

700MT

CF700-9F/CF700-9US

Service Manual

Edition No.: 20230605
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Introduction

This manual introduces CF700-9F/CF700-9US maintenance information, disassembly procedure, check & adjustment methods, troubleshooting and technical specifications. There are illustrations, drawings to guide your operation.

Chapter 1: general service information, tools vehicle structure and technical data.

Chapter 2: inspection and adjusting key points service guide.

Chapter 3 and later disassembly of parts and components installation overhaul and troubleshooting.

The fourth chapter and the rest of chapters introduces each part of the vehicle disassembly, installation, adjustment, repair and method of fault diagnosis, etc.

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CFMOTO tried many ways and efforts to make this manual perfect and accurate. But this manual isn't response for any different and missing.

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The information in this manual refer to the newest product when comes out. The pictures, drawings and photos in this manual doesn't stand for the real model, assy and parts.

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Contents can help you find out the topic you want and the chapter number. Use the page label to see the chapter page. And find more accurate in contents each chapter.

Units form

A	Ampere	lb	Pounds
ABDC	After bottom dead center	m	Meter
AC	Alternating current	min	Minutes
ATDC	After top dead center	N	Newton
BBDC	Before bottom dead center	Pa	Pascal
BDC	Bottom dead center	PS	Horsepower
BTDC	Before top dead center	Psi	P o u n d / S q u a r e inches
°C	Celsius	r	Rounds
DC	Direct current	rpm	R o u n d s p e r minutes
F	Farad	TDC	Top dead center
°F	Fahrenheit	TIR	Times indicator record
ft	Feet	V	Volt
g	Gram	W	Watt
h	Hour	Ω	Ohm
L	Liter	in	Inches
US gal	US gallon	US qt	US quart
oz	Ounce	HP	Horse power
cm Hg	Hg deepness in cm	pint	Pint
cu in	Cubical inches	mL	Milliliter

Forward

This service manual is not only specially designed for professional machinist, but also it is used to instruct the vehicle's user how to do maintenance work. It is necessary to know mechanical knowledge, tools proper usage and have a well understanding of service procedure Conversion before you perfectly solve all service problems. If no, you should get the service support by professional machinist. Please read this service manual and understand it before operate for high efficiency work. And working in clean area. For vehicle mechanical performance and safety works. No tools replaced or use temporary tools since that we have been appointed the special service tools and equipment. All service and scheduled maintenance should be executed base on the instructions of service manual. Any consequences are responsible by the vehicle's owner resulted from any rule breaking operations.

To get the longest life out of your vehicle.

Follow the maintenance schedule in this maunal.

Be alert for problems and non-schedule maintenance.

Use genuine CFMOTO parts and proper tools.

This SM introduces the CF motorcyle's specialized tools, instruments, and tester, they should be listed in the parts TOC as the original parts.

Follow the service manual procedures step by step. Do not take shortcuts.

Remember to keep complete records of maintenance and repair with dates and any new parts installed.

How to Use This Manual

This production separate into several mainly systems in this manual. These systems make up each chapters in this manual. The contents has shown all the system in this production and can help you find out each chapters. Each chapter also has its own contents.

Example: If you want to find out the ignition coil information. Find out electrical system chapter in contents first. Then find the ignition in electrical system contents.

If you see the warning signal. Please pay more attention. And follow the safety handle and service method.

 **Danger:** Indicating that it may cause deaths to operators or people around, if no measures are taken.

 **Warning:** Indicating that it may hurt operators or damage components, if no measures are taken.

 **CAUTION:** Indicating that to prevent components from being damaged, precautionary measures should be taken.

NOTE: Indicating that there are easier or clearer information for operation. No signal is used in this circumstance.

Note:

The disassemble steps exclude the electrical parts, police implements and engine, etc. Electrical parts and engine are shown in the separate chapters.

All connectors are unplugged by default during removal.

The guide line without serial number in the picture indicates the direction of removal.

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General Information

1.1 Operation Cautions

⚠ DANGER: It is forbidden to run the engine for a long time in a closed place or a place with poor ventilation because of harmful components in the exhaust gas.



⚠ WARNING: Battery liquid (dilute sulfuric acid) is highly caustic and may cause burns to skin and eyes. Flush with water if splashed to skin and get immediate medical attention. Flush with water if splashed to clothes to avoid burns. Keep battery and liquid away from reach of children.



⚠ WARNING: When the engine has just stopped, the temperature of the engine and the muffler is very high. Be careful not to touch it with your hands to avoid burns. Please wear long-sleeved working clothes and gloves during maintenance.



⚠ WARNING: Coolant is a toxic liquid. Please do not drink it or get it on your skin/eyes/clothes. In case of getting on skin/clothes, wash immediately with soapy water. If it gets on your eyes, wash it immediately with plenty of water and go to the hospital for treatment. If you drink the coolant by mistake, please try to spit it out/rinse your mouth immediately and go to the hospital for treatment. The coolant must be kept in a safe place out of the reach of children.



General Information

⚠️ WARNING: Must wear appropriate work clothes (one-piece work clothes, etc.)/hat/safety boots, if necessary, also wear dust glasses and dust mask/gloves and other safety protective equipment to protect body.



⚠️ DANGER: Gasoline is flammable, fireworks are strictly prohibited in the work site. Pay attention not only to open flames, but also to electric sparks. In addition, the vaporized gasoline has the risk of explosion, please choose a well-ventilated site for operation.



⚠️ DANGER: When charged, Battery may generate hydrogen which is explosive. Charge the battery in a well-ventilated place.



⚠️ WARNING: When two or more people are working, they must constantly greet each other to confirm safety.



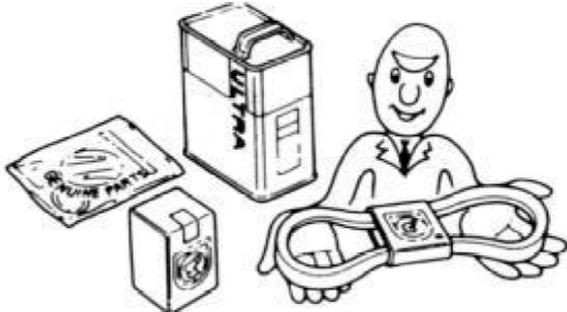
⚠️ DANGER: Be careful to get clamped by the turning parts like wheels and clutch.



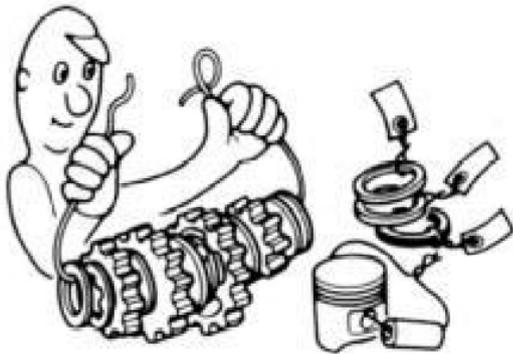
General Information

1.2 Disassembly and Assembly Cautions

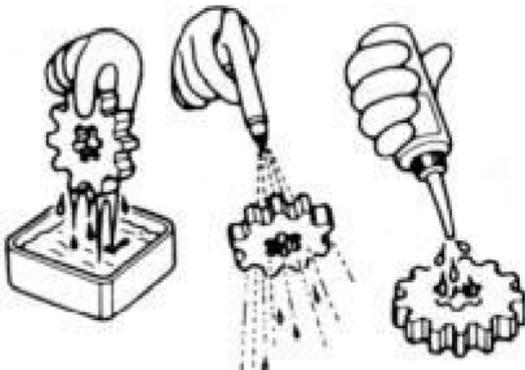
■ Use genuine CFMOTO Parts, lubricants and grease.



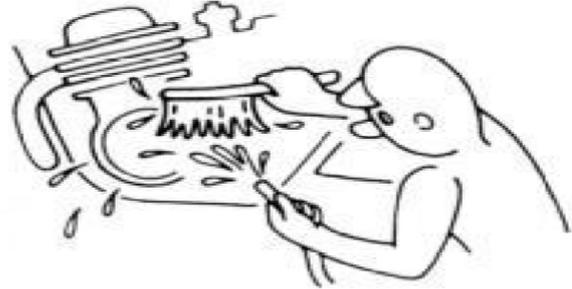
■ Place and store the disassembled parts separately in order for correct assemble.



■ Clean and blow off the detergent after disassembling the parts. Apply lubricants on the surface of moving parts.



■ Clean the mud, dust before overhauling.



■ Replace the disassembled washers, O-rings, piston pin circlip and cotter pin with new ones.

■ Elastic circlips might get distorted after disassembled. Do not use the loosed circlips.

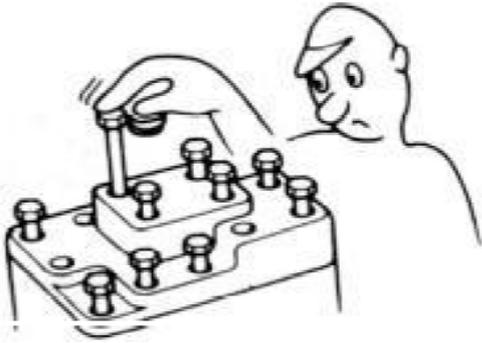


■ Measure the data during disassembly for correct assembly.

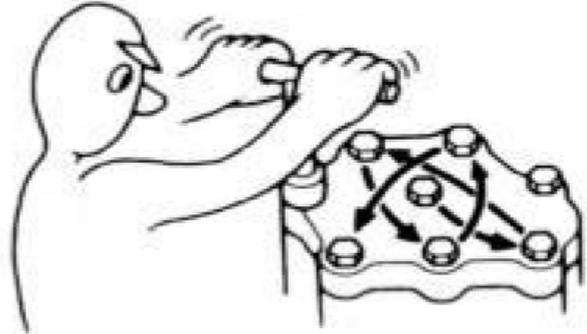


General Information

■ If not knowing the length of screws, install the screws one by one and tighten with same torque.



■ Pre-tighten the bolts, nuts and screws, then tighten them according to the specified torque, from big to small and from inner side to outer side.



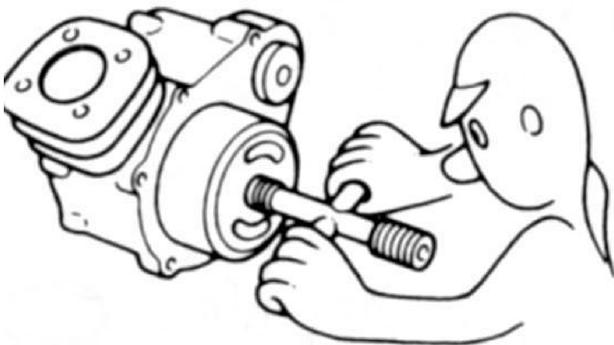
■ Check if the disassembled rubber parts are aged and replace it if necessary. Keep the rubber parts away from grease.



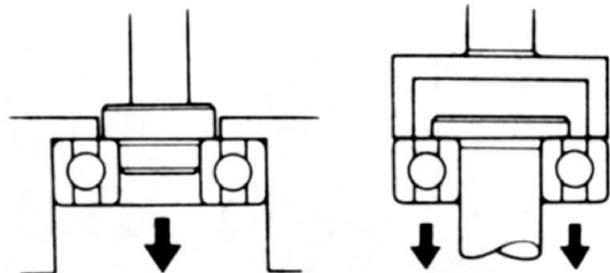
■ Apply or inject recommended lubricant to the specified parts.



■ Use special tools wherever necessary.

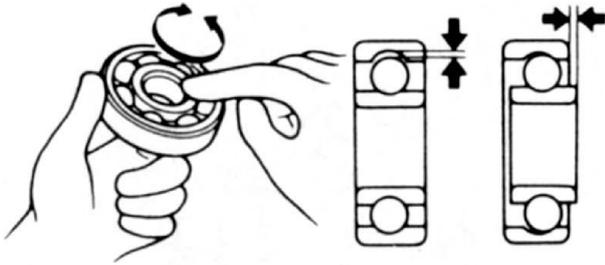


■ If the disassembling of pressed ball bearing is done by pressing the balls, the disassembled should not be used again.



General Information

■ Turn the ball bearing with hands to make sure the bearing will turn smoothly. Replace if the axial or radial play is too big. If the surface is uneven, clean with oil, replace if the cleaning does not help. When pressing the bearing into the machine or to the shaft, replace the bearing if it could not be pressed tight.



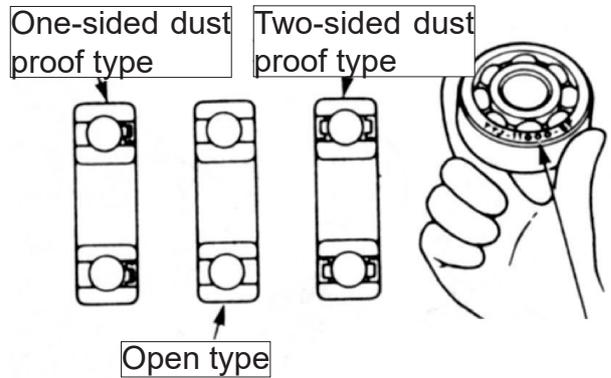
■ Keep the bearing block still when blowing dry the bearing after washing clean. Apply oil or lubricant before assembling.



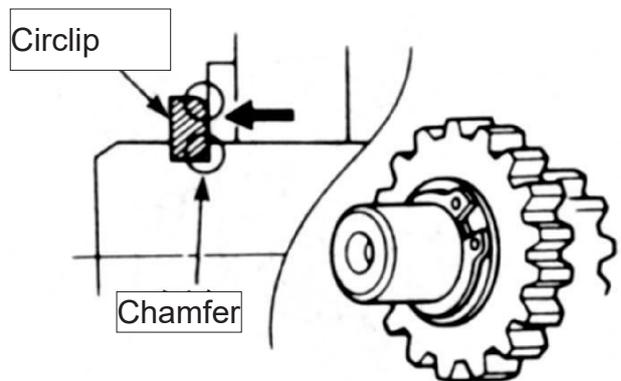
■ After assembling, check if all the tightened parts are properly tightened and can move smoothly.



■ Install the one-side dust-proof bearing in the correct direction. When assembling the open type or double-side dust-proof bearing, install with manufacturer's mark outward.



■ When installing the elastic retaining ring, the chamfer side should be facing the direction of the force. Do not use the retainer that has loosened and lost elasticity. After assembly, turn the elastic retaining ring to confirm that it has been securely loaded into the slot.

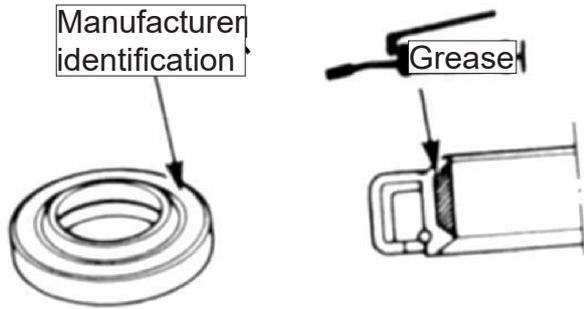


■ Brake fluid and coolant may damage coating, plastic and rubber parts. Flush these parts with water if splashed.

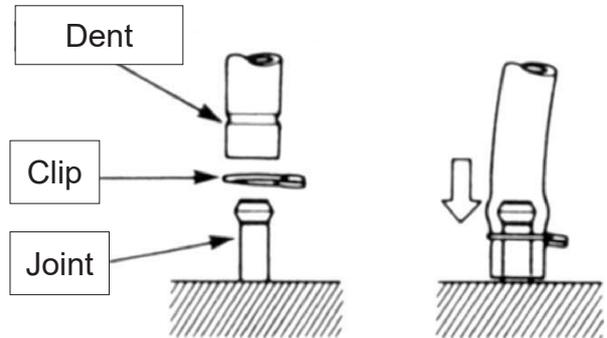


General Information

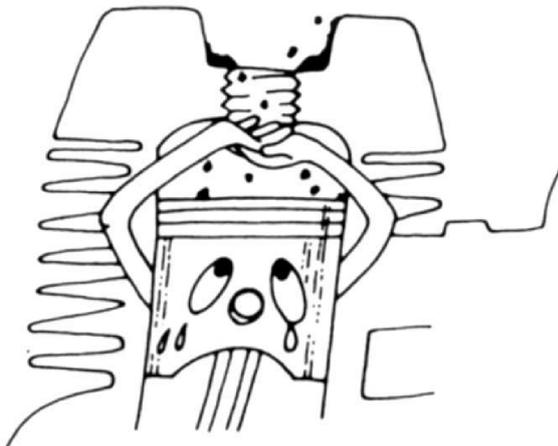
■ Install oil seal with the side of manufacturer's mark outward. Do not fold or scratch the oil seal lip. Apply grease to the oil seal lip before assembling.



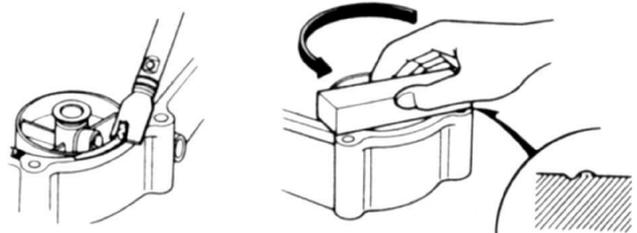
■ When installing pipe parts, the pipe should be inserted into the root of the joint. If there is a pipe clip, the pipe clip should be installed in the dent of the pipe. Replace tubes that are not tight during installation.



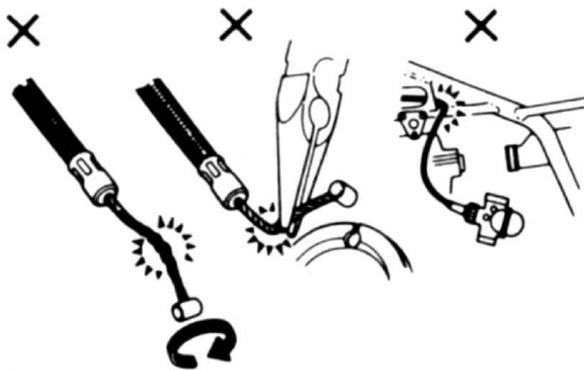
■ Do not get dust, dirt and so on into the engine and inside the brake oil pressure system .



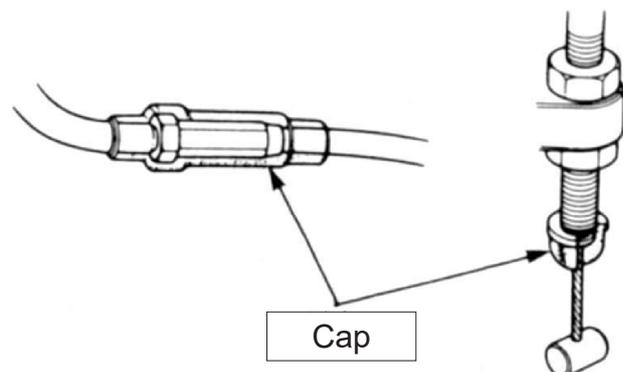
■ The gasket material attached to the bonding surface of each engine case should be cleaned before assembly. The bumps on the contact surface must be removed by grinding them evenly with a whetstone.



■ Don't twist or bend the cables too much. Deformed and damaged cables may cause poor movement or breakage.

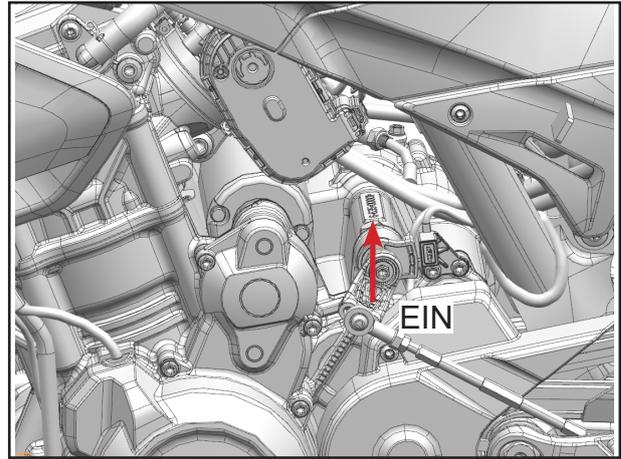
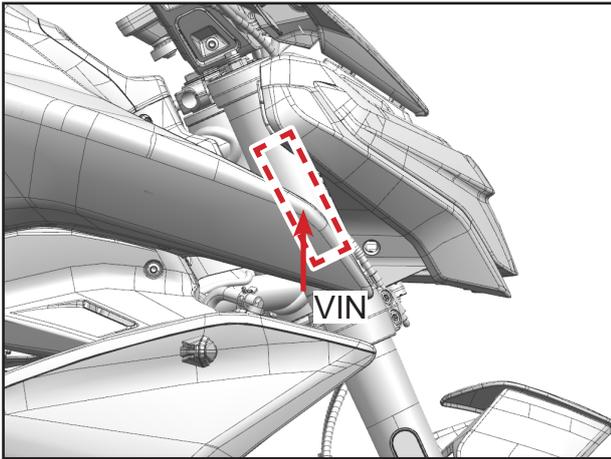


■ When assembling the cap parts, the cap must be inserted into the groove if there is a groove.



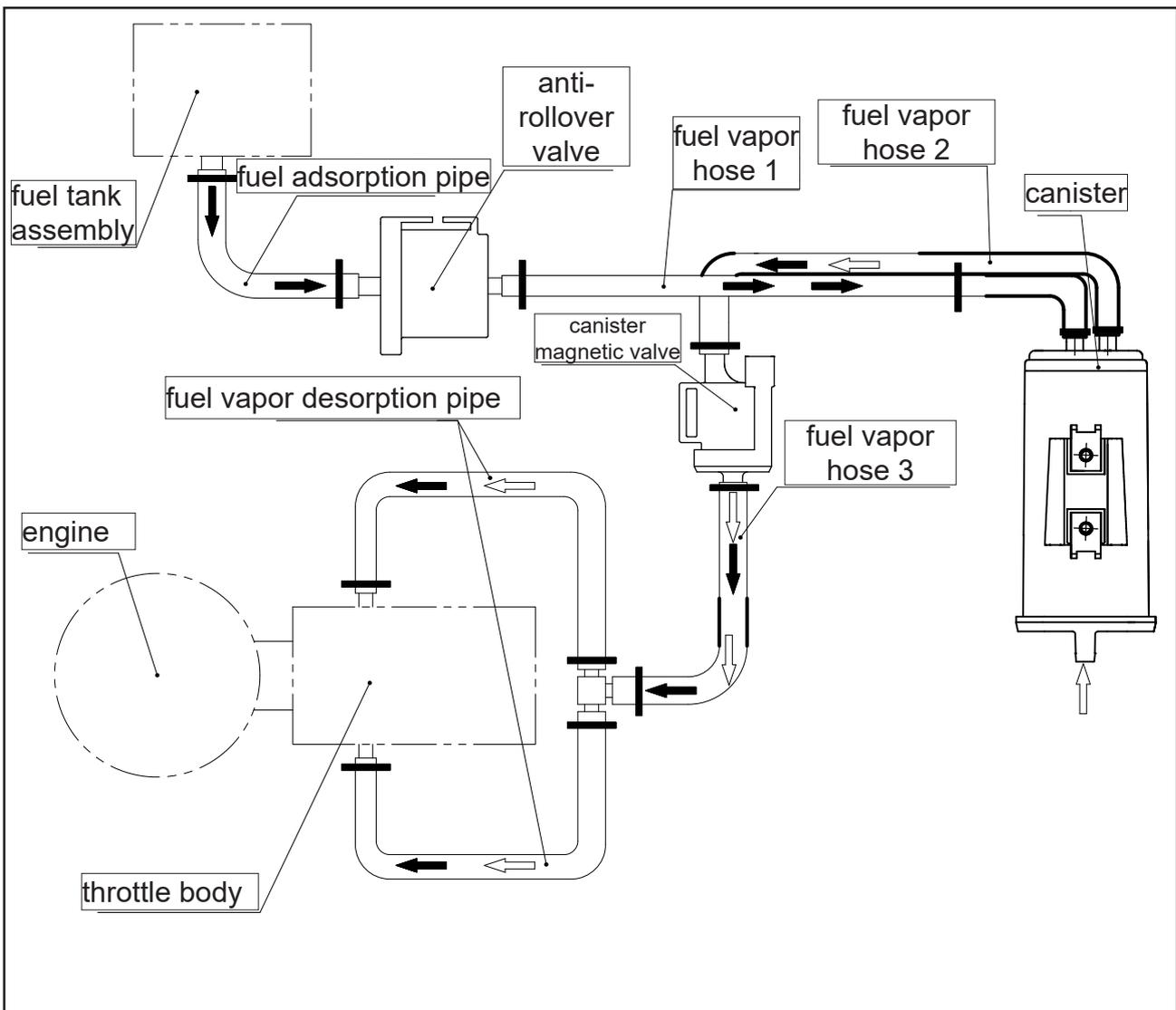
General Information

1.3 VIN and EIN Location



1.4 Fuel Evaporation System Diagram

⚠ CAUTION: Keep the anti-rollover valve installed in horizontal position, do not change the fuel evaporation system, otherwise it can cause non-compliance with CN regulation 4 requirements. After disassembly and maintenance, check that the pipeline connections should be good and the pipeline joints are free from air leakage/clogging etc.; the connectors are free from extrusion/rupture/damage etc. The fuel vapor in the fuel tank is released to the carbon canister through the adsorption tube. When the engine stops working, the activated carbon in the carbon canister adsorbs the fuel vapor; when the engine is working, the fuel vapor in the carbon canister is released to the engine combustion chamber through the desorption tube to participate in the combustion, preventing the fuel vapor from being directly emitted into the atmosphere and causing environmental pollution. At the same time, the adsorption tube also has the function of balancing the air pressure in the fuel tank, when the air pressure in the fuel tank is lower than the external atmospheric pressure, it can supplement the air pressure in the fuel tank through the carbon can air tube and the adsorption tube; therefore, the pipelines should be smooth and have no blockage/extrusion, otherwise it can cause damage to the fuel pump or deformation or rupture of the fuel tank, etc.



Maintenance Information

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Maintenance Information

CAUTION

▶ = Reduce interval by 50% on vehicles subjected to severe use.

■ = Have an authorized dealer perform repairs that involve this component or system.

Clear maintenance mileage

After completing scheduled maintenance, the maintenance information mileage in the meter need to be manually cleared.

Short press ENT to enter menu.

Long press \triangle or ∇ , until enters vehicle information.

Short press \triangle or ∇ , until enters maintenance information.

Long press ENT (> 10 seconds) to clear maintenance mileage.

2.1 Daily Maintenance Schedule

Project	Maintenance before riding			
	Hour	Calendar	km	Remarks
Fuel system				
Fuel tank hose	-	daily	-	Inspect for aging and damage
Electrical system				
Switches	-	daily	-	Inspect
Lights and horn	-	daily	-	

Maintenance Information

2.2 Break-in Maintenance Schedule

Project		Break-in maintenance interval (Carry out maintenance of whichever interval comes first)			
		Hour	Calendar	km	Remarks
Engine					
	Oil and oil filter	-	-	1000	Replace
	Oil screen	-	-	1000	Clean
■	Idle	-	-	1000	Inspect
■	Coolant	-	-	1000	
	Throttle system	-	-	1000	
Electrical system					
■	Functions of electrical parts	-	-	1000	Inspect
	Battery	-	-	1000	
	Fuses or circuit breakers	-	-	1000	
Brake system					
	Brake discs	-	-	1000	Inspect
	Brake pads	-	-	1000	
	Brake fluid level	-	-	1000	
■	Brake hoses	-	-	1000	Inspect for damage and sealing
	Brake lever	-	-	1000	Inspect for free play
Wheels					
	Tire condition	-	-	1000	Inspect
	Tire pressure	-	-	1000	
Suspension system					
■	Rear shock absorber and front forks	-	-	1000	Inspect for leaking (maintain parts according to the requirement)
Cooling system					
	Coolant level	-	-	1000	Inspect
■	Coolant	-	-	1000	
■	Radiator fan function	-	-	1000	
	Coolant hoses	-	-	1000	
Steering system					
■	Steering bearings	-	-	1000	Inspect
Other parts					
■	Diagnosis connector	-	-	1000	Read with PDA
■	Mobile parts	-	-	1000	Lubricate, inspect for flexibility
■	Bolts and nuts	-	-	1000	Inspect for fastness
■	Cables	-	-	1000	Check for damage, sticking, and pulling flexibility.

Maintenance Information

2.3 Periodic Maintenance Schedule

Project		Periodic Maintenance Interval (Carry out maintenance of whichever interval comes first)			
		Hour	Calendar	km	Remarks
Engine					
	Oil and oil filter	-	12M	15000	Replace
	Oil screen	-	12M	15000	Clean
■	Clutch	-	-	15000	Inspect, service if necessary or replace
	Idle	-	-	15000	Inspect, adjust if necessary
■	Coolant	-	12M	15000	Inspect, replace if necessary
		-	48M	-	Replace
	Throttle system	-	-	10000	Inspect, adjust if necessary
■	Throttle body	-	-	15000	Clean
▶ ■	Air filter element	-	12M	15000	Replace
■	Spark plug	-	-	30000	Replace
■	Valve clearance	-	-	30000	Inspect, adjust if necessary
Electrical system					
■	Functions of electrical parts	-	12M	10000	Inspect, service if necessary or replace
	Battery	-	6M	5000	Inspect, charge if necessary
	Fuses or circuit breakers	-	6M	5000	Inspect, replace if necessary
■	Wires	-	12M	10000	Inspect for damage and bending during laying
Brake system					
	Front and rear brake system	-	12M	10000	Inspect, service if necessary or replace
	Brake discs	-	12M	10000	
▶	Brake pads	-	12M	10000	
	Brake fluid level	-	12M	10000	Inspect, add if necessary
		-	12M	10000	Inspect for damage and sealing
		-	12M	10000	Inspect free play
■	Brake fluid		24M	-	Replace
Wheels					
	Tire condition	-	12M	10000	Inspect, service if necessary or replace
	Tire pressure	-	12M	10000	Inspect, add air pressure if necessary
■	Wheel bearings	-	-	10000	Inspect, service if necessary or replace

Maintenance Information

Project		Periodic Maintenance Interval (Carry out maintenance of whichever interval comes first)			
		Hour	Calendar	km	Remarks
Suspension system					
■	Suspension system	-	-	5000	Inspect, service if necessary or replace
■	Rear and front shock absorbers	-	12M	10000	Inspect for leaking (maintain parts according to the requirement)
Cooling system					
	Coolant level	-	12M	10000	Inspect, add if necessary
■	Radiator fan function	-	12M	10000	Inspect, service if necessary or replace
■	Coolant hoses	-	12M	10000	
Frame system					
	Frame	-	-	30000	Inspect, service if necessary or replace
Steering system					
■	Steering bearings	-	12M	10000	Inspect, service if necessary or replace
Chain					
▶	Chain lubrication	-	-	600	Inspect immediately after riding in rainy weather
	Chain tightness	-	-	1000	Inspect, adjust if necessary
	Chain, rear sprocket, engine sprocket wear	-	12M	10000	Inspect, replace if necessary
	Chain guard	-	12M	10000	
Other parts					
■	Diagnosis connector	-	12M	10000	Read with PDA
■	Mobile parts	-	12M	10000	Lubricate, inspect for flexibility
■	Bolts and nuts	-	12M	10000	Inspect for fastness
■	Cables	-	12M	5000	Inspect for damage, bending and setting
■	Pipes, ducts, hoses and sleeves	-	12M	10000	Check for cracks, seals and correct layout

Technical Information

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3.1 Main parameters of the vehicle

Project		Parameter	
Model		CF700-9F	CF700-9US
Length		2184 mm	2184 mm
Width		880 mm	880 mm
Height		1438 mm	1438 mm
Wheel base		1418 mm	1418 mm
Engine model		283MU	283MU
Displacement		693 ML	693 ML
Fuel grade		RQ-95 or above	RQ-95 or above
Gross weight		220 kg	220 kg
Passengers		2 people(Include driver)	
Load		150 kg	
Tire	Front	120/70 ZR17	
	Rear	160/60 ZR17	
Min. Ground Clearance		170 mm	
Turning Circle Diameter		5600 mm	
Steering	Steering angle	Right	35°
		Left	35°
Brake system		Front	Hydraulic Disc
		Rear	Hydraulic Disc
Shock absorber	Suspension	Front wheel	Telescopic
		Rear wheel	Cantilever type
Frame		Steel tube	

Project		Standard
Fuel supplier	Fuel capacity	18 L
	Injector	Type: F01R00MG63
	Fuel pump	Voltage: DC13.5V±0.3V
		Pressure: 0.33MPa ± 0.01MPa
		Flow: ≥45 L/h
	Current: ≤2.80 A	

3.2 Main parameters of the engine

Project		Type/Specification		
Model		CF700-9F	CF700-9US	
Type		Cylinder in-line, Two Cylinder, four stroke, liquid cooled		
Bore × Stroke		83 mm × 64 mm		
Displacement		693 mL		
Compression ratio		11.6:1		
Low idling speed (Idling)		1500 r/min ± 150 r/min		
Starting		Electric		
Power		49Kw/9000rpm	51Kw/8750rpm	
Electrical system	Ignition type	ECU Ignition		
	Spark plug / Electrode gap	CR8EI/0.7 mm ~ 0.9 mm		
	Magneto type	PM three phase AC out motor flywheel		
Combustion system	Combustion chamber	Triangular		
	Air filter type	Sponge filter		
	Gasoline	RQ-95 and above unlead gasoline		
Valves system	Valves type	SOHC/Chain drive		
Lubrication system	Lubrication type	Pressure and splash		
	Oil pump type	Rotor drive		
	Oil filter type	Paper type, replaceable		
	Engine oil type	SAE10W/40 JASOMA2	SAE10W/40 SJ, JASOMA2	
Cooling system	Cooling type	Closed coolant circulation		
	Coolant type	-35°C anti-rust and anti-freeze fluid		
Drive train system	Clutch		Wet and multi-plate hand clutch	
	Transmission type		6-gear, constant mesh, step transmission	
	Reducer gear		6 Gears	
	Gearshift methods/orders		Mechanical reciprocating/ 1-0-2-3-4-5-6-5-4-3-2-0-1	
	Transmission ratio	Primary ratio		2.095
		Final ratio		3.067
	Secondary ratio	1st		2.353
		2nd		1.714
		3rd		1.333
		4th		1.111
5th		0.966		
6th		0.852		
Overall size		L×W×H(mm): 425 mm × 403 mm × 520 mm		
Dry weight		55 kg		
Output type		Chain		
Rotation of engine output		When moving forward, counter clockwise(left view).		

3.3 Maintenance Parameters Table

3.3.1 Front wheel

Project		Standard	Service limit	
Front wheel	Front wheel shaft bending	-	0.2 mm	
	Rim run-out	Longitudinal	-	0.8 mm
		Horizontal	-	0.8 mm
	Tire	Remaining groove	-	1.6 mm
		Tire pressure	Single 225kPa/Double 250kPa	-

3.3.2 Rear Wheel

Project		Standard	Service limit	
Rear wheel	Rim run-out	Longitudinal	0.8 mm	0.8 mm
		Horizontal	0.8 mm	0.8 mm
	Tire	Remaining groove	-	1.6 mm
		Tire pressure	Single 225kPa/Double 250kPa	-

3.3.3 Brake System

Project		Standard	Service limit
Front break	Front(Hand) brake free travel	10mm~15mm	-
	Brake disc abrasion	4.5 mm	4 mm
Rear break	Rear(Foot) brake free travel	5mm~10mm	-
	Brake disc abrasion	5 mm	4 mm

3.3.4 Light, Dashboard and Switch

Project	Standard
Fuse	Primary 30 A
	Subsidiary 1×7.5A 1×10A 5×15A
Lights	Headlight (Hi / Lo) LED
	Position light LED
	Tail light LED
	Turn light LED
	License light LED

3.4 Overhauling parameters Table

3.4.1 Valve Train+Cylinder Head

Project	Standard		Service Limit	Remark
	283MU			
Valve clearance (cold engine)	IN	0.08mm~0.13mm	-	
	EX	0.22mm~0.28mm	-	
Clearance, valve guide and valve stem	IN	0.01mm~0.037mm	-	
	EX	0.03mm~0.057mm	-	
I. D of valve guide	IN & EX	4.5mm~4.512mm	-	
O. D of valve stem	IN	4.475mm~4.490mm	-	
	EX	4.455mm~4.470mm	-	
Free length, valve spring	41.6mm		-	
Valve spring force	When compressed to 38.4mm, 103N~121N		-	
	When compressed to 30.5mm, 422N~466N		-	
	When compressed to 29.8mm, 455N~503N		-	
Camshaft lift	IN	36.543mm~36.657mm	-	
	EX	35.843mm~35.957mm	-	
Camshaft to hole clearance	0.028mm~0.071mm		-	
O. D of camshaft	23.950mm~23.972mm		-	
I. D of camshaft mating hole	24mm~24.021mm		-	
Camshaft run-out	0.02mm		-	
Cylinder head junction surface flatness	0.05mm		-	

3.4.2 Lubrication System

Project		Standard	Service limit	Remark
Outer rotor to inner rotor clearance		0.08mm~0.15mm	-	
Outer rotor to pump body clearance		0.15mm~0.193mm	-	
Oil pressure		3000r/min, 0.1MPa~0.3MPa	-	
Oil type	10W-40, JASOMA2	10W-40/SJ, JASOMA2	-	
Oil capacity	Change oil and filter	2200 mL	-	
	At overhaul	2600 mL	-	

3.4.3 Cylinder+Piston+Piston ring+ and Connecting rod

Project	Standard		Service limit	Remark
	283MU			
Clearance between piston and cylinder	0.032mm~0.044mm		-	
Dia.of piston skirt	82.988mm~82.970mm		-	
I.D of cylinder	83.008mm~83.026m m		-	
Cylinder junction surface flatness	0.03mm		-	
Piston ring closed clearance	1 Ring	0.25mm~0.40mm	-	
	2 Ring	0.40mm~0.55mm	-	
Clearance between piston ring and groove	1 Ring	0.03mm~0.07mm	-	
	2 Ring	0.02mm~0.06mm	-	
Thickness of piston ring	1 Ring	0.87mm~0.89mm	-	
	2 Ring	0.97mm~0.99mm	-	
Width of piston ring groove	1 Ring	0.92mm~0.94mm	-	
	2 Ring	1.01mm~1.03mm	-	
	Oil ring	1.510mm~1.525mm	-	
O.D of piston pin	18.996mm~19mm		-	
I.D of connecting rod small end	19.01mm~19.02mm		-	
Connecting rod big end side clearance	41mm~41.015mm		-	
Connecting rod big end thickness	22.85mm~22.9mm		-	
Crankshaft run out	0.02mm		-	

3.4.4 Clutch+Transmission

Project	Standard	Service limit	Remark
Friction disc A		-	
Quantity	3	-	
Friction disc B		-	
Quantity	4	-	
Steel disc A		-	
Quantity	5	-	
Steel disc B		-	
Quantity	1	-	
Clutch driven disc deformation	0.15mm	0.30mm	
Free length of clutch spring	51.7mm~52.7mm	50.7mm	
Quantity	3	-	
Shift fork thickness	4.8mm~5.0mm	-	

3.4.5 Cooling System

Project	Standard	Service limit	Remark
Start temp. of thermostat	72°C~85°C	-	
Lift range of thermostat valve	85°C, ≥8 mm	-	
Open pressure of radiator cap	135kPa~160kPa (Standard 140kPa)	-	
The relationship between the resistance of water temp .sensor and temperature	Temperature (°C)	-	
	-20	-	
	20	-	
	80	-	
	120	-	
Coolant type	-35°C anti-rust and anti-freeze fluid with high boiling point	-	

3.4.6 Air Inlet System

Project	Standard	Remark
Port size (mm)	φ 42 mm	
Idle speed (r/min)	1500 r/min ± 150 r/min	

3.4.7 Electrical System

Project	Standard		Remark
Spark plug	Model	CR8EI	
	Gap	0.7 mm ~ 0.9 mm	
Spark	> 8 mm, 1 Mpa		
Ignition coil resistance	Primary	1.23 Ω	
	Secondary	6k Ω ~13k Ω	
Magneto coil resistance	Trigger	400 Ω	
Max power	280W, 5000 r/min		
Stabilized voltage	13.5V~15.0V		
Primary peak voltage, ignition coil	≥27kV		
Peak voltage, trigger coil	≥17V		

3.5 Tighten Torque

3.5.1 Tighten torque Table for Vehicle

Project	Torque N•m(kgf•m)	Project	Torque N•m(kgf•m)
M5 Bolt, nut	5±1(0.5±0.1)	M5 Screw	4±1(0.4±0.1)
M6 Bolt, nut	10±1(1.0±0.1)	M6 Screw	9±1(0.9±0.1)
M8 Bolt, nut	20~30(2.0~3.0)	M6 flange bolt and nut	12±1(1.2±0.1)
M10 Bolt, nut	30~40(3.0~4.0)	M8 flange bolt and nut	20~30(2.0~3.0)
M12 Bolt, nut	40~50(4.0~5.0)	M10 flange bolt and nut	30~40(3.0~4.0)

Tighten to standard torque where not recorded in table below.

**NOTE: 1. Lubrication oil should be applied on screw thread and contact surface.
2. Replace with new ones if self-locking bolts are removed.**

Mounting place	Project	Torque N•m&whether to apply thread locker
Oxygen sensor	Oxygen sensor	50N•m
Nut, front exhaust pipe	Muffler nut	Inside 20N•m (1) Outside 12N•m (2) Inside 20N•m (1)
Bolts, front muffler body	Bolt M8*30	25N•m (Loctite®243)
Side stand switch	Bolt M5	4N•m (Loctite®243)
Lock nut, gearshift pedal rod	Nut M8	25N•m (Loctite®243)
Rear break fluid inlet pipe	Banjo bolt II	30N•m
Front break fluid outlet pipe	Banjo bolt II	30N•m
LH footrest parts bolts	Bolt M8*25	25N•m
RH footrest parts bolts	Bolt M8*25	25N•m
Engine hanging bracket and engine connecting bolt	Bolt M10*1.25*110 Bolt M10*1.25*150	45N•m (Loctite®243)
Engine hanging bracket and frame connecting bolt	Bolt M8*25	28N•m (Loctite®243)
Rear shock absorber bolt	Upper and lower bolt M12*60	60N•m (Loctite®243)
Output shaft nut	Small sprocket output shaft nut	102N•m (Loctite®243)
Handlebar supporter	Inner hexagon screw M10*1.25	45N•m (Loctite®243)
Install a RH handlebar switch	Build in	2N•m
Install a clutch lever assy	Build in	2N•m
Install a LH handlebar switch	Build in	2N•m
Install a fixed grip assy	Build in	2N•m
Steering head	Steering head nut M35*1	25N•m
Fastening lower triple clamp screw	Screw M8*35	25N•m
Fastening upper clamp screw	Upper triple clamp bolt M26*1	110N•m
	Inner hexagon screw M8*35	25N•m

03 Technical Information

Rear axle nut	M18*1.5N.m	110N•m
Install a fuel pump	Bolt M6*16	5N•m
Secure the front brake caliper	Bolt M10*1.25*60	45N•m (Loctite®243)
Install a rear foot pedal parts to frame	Screw M8*20	25N•m (Loctite®243)
Install a small sprocket guard	Stepped screw M5	5N•m (Loctite®243)
Gearshift connecting rod and gearshift connecting seat	GB70.2 M6*16	6N•m (Loctite®243)
Install a LH, RH bumper assy	Bolt M8*20	25N•m (Loctite®243)
Install a bumper connecting pipe assy	Bolt M8*20	25N•m (Loctite®243)
Install a rear cushion	Bolt M8*35	25N•m (Loctite®243)
Rear armrest panel	Stepped screw M5	6N•m (Loctite®243)
Install a side box LH, RH bracket assy	Screw M8	25N•m (Loctite®243)
Install a side box bracket connecting rod	Flange bolt M8	25N•m (Loctite®243)
Install a middle supporter	Screw M8	30N•m (Loctite®243)
Front brake disc screw	Screw M8*25	25N•m (Loctite®243)
Rear brake disc screw	Screw M8	25N•m (Loctite®243)

3.6 Running Materials & Assembling Materials

Running materials include lubricant oil (engine oil), lubricant grease. Assembling materials include flange sealants, thread locker.

3.6.1 Vehicle Running Materials

Application areas	Notes	Type
Steering column bearing Front and rear footrest pivot Side stand pivot Front and rear wheel LH/RH bushing Sprocket seat oil seal Seat cable Clutch cable Rear fork bearings Rear brake pedal bushing Gearshift lever pivot A-shape swing arm roller bearing Rear fork roller bearing Rod assembly bearings		Multi-purpose lithium base lubrication oil GB/T5671
Thread of rear wheel axle nut and joint Rear brake cam seal felt Handle bar inner surface		Engine oil
Lower dust-proof seal lip of front shock absorber		Absorber oil 5#

3.6.2 Engine Running Materials & Assembling Materials

Project	Specification	Using parts	Remark
Lubricant oil	SAE 10W-50 SJ, JASOMA2	Rotation and moving section in cylinder, crankcase and cylinder head.	Capacity: 2600mL
Lubricant oil with molybdenum		Piston pin, valve stem, valve oil seal, camshaft	
Lubricant grease	3# MoS ₂ lithium	Oil seal lip, o-ring and rubber seal face, bearing with sealant	
Coolant	-35°C anti-rust and anti-freeze fluid with high boiling point	Cooling system, water seal installation	Capacity depends on radiator water pipes
Flange sealant		Crankcase faying face, crankcase and cylinder joint cylinder head and cylinder head cover joint	
Tread locker		Parts of thread	

4.1 Seat Removal and Installation..... 4-2

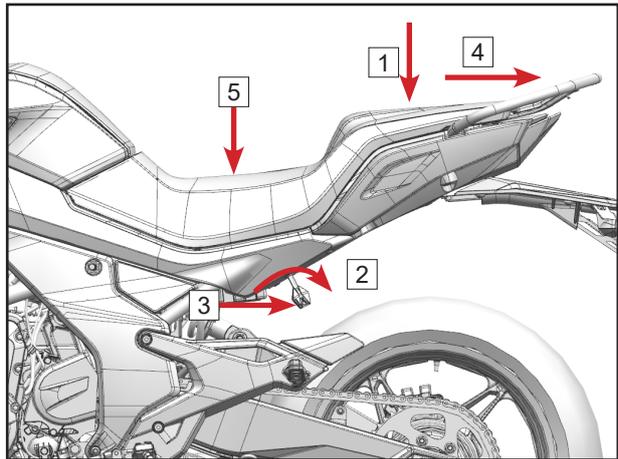
4.1 Seat Removal and Installation

Removal

Press down on the seat cushion in the direction of the arrow **1**.

Turn the ignition switch key **3** clockwise in the direction of the arrow **2** to open the seat lock.

Remove the seat **5** backwards in the direction of the arrow **4**.



Installation

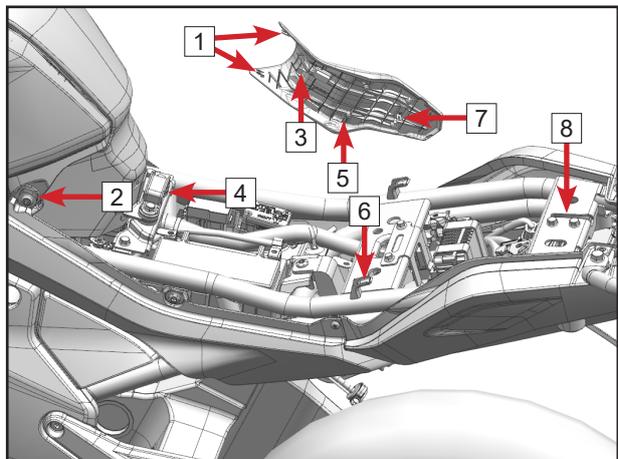
Snap the left and right tabs **1** of the bottom of the seat into the mounting point **2**.

Snap the tab **3** on the bottom of the seat into the mounting points **4**.

Snap the left and right notches **5** of the bottom of the seat into the mounting point **6** on the frame.

Press the bottom hook **7** of the seat into the mounting point **8** on the frame.

When you hear a "click" sound, the latch of the seat lock is now seated in the seat hook.



NOTE: After installing the seat cushion, shake the seat cushion back and forth, left and right to check if it is installed in place.

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CFMOTO

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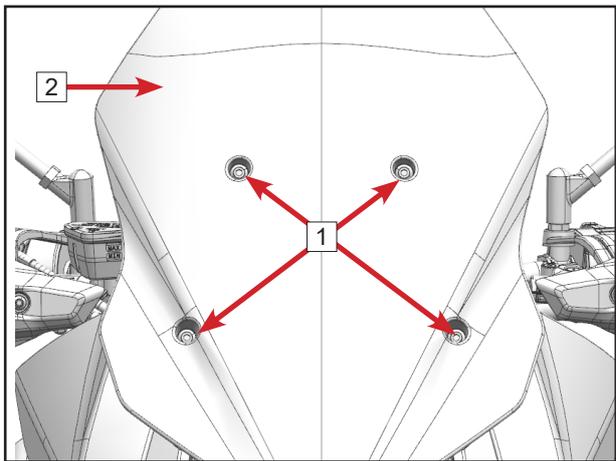
5.1 Windshield

Removal

Remove bolt gasket assembly **1**.
Remove windshield **2**.

Installation

Install in reverse order of disassembly.



5.2 Deflector

5.2.1 LH Deflector

Removal

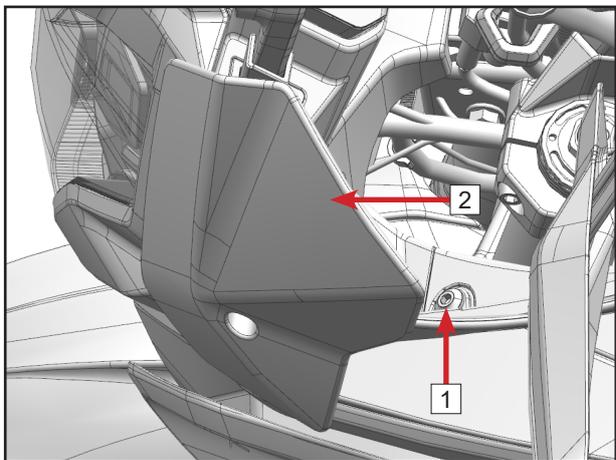
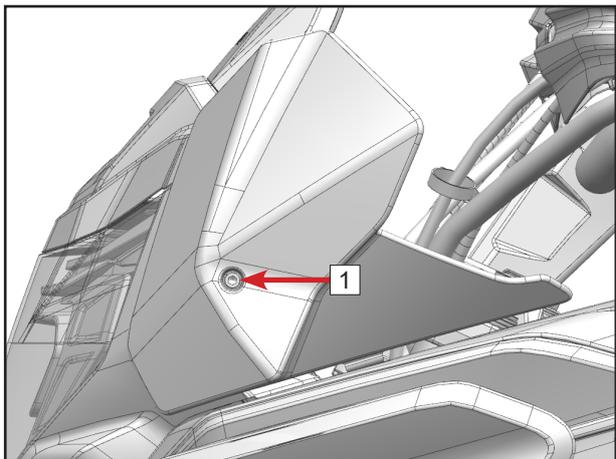
Remove bolt **1**.

Remove bolt **1**.
Remove LH deflector **2**.

Remove RH deflector same way as LH.

Installation

Install in reverse order of disassembly.



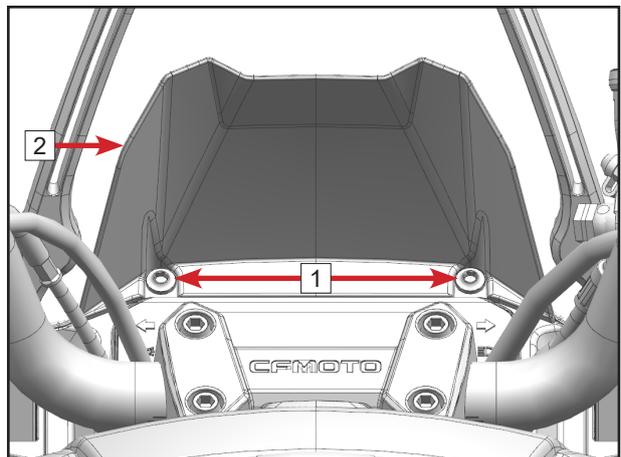
5.3 Dashboard Light Shield

Removal

Remove bolts **1**.
Remove dashboard light shield **2**.

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

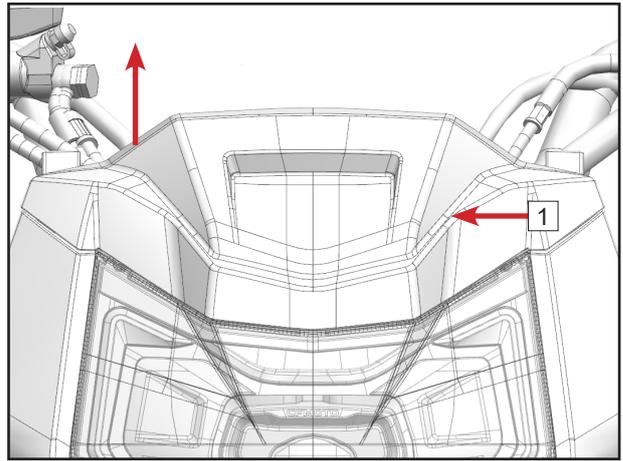
5.4 Headlight Upper Cover

Removal

In the direction of the arrow, remove the headlight upper cover [2].

Installation

Install in reverse order of disassembly.



5.5 Windshield Bracket Rod

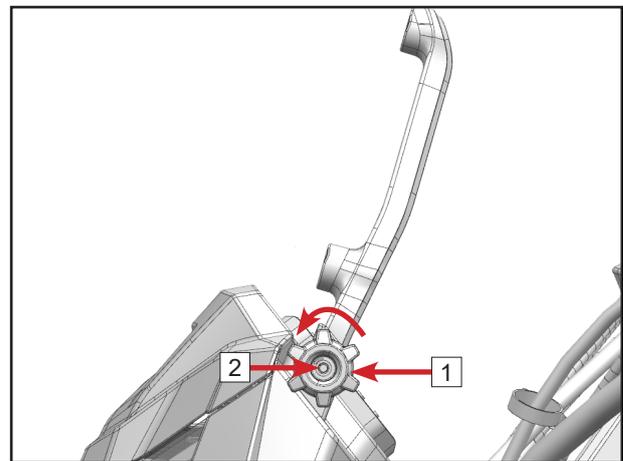
5.5.1 Windshield LH Bracket Rod

Removal

Turn the LH adjustment knob [1] of the windshield counterclockwise in the direction of the arrow to the limit (the RH adjustment knob of the windshield clockwise to the limit) .

Remove the nut [2].

Remove the LH adjusting knob [1] of the windshield.



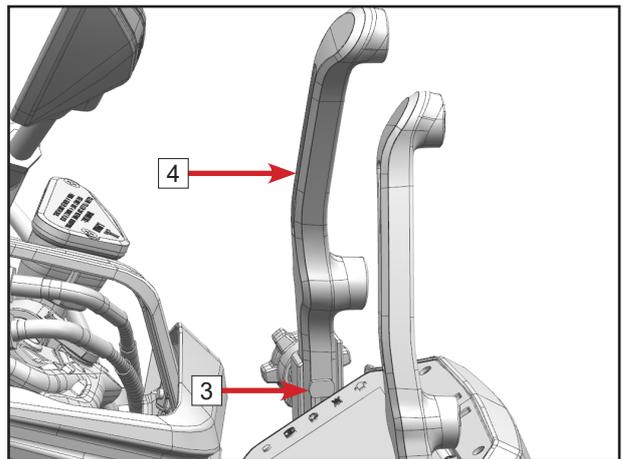
Remove the LH bracket pin [3] of the windshield.

Remove the LH bracket rod [4] of the windshield.

Remove RH bracket rod same way as LH.

Installation

Install in reverse order of disassembly.



5.6 Inner Panel

5.6.1 LH Inner Panel

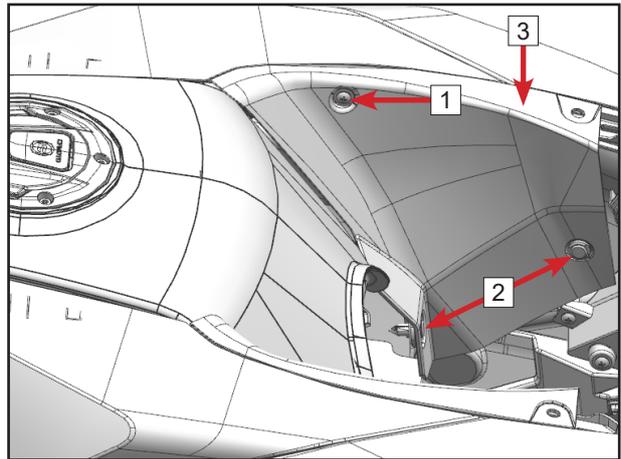
Removal

- Remove screw **1**.
- Remove clasps **2**.
- Remove LH inner panel **3**.

Remove RH inner panel same way as LH.

Installation

Install in reverse order of disassembly.



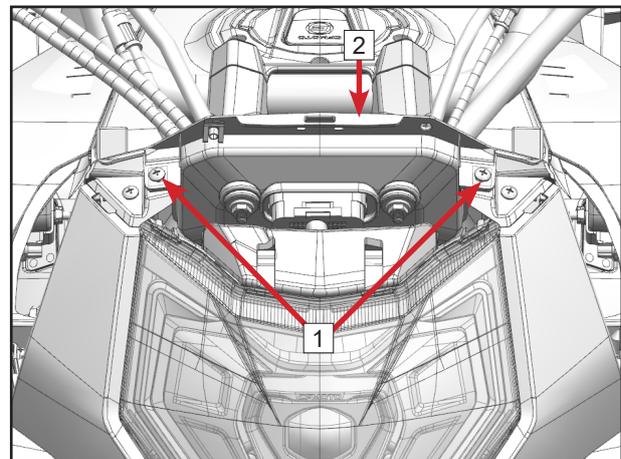
5.7 Dashboard Guard Assembly

Removal

- Remove screws **1**.
- Unplug dashboard connectors and USB connectors.
- Remove dashboard guard **2**.

Installation

Install in reverse order of disassembly.



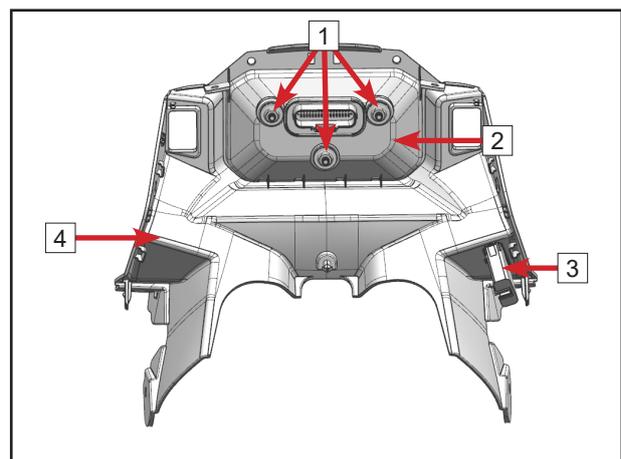
5.7.1 Dashboard Guard Assembly Disassembly

Removal

- Remove nuts **1**.
- Remove dashboard **2**.
- Remove USB output socket assembly **3**.
- Remove dashboard guard **4**.

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

5.8 Headlight Panel

5.8.1 Headlight LH Front Panel Removal

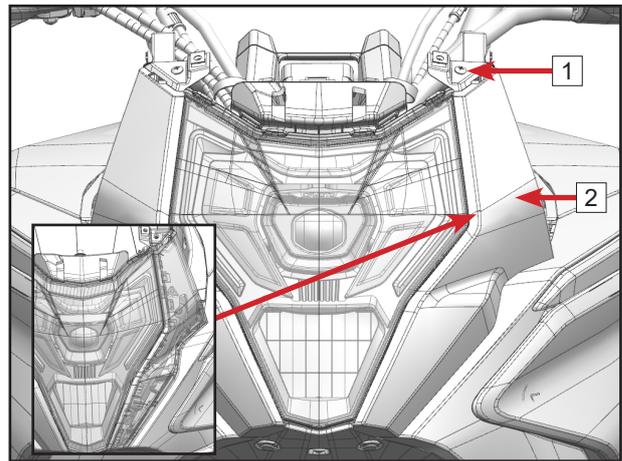
Remove screw [1].

Dislocate the inner clasp and remove the LH front panel of the headlight [2].

Remove the RH front panel same way as LH.

Installation

Install in reverse order of disassembly.



5.9 Front Lower Panel

Removal

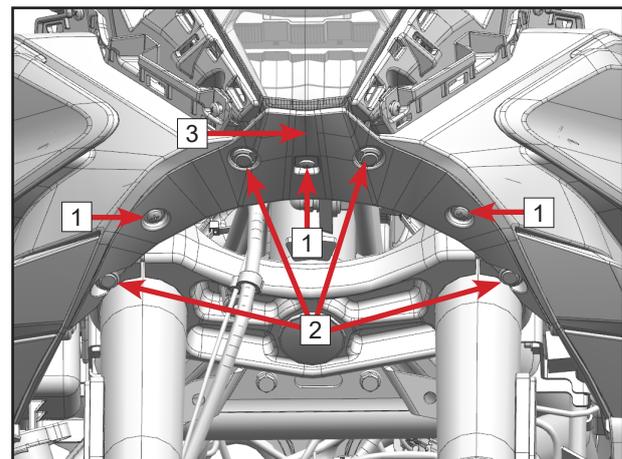
Remove screw [1].

Remove clasps [2].

Remove front lower panel [3].

Installation

Install in reverse order of disassembly.



5.10 Panel Assembly

5.10.1 LH Panel Assembly

Removal

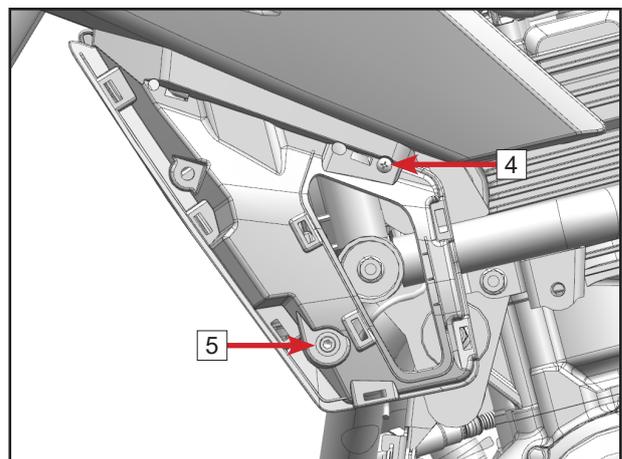
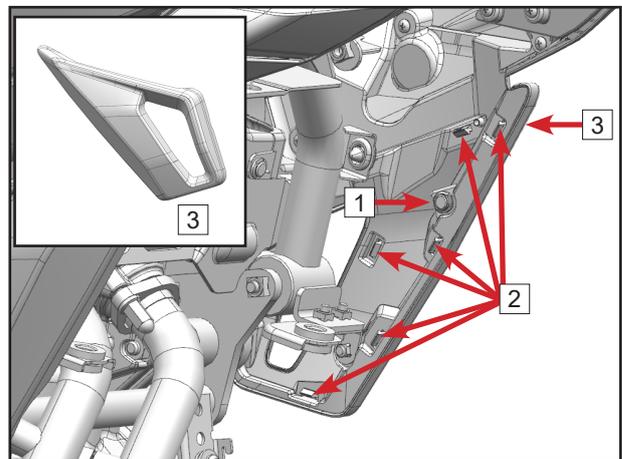
Remove clasp [1].

Dislocate clasps [2].

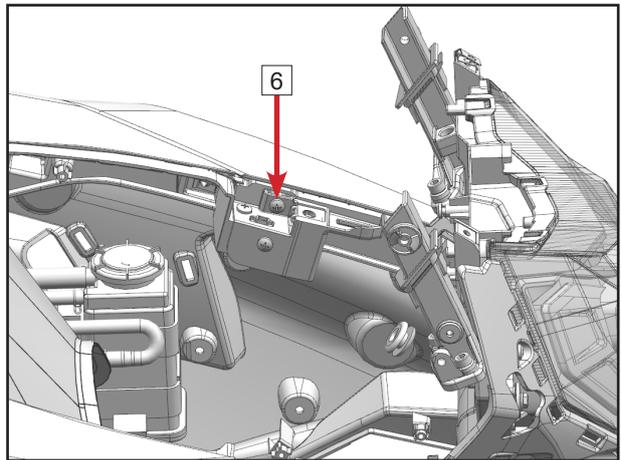
Remove reservoir lower LH deco guard [3].

Remove screw [4].

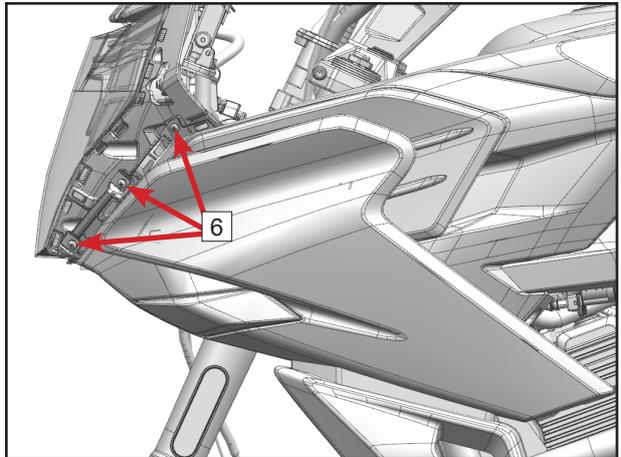
Remove bolt gasket assembly [5].



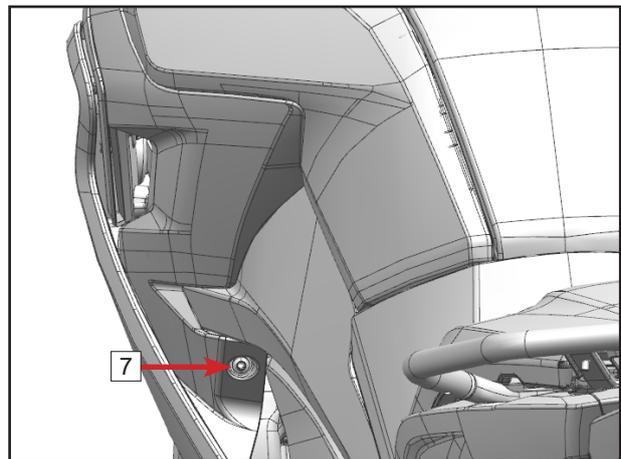
Remove screw **6**.



Remove screw **6**.

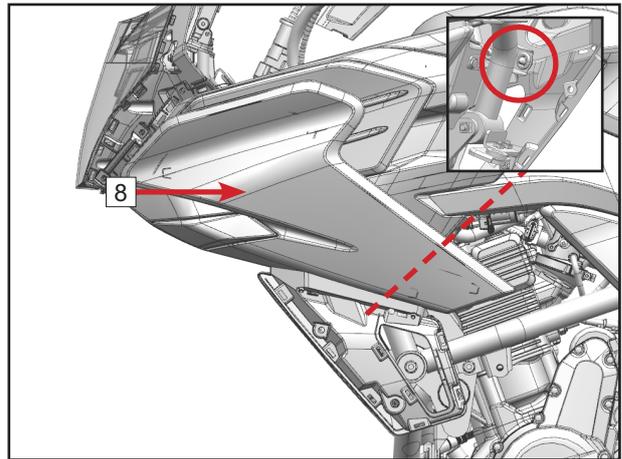


Remove bolt **7**.

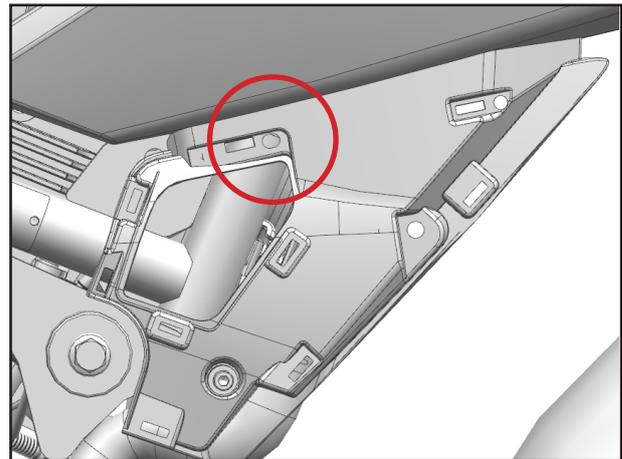


05 Body Covering Parts

Dislocate fastener.
Unplug LH turn light connectors.
Remove LH panel assembly [8].



The removal method of the RH panel assembly is the same as the LH panel assembly, but the number of screws of the RH panel assembly is one less than that of the LH panel assembly. See the picture on the right for details (remove the lower RH deco guard of the reservoir and you can see it, there is no screw fixation here)



Installation

Install in reverse order of disassembly.

5.10.2 LH Panel Assembly Disassembly

5.10.2.1 LH Turn Light (state 1)

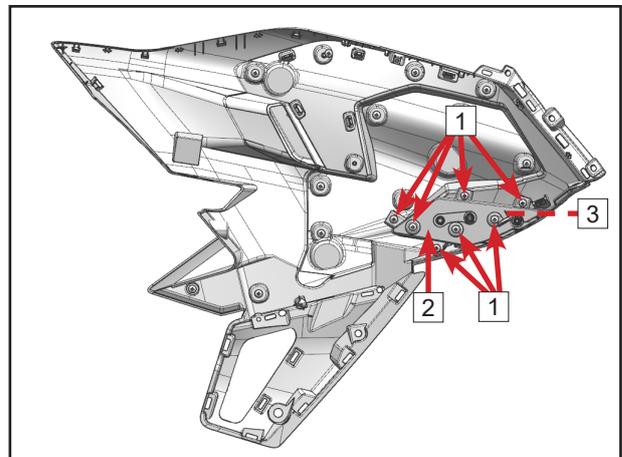
Removal

Remove screws [1].

Remove LH turn light bracket [2].

Remove LH turn light [3].

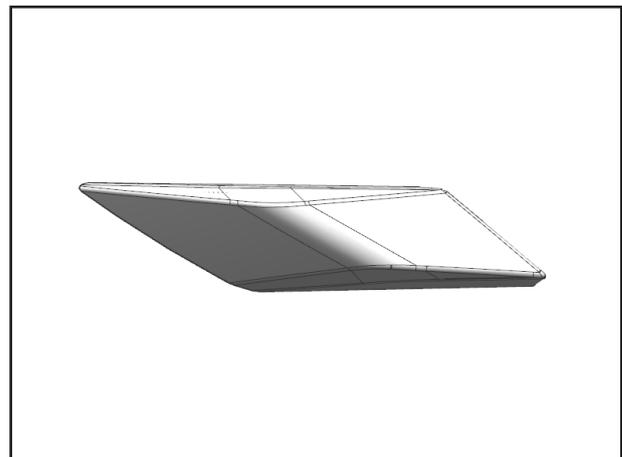
NOTE: The turn light of this vehicle is LED. If the turn light is damaged, it needs to be replaced with a new one.



LH turn light is in the right picture.

Installation

Install in reverse order of disassembly.

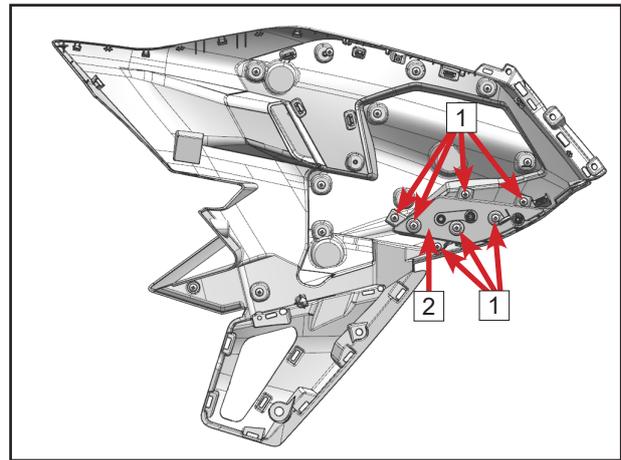


5.10.2.2 Turn Light (state 2)

Removal

Remove screws **1**.

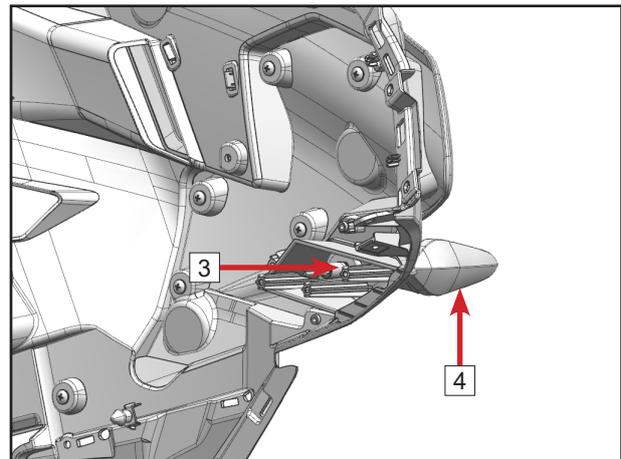
Remove LH turn light bracket **2**.



Remove nut gasket assembly **3**.

Remove LH turn light **4**.

NOTE: The turn light of this vehicle is LED. If the turn light is damaged, it needs to be replaced with a new one.

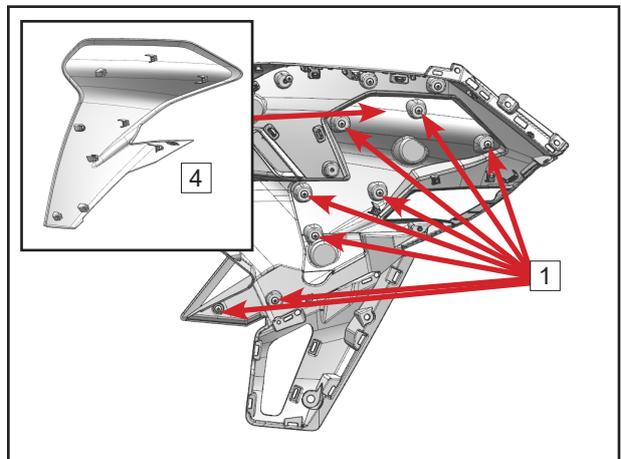


5.10.2.3 Turn Light LH Front Panel

Removal

Remove screws **1**.

Remove turn light LH front panel **4**.



5.10.2.4 Turn Light LH Rear Panel and Headlight LH Rear Panel

Removal

Remove screws **1**.

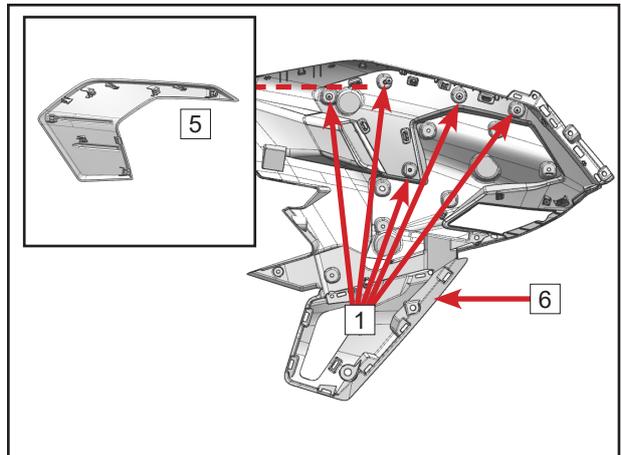
Remove turn light LH rear panel **5**.

Remove headlight LH rear panel **6**.

RH panel assembly removal is the same way as LH.

Installation

Install in reverse order of disassembly.

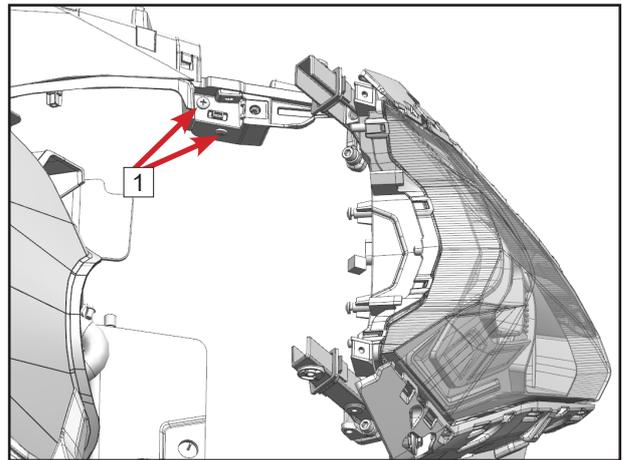


05 Body Covering Parts

5.11 Head Guard Bracket

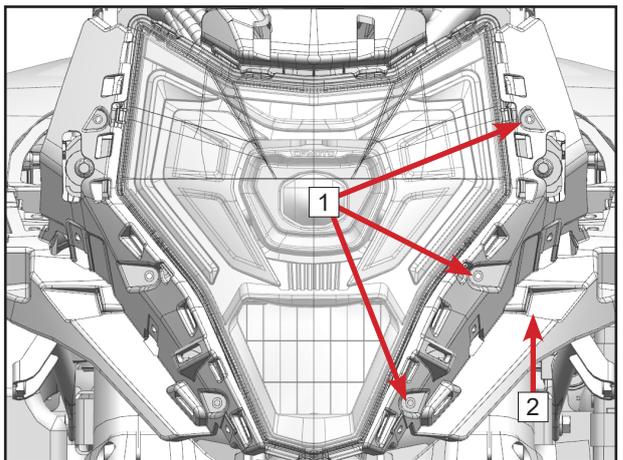
5.11.1 LH Head Guard Bracket Removal

Remove screws **1**.



Remove screws **1**.

Remove LH head guard bracket **2**.



RH head guard bracket removal is the same way as LH.

Installation

Install in reverse order of disassembly.

5.12 Headlight

Removal

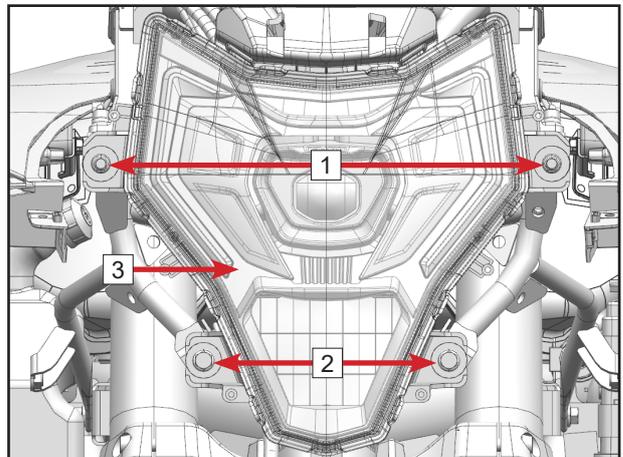
Remove nuts and bolts assembly **1**.

Remove bolts **2**.

Unplug headlight connectors.

Remove headlight **3**.

NOTE: The headlight of this vehicle is LED. If the headlight is damaged, it needs to be replaced with a new one.



Installation

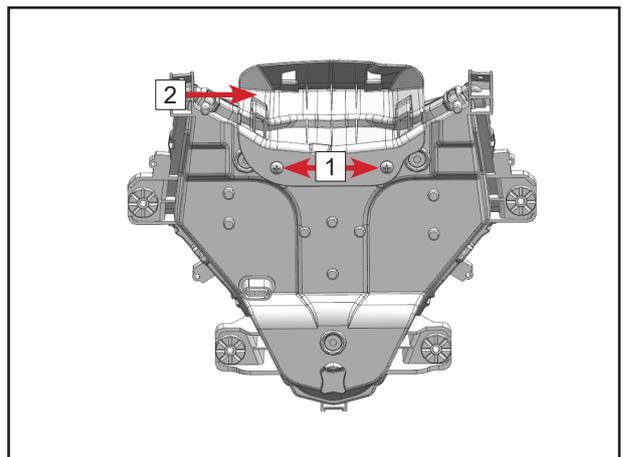
Install in reverse order of disassembly.

5.13 Headlight Upper Cover Mounting Plate

Removal

Remove screws **1**.

Remove headlight upper cover mounting plate **2**.



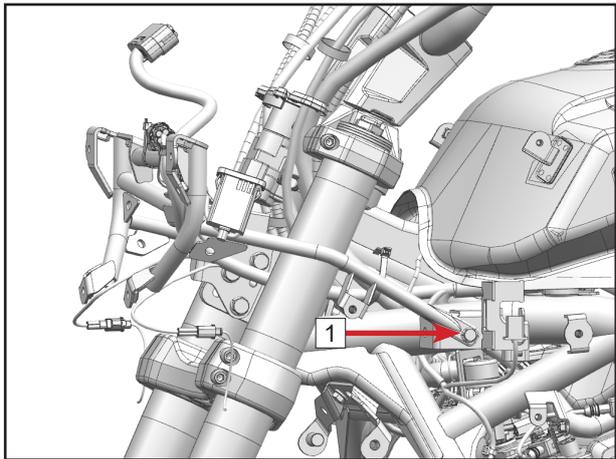
Installation

Install in reverse order of disassembly.

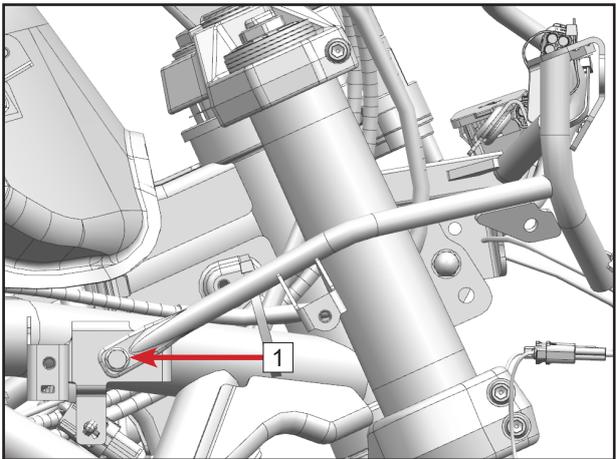
5.14 Headlight Bracket

Removal

Remove bolt 1.



Remove bolt 1.



Remove nuts, circlips, washers assembly 2.

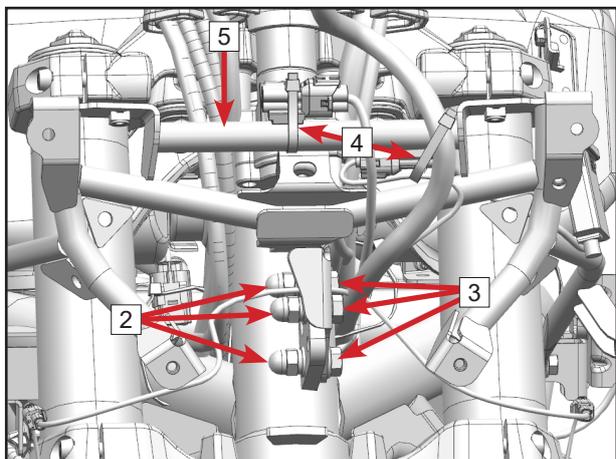
Remove bolts 3.

Remove ties 4.

Remove headlight bracket 5.

Installation

Install in reverse order of disassembly.



5.15 Windshield Bracket

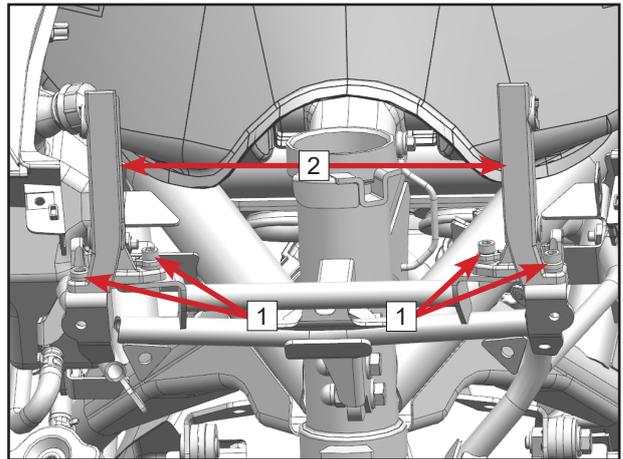
Removal

Remove bolts [1].

Remove windshield bracket [1].

Installation

Install in reverse order of disassembly.



5.16 Frame Panel

5.16.1 Frame LH Panel

Removal

Remove bolt [1].

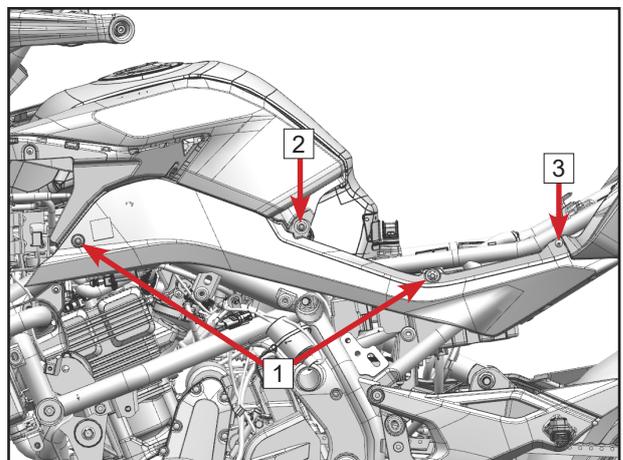
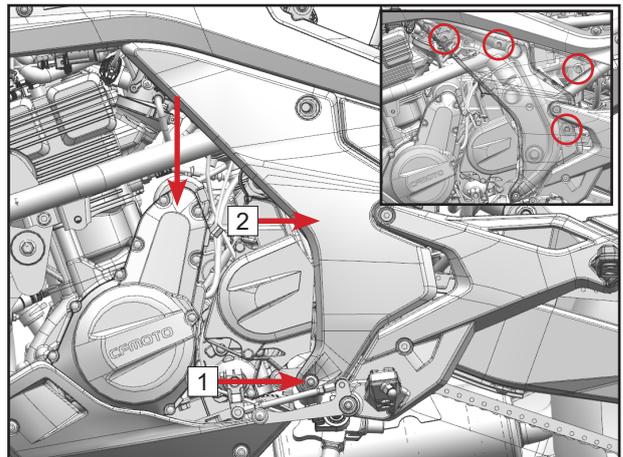
Outward, pull down the LH panel of the frame, remove the inner fastener, remove the LH panel of the frame [2].

The removal method of the RH panel of the frame and the LH frame of the frame is the same.

The LH and RH panel of the frame can be removed separately.

Installation

Install in reverse order of disassembly.



5.17 Seat Panel

5.17.1 Seat LH Panel

Removal

Remove bolts [1].

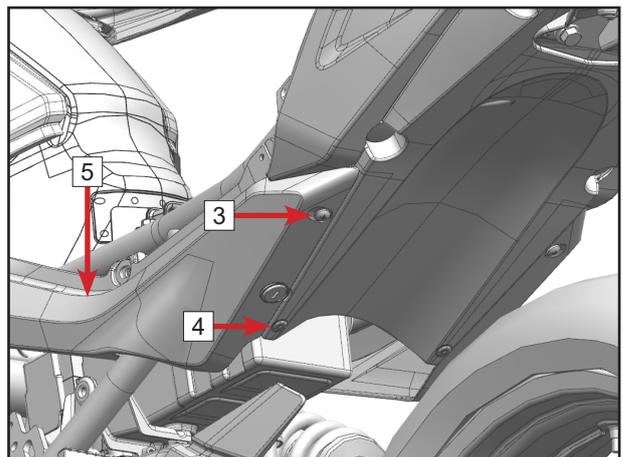
Remove bolts, gaskets, T-bushing assembly [2].

Remove screw [3].

Remove screw [3].

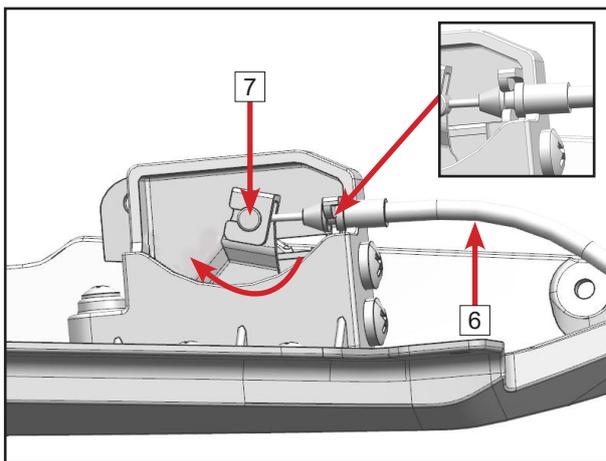
Remove clasp [4].

Release seat LH panel [5].

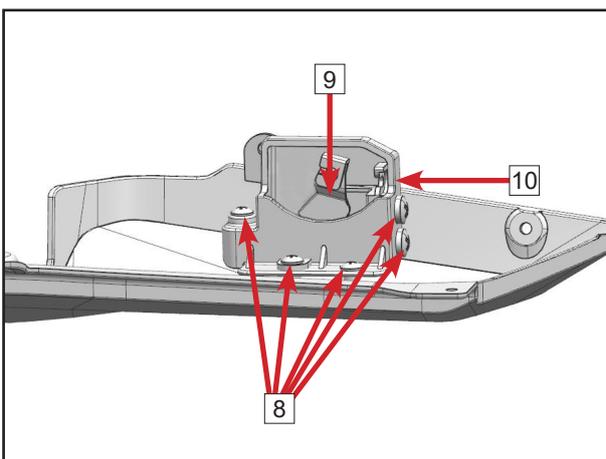


CFMOTO

Pull up the seat lock cable **6** off the slot, turn clockwise to remove the terminal **7**, remove the LH panel **5** of the seat.



Remove screws **8**.
Remove seat lock **9**.
Remove seat lock guard **10**.



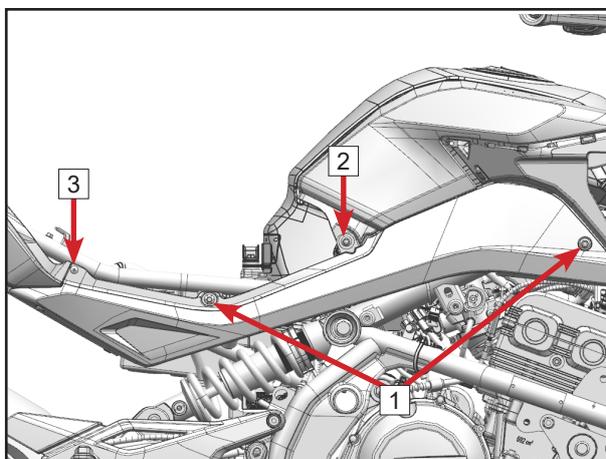
Installation

Install in reverse order of disassembly.

5.18 Seat RH Panel

Removal

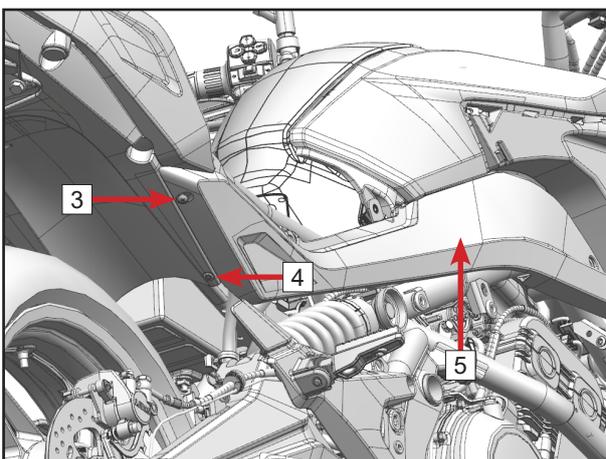
Remove bolts **1**.
Remove bolts, gaskets, T-bushing assembly **2**.
Remove screw **3**.



Remove screw **3**.
Remove clasp **4**.
Remove seat RH panel **5**.

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

5.19 Fuel Tank Panel

5.19.1 Fuel Tank LH Panel

Removal

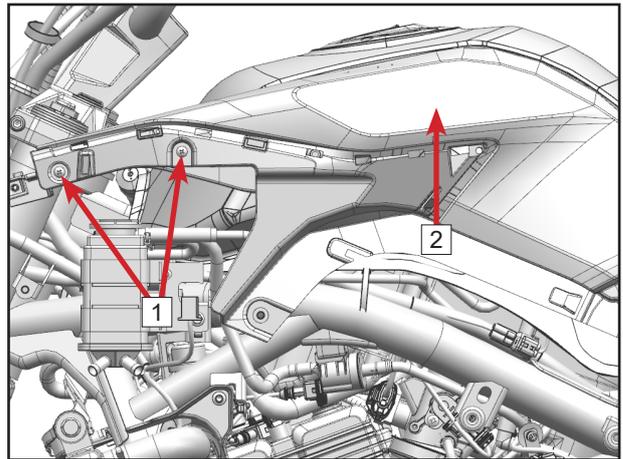
Remove screws [1].

Remove fuel tank LH panel [2].

Remove fuel tank RH panel same way as LH.

Installation

Install in reverse order of disassembly.



5.19.2 Fuel Tank LH Panel Inner Plate

Removal

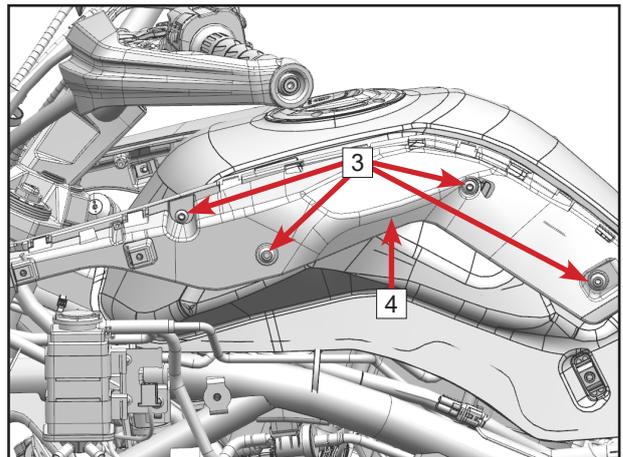
Remove bolts [3].

Remove fuel tank LH panel inner plate [4].

Remove fuel tank RH panel inner plate same way as LH.

Installation

Install in reverse order of disassembly.



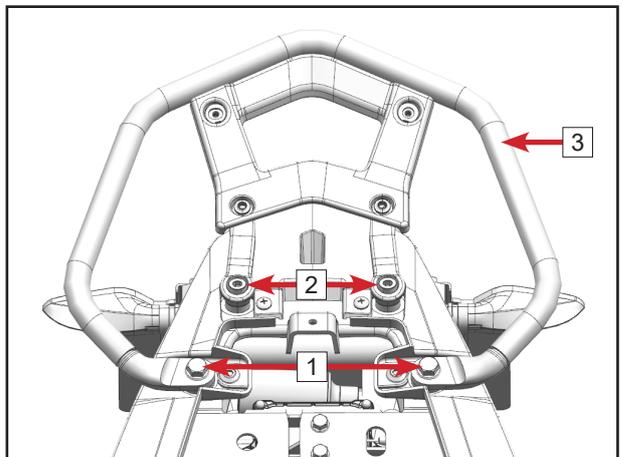
5.20 Rear Armrest Assembly

Removal

Remove bolts [1].

Remove bolts [2].

Remove rear armrest assembly [3].

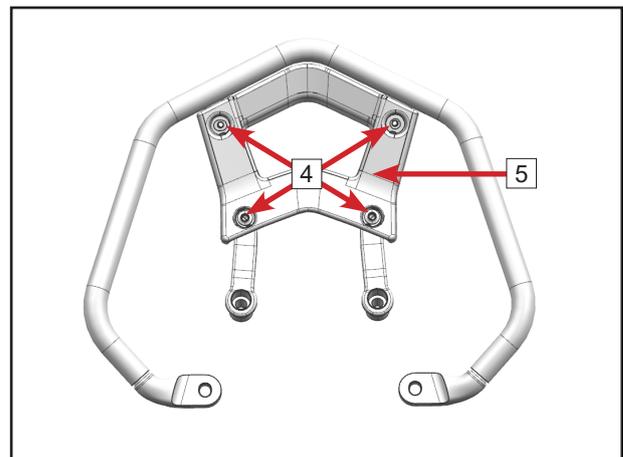


Remove bolts [4].

Disassemble rear armrest cover plate [5], rear armrest assembly [3].

Installation

Install in reverse order of disassembly.



5.21 Tail Light Panel

5.21.1 Tail Light Upper Panel

Removal

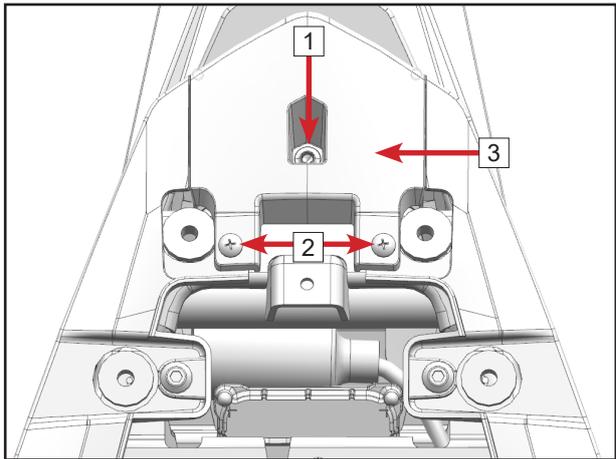
Remove bolt 1.

Remove screws 2.

Remove tail light upper panel 3.

Installation

Install in reverse order of disassembly.



5.21.2 Tail Light LH Panel

Removal

Remove clasp 1.

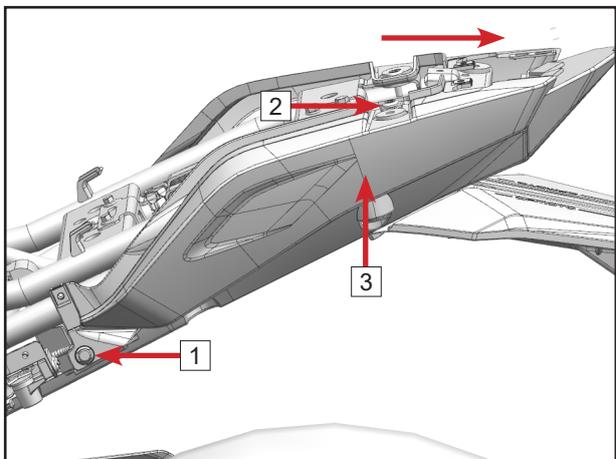
Remove bolt 2.

Remove the tail light LH panel backwards 3.

Remove tail light RH panel same way as LH.

Installation

Install in reverse order of disassembly.



5.22 Tail Light

Removal

Unplug tail light connectors.

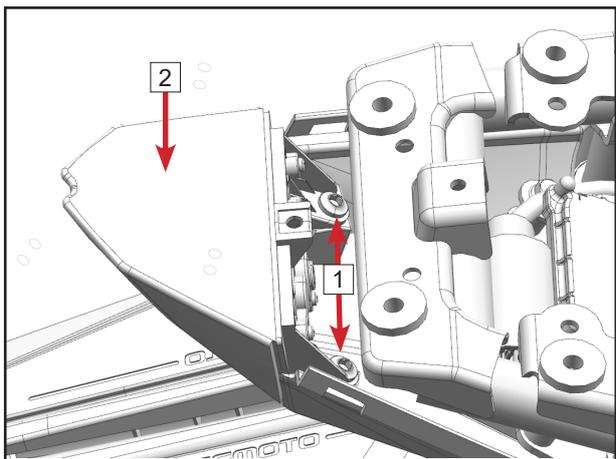
Remove bolts 1.

Remove tail light 2.

NOTE: The tail light of this vehicle is LED. If the tail light is damaged, it needs to be replaced with a new one.

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

5.23 Rear Fender Assembly (state 1)

Removal

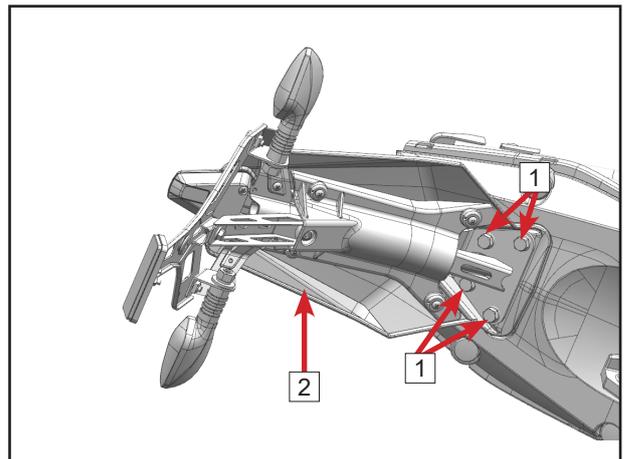
Unplug rear turn light, license light connector.

Remove bolts [1].

Remove rear fender assembly [2].

Installation

Install in reverse order of disassembly.



5.23.1 Rear Fender Assembly Disassembly

5.23.1.1 Rear Fender Lining

Removal

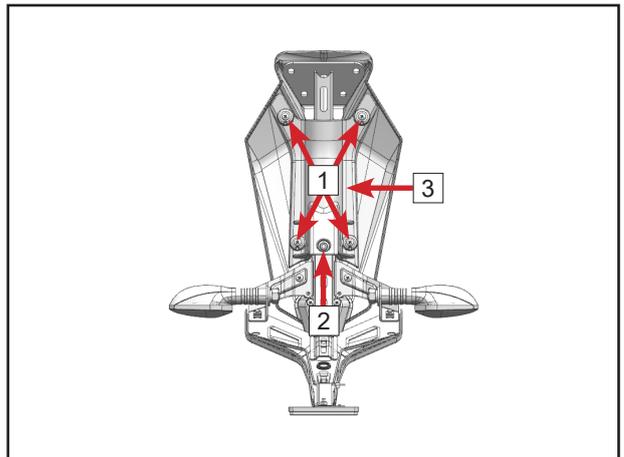
Remove screws [1].

Remove bolt [2].

Remove rear fender lining [3].

Installation

Install in reverse order of disassembly.



5.23.1.2 Rear Fender

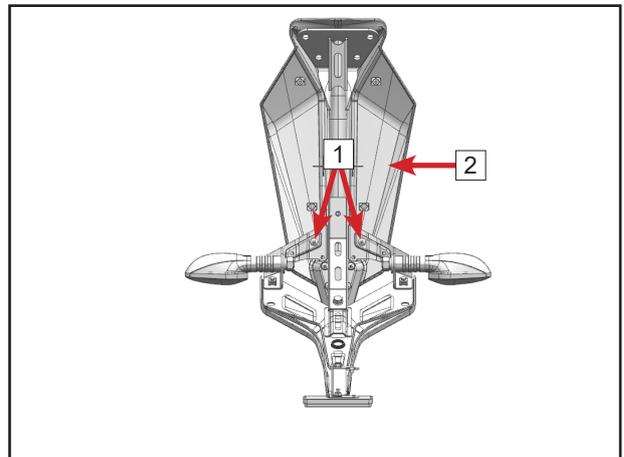
Removal

Remove screws [1].

Remove rear fender [2].

Installation

Install in reverse order of disassembly.



5.23.1.3 License Light Lower Cover

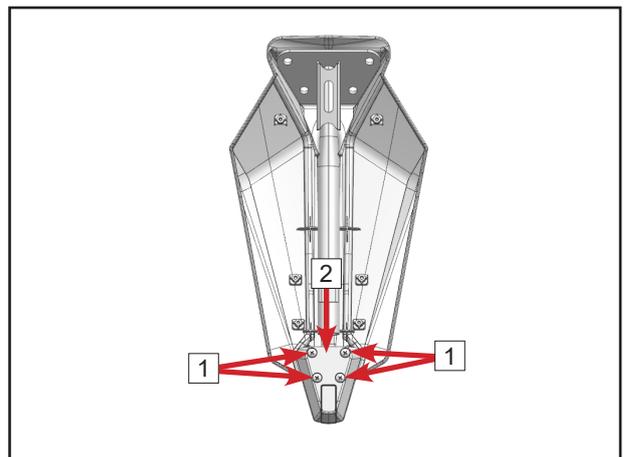
Removal

Remove screws [1].

Remove license light lower cover [2].

Installation

Install in reverse order of disassembly.



5.23.1.4 License Light

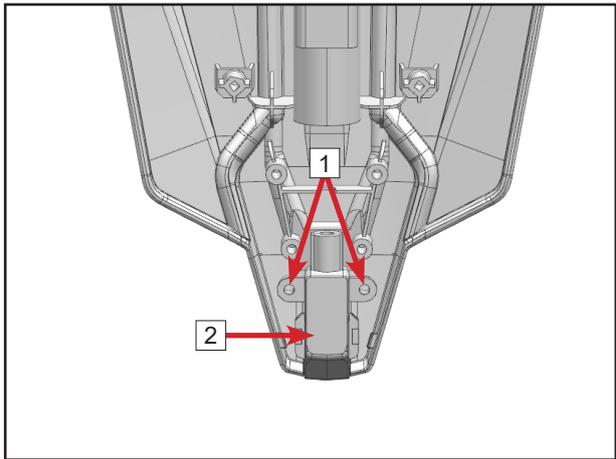
Removal

Remove screws [1].

Remove license light [2].

Installation

Install in reverse order of disassembly.



5.23.1.5 Rear Turn Light

Removal

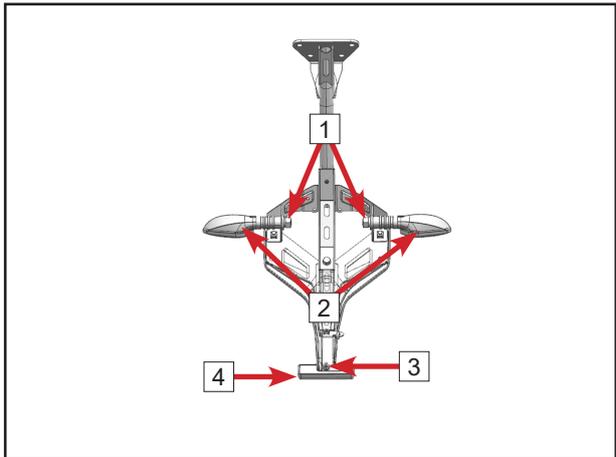
Remove nuts, gaskets assembly [1].

Remove rear LH & RH turn light [2].

NOTE: The rear turn light of this vehicle is LED. If the rear turn light is damaged, it needs to be replaced with a new one.

Installation

Install in reverse order of disassembly.

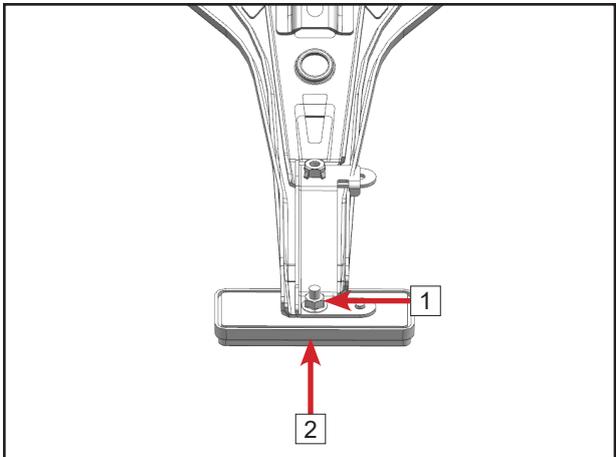


5.23.1.6 Rear Reflector

Removal

Remove nut [3].

Remove rear reflector [4].



5.23.1.7 Rear Fender Bracket and License Bracket

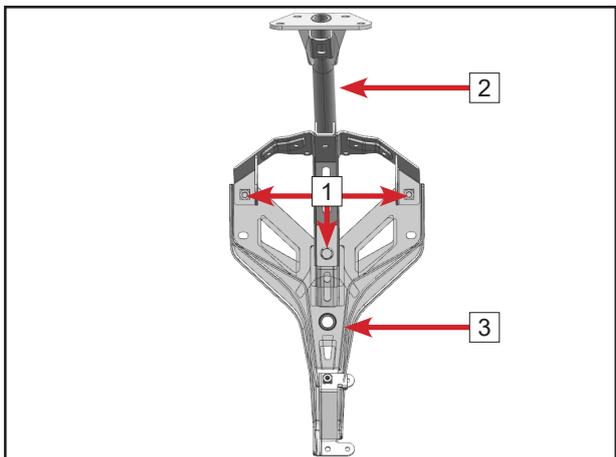
Removal

Remove bolts [1].

Disassemble rear fender bracket [2] and license bracket [3].

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

5.24 Rear Fender Assembly (state 2)

Removal

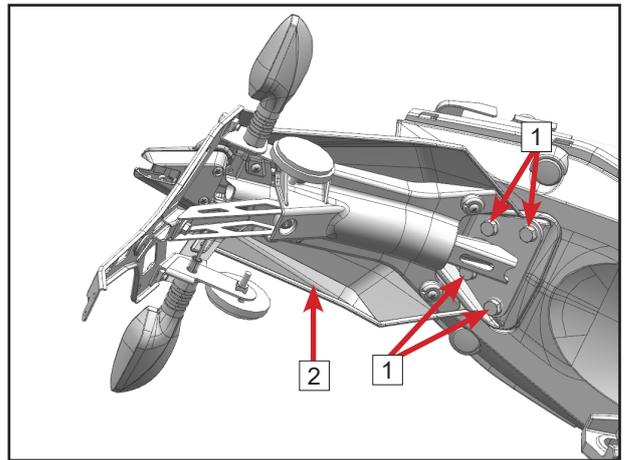
Unplug rear turn light and license light connectors.

Remove bolts [1].

Remove rear fender assembly [2].

Installation

Install in reverse order of disassembly.



5.24.1 Rear Fender Assembly Disassembly

5.24.1.1 Rear Fender Lining Removal

Removal

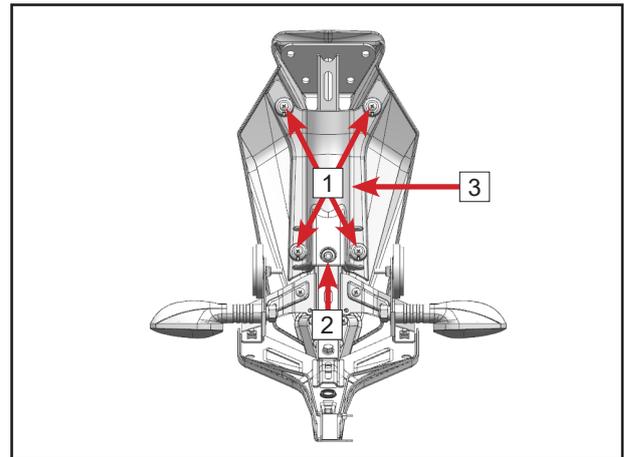
Remove screws [1].

Remove bolt [2].

Remove rear fender lining [3].

Installation

Install in reverse order of disassembly.



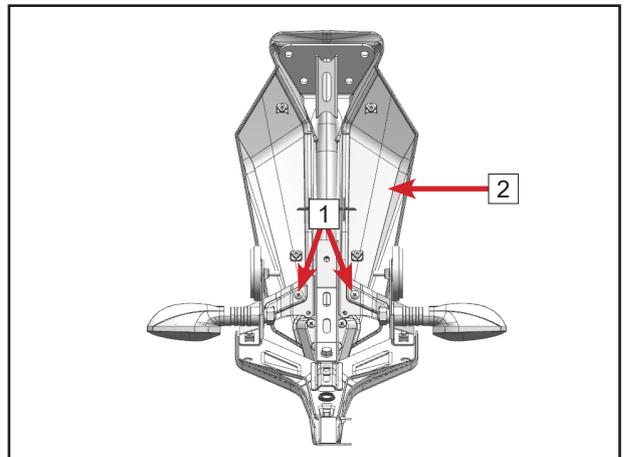
5.24.1.2 Rear Fender Removal

Remove screws [1].

Remove rear fender [2].

Installation

Install in reverse order of disassembly.



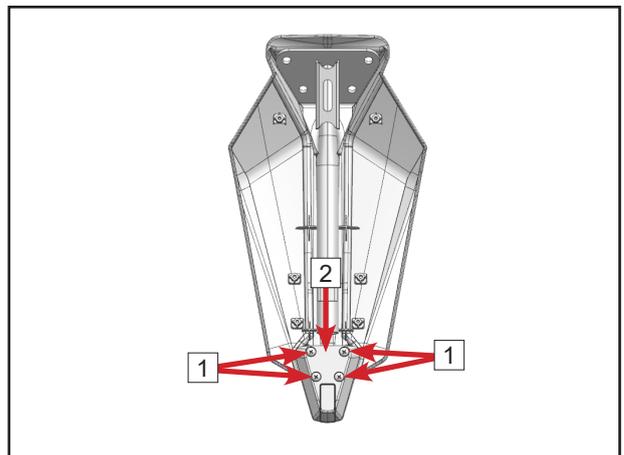
5.24.1.3 License Light Lower Cover Removal

Remove screws [1].

Remove license light lower cover [2].

Installation

Install in reverse order of disassembly.



5.24.1.4 License Light

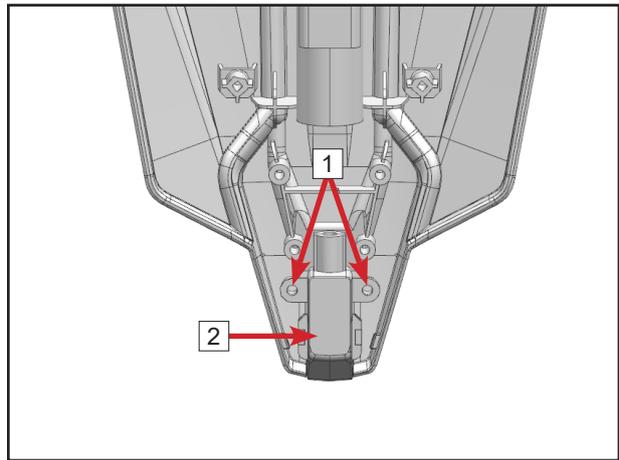
Removal

Remove screws **1**.

Remove license light **2**.

Installation

Install in reverse order of disassembly.



5.24.1.5 Rear Reflector and Rear Turn Light

Removal

Remove rear reflector **1**.

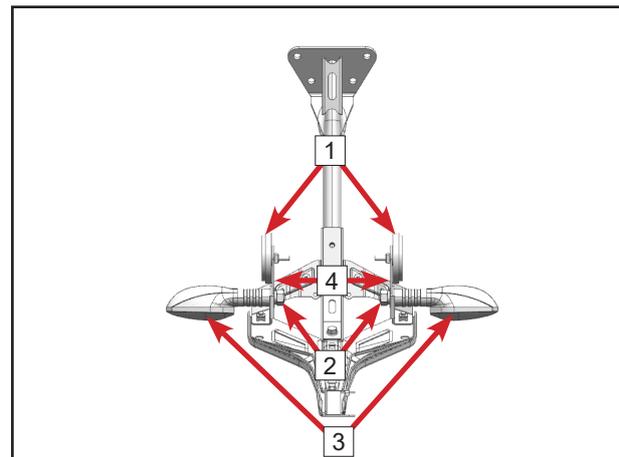
Remove nuts and gaskets assembly **2**.

Remove rear LH & RH turn light **3**.

Remove rear reflector bracket **4**.

Installation

Install in reverse order of disassembly.



5.24.1.6 Rear Fender Bracket and License Bracket

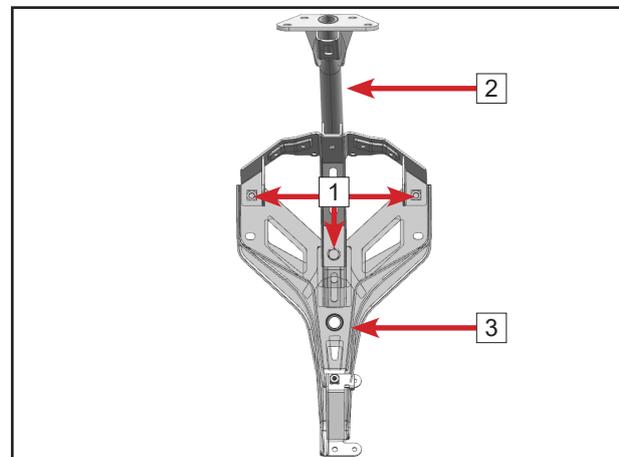
Removal

Remove bolts **1**.

Disassemble rear fender bracket **2** and license bracket **3**.

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

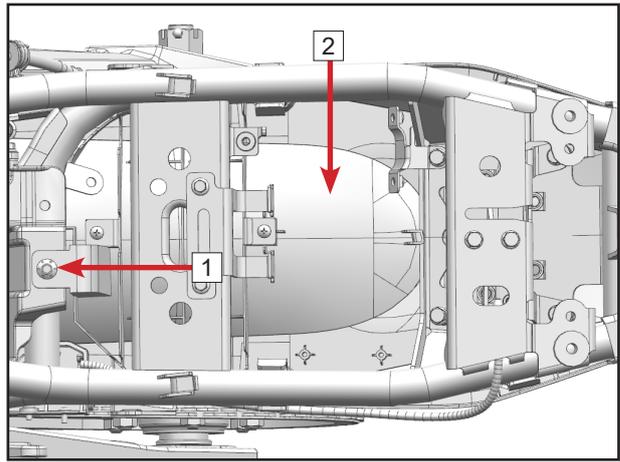
5.25 Frame Base Plate

Removal

Remove relevant electrical parts.
Remove bolt **1**.
Remove frame base plate **2**.

Installation

Install in reverse order of disassembly.



5.26 Engine Guard

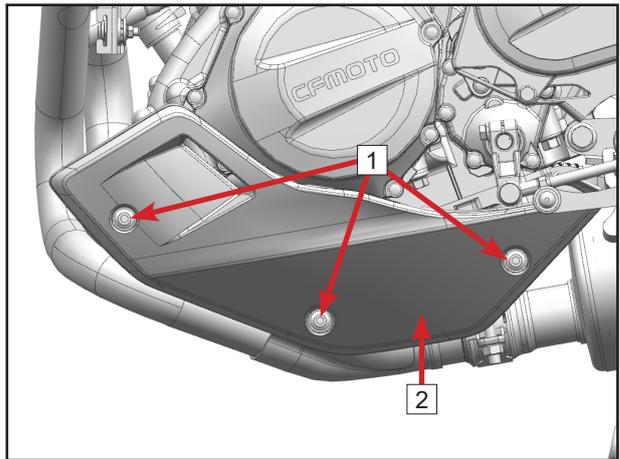
5.26.1 Engine LH Guard

Removal

Remove bolts **1**.
Remove engine LH guard **2**.

Installation

Install in reverse order of disassembly.



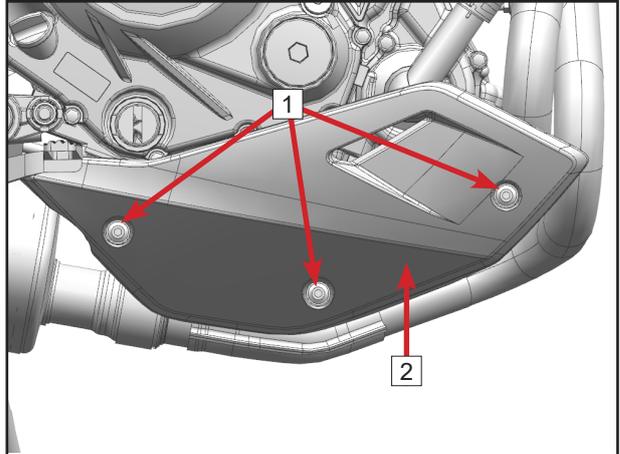
5.26.2 Engine RH Guard

Removal

Remove bolts **1**.
Remove engine RH guard **2**.

Installation

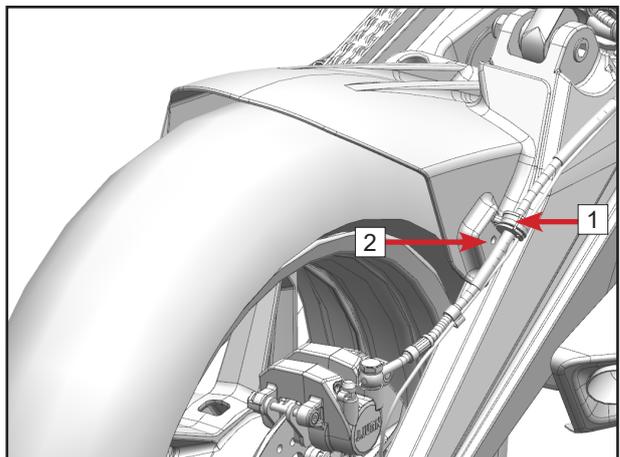
Install in reverse order of disassembly.



5.27 Rear Swing Arm Fender

Removal

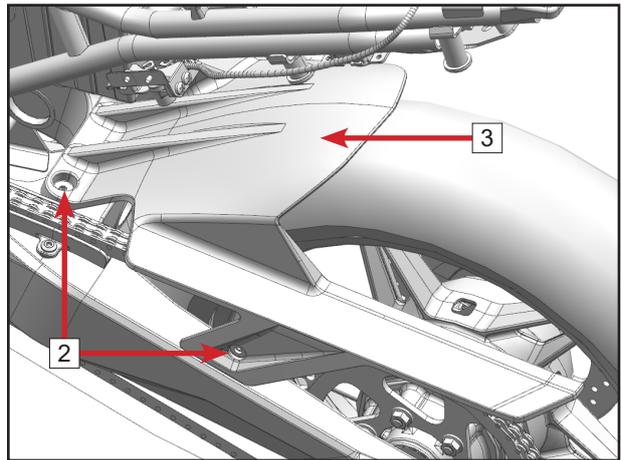
Unplug rubber hose clip assembly **1**.
Remove bolt **2**.



Remove bolts [2].
Remove rear swing arm fender [3].

Installation

Install in reverse order of disassembly.



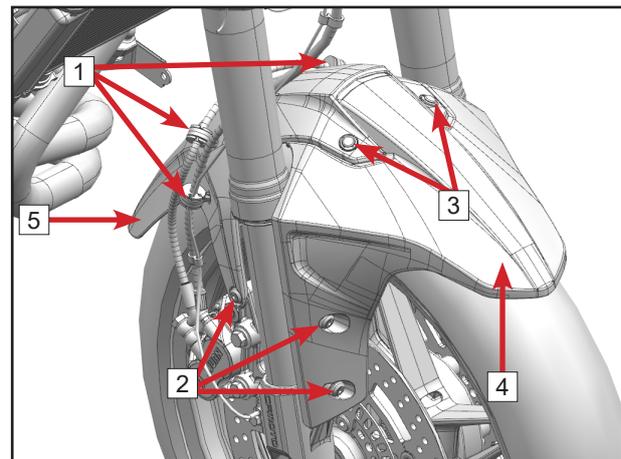
5.28 Front Fender Assembly

Removal

Unplug 3 rubber hose clip assembly [1].
Remove 6 bolts [2] (LH and RH) .
Remove clasps [3].
Remove front fender front part [4] and rear part [5].

Installation

Install in reverse order of disassembly.

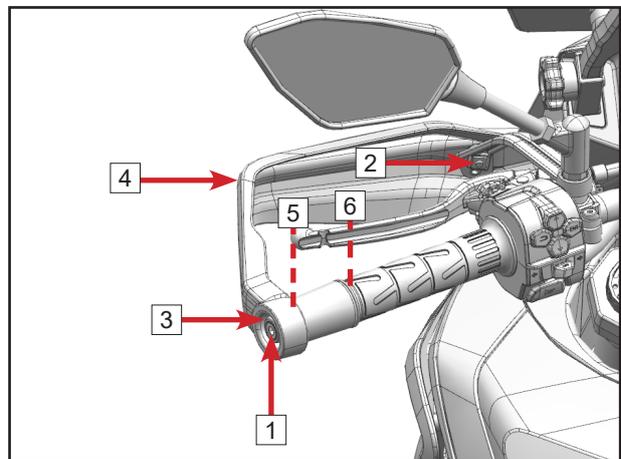


5.29 Hand Guard (if equipped)

5.29.1 LH Hand Guard

Removal

Release bolt [1].
Remove bolt [2].
Remove hand guard bushing [3] and LH hand guard [4] together with T-bushing [5] and balance block [6].

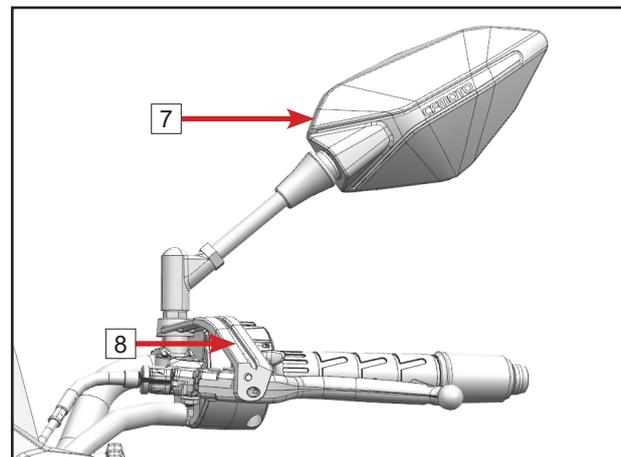


Remove LH rearview mirror [7].
Remove LH hand guard bracket [8].

Remove RH hand guard same way as LH.

Installation

Install in reverse order of disassembly.



05 Body Covering Parts

5.30 Reservoir Rear Fender

5.30.1 Reservoir Rear LH Fender

Pre-work

Remove radiator assembly (see 09 chapter for details).

Removal

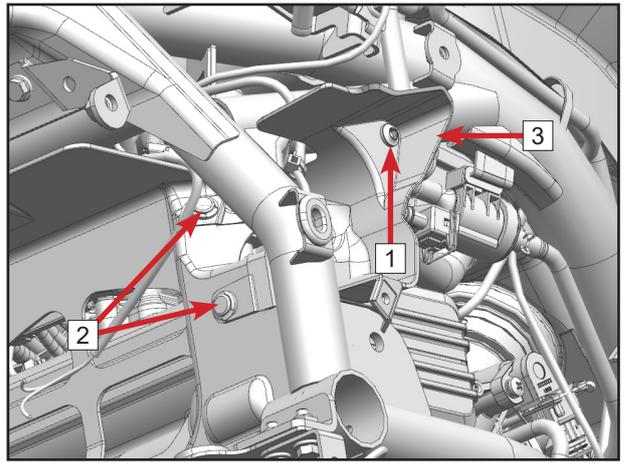
Remove bolt **1**.

Remove clasps **2**.

Remove reservoir rear LH fender **3**.

Installation

Install in reverse order of disassembly.



5.30.2 Reservoir Rear Middle Fender

Removal

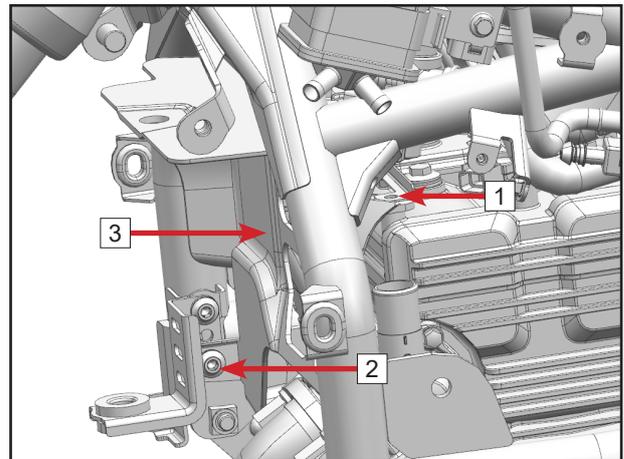
Remove 2 bolts **1** (LH and RH) .

Remove bolt **2**.

Remove reservoir rear middle fender **3**.

Installation

Install in reverse order of disassembly.



06 Fuel System

6.1 Fuel Tank	6-3
6.2 EFI Fuel Filter	6-4
6.3 Fuel Pump	6-5
6.4 Float Ball	6-6

CFMOTO

⚠ DANGER:

Fuel is flammable, please service the fuel system in a ventilated area, and turn off the engine beforehand and wait for the engine and muffler to cool down completely. Smoking or other pyrotechnic acts in the fueling area or fuel storage area are strictly prohibited.

Do not tilt or invert the fuel tank to avoid spilled fuel flowing onto hot parts

Fuel is toxic and harmful to health. Do not allow fuel to touch your skin, eyes or clothing. Do not breathe fuel vapors.

When the fuel touches the skin, rinse the contact area with plenty of water immediately.

In case of contact with eyes, wash with water immediately and seek medical attention.

If fuel comes into contact with clothing, change clothing promptly.

If fuel is swallowed by mistake, seek medical attention immediately.

Dispose of fuel properly to avoid environmental hazards.

⚠ WARNING:

Please use genuine parts for service work, otherwise the normal operation of the EFI system cannot be guaranteed.

During the service process, disassembly of EFI parts is prohibited.

During the service process, EFI parts should be held lightly.

When disconnecting or connecting the plug, be sure to turn off the ignition switch, otherwise it will damage the EFI parts.

When removing the electric fuel pump from the fuel tank, do not energize the fuel pump to avoid electrical sparks and fire.

Fuel pump is not allowed to run test in dry state or in water, otherwise it will reduce its service life, in addition, the positive and negative lines of the fuel pump must not be connected to the reverse.

The fuel supply pressure of the EFI system is high (about 330kPa), and all fuel lines are made of high-pressure resistant fuel lines. Even if the engine is not running, the line also maintains a high oil pressure, so in the maintenance process be careful not to easily remove the fuel line.

When the ignition system is checked, jump spark testing should be done only when necessary and for the shortest possible time. The throttle should not be opened during testing, otherwise it will cause a large amount of unburned gasoline to enter the exhaust pipe and damage the three-way catalytic converter.

When the fuel system needs to be repaired, the fuel system should be depressurized before removing the fuel pipe, and the method of depressurization is as follows: remove the fuel pump relay and start the engine to make it idle until the engine turns off by itself.

The removal of the fuel pipe and the replacement of the fuel filter should be carried out in a well-ventilated place by professional maintenance personnel.

When connecting the battery, the positive and negative poles of the battery should not be connected wrongly to avoid damaging the electronic components, and the system adopts negative grounding.

When the engine is running, it is not allowed to remove the battery cable.

Before implementing electric welding on the whole vehicle, the positive and negative battery cables and electronic control unit must be dismantled.

Do not use the method of piercing the skin of the wire to detect the electrical signal of the input and output of the parts.

Establish the awareness of environmental protection and effectively dispose of the waste generated during the maintenance process.

6.1 Fuel Tank

Pre-work

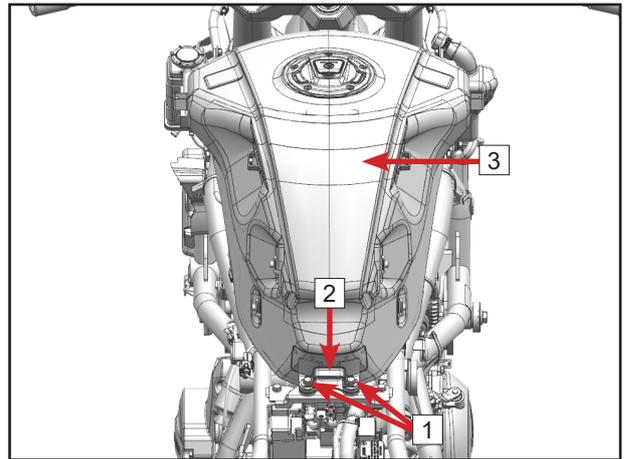
Remove relevant body covering parts (refer to these chapters for details: 5.1 5.2 5.3 5.4 5.6 5.7 5.8 5.9 5.10 5.15 5.16 5.17 5.18, the dashboard guard assembly in chapter 5.7 only needs to be removed of the screws and push the dashboard guard up to facilitate the next removal of the headlight panel in chapter 5.8)

Removal

Remove bolts [1].

Remove seat bracket [2].

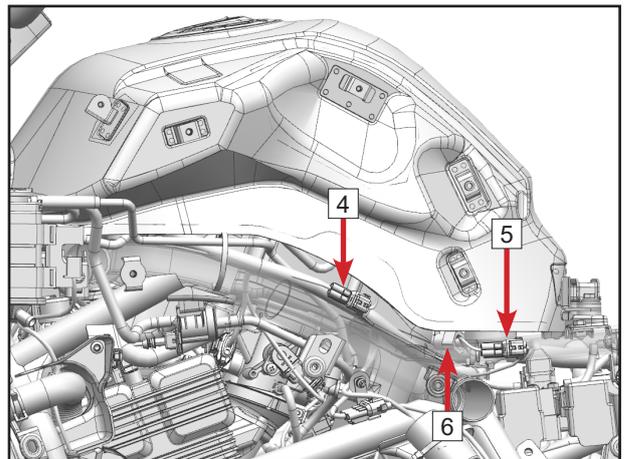
Lift up fuel tank [3].



Unplug fuel level sensor connectors [4].

Unplug fuel pump sensor connectors [5].

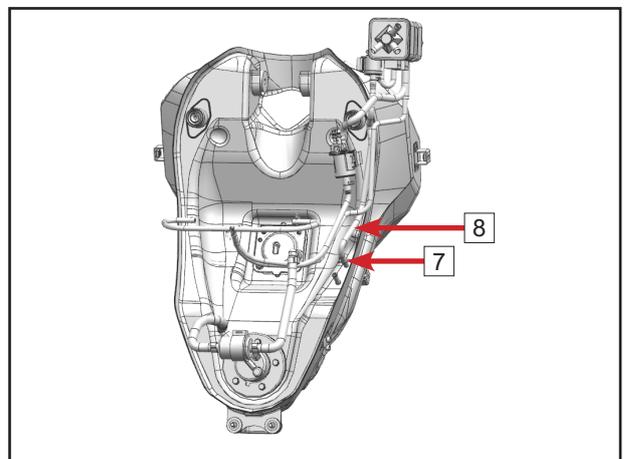
Unplug high-pressure fuel hose [6].



Release clasp [7].

Remove fuel adsorption hose [8].

Remove fuel tank [3].



⚠ DANGER: Do not invert the fuel tank to prevent fuel leakage.

Installation

Install in reverse order of disassembly.

⚠ WARNING: When installing the fuel tank, install the quick connector of the high-pressure pipe first, and check that the pipes cannot be squeezed or damaged.

6.2 EFI Fuel Filter

The fuel filter is used to filter impurities in the fuel to prevent clogging of the fuel system, reduce mechanical wear and tear, and ensure stable engine operation. In addition, the fuel filter can filter the water in the fuel to reduce the water in the fuel from entering the engine, which leads to slow acceleration response, weak acceleration, stalling, unstable idle speed, difficult starting, etc.

EFI fuel filter changing

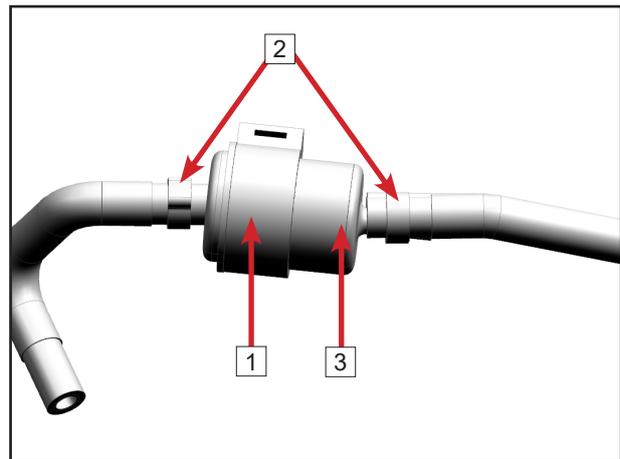
Disconnect the EFI fuel filter rubber sleeve **1** to disengage the fuel filter **3** from the vehicle.

Remove the clamp **2** at each end of the EFI fuel filter.

Remove the EFI fuel filter.

Replace the EFI fuel filter with a new one, and pay attention to the "OUT" mark towards the fuel outlet when installing it.

NOTE: The fuel filter should be replaced in a timely manner. A clogged or damaged fuel filter for a long time can lead to premature damage to the fuel pump or engine.



6.3 Fuel Pump

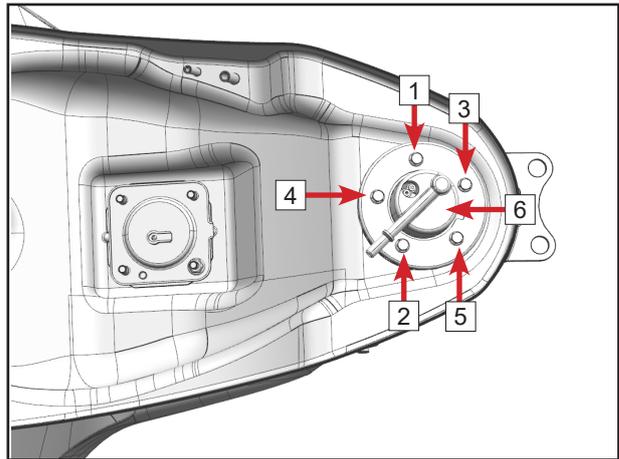
Depressurize the fuel system.

Ensure that vehicle static electricity is discharged by grounding.

Disconnect the cable wires associated with the fuel pump.

Disconnect the quick connector and use a towel to prevent leakage of fuel.

Clean the bottom of the fuel tank and the fuel pump after removing all connections and connectors under the fuel pump to prevent foreign objects from entering the fuel tank.



NOTE: Excessive foreign material in the fuel tank can cause premature fuel pump wear or clog the fuel filter. Excessive foreign material in the fuel tank can cause premature fuel pump wear or clog the fuel filter.

In turn remove bolt [1]~ bolt [5].

Carefully remove fuel pump [6].

NOTE: There will still be some fuel in the removed old fuel pump, and the old fuel pump should be transferred to the appropriate container at once.

Check the tank for debris. Clean the inside of the tank thoroughly with clean fuel before reinstalling the new fuel pump. Do not use water or other chemical agents to clean the inside of the tank.

Installation

Slip the fuel pump seal ring from bottom to top to the pump assembly mounting position, and then position the fuel pump properly into the tank assembly mounting hole.

NOTE: The arrow of the fuel pump is always aligned with the tank's positioning mark.

Place the fuel pump screw cap on the fuel pump assembly and fuel tank assembly where the three fit together.

Install the bolts [1]~ bolts [5] in order.

Reconnect quick connectors, cable wires and other parts, and start power to test if fuel pump starts properly.

See electrical system for fuel pump overhaul.

6.4 Float Ball

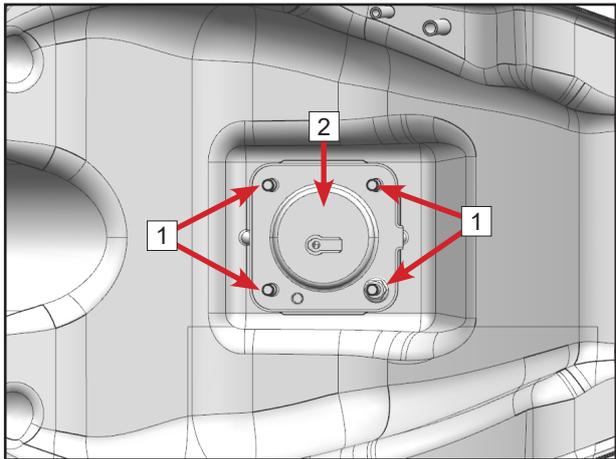
Depressurize the fuel system.

Ensure that vehicle static electricity is discharged by grounding.

Remove the four bolts diagonally **1**.

Remove the float ball **2** carefully.

The float ball has a certain bend in it and needs to be tilted to prevent damage to the float ball when removing it.



Installation

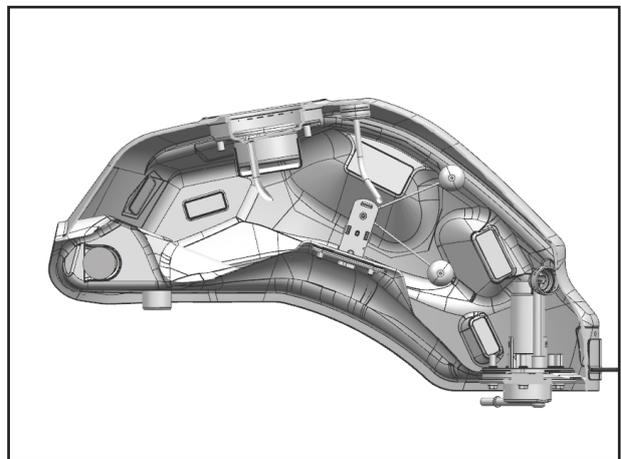
When installing the float ball, ensure that the direction of the float ball is the rear of the tank. The wrong direction of float ball will affect the positioning of fuel float ball.

Inspection

Check the appearance of the fuel tank for dents, cracks or other breakages, and replace the tank components if necessary. Check whether the hose is ruptured, aging, leaking or other phenomena, and replace if necessary.

Installation

Install in reverse order of disassembly.



NOTE: When installing the tank, there should be no extrusion, excessive bending and other phenomena between the pipelines and cables.

07 Lights and Switches

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7.1 Maintenance Information

7.1.1 Operation Instructions

⚠ CAUTION:

If the inspection should be done with battery, check if the battery is normal first. Inspection of switch continuity can be done without removing the switches from the vehicle.

After the inspecting and overhauling of each part, cables and wires should be routed properly.

7.1.2 Inspection Benchmark

Project		Standard
Fuse	Main Fuse	30A
	Auxiliary Fuse	3×5A 2×10A 3×15A 1×25A
Lights	ABS battery valve	15A
	Headlight	High-beam LED:2*6W 1*12W Low-beam LED:1*12W Position light LED:30*0.2W
	Turn light	LED:3*0.5W
	Tail light	LED:21*0.2W

7.2 Lights Troubleshooting

Headlight cannot turn on, no reaction when Hi/Lo switching.

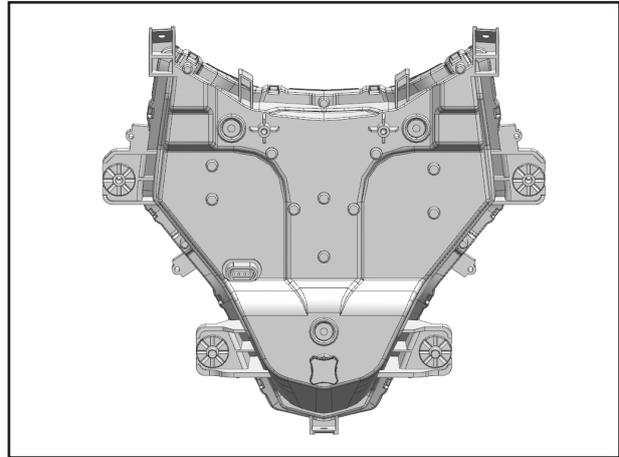
Possible causes:

- 1) Blown fuse.
- 2) Switch damaged.
- 3) Battery bad connection or no battery power.
- 4) Abnormal plugging of related connectors, such as receding pins, crooked pins or not plugged in place, etc.
- 5) BCM failure.
- 6) Headlight controller failure.

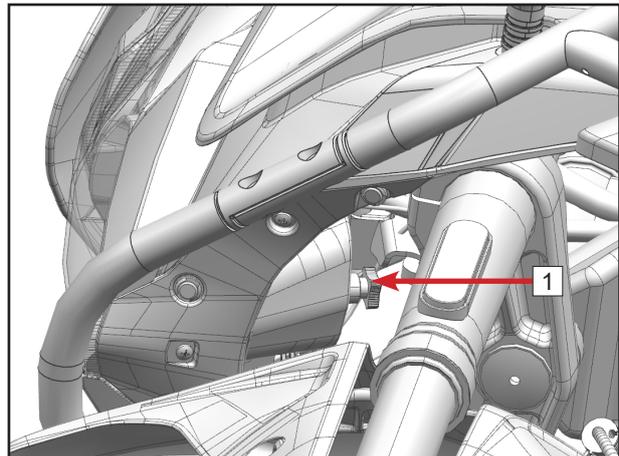
Headlight

Removal

Refer to 05 chapter headlight removal section.



Without disassembly, the gear 1 can be adjusted directly by using a screwdriver on the right side of the vehicle headlight to adjust the up and down angle of the low/high beam.



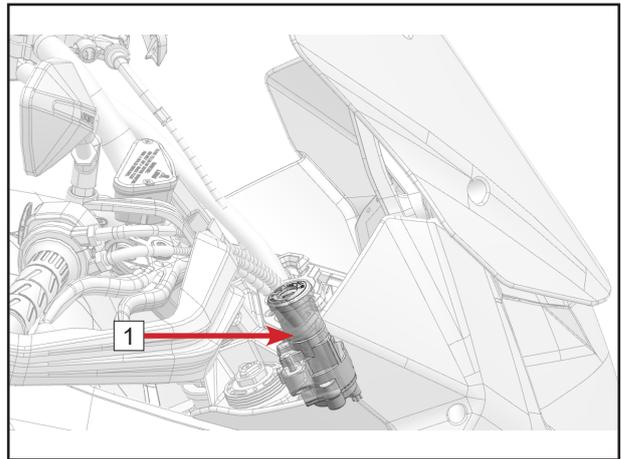
NOTE:The headlight is an LED lamp, the body must be replaced in its entirety when damaged.

7.3 Ignition Lock

Inspection

Unplug the connector that connects the ignition switch **1** to the main cable and check the ignition switch connection.

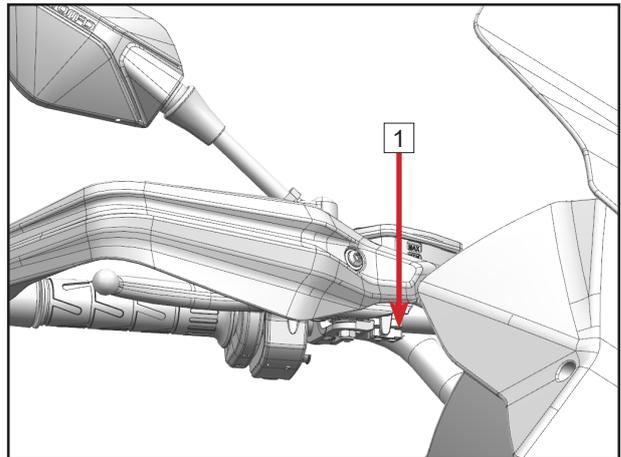
Ignition switch			Whether key can be pulled out
Gear/Color	Red	Black	
			No
			Yes
			Yes



7.4 Front Brake Light Switch

Unplug the front brake light wiring switch **1** to check the front brake light wiring.

1. Front brake handle pinched: brake light on
2. Front brake handle released: brake light out



CFMOTO

7.5 Handlebar Switch

7.5.1 LH Handlebar Switch

Disconnect connectors between LH handlebar switch cable and main cable, check on/off condition of each switch.

Dimmer switch 1			
function \ color	G/W	L	
	●	●	
	●	●	

Menu switch 2						
function \ color	G	B/W	L/B	GR/R	L/W	G/W
	●	●				●
ENT	●		●			●
	●			●		●
	●				●	●

R

Turn switch 3			
function \ color	O	GR	SB
	●	●	
		●	●

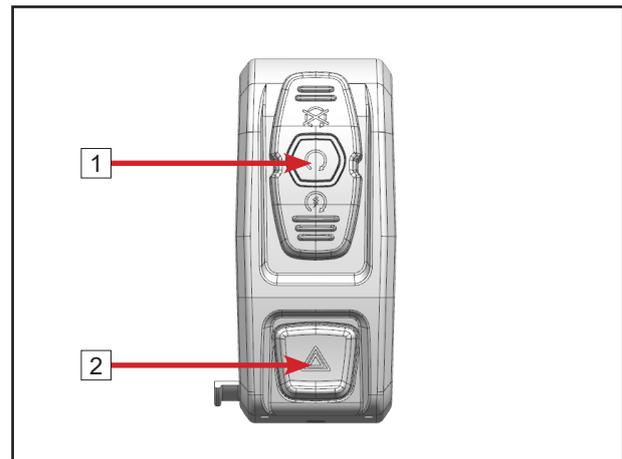
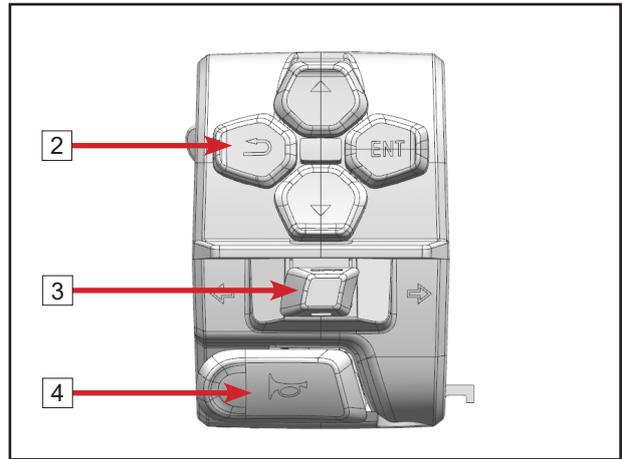
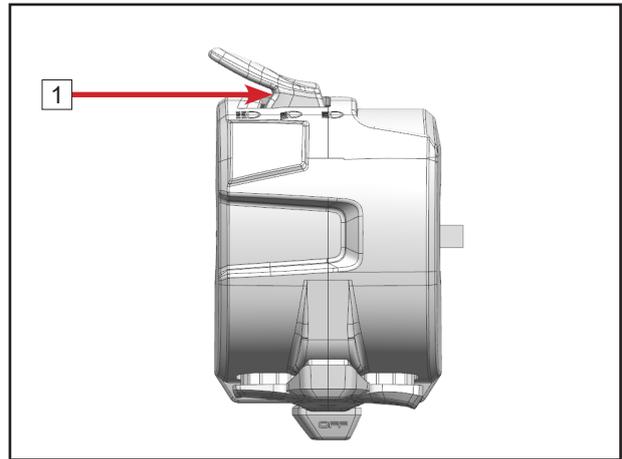
Horn switch 4			
function \ color	G/W	LG	
	●	●	

7.5.2 RH Handlebar Switch

Disconnect connectors between RH handlebar switch cable and main cable, check on/off condition of each switch.

Stop, start switch 1			
function \ color	B/BR	BR/B	Y/R
	●	●	
	●	●	●

Hazard switch 2			
function \ color	O	GR	SB
	●	●	●

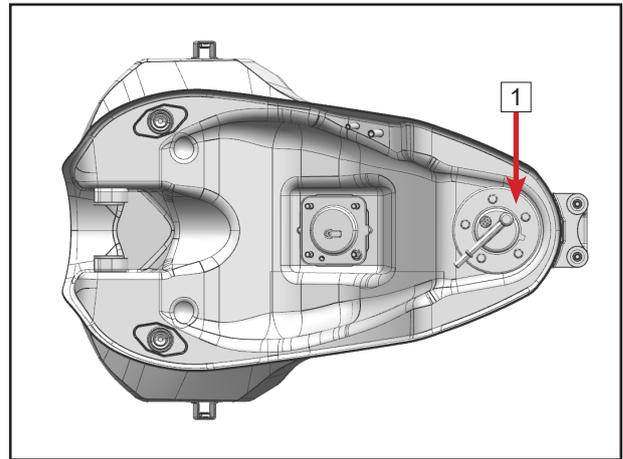


7.6 Fuel Level Sensor

Removal

Refer to fuel system chapter.

Remove four nuts, then remove fuel level sensor 1.



Inspection

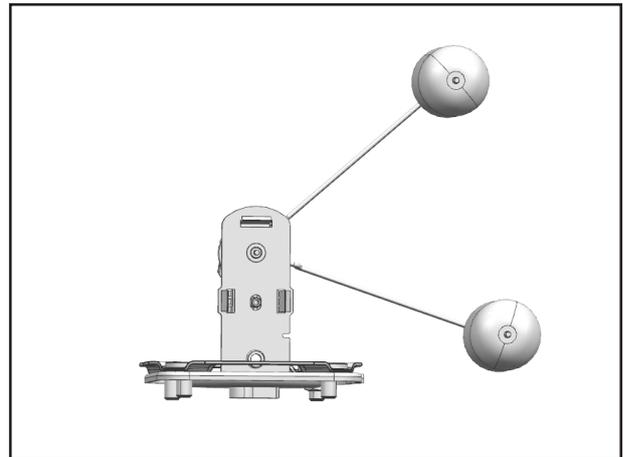
Check fuel level sensor seal for deformation/damage/hardening, and replace it if it is.

Check the resistance value of the fuel level sensor at both high and low poles.

Resistance value:

high: $(10 \pm 1.5) \Omega$

low: $(450 \pm 5) \Omega$



Connect the fuel level sensor cable to the main cable, turn on the ignition switch, swing the fuel level sensor float up and down slowly, and check the swing of the gauge pointer on the dashboard.

If the pointer fails to reach point F or E, the gauge is bad, replace with a new one.

If the pointer swings unstably, the fuel level sensor is bad, replace with a new one.

NOTE: Check for leakage after the fuel level sensor is installed.

7.7 Battery

⚠ CAUTION:

1. Even battery not being used, it loses power everyday.
2. Charging method and condition is critical to battery service life, using high charge current to quick-charge will have negative effect on battery service life.
3. If charging exceeds required current, voltage or time, battery will be damaged.
4. If battery being too low due to repeatedly starting of engine, charge immediately.
5. When battery is in state of discharge for a long time, it will go into deep discharge and sulfation will happen therefore damage the battery.
6. Battery does not need maintenance, no need to check acid level.
7. When engine is working, do not disassemble battery cables. Do not check in/out-put electrical signal of parts by puncturing wire skin.
8. Establish awareness of environmental protection, process the waste effectively produced in maintenance.

Battery removal

Remove seat.

Remove the positive and negative fastening bolts.

Remove battery 1.

⚠ CAUTION: Remove the negative terminal line before removing the battery. Otherwise, the battery will be short-circuited.

Charging

Turn off all consuming appliances and engine.

Remove the battery.

Connect the charger to the battery and switch it on.

Turn off the charger after charging and disconnect it from the battery.

NOTE: If the vehicle is not in use, recharge its battery every 3 months.

Charging voltage inspection

The battery must be fully functional and fully charged.

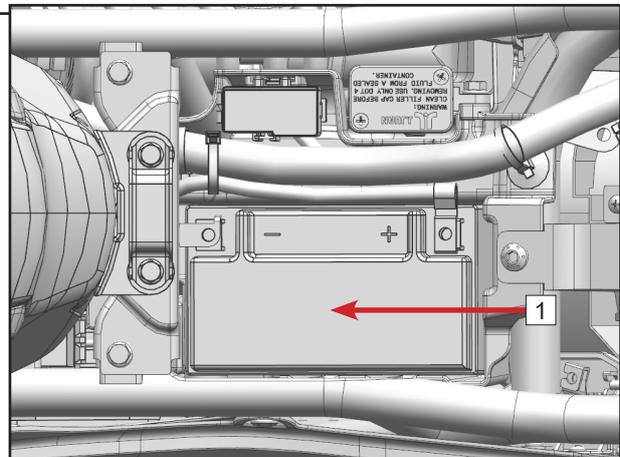
Start the vehicle for voltage measurements. Measurement point positive (+) and measurement point grounded (-).

Charging voltage	
5000rpm	13.5V~15.0V

If the value displayed is less than the specified value:

Check the plug from the engine to the regulator.

Check the plug from the regulator to the cable harness.



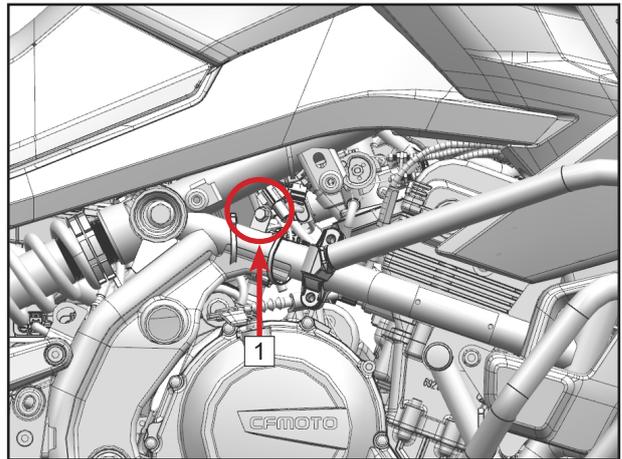
Check the electronic winding of the engine.
If the displayed value is greater than the specified value:
 Replace the regulator.

7.8 Ground Wire

Ground wire **1** is located inside the frame RH panel.

Inspection

Shut down the engine and all electricals.
Inspect the ground wire for any abnormalities.
Check bolt **1** if loose.



7.9 T-BOX

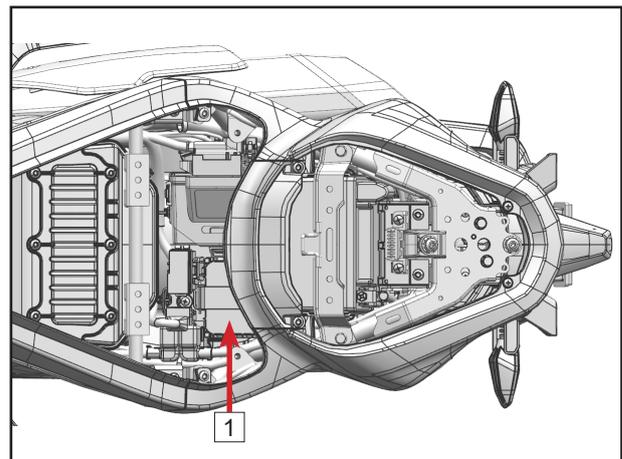
T-BOX is located under the middle seat.
Take out T-BOX **1**.
Inspect connectors connection.

Working voltage:9V~16V

Average power:≤300mA

Static current(4G off):≤0.5mA / 13.5V

indicator color	red
equipment damaged	off
network anomaly	on
network normal	quick flash



T-BOX fault code

No.	DTC Display	DTC Meaning	Mature Condition	Demature Condition	Possible Fault Causes	Corrective Action
1	B200009	Network module exception	1.Ignition state shall be IGN ON,time > 3s; 2..Power supply voltage is in the range of 9-16V; 3. Module register fail, and keep the status at least at t >= 4min;	Module register success	1.SIM is abnormal; 2.Antennan is short or open; 3.LTE Module error;	1.Check the SIM staus; 2.Replace TBOX;
2	B200551	SK not written	SK is the default value	SK is not the default value	SK is not written	Write SK

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8.5 Trouble Diagnosis by Engine 8-27

8.1 Service Tools

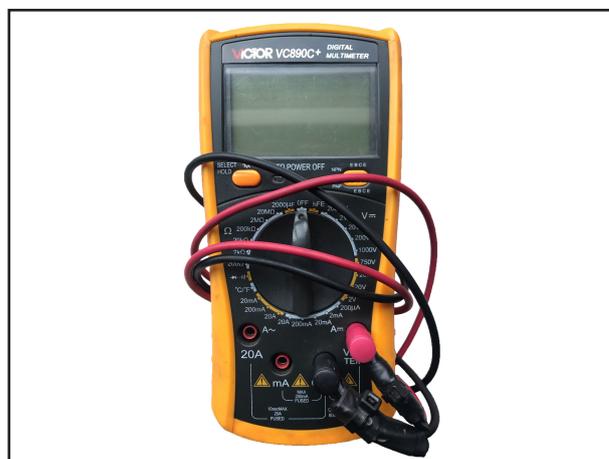
CFMOTO DSCAN

Function :Read/clear the EFI system fault code, observe the data flow, update and scrub the ECU program, etc.



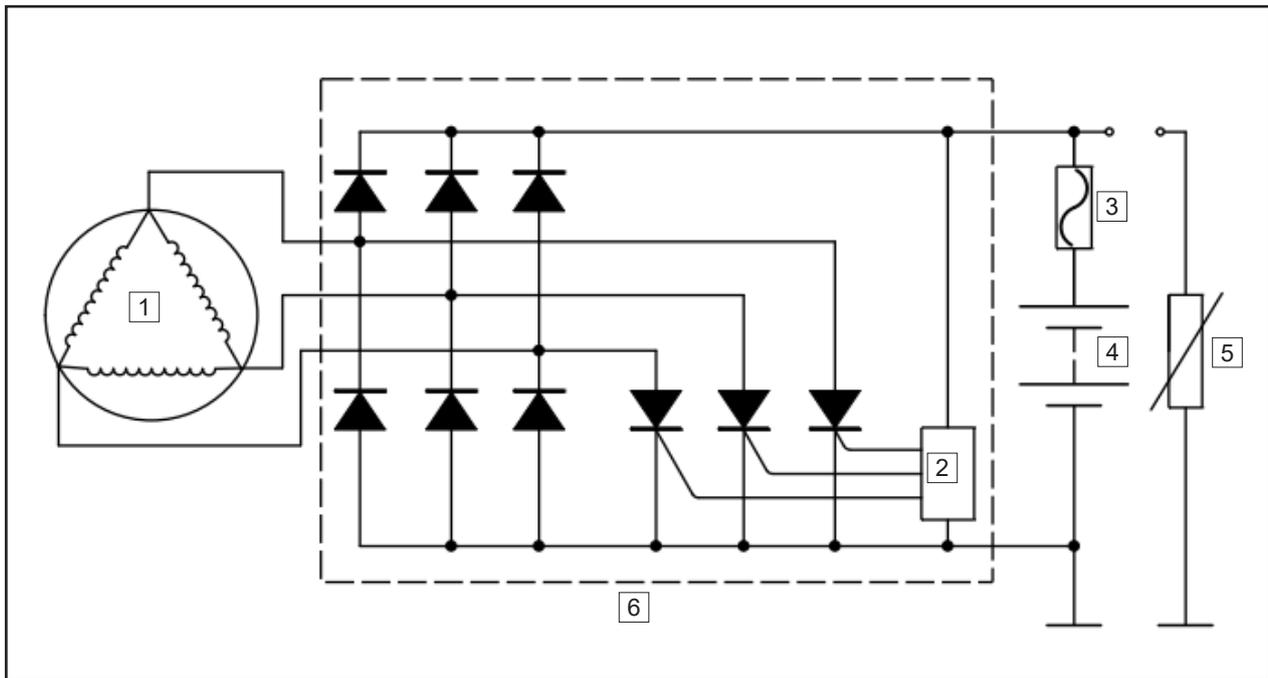
Digital Multimeter

Function :Check the voltage, current, resistance and other parameters of the EFI system.



8.2 Charging System

8.2.1 Charging Wiring Diagram



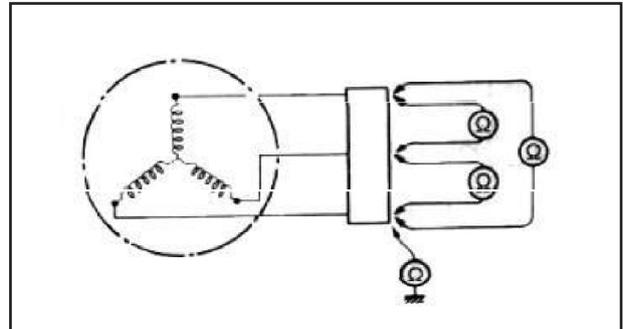
1	Magneto	3	Fuse	5	Load
2	Stable voltage	4	Battery	6	Regulator

8.2.2 Magneto Coil Resistance

- Measure 3-phase magneto stator coil resistance.
- If the resistance is out of specification, replace with a new stator.
- Check for the insulation between stator coil and core.

MAG Coil Resistance: $0.5\Omega \sim 1.5\Omega$ (Y-Y)

Resistance between Stator Coil and Core $\infty\Omega$ (Y-G)



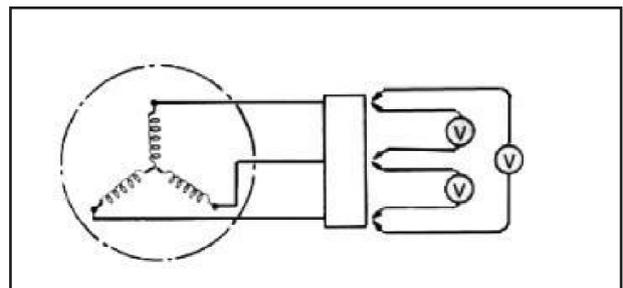
8.2.3 MAG Non-loaded Performance

- Start the engine and allow it run at 5000r/min.

Use multimeter to measure the voltage between 3 output lines.

- If the reading is below specification, replace with a new magneto.

The multimeter is set to AC voltage.

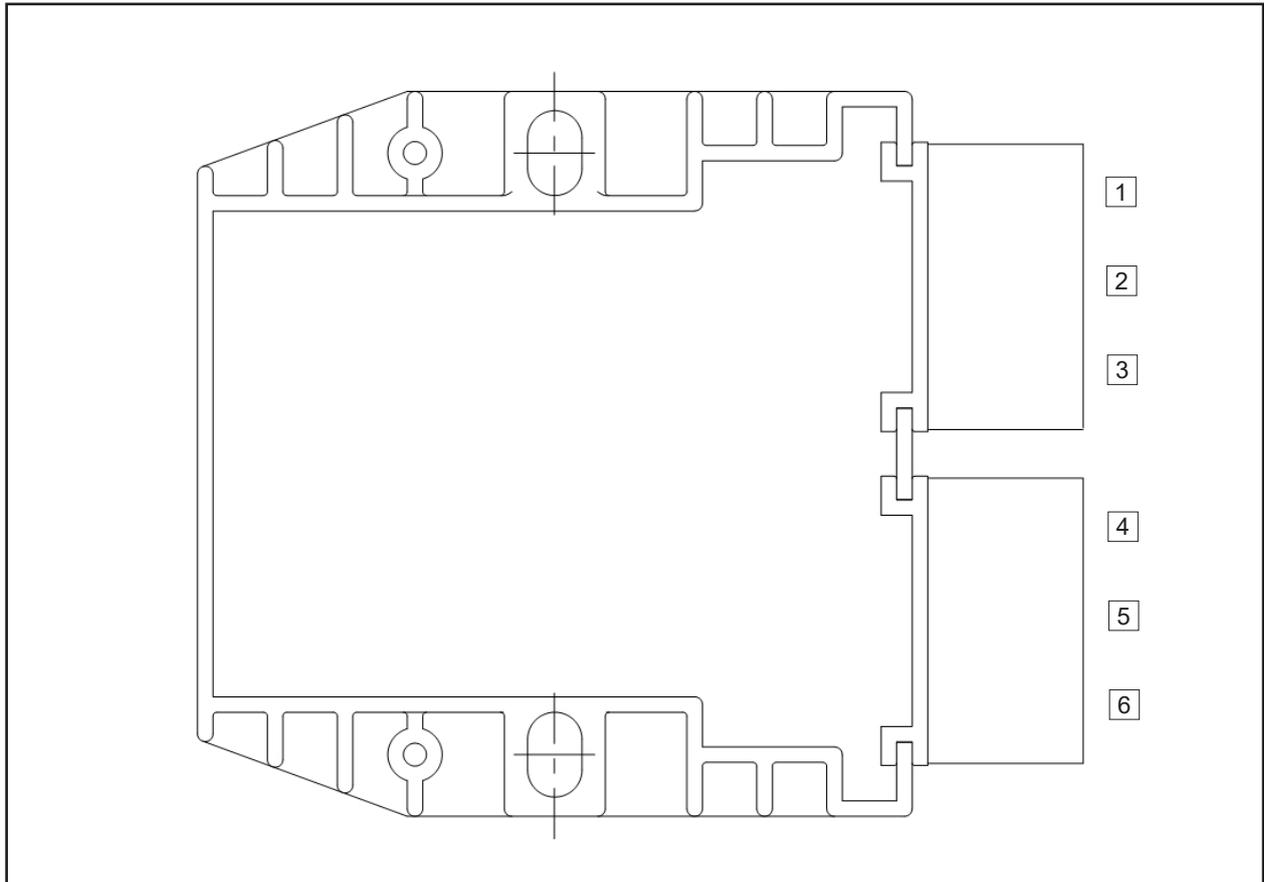


Voltage between Output Lines When MAG

Non-loaded:

$>50V(AC)$ at 5000r/min

8.2.4 Regulator

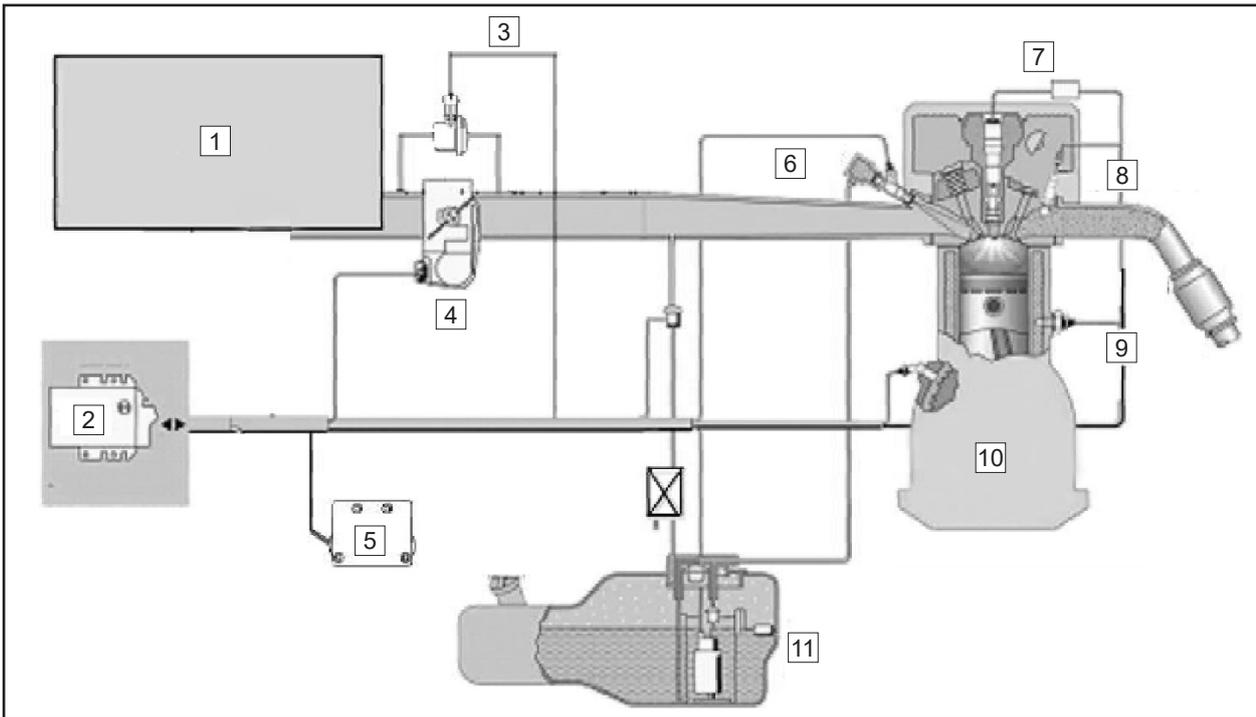


1	IN3	2	IN2	3	IN1	4	OUT	5	NC	6	GND
---	-----	---	-----	---	-----	---	-----	---	----	---	-----

When engine running at 5000r/min and at the state of battery full charged, if the voltage between red and green terminal exceeds 15V or is lower 13.5V, replace with a new regulator.

8.3 EFI System

8.3.1 EFI Structure



1	Air filter	5	Roll-over sensor	9	Coolant temperature sensor
2	ECU	6	Fuel injector	10	Trigger
3	Stepper motor	7	Ignition coil	11	Fuel pump assembly
4	Throttle body assembly	8	Oxygen sensor		

8.3.1.1 Sensors

A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. Including:

- Intake pressure sensor (load information)
- Intake temperature sensor (air density information)
- TPS (load and load range information, acceleration and deceleration information)
- Trigger (crankshaft phase information)
- Water temp sensor (engine temperature information)
- Mileage sensor (output shaft speed information)
- Gear sensor (gear information)
- Oxygen sensor (excess air coefficient i.e. information with λ greater than 1 or less than 1)
- Roll-over sensor (vehicle tipping protection function)

8.3.1.2 ECU

Electronic Control Unit, the brain of EFI system, which determines the amount of fuel injection, ignition timing and other parameters a engine needs to keep running by calculating and analyzing values provided by sensors.

8.3.1.3 Actuator

Execute the EFI instruction. Main actuators include:

- Fuel pump assembly (supplies high pressure fuel)
- Injector (constant fuel injection for better fuel atomization)
- Ignition coil (provide the spark plug with high pressure ignition energy)
- Idle control (supply idle intake)

8.3.2 EFI System Maintenance Notice

- Always use genuine CFMOTO parts for maintenance, otherwise it can not assure a normal performance to EFI system.
- During the maintenance procedure, never try to disassemble the EFI components.
- In the course of maintenance, EFI parts must be handled carefully.
- Ignition switch must be shut off before connecting or disconnecting connectors, otherwise, it may cause the EFI parts damage.
- When removing fuel pump from fuel tank, do not energize the fuel pump, otherwise, a spark can cause a fire.
- Fuel pump is not allowed to operate in a dry environment or under water, otherwise, its life would be shortened. Besides, reverse connections between positive and negative terminal of fuel pump is prohibited.
- The fuel pressure in EFI fuel supply system is very high (about 330kPa), accordingly, all fuel lines are high pressure resisting. Even if the engine is not running, the fuel pressure is still high. Therefore, do not disassemble the fuel line unless it's necessary.
- If possible, don't do the spark test. If spark test is done unavoidably, try to complete the test as soon as possible. Besides, don't open the throttle, otherwise, a large quantity of unburnt fuel would enter muffler, causing the catalytic converter damage.

- Idle speed is controlled by EFI, so it's unadjustable.

When the fuel line needs to be repaired, release the fuel pressure as follows:

Remove fuel pump relay, start the engine and allow it to idle until the engine stalls automatically.

Fuel line removal and fuel filter replacement should be practiced by a professional person in a well-ventilated place.

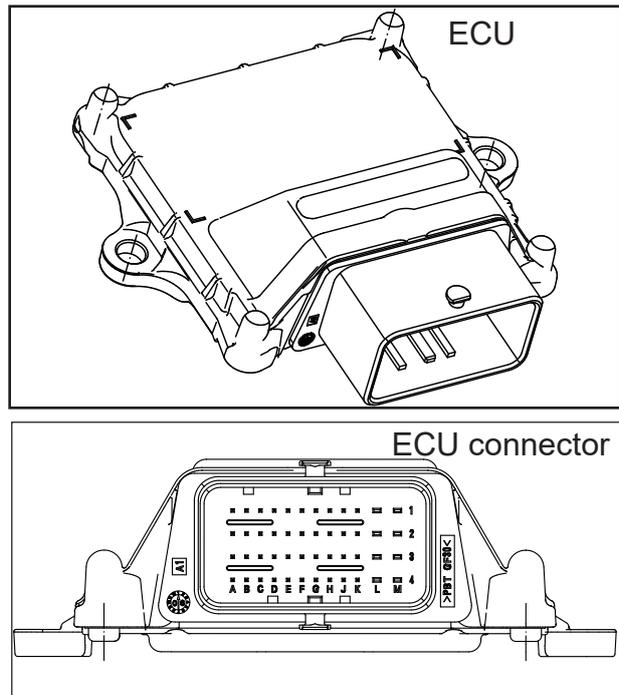
Throttle limit screw of throttle body has been adjusted when they left the factory. It is not allowed to change its initial position.

- Don't reverse the battery cable connections. This may damage electrical components. This system uses the negative GND.
- Never remove the battery cables when the engine is running.
- Always remove cables and electrical control units which are connected with battery terminals.
- Never test the component input and output electric signal by piercing the cable plastic jacket.
- Respect the environment and dispose of the waste left during maintenance.

8.3.3 EFI Components and Function

8.3.3.1 ECU

Electronic Control Unit, the brain of EFI system, which determines the amount of fuel injection, ignition timing and other parameters a engine needs to keep running by calculating and analyzing values provided by sensors.



ECU pin function:

1(M1)	oxygen sensor heating 2	17(B1)	stepper motor phase D	33(F3)	continuous power (UBD)
2(L1)	oxygen sensor heating 1	18(A1)	stepper motor phase C	34(E3)	K_line
3(M2)	ignition 1	19(K2)	oxygen sensor signal 1	35(D3)	N gear switch
4(L2)	AIS magnetic valve	20(J2)	oxygen sensor signal 2	36(C3)	ignition diagnose 1
5(M3)	ignition GND	21(H2)	ignition diagnose 2	37(B3)	clutch switch
6(L3)	canister magnetic valve	22(G2)	NULL	38(A3)	roll-over switch
7(M4)	ignition 2	23(F2)	side stand switch	39(K4)	ECO/SPORT mode switch
8(L4)	non-continuous power UBR1	24(E2)	NULL	40(J4)	engine RPM output
9(K1)	air intake pressure sensor 1(DS)	25(D2)	NULL	41(H4)	speed sensor
10(J1)	sensor GND 1	26(C2)	starter relay	42(G4)	speed sensor B(DGB)
11(H1)	air intake temp. sensor (TANS)	27(B2)	stepper motor phase A	43(F4)	speed sensor A(DGA)
12(G1)	TPS (DKG)	28(A2)	stepper motor phase B	44(E4)	headlight relay
13(F1)	engine temp. sensor(TMOT)	29(K3)	MIL	45(D4)	fan relay
14(E1)	main relay	30(J3)	5V output 1	46(C4)	fuel pump relay
15(D1)	CAN1 I/F 1 Low	31(H2)	NULL	47(B4)	fuel inject 2
16(C1)	CAN1 I/F 1 High	32(G3)	ignition switch KL15	48(A4)	fuel inject 1

Limit Data:

Project		Data			Unit
		Min	Standard	Max	
Battery voltage	Running	9	14±0.1	16	V
	Limit	6.0-9.0		16.0-18.0	V
Maximum voltage and time	26.0V	Maintain some functions and perform fault diagnosis		5	min
Working temperature		-40		70	°C
Storage temperature		-40		70	°C

NOTE: No additional load is allowed on the housing or cover plate. Handle with care, do not drop on the floor.

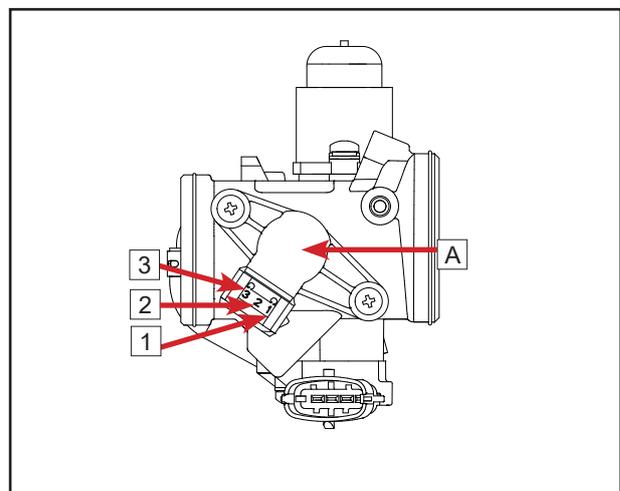
8.3.3.2 Throttle Body Assembly

Connected between air filter and engine. When throttle lever is applied, the valve butterfly in throttle body would spin at a certain angle. TPS can monitor the position of valve butterfly and send the signal to ECU.

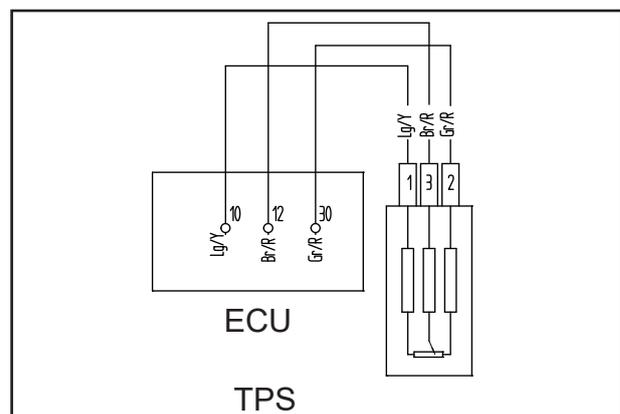
TPS pin function:

- 1 to ECU10 pin (GND)
- 2 to ECU30 pin (5V power)
- 3 to ECU12 pin (Output voltage signal)

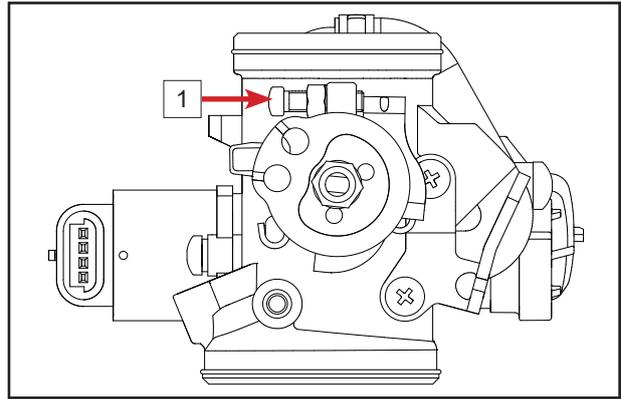
A TPS



On the right is the wiring diagram with ECU.



NOTE:Engine idle speed is totally regulated by EFI system. It is not allowed to adjust the limit screw **1** by hand.
 Also not allowed to apply a heavy load on its housing or cover, it may deform and damage it.
 Always handle it gently. Never drop it, especially on a hard surface.

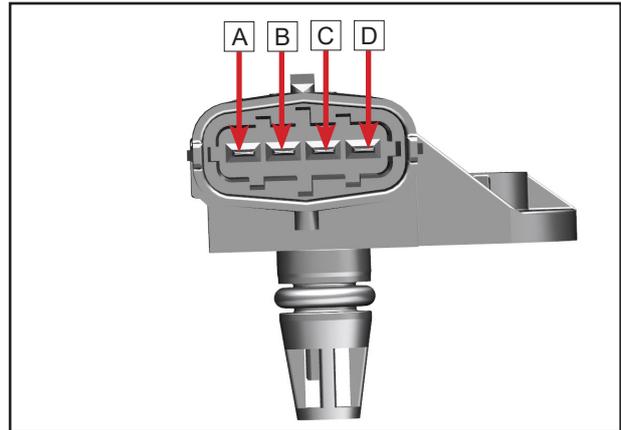


8.3.3.3 Air Intake Pressure/Temperature Sensor

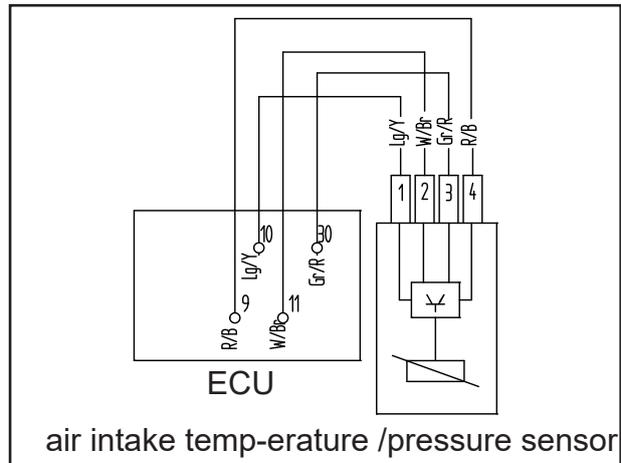
Measure the intake manifold pressure and give the signal to ECU.

Pin function

- A** to ECU 9 pin(air intake pressure signal)
- B** to ECU 30 pin(5V reference voltage)
- C** to ECU 11 pin(air intake temperature signal)
- D** to ECU 10 pin(sensor GND 1)

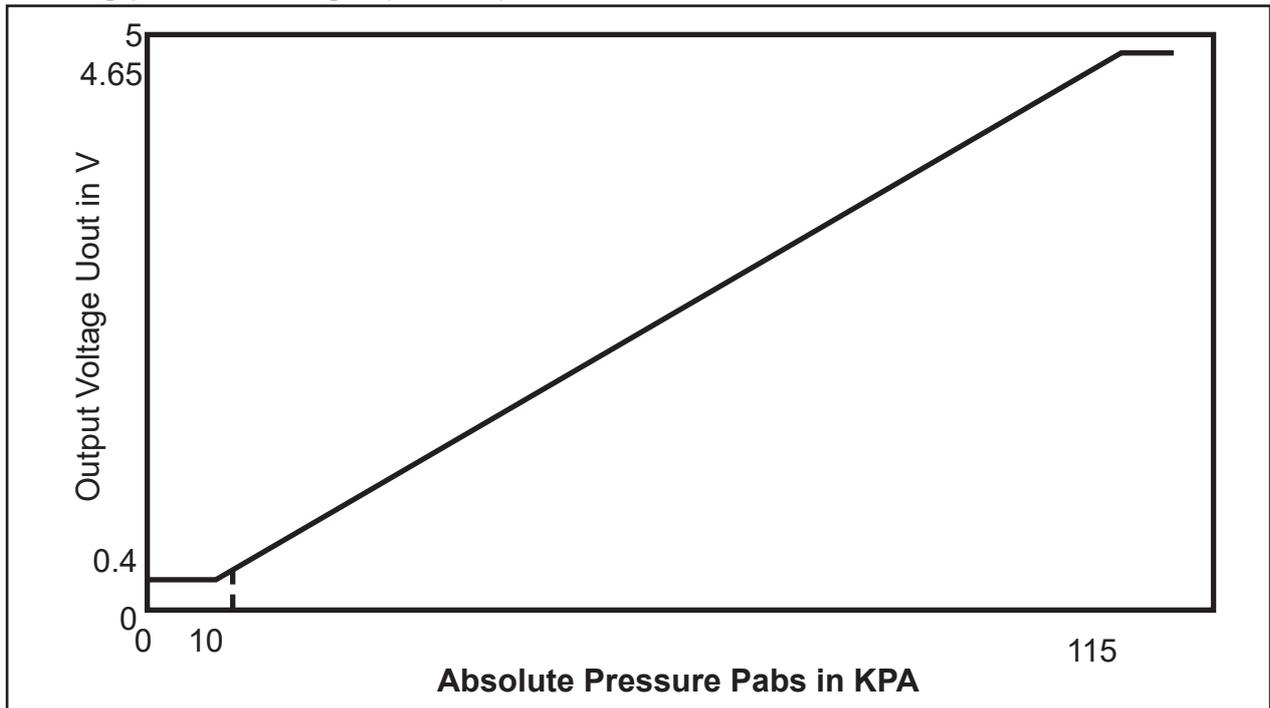


Intake pressure sensor connects with ECU.

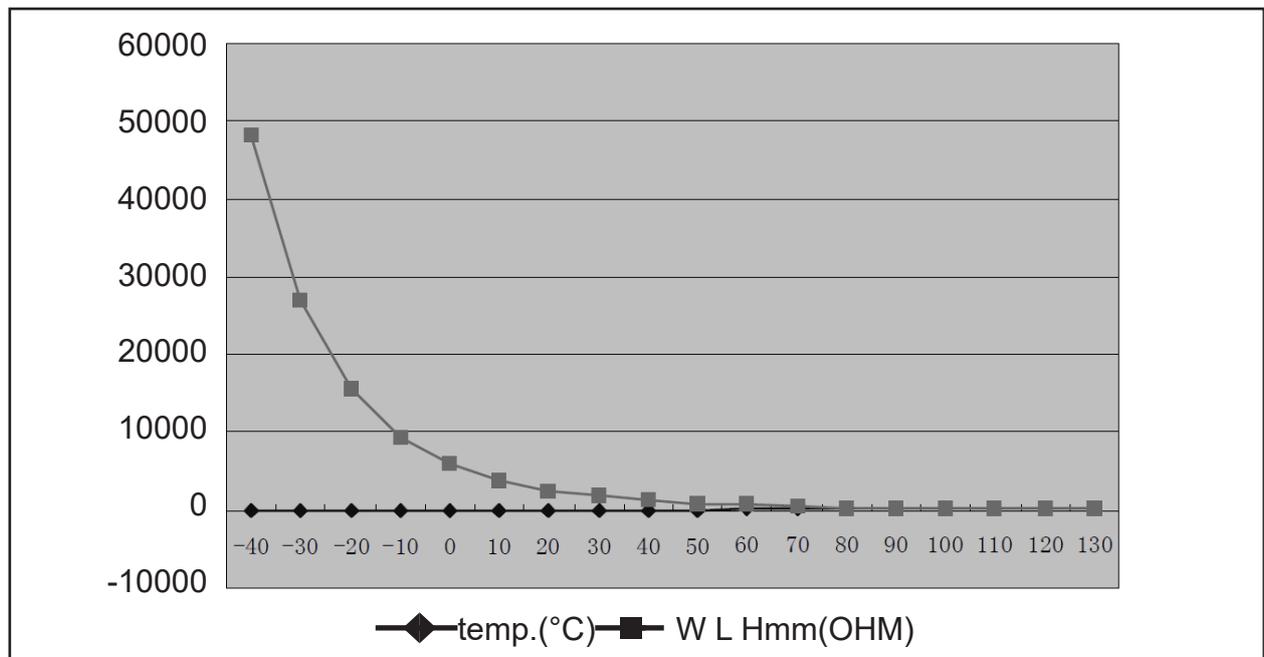


The following figure refers to output voltage pressure relation.

Testing pressure range: (10~115)kPa



The following chart explains resistance-temperature relation.



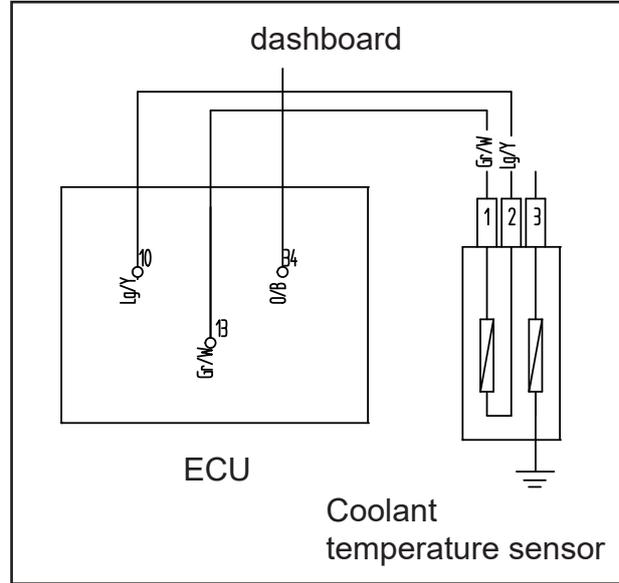
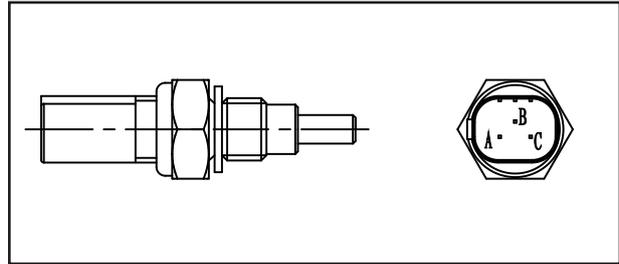
8.3.3.4 Coolant Temperature Sensor

This sensor is a negative temperature coefficient (NTC) thermistor, whose resistance increases with the temperature of coolant decreases. It outputs 2 set of coefficients, one is for ECU to monitor the temperature of coolant, the other is for meter display.

A and C consists of one group, which provides signal for ECU.

Through the ECU, the coolant temperature signal is provided to the dashboard.

Coolant temperature sensor connects with ECU:



This right chart is A and C terminal temperature. The signal is to the ECU.

Temp°C	A,C Resistance(KΩ)
-20±0.1	13.71~16.94
25±0.1	1.825~2.155
80±0.1	0.303~0.326
110±0.1	0.1383~0.1451

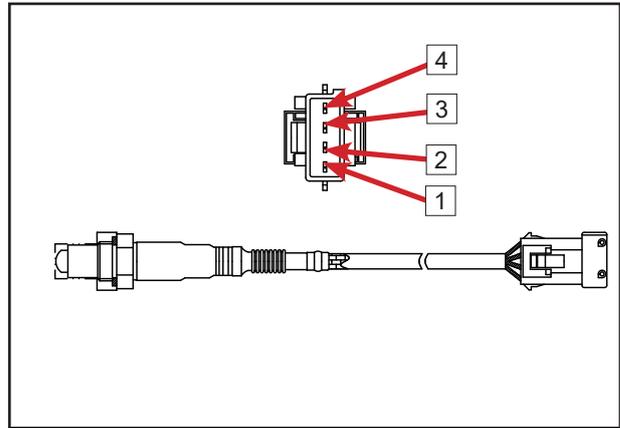
8.3.3.5 Oxygen Sensor

This sensor is used in closed-loop feedback-controlled fuel injection to improve the air-to-fuel ratio accuracy and control the emission.

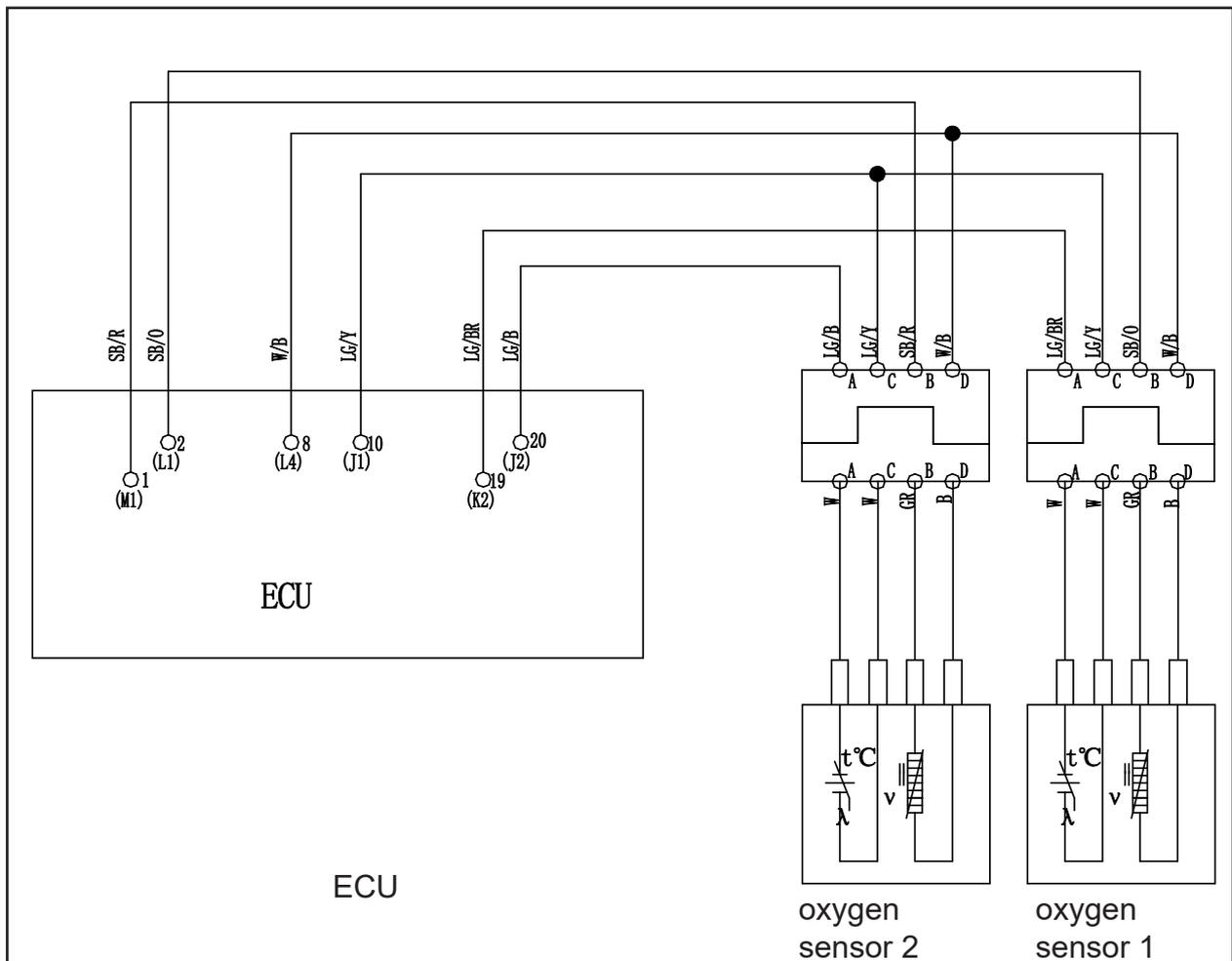
It's located in the exhaust stream to measure the amount of oxygen in exhaust and send the signal to ECU, which can revise the fuel injector output, so as to reduce the amounts of both unburnt fuel and oxides of nitrogen entering the atmosphere.

Pins function:

- 4 Output signal voltage +
- 3 Output signal voltage -
- 2 heating GND -
- 1 heating power +

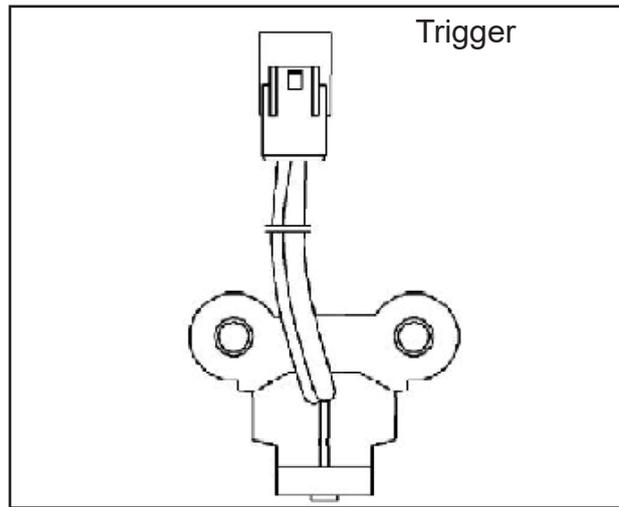


The following is the wiring diagram of sensor and ECU.



8.3.3.6 Trigger

The engine RPM signal is provided to the ECU, and the ECU uses this signal to determine the ignition angle, injection phase, etc.



On the right is the wiring diagram of the trigger and the ECU.

Trigger resistance measuring:

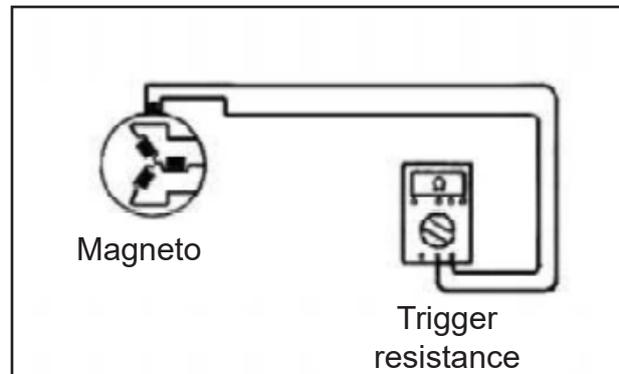
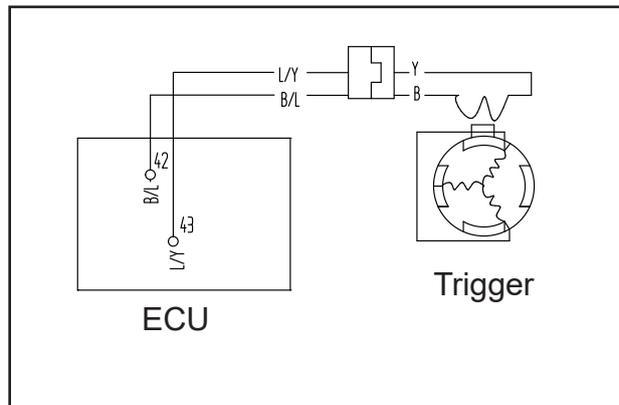
- Set the multimeter to $1 \times 100 \Omega$
Trigger coil resistance: $100\Omega \sim 160\Omega (20^\circ\text{C})$
- If the resistance reading is out of specification above, replace it.

Trigger peak voltage measuring:

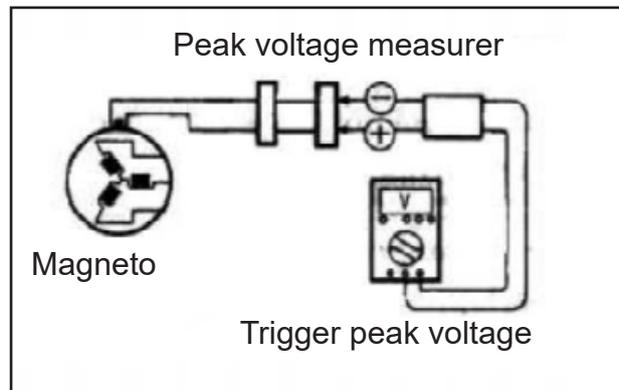
Connect multimeter and peak voltage adapter as right wiring diagram illustrates.

- + : Green (B) Lead
- : Blue (A) Lead

NOTE: When using peak voltage adapter, refer to the relevant Owner's Manual.



- Set multimeter to V(AC) range.
- Place the transmission in N and turn the ignition switch to "ON".
- Push starter switch and allow the engine to run for seconds, then test trigger peak voltage.
- Repeat above procedure and get the highest trigger coil peak voltage.
Trigger coil peak voltage: $\geq 2\text{V} (300\text{r/min})$
- If the trigger coil peak voltage reading is out of above specification, replace it.

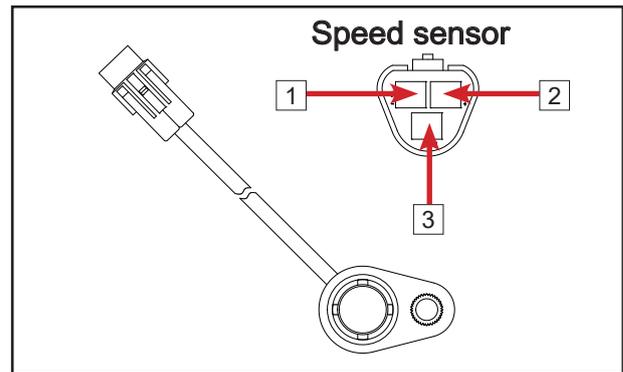


8.3.4 Speed Sensor

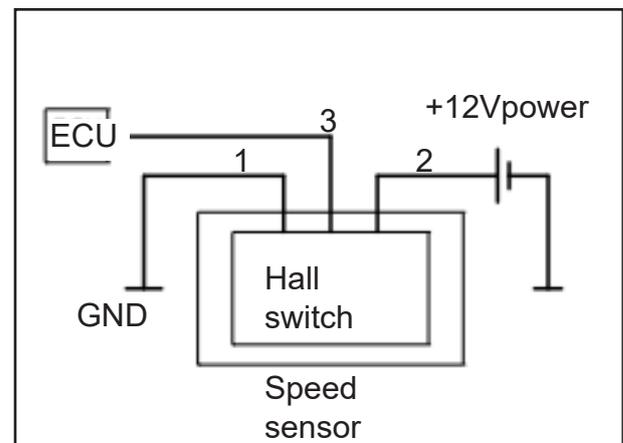
This sensor is used to detect the rotating speed of the engine output shaft and provide the signal for ECU to determine the vehicle speed. It belongs to Hall effect sensor, that varies its output voltage in response to a magnetic field.

Pins and Function

1. Ground
2. Power+DC12V
3. Output voltage signal yellow (>80% input power voltage, yellow)

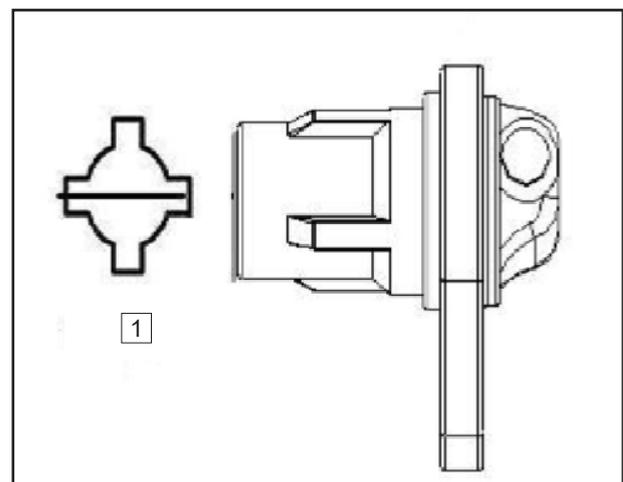


Speed sensor connects with ECU:



Speed sensor test

- Ground pin 1 and connect pin 2 with +12V power.
- Fix gear **1** 2.5mm away from a speed sensor as the right figure illustrates.
- Turn multimeter to DCV range
- Slowly turn the gear and measure the voltage between pin 2 and pin 3 to determine that if the reading varies from 0V~12V.
- If the reading doesn't vary, it indicates the sensor is defective and needs to be replaced.



8.3.4.1 Fuel Pump Assembly

This fuel pump assembly includes fuel pump, plastic support, preliminary filter, fine filter and pressure regulator. It supplies fuel for engine under a certain pressure and flow.

Pins and Function:

1. Blue (Ground)
2. Red (+12V)

Parameters:

Voltage:DC13.5V±0.3V

Pressure:0.3MPa±0.01MPa

Flow≥45L/h

Current≤2.5A

Pressure regulator opening pressure :0.33MPa±0.01MPa

Current≤2≤2.8A

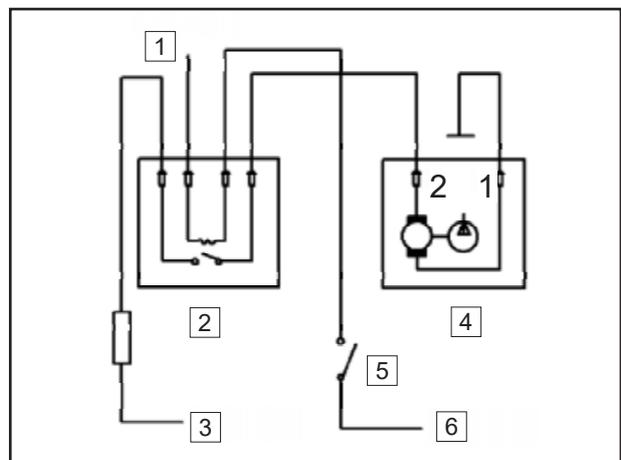
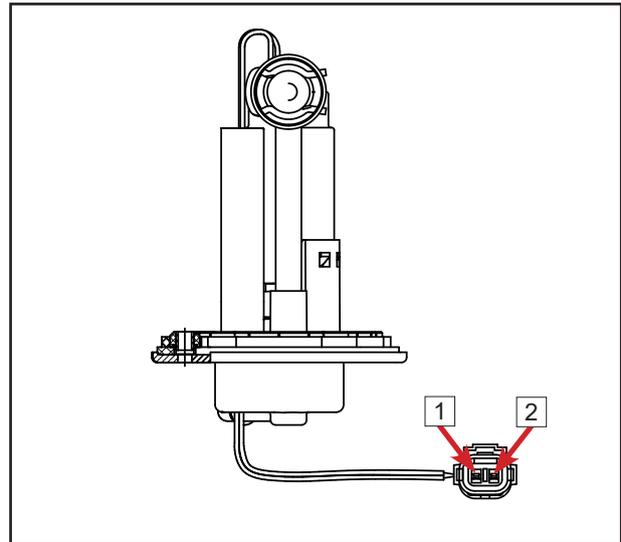
- This fuel pump is located in fuel tank
- Don't operate the fuel pump in dry condition in order to prevent damage.
- Always handle the fuel pump gently. Never drop the fuel pump, especially on a hard surface. Such a shock to pump can damage it.
- The battery supplies power to the fuel pump assembly through the fuel pump relay, which connects the electric fuel pump circuit only when starting and when the engine is running.

Fuel Pressure Test

- Connect the fuel pressure gauge with fuel outlet and tighten the joint with a clamp to prevent fuel leaks.
- Route according to the right circuit.
- Turn both ignition switch engine stop switch on.
- At this moment,fuel pump will operate for 5 seconds. After the fuel pump stops running, fuel pressure should be in specification,otherwise replace it.
- After the engine stops running, 0.25MPa fuel pressure should be kept for more than 5 minutes, otherwise replace the fuel pump.

Pressure Relief in Fuel System:

In an EFI model,the pressure in fuel system is very high,so all the line is high pressure resistant. Even though the engine is not started, the pressure in fuel system remains high. Therefore, it's not



1	Connect with ECU pin 46	3	Positive terminal, battery	5	Engine stop switch
2	Fuel pump relay	4	Fuel pump assembly	6	Ignition switch

recommended to remove fuel lines before pressure relief.

Follow the procedure below to perform pressure relief:

Remove fuel pump relay. Start the engine and allow it to idle until the engine stops automatically.

8.3.4.2 Fuel Injector

One end of fuel injector mounts into fuel injector seat, and the other end attaches to the injector cap, which connects with a fuel line. Fuel injector is controlled by ECU to inject fuel at stated time into the engine. This injector nozzle is a 4-hole style. Don't turn injector after the joint between injector and injector cap is installed.

Pins and Function

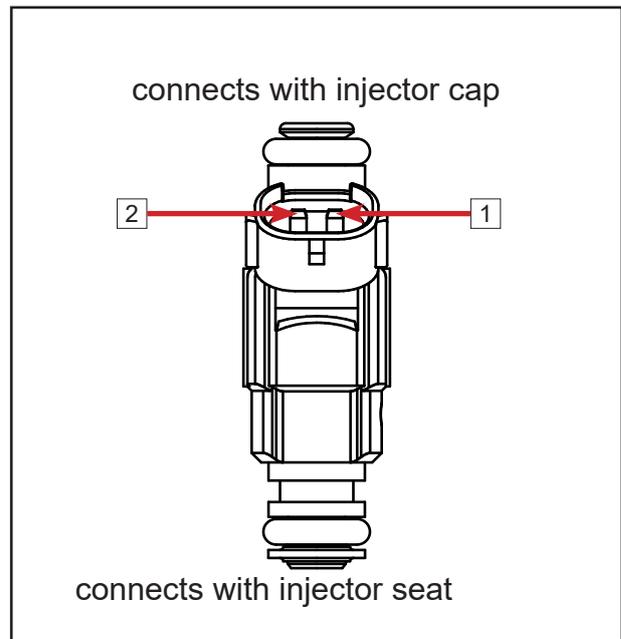
2 connects with fuel pump relay output terminal.

1 injector 1 connects with ECU pin 48.

1 injector 1 connects with ECU pin 47.

Fuel Injector

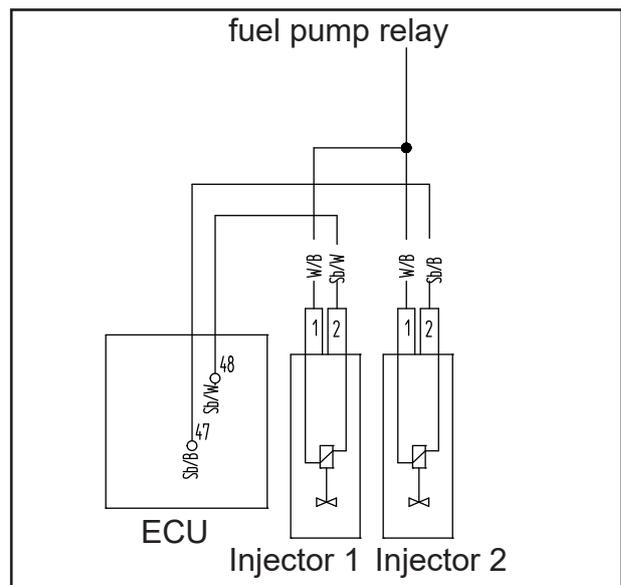
Resistance: $12.5\Omega \pm 1\Omega (20^{\circ}\text{C})$



Fuel injector connects with ECU:

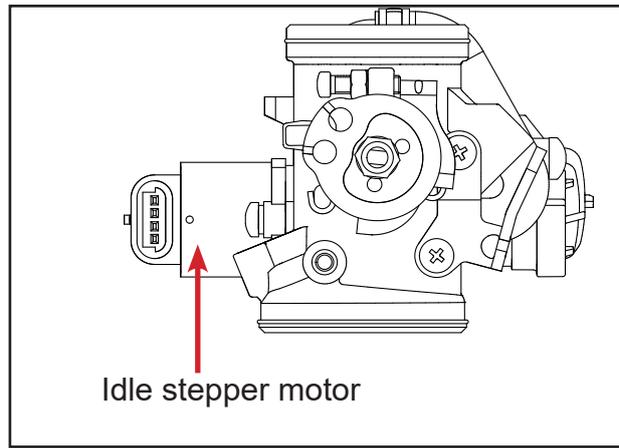
Fuel Injector Installation:

- Install fuel injector manually. Never knock fuel injector with a hammer.
- When removing and installing fuel injector, the o-rings on both ends must be replaced.
- Perform pressure relief before fuel injector removal if necessary.
- Test the fuel injector sealing after installation to ensure no leaks.

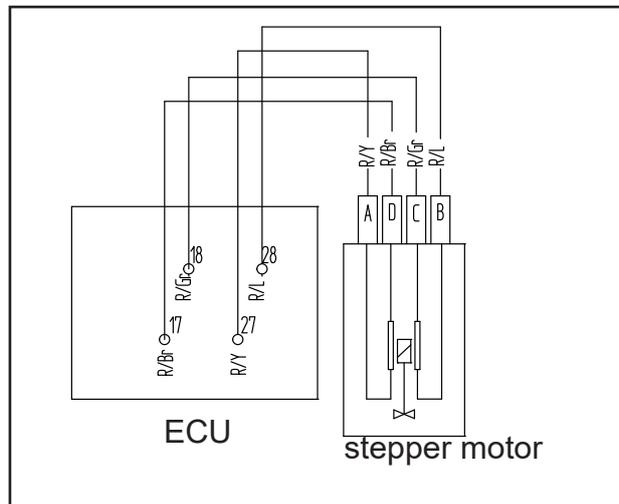


8.3.4.3 Idle Stepper Motor

Used to control the air flow of by-pass. ECU calculates the engine load and controls Idle stepper motor through electrical pulse duration and frequency (commonly known as duty ratio). Idle stepper motor allows different air flows passed through under different pressure. Therefore, it should be adjusted according to situation.



Idle stepper motor connects with ECU:



Idle Control Valve Parameters:

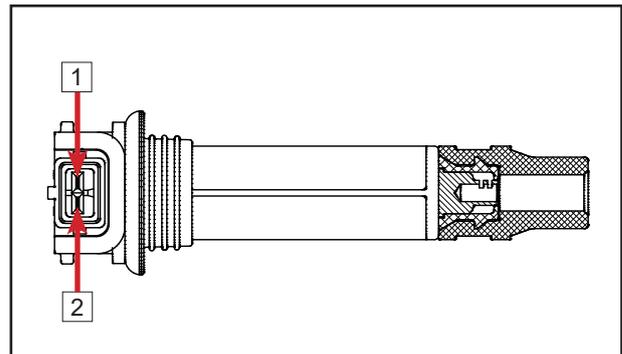
Item	Value			Unit
	Min	Standard	Max	
Rated voltage		13.5		V
Resistance (+ 20°C)		16		Ω
Rated current		0.85		A
Control Pulse Frequency			30	HZ
Standard Control Pulse Width		≈ 8		ms
Air Flow(When pressure difference = 700mbar, duty ratio=100%)		5		m ³ /h

8.3.4.4 Ignition Coil

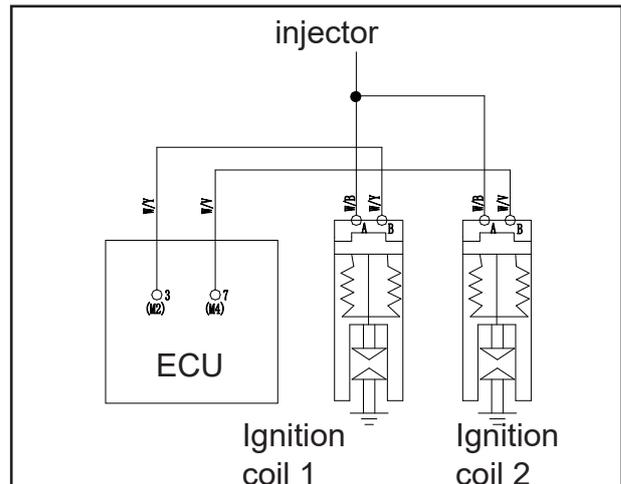
Ignition coil transforms the low voltage of primary coil to high voltage of secondary coil needed to spark the spark plug and ignite the mixture of air and fuel in cylinder.

Pins and Function:

- 1.Power
- 2.Signal

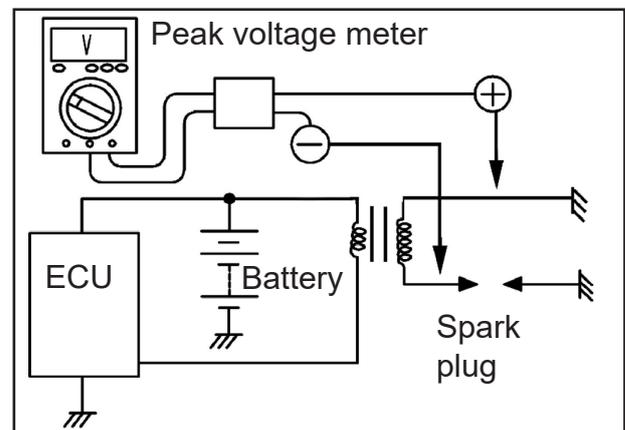


Ignition coil connects with ECU:



Secondary Ignition Voltage Test:

- Connect the engine according to EFI wiring diagram.
- Connect the peak voltage tester according to the right diagram.
- Start the engine.
- Secondary ignition voltage should be >15000V.

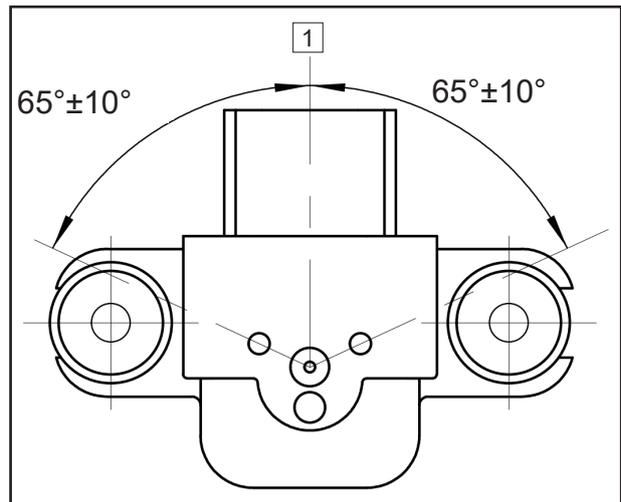


Ignition Coil Parameters:

Item	Value				
	Min	Standard	Max	Unit	
Stated Voltage		14		V	
Operating Voltage	6		16.5	V	
Resistance (20°C~25°C)	Primary Winding Resistance	0.74	0.76	0.78	Ω
	Secondary Winding Resistance	10.1	10.6	11.1	kΩ
Primary Current		7		A	

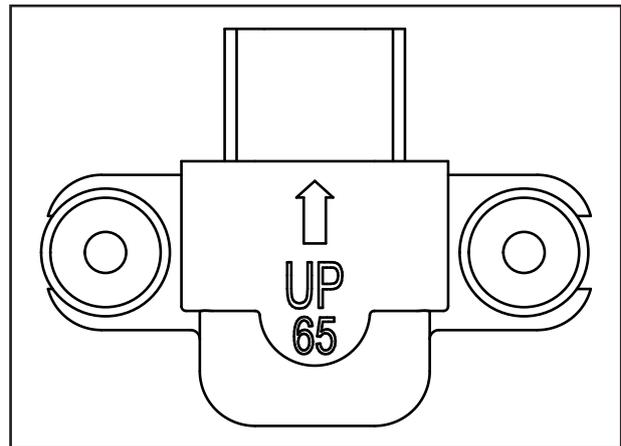
8.3.4.5 Roll-Over Sensor

Roll-over sensor is used for preventing vehicle from tilting. When vehicle's tilt angle is larger than setted tilt angle, an "OUT" signal will be transferred to ECU. ECU will stop the engine.

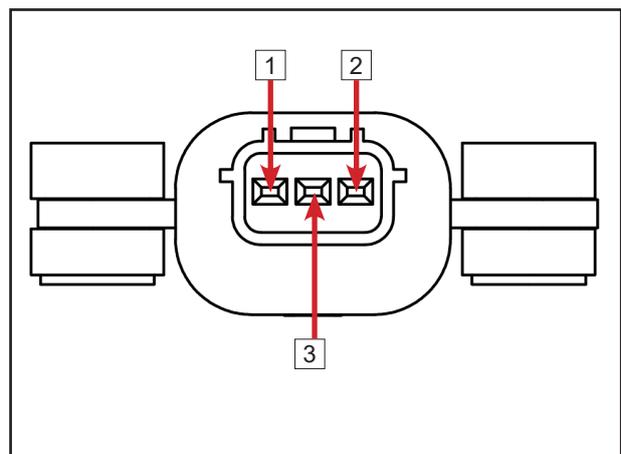


1 | Tilt Angle

Installation is shown on the right.



Connect the roll-over sensor as shown in the EFI diagram.



1 | VCC 2 | GND 3 | OUT

8.3.5 EFI Self-Diagnosis

ECU constantly monitors sensors,actuators,circuits,MIL and battery voltage,etc,even itself. It also tests sensors output signal,actuator drive signal and inner signal(such as closed-loop control,coolant temp. signal, idle speed control and battery voltage control,etc for reliability).If any malfunction or suspectable signal found, ECU would record the fault information in RAM.

Fault information comes in form of fault codes,which are then displayed on PDA, in sequence of which fault comes first. Fault can be divided into “steady fault”and “occasional fault”(such as a fault caused by harness short or loose connection.)

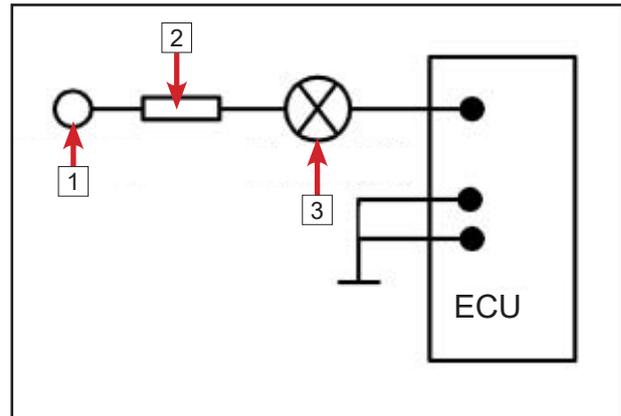
PDA (diagnostic tool) or MIL can be used to locate the part in trouble immediately after fault happens.

The fault diagnosis of EFI system mainly adopts MIL and PDA(diagnostic tool).

8.3.5.1 MIL

MIL is a light-emitting diode and located on instrument panel. It indicates different fault codes through the flashes in different frequency.

MIL to ECU, the pin into ECU29 should be less than 0.5A.



MIL Flash Principles:

a: In flashing mode and no trouble in memory

The fault indicator (MI indicator) lights up when the motorcycle ignition switch is in the ON position and the engine has not been started.

The fault indicator (MI indicator) located on the dashboard is yellow when the fault indicator (MI indicator) is activated.

The fault indicator (MI indicator) goes out if the OBD system does not detect a fault after the engine starts.

The fault indicator (MI indicator) activates to illuminate in the event of a fault in any component connected to the OBD system and related to emissions or in the OBD system itself, signaling the fault by means of a visual signal to notify the driver.

Restart the vehicle after it gets repaired and the fault is eliminated.

However, the historical fault information stored in the system can still be read by the diagnostic tool at this time, and this historical fault information can be actively cleared by the diagnostic tool.

1	+12V power	2	Limit resistance	3	Light diode
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8.3.5.2 Fault Code Table

No.	Fault code	Instruction (UAES)
1	P0030	Upstream cylinder 1 oxygen sensor heating control circuit open
2	P0031	Upstream cylinder 1 oxygen sensor heating control circuit voltage too low
3	P0032	Upstream cylinder 1 oxygen sensor heating control circuit voltage too high
4	P0050	Upstream cylinder 2 Oxygen sensor heating control circuit open
5	P0051	Upstream cylinder 2 oxygen sensor heating control circuit voltage too low
6	P0052	Upstream cylinder 2 oxygen sensor heating control circuit voltage too high
7	P0107	Air intake pressure sensor short to GND
8	P0108	Air intake pressure sensor short to battery
9	P0112	Air intake pressure sensor signal voltage too low
10	P0113	Air intake pressure sensor signal voltage too high
11	P0117	Coolant temp. sensor circuit volatge too low
12	P0118	Coolant temp. sensor circuit volatge too high
13	P0122	TPS circuit voltage lower than min.voltage
14	P0123	TPS circuit voltage higher than max. voltage
15	P0130	Upstream cylinder 1 oxygen sensor singal improper
16	P0131	Upstream cylinder 1 oxygen sensor circuit voltage too low
17	P0132	Upstream cylinder 1 oxygen sensor circuit voltage too high
18	P0134	Upstream cylinder 1 oxygen sensor circuit signal error
19	P0150	Upstream cylinder 2 oxygen sensor signal abnormal
20	P0151	Upstream cylinder 2 oxygen sensor signal too low
21	P0152	Upstream cylinder 2 oxygen sensor signal circuit voltage too high
22	P0154	Upstream cylinder 2 oxygen sensor circuit signal error
23	P0201	Cylinder 1 injector control circuit open
24	P0261	Cylinder 1 injector control circuit short to GND
25	P0262	Cylinder 1 injector control circuit short to battery
26	P0202	Cylinder 2 injector control circuit open
27	P0264	Cylinder 2 injector control circuit short to GND
28	P0265	Cylinder 2 injector control circuit short to battery
29	P0322	No speed sensor signal (open or short)
30	P0480	Fan control circuit open
31	P0511	Idle actuator short
32	P0560	Battery voltage signal improper
33	P0562	Battery voltage too low
34	P0563	Battery voltage too high
35	P0627	Fuel pump relay control circuit open
36	P0629	Fuel pump relay control circuit short to battery
37	P0650	MIL circuit error
38	P0691	Fan control circuit short to ground
39	P0692	Fan control circuit short to battery
40	P0501	Speed signal error
41	P1116	Engine temperature out of limit
42	P0602	Control module programming error
43	P0116	Coolant temp. sensor circuit error
44	P1098	Roll-over sensor error

8.4 Fault Diagnosis

8.4.1 Engine Body

Phenomenon	Cause	Measure
Cannot start or difficult to start	Cylinder pressure too low 1. Cylinder worn 2. Piston ring worn 3. Air leakage of cylinder gasket 4. Valve stem worn or unsuitable valve seat 5. Spark plug loosen 6. Starting motor rotate too slowly 7. Improper valve timing 8. Improper valve clearance	Replace Replace Replace Repair or replace Tighten Check electrical parts Adjust Adjust
	Spark plug cannot ignite or weak ignition 1. Improper spark plug clearance 2. Spark plug dirty or wet 3. Defect ignition coil 4. Trigger short circuit or open circuit 5. Magneto malfunction Insufficient fuel inside throttle body 1. Breather hole block 2. Injector blocked or failure 3. High Pressure oil pump failure 4. Low pressure, oil pump 5. Oil pump Filter net blocked	Adjust or replace Clean & dry or replace Replace Replace Replace Clean or replace Clean or replace Inspect or replace Inspect or replace Clean or replace
No idle speed or unstable speed	1. Improper valve clearance 2. Unsuitable valve seat 3. Defective valve 4. Swing or swing arm shaft wear 5. Dirty spark plug 6. Incorrect valve clearance 7. Ignition coil failure 8. In & Ex a air hose blocked, idle valve 9. Magneto failure	Adjust Repair or replace Replace Replace Replace Replace or adjust Replace Adjust or replace Replace

CFMOTO

Phenomenon	Cause	Measure
High RPM unstable	<ol style="list-style-type: none"> 1. Valve spring getting worn 2. Camshaft worn 3. Spark plug dirty 4. Spark plug clearance too narrow 5. Valve timing incorrect 6. Ignition coil failure 7. Low pressure,oil pump 8. Air filter too dirty 	<p>Replace</p> <p>Replace</p> <p>Clean or replace</p> <p>Adjust or replace</p> <p>Adjust</p> <p>Replace</p> <p>Adjust or replace</p> <p>Clean or replace</p>
Blue or black exhaust gas	<ol style="list-style-type: none"> 1. Engine oil too much 2. Piston ring worn 3. Valve guide worn 4. Cylinder worn or scraped 5. Valve stem worn 6. Oil seal of valve stem damaged 	<p>Check oil level and drain</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Replace</p>
Engine Power not enough	<ol style="list-style-type: none"> 1. Valve clearance improper 2. Valve spring getting weak 3. Valve timing incorrect 4. Cylinder worn 5. Piston ring worn 6. Improper valve seat 7. Spark plug dirty 8. Improper spark plug clearance 9. Injector blocked 10. Insufficient pressure,oil pump 11. Air filter too dirty 12. Swing arm or camshaft worn 13. Air leakage of inlet pipe 14. Engine oil too much 	<p>Adjust</p> <p>Replace</p> <p>Adjust</p> <p>Replace</p> <p>Replace</p> <p>Replace or repair</p> <p>Clean or replace</p> <p>Clean or replace</p> <p>Clean or replace</p> <p>Adjust or replace</p> <p>Clean or replace</p> <p>Replace</p> <p>Tighten or replace</p> <p>Check oil level and change</p>
Engine Overheating	<ol style="list-style-type: none"> 1. Carbon deposit on piston head 2. Engine oil too less or too much 3. Oil pump failure 4.Hose blocked 5. Air leakage of inlet pipe 6. Unsuitable engine oil 7. Cooling system failure 	<p>Clean</p> <p>Check and add or drain</p> <p>Replace</p> <p>Clean</p> <p>Tighten or replace</p> <p>Change oil</p>

Phenomenon	Cause	Measure
Engine abnormal noise	Valve abnormal noise 1. Valve clearance too big 2. Valve spring worn or broken 3. Swing arm or camshaft worn	Adjust Replace Replace
	Piston abnormal noise 1. Piston worn 2. Cylinder worn 3. Carbon deposit inside combustion chamber 4. Piston pin or pin hole worn 5. Piston ring or groove worn	Replace Replace Clean Replace Replace
	Timing chain abnormal noise 1. Chain stretched out 2. Chain sprocket worn 3. Tensioner failure	Replace chain and sprocket Replace chain and sprocket Repair or replace
	Clutch abnormal noise 1. Clutch gear worn or damaged 2. Cushion rubber aging or damaged	Replace clutch gear Replace clutch gear
	Crankshaft abnormal noise 1. Bearing noise 2. Crankshaft pin bearing down 3. Clearance too big	Replace Replace Replace
	Transmission abnormal noise 1. Gear worn or damaged 2. Main shaft or counter shaft worn 3. Bearing worn 4. Bushing worn	Replace Replace Replace Replace
Clutch slippery	1. Clutch drive disc worn 2. Clutch driven disc worn or damaged 3. Clutch spring getting weak	Replace Replace Replace

Ignition System:

Phenomenon	Cause	Measure
No spark or weak spark	1. Flame ignitor malfunction 2. Spark plug burnt 3. Incorrect spark plug clearance 4. Carbon deposit in spark plug 6. Battery low voltage 7. Ignition coil malfunction 8. Trigger coil malfunction 9. Incorrect trigger clearance 10. Other circuit malfunction	Replace Replace Adjust Clean Replace Charge or replace Replace Replace Adjust Inspect

8.4.2 Troubleshooting Method

The ECU control unit takes the following measures to prevent engine damage when parts of the EFI system are faulty.

Code	Part	Output signal instability range or standard	ECU engine control unit backup
P0112 or P0113	air intake temp. sensor	air intake temp. Ta=-40°C~+130°C	If the intake temperature sensor fails, the circuit is open, and the ECU control unit sets the temperature to -40°C. If the intake temperature sensor fails, the circuit is short-circuited, and the ECU control unit sets the temperature to 130°C.
P0117 or P0118	coolant temp. sensor	coolant temp. Tw=-40°C~+130°C	If the coolant temperature sensor system fails, the circuit is open, and the ECU control unit sets the coolant temperature as -40°C. If the coolant temperature sensor system fails and the circuit is short-circuited, the ECU control unit sets the coolant temperature to 129°C.
P0130, P0131, P0132 and P0134	oxygen sensor #1	The oxygen sensor activates and the sensor continuously sends a signal (output voltage) to the ECU control unit.	If the oxygen sensor is not activated, the ECU control unit stops the oxygen sensor feedback mode. If the oxygen sensor output voltage is incorrect, the ECU control unit stops the oxygen sensor feedback mode.
P0150、P0151、P0152 and P0154	oxygen sensor #2	The oxygen sensor activates and the sensor continuously sends a signal (output voltage) to the ECU control unit.	If the oxygen sensor is not activated, the ECU control unit stops the oxygen sensor feedback mode. If the oxygen sensor output voltage is incorrect, the ECU control unit stops the oxygen sensor feedback mode.

8.5 Trouble Diagnosis by Engine

Before trouble diagnosis by engine problems, initial checking should be done as follows.

1. Confirm if MIL is ok.
2. Confirm there's no trouble code record by PDA checking.
3. Confirm there's really trouble existing complained by end-users and confirm the condition.

Check appearance:

1. Check fuel hoses for any fuel leakage.
2. Check vacuum pipes if any broken, twist or improper connection.
3. Check intake manifold if any blocked, air leakage or damaged.
4. Check high-tension cable if any damaged, aging or ignition order is correct.
5. Check wiring close to ground if it's clean and firm.
6. Check connector of all sensors and actuator if any loose or improper connection.

Important note: In case there are some problems as above-mentioned. Firstly, repair work should be carried out according to the phenomenon, otherwise, subsequent fault diagnosis and maintenance work will be affected.

Diagnosis aid:

1. Confirm engine does not have any trouble record.
2. Confirm there is really trouble existing.
3. During checking, do not neglect vehicle periodic maintenance, cylinder pressure, valve timing, fuel supply and so on.
4. Replace ECU to test.

In case trouble disappears, then it's a problem of ECU. If trouble still exists, then assemble original ECU and check other points.

Common troubles:

- When starting the engine, engine cannot rotate or rotate slowly.
- When starting engine, starter motor can rotate but cannot start engine.
- Difficult to start warm or hot engine.
- Difficult to start cold engine .
- RPM is ok, but difficult to start engine.
- Starting is ok, but idle speed is unstable at any time.
- Starting is ok, but idle speed is unstable during engine warm-up period.
- Starting is ok, but idle speed is unstable after engine warm-up.
- Starting is ok, idle speed is unstable or engine stop when switch on some lights or other electric components.
- Starting is ok, but too high idle speed.
- RPM cannot go up or engine stop when acceleration.
- Slow acceleration.
- Insufficient power and bad performance when acceleration.

(1) When starting, engine not rotating or slow.

General failure part: 1. Battery. 2. Starter motor. 3. Wirings harness or ignition switch. 4. Engine mechanism part.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Use multi-meter to check battery voltage if voltage is between 8-12V or not when engine starts.	YES	Next step
		NO	Replace battery
2	Turn on ignition switch, stop switch side stand switch and check if voltage of ECU pin 32 is around 12V.	YES	Next step
		NO	Repair switches or change harness
3	Keep ignition switch "on", use multi-meter to check if voltage of starting motor anode is over 8V.	YES	Next step
		NO	Repair switches or change harness
4	Disassemble starting motor and check its working status, especially whether there was broken circuit or jammed by bad lubrication.	YES	Repair or replace starting motor
		NO	Next step
5	If error only occur in Winter, check if starting motor resistance is too big caused by improper oil used.	YES	Change to proper lubricant
		NO	Next step
6	Check if mechanical resistance is too big inside engine.	YES	Check engine inside resistance
		NO	Repeat above procedures

(2) When starting, engine can rotate but cannot start.

General failure part: 1. No fuel. 2. Fuel pump. 3. Trigger. 4. Ignition coil. 5. Mechanical parts of engine

General diagnosis procedures:

No.	Procedures	Results	Next
1	Connect fuel pressure gauge, turn on ignition switch or start engine, check if fuel pressure is around 300kpa.	YES	Next step
		NO	Check and repair fuel supply system
2	Connect PDA, check if there's signal of RPM data after starting engine.	YES	Next step
		NO	Check and repair RPM sensor circuit
3	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next step
		NO	Check and repair ignition system
4	Test cylinder pressure and check if pressure is enough.	YES	Eliminate engine mechanical failures
		NO	Next step
5	Use PDA to test, turn on ignition switch, check if power supply of ECU pin 32 and pin 33 is normal, check if pin 5 and pin 10 works normally.	YES	Use PDA to check
		NO	Repair related circuit

(3) Difficult to start hot engine.

General failure part: 1. Water in fuel tank. 2. Fuel pump. 3. Water temp. sensor. 4. Ignition coil.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Connect fuel pressure gauge, turn on ignition switch or start engine, check if fuel pressure is around 300kpa.	YES	Next step
		NO	Check and repair fuel supply system
2	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next step
		NO	Check and repair ignition system
3	Disconnect water temp. sensor connector, check whether the engine can be started or not. (Or replace water temp. sensor with a 300Ω resistance. Check whether the engine can be started or not.)	YES	Change fuel
		NO	Next step
4	Check whether the failure happens right after fueling.	YES	Use PDA to check
		NO	Repair related circuit
5	Use PDA to test, turn on ignition switch, check if power supply of ECU pin 32 and pin 33 is normal; check if pin 5 and pin 10 works normally.	YES	Use PDA to check
		NO	Repair related circuit

(4) Difficult to start cold engine.

General failure part: 1. Water in fuel tank. 2. Fuel pump. 3. Coolant temp. sensor. 4. Injector. 5. Ignition coil. 6. Throttle body and by-pass. 7. Mechanical parts of engine

General diagnosis procedures:

No.	Procedures	Results	Next
1	Connect fuel pump gauge ,start engine, check if pressure is around 300kPa.	YES	Next step
		NO	Check and repair fuel supply system
2	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next step
		NO	Check and repair ignition system
3	Disconnect water temp. sensor connector, check whether the engine can be started or not. (Or replace water temp. sensor with a 2500Ω resistance. Check whether the engine can be started or not.)	YES	Repair circuit or replace sensor
		NO	Next step
4	Slightly draw throttle cable and check if engine could start easily.	YES	Clean throttle body and by-pass
		NO	Next step
5	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace injector
		NO	Next step
6	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical failures
		NO	Next step

(5) Normal RPM but difficult to start in any condition.

General failure part: 1. Water in fuel tank. 2. Fuel pump. 3. Injector. 4. Ignition coil. 5. Throttle body and by-pass. 6. Air intake pipe. 7. Ignition timing. 8. Spark plug. 9. Mechanical part of engine.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next step
2	Connect fuel pump gauge, start engine, check if pressure is around 330kPa.	YES	Next step
		NO	Check and repair fuel supply system
3	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if blue and white spark appears.	YES	Next step
		NO	Check and repair ignition system
4	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or replace
5	Disconnect water temp. sensor connector, check whether the engine can be started or not.	YES	Repair circuit or replace sensor
		NO	Next step
6	Slightly draw throttle cable and check if engine could start easily.	YES	Clean throttle body and by-pass
		NO	Next step
7	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
8	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
9	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical failures
		NO	Next step

(6) Normal starting, but unstable idle speed.

General failure part: 1. Water in fuel tank. 2. Injector. 3. Spark plug. 4. Throttle body and by-pass. 5. Air intake pipe. 6. Air control valve. 7. Ignition timing. 8. Spark plug. 9. Mechanical part of engine.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next step
2	Check if air control valve is blocked.	YES	Clean or replace
		NO	Next step
3	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or replace
4	Check if there is carbon deposit inside throttle body and air control valve.	YES	Clean
		NO	Next step
5	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
6	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical failures
		NO	Next step
8	Check if ignition timing complies with standard regulation.	YES	Next step
		NO	Check and repair ignition timing

(7) Normal starting, but unstable idle speed during engine warming.

General failure part: 1. Water in fuel tank. 2. Injector. 3. Spark plug. 4. Throttle body and by-pass. 5. Air intake pipe. 6. Air control valve. 7. Mechanical part of engine.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next step
2	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or replace
3	Check if there is carbon deposit inside throttle body and air control valve.	YES	Clean
		NO	Next step
4	Disconnect water temp. sensor connector and start engine to check idle speed is stable or not.	YES	Repair circuit or replace sensor
		NO	Next step
5	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
6	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical failures
		NO	Next step

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(8) Normal starting, but unstable idle speed after engine warming.

General failure part: 1. Water in fuel tank. 2. Injector. 3. Spark plug. 4. Throttle body and by-pass. 5. Air intake pipe. 6. Air control valve. 7. Mechanical part of engine.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next step
2	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or replace
3	Check if there is carbon deposit inside throttle body and air control valve.	YES	Clean
		NO	Next step
4	Disconnect water temp. sensor connector and start engine to check idle speed is stable or not.	YES	Repair circuit or replace sensor
		NO	Next step
5	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
6	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical failures
		NO	Next step

(9) Normal starting, unstable idle speed or engine stop when it is electronic loaded (e.g. headlight is on).

General failure part: 1. Air control valve. 2. Injector.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Disassemble air control valve and check if there is carbon deposit inside throttle body, idle adjustment and by-pass.	YES	Clean
		NO	Next step
2	Check if output power increases when lighting, by using PDA to test if ignition advance angle, fuel spray and air intake volume is normal.	YES	To step 4
		NO	Next step
		NO	Repair air intake system
3	Disassemble injector and use special tool to check if there is leakage or blocked or wrong fuel flow.	YES	Replace
		NO	Next step

(10) Engine starts normally, but idle speed is too high.

General failure part: 1. Throttle body and by-pass. 2. Injector seat. 3. Air control valve. 4. Water temp. sensor. 5. Ignition timing.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if throttle cable is jammed or too tight.	YES	Adjust
		NO	Next step
2	Check if air filter is blocked or air intake pipe leaks.	YES	Check and repair air intake system
		NO	Next step
3	Check if there is carbon deposit inside throttle body and air control valve.	YES	Clean
		NO	Next step
4	Remove water temp. sensor connector, start engine to check if idle speed is too high.	YES	Repair wiring or replace sensor
		NO	Next step
5	Check if ignition timing complies with standard regulation.	YES	Next step
		NO	Check and repair ignition timing

(11) RPM cannot increase or engine stop when accelerating.

General failure part: 1. Water in fuel tank. 2. TPS. 3. Spark plug. 4. Throttle body and by-pass. 5. Air intake pipe. 6. Air control valve. 7. Injector. 8. Ignition timing. 9. Exhaust pipe.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked.	YES	Check and repair air intake system
		NO	Next step
2	Connect fuel pressure gauge, turn on ignition switch or start engine, check if fuel pressure is around 250kpa.	YES	Next step
		NO	Check and repair fuel supply system
3	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or replace
4	Remove air control valve and check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean
		NO	Next step
5	Check if TPS and its circuit is normal.	YES	Next step
		NO	Repair wiring or replace sensor
6	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
7	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
8	Check if ignition timing complies with standard regulation.	YES	Next step
		NO	Check and repair ignition timing
9	Check if exhaust gas exhale smoothly.	YES	Next step
		NO	Repair or replace exhaust pipe

(12) Low acceleration.

General failure part: 1. Water in fuel tank. 2. TPS. 3. Spark plug. 4. Throttle body and by-pass. 5. Air intake pipe. 6. Air control valve. 7. Injector. 8. Ignition timing. 9. Exhaust pipe.

General diagnosis procedures:

No.	Procedures	Results	Next
1	Check if air filter is blocked.	YES	Check and repair air intake system
		NO	Next step
2	Connect fuel pressure gauge, turn on ignition switch or start engine, check if fuel pressure is around 300kpa.	YES	Next step
		NO	Check and repair fuel supply system
3	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or replace
4	Remove air control valve and check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean
		NO	Next step
5	Check if T P S and its circuit is normal.	YES	Next step
		NO	Repair wiring or replace sensor
6	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
7	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
8	Check if ignition timing complies with standard regulation.	YES	Next step
		NO	Check and repair ignition timing
9	Check if exhaust gas exhale smoothly.	YES	Next step
		NO	Repair or replace exhaust pipe

(13) Difficult to accelerate and bad performance.

General failure part: 1. Water in fuel tank. 2. TPS. 3. Spark plug. 4. Ignition coil. 5. Throttle body and by-pass. 6. Air intake pipe. 7. Air control valve. 8. Injector. 9. Ignition timing. 10. Exhaust pipe.

General diagnosis procedures:

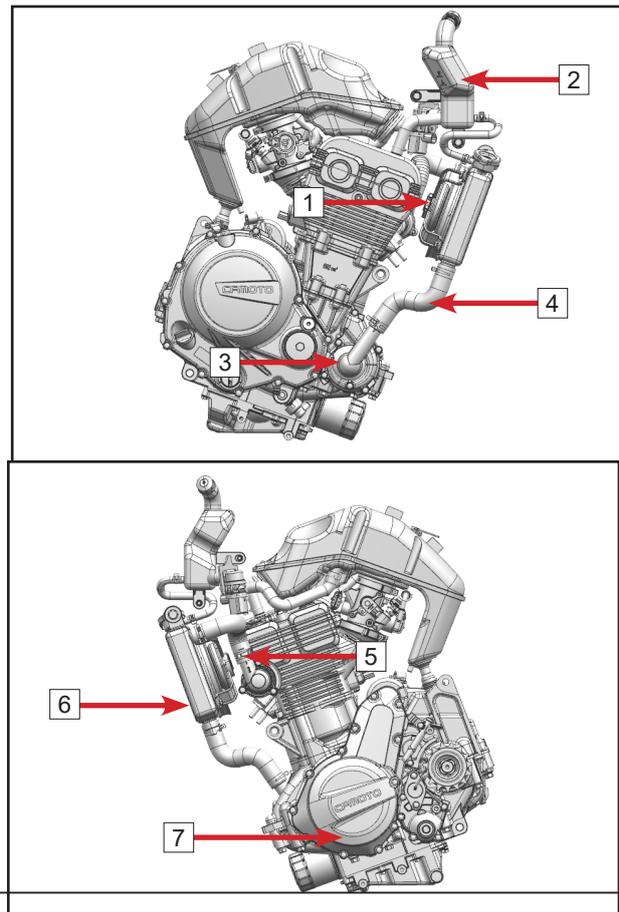
No.	Procedures	Results	Next
1	Check if clutch sliding, low tire pressure, bad brake or wrong tire size.	YES	Repair
		NO	Next step
2	Check if air filter is blocked.	YES	Check and repair air intake system
		NO	Next step
3	Connect fuel pressure gauge, turn on ignition switch or start engine, check if fuel pressure is around 300kpa.	YES	Next step
		NO	Check and repair fuel supply system
4	Disconnect high-tension cable, connect spark plug and set its electrode 5mm to engine body, then start engine to check if spark is strong enough.	YES	Next step
		NO	Check and repair ignition timing
5	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Replace
6	Remove air control valve and check if there is carbon deposit inside throttle body, air control valve and by-pass.	YES	Clean
		NO	Next step
7	Check if T PS and its circuit is normal.	YES	Next step
		NO	Repair wiring or replace sensor
8	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
9	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
10	Check if ignition timing complies with standard regulation.	YES	Next step
		NO	Check and repair ignition timing
11	Check if exhaust gas exhale smoothly.	YES	Next step
		NO	Repair or replace exhaust pipe

09 Cooling System

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9.1 Cooling System Diagram

1. Fan motor assembly
2. Reservoir assembly
3. Water pump assembly
4. Radiator water outlet pipe
5. Radiator water inlet pipe
6. Radiator assembly
7. Engine assembly



⚠ DANGER:

Coolant is toxic. Don't drink nor spill on skin, eyes, clothing. If coolant is swallowed, induce vomit and seek for medical attention. If you get coolant on your skin or in your eyes, immediately wash it off before medical attention. If you spill coolant on your clothing, change your clothing.

Rusting and corroding residues in engine and radiator must be treated according to regulations. The chemical inside can do harm to humans.

⚠ CAUTION:

If tap water is added to the cooling system, scale deposit will accumulate inside the cooling system. When the temperature is below zero, ice will be generated, which will seriously affect the operation of the cooling system.

Antifreeze is added anti-rust agent and antiseptic. When it is diluted, it will lose resistance of rust and corrosion. The dilution concentration of antifreeze must be consistent with the manufacturer's instructions.

The coolant added into the cooling system is green and contains ethylene glycol. When the ambient temperature is at -35°C , please choose the coolant whose freezing point is lower than -35°C .

⚠ WARNING:

The coolant will be very hot and under pressure when the vehicle is running.

Never open the radiator cap when the engine is still hot. Otherwise, the vapor or hot coolant will cause injury.

If get scalded, rinse the wound with flowing cold water for more than 10 minutes until the wound is no longer painful and seek medical advice immediately.

9.2 Cooling System

Pre-work

Remove relevant body covering parts (see these chapters for details: 5.1 5.2 5.3 5.4 5.6 5.7 5.8 5.9 5.10 5.25, in 5.7 chapter, the dashboard guard assembly only needs to be removed of screws and push the dashboard guard up to facilitate the next removal of the headlight panel in chapter 5.8)

Before performing maintenance operations on the cooling system, wait for the radiator to cool completely, otherwise, there is a risk of burns.

Removal

Release clamp **1**.

Remove bolts **2**.

Remove reservoir assembly **3**.

Place a container under the pump to collect the coolant.

Remove drain bolt **4**.

Drain coolant.

Release clamp **5**.

Remove outlet pipe **6**.

NOTE: After water outlet pipe removal, there is still some coolant spilling out.

Release upper clamp of inlet pipe **7**.

Remove inlet pipe **8**.

Unplug the fan motor assembly connectors.

Remove the bolt **9**.

Remove the radiator assembly **11** by disconnecting the three fasteners **10** in the direction of the arrow.

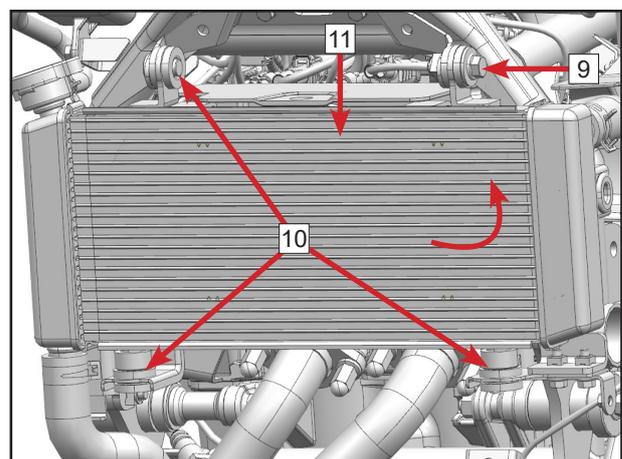
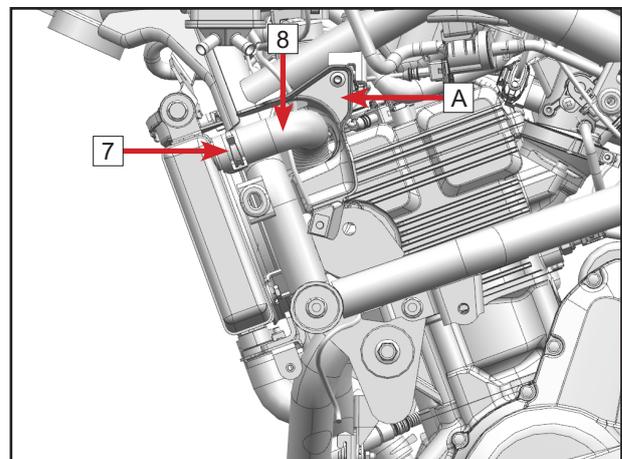
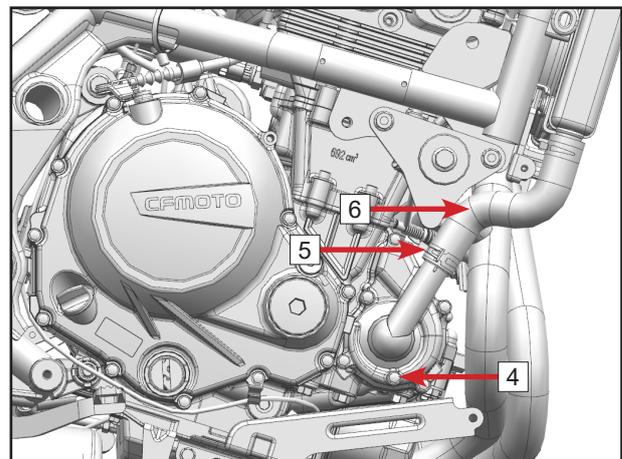
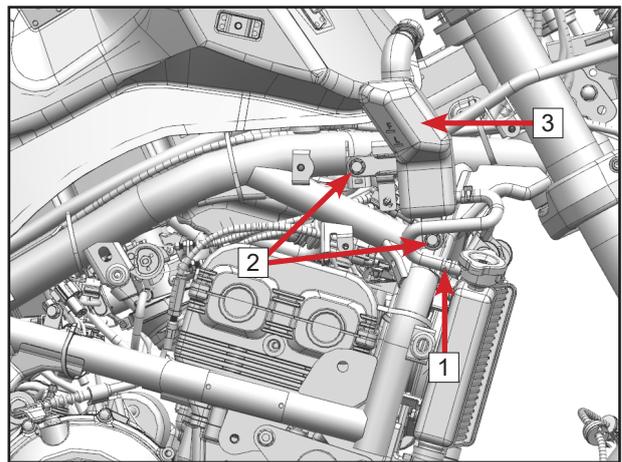
Remove the rear LH baffle **A** of the reservoir (see chapter 05 for details).

Loosen the lower clamp of the inlet pipe.

Remove the inlet pipe **8**.

Installation

Installation takes place in reverse order of disassembly.



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9.3 Coolant

Coolant in cooling system is a mixture of 51.5% water, 46% ethylene glycol antifreeze and 2.5% additive. This mixture ratio provides optimized corrosion resistance and fine heat production. The mixture has good anti-corrosion and endothermic function, and its freezing point is -35°C . If engine works under -35°C , choose coolant of -40% or -50%.

⚠ CAUTION:

Use high quality ethylene glycol base antifreeze mixed with distilled water. Never mix alcohol base anti-freeze or other different brands of antifreeze. The ratio of mixture should not be more than 60% or less than 50%. Do not use anti-leak additive.

9.3.1 Coolant Level Inspection

Hold the vehicle upright on level ground or prop it up with support.

Check the reservoir coolant level after the coolant has cooled completely.

Coolant level should be in the **A** zone.

If higher than **A**, drain the reservoir coolant to the **A** zone.

If lower than **A**, add reservoir coolant to **A** zone.

9.3.2 Coolant Spoilage Inspection

If white cotton-like floating material is found, the aluminum parts within the cooling system are corroded. When the coolant is brown, iron or steel parts are rusting. In any case, flush the cooling system.

If the coolant emits an unusual odor, check the cooling system

for leaks. The odor may be caused by exhaust gas leaking into the cooling system.

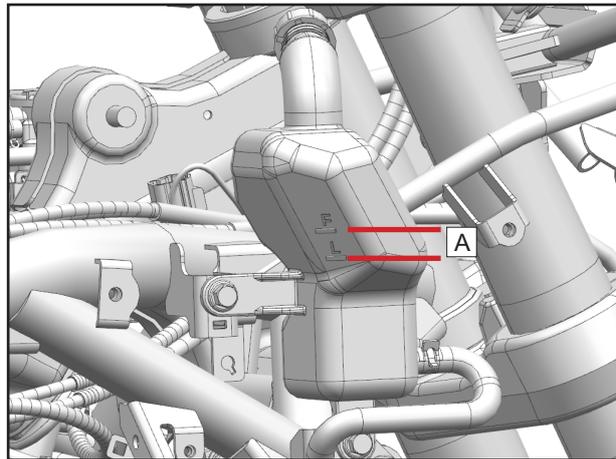
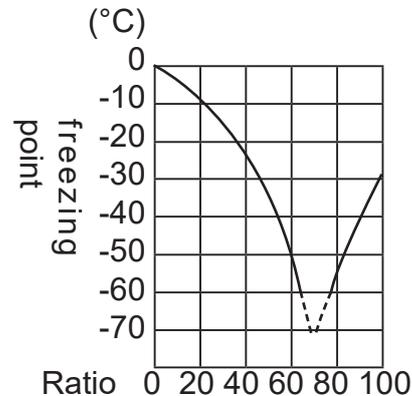
9.3.3 Coolant Addition

Open the reservoir cover and add the same coolant to area A.

⚠ CAUTION: If the coolant needs to be replenished frequently, or if the coolant in the reservoir is frequently backed up and drained, there may be a leak in the cooling system, contact your dealer to have the cooling system checked.

Only the original CFMOTO coolant is recommended. Mixing different coolants may cause engine damage, contact your dealer to replace the coolant.

Mixing ratio	Freezing point
50%	-30°C
55%	-40°C
60%	-55°C



9.3.4 Coolant Changing

Prop up the vehicle using side stand on a level surface.

Place a container under the water pump.

Remove the drain bolt **1**.

Loosen the radiator pressure cap.

Drain the coolant.

Install the drain bolt.

Open the radiator pressure cap **2**.

Fill up with coolant using a funnel.

Remove the drain bolt until a steady level of coolant flows out and then immediately tighten the drain bolt.

Continue to fill the radiator with coolant up to the filling point.

Reinstall the pressure cap.

Open the reservoir cap and add the same amount of coolant to area A.

Install the reservoir cap.

Run the engine at idle speed for 2 to 3 minutes.

Recheck coolant level after engine cools down.

9.3.5 Cooling System Flushing

After a period of use, the cooling system will accumulate rust and scale in the radiator. When these accumulations are estimated or found, flush the cooling system. If this buildup cannot be cleaned, the passage will become clogged and the cooling system efficiency will be greatly reduced.

Drain the cooling system (see Coolant Changing).

Fill the cooling system with fresh water mixed with flushing compound.

⚠ WARNING

Do not use flushing chemicals that are harmful to aluminum engines and radiators. Carefully follow the directions for use provided by the manufacturer of the cleaning product.

Warm up the engine and run it at normal operating temperature for approximately ten minutes.

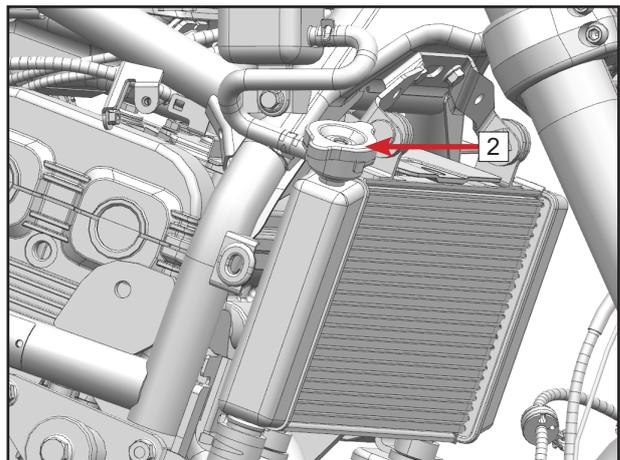
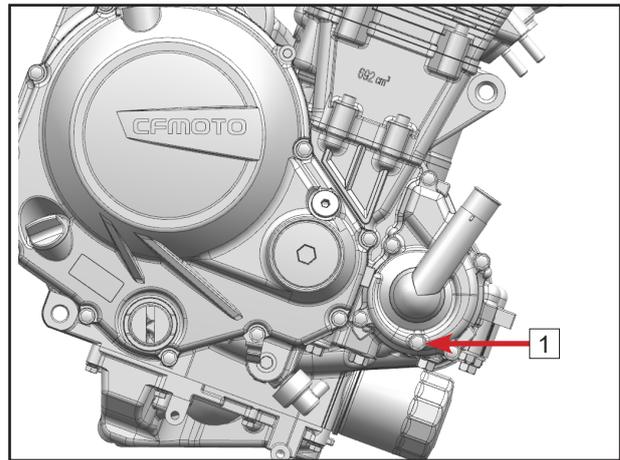
Turn off the engine and drain the cooling system.

Fill the system with water.

Preheat the engine and drain the system.

Repeat the above two steps again.

Refill the cooling system with coolant and evacuate the air from the system (see Coolant Changing).



9.4 Seal Inspection

Radiator Cap Inspection

Remove radiator cap.

Measure the open pressure of radiator cap with pressure gauge.

If the pressure is out of standard, replace a new part.

Radiator Cap Open Pressure:

135kPa~160kPa

1.35kgf/cm²~1.6kgf/cm²

19.58psi~23.2psi

Standard:

140kPa

1.4kgf/cm²

20.3psi

Seal Inspection

Connect the pressure gauge with reservoir joint.

⚠️WARNING: Never open the radiator cap when the engine is still hot. Otherwise, the vapor or hot coolant will cause injury.

Inflate to 135kPa, and last for 10s.

If the pressure decreases within 10s, there is leaking inside the system. Inspect the whole system and replace the broken parts.

NOTE: When removing the gauge, cover radiator cap with cloth, in case the coolant spills out.

NOTE: The test pressure should not exceed the opening pressure of the radiator cap.

9.5 Fan Motor Assembly

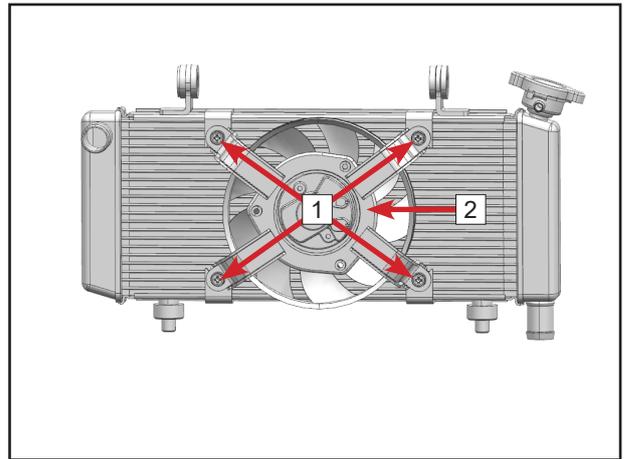
Removal

Remove bolts **1**.

Remove fan motor assembly **2**.

Installation

Installation takes place in reverse order of disassembly.

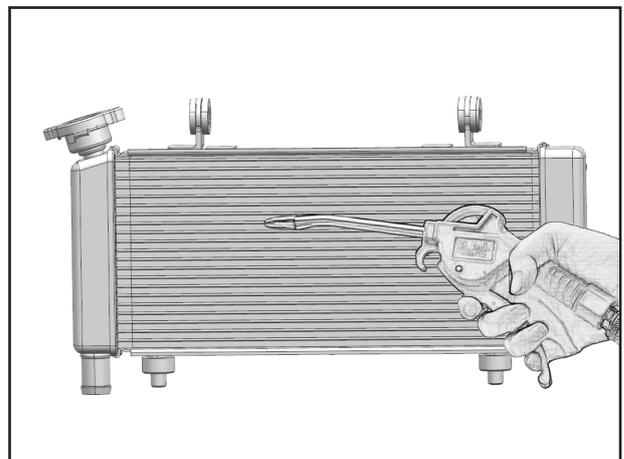


9.6 Fan Motor Cleaning and Inspection

Radiator cleaning and inspection

Check whether there is dirt on the radiator mesh, and if so, clean it with a low-pressure water gun or low-pressure compressed air.

NOTE: Do not clean the radiator by hand when it is hot. Allow the radiator to cool before cleaning.



NOTE: If a high-pressure cleaning device is used for cleaning, it can cause damage to the radiator blades, which in turn can affect the performance of the radiator. Therefore, the use of high-pressure cleaning devices is not recommended.

NOTE: Check the radiator blades for deposits (e.g., dirt, dust, leaves,) as any deposits will prevent it from cooling effectively.



Service the radiator blades with a small screwdriver.

9.7 Inspection

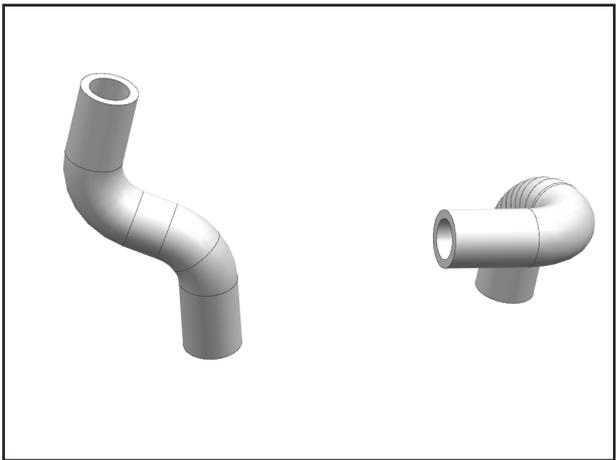
9.7.1 Inlet Pipe and Outlet Pipe Inspection

Check radiator inlet and outlet pipes for damage and rupture.

Rubber hose will be naturally aged due to heat and longer use, and the cooling system will cause the pipe to rupture when heated. Check whether there are cracks in the hose by pinching it with your fingers, and replace it if it is damaged or broken.

Check the tightness of the coolant pipe clamp, if it is loose, tighten it or replace it.

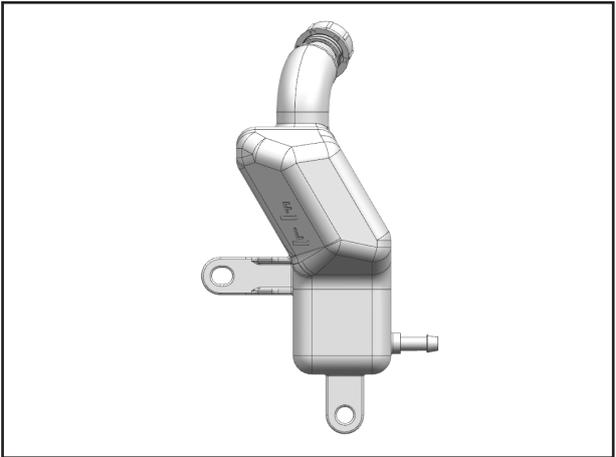
Check whether the water pump, water pipe and the connection parts are leaking, if there is leakage, replace them.



9.7.2 Reservoir Inspection

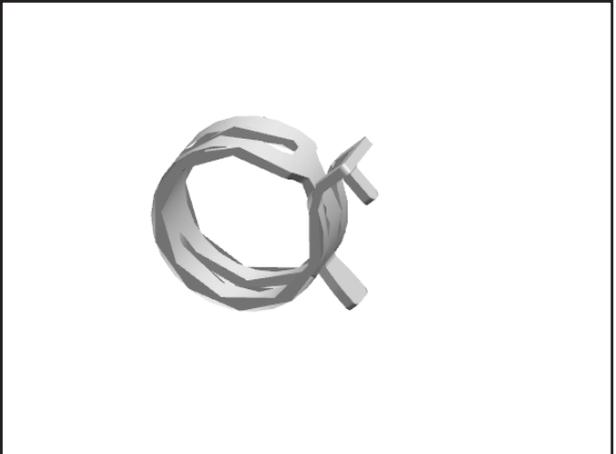
Check whether the reservoir is broken or cracked, if it appears, replace with new parts at once.

Check whether the water pipe of the reservoir is broken or cracked, if it appears, replace with new parts at once.



9.7.3 Clamp Inspection

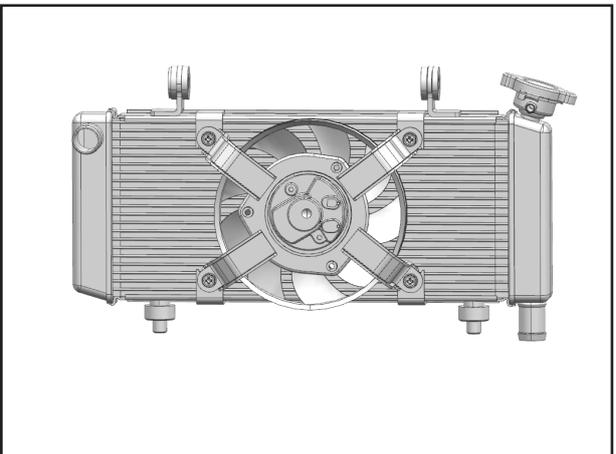
Check if the clamps are worn, deformed or cracked, if it appears, replace with new parts at once.



9.7.4 Fan Motor Assembly Inspection

Rotate the blades by hand to check their rotational flexibility and integrity, if the blades are stuck or broken then replace with a new fan motor assembly [2].

Battery voltage 12V, motor running at full speed, amperage meter current not more than 5A. If the motor does not rotate or the current exceeds the regulation, replace the fan motor assembly [2].



10.1 Muffler..... 10-2
 10.1.1 Inspection 10-3

⚠ DANGER: The temperature of the muffler is very high after the engine has run. When dismantling and repairing the muffler, the vehicle must not be parked near flammable and explosive materials, which may ignite or detonate the flammable and explosive materials. Do not operate the muffler and other high-temperature parts when the vehicle is not yet cooled, which may cause serious burns to the operator or the surrounding personnel. The muffler will emit toxic and harmful gases, and shall not be operated in a closed or no effective ventilation environment. The toxic and harmful gases emitted from the muffler may cause poisoning or even death to the surrounding personnel.

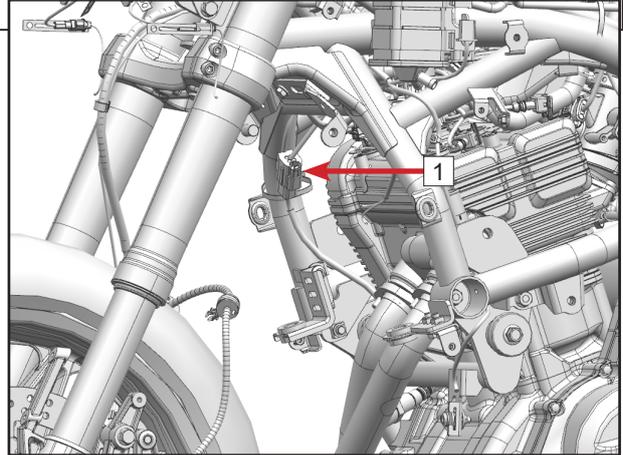
10.1 Muffler

Pre-work

Remove body covering parts (see chapter 5.1-5.4, 5.6-5.10, 5.15).

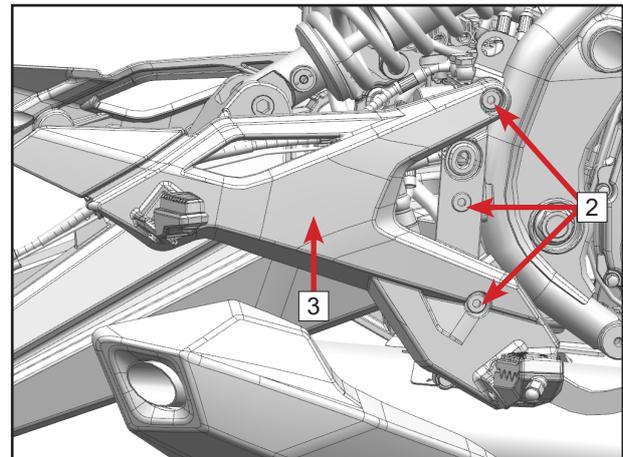
Removal

Unplug oxygen sensor connectors **1**.

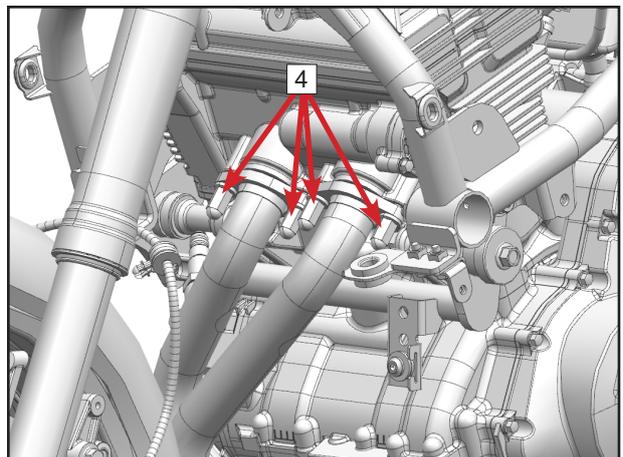


Remove bolts **2**.

Release RH footrest bracket assembly **3**.



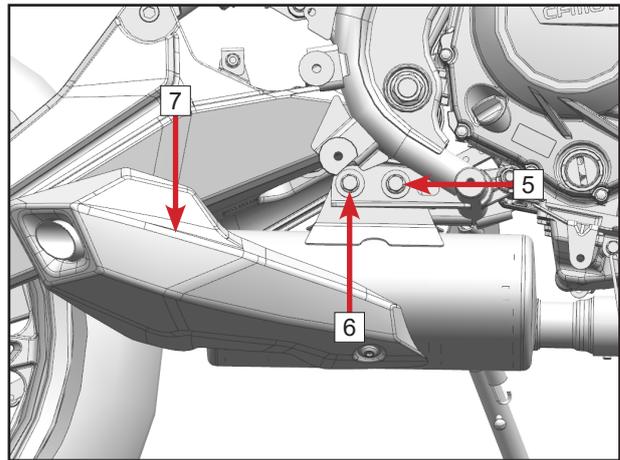
Remove nuts **4**.



- Remove bolt [5].
- Remove muffler mounting shaft and nut assembly [6].
- Remove muffler assembly [7].

Installation

Install in reverse order of disassembly.



10.1.1 Inspection

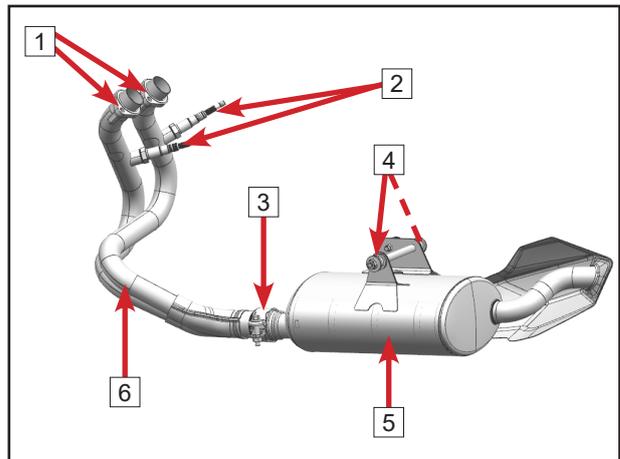
Inspect the exhaust liner [1] and replace with new parts if corrosion, cracking or deformation occurs.

Overhaul of the oxygen sensor [3] as detailed in the electrical chapter.

Inspect the graphite sealing sleeve [3], if it appears corroded, cracked, or deformed, replace it with a new part.

Inspect the muffler buffer sleeve [4], if it appears deformation, aging, or cracks, replace with new parts.

Check the muffler assembly [5] and exhaust pipe assembly [6], if there are cracks, breakage, welding holes and poor welding, replace with new parts.



11 Wheels and Brake System

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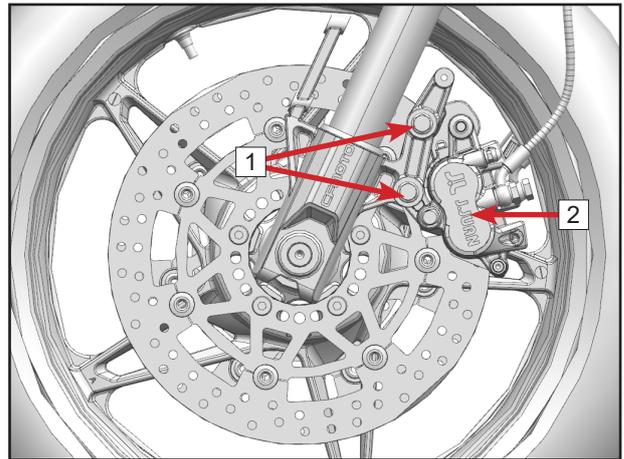
11 Wheels and Brake System

11.1 Front Brake Caliper Assembly

Removal

Remove bolts [1].

Remove LH front brake caliper assembly [2].

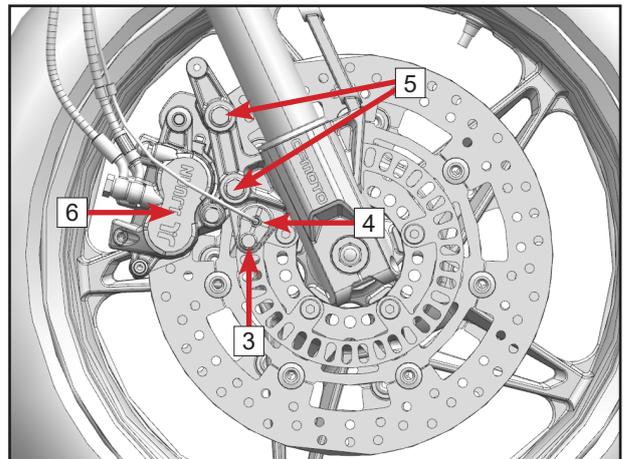


Remove bolt [3].

Remove speed sensor [4].

Remove bolts [5].

Remove RH front brake caliper assembly [6].



Installation

Install in reverse order of disassembly.

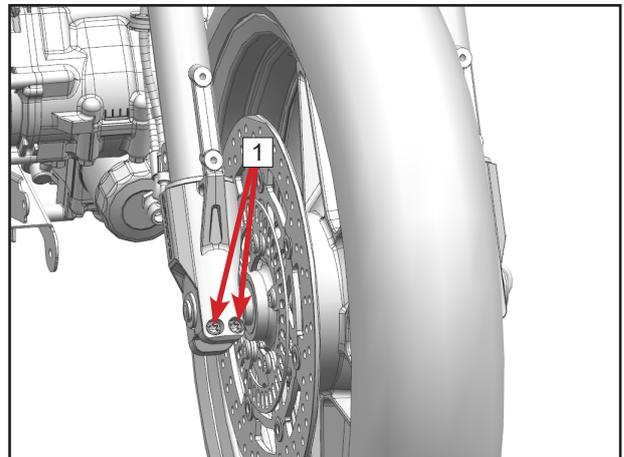
11.2 Front Wheel

Pre-work

Use jacks or front wheel supports or cranes to lift the front wheel off the ground (select the part of the vehicle that can bear the load to prevent the vehicle from tipping over and causing injury to the operator).

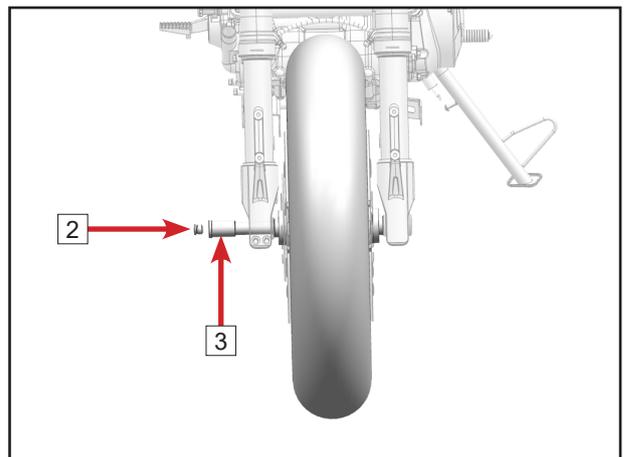
Removal

Remove bolts [1].



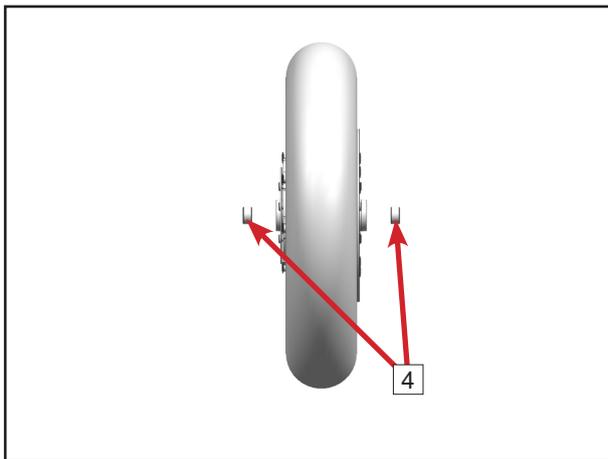
Remove front wheel shaft rubber plug [2].

Remove front wheel shaft [3].



CFMOTO

Remove front wheel shaft busings 4, do not lose them.



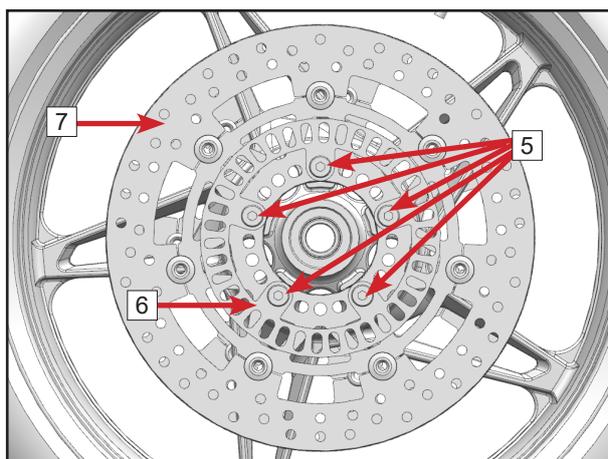
Remove bolt and gasket assembly 5.

Remove front gear ring 6.

Remove front brake disc 7.

Remove front wheel.

LH and RH side brake discs removal is the same way (LH side has no gear ring).

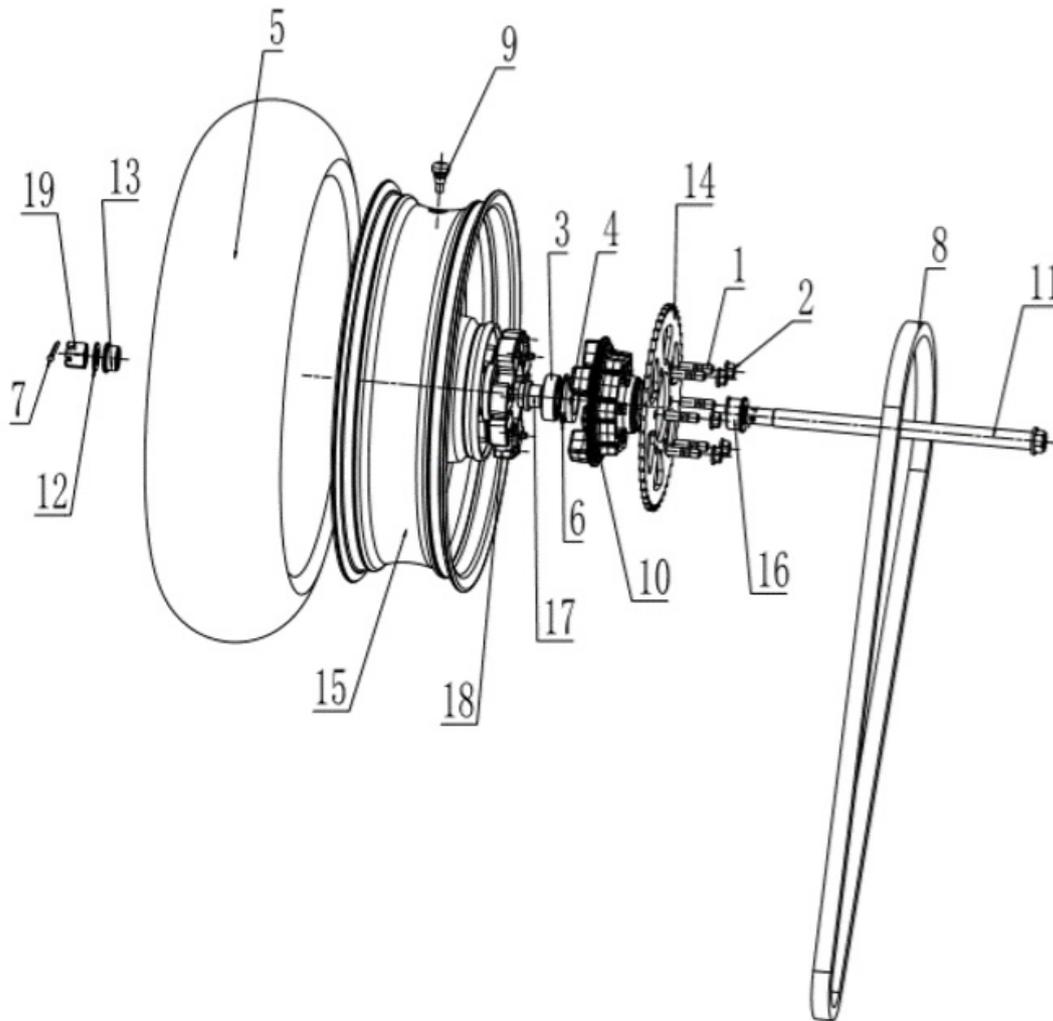


Installation

Install in reverse order of disassembly.

11 Wheels and Brake System

11.3 Rear Wheel Assembly Diagram



1	stud	2	nut	3	roller bearing	4	oil seal
5	tire	6	circlip for hole	7	cotter pin	8	chain
9	inflation valve	10	sprocket seat	11	rear wheel shaft	12	rear wheel shaft washer
13	rear wheel RH bushing	14	rear sprocket	15	rear rim assembly	16	rear wheel LH bushing
17	sprocket seat bushing	18	sprocket seat damper rubber	19	rear wheel shaft nut		

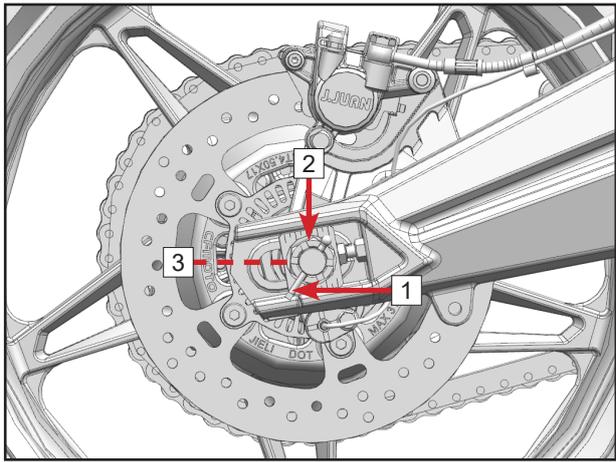
11.4 Rear Wheel

Pre-work

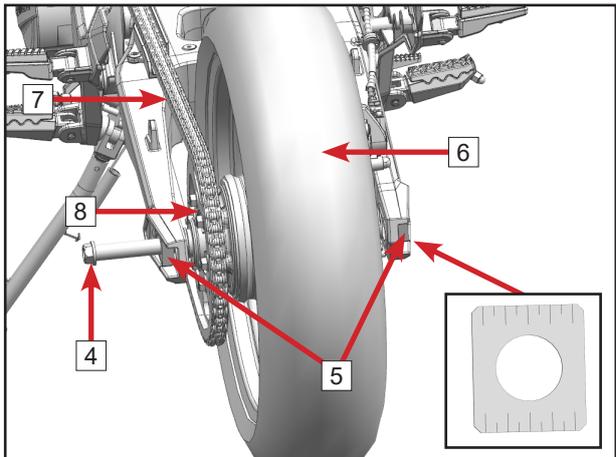
Use a jack or rear wheel brace or crane to get the rear wheel off the ground (select the part of the vehicle that can support the weight to prevent the vehicle from tipping over and causing injury to the operator). Remove the rear swing arm fenders (see chapter 05 for details).

Removal

- Remove cotter pin **1**.
- Remove rear wheel shaft nut **2**.
- Remove rear wheel shaft washer **3**.

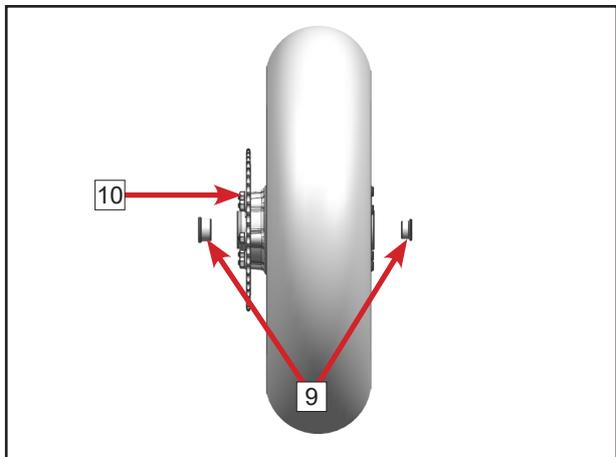


- Remove rear wheel shaft **4**.
- Remove chain adjuster **5**.
- Push rear wheel **6** to the front of the vehicle.
- Remove chain **7** from rear sprocket **8**.
- Remove rear wheel **6**.



NOTE: When taking out the rear wheel, tilt the tire slightly to the right to prevent the rear sprocket and sprocket seat assembly from falling and smashing.

- Remove rear wheel LH and RH bushings **9**, do not lose them.
- Remove sprocket seat assembly directly from rear wheel **10**.



Installation

Install in reverse order of disassembly.

NOTE: When installing chain adjuster **5, the calibration positions of the LH and RH chain adjuster should be the same.**

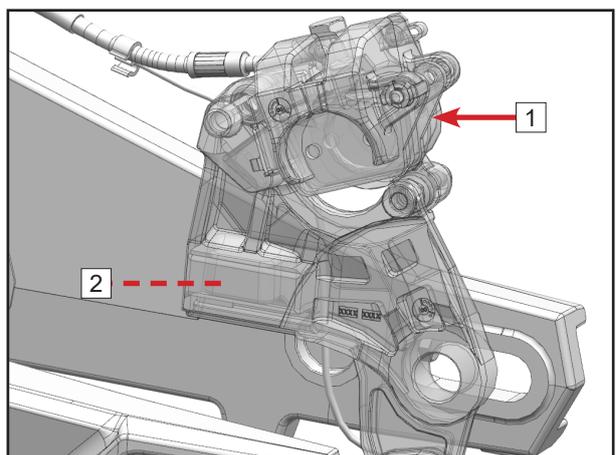
11.5 Rear Brake Caliper Assembly

Removal

- Remove rear brake caliper assembly **1** from rear fork limit block **2**.

Installation

Install in reverse order of disassembly.



11 Wheels and Brake System

11.6 Footrest Bracket Assembly

11.6.1 LH Footrest Bracket Assembly

Removal

Remove bolt [1].

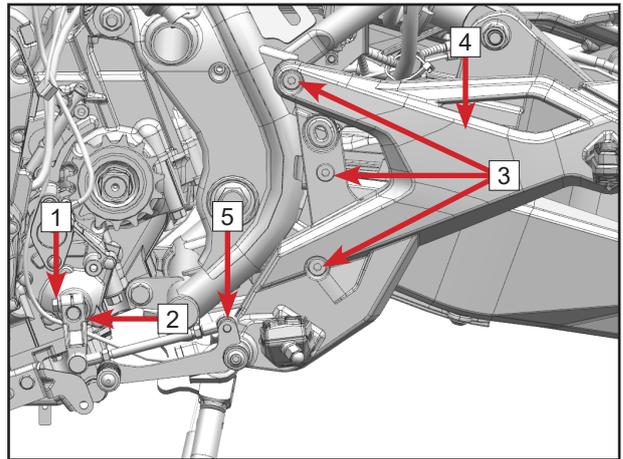
Remove gearshift lever connecting seat [2].

Remove bolts [3].

Remove LH footrest bracket assembly [4] and gearshift lever assembly [5].

Installation

Install in reverse order of disassembly.



11.6.2 RH Footrest Bracket Assembly

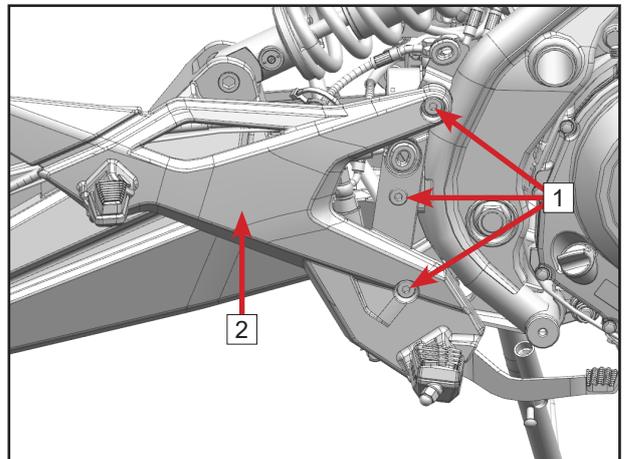
Removal

Remove bolts [1].

Release RH footrest bracket assembly [2] (removal see chapter 11.7.1).

Installation

Install in reverse order of disassembly.



11.7 ABS Brake Assembly

Pre-work

Remove seat (see chapter 04) .

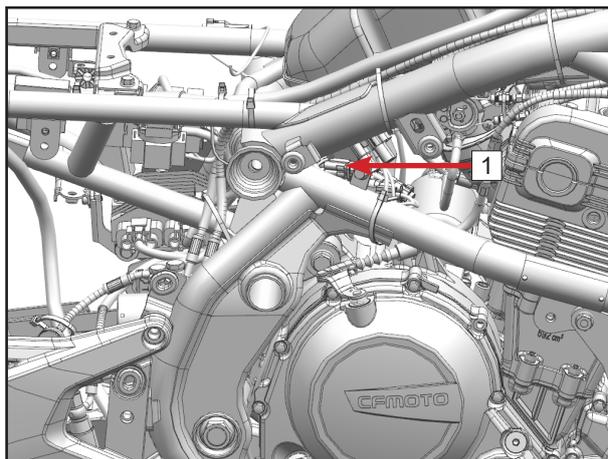
The MAB actuator unit in the ABS brake assembly is located in the lower part of the rear shock absorber, remove the relevant body covering parts (see chapter 05 for details).

Remove the fuel tank (see 06 Fuel System for details).

Remove the front brake caliper assembly (see this chapter) and pull off the three front brake fluid hose clamps fixed to the front fenders (see chapter 05 front fenders for details).

Remove the rear wheel and rear caliper assembly (see this chapter for details).

Remove the rear shock absorber (see chapter 12 for details).



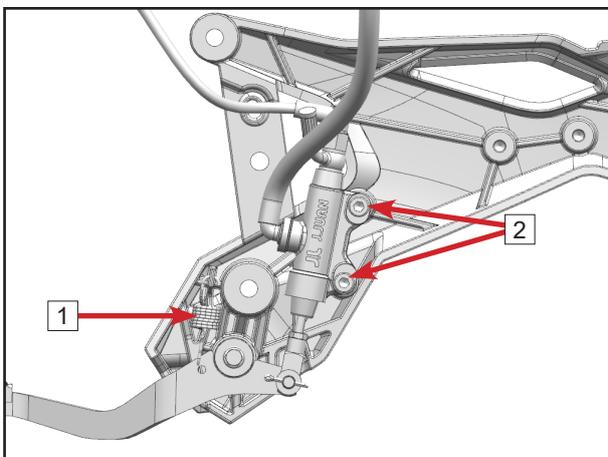
11.7.1 Rear Brake Master Cylinder

Pre-work

Release RH footrest bracket assembly (see chapter 11.6) .

Removal

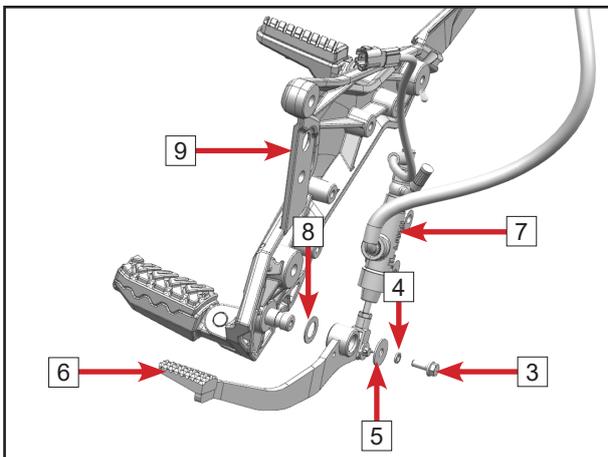
Unplug rear brake light switch connectors **1**.



Flip RH footrest bracket assembly.

Remove return spring **1**.

Remove bolts **2**.



Remove bolt **3**.

Remove washer **4**.

Remove gasket I **5**.

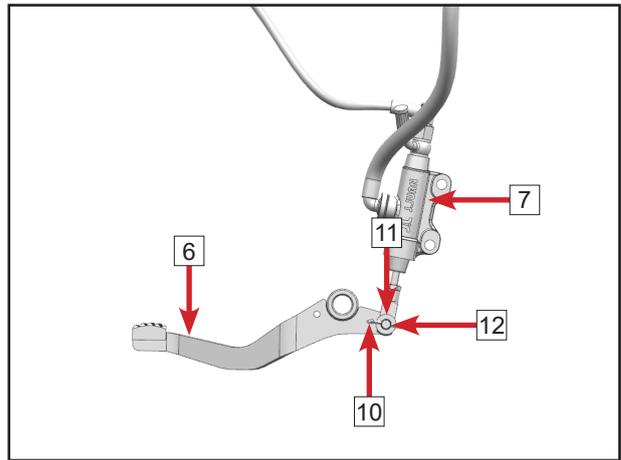
Remove rear brake pedal **6** and rear brake master cylinder **7**.

Remove gasket II **8**.

Remove RH footrest bracket assembly **9**.

11 Wheels and Brake System

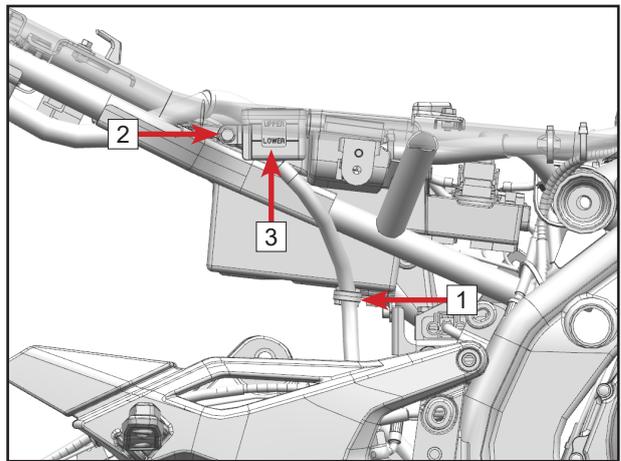
- Remove cotter pin **10**.
- Remove washer **11**.
- Remove pin shaft **12**.
- Remove rear brake pedal **6**.



11.7.1.1 Rear Brake Reservoir Removal

- unplug rear brake fluid hose clamp **1**.
- Remove bolt **2**.
- Remove rear brake reservoir **1**.

⚠ CAUTION: Brake reservoir can not be inverted, to prevent air goes into the brake line, resulting in brake system failure.



11.7.1.2 Rear Brake Fluid Outlet Pipe Removal

Remove bolt gasket assembly **1** (After removing the bolt, there will be a small amount of brake fluid dripping, take caution) .

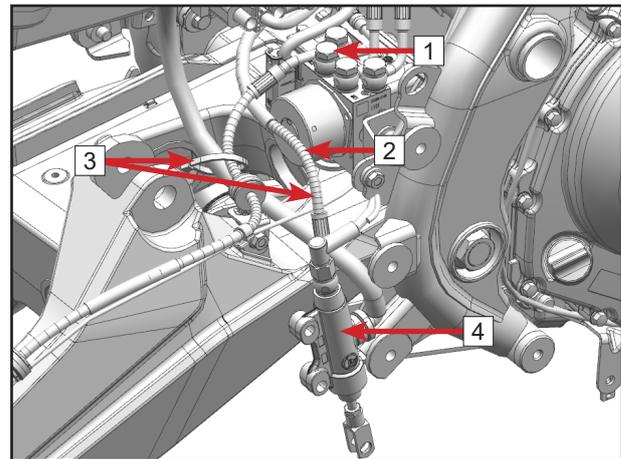
bolt torque: $30 \pm 2 \text{ N}\cdot\text{m}$

- Release rear brake fluid outlet pipe **2**.
- Remove 2 ties **3**.
- Remove rear brake master cylinder **4**.

Installation

Install in reverse order of disassembly.

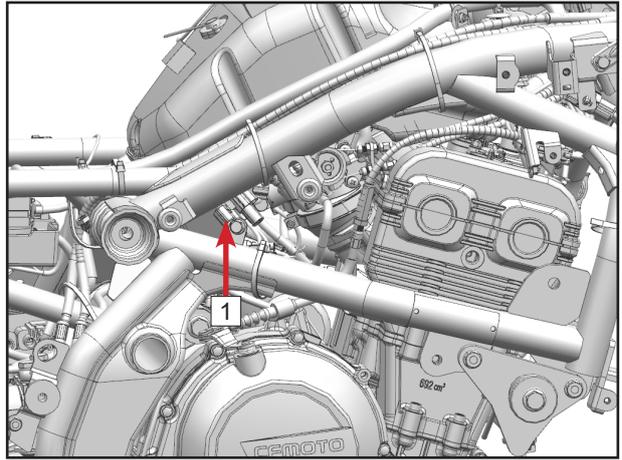
NOTE: Exhaust air after installing rear brake master cylinder.



11.7.2 Rear Brake Caliper Assembly Removal

Unplug rear wheel speed sensor connectors

- 1.
- 2.

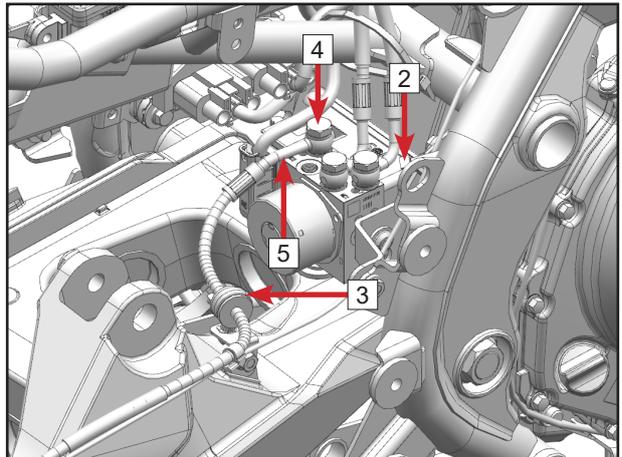


11.7.2.1 Rear Brake Inlet Pipe Removal

Unplug rear brake fluid hose clamp (3).
Remove bolt gasket assembly (4) (After removing the bolt, there will be a small amount of brake fluid dripping, take caution) .

bolt torque: $30 \pm 2 \text{ N}\cdot\text{m}$

Release rear brake fluid inlet pipe (5).

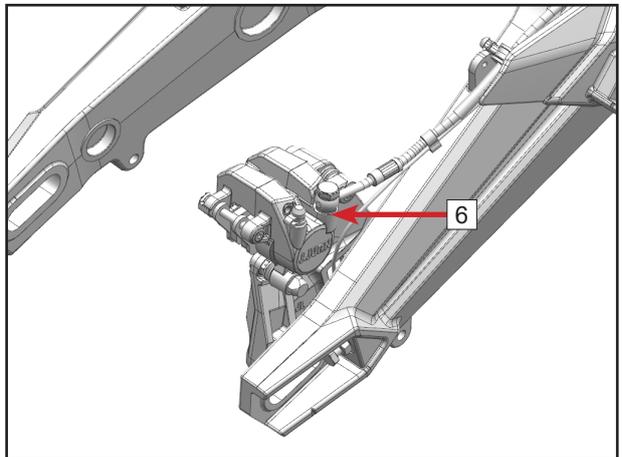


Remove rear brake caliper assembly (6).

Installation

Install in reverse order of disassembly.

NOTE: Exhaust air after installing rear brake caliper.



11 Wheels and Brake System

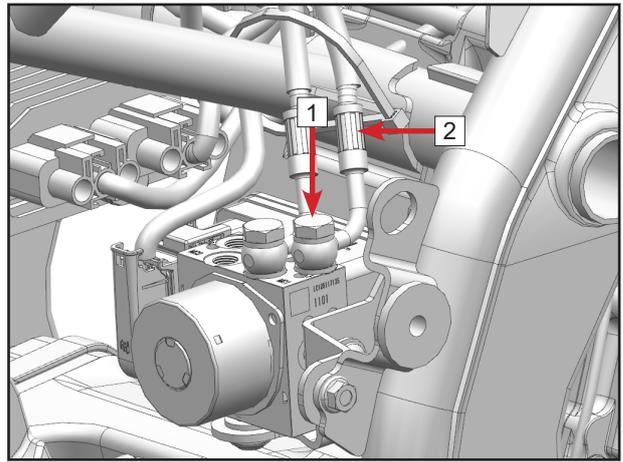
11.7.3 Front Brake Caliper Assembly

11.7.3.1 Front Brake Fluid Inlet Pipe Removal

Remove bolt gasket assembly **1** (After removing the bolt, there will be a small amount of brake fluid dripping, take caution) .

Release front brake fluid inlet pipe **2**.

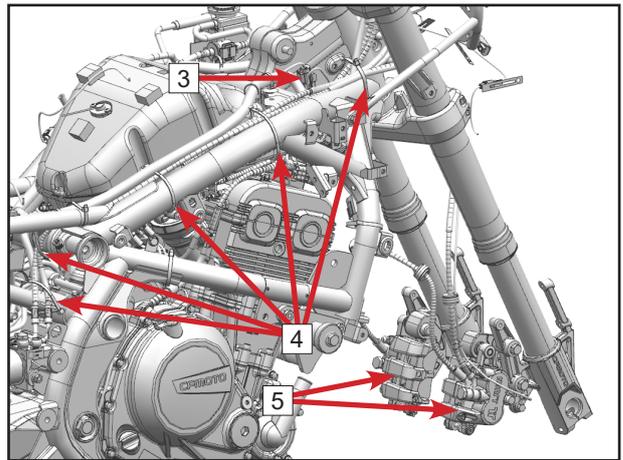
bolt torque: 30 ± 2 N·m



Unplug front wheel speed sensor connectors **3**.

Remove tie **4**.

Remove front brake caliper assembly **5**.



Installation

Install in reverse order of disassembly.

NOTE: Exhaust air after installing front brake caliper.

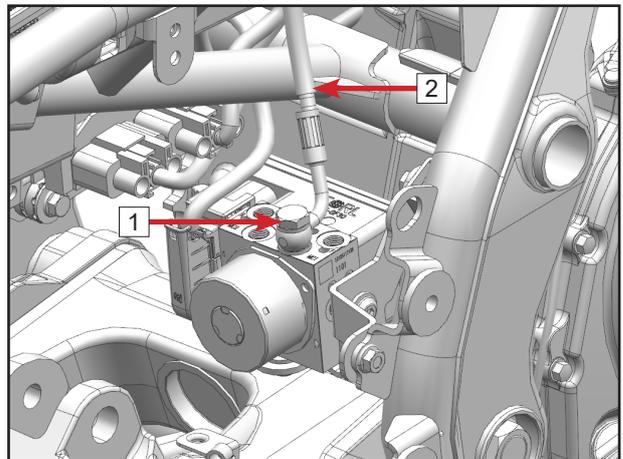
11.7.4 Front Brake Pump Assembly

11.7.4.1 Front Brake Fluid Outlet Pipe Removal

Remove bolt gasket assembly **1** (After removing the bolt, there will be a small amount of brake fluid dripping, take caution) .

Release front brake fluid outlet pipe **2**.

bolt torque: 30 ± 2 N·m

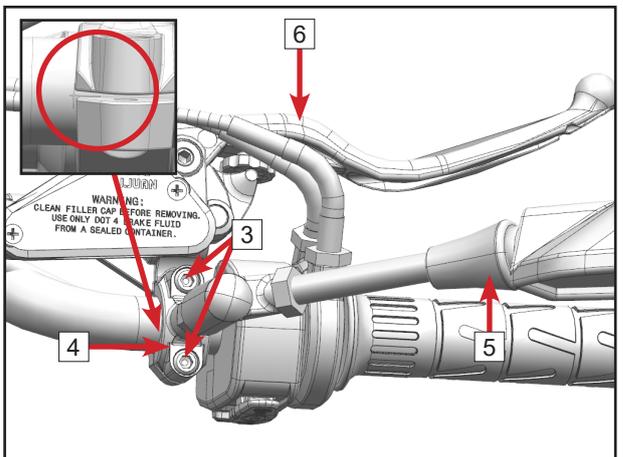


Remove bolts **3**.

Remove front brake pump assembly cover **4** and rearview mirror **5** together.

Remove front brake pump assembly **6**.

⚠ CAUTION: Brake reservoir can not be inverted, to prevent air goes into the brake line, resulting in brake system failure.



Installation

Install in reverse order of disassembly.

NOTE: When installing cover **4, it should be assembled according to the marked points on the handlebar.**

NOTE: Exhaust air after installing front brake pump assembly.

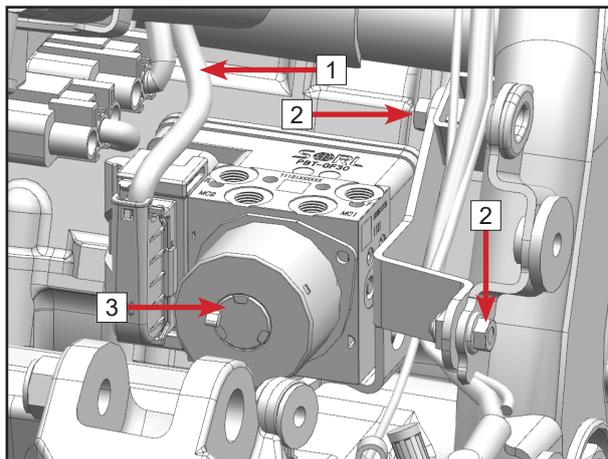
11.7.5 MAB Execution Unit

Removal

- Unplug MAB execution unit connector **1**.
- Remove bolts **2**.
- Remove MAB execution unit **3**.

Installation

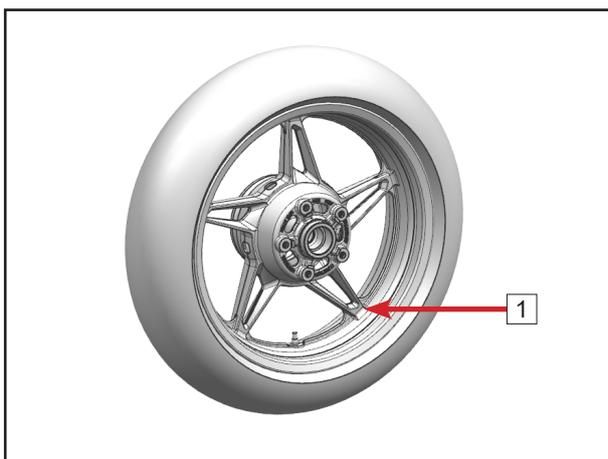
Install in reverse order of disassembly.



11.8 Tire Inspection

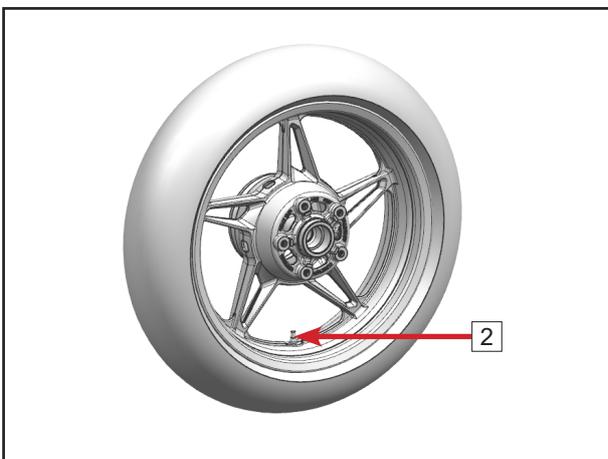
CAUTION: Special tire press machine must be used to remove the tire. When picking the tire, avoid the inflation valve to prevent damage to the tire pressure sensor

Check rim **1** for bending, breakage and cracks, replace if necessary.



If equipped with tire pressure sensor:

Check whether the tire pressure sensor inflation valve **2** is broken and leaking, the vehicle uses tire pressure sensor, if the inflation valve is broken or tire pressure display is not normal, replace the tire pressure sensor with a new one.

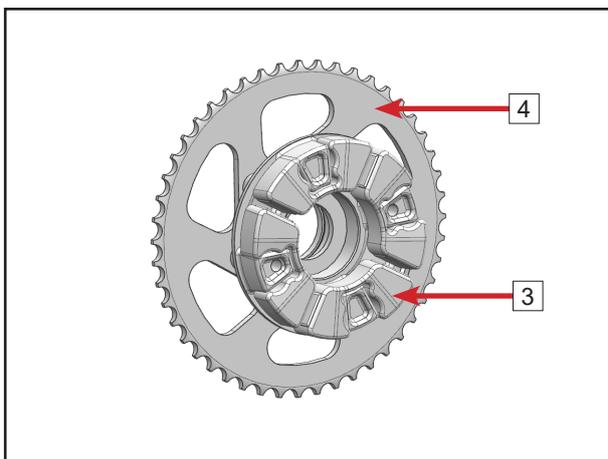


Check whether the rubber damper **3** is aged or broken.

If the rubber damper is aged or broken, replace it.

Check whether the sprocket seat **4** and rear sprocket are worn or broken.

If the sprocket seat or rear sprocket is worn or broken, replace.



11 Wheels and Brake System

11.8.1 Tire Pressure

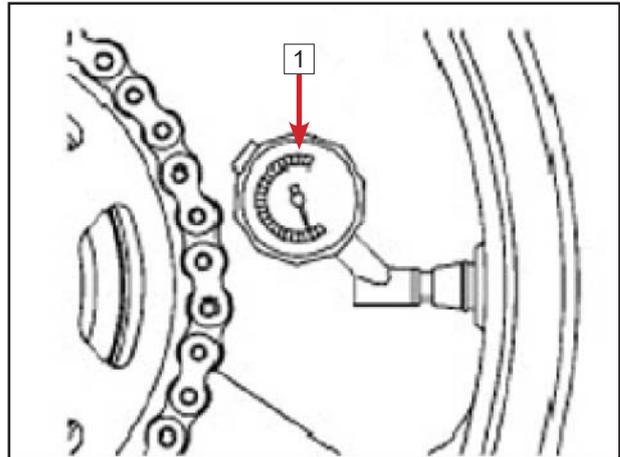
Remove tire inflation valve cover.

Use a tire pressure gauge **1** to measure tire pressure when the tire is cold.

	single		
pressure	kPa	kgf/cm ²	psi
front	225	2.29	32.6
rear	250	2.55	36.3

Adjust the pressure of the tires if necessary, according to the parameters.

Install tire inflation valve cover.



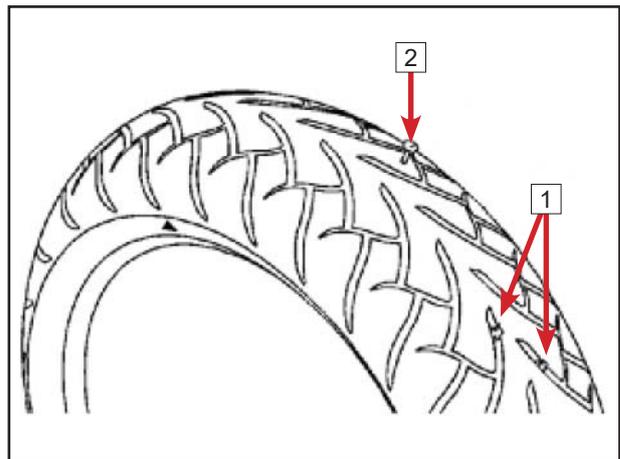
11.8.2 Tire Surface

Remove any embedded stones **1** or other foreign inclusions particles **2** from the tread of the tire.

Inspect the tire tread for cracks, cuts or dent damage at various points.

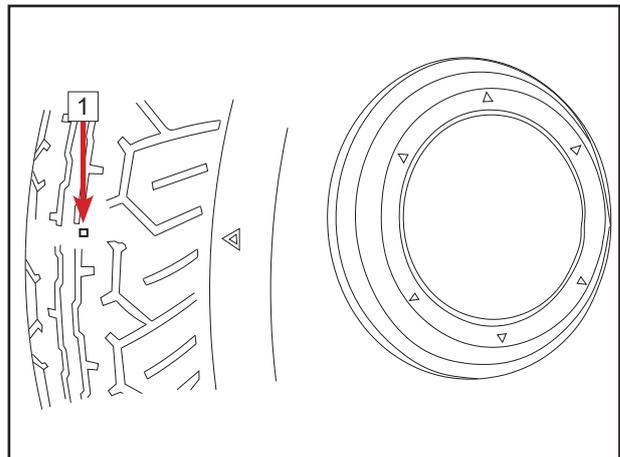
Inspect the tire tread for bulges or bumps in various places, bulges or bumps indicate internal damage to the tire.

If the above damage occurs, replace the tire to avoid the rapid expansion of tire damage leading to danger.



Check the tire wear level, when the tire tread wears beyond the limit, it will be punctured and cause failure. Generally 90% of tire failures occur during the last 10% of the tire's service life. Therefore continued use when the tire surface is worn to the bare surface is unsafe.

When the tire tread wears to the height of the wear bump **1**, the tire must be replaced.

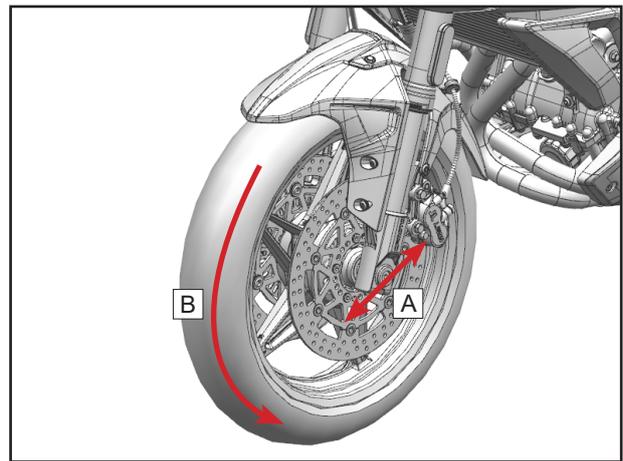


11.8.3 Wheel Bearing

Use a jack to prop the front wheel off the ground.

Push and pull the wheel along the direction **A** to check whether the front wheel bearing is damaged, gently and quickly rotate the wheel along the direction **B** to check whether the wheel rotation is smooth and check whether there is noise when rotating.

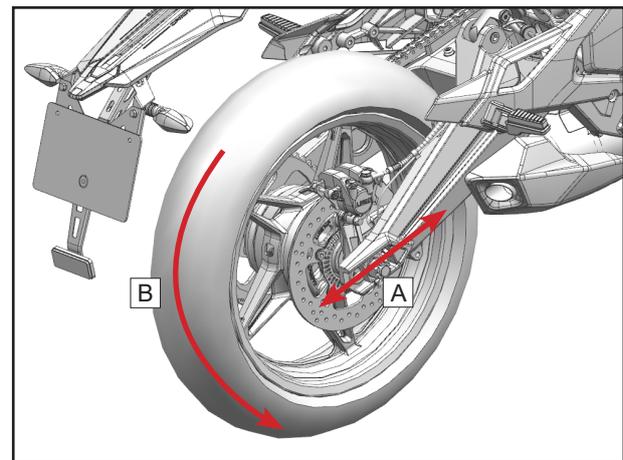
If noise is found and the movement is stuck, replace the front wheel bearings.



Prop up the rear wheel.

Push and pull the wheel along the direction **A** to check whether the front wheel bearing is damaged, gently and quickly rotate the wheel along the direction **B** to check whether the wheel rotates smoothly and check whether there is noise when rotating.

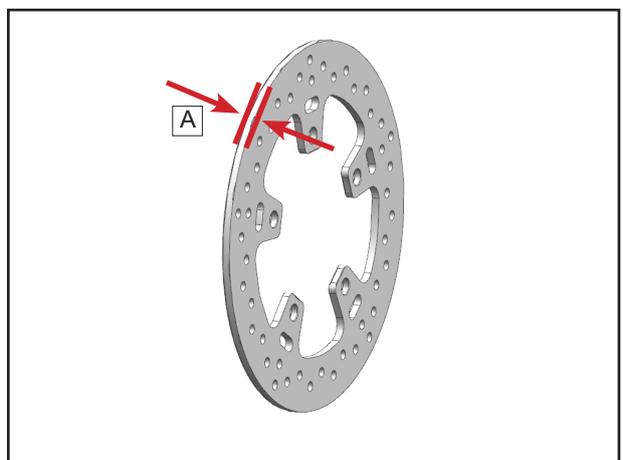
If noise is found and the movement is stuck, replace the rear wheel bearings.



11.8.4 Brake Disc Wear Inspection

Use a micrometer or caliper to measure the thickness **A** of the brake disc, and if it reaches the service limit, it needs to be replaced immediately.

project		standard	limit
front brake	brake disc wear	4.5mm	4mm
rear brake		5mm	4mm



11.9 Brake System Inspection

⚠WARNING:

Brake fluid can irritate the skin.

Ensure that brake fluid is stored out of the reach of children.

Do not allow brake fluid to contact skin, eyes or clothing. Wear protective clothing and goggles for handling.

In case of swallowing brake fluid, seek medical attention immediately.

In case of skin contact, immediately flush the contact area with plenty of water.

If brake fluid comes in contact with eyes, immediately flush eyes thoroughly with water and seek medical attention.

If brake fluid is spilled on clothing, replace the clothing.

11.9.1 Hand Brake Master Cylinder Inspection

Front brake fluid level inspection

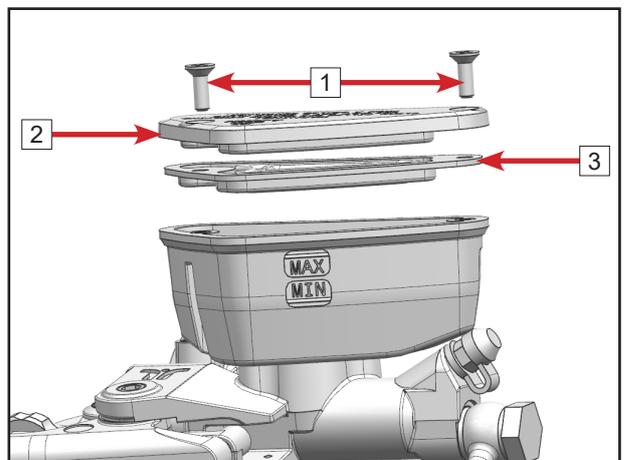
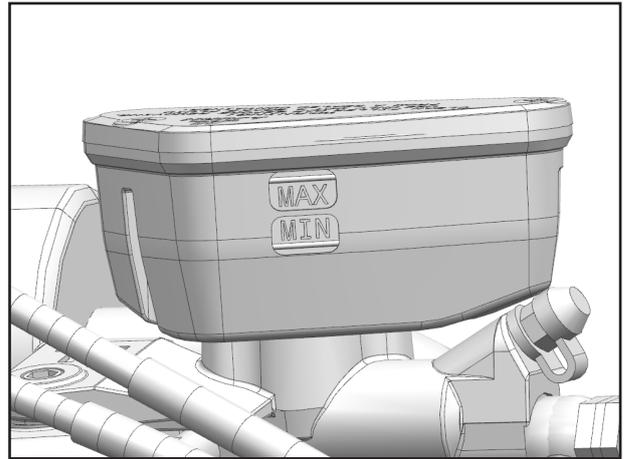
Park the vehicle on level ground, hold the body and steering handle so that the handbrake fluid reservoir is parallel to the ground.

Check the brake fluid level in the reservoir.

If the fluid level is above MAX, drain a certain amount of brake fluid to between MAX and MIN.

If the fluid level is between MAX and MIN, the fluid level is appropriate.

If the fluid level is lower than MIN, add brake fluid to between MAX and MIN.



Brake fluid changing

Remove screws [1].

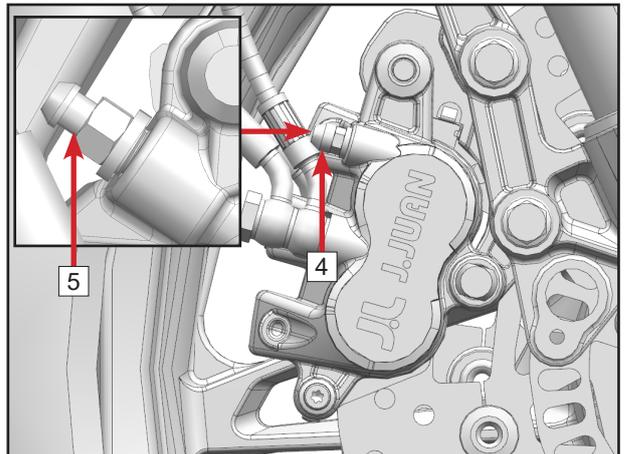
Remove fluid reservoir cover [2].

Remove brake fluid reservoir washer [3].

NOTE: The reservoir washer may be depressed due to the negative pressure generated by the reduction of brake fluid during daily use, which will not affect normal use, but the reservoir washer still needs to be restored during installation.

Open the rubber sleeve [4] of the air-bleed bolt.

Connect a clean plastic hose to the air-bleed bolt [5] and place the other end into the container.



Repeatedly grip and release the brake handle **A** until it feels hard in the hand and then grip the brake handle tightly.

Slightly loosen the air-bleed bolt **5**.

Wait until brake fluid no longer drains/brake feels soft.

Tighten the air-bleed bolt.

Add brake fluid.

Repeat the steps of "grip and release the brake handle" to "Retighten the air-bleed bolt" until fresh brake fluid is sprayed.

⚠️WARNING: Always ensure that the brake fluid level is not lower than MIN to prevent air from entering the brake system and avoid damage to the brake system resulting in injury or death.

⚠️WARNING: If the brake system contains air, the brake fluid replacement must be repeated until there is no air in the discharged brake fluid.

Brake fluid addition

Add brake fluid to between MAX and MIN.

Install reservoir washer **3**.

Install reservoir cover **2**.

Install screws **1**.

11.9.2 Rear Brake Master Cylinder Inspection

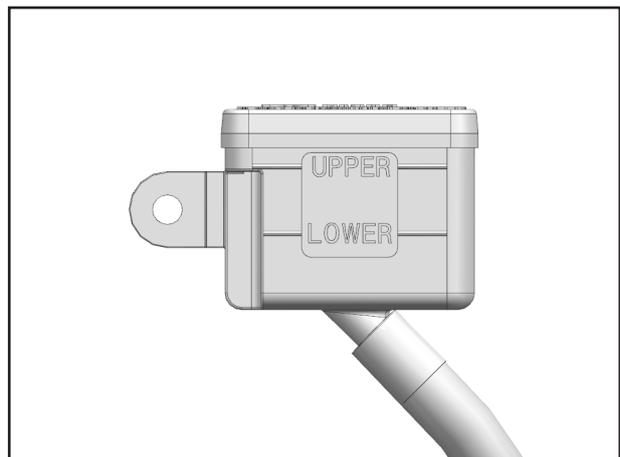
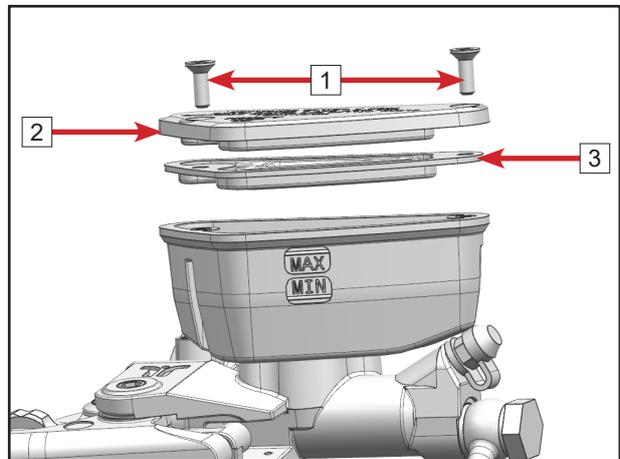
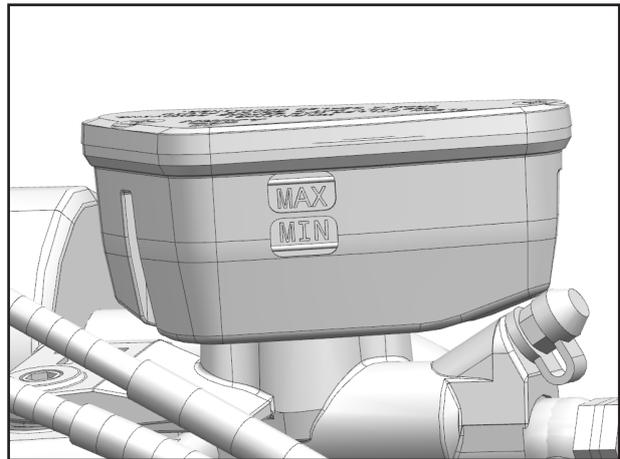
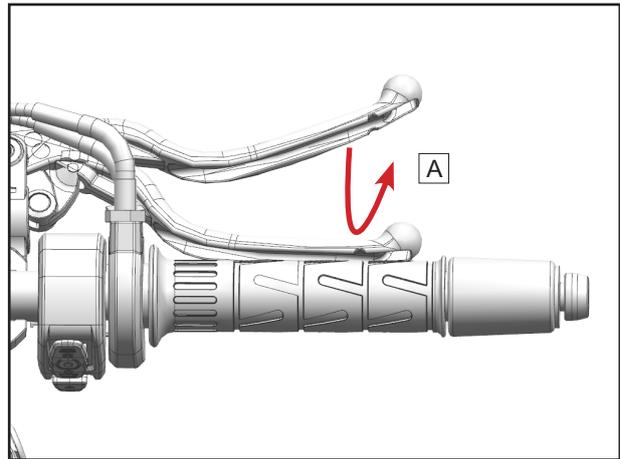
Rear brake fluid level inspection

Park the vehicle on level ground and hold the body so that the rear brake fluid reservoir is parallel to the ground.

Check the brake fluid level in the reservoir. If the fluid level is above UPPER, drain a certain amount of brake fluid to between UPPER and LOWER.

If the fluid level is between UPPER and LOWER, the fluid level is appropriate.

If the fluid level is below LOWER, add brake fluid to between UPPER and LOWER.



Brake fluid changing

Remove screws [1].

Remove reservoir cover [2].

Remove reservoir washer [3].

NOTE: The reservoir washer may be depressed due to the negative pressure generated by the reduction of brake fluid during daily use, which will not affect normal use, but the reservoir washer still needs to be restored during installation.

Open the rubber sleeve [4] of the air-bleed bolt.

Connect a clean plastic hose to the air-bleed bolt [5] and place the other end into the container.

Repeatedly step down and release the brake pedal [A] until it feels hard and then step down the brake pedal tightly.

Slightly loosen the air-bleed bolt [5].

Wait until brake fluid no longer drains/brake feels soft.

Tighten the air-bleed bolt.

Add brake fluid to between UPPER and LOWER.

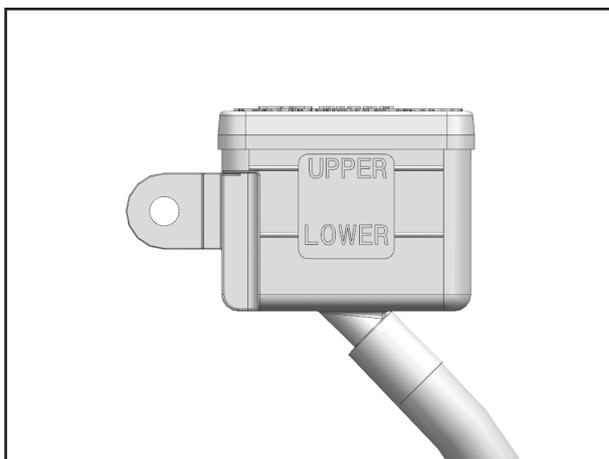
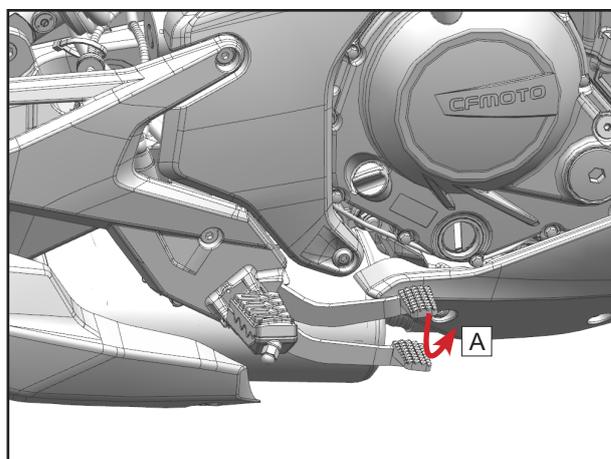
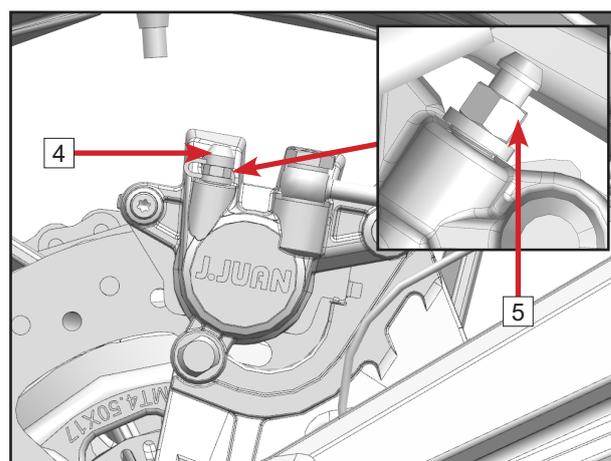
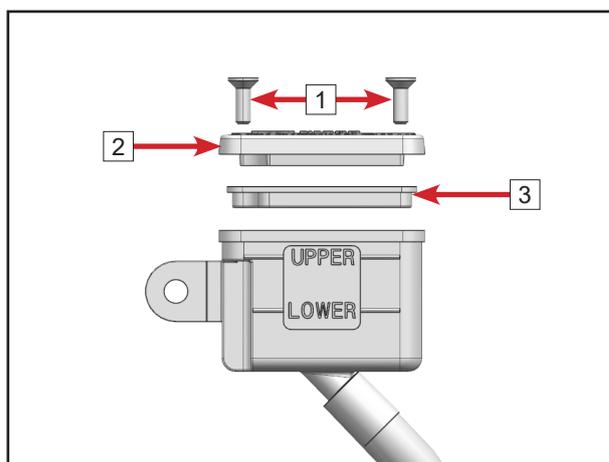
Repeat the steps of “step down and release the brake pedal” to “Retighten the air-bleed bolt” until fresh brake fluid is sprayed.

⚠ WARNING: Always ensure that the brake fluid level is not lower than LOWER to prevent air from entering the brake system and avoid damage to the brake system resulting in injury or death.

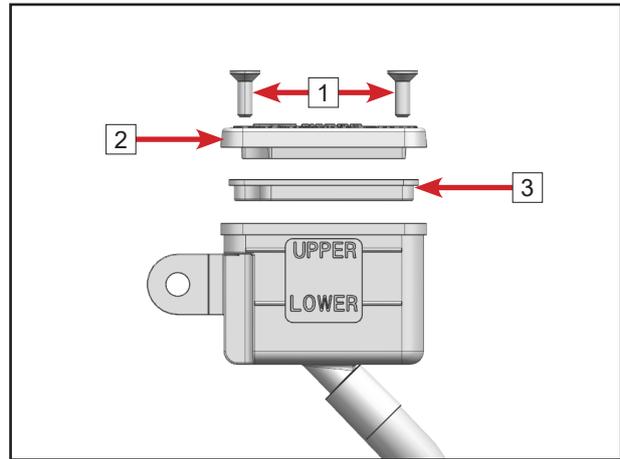
⚠ WARNING: If the brake system contains air, the brake fluid replacement must be repeated until there is no air in the discharged brake fluid.

Brake fluid addition

Add brake fluid to between UPPER and LOWER.



- Install reservoir washer [3].
- Install reservoir cover [2].
- Install screws [1].



11.9.3 Brake Line Inspection

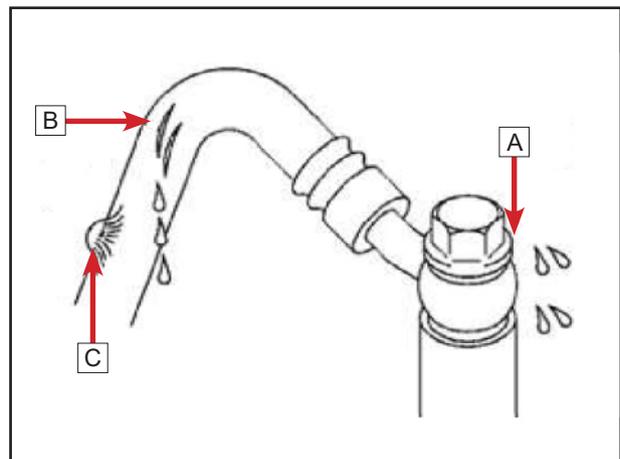
Inspect brake hoses, connectors and lines for damage, cracks and leaks.

High pressure within the brake lines can cause fluid leaks [A] or hose blowouts if not properly maintained.

Bend and twist the rubber hoses when inspecting the brake lines. If any cracks [B], bulges [C], or leaks are found, replace.

Tighten all brake hose connection bolts and brake hose connector nuts.

Check the brake hose lines and reset the brake hose lines if they are incorrect.



11.9.4 Brake Caliper Assembly and Brake Disc Inspection

Brake caliper assembly

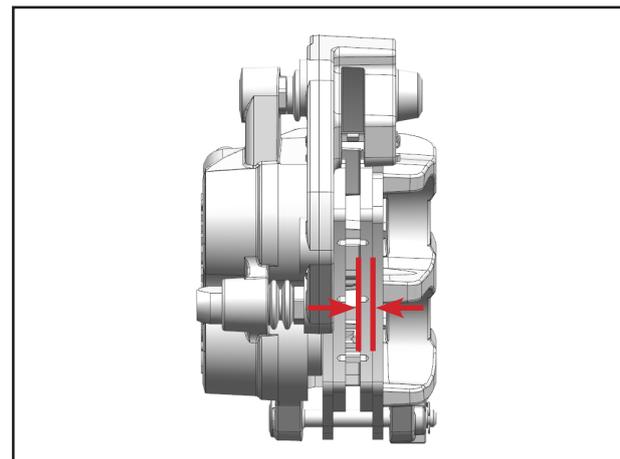
Remove of the brake caliper assembly.

Check the minimum thickness of each brake pad.

Minimum thickness of front and rear brake friction disc: 1.3mm.

Replace the brake pads before the brake pads wear to the minimum thickness, replace the two brake caliper brake pads at the same time.

Check whether the brake pads are missing pieces of have deep scratches and broken conditions, if any, replace the brake pads with new ones.



11 Wheels and Brake System

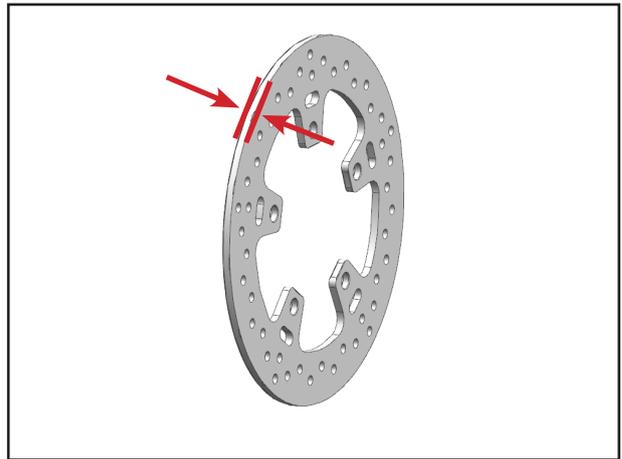
Brake disc

Check the minimum thickness of brake discs.

Minimum thickness of front and rear brake disc: 4mm.

Replace the brake discs before the brake discs wear to the minimum thickness.

Check whether the brake discs are missing pieces or have deep scratches and broken conditions, if any, replace the brake discs with new ones.

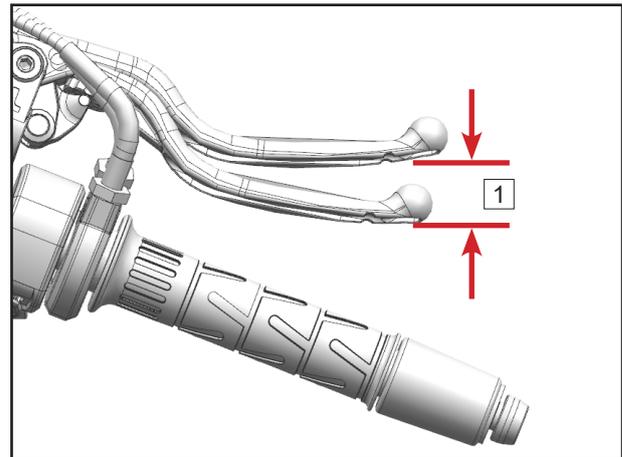


11.10 Free Play

11.10.1 Front Brake Lever Free Play

Check the free play of front brake lever 1.

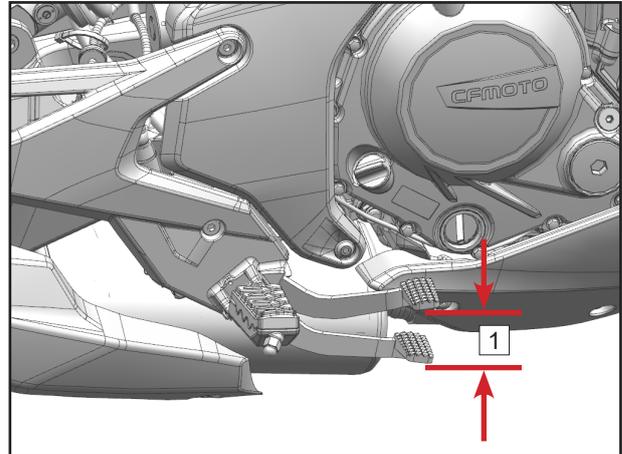
Free play: 10mm~15mm



11.10.2 Rear Brake Pedal Free Play

Check the free play of rear brake pedal 1.

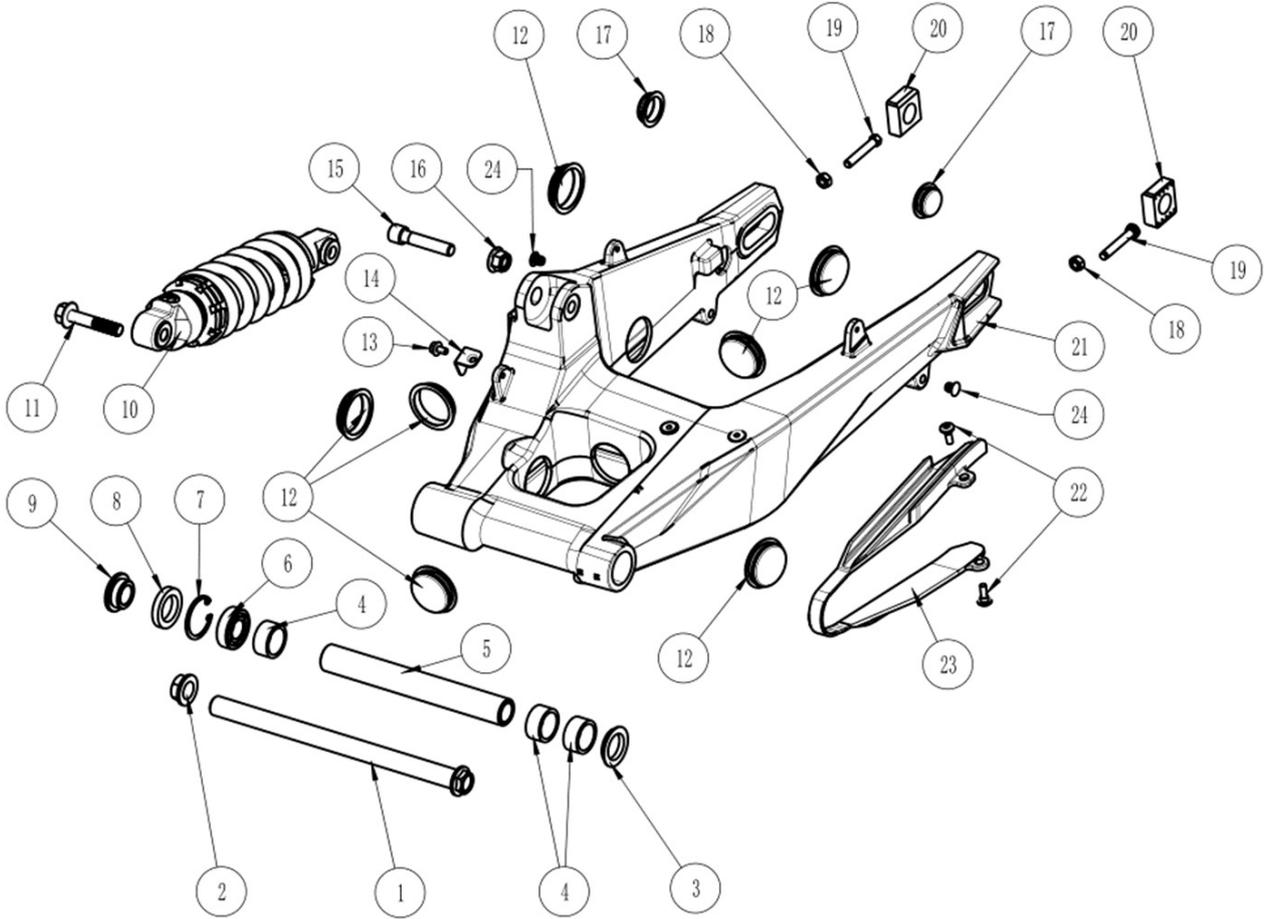
Free play: 5mm~10mm



12 Shock Absorbers and Rear Fork

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12.1 Rear Suspension System Diagram



1	rear fork shaft	2	nut M20×1.5	3	dust seal	4	roller bearing	5	rear fork sleeve
6	roller bearing	7	circlip for hole	8	oil seal	9	rear fork RH bushing	10	rear shock absorber
11	flange bolt	12	dust cap big	13	bolt	14	line clamp	15	rear shock absorber bolt
16	nut	17	dust cap small	18	nut	19	bolt	20	chain adjuster
21	rear fork	22	chain guard screw	23	chain guard	24	clutch lever rubber plug		

12 Shock Absorbers and Rear Fork

12.2 Front Shock Absorber

Pre-work

Remove relevant body covering parts and front fender (see chapter 05) .

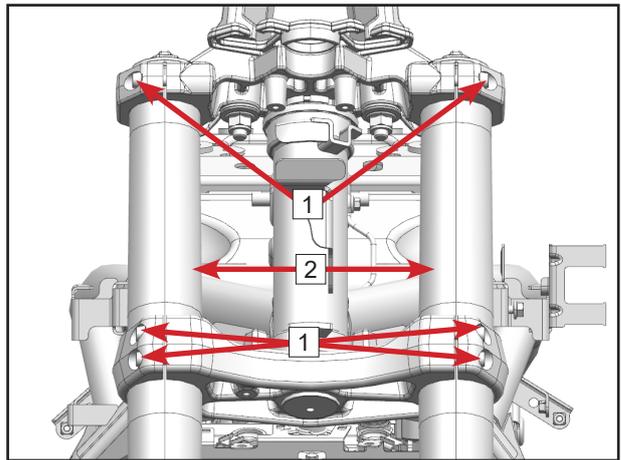
Remove front wheel and front brake caliper assembly (see chapter 11) .

Removal

Remove screws [1].

After turning the shock absorber, pull out the front shock absorber downward [2].

screw torque: 20N·m



Installation

Install in reverse order of disassembly.

12.3 Rear Shock Absorber

Removal

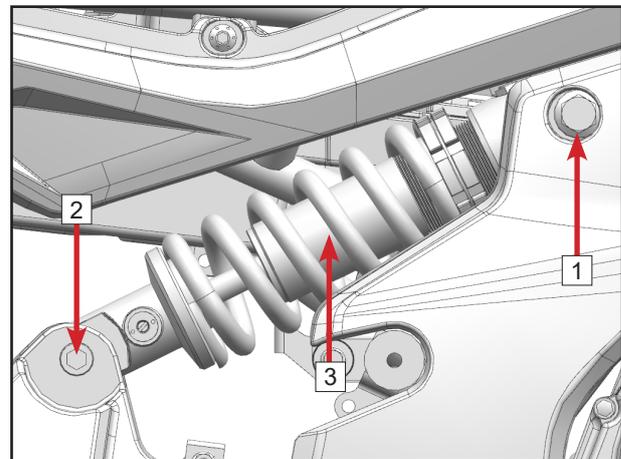
Remove bolts [1].

Remove bolt and nut assembly [2].

Remove rear shock absorber backwards [3].

Rear Shock Absorber bolt :59N·m

Rear Shock Absorber nut :59N·m



Installation

Install in reverse order of disassembly.

12.4 Rear Fork

Pre-work

Remove frame LH and RH panel (see chapter 05) .

Remove LH and RH footrest bracket assembly (see chapter 11) .

Remove rear fork fender (see chapter 05) .

Remove rear wheel and rear brake caliper assembly (see chapter 11) .

Remove rear shock absorber (see this chapter) .

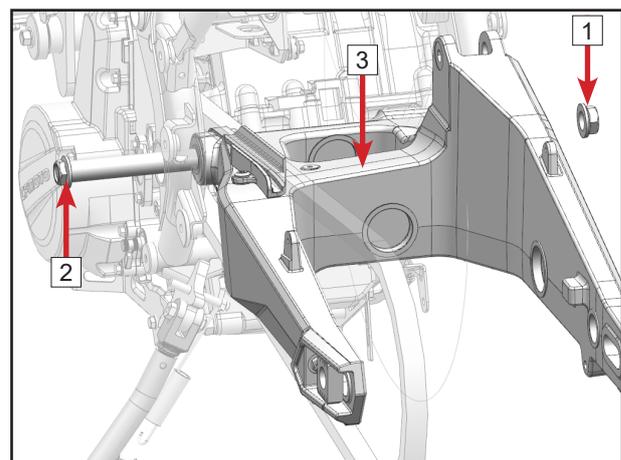
Removal

Remove nut [1].

Remove rear fork shaft [2].

Remove rear fork [3].

rear fork shaft nut torque: 180N·m



Installation

Install in reverse order of disassembly.

12.5 Chain

Pre-work

Remove rear fork (see this chapter).

Removal

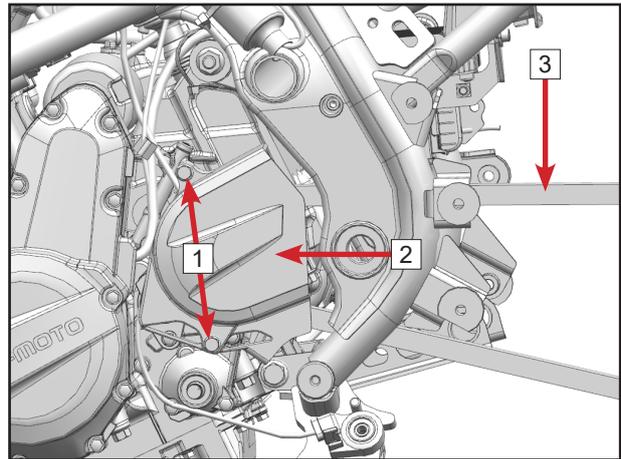
Remove bolts [1].

Remove sprocket guard [2].

Remove chain [3].

Installation

Install in reverse order of disassembly.

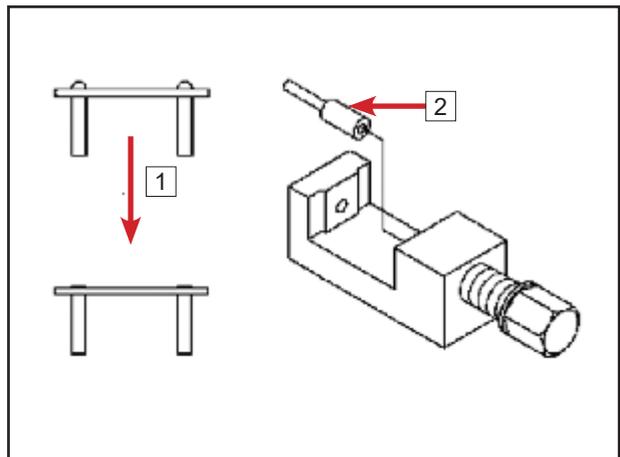


12.6 Drive Chain Inspection

The drive chain is mounted through the swing arm and the chain can only be cut off and not removed. Prepare new chain pins, chain plates, and oil seal box tools to reconnect the chain.

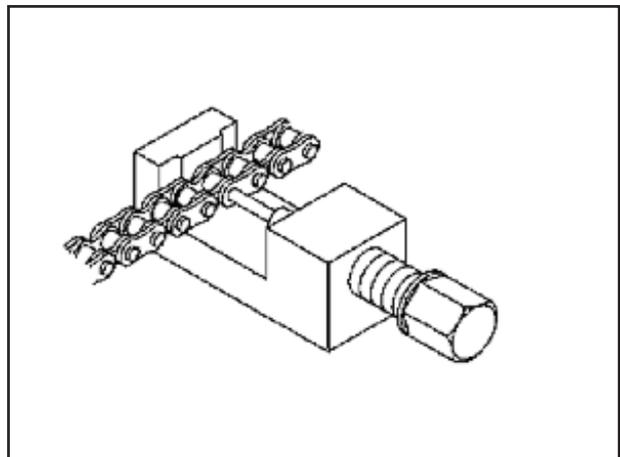
Squeeze [1] the pins with force to make them flat.

Set the cutting and riveting pins [2] according to the illustration.

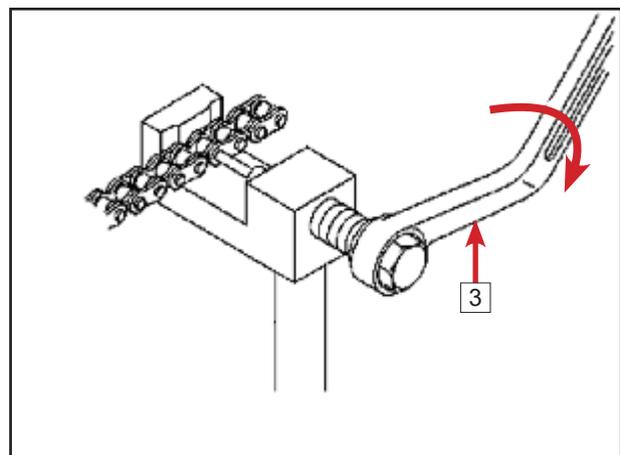


Tighten the pin holder with the bolt until it contacts the chain pin.

Ensure that the cutting pin is aligned with the center of the chain pin.



Remove the chain pin by turning the pin holder clockwise with the tool [3].



12 Shock Absorbers and Rear Fork

Drive chain installation

Engage the new drive link to the drive chain and replace the old drive chain link.

Remove the drive chain from the new drive chain.

Lubricate the chain pins **2** and seals **1**.

Engage the drive chain with the rear sprocket.

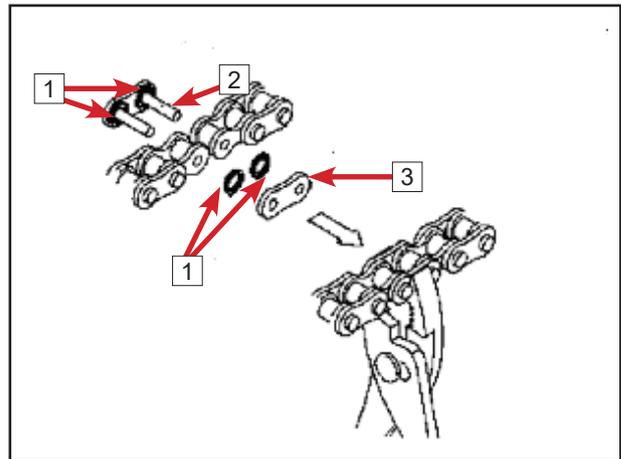
Insert the chain pin in the drive chain link.

Install seals **1**.

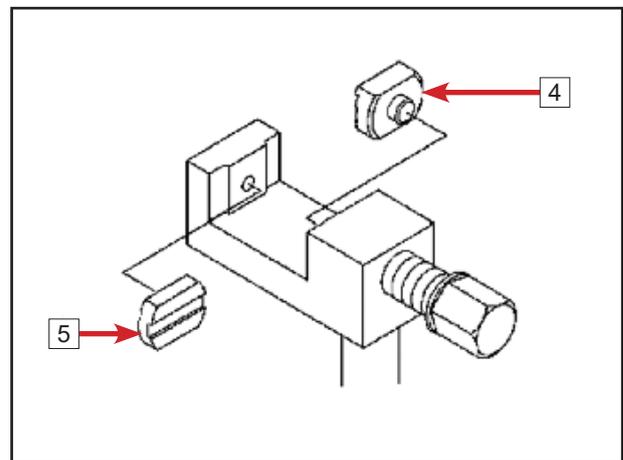
Install the chain plate with the markings **3** facing outwards.

Fix the chain plate by pushing it by hand or with pliers.

Use the seal to prevent leakage of lubricant from the chain and ensure that the seal is correctly installed.

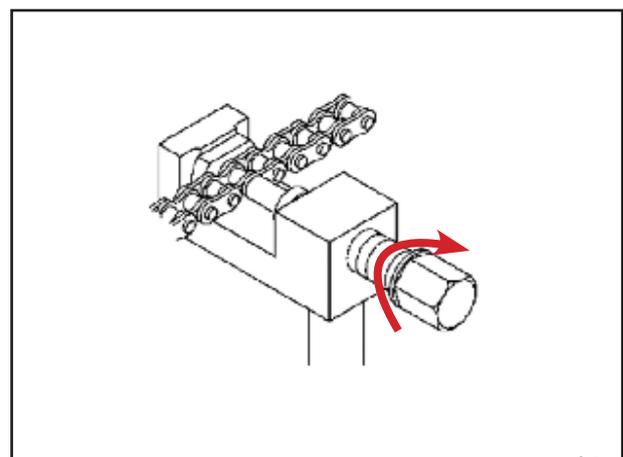


Set fixer **4** and plate setter **5** on the pin holder.



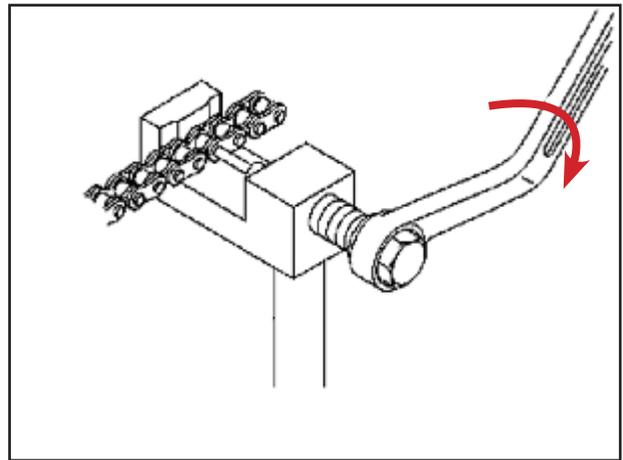
Install the fixer to the chain plate.

Rotate the pin holder by hand until the fixer touches the chain plate.

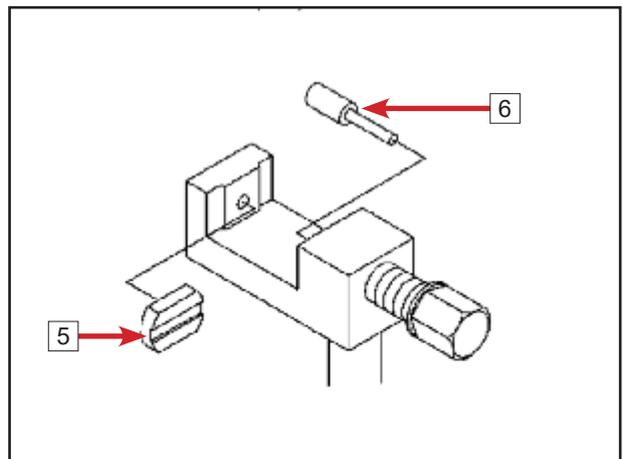


Turn the pin holder clockwise with a tool until the two pins of the chain enter the slots of the fixer **4**.

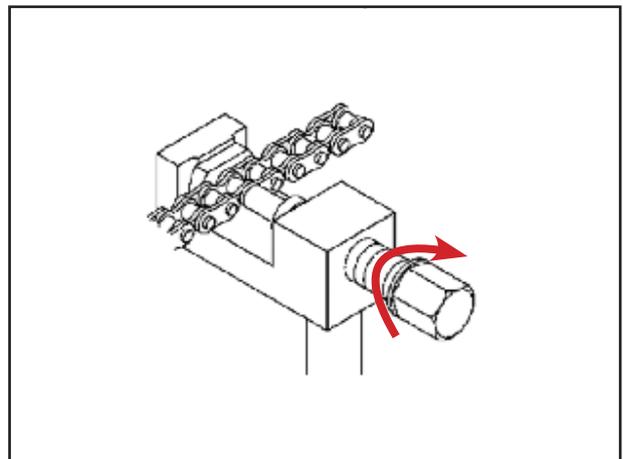
Remove the fixer **4**.



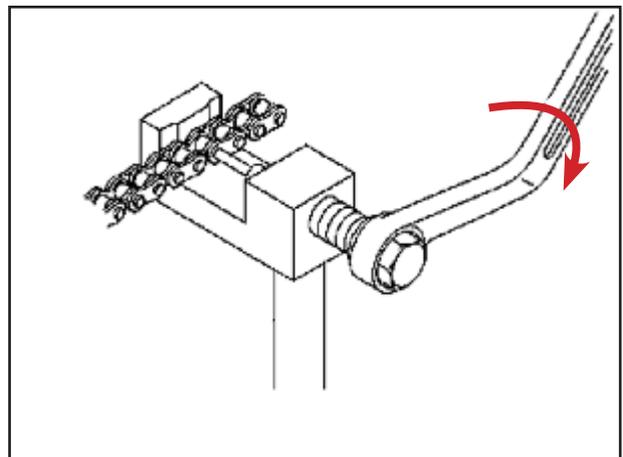
Set the fixer [5], cutting and riveting pins [6] according to the illustration.



Rotate the pin holder until the riveting pin contacts the chain pin.



Turn the tool clockwise until the tip of the riveting pin contacts the chain pin.
Perform the riveting.
The riveting method is the same for other chain pins.



12 Shock Absorbers and Rear Fork

Inspection

After riveting, check whether there are cracks in the riveted part of the chain pin.

Measure the outer diameter **1** and width **2** of the chain pin and chain plate.

Outer diameter of chain pin:

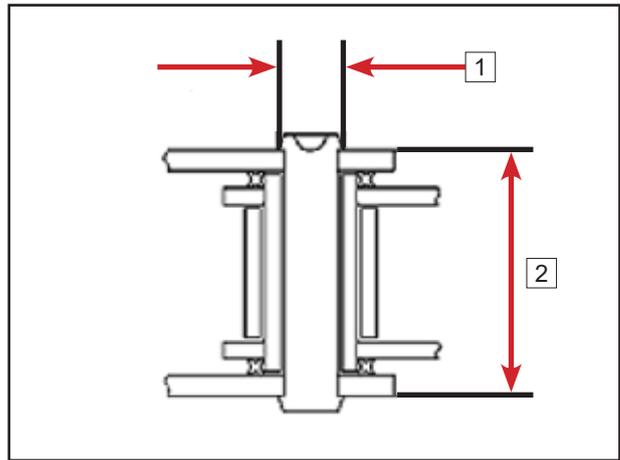
Standard: 5.45mm~5.55mm

Outer width of the chain plate:

Standard: 17.25mm~17.45mm

(0.679in.~0.687in.)

If the reading exceeds the specified length, cut and re-rivet the chain link.



Drive chain tightness adjustment

Remove cotter pin **1**.

Release rear wheel shaft nut **2**.

Loosen the LH and RH lock nuts **3**.

Turn the LH and RH adjustment bolt **4** to adjust chain tightness.

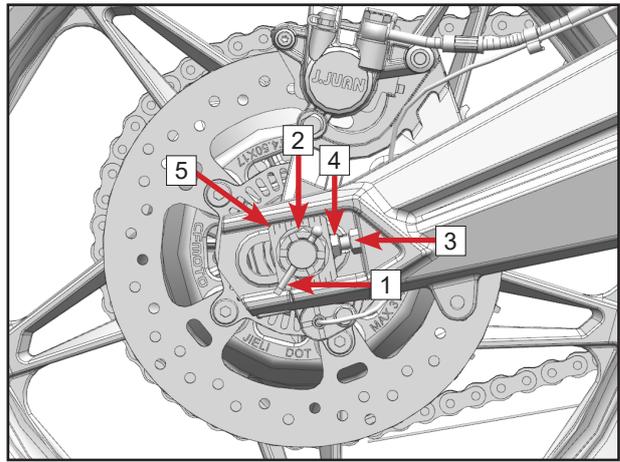
Make sure LH and RH chain adjuster **5** markings are in the same relative position as the reference markers.

Make sure the adjuster is tight against the adjusting bolt.

Tighten LH and RH lock nuts **3**.

Tighten the rear wheel shaft nut **2** (110N•m).

Install cotter pin **1**.



NOTE: The removed cotter pins cannot be reused, replace with new ones.

12.7 Front Shock Absorber Inspection

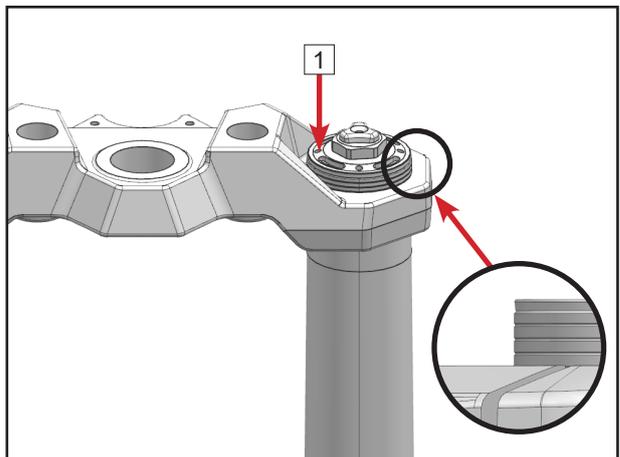
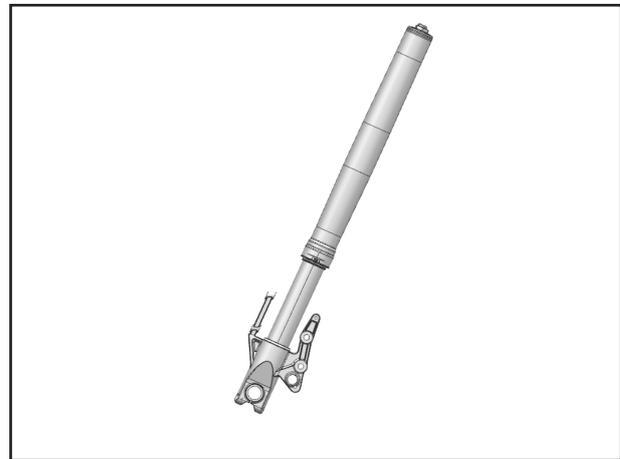
Inspection

Inspect the appearance of the front shock absorber for damage such as breakage, cracks, etc., and replace parts if any.

Clean the dust and mud from the front shock absorber.

Hold the handlebar and press down several times to check if the front shock absorber compression rebound is normal.

CAUTION: When installing front shock absorbers, the upper end faces **1** of the two front shock absorbers should be flush, and the number of scales exposed from the upper end of the front shock absorbers should be the same.

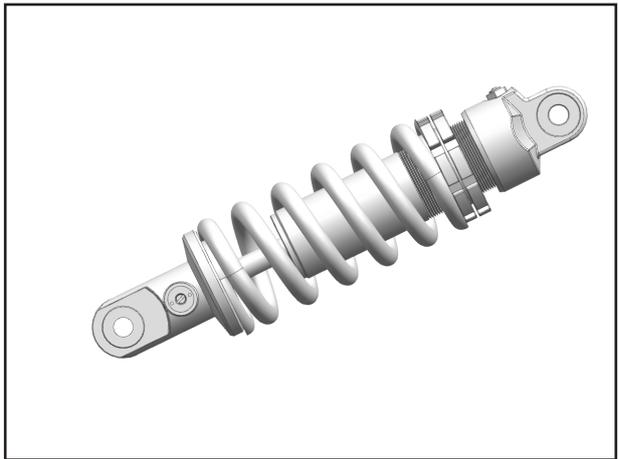


12.8 Rear Shock Absorber Inspection

Inspect the appearance of the rear shock absorber for damage such as breakage, cracks, etc., and replace parts if any.

Clean the dust and mud from the rear shock absorber.

Press down the seat cushion several times to check if the rear shock absorber compression rebound is normal.



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CFMOTO

13.1 Special Tools

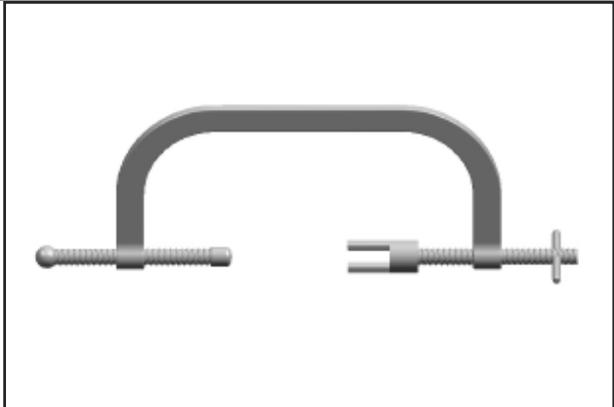
Magneto rotor removal tool

0700-031000-922-002



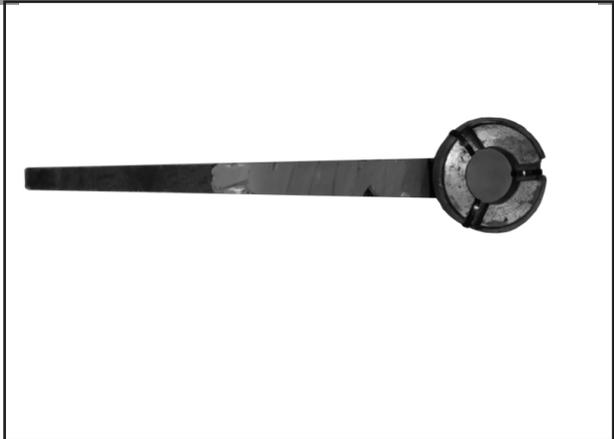
Valve spring clamp

0180-022006-922-001



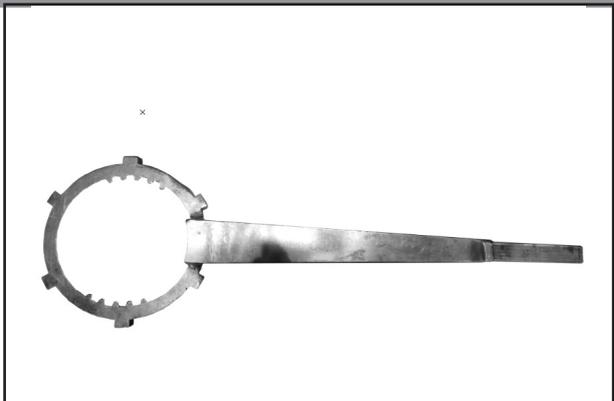
Magneto rotor stopping tool

0700-031000-922-001



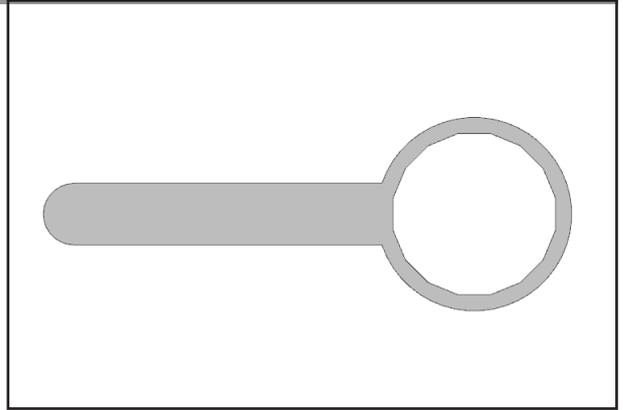
Clutch stopping tool

0HU0-051000-922-001



Oil filter tool

0MQ0-070200-922-001



13.2 Engine Removal

Turn off the engine.

Remove seat **1**. (Refer to seat chapter)

Remove LH/RH panel assembly **2**. (Refer to outer part chapter)

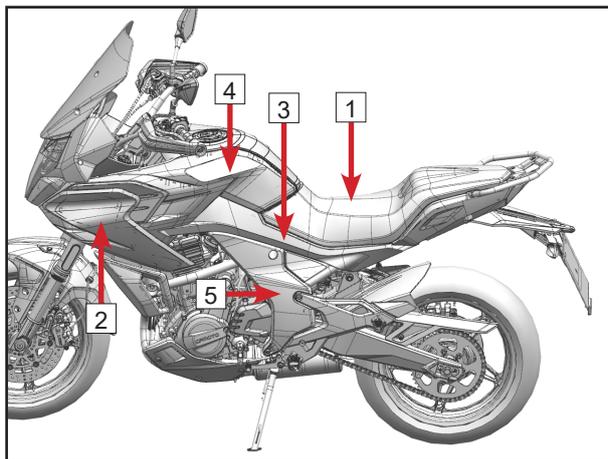
Remove seat LH/RH panel **3**. (Refer to outer part chapter)

Remove fuel tank LH/RH panel **4**. (Refer to outer part chapter)

Remove bracket LH/RH panel **5**. (Refer to outer part chapter)

Remove fuel tank. (Refer to fuel system)

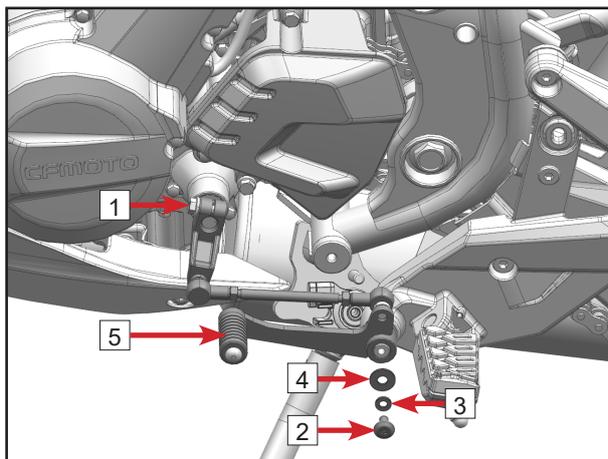
Remove all electrical connectors connected to the engine.



Remove bolt **1**.

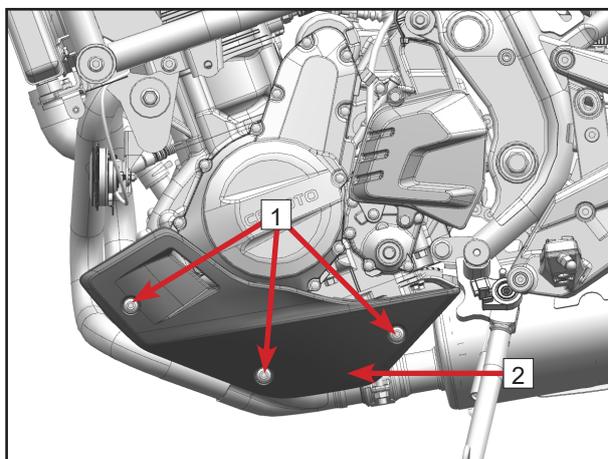
Remove inner hex screw **2**, washer **3** and washer **4**.

Remove gearshift rod assembly **5**.



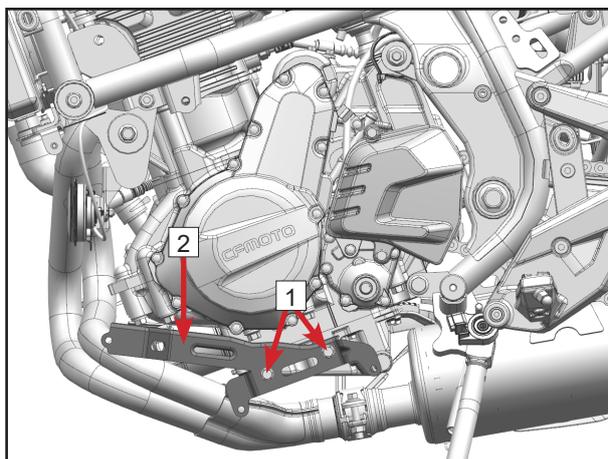
Remove bolt **1**.

Remove engine LH panel **2**.

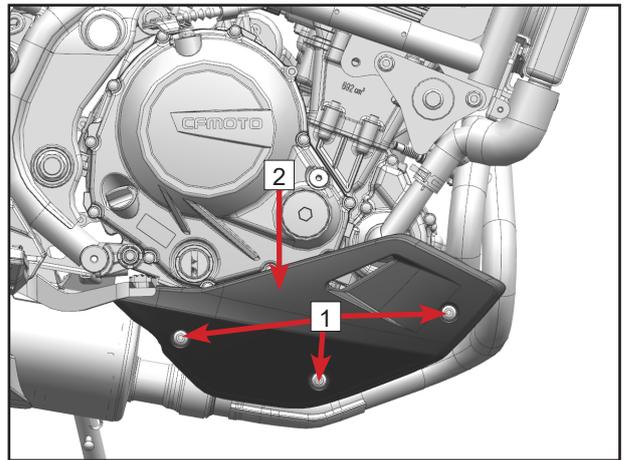


Remove bolt **1**.

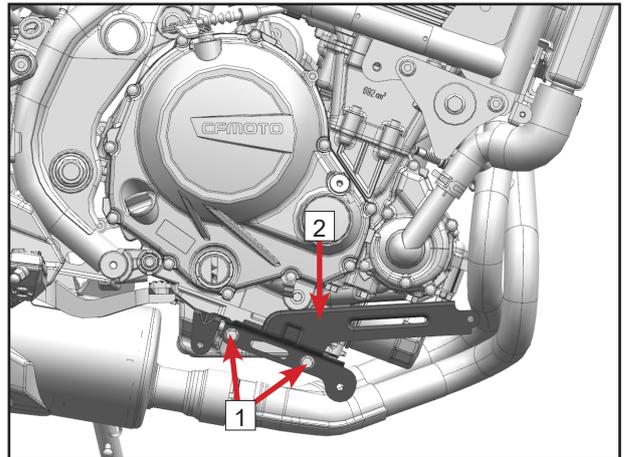
Remove bracket **2**.



Remove bolt **1**.
Remove engine RH panel **2**.



Remove bolt **1**.
Remove bracket **2**.



Place a pan under water pump.
Remove drain bolt **1** with washer.

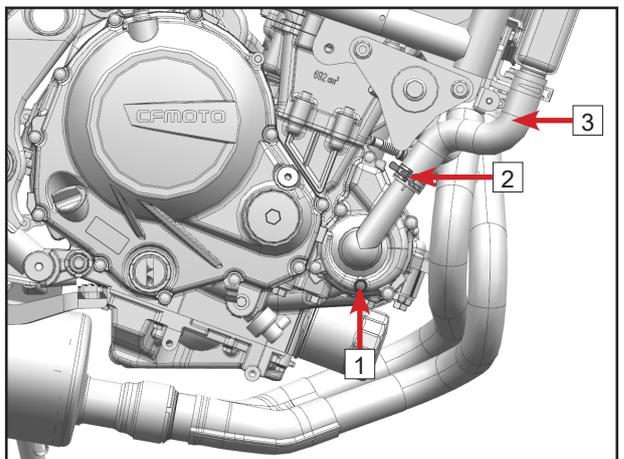
NOTE: There is pressure inside cooling system. The coolant will spill out after removing drain bolt.

Drain the coolant completely.

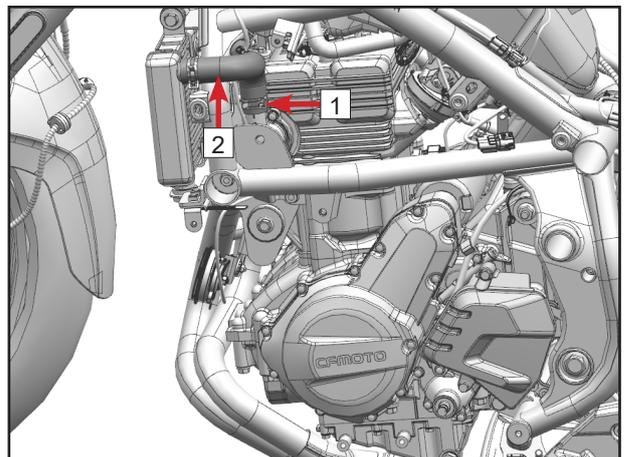
Loosen clamp **2**.

Remove water outlet pipe from water pump cover **3**.

NOTE: After water outlet pipe removal, there is still some coolant spilling out.

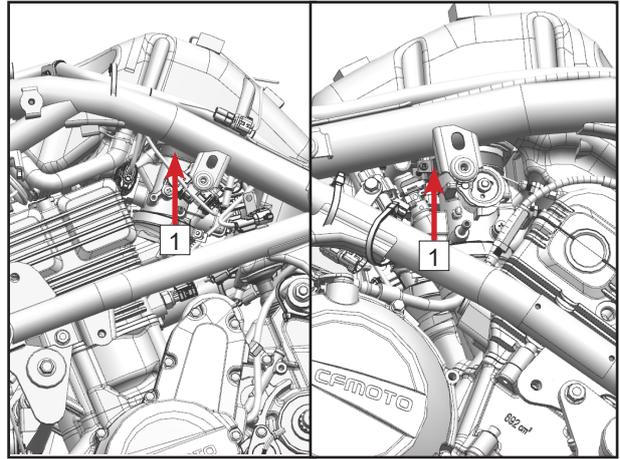


Loosen clamp **1**.
Remove water inlet pipe from thermostat cap **2**.

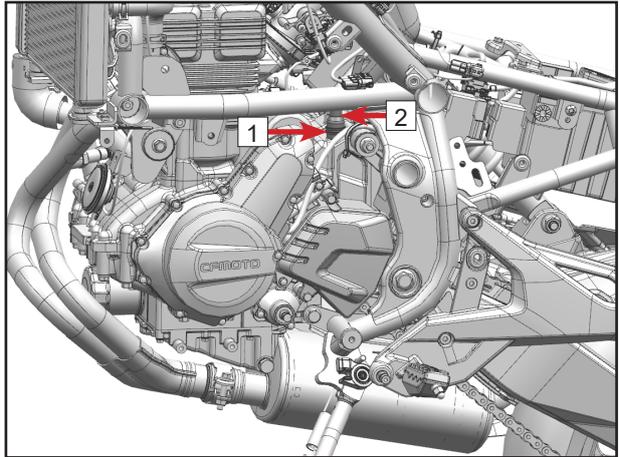


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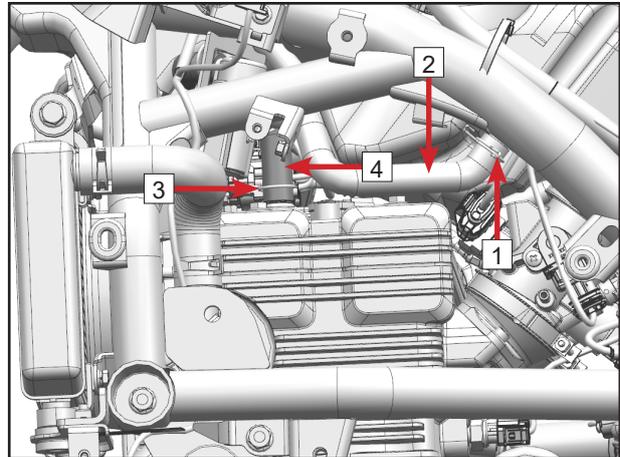
Remove throttle cable from throttle valve.
Loosen clamp **1**.



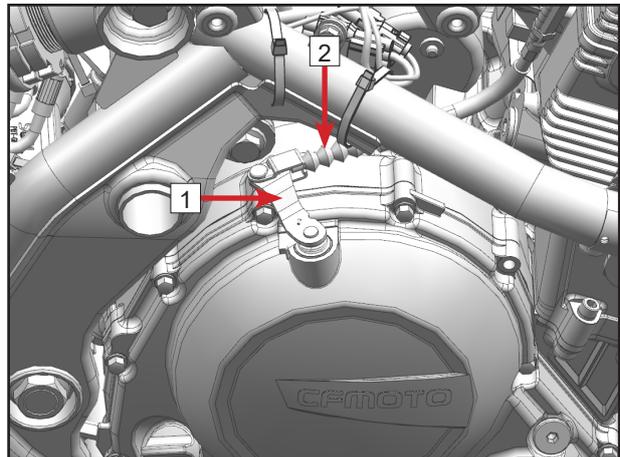
Loosen clamp **1**.
Remove breather pipe **2** from engine.



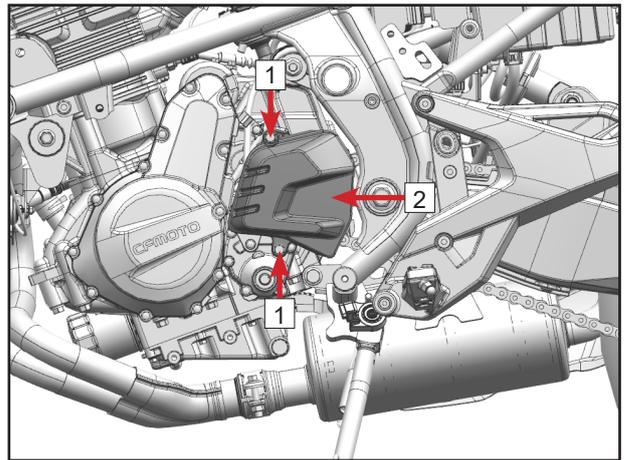
Loosen clamp **1**.
Remove air inlet pipe **2** from the air filter lower housing.
Remove air filter assembly.
Loosen clamp **3**.
Remove air outlet pipe **4** from the engine.



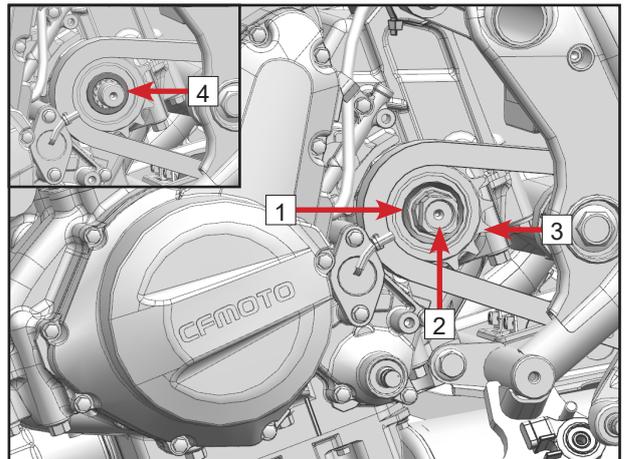
Turn clutch release rod **1**.
Remove clutch cable **2**.



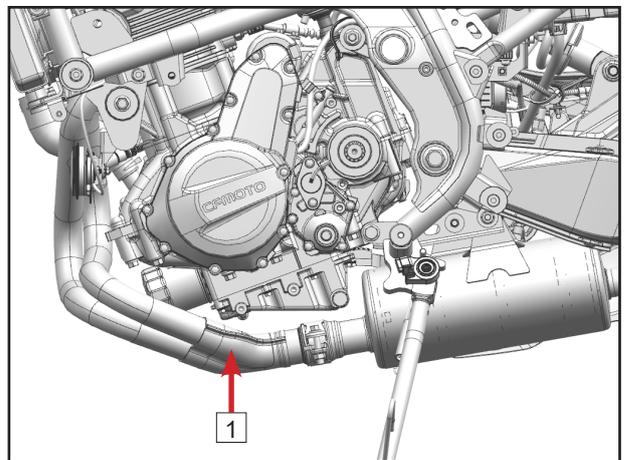
Remove bolt **1**.
Remove sprocket cover **2**.



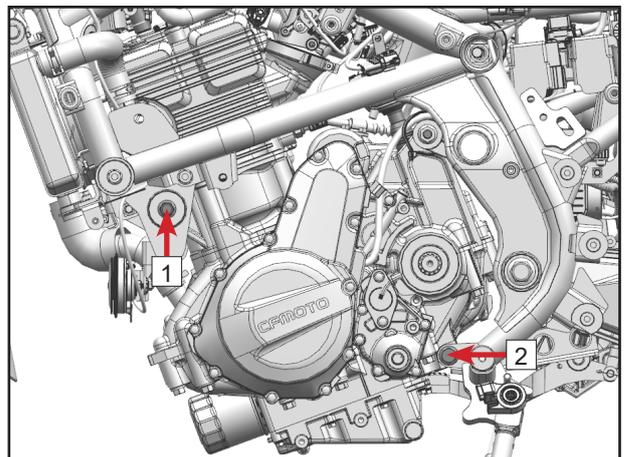
Use a chisel and hammer to smooth the turned part of lock washer **1**.
Remove counting pulse nut **2**.
Remove lock washer **1**.
Remove countershaft gasket **4**.
Remove output sprocket **3** (with chain).



Separate the exhaust system **1** from the engine, see the Exhaust System section for detail.



Place a jack padding a soft pad under the engine and hold the engine against it.
Remove bolt **1** and nut.
Remove bolt **2** and nut.



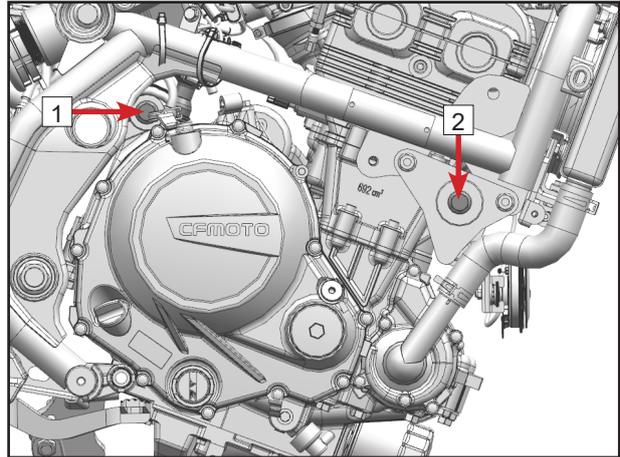
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Remove bolt **1** and nut.

Remove bolt **2** and nut.

Slowly lower the jack and remove the engine.

Transfer the engine to a suitable platform or holder for subsequent disassembly and repair work.

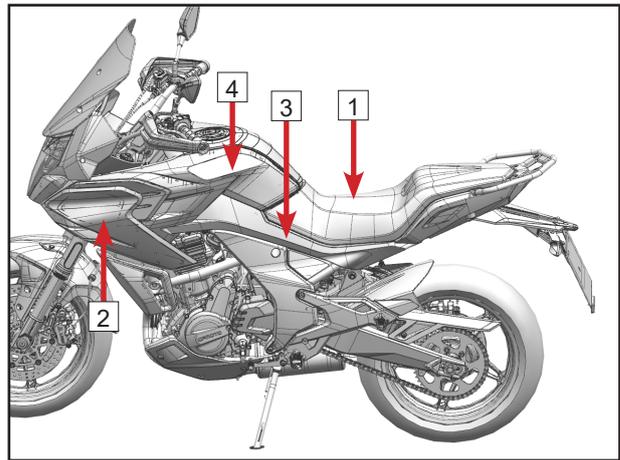


13.3 Engine Air Intake System

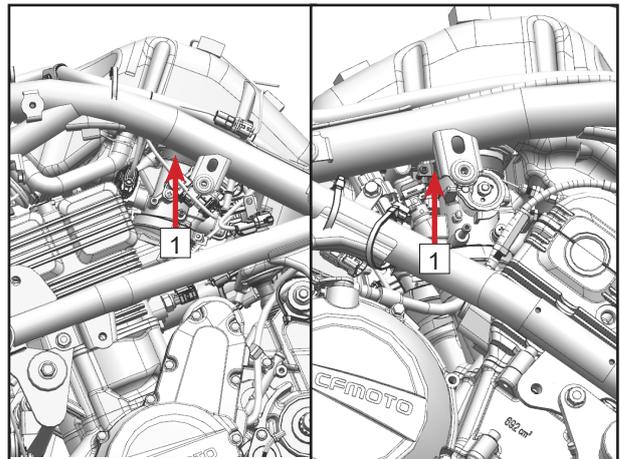
13.3.1 Air Filter Assembly

Removal

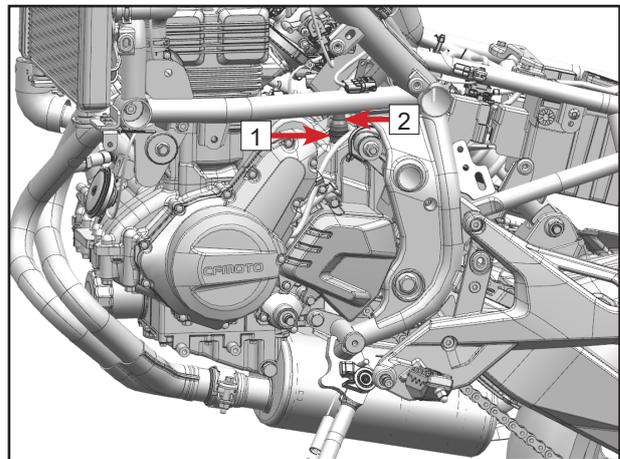
- Remove seat **1**. (Refer to seat chapter)
- Remove LH/RH panel assembly **2**. (Refer to outer part chapter)
- Remove seat LH/RH panel **3**. (Refer to outer part chapter)
- Remove fuel tank LH/RH panel **4**. (Refer to outer part chapter)
- Remove fuel tank. (Refer to fuel system)



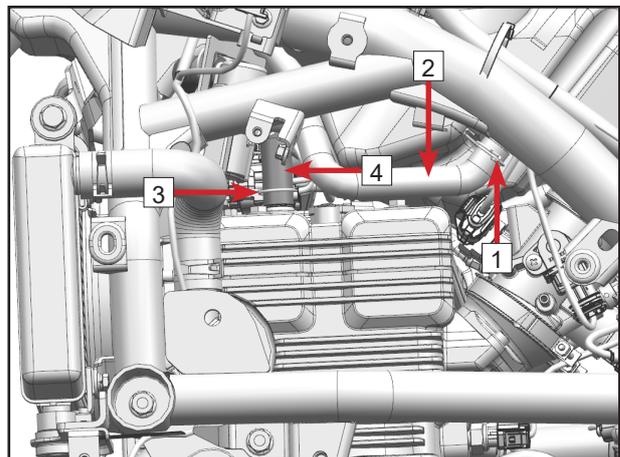
Loosen clamp **1**.



Loosen clamp **1**.
Remove breathing hose **2** from engine.



Loosen clamp **1**.
Remove air intake pipe **2** from air filter.
Remove air filter assembly.
Loosen clamp **3**.
Remove air outlet pipe **4** from the engine.

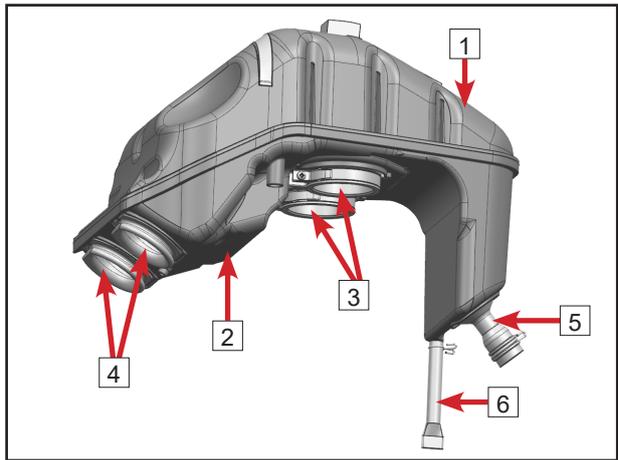


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Inspection

Inspect upper cover **1**, lower cover **2** and outlet pipe **3** for crack or other damages. Replace the whole part if it does.

Inspect intake pipe **4**, breathing hose **5** and storage hose **6** for aging or other damages. Replace if it does.



Filter Element Replacement

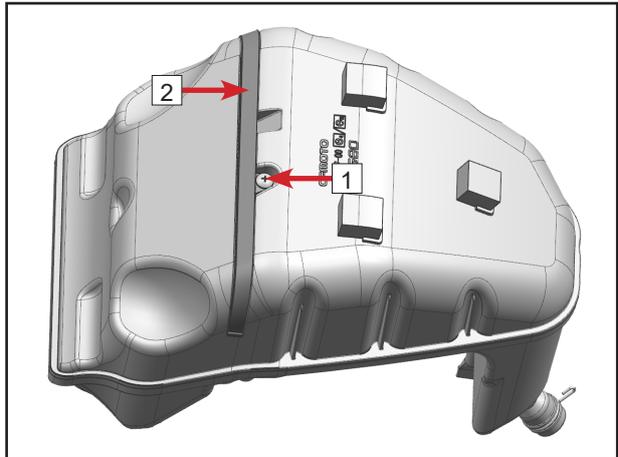
Remove screw **1**.

Remove filter element **2**.

Clean air filter cover.

Place new filter element **2**.

Install and tighten screw **1**.



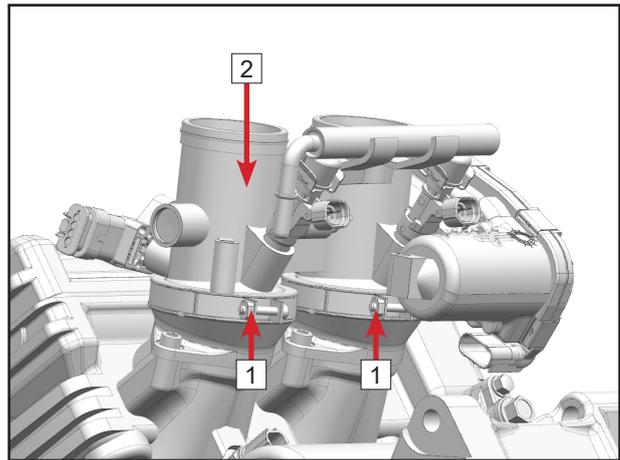
Installation

Reverse the removal procedures for installation.

13.3.2 Throttle Valve Assembly Throttle valve assembly Removal

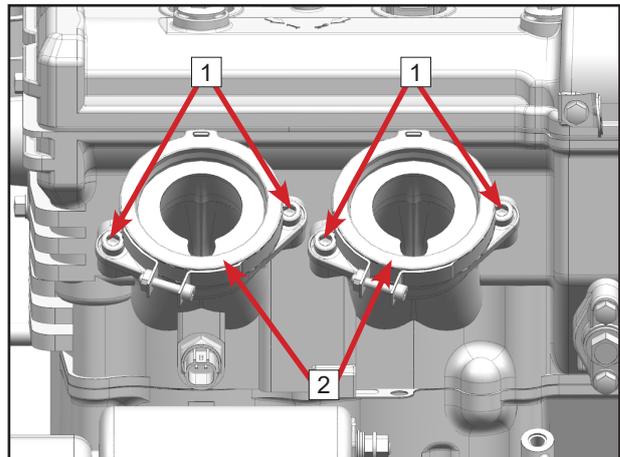
Loosen clamp **1**.

Remove throttle assembly **2**.



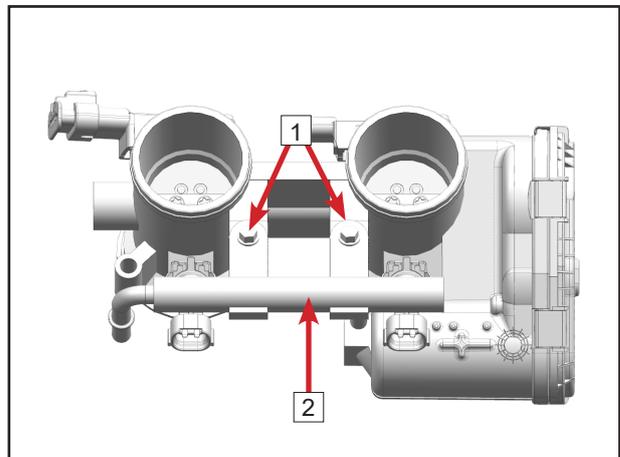
Remove four M6 inner hex screws **1**.

Remove air intake pipe assembly **2**.



Remove two bolts **1**.

Remove oil rail assembly **2**.

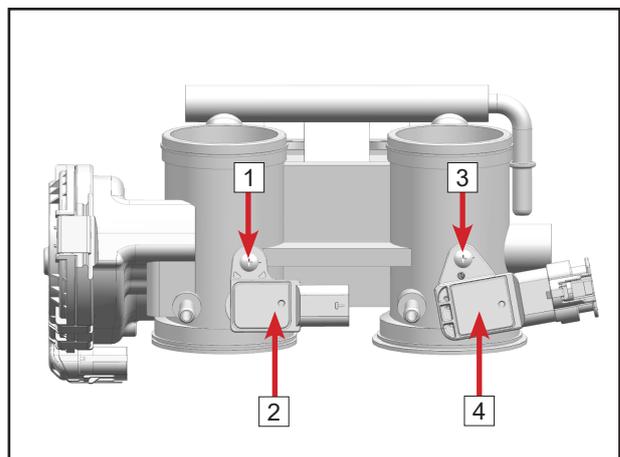


Remove screw **1**.

Remove intake air pressure sensor **2**.

Remove screw **3**.

Remove T-MAP **4**.

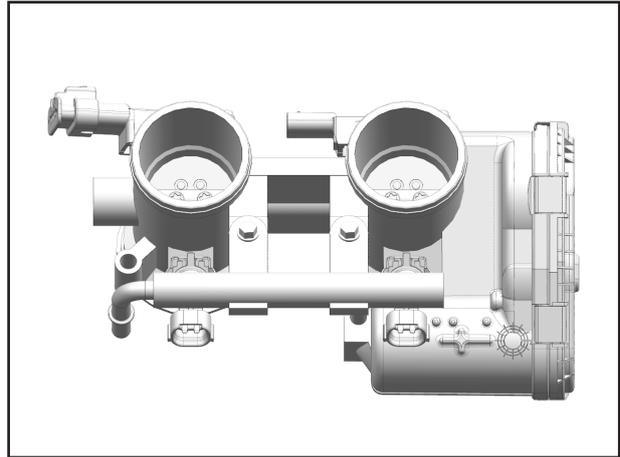


Throttle Valve Assembly Inspection

Inspect throttle valve for damage or cracks. Replace if any defect is found.

The throttle body must be handled with care. Falling parts must be scrapped because they are damaged and cannot be ruled out after a short period of use.

Idle stepping motor, throttle position sensor and intake temperature pressure sensor service refers to Electrical System.



Oil Rail Assembly

Removal

Push oil rail assy clamp **1** to remove fuel injector cap.

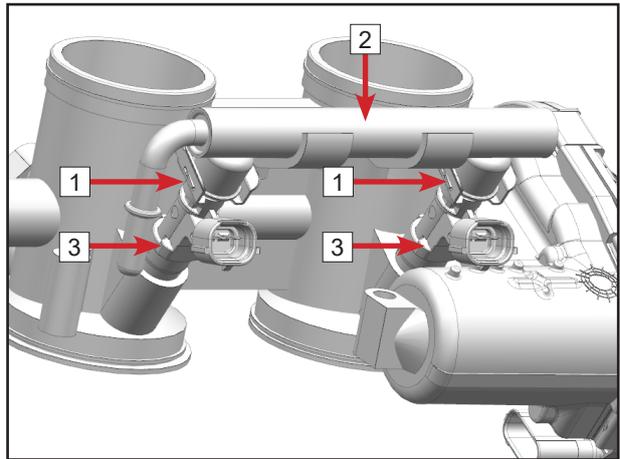
Remove fuel injector cap **2**.

Remove fuel injector **3**.

Inspection refers to Electrical System.

Assembly

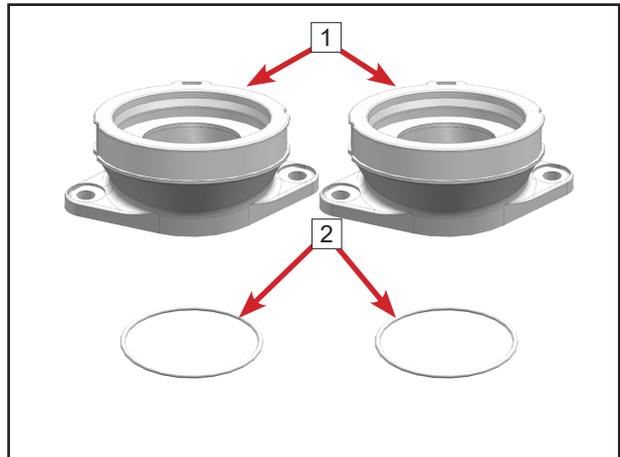
Install fuel injector **3** on oil rail assembly **2**, and then install fuel injector cap clamp **1**. Click the fuel injector cap into the clamp **1** groove.



Air Intake Pipe Assembly

Inspect air intake pipe **1** for cracks or damage. Replace if any defect is found.

Inspect rubber seal ring **2** for cracks, hardening or damage. Replace if any defect is found.



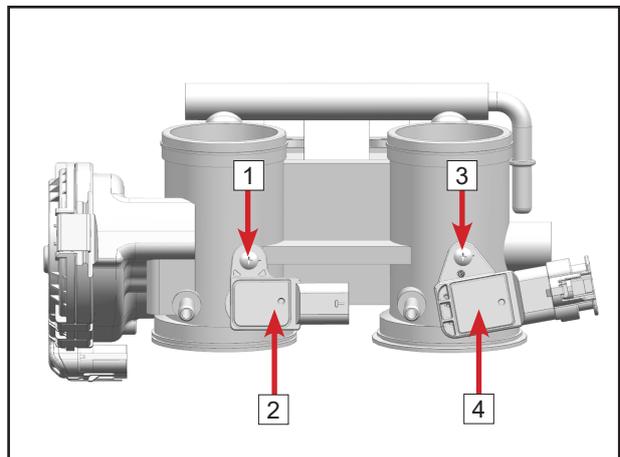
Throttle Valve Assembly

Install intake air pressure sensor **2**.

Install screw **1**.

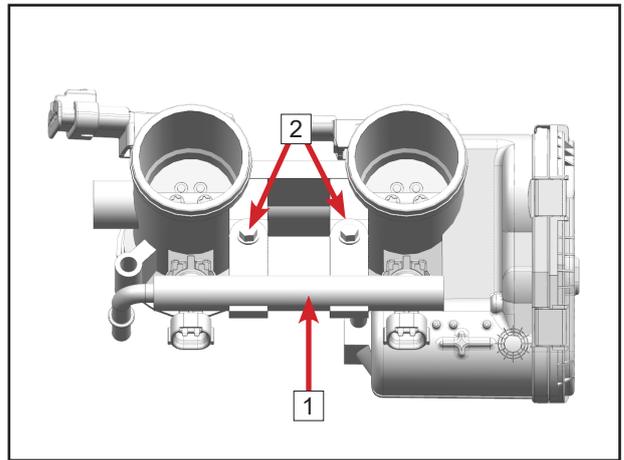
Install intake T-MAP sensor **4**.

Install screw **3**.



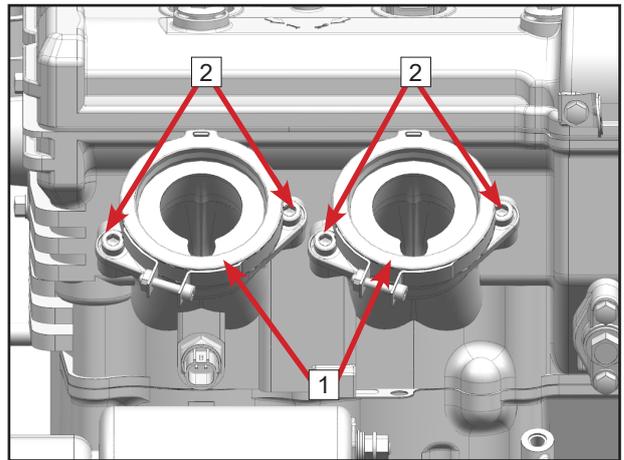
Install oil rail assembly **1**.

Install bolts **2**.



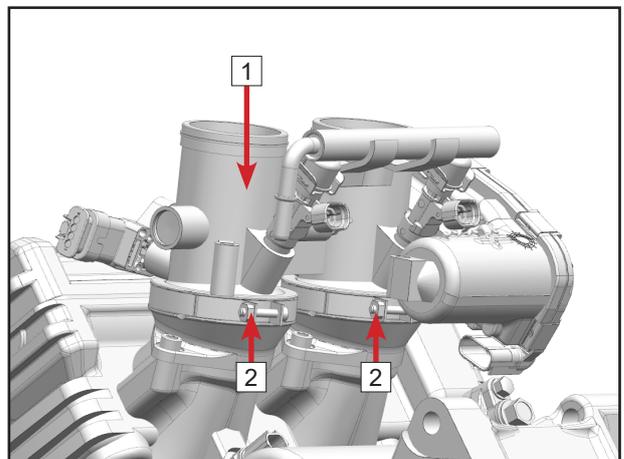
Install air intake pipe assembly **1**.

Install M6 inner hex screws **2**.



Install throttle valve assembly **1**.

Tighten clamps **2**.



13.4 Engine Disassembly

13.4.1 Engine Fixation

Fix the engine firmly on the bench.

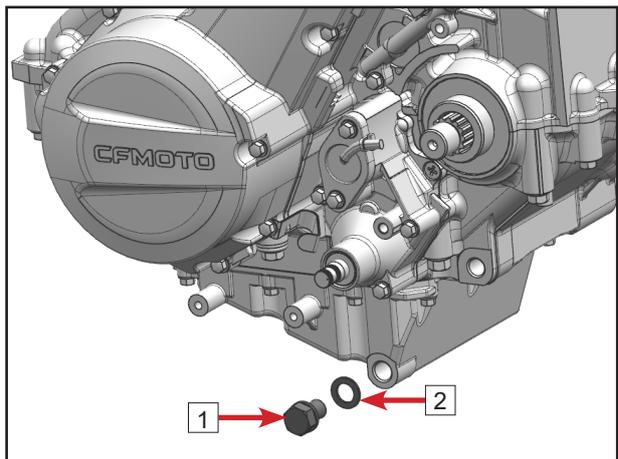
⚠ WARNING: Fix the engine firmly on the bench, in case it falls down to cause injury or engine damage.

⚠ WARNING: Disassemble the engine when the engine is cool. Otherwise, wear protective clothes in case of getting burnt.

13.4.2 Engine Oil Drain

Remove magnetic drain bolt **1** and washer **2**.

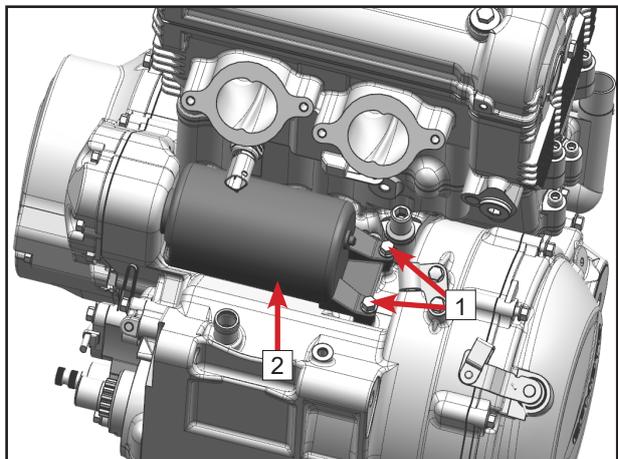
Drain the engine oil completely.



13.4.3 Starter Motor Removal

Remove two bolts **1**.

Remove starter motor **2**.

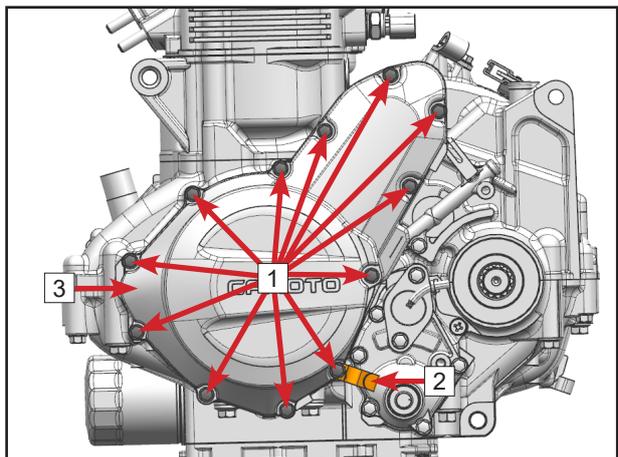


13.4.4 LH Side Cover Removal

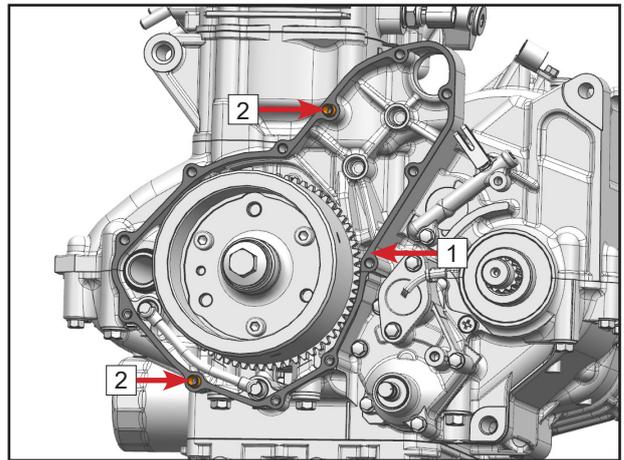
Remove bolts **1** in criss-cross way.

Remove clip **2**.

Remove LH side cover **3**.

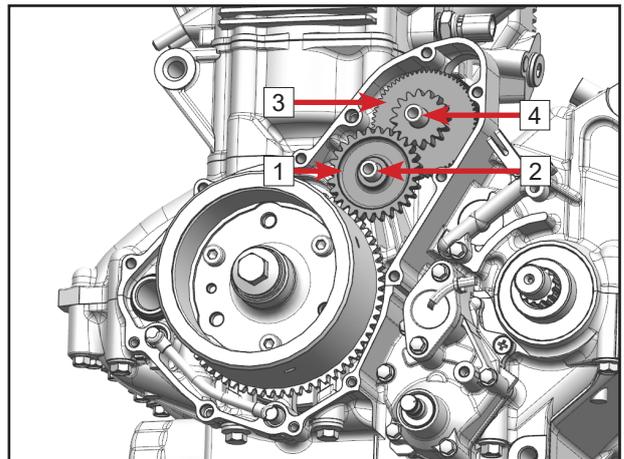


Remove seal gasket **1**.
Remove dowel pins **2**.

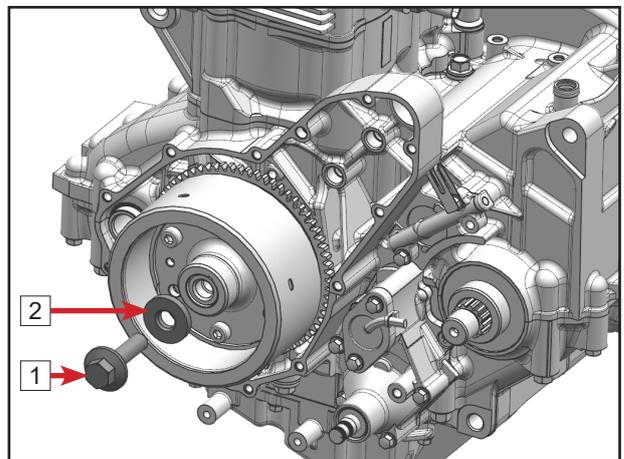


13.4.5 Magneto Rotor Removal

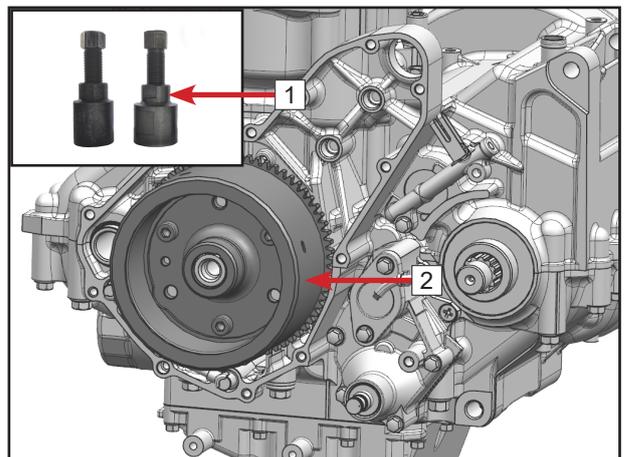
Remove starter middle gear **1**.
Remove middle gear shaft **2**.
Remove dual gear assembly **3**.
Remove middle gear shaft **4**.



Remove bolt **1** and washer **2**.

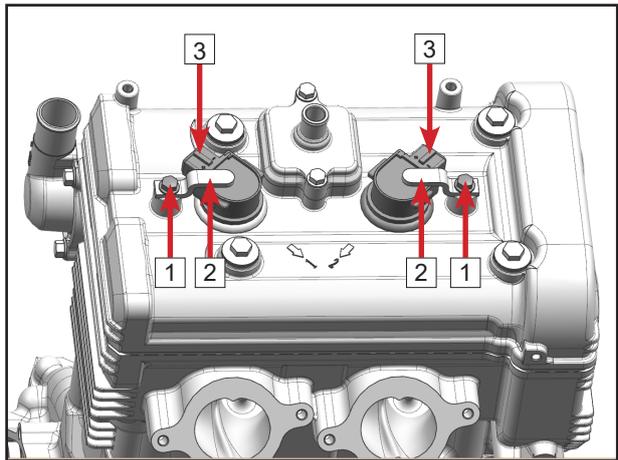


Use special tool: magneto rotor remover **1** to remove magneto rotor **2**.

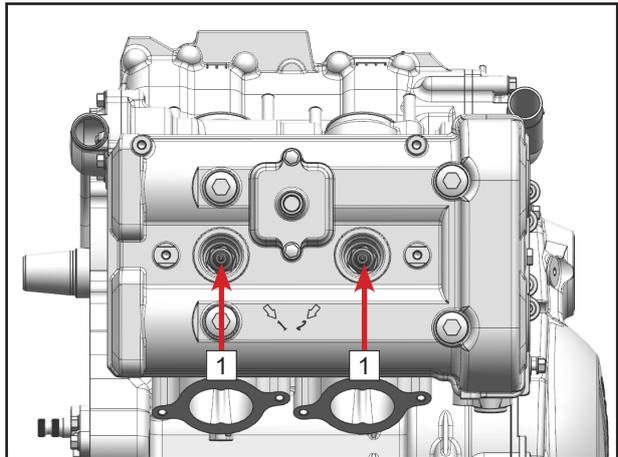


13.4.6 Cylinder Head Cover Removal

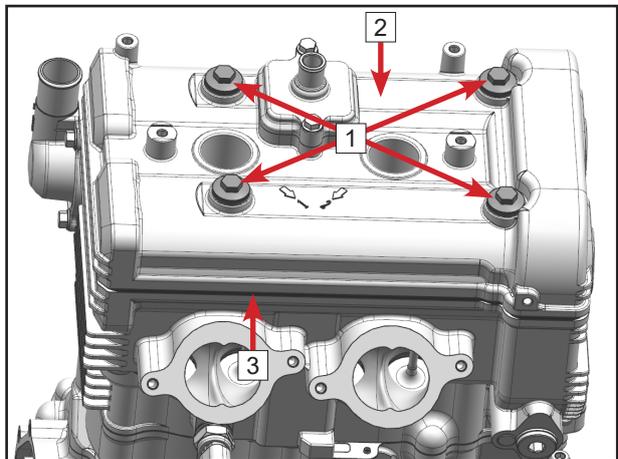
Remove bolt **1** and press plate **2**.
Remove ignition coil **3**.



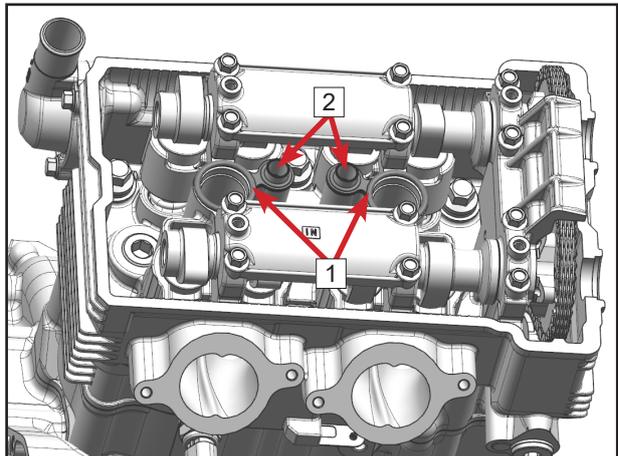
Remove spark plug **1**.



Remove cylinder head cover bolt and seal ring **1**.
Remove cylinder head cover **2** and seal ring **3**.



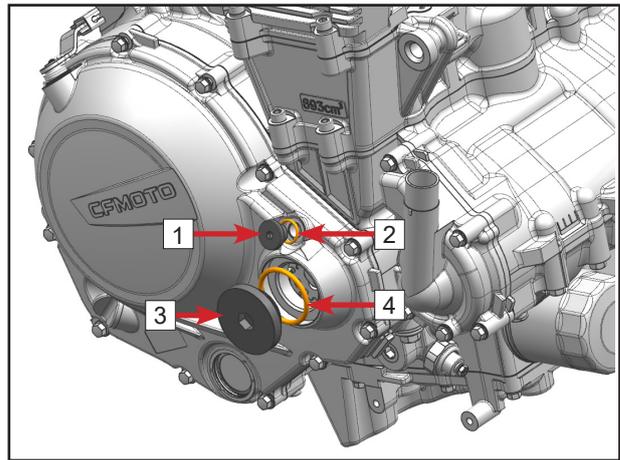
Remove spark plug hole seal ring **1**.
Remove gulf pin **2**.



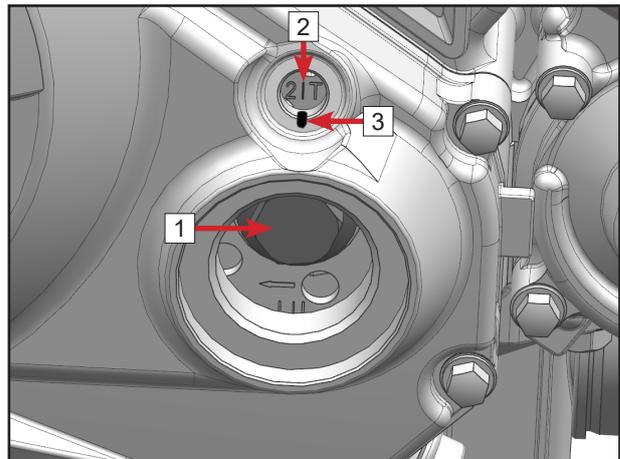
13.4.7 Tensioner Assembly Removal

Remove timing inspection hole cap **1** and O-seal ring **2**.

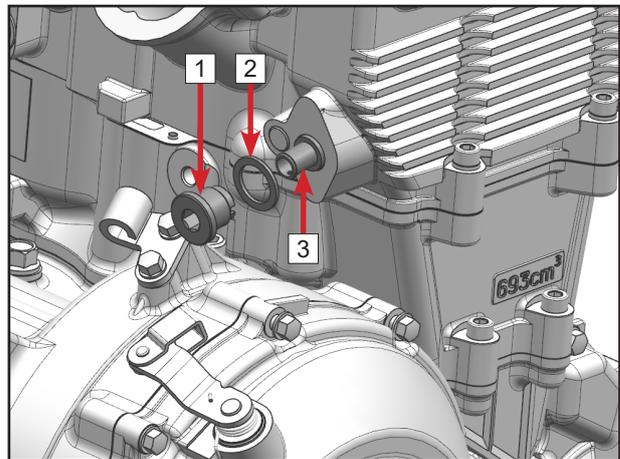
Remove strainer cover **3** and O-seal ring **4**.



Rotate bolt **1** clockwise with socket until mark "I" **2** of "2IT" aligns with mark slot **3**.



Remove screw plug **1** and washer **2**.
Remove tensioner **3**.



13.4.8 Camshaft Removal

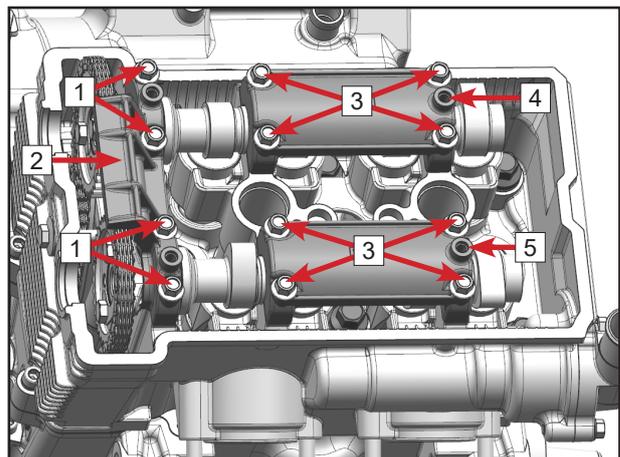
Remove four bolts **1**.

Remove camshaft plate **2**.

Remove eight bolts **3**.

Remove air intake camshaft seat (IN) **4**.

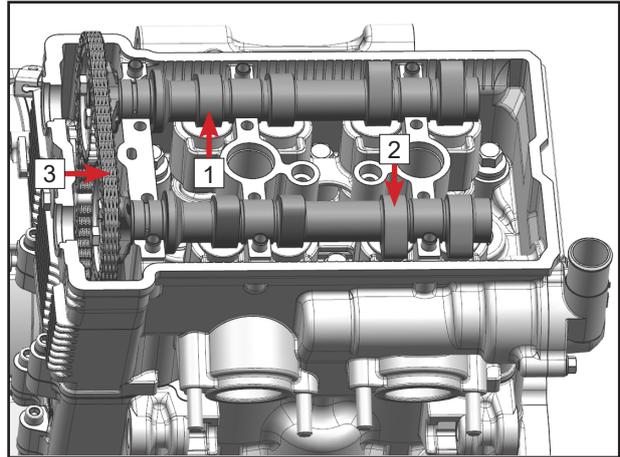
Remove air exhaust camshaft seat (EX) **5**.



NOTE: Hook timing chain 3 to prevent it falling into crankcase.

Remove air intake camshaft 1.

Remove air exhaust camshaft 2.

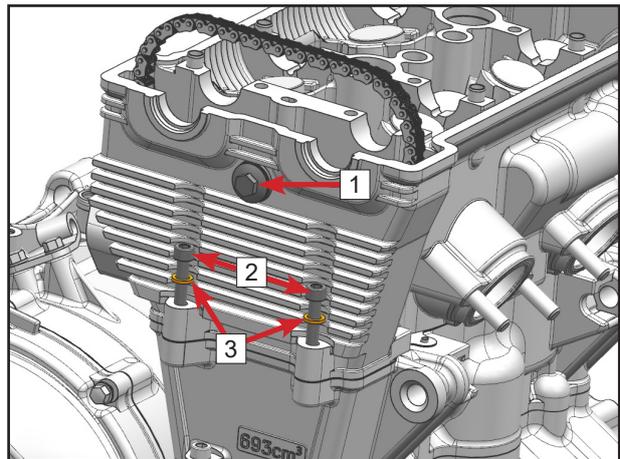


13.4.9 Cylinder Head Removal

NOTE: Hook timing chain to prevent it falling into crankcase.

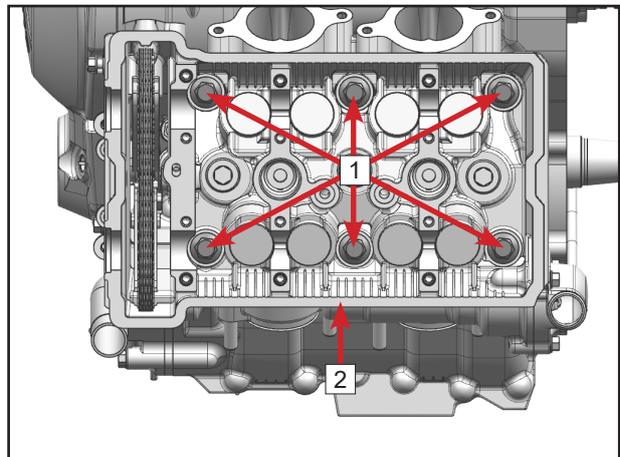
Remove cylinder head bolt and seal ring 1.

Remove inner hex bolt 2 and washer 3.



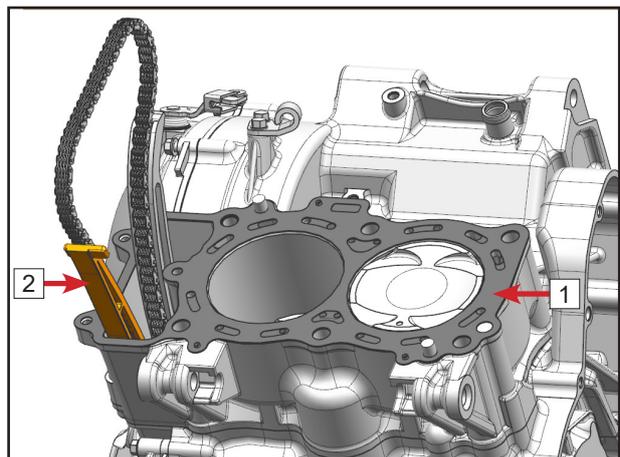
Remove six bolts and washers 1.

Remove cylinder head 2.



Remove cylinder head gasket 1.

Remove chain guide 2.

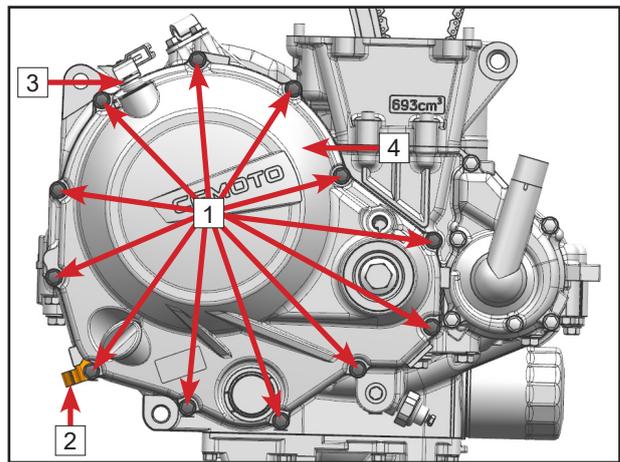


13.4.10 RH Side Cover Removal

Remove bolts **1** in criss-cross way.

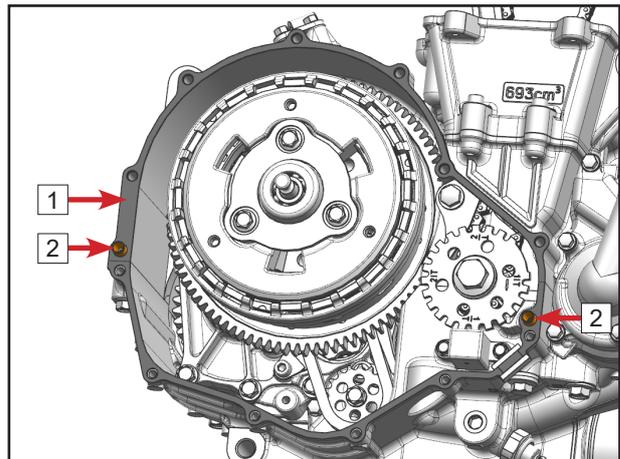
Remove clip **2**.

Remove RH side cover **4**. (Rotate clutch rod **3** to proper position to remove RH side cover.)



Remove RH side cover seal gasket **1**.

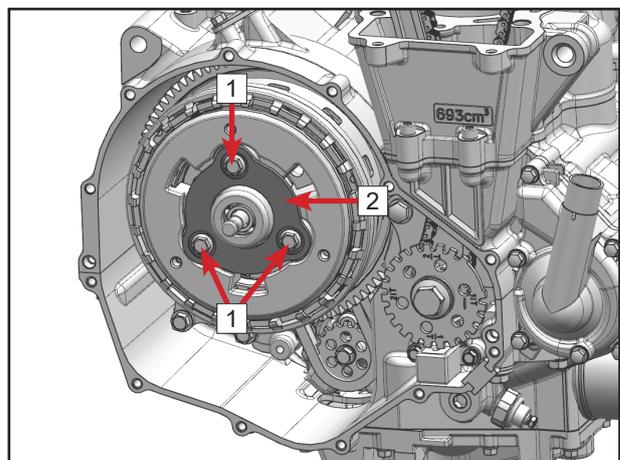
Remove dowel pin **2**.



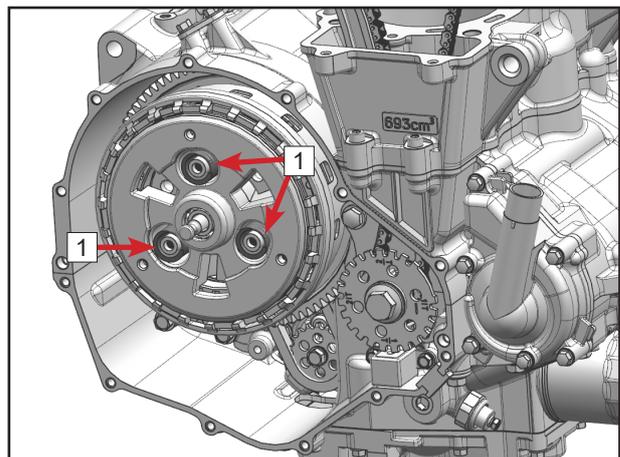
13.4.11 Clutch Removal

Remove three bolts **1**.

Remove clutch spring plate **2**.

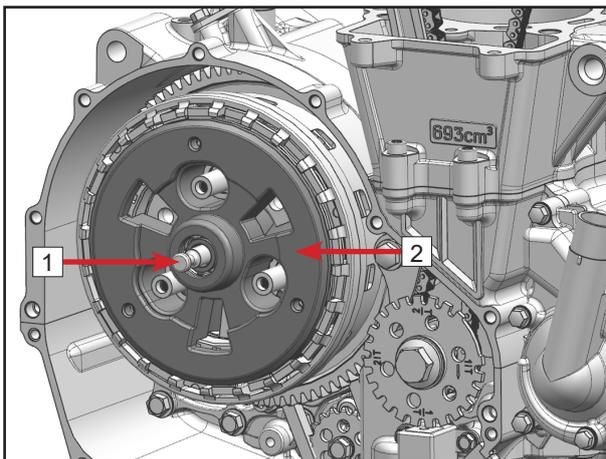


Remove three springs **1**.

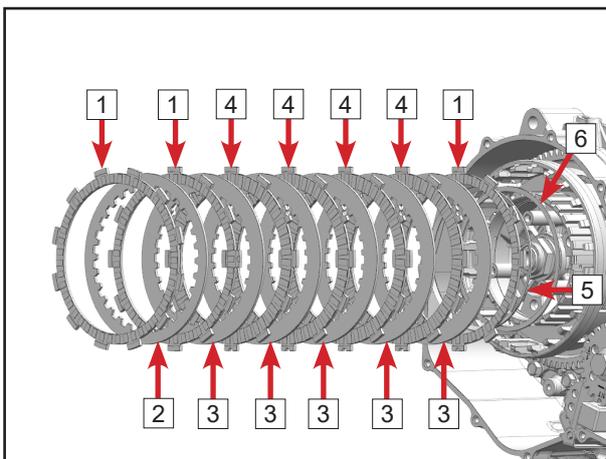


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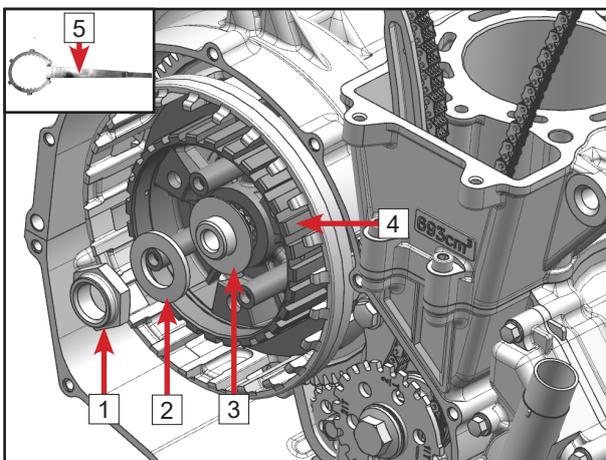
Pull the tie-rod **1** to remove clutch press plate assembly **2** together.
Separate tie-rod and press plate assembly.



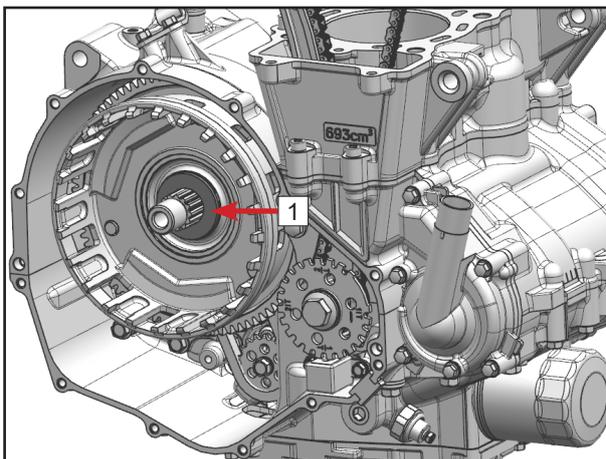
Remove friction disc A **1**, steel plate B **2** and friction disc A **1** in turn.
Remove five steel plate A **3** and four friction disc B **4**.
Remove friction discs A **1**.
Remove circlip **5**.
Remove washer **6**.



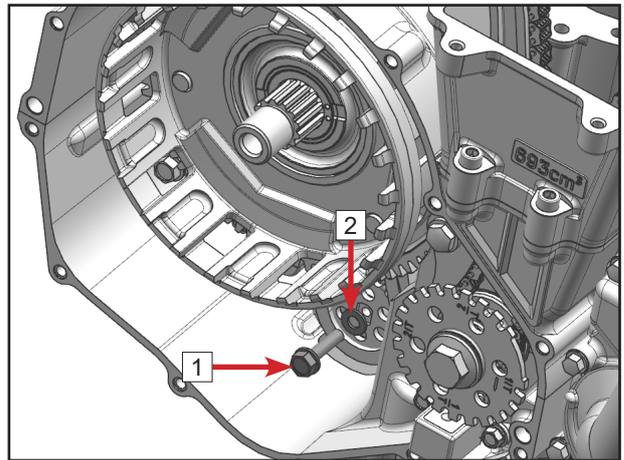
Use special tool: clutch stopping wrench **5** to fix clutch hub and remove nut **1**.
Remove circlip **2**.
Remove washer **3**.
Remove central sleeve **4**.



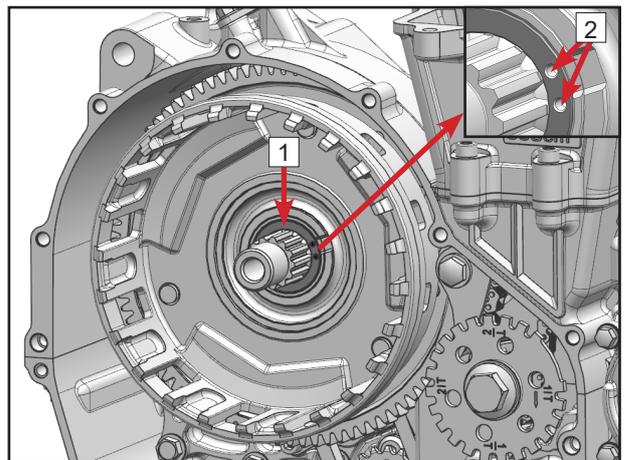
Remove washer **1**.



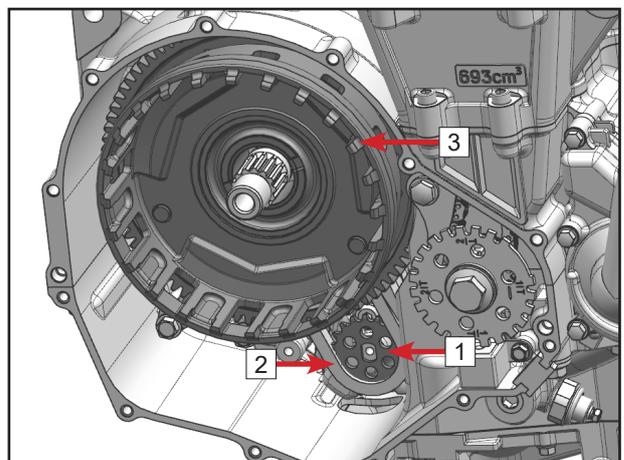
Remove bolt **1** (LH-hand thread) and washer **2**.



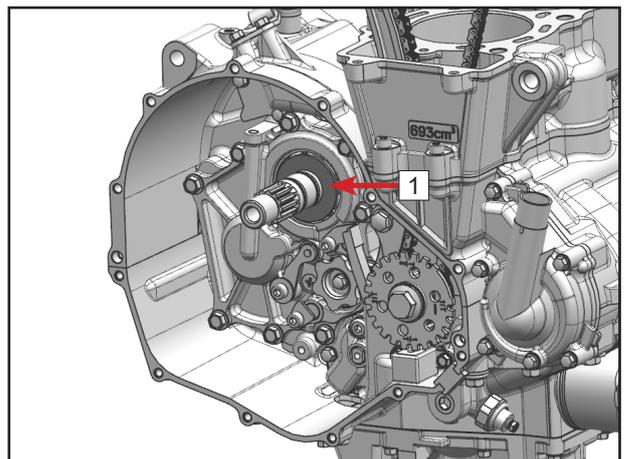
Insert into the holes **2** with needle-nose pliers and pull out the clutch shaft sleeve **1**.



Pull out oil pump sprocket **1** by needle-nose pliers along with oil pump chain **2** from crankcase.
Remove housing assembly **3**, oil pump sprocket **1** and oil pump chain **2** together.



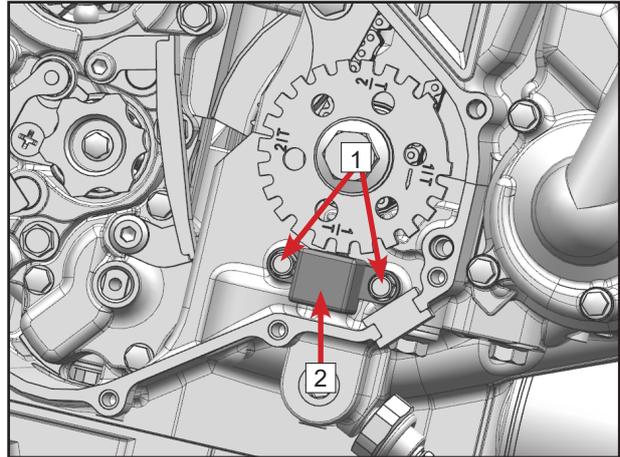
Remove washer **1**.



13.4.12 Crankshaft Pulsing Rotor Removal

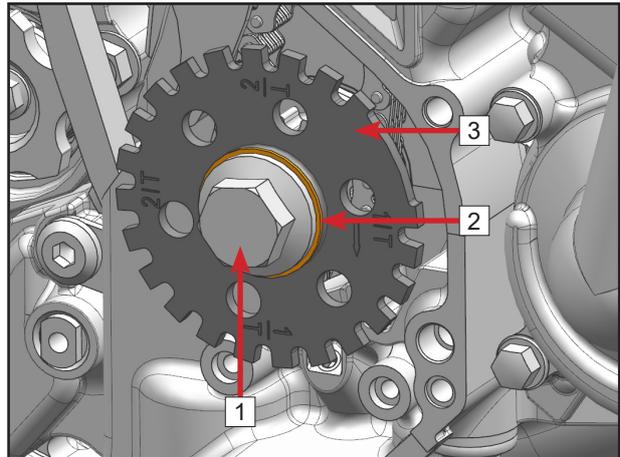
Remove two bolts **1**.

Remove trigger assembly **2**.



Remove bolt **1** and washer **2**.

Remove crankshaft pulsing rotor **3**.



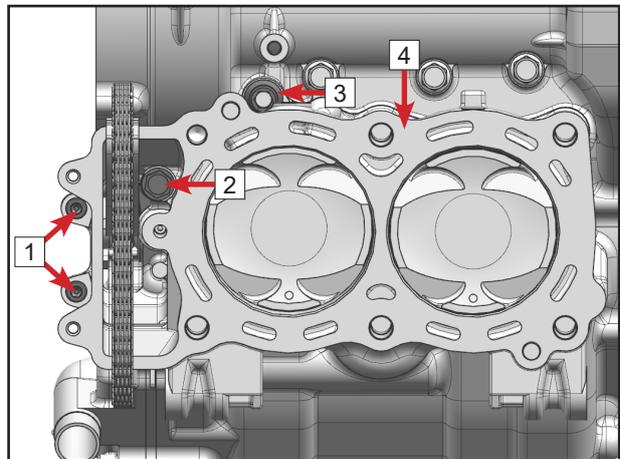
13.4.13 Cylinder Body Removal

Remove inner hex bolt and washer **1**.

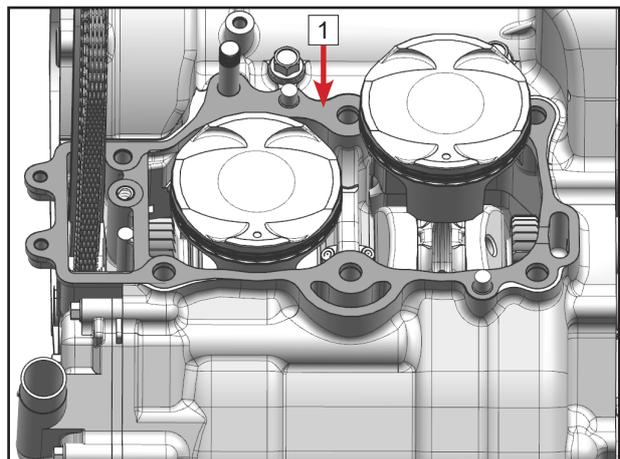
Remove bolt and washer **2**.

Remove nut and washer **3**.

Loosen cylinder body **4** by slightly shaking it. Lift to remove cylinder body.

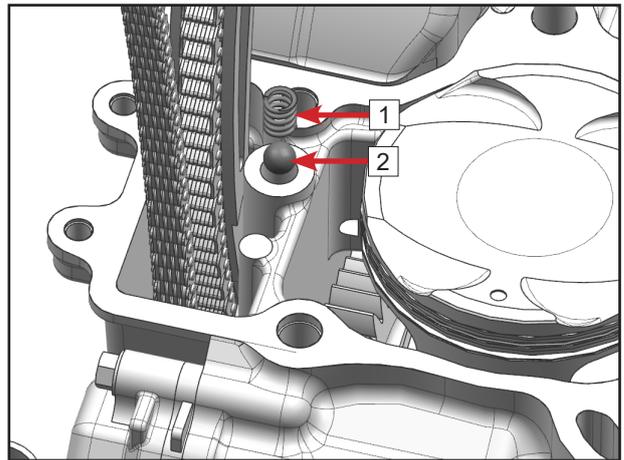


Remove cylinder body gasket **1**.



Remove balance gear spring **1**.

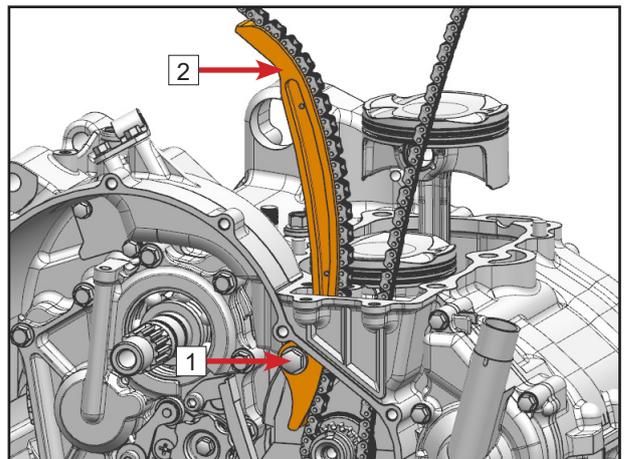
Remove steel ball **2**.



13.4.14 Tensioner Plate Removal

Remove pin shaft **1**.

Remove tensioner plate **2**.



13.4.15 Piston Removal

Rotate the crankshaft to adjust the piston to the proper position.

Remove position pin circlip **1** from notch **4** by needle-nose pliers.

NOTE: Removing only one piston pin circlip is required. The removed circlip can not be reused. Replace with new one during installation.

Remove piston pin **2** from other side.

Remove piston **3** from connecting rod.

NOTE: Mark the removed parts (1 cylinder or 2 cylinder) so that they can be quickly returned to their original position when reinstalled.

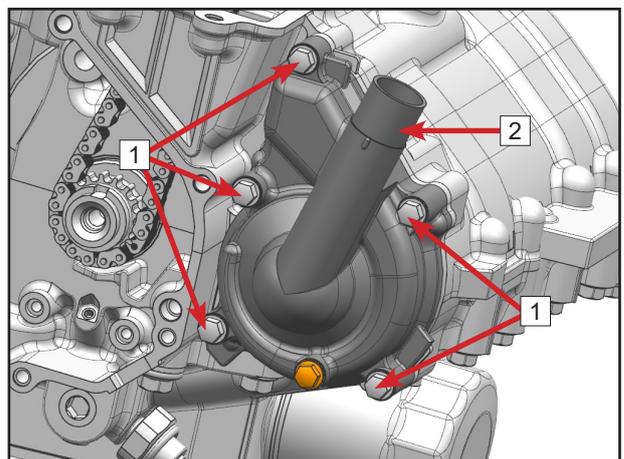
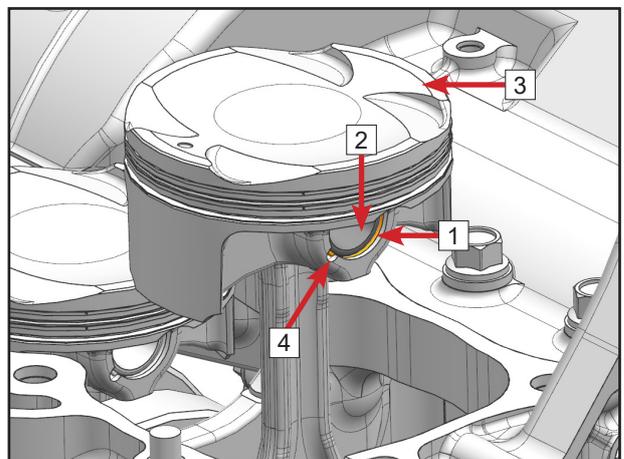
Remove another piston in the same way.

13.4.16 Water Pump Removal

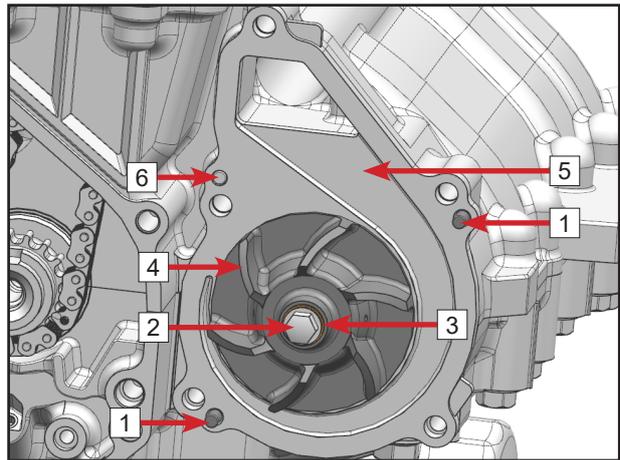
Remove five bolts **1**.

Remove water pump cover **2**.

NOTE: The seal gasket may remain on the cover. Remove it along with water pump cover.

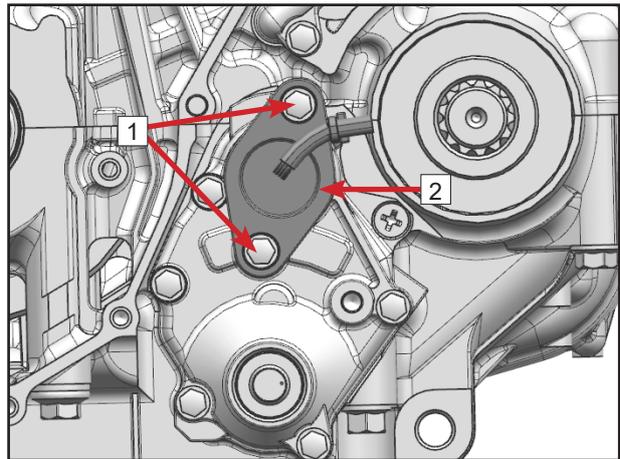


- Remove needle **1**.
- Remove bolt **2** and washer **3**.
- Remove water pump impeller **4**.
- Remove water pump **5** and needle **6**.

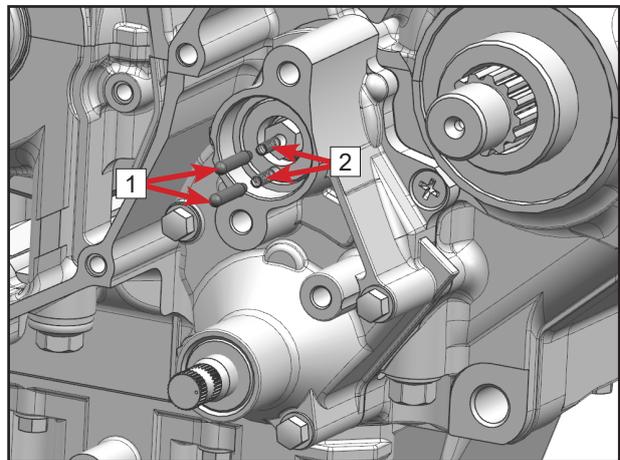


13.4.17 Gearshift Assembly Removal

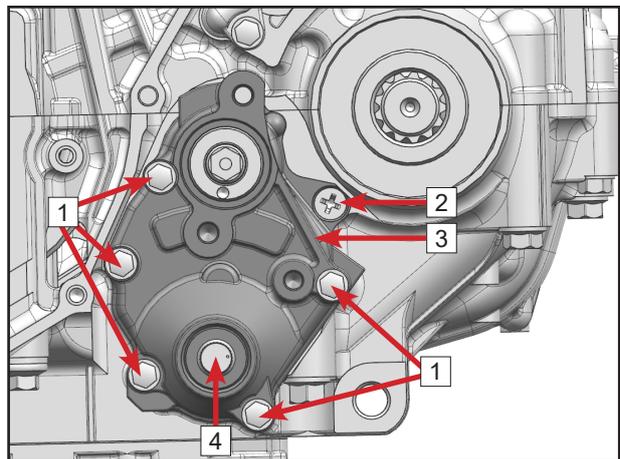
- Remove bolt **1**.
- Remove gearshift contactor **2**.



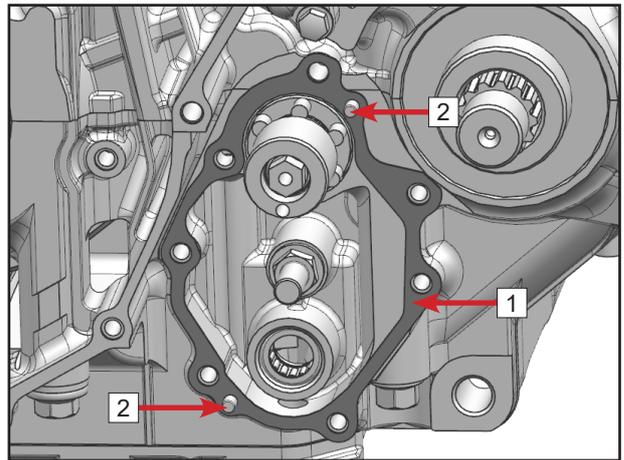
- Remove ball contactor **1**.
- Remove contactor spring **2**.



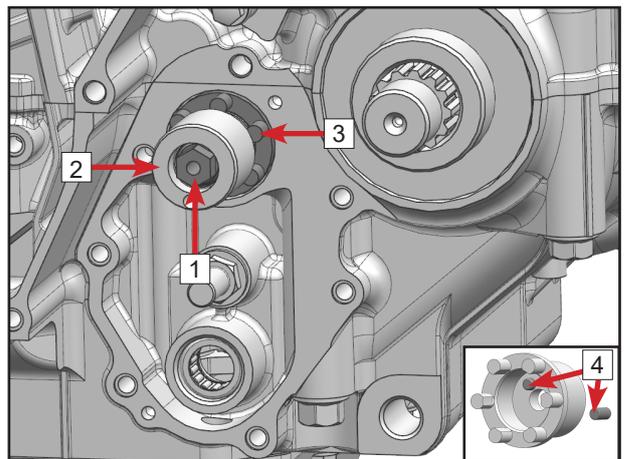
- Remove bolts **1**.
- Remove screw **2**.
- Remove gearshift cover **3** and gearshift sub assembly **4**.



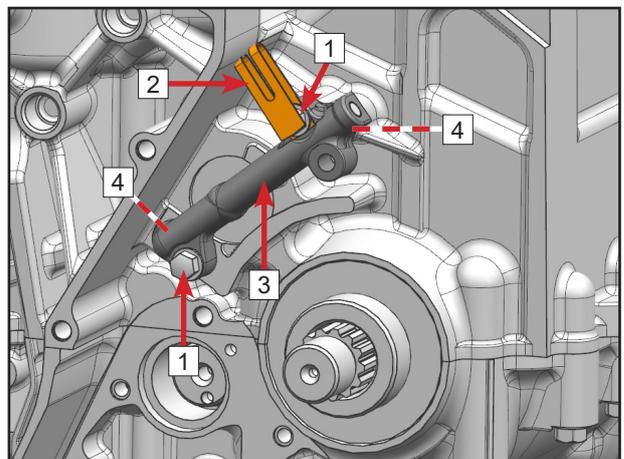
Remove gearshift cover gasket **1**.
Remove roller needle **2**.



Remove contactor bolt **1**.
Remove gear drive shaft **2**.
Remove shift location drum **3**.
Remove roller needle **4**.

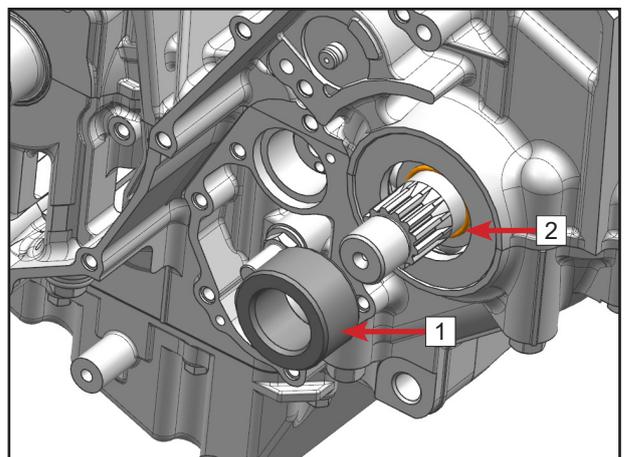


Remove bolt **1** and clip **2**.
Remove oil pipe IV assembly **3**.
Remove O-seal ring **4** from oil pipe IV assembly.



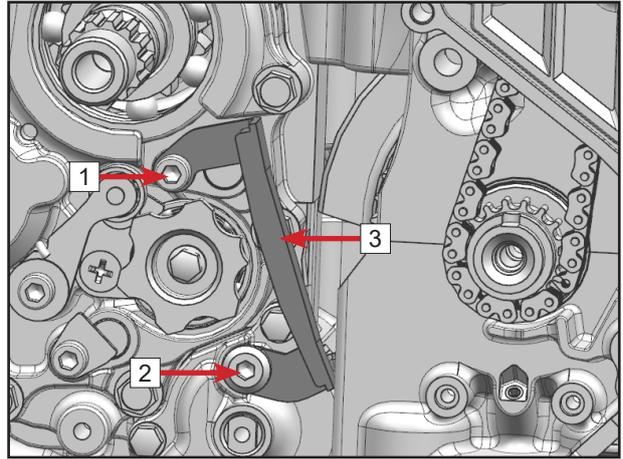
13.4.18 Transmission Assembly Removal

Remove countershaft sleeve **1**.
Remove O-seal ring **2**.

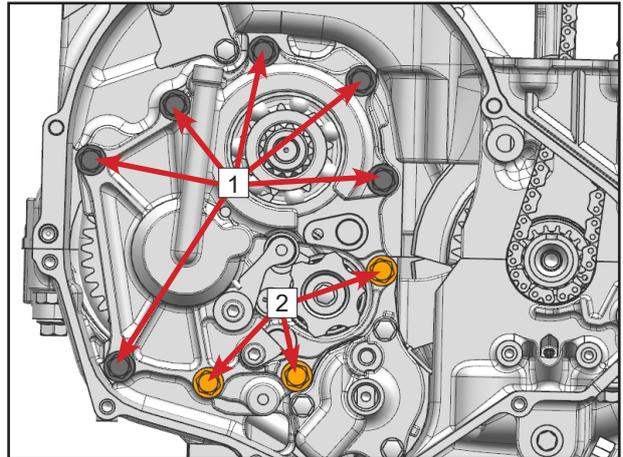


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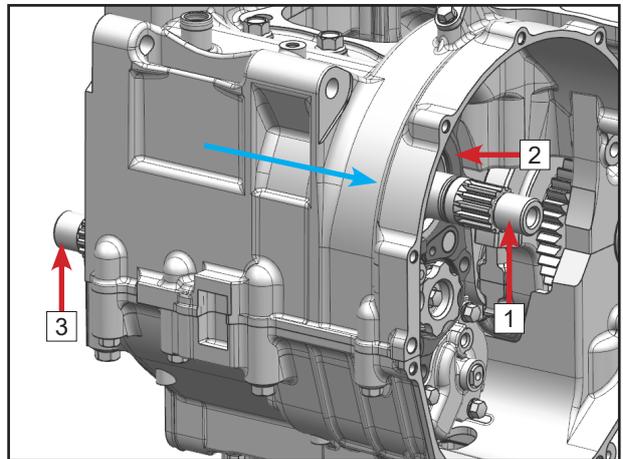
Remove inner hex screw **1** and screw **2**.
Remove oil pump chain guide **3**.



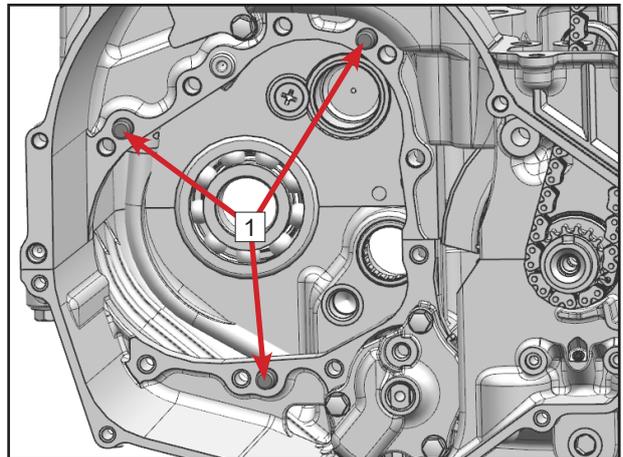
Remove bolts **1** and bolts **2** in criss-cross way.



Slightly shake main shaft **1** to make it loose.
Pull out transmission assembly **2**.
Knock countershaft **3** gently with rubber hammer if necessary.



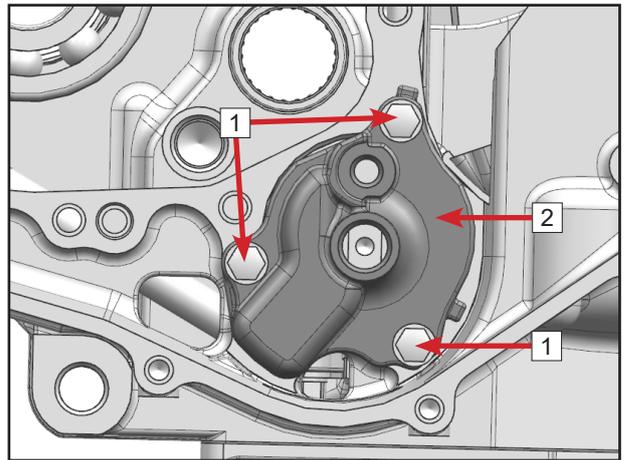
Remove needle rollers **1**.



13.4.19 Oil Pump Assembly Removal

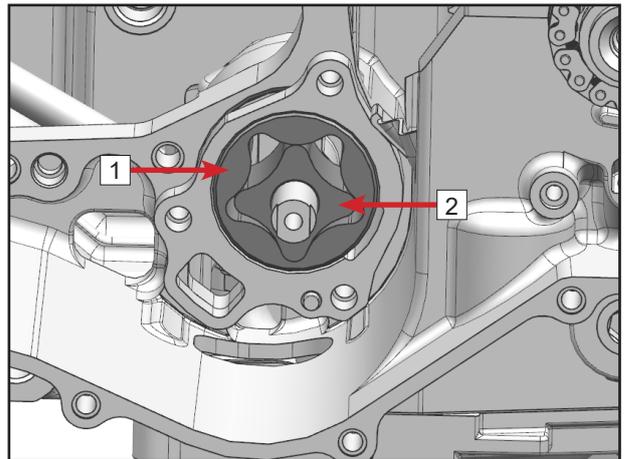
Remove three bolts **1**.

Remove oil pump cover **2**.



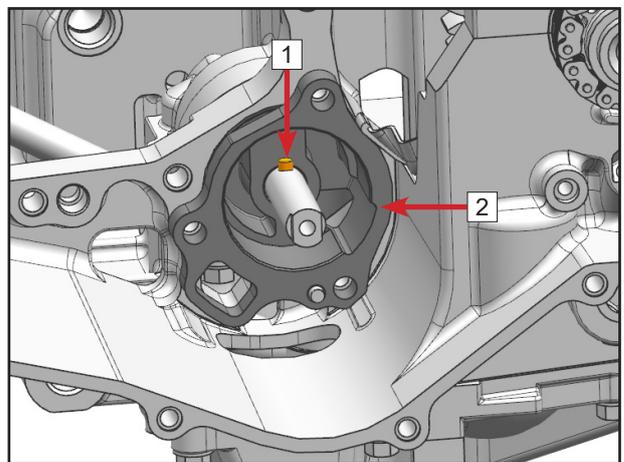
Remove auxiliary oil pump outer rotor **1**.

Remove auxiliary oil pump inner rotor **2**.

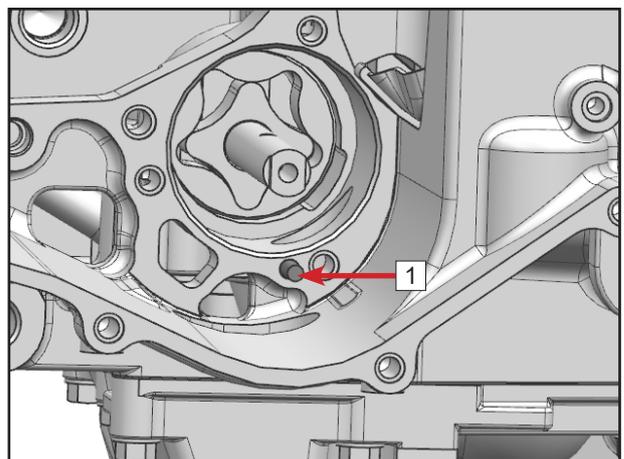


Remove roller needle **1**.

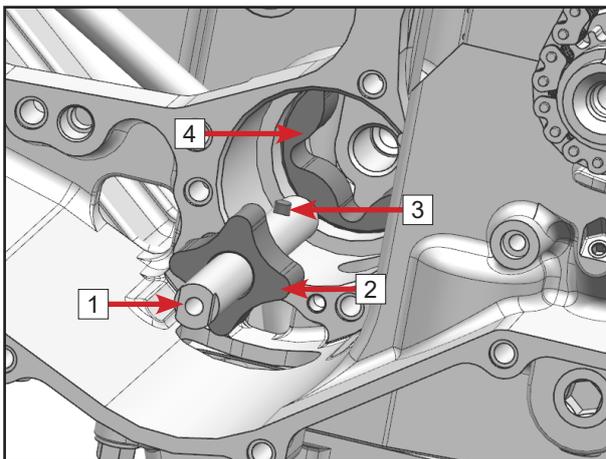
Remove oil pump **2**.



Remove roller needle **1**.



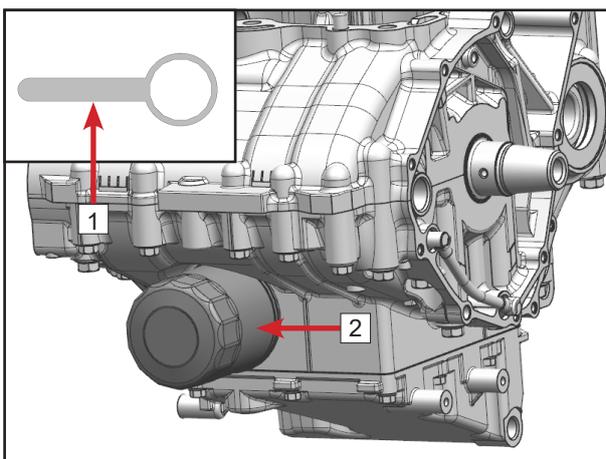
Remove oil pump shaft **1**, oil pump inner rotor **2** and needle **3** at the same time.
Remove oil pump outer rotor **4**.



13.4.20 Oil Filter Removal

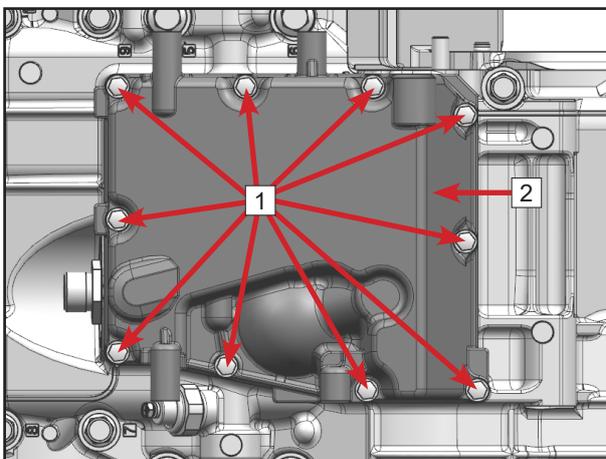
Use special tool: oil filter wrench **1** to remove the oil filter **2**.

⚠ CAUTION: Cover a cloth or rubber cushion when removing the oil filter, in case the special tool damages the oil filter.

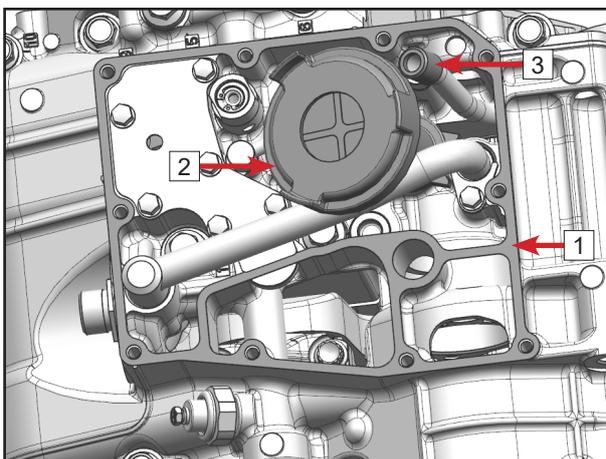


13.4.21 Oil Pan Removal

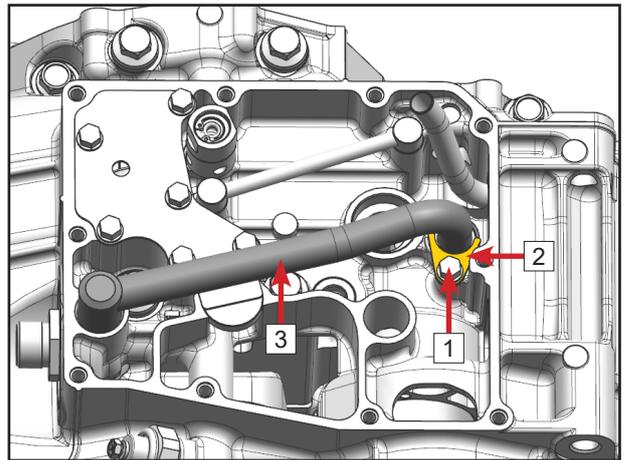
Remove ten bolts **1** in criss-cross way.
Remove oil pan **2**.



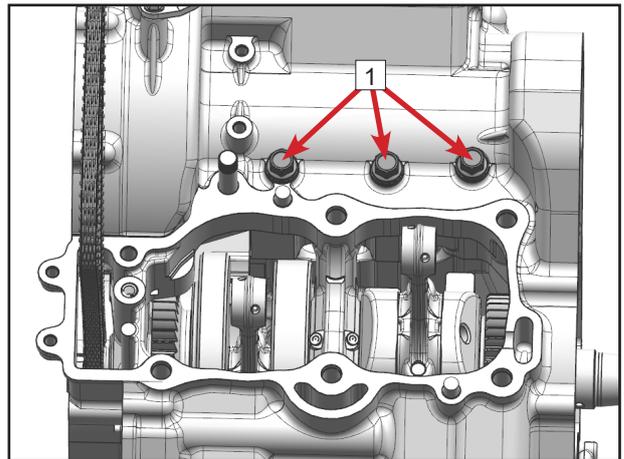
Remove gasket **1**.
Remove oil suction pan and seal ring **2**.
Remove oil return pipe rubber sleeve **3**.



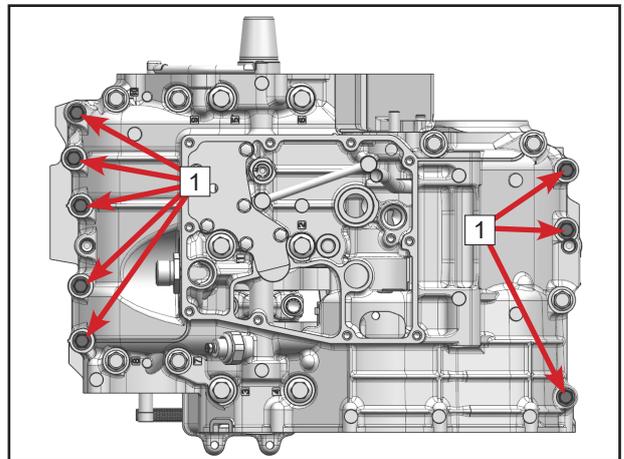
Remove bolt **1** and oil pipe I press plate **2**.
Remove oil pipe I **3**.



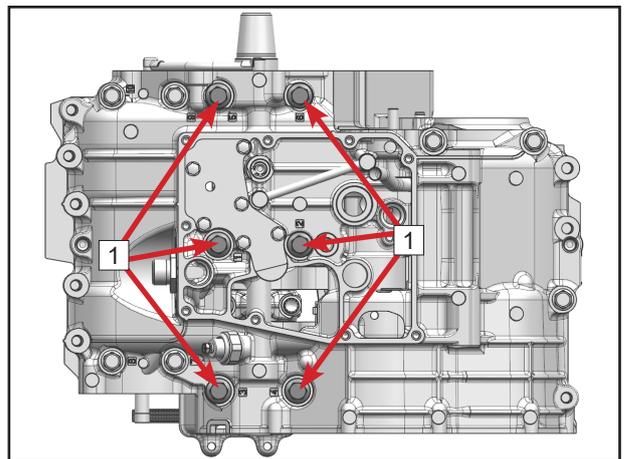
13.4.22 Crankcase Separation
Remove bolts and washers **1**.



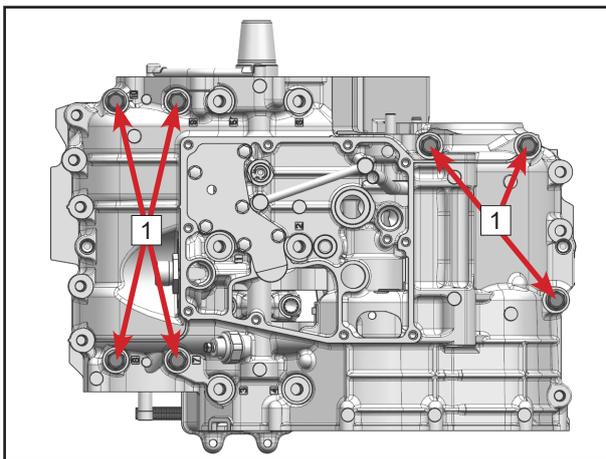
Remove eight bolts **1** in criss-cross way.



Remove bolts and washers **1** in criss-cross way.

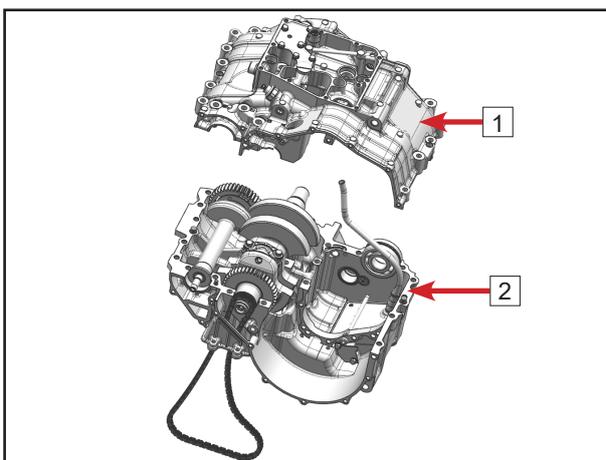


Remove bolts **1** in criss-cross way.

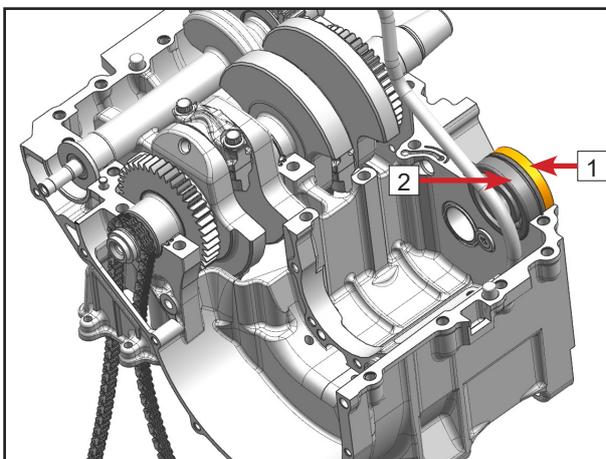


Remove lower crankcase **1** from upper crankcase **2**.

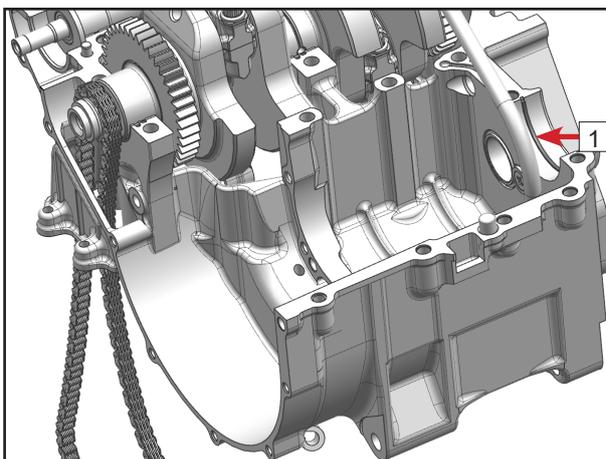
NOTE: Keep plain bearing in original position.



Remove countershaft oil seal **1**.
Remove countershaft bearing **2**.

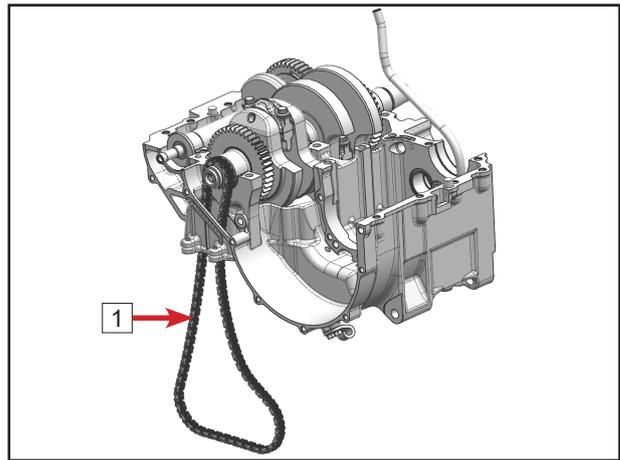


Remove bearing stop ring **1**.



13.4.23 Timing Chain Removal

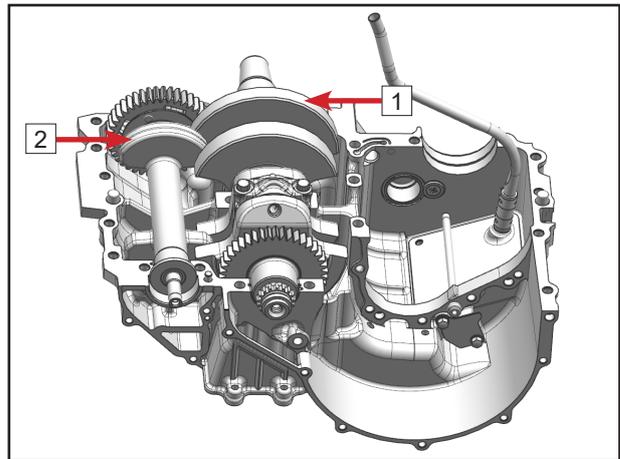
Remove timing chain **1**.



13.4.24 Crankshaft and Balancer Assembly Removal

Remove crankshaft assembly **1** and Balancer assembly **2** together.

⚠ CAUTION: Pay attention during crankshaft and balancer removal to prevent parts impact and damage.

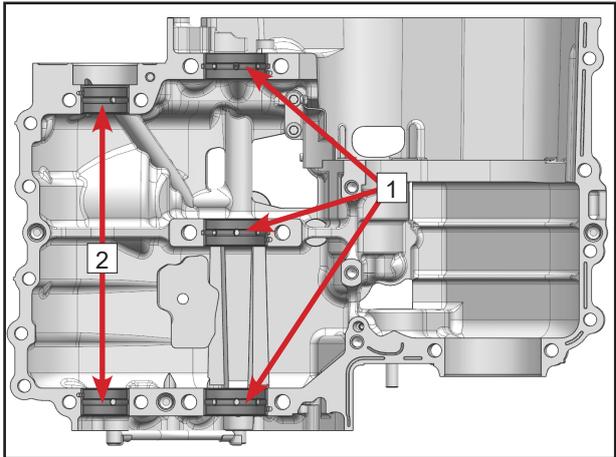
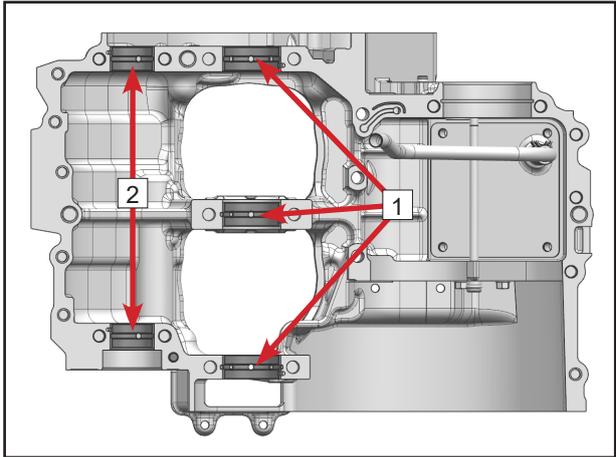


13.5 Single Part Operation

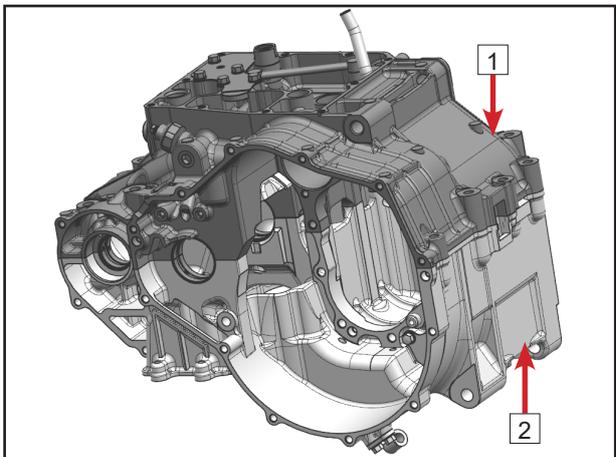
13.5.1 Crankshaft Plain Bearing and Balancer Shaft Plain Bearing Radial Clearance Inspection

Remove any remnants of sealing compound and clean the sections of the engine case thoroughly.

Clean crankshaft plain bearing **1** and balancer shaft plain bearing **2**.

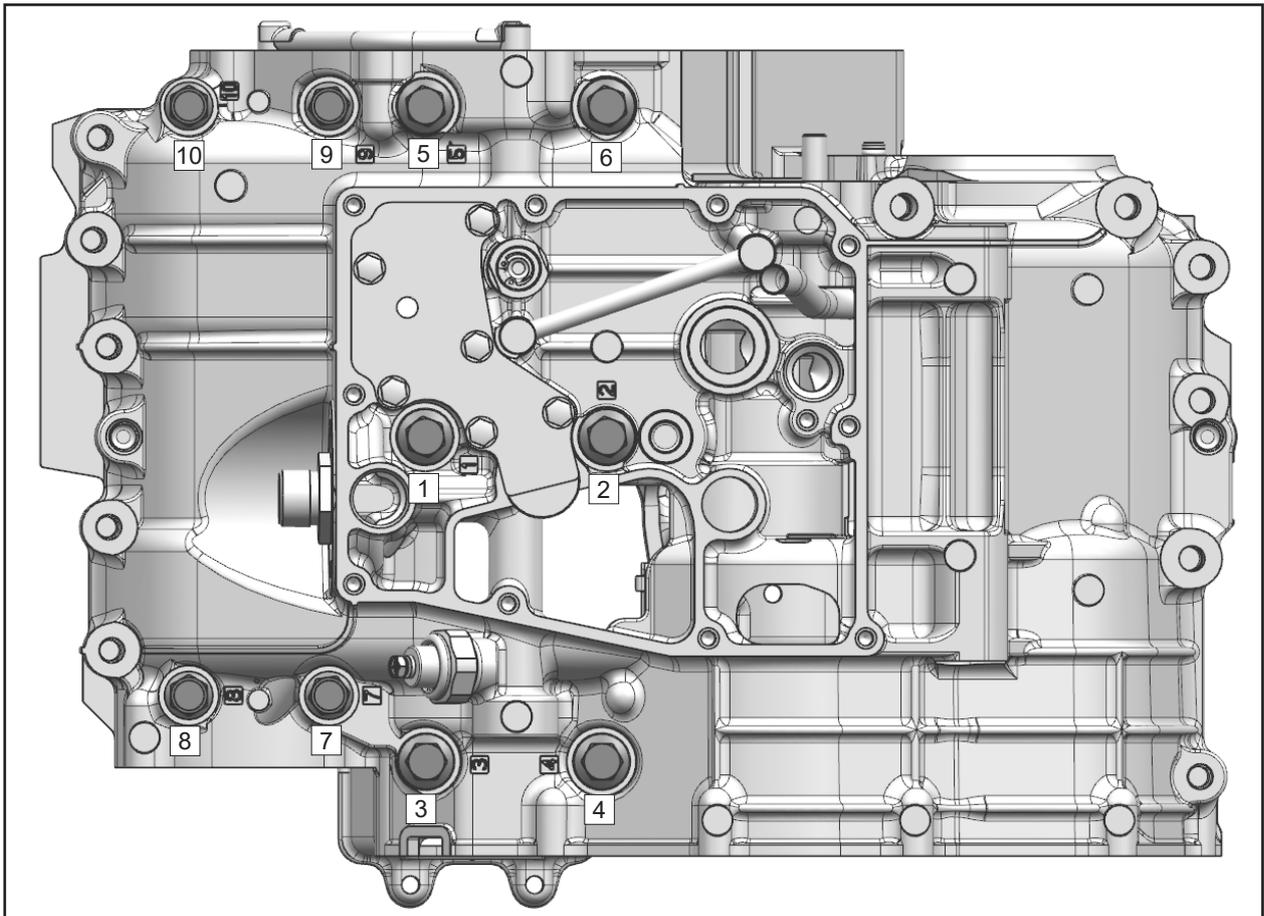


Install lower crankcase **1** on upper crankcase **2**.



13 Engine

Install and tighten crankcase bolt according to the following sequence and steps. One washer is installed at the bolt 1~6.



Tighten crankcase bolt as following numbers and steps:

Tighten steps	Bolt number	Torque (N·m)
Step 1	1 ~ 10	8
Step 2	1 ~ 10	20
Step 3	1 ~ 10	35
Step 4	1 ~ 6	44

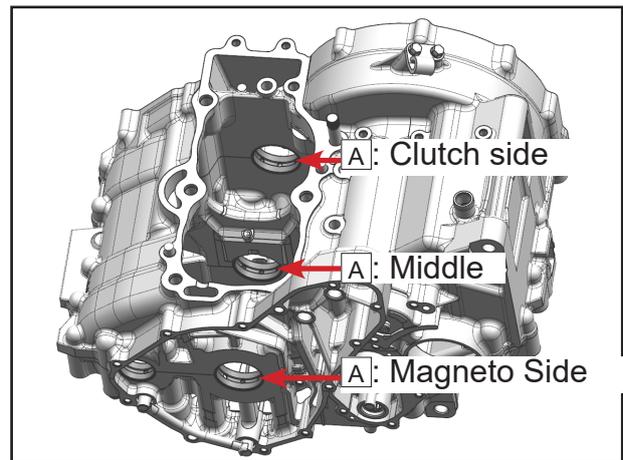
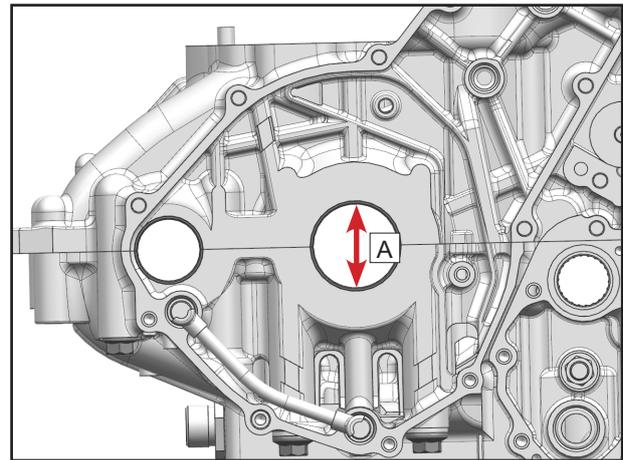
NOTE: Apply liquid mixed with oil and MoS₂ grease on thread and washer of bolt 1~10 (weight ratio 10:1).

Perpendicular to the crankcase joint, measure the inner diameter **A** of the crankshaft plain bearing (a total of 3 places: magneto side, middle, clutch side) and compare with the measured outer diameter **D** of crankshaft main journal at the corresponding position (refer to the chapter "Selecting Crankshaft Plain Bearing")

The difference of **A** and **D** is the radial clearance of crankshaft plain bearing.

Crankshaft Plain Bearing Radial Clearance	
Service Limit	$A - D \leq 0.07\text{mm}$

If the radial clearance of crankshaft plain bearing exceeds the service limit, replace the plain bearing or crankshaft, or both.

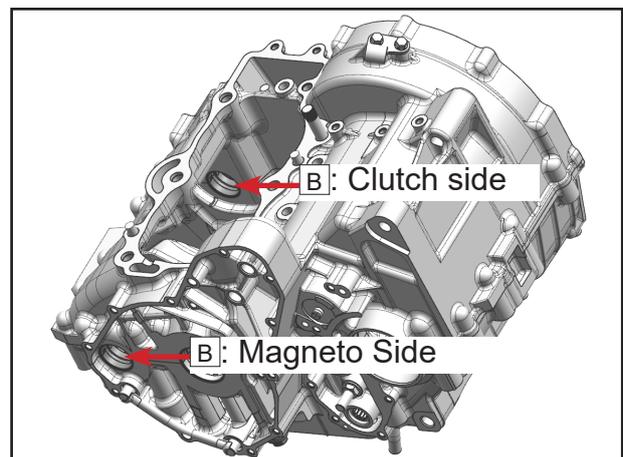
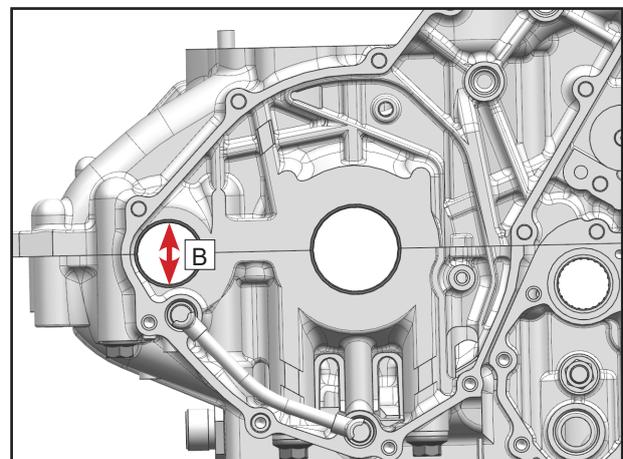


Perpendicular to the crankcase joint, measure the inner diameter **B** of balancer shaft plain bearing (a total of 2 places: magneto side, clutch side) and compare with the measured outer diameter **E** of balancer shaft journal at the corresponding position (refer to the chapter "Selecting Balancer Shaft Plain Bearing").

The difference of **B** and **E** is the radial clearance of balancer shaft plain bearing.

Balancer Shaft Plain Bearing Radial Clearance	
Service Limit	$B - E \leq 0.07\text{mm}$

If the radial clearance of balancer shaft plain bearing exceeds the service limit, replace the plain bearing or balancer shaft, or both.



13.5.2 Selecting Crankshaft Plain Bearing

Crankshaft Plain Bearing Seat Hole

Clean crankshaft plain bearing seat hole. Install lower crankcase on upper crankcase, tighten crankcase bolt to the specified torque (refer to the chapter "Crankshaft Plain Bearing and Balancer Shaft Plain Bearing Radial Clearance Inspection").

NOTE: Do not install crankshaft plain bearing on crankcase.

Perpendicular to the crankcase joint, measure the diameter 1 of crankshaft plain bearing seat hole (a total of 3 places: magneto side, middle, clutch side). Record the measurement data and confirm the diameter mark 1 of crankshaft plain bearing seat hole against the table of "Crankshaft Plain Bearing Seat Hole (New Part)".

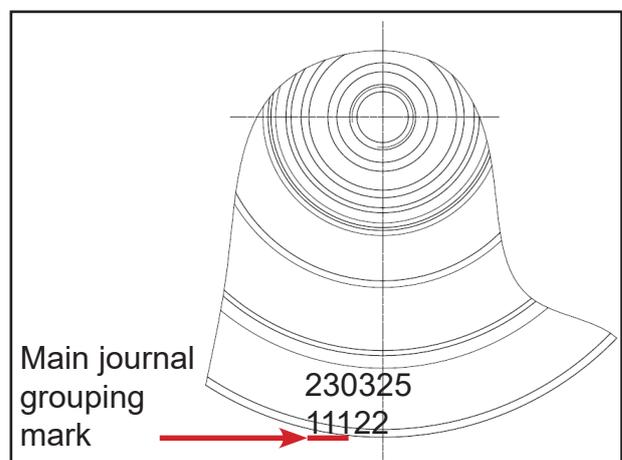
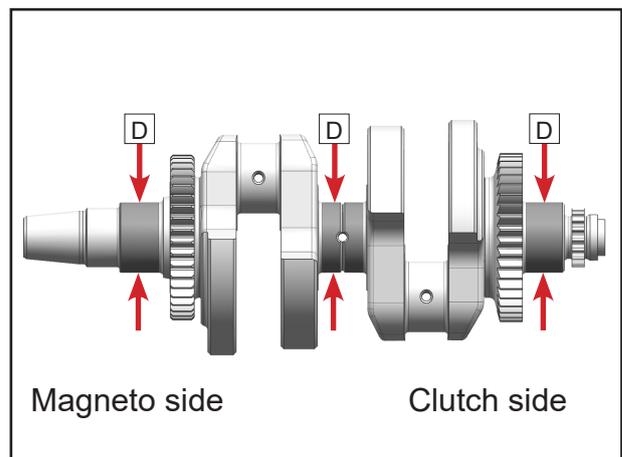
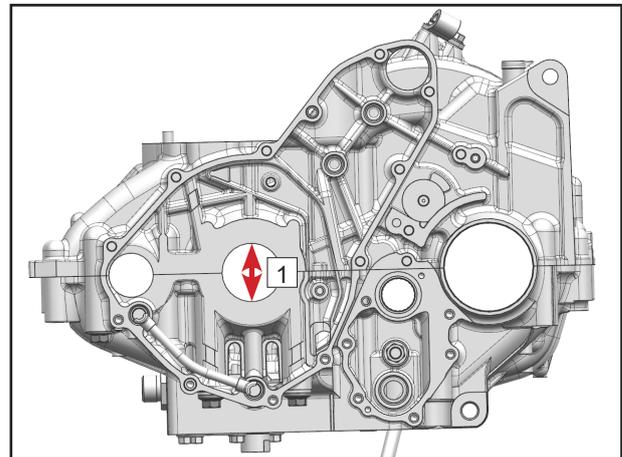
Crankshaft Plain Bearing Seat Hole (New Part)	
Mark	Diameter 1
Yellow	41.000 mm ~ 41.008 mm
Green	41.008 mm ~ 41.016 mm

Crankshaft Main Journal

Crankshaft main journal diameter D are grouped in the table below.

Crankshaft Main Journal (New Part)	
Mark	Diameter D
2	37.984 mm ~ 37.992 mm
1	37.993 mm ~ 38.000 mm

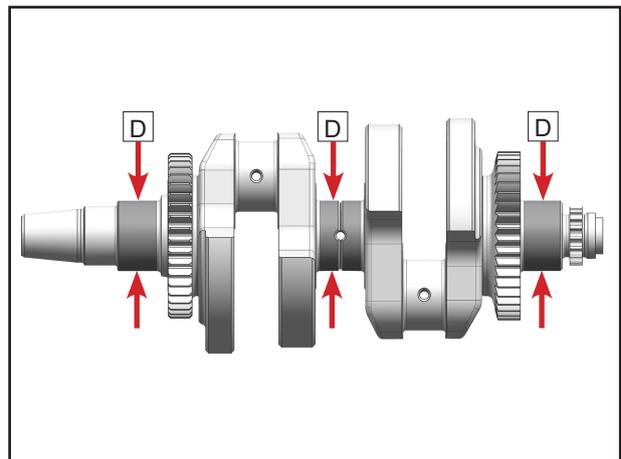
The grouping mark is shown on the right picture, from left to right is the main journal grouping mark of magneto side, middle and clutch side.



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Measure crankshaft main journal diameter \square D. Replace new part if it is less than service limit.

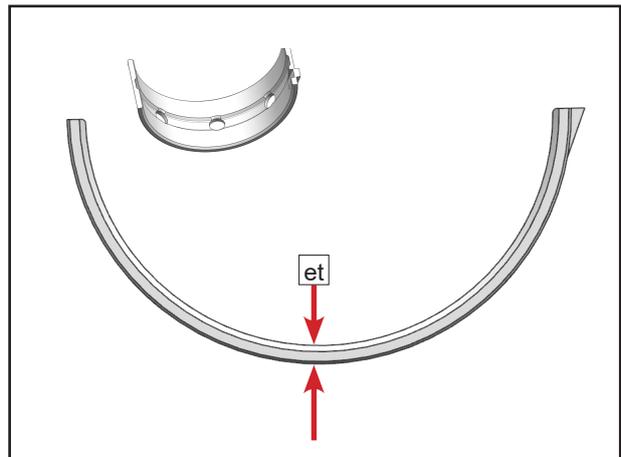
Crankshaft Main Journal Diameter \square D	
Service Limit	37.97 mm



Crankshaft Plain Bearing

The plain bearing central wall thickness \square et grouping is shown in the following table.

Crankshaft Plain Bearing (New Part)	
Color Mark	Central Wall Thickness \square et
Brown	1.496 mm ~ 1.500 mm
Black	1.501 mm ~ 1.504 mm
Blue	1.505 mm ~ 1.508 mm



Select crankshaft plain bearing as following table.

Crankshaft Plain Bearing Seat Hole Mark	Crankshaft Main Journal Mark	Plain Bearing Color
Yellow	1	Brown
Yellow	2	Black
Green	1	Black
Green	2	Blue

13.5.3 Select Balancer Shaft Plain Bearing

Balancer Shaft Plain Bearing Seat Hole

Clean balancer shaft plain bearing seat hole.

Install lower crankcase on the upper crankcase, tighten crankcase bolt to the specified torque (refer to the chapter "Crankshaft Plain Bearing and Balancer Shaft Plain Bearing Radial Clearance Inspection") .

NOTE: Do not install balancer shaft plain bearing on crankcase.

Perpendicular to the crankcase joint, measure the diameter ① of balancer shaft plain bearing seat hole (a total of 2 places: magneto side and clutch side).

Record the measurement data and confirm the diameter mark ① of balancer shaft plain bearing seat hole and compare the table of "Balancer Shaft Plain Bearing Seat Hole (New Part)".

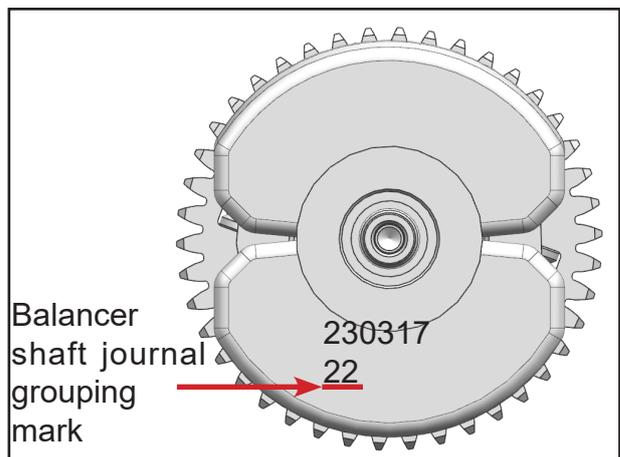
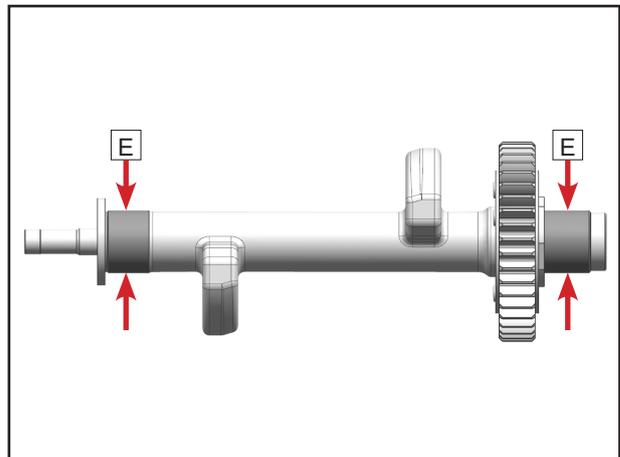
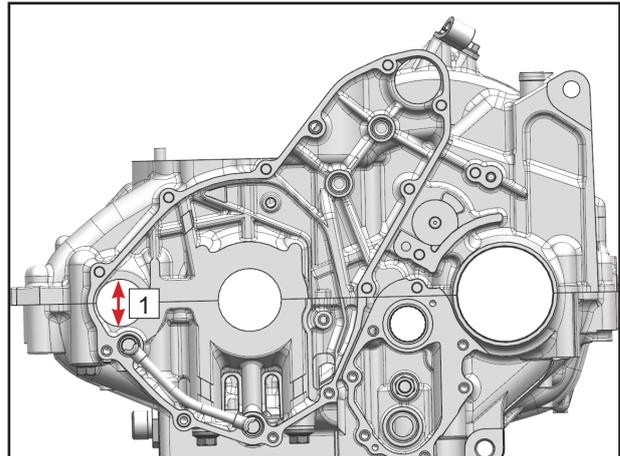
Balancer Shaft Plain Bearing Seat Hole (New Part)	
Mark	Diameter
Yellow	31.000 mm ~ 31.008 mm
Green	31.008 mm ~ 31.016 mm

Balancer Shaft Journal

Balancer shaft journal diameter ⑤ grouping sees the following table.

Balancer Shaft Journal Diameter (New Part)	
Mark	Diameter
1	27.987 mm ~ 27.993 mm
2	27.994 mm ~ 28.000 mm

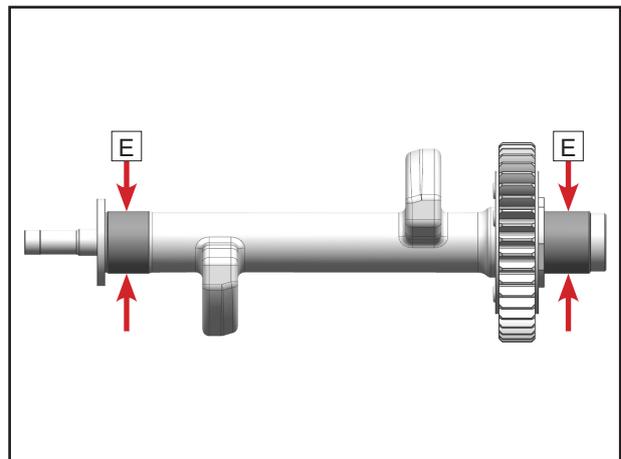
The grouping mark of balancer shaft neck is shown on the right picture, from left to right is the grouping mark of magneto side and clutch side.



CFMOTO

Measure balancer shaft journal diameter [E]. Replace new part if it is lower than service limit.

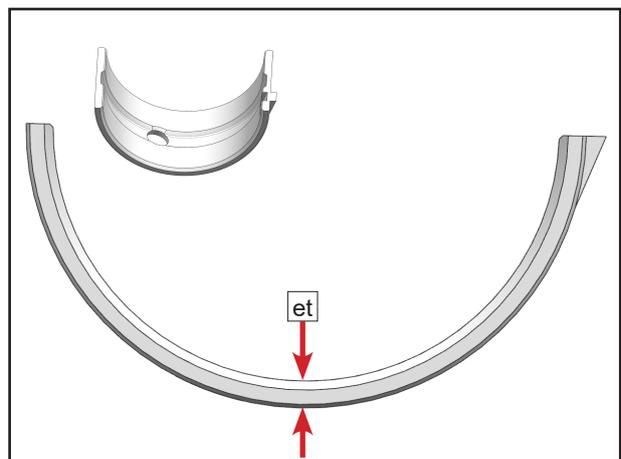
Balancer Shaft Journal Diameter	
Service Limit	27.96 mm



Balancer Shaft Plain Bearing

The central wall thickness [et] of the plain bearing is grouped in the following table.

Balancer Shaft Plain Bearing (New Part)	
Color Mark	Central Wall Thickness [et]
Brown	1.490 mm ~ 1.494 mm
Black	1.495 mm ~ 1.498 mm
Blue	1.499 mm ~ 1.502 mm



Select balancer shaft plain bearing as following table.

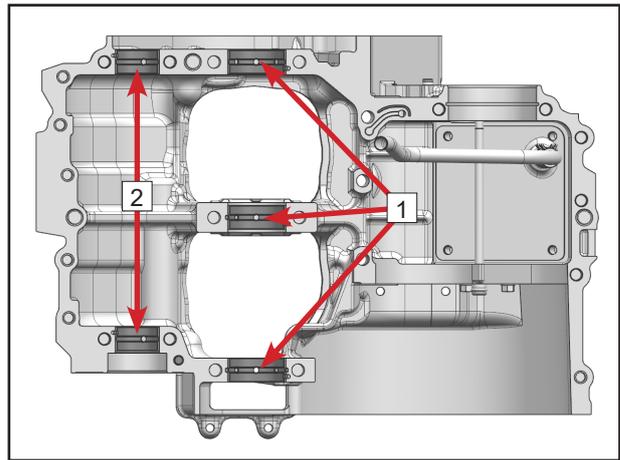
Balancer Shaft Plain Bearing Seat Hole Mark	Balancer Shaft Journal Mark	Balancer Shaft Plain Bearing Color
Yellow	2	Brown
Yellow	1	Black
Green	2	Black
Green	1	Blue

13.5.4 Crankshaft Plain Bearing and Balancer Shaft Plain Bearing Replacement

Remove crankshaft plain bearing **1** from upper crankcase.

Remove balancer shaft plain bearing **2** from upper crankcase.

Clean plain bearing seat hole.



Remove crankshaft plain bearing **1** from lower crankcase.

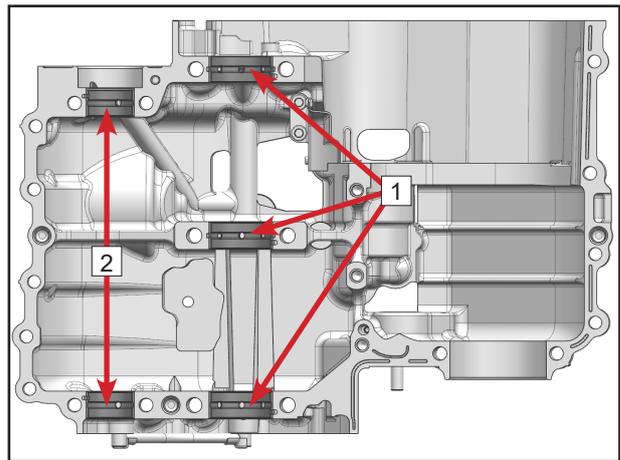
Remove balancer shaft plain bearing **2** from lower crankcase.

Clean plain bearing seat hole.

Select appropriate plain bearing.

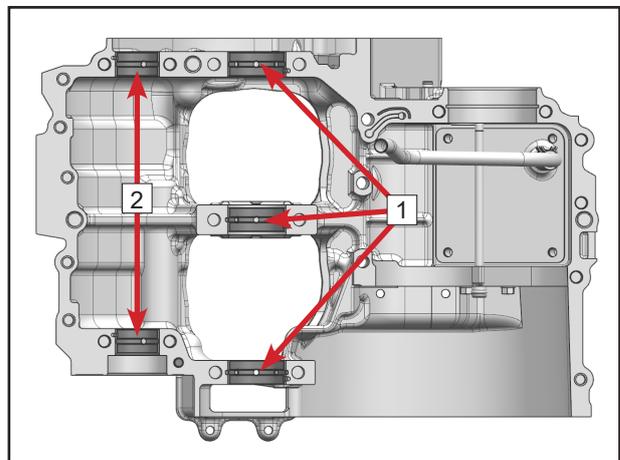
Install new crankshaft plain bearing **1** on lower crankcase.

Install new balancer shaft plain bearing **2** on lower crankcase.



Install new crankshaft plain bearing **1** on upper crankcase.

Install new balancer shaft plain bearing **2** on upper crankcase.



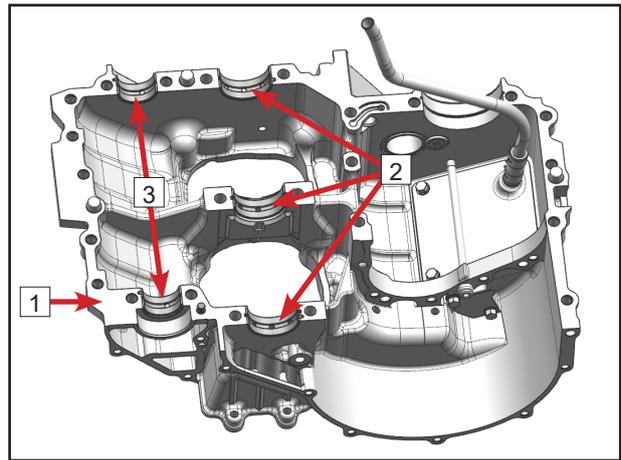
13.5.5 Upper Crankcase Operation

Remove any remnants of sealing compound and clean the upper crankcase thoroughly.

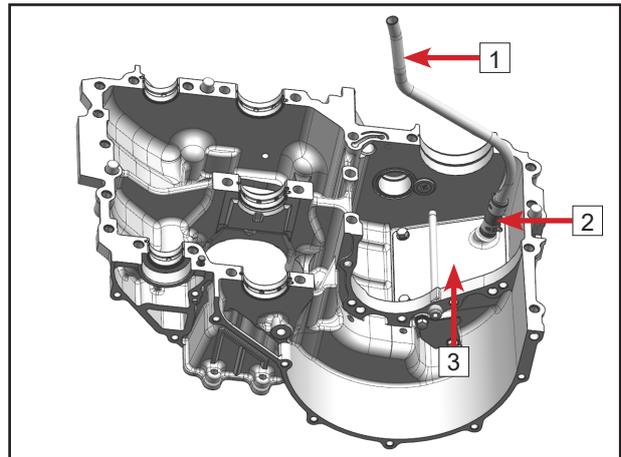
Inspect upper crankcase **1** for crack or other damage. Replace it if it does.

NOTE: Replace upper crankcase and lower crankcase in pairs.

Inspect crankshaft plain bearing **2**, balancer shaft plain bearing **3** for crack, scratch or over wear. Replace it if it does.

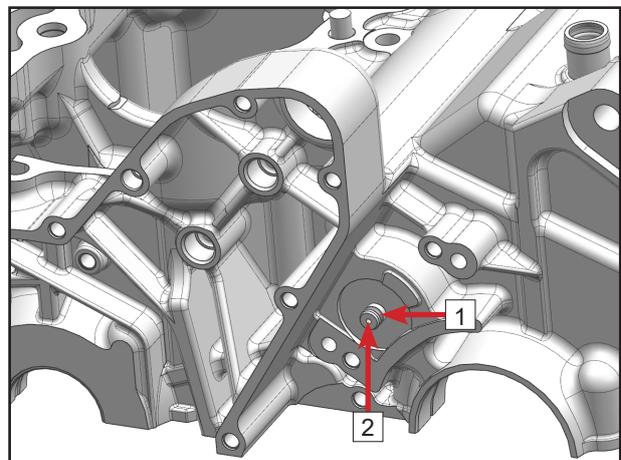


Inspect oil return hose **1**, breather connecting pipe **2**, breather assembly **3** for damage. Replace it if it does.



Inspect O-ring **1** for crack, harden or other damage. Replace it if it does.

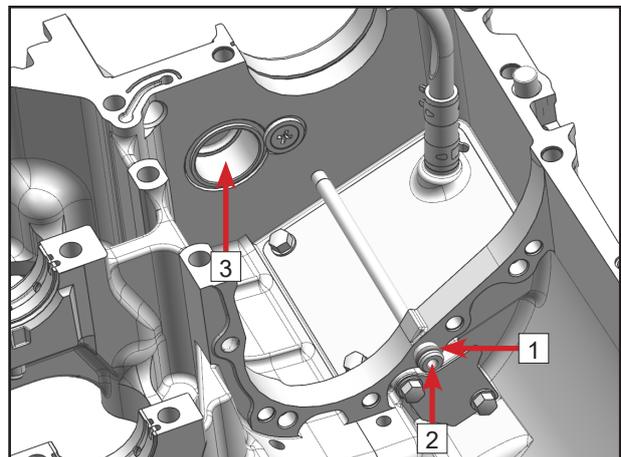
Clean the oil hole **2** with compressed air to ensure that the oil hole is smooth.



Inspect O-ring **1** for crack, harden or other damage. Replace it if it does.

Clean the oil hole **2** with compressed air to ensure that the oil hole is smooth.

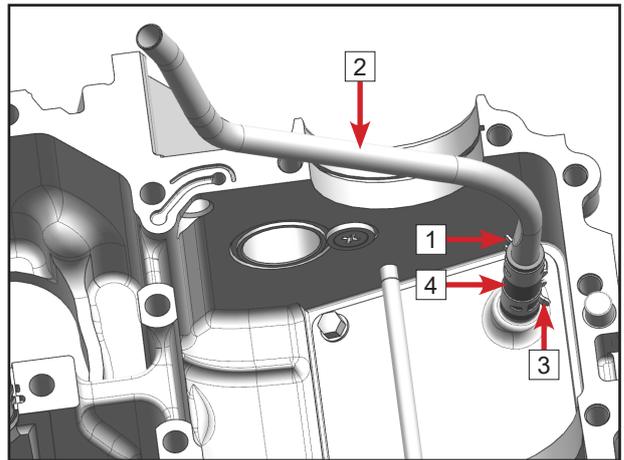
Inspect shaft sleeve **3** for over wear or other damage. Replace it if it does.



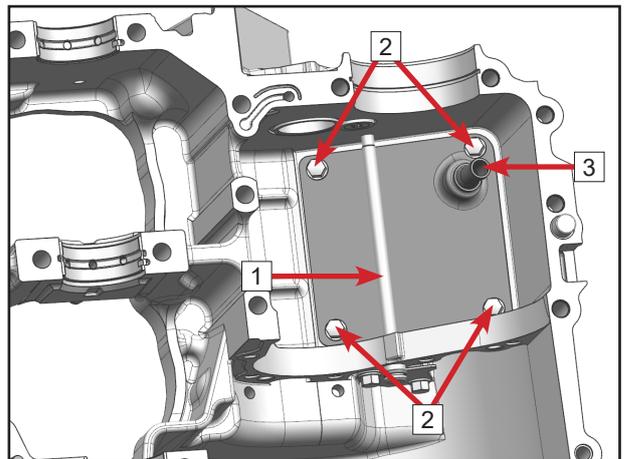
Breather Assembly

Removal

- Loosen steel band clamp **1**.
- Remove oil return hose **2**.
- Loosen steel band clamp **3**.
- Remove breather connecting pipe **4**.

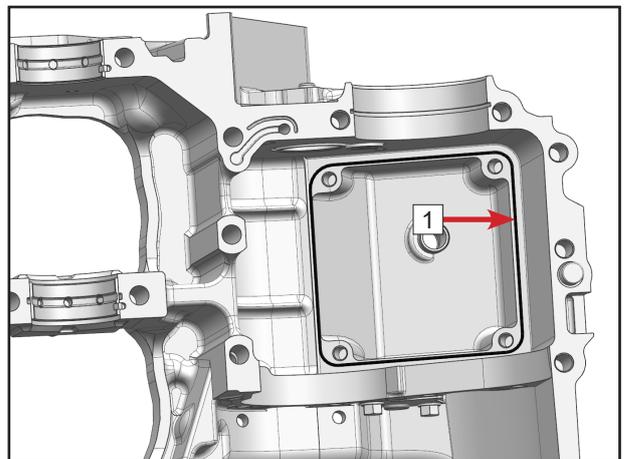


- Remove oil pipe 5 **1**.
- Remove bolt **2**.
- Remove breather assembly **3**.

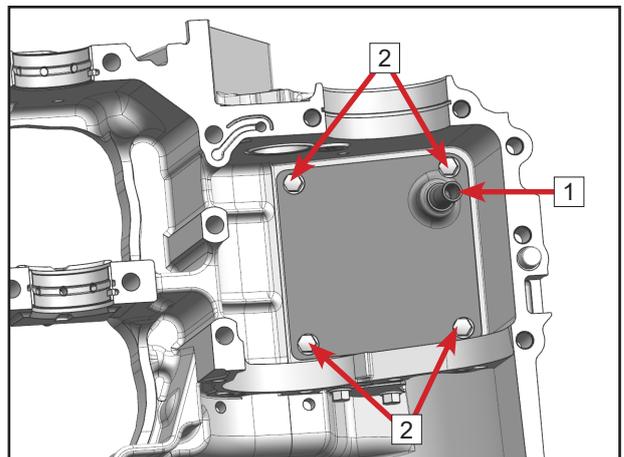


Installation

- Clean flange sealant remaining on the upper crankcase.
- Apply evenly and continuously 599 flange sealant along the track shown on the right picture **1**.

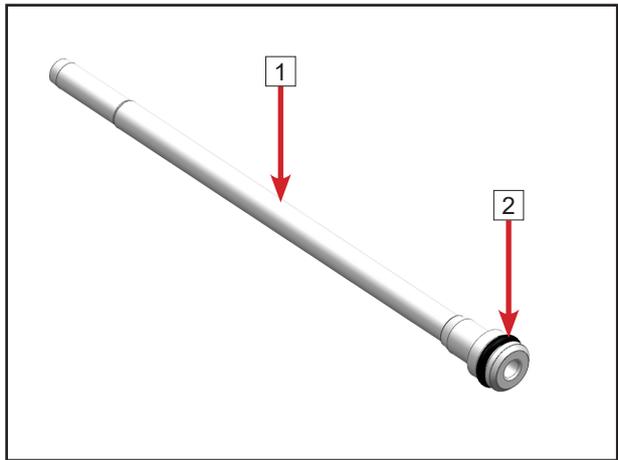


- Install breather assembly **1**.
- Install bolt **2** in criss-cross way to the specified torque.

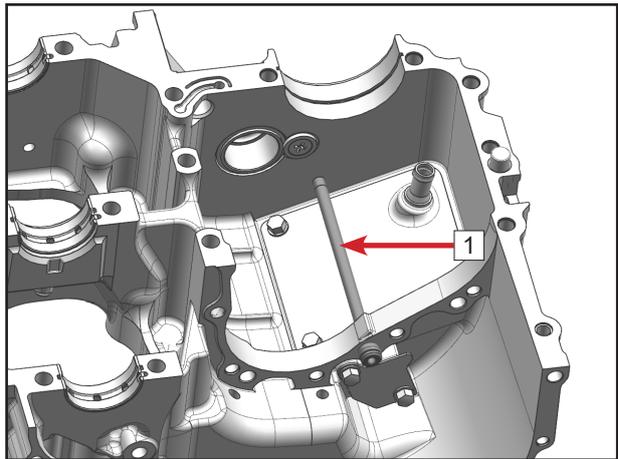


Breather Assembly Bolt Torque
10N•m

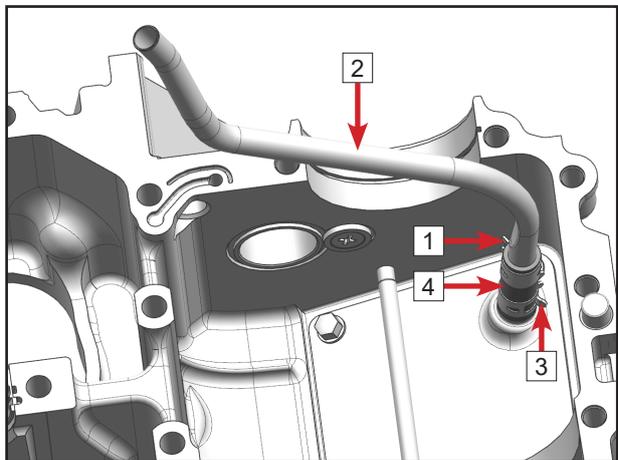
Ensure that O-ring **2** was installed on oil pipe **5** **1**.



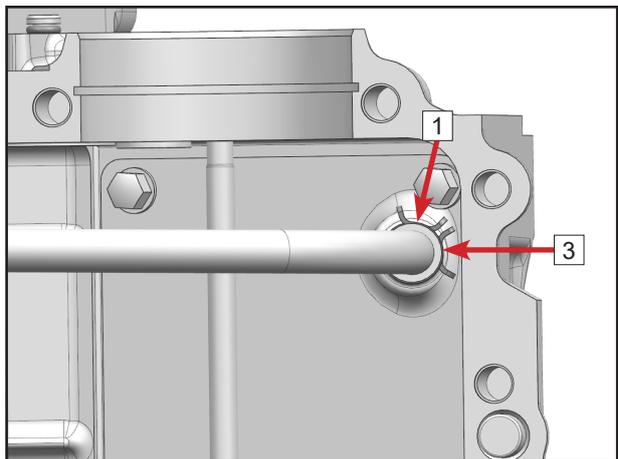
Install oil pipe **5** **1**.



Stick steel band clamp **1** and **3** onto breather connecting pipe **4**.
Install breather connecting pipe **4** on the pipe joint of breather assembly, and then chuck steel band clamp **3**.
Install oil return pipe **2** on the breather connecting pipe **4**, and then chuck steel band clamp **1**.



The direction of steel band clamp **1** and **3** is shown on the right picture.



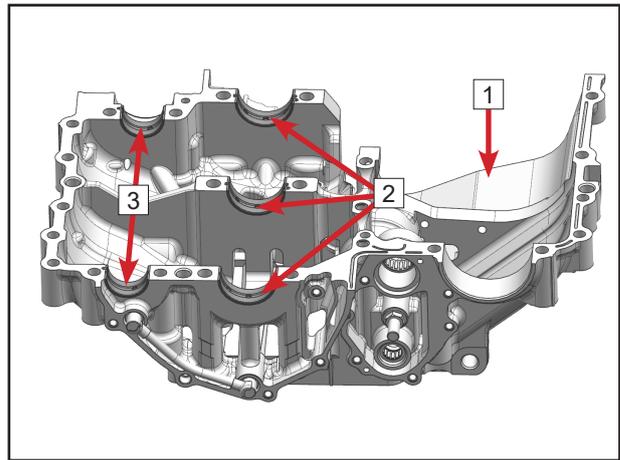
13.5.6 Lower Crankcase Operation

Remove any remnants of sealing compound and clean the lower crankcase thoroughly.

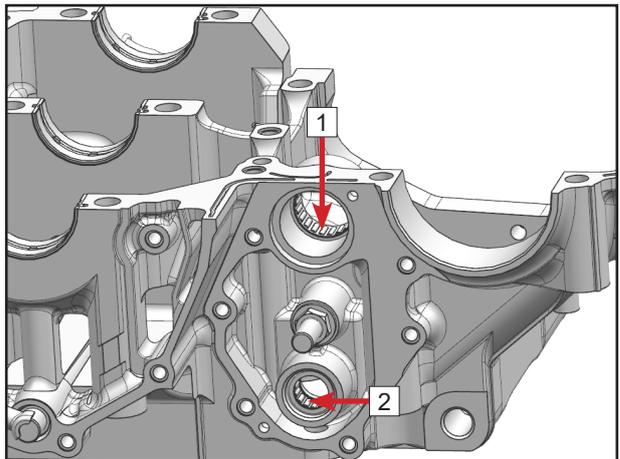
Inspect lower crankcase **1** for crack or other damage. Replace it if it does.

NOTE: Replace upper crankcase and lower crankcase in pairs.

Inspect crankshaft plain bearing **2**, balancer shaft plain bearing **3** for crack, scratch or over wear. Replace it if it does.

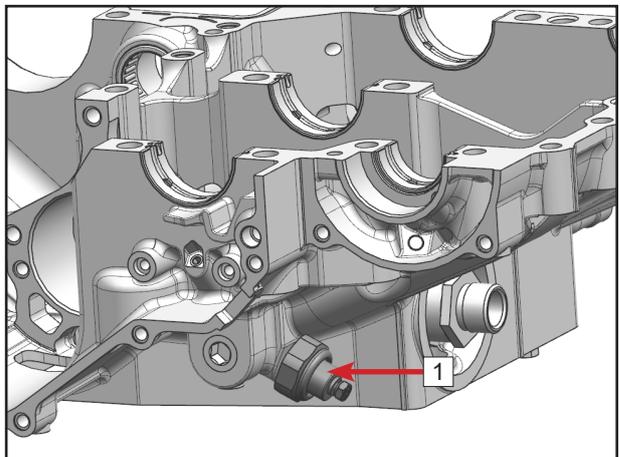


Inspect needle bearing **1** and **2** for over wear or damage. Replace it if it does.



When replacing oil pressure switch **1**, apply 567 thread sealant on the thread part of oil pressure switch.

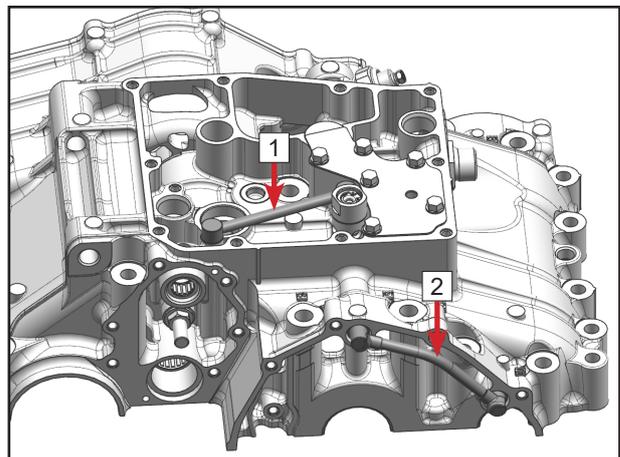
Oil Pressure Switch Torque
15N•m



Oil Pipe Removal

Remove oil pipe 3 **1**.

Remove oil pipe 2 **2**.

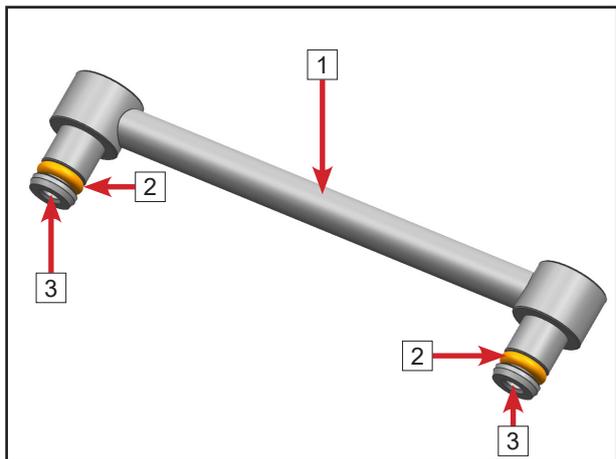


Inspection

Inspect oil pipe 3 **1** for damage. Replace it if it does.

Inspect O-ring **2** for crack, harden or other damage. Replace it if it does.

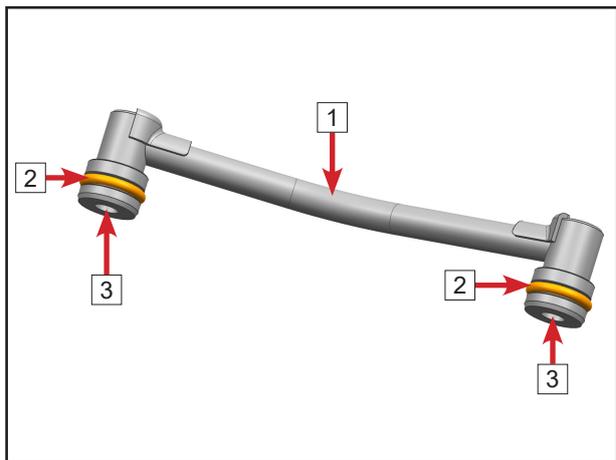
Clean the oil hole **3** with compressed air to ensure that the oil hole is smooth.



Inspect oil pipe 2 **1** for damage. Replace it if it does.

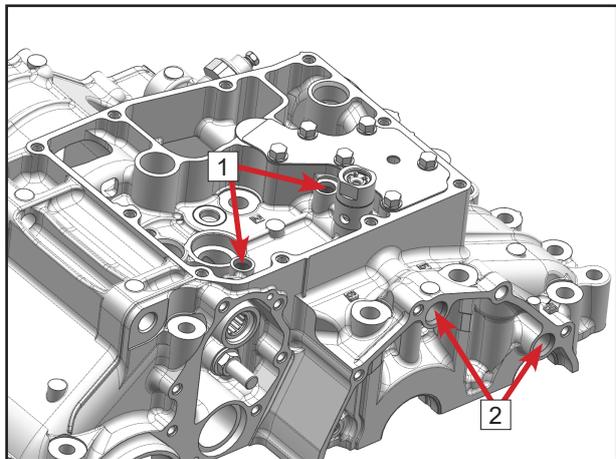
Inspect O-ring **2** for crack, harden or other damage. Replace it if it does.

Clean the oil hole **3** with compressed air to ensure that the oil hole is smooth.



Installation

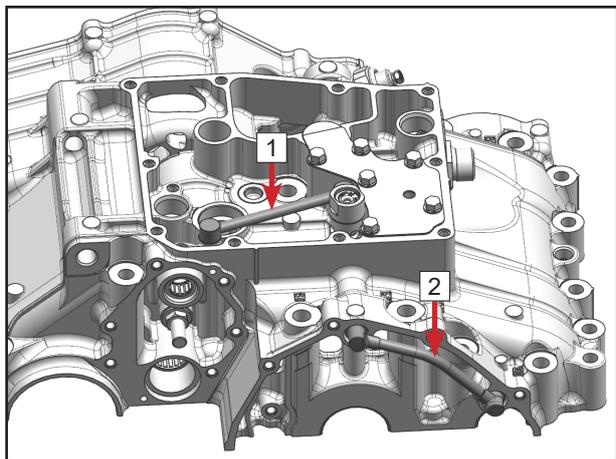
Apply oil on the hole **1** and **2**.



Ensure that O-ring was installed on oil pipe 3 and 2.

Install oil pipe 3 **1**.

Install oil pipe 2 **2**.



Oil Pressure Relief Valve

Removal

Remove oil pressure relief valve [1].

Disassembly

Remove circlip for hole [1].

Remove relief valve spring seat [2].

Remove relief valve spring [3].

Remove relief valve core [4].

Remove O-ring [6].

Inspection

Inspect relief valve core [4] for serious wear or damage. Replace it if it does.

Inspect relief valve body [5] for serious wear or damage. Replace it if it does.

Inspect relief valve spring seat [2] for serious wear or damage. Replace it if it does.

Inspect that the relief valve core can move smoothly in relief valve body. If relief valve core is stuck, replace relief valve core or relief valve body.

Inspect O-ring [6] for crack, harden or other damage. Replace it if it does.

Measure relief valve spring [3] free length. Replace spring if it is lower than limit value.

Relief Valve Spring Free Length	
Minimum spring length after use	23mm

Assembly

Apply oil on relief valve core [4] and relief valve spring [3].

Install relief valve core [4] on relief valve body [5].

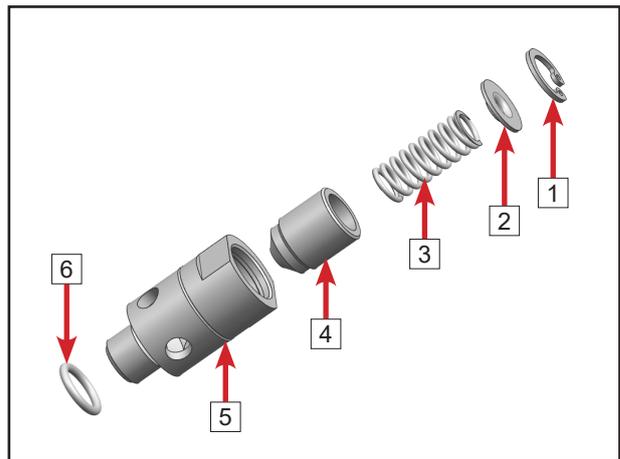
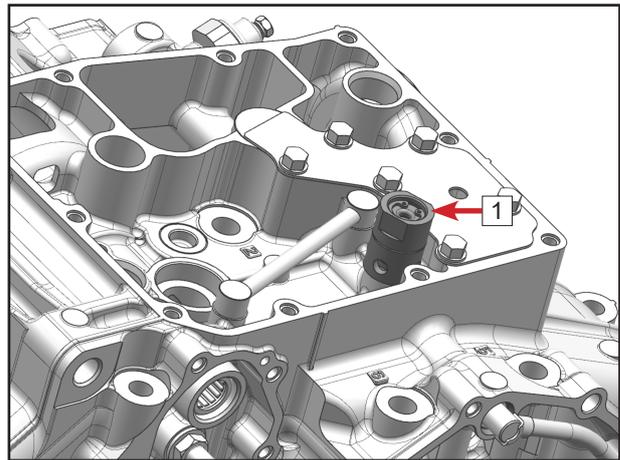
Install relief valve spring [3] on relief valve core [4].

Install relief valve spring seat [2].

Install circlip for hole [1].

NOTE: Do not use the removed circlip again. The side with round corner of circlip faces inside when installing. Make sure that it is fully assembled in place after installing circlip.

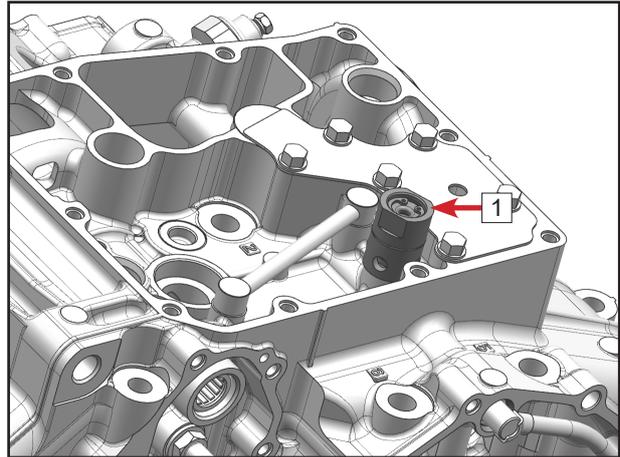
Install O-ring [6] on relief valve body [5].



Installation

Install oil pressure relief valve **1** and tighten to the specified torque.

Oil Pressure Relief Valve Torque
15N•m



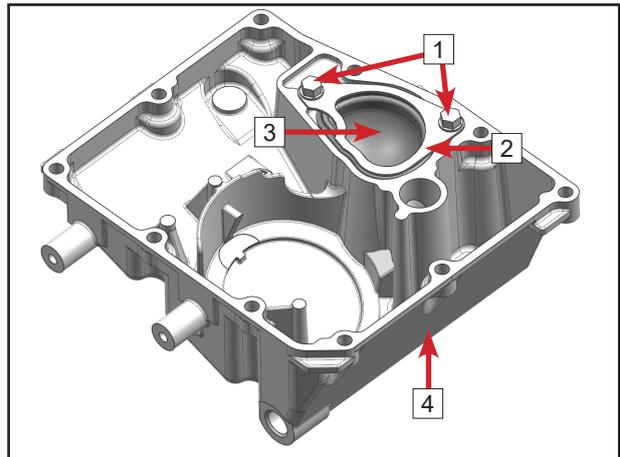
13.5.7 Oil Pan Operation

Disassembly

- Remove bolt **1**.
- Remove oil strainer holder **2**.
- Remove oil strainer **3**.

Inspection

- Inspect oil pan **4** for crack or other damage. Replace it if necessary.
- Inspect oil strainer **3** for crack or other damage. Replace it if necessary.
- Remove oil strainer holder **2** for damage. Replace it if necessary.



Assembly

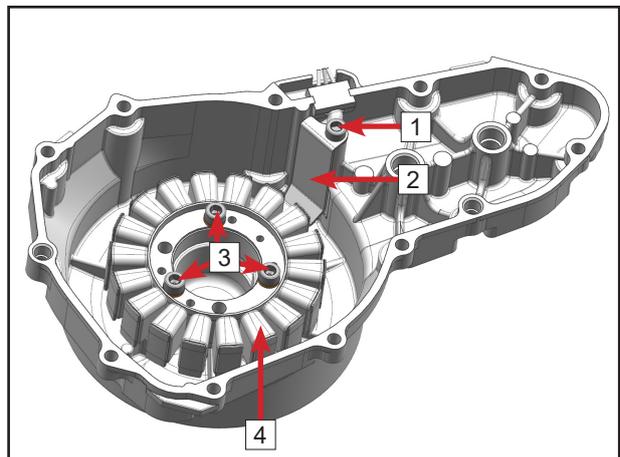
- Clean all parts.
- Install oil strainer **3**.
- Install oil strainer holder **2**.
- Apply 243 thread locker on bolt **1**.
- Install bolt **1** and tighten to the specified torque.

Oil Strainer Holder Bolt Torque
10N•m

13.5.8 LH Side Cover Operation

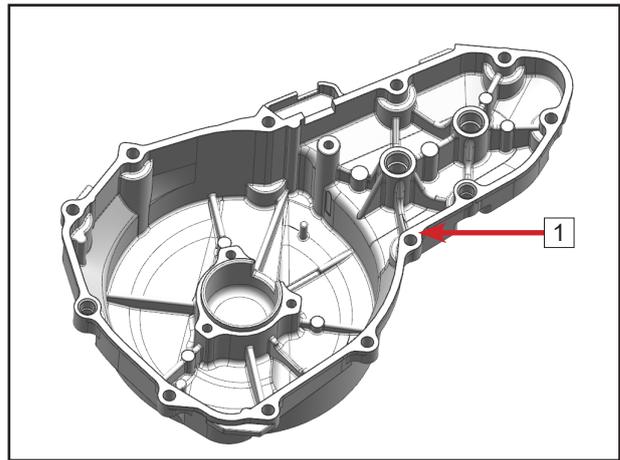
Disassembly

- Remove bolt **1**.
- Remove plate **2**.
- Remove screw and washer **3**.
- Remove magneto stator **4**.



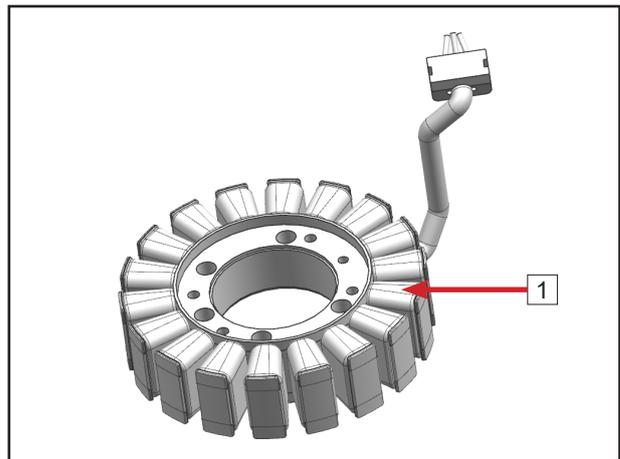
Inspection

Inspect LH side cover **1** for crack or other damage. Replace it if necessary.



Inspect magneto stator **1** for damage. Replace it if necessary.

Inspect metal coil for breakage, aging or other damage. Replace if necessary.



Assembly

Clean all parts.

Install magneto stator **4** on LH side cover **5**.

Apply 243 thread locker on screw **3**.

Install screw and washer **3** and tighten to the specified torque.

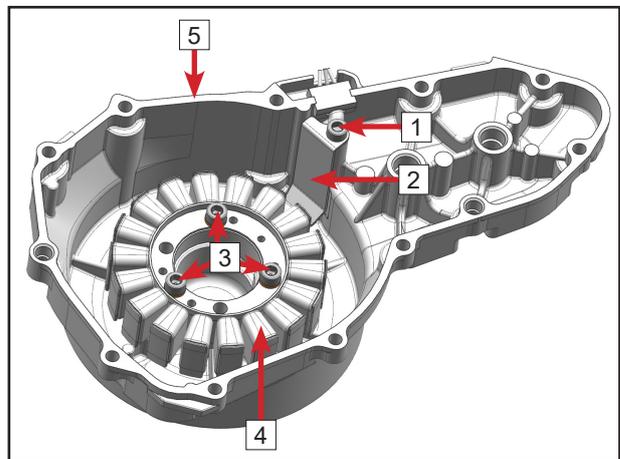
Magneto Stator Screw Torque
12N•m

Arrange the cables of magneto stator to the correct position, and install the plate **2** to fix the cables.

Apply 243 thread locker on screw **1**.

Install screw **1** and tighten to the specified torque.

Plate Screw Torque
12N•m

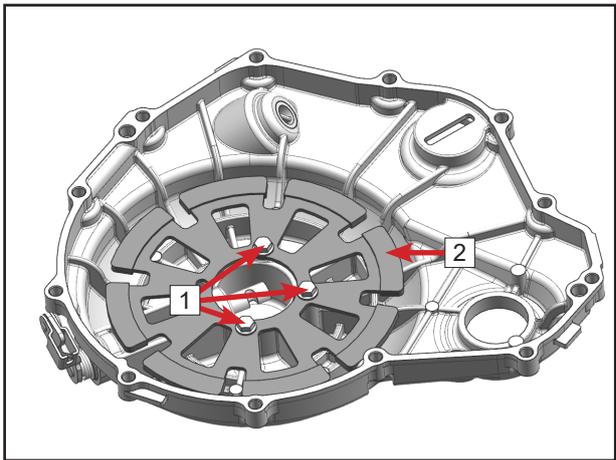


13.5.9 RH Side Cover Operation

Disassembly

Remove bolt **1**.

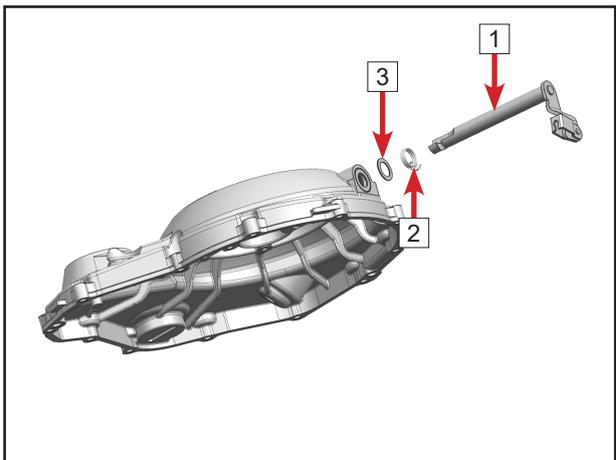
Remove rubber assembly **2**.



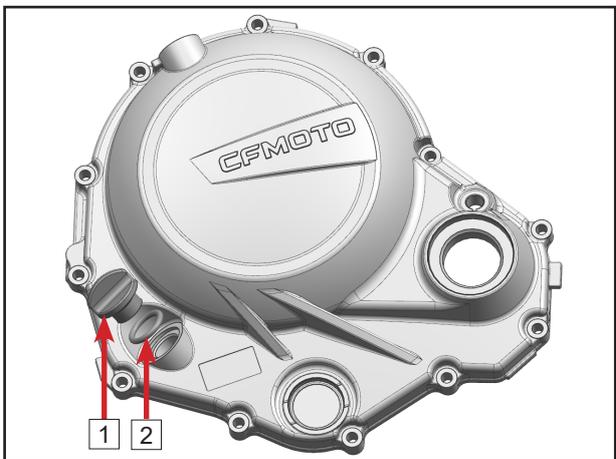
Remove clutch release shaft **1**.

Remove clutch control lever return spring **2**.

Remove washer **3**.



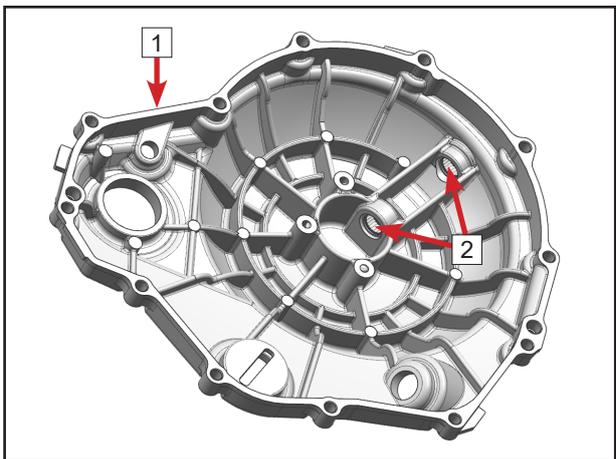
Remove oil filling plug **1** and O-ring **2**.



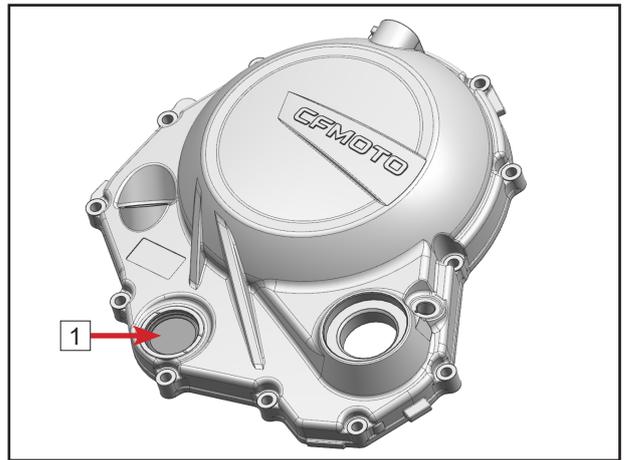
Inspection

Inspect RH side cover **1** for crack or other damage. Replace it if necessary.

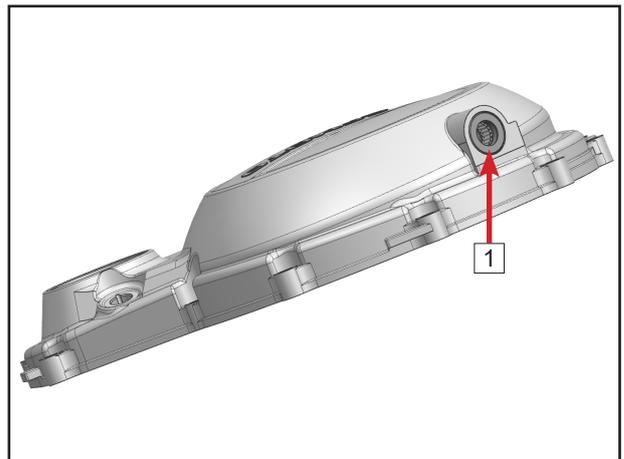
Inspect needle bearing **2** for serious wear or damage. Replace it if necessary.



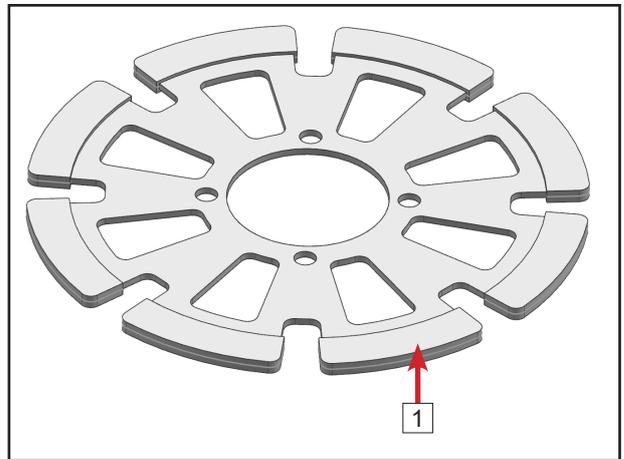
Inspect oil level viewer **1** for damage or leakage. Replace it if it does.



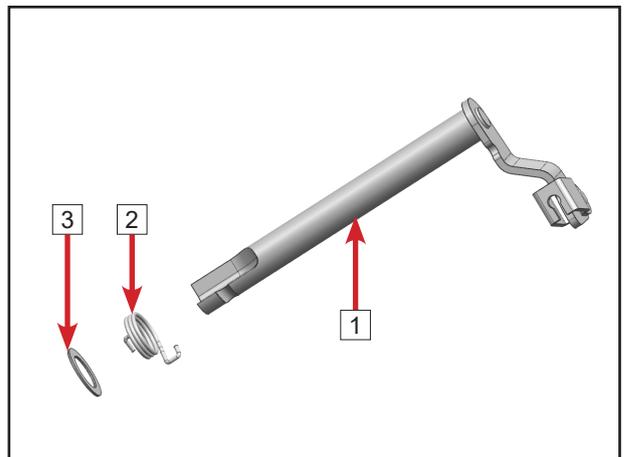
Inspect oil seal **1** for damage. Replace it if it does.



Inspect rubber assembly **1** for damage. Replace it if it does.

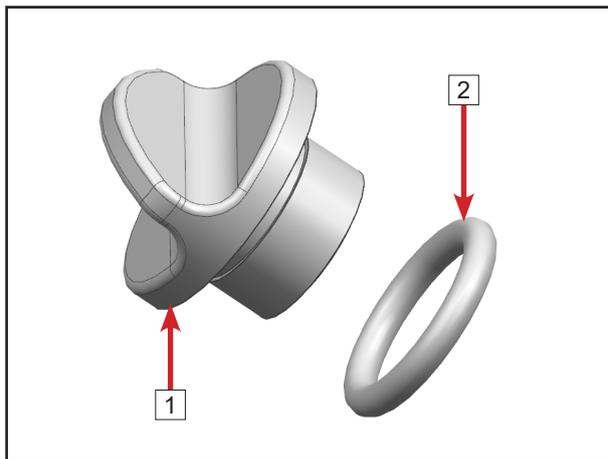


Inspect clutch release shaft **1** for serious wear or damage. Replace it if it does.
Inspect clutch control lever return spring **2** and washer **3**. Replace it if necessary.



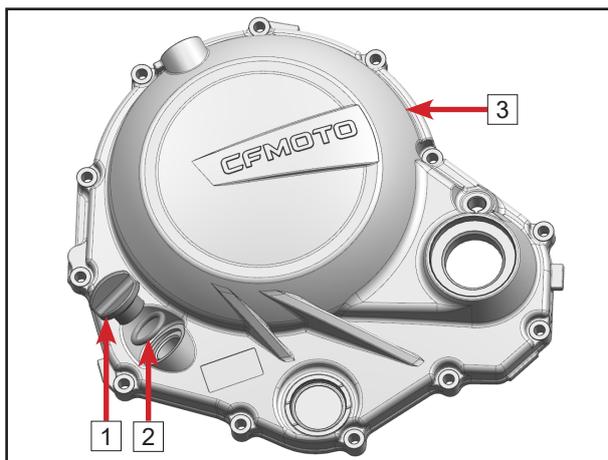
CFMOTO

Inspect oil filling plug **1** for damage.
Replace it if it does.
Inspect O-ring **2** for crack, harden or other damage.
Replace it if it does.

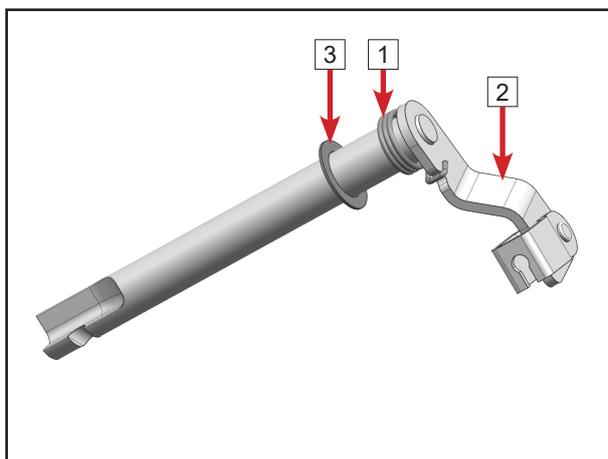


Assembly

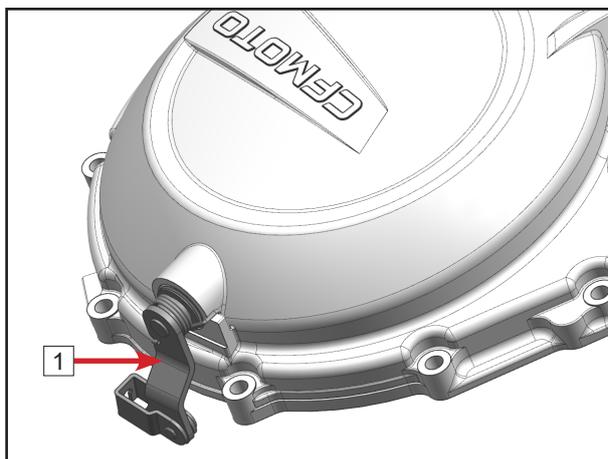
Apply oil on O-ring **2**.
Install O-ring **2** on oil filling plug **1**.
Install and tighten oil filling plug on RH side cover.



Install clutch control lever return spring **1** on clutch release shaft, and stick the end of spring onto the notch of clutch control arm **2**.
Install washer **3** on clutch release shaft.

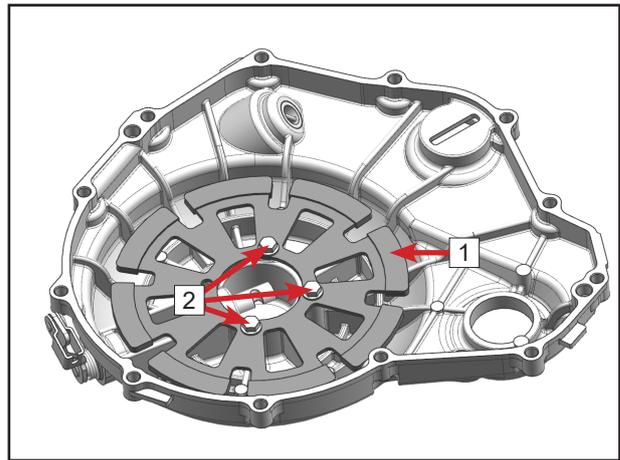


Install clutch release shaft **1** on RH side cover, and stick the other side of spring on RH side cover.



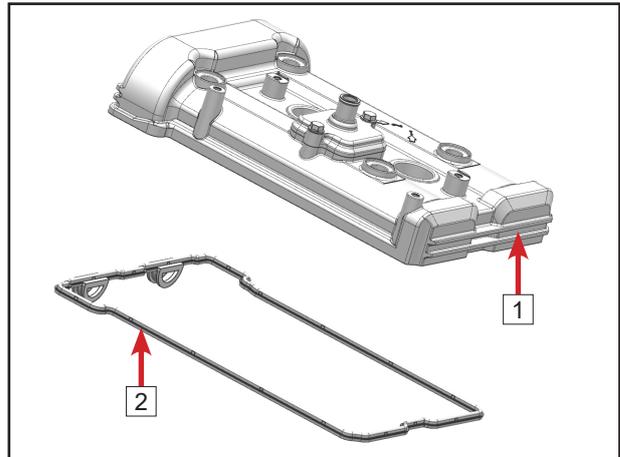
Install rubber assembly **1**.
Install bolt **2** and tighten to the specified torque.

Denoise Plate Bolt Torque
12N•m



13.5.10 Cylinder Head Cover Operation

Inspect cylinder head cover **1** for crack or other damage. Replace it if it does.
Inspect cylinder head cover seal ring **2** for crack, harden or other damage. Replace it if it does.



Tongue Valve Assembly

Removal

Remove bolt **1**.
Remove non-return valve cover **2**.
Remove tongue valve assembly **3**.

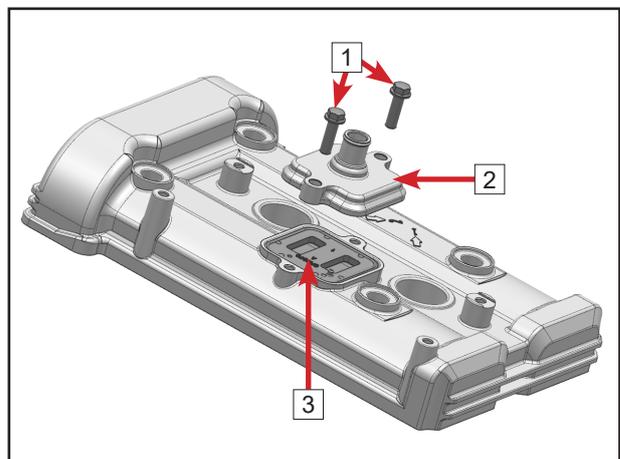
Inspection

Inspect non-return valve cover or tongue valve assembly for damage. Replace it if it does.

Installation

Install tongue valve assembly **3**.
Install non-return valve cover **2**.
Install bolt **1** and tighten to the specified torque.

Non-return Valve Cover Bolt Torque
10N•m

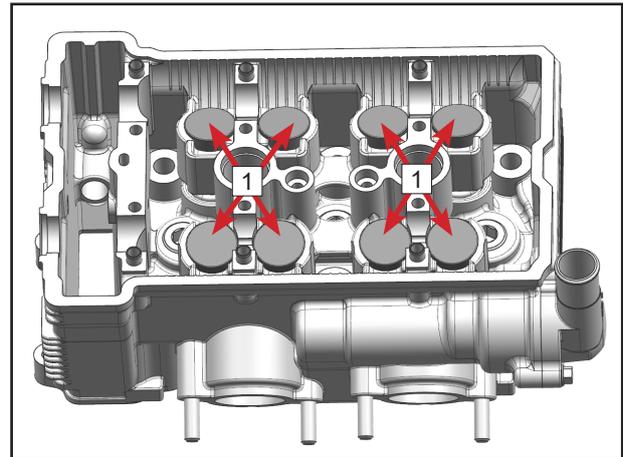


13.5.11 Cylinder Head Disassembly

NOTE: When removing the same multiple parts on the cylinder head, it is highly recommended to identify their location and classify them. If a part is found to be damaged, it is easier to find out what caused the damage from the relevant part. In addition, because the old parts are well run in the process of engine operation, if the original position is guaranteed during reinstallation, the original good fit can be guaranteed.

Remove valve tappet **1**.

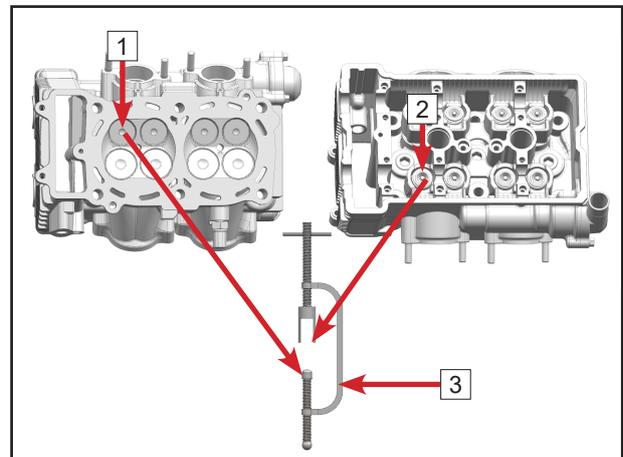
NOTE: Record the position of tappet in order to quickly install to the original position when reassembling.



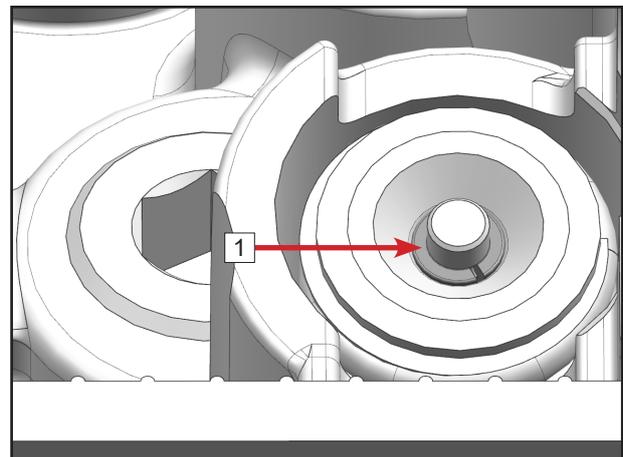
Install valve spring compressing clamp **3**. Hold the lower part of the valve spring compressing clamp against the valve disc **1**, and press the upper part against the valve spring upper seat **2**.

Rotate slowly the rod on the top of valve spring compressing clamp to compress valve spring until valve lock clip is fully exposed.

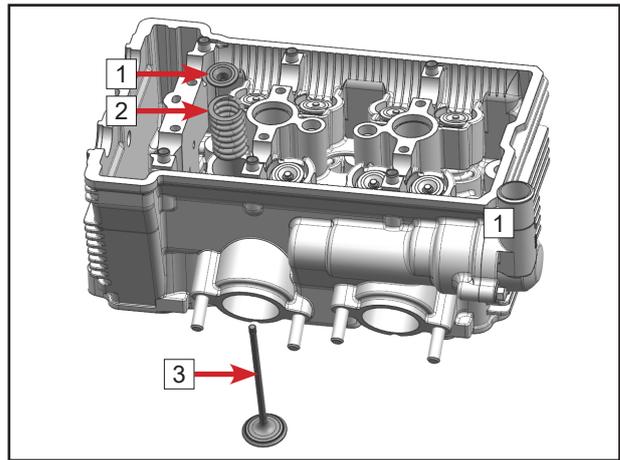
⚠ WARNING: Wear safety goggles when compressing valve spring. Non-standard operation may cause the valve spring to fly out and hurt people under the action of strong pre-pressure.



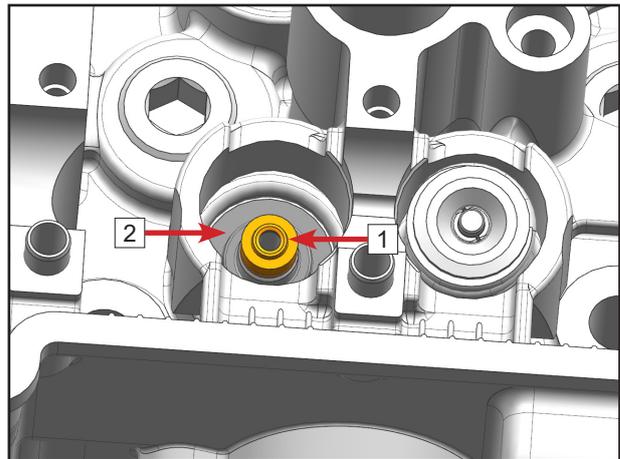
Remove valve lock clip **1**.



Loosen and remove valve spring compressing clamp.
 Remove valve spring upper seat [1].
 Remove valve spring [2].
 Remove valve [3].



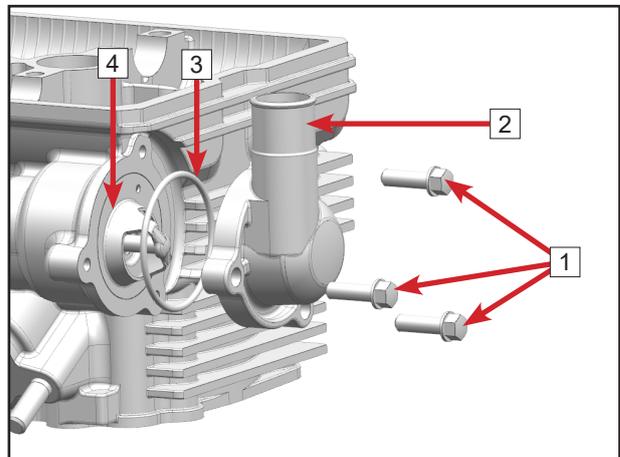
Remove and abandon valve stem seal ring [1].
 Remove valve spring lower seat [2].



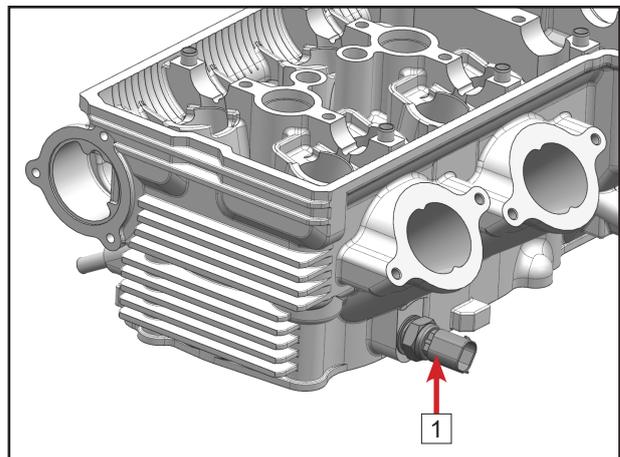
Remove other valve in the same way.

NOTE: Replace new valve stem seal ring when removing valve each time. The removed valves and related parts are marked according to their location and placed one by one so that they can be quickly installed to the original position when reassembled.

Remove bolt [1].
 Remove thermostat cap [2].
 Remove O-ring [3].
 Remove thermostat [4].
 Inspect O-ring [3] for crack, harden or damage. Replace it if it does.

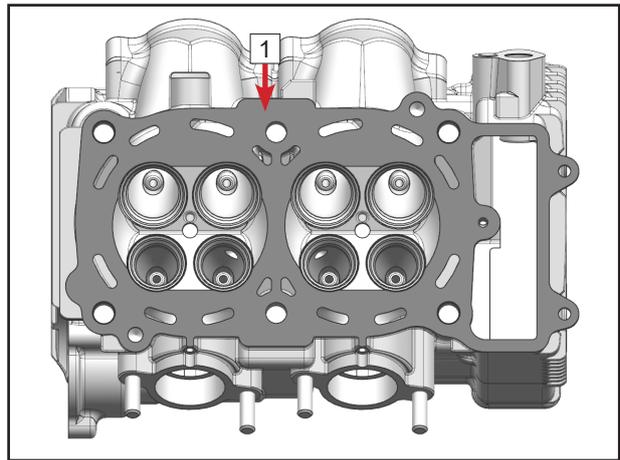


Remove water temperature sensor [1].



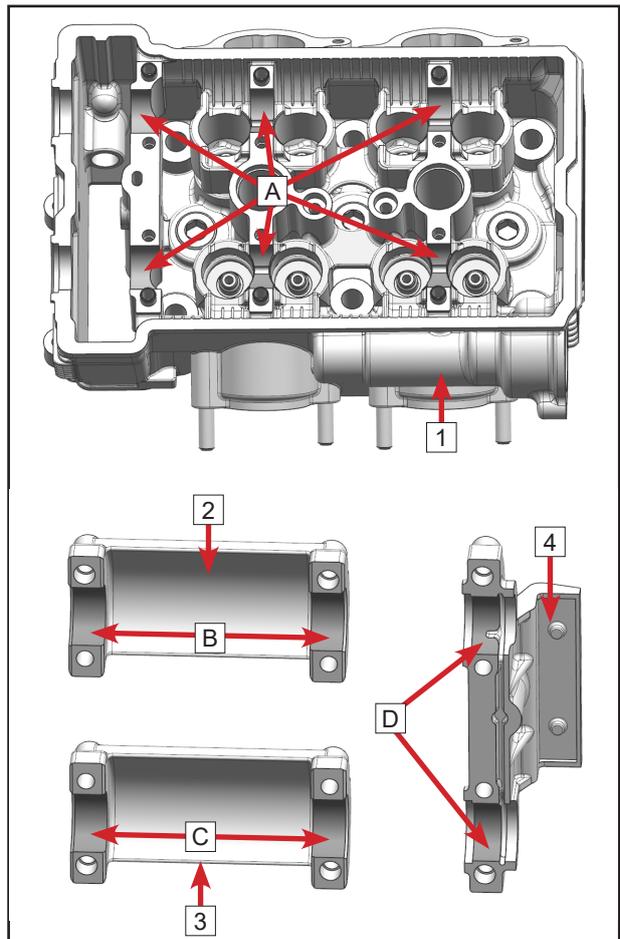
13.5.12 Cylinder Head Inspection Cylinder Head

Clean carbon deposits from the combustion area and junction surface **1**. Inspect cylinder head valve seats for cracks. Replace if cracks are found.



Inspect camshaft bearing hole **A**, **B**, **C** and **D** for serious wear or other damage. Replace it if it does.

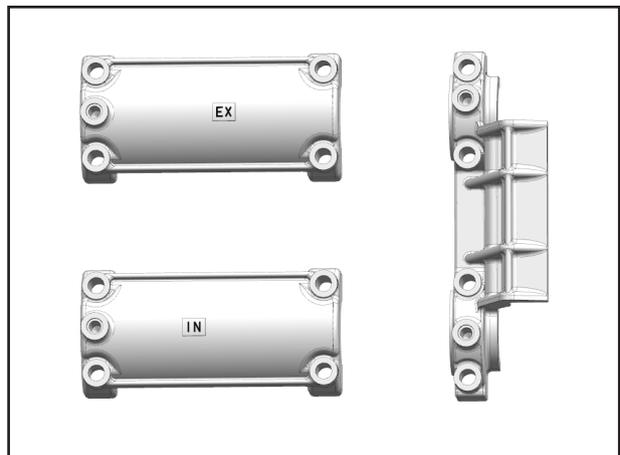
NOTE: Replace cylinder head **1, air intake camshaft seat **2**, exhaust camshaft seat **3** and camshaft position plate **4** at the same time.**



Camshaft Seat Distinguishing Mark

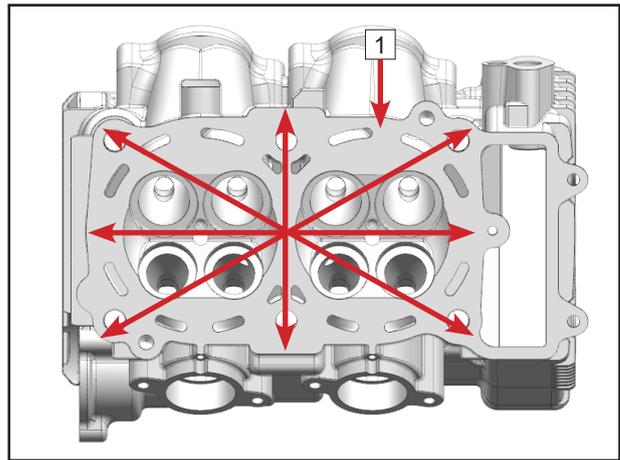
IN: Air intake camshaft seat

EX: Exhaust camshaft seat



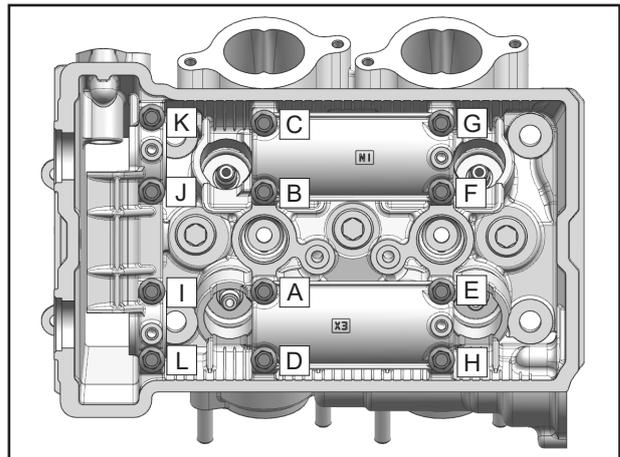
Inspect the planeness of the sealing surface 1 with the knife straight edge and feeler rule in the eight directions as shown. Replace the cylinder head if the measured value is greater than the service limit.

Cylinder head Planeness	
Service Limit	0.05mm



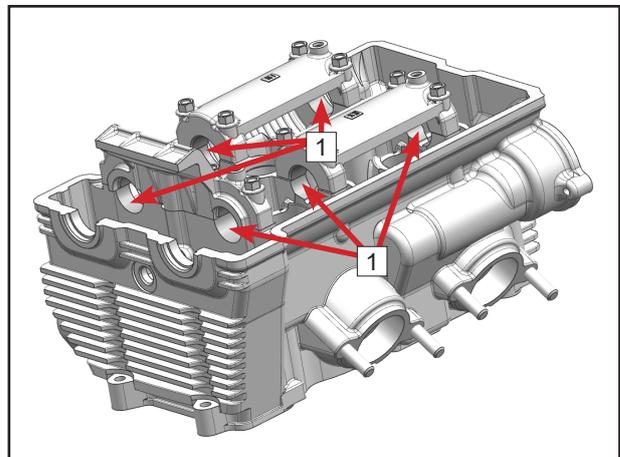
Clean cylinder head, camshaft seat and camshaft position press plate. Install camshaft seat and camshaft position press plate on the cylinder head. Install camshaft seat bolt and tighten it according to the sequence of A ~ L in three steps.

Camshaft Seat Bolt Torque	
Step 1	5N•m
Step 2	8N•m
Step 3	12N•m



Measure the diameter of camshaft bearing hole 1. Replace cylinder head, camshaft seat and camshaft position press plate at the same time if it exceeds the service limit.

Camshaft Bearing Hole Diameter	
New Parts	24 mm ~ 24.021 mm
Service Limit	24.05 mm



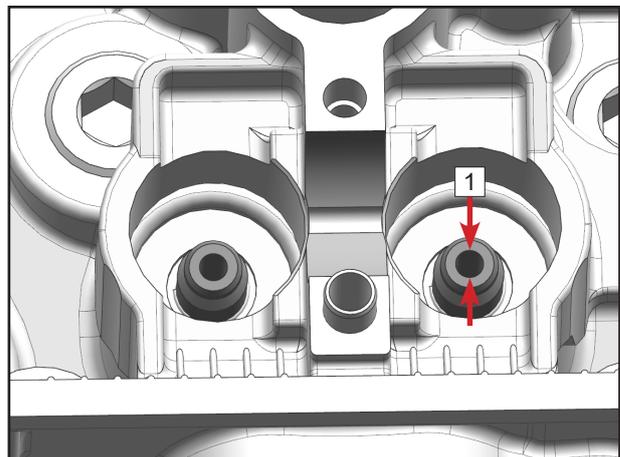
Inspect valve guide for serious wear or other damage. Replace cylinder head if it does.

Measure the inner diameter 1 of the valve guide in three places with an inner diameter gauge.

NOTE: Clean valve guides and remove carbon build-up before measurement.

Valve Guide Inner Diameter (IN&EX)	
New Parts	4.5 mm ~ 4.512 mm
Service Limit	4.54 mm

If the valve guide inner diameter is beyond the service limit, replace the cylinder head.



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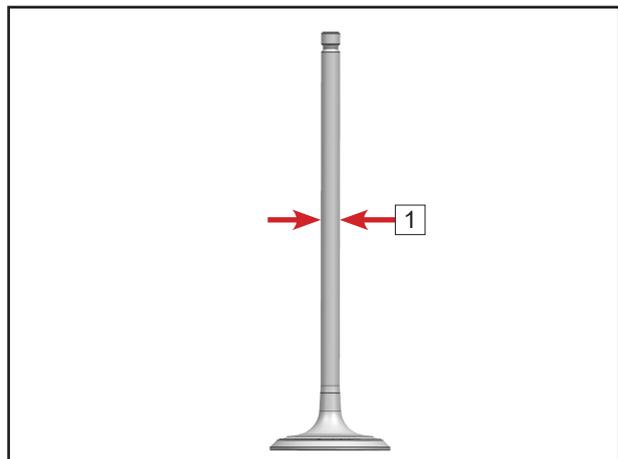
Valve

Measure valve stem for abnormal wear or bending. Replace if damaged.

Use a micrometer to measure valve stem diameter 1 at three locations.

Valve Stem Diameter (Intake Valve)	
New Parts	4.475 mm ~ 4.49 mm
Service Limit	4.465 mm

Valve Stem Diameter (Exhaust Valve)	
New Parts	4.455 mm ~ 4.47 mm
Service Limit	4.445 mm



If valve stem diameter is beyond the service limit, replace the valve.

Clearance Between Valve stem and Valve Guide

Inspect the clearance between valve stem and valve guide. Replace valve or cylinder head if it exceeds the service limit.

Clearance Between Valve Stem and Valve Guide		
New Parts	Intake valve	0.01 mm ~ 0.037 mm
	Exhaust valve	0.03 mm ~ 0.057 mm
Service Limit	Intake valve	0.08 mm
	Exhaust valve	0.1 mm

Valve Face and Valve Seat

NOTE: Clean valve faces and seats of carbon build-up before measurement.

Inspect valve and valve seat for evidence of being burnt or sunk. Replace the valves or cylinder head as necessary.

Apply grinding agent to the valve face, then insert it into the cylinder head and lap the valve in with a grinding tool.

NOTE: Make sure valve sealing is qualified. Apply identification agent to inspect valve contact area condition.

NOTE: The valve seat contact marking agent should appear at the center of the valve face.

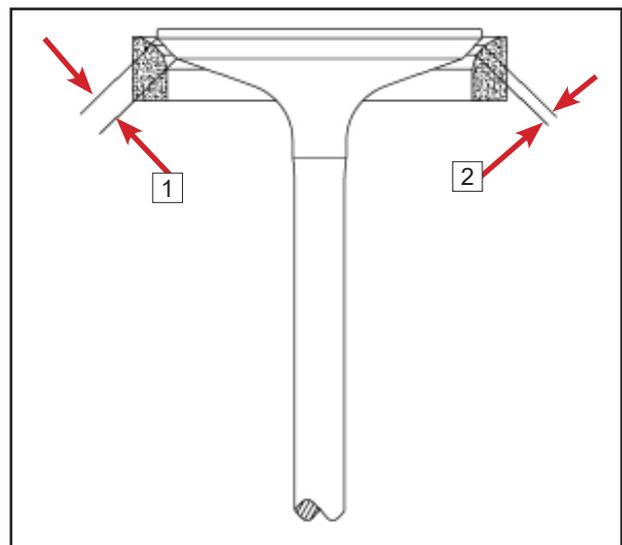
Grind the valve as necessary until the sealing between valve and seat is qualified.

Thoroughly clean the valve face and seat, then check the contact width.

NOTE: Any remaining grinding agent must be cleaned before measuring.

Measure valve seat contact width [2] with a calliper.

Valve Seat Contact Width		
New Parts	Intake valve	0.9 mm ~ 1.1 mm
	Exhaust valve	0.9 mm ~ 1.1 mm
Service Limit	Intake valve	1.4mm
	Exhaust valve	1.4mm

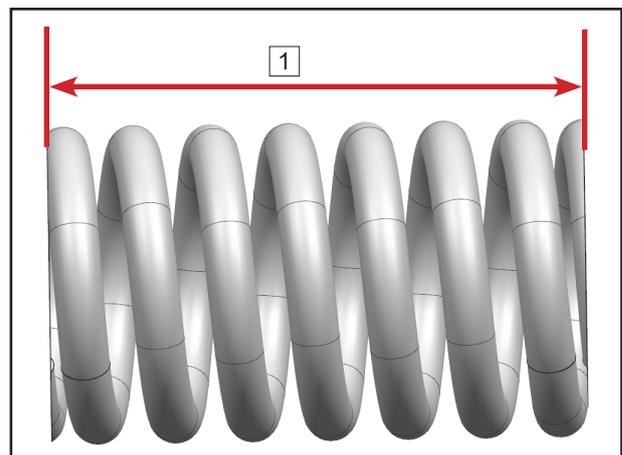


Valve Spring

Inspect valve spring for visible damage. Replace it if it does.

Inspect the free length [1] of valve spring. Replace valve spring if the measurement value is lower than service limit.

Free Length of Valve Spring	
New Parts	41.6 mm
Service Limit	39.8 mm



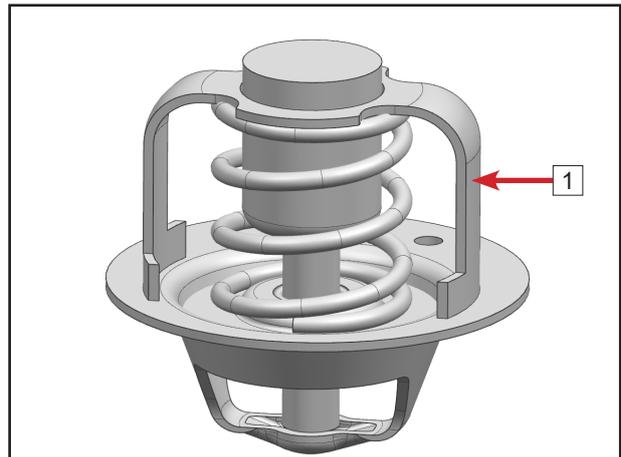
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Measure the elasticity of valve spring when compressed to a specified length. Replace the spring if the elasticity is not within the specified range.

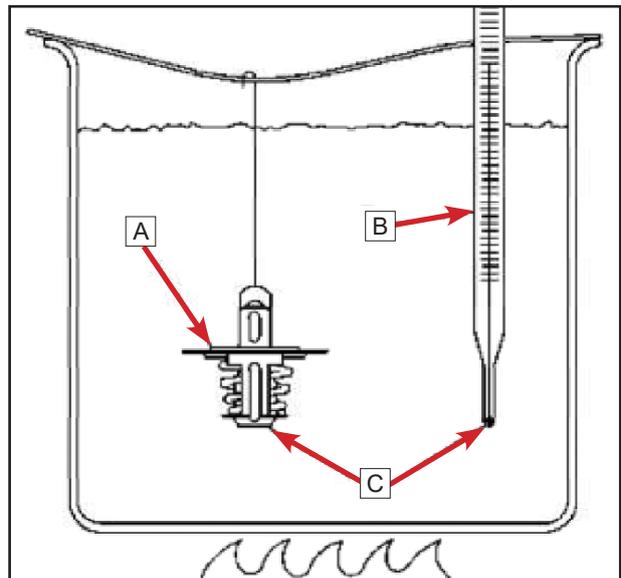
Valve Spring Elasticity	
Compress to 38.4mm	103N ~ 121N
Compress to 30.5mm	422N ~ 466N
Compress to 29.8mm	455N ~ 503N

Thermostat

Inspect the thermostat **1** at room temperature. Replace with a new thermostat if the valve is open.



For valve open temperature inspection, hang thermostat **A** in a container of water. The thermostat should be fully immersed without touching container wall or bottom. Hang a thermometer **B** at the same level without touching wall or bottom. The thermal position **C** must be equal. Heat the water slowly, making note of the temperature that the thermostat begins to open, and its full open temperature. Replace with a new thermostat if beyond the specification.



Thermostat Open Temperature	
Open	70°C ~ 74°C
Full Open	83°C ~ 87°C
	Full open range ≥ 8mm

13.5.13 Cylinder Head Assembly

Use cylinder head, camshaft seat and camshaft position plate together, and the codes on them should be consistent. When replacing any one of them, they should be replaced in sets.

Inspect the surface of cylinder head for obvious aluminum chips, bumps, scratches wounds, sand holes, etc.. Clean it up or replace it with a new one if found.

Use an air gun to blow air into the hole **1** to test whether the oil passage is smooth. Feel whether the air is out from the hole **2**, if not, replace the cylinder head.

The cylinder of the plug **1** is coated with 648 cylinder bonding sealant.

Use a small copper hammer to install the plug **1** on the cylinder head so that the exposed height is <2mm.

Apply 567 thread locker on the taper plug **1**.

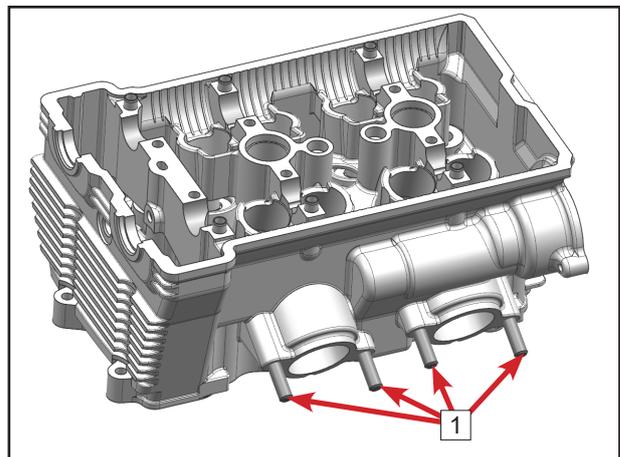
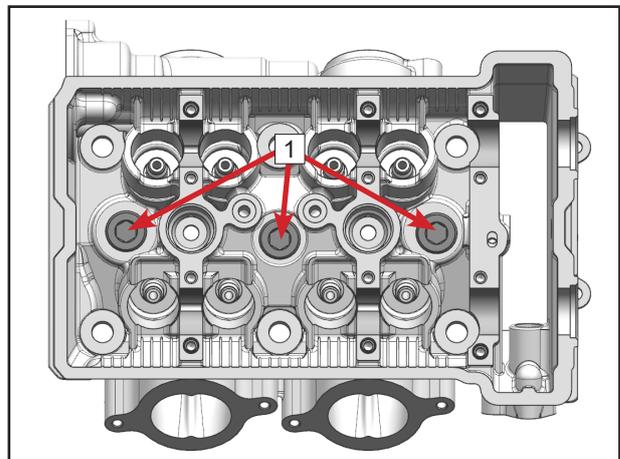
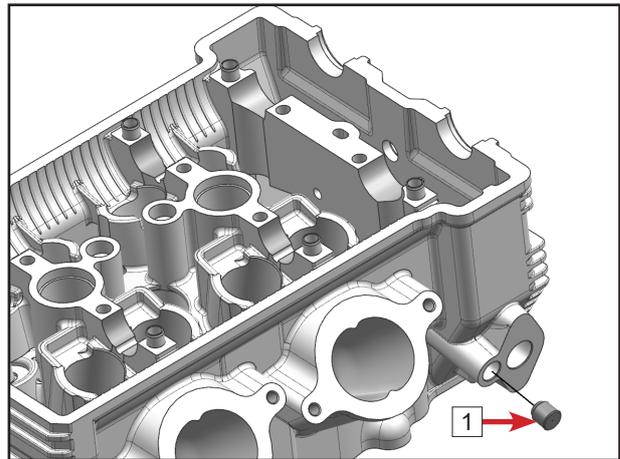
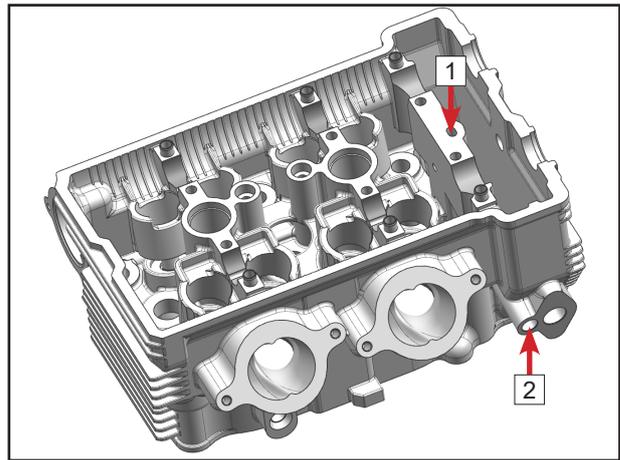
Install taper plug **1**, and tighten to the specified torque.

Cylinder Head Taper Plug Torque
54N•m

Apply 243 thread locker on the end of stud **1** with short screw .

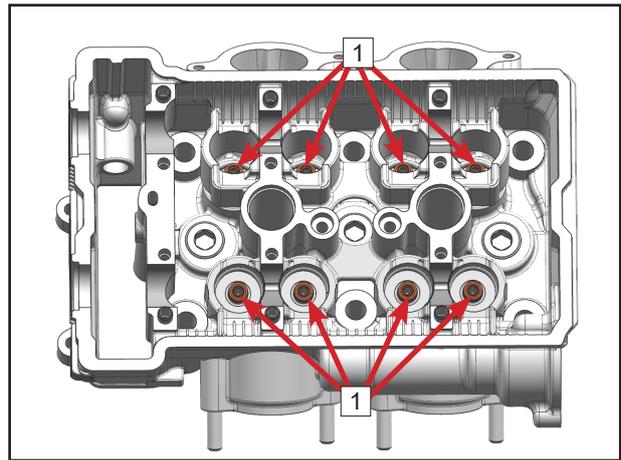
Install stud **1**, and tighten to the specified torque.

Cylinder Head Stud Torque
25N•m

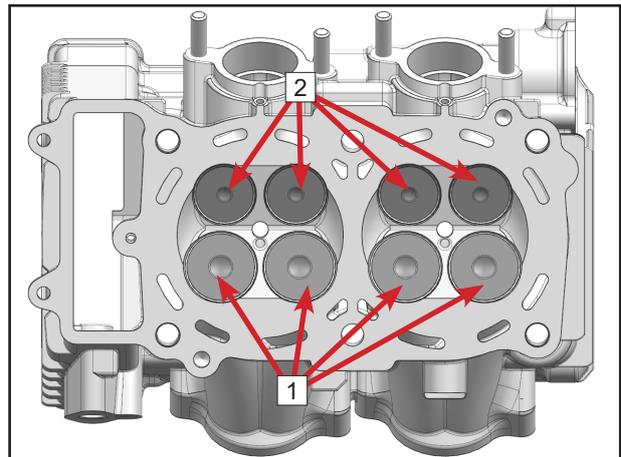


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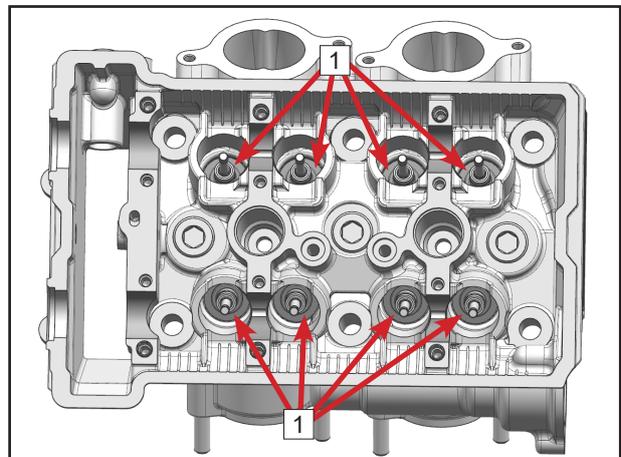
Apply oil on valve guide.
Install valve stem seal ring **1**.



Apply the mixture of oil and MoS₂ on the top of valve stem (weight ratio 10:1).
Install air intake valve **1** and exhaust valve **2**.



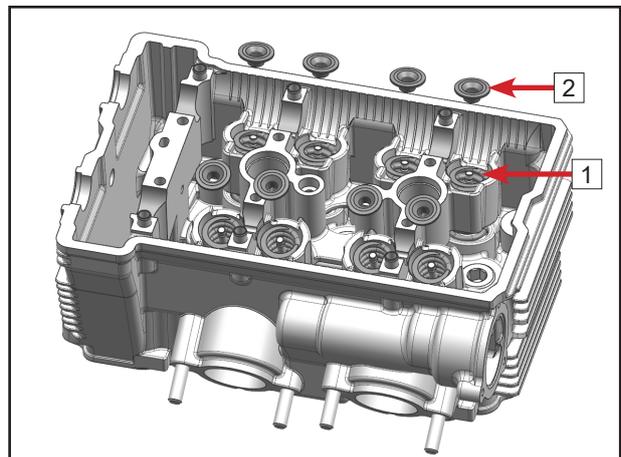
Install valve spring lower seat **1** (The big end faces down).



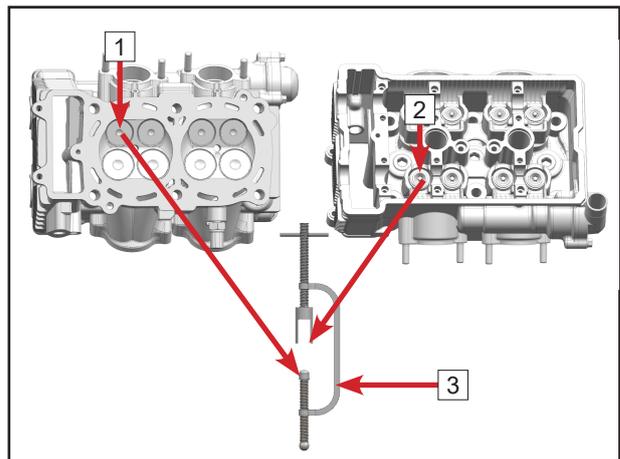
Install valve spring **1**.

NOTE: The painted end of valve spring faces up.

Install valve spring upper seat **2**.



Install valve spring compressing clamp.
 Hold the lower part of valve spring compressing clamp against the valve disc **1**, and press the upper part on the valve spring upper seat **2**.
 Rotate slowly the rod at the top of valve spring compressing clamp to compress the valve spring until the lock clip slot on the valve is completely exposed.



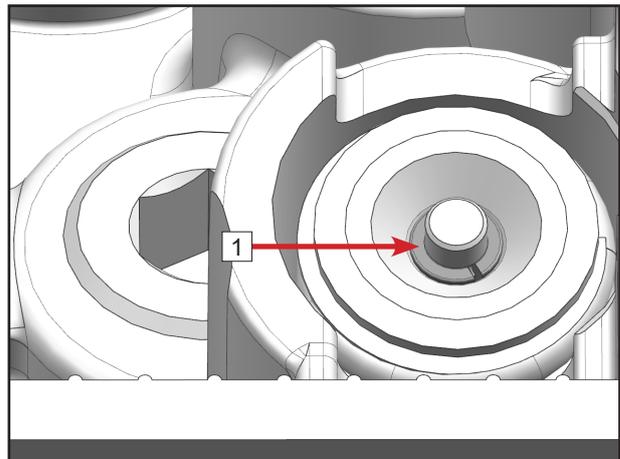
Install valve lock clip **1**, and slowly release valve spring compressing clamp.

NOTE: To make lock clip installation easier, coat the lock clips with grease. The lock clips must fit properly into the locking slot on the valve stem and stay in position.

Install the remaining valve components in the same method.

After installing the valve springs, tap the end of each valve stem a few times with a soft hammer to open and close the valve. This confirms that the valve springs are properly locked.

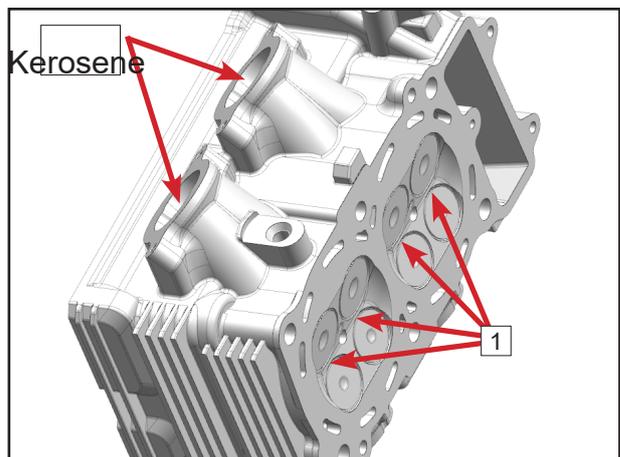
⚠️ WARNING: Improper installation of valve lock clips can damage the engine.



Inspect the sealing of cylinder head.

Oil Inspection

Clean the bottom part of cylinder head and valve disc with dust-free paper.
 Fill kerosene or other cleaning solvent into the inlet and exhaust passage.
 Inspect whether kerosene flows from valve seat ring **1** after standing for five minutes.



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Optical Inspection

Use optical inspection when there is no suitable cleaning solvent.

Align the bottom of cylinder head with light source.

Observe whether there is light **1** leaking from the valve seat ring at the inlet and exhaust passage.

If the cylinder head sealing does not pass the oil inspection or optical inspection, remove the valve and inspect the corresponding valve and valve seat surface. If there is no problem, clean the valve and valve seat and then reinstall. Replace new parts if still not passed the oil inspection or optical inspection.

Apply 569 thread locker on water temperature sensor.

Install water temperature sensor **1**, and tighten to the specified torque.

Water Temp. Sensor Torque
9N•m ~ 23N•m

NOTE: After tightening water temperature sensor, its plane **A should be basically parallel to the seal surface **B** of cylinder head. If the angle **A** and **B** is not appropriate, add washer for adjustment until it meets the requirements.**

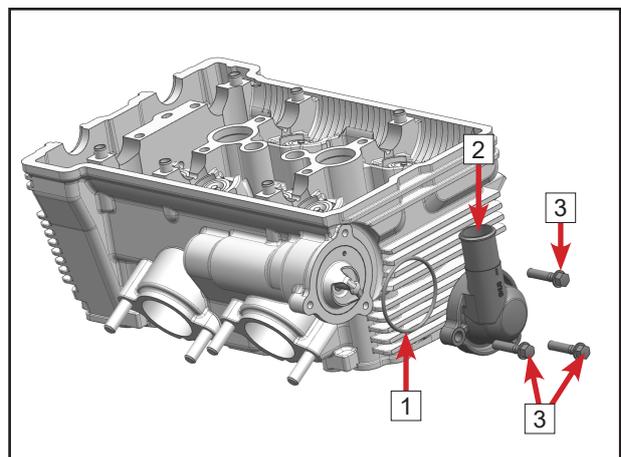
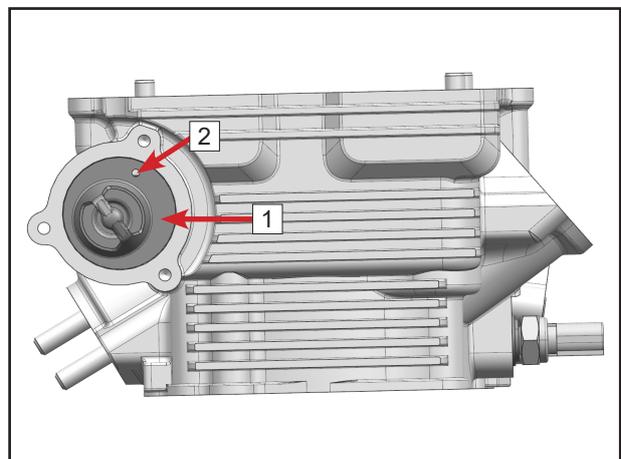
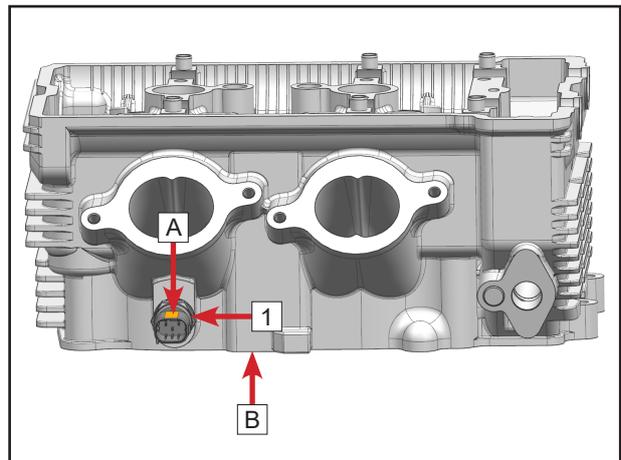
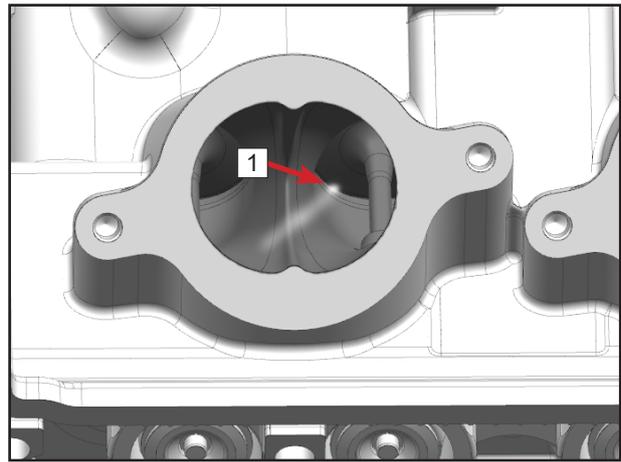
Install thermostat **1** (the hole **2** faces upside).

Install O-ring **1** on the thermostat cover **2**.

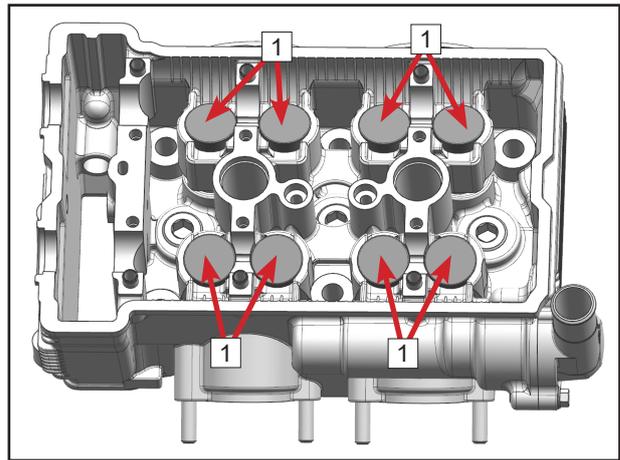
Install thermostat cover **2**.

Install bolts **3**, and tighten to the specified torque.

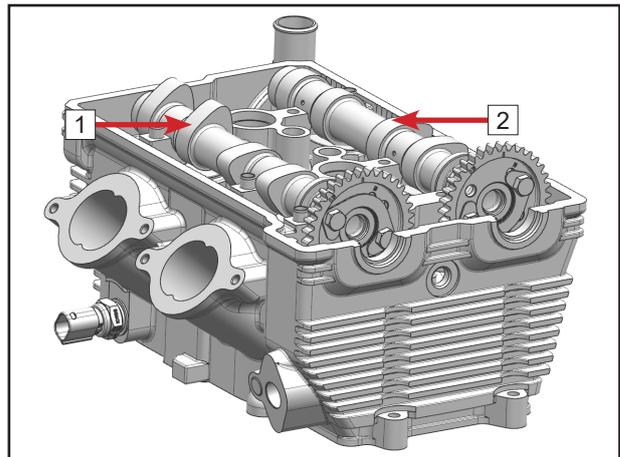
Thermostat Cover Bolt Torque
12N•m



Install the corresponding tappet **1** in each corresponding tappet hole.

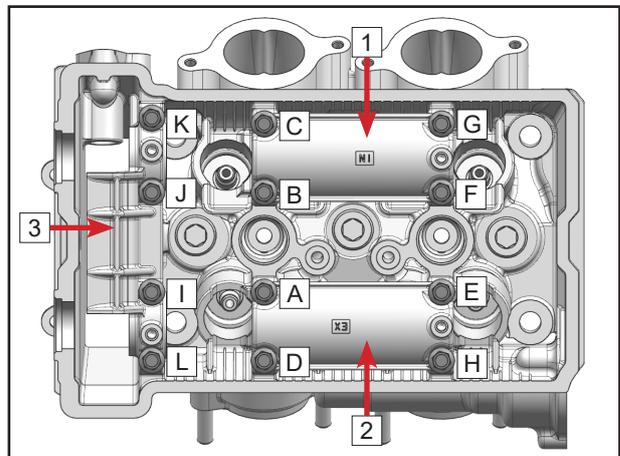


Pre-inspect and adjust valve clearance:
Install intake camshaft **1** and exhaust camshaft **2**.



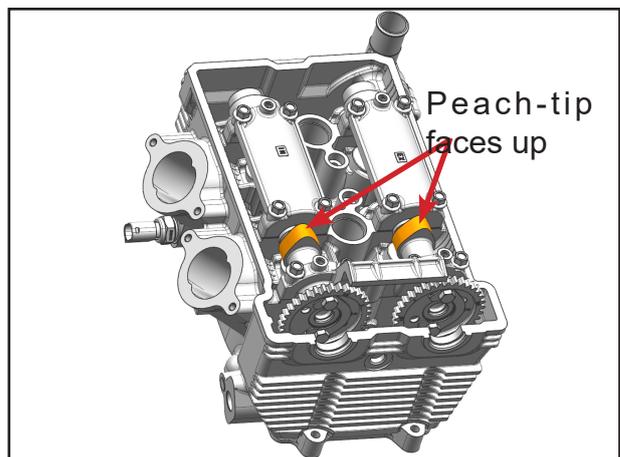
Install air intake camshaft seat **1**, exhaust camshaft seat **2** and camshaft position plate **3**.
Install camshaft seat bolt, and tighten according to the sequence of **A~L** in three steps.

Camshaft Seat Bolt Torque	
Step 1	5N•m
Step 2	8N•m
Step 3	12N•m



Turn the camshaft to make the peach-tip of each CAM face up, and measure the clearance between the cylinder surface of CAM and the tappet with a feeler. If it does not meet the requirements, replace the tappet with the appropriate thickness and measure again until it meets the requirements.

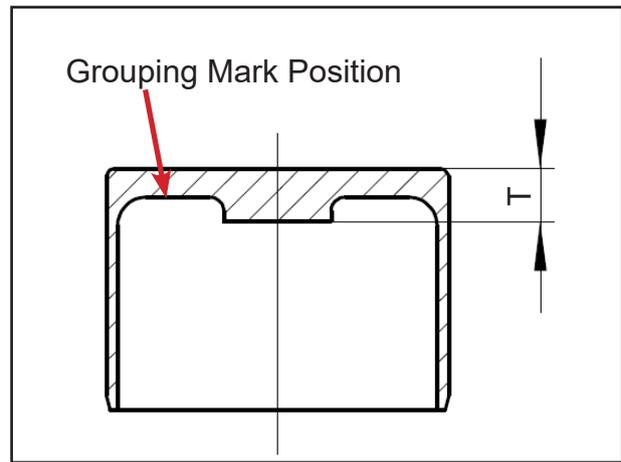
Valve Clearance (Cold Engine)	
Intake Valve	0.09 mm ~ 0.12 mm
Exhaust Valve	0.23 mm ~ 0.27 mm



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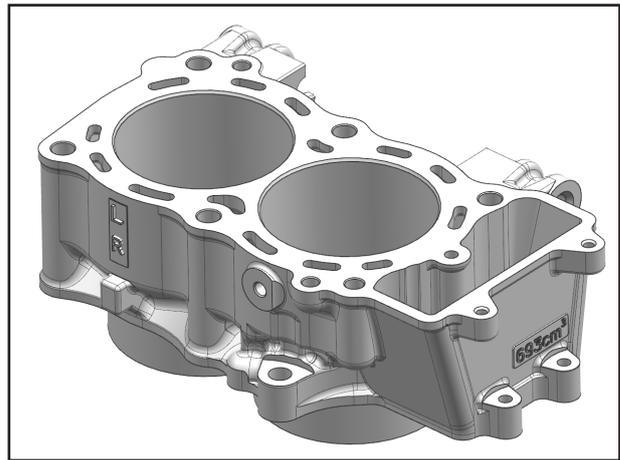
Valve tappets are grouped according to thickness T as follows:

Valve Tappets T Size Grouping			
Mark	T(mm)	Mark	T(mm)
320	3.20	376	3.76
322	3.22	378	3.78
324	3.24	380	3.80
326	3.26	382	3.82
328	3.28	384	3.84
330	3.30	386	3.86
332	3.32	388	3.88
334	3.34	390	3.90
336	3.36	392	3.92
338	3.38	394	3.94
340	3.40	396	3.96
342	3.42	398	3.98
344	3.44	400	4.00
346	3.46	402	4.02
348	3.48	404	4.04
350	3.50	406	4.06
352	3.52	408	4.08
354	3.54	410	4.10
356	3.56	412	4.12
358	3.58	414	4.14
360	3.60	416	4.16
362	3.62	418	4.18
364	3.64	420	4.20
366	3.66	422	4.22
368	3.68	424	4.24
370	3.70	426	4.26
372	3.72	428	4.28
374	3.74		



13.5.14 Cylinder Body Inspection/ Measurement

Check the cylinder for cracks, strains, or wear steps at the upper and lower ends. Replace as necessary.



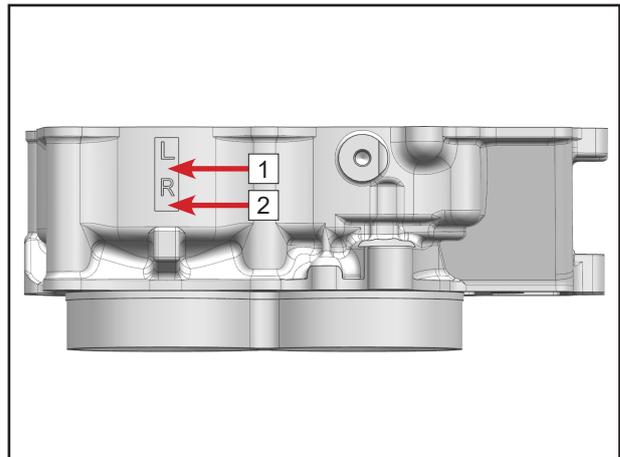
Cylinder Body Inner Diameter

The inner diameter of cylinder block is grouped according to the following table, and the position of grouping mark shows on the right.

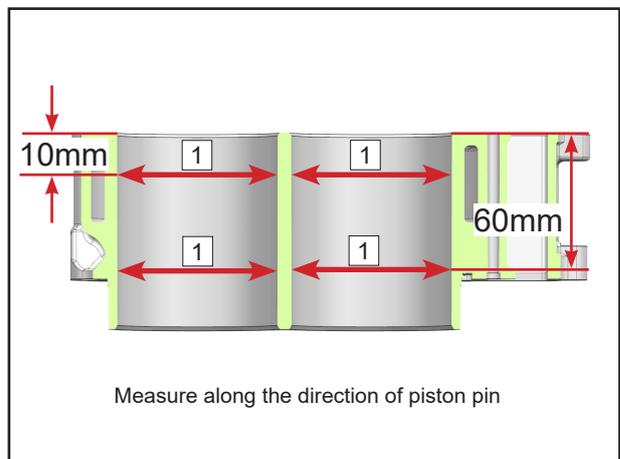
1: cylinder 1 grouping mark position

2: cylinder 2 grouping mark position

Cylinder Body (New Parts)	
Mark	Cylinder Body Inner Diameter
I	83.008 mm ~ 83.015 mm
II	83.016 mm ~ 83.023 mm



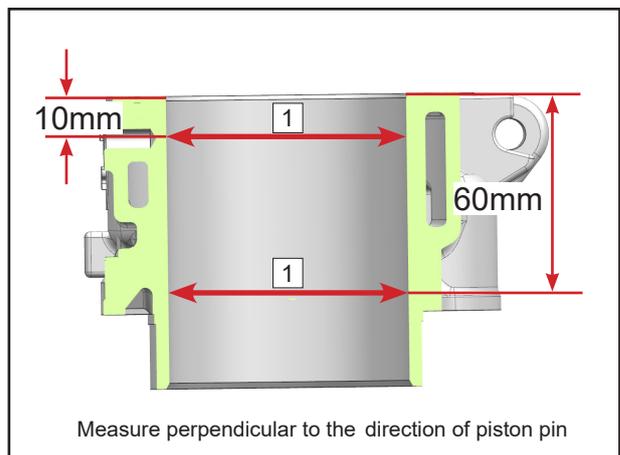
Due to the different wear degree of the cylinder body in different directions, measure the inner diameter 1 of two cylinders along the direction of the piston pin and perpendicular to the direction of piston pin at the position shown on the right, 10mm and 60mm away from the upper plane of cylinder body.



Replace cylinder body if the diameter 1 of any cylinder body exceeds service limit.

Cylinder Body Inner Diameter 1	
Service Limit	83.07 mm

NOTE: Replace new piston ring when replacing cylinder body.



Cylinder Body Planeness

Inspect the planeness of sealing surface with knife straight edge and feeler rule in the eight directions shown. Replace cylinder body if the measurement value is larger than service limit.

Cylinder Body Planeness	
Service Limit	0.05 mm

13.5.15 Piston Inspection/Measurement Piston Inspection

Inspect piston for scratches, cracks or other damage. Replace piston and piston ring if it does.

Measure the skirt diameter [1] of piston at 10.5mm from the bottom of the piston and perpendicular to the direction of pin hole. Replace piston if it is less than service limit.

Piston Skirt Section Diameter	
New Part	82.970 mm ~ 82.985 mm
Service Limit	82.920 mm

Piston/Cylinder Body Clearance

Piston/cylinder body clearance: The difference between cylinder body inner diameter and piston skirt diameter.

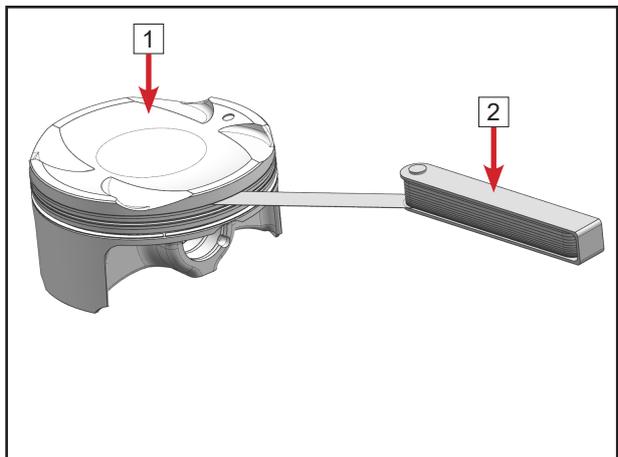
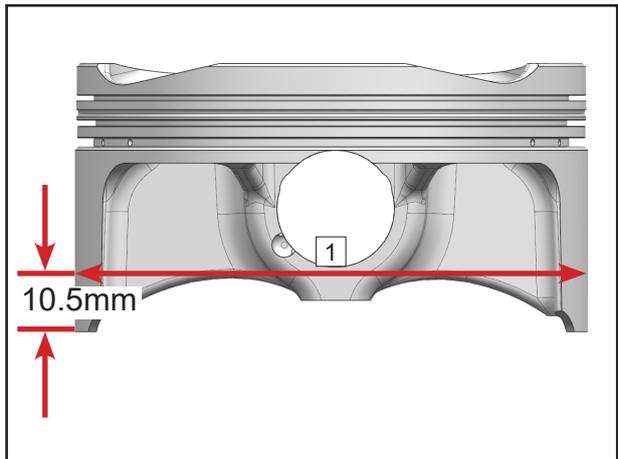
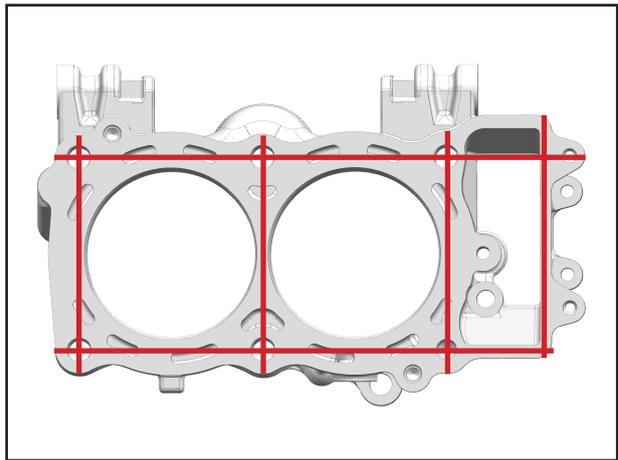
According to the above measurement results, calculate the fit clearance between piston and cylinder body. Replace piston or cylinder body, or both if the clearance is larger than service limit.

Piston / Cylinder Body Clearance	
Standard	0.031 mm ~ 0.045 mm
Service Limit	0.1 mm

Piston Ring/Groove Clearance

Use a feeler gauge [2] to measure each ring/piston groove clearance. Replace piston [1] and piston rings if beyond service limit.

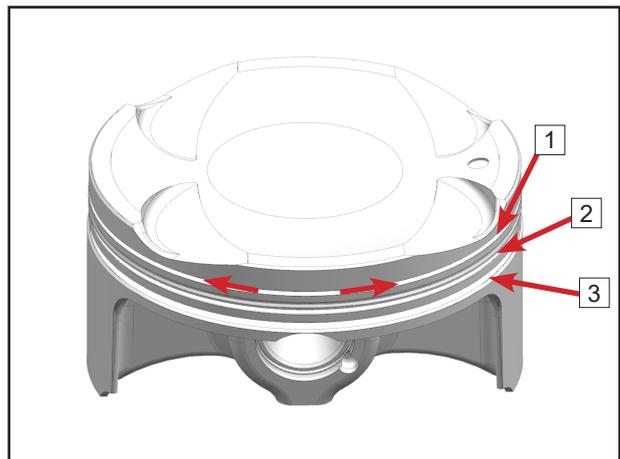
Piston Ring/Groove Clearance	
The First Gas Ring	
Standard	0.03 mm ~ 0.07 mm
Service Limit	0.16 mm
The Second Gas Ring	
Standard	0.02 mm ~ 0.06 mm
Service Limit	0.16 mm



Piston Disassembly

Carefully open the opening of the first ring **1** with thumb and push the ring outward to remove the first ring.

Remove the second ring **2** and combined ring **3** in the same manner.

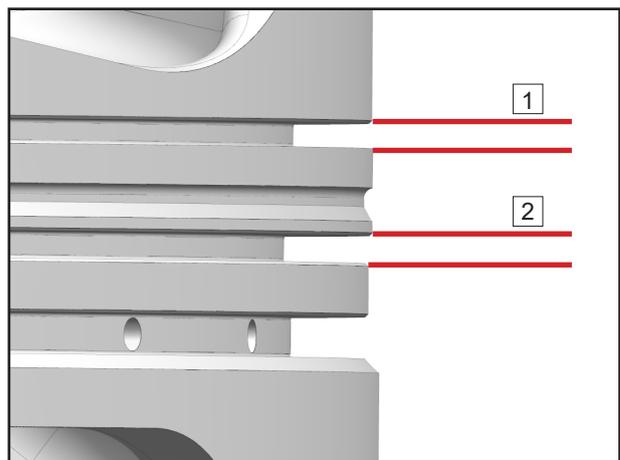


Piston Ring Groove Width

Use vernier calipers to measure the width of the first gas ring groove **1** and the second ring groove **2** of piston.

Replace the piston if the width of ring slot is greater than service limit.

Piston Ring Slot Width	
The First Gas Ring Groove 1	
New Part	0.92 mm ~ 0.94 mm
Service Limit	1.02 mm
The Second Gas Ring Groove 2	
New Part	1.01 mm ~ 1.03 mm
Service Limit	1.11 mm

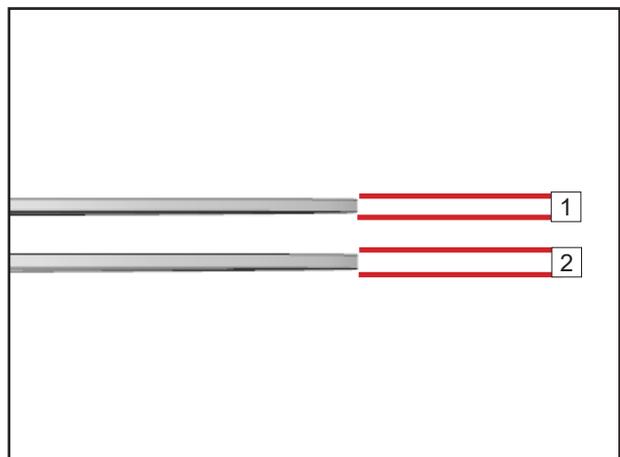


Piston Ring Thickness

Measure the thickness of piston ring in several places with micrometer.

Replace the piston ring if the measurement value is lower than service limit.

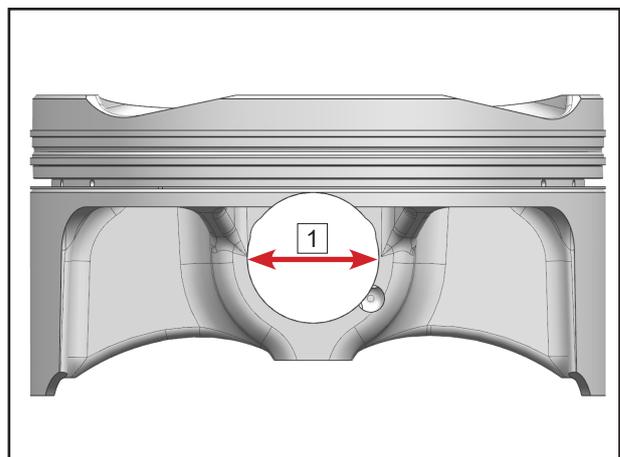
Piston Ring Thickness	
The First Gas Ring 1	
New Part	0.87 mm ~ 0.89 mm
Service Limit	0.8 mm
The Second Gas Ring 2	
New Part	0.97 mm ~ 0.99 mm
Service Limit	0.9 mm



Piston Pin Hole

Measure the diameter **1** of piston pin hole. Replace piston if the measurement value is larger than service limit.

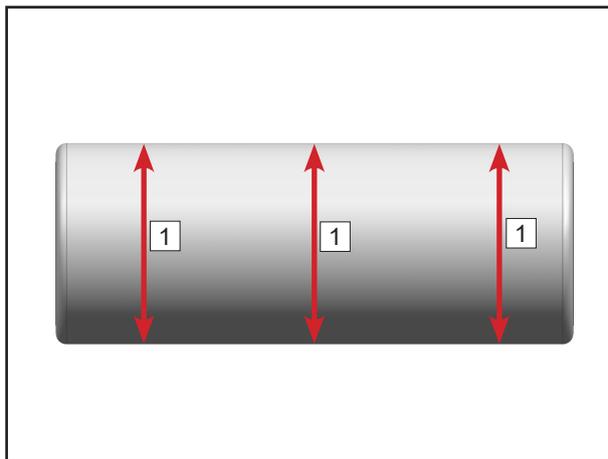
Piston Pin Hole Diameter	
New Part	19.004 mm ~ 19.010 mm
Service Limit	19.04 mm



Piston Pin Diameter

Use micrometer to measure piston pin diameter **1** in multiple places. Replace piston pin if the measurement value is lower than service limit.

Piston Pin Diameter	
New Part	18.996 mm ~ 19 mm
Service Limit	18.98 mm



Piston Grouping

The skirt diameter **1** and weight of the piston are grouped in the table below, and the marked position is shown on the right picture.

2: Exhaust side mark

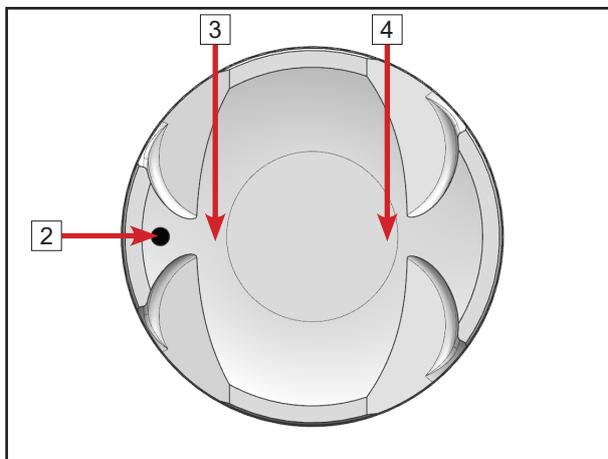
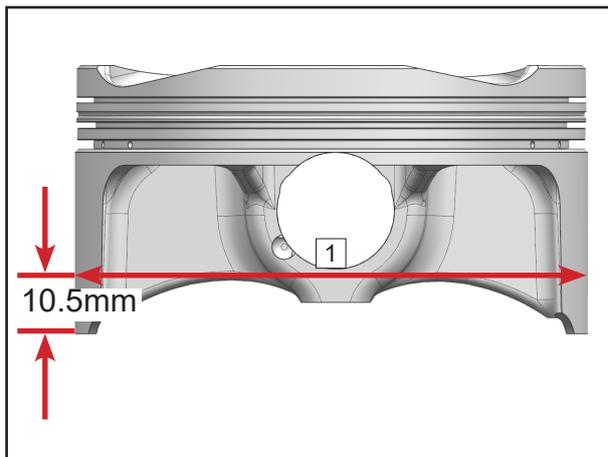
3: Skirt section diameter grouping mark

4: Weight grouping mark

Piston (New Part) Skirt Diameter Grouping	
Mark	Skirt Diameter
I	82.970 mm ~ 82.977 mm
II	82.978 mm ~ 82.985 mm

Piston (New Part) Weight Grouping	
Mark	Weight
A	209g ~ 213g
B	214g ~ 218g

NOTE: The same engine must be equipped with pistons of the same weight grouping.



Piston/Cylinder Body Grouping

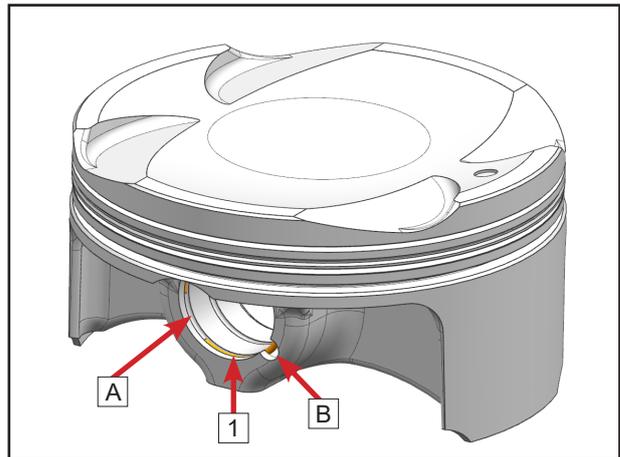
Piston and cylinder body must be assembled in accordance with the following table.

Cylinder Body Mark	Piston Mark
I	I
II	II

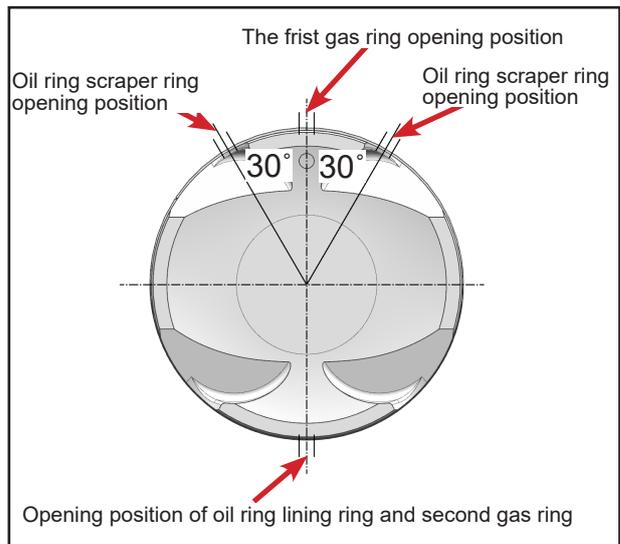
Piston Assembly

Insert one piston pin circlip **1** with needle-nose pliers.

Stagger the piston pin circlip opening **A** with the ring groove opening **B**.



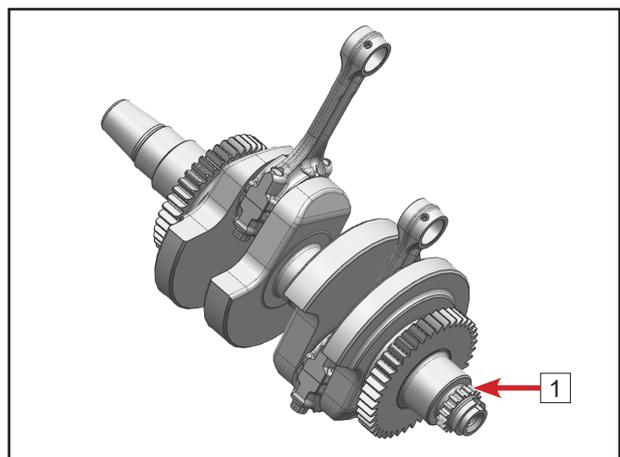
Install the combined oil ring, the second gas ring and the first gas ring in turn into the corresponding piston ring groove according to the right picture.



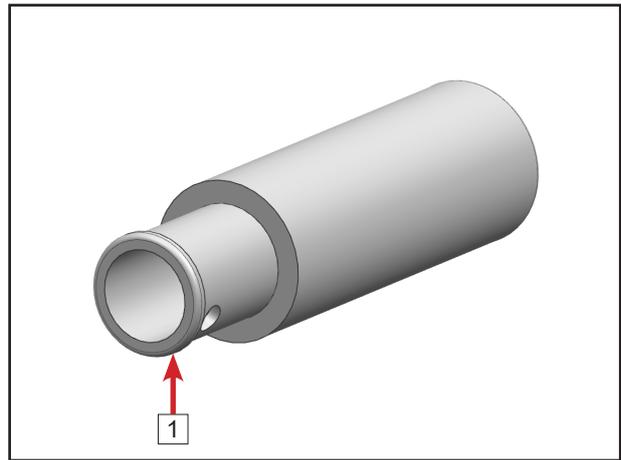
13.5.16 Timing combination Inspection

Clean all parts.

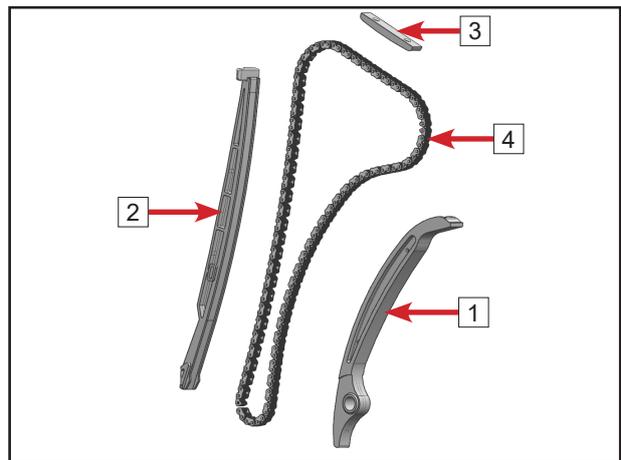
Inspect timing drive sprocket **1** for serious wear or damage. Replace crankshaft if it does.



Inspect tensioner for serious wear or damage. Replace it if it does.
 Press plunger **1**, and inspect whether the plunger bounces smoothly. If the rebound is rough or stuck, replace the tensioner.

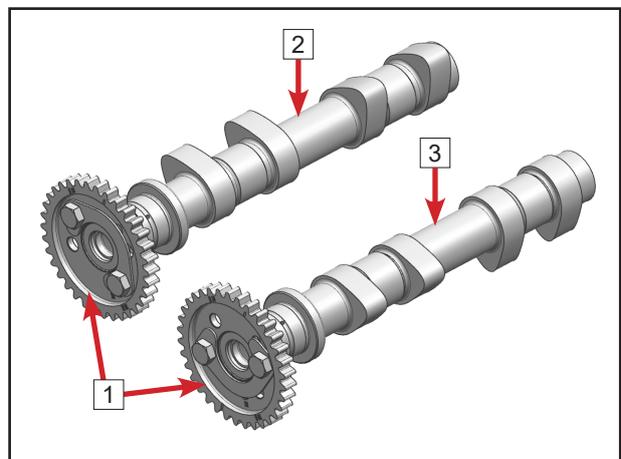


Inspect tension plate **1** for serious wear or damage. Replace tension plate if it does.
 Inspect chain guide **2** for serious wear and damage. Replace chain guide if it does.
 Inspect chain guide block **3** for serious wear or damage. Replace chain guide block if it does.
 Inspect timing chain **4** for serious wear or damage. Replace timing chain if it does.
 Inspect whether the link of timing chain **4** moves freely. If it is stiff, replace the timing chain.



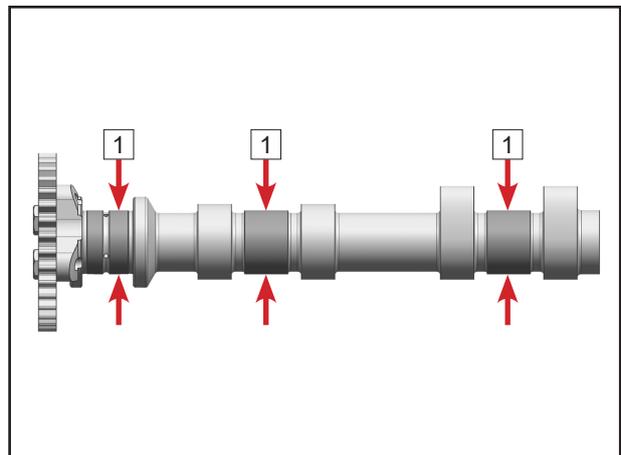
Camshaft Assembly

Inspect timing sprocket **1** for serious wear or damage. Replace it if it does.
 Inspect intake camshaft **2** and exhaust camshaft **3** for serious wear or damage. Replace it if it does.



Measure the diameter **1** of camshaft journal. Replace new camshaft if the measurement value is lower than service limit.

Camshaft Journal Diameter	
Intake Camshaft	
New Part	23.950 mm ~ 23.972 mm
Service Limit	23.920 mm
Exhaust Camshaft	
New Part	23.950 mm ~ 23.972 mm
Service Limit	23.920 mm



The difference between the camshaft bearing hole diameter and the camshaft journal diameter is the camshaft journal/camshaft bearing hole clearance.

Inspect the clearance between the camshaft journal and the camshaft bearing hole. If the clearance exceeds service limit, replace the camshaft or cylinder head with a new one.

The diameter measurement of camshaft bearing hole refers to the section "Cylinder Head Inspection".

Camshaft Journal/Camshaft Bearing Hole Clearance	
New Part	0.028 mm ~ 0.071 mm
Service Limit	0.13 mm

Measure the CAM height 1 of the intake and exhaust camshafts respectively. If the measurement value is less than the service limit, replace the camshaft with a new one.

Camshaft Height	
Intake Camshaft	
New Part	35.843 mm ~ 35.957 mm
Service Limit	35.74 mm
Exhaust Camshaft	
New Part	36.543 mm ~ 36.657 mm
Service Limit	36.44 mm

Camshaft Identification

The camshaft is cast with a distinguishing mark between the cylinder 1 CAM and the cylinder 2 CAM.

Intake Camshaft: IN

Exhaust Camshaft: EX

Camshaft Disassembly

NOTE: Disassemble the intake and exhaust camshafts in the same way.

Turn over the tightening part of stop plate 1.

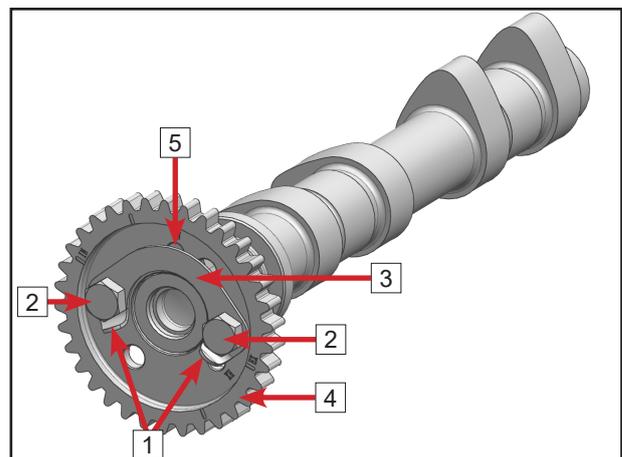
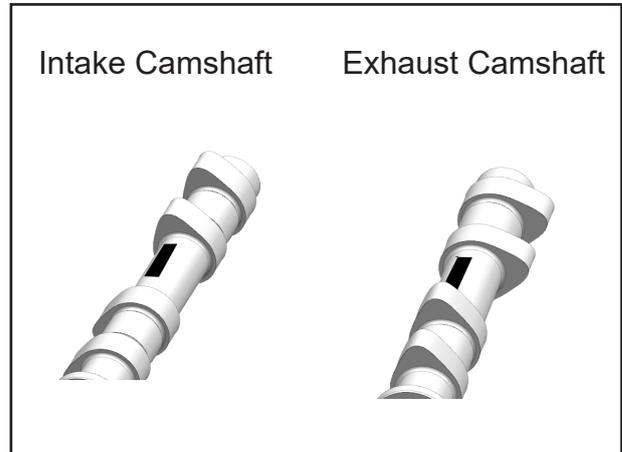
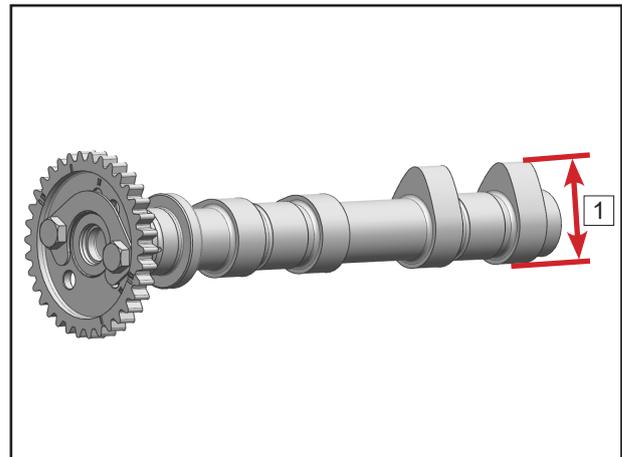
1.

Remove bolts 2.

Remove and abandon stop plate 3.

Remove timing sprocket 4.

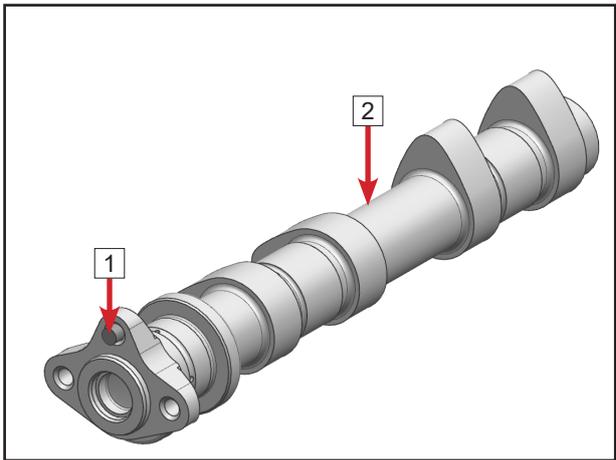
Remove needle roller 5.



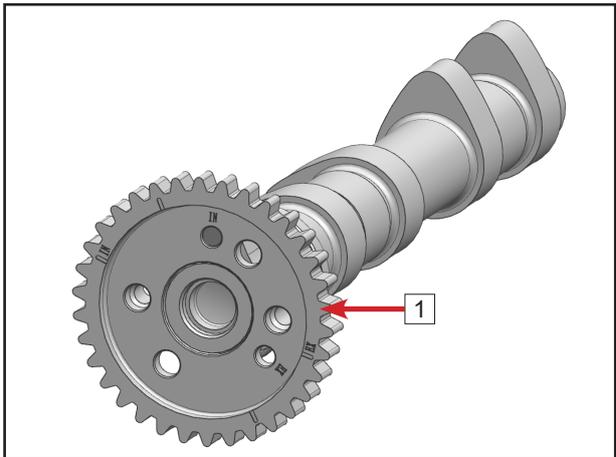
Camshaft Assembly

Intake Camshaft

Install needle roller **1** on the intake camshaft **2**.

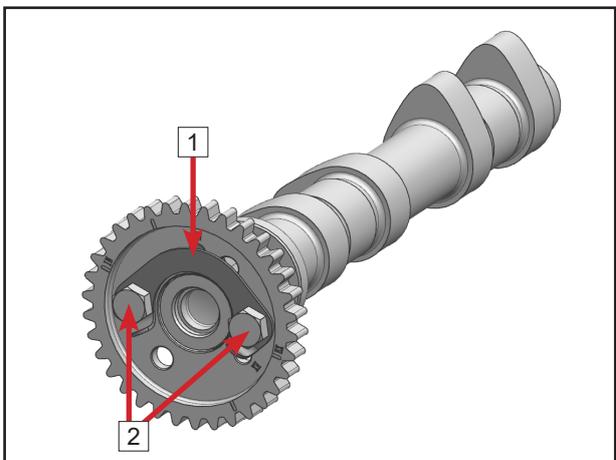


Align the "IN" marking hole on timing sprocket with the needle roller on the intake camshaft, and install the timing sprocket **1** on the intake camshaft.

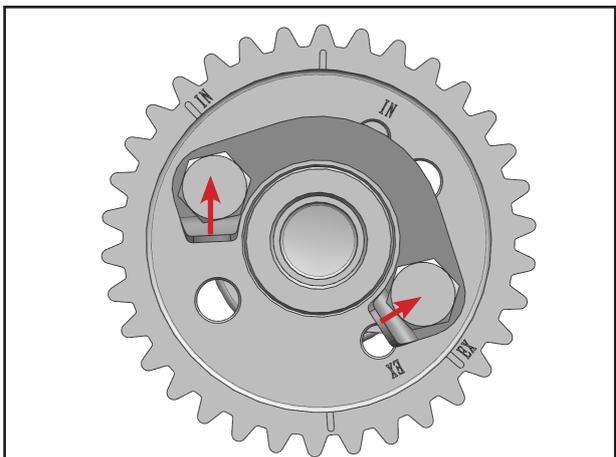


Apply 243 thread locker on the bolts **2**. Install retainer **1** and bolts **2**, and tighten bolts to the specified torque.

Timing Sprocket Bolt Torque
15N•m

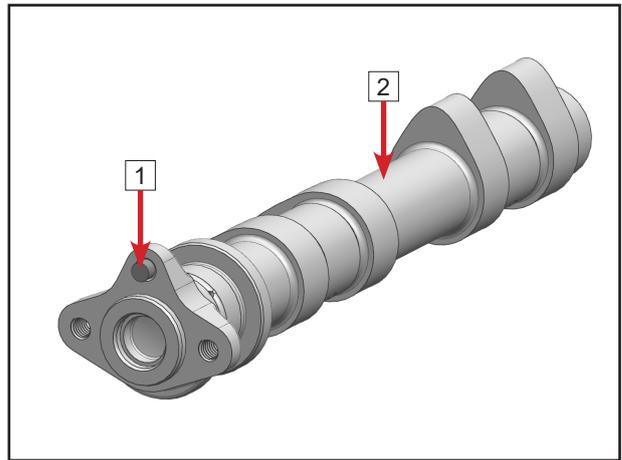


Flange the retainer to prevent the bolts from loosening.

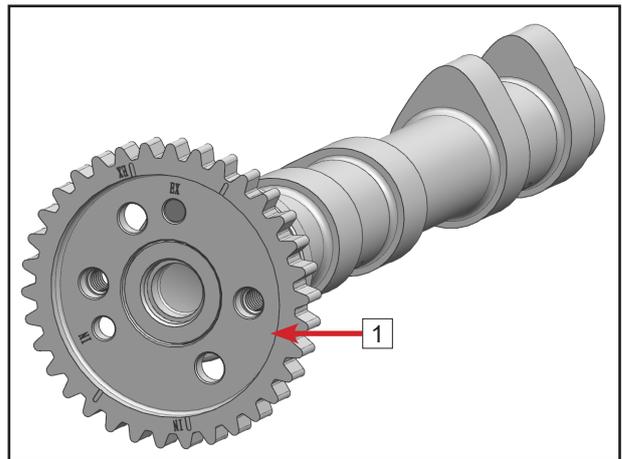


Exhaust Camshaft

Install needle roller **1** on the exhaust camshaft **2**.

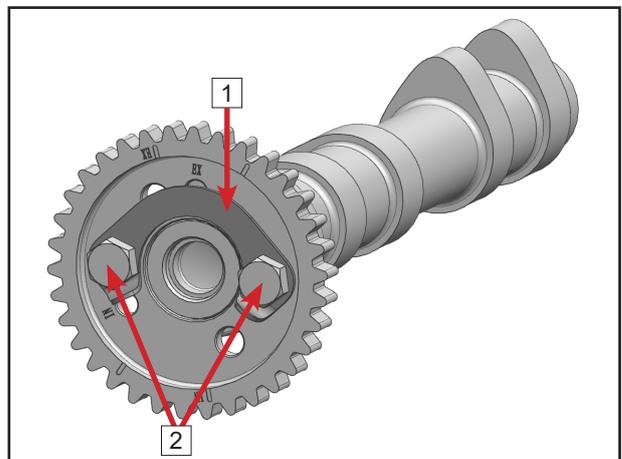


Align the "EX" marking hole on timing sprocket with the needle roller on the exhaust camshaft and install the timing sprocket **1** on the exhaust camshaft.

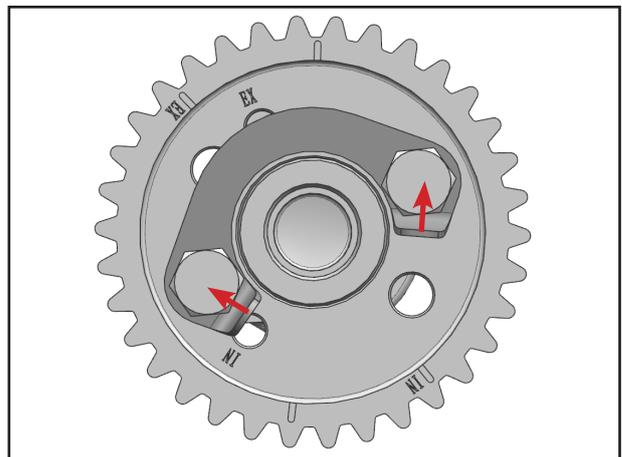


Apply 243 thread locker on the bolts **2**. Install retainer **1** and bolts **2**, and tighten the bolts to the specified torque.

Timing Sprocket Bolt Torque
15N•m



Flange the retainer to prevent the bolts from loosening.

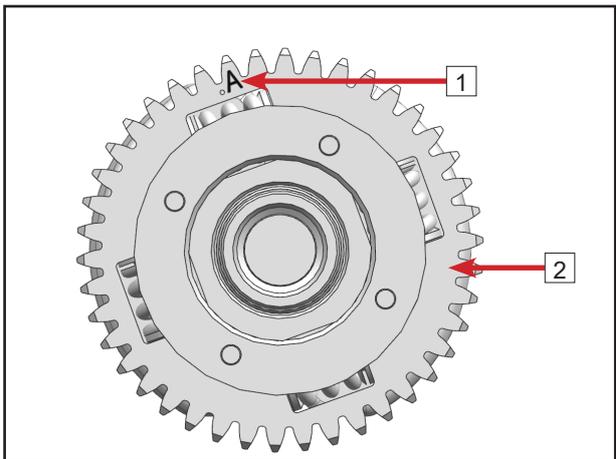
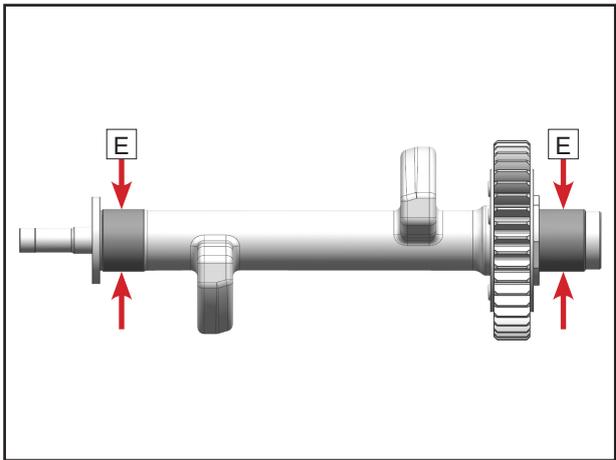


13.5.17 Balance Shaft Assembly Inspection

Inspect balance shaft assembly for serious wear or damage. Replace it if it does. Measure the diameter **E** of balance shaft journal with micrometer. Replace it if it is lower than service limit.

Balance Shaft Journal Diameter E	
New Part	27.987 mm ~ 28.000 mm
Service Limit	27.96 mm

The balance shaft assembly is divided into groups A and B according to the measurements with pins of balance driven gear, and the grouping mark (A or B) **1** is engraved on the balance driven gear **2**.



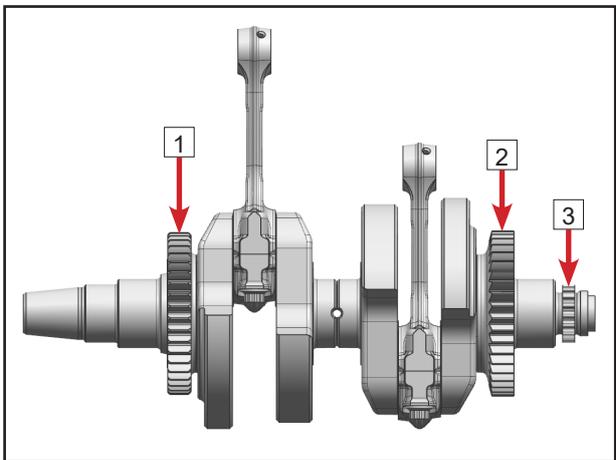
13.5.18 Crankshaft Connecting Rod Inspection

Inspection for Crankshaft

Inspect supporting journal for scratches, cracks, or other damage. If so, replace with new crankshaft combination.

Inspect balancer drive gear **1**, output gear **2** and timing drive sprocket **3** for serious wear or other damage. If so, replace with new crankshaft combination.

⚠ WARNING: Replace with a new one if the relevant size of parts is less than service limit. if not replaced, it may cause engine damage.

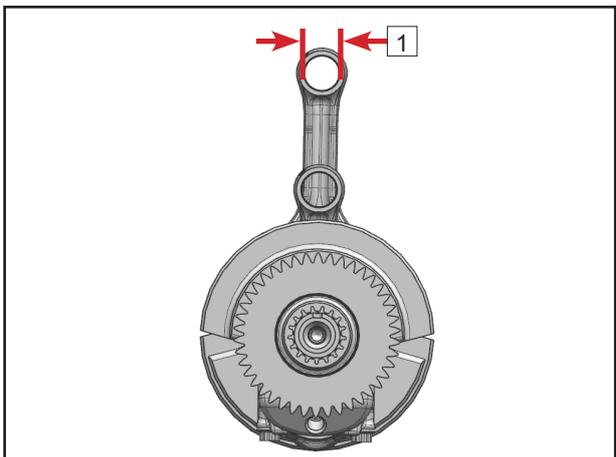


Connecting Rod Small End Hole Inner Diameter

Measure the inner diameter of connecting rod small end hole **1**.

Connecting Rod Small End Hole Inner Diameter	
New Part	19.010 mm ~ 19.020 mm
Service Limit	19.050 mm

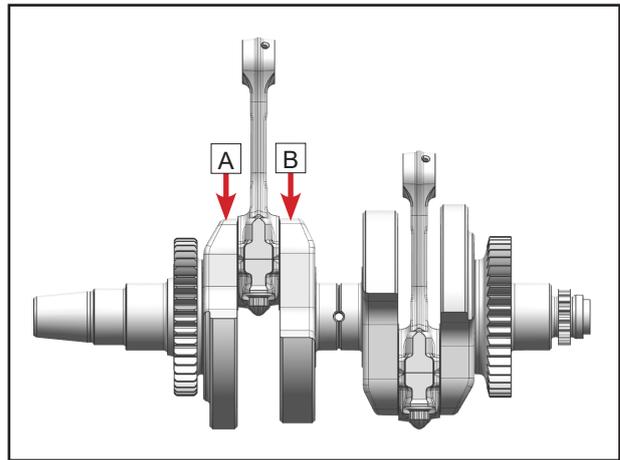
Replace the connecting rod if the inner diameter of connecting rod small end hole exceeds the standard.



Big end clearance of connecting rod

Measuring the end clearance of the connecting rod: first, one side of the connecting rod big end is close to the crank arm **A** of the crankshaft, and then the gap between the other side of the connecting rod big end and the crank arm **B** of the crankshaft is measured with a feeler gauge.

The big end clearance of the other connecting rod is measured by the same method.



Big end clearance of connecting rod	
New Part	0.15 mm ~ 0.30 mm
Service Limit	0.55 mm

If the clearance is greater than the maintenance limit, replace the connecting rod and measure the clearance again. If the clearance still exceeds the service limit after replacing the connecting rod, the crankshaft must be replaced.

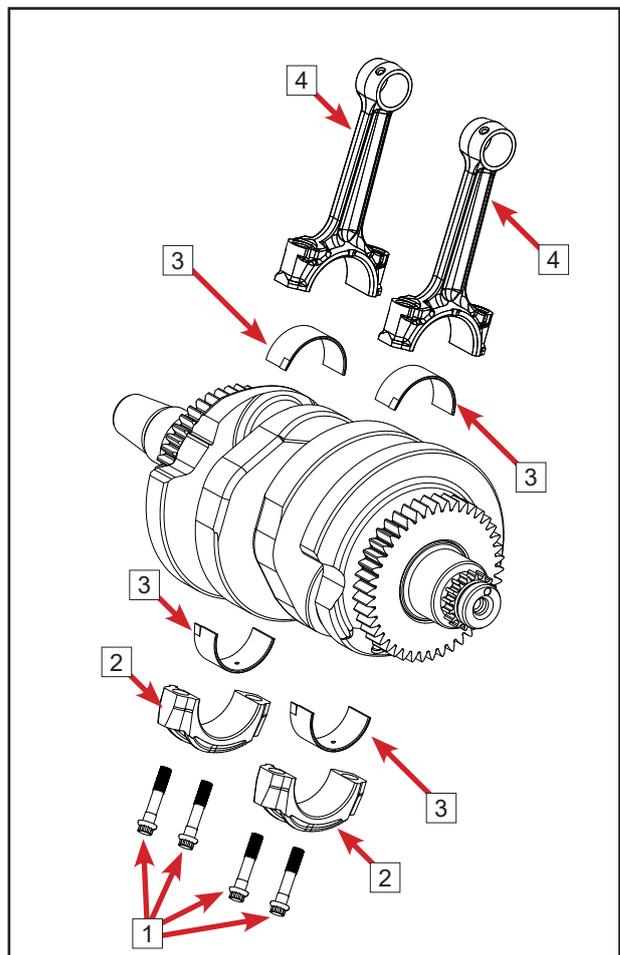
Disassembly of crankshaft connecting rod

Remove connecting rod bolts **1**.

Remove connecting rod cap **2**.

Remove connecting rod **4**.

From connecting rod cap **2** and connecting rod **4** remove connecting rod bearing **3**.



NOTE: When disassembling, the connecting rod cover, connecting rod body and connecting rod bearing should be marked and placed one by one, so that they can be quickly installed to the original position when reassembling. Do not remove if the connecting rod bearing is not excessive wear or damaged.

⚠ WARNING: If the connecting rod bolt is removed, it is recommended to replace new connecting rod bearing when reinstalling the connecting rod.

Connecting rod big end radial clearance

NOTE: Connecting rods must be assembled according to the pairing mark on the big end side of the connecting rod. The connecting rods of cylinder 1 and cylinder 2 are not interchangeable.

- 1: Connecting rod bolt
- 2: Connecting rod bearing
- 3: Connecting rod

Install the connecting rod bearing 2 as in the initial state.

Install the connecting rod bolts 1 and tighten them in two steps.

First Step: Torque
18N•m
Second Step: Corner Mounting
180° ±2°

Measure the inner diameter A of the big end bearing of the connecting rod:

Inner Diameter of Connecting Rod Big End Bearing A	
Service Limit	38.06 mm

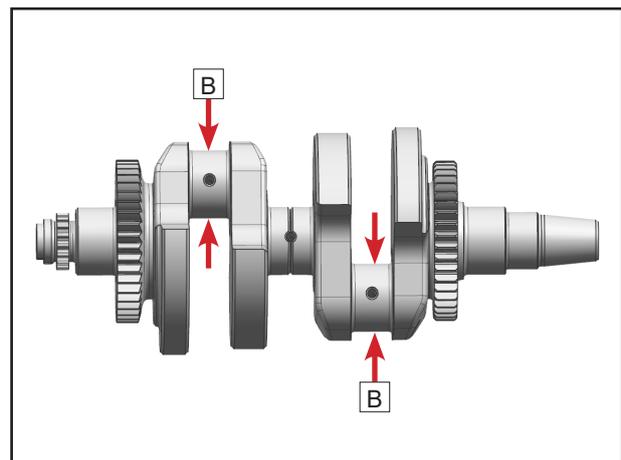
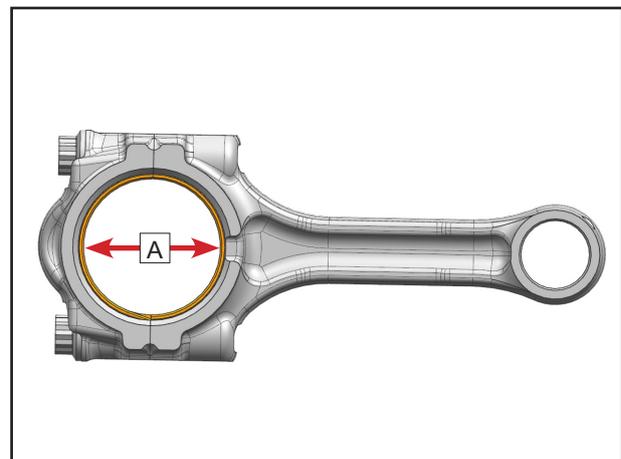
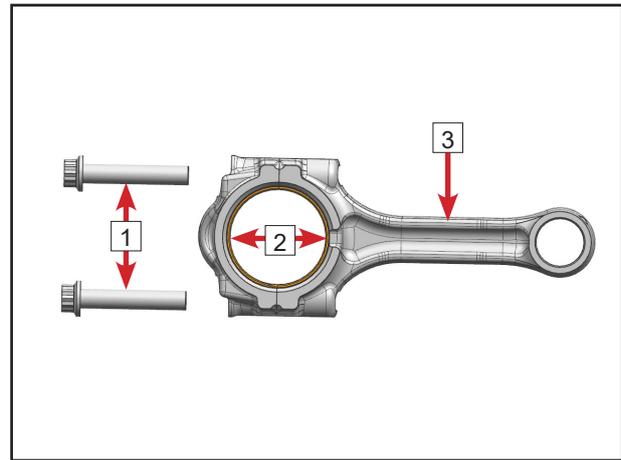
Measure the outer diameter B of the connecting rod journal:

Connecting Rod Journal Diameter B	
New Part	37.985 mm ~ 38.000 mm
Service Limit	37.97 mm

Compare measurements of inner diameter A and outer diameter B and determine the radial clearance:

Radial Clearance of Big End of Connecting Rod	
Service Limit	$A - B \leq 0.07 \text{ mm}$

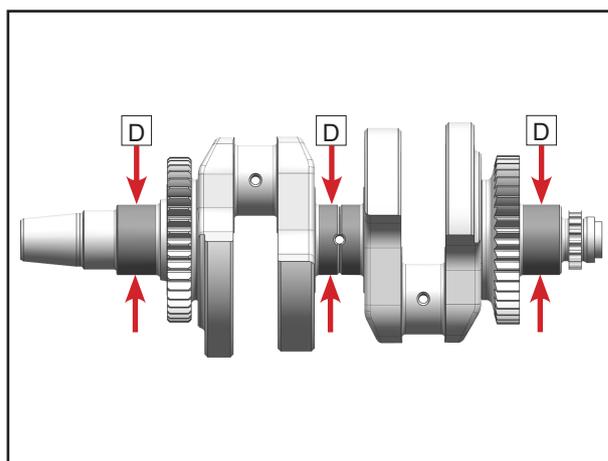
If the radical clearance exceeds service limit, replace connecting rod bearing or crankshaft, or both.



Crankshaft Main Journal

Measure the diameter $\square D$ of crankshaft main journal. Replace new part if it is lower than service limit.

Diameter $\square D$ of Crankshaft Main Journal	
New Part	37.984 mm ~ 38.000 mm
Service Limit	37.97 mm



Connecting rod grouping

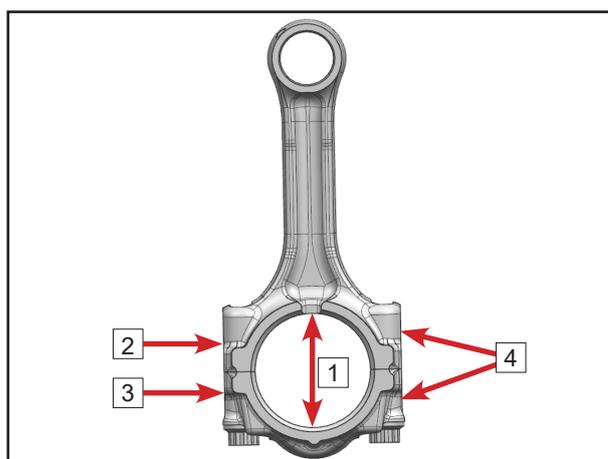
The diameter $\square 1$ of the crank bore of the connecting rod and the weight of the connecting rod are grouped in the following table. The position of grouping mark shows on the right.

$\square 2$: Crank bore diameter $\square 1$ grouping mark

$\square 3$: Connecting rod weight mark

$\square 4$: Pairing mark

The pairing marks of connecting rod cap and connecting rod are the same.



Crank Bore (New Part)	
Mark	Diameter
1	41.000 mm ~ 41.005 mm
2	41.006 mm ~ 41.010 mm
3	41.011 mm ~ 41.015 mm

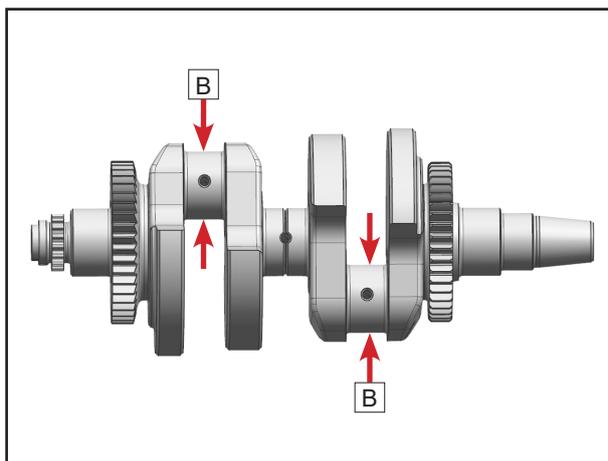
Connecting Rod Weight G (New Part)	
Mark	Weight
367	$366g \leq G < 368g$
369	$368g \leq G < 370g$
371	$370g \leq G < 372g$
373	$372g \leq G < 374g$
375	$374g \leq G < 376g$
377	$376g \leq G < 378g$
379	$378g \leq G < 380g$
381	$380g \leq G < 382g$
383	$382g \leq G < 384g$
385	$384g \leq G \leq 386g$

NOTE: The same crankshaft must be fitted with the same weight group marked connecting rod.

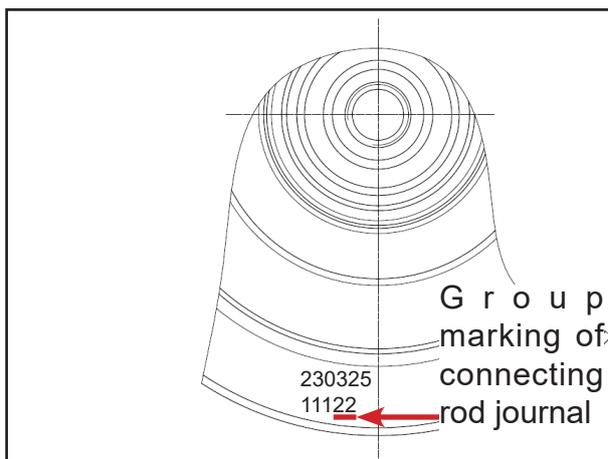
Crankshaft Connecting Rod Journal Grouping

Crankshaft connecting rod journal diameter [B] grouping is shown in the table below.

Crankshaft Connecting Rod Journal (New Part)	
Mark	Diameter
3	37.985 mm ~ 37.990 mm
2	37.991 mm ~ 37.995 mm
1	37.996 mm ~ 38.000 mm



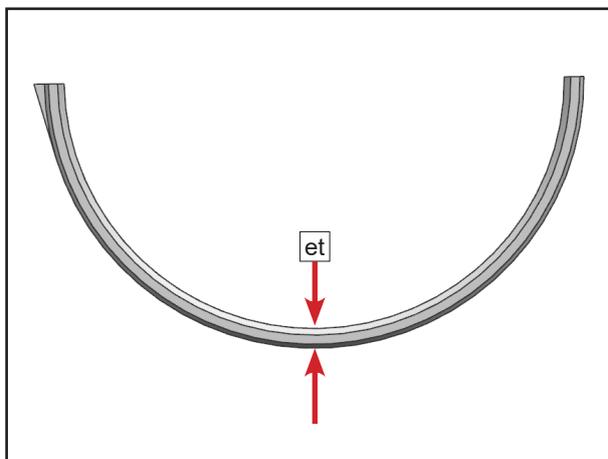
The group marking position of crankshaft connecting rod journal is shown in the example on the right, from left to right are the group marking of cylinder 1 (Magneto side) and cylinder 2 (Clutch side) connecting rod journal.



Connecting Rod Bearing Grouping

The grouping of connecting rod bearing thickness is shown in the table below.

Connecting Rod Bearing (New Part)	
Color Mark	Thickness [et]
Black	1.485 mm ~ 1.488 mm
Blue	1.489 mm ~ 1.491 mm
Green	1.492 mm ~ 1.494 mm
Yellow	1.495 mm ~ 1.497 mm



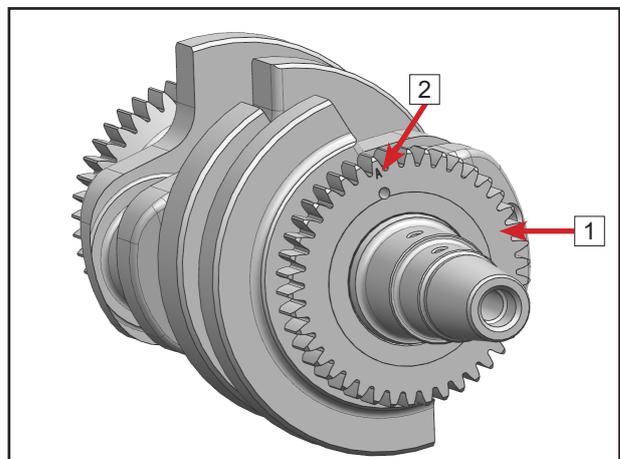
Connecting Rod Bearing Selection

Select connecting rod bearing as following table.

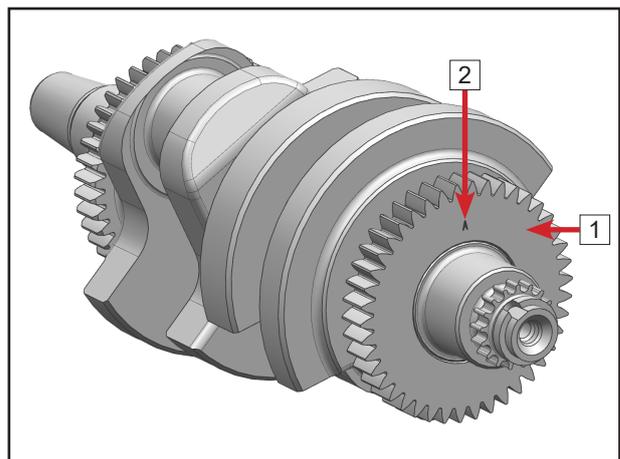
Crankshaft Connecting Rod Journal Mark	Connecting Rod Bore Mark	Connecting Rod Bearing Mark
1	1	Black
2	1	
1	2	
3	1	Blue
2	2	
1	3	
3	2	Green
2	3	
3	3	
3	3	Yellow

Balance Shaft Driving Gear / Output Gear Grouping

The balance shaft driving gear **1** is divided into group A and B according to the measurement with pins, and the position of the grouping mark (A or B) **2** is shown on the right.



The output gear **1** is divided into group A and B according to the measurement with pins, and the position of the grouping mark (A or B) **2** is shown on the right.



13.5.19 One-way Clutch Inspection

Insert the starting motor gear **1** counterclockwise into the one-way clutch, do not squeeze into.

Inspect the locking of starting motor gear **1**:

If the starting motor gear cannot be turned counterclockwise and cannot be locked clockwise, replace the one-way clutch.

Inspect one-way clutch and coupling for wear or other damage.

NOTE: If the one-way clutch and coupling are damaged, they must be replaced at the same time.

Inspect the inner part of magneto rotor **1** for scratches or other damage. Replace new parts if it does.

One-way Clutch Removal

Remove starting motor gear **6**.

Remove inner hex bolt **1**.

Remove coupling **5**.

Remove one-way clutch **4**.

Remove washer **3**.

One-way Clutch Installation

Install one-way clutch **4** on the coupling **5**.

Install coupling on the magneto rotor.

Apply 263 thread locker on inner hex bolts **1**.

Install inner hex bolts **1**, and tighten to the specified torque.

Magneto Rotor Bolt Torque
34N•m

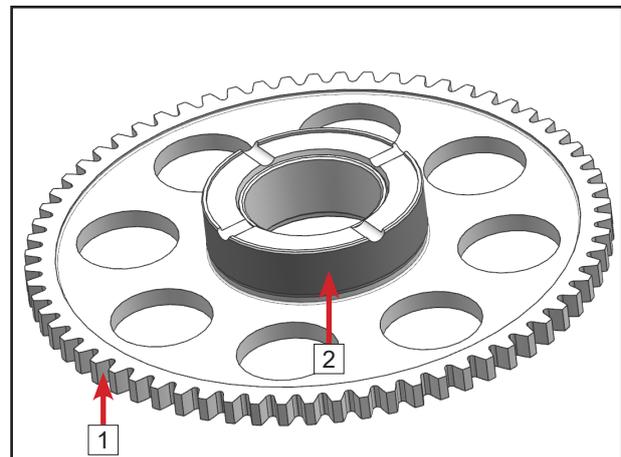
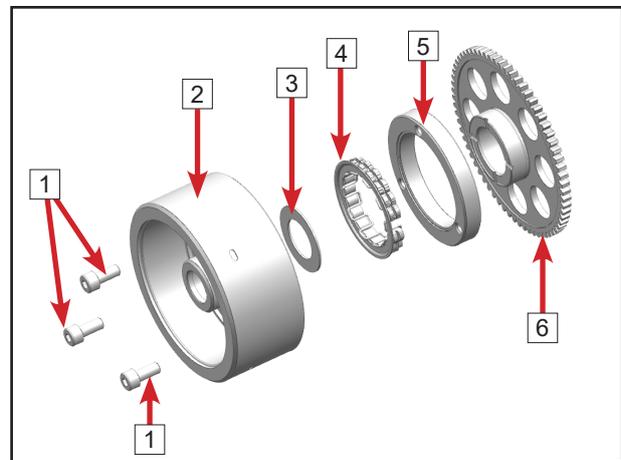
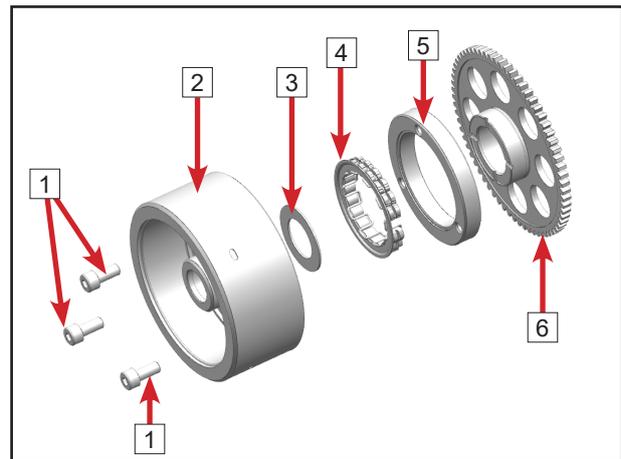
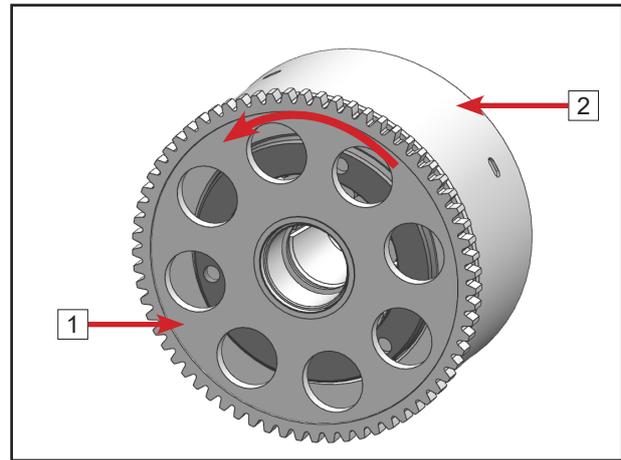
Apply oil on one-way clutch.

Install washer **3** on the magneto rotor.

Rotate starting motor gear **6** into one-way clutch.

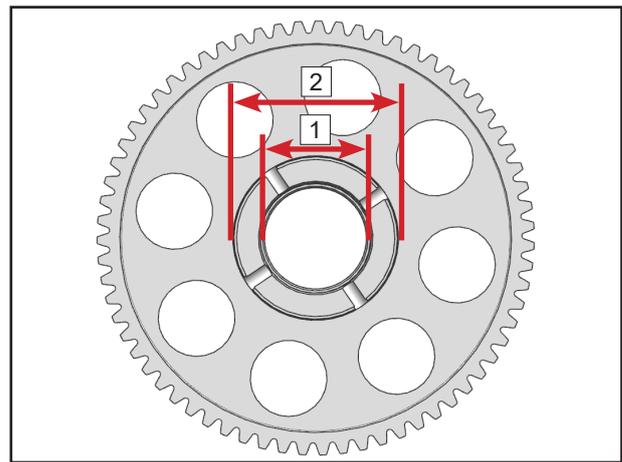
13.5.20 Starting Gear Inspection

Inspect starting motor gear, especially the surface **1** and clutch cylinder **2** for wear or other damage. Replace the starting motor gear if necessary.

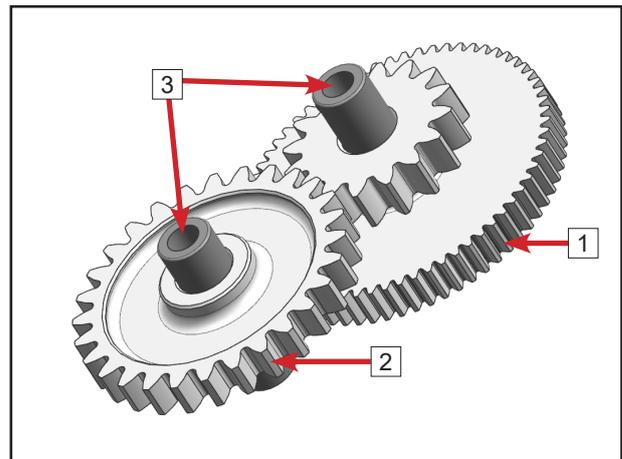


Measure the inner diameter [1] and outer diameter [2] of starting motor gear. Replace new parts if it exceeds the service limit.

The Inner Diameter of Starting Motor Gear	
New Part	32.025 mm ~ 32.050 mm
Service Limit	32.075 mm
The Outer Diameter of Starting Motor Gear	
New Part	51.705 mm ~ 51.718 mm
Service Limit	51.68 mm



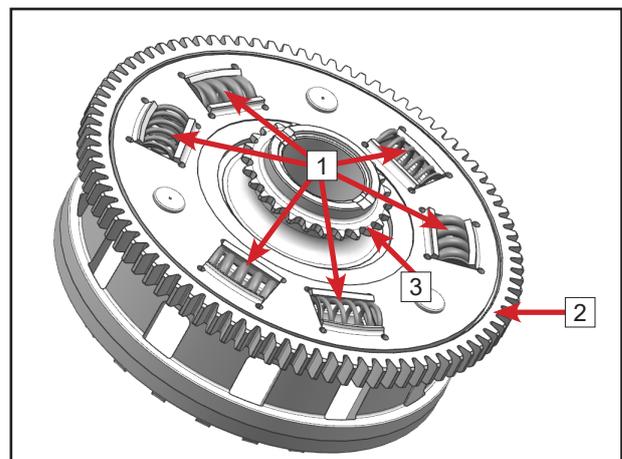
Inspect dual gear [1], starting middle gear [2] and gear shaft [3] for serious wear or damage. Replace new parts if it does.



13.5.21 Clutch Inspection

Clutch Cover

Check whether the internal buffer spring [1] is worn, if worn, there will be shaking between the gear and clutch housing, and produce abnormal noise, such as shaking larger, then need to replace the housing [2]. Inspect sprocket [3] for serious wear or damage. Replace the housing if it does.



Lining Disc or Driven Disc

Check lining disc and driven disc one by one.

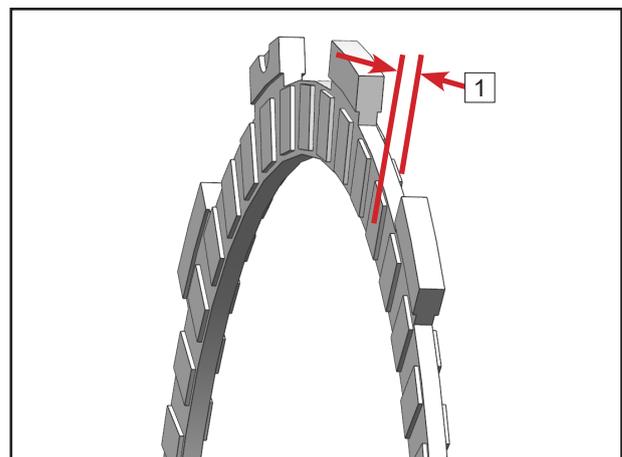
If the friction material fall off, loose and other defects.

If the friction surface has discoloration or uneven wear caused by overheating.

Measure the thickness [1] of each lining disc at different points.

If any piece shows signs of damage or wear exceeds the maintenance limit, replace with a new one.

Lining Disc Thickness	
New Part	2.9 mm ~ 3.1 mm
Service Limit	2.8 mm



CFMOTO

Lining disc or driven disc is placed on the plate.

Use a feeler gauge to measure the clearance between the friction plate or driven plate and the plate from multiple directions. The clearance is the flatness of the lining disc or driven disc.

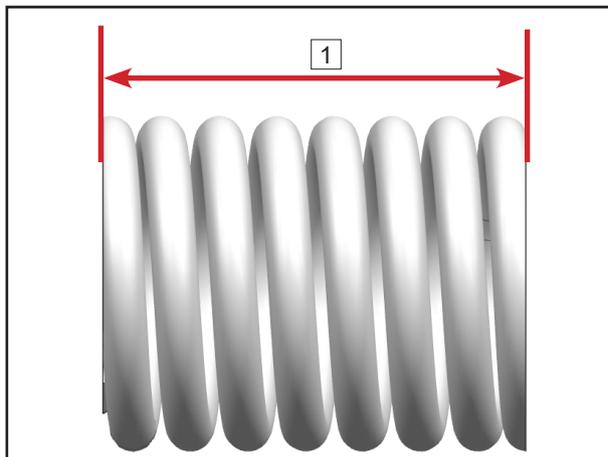
Flatness of the Lining Disc or Driven Disc	
New Part	≤0.15 mm
Service Limit	0.3 mm

Clutch spring

Measuring the free length 1 of clutch spring.

If the measured value is less than the service limit, replace the spring.

Clutch Spring Free Length	
Service Limit	51 mm

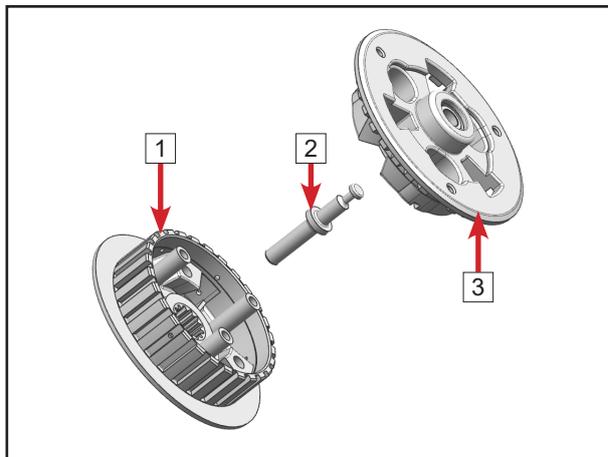


Central Sleeve

Inspect central sleeve 1 for serious wear or damage. Replace central sleeve if it does.

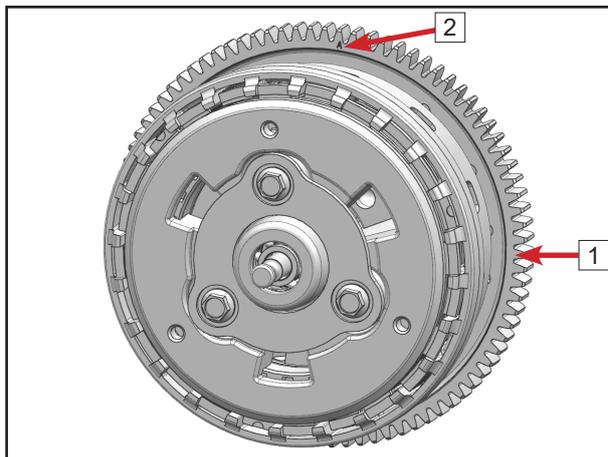
Inspect press palte 3 for serious wear or damage. Replace press palte if it does.

Inspect clutch tie-rod 2 for serious wear or damage. Replace clutch tie-rod if it does.



Clutch Grouping

The clutch is divided into group A and group B according to the measurement with pins of primary driven gear 1. The grouping mark (A or B) 2 is shown on the right.



13.5.22 Shift Gear Inspection

Shift Gear Disassembly

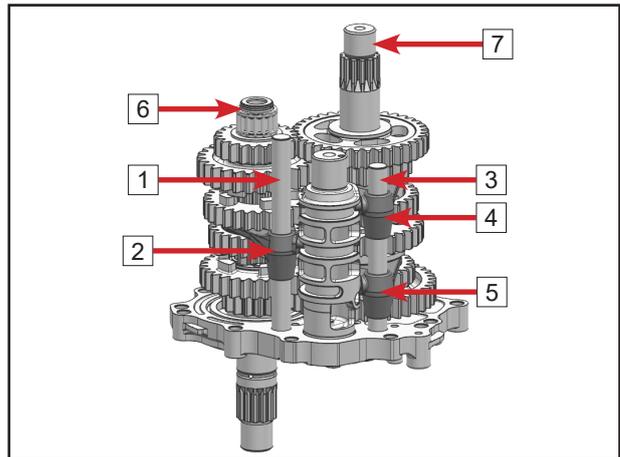
Remove main shaft fork shaft [1].

Remove main shaft fork [2].

Remove countershaft fork shaft [3].

Remove countershaft fork [4] and [5].

Remove main shaft [6] and countershaft [7].



Remove inner hex bolt [1].

Remove swing arm sleeve [2].

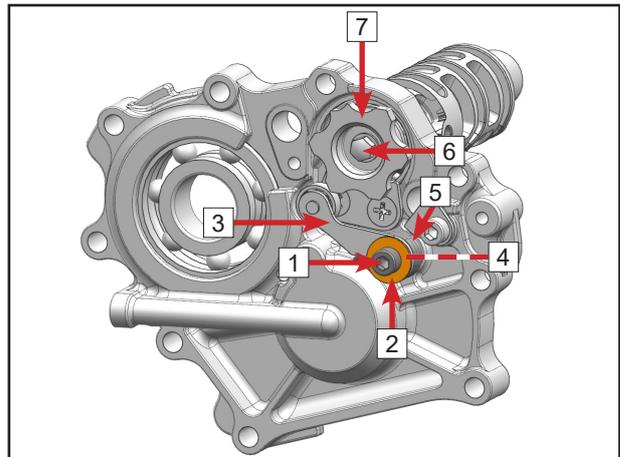
Remove swing arm [3].

Remove washer [4].

Remove gearshift swing arm spring [5].

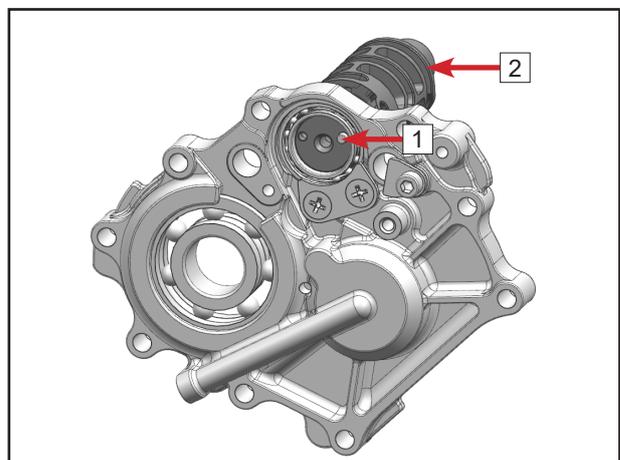
Remove bolt [6].

Remove gearshift drum CAM [7].

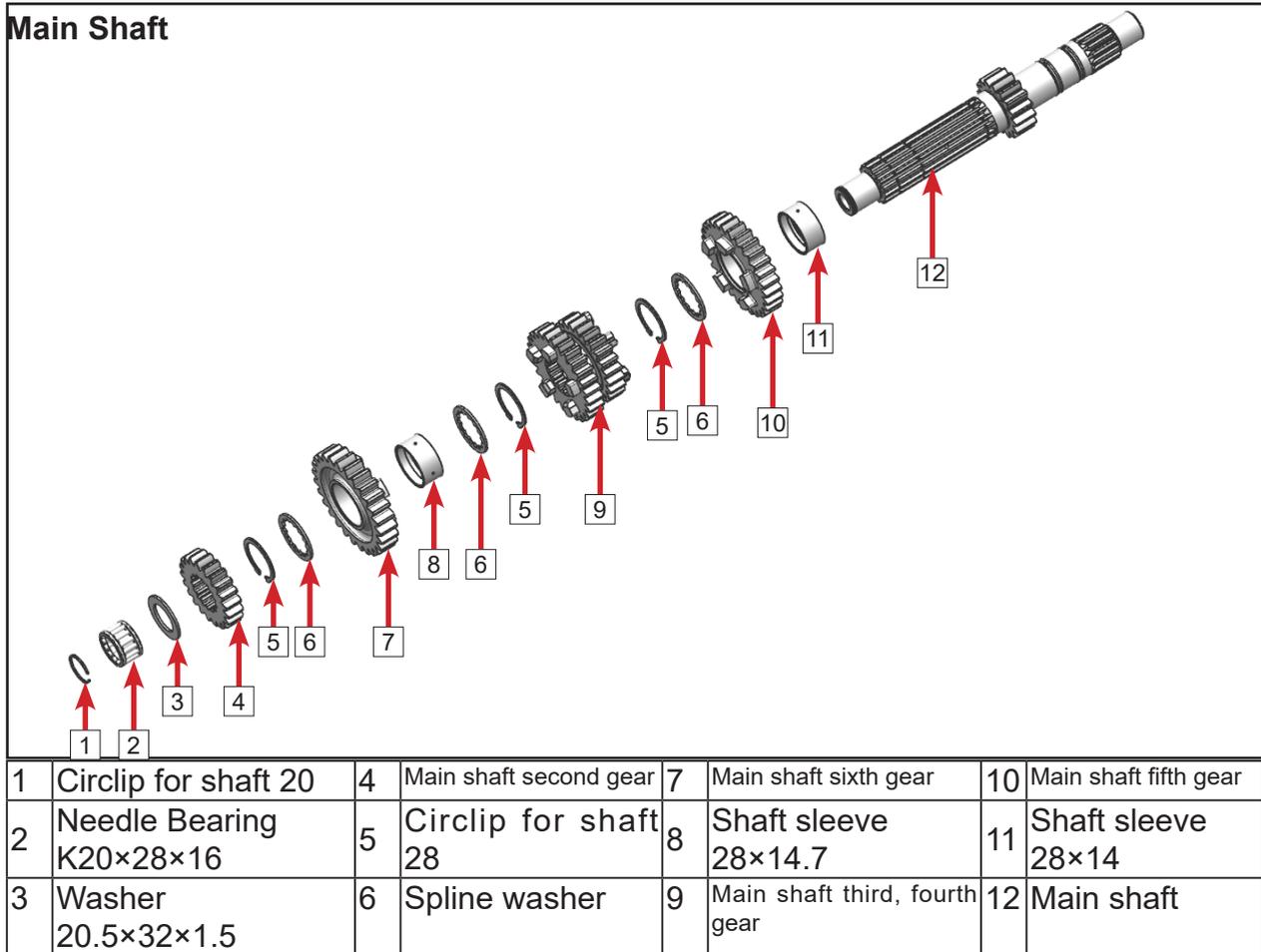


Remove needle roller [1].

Remove gearshift drum [2].



Shift Gear Inspection



Disassembly

Disassembly main shaft as shown in the picture above.

NOTE: The retaining circlip must be replaced after removal.

Inspection

Inspect needle bearing [2] for serious wear or damage. Replace needle bearing if so.

Inspect the journal of main shaft [12] for serious wear or damage. Replace main shaft if so.

Inspect the tooth surface of main shaft [12] and male spline for serious wear or damage. Replace main shaft if so.

Inspect the tooth surface of main shaft second gear [4] and female spline for serious wear or damage. Replace gear in pairs if so.

Inspect the tooth surface of main shaft sixth gear [7] and fifth gear [10] for serious wear or damage. Replace gear in pairs if so.

Inspect the shift position of main shaft sixth gear [7] and fifth gear [10] for serious wear or damage. Replace gear in pairs if so.

Inspect the tooth surface of main shaft third, fourth gear [9] and female spline for serious wear or damage. Replace gear in pairs if so.

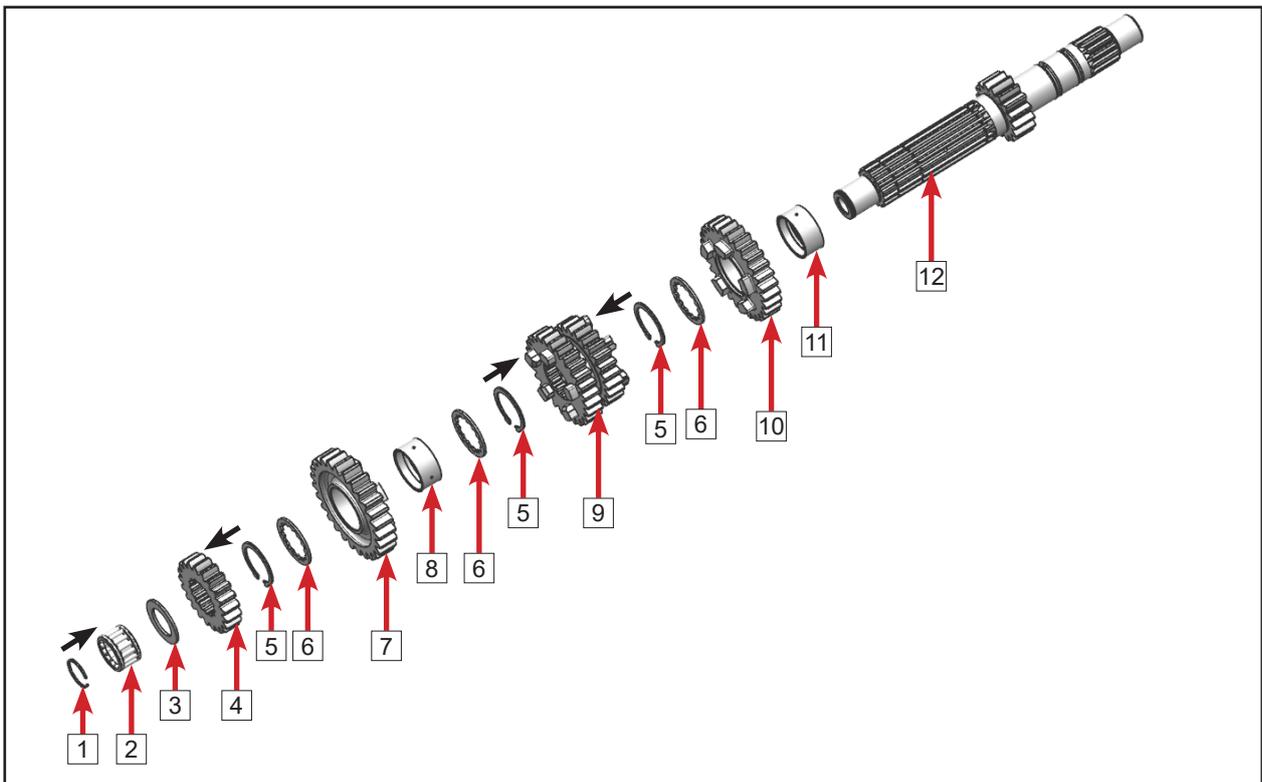
Inspect the shift position of main shaft third, fourth gear [9] for serious wear or damage. Replace gear in pairs if so.

Inspect whether the third and fourth gear of main shaft [9] should slide smoothly on main shaft [12]. Replace the third and fourth gear or main shaft if stuck.

Inspect washer [3] and spline washer [6] for serious wear or damage. Replace washer or spline washer if so.

Inspect shaft sleeve [8] and [11] for serious wear or damage. Replace shaft sleeve if so.

Use new circlip [1] and [5] for each service.



Assembly

NOTE: The removed circlip must not be used again and replaced with a new one. When installing the retaining circlip, the side with round corners faces the direction indicated by the arrow in the figure. Make sure the retaining circlip is fully installed in the slot.

Please lubricate all parts carefully before assembly.

Install shaft sleeve [11] on the main shaft [12].

Install main shaft fifth gear [10].

Install spline washer [6].

Install a new circlip [5].

Install main shaft third, fourth gear [9].

Install a new circlip [5].

Install spline washer [6].

Install shaft sleeve [8].

Install main shaft sixth gear [7].

Install spline washer [6].

Install a new circlip [5].

Install main shaft second gear [4].

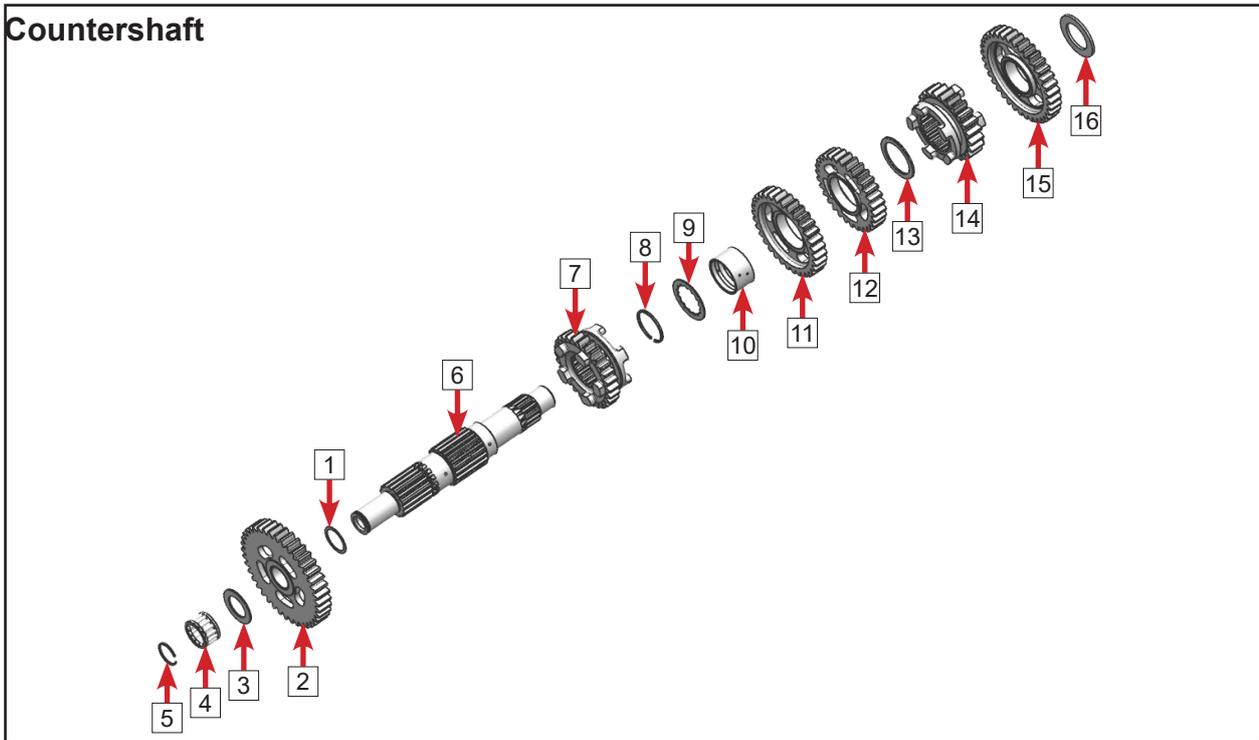
Install washer [3].

Install needle bearing [2].

Install a new circlip [1].

Finally inspect the motion smoothness of all gears.

Countershaft



1	Washer 20.4×25×0.5	5	Circlip for shaft 20	9	Spline washer	13	Washer 30×38.5×1.5
2	Countershaft first gear	6	Countershaft	10	Shaft sleeve 29.65	14	Countershaft sixth gear
3	Washer 20.4×32×1.2	7	Countershaft fifth gear	11	Countershaft third gear	15	Countershaft second gear
4	Needle bearing K20×28×16	8	Circlip 30	12	Countershaft fourth gear	16	Washer 25×39×2

Disassembly

Disassembly countershaft as shown in the picture above.

NOTE: The retaining circlip must be replaced after removal.

Inspection

Inspect needle bearing [4] for serious wear or damage. Replace needle bearing if so.

Inspect the journal of countershaft [6] for serious wear or damage. Replace countershaft if so.

Inspect male spline of countershaft [6] for serious wear or damage. Replace countershaft if so.

Inspect the tooth surface and female spline of countershaft fifth gear [7], sixth gear [14] for serious wear or damage. Replace gears in pairs if so.

Inspect the shift position of countershaft fifth gear [7], sixth gear [14] for serious wear or damage. Replace gears in pairs if so.

Inspect the tooth surface of countershaft first gear [2], third gear [11], fourth gear [12] and second gear [15] for serious wear or damage. Replace gears in pairs if so.

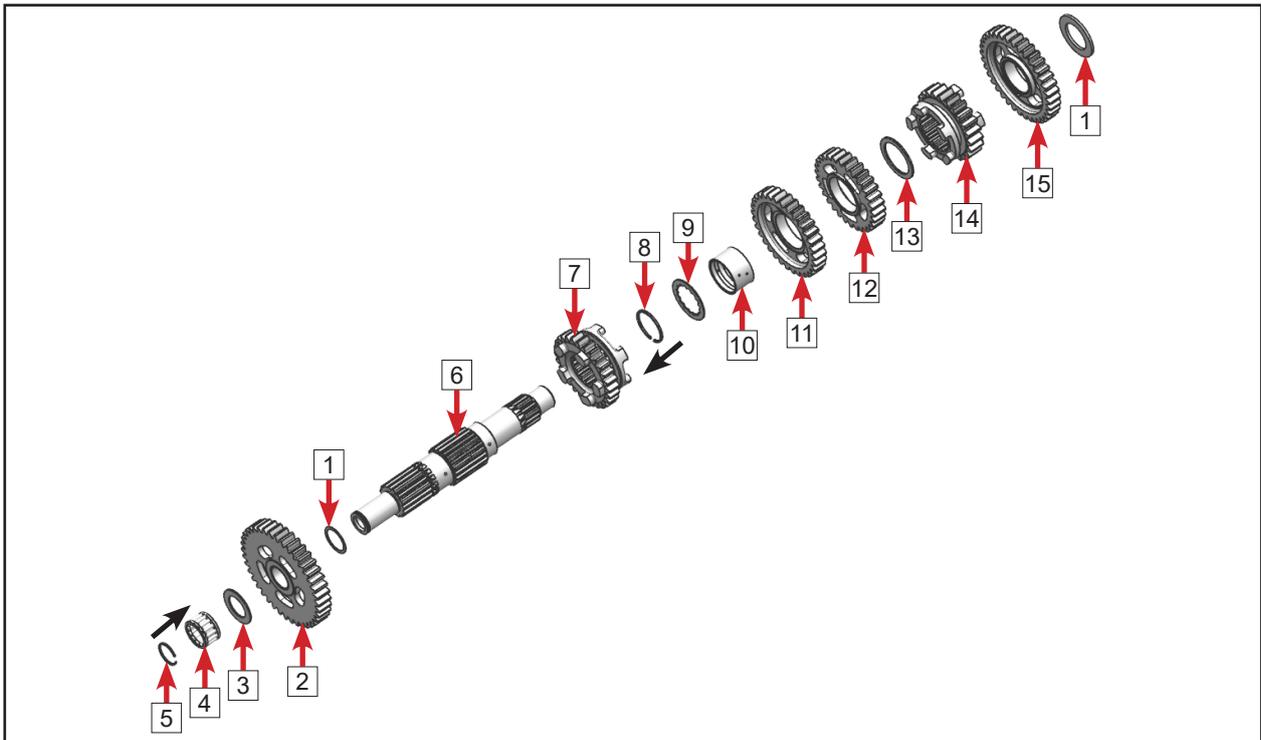
Inspect the shift position of countershaft first gear [2], third gear [11], fourth gear [12] and second gear [15] for serious wear or damage. Replace gears in pairs if so.

Inspect whether countershaft fifth gear [7] and sixth gear [14] should slide smoothly on countershaft [6]. Replace countershaft fifth gear or sixth gear or countershaft if stuck.

Inspect washer [1 3 13 16] and spline washer [9] for serious wear or damage. Replace washer or spline washer if so.

Inspect shaft sleeve [10] for serious wear or damage. Replace shaft sleeve if so.

Use new circlip [5] and [8] for each service.



Assembly

NOTE: The removed circlip must not be used again and replaced with a new one. When installing the retaining circlip, the side with round corners faces the direction indicated by the arrow in the figure. Make sure the retaining circlip is fully installed in the slot.

Please lubricate all parts carefully before assembly.

Install washer **1** on the countershaft **6**.

Install countershaft first gear **2**.

Install washer **3**.

Install needle bearing **4**.

Install a new circlip **5**.

Install countershaft fifth gear **7**.

Install a new circlip **8**.

Install spline washer **9**.

Install shaft sleeve **10**.

Install countershaft third gear **11**.

Install countershaft fourth gear **12**.

Install washer **13**.

Install countershaft sixth gear **14**.

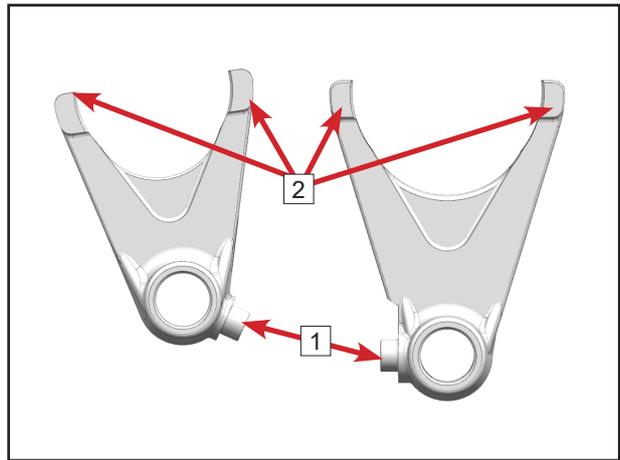
Install countershaft second gear **15**.

Install washer **16**.

Finally inspect the motion smoothness of all gears.

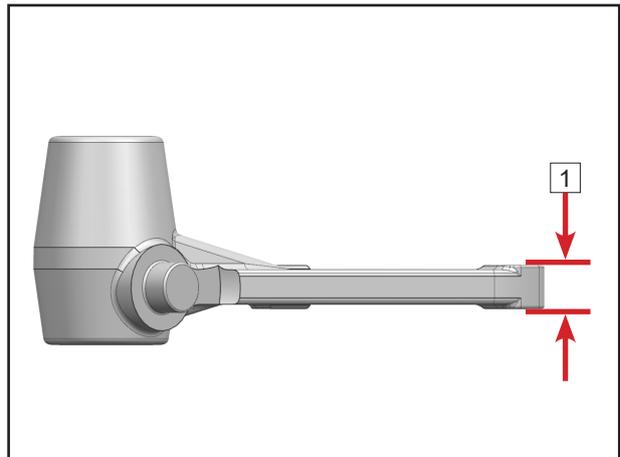
Fork/Fork Shaft/Sliding Gear

Inspect fork pin **1** and fork claws **2** for serious wear, damage or bending. Replace new fork if so.



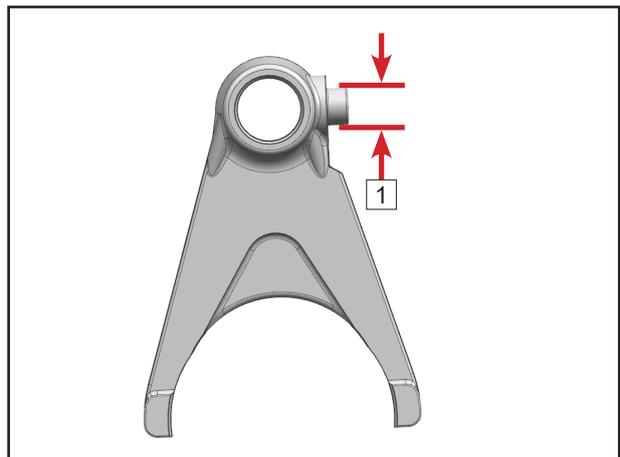
Measure the thickness **1** of the shifting fork claw. If it is less than the service limit, replace with new part.

Shifting Fork Claw Thickness	
New Part	5.9 mm ~ 6.0 mm
Service Limit	5.8 mm

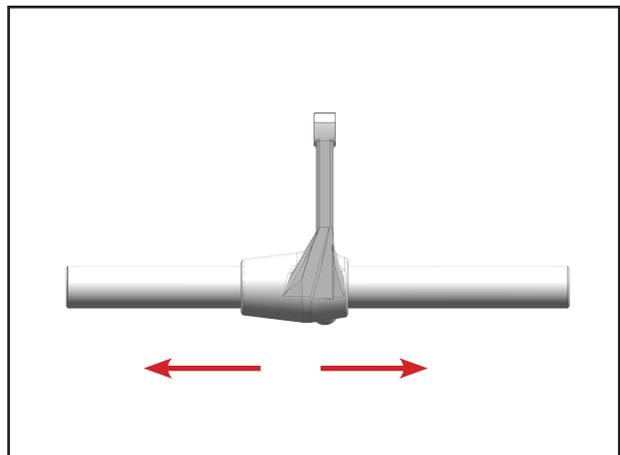


Measure the diameter of shifting fork pin **1**. If it is less than the service limit, replace with new part.

Diameter of Shifting Fork Pin	
New Part	6.9 mm ~ 7.0 mm
Service Limit	6.8 mm

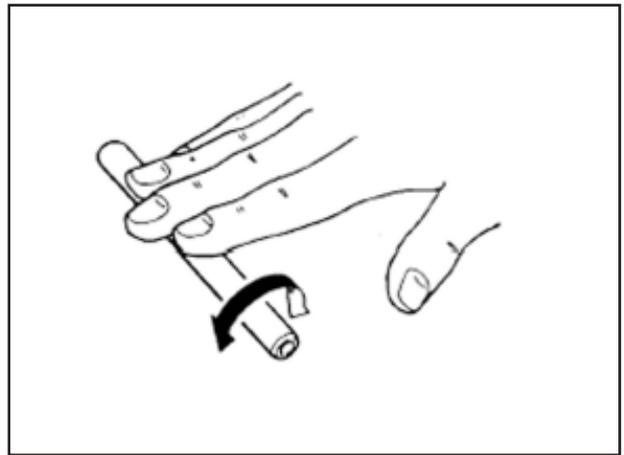


Place each fork on the fork shaft, move it left and right. If not smooth, replace with new parts.



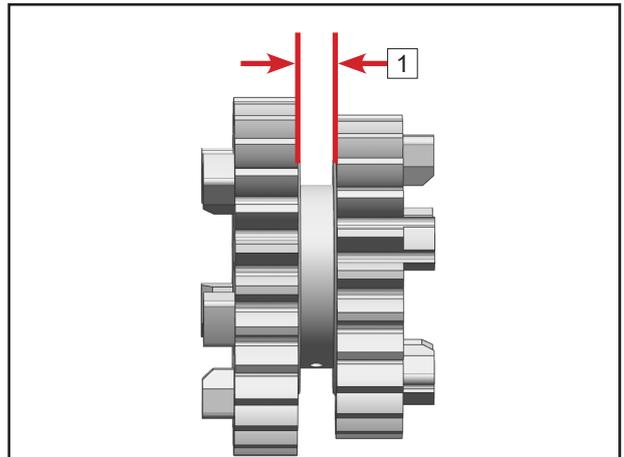
Put the fork shaft on the plate to roll.
Replace new part if found any bending.

⚠ CAUTION: Do not try to correct a bent shift fork shaft.



Measure the width **1** of slot on the sliding gear matching with the fork. If it is greater than service limit, replace it with new part.

Fork Slot Width	
New Part	6.05 mm ~ 6.15 mm
Service Limit	6.25 mm

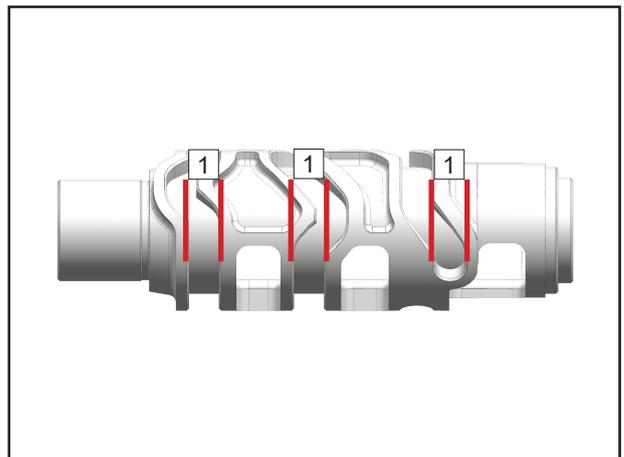


Gearshuft Drum

Inspect the shifting slot of the gearshift drum for damage or excessive wear.
Replace new part if so.

Measure the width **1** of shifting slot.
Replace new part if it is greater than service limit.

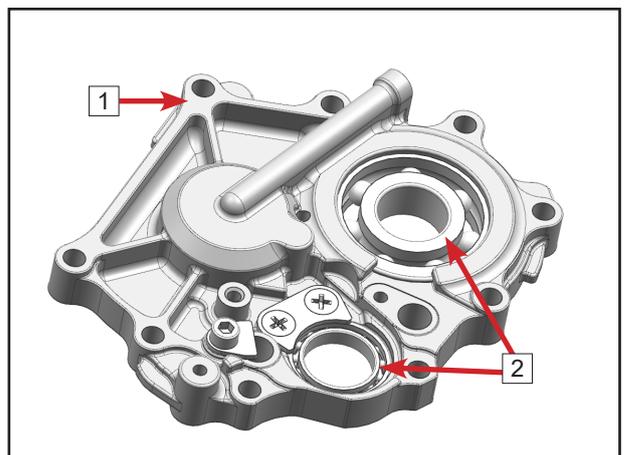
Shifting Slot Width	
New Part	7.10 mm ~ 7.17 mm
Service Limit	7.30 mm



Gear Case

Inspect gear case **1** for cracks or other damage. Replace it if necessary.

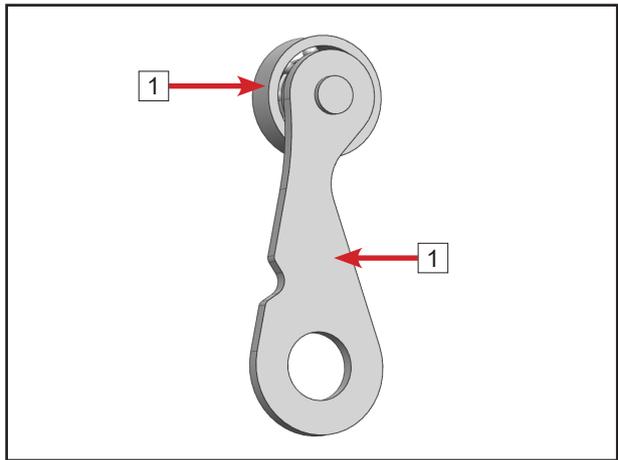
Gently rotate the inner ring of bearing **2 with fingers, the bearing should rotate smoothly and quietly. Replace it if the bearing rotation has stuck, noise or other defects.**



Gearshift Swing Arm

Inspect gearshift swing arm **1** for deformation. Replace new gearshift swing arm if it does.

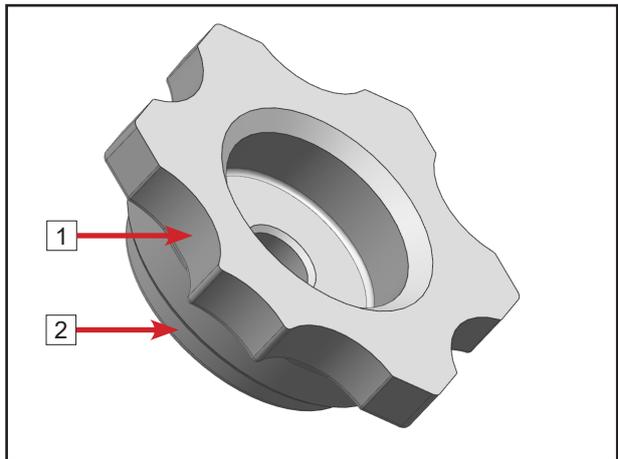
Inspect whether the bearing **2** rotates flexibly. If stuck, replace the new shift position swing arm parts.



Gearshift Drum CAM

Inspect gearshift drum CAM for cracks or damage. Replace it if so.

Inspect position tooth surface **1** and cylinder surface **2** for serious wear. Replace gearshift drum CAM if it does.

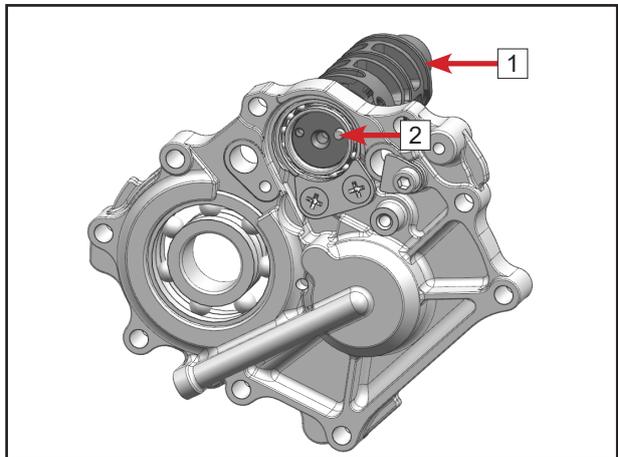


Shifting Assembly

Please lubricate all parts carefully before assembly.

Install gearshift drum **2**.

Install needle roller **1**.



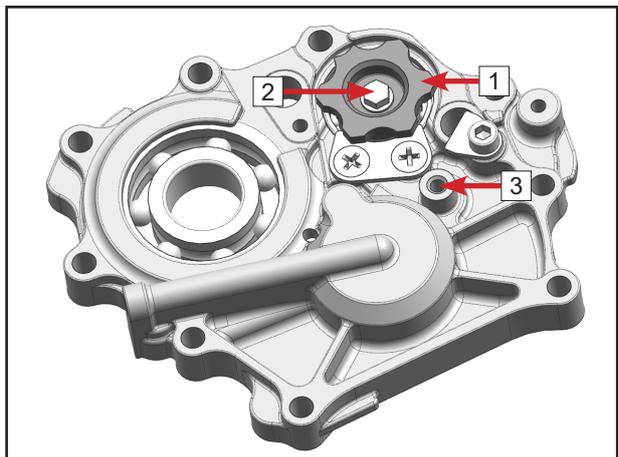
Align the position slot of gearshift drum CAM with the needle roller on the gearshift drum, and install gearshift drum CAM **1**.

Apply 243 thread locker on the bolt **2**.

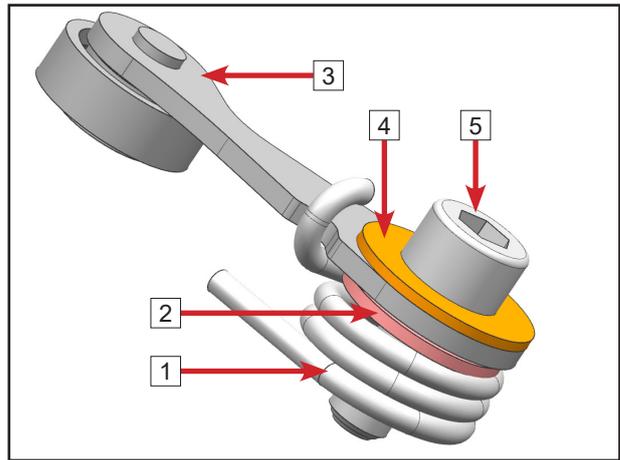
Install bolt **2**, and tighten to the specified torque.

Gearshift Drum CAM Bolt Torque
12N•m

Apply 243 thread locker on the hole **3**.

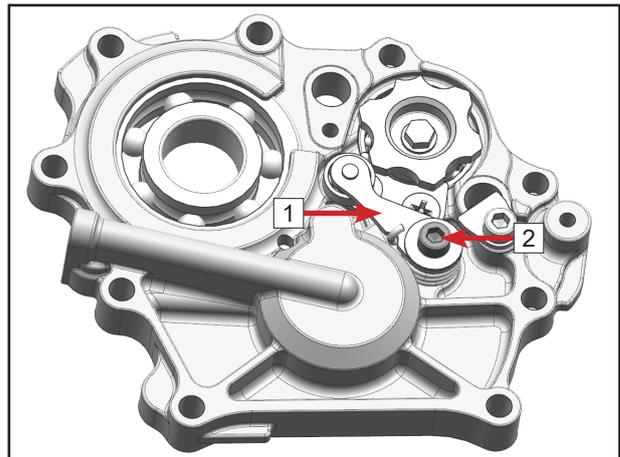


Assemble swing arm spring [1], washer [2], gearshift swing arm [3], swing arm shaft sleeve [4] and inner hex bolt [5] together.

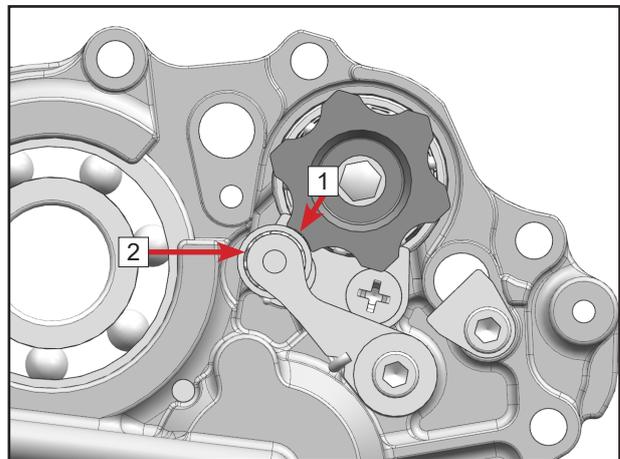


Install gearshift swing arm [1], and tighten bolt [2] to the specified torque.

Gearshift Swing Arm Bolt Torque
12N•m

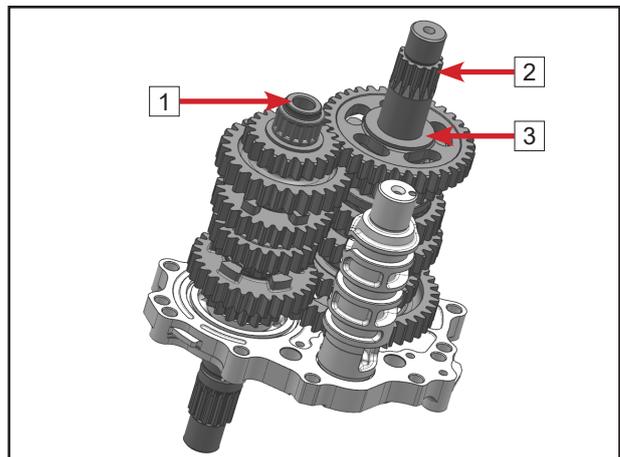


Turn gearshift drum CAM, and align neutral position [1] with the bearing [2].



Install main shaft [1] and countershaft [2].

NOTE: Make sure the washer [3] is not missing.

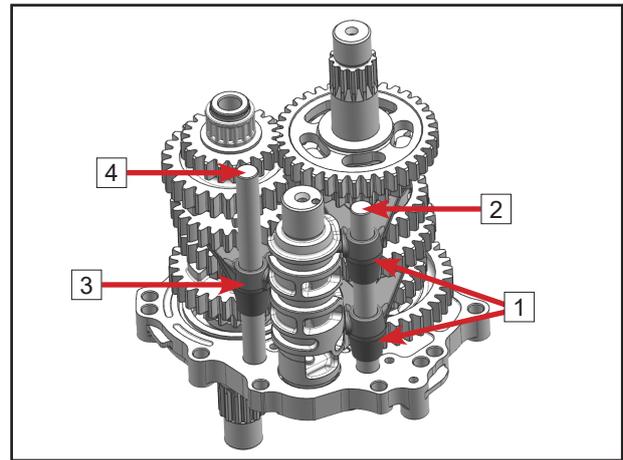


Insert the fork pawl into the fork slot of sliding gear, insert the fork pin into the shift slot on the shift drum, and then install the countershaft fork **1**.

Install countershaft fork shaft **2**.

Insert the fork pawl into the fork slot of sliding gear, insert the fork pin into the shift slot on the shift drum, and then install the main shaft fork **3**.

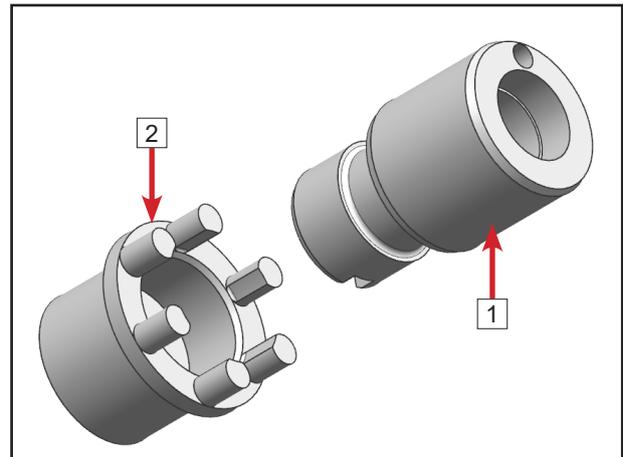
Install main shaft fork shaft **4**.



13.5.23 Gearshift Assembly Inspection

Inspect gear drive shaft **1** for severe wear or damage. Replace it if it does.

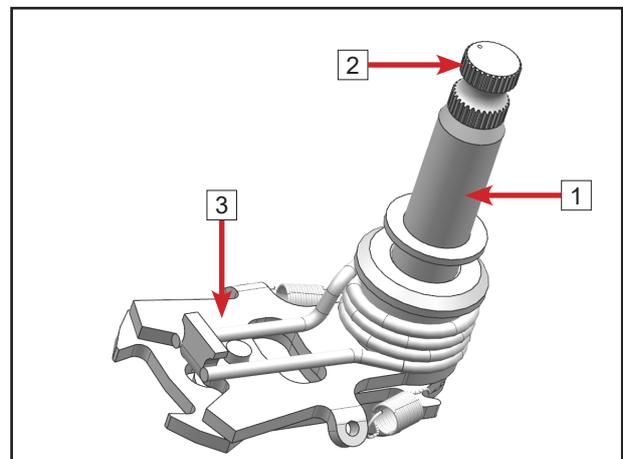
Inspect shift location drum **2** for severe wear or damage. Replace it if it does.



Inspect shift lever spline **2** for wear and damage. Replace new shift lever assembly **1** if so.

Inspect fork pawl **3** for severe wear. Replace new shift lever assembly **1** if so.

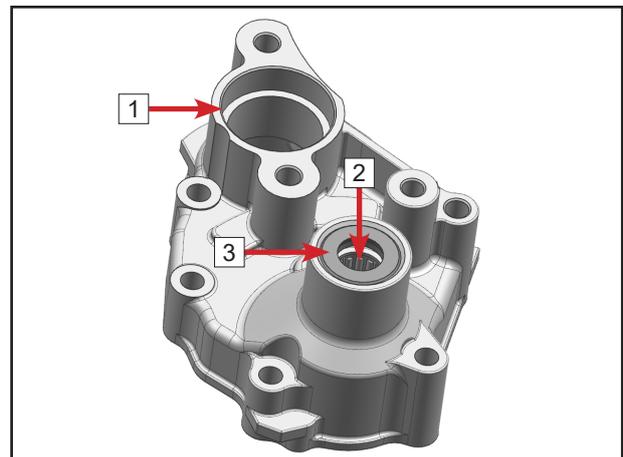
Inspect whether the fork pawl **3** rebounds smoothly without stuck. Replace new shift lever assembly **1** if serious stuck.



Inspect gearshift shaft cover **1** for cracks or other damage. Replace new part if so.

Inspect needle bearing **2**. Replace new part if damaged or stuck in rotation.

Inspect oil seal **3** for damage. Replace new part if so.

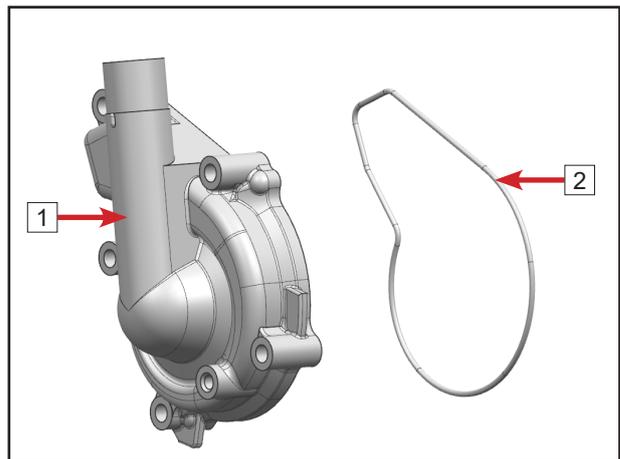


13.5.24 Water Pump Inspection

Water Pump Cover

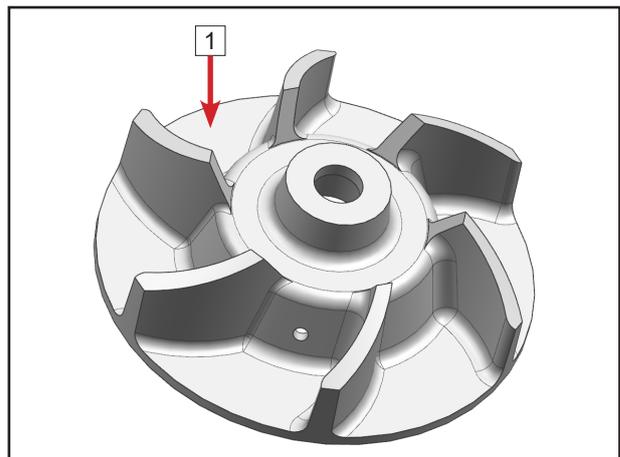
Inspect water pump cover **1** for cracks, damage or severe deformation. Replace new parts if it does.

Inspect water pump cover seal ring **2** for breakage, hardening or damage. Replace it if necessary.

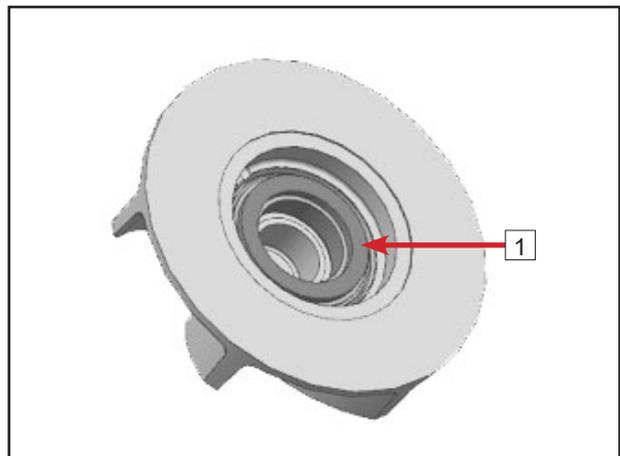


Water Pump Impeller

Inspect water pump impeller **1** for cracks or other damage. Replace it if it does.



Before installing water seal ring **1**, use a medical cotton swab dipped in alcohol to clean the water seal ring.



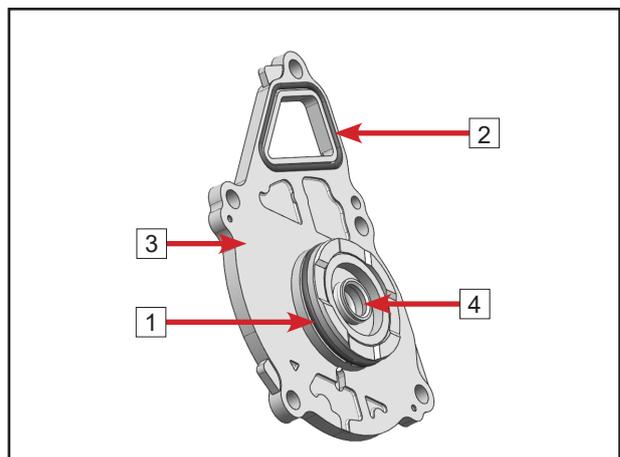
Water Pump

Inspect O-ring **1** and water pump seal ring **2** for cracks, hardening or damage. Replace it if necessary.

Inspect water pump **3** for cracks, damage or severe deformation. Replace new part if it does.

Inspect oil seal **4** for damage. Replace it if it does.

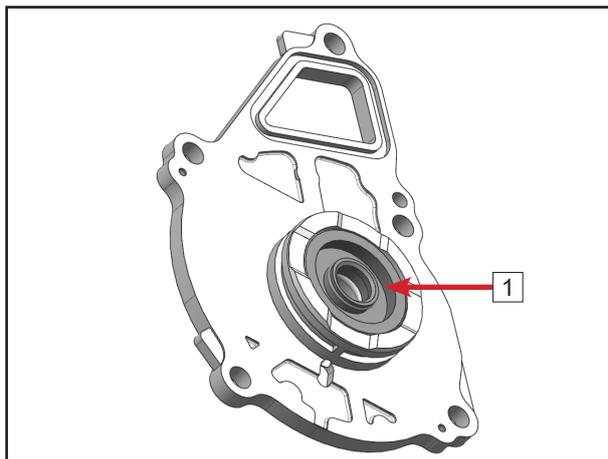
Inspect visually water pump. If any part is damaged, replace the pump body as a whole. If the pump body is not damaged, it can not be disassembled.



Removal

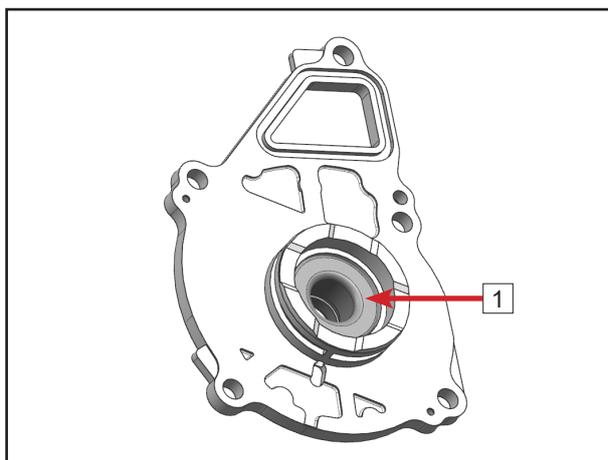
Remove oil seal **1**.

NOTE: The removed oil seal should be scrapped, and new oil seal must be used when installing.



Use suitable tools to press the water seal ring **1** out of pump body.

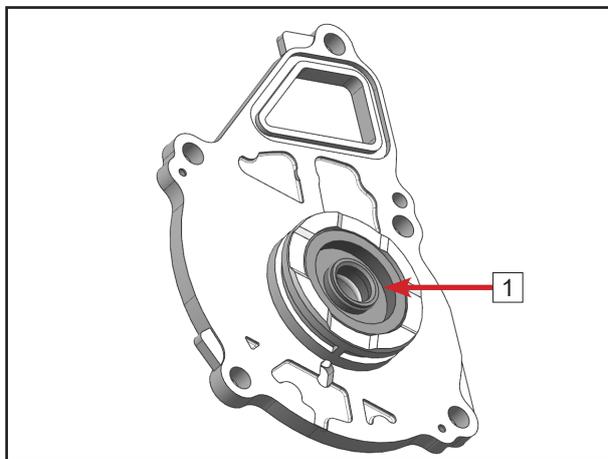
NOTE: The removed water seal should be scrapped, and new water seal must be used when installing.



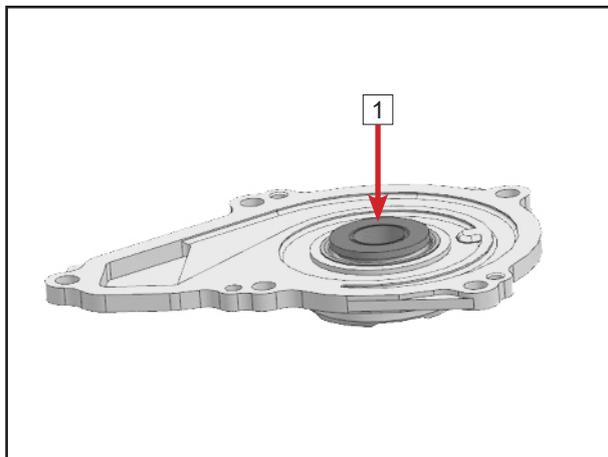
Assembly

Apply 648 cylindrical bonding sealant on the outer cylinder of oil seal **1**, and install oil seal **1**.

NOTE: The marked side of oil seal faces outside.



Apply sealant to the mounting surface of water seal static ring assembly **1**, and install it into the mounting hole of water pump body with appropriate tool.

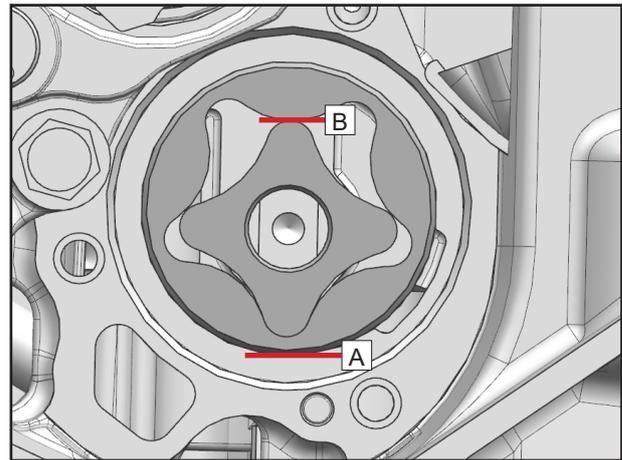


13.5.25 Oil Pump Inspection

Measure the clearance **A** between the outer rotor and oil pump housing and the clearance **B** between the inner and outer rotors by feeler.

Oil Pump	
Outer Rotor and Oil Pump Housing Clearance	A ≤ 0.15mm
Inner and Outer Rotors Clearance	B ≤ 0.2mm

If the measurement value exceeds the specified range: replace oil pump inner and outer rotor. Replace oil pump housing if necessary.



Inspect oil pump inner rotor **1**, outer rotor **2** for severe wear or damage. Replace oil pump rotor if it does.

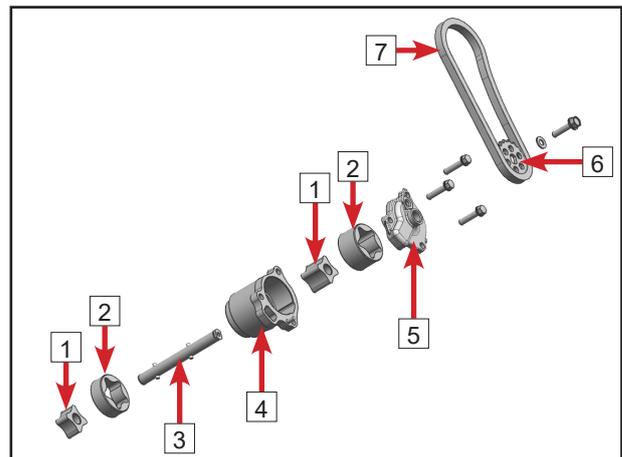
Inspect oil pump shaft **3** for severe wear or damage. Replace oil pump shaft if it does.

Inspect oil pump body **4** for severe wear or damage. Replace oil pump body if it does.

Inspect oil pump cover **5** for severe wear or damage. Replace oil pump cover if it does.

Inspect oil pump sprocket **6** for severe wear or damage. Replace oil pump sprocket if it does.

Inspect oil pump chain **7** for severe wear or damage. Replace oil pump chain if it does.



13.6 Engine Assembly

13.6.1 Crankshaft Assembly and Balancer

Assemble crankshaft and balancer in pairs according to following table.

Balancer Drive Gear (on crankshaft) Mark	Balancer Mark
A	B
B	A

The grouping of balancer drive gear refers to chapter 13.5.18.

The grouping of balancer refers to chapter 13.5.17.

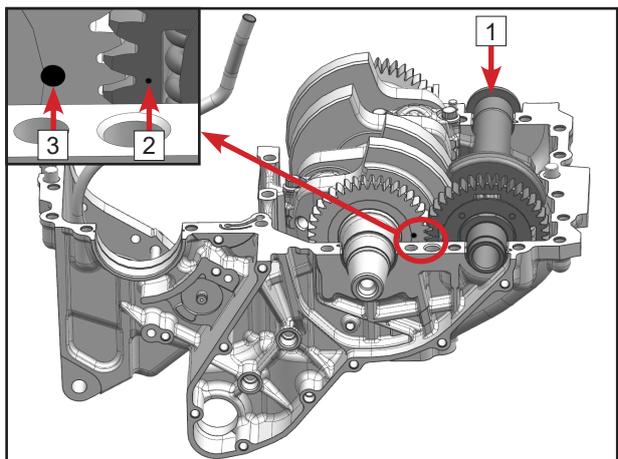
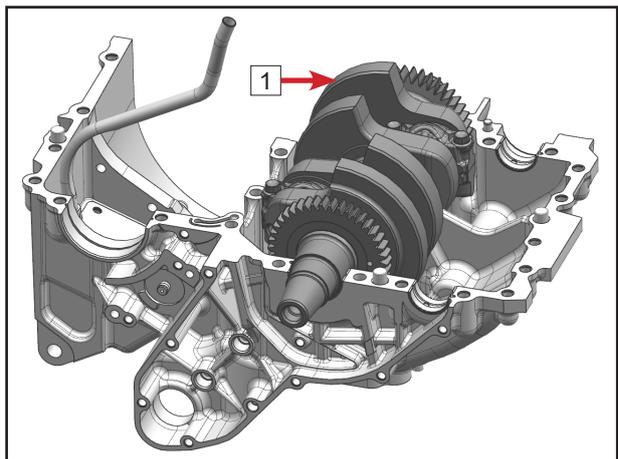
Apply oil on main plain bearing and crankshaft main journal.

Install crankshaft assembly **1**.

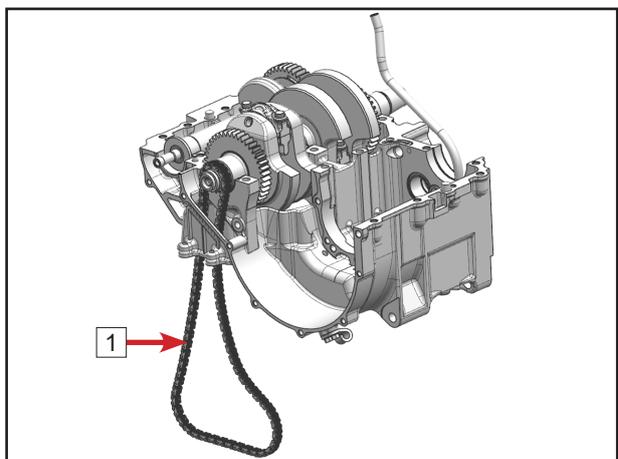
Apply oil on balance plain bearing and balance shaft neck.

Install balancer assembly **1**.

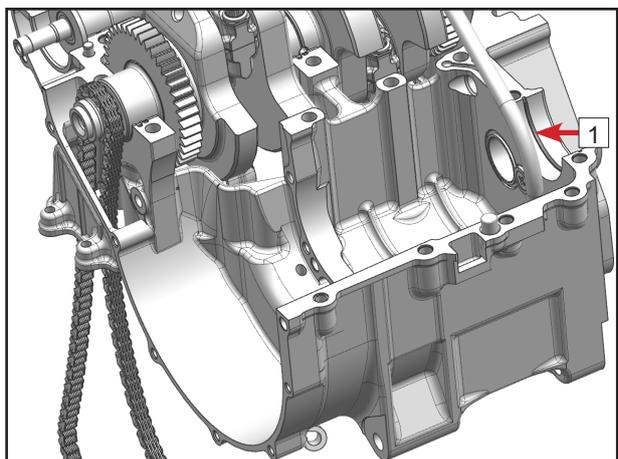
NOTE: Align mark **2 and mark **3** when installing.**



Place timing chain **1** on correct position.

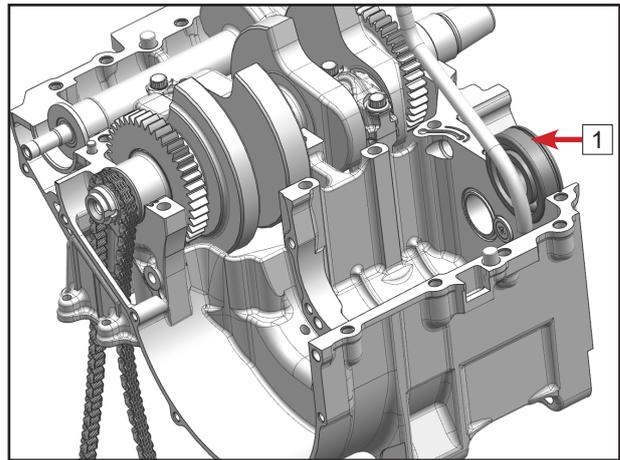


Install bearing stop ring **1** on the slot of upper crankcase.



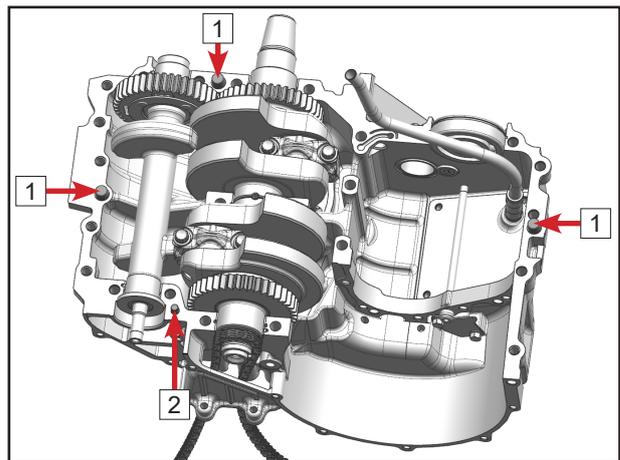
Install countershaft bearing **1**.

NOTE: Click bearing stop ring on ring slot of countershaft bearing.



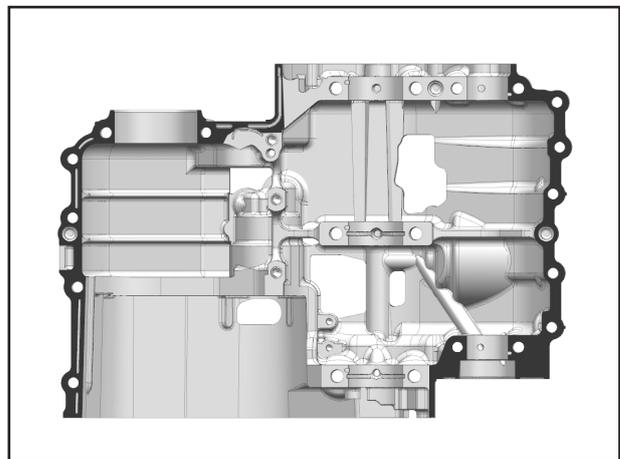
13.6.2 Lower Crankcase Installation

Install needle rollers **1** and **2**.

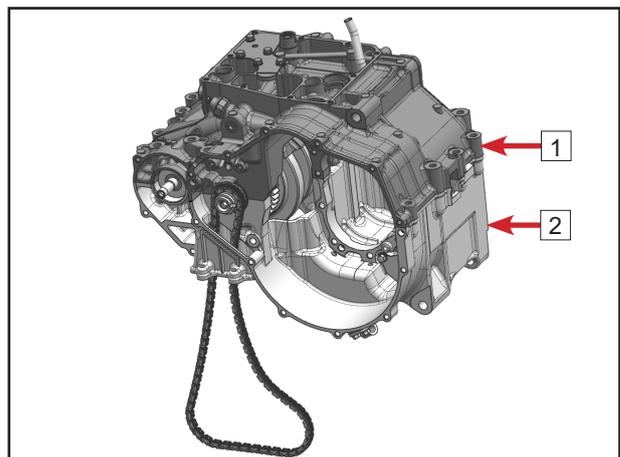


Wipe junction area of upper and lower crankcase with dust-free paper to make it clean and dry.

Apply KB598 flange sealant on lower crankcase junction area evenly. The gluing position is shown on the right picture.

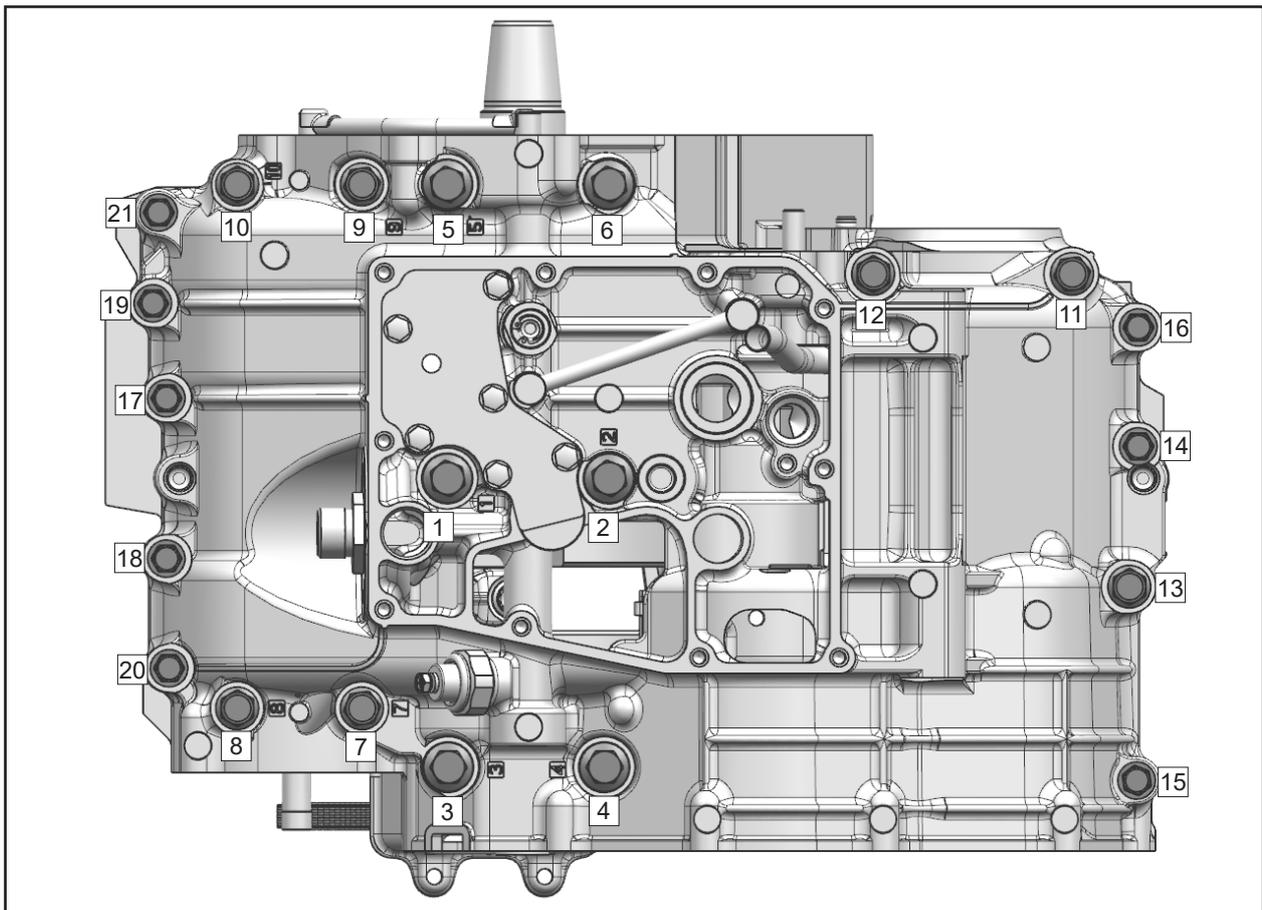


Install lower crankcase **1** on upper crankcase **2**.



CFMOTO

Install and tighten crankcase bolt according to the following sequence and steps. One washer is installed at the bolt 1~6.



Tighten Steps	Bolt Number	Torque (N·m)
Step 1	1~21	8
Step 2	1~10	20
Step 3	1~10	35
Step 4	1~6	44
Step 5	11~13	27.5
Step 6	14~21	20

Bolt Number	Part Name
1, 2, 5, 6	Bolt M9×113
3, 4	Bolt M9×83
7, 9	Bolt M8×73
8, 10, 11	Bolt M8×60
12	Bolt M8×110
13	Bolt M8×50
14, 16, 17, 18, 19, 20	Bolt M7×40
15	Bolt M7×34
21	Bolt M7×47

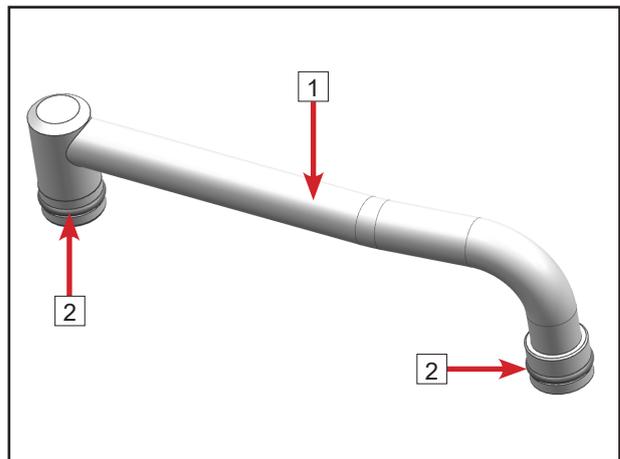
NOTE: Apply liquid mixed with oil and MoS₂ grease on thread and washer of bolt 1~10 (weight ratio 10:1).

The crankshaft should be rotated flexibly without stuck, otherwise loosen crankcase bolt for inspection.

13.6.3 Oil Pan Assembly

Install O-seal rings **2** on oil pipe assembly **1**.

Apply oil on O-seal ring **2**.

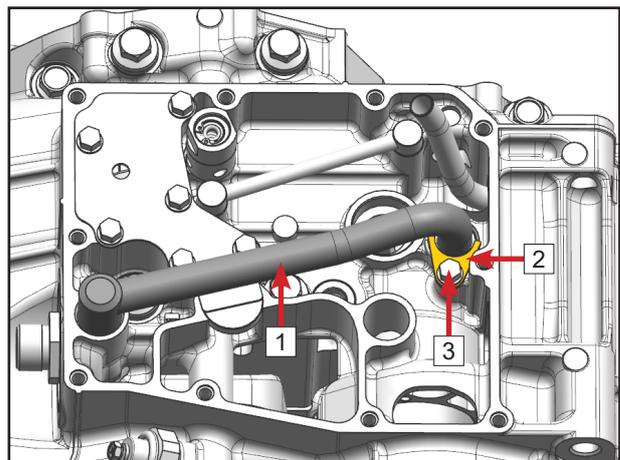


Apply oil on holes of oil pipe **1**.

Install oil pipe **1** on lower crankcase.

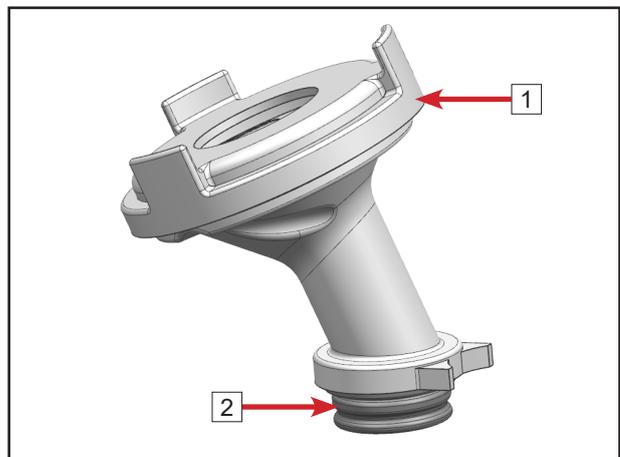
Install oil pipe **1** press plate **2**.

Install bolt **3** (apply 243 thread locker), and tighten to specified torque.



Oil Pipe	Press Plate Bolt Torque
	10N•m

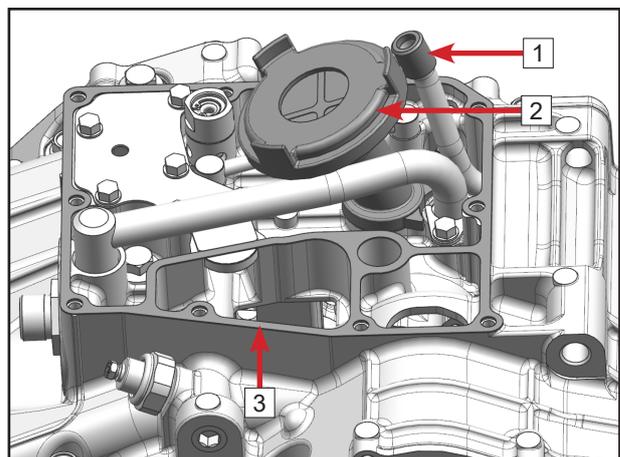
Install oil suction pan **1** on seal ring **2**.



Install damper, oil return hose **1**.

Install oil suction pan assembly **2** on correct position.

Place oil pan gasket **3** on correct position.

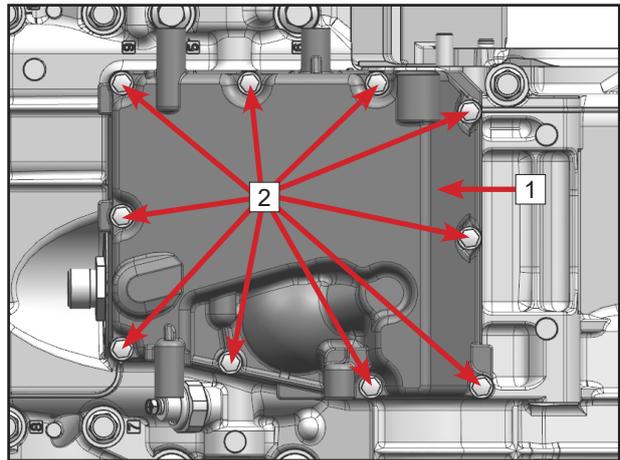


Align oil return hose with installation slot of oil suction pan.

Install oil suction pan **1**.

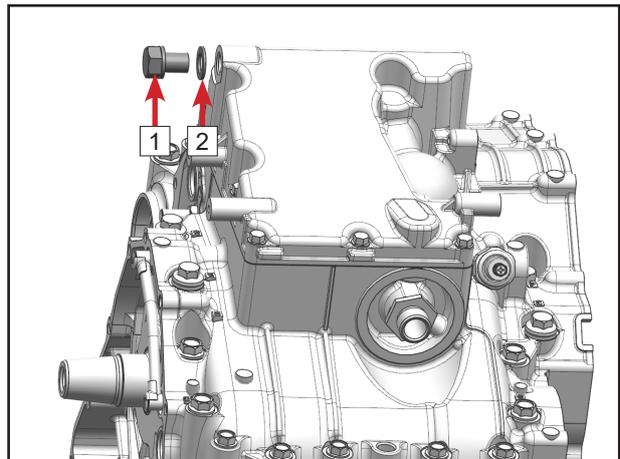
Install bolt **2** and tighten it to the specified torque in criss-cross way.

Oil Pan Bolt Torque
12N•m



Install magnetic drain bolt **1** and washer **2**, and tighten to the specified torque.

Magnetic Drain Bolt Torque
35N•m

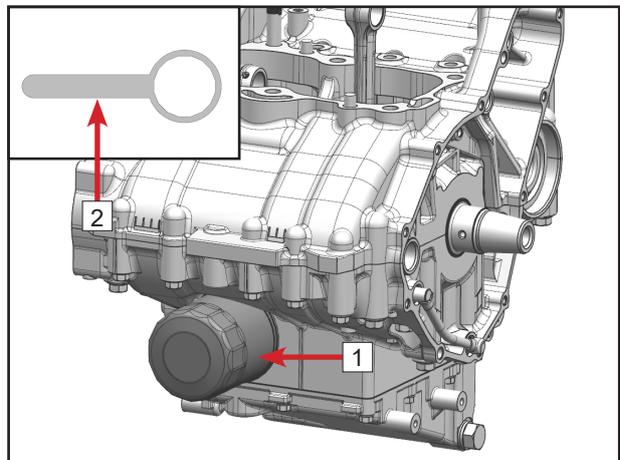


13.6.4 Oil Filter Installation

Use special wrench: oil filter wrench **2** to install oil filter **1**.

Oil Filter Torque
17N•m

⚠ CAUTION: Wrap oil filter with a cloth or rubber mat, to prevent the wrench breaks the filter.



13.6.5 Oil Pump Assembly

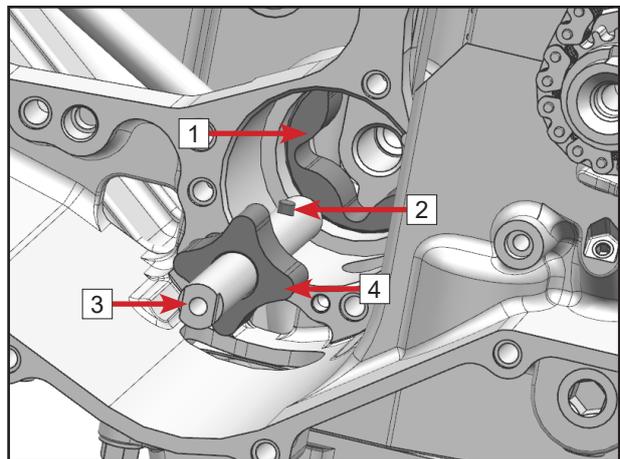
NOTE: Apply oil on main oil pump outer rotor, main oil pump inner rotor and oil pump shaft before installation.

Install main oil pump outer rotor **1**.

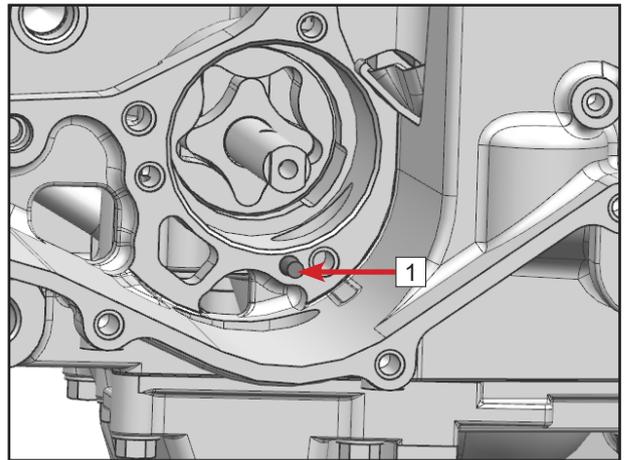
Install roller needle **2** on oil pump shaft **3**.

Install main oil pump inner rotor **4** on oil pump shaft **3**, and stick roller needle **2** into the groove of inner rotor **4**.

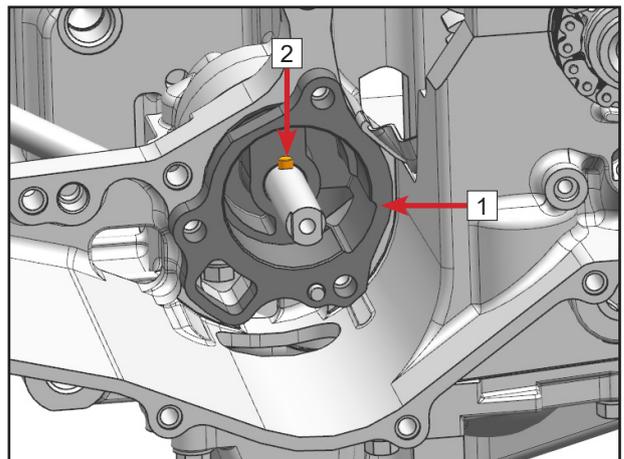
Install oil pump shaft with inner rotor **3** on the lower crankcase. (Rotate to the right angle when installing)



Install roller needle **1**.



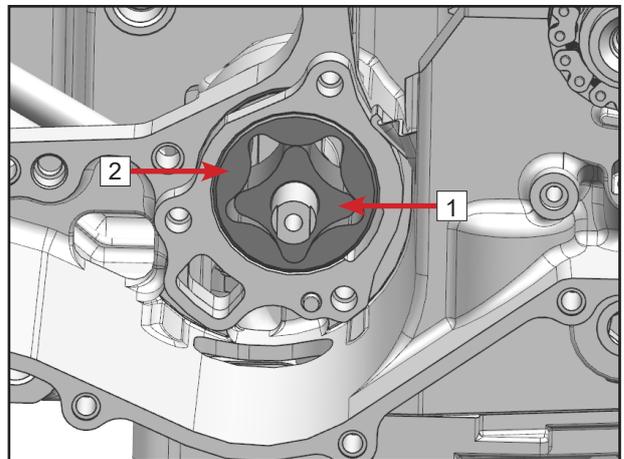
Install oil pump **1**.
Install roller needle **2**.



NOTE: Apply auxiliary oil pump inner rotor and auxiliary oil pump outer rotor with oil before installing.

Install auxiliary oil pump inner rotor **2** and stick roller needle into the groove of inner rotor.

Install auxiliary oil pump outer rotor **2**.
(Rotate to the right angle when installing)

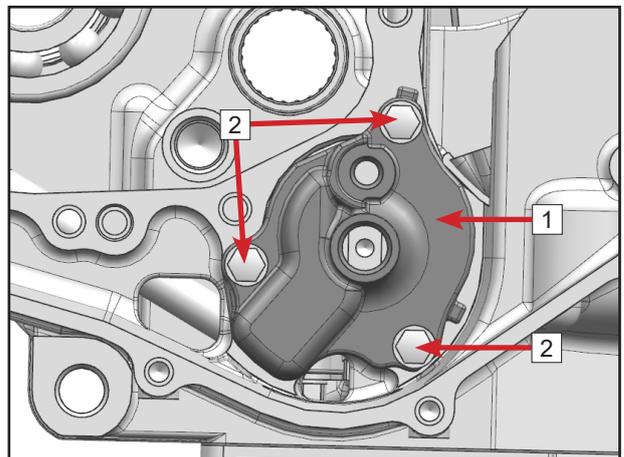


Install oil pump cover **1**.
Install bolts **2** and tighten to the specified torque.

Oil Pump Cover Bolt Torque
12N•m

Rotate oil pump shaft to make sure it rotates freely.

Pull and push oil pump shaft to make sure it has axial clearance.



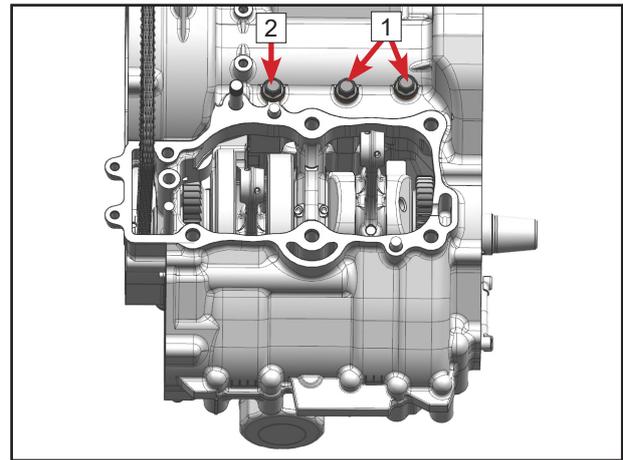
13.6.6 Cylinder Body and Pistons Installation

Install bolts and washers **1** and tighten to the specified torque.

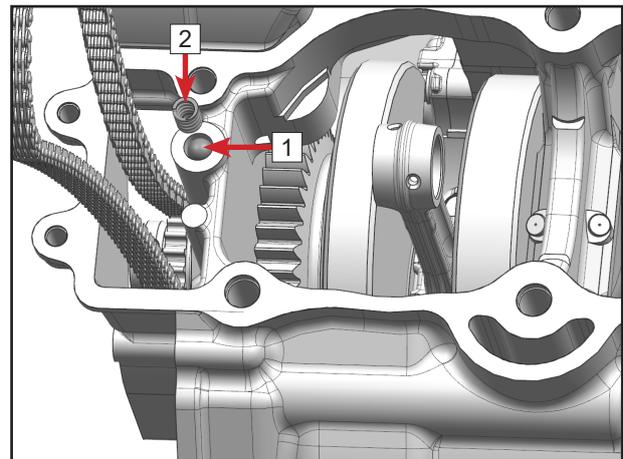
Install bolt and washer **2** and tighten to the specified torque.

Crankcase Bolt 1 2 Torque
27.5N•m

NOTE: Apply engine oil on the bolt thread before installing.



Install steel ball **1** and balance gear spring **2**.



Install roller needle **1**.

Install new cylinder body gasket **2**.

Assemble cylinder body and piston in pairs according to following table.

Cylinder Body Mark	Piston Mark
I	I
II	II

Rotate crankshaft to make the connecting rod at a suitable position.

Apply engine oil on piston pin **1**.

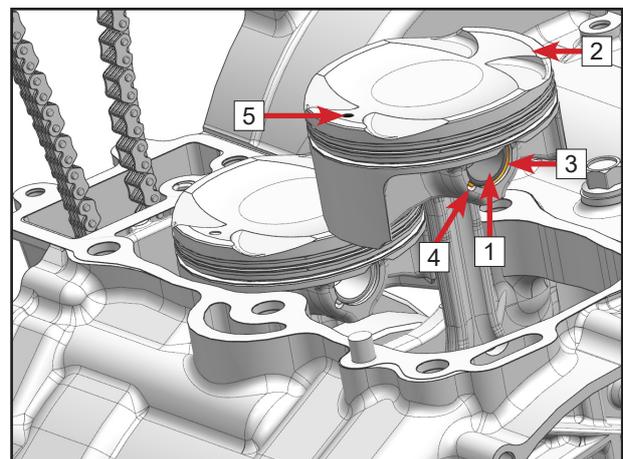
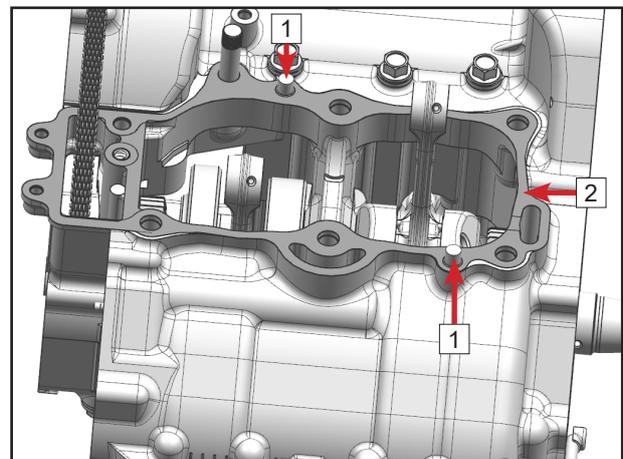
Insert the piston pin through the piston pin seat hole and the connecting rod small end hole, and attach the piston **2** to the connecting rod.

Install new piston pin circlip **3** with needle-nose pliers.

Ensure that the piston pin circlip are correctly positioned, and the circlip opening and ring groove notch **4** should be staggered.

⚠ CAUTION: The direction of piston mark **5 faces toward air exhaust side.**

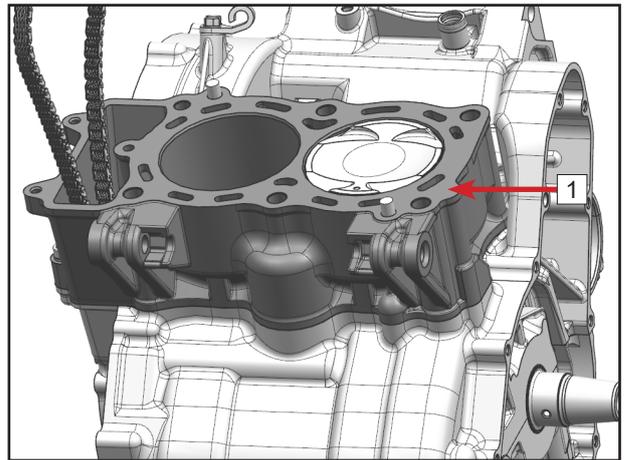
The other piston applies the same procedures.



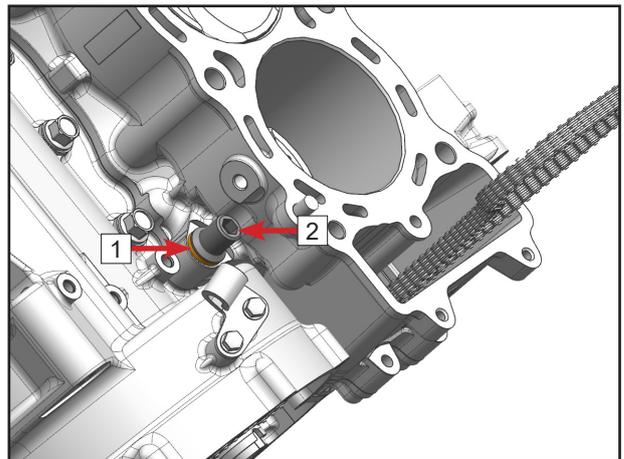
Apply engine oil on cylinder body **1** walls and pistons.

Align cylinder body and piston head. Slightly shake cylinder body to install pistons.

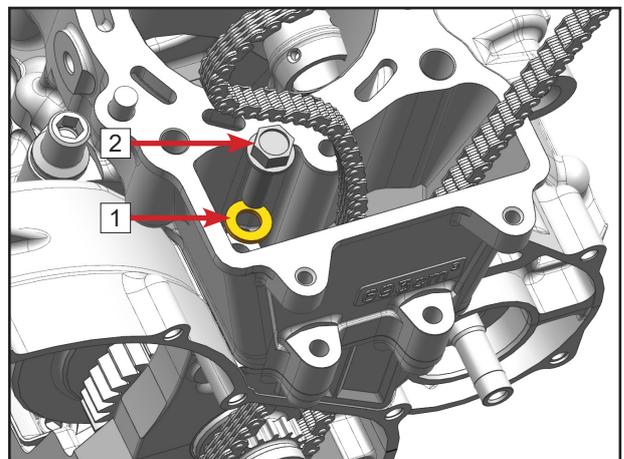
⚠ CAUTION: Make the opens of piston rings stall till during installation.



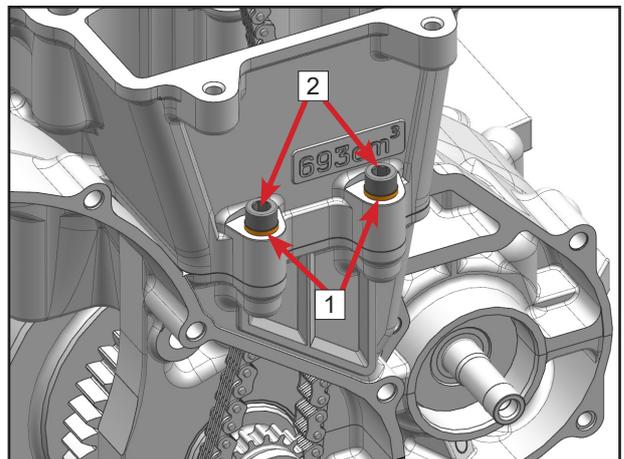
Install washer **1** and bolt **2**, and pre-tighten.



Install washer **1** and bolt **2**, and pre-tighten.



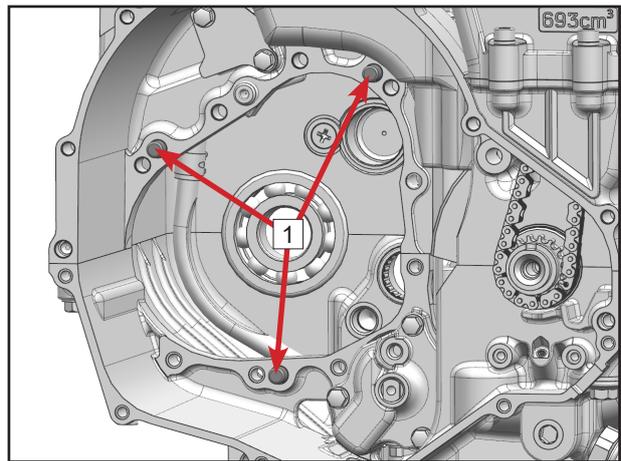
Install washers **1** and inner hex bolts **2**, and pre-tighten.



13.6.7 Transmission Assembly Installation

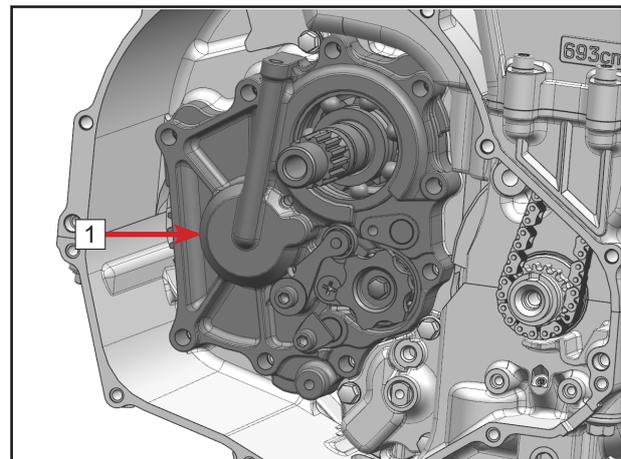
Install roller needle **1**.

Apply engine oil on all bearing holes.



Apply engine oil on all shaft journal.

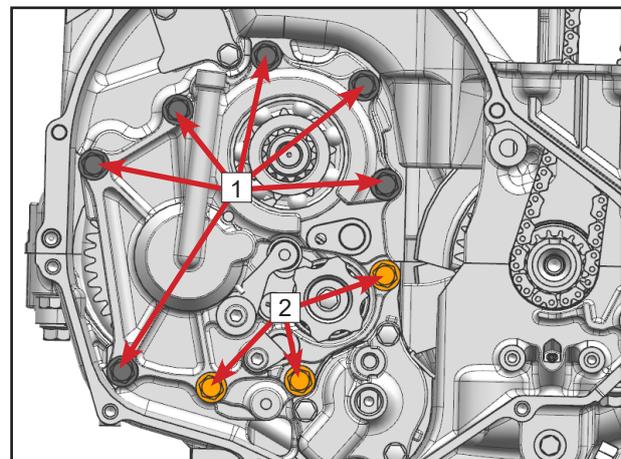
Install transmission assembly **1**.



Apply 243 thread locker on bolt **1** and bolt **2**.

Install bolt **1** and bolt **2**, and tighten to the specified torque in criss-cross way.

Gearshift Cover Bolt 1 2 Torque
20N•m

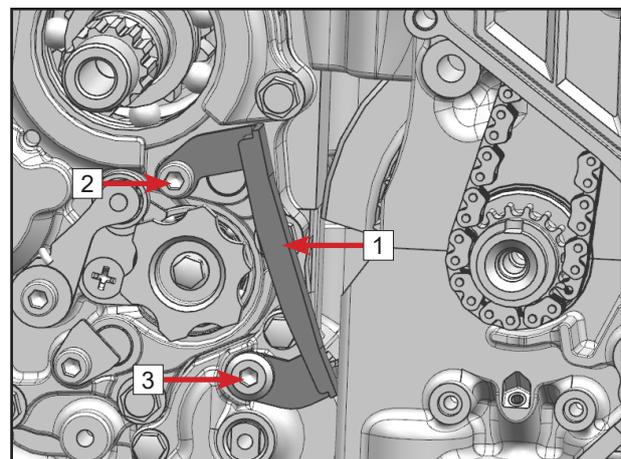


Apply 243 thread locker on inner hex screw **2** and **3**.

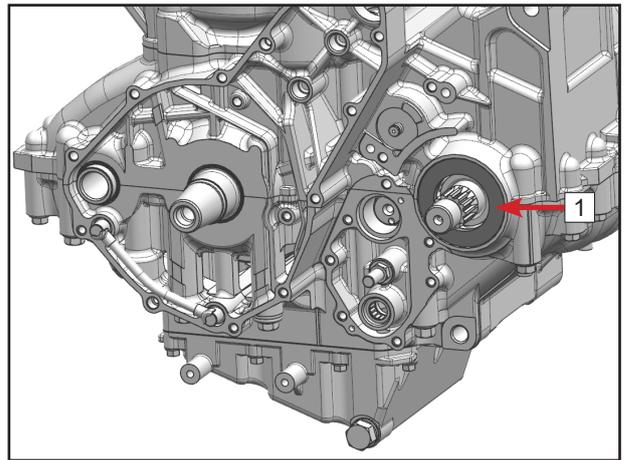
Install oil pump chain guide **1**.

Install inner hex screw **2** and **3**, and tighten to the specified torque.

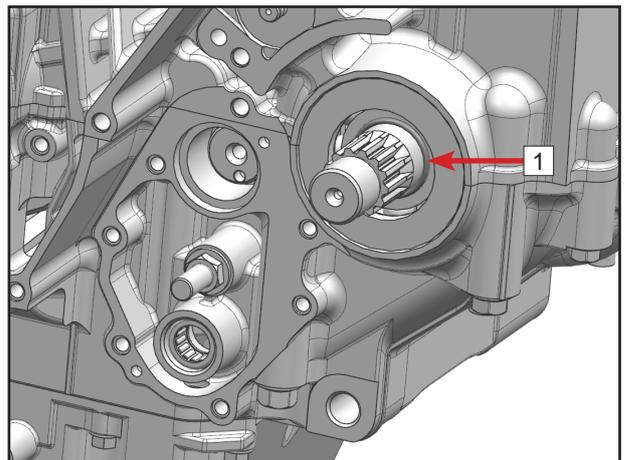
Oil Pump Chain Guide Bolt 2 3 Torque
10N•m



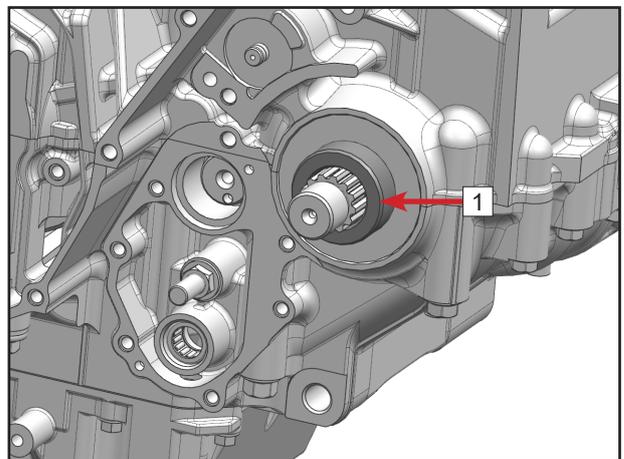
Install countershaft oil seal **1** with right tool.



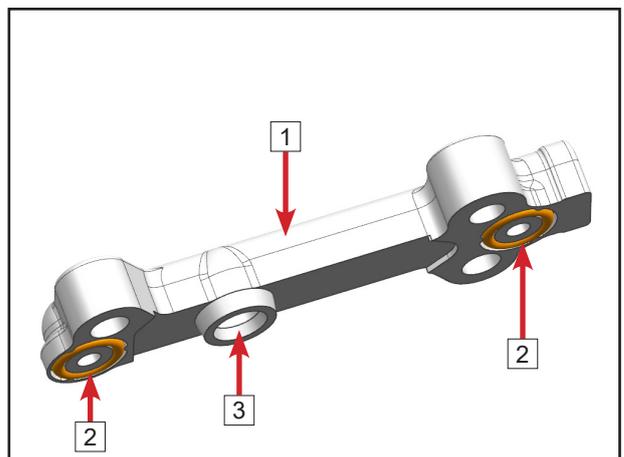
Install O-seal ring **1**.



Install countershaft sleeve **1**.

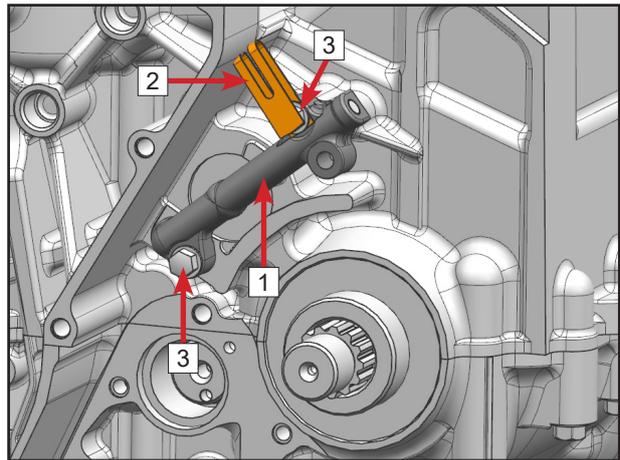


Install O-seal ring **2** on oil pipe IV assembly **1**.
Apply engine oil on the installation hole **3**.

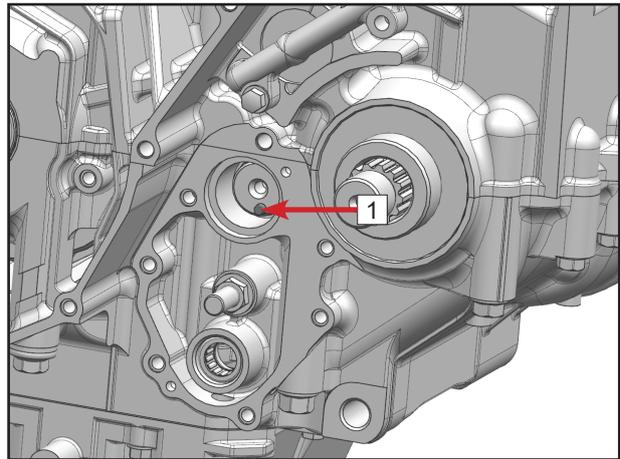


Install oil pipe IV assembly **1**.
Install wire clip **2**.
Install bolt **3**, and tighten to the specified torque.

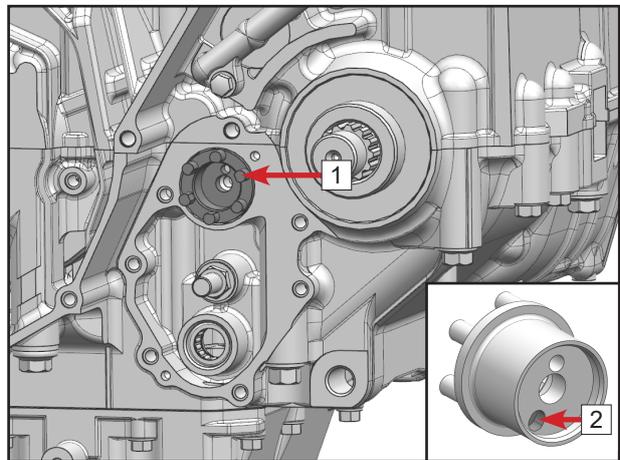
Oil Pipe IV Bolt Torque
10N•m



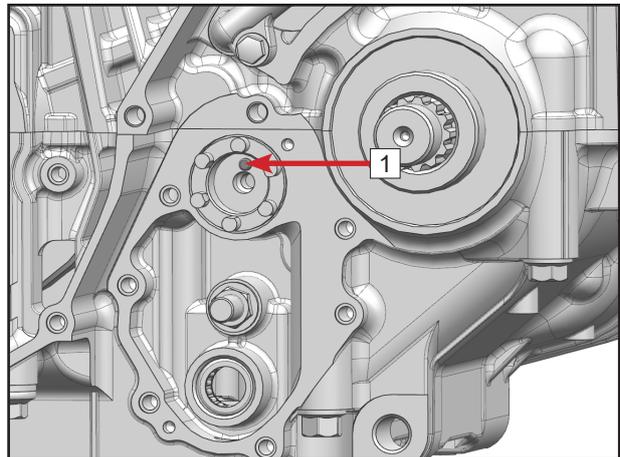
13.6.8 Gearshift Assembly Installation
Install roller needle **1** on the position hole of shift drum.



Align position hole **2** of shift drum with roller needle, and install shift drum **1**.



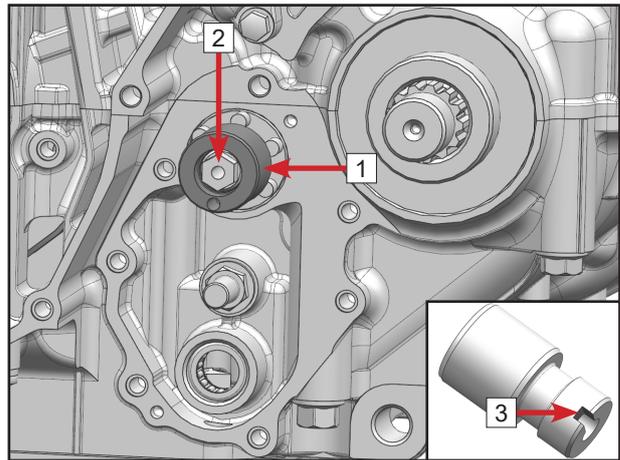
Install roller needle **1** on position hole of shift drum.



Align position slot **3** of gear drive shaft with roller needle, and install gear drive shaft **1**.

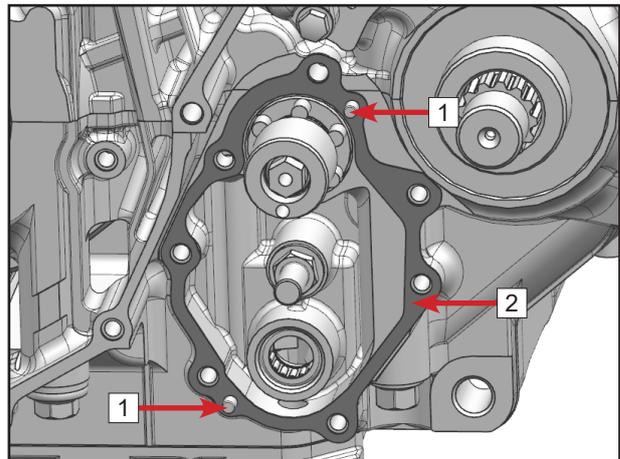
Apply contact bolt **2** with 243 thread locker, install contact bolt **2**, and tighten to the specified torque.

Contact Bolt Torque
12N•m



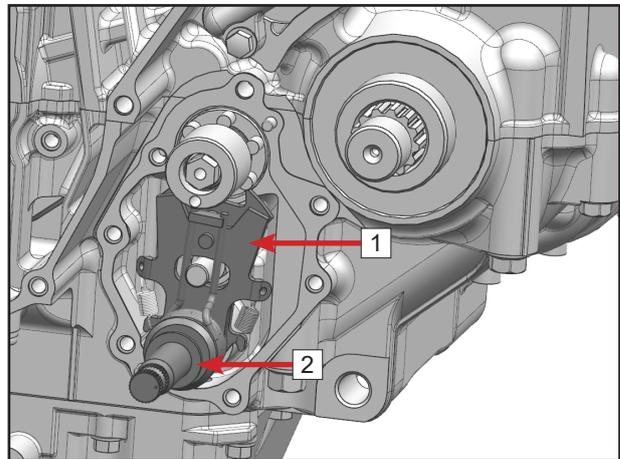
Install roller needle **1**.

Install gearshift cover gasket **2**.



Install gearshift sub assembly **1**.

NOTE: Make sure the gasket **2 is not missing.**

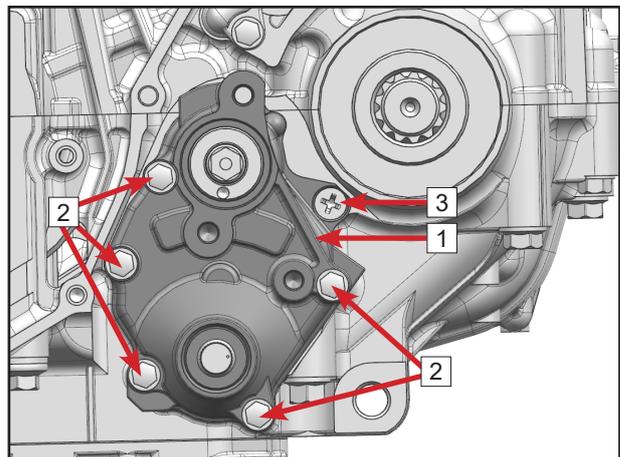


Install gearshift cover **1**.

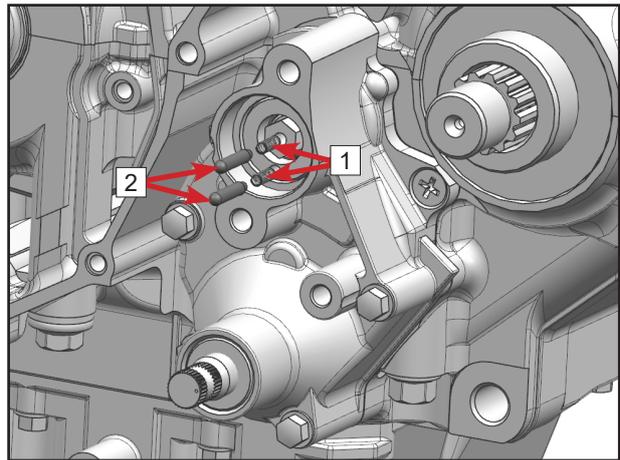
Install bolt **2** and screw **3**, and tighten to the specified torque.

Gearshift Cover Bolt 2 Torque
12N•m

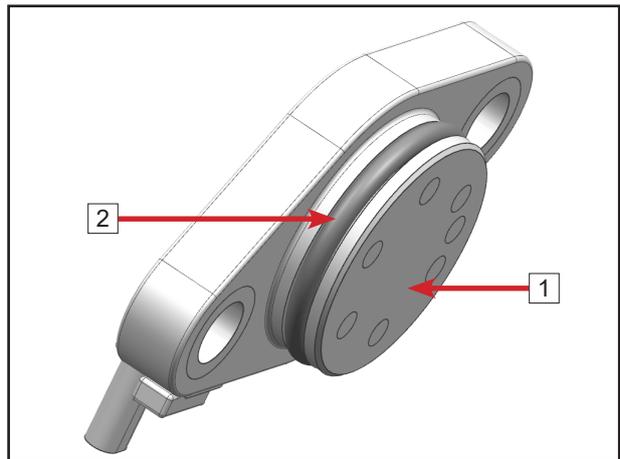
Gearshift Cover Screw 3 Torque
6N•m



Install contact spring **1**.
Install ball contact **2**.

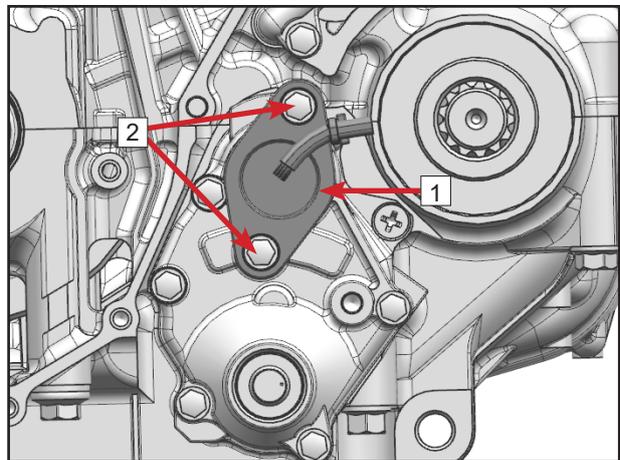


Install O-seal ring **2** on gear contactor **1**.
Apply O-seal ring **2** with engine oil.



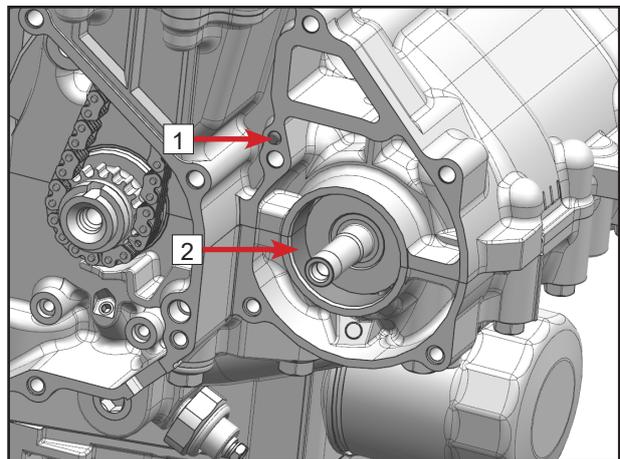
Install gear contactor **1**.
Install bolt **2**, and tighten to the specified torque.

Gear Contactor Bolt Torque
10N•m

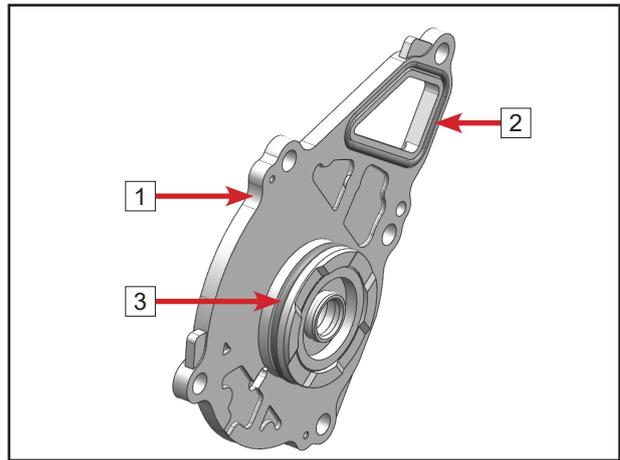


13.6.9 Water Pump Installation

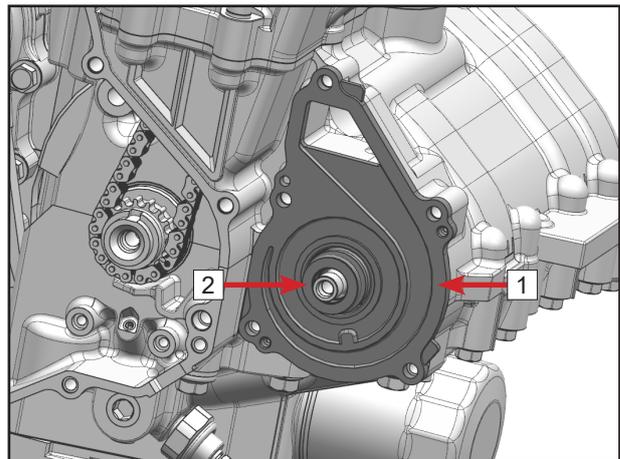
Install roller needle **1**.
Apply installation hole **2** with engine oil.



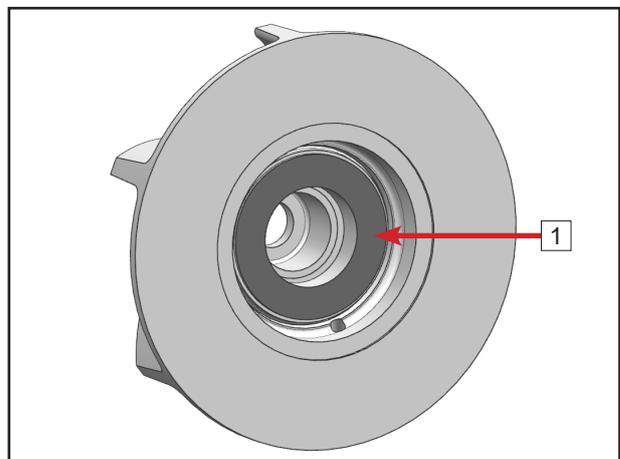
Install water pump seal ring **2** and O-seal ring **3** on the water pump **1**.



Install water pump assembly **1**.
Clean water seal static ring surface **2** with ethyl alcohol. Make sure the working surface is clean without foreign matters.



Clean water seal moving ring surface **1** with ethyl alcohol. Make sure the working surface is clean without foreign matters.



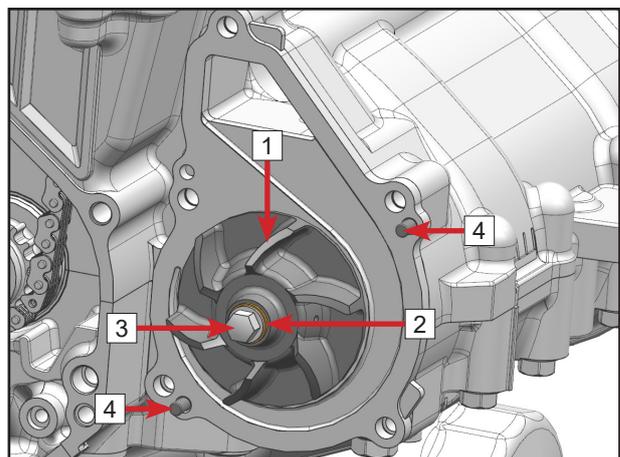
Install water pump impeller assembly **1**.
Install washer **2** and bolt **3**, and tighten to the specified torque.

Water Pump Impeller Bolt Torque
10N•m

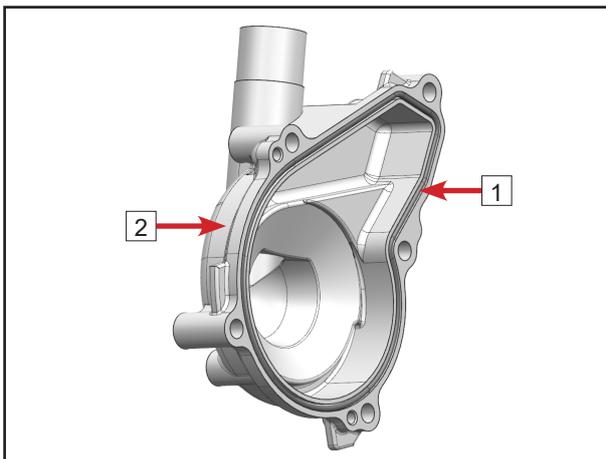
Inspect the clearance between impeller and water pump with feeler gauge. The clearance should be within the scope of the table below.

Clearance standard
0.2 mm ~ 0.85 mm

Install roller needle **4**.



Install water pump cover seal ring **1** on water pump cover **2**.

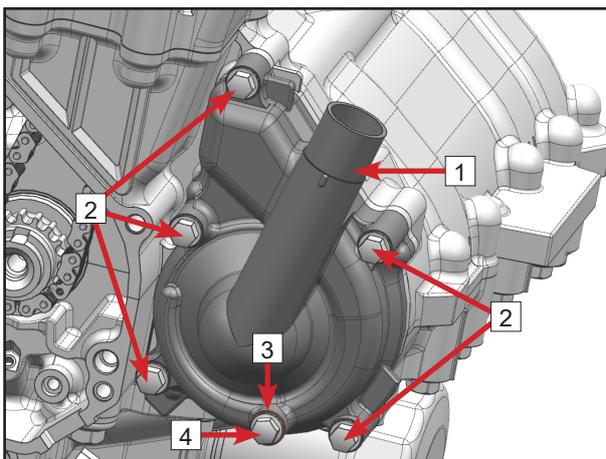


Install water pump cover assembly **1**.
Install bolt **2**, and tighten in criss-cross way to the specified torque.

Water Pump Cover Bolt 2 Torque
12N•m

Install washer **3** and drain bolt **4**, tighten to the specified torque.

Drain Bolt 4 Torque
7N•m

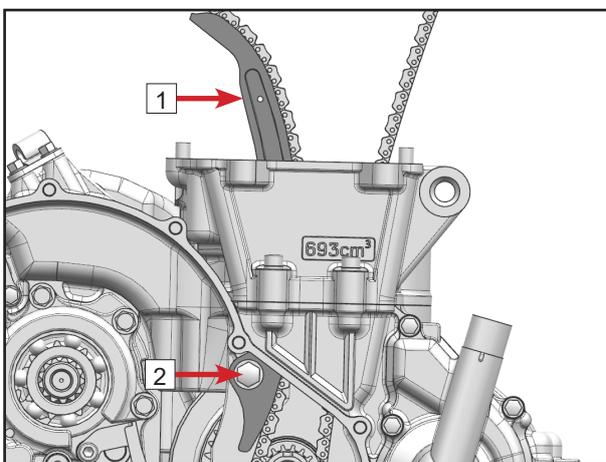


13.6.10 Tensioner Plate Installation

Apply pin shaft **2** with 243 thread locker.
Install tensioner plate **1**.
Install pin shaft **2**, and tighten to the specified torque.

Pin Shaft Torque
20N•m

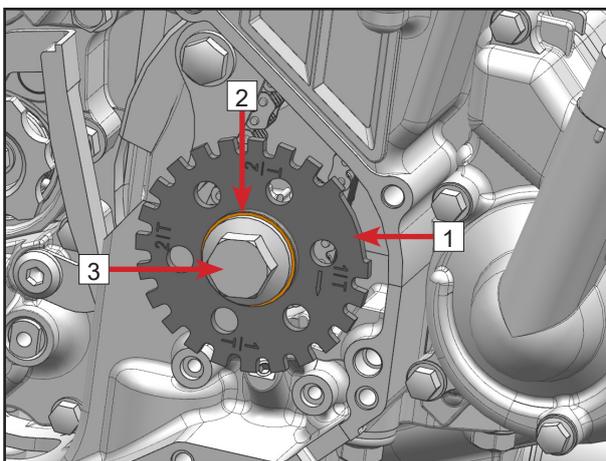
Turn flexibly tensioner plate left and right without stuck.



13.6.11 Crankshaft Pulsing Rotor Installation

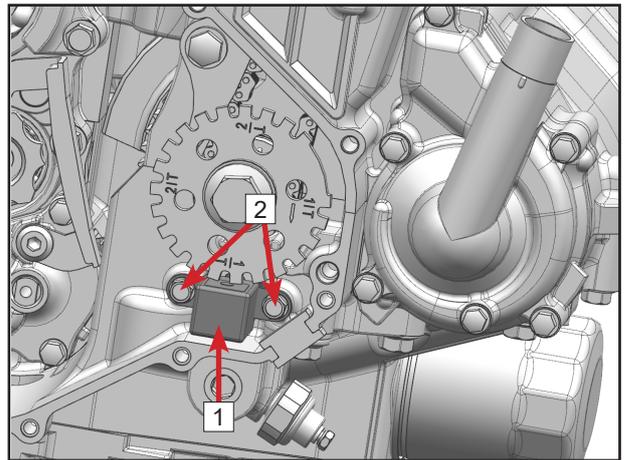
Align the convex on crankshaft pulsing rotor **1** with the slot of timing drive sprocket.
Install crankshaft pulsing rotor **1**.
Apply bolt **3** with 243 thread locker.
Install washer **2** and bolt **3**, and tighten to the specified torque.

Crankshaft Pulsing Rotor Bolt Torque
40N•m



Apply bolt **2** with 243 thread locker.
 Install trigger assembly **1**.
 Install bolt **2**, and tighten to the specified torque.

Trigger Assembly Bolt Torque
6N•m



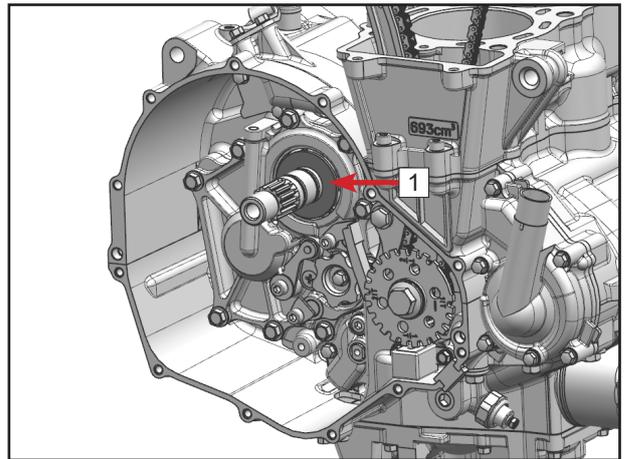
13.6.12 Clutch Installation

Assemble clutch and crankshaft in pairs according to the below table.

Clutch Grouping Mark	Output Gear (on Crankshaft) Grouping Mark
A	B
B	A

The grouping of clutch refers to chapter 13.5.21.

The grouping of output gear refers to chapter 13.5.18.



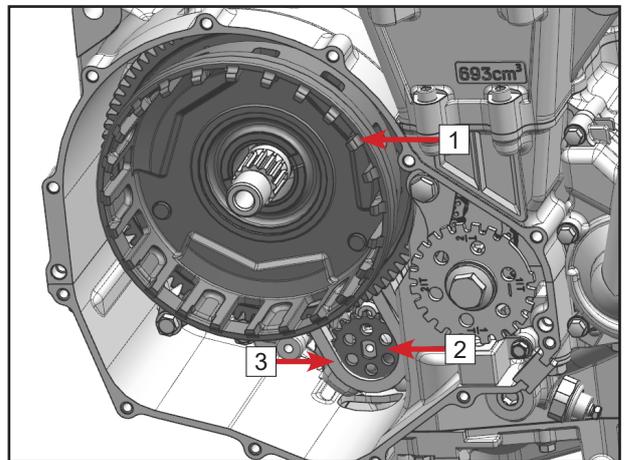
Install washer **1**.

Hang oil pump chain **3** on the sprocket of outer cover **1**.

Hang oil pump sprocket **2** on oil pump chain.

Install outer cover assembly **1**.

NOTE: Align primary driven gear of outer cover with output gear of crankshaft.

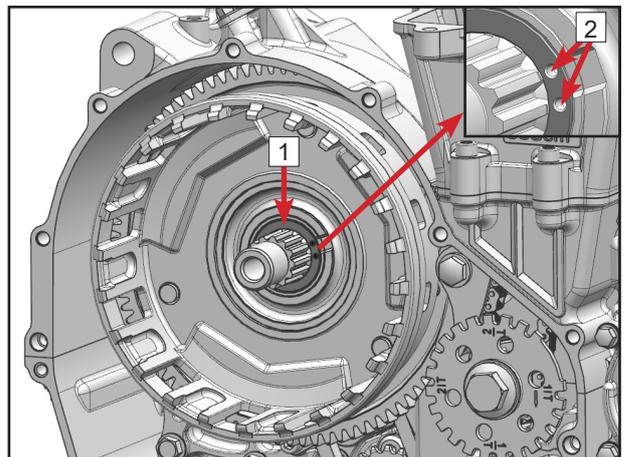


Rotate oil pump shaft to the right position, and align the central hole of oil pump gear with oil pump shaft. Install oil pump gear on the shaft.

Apply engine oil on clutch sleeve **1**.

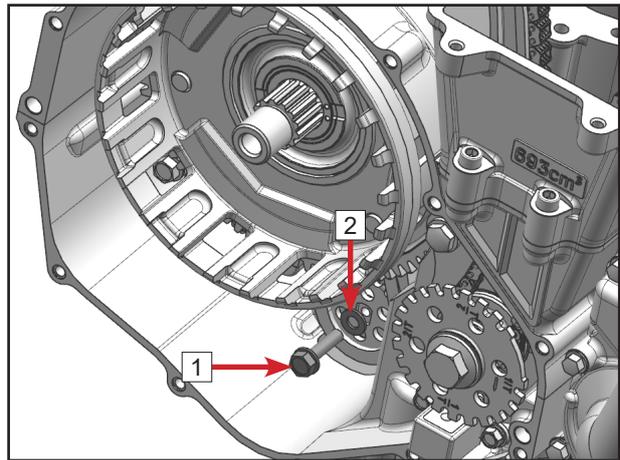
Install clutch sleeve **1**.

NOTE: The holes **2 on clutch sleeve face outside.**

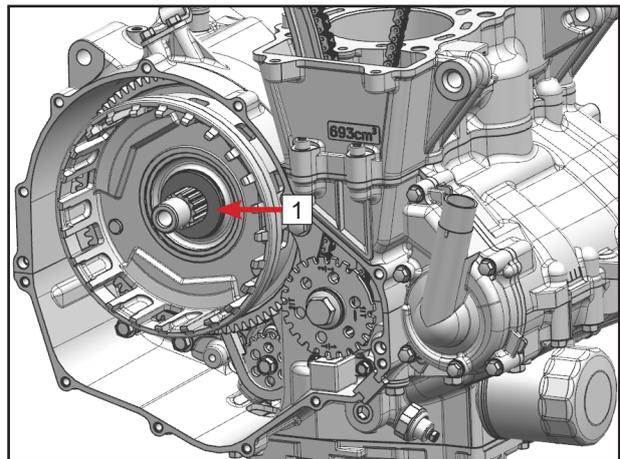


Apply bolt **1** (left-hand thread) with 243 thread locker.
 Install washer **2** and bolt **1**, and tighten to the specified torque.

Oil Pump Sprocket Bolt Torque
12N•m

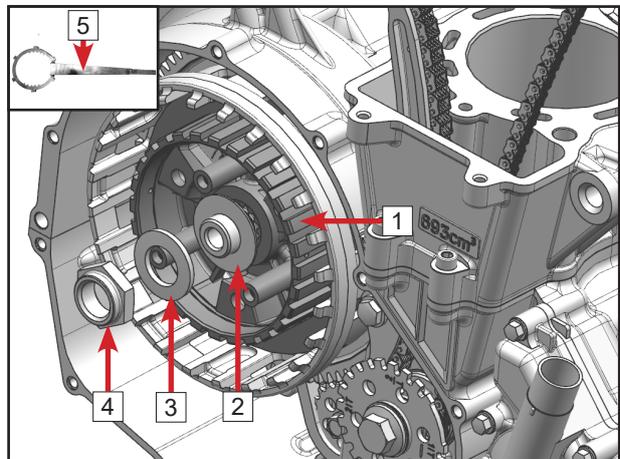


Install washer **1**.



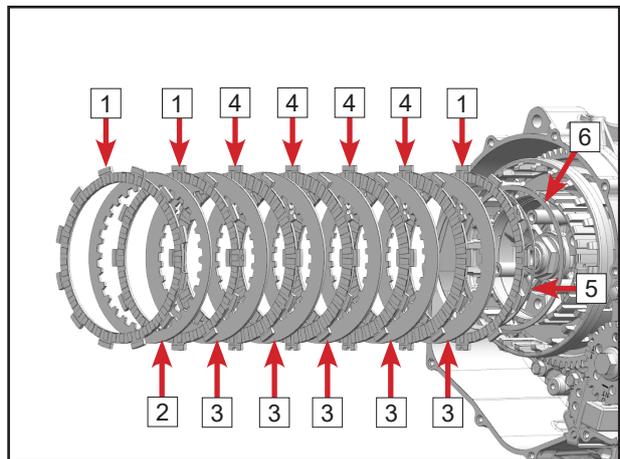
Install central sleeve **1**.
 Install washer **2**.
 Install circlip **3** (The surface with mark faces outside).
 Use clutch stopping wrench **5** to fix the clutch housing.
 Apply main shaft with 243 thread locker.
 Install nut **4**, and tighten to the specified torque.

Clutch Nut Torque
132N•m

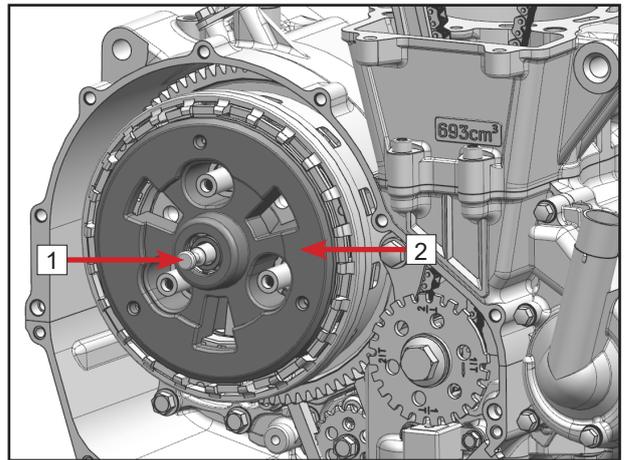


Remove clutch stopping wrench, rotate central sleeve. The movement should be flexible without stuck.

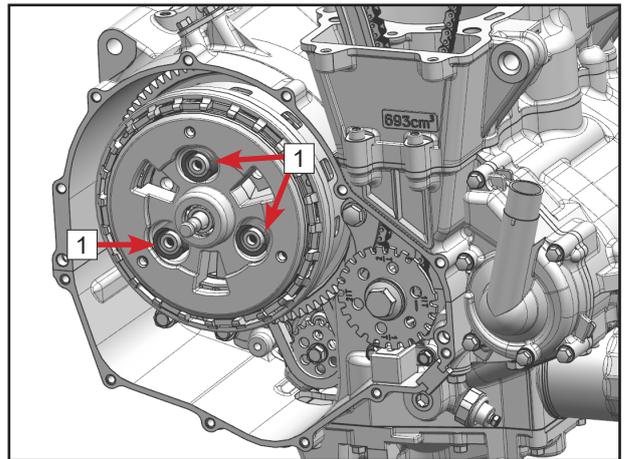
Apply friction disc with engine oil.
 Install washer **6**.
 Install circlip **5** (The small end faces inside).
 Install friction disc A **1**.
 Alternately install five steel plate A **3** and four friction disc B **4**.
 Install friction disc A **1**, steel plate B **2** and friction disc A **1**.



Install clutch rod **1** on press plate assembly **2**.
 Install press plate assembly **2**.

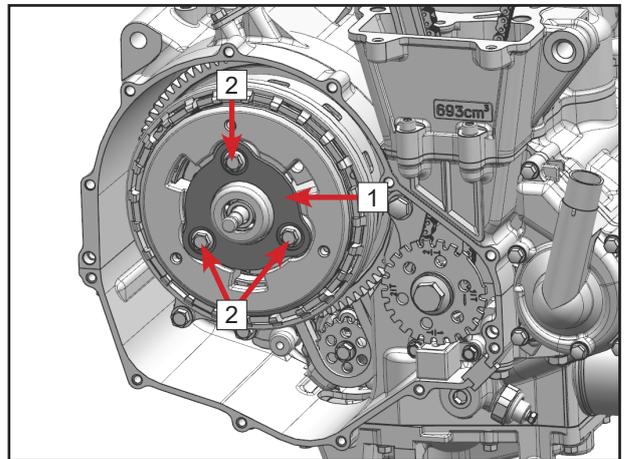


Install press spring **1**.



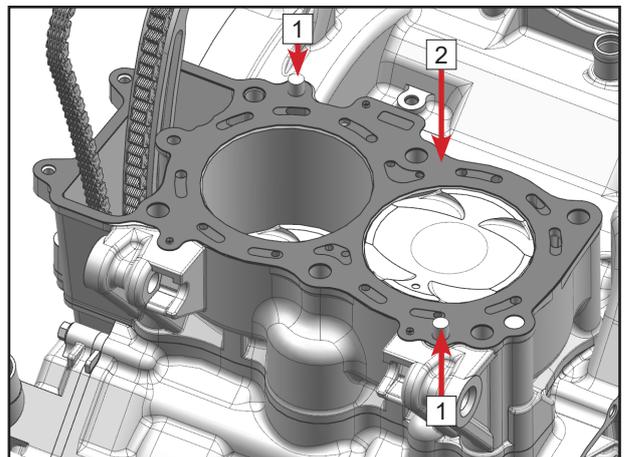
Install press plate **1**.
 Install three bolts **2**, and tighten to the specified torque.

Clutch Press Plate Bolt Torque
10N•m



13.6.13 Cylinder Head Installation

Wipe cylinder body top seal surface and cylinder head bottom seal surface.
 Install roller needle **1**.
 Install new cylinder head gasket **2**.



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Apply the mixture of oil and MoS₂ grease on cylinder head bolt screw and washer (weight ratio 10:1).

Install cylinder head bolt and washer, and tighten according to the sequence of 1~6 in two steps.

Cylinder Head Bolt Torque	
Step 1	20N•m
Step 2	54N•m

Bolt Number	Part Name
1, 3, 4, 5	Cylinder head bolt M10×158
2	Cylinder head bolt M10×176
6	Cylinder head bolt 10×1.25×80

Tighten bolt 1 to the specified torque.

Bolt 1 Torque
27.5N•m

Tighten nut 1 to the specified torque.

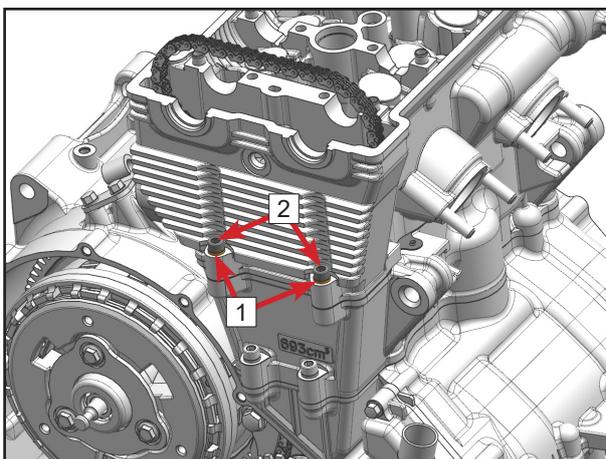
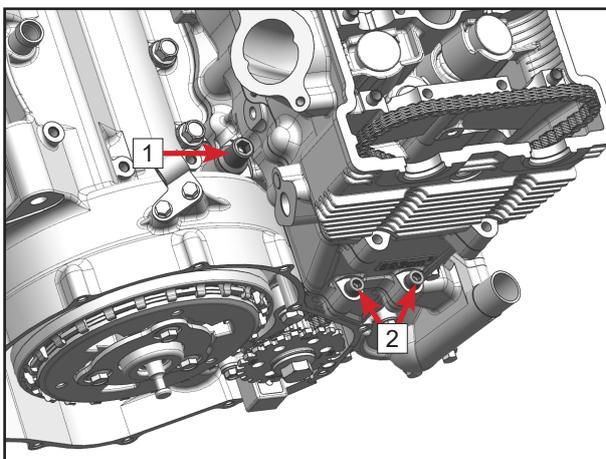
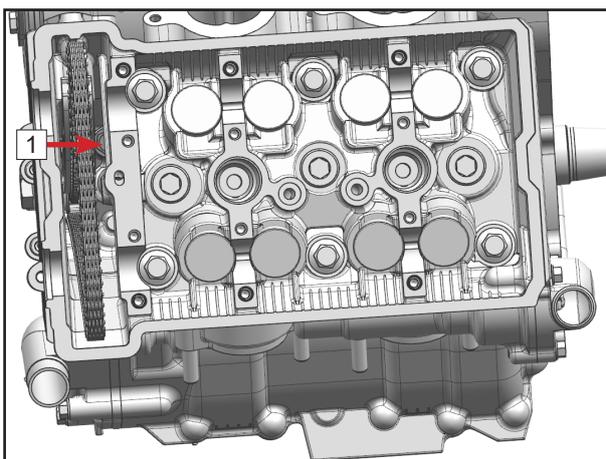
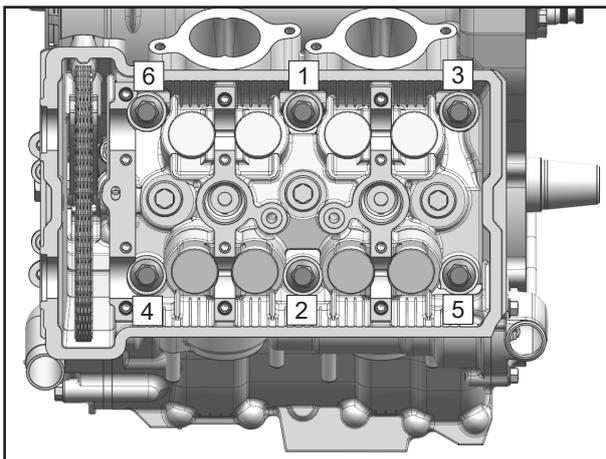
Nut 1 Torque
25N•m ~ 30N•m

Tighten inner hex bolt 2 to the specified torque.

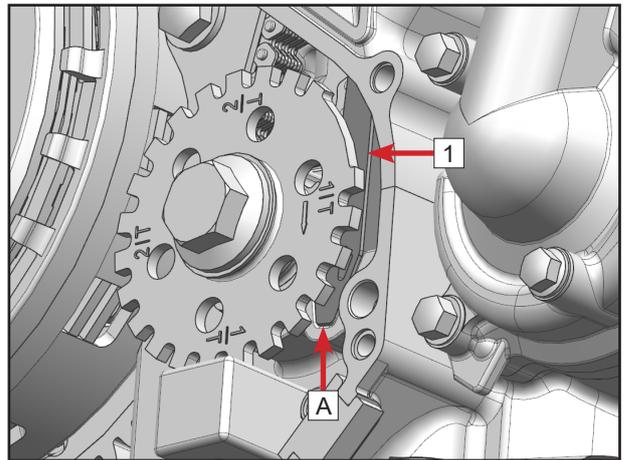
Inner Hex Bolt 2 Torque
12N•m

Install washer 1 and inner hex bolt 2, and tighten to the specified torque.

Inner Hex Bolt 2 Torque
12N•m

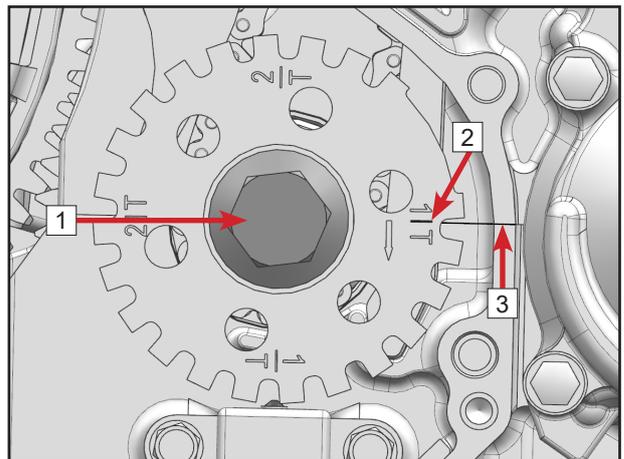


Stick the lower end of chain guide **1** into crankcase groove **A**.



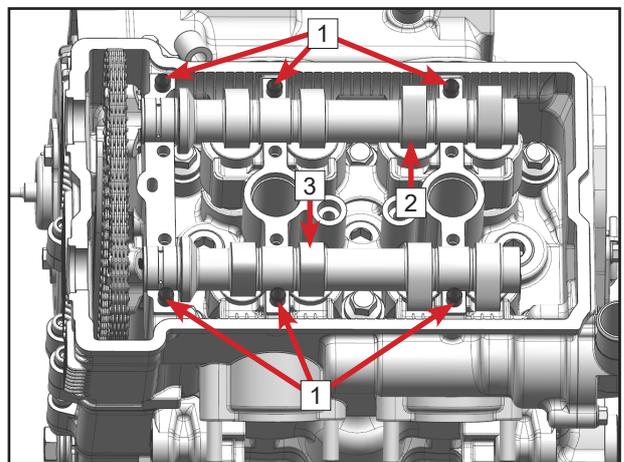
13.6.14 Camshaft Installation

Rotate bolt **1** clockwise to align "I" of "1IT" on crankshaft pulsing rotor **2** with crankcase joint **3**.



Install dowel pins **1**.

Hang timing chain on the timing sprocket, install air intake camshaft **2** and air exhaust camshaft **3** on cylinder cover.

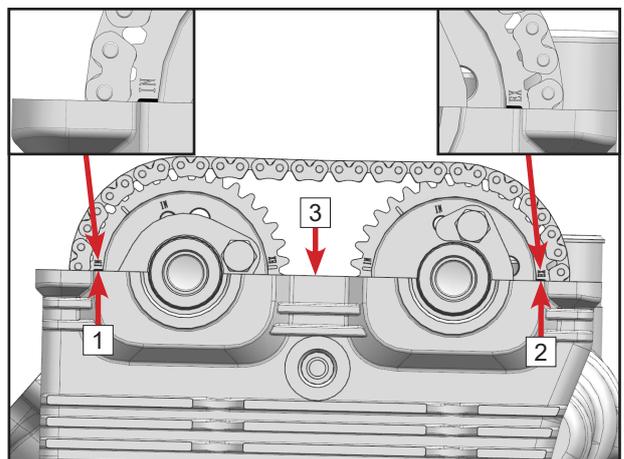


Tighten timing chain and inspect the marking position on camshaft timing sprocket.

The "IN" engraving **1** on the intake camshaft timing sprocket and the "EX" engraving **2** on the exhaust camshaft timing sprocket should be flush with cylinder head sealing surface **3**, as shown on the right.

Re-adjust the position of sprocket in the chain if the position of camshaft is not accurate, until the above requirements are met.

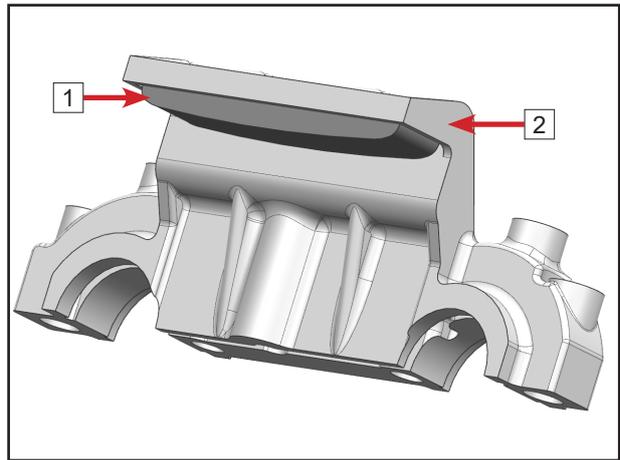
⚠️ WARNING: Do not turn crankcase pulsing rotor when installing camshaft, or will cause the engine timing failure.



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Install chain guide block **1** on the camshaft position plate **2**.

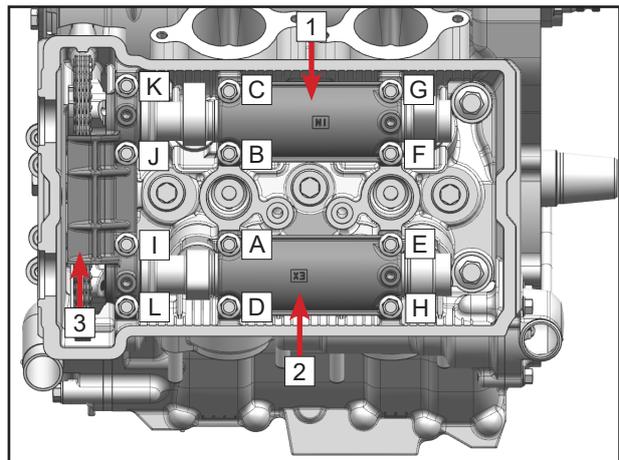
NOTE: The marked side of chain guide block faces outside.



Install air intake camshaft seat **1**.
 Install exhaust camshaft seat **2**.
 Install camshaft position plate **3**.
 Install camshaft seat bolt, and tighten it according to the sequence of **A~L** in three steps.

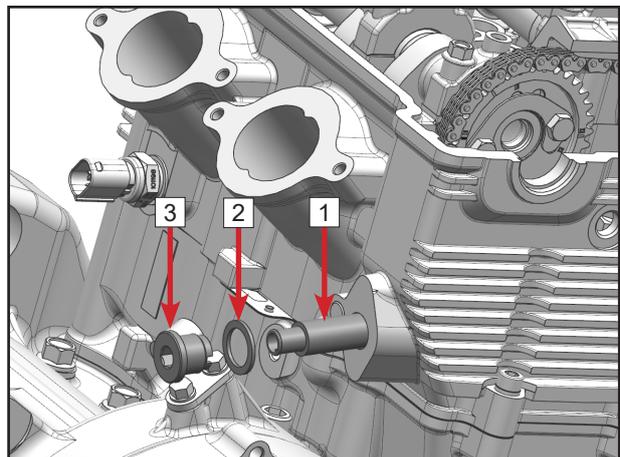
Camshaft Seat Bolt Torque	
Step 1	5N•m
Step 2	8N•m
Step 3	12N•m

NOTE: The intake camshaft seat, the exhaust camshaft seat, the camshaft position plate and the cylinder head shall be equipped with the same coding mark.



Install tensioner assembly **1**.
 Install washer **2** and bolt plug **3**, and tighten to the specified torque.

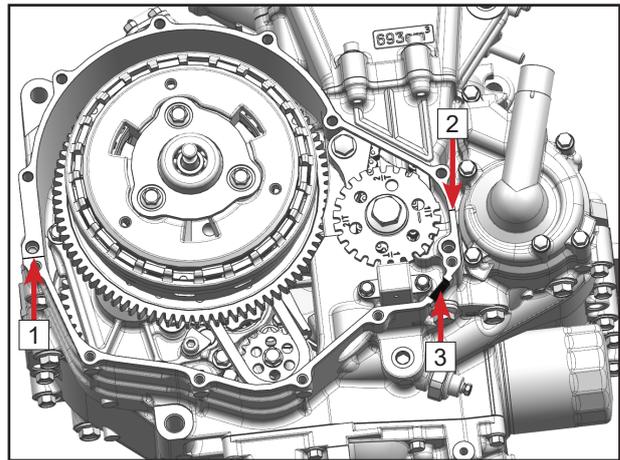
Tensioner Bolt Plug 3 Torque
30N•m



13.6.15 RH Side Cover Installation

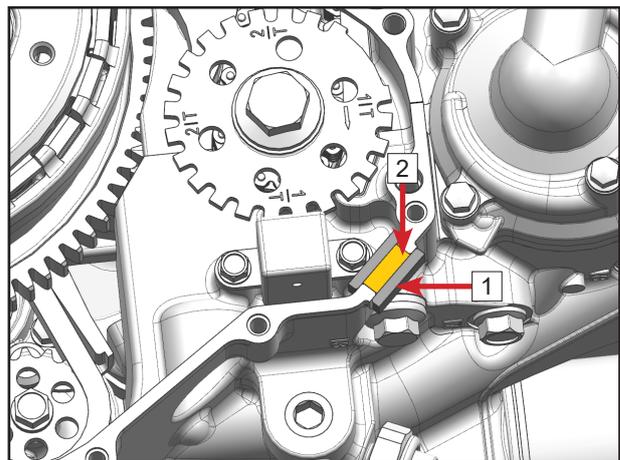
Apply KB598 flange sealant on the crankcase joint.

Apply KB598 flange sealant on the slot of trigger rubber seal block **3**.



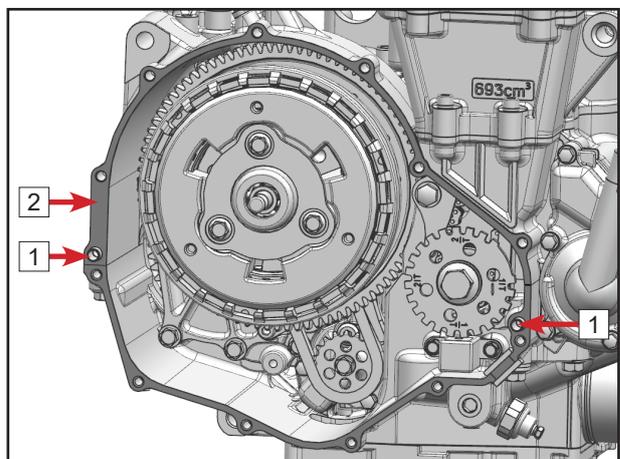
Install trigger rubber seal block **1** on crankcase.

Apply KB598 flange sealant on the area **2** of trigger rubber seal block.



Install position pin **1**.

Install new RH side cover seal gasket **2**.



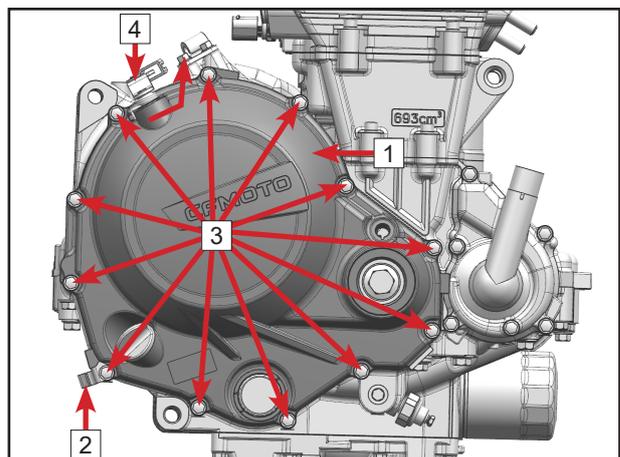
Install RH side cover **1**.

NOTE: Rotate the clutch control shaft assembly **4** counterclockwise to an appropriate angle when installing RH side cover.

Install clip **2**.

Install bolt **3**, and tighten in criss-cross way to the specified torque.

RH Side Cover Bolt Torque
12N•m



13.6.16 Valve Clearance Inspection

Rotate the bolt **1** clockwise, and measure the clearance between the CAM base cylinder and the tappet with a feeler when the peach-tip of the CAM on the camshaft is facing upwards.

NOTE: Only turn the bolt clockwise **1.**

NOTE: Inspect and adjust valve clearances on a cold engine.

Record the measurement data, if it does not meet the requirements, replace the valve tappet with the appropriate thickness, and then measure again until it meets the requirements.

Please refer to the section "Pre-Inspect and Adjust Valve Clearance".

Valve Clearance (Cold Engine)	
Air Inlet Valve	0.09 mm ~ 0.12 mm
Exhaust Valve	0.23 mm ~ 0.27 mm

Inspect O-ring **2** and **4** for harden or damage.

Install O-ring **2** into the corresponding hole of RH side cover after applying oil on it.

Install timing inspection hole cap **1** on RH side cover, and tighten to the specified torque.

Timing Inspection Hole Cap Torque
6N•m

After applying oil on the O-ring **4**, install it on the strainer cover **3**.

Install strainer cover **3** on RH side cover, and tighten to the specified torque.

Strainer Cover Torque
20N•m

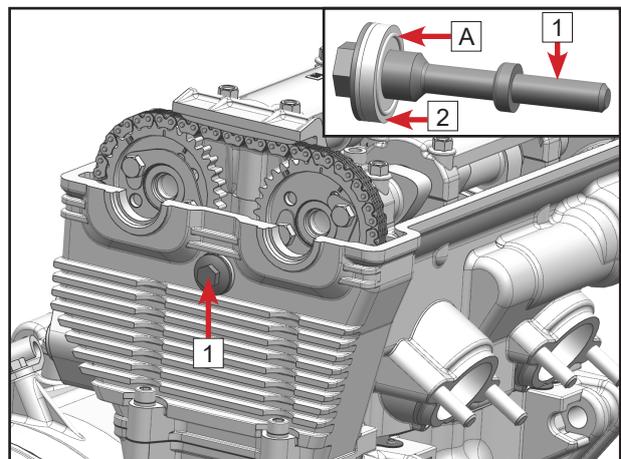
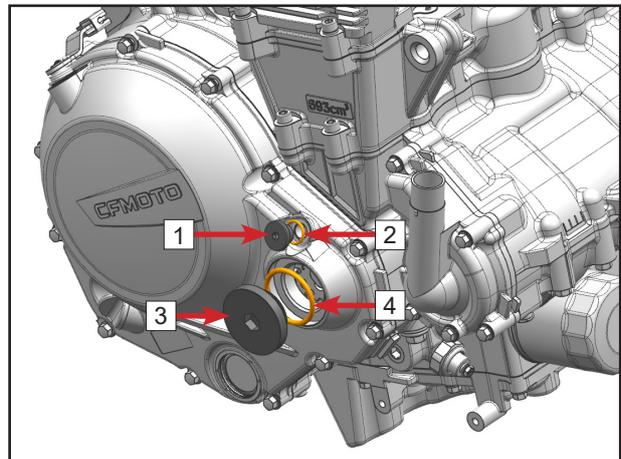
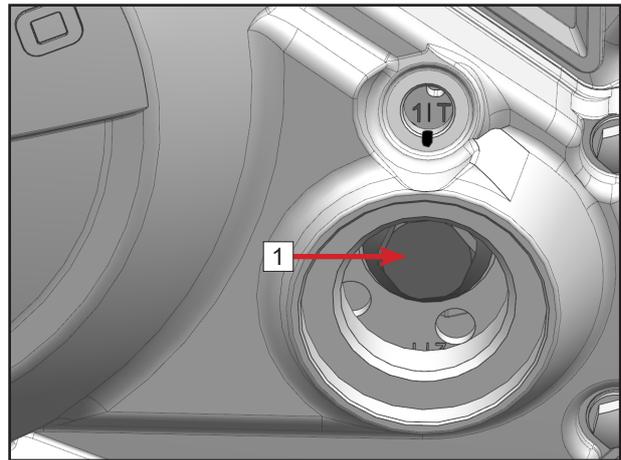
13.6.17 Cylinder Head Cover Installation

Install seal ring **2** on cylinder head bolt **1**.

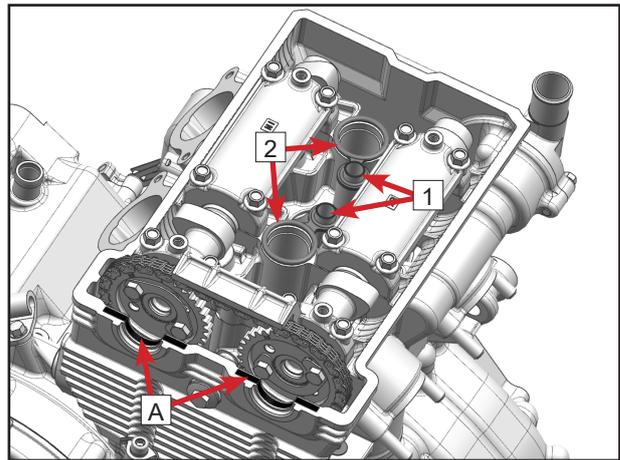
A: Ring band on the seal ring **2**.

Install cylinder head bolt **1**.

Cylinder Head Bolt Torque
12N•m

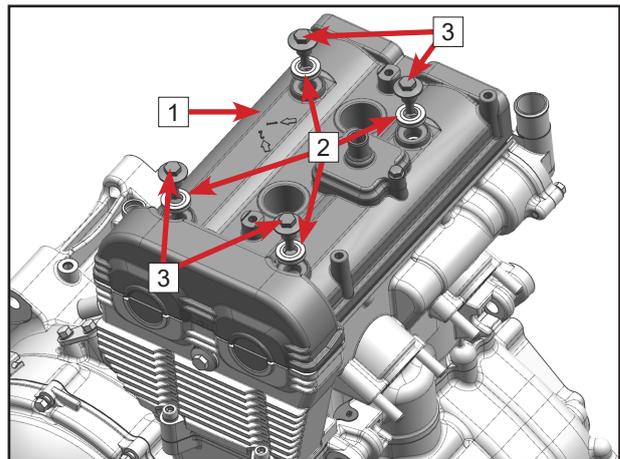


Install gulp pins **1**.
 Install spark plug seal rings **2**.
 Apply KB598 flange sealant **A** on the
 cylinder head, as shown on the right.



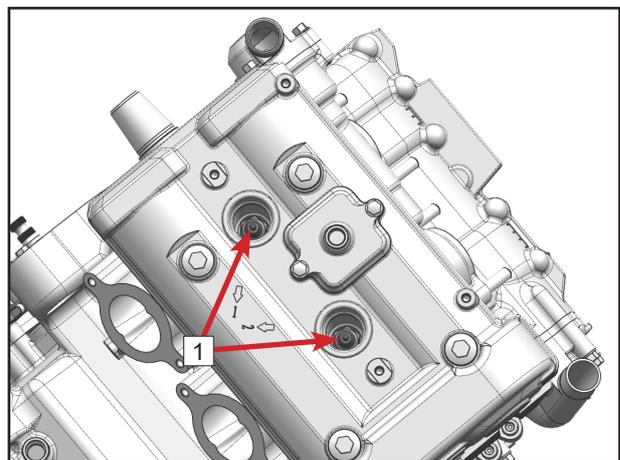
Install cylinder head cover seal ring on the
 cylinder head cover.
 Install cylinder head cover assembly **1**.
 Install cylinder head cover bolt seal rings
2 (The side with seal band faces down)
 and cylinder head cover bolts **3**, and
 tighten to the specified torque.

Cylinder Head Cover Bolt Torque
12N•m



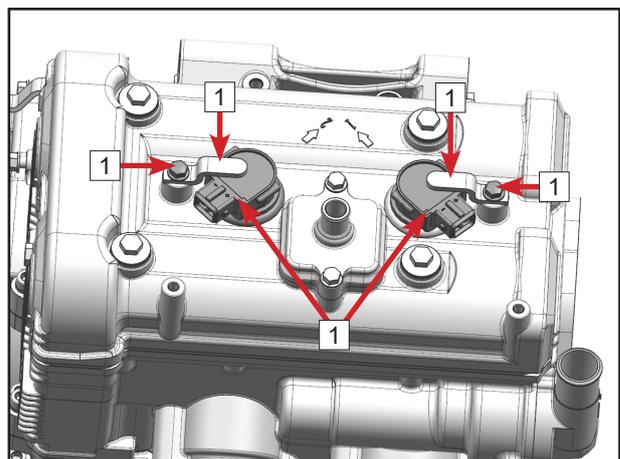
Install spark plug **1**, and tighten to the
 specified torque.

Spark Plug Torque
15N•m



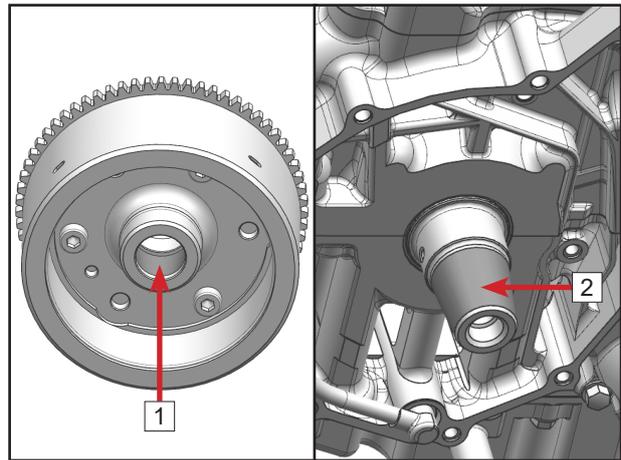
Install ignition coil **1**, the direction of the
 connector is shown on the right.
 Install press plate **2**.
 Install bolts **3**, and tighten to the specified
 torque.

Ignition Coil Plate Bolt Torque
10N•m



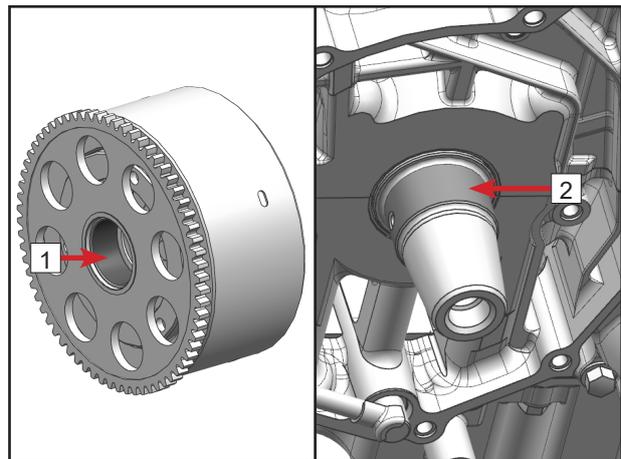
13.6.18 Magneto Rotor Installation

Clean the taper hole of magneto rotor **1** and the cone of crankshaft **2** with dust-free paper.

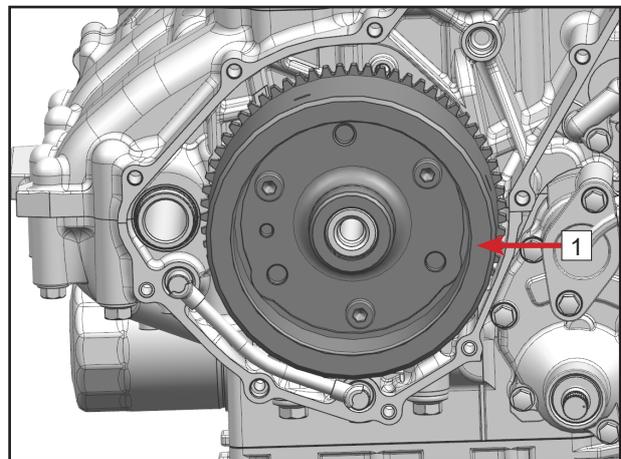


Apply engine oil on bushing **1** and crankshaft journal **2**.

NOTE: There should not be oil on the taper hole of magneto hole and the cone of crankshaft.



Install magneto rotor assembly **1**.

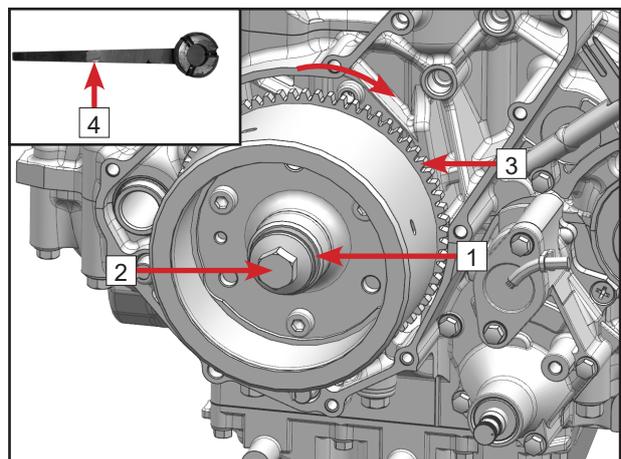


Fix the magneto rotor with magneto rotor stop wrench **4**.

Install washer **1** and bolt **2**, and tighten to the specified torque.

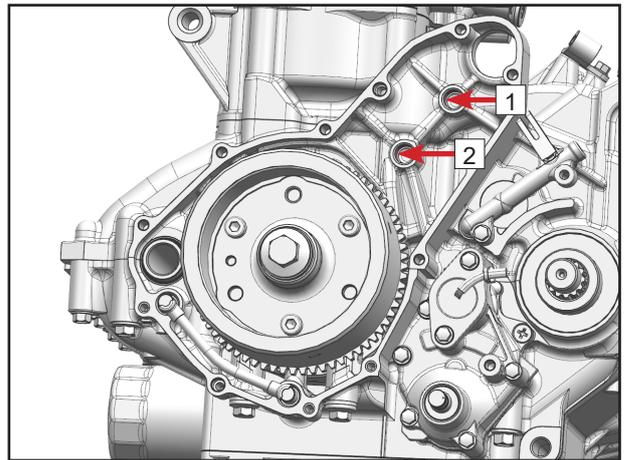
Magneto Rotor Bolt Torque
180N•m

Inspect the rotation of starting gear **3**, the starting gear clockwise rotation should be flexible without stuck.



13.6.19 Dual Gear and Starting Gear Installation

Apply grease on gear shaft hole [1] and [2].

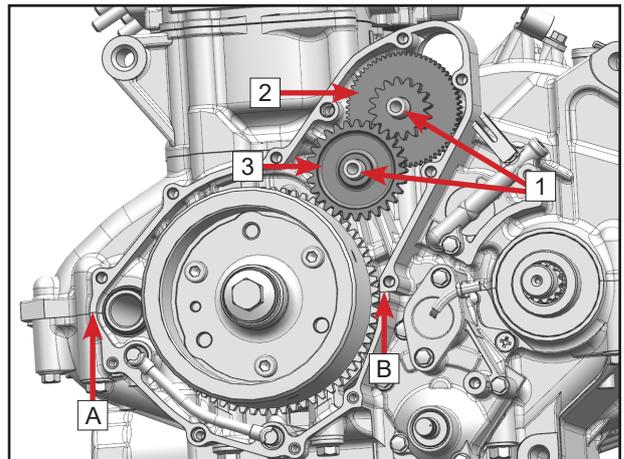


Apply oil on gear hole and surface.
Install middle gear shaft [1] and dual gear [2].

Install middle gear shaft [1] and starting gear [3].

Apply grease on exposed part of middle gear shaft.

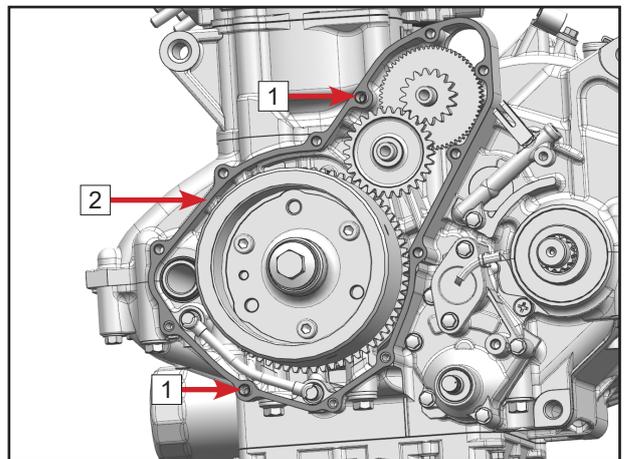
Apply KB598 flange sealant on crankcase joint [A] and [B].



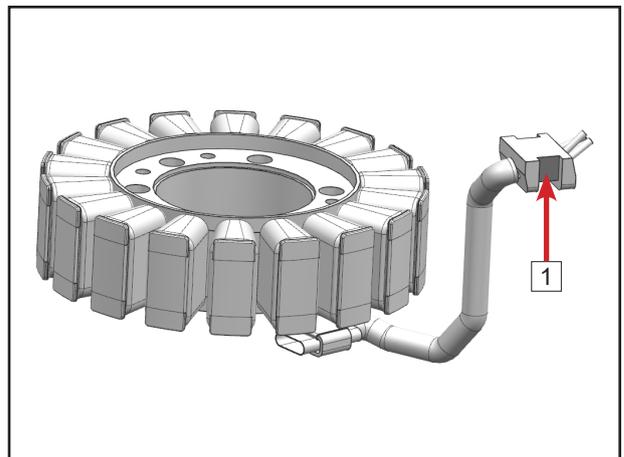
13.6.20 LH Side Cover Installation

Install position pin [1].

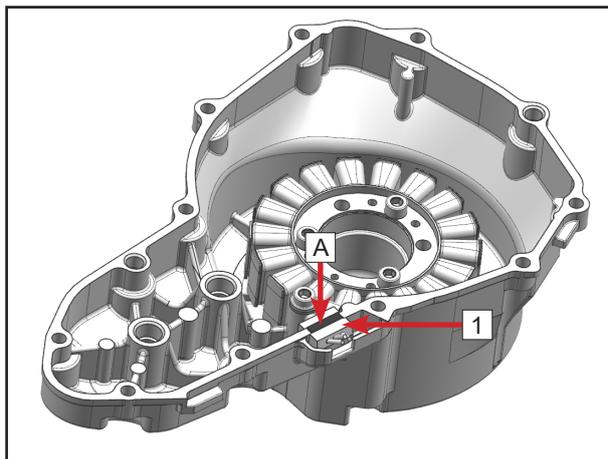
Install new LH side cover seal gasket [2].



Apply KB598 flange sealant on the seal slot of magneto stator cable rubber sleeve [1].

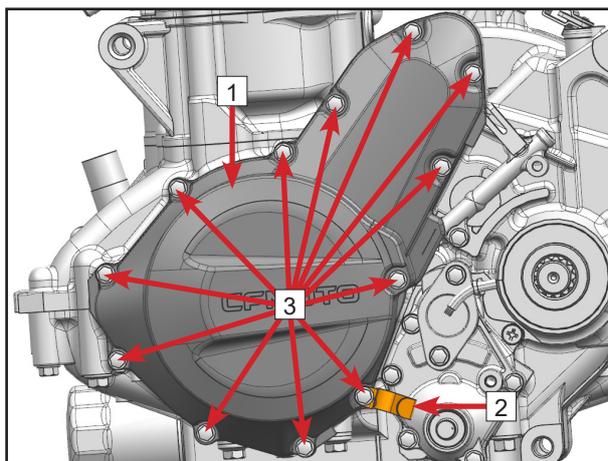


Install magneto stator cable rubber sleeve **1** on LH side cover.
 Apply KB598 flange sealant on the area **A** of magneto stator cable rubber sleeve.



Install LH side cover **1**.
 Install clip **2**.
 Install bolts **3**, and tighten in criss-cross way to the specified torque.

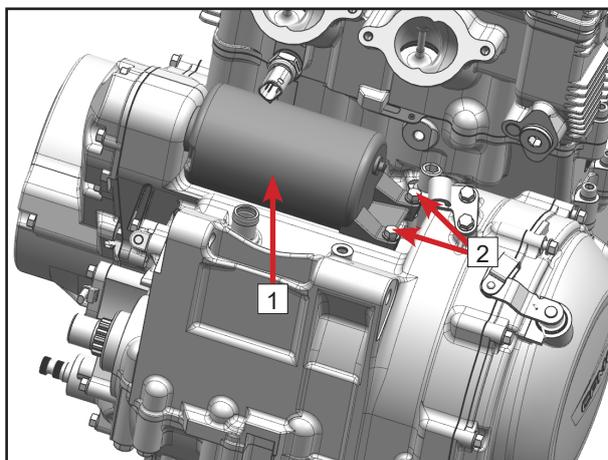
LH Side Cover Bolt Torque
12N•m



13.6.21 Starter Motor Installation

Apply oil on the starter motor hole of tank.
 Install starter motor **1**.
 Apply 569 thread locker on the bolts **2**.
 Install bolts **2**, and tighten to the specified torque.

Starter Motor Bolt Torque
12N•m



13.6.22 Oil Filling

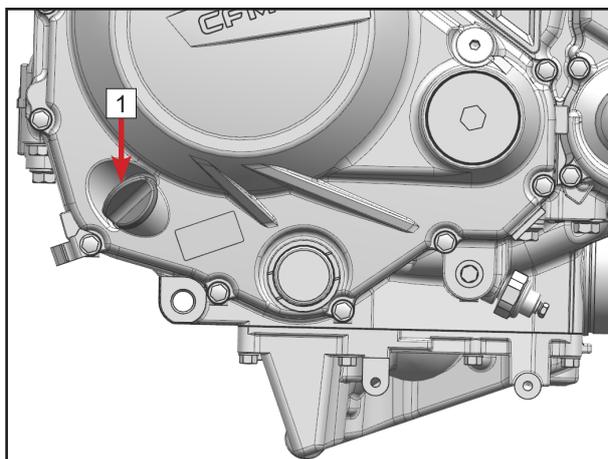
Remove oil filling plug **1** and O-ring.
 Fill the engine with the recommended oil.
 Recommended oil type: SAE 10W/40 SJ
 JASO MA2

Engine oil capacity:

Overhaul: 2.6L

Replace oil and oil filter: 2.2L

Re-install oil filling plug **1** and O-ring.



13.7 Lubrication System

13.7.1 Oil Level Inspection

Stop the vehicle on the level floor.

Start the engine and run it at idle state for a few minutes.

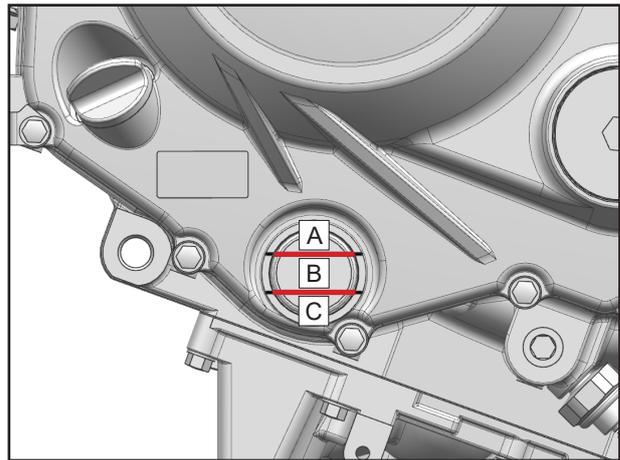
Turn off the engine and wait a few minutes until all the oil flows back into oil pan.

Upright the vehicle on the level floor, then observe the oil level through the oil level viewer.

If oil level is at **A** area: drain excess oil into **B** area.

If oil level is at **B** area: suitable oil level.

If oil level is at **C** area or invisible: add the same brand oil to **B** area.



NOTE: Strictly follow the procedure to prevent a wrong oil level indication.

13.7.2 Oil Replacement

Stop the vehicle on the level floor.

Run the engine at idle speed for a few minutes to turn off the engine after heating.

⚠️ WARNING: Long time of heating engine will cause the temperature of engine and oil is too high. Please wear appropriate protective clothing and gloves for operation, or wait until the temperature is suitable to replace.

Place a oil pan under the oil drain position. Remove magnetic drain bolt **1** and seal washer **2**.

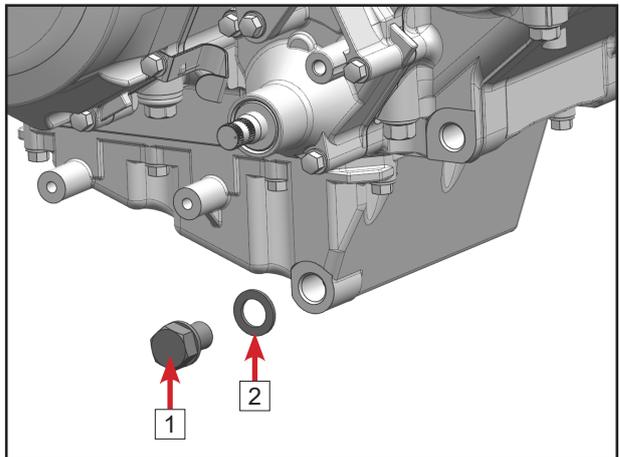
Drain the used oil.

⚠️ WARNING: Oil is toxic, please dispose of it properly after use.

Clean drain bolt and the area near oil drain hole.

Replace a new one if the seal washer is damaged.

Reinstall drain bolt **1** and seal washer **2**, and tighten to the specified torque.



Magnetic Drain Bolt Torque
35N•m

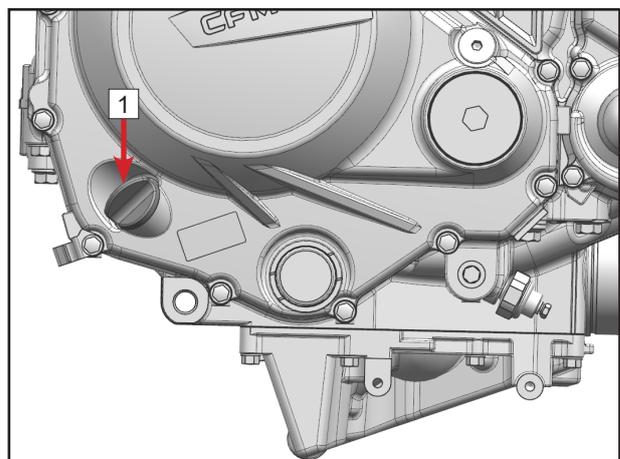
Remove oil filling plug **1** and O-ring.

Add recommended SAE 10W/40 SJ JASO MA2 oil.

Oli change (replace oil filter at the same time): 2.2L

Re-install oil filling plug **1** and O-ring.

Inspect the engine oil level and after filling.



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Remove fairing.

Remove main oil rail plug **1**, and install the adapter **2** and dashboard **3** into the plug hole.

Tool: Oil pressure gauge, 10kgf/cm²

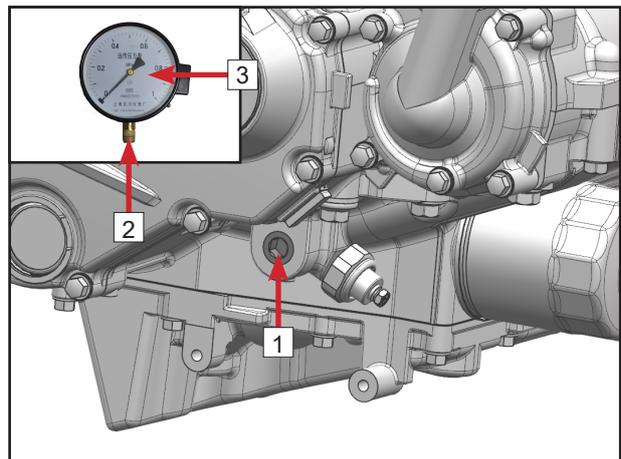
Oil pressure gauge adapter, PT3/8

Start the engine and pre-heat it.

Run the engine at the specified speed and read the oil pressure gauge.

If the oil pressure is far below standard, immediately inspect the oil pump, oil relief valve and/or main plain bearing for wear.

If the reading is much higher than the standard, inspect the oil duct for blockage.



Oil Pressure	
Coolant Temp: $\geq 70^{\circ}\text{C}$ Engine RPM: Idle Speed	$\geq 0.12\text{MPa}$
Coolant Temp: $\geq 70^{\circ}\text{C}$ Engine RPM: 4000r/min	$\geq 0.3\text{MPa}$

Turn off the engine.

Remove oil pressure gauge and adapter.

⚠️WARNING: Beware of burns. Hot oil will drain through the oil channel when removing dashboard and adapter.

Apply 243 thread locker on the main oil rail plug.

Install main oil rail plug, and tighten to the specified torque.

Main Oil Rail Plug Torque
20N•m

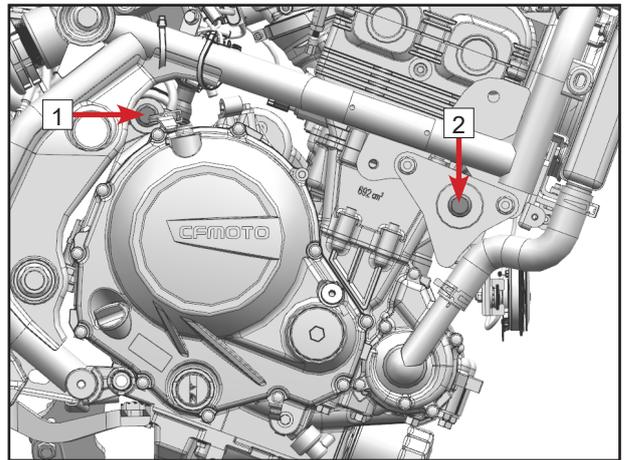
13.8 Install Engine on the Vehicle

Use a lifting device to place the engine into the frame to align the engine mounting holes with the frame holes.

Install bolt **1** and nut.

Install bolt **2** and nut.

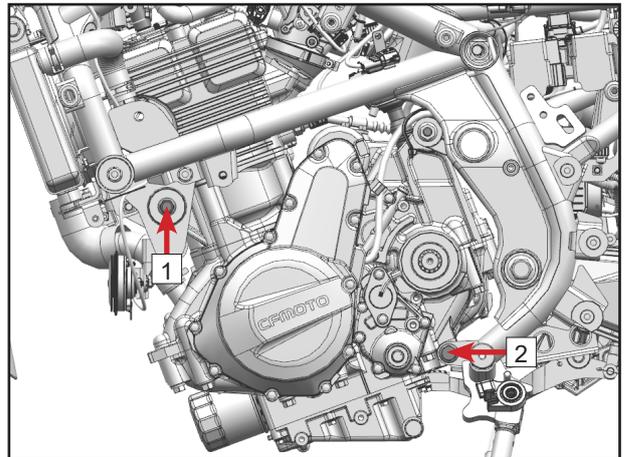
NOTE: Fix the bolt with wrench and then install the nut.



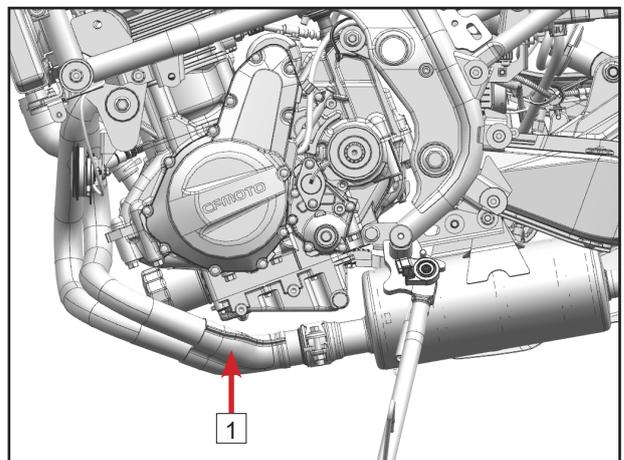
Install bolt **1** and nut.

Install bolt **2** and nut.

NOTE: Fix the bolt with wrench and then install the nut.



Install exhaust system **1** on the engine, see the "Exhaust System" section for details.



Hang the chain on the output sprocket **3**, and install output sprocket **3**.

Install countershaft gasket **4**.

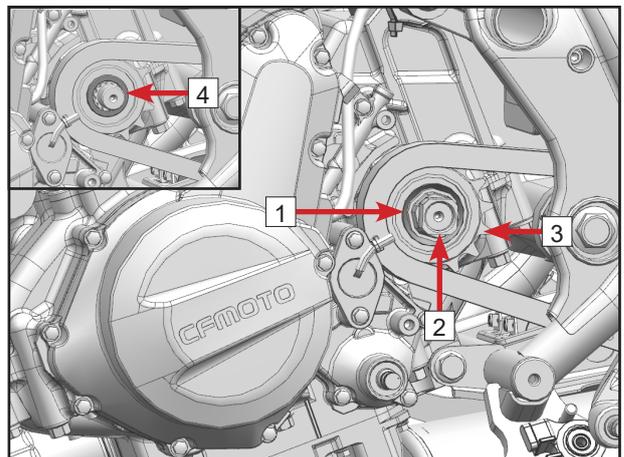
Install lock washer **1**.

Apply counting pulse nut **2** with 243 thread locker.

Install counting pulse nut **2**, and tighten to the specified torque.

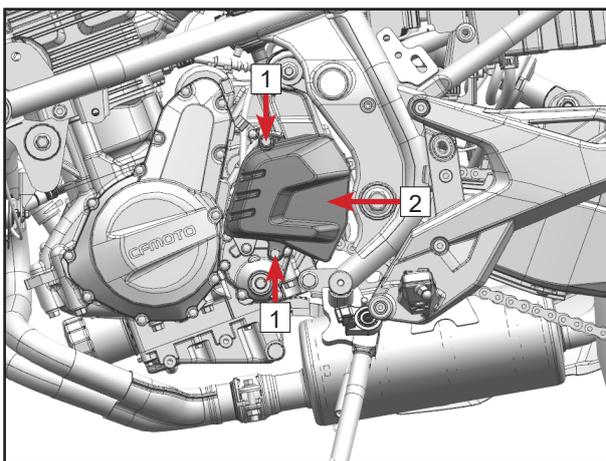
Counting Pulse Nut Torque
125N•m

Flange the lock washer **1** to prevent the counting pulse nut **2** from loosening.

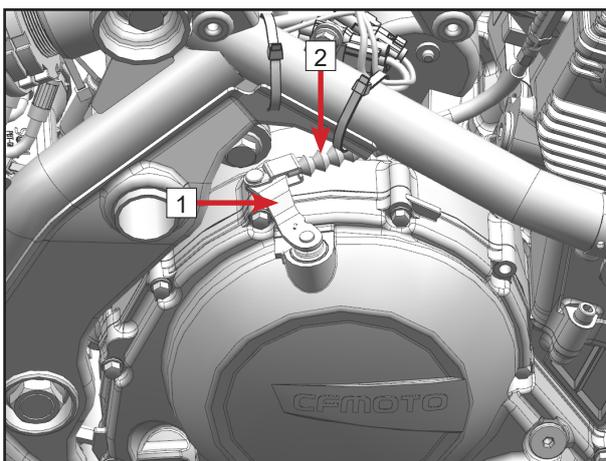


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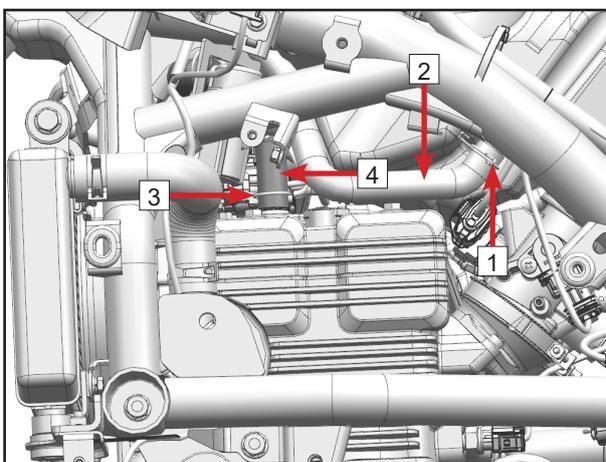
Install sprocket cover **2**.
Install bolt **1**.



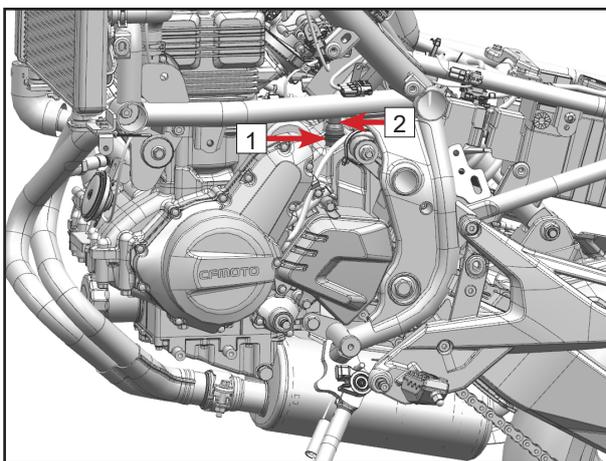
Turn clutch release rod **1**.
Install clutch cable **2**.



Install air outlet pipe **4** on the engine.
Tighten clamp **3**.
Install air filter assembly on throttle valve body.
Install air inlet pipe **2** on the lower cover of air filter.
Tighten clamp **1**.

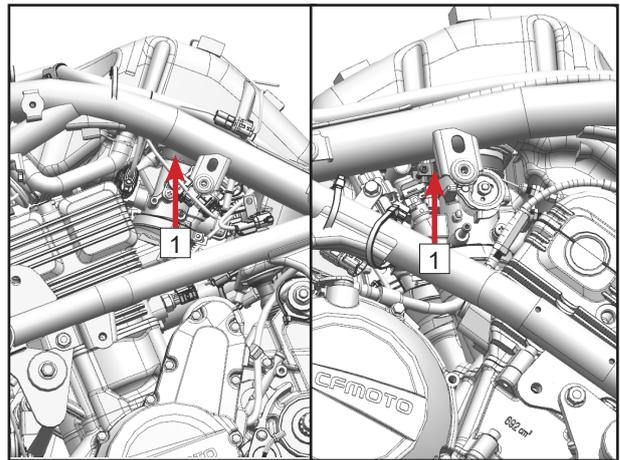


Install breather hose **2** on engine.
Tighten clamp **1**.

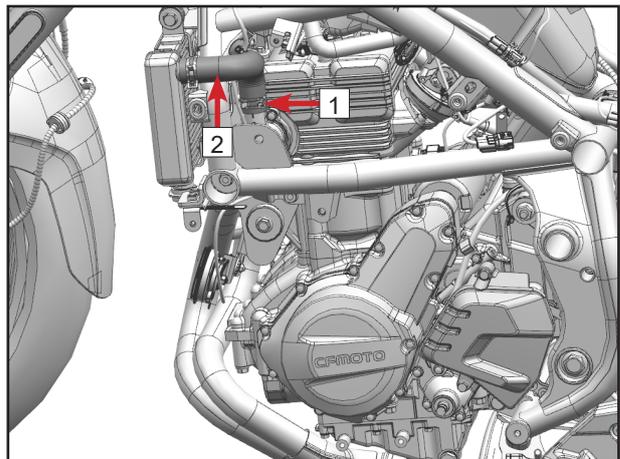


13 Engine

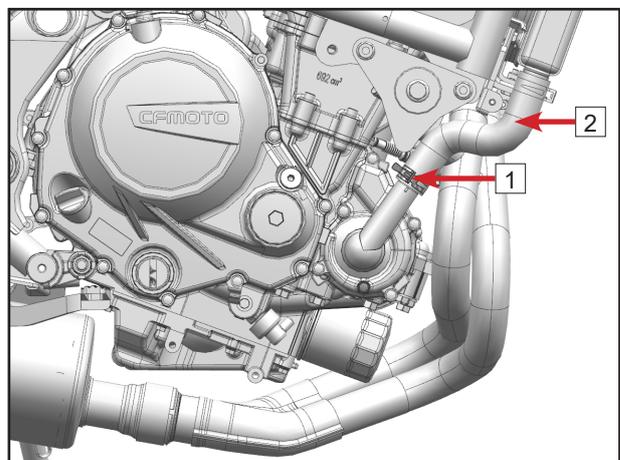
Tighten clamp **1**.
Install throttle cable on the throttle valve body.



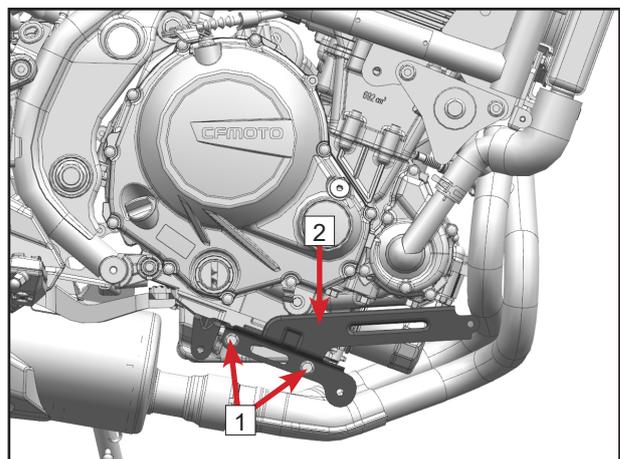
Install water inlet pipe **2** on the thermostat cap.
Tighten clamp **1**.



Install water outlet pipe **2** on water pump cover.
Tighten clamp **1**.

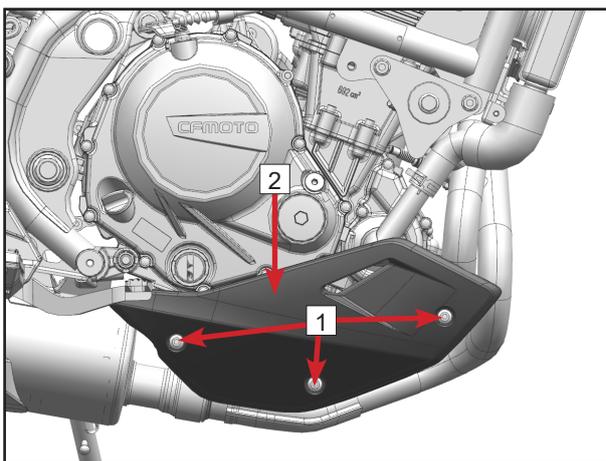


Install bracket **2** and bolt **1**.

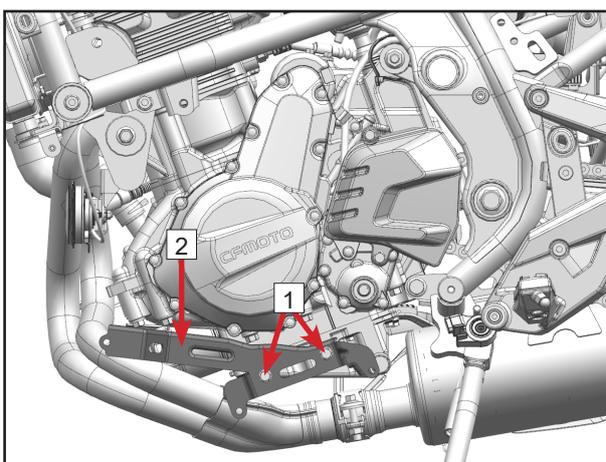


CFMOTO

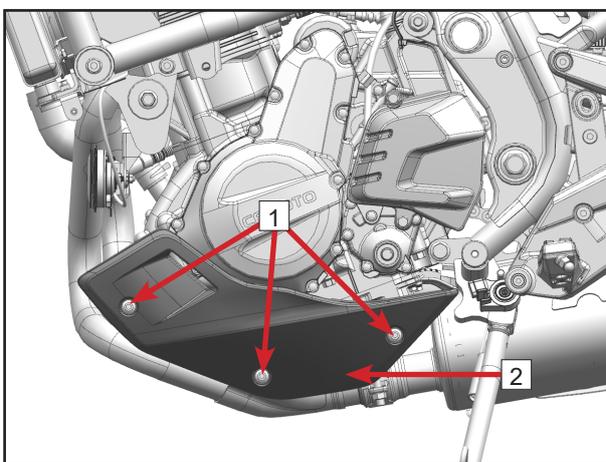
Install engine RH panel **2** and bolt **1**.



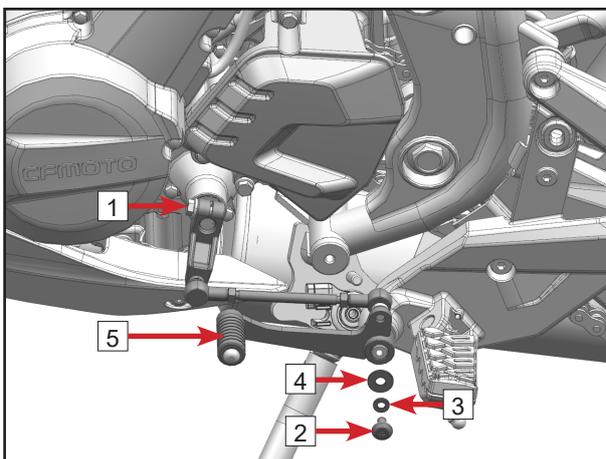
Install bracket **2** and bolt **1**.



Install engine LH panel **2** and bolt **1**.



Install gearshift rod assembly **5**.
Install washer **4**, washer **3** and inner hex screw **2** in sequence.
Install bolt **1**.



Insert all electrical connectors connected to the engine.

Install fuel tank. (Refer to Fuel System)

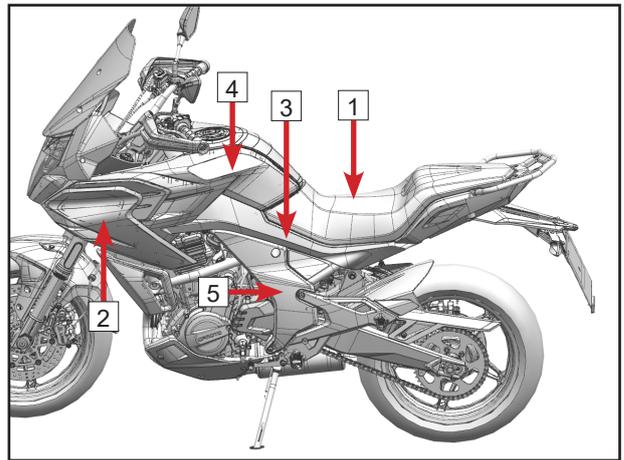
Install bracket LH/RH panel **5**. (Refer to Appearance Part chapter)

Install fuel tank LH/RH panel **4**. (Refer to Appearance Part chapter)

Install seat LH/RH panel **3**. (Refer to Appearance Part chapter)

Install LH/RH panel assembly **2**. (Refer to Appearance Part chapter)

Install seat **1**. (Refer to Seat chapter)



14 Handlebar and Triple Clamps

14.1 Clutch Lever Assembly	14-2
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14.15 Front Fork Pipe Lower Triple Clamp Assembly	14-11

14.1 Clutch Lever Assembly

Pre-work

If equipped with hand guard, remove hand guard first (see chapter 05).

Removal

Unplug relevant electrical parts connectors.

Remove rearview mirror [1].

Remove bolts [2].

Remove clutch lever assembly cover [3].

Remove clutch lever assembly [4].

NOTE: When installing cover [3], Assemble according to the marked points on the handlebar, and the bolts on the upper side should be assembled first when assembling the bolts [2].

Installation

Install in reverse order of disassembly.

14.2 Clutch Cable

Pre-work

Remove relevant body covering parts (see chapter 05).

Remove clutch lever assembly (see this chapter).

Removal

Engine end:

Remove the lower terminal [1] of the clutch cable from the clutch control shaft assembly [2].

Remove the clutch cable [3] from the clutch cable bracket [4].

Remove wire clip [5].

Remove bolt [6].

Remove main cable LH wire clip [7].

Remove tie [8].

Remove tie [9].

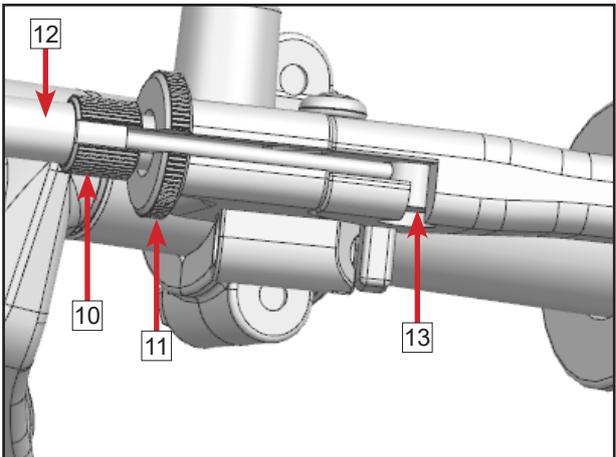
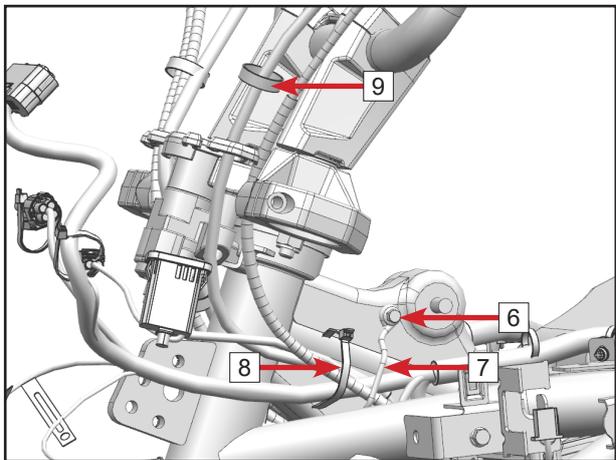
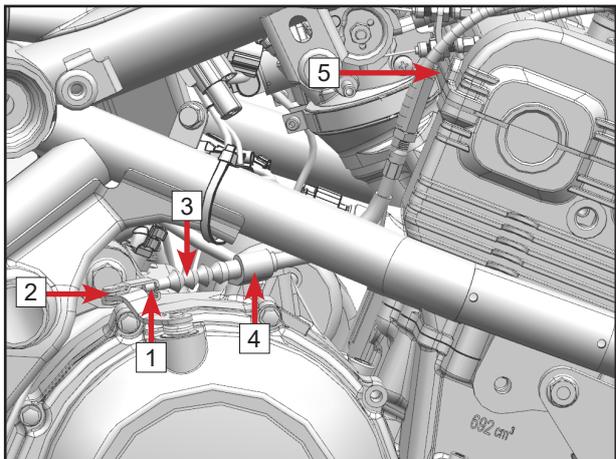
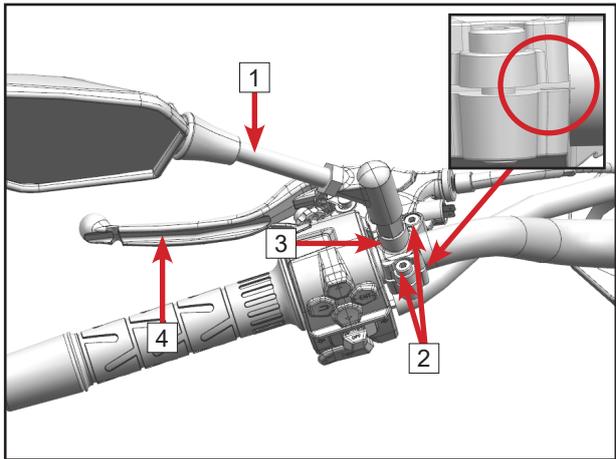
Clutch lever end:

Turn the open slot of the adjusting bolt [10] and the open slot of the lock nut [11] until they are flush.

Remove the clutch cable [12] and take out the clutch cable terminal [13].

Installation

Install in reverse order of disassembly.



14 Handlebar and Triple Clamps

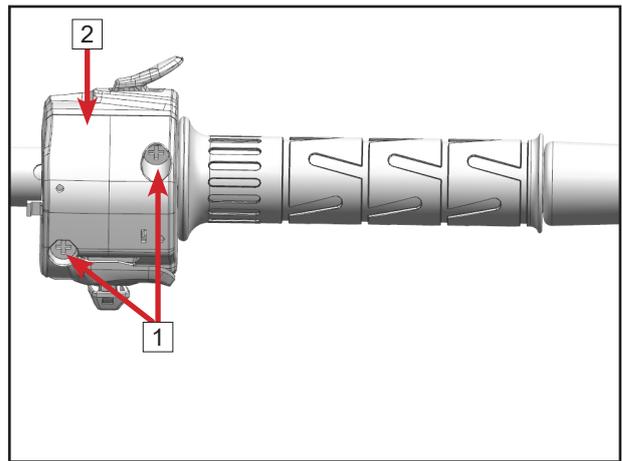
14.3 LH Handlebar Switch Assembly

Removal

Unplug LH handlebar switch assembly connectors.

Remove screws **1**.

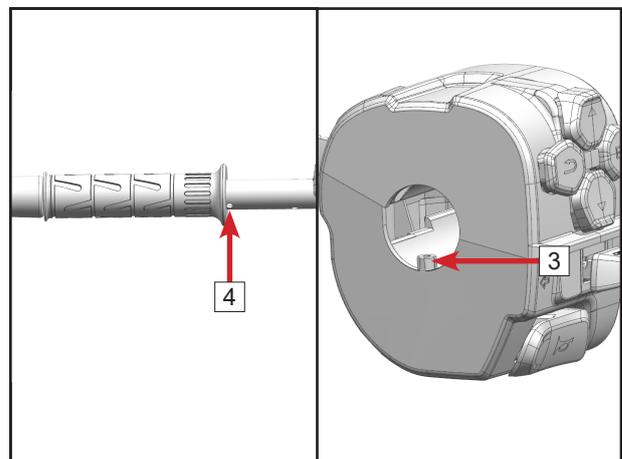
Disassemble and remove LH handlebar switch assembly **2**.



When installing the LH handlebar switch assembly, align the dowel pin **3** with the dowel hole **4** on the handlebar.

Installation

Install in reverse order of disassembly.



14.4 Balance Block (state 1)

14.4.1 LH Balance Block

Removal

Release bolt [1].

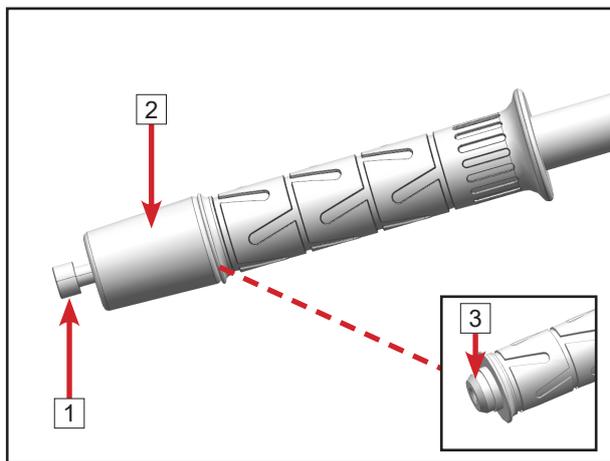
Remove balance block [2] and bolt [1] together.

Remove balance block sleeve [3].

Remove RH balance block same way as LH.

Installation

Install in reverse order of disassembly.



14.5 Balance Block (state 2)

14.5.1 LH Balance Block

Removal

Release bolt [1].

Remove bolt [2].

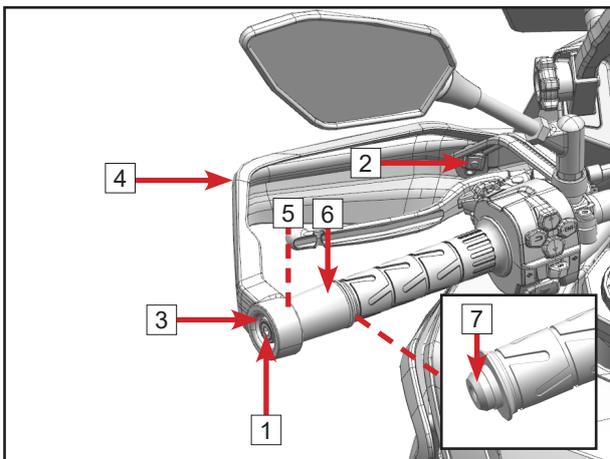
Remove hand guard bushing [3], LH hand guard [4], T-bushing [5] and balance block [6] all together.

Remove balance block sleeve [7].

Remove RH balance block same way as LH.

Installation

Install in reverse order of disassembly.



14.6 LH Hand Grip

Pre-work

Remove LH balance block (see this chapter).

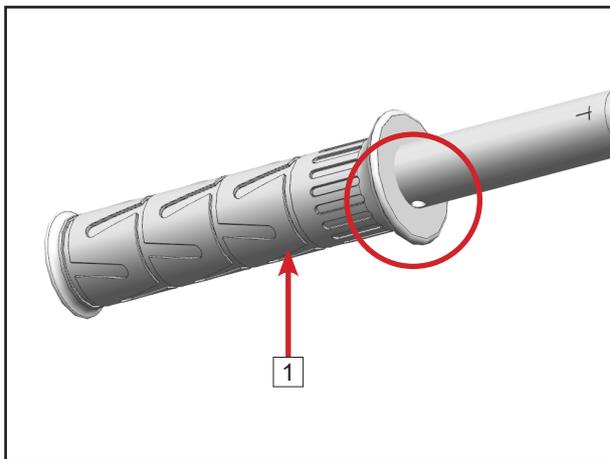
Removal

Remove LH hand grip [1].

Installation

Install in reverse order of disassembly.

NOTE: When installing LH grip, do not cover up switch positioning hole.



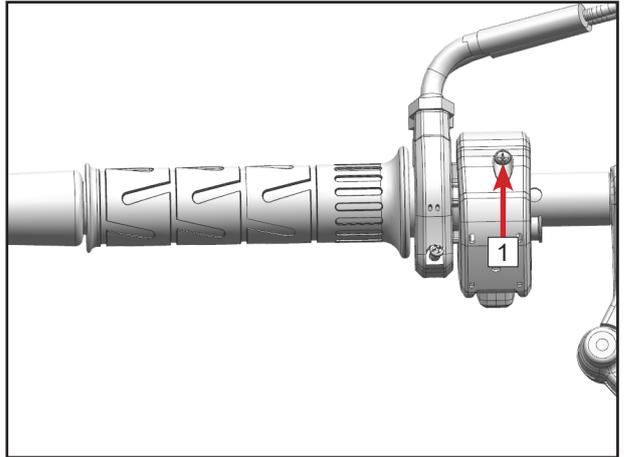
14 Handlebar and Triple Clamps

14.7 RH Handlebar Switch Assembly

Removal

Unplug RH handlebar switch assembly connectors.

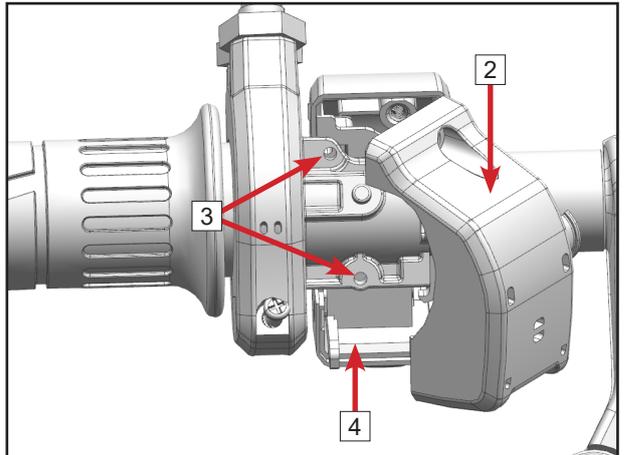
Remove screw **1**.



Release RH handlebar switch lower housing **2**.

Remove screws **3**.

Remove RH handlebar switch lower housing **2** and RH handlebar switch upper housing **4** together.



Installation

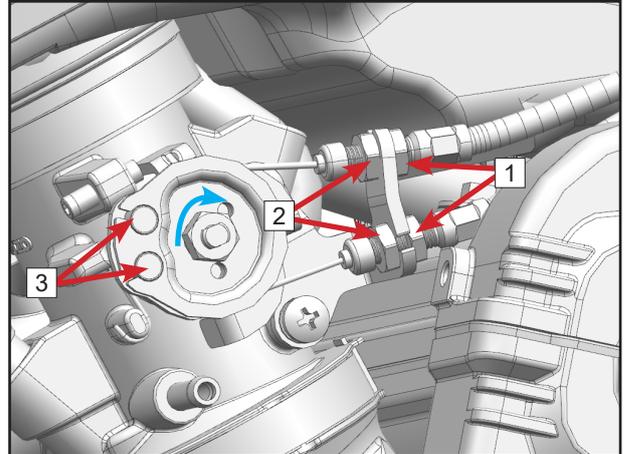
Install in reverse order of disassembly.

14.8 Throttle Cable

Removal

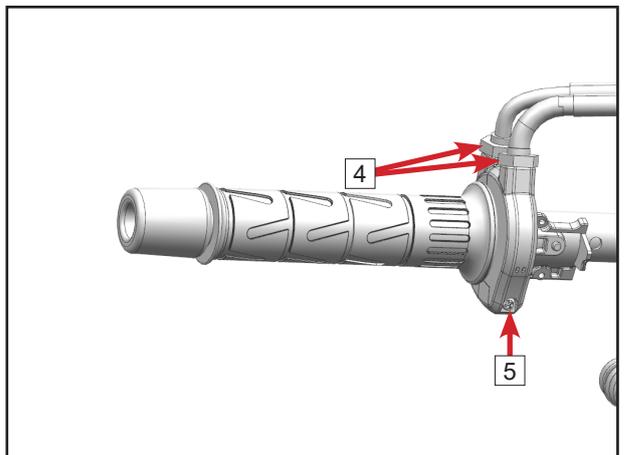
Remove relevant body covering parts (see chapter 05).

Release nut **1** and nut **2**, then remove throttle cable terminals **3**.



Release nuts **4**.

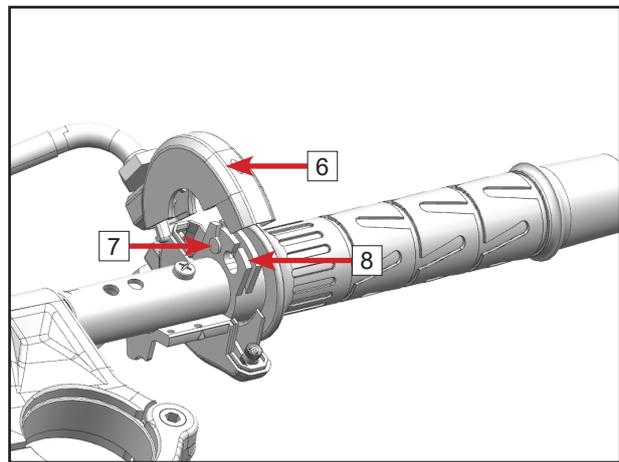
Remove bolt **5**.



Open the upper housing [6] of the throttle cable.

Remove the terminals [7] of the throttle cable I from the right grip core [8].

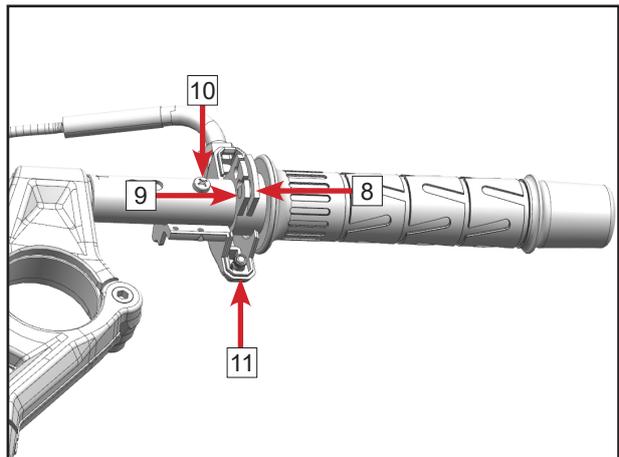
Remove the upper housing [6] of the throttle cable together with the throttle cable I .



Remove the throttle cable II terminal [9] from the right grip core [8].

Remove the bolt [10].

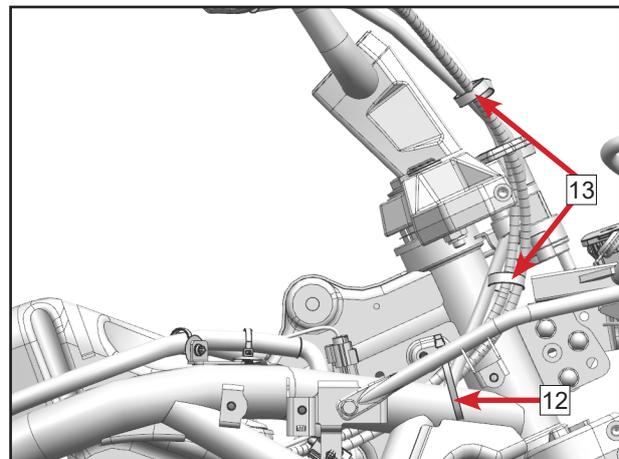
Remove the lower housing [11] of the throttle cable together with the throttle cable II.



Remove tie [12].

Remove tie [13].

Remove throttle cable I and throttle cable II .



Installation

Install in reverse order of disassembly.

⚠ WARNING: The installation of a new throttle cable must be arranged according to the factory alignment, otherwise the throttle is prone to seize, which may lead to danger.

14.9 RH Hand Grip Assembly

Pre-work

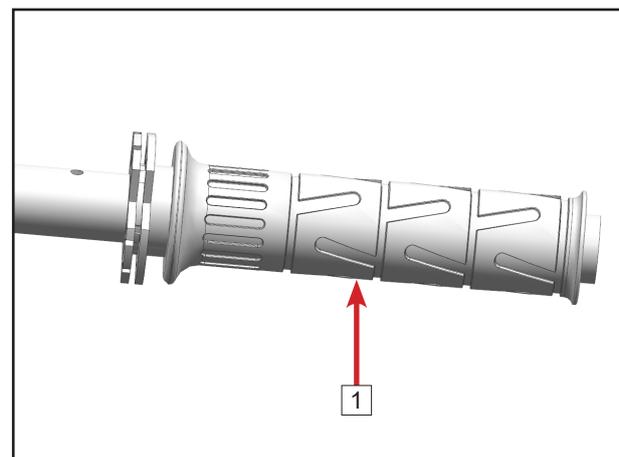
Remove RH balance block (see this chapter) .

Remove RH handlebar switch (see this chapter)

Remove upper throttle cable (see this chapter) .

Removal

Remove RH grip assembly [1].



Installation

Install in reverse order of disassembly.

14 Handlebar and Triple Clamps

14.10 Control Parts Inspection

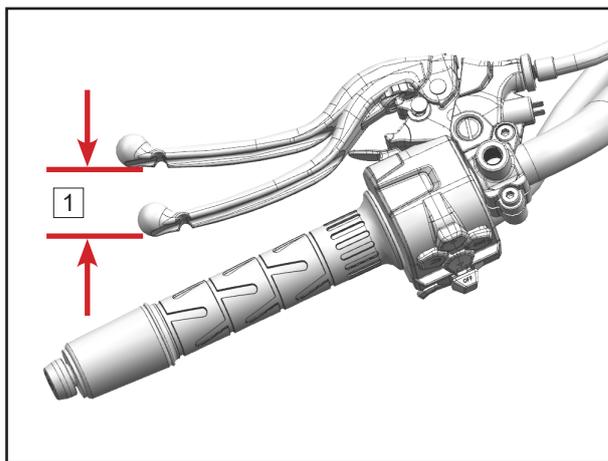
14.10.1 Clutch Lever Clearance Inspection

Check the smoothness of the clutch lever returning.

Orient the vehicle in the straight direction.

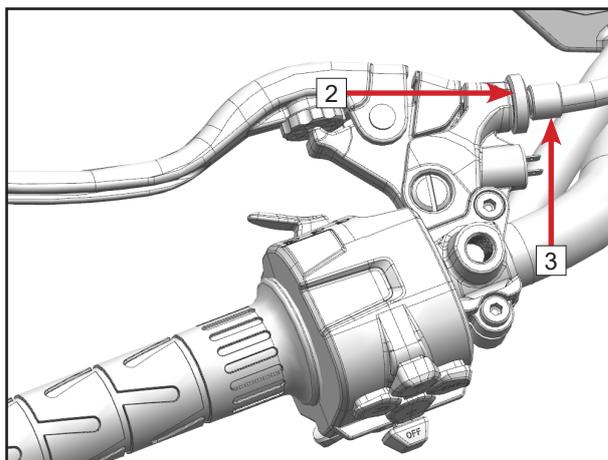
Slowly squeeze the clutch lever until significant resistance is felt, between which is the free play of the clutch lever.

Check the free play **1** of the clutch lever: about 10mm.

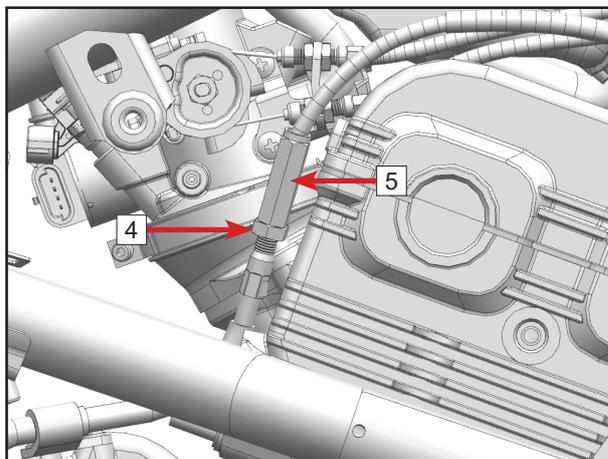


Clutch cable free play adjustment

When fine-tuning the handle end: loosen the lock nut **2**, rotate the adjusting nut **3** for adjustment, and tighten the lock nut **2** after adjustment.

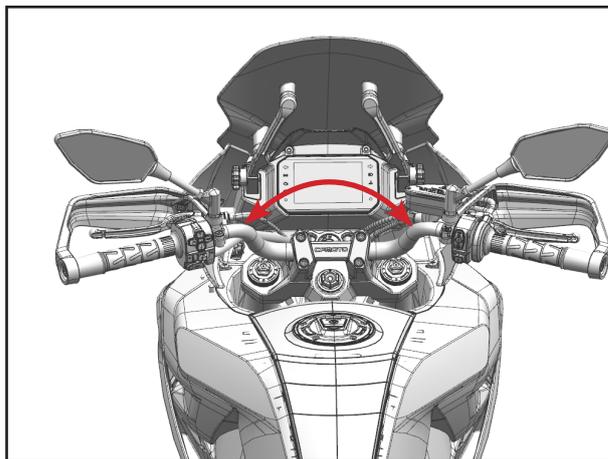


When the engine end is being adjusted: loosen the lock nut **4**, turn the adjusting nut **5** to adjust, and tighten the lock nut **4** after the adjustment.



14.10.2 Handlebar Interference Inspection

Turn the handlebar left and right to check whether all kinds of cables interfere with the front wheel. Whether there is interference with the tank when the handlebar is turned to its limit.



14.10.3 Throttle Cable Free Play

Check the smoothness of the throttle grip turning and returning.

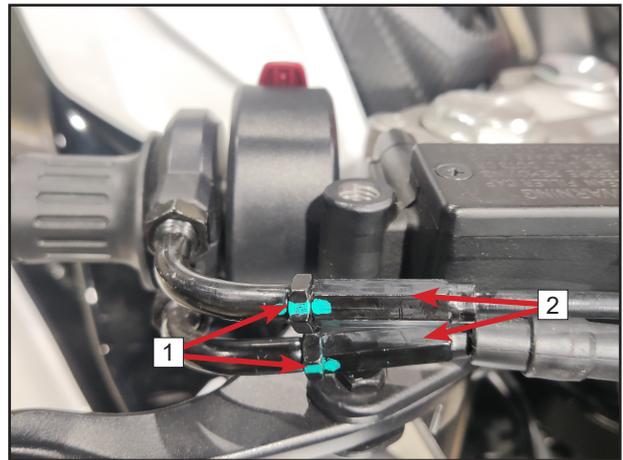
Twist the throttle grip slowly until significant resistance is felt, between which is the throttle grip free play.

Check the free play of the throttle cable.

Free play: 2mm~3mm

Throttle cable adjustment

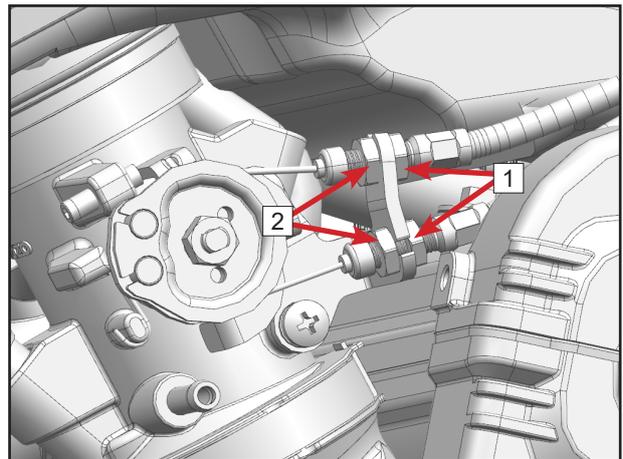
When fine-tuning the grip end: remove the dust sleeve, loosen the lock nut **1**, rotate the adjusting nut **2** for adjustment, and tighten the lock nut **1** after adjustment.



Pre-work

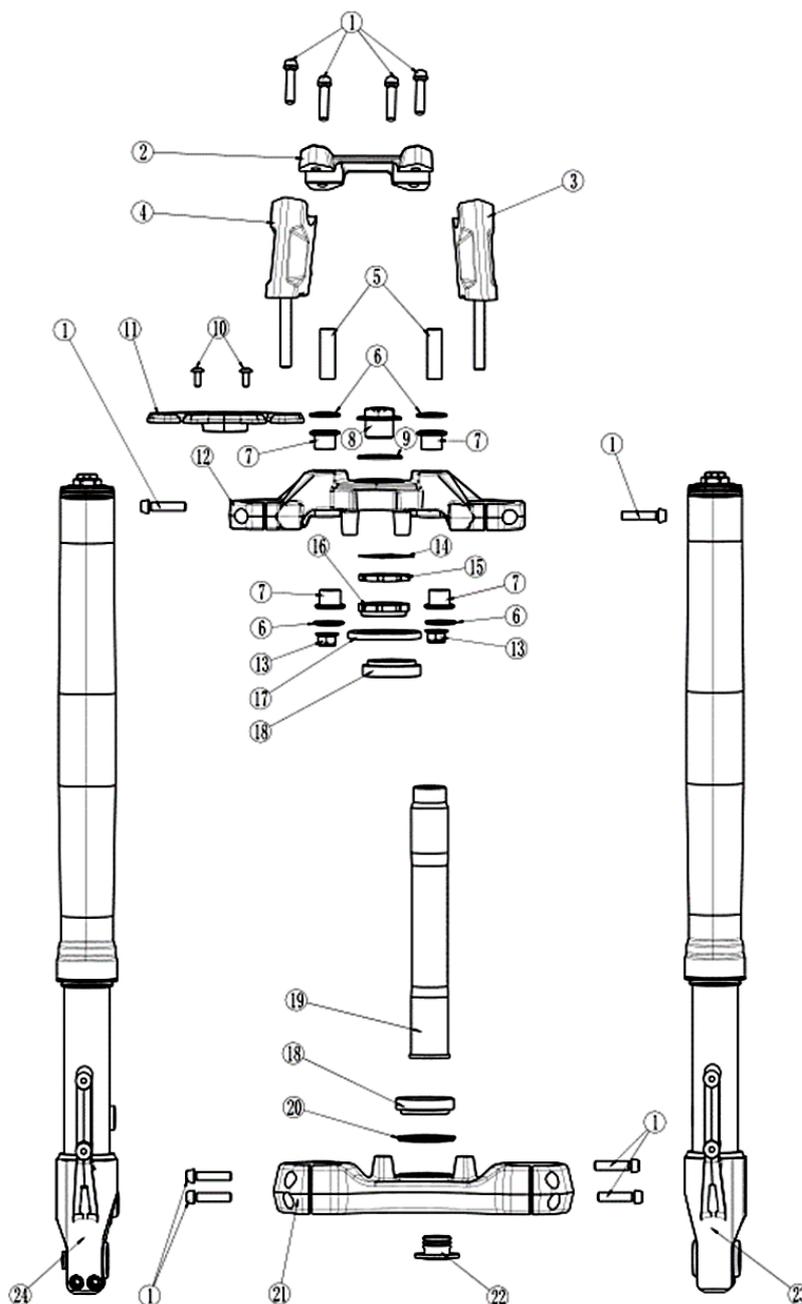
Remove relevant body covering parts (see chapter 05).

When the engine end is being adjusted: loosen the nut **2**, adjust the nut **1** to appropriate position, and tighten the nut **2**.



14 Handlebar and Triple Clamps

14.11 Front Suspension System Diagram



1	screw M8×35	2	handlebar cover	3	handlebar LH supporting seat assembly	4	handlebar RH supporting seat assembly	5	upper triple clamp liner
6	washer	7	upper triple clamp rubber damper	8	upper triple clamp screw	9	washer	10	screw M5×14
11	clip	12	upper triple clamp	13	nut	14	washer	15	lock nut I
16	lock nut II	17	upper retainer dust cap	18	steering bearing assembly	19	front fork pipe	20	lower retainer dust cap assembly
21	lower triple clamp	22	rubber plug II	23	front LH shock absorber	24	front RH shock absorber		

14.12 Handlebar Assembly

Pre-work

Remove LH and RH handlebar switch assembly (see this chapter) .

Remove clutch lever assembly (see this chapter) .

Remove front brake master cylinder assembly (see this chapter) .

Remove throttle cable (see this chapter) .

Remove hand guard (if equipped, see chapter 05) .

Remove balance block and grip (see this chapter) .

Removal

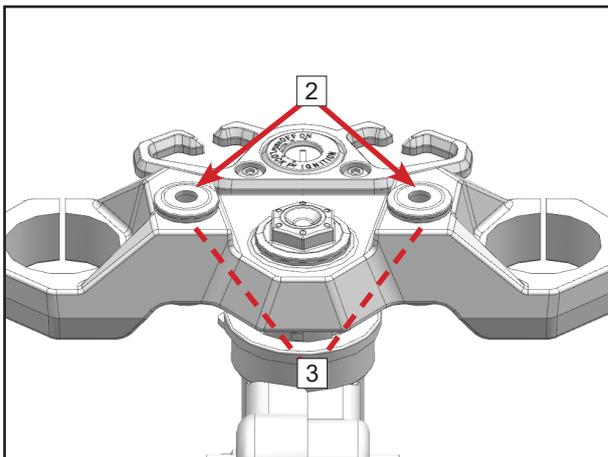
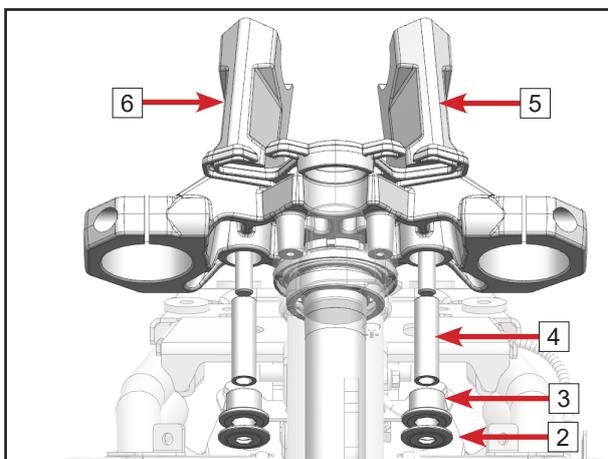
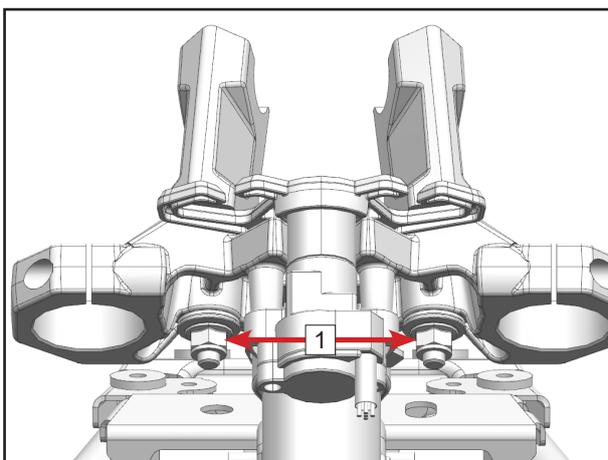
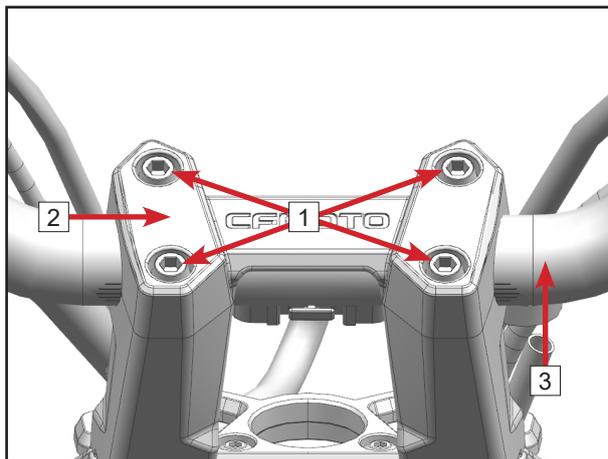
Remove bolts [1].

Remove handlebar cover [2].

Remove handlebar assembly [3].

Installation

Install in reverse order of disassembly.



14.13 Handlebar Support Assembly

Pre-work

Remove handlebar assembly (see this chapter) .

Remove relevant body covering parts (see chapter 05) .

Removal

Remove nuts [1].

Remove washers [2].

Remove upper triple clamp rubber damper [3].

Remove upper triple clamp liner [4].

Remove handlebar LH bracket assembly [5].

Remove handlebar RH bracket assembly [6].

Remove washers [2].

Remove upper triple clamp rubber damper [3].

Installation

Install in reverse order of disassembly.

14 Handlebar and Triple Clamps

14.14 Upper Triple Clamp

Pre-work

Remove front shock absorber (see chapter 12) .

Remove handlebar assembly (see this chapter) .

Remove handlebar bracket assembly (see this chapter) .

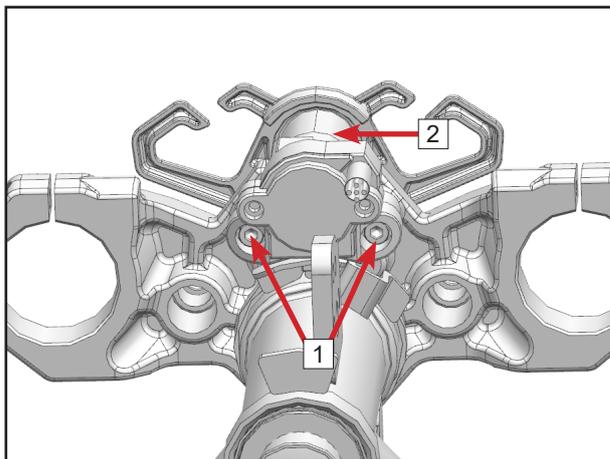
14.14.1 Power Lock

Removal

Unplug power lock connectors.

Remove bolts [1].

Remove power lock [2].



Installation

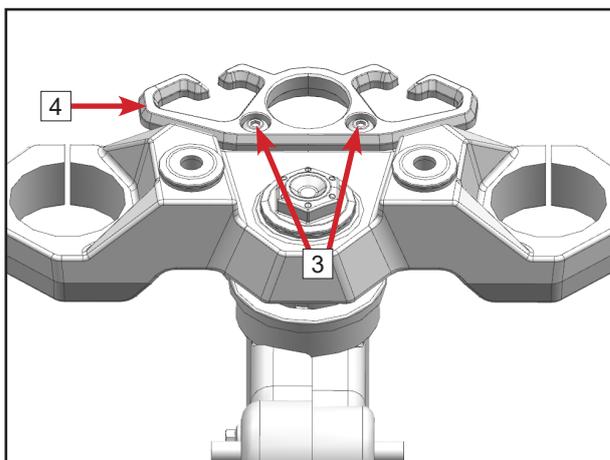
Install in reverse order of disassembly.

14.14.2 Clip

Removal

Remove bolts [3].

Remove clip [4].



Installation

Install in reverse order of disassembly.

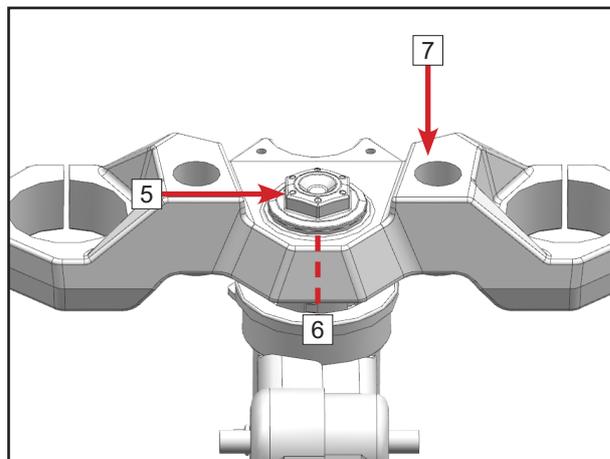
14.14.3 Upper Triple Clamp Removal

Removal

Remove upper triple clamp screw [5].

Remove washer [6].

Remove upper triple clamp [7].



Installation

Install in reverse order of disassembly.

14.15 Front Fork Pipe Lower Triple Clamp Assembly

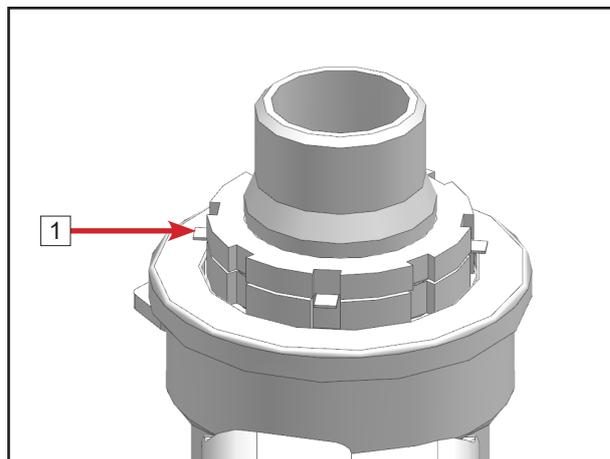
Pre-work

Remove handlebar bracket assembly (see this chapter) .

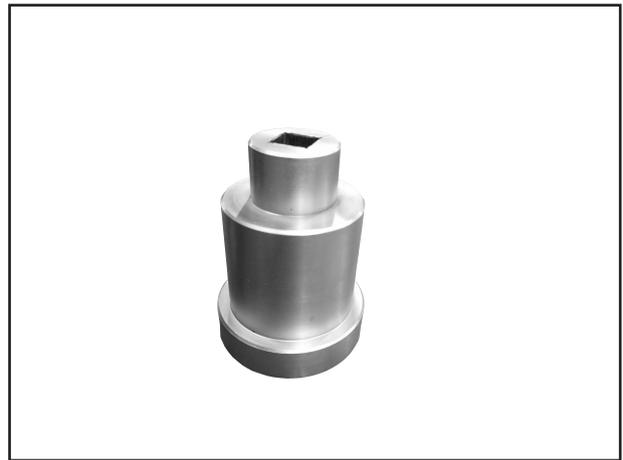
Remove upper triple clamp (see this chapter) .

Removal

Level out the bumps [1] on the washer.

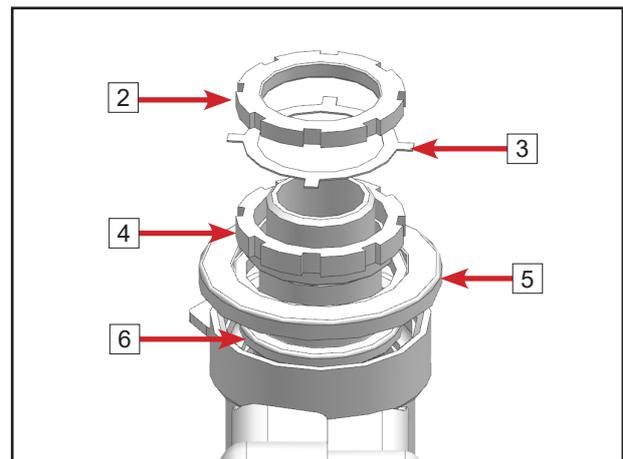


Lock nut special tool:
A000-050006-922-001



Remove lock nut I [2].
Remove washer [3].
Remove lock nut II [4];
Remove upper retainer dust cap [5].
Remove steering bearing assembly [6].

NOTE: The removed washer [3] cannot be reused, replace.

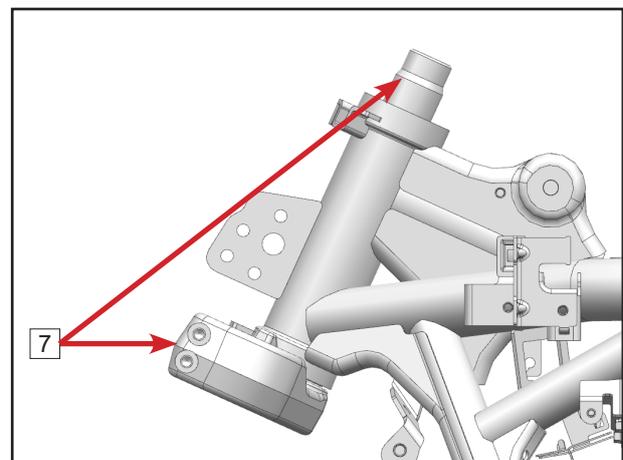


Remove front fork pipe lower triple clamp assembly [7].

Installation

Install in reverse order of disassembly.

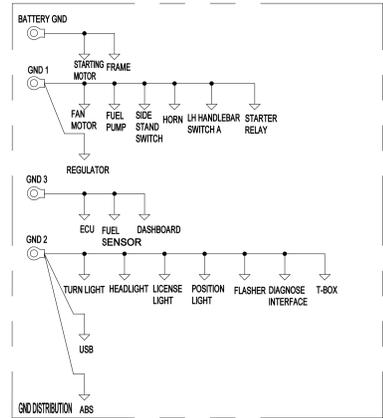
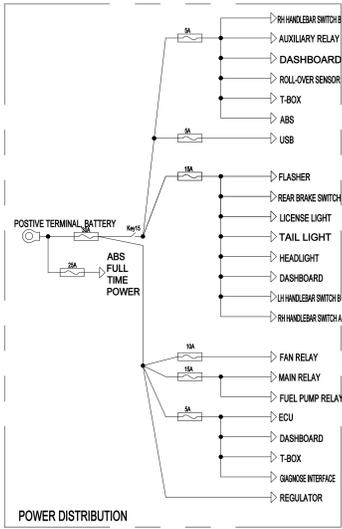
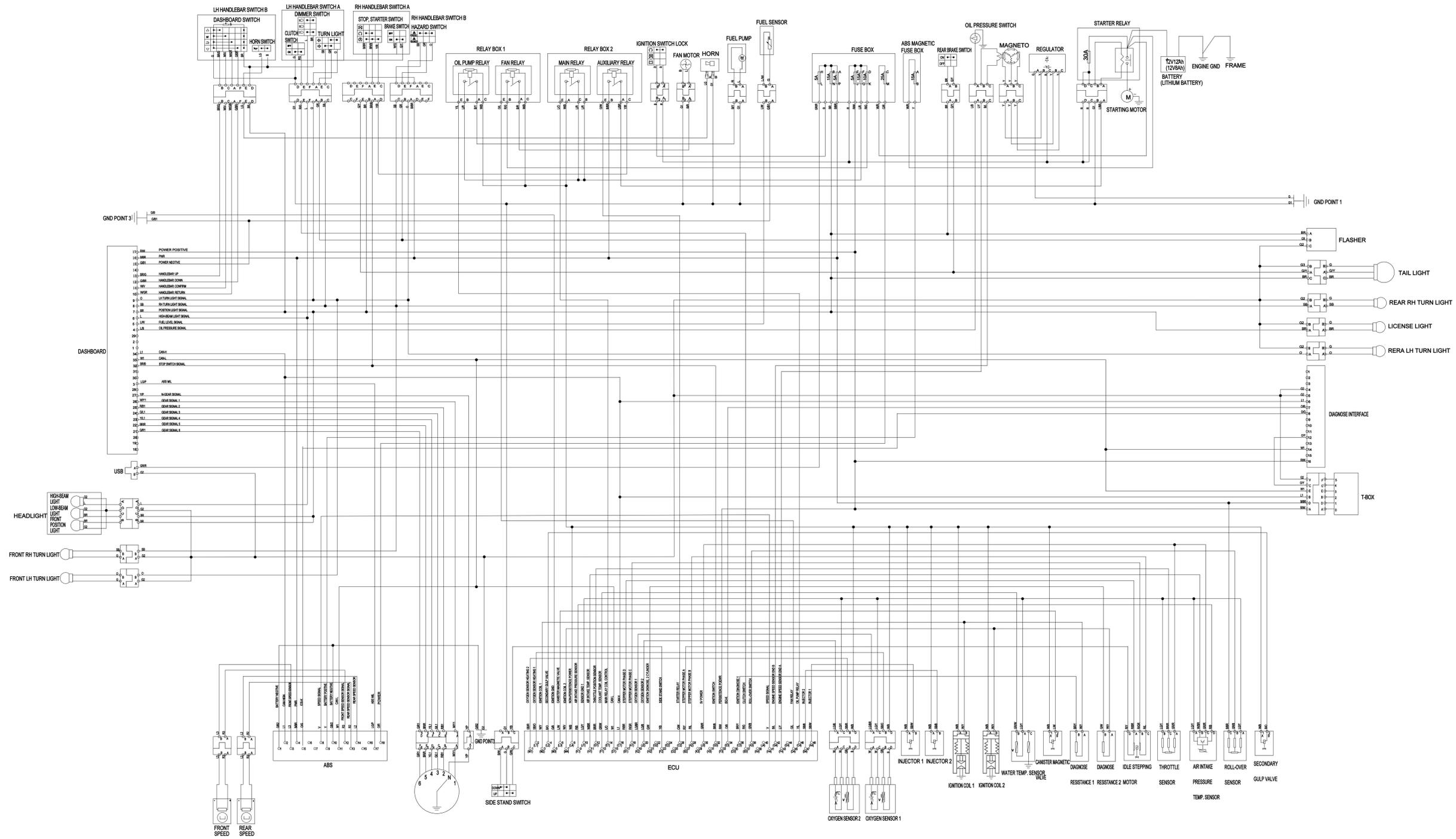
NOTE: Apply sufficient grease to the steering bearing assembly during installation and replacement.



Inspection

Check whether the steering bearing assembly rotation is flexible, whether there is abnormal wear, stuck, abnormal sound or other phenomena, replace if necessary. Check whether the dust cover of the upper retainer has cracks, if so, replace.

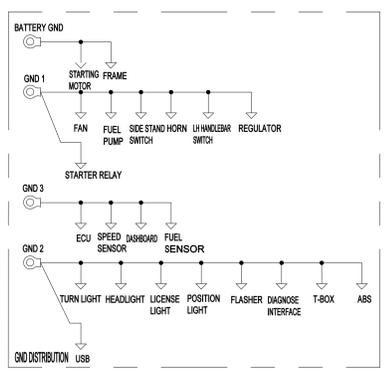
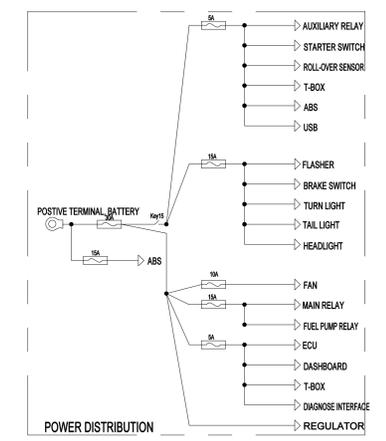
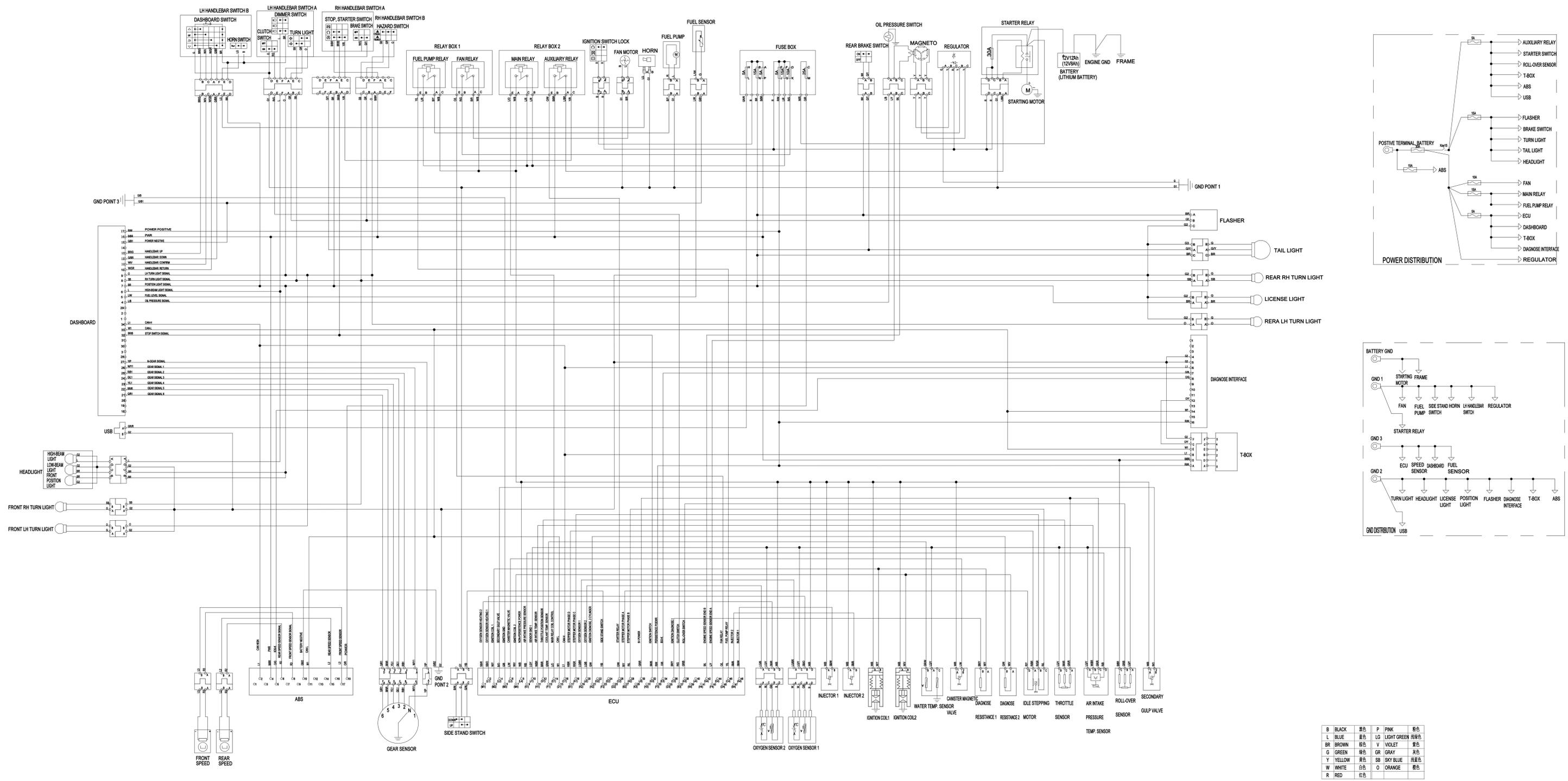
ABS status 1



B	BLACK	黑色	P	PINK	粉色
L	BLUE	蓝色	LG	LIGHT GREEN	浅绿色
BR	BROWN	棕色	V	VIOLET	紫色
G	GREEN	绿色	GR	GRAY	灰色
Y	YELLOW	黄色	SB	SKY BLUE	天蓝色
W	WHITE	白色	O	ORANGE	橙色
R	RED	红色			

COLOR TABLE

ABS status 2



B	BLACK	黑色	P	PINK	粉色
L	BLUE	蓝色	LG	LIGHT GREEN	浅绿色
BR	BROWN	棕色	V	VIOLET	紫色
G	GREEN	绿色	GR	GRAY	灰色
Y	YELLOW	黄色	SB	SKY BLUE	浅蓝色
W	WHITE	白色	O	ORANGE	橙色
R	RED	红色			

COLOR TABLE