, be sure to use the fuel that we specify or recommend. Nonconformance resulting from use of fuel and lube oil other than those specified or recommended by our company is not covered by our warranty and repair service.

(2) Capacity

Compartment	Type of fluid	Capacity in liters (gal.)		
		SW654, SW654H	SW654B	SW654ND
Engine oil pan	Engie oil	11.2 (3.0)		
Wheel motor	Gear oil	1.6 (0.4) x 2		
Vibrator	Gear oil	2.2 (0.6) x 2	1.7 (0.4) x 2	10.4 (2.7) x 2
Hydraulic oil tank	Hydraulic oil	44 (11.6)		
Fuel tank	Diesel oil	120 (32)		
Radiator	Coolant	9 (2.4)		
Water sprinkler tank	Water	300 (79) x 2		

(3) Rating

Lubricant	Service classification	Ambient temp. and applicable viscosity rating			Applicable standards
		-15 – 30°C (5 – 86°F) Cold	0 – 40°C (32 – 104°F) Moderate	15 – 55°C (59 – 131°F) Tropical	
Engine oil	API grade CJ-4	SAE 10W-30	SAE 30	SAE 40	—
Gear oil	API grade GL5	SAE 80W-90	SAE 90	SAE 140	MIL-L-2105C
Hydraulic oil	Wear resisting	ISO-VG32 over VI 140	ISO-VG46 over VI 140	ISO-VG68 over VI 110	ISO-3448
Grease	Lithium type extreme-pressure grease				NLGI-2
Fuel	Diesel oil				ASTM-D975-2D

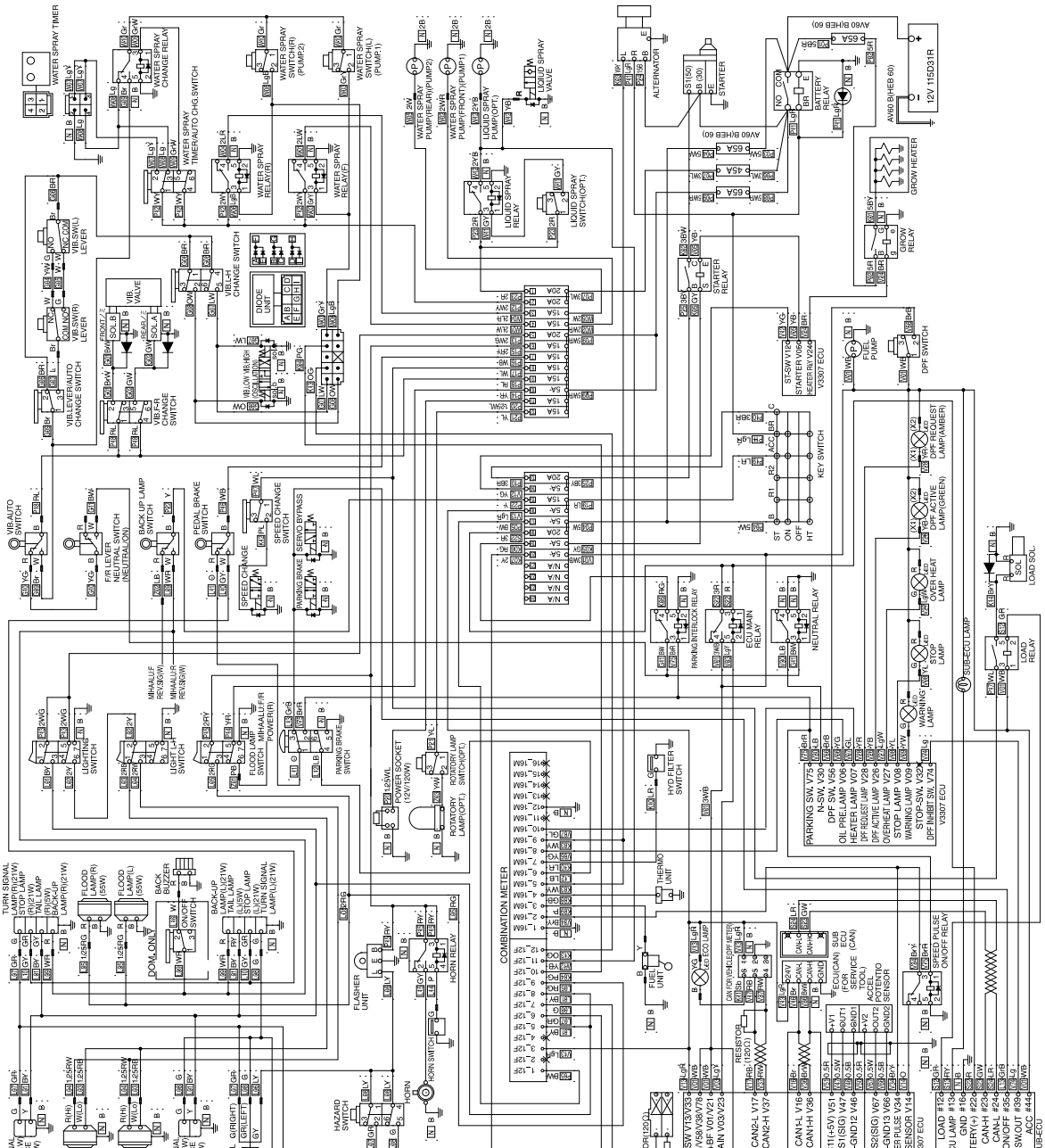
(4) Recommended lubricants

Lubricant / Oil company	Engine oil API – CJ4	Gear oil API GL 5	Hydraulic oil ISO-VG 46	Grease (NLGI – 2)
CHEVRON	DELO 400 LE	RPM Universal Gear Lubricants	Rando HDZ 46	Multifak EP 2
BP	—	BP Energear HYPO – U	Bartran HV 46	BP Energrease LS – EP 2
CASTROL	Tection Extra	EXP Gear OILS	Castrol Hyspin AWH 46	Castrol Spheerol ELP 2
EXXON MOBIL	Mobil Delvac 1 ESP	Mobilube HD	Mobil DTE 10 Excel 46	Mobilux EP 2
SHELL	Shell Rimula R4 L	Shell Spirax S2 A 90	Shell Tellus S2V 46	Shell Alvania Greases EP 2

⚠ CAUTION

- **Fill the fluid reservoirs with the filters installed.**
- **Use recommended fuels and lubricants only.**
- **Use the hydraulic oils which specifications are as clean as ISO4406 18/13 or above.**

3.7 Electric Wiring Diagram



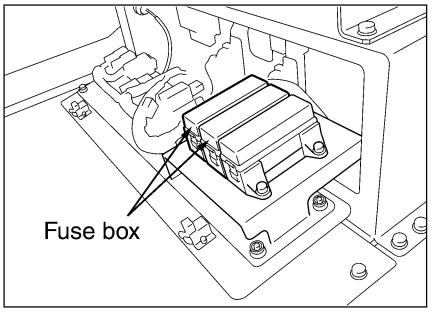
CAUTION: Size of wires not indicated by letters are AV 0.85.

Color of wire

B	Black	BrR	Brown/ Red stripe	GR	Green/ Red stripe	LR	Blue/ Red stripe	P	Pink	RW	Red/ White stripe	WR	White/ Red stripe	YR	Yellow/ Red stripe	LB	Blue/ Black stripe
BR	Black/ Red stripe	BrW	Brown/ White stripe	GW	Green/ White stripe	LW	Blue/ White stripe	R	Red	RY	Red/ Yellow stripe	Y	Yellow	YW	Yellow/ White stripe	WG	White/ Green stripe
BW	Black/ White stripe	G	Green	GY	Green/ Yellow stripe	LY	Blue/ Yellow stripe	RB	Red/ Black stripe	W	White	YB	Yellow/ Black stripe	BrY	Brown/ Yellow stripe		
BY	Black/ Yellow stripe	GB	Green/ Black stripe	Gr	Gray	Lg	Light green	RG	Red/ Green stripe	WB	White/ Black stripe	YG	Yellow/ Green stripe	Sb	Blue		
Br	Brown	GL	Green/ Blue stripe	L	Blue	O	Orange	RL	Red/ Blue stripe	WL	White/ Blue stripe	YL	Yellow/ Blue stripe	BG	Black/ Green stripe		

Fuse box

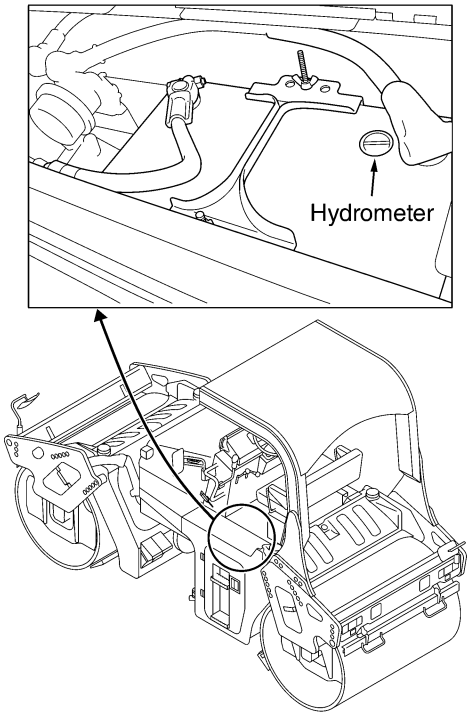
The fuse box houses six 5 A-, nine 15 A-, and five 20 A- fuses lined up with spares fitted for three 5 A-, three 15 A- and two 20 A- fuses.
Use fuses of correct capacity (refer to page 38).



NOTE: When a fuse is burned, determine the cause before replacing.

Battery

★ Leaving the battery unused for long without attention or its power excessively at a time can cause damage to the plates, leading to a shortened life.
★ For long-term storage, charge it fully, tighten the caps securely, store in a cool and dry place, and check the level of charge at least once a month.
★ Keep the battery in a satisfactory condition at all times.
★ The battery should be in a satisfactory condition when the engine is to be started on cold days. Avoid starting the engine with the battery in a poor condition at any time.



⚠ WARNING

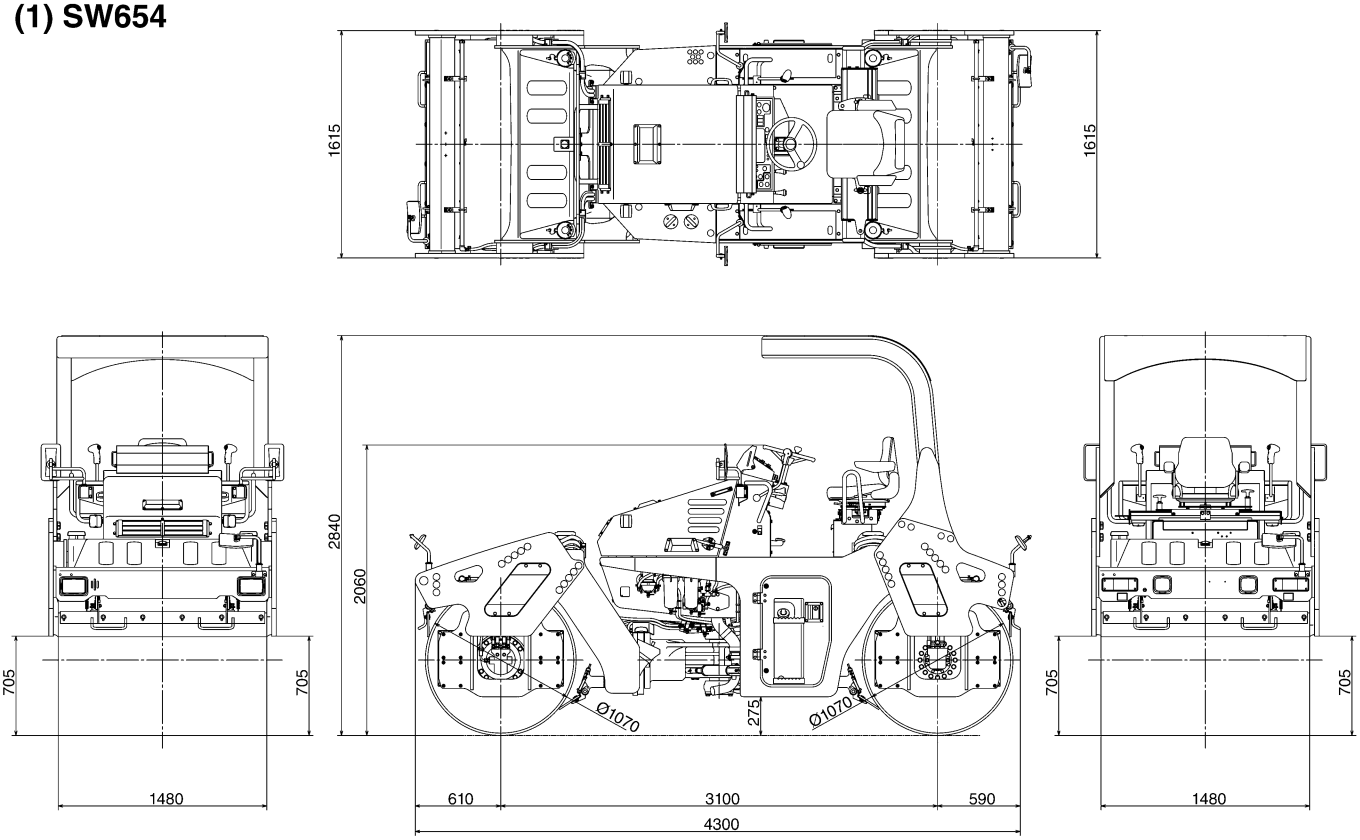
- **The battery contains diluted sulfuric acid, which will dissolve clothes and skin. Should you get battery fluid on your clothes or skin, wash it off immediately with copious quantities of clean water.**
- **If you get it in your eyes, rinse them straight away with clean water and immediately seek the help of a doctor.**
- **If you accidentally ingest it, drink copious quantities of water and immediately seek the help of a doctor.**
- **Always wear safely glasses when handling the battery.**
- **The battery generates hydrogen gas, so there is a danger of explosions. Avoid recharging the battery, keep cigarettes and flames away, etc., in poorly ventilated places when there is a danger of generating sparks.**
- **The inspection and handling of batteries should be carried out with the engine turned off and the starter switch in the OFF position.**
- **Turn the starter switch to the OFF position, then wait at least 30 seconds before removing the battery. An abnormality may arise in the ECM (engine control module).**
- **Be careful not to accidentally connect the two battery terminals with tools or other metallic objects.**
- **Tangled terminals may generate sparks due to improper connections, resulting in the danger of explosions. Make sure terminals are connected firmly.**
- **The battery is for starting the engine and operating electrical equipment on the machine. Do not use it for any other purpose.**

⚠ CAUTION

The power-supply voltage of this machine is 12 V.

4 SPECIFICATIONS

(1) SW654

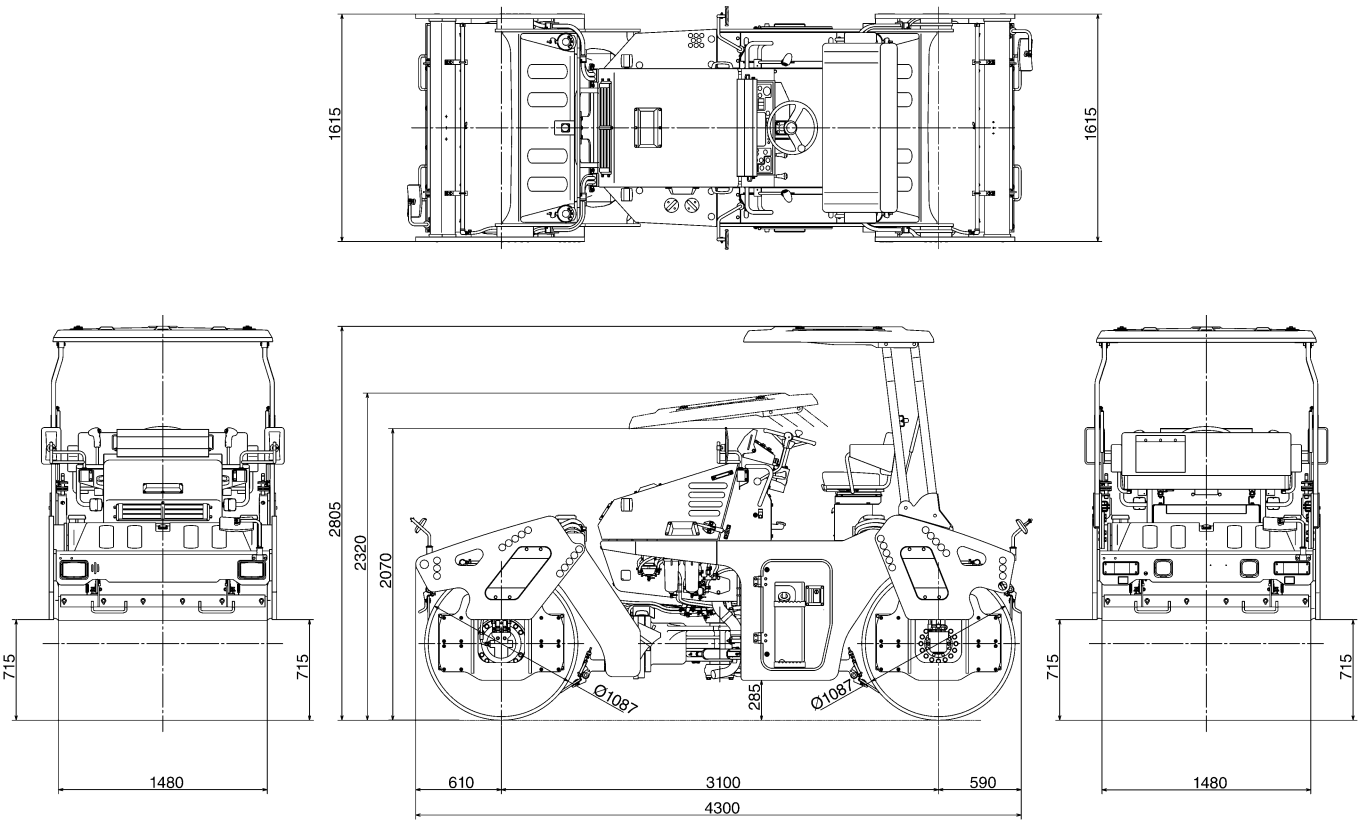


Model	SW654 (with ROPS)
Weight	
Operating weight	7,070 kg (15,585 lbs)
On front axle	3,360 kg (7,405 lbs)
On rear axle	3,710 kg (8,180 lbs)
Dimension	
Overall length	4,300 mm (169”)
Overall width	1,615 mm (64”)
Overall height	2,840 mm (112”)
Wheelbase	3,100 mm (122”)
	Roll (Dia. x Width)
Front	1,070 mm x 1,480 mm (42” x 58”)
Rear	1,070 mm x 1,480 mm (42” x 58”)
Performance	
Travel speed (forward / reverse)	0 – 12 km/h (0 – 7.5 mile/h)

Performance		
Vibration system	Low	High
Frequency	67 Hz (4,000 vpm)	50 Hz (3,000 vpm)
Centrifugal force	62 kN (13,940 lbs)	69 kN (15,510 lbs)
Gradeability	18 degrees	
Rolling width	1,480 mm (58”)	
Minimum turning radius	5.2 m (205”)	
Engine		
Model	KUBOTA “ V3307-CR-T-EF05 ” Diesel engine	
Total displacement	3.331 L (203.3 cu.in)	
Rated output	54.6 kW / 2,200 min^{-1} (73 HP / 2,200 rpm)	
Max. torque	261 N·m / 1,500 min^{-1} (193 ft·lb / 1,500 rpm)	
Tank capacity		
Fuel tank	120 liters (31.7 gal)	
Hydraulic oil tank	44 liters (11.6 gal)	
Water sprinkler tank	300 liters x 2 (79.3 gal x 2)	

NOTE: 1) Gradeability is the calculated value. It may vary with ground surface conditions.
2) According to European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

(2) SW654H



Model	SW654H (with AWNING)
Weight	
Operating weight	7,720 kg (17,020 lbs)
On front axle	3,770 kg (8,310 lbs)
On rear axle	3,950 kg (8,710 lbs)
Dimension	
Overall length	4,300 mm (169”)
Overall width	1,615 mm (64”)
Overall height	2,805 mm (110”)
Wheelbase	3,100 mm (122”)
	Roll (Dia. x Width)
Front	1,087 mm x 1,480 mm (43” x 58”)
Rear	1,087 mm x 1,480 mm (43” x 58”)
Performance	
Travel speed (forward / reverse)	0 – 12 km/h (0 – 7.5 mile/h)

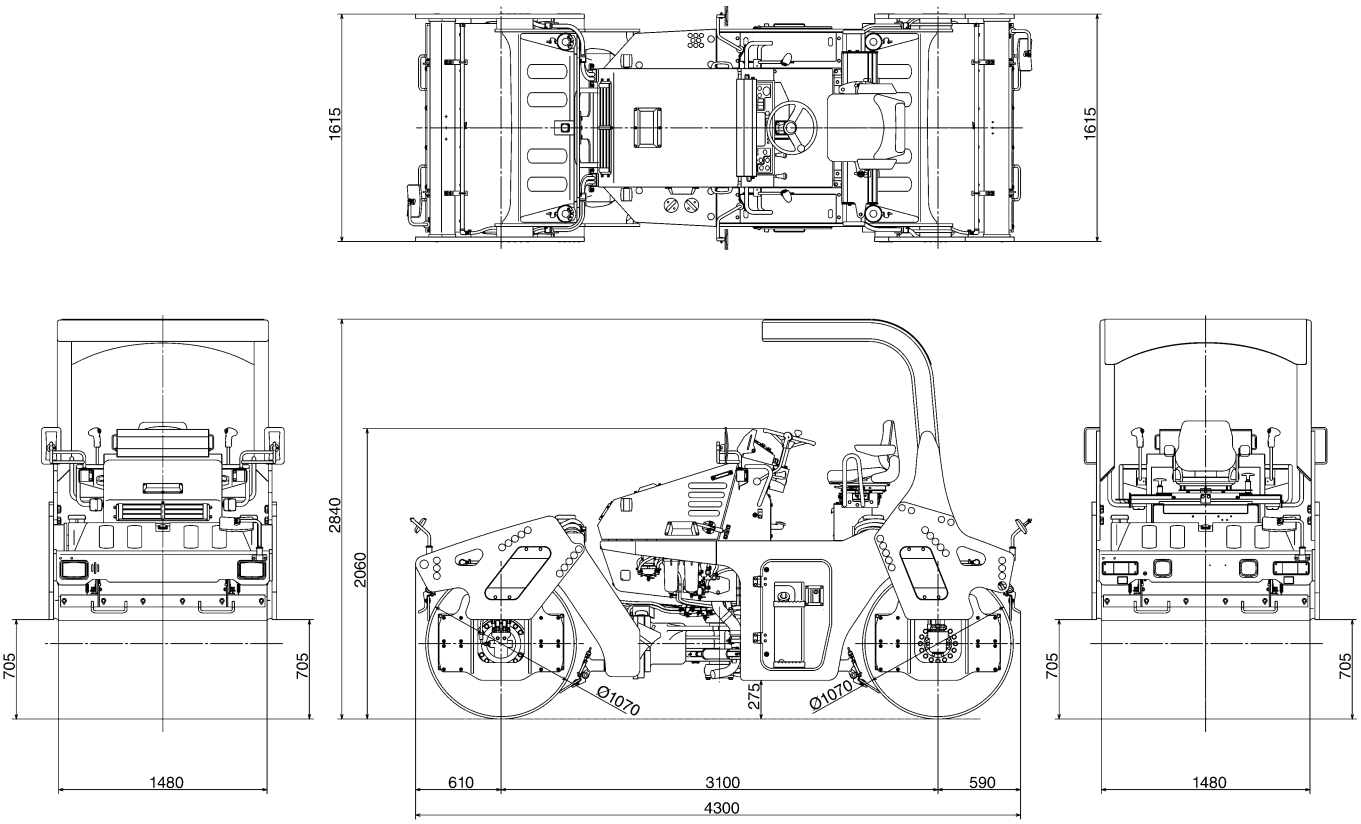
Performance		
Vibration system	Low	High
Frequency	67 Hz (4,000 vpm)	50 Hz (3,000 vpm)
Centrifugal force	62 kN (13,940 lbs)	69 kN (15,510 lbs)
Gradeability	16 degrees	
Rolling width	1,480 mm (58”)	
Minimum turning radius	5.2 m (205”)	

Engine	
Model	KUBOTA “ V3307-CR-T-EF05 ” Diesel engine
Total displacement	3.331 L (203.3 cu.in)
Rated output	54.6 kW / 2,200 min^{-1} (73 HP / 2,200 rpm)
Max. torque	261 N·m / 1,500 min^{-1} (193 ft·lb / 1,500 rpm)

Tank capacity	
Fuel tank	120 liters (31.7 gal)
Hydraulic oil tank	44 liters (11.6 gal)
Water sprinkler tank	300 liters x 2 (79.3 gal x 2)

NOTE: 1) Gradeability is the calculated value. It may vary with ground surface conditions.
2) According to European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

(3) SW654B

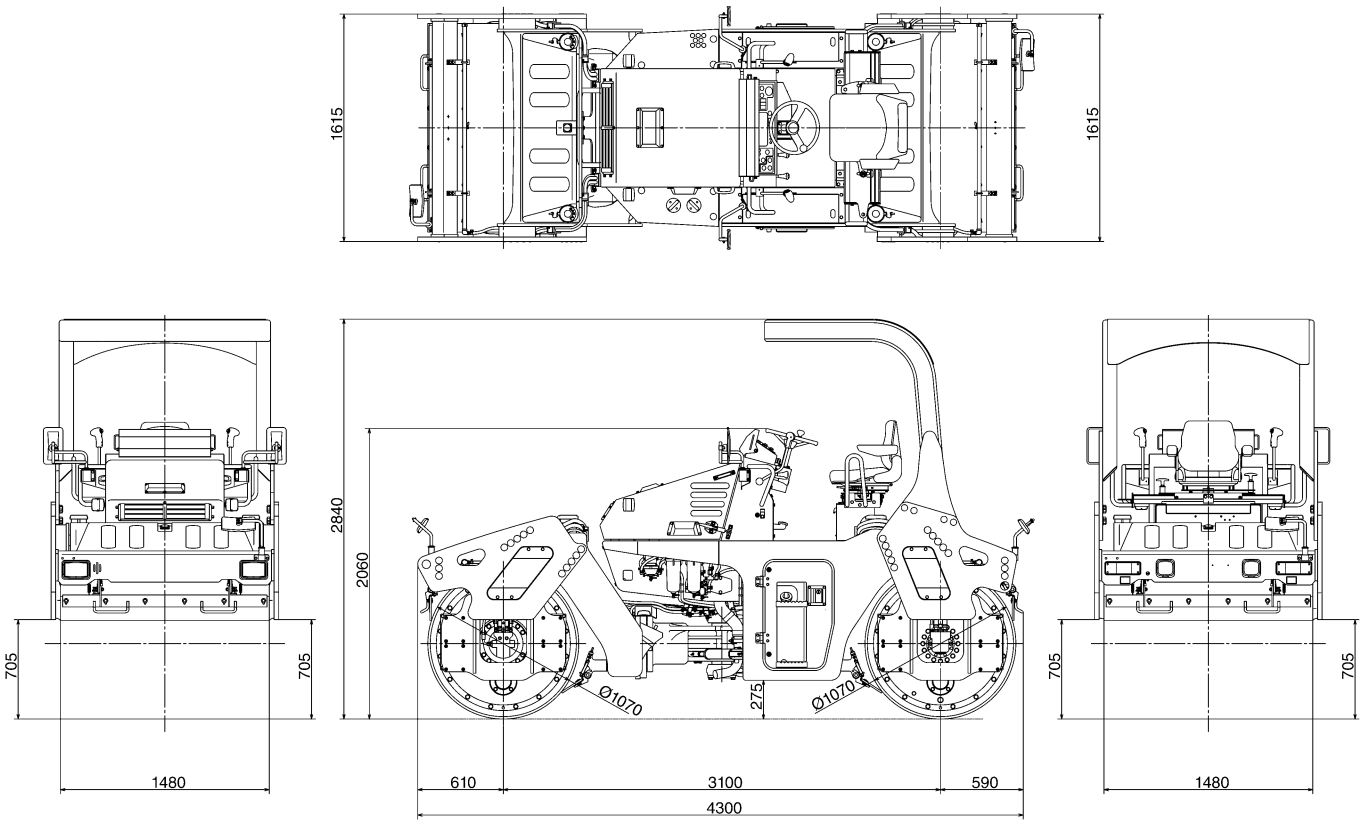


Model	SW654B (with ROPS)
Weight	
Operating weight	7,970 kg (17,570 lbs)
On front axle	3,810 kg (8,400 lbs)
On rear axle	4,160 kg (9,170 lbs)
Dimension	
Overall length	4,300 mm (169”)
Overall width	1,615 mm (64”)
Overall height	2,840 mm (112”)
Wheelbase	3,100 mm (122”)
	Roll (Dia. x Width)
Front	1,070 mm x 1,480 mm (42” x 58”)
Rear	1,070 mm x 1,480 mm (42” x 58”)
Performance	
Travel speed (forward / reverse)	0 – 12 km/h (0 – 7.5 mile/h)

Performance		
Vibration system	Low	High
Frequency	67 Hz (4,000 vpm)	50 Hz (3,000 vpm)
Centrifugal force	61 kN (13,715 lbs)	67 kN (15,060 lbs)
Gradeability	16 degrees	
Rolling width	1,480 mm (58”)	
Minimum turning radius	5.2 m (205”)	
Engine		
Model	KUBOTA “ V3307-CR-T-EF05 ” Diesel engine	
Total displacement	3.331 L (203.3 cu.in)	
Rated output	54.6 kW / 2,200 min^{-1} (73 HP / 2,200 rpm)	
Max. torque	261 N·m / 1,500 min^{-1} (193 ft·lb / 1,500 rpm)	
Tank capacity		
Fuel tank	120 liters (31.7 gal)	
Hydraulic oil tank	44 liters (11.6 gal)	
Water sprinkler tank	300 liters x 2 (79.3 gal x 2)	

NOTE: 1) Gradeability is the calculated value. It may vary with ground surface conditions.
2) According to European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

(4) SW654ND



Model	SW654ND (with ROPS)
Weight	
Operating weight	7,370 kg (16,250 lbs)
On front axle	3,510 kg (7,740 lbs)
On rear axle	3,860 kg (8,510 lbs)
Dimension	
Overall length	4,300 mm (169”)
Overall width	1,615 mm (64”)
Overall height	2,840 mm (112”)
Wheelbase	3,100 mm (122”)
	Roll (Dia. x Width)
Front	1,070 mm x 1,480 mm (42” x 58”)
Rear	1,070 mm x 1,480 mm (42” x 58”)
Performance	
Travel speed (forward / reverse)	0 – 12 km/h (0 – 7.5 mile/h)

Performance		
Vibration system	Vibration	Oscillation
Frequency	49 Hz (2,940 vpm)	49 Hz (2,940 vpm)
Centrifugal force	68 kN (15,285 lbs)	124 kN (27,875lbs)
Gradeability	18 degrees	
Rolling width	1,480 mm (58”)	
Minimum turning radius	5.2 m (205”)	
Engine		
Model	KUBOTA “ V3307-CR-T-EF05 ” Diesel engine	
Total displacement	3.331 L (203.3 cu.in)	
Rated output	54.6 kW / 2,200 min^{-1} (73 HP / 2,200 rpm)	
Max. torque	261 N·m / 1,500 min^{-1} (193 ft·lb / 1,500 rpm)	
Tank capacity		
Fuel tank	120 liters (31.7 gal)	
Hydraulic oil tank	44 liters (11.6 gal)	
Water sprinkler tank	300 liters x 2 (79.3 gal x 2)	

NOTE: 1) Gradeability is the calculated value. It may vary with ground surface conditions.
2) According to European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

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