"Required reading" Read this manual and the owner's manual for the engine before using the machine.
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Greeting

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.

Introduction

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 your local 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.

<table>
<thead>
<tr>
<th>Warning symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>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.</td>
</tr>
<tr>
<td>!</td>
<td>This symbol indicates that serious injury or death will occur if the warning is ignored.</td>
</tr>
<tr>
<td>!</td>
<td>This symbol indicates that serious injury or death may occur if the warning is ignored.</td>
</tr>
<tr>
<td>!</td>
<td>This symbol indicates that injury or damage to property may occur if the warning is ignored.</td>
</tr>
<tr>
<td>!</td>
<td>This symbol indicates precautions on the mechanism of the machine.</td>
</tr>
</tbody>
</table>
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 Tractor’s Owner’s Manual
- Service Instructions for PTO Drive Shafts

Purpose

This product is intended for aerating golf courses.
Do not use this product in any way other than its intended purpose, and do not modify this product.
Operating this product for other purposes and modifying it may be very dangerous and may cause damage to the product.

Safety

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 material to them.
3. All operators and mechanics should seek and obtain professional and practical instruction. The owner is responsible for training the users.
4. Never allow children or people unfamiliar with these instructions to use or service the machine.
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.

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. 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.
3. Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.
4. Check that shields are attached properly.
5. Before using, always visually inspect to see that the tines and tine mounts are not worn or damaged.
   When some tines are worn, replace all the installed tines at the same time to prevent abnormal vibration.
6. Pay attention to all the tine mount holders, which operate simultaneously.

Operation

1. Only operate in good light, keeping away from holes and hidden hazards.
2. Never operate the machine with damaged guards, shields, or without safety protective devices in place.
3. Stop the engine in the following conditions.
   [4] 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.
4. Keep hands and feet away from the rotating parts.
5. Never operate while people, especially children, or pets are nearby.
6. Stop the tines rotating before crossing surfaces other than grass.
7. Disengage drive to attachments when transporting or not in use.
8. 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.
Fasten the machine to the truck with a rope or other suitable restraining device that has sufficient strength.
**Maintenance and Storage**

1. Disengage drives on level ground, stop drive to the tine section, set parking brake, stop engine. Wait for all movement to stop before adjusting, cleaning or repairing.
2. Never allow untrained personnel to service machine.
3. Appropriately manage and correctly use the tools necessary for servicing or adjusting the machine.
4. Carefully release pressure from components with stored energy.
5. Use care when checking the tines.
   - [1] Wrap the tines or wear gloves, and use caution when servicing them.
6. On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.
7. Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
8. Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.
9. Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.

**Towing**

1. Follow the manufacturer’s recommendation for weight limits for towed equipment and towing on slopes.

---

**Disposal**

**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 The 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.)
## Product Overview

### 1. Specifications

#### 1-1. Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>TDA1200</th>
<th>TDA1600</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TDA1200</strong></td>
<td><strong>TDA1600</strong></td>
<td><strong>TDA1200</strong></td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>TDA1200</td>
<td>TDA1600</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total length</td>
<td>38.19 in</td>
<td>97 cm</td>
</tr>
<tr>
<td>Total width</td>
<td>55.91 in</td>
<td>142 cm</td>
</tr>
<tr>
<td>Total height</td>
<td>33.46 in</td>
<td>85 cm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1157.41 lb</td>
<td>525 kg</td>
</tr>
<tr>
<td>Gear oil capacity</td>
<td>1.0 U.S.gals</td>
<td>3.8 dm³ (3.8 L)</td>
</tr>
<tr>
<td>Number of crank</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Tine φ17 • 8.46 in</td>
<td>φ17 • 215 mm</td>
<td></td>
</tr>
<tr>
<td>Number of tines</td>
<td>18 pcs (Various options available)</td>
<td></td>
</tr>
<tr>
<td>Astrating width</td>
<td>46.06 in</td>
<td>117 cm</td>
</tr>
<tr>
<td>Pitch (Traveling direction)</td>
<td>Depending on the condition</td>
<td></td>
</tr>
<tr>
<td>Interval</td>
<td>2.56/3.94 in</td>
<td>6.5 • 10 cm</td>
</tr>
<tr>
<td>Working depth</td>
<td>Max. 9.84 in (Depending on the condition)</td>
<td>Max. 25 cm (Depending on the condition)</td>
</tr>
<tr>
<td>Drive</td>
<td>Aerating</td>
<td>PTO driving</td>
</tr>
<tr>
<td>Speed of PTO rotation</td>
<td>Max. 400 rpm</td>
<td></td>
</tr>
<tr>
<td>Working speed</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Applicable tractor</td>
<td>Horsepower 13.2 kW (18.0 PS) or more</td>
<td></td>
</tr>
<tr>
<td>Max lifting capacity</td>
<td>1,432.98 lbf or more</td>
<td>650 kgf or more</td>
</tr>
<tr>
<td>Universal joint</td>
<td>Clutch setting torque Allowed max 4,602.52 lbf-in</td>
<td>Allowed max 520 N-m (5,302.44 kgf-cm)</td>
</tr>
<tr>
<td></td>
<td>Regular use 2478.28 lbf-in</td>
<td>Regular use 280 N-m (2,855.16 kgf-cm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>Tractor ; 3-point link lifting type</td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>0.46 acres/hour (0.99 mph x Operating width)</td>
<td>1.872 m³/h (1.6 km/h x Operating width)</td>
</tr>
</tbody>
</table>

---

**Note:** All specifications are subject to change without notice. Please refer to the manufacturer’s official documentation for the most accurate information.
1-2. Types of Tines

There are two main types of tines: "pipe type" (which pulls out the lawn) and "spike type" (which drills holes).

<table>
<thead>
<tr>
<th></th>
<th>Pipe type</th>
<th>Spike type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeration effect</td>
<td>Large effect</td>
<td>Good</td>
</tr>
<tr>
<td>Permeability effect</td>
<td>Large effect</td>
<td>Good</td>
</tr>
<tr>
<td>Underground gas diffusion effect</td>
<td>Large effect</td>
<td>Good</td>
</tr>
<tr>
<td>Damage to turf surface</td>
<td>Large</td>
<td>Less than with pipe type</td>
</tr>
<tr>
<td>Damage to lawn</td>
<td>Large</td>
<td>Less than with pipe type</td>
</tr>
<tr>
<td>Lawn recovery</td>
<td>Takes time</td>
<td>Quick</td>
</tr>
<tr>
<td>Aeration period</td>
<td>When lawn cultivation is thriving</td>
<td>Whenever needed</td>
</tr>
<tr>
<td>Core disposal</td>
<td>Necessary</td>
<td>Unnecessary (Cores not discharged)</td>
</tr>
<tr>
<td>Mowing after aeration</td>
<td>Better to mow</td>
<td>Better to mow</td>
</tr>
<tr>
<td>Effect on play after aeration</td>
<td>Not immediately possible</td>
<td>Instantly possible (However, mowing after tamping is required.)</td>
</tr>
<tr>
<td>Degradation of thatch by mixing with soil</td>
<td>Promoted</td>
<td>Limited</td>
</tr>
</tbody>
</table>

### 1. Pipe-type Tines

<table>
<thead>
<tr>
<th>Tip dimensions</th>
<th>Outer diameter of mount</th>
<th>Total length</th>
<th>Quantity used</th>
<th>Tine mount</th>
<th>Lawn pressing plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>φ10V tine 100</td>
<td>6 mm (0.24 in)</td>
<td>9.5 mm (0.37 in)</td>
<td>100 mm (3.94 in)</td>
<td>72 96</td>
<td>Specialized Specialized</td>
</tr>
<tr>
<td>φ12V tine 120</td>
<td>8.2 mm (0.323 in)</td>
<td>9.5 mm (0.37 in)</td>
<td>120 mm (4.72 in)</td>
<td>72 96</td>
<td>Specialized Specialized</td>
</tr>
<tr>
<td>φ13V tine 225</td>
<td>7 mm (0.43 in)</td>
<td>12 mm (0.47 in)</td>
<td>225 mm (8.86 in)</td>
<td>18 24</td>
<td>- -</td>
</tr>
<tr>
<td>φ16V tine 125</td>
<td>11 mm (0.43 in)</td>
<td>16 mm (0.63 in)</td>
<td>125 mm (4.92 in)</td>
<td>36 48</td>
<td>Specialized -</td>
</tr>
<tr>
<td>φ17V tine 215</td>
<td>10 mm (0.39 in)</td>
<td>12 mm (0.47 in)</td>
<td>215 mm (8.46 in)</td>
<td>18 24</td>
<td>- -</td>
</tr>
<tr>
<td>φ17V tine 265</td>
<td>10 mm (0.39 in)</td>
<td>12 mm (0.47 in)</td>
<td>265 mm (10.43 in)</td>
<td>18 24</td>
<td>- -</td>
</tr>
</tbody>
</table>

* In the column “Quantity used”, the upper figure indicates the quantity for TDA1200 and the lower for TDA1600.

### 2. Spike-type Tines

<table>
<thead>
<tr>
<th>Tip dimensions</th>
<th>Outer diameter of mount</th>
<th>Total length</th>
<th>Quantity used</th>
<th>Tine mount</th>
<th>Lawn pressing plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>φ8 spike tine</td>
<td>8 mm (0.31 in)</td>
<td>16 mm (0.63 in)</td>
<td>120 mm (4.72 in)</td>
<td>36 48</td>
<td>Specialized -</td>
</tr>
<tr>
<td>φ10 solid tine</td>
<td>10 mm (0.39 in)</td>
<td>9.5 mm (0.37 in)</td>
<td>100 mm (3.94 in)</td>
<td>72 96</td>
<td>Specialized Specialized</td>
</tr>
<tr>
<td>φ12.5 spike tine</td>
<td>12.5 mm (0.49 in)</td>
<td>16 mm (0.63 in)</td>
<td>120 mm (4.72 in)</td>
<td>36 48</td>
<td>Specialized -</td>
</tr>
</tbody>
</table>

* In the column “Quantity used”, the upper figure indicates the quantity for TDA1200 and the lower for TDA1600.
1-3. Relationship between Operation Speed and Pitch

**TDA1200**

Important
The engine rotation speed during tractor operation should be 1,600 - 2,000 rpm.
Max PTO rotation speed should be 400 rpm.
If the PTO rotation speed exceeds 400 rpm, the machine will be damaged.

Use the following table as reference.
Tractor's speed and the pitch vary depending on the tractor's specifications.

<table>
<thead>
<tr>
<th>Tractor</th>
<th>Speed change</th>
<th>Main speed change</th>
<th>Speed</th>
<th>PTO rotation</th>
<th>Crank rotation</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDA1200</td>
<td>1</td>
<td>1</td>
<td>0.52 km/h</td>
<td>1st speed</td>
<td>Slow speed</td>
<td>53 mm</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0.75 km/h</td>
<td>1st speed</td>
<td>Slow speed</td>
<td>75 mm</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>1.06 km/h</td>
<td>1st speed</td>
<td>Slow speed</td>
<td>108 mm</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>1.60 km/h</td>
<td>1st speed</td>
<td>Slow speed</td>
<td>163 mm</td>
</tr>
</tbody>
</table>

* The above table shows the figures during the maximum engine rotation speed 1,800 rpm.

**TDA1600**

Important
The engine rotation speed during tractor operation should be 1,800 - 2,300 rpm.
Max PTO rotation speed should be 1,000 rpm.
If the PTO rotation speed exceeds 1,000 rpm, the machine will be damaged.

Use the following table as reference.
Tractor's speed and the pitch vary depending on the tractor's specifications.

<table>
<thead>
<tr>
<th>Tractor</th>
<th>Speed change</th>
<th>Main speed change</th>
<th>Speed</th>
<th>PTO rotation</th>
<th>Crank rotation</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDA1600</td>
<td>1</td>
<td>1</td>
<td>0.58 km/h</td>
<td>1st speed</td>
<td>Slow speed</td>
<td>53 mm</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0.83 km/h</td>
<td>1st speed</td>
<td>Slow speed</td>
<td>75 mm</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>1.18 km/h</td>
<td>2nd speed</td>
<td>Slow speed</td>
<td>53 mm</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>1.78 km/h</td>
<td>2nd speed</td>
<td>Slow speed</td>
<td>108 mm</td>
</tr>
</tbody>
</table>

*The above table shows the figures during the maximum engine rotation speed 2,000 rpm.*
2. Names of Each Section
3. Regulation Decals

3-1. Positions of Regulation Decals

3-2. Description of Regulation Decals

Serial Number Plate
The serial number plate indicates the model and serial number of the machine.

Specification Decal
(For Europe)
CE mark indicates that the machine sold in the EU nations complies with the EU requirements.
The Specification decal indicates the CE marking, model, and weight, etc.
UKCA Mark
(For UK)
UKCA mark indicates that the machine sold in the UK complies with the UK requirements.

Year of Manufacture Decal
(For Europe)
The year of manufacture decal indicates the year when this machine was manufactured.
4. Safety Signs and Instruction Signs

4-1. About Safety Signs and Instruction Signs

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.

4-2. Positions and Description of Safety Decals and Instruction Decals

- **K425001750 Handling precautions**: Remove the ignition key before maintenance work. May cut your hand - Keep hands away from moving parts.
- **K4205002300 Prohibition of riding decal**: Do not ride the mechanical equipment.
- **K4205001750 PTO caution decal**: May catch your arm - Keep away from PTO moving parts during the engine running.
- **K4205001760 PTO caution decal**: May cut your leg - Be sure that people around the machine keep a safe distance away during operation.
- **K4209001570 PTO MAX 400 rpm decal**: May cut your hand - Keep hands away from moving parts during the engine running.
- **K4209001560 PTO MAX 1000 rpm decal**: It indicates PTO max rotation speed.

[TDA1200] 
K4209001570 PTO MAX 400 rpm decal It indicates PTO max rotation speed.

[TDA1600] 
K4209001560 PTO MAX 1000 rpm decal It indicates PTO max rotation speed.

- **[TDA1200]**
- **[TDA1600]**
Handling Instructions

5. Tractor

5-1. Tractor Standards

This machine employs “standard three-point link” mounting system. In the “standard three-point link”, attach the top and lower links of the tractor and the universal joint of this machine by hand.

5-2. Preparation on The Tractor

**Caution**

Read the “three-point link standards” in the tractor’s owner’s manual carefully.

**Important**

Only the tractors equipped with standard three-point link parts can be connected to this machine.

1. If the tractor is equipped with specific three-point link, remove the top link bracket for specific three-point link and replace it with standard three-point link parts.

   Use the length-adjustable top link, the both ends of which have a screw.

   Attach the lift rod to the front hole of the lower link.

2. If the moving distance when raising and lowering the attached machine is insufficient, adjust it by changing the mounting holes on the lift rod.

   - Use the upper hole to increase the moving distance when raising.
   - Use the lower hole to increase the moving distance when lowering.

6. Adjustment before Attachment

6-1. Precautions about Attachment

**Warning**

Make sure there is no one around the tractor and between this machine and the tractor.

**Warning**

Do not get under the machine. Do not put your foot under the machine.

**Warning**

Before attaching the machine, apply the parking brake of the tractor, set the PTO speed change lever to the “Neutral” position and stop the engine.

**Warning**

When attaching the machine, install the tractor’s genuine balance weights to adjust balance. Otherwise, the machine may lose balance and overturn.

**Caution**

Attach and detach the machine on a flat, stable place.

**Caution**

Two or more workers should attach and detach this machine since it is very heavy.

6-2. Method of Attaching The Machine

1. Place the machine on a flat, stable location.

2. Move the tractor backward to the machine and align the center position of the machine’s linkage section.

3. Raise and lower the lower links with the tractor’s lift lever to align them with the link pin position.

4. Apply the tractor’s parking brake and stop the engine.

5. Chock the tractor.

6. Attach the left lower link and lock the link pin.

7. Raise and lower the lower link with the leveling handle on the right lift link to align it with the pin position.
8. Attach the right lower link and lock the link pin.

9. Align the implement mounting hole in the top link (upper link) with the mounting holes of the machine.
   If the top link (upper link) is not aligned with the mounting pin hole, loosen the lock nuts on the top link and adjust its length.

10. Attach the top link (upper link), lock the link pin and tighten the lock nuts.

11. Start the tractor's engine and raise the machine slightly with the lift lever.

12. Adjust the top link (upper link) so that the machine can level off.
   * Adjust it so that the machine vibrates only 10 - 20 mm on the right and left sides evenly. Check the vibration on the right and left sides of the machine. If the vibration is large, adjust so that the play is reduced.

---

**6-3. Method of Attaching Universal Joint**

- **Caution**
  Before attaching the universal joint, disengage the PTO clutch and stop the tractor's engine.

- **Important**
  Do not mount the universal joint that is too long or too short.
  A long universal joint prongs the tractor's PTO shaft or the attached machine's input shaft. A short universal joint is in poor meshing engagement and will cause breakage.

- **Important**
  The universal joint length depends on the type of tractor to be linked.

- **Important**
  Do not raise the machine with only one side of tractor's lower links attached.

- **Important**
  Do not continue rotating the universal joint with the machine raised. The universal joint or the machine may break.

1. Set the tractor PTO speed change lever to the "Neutral" position.
2. Raise or lower the machine slowly to adjust its height so that the height of tractor's PTO shaft and that of machine's input shaft are on the same level.
3. Close the hydraulic stop valve completely.
   Note:
   For the location of the hydraulic stop valve, refer to the tractor operator's manual.
4. Apply the tractor parking brake and stop the engine.
5. Hang the chain of universal joint on the top link (lift link).

---

**Note:**
For removing the machine, reverse the installation procedure.
Important
Be sure to attach the universal joint clutch part to the implement side.

6. Pull the set cover and simultaneously push the universal joint onto PTO shaft until the locking device engages.
   *Make sure that the knock pin and set cover have returned to their original positions.

7. Press the knock pin and simultaneously push the universal joint onto PTO shaft until the pin engages.
   *Attach it with the tractor’s PTO speed change lever in neutral.

8. Attach the universal joint to the machine and then attach it to the tractor.
   Insert it until the knock pin locks.
   *Make sure that the knock pin and set cover have returned to their original positions.

Important
Do not forcibly insert the universal joint with a hammer etc.
It may cause the joint breakage.

9. Shorten the joint to the highest possible extent and attach it if the clearance between the joint tip and the tractor’s PTO shaft is approximately 10 mm.
   *Make sure that the lock pin head projects more than 10 mm.
   *Make sure that the lock pin is precisely in meshing engagement with the shaft groove.
   If there is not that clearance, cut off the excessive portion of universal joint.

10. Attach the chain for stopping protective cover rotation on the lower link hook.

11. Make sure that the machine is not equipped with tines.

12. Start the engine of the tractor.

13. Make sure that there is no abnormal noise in the universal joint and the machine when rotating PTO shaft with the machine lowered (or with the front roller in contact with the ground).
6-4. Method of Cutting Universal Joint

<table>
<thead>
<tr>
<th>Caution</th>
<th>Work with great caution when using a high speed cutter.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Important</th>
<th>The universal joint length depends on the type of tractor to be linked.</th>
</tr>
</thead>
</table>

1. Hold the half shafts of universal joint next to each other in the shortest working position between the tractor and machine, and mark them.

2. Cut the inner and outer guard tubes at the marked positions.

3. Mark the shaft at the same length from its tip as the removed guard tube.

4. Cut the inner and outer shafts at the marked position.

5. Round off all sharp edges, remove burrs and clean the shafts.
7. Inspections

7-1. Precautions before Inspection

Read "Inspection before work" on the tractor’s owner’s operating manual carefully.

Be sure to stop the engine before inspection, service and adjustment with the tractor linked.

7-2. Inspection of Covers

If you have removed a protective cover during inspection, be sure to securely install it in its original position.
If a protective cover remains removed, foreign objects may fly off, possibly resulting in injuries.

- Make sure that there is no wear or deterioration of protective covers.
- Make sure that there is no damage to protective covers.
- Make sure that there is no interference with moving parts due to deformation of protective covers.
- Make sure that protective covers are installed in their appropriate positions.

7-3. Inspection of Rollers

Bearing wear due to frequent use or bearing damage caused by water infiltration may prevent the roller from rotating smoothly.
Inspect the roller and, if necessary, replace parts such as oil seals and bearings.
1. Make sure that there is no abrasion nor adhesion of the roller.
2. Make sure that there is no wear of the roller shaft.
3. Make sure that there is no wear nor damage of the oil seal.
4. Make sure that there is no wear nor rust of the bearing.
5. Make sure that there is no play in the roller shaft.

7-4. Inspection of Tines

Vibration from imbalance, dullness or poor discharge of cores may occur due to frequent use or damage during transportation.
Inspect and, if necessary, replace.
1. Make sure that the tines are not bent.
2. Make sure that the tines are not chipped.
3. Check how much the tines are worn.
   - The operating depth cannot be maintained if tine wear is 10 mm (0.39 in) or more.
4. Make sure that the edges of tines are not too blunt, making cutting difficult.
5. Make sure that the mounting bolts for the tines are not loose.
6. Check how much the sliding plate of the tine mount section is worn.

7-5. Inspection of Lawn Pressing Plate

Damage may occur due to frequent use or during transportation.
Inspect and, if necessary, replace.
1. Make sure that there is no deformation of the lawn pressing plate.
2. Make sure that there are no cracks or damage to the lawn pressing plate.
3. Make sure that the mounting bolts for the lawn pressing plate are not loose.
7-6. Inspection of Gear Oil
The oil gauge is located on the side of the gear box.
1. On a level surface, check that the oil level reaches the middle of the oil gauge.
2. Check underneath the machine for oil leakage.

7-7. Supply of Gear Oil

**Important** Do not mix different types of oil.

**Important** Use BONNOC TS680 (or equivalent) as oil.

1. If the oil level is low, follow the steps below to supply oil.
   [1] Open the oil filler cap, and then supply oil through the oil filling port until the oil level reaches the middle of the oil gauge.
2. On a level surface, check if the oil level is at the middle of the oil gauge. If necessary, supply oil.
3. Check underneath the machine for oil leakage.

7-8. Inspection of Universal Joint
1. Inspect the chain for damage, abnormal wear and so on.
2. Inspect the cover for cracks, damage, abnormal wear and so on.

7-9. 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.
8. Tightening Torques

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

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.

8-1. Standard Tightening Torques

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>General bolt</th>
<th>Heat-treated bolt</th>
<th>Heat-treated bolt</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Strength classification 4.8</td>
<td>Strength classification 8.8</td>
<td>Strength classification 10.9</td>
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<tr>
<td></td>
<td>N-m kgf-cm lb-in</td>
<td>N-m kgf-cm lb-in</td>
<td>N-m kgf-cm lb-in</td>
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<tr>
<td>M5</td>
<td>3 - 5 30.59 - 50.99 26.55 - 44.26</td>
<td>5 - 7 50.99 - 71.38 44.26 - 61.96</td>
<td>7 - 10 71.38 - 101.97 61.96 - 88.51</td>
</tr>
<tr>
<td>M6</td>
<td>7 - 9 71.38 - 91.77 61.96 - 79.66</td>
<td>8 - 11 81.58 - 112.17 70.81 - 97.36</td>
<td>14 - 18 142.76 - 183.55 123.91 - 159.32</td>
</tr>
<tr>
<td>M8</td>
<td>14 - 19 142.76 - 193.74 123.91 - 168.17</td>
<td>20 - 29 234.53 - 295.71 203.57 - 256.68</td>
<td>28 - 38 285.52 - 357.49 247.83 - 336.34</td>
</tr>
<tr>
<td>M10</td>
<td>29 - 38 295.71 - 387.49 256.68 - 336.34</td>
<td>40 - 57 458.87 - 581.23 398.30 - 504.51</td>
<td>58 - 76 591.43 - 774.97 513.36 - 672.68</td>
</tr>
<tr>
<td>M12</td>
<td>52 - 67 530.24 - 683.20 460.25 - 593.02</td>
<td>60 - 85 683.20 - 866.75 593.02 - 752.34</td>
<td>104 - 134 1,060.49 - 1,366.40 920.50 - 1,186.03</td>
</tr>
<tr>
<td>M14</td>
<td>70 - 94 713.79 - 958.52 619.57 - 831.99</td>
<td>106 - 134 1,080.88 - 1,366.40 938.21 - 1,186.03</td>
<td>140 - 188 1,427.58 - 1,917.04 1,239.14 - 1,663.99</td>
</tr>
<tr>
<td>M16</td>
<td>88 - 112 897.34 - 1,142.96 778.89 - 991.31</td>
<td>152 - 188 1,549.94 - 1,917.04 1,345.35 - 1,663.99</td>
<td>200 - 260 2,141.37 - 2,651.22 1,858.71 - 2,301.26</td>
</tr>
<tr>
<td>M18</td>
<td>116 - 144 1,182.85 - 1,468.37 1,026.72 - 1,274.54</td>
<td>200 - 240 2,039.40 - 2,447.28 1,770.20 - 2,124.24</td>
<td>280 - 340 2,855.16 - 3,466.98 2,478.28 - 3,009.34</td>
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<tr>
<td>M20</td>
<td>147 - 183 1,496.96 - 1,866.05 1,301.10 - 1,619.73</td>
<td>245 - 295 2,498.27 - 3,008.12 2,168.50 - 2,611.05</td>
<td>370 - 450 3,772.69 - 4,588.65 3,274.87 - 3,982.95</td>
</tr>
<tr>
<td>M22</td>
<td>295 3,008.12 2,611.05</td>
<td>440 - 570 3,982.95 - 4,691.03 3,500.10 - 4,210.10</td>
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<tr>
<td>M24</td>
<td>370 3,772.89 3,274.87</td>
<td>530 5,404.41 4,691.03</td>
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<tr>
<td>M27</td>
<td>550 5,608.35 4,868.05</td>
<td>-</td>
<td>1,000 10,197.00 8,851.00</td>
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<td>M30</td>
<td>740 7,545.78 6,549.74</td>
<td>-</td>
<td>1,340 14,628.78 11,860.34</td>
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</table>
### 8-2. Tightening Torque by Model

**TDA1200**

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 sealant).

<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><strong>Frame &amp; Cover</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K0013161201</td>
<td>BOLT, HT M16-120</td>
<td>210 - 260</td>
<td>2,141.37 - 2,651.22</td>
</tr>
<tr>
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<tr>
<td></td>
<td>K0013160952</td>
<td>BOLT, HT M16-95</td>
<td>210 - 260</td>
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<td></td>
</tr>
<tr>
<td></td>
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<td>BOLT, HT M16-60</td>
<td>210 - 260</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K0010120302</td>
<td>BOLT, HT M12-30</td>
<td>104 - 134</td>
<td>1,060.49 - 1,366.40</td>
</tr>
<tr>
<td><strong>Front &amp; Rear Rollers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K0071000372</td>
<td>BOLT, FOR HYDRAULIC MOTOR</td>
<td>52 - 67</td>
<td>530.24 - 683.20</td>
</tr>
<tr>
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<td></td>
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<tr>
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<td>104 - 134</td>
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</tr>
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<td></td>
</tr>
<tr>
<td></td>
<td>K0010100252</td>
<td>BOLT, HT M10-25</td>
<td>58 - 76</td>
<td>591.43 - 774.97</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td></td>
<td>K0010140302</td>
<td>BOLT, HT M14-30</td>
<td>700 - 940</td>
<td>7,137.90 - 9,585.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K0010140452</td>
<td>BOLT, HT M14-45</td>
<td>700 - 940</td>
<td>7,137.90 - 9,585.18</td>
</tr>
<tr>
<td><strong>Gear Box</strong></td>
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<td></td>
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<td>BOLT, HT M12-100</td>
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<tr>
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<tr>
<td></td>
<td>K0013140502</td>
<td>BOLT, HT M14-50</td>
<td>140 - 188</td>
<td>1,427.58 - 1,917.04</td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
<td>K0013120702</td>
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<tr>
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<td>1,427.58 - 1,917.04</td>
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<td></td>
<td>K0010120502</td>
<td>BOLT, HT M12-50</td>
<td>104 - 134</td>
<td>1,427.58 - 1,917.04</td>
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<tr>
<td></td>
<td>K0010100602</td>
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<td>58 - 76</td>
<td>591.43 - 774.97</td>
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<td></td>
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<tr>
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<td>K0010100402</td>
<td>BOLT, HT M10-40</td>
<td>29 - 38</td>
<td>295.71 - 387.49</td>
</tr>
</tbody>
</table>
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<table>
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<tr>
<th>Location</th>
<th>Code</th>
<th>Part name</th>
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<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>Frame &amp; Cover</td>
<td>K0013161201</td>
<td>BOLT, HT M16-120</td>
<td>210 - 260</td>
<td>2,141.37 - 2,651.22</td>
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<tr>
<td>Front &amp; Rear Rollers</td>
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<td>530.24 - 683.20</td>
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<td>700 - 940</td>
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<td>BOLT, HT M10-40</td>
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<td>295.71 - 387.49</td>
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<td>14 - 19</td>
<td>142.76 - 193.74</td>
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<td>14 - 19</td>
<td>142.76 - 193.74</td>
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<td>BOLT, HT M10-40</td>
<td>29 - 38</td>
<td>295.71 - 387.49</td>
</tr>
</tbody>
</table>
9. Adjustment before Operation

9-1. Precautions about Adjustment

⚠️ Warning
Make sure there is no one around the tractor and between this machine and the tractor.

⚠️ Warning
Before adjusting the machine, apply the parking brake of the tractor, set the PTO speed change lever to the “Neutral” position and stop the engine.

9-2. Adjustment of Tine Depth

⚠️ Important
Select an appropriate tine depth in consideration of the working condition. Work without taking the working condition into consideration may apply excessive force to the machine, causing damage to the tines and machine. When the tine depth is deeper, slow down the working speed as necessary.

⚠️ Important
When moving the front roller up and down, move the right and left up-down handles two turns alternately. When one side alone is moved up and down, the scraper and lawn pressing plate bracket will be deformed.

⚠️ Important
The scale does not indicate the actual depth. It is just a rough indication. Judge the depth by actual work.

Turn the up-down handle to adjust the tine depth.
① Loosen the right and left roller holding fixtures.
② Turn the right and left up-down handles to adjust the tine depth. (Approx. 4 mm/turn)
• Turn the up-down handle clockwise to increase the coring depth. (The roller rises and the machine lowers.)
• Turn the up-down handle counter clockwise to decrease the coring depth. (The roller lowers and the machine rises.)
• A depth gauge and scale mark 150A are provided on both sides of the machine. One scale corresponds to 1 cm. When the tip of the depth gauge is at the uppermost edge of the scale, it shows the maximum depth of standard tine.

③ Tighten the right and left “roller holding fixtures.”
10. Operation Method
10-1. Positions and Description of Operation Decals

K4203001400
DECAL, DEPTH ADJUSTING HANDLE
It indicates the tine depth.

K4203001390
DECAL, CRANK EFFECT SPEED
It indicates the crank rotation speed.

Shallow  Deep

Low
Crank effect speed
High
10-2. Change Lever

**Warning**
Stop the PTO rotation before shifting the change lever.

**Important**
When the change lever for switching cannot be engaged easily, step on the clutch pedal of the tractor once again, then the change lever will be engaged easily. If you operate the change lever forcibly, the transmission and change lever can be damaged.

Operate the change lever for switching over crank rotation speed to change high and low speed.
Shift the lever to the appropriate position.

10-3. Up-Down Handle

Operate the up-down handle to adjust the tine depth.
Rotate the handle to the appropriate direction.
Rotate the handle clockwise to increase the coring depth.
Rotate the handle counterclockwise to decrease the coring depth.
10-4. Rear Roller

- If the rear roller is equipped, when using spike tines for coring, it functions to trample the lawn surface, so golfers will be possible to play immediately.
- When using side open tines for coring, keep the rear roller raised, to avoid to trample the grass and soil removed by the side open tines.

A: When using the rear roller
  ① Remove the snap pin and remove the flat head pin securing the rear roller from the hole B.
  ② Insert the flat head pin into the hole A on the roller holding plate and insert the snap pin to release the rear roller.
  ③ Do the same operation on the opposite side to release the rear roller.

B: When not using the rear roller
  ① Remove the snap pin and remove the flat head pin.
  ② Raise the roller hanger to the appropriate height where the rear roller cannot trample the grass and soil removed by the side open tines, and insert the flat head pin into the hole B of the roller holding plate and then insert the snap pin.
  ③ Raise the opposite side in the same way and fix it.

11. Traveling

11-1. Precautions before Traveling

**Warning**
When the machine is attached to a tractor for transportation, drive the tractor so that the traveling speed will not exceed 10 km/h. When moving up and down on a slope, exercise special care to drive the tractor at a speed that will permit emergency stop at any time.

**Warning**
When you feel that the front of the tractor is lifted on a slope, it is very likely that the steering wheel will not function or the tractor may be overturned. Be sure to add some balance weights in that case.

**Important**
Traveling with the tractor linked at a maximum speed will cause bounce and jounce, damaging the machine.

11-2. Traveling Operation

1. Start the tractor engine and rev it up.
2. Raise the machine to the maximum height with the tractor's up/down lever (hydraulic lever).
3. Travel slowly for transportation.
12. Operations
12-1. Precautions before Operation

**Important**
- Do not move forward when lowering the machine and without turning the PTO shaft, otherwise the lawn and machine will be damaged heavily.
- Lower the machine slowly so that the lawn and machine will not be damaged.
- Do not move backward nor turn when the machine has lowered and touched on the ground, otherwise the lawn and machine will be damaged heavily.
- When stone or rock is expected to exist under the ground, lower the speed of PTO rotation.

**Important**
Select an appropriate tine depth in consideration of the working condition. Work without taking the working condition into consideration will apply excessive force to the machine, possibly damaging the tines and machine.

**Important**
- Check that the front roller is in contact with the ground before work. When the coring depth is too deep, the roller may be lifted according to the condition of the soil, it possibly cause to damage the PTO of the tractor or the machine.
- Large tines or attachments may cause the tine mount holder to be lifted. Slow down the PTO speed or stop the machine before the tine mount holder overturns.
- Do not rotate the universal joint at an angle exceeding 30 degrees.
- Carefully select the coring depth according to the condition of the putting green. If the coring surface is too hard it will apply excessive force to the driving system of the machine, causing breakage. Decrease the tine depth in such a condition.
- Excessively high PTO rotation speed (TDA1200: more than 400 rpm/TDA1600: more than 1,000 rpm) will apply excessive force to the machine, causing breakage of the machine or spouting of oil from the gearbox.
- High-speed operation will lower the work effectiveness. Select an appropriate working speed according to the condition.
- Meandering operation is likely to damage the green. Move the machine straight.
- Do not turn the PTO in the reverse direction, otherwise the machine can be broken
- Operate the machine at appropriate speed, keeping the front roller from bouncing. If you operate with the front roller bouncing, the machine may break down.

**Caution**
- When abnormal vibration, abnormal sound (wire or vinyl coiling tangled in the tines), or other anomaly occurs in the machine during work, stop the engine immediately and investigate into the cause. Completely repair the machine before operating it again.
- When colliding with some obstacle, stop the tractor engine and check up whether respective parts are not damaged.
- Remove stone, wire, sticks, and other obstacles before work, otherwise not only machine trouble but also an accident due to the scattering of such objects may result.
- When leaving the machine, park the machine on a flat ground, stop the tractor engine and remove the key. Be sure to apply the parking brake and chock the tires.

**Warning**
- Do not operate the machine in places in danger of a land subsidence or landslide.
- The machine may overturn on a slope with an irregular surface. Do operate use the machine in such a place.
- Avoid operation on slopes.
- The machine is in danger of slipping and overturning on a wet slope. Do not operate the machine in such a condition.
- Check to see if someone is playing in the vicinity. There is a possibility of getting struck with a hit ball.
- Check the surroundings for safety (front, back, right, and left, as well as trees, ditches, irregular surface of the green, sprinklers, and cups etc.) during operation. Operate the machine at an appropriate speed so that you can stop the machine any time in an emergency. Avoid sudden acceleration, sudden braking, and abrupt steering. Drive the machine slowly especially when descending a slope.
- When the machine is attached, the total length of tractor will increase. Be careful of the people and objects around the machine when turning the machine.
- Do not touch the tines, crank, and other moving sections when the machine is in operation, otherwise your fingers or hands may get injured.
- Do not operate the machine at night time or in bad weather when the visibility is poor.

**Caution**
- When abnormal vibration, abnormal sound (wire or vinyl coiling tangled in the tines), or other anomaly occurs in the machine during work, stop the engine immediately and investigate into the cause. Completely repair the machine before operating it again.
- When colliding with some obstacle, stop the tractor engine and check up whether respective parts are not damaged.
- Remove stone, wire, sticks, and other obstacles before work, otherwise not only machine trouble but also an accident due to the scattering of such objects may result.
- When leaving the machine, park the machine on a flat ground, stop the tractor engine and remove the key. Be sure to apply the parking brake and chock the tires.
- Lower the attached machine with care so that the tines cannot touch the ground.
12-2. Aeration Procedure

① Transfer the machine with raising position to the location in front of the working point.
② Select the crank rotation speed using the change lever.
③ Select an appropriate working speed by combining the main transmission and auxiliary transmission of the tractor.
④ Lower the machine slowly.
⑤ Raise the engine speed up to the preset PTO rotation speed.
⑥ Move the machine forth during work.
   ● Keep the front roller in contact with the ground at all times during work. If the machine becomes unstable, change the PTO rotation speed to stabilize the machine. If it does not stabilize, change the coring depth, change the size of tines, or change the tines with new ones.
⑦ When the work is finished, stop the tractor, operate the tractor up-down lever to raise the machine.
⑧ When all tines get off the ground, stop the PTO rotation immediately.
⑨ Move to the next work place, and continue the work following the above procedure.

13. Transporting

Transporting the machine attached to a tractor:
When loading the machine into a trailer or a truck to transport it, drive the tractor in reverse. When unloading, drive the tractor forward.
Transporting only the machine:
When loading the machine into a trailer or a truck to transport it, put the machine with tines removed on a pallet and then load and unload the pallet.
Before transportation, fix the machine on board.

14. Long-Term Storage

- Remove dirt, grass clippings, debris, oil stains etc. completely.
- Supply oil and apply grease to appropriate parts.
- If loosen or lost bolts and nuts found, tighten or service the machine.
- Service defective parts and deteriorated paint.
- Storage location
  Cover the machine and store it in a dry place where it will not be exposed to rain. For storing the machine detached from the tractor, fix the machine with tines removed on a pallet and place it on a flat ground.
15. Maintenance Precautions

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

**Caution**
For maintenance and repair works on the machine lifted up by the tractor, close the hydraulic stop valve of the tractor completely. In addition, place blocks as appropriate supports under the machine.

**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.

16. Maintenance Schedule

○ ○ ○ Inspection, adjustment, replenishment, and cleaning
● ● ● Replacement

<table>
<thead>
<tr>
<th>Maintenance item</th>
<th>Before use</th>
<th>Every 50 hours</th>
<th>Every 100 hours</th>
<th>Every 300 hours</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Condition of tines</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td>(∗)</td>
</tr>
<tr>
<td>Loose screws in respective sections</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Greasing</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change of oil in gearbox</td>
<td></td>
<td>○ (first time)</td>
<td>●</td>
<td>●</td>
<td>100 hours after initial operation</td>
</tr>
<tr>
<td>Removal of dust, etc.</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(∗)When cracks, damage, or abrasion is found on the tines, replace them immediately.

◆ The operations in the table above should be performed whenever necessary, regardless of the time intervals specified.
◆ For tractor maintenance schedule, refer to the Tractor's Owner's Manual.
◆ The values for consumables are not guaranteed.
17. Greasing
17-1. 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.

17-2. Greasing Points
Grease nipples are installed in the following locations.
Add grease every 50 hours of operation.

There is one point each on the left and right ends of the front and rear rollers.

18. Maintenance Work
18-1. Cleaning of Aeration Section
Be sure to clean the aeration section after use.
1. Stop the tractor engine, and then remove the key.
2. Carefully clean the inside and outside of the aeration section with water or compressed air.

18-2. Change of Tines

**Caution**
Wear gloves when touching tines to avoid cutting your hands.

**Important**
Replace all tines at the same time.
Mixing new and old tines will cause abnormal vibration.

1. Stop the tractor engine.
2. Loosen the bolts.
3. Remove the old tine.
4. Fully insert the new tine into the hole in the tine mount.
5. While holding the tine in place with your hand, firmly tighten the bolts.
6. Check that the tine does not fall out.

Note:
Use the optional tine mount and exclusive lawn pressing plate to aerate with a finer pitch.
18-3. Change of Gear Oil

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

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

**Important**
If the oil emulsifies or if it becomes even slightly less transparent, change the oil immediately.

**Important**
Use BONNOC TS680 (or equivalent) as oil.

1. Follow the steps below to remove the old oil.
   1. Remove the drain plug and drain the old oil into a container.
   2. Install the drain plug.
2. Open the oil filler cap, and then supply new oil through the oil filling port until the oil level reaches the middle of the oil gauge. The gear box capacity is approximately 3.8 dm³ (3.8 L).
3. Tighten the oil filler cap securely.
4. On a level surface, check if the oil level is at the middle of the oil gauge. If necessary, supply oil.
5. Check underneath the machine for oil leakage.

18-4. Disassembly of Crank

**Warning**
When disassembling the crank section to replace bearings, exercise care so as not to have your fingers or hands caught in the crank metal fittings. Right after the crank section is separated, the respective crank metal fittings will rotate by their worn weight.

**Caution**
When crank metal fittings are set out of position, vibration and noise will be generated, possibly damaging the machine.

Respective crank metal fittings are attached in a 45-degree turned state to ensure right timing. Follow the assembling timing ① - ⑧ shown in Timing chart.
Timing Chart
TDA1200

View from the back

View from the left side

Timing

Left

1 5 3 4 6 2

Timing Chart
TDA1200

View from the back

View from the left side

Timing

Left

1 5 3 4 6 2
Déclaration de conformité de l'UE

Position : Quality Dept. Director
Name : [Signature]
Signature : [Signature]
Date : 20 February 2021 (2022/02/20)
Place : Japan

Conformité des procédures d'assurance de la conformité : Module A (2006/42/CE)

Conformité des procédures techniques de fabrication

Adresse : 1-25 Miyukicho, Toyota, Aichi, Japan

Conformité avec les directives suivantes :

2004/108/CE
2014/68/UE
2006/42/CE
2004/108/CE
2014/68/UE

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<tr>
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EU Declaration

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Declaration de Incorporacion de la UE

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UK Declaration of Conformity

Manufacturer Name: KAEEKO
Registration No.: 271201
Type: TCM100
Brand Name: BRONNESS
Product: Deep Airator
Address: 1-35 Minato-cho, Toyokawa, Aichi-pre, Japan
ManUFACTUREr Co. Ltd.
1-25 Minato-cho, Toyokawa, Aichi-pre, Japan
Kyonino Co. Ltd.

We hereby declare that this product has been designed and manufactured under the following specifications:

ISO 14545-5: 2016 (SMID2006)
ISO 14545-4: 2013 (SMID2006)
ISO 14545-1: 2010 (SMID2009)

Supply of Machinery (Safety) Regulations 2008 (SMID2008)

Conforms to the following Directives:

UK Assessment Procedure: Module A (SMID2009)

Date: 20 February 2021 (29/2/2021)
Place: Japan

Signature: [Signature]

Name: [Name]
Position: [Position]

Regd. No. 7150, the United Kingdom
Unit 5 Hoku Industrial Park, Grewal Road, Bakersage, Hampshire
Kyonino Co. Ltd.
1-25 Minato-cho, Toyokawa, Aichi-pre, Japan
Kyonino Co. Ltd.

Keep of Technical Documentation

UK 000