"Required reading"
Read this manual before using the machine.
Thank you for purchasing the Baroness product. This manual describes the proper handling, adjustment, and inspection of your product. We hope you will use the product safely, and take advantage of its best performance.

Keeping The Owner's Operating Manual

Keep this Owner's Operating Manual in the box on the rear right side of the seat.
Read this manual carefully to ensure that you thoroughly understand how to properly operate and maintain the product, and to avoid causing injury to yourself or others.

The operator is responsible for operating the product properly and safely.

Maintenance should only be performed by a certified specialist.

If you have any questions concerning maintenance or genuine parts, please contact a Baroness dealer or Kyoeisha.

When making inquiries about the product, please specify the product's model designation and serial number.

When loaning or transferring the product, please also provide this manual together with the product.

Kyoeisha Co., Ltd.

**Warning Symbols**

This manual uses the following warning symbols for handling precautions that are important for your safety.

- **Danger**
  - This symbol indicates that serious injury or death will occur if the warning is ignored.

- **Warning**
  - This symbol indicates that serious injury or death may occur if the warning is ignored.

- **Caution**
  - This symbol indicates that injury or damage to property may occur if the warning is ignored.

- **Important**
  - This symbol indicates precautions on the mechanism of the machine.

This symbol indicates the articles regarding “Danger,” “Warning,” or “Caution.” Those articles describe important safety precautions and so read them carefully to understand completely before operating the machine.

Failure to adequately follow these safety precautions may cause an accident.
Precautionary Statement

⚠️ Caution
The information described in this manual is subject to change for improvement without prior notice.
When replacing parts, be sure to use genuine Baroness parts or parts designated by Kyoeisha.
Note that the Baroness product warranty may not apply to defects caused by the use of parts from other companies.

Prior to use, carefully read the following manuals to thoroughly understand the contents for safe and correct operation.
- Baroness Owner's Operating Manual
- The Battery's Owner's Manual
- The Charger's Owner's Manual

Purpose
This product is intended for leveling bunkers at golf courses.
Do not use this product in any other way than its intended purpose, and do not modify the product.
Operating this product for other purposes and modifying it may be very dangerous and may cause damage to the machine.
In addition, this product is not authorized for operation as a special motor vehicle. Do not operate it on public roads.
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Failure to adequately follow these safety precautions may cause an accident resulting in injury or death.

**Danger**

This product is designed to ensure safe operation and has been tested and inspected thoroughly before shipment from the factory. The product is equipped with safety devices to prevent accidents. However, whether the product demonstrates its original performance level depends on the manner in which it is operated and handled, as well as the manner in which it is managed on a daily basis. Inappropriate use or management of the product may result in injury or death. Observe the following safety instructions to ensure safe operation.

**Safe Operating Practices**

**Training**

1. Read this manual and other training material carefully. Be familiar with the controls, safety signs, and the proper use of the equipment.
2. If the operator or mechanic cannot read English, it is the owner's responsibility to explain this manual to them.
3. All operators and mechanics should seek and obtain professional and practical instruction. The owner is responsible for training the users. Such instruction should emphasize.
   - [1] The need for care and concentration when working with ride-on machines.
   - [2] Control of a ride-on machine sliding on a slope will not be regained by the application of the brake.
4. Insufficient wheel grip
5. Being driven too fast
6. Inadequate braking
7. The type of machine is unsuitable for its task
8. Lack of awareness of the effect of ground conditions, especially slopes
9. Incorrect hitching and load distribution

4. Never allow children or people unfamiliar with these instructions to use or service the machine. Local regulations may restrict the age of the operator.
5. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people, or property.
6. Keep in mind that the owner, operator, and mechanic are responsible for accidents or hazards occurring to other people or their property.
7. You can find additional safety information where needed throughout this manual.
8. Determine the left and right sides of the machine from the normal operating position.

**Preparation**

1. Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
2. While operating, always wear substantial footwear, long trousers, hard hat, safety glasses, and ear protection. Long hair, loose clothing, or jewelry may get tangled in moving parts.
3. Do not operate the equipment when barefoot or wearing open sandals.
4. Inspect the area where the equipment is to be used and remove all objects such as rocks, toys, and wire which can be thrown by the machine.
5. Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.
6. Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.
7. If the brake operation is faulty or the parking brake lever has noticeable play, be sure to adjust or repair them before operating the machine.

**Operation**

1. Only operate in good light, keeping away from holes and hidden hazards.
2. Before attempting to power up, disengage all attachments, shift into neutral, and engage the parking brake. Only power up from the operator's position.
3. Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care.
4. To guard against overturning:
   [1] Do not stop or start suddenly when going up or downhill.
   [5] Never drive the machine on a slope with an angle of gradient that is greater than that specified or in a place where there is a danger of the machine slipping.
5. Never operate the machine with damaged guards, shields, or without safety protective devices in place.
   Be sure all interlocks are attached, adjusted and functioning properly.
6. Do the following before leaving the operator's position.
   [1] Stop on level ground.
   [2] Change into neutral and set the parking brake.
   [3] Power down and remove the key.
7. Disengage the drive to attachments, power down, and remove the key in the following conditions:
   [1] Before making height adjustment unless adjustment can be made from the operator's position.
   [2] Before checking, cleaning or working the machine.
   [3] After striking a foreign object or if an abnormal vibration occurs. Inspect the machine for damage and make repairs before restarting and operating the equipment.
8. Look behind and down before backing up to be sure of a clear path.
9. Do not carry passengers.
10. Never operate while people, especially children, or pets are nearby.
11. Slow down and use caution when making turns and crossing roads and sidewalks.
12. Do not operate the machine under the influence of alcohol or drugs.
13. Take care when loading or unloading the machine into a trailer or a truck. Load or unload the machine in a flat and safe place.
    Before loading or unloading, set the parking brake on the truck or trailer, stop the engine, and chock the wheels.
    When transporting the machine on a truck or a trailer, set the parking brake, power down, and fasten the machine to the truck with a rope or other suitable restraining device that has sufficient strength.
    When using a loading ramp, select one with sufficient strength, length, and width and that will not cause the machine to slip.
14. Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
15. Do not take your eyes off the road ahead. Do not operate the machine with no hands.
16. Do not operate the machine when there is the risk of lightning.

**Maintenance and Storage**

1. Disengage drives on level ground, set parking brake, power down and remove the key. Wait for all movement to stop before adjusting, cleaning or repairing.
2. To reduce the fire hazard, keep the engine, battery compartment, attachments and drives free of grass, leaves, or excessive grease. Clean up oil.
3. Do not store indoors where there is a flame or a spark.
4. Never allow untrained personnel to service machine.
5. Appropriately manage and correctly use the tools necessary for servicing or adjusting the machine.
6. Use jack stands to support components when required.
7. Carefully release pressure from components with stored energy.
8. Disconnect battery before making any repairs.
   Disconnect the negative terminal first and the positive last.
   Reconnect positive first and negative last.

9. Make sure that parts such as wires are not touching each other and that their covers have not come off.

10. Charge batteries in an open well ventilated area, away from spark and flames.
    Unplug charger before connecting or disconnecting from battery.
    Wear protective clothing and use insulated tools.

11. Keep all parts in good working condition and all hardware tightened.
    Replace all worn or damaged decals.

12. Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
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Recycle and Waste Disposal

About Recycle

Recycling battery etc. is recommended for environmental conservation and economical use of resources. It may be required by local laws.

About Waste Disposal

Make sure that waste generated when servicing or repairing the machine is disposed of in accordance with local regulations. (e.g. waste oil, antifreeze, rubber products, and wires etc.)
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## Specifications

### Model

<table>
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<tr>
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<th>SP160EB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total length</strong></td>
<td></td>
</tr>
<tr>
<td>with Blade</td>
<td>78.74 in</td>
</tr>
<tr>
<td>with Rake and Blade</td>
<td>90.55 in</td>
</tr>
<tr>
<td><strong>Total width</strong></td>
<td>74.80 in</td>
</tr>
<tr>
<td><strong>Total height</strong></td>
<td>48.82 in</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
</tr>
<tr>
<td>Main vehicle (empty fuel tank) with Rake</td>
<td>1,082.45 lb</td>
</tr>
<tr>
<td>Blade</td>
<td>55.11 lb</td>
</tr>
<tr>
<td>Cultivator</td>
<td>41.89 lb</td>
</tr>
<tr>
<td>Finishing brush</td>
<td>23.37 lb</td>
</tr>
<tr>
<td><strong>Minimum turning radius</strong></td>
<td>133.46 in</td>
</tr>
<tr>
<td><strong>Motor</strong></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>MPUX250-0245FP1</td>
</tr>
<tr>
<td>Type</td>
<td>AC motor</td>
</tr>
<tr>
<td>Rated output</td>
<td>2.5 kW (3.40 PS)/2,000 rpm</td>
</tr>
<tr>
<td>Maximum rpm</td>
<td>2,400 rpm</td>
</tr>
<tr>
<td><strong>Transmission oil capacity</strong></td>
<td>2.0 dm$^3$ (2.0 L)</td>
</tr>
<tr>
<td><strong>Operating width</strong></td>
<td></td>
</tr>
<tr>
<td>Rake</td>
<td>74.80 in</td>
</tr>
<tr>
<td>Blade</td>
<td>31.50 in</td>
</tr>
<tr>
<td>Cultivator</td>
<td>45.67 in</td>
</tr>
<tr>
<td>Finishing brush</td>
<td>76.77 in</td>
</tr>
<tr>
<td><strong>Drive</strong></td>
<td></td>
</tr>
<tr>
<td>Traveling</td>
<td>Mechanical</td>
</tr>
<tr>
<td>Operating</td>
<td>-</td>
</tr>
<tr>
<td><strong>Speed (HST)</strong></td>
<td></td>
</tr>
<tr>
<td>Forward Low</td>
<td>0 - 4.66 mph</td>
</tr>
<tr>
<td>High</td>
<td>0 - 9.32 mph</td>
</tr>
<tr>
<td>Reverse Low</td>
<td>0 - 1.55 mph</td>
</tr>
<tr>
<td>High</td>
<td>0 - 3.11 mph</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Maximum inclination for operation</strong></td>
<td>15 degrees</td>
</tr>
<tr>
<td><strong>Tire size</strong></td>
<td></td>
</tr>
<tr>
<td>Front wheel</td>
<td>PD21 x 11.00 - 10</td>
</tr>
<tr>
<td>Rear wheel</td>
<td>22 x 11.00 - 8</td>
</tr>
<tr>
<td><strong>Tire pneumatic pressure</strong></td>
<td></td>
</tr>
<tr>
<td>Front wheel</td>
<td>10.15 psi</td>
</tr>
<tr>
<td>Rear wheel</td>
<td>5.80 psi</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>US Battery US8VGH XC2 8V x 6</td>
</tr>
</tbody>
</table>

*The factory default maximum motor rpm is 2,400 rpm.*
Sound Pressure Level

This machine was confirmed to have a continuous A-weighted sound pressure level of 64 dB by measuring identical machines in accordance with the procedure specified in ISO5395-1:2013.

Sound Power Level

This machine was confirmed to have a sound power level of 82 dB by measuring identical machines in accordance with the procedure specified in ISO5395-1:2013.

Vibration Level

Hand-Arm Vibration

This machine was confirmed not to exceed a vibration level of 2.5 m/s² to hands and arms by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.
Uncertainty K = 0.1 m/s²

Whole Body Vibration

This machine was confirmed not to exceed a vibration level of 0.5 m/s² to the whole body by measuring identical machines in accordance with the procedure specified in ISO 5395-1:2013.
Uncertainty K = 0.2 m/s²

Names of Each Section

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<th>Number</th>
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</tr>
<tr>
<td>Seat lever</td>
<td>2</td>
</tr>
<tr>
<td>Seat</td>
<td>3</td>
</tr>
<tr>
<td>Shift lever</td>
<td>4</td>
</tr>
<tr>
<td>Driver platform</td>
<td>5</td>
</tr>
<tr>
<td>Rear wheel</td>
<td>6</td>
</tr>
<tr>
<td>Brake pedal</td>
<td>7</td>
</tr>
<tr>
<td>Front wheel</td>
<td>8</td>
</tr>
<tr>
<td>Locking pedal</td>
<td>9</td>
</tr>
<tr>
<td>Blade</td>
<td>10</td>
</tr>
<tr>
<td>Broom holder</td>
<td>11</td>
</tr>
<tr>
<td>Charging connector</td>
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</tr>
<tr>
<td>Traveling pedal</td>
<td>13</td>
</tr>
<tr>
<td>Cultivator lever</td>
<td>14</td>
</tr>
<tr>
<td>Blade lever</td>
<td>15</td>
</tr>
<tr>
<td>Rake</td>
<td>16</td>
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Regulation Decals

Positions of Regulation Decals

A Serial number plate
B Specification decal
C Year of manufacture decal
D Battery capacity decal
E Recycle decal

Description of Regulation Decals

Serial Number Plate

The serial number plate indicates the model and serial number of the machine.

Battery Capacity Decal

(For Europe)
The battery capacity decal indicates the capacity by 20HR and CCA.

Specification Decal

(For Europe)
The Specification decal indicates the CE marking, model, and weight, etc.

Year of Manufacture Decal

(For Europe)
The year of manufacture decal indicates the year when this machine was manufactured.
Recycle Decal

Recycle Decal illustrates Recycle Mark in accordance with local regulation.
(For Europe)

Pb

(For USA)

Positions of Safety Decals and Instruction Decals

Important

Safety decals and instruction decals are attached to this product. Make sure that they are preserved in their entirety. If they are damaged, become dirty, or peel off, replace them with new ones.

Part numbers for decals that need to be replaced are listed in the parts catalog. Order them from a Baroness dealer or Kyoeisha.

Positions of Safety Decals and Instruction Decals

1. Warning decal
2. Caution to getting pinched decal
Description of Safety Decals and Instruction Decals

Warning Decal

SP160EB0103Z0
DECAL, WARNING

1. Warning
   Read the Owner's Operating Manual.

2. Caution
   Flying objects - Be sure that people around the machine keep a safe distance away.

3. Warning
   Rollover - Do not work on slopes of 15 degrees or more. When you descend a slope, drive at low speed.

4. Warning
   Apply the parking brake, power down, and then remove the key before leaving the machine.

Caution to Getting Pinched Decal

K4205001930
Decal, caution to getting pinched

Caution
May pinch - There is a risk of being pinched.
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Inspections

Inspect the machine according to the maintenance schedule so that you will be able to take advantage of its optimum performance for a long period of time.

Rake

Inspection of Rake

Due to frequent use or damage caused during use or transportation, tracks, such as from tires, may remain after use. Inspect, and if necessary, repair or replace.

1. Make sure that the rake pipe is not bent.
2. Make sure that the cross-link chain is not twisted or worn.
3. Make sure that the rake shaft is not worn.
4. Make sure that the center shaft of the fulcrum swing fitting is not worn.
5. Make sure that a spring pin is not missing from the rake shaft.
6. Make sure that a hardened flat-head pin on the rake hanging arm is not worn.
7. Make sure that the plate springs are not cracked or bent.
8. Make sure that a spring pin is not missing from the rake fulcrum fitting.
9. Make sure that the rake mounting bracket is not bent.
10. Make sure that the smoother plate is not bent, cracked or unevenly worn.
11. Make sure that the warp board is not bent, cracked or worn.
12. Make sure that the fork prong bar is not bent or worn.

Blade

Inspection of Blade

Note:
Depending on the specifications, this function may not be available.
Due to frequent use or damage caused during use or transportation, it may become difficult to move sand around. Inspect, and if necessary, repair or replace.

1. Make sure that the spring pin is not missing from the lever arm.
Cultivator
Inspection of Cultivator

Note:
Depending on the specifications, this function may not be available.
Due to frequent use or damage caused during use or transportation, it may become difficult to adjust the sand depth.
Inspect, and if necessary, repair or replace.
1. Make sure that the cultivator wire is not broken.
2. Make sure that the free lock pin is not missing.
3. Make sure that the parker clamp is not loose.
4. Make sure that the trapezoidal cultivator fitting is not worn.

Finishing Brush
Inspection of Finishing Brush

Note:
Depending on the specifications, this function may not be available.
Due to frequent use or damage caused during use or transportation, the rake may leave tracks.
Inspect, and if necessary, repair or replace.
1. Make sure that the brush mounting frame is not bent.
2. Make sure that the brush is not bent or excessively worn.

Battery
Battery Characteristics

1. Long-term storage of battery
The battery will discharge, even while it is not used. (Self-discharge)
The rate of discharge is affected by ambient temperature.
When storing the battery for an extended period of time, periodically measure the specific weight of the battery fluid, and recharge the battery as necessary.

2. Variations in battery up-time according to variations in capacity due to temperature.
The battery up-time is affected by temperature and the number of years of use.
The battery capacity is greatly affected by temperature.
Since capacity decreases as the temperature decreases, battery up-time will be reduced.
Inspection of Battery

**Danger**
Keep fire away while inspecting or charging the battery. The battery may explode.

**Danger**
Do not allow the battery fluid level to become lower than the minimum level. The battery may explode if it is used or charged while the battery plate is exposed.

Make sure that the battery fluid level is between the (maximum level) and the (minimum level).

![Battery Fluid Level Diagram]

**Warning**
Loose or corroding terminals may result in an insufficient charge, burnt terminal connectors, or the battery catching fire or exploding.

1. Make sure that there is no abnormality such as corrosion of the terminals and cables. If there is corrosion in the terminals, brush it off, and then lightly apply grease.
2. Make sure that the terminal nuts are not loose. If they are loose, firmly tighten the nuts.

**Measuring Battery Specific Weight**

**Danger**
Be careful not to let your skin, eyes or clothes, etc., come into contact with the battery fluid and not to swallow the fluid accidentally. Should your skin or clothes come into contact with the battery fluid, immediately wash them with water.

**Danger**
When measuring the specific weight, wear protective garments, safety glasses and gloves, etc.

Measure the specific weight to determine the battery condition.

1. Stand the outside cylinder of the hydrometer vertically, and draw up the battery fluid with the dropper.
2. Make sure that there are no bubbles on the float when it is floating, and then look horizontally at the scale to read the value in contact with the top surface of the fluid.

![Hydrometer Diagram]

Note:

1. The specific weight is affected by temperature. Convert the hydrometer reading to the specific weight at 20 °C.

2. Correct specific weight = Hydrometer reading + 0.0007 \times (Temperature when measured − 20)
   - The remaining capacity of the battery is approximately 100% when the specific weight is 1.28.
The battery can be considered to have reached the end of its life when there is a variation of 0.05 or more in the specific weight of each cell. "Battery Characteristics" (Page 4-3)

Supply of Battery Fluid

**Danger**

Be careful not to let your skin, eyes or clothes, etc., come into contact with the battery fluid or accidentally swallow the fluid. Should your skin or clothes come into contact with the battery fluid, immediately wash them away with water.

**Danger**

When you supply battery fluid, wear protective garments, safety glasses and gloves, etc.

**Danger**

Do not allow the battery fluid level to become lower than the minimum level. The battery may explode if it is used or charged while the battery plate is exposed.

**Warning**

Do not supply battery fluid above the maximum level. The battery fluid might overflow and cause the vehicle damage and a fire.

**Important**

To prevent battery fluid overflow, add purified water after charging.

If the battery fluid level is lower than halfway between the maximum level and minimum level, add purified water up to the maximum level.

Note:
Depending on the specifications, this function may not be available.
Using a battery filling system, the battery can be reliably filled in a short period of time.

1. Insert the end of the hose on the hand pump into a container of distilled water.

---

**Combined Supply of Battery Fluid**

1. **Battery case**
2. **Purified water filling port**
3. **Battery plates**
   - A Maximum level 2 - 5 mm (0.079 - 0.197 in.)
   - B Minimum level 10 mm (0.394 in.)

---

**Combined Supply of Battery Fluid_001**

1. **Hand pump**
2. **Distilled water**
2. Connect the other end of the hose on the hand pump to the water supply hose on the battery.

3. Squeeze the hand pump to supply distilled water to the battery.
4. When the hand pump becomes hard to squeeze, refilling is finished.
5. Remove the hose of the hand pump and the water supply hose on the battery.

**Inspection of Battery Remaining Charge**

**Important**
When the second LED indicating lamp from the left of the battery remaining charge gauge lights up, immediately stop operation and recharge the battery.

**Important**
If a buzzer sounds, indicating an insufficient battery remaining charge, while the second or further LED indicating lamp from the left of the battery remaining charge gauge lights up, the battery may have deteriorated. Replace the battery.
"Replacement of Battery" (Page 5-18)
"Replacement of Battery Cable" (Page 5-18)

Turn the key switch to the "ON" position. When the battery is fully charged, the LED indicating lamp on the right end lights up and moves to the left as the battery becomes discharged. When the second LED indicating lamp from the left lights up, it is time to recharge the battery.

"Charging of Battery" (Page 4-7)
* The machine up-time per charge differs greatly depending on the course configuration, number of bunkers and operations performed.
Charging of Battery

**Danger**

While charging, explosive gas (hydrogen gas) is generated. Charge batteries in a well-ventilated area, where they will not get wet, for example, from rain.

**Danger**

The battery may explode if it is charged while a battery plate is exposed.

**Danger**

While charging, do not disconnect or connect the plugs of the charger and not allow a tool to cause a short circuit. The battery may explode.

**Important**

Charge the battery with the charger included with the machine.

**Important**

Leaving the battery discharged will shorten its life.

**Important**

Before driving the machine, make sure that the output plug of the charger is disconnected from the connector on the main vehicle.

Charging procedures
1. Apply the parking brake, and then turn the key switch to the "OFF" position.
2. Open the battery cover.
   "Seat Platform" (Page 4-28) "Battery Cover" (Page 4-28)
3. Remove the water-proof cap from the connector on the main vehicle, and then plug in the output plug of the charger.
4. Insert the input plug into the power supply outlet (AC85 - 265 V, 45 - 65 Hz).
5. The LEDs will quickly flash from the top to the bottom, and then charging begins after approximately 10 seconds.
6. When charging is finished, the "AC On" LED on the charger flashes (or lights up) and the "100% Charge" LED lights up. (The "AC On" LED flashes when the input voltage is 100 V and lights up when it is 200 V.)
7. Disconnect the input plug of the charger from the power supply outlet.
8. Disconnect the output plug of the charger from the connector on the main vehicle.
9. Install the water-proof cap onto the connector on the main vehicle.

**Tire**

**Inspection of Tires**

1. Check the pneumatic pressure of the tires.
2. Make sure that there are no cracks, damage or abnormal wear.

<table>
<thead>
<tr>
<th>Tire size</th>
<th>Pneumatic pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front wheel (PD21 x 11.00 - 10)</td>
<td>70 kPa (0.7 kgf/cm²)</td>
</tr>
<tr>
<td>Rear wheel (22 x 11.00 - 8)</td>
<td>40 kPa (0.4 kgf/cm²)</td>
</tr>
</tbody>
</table>

**Brake**

**Inspection of Brake**

While traveling, depress the brake pedal firmly to make sure that the brake is applied effectively.

**Inspection of Parking Brake**

**Important**

If the operator leaves the seat without applying the parking brake in power-on state, a buzzer will sound. (intermittent tone)
When the parking brake is applied, the buzzer will stop.

1. Park the machine on a level surface.
2. Switch on the machine.
   "Procedure to Switch On Machine" (Page 4-16)
3. Set the transmission shift lever to the "Neutral" position.
   "Shift Lever" (Page 4-26)
4. Check that the parking brake is applied.
5. Push the main vehicle back and forth to check that the brake is applied effectively.
6. Release the parking brake.
   "Brake Pedal" (Page 4-27)

---

**Shift Lever**

**Inspection of Shift Lever Fulcrum**

The shift lever fulcrum may begin to rattle due to frequent use and may no longer be able to perform shift operations correctly.
1. Make sure that the shift lever fulcrum does not rattle.
2. Make sure that there is no wear of the shift lever fulcrum bolt.
3. Make sure that the plate of the shift lever fulcrum is not bent.
7. Push the main vehicle back and forth to check that the brake is not dragging.

6. Set the transmission shift lever to the "Neutral" position.

7. Check that the safety device brake wire is automatically pulled by activation of the safety device under the driver platform when the key switch is turned to the "OFF" position.

8. Apply the parking brake.

9. Check that the brake is automatically released by activation of the safety device when the key switch is turned to the "ST" position to switch on the machine.

---

**Important**

If the operator leaves the seat without applying the parking brake in power-on state, a buzzer will sound. (intermittent tone)

When the parking brake is applied, the buzzer will stop.

The safety device is installed under the driver platform.

Before using the machine, check that the safety device operates correctly.

1. Park the machine on a level surface.
2. Switch on the machine.
3. Lower the rake.
4. Open the driver platform.

5. Release the parking brake.

---

10. Slowly turn the key switch back from the "ST" position to the "ON" position.
11. Close the driver platform.
12. Raise the rake.
13. Release the parking brake.
14. Push the main vehicle back and forth to check that the brake is not dragging.
15. Turn the key switch to the "OFF" position.
16. Push the main vehicle back and forth to check that the brake is applied effectively.

**Wire**

**Inspection of Wire**

1. Make sure that the wire is not cracked or damaged.
2. If the wire is cracked or damaged, replace it with a new one immediately.
Steering Wheel

Inspection of Steering Wheel

1. Make sure that there is no play in the steering wheel.
2. Make sure that the steering wheel can be turned smoothly without abnormal noise, etc.
3. Make sure that the steering chain is not overtightened and is not loose.
4. Make sure that there are no cracks, damage or abnormal wear in the steering chain.

Transmission

Inspection of Transmission Oil

1. Place the machine so that its frame will be level, and then make sure that the transmission oil level is at the oil level plug at any time. The oil level plug is located on the left side of the transmission.
2. Check underneath the machine for oil leakage.

Supply of Transmission Oil

Important
Do not mix different types of transmission oil.

Important
Be sure to pour automobile gear oil that is classified as SAE Viscosity Grade #90 into the transmission.

1. Remove the oil filler cap.

Cooling Fins

Inspection of Cooling Fins

1. Make sure that there is no damage to the cooling fins.
2. Make sure that the cooling fins are not dirty.

Oil Leakage

Inspection of Oil Leakage

After approximately 50 hours of operation, some joints may be loosened and oil and grease may leak. Be sure to retighten the parts. Check the bottom of the machine for oil and grease leakage.
## Tightening Torques

**Important**

Refer to the Tightening Torque table. Note that the Baroness product warranty may not apply to defects caused by incorrect or overtorque tightening, etc.

### Standard Tightening Torques

**Bolts and Nuts**

**Important**

A number of bolts are used in each part of this machine. Be sure to re-tighten the bolts and nuts, because they may be loosened at the earlier stage of the use.

As to the bolts and nuts without any special instruction, tighten them in appropriate tightening torque with proper tool.

Too much tightening may cause the looseness or damage of the screw.

The strength of tightening is determined by types of screws, strength, the friction of thread face or base face and others.

The table below is for the galvanized or parkerized bolts.

In case that the strength of internal thread is weak, it is not applied.

Do not use rusty or sand attached "screw."

Otherwise, it may cause insufficient tightening even if you apply the specified tightening torque.

The friction of the screw face becomes higher and the tightening torque is canceled out by the friction, therefore sufficient tightening cannot be applied.

If "screw" is wet by water or oil, do not tighten it with normal tightening torque.

If the screw is wet, the torque coefficient will get smaller and it may result in too much tightening.

Too much tightening may cause looseness by the screw stretched or result in damage.

Do not use a bolt experienced too much burden.

Using the impact wrench requires the skill.

Do exercise as much as possible for steady tightening.
<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Heat-treated bolt</th>
<th>General bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strength class. 8.8</td>
<td>Strength class. 4.8</td>
</tr>
<tr>
<td></td>
<td>8 T</td>
<td>M T</td>
</tr>
<tr>
<td>Nominal</td>
<td>Heat-treated bolt</td>
<td>General bolt</td>
</tr>
<tr>
<td>diameter</td>
<td>Strength class. 8.8</td>
<td>Strength class. 10.9</td>
</tr>
<tr>
<td></td>
<td>8 T</td>
<td>11 T</td>
</tr>
<tr>
<td>M5</td>
<td>5 - 7</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>50.99 - 71.38</td>
<td>71.38 - 91.77</td>
</tr>
<tr>
<td></td>
<td>44.26 - 61.96</td>
<td>70.81 - 97.36</td>
</tr>
<tr>
<td>M6</td>
<td>8 - 11</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>81.58 - 112.17</td>
<td>81.81 - 117.76</td>
</tr>
<tr>
<td></td>
<td>61.58 - 91.77</td>
<td>70.81 - 97.36</td>
</tr>
<tr>
<td>M8</td>
<td>23 - 29</td>
<td>28 - 29</td>
</tr>
<tr>
<td></td>
<td>234.53 - 295.71</td>
<td>203.57 - 256.68</td>
</tr>
<tr>
<td></td>
<td>28 - 38</td>
<td>28 - 38</td>
</tr>
<tr>
<td>M10</td>
<td>45 - 57</td>
<td>58 - 76</td>
</tr>
<tr>
<td></td>
<td>458.87 - 581.23</td>
<td>398.30 - 504.51</td>
</tr>
<tr>
<td></td>
<td>58 - 76</td>
<td>58 - 76</td>
</tr>
<tr>
<td>M12</td>
<td>67 - 85</td>
<td>104 - 134</td>
</tr>
<tr>
<td></td>
<td>683.20 - 866.75</td>
<td>593.02 - 752.34</td>
</tr>
<tr>
<td></td>
<td>104 - 134</td>
<td>104 - 134</td>
</tr>
<tr>
<td>M14</td>
<td>106 - 134</td>
<td>140 - 188</td>
</tr>
<tr>
<td></td>
<td>1,080.88 - 1,366.40</td>
<td>938.21 - 1,186.03</td>
</tr>
<tr>
<td></td>
<td>140 - 188</td>
<td>140 - 188</td>
</tr>
<tr>
<td>M16</td>
<td>152 - 188</td>
<td>210 - 260</td>
</tr>
<tr>
<td></td>
<td>1,549.94 - 1,917.04</td>
<td>1,345.35 - 1,663.99</td>
</tr>
<tr>
<td></td>
<td>210 - 260</td>
<td>210 - 260</td>
</tr>
<tr>
<td>M18</td>
<td>200 - 240</td>
<td>280 - 340</td>
</tr>
<tr>
<td></td>
<td>2,039.40 - 2,447.28</td>
<td>1,770.20 - 2,124.24</td>
</tr>
<tr>
<td></td>
<td>280 - 340</td>
<td>280 - 340</td>
</tr>
<tr>
<td>M20</td>
<td>245 - 295</td>
<td>370 - 450</td>
</tr>
<tr>
<td></td>
<td>2,498.27 - 3,008.12</td>
<td>2,168.50 - 2,611.05</td>
</tr>
<tr>
<td></td>
<td>370 - 450</td>
<td>370 - 450</td>
</tr>
<tr>
<td>M22</td>
<td>295</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td>3,008.12</td>
<td>3,772.89</td>
</tr>
<tr>
<td>M24</td>
<td>370</td>
<td>3,772.89</td>
</tr>
<tr>
<td>M27</td>
<td>550</td>
<td>5,608.35</td>
</tr>
<tr>
<td>M30</td>
<td>740</td>
<td>7,545.78</td>
</tr>
</tbody>
</table>

Note:
The same values are applied to "fine screw thread."
# Principal Tightening Torques

## Tightening Torque by Model

**SP160EB**

Tighten the following bolts and nuts at the torque specified in the table. For thread locking adhesive, apply a middle strength thread locker (ThreeBond 1322 or equivalent anaerobic adhesives).

<table>
<thead>
<tr>
<th>Location</th>
<th>Code</th>
<th>Part name</th>
<th>Tightening torque</th>
<th>Thread locking adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>N-m</td>
<td>kgf-cm</td>
</tr>
<tr>
<td>Chain wheel</td>
<td>K0010100202</td>
<td>Bolt, heat-treated M10-20</td>
<td>29 - 38</td>
<td>295.71 - 387.49</td>
</tr>
<tr>
<td>Front wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front wheel bracket</td>
<td>K0000100252</td>
<td>Bolt, M10-25</td>
<td>29 - 38</td>
<td>295.71 - 387.49</td>
</tr>
<tr>
<td>Wheel bearing</td>
<td>K0000100352</td>
<td>Bolt, M10-35</td>
<td>29 - 38</td>
<td>295.71 - 387.49</td>
</tr>
<tr>
<td>Wheel</td>
<td>K0011120352</td>
<td>Bolt, heat-treated M12-35P1.5</td>
<td>67 - 85</td>
<td>683.20 - 866.75</td>
</tr>
<tr>
<td>Rhombic flange unit</td>
<td>K0661204010</td>
<td>Rhombic flange unit UCFL204L2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Rear wheel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheel mounting base</td>
<td>K0160000042</td>
<td>20 special nut P1.5</td>
<td>147 - 183</td>
<td>1,498.96 - 1,866.05</td>
</tr>
<tr>
<td>Wheel</td>
<td>K0011120252</td>
<td>Bolt, heat-treated M12-25P1.5</td>
<td>67 - 85</td>
<td>683.20 - 866.75</td>
</tr>
<tr>
<td>Servomotor</td>
<td>K001A080251</td>
<td>Bolt, w/hexagon hole, M8-25</td>
<td>14 - 19</td>
<td>142.76 - 193.74</td>
</tr>
<tr>
<td>Electrolytic capacitor</td>
<td>K0000050122</td>
<td>Bolt, M5-12</td>
<td>3</td>
<td>30.59</td>
</tr>
</tbody>
</table>

**Note:**

The maximum allowable tightening torque for the mounting bolt of the electrolytic capacitor is 3.23 N-m.
**Adjustment before Work**

**Adjustment of Steering Wheel**

**Warning**
Since it is dangerous, do not adjust while traveling.

**Caution**
Be sure the steering wheel position is securely locked. It may result in an unexpected accident if it becomes loose while traveling.

The steering wheel can be adjusted up or down with the tilt lever. Adjust the position according to the operator's body size. Shift the tilt lever to the "FREE" position, move the steering wheel to the position that suits your work requirements, and then shift the tilt lever to the "LOCK" position to secure it. The tilt lever is located to the left of the driver's seat.

**Adjustment of Rake**

1. Adjust the fork prong bar. The working depth of fork prong bar can be adjusted with the nut.

2. On a level surface, lower the rake, and then drive the machine forward about approximately 20 cm (7.87 in).

3. Place a wooden board with a thickness of about 15 mm (0.59 in) under the warp board.

4. Adjust the fork prong bar to a position where the rake load is applied to the wooden board and the tip of the fork prong bar lightly touches the ground, and then lock it in place with the nut.

**Adjustment of Seat**

Use the seat adjustment lever to adjust the seat back and forth. Adjust the position according to the operator's body size. The adjustment lever is located beneath the front part of the seat.
2. Adjust the rake height.
The height of raised rake can be adjusted by
the link of the cross link chains.
As a standard, 8 links of chain are used.
[1] Lower the rake on a level surface.
[2] Loosen the nut.
[3] Reduce the number of chain link.
[5] Adjust the rake stopper so that it lightly
touches the rake, and then tighten the nut.
[6] Raise and lower the rake to check that it
lightly touches the rake stopper.

Adjustment of Blade

Note: Depending on the specifications, this function
may not be available.
The blade can be adjusted with the bolt.
1. Loosen the bolt, and then move the small
blade to the desired position.
[1] Toward A to take a thin layer from the
surface of the sand
[2] Toward B to take a thick layer from the
surface of the sand

Adjustment of Finishing Brush

Note: Depending on the specifications, this function
may not be available.
The height of the finishing brush can be
adjusted by moving the right and left movable
arms while griping the right and left clutch
levers.
Return the clutch levers after adjusting the
height of the brush on the ground according to
the bunker conditions.
The mounting height can be adjusted to one of
four levels.
1. When traveling, adjust to the lowest position.
2. When used for light finishing, adjust to the position second from the bottom.

3. When used for normal finishing, adjust to the position third from the bottom.

4. When used for heavy finishing, adjust to the highest position.

Procedure to Switch On/Off Machine

Procedure to Switch On Machine

**Warning**

The machine may enter a free-run (neutral) state for electrical or mechanical reasons. Depress the brake pedal to stop the machine.

- If the machine entered a free-run state for electrical reasons, the travel safety device will be activated and the brake will be automatically applied. However, depending on the circumstances, the machine may not be stopped. In that case, depress the brake pedal to stop the machine.

These are the cases of free-run state for electrical reasons.

1. When the red LEDs in the alarm display panel light up.
2. When the buzzer notifies.
3. When the machine is switched off.

**Warning**

Before switching on the machine, make sure that there are no other people or obstacles around the machine.

**Caution**

Make sure that the covers are correctly installed and are not damaged.

1. Sit on the seat.
2. Make sure that the parking brake is applied.
3. Make sure that the traveling pedal is in the neutral position.
4. Turn the key switch to the "ST" position to switch on the machine.

Note:
When the machine is switched on, the buzzer sounds briefly and the red LED lights up.

5. Slowly turn the key switch back to the "ON" position.

Procedure to Switch Off Machine

Warning
Make sure that the parking brake is applied before switching off the machine. The machine may jerk.

Important
If the operator leaves the seat without applying the parking brake in power-on state, a buzzer will sound. (intermittent tone)
When the parking brake is applied, the buzzer will stop.

1. Set the traveling pedal to neutral.

2. Stop the machine on level ground, and then apply the parking brake.

3. Turn the key switch to the "OFF" position.

Safety Mechanisms

This machine is equipped with a safety function for switching on the machine. When switching on the machine, the safety function prevents the machine from being switched on unless all of the following three conditions are met.
- An operator is sitting on the seat.
- The parking brake is applied.
- The traveling pedal is set to the neutral position.

Warning Mechanisms

This machine features a warning mechanism to indicate when the operator leaves the seat without applying the parking brake or when a malfunction is detected in the travel control system.

1. If the operator leaves the seat without applying the parking brake in power-on state, a buzzer will sound. (intermittent tone)
   * When the parking brake is applied, the buzzer will stop.

2. If any of the following malfunctions are detected in the travel control system, a buzzer will sound. (continuous tone)
   [1] LV (low voltage)
   [2] HV (high voltage)
   [3] OH (overheating)
   [4] OL (overload)
   [5] TE (transistor error)
   [6] EE (encoder error)
   [7] OS (overspeed)
   * Stop the machine, apply the parking brake, and then turn the key switch to the "OFF" position.
   When the key switch is turned to the "ON" position after a while, the buzzer will stop.
   If the buzzer continues to sound, check which red LED in the alarm display panel is lit.
   "Alarm Display Panel" (Page 4-30)
Travel Safety Device

**Warning**

It may result in an unexpected accident, if the machine enters a free-run state. For fear that the travel safety device malfunctions and the brake is not automatically applied, immediately depress the brake pedal to stop the machine when the buzzer sounds. When switching off the machine, make sure that the parking brake is applied.

The travel safety device is installed under the driver platform.

1. When the travel safety device is activated, the brake wire is automatically pulled to stop the machine.

2. The travel safety device is activated when a malfunction is detected in the travel electrical control system and a red LED in the operation panel lights up or when the machine is switched off.

![Diagram](TravelSafetyDevice_001)

<table>
<thead>
<tr>
<th>1</th>
<th>Travel safety device</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Driver platform</td>
</tr>
</tbody>
</table>

![Diagram](TravelSafetyDevice_002)

<table>
<thead>
<tr>
<th>1</th>
<th>Brake wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Transmission</td>
</tr>
<tr>
<td>3</td>
<td>Brake</td>
</tr>
<tr>
<td>4</td>
<td>Brake lever</td>
</tr>
<tr>
<td>5</td>
<td>Travel safety device</td>
</tr>
</tbody>
</table>
Malfunction Detection

LV

1. If the normal control input voltage of 48 V drops to 36 V or less due to the load, a red LED (LV-HV) in the alarm display panel lights up while the buzzer sounds to warn that the battery remaining charge is insufficient. Immediately recharge the battery.

2. If the load is removed and the voltage is restored, the buzzer stops. The voltage drop due to the load increases if the battery remaining charge has become insufficient.

3. A malfunction is detected if the warning continues for 30 seconds or more and, in addition to the red LED (LV-HV) lighting up and the buzzer sounding, the travel safety device automatically applies the brake since the machine enters a free-run state.

Control input voltage drops to 36 V or less

↓

Red LED (LV-HV) lights up while buzzer sounds to warn of insufficient battery remaining charge

↓

LV (low voltage) occurs if warning continues for 30 seconds or more

↓

Travel control stops (machine enters free-run state)

Malfunction detected and warning indicated with red LED (LV-HV) lighting up while buzzer sounds

↓

Brake automatically applied

OL

1. If a load greater than rated one is applied to the motor, the red LED (OH-OL) in the alarm display panel lights up and the buzzer sounds to warn that the load applied to the motor is too large. Travel at low speed.

2. If the load is reduced to no more than rated one, the buzzer stops.

3. If the warning continues for 30 seconds or more and a malfunction is detected, in addition to the red LED (OH-OL) lighting up and the buzzer sounding, the travel safety device automatically applies the brake since the machine enters a free-run state.

Load greater than rated one applied to the motor

↓

Red LED (OH-OL) lights up while buzzer sounds to warn of overload

↓

OL (overload) occurs if warning continues for 30 seconds or more

↓

Travel control stops (machine enters free-run state)

Malfunction detected and warning indicated with red LED (OH-OL) lighting up while buzzer sounds

↓

Brake automatically applied
In addition to the red LED lighting up and the buzzer sounding to warn of the malfunction, the travel safety device automatically applies the brake since the machine enters a free-run state.

Key Switch ON

1. If no malfunction is detected in the travel electrical control system, the travel safety device automatically releases the brake.
2. If a malfunction is detected, the brake is not automatically released.

<table>
<thead>
<tr>
<th>Key Switch ON</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Key switch ON</td>
<td></td>
</tr>
</tbody>
</table>
|   | Malfunction confirmation time (Buzzer sounds briefly)
|   |   |
| No malfunction | Malfunction detected |
|   |   |
| Control begins normally (Buzzer stops) | Control does not begin (Buzzer continues sounding)
|   |   |
| Brake automatically released | Brake not automatically released |

Key Switch OFF

1. Since the machine enters a free-run state, the travel safety device automatically applies the brake.
Protection Device (OCR)

If an overcurrent is fed to the circuits of the safety device, the current is interrupted by the OCR (overcurrent relay) to protect the safety device circuitry. The OCR is located on the bottom of the driver platform.

1. If the OCR is activated, the machine does not travel, even if the traveling pedal is depressed, and the OCR LED (orange) lights up.

Important

Before performing maintenance on the electrical system, be sure to disconnect the negative terminal of the battery.

2. If the OCR LED lights up, the following troubles may have occurred.
   • Inappropriate positions of the limit switches.
   • Current surge in the safety device circuit due to a damage.
   Adjust the limit switches in the safety device and check for the cause such as damage.

3. Press the OCR button to reset the safety device and turn off the OCR LED.
Operation Method

Cautions for when You Leave The Machine

⚠️ Caution
If the brakes are not sufficiently effective, use the wheel stoppers to secure the machine.

⚠️ Caution
Never park the machine on a slope.

Positions of Operation Decals

| 1   | Key switch mark |
| 2   | Light switch mark |
| 3   | Rake up/down mark |
| 4   | Tilt steering mark |
| 5   | Parking brake mark |
| 6   | Front wheel mark |
| 7   | BRAKE decal |
| 8   | FORWARD decal |
| 9   | BACKWARD decal |
| 10  | Indicating shift decal |
Description of Operation Decals

Key Switch Mark

Key switch mark
This indicates the key switch positions.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
</tr>
<tr>
<td>2</td>
<td>ON</td>
</tr>
<tr>
<td>3</td>
<td>START</td>
</tr>
</tbody>
</table>

Light Switch Mark

Note:
Depending on the specifications, this function may not be available.

K4203001410
STICKER, LIGHT SWITCH
This indicates the light switch positions.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
</tr>
</tbody>
</table>

Rake Up/Down Mark

Rake up/down mark
This indicates up/down of the rake.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UP</td>
</tr>
<tr>
<td>2</td>
<td>DOWN</td>
</tr>
</tbody>
</table>

Tilt Steering Mark

Tilt steering mark
This indicates the direction of tilt steering and lock/free of the position.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FREE</td>
</tr>
<tr>
<td>2</td>
<td>LOCK</td>
</tr>
</tbody>
</table>
Parking Brake Mark

Parking brake mark
This indicates lock/release of the parking brake.

1 Lock
2 Release

BRAKE Decal

K4203001450
Decal, BRAKE
This indicates brake.

FORWARD Decal

K4203001430
Decal, FORWARD
This indicates forward travel.

Front Wheel Mark

K4209001180
DECAL, ARROW POINT
This indicates the front wheel direction.

SP160EB
Handling Instructions
BACKWARD Decal

K4203001440
Decal, BACKWARD
This indicates backward travel.

Indicating Shift Decal

SP160E-0131Z0
DECAL, INDICATING SHIFT
This indicates the positions of the shift lever.

Light Switch

Note:
Depending on the specifications, this function may not be available.

Caution
The lights provide auxiliary lighting. Do not operate the machine at night or under poor visibility.

The light switch is located in the operation panel. When the switch is set to the "ON" position, the lights turn on. When it is set to the "OFF" position, the lights turn off. Note: The lights do not turn on when the key switch is set to the "OFF" position.

Up/Down Switch Lever

Important
The rake cannot be raised or lowered when the driver platform is open or has not be correctly closed.

The up/down switch lever is on the right side below the steering wheel and is used to operate the rake.

- Shift the up/down switch lever to the "UP" position to raise the rake and automatically stop it at its highest position.
- Shift the up/down switch lever to the "DOWN" position to lower the rake and automatically stop it at its lowest position.
Shift the up/down switch lever to the neutral position to stop the rake.

### Shift Lever

**Caution**

When moving the shift lever, make sure to stop the machine completely on a level surface.

The shift lever is located to the left of the seat. It can be set to the three levels "Low speed", "Neutral" and "High speed". Set the lever to the position appropriate for traveling or your work requirements.

<table>
<thead>
<tr>
<th>Low speed (L):</th>
<th>When leveling the bunker</th>
<th>When using the blade</th>
<th>When using the cultivator</th>
<th>When traveling on steep uphills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral (N):</td>
<td>When towing this machine</td>
<td>When servicing this machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High speed (H):</td>
<td>When traveling</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Traveling Pedal

**Warning**

Do NOT start to move or stop the machine abruptly. Doing so is very dangerous and may cause damage.

**Warning**

Do not release the parking brake with your foot left on the traveling pedal. The machine may suddenly accelerate.

The traveling pedal is located in the right foot area. When the forward side is depressed, the machine travels forward. When the reverse side is depressed, the machine travels backward. The speed changes in accordance with how much the pedal is depressed. When you take your foot off the pedal, the machine stops automatically.

**Note:**
The machine cannot travel if the parking brake is applied.
**Brake Pedal**

**Caution**
- When leaving the driver's seat, park the machine on a stable, flat surface and be sure to apply the parking brake.

**Caution**
- Do not park on a slope.

**Important**
- To keep stopping on a slope, be sure to apply the parking brake. Keeping stopping without braking eats electricity of the battery.

The brake pedal is located in the left foot area. To stop the machine, depress the brake pedal all the way firmly. When parking, firmly depress the brake pedal and lock it with the lock fitting. To release it, firmly depress the brake pedal and release the lock fitting.

**Front Cover**

**Caution**
- Do not open the front cover in strong winds.

**Caution**
- When closing the front cover, be careful not to pinch your hands.

The front cover is in front of the steering wheel and is opened in order to perform maintenance. Follow the steps below to open the front cover.

1. Remove the dimple knobs.

2. Open the front cover, and then tilt it forward until the wire is fully extended.
Do not open the driver platform in strong winds.

When closing the driver platform, be careful not to pinch your hands.

Follow the steps below to open the driver platform.
1. Lower the rake.
2. Release the rubber catches, and then fully open the driver platform.
3. When closing the driver platform, slowly lower it while securely supporting it, and then firmly secure the rubber catches.

Note:
When the driver platform is opened, a safety switch is activated and the rake cannot be raised or lowered.

Follow the steps below to open the seat platform.
1. With the seat lever, bring the seat to the frontmost position.
2. Lightly press down the seat, and then release the seat platform fastener.
3. Open the seat platform.

Do not open the battery cover in strong winds.

When closing the battery cover, be careful not to pinch your hands.

The battery covers are located on the left and right sides under the seat and are opened in order to recharge the battery and perform maintenance.
1. Open the seat platform.
2. Grip the handle and pull up the battery cover to attach cover A to the magnet.
3. Slide cover B in the direction of the arrow to remove it.
If you continue to operate the machine in this condition, the battery remaining charge will become insufficient and a buzzer will sound. "Alarm Display Panel" (Page 4-30)
When the second LED indicating lamp from the left lights up, immediately recharge the battery.
"Charging of Battery" (Page 4-7)
* The machine up-time per charge differs greatly depending on the course configuration, number of bunkers and operations performed.

**Battery Remaining Charge Gauge**

Battery Remaining Charge

Battery remaining charge is displayed in the upper gauge of the battery remaining charge gauge.

When the battery is fully charged, the LED indicating lamp on the right end lights up and moves to the left as the battery becomes discharged.
When the second LED indicating lamp from the left lights up, it is time to recharge the battery.
Alarm Display Panel

The alarm display panel is located in the operation panel. Red (orange for OCR) LEDs light up when a malfunction is detected in the travel electrical control system or when the machine is switched off.

![Alarm Display Panel](image-url)
<table>
<thead>
<tr>
<th>Code</th>
<th>Name of error</th>
<th>Details of error</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV</td>
<td>Low voltage</td>
<td>・Control input voltage drops to 36 V or less for 30 seconds ・Insufficient battery remaining charge ・Faulty battery charging ・End of battery life</td>
<td>・Machine abruptly stopped while traveling downhill continuously for 2 to 3 minutes or more</td>
<td>・Recharge the battery. ・Check the charger connections. ・Measure the specific weight of the battery to diagnose it.</td>
</tr>
<tr>
<td>HV</td>
<td>High voltage</td>
<td>・Control input voltage rises to 70 V or more ・Machine abruptly stopped while traveling downhill continuously for 2 to 3 minutes or more</td>
<td>・Drive cooling fan not rotating ・Dirty cooling fins ・Traveling with the brake dragging</td>
<td>・Replace the drive cooling fan. ・Clean the cooling fins. ・Adjust the brake.</td>
</tr>
<tr>
<td>OH</td>
<td>Overheating</td>
<td>・Temperature of cooling fins for servo drive increases to 80 °C (176 °F) or more ・Temperature of motor increases to 130 °C (266 °F) or more ・High-load operations using blade or cultivator performed at high speed ・Traveling at high speed on a steep upward slope ・Traveling with the brake dragging</td>
<td>・Drive cooling fan not rotating ・Dirty cooling fins ・Traveling with the brake dragging</td>
<td>・Perform high-load operations at low speed. ・Travel at low speed on a steep upward slope. ・Adjust the brake.</td>
</tr>
<tr>
<td>OL</td>
<td>Overload</td>
<td>・Load greater than rated torque applied to motor ・High-load operations using blade or cultivator performed at high speed ・Traveling at high speed on a steep upward slope ・Traveling with the brake dragging</td>
<td>・Load greater than rated torque applied to motor ・High-load operations using blade or cultivator performed at high speed ・Traveling at high speed on a steep upward slope ・Traveling with the brake dragging</td>
<td>・Perform high-load operations at low speed. ・Travel at low speed on a steep upward slope. ・Adjust the brake.</td>
</tr>
<tr>
<td>TE</td>
<td>Transistor error</td>
<td>・Current greater than specified value fed to transistor ・Transistor temperature exceeds specified value ・Transistor control voltage less than specified value ・High-load operations using blade or cultivator performed at high speed ・Traveling at high speed on a steep upward slope ・Traveling with the brake dragging</td>
<td>・Current greater than specified value fed to transistor ・Transistor temperature exceeds specified value ・Transistor control voltage less than specified value ・High-load operations using blade or cultivator performed at high speed ・Traveling at high speed on a steep upward slope ・Traveling with the brake dragging</td>
<td>・Perform high-load operations at low speed. ・Travel at low speed on a steep upward slope. ・Adjust the brake.</td>
</tr>
<tr>
<td>EE</td>
<td>Encoder error</td>
<td>・Error occurred in encoder signal from motor ・ Loose encoder connector ・ Broken or shorted encoder cable</td>
<td>・Error occurred in encoder signal from motor ・ Loose encoder connector ・ Broken or shorted encoder cable</td>
<td>・Correctly connect the encoder connector. ・Replace the encoder cable.</td>
</tr>
<tr>
<td>OS</td>
<td>Overspeed</td>
<td>・Motor rpm exceeds specified value ・Traveling at high speed on a steep downward slope after LV occurs</td>
<td>・Motor rpm exceeds specified value ・Traveling at high speed on a steep downward slope after LV occurs</td>
<td>・Travel at low speed on a steep downward slope after LV occurs.</td>
</tr>
<tr>
<td>OCR</td>
<td>Overcurrent relay</td>
<td>・Overcurrent fed to circuits of travel safety device ・Faulty adjustment of limit switches in travel safety device ・Damage to limit switches in travel safety device</td>
<td>・Overcurrent fed to circuits of travel safety device ・Faulty adjustment of limit switches in travel safety device ・Damage to limit switches in travel safety device</td>
<td>・Adjust the limit switches in the travel safety device. ・Replace the limit switches in the travel safety device.</td>
</tr>
</tbody>
</table>
Travel of Machine

Precautions during Travel

**Warning**
It may result in an unexpected accident if the machine enters a free-run state. For fear that the travel safety device malfunctions and the brake is not automatically applied, immediately depress the brake pedal to stop the machine when the buzzer sounds. When switching off the machine, make sure that the parking brake is applied.

**Warning**
When you descend a slope, drive at low speed and avoid abrupt steering.

**Caution**
Under any circumstances drive the machine at such a speed that you can stop it immediately for emergencies.

**Caution**
Before traveling, make sure that the output plug of the charger is disconnected from the connector on the main vehicle.

**Caution**
Before moving the shift lever, make sure to stop the machine completely on a level surface.

Traveling Procedure

1. Switch on the machine. "Procedure to Switch On Machine" (Page 4-16)
2. Raise the rake.
3. Release the parking brake.
4. Set the shift lever to the "Low speed" position or the "High speed" position.
5. Slowly depress the traveling pedal.
6. The machine starts traveling.

Towing The Machine

**Caution**
When towing the machine, travel at a speed no more than 3.0 km/h.

**Caution**
If the travel safety device brake wire is removed from the hook spring on the transmission brake lever, the brakes will no longer operate and the machine will enter a free-run (neutral) state. After repairs are completed, be sure to attach the travel safety device brake wire to the hook spring.

If the machine does not travel due to activation of the safety device, etc., you can move it by towing or pushing it.
1. Apply the parking brake.
2. Lower the rake.
3. Switch off the machine.
4. Chock the wheels.
5. Secure the machine with ropes.
6. Release the parking brake.
7. Open the driver platform.
8. Remove the cotter pin and washer from the transmission brake lever.
9. Remove the hook spring from the transmission brake lever.
Important
Do not remove the parking brake wire.

10. Remove only the travel safety device brake wire from the hook spring.

11. Attach the hook spring to the transmission brake lever.
12. Attach the cotter pin and washer to the transmission brake lever.
13. Close the driver platform.
14. Apply the parking brake.
15. Switch on the machine.
16. Raise the rake.
17. Raise the blade and cultivator if installed.
18. Switch off the machine.
19. Remove the wheel stoppers.
20. Set the shift lever to the "Neutral" position.
21. Release the parking brake

Warning
While towing, always keep your foot on the brake pedal and depress the brake pedal at any time to stop.

22. Tow the machine slowly.

Operations
Precautions during Work

Warning
Do not start to move or stop the machine abruptly.

Warning
It may result in an unexpected accident if the machine enters a free-run state. For fear that the travel safety device malfunctions and the brake is not automatically applied, immediately depress the brake pedal to stop the machine when the buzzer sounds. When switching off the machine, make sure that the parking brake is applied.

Caution
Before starting operations, check that the area where the operations are to be performed is safe.

Caution
Do not enter or leave a bunker via a steep slope or extremely uneven ground.

Caution
Before moving the shift lever, make sure to stop the machine completely on a level surface.

Important
Set the shift lever to the "Low speed" position during operations.

Important
Do not back up with the rake, cultivator or finishing brush lowered.
Rake

Important
Performing operations at high speed may leave undulations on bunker surfaces or tire tracks.

Important
The rake up/down lever cannot be operated when the driver platform is open or has not been correctly closed.

1. Switch on the machine.
   "Procedure to Switch On Machine" (Page 4-16)
2. Set the shift lever to the "Low speed" position.
3. Raise the rake.
4. Raise the blade and cultivator if installed.
5. Release the parking brake.
6. Enter the bunker.
7. Depress the traveling pedal to start traveling.
8. At the bunker area where the operation is to be started, repeatedly perform the following operations.
   · Move the blade lever forward to lower the blade, and then hold the blade lever in place while traveling to lift the sand.
   · Move the blade lever toward you to raise the blade.
9. At the bunker area where the operation is to be stopped, raise the rake.
10. Leave the bunker.
11. If tire tracks remain, use the broom to remove them.

Blade

Note:
Depending on the specifications, this function may not be available.

Caution
If the blade is raised, do not touch the lifting lever.

Caution
When getting on and off the machine, watch out the blade lever lest you should get your foot caught on it and fall.

1. Switch on the machine.
   "Procedure to Switch On Machine" (Page 4-16)
2. Set the shift lever to the "Low speed" position.
3. Raise the rake.
4. Raise the blade.
5. Raise the cultivator if installed.
6. Release the parking brake.
7. Enter the bunker.
8. Depress the traveling pedal to start traveling.
9. At the bunker area where the operation is to be started, repeatedly perform the following operations.
   · Move the blade lever forward to lower the blade, and then hold the blade lever in place while traveling to lift the sand.
   · Move the blade lever toward you to raise the blade.
10. At the bunker area where the operation is to be stopped, raise the blade.
11. Leave the bunker.
12. If tire tracks remain, use the broom to remove them.
Cultivator

Note:
Depending on the specifications, this function may not be available.

1. Switch on the machine.
   "Procedure to Switch On Machine" (Page 4-16)
2. Set the shift lever to the "Low speed" position.
3. Raise the rake.
4. Raise the cultivator.
5. Raise the blade if installed.
6. Release the parking brake.
7. Enter the bunker.
8. At the bunker area where the operation is to be started, lower the rake.
9. Depress the traveling pedal to start traveling.
10. At the bunker area where the operation is to be started, squeeze the clutch lever and pull the cultivator lever toward you.
11. After lowering the cultivator board to the desired depth, release the clutch lever, and level with the rake at the same time that the cultivator operation is performed.
12. At the bunker area where the operation is to be stopped, raise the cultivator.
13. Raise the rake.
14. Leave the bunker.
15. If tire tracks remain, use the broom to remove them.

Finishing Brush

Note:
Depending on the specifications, this function may not be available.

1. Switch on the machine.
   "Procedure to Switch On Machine" (Page 4-16)
2. Set the shift lever to the "Low speed" position.
3. Raise the rake.
4. Raise the blade and cultivator if installed.
5. Release the parking brake.
6. Adjust the height of the brush from the ground according to the bunker conditions.
7. Enter the bunker.
8. Depress the traveling pedal to start traveling.
9. At the bunker area where the operation is to be started, lower the rake.
   The finishing brush is lowered at the same time.
10. At the bunker area where the operation is to be stopped, raise the rake.
    The finishing brush is raised at the same time.
11. Leave the bunker.
12. If tire tracks remain, use the broom to remove them.
Transporting

Transporting Procedure

When loading the machine into a trailer or a truck to transport it, drive the machine in reverse.
When unloading, drive the machine forward.

Loading:
1. Apply the machine parking brake.
2. Lower all the attachments.
3. Switch off the machine.
4. Be sure to fasten the machine with ropes, etc.

Note:
For fastening the machine with ropes, use the following positions.
Use the right and left tow hooks for rear part of the machine.
Front part of machine

| 1 | Tow hook |

Rear part of machine

Unloading:
1. Release roping.
2. Switch on the machine.
3. Raise all the attachments.
4. Release the machine parking brake.

Storage

Before Long-Term Storage

- Completely remove dirt, grass clippings, debris, oil stains, etc.
- Store the machine in a well-ventilated area, where it will not be exposed to rain, dust or direct sunlight.
- Supply oil and apply grease to appropriate parts.
- Disconnect the negative battery wires.
- Recharge the battery every three months so it will not discharge excessively.
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Maintenance Schedule ......................Page 5-3
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Maintenance Precautions

**Caution**
First, learn well the maintenance operations you plan to perform.

**Important**
Use tools appropriate for each maintenance operation.

**Important**
For the safe and best performance of your machine, use Baroness genuine parts for replacement and accessories. Please note that our product warranty may be void if you use non-genuine parts for replacement or accessories.

Precautions for Maintenance

This machine employs precision electric devices. For maintenance, exercise care in the following points.

1. Do not use high-pressure washing with fluid such as water in the traveling pedal area.

2. Do not use fluid such as water and high-pressure air to clean the electric devices behind the seat. Clean them with low-pressure air or a dry cloth each time after using the machine. Inside the driver platform

Inside the servo driver
## Maintenance Schedule

**SP160EB**

Follow the maintenance schedule below.

- ○ · · · Inspect, adjust, supply, clean
- ● · · · Replace (first time)
- △ · · · Replace

<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Before Work</th>
<th>After Work</th>
<th>Every Week</th>
<th>Every 25 hrs.</th>
<th>Every 50 hrs.</th>
<th>Every 100 hrs.</th>
<th>Every 200 hrs.</th>
<th>Every 250 hrs.</th>
<th>Every 400 hrs.</th>
<th>Every 500 hrs.</th>
<th>Every 800 hrs.</th>
<th>Every 1000 hrs.</th>
<th>Every 1500 hrs.</th>
<th>Every 3000 hrs.</th>
<th>Every 5000 hrs.</th>
<th>Every month</th>
<th>Every year</th>
<th>Every 2 years</th>
<th>Every 4 years</th>
<th>When Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check looseness and corrosion of battery terminals</td>
<td>○</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>*1 Check battery fluid level and supply</td>
<td>○</td>
<td></td>
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</tr>
<tr>
<td>Check battery remaining charge (remaining charge gauge)</td>
<td>○</td>
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</table>

Remarks

*1 Check looseness and corrosion of battery terminals

*1 Check battery fluid level and supply

*1 Check battery remaining charge (remaining charge gauge)

Remarks

- ○ · · · Inspect, adjust, supply, clean
- ● · · · Replace (first time)
- △ · · · Replace

Remarks

*1 Check looseness and corrosion of battery terminals

*1 Check battery fluid level and supply

*1 Check battery remaining charge (remaining charge gauge)

Remarks

*1 Check looseness and corrosion of battery terminals

*1 Check battery fluid level and supply

*1 Check battery remaining charge (remaining charge gauge)
<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Before Work</th>
<th>After Work</th>
<th>Every 25 hrs.</th>
<th>Every 50 hrs.</th>
<th>Every 100 hrs.</th>
<th>Every 200 hrs.</th>
<th>Every 250 hrs.</th>
<th>Every 400 hrs.</th>
<th>Every 500 hrs.</th>
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<th>Every 1500 hrs.</th>
<th>Every 3000 hrs.</th>
<th>Every 5000 hrs.</th>
<th>Every 10000 hrs.</th>
<th>Every 2 years</th>
<th>Every 4 years</th>
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<td>Grease and lubricate all moving parts</td>
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Remarks:
- ○: When Required
- ●: 50 hours first check, every 100 hours thereafter
- △: Replace
### Maintenance Schedule

<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Before Work</th>
<th>After Work</th>
<th>Every 25 hrs.</th>
<th>Every 50 hrs.</th>
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<th>Every 800 hrs.</th>
<th>Every 1000 hrs.</th>
<th>Every 1500 hrs.</th>
<th>Every 2000 hrs.</th>
<th>Every month</th>
<th>Every year</th>
<th>Every 2 years</th>
<th>Every 4 years</th>
<th>When Required</th>
<th>Remarks</th>
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<td>Replace small blade</td>
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</table>

- *1: Refer to the Battery's Owner's Manual.
- The values for consumables are not guaranteed.

### Adjusted Values

<table>
<thead>
<tr>
<th>Steering chain</th>
<th>Approximately 5 mm (0.20 in.)</th>
<th>Steering chain slack</th>
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<tbody>
<tr>
<td>Rake Fork depth (standard)</td>
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<tr>
<td>Arm stopper</td>
<td>23 mm (0.91 in.)</td>
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</tr>
<tr>
<td>Raised height</td>
<td>200 mm (7.87 in.)</td>
<td></td>
</tr>
<tr>
<td>Exposed length of screw shaft from spherical joint</td>
<td>65 mm (2.56 in.)</td>
<td></td>
</tr>
<tr>
<td>Exposed length of threaded end of connecting shaft</td>
<td>20 mm (0.79 in.)</td>
<td></td>
</tr>
<tr>
<td>Installation depth of spherical joint</td>
<td>15 mm (0.59 in.)</td>
<td></td>
</tr>
</tbody>
</table>
Jacking Up The Machine

About Jacking Up The Machine

**Warning**

When replacing a tire or beginning any other maintenance or repairs, be sure to chock the wheels to prevent the machine from moving. Before jacking up the machine, park it on a hard, flat surface such as a concrete floor and remove any obstacles that could prevent you from performing the work safely. When necessary, use an appropriate chain block, hoist, or jack. Support the machine securely with jack stands or appropriate blocks. Failure to do so may cause the machine to move or fall, resulting in injury or death.

Use the jack-up points identified in this manual when jacking up the machine. Only place a jack under the jack-up points specified. Placing a jack at any other point could result in damage to the frame or other parts.

**Jack-Up Points**

<table>
<thead>
<tr>
<th></th>
<th>Jack-up Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front left frame</td>
</tr>
<tr>
<td>2</td>
<td>Front right frame</td>
</tr>
<tr>
<td>3</td>
<td>Rear left frame</td>
</tr>
<tr>
<td>4</td>
<td>Rear right frame</td>
</tr>
</tbody>
</table>

1. Front left frame

2. Front right frame

3. Rear left frame
Greasing

About Greasing

Since there may be adhesion or damage due to lack of grease on moving parts, they must be greased.
Add urea-based No. 2 grease in accordance with the Maintenance Schedule.
Other locations where the specified grease or lubricant is used are indicated in "Greasing Points".
Add grease using the specified grease or lubricant.

Greasing Points

Grease nipples are installed in the following locations.
Add grease every 50 hours of operation.

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of Greasing Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steering wheel frame</td>
</tr>
<tr>
<td>2</td>
<td>Front wheel pivot</td>
</tr>
<tr>
<td>3</td>
<td>Traveling pedal fulcrum</td>
</tr>
<tr>
<td>4</td>
<td>Neutral lever fulcrum</td>
</tr>
<tr>
<td>5</td>
<td>Brake pedal fulcrum</td>
</tr>
<tr>
<td>6</td>
<td>Front wheel shaft rhombic flange unit</td>
</tr>
<tr>
<td>7</td>
<td>Rake frame fulcrum</td>
</tr>
<tr>
<td>8</td>
<td>Blade lever fulcrum</td>
</tr>
<tr>
<td>9</td>
<td>Blade arm fulcrum</td>
</tr>
<tr>
<td>10</td>
<td>Cultivator lever fulcrum</td>
</tr>
</tbody>
</table>
1. Steering wheel frame

2. Front wheel pivot

3. Traveling pedal fulcrum

4. Neutral lever fulcrum

5. Brake pedal fulcrum

6. Front wheel shaft rhombic flange unit
   There is one point each on the left and right.

7. Rake frame fulcrum
   There is one greasing point on each rake frame fulcrum.
8. Blade lever fulcrum  
There is one point each on the left and right.

1. Clean up the dirt and dust on the upper side of battery with a cloth damped with water, or wash off with water.
2. If there is corrosion or dirt on the terminals, wash off with water or hot water and then apply a thin coating of grease.

Cleaning of Cooling Fins

**Important**  
Do not allow water to come into contact with electrical components during cleaning. It may cause malfunction of the machine.

**Important**  
Unclean cooling fins may cause overheating or malfunction to the servo driver or motor.

**Important**  
Do not use fluid such as water and high-pressure air to clean the cooling fins. Also, do not use solid objects such as a spatula or screwdriver. Clean them with low-pressure air. Otherwise, the fins may be damaged, possibly resulting in reduced cooling performance.

If the cooling fins have been contaminated with dust, be sure to clean them. Especially after operating the machine in a dusty environment, it is important to remove dust as soon as possible.
1. Open the driver platform.
2. Carefully clean the cooling fins with low-pressure compressed air.

---

9. Blade arm fulcrum

10. Cultivator lever fulcrum  
There is one point each on the left and right.

**Danger**  
Do not clean the battery with a dry cloth. Cleaning the battery with a dry cloth may cause it to catch fire or explode due to static electricity.

---

Maintenance Work

Cleaning of Battery

**Danger**  
Do not clean the battery with a dry cloth. Cleaning the battery with a dry cloth may cause it to catch fire or explode due to static electricity.
3. Close the driver platform, and then firmly secure the rubber catch.

**Cleaning inside The Driver Platform**

**Important**
Do not allow water to come into contact with electrical components during cleaning. It may cause malfunction of the machine.

**Important**
Do not use fluid such as water and high-pressure air for cleaning inside the driver platform. Do not use a wet cloth nor high-pressure air. It may cause malfunction of the machine.

Be sure to remove dust attached inside the driver platform. Especially after operating the machine in a dusty environment, it is important to remove dust as soon as possible.

1. Follow the steps below to remove the driver cover.
   1. [1] Open the driver platform.
   2. [2] Remove the long nuts A.
   4. [4] Remove the long nuts B.

2. Clean the inside of the driver platform with low-pressure air.
3. Follow the steps below to remove the servo driver cover.
   1. [1] Remove the screws.
   2. [2] Remove the servo driver cover.

4. If sandy dust accumulates on the circuit board inside the servo driver, remove it carefully with low-pressure air.
Change of Fork Prong Bar

**Caution**
Wear gloves when touching a fork prong bar.

When wear of the fork prong bar results in no margin for tightening the nut on the fork prong bar, replace the fork prong bar.

1. Loosen the nut, and then replace the fork prong bar.

2. Replace the smoother plates.

3. Install the bolts, washers and nuts with friction ring.

**Important**
If the chain completely fixed with the nuts with friction ring, the smoother plates cannot level out very well.

4. Tighten the nuts with friction ring so that the chain can move.

**Change of Smoother Plate**

Replace the smoother plates if smoothing ability decreased due to the plates wear.

1. Remove the nuts with friction ring, bolts and washers.

2. Adjust the small blade.

"Adjustment of Blade" (Page 4-15)

3. Tighten the bolts.
Change of The Cultivator Fitting

Note:
Depending on the specifications, this function may not be available.

⚠️ Caution
When removing the cultivator, be careful not to pinch your hands.

When wear of the trapezoidal cultivator fitting disables unhardening the sand, replace the trapezoidal cultivator fitting.
1. Remove the bolts at the bottom of the machine on the right side.

2. Remove the bolts at the bottom of the machine on the left side.

3. Pull out the cultivator from the bottom of the machine.

4. Remove the bolts, and then replace the trapezoidal cultivator fittings.

5. Tighten the bolts for the trapezoidal cultivator fitting.

⚠️ Caution
When installing the cultivator, pay attention to its falling.

6. Install the cultivator to the machine with bolts.

Change of Finishing Brush

Note:
Depending on the specifications, this function may not be available.

⚠️ Caution
Be careful since the finishing brush is heavy.

When wear of the finishing brush results in rake tracks remaining, replace the finishing brush.
1. Remove the bolts from the rake, and then remove the finishing brush.
**Caution**

Place the finishing brush on level surface.

2. Remove the bolts, and then replace the finishing brush.

3. Tighten the bolts.

**Removing/Installing Tires**

**Front Tire**

Follow the steps below to remove the front tire.

1. Securely place the jack beneath the jack-up points of the front left/right frame area, and then raise it until the tire lifts off the ground. "Jack-Up Points" (Page 5-6)

2. Follow the steps below to remove the tire.

   [1] Loosen the lock bolts for the left rhombic flange unit.
   [2] Remove bolt A.
   [3] Remove bolt B and nut B, and then remove the left rhombic flange unit.
   [4] Remove bolt C and nut C, and then remove the right rhombic flange unit.

   [6] Remove the wheel mounting bolt, and then remove the tire.

**Important**

Tighten the bolts in the tightening order (diagonally).

For installing the front tires, reverse the removing procedure.
Rear Tires

Follow the steps below to remove the rear tires:
1. Loosen the bolts.
2. Securely place the jack beneath the jack-up point of the rear left/right frame area, and then raise it until the tire lifts off the ground. "Jack-Up Points" (Page 5-6)
3. Remove the bolts.
4. Remove the tire from the wheel mounting seat.

Important
Tighten the bolts in the tightening order (crosswise).

For installing the rear tires, reverse the removing procedure.

Adjustment of Steering Chain

Excessive play with a loose steering chain may stretch the chain further while you may feel a heavy steering wheel with an excessively tight chain and the chain and wheel may wear prematurely.

Important
Make sure that the steering chain has the specified amount of slack.

1. Open the front cover.

2. With the nuts on each end of the steering chain, adjust the chain tension so that there is approximately 5 mm (0.20 in) of slack.

3. After making adjustments, firmly secure the nuts.

Adjustment of Traveling Pedal

Important
Do not adjust the traveling pedal. Traveling at 15.0 km/h or more may damage the machine.

The traveling pedal is set a factory default forward speed of 15.0 km/h and reverse speed of 5.0 km/h.
Adjustment of Shift Lever Fulcrum

The shift lever fulcrum may begin to rattle due to frequent use and may no longer be able to perform shift operations correctly. Follow the steps below to adjust the shift lever fulcrum.

**Important**
Before adjusting the shift lever fulcrum, be sure to set the key switch to the "OFF" position.

**Important**
When adjusting the shift lever fulcrum, make sure that shift lever operation remains smooth.

1. Loosen the nut.
2. Tighten the bolt until the shift lever fulcrum does not rattle.
3. Tighten the nut to secure the bolt.

### Adjustment of Brake

**Caution**
Make sure that the brake wire is not cracked or damaged.

**Caution**
Perform the adjustment with the machine switched off.

---

Adjustment of Parking Brake Wire

**Important**
Adjust the play of the brake lever so that it is as small as possible and the brakes do not drag when the lever is released.

When the brake wire is stretched, the play of the brake pedal may become large, the braking effectiveness may become worse and the brake pedal may unexpectedly lock. If the brake is not sufficiently effective when the brake pedal is depressed, adjust the brake wire.

1. Park the machine on a level surface.
2. Release the parking brake.
3. Loosen the travel safety device brake wire.
4. Adjust the brake by tightening the adjustment bolt on the transmission side.

[1] Loosen the lock nut B.
[2] Adjust the parking brake wire with the adjustment bolt B.
  - If the brake lever play is too large, the braking power will be decreased and the brake pedal will be soft.
  - If the brake lever play is too small, the braking power will be increased and the brake pedal will be hard.
[3] Firmly secure the adjustment bolt B with the lock nut B.

Note:
If adjustment with the adjustment bolt on the transmission side is not completed, adjust by tightening the adjustment bolt on the pedal side.
Adjustment of Parking Brake Wire

1. Brake pedal
2. Adjustment bolt A
3. Lock nut A
4. Parking brake wire
5. Transmission
6. Lock nut B
7. Adjustment bolt B
8. Brake lever

5. Inspect the parking brake. "Inspection of Parking Brake" (Page 4-8)

Adjustment of Parking Brake Switch

1. Adjust the parking brake switch position so that the switch is pressed to produce a clicking sound when the brake pedal is locked.
2. Adjust the parking brake switch position so that the switch stroke is 6.0 mm (0.24 in.) or less when the brake pedal is locked.

Note:
The following occur when the parking brake switch is pressed.
- The machine does not travel, even if the traveling pedal is depressed.
- The buzzer will not sound when the operator leaves the seat.
Adjustment of Travel Safety Device Brake

**Important**
Before adjusting the travel safety device brake, complete the adjustment of the parking brake.

1. Park the machine on a level surface.
2. Release the parking brake.
3. Loosen the lock nut.
4. Adjust the travel safety device brake wire with the adjustment bolt.
   Adjust the travel safety device brake wire so that its play is as small as possible and the brakes do not drag when the brake is released.
5. Firmly tighten the lock nut.

6. Inspect the travel safety device brake.
   "Inspection of Travel Safety Device Brake" (Page 4-9)
Replacement of Battery

When replacing the battery, observe the following precautions.

**Danger**
Keep away from fire while replacing the battery. The battery may explode. Perform the operation in a well-ventilated area, where parts will not get wet, for example, from rain.

**Danger**
Do not short-circuit the battery. The battery will short-circuit not only if the positive and negative terminals come into contact with a metal tool but also if the positive terminal comes into contact with any metal part (for example, the main vehicle).

When the battery terminals are connected to the vehicle's cable terminals, securely tighten the nuts. Inadequate tightening may result in a fire or explosion.

**Warning**
When connecting the vehicle's cable terminals to the battery, do not reverse the connections to the positive and negative terminals. Firmly secure the battery with the mounting bracket. Inadequate securing may result in battery damage, leaking fluid or a fire or explosion.

**Warning**
Do not modify the battery terminals. Do not obstruct the battery's vent plug or side exhaust holes with the connected cables, etc. Do not connect electrical devices directly to the battery.

**Caution**
Do not allow flexible polyvinyl chloride etc. including plasticizers to come into contact with the battery. Position the battery so that it is level while being handled, and install it level in the mounting bracket. If terminal covers and heat shield plates are installed on the battery, install them in their original positions after replacing the battery.

**Caution**
The battery is a heavy weight. Exercise care in leakage and injury due to overturn or drop during moving, unpacking, removal and installation.

**Important**
Select a battery with terminals (positive and negative) at the same positions. Forcing connections to a battery with terminals at different positions will damage the cables.

**Important**
When placing the battery in the machine, never carry it by its terminals. This may cause faulty terminal connections due to deformed terminals or fluid leakage from around the terminals.

**Important**
Use a replacement battery of the same size as the original one.

**Important**
When replacing the battery, be sure to replace it with a new one.

**Important**
Be careful with the used battery since it may retain power.

Follow the steps below to replace the battery.
1. Switch off the machine and remove the key.
2. Disconnect the battery cable. Refer to the figure and disconnect the battery cable in the appropriate order. Disconnect the wires in order, from (negative) terminal ① to terminal ⑫.

3. Use the included battery handle to replace the battery.

4. For installing the battery, reverse the removing procedure.

---

**Replacement of Battery Cable**

When replacing the battery cable, observe the following precautions.

**Danger**

Keep away from fire while replacing the battery cable.
The battery may explode.
Perform the operation in a well-ventilated area, where parts will not get wet, for example, from rain.

**Danger**

Do not short-circuit the battery.
The battery will short-circuit not only if the positive and negative terminals come into contact with a metal tool but also if the positive terminal comes into contact with any metal part (for example, the main vehicle).

---

When the battery terminals are connected to the vehicle's cable terminals, securely tighten the nuts.
Inadequate tightening may result in a fire or explosion.

**Warning**

When connecting the vehicle's cable terminals to the battery, do not reverse the connections to the positive and negative terminals.

**Warning**

Do not obstruct the battery's vent plug or side exhaust holes with the connected cables, etc.

**Caution**

If terminal covers and heat shield plates are installed on the battery, install them in their original positions after replacing the battery.

Follow the steps below to replace the battery cable.
1. Switch off the machine and remove the key.
2. Disconnect the battery cable.
   Refer to the figure and disconnect the battery cable in the appropriate order.
   Disconnect the wires in order, from (negative) terminal ① to terminal ⑫.
3. For installing the battery cable, reverse the removing procedure.

---

### Table: Replacement of Battery Cable

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Negative wire (black)</td>
</tr>
<tr>
<td>2</td>
<td>Positive wire (red/green)</td>
</tr>
<tr>
<td>3</td>
<td>Negative wire (black)</td>
</tr>
<tr>
<td>4</td>
<td>Positive wire (red)</td>
</tr>
<tr>
<td>5</td>
<td>Front</td>
</tr>
</tbody>
</table>
Change of Brake Wire

**Caution**

If there are cracks, damage or other defects in the brake wire, replace it immediately.

**Important**

The brake wire of travel safety device is unexchangeable. Replace a whole travel safety device brake Assy.

1. Apply the parking brake.
2. Lower the rake.
3. Switch off the machine.
4. Chock the wheels.
5. Release the parking brake.
6. Open the driver platform.
7. Remove the cotter pin and washer from the brake lever.
8. Remove the hook spring from the brake lever.
9. Remove only the parking brake wire from the hook spring.
10. Remove the cotter pin and washer, and then pull out the pin.
11. Loosen the lock nut A and lock nut B.
12. Remove the parking brake wire.
13. Install a new parking brake wire.
14. Tighten the lock nut A at the level where the longest thread part of the adjustment bolt A projects toward the brake pedal.
15. Attach the parking brake wire to the hook spring.
16. Attach the hook spring to the brake lever.
17. Attach the washer and cotter pin to the brake lever.
18. Adjust the parking brake.
Change of Transmission Oil

**Caution**
Be careful with hot oil, which could cause burns if it contacts your skin.

**Important**
When you change the transmission oil, be sure to drain it into a bowl and discard it in accordance with regional laws and regulations.

**Important**
Be sure to pour automobile gear oil that is classified as SAE Viscosity Grade #90 into the transmission.

Change the transmission oil in accordance with the Maintenance Schedule.
1. Move the machine onto a level surface, and then switch off the machine. 
   "Procedure to Switch Off Machine" (Page 4-17)
2. Remove the drain plug while the transmission oil is warm, and then drain the oil into a container.
3. Install the drain plug in the transmission.
4. Remove the oil filler cap and oil level plug.
5. Supply new transmission oil through the oil filling port.
   Transmission oil quantity is 2.0 dm$^3$ (2.0 L). 
   "Supply of Transmission Oil" (Page 4-10)
6. Make sure that the transmission oil level is filled up to the tip of the oil level opening. 
   "Inspection of Transmission Oil" (Page 4-10)
7. Install the oil filler cap and oil level plug.
8. Check underneath the machine for oil leakage.

Change of Fuse

**Fuses**

**Important**
Before performing maintenance on the electrical system, be sure to disconnect the negative terminal of the battery.

**Important**
If a fuse blows, a short may have occurred within the electrical circuit. Check for the cause, such as faulty terminal connections, damaged wiring or terminals, or incorrect wiring.

1. The fuse holder is located inside the front cover.
   Glass fuse (30 A)
2. Open the driver platform to access the fuse.
   Check the blown fuse indicator.
   BF fuse (325 A)
EU Declaration of Conformity

Product Identification
Product: Electric bunker rake
Brand-Name: BARONESS
Type: SP160EB
Version(s): Not Applicable
Starting Serial No.: 10402

Manufacturer
Name: Kyoeisha Co., Ltd.
Address: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Conforms to the following Directives
2006/42/EC Machinery (MD)
2014/30/EU Electromagnetic compatibility (EMC)

We have been designed and manufactured under the following specifications
ISO 5395-1 : 2013 (2006/42/EC)
ISO 5395-3 : 2013 (2006/42/EC)
EN 61000-6-2:2005 (2014/30/EU)
EN 61000-6-3:2007 (2014/30/EU)

Keeper of Technical Documentation
Name: Kyoeisha Co., Ltd.
Address: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Compiler of the technical file (2006/42/EC)
Name: Kyoeisha U K Ltd.
Address: Unit 5 Hatch Industrial Park Grewell Road, Basingstoke Hampshire RG24 7NG, the United Kingdom

Conformity assessment procedures
Internal production control : Module A (2006/42/EC)
EC-type examination : Module B (2014/30/EU)

Place : Japan
Date : 15 June 2020 (15 / 6 / 2020)
Signature : A. Hayashi
Name : Aiko Hayashi
Position : Quality Dept. Director

Déclaration de conformité UE

Identification du produit
Produit : Râteau pour fosses électrique
Fabricant : BARONESS
Type : SP160EB
Version(s) : Non applicable
Numéro de série de début : 10402

Fabricant
Nom : Kyoeisha Co., Ltd.
Adresse : 1-26, Miyuki-cho, Toyokawa, préfecture d'Aichi, Japon

Conforme aux directives suivantes :
2006/42/CE Machine (MD)
2014/30/UE Compatibilité électromagnétique (CEM)

Conception et fabrication en respect des spécifications suivantes :
ISO 5395-1 : 2013 (2006/42/CE)
EN 61000-6-2:2005 (2014/30/UE)
EN 61000-6-3:2007 (2014/30/UE)

Fiche technique
Marque : Kyoeisha Co., Ltd.
Adresse de la marque : 1-26, Miyuki-cho, Toyokawa, préfecture d'Aichi, Japon

Complèteur de la fiche technique (2006/42/CE)
Nom : Kyoeisha U K Ltd.
Adresse : Unit 5 Hatch Industrial Park Grewell Road, Basingstoke Hampshire RG24 7NG, Royaume-Uni

Procédures d'évaluation de la conformité
Contrôle de production interne : module A (2006/42/CE)
Examen de type CE : module B (2014/30/UE)
Declaración de conformidad de la UE

Identificación del producto
Producto: Rasnillo para búnker electric
Marca: BARONESS
Tipo: SP160EB
Versión: No aplicable
Nº de serie inicial: 10402
Fabricante Nombre: Kyoeisha Co., Ltd.
Dirección: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japón

Cumple las siguientes Directivas
2006/42/CE Maquinaria (MD)
2014/30/UECompatibilidad electromagnética (EMC)

Se ha diseñado y fabricado utilizando las siguientes especificaciones
ISO 5395-1 : 2013 (2006/42/CE)
EN 61000-6-2: 2005 (2014/30/UE)
EN 61000-6-3: 2007 (2014/30/UE)

Documentación técnica
Nombre del responsable: Kyoeisha Co., Ltd.
Dirección del responsable: 1-26 Miyuki-cho, Toyokawa, Aichi- pref., Japón

Compilador del archivo técnico (2006/42/CE)
Nombre: Kyoeisha U.K. Ltd.
Dirección: Unit 5 Hatch Industrial Park Greywell Road, Basingstoke Hampshire RG24 7NG, Reino Unido

Procedimientos de evaluación de conformidad
Control de fabricación interno: Módulo A (2006/42/CE)
Examen de tipo CE: Módulo B (2014/30/UE)

EU-Konformitätserklärung

Produktbeschreibung
Produkt: Elektrischer Bunkerharken
Marke: BARONESS
Modell: SP160EB
Version(en): Nicht zutreffend
Startseriennummer: 10402
Hersteller Name: Kyoeisha Co., Ltd.
Adresse: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Entspricht den folgenden Richtlinien
2006/42/EG Maschinenrichtlinie
2014/30/EUElektromagnetische Verträglichkeit (EMV)

Unter Anwendung der folgenden Bestimmungen entwickelt und hergestellt
ISO 12100 : 2010 (2006/42/EG)
ISO 5395-1 : 2013 (2006/42/EG)
ISO 5395-3 : 2013 (2006/42/EG)
EN 61000-6-2: 2005 (2014/30/EU)
EN 61000-6-3: 2007 (2014/30/EU)

Technische Dokumentation
Name des Halters: Kyoeisha Co., Ltd.
Adresse des Halters: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Technische Unterlagen erstellt von (2006/42/EG)
Name: Kyoeisha U.K. Ltd.
Adresse: Unit 5 Hatch Industrial Park Grenewell Road, Basingstoke Hampshire RG24 7NG, Großbritannien

Konformitätsbewertungsverfahren
Intere Produktion kontrolle: Modul A (2006/42/EG)
EG-Beaumusterprüfung: Modul B (2014/30/EU)
EU-försäkran om överensstämmelse

Produktdentifieration
Produkt: Elektrisk Bunkerkratta
Mark: BARCNESS
Typ: SP160EB
Version(er): Ej aktuellt
Seriennummer startar på: 10402

Tillverkare
Namn: Kyoeisha Co., Ltd.
Adress: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Uppfyller följande direktiv
2006/42/EG Maskindirektivet
2014/30/EU Elektromagnetisk kompatibilitet (EMC)

Följande kravspecifikationer har följts vid konstruktion och tillverkning:
ISO 12100 : 2010 (2006/42/EG)
ISO 5395-1 : 2013 (2006/42/EG)
ISO 5395-3 : 2013 (2006/42/EG)
EN 61000-6-2:2005 (2014/30/EU)
EN 61000-6-3:2007 (2014/30/EU)

Teknisk dokumentation
Innehavarens namn: Kyoeisha Co., Ltd.
Innehavarens adress: 1-26 Miyuki-cho, Toyokawa, Aichi-pref., Japan

Den tekniska filen (2006/42/EG) har tagits fram av
Namn: Kyoeisha U.K.Ltd.
Adress: Unit 5 Hatch Industrial Park Grewell Road, Basingstoke Hampshire RG24 7NG, Storbritannien

Förarande för bedömning av överensstämmelse
Intern produktionskontroll: Modul A (2006/42/EG)
EG-typprovning: Modul B (2014/30/EU)