

**WORKSHOP MANUAL**  
**FOR**  
**RT-50R / RT-70 R / RD / RT-70 F**  
**TAMPING RAMMER**



April 1. 2017

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## 1. For safety on maintenance work

### CAUTION

- Be sure to stop the engine and wait until it has been cooled down to carry out inspection and maintenance. You may be suffered an unexpected burn if you try to start the maintenance work while engine is still hot.
- In order to secure safety, wear clothes suitable for the work, protection cap, and safety shoes when working on maintenance. Do not wear clothes stained with oil as they may catch fire.
- Carry out inspection and maintenance at a place where it is solid and level.

### DANGER

#### Caution: Flammables

- Exhaust gas discharged out of the engine contains toxic substances such as carbon monoxide which is very dangerous. When running the engine indoors, there must be well ventilated. In addition, the same is to be applied when working with fuel, cleaning fluid, paint or the like.
- In order to avoid fire, do not fuel while the engine is running. Use incombustible fluid for cleaning of components. Prepare fire fighting implements such as fire extinguisher at a place where easily accessible.

## 2. Points to remember before work

1. Before carrying out removal and/or disassembly, make sure how it has been mounted.
2. If there is a possibility that components concerned might be contaminated or damaged, take protective measures such as putting a cover them.
3. When an overhaul related to oil seal, gasket, and packing has been carried out, replace them with new one.
4. Tighten bolts and nuts with the specified torque.
5. If application of anti-loosening agent (such as Lock Tight #270) is specified, follow as it is instructed.

(Before application of an adhesive, degrease and clean the screw threads concerned.)

Table of standard tightening torque for bolts and nuts

Unit : N·m (kgf·cm)

Bolt strength : 10.9

Bolt size	Material of threads to mated	
	Aluminum (High strength)	SS, FCD, Aluminum + heil-sert
M6	10.8 ~ 12.7 (110 ~ 130)	12.7 ~ 14.7 (130 ~ 150)
M8	21.6 ~ 22.5 (220 ~ 230)	32.3 ~ 36.3 (330 ~ 370)
M10	49.0 ~ 53.9 (500 ~ 550)	63.7 ~ 73.5 (650 ~ 750)
M12	63.7 ~ 68.6 (650 ~ 700)	108.0 ~ 127.0 (1100 ~ 1300)

### 3. Inspection procedures

#### 1. Visual inspection for:

1. Mounting of each equipment
2. Missing component
3. Damaged part of machine itself
4. Crack and/or distortion of rubber cushion
5. Tightness and coming off of bolts and nuts
6. Lubrication

Machine lubricant (RO#100: multi-purpose general use or SAE10W30: engine oil)

RT-50R -----0.6 liters

RT-70R(D), 70F----0.9 liters

Engine lubricant (SAE10W-30: class SE or SF)

RT-50R -----0.3 liters

RT-70R(D), 70F----0.4 liters

7. Oil leakage, contamination and clogging of strainer
8. Damage to air-cleaner, contamination of filter element
9. Wear and damage to foot
10. Damage, contamination of name plates (safety plates in particular)

#### 2. Running inspection for:

1. Start performance of the engine
2. Engine speed (With being loaded for high set speed)

High set speed    4,000 ~ 4,100/min.(rpm) RT-50R

3,700 ~ 3,800/min.(rpm) RT-70R(D)

3,800 ~ 3,900/min.(rpm) RT-70F

Idling speed        1,500 ~ 1,600/min.(rpm)

3. When tamping with engine at maximum speed, check for:  
Unusual noise in the machine and the engine  
Unusual leaping  
(Setting or damage to spring, slip of clutch and so on)
4. Operation of throttle wire and throttle lever

## 4. Disassembly and re-assembly of engine and clutch

### 4 - 1 Disassembly procedures

1. Remove the fuel pipe and the throttle wire.

Note: Remove the fuel pipe after the fuel cock has been closed.

2. Remove the engine support (50R:53, 70R/RD:59, 70F:52).

3. Remove engine mounting bolts or nuts to remove the engine.

4. Remove the nut(50R:42, 70R/D:47, 70F:49) to remove the clutch assy with the tool for pulling out clutch (option).



Clutch puller : 1003745

### 4 - 2 Re-assembly procedures

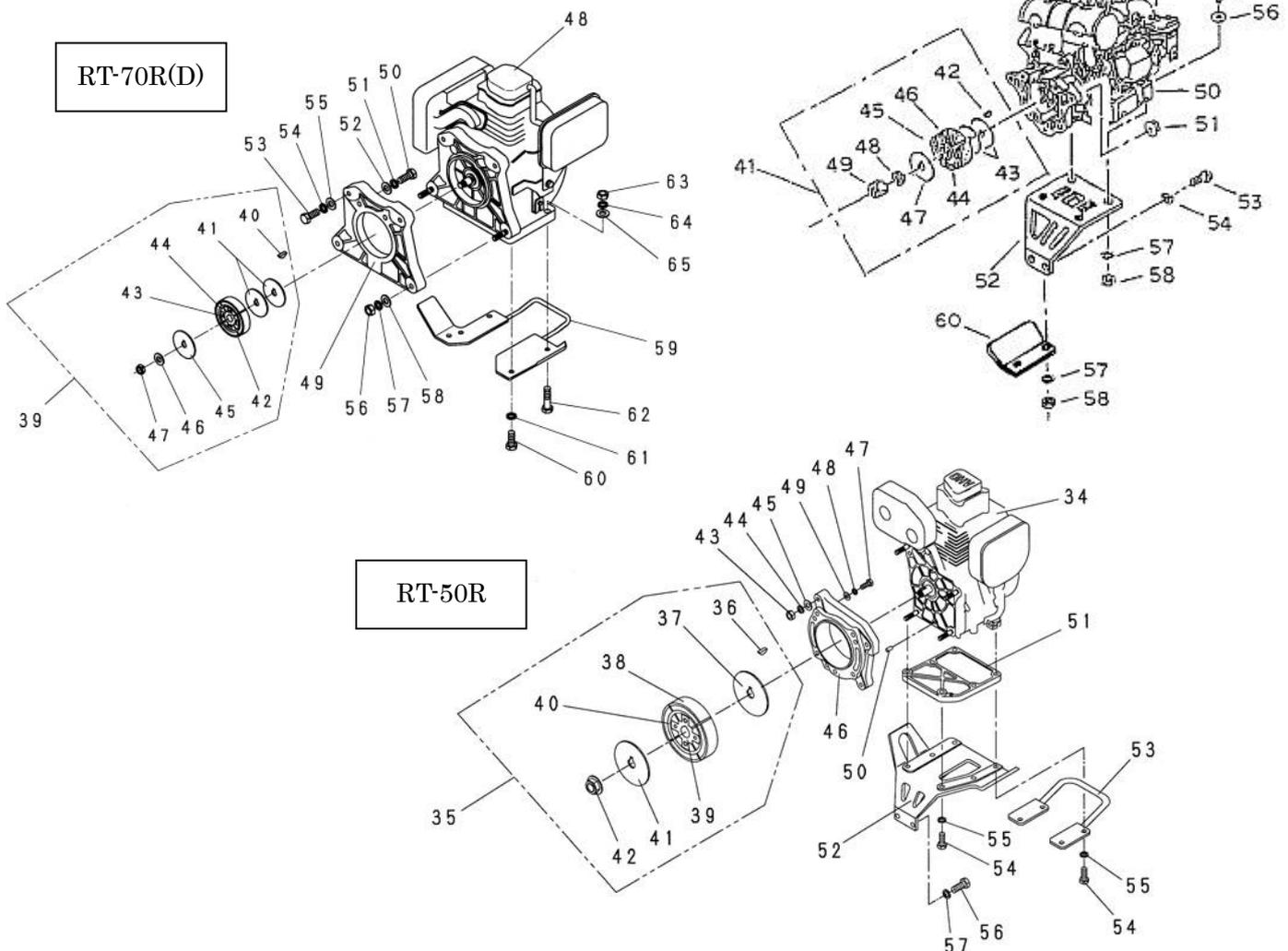
1. Re-assemble in the reverse order of disassembly illustrated above.

Note: Check the clutch shoe for wear and the spring for setting to replace it if found unacceptable.

2. Check engine oil.

Note: Use engine oil, SAE10W30, for automobile.

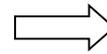
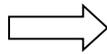
3. Check the high set speed of engine after re-assembly.



## 5. Disassembly and re-assembly of crankcase

### 5 - 1 Disassembly procedures

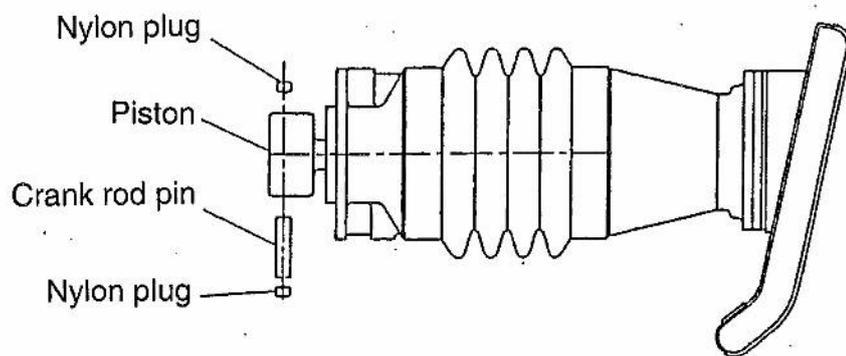
1. Remove the engine assembly by following the steps 1 to 3, section 4-1.
2. Drain lubricant in the machine out of the drain plug.
3. Remove the bolts fastening the crankcase and the upper cylinder to separate them.
4. The crankcase assembly can be come off by extracting the rod pin while the nylon plug in the crank rod pin mounting is being pushed.



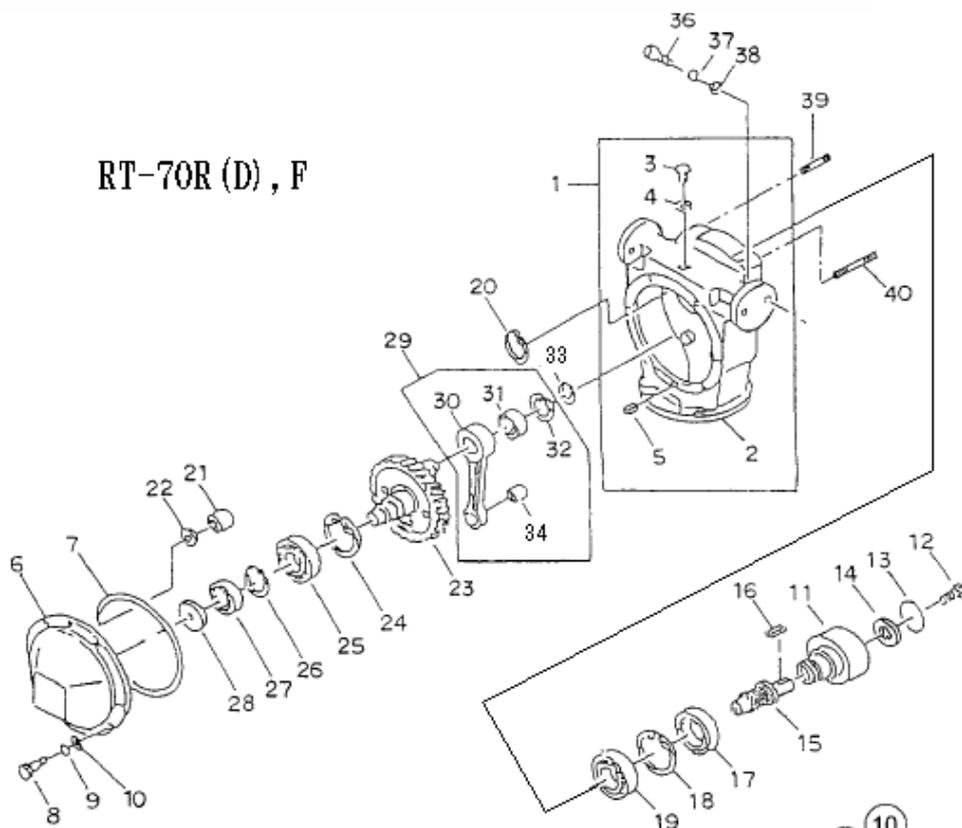
5. Remove the bolts( 8 ) mounting the bearing case ( 6 ) and screw the removed bolts into dummy threaded holes in the bearing case to remove the bearing case from the crank case ( 1 ).  
Note: In case of working on models RT-70R(D), RT-70F, remove the rod pin first, otherwise the crank rod is to be bent.
6. Remove the snap ring ( 33 ) securing the crank rod ( 29 ) to remove the crank gear ( 23 ).
7. In case of models RT-70R(D), RT-70F:  
Remove the snap ring ( 24 ) in the bearing case to remove the crank gear ( 23 ).  
(Remove the snap ring by inserting the tip of snap ring pliers from the oblong hole in the gear.)  
In case of model RT-50R:  
Remove the snap ring ( 22 ) in the crank case to remove the crank gear ( 23 ).  
(Remove the snap ring by inserting the tip of snap ring pliers from the oblong hole in the gear.)
8. In case of models RT-70R(D), 70F:  
When the bolt ( 12 ) and the snap ring ( 20 ) have been removed, the clutch drum ( 11 ) can be pulled out toward the front side.  
In case of model RT-50R:  
When the bolt ( 10 ) has been removed, the clutch drum ( 9 ) can be pulled out toward the engine side and the pinion ( 13 ) toward the front side.

### 5 - 2 Re-assembly procedures

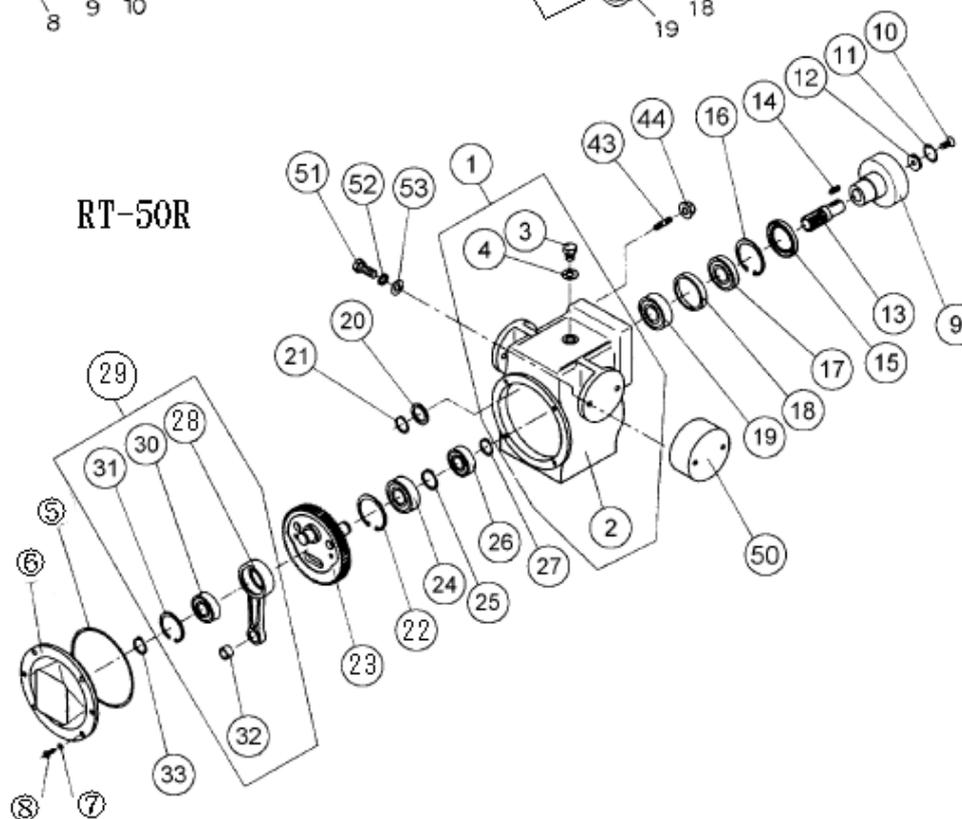
1. Re-assemble them in the reverse order of disassembly illustrated above.
2. Replace the oil seal and the O-ring with new ones.
3. Apply grease to the sliding recess in oil seal.
4. Apply grease to the hole into which the rod pin of crank rod is to be inserted.  
Note: Align both holes in the crank rod and in the piston to insert the rod pin.  
Forcible drive against the rod pin may damage to the bushing in the crank rod.
5. Apply lock tight to the counter-sunk bolt ( 12 ). RT-50R(10).



RT-70R (D), F



RT-50R



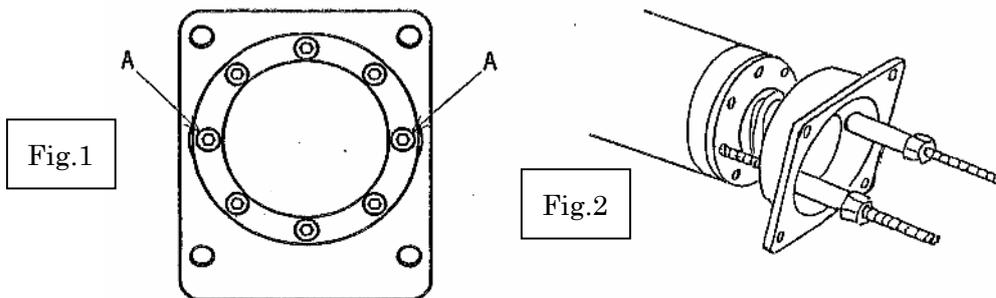
## 6. Disassembly and re-assembly of lower cylinder and foot

### 6-1 Disassembly and re-assembly of RT-50R

#### Disassembly procedures

1. Remove the drain plug to discharge lubricant.
2. Remove the nylon nuts (40) to remove the foot plate (33).
3. Remove 2 bolts (marked "A") out of 8 bolts on the back of foot block (refer to Fig.1).
4. Screw the 2 threaded bars (M8 x 190mm long) in the unscrewed holes and insert the collar (15mm O.D. x 11mm I.D. x 50mm long) into each bar to fasten them temporarily with nuts (refer Fig.2). Mark the foot block (26) to identify its mounting orientation.
5. Remove other remaining 6 bolts and loosen the temporary fastening nuts equally. Take care that the threaded bars are not to become loose during this step.
6. Remove the threaded bars when no spring pressure is felt.

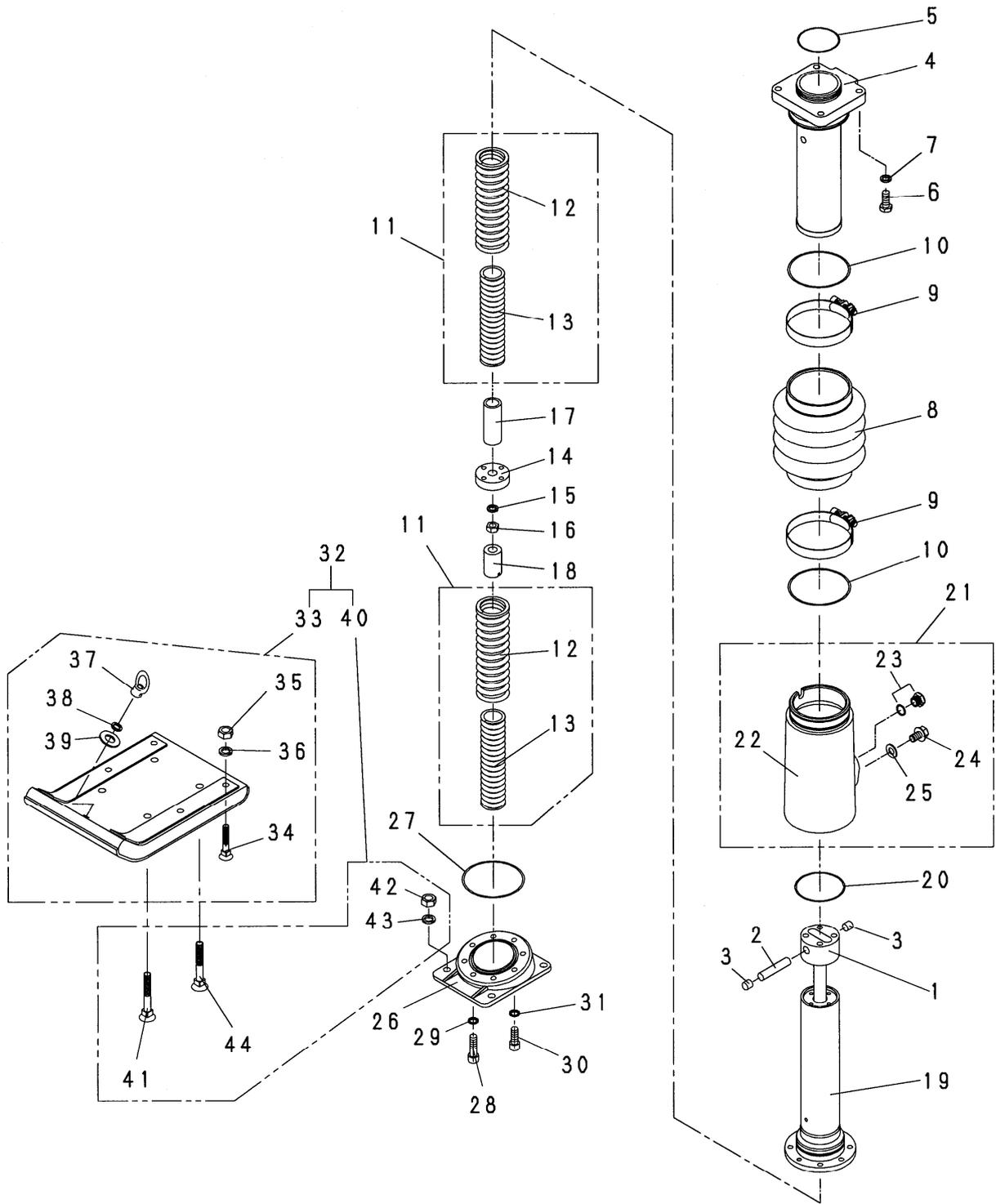
**Danger: Removal of hexagon socket head bolts (28, 33) without foot block being secured may cause the foot block to jump up by spring force which results in personal injury.**



7. Remove the lower damper (18) and nut (16) to remove the piston guide (14). In case where the joint between the piston and the crank rod comes off, the disassembly may easily be carried out by holding the lower cylinder assembly in a vice after it has been extracted out of the upper cylinder.

#### Re-assembly procedures

1. Re-assemble them in the reverse order of disassembly illustrated above.
2. Replace the disassembled O-ring with new one.
3. Apply grease to the O-ring to re-assemble it.
4. Tighten the nut (16) with a torque specified.  
M16 : 156.8 ~ 176.4N·m (1,600~1,800kgf·cm)
5. Pay attention to the foot block (26) for mounting orientation (markings are to be aligned).
6. Fill up lubricant after re-assembly.
7. If a spring is to be replaced, replace it with a set of upper and lower springs.



## 6-2 Disassembly and re-assembly of RT-70R/D, 70F

### Disassembly procedures

1. Remove the drain plug to discharge lubricant.
2. Remove the nylon nuts (45) to remove the foot assembly (36).
3. Remove the bolts (6 pieces of M8 hexagon socket head bolts and 4 pieces of M10 bolts) other than 2 hexagon socket head bolts (marked "A") to remove the foot block (30) and the protection pipe assembly (20) (refer to Fig.1).
4. With 2 bolts marked "A" left as they were, screw 2 threaded bars (M8 x 190mm long) in 2 threaded holes on a diagonal line out of 4 places of the unscrewed holes and insert the collar (15mm O.D. x 11mm I.D. x 50mm long) into each bar to fasten them temporarily with nuts (refer to Fig.2).
5. Remove other remaining 2 (marked "A") and loosen the temporary fastening nuts equally (refer to Fig.2). Take care that the threaded bars are not to become loose during this step.
6. Remove the threaded bars when no spring pressure is felt.

**Danger: Removal of hexagon socket head bolts (28, 33) without foot block being secured may cause the spring seat to jump up by spring force which results in personal injury.**

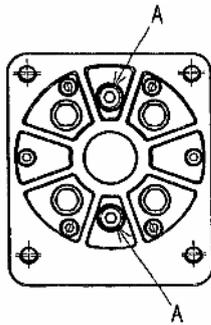


Fig. 1

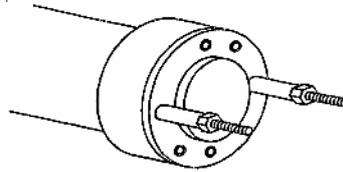
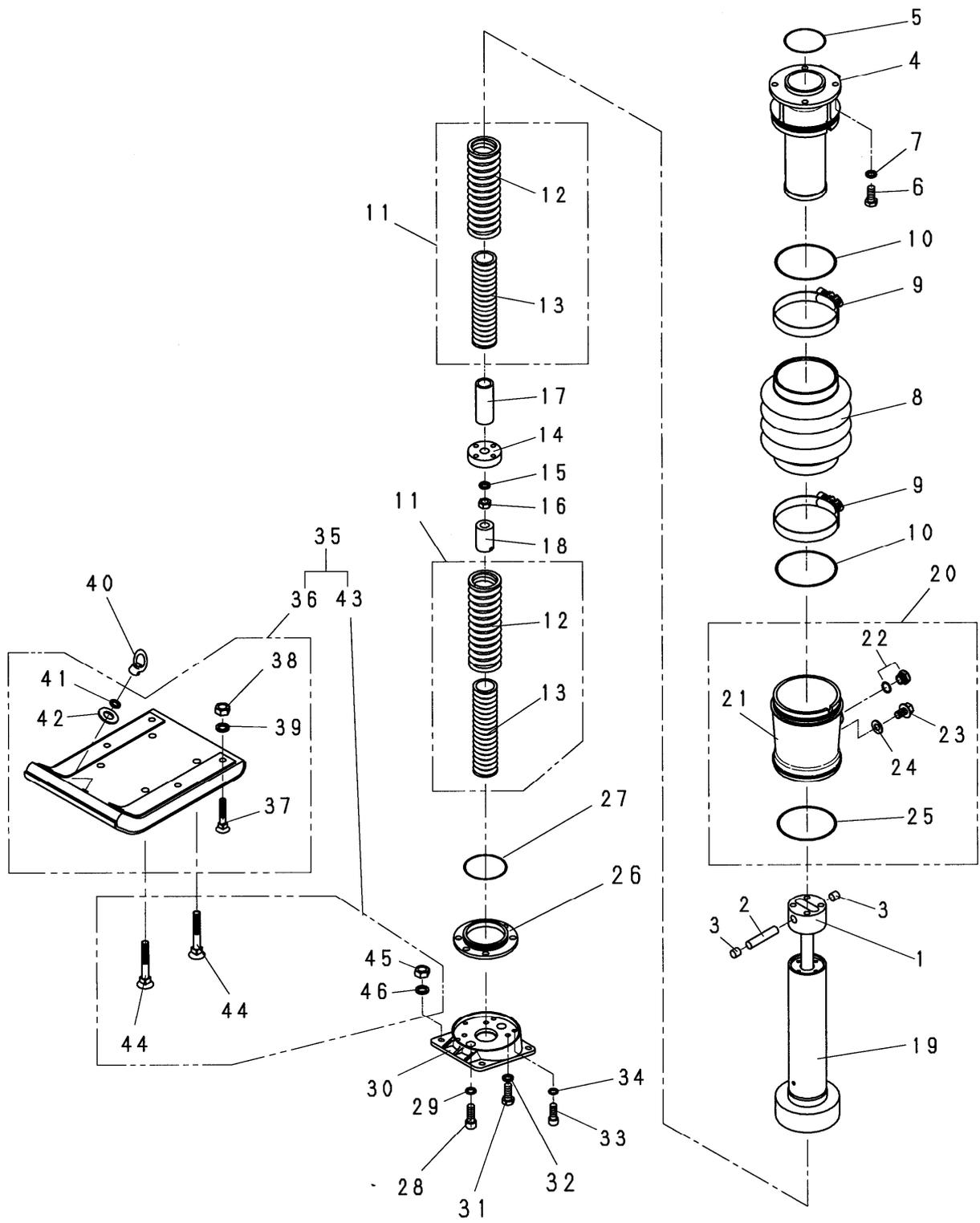


Fig. 2

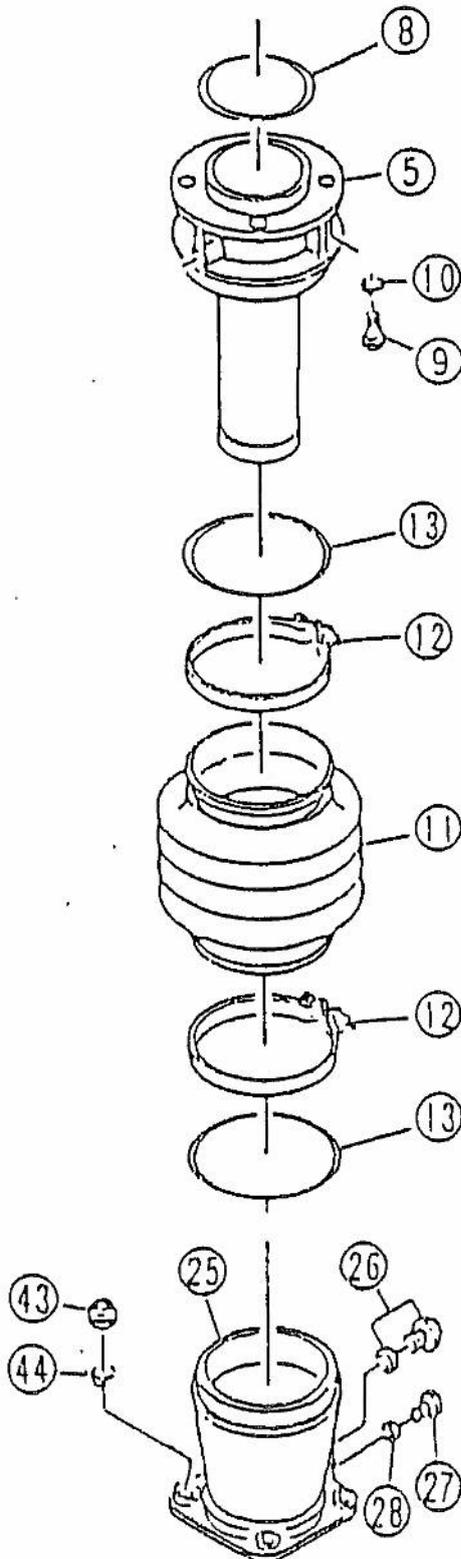
7. Remove the lower damper (18) and nut (16) to remove the piston guide (14). In case where the joint between the piston and the crank rod comes off, the disassembly may easily be carried out by holding the lower cylinder assembly in a vice after it has been extracted out of the upper cylinder.

### Re-assembly procedures

1. Re-assemble them in the reverse order of disassembly illustrated above.
2. Replace the disassembled O-ring with new one.
3. Apply grease to the O-ring to re-assemble it.
4. Tighten the nut (16) with a torque specified.  
M20 : 245 ~ 264.6N·m (2,500~2,700kgf·cm)
5. Pay attention to the spring seat (26) for mounting orientation (markings are to be aligned).
6. Fill up lubricant after re-assembly.
7. If a spring is to be replaced, replace it with a set of upper and lower springs.



## 7. Replacement of bellows



### 7-1 Disassembly procedure

1. Carry out disassembly by following steps 1 to 4, section 5 to separate the crank case assembly and the upper cylinder (5).
2. Removal of the band (12) on upper side allows the upper cylinder (5) to be extracted upward.
3. Removal of the band (12) on lower side allows the bellows to be extracted.

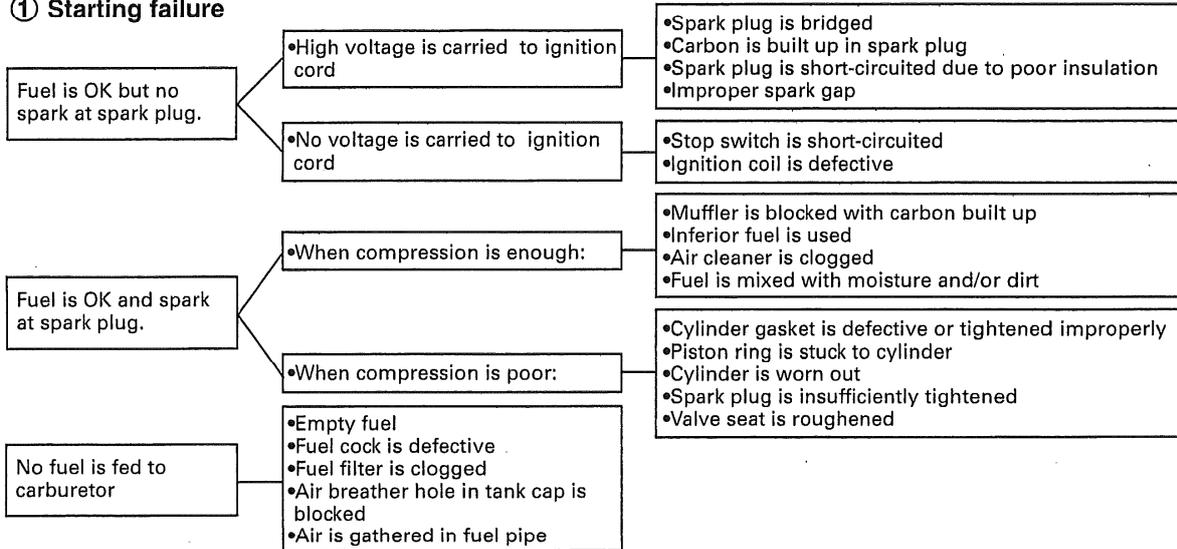
### 7-2 Re-assembly procedures

1. Although re-assembly is to be made in the reverse order of disassembly, pay attention to the upper cylinder (5) and the crank case for respective mounting directions. When fitting bellows, assemble it so that the protruding part located inside of the bellows fits in the cut-out of both the protection pipe (25) and the upper cylinder (5).
2. Replace the disassembled O-ring with new one.
3. Apply oil to threaded parts of the bellows to tighten both bands.
4. Fill up lubricant after re-assembly.

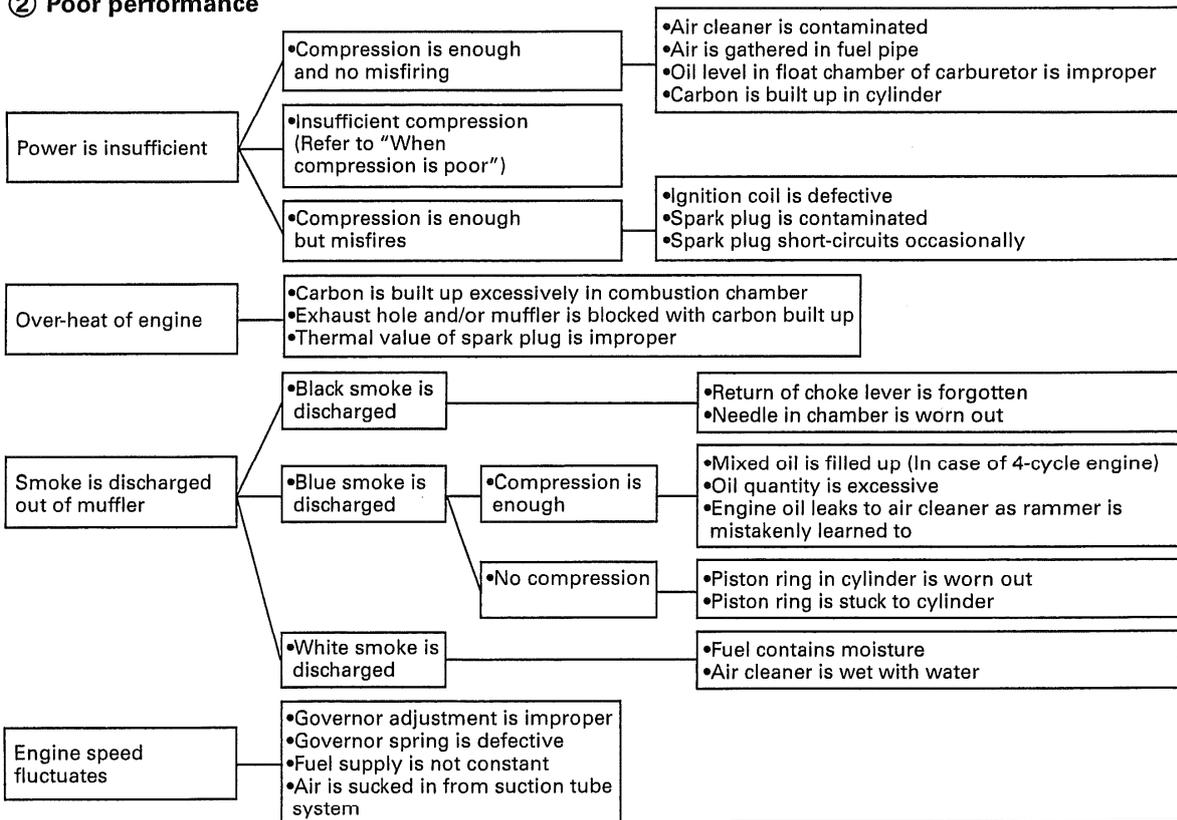
# 8. Trouble-shooting

## 1. Engine

### ① Starting failure



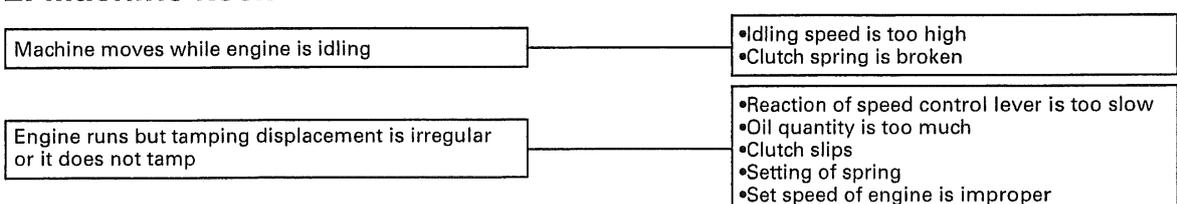
### ② Poor performance



### ③ Movement of recoil starter is not smooth

- Dirt is clogged in rotating parts
- Setting of spiral spring

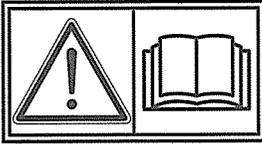
## 2. Machine itself





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[info@meiwa-ltd.co.jp](mailto:info@meiwa-ltd.co.jp)

# EH09-2D/10D for Rammer



取扱説明書

JP

INSTRUCTIONS FOR USE (USA only)

US

INSTRUCTIONS FOR USE

Original EN

BEDIENUNGSANLEITUNG

DE

MANUEL D'UTILISATION

FR

GEBRUIKSAANWIJZING

NL

MANUAL DE INSTRUCCIONES

ES

MANUALE D'USO E MANUTENZIONE

IT

MANUAL DE INSTRUÇÕES

PT

ΟΔΗΓΙΕΣ ΧΡΗΣΕΩΣ ΚΑΙ ΣΥΝΤΗΡΗΣΕΩΣ ΚΙΝΗΤΗΡΩΝ

GR

INSTRUKTIONSBOK

NO

BRUKSANVISNING

SE

KÄYTTÖ-JA HUOLTO-OHJEET

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BRUGSANVISNING

DK

РУКОВОДСТВО ПО ЭКСПЛУАТАЦИИ

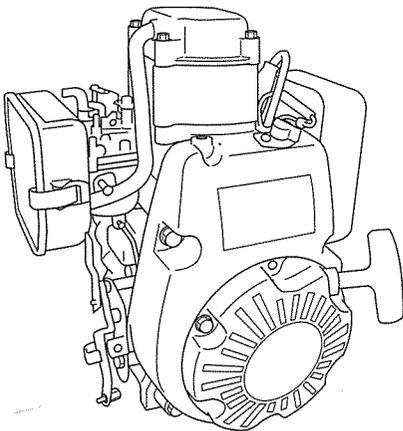
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使用说明书

CN

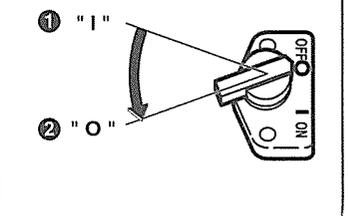
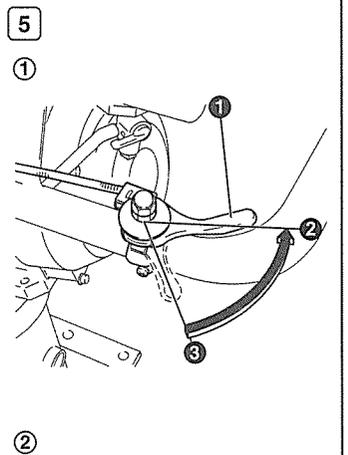
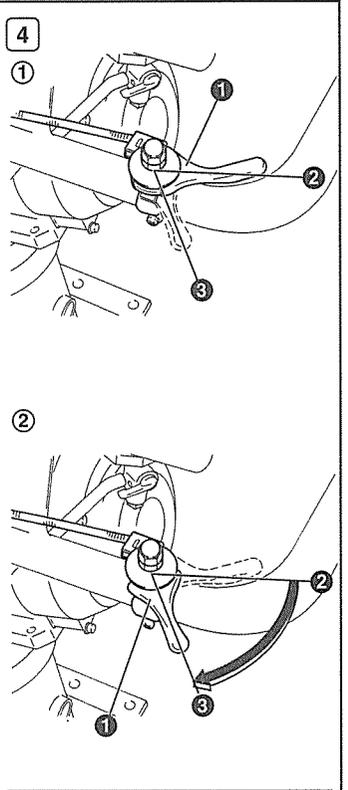
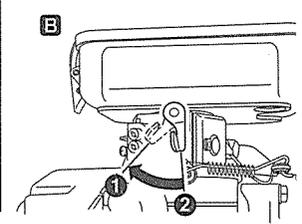
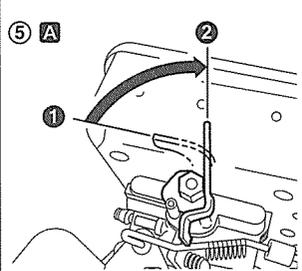
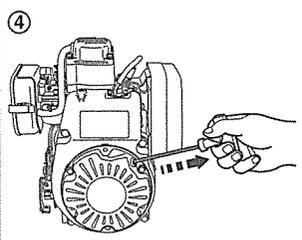
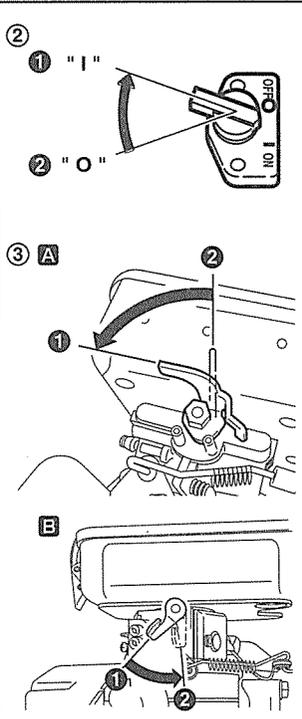
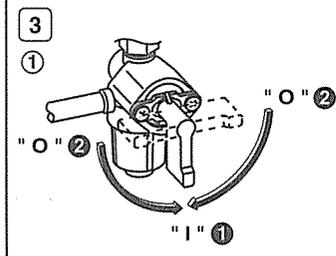
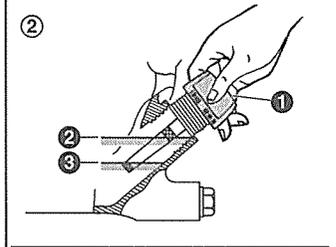
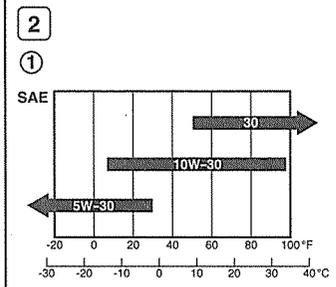
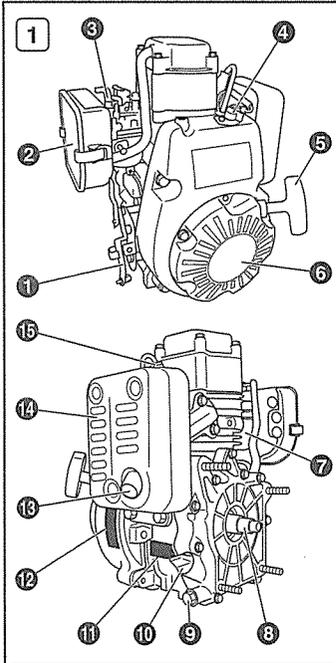
إرشادات الاستعمال

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## OHV Gasoline Engines



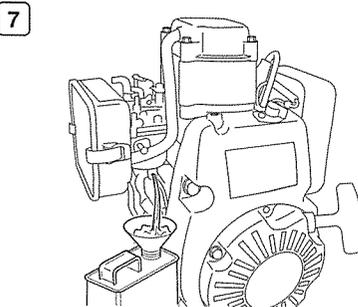
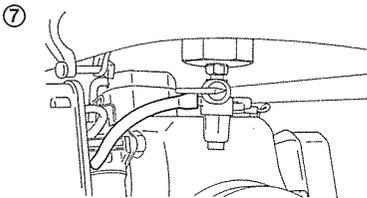
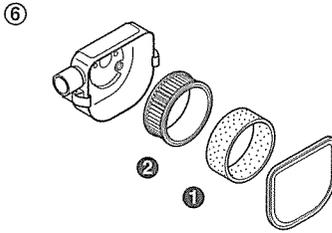
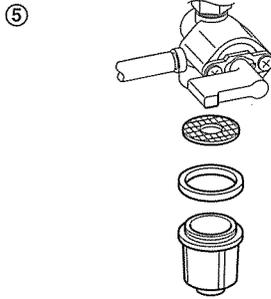
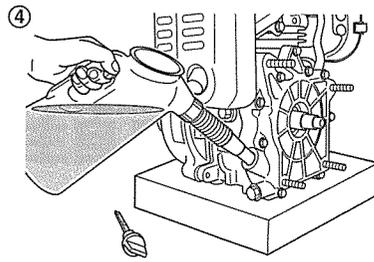
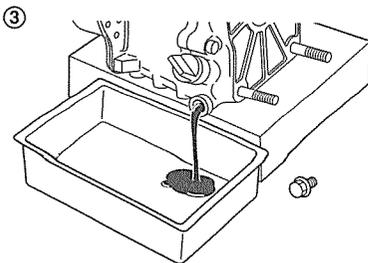
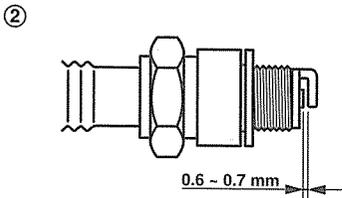
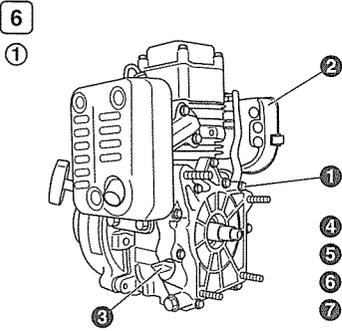
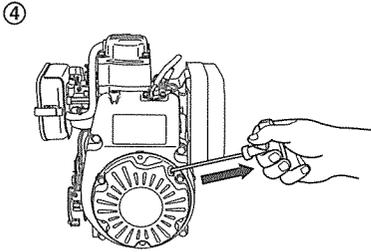
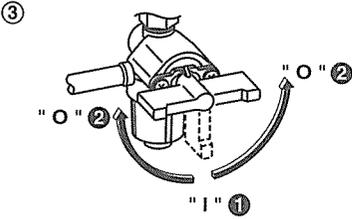
# 国内排出ガス自主規制について



このマークは、(一社)日本陸用内燃機関協会の小形汎用エンジン排出ガス自主規制に適合していることを示しています。

(一社)日本陸用内燃機関協会：陸用エンジン業界の健全な発展と最新技術の開発を図り、併せて関連する諸製造業界の発展にも寄与することを目的とする団体で、環境保全の重要性を考慮して小形汎用エンジンの排出ガス浄化のため自主規制に取り組んでいます。

自主規制の内容については、下記のホームページにてご覧頂けます。  
<http://www.lemma.or.jp>



(California Proposition 65)

 <b>WARNING:</b> 
The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

(California only)

## AIR INDEX

To show compliance with California emission regulations, a hangtag has been provided displaying the Air Index level and durability period of this engine.

The Air Index level defines how clean an engine's exhaust is over a period of time. A bar graph scaled from "0" (most clean) to "10" (least clean) is used to show an engine's Air Index level. A lower Air Index level represents cleaner exhaust from an engine.

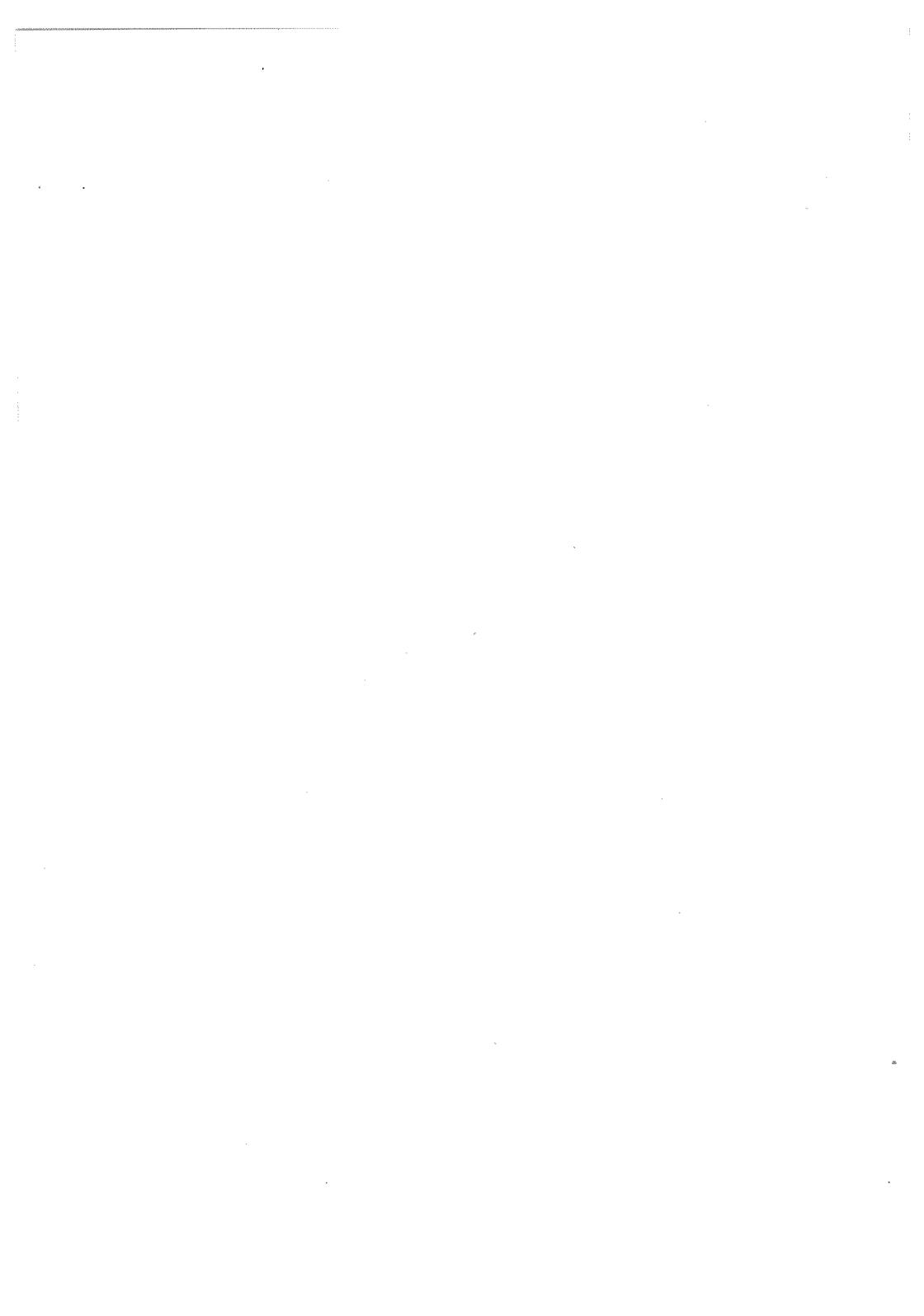
The period of time (in hours) that the Air Index level is measured is known as the durability period. Depending on the size of the engine, a selection of time periods can be used to measure the Air Index level (see below).

<u>Descriptive Term</u>	<u>Applicable to Emissions Durability Period</u>
Moderate	- 50 hours (engine from 0 to 80 cc) 125 hours (engine greater than 80 cc)
Intermediate	- 125 hours (engine from 0 to 80 cc) 250 hours (engine greater than 80 cc)
Extended	- 300 hours (engine from 0 to 80 cc) 500 hours (engine greater than 80 cc) 1000 hours (225 cc and greater)

**Notice :** This hangtag must remain on this engine or piece of equipment, and only be removed by the ultimate purchaser before operation.

**Notice :** FEDERAL EMISSION COMPONENT DEFECT WARRANTY and CALIFORNIA EMISSION CONTROL WARRANTY are applicable to only those engines/ generators complied with EPA (Environmental Protection Agency) and CARB (California Air Resources Board) emission regulations in the U.S.A.

**Notice :** To the engines/generators exported to and used in the countries other than the U.S.A., warranty service shall be performed by the distributor in each country in accordance with the standard SUBARU engine/generator warranty policy as applicable.



# FOREWORD

Thank you very much for purchasing a **SUBARU ENGINE**.

Your **SUBARU ENGINE** can supply the power to operate various sorts of machines and equipment. Please take a moment to familiarize yourself with the proper operation and maintenance procedures in order to maximize the safe and efficient use of this product.

Keep this owner's manual at hand, so that you can refer to it at any time.

Due to constant efforts to improve our products, certain procedures and specifications are subject to change without notice.

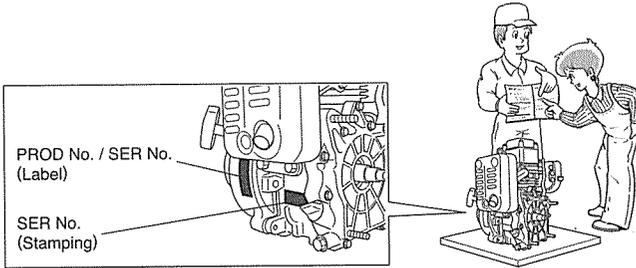
When ordering spare parts, always give us the **MODEL, PRODUCTION NUMBER** and **SERIAL NUMBER** of your engine.

Please fill in the following blanks after checking the production number on your engine.  
(Location of label is different depending on the engine specification.)

PROD NO.									

SER NO.				

**US**



## NOTICE

The engine which is complied with the emission regulation of USA, Europe, and China has the emission control label placed on the engine according to each country's regulation.

Exporting any engine to these countries/regions which does not have the emission control label is a violation and subject to penalty.

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**NOTE** Please refer to the illustrations on the back page of the front cover or back cover for Fig. ① to ⑦ indicated in the sentence.

# 1. SAFETY PRECAUTIONS

Please make sure you review each precaution carefully.

Pay special attention to statement preceded by the following words.

**⚠ WARNING** “WARNING” indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

**⚠ CAUTION** “CAUTION” indicates a possibility of personal injury or equipment damage if instructions are not followed.

## **⚠ WARNING** : EXHAUST PRECAUTIONS

- Never inhale exhaust gasses.  
They contain carbon monoxide, a colorless, odorless and extremely dangerous gas which can cause unconsciousness or death.
- Never operate the engine indoors or in a poorly ventilated area, such as tunnel, cave, etc.
- Exercise extreme care when operating the engine near people or animals.
- Keep the exhaust pipe free of foreign objects.



US

## **⚠ WARNING** : REFUELING PRECAUTIONS

- Gasoline is extremely flammable and its vapors can explode if ignited.
- Do not refuel indoors or in a poorly ventilated area.
- Be sure to stop the engine prior to refueling.
- Do not remove fuel tank cap nor fill fuel tank while engine is hot or running. Allow engine to cool at least 2 minutes before refueling.
- Do not overfill the fuel tank.
- If fuel is spilled, wipe it away carefully and wait until the fuel has dried before starting the engine.
- After refueling, make sure that the fuel cap is secured to prevent spillage.

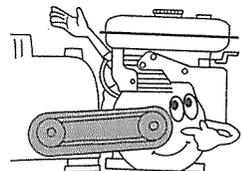
## **⚠ WARNING** : FIRE PREVENTION

- Do not operate the engine while smoking or near an open flame.
- Do not use around dry brush, twigs, cloth rags, or other flammable materials.
- Keep the engine away from flammables and other hazardous materials (trash, rags, lubricants, explosives).



## **⚠ WARNING** : OTHER SAFETY PRECAUTIONS

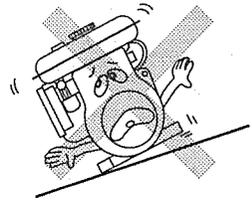
- Place the protective covers over the rotating parts.  
If rotating parts such as the drive shaft, pulley, belt, etc. are left exposed, they are potentially hazardous. To prevent injury, equip them with protective covers or shrouds.



**■ Be careful of hot parts.**

The muffler and other engine parts become very hot while the engine is running or just after it has stopped. Operate the engine in a safe area and keep children away from the running engine.

- Do not touch the spark plug and ignition cable when starting and operating the engine.
- Never make adjustments on the machinery while it is connected to the engine, without first removing the ignition cable from the spark plug. Turning the crankshaft by hand during adjusting or cleaning might start the engine, and cause serious injury to the operator.
- Operate the engine on a stable, level surface. If the engine is tilted, fuel spillage may result.



**US**

**NOTE**

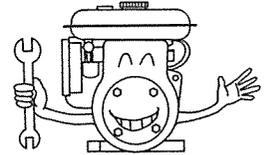
Operating the engine at a steep incline may cause seizure due to improper lubrication even with a maximum oil level.

- Do not transport the engine with fuel in tank or with fuel strainer valve open.
- Do not move the engine while in operation when it has been removed from the equipment.
- Keep the unit dry (do not operate it in rainy conditions).



**⚠ CAUTION : PRE-OPERATION CHECKS**

- Carefully check fuel hoses and joints for looseness and fuel leakage. Leaked fuel creates a potentially dangerous situation.
- Check bolts and nuts for looseness. A loose bolt or nut may cause serious engine trouble.
- Check the engine oil and refill if necessary.
- Check the fuel level and refill if necessary. Take care not to overfill the tank.
- Keep cylinder fins and recoil starter free of dirt, grass and other debris.
- Wear snug fitting working clothes when operating the engine. Loose aprons, towels, belt, etc., may be caught in the engine or drive train, causing a dangerous situation.



**⚠ CAUTION : PRECAUTIONS ON THE HANDLING OF THE WARNING LABEL**

- Warning labels are affixed to our rammer with regard to particularly serious dangers. When using the engines, please use them safely after carefully reading the instruction manual and understanding the dangers.

**Warning Label Exclusively for the United States and Canada**

<p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>Read INSTRUCTIONS FOR USE before use.</b></p> <p>The engine emits toxic gas from its exhaust. Do not run in an enclosed area.</p> <p>Hot surfaces can burn you. Stay away if engine has been running.</p>	<p style="text-align: center;"><b>⚠ AVERTISSEMENT</b></p> <p>Lisez les INSTRUCTIONS POUR L'USAGE avant d'utiliser le moteur.</p> <p>Le moteur émet des gaz toxiques de son échappement. Ne pas faire fonctionner dans un espace clos.</p> <p>Les surfaces chaudes peuvent vous brûler. Éloignez-vous si le moteur a été utilisé.</p>	<p style="text-align: center;"><b>⚠ ADVERTENCIA</b></p> <p>Lea las INSTRUCCIONES PARA EL USO antes de utilizar el motor.</p> <p>El motor emite gases tóxicos de su escape. No opere en un espacio cerrado.</p> <p>Las superficies calientes pueden quemarle. Alejarse del motor si se ha estado utilizando.</p>
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For use in the United States or Canada, please affix the label suited to the region from among the enclosed warning labels.

## SYMBOLS

	<i>Read manual.</i>		<i>Shut off fuel valve when the engine is not in use.</i>
	<i>Stay clear of the hot surface.</i>		<i>Check for leakage from hose and fittings.</i>
	<i>Exhaust gas is poisonous. Do not operate in an unventilated room or enclosed area.</i>		<i>Fire, open flame and smoking prohibited.</i>
	<i>Stop the engine before refueling.</i>		<i>HOT, avoid touching the hot area.</i>

US

<i>USA and CANADA only</i>			
	<i>Read INSTRUCTIONS FOR USE before use.</i>		<i>The engine emits toxic gas can kill you in minutes. Do not run in an enclosed area.</i>
			<i>Hot surface can burn you. Stay away if engine has been running.</i>
	<i>Gasoline is extremely flammable and its vapors can explode.</i> <ul style="list-style-type: none"> <li>• Stop the engine before refueling.</li> <li>• Check for leakage from hoses and fittings.</li> <li>• Shut off fuel valve when the engine is not in use.</li> </ul>		

	On (Run)		Engine start (Electric start)		Fuel (gasoline)		Primer
○	Off (Stop)		Engine stop		Fuel (diesel)		Push primer
	Engine oil		Cold engine		Fuel shut-off		Do not push primer
	Add oil		Warm engine		Fuel system failure / malfunction	2X	Two times
	Battery		Electrical preheat (Low temperature start aid)		Choke		
	Fast		Run position	+	Plus ; positive polarity		
	Slow		Stop position	-	Minus ; negative polarity		

## 2. COMPONENTS

(See Fig. ①)

**NOTE** Please refer to the illustrations on the back page of the front cover or back cover for Fig. ① to ⑦ indicated in the sentence.

- |                       |                                 |
|-----------------------|---------------------------------|
| ① SPEED CONTROL LEVER | ⑨ OIL DRAIN PLUG                |
| ② AIR CLEANER         | ⑩ OIL GAUGE (OIL FILLER)        |
| ③ CHOKE LEVER         | ⑪ ENGINE SERIAL NO. (STAMPING)  |
| ④ STOP SWITCH         | ⑫ ENGINE NAME LABEL (SPEC. NO.) |
| ⑤ STARTER HANDLE      | ⑬ EXHAUST OUTLET                |
| ⑥ RECOIL STARTER      | ⑭ MUFFLER COVER                 |
| ⑦ CARBURETOR          | ⑮ SPARK PLUG                    |
| ⑧ P.T.O. SHAFT        |                                 |

### 3. PRE-OPERATION CHECKS

#### NOTE

Engine shipped from our factory is without oil. Before starting engine, fill with oil. Do not over-fill.

#### 1. CHECK ENGINE OIL (See Fig. ②)

Before checking or refilling engine oil, be sure the rammer with engine stopped is located on stable and level surface in the upright position.

- Remove the oil gauge and check the oil level. Do not screw the oil gauge into the oil filler neck to check oil level. If the oil level is low, refill to the upper level with the following recommended oil.
- Use 4-stroke automotive detergent oil of API service class SE or higher grade. (SG, SH or SJ is recommended)
- Select the viscosity based on the air temperature at the time of operation as shown in the table. (See Fig. ②-①)

**Oil capacity : 0.3 liter (0.079 U.S. gal)**  
**(With the engine installed onto rammer)**

**Explanation of Fig. ②-②**

- ① OIL GAUGE
- ② UPPER LEVEL ③ LOWER LEVEL

#### 2. CHECK FUEL

#### ▲ WARNING

- **Do not refuel while smoking, near an open flame or other such potential fire hazards. Otherwise fire accident may occur.**
- **Remove the static electricity from your body before refilling the gasoline. Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns. Static electricity can be discharged from the body by touching by hand the metal parts of the unit and the fuel dispensing pump.**

- Make sure the engine is cooled down enough after engine is stopped.
- Use unleaded automotive gasoline only.
  - Unleaded regular/premium or reformulated gasoline containing no more than 10% Ethanol (E10), or 15% MTBE may also be used.
  - Never use gasoline containing ethanol exceeding 10%, or MTBE exceeding 15% because engine or fuel system damage could result.
  - Never use stale or contaminated gasoline.
  - Use of these non-recommended fuels may result in reduced performance and/or denial of warranty.
- Wipe off any spilled fuel before starting the engine.

### 4. OPERATING YOUR ENGINE

(See Fig. ③)

The specifications for the fuel valve, speed switch and speed control lever may differ depending on the rammer body.

#### 1. STARTING

- (1) Open the fuel valve. (See Fig. ③-①)
  - ① OPEN ② CLOSE
- (2) Turn the STOP SWITCH to the position " | " (ON). (See Fig. ③-②)
  - ① ON ② OFF
- (3) Close the choke lever.
  - FLOAT Type** (See Fig. ③-③-①)
  - DIAPHRAGM Type** (See Fig. ③-③-②)
    - ① CLOSE ② OPEN
- If the engine is cold or the ambient temperature is low, close the choke lever fully.
- If the engine is warm or the ambient temperature is high, open the choke lever half-way, or keep it fully open.
- For the diaphragm type, press the primer pump on the carburetor casing a few times to circulate the fuel to the carburetor.

- (4) Pull the starter handle slowly until resistance is felt. This is the "compression" point. Return the handle to its original position and pull swiftly. Do not pull out the rope all the way. After starting the engine, allow the starter handle to return to its original position while still holding the handle. (See Fig. ③-④)
- (5) After starting the engine, gradually open choke by turning the choke lever and finally keep it fully opened. Do not fully open the choke lever immediately when the engine is cold or the ambient temperature is low, because the engine may stop. (See Fig. ③-⑤)

**FLOAT Type** (See Fig. ③-⑤-①)

**DIAPHRAGM Type** (See Fig. ③-⑤-②)

- ① CLOSE ② OPEN

#### 2. RUNNING

- (1) After the engine starts, set the speed control lever at ② (low speed) position and warm it up without load for a few minutes. (See Fig. ④-①)
- (2) Gradually move the speed control lever toward ③ (high speed) position and set it at the required engine speed. (See Fig. ④-②)
  - Whenever high speed operation is not required, slow the engine down (idle) by moving the speed control lever toward ② (low speed) position to save fuel and extend engine life.

US

## 5. MAINTENANCE

(See Fig. 6)

### 3. STOPPING

- (1) Set the speed control lever at ② (low speed) position and allow the engine to run at low speed for 1 or 2 minutes before stopping. (See Fig. 5-1)
- (2) Turn the STOP SWITCH counterclock-wise to the position "O" (OFF). (See Fig. 5-2)
- (3) Close the fuel valve. (See Fig. 5-3)
- (4) Pull the starter handle slowly and return the handle to its original position when resistance is felt. This operation is necessary to prevent outside moist air from intruding into the combustion chamber. (See Fig. 5-4)

#### ※ STOPPING ENGINE WITH THE FUEL VALVE

Close the fuel valve and wait for a while until the engine stops.

Avoid to let the fuel remain in the carburetor over long periods, or the passages of the carburetor may become clogged with impurities, and malfunctions may result.

**MAINTENANCE, REPLACEMENT OR REPAIR OF THE EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY NONROAD ENGINE REPAIR ESTABLISHMENT OR INDIVIDUAL.**

The specifications for the fuel strainer, air cleaners, fuel pipes and so forth may differ depending on the rammer casing.

Read the Instruction manual for the rammer body.

### 1. DAILY INSPECTION (SEE FIG. 6-1)

Before running the engine, check the following service items.

- ① LOOSE OR BROKEN BOLTS AND NUTS
- ② CLEAN AIR CLEANER ELEMENT
- ③ ENOUGH CLEAN ENGINE OIL
- ④ LEAKAGE OF GASOLINE AND ENGINE OIL
- ⑤ ENOUGH GASOLINE
- ⑥ SAFE SURROUNDINGS
- ⑦ EXCESSIVE VIBRATION, NOISE

### 2. PERIODIC INSPECTION

Periodic maintenance is vital to the safe and efficient operation of your engine.

Check the table below for periodic maintenance intervals.

Maintenance Items	Every 8 hours (Daily)	Every 50hours (Weekly)	Every 200hours (Monthly)	Every 500 hours	Every 1000 hours
Clean engine and check bolts and nuts	● (Daily)				
Check for leakage from hoses and fitting	● (Daily)				
Check and refill engine oil	● (Refill daily up to upper level)				
Change engine oil (*note 1)	● (Initial 20 hours)	● (Every 100 hours)			
Clean spark plug		●			
Clean air cleaner		●			
Replace air cleaner element			●		
Clean fuel strainer			●		
Clean and adjust spark plug and electrodes			●		
Replace spark plug				●	
Remove carbon from cylinder head (*note 2)				●	
Check and adjust valve clearance (*note 2)				●	
Clean and adjust carburetor (*note 2)				●	
Replace fuel lines					● (Every 2 years)
Overhaul engine if necessary (*note 2)					●

\*Note: 1. Initial oil change should be performed after first twenty (20) hours of operation. Thereafter change oil every hundred (100) hours. Before changing oil, check for a suitable way to dispose of old oil. Do not pour it down into sewage drains, onto garden soil or into open streams. Your local zoning or environmental regulations will give you more detailed instructions on proper disposal.

\*Note: 2. As to the procedures for these items, please refer to the SERVICE MANUAL or consult your nearest service dealer.

IT IS ALSO NECESSARY FOR THE USER OF THIS ENGINE TO CONDUCT THE MAINTENANCE AND ADJUSTMENTS ON THE EMISSION-RELATED PARTS LISTED BELOW TO KEEP THE EMISSION CONTROL SYSTEM EFFECTIVE.

The emission control system consists of the following parts :

- (1) Carburetor and internal parts
- (2) Cold start enrichment system, if applicable
- (3) Intake manifold, if applicable
- (4) Air cleaner elements
- (5) Spark plug
- (6) Magneto or electronic ignition system
- (7) Spark advance/ retard system, if applicable
- (8) Exhaust manifold, if applicable.
- (9) Hoses, belts, connectors, and assemblies

The maintenance schedule indicated in the following table is based on the normal engine operation.

Should the engine be operated in extremely dusty condition or in heavier loading condition, the maintenance intervals must be shortened depending on the contamination of oil, clogging of filter elements, wear of parts, and so on.

### 3. INSPECTING THE SPARK PLUG

(See FIG. 6-2)

- (1) Clean off carbon deposits on the spark plug electrode using a plug cleaner or wire brush.
- (2) Check electrode gap. The gap should be 0.6 mm to 0.7 mm (0.02 inch.-0.03 inch.). Adjust the gap, if necessary, by carefully bending the side electrode.

Recommended Spark Plug : NGK : BMR4A  
(CHAMPION : RCJ14)

### 4. ENGINE OIL CHANGE

(See FIG. 6-3, 4)

Initial oil change : After 20 hours of operation  
Thereafter : Every 100 hours of operation

- (1) When changing oil, stop the engine and loosen the drain plug. Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

#### CAUTION

To prevent injury, pay attention to the hot oil.

- (2) Re-install the drain plug before refilling oil.

**Oil capacity : 0.3 liter (0.079 U.S. gal)**  
**(With the engine installed onto rammer)**

- (3) Refer to page 5 for the recommended oil.

- Always use the best grade and clean oil. Contaminated oil, poor quality oil and shortage of oil cause damage to engine or shorten the engine life.

### 5. CLEANING FUEL STRAINER

(See Fig. 6-5)

#### WARNING Flame Prohibited

#### WARNING

Remove the static electricity from your body before refilling the gasoline. Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns. Static electricity can be discharged from the body by touching the metal parts of the unit by hand.

US

- (1) Drain the fuel from the tank.
- (2) Close the fuel valve and remove the fuel strainer.
- (3) After removing dirt and water, wash the fuel strainer with kerosene or gasoline.
- (4) Reinstall securely to prevent leakage.

### 6. CLEANING AIR CLEANER

(See Fig. 6-6)

A dirty air cleaner element will cause starting difficulty, power loss, engine malfunctions, and shorten engine life extremely. Always keep the air cleaner element clean.

#### WARNING Flame Prohibited

Dual Element Type (Urethane Foam and Nonwoven Cloth elements) (See Fig. 6-6)

- Remove the urethane form from the nonwoven cloth element and wash it in the kerosene or diesel fuel. Then saturate it in a mixture of 3 parts kerosene or diesel fuel and 1 part engine oil. Squeeze the element to remove the mixture and install it in position. (See Fig. 6-6-10)
- Wash the element in kerosene and drain off the kerosene. Then saturate it in a mixture of 3 parts kerosene and 1 part engine oil, wring the element to remove the mixture and install. (See Fig. 6-6-2)

#### NOTE

Clean and replace air cleaner elements more often when operating in dusty environments. Replace the element in case that dirt or dust can not be removed and/or that the element is deformed or deteriorated.

## 7. FUEL HOSE REPLACEMENT

(See Fig. 6-7)

### ⚠ WARNING

- Take extreme caution when replacing fuel hose ; gasoline is extremely flammable.
- Remove the static electricity from your body before refilling the gasoline.  
Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns.  
Static electricity can be discharged from the body by touching by hand the metal parts of the unit.

Replace the fuel hose every 2 years.

If fuel leaks from fuel hose, replace the fuel hose immediately.

## 8. CHECKING BOLTS, NUTS AND SCREWS

- Retighten loose bolts and nuts.
- Check for fuel and oil leaks.
- Replace damaged parts with new ones.

## 9. HIGH ALTITUDE ENGINE OPERATION

- Please have an authorized SUBARU Industrial Power Products dealer modify this engine if it is to be run continuously above 5000 feet (1500 meters). Failure to do so, may result in poor engine performance, spark plug fouling, hard starting, and increased emissions.
- Carburetor modification by an authorized SUBARU Industrial Power Products dealer will improve performance and allow that this engine meets EPA (Environmental Protection Agency) emission standards throughout its useful life.
- An engine converted for high altitudes can not be run at 5000 feet or lower. In doing so, the engine will overheat and cause serious engine damage.  
Please have an authorized SUBARU Industrial Power Products dealer restore high altitude modified engines to the original factory specification before operating below 5000 feet.

## 6. PREPARATIONS FOR STORAGE

### 1. DISCHARGE FUEL (See Fig. 7)

The specifications for the fuel tank specifications will differ depending on the rammer body. Read the Instruction manual of the rammer.

### ⚠ WARNING Flame Prohibited

If you do not use the engine more than 1 month, discharge fuel to prevent gum in the fuel system and carburetor parts.

### ⚠ WARNING

- Remove the static electricity from your body before refilling the gasoline.  
Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns.  
Static electricity can be discharged from the body by touching by hand the metal parts of the unit.
- Always store/carry the fuel (gasoline) with metallic portable tank to prevent fire.

- To drain the fuel in the fuel tank, remove the strainer cup and then open the fuel valve and let the fuel drain into a catch pan. When the fuel is completely drained, close the fuel valve.
- For the float carburetor  
To drain the fuel in the carburetor, loosen the drain at the bottom of it.
- For the diaphragm carburetor  
Operate the engine until it runs out of fuel and stops. Then, press the primary pump a few times to completely discharge the fuel from the carburetor.

### 2. ENGINE OIL

- Change the engine oil with fresh oil.
- Remove the spark plug, pour about 5 cc of engine oil into the cylinder, slowly pull the starter handle of the recoil starter 2 or 3 times, and reinstall the spark plug.

### 3. CLEAN AND STORE

- Slowly pull the recoil starter handle until resistance is felt and leave it in that position.
- Clean the engine thoroughly with an oiled cloth, put the cover on, and store the engine indoors in a well ventilated, low humidity area.

US

## 7. EASY TROUBLESHOOTING

### WHEN ENGINE WILL NOT START :

Perform the following checks before you take the engine to your SUBARU Industrial Power Products dealer. If you still have trouble after completing the checks, take the engine to your nearest SUBARU Industrial Power Products dealer.

#### 1. Is there a strong spark across the electrode?

- (1) Is the stop switch at position " | " (ON)?
- (2) Remove and inspect the spark plug.  
If the electrode is fouled, clean or replace it with new one.
- (3) Remove the spark plug and connect it to the plug cap.  
Pull the starter handle while grounding spark plug against engine body. Try with a new spark plug if the spark is weak or there is no spark.  
The ignition system is faulty if there is no spark with a new spark plug.

#### ⚠ WARNING

- Wipe out spilled fuel carefully before testing. Place spark plug as far away from spark plug hole as possible.
- Do not hold spark plug by hand while pulling recoil starter.

#### NOTE

The engine with oil sensor will stop automatically when the oil level falls below the prescribed limit. Unless the oil level is raised above the prescribed limit, the engine will stop immediately after starting.

#### 2. Is there enough compression?

Pull the starter handle slowly and check if resistance is felt. If little force is required to pull the starter handle, check if the spark plug is tightened firmly. If the spark plug is loose, tighten it.

#### 3. Is the spark plug wet with gasoline?

- (1) Is the fuel valve opened?
- (2) Choke (close choke lever) and pull the starter handle five or six times. Remove the plug and check if its electrode is wet. If the electrode is wet, fuel is well supplied to your engine.
- (3) When the electrode is dry, check where the fuel stops. (Check the fuel intake of the carburetor.)
- (4) In case the engine does not start with well supplied fuel, try using fresh fuel.

US

## 8. SPECIFICATIONS

MODEL		EH09-2D	EH10D
Type		Air-cooled,4-cycle,single-cylinder, horizontal shaft,OHV,gasoline engine	
Bore x Stroke	mm (in.)	51 x 42 (2.0 x 1.7)	53 x 44 (2.1 x 1.7)
Piston displacement	mL(cc)	86	97.1
Compression ratio		8.7	9.3
Maximum Output	kW / rpm	2.1 / 4200	2.4 / 4200
Continuous Output	kW / rpm	1.5 / 3600	—
Maximum torque	N·m / rpm	4.9 / 3600	5.7 / 2800
Direction of Rotation		Counter clockwise as viewed from PTO shaft side	
Cooling system		Forced air cooling	
Valve arrangement		Over Head Valve type	
Lubrication		Splashing type	
Lubricant		4-stroke automotive detergent oil - SAE; #20,#30 or 10W-30 API service class; SE or higher (SG, SH or SJ is recommended)	
Oil Capacity	liter (U.S. gal)	0.3 (0.079) [With the engine installed onto rammer]	
Carburetor		Horizontal draft,float type / Diaphragm type	
Fuel		Automotive unleaded gasoline	
Fuel feed		Gravity type	
Method of ignition		Flywheel magneto (solid state)	
Spark Plug		NGK : BMR4A (CHAMPION : RCJ14)	
Starting System		Recoil starter	
Governor		Centrifugal flyweight type	
Air Cleaner system		Semi wet type	
Dry Weight	kg (lb)	10.2 (22.4)	
Dimensions (L x W x H)	mm (in.)	235 x 309 x 341 (9.3 x 12.2 x 13.4)	
Valve Clearance (Intake and Exhaust)	mm (in.)	0.1±0.03 (0.0039±0.0012) Note : Adjust the valve clearance while the engine is cold.	
Emissions Durability Period		300 hours	

Specifications are subject to change without notice



**SUBARU**



# FOREWORD

Thank you very much for purchasing a **ROBIN ENGINE**.

Your **ROBIN ENGINE** can supply the power to operate various sorts of machines and equipment.

Please take a moment to familiarize yourself with the proper operation and maintenance procedures in order to maximize the safe and efficient use of this product.

Keep this owner's manual at hand, so that you can refer to it at any time.

Due to constant efforts to improve our products, certain procedures and specifications are subject to change without notice.

When ordering spare parts, always give us the **MODEL**, **PRODUCTION NUMBER** and **SERIAL NUMBER** of your engine.

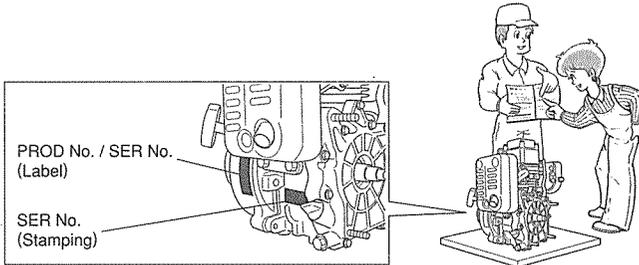
Please fill in the following blanks after checking the production number on your engine.

(Location of label is different depending on the engine specification.)

PROD NO.									

SER NO.				

EN



## NOTICE

The engine which is complied with the emission regulation of USA, Europe, and China has the emission control label placed on the engine according to each country's regulation.

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**NOTE** Please refer to the illustrations on the back page of the front cover or back cover for Fig. ① to ⑦ indicated in the sentence.

# 1. SAFETY PRECAUTIONS

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Please make sure you review each precaution carefully.

Pay special attention to statement preceded by the following words.

**⚠ WARNING** “WARNING” indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

**⚠ CAUTION** “CAUTION” indicates a possibility of personal injury or equipment damage if instructions are not followed.

## **⚠ WARNING** : EXHAUST PRECAUTIONS

- Never inhale exhaust gasses.  
They contain carbon monoxide, a colorless, odorless and extremely dangerous gas which can cause unconsciousness or death.
- Never operate the engine indoors or in a poorly ventilated area, such as tunnel, cave, etc.
- Exercise extreme care when operating the engine near people or animals.
- Keep the exhaust pipe free of foreign objects.



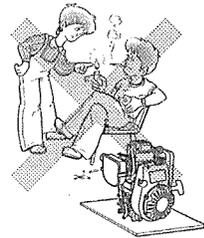
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## **⚠ WARNING** : REFUELING PRECAUTIONS

- Gasoline is extremely flammable and its vapors can explode if ignited.
- Do not refuel indoors or in a poorly ventilated area.
- Be sure to stop the engine prior to refueling.
- Do not remove fuel tank cap nor fill fuel tank while engine is hot or running.  
Allow engine to cool at least 2 minutes before refueling.
- Do not overfill the fuel tank.
- If fuel is spilt, wipe it away carefully and wait until the fuel has dried before starting the engine.
- After refueling, make sure that the fuel cap is secured to prevent spillage.

## **⚠ WARNING** : FIRE PREVENTION

- Do not operate the engine while smoking or near an open flame.
- Do not use around dry brush, twigs, cloth rags, or other flammable materials.
- Keep the engine away from flammables and other hazardous materials (trash, rags, lubricants, explosives).



## **⚠ WARNING : OTHER SAFETY PRECAUTIONS**

### ■ Place the protective covers over the rotating parts.

If rotating parts such as the drive shaft, pulley, belt, etc. are left exposed, they are potentially hazardous. To prevent injury, equip them with protective covers or shrouds.

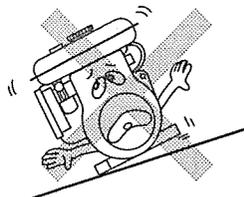
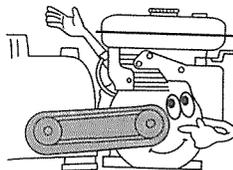
### ■ Be careful of hot parts.

The muffler and other engine parts become very hot while the engine is running or just after it has stopped. Operate the engine in a safe area and keep children away from the running engine.

### ■ Do not touch the spark plug and ignition cable when starting and operating the engine.

### ■ Never make adjustments on the machinery while it is connected to the engine, without first removing the ignition cable from the spark plug. Turning the crankshaft by hand during adjusting or cleaning might start the engine, and cause serious injury to the operator.

### ■ Operate the engine on a stable, level surface. If the engine is tilted, fuel spillage may result.



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## **NOTE**

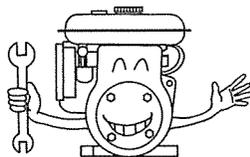
Operating the engine at a steep incline may cause seizure due to improper lubrication even with a maximum oil level.

- Do not transport the engine with fuel in tank or with fuel strainer valve open.
- Do not move the engine while in operation when it has been removed from the equipment.
- Keep the unit dry (do not operate it in rainy conditions).



## **⚠ CAUTION : PRE-OPERATION CHECKS**

- Carefully check fuel hoses and joints for looseness and fuel leakage. Leaked fuel creates a potentially dangerous situation.
- Check bolts and nuts for looseness. A loose bolt or nut may cause serious engine trouble.
- Check the engine oil and refill if necessary.
- Check the fuel level and refill if necessary. Take care not to overfill the tank.
- Keep cylinder fins and recoil starter free of dirt, grass and other debris.
- Wear snug fitting working clothes when operating the engine. Loose aprons, towels, belt, etc., may be caught in the engine or drive train, causing a dangerous situation.



# SYMBOLS

	<i>Read manual.</i>		<i>Shut off fuel valve when the engine is not in use.</i>
	<i>Stay clear of the hot surface.</i>		<i>Check for leakage from hose and fittings.</i>
	<i>Exhaust gas is poisonous. Do not operate in an unventilated room or enclosed area.</i>		<i>Fire, open flame and smoking prohibited.</i>
	<i>Stop the engine before refueling.</i>		<i>HOT, avoid touching the hot area.</i>

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	On (Run)		Engine start (Electric start)		Fuel (gasoline)		Primer
	Off (Stop)		Engine stop		Fuel (diesel)		Push primer
	Engine oil		Cold engine		Fuel shut-off		Do not push primer
	Add oil		Warm engine		Fuel system failure / malfunction	2X	Two times
	Battery		Electrical preheat (Low temperature start aid)		Choke		
	Fast		Run position		Plus ; positive polarity		
	Slow		Stop position		Minus ; negative polarity		

## 2. COMPONENTS

(See Fig. 1)

**NOTE** Please refer to the illustrations on the back page of the front cover or back cover for Fig. 1 to 7 indicated in the sentence.

- ① SPEED CONTROL LEVER
- ② AIR CLEANER
- ③ CHOKE LEVER
- ④ STOP SWITCH
- ⑤ STARTER HANDLE
- ⑥ RECOIL STARTER
- ⑦ CARBURETOR
- ⑧ P.T.O. SHAFT
- ⑨ OIL DRAIN PLUG
- ⑩ OIL GAUGE (OIL FILLER)
- ⑪ ENGINE SERIAL NO. (STAMPING)
- ⑫ ENGINE NAME LABEL (SPEC. NO.)
- ⑬ EXHAUST OUTLET
- ⑭ MUFFLER COVER
- ⑮ SPARK PLUG

### 3. PRE-OPERATION CHECKS

#### NOTE

Engine shipped from our factory is without oil. Before starting engine, fill with oil. Do not over-fill.

#### 1. CHECK ENGINE OIL (See Fig. ②)

Before checking or refilling engine oil, be sure the rammer with engine stopped is located on stable and level surface in the upright position.

- Remove the oil gauge and check the oil level. Do not screw the oil gauge into the oil filler neck to check oil level. If the oil level is low, refill to the upper level with the following recommended oil.
- Use 4-stroke automotive detergent oil of API service class SE or higher grade. (SG, SH or SJ is recommended)
- Select the viscosity based on the air temperature at the time of operation as shown in the table. (See Fig. ②-①)

**Oil capacity : 0.3 liter  
(With the engine installed onto rammer)**

**Explanation of Fig. ②-②**

- ① OIL GAUGE
- ② UPPER LEVEL    ③ LOWER LEVEL

#### 2. CHECK FUEL

#### ⚠ WARNING

- Do not refuel while smoking, near an open flame or other such potential fire hazards. Otherwise fire accident may occur.
- Remove the static electricity from your body before refilling the gasoline. Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns. Static electricity can be discharged from the body by touching by hand the metal parts of the unit and the fuel dispensing pump.
- Make sure the engine is cooled down enough after engine is stopped.
- Use unleaded automotive gasoline only.
  - Unleaded regular/premium or reformulated gasoline containing no more than 10% Ethanol (E10), or 15% MTBE may also be used.
  - Never use gasoline containing ethanol exceeding 10%, or MTBE exceeding 15% because engine or fuel system damage could result.
  - Never use stale or contaminated gasoline.
  - Use of these non-recommended fuels may result in reduced performance and/or denial of warranty.
- Wipe off any spilled fuel before starting the engine.

### 4. OPERATING YOUR ENGINE

(See Fig. ③)

The specifications for the fuel valve, speed switch and speed control lever may differ depending on the rammer body.

#### 1. STARTING

- (1) Open the fuel valve. (See Fig. ③-①)
  - ① OPEN    ② CLOSE
- (2) Turn the STOP SWITCH to the position " | " (ON). (See Fig. ③-②)
  - ① ON    ② OFF
- (3) Close the choke lever.
  - FLOAT Type** (See Fig. ③-③-Ⓐ)
  - DIAPHRAGM Type** (See Fig. ③-③-Ⓑ)
  - ① CLOSE    ② OPEN

- If the engine is cold or the ambient temperature is low, close the choke lever fully.
- If the engine is warm or the ambient temperature is high, open the choke lever half-way, or keep it fully open.
- For the diaphragm type, press the primer pump on the carburetor casing a few times to circulate the fuel to the carburetor.

- (4) Pull the starter handle slowly until resistance is felt. This is the "compression" point. Return the handle to its original position and pull swiftly. Do not pull out the rope all the way. After starting the engine, allow the starter handle to return to its original position while still holding the handle. (See Fig. ③-④)
- (5) After starting the engine, gradually open choke by turning the choke lever and finally keep it fully opened. Do not fully open the choke lever immediately when the engine is cold or the ambient temperature is low, because the engine may stop. (See Fig. ③-⑤)
  - FLOAT Type** (See Fig. ③-⑤-Ⓐ)
  - DIAPHRAGM Type** (See Fig. ③-⑤-Ⓑ)
  - ① CLOSE    ② OPEN

#### 2. RUNNING

- (1) After the engine starts, set the speed control lever at ② (low speed) position and warm it up without load for a few minutes. (See Fig. ④-①)
- (2) Gradually move the speed control lever toward ③ (high speed) position and set it at the required engine speed. (See Fig. ④-②)
  - Whenever high speed operation is not required, slow the engine down (idle) by moving the speed control lever toward ② (low speed) position to save fuel and extend engine life.

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### 3. STOPPING

- (1) Set the speed control lever at ② (low speed) position and allow the engine to run at low speed for 1 or 2 minutes before stopping. (See Fig. ⑤-①)
- (2) Turn the STOP SWITCH counterclock-wise to the position "O" (OFF). (See Fig. ⑤-②)
- (3) Close the fuel valve. (See Fig. ⑤-③)
- (4) Pull the starter handle slowly and return the handle to its original position when resistance is felt. This operation is necessary to prevent outside moist air from intruding into the combustion chamber. (See Fig. ⑤-④)

#### ※ STOPPING ENGINE WITH THE FUEL VALVE

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Close the fuel valve and wait for a while until the engine stops.  
 Avoid to let the fuel remain in the carburetor over long periods, or the passages of the carburetor may become clogged with impurities, and malfunctions may result.

### 5. MAINTENANCE

#### (See Fig. ⑥)

The specifications for the fuel strainer, air cleaners, fuel pipes and so forth may differ depending on the rammer casing.  
 Read the instruction manual for the rammer body.

#### 1. DAILY INSPECTION (SEE FIG. ⑥-①)

Before running the engine, check the following service items.

- ① LOOSE OR BROKEN BOLTS AND NUTS
- ② CLEAN AIR CLEANER ELEMENT
- ③ ENOUGH CLEAN ENGINE OIL
- ④ LEAKAGE OF GASOLINE AND ENGINE OIL
- ⑤ ENOUGH GASOLINE
- ⑥ SAFE SURROUNDINGS
- ⑦ EXCESSIVE VIBRATION, NOISE

#### 2. PERIODIC INSPECTION

Periodic maintenance is vital to the safe and efficient operation of your engine.  
 Check the table below for periodic maintenance intervals.

Should the engine be operated in extremely dusty condition or in heavier loading condition, the maintenance intervals must be shortened depending on the contamination of oil, clogging of filter elements, wear of parts, and so on.

Maintenance Items	Every 8 hours (Daily)	Every 50 hours (Weekly)	Every 200 hours (Monthly)	Every 500 hours	Every 1000 hours
Clean engine and check bolts and nuts	● (Daily)				
Check for leakage from hoses and fitting	● (Daily)				
Check and refill engine oil	● (Refill daily up to upper level)				
Change engine oil	● (Initial 20 hours)	● (Every 100 hours)			
Clean spark plug		●			
Clean air cleaner		●			
Replace air cleaner element			●		
Clean fuel strainer			●		
Clean and adjust spark plug and electrodes			●		
Replace spark plug				●	
Check and adjust valve clearance				●	
Remove carbon from cylinder head				●	
Clean and adjust carburetor				●	
Replace fuel lines					● (Every 2 years)
Overhaul engine if necessary					●

### 3. INSPECTING THE SPARK PLUG

(See FIG. 6-2)

- (1) Clean off carbon deposits on the spark plug electrode using a plug cleaner or wire brush.
- (2) Check electrode gap. The gap should be 0.6 mm to 0.7 mm. Adjust the gap, if necessary, by carefully bending the side electrode.

Recommended Spark Plug : NGK : BMR4A  
(CHAMPION : RCJ14)

### 4. ENGINE OIL CHANGE

(See FIG. 6-3, 4)

Initial oil change : After 20 hours of operation  
Thereafter : Every 100 hours of operation

- (1) When changing oil, stop the engine and loosen the drain plug. Drain the used oil while the engine is warm. Warm oil drains quickly and completely.

#### ⚠ CAUTION

To prevent injury, pay attention to the hot oil.

- (2) Re-install the drain plug before refilling oil.  
**Oil capacity : 0.3 liter**  
**(With the engine installed onto rammer)**
- (3) Refer to page 5 for the recommended oil.
  - Always use the best grade and clean oil. Contaminated oil, poor quality oil and shortage of oil cause damage to engine or shorten the engine life.

### 5. CLEANING FUEL STRAINER

(See Fig. 6-5)

⚠ WARNING Flame Prohibited

#### ⚠ WARNING

Remove the static electricity from your body before refilling the gasoline. Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns. Static electricity can be discharged from the body by touching the metal parts of the unit by hand.

- (1) Drain the fuel from the tank.
- (2) Close the fuel valve and remove the fuel strainer.
- (3) After removing dirt and water, wash the fuel strainer with kerosene or gasoline.
- (4) Reinstall securely to prevent leakage.

### 6. CLEANING AIR CLEANER

(See Fig. 6-6)

A dirty air cleaner element will cause starting difficulty, power loss, engine malfunctions, and shorten engine life extremely. Always keep the air cleaner element clean.

⚠ WARNING Flame Prohibited

Dual Element Type (Urethane Foam and Nonwoven Cloth elements) (See Fig. 6-6)

- Remove the urethane foam from the nonwoven cloth element and wash it in the kerosene or diesel fuel. Then saturate it in a mixture of 3 parts kerosene or diesel fuel and 1 part engine oil. Squeeze the element to remove the mixture and install it in position. (See Fig. 6-6-1)
- Wash the element in kerosene and drain off the kerosene. Then saturate it in a mixture of 3 parts kerosene and 1 part engine oil, wring the element to remove the mixture and install. (See Fig. 6-6-2)

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#### NOTE

Clean and replace air cleaner elements more often when operating in dusty environments. Replace the element in case that dirt or dust can not be removed and/or that the element is deformed or deteriorated.

### 7. FUEL HOSE REPLACEMENT

(See Fig. 6-7)

#### ⚠ WARNING

- Take extreme caution when replacing fuel hose ; gasoline is extremely flammable.
- Remove the static electricity from your body before refilling the gasoline. Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns. Static electricity can be discharged from the body by touching by hand the metal parts of the unit.

Replace the fuel hose every 2 years. If fuel leaks from fuel hose, replace the fuel hose immediately.

### 8. CHECKING BOLTS, NUTS AND SCREWS

- Retighten loose bolts and nuts.
- Check for fuel and oil leaks.
- Replace damaged parts with new ones.

## 6. PREPARATIONS FOR STORAGE

### 1. DISCHARGE FUEL (See Fig.7)

The specifications for the fuel tank specifications will differ depending on the rammer body. Read the instruction manual of the rammer.

#### **⚠ WARNING Flame Prohibited**

If you do not use the engine more than 1 month, discharge fuel to prevent gum in the fuel system and carburetor parts.

#### **⚠ WARNING**

- **Remove the static electricity from your body before refilling the gasoline. Sparking from electrostatic discharge may cause the ignition to the vaporized fuel (gasoline) resulting burns. Static electricity can be discharged from the body by touching by hand the metal parts of the unit.**
- **Always store/carry the fuel (gasoline) with metallic portable tank to prevent fire.**

- To drain the fuel in the fuel tank, remove the strainer cup and then open the fuel valve and let the fuel drain into a catch pan. When the fuel is completely drained, close the fuel valve.
- For the float carburetor  
To drain the fuel in the carburetor, loosen the drain at the bottom of it.
- For the diaphragm carburetor  
Operate the engine until it runs out of fuel and stops. Then, press the primary pump a few times to completely discharge the fuel from the carburetor.

### 2. ENGINE OIL

- Change the engine oil with fresh oil.
- Remove the spark plug, pour about 5 cc of engine oil into the cylinder, slowly pull the starter handle of the recoil starter 2 or 3 times, and reinstall the spark plug.

### 3. CLEAN AND STORE

- Slowly pull the recoil starter handle until resistance is felt and leave it in that position.
- Clean the engine thoroughly with an oiled cloth, put the cover on, and store the engine indoors in a well ventilated, low humidity area.

## 7. EASY TROUBLESHOOTING

### WHEN ENGINE WILL NOT START :

Perform the following checks before you take the engine to your Robin dealer.  
If you still have trouble after completing the checks, take the engine to your nearest Robin dealer.

#### 1. Is there a strong spark across the electrode ?

- (1) Is the stop switch at position " I " (ON)?
- (2) Remove and inspect the spark plug.  
If the electrode is fouled, clean or replace it with new one.
- (3) Remove the spark plug and connect it to the plug cap.  
Pull the starter handle while grounding spark plug against engine body.  
Try with a new spark plug if the spark is weak or there is no spark.  
The ignition system is faulty if there is no spark with a new spark plug.

#### **⚠ WARNING**

- **Wipe out spilled fuel carefully before testing. Place spark plug as far away from spark plug hole as possible.**
- **Do not hold spark plug by hand while pulling recoil starter.**

#### **NOTE**

The engine with oil sensor will stop automatically when the oil level falls below the prescribed limit. Unless the oil level is raised above the prescribed limit, the engine will stop immediately after starting.

#### 2. Is there enough compression?

Pull the starter handle slowly and check if resistance is felt. If little force is required to pull the starter handle, check if the spark plug is tightened firmly. If the spark plug is loose, tighten it.

#### 3. Is the spark plug wet with gasoline?

- (1) Is the fuel valve opened?
- (2) Choke (close choke lever) and pull the starter handle five or six times.  
Remove the plug and check if its electrode is wet. If the electrode is wet, fuel is well supplied to your engine.
- (3) When the electrode is dry, check where the fuel stops. (Check the fuel intake of the carburetor.)
- (4) In case the engine does not start with well supplied fuel, try using fresh fuel.

## 8. SPECIFICATIONS

MODEL		EH09-2D	EH10D
Type		Air-cooled,4-cycle,single-cylinder, horizontal shaft,OHV,gasoline engine	
Bore x Stroke	mm	51 x 42	53 x 44
Piston displacement	mL(cc)	86	97.1
Compression ratio		8.7	9.3
Maximum Output	kW / rpm	2.1 / 4200	2.4 / 4200
Continuous Output	kW / rpm	1.5 / 3600	—
Maximum torque	N·m / rpm	4.9 / 3600	5.7 / 2800
Direction of Rotation		Counter clockwise as viewed from PTO shaft side	
Cooling system		Forced air cooling	
Valve arrangement		Over Head Valve type	
Lubrication		Splashing type	
Lubricant		4-stroke automotive detergent oil - SAE; #20,#30 or 10W-30 API service class; SE or higher (SG, SH or SJ is recommended)	
Oil Capacity	liter	0.3 (With the engine installed onto rammer)	
Carburetor		Horizontal draft,float type / Diaphragm type	
Fuel		Automotive unleaded gasoline	
Fuel feed		Gravity type	
Method of ignition		Flywheel magneto (solid state)	
Spark Plug		NGK : BMR4A (CHAMPION : RCJ14)	
Starting System		Recoil starter	
Governor		Centrifugal flyweight type	
Air Cleaner system		Semi wet type	
Dry Weight	kg	10.2	
Dimensions (L x W x H)	mm	235 x 309 x 341	

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Specifications are subject to change without notice



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