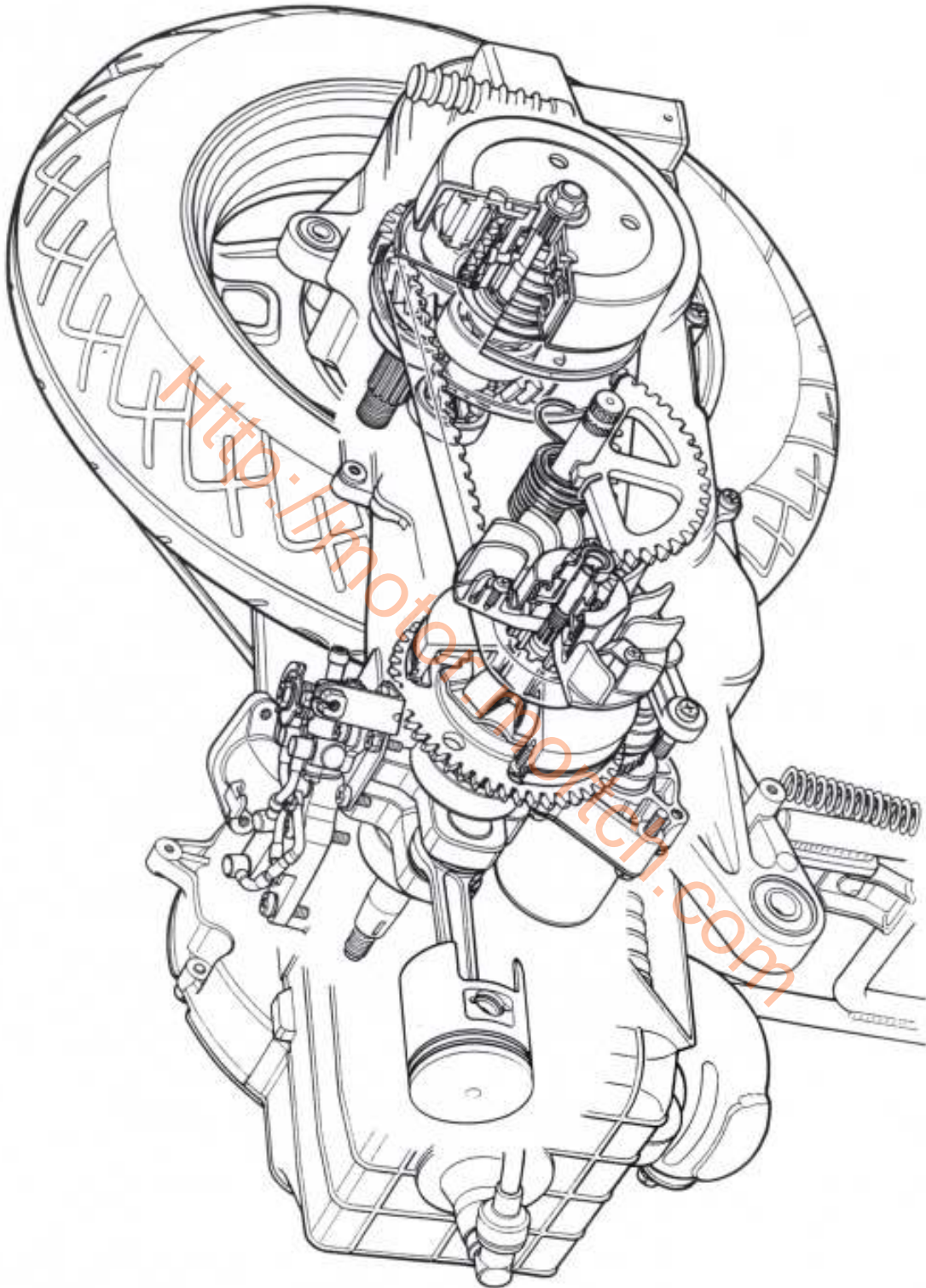


# Service and Maintenance Manual

2 STROKE 50cc  
1E40QMB  
[Http://motor.mortch.com](http://motor.mortch.com)



## Cylinder head nuts and exhaust pipe bolts

Tighten at initially 1000 km (600 miles, 2 months), and every 6000 km (4000 miles, 12 months)

If cylinder head nuts are not tightened to the specified torque, may result in leakage of compressed fuel-air mixture and reduce output, tighten the cylinder head nuts in the following procedures:

1. Remove the frame lower covers.
2. Remove the cylinder head cover bolt.
3. Remove spark plug cap.
4. Tighten the nuts evenly one by one to their specified torque. Tighten the nuts in the order indicated.

### Tightening torque:

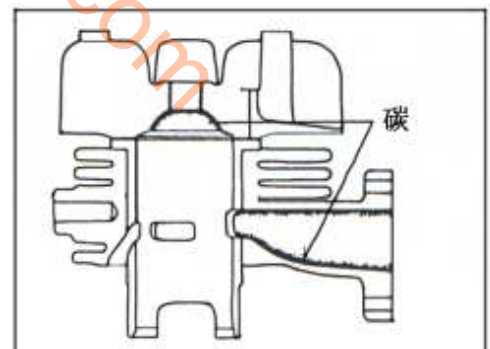
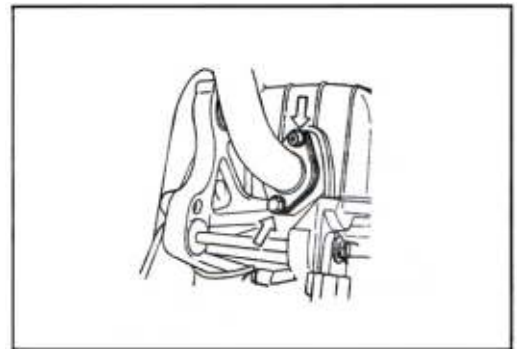
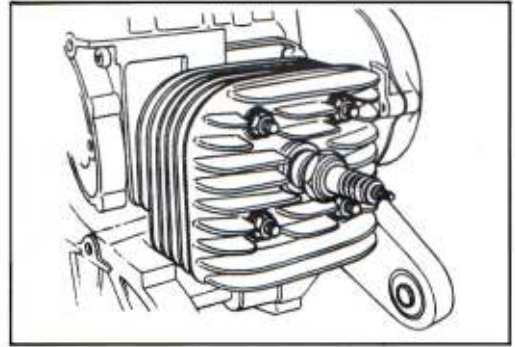
Cylinder head nut: 15-18N.m

Exhaust pipe bolt: 15-18N.m

## Cylinder and cylinder head

Remove carbon every 6000 km (4000 miles, 12 months)

Carbon deposits in the combustion chamber and the cylinder head will raise the compression ratio and may cause preignition and overheating. Carbon deposited at the exhaust port of the cylinder will prevent the flow of exhaust gases, reducing the output. Remove carbon deposits periodically.



## SPARK PLUG

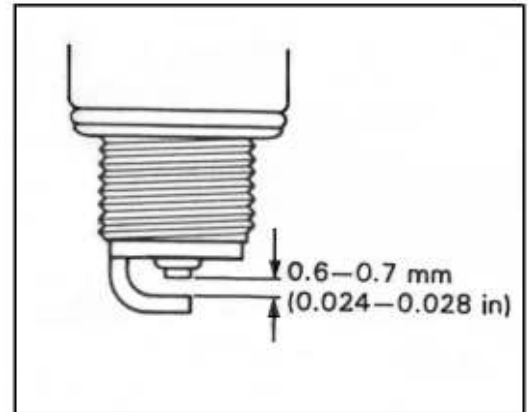
Neglecting the spark plug maintenance eventually leads to difficult starting and poor performance. If the spark plug is used for a long time, the electrode gradually burns away and carbon builds up along the inside part. In accordance with the periodic table, the plug should be removed for inspection, cleaning and to reset the gap.

- Carbon deposits on the spark plug will prevent good sparking and cause misfiring. Clean the deposits off periodically.
- If the center electrode is fairly worn down, the plug should be replaced and the plug gap set to the specified gap using a thickness gauge.

### Thickness gauge

Spark plug gap: 0.6-0.7 mm (0.024-0.028 inch)

Check the spark plug for burnt condition. If abnormal replace the spark plug as indicated in the chart.



NGK	TROCH	REMARKS
BPR7HS	E8RTC	If the standard plug is apt to get wet, replace with the plug.
BPR8HS	E7RTC	Standard
BPR9HS	E6RTC	If the standard plug is apt to overheat, replace with the plug.

- Tighten the spark plug to the specified torque.

### Spark plug

**Tightening torque: 15-18N.m**

### NOTE:

- To check the spark plug, first make sure that the fuel used is unleaded gasoline, and if plug is either sooty with carbon or burnt white, replace it.
- Confirm the thread size and reach when replacing the plug.

### FUEL LINE

Inspect at initially 1000 km (600 miles, 2 months) and every 6000 km (4000 miles, 12 months), replace every 4 years.

## ENGINE

### CONTENS

Engine components removal with the engine in place

Engine removal and remounting

Engine removal

Engine remounting

Engine disassembly

Engine components inspection and servicing

Bearings

Oil seals

crankshaft

automatic clutch inspection

cylinder head

cylinder

piston

reed valve

engine remounting

oil seals

bearings

bushings

crankshaft

crankcase

rear axle shaft

transmission

starter pinion and starter gear

Movable driven and clutch

Movable drive

Kicking starter

Piston

Oil pump and oil pump driven gear

Intake pipe

Magneto

[Http://motor.mortch.com](http://motor.mortch.com)

**Engine components removable with the engine in place**

The parts listed below can be removed and reinstalled without removing the engine from the frame.

**Engine left side**

Kicking starter lever

Clutch brake pad kit

Driver left face

V-belt

Driver belt right face

**Electric starter gear**

Super clutch

Driven face

**Engine center**

Carburetor

Intake pipe

Reed valve

Oil pump

Worm wheel

Cylinder head

Cylinder

Piston

**engine right side**

cooling fan

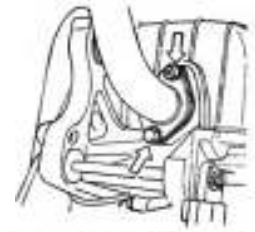
Magneto

Starter motor

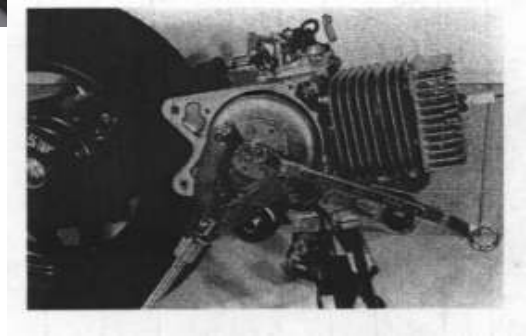
[Http://motor.mortch.com](http://motor.mortch.com)

## ENGINE ASSY.

- Remove the muffler
- Remove cooling fan cover
- Remove cylinder cover
- Remove cooling fan



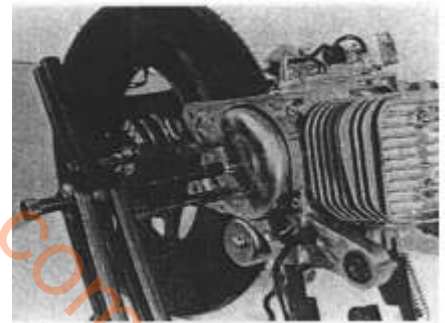
- Remove magneto nut with special tools.



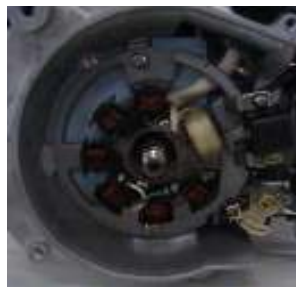
- remove magneto rotor and half circle key with special tools.



- remove magneto stator and paper gasket



- remove oil pump



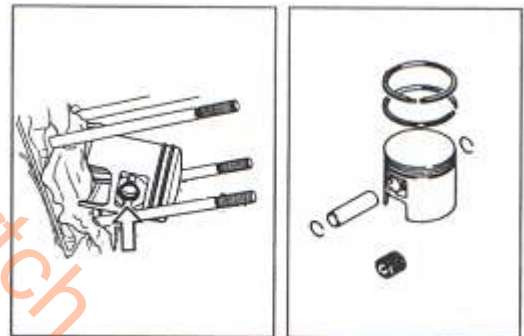
Remove worm wheel and oil seal press board



- remove cylinder head and cylinder



- Place a cloth stopper beneath the piston and remove the circlip with a plier.
- remove the piston pin and piston.
- 



- Remove the kick starter lever.
- Remove side cover



- Remove movable ratchet wheel and clip

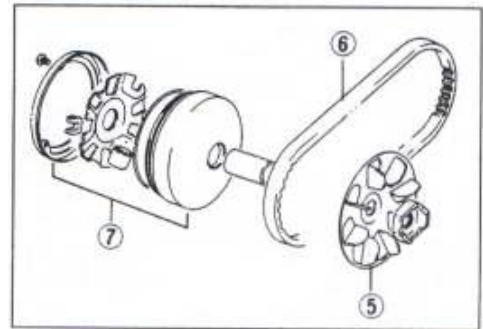




- Remove starting driven ratchet wheel by removing the nuts.



- Remove fan⑤ and V-belt⑥.
- Disassemble the movable drive face⑦.



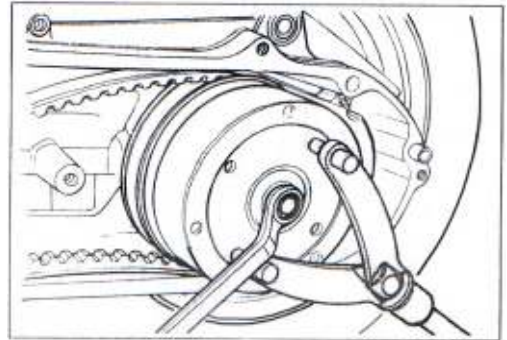
- Remove electric gear press board, electric gear And super clutch



- Remove starter motor



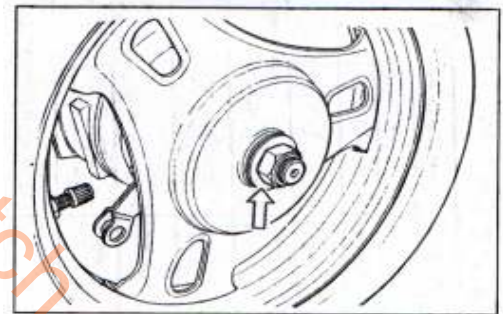
- Remove the clutch housing with the special tool.



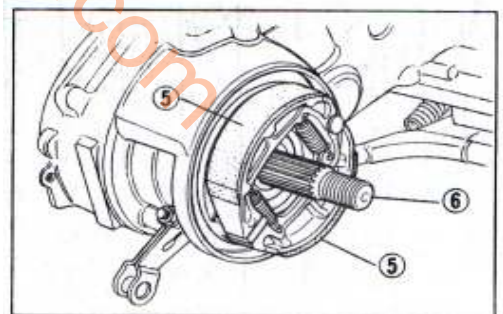
- drain gear oil



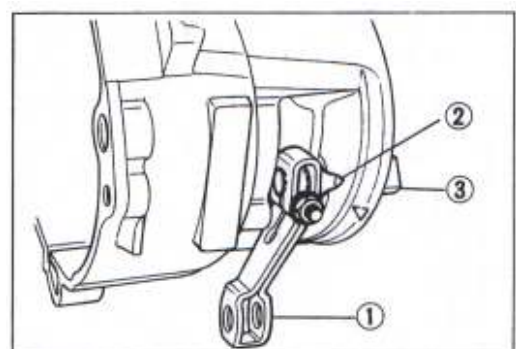
- remove rear axle nut
- remove rear wheel



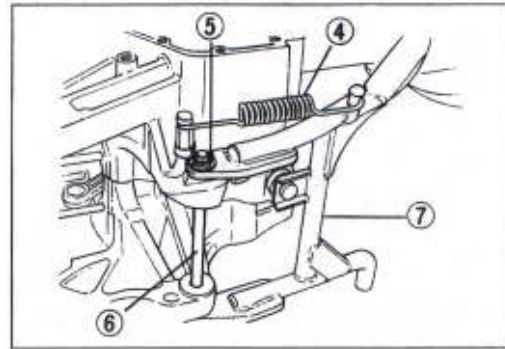
- remove brake shoe⑤ and rear axle⑥。



- Remove the rear brake cam lever①, indicator plate② and camshaft③.



- remove spring④
- remove cotter pin⑤ and shaft⑥
- remove main stand⑦



- remove gearcase cover



- Remove paper gasket① and middle gear assy.②,  
Remove output gear assy.③



- remove carburetor

- remove intake pipe



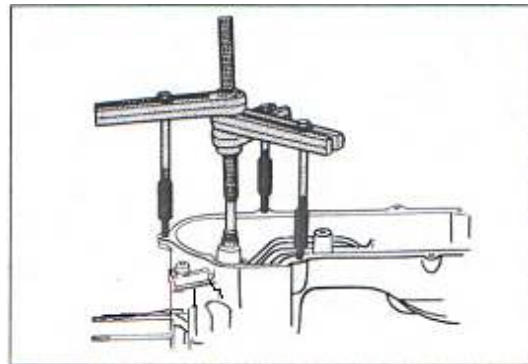
- remove reed valve and paper gasket.



- Remove crankcase fixing shaft



- disassemble crankcase with special tools



- Remove crankcase with special tools

- Remove crankshaft bearing with special tools

**Sliding shaft**

**Warning: use a new sliding shaft.**

## Unscrew clutch shoe nut with special tools.

- Remove the nut while holding down clutch shoe assy. by both hands as shown in the illustration.

**WARNING:** Gradually back off the clutch shoe assy. pressed down by hands to counter the clutch spring load. Releasing the hand suddenly may cause the following parts to fly apart.

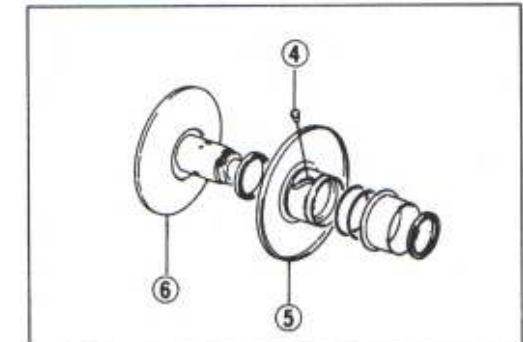
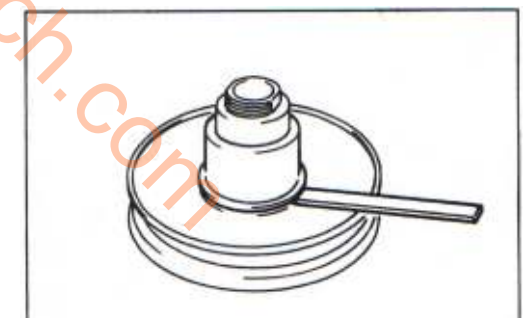
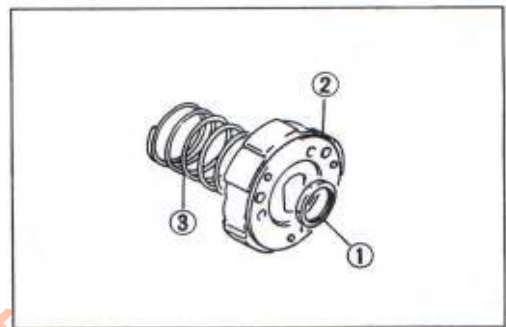
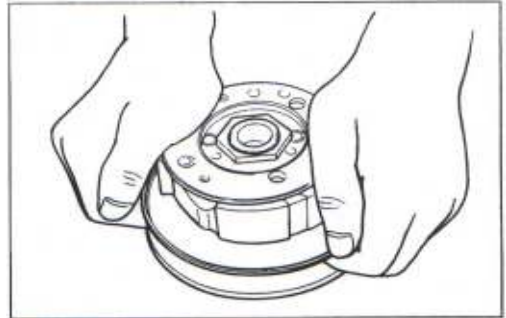
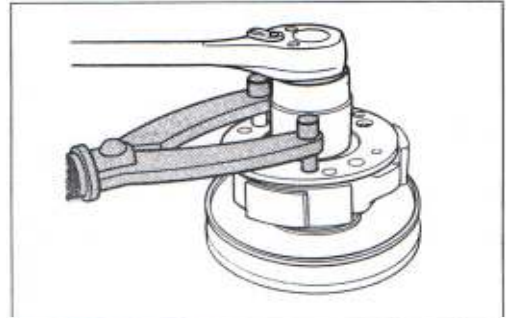
- ① nut
- ② clutch shoe
- ③ spring

## CAUTION:

**Do not attempt to disassemble the clutch shoe assy. Otherwise the clutch shoe may be damaged.**

- Using a screwdriver or the like, pry up the movable driven face spring guide.

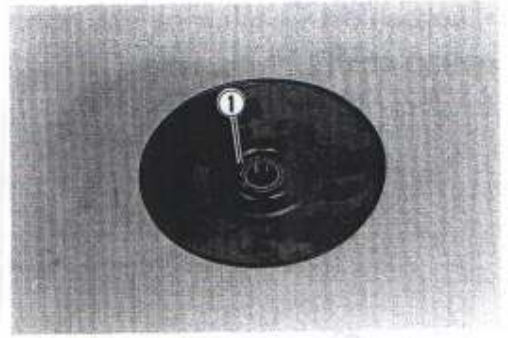
- Remove the pins④, movable driven face⑤ and fixed driven face⑥.



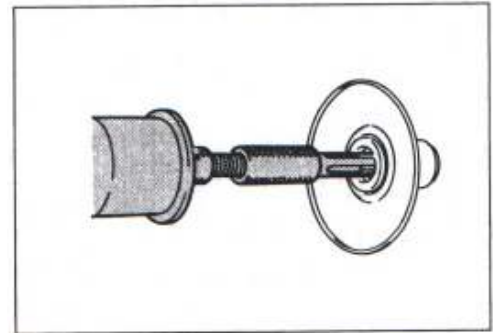
**Remove circlip**

- Remove bearing with special tool.

**CAUTION:** Replace the removed bearing with a new one.



- Remove bearing with special tool.



**CAUTION:** Replace the removed bearing with a new one.

- Remove the spacer

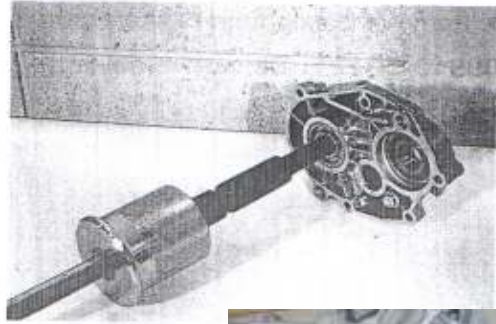


Remove the oil seal from the gearcase cover with the speical tool.

**CAUTION:** Replace the removed oil seal with a new one.



- Remove gearcase cover bearing with special tool



Remove left crankcase oil seal

- do it with special tool

**warning: use a new oil seal**

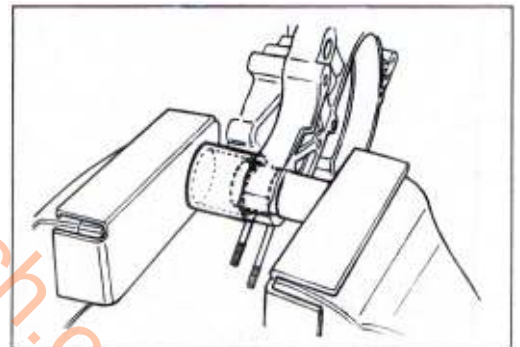


- remove left crankcase bearing with special tool

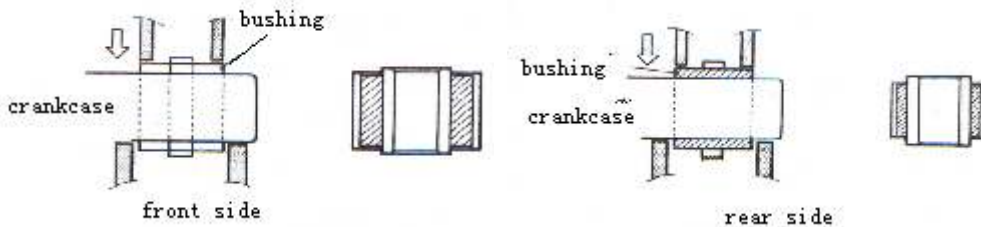
**warning: use a new one**

- remove left crankcase shock absorber bushing with special tool

**warning: use a new bushing**



wrap the oil seal with two appropriate size of sheet irons and clamp it, shown as fig.



- Remove right crankcase oil seal with special tool

**Warning: use a new oil seal**



- remove right crankcase bearing  
**sliding bearing**

**warning: use a new bearing**



[Http://motor.mortch.com](http://motor.mortch.com)

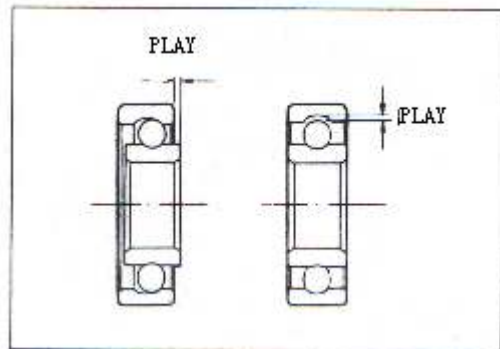


## ENGINE COMPONENTS INSPECTION AND SERVICING

### BEARINGS

Clear bears with solvent and lubricate with engine oil before inspecting.

Turn the inner ring and check to see that the inner rieng turns smoothly. If it does not turn lightly, quietly and smoothly, or if noise is heard, the bearing is defective and must be replaced with a new one.



### OIL SEAL

Damage to the lip of the oil seal may result in leakage of the fuel-air mixture or oil.

Inspect for damage and be sure to replace the damaged seal if found.



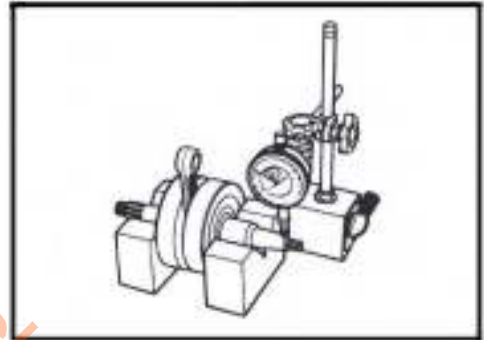
### CRANKSHAFT

#### CRANKSHAFT RUNOUT

Support crankshaft by “V” block, with the dial gauge rigged to read the runout as shown.

**Service limit: 0.05mm(0.002in)**

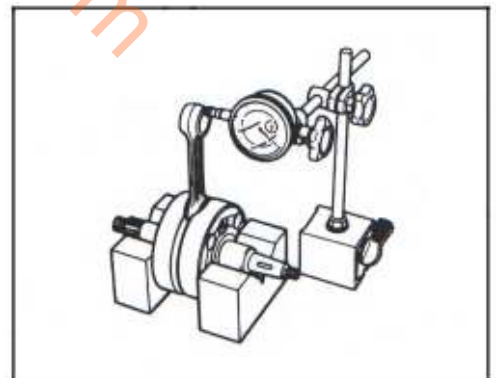
Excessive crankshaft runout is often responsible for abnormal engine vibration. Such vibration shortens engine life.



#### Condition of big end bearing

Turn the crankshaft with the connecting rod to feel the smoothness of rotary motion in the big end. Move the rod up and down while holding the crankshaft rigidly to be sure that there is no rattle in the big end.

Wear on the big end of the connecting rod can be estimated by checking the movement of the small end of the rod. The method can also check the extent of wear on the parts of the connecting rod 's big end. If wear exceeds the limit, replace connecting rod, crank pin and crank pin bearing.



**Service limit: 3.0mm(0.12in)**

## Connecting rod small end inside diameter

Measure the connecting rod small end diameter with a caliper gauge.

Service limit: 14.040mm

## Automatic clutch inspection

The scooter is equipped with an automatic clutch and variable ratio belt drive transmission. The engagement of the clutch is governed by engine RMPS and centrifugal mechanism located in the clutch.

To insure proper performance and long lifespan of the clutch, it is essential that the clutch engages smoothly and gradually. Two inspection checks must be performed to thoroughly check the operation of the drivetrain. Follow the procedures listed.

### 1. Inspect initial engagement

Warm up the scooter to normal operating temperature.

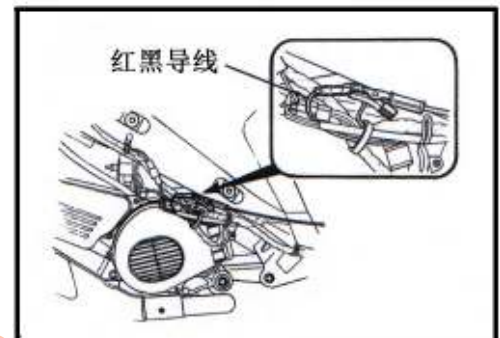
Remove the right frame side cover.

Connect an electric tachmeter to the connecting portion of the magneto lead wire (black with red tracer).

Seated on the scooter with the scooter on level ground, increase the engine RPMs slowly and note the RPM at which the scooter begins to move forward.

Tachometer

Standard	2900r/min
tolerance	± 300r/min



### 2. Clutch "LOCK-UP" inspection

Perform the inspection to determine if the clutch is engaging fully and not slipping.

Warm the engine to normal operating temperatures.

Connect the electric tachomter to the magneto lead wire.

Apply the rer brake as firm as possible.

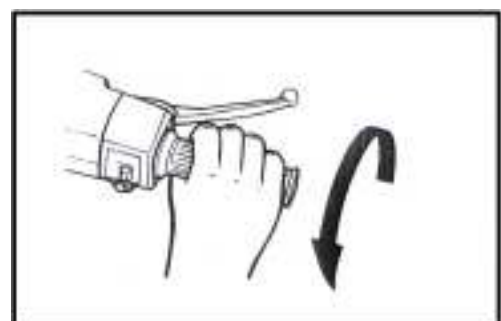
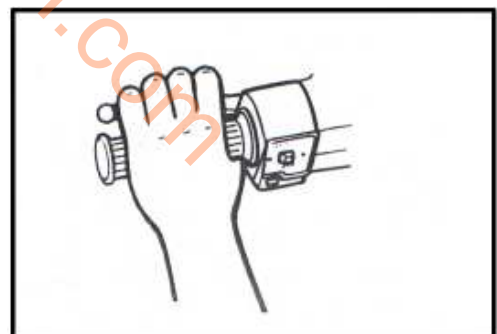
Briefly open the throttle fully and note the maximum engine RPMs sustained during the test cycle.

**CAUTION:**

Do not apply full power for more than 10 seconds or damage to the clutch or engine may occur.

LOCK-UP R/MIN

Standard	5800r/min
Tolerance	± 400r/min



If the engine R/MIN doesn't coincide with the specified r/min range, then disassemble the clutch.

Clutch shoe---inspect the shoes visually for chips, cracking, uneven wear and burning, and check the thickness of the shoes with vernier calipers. If the thickness is less than the following service limit, replace them as a set.

Clutch springs ----visually inspect the clutch springs for stretched coils or broken coils.

Service limit: 2.0mm(0.08in)

**CAUTION :** clutch shoes or springs must bechanged as a set and never individually.

Clutch wheel—inspect visually the condition of the inner clutch wheel surface for scrolling, cracks, or uneven wear. Measure inside diameter of the clutch wheel with inside calipers. Measure the diameter at several points to check for an out-of-round condition as well as wear.

Service limit: 110.50mm(4.350in)



测量离合器盘的内径

## DRIVE BELT

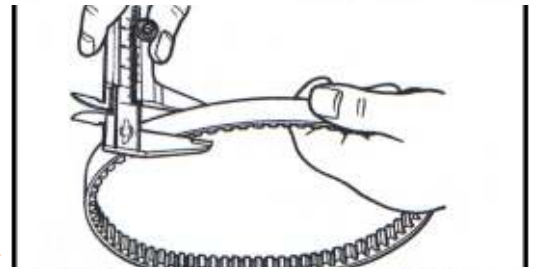
Remove the drive belt and check for cracks, wear and separation. Measure the drive belt width with a vernier calipers. Replace it if the belt width is less than the service limit or and defect has been found.

Service limit: 16.0mm(0.630in)

**CAUTION;** Always keep the drive belt away from any geasy matter.

## Drive face

Inspect the belt contact surface of the dirve faces for wear, scratches or any abnormality . if there is something unusual, replace the drive face with a new one.



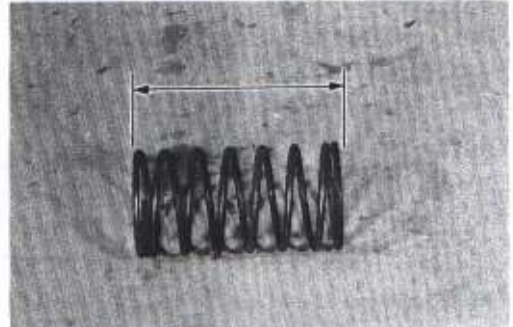
### Roller and sliding surface

Inspect each roller and sliding surface for wear or damage.



### Driving face spring

Measure the free distance of the driven face spring. If the length is shorter than the service limit, replace the spring with a new one.  
service limit: **104.5mm(4.11in)**



### Driven face pin and oil seal

Turn the driven face and check to see that the driven faces turn smoothly. If any stickiness or hitches are found, visually inspect the lip of oil seal, driven face sliding surface and sliding pins for wear or damage.

#### Driven face

inspect the belt contacting surface of both driven faces for any scratches, wear and damage.

Replace driven face with a new one if there are any abnormality.



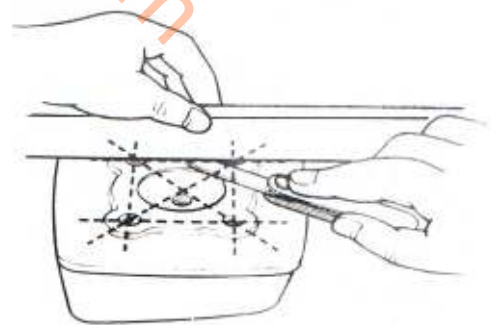
### Cylinder head

Decarbon the combustion chamber.

Check the surface of the cylinder head as shown in the illustration for distortion with a straightedge and thickness gauge, taking a clearance reading at several places.



service limit: **0.05mm(0.002in)**



If the largest reading at any portion of the straightedge exceeds the limit, rework the surface by rubbing it against emery paper laid flat on the surface plate in a lapping manner. The surface must be smooth and perfectly flat in order to secure a tight joint: a leaky joint can be the cause of reduced power output and increased fuel consumption.

## CYLINDER

Decarbon exhaust port and upper part of the cylinder, taking care not to damage the cylinder wall surface. The wear of the cylinder wall is determined from diameter reading taken at 20mm from the top of the cylinder with a cylinder gauge. If the wear thus determined exceeds the limit indicated below, rework the bore to the next oversize by using a boring machine or replace the cylinder with a new one. Oversize pistons are available in two sizes: 0.5mm and 1.0mm.

(cylinder gauge)

**service limit: 40.075mm(1.5778in)**

after reworking the bore to an oversize, be sure to chamfer the edges of ports and smooth the chamfered edges with emery paper. To chamfer, use a scraper, taking care not to nick the wall surface.

### NOTE:

Minor surface flaws on the cylinder wall due to seizure or similar abnormalities can be corrected by grinding the flaws off with fine-grain emery paper. If the flaws are deep grooves or otherwise persist, the cylinder must be reworked with a boring machine to the next oversize.

## PISTON

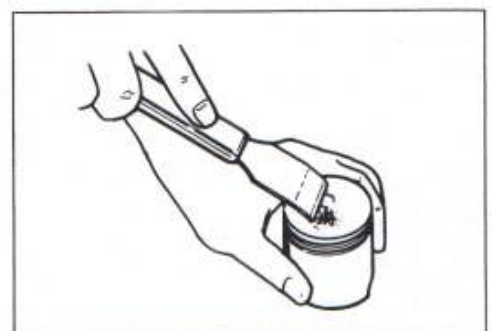
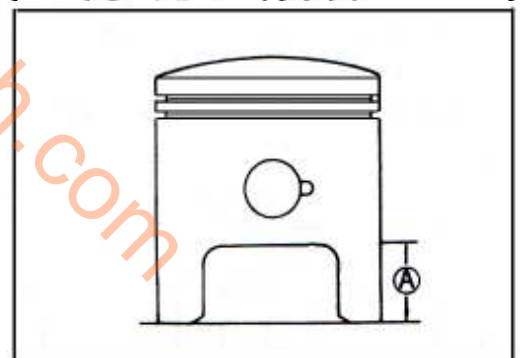
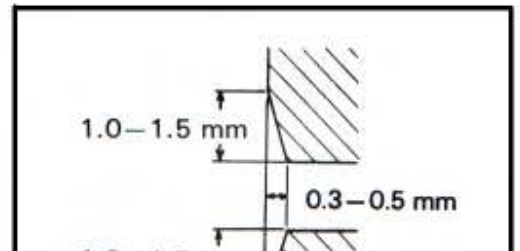
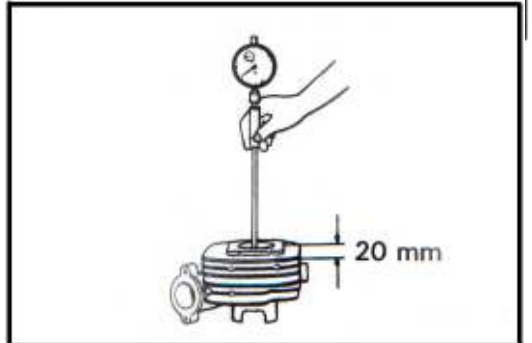
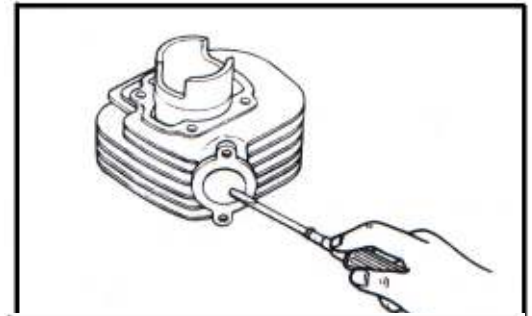
### cylinder and piston clearance

cylinder -piston clearance is the difference between piston diameter and cylinder bore diameter. Be sure to take the measured diameter at right angles to the piston pin. The value of elevation  $\text{A}$  is prescribed to be 20mm from the skirt end.

(micrometer)

**service limit: 39.885mm(1.5703in)**

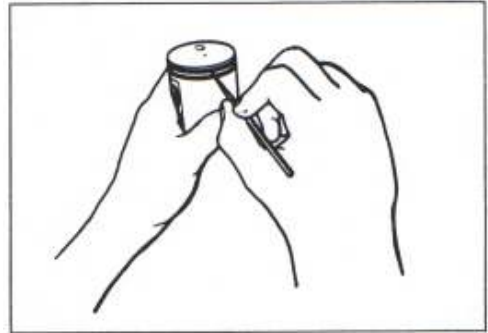
As a result of the above measurement, if the piston-to-cylinder clearance exceeds the following limit, overhaul the cylinder and use an oversize piston, replace both cylinder and piston. The measurement for the bore diameter should



be taken in the intake-to-exhaust port direction and at 20mm from the cylinder top surface.

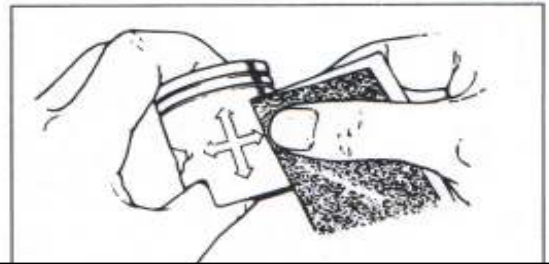
Unit: mm

	Standard	service limit
Cylinder	40.005-40.020	40.075
Piston	39.94-39.955	39.885
Cylinder to piston	0.06-0.07	0.120



### Decarboning

Decarbon the piston and piston ring grooves, as illustration. After cleaning the grooves, fit the rings and rotate them in their respective grooves to be sure that they move smoothly. Carbon in groove is liable to cause the piston ring to get stuck in the groove, and the condition will lead to reduce engine power output.



Grind piston surface evenly with emery pa

A piston whose sliding surface is badly grooved ore scuffed due to overheating must be replaced. Shallow grooves or minor scuff can be removed by grinding with emery paper of about #400

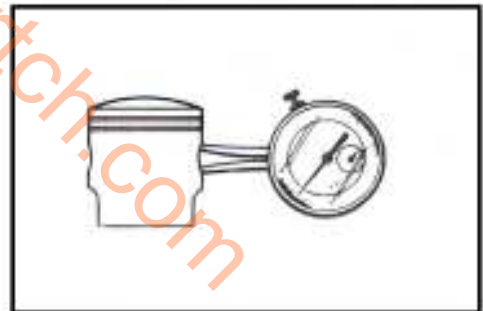
### Piston pin bore

Use a caliper gauge to measure the piston pin bore inside diameter,.

If reading exceeds the following service limit, replace it with a new one.

(Dial caliper)

Limit service: 12.30mm(0.4736in)

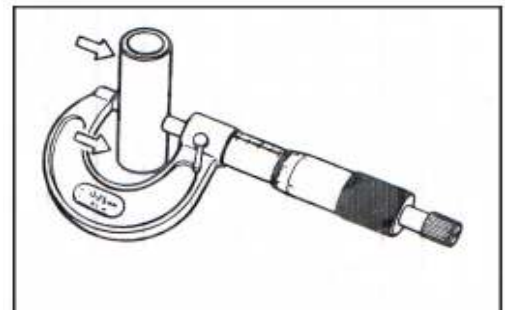


### Piston pin outside diameter:

Use a micrometer to measure the piston outside diameter at three positions.

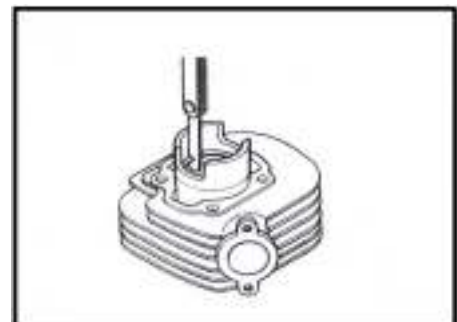
(Micrometer (0-25mm) )

service limit: 11.980mm(0.4717in)



### Piston rings

Check each ring for end gap, reading the gap with a thickness gauge shown in the illustration. If the end gap is found to exceed the limit, indicated below, replace it



with a new one.

The end gap of each ring is to be measured with the ring fitted squarely into the cylinder bore and held at the least worn part near the cylinder bottom, as shown in the illustration.

Service limit: 0.75mm(0.030in)

As the piston ring wears, its end gap increases reducing engine power output because of the resultant blow by through the enlarged gap. Here lies the importance of using piston rings with end gaps with the limit. Measure the piston ring free end gap to check the spring tension.

service limit: 3.6mm(0.14in)

Fix the piston ring in the piston ring groove, measure the ring side clearance with the thickness gauge while matching the sliding surface of piston and ring.

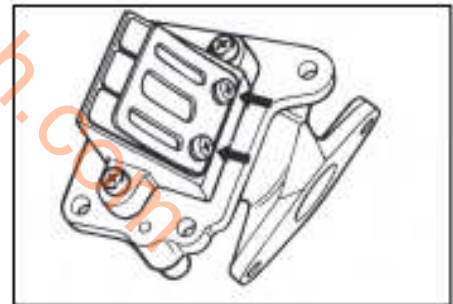
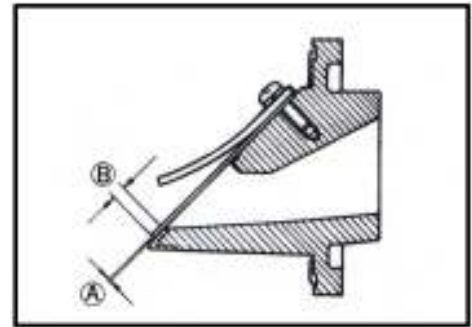
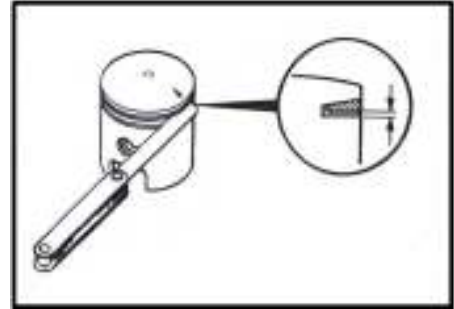
### Standard clearance

1st: 0.04-0.06mm(0.0016-0.0024in)

2nd: 0.02-0.04mm(0.0008-0.0016in)

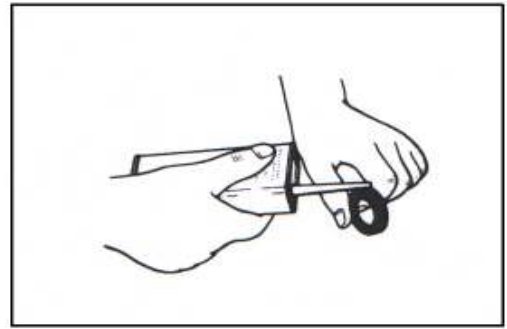
### Reed valve

Check the clearance A between reed valve and its seat and the dimension B. If the clearance A is noted to exceed 0.2mm, replace the reed valve assembly. The dimension B is at least 1mm.



## ENGINE Reassembly

Reassembly is generally performed in the reverse order of disassembly, but there are a number of reassembling steps that demand or deserve detailed explanation or emphasis. These steps will be taken up for respective parts and components.



## Oil seals

fit the oil seals to the crankcase following the procedure below. Replace removed oil seals with new ones.

- Lubricate the edge of oil seal



- Install oil seal into crankcase carefully with special tool.

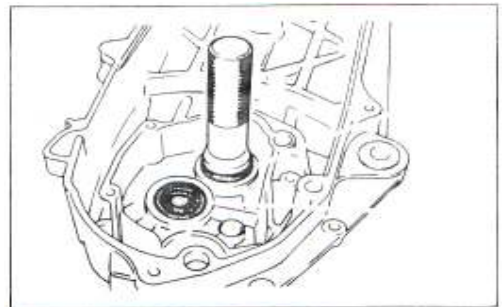
## Oil seal installation



## Bearing

Install new bearing with special tool

## Install bearing





**shock absorber bushing**

**positon**



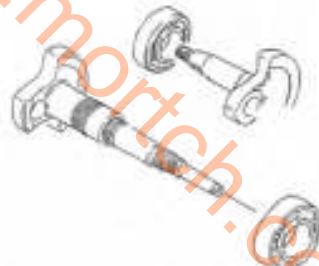
减震套

Install shock absorber bushing



**Install crankshaft bearing**

Press bearing into cankshaft



**Install crankshaft**

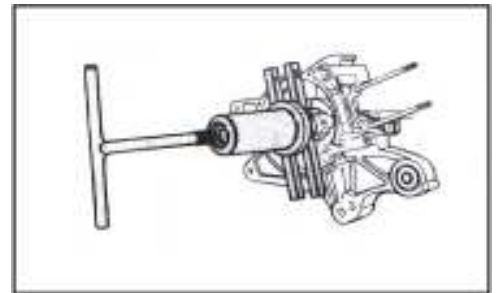
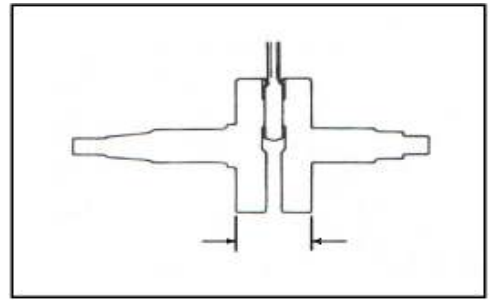


- Decide the length between the webs referring to the figure at right when rebuilding the crankshaft.

Standard width between webs:  $38 \pm 0.1\text{mm}$  ( $1.496 \pm 0.004\text{in}$ )

- when mounting the crankshaft into crankcase, it is necessary to pull its left end into the crankcase with the special tool.

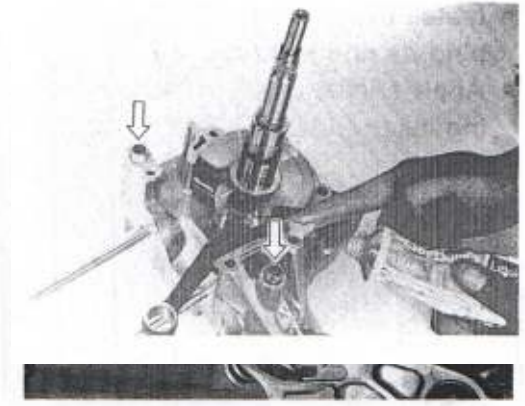
CAUTION: Never fit the crankshaft into the crankcase by driving it with a plastic hammer. Always use the special tool, otherwise crankshaft alignment accuracy will be affected.



<http://motor.mortch.com>

## CRANKCASE

- Wipe the crankcase mating surfaces with cleaning solvent.
- Apply evenly to the mating surface of the right half of the crankcase
- Tighten the crankcase screws securely.
- Check if crankshaft rotates smoothly.

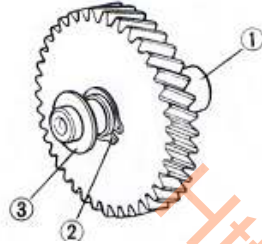


## Install gearcase bearing

Install new bearing and oil seal into gearcase cover with special tool, and tighten anchor pin.



- install output axle
- gearshift
- install middle gear, position pin by installing middle gear axle①, gasket② and thrust gasket③



- install gearcase cover into crankcase and lock bolt.



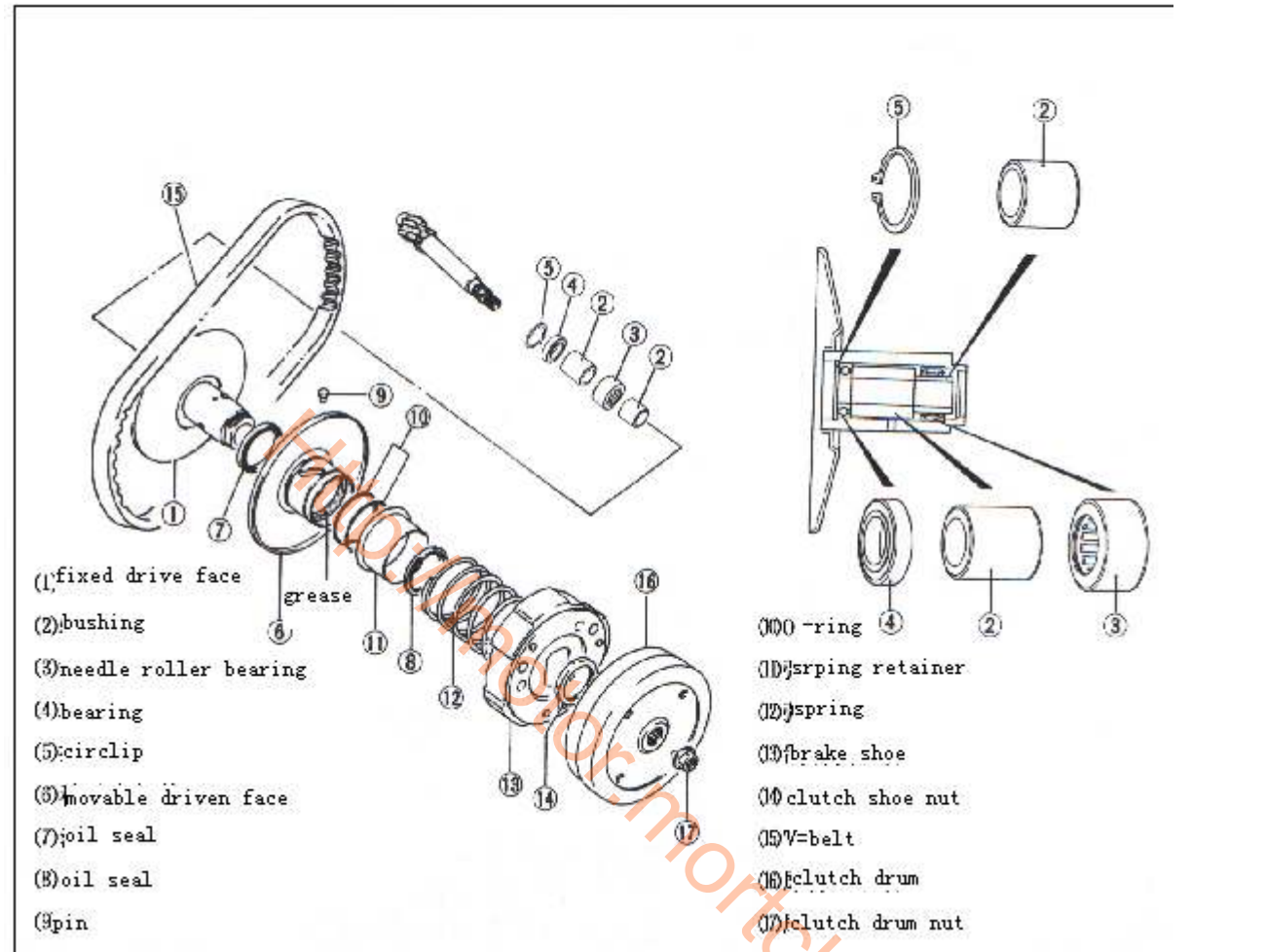
- tighten each screw



- screw oil drain nut①
- tightening torque: 4-7 N.m**  
**(0.4-0.7kg-m,3.0-5.0 Ib-ft)**

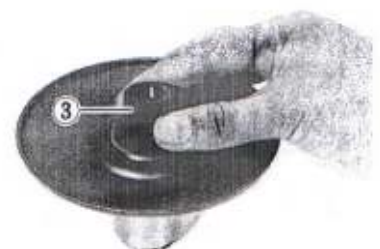


## Movable driven and clutch

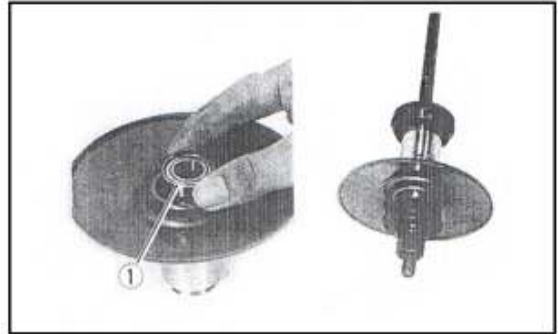


- install the bearing (2) in the fixed driven face (1) with the special tool.

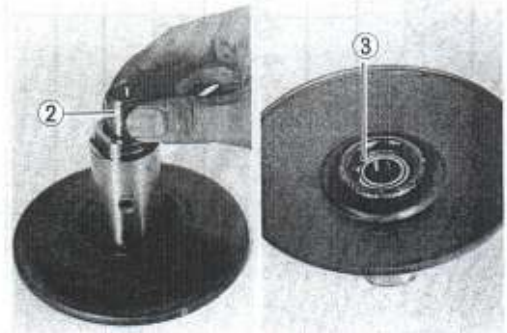
- install sliding bearing (3).



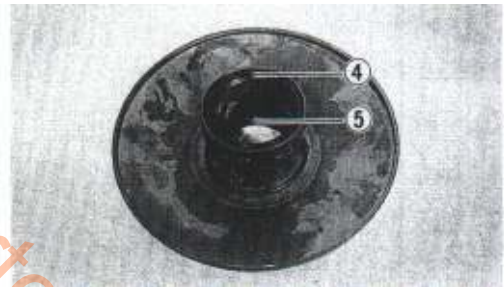
- Install the bearing ① with special tool



- install the spacer ② and circlip③.

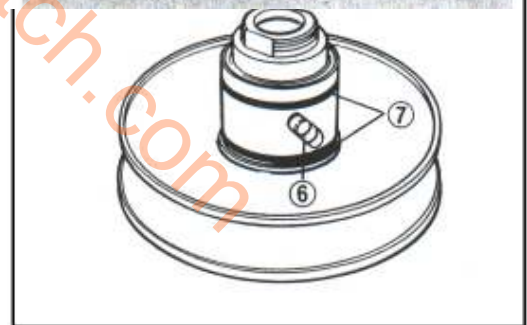


- install the new oil seals④ and ⑤ to the movable driven face with the special tool.
- apply grease to the lip of oil seals and groove of inside of movable driven face.



NOTE:

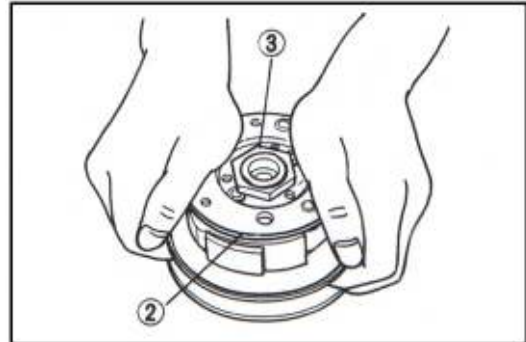
When reinstalling the movable face to the fixed face, make sure that the oil seal is positioned properly.



- install the pin ⑥ at three places on the driven face hub.
- Apply grease lightly to the cam part where the pins are placed.
- Install two O-RINGS⑦.

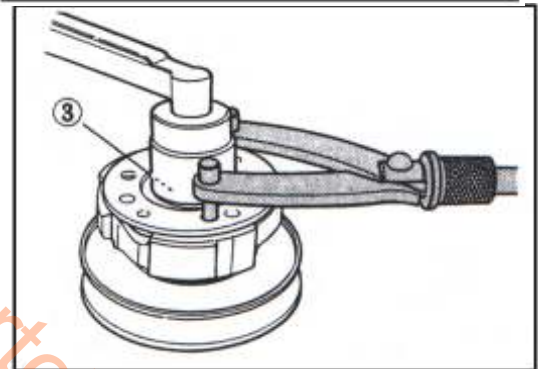


- Install the movable driven face seat①.
- install the clutch shoe assembly② and nut ③.



- tighten the nut③ to the specified torque with the special tool.

**tightening torque: 40-60 N.M  
(4.0-6.0kg.m 29.0-43.5lb-ft)**



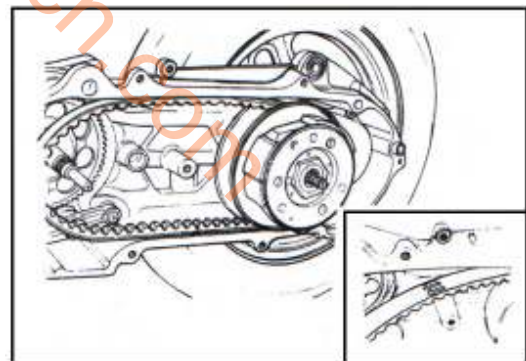
- insert the V-belt between the driven faces as deep inside possible while pulling the movable driven face all the way outside to provide the maximum clearance.

**CAUTION:**

the belt should be positioned so that the arrows on the belt periphery point the normal turning direction.

The V-belt contact face on the driven faces should be thoroughly cleaned to be free from oil.

- Thoroughly clean the clutch housing to be free from oil and position it over the clutch shoe assembly.
- tighten the clutch housing nut to the specified torque with the special tool.

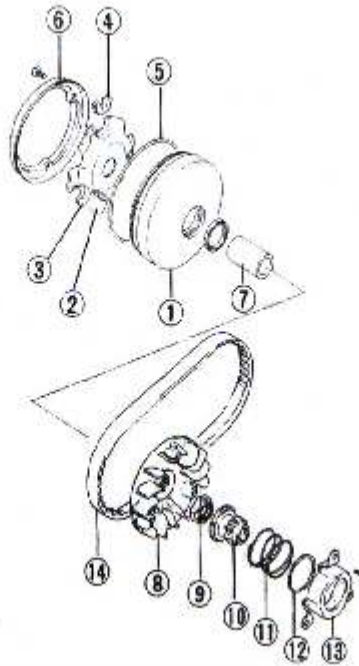


**Torque: 40-60 N.M**

**(4.0-6.0kg.m 29.0-43.5lb-ft)**

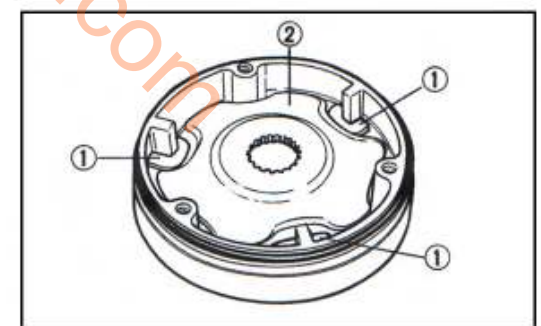
## MOVABLE DRIVE

- (1) movable drive face
- (2) roller
- (3) movable drive plate
- (4) damper
- (5) O-ring
- (6) movable drive face cover
- (7) spacer
- (8) fixed drive fan
- (9) kicking starter
- (10) kick starter driven gear
- (11) spring
- (12) gasket
- (13) retainer
- (14) V-BELT



- Apply grease to all the sliding and rolling surfaces for six roller weights. For each weight, approximately 1.5g of grease should be used.

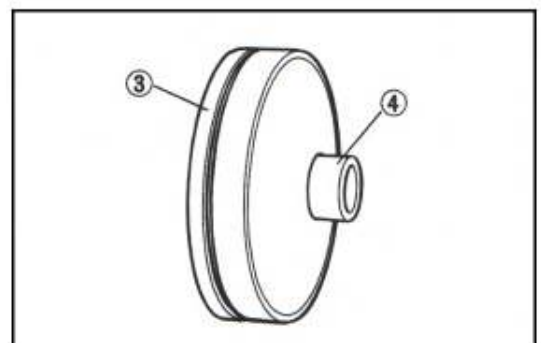
- Mount the three dampers (1) on the movable drive plate (2) and install it on the movable drive face.
- Position the O-RING on the movable drive face.



- Install the movable drive face cover (3).

**NOTE:**

1. Make sure that the movable drive plate is fully positioned inside, or the weight roller may come off.

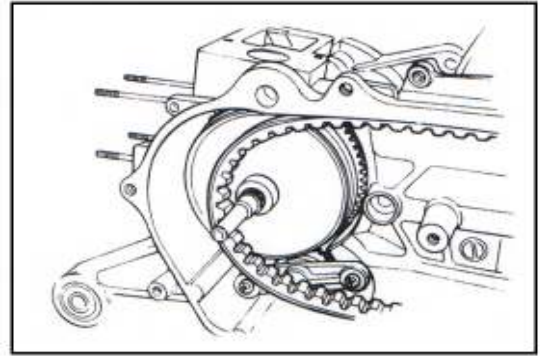




- Insert the spacer④
- Position the movable drive face subassembly on the crankshaft as shown in illustration.

**NOTE:**

*Thoroughly clean the belt contact to be free from oil.*

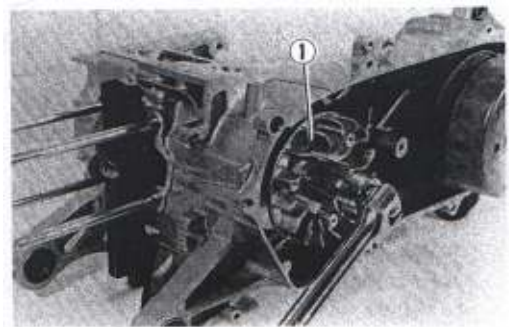


- Install the fixed drive fan①.
- tighten the nut to the specified torque with special tool.

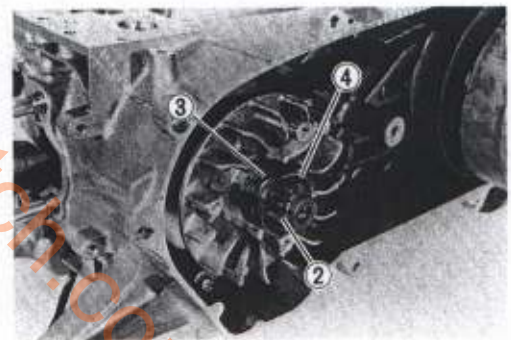
Connecting rod fixer

Tightening torque: 40-60N.M

(4.0-6.0kg-m, 29.0-43.5lb-ft)



- fill grease in the groove provided inside sliding surface of the kick driven gear and install ② on the end of the crankshaft. Wipe pff excess grease.

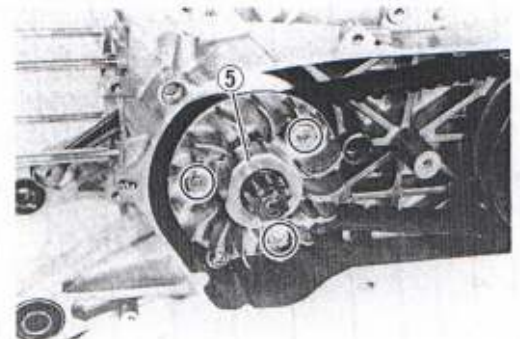


Install washer③ and spring④.

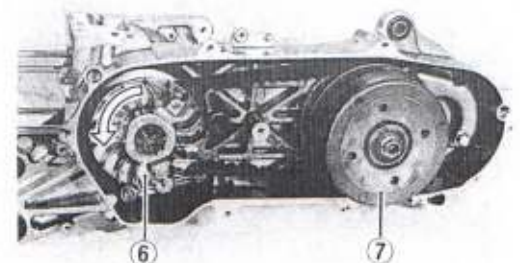
**NOTE:**

*When Installing washer③, face the resin surface of washer to outside.*

- install the retainer⑤.



- continue turning the fixed drive face⑥ by hand until the belt is seated in and both the drive and driven faces⑦ will move together smoothly with slip.

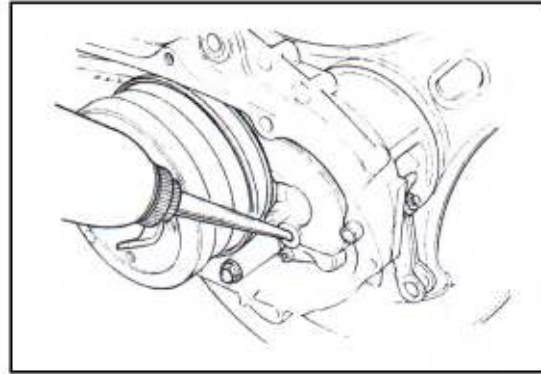


- fill the final gear box with engine oil up to the level hole.

Oil capacity: 90ml

- tighten the oil level bolt to the specified torque.

Tightening torque: 9-15M.M



## Starter assy.

- Inject lubrication into start bearing and lubrication in the end of starter shaft

### LUBRICATION

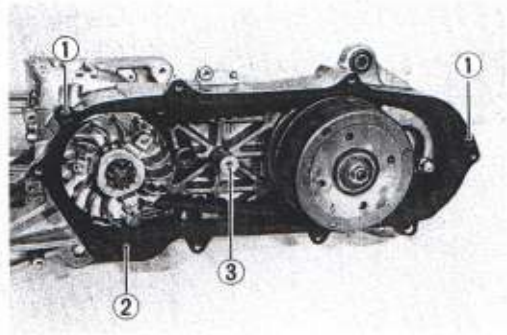
- Tighten starter shaft gasket



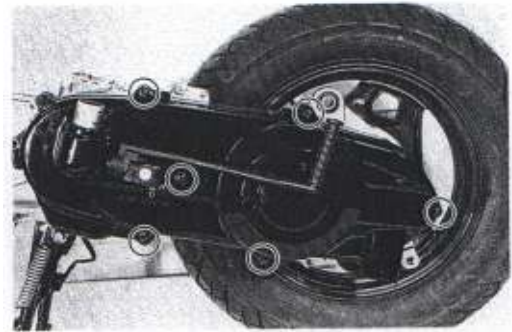
## Install starter ratchet wheel and circlip



- Install the dowel pins ①
- install the new gaskets (② and ③)



- apply pants to the clutch cover as shown in the illustration.



NOTE: INSTALL the kick starter lever as shown in the illustration.

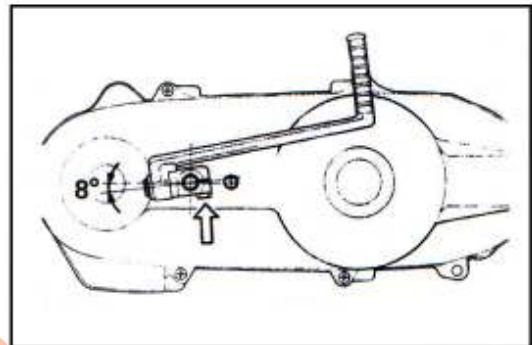
**Tightening torque: 8-12N.M**  
**(0.8-1.2kg-m, 6.0-8.5lb-ft)**

#### PISTON

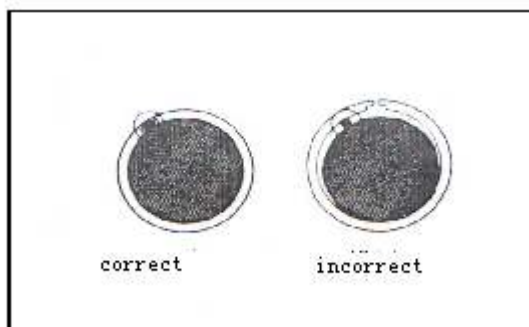
- install the piston rings on the piston.  
The first and the second ring: keystone ring.

NOTE:

*Position the ring so that the marking is on upside.*



- It is extremely important that, when the piston is fed into the cylinder, each ring in place should be so positioned as to hug the locating pin as shown in illustration.

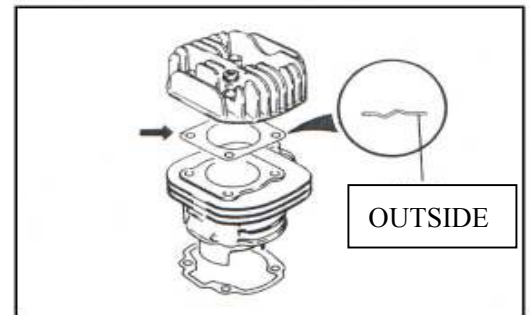
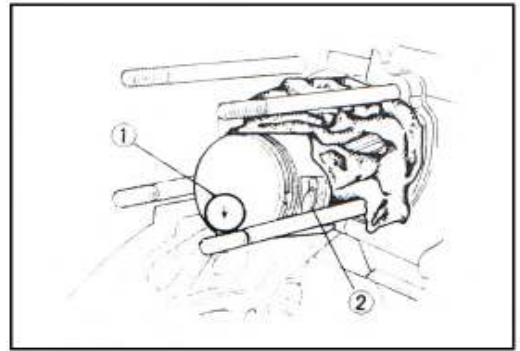


- apply oil for the piston and install the piston to the connecting rod.

**NOTE:**

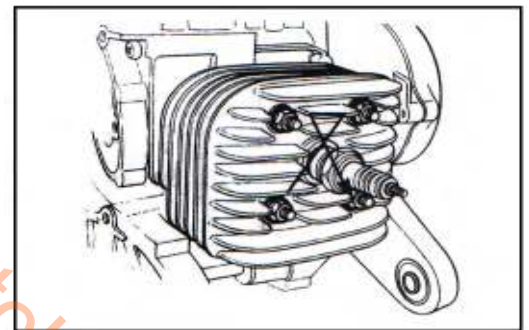
The arrow mark ① on the piston head should point the exhaust side.

- The circlip should be mounted in such a position that the mating ends of the circlip do not coincide with the groove portion of the piston.
- apply oil on the position and cylinder wall surfaces and install the cylinder over the piston carefully.



- tighten the cylinder head nut to the specification.

**tightening torque: 18-28N.m**



- install right crankcase oil seal press board

- install worm, and lubricate it with JINHONG special lubrication.

**Oil pump**

- install oil pump into crankcase

**torque: 3-5N.m**

**(0.3-0.5kg-m, 2.3-3.7lb-ft)**



螺丝

## Reed valve

- install reed valve paper gasket.
- Install reed valve
- Install oil hose



## Instake pipe

- install intake pipe



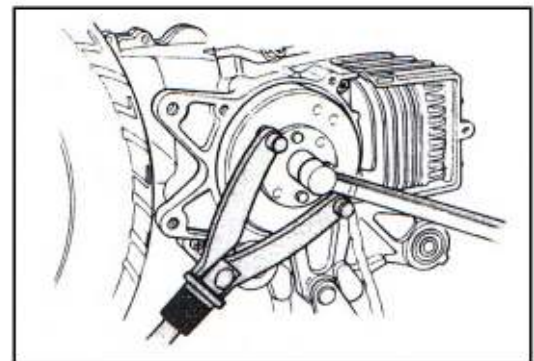
## Magneto

- clear crankshaft and magneto rotor
- install half circle key
- install paper gasket and stator coil, and then fix them



- tighten to specified torque with special tool

**specified torque: 35-45N.m  
(3.5-4.5kg.m,25.5-31.0lb-ft)**



- install cooling fan



- install guiding cover

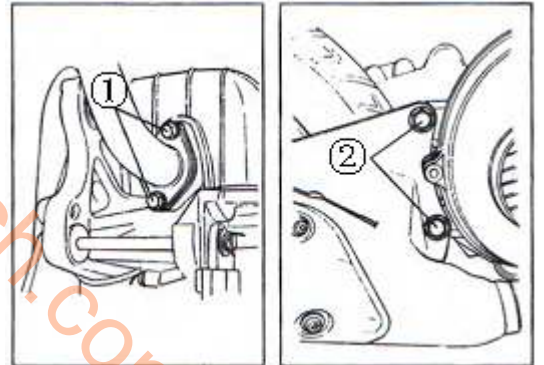
- install fan guiding cover



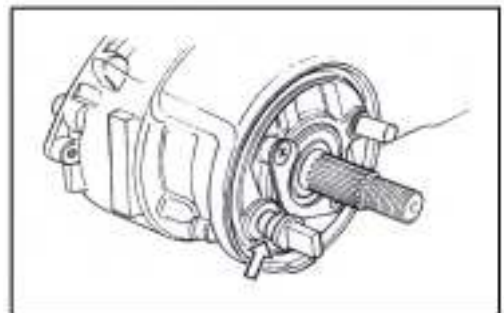
- install pipe screw ① and screw for tightening muffler to their specified torque.

①: 8-12N.m(0.8-1.2kg.m,6.0-8.5lb-ft)

②: 18-28N.m(1.8-2.8kg.m,13.0-20.0lb-ft)



- lubricate brake cam shaft with grease.



**SERVICING INFORMATION**

CONTENTS

**Troubleshooting**  
**Special tools**  
**Thread parts tightening torque**  
**Service data**

[Http://motor.mortch.com](http://motor.mortch.com)

**TROUBLESHOOTING**

**ENGINE**

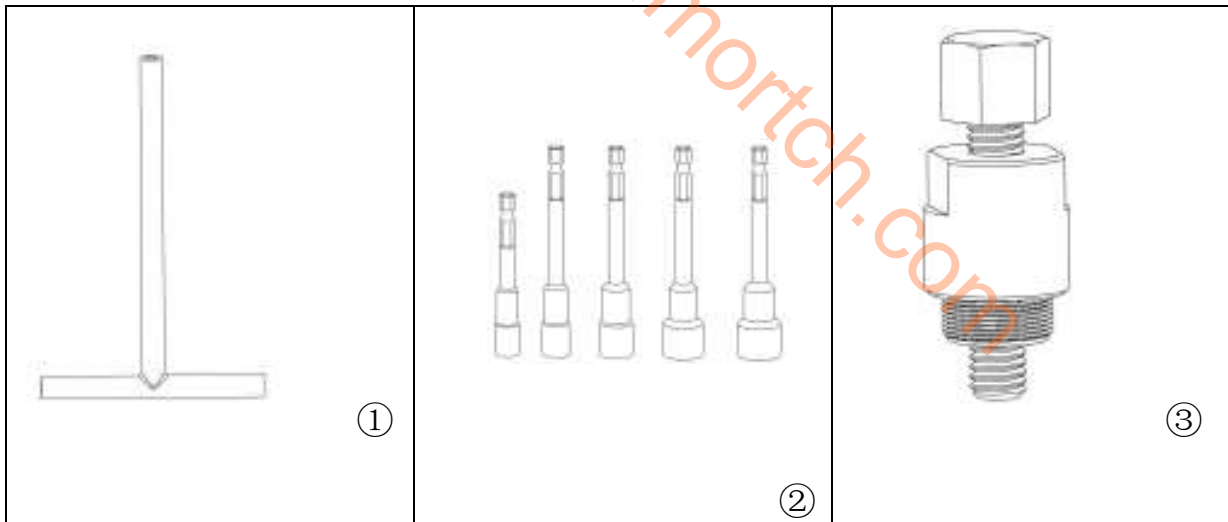
Complaint	Symptom and possible causes	Remedy
<b>Engine does not start, or is hard to start.</b>	<p><b>Compression too low</b></p> <ol style="list-style-type: none"> <li>1. Excessively worn cylinder or piston rings.</li> <li>2. Stiff piston ring in place.</li> <li>3. Gas leaks from the joint in crankcase, cylinder or cylinder head.</li> <li>4. Damaged reed valve.</li> <li>5. Spark plug too loose.</li> <li>6. Broken, cracked or otherwise failed piston.</li> </ol> <p><b>Plug not sparking</b></p> <ol style="list-style-type: none"> <li>1. Damaged spark plug or spark plug cap.</li> <li>2. Dirty or wet spark plug.</li> <li>3. Defective CDI &amp; ignition coil unit or stator coil.</li> <li>4. Open or short n high-tension cord.</li> <li>5. Defective ignition switch.</li> </ol> <p><b>No fuel reaching the carburetor</b></p> <ol style="list-style-type: none"> <li>1. Clogged hole in the fuel tank cap.</li> <li>2. Clogged or defective fuel cock.</li> <li>3. Defective carburetor float valve.</li> <li>4. Clogged fuel hose or defective vacuum hose.</li> </ol>	<p>Replace. Repair or replace. Repair or replace.</p> <p>Replace. Tighten Replace.</p> <p>Replace. Clean and dry. Replace. Replace. Replace.</p> <p>Clean. Clean or replace. Replace. Clean or replace.</p>
<b>Engine stalls easily.</b>	<ol style="list-style-type: none"> <li>1. Carbon deposited on the spark plug.</li> <li>2. Defective CDI &amp; ignition coil unit.</li> <li>3. Clogged fuel hose.</li> <li>4. Clogged jets in carburetor.</li> <li>5. Clogged exhaust pipe.</li> </ol>	<p>Clean. Replace. Clean. Clean. Clean.</p>
<b>Noisy engine.</b>	<p><b>Noise appears to come from piston</b></p> <ol style="list-style-type: none"> <li>1. Piston or cylinder worn down.</li> <li>2. Combustion chamber fouled with carbon.</li> <li>3. Piston pin, bearing or piston pin bore worn.</li> <li>4. Piston rings or ring grooves worn.</li> </ol> <p><b>Noise seems to come from crankshaft</b></p> <ol style="list-style-type: none"> <li>1. Worn or burnt crankshaft bearings.</li> <li>2. Worn or burnt conrod big-end bearings.</li> </ol> <p><b>Noise seems to come from final gear box</b></p> <ol style="list-style-type: none"> <li>1. Gears worn or rubbing.</li> <li>2. Badly worn splines.</li> <li>3. Worn or damaged bearing of drive shaft or rear axle shaft.</li> </ol>	<p>Replace. Clean. Replace. Replace.</p> <p>Replace. Replace.</p> <p>Replace. Replace. Replace.</p>
<b>Slipping clutch</b>	<ol style="list-style-type: none"> <li>1. Worn or damaged clutch shoes.</li> <li>2. Worn clutch drum.</li> </ol>	<p>Replace. Replace.</p>
<b>Engine idles poorly.</b>	<ol style="list-style-type: none"> <li>1. Excessively worn cylinder or piston rings.</li> <li>2. Stiff piston ring in place.</li> <li>3. Gas leaks from crankshaft oil seal.</li> <li>4. Spark plug gaps too wide.</li> <li>5. Defective CDI &amp; ignition coil unit.</li> <li>6. Defective magneto stator coil.</li> <li>7. Float-chamber fuel level out of adjustment in carburetor.</li> <li>8. Clogged jets in carburetor.</li> <li>9. Broken or damaged reed valve.</li> </ol>	<p>Replace. Replace. Replace. Adjust or replace. Replace. Replace. Replace. Clean or adjust. Replace.</p>

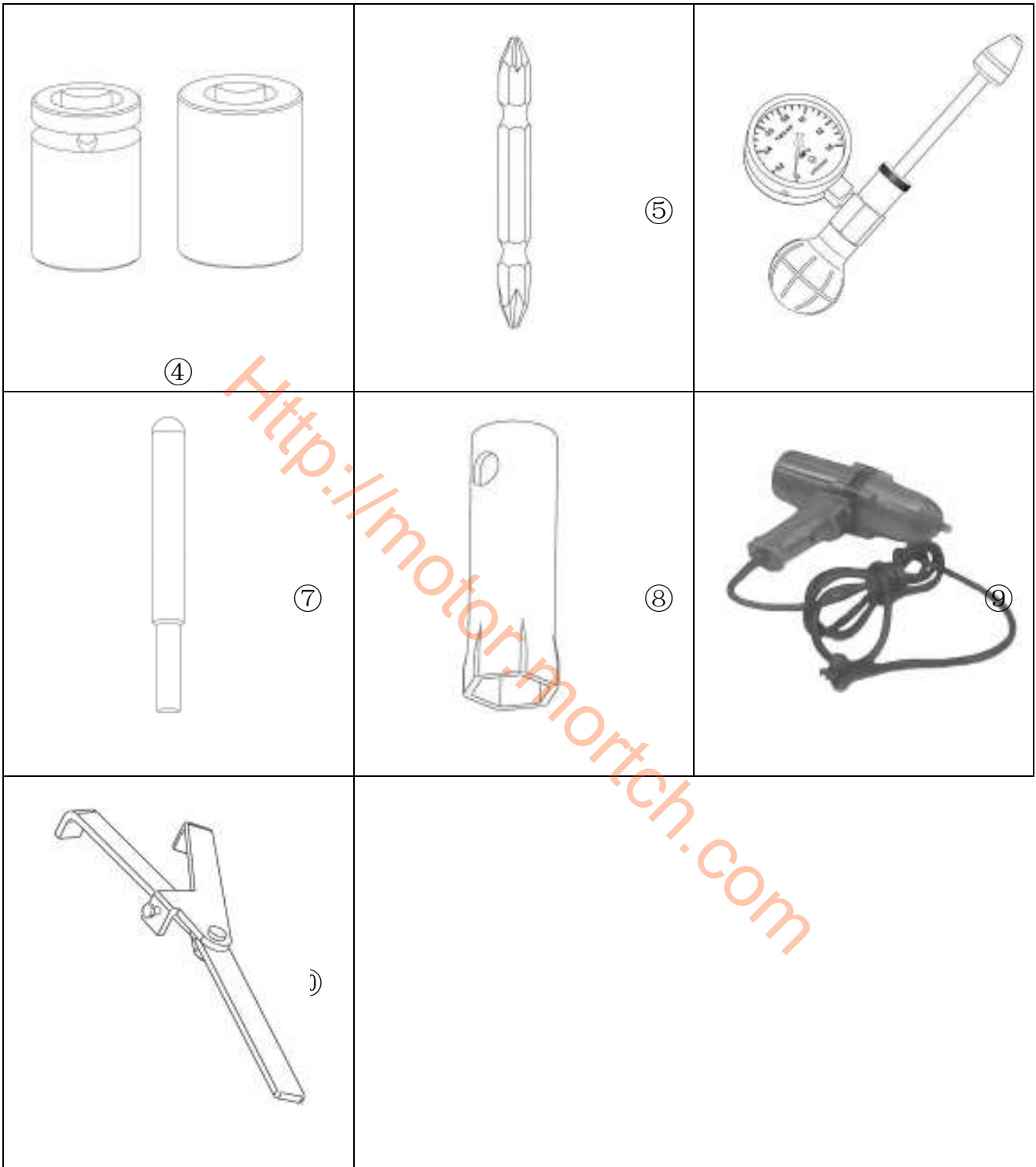


Complaint	Symptom and possible causes	Remedy
<b>Engine runs poorly in high-speed range.</b>	<ol style="list-style-type: none"> <li>1. Excessively worn cylinder or piston rings.</li> <li>2. Stiff piston ring in place.</li> <li>3. Spark plug gaps too narrow.</li> <li>4. Ignition not advanced sufficiently due to poorly working CDI &amp; ignition coil unit.</li> <li>5. Defective magneto stator coil.</li> <li>6. Float-chamber fuel level too low.</li> <li>7. Clogged air cleaner element.</li> <li>8. Clogged fuel hose, resulting in inadequate fuel supply to carburetor.</li> <li>9. Clogged fuel cock vacuum pipe.</li> </ol>	<p>Replace. Replace. Adjust. Replace. Replace. Adjust or replace. Clean. Clean and prime. Clean.</p>
<b>Dirty or heavy exhaust smoke.</b>	<ol style="list-style-type: none"> <li>1. Too much engine oil to the engine.</li> <li>2. Use of incorrect engine oil.</li> </ol>	<p>Check oil pump. Change.</p>
<b>Engine lacks power.</b>	<ol style="list-style-type: none"> <li>1. Excessively worn cylinder or piston rings.</li> <li>2. Stiff piston rings in place.</li> <li>3. Gas leaks from crankshaft oil seal.</li> <li>4. Spark plug gaps incorrect.</li> <li>5. Clogged air cleaner element.</li> <li>6. Float-chamber fuel level out of adjustment.</li> <li>7. Clogged air cleaner element.</li> <li>8. Fouled spark plug.</li> <li>9. Sucking air from intake pipe.</li> <li>10. Slipping or worn V-belt.</li> <li>11. Damaged/worn rollers in the movable drive face.</li> <li>12. Weakened movable driven face spring.</li> <li>13. Too rich fuel/air mixture due to defective starter system.</li> </ol>	<p>Replace. Replace. Replace. Adjust or replace. Clean. Adjust or replace. Clean. Clean or replace. Retighten or replace. Replace. Replace. Replace. Replace.</p>
<b>Engine overheats.</b>	<ol style="list-style-type: none"> <li>1. Heavy carbon deposit on piston crown.</li> <li>2. Defective oil pump or clogged oil circuit.</li> <li>3. Fuel level too low in float chamber.</li> <li>4. Air leakage from intake pipe.</li> <li>5. Use of incorrect engine oil.</li> <li>6. Use of improper spark plug.</li> <li>7. Clogged exhaust pipe/muffler.</li> </ol>	<p>Clean. Replace and clean. Adjust or replace. Retighten or replace. Change. Change. Clean or replace.</p>

## SPECIAL TOOLS LISTED BELOW FOR REMOVAL AND REINSTALLATION

NO.	TOOL NUMBER	DESCRIPTION
1	T01	“T” shape of sleeve
2	T02	sleeve tools (7mm,8mm,10mm,12mm,13mm)
3	T03	flywheel remover
4	T04	sleeve (18mm,24mm)
5	T05	screw remover
6	T07	cylinder pressure gauge
7	T08	piston pin remover
8	T09	spark plug remover
9	T10	flywheel lockbolt remover
10		clutch clamp





## TIGHTENING TORQUE OF SCREW THREAD PARTS

### ENGINE

ITEM	N. M
Cylinder guide cover tapping screw	1-4
Fan guide cover lock bolt	10-12
Cylinder cover locknut	15-18
Spark plug	15-18
Inlet pipe lock bolt	10-12
Cooling fan impeller lock screw	10-12
Flywheel lock bolt	45-50
Magneto stator coil lock screw	10-12
Magneto exciting lock screw	3-5
Oil pump lock screw	5-9
Right crankcase lock bolt	10-12
Bearing press board lock bolt	10-12
Cylinder double head bolt	15-18
Motor tightening bolt	10-12
Left crankcase cover lock screw	10-12
Left crankcase cover lock bolt	10-12
Main drive wheel face locknut	35-38
Driven wheel face locknut	35-38
Driven wheel face clutch locknut	55-60
Exceeding clutch outside lock screw	10-12
Electrical start idle press board screw	10-12
Gearcase lock bolt	10-12
Left crankcase discharging oil hole lock bolt	22-25
Left crankcase positioning pin shaft locknut	18-22

**SERVICE DATA**

**CYLINDER+PISTON+PISTON RING**

Unit: mm(in)

ITEM	STANDARD		TOLERANCE
Piston to cylinder clearance	0.06-0.07 (0.0024-0.0028)		0.120 (0.0047)
Cylinder bore	40.005-40.020 (1.5750-1.5756)		40.075 (1.5778)
Cylinder diameter	39.94-39.955 (1.5724-1.5746)		39.885 (1.5703)
Cylinder distortion	_____		0.04 (0.0016)
Cylinder head distortion	_____		0.04 (0.0016)
Piston ring free cotter end clearance	1 <sup>st</sup> ring	0.02~0.06mm	_____
	2en ring	0.02~0.06mm	_____
Piston ring close end clearance	0.15-0.35 (0.0059-0.0138)		0.8 (0.0315)
Piston ring to groove clearance	1 <sup>st</sup> ring	0.02~0.06(0.0008~0.0024)	
	2en ring	0.02~0.06(0.0008~0.0024)	
Piston pin bore	10.002-10.008 (0.3938-0.3940)		10.030 (0.3949)
Piston pin outside diameter	9.994-10.000 (0.3935-0.3937)		9.98 (0.3929)

**CONNECTING ROD+CRANKSHAFT**

ITEM	STANDARD	LIMIT
Conrod small end	13.995-14.006(0.5510-0.5514)	14.040(0.5528)
Conrod deflection	_____	3.0(0.12)
Conrod web to web width	38-38.1(1.496-1.500)	_____
Crankshaft runout	_____	0.05(0.002)

**CLUTCH**

**Unit: mm(in)**

ITEM	STANDARD	LIMIT
Clutch wheel inner diameter	112.00-112.15(4.410-4.415)	112.5(4.429)
Clutch shoe thickness	1.8(0.071)	1.2(0.005)
Clutch engagement	3000 ± 300r/min	
Clutch closedown	6000 ± 300r/min	

**TRANSMISSION SYSTEM+DRIVING CHAIN**

**UNIT: mm(in) EXCEPT RATIO**

ITEM	STANDARD	TOLERANCE
Final reduction ratio	/	/
Gear reduction ratio	/	/
Drive belt width	16.8-17.2(0.6614-0.6772)	16.4(0.6457)
Driven face spring free distance	69(2.72)	64.5(2.54)

[Http://motor.mortch.com](http://motor.mortch.com)