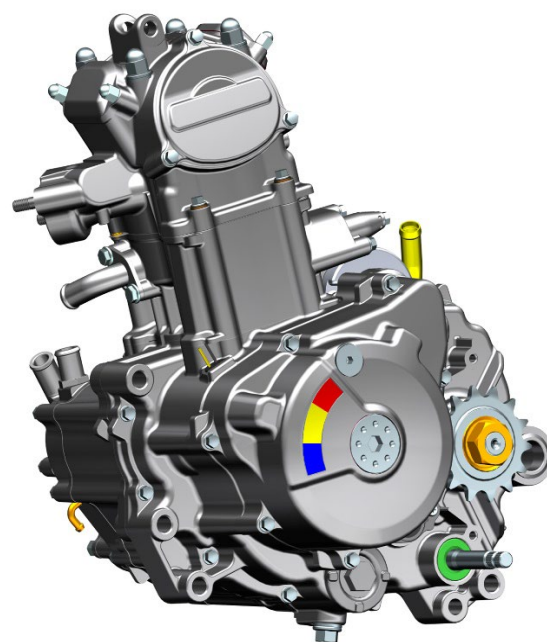




ZT163MLEngine Euro V

Service manual



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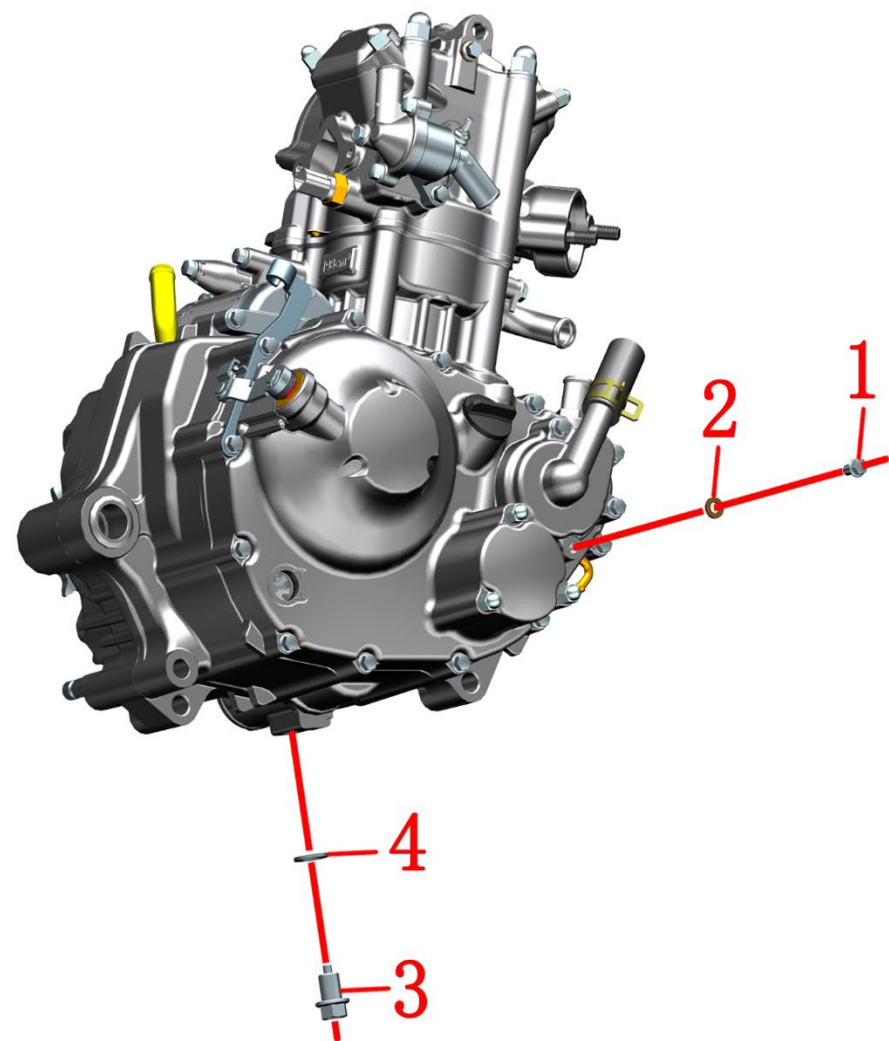
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This manual is suitable for ZT125 series engines. All the materials, illustrations, photos, etc. collected in this manual are compiled according to the latest products. However, due to continuous product improvement and other changes, there may be some inconsistencies between your engine and this manual. For colors or upgrades, please refer to the part codes on the official website. This manual will not be listed in detail; If the part names in this manual are inconsistent with the official website, the official website shall prevail.

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1-Drain engine oil and coolant procedure



PIG1 Drain engine oil and coolant procedure		Drain engine oil and coolant procedure		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1251100-067093	M6×10 top pin bolt (color Zinc)		1	12±1.5N.m
2	1251513-001019	6.3×12×1.6 copper gasket		1	
3	1251100-066093	M12×1.5×15 ablassschraube		1	30±3N.m
4	1244100-033000	Combined sealing gasket 12×φ20×2		1	

PROCEDURE:

●Draining of engine oil and coolant

Place a suitable water filling tool under the drain bolt, use an 8# sleeve to remove the 2 drain bolts (1) on the water pump cover on the right cover, and take out the copper pad (2); unscrew the water tank filler cap on the vehicle. Wait for the coolant drain to complete.

Place a suitable oil loading tool under the oil drain bolt, use a 14# sleeve to remove the oil drain bolt (3), and take out the gasket (4). Wait for the oil drain to complete.

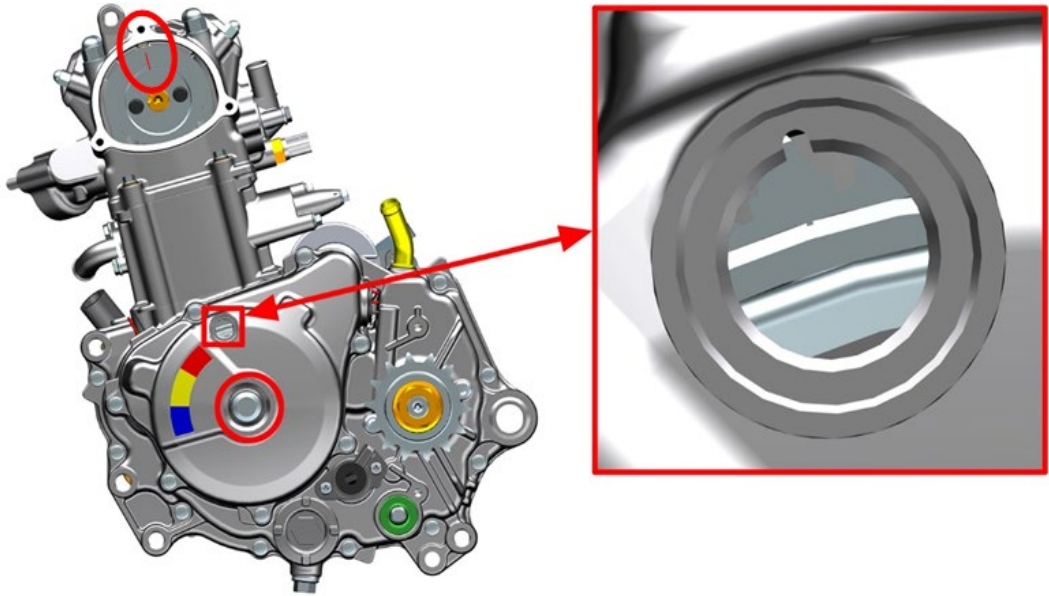
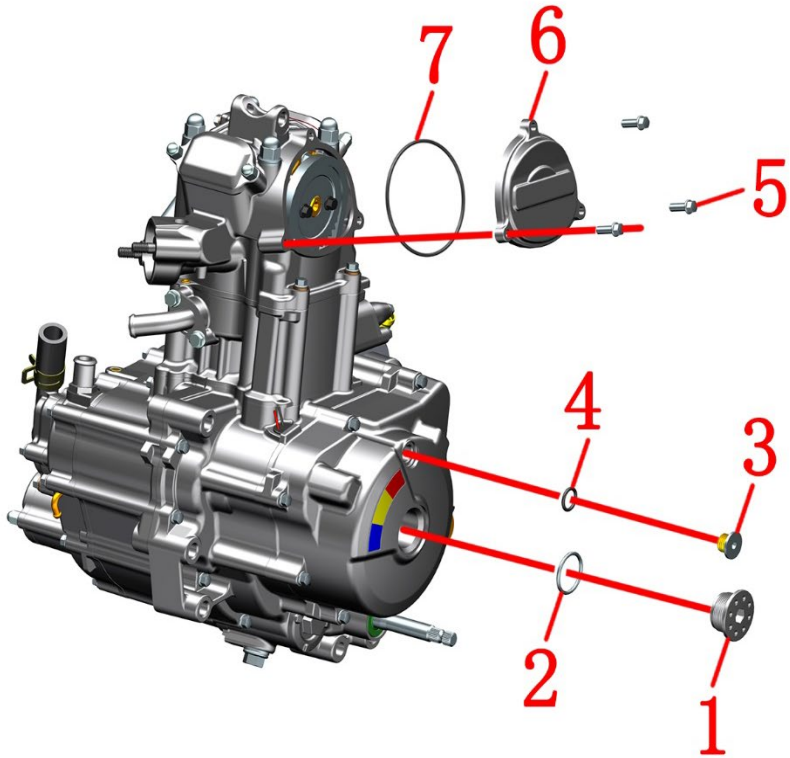
Wait until the engine oil and coolant are completely drained before removing the engine from the vehicle.


CAUTION:

●The discharge of engine oil and coolant must be carried out when the machine is cold to prevent burns.

●Antifreeze is corrosive to a certain extent, so be careful not to contaminate the engine and other parts, body, clothing, etc. when discharging the antifreeze. If parts are accidentally contaminated with antifreeze, immediately wipe them with a clean lint-free cloth. If clothing or skin is stained with antifreeze, immediately rinse with clean water. If the antifreeze is splashed into the eyes, immediately rinse with plenty of water and observe to decide whether to seek medical attention.

2-Cylinder head assembly



PIG1 Cylinder head assembly		Removal of cylinder head-1	CHK	
			ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION
1	4050956-003051	M30×1.5 aluminum screw plug (dark gray)	1	
	4050953-006051	M30×1.5 aluminum screw plug (titanium gold)		
2	1051453-003000	27.4×2.65 Acrylate rubber o-rings	1	
3	1040953-002093	M14×1.5 plug screw	1	12±1.5N.m
4	1051453-009000	O-ring, 13×2.8	1	
5	1251100-061093	M6×22 Hex flang bolt thread	3	12±1.5N.m
6	1040957-001000	ZT163ML cylinder head side cover	1	
7	1051457-001000	φ84.5×2.5 Acrylic O-ring	1	

PROCEDURE:

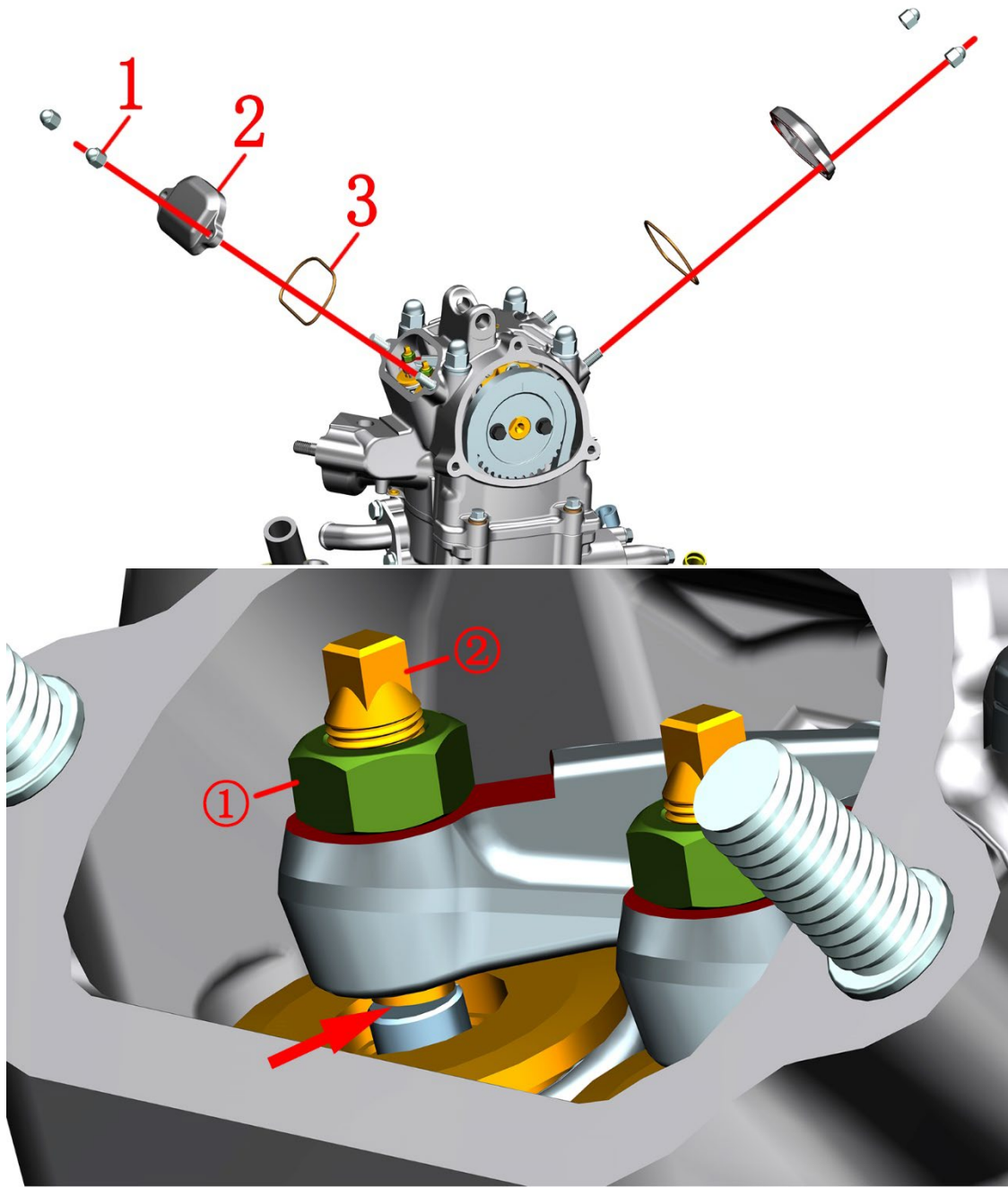
● Removal of cylinder head-1


- Use a 10# inner hexagon to remove the screw plug (1) on the left cover of the engine, and remove the O-ring (2);
- Use the 4# inner hexagon to remove the screw plug (3) on the left cover of the engine, and remove the O-ring (4).
- Use an 8# sleeve to remove the 3 bolts (5) on the cylinder head side cover (6), and take out the cylinder head side cover (6) and O-ring (7).
- Use a 14# sleeve to rotate the bolts in the red circle until the notch on the flywheel aligns with the notch on the left engine cover, and the timing mark on the timing sprocket aligns with the upper bolt hole.

CAUTION:

- When installing the O-ring, care should be taken not to cut the edge, and the edge must be replaced if there is a cut edge.
- Do not let foreign objects fall into the engine during disassembly and installation.
- The torque standard of screw plug (1) is: 16±1.5Nm.

2-Cylinder head assembly



PIG2 Cylinder head assembly		Adjustment of valve clearance		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1251300-096000	Non-standard cover type 9 degree nut M6×13		4	10±1.5N.m
2	1040957-002000	ZT163ML valve cover		2	
3	1051457-002000	φ50×2 Acrylic O-ring		2	

PROCEDURE:

● Adjustment of valve clearance

Use a 10 # sleeve to remove 4 nuts (1), and take out the valve chamber cover (2).

Use an 8 # plum wrench to loosen the nut ① on the intake rocker arm or exhaust rocker arm, and then use a 3# inner hexagon to adjust the stud ② on the intake rocker arm or exhaust rocker arm. Plug into the gap between the rocker arm and the valve, and check whether the valve clearance is within the standard clearance.

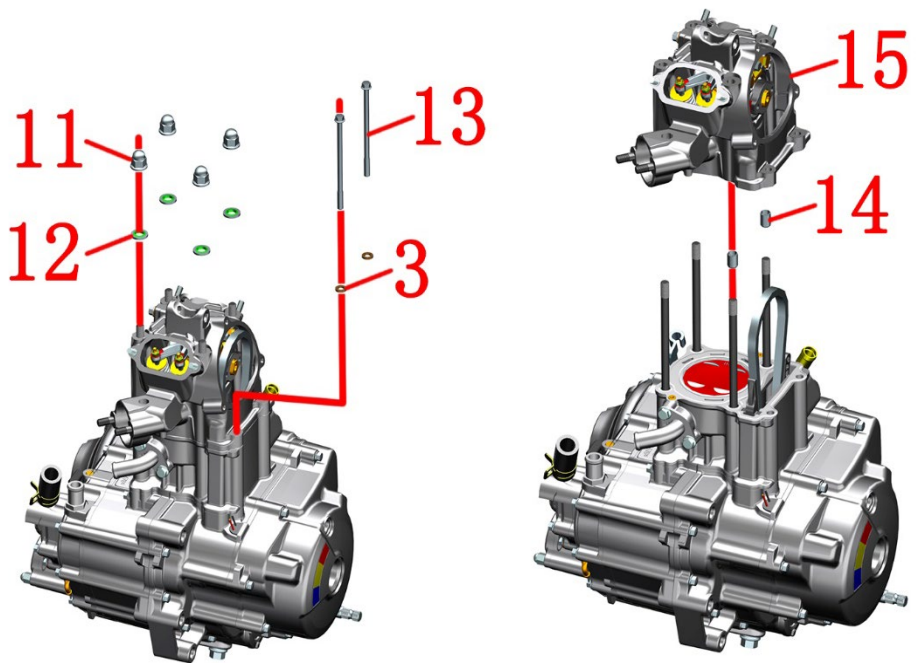
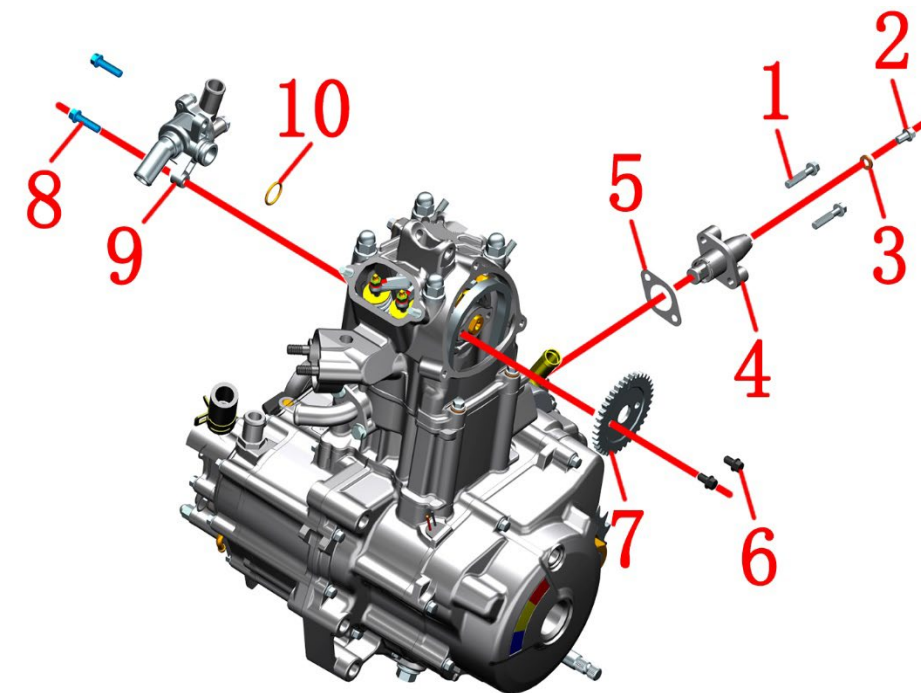
Intake valve clearance: 0.06 mm~ 0.10 mm


Exhaust valve clearance: 0.10 mm~ 0.14 mm

CAUTION:

- When adjusting the valve clearance, the notch on the flywheel must be aligned with the notch on the left cover, and the timing mark on the timing sprocket must be aligned with the upper bolt hole.
- The gap between the two intake valves of the same cylinder head is less than 0.02mm (the requirements for the two exhaust valves are also the same).
- After the valve clearance is adjusted, use a torque wrench to correct the torque of the nut ①, and the torque standard is: 9±1N.m.

2-Cylinder head assembly



PIG3 Cylinder head assembly		Removal of cylinder head-2	CHK	
			ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION
1	1251112-002093	GB16674 M6×30 Hexagon flange bolts	2	12±1.5N.m
2	1251100-067093	M6×10 top pin bolt (color Zinc)	3	10±1.5N.m
3	1251513-001019	6.3×12×1.6 copper gasket	3	
4	1051270-004000	ZT1P72MN tensioner sub-assembly	1	
5	1051253-004000	30×38 Washer, tensioner	1	
6	1251100-340094	M6×10 Hexagon flange bolts	2	10±1.5N.m
7	1050157-012000	ZT163ML timing driven sprocket	1	
8	1251100-061093	M6×22 Hex flang bolt thread	2	12±1.5N.m
9	1271200-199000	KD200-U thermostat	1	
10	1051468-010000	16.5×1.95 EPDM	1	
11	1251300-093000	Non-standard cap nut M8×18	4	25±3N.m
12	1051661-001000	Combined gasket φ9×φ18×2 (Dacromet)	4	
13	1251112-007093	GB16674 M6×1055 Hexagon flange bolts	2	12±1.5N.m
14	1251401-003000	φ10×14 dowel pin	2	
15	4050657-006000	ZT163ML cylinder head sub-assembly	1	

PROCEDURE:

● Removal of cylinder head-2

Use an 8# sleeve to pre-loosen the bolts (2), then remove the 2 bolts (1), and take out the tensioner (4) and gasket (5).

Use an 8# sleeve to remove the 2 bolts (6) on the timing driven sprocket (7), and take out the timing driven sprocket (7).

Use an 8# sleeve to remove 2 bolts(8), and remove the thermostat (9) and O-ring (10).

Use an 8# socket to remove 2 bolts (13), and take out 2 gaskets (3).

Use a 14# sleeve to remove 4 nuts (11), and take out 4 gaskets (12).

Grasp the cylinder head (15) and remove it from the engine.

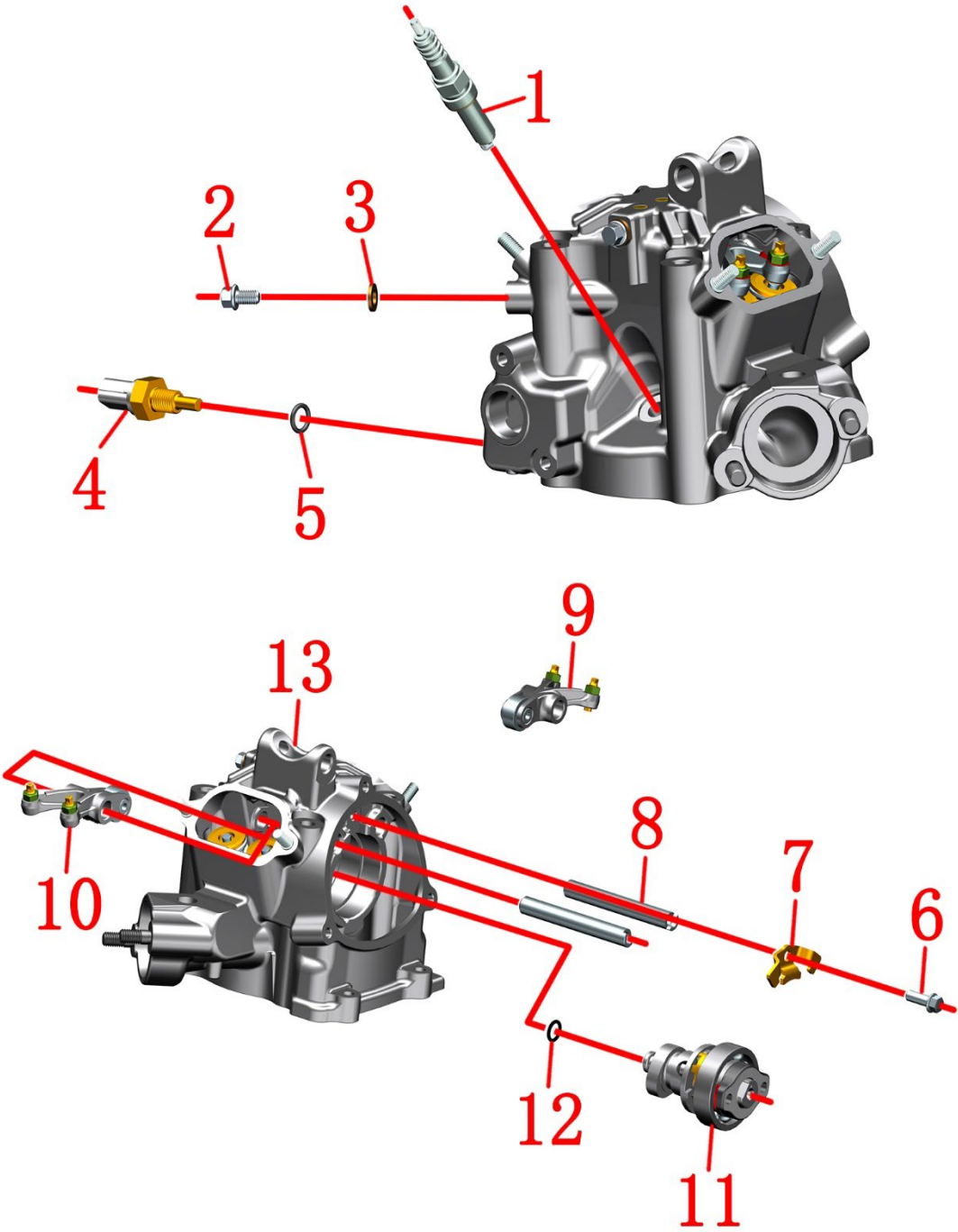
Note: 2 locating pins (14) Be careful not to lose or drop them inside the engine.


During installation, it is necessary to use an 8# sleeve to remove the bolts (2) and gaskets (3) on the tensioner (4), and then use tooling to retract the tensioner strut and put the tensioner (4) back.

CAUTION:

- Do not let foreign objects fall into the engine during disassembly and installation.
- When installing the bolts at the timing sprocket (6), apply an appropriate amount of thread fastening glue to the threads.
- The nut (11) needs to be tightened diagonally to the appropriate torque standard during installation.

2-Cylinder head assembly



PIG4 Cylinder head assembly		Disassembly of cylinder head sub-components		CHK	
				ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION	
1	1050970-004000	LMAR8A-9 spark plug	1	14±1N.m	
2	1251100-067093	M6×10 top pin bolt (color Zinc)	1	12±1.5N.m	
3	1251513-001019	6.3×12×1.6 copper gasket	1		
4	1050954-003000	communal sensor of water and oil	1	13±1.5N.m	
5	1051454-009000	φ9×φ2 EPDM O-ring	1		
6	1251112-001093	GB16674 M6×16 Hexagon flange bolts	1	12±1.5N.m	
7	1051357-005000	ZT163ML camshaft bearing pressure plate	1		
8	1050157-013000	ZT163ML rocker shaft	2		
9	1050157-002000	ZT163ML intake rocker arm sub-assembly	1		
10	1050157-001000	ZT163ML exhaust rocker arm sub-assembly	1		
11	1050157-009000	ZT163ML Camshaft Parts	1		
12	1051468-001000	8.8×1.9 fluorine rubber O-ring	1		
13	4050657-004000	ZT163ML cylinder head press-fit assembly	1		

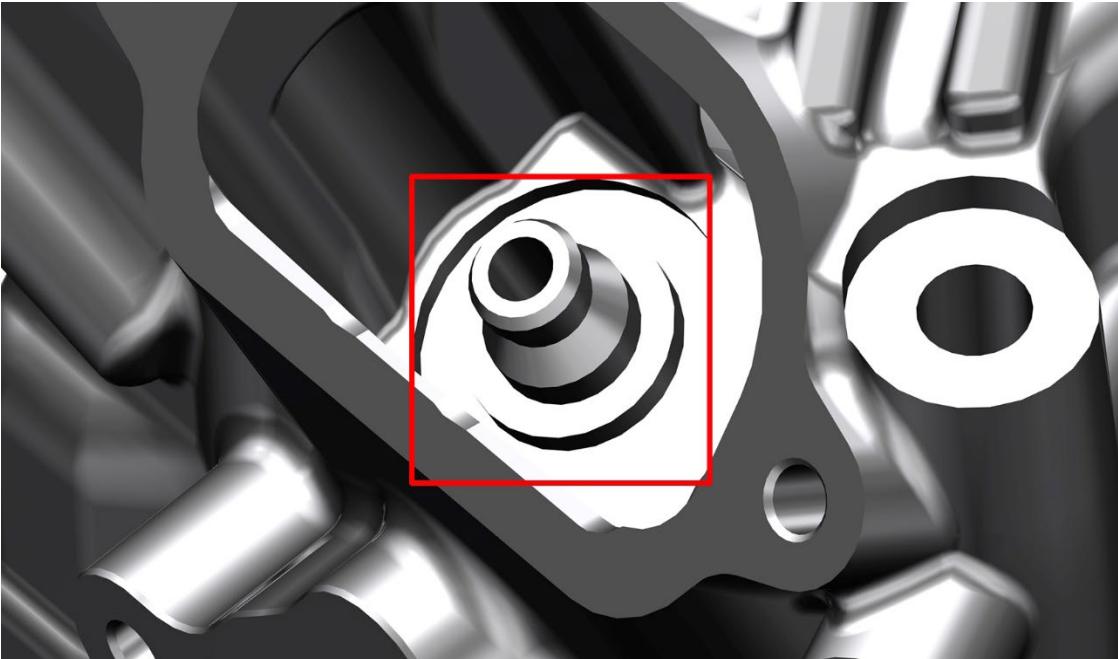
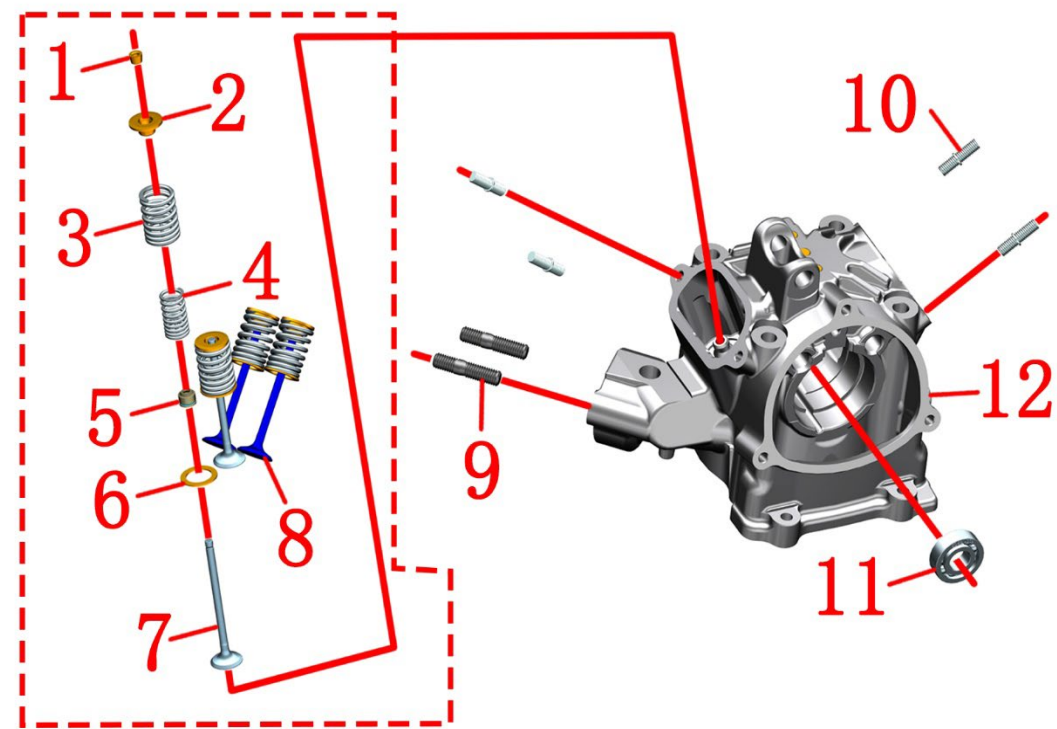
PROCEDURE:


- Disassembly of cylinder head sub-components
 - Use a 14# sleeve to remove the spark plug (1);
 - Use an 8# sleeve to remove the bolt (2), and remove the copper pad (3).
 - Use a 17# sleeve to remove the sensor (4), and take out the O-ring (5).
 - Use an 8# sleeve to remove the bolt (6), take out the bearing pressure plate (7) and 2 rocker arm shafts (8), and then take out the intake rocker arm (9) and exhaust rocker arm (10) from the gap in the valve chamber cover. Finally, take out the camshaft (11) and O-ring (12) from the notch on the side cover of the cylinder head.

CAUTION:

- The O-ring (5) is for one-time use and must be replaced after disassembly.
- When installing bolts(6), apply an appropriate amount of thread fastening glue to the thread.

2-Cylinder head assembly



PIG5 Cylinder head assembly		Disassembly of the press-fitted assembly on the cylinder head	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1050154-017000	ZT180MN Valve lock clamp	8	
2	1050154-016000	ZT180MN Valve spring ring	4	
3	1050157-007000	ZT163ML intake valve outer spring	4	
4	1050158-001000	ZT184MP valve inner spring	4	
5	1051553-001000	Φ5.0 valve stem diameter oil seal	4	
6	1050153-015000	16.5×23.5×1 valve spring seat	4	
7	1050157-004000	ZT163ML exhaust valve	2	
8	1050157-003000	ZT163ML intake valve	2	
9	1251111-011000	AYM8-M8×38 double head 10.9 studs bolts	2	
10	1251111-010000	Non-standard M6×23.5 double-head 9.8 studs bolt	4	
11	1250601-143000	GB276—6001RS/P5C3 deep groove ball bearings	1	
12	4050657-001000	ZT163ML cylinder head	1	

PROCEDURE:

●Disassembly of the press-fitted assembly on the cylinder head

Use the corresponding tool to press down the valve spring upper ring (2), take out the lock clip (1), outer spring (3), inner spring (4), valve oil seal (5), washer (6), and take out the exhaust valve (7) from the bottom of the cylinder head. The removal method of the intake valve (8) is the same as that of the exhaust valve (8).

Note: When installing, press the oil seal to the boss on the cylinder head (12) (at the rectangular mark).

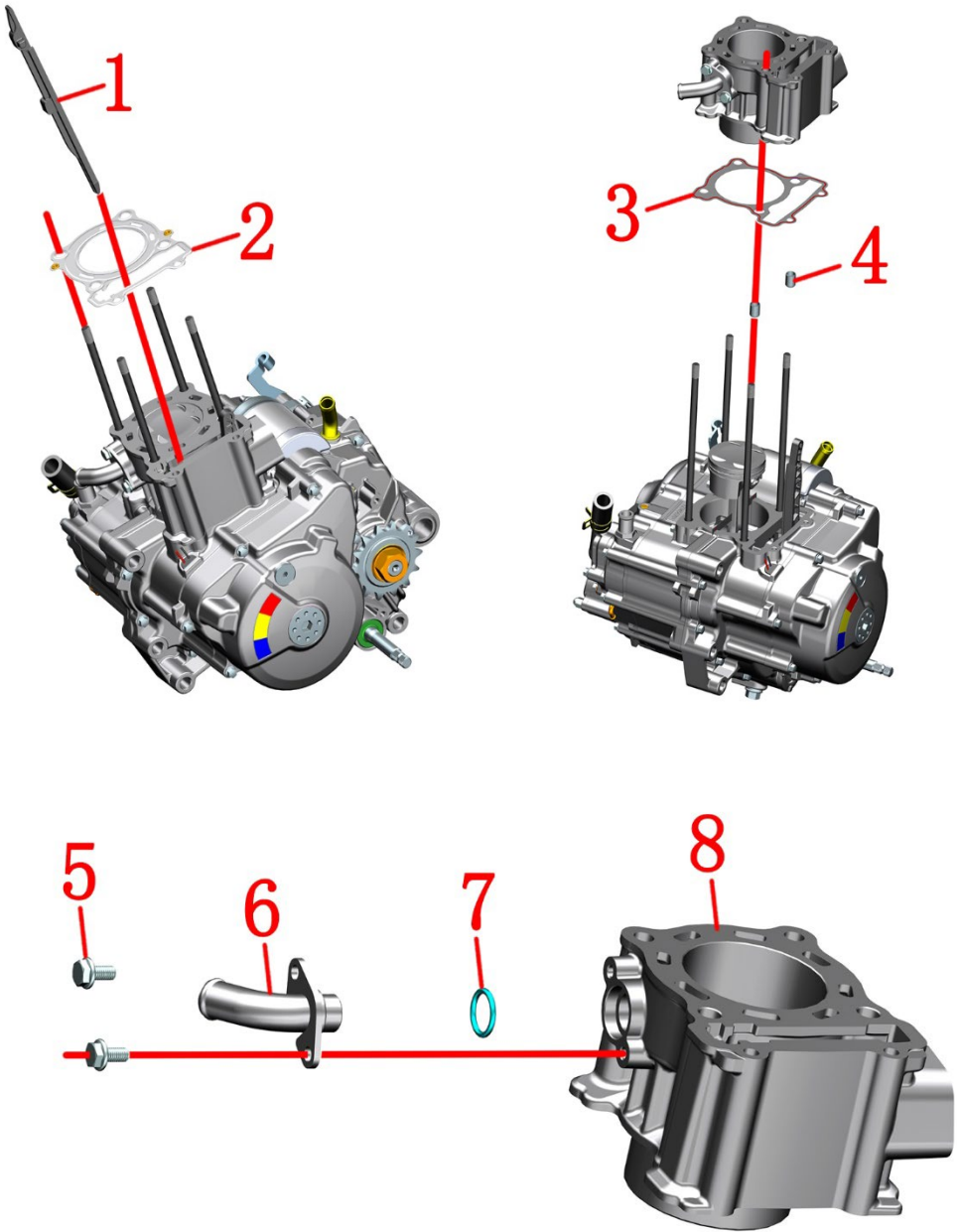
Use the stud removal tool to remove the studs (9), (10).


The bearing (11) is generally not damaged, if it needs to be replaced, please go to a professional organization or a qualified maintenance organization for replacement.

CAUTION:

- The oil seal (5) is for one-time use and must be replaced after disassembly.
- Do not disassemble the valve assembly unless necessary. If it must be replaced, please go to a professional organization or a qualified maintenance organization for replacement.
- When installing double-ended studs (9) and (10), an appropriate amount of thread fastening glue should be applied to the threads.

3-Cylinder block assembly



PIG1 Cylinder block assembly		Cylinder block disassembly and decomposition		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1051257-001000	ZT163ML guide strip		1	
2	1051657-001000	ZT163ML cylinder head gasket		1	
3	1051657-002000	ZT163ML Cylinder block box gasket		1	
4	1251401-003000	φ10×14 dowel pin		2	
5	1250105-136093	GB5789M6×12 (environmental color)		2	10±1.5N.m
6	1051957-008000	ZT163ML cylinder inlet pipe joint (pier system)		1	
7	1051457-006000	16×2.5 EPDM O-ring		1	
8	4050557-001000	ZT163ML cylinder block		1	

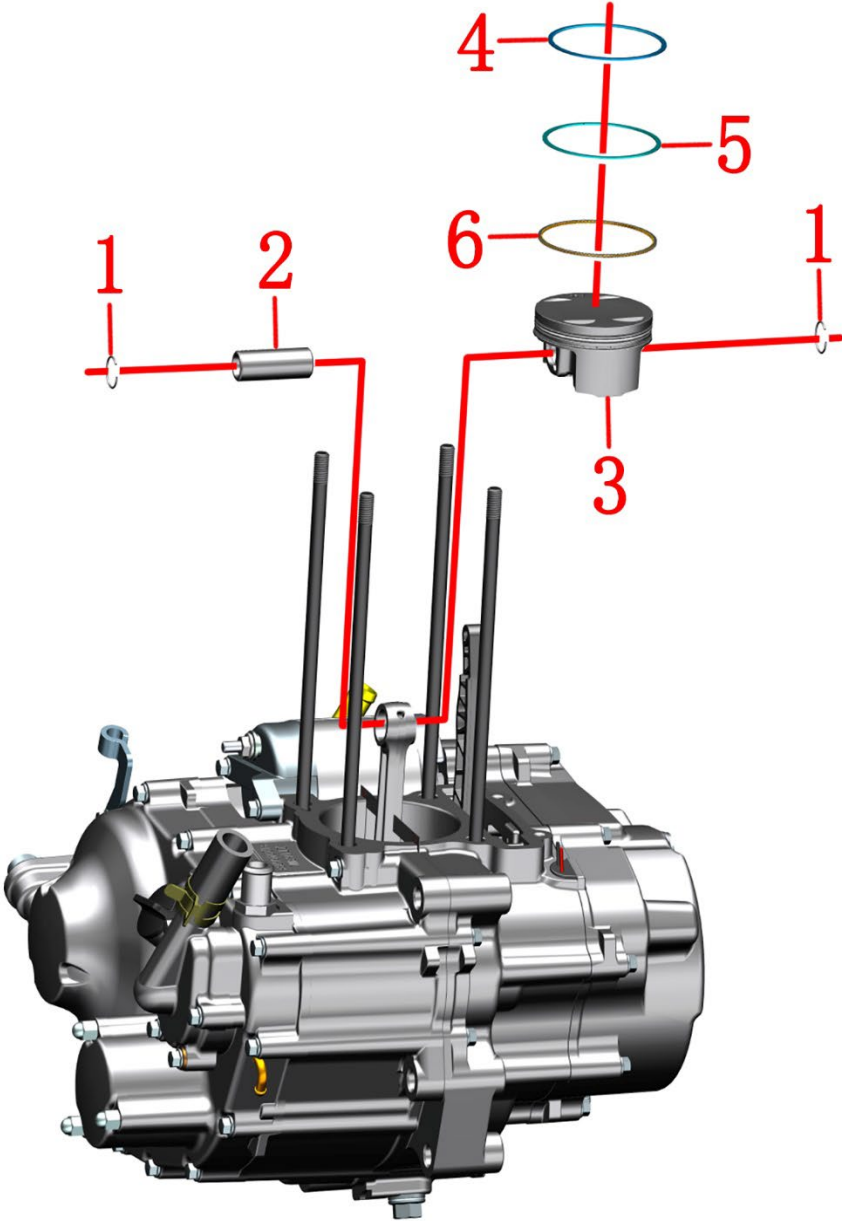
PROCEDURE:


- Cylinder block disassembly and decomposition
Take the guide bar (1) and spacer (2) out of the engine directly.
Grasp the cylinder block assembly and shake it slightly to take out the cylinder block assembly, and then take out the gasket (3) and positioning pin (4).
Note: 2 positioning pins (4) Be careful not to lose or drop them into the engine.
Use an 8# sleeve to remove the 2 bolts (5) on the cylinder block (8), and remove the water pipe joint (6) and O-ring (7).

CAUTION:

- Gasket (2), gasket (3) and O-ring (7) are for one-time use and need to be replaced every time they are disassembled.
- O-ring ((7)) Be careful not to trim the edge when installing, and it must be replaced if the edge is trimmed.
- Do not let foreign objects fall into the engine during disassembly and installation.

3-Cylinder block assembly



PIG2 Cylinder block assembly		Disassembly and decomposition of piston components	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1050457-004000	18.1×1 piston pin retaining ring	2	
2	1050457-003000	16×41×9 Piston Pin	1	
3	1050457-001000	ZT163ML piston	1	
4	1050457-005000	63.5×0.8×2.1 first air ring	1	
5	1050457-006000	63.5×0.8×2.1 second air ring	1	
6	1050457-007000	63.5×1.5×2.2 oil ring combination	1	

PROCEDURE:

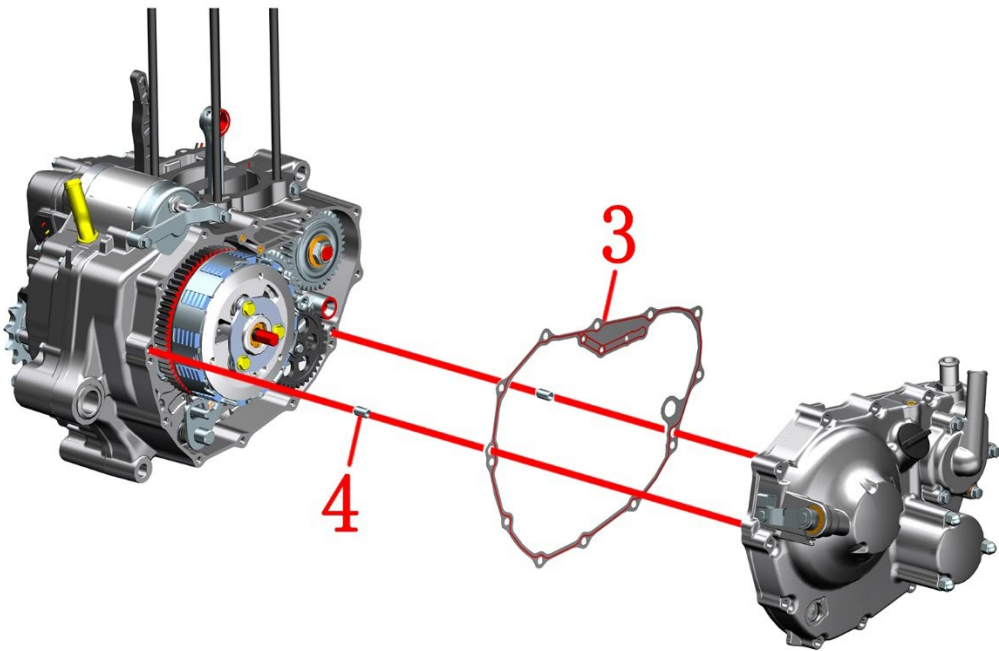
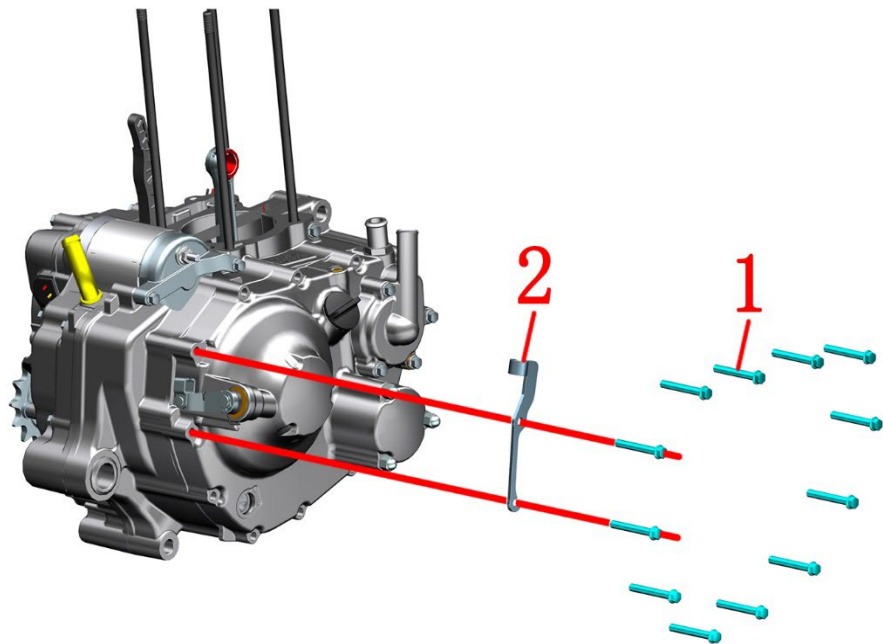
● Disassembly and decomposition of piston components


- Use needle-nose pliers to take out one end of the piston pin retaining ring (1) on the piston (3), then push out the piston pin (2), and remove the piston (3) from the crankshaft.
- Hold the gas ring (4) with your hands and stretch it out slightly, then take out the gas ring (5) and oil ring (6) in the same way.
- Note: When installing, the gaps of each air ring and oil ring should be staggered by 90° , and the gaps cannot be overlapped, otherwise there will be oil burning.

CAUTION:

- The retaining ring (1) will be deformed every time it is disassembled, and it is recommended to replace it after each disassembly.
- When the oil ring and air ring are installed on the piston, apply a proper amount of engine oil for lubrication to prevent scratching the outer wall of the piston.
- When the piston assembly is installed to the cylinder, it is necessary to apply an appropriate amount of engine oil on the outer wall of the piston and the inside of the cylinder block for lubrication to prevent scratches on the inner wall of the cylinder and cause serious damage to the engine.

4-Right crankcase cover assembly



PIG1 Right crankcase cover assembly		Remove the right crankcase cover assembly	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1251112-003093	GB16674 M6×45 Hex flange flange bolt	12	12±1.5N.m
2	1050757-004000	ZT163ML clutch cable bracket	1	
3	1051656-004000	ZT158MJ right crankcase cover gasket	1	
4	1251401-001000	φ8×14 hollow locating pin	2	

PROCEDURE:

● Remove the right crankcase cover assembly

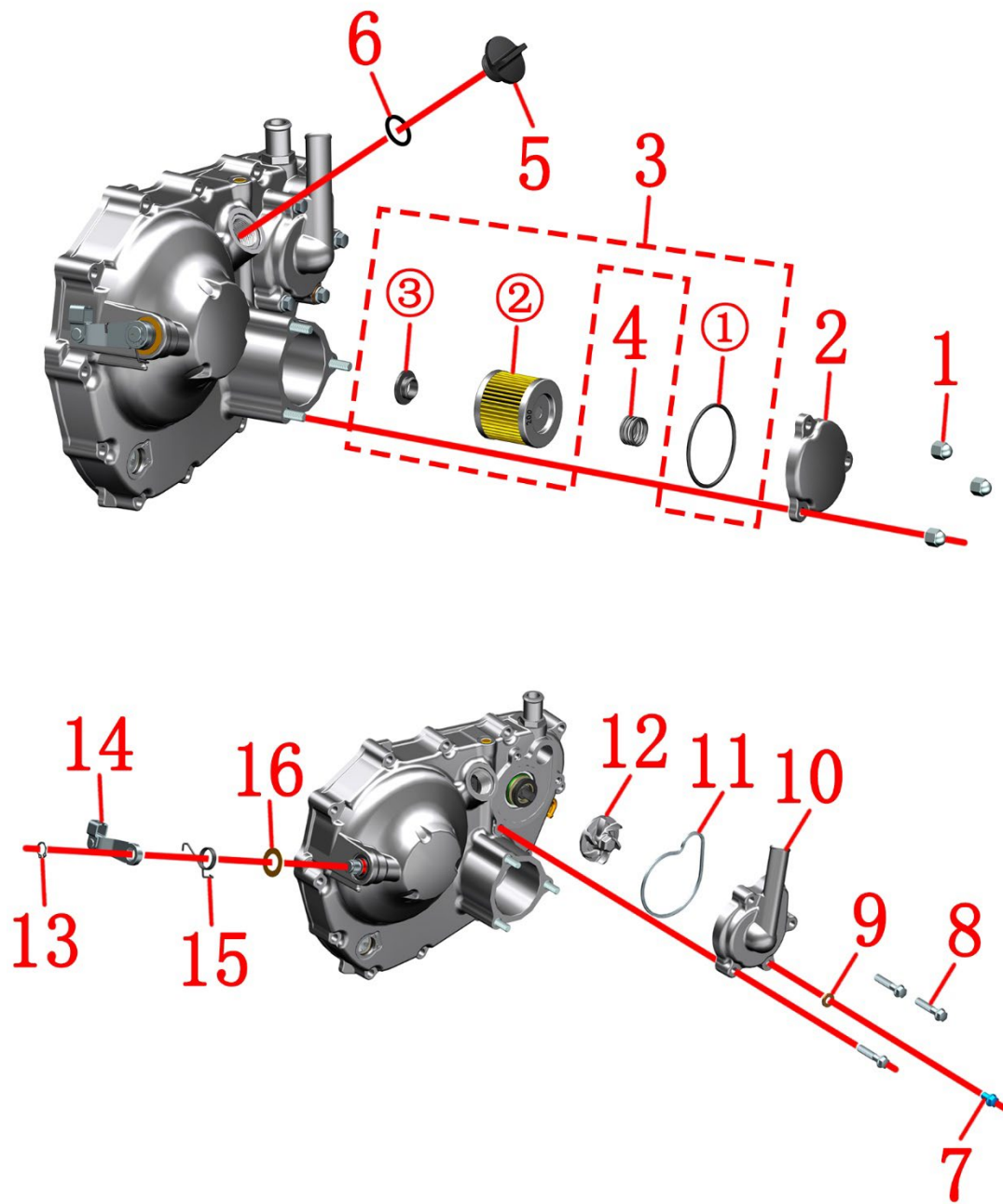
Use an 8# sleeve to remove the 12 bolts (1) on the right cover assembly, and remove the bracket (2).

Grasp the two sides of the right cover assembly with both hands and shake slightly, then remove the right cover assembly, and take out the gasket (3) and 2 positioning pins (4).

CAUTION:

● Gasket (3) is for one-time use and needs to be replaced every time it is disassembled.

4-Right crankcase cover assembly



PIG2 Right crankcase cover assembly		Decompose the right crankcase cover assembly-1	CHK	
			ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION
1	1251300-096000	Non-standard cover type 9 degree nut M6×13	3	10±1.5N.m
2	4050456-008051	ZT158MJ oil filter cover (dark gray)	1	
	4050456-006000	ZT158MJ oil filter cover (titanium)		
3	4131200-003000	ZT163ML fine filter sealing assembly	1	【1】
4	1050868-002000	Φ18.5×13×1.6 fine filter spring	1	
5	1251300-054000	M20×1.5 fuel filler cap	1	
6	1051456-003000	Φ19×φ2.65 nitrile rubber O-ring	1	
7	1251100-067093	M6×10 top pin bolt (color Zinc)	1	12±1.5N.m
8	1251112-002093	GB16674 M6×30 Hexagon flange bolts	3	12±1.5N.m
9	1251513-001019	6.3×12×1.6 copper gasket	1	
10	4050457-031051	ZT163ML water pump cover (dark gray)	1	
	4050457-030051	ZT163ML water pump cover (titanium)		
11	1051454-006000	ZT180MN Water pump sealing ring	1	
12	1051968-010000	ZT1P58MJ water pump blade	1	20±1.5N.m
13	1051154-003000	GB894.1 shaft retaining ring Ø 10	1	
14	1050756-013000	ZT158MJ clutch rod rocker arm assembly	1	
15	1050756-012000	ZT158MJ clutch handle torsion spring	1	
16	1251512-043000	φ14.2×φ24×0.5	1	

PROCEDURE:

●Decompose the right crankcase cover assembly

Use a 10# sleeve to remove 3 nuts (1), and take out the fine filter cover (2), O-ring (6), spring (4), fine filter (3), and sealing ring (3) in sequence.

Unscrew the oil filler cap (5) and take out the O-ring (6).

Use an 8# sleeve to remove 1 bolt (7) and 3 bolts (8), and take out 1 copper gasket (9), water pump cover (10), sealing ring (11) and water pump blade (12).

Use snap ring pliers to remove retaining ring (13), and take out rocker arm (14), torsion spring (15) and spacer (16) in sequence.

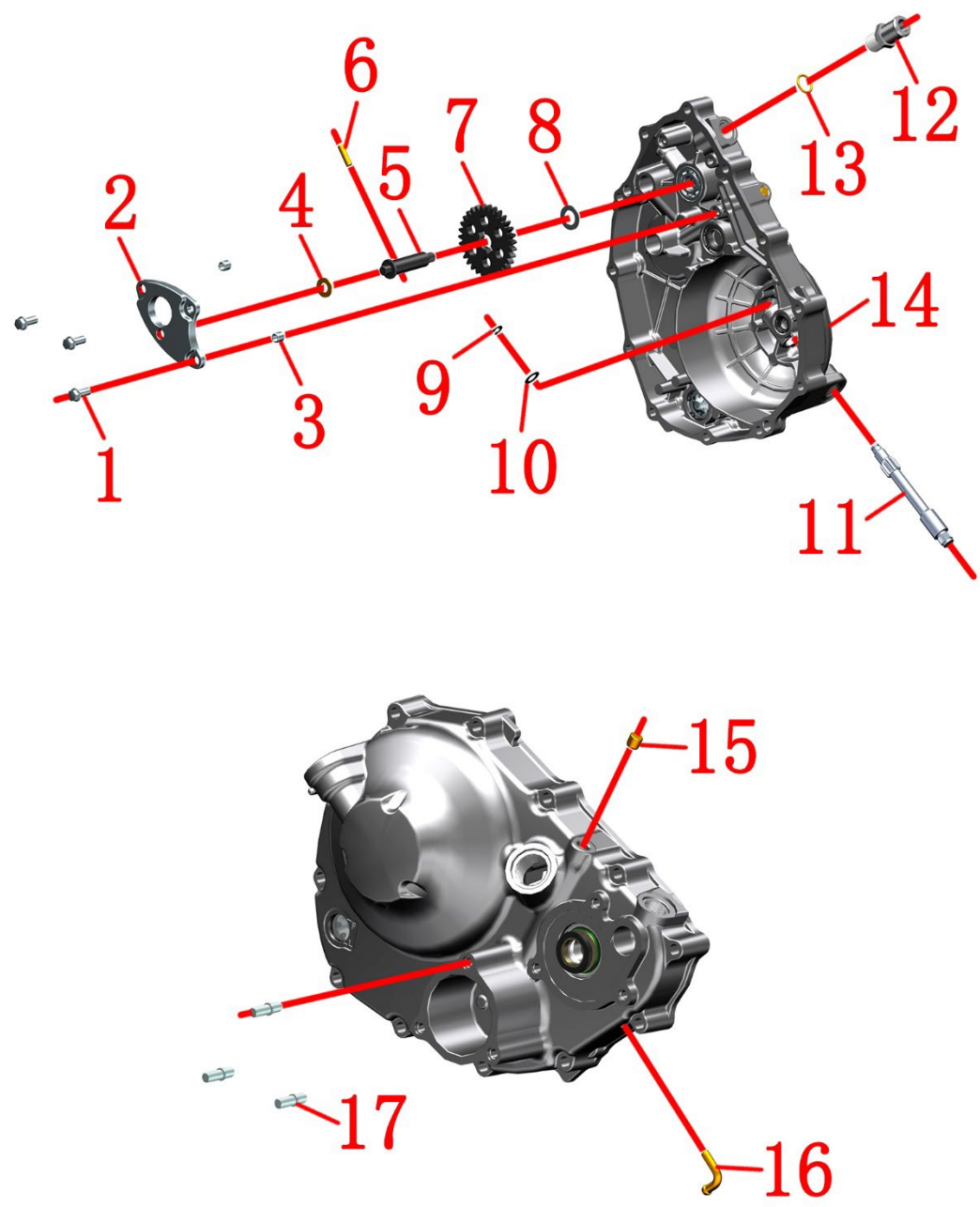
CAUTION:

●O-ring (6), copper gasket (9) and sealing ring (11) need to be replaced after disassembly. When installing the O-ring, care should be taken not to cut the edge, and the edge must be replaced if there is a cut edge.

●The retaining ring (13) will be deformed every time it is disassembled, and it is recommended to replace it after each disassembly.

●【1】. The sealing assembly includes an O-ring (6), a fine filter (2) and a sealing ring (3).

4-Right crankcase cover assembly



PIG3 Right crankcase cover assembly		Decompose the right crankcase cover assembly-2	CHK	
			ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION
1	1251112-001093	GB16674 M6×16 Hexagon flange bolts	3	
2	1051957-003000	ZT163ML water pump shaft pressure plate	1	
3	1051357-004000	φ8×8 hollow locating pin	2	
4	1251512-044000	φ8.2×φ16×1 Thrust washer	1	
5	1051957-001000	ZT163ML water pump shaft	1	
6	1250404-006000	GB119.2φ5×16 cylindrical pin	1	
7	1050357-004000	ZT163ML water pump gear	1	
8	1251512-007000	Thrust washer,12.2×20×1	1	
9	1250511-002000	GB896 opening retaining ring φ6×1	1	
10	1251512-003000	8.2×14×0.5 thrust washer	1	
11	1050756-014000	ZT158MJ clutch rod shaft	1	
12	1051957-005000	ZT163ML inlet and outlet water pipe joints	1	20±1.5N.m
13	1051457-003000	13×1.8 EPDM O-ring	1	
14	4050457-021051	Right crankcase cover press-fit assembly (dark gray)	1	
	4050457-029051	Right crankcase cover press assembly (titanium)		
15	1050853-020000	Φ8×7.5 oil plug	1	
16	1051970-009000	ZT1P72MN Right Crankcase Cover Leakage Pipe-A	1	
17	1251111-013000	Non-standard M6×25.5 double-head 9.8 studs bolt	3	

PROCEDURE:

●Decompose the right crankcase cover assembly

Use an 8# sleeve to remove 3 bolts (1), take out the pressure plate (2), positioning pin (3), washer (4), water pump shaft (5), gear (7) and washer (8) in sequence, pull out the straight pin(6) from the water pump shaft (5).

Use a 17# plum wrench to remove the water pipe joint (12), and take out the O-ring (13).

Use needle-nose pliers to pick out the retaining ring (9), take out the washer (10), and then pull out the clutch rod shaft (11) from the right cover pressing assembly (14).

Use the removal stud socket to remove the stud (17).

The oil plug (15) and the leaking pipe (16) are generally not damaged. If they need to be replaced, please go to a professional organization or a qualified maintenance organization for replacement.

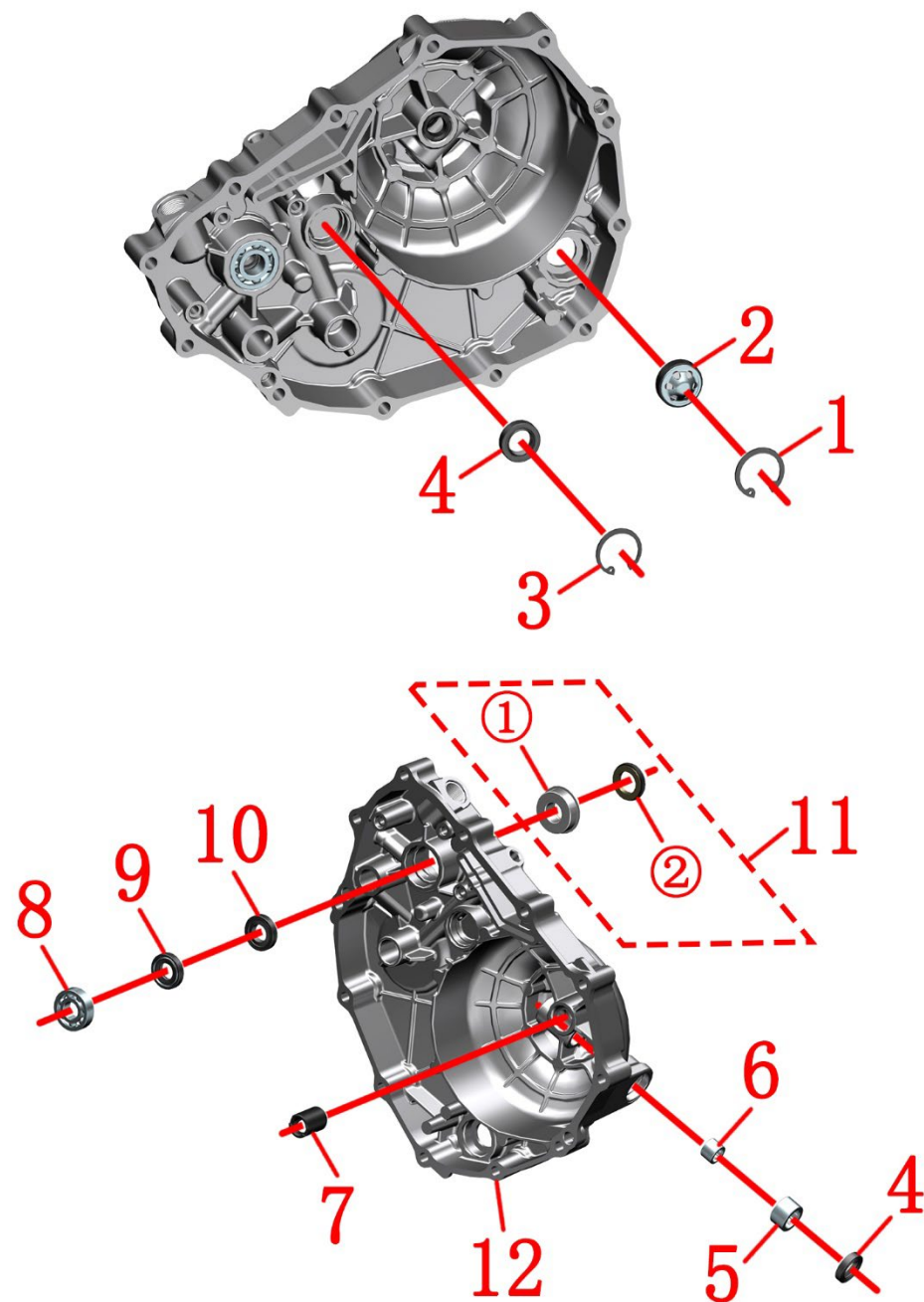
CAUTION:


●When installing bolts (1) and double-ended studs (17), apply a proper amount of thread fastening glue to the threads.

●The O-ring (13) needs to be replaced after it is disassembled. When installing the O-ring, be careful not to trim the edge. If there is a trimmed edge, it must be replaced .

●The retaining ring (9) will be deformed every time it is disassembled, and it is recommended to replace it after each disassembly.

4-Right crankcase cover assembly



PIG4 Right crankcase cover assembly		Decompose the press-fit assembly of the right crankcase cover	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1250700-012000	GB/T 893 ϕ 26 circlip for hole	1	
2	1050857-007000	Φ 25 hydrogenated nitrile rubber engine oil window	1	
3	1051354-013000	type hole circlip ϕ 24 \times 1	1	
4	1051553-002000	FB14 \times 22 \times 5 Hydrogenated nitrile oil seal	2	
5	1250602-033000	HK1412 needle roller bearing	1	
6	1250602-022000	GB290-HK1010 needle roller bearing	1	
7	1251700-141000	ZT158MJ right crankcase side cover bushing	1	
8	1250601-128000	GB276-6001/P5C3 deep groove ball bearing	1	
9	1051554-001000	FB12 \times 24 \times 5 HNBR oil seal	1	
10	1051570-007000	FB12 \times 24 \times 5 hydrogenated nitrile rubber seal	1	
11	1051954-006000	ZT180MN Water seal subassembly	1	【1】
12	4050457-015051	Right crankcase cover (dark grey/machined)	1	
	4050457-023051	Right crankcase cover (titanium/machined)		

PROCEDURE:

●Decompose the press-fit assembly of the right crankcase cover

Oil sight window (2), oil seal (4), oil seal (9), oil seal (10) need to be replaced only if there is oil leakage or oil leakage. If replacement is necessary, please go to a professional organization or a qualified maintenance organization for replacement.

Bearings (5), bearings (6), bearings (8), and bushings (7) will not be damaged in general. If they need to be replaced, please go to a professional organization or a qualified maintenance organization for replacement.

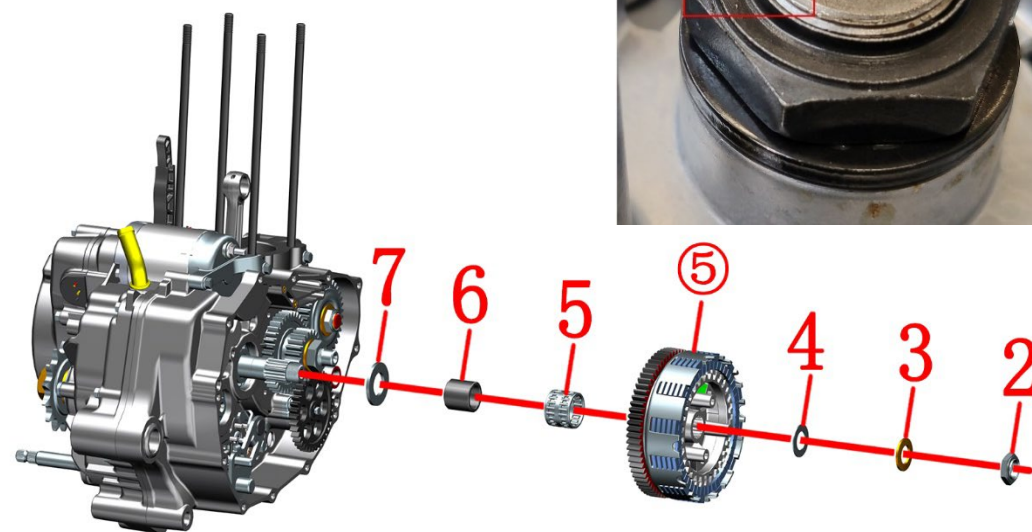
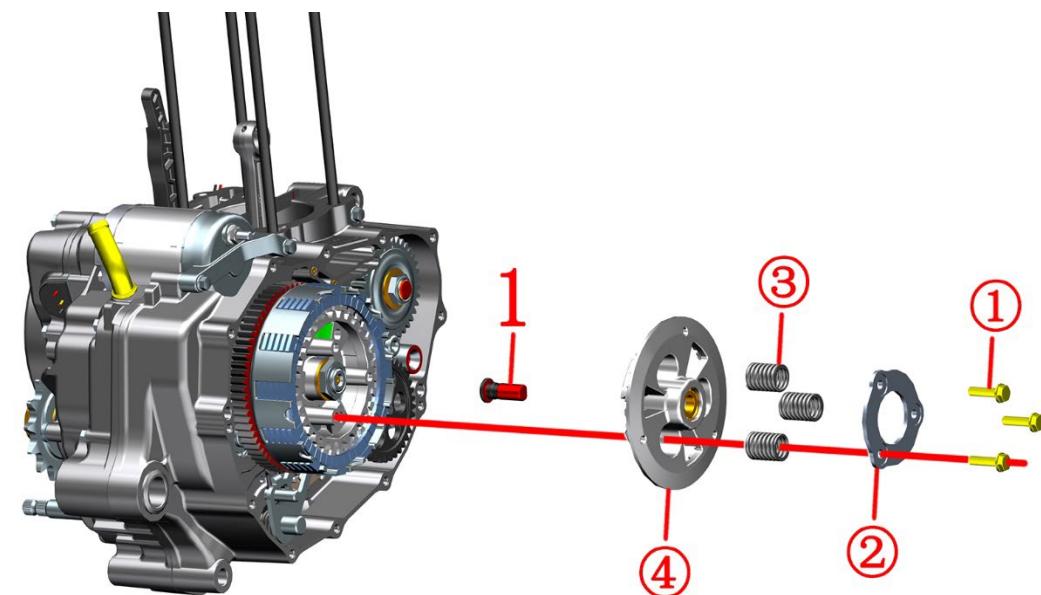
CAUTION:

●The retaining ring (1) or (3) will be deformed every time it is disassembled, and it is recommended to replace it after each disassembly.

●【1】: Water seal subassembly (11) includes water seal static ring ① and water seal dynamic ring ②. The water seal static ring ① needs to be press-fitted on the right cover.

●The oil seal must be replaced every time it is disassembled.

4-Right crankcase cover assembly



PIG5 Right crankcase cover assembly		Removal of the clutch assembly		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1050756-015000	ZT158MJ clutch toothed rod		1	
2	1251311-001094	Nut, M16×1		1	95±10N.m
3	1251514-002000	Lock washer, 16.2×28×2.4×2		1	
4	1251512-039000	Φ16.2×Φ28×1.5 thrust washer		1	
5	1251602-001000	263124 duplex needle bearing		1	
6	1251700-148000	ZT158MJ clutch bush		1	
7	1251512-038000	Φ20.2×Φ37×2 thrust washer		1	

PROCEDURE:

● Removal of the clutch assembly

Use a tool to lock the gear of the clutch assembly, and then use a 10# sleeve to remove 3 bolts ①, and take out the cover plate ②, spring ③, pressure plate ④ and toothed tie rod ① in sequence.

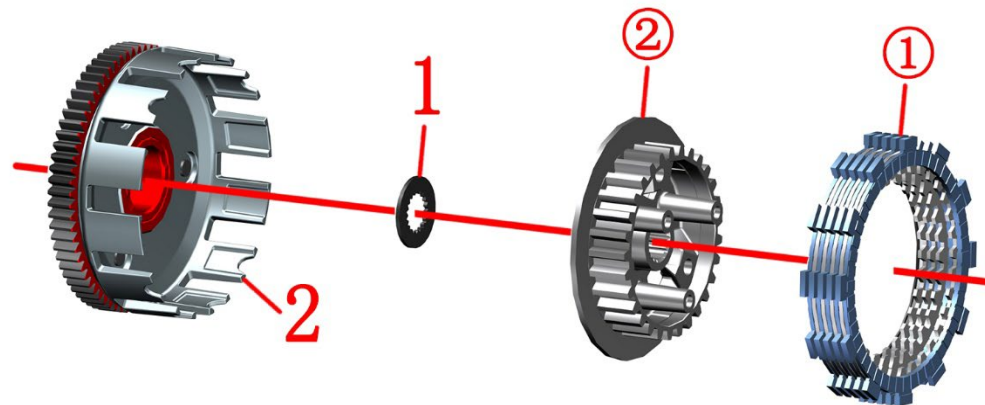
Use a 24# sleeve to remove the nut ②, take out the washer ③, washer ④, clutch assembly ⑤ in sequence, and then take out the washer ⑦, bush ⑥ and bearing ⑤ from the clutch assembly ⑤.

Note: When installing, it is also necessary to use a suitable tool to clamp the gear of the clutch assembly for installation.

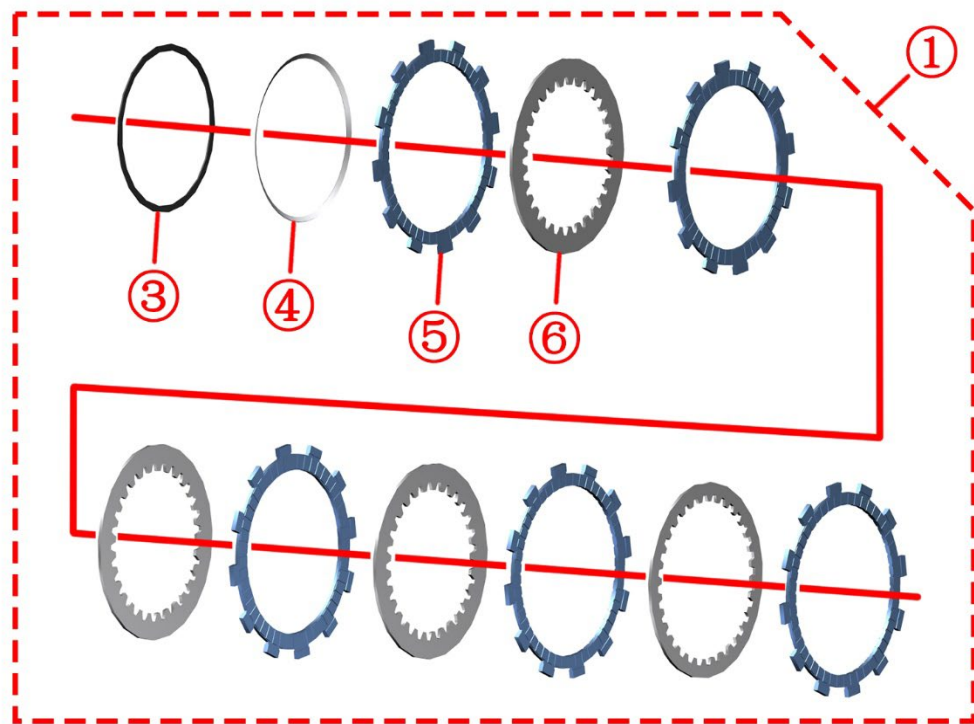
CAUTION:

- (2) After the nut is tightened to the torque, it is necessary to use a flat batch to insert the protrusion on the nut into the groove on the engine shaft for further fixing.
- The side of the gasket ③ with the letter "OUT" should be installed facing outward.
- If the normal serial number or code is not marked in the figure, it means that the part cannot be purchased separately or only shows the disassembly structure.
- The bolt ① torque standard is: $12 \pm 1.5\text{Nm}$.

4-Right crankcase cover assembly



PIG6 Right crankcase cover assembly		Clutch parts assembly		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1251500-084000	ZT158MJ clutch spline washer		1	
2	1050757-002000	ZT163ML clutch active hub sub-assembly		1	
3	1050757-003000	ZT163ML clutch driven hub sub-assembly		1	



PROCEDURE:

● Clutch parts assembly

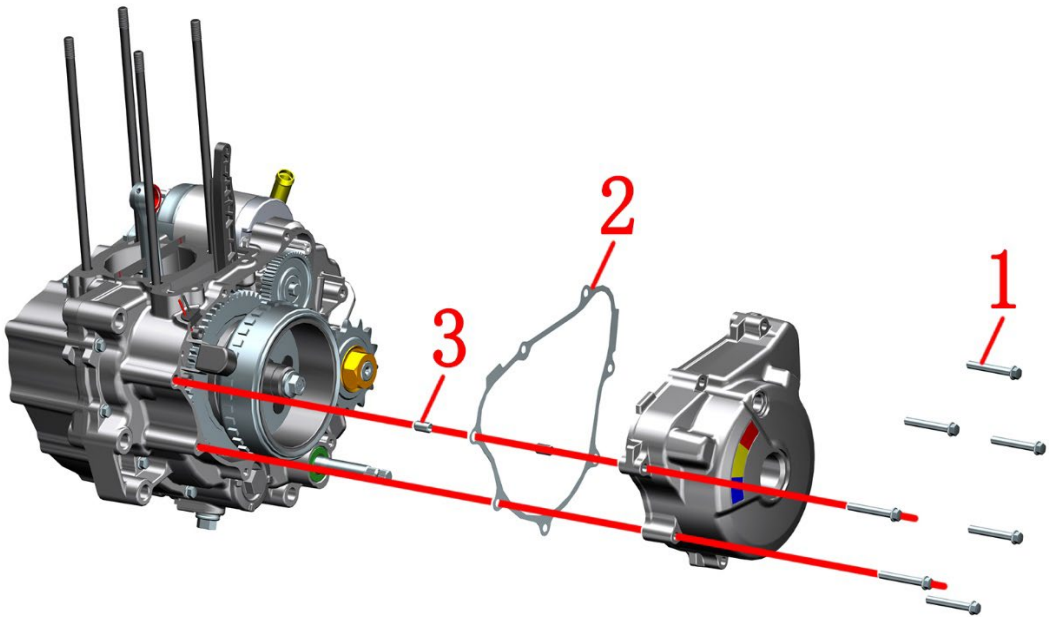
Take the friction plate assembly ①, driven disc ② and spline washer (1) out of the driving hub subassembly.


The installation method of friction plate assembly ① is washer ③-butterfly washer ④-friction plate ⑤-follower plate-friction plate ⑤-····-friction plate ⑤. Do not reverse or confuse the order when installing.

CAUTION:

● If you need to replace the friction plate assembly, please purchase the parts directly⁽³⁾: 1050757-003000 ZT163ML clutch driven hub subassembly.

5-Left crankcase cover assembly



PIG1 Left crankcase cover assembly		Removing and disassembling the left cover assembly	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1251112-003093	GB16674 M6×45 Hex flange flange bolt	7	12±1.5N.m
2	1051657-005000	ZT163ML left crankcase cover gasket	1	
3	1251401-001000	φ8×14 hollow locating pin	2	
4	1251201-001094	internal hexagonal round screw	2	12±1.5N.m
5	1251201-002094	internal hexagonal screw	3	12±1.5N.m
6	1051056-001000	ZT158MJ magnetic motor stator sub-assembly	1	
7	4050357-004051	ZT163ML left crankcase cover (dark gray)	1	
	4050357-005051	ZT163ML left crankcase cover (titanium)		

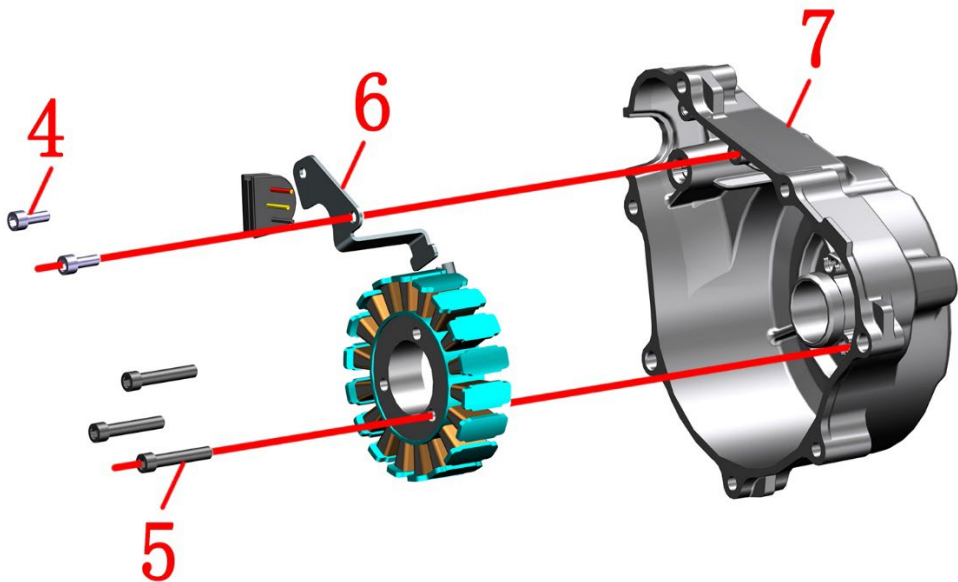
PROCEDURE:

● Removing and disassembling the left cover assembly

Use an 8# socket to remove 7 bolts (1), take out the left cover assembly, and then take out the gasket (2) and positioning pin (3) on the engine case.

Use a 5# inner hexagon to remove 2 bolts (4) and 3 bolts (5) on the left cover (7), and take out the magneto stator (6).

Note: The magneto stator is subject to the actual object. In the figure, the magneto stator has no wire harness, but the real object has a wire harness.



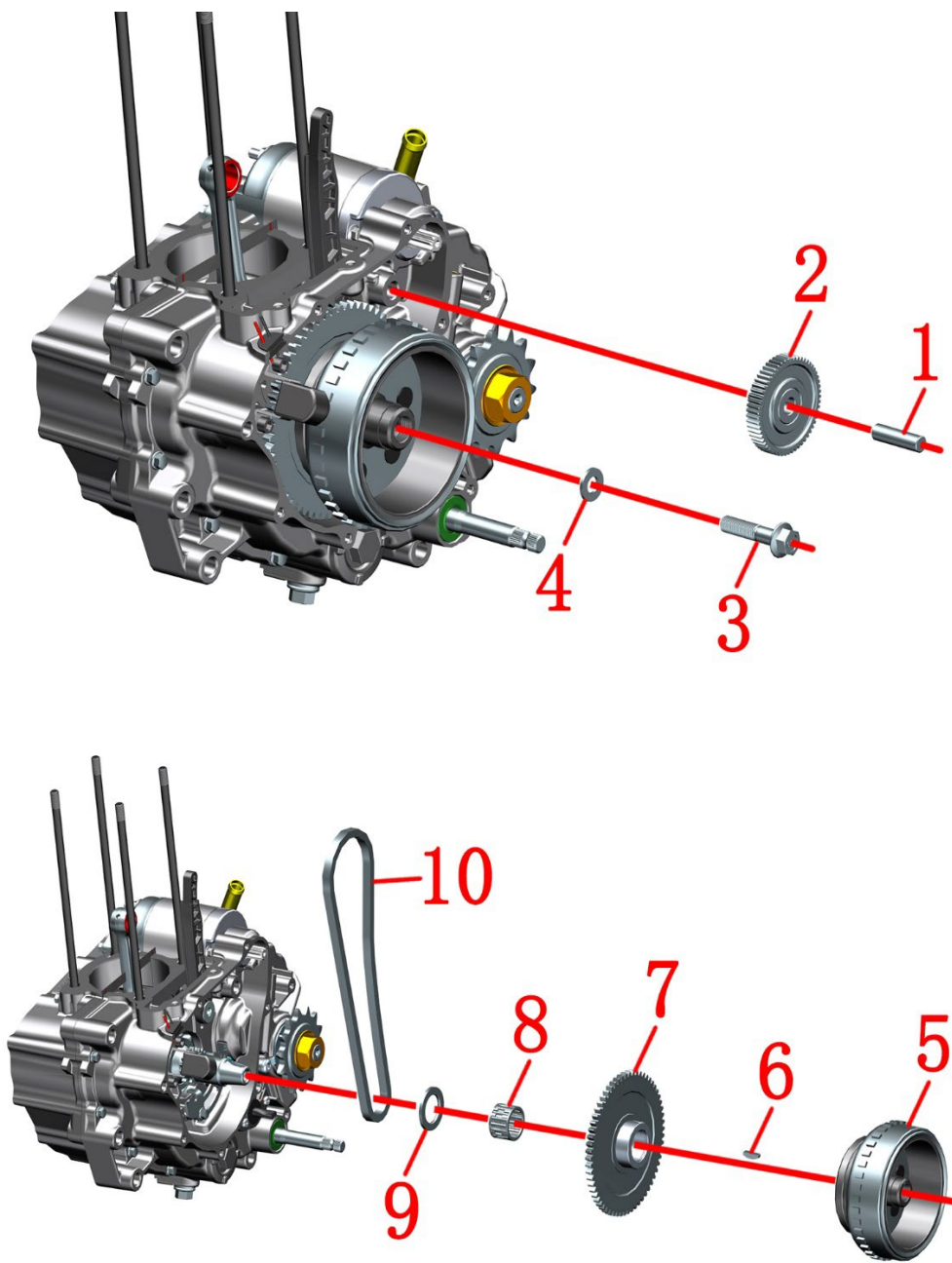
CAUTION:


● Gasket (2) is for one-time use and needs to be replaced every time it is disassembled.

● When installing bolt (4) and bolt (5), it is necessary to apply an appropriate amount of thread fastening glue on the thread.

● The waterproof rubber sleeve on the output line of the magneto stator needs to be assembled after applying sealant on the installation joint surface.

5-Left crankcase cover assembly



PIG2 Left crankcase cover assembly		Magneto Assembly Removal		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1051057-004000	ZT163ML electric starter reduction gear shaft		1	
2	1051057-006000	ZT163ML electric starter reduction gear		1	
3	1251100-341094	M10×1.25×45 hex flange bolt		1	60±5N.m
4	1251500-041000	10.3×20×2 gasket		1	
5	1051057-003000	ZT163ML magneto rotor clutch parts		1	
6	1251802-003000	4×4.6×25×14 woodruff key		1	
7	1051057-001000	ZT163ML electric starter gear		1	
8	1250602-052000	KT25×31×20 needle roller bearing		1	
9	1251512-050000	φ25×φ40×2.9 thrust washer		1	
10	1050157-015000	6.35×7×98 toothed chain		1	

PROCEDURE:

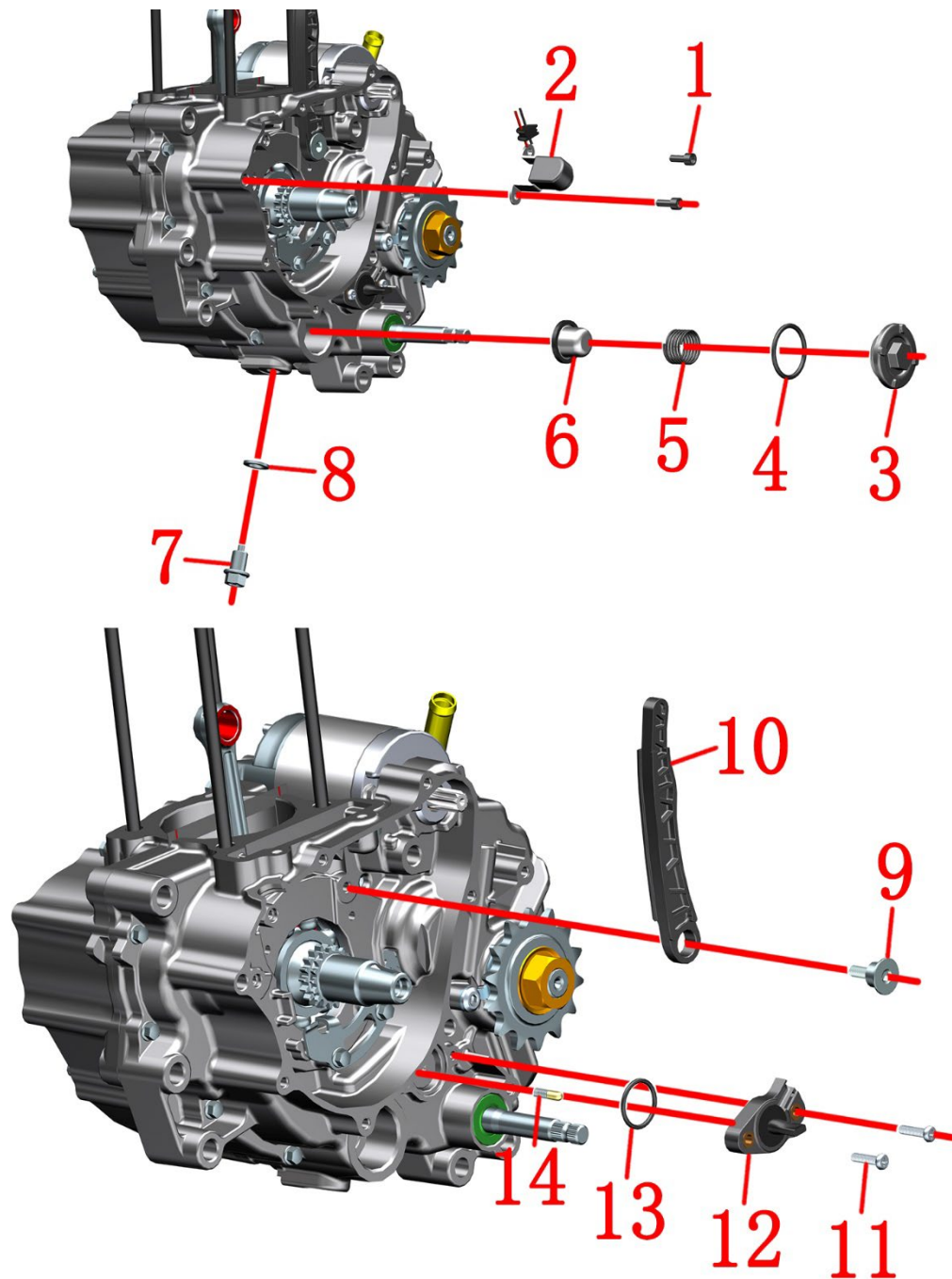
●Magneto Assembly Removal


- Take out the reduction gear shaft (1) and the reduction gear (2).
- Use a suitable tool to lock the large starter tooth, and then use a 14# sleeve to remove the bolt (3) and take out the gasket (4).
- Use a suitable puller to eject the magneto rotor (5), and then take out the half-round key (6), the electric starter tooth (7), the bearing (8), the washer (9) and the chain (10).

CAUTION:

- The reduction gear shaft (1) and the reduction gear (2) shall be installed with proper amount of engine oil.
- When installing the bearing (8) and the large starting gear (7), an appropriate amount of engine oil should be applied.
- The half-round key (6) needs to be inlaid on the crankshaft during installation, and the magneto rotor (5) needs to be installed with the groove aligned with the half-round key (6).

6-Crankcase parts



PIG1 Crankcase parts		Removal of crankcase parts-1	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1251201-001094	internal hexagonal round screw	2	12±1.5N.m
2	1050956-001000	ZT158MJ crankshaft position sensor	1	
3	4050968-003000	ZT1P58MJ Coarse filter cover (ceramic)	1	32±3N.m
4	1051468-003000	34.5×3.5 acrylate adhesive O-ring	1	
5	1050868-003000	Φ25.8×34.2×1.8 strainer spring	1	
6	1050868-004000	Outer diameter φ22×21 hat-shaped strainer	1	
7	1251100-066093	M12×1.5×15 ablassschraube	1	30±3N.m
8	1244100-033000	Combined sealing gasket 12×φ20×2	1	
9	1251100-165000	M6×16-13.8×8.7 pivot bolt	1	12±1.5N.m
10	1051257-002000	ZT163ML tensioner	1	
11	1250106-112000	GB9074.13 bolt M5×20	2	5±1N.m
12	1050656-010000	ZT158MJ gear display module	1	
13	1051454-011000	22.5×2.5 fluoro rubber o-ring	1	

PROCEDURE:

● Removal of crankcase parts-1

Use a 5 # inner hexagon to remove 2 bolts (1), and remove the sensor (2) (the actual sensor shall prevail).

Use a 24 # sleeve to remove the strainer cover (3), and take out the O-ring (4), spring (5), and strainer (6) in sequence.

Use a 14# sleeve to remove the oil drain bolt (7), and take out the gasket (8).

Use the 5# inner hexagon to remove the bolt (9) and take out the tensioner (10).

Use a Phillips screwdriver to remove 2 bolts (11), and take out the shift display assembly (12), O-ring (13) and shift display contact assembly (14).

CAUTION:

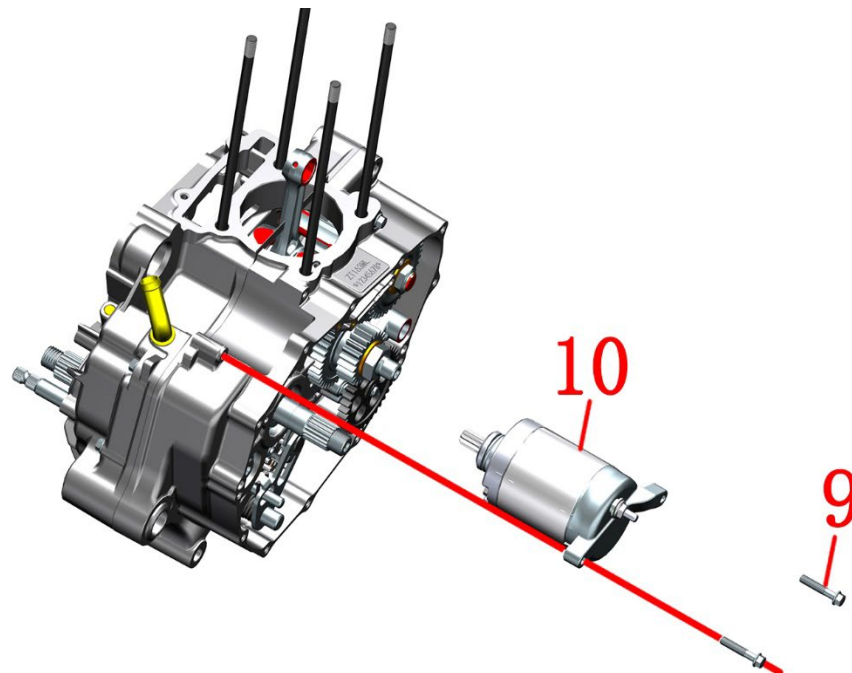
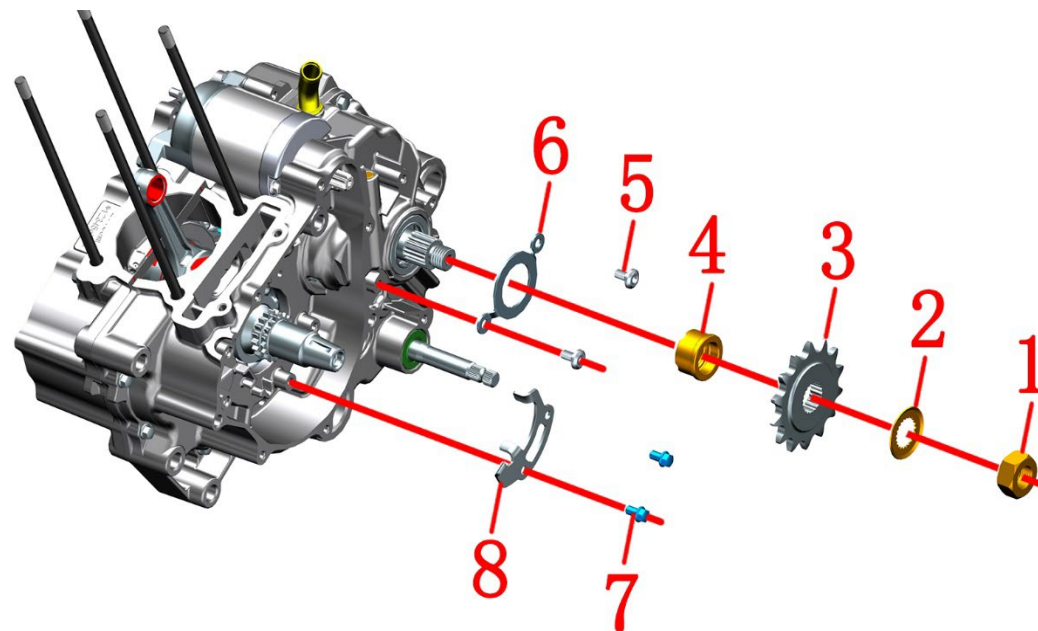
● O-rings (4) and (13) are for one-time use and must be replaced after disassembly; care should be taken not to cut edges during installation, and must be replaced if there is a cut edge.

● Gasket (8) is for one-time use and must be replaced after disassembly.

● When bolt (9) is installed, an appropriate amount of thread fastening glue should be applied to the thread.

● When installing the gear display assembly (12), spray an appropriate amount of engine oil on the gear display contact assembly (14).

6-Crankcase parts



PIG2 Crankcase parts		Removal of crankcase parts-2	CHK ADJ	CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1251300-033094	GN sprocket nut M16×1.5-6h (color Zinc)	1	95±10N.m
2	1251500-107000	ZT163ML sprocket lock washer	1	
3	1050357-005000	ZT163ML secondary shaft output sprocket	1	
4	1050257-011000	ZT163ML output sprocket bushing subassembly	1	
5	1251100-119093	Non-standard bolt M6×12	2	
6	1051357-006000	ZT163ML auxiliary shaft oil seal cover	1	
7	1251100-067093	M6×10 top pin bolt (color Zinc)	2	12±1.5N.m
8	1051256-003000	ZT158MJ tensioning guide pressure plate	1	
9	1251112-002093	GB16674 M6×30 Hexagon flange bolts	2	12±1.5N.m
10	1051057-005000	ZT163ML starter motor parts	1	

PROCEDURE:

● Removal of crankcase parts-2

Use a rubber hammer and a suitable tool to pry off the gasket (2), and then use a 27# sleeve to remove the bolt (1), and then take out the gasket (2), the sprocket (3), and the bushing (4); use a 5# inner hexagon to remove 2 bolts (5), Take out the oil seal cover (6).

Note: When installing, use a rubber hammer and corresponding tools to tap one side of the gasket (2) to fit the bolt (1).

Use an 8# sleeve to remove 2 bolts(7), and take out the pressure plate(8).

Use an 8# socket to remove 2 bolts (9), and take out the starter motor (10).

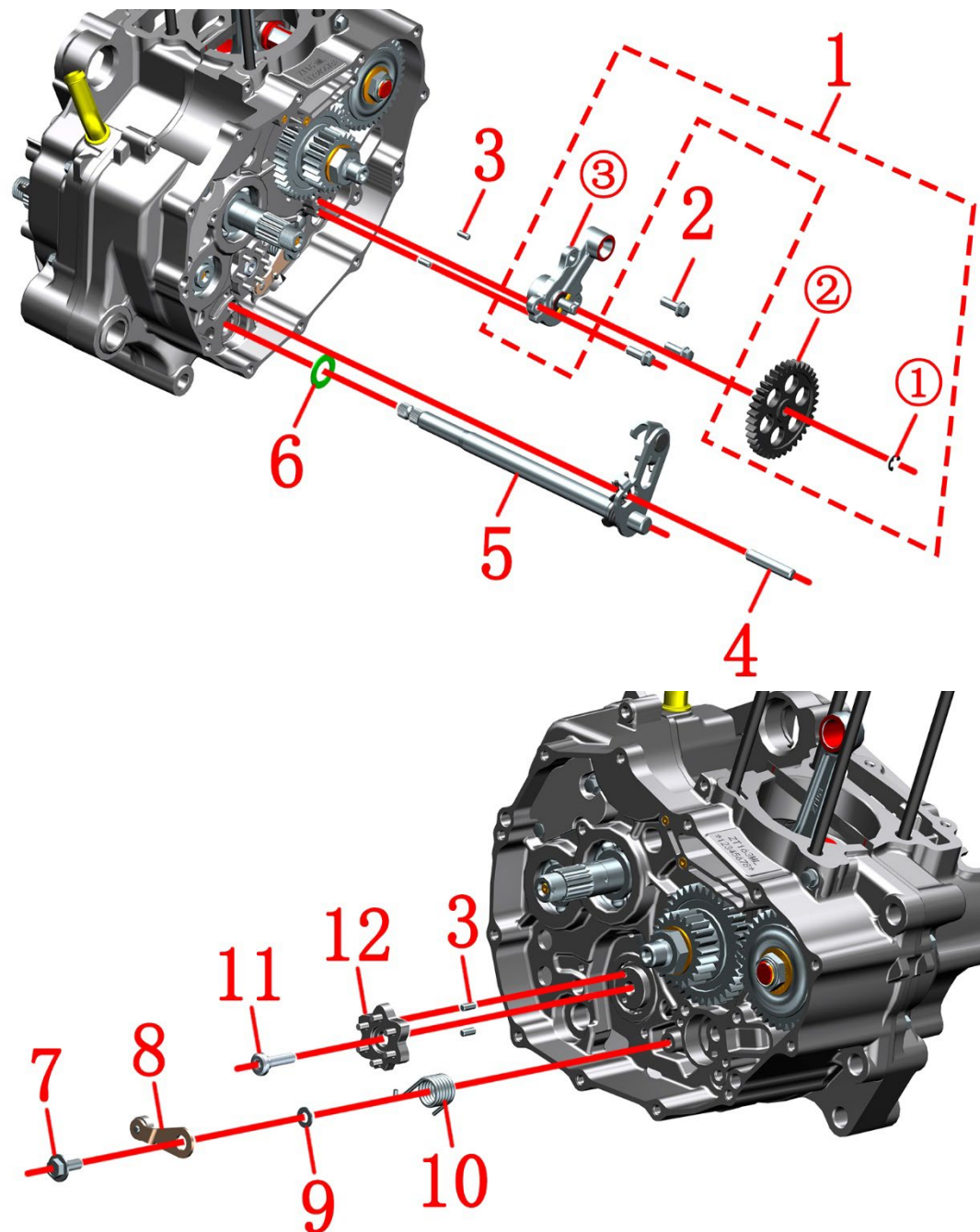
CAUTION:

● When bolts (5) and bolts (7) are installed, an appropriate amount of thread fastening glue should be applied to the threads.

● Shaft sleeve (4) Before installation, check whether the two O-rings inside are off or missing.

● Before installing the starter motor (10), apply an appropriate amount of engine oil to the meshing part between the front end of the motor and the reduction gear .

6-Crankcase parts



PIG3 Crankcase parts		Removal of crankcase parts-3	CHK ADJ	CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1050857-001000	ZT163ML oil pump assembly	1	
2	1251112-001093	GB16674 M6×16 Hexagon flange bolts	3	12±1.5N.m
3	1250404-004000	GB119.2φ4×10 cylindrical pin	4	
4	1050656-005000	ZT158MJ shifting return spring column	1	
5	1050657-001000	ZT163ML shift shaft sub-assembly	1	
6	1251512-009000	15.2×25×1.0 thrust washer	1	
7	1251100-068093	axle bolts	1	12±1.5N.m
8	1050656-014000	ZT158MJ arrester (NMB R-1450ZZ bearing)	1	
9	1251500-091000	Φ6.3×φ12×1 thrust washer	1	
10	1260100-246000	ZT158MJ limit stop wheel return spring	1	
11	1251100-321093	Big head hexagon socket head cap bolt M6×25	1	12±1.5N.m
12	1050657-002000	ZT163ML shift star cam sub-component	1	

PROCEDURE:

● Removal of crankcase parts-3

Use a pick to pick out the retaining ring ① on the oil pump assembly (1), and take out the gear ② on the oil pump assembly (1); use an 8# sleeve to remove the 3 bolts (2) on the oil pump assembly (1), and take out the remaining engine Oil pump assembly ③, and take out 2 cylindrical pins (3).

Take out the spring column (1), slowly pull out the shift shaft (5), and remove the washer (6).

Use a suitable tool to adjust the stopper (8) to a suitable angle, and then use a 10# sleeve to remove the bolt (7), and then take out the stopper (8), washer (9) and torsion spring (10) in sequence.

Use 5# inner hexagon to remove bolt (11), and take out shift star wheel (12) and 2 straight pins (3).

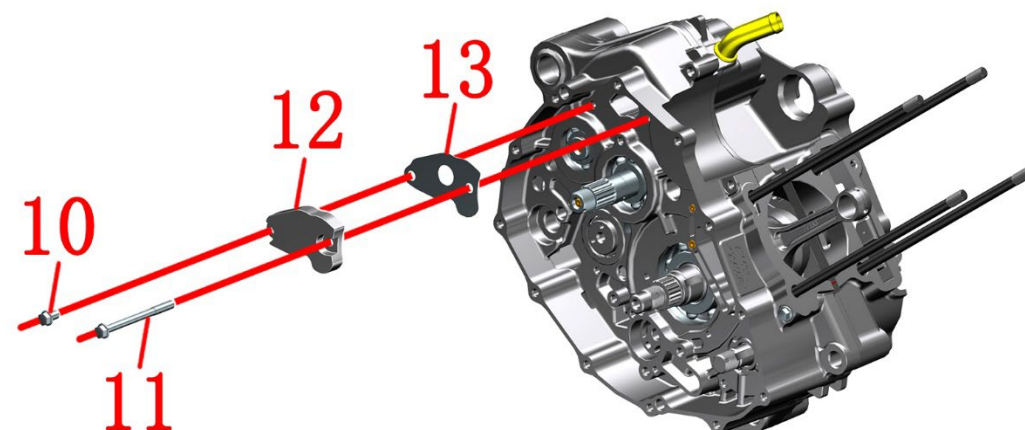
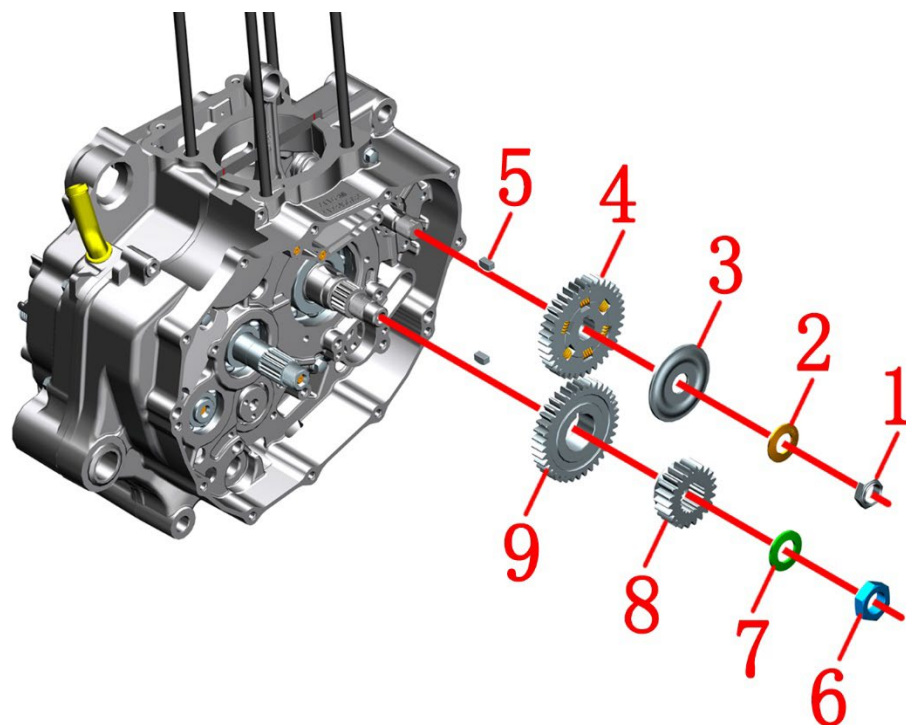
CAUTION:

● Oil pump assembly (1) and gear shift star wheel (12) need to be sprayed with proper amount of oil on the parts during installation.

● When bolts (2) and bolts (7) are installed, an appropriate amount of thread fastening glue should be applied to the threads.

● When installing the shift shaft (5), care should be taken not to damage the corresponding oil seal on the left box and cause oil leakage.

6-Crankcase parts



PIG4 Crankcase parts		Removal of crankcase parts-4	CHK ADJ	CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1251311-004094	M14×1 hexagonal thin lock nut (oxidized black)	1	70±10N.m
2	1251514-001000	14.2×27×2.1×1.5 anti-loose washer	1	
3	1050556-001000	ZT158MJ balance shaft tooth cover	1	
4	1050557-003000	ZT163ML balance shaft tooth assembly	1	
5	1251802-004000	5×5.5×26×9 woodruff key	2	
6	1251311-001094	Nut, M16×1	1	95±10N.m
7	1251514-002000	Lock washer, 16.2×28×2.4×2	1	
8	1050357-001000	ZT163ML primary drive gear	1	
9	1050357-002000	ZT163ML balance shaft drive gear	1	
10	1251100-067093	M6×10 top pin bolt (color Zinc)	1	12±1.5N.m
11	1251112-005093	GB16674 M6×75 Hexagon flange bolts	1	12±1.5N.m
12	1051957-007000	ZT163ML right box intake mouth plate	1	
13	1051657-004000	ZT163ML right box air inlet paper pad	1	

PROCEDURE:

● Removal of crankcase parts

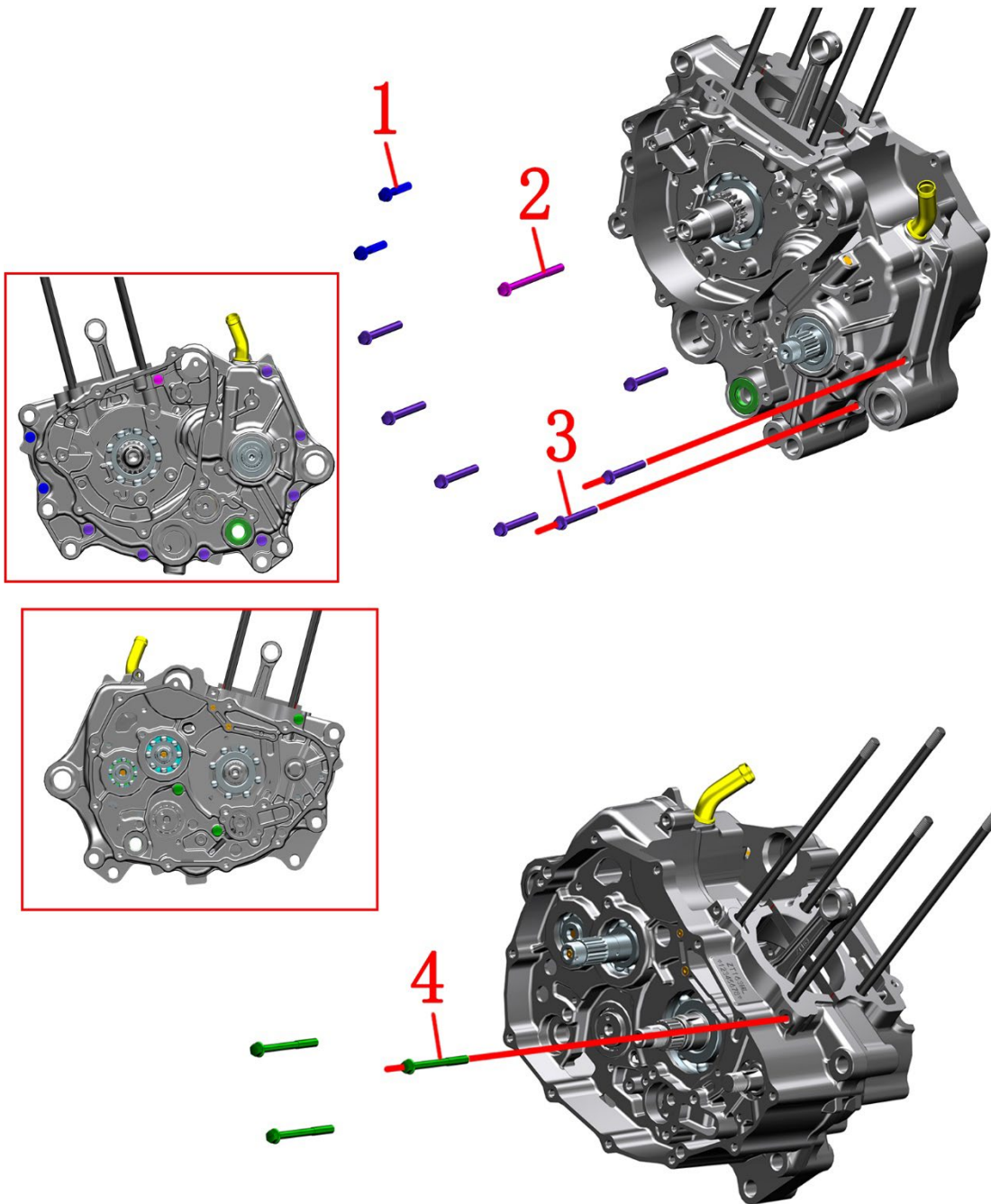
Use a suitable tool to hold the balance shaft drive tooth (4), and then use 19# sleeve and 24# sleeve to remove the bolt (1) and bolt (6) respectively, and take out the washer (2), cover plate (3), balance shaft tooth (4), half-round key (5), washer (7), primary drive gear (8), balance shaft drive gear (9), semicircular key (5).

Use an 8# sleeve to remove 1 bolt (10) and 1 bolt (11), and take out the air inlet plate (12) and the air inlet paper pad (13).

CAUTION:

- After the bolt (1) is tightened, it is necessary to use a flat batch to knock the protrusion of the bolt into the corresponding groove of the balance shaft.
- When installing gaskets (2) and (7), the side with "OUT" must face outward.
- When installing the bolt (10), apply an appropriate amount of thread fastening glue to the thread.

7-Crankcase removal



PIG1 Crankcase removal		Crankcase removal-1		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1251112-002093	GB16674 M6×30 Hexagon flange bolts		2	12±1.5N.m
2	1251112-005093	GB16674 M6×75 Hexagon flange bolts		1	12±1.5N.m
3	1251112-003093	GB16674 M6×45 Hex flange flange bolt		7	12±1.5N.m
4	1251112-004093	GB16674 M6×60 Hexagon flange bolts		3	12±1.5N.m

PROCEDURE:

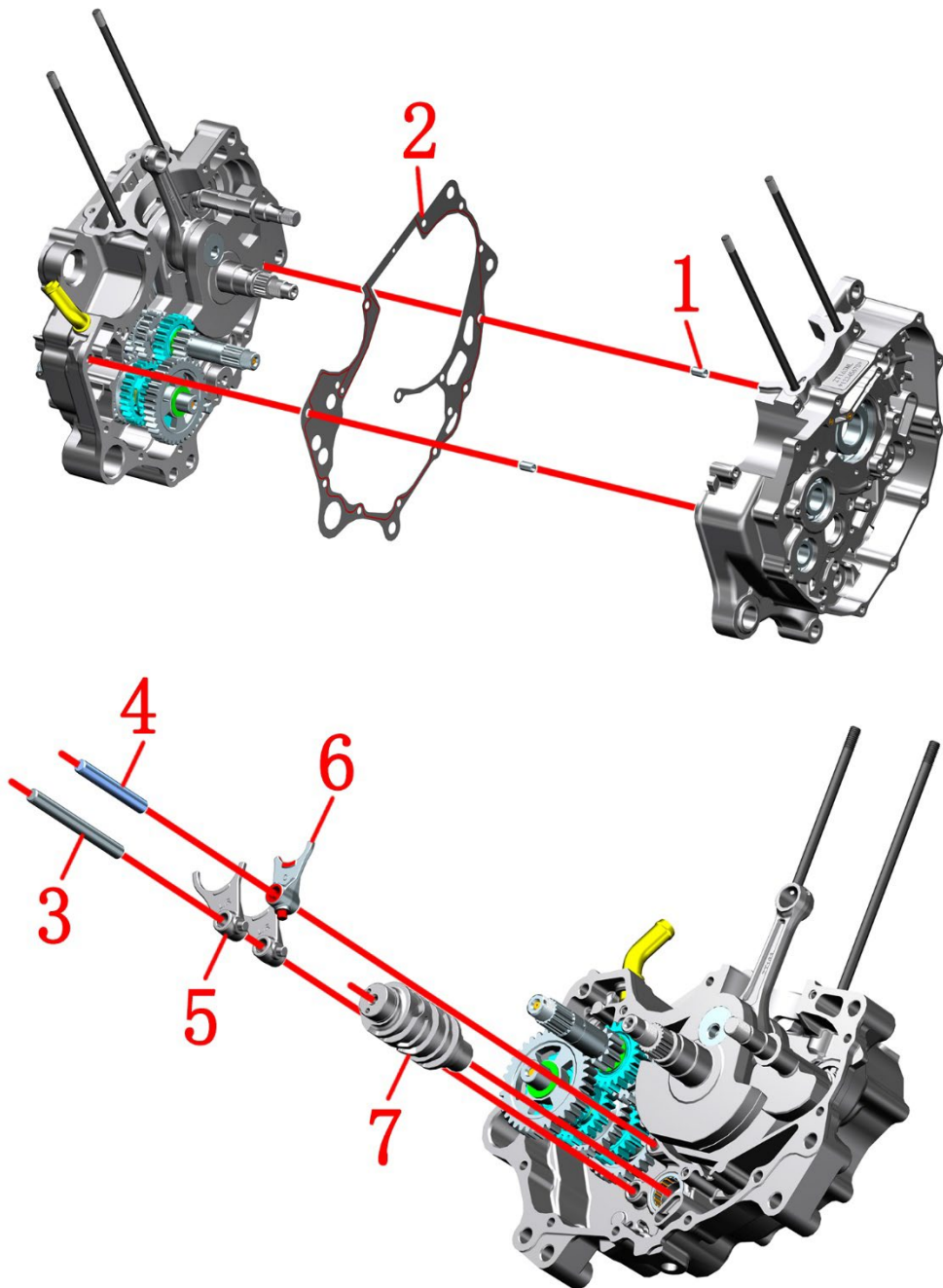
●Crankcase removal-1


Use an 8# sleeve to remove 2 bolts (1), 1 bolt (2), and 7 bolts (3) on the left engine box, then turn the engine over, so that the left engine box can be removed with the lower right box on top. 3 bolts (4) on the box body.

CAUTION:

- When the box bolts are tightened, they need to be pre-tightened diagonally before tightening the torque standard.
- When installing, it must be installed with the left box on the bottom and the right box on the top.

7-Crankcase removal



PIG2 Crankcase removal		Crankcase removal-2		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1251401-001000	φ8×14 hollow locating pin		2	
2	1051657-003000	ZT163ML crankcase gasket		1	
3	1050656-011000	ZT158MJ shift fork shaft		1	
4	1050651-006000	ZT154FMI shifting spindle fork shaft		1	
5	1050656-002000	ZT158MJ shifting auxiliary shaft fork		2	
6	1050656-001000	ZT158MJ shifting spindle fork		1	
7	1050657-003000	ZT163ML shift drum		1	

PROCEDURE:

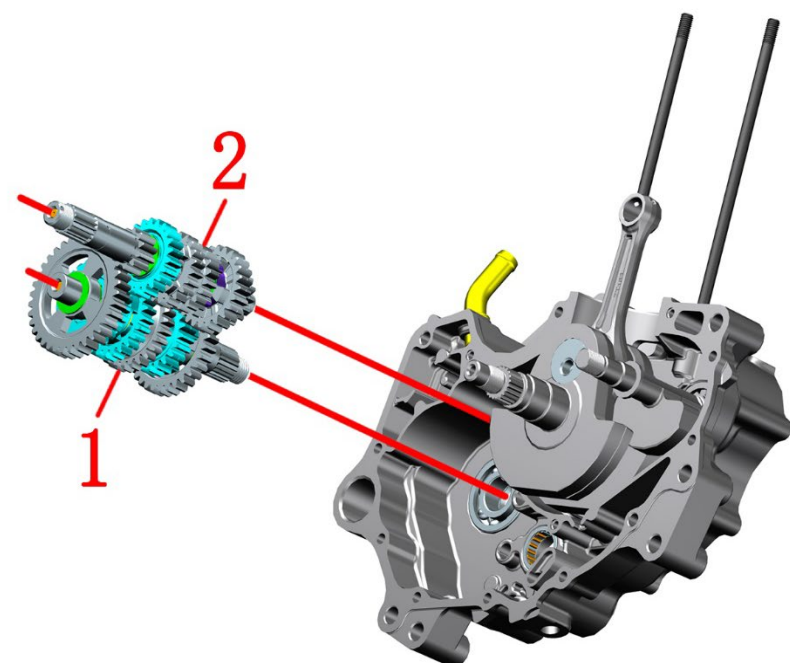
●Crankcase removal-2

With the left crankcase at the bottom and the right crankshaft at the top, take out the right crankcase assembly, and take out 2 positioning pins (1) and crankcase gasket (2).
Pull out the shift fork shaft (3) from the left crankcase, take out 2 shift forks (5), then pull out the shift fork shaft (4), take out 1 shift fork (6) and the transmission drum (7).

CAUTION:

- Gasket (2) is for one-time use and must be replaced after disassembly.
- When installing, it must be installed with the left box on the bottom and the right box on the top.
- Spray an appropriate amount of engine oil on the transmission drum(7) during installation.

7-Crankcase removal



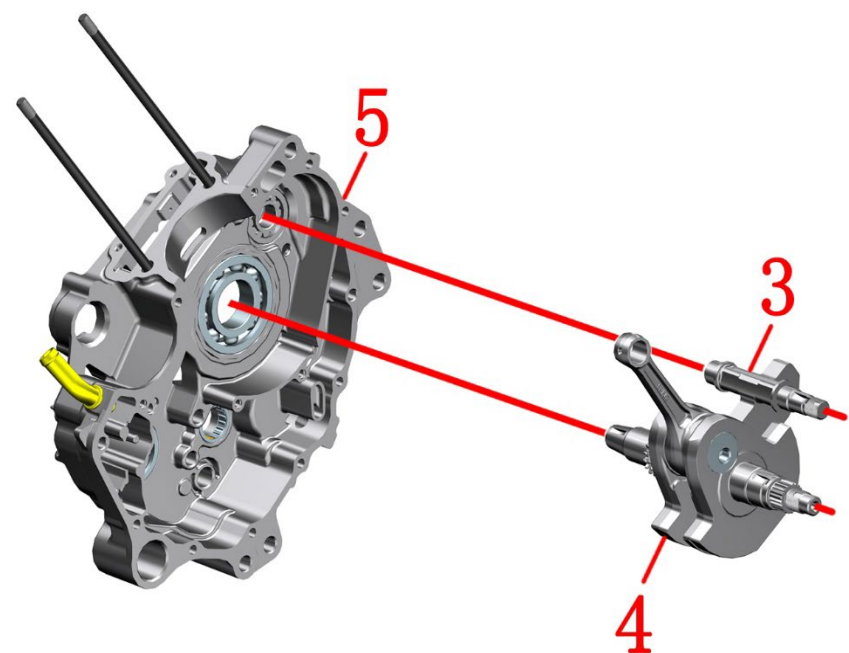
PIG3 Crankcase removal		Crankcase removal-3		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1050257-002000	Transmission countershaft sub-components		1	
2	1050257-001000	ZT163ML drive spindle sub-components		1	
3	1050557-001000	ZT163ML balance shaft		1	
4	1050457-002000	ZT163ML crankshaft connecting rod parts		1	
5	4050157-003000	ZT163ML left crankcase press-fit assembly		1	

PROCEDURE:

●Crankcase removal-3

Take out the auxiliary shaft (1) and the main shaft (2) from the left box at the same time.

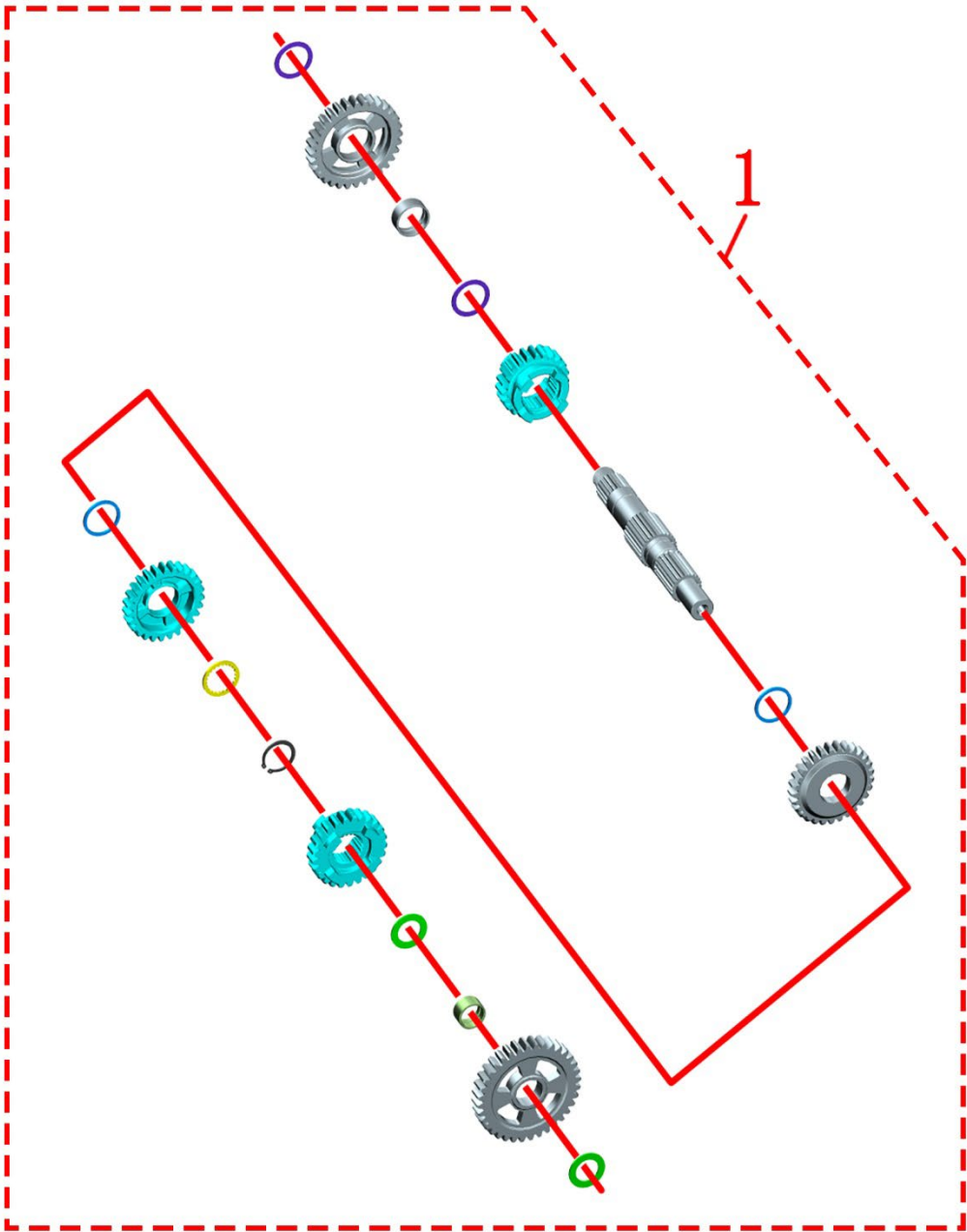
Take out the balance shaft (3) from the left crankcase (5), and finally use professional tools to take out the crankshaft (4).




CAUTION:

- When installing, the auxiliary shaft (1) and the main shaft (2) must be installed together.
- The auxiliary shaft (1) and the main shaft (2) are strictly forbidden to disassemble without permission.
- During installation, spray an appropriate amount of oil on the auxiliary shaft (1), main shaft (2), balance shaft (3) and crankshaft (4).

7-Crankcase removal



PIG4 Crankcase removal		Countershaft	CHK	
			ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION
1	1050257-002000	Transmission countershaft sub-components	1	

PROCEDURE:

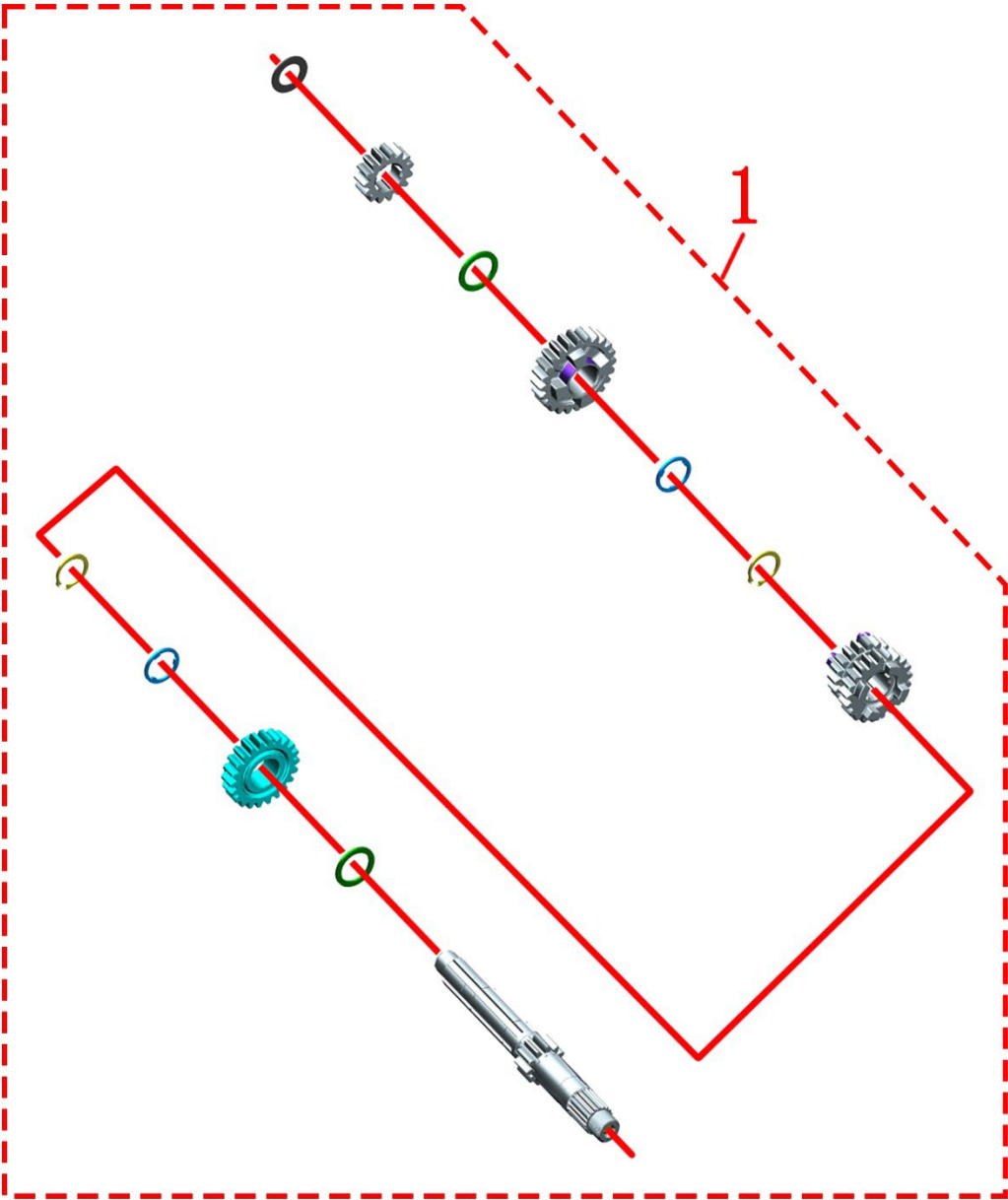
● Countershaft

The spare parts of the transmission countershaft are not sold separately and disassembly without permission is strictly prohibited. This figure only shows the approximate assembly sequence of the transmission countershaft.

CAUTION:

- When installing, the transmission main shaft and the transmission sub-shaft must be installed together.
- Spray an appropriate amount of engine oil on the transmission countershaft during installation.

7-Crankcase removal



PIG5 Crankcase removal		Drive shaft	CHK	
			ADJ	
NO.	PART NO.	PART NAME	QTY	CAUTION
1	1050257-001000	ZT163ML drive spindle sub-components	1	

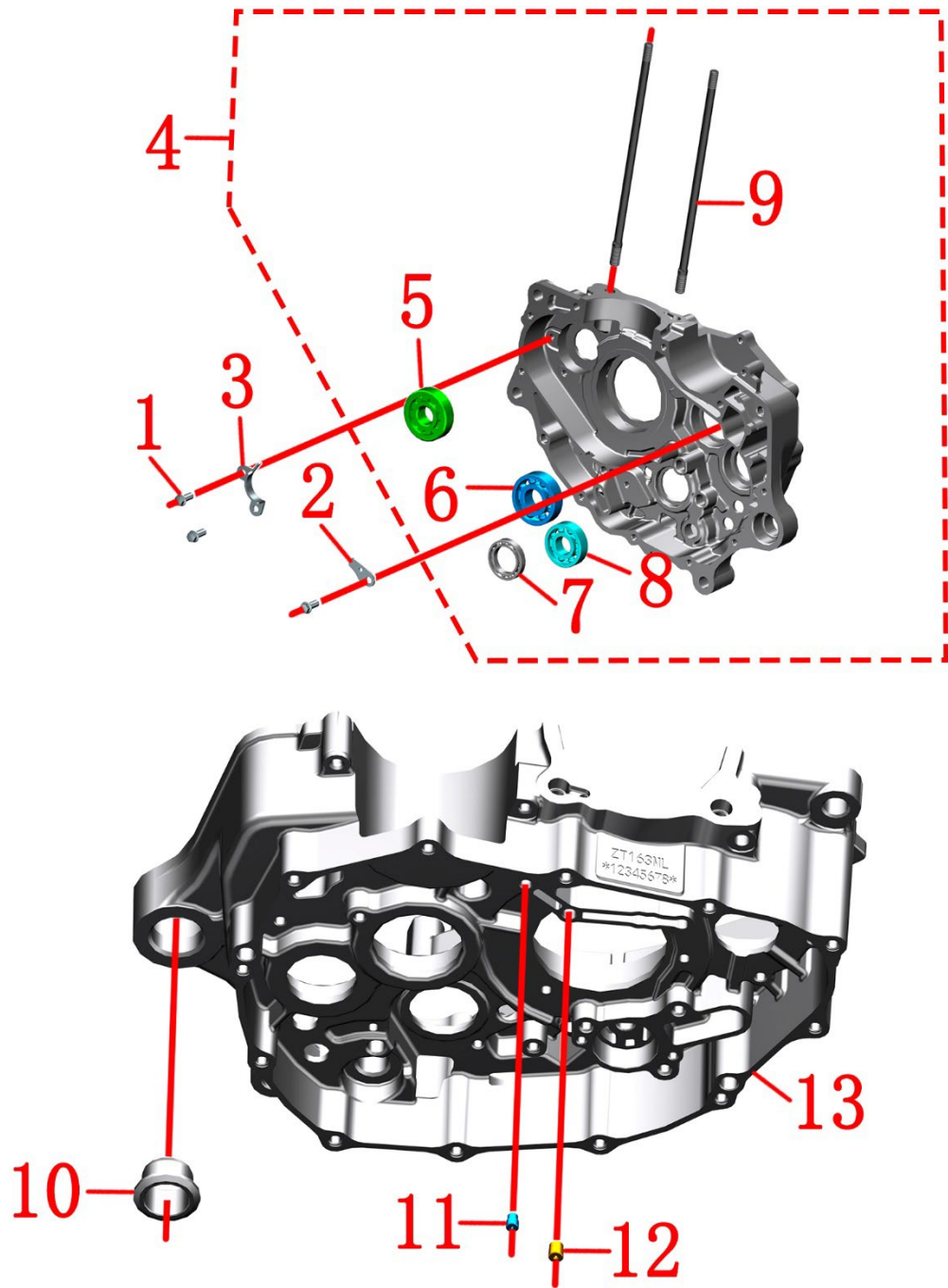
PROCEDURE:


- Drive shaft
The spare parts of the drive shaft are not sold separately and disassembly without permission is strictly prohibited. This figure only shows the approximate assembly sequence of the drive shaft.

CAUTION:

- When installing, the transmission main shaft and the transmission sub-shaft must be installed together.
- Spray an appropriate amount of engine oil on the transmission countershaft during installation.

8-Crankcase bearing and oil seal



PIG1 Crankcase bearing and oil seal		Right crankcase parts	CHK ADJ	 CAUTION
NO.	PART NO.	PART NAME	QTY	
1	1251112-001093	GB16674 M6×16 Hexagon flange bolts	3	12±1.5N.m
2	1051356-006000	ZT158MJ spindle bearing pressure plate	1	
3	1051356-013000	Bearing press plate of the right box balance shaft	1	
4	4050257-003000	ZT163ML right crankcase press-fit assembly	1	
5	1250602-047000	NJ303E/C3 Cylindrical Roller Bearings	1	
6	1250601-043000	GB276-6204/P6 deep groove ball bearing	1	
7	1250601-134000	6805 Bearing (P6)	1	
8	1250601-039000	GB276-6203/P6 deep groove ball bearing	1	
9	1251900-053000	YM8×1.25-M8×1.25×213 studs	2	25±2N.m
10	1051353-014000	ZT184MP Rear lifting hole bushing	1	
11	1051754-001000	1.0 × 5.5 × 6 over-oil pin	1	
12	1050868-005000	1.4 × 6.5 × 7 over-oil pin	1	
13	4050257-001000	ZT163ML right crankcase (machined)	1	

PROCEDURE:

● Right crankcase parts

Use an 8# sleeve to remove 3 bolts (1), and remove the bearing pressure plate (2) and bearing pressure plate (3).

Use the special stud removal tool to remove the studs (9).

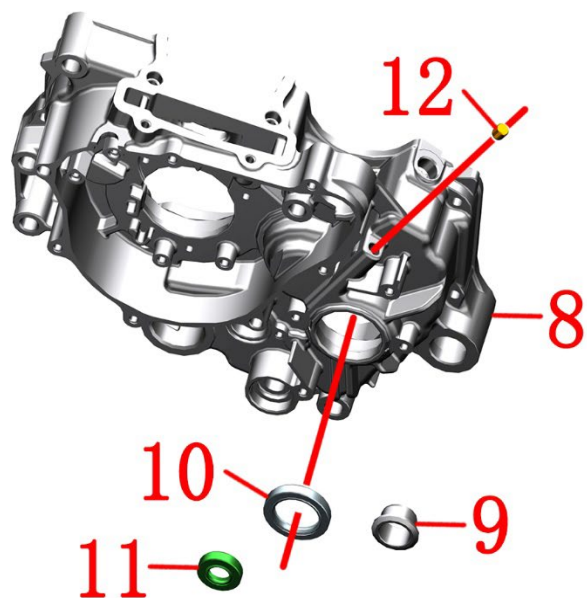
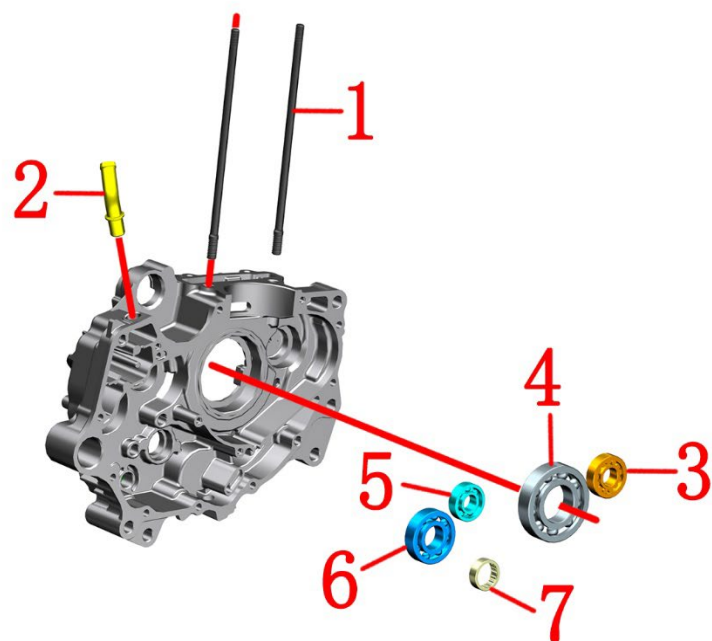
Bearings (5), (6), (7), (8), bushings (10), oil pins (11), (12) are generally not damaged, if they need to be replaced, please go to a professional organization or a qualified maintenance organization for replacement. The installation location is indicated here only.

CAUTION:

● Bolts (1) When installing, apply an appropriate amount of thread fastening glue to the thread.

● When installing the double-ended stud (9), an appropriate amount of thread fastening glue should be applied to the thread with the boss. After the installation is completed, the protruding height of the stud (9) should be $189.5 \pm 1\text{mm}$.

8-Crankcase bearing and oil seal



PIG2 Crankcase bearing and oil seal		Left crankcase parts		CHK	
				ADJ	
NO.	PART NO.	PART NAME		QTY	CAUTION
1	1251900-053000	YM8×1.25-M8×1.25×213 studs		2	25±2N.m
2	1051353-008000	ZT173YMM Air pipe		1	
3	1250602-051000	NJ203 Cylindrical roller bearing		1	
4	1250601-060000	GB276-6207/P53 deep groove ball bearing		1	
5	1250601-036000	GB276-6202RS/P6 deep groove ball bearing		1	
6	1250601-097000	GB276-62/22RS/P6 deep groove ball bearing		1	
7	1250602-020000	HK222910 needle roller bearing		1	
8	4050157-001000	ZT163ML left crankcase (machined)		1	
9	1051353-014000	ZT184MP Rear lifting hole bushing		1	
10	1051554-002000	FB30×42×7 hydrogenated nitrile oil seal		1	
11	1051553-005000	FB14×28×7 Fluorine rubber oil seal		1	

PROCEDURE:

●Left crankcase parts

Use the special stud removal tool to remove the studs(1).

The vent pipe (2), bearings (3), (4), (5), (6), (7), and bushing (9) will not be damaged under normal conditions. If they need to be replaced, please go to a professional organization or a qualified maintenance organization for replacement. The installation location is indicated here only.

Oil seals (10) and (11) need to be replaced only if there is oil leakage or oil leakage. If they need to be replaced, please go to a professional organization or a qualified maintenance organization for replacement.

CAUTION:

●When installing the double-ended stud (9), an appropriate amount of thread fastening glue should be applied to the thread with the boss. After the installation is completed, the protruding height of the stud (9) should be $189.5 \pm 1\text{mm}$.