482

This manual covers the following serial numbers and higher for each model listed:
R482/R483..............................................4820842

SMART RAMMERS
# TABLE OF CONTENTS

**Safety Information** .......................... 1
  - Introduction ........................................... 1
  - Safety Precautions .................................... 1
  - Safety Decals ......................................... 1

**Specifications** ................................. 3

**Operation** .......................... 4
  - Introduction ............................................. 4
  - Before Starting & Operating ....................... 4
  - Starting Engine ...................................... 4
  - Operating .............................................. 4
  - Stopping Engine .................................... 4
  - Lifting and Transporting .......................... 4

**Maintenance** .......................... 5
  - Maintenance Schedule ............................. 5
  - Fluid Levels .......................................... 5
  - Engine Maintenance .................................. 5
  - Engine Speed ......................................... 5
  - Checking Percussion System Oil ................ 5
  - Changing Percussion System Oil ................. 6

**Service** .................................. 7
  - Torque Chart ........................................... 7
  - Service Tools ......................................... 7
  - Handle Removal ...................................... 7
  - Engine Removal ..................................... 7
  - Centrifugal Clutch .................................. 8
  - Gearbox Removal ..................................... 8
  - Crank Gear Removal ................................ 8
  - Pinion Removal ...................................... 8
  - Breather Assembly ................................... 8
  - Slide Bearing Removal ............................. 8
  - Lower Unit ........................................... 9
  - Bellows and Shoe .................................... 9
  - Springbox ............................................. 9
  - Assembly Instructions ............................. 9
  - Gearbox Assembly .................................. 9
  - Lower Unit Assembly ............................... 10
  - Gearbox & Lower Unit Assembly .................. 10
  - Parts Replacement Cycles and Tolerances ........ 11

**Replacement Parts** .................. 13
  - Gearbox Assembly .................................. 14
  - Lower Unit Assembly ................................ 16
  - Gearbox and Lower Unit Assembly .......... 18
  - Handle Assembly .................................... 20
  - Engine Assembly ..................................... 22

**Warranty** .......................... 24
CALIFORNIA PROPOSITION 65 WARNING

Engine exhaust and some of its constituents are known in the state of California to cause cancer, birth defects, and other reproductive harm.
SAFETY INFORMATION

Introduction

This Safety Alert Symbol is used to call attention to items or operations which may be dangerous to those operating or working with this equipment. The symbol can be found throughout this manual and on the unit. Please read these warnings and cautions, along with all decals, carefully before attempting to operate the unit. Make sure every individual who operates or works with this equipment is familiar with all safety precautions.

WARNING

GENERAL WARNING. Indicates information important to the proper operation of the equipment. Failure to observe may result in damage to the equipment and/or severe bodily injury or death.

CAUTION

GENERAL CAUTION. Indicates information important to the proper operation of the equipment. Failure to observe may result in damage to the equipment.

Safety Precautions

LETHAL EXHAUST GAS: An internal combustion engine discharges carbon monoxide, a poisonous, odorless, invisible gas. Death or serious illness may result if inhaled. Operate only in a properly ventilated area. NEVER OPERATE IN A CONFINED AREA!

DANGEROUS FUELS: Use extreme caution when storing, handling and using fuels as they are highly volatile and explosive in vapor state. Do not add fuel while engine is running. Stop and cool the engine before adding fuel. DO NOT SMOKE!

SAFETY GUARDS: It is the owner's responsibility to ensure that all guards and shields are in place and in working order.

IGNITION SYSTEMS: Breakerless, magneto, and battery ignition systems can cause severe electrical shocks. Avoid contacting these units or their wiring.

SAFE DRESS: Do not wear loose clothing, rings, wristwatches, etc. near machinery.

REFERENCES: For details on safety rules and regulations in the United States, contact your local Occupational Safety and Health Administration (OSHA) office. Equipment operated in other countries must be operated and serviced in accordance and compliance with any and all safety requirements of that country. The publication of these safety precautions is done for your information. MBW does not by the publication of these precautions, imply or in any way represent that these are the sum of all dangers present near MBW equipment. If you are operating MBW equipment, it is your responsibility to insure that such operation is in full accordance with all applicable safety requirements and codes. All requirements of the United States Federal Occupational Safety and Health Administration Act must be met when operated in areas that are under the jurisdiction of that United States Department.

Safety Decals

Carefully read and follow all safety decals. Keep them in good condition. If decals become damaged, replace as required. If repainting the unit, replace all decals. Decals are available from authorized MBW distributors. Order the decal set listed on the following page.
Failure to comply could result in serious bodily injury.

**CAUTION**

STOP

Read Operating Instructions before operating this piece of equipment.

Keep unauthorized and untrained people away from this equipment.

**ROTATING & MOVING PARTS!**

- Make sure all guards and safety devices are in place.
- Wear OSHA approved hearing protection, foot protection, eye protection and head protection.
- Avoid breathing dust from operating machine, wear OSHA specified dust mask/respirator.

**SHUT OFF** the motor before servicing or cleaning.

DO NOT RUN in an enclosed area. The engine produces carbon monoxide, a POISONOUS GAS.

**UNLEADED GASOLINE**

**DANGER**

- Compressed spring could cause severe injury.
- See manual for disassembly instructions.
- La resorte comprimida podría causar la herida severa. Consulte el libro para ver el desmontaje correcto.

**U.S. PATENT 8,057,125**

**U.S. PATENT 8,202,022**

**19791**

**19895**

**13483**

**14773**

**14770**

**R482**

**12500**

**15287**

**15137**

**REMINDER**

CHECK ENGINE OIL DAILY. ENGINE MUST BE LEVEL.

**WARNING**

Operating, servicing and maintaining this equipment can expose you to chemicals including engine exhaust, which is known to the state of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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**19895**

**01326**

**CAUTION**

**WARNING**

OPERATION OF THIS EQUIPMENT MAY CREATE SPARKS THAT CAN START FIRES AROUND DRY VEGETATION. A SPARK ARRESTER MAY BE REQUIRED. THE OPERATOR SHOULD CONTACT LOCAL FIRE AGENCIES FOR LAWS OR REGULATIONS RELATING TO FIRE PREVENTION.

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Specifications subject to change without notice

1. Noise levels are taken at the operating position and are based on operating conditions. Background noise will increase noise levels.
2. Noise level is operating on loose gravel surface. Hearing protection may be required.
3. Not all product variations shown.

- No universal method or formula has been accepted for determining “Compaction Force”. All manufactures employ their own method or formula.

<table>
<thead>
<tr>
<th></th>
<th>482H/482H12</th>
<th>483H/483H12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Weight</strong></td>
<td>158 lb. (71.6 kg)</td>
<td>165 lb. (75 kg)</td>
</tr>
<tr>
<td><strong>Height in(cm)</strong></td>
<td>40 (101.6)</td>
<td>40 (101.6)</td>
</tr>
<tr>
<td><strong>Width in(cm)</strong></td>
<td>15.8 (40)</td>
<td>15.8 (40)</td>
</tr>
<tr>
<td><strong>Length in(cm)</strong></td>
<td>27 (68.6)</td>
<td>27 (68.6)</td>
</tr>
<tr>
<td><strong>Engine</strong></td>
<td>Honda GX100/GXR120</td>
<td>Honda GX100/GXR120</td>
</tr>
<tr>
<td><strong>Shoe (W x L), in (cm)</strong></td>
<td>11 x 13 (28 x 33)</td>
<td>13 x 15 (33 x 38)</td>
</tr>
<tr>
<td><strong>Operating Noise Level</strong> (dBA)</td>
<td>85-103²</td>
<td>85-103²</td>
</tr>
<tr>
<td><strong>Compaction Force, lbf (kN) / blow</strong></td>
<td>4550 (20.24)</td>
<td>4550 (20.24)</td>
</tr>
<tr>
<td><strong>Percussion Rate, blows / minute</strong></td>
<td>600-650</td>
<td>600-650</td>
</tr>
<tr>
<td><strong>Travel Speed, ft/min (m/min)</strong></td>
<td>60 (18.3)</td>
<td>60 (18.3)</td>
</tr>
<tr>
<td><strong>Compaction Depth in(cm)</strong></td>
<td>24 (60.9)</td>
<td>24 (60.9)</td>
</tr>
<tr>
<td><strong>Compaction Area, sq ft/h (sq m/h)</strong></td>
<td>3300 (307)</td>
<td>3900 (362)</td>
</tr>
<tr>
<td><strong>Engine Speed (rpm)</strong></td>
<td>3200</td>
<td>3200</td>
</tr>
<tr>
<td><strong>Fuel Capacity gal (L)</strong></td>
<td>1.1 (4.3)</td>
<td>1.1 (4.3)</td>
</tr>
<tr>
<td><strong>Gearbox Oil Capacity oz (L)</strong></td>
<td>12 (.4)</td>
<td>162 (.4)</td>
</tr>
<tr>
<td><strong>Engine Crank Case Capacity oz (L)</strong></td>
<td>10 (.3)</td>
<td>10 (.3)</td>
</tr>
</tbody>
</table>
**OPERATION**

**Introduction**

MBW equipment is intended for use in very severe applications. They are powered by four cycle engines and are available in different sizes and a selection of engines.

This parts manual contains only standard parts. Variations of these parts as well as other special parts are not included. Contact your local MBW distributor for assistance in identifying parts not included in this manual.

**Before Starting & Operating**

- **REMEMBER!** It is the owner’s responsibility to communicate information on the safe use and proper operation of this unit to the operators.
- Review ALL of the Safety Precautions listed on page 1 of this manual.
- Familiarize yourself with the operation of the machine and confirm that all controls function properly.
- Know how to STOP the machine in case of an emergency.
- Make sure hands, feet, and clothing are at a safe distance from any moving parts.
- **OIL LEVEL** - Check the oil level in the engine. For more information see “Lubrication” under the respective engine’s “Owners Manual” or the Maintenance section of this manual.
- **AIR CLEANER** - Check to ensure element is in good condition and properly installed.
- **FUEL SUPPLY** - The engines on MBW equipment require an automotive grade of clean, fresh, unleaded gasoline.
- **FUEL FILTER** - If clogged or damaged, replace.

**Starting Engine**

For detailed instructions refer to the engine “Owner’s Manual”.

1. Open fuel valve.
2. Turn engine switch to “ON”.
3. Set throttle to idle.
4. Choke engine if necessary (you may not need to choke a warm engine).
5. Pull starter rope repeatedly until engine starts.
6. Move choke lever to open position.
7. Allow engine to warm up for one or two minutes.

**Operating**

1. Familiarize yourself with the balance of the rammer before using it in job conditions. Due to the inherent design, the machine is top heavy and could tip over.
2. After the engine warms up, open the throttle fully for normal operation.
3. On uneven terrain, pushing down on the handle will aid climbing ability.

**WARNING**

Do not bear down (body weight of operator) on the machine.

4. After 3 passes, the rammer may have more kick back, this is an indication that ideal compaction is being reached.

**Stopping Engine**

1. Move throttle to idle position.
2. Let engine idle for one or two minutes.
3. Turn switch on engine to “STOP” position.
4. Turn off fuel valve.

**WARNING**

Always stop the engine before:

- Adding fuel.
- Leaving the equipment unattended for any amount of time.
- Before making any repairs or adjustments to the machine.

**Lifting and Transporting**

1. The unit may be lifted by the handle and engine guard.
2. The unit should be transported laying face down.
3. Secure it in place by the handle and shoe. DO NOT lay the unit on its sides or face up during transport.

---

The engine speed must NOT be high enough to engage the clutch.
**MAINTENANCE**

**WARNING**
Always exercise the stopping procedure before servicing or lubricating the unit.

After servicing the unit, replace and fasten all guards, shields, and covers to their original positions before resuming operation.

**CAUTION**
Always verify fluid levels and check for leaks after changing fluids.

Do not drain oil onto ground, into open streams, or down sewage drains.

---

**Maintenance Schedule**

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>MAINTENANCE</th>
<th>DAILY</th>
<th>EVERY 25 HOURS</th>
<th>EVERY 300 HOURS</th>
<th>YEARLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Cleaner</td>
<td>Check and clean</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine</td>
<td>Refer to engine operator/owner manual</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>Check and tighten as needed¹</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>In Line Fuel Filter</td>
<td>Replace</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Percussion System</td>
<td>Check oil level</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change oil²</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Shock Mounts</td>
<td>Check for cracks or deterioration</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spark Plug</td>
<td>Replace</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

1. Check all hardware after the first 5 hours of use, then follow the maintenance schedule.
2. Change oil in lower unit after the first 50 hours of operation, then follow the maintenance schedule.

---

**Fluid Levels**

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>FLUID VOLUME</th>
<th>RECOMMENDED OIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percussion System</td>
<td>12 oz. (.35 L)</td>
<td>SF SAE 10W-30 Motor Oil</td>
</tr>
<tr>
<td>Engine</td>
<td>Refer to engine operator/owner manual</td>
<td></td>
</tr>
</tbody>
</table>

---

**Engine Maintenance**

Refer to the engine owner's manual for maintenance intervals and procedures.

- Check and clean the air cleaner element at least once daily. The air cleaner has a foam pre-cleaner that can be washed.

- Check the engine oil level by removing the dipstick (the engine must be level). The oil level should be between the marks on the dipstick. See the "Check Engine Oil" section of the engine "Owner’s Manual" for information.

- See the "Change Engine Oil" section of the engine "Owner’s Manual" for information on the oil change intervals.

---

**Engine Speed**

Engine speed is factory set according to the speed listed in the Specifications section of this manual. Refer to the engine owners manual for procedure on setting operating speed if necessary.

---

**Checking Percussion System Oil**

Refer to Lower Unit Assembly, page 16.

The rammer percussion system and gearbox are lubricated by an oil mist which is formed and carried throughout the rammer by a pumping action in the machine's lower system.

1. Before daily operation, place the rammer on a flat surface and check the oil level in the sight gauge (#9) on the back side of lower unit (#11).
2. If the oil is not visible in the sight gauge, add oil through fill plug on top of gear box, page 14 (#27) as required. See Fluid Levels section of this manual for recommended type of oil.

3. Wait several minutes for oil to run down into lower unit and check oil level in sight gauge again. Be sure not to over fill unit.

**Changing Percussion System Oil**

Refer to Lower Unit Assembly, page 16.

1. Remove the drain plug (#17) below the sight gauge (#9) on the back of the springbox (#11).

2. Place an oil drain pan behind the shoe and tip the rammer back so the handle is on the ground.

Refer to Gearbox and Lower Unit Assembly, page 18.

3. With the handle still on the ground, remove the six hex head flange screws (#10) holding the cover (#5) to the gearbox (#3).

4. Remove the cover (#5) and cover gasket (#2), from the gearbox (#3).

5. Tip the unit forward and drain any oil into an oil pan.

6. After the oil has drained completely, replace the drain plug.

7. Pour oil as specified from Fluid Level section of this manual into front of gear box. Replace cover gasket, and cover and secure with the six hex head flange screws.
Assembly and disassembly should be performed by a service technician who has been factory trained on MBW equipment. The unit should be clean and free of debris. Pressure washing before disassembly is recommended.

- Prior to assembly, wash all parts in a suitable cleaner or solvent.

- Check moving parts for wear and failure. Refer to the Replacement section in this manual for tolerance and replacement cycles.

- All shafts and housings should be oiled prior to pressing bearings. Also, ensure that the bearings are pressed square and are seated properly.

- All bearings should be replaced when rebuilding any exciter or gearbox.

- All gaskets and seals should be replaced after any disassembly.

### Torque Chart

<table>
<thead>
<tr>
<th>SIZE</th>
<th>GRADE 2</th>
<th>GRADE 5</th>
<th>GRADE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4-20</td>
<td>49 in-lbs</td>
<td>76 in-lbs</td>
<td>9 ft-lbs</td>
</tr>
<tr>
<td>1/4-28</td>
<td>56 in-lbs</td>
<td>87 in-lbs</td>
<td>10 ft-lbs</td>
</tr>
<tr>
<td>5/16-18</td>
<td>8 ft-lbs</td>
<td>13 ft-lbs</td>
<td>18 ft-lbs</td>
</tr>
<tr>
<td>5/16-24</td>
<td>9 ft-lbs</td>
<td>14 ft-lbs</td>
<td>20 ft-lbs</td>
</tr>
<tr>
<td>3/8-16</td>
<td>15 ft-lbs</td>
<td>23 ft-lbs</td>
<td>33 ft-lbs</td>
</tr>
<tr>
<td>3/8-24</td>
<td>17 ft-lbs</td>
<td>26 ft-lbs</td>
<td>37 ft-lbs</td>
</tr>
<tr>
<td>7/16-14</td>
<td>24 ft-lbs</td>
<td>37 ft-lbs</td>
<td>52 ft-lbs</td>
</tr>
<tr>
<td>7/16-20</td>
<td>27 ft-lbs</td>
<td>41 ft-lbs</td>
<td>58 ft-lbs</td>
</tr>
<tr>
<td>1/2-13</td>
<td>37 ft-lbs</td>
<td>57 ft-lbs</td>
<td>80 ft-lbs</td>
</tr>
<tr>
<td>1/2-20</td>
<td>41 ft-lbs</td>
<td>64 ft-lbs</td>
<td>90 ft-lbs</td>
</tr>
<tr>
<td>9/16-12</td>
<td>53 ft-lbs</td>
<td>82 ft-lbs</td>
<td>115 ft-lbs</td>
</tr>
<tr>
<td>5/8-11</td>
<td>73 ft-lbs</td>
<td>112 ft-lbs</td>
<td>159 ft-lbs</td>
</tr>
<tr>
<td>5/8-18</td>
<td>83 ft-lbs</td>
<td>112 ft-lbs</td>
<td>180 ft-lbs</td>
</tr>
<tr>
<td>3/4-16</td>
<td>144 ft-lbs</td>
<td>200 ft-lbs</td>
<td>315 ft-lbs</td>
</tr>
<tr>
<td>1-8</td>
<td>188 ft-lbs</td>
<td>483 ft-lbs</td>
<td>682 ft-lbs</td>
</tr>
<tr>
<td>1-14</td>
<td>210 ft-lbs</td>
<td>541 ft-lbs</td>
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<td>1462 ft-lbs</td>
<td>2371 ft-lbs</td>
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<td>M 6</td>
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<td>4 ft-lbs</td>
<td>7 ft-lbs</td>
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<tr>
<td>M 8</td>
<td>6 ft-lbs</td>
<td>10 ft-lbs</td>
<td>18 ft-lbs</td>
</tr>
<tr>
<td>M 10</td>
<td>10 ft-lbs</td>
<td>20 ft-lbs</td>
<td>30 ft-lbs</td>
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### Service Tools

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<tr>
<th>Part No.</th>
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<tbody>
<tr>
<td>01629</td>
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<tr>
<td>20260</td>
<td>Springbox Tool</td>
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<tr>
<td>07205</td>
<td>Bellows Installation Tool</td>
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<tr>
<td>07552</td>
<td>Blind Hole Bearing Puller Tool</td>
</tr>
<tr>
<td>19950</td>
<td>Service Kit (Robin)</td>
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<tr>
<td>20194</td>
<td>Service Kit (Honda)</td>
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### Conversions

- in-lbs x 0.083 = ft-lbs
- ft-lbs x 12 = in-lbs
- ft-lbs x 0.1383 = kg-m
- ft-lbs x 1.3558 = N-m

### Handle Removal

Refer to Handle Assembly, page 20.

1. Turn fuel valve (#10) to the OFF position.
2. Loosen the hose clamp (#8) at the engine end of the fuel line (18). Disconnect the fuel line.
3. Remove flat head screws (#29) holding the throttle (#15) to the handle (#16).
4. Disconnect the tachometer (#26) wire running from the engine.
5. Remove four hex head flange screws (#34) and flange nuts (35) securing the handle (#16) to the torsion mounts (#5).
6. Lift the handle (#16) from the rammer.

### Engine Removal

**Note:** It is not necessary to remove the handle to take the engine off the machine

Refer to Engine Assembly, page 22.

1. Follow steps 1 through 4 under “Handle Removal.”
2. Support the engine and remove the four flange nuts (#7) securing the engine to the gearbox.
3. Remove the engine from the machine.
Centrifugal Clutch

Refer to Engine Assembly, page 22

1. Remove jam nut (#9) and key (4). Slide clutch (#3) off engine crankshaft.
2. Carefully insert woodruff key (#4) making sure key remains aligned with keyway.
3. Apply anti seize to engine shaft and slide clutch onto shaft.
4. Reinstall jam nut with medium strength thread locker and tighten to 60 ft.-lbers.

Gearbox Removal

Note: It is necessary to remove the Handle and the Engine to remove the Gearbox. It is easier to reassemble the gearbox if the handle and engine are removed.

1. If removing handle & engine refer to Handle Removal and Engine Removal sections of this manual.

Refer to the Gearbox and Lower Unit Assembly, page 18

2. Remove the hex flange screws (#10) holding the cover to the gearbox.

CAUTION

NOTE: There may be oil in the gearbox. Tip the unit back when removing the cover from the gearbox.

3. Tip the unit forward and drain any oil into an oil pan.
4. Remove the retaining ring (#7) from piston. Thread a 5/16-18 screw into the piston pin (#6) and remove the piston pin. (See Fig 1)
5. Remove the hex head cap screws and lock washers (#8 & #9) holding the gearbox to the lower system.
6. Remove the gearbox assembly (#3) from the lower system. (See Fig 2)

Crank Gear Removal

Refer to Gearbox Assembly, page 14.

1. Slip a retaining ring pliers through the slot opening in the crank gear (#20) and remove the retaining ring (#10).
2. Remove the SAE plug (#19) from the rear of the gearbox. Use a 3/8 in. (10mm) dia steel rod to press the crank gear out of the gearbox.
3. Remove the small retaining ring (#9) from the front of the crank gear (#20) and remove the connecting rod (#5).
4. Remove the retaining ring (#1) from the back of the crank gear. Remove the ball bearing (#2) using a bearing puller.

Pinion Removal

1. Remove the retaining ring (#4) from inside of the gearbox and press out the pinion (#21).
2. If the retaining ring is pinched in its groove, tap on the drum side of the pinion. This will relieve the pressure on the retaining ring.
3. Pry out the oil seal (#11) and discard. Remove the retaining rings (#10 & #18). Use a bearing puller to remove the ball bearings (#2 & #22).

Breather Assembly

1. Remove the hex head cap screw (#28) from the top of the breather assembly. Remove the plain washer, cap and filter (#29, #17, #15).
2. Use a pipe wrench to remove the breather tube (#16).

CAUTION

Do not disassemble the breather assembly.

Slide Bearing Removal

1. Remove the slide bearings support & slide bearing (#24, #25) by pulling them out of the housing guide tube.

CAUTION

Do not scratch or gouge the housing guide tube walls.

Lower Unit

Note: The lower unit can be separated from the drive unit (engine, gearbox and handle) without going through the complete disassembly procedure. If the lower system has not already been separated, follow the “Gearbox Removal” instruction.
Bellows and Shoe
Refer to Lower Unit Assembly, page 16.

Shoe and Springbox Removal
1. Drain the oil by removing the drain plug (#17). Tilt the lower unit to the side until all of the oil is drained out.
2. Remove the six hex head cap screws (#19) and lock washers (#20) from the top flange of the spring box (#11). Remove the bellows and clamping rings (#6, #7 & #8).
3. Remove the six hex head cap screws (#20) and lock washers (#21) from the bottom flange of the spring box. Remove the shoe (#10).

Spring Box

CAUTION
Observe the warning label on the Springbox Cover. Springbox contains springs under high compression. Follow the next steps very carefully.

1. Flip Springbox Assembly upside down. Insert two springbox tools (MBW #20260) into the bottom of the springbox cover (tools should be 180 degrees apart). Run the nuts that come with the tools down snug against the Cover. Remove the flat head socket screws holding the cover to the springbox. (See Fig 3)
2. While holding the bottom of the tool (#20260) from turning, slowly and evenly back off the nuts on the cover (#3). The tools and the cover can be removed when spring tension has been relieved. (See Fig 4)
3. Remove the o-ring (#4) from the cover (#3).
4. The lower springs (#1 & #2) can be removed from the springbox.
5. Place a drift pin or steel rod through the piston hole in the ram head (#12). Use this to hold the ram head from turning while removing the nut (#5). Remove and discard the elastic nut.
6. Remove the spring separator (#15), slide bearing (#16) and upper springs (#1 & #2).
7. Remove retaining ring (#14) and ram shaft slide bearing (#13).

Assembly Instructions

CAUTION
Prior to assembly wash all parts in a suitable cleaner or solvent.

Check moving parts for wear and failure. Refer to Parts Replacement and Tolerance Chart for tolerances and replacement cycles.

Replace all seals and gaskets at every overhaul or disassembly.

For torque settings other then those listed, see torque chart.

All shafts and housings should be oiled prior to pressing bearings in. Also, ensure that bearings press in square and seat properly.

Gearbox Assembly
Refer to Gearbox Assembly, page 14.

1. Press the small ball bearing (#22) into the housing from the back. Secure with a retaining ring (#18).
2. Press the large ball bearing (#2) into the housing from the back. Secure with a retaining ring (#10).
3. Press a new oil seal (#11) into the gearbox. Make sure the oil seal is pressed in straight.
4. Lightly oil the lip of the oil seal and the shaft portion of the pinion carefully press the pinion (#21) into the gearbox. Do not use excessive pressure to seat the pinion.
5. Install retaining ring (#4) into the pinion from inside the gearbox.
6. Press in the needle bearing (#6) inside the gearbox. Bearing must be pressed in with the numbers and letters facing up.
7. Place the retaining ring (#10) over the large shaft of the crank gear (#20). Press the ball bearing (#2) onto the crank gear.
8. Install retaining ring (#1) to secure the ball bearing.
9. Press bushing (#7) into connecting rod (#5).
10. Press the ball bearing (#3) into connection rod (#5) and secure with internal snap ring (#8).

11. Insert connecting rod assembly (#5) onto crank gear (#20), and secure with external retaining ring (#9).

12. Press the crank gear assembly into the gearbox. Install the snap ring (#10) using a retaining ring pliers inserted through the slot in the crank gear.

13. Install the SAE (#19) plug. Do not over tighten.

14. Replace the breather assembly (#14), filter, cap, and plain washer. Apply Loctite #242 to the threads of the hex head cap screw (#28) and install.

15. Slide bearing support (#24) into housing guide tube. Align tabs on bearing support to fit sides of rib in guide tube on engine side of housing.


Lower Unit Assembly
Refer to Lower Unit Assembly, page 16.

1. Install slide bearing (#13) into top of spring box (#11) and secure with retaining ring (#14).

2. Install the upper springs (#1,#2) into the springbox (#11).

3. Install the ram head (#12), spring separator (#15) and slide bearing (#16).

4. Secure with a new elastic stop nut (#5) torqued to 100 ft. lbs (135 Nm).

5. Install the lower springs (#1,#2).

6. Lightly grease the o-ring groove in the cover (#3) before installing a new o-ring (#4).

7. Use the two springbox tools (MBW #20260) to draw the cover down onto the springbox.

8. Install three flat head socket screws (#18) and torque to 8 ft. lbs (11Nm).

9. Assemble shoe (#10) to bottom of spring box with hex head cap screws (#22) and lock washers (#21). Orient the sight gauge (#9) so it points to the back side of the machine.

10. Install the bellows (#7) and clamping rings (#6 & #8) to the spring box and secure with six hex head cap screws (#19) and lock washers (#20). Torque to 9 ft. lbs (12 Nm).

Gearbox & Lower Unit Assembly
Refer to Gearbox and Lower Unit Assembly, page 18.

1. Before installing the gearbox to the lower assembly, apply Loctite #598 or equivalent silicone to the bottom of the gearbox (#3). Press the oil seal spacer (#1) onto the bottom of the gearbox.

2. Slide the gearbox assembly (#3) onto the lower assembly (#4). Secure using four hex head cap screws (#8) with lock washers (#9) torqued to 12 ft. lbs (16Nm).

3. Align the connecting rod with the piston and install the wrist pin (#6). Install the retaining ring (#7) to secure wrist pin in place.

4. Place a new gasket (#2) over the face of the gearbox.

5. Secure the cover to the gearbox using the hex flange head screws from the previous step. Be sure the bolts pass through the holes in the gasket. Tighten the flange screws equally and torque to 8 ft. lbs (11Nm). The gasket will compress slightly after initial tightening. Retorque the bolts after 5 minutes.

6. If the handle mounting brackets were removed, apply Loctite #242 to the four hex head flange screws and assemble handle bracket see page 20.

7. Refill percussion unit with oil per procedure in Maintenance section.
## Parts Replacement Cycles and Tolerances

<table>
<thead>
<tr>
<th>Parts</th>
<th>Replacement Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bearings</strong></td>
<td>Replace anytime a bearing is rough, binding, discolored or removed from housing or shaft.</td>
</tr>
<tr>
<td><strong>Bellows</strong></td>
<td>Replace when they are worn, cracked, or to the point of leaking.</td>
</tr>
<tr>
<td><strong>Clutch</strong></td>
<td>Replace clutch if the shoe and springs show signs of heat damage or if the clutch engages below 2000 rpm.</td>
</tr>
<tr>
<td><strong>Crank Gear</strong></td>
<td>Replace if teeth are cracked or if they become sharp.</td>
</tr>
<tr>
<td><strong>Engine Components</strong></td>
<td>Refer to your engine manufacturer’s Owner’s Manual.</td>
</tr>
<tr>
<td><strong>Slide Bearings (Gear Box)</strong></td>
<td>Replace if a 0.025” (0.635mm) feeler gauge can be slid between the spring box and guide tube.</td>
</tr>
<tr>
<td><strong>Hardware</strong></td>
<td>Replace any worn or damaged hardware as needed. Replacement hardware should be grade 5 and zinc plated unless otherwise specified.</td>
</tr>
<tr>
<td><strong>Pinion</strong></td>
<td>Replace if teeth are cracked or if they become sharp. Replace if the drum is scored or gouged deeper than 0.03” (.76mm).</td>
</tr>
<tr>
<td><strong>Slide Bearing (Spring Separator)</strong></td>
<td>Replace if a 0.025” (0.635mm) feeler gauge can be slid between the springbox and the piston.</td>
</tr>
<tr>
<td><strong>Piston Pin</strong></td>
<td>Replace if the outside diameter is less than 0.620” (15.75mm)</td>
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<tr>
<td><strong>Slide Bearing (Ram Shaft)</strong></td>
<td>Replace if less than .100 thick or visibly damaged.</td>
</tr>
<tr>
<td><strong>Safety Decals</strong></td>
<td>Replace if they become damaged or illegible.</td>
</tr>
<tr>
<td><strong>Seals &amp; Gaskets</strong></td>
<td>Replace if a leak is detected and at every overhaul or teardown.</td>
</tr>
<tr>
<td><strong>Springs</strong></td>
<td>If a flat spot on the side of a spring is greater than 0.09 in (2 mm) or the free length is less than 6.75 in (171 mm), <em>replace all</em>.</td>
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</tbody>
</table>
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REPLACEMENT PARTS

The warranty is stated in this book on page 24. Failure to return the Warranty Registration Card renders the warranty null and void.

MBW has established a network of reputable distributors/dealers with trained mechanics and full facilities for maintenance and rebuilding, and to carry an adequate parts stock in all areas of the country. Their sales engineers are available for professional consultation. If you cannot locate an MBW distributor in your area, contact MBW or one of our Sales Branches listed below.

When ordering replacement parts, be sure to have the following information available:

• Model and Serial Number of machine when ordering MBW parts
• Model and Serial Number of engine when ordering engine parts
• Part Number, Description, and Quantity
• Company Name, Address, Zip Code, and Purchase Order Number
• Preferred method of shipping

REMEMBER - You own the best! If repairs are needed, use only MBW parts purchased from authorized MBW distributors.

The unit’s serial number can be found in the following locations:

• The serial number decal is located on the top of the gearbox.
• The serial number is also stamped on the top of the gearbox.

Write Model Number here

Write Serial Number here

Contact Information

MBW, Inc.
250 Hartford Rd • PO Box 440
Slinger, WI  53086-0440
Phone: (262) 644-5234
Fax: (262) 644-5169
Email: mbw@mbw.com
Website: www.mbw.com

MBW (UK) Ltd.
Units 2&3 Cochrane Street
Bolton BL3 6BN, England
Phone: 01204 387784
Fax: 01204 387797
E-mail: saleseurope@mbw.com
Website: www.mbweurope.com
Gearbox Assembly
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KIT, SLIDE BEARING, (Includes items 25 & slide bearings in lower unit)
Lower Unit Assembly
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**KITS:**

- 20178 KIT, SLIDE BEARING, (Includes items 13, 14, 16 & slide bearing in gear box)
- 20175 SPRING BOX ASM. (Includes items 1, 2, 3, 4, 5, 9, 11 thru 16, 18, 19)
- 20886 KIT, LOWER LIFT HANDLE (Includes 17, 23, 24)
Gearbox and Lower Unit Assembly
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>14757</td>
<td>SPACER, OIL SEAL</td>
<td>1</td>
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<tr>
<td>2.</td>
<td>15667</td>
<td>GASKET, COVER</td>
<td>1</td>
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<tr>
<td>3.</td>
<td>19880</td>
<td>GEAR BOX ASSEMBLY,</td>
<td>1</td>
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<td>4.</td>
<td>19885</td>
<td>LOWER UNIT ASSEMBLY, R482 (11” SHOE)</td>
<td>1</td>
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<tr>
<td>5.</td>
<td>19886</td>
<td>LOWER UNIT ASSEMBLY, R483 (13”SHOE)</td>
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<tr>
<td>5.</td>
<td>19894</td>
<td>COVER, HOUSING, R482</td>
<td>1</td>
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<td>6.</td>
<td>20045</td>
<td>PISTON CONNECTING PIN</td>
<td>1</td>
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<tr>
<td>7.</td>
<td>20046</td>
<td>RETAINING RING, INTERNAL</td>
<td>1</td>
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<tr>
<td>8.</td>
<td>F042010HCS</td>
<td>HEX HEAD CAP SCREW, 1/4-20 x 1-1/4 GR5 ZP</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>F04LW</td>
<td>LOCKWASHER, 1/4, ZP</td>
<td>4</td>
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<tr>
<td>10.</td>
<td>F051807FWS</td>
<td>FLANGE HEAD LOCK SCREW, 5/16-18 x 7/8”, ZP</td>
<td>6</td>
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Handle Assembly

SLIDE TACH WIRE THRU SLEEVE & CLAMP ON ENGINE
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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<tbody>
<tr>
<td>1.</td>
<td>01026</td>
<td>CLAMP, WORM DRIVE</td>
<td>2</td>
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<tr>
<td>2.</td>
<td>01052</td>
<td>CLAMP, HOSE, 1/4&quot; FUEL HOSE</td>
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<td>3.</td>
<td>01145</td>
<td>CLAMP, CABLE</td>
<td>1</td>
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<td>4.</td>
<td>01291</td>
<td>CABLE TIE, 3/16 X 7-1/2&quot; LG.</td>
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<tr>
<td>5.</td>
<td>07351</td>
<td>TORSION MOUNT</td>
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<td>6.</td>
<td>07916</td>
<td>FERRULE, THROTTLE LEVER</td>
<td>1</td>
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<tr>
<td>7.</td>
<td>14965</td>
<td>BRACKET, MOUNTING, HANDLE</td>
<td>2</td>
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<td>8.</td>
<td>15016</td>
<td>CLAMP, 3/16&quot; FUEL HOSE</td>
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<td>9.</td>
<td>15183</td>
<td>HOSE, FUEL, 1/4&quot; X 2&quot;</td>
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<td>10.</td>
<td>16414</td>
<td>VALVE, FUEL</td>
<td>1</td>
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<td>11.</td>
<td>16415</td>
<td>TACHOMETER WITH WIRE (For models with tachometers only)</td>
<td>1</td>
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<tr>
<td>12.</td>
<td>16586</td>
<td>GROMMET, 1/2&quot;</td>
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<td>13.</td>
<td>19899</td>
<td>CABLE, THROTTLE</td>
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<td>14.</td>
<td>17439</td>
<td>SLEEVE, BRAIDED, (For models with tachometers only)</td>
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<td>15.</td>
<td>18742</td>
<td>THROTTLE, RATCHET STYLE</td>
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<td>16.</td>
<td>18877</td>
<td>GUIDE HANDLE</td>
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<td>17.</td>
<td>20393</td>
<td>CLAMP, SUPPORT</td>
<td>1</td>
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<td>18.</td>
<td>20303</td>
<td>HOSE, FUEL, 3/16 I.D. X 20&quot; lg.</td>
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<td>19.</td>
<td>20476</td>
<td>CAP, 2-1/4&quot;, EPA</td>
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<td></td>
<td>20472</td>
<td>CAP, 2-1/4&quot;, (FOR SUBARU FLOAT CARBURATOR ENGINES ONLY)</td>
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<tr>
<td>20.</td>
<td>20700</td>
<td>FUEL FILTER, IN-LINE</td>
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<td>01045</td>
<td>FUEL FILTER, IN-LINE(FOR SUBARU FLOAT CARBURATOR ENGINES ONLY)</td>
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<td>21.</td>
<td>21839</td>
<td>SHROUD, RAMMER HANDLE</td>
<td>1</td>
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<td>22.</td>
<td>21842</td>
<td>FUEL TANK, ONE GALLON, EPA</td>
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<td>23.</td>
<td>21876</td>
<td>KIT, FUEL TANK UPDATE (For serial number #4820xxx and lower)</td>
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<td>24.</td>
<td>21847</td>
<td>GASKET, FUEL TANK</td>
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<td>25.</td>
<td>21848</td>
<td>WELLNUT, 1/4-20</td>
<td>4</td>
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<td>26.</td>
<td>21849</td>
<td>MOUNTING BRACKET, FUEL TANK</td>
<td>1</td>
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<tr>
<td>27.</td>
<td>F013205PMS</td>
<td>PAN HEAD SCREW, #6-32 X 5/8&quot; LG.</td>
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<td>F0132HN</td>
<td>HEX NUT, #6-32</td>
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<td>28.</td>
<td>F011W</td>
<td>LOCK WASHER, #6</td>
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<td>29.</td>
<td>F032402FSS</td>
<td>FLAT HEAD SCREW, #10-24 X 1/4&quot; ZP</td>
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<td>30.</td>
<td>F042005CB</td>
<td>CARRIAGE BOLT, 1/4-20 X 5/8&quot; LG</td>
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<td>31.</td>
<td>F042008BCS</td>
<td>BUTTON HEAD SCREW, 1/4-20 X 1.0&quot; LG.</td>
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<td>32.</td>
<td>F0420ELN</td>
<td>NYLON LOCK NUT</td>
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<td>33.</td>
<td>F051807FWS</td>
<td>FLANGE SCREW, 5/16-18 X 7/8 ZP</td>
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<td>34.</td>
<td>F051808FWS</td>
<td>FLANGE SCREW, 5/16-18 X 1 ZP</td>
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<td>35.</td>
<td>F0518FN</td>
<td>NUT, FLANGE, 5/16-18 ZP</td>
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</tbody>
</table>

**ITEMS NOT SHOWN:**
TERMINAL, SCOTCHLOK SPLICE (NOT SHOWN) 1

**KITS:**

20305  KIT, FUEL HOSE ASSEMBLY (INCLUDES ITEMS #2, 8, 9, 18 & 20)
INSTALL INTO RAMMER HOUSING USING HIGH STRENGTH (RED) LOCTITE

Engine Assembly
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>17406</td>
<td>ADAPTER, ENGINE (HONDA GX100)</td>
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<tr>
<td>2.</td>
<td>17432</td>
<td>STUD (HONDA ONLY)</td>
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<td>3.</td>
<td>18055</td>
<td>CLUTCH, KIT (INCLUDES ITEMS: 4 &amp; 9)</td>
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<td>4.</td>
<td>18053</td>
<td>KEY, WOODRUFF, METRIC 4 X 13</td>
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<td>5.</td>
<td>18527</td>
<td>ENGINE GUARD, HONDA</td>
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<td>6.</td>
<td>18554</td>
<td>HONDA GX100 ENGINE, DIAPHRAGM STYLE (Includes items: 7,9,10,18,21 &amp; 22)</td>
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<td>7.</td>
<td>21049</td>
<td>HONDA GX10 ENGINE, DIAPHRAGM STYLE (Includes items: 7,9,10,18,21 &amp; 22)</td>
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<td>F0616FN</td>
<td>NUT, FLANGE 3/8-16 ZP</td>
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<td>8.</td>
<td>M08C025FWS</td>
<td>FLANGE HEAD SCREW, M8-1.25 X 25 MM LG.</td>
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<td>Q17211ZL8023</td>
<td>ELEMENT AIR CLEANER (HONDA GX100)</td>
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<td>9.</td>
<td>M12CHJN</td>
<td>JAMNUT, HEX, 12MM-1.25 ZP</td>
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<tr>
<td>10.</td>
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<td>HEX HEAD FLANGE SCREW, M8-1.25 X 40MM (Not provided by MBW Inc.)</td>
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<tr>
<td>11.</td>
<td></td>
<td>PIN, DOWEL, 6MM X 10MM (Not provided by MBW Inc.)</td>
<td>2</td>
</tr>
</tbody>
</table>

**KITS:**

- SERVICE KIT HONDA RAMMER:
  - #20387 IN-LINE FUEL FILTER (Diaphragm Carburetor Only)
  - #15667 HOUSING COVER GASKET
  - #16414 FUEL VALVE
  - #16586 GROMMET, FUEL VALVE
  - #19951 OIL, 1-QUART
  - Q17211ZL8023 AIR CLEANER ELEMENT (ITEM 16)
  - Q9805655777 SPARK PLUG CR5HSB
WHAT DOES THIS WARRANTY COVER? MBW, Incorporated (MBW) warrants each New Machine against defects in material and workmanship for a period of twelve (12) months. "New Machine" means a machine shipped directly from MBW or authorized MBW dealer to the end user. This warranty commences on the first day the machine is sold, assigned to a rental fleet, or otherwise put to first use.

MBW warrants each Demonstration Machine against defects in material and workmanship for a period of six (6) months. "Demonstration Machine" means a machine used by MBW or its agents for promotional purposes. This warranty commences on the first day the machine is sold, assigned to a rental fleet, or otherwise put to first use.

This warranty covers the labor cost for replacement or repair of parts, components, or equipment on New Machines or Demonstration Machines, and MBW shall pay labor costs at MBW's prevailing rate to affect the warranted repair or replacement. MBW reserves the right to adjust labor claims on a claim-by-claim basis.

This warranty covers the shipping cost of replacement parts, components, or equipment via common ground carriers from MBW to an authorized MBW dealer. Air freight is considered only in cases where ground transportation is not practical.

MAY THIS WARRANTY BE TRANSFERRED? This warranty is non-transferable and only applies to the original end user of a new machine or demonstration machine.

WHAT DOES THIS WARRANTY NOT COVER?
1. This warranty does not cover any Used Equipment. "Used Equipment" means any MBW machine or equipment that is not a New Machine or a Demonstration Machine. All Used Equipment is sold AS IS/WHERE IS WITH ALL FAULTS.

2. This warranty does not cover any New Machine, Demonstration Machine, or their equipment, parts, or components altered or modified in any way without MBW's prior written consent. This warranty does not cover the use of parts not specifically approved by MBW for use on MBW products. This warranty does not cover misuse, neglect, shipping damage, accidents, acts of God, the operation of any New Machine or Demonstration Machine in any way other than recommended by MBW in accordance with its specifications, or any other circumstances beyond MBW's control. This warranty does not cover any New Machine or Demonstration Machine repaired by anyone other than MBW factory branches or authorized MBW distributors.

3. This warranty does not cover, and MBW affirmatively disclaims, liability for any damage or injury resulting directly or indirectly from design, materials, or operation of a New Machine or Demonstration Machine or any other MBW product. MBW's liability with respect to any breach of warranty shall be limited to the provisions of this document and in no event shall exceed an amount equal to the purchase price of the New Machine or Demonstration Machine purchased from MBW.

4. This warranty does not cover engines, motors, and other assemblies or components produced by other manufacturers and used on a New Machine or Demonstration Machine, as said engines, motors, and other assemblies or components may have warranties provided by the manufacturer thereof. This warranty does not apply to consumable items, such as v-belts, filters, trowel and screed blades, seals, shock mounts, batteries, and the like, all of which are sold AS IS/WHERE IS WITH ALL FAULTS.

5. This warranty does not cover the cost of transportation and other expenses which may be connected with warranty service but not specifically mentioned herein.

6. This warranty does not cover any updates to any New Machine, Demonstration Machine, or any other MBW product. MBW reserves the right to improve or make product changes without incurring any obligation to update, refit, or install the same on New Machines or Demonstration Machines previously sold.

WHAT MUST YOU DO TO OBTAIN WARRANTY COVERAGE? Each New Machine or Demonstration Machine is accompanied by a Warranty Registration Card. You must sign, date, and return the Warranty Registration Card to the place of origin of the New Machine or Demonstration Machine, either to MBW, Inc. at P.O. Box 440, Slinger, Wisconsin 53086, MBW (UK), Ltd. at Units 2 & 3 Cochrane Street, Bolton BL3 6BN, United Kingdom or MBW FRANCE SARL at ZA D'Outreville, 5 Rue Jean Baptiste Neron, Bonnel 60540 France, within ten (10) days after purchase, assignment to a rental fleet, or first use. This signed warranty card is the buyer's affirmation that he has read, understood, and accepted the warranty at the time of purchase. Failure to return the warranty card as specified herein renders the warranty null and void. In order to receive warranty coverage consideration, warranty claims must be submitted within thirty (30) days after the New Machine or Demonstration Machine fails. Warranty claims must be submitted to MBW, Inc., MBW (UK), Ltd. or MBW FRANCE SARL, and written authorization for the return of merchandise or parts under the warranty must be obtained before shipment to MBW.

WHAT WILL MBW DO? MBW's obligation under this warranty is limited to the replacement or repair of parts for a New Machine or Demonstration Machine at MBW factory branches or at authorized MBW distributors, and such replacement or repair is the exclusive remedy provided hereunder. Labor must be performed at an authorized MBW distributor. MBW reserves the right to inspect and render a final decision on each warranty case, and MBW's repair or replacement is solely within the discretion of MBW.

IT IS EXPRESSLY AGREED THAT THIS SHALL BE THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY. UNDER NO CIRCUMSTANCES SHALL MBW BE LIABLE FOR ANY COSTS, LOSS, EXPENSE, DAMAGES, SPECIAL DAMAGES, INCIDENTAL DAMAGES, OR PUNITIVE DAMAGES ARISING DIRECTLY OR INDIRECTLY FROM THE USE OF THE NEW MACHINE OR DEMONSTRATION MACHINE WHETHER BASED UPON WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, OR ANY OTHER LEGAL THEORY.

THE FOREGOING WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE, AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITY ON MBW'S PART. MBW NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME ON BEHALF OF MBW ANY OTHER LIABILITY OR WARRANTY IN CONNECTION WITH THE SALE OR SERVICE OF ANY NEW MACHINE, DEMONSTRATION MACHINE, OR ANY OTHER MBW PRODUCT.

EXTENDED RAMMER WARRANTY - MODELS R422, R442, R482 & R483.

This extended warranty commences on the last day of MBW's standard, one year, "limited warranty" and runs for an additional four years (48 months). This extended warranty is limited to part replacement and shipping costs of Rammer bellows and non-metallic slide bearings only. This extended warranty does not cover labor, down time, or any other cost beyond that of component replacement and freight. This extended warranty is subject to all limitations set forth in MBW's "limited warranty", above.