

ZT370MU Engine Service Manuals

2024-12-12

Preface

All the information, illustrations, photos, etc. collected in this manual are compiled according to the latest product of ZT370MU Euro V+. However, due to continuous product improvement and other changes, your motorcycle may not conform to this manual. There are some inconsistencies. For parts upgrades, please refer to the part numbers on the ZONTES official website. No detailed listing will be given; if the part names in this manual are inconsistent with the official website, the official website shall prevail.

If some of the contents in this manual are insufficient, please refer to the "Driver's Manual" that comes with the vehicle.". The driver's manual is in the upgrade The latest version can be downloaded from Zontes website of PDF.



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User Notice

This manual is compiled by Guangdong TAYO Motorcycle Technology Co., Ltd. to guide dealers or service personnel. This manual cannot provide more detailed information about The knowledge of motorcycles is only for reference in maintenance. If you do not have the corresponding knowledge such as electrician, mechanic, etc., improper assembly or Repair failed.

If you need to clean or wash the body parts of this vehicle, you should use neutral car wash liquid or tap water or diesel, kerosene, etc. Acidic or alkaline car wash liquid will cause the parts to The paint, electroplating and anodized surfaces of the parts will cause irreversible corrosion; gasoline will cause premature aging or hardening of sealants, gaskets, rubber parts, etc. Use a non-woven cloth that will not leave residue for wiping. Ordinary rags may leave cloth scraps or wool that may affect assembly or cause other problems.

Our company will try its best to update this manual in time after any changes are made to the product.

The following are the meanings of the icons in this manual:

<u> </u>	0
DANGER	Failure to comply may result in personal injury or death to the operator or maintenance personnel; or serious damage to spare parts. Damage, shortened service life, etc.
WARNING	Failure to comply may result in personal injury or death to the operator or maintenance personnel; or damage to spare parts , Abnormalities, etc.
CAUTION	Failure to follow the warning may result in personal injury to the driver or maintenance personnel; or special attention is required during disassembly and assembly Matters
Ĩ	Indicates that there is a torque requirement at this location
Change	Indicates that the part needs to be replaced after disassembly
	Mark the location where the dimensions need to be measured

Contents

Preface	2
User Notice	3
Contents	4
Special tools	6
Engine inspection	7
Check engine cylinder pressure	7
Camshaft	8
Remove the camshaft	
Check the camshaft Check the timing chain and timing driven sprocket	
Check the tension strips and top guide strips	
Check the tensioner	
Installing the camshaft Cylinder head	
Remove the cylinder head	
Check guide strips	
Check the cylinder head	30
Install the cylinder head	31
Paragua the value	
Check the valve	
Valve stem runout limit: 0.030mm	
Check valve springs	38
Check valve tappets and valve rocker arms	
Install the valve	
Removing the Magneto Rotor Clutch	45
Check the overrunning clutch	
Installing the Magneto	
Clutch	
Disassembling the clutch	
Check the clutch plate	
Check the clutch springs	59
Check the clutch plate	
Check the clutch pressure plate	
Check the primary drive gear	61
Check the clutch gear	
Installing the Clutch	
Gear shifting mechanism	66
Check the gear shift shaft	67
Check the stopper	
Oil Pump	
Check the oil pump sprocket and chain	
Check the oil pump	
Check the pressure relief valve	74
Assembling the oil pump	75 77

Oil sump	
Remove the oil pan	
Check the primary filter and oil pan	
Install the oil pan	
Crankcase	
Crankcase unpacking	
Check the crankcase	
Install the crankcase	
Connecting rod and piston	
Disassembly of connecting rod and piston	
Check the cylinder and piston	
Check piston rings	
Check the piston pin	
Check the connecting rod	
Install connecting rod and piston	
Crankshaft and balance shaft	
Remove the crankshaft and balance shaft	
Check the fuel injectors	
Check the crankshaft	
Check the balance shaft	
Install the crankshaft	
Install the balance shaft	
Transmission gear device	
Remove the transmission gear unit	
Check the fork	
Check the shift drum	
Check the transmission gear	
Assembling the main and secondary shafts	
Installing the transmission gear	

Special tools

No.	Name	Coding	Use	Remark
1	Crankshaft balance shaft limit fixture	3011204-057900	When tightening the connecting rod bolts, fix Crankshaft, balance shaft	
2	Bearing assembly measuring tool	3011300-124500	Measuring bearing height	A dial gauge needs to be given separately
3	Transmission spindle sub-assembly fixture	3100200-709700	Auxiliary installation of the right main shaft bearing seat	
4	Flywheel external thread puller	3100200-297700	Removing the Magneto Rotor	
5	Magneto rotor locking limiter fixture	3011204-058500	Installing the Magneto Rotor	
6	Piston connecting rod assembly tool	3011204-020100	Quick assembly piston into the cylinder	
7	Clutch disc lock assist Tooling	3011204-058400	When installing the clutch, fix the Clutch, torque correction	
8	15# sleeve (custom made sleeve, L = 105mm)	3010400-065600	Installing and removing the cylinder head locking nut	
9	T14Spark plug socket	3100100-733300	Removing and installing spark plugs	
10	Hydraulic tensioner retractable rod tooling	3100100-948900	Retract the tensioner plunger to install Tensioner	

Engine inspection

Check engine cylinder pressure

The starting motor drives the crankshaft speed	Cylinder pressure
300rpm \sim 500rpm	11.7 bar \sim 12.3 bar

Hint:: _____

>When measuring cylinder pressure, ensure that the throttle valve is opened to the maximum.

≻ The spark plug should be removed and the connection with the high-voltage cap should be cut off to avoid electric shock.

➤After the pointer or number on the cylinder pressure gauge stabilizes, the cylinder pressure difference of each cylinder should not be greater than0.2bar.



(Already installed and used) Spark plug tightening torque: 13N·m

Tool used: T14Spark plug socket (3100100-733 300)

Camshaft





Remove the camshaft

1. Remove:

- ullet Exagon socket flat pan head screw plug (1)
- Exagon socket aluminum screw plug(2)



2. Alignment:

• Align the markings on the magneto rotor :b ,Mark a on the center line of the notch of the hexagon socket flat pan head screw plug hole.

a. Rotate the crankshaft counterclockwise.

b. Align the markings on the magneto rotor b Mark a on the center line of the notch of the hexagon socket flat pan head screw plug hole .

Hint:: _____

>When the magneto rotor is marked with a line b Mark the center line of the notch of the hexagon socket flat pan head screw plug hole a When aligned, the inlet camshaft is The engraved line on the driven sprocket c Parallel to each other and to the top surface of the cylinder head, and the lobe of the first cylinder inlet and outlet camshaft d All facing Inner part.





3. Remove:

- Chain hydraulic tensioner sub-components ①
- Chain hydraulic tensioner gasket



4. Remove:

- Intake and exhaust camshaft limit seat cover ①
- Intake and exhaust camshaft right seat cover 2
- Camshaft center seat cover ③
- Intake camshaft left seat cover ④

▲ Notice: -

➤To prevent damage to the intake and exhaust camshaft cover, camshaft or cylinder head, first ensure that the intake and exhaust camshaft lobe of the first cylinder is a Towards the inside, loosen the outer bolts of the seat cover first, and follow the limit seat cover 1→Right seat cover 2. Middle seat cover 3→Left seat cover 4 Loosen the inner bolts sequentially.





- 5. Remove:
 - Exhaust camshaft subassmbly (1)
 - Camshaft subassembly 2

Hint: ________

Fo prevent the timing chain from falling into the crankcase, fix it with a thin wire ③.



- 1、 Remove:
 - Timing driven sprocket ①

Hint:: -

>Use the timing driven sprocket bolt disassembly tool (2) to assist in loosening the timing driven sprocket bolt.



Check the camshaft

- 1. Examine:
- camshaft lobe
 - Camshaft lobe wear, scratches, pitting \rightarrow replace camshaft
- 2. Measurement:
- Camshaft lobe height a

Not within the range \rightarrow Replace the camshaft





- 3. Measurement:
- Measure the Journal-runout

Not within the range \rightarrow Replace the camshaft



Camshaft journal runout limit: 0.025mm



- 4. Measurement:
- the gap between the camshaft journal and the sea cover (use a plastic wire gap gauge to measure the gap) Not within the range → Measure the camshaft journal diameter



- a. Place the camshaft on the cylinder head camshaft seat.
- b. Place a plastic wire gap gauge (1) with the same width as the camshaft journal on the camshaft journal.
- c. Install the dowel pins and camshaft cover.



manner. (See "Installing the Camshaft "chapter).

>Do not rotate the camshaft when measuring the clearance between the camshaft journal and the seat cover.



d. Remove the camshaft seat cover and use the width comparison strip 2 to determine the width of the plastic line gap gauge 1 between the journals.



- 5. Measurement:
 - The camshaft journal diameter a
 - Not within the range ightarrow Replace the camshaft

Within the range \rightarrow Replace the cylinder head and the matching seat cover (replace if the gap between the camshaft journal and the seat cover is not within the range)



Camshaft journal diameter: 24.460-24.472mm

Camshaft journal minimum diameter: 24.452mm



Check the timing chain and timing driven sprocket

1. Examine:

- Check the timing chain
 - Wear/stiffness ightarrow Replace the timing chain and the matching timing driven sprocket

2. Examine:

- Check the timing driven sprocket (1)
 - Exceed 1/4 Wear a \rightarrow Replace the timing driven sprocket and chain



Check the tension strips and top guide strips

1. Examine:

- Chain top side guide strip①
- Chain tensioner (2)
 - Damage/wear \rightarrow Replace the tensioning strip/guide strip



Check the tensioner

1.Examine:

- Chain hydraulic tensioner components
 - Damaged/cracked/unable to pop out/stuck when popping out ightarrow replace the tensioner

a. Put the tensioner into the retractor tooling ④, tighten the bolts ①②③ in sequence, rotate "5" to gently press the timing tensioner rod into the timing tensioner housing Then loosen the bolt③, rotate slowly⑤, Observe whether the tensioner rod can rebound freely and whether it is stuck. If it can rebound freely without sticking, it means that the tensioner is intact. Otherwise, the tensioner needs to be replaced.



b. Move the timing tensioner limit snap ring 6, which is confirmed to be intact, to the middle position a, then rotate 5 to gently press the timing tensioner rod into the timing tensioner housing body.



c. Wait for the limit snap ring 6 to fit into the ring groove 7, loosen the limit snap ring 6 to reset it, and remove the tensioner for later use.



Installing the camshaft

1. Remove:

• Hexagon socket flat pan head screw plug(1)



2. Alignment:

• Align the markings on the magneto rotor b Mark a on the center line of the notch of the hexagon socket flat pan head screw plug hole.

a. Rotate the crankshaft counterclockwise.

b. Align the markings on the magneto rotor b Mark a on the center line of the notch of the hexagon socket flat pan head screw plug hole .



- 3. Install:
 - Intake camshaft oil plug positioning pin subassembly ①
 - camshaft oil plug positioning pin subassembly (2)
 - Press-fitted positioning pin ③
 - driven sprocket ④
 - Hint:: -

>Be careful to align the sprocket locating hole and locating pin.

> Use the camshaft bolt disassembly tool (5) to assist in tightening M7×12.5 Pivot bolt .





- 4. Install:
 - Camshaft subassembly ①
 - Exhaust camshaft subassembly(2)
 - Hint::

>Note that the mark "IN" on the camshaft indicates intake and "EX" indicates exhaust. Do not install it reversely.

>When installing the camshaft, be sure to install the camshaft lobe on the first cylinder.bLook towards the inside and then look at the markings on the outside of the sprocketaOredwhether it is parallel and parallel to the top surface of the cylinder head. If not, remove the camshaft and reinstall it .



5. Install:

- Intake and exhaust camshaft limit seat cover 1
- Intake and exhaust camshaft right seat cover 2
- Camshaft center seat cover ③
- Intake camshaft left seat cover ④

Hint:: -

>Make sure each camshaft cover and locating pin are installed in the original position, refer to the mark " \perp " points to the intake side.

Seat cover (2) is very similar to left seat cover (4). If you accidentally confuse them, you can refer to the position and size of the locating holes on the seat cover and the cylinder head. Small to distinguish.



6. Tighten:

• Camshaft cover bolt



7. Examine:

• Timing driven sprocket mark a,b

Make sure that the timing sprocket marks a and b are parallel to each other and to the top surface of the cylinder head.

(16

5



- 8. Install:
 - Chain hydraulic tensioner sub-components
 - Chain hydraulic tensioner gasket ③
 Change

- a. Take out the timing chain hydraulic tensioner components that are confirmed to be intact and ready for use (refer to the tensioner inspection section)
- b. Install the timing tensioner gasket (3), timing tensioner (1), and timing tensioner bolt (2) on the cylinder head.



c. Tighten the timing tensioner bolt.



Timing tensioner bolt torque: 12N·m

d. Use a socket wrench to turn the crankshaft clockwise 2-4 week, so that the timing tensioner rod can pop out smoothly and contact the tensioner strip.

Hint:: -

> When the timing tensioner rod pops out successfully and contacts the tensioner strip, a sound will be made, which can be used to determine whether the timing tensioner rod has popped out.



9. Rotation:

Crankshaft

(Make sure that the timing driven sprocket marks a, B are parallel to each other and to the top surface of the cylinder head and that the tip C of the first cylinder is facing outward by a few turns counterclockwise)



10. Inspection:

• Mark"1"

(Make sure the magneto rotor is marked with a line b The center line mark a of the notch of the hexagon socket flat pan head screw plug hole Aligned)

$\mathsf{Misaligned} \rightarrow \mathsf{Adjust}$

Refer to the section " Installing the Camshaft "



11. Measurement:

• Valve clearance





Hint:: _____

- Measure the valve clearance: with the cam nose upward, measure the clearance between the cam base circle and the valve tappet or small rocker arm with a feeler gauge.
- ➢ If the clearance is greater than the standard value, remove the bolt, remove the pressing block and valve tappet or small rocker arm, take out the valve adjusting pad,Reassemble the thick valve adjusting pad and measure the locking bolt; if the clearance is less than the standard value, use the thinner valve adjusting pad.Reassemble the thick valve adjusting pad and measure the

\Lambda Notice: -----

>When measuring the valve clearance, the cylinder head must be kept horizontal and fixed.

When replacing the valve adjustment pad and removing the camshaft, the cylinder head should be fixed. If the cylinder head tilts or shakes, check the position of each valve. Check whether the valve adjustment gasket is displaced or fallen off.

12. Installation:

• Hexagon socket flat pan head screw plug 1



13. Installation:

- Timing chain top side guide bar ①
- ϕ 14.8× ϕ 21×2.7 Ethylene/Acrylic Rubber Rectangular Ring(2) Change
- ϕ 7.8× ϕ 12.5×2.7Vinyl/Acrylic Rubber Rectangular Ring 3 (×4)
- Cylinder head cover inner seal ring (4) (x3) Change
- Cylinder head cover outer seal ring (5) Change
- M6×14 Hexagonal flange surface, smooth axis ϕ 9.6×19.5 Limit bolt (9.8 Grade/Zinc-Nickel Alloy) (6) (×2)
- ϕ 9.1× ϕ 18.2 Ethylene/acrylate rubber screw plug oil seal \bigcirc (×8)
- M6×14 Hexagonal flange surface, smooth axis ϕ 9.6×16.5 Limit bolt (9.8 Grade/Zinc-Nickel Alloy) (8) (×6)
- Cylinder head cover and ventilation cover sub-assembly (9)



Cylinder head cover bolt torque: 10N·m

Hint:: -

≻Apply flat sealant on the mating surface between the cylinder head cover outer seal ring and the cylinder head.

>During installation, confirm that the positioning pin and rectangular ring at (3) are in place, as well as the rectangular ring at (3).

>The cylinder head cover bolts are ϕ 9.1× ϕ 18.2 Ethylene/acrylate rubber screw plug oil seal, do not miss it.

>The two bolts 6 on the timing driven sprocket side are longer than the other bolts, so do not install them incorrectly.





15. Installation:

- BN8RTIP-8 Spark plug (heat value 8 gap 0.8 Iridium Platinum)
- Ignition coil (1) (×3)
- gnition coil single pressure plate (2)
- Ignition coil double pressure plate ③
- GB6177.1M6 (zinc-nickel alloy/without anti-loosening teeth) (4) (×2)

Spark plug torque: 13 N·m Clamp bolt torque: 12 N·m

Hint::

 \succ Install the ignition coil (1) according to the direction shown in the figure.



Cylinder head



Remove the cylinder head

Hint:: -

1. Remove:

- Intake camshaft subassembly
- Exhaust camshaft subassembly
- Refer to " Removing the Camshaft "chapter
- 2. Remove:
 - M7×60 internal and external hexagon flange bolts (×2)
 - M10×1.25×25 Cap flange nut (×8) and washer φ10.3×φ20×2 (×8)

>Loosen the bolts and nuts in the order shown in the figure.

≻ Remove the two M7 bolts before loosening the nuts.

>Loosen the bolts or nuts by 1/2 turn each time, and then remove them after all bolts or nuts are completely loosened.



Check guide strips

Check:

- Timing chain guide
 - Wear/damage → Replace

Check the cylinder head

Hint:: -

1. Clear:

• Carbon deposition in combustion chamber

(Use a round scraper)

>Do not use sharp tools that may cause nicks or scratches.

≻Clean the spark plug hole threads.

➤Clean the valve seat.

2. Examine:

- Cylinder head joint surface
 - Damage/scratches \rightarrow Replace
- Water stains on cylinder head Deposition/Rust → Remove
- 3. Measurement:
 - Warpage of cylinder head joint surface
 Not in scope → Resurface



Warping limit: 0.10mm

a. Place a ruler (1) on the joint surface of the cylinder and the cylinder head, and a thickness gauge (2) through the gap between the ruler and the joint surface.



- b. Measure the warpage.
- c. If the limit is exceeded, resurface the cylinder head.
- d. Wet the 400-600 mesh abrasive paper and place it on the dial, and use the "8" shaped grinding pattern to re-surface the cylinder head joint surface.

Hint:: _____

> To ensure an even surface, spin sand the cylinder head several times.

Install the cylinder head

1. Install:

- Φ 8×14 Hollow positioning pin(1)
- Cylinder head gasket subassembly (2) Change
- Timing chain guide (3)
- Timing chain guide tensioner shaft ④



2. Install:

- Cylinder head
- Change and washer ϕ 10.3× ϕ 20×2 (×8) M10×1.25×25 Cap flange nut (×8) ---
- M7×60 Internal and external hexagon flange bolts (×2)

Hint::

≻Lubricate the internal thread and mating surface of M10 × 1.25 × 25 cap flange nut with engine oil.

- 3. Tighten:
 - M10×1.25×25 Cap-shaped flange nut (1)-(8)
 - M7×60 Internal and external hexagon flange bolts (9)-(10)

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Cap flange nut torque: pre-tighten1st: 25N ·m , pre-tighten 2nd: 45N m, lock 3rd: 60N m, verification 4th: 60N ·m

M7×60 Torque of hexagon flange bolts: 17N·m

* Tighten in the order shown in the figure M10×1.25×25 Cap flange nuts (1)-(8), tighten in three stages, then tighten M7×60 inside and outside Hexagon flange bolts 9-10.



4. Install:

- Intake camshaft sub-assembly
- Exhaust camshaft subassembly Refer to the "Installing the Camshaft " section.

Valves and valve springs

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12

Removing the va	alve and valve spring		
	(×6)6 (×6)6 (×6)0 (×6)0 (×6)0 (×6)0 (×6)0 (×6)0 (×6)0 (×12) (×		$(\times 6)$ $(\times 6)$ $(\times 6)$ $(\times 2)$ $(\times 2)$ $(\times 2)$ $(\times 2)$
No.	Disassembled parts	QTY	Remark
	Cylinder head sub-assembly		Cylinder Head"chapter
1	GB70.1M5×13 Hexagon socket head locking hemispherical screws	2	
2	M14×1.25×12 Hexagon socket flat pan head screw plug (9.8Grade/Zinc-Nickel Alloy)	2	
3	φ13×φ2.8Hydrogenated Nitrile RubberOType ring	2	
4	Small rocker shaft	2	
5	Small rocker arm 11 (Electroplating) manufacturing parts	6	
6	3×27(inner diameter 25.4)×19Sliding tappet(DLC)	6	
7	Φ8.85 Valve clearance adjustment pad	12	
8	Valve lock clamp (5×8.475×14.25)	24	
9	Valve spring upper disc seat	12	

6

6

12

Valve outer spring3.8×2.9 (intake)

Valve inner spring

Valve outer spring3.4×2.7 (exhaust)

13	φ5.0 Valve stem oil seal	12	
14	Valve spring lower seat	12	
15	Exhaust valve	6	
16	Intake valve	6	

Remove the valve

Hint::-

The following steps apply to all valves and related parts.

≻Before removing internal cylinder head components (such as valve springs, valve lock clips, etc.), make sure the valves are sealing properly.

1. Remove:

- •GB70.1M5×13 Hexagon socket head locking hemispherical screw(1) (×2)
- •M14×1.25×12 Hexagon socket flat pan head screw plug (9.8Grade/Zinc-Nickel Alloy) (2) (×2)
- • ϕ 13× ϕ 2.8Hydrogenated Nitrile RubberORing (3) (× 2)
- •Small rocker shaft (4) (×2)
- •Small rocker arm 11 (plating) manufacturing parts(5)(×6)
- •3×27(inner diameter 25.4)×19Sliding tappet (DLC) (6) (×6)



2. Remove:

- •3× ϕ 27(inner diameter25.4)×19Sliding tappet (DLC)(1) (× 6)
- •Small rocker arm 11 (electroplating manufacturing part) @(X 6)
- • Φ 8.85Valve clearance adjustment pad (3) (×12)

Hint::-

≻ Remove the small rocker arm/sliding tappet and adjusting pads in order and place them in order so that they can be reinstalled in their original positions. Set.



3.Examine:

Valve seat ringaseal

Leakage at the valve seat ring \rightarrow Check the valve surface, seat ring surface, and seat ring width. Refer to the " Inspecting the Valve Seats " section.

a. Pour clean solvent (1) into the inlet and outlet.

b. Check the valve seatals it sealed well.

Hint::-

≻ Valve seat ring a There should be no leakage or very little leakage.





4. Remove:

•ZT180MNValve lock clamp (5×8.475×14.2 5)

Hint::-

>Remove the valve lock clip by compressing the valve spring with the valve spring compression tool (1) and the valve spring compression tool joint (2).



5. Remove:

- •Valve spring upper disc seat (1) (×12)
- •Valve inner spring (2) (×12)
- •Valve outer spring3.4×2.7 (exhaust) ③ (×6)
- •Valve outer spring3.8×2.9 (intake) ④ (×6)
- • ϕ 5.0Valve stem diameter oil seal (5) (×12)
- •Valve spring lower seat 6 (×12)
- •Exhaust valve⑦ (×6)
- •Intake valve (×6)
Hint::-

>Arrange the parts in the order in which they were removed, especially the valve outer spring, and mark them so that they can be reinstalled in their original positions.



Check the valve

The following steps apply to all valves.

- 1. Clear:
 - Carbon deposits

(Valve surface)

- 2. Examine:
- •Valve surface

Pitting/wear \rightarrow grinding valve surface

•Valve stem end

The valve stem end is mushroom-shaped or has a diameter larger than the stem diameter \rightarrow Replace the valve

- 3. Measurement:
- Valve stem runout

Not within the range \rightarrow Replace the valve

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Hint::
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≻If the valve is removed or replaced, be sure to recheck the valve seat ring for sealing.



Valve stem runout limit: 0.030mm



Check valve springs

The following steps apply to all valve springs.

- 1. Measurement:
- Free height of valve springa

Not within the range \rightarrow Replace valve spring



2. Measurement:

•Valve spring tilta

Not within the range \rightarrow Replace valve spring





Check valve tappets and valve rocker arms

The following steps apply to all valve lifters and rocker arms. Examine:

- • $3\times$ \$\phi27(inner diameter25.4) \times 19Sliding tappet (DLC)(1) (\times 6)
- •Small rocker arm 11 (Electroplating) manufacturing parts (2) (×6)

Damage/scratches/coating peeling off \rightarrow Replace the valve sliding tappet /valve rocker arm



Install the valve

The following steps apply to all valves and related parts.

- 1. Deburring:
 - Valve stem end



2. Lubricating:

- •Valve stem 1
- ϕ 5.0Valve stem oil seal (2)

(Recommended lubricant is recommended



Recommended oil for lubrication: 10W-50



3. Install:

- Valve spring lower seat (1) (×12)
- \$\$.0Valve stem diameter oil seal (2) (×12) Change
- •Exhaust valve ③ (×6)
- •Valve outer spring3.4×2.7 (exhaust) ④ (×6)
- •Valve inner spring (>12)
- •Valve spring upper disc seat (6) (×12)
- •Intake valve⑦ (×6)
- •Valve outer spring3.8×2.9 (intake) (8) (×6)

Hint::-

Make sure that each valve and related parts are installed in their original positions. If the mixing valve and outer spring are accidentally damaged, The valve seat diameter and the outer diameter of the spring can be used to judge (the valve seat diameter of the exhaust valve is small, and the outer diameter of the outer spring is small).
All springs have the dense part facing downward (valve seat) and the sparse part facing

>All springs have the dense part facing downward (valve seat) and the sparse part facing upward. Dense part (a), sparse part (b).



4. Install:



5. To fix the valve lock clip between the valve stem and the valve upper disc seat, tap the joint (1) lightly with a soft-faced hammer .





6. Lubricating:

- •Φ8.85Valve clearance adjustment pad Φ8.85 (×12)
- •3×¢27(inner diameter25.4)×19Sliding tappet (DLC) (×6)
- •Small rocker arm 11 (Electroplating) manufacturing parts (×6)
- •Small rocker shaft (×2)

(It is recommended to use the recommended lubricant and apply it evenly on the contact surface)



Recommended oil for lubrication: 10W-50

- 7. Install:
 - • Φ 8.85Valve clearance adjustment pad (1) (×12)
 - •Small rocker arm 11 (Electroplating) manufacturing parts (2) (×6)
 - •Small rocker arm shaft ③ (×2)
 - •GB70.1M5×13 Hexagon socket head locking hemispherical screw(4) (×2)
 - \$\phi13 \times \$\phi2.8 Hydrogenated Nitrile RubberORing \$\big5 (\times 2) \$\big6 \big6 \big6
 - •M14×1.25×12 Hexagon socket flat pan head screw plug (9.8Grade/Zinc-Nickel Alloy) (6) (×2)
 - •3× ϕ 27(inner diameter25.4)×19Sliding tappet (DLC)(7) (× 6)



Hexagon socket head locking hemispherical screw torque: 5N m, apply thread glue Hexagon socket head screw torque: $12N\cdot\!m$

Hint::-

>When installing the valve rocker arm shaft and valve rocker arm, pay attention to whether they are stuck. If stuck, they need to be replaced.

The valve tappet must be installed smoothly without sticking. If it sticks, it needs to be replaced.
 Each adjustment pad and valve tappet, valve rocker arm, and valve rocker arm shaft must be reinstalled in its original position.



Magneto rotor clutch

Remov	e the water pump cover and left cover in sequence					
Remove the water pump cover and left cover in sequence						
		Ì	16 N·m 🕅 12 N·m			
No.	Disassembly Parts/Steps	ОТҮ	16 N·m 12 N·m			
No.	Disassembly Parts/Steps	ð QTY	16 N·m 12 N·m Remark Confirm that the engine oil has been drained			
No.	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class)	QTY 14	16 N·m 12 N·m Remark Confirm that the engine oil has been drained			
No.	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class)	QTY 14	16 N·m I 2 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it.			
No.	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class)	0TY 14 1	16 N·m 12 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it.			
No. 1 2 3 4	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class)	QTY 14 1 1 4	16 N·m 12 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it.			
No. 1 2 3 4 5	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\phi6.3\pmathcdotsquare	QTY 14 1 1 4 1	16 N·m 12 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it.			
No. 1 2 3 4 5 6	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\phi6.3\pmi2\times1.6 Copper gasket \$\phi8\times14 Hollow positioning pin	QTY 14 1 1 4 1 3	16 N·m I 2 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it.			
No. 1 2 3 4 5 6 7	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\phi6.3\phi12\times1.6 Copper gasket \$\phi8\times14\$ Hollow positioning pin Combined sealing gasket \$\phi8\pmax418\times2	QTY QTY 14 1 1 4 1 3 4	16 N·m I 2 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it. It is recommended to replace it with a new one every time you disassemble it.			
No. 1 2 3 4 5 6 7 8	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\phi6.3\phi12\times1.6 Copper gasket \$\phi8\times14\$ Hollow positioning pin Combined sealing gasket \$\phi8\times418\times2 Water pump cover	QTY QTY 14 1 1 4 1 3 4 1 3	16 N·m I 2 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it. It is recommended to replace it with a new one every time you disassemble it.			
No. 1 2 3 4 5 6 7 8 9	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\phi6.3\pmi12\times1.6 Copper gasket \$\phi8\times14 Hollow positioning pin Combined sealing gasket \$\phi8\times418\times2 Water pump cover Water pump cover gasket	QTY QTY 14 1 1 4 1 3 4 1 1 1	16 N·m Remark Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it.			
No. 1 2 3 4 5 6 7 8 9 10	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\overlimed 6.3×\overlimed 12×1.6 Copper gasket \$\overlimed 8ealing gasket \$\overlimed 8×\overlimed 18×2\$ Water pump cover Water pump cover gasket M32×1.5×15 Hexagon socket aluminum screw plug	QTY QTY 14 1 1 1 4 1 3 4 1 1 1 1 1	16 N·m Remark Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it.			
No. 1 2 3 4 5 6 7 8 9 10 11	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) φ6.3×φ12×1.6 Copper gasket φ8×14 Hollow positioning pin Combined sealing gasket φ8×φ18×2 Water pump cover Water pump cover gasket M32×1.5×15 Hexagon socket aluminum screw plug φ29×φ2.8 Hydrogenated Nitrile Rubber O Type ring	QTY QTY 14 1 1 1 4 1 3 4 1 1 1 1 1 1	16 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it. Remove this bolt first, make sure the coolant has been drained, and then tighten it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it.			
No. 1 2 3 4 5 6 7 8 9 10 11 12	Disassembly Parts/Steps M6×30 internal and external hexagon flange bolts (9.8 class) M8×16 internal and external hexagon flange bolts (9.8 class) M6×16 internal and external hexagon flange bolts (9.8 class) M6×45 Full thread internal and external hexagon flange bolts (10.9 class) \$\phi6.3\phi12\times1.6 Copper gasket \$\phi8\times14\$ Hollow positioning pin Combined sealing gasket \$\phi8\times2\$ Water pump cover Water pump cover gasket M32\times1.5\times15\$ Hexagon socket aluminum screw plug \$\phi29\pi2.8\$ Hydrogenated Nitrile Rubber O Type ring M14\times1.25\times12\$ Hexagon socket flat pan head screw plug (9.8 class)	QTY QTY 14 1 1 1 4 1 3 4 1 1 1 1 1 1 1 1 1 1	16 N·m I 2 N·m Remark Confirm that the engine oil has been drained Remove this bolt first, make sure the coolant has been drained, and then tighten it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it. It is recommended to replace it with a new one every time you disassemble it.			

Removing	the Magneto Rotor Clutch		
18 17			Change Change
No.	Disassembly Parts/Steps	QTY	Remark
14	Left cover water channel sealing ring	1	It is recommended to replace it with a new one after each disassembly.
15	Left crankcase cover gasket	1	It is recommended to replace it with a new one after each disassembly.
16	Left crankcase cover subassembly	1	
17	M12×1.25×40 Hexagon flange bolt (12.9 class)	1	
18	φ 12.3×φ32×4 High strength flat gasket	1	
19	Magneto rotor clutch sub-assembly	1	
20	Electric starter secondary reduction gear subassembly	1	
21	5×4.8×ф16×12 Woodruff Key	1	
22	φ 12.2×φ20×1 Thrust washers	2	
23	Electric starter reduction gear subassembly	1	

Removing the Magneto Rotor Clutch

1. Disassembly

•Magneto rotor bolt "1"

•High strength flat pad

Hint::-

➢ Fix the magneto rotor and loosen the magneto rotor bolts with an electric gun.

2. Disassembly

Magnetic motor rotor "1"

(Use external thread pull code "2")

Woodruff Key
 Hint::-

➢ First, screw the external thread puller clockwise to the bottom, fix the magneto rotor, and then tighten the top bolt of the external thread puller with an electric gun to pull out the magneto. Machine rotor.





Check the overrunning clutch

- 1. Examine
 - •Over running clutch roller

Damaged/worn \rightarrow Replace magneto rotor



2. Examine

- •Electric starter with large gear
- •Electric starting reduction gear
 - Burrs/chips/bumps/wear \rightarrow Replace defective parts.

3.Examine

Electric starter large tooth contact surface
 Damage/wear/pitting → Replace the electric starter gear

4. Examine

• Overrunning clutch operation

a)Install the electric starter large tooth "1" onto the magneto rotor "2" and fix the magneto rotor.

b) When the electric starter gear is turned clockwise in the direction of "A", the electric starter gear and the electric starter reduction gear should be engaged and cannot rotate freely. Otherwise the overrunning clutch is faulty and the magneto rotor must be replaced.

c) When the electric starter gear is turned counterclockwise in the direction of "B", it should rotate freely. Otherwise, there is a problem with the overrunning clutch and the magnetic clutch must be replaced. Motor rotor.



Installing the Magneto

1. Install

- ●5×4.8×ф16×12Woodruff Key
- •Magnetic motor rotor
- •φ12.3×φ32×4High strength flat gasket
- •M12×1.25×40 Hexagon flange bolt (12.9 class)
 - Hint::-

Clean the tapered portion of the crankshaft and the tapered bore in the magneto rotor.

>When installing the magneto rotor, make sure the Woodruff key is properly seated in the keyway of the crankshaft.

>Lubricate the flat gasket with engine oil.

>Lubricate the magneto rotor bolt threads and flat washer mating surfaces with engine oil.

2. Tighten

Magneto rotor bolts

3. Smear

• Flat sealant (on the flat side of the oil-proof rubber sleeve of the magneto stator trigger and the groove of the left cover)



- 4. Install
 - Left cover gasket
 - •Left cover
 - Hint::-

 \succ Tighten the left cover bolts in stages and crosswise. (A copper washer is required for bolt (1)).



47 / 130

5. Install

• Water pump cover gasket

Water pump cover
 Hint::-----

≻Tighten the water pump cover bolts in stages and crosswise.



Clutch

Remove	he right rear cover of the clutch		
	Change Change Change Change Change Change Change Change Change Change Change Change Change Change Change Change		
NO.	Disassembly Parts/Steps	QIY	Remark
	Mix30 internal and external hexagon flange bolts (9.8 class)	10	
2	class)	1	
3	Clutch rear right cover	1	
4	Clutch right rear cover gasket	1	It is recommended to replace it with a new one after each disassembly.
5	GB119.2 ϕ 9×14Cylindrical Pins	2	
6	M24×2×15 Oil filler plug	1	
7	φ25×φ3.1 Hydrogenated Nitrile Rubber O Ring	1	It is recommended to replace it after each disassembly

Remove the	tie rod shaft		
	Tiscenth Part / Stars		Pemark
1	Clutch right cover rubber cover	1	пеннак
2	Clutch right cover rubber	1	
3	GB894.1Shaft circlip φ10×1	1	It is recommended to replace it with a new one after each disassembly.
4	Clutch lever rocker arm assembly	1	
5	Clutch rocker arm torsion spring	1	
6	GB896Open retaining ring φ9×1	1	It is recommended to replace it with a new one after each disassembly.
7	Clutch release rod shaft	1	
8	FBф15×ф26×7 Hydrogenated nitrile rubber oil seal	1	It is recommended to replace it with a new one after each disassembly.
9	GB290-HK1512 Needle Roller Bearings	1	,

10	GB290-HK1010 Needle Roller Bearings	1	
11	Non-standard large head hexagon socket bolts M6×12	1	
12	φ 10.2×φ18×1 Thrust washers	2	

Disassemblin	ng the clutch		
No.	Disassembly Parts/Steps	QTY	Remark
			Confirm that
			the engine oil
			has been
1	Clutch caring proceure plate	1	arainea
2	Clutch spring	1 2	
2	Clutch sliding pressure plate (self-made)	5 1	
	Clutch release lever	1	
<u>+</u> с	GB276-16001/P6Deep groove hall hearings	 1	
6	d111xd132 5x2 9Clutch friction nlate (vellow mina 271)	 >	
7	φ111/φ132.3/2.9/2.9/2.9/2.9/2.9/2.9/2.9/2.9/2.9/2.9	<u> </u>	
/ 0	ϕ_{132} , 55,0-5,0-5,0-5,00-6 in Grand G	 7	
<u></u>	$\psi_{132,3\times2,0}$ -319134 Gear clutch driven plate	/	
9	φ±±±×φ±32.5×2.9 Clutch inction plate (black miba 279)	/	



Disassembling the clutch

1. Disassembly

- •Clutch right rear cover "1"
- •Clutch right rear cover gasket

Hint::-----

≻Loosen the right cover bolts in stages and crosswise.



2. Disassembly

• Oil pump driven sprocket "1" (see "Oil pump" for details)



- 3. Disassembly
 - •M6×30 internal and external hexagon flange bolts (9.8Level) "1"*3
 - •Clutch spring pressure plate "2"
 - •Clutch spring *3
 - •Clutch sliding pressure plate "3"
 - •Clutch release lever "4"
 - •Clutch oil flow limiting shaft



- 4. Disassembly
 - \$\phi111 \phi132.5 \times 2.9 Clutch friction plate (yellowmiba271) "1"
 - \$4132.5 × 3.0-3 M36 Tooth clutch driven plate "2"



5. Disassembly

- •Clutch convex nut "1"
- ϕ 20.4× ϕ 35×4.5×4Lock washer "2"
 - Hint::-----

≻After tightening the friction plate, loosen the nut with an electric gun.



6.Disassembly

- \$\phi 132.5 \times 2.0 3 M34 Gear clutch driven plate*7
- ϕ 111× ϕ 132.5×2.9Clutch friction plate (blackmiba279)*7
- ϕ 111× ϕ 132.5×2.9Clutch friction plate (yellowmiba271)
- $\bullet \varphi 102.5 \times \varphi 109.5 \times 2 \times 1 \text{ Locking washers}$
- φ102.5× φ109.5×1.2Thrust washers

7. Disassembly

- •Clutch driven plate
- φ25.3×φ42×4.0Position mat*2
- Clutch active plate
- •Oil pump drive chain
- •KK32×37×36Double row needle roller bearings
- Clutch bushing (homemade)

Check friction plate

The following steps apply to all friction pads.

Hint::-

1. Examine

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•\phi111×\phi132.5×2.9Clutch friction plate (yellowmiba271) 、 (blackmiba279) Damage, wear \rightarrow
Replace the friction plates as a set.
```

2. Measurement

• ϕ 111× ϕ 132.5×2.9Clutch friction plate (yellowmiba271) 、 (blackMiba27 9) Thickness Exceeds the specified value \rightarrow Replace the friction plate as a set.

>When measuring the friction plate, select four positions for measurement.





Check the clutch plate

The following steps apply to all clutch plates.

1. Examine

• ϕ 132.5×3.0-3M36Gear, ϕ 132.5×3.0-3M34Thickness of clutch driven plate Damaged \rightarrow Replace the clutch plate.

2. Measurement

• ϕ 132.5×3.0-3M36Gear, ϕ 132.5×3.0-3M34Thickness of clutch driven plate Exceeds the specified value \rightarrow Replace the friction plate as a set.

Driven piece 1 thickness 2.95-3.05mm (0.116-0.120 inch)
Warpage limit
0.10mm (0.004inch) Driven piece2thickness
1.95-2.05mm (0.077-0.0 81inch) Warpage
limit
0.10mm (0.004inch)

3. Measurement

•Assembly width of friction plate and clutch driven plate Exceeds the specified value \rightarrow Adjust



Assembly width 43.0mm-43.8mm (1.69-1.73 inch)

Hint::-

>Thickness measurements were performed without oil.

 \succ Can only be performed if the friction plates and clutch plates have been replaced .

>Use 9 Friction plate and 8 Combine the friction plate and clutch driven plate and measure the total thickness of the friction plate and clutch driven plate.

Check the clutch springs

The following steps apply to all clutch springs.

- 1. Examine
 - •Clutch spring

 $\mathsf{Damaged} \rightarrow \mathsf{Replace} \ \mathsf{clutch} \ \mathsf{spring} \ \mathsf{as} \ \mathsf{necessary}.$

2. Measurement

- •Clutch spring free length "a"
 - Exceeds the specified value \rightarrow Replace the clutch spring as a set.

Clutch spring free length 43.1mm (1.70inch)
Limit length 42.6-43.6mm (1.68-1.72 inch)



Check the clutch plate

- 1. Examine
 - •Clutch active claw

Damage/Dents/Wear → Remove burrs from clutch plate claws or replace clutch plate. Hint::------

Dents on the clutch plate claw can cause unstable clutch operation.



2. Examine

•Oil pump driving sprocket "1"

 $\mathsf{Crack}/\mathsf{Damage}/\mathsf{Wear} \rightarrow \mathsf{Replace}$



3. Examine

Bearings

Damaged/worn \rightarrow Replace bearings and clutch plate.

Check the clutch disc

Examine

•Clutch driven plate spline

Hint::-

Damaged/dented/worn \rightarrow replace clutch disc

➢Dents on the clutch plate can cause erratic clutch operation.



Check the clutch pressure plate

Examine

- •Clutch spring pressure plate "1"
- Clutch pressure plate "2"

Crack/Damage \rightarrow Replace Bearing "3"

• Damaged/worn \rightarrow Replace



Check the primary drive gear

Examine

•Primary drive gear

Damage/wear \rightarrow Replace the crankshaft and clutch plate as a whole.

Excessive noise during operation \rightarrow Replace the crankshaft and clutch active plate as a whole.

Check the clutch gear

Examine

•Clutch gear1"

Damage/wear \rightarrow Replace the crankshaft and clutch plate as a whole.

Excessive noise during operation \rightarrow Replace the crankshaft and clutch drive plate as a whole



Check the tie rod shaft and tie rod

1. Examine

- •Tie rod shaft pinion tooth "1"
- •Separation lever tooth "2"

Damage/wear \rightarrow Replace the tie rod and tie rod shaft as a whole



2. Examine

Tie rod bearing

Damaged/worn \rightarrow Replace

Installing the Clutch

1. Install

- •φ25.3×φ42×4.0Position pad
- •Oil pump driven sprocket
- •Oil pump drive chain "1"
- •Clutch active plate "2"

Hint::-

>Install the oil pump drive chain onto the oil pump drive sprocket "a "superior.



2. Install

- •φ25.3×φ42×4.0Position pad
- Clutch driven plate
- $\bullet \varphi 102.5 \times \varphi 109.5 \times 1.2$ Thrust washers
- \$\phi102.5×\$\phi109.5×2×1 Locking washers
- ϕ 111× ϕ 132.5×2.9Clutch friction plate (yellowmiba271)
- ¢132.5×2.0-3M34Gear clutch 2 driven plate (×7)
- ϕ 111× ϕ 132.5×2.9 Clutch friction plate (black miba279(×7)

Hint::-

First, install the friction plate (yellow), then install the driven plates (3 4 teeth) and friction plates (black), and make sure that the grooves of the friction plates are Alignment.

3. Install

•φ20.4×φ35×4.5×4 Locking washers

•Convex nut of clutch



M20×1.0 Hexagonal locking nut (8 Level): 125 N ·m

Hint::----

≻Press the clutch friction plate tightly, and then tighten the clutch convex nut.

>Install the lock washer on the spindle, OUTThe markings face outward.

> Fix the clutch male nut on the main shaft opening and knock out a locking notch here with a flat-blade screwdriver.

4. Install

- •Clutch oil flow limiting shaft
- Clutch pressure plate
- •Clutch release lever
- ϕ 111× ϕ 132.5×2.9Clutch friction plate (yellowmiba271)
- \$4132.5 × 3.0-3 M36 Gear clutch driven plate
- •Spring of clutch (×3)
- •Clutch spring pressure plate
- •Clutch spring bolt (×3)



M6×30 Hexagon flange bolts (9.8 Grade): 10N ·m

a)Apply engine oil to the pressure plate bearing.

b)Assemble the clutch release lever, the last friction plate and the driven plate on the pressure plate, and install the friction plate in a staggered manner with the installed friction plate. Fit it into the active plate claw groove, and then assemble the pressure plate to the clutch.

c)Tighten the clutch spring bolts in stages and crosswise.

d) Apply lithium grease to the tie rods.

e) Position the release lever so that tooth "a" faces toward bolt "b".



5. Install

- •GB119.2 φ9×14 Cylindrical pin*2
- •Clutch right rear cover gasket
- •Clutch right rear cover

Č)	M6×30 Hexagon flange bolts (9.8 Level): 11.5N ·m
Hint::	

≻Tighten the clutch right rear cover bolts in stages and crosswise.

Gear shifting mechanism

Schematic diagram of gear shifting mechanism				
schematic diagram of gear shirting mechanism				
No.	name	QTY	Remark	
	Right rear crankcase cover assembly		The shift mechanism can be	
	Clutch assembly		disassembled only after it is	
	Shift rocker arm		removed	
1	φ14.2×φ22×1Thrust washers	1		
2	Spring retaining ring for shaft ϕ 19×1	1	Replacement	
3	φ19.2×φ27×1Thrust washers	1		
4	Stopper	1		
5	Stopper Bushing	1		
6	Shift shaft return torsion spring	1		
7	Stopper tension spring	1		
8	Gear shift shaft	1		
9	M8×14Shift torsion spring limit stud	1	Installation torque24±1.5 N·m	
10	M6×14 Middle hexagonal shaft Ф4×4.5 Hemispherical cap bolt	1	Installation torque 11.5±0.5 N·m	
11	Open retaining ring φ12×1.2	1	Replacement	
12	14.2×30×1.5Thrust washers	1		
13	FB ϕ 14× ϕ 25×7Hydrogenated nitrile rubber oil seal	1	Replacement	
14	GBT290-HK1412 Needle Roller Bearing	1		

Check the gear shift shaft

1. Remove:

- Open retaining ring(2)
- Thrus washer ①



Hint::

>After removing the retaining ring and gasket, use a rubber hammer to tap the shift shaft in the direction of the arrow in the figure to remove the shift shaft assembly.

- 2. Examine:
 - Shift shaft 1
 - Bent, damaged, worn \rightarrow replace
 - Shift shaft return torsion spring (2)
 - Sleeve of stopper ③
 Damaged, worn → replace

Check the stopper

Examine:

- Stop
 - Bent, damaged ightarrow Replace

The bearing rotates unsteadily \rightarrow replace the stopper



Install the shift shaft

- 1.Assemble the shift shaft assembly:
 - Shift shaft ①
 - Shift shaft return torsion spring(2)
 - Sleeve of stopper ③
 - Stop? (4)
 - Thrust washer (5)
 - Spring retaining ring for shaft 6 replace with new one
 - Stopper tension spring (7)



Hint::

>a of the shift shaft return torsion spring (2) Open the b installed on the shift shaft (1) Place.
>One end of the tension spring (7) of the brake is hooked into the tension spring hole of the brake.
>The retaining ring falls completely into the retaining ring groove of the stopper sleeve.

- 2. Install:
 - Shift shaft reset torsion spring limit stud(1)
 - M6×14 Middle hexagonal shaft Φ4×4.5Hemispherical cap bolt 2
 - Shift shaft assembly
 - Stopper tension spring ③



10W-50	Lubricate with engine oil before assembly: Shift shaft, oil seal inner ring
X	Bolt $\textcircled{1}$ installation torque: 11.5±0.5 N ·m
Hint::	

 The end of the shift shaft return torsion spring ④ is on the shift torsion spring limit stud①.
 The other end of the stopper tension spring ③ is hooked on the stopper ⑤ and the hemispherical cap bolt. ≻The detent meshes with the shift star cam.

> Apply thread sealant to bolts (1) and (2).

3. Install:

- Roller bearings
- Oil seal
- Thrust washer (1)
- Opening retaining ring(2) replace with new one



Hint::

>The disassembly and assembly of needle roller bearings requires a bearing pulling tool. Unless the bearing/housing is damaged and needs to be replaced, the bearing does not need to be removed for general maintenance.

>The oil seal only needs to be replaced when there is oil leakage. When replacing and installing, use engine oil to lubricate the inner and outer rings of the oil seal.

>When the bearings and oil seals need to be replaced, install the bearings and oil seals first and then install the shift shaft assembly.

>The retaining ring falls completely into the retaining ring groove.

Oil Pump



Schematic diagram of oil pump overall components				
253				
No.	name	QTY	Remark	
1	Oil pump cover	1		
2	Oil pump shaft	1		
3	φ4×16 Cylindrical Pins	1		
4	Inner rotor	1		
5	Outer rotor	1		
6	Φ8×14Hollow positioning pin	2		
7	Oil pump pressure relief valve plunger	1		
8	Oil pump relief valve spring	1		
9	Oil pump pressure relief valve spring seat	1		
10	Circlips for holes	1	Replacement	
11	M6×16 Hexagon flange bolts	1	Installation torque 11.5±0.5 N·m	
Check the oil pump sprocket and chain

1. According to the "Oil Pump Disassembly Diagram" Remove the oil pump.

2. Examine:

- Oil pump driven sprocket
- Oil pump drive chain

Cracks, damage, wear, chain jamming \rightarrow Replace defective parts.



Hint::

The chain moves smoothly throughout the entire circle without any sticking, otherwise replace it.
 The chain needs to be cleaned before installation.

Check the oil pump

1. Examine:

• Oil pump housing

Cracks, damage, wear \rightarrow Replace the oil pump assembly or housing.



- 2. Gap measurement check:
 - Tip clearance from inner rotor to outer rotor "a"
 - Clearance from outer rotor to oil pump housing "b"
 - 1 Inner rotor
 - (2) Outer rotor



>When the measured value exceeds the standard value, it is recommended to replace the oil pump assembly.

Check the pressure relief valve

1. Examine:

- Pressure relief valve plunger (1)
- Pressure relief valve spring





Assembling the oil pump

1. Assemble the pressure relief valve:

- Pressure relief valve plunger ①
- Pressure relief valve spring 2
- Pressure relief valve spring seat ③
- Elastic retaining ring for hole (4)-replace with new one



Hint::

>During installation, install (1)-(4) in sequence, and the pressure relief valve spring (2) falls into the pressure relief valve plunger (1).

> The raised surface of the pressure relief valve spring seat faces the spring.

>It is recommended to use a new elastic retaining ring for the hole, and the retaining ring should fall completely into the retaining ring groove.

2. Assembling the oil pump:

- Inner rotor ①
- Outer rotor (2)
- Solid pin(3)
- pump shaft(4)
- Oil pump cover (5)
- Hollo pin
- Oil pump cover bolts



3. Installation review:

After the oil pump assembly is installed, put the sprocket on the oil pump shaft and rotate the oil pump shaft. The rotation is smooth without any jamming. After the re-inspection is qualified, remove the sprocket and prepare for the final assembly.



Installing the Oil Pump

1. Install the oil pump mechanism:

- Oil pump assembly ①
- M6×45 Full thread hexagon flange bolts 2×4
- Oil pump driven gear fixing bolt ③



First install the oil pump seat onto the box, Then install the oil pump assembly (1) to the position shown in the figure.

>Install the driven gearOUTFace outwards, first mesh the gear with the chain. The sprocket is then mounted on the oil pump shaft according to the shape. Install the chain to the oil pump driving sprocket. See "Installing the Clutch".

≻Install the chain to the oil pump driving sprocket. See "Installing the Clutch".

≻For the installation sequence, see "Oil Pump Mechanism Explosion Diagram".

 \triangleright Apply thread glue to bolt ③.

2. Install the oil pump mechanism:

After installation, use pliers to clamp the oil pump sprocket locking plate tightly against the hexagonal flange head of the driven gear fixing bolt to prevent it from loosening.

Oil sump

Schematic diagram of oil pan mechanism decomposition				
ST OF				
No.	name	QTY	Remark	
	Oil pan gasket	1	Replacement	
2	UII pan parts	1		
3	φ6.3×φ12×1.6Copper gasket	3		
4	Combined sealing gasket ϕ 14× ϕ 23×2	1	Replacement	
5	M14×1.5×17Hexagon flange oil drain bolt	1	Installation torque40±3 N·m	
6	Coarse filter	1		
7	φ25×φ3.1Hydrogenated Nitrile RubberOType ring	1		
8	Oil coarse filter fixed buffer rubber bushing	1	Replacement	
9	Oil coarse filter fixing buffer rubber	1	Replacement	
	M6×30 internal and external hexagon flange bolts	18	Installation torque 11.5±0.5 N·m	

Schematic diagram of the overall components of the oil pan			
No.	name	QTY	Remark
1	M6×12Non-standard large head hexagon socket bolts	2	Installation torque 10±0.5 N·m
2	Oil battle	1	
3	φ6×9 Cylindrical locating pin	2	

Remove the oil pan

Remove::

- Oil pump assembly ①
- Oil pan(2)



Hint::

Loosen and remove the drain bolt, drain the engine oil, and then proceed with subsequent operations.
 Loosen the bolts diagonally in stages, 1/2 Circle, 15 Completely loosen the bolts and remove the oil pan assembly.

Check the primary filter and oil pan

1. Install the "Oil Pan Mechanism Disassembly Diagram" and remove the coarse filter.

- 2. Examine:
 - Coarse filter ①
 - Coarse filter fixing bushing (2)
 - Buffer rubber ring ③
 - Damaged or aged \rightarrow Replace. Contaminants \rightarrow Clean with detergent.



3. Check the oil pan:

Oil pan is damaged, cracked or deformed \rightarrow replace.

Install the oil pan

1. Install the primary filter:

Install the coarse filter according to the "Oil Pan Mechanism Explosion Diagram".

- Coarse filter ①
- Coarse filter fixing bushing (2)
- Buffer rubber ring (3)
- φ25×φ3.1 Hydrogenated Nitrile RubberOType ring ④
- M6×30 internal and external hexagon flange bolts (5)×3



FirstOThe ring is placed on the interface of the coarse filter without any distortion.Apply thread sealant to the bolts.

2. Assemble the oil pan assembly:

Assemble according to the "Oil pan overall component disassembly diagram".

- M6×12 Non-standard large head hexagon socket bolts ①×2
- Baffle (2)
- Cylindrical positioning pin (3)×2





Hint::

➤The bolts are coated with thread glue.

>If the cylindrical positioning repin is loose, it is necessary to apply fastening glue before assembly...

3. Install the oil pan mechanism:

Install according to the "Oil Pan Mechanism Disassembly Diagram".

- Oil pan gasket Replace
- Oil pan assembly ①
- Oil drain bolt combination washer replace with new one
- Oil drain bolt (2)
- Copper gasket × 3
- M6×30 internal and external hexagon flange bolts×15



X	Oil pan fixing bolt installation torque: 11.5±0.5 N ⋅m
X	Oil drain bolt installation torque: 40±3 N·m

Hint::

≻Oil pan gasket (replace).

- >Install the copper gasket according to the "Oil Pan Mechanism Disassembly Diagram"
- ➢Oil drain bolt washer (replace with new one)
- ≻Tighten diagonally15Bolts.

Crankcase

Separate cr	ankcase	
	 1: First, tighten 8 M9 bolts with a fixed torque gun with a torque of 25±1.5N·m, and then loosen the bolts in turn. 2: Tighten the M9 bolt with a fixed torque gun with a torque of 15±1.5N·m. 3: Finally, tighten the M9 bolt to 75° with a fixed twist gun. 	
Pre-tighte tighten the gun with a	n 6 M8 bolts and em with a fixed torque otorque of 24±1.5N·m Torque of 24±1.5N·m Torque Torque Torque	rque puirement: 5±0.5N
5N 	Torque requirement: Torque 11.5±0.5N 11.5±0.5N	
	Parts to be removed	QTY
	Cylinder head	
	Water Pump	
	Magneto	
	Starter motor	
	Clutch rear right cover	
1	Cylindrical paper full-flow oil fine filter	1
2	Oil filter element union bolt	1
3	Gear position sensor	1
4	Clutch cable bracket	1
5	Lower crankcase	1
6	GB119.2 φ9×14 Cylindrical Pins	2
7	Oil pressure switch	1
8	Double-ended stud	8
9	Oil channel cover	1

- 1. Turn the engine upside down
- 2. Tear down:
 - Crankcase bolts (×30)

Hint:: -

≻Loosen each bolt one at a time 1/4 After all bolts are loosened completely, remove it.

>Loosen the bolts in the correct order as shown.

>The numbers on the crankcase are reversed to indicate the order in which the crankcase bolts should be tightened.



- 3. Tear down:
 - Lower crankcase

Hint:: -

>Use a soft-faced hammer to strike the side of the crankcase, hitting only the reinforced portion of the crankcase, not the mating surface of the crankcase. Slowly and carefully The two halves of the crankcase are evenly separated.

- 4. Removal: Dowel Pins
- 5. Tear down
 - Crankshaft lower bearing
 - Balance shaft bearing (in the lower crankcase)

Hint::-

>Arrange the removed parts in order and make new marks so that they can be assembled correctly to their original positions during installation .

Check the crankcase

1. Clean both parts of the crankcase thoroughly with a mild solvent

2. Clean all gasket surfaces and crankcase mating surfaces

3. Examine

- Crankcase crack/damage \rightarrow replace
- Oil delivery channel
- Blockage \rightarrow Blow out with compressed air

Install the crankcase

1. Lubricate the crankshaft bearing inner surface (use recommended engine oil)

2. Apply sealant (on the crankcase mating surface)

Hint::

>Do not allow any sealant to come into contact with the oil passages or crankshaft or balance shaft



- 3. Install the locating pins
- 4. Put the shift drum assembly and gear in neutral position

5. Install

• Lower crankcase $\rightarrow 1$ (Upper crankcase $\rightarrow 2$)

Hint::

>Before tightening the crankcase bolts, ensure that the gears shift correctly when the shift drum assembly is turned manually.



6. Install

• Crankcase bolts (×30)

Hint::

>Lubricate with oil 1to 12Position the bolt threads, flange faces and combined seals, lubricate 13to 14Bolt threads and flange surfaces at the correct positions.

- a. Position in the figure9to12. Put in4OneM8×1.25×75 Bolts and ϕ 9× ϕ 18×2 (Dacromet) combined sealing gasket.
- b. Position in the figure 13to 14. Put in twoM8×1.25×60bolt.
- c. Position in the figure 18, 29Put in twoM6×60bolt (φ6.3×φ12×1.6Copper gasket2indivual).
- d. Position in the figure 16to26. Put in twoM6×60bolt.
- e. Position in the figure 15, 17, 19to25, 27, 28, 30, put in twelveM6×45bolt.



- 7. Tighten 1-8bolt
 - Figure, in order 1to8WillM9Pre-tighten the bolts and thenM9Tighten the bolts with a torque gun, torque 2 5±1.5N·m.
 - Then in sequence8to1After loosening the bolts, 1to8Use a torque gun toM9Bolt tightening, torque15±1.5N·m.
 - Last in order 1to8. Use a torque gun toM9Tighten the bolts to75°.

Hint::

➢If the bolts are tightened beyond the specified angle, do not loosen the bolts and tighten them again. Instead, replace them with new bolts and tighten them again run the program.



8. Tighten 9-14 bolt

• Press the picture below9to14Sequential preload6OneM8Bolts, tighten with a torque gun, torque24±1.5N ·m



9. Tighten 15-30 bolt

● In order 15 to 30. Tighten with a torque gun 18 One M6 Bolts, torque 11.5 ±1.5N ·m



Connecting rod and piston

Remove the con	necting rod and piston	
2	Parts to be removed	β
190.	Lower crankcase	QTI
1	Connecting rod cap	3
2	Connecting rod bearing	6
3	Piston pin retaining ring	6
4	Piston pin	3
5	piston	3
6	link	3
7	The first air ring	3
8	The second air ring	3
9	Oil ring assembly	3

Disassembly of connecting rod and piston

The following steps apply to all connecting rods and pistons

- 1. Disassembly
- Rod cover
- Rod
- Connecting rod bearing

Hint: -

Place the disassembled connecting rod bearings in order and mark them so that they can be installed in their original positions. After disassembling the connecting rod and connecting rod cap, Be careful not to scratch or bump the mating surfaces of the connecting rod and the connecting rod cap.



- 2. Disassembly
- Piston pin retaining ring 1
- •Pin2
- •Pistn3

Notice: -

>Do not use a hammer to drive out the piston pin.

➢Place identification marks on the top of the piston so that it can be assembled in the original position during reassembly.

>Before removing the piston pin, deburr the piston pin retainer groove and the piston pin bore . If both areas have been deburred and the piston pin is still difficult to remove, use a piston pin puller to remove it. Do not use a hammer to drive out the piston pin.



3. Disassembly

- •First air ring
- •Second air ring
- •Oil ring assembly

hint: -

➤To remove a piston ring, pinch the open end with your fingers and lift the other open end of the piston ring onto the top of the piston.



Check the cylinder and piston

1.Examine:

- Piston skir
- •Cylinder wall

Vertical scratches \rightarrow Replace cylinder, replace piston and piston ring.

2. Measurement

• Piston to cylinder clearance

a. Measuring the cylinder bore with a cylinder gauge



b. If it is not within the grouping range, replace the cylinder and replace the piston and piston rings as a set .

c. Use a measuring instrument to measure the piston skirt diameter "P":

- •A Piston group Ø 69.970~ Ø 69.975
- •B Piston group Ø 69.965~ Ø 69.970
- •C Piston group Ø 69.960~ Ø 69.965



a From the bottom edge of the piston 9.0mm

- d. If not within specification, replace piston and piston rings as a set
- e.Calculate piston-cylinder clearance using the following formula:
 - •Piston-cylinder clearance = cylinder diameter "D- Piston skirt diameter "P"
 - Piston-cylinder clearance0-0.05

f. If it is out of range, replace the cylinder and replace the piston and piston ring as a set.

Check piston rings

1. Measurement

•Ring side clearance ·

Out of range \rightarrow Replace the piston and piston ring as a whole

hint: _____

Before measuring the piston ring side clearance, clean the carbon deposits on the piston ring groove and piston ring.

➢Piston ring side clearance

First gas ring: ring side clearance0.025-0.06mm

Second gas ring: ring side clearance0.020-0.055mm

2.Install

• Piston ring (installed into cylinder)

Hint:-

➤After installing the piston ring, use the top of the piston to level the piston ring and push the piston ring to the bottom of the cylinder where the cylinder wear is the least.

3. Measurement

• Piston ring end clearance

Out of range \rightarrow Replace the piston ring

Hint: -

>Unable to measure the end clearance of the liner ring. If the scraper ring clearance is too large, replace the oil ring assembly.

➤Gas ring end gap

First gas ring: end gap0.18 0.30mm

Second gas ring: end gap0.30-0.50mm

Check the piston pin

1.Examine

- ●DLC Plating peeling/scratching → Replace the piston pin and check the lubrication system
- 2. Measurement
- •Piston pin outer diameter

Out of range \rightarrow Replace piston pin

- Piston pin outer diameter
- 15.994-16.000mm
- 3. Measurement
 - •Piston pin hole inner diameter "b"

Out of range → Replace piston Piston pin hole inner diameter 16.002-16.008mm

- 4. Calculate
 - •Clearance from piston pin to piston pin hole

Out of range \rightarrow Replace the piston pin and piston as a whole Piston pin-piston pin hole clearance = piston pin hole inner diameter - piston pin outer diameter Clearance from piston pin to piston pin hole0.002-0.014mm

Check the connecting rod

1.Measurement

• Crank pin to connecting rod bearing clearance

Out of range \rightarrow Replace the Connecting rod bearing Gap: 0.053-0.065mm

• The following steps apply to all connecting rods

hint: -

Interchange of connecting rod bearings and connecting rods is prohibited. In order to measure the correct crankpin to connecting rod bearing clearance and prevent damage to the engine, the connecting rod bearing must be installed in its original position.

a. Clean the connecting rod bearings, crank pin and inside of the connecting rod.

b. Install the connecting rod bearing into the connecting rod and the connecting rod bearing into the connecting rod cap

hint:

The locating lip on the connecting rod bearing a and the locating lip groove on the connecting rod cap b Alignment.



a. place a of plastic wire gap gauge on the crank pin.



b. Assemble the two parts of the connecting rod

Notice:

Hint:

•Tighten the connecting rod bolts using the angle method and install new bolts.

≻flange surfaces with clean engine oil.

- >Make sure the projection on the connecting rod cover a with b on the connecting rod The protruding parts of the regions face in the same direction.
- >After installing the connecting rod bearings, assemble the connecting rods and connecting rod caps without installing them on the crankshaft.



a. Tighten the connecting rod bolts while checking the parts shownaand bAre the parts flush with each other.

Hint:
>When installing the connecting rod bearing, be careful not to install it at an angle and the position should not deviate from the center.



a Side processing surface b Large hole end face

a. Loosen the connecting rod bolts, remove the connecting rod and connecting rod cap, and install these parts on the crankshaft with the connecting rod bearing shells in their current condition.

Hint:

- >Do not move the connecting rod or crankshaft until the clearance measurement is completed.
- ➤Make sure the cross section on the connecting rod cap a with the connecting rod b The marks point in the same direction.
- >Make sure the connecting rod b the mark is toward the left side of the crankshaft.



b. Tighten the connecting rod bolts with a torque wrench (the first time the connecting rod bolts 28N.m) Mark the corners of the connecting rod bolt "2" and the connecting rod cap "3"



c. Further tighten the connecting rod bolts until the specified angle is reached. 210°±5°



Hint:-

If the bolts are tightened beyond the specified angle, do not loosen the bolts and retighten them, but replace them with new bolts and perform the procedure again.
 Do not use a torque wrench to tighten the bolts to a specified angle.

b. After the installation is complete, check the "a The connecting rod pairing code at the ", the pairing code on the connecting rod and the connecting rod cap must be the same.



c. Remove the connecting rod and connecting rod bearing

d. I. Measure the width of the plastic wire gauge compressed on the crank pinb. Use the gauge card provided by the plastic wire clearance gauge to match the corresponding width and read the bearing Clearance. If the clearance between the crank pin and the connecting rod bearing exceeds the range0.053-0.065, then choose to replace the connecting rod bearing



1. Choose

•Connecting rod bearing

Hint:-

- ➤Connecting rod bearings are divided into six groups of specifications according to their colors: white, yellow, green, red, black and blue.
- >The letters on the side of the crank represent the connecting rod diameter group at (1)(2)(3) of the crankshaft.
- The numbers on the connecting rod represent the size group of the inner diameter of the connecting rod's large hole, which are divided into 1, 2, 3, 4 Four groups.
- ➤The letter engraved on the crankshaft crank side at "a" and the number on the connecting rod at "b" are used to match the specifications of the connecting rod bearing to be replaced.

➢For example, the numbers on the connecting rod and the letters on the side of the crank are 3 and B, the connecting rod bearing can be determined as a red bearing through the grouping table.

		b		
Connecting Rod large hole group Crankshaft connecting rod diameter group	1	2	3	4
Α	white	yellow	green	red
В	yellow	green	red	black
С	green	red	black	blue

Install connecting rod and piston

The following procedure applies to all connecting rods and pistons

•Connecting rod bearing

rod cap (on the connecting rod)

hint:

≻Be sure to reinstall each connecting rod bearing to its original position.

- ≻Align the locating lip on the connecting rod bearing a With the locating lip notch on the connecting rod and connecting rod cap b Alignment.
- Make sure that the projection c on the connecting rod cap With the protrusion on the connecting rod d Facing the same direction



2. Tighten

Connecting rod

Hint:

➤Tighten the connecting rod bolts using the angle method, and all bolts need to be replaced with new ones.

Hint:

- Following below steps to can assemble under the most suitable conditions
- a. Replace the connecting rod bolts with new ones
- b.Clean the connecting rod bolts and lubricate the bolt threads and bolt flange surfaces with clean engine oil.

c. After installing the connecting rod bearings, assemble the connecting rod and connecting rod cap without installing them on the crankshaft.

d. Tighten the connecting rod bolts while checking theaandbAre the parts flush with each other

Hint: -

➤To install the connecting rod bearing, attention should be paid to the installation angle and the position should not be misplaced.



a: Side machining surfaceb: Large hole end face

a、 Loosen the connecting rod bolts.Remove the connecting rod and connecting rod cap.Install these parts onto the crankshaft, leaving the connecting rod bearings in their current state

3.Install

- ●Lining ring1
- Scraper ring2
- •Scraper ring3
- •Second air ring4

hint:

•first air ring5

Make sure that when installing the piston ring, In the figure a The manufacturer's mark or number faces up.



4.Install

- Piston 1 (on the corresponding connecting rod2superior)
- ●Piston pin3
- •Piston pin retaining ring4

hint: -

> Apply engine oil to the piston pin .

➤As shown in the figure, when piston b When the forging mark on the connecting rod points upward, make sure a The protrusion at the left

➢Install the piston pin retaining ring so that the end of the retaining ring opening is "c" away from the piston cutout. "3 mm or more



- 5. lubricating
 - ●Piston
 - •Piston ring
 - •Cylinder (select 10W-50Engine oil)

6. Dislocation

- •Piston ring end clearance
 - a. Opening position of the first air ring
 - b. Opening position of the second air ring
 - c. Scraper ring
 - d. Lining ring
 - e. Scraper ring
 - A. Exhaust side



7. lubricating

• Crank pin

hint: -

•Inner surface of connecting rod bearing (use recommended lubricant)

8. Install

• Piston assembly 1 (Installed into the cylinder2and crank pin)

>If the protrusion "a" of the piston installation tool is damaged, it cannot be used. Handle with caution .

➤Using the protruding part "a" of the piston installation tool "3" and the blunt edge "b" of the cylinder, fix the position of the piston installation tool, and then install the cylinder. Push the plug up into the cylinder. (Tool 3 The piston can be installed even without protruding parts 3 Then it is positioned with the cylinder through



•Connecting rod cap

•Connecting rod bolt

Hint: ____

Make sure the raised mark at "a" on the connecting rod is toward the left side of the crankshaft.

Make sure the raised mark at "b" on the connecting rod cap and the raised mark at "a" on the connecting rod face the same direction.

≻Apply clean engine oil to the bolt threads and bolt flange surfaces.



10. Tighten

•Connecting rod bolt 1



Hint:

•Follow the steps below to tighten the connecting rod bolts a. Use a torque wrench to tighten the connecting rod bolts (first tighten the connecting rod bolts to28N.m) b. Mark the corners of the connecting rod bolt "2" and the connecting rod cap "3".



a. Further tighten the connecting rod bolts until the specified angle is reached.210± 5°

warn:

➢If the bolts are tightened beyond the specified angle, you should not loosen the bolts and retighten them. Instead, replace them with new bolts and perform the tightening again. The Program

Notice:

• Do not use a torque wrench to tighten the bolts to a specified angle

b.After the installation is complete, check the "aThe connecting rod pairing code at ", the pairing code on the connecting rod and the connecting rod cap must be the same.

warn:

If the matching codes on the connecting rod and connecting rod cap do not match, remove the connecting rod bolts and connecting rod bearings, and then follow the steps 1 Start over. In this case, be sure to replace the new connecting rod bolts.



Crankshaft and balance shaft



Remove the crankshaft and balance shaft

1.Remove

- Crankshaft assembly1
- Crankshaft bearing
- •Balance shaft2
- •Balance shaft bearing

Notice:-

Distinguish the position of each balance shaft bearing and crankshaft bearing so that they can be reinstalled in their original positions.



Check the fuel injectors

The following steps apply to all injectors 1.Examine:

•Injection nozzle1

Damaged/worn \rightarrow Replace the oil

•Nozzle Oil channel

Blockage → Blow out with compressed air



Check the crankshaft

1. Measurement

Crankshaft runout





2.examine

- •Crankshaft journal surface
- Crank pin surface
- •Bearing surface

Scratches/wear → Replace crankshaft

3. Measurement

•Crankshaft journal to crankshaft bearing clearance

Out of range \rightarrow Replace crankshaft bearing Journal

bearing clearance0.02-0.038mm

Notice:-

Do not interchange crankshaft bearings. To measure the correct crankshaft journal to crankshaft bearing clearance and prevent engine damage, the crankshaft bearings must be installed in their original positions.

- a. Clean the crankshaft bearings, crankshaft journals and crankcase bearings
- b. Place the upper crankcase upside down on a workbench
- c. Install the crankshaft bearing 1 and the crankshaft into the upper crankcase

hint:----

>The locating lip on the crankshaft bearing a With the positioning lip notch b on the upper crankcase Alignment .



d. Place a plastic wire gap gauge "1" on each crankshaft journal. Notice:





e.The crankshaft bearing1" to the lower part of the crankcase and assemble the two parts of the crankcase. **Hint:**

➤The locating lip of the crankshaft bearing a With the locating lip notch b in the lower crankcase Alignment

>Do not move the crankshaft until the clearance measurement is complete.


f. Tighten the bolts to specification in the same order as previously used to tighten the bolts on the crankcase assembly.

g. Remove the crankcase and crankshaft bearings

h.Compare the maximum width "a" of the compressed plastic wire gap gauge on the crankshaft journal with the provided gauge card, match the corresponding width, and read the gap value. The bearing clearance is out of range, replace the crankshaft bearing.



4.Choose

• Crankshaft bearing

hint:-

>The specifications of crankshaft bearings are divided into five colors: yellow, green, red, black and blue.

≻Engraved on the side of the crank a The letters at the bottom represent the main journal groups at ①, ②, ③, and ④ of the crankshaft.

Engraved on the upper case b The numbers at the bottom represent the group of the crankshaft journal of the case.

Engraved on the side of the crank a The letters and engravings on the lower crankcase b The numbers at the table correspond to the crankshaft to be reselected. Neck bearing.

>For example, Crank side a The letters and boxes b The numbers at A and 1, then select the yellow bearing according to the grouping table.



Box journal Crankshaft main journal group	1	2	3	
Α	yellow	green	red	
В	green	red	black	
С	red	black	blue	

Check the balance shaft

1.Measurement:

•Balance shaft runout

Out of range \rightarrow Replace the balance shaft Balance shaft runout limit0.050Millimeters



2.examine

•Balance shaft journal surface

•Bearing surface

Scratches/wear \rightarrow Replace balance shaft.

3. Measurement

•Clearance from balance shaft journal to balance shaft bearing

Out of range \rightarrow Replace the balance shaft bearing

Clearance between balance shaft journal and balance shaft bearing 0.025-0.043mm

Notice:-

Do not interchange balance shaft radial bearings. To measure the correct balance shaft journal to balance shaft bearing clearance and prevent engine damage, the balance shaft bearings must be installed in their original positions.

a. Clean the bearing shells of the balance shaft, the balance shaft journals and the bearing shell part of the crankcase b. Place the upper crankcase upside down on a workbench

c. Balance shaft bearing 1 and balance shaft into the upper crankcase

hint:-

➤The protrusion "a" on the balance shaft bearing shell with the notch "b" on the upper part of the crankcase.



d.Place a plastic wire gap gauge "1" on each balance shaft journal. Notice:

•Do not place the plastic wire gap gauge on the oil hole of the balance shaft journal.



e. Install the balance shaft bearing "1" into the lower crankcase and assemble the two parts of the crankcase.

hint:-----

≻Align the locating lip "a" of the balance shaft bearing with the locating lip notch "b" in the crankcase

>Do not move the balance shaft until the clearance measurement is completed.



f. Tighten the bolts to specification in the same order as the previous crankcase assembly bolts.

g. Remove the crankcase and balance shaft bearings.

h. The maximum width of the plastic wire gap gauge after compression on the crankshaft journal is "a"Compare with the provided gauge card, match the corresponding width, and read the gap. Replace the balance shaft bearing.



4.choose

•Balanceshaft bearing (J1-J2) hint:

≻The specifications of balance shaft bearings are divided into five colors: yellow, green, red, black and blue.

Engraved on the balance shaft a The letters at the bottom represent the balance shaft. J1, J2 The journal group mark at .

Engraved on the lower crankcase The number at the bottom represents the balance shaft diameter group of the box.

➢Engraved on the balance shaft a The letter 'a' and the letter 'b' are engraved on the lower crankcase The number at the bottom is used to determine the size of the replacement balance shaft bearing.

>J1, J2 Refers to the bearing position selected on the journal of the balance shaft and crankcase

For example, on the balance shaft a The letter b on the crankcase The numbers at A and 2, the journal bearing selected according to the grouping table is green.



Box shaft diameter Balance shaft diameter set	1	2	3
Α	yellow	green	red
В	green	red	black
С	red	black	blue

Install the crankshaft

1. Install

- •Crankshaft bearing (installed into upper crankcase)
- •Crankshaft bearing (installed into lower crankcase)

Crankshaft

Hint:-

Crankshaft bearing 1 Positioning lip on a With the locating lip notch b on the crankcase Alignment.

Make sure each crankshaft bearing is installed in its original position



Install the balance shaft

1. Install

- •Balance shaft bearing (installed in the upper crankcase)
- •Balance shaft bearing (installed in lower crankcase)
 - hint:-

Balance shaft bearing 1 Positioning lip on a With the locating lip notch b on the crankcase Alignment.
 Make sure each balance shaft bearing is installed in its original position.



2. Install

•Balance shaft

hint:-

Balance shaft by aligning crankshaft gear matching mark a Matching mark with balance shaft gear b to install it.



Transmission gear device



No.	Disassembled parts	QTY	Remark
	Lower crankcase subassembly		
1	Shift mechanism components		
2	Transmission countershaft subassembly	1	
3	FB ф40×ф62×7 Hydrogenated nitrile rubber oil seal	1	
4	TM 6204 RS /P53Deep groove ball bearings	1	
5	Φ20.2×Φ30×1.5 Thrust washers	1	
6	M6×16 internal and external hexagon flange bolts (9.8 class)	5	Installation torque 11.5±0.5N m, apply thread glue
7	M6×16 internal and external hexagon flange bolts (9.8 class)	1	
8	Speed shift countershaft gear left and right shift fork shaft baffle	2	
9	Buffer spring for the shift countershaft gear and the left and right shift fork shafts	1	
10	Speed change drum bearing baffle	1	Installation torque 11.5±0.5N m, apply thread glue
11	Shift fork shaft baffle in speed change main shaft gear	1	
12	Speed shift countershaft gear left and right shift fork shaft	1	
13	Shift fork shaft subassembly in the speed change main shaft gear	1	
14	Left shift fork, countershaft gear	1	
15	Speed shift countershaft gear right shift fork	1	
16	Gear shift drum parts	1	
17	Shift fork in the speed-changing main shaft gear	1	
18	φ6×9 Cylindrical locating pin	1	Interference in the box
19	Transmission spindle components	1	
20	Φ20.2×Φ30×1.5 Thrust washers	1	
21	TM 6204 RS / P53 Deep groove ball bearings	1	

Disassemble the transmission spindle components			
14			
No.	Disassembled parts	QTY	Remark
1	Φ20.2×Φ30×1.5Thrust washers	1	
2	Spindle second gear	1	
3	Spline locking pad for the sixth gear of the main shaft	1	
4	Spline lock washer baffle for the sixth gear of the main shaft	1	
5	Main shaft six-speed gear	1	
6	(13Z×1.667M×20°×Φ28×14.3) Main shaft sixth gear sleeve	1	
7	13Z×1.667M×20°×Ф31×1Involute spline washers	2	
8	Circlip for non-standard shaft φ25×1.5	2	
9	Main shaft third and fourth gear gear	1	
10	Main shaft fifth gear	1	
11	φ25×φ28×13.9) Main shaft fifth gear sleeve	1	
12	Transmission spindle	1	
13	6305 CN /P534 Deep groove ball bearings	1	Interference in the bearing seat
14	Spindle right bearing seat (self-made)	1	



18	ф2×5Hollow pin	1	In bearings 17 superior
19	Circlip for non-standard shaft φ62×1.7	1	In bearings 17 superior
20	Output sprocket bushing	1	Interference on counter shaft

Remove the transmission gear unit

1. Remove the transmission mechanism sub-assemblies (refer to the transmission mechanism section)

2.Remove:

- ullet Transmission countershaft sub-assembly (1)
- M6×16 Hexagon flange bolts 2 x2
- M6×14Pivot Φ 8×5 Hexagon socket flange bolt ③ x1

•Left and right shift fork shaft baffles for the speed change countershaft gear (4), shift drum bearing baffle (5), shift fork shaft baffle for the speed change mainshaft gear (6)

•Left and right shift fork shafts of the speed change countershaft gear and the shift fork shaft subassembly of the speed change mainshaft gear

- •Left fork-L, right fork-R
- •Gear shift drum sub-assembly (7)
- •Middle fork-C



3. Remove:

- \bullet Spindle bearing seat (1)
- •Transmission spindle sub-assembly (2)
- a) Screw two threaded holes into the two through-threaded holes of the spindle bearing seat.M6Bolt ③, as shown in the figure:



4. Remove:

- •Left bearing of speed change spindle
 - Note: This bearing requires a bearing pulling tool to disassemble and assemble. Unless the bearing is damaged or the housing is replaced, it is not necessary to remove this bearing for general maintenance.



Check the fork

The following steps are performed on all forks 1.Examine:

Fork head (1)

Fork claw(2)

Bent, deformed, chipped, cracked, or bruised \rightarrow replace.



2. Examine:

Fork shaft

Flat surface rolling fork shaft Bending, deformation \rightarrow replace.



Do not attempt to straighten a bent fork shaft.



3.Examine

Sliding of the shift fork (inserting the shift fork hole into the shift fork shaft) Stuck \rightarrow Replace the shift fork and the matching pull-out shaft together.



Check the shift drum

Examine:

- Speed Shift Drum Groove
 Defect, bruise, wear → Replace the transmission drum components
- Speed-changing drum star wheel ①
 Damage, wear → Replace the transmission drum components
- Speed Shift Drum Bearing ②
 Damage, spots on the ball and raceway, and sluggish rotation → Replace the transmission drum components

Check the transmission gear

1.Measurement:

Spindle runout (using alignment instrument and runout micrometer) The runout value is out of range \rightarrow Replace the transmission spindle







2. Measurement:

Drive shaft runout (use centering instrument and runout micrometer) The runout value is out of range \rightarrow Replace the transmission countershaft



3.Examine:

- •Transmission gear teeth of each gear
- Bluing, wear, breakage, pitting, plastic deformation \rightarrow Replace the corresponding gear •Transmission gear claw
 - Cracks, chipping, breaking, edge rounding \rightarrow Replace the corresponding gear



4.Examine:

•Pairing of transmission gears for each gear (pairing of small gears for each gear with corresponding large gears) Incorrect →Reassemble the drive spindle

5. Examine:

 Each gear transmission gear rotates and slides Rotation jam, sliding jam → Replace the faulty parts

6.Examine:

- Elastic retaining ring
 - Bent, deformed, damaged, lacking in elasticity \rightarrow Replace

Assembling the main and secondary shafts 1.Install: Spline washer (1)

Change Elastic retaining ring⁽²⁾

Hint::-

>Make sure the sharp end of the circlip on the opposite side of the spline washer and the restrained gear.

>When installing the circlip on the main shaft subassembly, open the openings b at both ends of the circlip. With the spline groove on the shaftcAlign as shown in Figure A

>When installing the circlip on the countershaft subassembly, make sure the spline teeth on the shaft are d Located in the middle of the opening "e" at both ends of the circlip, as shown in Figure B



Spindle А

B : Secondary axis

2.Install:

•Spline lock pad baffle ①

•Spline locking pad(2)

Hint::-

>Put the spline lock washer baffle into the ring groove a on the shaft, align the projections on the baffle with the splines on the shaft, and then install the spline locking pads.

>Make sure the projection between the spline lock pad locating marks "b" is aligned with the locating marks "c" on the spline lock pad retainer.



B: Secondary axis

Installing the transmission gear

1.Install:

Bearing①

Hint::——
➤ The end of the bearing with rubber seal ring faces the outside of the housing (i.e., inside the bearing seat hole).
➤ Fix the housing, keep the bearing level, and press the outer ring vertically into the seat hole.





2.Install:

• Spindle subassembly ①







3.Install:

- Middle fork ①
- Speed Shift Drum Subassembly
- Spindle gear fork shaft subassembly ③
 - Hint:-

> The mark on the shift fork faces the right side of the engine, and the shift fork is arranged according to the mark "R", "C", "L" order.

Carefully position the shift forks so they fit exactly onto the drive gears.

>Install the opening of the middle shift fork onto the groove of the third and fourth gears on the main shaft.



4. Install:

- Right shift fork ①
- Left shift for (2)
- Left and right fork shaft buffer spring ③
- Countershaft gear left and right fork shaft ④
- Left and right fork shaft buffer spring (3)
- Left and right fork shaft baffles
- Speed change drum bearing baffle 6
- Spindle gear middle fork shaft baffle (7)
- TM6204RS/P53Deep groove ball bearing (8)
- Counter shaft oil seal 9 | Change
- Elastic retaining ring for non-standard shaft φ62×1.7⁽¹⁾
- Transmission countershaft subassembly (1)



Baffle bolt torque: 11.5N. m, apply thread glue

Hint::-

>Install the right shift fork to the countershaft subassembly5Groove "a" of the gear tooth, install the left shift fork to the countershaft subassembly6Groove "b" of the gear tooth.

>When installing the speed change drum bearing baffle and the main shaft gear middle fork shaft baffle, the side with the mark "OUT" should face outward, as shown in the figure below.".

>The protrusion "d" on the middle shift fork shaft subassembly rotates to one side of the middle shift fork shaft baffle.

>Make sure that the circlip (10) of the bearing on the countershaft subassembly is inserted into the groove "e" of the upper crankcase.



5. Examine:

Transmission

Rotation stuck→Repair

Hint::-----

>Lubricate all gears, transmission shafts and bearings thoroughly with lubricating oil.