

⚠ 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 → 3SW79-40154
SW884ND → 3SW79-40154
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.

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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 when the machine is moving, but the system does not avoid collisions or reduce collision damage in all situations. But drivers should always take responsibility for being 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 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.

⚠ 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).

1 SAFETY NOTICES

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.

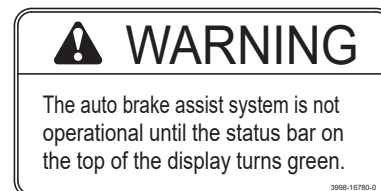
①3998-16777-1



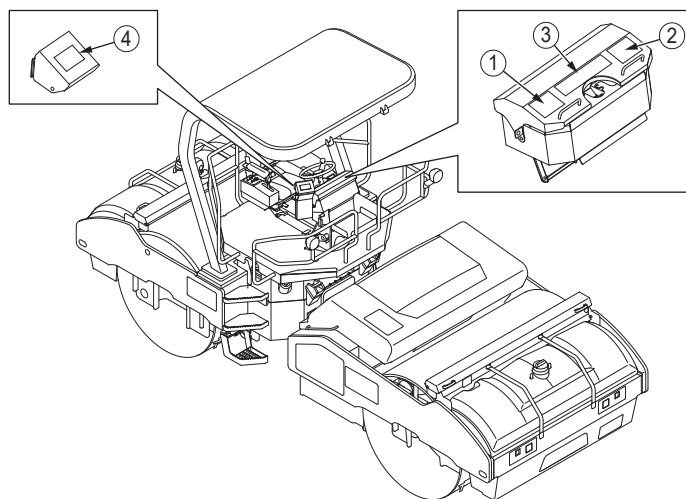
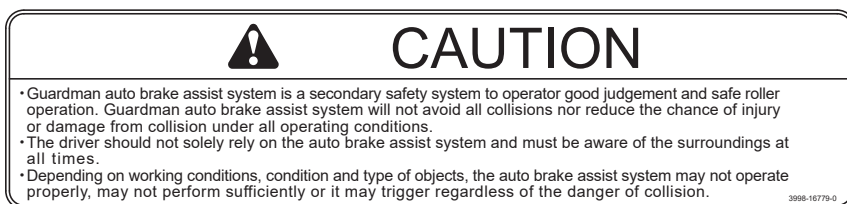
②3998-16778-0



④3998-16780-0



③3998-16779-0



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.

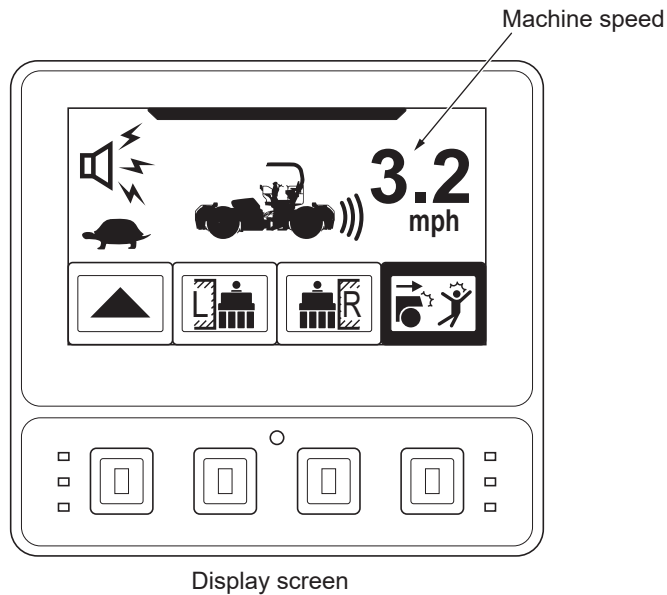
2) Alarms (Include alarm sounds and display alarms)

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 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM

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.



Guardman operating conditions

	SW884 Guardman SW994 Guardman	SW884ND Guardman SW994ND Guardman
Work condition (1st) 	0 - 4.5 mile/h (0 - 7.2 km/h)	0 - 4.0 mile/h (0 - 6.4 km/h)
Traveling (2nd) 	0 - 6.8 mile/h (0 - 11 km/h)	0 - 6.8 mile/h (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.
- The ABAS and alarm functions do not function during emergency traveling.
- *Emergency traveling here means traveling using the emergency propel switch.

2 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM

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

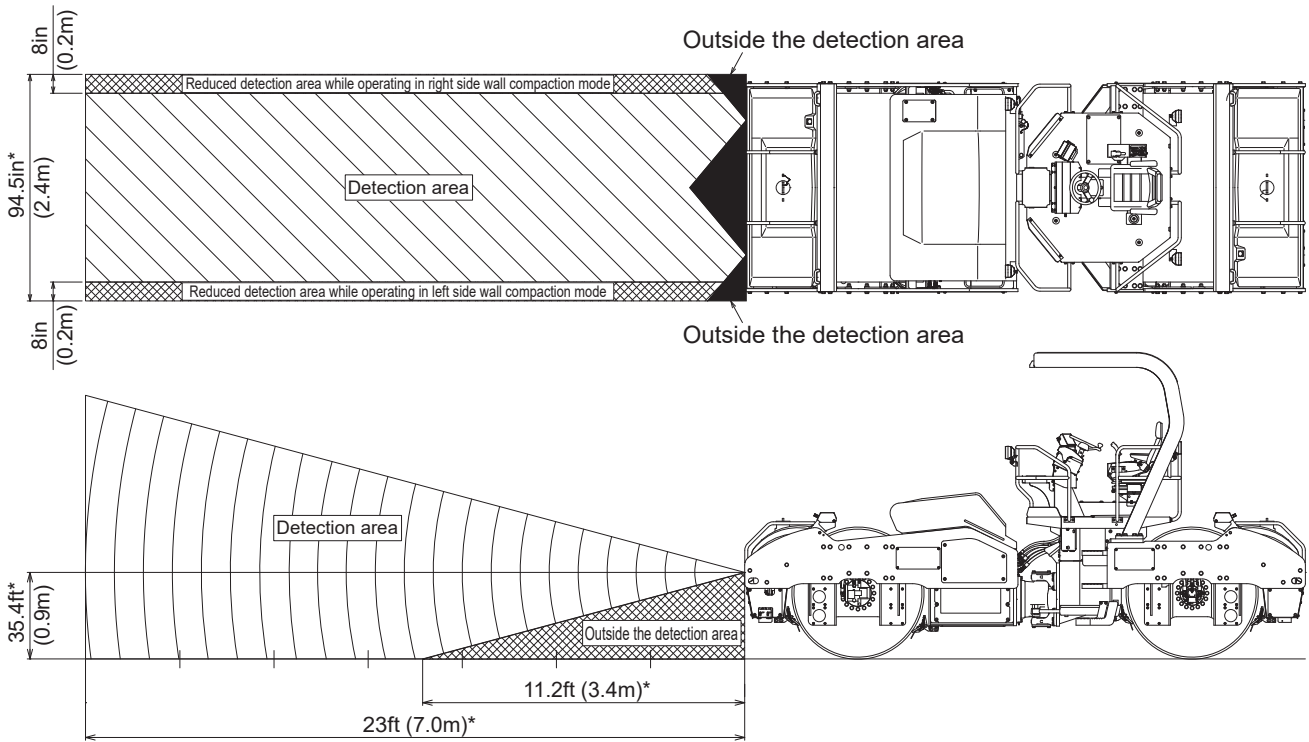
- **There is an area immediately behind and immediately in front of the machine that is outside the detection area. If an object is outside the detection area, the object will not be detected. Do not rely solely on the ABAS when driving.**
- **Even if an object is within the detection area, it may not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

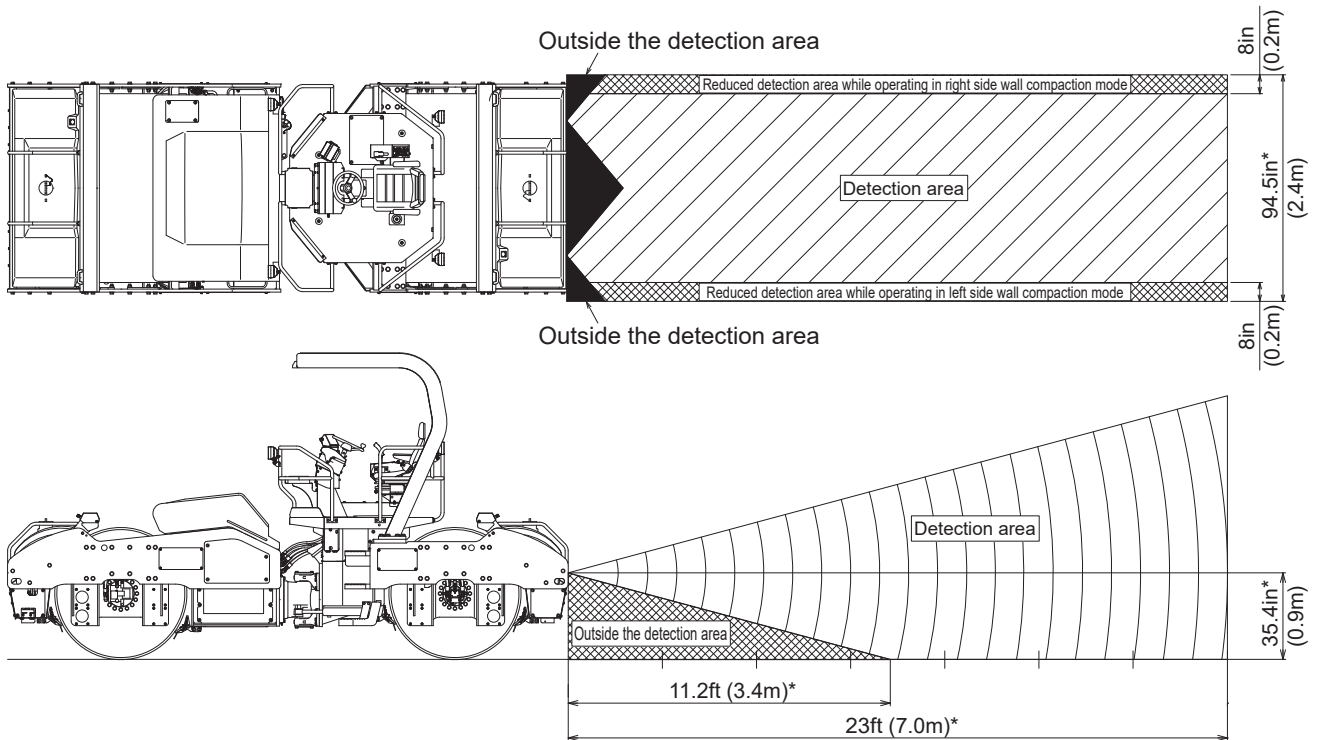
2 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM

Forward detection area



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

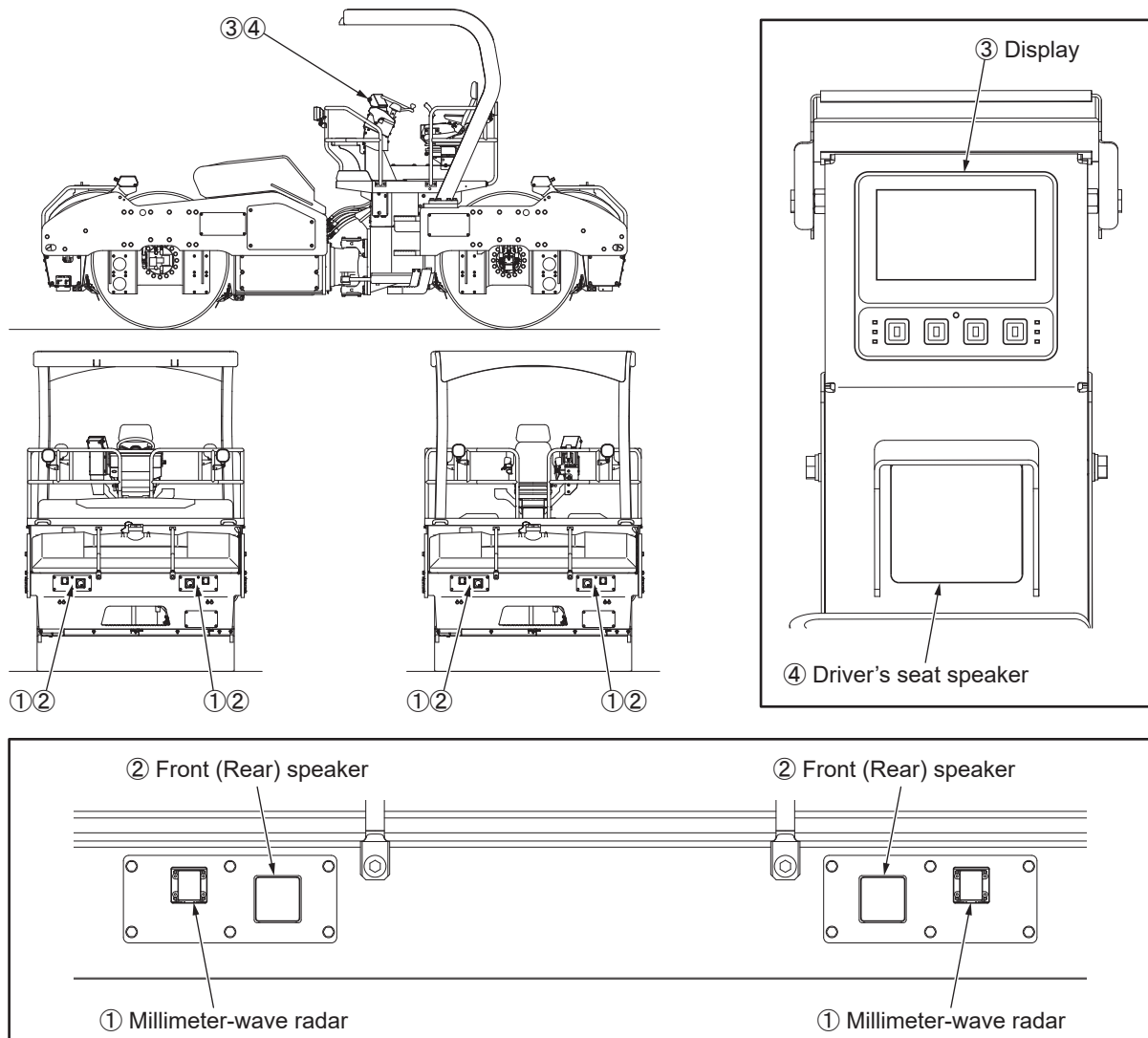
Rear detection area



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

MEMO

2.3 Names and functions of each part of the ABAS



① Millimeter-wave radar

Detects the presence or absence of objects in front of and behind the machine.

② Front (Rear) speaker

Play an alarm sound to the workers in the direction of move the machine.

③ Display

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

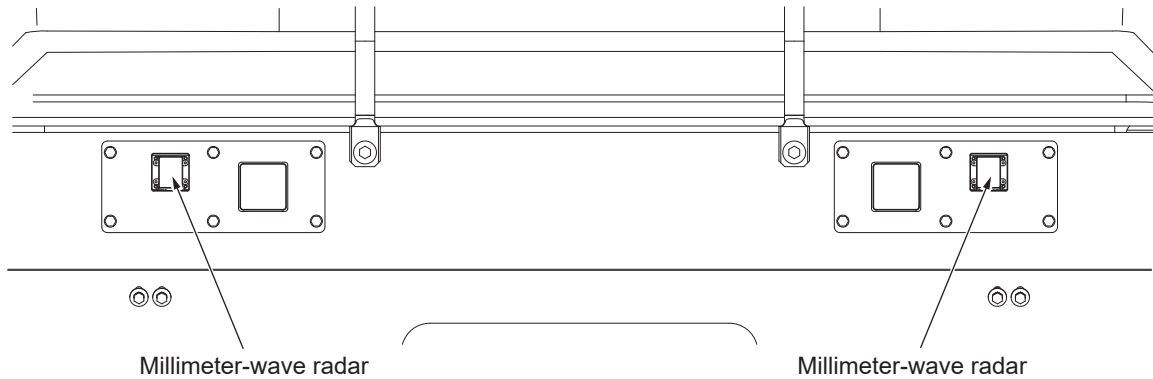
④ Driver's seat speaker

Plays an alarm sound to the driver.

2 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM

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.

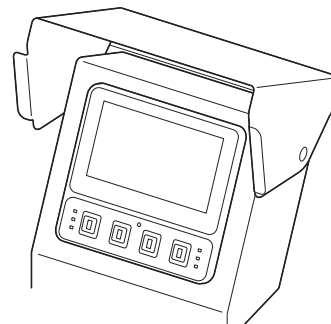
NOTICE

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

2 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM

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

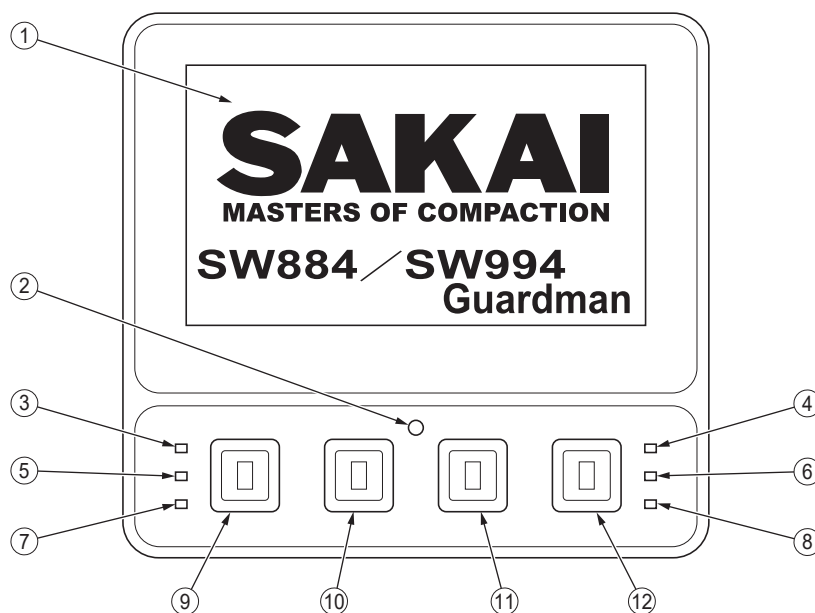
NOTICE

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.

2 OVERVIEW OF THE AUTO BRAKE ASSIST SYSTEM



① Display screen

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

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

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

⑦ ⑧ LED 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

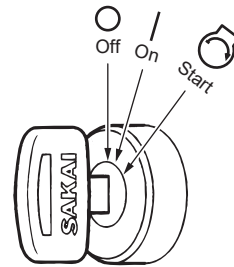
- ① Keep the display screen (glass surface) clean.
- ② Do not cover the light-receiving part of the brightness adjustment sensor with a cloth. Also, keep the light-receiving part clean.
When the screen brightness is set automatically by the brightness adjustment sensor, the screen may become difficult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

3 OPERATING PROCEDURE

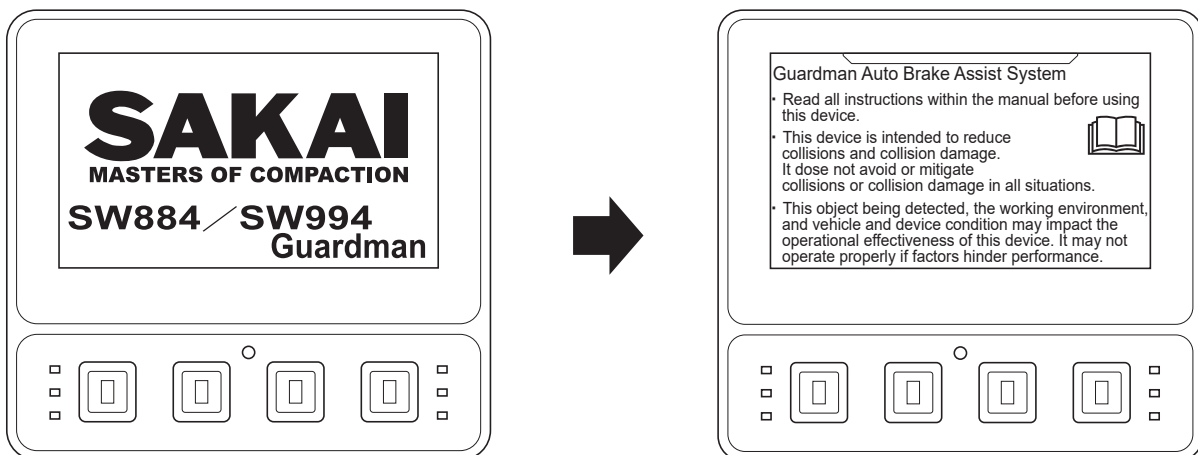
3.1 Turning on the Auto Brake Assist System

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.

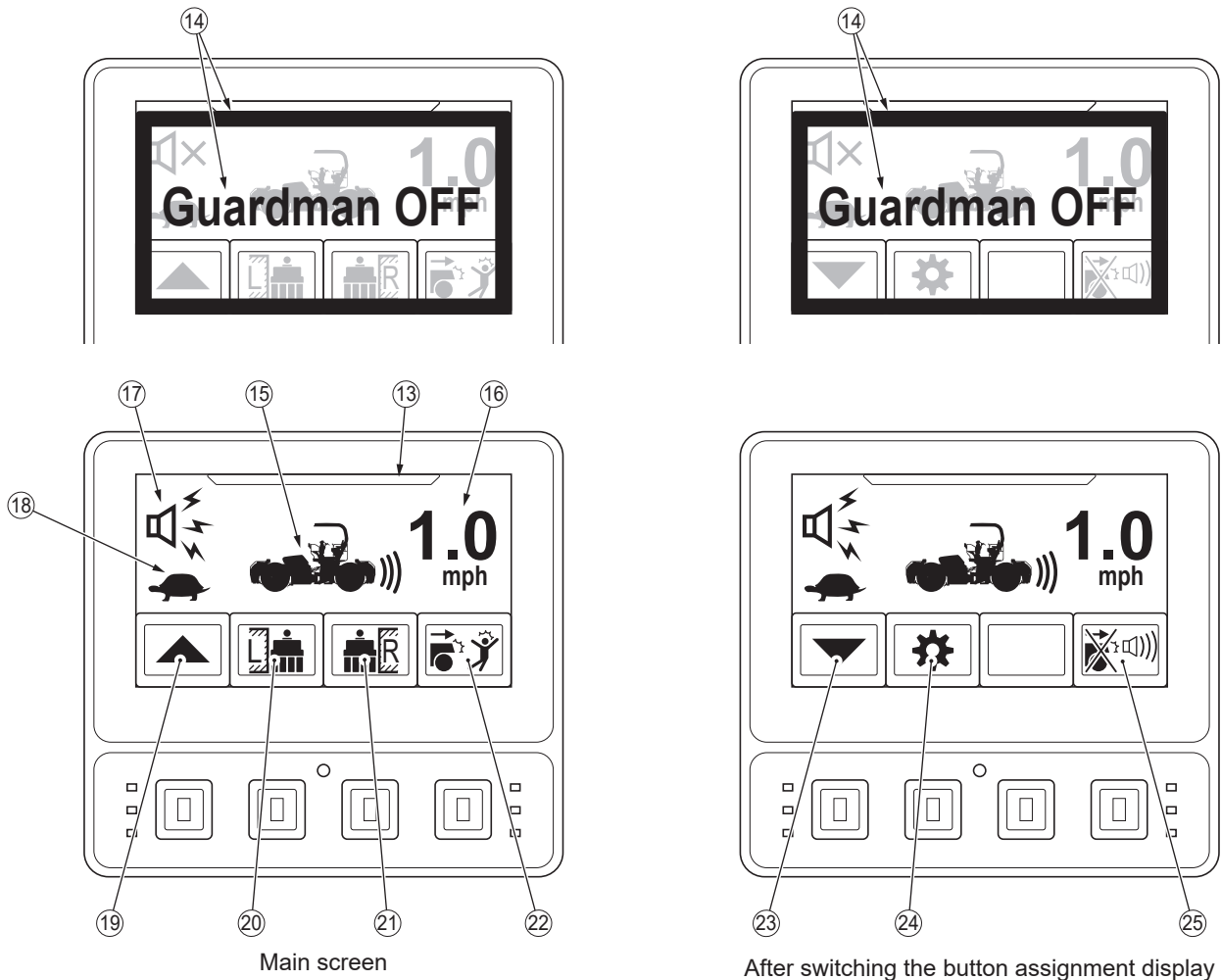
NOTICE

- 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



⑬ Operating status display line

Displays the operating status of the ABAS and alarm functions.

- Green : Indicates that the ABAS and alarm functions are turned on.
- Off : Indicates that the ABAS and alarm functions are turned off.

⑭ Guardman OFF display

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



⑮ Auto 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.



⑯ Display of machine speed

- White : Displays the machine speed.
- Off : When the machine speed cannot be detected due to a malfunction of the speed sensor or other reason.

NOTICE

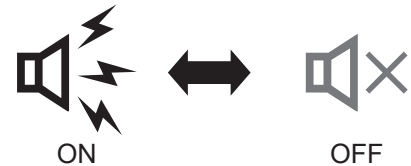
The displayed machine speed is the speed used to control the ABAS and may differ from the actual machine speed.

⑰ Alarm 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.



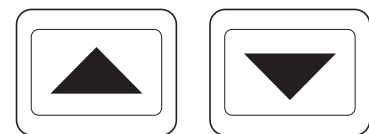
⑱ Speed stage display

Displays the speed stage selected with the Travel mode selector switch.

- Work condition :  is displayed.
- Traveling :  is displayed.

⑲ ⑳ Button assignment display switch mark

Gray : When the button assignment display can be switched.



Button assignment display switch mark

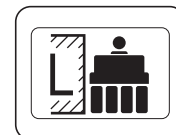
㉑ Left side wall compaction mode mark

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.



Left side wall compaction mode mark

3 OPERATING PROCEDURE

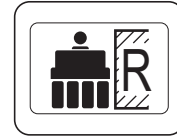
⑳ Right side wall compaction mode mark

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.



Right side wall compaction mode mark

㉑ Auto 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:

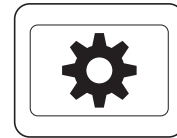
When the ABAS and alarm functions are automatically turned off.



Auto Brake Assist System on/off mark

㉒ Brightness setting mark

Gray : When the brightness setting can be changed.



Brightness setting mark

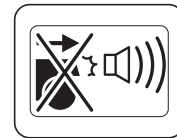
㉓ Alarm mode mark

Orange: When the alarm mode is turned on.

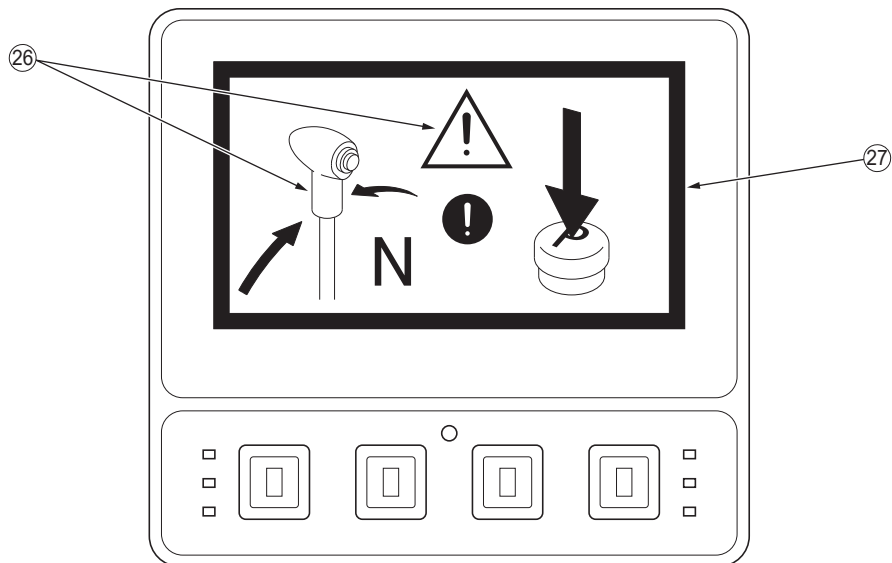
Gray : When the alarm mode is turned off.

Orange frame, gray text:

When the alarm mode is automatically turned off.



Alarm mode mark

Alarm screen example**②⑥ Alarm display**

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

②⑦ Outer 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 “3.12 Alarm list (when an object is detected) and response actions.”

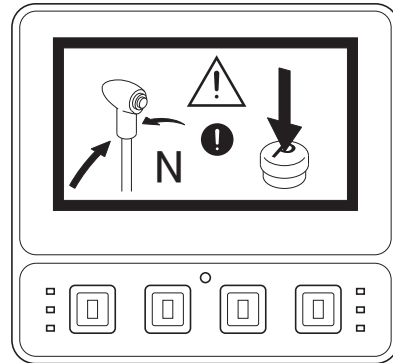
3.4 Procedure for releasing the ABAS after activation

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.



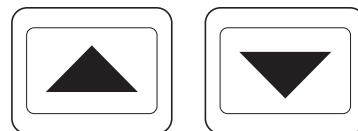
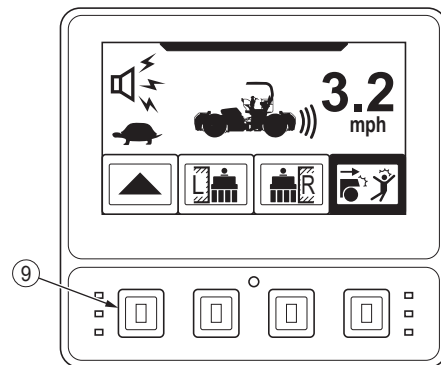
NOTICE

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

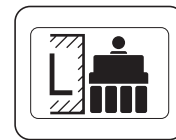
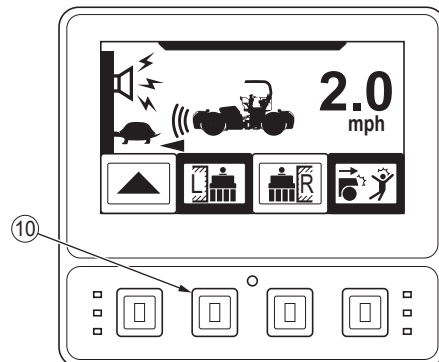
The left side wall compaction mode can be used when the ABAS and alarm functions are turned on, or when the alarm mode is turned on.

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.



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 OPERATING PROCEDURE

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.

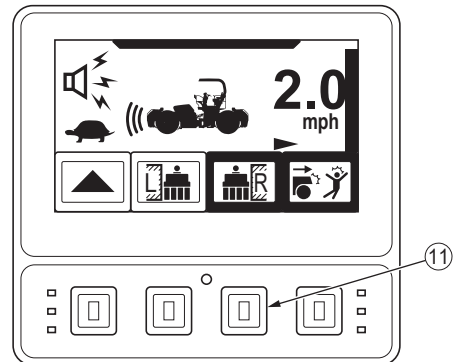
When the Right side wall compaction mode mark is displayed, press the ⑪ “Right side wall compaction mode” button on the display to switch the Right side wall compaction mode on and off.

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.



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.

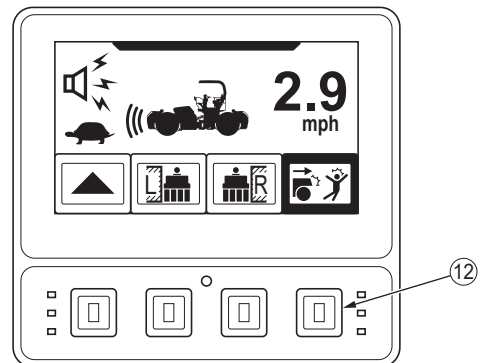
When the Auto Brake Assist System on/off mark is displayed, press the ⑫ “Auto Brake Assist System on/off” button on the display to switch between the on and off states of the Auto Brake Assist System and alarm functions.

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.**

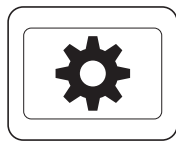
3.9 Setting the display brightness

There are two modes available for setting the display brightness: Automatic and Manual. When delivered, the product is set by default to Automatic mode.

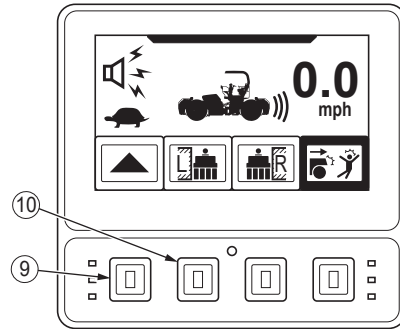
Setting the Automatic mode

The procedure for setting the Automatic mode is as follows.

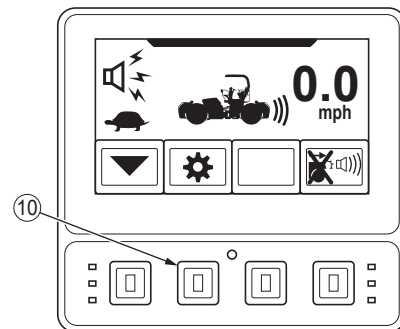
- 1) On the main screen, press the ⑨ “Switch button assignment display” button to display the Brightness setting mark.



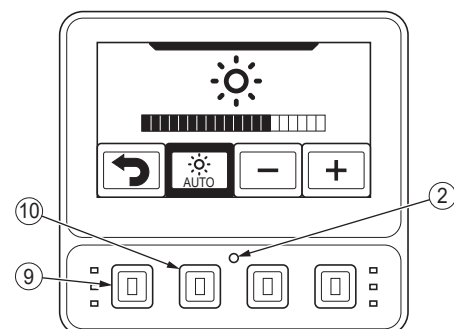
Brightness setting mark



- 2) When the Brightness setting mark is displayed, press the ⑩ “Brightness setting” button.



- 3) When Manual is displayed, press the ⑩ “Switch auto/manual” button. If the frame around Automatic is orange, the display brightness adjustment is set to the Automatic mode.



Brightness adjustment screen

- 4) Press the ⑨ “Close” button to return to the main screen.

* If the machine is moved forward or in reverse while the brightness setting 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.

⚠ CAUTION

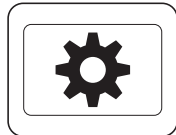
Do not cover the ② light-receiving part of the brightness adjustment sensor with a cloth.
Since the display brightness is adjusted based on data from the brightness adjustment sensor, the visibility of the display may decrease.

3 OPERATING PROCEDURE

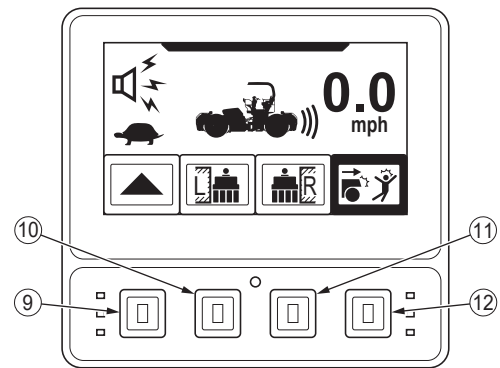
Setting the Manual mode

The procedure for setting the Manual mode is as follows.

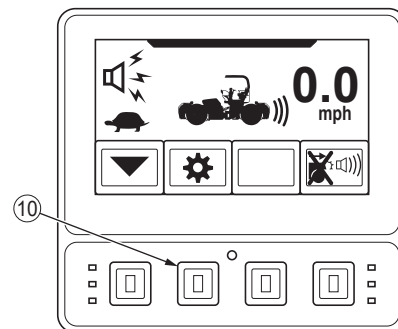
- 1) On the main screen, press the ⑨ “Switch button assignment display” button to display the Brightness setting mark.



Brightness setting mark



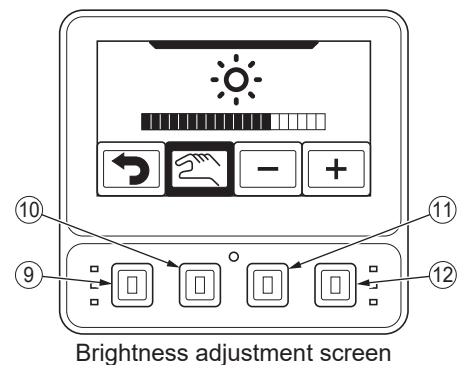
- 2) When the Brightness setting mark is displayed, press the ⑩ “Brightness setting” button.



- 3) When Automatic is displayed, press the ⑩ “Switch auto/manual” button. If the frame around Manual is orange, the display brightness adjustment is set to the Manual mode.

- 4) Press the ⑫ “+” button or ⑪ “-” button to adjust the display brightness.

+: Brighten
-: Darken



- 5) After adjusting the brightness, press the ⑨ “Back” button to return to the main screen.

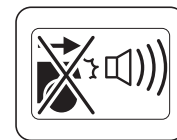
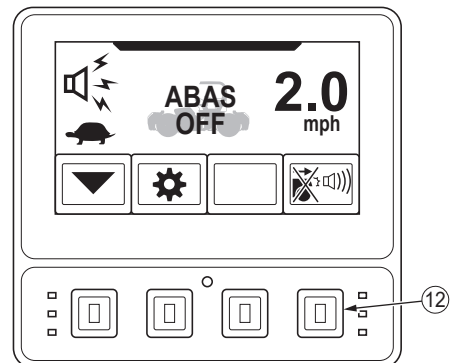
* If the machine is moved forward or in reverse while the Brightness adjustment screen is displayed, the display will automatically switch to the main screen after a certain period of time.

⚠ 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.

3.10 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.



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

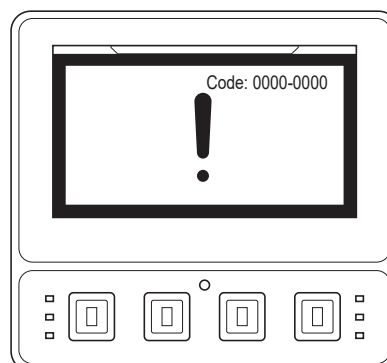
Turn on the alarm mode or turn off the ABAS and alarm functions in the following situations.

- 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.

3.11 Error information

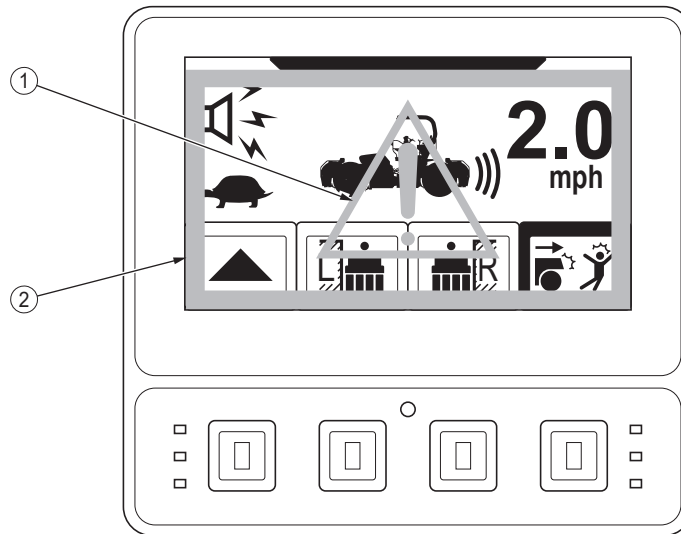
An error is displayed on the screen if any abnormality occurs in the ABAS.


Contact your dealers when an error is displayed.

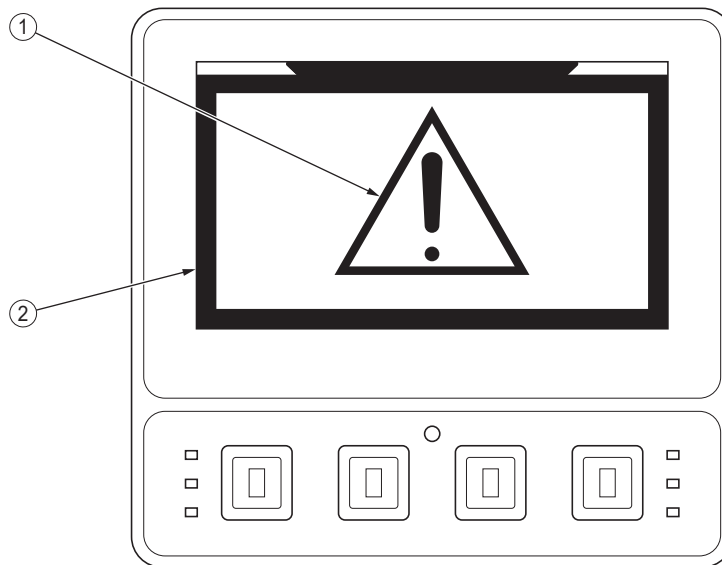



3 OPERATING PROCEDURE

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

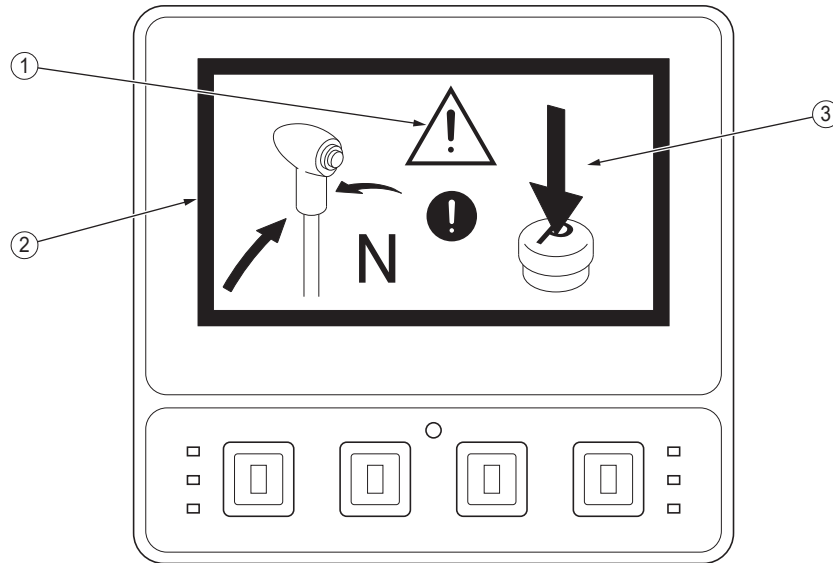



Alarm description	<ul style="list-style-type: none"> • Display: ① “ <p>- 36 -</p>
-------------------	---



<p>Alarm description</p>	<ul style="list-style-type: none"> • Display: ① “” and ② “Outer frame” are flashing in red. • 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 36). (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.)
<p>State</p>	<ul style="list-style-type: none"> • The risk of a collision is determined to be higher than that of the flashing yellow condition (see page 36). • The ABAS is not activated.
<p>Response action</p>	<ul style="list-style-type: none"> • Check and avoid the danger. Avoidance procedure: Step on the Brake pedal • 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.
<p>Notice</p>	<ul style="list-style-type: none"> • The alarm sound is played from the speaker. • When the ABAS and alarm functions are turned off, the Alarm display will not appear and the alarm sound will not be played.

3 OPERATING PROCEDURE



<p>Alarm description</p>	<ul style="list-style-type: none"> • Display: <ul style="list-style-type: none"> ① “” and ② “Outer frame” are lit in red. ③ “Return the F-N-R lever to N and press P” animation is displayed. * On the screen, the Neutral (N) position is indicated by “N” and the Parking brake switch is indicated by “P”. • Alarm sound: <ul style="list-style-type: none"> A long “Beep” sound is played. (Regarding the alarm sound timing, the alarm sounds continuously from activation until deactivation of ABAS.)
<p>State</p>	<ul style="list-style-type: none"> • The Auto Brake Assist System has activated and the machine is decelerating or stopping.
<p>Response action</p>	<ul style="list-style-type: none"> • Check and avoid the danger. <ul style="list-style-type: none"> Avoidance procedure: Step on the Brake pedal. • After the machine stops, check the safety of the surrounding environment. • Release the ABAS. <ul style="list-style-type: none"> Release procedure: Return the F-N-R lever to Neutral (N) and press the Parking brake switch. • 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.
<p>Important</p>	<ul style="list-style-type: none"> • By stepping on the Brake pedal after the ABAS is activated, the braking distance is shortened and the possibility of a collision is decreased. • 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.
<p>Notice</p>	<ul style="list-style-type: none"> • After the ABAS is activated, it will not be released even if you turn off the ABAS and alarm functions (see page 26). It is necessary to follow the procedure for releasing the ABAS after activation. • 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.

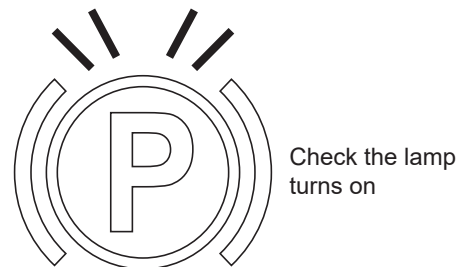
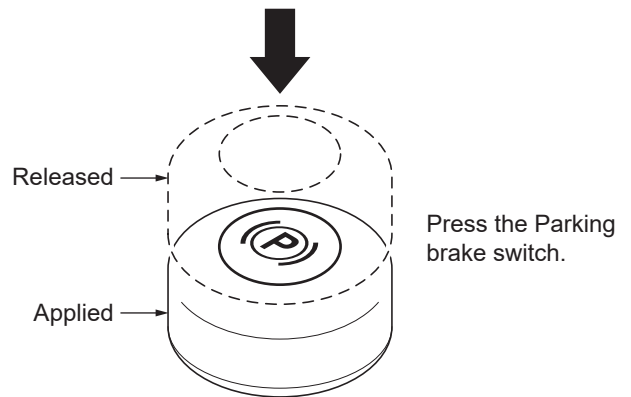
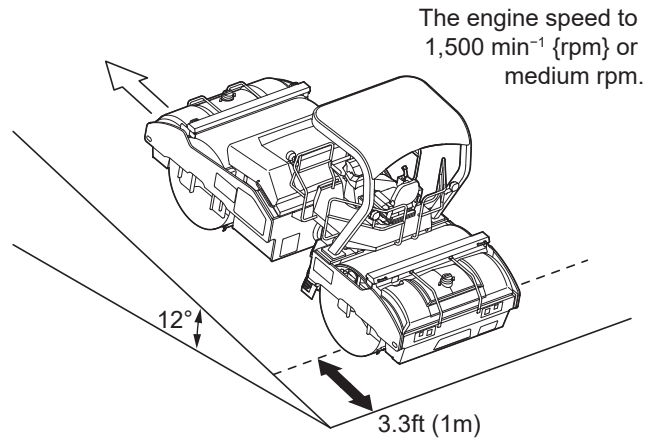
⚠ WARNING

- 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 $1,500\text{min}^{-1}$ {rpm} or medium rpm.

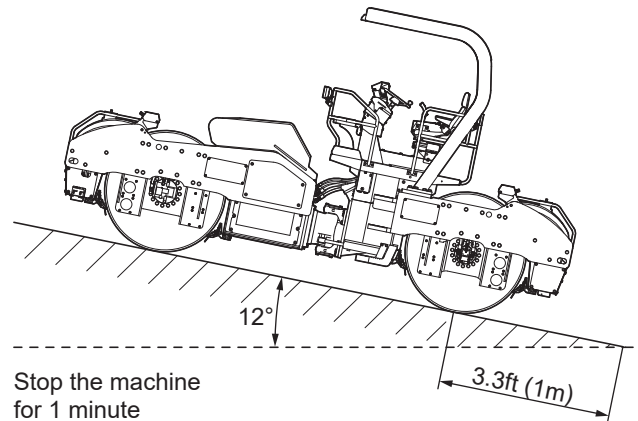
2) With the engine running, move the machine upward by 12° (20%) (slope with upward inclination of 12°) on a hard surface such as asphalt pavement.

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



Parking brake indicator lamp

- 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.

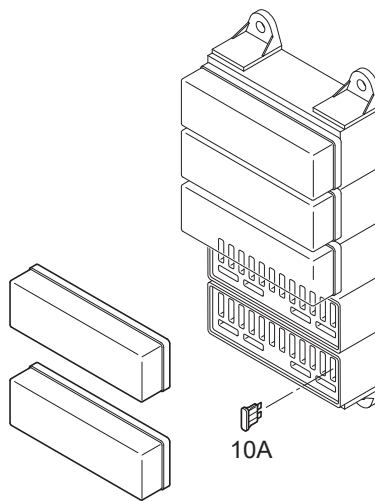
4.4 Fuses

⚠ 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.

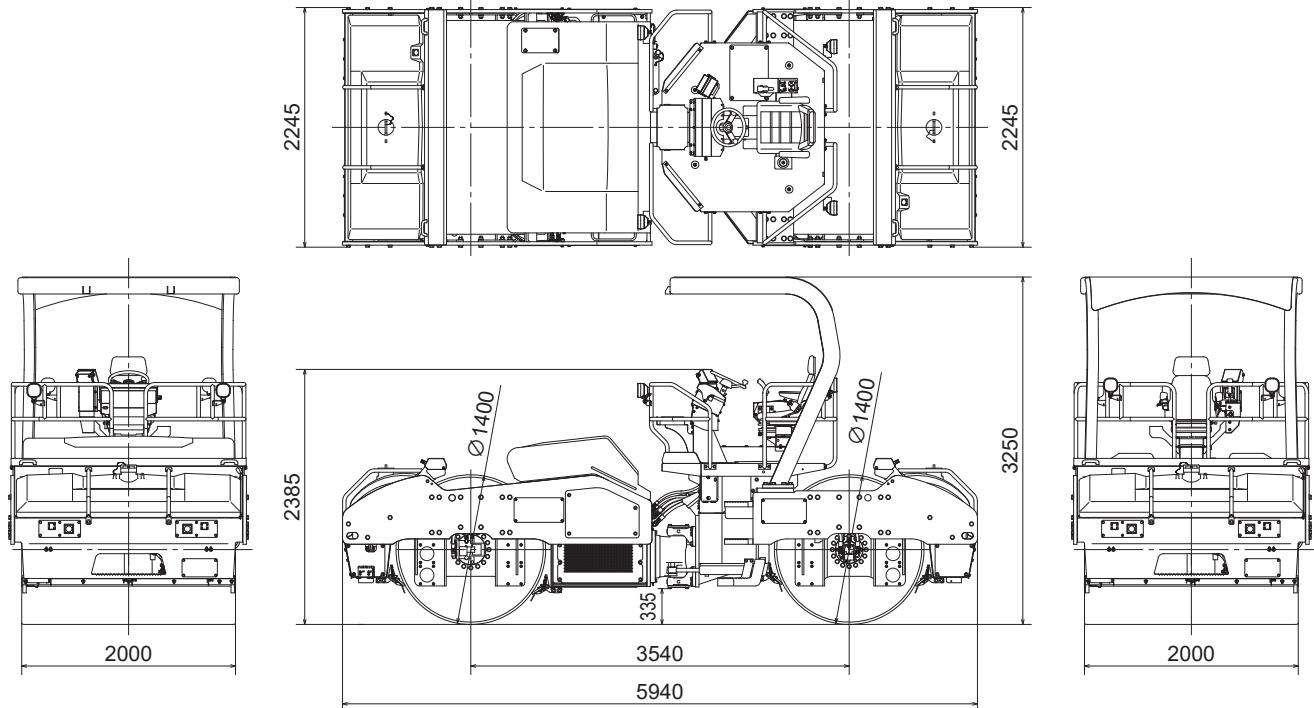
4.6 Warranty, disclaimer

- 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

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		

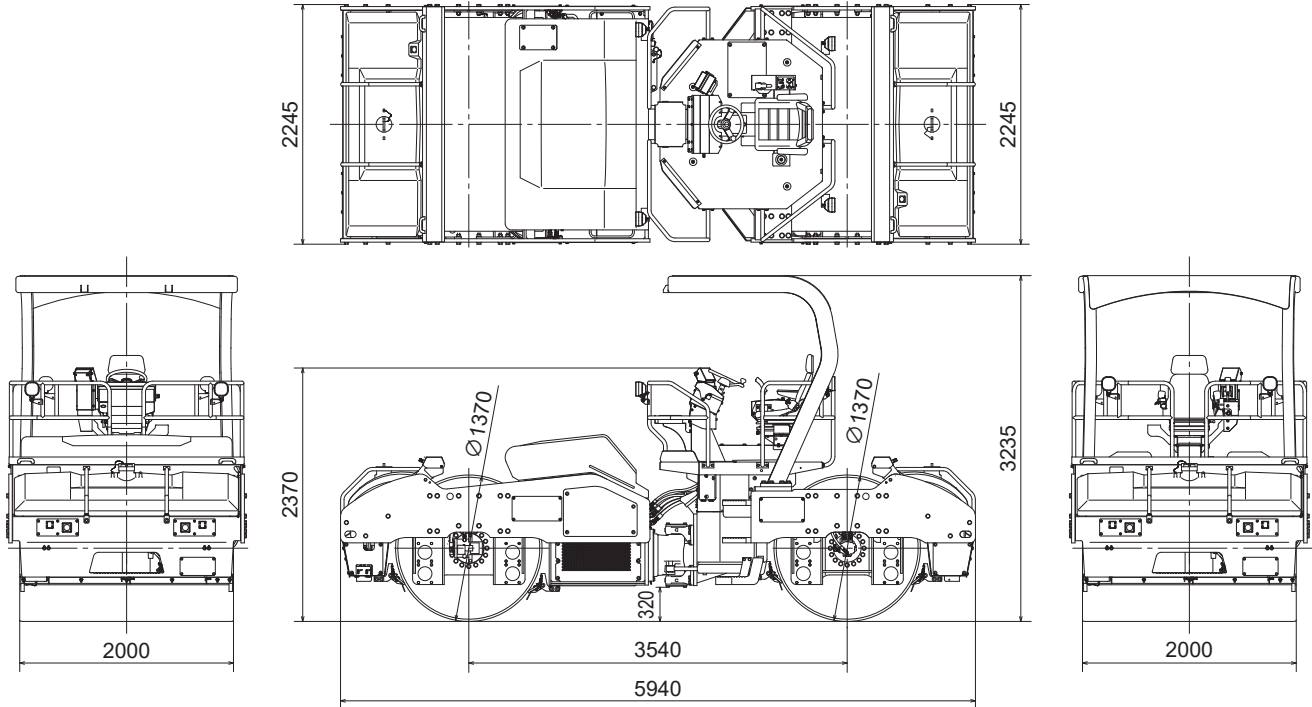
NOTE : 1) Gradeability is the calculated value. It may vary with ground surface conditions.

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

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

5 OVERVIEW AND SPECIFICATIONS

[SW884ND Guardman]



Model	SW884ND		Vibrating power	
Weight			Oscillation	
Operating weight	13,230 kg (29,165 lbs)		Frequency	46.7 Hz (2,800 vpm)
On front axle	6,520 kg (14,375 lbs)		Centrifugal force	172 kN (38,600 lbs)
On rear axle	6,710 kg (14,795 lbs)		Vibration	
Dimension			Frequency	50.0 Hz (3,000 vpm)
Overall length	5,940 mm (234")		Centrifugal force	158 kN (35,585 lbs)
Overall width	2,245 mm (88")		Engine	
Overall height	3,235 mm (127")		Model	CUMMINS "QSF3.8" Diesel Engine with turbo charger
Wheelbase	3,540 mm (139")		Total displacement	3.800 liters (229 cu.in)
Wheel			Rated output	97 kW (130 HP) / 2,200 min ⁻¹
Front	Roll (dia. x width)		Max. torque	488 N·m / 1,600 min ⁻¹
	1,370 x 2,000 mm (54" x 79")		Tank capacity	
Rear	Roll (dia. x width)		Fuel tank	292 liters (77.1 gal)
	1,370 x 2,000 mm (54" x 79")		Hydraulic oil tank	65 liters (17.2 gal)
Performance			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	2,000 mm (79")			
Minimum turning radius	6.4 m (252")			

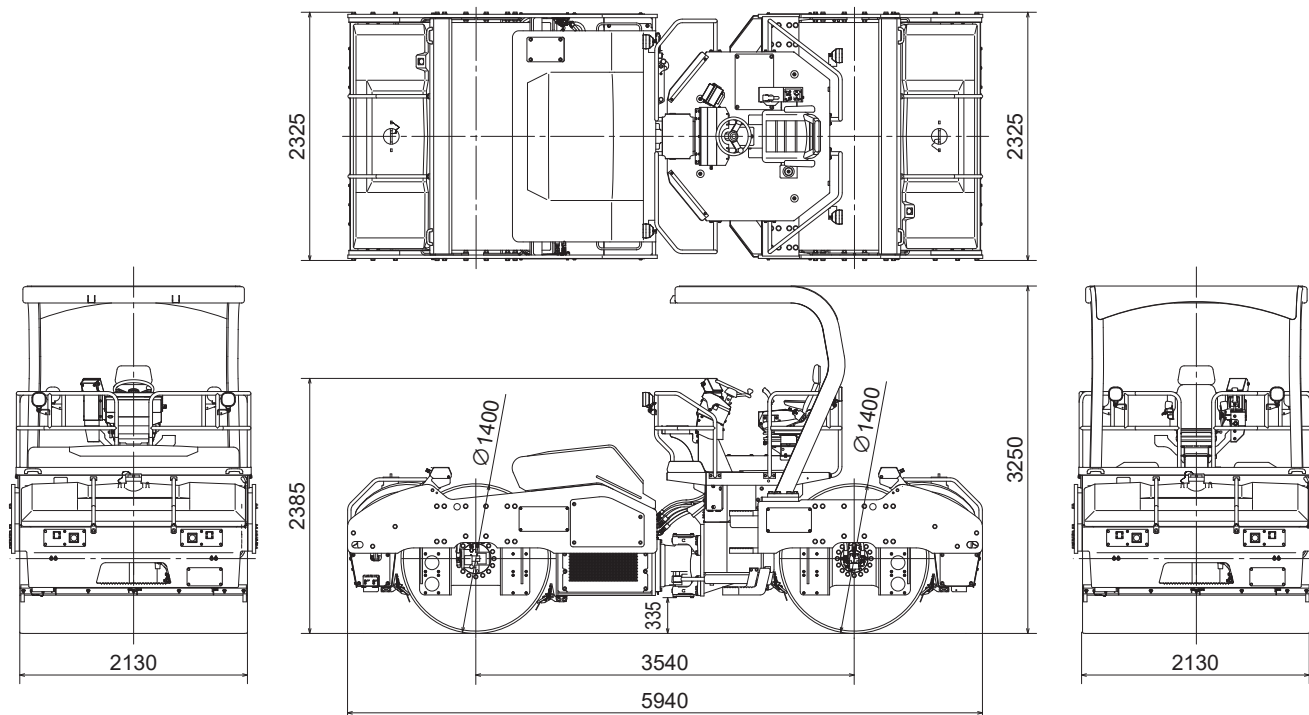
NOTE : 1) Gradeability is the calculated value. It may vary with ground surface conditions.

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

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

5 OVERVIEW AND SPECIFICATIONS

[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	50.0 Hz	41.7 Hz	
	(4,000 vpm)	(3,000 vpm)	(2,500 vpm)	
Centrifugal force	173 kN	98 kN	68 kN	
	(38,890 lbs)	(22,030 lbs)	(15,285 lbs)	
High amplitude				
Frequency	50.0 Hz	41.7 Hz		
	(3,000 vpm)	(2,500 vpm)		
Centrifugal force	185 kN	128 kN		
	(41,590 lbs)	(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			

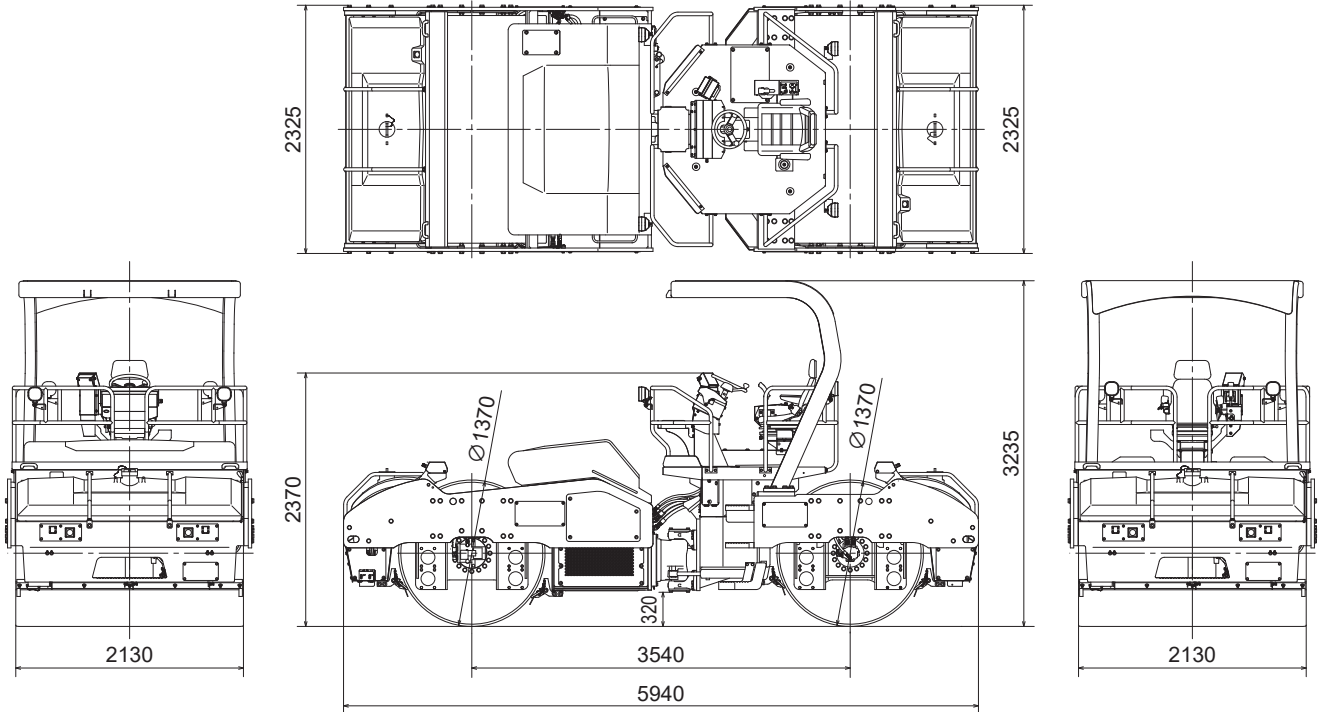
NOTE : 1) Gradeability is the calculated value. It may vary with ground surface conditions.

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

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

5 OVERVIEW AND SPECIFICATIONS

[SW994ND Guardman]



Model	SW994ND		Vibrating power	
Weight			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	
Dimension			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")		Engine	
Overall height	3,235 mm (127")		Model	CUMMINS "QSF3.8" Diesel Engine with turbo charger
Wheelbase	3,540 mm (139")		Total displacement	3.800 liters (229 cu.in)
Wheel			Rated output	97 kW (130 HP) / 2,200 min ⁻¹
Front	Roll (dia. x width)		Max. torque	488 N·m / 1,600 min ⁻¹
	1,370 x 2,130 mm (54" x 84")		Tank capacity	
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)
Performance			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 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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