ZT310T-M
Engine maintenance Manual

2022-02-11

Preface

All the materials, illustrations, photos, etc. collected in this manual are compiled according to the latest products of ZT310-M National IV. However, due to the continuous improvement of the product and other changes, there may be some inconsistencies between your motorcycle and this manual. For colors or upgrades, please refer to the part codes on the official website of ZONTES This manual will not be listed in detail; if the part names in this manual are inconsistent with the official website of ZONTES, please refer to the official website of ZONTES.

If part of the content of this manual is insufficient, please refer to the "Driver's Manual" included with the bike. The latest version of the driver's manual can be downloaded as a PDF in the model introduction corresponding to the official website of ZONTES.

User notice

This manual is compiled by Guangdong Tayo Motorcycle Technology Co., Ltd. to guide dealers or service personnel to use it. This manual cannot provide more detailed knowledge about motorcycles, and is only for reference for maintenance. If you do not have the corresponding knowledge such as electrician, machine repair, etc., improper assembly or repair failure may occur during repair.

If you need to clean or wash the body parts of the vehicle, you should use neutral car wash fluid or tap water, diesel, kerosene, etc. Acidic or alkaline car wash liquid will cause irreversible corrosion of the surface paint, electroplating surface, and anodized surface of the parts; gasoline will cause premature aging or hardening of sealants, gaskets, and rubber parts, reducing the service life. Non-woven fabrics should be used for wiping with no residue. Ordinary rags may leave cloth scraps or wool, etc., which may affect the assembly or cause other adverse effects.

Our company will update this manual as soon as possible after the product changes.

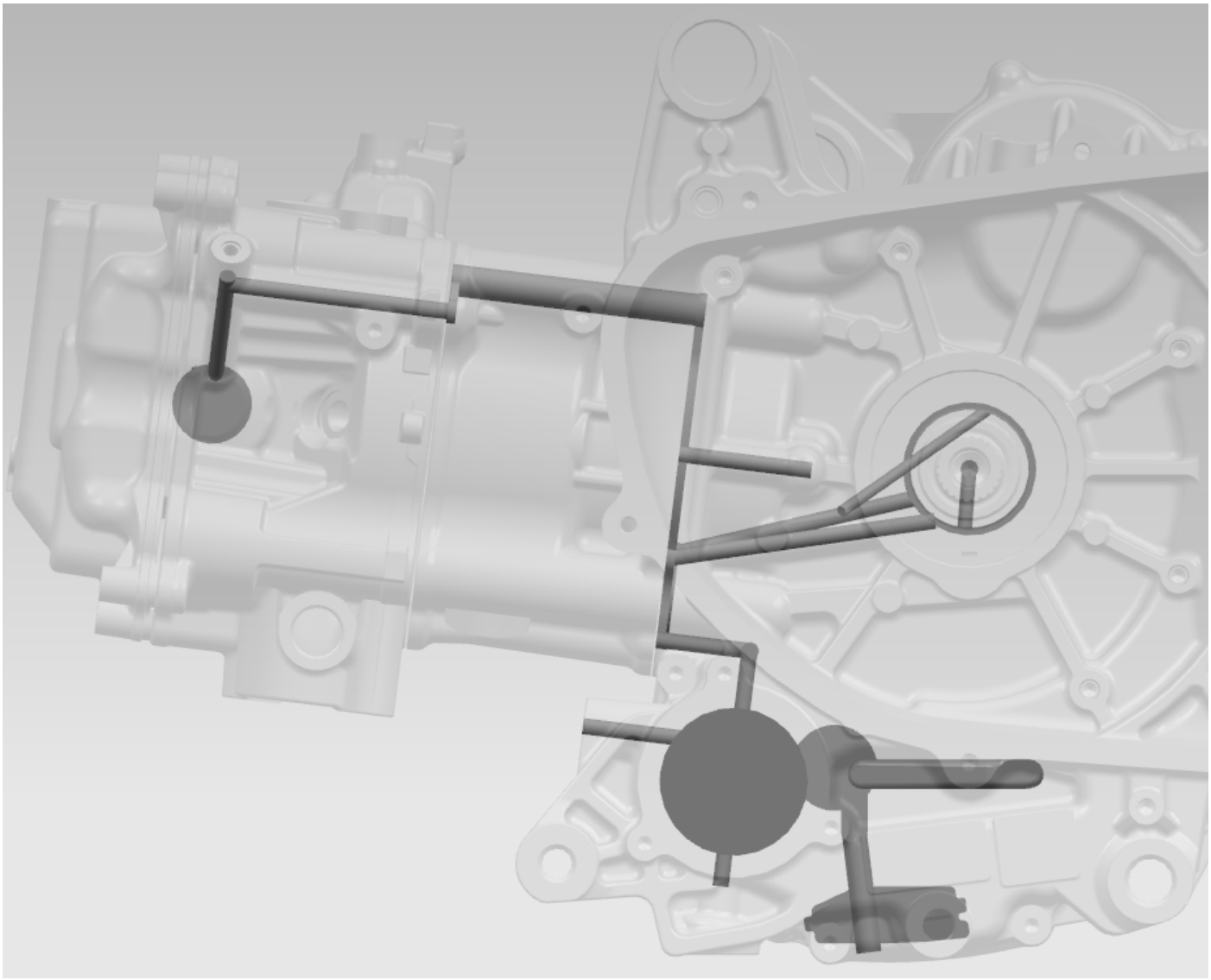
The following is the meaning of the icons marked in this manual：

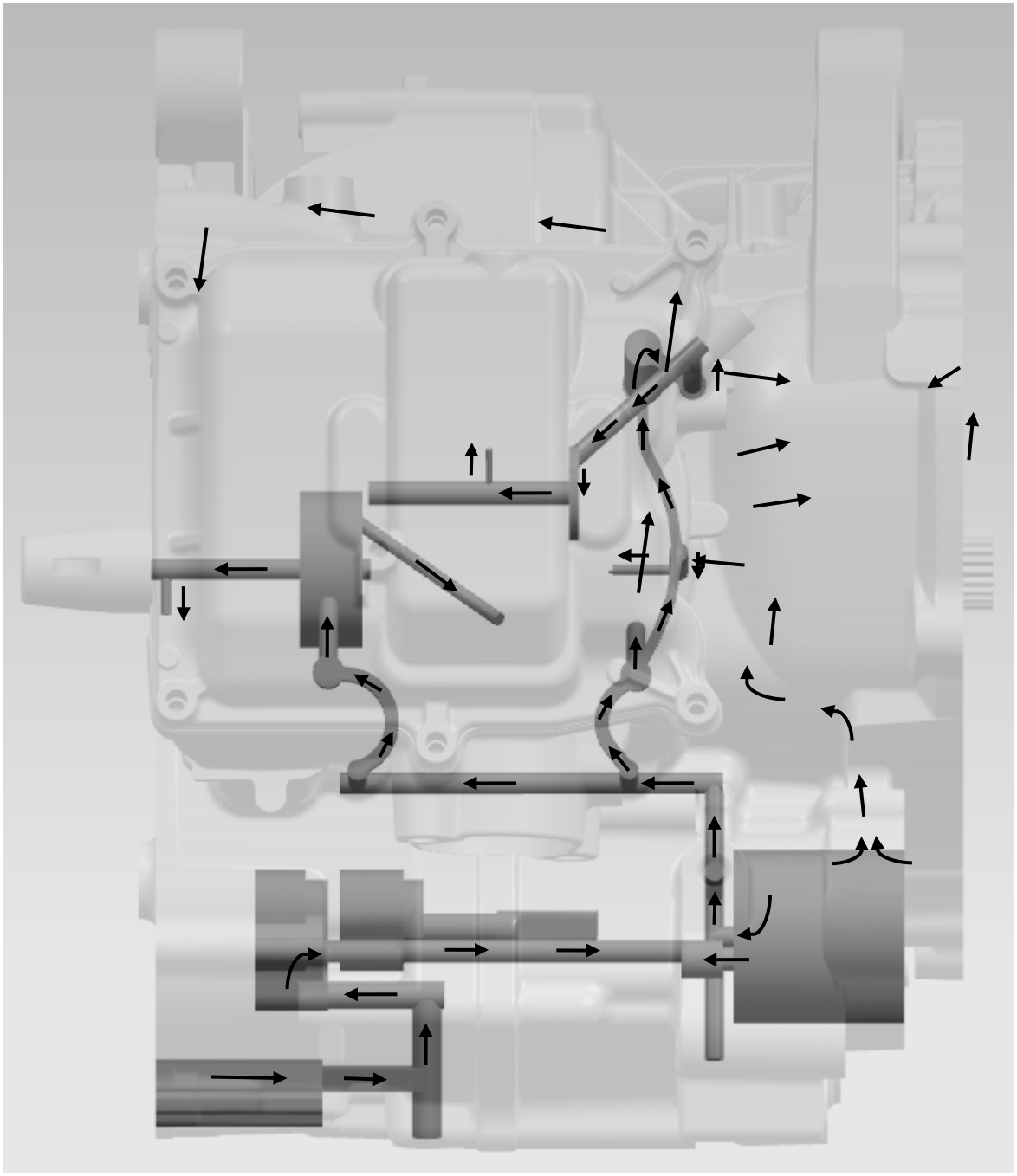
DANGER	Failure to observe will cause personal injury or death of the driver or maintenance personnel; or cause serious damage to parts and shorten the service life, etc.
WARNING	Failure to comply may result in personal injury or death of the driver or maintenance personnel; or damage to parts, abnormalities, etc.
CAUTION	Failure to observe the warning will cause personal injury to the driver or maintenance personnel; or matters requiring special attention during disassembly and assembly
	Indicates that there is a requirement for torque there
	Indicates that the piece needs to be replaced after disassembly
	Indicates that a measurement is required at this location

ZT310T-M Engine maintenance Manual

Lubrication system

One. Lubrication system diagram





Two, Maintenance information

General information

1. This chapter introduces the structure of the lubrication system and the maintenance of related parts.
2. The maintenance of the oil pump can be carried out on the whole vehicle without disassembling the engine separately.
3. The maintenance steps in this chapter can only be carried out after the oil is drained.
4. In the process of disassembling and installing the oil pump, be careful not to let dust and dirt enter the engine.
5. If the wear of any part of the oil pump exceeds the maintenance limit value, the entire oil pump assembly should be replaced.

Specification

Item		Standard	Maintenance
Engine oil capacity	Drain the oil for normal maintenance (replace the filter element)	1.75L（1.85US qt,1.54 Imp qt）	-
	Drain the oil during normal maintenance (without changing the filter element)	1.7L（1.8US qt,1.49 Imp qt）	-
	Drain the oil for normal maintenance and remove the right cover (replace the filter element)	1.8L（1.9US qt,1.58 Imp qt）	-
	Drain the oil for normal maintenance and remove the right cover (do not replace the filter element)	1.75L（1.85US qt,1.54 Imp qt）	-
	The whole machine is disassembled and reassembled	2.0L（2.1US qt,1.76 Imp qt）	-
Recommended engine oil		API SN grade or higher grade motorcycle special motor oil	-
Oil pump rotor	End gap	0.15 mm （0.006 in）	0.20 mm（0.008 in）
	Pump body clearance	0.15-0.21 mm （0.006-0.008 in）	0.35 mm（0.014 in）
	End face clearance	0.05-0.10 mm （0.002-0.004 in）	0.12 mm（0.005 in）

Torque value

Bolt	type	Assembly	position	Quantity
M6×60 Hexagon Flange Bolt	Oil Pump Locking Bolt	2	11±1.5N.m	-

Tools

1. Torque wrench +8# sleeve;
2. 8#-T-shaped socket wrench;

Three, Common fault phenomena/troubleshooting

1. The engine oil level is too low.

- Engine oil is leaking.
- The piston ring is worn or improperly installed.
- Cylinder wear.
- The seals such as valve guide and valve stem diameter oil seal are worn out.

2. The engine oil is dirty.

- The oil is not changed regularly.
- The gasoline is of poor quality.
- The piston ring is worn.
- Oil is oxidized.

Four, oil pump

Disassemble

Before disassembling the oil pump, perform the following operations:

• Remove the muffler. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Bolts and Nuts of Muffler for dis assembly and assembly)**

• Remove the right crankcase cover of the engine. **(Refer to ZT310T-M engine maintenance manual for dis assembly and assembly-Right crankcase cover, magneto-Right crankcase cover, magneto stator)**

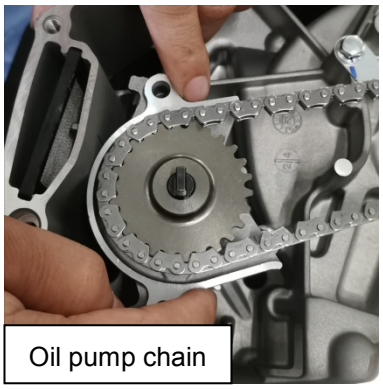
• Remove the magneto rotor. **(Refer to ZT310T-M engine maintenance manual for disassembly and assembly-Right crankcase cover, magneto-Magneto rotor)**

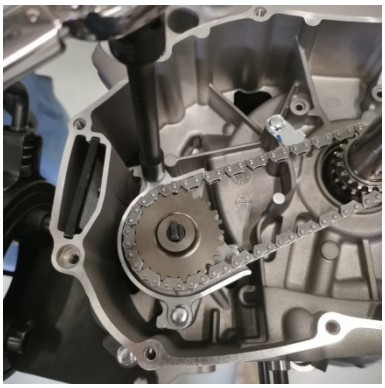
•Remove the 5×5.7×16 half-circle key and electric start gear. **(Refer to ZT310T-M Engine Maintenance Manual-Magneto Rotor for disassembly and assembly)**

① Use 8#-T type socket wrench to remove 2 oil pump locking bolts (Rotate counterclockwise).

② Take out the 2 oil pump bolts, and take out the oil pump assembly and the oil pump chain together.

Installation


Oil pump chain



① Put one end of the oil pump chain on the driven sprocket of the oil pump, and the other end on the driving gear of the oil pump at the crankshaft end, and align the oil pump shaft with the oil pump mounting hole on the box body and the oil pump positioning pin with the box body. Install the oil pump to the box body and press it in place by using the upper positioning pin hole (**Note:** oil should be sprayed on the chain, the inner and outer rotors of the oil pump); then install 2 oil pump bolts, use a torque wrench (or a wind screw) and 8 #The sleeve tightens the bolts, and the bolt tightening torque is 11±1.5N.

• Install 5×5.7×16 half-circle key and electric start gear. (**For installation, refer to ZT310T-M Engine Maintenance Manual- Right crankcase cover, magneto -Magneto Rotor**)

• Install the magneto rotor. (**Refer to ZT310T-M engine maintenance manual for installation-Right crankcase cover, magneto-Magneto rotor**)

• Install the right crankcase cover of the engine. (**Refer to ZT310T-M engine maintenance manual for installation-Right crankcase cover, magneto-Right crankcase cover, magneto stator**)

• Install a muffler. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Bolts and Nuts of Muffler for dis assembly and assembly)**

Disassembly/Installation

Disassemble in the following order:

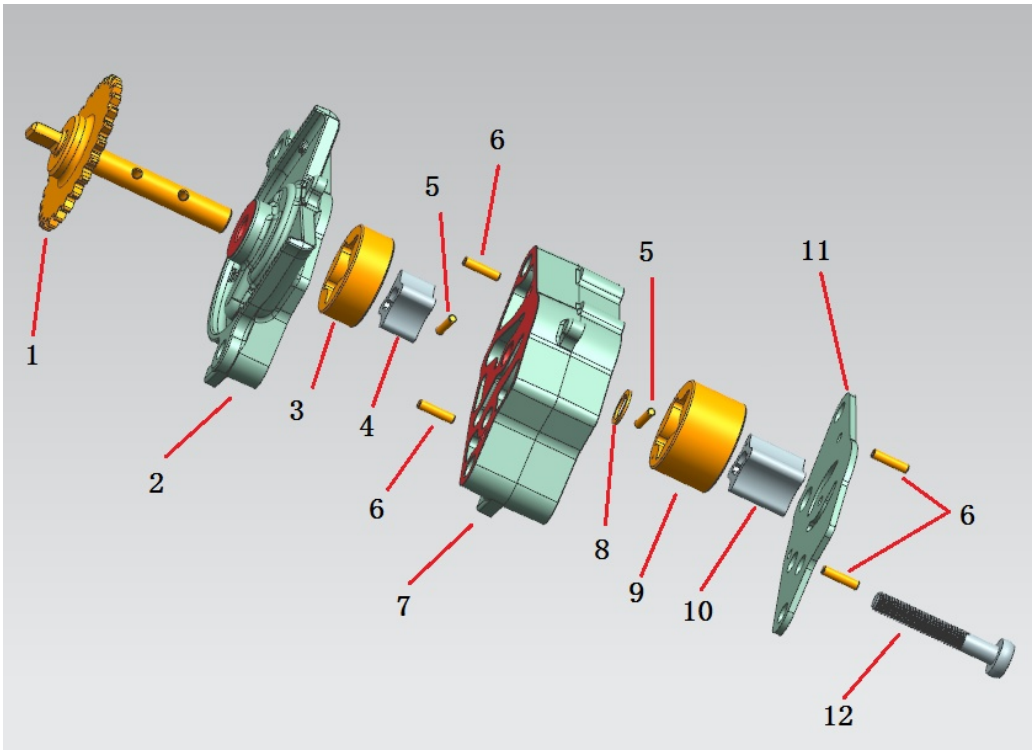
• M6×40 cross recessed pan head screws
• ZT1P72MN oil pump cover
• Inner rotor JBZ-29-18
• Outer rotor JBZ-29-18
• 2.5×12 cylindrical pin
• 8.6×11.5×1 thrust washer
• ZT1P72MN oil pump lower case
• 3×12 cylindrical pins
• Inner rotor JBZ-29-11
• Outer rotor JBZ-29-11
• 2.5×12 cylindrical pin
• ZT1P72MN oil pump upper case
• ZT1P72MN oil pump shaft assembly

Please assemble in the reverse order of disassembly

(Note: When assembling, oil should be applied to the inner and outer rotors to make the inner cavity of the oil pump fully lubricated)

Bolt: M6×40 Phillips pan head screw (tighten with a Phillips screwdriver or a wind screw + Phillips screw)

Torque: 5～7N.m



Serial	Name	Number
1	ZT1P72 oil pump assembly	1
2	ZT1P72 oil pump upper case	1
3	Outer rotor JBZ-29-11	1
4	Inner rotor JBZ-29-11	1
5	2.5X12 cylindrical pin	1
6	3X12 cylindrical pin	2
7	ZT1P72MN oil pump lower case	4
8	8.6X11.5X1 thrust piece	1
9	Outer rotor JBZ-29-18	1
10	Inner rotor JBZ-29-18	1
11	ZT1P72MN oil pump cover	1
12	M6X40 cross recessed pan head screws	1

Examination

Install the inner rotor JBZ-29-11 and the outer rotor JBZ-29-11 into the upper casing of the oil pump. Install the inner rotor JBZ-29-18 and the outer rotor JBZ-29-18 into the upper casing of the oil pump. (Before measuring the gap, install the oil pump shaft assembly into the corresponding inner rotor respectively)

End gap a

Measure several points and compare the maximum reading with the maintenance limit value.

Use a feeler gauge to measure the gap between the inner rotor and the outer rotor.

Maintenance limit value: 0.2mm (0.008in)

Pump body clearance b

Use a feeler gauge to measure the gap between the outer rotor of the oil pump and the oil pump body.

Maintenance limit value: 0.35mm (0.014in)

End face clearance

Use a straight edge gauge and a plug gauge to measure the end face gap.

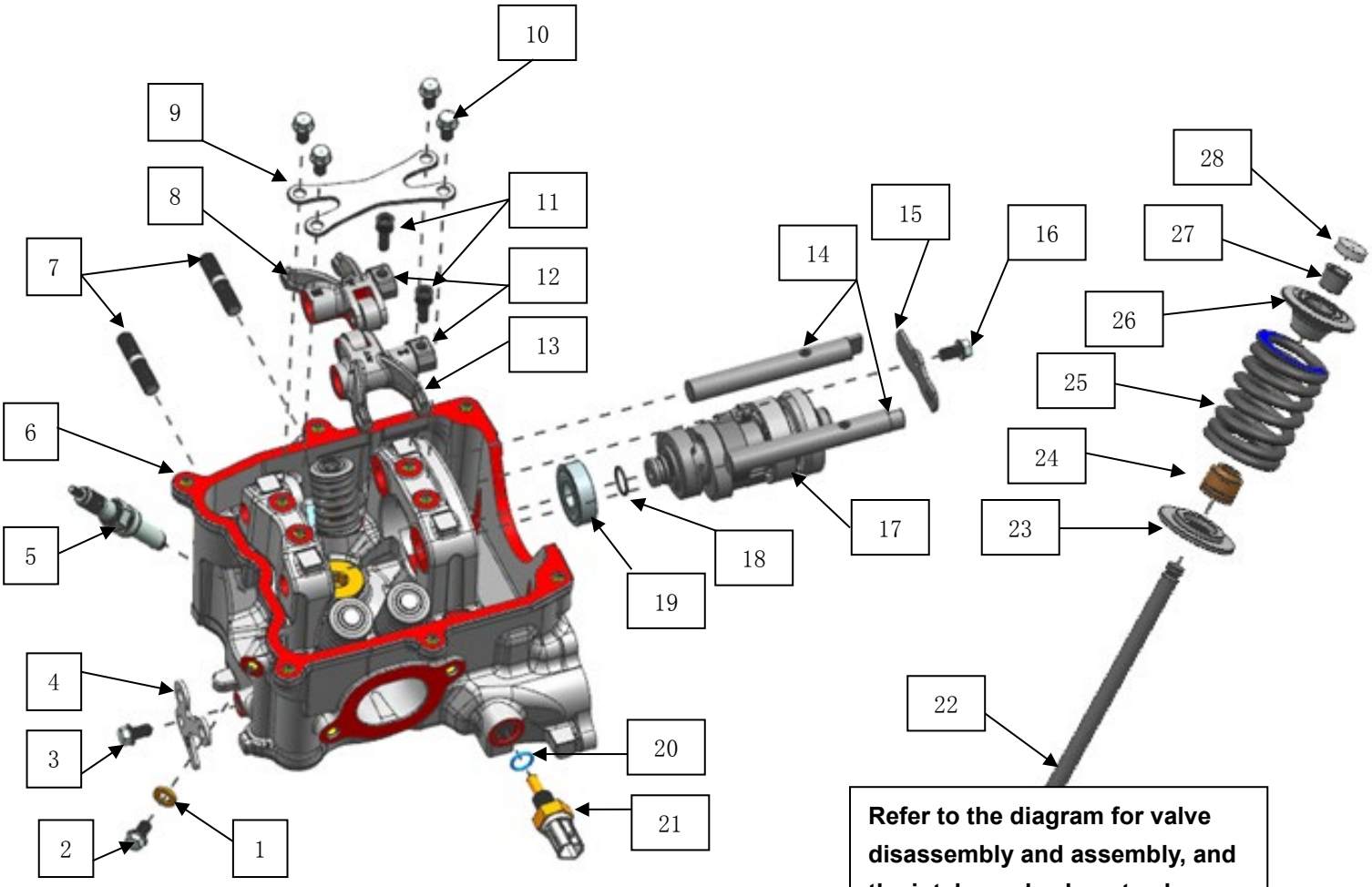
Maintenance limit value: 0.12mm (0.005in)

Check the oil pump chain

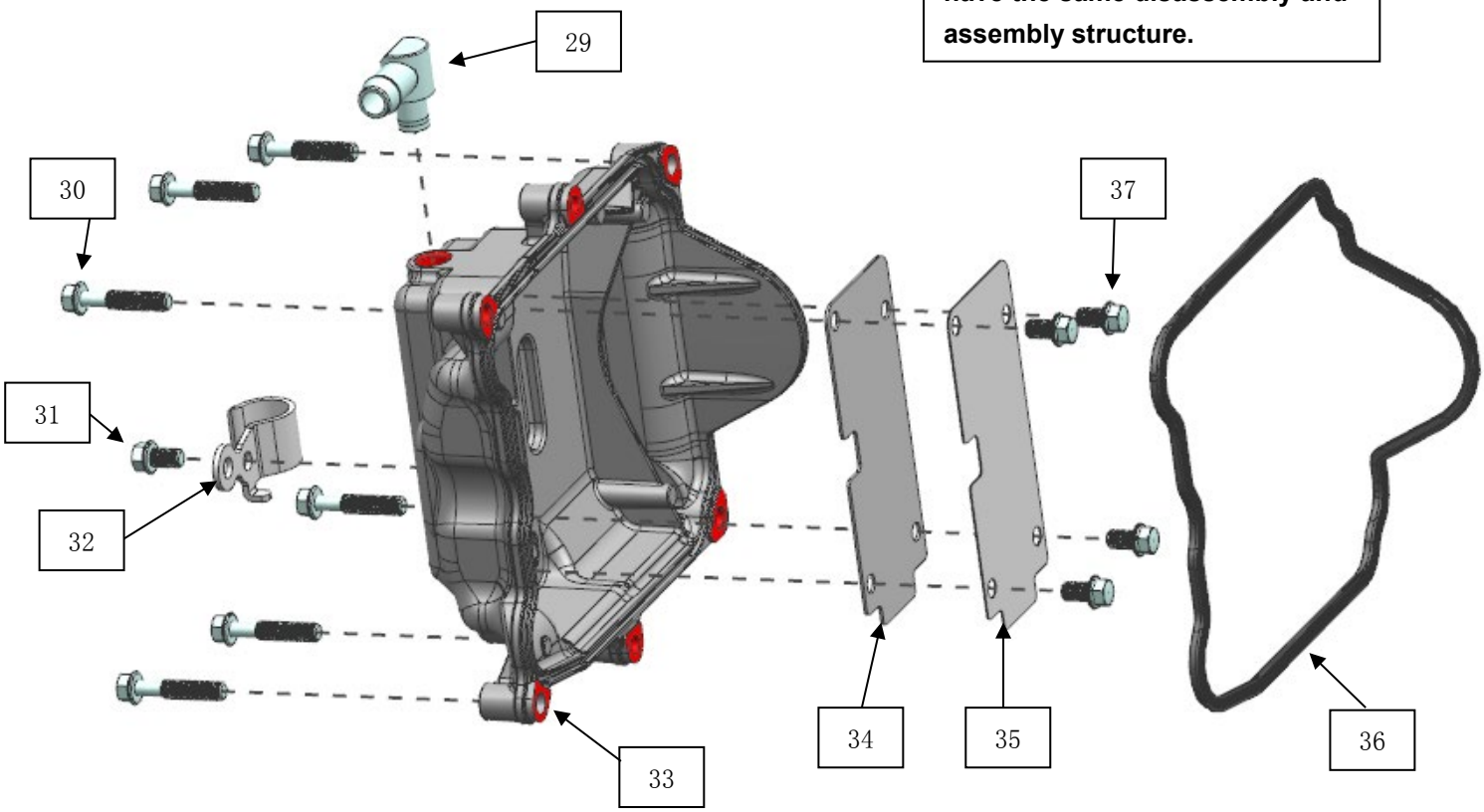
If the chain breaks or there are cracks on the surface of the chain, the chain should be replaced.

Cylinder head cover, cylinder head

One, System components



Refer to the diagram for valve disassembly and assembly, and the intake and exhaust valves have the same disassembly and assembly structure.



The part information

Serial	Name	Number	Serial	Name	Number
1	6.3×12×1.6 copper gasket	1	20	9×2 EPDM O-ring	1
2	M6×16 hexagon flange bolts	1	21	Water and oil shared sensor	1
3	M6×10 top pin bolt	1	22	ZTIP72MN valve	in2,ou2
4	ZT1P72MN Cylinder head wire clamp bracket	1	23	ZT1P72MN valve spring base	4
5	LMAR8A-9 spark plug	1	24	φ5.0 valve stem diameter oil seal	4
6	ZT1P72MN cylinder head	1	25	ZT1P72MN intake and exhaust valve springs	4
7	AYM8－M8×38 double head 10.9 grade stud	2	26	ZT1P72MN valve spring retainer	4
8	ZT1P72MN exhaust rocker arm sub-components	1	27	ZT1P58MJ valve lock clip	8
9	ZT1P72MN cylinder head pressure plate	1	28	Φ8.85 valve clearance adjustment pad	4
10	M6×10 top pin bolt	4	29	ZT1P72MN cylinder head cover air balance pipe	1
11	M5×15－5# Hexagon socket screw	2	30	M6×30 Hexagon Flange Bolt	6
12	ZT1P72MN rocker arm limit block	2	31	M6×10 top pin bolt	1
13	ZT1P72MN intake rocker arm sub-components	1	32	ZT1P72MN Cylinder Head Cover Oil Pipe Clamp	1
14	ZT1P72MN intake and exhaust rocker arm shaft	2	33	ZT1P72MN cylinder head cover	1
15	ZT1P72MN camshaft bearing pressure plate	1	34	ZT1P72MN cylinder head cover labyrinth cover gasket	1
16	M6×10 top pin bolt	1	35	ZT1P72MN Cylinder Head Cover Labyrinth Cover	1
17	ZT1P72MN decompression camshaft sub-components	1	36	ZT1P72MN cylinder head cover rubber gasket	1
18	φ11.8×φ1.9 fluorine rubber O-ring	1	37	M6×10 top pin bolt	4
19	GB276－6002-RS/P5C3 deep groove ball bearing	1	38		

Two, Maintenance information

General information

1. The engine must be removed from the frame for maintenance of the cylinder head cover and cylinder head.
(Remove the engine from the whole vehicle, refer to ZT310T-M Maintenance Manual-11.Remove the engine from the whole vehicle)
2. Remove the cylinder head cover and the cylinder head. The engine oil does not need to be drained. The rear wheel and the main bracket can be used to stand the engine firmly.

3. Before disassembling, remove the foreign matter and dust on the cylinder head cover and the joint surface of the cylinder head.
4. After disassembling the cylinder head cover, before disassembling the cylinder head, check the timing first and turn the piston to the top dead center.
5. When disassembling, the disassembled parts should be installed in a clean box and marked to prevent wrong installation during assembly.
6. When disassembling the cylinder head, first remove the two M8×110 hexagon flange bolts on the side, and finally remove the 4 M10×1.25 hexagon flange nuts on the cylinder head.
7. When disassembling the cylinder head, it is forbidden to bump or scratch the joint surface of the cylinder head.
8. When disassembling the cylinder head, the cylinder block and cylinder head gasket cannot be reused to prevent blow-by and air leakage.

Bolt torque value

Bolt type	Assembly position	Quantity	Torque (N•m)	Remarks
M6×30 Hexagon Flange Bolt	-	8	12±1.5	-
M8×110 Hexagon Flange Bolt	Cylinder head bolt	2	21±2	-
M10×1.25 Hexagon Flange Nut	Cylinder head nut	4	52±5	-
M6×10 top pin bolt	-	12	10±1	-
M6×22 Hexagon Flange Full Thread Bolt	Thermostat locking bolt	2	12±1.5	-
M6×16 hexagon flange bolts	-	3	12±1.5	-
M5×15－5# Hexagon socket screw	Rocker arm limit block locking bolt	2	7±1	Need to apply thread glue
LMAR8A-9 spark plug	-	1	14±1	-

Specification

Project		Standard value	Maintenance limit value
Intake and exhaust rocker shaft	Diameter	11.973-11.988 mm（0.4714-0.4720 in）	11.942 mm（0.4702 in）
Intake rocker arm sub-components	The inside diameter of	12-12.018 mm（0.4724-0.4731 in）	12.033 mm（0.4737 in）
Exhaust rocker arm sub-components	The inside diameter of	12-12.018 mm（0.4724-0.4731 in）	12.033 mm（0.4737 in）
Matching clearance between intake and exhaust rocker arm and intake and exhaust rocker arm shaft	Fit clearance	0.012-0.045 mm（0.0005-0.0018 in）	0.08 mm （0.0032 in）
Intake and exhaust valve springs	Free length	35.5-36.5 mm （1.3976-1.4370 in）	33.7 mm （1.3268 in）
Camshaft tip height	Inlet tip height	39.996-40.116 mm （1.5746-1.5794 in）	39.896 mm （1.5707 in）
	Exhaust tip height	39.946-40.066 mm （1.5727-	39.846 mm （1.5687 in）

		1.5774 in）	
Camshaft	Camshaft runout	-	0.03mm （0.0012 in）
Matching clearance between valve stem diameter and valve guide	Intake	0.01-0.037 mm （0.0004-0.0015 in）	0.08 mm （0.0032 in）
	Exhaust	0.025-0.052 mm （0.0010-0.0020 in）	0.1 mm （0.0039 in）
Valve stem diameter	Beat	-	0.01 mm （0.0004 in）

Tools

1. Pliers.
2. T-sleeve -8#.
3. T-type sleeve -10# / torque wrench +10# sleeve.
4. T-type sleeve-14# / torque wrench +14# sleeve.
5. 5# Inner hexagon.
6. 6# inner hexagon.
7. 10# inner hexagon.
8. The valve spring is placed on top of the clamp.
9. 22# open-end wrench.
10. 17# Torx wrench.
11. Spark plug sleeve.

Three, Failure phenomenon / failure analysis

When the engine cylinder head fails, it will affect the performance of the engine, and at the worst, it will be difficult to start the engine. The fault can be eliminated by detecting cylinder pressure, endoscope and other methods.

1. When the engine starts, the idle speed is unstable or difficult to start.

• The valve clearance is incorrect.
• Wrong timing, wrong teeth.
• The valve spring is broken.
• The valve is not closed tightly and leaks air.
• The spark plug has serious carbon deposits and insufficient ignition energy.
• The spark plug is loose and leaking.
• Blow-by of cylinder block and cylinder head gasket.

2. There is abnormal noise after the engine is running.

• The valve clearance is incorrect.
• The valve spring is broken.
• Worn valve seat.
• The camshaft slinger is broken.
• The camshaft bearing is worn or damaged.
• The tensioner is damaged.
• Worn or damaged intake and exhaust valve rocker arm bearings.
• The rocker arm limit block is broken.
• Excessive carbon deposits in the engine and deflagration.

3. After the engine warms up, the exhaust gas is abnormal.

• The valve stem diameter oil seal is worn or damaged.
• The valve guide is worn or damaged.

• The cylinder head gasket is damaged.

4. The engine is electrically started, and the crankshaft rotates without cylinder pressure or the cylinder pressure is very small.

• The valve spring is broken.
• Broken valve.
• Blow-by of cylinder block and cylinder head gasket.
• The spark plug is loose and leaking.
• Excessive carbon deposits on the valve.Causes valves to close poorly.

Four, Cylinder compression test

1. Warm up the engine to normal operating temperature, stop the machine and pull out the spark plug cap and remove the spark plug **(Refer to ZT310T-M maintenance manual-2.Maintenance-Spark plug for disassembly and assembly).**
2. Install the cylinder pressure gauge connector into the spark plug hole.
3. Fully open the throttle opening, press the start switch, and use the starter motor to drive the crankshaft and piston to run until the cylinder pressure gauge stops rising (Starter motor running time ≤ 15s).

Engine speed: 480-525r/min
Compression pressure: 750-1050 KPa (7.65- 10.71 Kgf/cm2, 108.8-152.3 psi)

① If the measured cylinder pressure is higher than the normal value, it indicates that there is carbon deposit on the top of the piston or on the cylinder wall.
② If the measured cylinder pressure is lower than the normal value, pour a small amount of clean oil from the spark plug, rotate the crankshaft a few times, make the piston ring and cylinder wall evenly covered with oil film, and retest the cylinder pressure. If the cylinder pressure measured after the oil is poured is greater than the last cylinder pressure value, please disassemble the machine and check the piston and piston ring.

Failure analysis:

a. The piston ring is worn.
b. Cylinder wear.
③ If the cylinder pressure measured by pouring oil is the same as the last time (The cylinder pressure is too small), First measure the valve clearance of the intake and exhaust valves for any abnormalities, then dismantle the machine to check the intake and exhaust valves for leaks and the cylinder head gasket coating for damage to the blowby gas.

Five, Cylinder head cover

Cylinder head cover removal

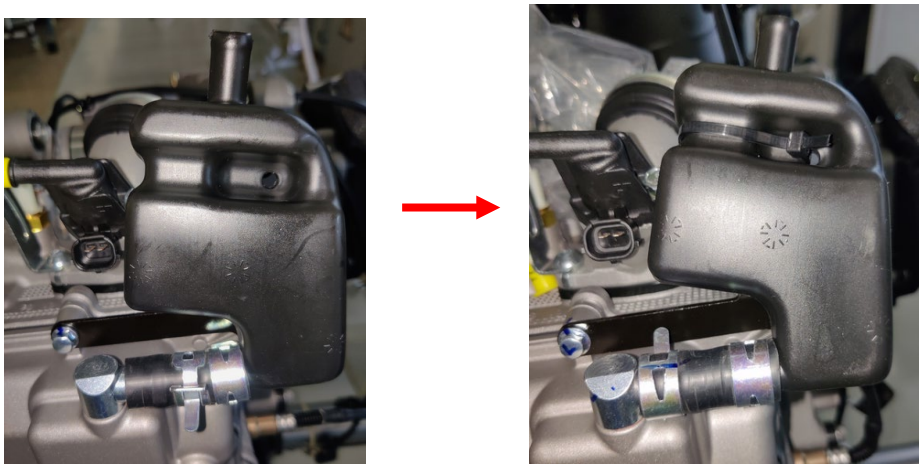
1. As shown in the figure, use scissors to cut off the separator fixing tie, use clamp pliers to remove the separator tube clamp, and remove the separator.

2. As shown in the figure, use T-rod-8# to remove the cylinder head cover locking bolts, and remove the separator bracket, cylinder head cover, and cylinder head cover sealing ring.

Cylinder head cover installation

1. As shown in the figure, after removing the flat sealant, oil stains and dust on the joint surface of the cylinder head and the cylinder head cover, apply an appropriate amount of flat sealant to the position shown in the figure. Check the cylinder head cover sealing ring on the cylinder head cover. After confirming that it is installed in place, install the cylinder head cover assembly to the corresponding position of the cylinder head. Use M6×30 bolts to pre-tighten the separator bracket and the cylinder head cover and tighten them with a fixed twist. 12±1.5 N•m.

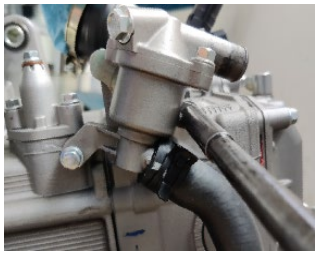
2. As shown in the figure, insert the separator tube into the air balance tube of the cylinder head cover, and use clamp pliers to move the clamp to the proper position to clamp the tube. Fix the separator to the separator bracket with a cable tie.

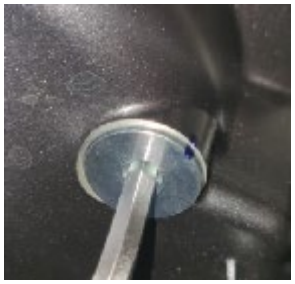


Six, Cylinder head

Cylinder head removal

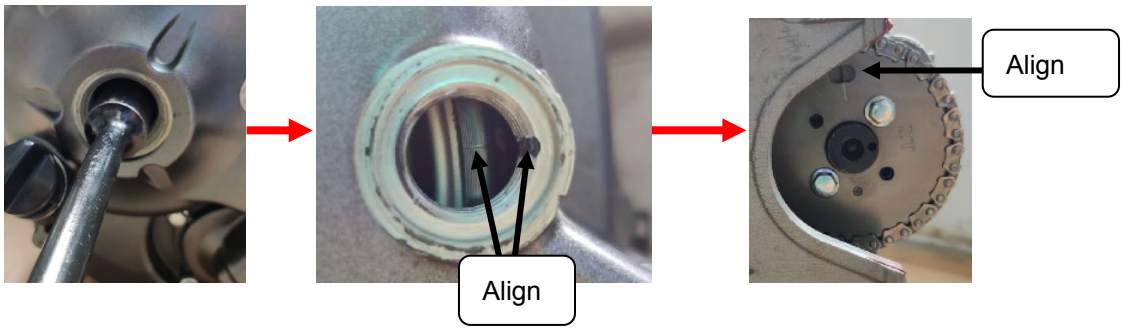
1. As shown in the figure, use T-sleeve-8# to remove the thermostat bolts and remove the thermostat, respectively use 5# and 10# Allen wrenches to remove the M14×1.5 screw plug on the right crankcase cover, M30×1.5 aluminum screw plug, and remove the O-ring.



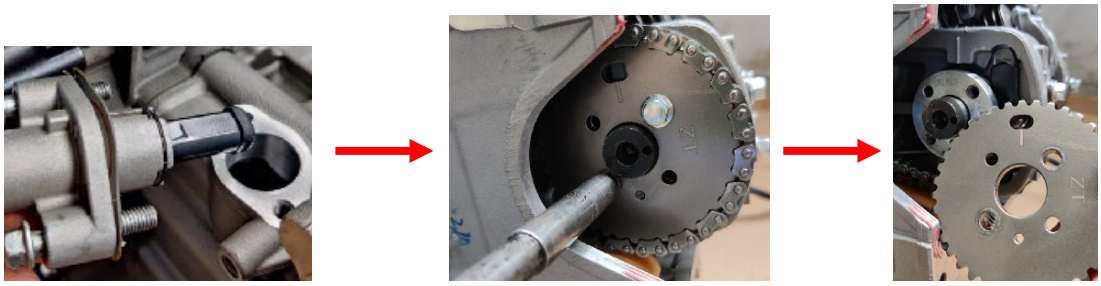



2. Insert the 14#-T socket wrench from the M30×1.5 aluminum screw plug hole and set it on the magneto rotor locking bolt, and then turn the crankshaft clockwise to align the T point engraved line on the flywheel with the M14×1.5 screw. The plug hole marks the gap. At the same time, the top dead center engraved line on the timing driven sprocket should also be aligned with the raised mark line on the cylinder head.

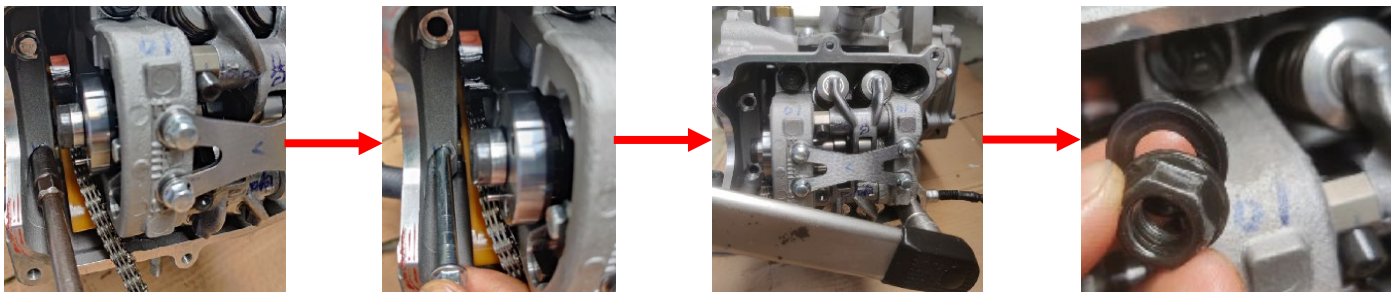
Note: Once the T-point engraved line turns over the marked line when rotating the flywheel, it cannot be reversely rotated back to the right point. The crankshaft must be turned clockwise twice again to re-align the points ! ! !



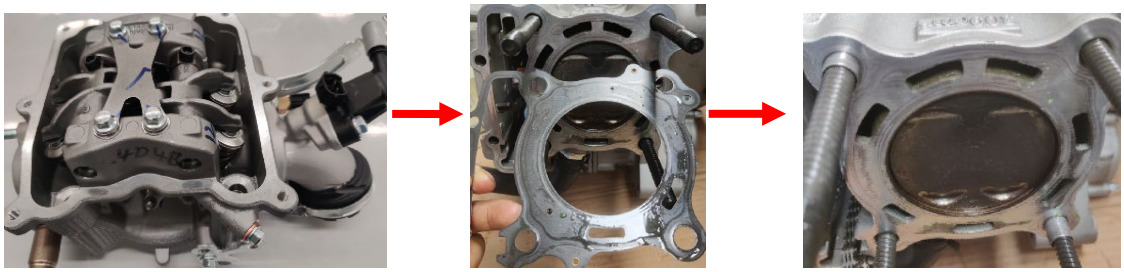
3. As shown in the figure, use T-bar-8# to remove the tensioner, timing driven sprocket fixing bolts, and timing driven sprocket **(Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder-Head-tensioner)**.



4. As shown in the figure, first remove the two M8×110 hexagonal flange bolts on the side of the cylinder head with T rod-10#, and remove the four M10×1.25 lock nuts on the cylinder head diagonally with wrench -14#.



5. As shown in the figure, remove the cylinder head, cylinder block and cylinder head gasket and positioning pins.

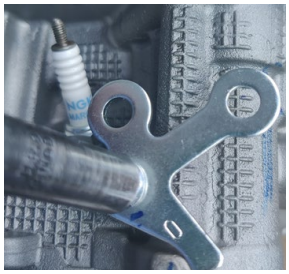
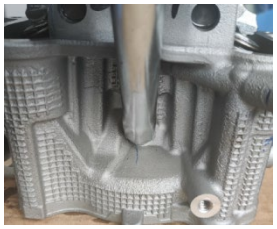
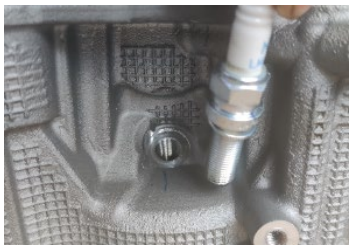


Cylinder head decomposition

1. As shown in the figure below, use 6#-inner hexagon to remove the high-pressure oil pipe bracket, intake manifold sub-assembly and heat insulation pad (The heat insulation pad O-ring cannot be damaged or broken).



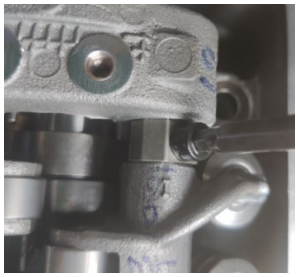
2. As shown in the figure below, use a 22# open-end wrench to remove the oxygen sensor, and T rod-8# to remove the cylinder head clamp bracket. Use the spark plug sleeve to remove the spark plug. Use a 17# torx wrench to remove the water and oil temperature sensor.

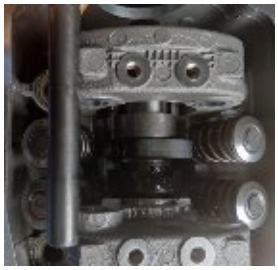





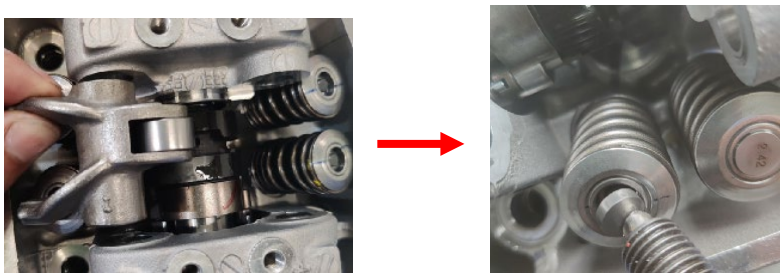
3. As shown in the figure below, loosen the cylinder head pressure plate and camshaft pressure plate bolts, and remove the cylinder head pressure plate and camshaft pressure plate.



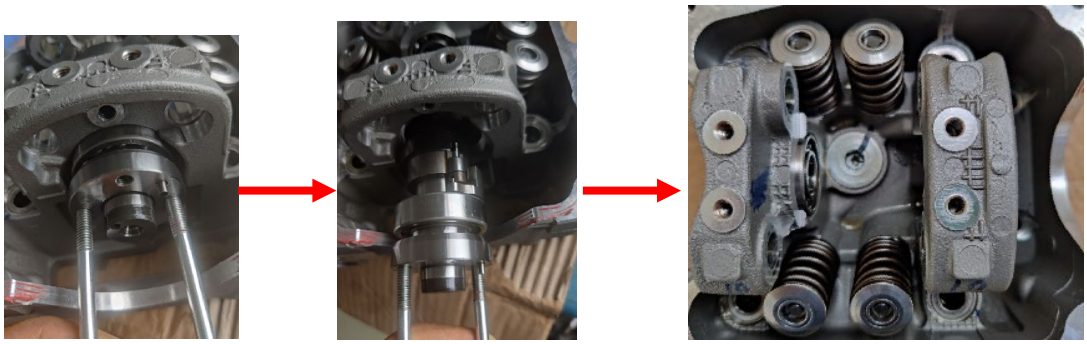

4. As shown in the figure below, use a 5# inner hexagon to remove the rocker arm limit block bolts, and remove the rocker arm limit block, rocker shaft, intake and exhaust rocker arm, and valve adjustment gaskets.



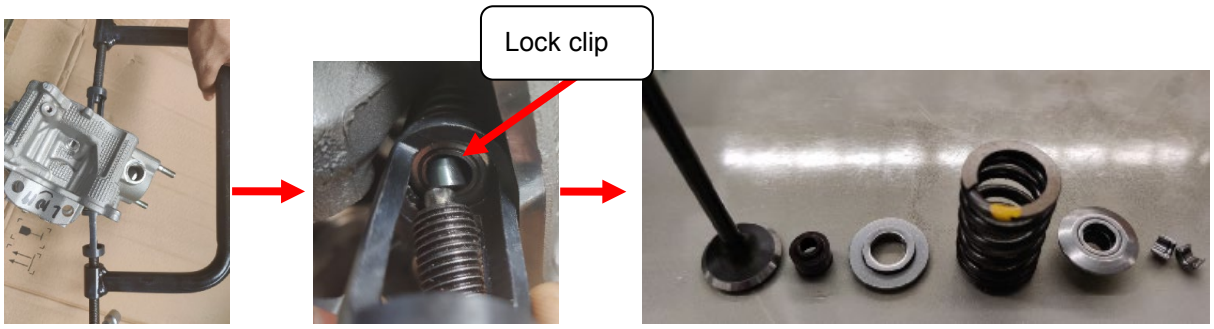


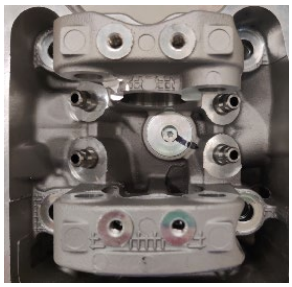


5. As shown in the figure, screw 2 M6 bolts into the camshaft threaded hole, keep the camshaft angle consistent with the point T of the alignment time, or rotate it slightly counterclockwise to an appropriate angle, and then remove the camshaft.



6. As shown in the figure, use the valve spring overhead pliers to remove the valve lock clamp (do not over-compress the valve spring). After removing the valve lock clip, remove the valve spring retainer, valve spring, valve stem diameter oil seal (**The removed valve stem diameter oil seal cannot be used again**), valve spring base, and valve in sequence.





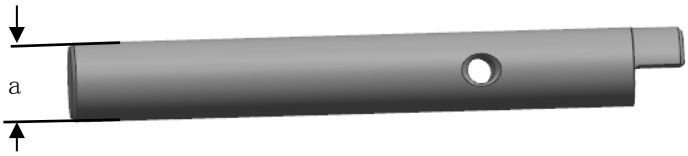
7. As shown in the figure, remove the carbon deposits in the combustion chamber. Do not scratch the joint surface of the cylinder head and the surface of the valve seat ring.

Cylinder head parts inspection:

1. Intake and exhaust rocker shaft

a. There is no abnormal wear on the inlet and exhaust rocker arm shafts.

Item		Standard value	Repair limit value
Intake and exhaust rocker shaft	diameter （a）	11.973-11.988 mm（0.4714-0.4720 in）	11.942 mm（0.4702 in）



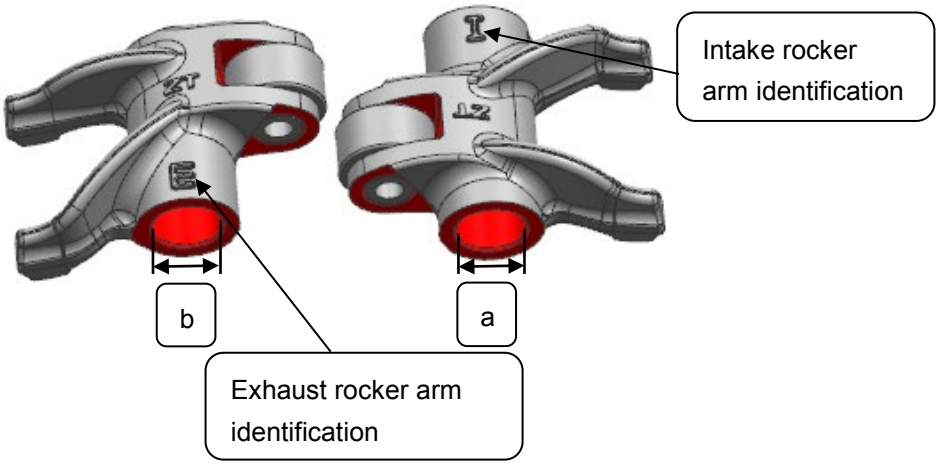
2. Intake rocker arm, exhaust rocker arm

a. The intake rocker arm (mark I) and exhaust rocker arm (mark E) have no abnormal wear.

b. The inlet and exhaust rocker arm rollers rotate smoothly without any abnormal noise.

Item		Standard value	Repair limit value
Intake rocker arm sub-components	inside diameter （a）	12-12.018 mm （0.4724-0.4731 in）	12.033 mm （0.4737 in）
Exhaust rocker arm sub-components	inside diameter （b）	12-12.018 mm （0.4724-0.4731 in）	12.033 mm （0.4737 in）
Matching clearance between intake and exhaust rocker arm and intake and exhaust rocker arm shaft	Fit clearance	0.012-0.045 mm （0.0005-0.0018 in）	0.08 mm （0.0032 in）

(**Note: The clearance between the inlet and exhaust rocker arm components and the inlet and exhaust rocker arm shafts is the value obtained by subtracting the outer diameter of the inlet and exhaust rocker arm shafts from the inner diameter of the inlet and exhaust rocker arm shafts.**)



3. Intake and exhaust valve springs

a. The intake and exhaust springs have no cracks and abnormal wear.

Item		Standard value	Repair limit value
Intake and exhaust valve spring	Free length （a）	35.5-36.5 mm （1.3976-1.4370 in）	33.7 mm （1.3268 in）

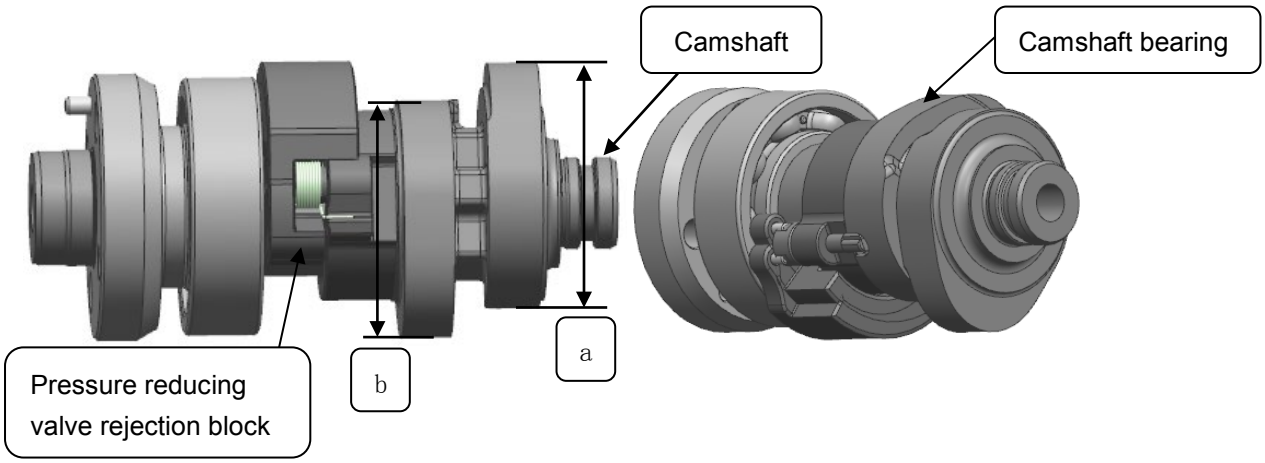
4. Camshaft

a. Check whether the return position of the camshaft pressure reducing valve is normal.

b. Check the camshaft pick for abnormal wear.

c. Rotate the camshaft bearing by hand, and it should rotate smoothly and without abnormal noise.

Item		Standard value	Repair limit value
Camshaft tip height	Inlet tip height (a)	39.996-40.116 mm （1.5746-1.5794 in）	39.896 mm （1.5707 in）
	Exhaust tip height (b)	39.946-40.066 mm （1.5727-1.5774 in）	39.846 mm （1.5687 in）
Camshaft	Camshaft runout	-	0.03mm （0.0012 in）



5. Intake valve, exhaust valve, cylinder head seat ring

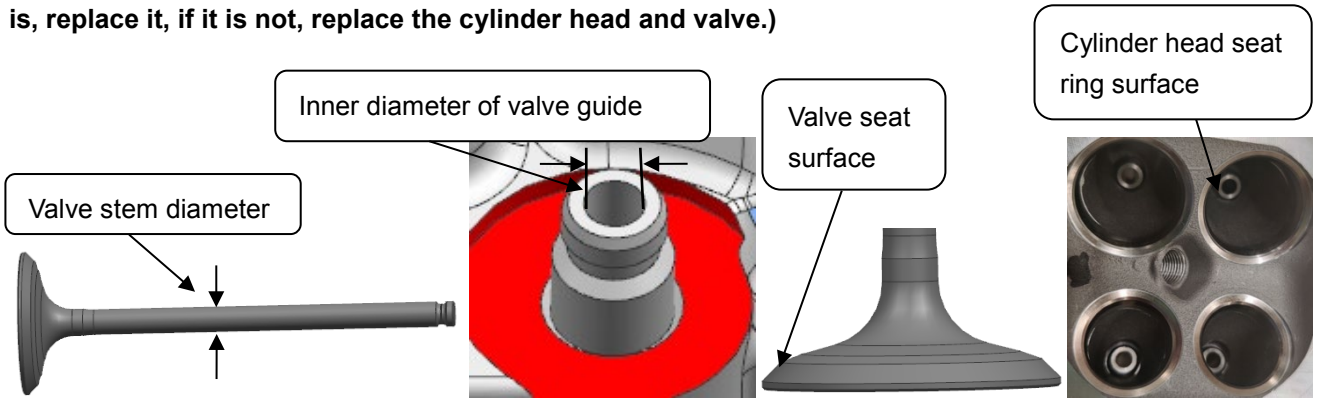
a. Check whether the valve stem diameter is abnormally worn, bent or ablated, and check whether the valve can move smoothly in the valve guide.

b. Check whether the valve seat ring surface is abnormally worn or ablated.

C. Check the seat ring surface of the cylinder head, and there is no abnormal wear or ablation.

Item		Standard value	Repair limit value
Matching clearance between valve stem diameter and valve guide	Intake	0.01-0.037 mm （0.0004-0.0015 in）	0.08 mm （0.0032 in）
	exhaust	0.025-0.052 mm （0.0010-0.0020 in）	0.1 mm （0.0039 in）
Valve stem diameter	beat	-	0.01 mm （0.0004 in）

(Note: The matching clearance between the valve stem diameter and the valve guide tube is the value obtained by subtracting the valve stem diameter from the outer diameter of the guide tube,when the fit clearance exceeds the maintenance limit value, please judge the amount of wear of the valve guide and valve stem diameter. After replacing the new parts with large wear, whether it is within the fitting standard value. If it is, replace it, if it is not, replace the cylinder head and valve.)

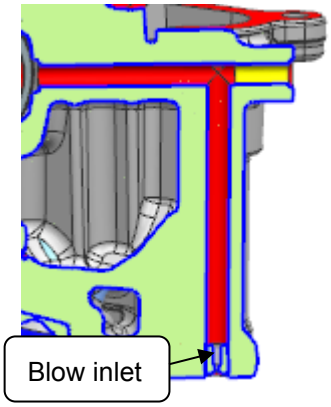


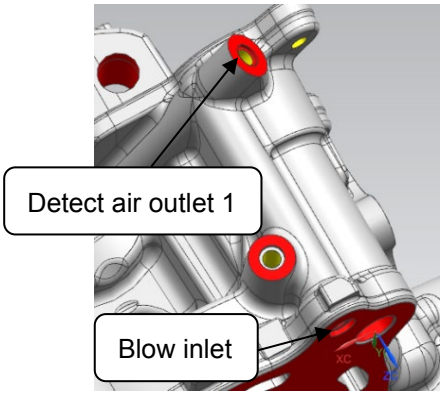
6、Cylinder head bearing

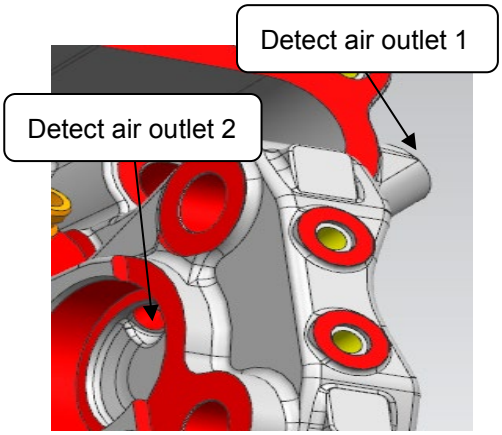
a. Check the cylinder head bearing. The bearing inner ring shall rotate smoothly without jamming. If the bearing inner ring rotates sluggishly, please replace the cylinder head bearing.

Cylinder head subassembly

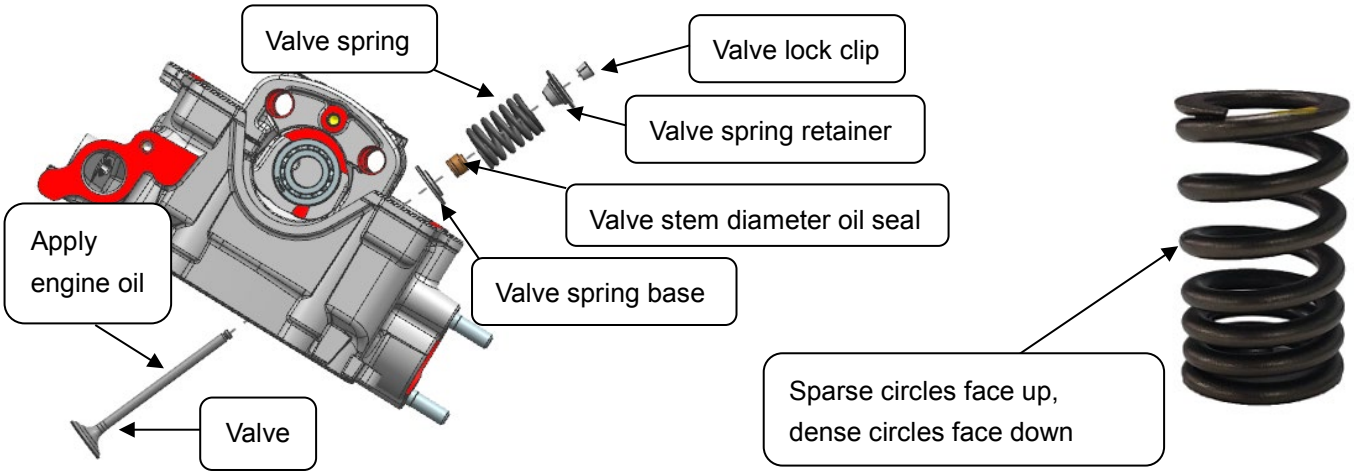
1. As shown in the figure, blow the cylinder head oil passage with an air gun to ensure that the cylinder head oil passage is unblocked.



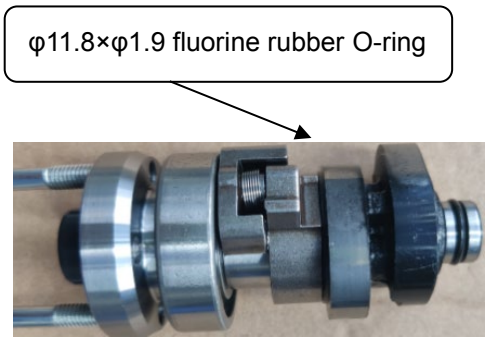


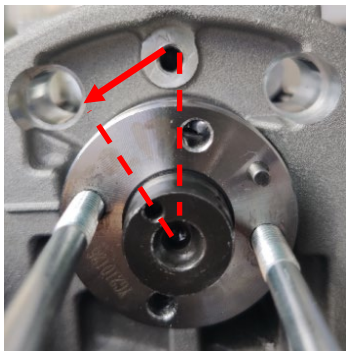


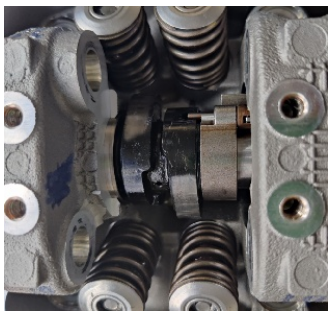
2. As shown in the figure, install the valve (Apply oil), valve spring base, valve stem diameter oil seal (To be pressed into place after installation), valve spring, valve spring retainer, and valve lock clip (Install with valve installation tools). (**Note: When installing the valve spring, the sparse ring faces upwards and the dense ring faces downwards.**)

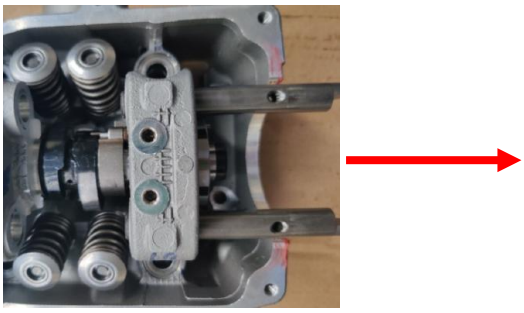


3. As shown in the figure, install the camshaft (Need to install O-rings), intake rocker arm sub-parts, exhaust rocker arm sub-parts, and intake and exhaust rocker arm shafts in order. (**Note: The camshaft can not miss the O-ring. When the camshaft is installed, the normal T point position needs to be rotated counterclockwise and inserted at a proper angle to install it in place**)





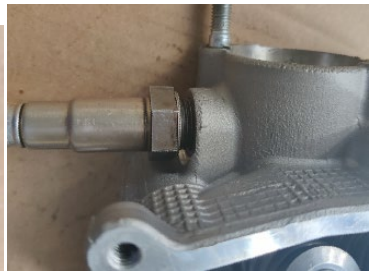


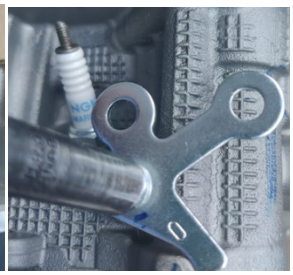


4. As shown in the figure, Install camshaft bearing pressing plate, M6×10 bolts need to be applyed thread glue. Install the valve clearance adjustment pad to adjust the valve clearance. (**Refer to ZT310T-M Maintenance Manual-2.Maintenance -Valve Clearance Adjustment for valve clearance adjustment**)

5. As shown in the figure, after adjusting the valve clearance, install the rocker arm limit block and the limit block locking bolt(the bolt needs to be coated with thread glue, the torque is 7±1 N•m). Install the pressure plate of the cylinder head and fasten it with 4 M6×10 bolts (apply thread glue, torque 10±1 N•m).

6. As shown in the figure, install spark plug (torque 14±1 N•m), water and oil temperature sensor (do not miss O-ring, torque 14±1.5 N•m), oxygen sensor, cylinder head wire clamp bracket (torque 10± 1 N•m).

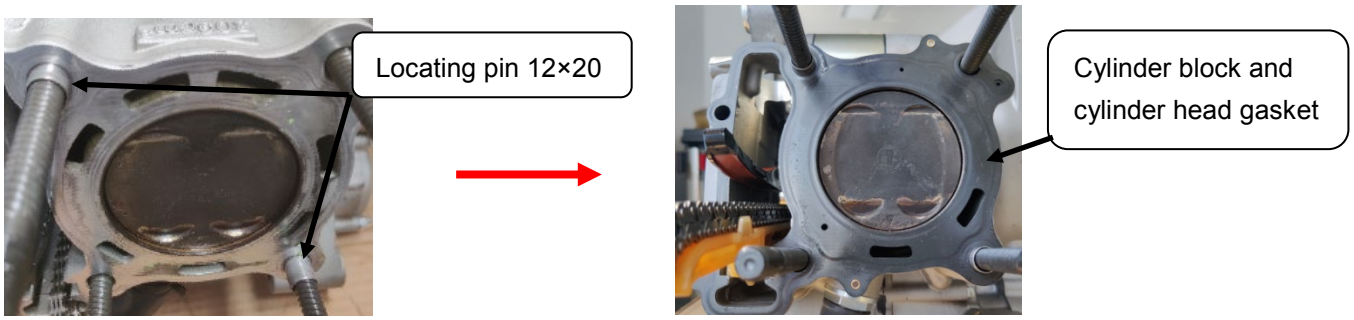




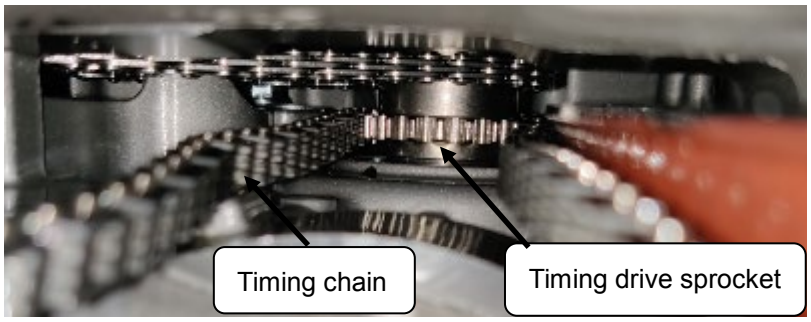
7. As shown in the figure, install the heat insulation pad (2 O-rings are not missing), the high-pressure oil pipe bracket and the intake manifold sub-assembly.

Cylinder head installation

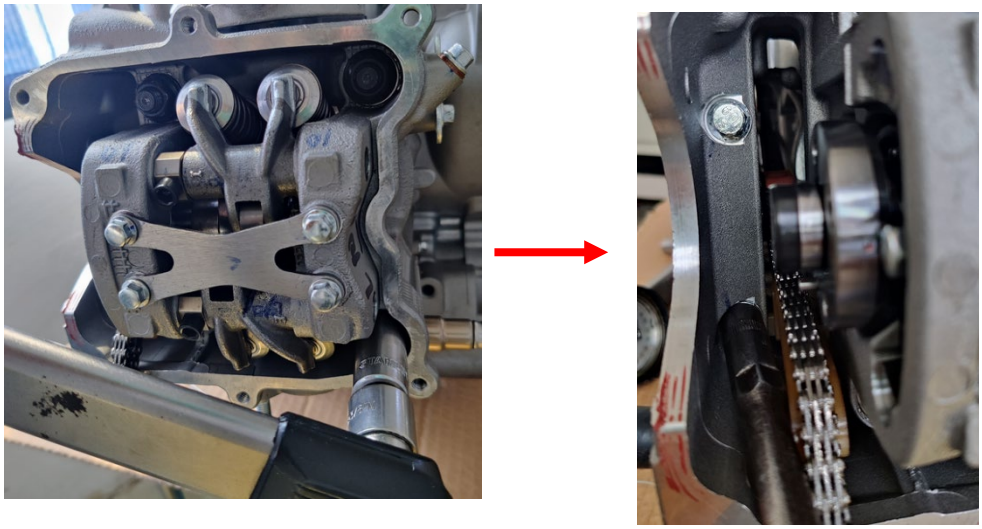
1、Remove the oil, water and dust on the joint surface of the cylinder and the cylinder head. After checking the cylinder and piston surfaces for foreign objects, install two φ12 positioning pins and cylinder block and cylinder head gaskets (**Note: the cylinder block and cylinder head gaskets cannot be reused.After the cylinder head has been disassembled, the cylinder block box gasket also needs to be replaced, and the joint surface needs to be coated with a flat sealant. For the installation of the cylinder piston, refer to the ZT310T-M Engine Maintenance Manual-Cylinder、Piston**).



2、As shown in the figure, check whether the timing chain has fallen off from the timing driving sprocket.If it falls off, you need to re-hang the timing chain on the timing driving gear.

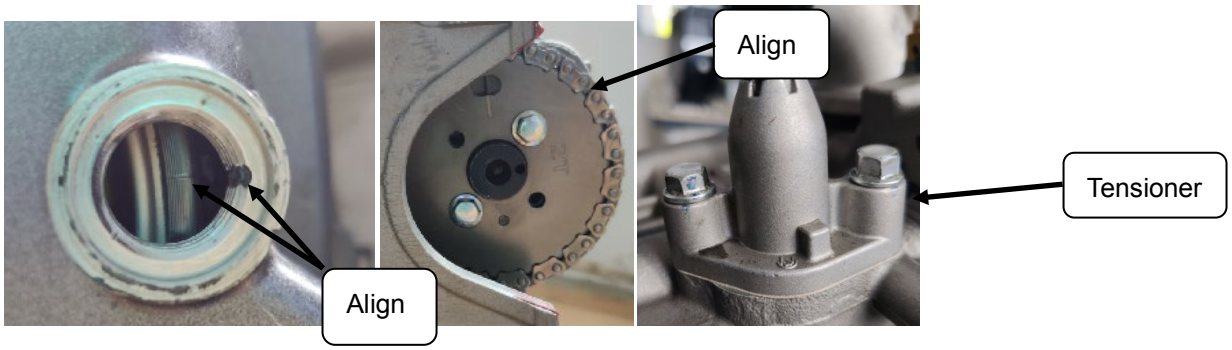


3、As shown in the figure, after confirming that there is no missing or wrong installation, install the cylinder head into the corresponding position of the engine.3 After evenly pre-tightening the cylinder head nut and the two side locking bolts, use a fixed torque wrench to tighten (M10×1.25 hexagon flange nut fixed torque 52±5 N•m, M8×110 hexagon flange surface 9.8 Grade bolts with a fixed torque of 21±2 N•m).



4、As shown in the figure, check the flywheel T point marking line, After confirming alignment with the right cover M14 x 1.5 screw plug hole scale, and turn the camshaft so that the dot is aligned with the camshaft pressing plate bolt.Put the timing driven sprocket into the timing chain and assemble it on the camshaft. At the same time, the timing of the timing driven sprocket is aligned with the timing mark of the cylinder head.Apply thread glue to the M6×16 bolts, and tighten the timing sprocket (torque of 12±1.5 N•m). After confirming that it is installed in place, install the tensioner. **(Refer to ZT310T-M engine service manual for tensioner installation - Cylinder head cover, cylinder head - Tensioner)**.

(Note: After confirming that the timing chain has not fallen off from the timing driving gear, tighten the timing sprocket with a fixed twist. After installing the tensioner, you need to rotate the crankshaft to recheck the timing for the second time.)



Seven, Guide bar

Guide strip removal

Before disassembling the guide bar, the following parts need to be disassembled.

· Tensioner. (**Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Tensioner for disassembly and assembly**)

·The cylinder head cover sub- parts. (**Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Cylinder Head Cover for disassembly and assembly**)

·Cylinder head assembly. (**Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Cylinder Head for disassembly and assembly**)

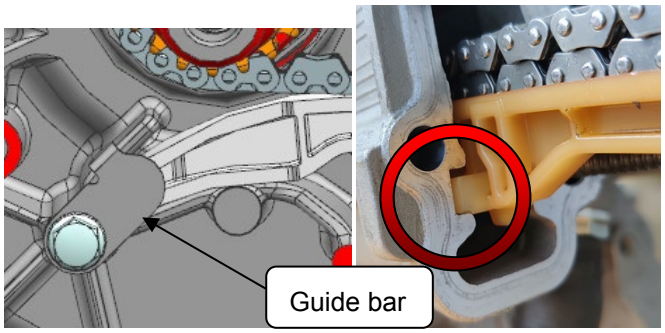
1. Remove the guide bar as shown in the figure.

Chenck

1. Check whether the guide bar is excessively worn or damaged.

Guide bar installation

1. Install the guide bar as shown in the figure. (Note: After the guide bar is installed in place, the raised point of the guide bar is lower than the joint surface of the cylinder block and cylinder head.)



Eight, Tension bar

Before disassembling the tension bar, the following parts need to be disassembled.

· Tensioner. **(Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Tensioner for disassembly and assembly)**

·The cylinder head cover sub-parts. **(For disassembly and assembly refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Cylinder Head Cover)**

·Cylinder head sub-assembly. **(Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Cylinder Head for disassembly and assembly)**

·Cylinder piston sub-assembly. **(Refer to ZT310T-M Engine Maintenance Manual-Cylinder and Piston for disassembly and assembly)**

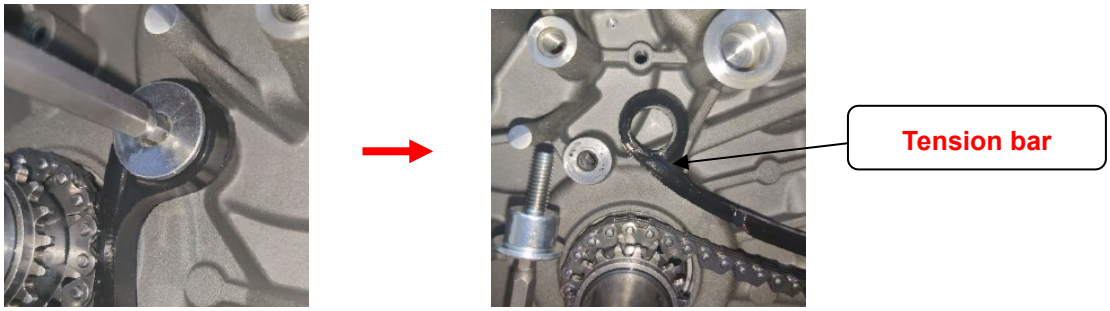
·Right crankcase cover sub-assembly. (**Refer to ZT310T-M engine maintenance manual for disassembly and assembly-right crankcase cover, magneto-right crankcase cover, magneto stator)**

· Magneto rotor sub-components. (**Refer to ZT310T-M engine maintenance manual for disassembly and assembly-right crankcase cover, magneto-magneto rotor)**

·Electric start gear. (**Refer to ZT310T-M engine maintenance manual for disassembly and assembly-right crankcase cover, magneto-magneto rotor)**

Tension bar removal

1. As shown in the figure, remove the fixing bolt of the tensioner with a 5# inner hexagon, and remove the tensioning bar.

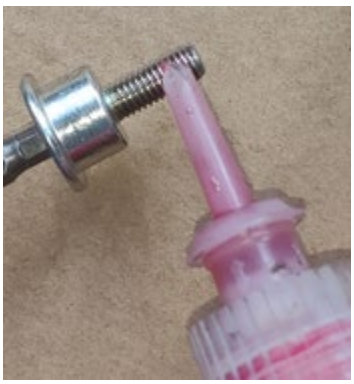


Check

1. Check whether the tensioning strip is excessively worn or damaged.

Tension strip installation

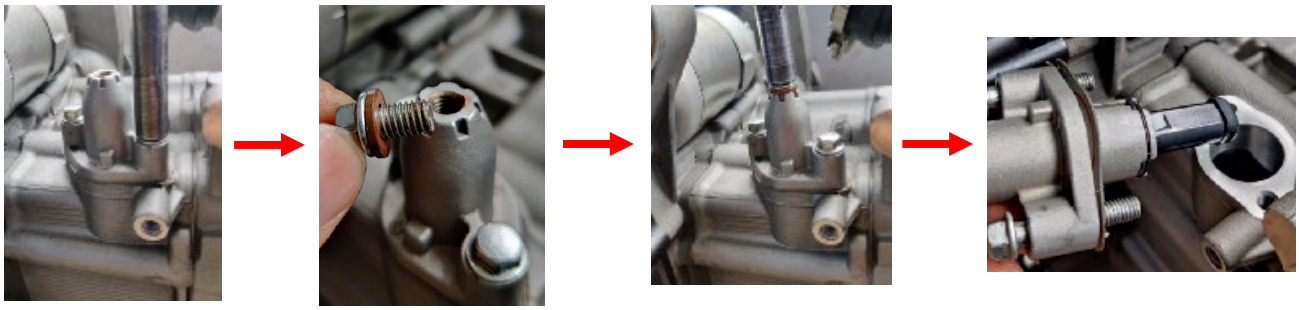
1. As shown in the figure, the fixing bolts of the tensioning strip are coated with thread glue and installed to the corresponding position of the box body, and the bolts are tightened with a fixed torque. The torque is 12±1.5 N•m.



Nine, tensioner

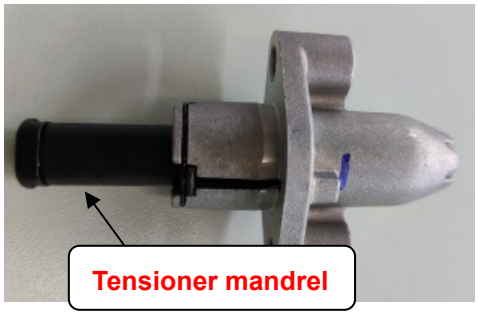
Tensioner removal

1. As shown in the figure, use T-rod-8# to remove the top bolts and copper pads of the tensioner, then loosen the tensioner evenly diagonally to fix bolts, and remove the tensioner and tensioner pads.



Check

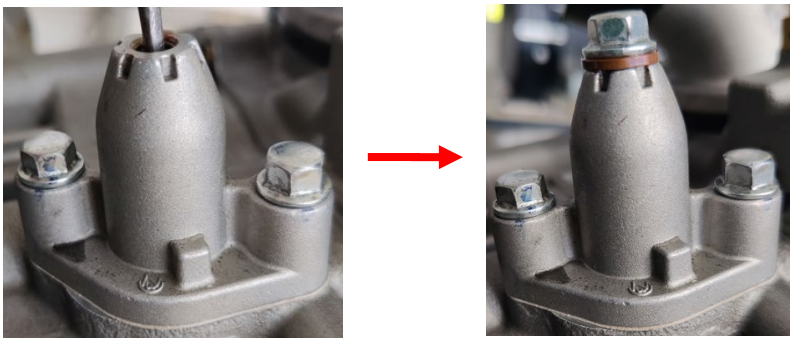
1. As shown in the figure, when the top rod of the tensioner is normally extended, press the fixed rod of the tensioner by hand, and the top rod is qualified if it cannot rebound.



Tensioner installation

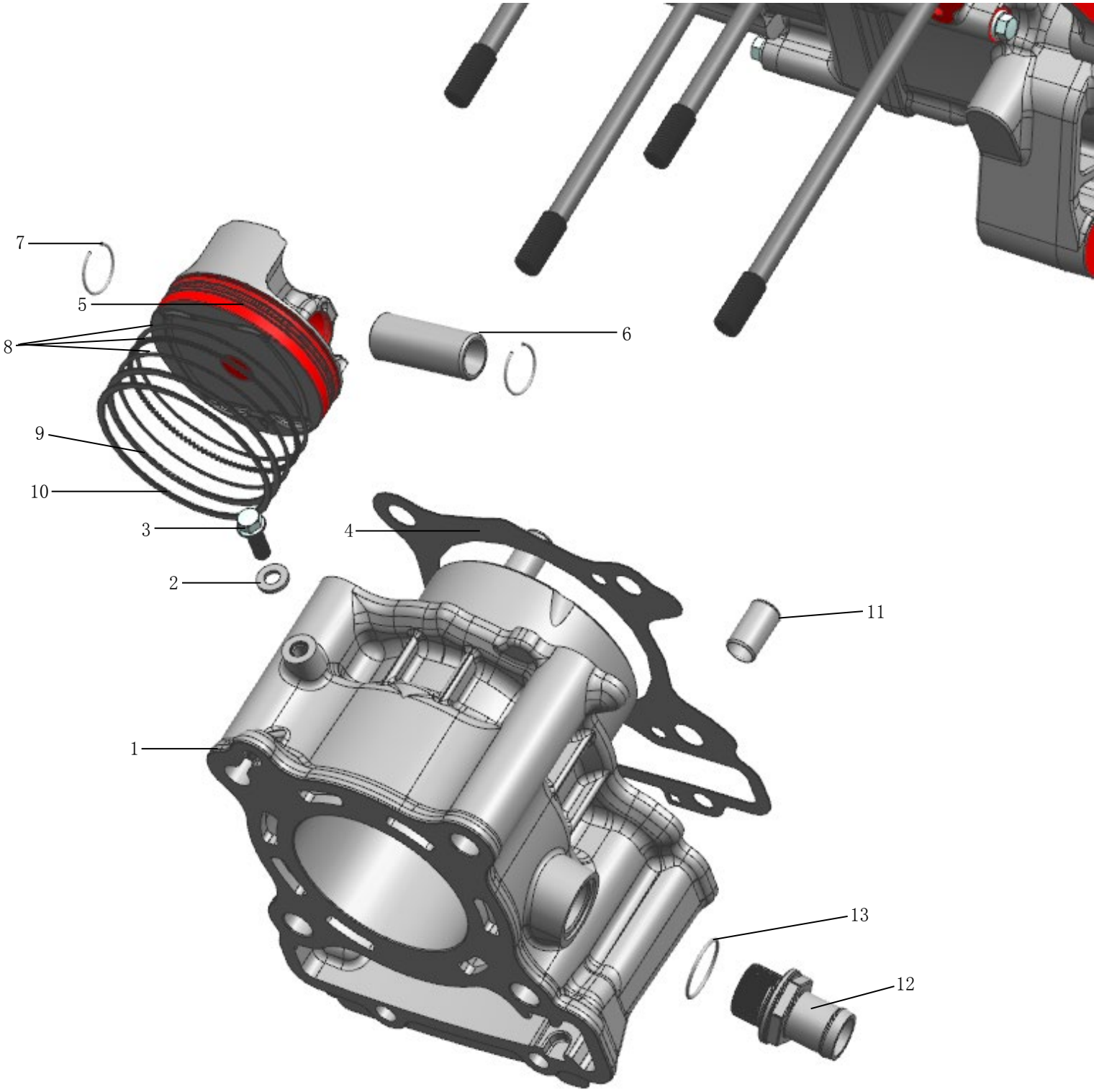
1. As shown in the picture, tighten the top rod of the tensioner with one word batch **(Turn the one word batch clockwise while pressing the top of the tensioner with your hand)**, When the highest point is received, tighten it forcefully. The ejector rod can be automatically locked. Put the tensioner gasket into the tensioner and put it into the corresponding position of the cylinder. Use M6×30 bolts to tighten at a fixed torque. The torque is 12±1.5 N• m.

2. As shown in the figure, rotate the ejector bolt counterclockwise with one word batch, after confirming that the tensioner ejector rod pops up, put in copper washers and M6×10 bolts, tighten them at a fixed torque, with a torque of 10±1 N•m.



Cylinder, piston

One, System components



The information of parts

Serial	Name	Number
1	cylinder	1
2	6.3×12.×1.6 copper gasket	1
3	M6×16 hexagon flange bolts (environmental protection color zinc)	1
4	Cylinder block box gasket	1
5	piston	1
6	17×42×10 Piston pin	1
7	20×1.2 piston pin retaining ring	2
8	Oil ring combination	1
9	Second air ring	1
10	First air ring	1
11	Locating pin 12×20	2
12	pipe connector	1
13	φ21×φ1.5 EPDM O-ring	1

Two, Maintenance information

General information

• This chapter introduces the maintenance of cylinders and pistons.

• The work of repairing cylinders and pistons requires removing the engine from the vehicle. (**Remove the engine from the whole vehicle, refer to ZT310T-M Maintenance Manual-11，Remove the engine from the whole vehicle**)

• Remove the cylinder head cover. (**Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Cylinder Head Cover for disassembly and assembly)**

• Remove the tensioner. (**Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Tensioner for disassembly and assembly**)

• Disassemble the cylinder head sub-assembly. (**Refer to ZT310T-M Engine Maintenance Manual-Cylinder Head Cover, Cylinder Head-Cylinder Head for disassembly and assembly**)

• When disassembling the cylinder, avoid scratching the joint surface of the cylinder and the box to cause damage.

• When the cylinder and piston are separated, pay attention to protect the piston and connecting rod to prevent the piston and connecting rod from colliding with the box body and causing damage.

• After removing the piston, clean up the carbon deposits and dirt on the top, and be careful not to drop it into the box.

•Clean the disassembled parts and blow them dry, and then carry out the inspection work.

Specification

Unit: mm (in)

<table>
<tr><th colspan="3">Item</th><th>Standard value</th><th>Maintenance limit value</th></tr>
<tr><td rowspan="4">cylinder</td><td colspan="2">the inside diameter of</td><td>71.990-72.005 (2.8342-2.8348)</td><td>72.055 (2.8368)</td></tr>
<tr><td colspan="2">Outer roundness</td><td>-</td><td>0.005 (0.002)</td></tr>
<tr><td colspan="2">Taper</td><td>-</td><td>0.005 (0.002)</td></tr>
<tr><td colspan="2">Flatness</td><td>-</td><td>0.005 (0.002)</td></tr>
<tr><td rowspan="8">piston
Piston ring
Piston pin</td><td colspan="2">Piston outer diameter</td><td>71.965-71.980 (2.8333-2.8339)</td><td>71.90 (2.831)</td></tr>
<tr><td colspan="2">Piston outer diameter measuring point</td><td>8 (0.3150) from the bottom of the skirt</td><td>-</td></tr>
<tr><td colspan="2">Piston pin hole inner diameter</td><td>17.002-17.008 (0.6694-0.6696)</td><td>17.038 (0.6708)</td></tr>
<tr><td colspan="2">Piston pin outer diameter</td><td>16.994-17.000 (0.6691-0.6693)</td><td>16.975 (0.6683)</td></tr>
<tr><td colspan="2">The gap between the piston pin hole and the piston pin</td><td>0.002-0.014 (0.0001-0.0006)</td><td>-</td></tr>
<tr><td rowspan="2">Clearance between piston ring and ring groove</td><td>First ring</td><td>0.02-0.06 (0.0008-0.0024)</td><td>0.115 (0.0045)</td></tr>
<tr><td>Second ring</td><td>0.02-0.06 (0.0008-0.0024)</td><td>0.115 (0.0045)</td></tr>
<tr><td rowspan="3">Piston ring end clearance</td><td>First ring</td><td>0.15-0.30 (0.006-0.012)</td><td>0.50 (0.0197)</td></tr>
<tr><td>Second ring</td><td>0.30-0.45 (0.0118 -0.0177)</td><td>1.15 (0.0453)</td></tr>
<tr><td>Oil ring (side rail)</td><td>0.20-0.70 (0.008-0.028)</td><td>-</td></tr>
<tr><td colspan="3">Clearance between cylinder and piston</td><td>0.010-0.040 (0.0004-0.0016)</td><td>0.15 (0.0059)</td></tr>
<tr><td colspan="3">Inner diameter of small end of connecting rod</td><td>17.010-17.017 (0.6697-0.67)</td><td>17.06(0.6717)</td></tr>
<tr><td colspan="3">Clearance between connecting rod and piston pin</td><td>0.010-0.023 (0.0004-0.0009)</td><td>0.06(0.0024)</td></tr>
</table>

Tool

1. Clamp pliers
2. Needle-nose pliers
3. Vernier caliper
4. Plug gauge
5. Roundness meter
6. Straightedge

Three, troubleshooting

1. When the engine is running at low speed, the compression pressure is too low, it is difficult to start or the performance is poor.

• The cylinder wall is worn, cracks appear on the top of the piston or the cylinder block wall is scratched.
• The piston ring is worn or cracked.
• The connecting rod is bent.
• The cylinder head valve is leaking.

2. The pressure of the engine is too high during compression, and it will make a knocking sound during operation.

• Excessive carbon deposits on the top of the piston or in the combustion chamber.

3. Abnormal engine noise.

• The piston ring is broken.

• The piston ring is worn or the cylinder wall is scratched.

• Piston ring carbon deposits or piston ring groove wear.

• The piston pin or piston pin hole is worn.

• The piston ring sticks to the piston ring groove.

4. The engine produces obvious smoke.

• The cylinder and the piston pull the cylinder, the piston is damaged or the coating film of the cylinder falls off.

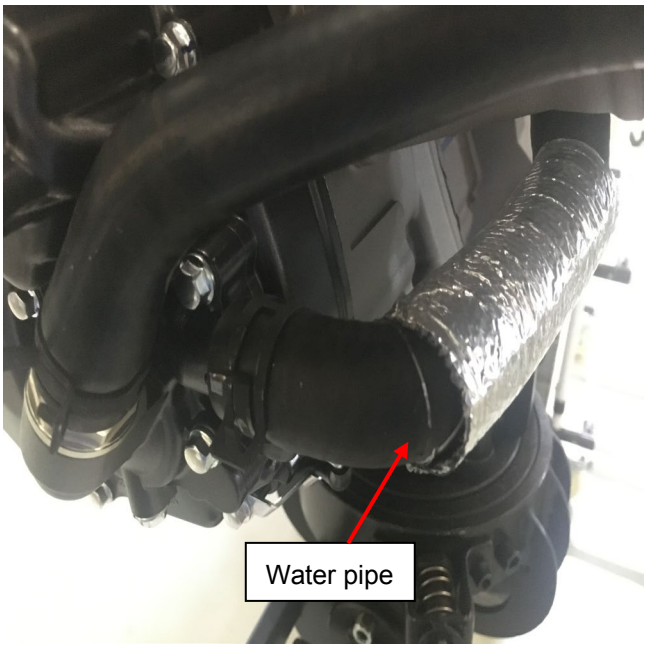
• The cylinder, piston or piston ring is worn.

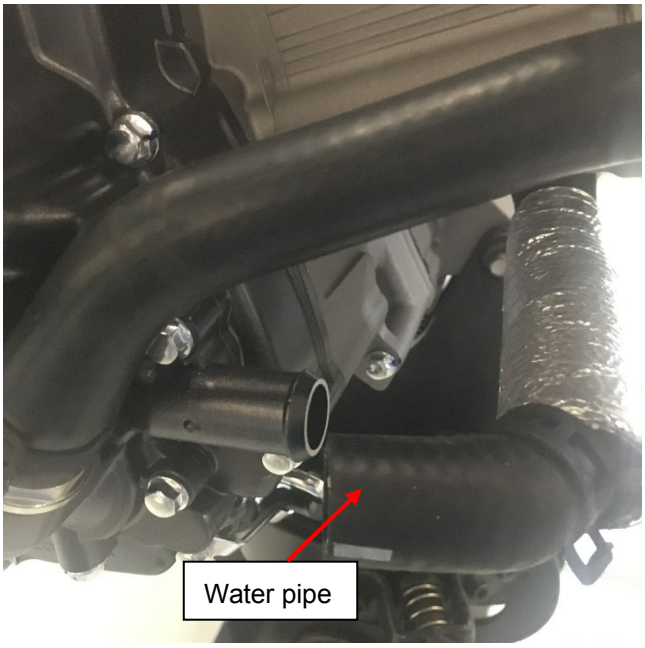
• The piston ring installation position is incorrect.

Four, The cylinder

Disassemble

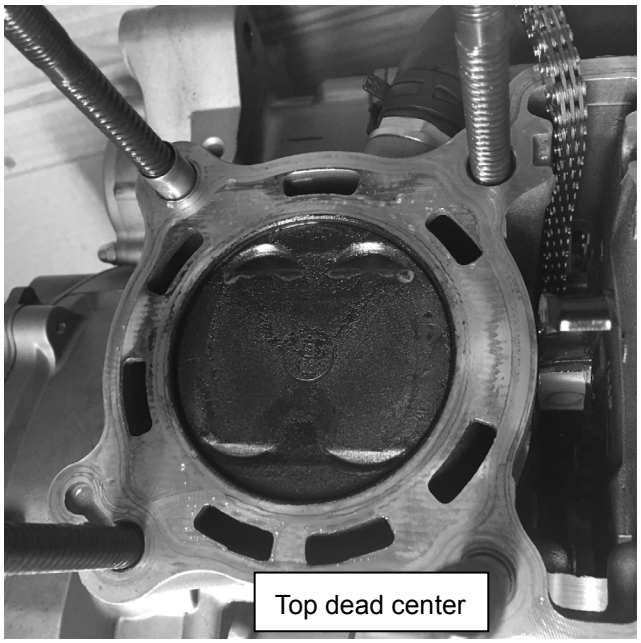
1. After the cylinder head is disassembled, Use clamp tool to remove the clamp from the pump cover outlet pipe connection, pull out the water pipe, and remove the cylinder block.

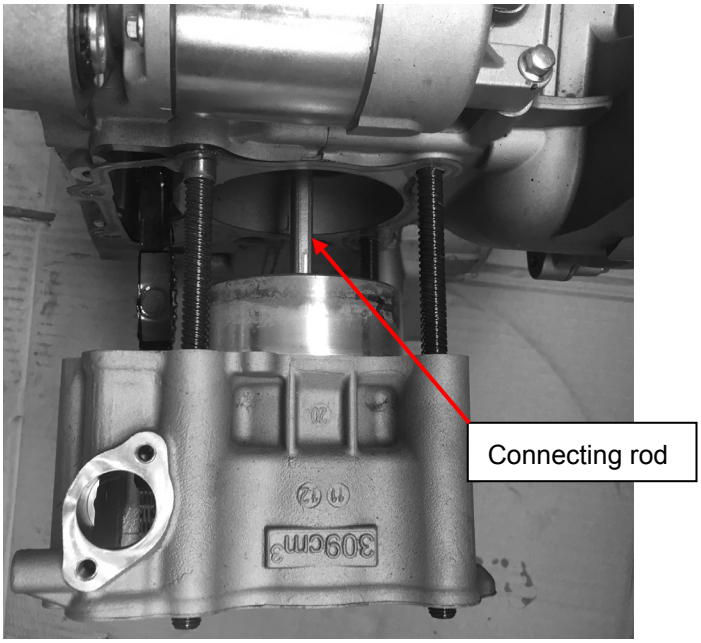




2. Remove the cylinder.

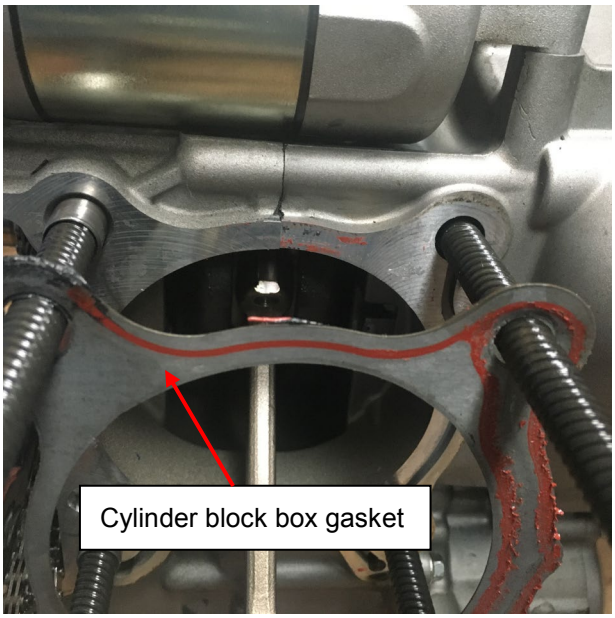
Remarks: ① Piston turned to upper stop before disassembly, and fix the crankshaft when pulling out the cylinder.
② Do not drop the timing chain into the crankcase.
③ Fix the piston and connecting rod by hand or other auxiliary tools when the cylinder is pulled out of the piston to avoid collision with the box and cause damage.

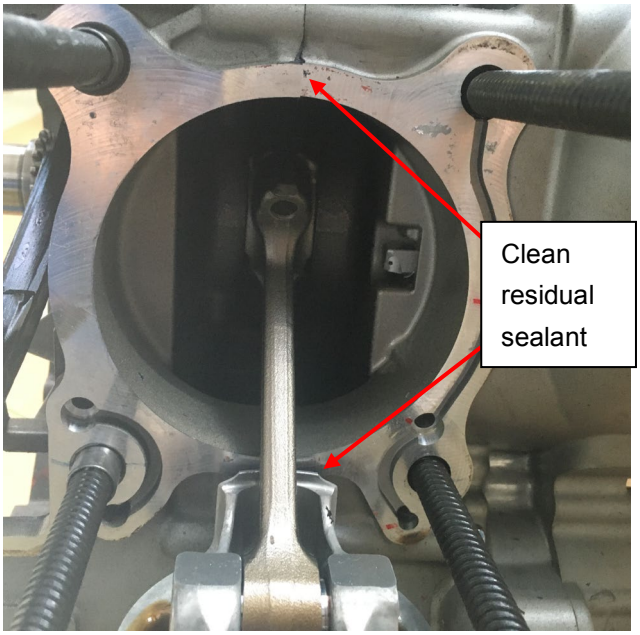




3. Remove the gasket of the cylinder block and case, and cleaning of residual sealant from the cylinder block binding face.

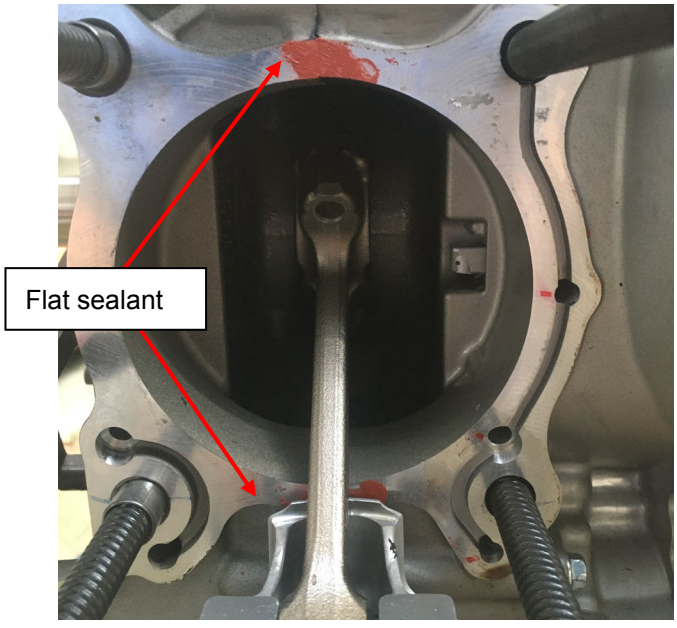
Remarks: ① Be careful when cleaning the joint surface to avoid scratches on the joint surface

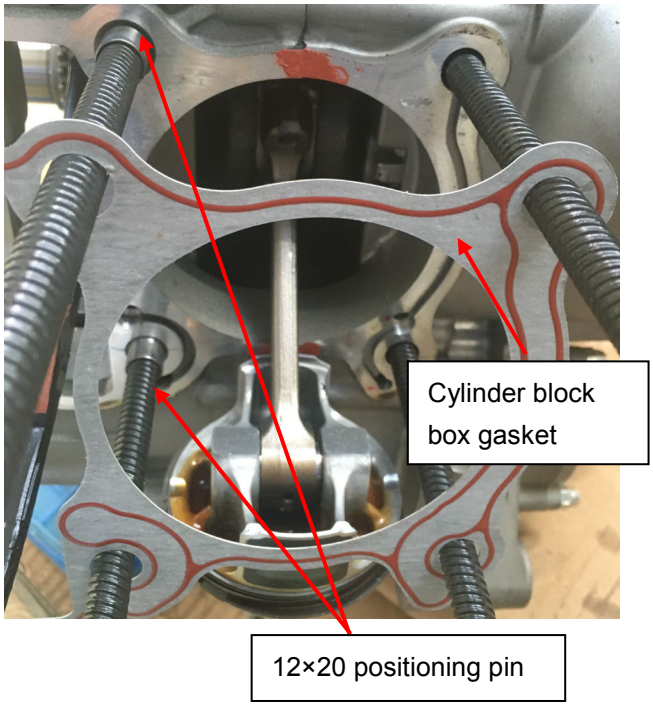




Installation

1. Apply appropriate amount of sealant to the corresponding position of the cylinder block and box joint surface, install a new cylinder block gasket, and two 12×20 positioning pins.



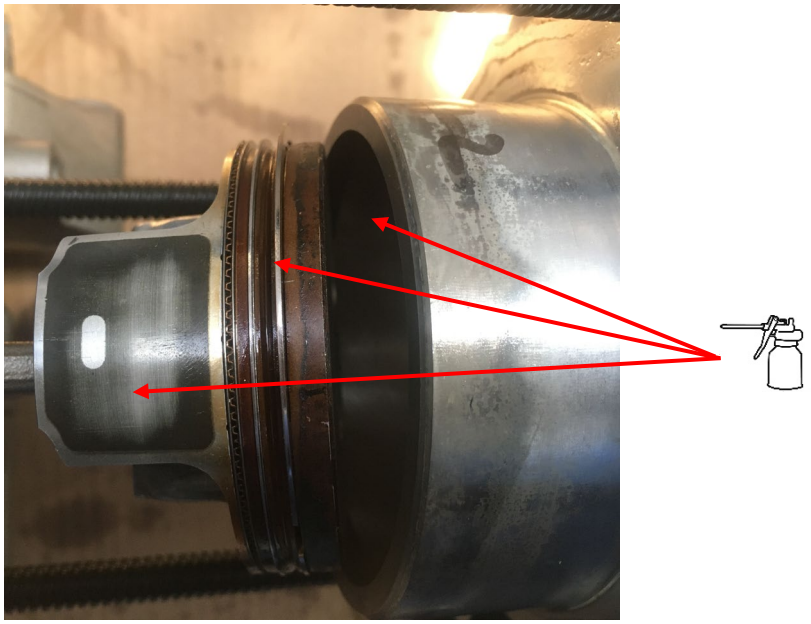


2. Install the cylinder block, and press the piston ring into the cylinder block by hand; the piston ring opening is staggered and assembled. **(Refer to -ZT310T-M Engine Maintenance Manual-Cylinder, Piston-Piston for installation of piston ring**)

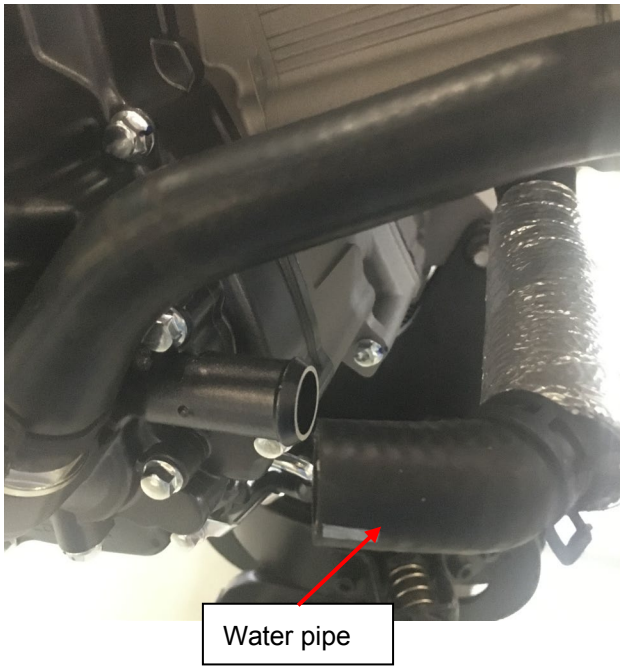
Remarks: ① Before installing the cylinder block, apply a proper amount of engine oil evenly on the inner wall of the cylinder block.

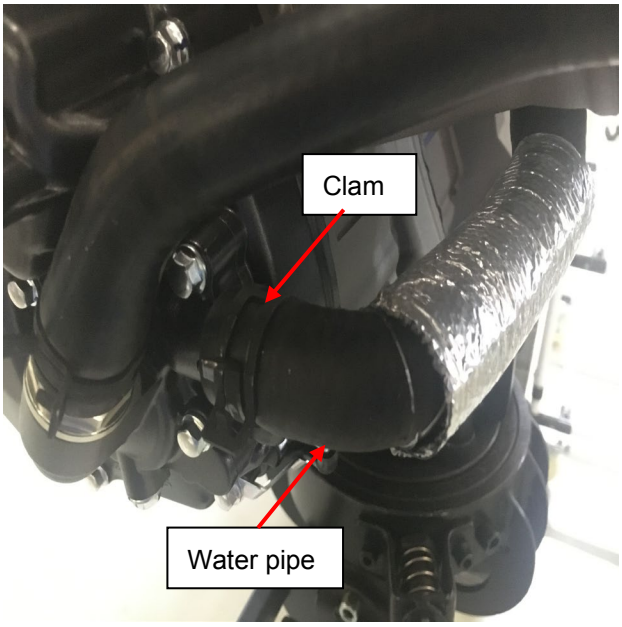
② Apply proper amount of engine oil to the piston skirt and piston ring.

③ Do not drop the timing chain into the crankcase.



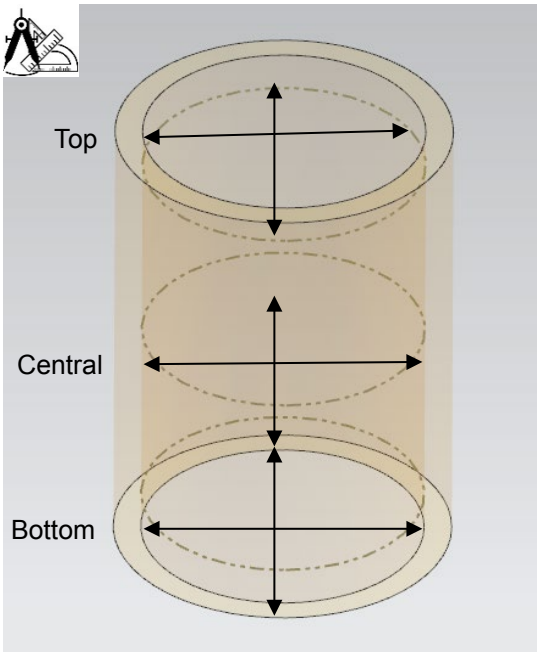
3. Put the water pipe onto the water pipe fitting of the pump cover, and use clamp pliers to clamp the clamp on the water pipe joint.





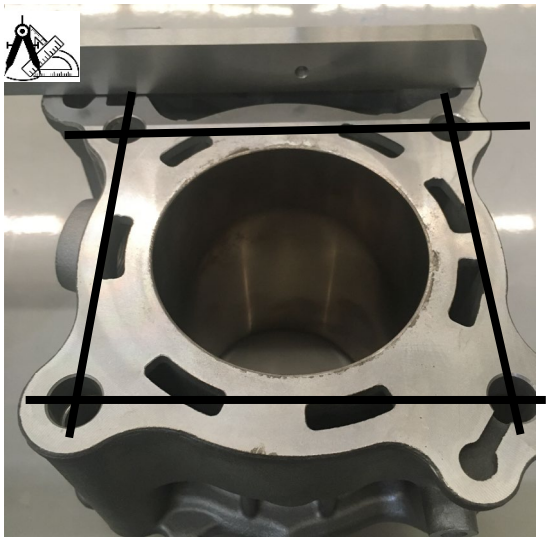
Inspection

1. Check for scratches and wear on the inner wall of the cylinder.
Measure and record the cylinder inner diameters of the three horizontal planes in the X and Y axis directions respectively.
The largest reading is used to judge whether the cylinder is worn or not.
Maintenance limit value: 72.055 mm (2.8368 in)



2. Measure and record the cylinder inner diameters of the three horizontal planes respectively in the X and Y axis directions.
Take the largest reading to judge the outer roundness of the cylinder.
Maintenance limit value:
Flatness: 0.05 mm (0.002 in)
Outer roundness: 0.05 mm (0.002 in)
Note: If the cylinder block exceeds the maintenance limit value, a new cylinder block must be replaced. If a new cylinder block is replaced, please calculate the fit gap between the piston and the new cylinder block. If the fit gap between the old piston and the new cylinder exceeds the maintenance limit value, then The piston also needs to be replaced.
Piston and cylinder block maintenance limit value: 0.15 mm (0.0059 in)

3. As shown in the figure, place a ruler and a plug gauge between the two holes of the cylinder to check whether the cylinder is twisted.
Maintenance limit value: 0.05 mm (0.002 in)



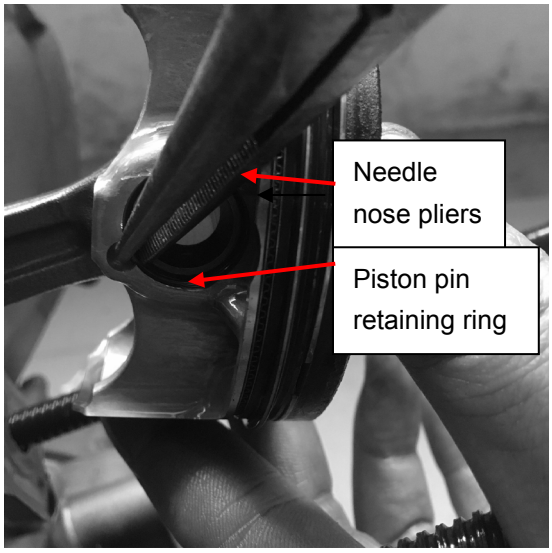
Five, The piston

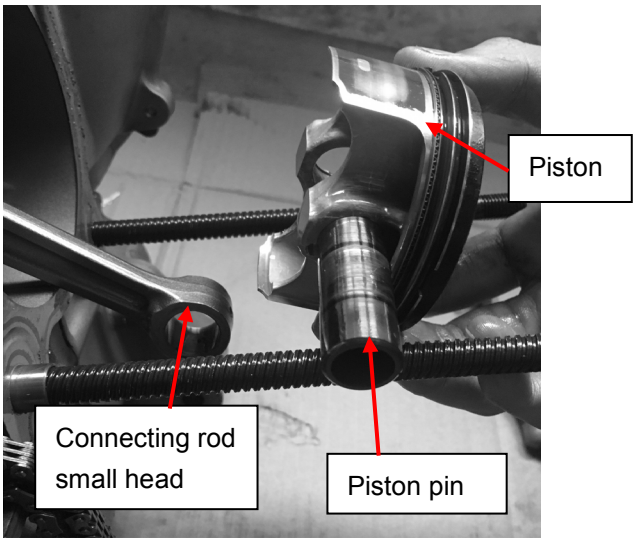
Disassemble

1. After the cylinder is removed, use needle-nose pliers to remove the piston pin retaining ring, push the piston pin out of the piston and connecting rod, and then remove the piston.

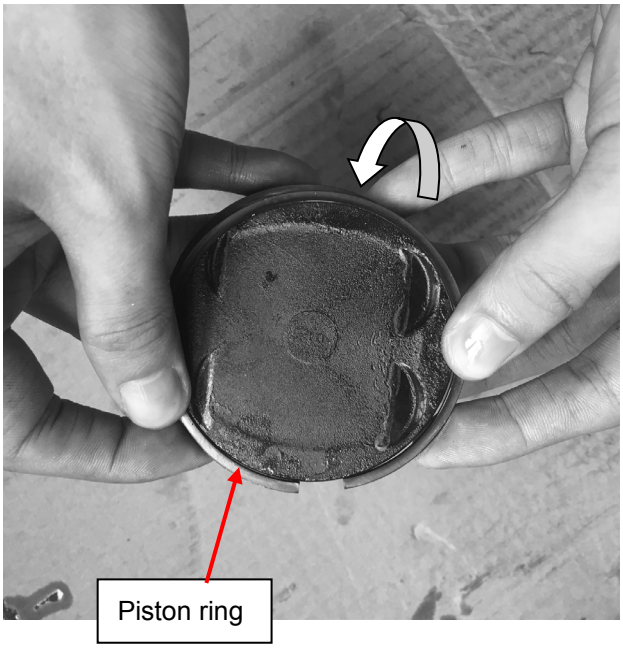
Remarks: ① Do not scratch the piston and piston ring when removing the piston pin retaining ring.

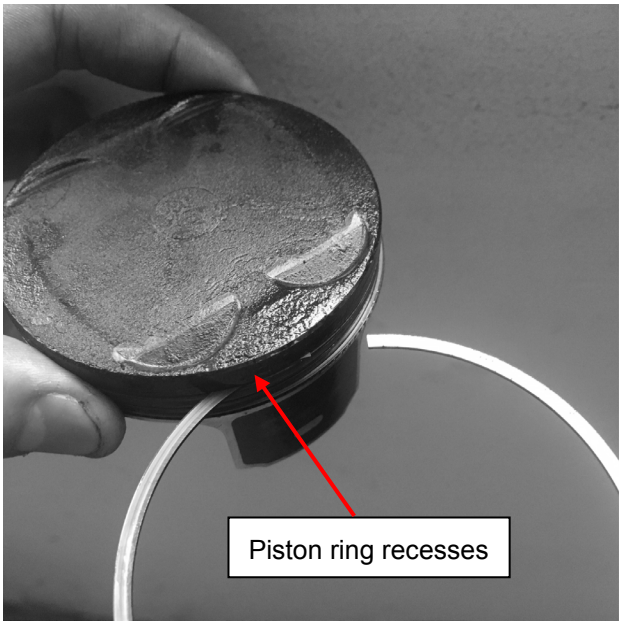
② Block the opening of the crankshaft case with cloth or other objects to prevent the piston pin retaining ring from falling into the case during disassembly





2. Remove the piston rings by pulling them apart and lifting them up against the gap and use a used piston ring or other suitable object to remove the carbon build-up from the piston ring grooves.





Installation

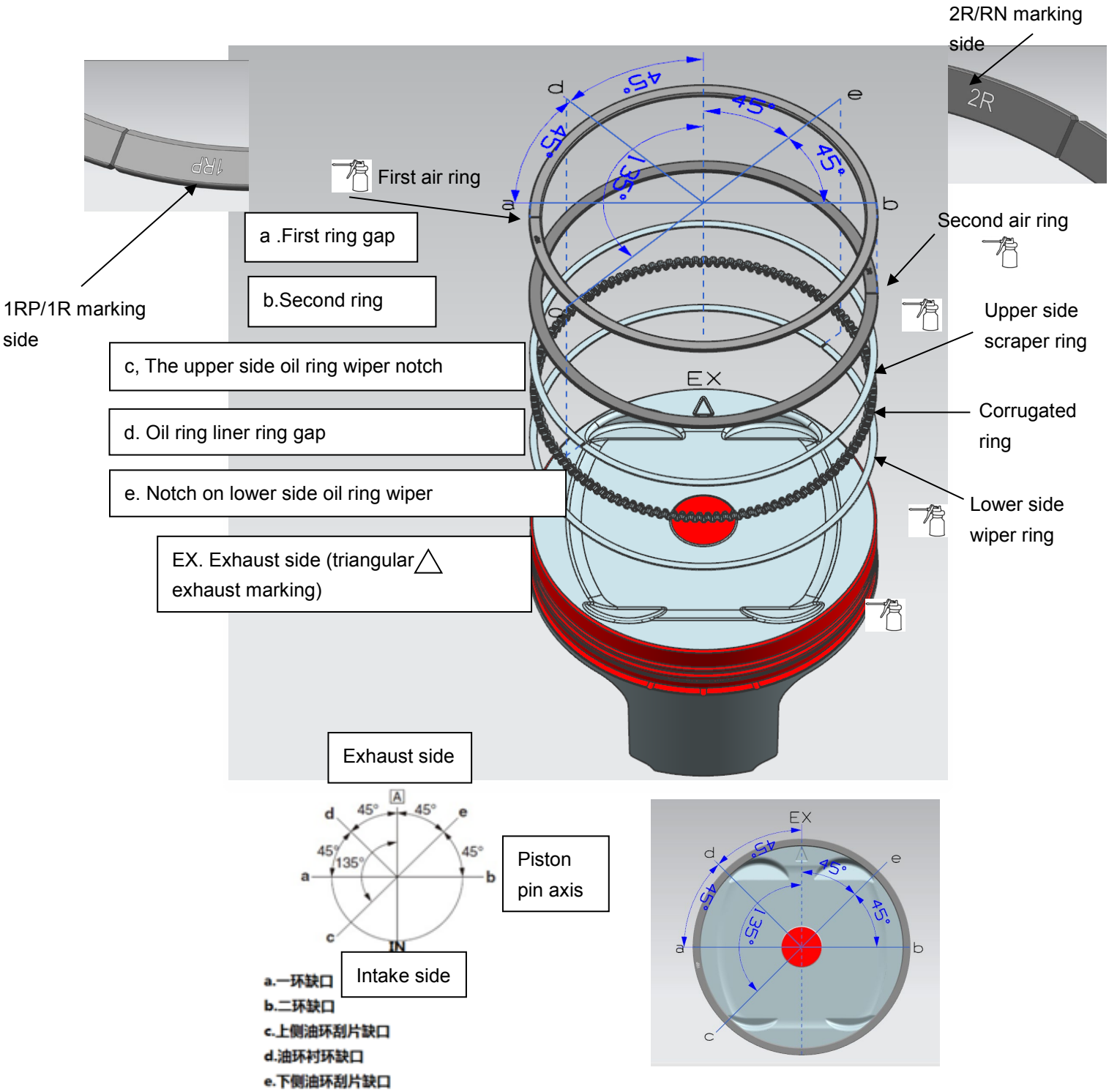
1. Apply a proper amount of engine oil to each piston ring and piston ring groove, and install the piston ring on the corresponding groove.

Remarks: ① Do not use the first air ring and the second air ring interchangeably.

② When installing the air ring, the side with the mark face up (top of the piston).

③ Install the oil ring assembly, first install the wave-shaped liner ring, then install the lower side wiper ring, and finally install the side wiper ring.

④ The first ring gap "a" is on the left side of the "△" EX mark, along the axial direction of the piston pin; the second ring gap "b" is on the right side of the "△" EX mark, and the angle with "a" is 180°; lower side The gap "e" of the oil ring wiper is at 45° between "△" EX and "b"; the angle between the gap "c" and "e" of the upper oil ring wiper is 180°; the gap "d" of the oil ring lining ring is at The left side of "△" EX is perpendicular to the line of "c" and "e". (As shown below)



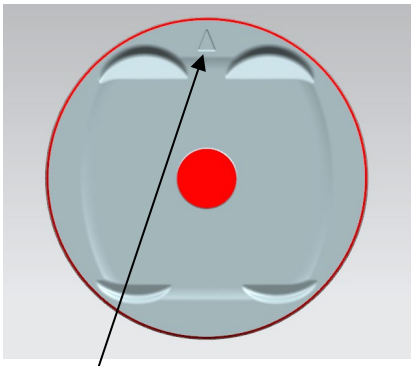
2. Put the piston pin into the piston and install it on the connecting rod, and use needle-nose pliers to install the piston pin retaining ring into the ring groove.

Remarks: ① Apply a proper amount of engine oil to the piston pin hole and the small end hole of the connecting rod.

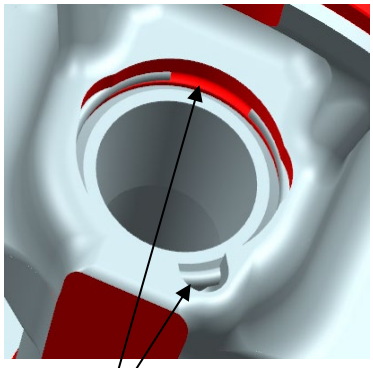
② The opening of the piston pin retaining ring should be staggered with the piston arc groove.

③ The piston pin retaining ring is installed in place.

④ The arrow on the top of the piston points to the exhaust side, do not install it backwards.



△ Mark on exhaust



Staggered

Inspection

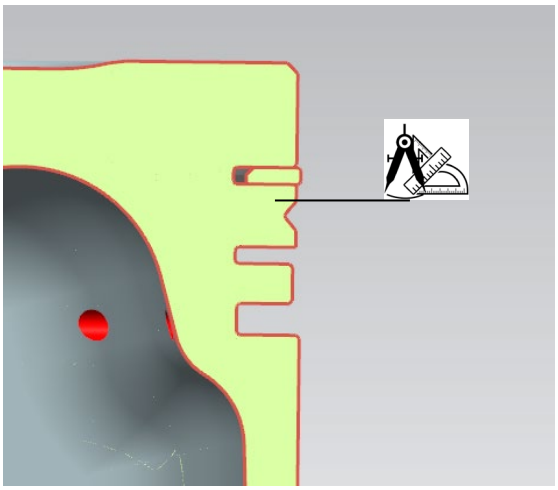
1. Rotate the piston ring and check the rotation of the piston ring. The piston ring should be able to rotate freely in the groove without feeling stuck.

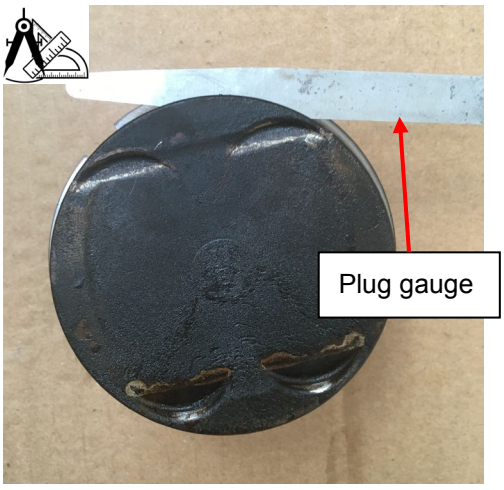
Press the piston ring until the outer surface is basically flush with the piston, and measure the clearance between the piston ring and the ring groove.

Note: before measuring the piston ring clearance, remove the carbon deposits on the piston ring groove and piston ring. When the clearance between the piston ring and the piston ring groove exceeds the maintenance limit, replace the new piston and piston ring.

Maintenance limit value:

First ring / second ring: 0.115 mm (0.0045 in)





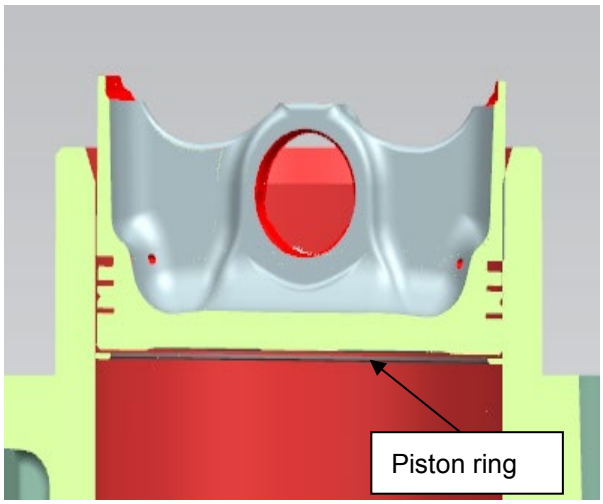
Plug gauge

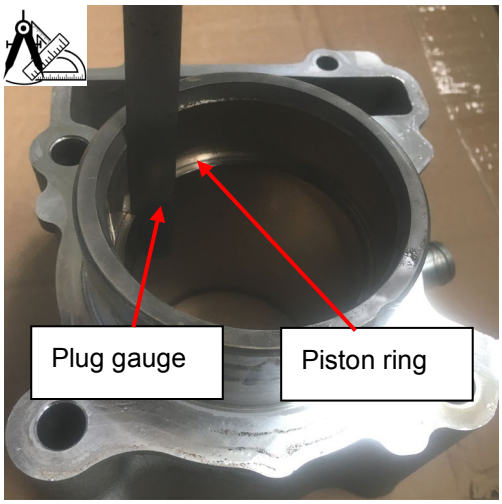
2. Use the piston to push the piston ring firmly into the cylinder, and use the plug gauge to measure the end clearance.

Maintenance limit value:

First ring: 0.50 mm (0.0197 in)

Second ring: 0.85 mm (0.0335in)





3. Check whether the outer surface of the piston is scratched or otherwise damaged. Measure the inner diameter of piston pin hole and take the maximum reading to judge the inner diameter.

Maintenance limit: 17.038 mm (0.6708 in)

Measure the outside diameter of the piston pin between the piston pin and the sliding surface of the connecting rod.

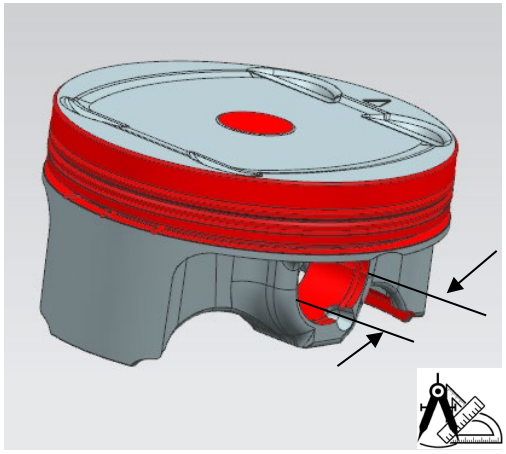
Maintenance limit: 16.975 mm (0.6683 in)

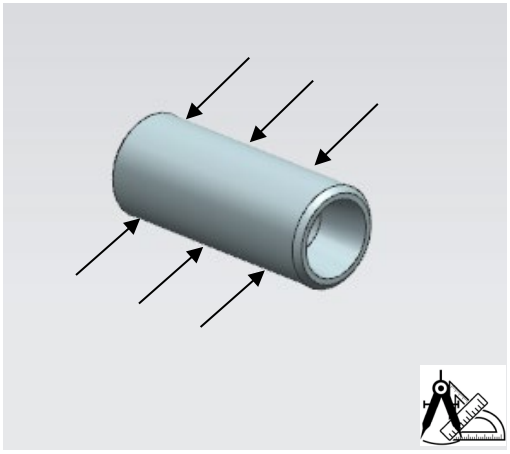
Calculate the clearance between the inner diameter of the piston pin hole and the outer diameter of the piston pin.

Standard value: 0.002-0.014 mm

Note: when the fit clearance between the piston pin hole and the piston pin exceeds the standard value, please evaluate and replace the parts with large wear,

Judge whether the fit clearance is within the maintenance limit. If yes, replace the corresponding parts. If no, replace the new piston pin and piston.





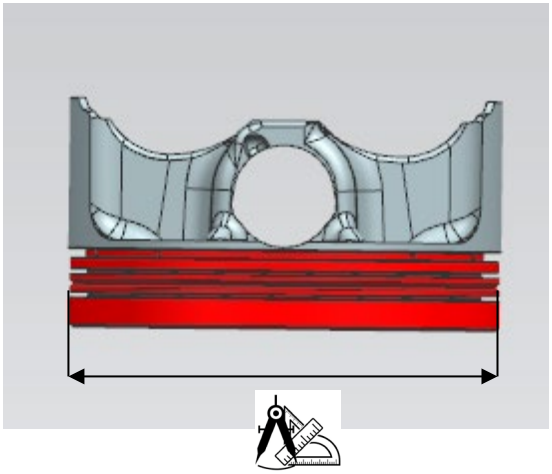
4. Measure the outer diameter of the piston at 8mm (0.3150 in) from the bottom of the piston and 90 ° perpendicular to the piston pin hole.

Maintenance limit: 71.90 mm (2.831 in)

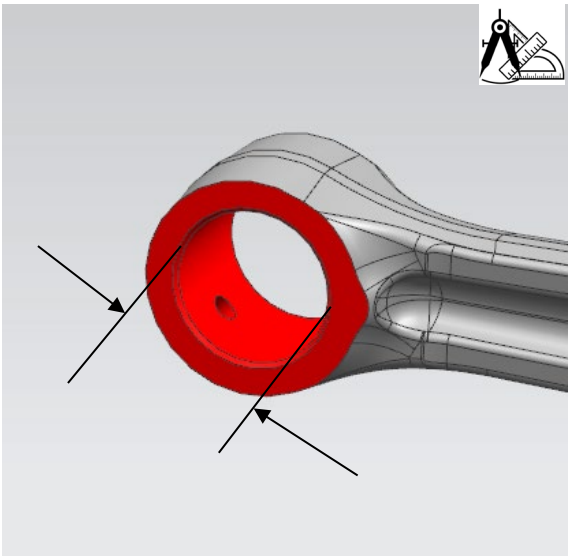
Calculate the fit clearance between cylinder and piston.

Maintenance limit: 0.15 mm (0.0059 in)

Note: when the fit clearance between piston and cylinder block exceeds the maintenance limit value, please evaluate and replace the parts with large wear and determine whether the fit clearance is within the maintenance limit value. If yes, replace the corresponding parts; if not, replace the new cylinder and piston.

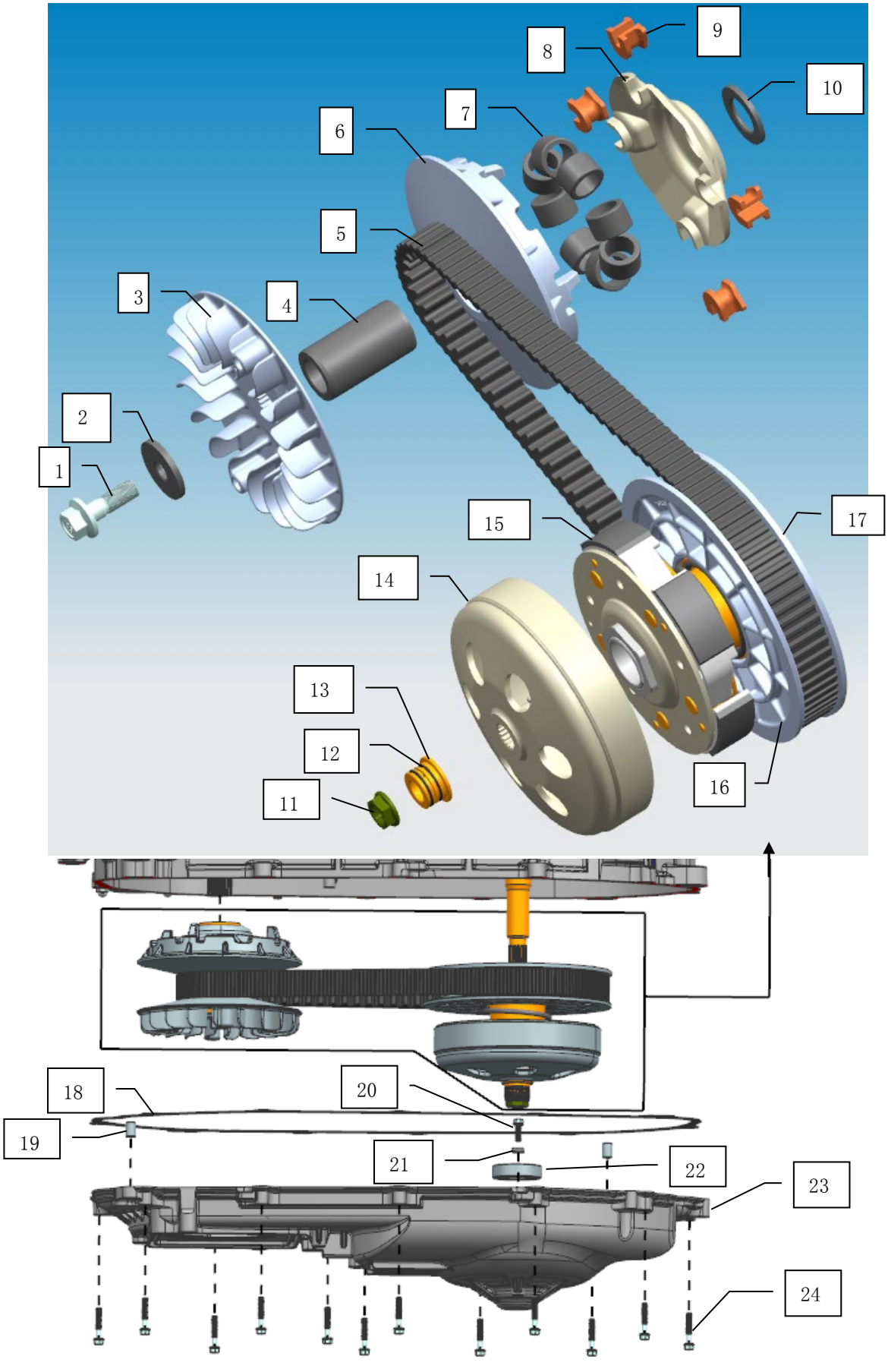


5. Measure the inner diameter of small end of connecting rod.
Maintenance limit: 17.06 mm (0.6717 in)
Calculate the fit clearance between the small end of connecting rod and piston pin.
Standard value: 0.01-0.023 mm (0.0004-0.0009 in)
Maintenance limit value: 0.06 mm (0.0024 in)
Note: the fit clearance between the inner diameter of the small end of the connecting rod and the outer diameter of the sliding surface of the piston pin
When it is greater than the maintenance limit, please evaluate and replace the parts with large wear,
Judge whether the fit clearance is within the maintenance limit. If yes, replace the corresponding
If not, replace the new connecting rod and piston pin.



Left crankcase cover, continuously variable clutch subassembly

One, System components



Part information

Serial	Name	Number	Serial	Name	Number
1	M12 × one point two five × 35 hexagon flange bolt (grade 10.9 / environmental color)	1	13	φ 14.5 ×φ 25 × 16 driven wheel bushing	1
2	φ12.3 ×φ 40 × 4 washer	1	14	ZT1P72MN Driven wheel clutch housing	1
3	ZT1P72MN Driving wheel drive plate	1	15	Driven wheel clutch shoe	5
4	ZT1P72MN Distance cylinder	1	16	Driven wheel sliding disc	1
	ZT1P72MN V-belt	1	17	Driven wheel fixing plate	1
6	ZT1P72MN Driving wheel sliding disc	1	18	Left crankcase cover gasket	1
7	ZT1P72MN Pulley	8	19	Φ10 × 14 hollow dowel	2
8	ZT1P72MN Slope plate	1	20	M6 × 16 hexagon flange bolt	1
9	ZT1P72MN Boot block	4	21	Bearing pressure plate of left crankcase cover	1
10	φ23.2×φ 40 × 3.25 washer	1	22	6005 — 2rd / p5c3 deep groove ball bearing	1
11	M14 × 1 hexagon flange nut (Grade 10 / environmental color zinc)	1	23	ZT1P72MN left crankcase cover	1
12	Φ21.8×φ1.8 acrylate rubber O-ring	2	24	M6 × 30 hexagon flange bolt	12

Two, Maintenance information

General information

1. This section describes the repair and maintenance of the drive sprocket and driven gear.

2. The maintenance of driving wheel and driven wheel can be carried out on the whole vehicle without dismantling the engine separately.

3. During maintenance, the driving wheel, driven wheel and V-shaped drive belt shall not touch oil or grease to prevent the V-shaped drive belt from slipping.

Torque value

Serial	Name	Number	Torque （N·m）	Remark
1	M14 × 1.0 hexagon flange nut (Grade 10 / environmental color zinc)	1	75±7 N.m	-
2	M12 × 1.25 × 35 hexagon flange bolt (grade 10.9 / environmental color)	1	103±10 N.m	-
3	M6 × 30 hexagon flange bolt	12	12±1.5 N.m	-
4	M6 × 16 hexagon flange bolt	1	12±1.5 N.m	Thread glue to be applied

Tools

1. Torque wrench;

2, 17# and 19# sleeves;（Extended sleeve recommended）;

3. Special fixing fixture for driving and driven wheels;

4. Elastic clip;

5. T-shaped sleeve -8#;

6. Hexagon socket -4#;

Three, Common fault phenomena / troubleshooting

1. The engine can be started and the rear wheel of the filler door does not rotate.

• The V-belt is severely worn or broken.
• The clutch shoe is worn or damaged.
• The large spring of the driven wheel is damaged.
• Damage to the splines of the housing clutch and drive shaft mating.
• Gear chamber gear is damaged.

2. The engine stalls or lacks power.

• V-belt slipping.
• The large spring of the driven wheel is damaged.

3. Insufficient high-speed power.

• The V-belt is worn or slipping.
• The clutch housing slips against the clutch shoes.
• The large spring of the driven wheel fails.
• Centrifugal roller wear.

4. When the engine idles normally, the rear wheels rotate rapidly.

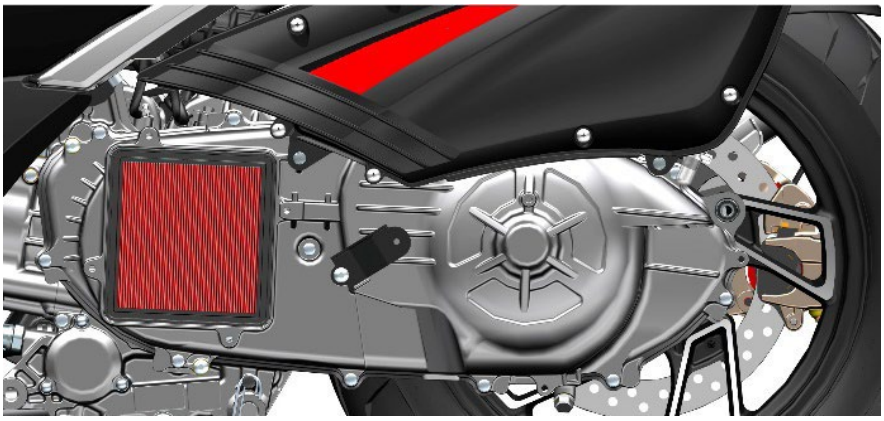
• Centrifugal roller return stall.
• Small spring of driven wheel shoe block is damaged.
• The driven wheel bearing is damaged and the bearing is stuck.

Four, Left crankcase cover

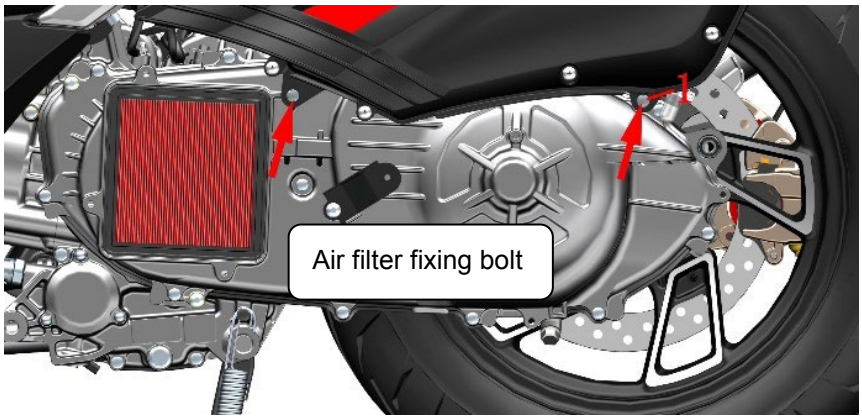
Before removing the left crankcase cover, remove the following parts.
a. Left engine hood, engine air inlet hood, engine air inlet filter element, anti vibration sponge of left engine hood.
(**Refer to ZT310T-M maintenance manual for disassembly and assembly-2, maintenance-air filter element (filter element), air inlet filter element)**

Left crankcase cover removal

① Remove the left cover according to the previous steps of replacing the air inlet filter element. Remove it as shown in the figure below.

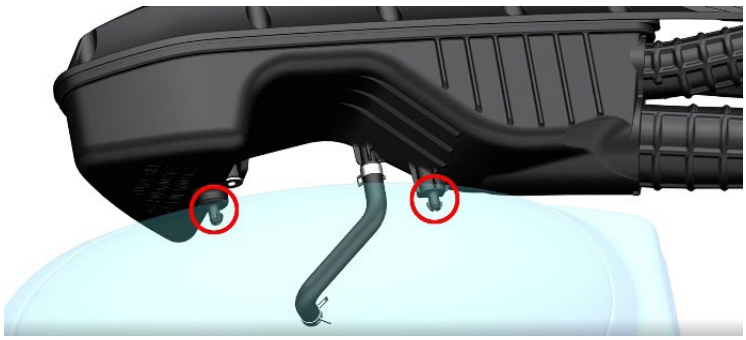


② Use T-shaped sleeve -8# to remove 2 fixing bolts (1) of air filter. Also remove the air inlet filter cartridge.

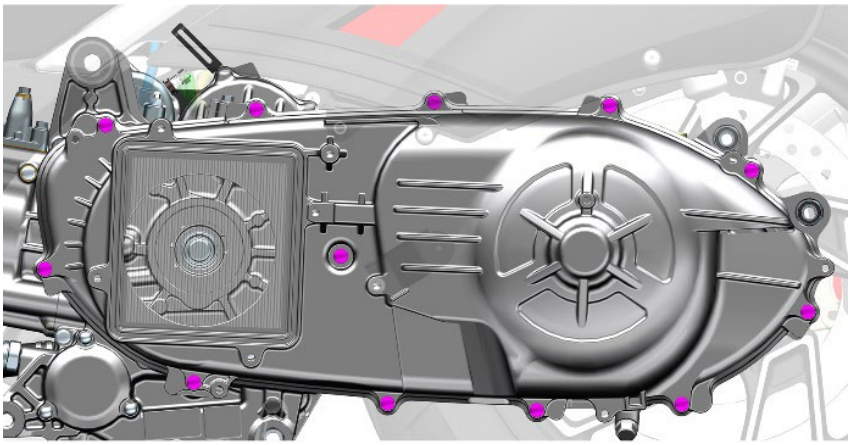


③ Clamp the exhaust pipe clamp on the inner side of the tail of the air filter with pointed nose pliers and move it upward by about 20mm (0.8 in). Then pull the exhaust pipe out of the crankcase by hand.

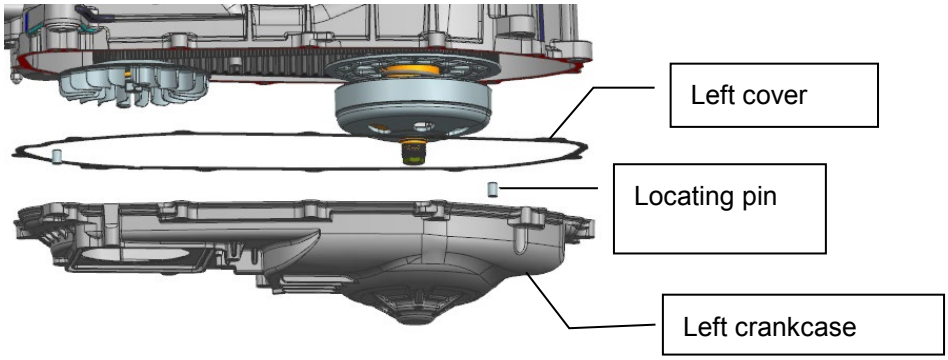
④ As shown in the figure below, pull the tail of the air filter outward with one hand and press the rear inner mud plate inward with the other hand. Separate the air filter from the rear inner mud plate.



⑤ Use T-shaped socket -8# to remove 12 M6 bolts of left crankcase cover × 30 hexagon flange bolt. The two box bolts at the bottom of the air filter need to move the air filter upward to expose.

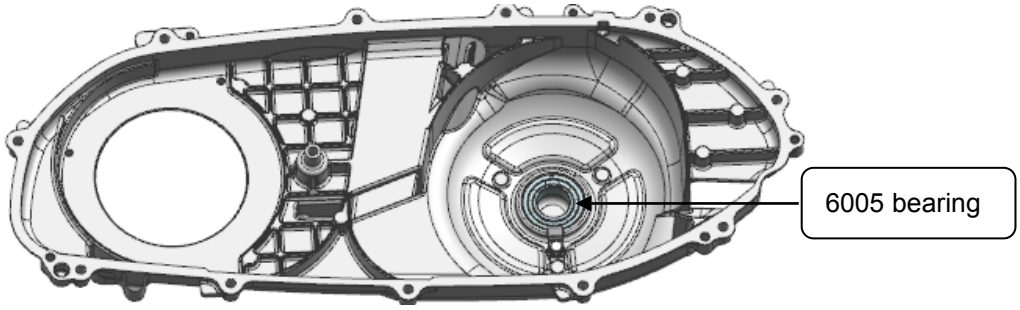


⑥ Remove the left crankcase cover, the left crankcase cover gasket and the locating pin.



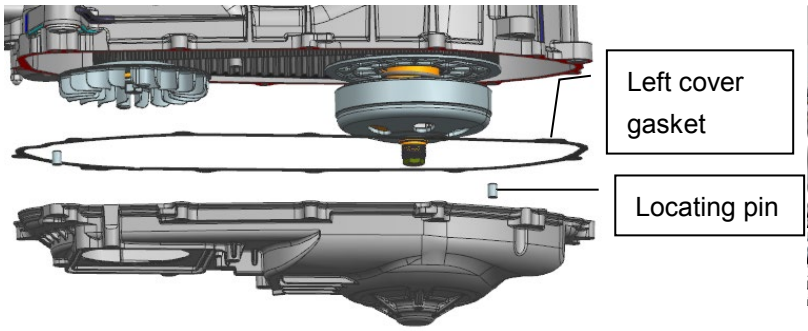
Inspection for left crankcase cover

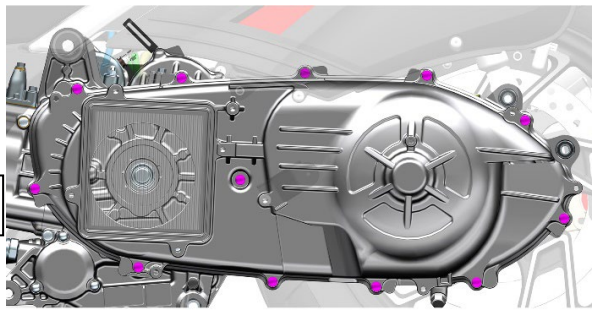
① Check the 6005 bearing of the left crankcase cover. If the inner ring of the bearing is stuck in rotation, please replace it in time.



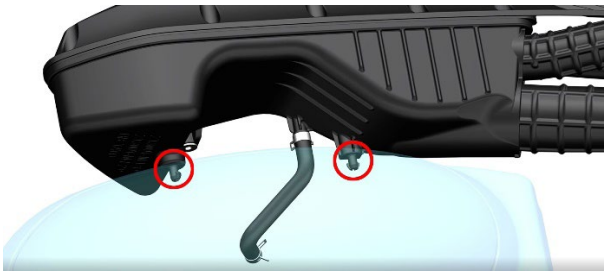
Installation of left crankcase cover

① Install the locating pin and the left crankcase cover gasket in place. Then align the locating pin and install the left crankcase cover in place. After evenly pre tightening the bolts of the left crankcase cover diagonally, tighten them with a constant torque of 12 ± 1.5 N.M. (Note: The left crankcase cover gasket may be broken or fractured during disassembly and will need to be replaced with a new gasket for assembly)





② As shown in the figure below, install the fixing point on the side of the air filter into the inner mud plate, then connect the exhaust pipe of the air filter to the air balance pipe of the gear chamber, move the clamp to the appropriate position and clamp the exhaust pipe. Tighten the fixing bolts of the air filter with a torque of 12 ± 1.5 N.M. **(Note: the exhaust pipe of air filter cannot be discounted)**



③ After installing the air filter, install the engine air inlet filter element, engine air inlet mask, anti vibration sponge of left engine cover and left engine cover in place. (**For assembly, refer to ZT310T-M maintenance manual-2, Maintenance-air filter element (filter element), air inlet filter element chapter**)

Five, Stepless speed change clutch subassembly

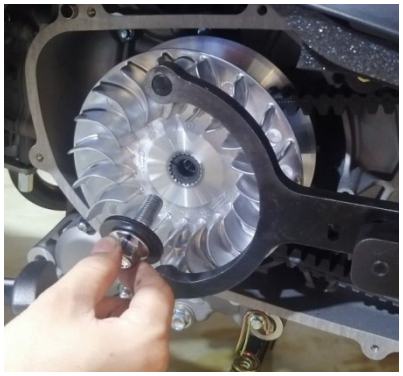
Disassemble

① The cylindrical pins of the special drive sprocket and driven gear locating fixture are inserted seperatively into the two locating holes on the outer blade of the main fixing disc and the two symmetrical heat sink holes on the clutch housing of the driven wheel. Prevent the driving wheel and driven wheel from rotating freely.

② Remove M12 counterclockwise with a torque wrench (or air screwdriver) and 17# socket × one point two five × 35 hexagon flange bolt.

③ Remove M14 counterclockwise with a torque wrench (or air screwdriver) and 19# socket × 1 hexagon flange nut.

④ Remove M12 × one point two five × 35 hexagon flange bolt and φ twelve point three ×φ forty × 4 washer. Then remove M14 × 1 hexagon flange nut and φ fourteen point five ×φ twenty-five × 16 driven wheel bushing.



⑤ Remove the drive and driven wheel positioning jigs and remove the ZT1P72MN main fixing disc from the crankshaft.

⑥ Remove the driven wheel clutch housing from the drive shaft.

⑦ Pinch the middle part of the V-drive belt and remove the belt together with the driven wheel sub-part.

⑧ Pinch the main sliding wheel sub-part and the ramp plate inside and remove it together with the drive wheel bushing.

⑨ Finally take out the φ23.2×φ40×3.25 washer to complete the disassembly of the continuously variable clutch sub-assembly.

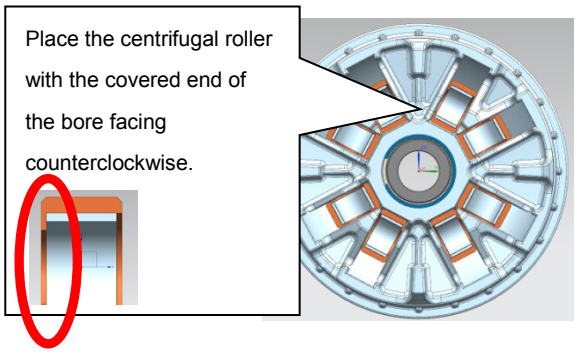
Assembly

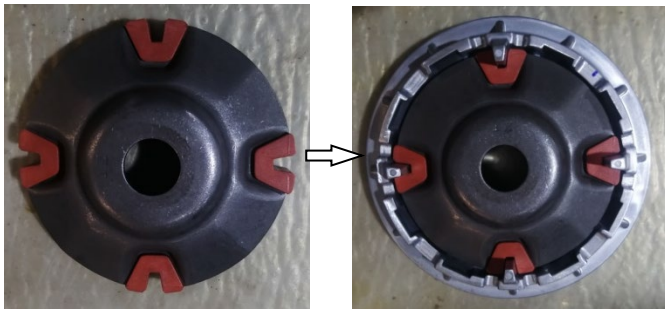
Note: 1. Before assembling, it is necessary to conduct a comprehensive inspection of all the parts of the disassembled continuously variable clutch sub-assembly, and replace the parts that reach the limit of use. 2. Before assembling, use an air gun to completely clean the dust accumulated in the belt room of the left crankcase. 3. Before assembling, make sure that there is no oil stain on the driving wheel, V-belt, and driven wheel to avoid slipping failure after assembly!!!

① First install the φ23.2×φ40×3.25 washer on the crankshaft and assemble it in place.

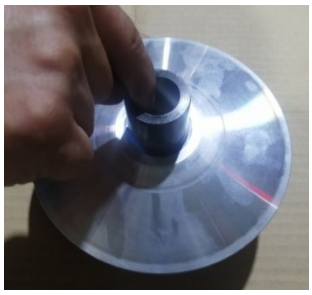
② Check that the 8 centrifugal rollers are intact in the centrifugal roller grooves of the main sliding wheel sub-part (Figure 1 below), the ramp plate with the four buffer sliders is then fitted to the main sliding wheel sub-part with the corresponding guide pillar (Figure 3 below).

Note: When placing the centrifugal roller, the covered end of the inner bore of the centrifugal roller points in the counterclockwise direction of rotation. Otherwise it can easily result in the failure of the steel sleeve embedded in the centrifugal roller when the engine is running!!!





③ Turn the main pulley sub-assembly with the centrifugal rollers and ramp over and insert the main pulley bushing into the bore of the main pulley sub-assembly. Then squeeze the sliding disc and ramp plate with one hand (to prevent the centrifugal roller from falling off if it comes apart) and hold the exposed drive wheel bushing with the other hand so that the inner bore of the drive wheel bushing is aligned with the crankshaft. Then the ramp plate, centrifugal roller, main sliding wheel sub-part, and drive wheel bushing assembly is advanced and assembled on the crankshaft, and topped with φ23.2×φ40×3.25 washers.



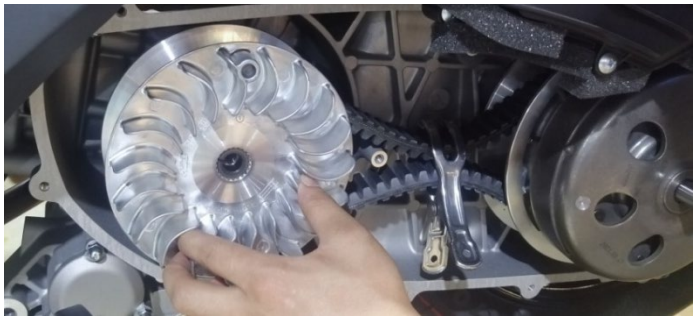

④ Place the driven wheel flat on the workbench or on a clean ground, then make the indicating arrow on the V-shaped transmission belt point to the counterclockwise rotation direction, place the V-shaped transmission belt on the outer ring of the driven wheel, and make a certain distance from The moving wheel is 4~5cm away. Press the driven wheel clutch housing with the palms of both hands, and the fingers of both hands buckle the moving plate of the driven wheel while pulling it upwards while rotating it clo ckwise. After the moving plate of the driven wheel is raised about 10mm in height, quickly extend a finger near the V-belt side to pivot the V-belt into the belt groove between the driven wheel moving disc and fixed discs. Finally, clamp the middle of the belt with an elastic clip to prevent the belt from loosening by itself.

Note: This step requires greater hand strength and certain operating experience to complete. Insufficient hand strength or no operating experience may cause injury to fingers caught by the driven pulley pulley! ! !

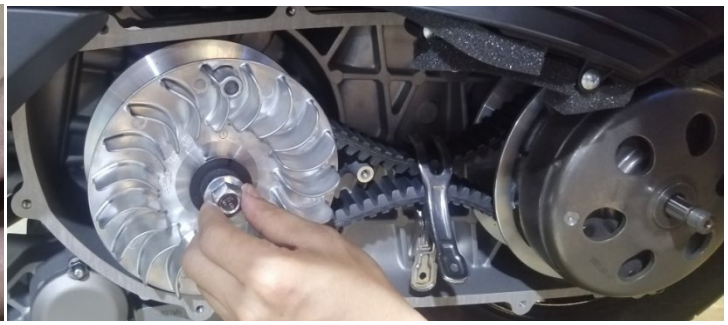


⑤ Pick up the combined driven wheel and the V-shaped transmission belt as a whole, with the clutch housing of the driven wheel facing outwards, and after the center inner hole of the driven wheel is aligned with the drive shaft, push the driven wheel inward into place (the drive shaft is used for mounting φ14.5×φ25×16 a section of the optical axis of the bushing of the driven wheel is exposed), and the other part of the V-shaped transmission belt is sleeved on the outer ring of the exposed crankshaft spline.

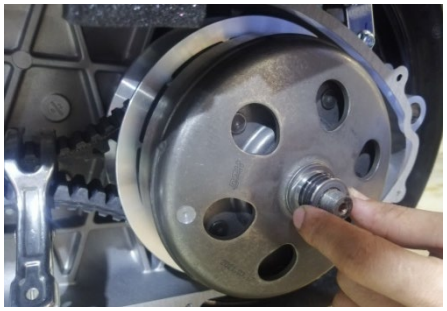
⑥ Main fixing plate with wind blade side facing outwards, the spline hole in the middle is aligned with the splines on the crankshaft, and then assembled on the crankshaft, and assembled in place.



⑦ Sleeve the φ12.3×φ40×4 washer on the M12×1.25×35 hexagon flange bolt, and then screw the M12×1.25×35 hexagon flange bolt into the crankshaft threaded hole.

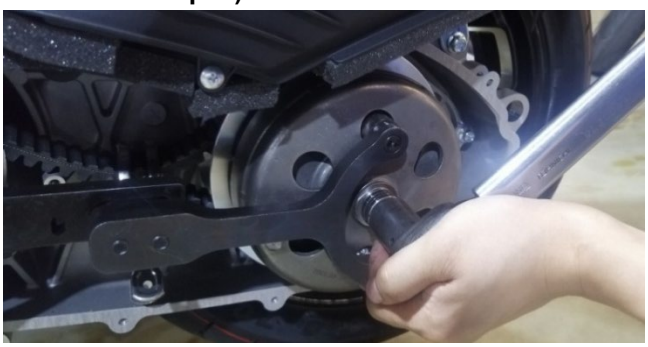



⑧ Point the stepped end of the φ14.5×φ25×16 driven wheel bushing toward the driven wheel, and install it on the exposed optical axis of the drive shaft. Then screw on the M14×1 hexagon flange nut on the drive shaft thread.
（**Note: If there is a lack of grease in the groove of the inner ring of the driven wheel bushing, high temperature resistant grease should be added. Do not leave out two O-rings. When screwing the nut, wipe off any grease on the threads.**）




⑨ Same as the first step during disassembly, The main fixing disc and the clutch housing of the driven wheel are clamped with special clamps so that they cannot rotate freely.

⑩ Tighten the M12×1.25×35 hexagon flange bolts clockwise with a torque wrench (or wind batch) and a 17# sleeve. The tightening torque must reach the range of 103±10N.M. Then tighten the M14×1 hexagonal flange nut clockwise with a torque wrench (or wind batch) and a 19# sleeve. The tightening torque must reach the range of 75±7N.M.
(Note: When tightening the M12 x 1.25 x 35 bolt with fixed torque, the belt cannot be held against the main fixed disc surface, which will result in insufficient torque for fixed torque.)

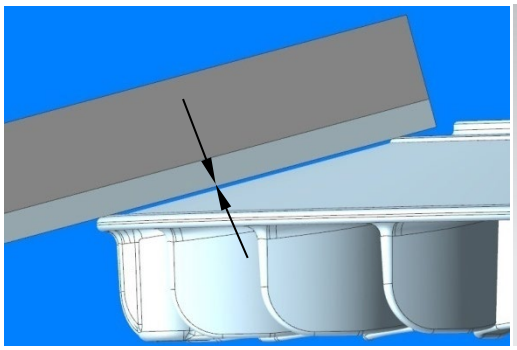
At this point, the assembly of the stepless variable speed sub-assembly is completed.

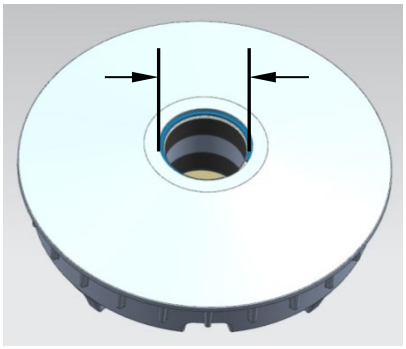
Six. Inspection of parts and limit values for use

Note: Every 20,000 kilometers, the CVT clutch sub-assembly needs to be inspected, maintained or repaired ! ! !

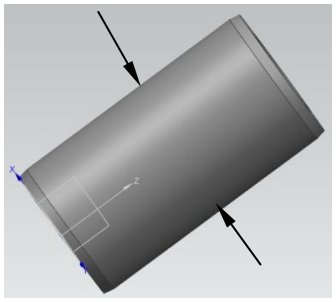
1. Check items and usage limits of the driving wheel

① Use a knife-edge ruler to align the tapered working surface of the driving wheel (Main fixed disc and sliding disc) in parallel, and then use a feeler gauge to check the amount of wear. It needs to be replaced when the gap is greater than or equal to 0.5mm. Use a vernier caliper or inner diameter micrometer to measure the inner lining aperture of the driving wheel sliding disc. The aperture ≥35.15mm needs to be replaced.

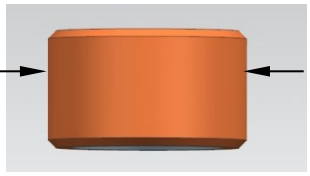




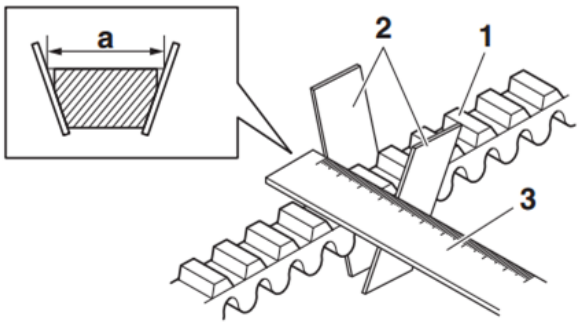
② Measure the outer diameter of the distance cylinder with a vernier caliper or an outer micrometer. It needs to be replaced when the outer diameter is less than or equal to φ34.9mm.



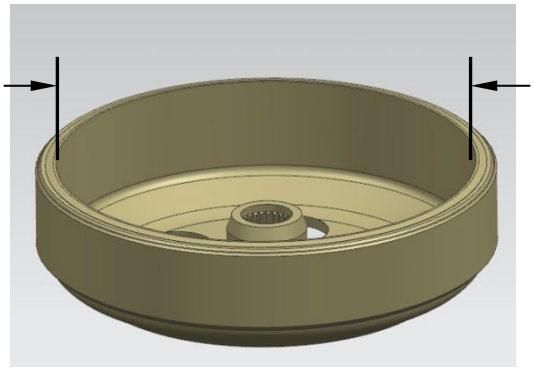
③ Check whether the centrifugal roller is worn and out of roundness, and need to be replaced if they are out of round and deformed. Measuring the diameter of the outer cylindrical surface of the centrifugal roller with a vernier caliper or an external micrometer. If the diameter is less than or equal to φ24.5mm, it needs to be replaced.



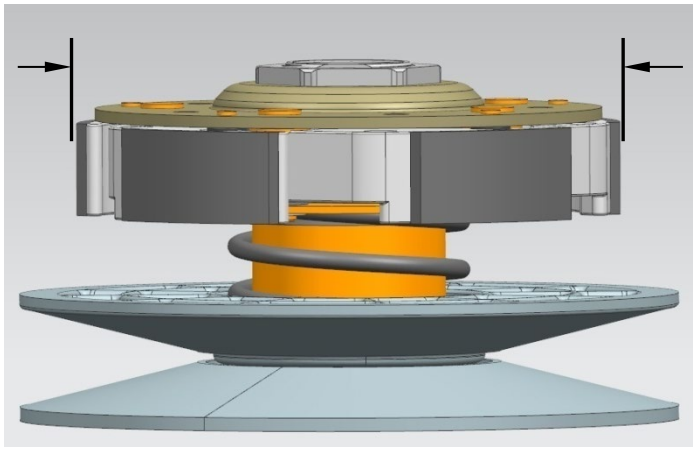
④ Check whether the V-shaped transmission belt is damaged such as cracks, broken wires, or tooth loss. If it occurs, it needs to be replaced. Press the measurement method shownin the figure below to measure the widest part of the V-shaped drive belt (dimension a in the figure). It needs to be replaced when the width is ≤25.5mm.



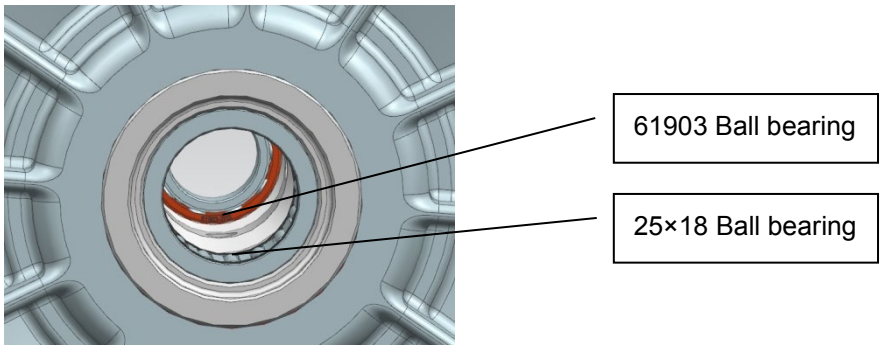
⑤ Check the inner circular surface of the driven wheel clutch housing for wear or damage. Use a vernier caliper to measure the inner diameter of the inner circle. It needs to be replaced when the hole diameter is greater than or equal to φ150.5mm. **(Note: The inner ring of the clutch housing has a wear resistant coating, it is not recommended to polish it, It will increase the wear of the inner ring of the clutch housing, clutch shoes and may also cause shaking of the ride.)**



⑥ Check whether the shoe block of the driven wheel clutch is worn or damaged. Use a vernier caliper to measure the diameter of the hoof block. If the diameter is less than or equal to φ146mm, it needs to be replaced. **(Note: Grinding the clutch shoes is not recommended, it will increase the wear on the inner ring of the clutch housing, the clutch shoes and may also cause shaking of the ride.)**

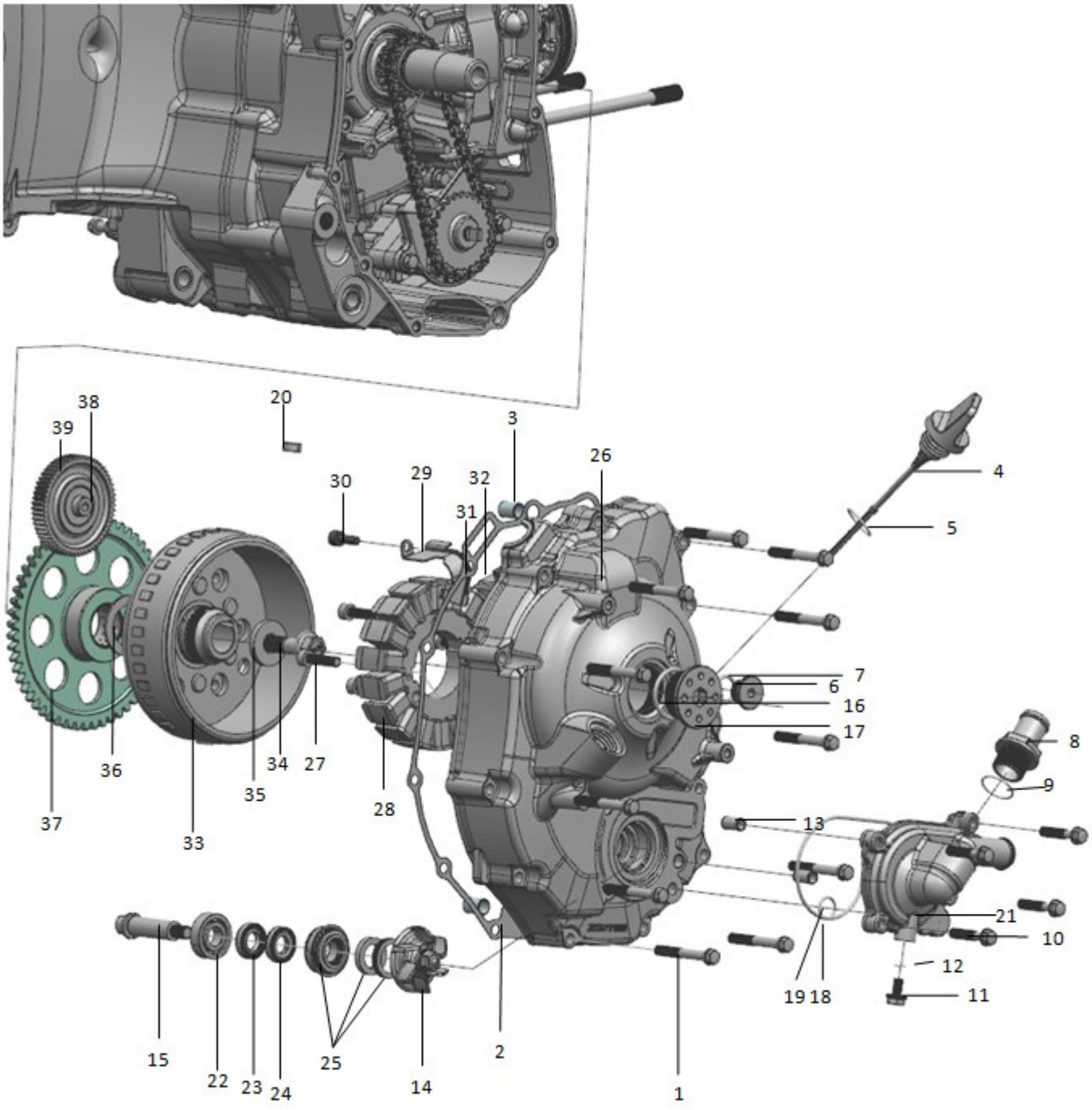


⑦ Check whether the 61903 ball bearings and 25×18 needle bearings press-fitted in the fixed shaft of the driven wheel are worn or damaged. Wear, looseness and fall apart require replacement of driven wheel sub-assembly **(Note: Except in exceptional cases, needle bearings in this position do not need to be greased, otherwise there is a risk of throwing them onto the V-drive belt.)**



Right crankcase cover, magneto

One, System components



Part information

Serial	Name	Number	Serial	Name	Number
1	M6×45 hexagon flange face 9.8 grade bolts	11	22	GB276 - 6001/P5C3 deep groove ball bearing	1
2	Right crankcase cover gasket	1	23	FB12×22×5 fluorine rubber oil seal	1
3	φ10×14 hollow positioning pin	2	24	FB12×24×5 Nitrile rubber oil seal (PTFE)	1
4	Dipstick	1	25	Water seal sub-component	1
5	18×3×3.5 Acrylic Glue O-ring	1	26	Right crankcase cover	1
6	M14×1.5 screw plug (environmental protection color zinc)	1	27	GB70.1M6×25 (environmental protection color zinc)	3
7	13×2.8 Acrylic Glue O-ring	1	28	Magneto stator sub-components	1
8	Pipe connector	1	29	Stator crimping plate	1
9	φ21×φ1.5 EPDM O-ring	1	30	M5×15 - 5# Hexagon socket cylinder screw (oxidized black)	3
10	M6×30 Hexagon Flange Bolt (Environmental Protection Color Zinc)	4	31	Trigger	1
11	GB5789M6×12 (environmental protection color)	1	32	Trigger pressure plate	1
12	φ5.6×φ1 EPDM O-ring	1	33	Magneto rotor sub-components (flywheel)	1
13	φ8×14 hollow positioning pin	2	34	M10×1.25×45 hexagon flange bolts (grade 10.9/oxidized black)	1
14	Water pump blade	1	35	φ10.3×φ28×4 washer	1
15	Water pump shaft	1	36	25.2×37×1.6 Thrust Washer	1
16	27.4×2.65 Acrylic O-ring	1	37	Electric starter gear	1
17	M30×1.5 aluminum screw plug (dark gray)	1	38	Electric starter reduction gear shaft	1
18	Water pump cover O-ring	1	39	Electric starter reduction gear assembly	1
19	φ11.5×φ1.8 EPDM O-ring	1	40		
20	Half round key	1	41		
21	Water pump cover (dark gray)	1	42		

Two. Maintenance information

General information

• This chapter introduces the removal and installation of the right crankcase cover, flywheel and magneto.
• These repairs can be carried out on the entire vehicle without disassembling the engine.
• Drain the engine oil and coolant before disassembling.

Torque value

NAME	Assembly location	QTY	Torque (N•m)	Remark
M6×45 hexagon flange face 9.8 grade bolts	Right crankcase cover locking bolt	11	12±1.5	-
M14×1.5 screw plug (environmental protection color zinc)	Right cover small AC cover	1	12±1.5	-
Pipe connector	Water pump cover water pipe joint	1	20±2.5	-
M6×30 Hexagon Flange Bolt (Environmental Protection Color Zinc)	Water pump cover locking bolt	4	12±1.5	-
GB5789M6×12 (environmental protection color)	Water pump cover drain bolt	1	10±1	-
M30×1.5 aluminum screw plug (dark gray)	Right cover large AC cover	1	16±1.5	-
GB70.1M6×25 (environmental protection color zinc)	Magneto locking bolt	3	10±1	Apply thread glue
M5×15 - 5# Hexagon socket cylinder screw (oxidized black)	Trigger, crimping plate locking bolt	3	5±1	Apply thread glue
M10×1.25×45 hexagon flange bolts (grade 10.9/oxidized black)	Flywheel locking bolt	1	75±7	-

Tools

1. Torque wrench
2. Lengthened outer hexagon socket-8#/T-type socket-8#
3. Dedicated flywheel fixing fixture
4. Sleeve-14#
5. Flywheel puller
6. Sleeve-17#
7. Hexagon socket head -5#
8. Slotted bolt cutter
9. Clamp pliers

10. Copper rod
11. Plane sealant
12. Thread fastening glue
13. Stun gun

Three. Right crankcase cover/magneto stator Disassemble

Disassemble

Before removing the right crankcase cover:

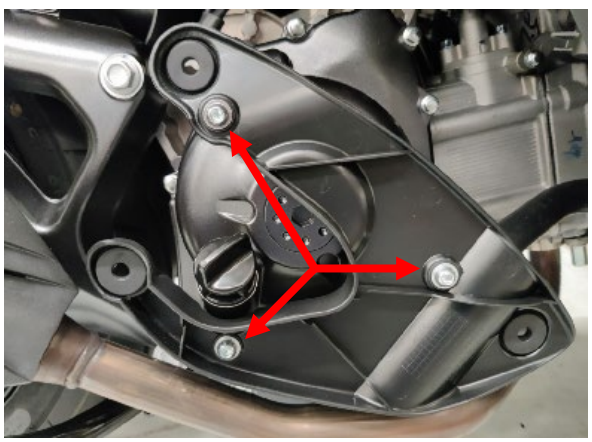
- •Remove the complete toilet, and disconnect the trigger wire and magneto stator cable connector. **(Refer to ZT310T-M Maintenance Manual-Disassembly and Start-Remove Storage Box)**
- • Unscrew the water bolt to drain the coolant. **(Refer to ZT310T-M maintenance manual-2. Maintenance-radiator for cooling liquid)**

Note: If only the gasket of the right crankcase cover is replaced, there is no need to put the coolant, and the water pipe does not need to be pulled out.

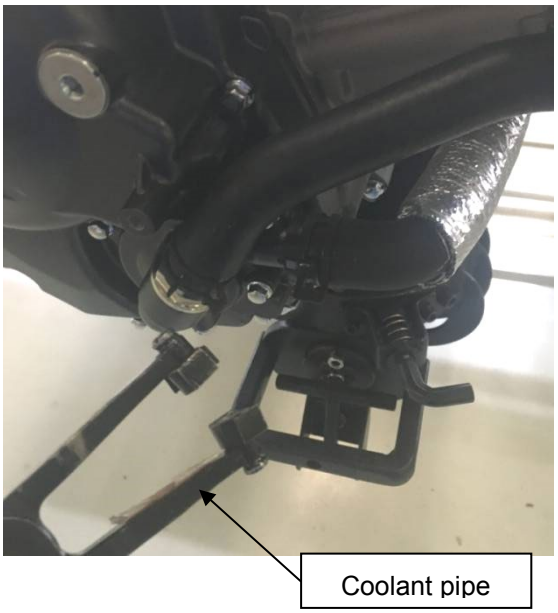
- • Unscrew the oil bolt to drain the engine oil. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Engine Oil for Draining Engine Oil)**
- •silencer. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Bolts and Nuts of Muffler for Muffler Disassembly and Assembly)**

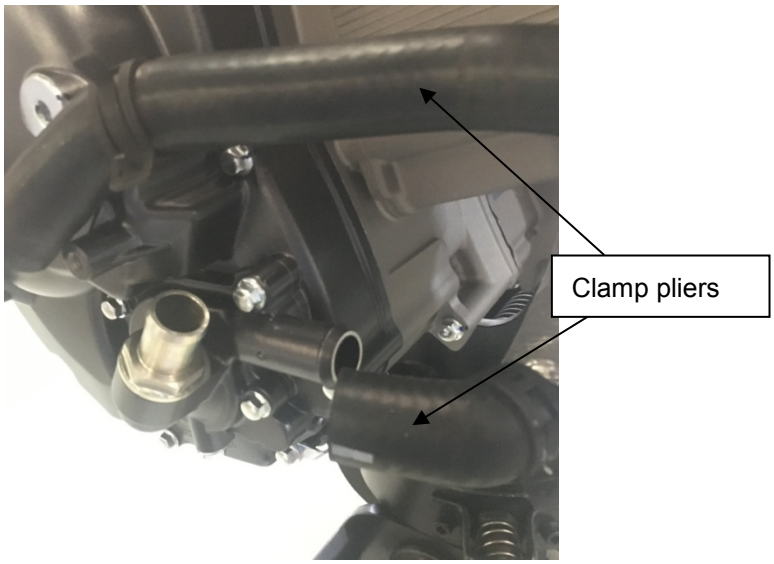
1. As shown in the figure below, remove the decorative cover of the right engine cover (pull it outwards to remove it).

2. Remove the 3 locking bolts of the bottom lining of the right cover decorative cover with a 5# inner hexagon, and remove the bottom lining of the right cover decorative cover.

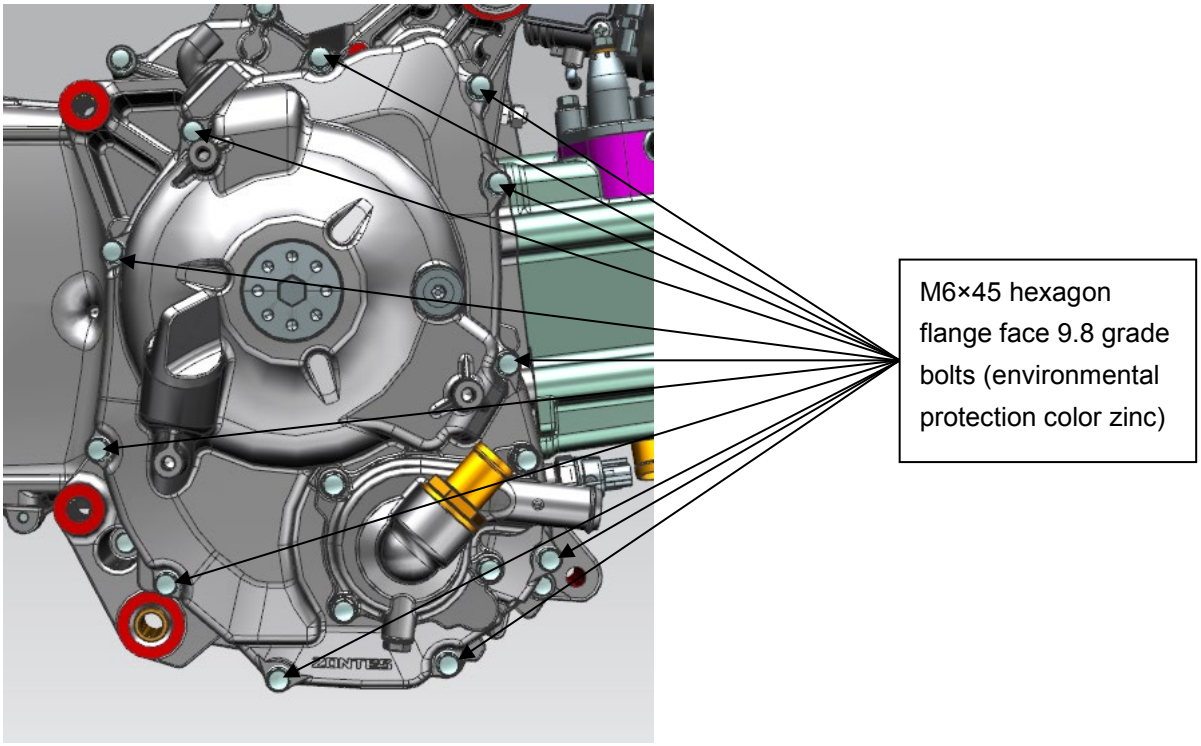


3. Use clamp pliers to take out the clamp on the water pipe joint and the outlet pipe of the water pump cover, and then pull out the coolant pipe.

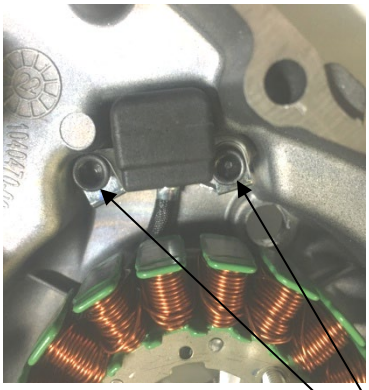


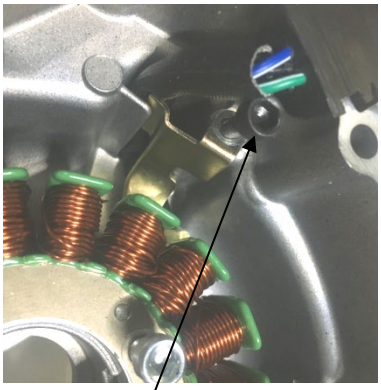


4. Use a torque wrench (or wind screw) and an extended outer hexagonal sleeve-8# to remove the 11 M6×45 hexagon flange bolts on the right crankcase cover diagonally and counterclockwise, and remove the right crankcase cover, 2 φ10 ×14 hollow positioning pin and right crankcase cover gasket.



5. After the right crankcase cover is removed from the engine, the magneto stator sub-component is on the right crankcase cover. Use a torque wrench (or a wind screw) and an inner hexagon gun head -5# to put the three GB70.1M6×25 bolts on the coil, two M5×15-5# inner hexagonal cylindrical screws on the trigger pressure plate, and the stator Remove one M5×15-5# hexagon socket screw on the crimping plate.





GB70.1M6×25 (Environmental protection color zinc)

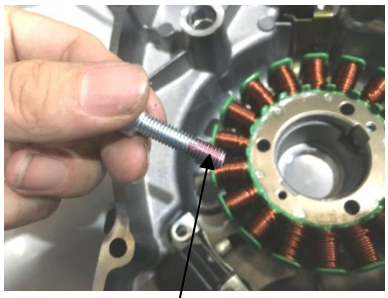
M5×15－5# Hexagon socket screw (oxidized black)

Installation

1. Place the stator sub-components of the magneto on the corresponding position of the right crankcase cover, on the three GB70.1M6×25 (environmental color zinc) bolts and three M5×15-5# hexagon socket screws (oxidized black) Apply a proper amount of thread glue on the threads, screw them into the corresponding threaded holes with a torque wrench and an inner hexagonal gun head-5# and tighten them. The torque standards are 10±1N•m and 5±1N•m respectively.

Remarks: ① The trigger cannot be installed reversely, and the side with the sensing point faces inward.

② The magneto wire is stuck at the bottom of the stator crimping plate.



Thread fastening glue

GB70.1M6×25(Environmental color zinc)

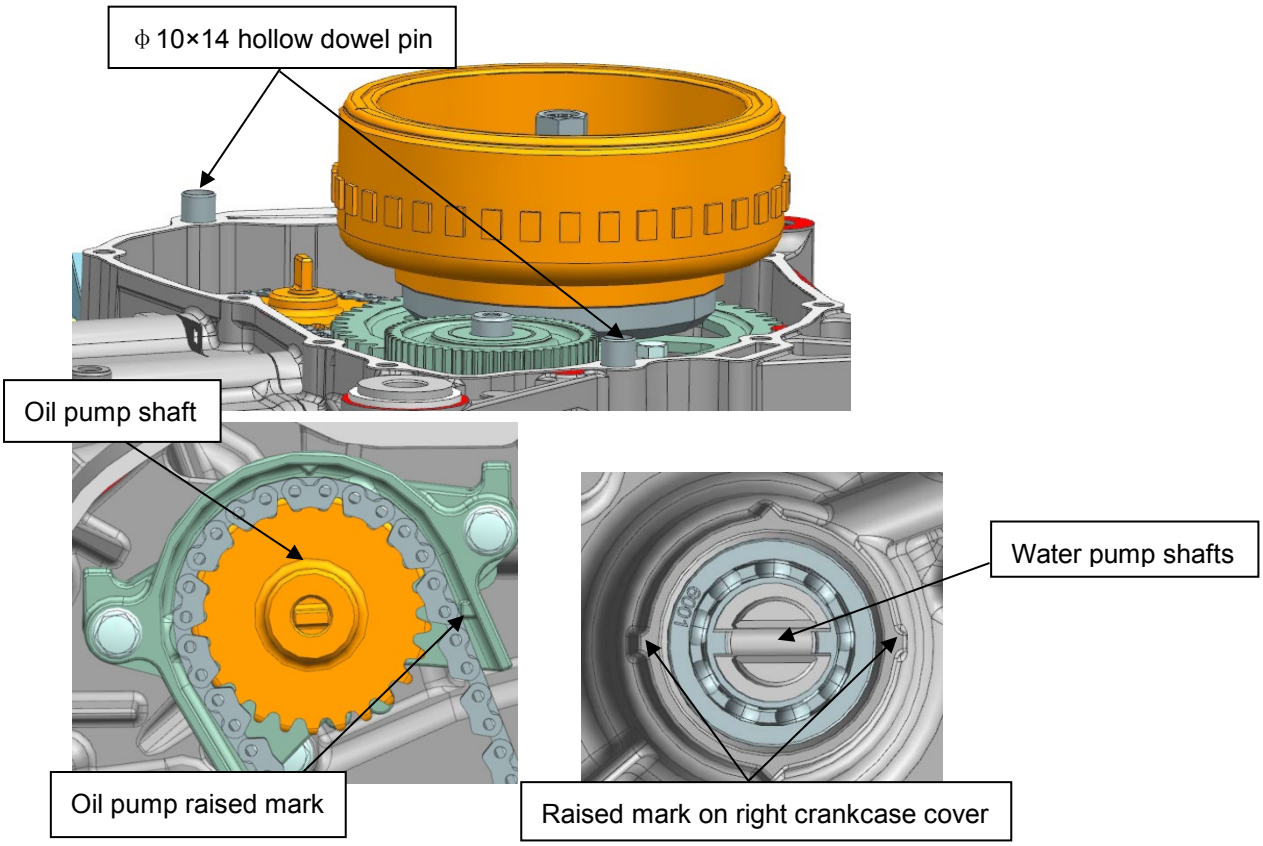
M5×15－5# Hexagon socket screw (oxidized black)

2. Install two φ10×14 hollow positioning pins and a new right crankcase cover gasket on the joint surface of the right crankcase and the right crankcase cover; rotate the oil pump shaft to make the straight protruding surface radially align with the oil pump convex Point mark; use a flat bolt cutter to turn the water pump shaft so that the flat groove is aligned with the raised marking point on the right crankcase cover.

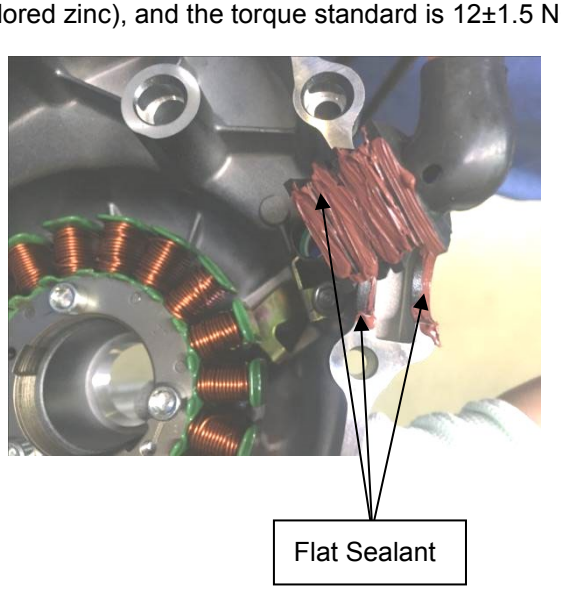
Remarks: ① When adjusting the oil pump shaft, you can turn the flywheel clockwise to drive the oil pump to rotate.

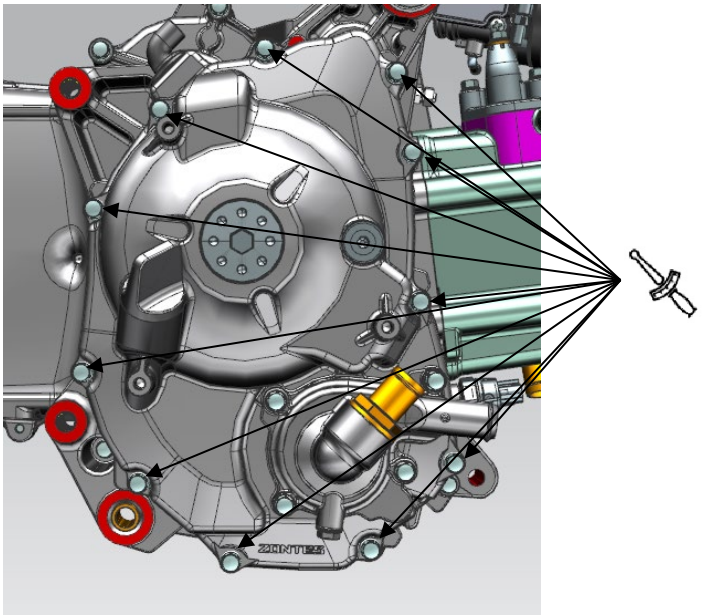
② Do not miss the positioning pin. The gasket of the right crankcase cover must not show creases or cracks.

③ The removed right crankcase cover gasket cannot be reused, because there is a risk of oil leakage, it needs to be replaced with a new right crankcase cover gasket.

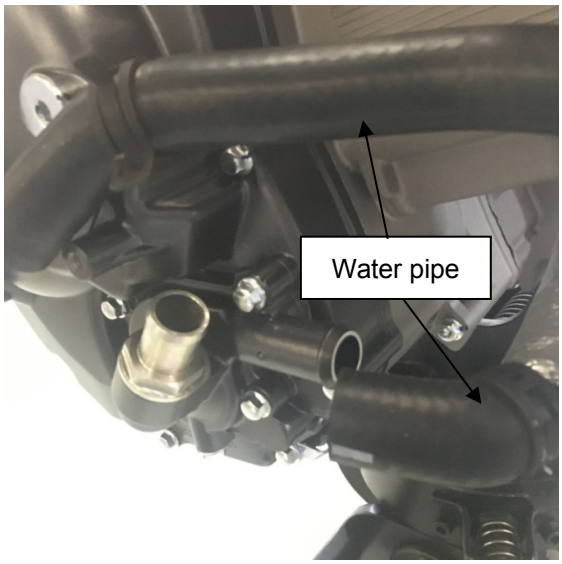


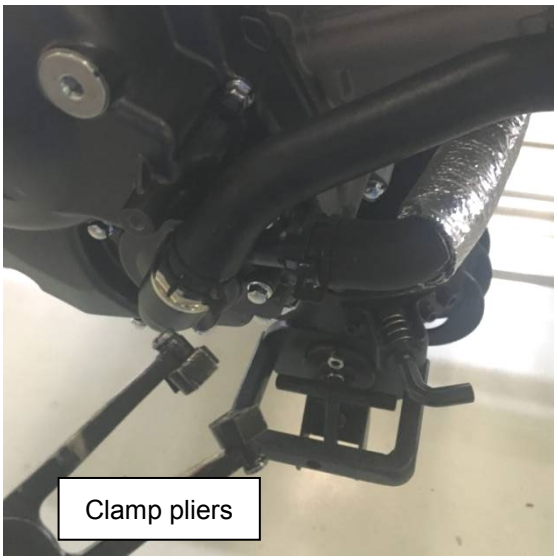
3. Apply an appropriate amount of flat sealant on the waterproof rubber sleeve of the right crankcase cover and press it tightly, install the right crankcase cover, use a torque wrench and an extended hex socket-8# to diagonally remove 11 M6× from the position of the positioning pin hole Tighten the 45 hex flange face 9.8 grade bolts (environmental colored zinc), and the torque standard is 12±1.5 N•m.



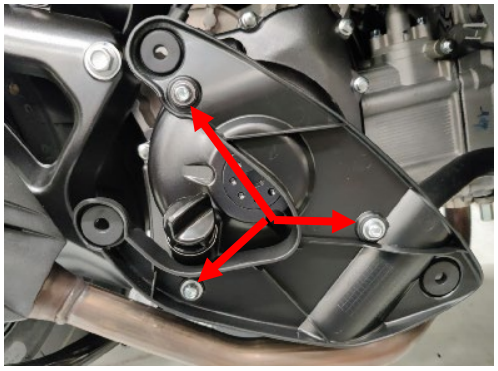


4. Reconnect the two water pipes to the right cover respectively, and use clamp pliers to install the clamp in place.





5. As shown in the figure, install the bottom liner of the right cover decoration cover in place, and tighten the right cover decoration cover locking bolts with a 5# inner hexagon.



6. Align the decorative cover of the right cover with the installation hole, press it in gently, and install it in place.

After installing the right crankcase cover:

•Connect the trigger wire and rectifier wire, and install the toilet in place. **(Refer to ZT310T-M Maintenance Manual-11. Complete vehicle engine disassembly-5. Install engine/6. Installation of the corresponding)**

• After tightening the oil drain bolt, add back 1.75L of engine oil. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Engine Oil-Adding Engine Oil)**

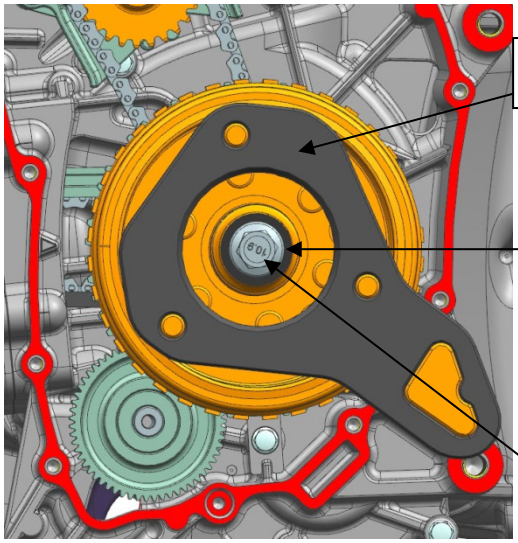
• After tightening the drain bolt, refill the coolant until it is full. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Radiator for adding coolant)**

• Install muffler. **(Refer to the ZT310T-M Maintenance Manual for the installation of the muffler-2. Maintenance-bolts and nuts of muffler)**

Four - Magneto rotor

Disassemble

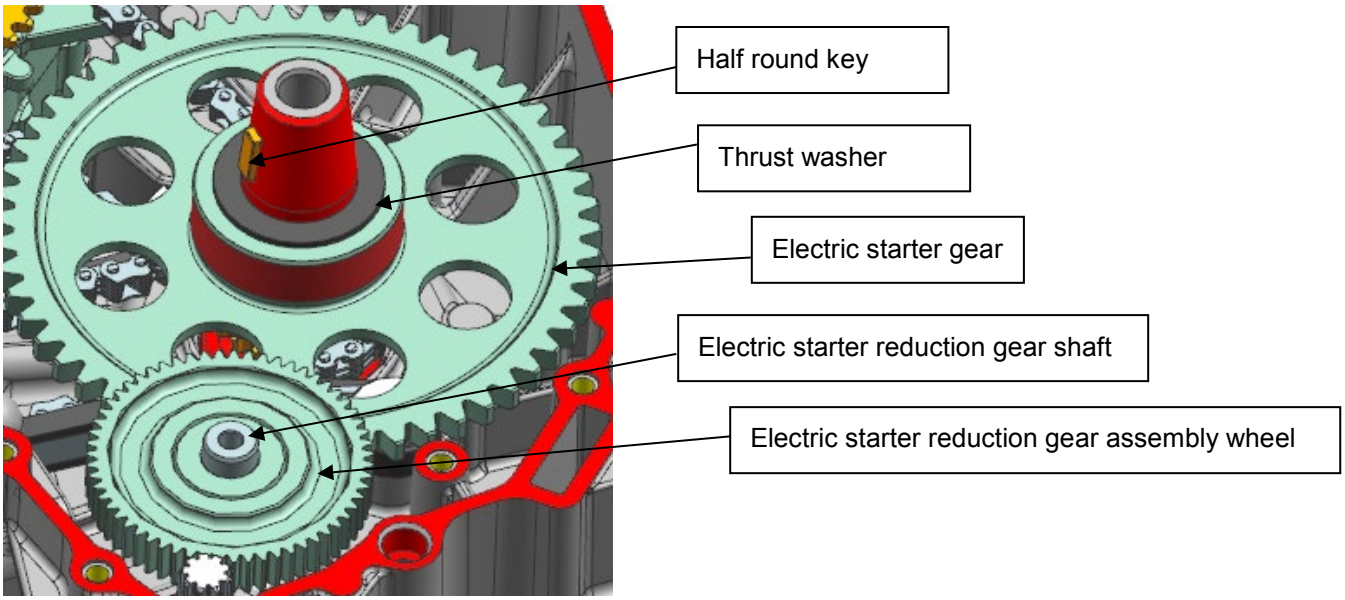
1. After the right crankcase cover is removed, Special clamps for fixing the flywheel so that it does not turn freely, use a torque wrench (or electric gun) and sleeve-14# to remove the M10×1.25×45 hexagonal flange bolts, and remove the φ10 .3×φ28×4 washer; screw the flywheel puller into the thread on the flywheel, and remove the flywheel with a stun gun and sleeve-17#.



2. Knock out the half-round key in the crankshaft groove with a copper rod, and take out the 25.2×37×1.6 thrust washer; electric starter gear; electric starter reduction gear assembly; electric starter reduction gear shaft.

Remarks: ① When hitting the semicircle key, the cloth should prevent the semicircle key or burr from falling into the box.

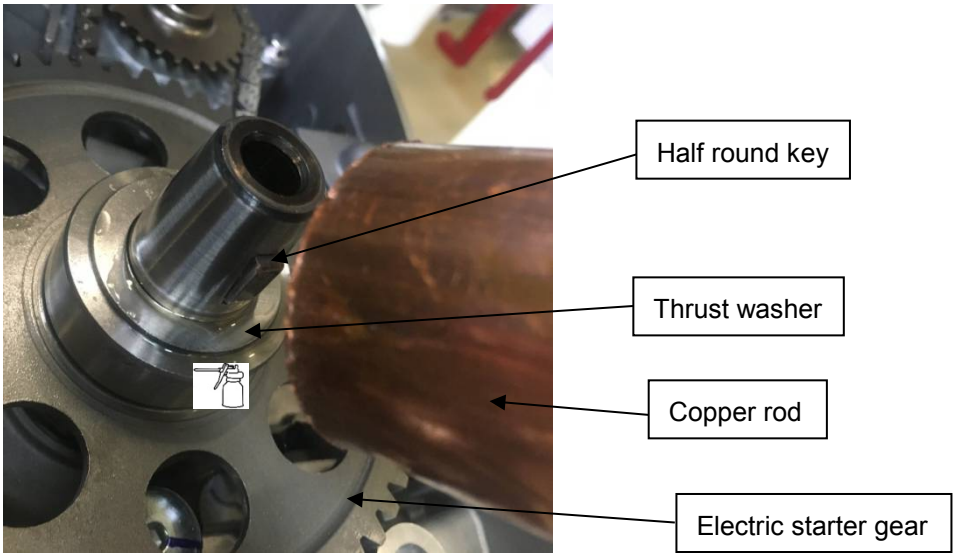
② Do not knock the half-round key to deform.



Installation

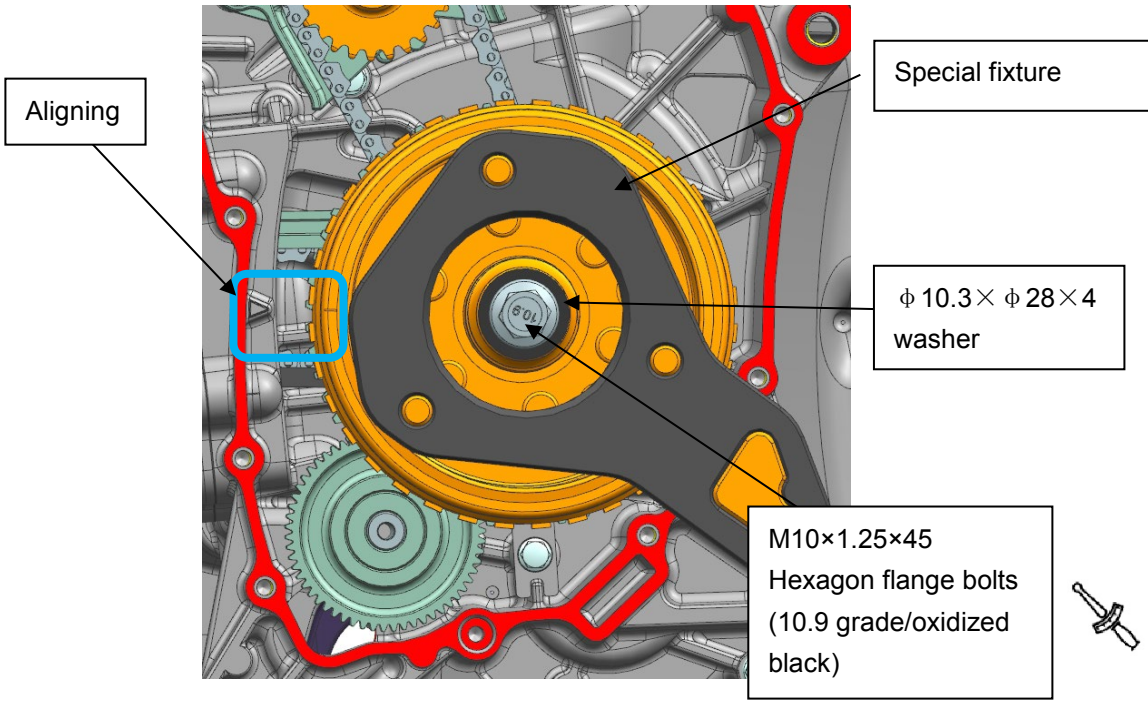
1. After checking that the electric starter gear, 25.2×37×1.6 thrust washer, electric starter reduction gear assembly, and electric starter reduction gear shaft are all installed correctly, use a copper rod to knock the half-circle key into the crankshaft.

Remarks: ① When installing the semicircular key, pad cloth to prevent the semicircular key from falling into the box.



2. Install the flywheel in place, put in φ10.3×φ28×4 washers, M10×1.25×45 hexagon flange bolts and screw them into the threads. Align the triangle marks on the box body, Special clamps for fixing the flywheel so that it does not turn freely, use a torque wrench and sleeve-14# to tighten the M10×1.25×45 hexagonal flange bolts (grade 10.9/oxidized black), the torque standard is 75±7 N•m.

Remarks: ① Apply engine oil to the joint surface of the start gear and the one-way gear (integrated with the flywheel). ② After the flywheel is installed, check whether the electric starter gear rotates counterclockwise smoothly, and move it up and down by hand to check whether there is an axial gap. If there is no axial gap, replace the thin thrust washer.



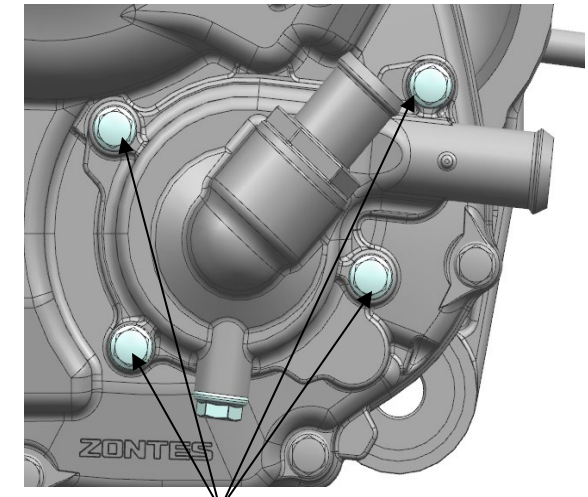
Install the right crankcase cover after the flywheel is installed.

Water pump

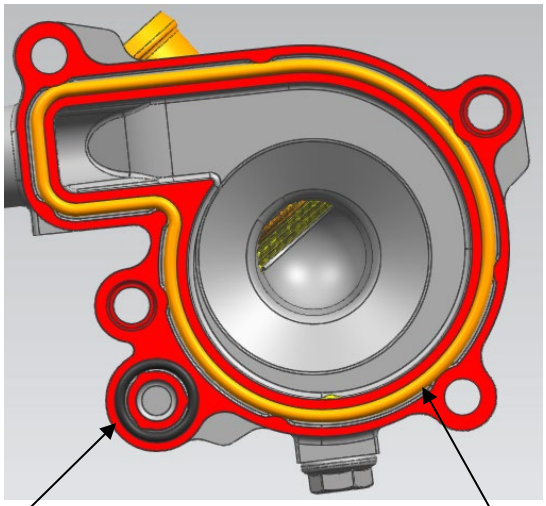
Dismantling

The combined parts of the water pumps are detailed in the table of system components and parts information

1. Counterclockwise dismantling of 4 x M6 x 30 hexagonal flange bolts (environmentally friendly coloured zinc) on the pump cover using a torque spanner (or Air Screw) and an extended hexagon socket - 8# and remove the pump cover O-ring, φ11.5×φ1.8 EPDM O-ring and two φ8×14 hollow locating pins.



M6×30 Hexagonal Flange



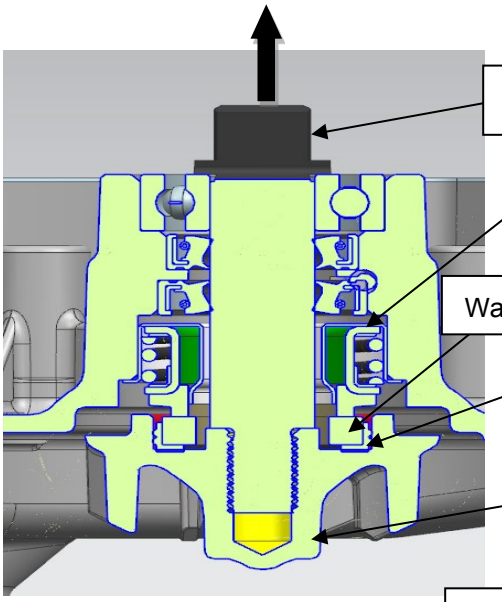
φ11.5×φ1.8 EPDM O-Rings

O-ring for water pump cover

2. Use a word screwdriver to limit the water pump shaft one groove, use a 12# spanner to rotate clockwise to loosen the water pump blade and remove it, take out the water seal dynamic ring and rubber.

Press the water pump shaft out, use a screwdriver to reach through the bearing hole to contact the water seal, then slowly tap the water seal out.

Use a screwdriver to pry out the two oil seals and tap out the bearings to complete the pump disassembly. **(Note: It is not recommended to disassemble the water pump and its internal bearings, oil seals and water seals when the pump is running normally and without faults. The water pump shaft thread is a left-handed reverse thread.)**



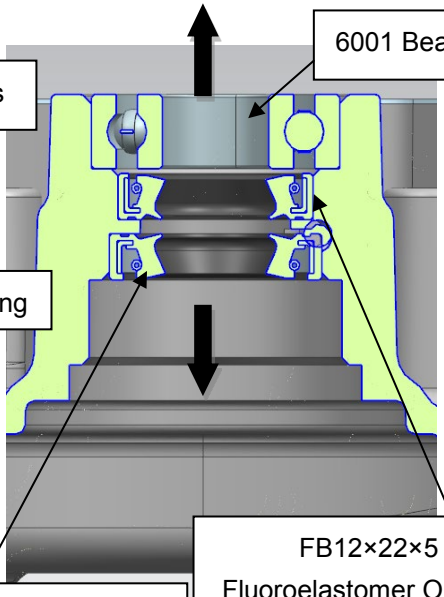
Water Pump Shafts

Water Seal

Water Seal Dynamic Ring

Water Seal Rubber Ring

Water Pump Blades



6001 Bearing

FB12×24×5 Nitrile Oil Seal （NBR）

FB12×22×5 Fluoroelastomer Oil Seal （FKM）

Inspection

1. Check the pump cover O-ring and φ11.5×φ1.8 EPDM O-ring on the pump cover. If there are bad phenomena such as wear and tear, cutting edge, etc., replace the O-ring with a new one to prevent the occurrence of poor sealing leading to water leakage.
2. Check the threads of the pump blades and pump shaft for wear.
3. Check whether the pump shaft and blades are cracked, damaged, worn, etc., if there is a bad need to replace the new.

Installation

1. Take new FB12 x 22 x 5 FKM oil seals and FB12 x 24 x 5 nitrile oil seals (PTFE) and press fit them to the position shown in the diagram below, measure the depth after fitting to determine if they are in place.

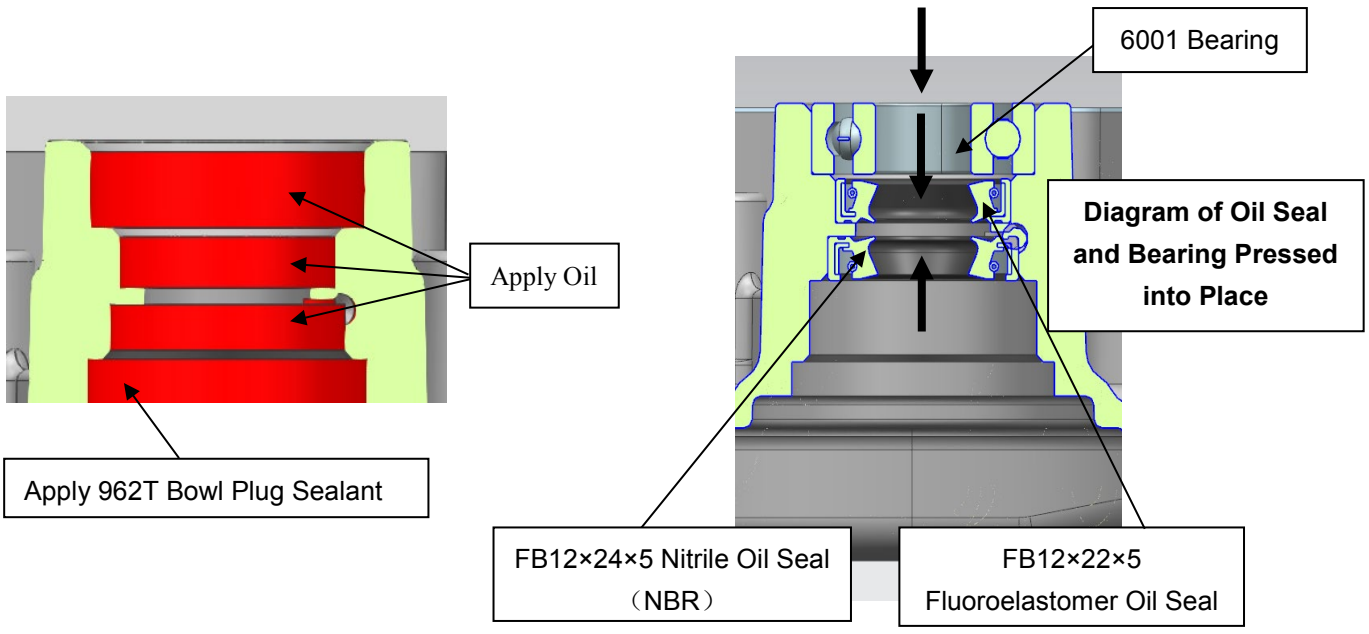
Note：① Apply oil to the oil seal installation hole location before installing the oil seal.

② The height of FB12×22×5 FKM oil seal is 0.3-0.5mm shorter than the bearing limit surface, and the distance between FB12×24×5 nitrile oil seal (PTFE) and pump cover combination surface is 17.6 (0~+0.1)mm.

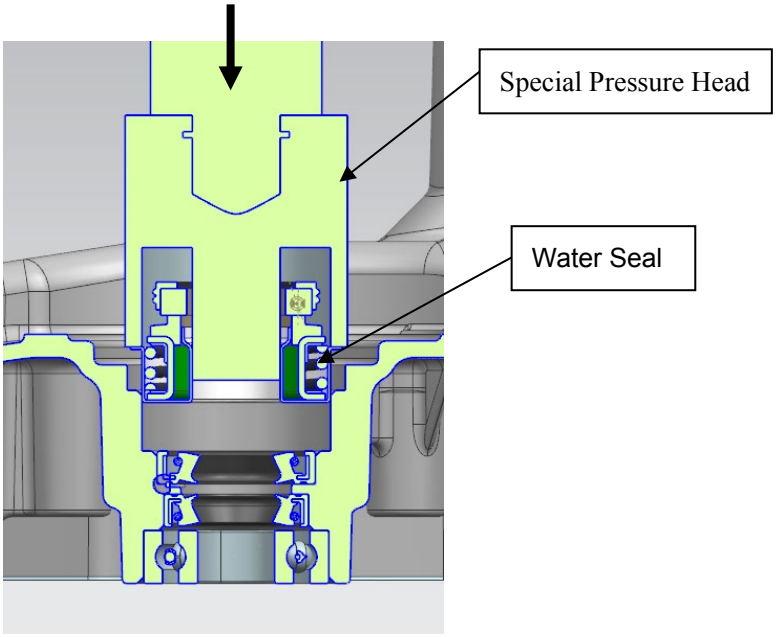
2. Check that the bearings rotate smoothly, if they are sticking, replace them with new ones. After greasing the bearing bore, press the bearing into place with a special pressure head.

Note：① Bearing type: GB276-6001/P5C3 deep groove ball bearing.

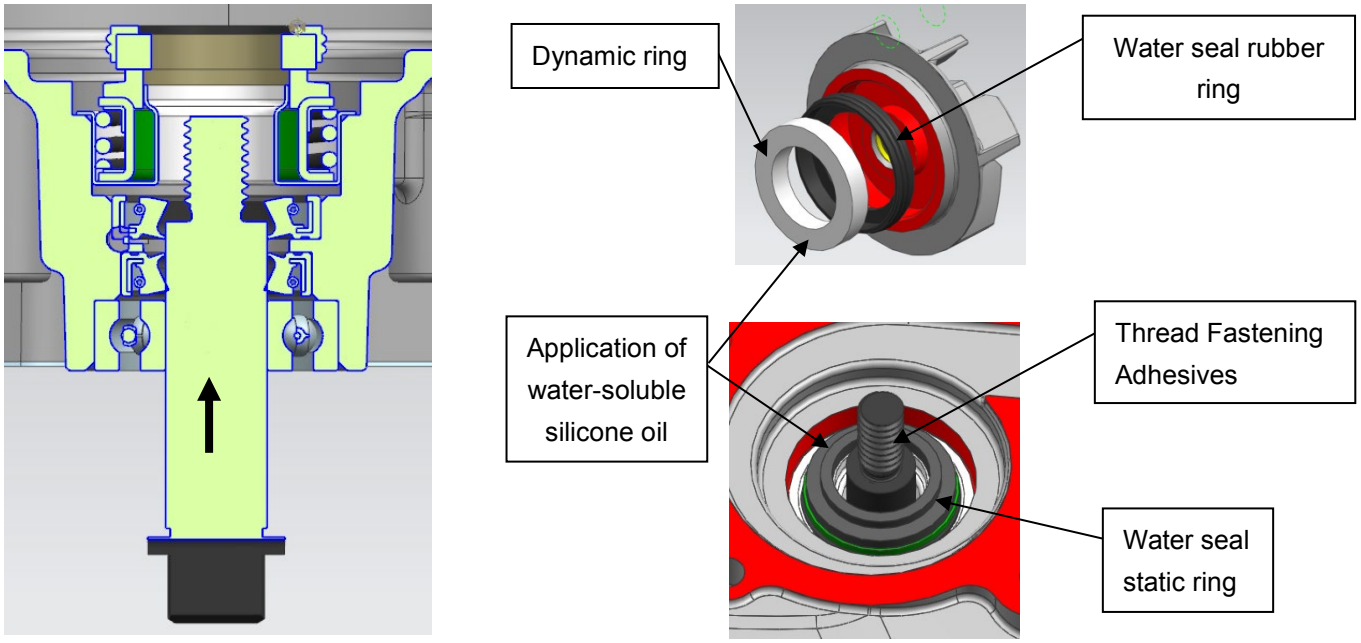
②Measure whether the bearing hole diameter increases, bearing hole diameter standard: Φ28 (-0.014, -0.027)



3. Take a new water seal, check to make sure the surface of the water seal is clean and free of debris, apply 962T bowl plug sealant to the hole where the water seal is installed and use the special pressure head for installing the water seal to press the water seal into place.

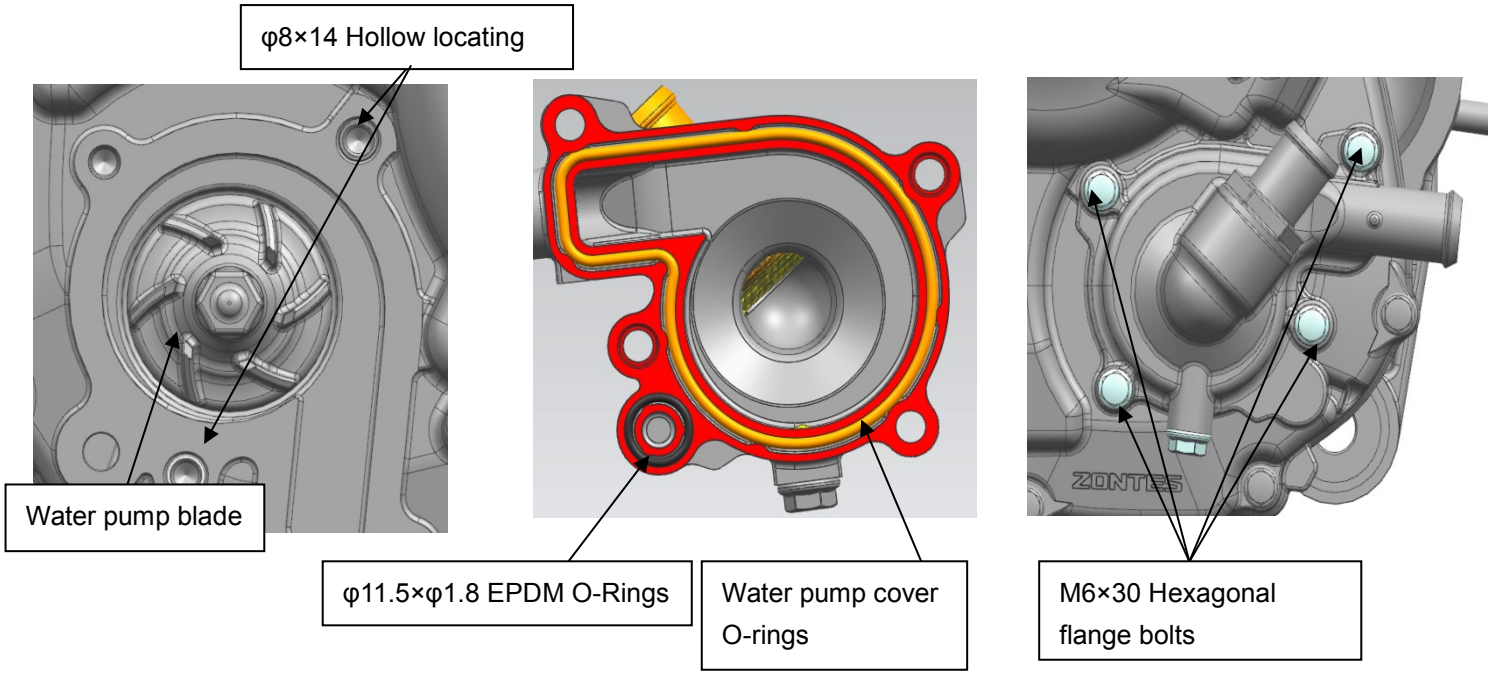


4. After checking that there is no abnormal wear on the water pump shaft, press it into the bearing hole and press it into place when the flange surface of the pump shaft is in contact with the inner ring of the bearing.
Note:① After the pump shaft is in place, apply the appropriate amount of thread fastening adhesive to the threads.



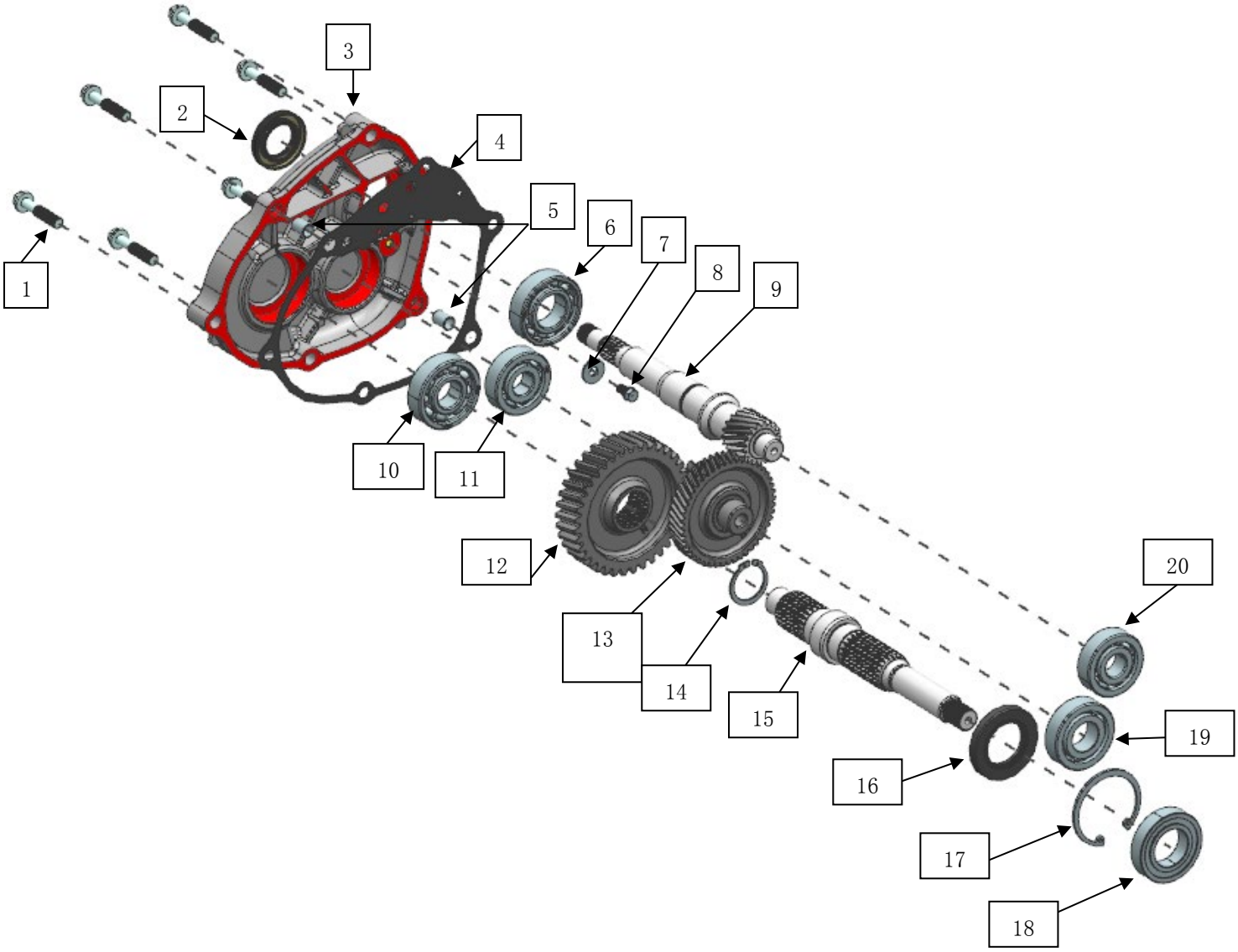
5. As shown in the picture above, the water seal dynamic ring is firstly dismantled and separated, then the rubber is fitted into the pump blade, and finally the ceramic dynamic ring is fitted into the pump blade (Note: you can apply the appropriate amount of silicon oil in the outer ring of the dynamic ring which is easier to put it into the water seal rubber ring)
Remarks:① Assembled in place, the ceramic scribe line is facing inward, and the smooth surface is facing out.
② Apply an appropriate amount of water-soluble silicone oil to the static ring and dynamic ring of the water seal.
6. Use a screwdriver to limit the water pump shaft, and then take a water pump blade, using 12# spanner left to tighten the water pump blade to the water pump shaft, using 12# socket and torque spanner to tighten, torque standard: 20N-M±1.5.
7. Take two φ8×14 hollow locating pins and put them into the corresponding holes, put the pump cover O-ring and φ11.5×φ1.8 EPDM O-ring on the pump cover groove (if the O-ring is cut and worn, replace it with a new one), and finally take four M6×30 hexagonal flange face bolts (environmentally friendly coloured zinc) and tighten the bolts

clockwise with a torque spanner (or Air Screw) and a lengthened hexagonal socket - 8#. Torque standard: 12±1.5 N-m.



Gearbox

One - System Components



The part information

Serial	Name	Number	Serial	Name	Number
1	GB16674M8×40(environmental protection color zinc)	6	11	GB276 – 6303-P5C3 deep groove ball bearing (nitriding)	1
2	FB25×42×6 fluorine rubber oil seal	1	12	ZT1P72MN output gear	1
3	ZT1P72MN gear box cover	1	13	ZT1P72MN Double gear assembly	1
4	ZT1P72MN gear box cover gasket	1	14	GB894.1 Circlip for shaft φ28×1.5	1
5	φ10×14 hollow positioning pin	2	15	ZT1P72MNOutput shaft	1
6	GB276-6205-P5C3 deep groove ball bearing (nitriding)	1	16	FB35×54×7 Fluorine rubber oil seal	1
7	6.2×19×2.5 gasket	1	17	GB893.1Circlips for holes φ52	1
8	GB5789M6×12 (environmental protection color)	1	18	GB276－60/28－2RKDeep groove ball bearing	1
9	ZT1P72MN drive shaft	1	19	GB276－62/22/P5 Deep groove ball bearing	1
10	GB276-6304/P5C3 deep groove ball bearing	1	20	GB276-6303-P5C3 Deep groove ball bearings (nitriding)	1

Two- Maintenance information

General information

Gear box oil volume:

Maintenance		**Engine oil volume**
Gearbox oil	Routine maintenance (do not disassemble the gearbox)	200ml
	Unconventional maintenance (decompose gearbox)	230ml

Bolt torque value:

Bolt model type	**Assembly position**	**Qty**	**Torque （N•m）**	**Remark**
GB16674M8×40 (Environmental protection color zinc)	Gear box cover lock bolt	6	20±2.5	-
GB5789M6×12 (Environmental protection color zinc)	6205 bearing plate bolt	1	10±0.5	Apply thread glue
Non-standard bolts M8×25 (Environmental protection color zinc)	Gearbox oil drain bolt	1	20±2.5	-

Tool:

1. T rod-10#
2. Circlip pliers for shaft
3. Fixed torque wrench
4. 10# Socket head
5. 14# Socket head

Three - Failure phenomenon / failure analysis

1. The engine gas valve is operating normally, but the car does not move

• Damage to the drive shaft, output shaft, double-tooth keyway or helical teeth in the gearbox causes the idling rear wheels to not move.

• The gears or bearings in the gearbox are stuck, causing the car to stop running (the rear wheels cannot rotate at this time).

2. There is abnormal noise in the gear box

• The gear is worn, or the meshing surface of the gear is corroded or damaged.

• The bearing is worn or damaged.

3. Oil leakage in the gear box

• The oil seal is worn or damaged.

• The gear box locking bolts are loose or the joint surface of the gear box cover is leaking oil.

Four - Gearbox disassembly and decomposition

When disassembling the gearbox, the engine does not need to be disassembled from the vehicle, but the gearbox oil needs to be drained and the following parts must be disassembled.

Drain the gear box oil**. (Refer to ZT310T-M Maintenance Manual-Engine Oil-Change Gear Box Oil)**

The parts to be disassembled are as follows:

• Engine left cover, engine left cover shockproof sponge, engine air inlet cover, air filter. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Air Filter (Filter Element), Air Inlet Filter Element)**

•Left crankcase cover. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-V-belt)**

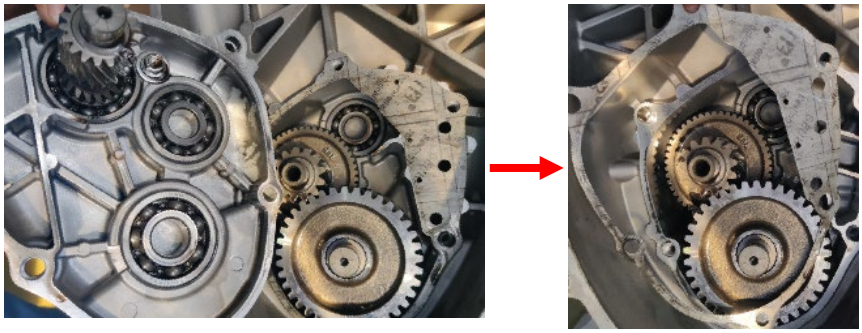
• Infinitely variable speed assembly. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-V-belt)**

• Rear brake hose and rear rocker arm assembly. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Brake System-Replace Brake Disc)**

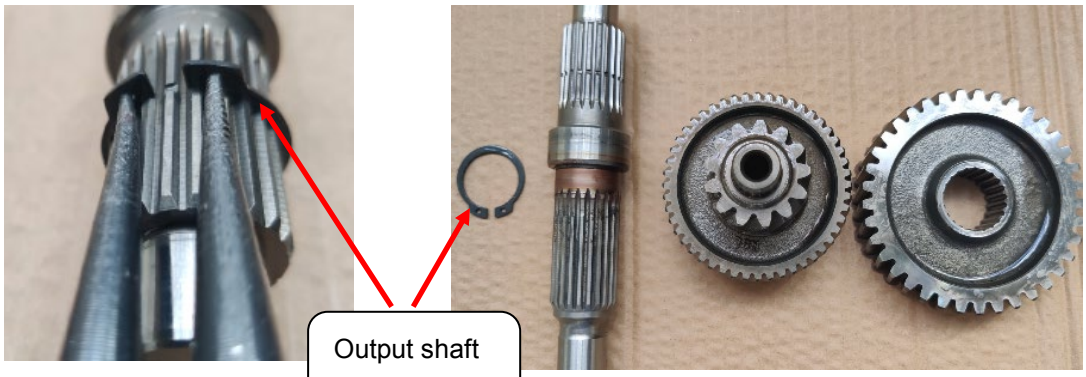
• Rear wheel assembly. **(Refer to ZT310T-M Maintenance Manual-2. Maintenance-Brake System-Replace Brake Disc)**

1. As shown in the figure, use T rod-10# to remove 6 GB16674M8×40 locking bolts on the gear box cover.

2. As shown in the figure, remove the gear box cover, gear box cover gasket, and positioning pins in sequence.



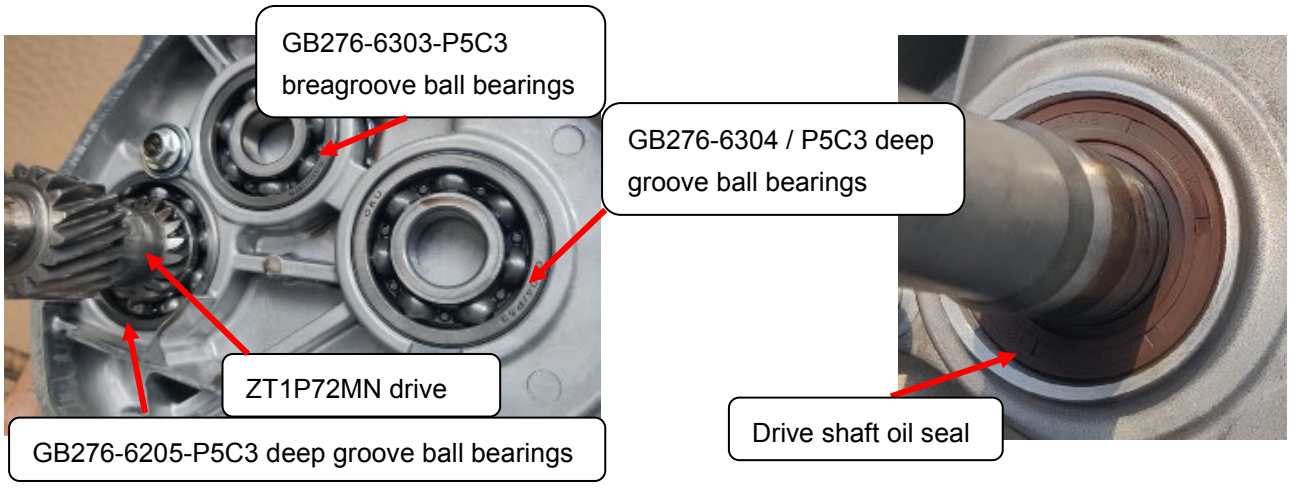
3. Remove the output gear, duplex gear assembly, output shaft and output shaft retainer in sequence as shown.



Five. Gear box gear, bearing examination

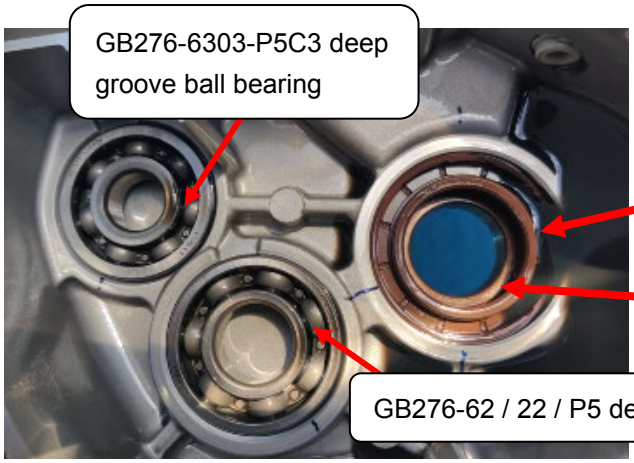
Gear box cover bearing, oil seal check

1. As shown in the figure, rotate the bearing inner ring with hand, the bearing is smooth, and the drive shaft is rotated, and the drive shaft bearing is smooth and silent. Replace the bearing such as a bearing rotation card. Check the drive shaft oil seal, oil seal is not scratched, abnormal wear, such as scratches, and replacement of abnormal grinding.



Left curved box bearings, oil seal check

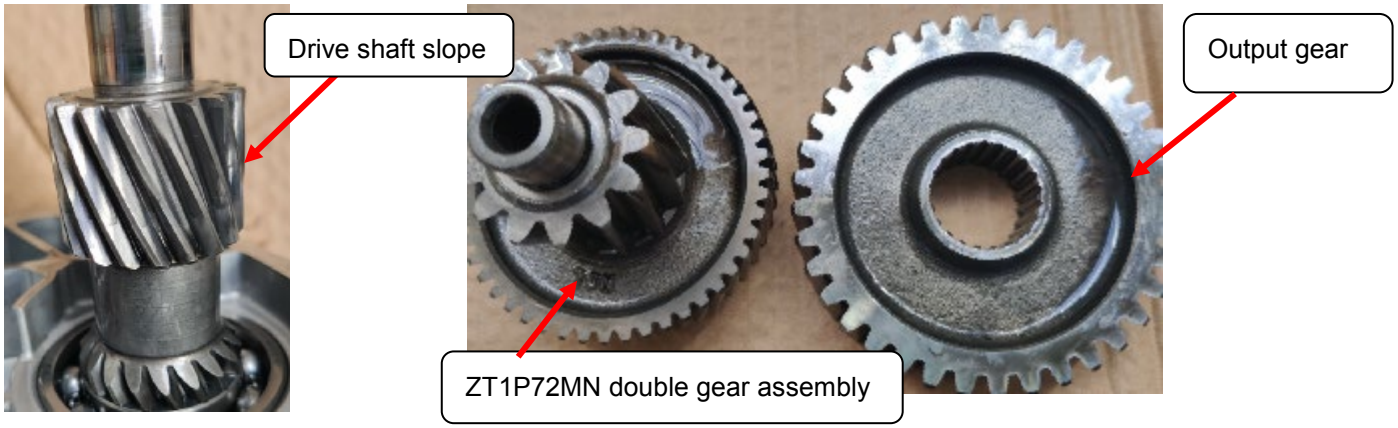
1, as shown, rotate the bearing inner ring with hand, and the bearing rotation is silent, such as the bearing rotation card is replaced. Check the output shaft oil seal, oil seal is not scratched, abnormal wear, such as scratch, abnormal grinding, replacement.



Drive shaft, output shaft, double gear check

1. As shown, ck drive shafts, output shafts and spline positions for bending, deformation and abnormal wear, if there is any replacement. （**Note: It is not recommended to press the drive shaft out of the 6205 bearing if there are no obvious problems, pressing out the drive shaft will damage the 6205 bearing.**）

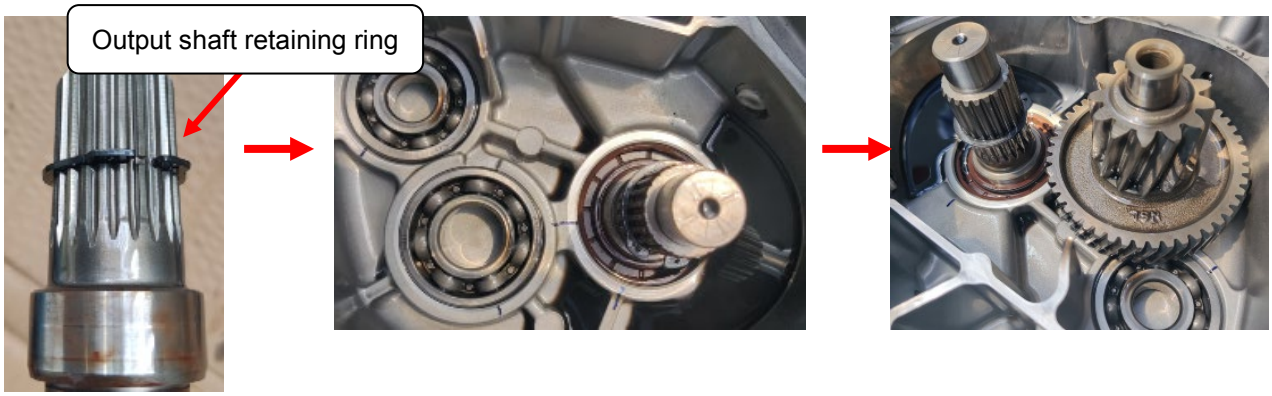
2, as shown, check the double gear assembly, output gears, drive shaft, whether there is abnormal wear, etched, if there is any replacement.



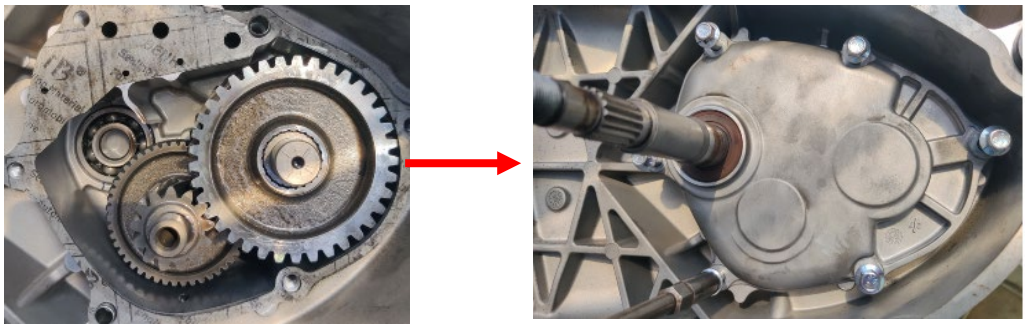
Six, Gearbox assembly

Before the gearbox cover, remove the oil stains on the joint surface of the gearbox cover, and inspect the joint surface of the gearbox cover, and require no scratches, bumps.

1, As shown, apply oil to the bearing surface of the left crankcase gear housing and insert the output shaft with the output shaft retaining ring fitted into the corresponding position in the left crankcase (when the output shaft is installed in place, the sound will sound), sequentially use the double gear assembly, The output shaft gear is installed in place.

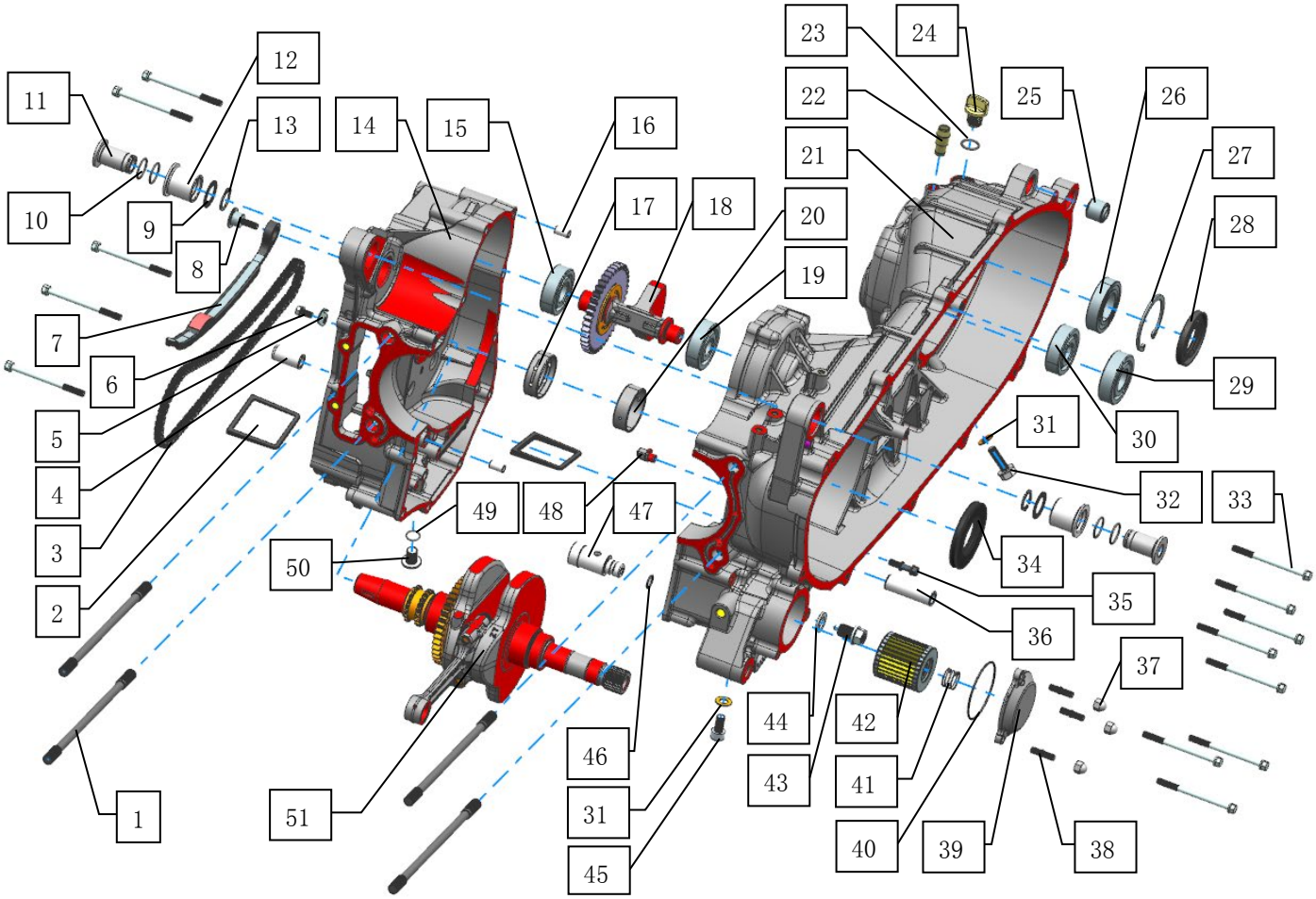


2, As shown, positioning pins and new gearbox cover paper pads are placed on the gearbox joint surface, apply the oil in the gearbox cover bearing surface, and install the gearbox cover in place, put 6 M8 × 40 bolts, from The positioning pin position is pressed against the angle and is tightened, and the torque is 20 ± 2.5 N • m.



Crankcase

One, system components



The part information

Serial	Name	Number
1.	YM10 × 1.25-M10 × 1.25 × 190 double head stud	4
2.	53 × 50.5 trapezoidal thick filter	2
3.	6.35 × 7 × 110 toothed chain	1
4.	φ10 × φ15 × 28.2 main support bushing	1
5.	ZT1P72MN directive barrier plate	1
6.	M6 × 10 top pin bolts	1
7.	ZT1P72MN tight	1
8.	M6 × 16-13.8 × 8.7 pivot bolt	1
9.	φ18.1 × φ26 × 1 gasket	2
10.	φ17.6 × φ2.4 tannyl glue O-ring	4
11.	φ12.4 × φ19 × 35.3 hanging mounting	2
12.	ZT1P72MN hanging liner press compulsory assembly	2
13.	GB894.1 axial elastic retaining ring φ18 × 1.2	2
14.	ZT1P72MN right crankbox	1
15.	GB276-6204 / P5C3 deep groove ball bearings (nitridation)	1
16.	φ8 × 14 hollow positioning pin	2
17.	ZT1P72MN right box axle φ40 × φ44 × 14	2
18.	ZT1P72MN balance shaft parts assembly	1
19.	GB276-6303-P5C3 deep groove ball bearings	1
20.	ZT1P72MN left box axle φ40 × φ44 × 14	2
21.	ZT1P72MN left curve box	1
22.	ZT1P58MJ cylinder head cover air balance pipe	1
23.	13.8 × 2.5 acrylate glue O-ring	1
24.	M14 × 1.5 fuel port nut	1
25.	8 × 20 × 19 shock absorber hanging hole bushing	1
26.	GB276-60 / 28-2RK deep groove ball bearings	1
27.	GB893.1 hole with elastic retaining ring φ52	1
28.	FB35 × 54 × 7 fluorine oil seal	1
29.	GB276-6303-P5C3 deep groove ball bearings (nitridation)	1
30.	GB276-62 / 22 / P5 deep groove ball bearings (human book / nitrid)	1
31.	8.3 × 16 × 1.5 copper pad	2
32.	Non-standard bolt M8 × 25 (environmental lottery)	1
33.	M6 × 75 hex flange bolts (environmentally friendly zinc)	13
34.	FB35 × 66 × 7 fluorine oil seal	1
35.	ZT1P58MJ main bracket reset spring column	1
36.	φ10 × φ15 × 47.5 main support bushing	1
37.	Non-standard cover type 9 degree nut M6×13 (environmental color zinc)	3
38.	Non-standard M6×25.5 double-head 9.8 studs bolts (environmental color zinc)	3
39.	The ZT1P72MN oil fine filter cover.	1
40.	O-ring of 55×2.5 acrylate glue.	1
41.	φ18.5×13×1.6 fine filter spring.	1
42.	Outer diameter φ45 × 46 cylindrical filter	1
43.	M12 × 1.5 × 15 oil bolts (environmentally friendly zinc)	1
44.	Combined seal 12 × φ20 × 2	1
45.	GB70.1. Internal hex bolts M8 × 16 (environmentally friendly zinc)	1

46.	9.8×2.4 Hydrogenated nitrile rubber O-ring	1
47.	ZT1P72MN Pressure Valve Parts	1
48.	ZT1P72MN injector	1
49.	φ11 × φ1.8 fluorine glue O-ring	1
50.	M10 × 1.25 × 10 oil block bolt	1
51.	ZT1P72MN crankshaft link parts assembly	1

Two, Repair information

General information

1. This chapter introduces the separation of the crankcase and the inspection and maintenance of parts such as the crankshaft.
2. The maintenance steps in this section must be removed after the oil and gear chamber oil can be carried out.
3. The maintenance of the crankcase must be removed separately. **(Removal Engine Reference ZT310T-M Maintenance Manual-11.Complete vehicle engine disassembly)**
4. After the engine is removed from the vehicle, the following components must be removed before the crankcase is out of the box:

· Main bracket **(Main bracket disassembly reference ZT310T-M repair maintenance manual-2. Maintenance-main bracket)**

· Cylinder head cover **(Cylinder head cover disassembly reference ZT310T-M engine repair manual-Cylinder head cover, cylinder head)**

· Tensioner **(Tensioner disassembly reference ZT310T-M engine repair manual-Cylinder head cover, cylinder head-Tensioner)**

· Cylinder head assembly **(Cylinder head assembly refer to ZT310T-M engine repair manual-Cylinder head cover, cylinder head)**

· Cylinder, piston **(Cylinder, piston disassembly reference ZT310T-M engine repair manual-Cylinder, piston)**

· Left curved box cover **(Left curved box cover disassembly refer to ZT310T-M engine repair manual-Left curved clutch cover, no-transversion clutch)**

· Stepless variable speed clutch **(Stepless variable speed clutch disassembly refer to ZT310T-M engine repair manual-Left curved clutch cover, no transversion clutch division assembly)**

· Right Current Box Cover **(Right crank tank cover disassembly reference ZT310T-M engine repair manual-Right crank case cover, magnetic motor)**

· Flywheel, reduction gear **(Right crank tank cover disassembly reference ZT310T-M engine repair manual-Right crank case cover, magnetic motor)**

· Electric starter gear **(Right crank tank cover disassembly reference ZT310T-M engine repair manual-Right crank case cover, magneto)**

· Machine oil pump **(Oil pump disassembly refer to ZT310T-M engine repair manual-Lubrication system)**

5. Dissoliation and install the crankcase process, do not violence, prevent damage to the crankcase binding surface.

Specifications:

Unit : mm (in)

project		**standard**	**Maintenance limit value**
Crankshaft	Continuous rod big head	0.10 (0.004)	0.40 (0.016)
	Spindle neck gap	0.024-0.052 (0.001-0.002)	0.075 (0.003)
	Crankshaft	-	0.03 (0.0012)
	Spindle neck diameter	39.988-40 (1.5743, 1.5748)	39.982 (1.5741)

	Liner inner diameter	17.010-17.017 (0.6697-0.67 in)	17.06 (0.6717)

Torque value:

Bolt model	Assembly location	quantity	Torque	Remark
M6 × 75 hex flange bolt	Left and right box body box bolts	Mean	12 ± 1.5n.m	-
M6 × 10 hex flange	-	-	10 ± 1N.m	-
M6 × 30 hex flanged bolts	Start motor lock bolt	2	12 ± 1.5n.m	-
Non-standard cover type 9 degree nut M6×13 (environmental color zinc)	Fine filter cover locking nut	3	10±1N.m	-

Tool:

1. Torque wrench + 8 #、10# sleeve;
2. 8 # 、10# T-shaped sleeve wrench;
3. Spring clamp for shafts；

Three, Common faults / troubleshooting

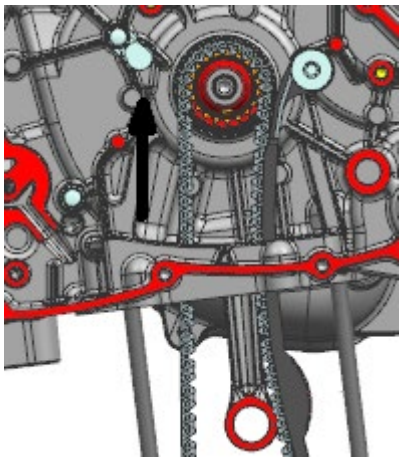
1, Abnormal sound.

· Crankcase shaft watts are wear.
· The end shaft watt watt in the link.
· The tabtop is abnormal.
• Balance axis bearing is abnormal wear.

2, The shaft does not move

· Crankshaft shaft is damaged.
· The tales of the connecting rod is damaged.
. Abnormal wear of the small end of the connecting rod.

Four, The decomposition of the crankcase



1. Unpackage chain

① Disassembly

The timing chain can be removed as shown in the direction shown in the figure arrow.

② Check

If there is a problem, you need to replace the timing chain and timing.

● Crack
● Serious wear
● Turn the obvious snap

③ Assembly

The chain surface is sprayed, and the chain end is still set on the timing chain teeth according to the above figure, and the other end is pulled out from the sprocket chamber and straightened the chain from falling off.

2, Remove the tightness

(Tension tight disassembly refer to ZT310T-M engine repair manual - cylinder head cover, cylinder head - tight)

3, Disassembly guide strip pressure plate

① Disassembly

Use the tool 1 or 2 to remove the pressed bolt, take the pressure plate.

② Check

If the platen is deformable or broken, it should be replaced.

③ Assembly

Install the pressure plate as shown in the illustrated position, bolt applied to the threaded glue, screw into the pressed bolt hole and tighten the tool 1, and the tightening torque is 10 ± 1 N.m.

4, Disassemble the trapezoidal thick filter

① Disassembly

Remove the trapezoidal rough filter with a flat clamp (or other tool with a flat clamping function) (preventing the deformation of the crude filter) to remove the trapezoidal crust with a mild solvent.

② Check

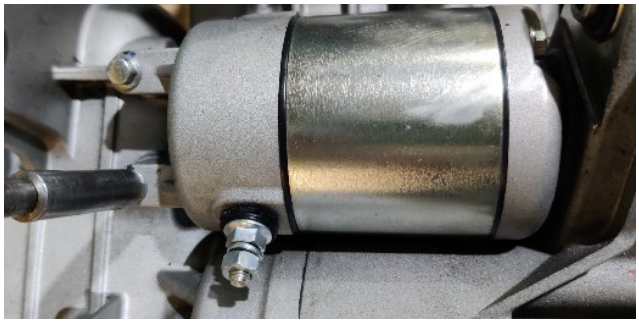
If the filter is broken, it should be replaced.

③ Assembly

Put the crust in the cabinet according to the illustration and press it in place (there is a font identification side facing down, do not load the wrong direction).

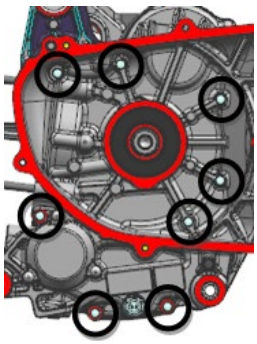
5, Decomposition crankcase

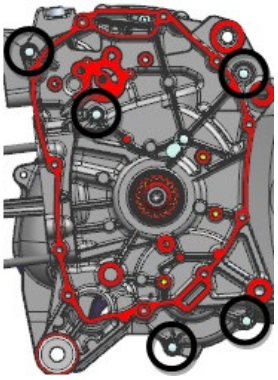
① Remove the start motor with tool 1 or tool 2 as shown below.



② Tool 1 or Tool 2 Agimifier is uniformly uniformly dismantled, first remove 8 M6 × 75 hex flanged bolts on the left

side, and then rotate the box to remove the right side of 5 M6 × 75 hex flange bolts.





③ Place the left crankcase down, taking the rubber hammer symmetry, tapping the box to reinforce the hole or process boss (Note: Do not knock the crankcase binding surface or other assembly joint surface), so that the crankcase is uniformly separated, Finally remove the right crankcase, balance shaft, crankshaft and locating pin.

④ Cleaning crankcase

The crankcase was thoroughly cleaned with a mild solvent to remove the assembly binding surface residual glue.

⑤ Check the crankcase

● If the crankcase is found to have functional damage such as cracks or combined surface, the corresponding crankcase should be replaced.

● Rotate the left and right box balance axis bearing inner ring, such as a snap, abnormal sound, the inner ring is loose, and the corresponding bearing should be replaced.

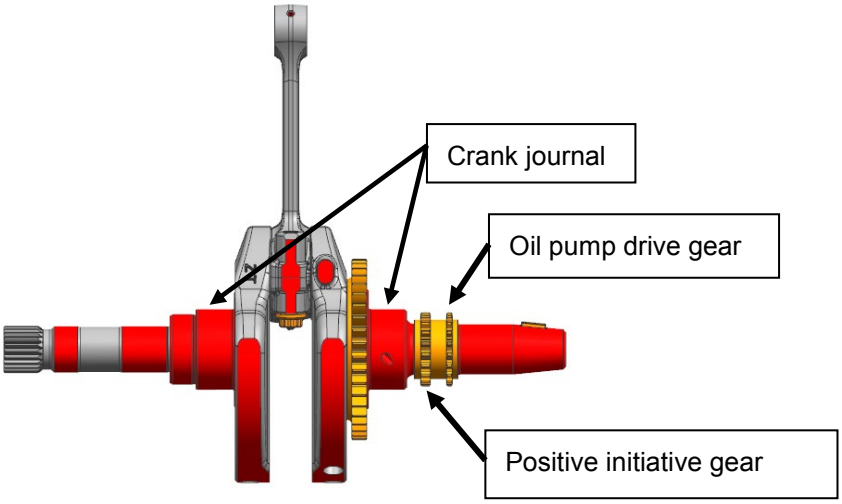
● Check the left and right box crankshafts, if there is abnormal wear, replace the shaft tiles.

● Check the crankshaft oil seal, such as the main, and the sub-lip loss should be replaced.

6, Check the crankshaft

● Check the engine oil pump drive gear, and there is no abnormal wear and damage in the initiative tooth surface;

Check that the surface of the crankshaft neck is damaged, discolored, or scratched, if available, then replace the crankshaft.



● Line small head inner **diameter inspection (link small head inner diameter check Reference ZT310T-M engine repair manual - cylinder, piston - piston)**

● Linear front slot check

The plug is inserted between the crankshaft and the end surface of the connecting rod, and the gap is measured.

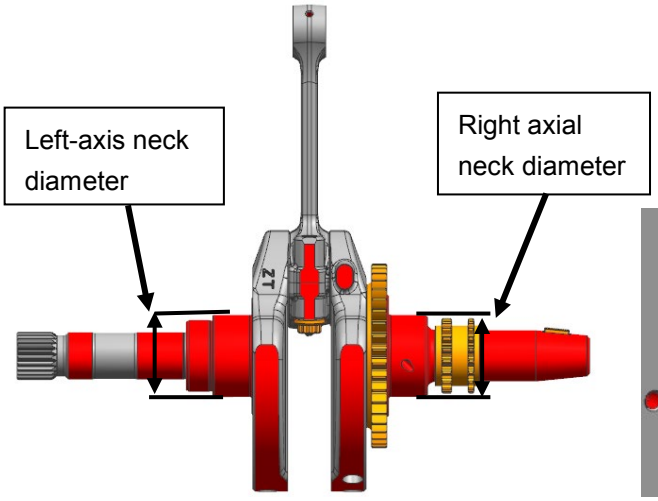
Maintenance limit value: 0.40mm (0.016in)

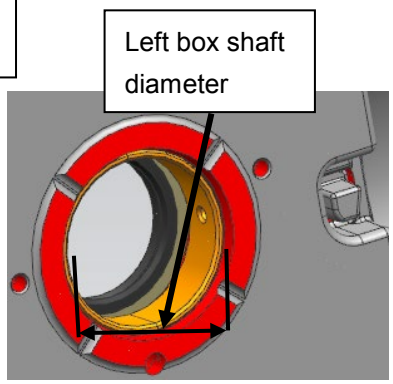
● Calling gap inspection of the crankshaft main journal and the shaft

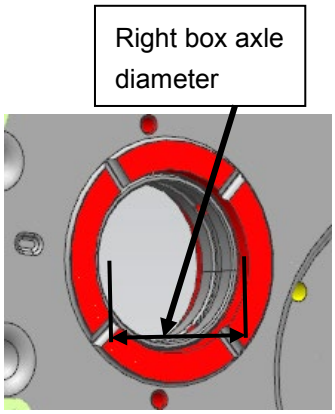
The diameter of the left, right journal and the left and right shafts of the crankshaft is measured, and the diameter of the right shaft is reduced by the diameter of the crankshaft body, and the mating gap between the left and right spindle necks and the shaft tiles can be calculated.

Maintenance limit value: 0.075mm (0.003 in)

Note: When the coordination gap of the primary journal and the bearing is exceeded, the components of the replacement amount of wear are evaluated. It is determined whether or not the gap is within the maintenance limit, yes, the corresponding components, no, need to replace The new crankshaft, and the shaft.





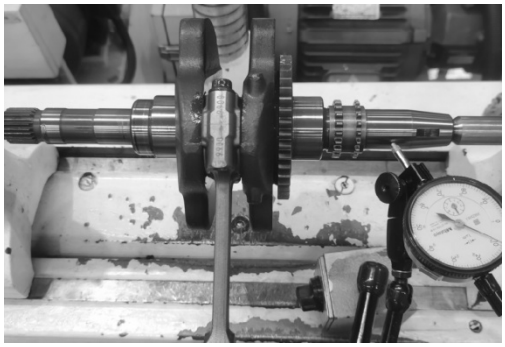


● Crankshaft runout inspection

Place the crankshaft on the V-shaped block or bracket and measure the corresponding point beating value with a percent watch.

Note: When the crankshaft beats exceeds the maintenance limit, the new crankshaft needs to be replaced.

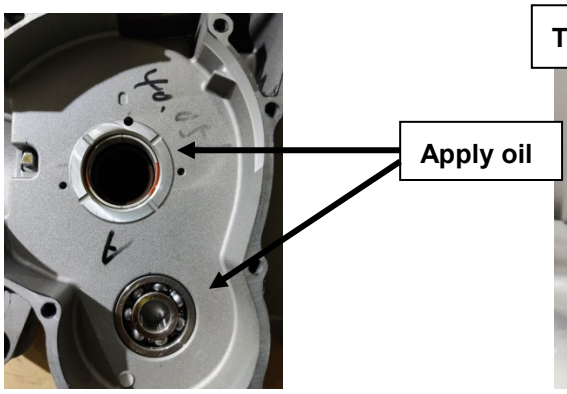
Maintenance limit value: 0.03 mm (0.0012 in)

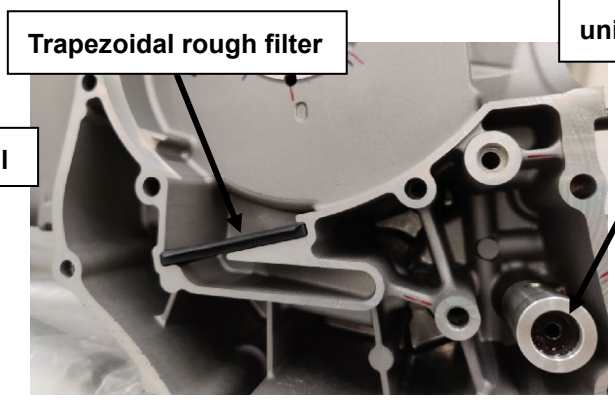


Five. Assembly of the crankcase

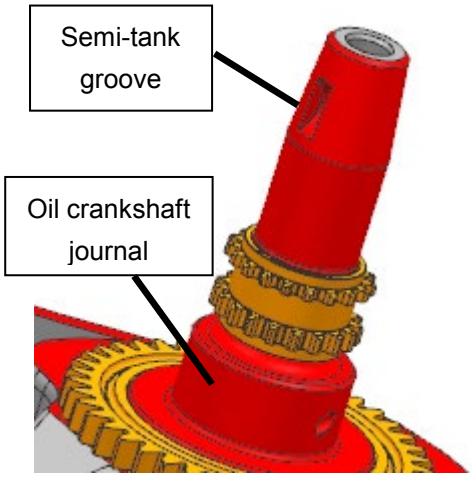
Clean the inside of the crankcase before assembly, check whether there is crack or other damage.

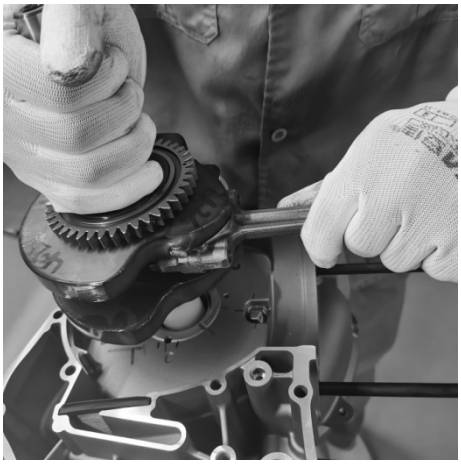
① Apparatus oil is applied at the left crank tank bearing inner ring and the cage, the inner diameter, and the oil seal lip. (**Note: Check that the left crankcase pressure relief valve sub-assembly, 9.8 x 2.4 hydrogenated nitrile O-ring and trapezoidal rougheners are not missing before installation**)





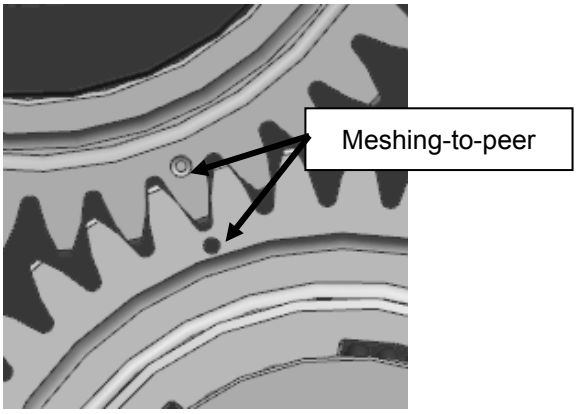
② Apply a suitable amount of oil to the left and right main journals of the crankshaft, as shown below, the crankshaft is loaded into the left crankcase (Note: The crankshaft semicircular keyway is upwards, do not scratch the left crankcase bearing pad and crankshaft oil seal when putting in the crankshaft.).



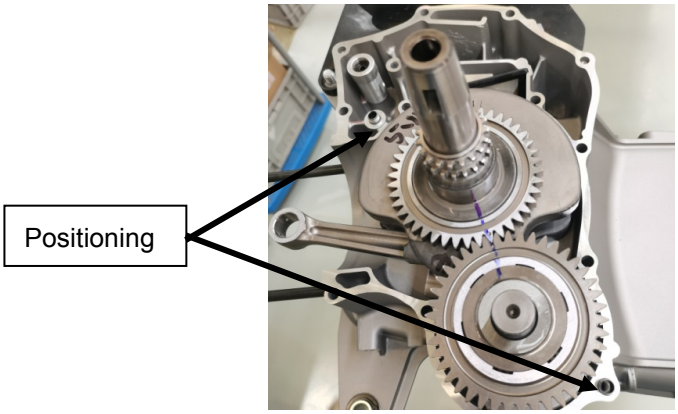


③ Apply an appropriate amount of oil at the balance axis neck to load the balance axis to align the balance axis bearing hole into the left curve.

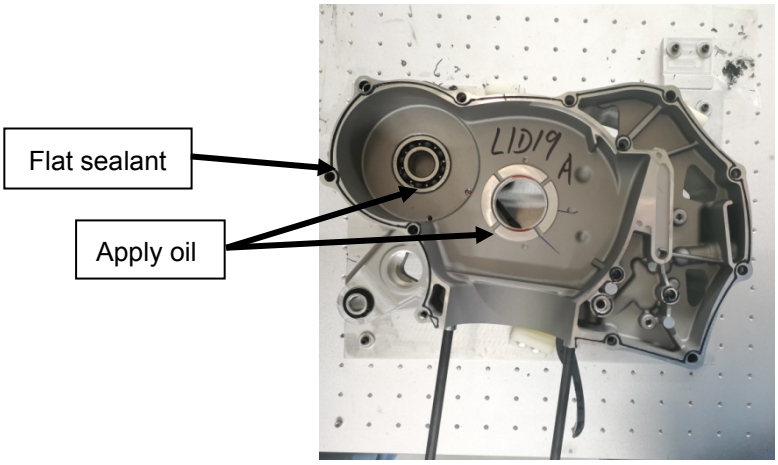
(Note: Balanced axle teeth and crankshaft balance axis drive teeth must correctly engage the point!)



④ Install two φ8×14 hollow locating pins into the left crankcase locating pin holes.



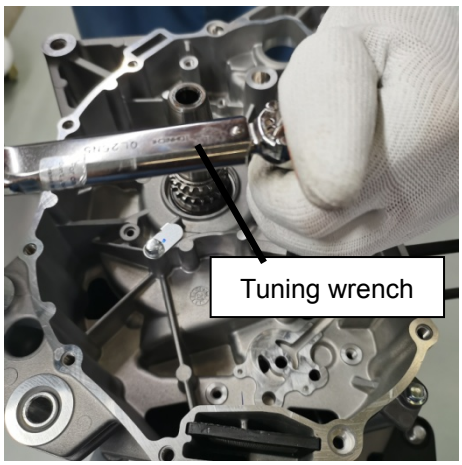
⑤ As shown in the figure, apply a layer of flat sealed rubber in the right crankcase, in the bearing inner ring and the holder, and the inner trails are applied to the right amount of oil.



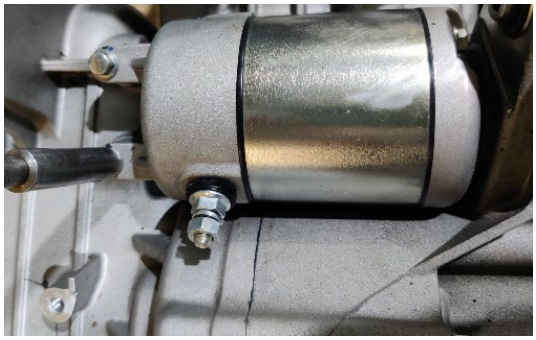
⑥ Combine the right crankcase to two positioning pins, and complete the box downward.

(Note: When placing the right crankcase, do not scratch the right crankcase bearing pad and do not operate with violence when closing the case to avoid bumping or scratching the parts and the bonding surfaces.)

⑦ First load 5 M6 × 75 hex flange bolts from the right side, uniformly pretextile from the positioning pin position, torsion, torsion of 12 ± 1.5 nm, rotate the casing, 8 M6 × 75 hex flange bolts are loaded into the crankcase from the left side, and the diagonal is evenly tightened, and the torsion is 12 ± 1.5 nm.



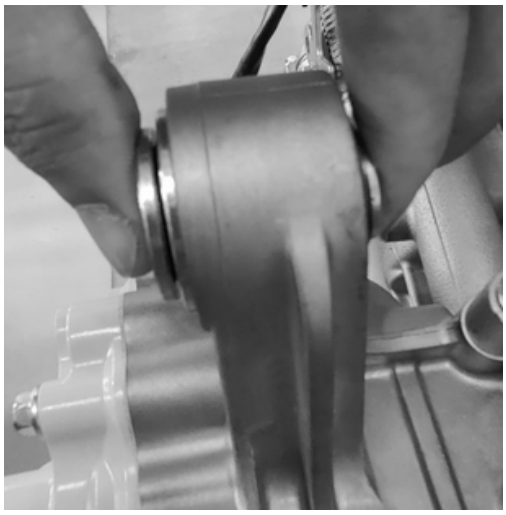
8 After installing the starter motor as shown, putting 2 M6 × 30 hex flange bolts, and the tightening of the pretension, the torque is 12 ± 1.5 N.m.



Left and Right Crankcase Upper Fixed Point Disassembly and Inspection

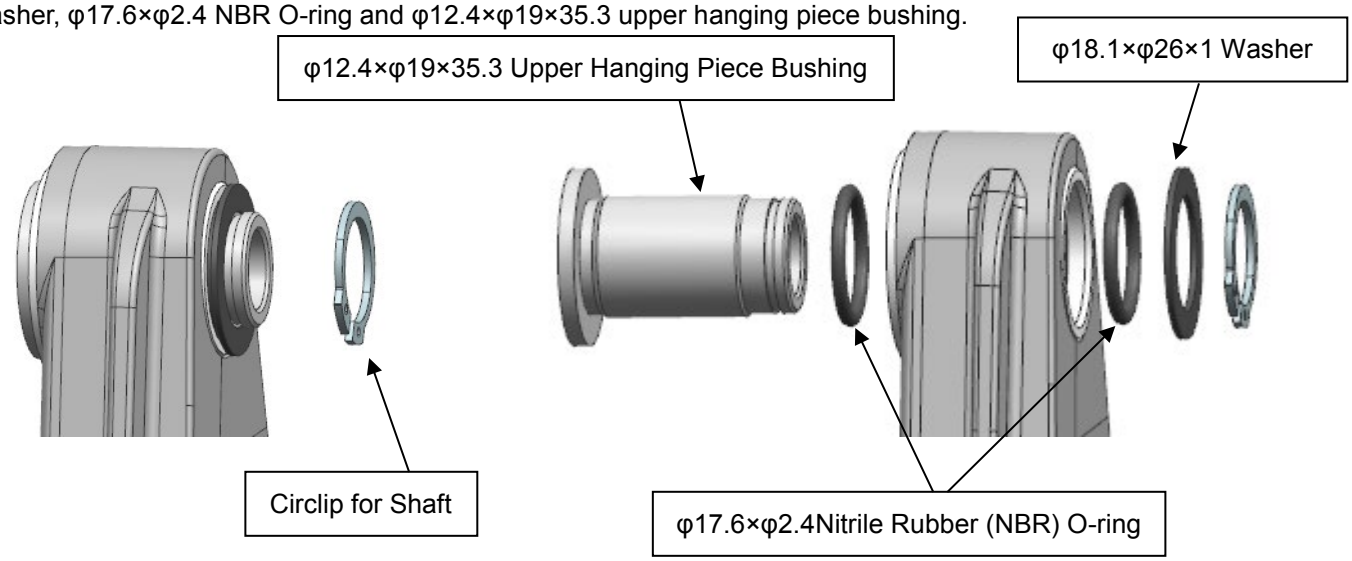
Upper Hanging Piece Inspection

1. As shown in the diagram, pinch the ends of the upper hanging piece bushings on φ12.4×φ19×35.3 by hand and turn it back and forth, if it can turn, it passes. **(Note: If the upper hanging bushings do not rotate, they need to be disassembled to add the appropriate amount of high temperature and high load resistant grease.)**



Upper Hanging Piece Disassembly

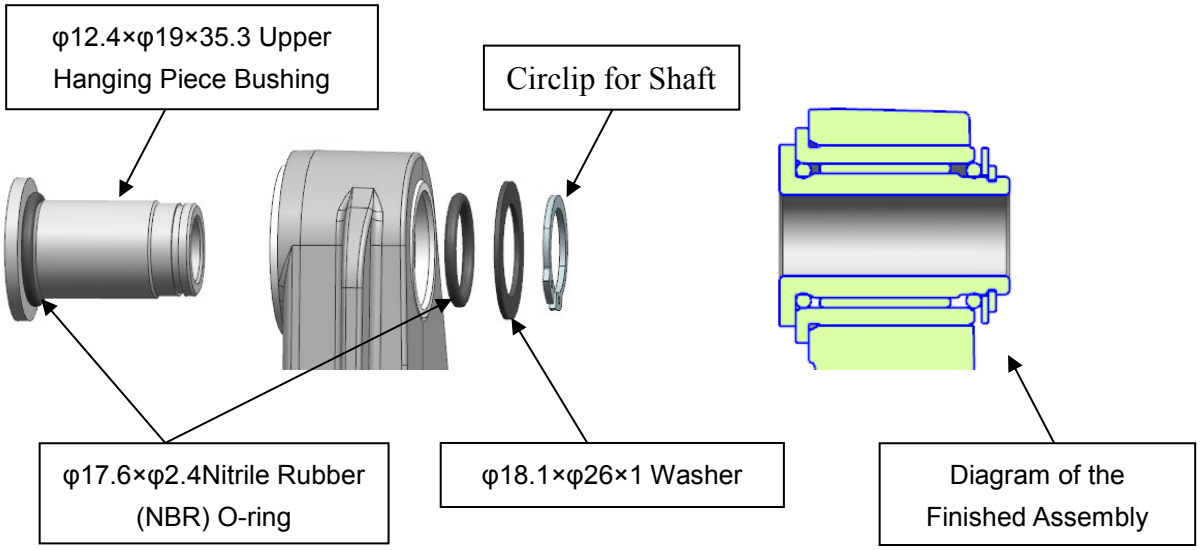
1. As shown in the diagram, remove the circlip for shaft with tool 3 spring clamp for shafts and take out φ18.1×φ26×1 washer, φ17.6×φ2.4 NBR O-ring and φ12.4×φ19×35.3 upper hanging piece bushing.



Upper Hanging Piece Installation

1. As shown in the diagram, take a φ17.6×φ2.4 nitrile (NBR) O-ring and insert it into the root of the φ12.4×φ19×35.3 upper hanging piece bushing, apply an appropriate amount of grease to the surface of the upper hanging piece bushing and insert it into the upper hanging piece press-fit assembly, put another φ17.6×φ2.4 nitrile (NBR) O-ring into the groove

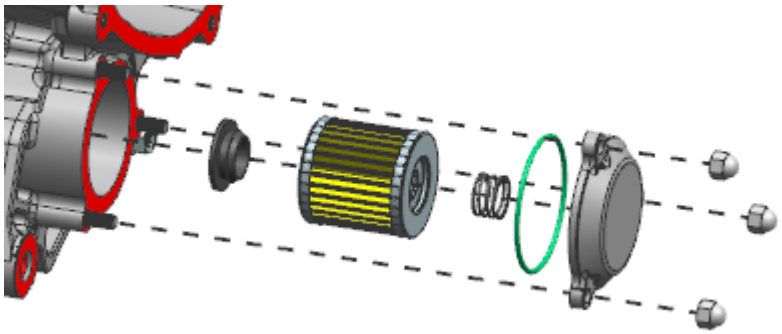
side of the upper hanging piece bushing and press it into place to seal the grease, then install the φ18.1×φ26×1 Gasket and circlip for shaft. **(Note: Use high temperature and high load resistant grease.)**



Fine Filter

Dismantling

1.Remove three M6 cap nuts on fine filter cover with a 10# socket (or T-socket-10#) and remove the fine filter cover, 55×2.5 polyacrylate rubber (SGA) O-ring, φ18.5×13×1.6 fine filter spring, and φ45×46 cylindrical fine filter of outside diameter (including gasket) respectively.



Inspection

1. Check that the 55 x 2.5 polyacrylate rubber (SGA) O-ring is free of scratches, cracks and cut edges. If these cases happen, this part need to be replaced in time.
2. Check the fine filter. Check whether filter paper of the fine filter is not blocked or damaged. If it is blocked or damaged, it should be replaced in time. **(Refer to the ZT310T-M service manual for oil filter change intervals - 2. Maintenance - Maintenance intervals table)**

Installation

1. Place the cylindrical fine filter (including gasket), φ18.5×13×1.6 fine filter spring and fine filter cover (O-ring pressed into the groove of the fine filter cover in advance) to the corresponding installation position of the fine filter in the left crankcase in turn, press the fine filter cover by hand, screw in the M6 cap nuts respectively, and tighten with a fixed torque of 10±1N.m. **(Note: When installing the fine filter cover, do not cut the edge of the O-ring and the black gasket should be installed on the corresponding positioning boss of the left crankcase.)**
(For normal maintenance of the engine fine filter, please refer to the ZT310T-M maintenance manual - II. Maintenance - Engine oil.)