

MODEL SW8884・4884ND・8844ZZD・9944ZZD

**⚠ WARNING**  
Before operating, inspecting, or maintaining this machine, read these instructions thoroughly. Failure to follow these instructions and safety precautions could result in serious injury, death or property damage.

**OPERATING &  
MAINTENANCE  
INSTRUCTIONS**

**SAKAI HEAVY INDUSTRIES, LTD.**

**VIBRATING  
ROLLER**

**MODEL**  
**SW884 SW884ND**  
**SW994 SW994ND**

**From** SW884 → 3SW79 - 40154  
SW884ND → 3SW79 - 40154  
SW994 → 3SW80 - 40113  
SW994ND → 3SW80 - 40132

**SAKAI®**

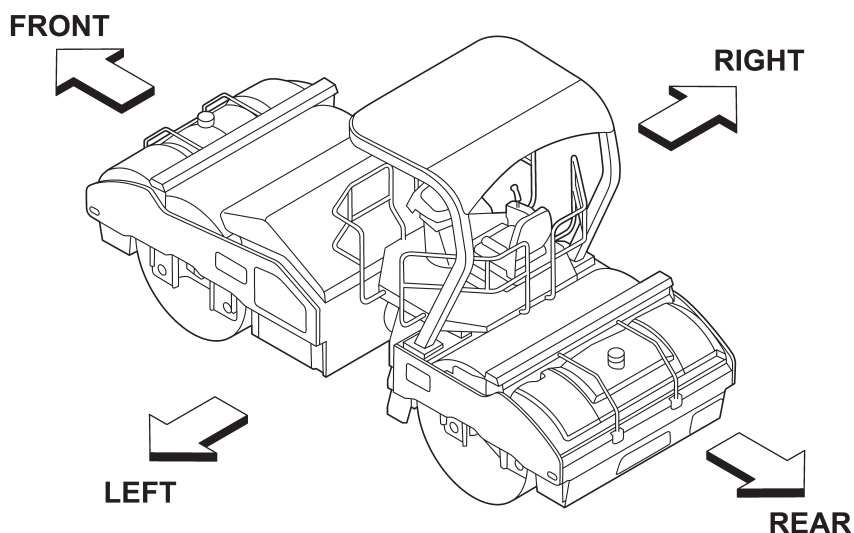
## PREFACE

This operator's manual serves as a guide for the use of your SAKAI SW884, SW884ND, SW994, SW994ND Vibrating Roller and should be read thoroughly by all persons using this machine, especially 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.

Keep this manual for future reference and keep it nearby whenever you work. If the instruction manual is lost or is damaged and is not legible, replace it immediately by contacting your dealer.

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 engine instructions due to the results of improvements in machine design. If you have any inquiry regarding your machine or this manual, contact your dealers.



SW884, SW884ND, SW994, SW994ND

### **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.**

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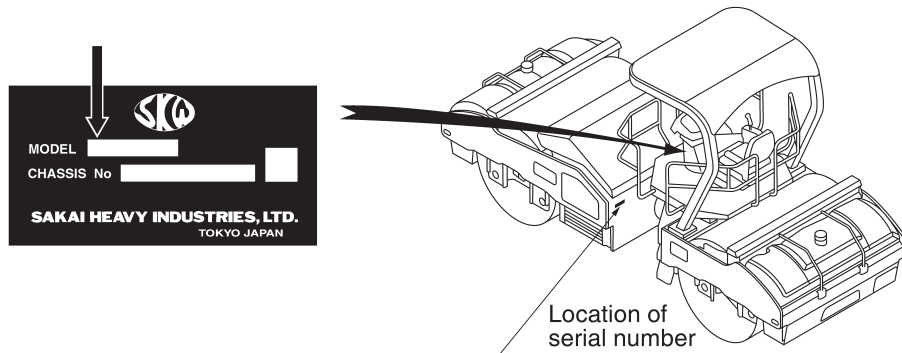
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## MACHINE AND ENGINE IDENTIFICATION NUMBERS

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

### (1) Machine model

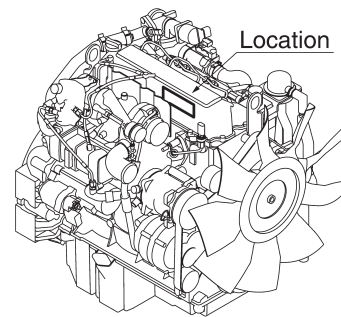
Indicated on the nameplate of the dashboard in the operator's station.



### (2) Machine serial number

SW884 → 3SW79 - ○○○○○○  
 SW884ND → 3SW79 - ○○○○○○  
 SW994 → 3SW80 - ○○○○○○  
 SW994ND → 3SW80 - ○○○○○○

### (3) Engine serial number



## **SAFETY PRECAUTIONS**

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 safety labels.




### **WARNING**

**Before operating, inspecting, or maintaining this machine, read these instructions thoroughly. Failure to follow these instructions and safety precautions could result in serious injury, death or property damage.**

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 authorized in this manual, it could be dangerous and you assume responsibility for your own personal safety.

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

- |  |   |
|--|---|
|  <b>DANGER</b>  | <b>DANGER</b> indicates a hazardous situation which, if not avoided, will result in death or serious injury.<br>The safety decals on the machine are red.       |
|  <b>WARNING</b> | <b>WARNING</b> indicates a hazardous situation which, if not avoided, could result in death or serious injury.<br>The safety decals on the machine are orange.  |
|  <b>CAUTION</b> | <b>CAUTION</b> indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.<br>The safety decals on the machine are yellow. |
| <b>NOTICE</b>  | <b>NOTICE</b> is used to address practices not related to physical injury.<br>The safety decals on the machine are blue.  |

Do not alter or modify this machine unless it has been authorized by SAKAI. Doing so could be dangerous and result in serious injury or death.

Do not operate or maintain this machine unless you have read this manual and have been trained in safe and proper use.

## 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 use a cell phone while driving, 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 of the safety labels attached to the machine.



#### ■ When the instruction manual is lost, damaged or not legible, replace it immediately by contacting your dealer

#### ■ 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. Vibration rolling compaction under conditions of excessive compaction, or using it to crush the rocks can damage the machine.

#### ■ Obey the worksite rules

- Follow noise standards and worksite rules that deal with safety.

#### ■ Wear protective clothing appropriate to work

- Wear protective 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 the machine or collapsing the shoulder of the road.

■ **The operator must determine that it is safe to move the machine to a hazardous area under unusual conditions**

- Such areas include sloping land, unstable road shoulders and soft ground.

■ **Prepare in advance for an accident**

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

■ **Realize the capability of the machine**

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

■ **A machine without ROPS must not be operated on slopes or unsafe grounds**

■ **A machine without CABIN must not be operated in bad weather or in a harmful polluted area**

■ **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 only after making sure that it is safe to operate.

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

■ **Beware when operating moving parts**

- When operating moving parts such as covers, understand the movable range and be careful not to get your hands or feet caught.

## 1 BASIC PRECAUTIONS FOR SAFETY

### ■ Operator must only operate the machine when sitting in the operator's seat

### ■ Be careful of hot parts

- After your machine has operated for some time, the coolant, engine oil and hydraulic oil will heat up and the internal pressure will increase. If, in this state, you try to remove the filler caps, drain the oil or replace the filters, you can get burned. Wait for the temperature of the machine to cool down before performing these tasks.
- To remove the radiator cap, stop the engine and slowly loosen the cap after the coolant cooled down to relieve the pressure (For the radiator cap with a lever, lift the lever to release the trapped pressure before removing the radiator cap).
- When removing the filler cap on the hydraulic tank, release the trapped pressure by turning it slowly to prevent the oil from gushing out (For the cap with a lever, lift the lever to release the trapped pressure before removing the cap).
- While the engine is running or immediately after it has been stopped, do not touch the engine, muffler, exhaust pipes, hydraulic pumps and motors, lights, etc., as they will be hot and cause burns.
- 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 location of 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. Fuel is highly flammable.
- Do not smoke and do not use matches or cigarette lighters close to flammable materials.
- When refueling, stop the engine and keep open flames away from the engine.
- The filler caps of the fuel and oil tanks must be securely tightened.



### ■ In case of machine fire

- In case of a machine fire, stop the engine by turning the starter switch to the ○ (OFF) position, then move away from the machine as quickly as possible as it may cause serious injuries or death.

■ **Do not touch the muffler, exhaust pipe or the DPF during and after the engine is running as they are very hot**

■ **When getting on and off the machine, make sure the machine is completely stopped**

- For getting on and off, face the machine and use the handrails and the step.
- Watch your step when getting on or off the machine.
- Do not jump on or off the machine, particularly when it is moving.
- When getting on and off an articulated type machine, make the machine straight before stopping. In the bent state, there is a risk of getting caught or pinched because the getting on and off space will be narrow.

■ **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 on the operator's platform.

■ **When leaving the machines**

- To prevent theft and to prevent the machine from being operated by unauthorized personnel, always remove the starter key and make sure to carry it with you.

■ **How to handle hydraulic fluid**

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



■ **Do not use worn tires (If tires installed)**

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



## 1 BASIC PRECAUTIONS FOR SAFETY

### 1.2 Preparation for Safe Operation

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

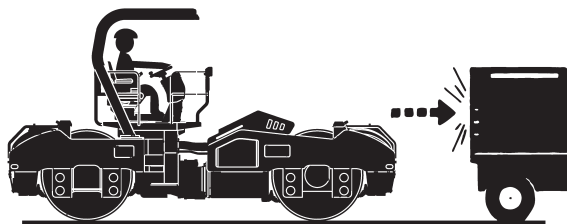
- Do not place parts, tools or unnecessary items on the step, operator's station and floor board.
- Keep the step, floor board, brake pedal, controls and handholds free from mud, oil, ice or water, as they can cause slippage. Repair them if found to be damaged.  
Tighten the loose bolts.
- Keep your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

#### ■ Inspect your machine before operation

- Check your machine for damages such as cracks and deformation. If any damage is found, report it to the person in charge.
- Check the level of fluids (fuel, engine oil, coolant, antifreeze and hydraulic oil).  
Add as necessary.
- Check the ground on which the machine is parked for signs of leakage of oil, fuel and water. If there is evidence of leakage, investigate the cause and repair it immediately.

#### ■ Watch your distance

- When driving, bear in mind the stopping distance. Avoid abrupt starting and stopping, and moving in a zigzag direction.



#### ■ Understand the ROPS function (If ROPS installed)

- Ensure that there are no loose bolts, cracks or rust on the ROPS body and the attaching portions.
- Tighten the bolts with the specified torques of **883 N·m** after the ROPS are removed.
- Do not weld nor drill holes to the ROPS parts without permission from SAKAI, because it may decrease the strength of the ROPS.
- Be sure to wear the seatbelt during the operation.

### 1.3 Before Starting the Engine

#### ■ Before getting on, make sure the area around the machine is safe

- Before getting on the machine, make certain that there are no obstacles around the machine and no workers under it. If any worker is close to the machine, warn the machine is about to be moved and to stay away from the path.

#### ■ Make sure the hood and the door are closed

#### ■ 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 turn your body to run the machine in reverse.
- Adjust the seat to allow proper operation of the steering wheel, levers, switches, etc.

#### ■ Secure good visibility (If CABIN installed)

- Keep the windows clean for good visibility.
- Securely fixed the door whether open or closed.

#### ■ Ensure good forward and backward visibility

- Adjust mirrors for good visibility. If dirty, clean them. If damaged, replace.

#### ■ Check that the horn, lamps and gauges are 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, sound the horn.  
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 without sitting on the driver's seat as there is a risk of operational mistakes.

## 1 BASIC PRECAUTIONS FOR SAFETY

### ■ Pay attention to ventilation

- Exhaust gas is dangerous.  
When starting the engine in a poorly ventilated place such as in an enclosed area, open the windows and the entrance doors to provide sufficient ventilation.



### ■ Do not stand close to the exhaust gas pipe outlet

- Exhaust gas is harmful if breathed in. Can cause cancer.

## 1.4 After Starting the Engine

### ■ Secure safety around the machine

- Before moving the machine, ensure that the area around the machine is clear of personnel and obstructions. Moreover, honk the horn, indicating that you intend to move the machine, but wait a little while before actually moving.



### ■ Warm up the engine

- Do not start driving the machine immediately after starting the engine. Execute the warming up operation by idling the machine for several minutes.
- Check the ground on which the machine is parked for signs of leakage of oil, fuel and water. If there is evidence of leakage, investigate the cause and repair it immediately.

### ■ Do a test run

- Make a test run in a safe place to check that there are no abnormal signs.
- Listen for unusual sounds, and check for abnormal temperature rise. If abnormal, park the machine in a safe place and find the source of the trouble before operating.
- Fix all the abnormalities before operating the machine.

## 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 the operation

- Sit in the driver's seat before starting the operation.

### ■ Seatbelt (Seatbelt equipped machines)

- Be sure to wear the seatbelt during the operation.

### ■ No other person on machine but the operator

- This machine is a one-man roller. Do not allow anyone to get on except the operator. Only the operator is allowed to be on this machine while it is running or in operation.

### ■ Never get on and off when the machine is moving

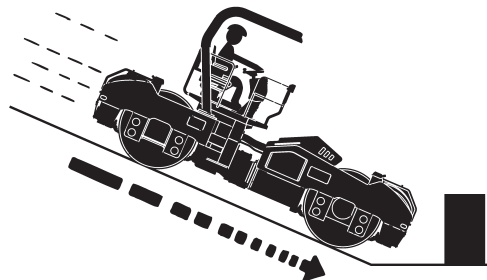
- Getting on or off the machine only after making sure it stopped completely and after the parking brake is applied.

### ■ Do not let anyone enter the work area

- There is a danger of being run over causing serious injuries or death.
- If the visibility of the driver is poor, arrange a guide to ensure peripheral safety.

### ■ When going up or down a slope, run at a steady low speed and do not shift the speed

- Shifting speeds on a slope can cause unexpected running down the slope.
- Going down on a slope at speeds other than low range can cause the machine to get out of control.



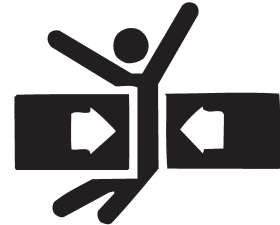
■ **Refrain from inattentive driving**

- Inattentive driving can cause an accident. Use extreme care for workers present in the path of the 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 traveling direction, make sure it is safe to do so in the path of the traveling direction**

■ **Keep everyone away from the pinch points**

- When making turns, do not allow anyone to come close to the pinch points of the machine.



■ **At night, carefully drive the machine**

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

■ **Avoid continuous work for a long time**

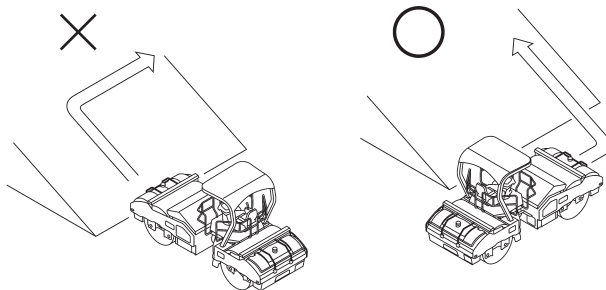
- Avoid long hours of continual operation as it may lead to an accident from fatigue.

■ **Repair as soon as possible if found to be broken or faulty**

- 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.

## 1 BASIC PRECAUTIONS FOR SAFETY

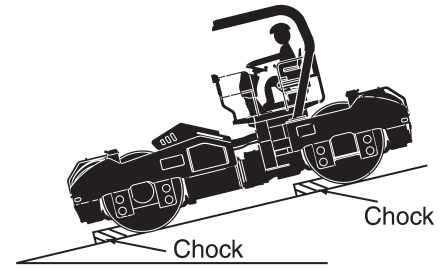
- **Do not operate the machine unless you are seated in the operator's seat. Do not drive in a standing posture**
  - Do not put your legs out or lean forward. Be sure to sit in the proper position while driving the machine.
  
- **While making turns, do not run at abnormally high speed and do not turn the steering wheel abruptly and sharply. High speed turns, especially on a soft or an uneven ground, could result in a rollover**
  
- **For traveling on structures such as a bridge, make certain that the structures 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 the slope. If necessary to do so, go straight down the slope to the flat ground, move sideways and go straight up to the destination**



- **On a steep slope, run the machine at low speed**

■ **When parking**

- Select a level and a hard ground. If necessary to park on a slope, chock the front side of the drums and the front tires which are facing the downhill side of the slope.
- When required to park on a public road, provide necessary markings such as flags, barriers and the lighting. However, be sure they do not obstruct the traffic.
- Stop the engine when getting off the machine. Remove the starter key from switch, and store it in a appropriate place.
- Be sure not to get your hands caught when handling the chocks.



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

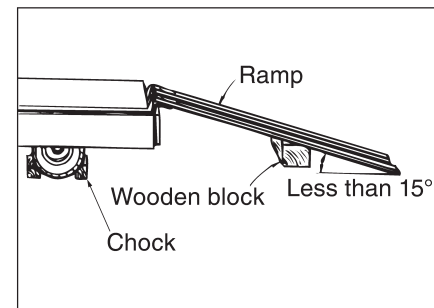
- The surface of the tires in contact with the ground may become flattened and deformed (forming of flat spots) during the long-term parking.
- The forming of flat spots may cause bounding or shaking during the operation of the machine.
- If flat spots occur, run the machine to restore the circular shape of the tires and improve the situation.
- To prevent the forming of the flat spots during the 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 BASIC PRECAUTIONS FOR SAFETY

### 1.6 Loading and Unloading

- Loading and unloading can be dangerous. Use extreme care.
- Select a level and hard ground. Leave sufficient distance with the road shoulder blocks.
- 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. To change or correct the direction, go down the ramps and correct the direction.
- Do not use kinked, twisted or damaged wireropes for crane or winch operation. Use ones with ample strength.
- When loading is complete, place the wooden blocks under the drums and fasten the chains to the machine to fix properly.



### 1.7 Transportation

- Follow the required regulations.
- For the transportation route, consider the overall width, height, and weight after the machine is loaded on the trailer.
- Before passing under a bridge or any structure, know the maximum height of the trailer with the machine on it and the clearance with them.

### 1.8 Towing

- Towing should be carried out in emergency and short distances only. For long distance, use a truck or a trailer for transportation.
- Tow the machine in accordance with the section on the unloader valve in “2.13 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 and while towing.
- Align the connection points of the failed machine and the towing machine in a straight line when connecting the machines.

## 1.9 Handling the Battery

### ■ When handling the battery

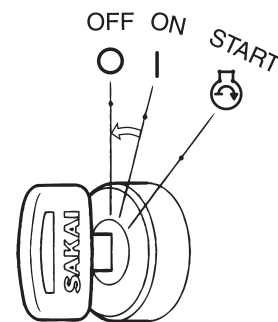
- Refer to “3.3 Periodic Maintenance Points” for information on where to install the battery.
- Battery electrolyte contains sulphuric acid. It will destroy clothing and harm the skin. If it touches your clothing or skin, flush with large quantities of water.
- In case of contact with eyes, flush with clean water and get medical help immediately.
- If swallowed, drink large amount of water, milk, beaten egg or vegetable oil, and get medical help immediately.
- Wear safety goggles when handling the battery. Wear safety goggles, full face shield, rubber gloves and rubber apron when adding fluids to the battery.
- In poorly ventilated places, do not recharge the battery or bring cigarettes and flames closer to the battery as there is a risk of 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 hands after handling.**

- Inspect or handle the battery with the engine stopped and the starter switch in the ○ position.
- Turn the starter switch to the ○ position, then wait at least 30 seconds before removing the battery. If not, an abnormality may arise in the ECM (Engine Control Module).

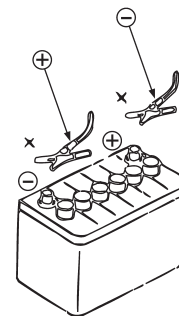


## 1 BASIC PRECAUTIONS FOR SAFETY

- 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 the 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 is shortened but also it can cause explosions if you continue to use 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 the 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 the machine body. This can generate dangerous sparks.
- Do not connect the booster cable to the wrong terminal. Never connect the positive terminal to the negative terminal or the body of the machine.
- Final connection to the engine block of the failed machine may cause sparks. Therefore, the connecting point should be as far as possible from the battery.



## 1.10 Before Servicing

### ■ Attach warning tags when servicing the machine

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

**Do not operate.**

If not use, keep this warning tag in the tool box.

### ■ Setting the chocks

- Before the inspection or the maintenance work, set the chocks in front and behind the roller drum (wheels) to prevent the machine from moving.

### ■ Use proper tools

- It is very dangerous to use damaged or deteriorated tools or to use the 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.
- Change any hose found to be abnormal even if it is within its recommended service interval.
- Replace the fuel hose, high pressure hydraulic hoses and the other liquid hoses regularly to prevent fire. Replace the high pressure hoses of the power steering system every two years.
- Refer to "3 PERIODIC MAINTENANCE" for detailed information on the timing of replacements.

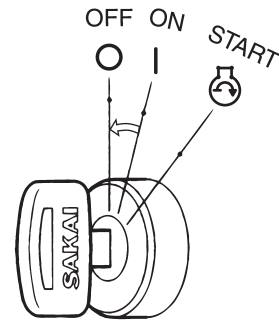
Follow the procedures outlined in "3.4 Maintenance Procedure".

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

## 1 BASIC PRECAUTIONS FOR SAFETY

### ■ Inspect or service your machine with the engine stopped

- If required to keep the engine running in a case like radiator interior cleaning, perform the work with two persons. One person should sit on the operator's seat and be ready to stop the engine at any time. He must be careful not to touch the levers that are not necessary. Maintenance personnel must be careful not to touch or caught between the moving parts.



### ■ Supplying fuel, oils and grease

- Do not cover the filler port when refueling. Refueling a 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 cleaning. 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 the radiator to cool down before removing the radiator cap. Before removing the cap, cover it with a rag to prevent splashing out of pressurized coolant which may cause burn.

### ■ Illumination

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



### ■ Make sure the gas dampers are properly maintained

- Before inspecting the engine room, make sure the gas dampers are firmly stopped and hold the hood. Furthermore, in machines with hood fall prevention stays, make sure they are firmly fixed.

### ■ Points to beware of when filling the sprinkler tank with water (For the machines equipped with sprinkler tanks)

- 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 the service work, do not allow the persons not involved in performing the service 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 the sensors, connectors and the operator's station.

### ■ Take care not to get caught or crushed

- Be sure to fasten the hood and other covers after opening them to prevent unexpected closing and avoid getting caught between them.
- If there is a need to crawl under the lifted machine, make 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 handle them appropriately and safely.
- When repairing the electrical system or welding, disconnect the negative cable from the battery to shut off the electricity.



## NOTICE

**Carrying out work while the cables are connected to the negative terminal may cause electrocution or explosions.**

## 1 BASIC PRECAUTIONS FOR SAFETY

### ■ Carefully handle high pressure hoses

- Do not try to bend or hit high pressure hoses against a hard object. Do not use bent or damaged hoses or pipes. There is a risk of burst.
- Replace the damaged fuel hose, hydraulic hoses and the liquid hoses. Spilled or hydraulic oil or any other fluids can cause fire.

### ■ Be careful of high pressure hydraulic fluid

- Bear in mind that the working equipment hydraulic systems are under internal pressure. Do not add, drain, inspect, or service the hydraulic systems until the internal pressure is relieved.



### NOTICE

**Hydraulic fluid leaking through a fine hole at high pressure can penetrate your skin and eyes. Inspect the leakage by holding a hard board close to the suspected leaking position wearing goggles and gloves. If affected by high pressure oil, get medical help immediately.**

### ■ Be careful of hot parts

- The coolant, engine oil and the hydraulic oil become hot after the machine is operated for some time.
- Removing the radiator cap or draining the coolant or oil can cause burn.

Follow the procedures outlined in “3.4 Maintenance Procedure”.



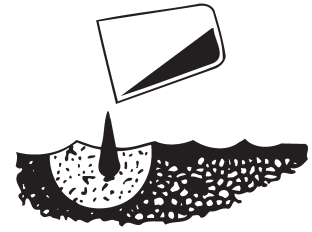
### ■ Be careful when inspecting or servicing rotating fans or belts

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



■ **Used oil disposal**

- Do not throw the 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 the local, state and the 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 a gas damper, be sure to fix it firmly and drill a hole around 2 – 3 mm in diameter at about 20 – 30 mm from the edge on the tube bracket side to release the gas pressure. When doing this, be sure to wear a protective goggles because of the risk of scattering oil or chips by the compressed gas inside.

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

- Disassembly, repair and reassembly of tires require special facilities and knowledge. Have them repaired at a professional tire repair shop.
- When dismounting a tire, chock the other tires for safety.
- When welding work is carried out near the tires, use extreme care, as this can cause an explosion of the tires.



⚠ **DANGER**

**An improperly fitted tire can separate from the rim when inflating and cause serious injury or death.**



# 1 BASIC PRECAUTIONS FOR SAFETY

## 1.12 Safety Labels

Keep all labels clean. If any label becomes illegible or is lost, replace with new one.

① 3998-16696-0

<b>⚠ DANGER</b>	
	<ul style="list-style-type: none"> <li>Do not approach, or allow objects to touch the rotating parts.</li> <li>Body parts which make contact with rotating mechanism will be severed.</li> </ul>
	<ul style="list-style-type: none"> <li>Do not open the radiator cap and the auxiliary tank cap when fluid is hot.</li> <li>Radiator fluid is flammable. Avoid exposure to flame when the cap has been removed.</li> </ul>
	<ul style="list-style-type: none"> <li>Avoid contact with machine parts in the vicinity of the engine while engine is running and after it has been stopped. Contact with hot part will cause burns.</li> </ul>

3998-16696-0

② 3998-16505-0

<b>⚠ DANGER</b>	
	<b>Roll Over Prevention</b> <ul style="list-style-type: none"> <li>Do not work in the vicinity of overhanging banks, or on grades steep enough to cause the machine to slide or roll over.</li> <li>Reduce speed prior to making turns.</li> <li>Pay particular attention when operating on uneven surfaces, as the machine may become unstable.</li> </ul>

3998-16505-0

③ 3998-16501-0

<b>⚠ DANGER</b>	
<b>Be Careful with Fire</b> <ul style="list-style-type: none"> <li>When refueling, stop the engine and do not smoke.</li> <li>The filter cap of the fuel tank must be kept tight.</li> </ul>	

3998-16501-0

④ 3998-16559-0

<b>DANGER EXPLOSIVE GASES</b> <small>Cigarettes, flames or sparks could cause battery to explode. Always shield eyes and face from battery. Do not charge or use booster cables or adjust post connections without proper instruction and training.</small>
<b>KEEP VENT CAPS TIGHT AND LEVEL</b>
<b>POISON CAUSES SEVERE BURNS</b> <small>Contains sulfuric acid. Avoid contact with skin, eyes or clothing. In event of accident flush with water and call a physician immediately.</small>
<b>KEEP OUT OF REACH OF CHILDREN</b>

3998-16559-0

⑤ 3998-19678-0


3998-19678-0

⑥ 3998-06139-0



⑦ 3998-16646-1

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3998-16646-1

⑧ 3998-16652-0

	<b>⚠ WARNING</b>
	<ul style="list-style-type: none"> <li>Avoid inhalation of exhaust gas.</li> <li>Avoid contact with exhaust pipe while engine is running and after it has been stopped. Contact with hot exhaust pipe will cause burns.</li> </ul>

3998-16652-0

⑨ 3998-16504-0

<b>⚠ WARNING</b>	
<b>1. When Handling the Machine:</b> <ul style="list-style-type: none"> <li>Operate only while seated.</li> <li>Use the handrails and steps when boarding and getting off.</li> <li>Never carry passengers.</li> <li>Never attempt to board or get off the machine while it is moving.</li> </ul>	
<b>2. Preparation for Safe Operation</b> <ul style="list-style-type: none"> <li>Clean the steps, operator's station and floorboards.</li> <li>Obey the worksite rules.</li> <li>Sakai accepts no responsibility for any injury or damage to the machine caused by unapproved modification.</li> <li>Do not use a machine which needs repair or maintenance.</li> <li>Sound the horn immediately prior to starting the engine to warn people in the vicinity.</li> </ul>	
<b>3. Starting the Engine</b> <ul style="list-style-type: none"> <li>Check that all operating levers are in the neutral position.</li> <li>Idle the engine for about 5 minutes to warm it up prior to commencing work.</li> </ul>	
<b>4. Parking Precautions</b> <ul style="list-style-type: none"> <li>When parking the machine, park it on level ground, set the parking switch and set the roller chocks.</li> <li>Allow the engine to cool off by running it for about 5 minutes before stopping.</li> <li>When getting off the machine, remove the key from the ignition switch.</li> </ul>	

3998-16504-0

⑩ 3998-16499-0

<b>⚠ WARNING</b>	
<ul style="list-style-type: none"> <li>Do not open the hood with the engine running.</li> <li>Contact with hot parts will cause burns.</li> <li>Contact with rotating parts will cause severe injury.</li> </ul>	

3998-16499-0

⑪ 3998-16547-0 (4 locations)

	<b>⚠ WARNING</b>
	<ul style="list-style-type: none"> <li>Take care to avoid pinching of hands or fingers when closing this cover.</li> </ul>

3998-16547-0

⑫ 1568-19011-1

<b>⚠ WARNING</b>	
<b>1. This vehicle may malfunction from a strong electromagnetic wave in its neighboring environment.</b> <small>Control is maintained using electronics. Do not use this vehicle in an environment that may expose it to a strong electromagnetic wave. Do not use a device with a strong electromagnetic wave on or near this vehicle.</small>	
<b>2. Electronics on this vehicle emit a minor electromagnetic wave.</b> <small>Do not operate this vehicle if you wear a pacemaker. Long term operation may cause damage to your health from the electromagnetic wave.</small>	

1568-19011-1

⑬ 3998-16489-0

<b>CALIFORNIA</b> <b>Proposition 65 Warning</b>	
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

⑭ 3998-16510-0

<b>⚠ CAUTION</b>	
Refill the specified quantity of oil in the vibrator case when changing oil.	

3998-16510-0

⑮ 2998-96001-1

<b>⚠ CAUTION</b>	
<b>USE SPECIFIED FUEL ONLY</b>	
<ul style="list-style-type: none"> <li>Use of other than the specified fuel may result in damage to the engine.</li> <li>Please refer to the manual for details.</li> </ul>	

2998-96001-1

⑯ 3998-16680-0

<b>⚠ CAUTION</b>	
	Reference service manual for special fill procedure. Failure to follow this procedure can result in severe engine damage.

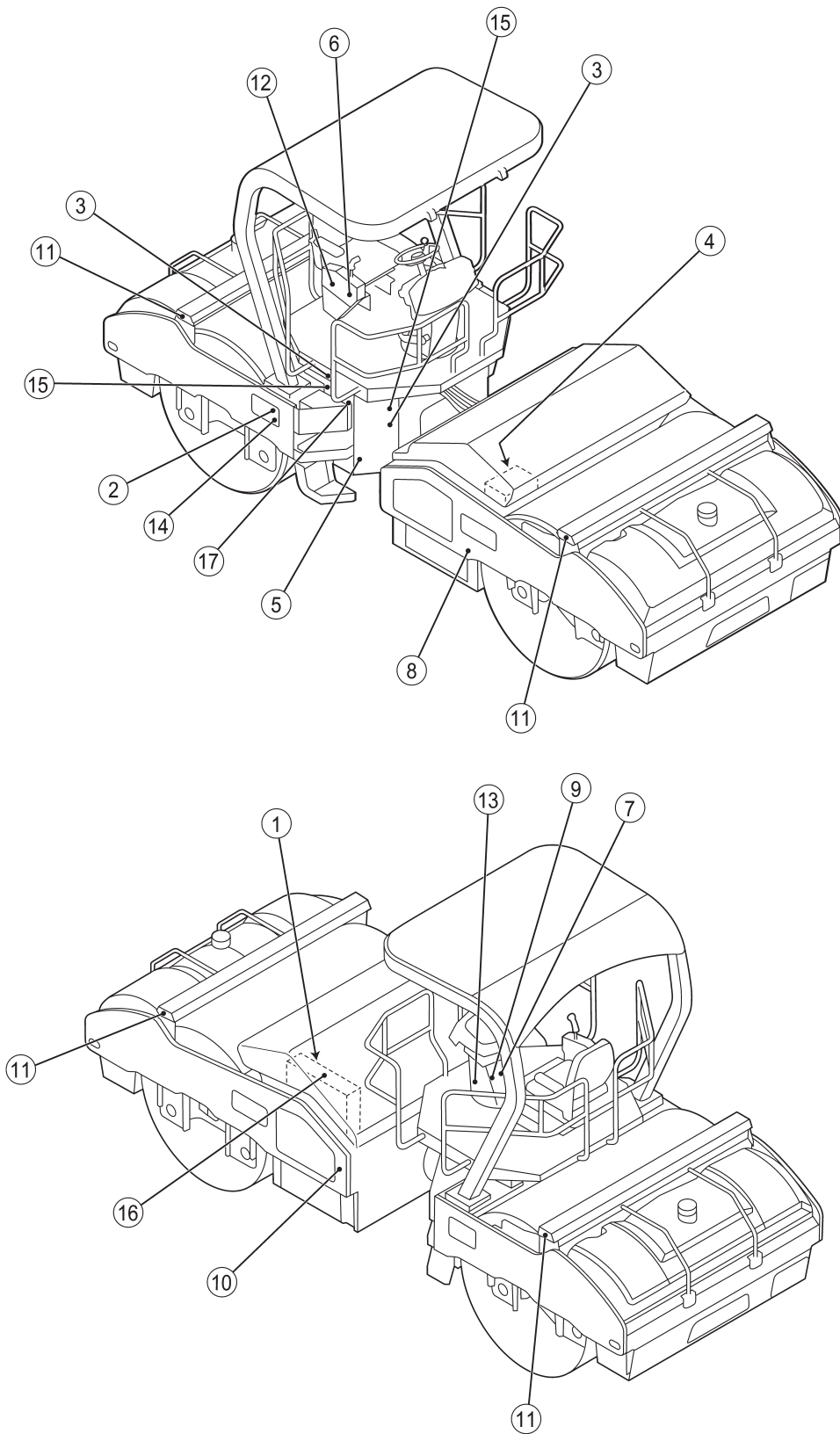
3998-16680-0

⑰ 1418-19109-0

<b>⚠ CAUTION</b>	
<b>USE SPECIFIED DEF ONLY</b>	
<ul style="list-style-type: none"> <li>Use of nonconforming DEF may result in damage to the SCR system.</li> <li>Please refer to the manual for details.</li> </ul>	

1418-19109-0

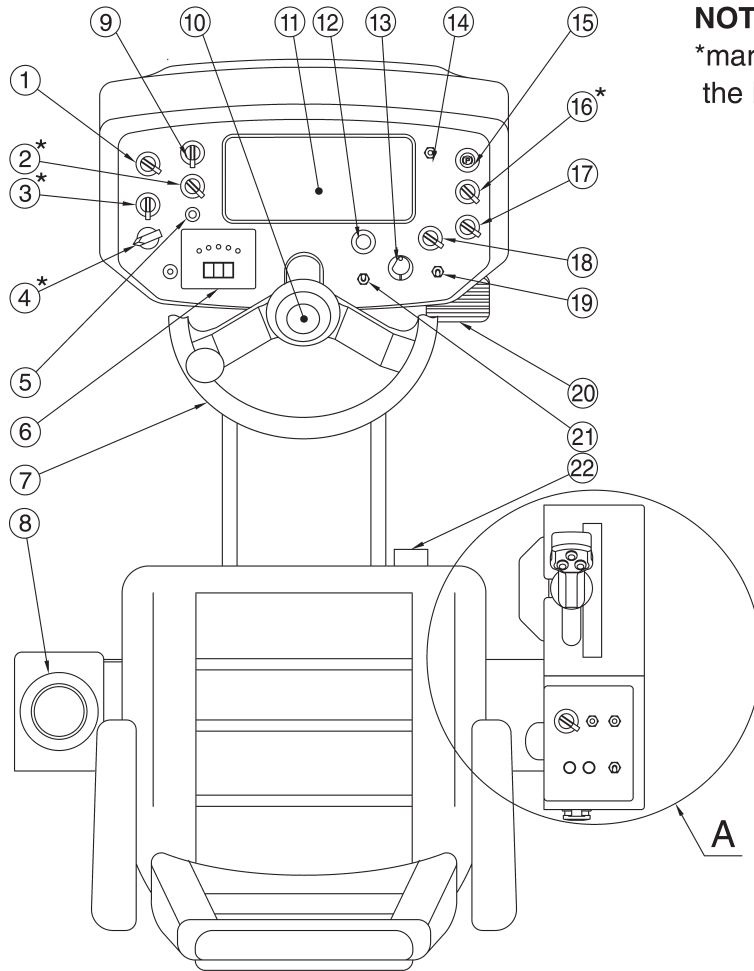
SW884, SW884ND, SW994, SW994ND



## 2 OPERATION

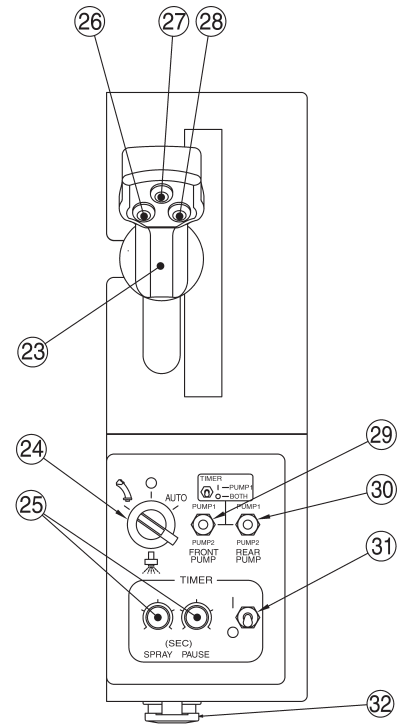
### 2.1 Instruments and Controls

#### 2.1.1 Operator's station



**NOTE:**

\*marked switches respond only when the F-N-R lever is in the neutral position.



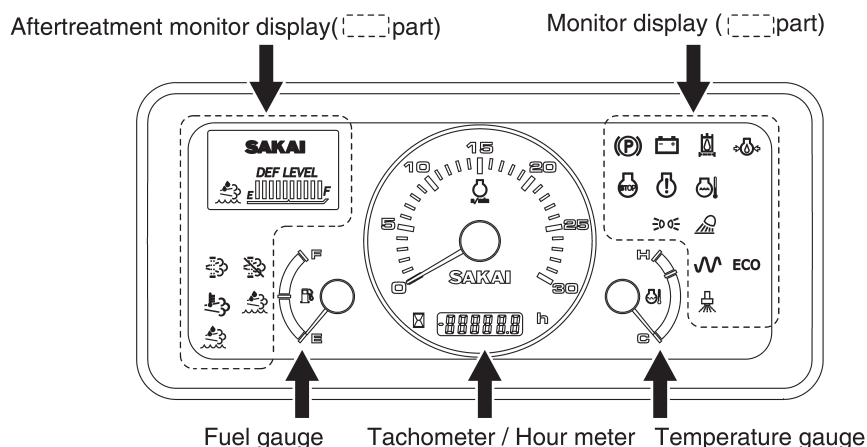
DETAIL A

- |   |   |
|---|---|
| ① Vibration drum selector switch                          | ⑮ Parking brake switch                                |
| ② Vibration amplitude selector switch (SW884, SW994)      | ⑯ Travel mode selector switch                         |
| Vibration type selector switch (SW884ND, SW994ND)         | ⑰ Engine speed selector switch                        |
| ③ Vibration frequency selector switch (SW884, SW994)      | ⑱ Lamp switch   |
| ④ IPF selector switch                                     | ⑲ Engine diagnostic switch                            |
| ⑤ AUTO SPEED lamp   | ⑳ Brake pedal   |
| ⑥ EXACT COMPACT METER                                     | ㉑ Disable regeneration switch                         |
| ⑦ Steering wheel  | ㉒ Swivel release pedal                                |
| ⑧ Drink holder  | ㉓ Forward-Neutral-Reverse lever (F-N-R lever)         |
| ⑨ Vibration mode selector switch (Manual or Auto control) | ㉔ Spray mode selector switch (Manual or Auto control) |
| ⑩ Horn switch   | ㉕ Spray timer dial                                    |
| ⑪ Combination meter                                       | ⑯ Vibration switch                                    |
| ⑫ Parked manual regeneration switch                       | ⑰ AUTO SPEED set switch                               |
| ⑬ Starter switch  | ⑱ Spray switch  |
| ⑭ Emergency propel switch                                 | ⑲ Front spray pump selector switch                    |
|   | ⑳ Rear spray pump selector switch                     |
|   | ㉑ Spray timer switch                                  |
|   | ㉒ Accessory socket                                    |

### 2.1.2 Gauges, indicator lamps and warning lamps

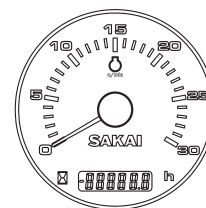
For safe execution of the work, fully understand the role and function of the systems involved.

#### Combination meter



#### Tachometer / Hour meter

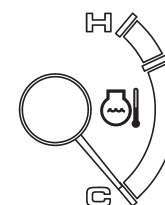
Indicates the engine RPM. The hour meter shows total operating hours. The service interval recommendation in this manual is based on the hour meter readings.



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 speed for about ten minutes before shutting it down. Then determine the cause.

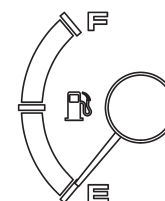


Temperature gauge

#### Fuel gauge

Indicates the fuel level in the tank.

- E: The tank is empty
- F: The tank is full



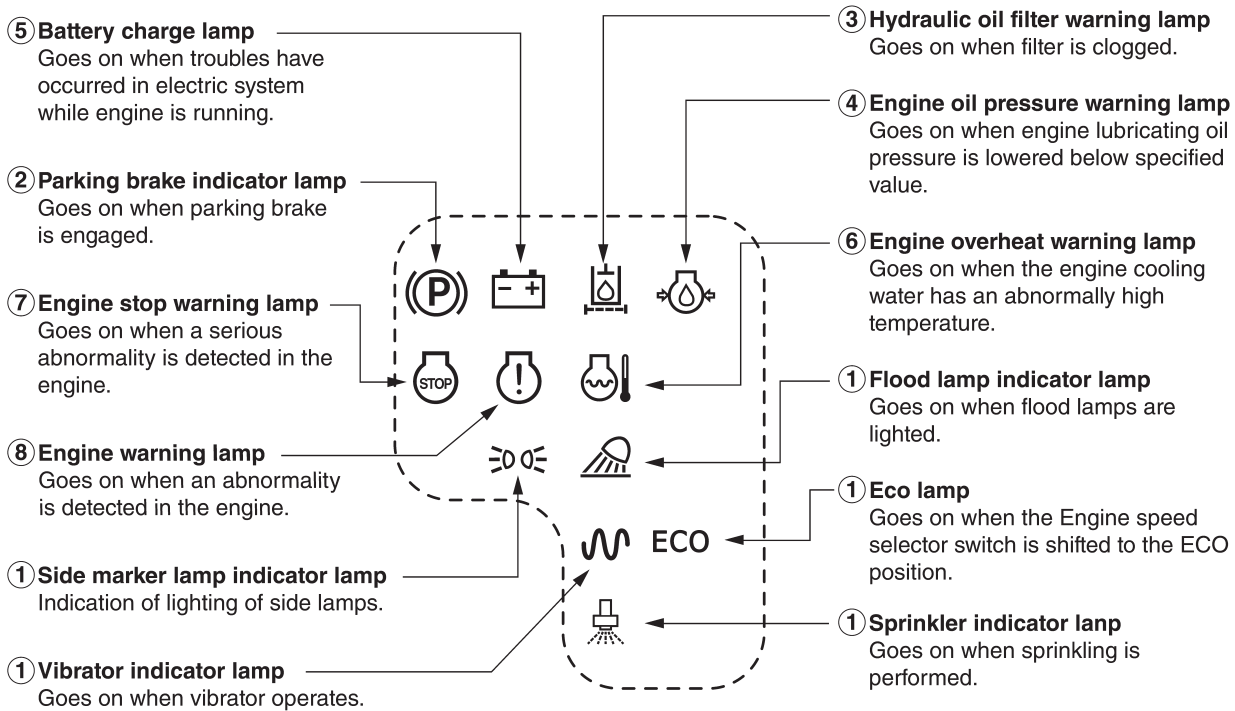
Fuel gauge

#### NOTICE

**Be sure to use the fuel recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).**

## 2 OPERATION

### Monitor display



① Indicator lamps [ ]  
Display the operation of each corresponding system.

② Parking brake indicator lamp [ (P) ]  
This flashes once when the Starter switch is turned to the I position.  
After that it remains on while the parking brake is engaged, and turns off when it is released.

③ Hydraulic oil filter warning lamp [ ]  
This flashes once when the Starter switch is turned to the I position.  
After that it lights up when the hydraulic oil filter is clogged. When it lights up, stop the machine and inspect the cause.

### NOTICE

**Hydraulic oil filter warning lamp goes on when the engine rpm is increased before the engine gets warmed up adequately. Execute the warm up operation sufficiently by idling the machine and wait until the lamp goes off before starting your work.**

④ Engine oil pressure warning lamp [ ]  
This turns on when the Starter switch is turned to the I position, and turns off when the engine starts running.  
It turns on when the engine oil pressure drops below the specified level during the engine is running. When it lights up, stop the machine and inspect the cause.

⑤ Battery charge lamp [  ]

This turns on when the Starter switch is turned to the I position, and turns off when the engine starts running.

It turns on when there is an abnormality in the electric charging system during the engine is running. When it lights up, stop the machine and inspect the cause.

⑥ Engine overheat warning lamp [  ]

This turns on when the Starter switch is turned to the I position, and turns off when the engine starts running.

When the Engine overheat warning lamp lights, there is a possibility of overheating.

Stop the machine and cool the engine gradually by setting the Engine speed selector switch to the IDLE position.

If the lamp still remains on, the engine might be abnormal. Get proper checking / maintenance or repairing immediately.

⑦ Engine stop warning lamp [  ]

This turns on when the Starter switch is turned to the I position, and turns off when the engine starts running.

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

⑧ Engine warning lamp [  ]

This turns on when the Starter switch is turned to the I position, and turns off when the engine starts running.

The Engine warning lamp may light, when the water is accumulated in the fuel prefilter.

Drain the water inside the fuel prefilter (refer to “3.4 Maintenance Procedure”).

If the lamp still remains on, the engine may be abnormal. Get proper checking / maintenance or repairing before a serious failure occurs.

**NOTICE**

- **Checking the warning lamps and Parking brake indicator lamp**  
They should turn on when the Starter switch is turned to the I position.  
If not, there is some trouble.  
Check and repair the combination meter or wirings harness.
- **The transparent cover of the combination meter**  
This may become unclear because of aged deterioration caused by fine sand or dust or ultraviolet light. When any flaw or mist is found on the cover, contact your dealer.

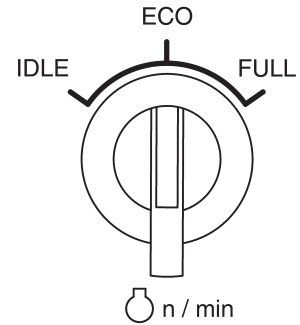
## 2 OPERATION

### Eco lamp

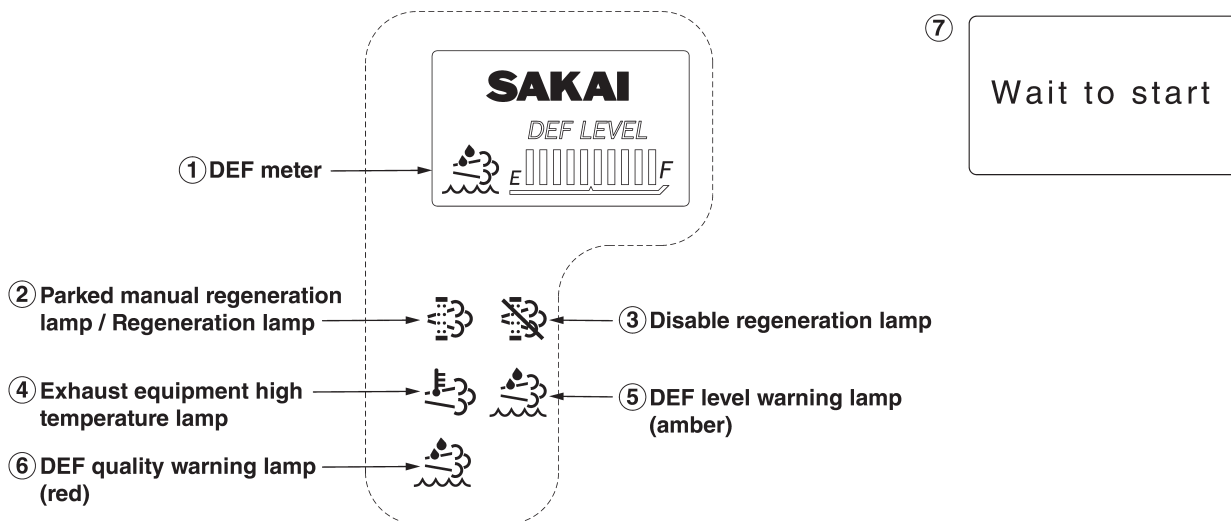
Eco lamp turns on when the Engine speed selector switch is shifted to ECO position. The engine runs under the fuel-efficient mode when the Eco lamp is turned on.

Normal vibration is work in the ECO mode.

**ECO**  
Eco lamp



### Aftertreatment monitor display



#### ① DEF meter

Indicates the DEF level in the DEF tank

E: Indicates the empty DEF tank

F: Indicates the full tank

Do not use the DEF until the tank gets empty. Fill the tank regularly.

Refer to “2.6 Operating the DEF SCR System” for more details.



### NOTICE

- The warning lamp may turn on or flashes when using the machine with low DEF level. The engine output will also be limited and not allowed the machine to perform to its full potential.  
The engine will stop if the machine continues to operate in this state.
- Use AUS32 for the DEF, or an ISO 22241-1 certified DEF.  
Do not use anything else. If any kind of additive or water is mixed into the DEF, the machine will not be able to function properly, and it will not satisfy the exhaust gas emissions standards. This will also damage the engine system.  
If the tank is filled with any fluid other than DEF, contact your dealer.



- ② Parked manual regeneration lamp / Regeneration lamp  
Turns on and flashes during the regeneration of the SCR or when the parked manual regeneration is necessary.



- ③ Disable regeneration lamp  
Turns on while the SCR automatic regeneration is disabled.



- ④ Exhaust equipment high temperature lamp  
Turns on when the exhaust equipment is hot during the actions such as SCR regeneration.



- ⑤ DEF level warning lamp (amber)  
Turns on or flashes when the DEF level in the tank falls below the standard level.



- ⑥ DEF quality warning lamp (red)  
Turns on or flashes when the DEF concentration is below the minimum required value, or something other than the DEF is detected.  
It may also turn on when the DEF concentration approaches the minimum required value.



- ⑦ Wait to start  
When the wait to start light is lit on the monitor display, it means the engine is undergoing self-diagnosis, and the engine should not be started.  
You must wait to start the engine. The most common reason for this is to wait for the intake air heaters to complete a pre-heat cycle during cold ambient conditions.

Wait to start



## 2 OPERATION

### AUTO SPEED lamp

Steady light : Goes on when the AUTO SPEED is selected by pressing the AUTO SPEED set switch.

Slow flicker : Goes on when the AUTO SPEED is canceled by pressing the AUTO SPEED set switch.

Fast flicker : Goes on when either the IPF / Travel mode / Vibration frequency / Vibration amplitude / Engine speed position is changed while in the AUTO SPEED modes.



AUTO SPEED

### EXACT COMPACT METER

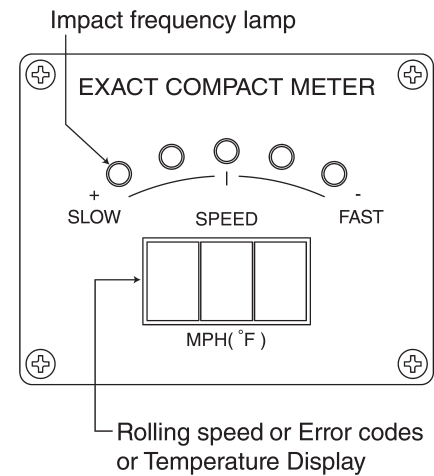
It consists of five lamps and a display.

- Impact frequency lamp  
The lamp flashes depending on the rolling speed (propel speed) and Impacts Per Foot (IPF) setting.
- Rolling speed / Error codes / Temperature Display  
The display indicates the rolling speed, error codes and the temperature.

Refer to “2.8 EXACT COMPACT Operation” for more details.

### NOTICE

**Temperature display function is OPTIONAL.**



### 2.1.3 Switches

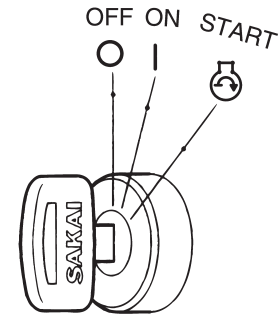
#### Starter switch

Starts and stops the engine.

**O** position : 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.

**I** position : The charging circuit and the lamp circuit are charged with electricity. Leave the key in this position after starting the engine.

**START** position: The engine is cranked and gets started.  
Release the key the moment when the engine starts.  
It will automatically return to the **I** position.



#### NOTICE

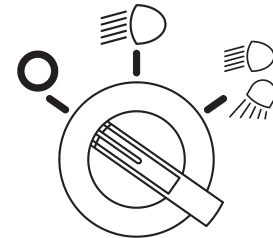
**Set the Forward-Neutral-Reverse (F-N-R) lever in the Neutral position (N) and press down the Parking brake switch before starting the engine. Unless these conditions are met, the engine will not start.**

#### Lamp switch

**O** position : All lamps are switched off.

**D** position : The dash panel and the front lamps turn on.

**L** position : All the lamps turn on.

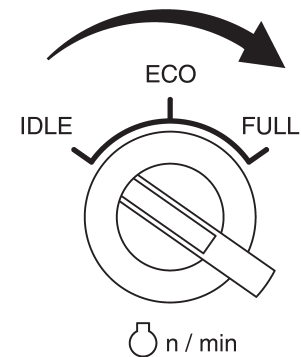


#### Engine speed selector switch

Shifts the engine RPM.

Engine speed	IDLE	ECO	FULL
		900 min <sup>-1</sup>	1850 min <sup>-1</sup>

(± 50 min<sup>-1</sup>)



Engine speed selector switch

## 2 OPERATION

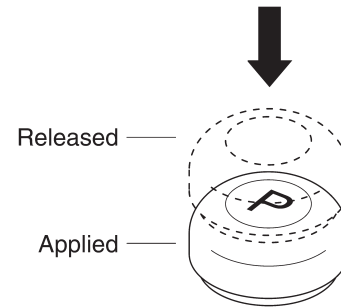
### Parking brake switch

Use it as a parking brake.

Do not use while the machine is moving.

If switch (P) is pressed down, the parking brake will be applied and the indicator lamp (P) on the dashboard turns on.

When pressed again, the brake is released and the indicator lamp goes off.



### **⚠ WARNING**

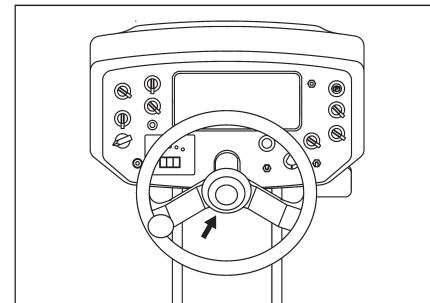
**Always press the switch to apply the parking brake before getting off the machine.**

### NOTICE

- To disengage the brake, be sure to press the switch again.
- Do not pull the switch. It may cause damages.
- When you press the Parking brake switch down while the machine is running, the brake will be activated. To start the engine again, shift the F-N-R lever back to the Neutral position (N), set the engine speed to idle, push down the Parking brake switch.

### Horn switch

Pressing the switch at the center of the Steering wheel makes the horn sound.

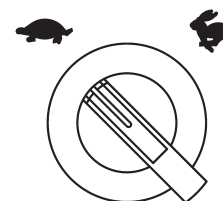


## Travel mode selector switch

Select the mode according to the condition.

 position : Work condition


- The AUTO SPEED function can be controlled with this mode. Refer to “2.4.6 AUTO SPEED”.
- Maximum speed is regulated by each vibration frequency in the case of SW884 and SW994.




Frequency (vpm)	Propel speed mile/h (km/h)
2,500	0 – 2.8 (0 – 4.5)
3,000	0 – 3.4 (0 – 5.5)
4,000	0 – 4.5 (0 – 7.2)

- Maximum speed is regulated by each vibration type in the case of SW884ND and SW994ND.

Vibration type	Propel speed mile/h (km/h)
Ordinary Vibration	0 – 3.4 (0 – 5.5)
Oscillational Vibration	0 – 4.0 (0 – 6.4)



 position : Traveling 0 – 6.8 mile/h (0 – 11 km/h)

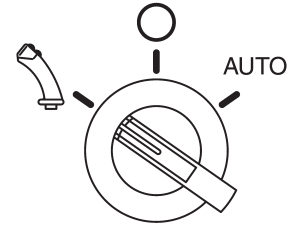
## NOTICE

- Do not shift the gears while the machine is moving.
- Machine speed can be operated using either the ECO or FULL position of the Engine speed selector switch.
- Travel mode can only be selected when the F-N-R lever is in the Neutral position .

## 2 OPERATION

### Vibration mode selector switch

-  position : Vibration can be controlled by the Vibration switch on the F-N-R lever
-  position : Vibration is off
- AUTO position : Vibration engages automatically when the F-N-R lever is moved to Forward or Reverse






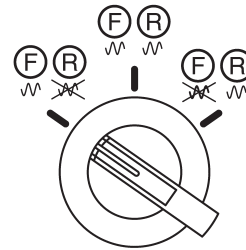
The Vibrator indicator lamp stays on when the machine is running with any vibration mode.

### NOTICE



- For vibratory compaction, the Engine speed selector switch must be in the ECO or FULL position.
- Do not operate the vibrator on a hard area such as cement concrete pavement surface or the ground covered by thick steel sheets.
- Turn the vibrator off when the machine is not moving.
- Stop the vibration immediately if the machine gets stuck in the mud during the vibratory operation.

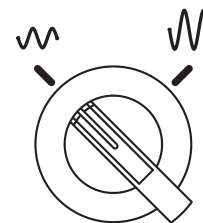
### Vibration drum selector switch

-  position : Only the front drum vibrates
-  position : Both drums vibrate
-  position : Only the rear drum vibrates



### Vibration amplitude selector switch (For SW884, SW994)

-  position : Low amplitude vibration
-  position : High amplitude vibration



### NOTICE

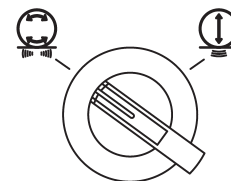
Selection is applied only when the F-N-R lever is in the Neutral position **(N)**.

### Vibration type selector switch (For SW884ND, SW994ND)

Select the ordinary or oscillatory vibration.

 : Ordinary vibration

 : Oscillatory vibration



### NOTICE

**Selection is applied only when the F-N-R lever is in the Neutral position (N) .**

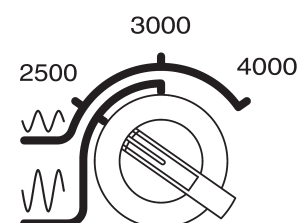
### Vibration frequency selector switch (For SW884, SW994)

2500 position : Vibration can be set at 2,500 vpm in the low or high amplitude position.

3000 position : Vibration can be set at 3,000 vpm in the low or high amplitude position.

4000 position : Vibration can be set at 4,000 vpm in the low amplitude position only.

Vibration will automatically be limited to 3,000 vpm when high amplitude is selected, regardless of the frequency selection. This machine can not operate at 4,000 vpm in high amplitude.



### NOTICE


**Selection is applied only when the F-N-R lever is in the Neutral position (N) .**

### Vibration switch

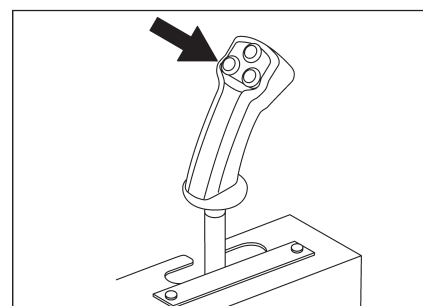
The Vibration switch is integrated into the F-N-R lever.

The green button toggles vibration ON and OFF.

Press the green button once to start the vibration. Press the green button again to stop. You need to press the button for about 1 second to start the vibration.

It works only when the Vibration mode selector switch is set to the  position.

The Vibrator indicator lamp stays on when the machine is running with any vibration mode.



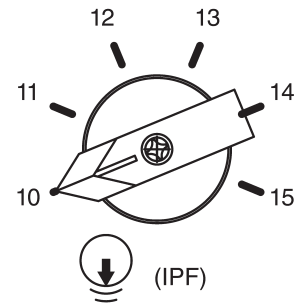
### NOTICE

**For vibratory compaction, the Engine speed selector switch must be in the ECO or FULL position.**

## 2 OPERATION

### IPF selector switch

The number of Impacts Per Foot (IPF) can be selected when using the EXACT COMPACT METER. Refer to “2.8 EXACT COMPACT Operation”. IPF number can be set at 10, 11, 12, 13, 14, 15.





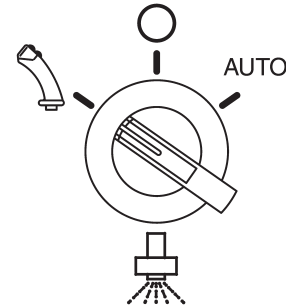
### NOTICE

**Selection should only be made when the F-N-R lever is in the Neutral position (N).**  
**Selection should only be made in the case of the SW884, SW994 and in ordinary vibration of the SW884ND and SW994ND.**


### Spray mode selector switch / Spray switch / Spray timer switch / Spray timer dial

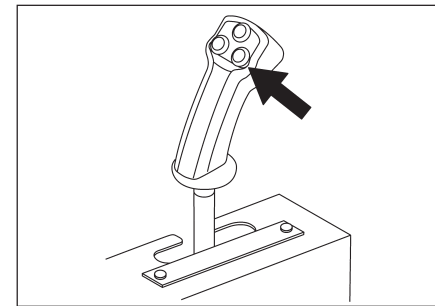
#### Spray mode selector switch

-  position : Spray system can be controlled by the blue button on the F-N-R lever.
-  position : Spray system is off.
- AUTO position : Spray system is activated when the F-N-R lever is in the Forward or Reverse position and deactivated when the F-N-R lever is moved to the Neutral position (N).





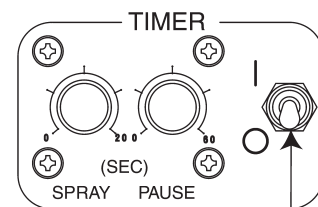
#### Spray switch

The Spray switch is integrated into the F-N-R lever. The blue button toggles the spray system on and off. Spray pumps turn on when the blue button is depressed once and turn off when the blue button is depressed again. You need to press the button for about 1 second to start the pumps. It works only when the Spray mode selector switch is set to the  position.



#### Spray timer switch

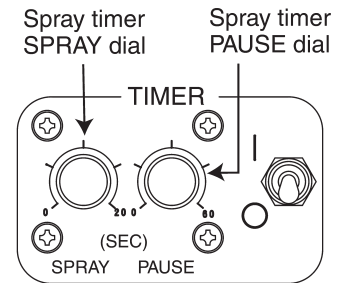
-  position : Spray timer is on
-  position : Spray timer is off



Spray timer switch

Spray timer - SPRAY dial

Spraying time can be set from 0 – 20 seconds by turning this dial.



Spray timer - PAUSE dial

Sprinkling pause interval can be set from 0 – 60 seconds by turning this dial.

**NOTICE**

**The Sprinkler indicator lamp stays on whenever the water is spraying. In timer mode, the lamp turns on (indicates spraying) and off (indicates pausing).**

Front spray pump selector switch

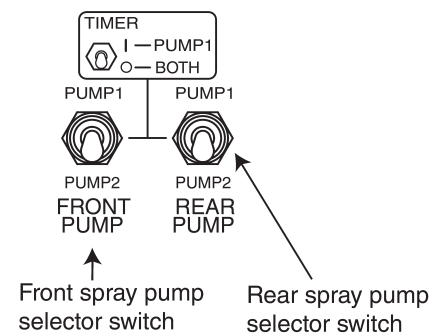
Rear spray pump selector switch

There is a total of four spray bars on the SW Series rollers. Two spray bars on the front drum and two spray bars on the rear drum. A total of four water pumps are attached exclusively for each spray bar.

When pump 1 is selected for either the front or rear drum, one spray bar is operational.

When pump 2 is selected for either the front or rear drum, the second spray bar is operational. When BOTH are selected for either the front or rear drum, both spray bars operate and only pump 1 or pump 2 is doubled the volume of water spraying to wet the drum. In most cases, selected. In a few situations, where a heavy application of water is required on the drum, such as in very windy and/or dry desert conditions, both pumps are used simultaneously.

When only one pump is required, it is recommended to alternate the pumps so that they both wear evenly. Alternating pump use is also helps to keep them in better operating condition by running water through them to keep the inside of the pump wet. For example, on a multi-day project, it is recommended to use pump 1 on the first day, pump 2 on the second day, and alternate each day.



PUMP 1 position : Actuate pump 1

Center position : Actuate pump 1 when select the intermittent spray

Actuate pump 1 and pump 2 when deselect the intermittent spray

PUMP 2 position : Actuate pump 2



## 2 OPERATION

### Engine diagnostic switch

Engine diagnose can be conducted using the Engine diagnostic switch.

It is used only when carrying out inspection or maintenance work.

Set the switch as shown in ○ position during normal operation. Refer to “2.2.3 Engine diagnostic”.



- | position : Engine diagnostic is activated
- position : Engine diagnostic is shut off

### Emergency propel switch

Propel the machine with this switch if the machine can't be propelled with the F-N-R lever.

Sometimes called a limp home switch, this function will only work after MANUALLY plugging the appropriate wire harness connection.

Refer to “2.4.4 Traveling” for the detailed procedure on how to plug in the wire harness.



### AUTO SPEED set switch

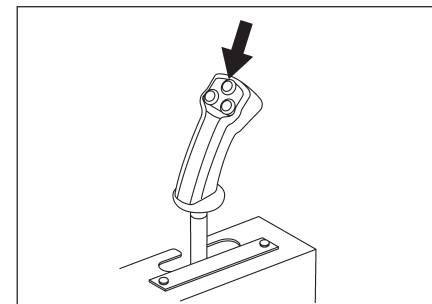
The AUTO SPEED set switch is the top button on the F-N-R lever.

The speed at which the machine is traveling when the button is depressed will be recorded into memory.


The button must be depressed and held for at least one second. When AUTO SPEED is set, the machine will run at the preset speed when the F-N-R lever is moved to the full Forward or full Reverse position.

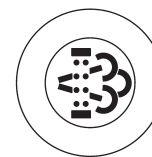
The AUTO SPEED memory is canceled when the button is pushed again and held for one second or longer.

Refer to “2.4.6 AUTO SPEED” for full operational instructions.



## Parked manual regeneration switch

Press the  switch to start the parked manual regeneration. Press the switch again to stop the parked manual regeneration.



MANUAL  
REGEN.

## Disable regeneration switch

Use to disable / enable regeneration.

- | position : Disables regeneration, and the Disable regeneration lamp turns on.
- position : Enables regeneration, and the Disable regeneration lamp turns off.

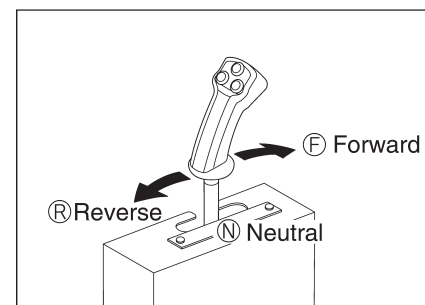


DISABLE  
REGEN.

## 2.1.4 Operating levers and pedals

## Forward-Neutral-Reverse lever (F-N-R lever) with AUTO SPEED / Vibration / Spray switch

Moving the F-N-R lever forward or backward makes the machine travel forward or backward.  
The Neutral position (N) brings the machine to a stop.  
The machine speed increases or decreases in proportion to the amount of lever movement.  
AUTO SPEED / Vibration / Spray switches are integrated into this lever.



## NOTICE

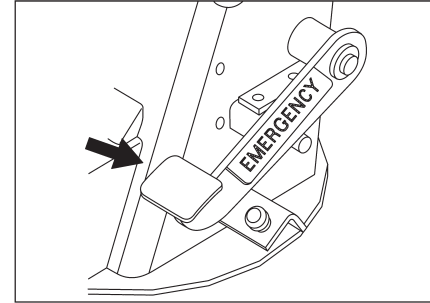
- For normal braking, return the F-N-R lever back to Neutral position (N) .
- In an emergency, depress the Brake pedal.

## 2 OPERATION

### Brake pedal

Use it in emergencies. Carry out inspections in accordance with “3.3 Periodical Maintenance Points” after each use.

When the pedal is fully depressed in an emergency, the machine will suddenly stop with the engine.



### NOTICE

- Do not use the Brake pedal to stop during normal machine operation.
- Use only in an emergency.
- Use the F-N-R lever to stop the machine under normal operating conditions.
- Continuous use of the Brake pedal will damage the brake.
- The F-N-R lever must be in the Neutral position (N) to release the brake for travel again.

### Unloader valve

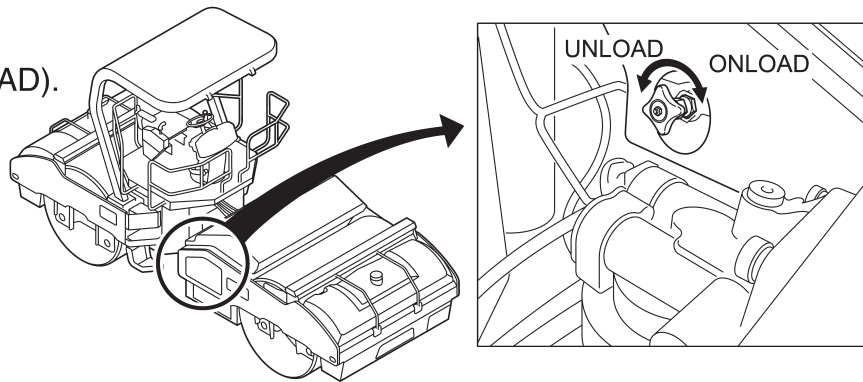
The Unloader valve disengages the drive, similar to a clutch. Use this valve for towing the machine when the engine or the hydraulic drive is failed.

For towing

Turn the knob counterclockwise (UNLOAD).

For normal traveling

Turn the knob clockwise (ONLOAD).



### ⚠ WARNING

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

### NOTICE

For normal travel, be sure that the Unloader valve is in the ONLOAD position.

### 2.1.5 Fuse box and line fuse

#### ⚠ WARNING

- When changing a fuse, cut the power supply by turning the Starter switch to the O position.
- Use fuses of correct capacity. Using the wrong fuses may cause fires.

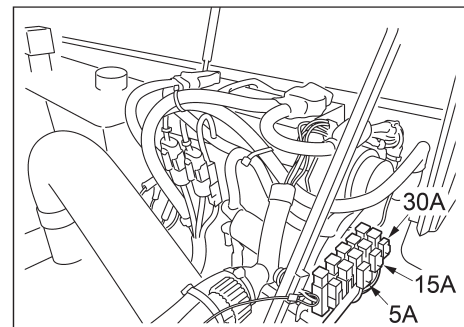
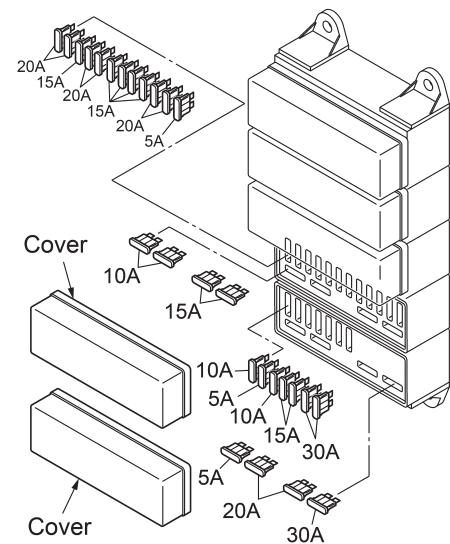
Fuses protect the electrical components and wiring from burning. Change any fuse which is deteriorated (powder-coated) or the connection is loose with the fuse holder.

To replace fuses, take off the cover.

Be sure to use the fuses of correct capacity.

Using improperly rated fuses may result in poor machine performance, damage to the electrical system, or safety problems, such as an electrical fire.

Refer to “3.8 Fuse Box and Line Fuse”.

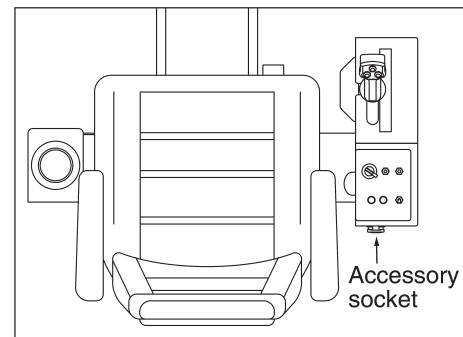


## 2 OPERATION

### 2.2 Handling

#### 2.2.1 Accessory socket

The Accessory socket can be used by setting the Starter switch to the I position. Open the cover of the socket and 12 V DC current can be taken out as a power source for the electronic equipment.



#### **⚠ WARNING**

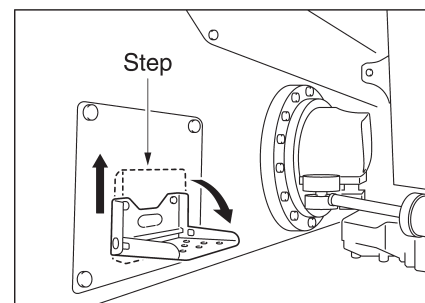
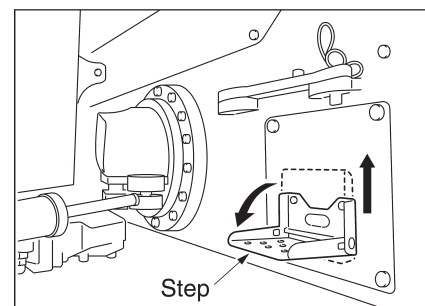
When connecting electronic equipment to the Accessory socket, make sure it does not interrupt the forward and reverse movement of the F-N-R lever.

#### NOTICE

- Use electronic equipment with power consumption of 120 W (12 V, 10 A) or less.
- Close the cover when not using to prevent foreign matters from entering the socket.
- There is a possibility of the battery running flat when the Accessory socket is used for a long time to power the electronic equipment with the engine turned off or idling.

### 2.2.2 Step for maintenance of engine room

Pull up and close the step after the maintenance work.  
Pull down to open the step when starting maintenance.



#### ⚠ WARNING

Step withstands load of 130 kg (286 lbs).

#### ⚠ CAUTION

Keep step closed during operation.

### 2.2.3 Engine diagnostic

Engine diagnose can be conducted using the Engine diagnostic switch.

It is used only when carrying out inspection or maintenance work.

Set the switch as shown in ○ position during the normal operation.



DIAG.

Engine diagnostic switch

- | position : Engine diagnostic is activated
- position : Engine diagnostic is shut off

#### NOTICE

- See the engine manual when operating the Engine diagnostic switch.
- When a engine malfunction occurred, contact your dealer immediately for appropriate inspection, maintenance, or repair.

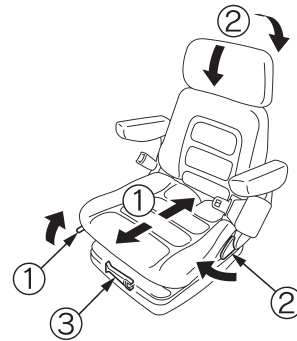
## 2 OPERATION

### 2.3 Adjustments

#### 2.3.1 Seat adjustment

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

- 1) Pull the lever ① and adjust seat position longitudinally.
- 2) Pull the lever ② and turn the backrest to the optimum angle.
- 3) Pull the suspension lever ③ to set the seat to the suitable suspension position for your body weight.



#### **⚠ WARNING**

- **Do not adjust the seat while driving the machine.**
- **Unexpected accidents may occur if the seat is not fixed completely and it's in the sliding state.**  
**Before moving the machine, make sure that the seat is completely fixed after making proper adjustments.**
- **Do not pinch your fingers, hands or legs while adjusting the seat.**
- **Stop the machine on a flat surface to adjust the seat.**
- **Sit and adjust the seat so that your back is in close contact with the backrest of the seat when depressing the Brake pedal fully. Also make sure to adjust the seat so as to be able to firmly step on the Brake pedal when you twist your body to look back in order to move the machine backwards.**

#### **NOTICE**

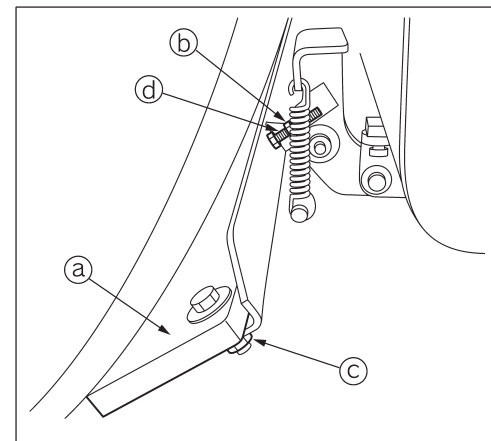
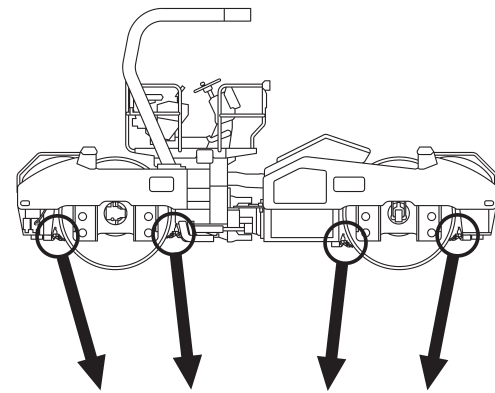
**Be sure to wear the seatbelt during the operation.**

### 2.3.2 Scraper adjustment and replacement

#### Scraper

Adjusting the gap between the scraper blade (a) and the drum

- 1) Loosen the lock nuts (b) at 2 locations and the nuts (c) at 7 locations.
- 2) Adjust the scraper blade (a) to eliminate the clearance between the scraper blade (a) and the drum.
- 3) Tighten the nuts (c).
- 4) Make fine adjustment of the gap between the scraper blade (a) and the drum by the set bolt (d).
- 5) Tighten the lock nuts (b).

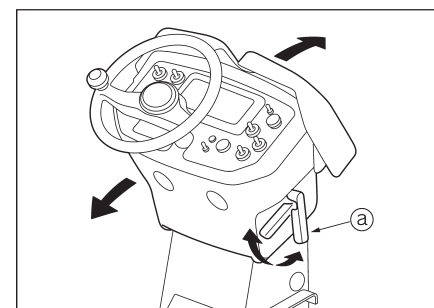


#### Replacing the scraper blade

- 1) Remove the bolts and the nuts (c) at 7 locations.
- 2) Replace the scraper blade (a) with a new one.
- 3) Reinstall and tighten the bolts and the nuts (c).

### 2.3.3 Adjusting the steering wheel position

- 1) Pull the lever (a) upward to disengage the lock.
- 2) Set the Steering wheel to your best operating position.
- 3) Lower the lever (a) to lock the Steering wheel.





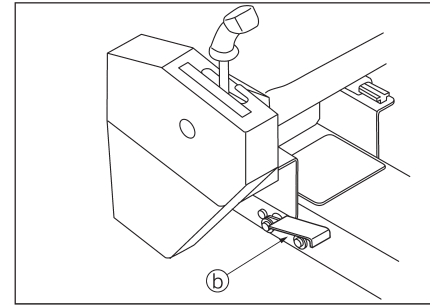
## 2 OPERATION

### 2.3.4 Adjusting the operator's platform position

Operator's platform rotates by 60 and 90 degrees, clockwise or counterclockwise.

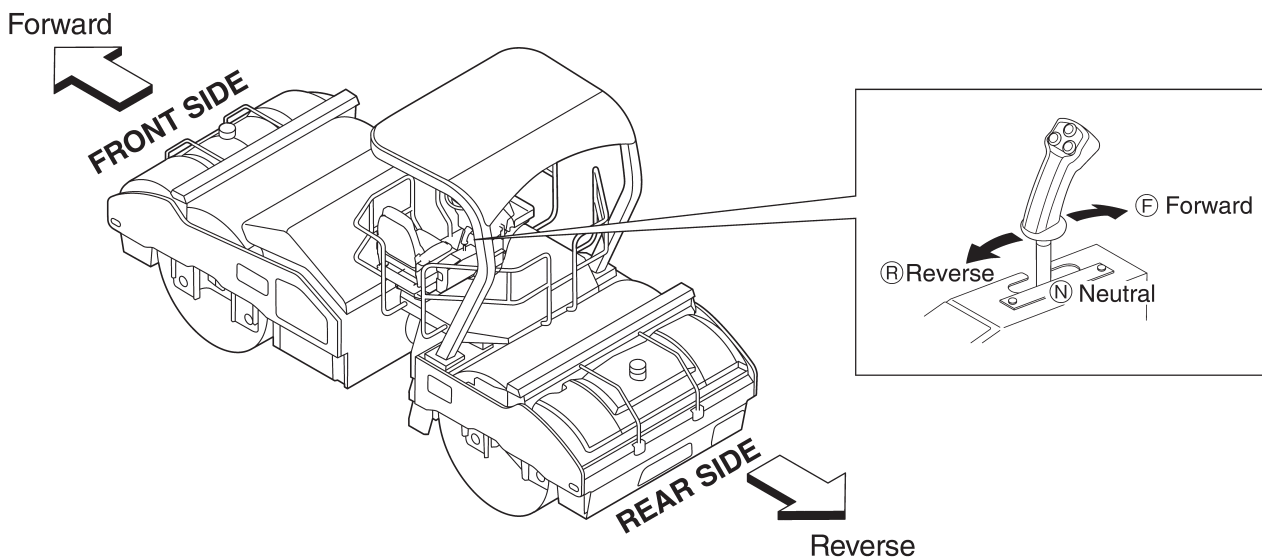
Set it at the desired angle to allow you to easily see the drum edge during work.

- 1) While depressing the swivel pedal (b), rotate the operator's platform by pushing or pulling with your other foot.
- 2) As soon as it starts rotating, release the swivel pedal (b) and continue to push the operator's platform at 60 degrees, it will automatically lock into position.
- 3) Continuing the same action while depressing the swivel pedal (b) will allow the operator's platform to lock automatically at 90 degrees position.



#### ⚠ WARNING

- Make sure the operator's platform is completely locked in place before continuing to operate the machine. If the operator's platform is not locked in place, it could unexpectedly rotate during operation and cause the operator to lose control of the machine and result in an accident with the potential for injury or death.
- Make sure the direction of FRONT side and REAR side when the operator's platform are rotated.



#### ⚠ CAUTION

Park the machine on a flat ground when rotating the operator's platform. The operator's platform may otherwise spin unexpectedly.

## 2.4 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.

### 2.4.1 Inspection before starting

1) Check that the Steering lock bar is in the Unlock position.

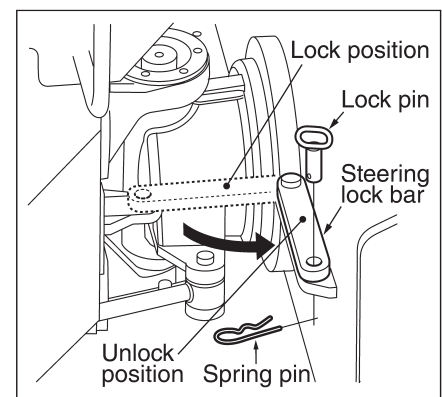
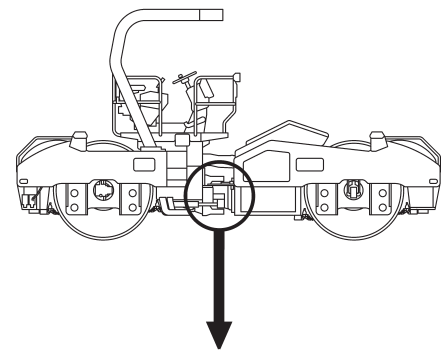
### ⚠ WARNING

**Make sure that the Steering lock bar is connected in the Unlock position before moving the machine. Steering is impossible if the Steering lock bar is in the Lock position.**

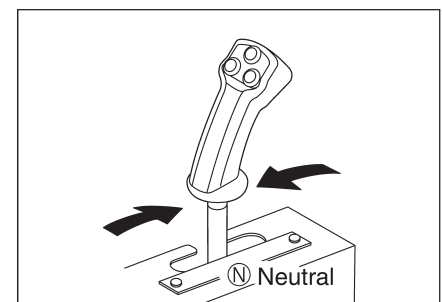
The Steering lock bar is located at the center of the right side of the machine.

To unlock the Steering lock bar

- 1)-1 Remove the Spring pin.
- 1)-2 Pull out the Lock pin.
- 1)-3 Set the Steering lock bar in the Unlock position.
- 1)-4 Retain the Steering lock bar in the Lock position by inserting the Lock pin into the locking holes.
- 1)-5 Secure the Lock pin with the Spring pin.

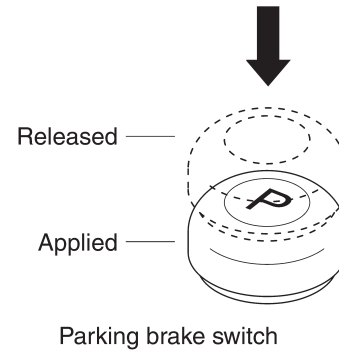


2) After setting the Steering lock bar in the Unlock position, check that the F-N-R lever is in the Neutral position (N).



## 2 OPERATION

3) Confirm that the parking brake is engaged.



### NOTICE

When the F-N-R lever is not in the Neutral position (N), or the parking brake is released, the interlocking system will be operated and the engine will not start.

### 2.4.2 Starting the engine

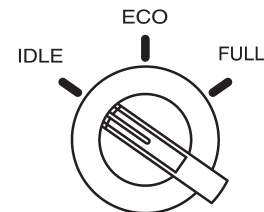
#### ⚠ WARNING

Check that there are no people or obstacles around the machine and beep the horn before starting the engine.

1) Set the Engine speed selector switch in the IDLE position.

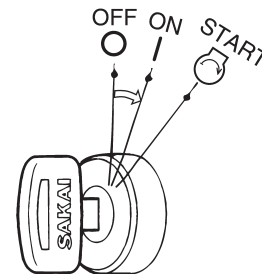
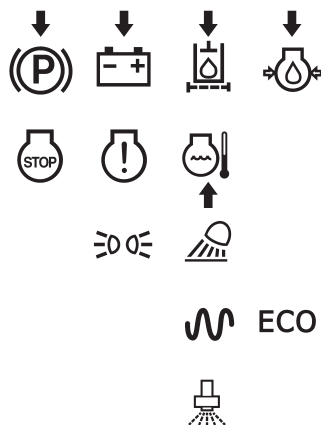
Engine speed	IDLE	ECO	FULL
		900 min <sup>-1</sup>	1850 min <sup>-1</sup>

(± 50 min<sup>-1</sup>)



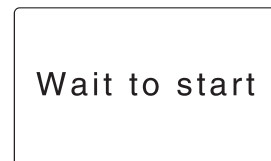
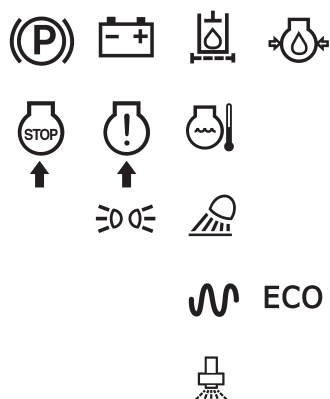
Engine speed selector switch

2) Turn the Starter switch to the | position and check that the warning lamps and Parking brake indicator lamp on the monitor display turn on.



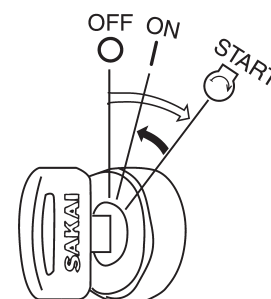
Starter switch

- 3) Start the engine after the engine check lamps and the “Wait to start” on the LCD monitor display turn off.



LCD monitor display

- 4) Turning the key to the START position makes the engine start. Release the key the moment the engine is started. The key will automatically return to I position.



Starter switch

#### NOTICE

- Do not keep the Starter switch key at 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 turn off immediately after the engine is started. If any of these warning lamps stay on while the engine is running, shut down the machine, determine the cause and fix the fault.

## 2 OPERATION

### 2.4.3 After starting the engine

Do not move the machine immediately after starting the engine. Perform the following steps.

#### NOTICE

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

1) Run the engine at idling speed for about 5 minutes to warm up. The warming-up run allows the lubricating oil to reach the vital parts of the engine and the hydraulic system and gradually warming up the engine, the engine oil and the hydraulic oil to prepare the machine for driving. After the warming up operation, check that:

- Temperature gauge ..... Pointer stays near the center zone
- Fuel gauge ..... Pointer stays between the E and F marks
- Battery charge lamp ..... turned off
- Engine oil pressure warning lamp ..... turned off
- Engine stop warning lamp ..... turned off
- Engine warning lamp ..... turned off
- Engine overheating warning lamp ..... turned off
- Parked manual regeneration lamp / Regeneration lamp ..... turned off
- Exhaust equipment high temperature lamp ..... turned off
- Disable regeneration lamp ..... turned off
- DEF level warning lamp (amber) ..... turned off
- DEF quality warning lamp (red) ..... turned off

2) 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 driver's seat while starting the engine and during the operation.**

## 2.4.4 Traveling

### **⚠ WARNING**

- When starting to move, operate the horn after securing the safety around the machine.
- Be sure to wear the seatbelt during operation.

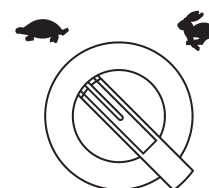
### NOTICE

While traveling, do not turn the Starter switch to **O**.

1) Select mode according to operating condition.

 position : For work

- The AUTO SPEED function can be controlled with this mode. Refer to “2.4.6 AUTO SPEED”.
- Maximum speed is regulated by each vibration frequency in the case of SW884 and SW994.



Travel mode selector switch


Frequency (vpm)	Propel speed mile/h (km/h)
2,500	0 – 2.8 (0 – 4.5)
3,000	0 – 3.4 (0 – 5.5)
4,000	0 – 4.5 (0 – 7.2)

- Maximum speed is regulated by each vibration type in the case of SW884ND and SW994ND.

Vibration type	Propel speed mile/h (km/h)
Ordinary Vibration	0 – 3.4 (0 – 5.5)
Oscillatory Vibration	0 – 4.0 (0 – 6.4)

ECO or FULL position of the Engine speed selector switch.


## 2 OPERATION

 position : For traveling 0 – 6.8 mile/h (0 – 11 km/h).

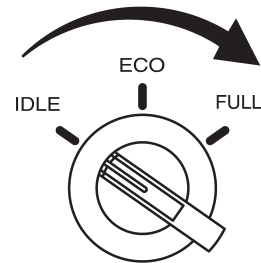
### WARNING

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

### NOTICE

- You can only select traveling condition when the F-N-R lever is in the Neutral position .
- Be sure to shift the gears only when the machine is stopped. Shifting speed is not possible while moving.


- 2) Select ECO or FULL position of the Engine speed selector switch.

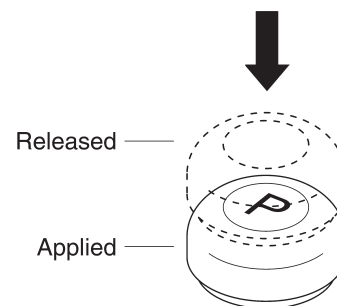


Engine speed selector switch

### NOTICE

Machine speed can be reached at FULL position of the Engine speed selector switch. Maximum speed is a reference value.

- 3) Press down the Parking brake switch to release the brake. Check that indicator lamp  on the monitor display turns off.

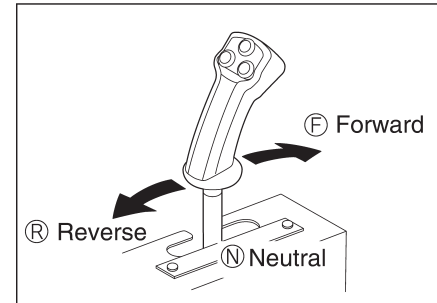


Parking brake switch

### NOTICE

Do not pull the switch. It may damage the switch.

- 4) Move the F-N-R lever in the direction you want to travel, and the machine will start traveling.



### **⚠ WARNING**

- Pay extreme attention to the area behind the machine when reversing, since the space just behind the machine tends to be a blind spot.
- Pay careful attention to your surroundings and maintain the control of the machine when changing the switches. Whenever possible, stop the machine to change the switch settings before continuing the operation.

### **NOTICE**

- Do not operate the F-N-R lever quickly.
- The traveling speed can be controlled by the Engine speed selector switch and the F-N-R lever.



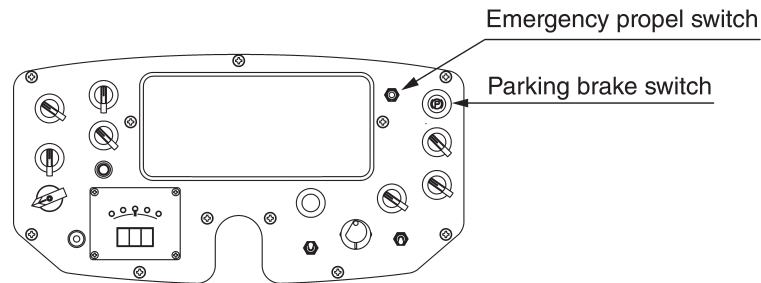
## 2 OPERATION

### Emergency traveling

If the machine doesn't move when you operate the forward and reverse control lever while the engine is running, there may be a problem with the control system.

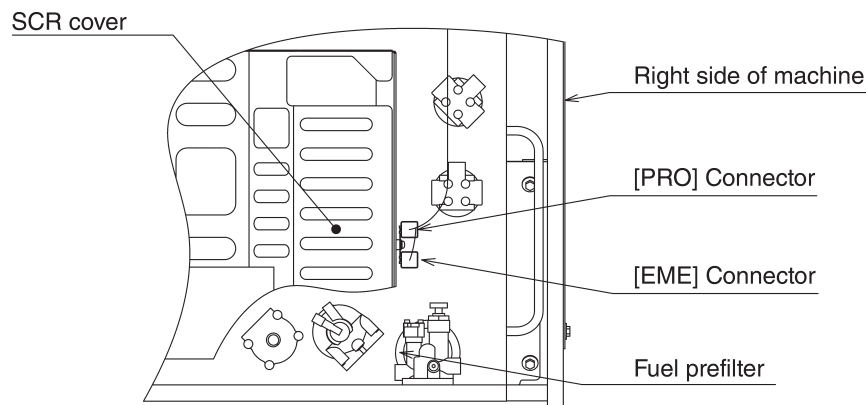
In this case, you may temporarily bypass the controller to drive the machine by following the procedure below.

- 1) Push the Parking brake switch. Stop the engine and make sure the Emergency propel switch is in the neutral position.



- 2) Identify the connectors of PRO & EME on the SCR cover on the right side of the machine.

- 3) Remove the plugs from connector PRO then exchange connectors PRO and EME.



- 4) Make sure the connectors are properly connected, close the hood but do not start the engine until you have checked the surrounding area for obstacles.

Also make sure that the Emergency propel switch and the traveling direction of the machine are the same. Now it will be safe to move the machine to a safe area.

There may be some other problems if the machine will not move at this point. You will have to tow the machine to a safe area. Refer to “2.13 Towing” for the details.

After moving the machine to a safe area, proceed to the next procedure.

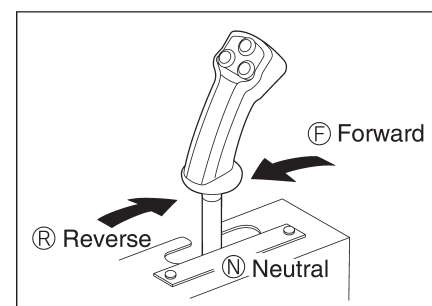
- 1) Push the Parking brake switch.
- 2) Stop the engine.
- 3) Be sure the F-N-R lever is in Neutral position (N) .
- 4) Contact your servicing dealer.
- 5) Exchange the connectors again.

### 2.4.5 Braking and parking

#### **⚠ WARNING**

- **Avoid abrupt braking. Leave enough space from other vehicles or objects for braking safely.**
- **Avoid parking on a slope.**
- **If necessary to park on a slope, chock the drums to prevent unexpected moving down the slope.**

- 1) Move the F-N-R lever to the Neutral position (N) , and the machine will come to a halt.



#### **⚠ WARNING**

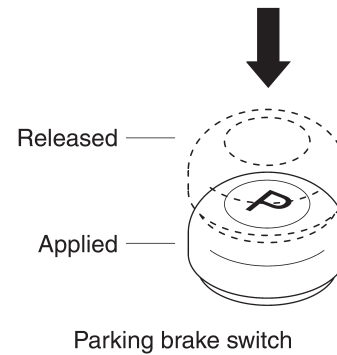
- **For normal braking, move the F-N-R lever back to the Neutral position (N) .**
- **In an emergency, depress the Brake pedal.**

#### **NOTICE**

**When depressing the Brake pedal, the brake is activated and the engine is stopped at the same time. After depressing the Brake pedal, return the F-N-R lever to the Neutral position (N) , and press the Parking brake switch, otherwise the machine will not start.**

## 2 OPERATION

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




### 2.4.6 AUTO SPEED

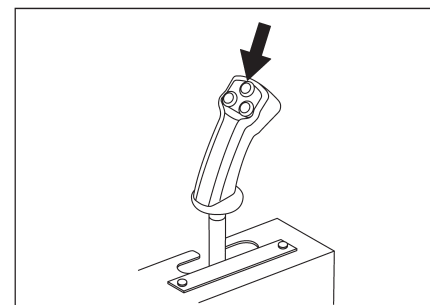
#### 2.4.6.1 Setting

The machine propel speed can be memorized by the machine controller and the speed is controlled automatically. It will help to easily control your speed easily to a preset value when a certain speed is required on the work site.

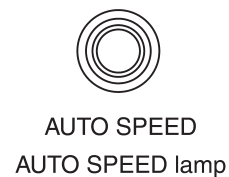
#### NOTICE

- The **AUTO SPEED** function only operates when the Engine speed selector switch is set to the ECO or the FULL and the Travel mode selector switch is in the  position.
- The minimum allowable **AUTO SPEED** setting is 1.5 miles per hour.

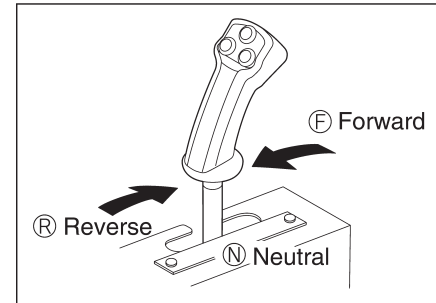
- 1) With the machine moving at the desired AUTO SPEED, press the top button on the F-N-R lever and hold for at least one second to set the AUTO SPEED equal to the current machine speed.



- 2) Check the AUTO SPEED lamp.  
If the AUTO SPEED is successfully set up in Step 1, the AUTO SPEED lamp will remain on. If the lamp is not illuminated, repeat the Step 1.



- 3) After setting the AUTO SPEED in Step 1, move the F-N-R lever to the Neutral position (N).  
The AUTO SPEED feature is now set and the machine will travel at the selected speed when the F-N-R lever is in the full Forward or full Reverse position.

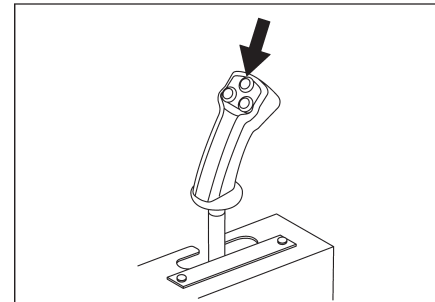


## NOTICE

**Do not change the IPF / Vibration Frequency / Vibration Amplitude / Travel Mode / Engine Speed switch setting after setting the AUTO SPEED without first canceling the AUTO SPEED first. Doing this will cause the AUTO SPEED lamp flashing until the IPF / Vibration Frequency / Vibration Amplitude / Travel Mode / Engine Speed switch is set back to the position it was in when AUTO SPEED was set.**

### 2.4.6.2 Canceling AUTO SPEED

- 1) Press and hold the top button on the F-N-R lever for at least one second when the AUTO SPEED lamp is on.

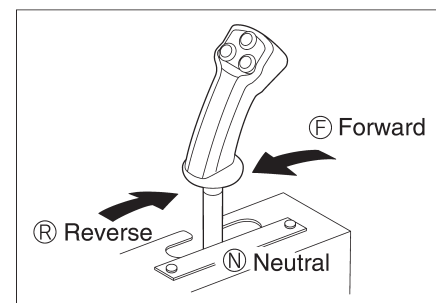


- 2) Check the AUTO SPEED lamp.  
If it is ready to cancel the AUTO SPEED, the lamp will flash. If the lamp is not flashing, press the top button again and hold for at least one second.



AUTO SPEED  
AUTO SPEED lamp

- 3) Move back the F-N-R lever to the Neutral position (N).  
AUTO SPEED is canceled after the machine stops.



## 2 OPERATION

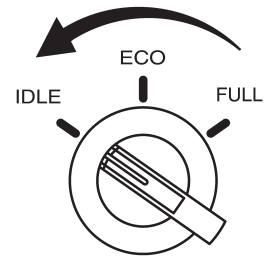
- 4) Check the AUTO SPEED lamp.  
When the AUTO SPEED is canceled completely, the lamp turned off.

### **⚠ CAUTION**

**At first, move the F-N-R lever slowly after the AUTO SPEED feature is canceled because the machine response will be faster now.**

### 2.4.7 Stopping the engine

- 1) Set the Engine speed selector switch to the IDLE position, wait for about 5 minutes with the engine idling to gradually cool down the engine.

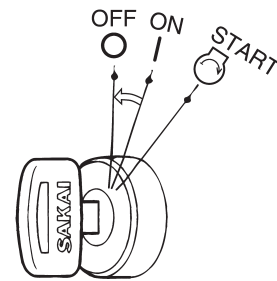


Engine speed selector switch

### NOTICE

- Do not bring a hot engine to a sudden stop except in 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 switch key to the ○ position to stop the engine.



Starter switch

### NOTICE

- While traveling, do not turn the Starter switch to ○ .
- The DEF Pump will continue running for several dozen seconds to cool the DEF injector after turning off the Starter switch. This is not a malfunction.

3) Remove the Starter switch key.

**⚠ WARNING**

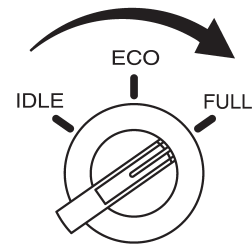
- **When dismounting from the machine, apply the brake by pressing the Parking brake switch. If necessary to park on a slope, chock the wheels to prevent unexpected moving down the slope.**
- **Never fail to remove the Starter switch key when leaving the machine.**

#### **2.4.8 Check after stopping the engine**

- 1) Perform walk-around checks for oil and water leakage, and 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.
- 5) When transporting the machine, please strictly comply with all applicable laws and regulations.

## 2.5 Vibratory Operation

- 1) Turn the Engine speed selector switch clockwise to set the engine RPM to FULL or ECO position.



Engine speed selector switch


### NOTICE


It is possible to conduct the vibratory rolling compaction when setting the Engine speed selector switch to FULL and ECO. ECO is the fuel-efficient position called the ECO MODE.

The ECO mode is recommended when working on flat road surfaces.

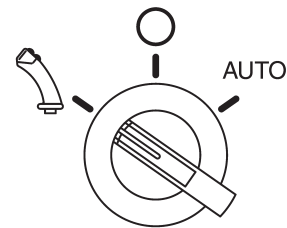
The maximum speed and the grade-ability are degraded.

Please conduct the rolling compaction by setting the Engine speed selector switch to the FULL position when working on soft, steep sloped and rugged road surfaces.

- 2) Select  or AUTO position of the Vibration mode selector switch.

 position : Vibration can be controlled by the Vibration switch on the F-N-R lever

AUTO position : Vibration generates automatically when the F-N-R lever is moved to the Forward or Reverse positions




Vibration mode selector switch


### NOTICE

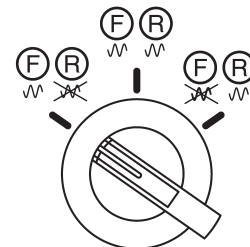
For the vibratory rolling, run the engine at FULL or ECO.

- 3) Select the vibration drum of the Vibration drum selector switch.

 position : Only the front drum will vibrate



 position : Both drums will vibrate

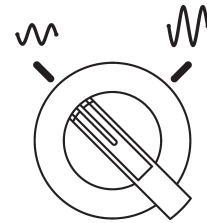
 position : Only the rear drum will vibrate



Vibration drum selector switch

4) Select the vibration amplitude (For SW884, SW994).

-  position : Low amplitude vibration  
 position : High amplitude vibration





Vibration amplitude selector switch

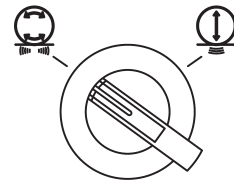
#### NOTICE

Should select only when the F-N-R lever is in the Neutral position (N) .

5) Select the vibration type (For SW884ND, SW994ND).

Select the ordinary or the oscillatory vibration.

-  position : Ordinary vibration  
 position : Oscillatory vibration



Vibration type selector switch

#### NOTICE

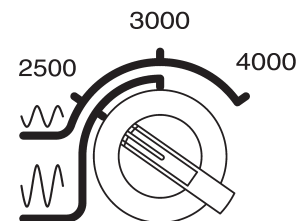
Should select only when the F-N-R lever is in the Neutral position (N) .

6) Select the vibration frequency (For SW884, SW994).

2500 position : Low or high amplitude vibration  
generates at the 2,500 vpm.

3000 position : Low or high amplitude vibration  
generates at the 3,000 vpm.

4000 position : Only low amplitude vibration  
generates at 4,000 vpm.



Vibration frequency selector switch

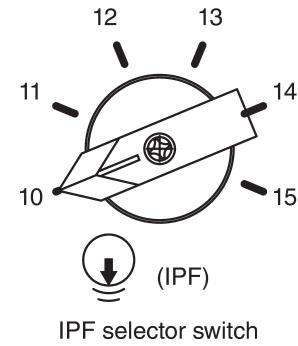
#### NOTICE

- If 4,000 vpm is selected and the machine is set on the high amplitude, it will automatically switch to operate at 3,000 vpm frequency in high amplitude.
- Should select only when the F-N-R lever is in the Neutral position (N) .



## 2 OPERATION

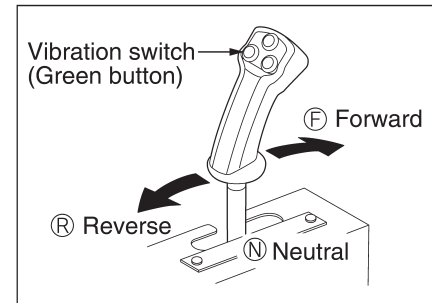
- 7) Select Impacts Per Foot using the IPF selector switch.  
Number of Impacts Per Foot is selected as an input value for the EXACT COMPACT METER.  
IPF number can be selected from 10, 11, 12, 13, 14, 15.  
The green lights on the EXACT COMPACT METER will light up when the machine speed matches the desired IPF number.  
Refer to “2.8 EXACT COMPACT Operation” for more details.



### NOTICE


- Should select only when the F-N-R lever is in the Neutral position (N).
- Selection is applied in the case of SW884, SW994 and the ordinary vibration of SW884ND and SW994ND.

- 8) To generate vibration.  
When the AUTO mode is enabled as described in Step 2 above, placing the F-N-R lever in the Forward or Reverse positions will cause the vibration start automatically when the machine starts moving.



### NOTICE

**Vibration can not be controlled by the Vibration switch on the F-N-R lever in AUTO mode.**

When  position is selected in Step 2, press and hold the Vibration switch (green button) for at least one second to start the vibration. The vibration indicator lamp on the F-N-R lever will illuminate.

To turn off the vibration, again press and hold the Vibration switch (green button) on the F-N-R lever for at least one second. The vibration indicator lamp will turn off when no vibration is occurring.

### WARNING

**Pay careful attention to your surroundings and maintain the control of the machine when changing switch positions. Whenever possible, stop the machine to change the switch settings before continuing the operation.**

### NOTICE

**Stop vibration if the machine has encountered a running difficulty, for example, when it gets stuck in the mud.**

## 2.6 Operating the DEF SCR System

### 1) About the DEF SCR (Selective Catalytic Reduction) system.

The DEF SCR system breaks down toxic nitrogen oxides (NOx) contained in the exhaust gas into harmless nitrogen and water. DEF is sprayed into the exhaust gas, and the ammonia generated by the urea reacts with the nitrogen oxides breaking them down into nitrogen and water.

Depending on the operating conditions, when the DEF SCR system's cleaning function deteriorates, the regeneration is carried out to protect the system.

#### NOTICE

- **Keep the DEF tank topped up at the right time.**
- **Always use the DEF designated by our company.**

### 2) Regeneration.

Regeneration is carried out in the following ways.

- Automatic regeneration.

The Exhaust equipment high temperature lamp  will turn on.



#### NOTICE

**The machine can be driven or operated as usual during the automatic regeneration.**

- Parked manual regeneration request.


Parked manual regeneration lamp / Regeneration lamp  will turn on.



Press the Parked manual regeneration switch  in accordance with 3) Procedures for parked manual regeneration.

The Exhaust equipment high temperature lamp  will turn on when the regeneration begins, and the Parked manual regeneration lamp / Regeneration lamp  will flash.

- Parked manual regeneration lamp / Regeneration lamp  will flash.

Parked manual regeneration lamp / Regeneration lamp  will turn on.

Press the Parked manual regeneration switch  in accordance with 3) Procedures for parked manual regeneration.

The Exhaust equipment high temperature lamp  will turn on when the regeneration begins, and the Parked manual regeneration lamp / Regeneration lamp  will flash.

#### WARNING

- **Do not carry out the regeneration in an enclosed space with poor ventilation, such as inside a garage or a room. There is a danger of carbon monoxide poisoning.**
- **Check to make sure that there are no flammables near the exhaust pipe outlet to prevent fires.**
- **Do not touch or let people go near the exhaust pipe or muffler, which will be hot during regeneration, and for a while after regeneration.**

#### NOTICE

**The engine sound, exhaust gas smell, etc., may change during the regeneration.**

## 2 OPERATION

### 3) Procedure for parked manual regeneration.

- 3)-1 Turn off the vibrator.
- 3)-2 Move the machine to a safe place (The exhaust gas temperature will rise during the parked manual regeneration, so do not park near anything that can burn).
- 3)-3 Move the F-N-R levers to the Neutral position (N).
- 3)-4 Press the Parking brake switch.
- 3)-5 Set the engine to the idling position. If the temperature gauge is in the position (C) before carrying out the parked manual regeneration, warm up the engine.
- 3)-6 Check to make sure that the Disable regeneration lamp is turned off.
- 3)-7 Press the Parked manual regeneration switch (Regeneration is complete when all the indicator lamps turn off. Be sure to let the engine idle for 5 minutes after completion of regeneration).

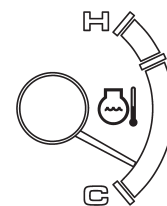
### **⚠ CAUTION**

**The exhaust gas temperature will rise during regeneration, so beware of burns, fires, etc.**

### NOTICE

- **The SCR system must never be modified. The machine will not be able to function properly, and it will not satisfy the exhaust gas emissions standards.**
- **Do not turn the engine off immediately after regeneration.**  
**Set the Engine speed selector switch to the IDLE position after regeneration, and let the engine cool gradually for around 5 minutes.**
- **Stopping the engine suddenly without letting it cool may shorten the life span of the engine parts.**
- **Continuing to use the machine without carrying out the regeneration when the Parked manual regeneration lamp / Regeneration lamp is flashing may, in the worst case scenario, result in a limit being placed on the engine output.**  
**Promptly carry out the parked manual regeneration.**
- **Parked manual regeneration can be carried out any time, but limit it to once daily except when the Parked manual regeneration lamp / Regeneration lamp flashes.**
- **Operating the Parking brake switch or the accelerator lever during the parked manual regeneration will automatically stop regeneration. Restart the parked manual regeneration in accordance with the prescribed procedure.**

- 4) Carrying out the regeneration on cold weather.  
Be sure to let the engine warm up adequately on cold weather before carrying out the regeneration.  
As a rough guide, let the engine warm up until the Temperature gauge indicates the position shown in the illustration on the right.





Temperature gauge

## 5) Disable regeneration.

If there is a danger of hot gas contact with nearby flammable materials, disable the regeneration by turning the Disable regeneration switch to the **I** position to prevent fires and burns from high temperature exhaust gas during the regeneration.

When the safety is secured, promptly turn the Disable regeneration switch to the **O** position.

Turning the Disable regeneration switch to the **I** position will turn on the Disable regeneration lamp  and the disable regeneration.

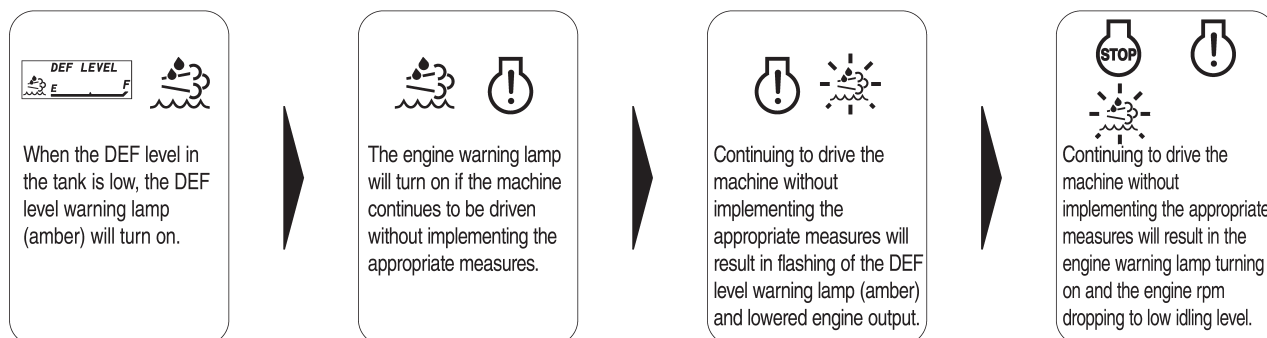
Turning the Disable regeneration switch to the **O** position will turn off the Disable regeneration lamp  and enable the regeneration.

**⚠ WARNING**

**When there are flammable materials (paper, dead leaves, etc.) or people nearby, disable the regeneration to prevent fires and burns from high temperature exhaust gas.**

## 6) Implement the following procedures when there is an abnormality in the DEF SCR system.

• **When the DEF level is low**

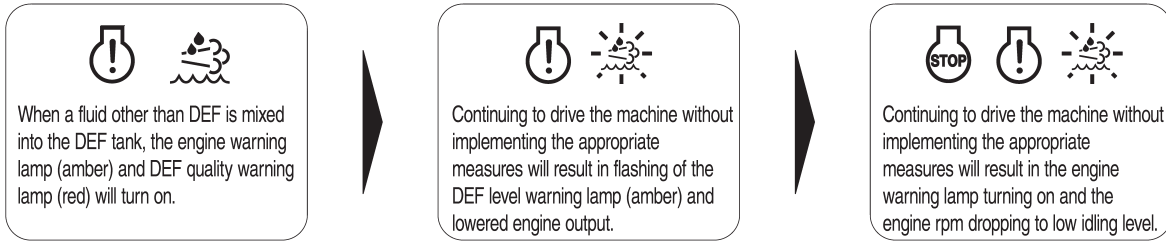


**NOTICE**

- **When the above warning is displayed, fill the tank immediately with DEF designated by SAKAI.**
- **Be sure to use the DEF recommended by SAKAI (refer to "3.6 Fluid and Lubricant Capacities").**
- **If the warning lamp does not turn off even after filling the tank with DEF, stop the engine, make sure the system busy lamp turns off, then turn the Starter switch from the **I** position to the **O** position twice before restarting the engine.**

## 2 OPERATION

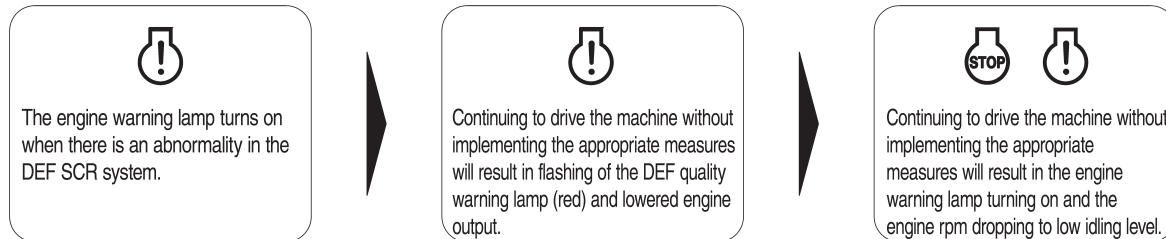
- **When there is an abnormality in the DEF quality**



### NOTICE

- **When the above warning is displayed, completely drain the fluid from the DEF tank, and refill with the DEF designated by SAKAI.**
- **Be sure to use the DEF recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).**
- **If the warning does not turn off even after changing the DEF, stop the engine, turn the Starter switch from the I position to the O position twice, then restart the engine.**

- **Abnormality in the DEF SCR system**



### NOTICE

**When the above warning is displayed, contact your dealer.**

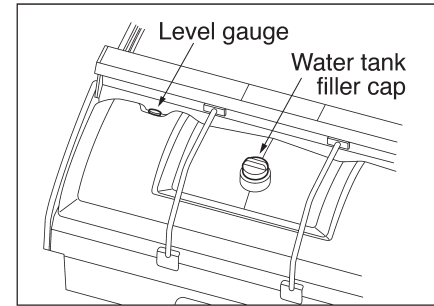
**NOTICE**

- **Put AUS32 or ISO (International Organization for Standardization) ISO22241-1 certified DEF in the DEF tank.**  
Using any other DEF may cause machine break downs. It may also cause the DEF SCR system failures and will not satisfy the exhaust gas emission standards.
- **Never modify the DEF SCR system.**  
Modifying it may cause machine break downs. It may also cause the DEF SCR system failures and will not satisfy the exhaust gas emission standards.
- **The machine will not be able to function properly, and it will not satisfy the exhaust gas emissions standards. It may also damage the machine.**
- **The DEF SCR system will continue running for several minutes after the Starter switch is turned off to pump back the DEF left inside the pipes, injector, and the supply pump into the DEF tank. This is not an abnormal symptom.**  
Do not pull out the battery cord while the system is running.
- **Keep the DEF tank topped up before the DEF runs out.**
- **If the engine has not been turned on for one year or more, replace the DEF before starting it. Starting the engine without changing the DEF may cause the SCR system errors.**
- **Check the DEF SCR system to make sure that there are no abnormalities after starting the engine.**  
If there is something wrong with the DEF SCR system, stop the engine and restart it.

## 2 OPERATION


### 2.7 Water Spray System


- 1) Before turning the water spray system on, check the water level in the tank with the level gauge. Add water as necessary.




#### NOTICE

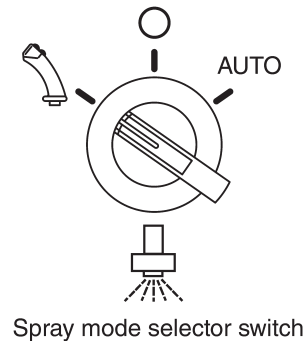
**Use clean water wherever practicable.**

- 2) Select  or AUTO position of the Spray mode selector switch.

 position : Spray system can be controlled by the blue button on the F-N-R lever.

 position : Spray system is shut off.

AUTO position : Spray system is actuated when the F-N-R lever is in the Forward or Reverse position and deactivated when the F-N-R lever is moved to the Neutral position .



- 3) Select water pumps for front and rear drums.

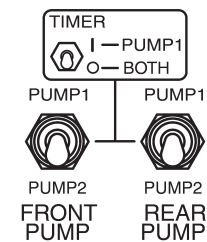
Two same water pumps are installed to each front and rear drums spray system. There are three positions at each switch.

PUMP 1 position: Actuate pump 1

Center position: Actuate pump 1 when select the intermittent spray (see 4)

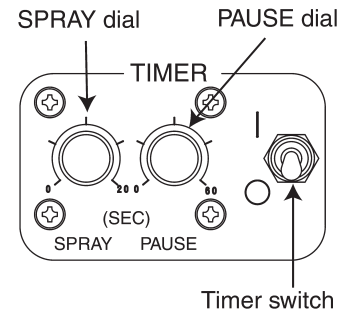
Actuate pump 1 and pump 2 when deselect the intermittent spray (see 4)

PUMP 2 position: Actuate pump 2



4) Select **I** position of the Timer switch for intermittent spray.

- I** position : Spray timer is activated
- O** position : Spray timer is shut off



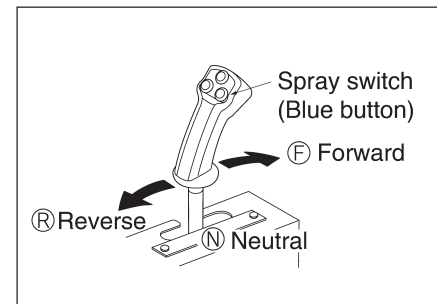
5) Adjust the spray time and the pause time.

The spray time is adjustable between 0 – 20 seconds using the SPRAY dial and the pause time is adjustable between 0 – 60 seconds with the PAUSE dial.

Adjust according to the job site conditions.


6) To start spraying.

When AUTO position is selected, placing the F-N-R lever in the Forward or Reverse position causes travel and sprinkling to start simultaneously.



**NOTICE**

**The water can not be controlled by the Spray switch.**

When  position is selected, press the Spray switch (blue button) and hold for at least one second and the system will start spraying. The sprinkler indicator lamp will illuminate.


Pressing and holding the Spray switch (blue button) for at least one second while the system is spraying will stop the sprinkling.

The sprinkler indicator lamp will turn off.

**⚠ WARNING**

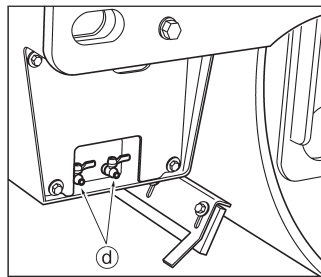
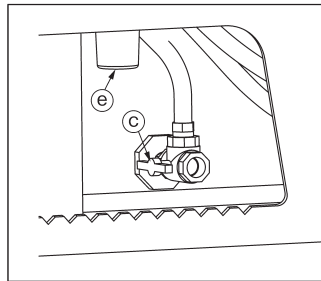
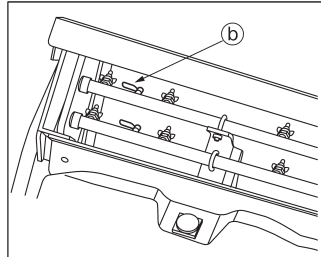
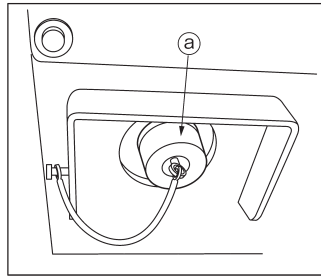
**Pay careful attention to your surroundings and maintain the control of the machine when changing the switch positions. Whenever possible, stop the machine to change the switch settings before continuing operation.**

**NOTICE**

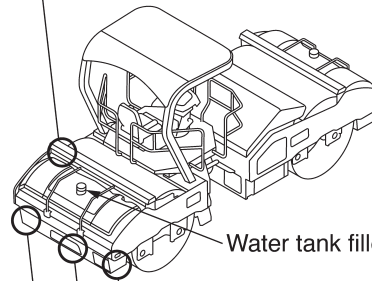
**When starting asphalt compaction, place the Spray mode selector switch in the  position and moisten the drum surface completely before selecting the intermittent spray. For resuming work after a short break, follow the same procedure.**



## 2 OPERATION



Spray bars and drain cocks (b)



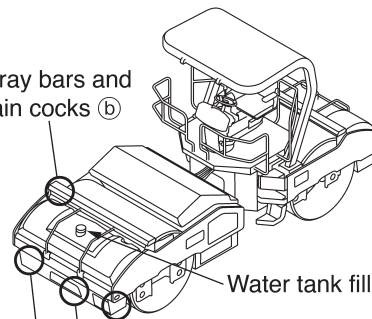
Water tank filler cap

Water pump drain cocks (d)

Water tank selector valve (c) / Water filter (e)

Water tank drain cap (a)

Spray bars and drain cocks (b)



Water tank filler cap

Water pump drain cocks (d)

Water tank selector valve (c) / Water filter (e)

Water tank drain cap (a)

### To drain water

- 1) Open the Water tank filler caps.
- 2) Open the Water tank drain caps (a) and drain water from the tanks completely.
- 3) Open drain cocks (b) of spray bars at front and rear, to drain water completely.
- 4) Turn the lever of Water tank selector valve (c) clockwise, open the drain cocks (d) of water pumps.  
Remove the bowl (e) from water filters; throw away the water in the bowl; then put the bowl back on the water filters.
- 5) Run the water pumps approximately 30 seconds with the water pump drain cocks open.
- 6) Make sure the water is completely drained from all hoses, water pumps and spray nozzles.

### NOTICE

- To avoid freezing, fully drain the water tank, pipes and filters in cold weather.
- Pay attention to the water level because turning the pump with an empty water tank will damage the pumps.

## 2.8 EXACT COMPACT Operation (Impact Space Indicator & Speed Meter)

### 2.8.1 Function

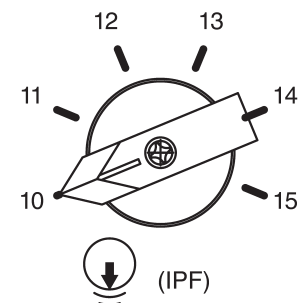
- Indicates if the machine is achieving the desired number of Impacts Per Foot based on the inputs of rolling speed and the operating frequency of the machine. The information is visually displayed by yellow, green, and red LED lights.
- Indicates the rolling speed.
- Indicates the error codes of the machine controller.
- Indicates the rolling surface temperature (OPTION).

### 2.8.2 Operating instruction

#### IPF selector switch

The desired number of Impacts Per Foot can be selected as an input for the EXACT COMPACT METER.

IPF number can be selected from 10, 11, 12, 13, 14, 15.



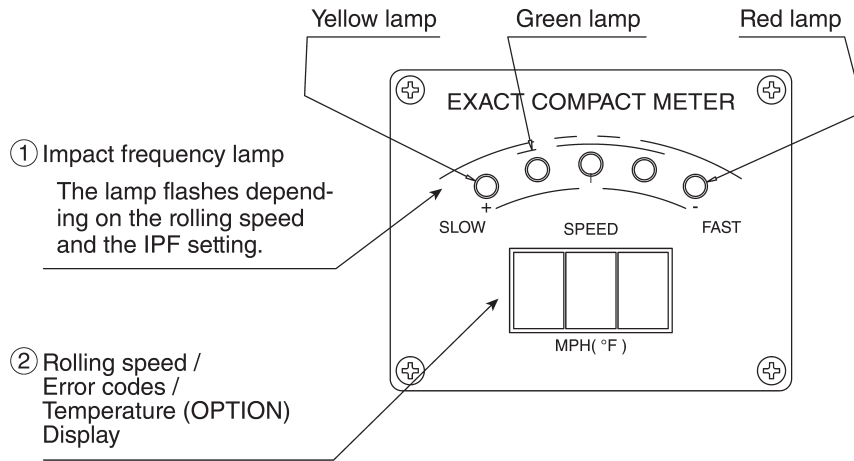
IPF selector switch

#### NOTICE

- **Should select only when the F-N-R lever is in the Neutral position (N).**
- **Selection is applied in the case of SW884, SW994 and the ordinary vibration of SW884ND and SW994ND.**

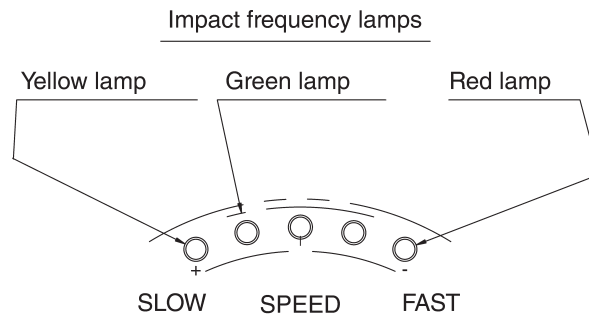
## 2 OPERATION

### Display



#### ① Impact frequency lamp.

The position where the Impact frequency lamp flashes, indicates whether actual impact frequency is greater or lesser than the preset IPF.



- Yellow light :  $+3 < \text{Difference comparing to IPF numbers}$
- Left green light :  $+1 < \text{Difference comparing to IPF numbers} \leq +3$
- Center green light :  $-1 \leq \text{Difference comparing to IPF numbers} \leq +1$
- Right green light :  $-3 \leq \text{Difference comparing to IPF numbers} < -1$
- Red light :  $\text{Difference comparing to IPF numbers} < -3$

#### ② Rolling speed / Error codes / Temperature display.

When the Starter switch key is turned to the Starter switch I position, PON shows up for approximately 2 seconds.

After that, the rolling speed is displayed. If there is an error in the system, the error code is displayed.

Temperature is displayed when the Temperature / Machines speed selector switch is selected to °F position.

### NOTICE

**Temperature display function is OPTIONAL.**

### 2.8.3 Operation

- 1) When the ignition is turned to the I position, the rolling speed display shows [0.0] after approximately 2 seconds. If the display shows any other message, there may be problems. Refer to “2.9 Machine Controller Diagnoses” for details.
- 2) Select the desired frequency from 2,500 vpm, 3,000 vpm, or 4,000 vpm by means of the Vibration frequency selector switch.
- 3) Select the desired Impacts Per Foot from 10, 11, 12, 13, 14, 15 IPF by means of the IPF selector switch.
- 4) When the machine travels with vibration on, the illuminated color of the Impact frequency lamp moves in accordance with the rolling speed and the Impacts Per Foot selection.
- 5) In order to execute compaction work at the desired vibration frequency and IPF setting, the work should be performed at the rolling speed where the center green light stays illuminated.
- 6) Using the AUTO SPEED function (refer to “2.4.6 AUTO SPEED”) will assist compaction work.  
The following table shows the reference with Frequency / IPF / Propel speed.

Frequency (vpm)	Propel speed (mile/h)					
	IPF 10	IPF 11	IPF 12	IPF 13	IPF 14	IPF 15
2,500	2.8	2.6	2.4	2.2	2.0	1.9
3,000	3.4	3.1	2.8	2.6	2.4	2.3
4,000	4.5	4.1	3.8	3.5	3.2	3.0

#### NOTICE

- **Increase the rolling speed when the Yellow light is illuminated.  
Reduce the rolling speed when the Red light is illuminated.  
Selection is applied in the case of SW884, SW994 and the ordinary vibration of SW884ND and SW994ND.**
- **When using the EXACT COMPACT METER in vibratory mode, be sure to run the engine at ECO or FULL engine speed.**
- **If the engine is not running at the ECO or FULL speed position, the EXACT COMPACT METER may display inaccurate results.**

### 2.9 Machine Controller Diagnoses

If error code like an E XX is displayed on the EXACT COMPACT METER, some kind of error has been detected.

#### NOTICE

**When an error is detected, the engine may stop. See chart on next page.**

## 2 OPERATION

Error code	Function / Component	Error	Engine stop
E01	Potential meter	Out voltage to machine controller is grounded	Yes
E02	Potential meter	Output voltage to machine controller is power supply voltage	Yes
E03	Forward switch / F-N-R lever	Short circuit to machine controller	Yes
E04	Forward switch / F-N-R lever	Broken wire	Yes
E05	Reverse switch / F-N-R lever	Short circuit to machine controller	Yes
E06	Reverse switch / F-N-R lever	Broken wire	Yes
E11	Speed sensor	Broken wire	Yes(*)
E15(Lo)	Rolling surface temperature sensor (OPT)	Broken wire or low temperature	No
E21	Vibration selector switch	Broken wire / Short circuit to machine controller	No
E22	IPF selector switch	Broken wire / Short circuit to machine controller	No
E31	Current control / Propel pump solenoid for forward	Current outside the nominal range	Yes
E32	Current control / Propel pump solenoid for reverse	Current outside the nominal range	Yes
E33	Current control / Vibration pump solenoid for front Hi	Current outside the nominal range	No
E34	Current control / Vibration pump solenoid for front Lo	Current outside the nominal range	No
E35	Current control / Vibration pump solenoid for rear Hi	Current outside the nominal range	No
E36	Current control / Vibration pump solenoid for rear Lo	Current outside the nominal range	No
E41	CAN BUS / ECU	Signal defect to machine controller	Yes(*)
E42	Traveling controller	Signal defect to machine controller	Yes
E43	Exact meter	Signal defect to exact meter	Yes
E44	Working controller	Signal defect to machine controller	Yes
E45	Working controller	Parameter error	Yes
E88	Traveling controller / Working controller	Parameter mismatch	Yes
E00	Forward switch / Parking brake switch	Broken wire / Short circuit to machine controller	Yes

### NOTICE

- When the machine controller malfunctions or fails, contact your dealer immediately for appropriate inspection, maintenance, or repair.
- Refer to Emergency traveling on page 56 when it is necessary to move the machine urgently.

\* Only AUTO SPEED mode (refer to "2.4.6 AUTO SPEED").

## 2.10 Safety Precautions for Work

### 2.10.1 Compaction operation

#### ■ Do not operate the vibrator on a hard surface

- Do not operate the vibrator on a hard surface such as concrete pavement, as this can cause the machine to jump and give abnormal shock load which may damage the shock isolators.

#### ■ Change the direction of travel gently

- When changing the direction of travel during the 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.

### 2.10.2 When going downhill

#### ■ Use the F-N-R lever

- Run slowly when going downhill. Do not use excessive speed. Avoid changing the speed if possible when going downhill. Start slowly and stop slowly when on steep slopes.

#### ■ Use the engine brake

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

### 2.10.3 On a slope

#### ■ Working on a sidehill

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

## 2.11 Applicable Jobs

This machine can be used for the 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
- Roller compacted concrete

### Layers to be compacted

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

## 2.12 After Operation

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

Observe the following to prevent the machine getting stuck or unworkable next morning due to mud, extraneous matter on the drums or due to freezing in the cold weather:

- 1) Check the fuel level and confirm the engine coolant temperature and the engine oil pressure are normal.
- 2) Remove mud and water from the machine. Especially the mud on the hydraulic cylinder piston rod may get into the seals together with water drops damaging the seals.
- 3) Park the machine on a hard and dry surface. If such a place is not available, cover the ground with hard plates.
- 4) Low temperature will cause a significant reduction of battery efficiency. Cover the batteries or remove from the machine and store in a warm place till the following day's operation. Take care not to tilt the battery when removing from the machine as there is a danger of battery fluid leaking.
- 5) To prevent freezing, drain water from the spray system. Refer to "2.7 Water Spray System".

### NOTICE

- **Insufficient draining of water can cause damage to the machine.**
- **Do not clean with high pressure water around the instrument panel or behind the dash board. It may cause instrument failures.**



## 2.13 Towing

### ⚠ WARNING

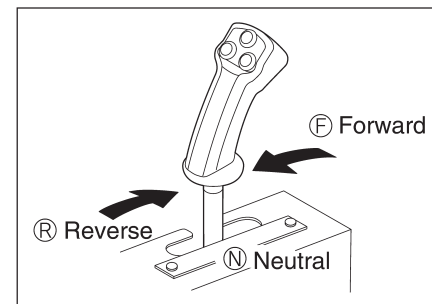
- Do not tow if the braking system is broken as it is dangerous.
- Do not perform towing on a slope.
- Do not use twisted, kinked or damaged cables when towing.
- Do not step over the wire rope.
- To tow the machine, use cables with ample strength.
- Keep everyone away from the space between the machine and the towing machine when connecting them and while towing.
- Align the connection points of the failed machine and the towing machine in a straight line when connecting.
- Be sure to attach the wire rope firmly to the towing hook.

### NOTICE

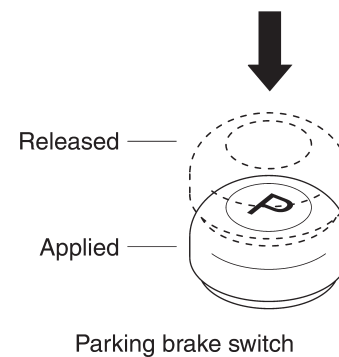
Towing should only be carried out in emergencies and over the short distances. A truck or trailer should be used for long distance transport.

#### 2.13.1 If the engine can be started

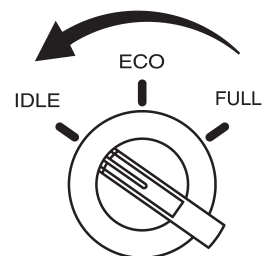
- 1) Move the F-N-R lever to the Neutral position (N).



- 2) Press the Parking brake switch securely, and check the Parking brake indicator lamp (P) illuminates. If the lamp does not turn on, refer to “2.1.3 Switches”.

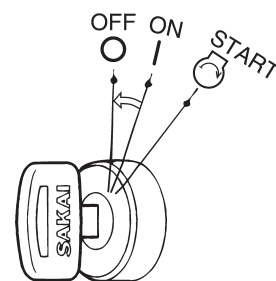


- 3) Set the Engine speed selector switch at the IDLE position.



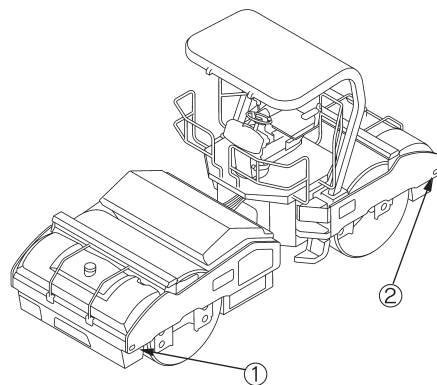
Engine speed selector switch

- 4) Turn the Starter switch to the **O** position to stop the engine.

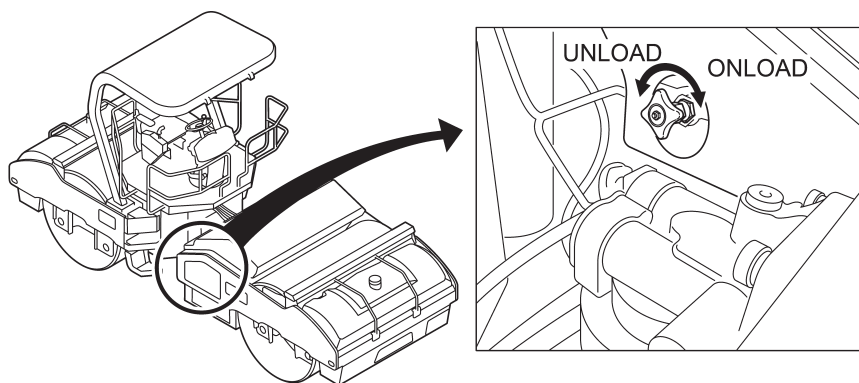


Starter switch

- 5) Draw the wire rope from the other machine and put its hook on the hooking point ① or ② (one each on right and left) of the machine.

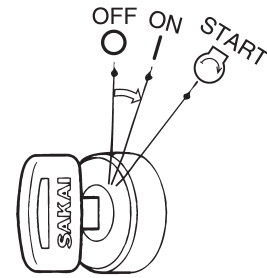
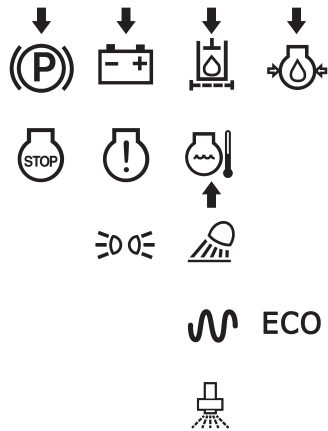


- 6) Turn the Unloader valve knob counterclockwise to the UNLOAD position.



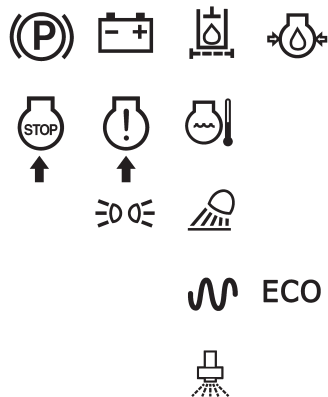
## 2 OPERATION

- 7) Turn the Starter switch to the I position and check that the warning lamps and Parking brake indicator lamp on the monitor display are on.



Starter switch

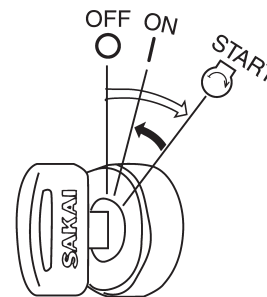
- 8) Start the engine after the engine check lamp turned off.



Wait to start

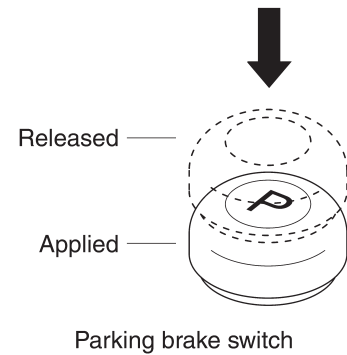
LCD monitor display

- 9) Turning the key to the START position makes the engine start. Release the key at the moment when the engine started. The key will automatically return to I position.



Starter switch

- 10) Press down the Parking brake switch to release the brake. Check that the Parking brake indicator lamp (P) on the monitor display turns off.



- 11) Tow the machine.

**⚠ WARNING**

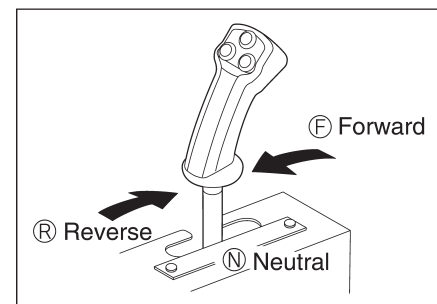
- **Hold the Steering wheel.**
- **Do not touch the F-N-R lever. It may cause unexpected movements.**
- **Depress the Brake pedal in an emergency.**
- **Tow the machine slowly. It may move in unexpected ways.**

Do not release the Brake pedal until towing begins. Take your foot off the Brake pedal when the wire rope gets under tension. The steering of the machine can be done while towing.

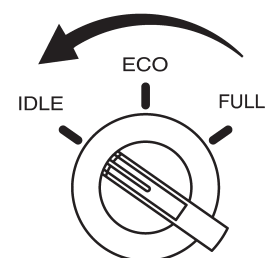
**2.13.2 If the engine cannot be started**

This section applies to situations in which the parking brake cannot be applied or released by operating the Parking brake switch.

- 1) Move the F-N-R lever to the Neutral position (N) .



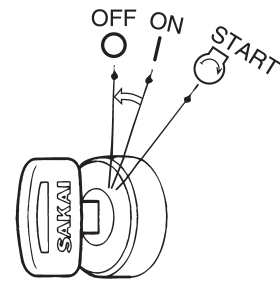
- 2) Set the Engine speed selector switch at the IDLE position.



Engine speed selector switch

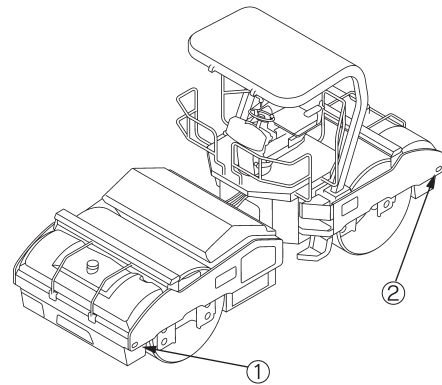
## 2 OPERATION

3) Turn the Starter switch to the **○** position.



Starter switch

4) Draw the wire rope from the other machine and put its hook on the hooking point ① or ② (one each on right and left) of the machine.



5) Disengaging the brake.

### **⚠ WARNING**

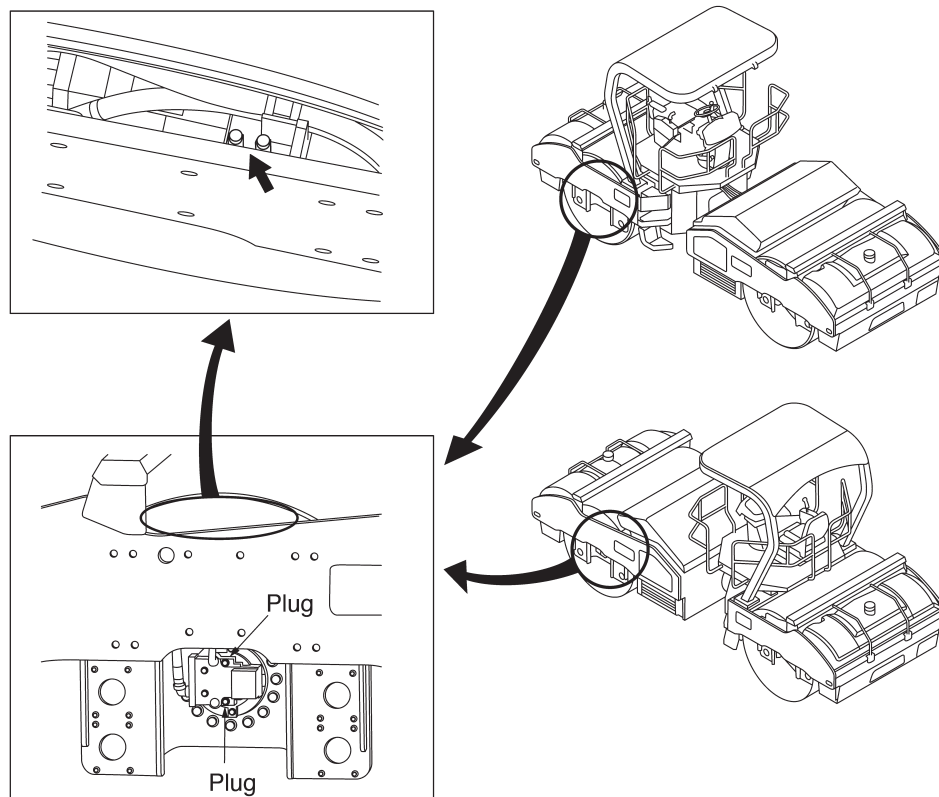
- Disengage the brake on a flat ground.
- Chock the drums.
- Do not try to release the brake immediately after stopping a hot engine. Let the oil cool down.
- For the brake disengaging work, wear a hard hat, safety goggles and protector gloves.



Use the same procedure for both front and rear drums.

- 5)-1 Remove the brake-disengaging bolts and washers (two each) from the machine frame.

Brake-disengaging bolts and washers (red)



- 5)-2 Remove the plugs (2 locations) from the motor.

**NOTICE**

**Conduct the work rapidly, as the oil will gush out when the plugs are taken off.**

- 5)-3 Screw the removed bolts with the washers attached into the plug holes.  
Screwing them in until they become a little tight will disengage the brake.

**NOTICE**

**Wash clean the brake-disengaging bolts and blank plugs before fitting to the motors.**

## 2 OPERATION

### 6) Opening the Unloader valve.

#### **⚠ WARNING**

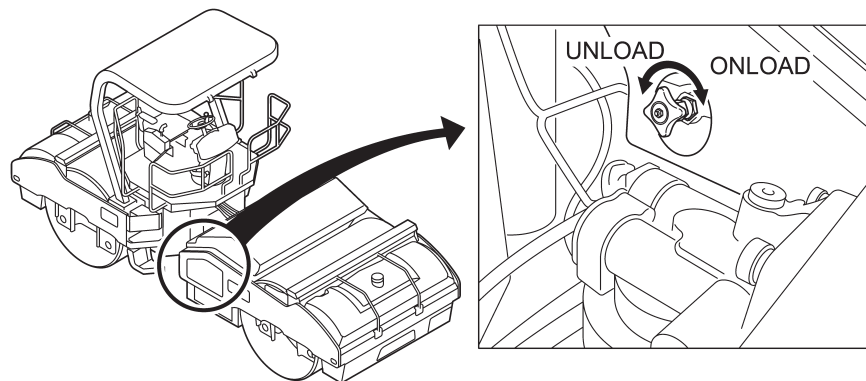
- Open (Turning to UNLOAD side) the Unloader valve on a flat ground.
- Chock the drums.
- Opening the Unloader valve will disengage the drive, so never get in front or behind the machine when the brakes disengaged.
- Turning the Unloader valve to UNLOAD position will cut the power for traction. Do not enter the areas ahead and behind the machine as it is very dangerous.

#### **NOTICE**

For normal operation, be sure to close (ONLOAD position) the Unloader valve.

The Unloader valve disengages the drive, similar to a clutch.

Turn the Unloader valve knob counterclockwise (UNLOAD position) to open.



### 7) Tow the machine.

#### **⚠ WARNING**

- Keep away from the machine.
- Tow the machine slowly. It may move in unexpected ways.

## 2.14 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 the wrong direction, bring down the machine from the ramps without steering and correct the direction.
- Turning the Unloader valve to UNLOAD position cuts the power for traction.
- Do not enter the areas ahead and behind the machine as it is very dangerous.

### NOTICE

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

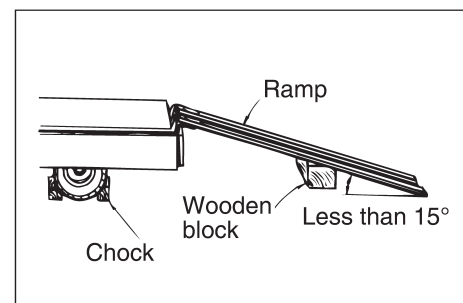
#### 2.14.1 If the engine can be started

- 1) Apply the brakes and chock the wheels of the truck or trailer.

Aligned the center of the machine with the center of the truck or trailer and fix the ramps securely.

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

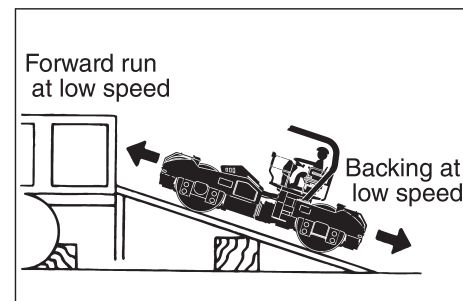
Leave enough space between the ramps according to the width of the machine drum.



- 2) Decide the direction correctly and conduct loading or unloading at low speed.

For loading, run forward at low speed.

For unloading, run backward at low speed.



- 3) Stop the machine safely in the correct position on the truck or trailer.



## 2 OPERATION

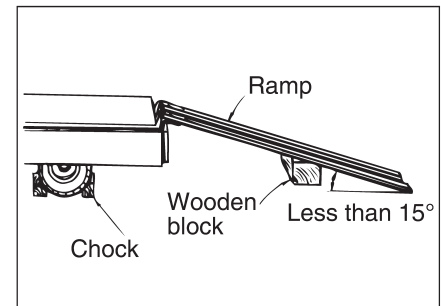
### 2.14.2 If the engine cannot be started

#### 1) Preparing the trailer.

- 1)-1 Apply the brakes and chock the wheels of the truck or trailer. Aligned the center of the machine with the center of the truck or trailer and fix the ramps securely.

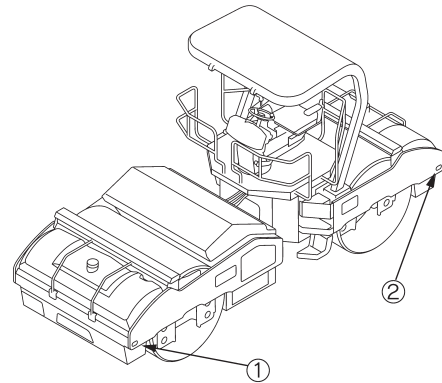
The angle between the ramps and ground must be less than 15 degrees.

Leave enough space between the ramps according to the width of the machine drum.



- 1)-2 Decide the direction correctly and move the machine towards the ramps.

- 1)-3 Draw the wire rope from the truck or trailer winch and put its hook on the hooking point ① or ② (one each on right and left) of the machine.



#### 2) Disengaging the brake.

##### **⚠ WARNING**

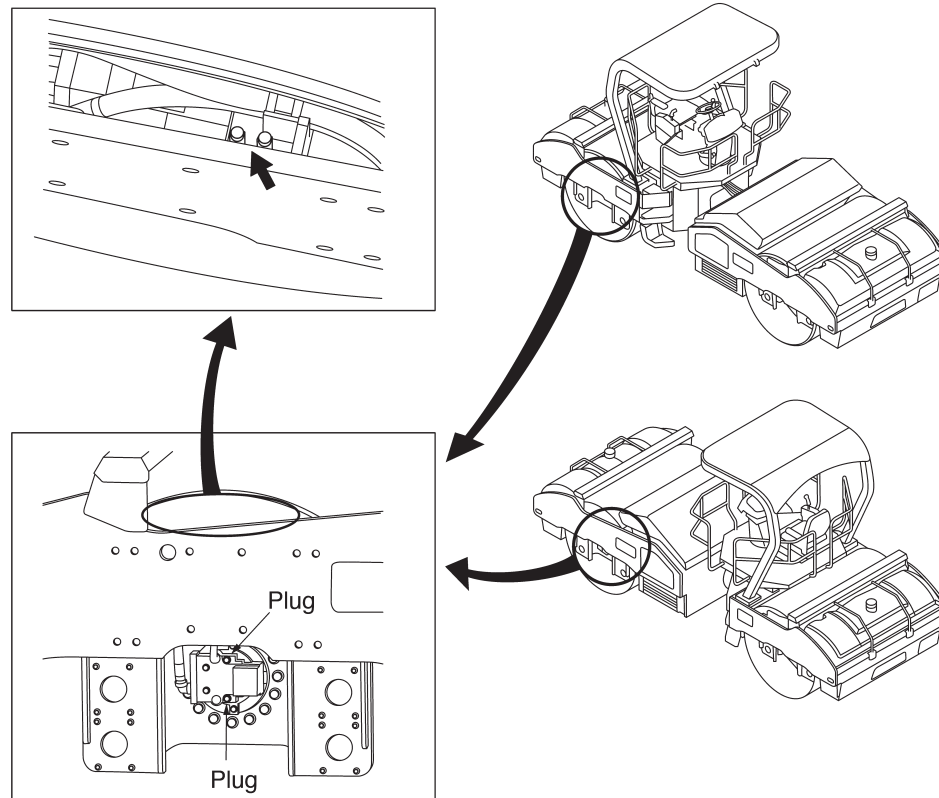
- **Disengage the brake on flat ground.**
- **Chock the drums.**
- **Do not try to release the brake immediately after stopping a hot engine. Let the oil cool down.**
- **For the brake disengaging work, wear a hard hat, safety goggles and protector gloves.**



Use the same procedure for both front and rear drums.

2)-1 Remove the brake-disengaging bolts and washers (two each) from the machine frame.

Brake-disengaging bolts and washers (red)



2)-2 Remove the plugs (2 locations) from the motor.

**NOTICE**

**Conduct the work rapidly, as the oil will gush out when the plugs are taken off.**

2)-3 Screw the removed bolts with the washers attached into the plug holes.  
Screwing them in until they become a little tight will disengage the brake.

**NOTICE**

**Wash clean the brake-disengaging bolts and blank plugs before fitting to the motors.**

## 2 OPERATION

### 3) Operating the Unloader valve.

#### **⚠ WARNING**

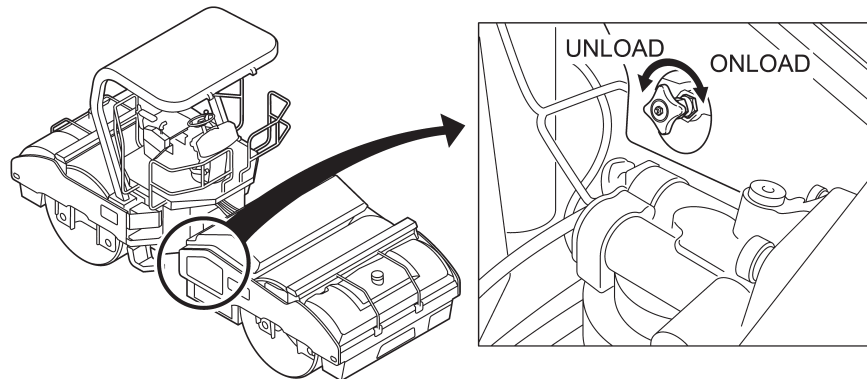
- **Open (Turning to UNLOAD side) the Unloader valve on a flat ground.**
- **Chock the drums.**
- **Opening the Unloader valve will disengage the drive, so never get in front or behind the machine when the brakes disengaged.**
- **Turning the Unloader valve to UNLOAD position will cut the power for traction. Do not enter the areas ahead and behind the machine as it is very dangerous.**

#### **NOTICE**

**For normal operation, be sure to close (ONLOAD position) the Unloader valve.**

The Unloader valve disengages the drive, similar to a clutch.

Turn the Unloader valve knob counterclockwise (UNLOAD position) to open.



### 4) Loading the machine.

4)-1 Perform loading by means of the truck or trailer winch.

4)-2 Stop the machine safely in the correct position on the truck or trailer.

4)-3 When the loading is completed, return the Unloader valve to the ONLOAD position, then return the brake-disengaging bolts and washers to the machine frame and tighten the plugs of the motor.

## 2.15 After Loading the Machine

Tie the machine as follows after stopping it safely in the correct position on the truck or trailer.

- 1) Press the Parking brake switch to apply the parking brake. Place the chocks under the drums to prevent movement.
- 2) Fix the machine firmly with ropes tied at the front and rear towing hook holes and be careful that it does not slip sideways.

## 2.16 Transportation

### NOTICE

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

For transportation, obey the traffic regulations.

## 2 OPERATION

### 2.17 Operation in Cold Weather

In cold weather, take the following measures to prevent troubles such as starting difficulties and coolant freezing.

#### 2.17.1 Fuel, oil and grease

Use the fuel and oil with low viscosity (refer to “3.6 Fluid and Lubricant Capacities”).

#### 2.17.2 Coolant

##### **⚠ WARNING**

**Coolant is flammable. Do not bring open flames close and do not smoke when handling it.**

##### **NOTICE**

**Use ethylene glycol-base antifreeze.**

Use soft water as cooling water. And mix the antifreeze to it.  
Please refer to the following table for the mixing ratio.

Ambient temperature	Always
Amount of antifreeze	11 L (2.9 gal)
Amount of water	11 L (2.9 gal)
Ratio	50%

Our machines are filled with a long-life coolant.  
The life of the antifreeze is two years.  
Use non-amine type long-life coolant when changing.

**⚠ WARNING**

- Do not remove the radiator cap while the coolant is hot.
- Hot water may spurt out and cause burns. When the water temperature drops, slowly turn the cap to release the pressure and remove the Auxiliary tank cap.

**NOTICE**

Failure to follow this procedure can result in severe engine damage.

- Fill :
- 1) Fill the coolant at 3 gallons per minute (12 liters per minute) until the coolant reaches the lower part of the filler port. Wait for 1 minute, then top up the coolant up to the lower part of the fill neck if needed.
  - 2) Start the engine and run at ECO speed for 1 minute or until the engine warning lamp turns on.
  - 3) Turn off the engine and top up the coolant up to lower part of the filler port if needed.
  - 4) Refit the Auxiliary tank cap.

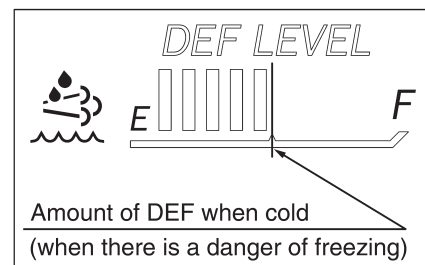
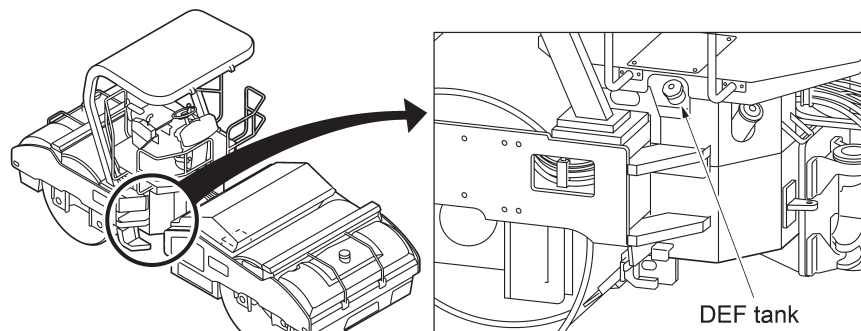
**2.17.3 DEF**

When the DEF inside the tank freezes, it may expand damaging the equipment inside the tank and parts.

Fill the tank with the prescribed amount of DEF while it is cold.

When there is a risk of freezing, adjust the amount of DEF less than half of the tank.

The DEF freezes at  $-11^{\circ}\text{C}$ .



### 2.17.4 Battery

#### **⚠ WARNING**

- **The battery generates hydrogen gas, so there is a danger of explosions. When there is a danger of generating sparks in poorly ventilated places, avoid recharging the battery and keep away the cigarettes and flames etc.**
- **The battery contains diluted sulfuric acid, which will dissolve clothes and burn skin. If you get battery fluid on your clothes or skin, wash it off immediately with plenty of clean water.**
- **If you get it in your eyes, rinse them immediately with clean water and seek the medical help of a doctor.**
- **If you accidentally ingest it, drink plenty of water and immediately seek the medical help of a doctor.**
- **Always wear safely glasses when handling the battery.**
- **The inspection and handling of batteries should be carried out with the engine turned off and the Starter switch in the O position.**
- **Turn the Starter switch to the O position, then wait at least 30 seconds before removing the battery. If not, an abnormality may arise in the ECM (Engine Control Module).**
- **Be careful not to connect the two battery terminals together by tools or other metallic objects.**
- **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 the machine body. This can generate sparks, causing an explosion.**
- **Loose 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 the electrical equipment on the machine. Do not use it for any other purpose.**

#### **NOTICE**

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

The battery efficiency drops at low temperature and the battery fluid will tend to freeze if the level of charge is low. Therefore, it should be maintained at 100%. Maintain the battery fully charged wherever practicable, and give attention to heat insulation at night for the next day's operation.

For the level of charge, check the specific gravity of electrolyte with a hydrometer and use the following table of conversion.

Temperature Level of charge (%)	20°C (68°F)	0°C (32°F)	-10°C (14°F)	-20°C (-4°F)
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26



## 2.18 When the Cold Season is Over

Proceed as follows when the winter is over and the warm climate begins:

- 1) Change the oil and the fuel with those suitable for warm season (refer to “3.6 Fluid and Lubricant Capacities”).
- 2) If AF-PT antifreeze is in use, drain the coolant completely, wash inside the cooling system, and refill with clean water (city water).
- 3) Check to make sure there is no damage to parts inside the DEF tank. Carry out repairs if identified any damage.

## 2.19 Extended Storage

Proceed as follows to leave the machine unused for more than a month:

- 1) Store the machine in a closed area after cleaning.
- 2) Conduct oiling, greasing and changing of oil.
- 3) Fill up the DEF tank. However, fill the tank less than half if there is a danger of freezing.
- 4) Grease the exposed portion of hydraulic cylinder piston rods.
- 5) Cover the battery after disconnecting the negative cable or remove the battery from the machine and store in a safe place.
- 6) If the temperature is expected to go below 0°C, add antifreeze to the coolant.
- 7) Completely drain the water of spray system.
- 8) Place the F-N-R lever to the Neutral position (N), the Vibration mode selector switch to the O position and apply the Parking brake.
- 9) Chock the machine drums.
- 10) Remove the Starter switch key.

## 2.20 During and After the Storage Period

### **⚠ WARNING**

**If it is necessary to operate the machine in indoor storage space, ensure good ventilation by keeping windows and doors of the storage area open to prevent gas poisoning.**

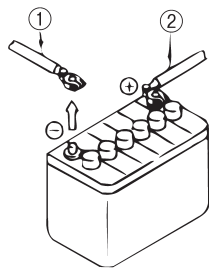
- During storage period, operate the machine at least once a month to prevent the oil films on the lubricated parts from deteriorating and also to charge the batteries.
- To prevent the brake linings from sticking to the brake drum, disengage the brake once a month. When doing this, do not allow the machine to move unexpectedly.
- Follow the procedures below if the machine is not used for two months or more after storage.
  - Change the DEF pump filter and fill up the DEF tank before starting the engine.
  - Check the SCR system to make sure there are no abnormalities after starting the engine.
  - If there is something wrong with the SCR system, stop the engine and restart it.  
If there is an abnormality in the SCR system even after restarting the engine, contact your dealer.
  - If a year or more has passed since refilling the DEF tank, contact your dealer to change the DEF.
  - Dispose the drained DEF in accordance with the local environmental laws, rules and regulations.  
Old DEF may release an ammonium smell. Change the DEF in a well-ventilated place.

## 2.21 When the Battery has Discharged

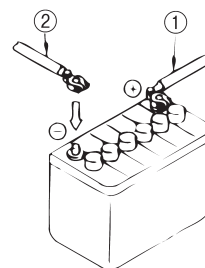
### ⚠ WARNING

- To check and handle the batteries, keep the engine stopped with the Starter switch in the  $\bigcirc$  position.
- The batteries release explosive gases. Do not smoke close to the batteries. Keep flames and sparks away from the batteries.
- The battery liquid is very corrosive and will harm your clothing or skin. If it contacts your clothing or skin accidentally, flush with sufficient amount of water. In case if you get it in 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 the machine body. This can generate sparks, causing an explosion.
- Loose battery terminals can cause sparks resulting an explosion. When connecting the terminals, make certain that they are tight.

Disconnect with negative cable first



Connect with positive cable first



### 2.21.1 Connecting and disconnecting the booster cables

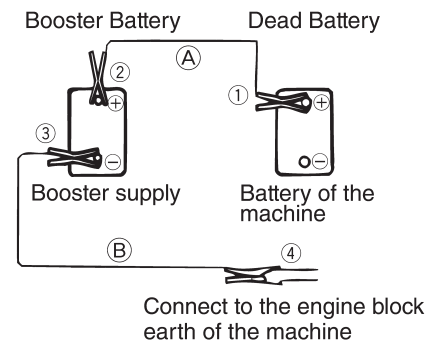
#### NOTICE

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

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

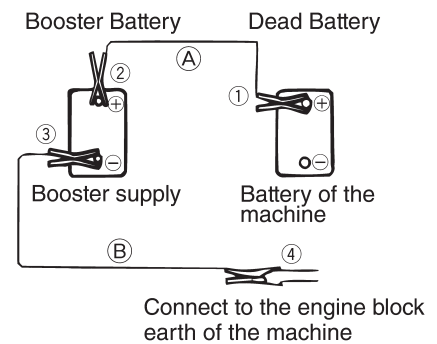
### ■ Connecting the booster cables

- 1) Connect one end of the positive booster cable (A) to the positive  $\oplus$  terminal of the dead battery on the machine.
- 2) Connect the other end of the positive booster cable to the positive  $\oplus$  terminal of the booster battery.
- 3) Connect the negative booster cable (B) to the negative  $\ominus$  terminal of the booster supply.
- 4) Connect the other end of the negative booster cable to a good earth ground on the engine block of the machine.



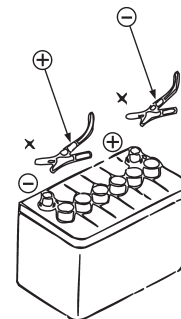
### ■ Disconnecting the booster cables

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



### ⚠ WARNING

- Do not allow the positive  $\oplus$  terminal to make contact with the negative  $\ominus$  terminal when connecting the booster cables.
- Wear safety goggles when jump-starting the engine.
- Do not allow the machine to make contact with the booster supply.
- Do not make wrong connections. Connect the negative  $\ominus$  cable to the engine block earth as much as far from the battery, as sparks may occur when connecting.



## 3 PERIODIC MAINTENANCE

### 3.1 Precautions

Failure to inspect and lubricate the machine at the correct regular intervals increases the chance of occurring problems and reduces the service life of the machine.

This manual describes the standard inspection / maintenance period, but it is necessary to use the machine always in the best condition by shortening the period and enhancing the content depending on the usage conditions such as site conditions and work conditions.

#### **⚠ WARNING**

**Be careful not to get burn yourself when replacing filters, elements, oil, etc. which are hot after use.**

#### **NOTICE**

- **After maintenance and inspection, record the inspection results. Note that the replacing filter elements, refilling or changing oil and grease and cleaning the radiator fins are important.**
- **Waste oil, waste coolant, waste DEF, 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 these systems.
- 4) For checking the oil level or changing oil, park the machine on a level and hard surface.
- 5) Change the oil while it's warm.
- 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. Fill up the DEF tank. However, fill the DEF tank less than half mark if there is a risk of freezing.
- 7) In freezing weather, add antifreeze to the coolant according to the ambient temperature.
- 8) Repair and service the hydraulic pumps and motors in the authorized service shops.
- 9) Contact one of our sales offices or a factory designated by our company to change DEF hoses and clean the DEF tank.
- 10) Turn the Starter switch to **O** when performing services such as repairing broken wires, short circuits and tightening loose terminals.

#### **Periodic replacement of important maintenance parts**

The following parts and components should be replaced periodically as detailed on the next page.

These parts are prone to material deterioration due to aging or physical change due to friction. While it is difficult to determine their useful limit by regular inspection, you should replace with new ones after certain periods of service to ensure they function as intended.

If any defects are detected such as crack, deformation or oil leakage, replace them even if it is within the scheduled replacement time.

### 3 PERIODIC MAINTENANCE

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	
	Isolator rubber	Isolator rubber itself	4 years	
4 Fuel system	Piping parts	Fuel hose	2 years	
5 Engine related parts	Engine mounting parts	Isolator 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	
10 Urea system	Piping parts	Coolant hose for urea system	2 years	
		Urea hose	9,000 hours	

#### NOTICE

- **With a new machine, change the engine oil and change the engine oil filter element after 50 hours of operation for the first time only (refer to “3.4 Maintenance Procedure”).**
- **When trouble occurs in the location indicated by the indicator lamp on the dashboard display, sensor will work and corresponding lamp comes on. If this occurs, conduct necessary service regardless of the periodic service interval recommendation.**
  - 1) **The hydraulic oil filter warning lamp ⇨ Replace elements**
- **Check the electric wiring at regular intervals not exceeding one month. Replace it if there is any abnormality.**

**If there is any trouble on the electric wiring, replace it with new one.**

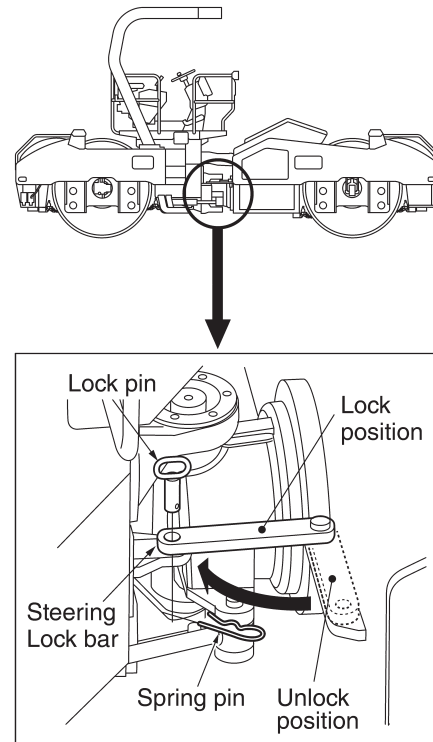
  - 1) **Damage to the wire harness and loose clamps**
  - 2) **Loose sockets**
  - 3) **Function of electrical systems**
- **For the parts other than listed above, if any abnormality is found during periodical inspection or daily check, replace or repair it immediately.**

### 3 PERIODIC MAINTENANCE

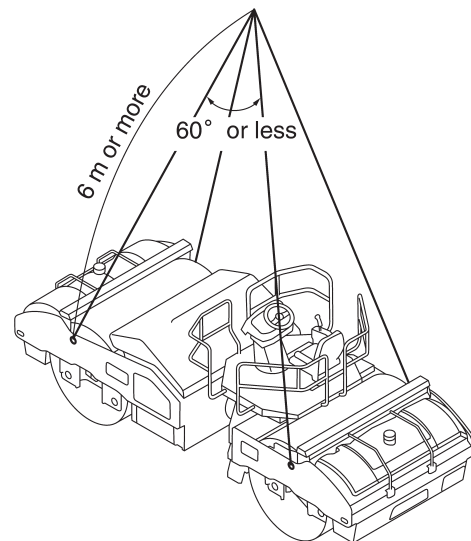
#### 3.1.1 Lifting the machine by using a crane

##### **⚠ WARNING**

- Get a qualified person to lift and lower the machine using a crane.
- Lock the articulation with the lock bar located at the center of the machine.
- Remove the ROPS before lifting the machine.
- Do not use twisted, kinked or damaged wire ropes when lifting.
- Use the wire ropes appropriate for the weight of the machine when hoisting it.

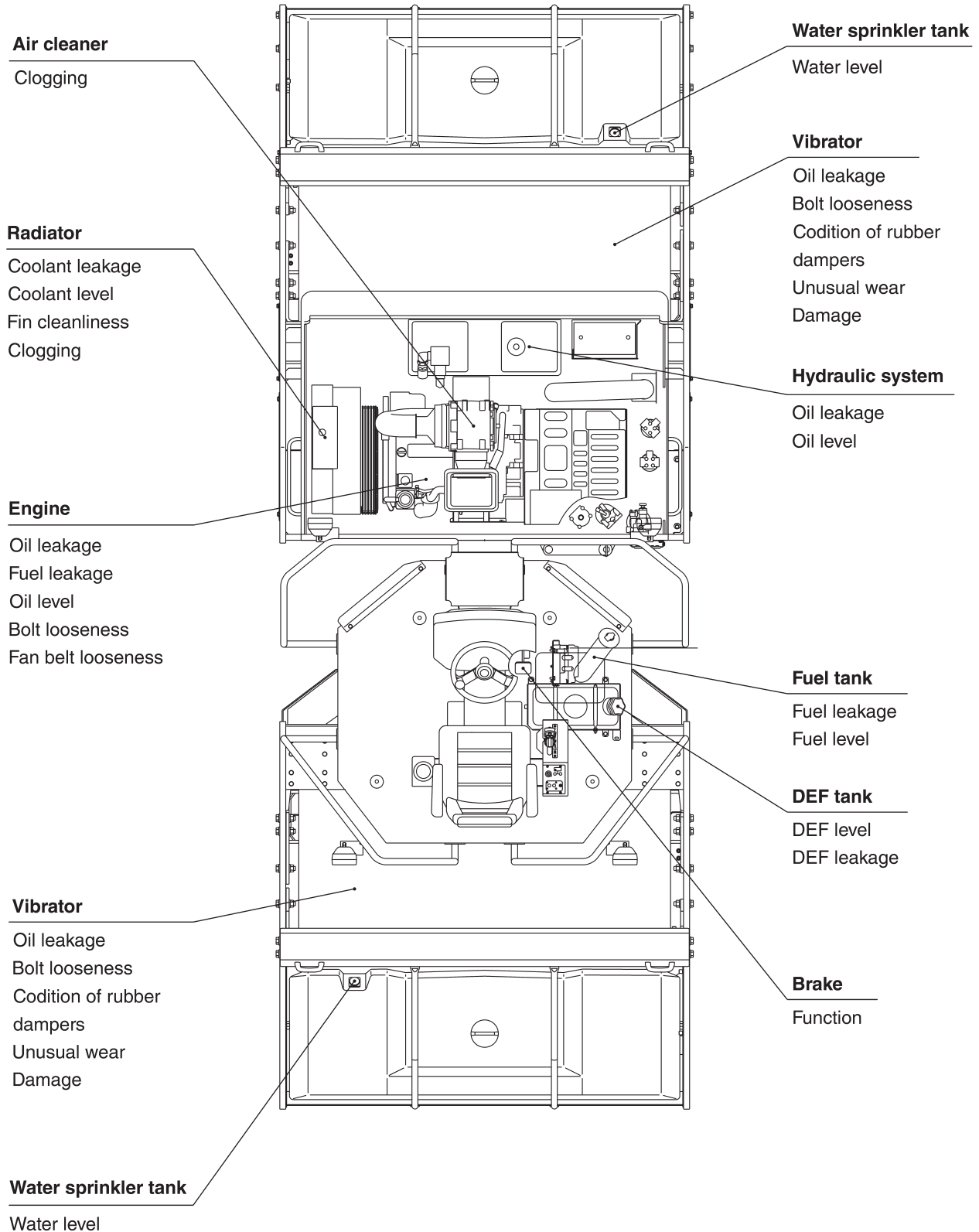


- 1) Hang the wire ropes securely on the hook and lifting points as shown.
- 2) If the wire ropes make contact with the other parts of the machine, put pieces of cloth or wooden blocks at the contact points. Carefully perform lifting.
- 3) When lifting, keep the machine properly balanced.



### 3.2 Walk-around Inspection

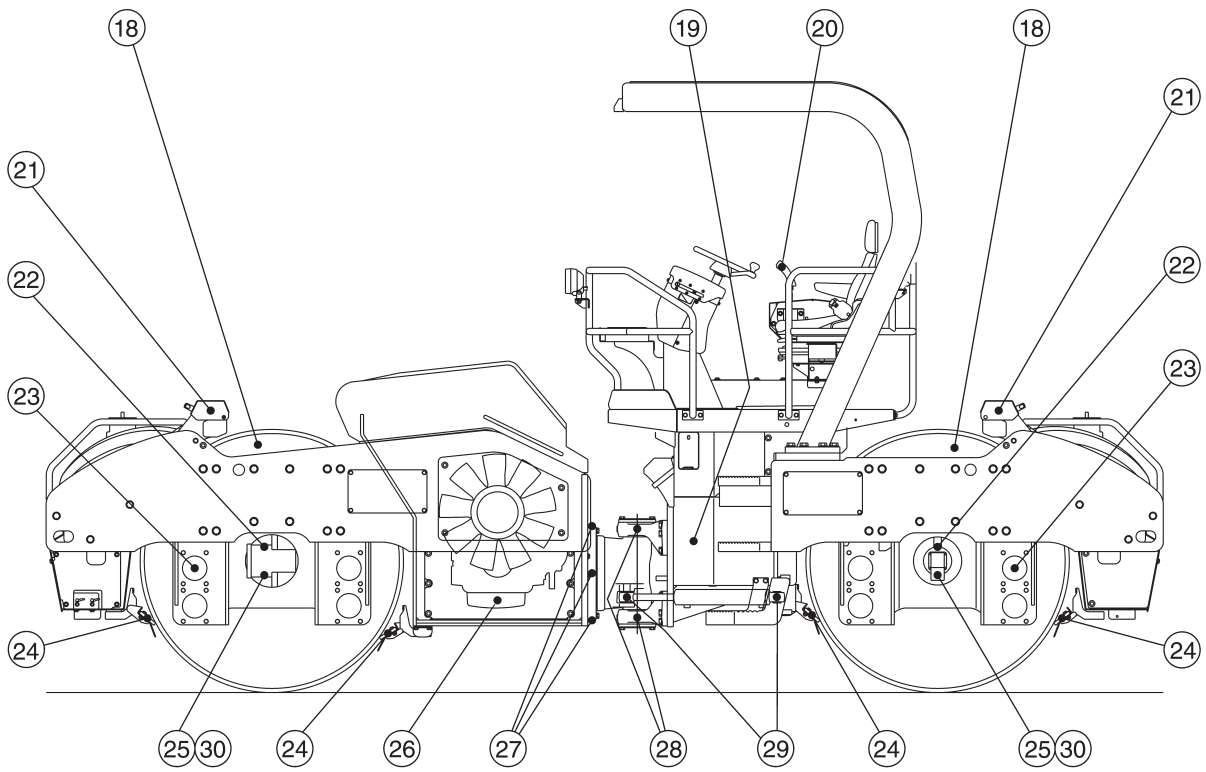
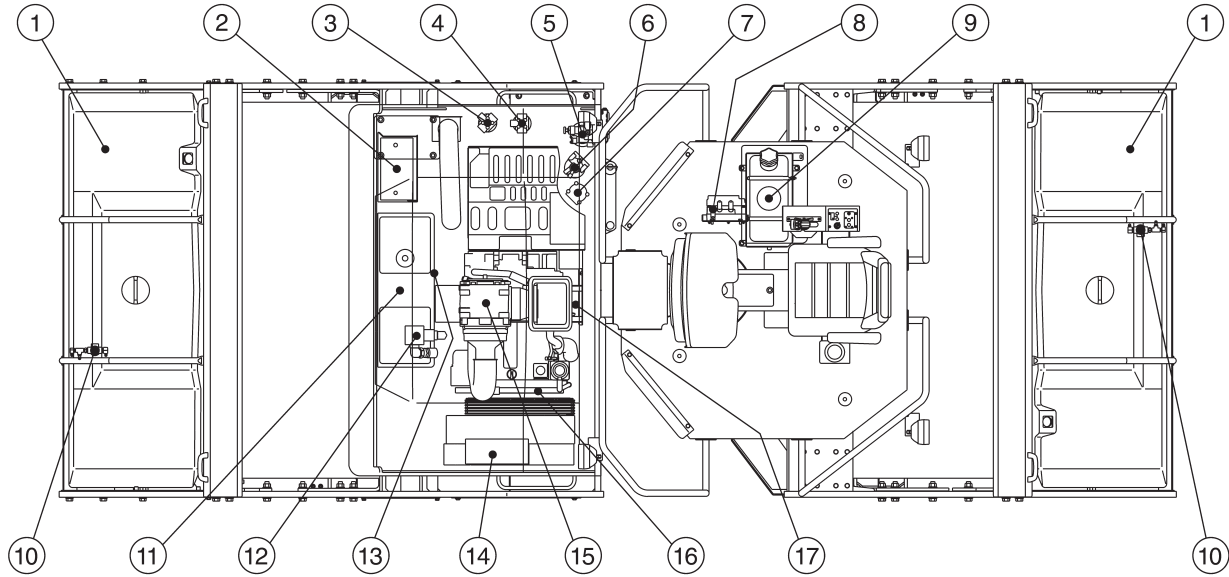
Daily walk-around inspection is important for efficient operation of this machine. Therefore, perform walk-around inspection and look for loose bolts, nuts and signs of leakage in addition to the following before using this machine each day.





### 3 PERIODIC MAINTENANCE

#### 3.3 Periodic Maintenance Points



### 3 PERIODIC MAINTENANCE

Interval	No	Item	Service	Lubricant	Q'ty
Every 10 service hours or daily	⑤	Fuel prefilter	Check, drain water and dirt		1
	⑭	Auxiliary tank	Check coolant level	Coolant	1
	⑮	Air cleaner	Check indicator		1
	⑯	Fan belt	Check tension and unusual wear		1
	⑰	Engine oil level gauge	Check oil level	Engine oil	1
Initial 50 hours	⑦	Engine oil filter	Change filter element		1
	⑳	Engine oil pan	Change engine oil	Engine oil	1
Every 50 service hours	②	Battery	Check looseness of terminal and appearance	Battery fluid	1
	⑩	Sprinkler filter	Clean filter element		2
	⑬	Hydraulic oil level gauge	Check oil level	Hydraulic oil	1
Every 250 service hours	⑦	Engine oil filter	Change filter element		1
	⑱	Vibrator	Check oil level	Gear oil	2
	㉑	Sprinkler pipe	Clean inside pipe		4
	㉓	Rubber dampers	Check for cracks		24
	⑳	Engine oil pan	Change engine oil	Engine oil	1
Every 500 service hours	③	Hydraulic oil pump filter	Change filter element*		1
	④	Hydraulic oil line filter	Change filter element*		1
	㉒	Control links	Check looseness and adjust		1
	㉔	Tilt pin bearing	Grease 4 fittings	Grease	4
	㉕	Center pin bearing	Grease 2 fittings	Grease	2
	㉖	Cylinder head and anchor pins	Grease 4 fittings	Grease	4
Every 500 hours or 3 months, or each time after brake pedal is used	⑳	Parking brake	Check function		2
Every 1000 service hours	⑤	Fuel prefilter	Change filter element		1
	⑥	Fuel filter	Change filter element		1
	⑪	Hydraulic oil tank	Change hydraulic oil	Hydraulic oil	1
	⑫	Hydraulic oil suction filter	Clean filter element		1
	⑱	Vibrator	Change gear oil	Gear oil	2
	㉒	Gear case (Wheel Motor)	Change gear oil	Gear oil	2
	㉕	Brake	Check brake disk thickness		-
Every 4000 service hours	⑧	DEF pump filter	Change filter element		1
As needed	①	Water sprinkler tank	Clean inside tank		2
	⑨	DEF tank	Check DEF level, add as necessary	DEF	1
	⑮	Air cleaner	Change element		1
	⑲	Fuel tank	Drain water and dirt		1
	㉔	Scrapers	Adjust and clean		4

#### NOTICE

**\*For Nos. 3 and 4 above, follow the instructions above and change the filter element when the monitor lamp lights up.**

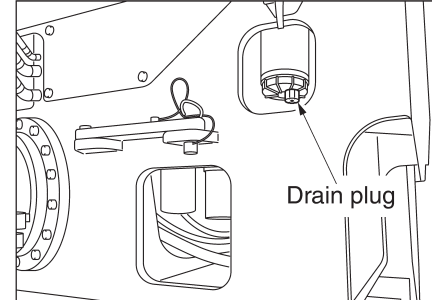
### 3.4 Maintenance Procedure

➔ For servicing the engine, see the separate engine manual.

#### (1) Every 10 service hours or daily

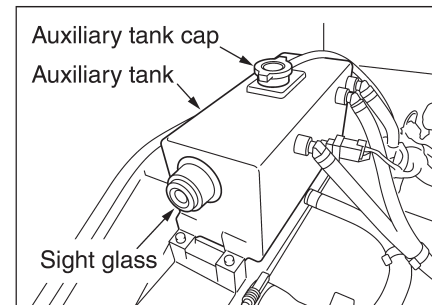
##### ⑤ Fuel prefilter

Check the bottom of the filter is filled with water. If it is filled with water, remove the Drain plug at the bottom to drain water.



##### ⑭ Auxiliary tank

Check the coolant level in the sight glass. If the coolant can not be seen, open the Auxiliary tank cap and replenish.  
Use soft water only.



#### ⚠ WARNING

- Do not remove the Auxiliary tank cap while the coolant is hot.
- Hot water may spurt out and cause burns. When the water temperature drops, slowly turn the cap to release the pressure and remove the Auxiliary tank cap.

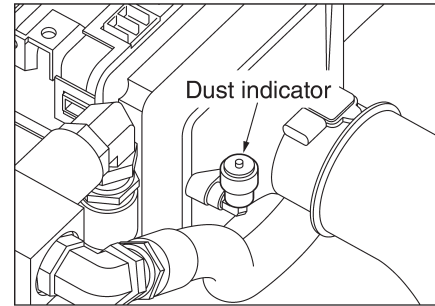


#### NOTICE

- Failure to follow this procedure can result in severe engine damage.  
Fill : 1) Fill the coolant at 3 gallons per minute (12 liters per minute) until the coolant reaches the lower part of the filler port. Wait for 1 minute, then top up the coolant up to the lower part of the filler port if needed.  
2) Start the engine and run at ECO speed for 1 minute or until the Engine warning lamp turns on.  
3) Turn off the engine and top up the coolant up to the lower part of the filler port if needed.  
4) Refit the Auxiliary tank cap.
- Replace the long-life coolant every two years. Replace the other types every year.

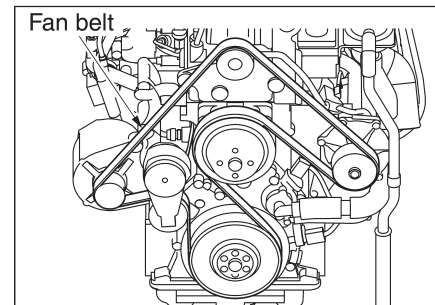
**15 Air Cleaner**

When the red float of the Dust indicator reaches the service level (a mark on the indicator), clean the element (refer to “(9) As needed”).

**16 Fan belt**

➔ See the separate engine manual.

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

**⚠ WARNING**

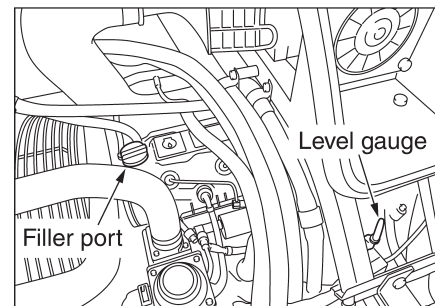
**Make sure the engine is completely stopped to avoid any risks when checking the looseness, tension or damages of the fan belt.**

**Also make sure that the Starter switch key is removed from the Starter switch.**

**17 Engine oil level gauge**

➔ See the separate engine manual.

Stop the engine and check the engine oil level. Pull out the oil level gauge and wipe off the oil. Then insert into the full length of the oil dip pipe again and pull it out. Check that the oil level is between MAX and MIN. In case of shortage, add oil through the engine oil Filler port.

**⚠ WARNING**

**The engine, engine oil and the engine parts are hot and may cause burn immediately after the engine is stopped. Please wait until the temperature is dropped before inspecting.**

**NOTICE**

**When checking the amount of oil after running the engine, please check at least 15 minutes after the engine is stopped. If the machine is inclined, please move it to a flat ground before checking the oil level.**

### 3 PERIODIC MAINTENANCE

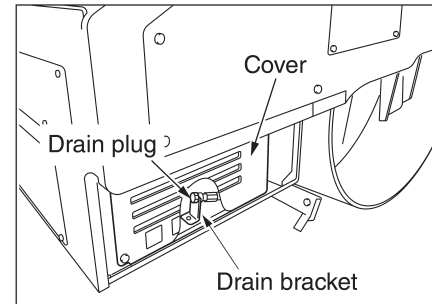
#### (2) Initial 50 hours

⑦ Engine oil filter

⑳ Engine oil pan

➔ See the separate engine manual.

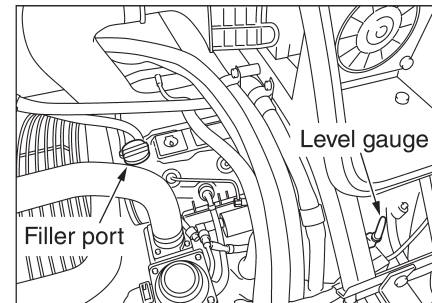
- 1) Remove the Cover. Remove the Drain plug from the Drain bracket.
- 2) Remove the Drain plug and drain the oil while the it is warm after operation.



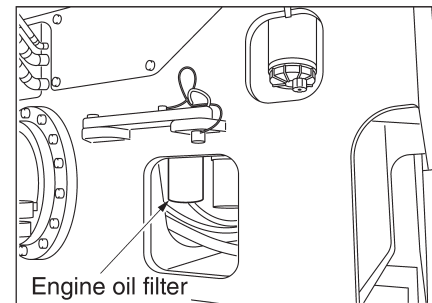
#### ⚠ WARNING

Be careful not to get burned when draining warm oil.

- 3) Refit the Drain plug and fill the crankcase with the engine oil from the Filler port.



- 4) Change the Engine oil filter element.



#### NOTICE

- Be sure to use the engine oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).
- For a new machine, change the oil at 50 operating hours for the initial time only.

**(3) Every 50 service hours****② Battery**

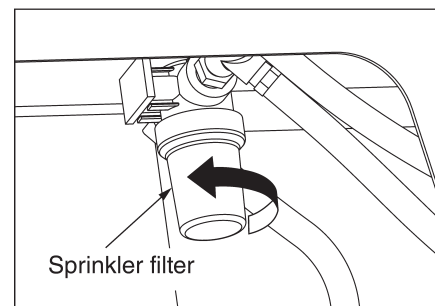
- 1) If the terminals are loose, tighten the terminals and apply a thin coat of petroleum jelly or grease to prevent rust.
- 2) Make sure that the surface of the battery is normal.
- 3) Be sure to tighten the battery holder if it is loose.

**NOTICE**

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

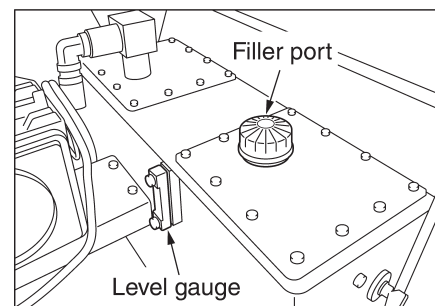
**⑩ Sprinkler filter**

Take off the filter bowl by turning counterclockwise as viewed from the bottom. Clean the element.

**⑬ Hydraulic oil level gauge**

Check the oil level with the Level gauge on the side of the tank. The level is proper if it is between the H and L marks.

If necessary, add hydraulic oil from the Filler port.

**NOTICE**

**Be sure to use the hydraulic oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).**

### 3 PERIODIC MAINTENANCE

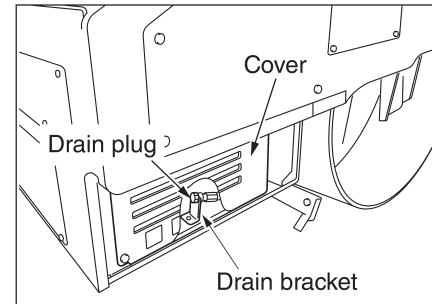
#### (4) Every 250 service hours

⑦ Engine oil filter

⑳ Engine oil pan

➔ See the separate engine manual.

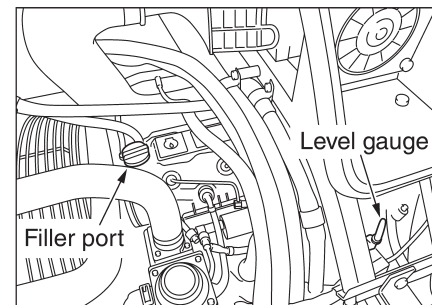
- 1) Remove the Cover. Remove the Drain plug from the Drain bracket.
- 2) Remove the Drain plug and drain the oil while the it is warm after operation.



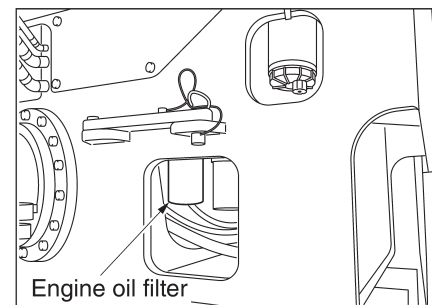
#### **⚠ WARNING**

**Be careful not to get burned when draining warm oil.**

- 3) Refit the Drain plug and fill the crankcase with the engine oil from the Filler port.



- 4) Change the Engine oil filter element.



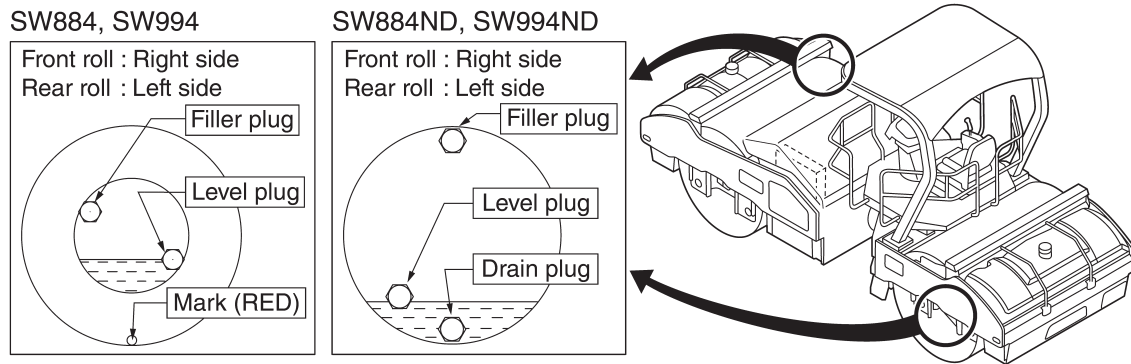
#### **NOTICE**

- Be sure to use the engine oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).
- For a new machine, change the oil at 50 operating hours for the initial time only.

**18 Vibrator**

Check for oil leaks and follow the steps below to check the gear oil level.  
Add gear oil as needed.

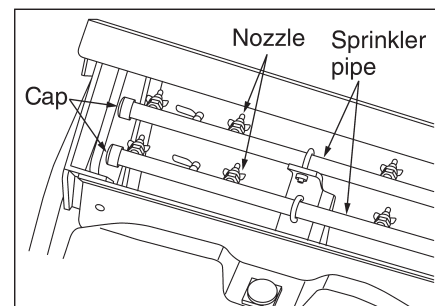
- 1) Rotate the drum until the Mark (for SW884, SW994) or the Drain plug (for SW884ND, SW994ND) is at the bottom.
- 2) Remove the Level plug and check the oil level.  
If it is not necessary to supply oil, clean the Level plug and reinstall it.  
If it is necessary to supply oil, continue with the following steps.
- 3) Remove the Filler plug and supply oil from the Filler plug port until the oil comes out from the Level plug port.
- 4) Clean the Level plug and the Filler plug and reinstall them.

**NOTICE**

**Be sure to use the gear oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).**

**21 Sprinkler pipe**

- 1) Sprinkler pipe  
Remove the Cap from both ends of each Sprinkler pipe.  
Operate the water pump to wash away the dust inside the pipe.
- 2) Nozzle
  - Remove the Nozzles from the Sprinkler pipe and separate the filter from each Nozzle.
  - Clean the filters. Use a needle or the like to clean the Nozzle hole. Refit the filters to the Nozzles.
  - Refit the Nozzles to the Sprinkler pipes so that the water is sprayed parallel to the pipes in the form of a hand fan.

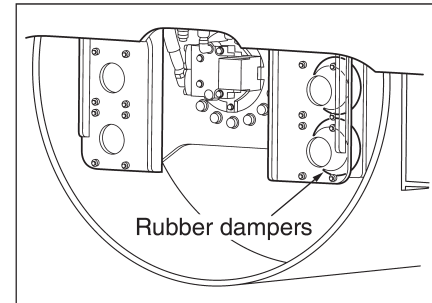




### 3 PERIODIC MAINTENANCE

#### ②③ Rubber dampers

Check the Rubber dampers for cracks, and their mounting bolts for looseness.

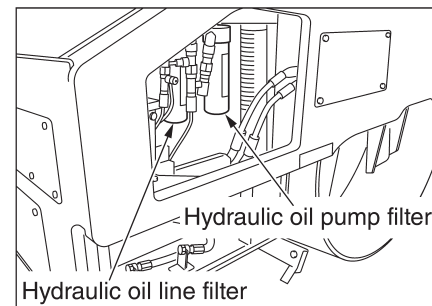


#### (5) Every 500 service hours

#### ③ Hydraulic oil pump filter

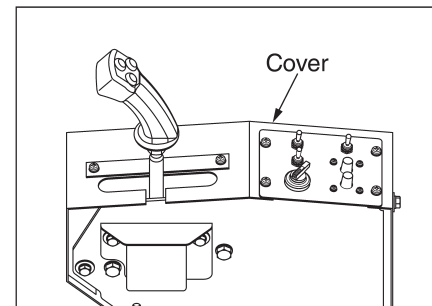
#### ④ Hydraulic oil line filter

Change the filter elements.



#### ②④ Control links

Remove the Cover.  
Check the bolts and nuts for looseness.

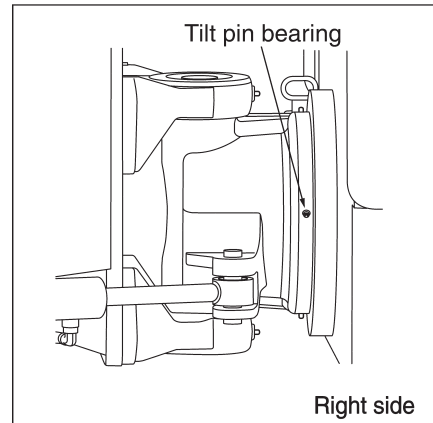
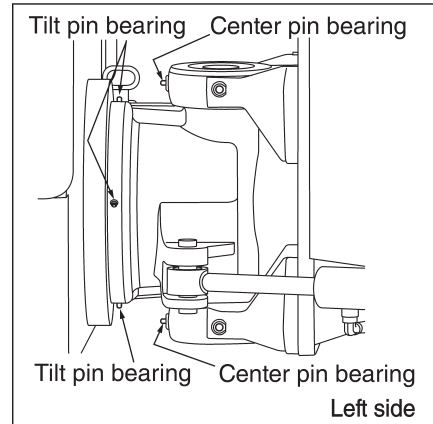


27 **Tilt pin bearing**

28 **Center pin bearing**

Apply grease to 6 locations.

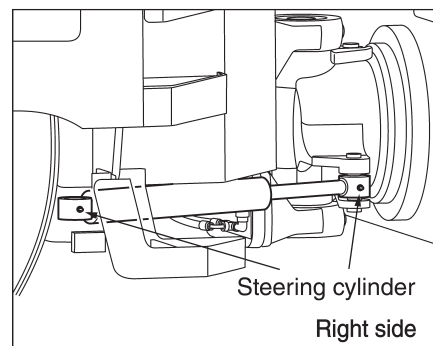
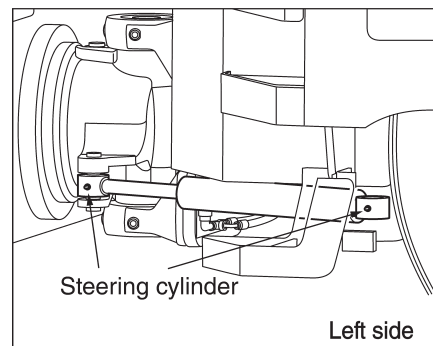
There are four locations on the left, right, top and bottom of the Tilt pin bearing, and two locations on the Center pin bearings.



29 **Cylinder head and anchor pins**

Apply grease to 4 locations.

The Steering cylinders are on both sides of the machine.



### 3 PERIODIC MAINTENANCE

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

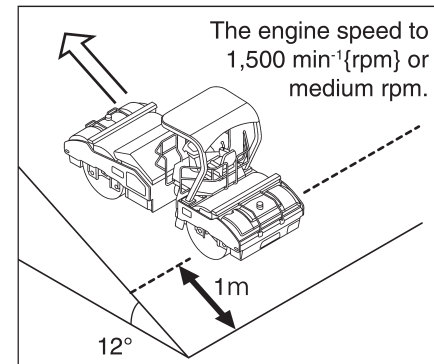
##### ③⑩ Parking brake

#### ⚠ WARNING

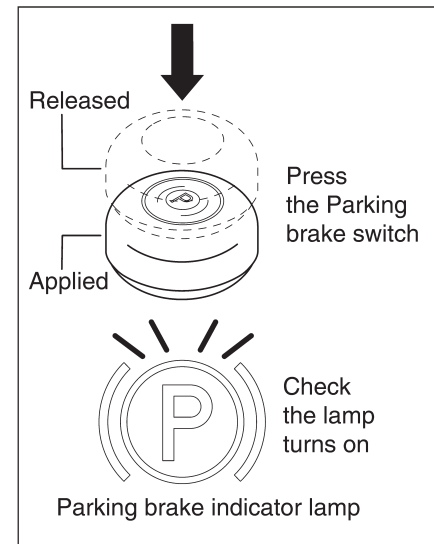
- Make sure there are no people or obstacles near the machine to ensure safety.
- Keep your hands on the F-N-R lever and the Steering wheel during this inspection. The machine may move unexpectedly during the inspection, which may lead to accidents.

1) Adjust the engine speed to  $1,500 \text{ min}^{-1}$  {rpm} or medium rpm.

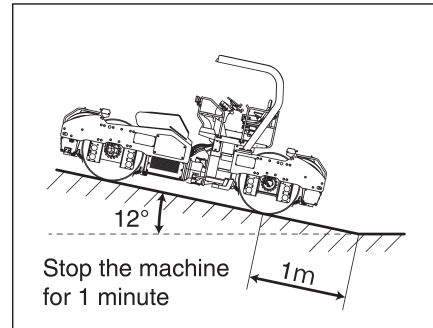
2) With the engine running, move the machine upward by  $12^\circ$  (20%) (slope with upward inclination of  $12^\circ$ ) on a hard surface such as asphalt pavement.



3) Press the Parking brake switch (P) to engage the parking brake. Check that the Parking brake indicator lamp (P) turns on.  
If the lamp (P) does not turn on, contact your dealer.



- 4) Remain seated to make sure the machine remains completely still for 1 minute. If it moves, move it immediately to a flat ground, stop using it, contact your dealer, and have it repaired.



**⚠ WARNING**

- **This inspection should be performed each time the Brake pedal is used. If not inspected, the parking brake may malfunction the next time when you try to use it, resulting in a serious accident.**
- **Modify the machine.**  
**Please do not modify the machine without the permission for safety reasons. We are not responsible for injuries, death or breakdowns caused by the modifications.**

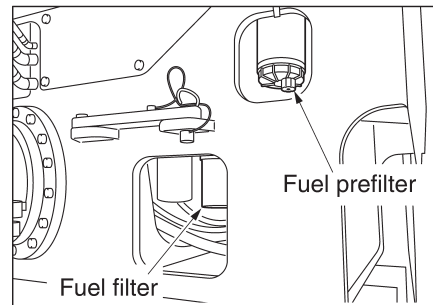
**(7) Every 1,000 service hours**

⑤ **Fuel prefilter**

⑥ **Fuel filter**

➔ **See the separate engine manual.**

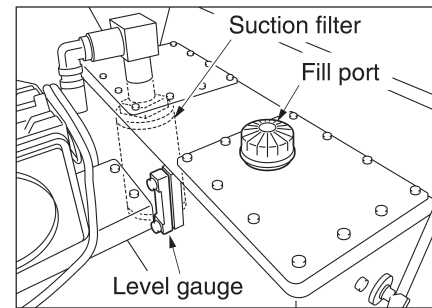
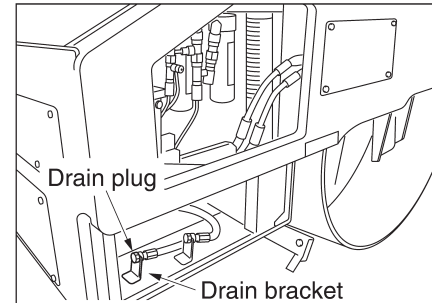
Change the Fuel filter element and the Fuel prefilter element.



### 3 PERIODIC MAINTENANCE

#### ⑪ Hydraulic oil tank

- 1) Remove the Drain plug, and drain oil while it is warm.
- 2) Clean inside of the tank, and fill it with fresh oil to the specified level.
- 3) Start the engine and run at idling for 2 to 5 minutes. When the bubbles in the hydraulic oil are gone, stop the engine and recheck the oil level.



#### **⚠ WARNING**

Be careful not to get burned when draining warm oil.

#### NOTICE

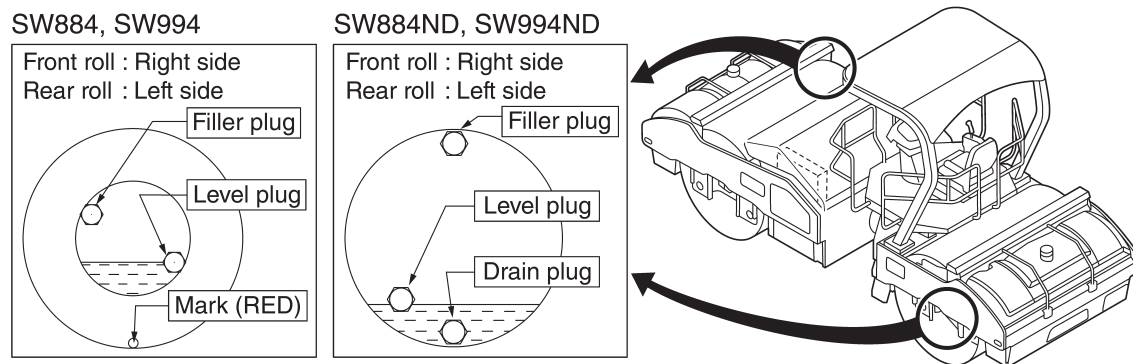
Be sure to use the hydraulic oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).

#### ⑫ Hydraulic oil suction filter

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

**18 Vibrator**

- 1) Rotate the drum until the Level plug (for SW884, SW994) or the Drain plug (for SW884ND, SW994ND) is at the bottom.
- 2) Remove the Filler plug and Level plug.  
Also remove the Drain plug (for SW884ND, SW994ND).
- 3) Drain the oil from the vibrator.
- 4) Rotate the drum until the Mark comes to the bottom (for SW884, SW994).  
Reinstall the Drain plug after cleaning it. (for SW884ND, SW994ND).
- 5) Supply oil from the Filler plug port until oil flows out from the Level plug port.
- 6) Clean the Level plug and the Filler plug and reinstall them.


**⚠ WARNING**

Be careful not to get burned when draining warm oil.

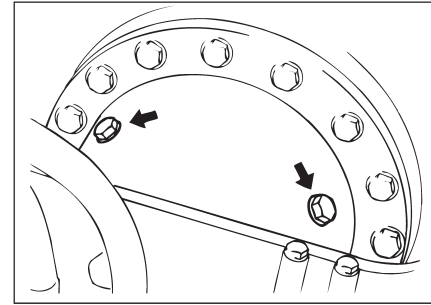
**NOTICE**

- The oil capacity of the vibrator is 22 liters for the SW884 and SW994, and 75 liters for the SW884ND and SW994ND. Never add more oil than the specified amount.
- Be sure to use the gear oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).

### 3 PERIODIC MAINTENANCE

#### ② Gear case (Wheel motor)

- 1) Move the machine so that one of the two plugs is positioned directly below.
- 2) While the oil is warm, drain the oil with the drain plug and the level plug removed.
- 3) Rotate the roll slowly so that drain port is on the top (or side) and the level plug is on the side (or top). Supply oil until it overflows from the level port.
- 4) Refit the drain plug and the level plug.



#### ⚠ WARNING

Be careful not to get burned when draining warm oil.

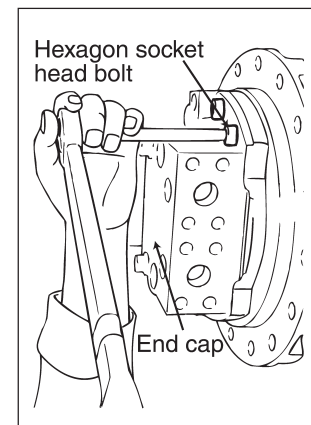
#### NOTICE

Be sure to use the gear oil recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).

#### ② Brake

- 1) Loosen the Hexagon socket head bolts (6 bolts) that fixed the End cap.  
Loosen them uniformly because the brake spring tends to push the End cap.

Bolt size	M16 x 50L
Hexagon socket head across flats	14



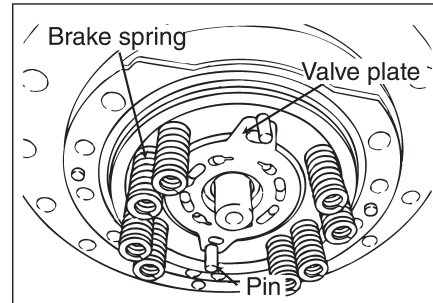
#### ⚠ CAUTION

Be careful when handling the End cap so as not to damage the sealing surface. Even the slightest damage can cause oil leak.

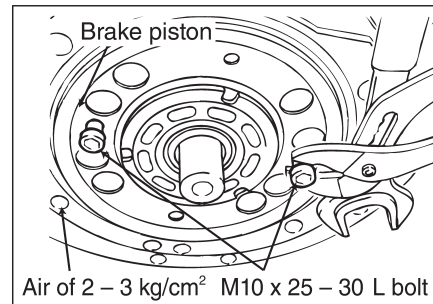
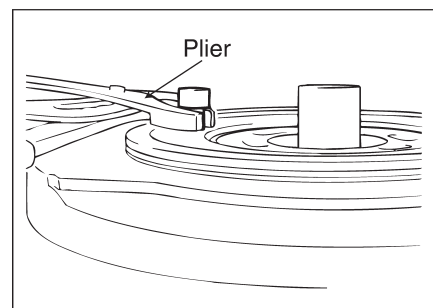
2) Remove the following parts which will be exposed after removing the End cap.

Item	Quantity
Valve plate	1
Brake spring	8
Pin	2
O-Ring (Large)	1
O-Ring (Small)	1

It is recommended replace the O-Rings with new ones.

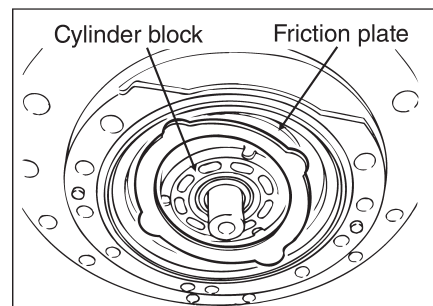


3) If you blow compressed air of 2 – 3 kg/cm<sup>2</sup> into the hole shown in sketch, the Brake piston will come up (Have the opposite side hole plugged).  
Or, screw M10 x 25 – 30 L bolts into the two tapped holes of the Brake piston, and lift it alternately using a wrench or the like as fulcrum point.



4) Take out the separate and Friction plates. Bent-end wire makes it easier to remove them.

Item	Quantity
Separate plate	4
Friction plate	3



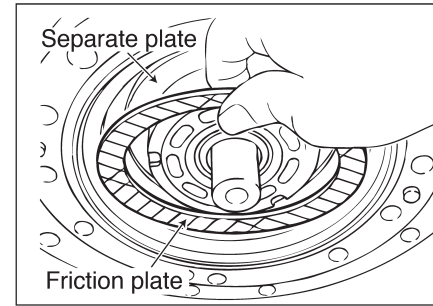
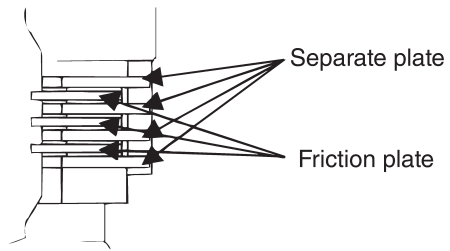
**NOTICE**

**Do not pull out the Cylinder block. Pulling it out at this stage makes it impossible to reassemble.**

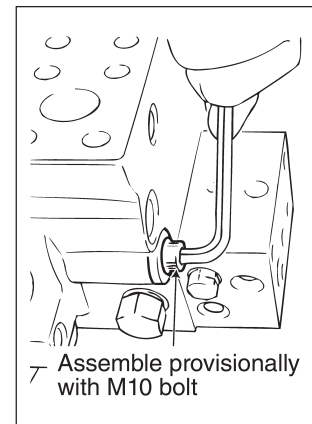
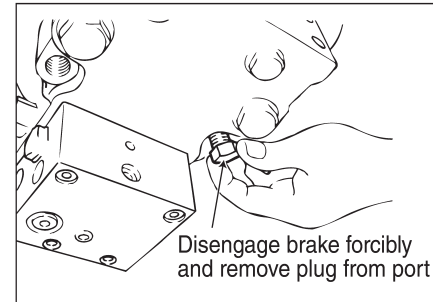
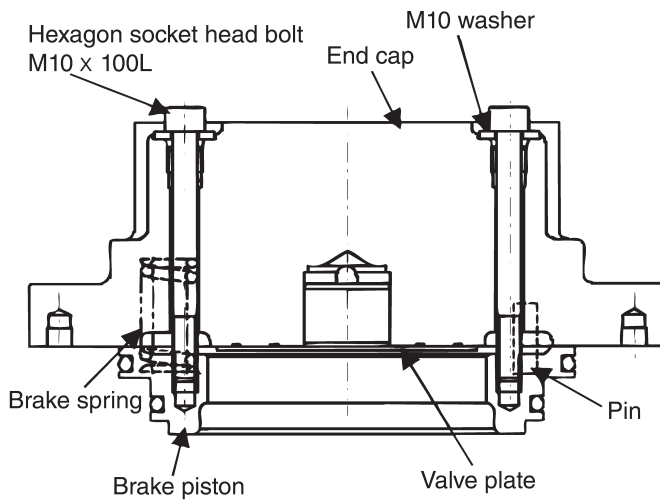


### 3 PERIODIC MAINTENANCE

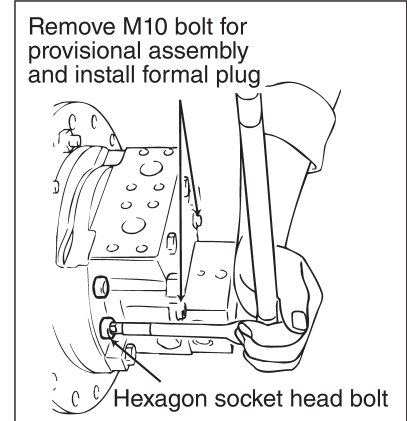
5) Install Separate plate and Friction plate alternately. Be careful to install them in the correct quantity and order.



6) Remove the brake releasing port plug (19 across flats) from the End cap. Assemble temporary with M10 bolts so that the Brake springs, Valve plates and Pins are held between the End cap and the Brake piston (provisional assembly).

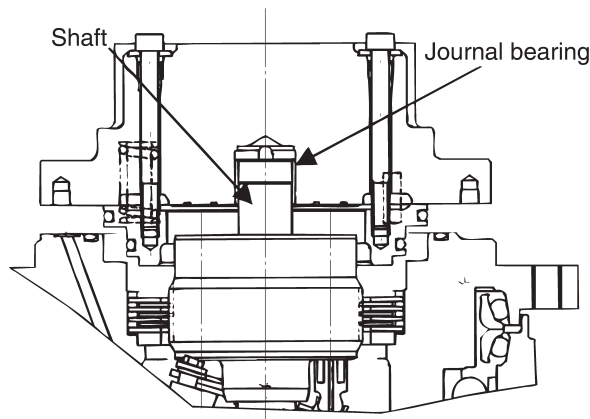


7) Tighten this temporary sub-assembled End cap to the housing with Hexagon socket head bolt.



**NOTICE**

Install as straightly as possible so that the Shaft end does not damage the Journal bearing that is press-fitted into the End cap.



< Tightening torque for the Hexagon socket head bolt >

Bolt size	M16 x 50 L
Tightening torque	170 – 214 ft lb

< Tightening torque for the Hexagon socket head bolt >

Plug size	9 / 16 – 18 UNF
Tightening torque	20 – 35 ft lb

### 3 PERIODIC MAINTENANCE

#### List of replacement parts

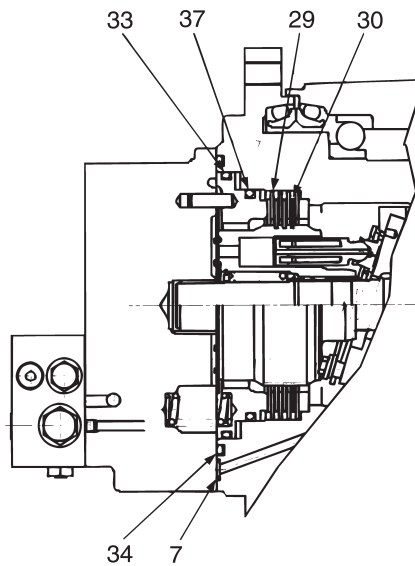
In addition to the Friction and Separate plates, it is recommended to replace the relevant O-Rings with new ones.

No.	Item	Quantity	Drawing # (DAIKIN Dwg.# (Standard JIS Nominal)
			BMV75, BM75
7	O-Ring	4 (2)	KP1B010A / 1BP10A
29	Separate plate	4	1731874
30	Friction plate	3	SP1051
33	O-Ring	1	KG1B185 / 1BG185
34	O-Ring	1	SP1092 / WG45
37	O-Ring	1	KG1B160 / 1BG160

#### NOTICE

**Quantity for No.7 O-ring : 4 for BMV75 and 2 for BM75.**

**The BMV series is used two more than the BM series as a seal for the second speed selection passage.**



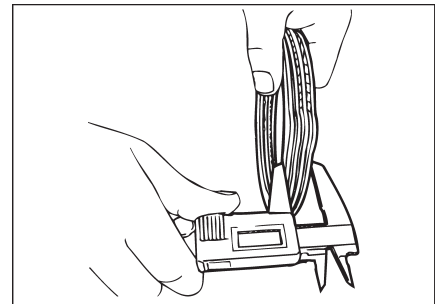
If any of the following occur, replace all the Friction and Separate plates even if the machine has not been operated for 1,000 hours.

- 1) When the braking force becomes weaker than the driving force of the hydraulic motor (Despite the brake being actuated, the hydraulic motor rotates when the HST drive is engaged). Checking procedure: Press the Parking brake switch, set the throttle to full and move the F-N-R lever to the Reverse position. If traveling starts, replace the plates.
- 2) When the total thickness of the friction and Separate plates is less than the values in the chart below.

Standard dimensions		
Separate plate	4 plates:	2.3 (per plate)
Friction plate	3 plates:	3.3 (per plate)
Total thickness		
Standard total thickness for replacement		18.5

Thickness of the Separate and Friction plates for SW884, SW884ND, SW994 and SW994ND is same.

- Checking procedure: Disassemble and measure the plate thickness after every 500 hours of operation in accordance with the instructions given earlier.



### (8) Every 4,000 service hours

#### ⑧ DEF pump filter

- ➔ Refer to “3.5.1 Changing the DEF pump filter”.

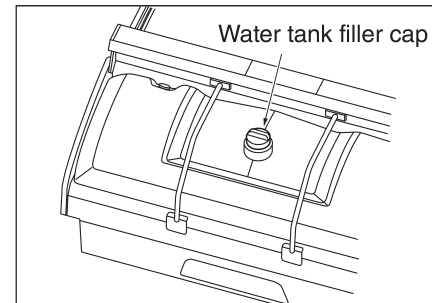
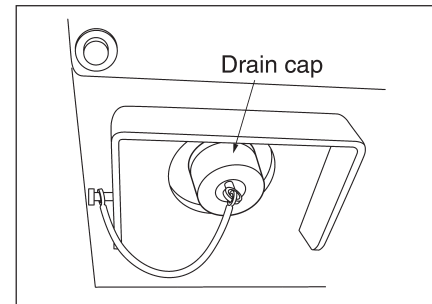
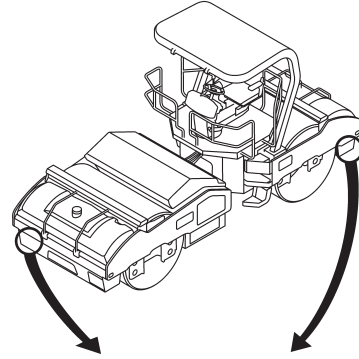
Change the DEF pump filter element.

### 3 PERIODIC MAINTENANCE

#### (9) As needed

##### ① Water tank

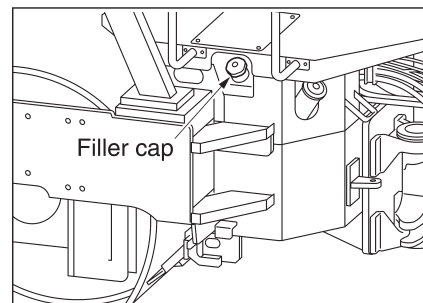
- 1) With the Drain cap removed, remove the water and sediment from the bottom of the tank.
- 2) If sedimentation is substantial, remove the drain plug and clean the inside of the tank.
- 3) When the necessary work is complete, refit the Drain cap and the Water tank filler cap.



**⑨ DEF tank**

Check the DEF level.

If level is insufficient, remove the Filler cap and fill the tank through the filler port.

**⚠ WARNING**

- **Touching DEF may cause skin irritation, so it is necessary to take off clothes and shoes contaminated with DEF and wash with cold or warm water. Seek medical help immediately if you experience any pain or changes in appearance.**
- **If the DEF is accidentally swallowed, rinse your mouth well with water, and seek medical help immediately.**
- **If the DEF gets in your eyes, rinse immediately with clean water for few minutes and seek medical help immediately.**
- **Wear protective glasses when there is a risk of the DEF splattering. Wear rubber gloves if you need or may need to touch the DEF during work.**
- **Do not put anything other than DEF into the DEF tank. In particular, diesel, gasoline, etc., can cause a fire. In addition, putting additives to the tank can generate toxic gases.**
- **Opening the DEF tank cap may release toxic ammonia gas. When opening the cap or filling the tank, keep your face away from the filler port.**
- **If DEF spills, wipe it off immediately and wash with water. Failure to do this can result in the release of toxic gases and corrosive substances.**

**NOTICE**

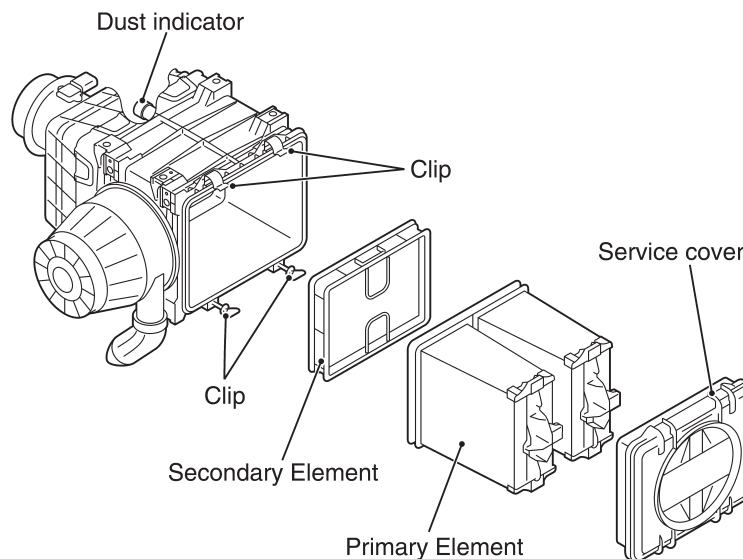
**Be sure to use the DEF recommended by SAKAI (refer to “3.6 Fluid and Lubricant Capacities”).**

### 3 PERIODIC MAINTENANCE

#### 15 Air cleaner

When the red float of the Dust indicator reaches the service level (a mark on the indicator), change the element as described below.

- 1) Open the Service cover clips to remove the Primary element from the main filter housing.
- 2) Primary element  
Grasp the handle in the center of the element and pull the filter element outward.  
Clean the inside of the housing with a damp cloth to remove any dust.



- 3) Secondary element

#### ⚠ CAUTION

To prevent dust from getting into your eyes and nose, wear protective equipment such as protective goggles and dust respirators before cleaning the air cleaner or outer element.

#### NOTICE

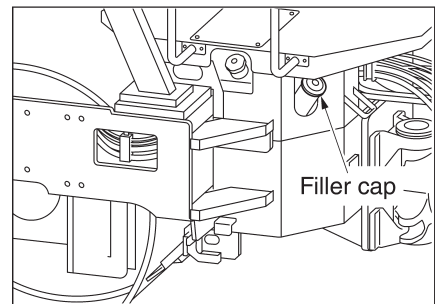
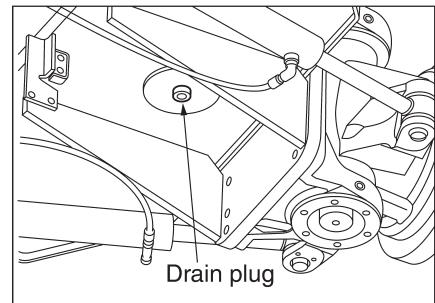
- Stop the engine before inspection, cleaning, or maintenance. Failure to do so will allow dust to enter the engine and cause engine failures.
- Be sure to use genuine SAKAI replacement elements.
- Be careful when removing the Secondary element. Any loose debris can fall into the air intake piping that connects directly to the engine. Clean the area around the Secondary element and replace the Secondary element immediately to avoid ingesting engine contamination.
- Do not clean the filter elements. Cleaning the filter elements with impact or compressed air voids the warranty and can degrade or damage the filter media and cause malfunction.

- The Secondary element should be replaced with a new one once every three replacements of the Primary element. If the Primary element is damaged, the Secondary element should be inspected and replaced if necessary. The Secondary element is removed by pulling on the plastic ring tabs on the inside of the filter element.

4) Attach the element then the Service cover with Clips.

#### 19 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 inside of the tank.
- 3) After completing the necessary work and refueling, tighten the Filler cap securely.



#### ⚠ WARNING

- The fuel will ignite if open flames or ignition sources are used close to it.
- When removing the water or sediment from a tank filled with fuel, the fuel will gush out when the Drain plug is fully screwed out.



#### 24 Scrapers

When the blade is worn, adjust the scraper properly. Refer to “2.3.2 Scraper adjustment and replacement” for adjustment. If the clearance is beyond the adjustable range, replace the blade.

#### ⚠ CAUTION

Be careful not to get your fingers caught between the drum and blade.



### 3 PERIODIC MAINTENANCE

#### 3.5 Consumable Parts

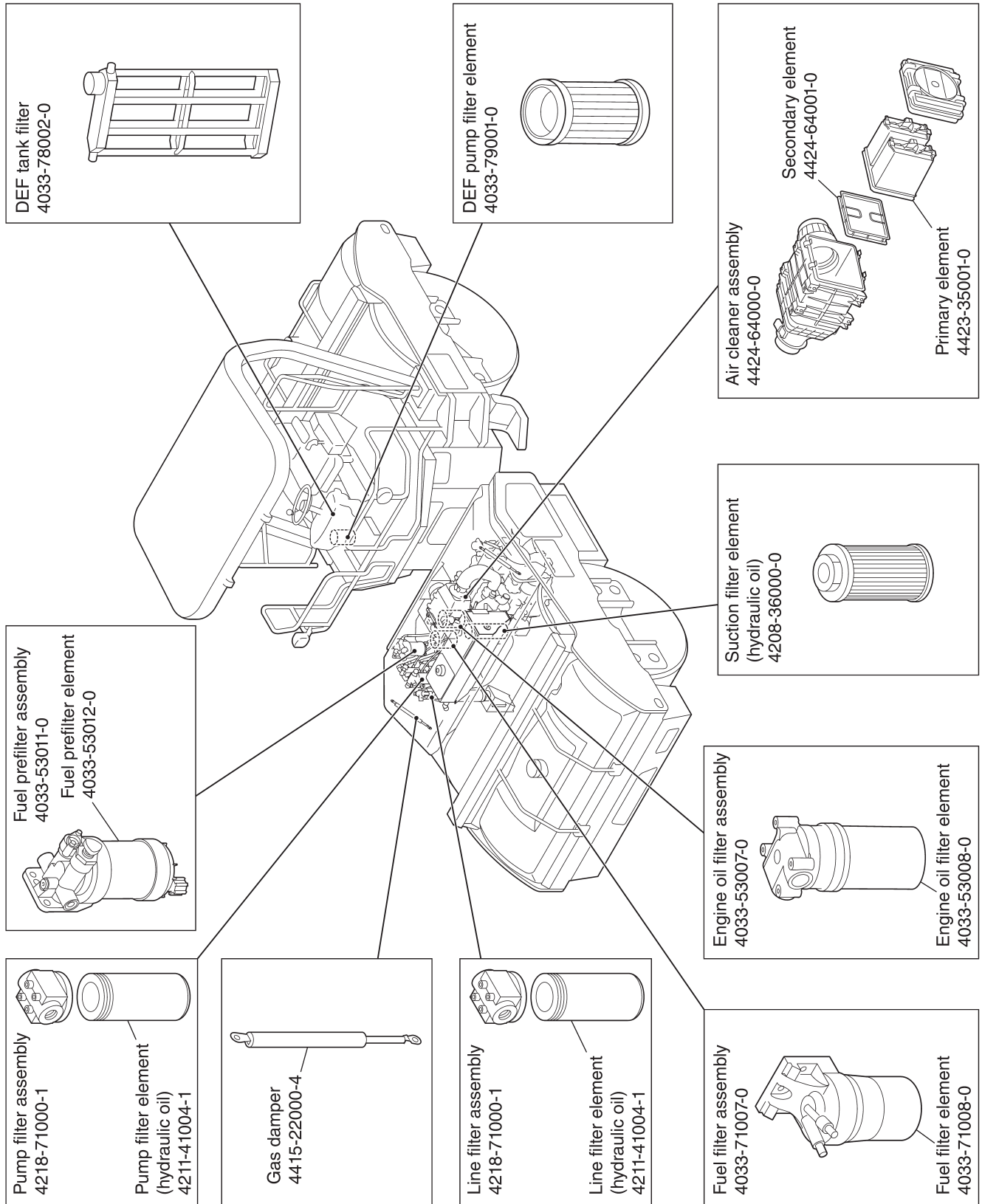
Replace consumable parts such as filter elements and air cleaner elements during the periodical maintenance or before reaching the wear limit. Proper replacement of consumable parts extends the overall life of the machine and enables cost-effective operations.

Use genuine SAKAI parts as replacement parts.

The part numbers are subject to change due to part improvements.

When ordering parts, make sure to obtain the latest part numbers by checking with your dealer of the version, model name and model number of the machine you are using.

Consumable Part	Part No.	Interval		Remark
		Annual replacement (year)	Replacement per operation (hours)	
Engine oil filter element	4033-53008-0	0.25	250	
Line filter assembly	4218-71000-1		As needed	
Line filter element (hydraulic oil)	4211-41004-1		500	
Pump filter assembly	4218-71000-1		As needed	
Pump filter element (hydraulic oil)	4211-41004-1		500	
Fuel prefilter assembly	4033-53011-0		As needed	
Fuel prefilter element	4033-53012-0	1.0	1,000	
Fuel filter assembly	4033-71007-0		As needed	
Fuel filter element	4033-71008-0	1.0	1,000	
Suction filter element (hydraulic oil)	4208-36000-0		1,000	
DEF pump filter element	4033-79001-0		4,000	
DEF tank filter	4033-78002-0		As needed	
Air cleaner assembly	4424-64000-0		As needed	
Primary element	4423-35001-0		As needed	
Secondary element	4424-64001-0		As needed	Should be replaced with a new one once every three replacements of the primary element.
Gas damper	4415-22000-4	2		
Battery	4914-57000-0		As needed	



### 3 PERIODIC MAINTENANCE

#### 3.5.1 Changing the DEF pump filter

##### **⚠ WARNING**

- Touching DEF may cause skin irritation, so it is necessary to take off clothes and shoes contaminated with DEF and wash with cold or warm water. Seek medical help immediately if you experience any pain or changes in appearance.
- If the DEF is accidentally swallowed, rinse your mouth well with water, and seek medical help immediately.
- If the DEF gets in your eyes, rinse immediately with clean water for few minutes and seek medical help immediately.
- Wear protective glasses when there is a risk of the DEF splattering. Wear rubber gloves if you need or may need to touch the DEF during work.
- Do not put anything other than DEF into the DEF tank. In particular, diesel, gasoline, etc., can cause a fire. In addition, putting additives to the tank can generate toxic gases.
- Opening the DEF tank cap may release toxic ammonia gas. When opening the cap or filling the tank, keep your face away from the filler port.
- If DEF spills, wipe it off immediately and wash with water. Failure to do this can result in the release of toxic gases and corrosive substances.

##### **⚠ CAUTION**

Due to the high temperature of the pump, the filter cannot be replaced immediately after the engine is stopped. Change after everything is cooled down.

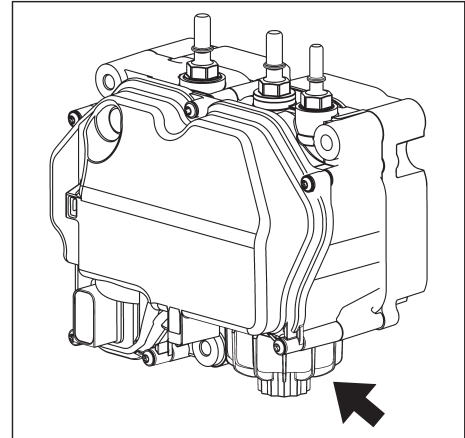
##### **NOTICE**

- Use genuine SAKAI products for replacement parts.
- Operate the machine without a DEF filter, or using non-genuine SAKAI filters may damage the DEF pump or the DEF injector due to contaminants. Never use the machine without a DEF pump filter, or a non-genuine SAKAI filter.
- The DEF pump filter cannot be cleaned. Cleaning will reduce the performance and cause failures in the DEF pump and the DEF injector. The element must never be reused.
- If the DEF pump filter is not assembled correctly, it may cause DEF leaks. Follow the correct procedures when changing the DEF pump filter.
- The DEF freezes at -11°C. Freezing makes it difficult to replace the filter. Replace the filter when the ambient temperature exceeds -11°C where the DEF does not freeze.
- Put AUS32 or ISO22241-1 certified DEF in the DEF tank. Using anything else may cause breakdowns in the DEF SCR system.
- Always replenish the DEF tank at the appropriate time.
- Always keep the area around the DEF tank cap clean and be careful not to allow contaminants to enter the DEF tank when opening the cap.
- When storing the machine for more than a month, fill the DEF tank.
- On cold days, fill the tank to the specified level.

To prevent malfunctions due to DEF freezing and the urea precipitation after the engine is stopped, the DEF system continues running automatically for several minutes after the engine is turned off to suck the DEF remaining inside the DEF injector and the DEF pump, and returns it to the tank.

Always clean the area around the DEF pump after the DEF system is stopped running, and also before changing the DEF filter.

The DEF pump filter is located at the bottom of the DEF pump.

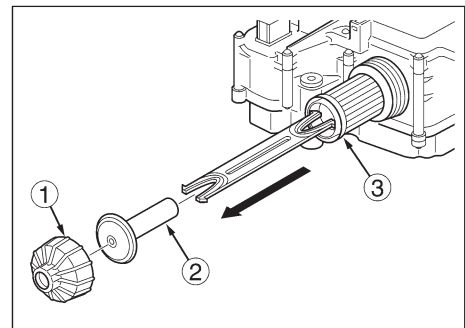


1) Unscrew the DEF filter cap ①. A 27 mm wrench can be used to remove the cap.

2) Remove the aftertreatment DEF filter equalizing element ②.

3) Remove the old aftertreatment DEF dosing unit filter element ③.

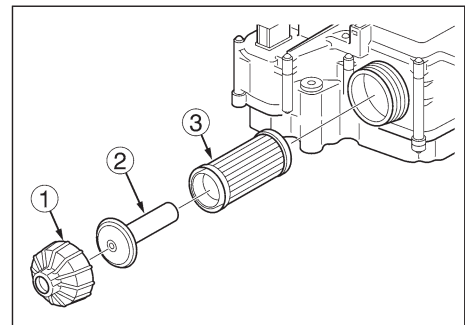
The new filter includes a disposable service tool to help you remove the oil filter. Use the appropriate end of the tool, depending on the color of the plastic on the filter. When inserting the tool, a “click” sound can be heard which indicates proper engagement with the filter.



4) Insert the DEF filter equalizing element ② into the DEF filter cartridge ③.

5) Insert the assembly into the aftertreatment DEF dosing unit.

6) Install and tighten the cap ①. A 27 mm wrench can be used to tighten the filter cap.



**Torque Value:** 20 N•m [177 in-lb]

### 3.6 Fluid and Lubricant Capacities

#### (1) General rules

- 1) Never add water or lubricant with the strainer removed.
- 2) Use the recommended lubricant and hydraulic fluid.
- 3) Do not use different brands of lubricants and hydraulic fluids.
- 4) When replacing oil, drain it completely and clean the container with flushing oil before filling it with new oil.
- 5) Be sure to use the specified type of fuel when fueling the SAKAI machines.  
Nonconformities or problems resulting from the use of fuels and lubricants other than those specified by SAKAI are not covered by our warranty.

#### (2) Capacity

Compartment	Type of fluid	Capacity in liters (gal.)
Fuel tank	Diesel oil	292 (77.1)
Engine oil pan	Engine oil	11 (2.9)
Radiator	Coolant	22 (5.8)
Hydraulic oil tank	Hydraulic oil	65 (17.2)
Gear case (Wheel motor)	Gear oil	3.6 (0.95) x 2
Vibrator (SW884, SW994)	Gear oil	22 (5.8) x 2
Vibrator (SW884ND, SW994ND)	Gear oil	75 (19.8) x 2
Water sprinkler tank	Water	600 (158.5) x 2
DEF tank	DEF	19 (5.0)

#### (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 5W-40	SAE 5W-40	SAE 5W-40	MIL-L-2104B
Gear oil	API grade GL5	SAE 80W-90	SAE 90	SAE 140	MIL-L-2105
Hydraulic oil	Anti wear	ISO-VG32 over VI 140	ISO-VG46 over VI 140	ISO-VG68 over VI 110	ISO-3448
Grease	Lithium type extreme pressure				NLGI-2
Fuel	Diesel oil				ASTM D975-2D
DEF	ISO22241-1 or AUS32				

**(4) Storing the DEF**

- Keep the DEF containers airtight, avoid direct sunlight, and store it indoors in a well ventilated place.
- To store the DEF, use the containers in which you purchased them. Do not store in other containers as this will lead to loose the quality.
- Outsource the disposal of the DEF to an industrial waste disposal company to ensure proper disposal. In addition, DEF containers are also treated as industrial waste and must be disposed of in the same way.
- The temperature requirements and storage period for DEF are as shown below:

Temperature during storage	Storage period
Below 10°C	Up to 36 months
Below 25°C	Up to 18 months
Below 30°C	Up to 12 months
Below 35°C	Up to 6 months

**(5) Recommended lubricants**

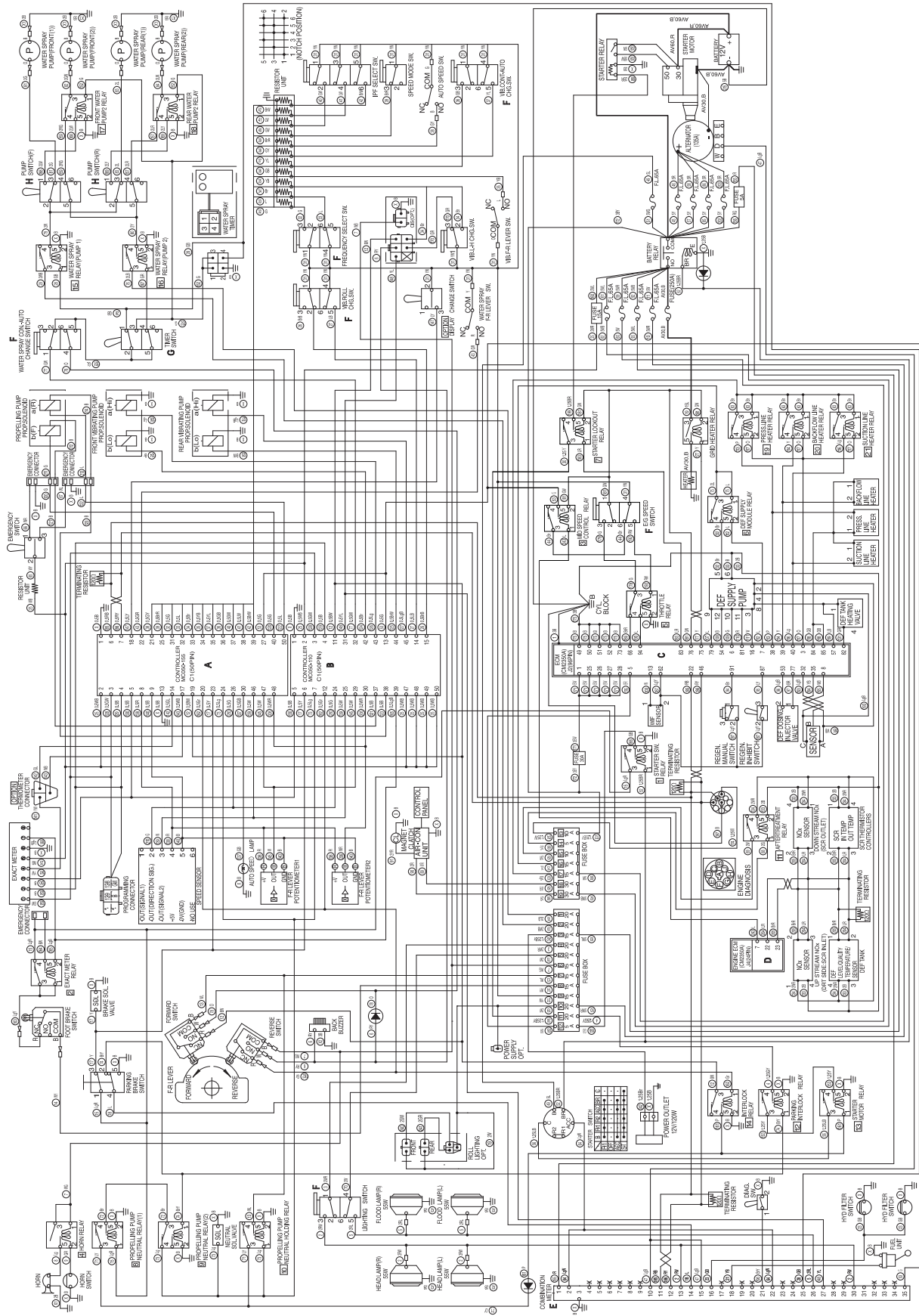
Lubricant Oil company	Engine oil AP-CJ4	Gear oil API GL 5	Hydraulic oil ISO-VG 46	Grease (NLGI-2)
CHEVRON	DELO 400 LE	RPM Universal Gear Lubricants	Rando HDZ 46	Martifak EP 2
BP	—	BP Energear HYPO-U	Bartran HV 46	BP Energrease LS-EP 2
CASTROL	Tection Extra	EXP Gear OILS	Castrol Hyspin AWH 46	Castrol 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 A90	Shell Tellus S2V 46	Shell Alvania Greases EP2

**NOTICE**

- **Fill the fluid reservoirs with the filters installed.**
- **Use recommended fuels and lubricants only.**
- **Be careful of contaminants entering fluid reservoirs when refilling them.**

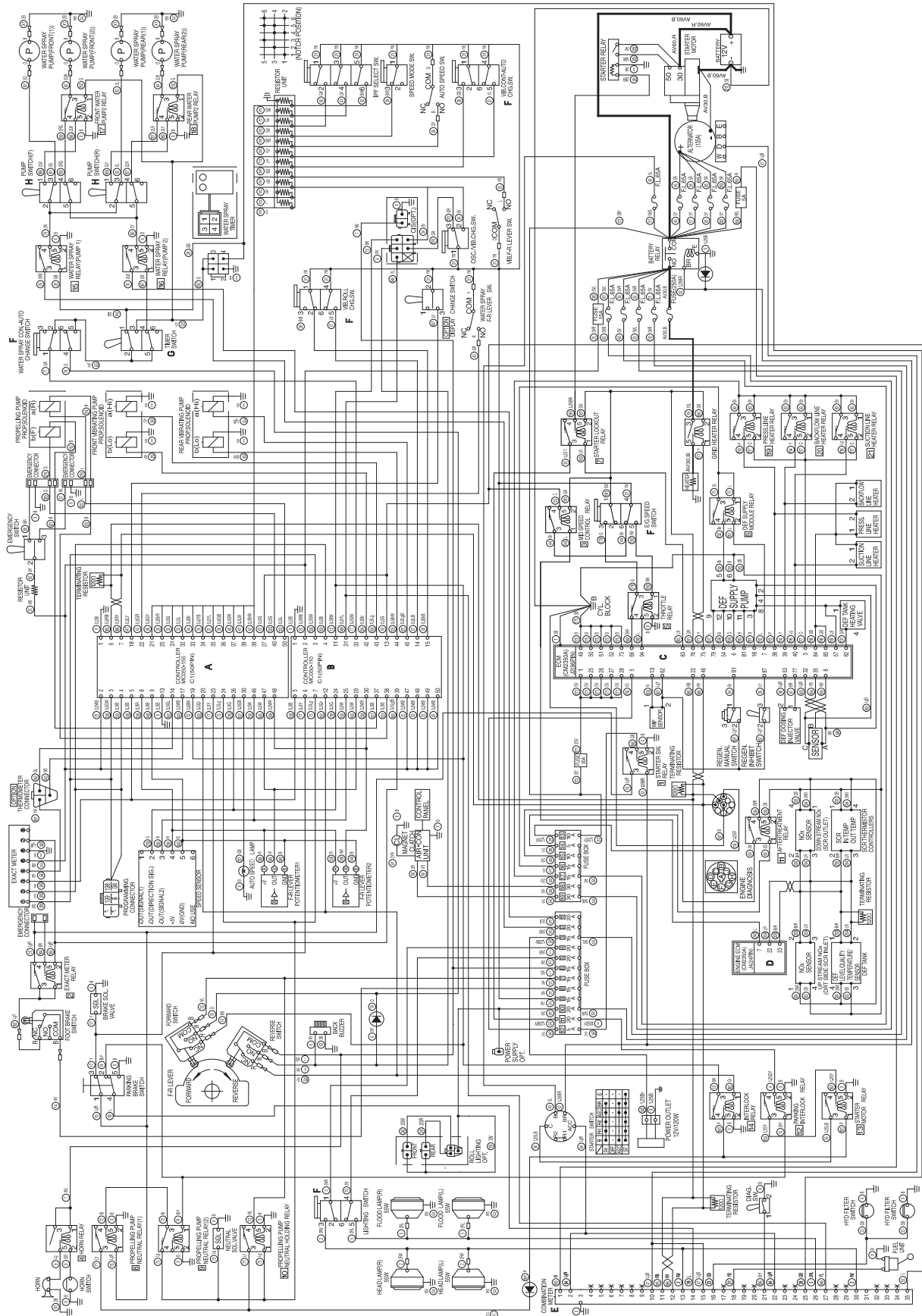
# 3 PERIODIC MAINTENANCE

## 3.7 Electric Wiring Diagram SW884, SW994





SW884ND, SW994ND





### 3 PERIODIC MAINTENANCE

COMBINATION METER

1	POWER SUPPLY(+)
2	KEY SWITCH INPUT(IGN)
3	POWER SUPPLY(-)
4	TURN SIGNAL INPUT(RIGHT)
5	ENGINE RED STOP WARNING LAMP
6	OVER HEAT LAMP
7	FUNCTION SELECT-1
8	FUNCTION SELECT-3
9	BUZZER OUTPUT
10	LAMP CHECK INPUT
11	CAN(+)
12	CAN(-)
13	HEADLIGHT LAMP(MARKER LAMP)
14	PARKING BRAKE LAMP
15	CHARGE WARNING LAMP
16	HYDRAULIC OIL FILTER WARNING LAMP
17	ENGINE MALFUNCTION LAMP
18	FUEL GAUGE INPUT
21	DTC DISPLAY INPUT
22	HOURLY METER INPUT
23	TURN SIGNAL INPUT(LEFT)
24	PREHEATING LAMP
25	WATER SPRAY LAMP
26	WORKING LAMP(FLOOD LAMP)
27	VIBRATION ACTUATION LAMP
28	LIQUID SPRAY LAMP
29	HIGH BEAM LAMP
30	BACKLIGHT
31	EXHAUST SYSTEM HIGH TEMPERATURE LAMP
32	DEF (AD BLUE)LOW LEVEL LAMP (AMBER)
33	MANUAL REGENERATION(AMBER)
34	LYS PIN
35	ECO MODE LAMP

REV RATIO SEL.  
127 PULSE/REV SET(No.7)  
TEMP CURVE SEL.  
TEMP. 50-103°C SET(No.0)

#### DETAIL E

ECM (CM2350A)  
J2(96PIN)

1	BATTERY(+)
3	DEF LINE HEATERS RELAY CONTROL
5	KEY SWITCH
6	DEF SUPPLY MODULE PUMP
7	DEF SUPPLY MODULE HEATER RELAY
8	OEM SENSOR SUPPLY
13	WATER IN FUEL SENSOR
16	DEF PRESS.SENSOR
22	J1939(+)/DATALINK 1
25	BATTERY(+)
26	BATTERY(+)
27	BATTERY(+)
28	BATTERY(+)
32	OEM SENSOR RETURN
35	COOLANT LEVEL
38	DEF HEATER1:PRESSURE LINE
39	DEF HEATER2:BACKFLOW LINE
40	DEF HEATER3:SUCTION LINE
46	J1939(-) DATALINK 1
49	BATTERY RETURN(-)
50	BATTERY RETURN(-)
51	BATTERY RETURN(-)
52	BATTERY RETURN(-)
53	DEF DOSING INJECTOR VALVE LOW(-)
54	DEF PUMP MOTOR RETURN
57	TANK HEATER RELAY/DEF REVERTING VALVE
62	OEM SWITCH/OEM SENSOR(RETURN)
66	ISC 2 SWITCH(MID)
73	BATTERY RETURN(-)
75	INTAKE AIR HEATER(+)
76	IAT/ASO/SLO/BRAKE LAMP RETURN
77	DEF DOSING INJECTOR VALVE HIGH(+)
79	DEF PUMP MOTOR SUPPLY
81	DEF REVERTING VALVE
82	DEF TANK HEATING RELAY/VALVE
83	STARTER LOCKOUT RELAY
84	LINE HEATER RETURNS
85	LINE HEATER RETURNS
87	EXHAUST SYSTEM CLEANING (REGEN) INHIBIT SWITCH
91	DIAGNOSTIC SWITCH/EXHAUST SYSTEM CLEANING(REGEN) INITIATE SWITCH
94	ISC 1 SWITCH(FULL)

#### DETAIL C

ENGINE ECM(CM2350)  
J4(24PIN)

7	DUAL OUTPUTB
22	J1939(+)/DATA LINK 2
23	J1939(-)/DATA LINK 2

#### DETAIL D

CONTROLLER MC050-110  
C1(50PIN)

1	GND(-)
2	POWER(+)
3	CAN0+
4	CAN0+
5	AIN/CAN0 SHIELD
6	DIN
7	DIN
8	5VDC SENSOR POWER(+)
9	SENSOR GND(-)
10	DIN
11	DIN
12	DIN
13	DIN
14	DIN/AIN
15	DIN/AIN
16	DIN/AIN
17	DIN/AIN
18	DIN/AIN/FREQIN
19	DIN/AIN/FREQIN
20	CAN1+
21	CAN1-
22	AIN/CAN1 SHIELD
23	DIN/AIN/FREQIN
24	DIN/AIN/FREQIN
25	DIN/AIN/FREQIN
26	DIN/AIN/FREQIN
27	AIN/TEMP/RHEO
28	AIN/TEMP/RHEO
29	AIN/TEMP/RHEO
30	AIN/TEMP/RHEO
31	DOUT
32	DOUT
33	DOUT
34	DOUT/PVG POWER
35	DOUT/PVG POWER
36	DOUT/PVG POWER
37	PWMOUT/DOUT/PVGOUT
38	PWMOUT/DOUT/PVGOUT
39	PWMOUT/DOUT/PVGOUT
40	PWMOUT/DOUT/PVGOUT
41	PWMOUT/DOUT/PVGOUT
42	PWMOUT/DOUT/PVGOUT
43	PWMOUT/DOUT/PVGOUT
44	PWMOUT/DOUT/PVGOUT
45	PWMOUT/DOUT/PVGOUT
46	PWMOUT/DOUT/PVGOUT
47	POWER(+)
48	POWER(+)
49	POWER(+)
50	POWER(+)

#### DETAIL B

CONTROLLER MC050-155  
C-1(50PIN)

1	GND(-)
2	POWER(+)
3	CAN0+
4	CAN0-
5	AIN/CAN0 SHIELD
6	CAN1+
7	CAN1-
8	3.35VDC SENSOR POWER(+)
9	SENSOR GND(-)
10	1.66VDC SENSOR POWER(+)
11	CAN2+
12	CAN2-
13	AIN/CAN1 SHIELD
14	AIN/CAN2 SHIELD
15	DIN/AIN
16	DIN/AIN
17	DIN/AIN
18	DIN/AIN
19	DIN/AIN
20	DIN/AIN
21	DIN/AIN
22	DIN/AIN
23	DIN/AIN
24	DIN/AIN
25	DIN/AIN
26	DIN/AIN
27	DIN/AIN
28	DIN/AIN
29	DIN/AIN
30	DOUT
31	DIN/AIN
32	DIN/AIN
33	DIN/AIN
34	DIN/AIN
35	DIN/AIN
36	DIN/AIN
37	DIN/AIN
38	DIN/AIN
39	DIN/AIN
40	PWMOUT/DOUT/PVGOUT
41	DIN/AIN
42	DIN/AIN
43	DIN/AIN
44	DIN/AIN
45	DIN/AIN
46	DIN/AIN/FREQIN
47	DIN/AIN/FREQIN
48	DIN/AIN/FREQIN
49	DIN/AIN/FREQIN
50	PWMOUT/DOUT/PVGOUT

#### DETAIL A

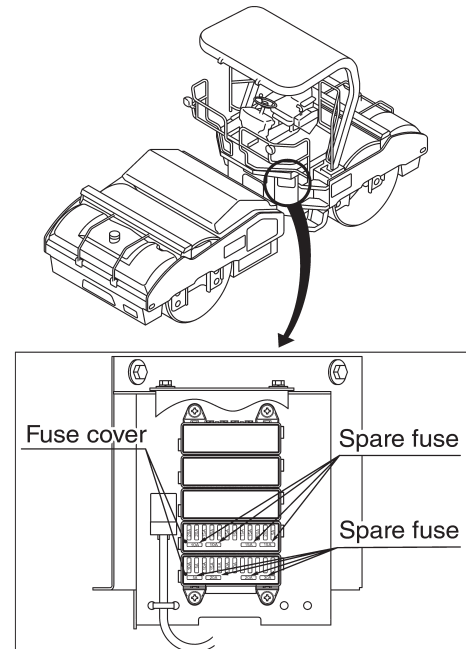
### 3.8 Fuse Box and Line Fuse

#### Fuse Box

The Fuse box contains two 30 A-, six 20 A-, seven 15 A-, two 10 A-, two 5 A-, and spare fuses of one 30 A-, two 20 A-, two 15 A-, one 5 A-, two 10 A-. Refer to “2.1.5 Fuse Box and line fuse”.

#### Line Fuse

The Line fuse holders of 30 A-, 15 A-, 5 A- are located on the side of the battery. Refer to “2.1.5 Fuse Box and line fuse”.



#### **⚠ WARNING**

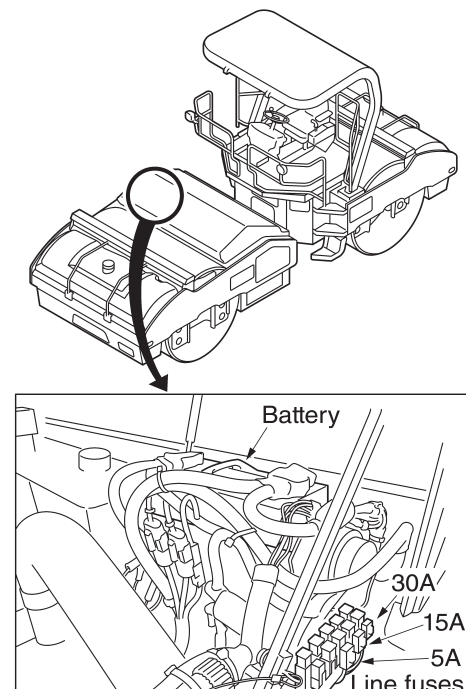
**Use the fuses of correct capacity. Using the wrong fuses may cause fires.**

#### NOTICE

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

### 3.9 Battery

- 1) Leaving the battery unused for a long time or using its power excessively at any time may damage the plates and shorten its life.
- 2) For long-term storage, charge it fully, store in a cool and dry place, and check the level of charge at least once a month.
- 3) Maintain the level of charge above 75%.
- 4) In cold weather, it is desirable to start the engine with the battery fully charged (100%).



### 3 PERIODIC MAINTENANCE

#### **⚠ WARNING**

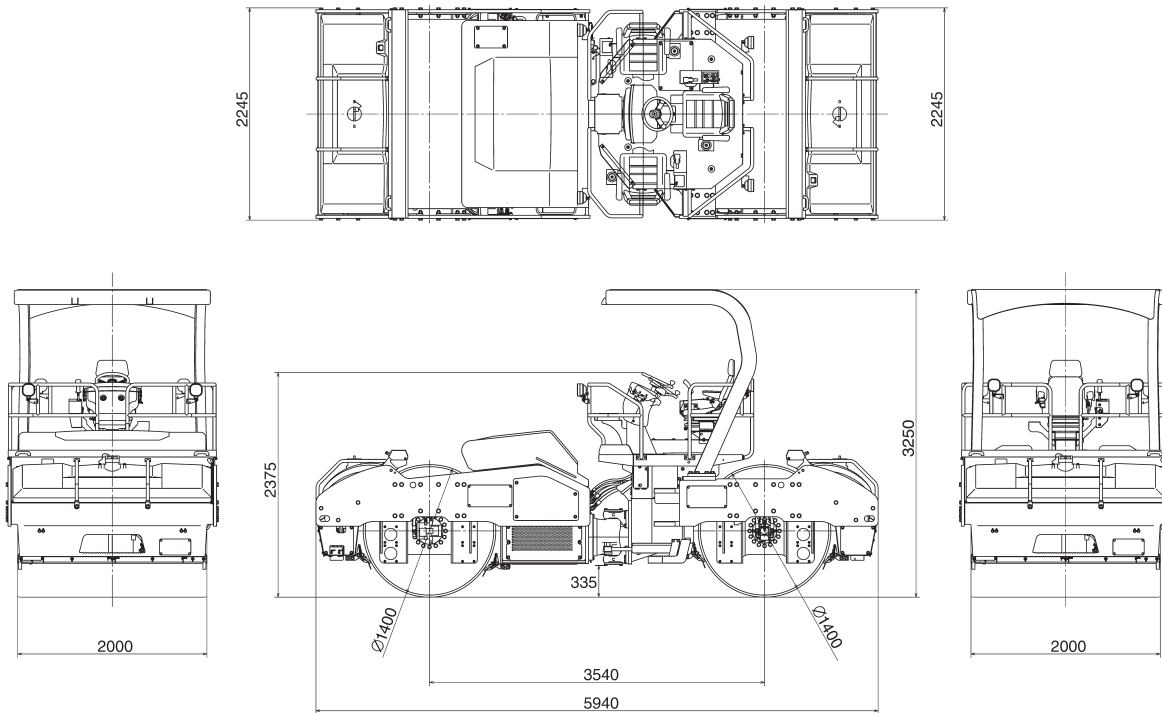
- The battery generates hydrogen gas, so there is a danger of explosions. When there is a danger of generating sparks in poorly ventilated places, avoid recharging the battery and keep away the cigarettes and flames etc.
- The battery contains diluted sulfuric acid, which will dissolve clothes and burn skin. If you get battery fluid on your clothes or skin, wash it off immediately with plenty of clean water.
- If you get it in your eyes, rinse them immediately with clean water and seek the medical help of a doctor.
- If you accidentally ingest it, drink plenty of water and immediately seek the medical help of a doctor.
- Always wear safety glasses when handling the battery.
- The inspection and handling of batteries should be carried out with the engine turned off and the Starter switch in the **O** position.
- Turn the starter switch to the **O** position, then wait at least 30 seconds before removing the battery. If not, an abnormality may arise in the ECM (Engine Control Module).
- Be careful not to connect the two battery terminals together by tools or other metallic objects.
- 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 the machine body. This can generate sparks, causing an explosion.
- Loose 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 the electrical equipment on the machine. Do not use it for any other purpose.

#### **NOTICE**

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

## 4 SPECIFICATIONS

### (1) SW884



<b>Model</b>	<b>SW884</b>	
<b>Weight</b>		
Operating weight	12,890 kg (28,415 lbs)	
On front axle	6,350 kg (14,000 lbs)	
On rear axle	6,540 kg (14,420 lbs)	
<b>Dimension</b>		
Overall length	5,940 mm (234")	
Overall width	2,245 mm ( 88")	
Overall height	3,250 mm (128")	
Wheelbase	3,540 mm (139")	
<b>Wheel</b>		
Front	Roll (dia. x width) 1,400 x 2,000 mm (55" x 79")	
Rear	Roll (dia. x width) 1,400 x 2,000 mm (55" x 79")	
<b>Performance</b>		
Travel speed	1st 2,500 vpm 0 – 4.5 km/h (0 – 2.8 mile/h) 3,000 vpm 0 – 5.5 km/h (0 – 3.4 mile/h) 4,000 vpm 0 – 7.2 km/h (0 – 4.5 mile/h) 2nd 0 – 11 km/h (0 – 6.8 mile/h)	
Gradeability	29 % (16°)	
Rolling width	2,000 mm (79")	
Minimum turning radius	6.4 m (252")	

<b>Vibrating power</b>			
Low amplitude			
Frequency	66.7 Hz (4,000 vpm)	50.0 Hz (3,000 vpm)	41.7 Hz (2,500 vpm)
Centrifugal force	160 kN (35,970 lbs)	90 kN (20,230 lbs)	63 kN (14,160 lbs)
High amplitude			
Frequency	50.0 Hz (3,000 vpm)	41.7 Hz (2,500 vpm)	
Centrifugal force	177 kN (39,790 lbs)	123 kN (27,650 lbs)	
<b>Engine</b>			
Model	CUMMINS "QSF3.8" Diesel Engine with turbo charger		
Total displacement	3.800 litres (229 cu.in)		
Rated output	97kW (130HP) / 2,200min <sup>-1</sup>		
Max. torque	488 N·m / 1,600 min <sup>-1</sup>		
<b>Tank capacity</b>			
Fuel tank	292 liters (77.1 gal)		
Hydraulic oil tank	65 liters (17.2 gal)		
Water sprinkler tank	600 liters (158.5 gal) x 2		

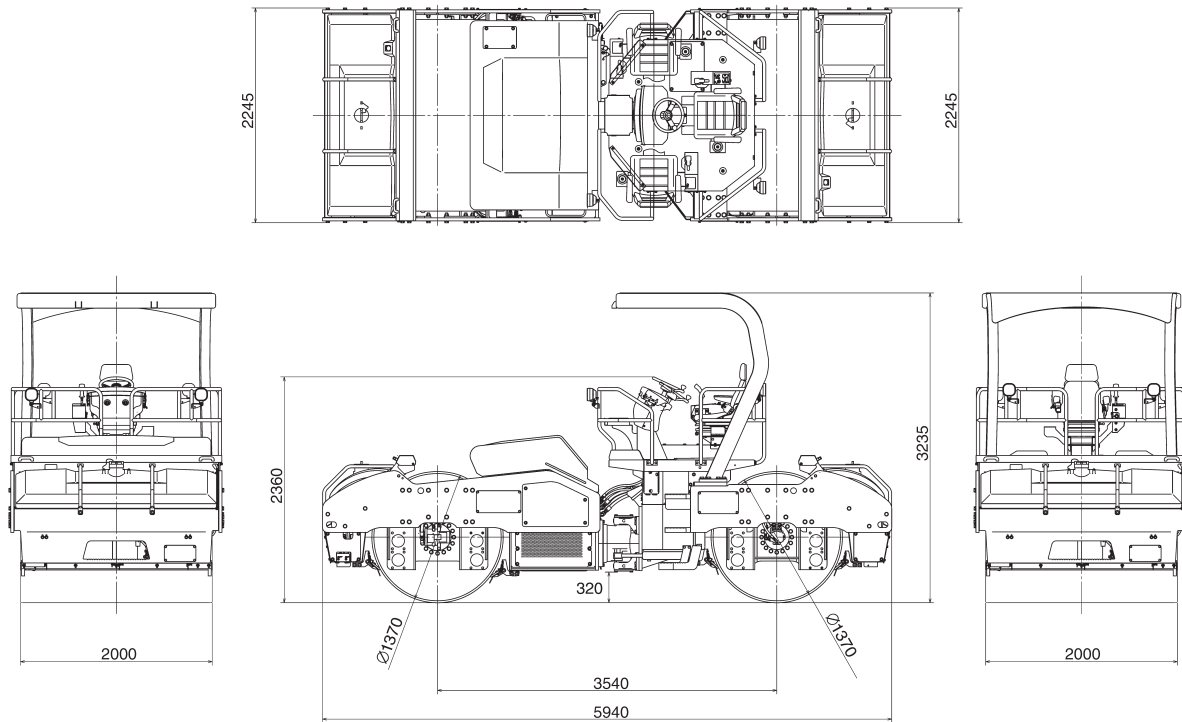
**NOTE:** 1) Gradeability is the calculated value. It may vary with ground surface conditions.

2) According to the European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.

Operating weight : Fuel=50%, Water=50%, Operator=75kg.

## 4 SPECIFICATIONS

### (2) SW884ND



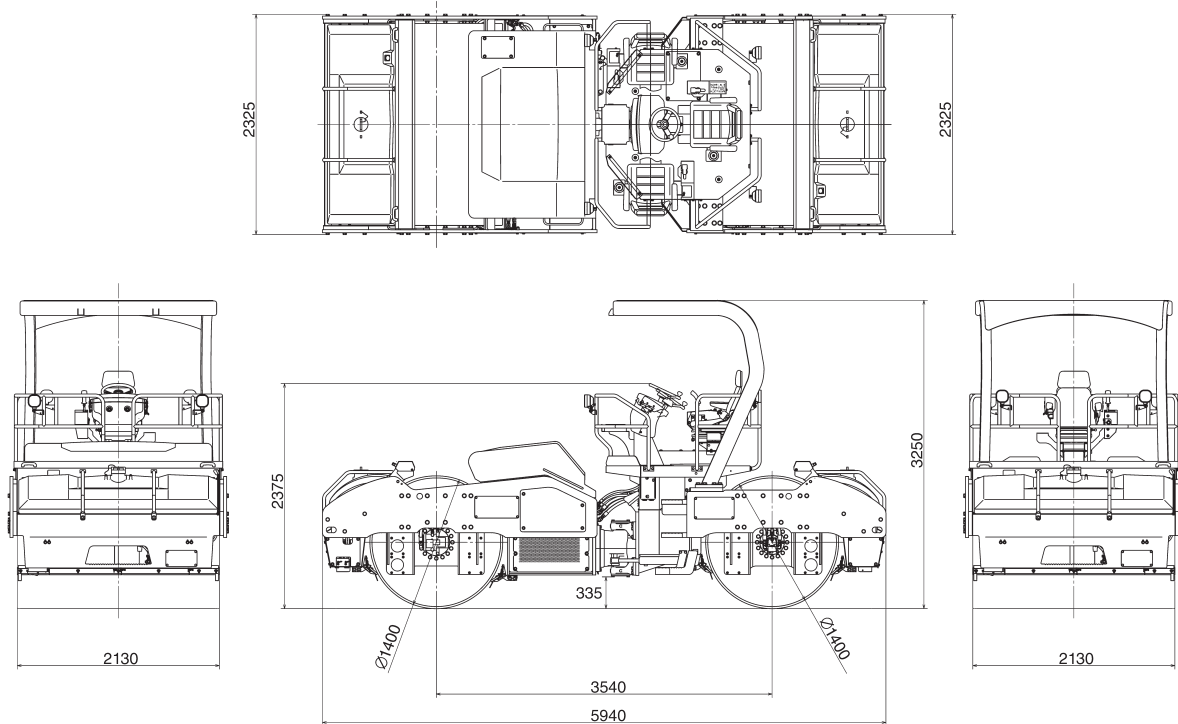
Model		SW884ND	
<b>Weight</b>			
Operating weight		13,230 kg (29,165 lbs)	
On front axle		6,520 kg (14,375 lbs)	
On rear axle		6,710 kg (14,795 lbs)	
<b>Dimension</b>			
Overall length		5,940 mm (234")	
Overall width		2,245 mm ( 88")	
Overall height		3,235 mm (127")	
Wheelbase		3,540 mm (139")	
Wheel			
Front		Roll (dia. x width)	
		1,370 x 2,000 mm (54" x 79")	
Rear		Roll (dia. x width)	
		1,370 x 2,000 mm (54" x 79")	
<b>Performance</b>			
Travel speed	1st Oscillation	0 – 6.4 km/h (0 – 4.0 mile/h)	
	Vibration	0 – 5.5 km/h (0 – 3.4 mile/h)	
	2nd	0 – 11 km/h (0 – 6.8 mile/h)	
Gradeability		28 % (15°)	
Rolling width		2,000 mm (79")	
Minimum turning radius		6.4 m (252")	
<b>Vibrating power</b>			
Oscillation			
Frequency		46.7 Hz (2,800 vpm)	
Centrifugal force		172 kN (38,600 lbs)	
Vibration			
Frequency		50.0 Hz (3,000 vpm)	
Centrifugal force		158 kN (35,585 lbs)	
<b>Engine</b>			
Model		CUMMINS "QSF3.8" Diesel Engine with turbo chager	
Total displacement		3.800 litres (229 cu.in)	
Rated output		97kW (130HP) / 2,200min <sup>-1</sup>	
Max. torque		488 N·m / 1,600 min <sup>-1</sup>	
<b>Tank capacity</b>			
Fuel tank		292 liters (77.1 gal)	
Hydraulic oil tank		65 liters (17.2 gal)	
Water sprinkler tank		600 liters (158.5 gal) x 2	

**NOTE:** 1) Gradeability is the calculated value. It may vary with ground surface conditions.

2) According to the European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.

Operating weight : Fuel=50%, Water=50%, Operator=75kg.

(3) SW994



<b>Model</b>	<b>SW994</b>	
<b>Weight</b>		
Operating weight	13,270 kg (29,255 lbs)	
On front axle	6,530 kg (14,395 lbs)	
On rear axle	6,740 kg (14,860 lbs)	
<b>Dimension</b>		
Overall length	5,940 mm (234")	
Overall width	2,325 mm (92")	
Overall height	3,250 mm (128")	
Wheelbase	3,540 mm (139")	
<b>Wheel</b>		
Front	Roll (dia. x width) 1,400 x 2,130 mm (55" x 84")	
Rear	Roll (dia. x width) 1,400 x 2,130 mm (55" x 84")	
<b>Performance</b>		
Travel speed	1st 2,500 vpm 0 – 4.5 km/h (0 – 2.8 mile/h) 3,000 vpm 0 – 5.5 km/h (0 – 3.4 mile/h) 4,000 vpm 0 – 7.2 km/h (0 – 4.5 mile/h) 2nd 0 – 11 km/h (0 – 6.8 mile/h)	
Gradeability	28 % (15°)	
Rolling width	2,130 mm (84")	
Minimum turning radius	6.5 m (256")	

<b>Vibrating power</b>			
Low amplitude			
Frequency	66.7 Hz (4,000 vpm)	50.0 Hz (3,000 vpm)	41.7 Hz (2,500 vpm)
Centrifugal force	173 kN (38,890 lbs)	98 kN (22,030 lbs)	68 kN (15,285 lbs)
High amplitude			
Frequency	50.0 Hz (3,000 vpm)		41.7 Hz (2,500 vpm)
Centrifugal force	185 kN (41,590 lbs)		128 kN (28,775 lbs)
<b>Engine</b>			
Model	CUMMINS "QSF3.8" Diesel Engine with turbo charger		
Total displacement	3.800 litres (229 cu.in)		
Rated output	97kW(130HP) / 2,200min <sup>-1</sup>		
Max. torque	488 N·m / 1,600 min <sup>-1</sup>		
<b>Tank capacity</b>			
Fuel tank	292 liters (77.1 gal)		
Hydraulic oil tank	65 liters (17.2 gal)		
Water sprinkler tank	600 liters (158.5 gal) x 2		

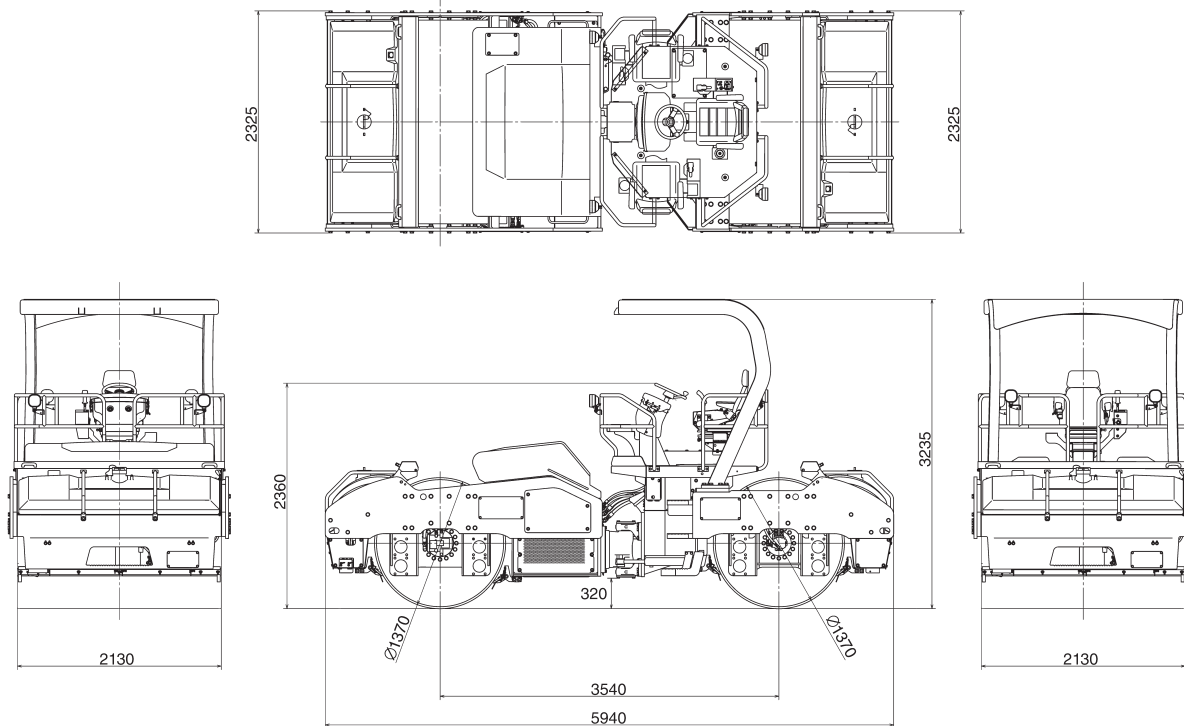
**NOTE:** 1) Gradeability is the calculated value. It may vary with ground surface conditions.

2) According to the European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.

Operating weight : Fuel=50%, Water=50%, Operator=75kg.

## 4 SPECIFICATIONS

### (4) SW994ND



<b>Model</b>	<b>SW994ND</b>		<b>Vibrating power</b>	
<b>Weight</b>			Oscillation	
Operating weight	13,590 kg (29,960 lbs)		Frequency	46.7 Hz (2,800 vpm)
On front axle	6,690 kg (14,750 lbs)		Centrifugal force	172 kN (38,600 lbs)
On rear axle	6,900 kg (15,210 lbs)		Vibration	
<b>Dimension</b>			Frequency	50.0 Hz (3,000 vpm)
Overall length	5,940 mm (234")		Centrifugal force	158 kN (35,585 lbs)
Overall width	2,325 mm (92")		<b>Engine</b>	
Overall height	3,235 mm (127")		Model	CUMMINS "QSF3.8" Diesel Engine with turbo charger
Wheelbase	3,540 mm (139")		Total displacement	3.800 litres (229 cu.in)
Wheel			Rated output	97kW (130HP) / 2,200min <sup>-1</sup>
Front	Roll (dia. x width)		Max. torque	488 N·m / 1,600 min <sup>-1</sup>
	1,370 x 2,130 mm (54" x 84")		<b>Tank capacity</b>	
Rear	Roll (dia. x width)		Fuel tank	292 liters (77.1 gal)
	1,370 x 2,130 mm (54" x 84")		Hydraulic oil tank	65 liters (17.2 gal)
<b>Performance</b>			Water sprinkler tank	600 liters (158.5 gal) x 2
Travel speed	1st Oscillation 0 – 6.4 km/h (0 – 4.0 mile/h)			
	Vibration 0 – 5.5 km/h (0 – 3.4 mile/h)			
	2nd 0 – 11 km/h (0 – 6.8 mile/h)			
Gradeability	28 % (15°)			
Rolling width	2,130 mm (84")			
Minimum turning radius	6.5 m (256")			

**NOTE:** 1) Gradeability is the calculated value. It may vary with ground surface conditions.

2) According to the 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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