No. 3498-30640-3

**⚠ 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.**

# INSTRUCTION MANUAL

MODEL

# Auto Brake Assist System

## Guardman

**From** SW884 → 3SW79-40331
SW884ND → 3SW79-40331
SW994 → 3SW80-40113
SW994ND → 3SW80-40132

SAKAI

# INTRODUCTION

This instruction manual is a guide for the safe use of the SAKAI Guardman Auto Brake Assist System.
Before your first use of this machine. Read the instruction manual for the machine on which the Auto Brake Assist System (“ABAS”) is installed for information about the handling of the machine.

Before using a machine with the ABAS, read this instruction manual carefully and be sure to fully understand its contents in order to use this equipment correctly. Also, after reading this instruction manual, be sure to store it properly in a place near this equipment so it is readily available.

Replace this instruction manual immediately if it is lost or damaged and cannot be read.

If the machine on which the ABAS is installed will be lent to or used by another person, adequately explain how to handle it properly and instruct them to read this manual in advance. When transferring the machine on which this equipment is installed, be sure to include this instruction manual.

The details in this instruction manual may differ from the product when purchased due to improvements of the ABAS.

Contact your dealer if you have any questions or concerns about the ABAS, or if it malfunctions.

# TABLE OF CONTENTS

# MACHINE MODEL AND CHASSIS NUMBER LOCATIONS

When contacting your dealer with inquiries about the ABAS, be prepared to provide the machine model and chassis number.

**(1) Machine model**

Refer to the “Machine model” in the instruction manual for the machine being used.

**(2) Machine serial number**

Refer to the “Machine serial number” in the instruction manual for the machine being used.

# 1 SAFETY NOTICES

For the safe use of Auto Brake Assist System (“ABAS”), correct handling and periodical maintenance are of utmost importance. Carefully read and fully understand the safety precautions contained in this instruction manual before using the ABAS.
Refer to the instruction manual for the machine being used for operating information and safety precautions related to the use of the machine.

## 1.1 About the safety notices

**■ 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.**

**■ Precautions for the safe operation and maintenance of the ABAS are indicated on the safety label attached to the ABAS.**

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

**★ About the safety label**

A safety label is attached to the ABAS. Never remove or modify the information on the safety label. (See “1.4 Safety Labels” for information on the contents and attachment position of the safety label).

**■ The contents of this instruction manual and the safety label attached to the ABAS cannot predict or describe all possible dangerous conditions. For this reason, in addition to the information presented in this instruction manual and on the safety label of the ABAS, pay close attention to other details while working and be careful not to cause an accident.**

## 1.2 About this product

### ■ Drive safely

- The purpose of the ABAS is to assist in avoiding collisions during machine movement. However, the system cannot prevent all collisions or reduce the chance of collision damage in all situations. Operators should always be aware of their surroundings and drive safely without relying on the ABAS.
- The ABAS is designed for use in construction work on flat ground. Note that the ABAS may not be able to perform properly when the machine is working on a slope.
- If the alarm is activated, the driver should check the road and surroundings, and take immediate appropriate action such as braking the machine.

### ■ Understand the capabilities of the ABAS

Be sure to fully understand the capabilities of the ABAS before using it. Over-reliance on the capabilities of the ABAS may lead to an accident.

### ■ About the recording of machine data

The ABAS records and accumulates control data for the controller of the ABAS.
The controller does not record voices, such as conversations, or video.

### ■ About the handling of data

SAKAI may acquire and use the data recorded in the controller for the purposes of diagnosing machine failure, performing research and development, and improving quality.
SAKAI will not disclose or provide any of the acquired data to third parties except in the following cases.

- When the owner of the machine has consented to such disclosure
- When such disclosure is based on a legally enforceable request, such as from the police, courts, or government agencies.

## 1.3 Safety Precautions

**⚠ DANGER**

- **Do not test the stopping operation of ABAS with people, walls or other objects.**
  **The ABAS may not operate properly depending on the situation, and this could lead to an accident.**
- **Never use the ABAS to stop the machine on a routine basis.**
  **The ABAS may not operate properly depending on the situation, and this could lead to an accident.**

**⚠ WARNING**

- **Do not use an ABAS that has not been maintained**
  - **Before using the ABAS, thoroughly inspect and maintain it to make sure that there are no malfunctions. (See "4.1 Inspection before starting work.")**
    **If you feel that there is an abnormality in the operation or performance, or if there is any damage, stop using the ABAS immediately and contact your dealer.**
  - **In the event that the sensors need to be removed or repaired, such as due to an accident, or if a sensor error appears on the display, be sure to contact your dealer.**
  - **In order to ensure safety, ask your dealer to inspect and perform maintenance on the system once a year.**
- **Have workers in the surrounding area wear reflective safety vests**
  **To enhance driver visibility and safety, be sure to have workers in the surrounding area wear safety vests.**
- **Sit in the driver's seat before starting operation**
  **When driving the machine, sit fully back in the driver's seat with your back against the backrest, and be sure to wear the seatbelt while driving a machine that is equipped with a seatbelt.**
- **Do not let go of the F-N-R lever and the steering wheel while driving.**

**⚠ WARNING**

**■ In the following situations listed below, the ABAS may not be able to properly detect a person or an obstacle (hereafter referred to as an object) in the path of the machine. In some cases, the ABAS will not operate, or the collision cannot be avoided even if an object is detected and the ABAS is activated.**
**Situations where ABAS may not work :**

- **○ When the object is hidden in thick steam or dust generated on the asphalt road surface.**
- **○ When the object suddenly enters the detection area.**
- **○ When the object is outside the detection area of the millimeter-wave radar. (See "2.2 Detection area.")**
- **○ When the size of the object is less than 1.3 ft (0.4 m) in width or less than 2.6 ft (0.8 m) in height for detection.**
- **○ When the object has a rounded shape.**
- **○ When the object has a complex shape.**
- **○ When the surface of the object is glossy, such as a mirror or metal.**
- **○ When the object is approaching the machine.**
- **○ When used in bad weather (rain, snow, fog, etc.).**
- **○ When the mounting position of the Millimeter-wave radar is misaligned.**
- **○ When the surface of the Millimeter-wave radar is dirty or scratched.**
- **○ When the hydraulic oil temperature is low.**
- **○ When the hydraulic oil being used is different from the specified oil. (Be sure to use the hydraulic oil specified in the instruction manual for the machine being used.)**
- **○ When driving on slippery roads (ice, sand, etc.).**
- **○ When the surrounding workers are wearing dark-colored (dark blue, black, etc.) work clothing.**
- **○ When the object does not conduct electricity easily, such as an object made of cardboard or wood.**
- **○ When the unloader valve is even slightly open.**

**⚠ WARNING**

- **If the operating conditions are not met, the ABAS and the alarm functions are automatically turned off. (See "2.1 Conditions for operating the ABAS and the alarm functions"). Be sure to fully check the safety of the surrounding environment before driving.**
- **Do not drive until the ABAS has started up.**
  **Do not operate the machine until the Millimeter-wave radar startup check has completed.**
- **Do not operate the unit or watch the display while driving.**
  **Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**
- **Slow down traveling on slopes**
  - **Traveling on slopes, the braking distance is longer when the brakes are applied. Even if the ABAS is activated, the risk of a collision is greater. Be sure to slow down and drive carefully.**
  - **The activation timing of the ABAS is set as if the construction work is being performed on flat ground.**
- **When the hydraulic oil temperature is low, braking distances may be longer than normal. Warm-up machine before operating.**
- **Do not rely on alarms while driving**
  **Depending on the detection timing, the Alarm display may be delayed or may not be displayed, or the alarm sound may be delayed or may not be played.**
- **When using the machine with the ABAS and alarm functions turned off during loading and unloading work, be sure to pay close attention to the safety of the surrounding environment.**
- **If the ABAS and alarm functions were turned off, such as during loading and unloading work, be sure to turn them back on before moving the machine. (See "3.8 Turning the ABAS and alarm functions on and off.")**

**⚠ WARNING**

**■ Detection sensors**

**・Keep the surface of the Millimeter-wave radar clean. (See "2.4 Handling the Millimeter-wave radar.") If the surface of the Millimeter-wave radar is left as is with water droplets or dirt, the sensor will not be able to perform properly.**

**・When storing the machine, wipe the area around the detection sensor with a clean, soft cloth, dry it thoroughly, and then cover it with the detection sensor cover that comes with the product.**

**・Do not attach any films or stickers (including transparent types) to the Millimeter-wave radar surface.**
**Doing so may cause failures or malfunctions.**

**・Do not allow the detection sensor and the surrounding area where the detection sensor is installed to be struck strongly. If the part where the detection sensor is mounted is damaged due to an accident, contact your dealer.**

**・When using a high pressure washer, do not spray water directly on the speaker or Millimeter-wave radar as this will cause the sensor to fail.**

**■ Never modify, disassemble, or repair the ABAS (including the detection sensor). Doing so may result in failures, detection errors, or malfunctions.**

**■ The ABAS may activate in the following situations, even if there is no risk of a collision.**

- **○ When approaching a steep uphill slope or at the end of a downhill slope.**
- **○ When used in bad weather (rain, snow, fog, etc.).**
- **○ When there is thick steam or dust.**
- **○ When flying objects (trash, insects, birds, etc.) are detected.**
- **○ When the machine is passing near a vehicle or wall.**
- **○ When the mounting position of the detection sensor is misaligned.**
- **○ When the surface of the Millimeter-wave radar are dirty or scratched.**
- **○ When there is a metal object on the ground such as a manhole or grating (ditch cover).**

**■ Be careful of sudden machine stops**
**This machine may come to a sudden stop in the event of an abnormality in the ABAS function.**
**Be sure to wear your seatbelt when driving.**

**■ Refrain from inattentive driving**
**Inattentive driving can cause an accident. Use extreme care for the safety of others in the path of the machine or around it. In case of danger, stop and sound the horn to warn others.**

**⚠ WARNING**

- **When changing the traveling direction, make sure it is safe to do so in the path of the traveling direction.**
  **After you switch the F-N-R lever, if ABAS activates in response to a machine following behind, there is a risk that the following machine may rear-end this machine, so check that the direction you are traveling is safe before switching the F-N-R lever.**
- **Keep a sufficient distance between this machine and other machines**
  **If another machine suddenly approaches and this machine's ABAS is activated, this machine will not be able to move until you deactivate the ABAS, and this machine may be rear-ended.**
- **Inform other drivers**
  **As this machine may suddenly stop due to the activation of ABAS, inform other drivers of this machine to understand the braking distance and to drive with a sufficient distance.**

**⚠ CAUTION**

- **Do not cover the light-receiving part of the brightness adjustment sensor (see "2.5 Names and functions of the parts of the display") with a cloth. Since the display brightness is adjusted based on data from the brightness adjustment sensor, the visibility of the display may decrease and could lead to an accident.**
- **When Guardman ABAS is activated and the machine comes to a sudden stop, the drums and/or tires may shove the asphalt mat or soil and cause cracking.**

## 1.4 Safety Labels

### SW884, SW884ND, SW994, SW994ND

Keep all labels clean. If you cannot read a safety label or the label is missing, replace it with a new one. There are other safety labels than those shown below and treat them in the same manner as the one shown here.

Never remove or modify the information on the safety label.

①3998-16777-1

**⚠ DANGER**

- Do not test the stopping operation of auto brake assist system with people, walls or other objects.
- Do not routinely use auto brake assist system in place of the service brake to stop the machine.

3998-16777-1

②3998-16778-0

**⚠ WARNING**

- Do not disassemble or modify any Guardman sensors or components. Malfunction or failure may result.
- If there are any abnormalities in operation or performance or if there is any damage to the machine or system, stop using the product immediately and contact a certified Sakai dealer.

3998-16778-0

④3998-16780-0

**⚠ WARNING**

The auto brake assist system is not operational until the status bar on the top of the display turns green.

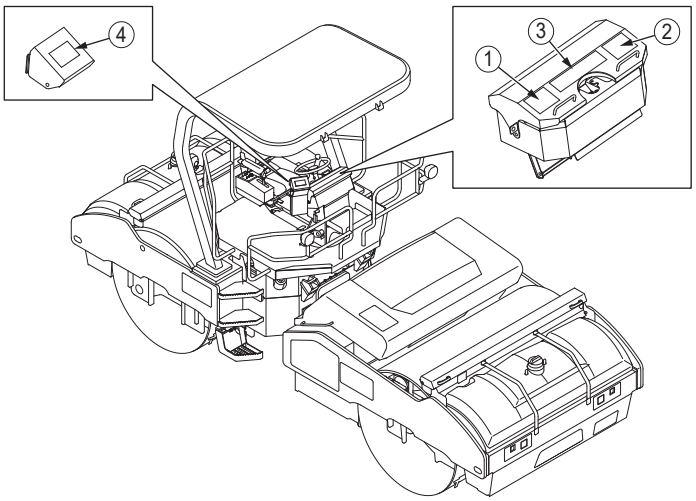
3998-16780-0

③3998-16779-0

**⚠ CAUTION**

- Guardman auto brake assist system is a secondary safety system to operator good judgement and safe roller operation. Guardman auto brake assist system will not avoid all collisions nor reduce the chance of injury or damage from collision under all operating conditions.
- The driver should not solely rely on the auto brake assist system and must be aware of the surroundings at all times.
- Depending on working conditions, condition and type of objects, the auto brake assist system may not operate properly, may not perform sufficiently or it may trigger regardless of the danger of collision.

3998-16779-0



# 2 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM

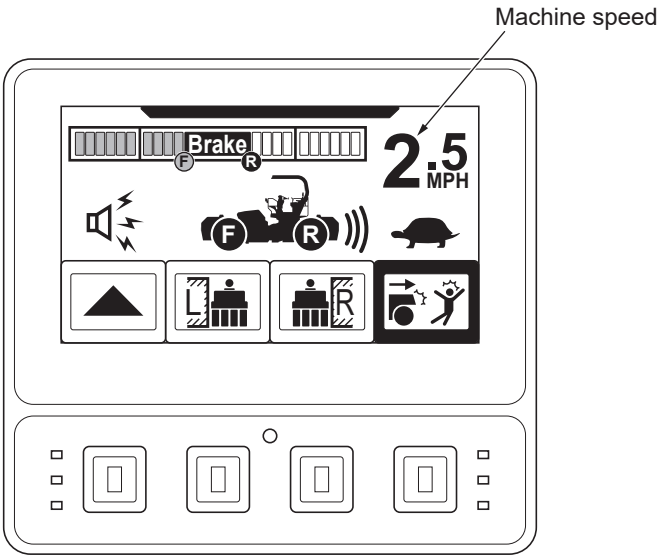
The Auto Brake Assist System consists of the following two functions.

1) Auto Brake Assist System
   The Auto Brake Assist System (“ABAS”) function uses a Millimeter-wave radar mounted at the front and rear of the machine to detect objects in the path of the machine when the machine is moving. When the system determines that the risk of a collision is even greater than when the alarm operates as described in 2), the system activates the ABAS to assist in avoiding the collision or reducing collision damage.
2) Alarms (Include alarm sounds and display alarms)
   The alarm functions use a Millimeter-wave radar mounted at the front and rear of the machine to detect objects on the road when the machine is moving. If the system determines that there is a high risk of a collision, it will display an alarm and play an alarm sounds to the driver and an alarm sounds to alert the surrounding workers in order to assist the driver and surrounding workers in avoiding the collision.

## 2.1 Conditions for operating the ABAS and the alarm functions

・The ABAS and alarm functions are activated when the machine is in move (when the F-N-R lever is in the Forward (F) or the Reverse (R) position).

*The machine speed that is shown on the display is a reference speed for the Auto Brake Assist System.
The displayed speed may differ from the actual speed of the machine.




Display screen

Guardman operating conditions

| | SW884 Guardman<br>SW994 Guardman | SW884ND Guardman<br>SW994ND Guardman |
|---|---|---|
| Work condition (1st) | 0 - 4.5 mile/h<br>(0 - 7.2 km/h) | 0 - 4.0 mile/h<br>(0 - 6.4 km/h) |
| Traveling (2nd) | 0 - 6.8 mile/h<br>(0 - 11 km/h) | 0 - 6.8 mile/h<br>(0 - 11 km/h) |

・The ABAS and alarm functions are activated when within the specification speed.
See “5 OVERVIEW AND SPECIFICATIONS” for details on specification speeds.

*In the alarm mode, there is no speed limit. The alarm function is activated.
See “3.11 Alarm mode”

・The ABAS and alarm functions do not function during emergency traveling.

*Emergency traveling here means traveling using the emergency propel switch.

## 2.2 Detection area

| | | SW884 Guardman | SW884ND Guardman | SW994 Guardman | SW994ND Guardman |
|---|---|---|---|---|---|
| In front of the machine | | 2.6 to 23 ft (0.8 to 7 m) | 2.6 to 23 ft (0.8 to 7 m) | 2.6 to 23 ft (0.8 to 7 m) | 2.6 to 23 ft (0.8 to 7 m) |
| Behind the machine | | 2.6 to 23 ft (0.8 to 7 m) | 2.6 to 23 ft (0.8 to 7 m) | 2.6 to 23 ft (0.8 to 7 m) | 2.6 to 23 ft (0.8 to 7 m) |
| Height from the ground *1 | | 2.6 ft (0.8 m) or more | 2.6 ft (0.8 m) or more | 2.6 ft (0.8 m) or more | 2.6 ft (0.8 m) or more |
| Detection width | Normal usage | 95 in (2.4 m) | 95 in (2.4 m) | 95 in (2.4 m) | 95 in (2.4 m) |
| | *2 | 87 in (2.2 m) | 87 in (2.2 m) | 87 in (2.2 m) | 87 in (2.2 m) |
| | *3 | 79 in (2.0 m) | 79 in (2.0 m) | 79 in (2.0 m) | 79 in (2.0 m) |

*1 : Objects that are less than 2.6 ft (0.8 m) in height may be detected depending on the color, shape, or other characteristics of the object.
The above values are approximate values and may vary depending on various conditions.
*2 : While operating in left (or right) side wall compaction mode (one side only)
*3 : While operating in left (or right) side wall compaction mode (both sides)

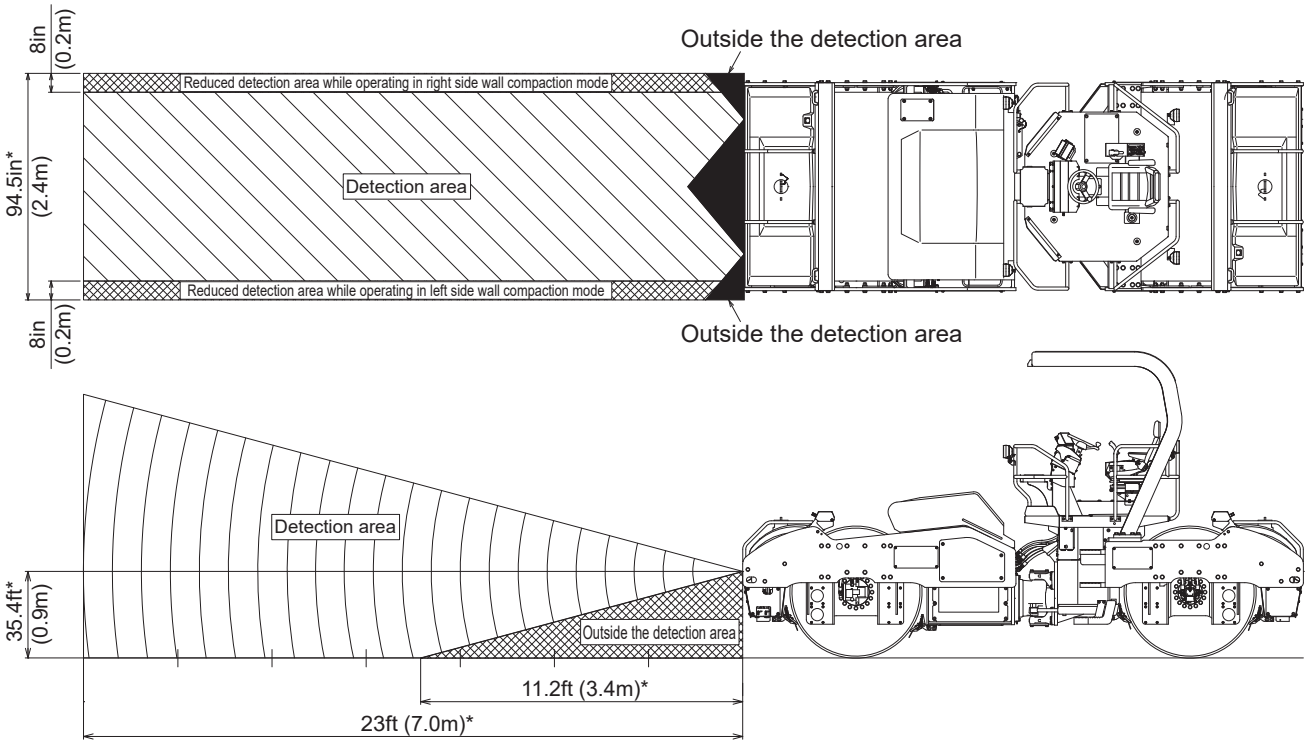
**⚠ WARNING**

- **There is an area immediately behind and immediately in front of the machine that is outside the detection area. If an object is outside the detection area, the object will not be detected. Do not rely solely on the ABAS when driving.**
- **Even if an object is within the detection area, it may not be detected depending on the color, shape, or size of the object, the surrounding environment, or other conditions.**

**⚠ CAUTION**

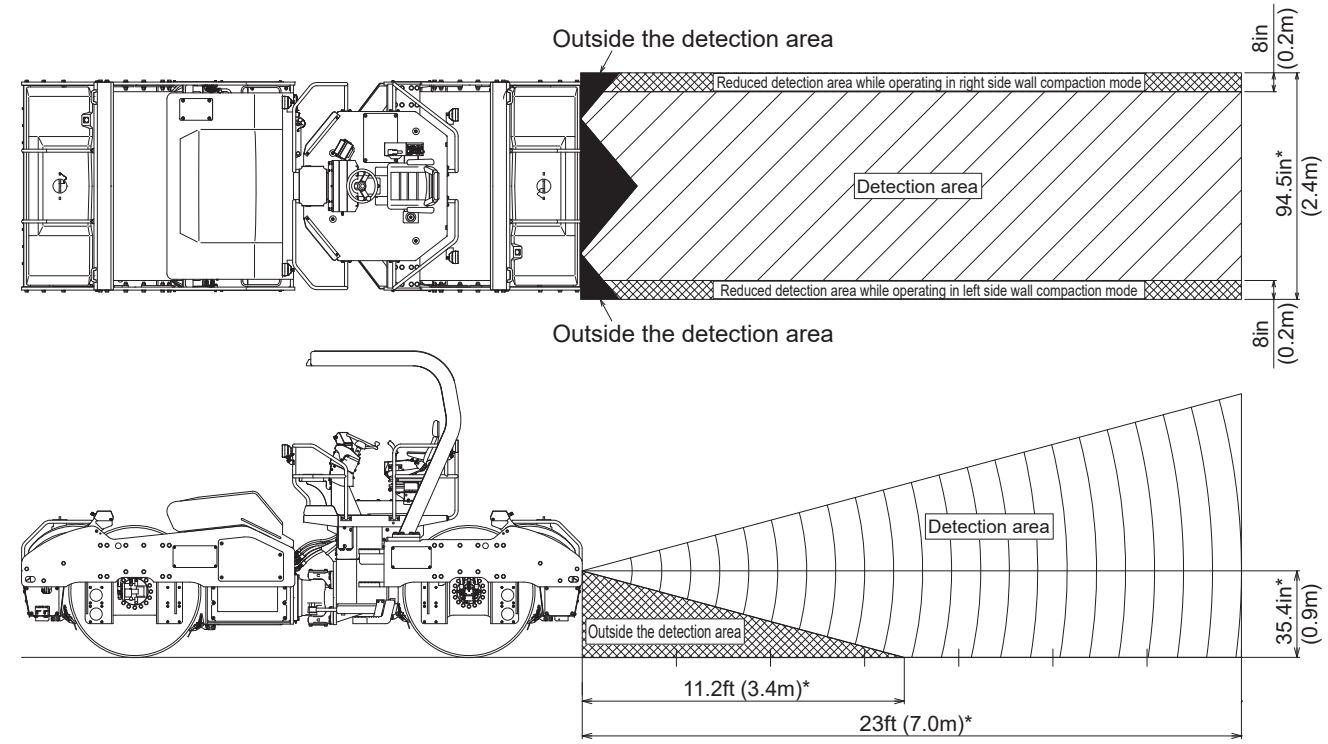
**Depending on the road surface conditions, the surrounding environment, and the color, shape, or material of the object, the object may be detected even if it is outside the detection area.**

Forward detection area




Note: Values are estimates and may differ depending on various conditions.

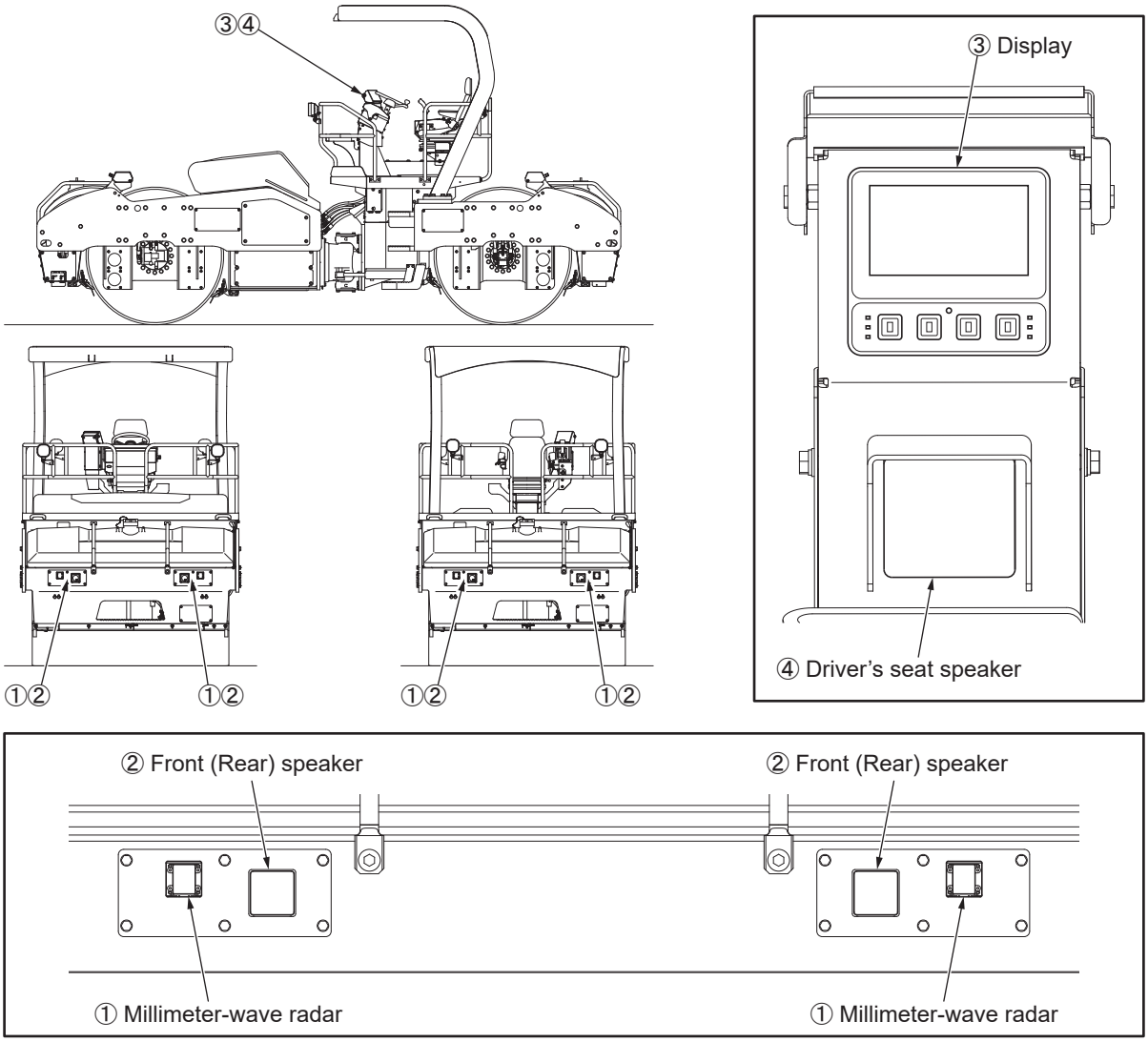
Rear detection area




Note: Values are estimates and may differ depending on various conditions.

***MEMO***

## 2.3 Names and functions of each part of the ABAS




①Millimeter-wave radar
Detects the presence or absence of objects in front of and behind the machine.

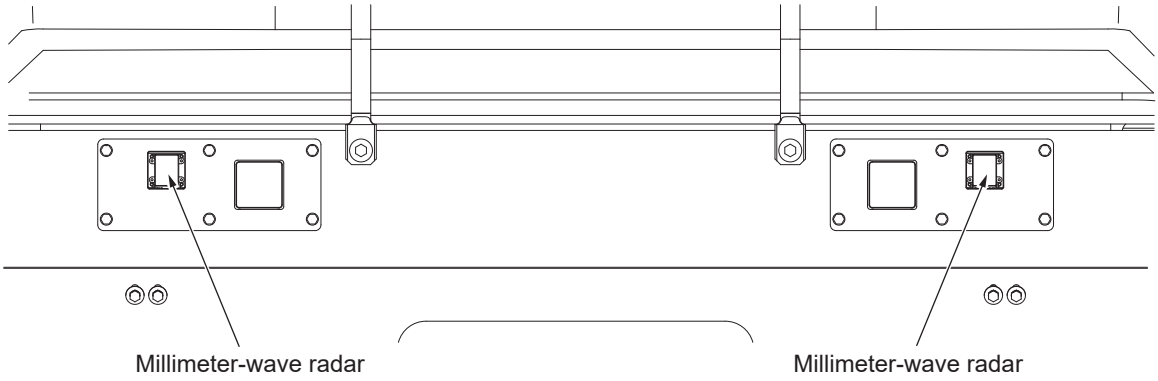
②Front (Rear) speaker
Play an alarm sound to the workers in the direction of move the machine.

③Display
- Contains various operation buttons such as the on/off button for the Auto Brake Assist System functions.
- Displays various alarms.
- Displays the machine speed.

④Driver's seat speaker
Plays an alarm sound to the driver.

## 2.4 Handling the Millimeter-wave radar

The Millimeter-wave radar is installed at the front and rear of the machine.
Observe the following points to use the Millimeter-wave radar safely.




**⚠ WARNING**

- **Keep the surface of the Millimeter-wave radar clean and free of dirt and water droplets.**
  **Cleaning method: Gently wipe off any dirt and water droplets on the surface using a cotton swab or a clean, soft cloth such as gauze.**
- **When using a high pressure washer, do not spray water directly on the Millimeter-wave radar as this will cause it to fail.**
- **Do not allow the Millimeter-wave radar or the surrounding area where the Millimeter-wave radar is mounted to be struck strongly.**
  **If the part where the Millimeter-wave radar is mounted is damaged due to an accident, contact your dealer.**
- **Do not remove or disassemble the Millimeter-wave radar. Also, do not change the mounting method.**

**⚠ WARNING**

- **Do not attach any films or stickers (including transparent types) to the surface of the Millimeter-wave radar.**
- **Do not attempt any repairs by yourself as this is dangerous. In the unlikely event that you see smoke coming from the Millimeter-wave radar, immediately stop using it and request repairs from your dealer.**

## ■ Environmental conditions

Avoid long-term storage in locations with high temperatures, high humidity, condensation, or corrosive gases.

## ■ Radio Regulatory Compliance

For Japan

Millimeter Wave Radar complies with the Japanese Radio Law.
Do not erase the millimeter wave radar printout as it is proof of compliance.
Do not modify millimeter wave radar. Modification will invalidate the certification number.


For USA

Contains Part 95 Vehicular Radar Systems
FCC ID: 2A3MR-OSA-79G-AL

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1) This device may not cause harmful interference, and
2) this device must accept any interference received, including interference that may cause undesired operation.

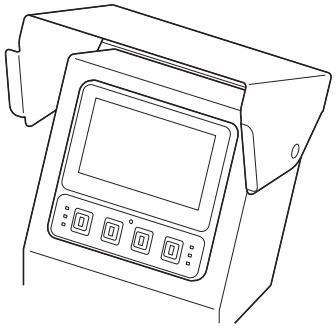
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**NOTICE**

**Millimeter wave radar should never be taken outside of Japan and the U.S., where it complies with radio laws.**

## 2.5 Names and functions of the parts of the display

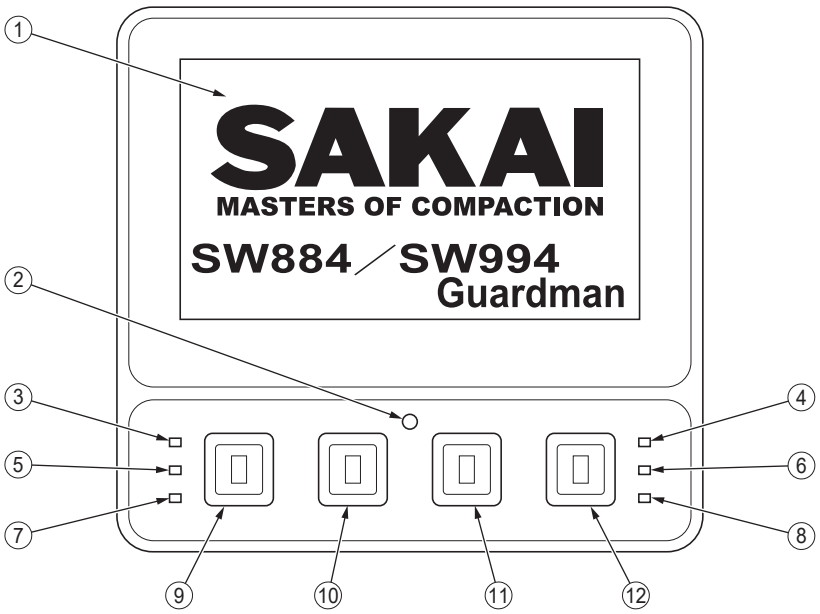
The display is located in front of the driver's seat.



Display with front cover open

**NOTICE**

**Open the front cover of the display before using it.**
**The cover will stay open at the position you set it.**
**Adjust the angle of the cover so that the display screen is easy to see.**




①Display screen

②Light-receiving part of brightness adjustment sensor
Detects ambient brightness.

③ ④LED indicator lamps (green)
Green LED: Indicates that the ABAS and alarm functions are on.

⑤ ⑥LED indicator lamps (orange)
Flashing orange LED: Indicates that the alarm mode is on.

⑦ ⑧LED indicator lamps (red)
Red LED: Indicates that an error has occurred in the ABAS and alarm functions.

⑨ to ⑫ buttons
Each button has different functions. For details, see “3. OPERATING PROCEDURE”.

**⚠ CAUTION**

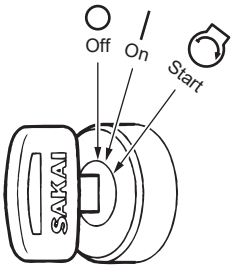
- **① Keep the display screen (glass surface) clean.**
- **② Do not cover the light-receiving part of the brightness adjustment sensor with a cloth. Also, keep the light-receiving part clean.**
  **When the screen brightness is set automatically by the brightness adjustment sensor, the screen may become difficult to see if the brightness adjustment sensor does not correctly recognize the surrounding environment.**

# 3 OPERATING PROCEDURE

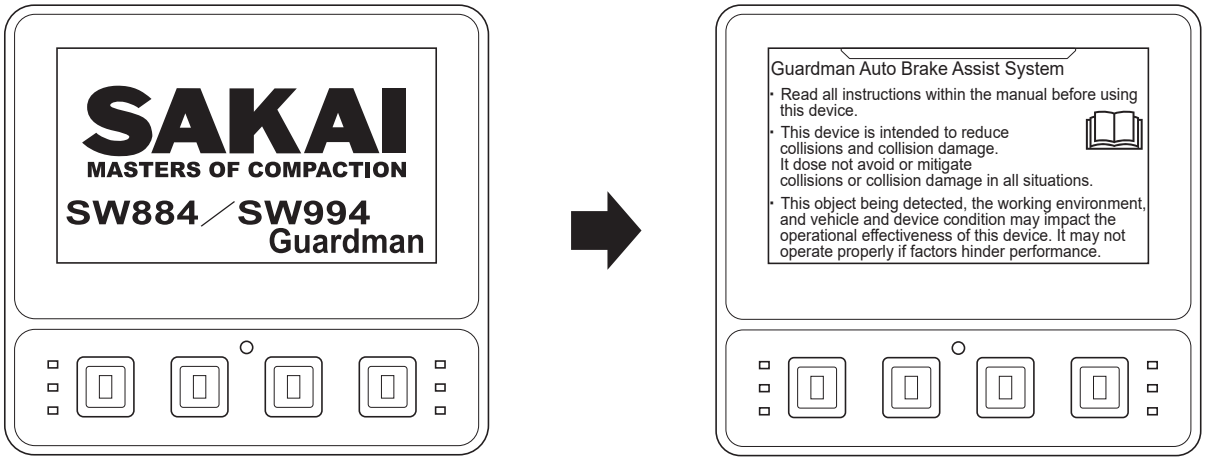
## 3.1 Turning on the Auto Brake Assist System

When the Starter switch of the machine is turned to the on position, the Auto Brake Assist System (“ABAS”) automatically starts to turn on.

*Refer to the instruction manual of the machine being used for the position and details of the Starter switch.




When the engine is started, the ABAS system is activated, and when the LED turns green, ABAS is ready for operation.




**⚠ WARNING**

**When the engine is started, the ABAS system is automatically activated. When the LED turn green, ABAS is ready for operation.**
**Do not operate the machine until the Millimeter-wave radar startup check has finished.**

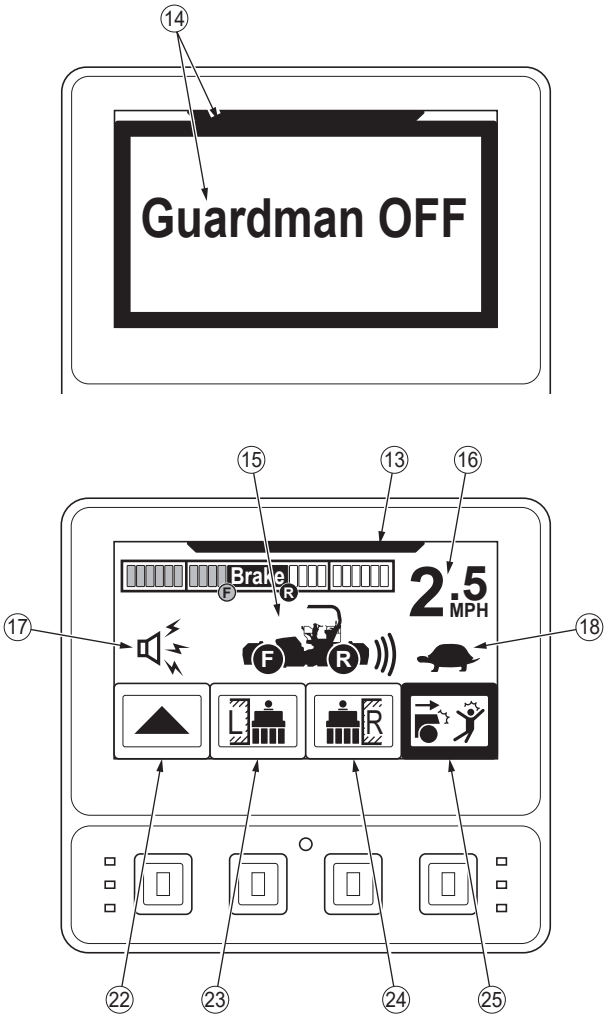
**NOTICE**

- **After stopping the engine, wait about 30 seconds before immediately restarting the engine again.**
- **The ABAS may restart when the Starter switch of the machine is turned to the on position and then to the start position.**

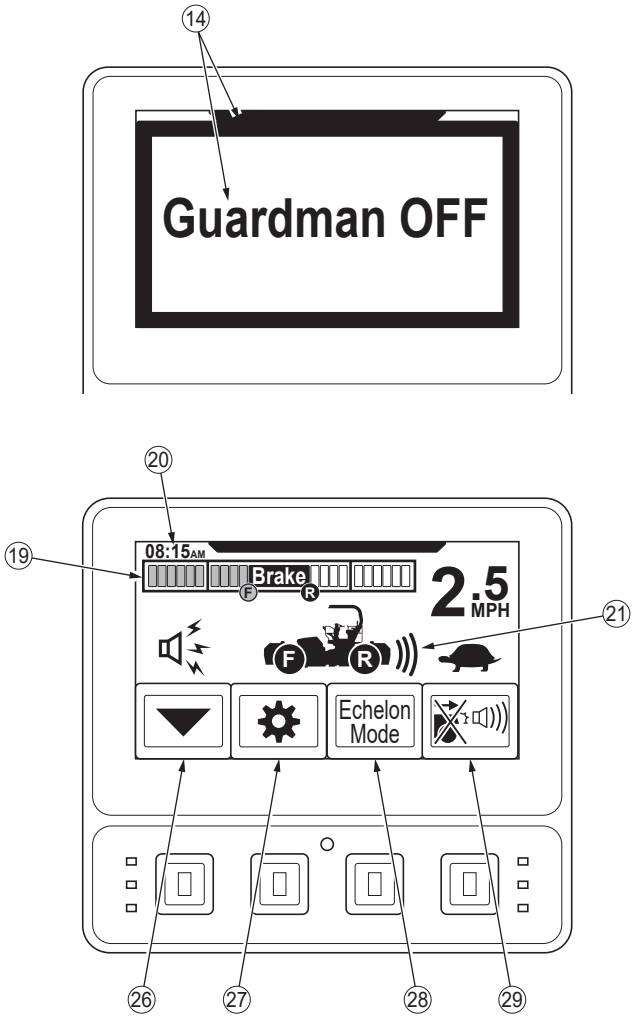
## 3.2 Turning off the ABAS

When the Starter switch of the machine is turned to the off position, the engine stops and the ABAS also turns off.

## 3.3 Contents of the display screen




Main screen




After switching the button assignment display

⑬Operating status display line
Displays the operating status of the ABAS and alarm functions.
- Green : Indicates that the ABAS and alarm functions are turned on.
- Orange flashing:
  Indicates that the ABAS is turned off and the alarm functions are turned on.
- Off : Indicates that the ABAS and alarm functions are turned off.

⑭Guardman OFF display
When the ABAS and alarm functions are turned off, Guardman OFF is displayed with a flashing red square frame.

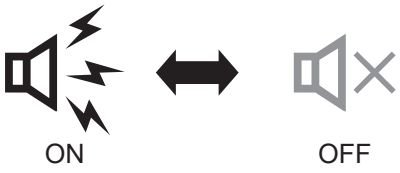

⑮Auto Brake Assist System ON/OFF display
Displays the operating status of the ABAS.
- Orange : Indicates that the ABAS is turned on.
- Gray : Indicates that the ABAS is turned off.


⑯Display of machine speed
The value displayed is equivalent to the “Rolling speed” displayed on the “EXACT COMPACT METER”.
It may differ from the speed used to control the ABAS.
- White : When the machine is within the speed range of the Guardman operating conditions.
- Gray : When an error has occurred. When the machine is outside the speed range of the Guardman operating conditions.
  (See “2.1 Conditions for operating the ABAS and the alarm functions”)

**NOTICE**

**The displayed machine speed is the speed used to control the ABAS and may differ from the actual machine speed.**

⑰Alarm function ON/OFF display
Displays the operating status of the Alarm function.
Orange: Indicates that the Alarm function is ON.
Gray : Indicates that the Alarm function is OFF.




⑱Speed stage display
Displays the speed stage selected with the Travel mode selector switch.
- Work condition : is displayed.
- Traveling : is displayed.

⑲ Distance bar

The length of the horizontal bar displays how far apart the object detected by the detection sensor is from the machine.
Short bar : The distance between the object and the machine is close.
Long bar : The distance between the object and the machine is far.

- The Distance bar is the longest when no object is detected.
- The distance represented by one hatch mark on the bar varies depending on the speed of the machine. The faster the speed of the machine, the longer the distance represented by one hatch mark.


- Distance bar status display

1) Brake

Displays the operating status of the ABAS.


Red : ABAS is operating
When the F-N-R lever is set to “Forward” or “Reverse”.
Gray : ABAS is not operating
When the F-N-R lever is set to “Neutral” or ABAS is off.

2) F

Displays the operating status of the front ABAS.


Orange: Front ABAS is operating
When “1) Brake” is red and the F-N-R lever is set to “Forward”.
ABAS is operating when there are no more “4) Hatch marks” up to “1) Brake”.
Gray : Front ABAS is not operating
When “1) Brake” is gray or the F-N-R lever is not set to “Forward”.

3) R

Displays the operating status of the rear ABAS.


Orange: Rear ABAS is operating
When “1) Brake” is red and the F-N-R lever is set to “Reverse”.
ABAS is operating when there are no more “4) Hatch marks” up to “1) Brake”.
Gray : Rear ABAS is operating
When “1) Brake” is gray or the F-N-R lever is not set to “Reverse”.

4) Hatch marks
The hatch marks on the left side of “1) Brake” indicate the approximate distance between the machine and the object in front, and the hatch marks on the right side of “1) Brake” indicate the approximate distance between the machine and the object behind.
White : Alarm functions are activated.
Gray : ABAS and alarm functions are not activated.

⑳ Time display
Displays the setting time.
It is hidden when it is set to be hidden in the settings.

**03:15PM**
12-hour system display

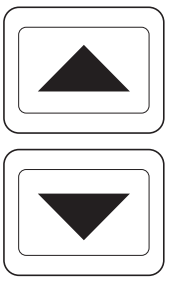
**15:15**
24-hour system display

㉑ Detection determination display
Displays the direction in which an object is being detected.
When it is displayed on the left side of ⑮ “Auto Brake Assist System ON/OFF display”, it is detecting an object in front of the machine.
When it is displayed on the right side, it is detecting an object behind the machine.

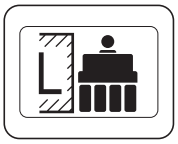

Forward sensor on


Reverse sensor on

㉒ ㉖ Button assignment display switch mark
Gray : When the button assignment display can be switched.

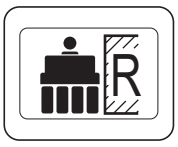

Button assignment display switch mark

㉓ Left side wall compaction mode mark
Orange: When the left side wall compaction mode is turned on.
Gray : When the left side wall compaction mode is turned off.
Orange frame, gray illustration:
When the left side wall compaction mode is automatically turned off.
Black : When the left side wall compaction mode is turned off and inactive.
When the echelon rolling mode is turned on.



Left side wall compaction mode mark

㉔Right side wall compaction mode mark
Orange: When the right side wall compaction mode is turned on.
Gray : When the right side wall compaction mode is turned off.
Orange frame, gray illustration:
When the right side wall compaction mode is automatically turned off.
Black : When the right side wall compaction mode is turned off and inactive.
When the echelon rolling mode is turned on.

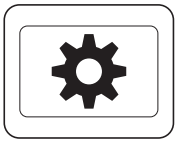


Right side wall compaction mode mark

㉕Auto Brake Assist System on/off mark
Orange: When the ABAS and alarm functions are on.
Gray : When the ABAS and alarm functions are manually turned off.
Orange frame, gray illustration:
When the ABAS and alarm functions are automatically turned off.


Auto Brake Assist System on/off mark

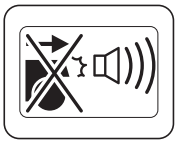
㉗Settings mark
Gray : When the settings can be changed.
Black : When the settings cannot be changed.
When the machine is moving.


Settings mark

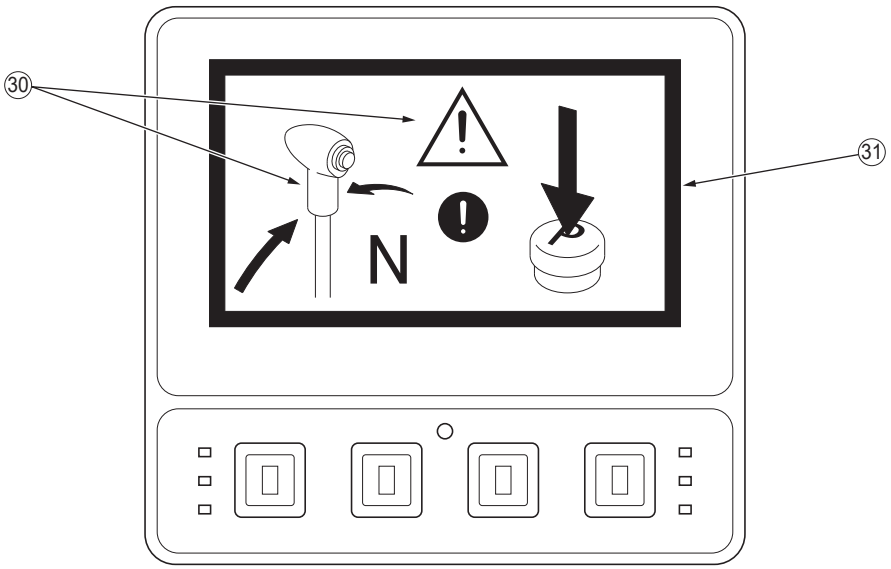
㉘Echelon Rolling mode mark
Orange: When the echelon rolling mode is turned on.
Gray : When the echelon rolling mode is turned off.
Orange frame, gray illustration:
When the echelon rolling mode is automatically turned off.

Echelon Rolling mode mark

㉙Alarm mode mark
Orange: When the alarm mode is turned on.
Gray : When the alarm mode is turned off.
Orange frame, gray illustration:
When the alarm mode is automatically turned off.
Black : When the alarm mode is turned off and inactive.
When the echelon rolling mode is turned on.


Alarm mode mark

**Alarm screen example**




㉚Alarm display
Various symbols and illustrations are displayed depending on the situation, and the display lights up or flashes.

㉛Outer frame
The Outer frame is displayed in various colors depending on the situation, and the frame lights up or flashes.

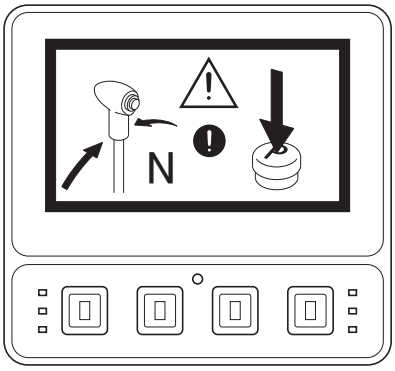
For details on the contents of the Alarm display, see “3.13 Alarm list (when an object is detected) and response actions”.

## 3.4 Procedure for releasing the ABAS after activation

When the ABAS has activated, the screen will show you how to release the ABAS.
The ABAS can be released using the following procedure.

1) Return the F-N-R lever to Neutral (N).
2) Press the Parking brake switch.

After performing the above steps, the ABAS function will be ON and ready to operate.



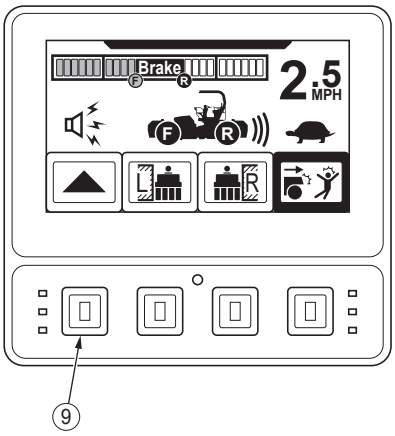

**NOTICE**

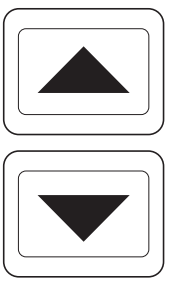
**On the screen, the Neutral (N) position is indicated by “N” and the Parking brake switch is indicated by “P”.**

*** Refer to the instruction manual for the machine being used for the locations of the F-N-R lever and parking brake switch.**

## 3.5 Switching the button assignment display

When the Button assignment display switch mark is displayed, the button assignment display can be switched by pressing the ⑨ “Button assignment display switch” button on the display.



Button assignment display switch mark

## 3.6 Left side wall compaction mode

The left side wall compaction mode can be used when the ABAS and alarm functions are turned on, or when the alarm mode is turned on.

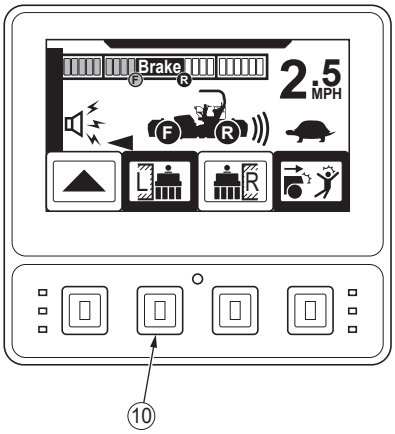
When the Left side wall compaction mode mark is displayed, press the ⑩ “Left side wall compaction mode” button on the display to switch the left side wall compaction mode on and off.

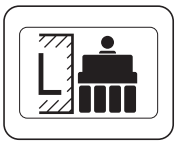
Orange: When the left side wall compaction mode is turned on.

Gray : When the left side wall compaction mode is turned off.

Orange frame, gray illustration: When the left side wall compaction mode is automatically turned off.

Black : When the left side wall compaction mode is turned off and inactive. When the echelon rolling mode is turned on.




Left side wall compaction mode mark

**⚠ WARNING**

**When using the left (or right) side wall compaction mode, the detection width will be narrowed, so be careful of the surrounding environment.**

## 3.7 Right side wall compaction mode

The Right side wall compaction mode can be used when the ABAS and alarm functions are turned on, or when the alarm mode is turned on.

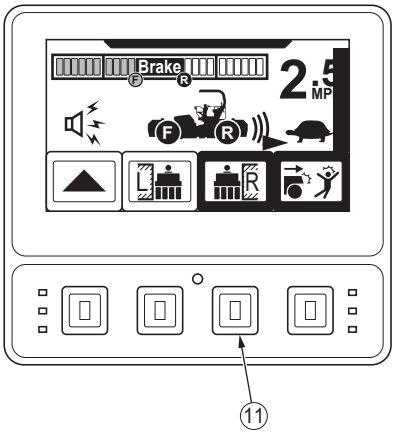
When the Right side wall compaction mode mark is displayed, press the ⑪ “Right side wall compaction mode” button on the display to switch the Right side wall compaction mode on and off.

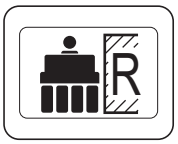
Orange: When the right side wall compaction mode is turned on.

Gray : When the right side wall compaction mode is turned off.

Orange frame, gray illustration:
When the right side wall compaction mode is automatically turned off.

Black : When the right side wall compaction mode is turned off and inactive.
When the echelon rolling mode is turned on.




Right side wall compaction mode mark

**⚠ WARNING**

**When using the left (or right) side wall compaction mode, the detection width will be narrowed, so be careful of the surrounding environment.**

**NOTICE**

**Use the side wall compaction mode in the following situations.**

- **When the ABAS is activated frequently while compacting close to a structure on the side of the machine.**
- **When there are many detection errors due to the adverse conditions in the surrounding environment.**

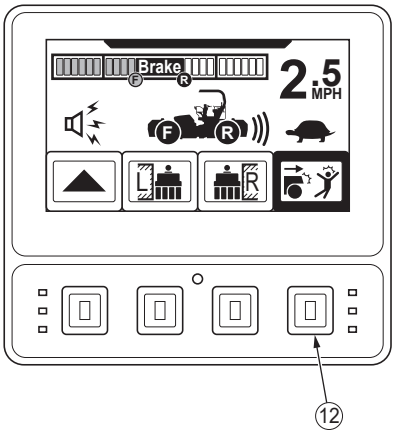
## 3.8 Turning the ABAS and alarm functions on and off.

When the Auto Brake Assist System on/off mark is displayed, press the ⑫ “Auto Brake Assist System on/off” button on the display to switch between the on and off states of the Auto Brake Assist System and alarm functions.

Orange: When the ABAS and alarm functions are on.

Gray : When the ABAS and alarm functions are off.

Orange frame, gray illustration:
When the ABAS and alarm functions are automatically turned off.




Auto Brake Assist System on/off mark

**⚠ WARNING**

**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

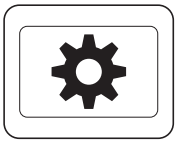
**NOTICE**

**Turn off the ABAS and alarm functions, or turn on the alarm mode in the following situations.**

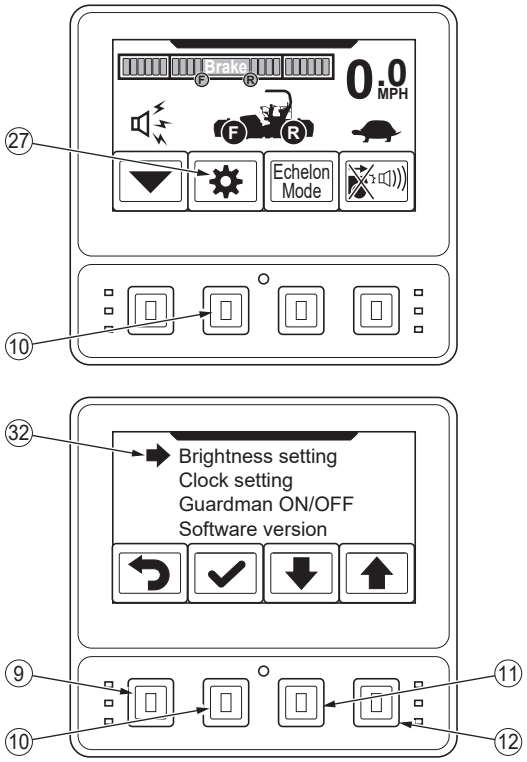
- **When compacting close to a structure located in front of and behind the machine.**
- **When loading and unloading to and from trucks, trains, ships, etc.**
- **When the machine is unstable due to an accident or breakdown.**
- **When there are many detection errors due to the adverse conditions in the surrounding environment.**
- **When driving on steep slope.**

## 3.9 Settings

When the ㉗ “Settings” mark is displayed, press the ⑩ “Settings” button on the display to display the settings screen.

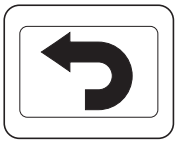


Settings mark



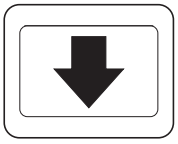

Settings screen

⑨“Back” button : Returns to the previous screen.
⑩“OK” button : Moves to the screen of the selected item.
⑪“Down” button : Selects the item below.
⑫“Up” button : Selects the item above.

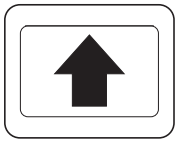


Back mark

OK mark



Down mark



Up mark

The item displayed to the right of the ㉜ “Select” mark is the currently selected item.

Select mark

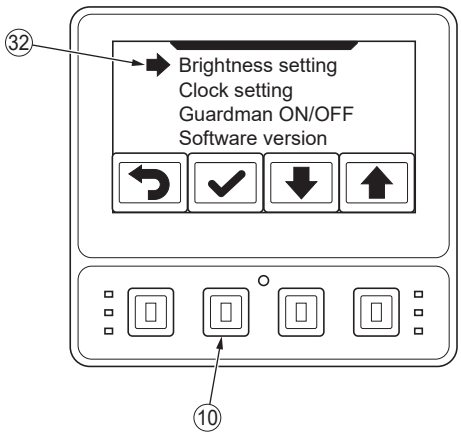
*If you operate the machine forward or backward while the Settings screen is displayed, the display will automatically switch to the Main screen after a certain period of time.

**⚠ WARNING**

**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

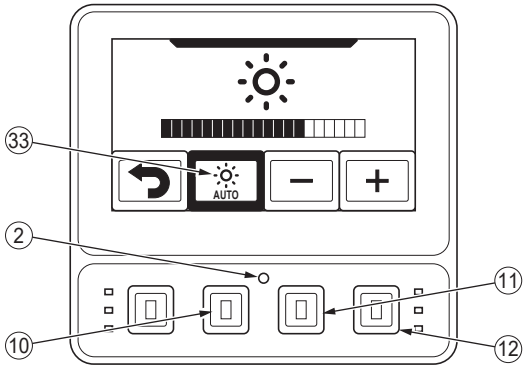
### 3.9.1 Brightness setting

When the ㉜ “Select” mark is displayed to the left of the “Brightness setting” on the Settings screen, press the ⑩ “OK” button to display the Brightness setting screen.




There are two modes available for setting the display brightness: Automatic and Manual.

* If you operate the machine forward or backward while the Brightness adjustment screen is displayed, the display will automatically switch to the Main screen after a certain period of time.

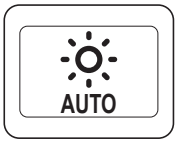



Brightness adjustment screen

**Setting the Automatic mode**

The procedure for setting the Automatic mode is as follows.

1) Press the ⑩ “Manual” button.
2) When the mark switches to the ㉝ “AUTO” mark, the setting is complete.




AUTO mark

Manual mark

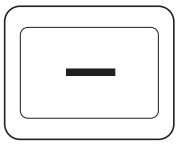
**⚠ CAUTION**

**Do not cover the ② light-receiving part of the brightness adjustment sensor with a cloth.**
**Since the display brightness is adjusted based on data from the brightness adjustment sensor, the visibility of the display may decrease.**

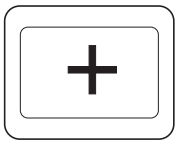
**Setting the Manual mode**

The procedure for setting the Manual mode is as follows.

1) Press the ⑩ “AUTO” button.
2) When the mark switches to the ㉝ “Manual” mark, the setting is complete.
   ⑪ “−” button: Brighten
   ⑫ “+” button: Darken



“ - ” mark



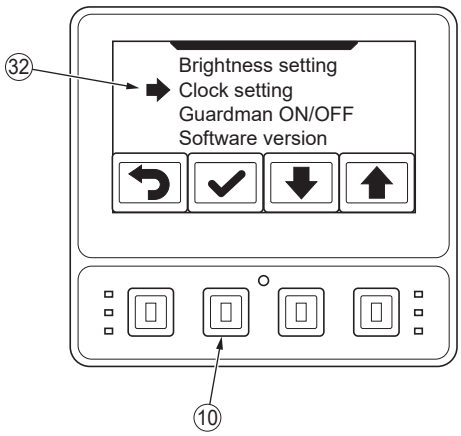
“ + ” mark

**⚠ WARNING**

**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

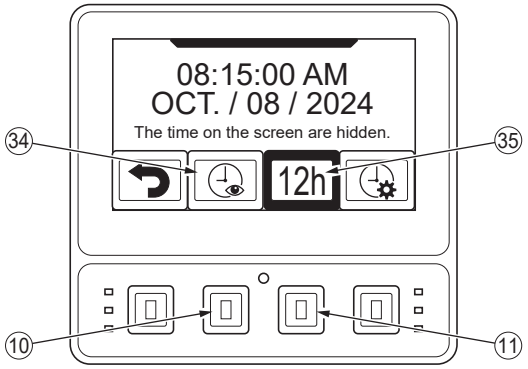
### 3.9.2 Clock setting

When the ㉜ “Select” mark is displayed to the left of “Clock setting” on the Settings screen, press the ⑩ “OK” button to display the Clock setting screen.




On this screen, you can change the display settings of the clock displayed in the upper left corner of the screen.

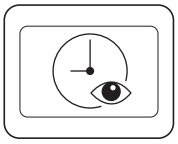
* If you operate the machine forward or backward while the Clock setting screen is displayed, the display will automatically switch to the Main screen after a certain period of time.




Clock setting screen

**Setting the time display**

When the ㉞ “Time display” mark is displayed, press the ⑩ “Time display” button on the display to switch between displaying and hiding the clock in the upper left corner of the screen.
Orange: The time is displayed.
Gray : The time is not displayed.



Time display mark

**Setting the 12-hour system**

The procedure for setting the 12-hour system is as follows.
1) Press the ⑪ “24-hour system” button.
2) When the mark switches to the ㉟ “12-hour system” mark, the setting is complete.


12-hour system mark

**Setting the 24-hour system**

The procedure for setting the 24-hour system is as follows.

1) Press the ⑪ “12-hour system” button.
2) When the mark switches to the ㉟ “24-hour system” mark, the setting is complete.

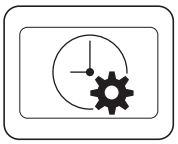

24-hour system mark

**⚠ WARNING**

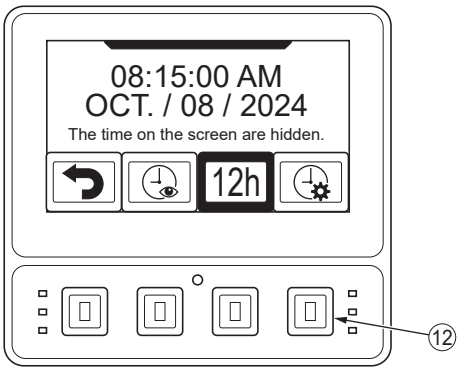
**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

### 3.9.2.1 Setting date and time

Press the ⑫ “Setting date and time” button on the Clock setting screen to display the Setting date and time screen.

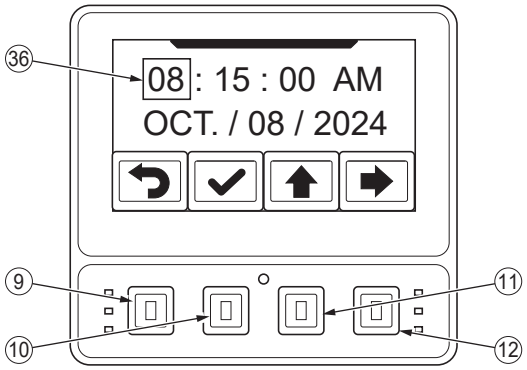


Setting date and time mark




This screen allows you to set the date and time shown on the display.

*If you operate the machine forward or backward while the Setting date and time screen is displayed, the display will automatically switch to the Main screen after a certain period of time.



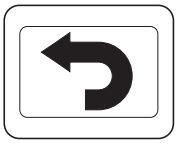

Setting date and time screen

⑨“Back” button: Returns to the Clock setting screen without changing the date and time.

⑩“OK” button : Updates the date and time and moves to the Clock setting screen.

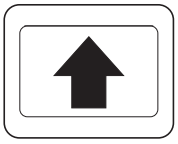
⑪“Change value” button: Changes the value of the selected item.

⑫“Change item” button: Changes the selected item.

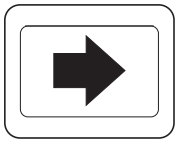


Back mark

OK mark



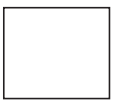
Change value mark



Change item mark

⑯ The item surrounded by the “Select” mark is the currently selected item.

*⑯ The “Select” mark is a square frame that changes depending on the value.



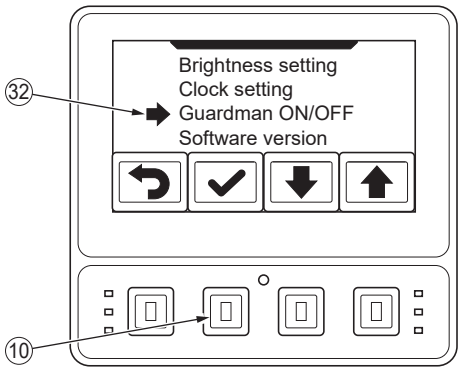
Select mark

**⚠ WARNING**

**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

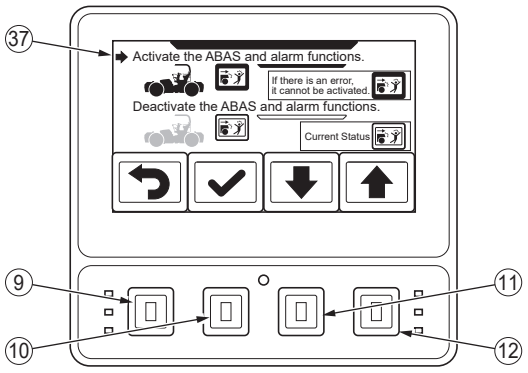
### 3.9.3 Guardman ON/OFF

When the ㉜ “Select” mark is displayed to the left of “Guardman ON/OFF” on the Settings screen, press the ⑩ “OK” button to display the Guardman ON/OFF screen.



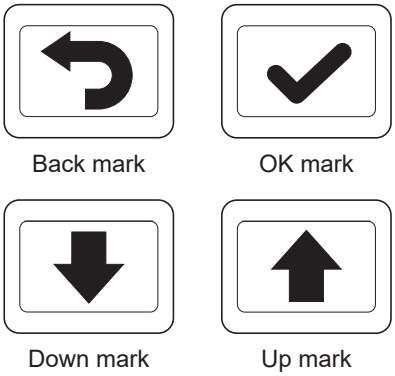

On this screen, you can switch the ABAS and alarm functions on and off instead of using “3.8 Turning the ABAS and alarm functions on and off.”

* If you operate the machine forward or backward while the Guardman ON/OFF screen is displayed, the display will automatically switch to the Main screen after a certain period of time.




Guardman ON/OFF screen

⑨ “Back” button : Returns to the Settings screen without switching Guardman on or off.
⑩ “OK” button : Switches the setting to the selected item.
⑪ “Down” button : Changes the selected item.
⑫ “Up” button : Changes the selected item.



Back mark OK mark

Down mark Up mark

㊲ The item displayed to the right of the “Select” mark is the currently selected item.

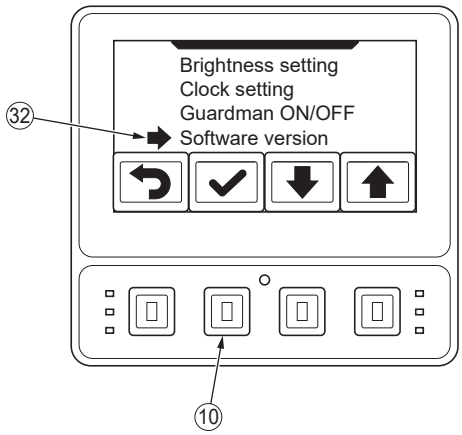
Select mark

**⚠ WARNING**

**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

### 3.9.4 Version Information

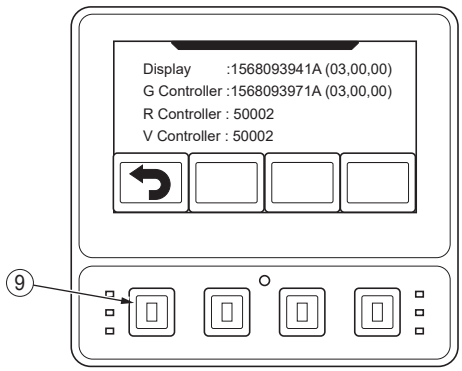
When the ㉜ “Select” mark is displayed to the left of “Software version” on the Settings screen, press the ⑩ “OK” button to display the Version information screen.




This screen displays the software version information.

* If you operate the machine forward or backward while the Version information screen is displayed, the display will automatically switch to the Main screen after a certain period of time.

⑨“Back” button : Returns to the Settings screen.

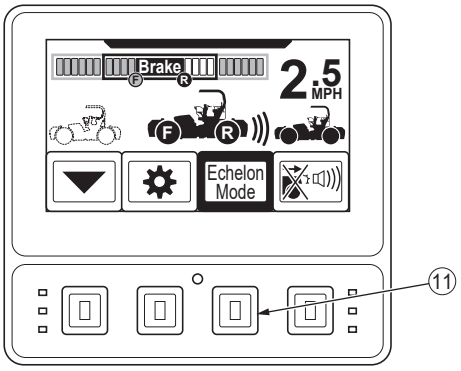



Version information screen

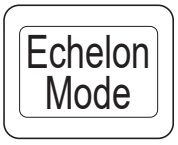
**⚠ WARNING**

**Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

## 3.10 Echelon Rolling mode



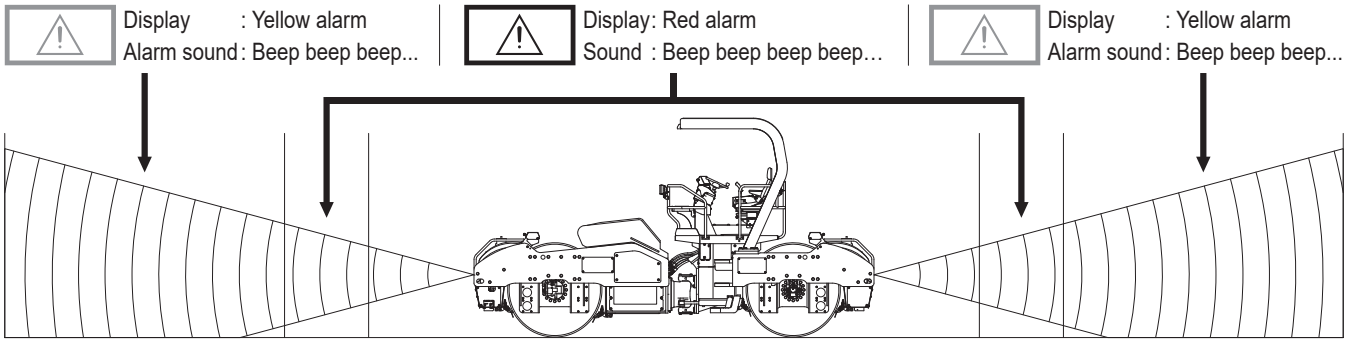

When the “Echelon Rolling mode” mark is displayed, pressing the ⑪ “Echelon Rolling mode” button on the display will switch the Echelon Rolling mode on and off.
When you turn on the Echelon Rolling mode, the ABAS and alarm functions are turned on.
Orange: When the echelon rolling mode is turned on.
Gray : When the echelon rolling mode is turned off.
Orange frame, gray illustration:
When the echelon rolling mode is automatically turned off.



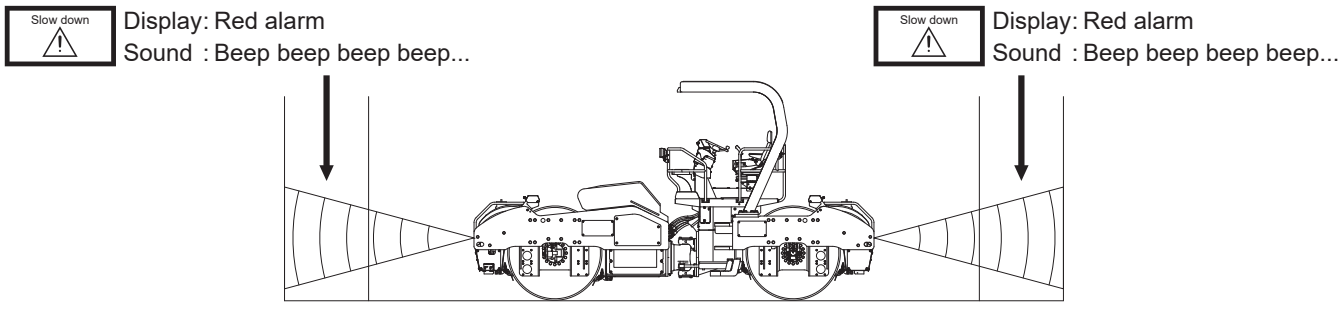
Echelon Rolling mode mark

Echelon Rolling mode is used for situations where multiple machines are running side by side in the same direction.
Echelon Rolling mode has a shorter warning area, allowing machines to get closer to each other than in Standard mode.
When an alarm sounds in Echelon Rolling mode, this indicates that the distance between machines is too close, so immediately reduce the speed and take other actions to move away from the other machines.

### Standard




### Echelon Rolling mode



**Basic precautions for safety**

**■Refrain from inattentive driving**

- Inattentive driving can cause an accident.
- Use extreme care for the safety of others in the path of the machine or around it. In case of danger, stop and sound the horn to warn others.

**■When changing the traveling direction, make sure it is safe to do so in the path of the traveling direction**

After you switch the F-N-R lever, if ABAS activates in response to a machine following behind, there is a risk that the following machine may rear-end this machine, so check that the direction you are traveling is safe before switching the F-N-R lever.

**■Keep a sufficient distance between this machine and other machines**

If another machine suddenly approaches and this machine's ABAS is activated, this machine will not be able to move until you deactivate the ABAS, and this machine may be rear-ended.

**■Inform other drivers**

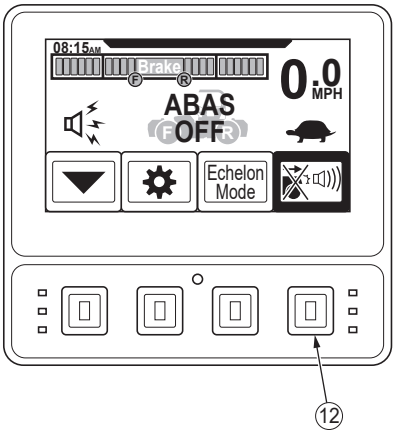
As this machine may suddenly stop due to the activation of ABAS, inform other drivers of this machine to understand the braking distance and to drive with a sufficient distance.

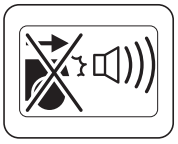
**■We recommend using a machine with ABAS when performing echelon compaction.**

Machines with ABAS may stop suddenly, so we recommend that all of the machines running side by side also use our rollers with ABAS.

## 3.11 Alarm mode

When the Alarm mode mark is displayed, pressing the ⑫ “Alarm mode” button on the display will switch the alarm mode on and off.
Orange: When the alarm mode is turned on.
Gray : When the alarm mode is turned off.
Orange frame, gray illustration:
When the alarm mode is automatically turned off.
Black : When the alarm mode is turned off and inactive.
When the echelon rolling mode is turned on.



Alarm mode mark

**NOTICE**

**When the alarm mode is turned on, only the alarm function operates without the ABAS.**

**⚠ WARNING**

- **If you must unavoidably use the alarm mode, pay close attention to the safety of the surrounding environment.**
- **Do not operate or stare at the display while driving as doing so could cause a collision. Be sure to stop the machine in a safe place and press the Parking brake switch to the on position before operating the machine.**

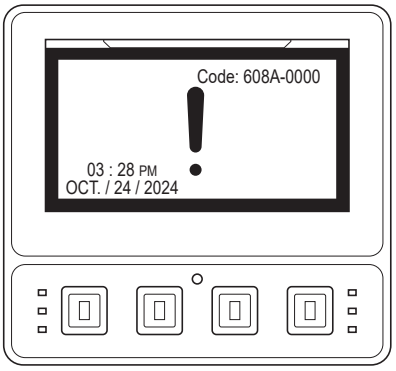
**NOTICE**

**Turn on the alarm mode or turn off the ABAS and alarm functions in the following situations.**

- **When compacting close to a structure located in front of and behind the machine.**
- **When loading and unloading to and from trucks, trains, ships, etc.**
- **When the machine is unstable due to an accident or breakdown.**
- **When there are many detection errors due to the adverse conditions in the surrounding environment.**

## 3.12 Error information

An error is displayed on the screen if any abnormality occurs in the ABAS.
Contact your dealers when an error is displayed.




**Error code** *: Value range 0 to F (hex)

**Code: 6 * * * - * * * ***

The display detects errors.

| * | Error Summary |
|---|---|
| 1 | Communication system error |
| 2 | Failure of Guardman controller |
| 4 | Failure of A controller |
| 8 | Failure of B controller |

The controller detects errors.

| * | Error Summary |
|---|---|
| 1 | Failure of front detection sensor system |
| 2 | Failure of rear detection sensor system |
| 4 | Failure of A controller |
| 8 | Failure of B controller |

The controller detects errors.

| * | Error Summary |
|---|---|
| 2 | The A controller or B controller has determined that the machine speed sensor has failed. |
| 8 | Failure of the display system |

The controller detects errors.

| * | Error Summary |
|---|---|
| 2 | The Guardman controller has determined that the machine speed sensor has failed. |

The controller detects errors.

| * | Error Summary |
|---|---|
| 8 | During Emergency traveling |

The controller detects errors.

| * | Error Summary |
|---|---|
| 1 | Failure of the front right side detection sensor system |
| 4 | Failure of the front left side detection sensor system |

The controller detects errors.

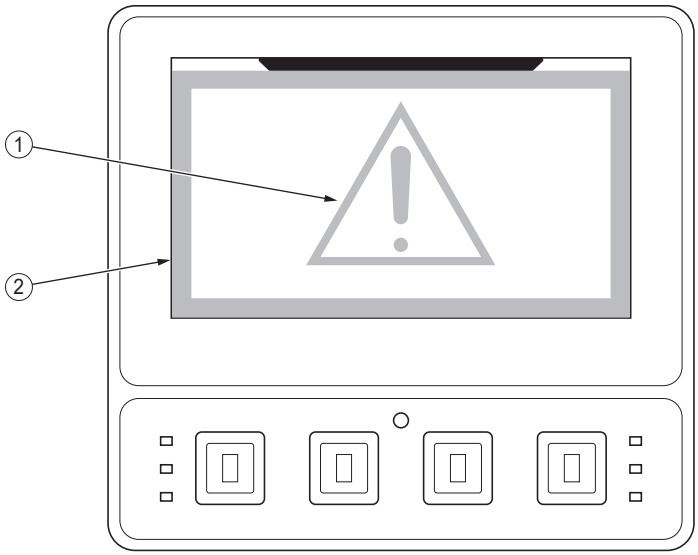
| * | Error Summary |
|---|---|
| 1 | Failure of the rear left side detection sensor system |
| 4 | Failure of the rear right side detection sensor system |

• Refer to the table below to convert alphanumeric characters that are not listed in the table.

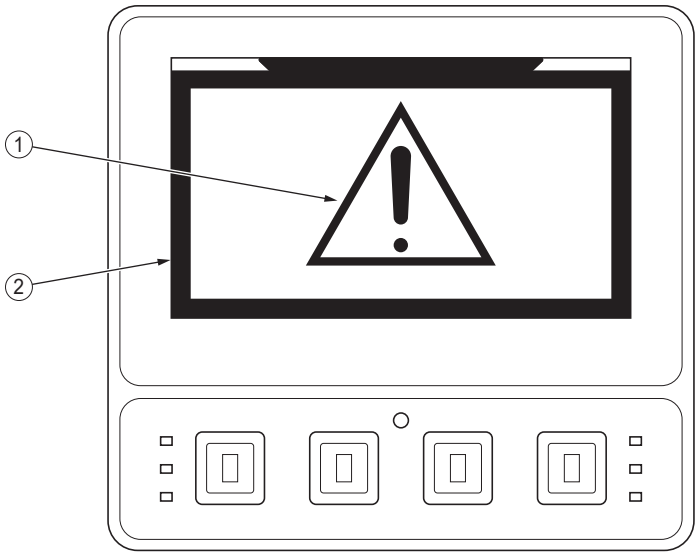
| Alphanumeric characters of * | 3 | 5 | 6 | 7 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Error combination E.G. →A → Errors 2 and 8. | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 4 | 1 | 2 | 1 |
| | 2 | 4 | 4 | 2 | 8 | 8 | 2 | 8 | 4 | 4 | 2 |
| | | | | 4 | | | 8 | | 8 | 8 | 4 |
| | | | | | | | | | | | 8 |

| 0 | Not applicable |
|---|---|

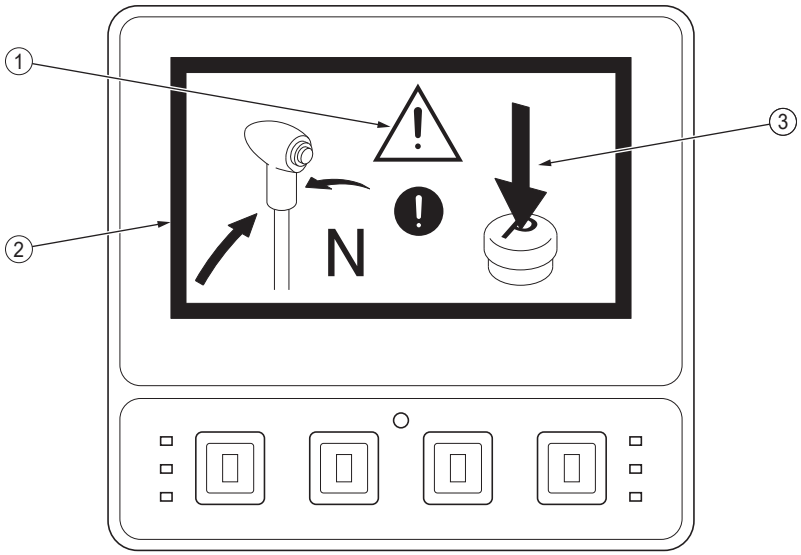
## 3.13 Alarm list (when an object is detected) and response actions




| | |
|---|---|
| Alarm description | • Display: ① “ ⚠ ” and ② “Outer frame” are flashing in yellow.<br>• Alarm sound: “Beep beep beep…” sound (Auto Brake Assist System, alarm mode) is played. (Regarding the alarm sound timing, the alarm sound plays when an object is detected, and the sound is repeated while there is a risk of collision.) |
| State | • An object is detected in the detection area and there is a risk of collision.<br>• The ABAS is not activated. |
| Response action | • Check and avoid the danger.<br>Avoidance procedure : ○ Step on the Brake pedal<br>○ Move the F-N-R lever to Neutral (N), or move the lever to Forward (F) after checking the safety of the area ahead of the machine, or move the lever to Reverse (R) after checking the safety of the area behind of the machine.<br>○ Stop the machine in a safe place and move the object out of the detection area.<br>• If the alarm symbol is constantly displayed or the alarm sound replayed with no influences from the surrounding environment and no object present, contact your dealer. |
| Notice | • The alarm sound is played from the speaker.<br>• When the ABAS and alarm functions are turned off, the Alarm display will not appear and the alarm sound will not be played. |




| | |
|---|---|
| Alarm description | • Display: ① “ ⚠ ” and ② “Outer frame” are flashing in red.<br>• Alarm sound: “Beep beep beep beep...” (Auto Brake Assist System, alarm mode) is played. Sounds at shorter intervals than in the flashing yellow state (see page 44).<br>(Regarding the alarm sound timing, the alarm sound plays when an object is detected, and the sound is repeated while there is a high risk of collision.) |
| State | • The risk of a collision is determined to be higher than that of the flashing yellow condition (see page 44).<br>• The ABAS is not activated. |
| Response action | • Check and avoid the danger.<br>Avoidance procedure: Step on the Brake pedal<br>• If the alarm symbol is constantly displayed or the alarm sound replayed with no influences from the surrounding environment and no object present, contact your dealer. |
| Notice | • The alarm sound is played from the speaker.<br>• When the ABAS and alarm functions are turned off, the Alarm display will not appear and the alarm sound will not be played. |




| | |
|---|---|
| Alarm description | • Display:<br>① " ⚠ " and ② "Outer frame" are lit in red.<br>③ "Return the F-N-R lever to N and press P" animation is displayed.<br>* On the screen, the Neutral (N) position is indicated by "N" and the Parking brake switch is indicated by "P".<br>• Alarm sound:<br>A long "Beep" sound is played.<br>(Regarding the alarm sound timing, the alarm sounds continuously from activation until deactivation of ABAS.) |
| State | • The Auto Brake Assist System has activated and the machine is decelerating or stopping. |
| Response action | • Check and avoid the danger.<br>Avoidance procedure: Step on the Brake pedal.<br>• After the machine stops, check the safety of the surrounding environment.<br>• Release the ABAS.<br>Release procedure: Return the F-N-R lever to Neutral (N) and press the Parking brake switch.<br>• If the ABAS continues to be activated, the alarm symbol is constantly displayed or the alarm sound replayed with no influences from the surrounding environment and no object present, contact your dealer. |
| Important | • By stepping on the Brake pedal after the ABAS is activated, the braking distance is shortened and the possibility of a collision is decreased.<br>• When Guardman ABAS is activated and the machine comes to a sudden stop, the drums and/or tires may shove the asphalt mat or soil and cause cracking. |
| Notice | • After the ABAS is activated, it will not be released even if you turn off the ABAS and alarm functions (see page 28).<br>It is necessary to follow the procedure for releasing the ABAS after activation.<br>• After the ABAS is activated, the speaker will play a "Beep Beep Beep Beep..." alarm sound until the machine comes to a stop. |

# 4 INSPECTION AND MAINTENANCE

## 4.1 Inspection before starting work

To be sure the Auto Brake Assist System (“ABAS”) will work properly, it is important to perform a daily inspection before starting work. Perform the following safety checks.

- Is the surface of the Millimeter-wave radar display scratched or dirty?
- Are there any loose bolts and nuts?
- Is the mounting of the equipment damaged or deformed?
- Is there any evidence that something has collided with the equipment?

After checking the above points, start the ABAS and check the display for any error information. Press each operation button and be sure that it works normally.
If nothing is displayed on the display even after starting the engine of the machine, it is possible that the ABAS has failed to start, the system itself has failed, or the display function of the system has failed.
Stop the engine once and start the engine again. If the condition does not improve, contact your dealer.

**⚠ WARNING**

**If the ABAS is not maintained or used in an abnormal state, the ABAS may not operate properly and could lead to an accident.**

## 4.2 Maintenance

- Regularly check the surface of the Millimeter-wave radar display for dirt and scratches.
- If the Millimeter-wave radar surface is stained by water or oil, it will affect the performance of the object detection. Be sure to wipe the surface clean.
- Gently wipe the water or oil off the surface using a cotton swab or a clean, soft cloth such as gauze.

**⚠ WARNING**

**Do not disassemble the ABAS. The system may not perform properly if the mounting position is different, and this could also lead to failures, detection errors, or malfunctions.**

## 4.3 Inspecting the parking brake

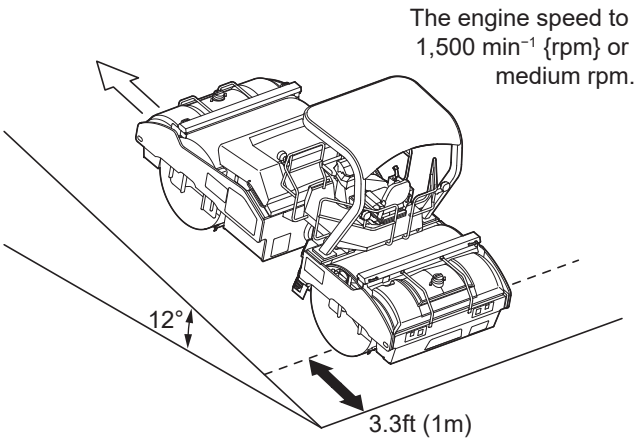
Every 500 hours or 3 months, or each time after brake pedal is used.
This inspection should also be performed when the ABAS is activated. If the inspection is not performed, the Parking brake may not function properly and a serious accident could occur.

**⚠ WARNING**

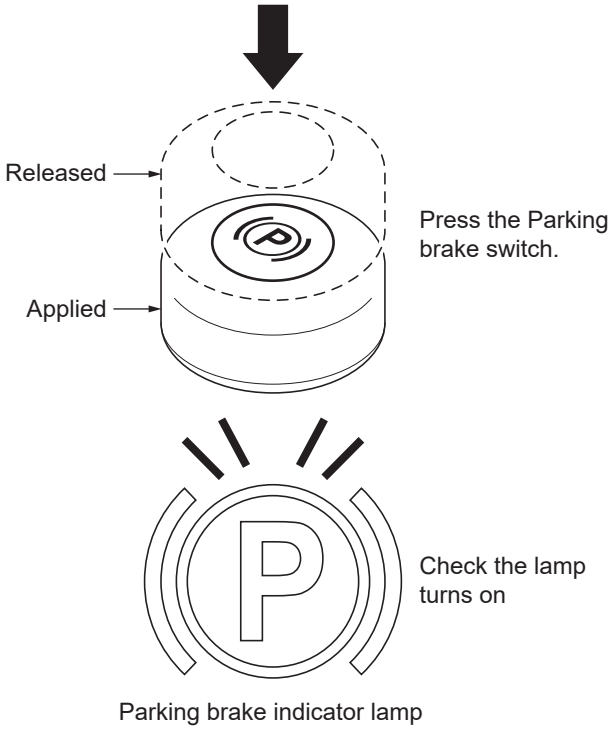
- **Make sure there are no people or obstacles near the machine to ensure safety.**
- **Keep your hands on the F-N-R lever and the Steering wheel during this inspection. The machine may move unexpectedly during the inspection, which may lead to accidents.**

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

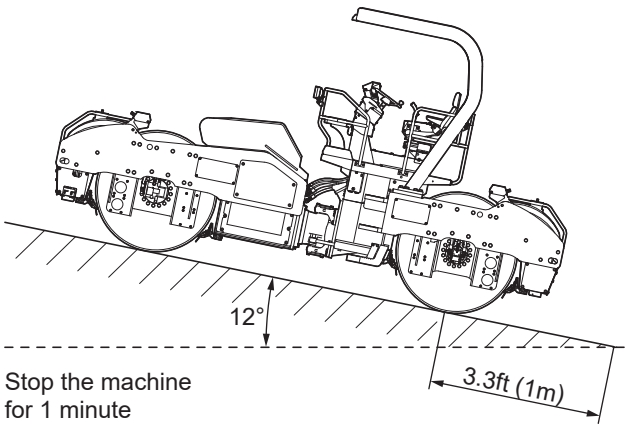
2) With the engine running, move the machine upward by 12° (20%) (slope with upward inclination of 12°) on a hard surface such as asphalt pavement.




3) Press the Parking brake switch Ⓟ to engage the parking brake. Check that the Parking brake indicator lamp Ⓟ turns on.
If the lamp Ⓟ 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**

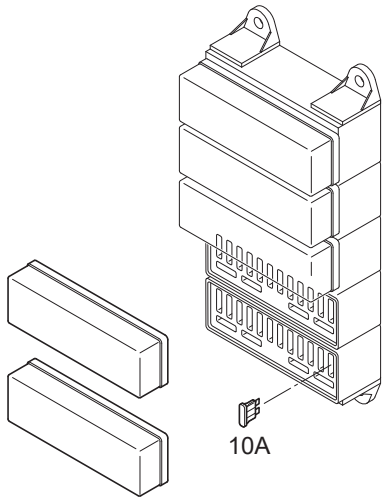
- **This inspection should be performed each time the Brake pedal in used. If not inspected, the Parking brake may malfunction the next time when you try to use it, resulting in a serious accident.**
- **Modify the machine. Please do not modify the machine without the permission for safety reasons. We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

## 4.4 Fuses

**⚠ WARNING**

**When changing a fuse, turn off the power supply by turning the Starter switch to the OFF position.**
**Changing fuses without turning off the power supply may cause a fire, a electric shock or malfunction.**

Refer to the instruction manual for the machine being used for the installation location of the fuse box.




- The ABAS uses fuses that are located where it is labeled AUTO BRAKE ASSIST SYSTEM.
- Change any fuse which has become powder-coated due to deterioration or where the fuse is loose in the fuse holder.
- Remove cover and replace the fuse.
- Be sure to use fuses of correct capacity.
- Always use genuine fuses.

**⚠ WARNING**

- **If a fuse blows, the ABAS will not operate.**
- **When replacing the fuses, be sure to replace them with fuses of the same capacity. Using a fuse that exceeds the specified capacity may cause a fire or malfunction.**

**NOTICE**

**When a fuse blows, investigate the cause before replacing it.**

## 4.5 Regular inspections

**⚠ WARNING**

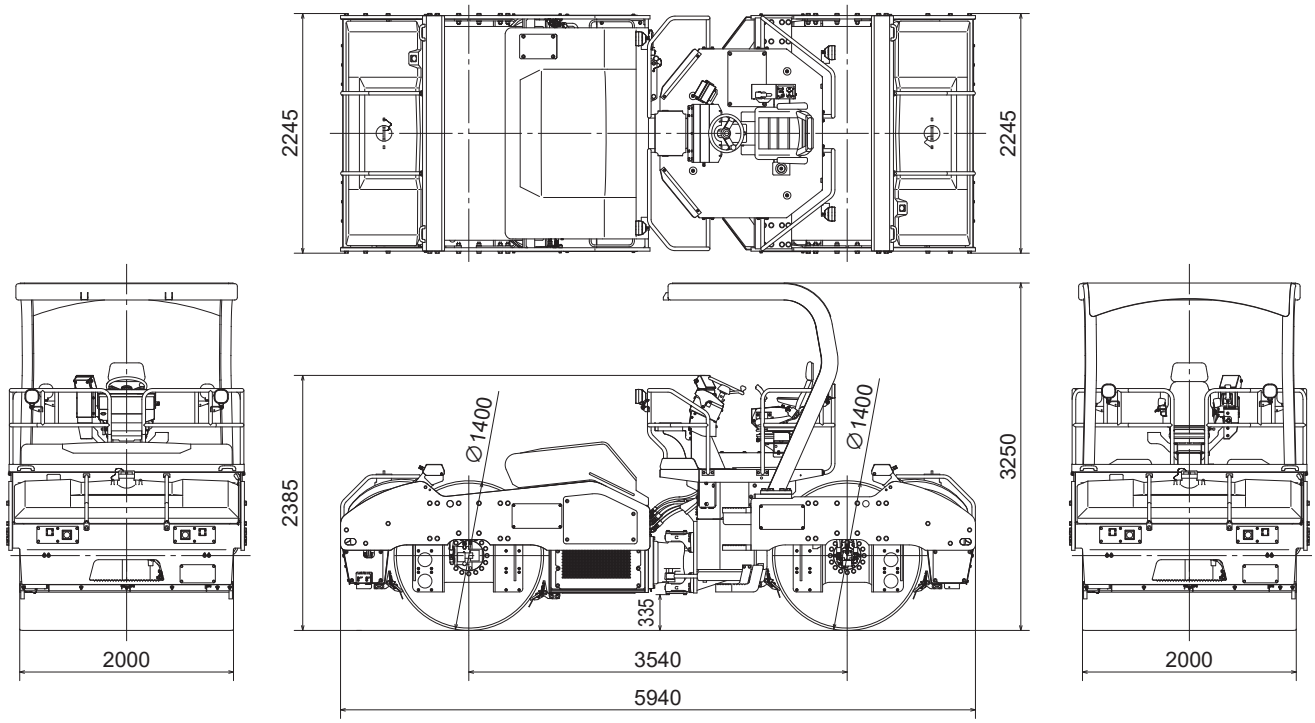
**In order to ensure safety, ask your dealer to inspect and perform maintenance on the system once a year.**

## 4.6 Warranty, disclaimer

- The product warranty varies depending on the country, please check with the local SAKAI dealer.
  Contact your dealer if a failure occurs under normal operating conditions within this warranty period.
  However, if “4.5 Regular inspections” is not performed, the warranty is not applicable.
- If you disassemble the ABAS, the warranty will be voided and the system will not be covered.
- Our company is not responsible for any personal injury, damage to property, or malfunctions caused by a disassembled or modified ABAS or use of the system under abnormal conditions.
- Our company is not responsible for any damage to the road surface caused by the activation of the ABAS.
- The purpose of the ABAS is to assist in avoiding collisions when the machine is moving or to reduce collision damage, but the system does not avoid collisions or reduce collision damage in all situations. Our company is not responsible for accidents resulting in injury or property damage that occur when the ABAS does not activate or when a collision cannot be avoided even when the ABAS does activate.

# 5 OVERVIEW AND SPECIFICATIONS

[SW884 Guardman]



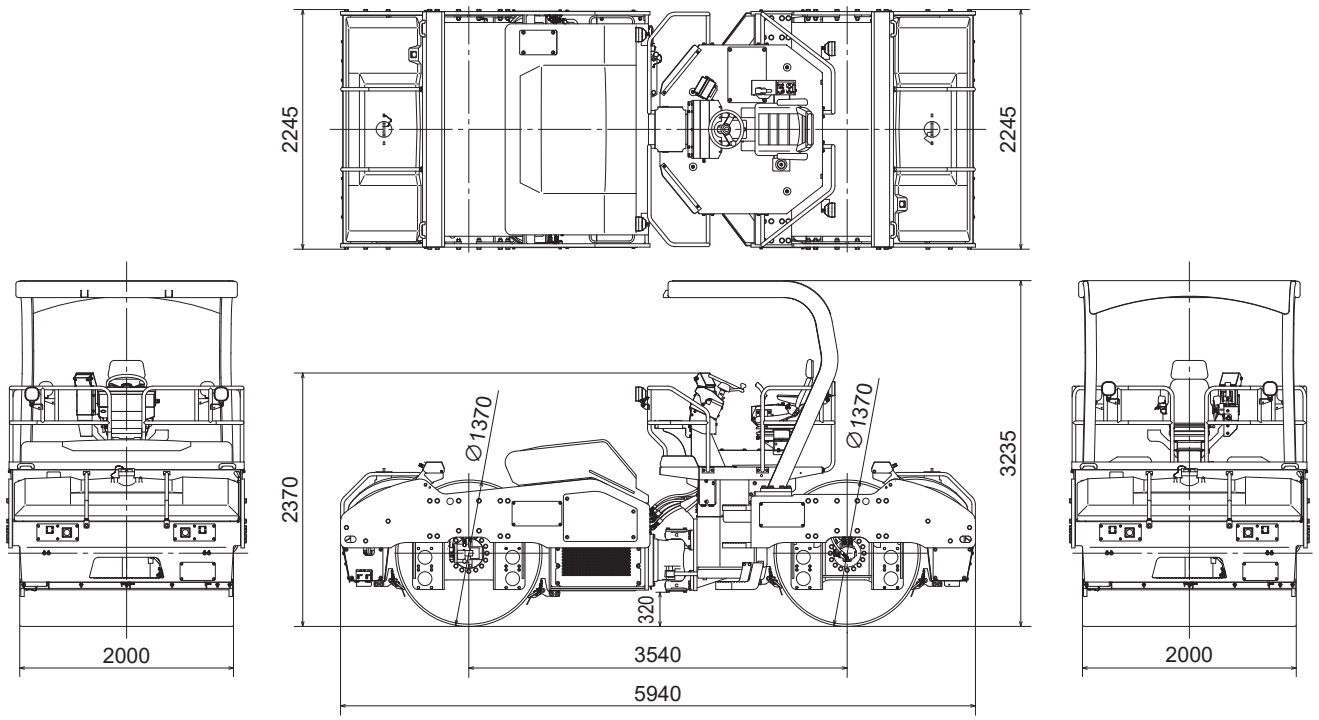

| Model | SW884 |
|---|---|
| **Weight** | |
| Operating weight | 12,890 kg (28,415 lbs) |
| On front axle | 6,350 kg (14,000 lbs) |
| On rear axle | 6,540 kg (14,420 lbs) |
| **Dimension** | |
| Overall length | 5,940 mm (234”) |
| Overall width | 2,245 mm ( 88”) |
| Overall height | 3,250 mm (128”) |
| Wheelbase | 3,540 mm (139”) |
| Wheel | |
| 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”) |
| **Performance** | |
| 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”) |

| Vibrating power | | | |
|---|---|---|---|
| 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) | |

| Engine | |
|---|---|
| Model | CUMMINS “QSF3.8” Diesel Engine with turbo charger |
| Total displacement | 3.800 liters (229 cu.in) |
| Rated output | 97 kW (130 HP) / 2,200 $min^{-1}$ |
| Max. torque | 488 N·m / 1,600 $min^{-1}$ |
| **Tank capacity** | |
| 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 European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

[SW884ND Guardman]

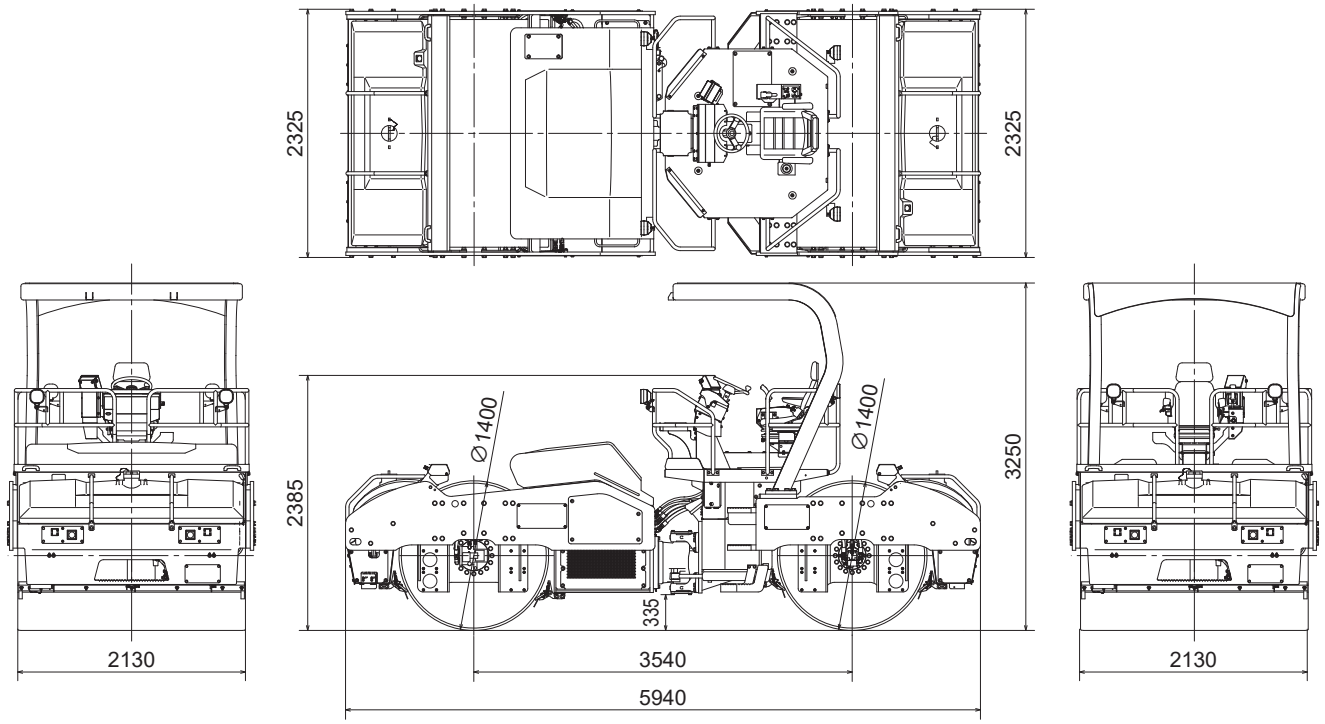



| Model | SW884ND |
|---|---|
| **Weight** | |
| Operating weight | 13,230 kg (29,165 lbs) |
| On front axle | 6,520 kg (14,375 lbs) |
| On rear axle | 6,710 kg (14,795 lbs) |
| **Dimension** | |
| Overall length | 5,940 mm (234”) |
| Overall width | 2,245 mm ( 88”) |
| Overall height | 3,235 mm (127”) |
| 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”) |
| **Performance** | |
| 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”) |

| | |
|---|---|
| **Vibrating power** | |
| 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) |
| **Engine** | |
| Model | CUMMINS “QSF3.8” Diesel Engine with turbo charger |
| Total displacement | 3.800 liters (229 cu.in) |
| Rated output | 97 kW (130 HP) / 2,200 $min^{-1}$ |
| Max. torque | 488 N·m / 1,600 $min^{-1}$ |
| **Tank capacity** | |
| 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 European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

[SW994 Guardman]



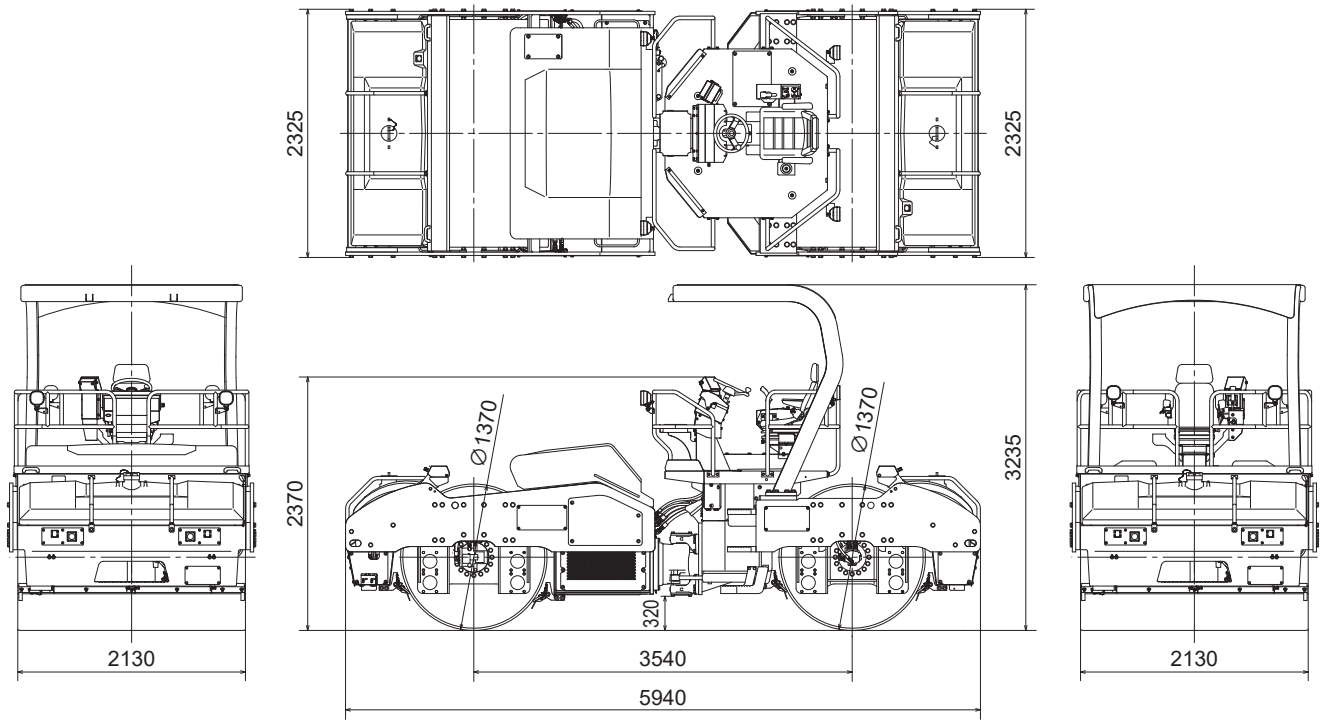

| Model | SW994 |
|---|---|
| **Weight** | |
| Operating weight | 13,270 kg (29,255 lbs) |
| On front axle | 6,530 kg (14,395 lbs) |
| On rear axle | 6,740 kg (14,860 lbs) |
| **Dimension** | |
| Overall length | 5,940 mm (234”) |
| Overall width | 2,325 mm ( 92”) |
| Overall height | 3,250 mm (128”) |
| Wheelbase | 3,540 mm (139”) |
| Wheel | |
| 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”) |
| **Performance** | |
| 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”) |

| Vibrating power | | | |
|---|---|---|---|
| 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) | |

| Engine | |
|---|---|
| Model | CUMMINS “QSF3.8” Diesel Engine with turbo charger |
| Total displacement | 3.800 liters (229 cu.in) |
| Rated output | 97 kW (130 HP) / 2,200 $min^{-1}$ |
| Max. torque | 488 N·m / 1,600 $min^{-1}$ |
| **Tank capacity** | |
| 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 European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

[SW994ND Guardman]




| Model | SW994ND |
|---|---|
| **Weight** | |
| Operating weight | 13,590 kg (29,960 lbs) |
| On front axle | 6,690 kg (14,750 lbs) |
| On rear axle | 6,900 kg (15,210 lbs) |
| **Dimension** | |
| Overall length | 5,940 mm (234”) |
| Overall width | 2,325 mm ( 92”) |
| Overall height | 3,235 mm (127”) |
| Wheelbase | 3,540 mm (139”) |
| Wheel | |
| Front | Roll (dia. x width) |
| | 1,370 x 2,130 mm (54” x 84”) |
| Rear | Roll (dia. x width) |
| | 1,370 x 2,130 mm (54” x 84”) |
| **Performance** | |
| 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”) |

| | |
|---|---|
| **Vibrating power** | |
| 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) |
| **Engine** | |
| Model | CUMMINS “QSF3.8” Diesel Engine with turbo charger |
| Total displacement | 3.800 liters (229 cu.in) |
| Rated output | 97 kW (130 HP) / 2,200 $min^{-1}$ |
| Max. torque | 488 N·m / 1,600 $min^{-1}$ |
| **Tank capacity** | |
| 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 European Standards (EN500-1, ISO 6165, etc.), the weight are defined as follows.
Operating weight : Fuel=50%, Water=50%, Operator=75kg.

***MEMO***

**SAKAI AMERICA, INC.**

90 INTERNATIONAL PKWY ADAIRSVILLE,
GA 30103
Phone : 770-877-9433
Fax : 770-877-9886

2025.03.dataonly ① TI

SAKAI HEAVY INDUSTRIES, LTD.