

800NK

Service Manual

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INTRODUCTION

This service manual introduces CF800-7 CF800-7A CF800-7F maintenance information, including disassembly procedure, checking & adjustment methods, troubleshooting and technical specifications. There are some illustrations to guide your operation.

The first three chapters mainly introduce general operation information, special tool, vehicle structure, basic specification, inspection & maintenance methods etc.,

Other chapters introduce vehicle part removal, installation, adjustment, service, fault diagnosis and etc.

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This manual has been improved by using many ways to make it accurate. But we are not responsible for any difference or missing.

CFMOTO reserves right to make improvements and modifications to the products without prior notice. Overhaul and maintenance should be done according to actual condition of vehicle. And CFMOTO is not responsible for production improvements and modifications. This manual is only for reference. If any objections, please ask the nearest dealer to get the latest information.

The information in this manual are the latest depends on latest productions on coming out. The images in this manual may not stand for actual model, assembly or parts.

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CONVERSATION TABLE

A	Ampere	lb	Pound
ABDC	After bottom dead center	m	Meter
AC	Alternating current	min	Minute
ATDC	After top dead center	N	Newton
BBDC	Before bottom dead center	Pa	Pascal
BDC	Bottom dead center	PS	Metric horse power
BTDC	Before top dead center	Psi	Pound/Square Inch
°C	Centigrade	r	Revolutions
DC	Direct current	rpm	Revolutions per minute
F	Farad	TDC	Top dead center
°F	Fahrenheit	TIR	Total indicator reading
ft	Feet	V	Volt
g	Gram	W	Watt
h	Hour	Ω	Ohm
L	Litre	in	Inch
US gal	Gallon(US)	US qt	Quart(US)
oz	Ounce	HP	British horsepower
cm Hg	Centimeter of mercury	pint	Pint
cu in	Cubic inch	mL	Milliliter

FOREWORD

This manual is designed primarily for use by trained mechanics in repair workshops. However, the thorough details and basic information within this manual are sufficient to enable owners to perform basic maintenance and repair work on their motorcycles themselves. A mastery of the basics of mechanics, proper use of tools, and an understanding of repair procedures are necessary to obtain more comprehensive maintenance and repair results. If you lack practical experience or are unsure about maintenance and repair work, all adjustments, maintenance and repair work must be done by a qualified mechanic. To increase efficiency and avoid major errors, read this manual to thoroughly understand the repair procedures before operating, and then work carefully in a clean area. Once a special tool or equipment is specified, do not use temporary tools or equipment instead. The mechanical performance of the vehicle can only be guaranteed by using the proper tools or equipment, and the use of alternative tools can seriously compromise operational safety. During the warranty period, we recommend that all repairs and scheduled maintenance be performed in accordance with this service manual. We are not responsible for the consequences of owner's own maintenance or repairs not performed in accordance with the procedures in this service manual.

How to get long service life:

- Follow the periodic maintenance chart in this manual.
- Non-periodical maintenance in special situations.
- Use tools properly and use CFMOTO genuine parts.
- The special tools, gauges and testers necessary for CFMOTO motorcycles introduced in this service manual are listed in the parts catalog as necessary original parts.
- Follow the procedures in this manual carefully. Please do not speculate.
- Be sure to keep complete records of maintenance and repairs on specific dates, and indicate when new parts were replaced.

How to use this manual:

In this manual, the product is described in terms of its main systems. These systems make up the content of the chapters in this manual. The table of contents already shows all the systems of this product and helps you to target the specific chapters of the system. Each chapter has its own sub-category. For example, if you want to find information on ignition coils, use the table of contents to lock the chapter on electrical systems; then, find the section on ignition coils in the table of contents on the first page of that chapter.

Whenever you see the following warnings or warning symbols, you must pay attention and comply with the safety operation and maintenance method.

 **DANGER:** This symbol means it will cause serious injuries even death if you don't follow the procedure.

 **WARNING:** This symbol means the special steps. It may cause the vehicle damage if you don't follow the procedure.

 **CAUTION:** This symbol means precautions are needed to prevent parts from damaging.

NOTE: It makes operation process easier or offers clearer information. It has no symbol.

NOTE:
The vehicle disassembly steps do not include electrical parts, police equipment and engines by default. Electrical and engine contents will be disassembled and overhauled in a separate chapters.
All connectors are disconnected by default during disassembly.
The guide lines without serial numbers in the picture indicate the disassembly direction.

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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.



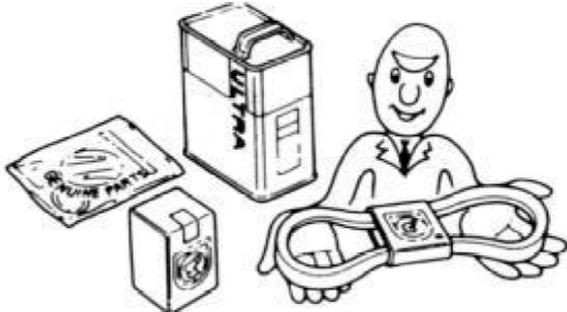
⚠️ DANGER: Be careful to get clamped by the turning parts like wheels and clutch.



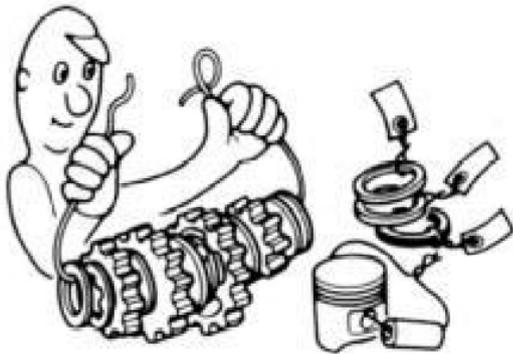
General Information

1.2 Disassembly and Assembly Cautions

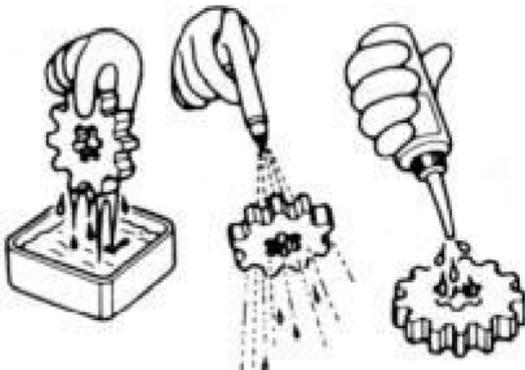
■ Use genuine CFMOTO Parts, lubricants and grease.



■ 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.

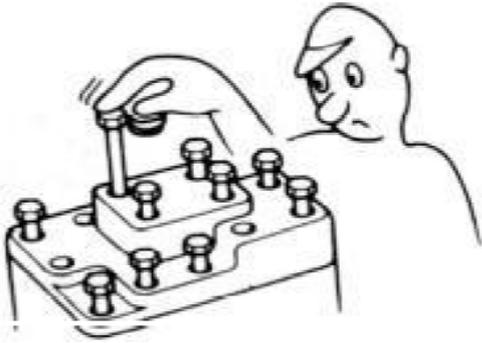


■ Measure the data during disassembly for correct assembly.

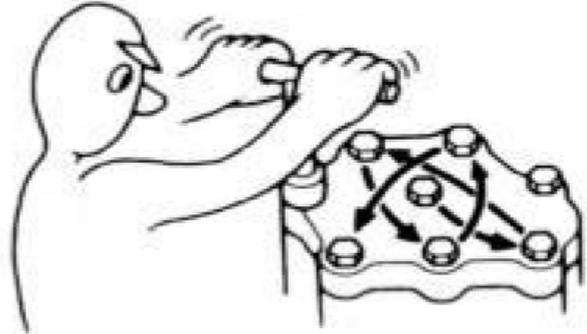


General Information

■ 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.



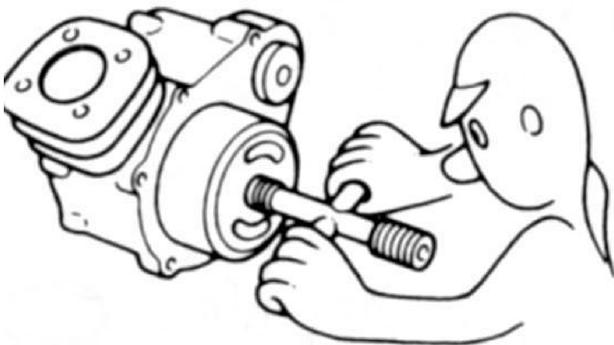
■ Check if the disassembled rubber parts are aged and replace it if necessary. Keep the rubber parts away from grease.



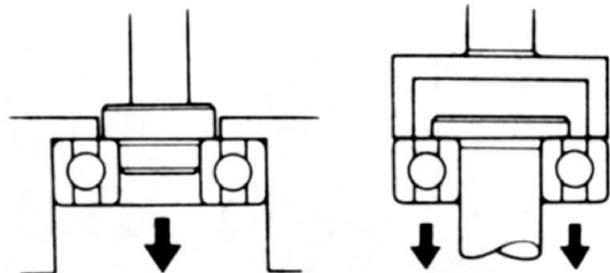
■ Apply or inject recommended lubricant to the specified parts.



■ Use special tools wherever necessary.

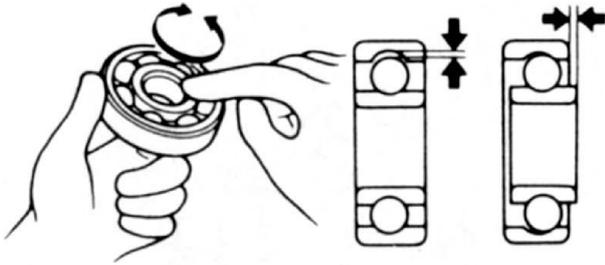


■ If the disassembling of pressed ball bearing is done by pressing the balls, the disassembled should not be used again.



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.



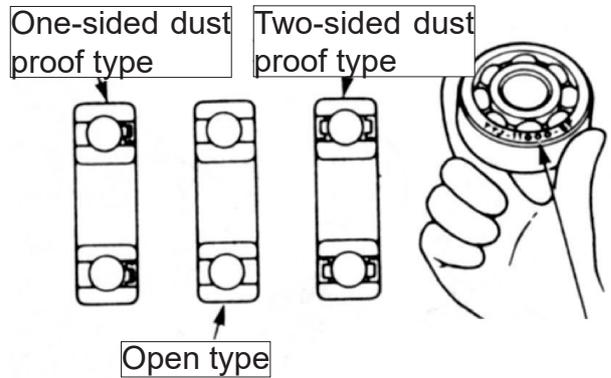
■ Keep the bearing block still when blowing dry the bearing after washing clean. Apply oil or lubricant before assembling.



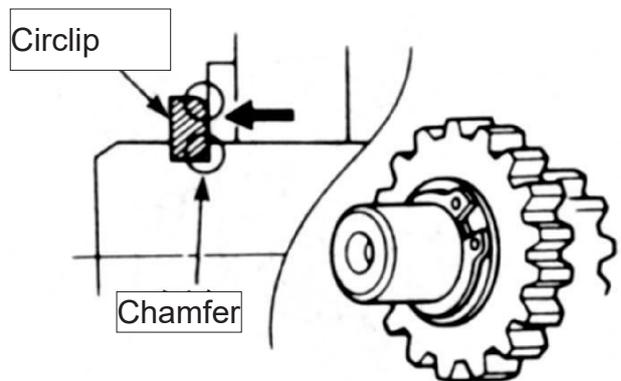
■ After assembling, check if all the tightened parts are properly tightened and can move smoothly.



■ 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.

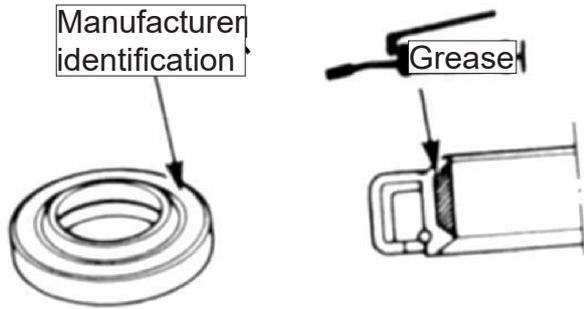


■ Brake fluid and coolant may damage coating, plastic and rubber parts. Flush these parts with water if splashed.

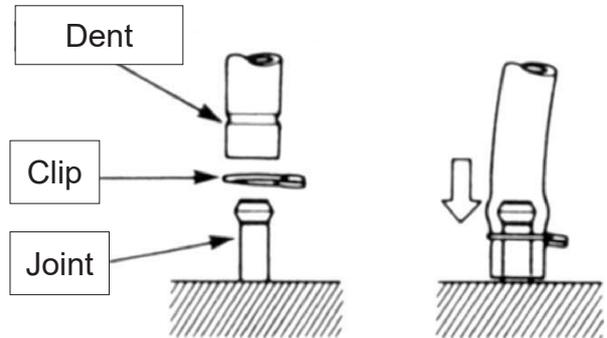


General Information

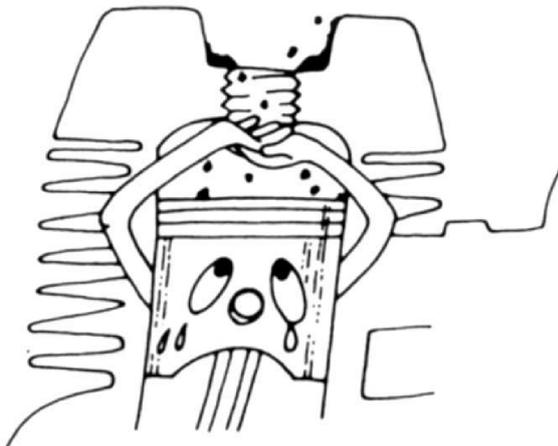
■ Install oil seal with the side of manufacturer's mark outward. Do not fold or scratch the oil seal lip. Apply grease to the oil seal lip before assembling.



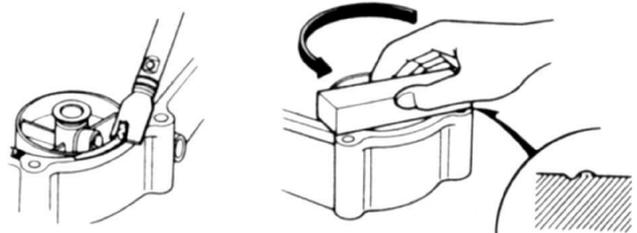
■ When installing pipe parts, the pipe should be inserted into the root of the joint. If there is a pipe clip, the pipe clip should be installed in the dent of the pipe. Replace tubes that are not tight during installation.



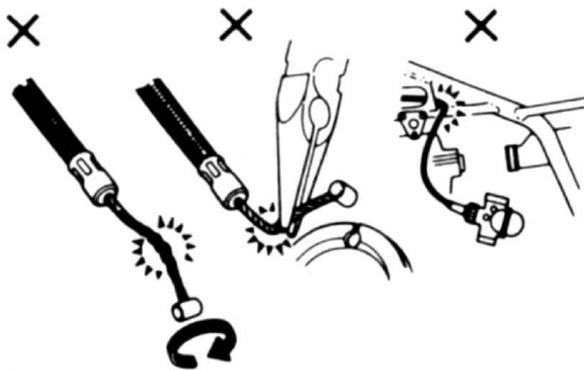
■ Do not get dust, dirt and so on into the engine and inside the brake oil pressure system .



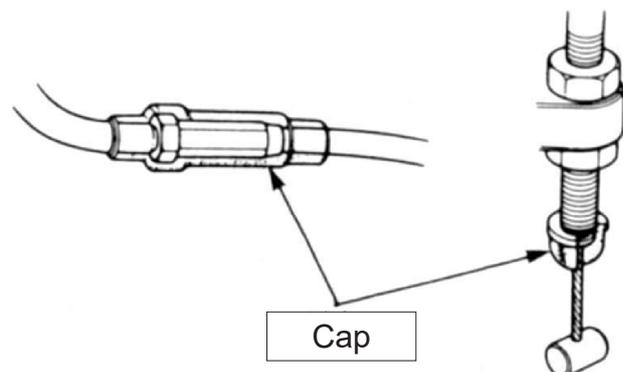
■ The gasket material attached to the bonding surface of each engine case should be cleaned before assembly. The bumps on the contact surface must be removed by grinding them evenly with a whetstone.



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

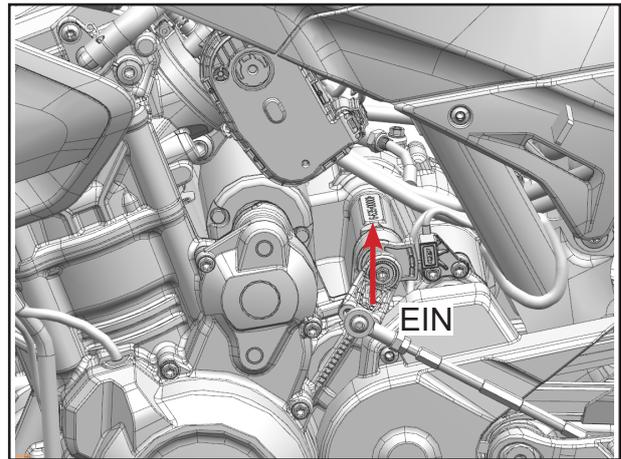
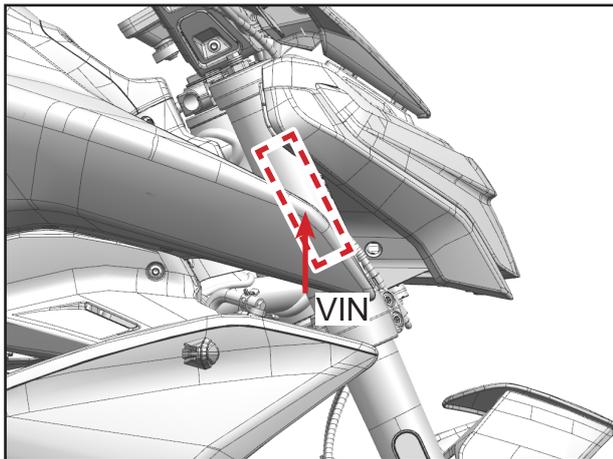


■ When assembling the cap parts, the cap must be inserted into the groove if there is a groove.



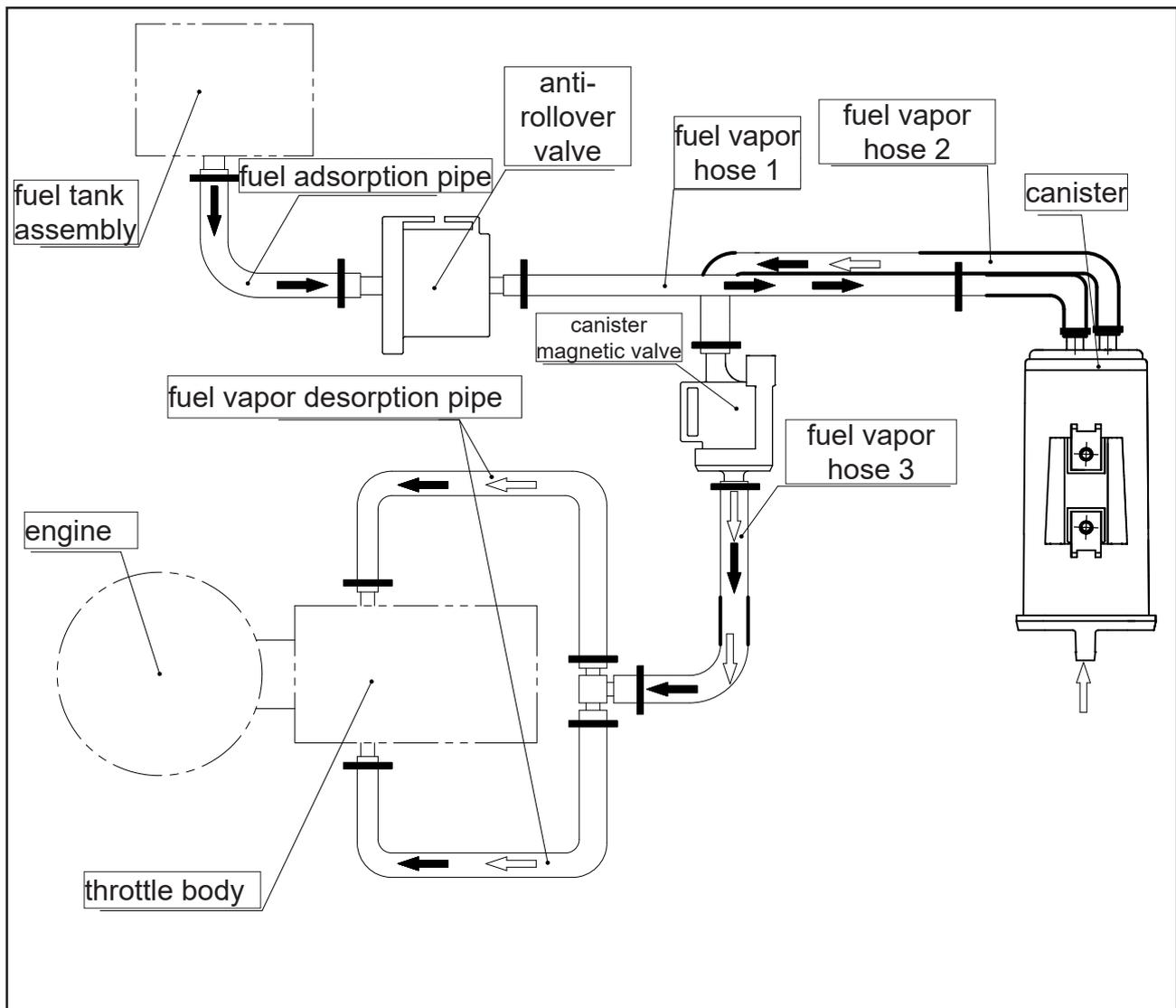
General Information

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 SET to enter menu.

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

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

Long press SET and \triangle (> 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

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Technical Information

3.1 Main Parameters of the Vehicle

Project		Parameter	
Model		CF800NK	
Length		2146 mm	
Width		810 mm	818 mm
Height		1120 mm	1137 mm
Wheel base		1465 mm	
Engine model		288MW	
Displacement		799CC	
Fuel grade		SAE10W / 50 SJ, JASOMA2	
Gross weight		186 mm	
Passengers		2 people	
Load		180	
Tire	Front	120/70 R17	
	Rear	180/55 R17	
Min. ground clearance		185 mm	
Turning circle diameter		5.2 m	
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	15 L	
	Injector	Type: F01R00MG75	
	Fuel pump	Voltage: DC12±0.3V	
		Pressure: 0.35MPa ± 0.01MPa	
		Flow: ≥80 L/h	
		Current: ≤6 A	

3.2 Main Parameters of Engine

Project		Type/Specification			
		288MW			
Type	Line engine, twin-cylinder, 4-stroke, water-cooled, DOHC				
Bore × Stroke	88 mm × 65.7 mm				
Displacement	799 mL				
Compression ratio	12.7:1(±0.3)				
Low idling speed (Idling)	1610 r/min ± 150 r/min	1610 r/min ± 160 r/min			
Starting	Electric				
Power	74kW / 9000rpm	35kW / 6750rpm	70kW / 9250rpm		
Electrical system	Ignition type	ECU			
	Spark plug/Electrode gap	NGK LMAR9AI-10	1.0 mm		
	Magneto type	PM three phase AC 29A/350W			
Combustion system	Combustion chamber	Triangular			
	Air filter type	paper filter			
	Gasoline	RQ-95 and above			
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/50 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 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	1.923		
		Final ratio	2.813		
		Secondary ratio	1st	2.846	
			2nd	2.000	
			3rd	1.550	
			4th	1.273	
5th			1.083		
6th	0.957				
Overall size	L(mm)×W(mm)×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).				

Technical Information

3.3 Maintenance Parameter 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	2.0 mm
		Horizontal	0.8 mm	2.0 mm
	Tire	Remaining groove	-	1.6 mm
		Tire pressure	240 kPa	-

3.3.2 Rear Wheel

Project		Standard	Service limit	
Rear wheel	Rim run-out	Longitudinal	0.8 mm	2.0 mm
		Horizontal	0.8 mm	2.0 mm
	Tire	Remaining groove	-	1.6 mm
		Tire pressure	260 kPa	-

3.3.3 Brake System

Project		Standard	Service limit
Front brake	Front (hand) brake free travel	10mm~15mm	-
	Brake disc abrasion	4.5 mm	3.5 mm
Rear brake	Rear (foot) brake free travel	5mm~10mm	-
	Brake disc abrasion	5 mm	4 mm

3.3.4 Light, Dashboard and Switch

Project	Standard	
	Fuse 1×5A 2×7.5A 2×10A 2×15A 1×25A	
Light, bulb	Headlight (Hi/Lo)	LED
	Position light	LED
	Tail light	LED
	Turn light	LED
	License light	LED

3.3.5 Valve Train&Cylinder Head

Project	Standard		Service limit	Remark
	288MW			
Valve clearance (cold engine)	IN	0.10mm~0.15mm	-	
	EX	0.15mm~0.20mm	-	
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		-	

Technical Information

3.3.6 Lubrication System

Project	Standard	Service limit	Remark
Outer rotor to inner rotor clearance	≤ 0.20mm	-	
Outer rotor to pump body clearance	≤ 0.15mm	-	
Oil pressure	1500r/min , 1.4bar 6000r/min , 2.4bar	-	
Oil type	10W-50/SJ, JASOMA2	-	
Oil capacity	Change oil and filter	2800 mL	-
	At overhaul	2900 mL	-

3.3.7 Cylinder, Piston, Piston Ring and Connecting Rod

Project	Standard	Service limit	Remark
Clearance between piston and cylinder	0.035mm~0.070mm		
Dia. of piston skirt	82.920mm~87.980mm	-	
I.D of cylinder	88.000mm~88.012m 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	-	

3.3.8 Clutch and 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	-	
Friction pad thickness	0.15mm	0.30mm	
Free length of clutch spring	43.6mm	43mm	
Quantity	3	-	
Shift fork thickness	4.8mm~5.0mm	-	

3.3.9 Cooling System

Project	Standard/Parameter	Service limit	Remark
Start temp. of thermostat	72°C~85°C	-	
Lift range of thermostat valve	≥8 mm at 85°C	-	
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	-	
Coolant type	120	-	
	-35°C anti-rust and anti-freeze fluid with high boiling point	-	

3.3.10 Air Inlet System

Project	Parameter	Remark
Port size(mm)	φ 42 mm	
Idle speed (r/min)	1610 r/min ± 150 r/min	

3.3.11 Electrical System

Project	Parameter		Remark
Spark plug	Model	NGK LMAR9AI-10	
	Gap	1 mm	
Spark	> 8 mm, 1MPa		
Ignition coil resistance	Primary	1.23 Ω	
	Secondary	6k Ω ~13k Ω	
Magneto coil resistance	Trigger	400 Ω	
Max power	350W		
Stabilized voltage	13.5V~15.0V		
Primary peak voltage, ignition coil	≥27kV		
Peak voltage, trigger coil	≥17V		

Technical Information

3.4 Tighten Torque

3.4.1 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 M8X30	25N·m
Clamp (middle exhaust)	Clamp	8N·m
Motor negative cable	Bolt M6x16	6N·m
Lock nut, rear brake lever	Nut	25N·m (yes)
Dual hydraulic sensor switch	Dual hydraulic sensor switch	30N·m
Rear brake fluid inlet pipe	Banjo bolt II	30N·m
Oil pressure switch	Oil pressure switch	30N·m
Front brake fluid outlet pipe	Banjo bolt II	30N·m
ABS	Bolt M6X22	10N·m
Bolt, engine and frame	Bolt M10x45	45N·m (yes)
Lower bolt, LH front footrest	Bolt M10X65	45N·m
Lower bolt, RH front footrest	Bolt M10x80	45N·m
Connecting bolt, engine bracket and engine	Bolt M10x60	45N·m (yes)
Bracket, middle supporter	Bolt M10x45	45N·m (yes)
Connecting bolt, engine bracket and frame	Bolt M8X50	25N·m (yes)
Bolt, rear shock absorber	Shock absorber bolt (lower) M12X60	80N·m (yes)
	Shock absorber bolt (upper) M12x60	80N·m (yes)
Nut, output shaft	Nut, output shaft	100N·m (yes)
Motor negative cable, positive cable(negative cable is above the starting cable)		10N·m
Bolt, frame	Lower bolt, frame M10X30	60N·m (yes)
Bolt, frame	Upper bolt, frame M10X30	60N·m (yes)
Steering damper(with frame)	Bolt M8X20	25N·m (yes)
Handlebar and press cover	Screw M8X25	20N·m

Technical Information

Balance block assembly	M8×70	20N·m (yesyes)
Balance block assembly	M8×50	20N·m (yes)
Steering column nut	Steering column nut	20N·m
Steering damper, lower triple clamp	Bolt M8X25	25N·m (yes)
Front brake master cylinder pipe	Banjo bolt II	30N·m
Front shock absorber, lower triple clamp	Screw M8×30 (upper)	20N·m (yes)
	Screw M8×30 (lower)	18N·m (yes)
Front shock absorber, upper triple clamp	Screw M8×30	20N·m (yes)
Screw, upper triple clamp	Screw M8×25	20N·m (yes)
Bolt, front wheel shaft	Screw M8×20	25N·m (yes)
Rear wheel nut	Nut	90N·m
Front wheel nut	Front wheel shaft screw	50N·m
Front caliper	Bolt M10×1.25×60	45N·m (yes)
Brake fluid pipe	Banjo bolt	25N·m
Rear footrest	screw M8X25	25N·m
Rear muffler clamp	Clamp	8N·m
Rear muffler	screw M8X35	25N·m
Screw, front brake disc	M8X25 screw	25N·m (yes)
Screw, rear brake disc	M8	25N·m (yes)
Rear sprocket	Sunk screw M8X26	25N·m (yes)

Technical Information

3.5 Running Materials & Assembling Materials

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

3.5.1 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#

3.5.2 Engine Running Materials & Assembling Materials

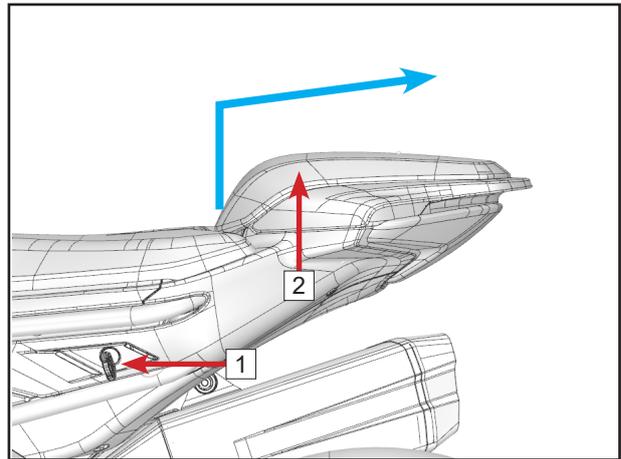
Project	Specification	Using parts	Remark
Lubricant oil	SAE 10W-50 SJ, JASOMA2	Rotation and moving section in cylinder, crankcase and cylinder head.	Capacity: 2800mL
Lubricant oil with molybdenum		Piston pin, valve stem, valve oil seal, camshaft	
Lubricant grease	3# MoS ₂ lithium grease	Oil seal, o-ring 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	
Thread locker		Parts of thread	

4.1 Seat Removal..... 4-2

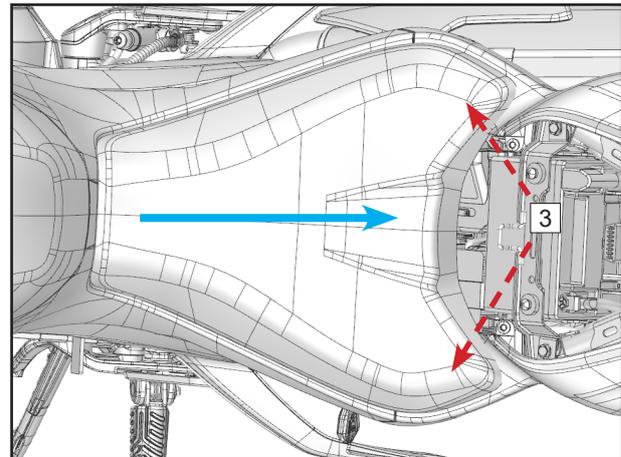
4.2 Seat Installation 4-2

4.1 Seat Removal

- Insert the key into the seat lock **1**.
- Unlock seat lock **1**.
- Lift the front part of seat **2**
- Remove seat cushion from rear.



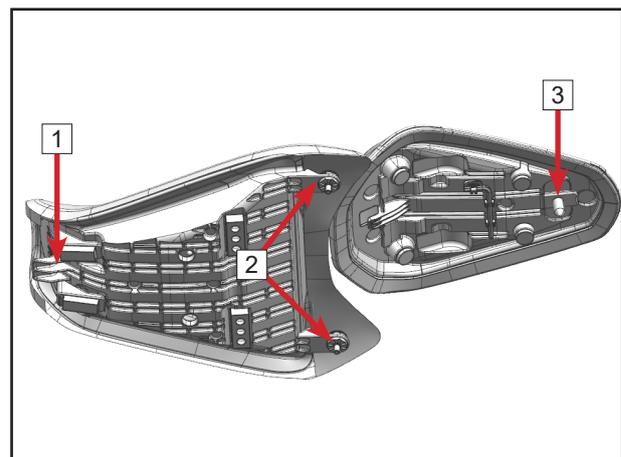
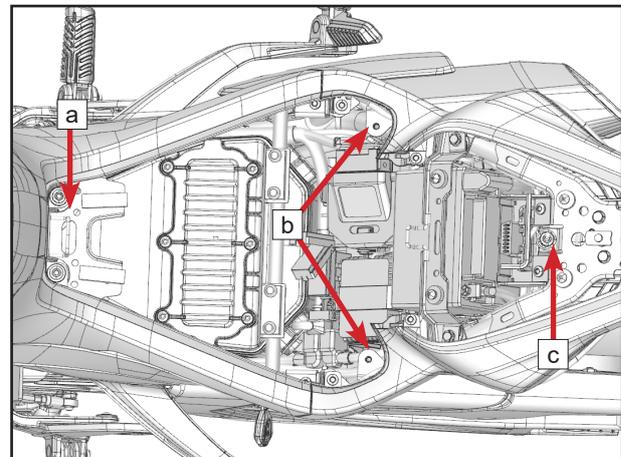
- Remove the two bolts and gaskets **3**.
- Lift the rear part of seat.
- Remove seat cushion from rear.



4.2 Seat Installation

- Put clasp **1** into **a**.
- Install two bolts **2** onto **b**.
- Push **3** into seat lock cylinder **c**.

NOTE: If the seat is not properly installed, it may become loose. Pull up the seat cushion to check if it is properly locked.



05 Body Covering Parts

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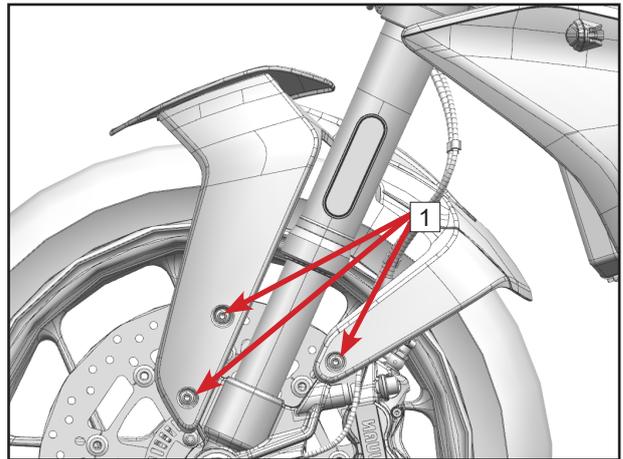
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5.1 Front Fender Assembly

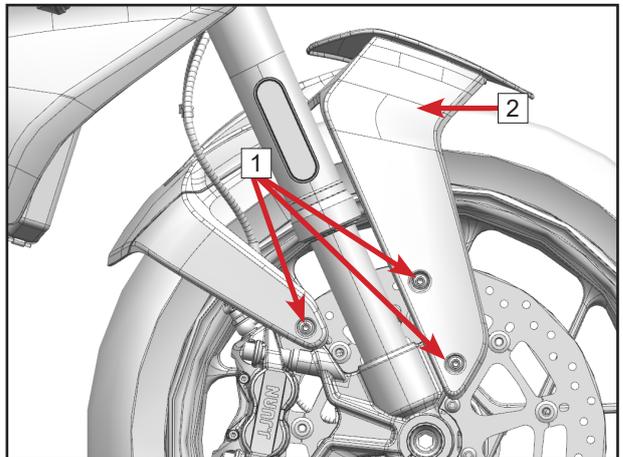
Removal

Remove bolts **1**.



Remove bolts **1**.

Remove front fender **2**.



Installation

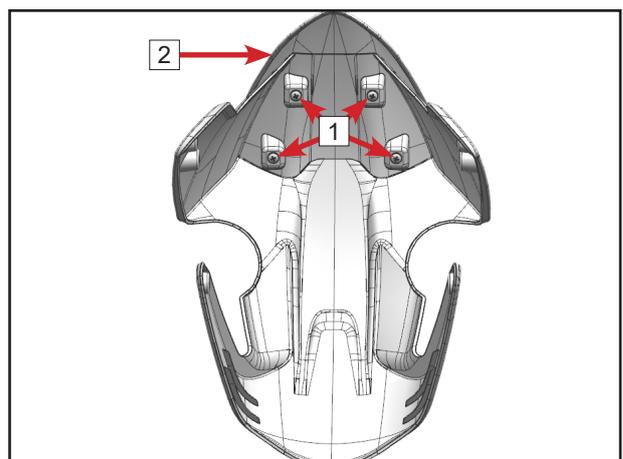
Install in reverse order of disassembly.

5.1.1 Front Fender Deco Plate

Removal

Remove bolts **1**.

Remove front fender deco plate **1**.



Installation

Install in reverse order of disassembly.

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5.2 Dashboard Lower Deco Guard (status 1)

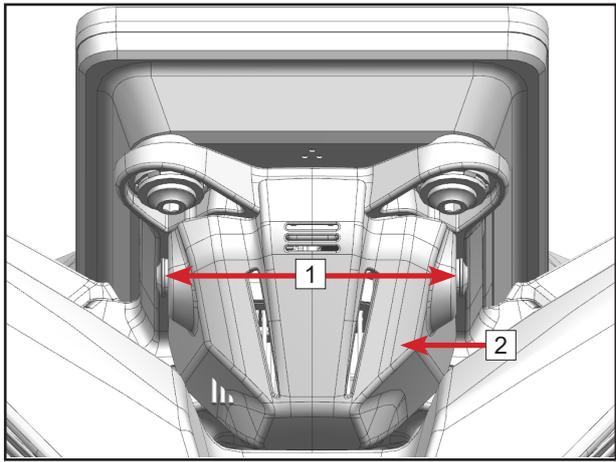
Removal

Remove bolts [1].

Remove dashboard deco guard [2].

Installation

Install in reverse order of disassembly.



5.2.1 Dashboard Lower Deco Guard (status 2)

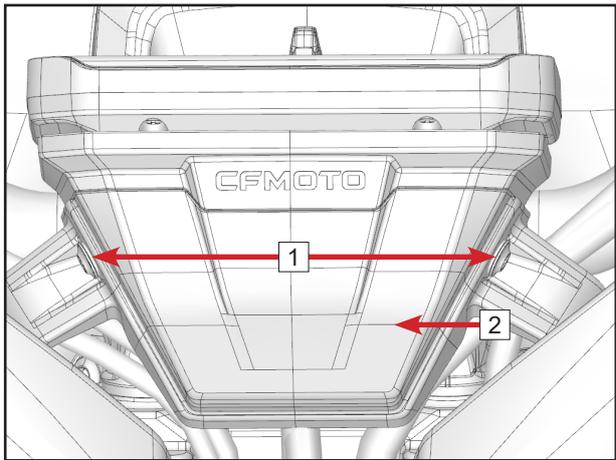
Removal

Remove bolts [1].

Remove dashboard deco guard [2].

Installation

Install in reverse order of disassembly.



5.3 Auxiliary Indicator Deco Guard (if equipped)

5.3.1 LH Auxiliary Indicator Deco Guard

Removal

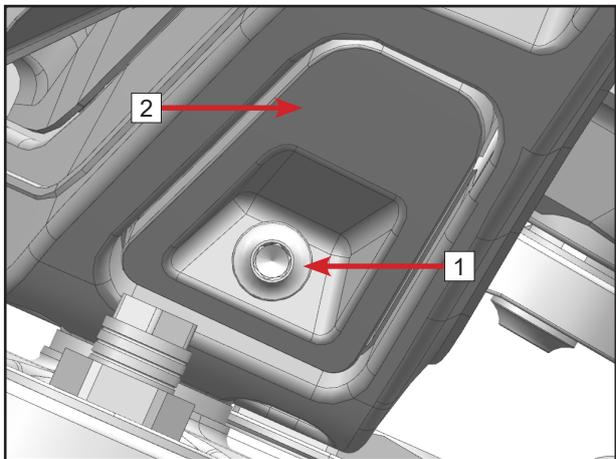
Remove bolt [1] (handlebar LH lower).

Remove LH auxiliary indicator deco guard [2].

Remove RH auxiliary indicator deco guard same way as LH auxiliary indicator deco guard.

Installation

Install in reverse order of disassembly.



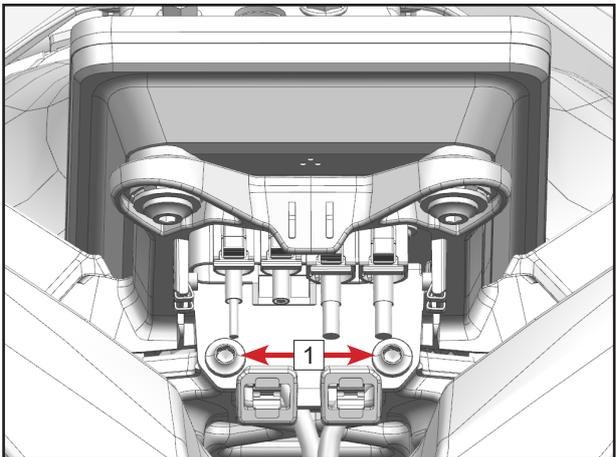
5.4 Dashboard Assembly (status 1)

Removal

Turn off vehicle power.

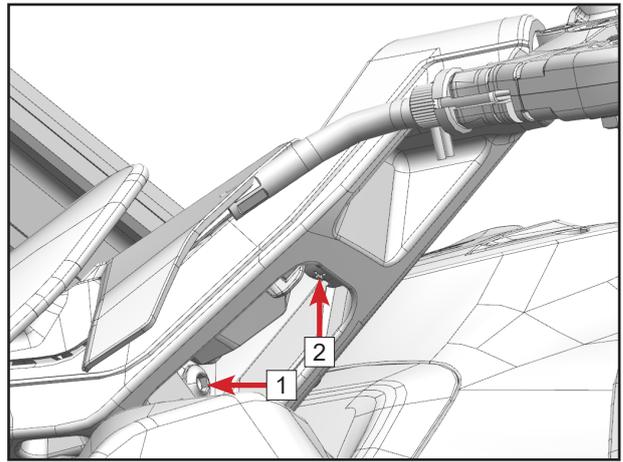
Unplug dashboard connectors.

Remove bolts [1].

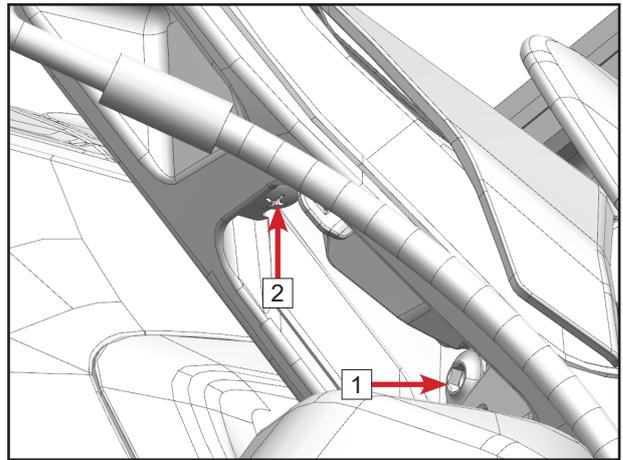


05 Body Covering Parts

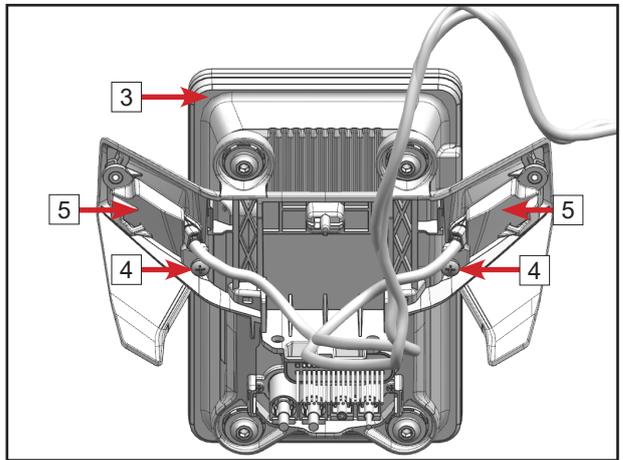
Remove bolt **1**(handlebar LH lower).
Remove screw **2**(handlebar LH lower).



Remove bolt **1**(handlebar RH lower).
Remove screw **2**(handlebar RH lower).



Turn the dashboard assembly forward **3**.
Remove screw **4**.
Release LH and RH auxiliary indicator **5**.
Remove dashboard assembly **3**.



Installation

Install in reverse order of disassembly.

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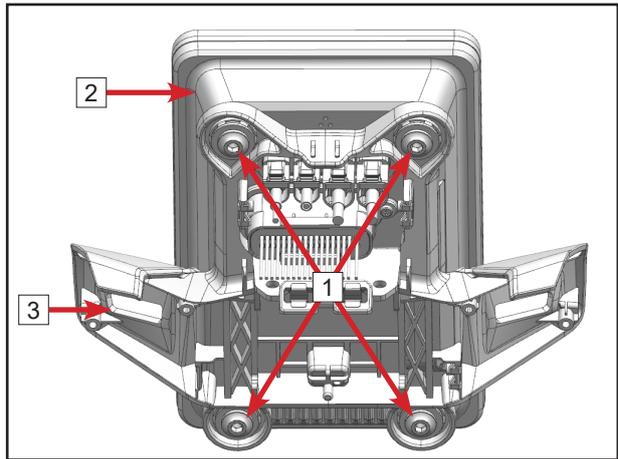
5.4.1 Dashboard Assembly Disassembly Removal

Remove bolts **1**.

Disassemble dashboard **2** and dashboard bracket **3**.

Installation

Install in reverse order of disassembly.



5.5 Dashboard Assembly (status 2)

Removal

Turn off vehicle power.

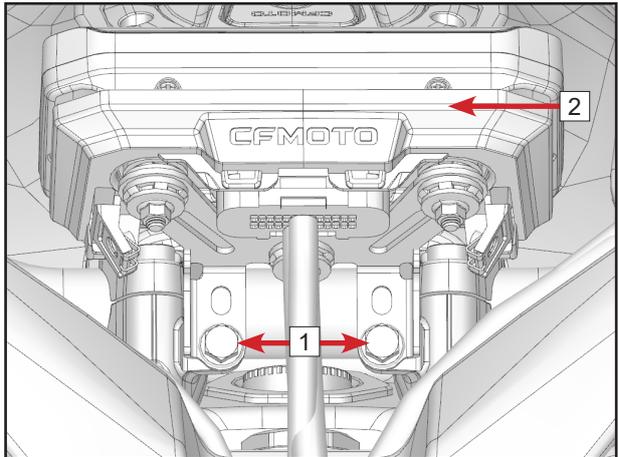
Unplug dashboard connectors.

Remove bolts **1**.

Remove dashboard assembly **2**.

Installation

Install in reverse order of disassembly.



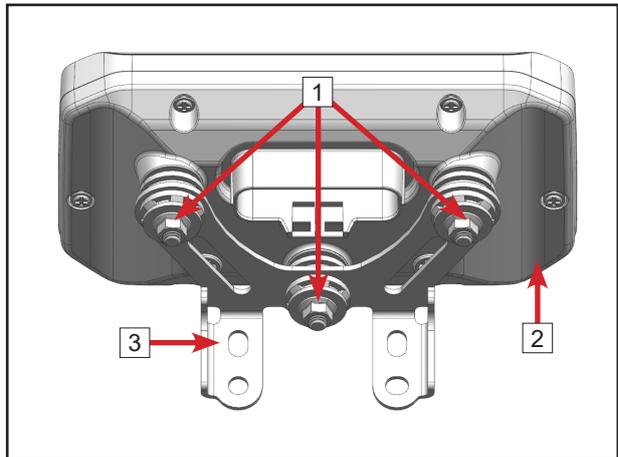
5.5.1 Dashboard Assembly Disassembly Removal

Remove nut **1**.

Disassemble dashboard **2** and dashboard bracket **3**.

Installation

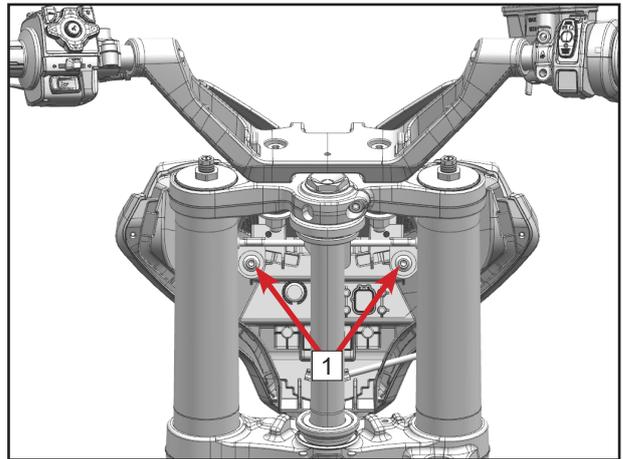
Install in reverse order of disassembly.



5.6 Headlight Assembly

Removal

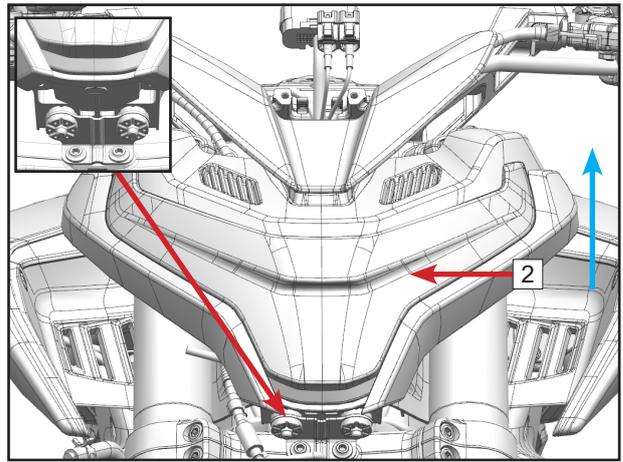
Turn the handle left and right respectively to the limit and remove the two bolts **1**.



Unplug headlight connectors.

Remove the headlight assembly **2** from the lower fixing point in the direction of the arrow upwards.

Remove headlight assembly **2**.



Installation

Install in reverse order of disassembly.

5.6.1 Headlight Assembly Disassembly

Removal

Remove screws **1**.

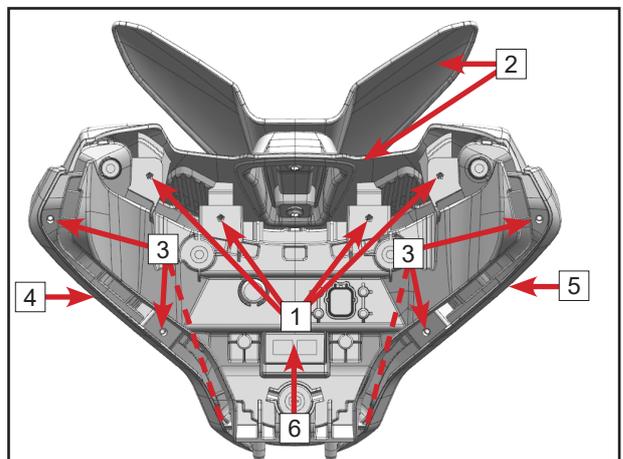
Remove the deflector deco cover and headlight upper deco cover assembly **2**.

Remove screws **3**.

Remove headlight LH deco guard **4**.

Remove headlight RH deco guard **5**.

Remove headlight **6**.



Installation

Install in reverse order of disassembly.

NOTE: The headlights of this vehicle are LED lights. When the headlights are damaged, they need to be replaced with new headlights.

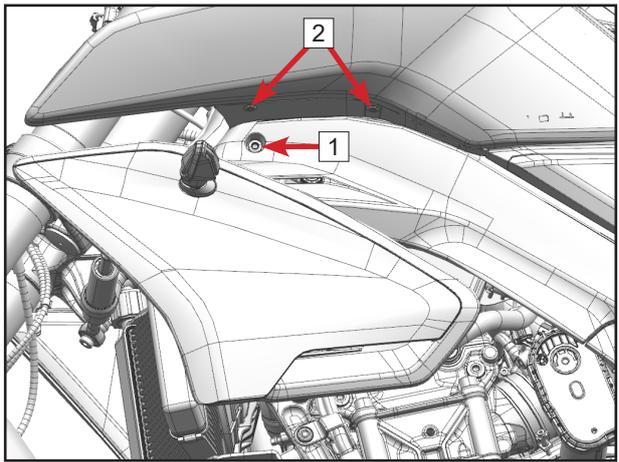
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5.7 Radiator Deco Plate and Vehicle Front Deco Plate Assembly

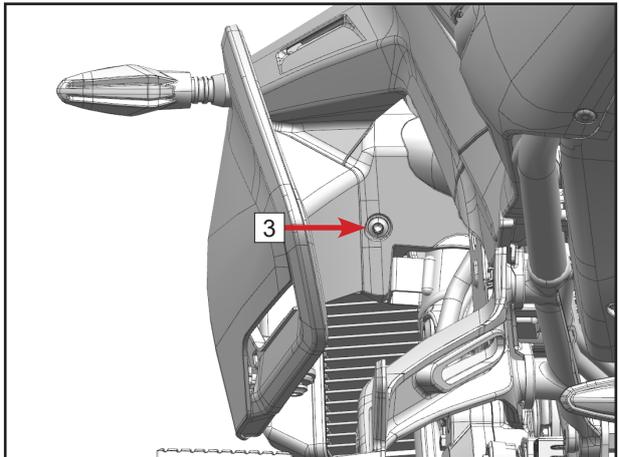
5.7.1 Radiator LH Deco Plate and Vehicle LH Front Deco Plate Assembly Removal

Remove bolt [1].

Remove expansion rivets [2].

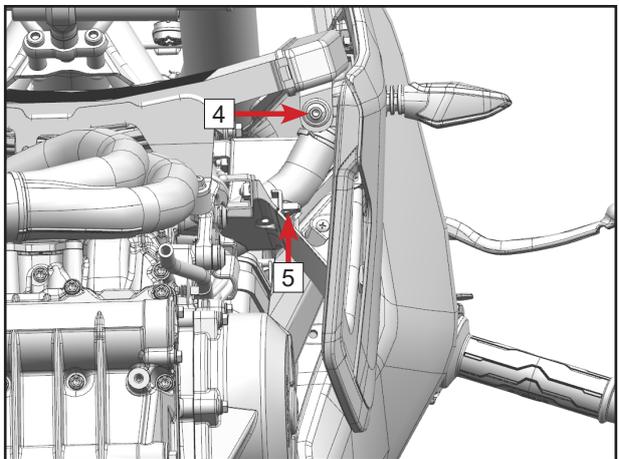


Remove bolt [3].

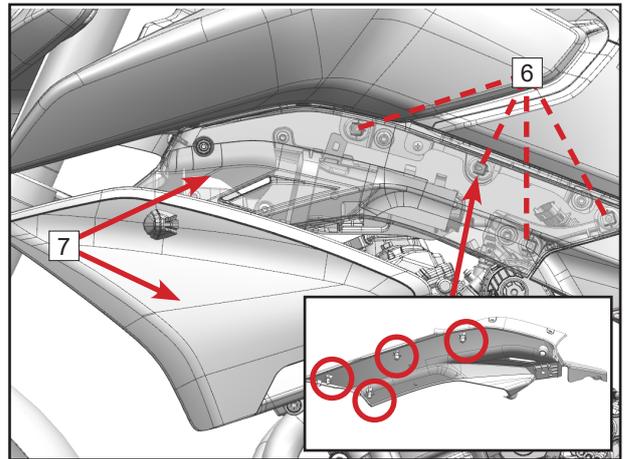


Remove the bottom bolt [4].

Release the clasp fixing point [5].



Pull out the vehicle LH front deco plate fixed point **6**.
 Unplug the LH front turn light connector.
 Remove radiator LH deco plate and vehicle LH front deco plate assembly **7**.



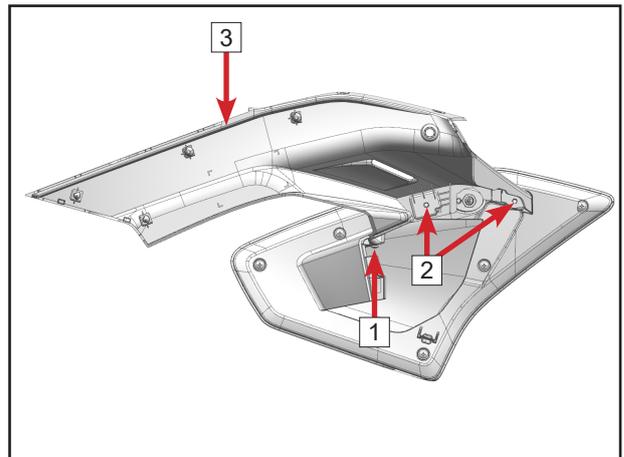
Installation

Install in reverse order of disassembly.

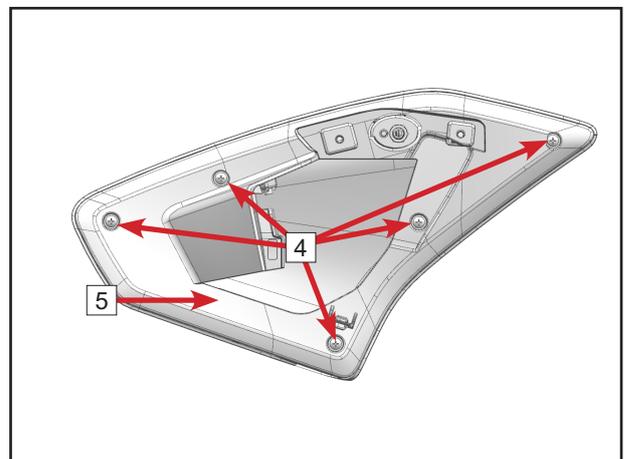
5.7.2 Radiator LH Deco Plate and Vehicle LH Front Deco Plate Assembly Disassembly

Removal

Remove screw **1**.
 Remove bolts **2**.
 Remove vehicle LH front deco plate **3**.



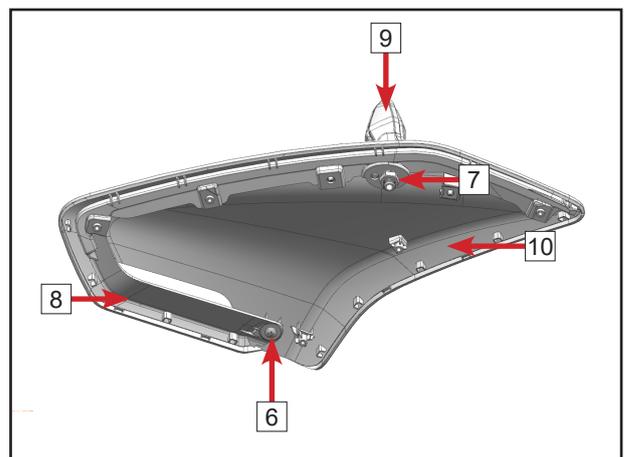
Remove screws **4**.
 Remove radiator LH inner plate **5**.



Remove screw **6**.
 Remove nut washer assembly **7**.
 Remove radiator LH deco plate deco strip **8**.
 Remove LH front turn light **9**.
 Remove radiator LH deco plate **10**.

Installation

Install in reverse order of disassembly.



NOTE: The turn lights of this vehicle are LED lights. When the turn lights are damaged, they need to be replaced with new ones.

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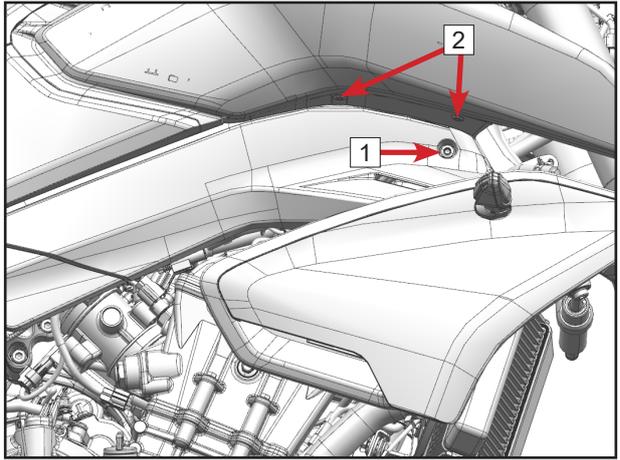
5.7.3 Radiator RH Deco Plate and Vehicle RH Front Deco Plate Assembly

The reserved USB connector of vehicle RH front deco plate can be installed later.

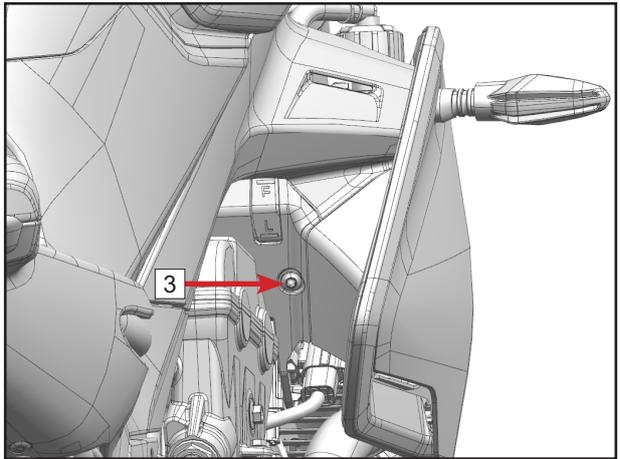
Removal

Remove bolt [1].

Remove expansion rivets [2].

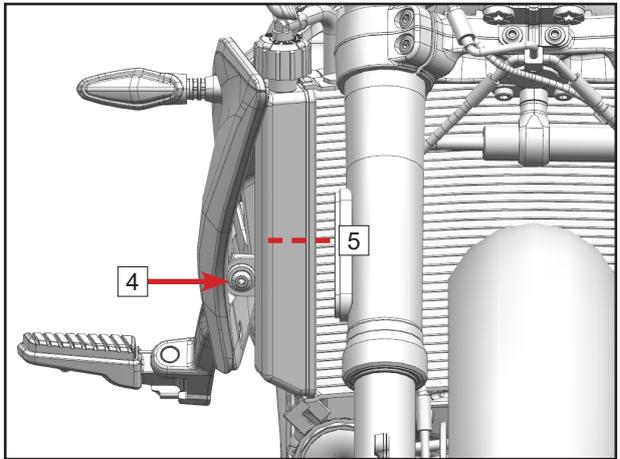


Remove bolt [3].



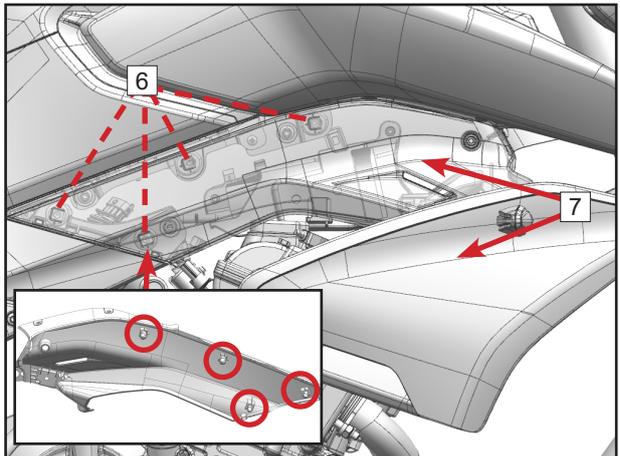
Remove bolt [4].

Release the clasp fixing point [5] (same as LH).



Pull out the vehicle RH front deco plate fixed point [6].

Unplug the RH front turn light connector.
Remove radiator RH deco plate and vehicle RH front deco plate assembly [7].



Installation

Install in reverse order of disassembly.

5.7.4 Radiator RH Deco Plate and Vehicle RH Front Deco Plate Assembly Disassembly

Removal

Remove screw [1].

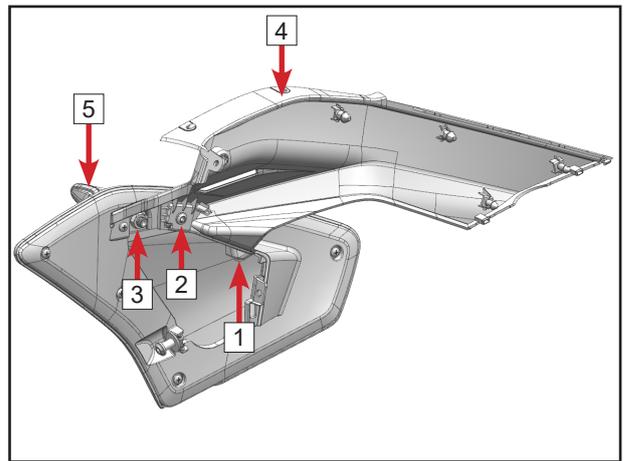
Remove bolt [2].

Remove nut washer assembly [3].

Remove vehicle RH front deco plate [4].

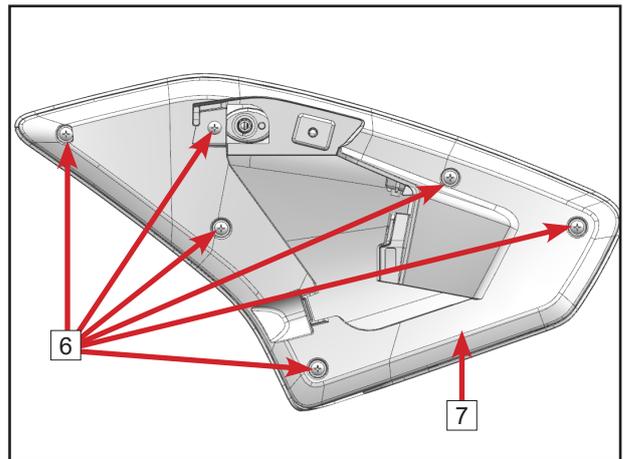
Remove vehicle RH front turn light [5].

NOTE: The turn lights of this vehicle are LED lights. When the turn lights are damaged, they need to be replaced with new ones.



Remove screws [6].

Remove radiator RH inner panel [5].

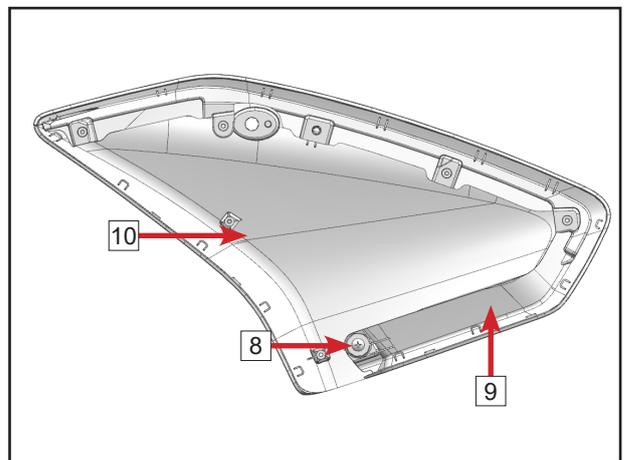


Remove screw [8].

Remove radiator RH deco plate deco strip [9].

[9].

Remove radiator RH deco plate [10].



Installation

Install in reverse order of disassembly.

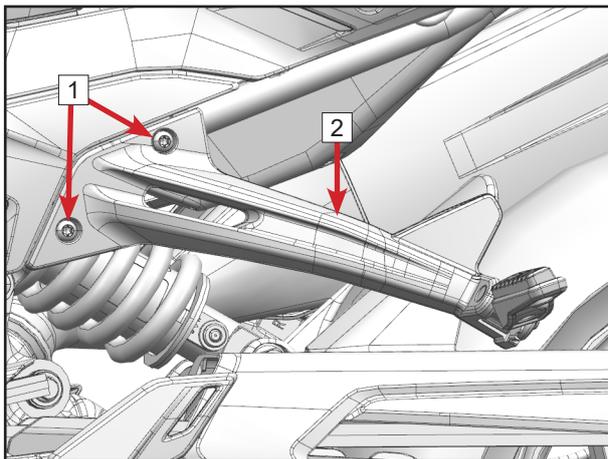
CFMOTO

5.8 LH/RH Rear Footrest Bracket

Removal

Remove bolts [1].

Remove LH rear footrest bracket [2].

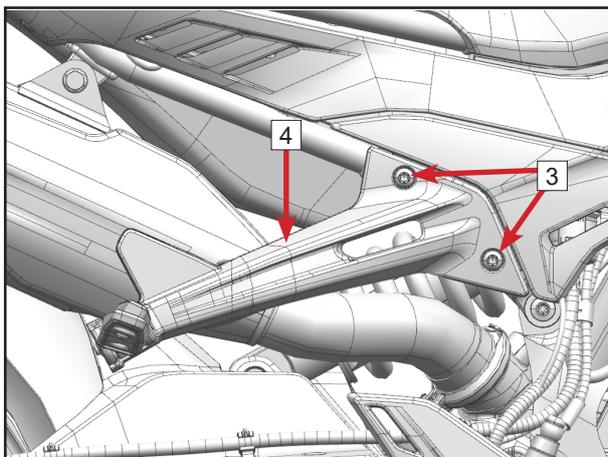


Remove bolts [3].

Remove RH rear footrest bracket [4].

Installation

Install in reverse order of disassembly.

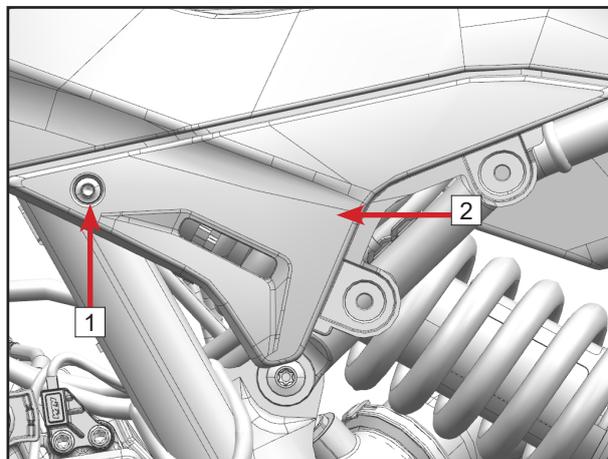


5.9 Vehicle LH/RH Lower Deco Plate

Removal

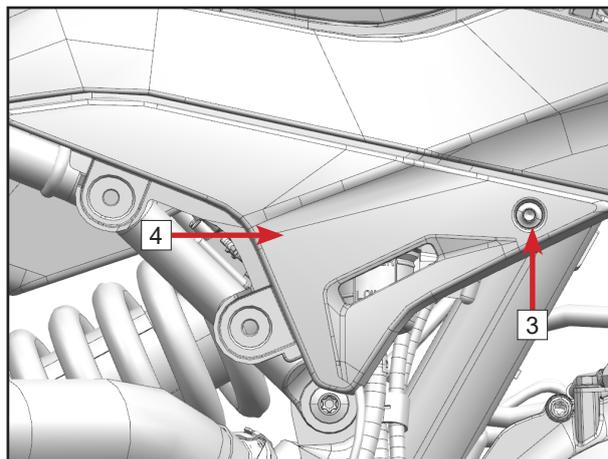
Remove bolt [1].

Remove vehicle LH lower deco plate [2].



Remove bolt [3].

Remove vehicle RH lower deco plate [4].



5.10 Rear Seat Front Deco Plate

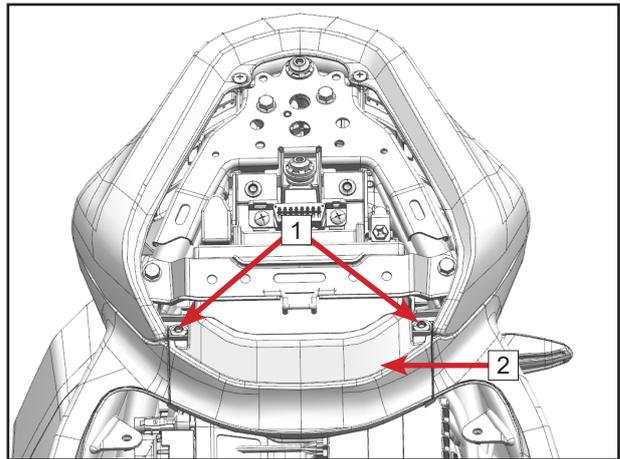
Removal

Remove bolts [1].

Remove seat front deco plate [2].

Installation

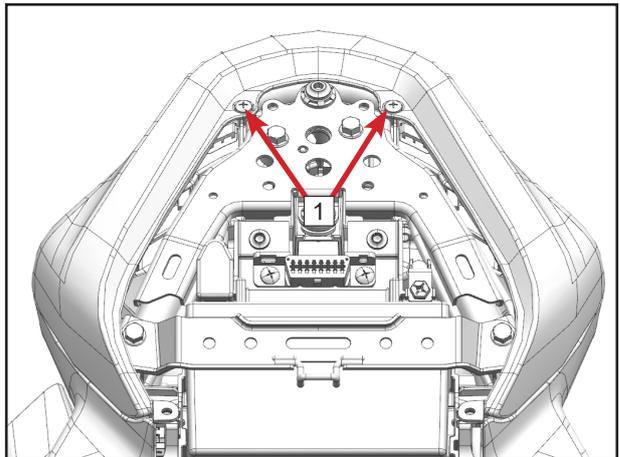
Install in reverse order of disassembly.



5.11 Rear Seat Rear Deco Plate

Removal

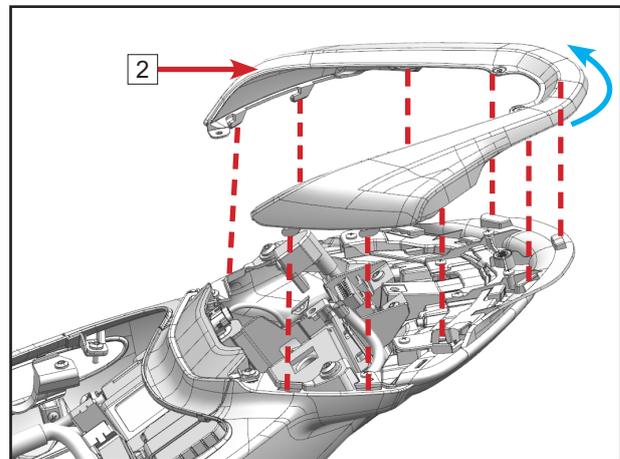
Remove screws [1].



Remove rear seat rear deco plate [2].

Installation

Install in reverse order of disassembly.



5.12 Vehicle Rear Deco Plate

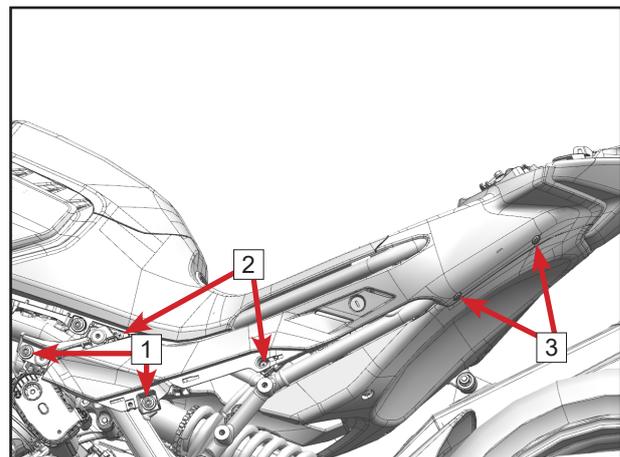
5.12.1 Vehicle LH Rear Deco Plate

Removal

Remove bolts [1].

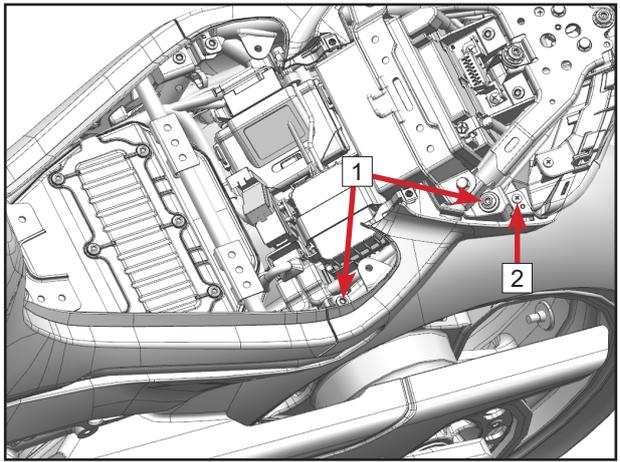
Remove screws [2].

Remove expansion rivets [3].

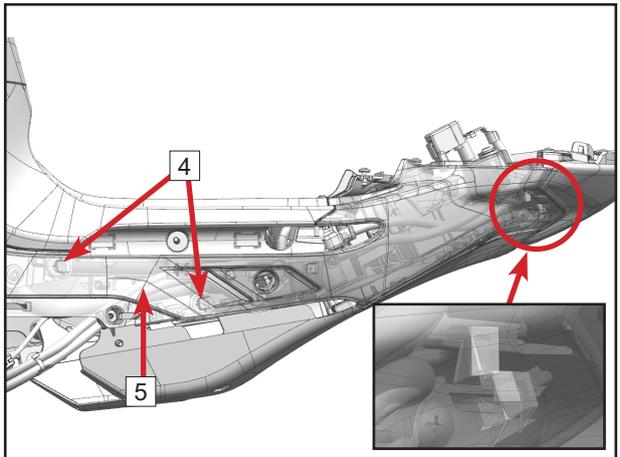


CFMOTO

Remove bolts [1].
Remove screw [2].



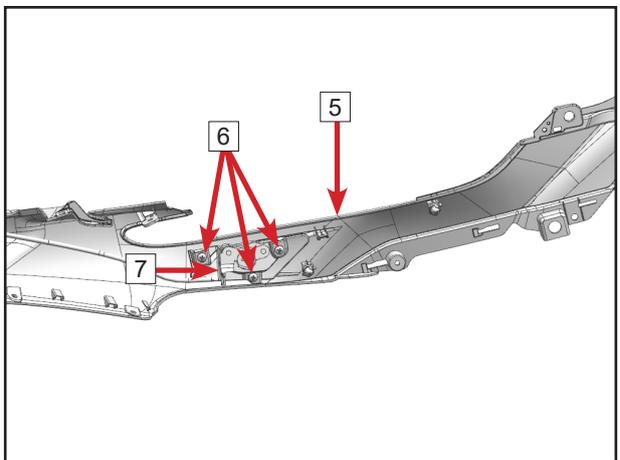
Pull out the vehicle LH rear deco plate fixed point [4].
Loosen the vehicle LH rear deco plate [5].



Remove screws [6].
Release seat lock cylinder and bracket assembly [7].
Remove vehicle LH rear deco plate [5].

Installation

Install in reverse order of disassembly.



5.12.2 Vehicle RH Rear Deco Plate

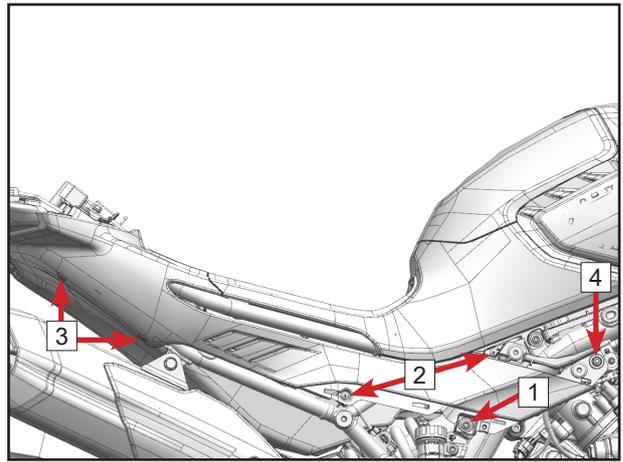
Removal

Remove bolt **1**.

Remove screws **2**.

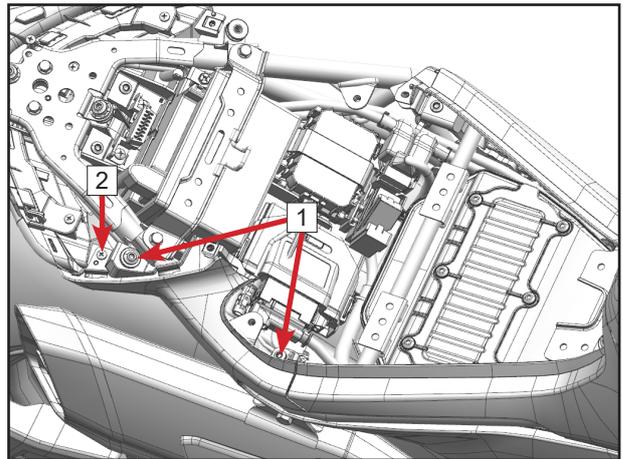
Remove expansion rivet **3**.

Remove nut **4**.



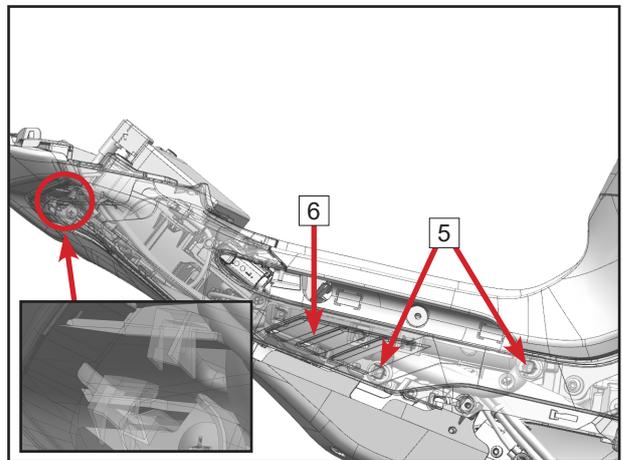
Remove bolts **1**.

Remove screw **2**.



Pull out the vehicle RH rear deco plate fixed point **5**.

Remove the vehicle RH rear deco plate **6**.



CFMOTO

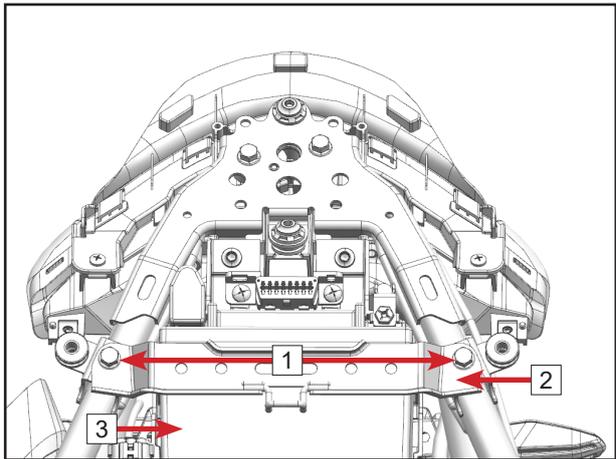
5.13 Tail Light Assembly

Removal

Remove bolts **1**.

Remove front seat rear bracket **2**.

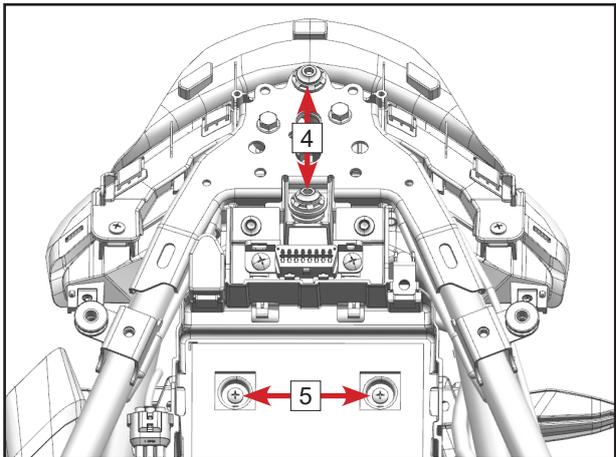
Remove battery **3**.



Remove bolts **4**.

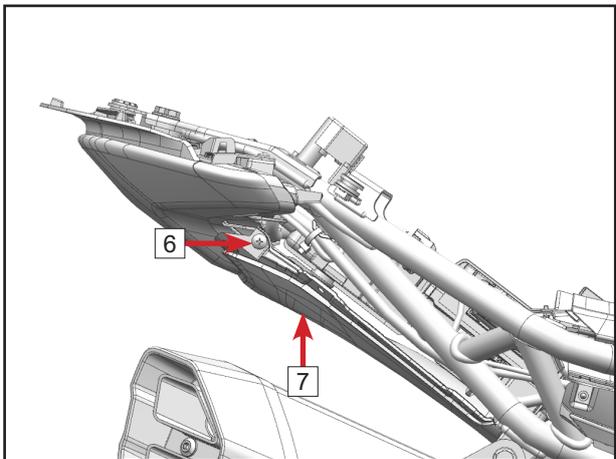
Remove screws **5**.

NOTE: When removing bolts **5**, pay attention not to lose the T-shaped bushings.



Remove screws on both sides **6**.

Release the end of the rear vehicle body bottom panel **7**.

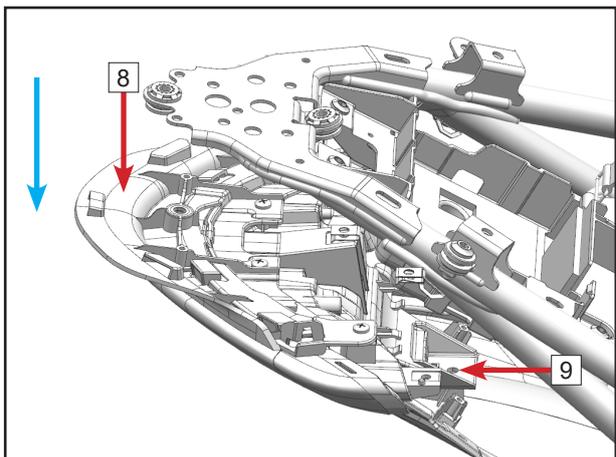


Pull down the tail light assembly **8** and rear vehicle body bottom panel **7**.

Remove bolt **9**.

Unplug tail light connectors.

Remove tail light assembly **8**.



Installation

Install in reverse order of disassembly.

5.13.1 Tail Light Assembly Disassembly Removal

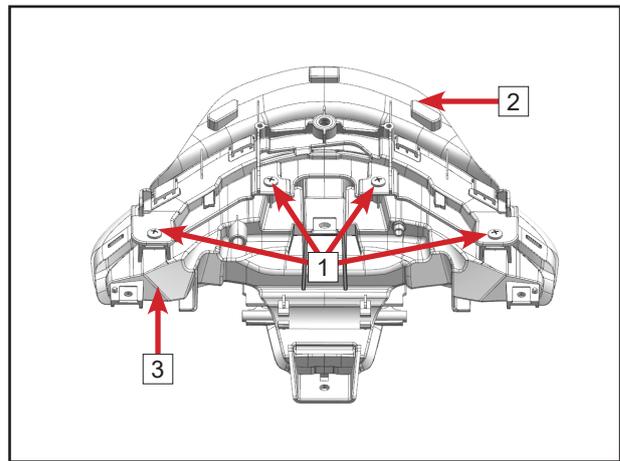
Remove screws **1**.

Remove rear seat deco plate inner plate **2** and tail light **3**.

Installation

Install in reverse order of disassembly.

NOTE: The tail lights of this vehicle are LED lights. When the tail lights are damaged, they need to be replaced with new ones.



5.14 Fuel Tank Deco Plate Assembly

5.14.1 Fuel Tank LH Front Deco Plate Removal

Remove bolts **1**.

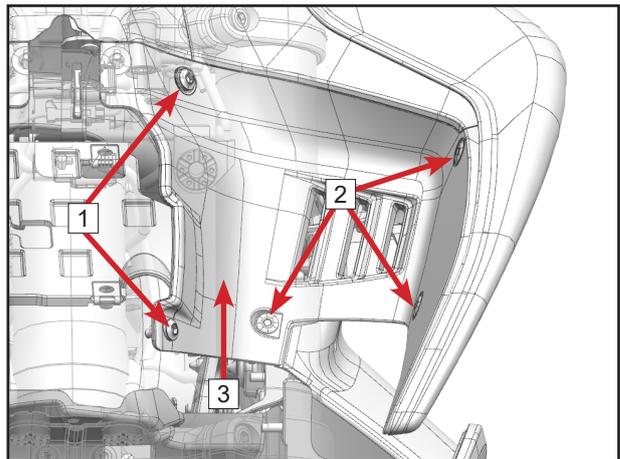
Remove expansion rivets **2**.

Remove fuel tank LH front deco plate **3**.

Fuel tank RH front deco plate removal is the same way as LH.

Installation

Install in reverse order of disassembly.



5.14.2 Ignition Lock Deco Guard (state 1) Removal

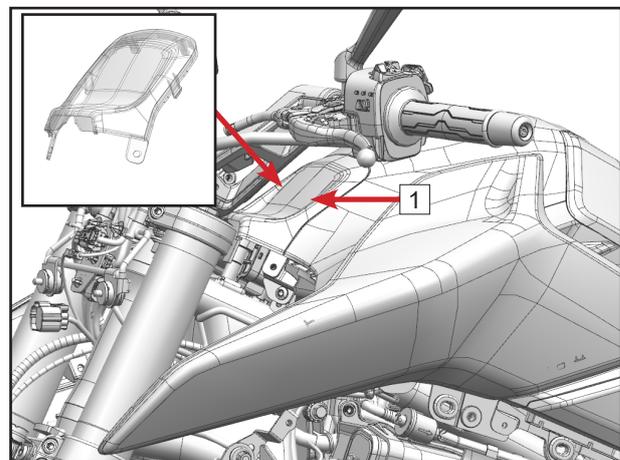
Removal

Remove the ignition lock deco cover clasp.

Remove ignition lock deco guard **1**.

Installation

Install in reverse order of disassembly.



5.14.3 Ignition Lock Deco Guard (state 2) Removal

Removal

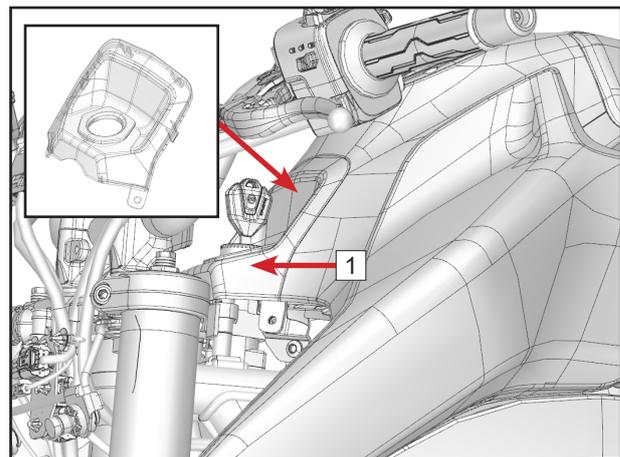
Unplug key.

Remove the ignition lock deco cover clasp.

Remove ignition lock deco guard **1**.

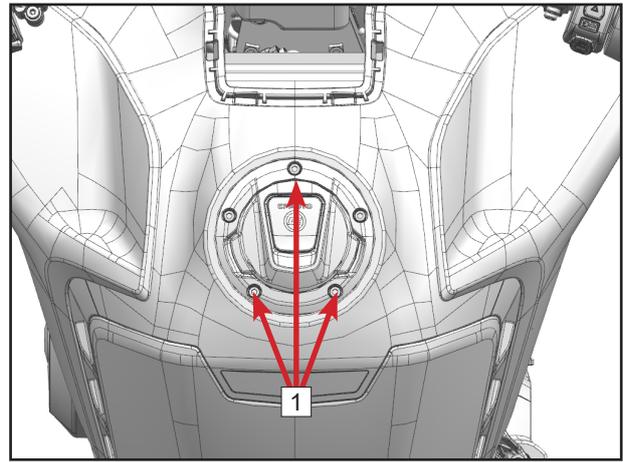
Installation

Install in reverse order of disassembly.



5.14.4 Fuel Tank Lock Assembly Removal

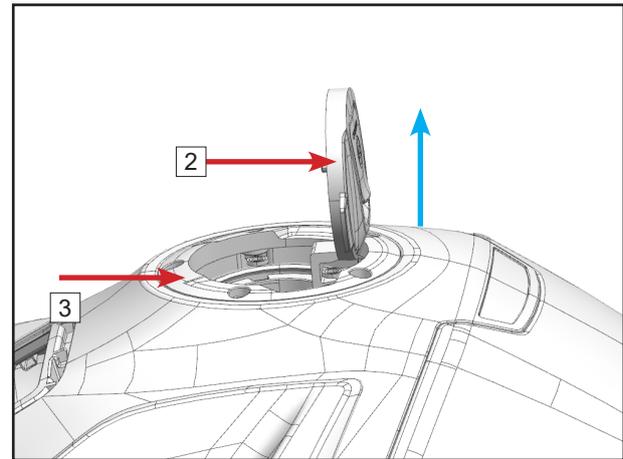
Remove bolts **1**.



Insert key.
Open fuel tank cover **2**.
Hold the fuel tank cover **2** and remove the fuel tank lock assembly upward **3**.

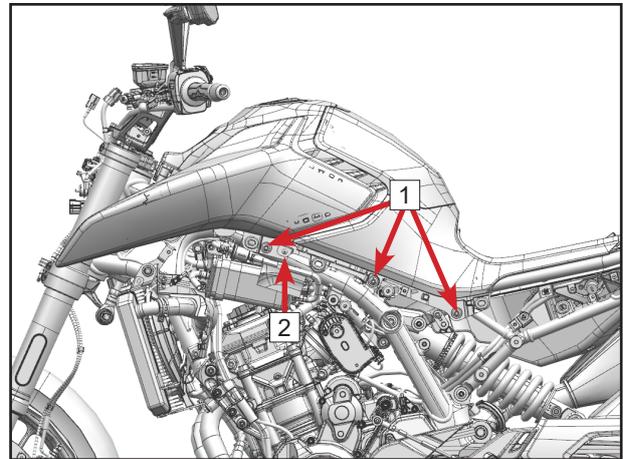
Installation

Install in reverse order of disassembly.

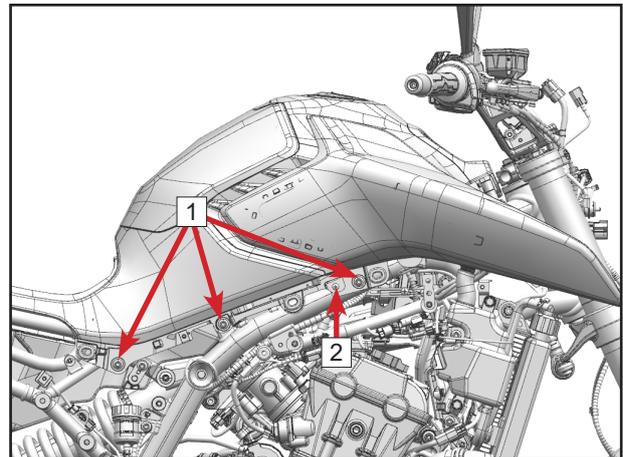


5.14.5 Fuel Tank Deco Plate Assembly Removal

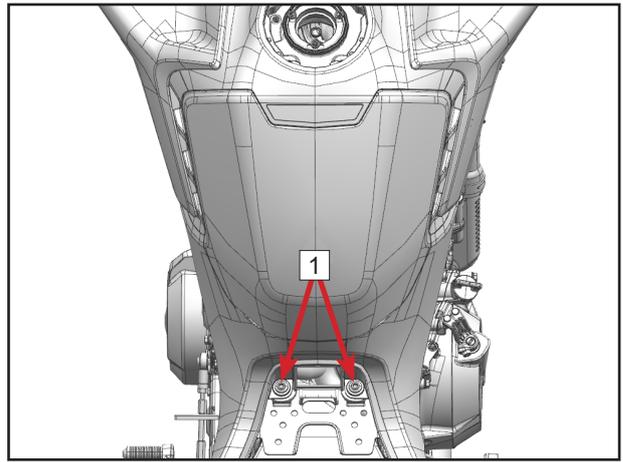
Remove bolts **1**.
Remove screw **2**.



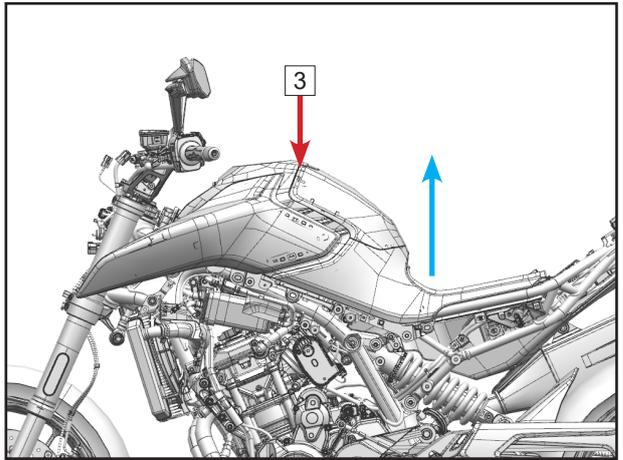
Remove bolts **1**.
Remove screw **2**.



Remove bolts **1**.



Lift the tank deco plate assembly **3** upward, unplug the connectors of related electrical parts fixed to the LH and RH deco plates of the tank, then remove the tank deco plate assembly **3**(State 1). Remove the tank deco plate assembly upward **3**(State 2).



Installation

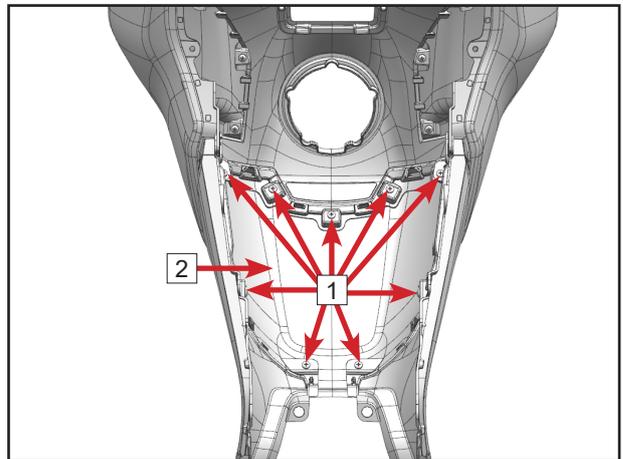
Install in reverse order of disassembly.

5.14.6 Fuel Tank Deco Plate Assembly Disassembly

Removal

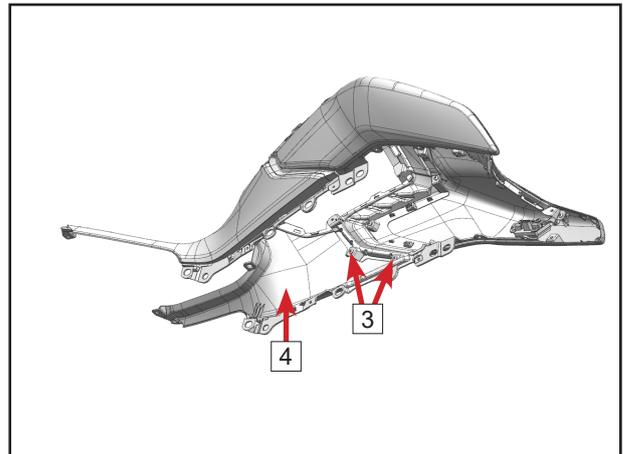
Remove screws **1**.

Remove fuel tank rear deco plate **2**.



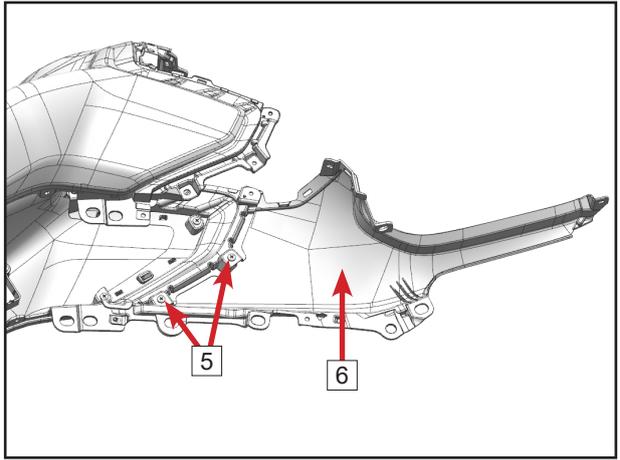
Remove screws **3**.

Remove fuel tank LH rear deco plate **4**.

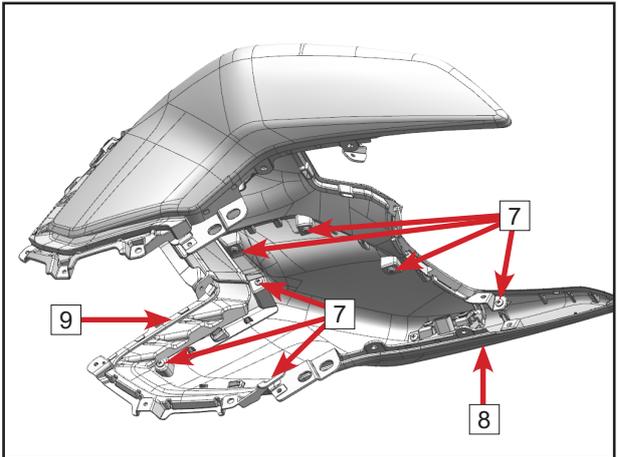


CFMOTO

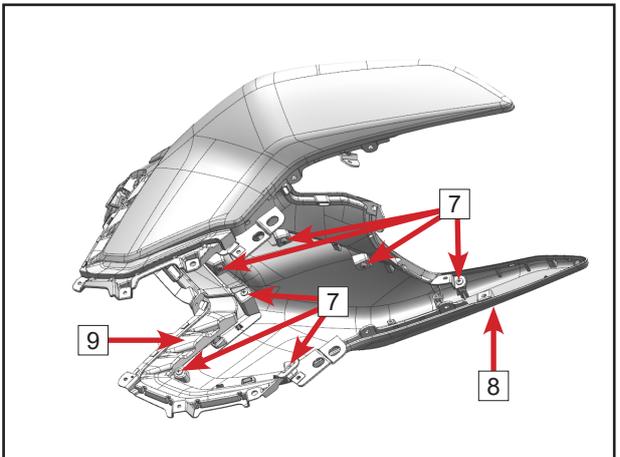
Remove screws **5**.
Remove fuel tank RH rear deco plate **6**.



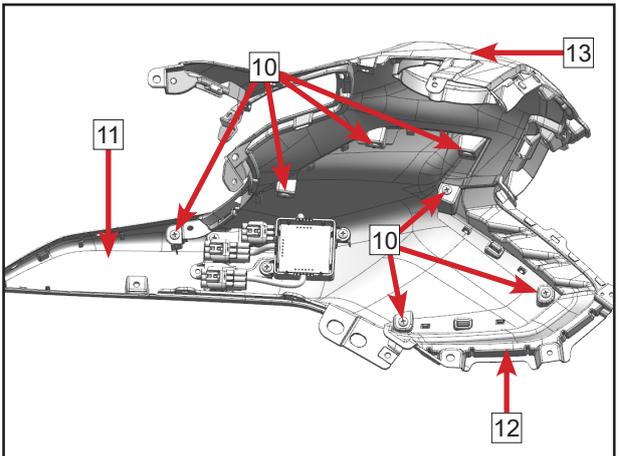
Remove screws **7**.
Remove fuel tank LH deco plate assembly **8**(state 1).
Remove fuel tank LH deco strip **9**.



Remove screws **7**.
Remove fuel tank LH deco plate **8**(state 2).
Remove fuel tank LH deco strip **9**.



Remove screws **10**.
Remove fuel tank RH deco plate assembly **11**(state 1).
Remove fuel tank RH deco strip **12**.
Remove fuel tank upper deco plate **13**.



05 Body Covering Parts

Remove screws 10.

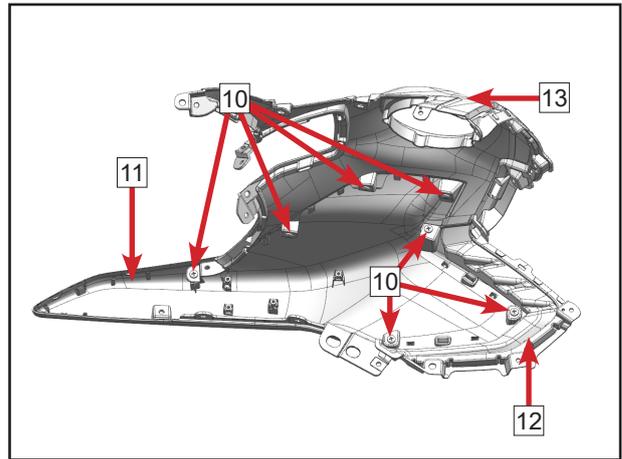
Remove fuel tank RH deco plate 11 (state 2).

Remove fuel tank RH deco strip 12.

Remove fuel tank upper deco plate 13.

Installation

Install in reverse order of disassembly.



5.14.6.1 Fuel Tank LH+RH Deco Plate Assembly Disassembly

Removal

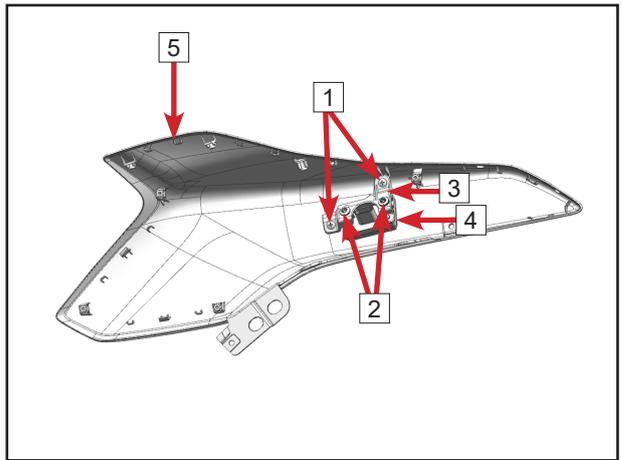
Remove screws 1.

Remove bolts 2.

Remove key base station bracket 3.

Remove key base station 4.

Remove fuel tank LH deco plate 5.



Unplug connector 1 fixing point on the back.

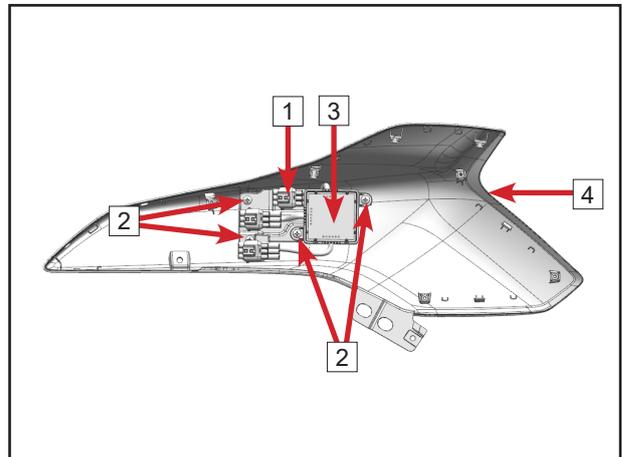
Remove screw 2.

Remove 3.

Remove fuel tank RH deco plate 4.

Installation

Install in reverse order of disassembly.



CFMOTO

5.15 Rear Fender Assembly

Pre-work

Remove rear wheel.

Removal

Method 1:

Unplug rear turn light and license light connectors [1].

Method 2:

Not unplugging the rear turn light and license light connectors [1].

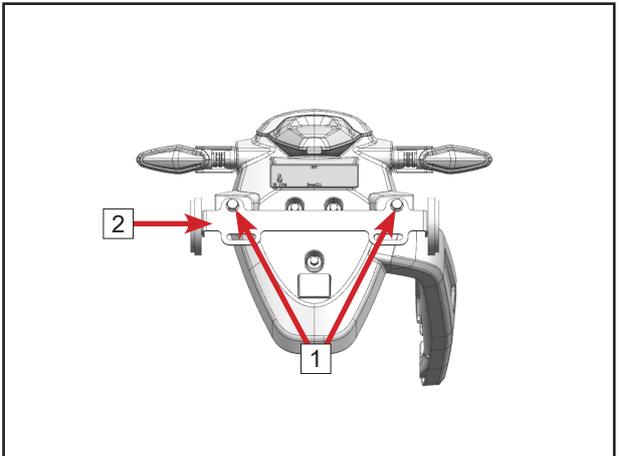
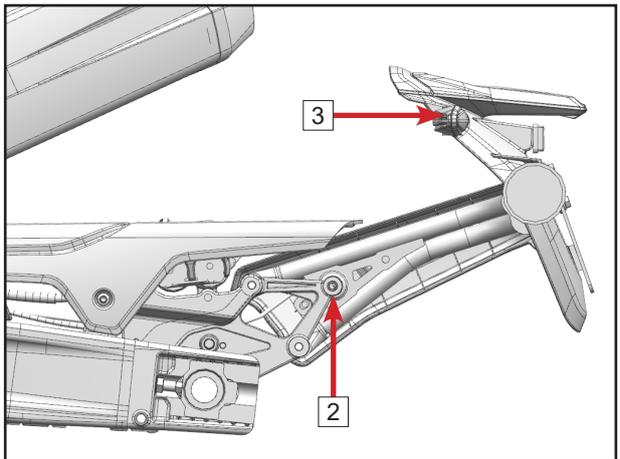
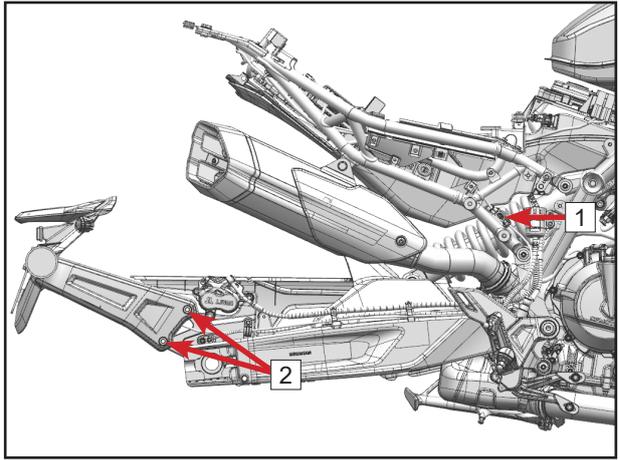
Execute the above method one and method two according to actual needs, and the subsequent disassembly steps are the same.

Remove bolt [2].

Remove rear fender assembly [3].

Installation

Install in reverse order of disassembly.



5.15.1 Rear Fender Assembly Disassembly(state 1)

5.15.1.1 Rear Reflector Assembly

Removal

Remove bolts [1].

Remove rear reflector assembly [2].

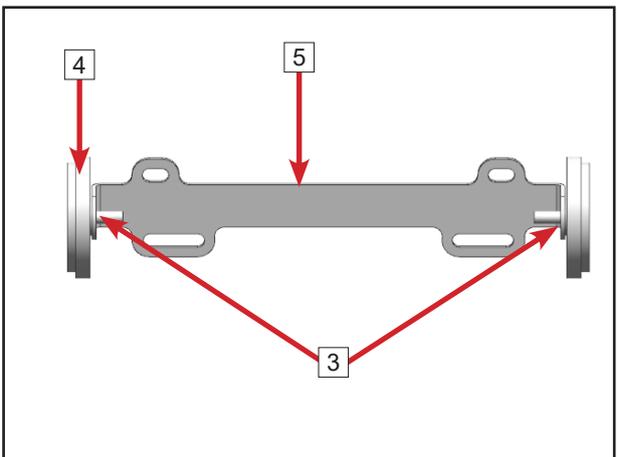
Remove nuts [3].

Remove LH and RH rear reflectors [4].

Remove rear reflector bracket [5].

Installation

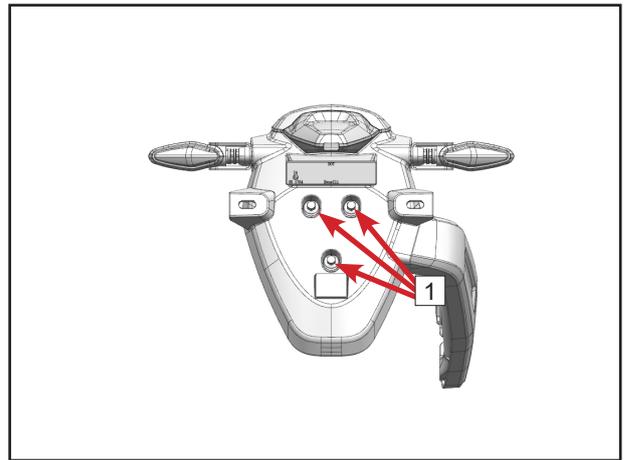
Install in reverse order of disassembly.



5.15.1.2 Rear Fender Bracket

Removal

Remove bolts **1**.

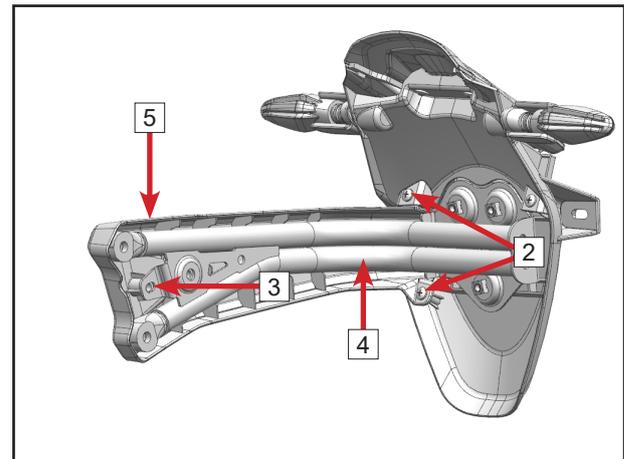


Remove screws **2**.

Remove bolt **3**.

Remove rear fender bracket **4**.

Remove rear fender bracket deco plate **5**.



Installation

Install in reverse order of disassembly.

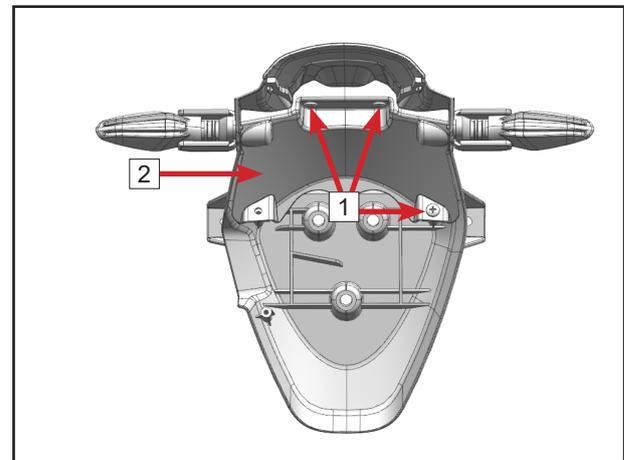
5.15.1.3 Rear Fender Inner Plate

Removal

Remove screws **1**.

Remove rear fender inner plate **2**.

Unplug LH+RH rear turn light, license light adapter cable.



Installation

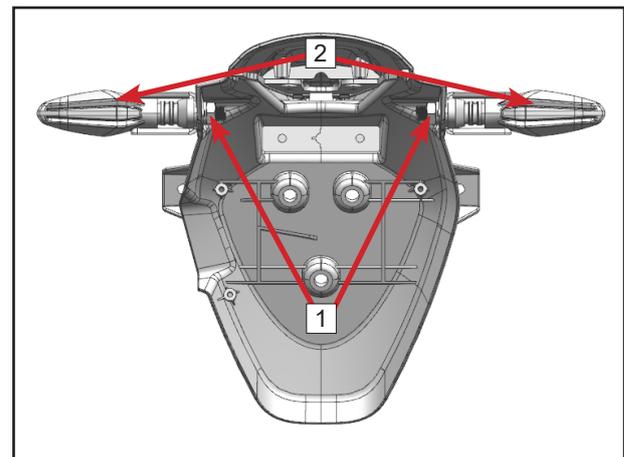
Install in reverse order of disassembly.

5.15.1.4 LH and RH Rear Turn Light

Removal

Remove nut washer assembly **1**.

Remove LH+RH rear turn light **2**.



Installation

Install in reverse order of disassembly.

CFMOTO

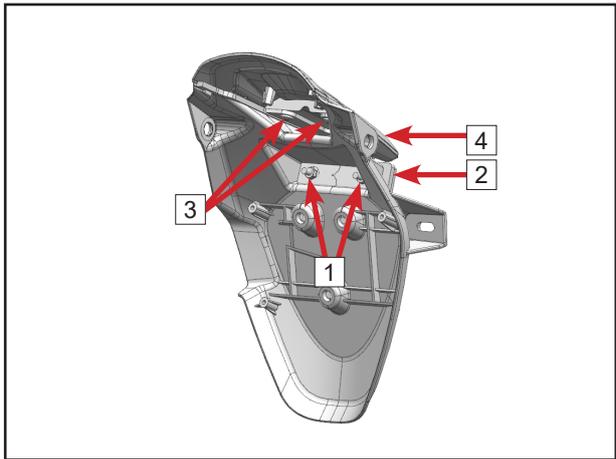
5.15.1.5 Rear Reflector and License Light Removal

Removal

- Remove nuts **1**.
- Remove rear reflector **2**.
- Remove screws **3**.
- Remove license light upper housing **4**.

Installation

Install in reverse order of disassembly.

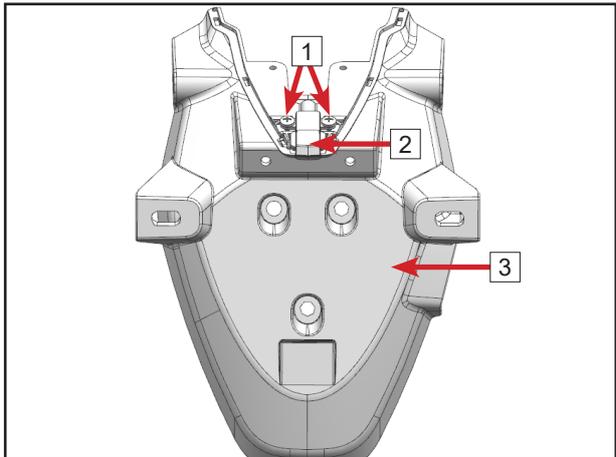


5.15.1.6 Rear Fender and License Light Removal

- Remove screws **1**.
- Remove license light **2**.
- Remove rear fender **3**.

Installation

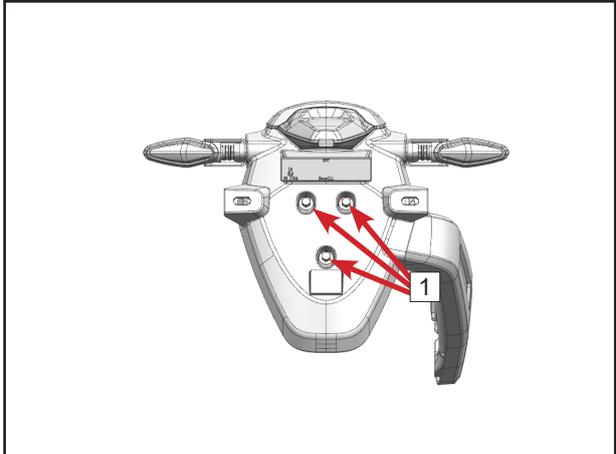
Install in reverse order of disassembly.



5.15.2 Rear Fender Assembly Disassembly (state 2)

5.15.2.1 Rear Fender Bracket Removal

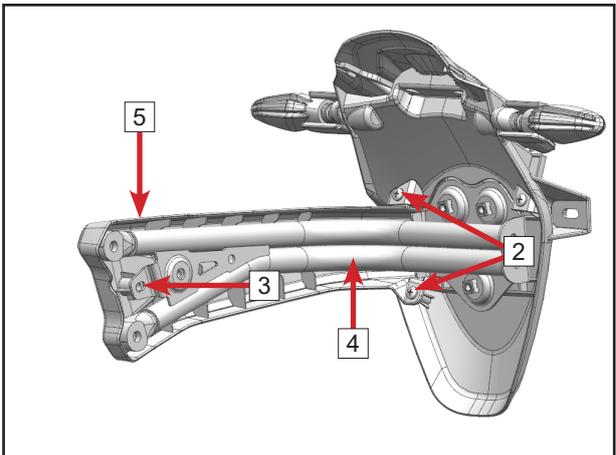
- Remove bolts **1**.



- Remove screws **2**.
- Remove bolt **3**.
- Remove rear fender bracket **4**.
- Remove rear fender bracket deco plate **5**.

Installation

Install in reverse order of disassembly.



5.15.2.2 Rear Fender Inner Plate

Removal

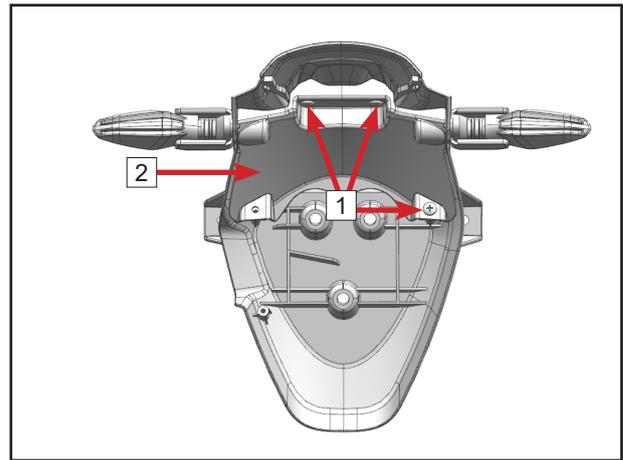
Remove screws [1].

Remove rear fender inner plate [2].

Unplug LH+RH rear turn light, license light adapter cable.

Installation

Install in reverse order of disassembly.



5.15.2.3 LH and RH Rear Turn Light

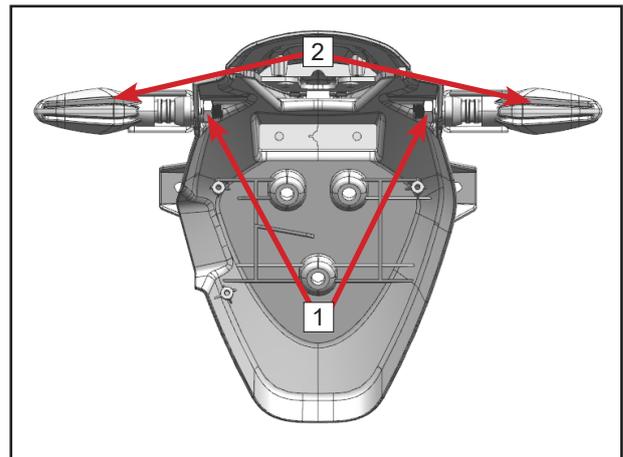
Removal

Remove nut washer assembly [1].

Remove LH and RH rear turn light [2].

Installation

Install in reverse order of disassembly.



5.15.2.4 Rear Reflector and License Light

Removal

Remove nuts [1].

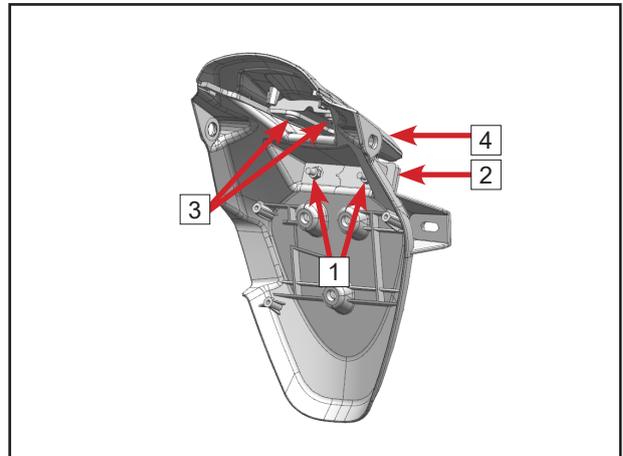
Remove rear reflector [2].

Remove screws [3].

Remove license light upper housing [4].

Installation

Install in reverse order of disassembly.



5.15.2.5 Rear Fender and License Light

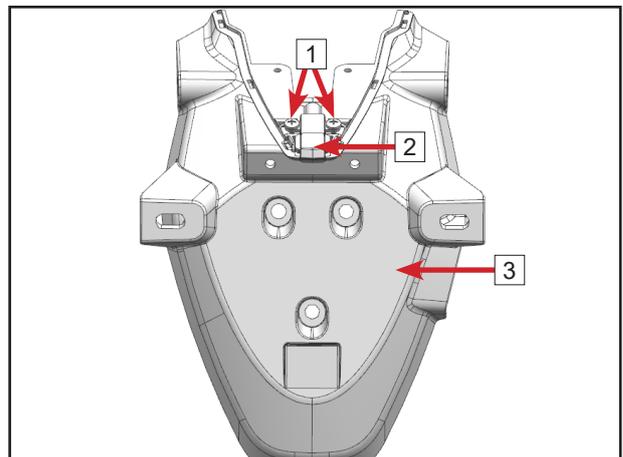
Remove screws [1].

Remove license light [2].

Remove rear fender [3].

Installation

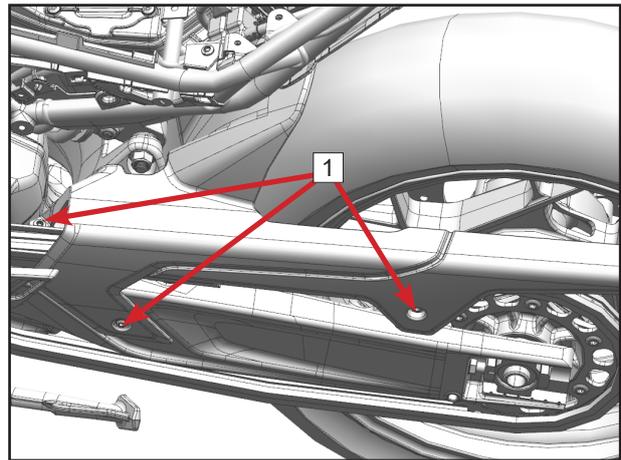
Install in reverse order of disassembly.



5.16 Rear Fork Panel

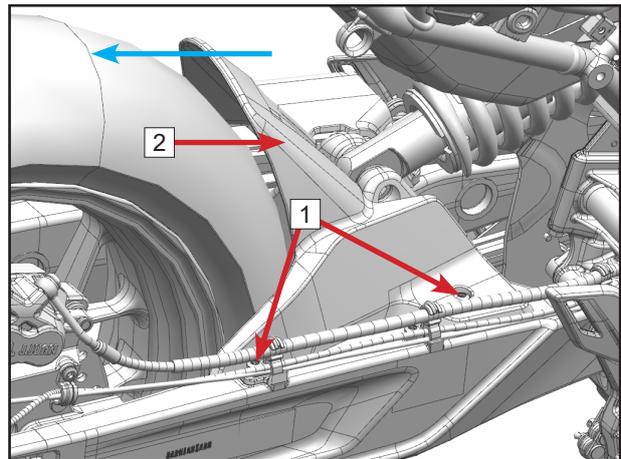
Removal

Remove bolts **1**.



Remove bolts **1**.

Remove the rear fork guard to the rear of the vehicle **2**.



Installation

Install in reverse order of disassembly.

5.17 Battery Bracket

Pre-work

Remove the relevant electrical parts.

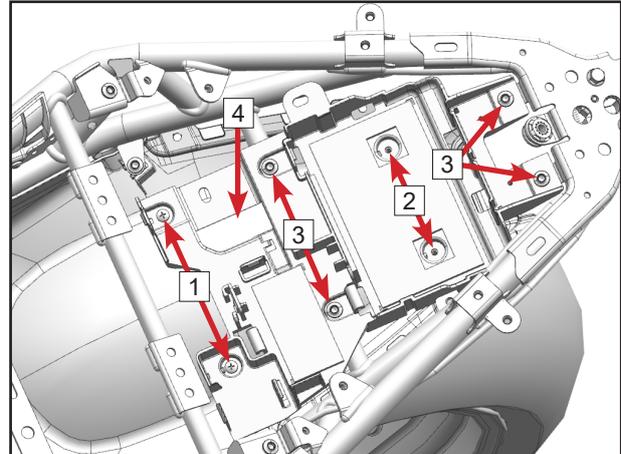
Removal

Remove screw **1**.

Screws **2** (If the taillight assembly is not disassembled, disassemble. If the taillight assembly has been disassembled, may not disassemble)

Remove bolts **3**.

Remove battery bracket **4**.



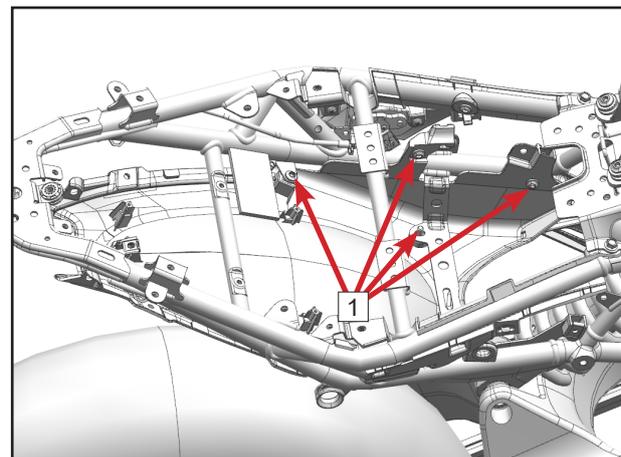
5.18 Rear Vehicle Base Panel

Pre-work

Remove the battery bracket, the air filter assembly, the taillight assembly, the LH rear deco plate of the vehicle, and the RH rear deco plate of the vehicle.

Removal

Remove bolts **1**.



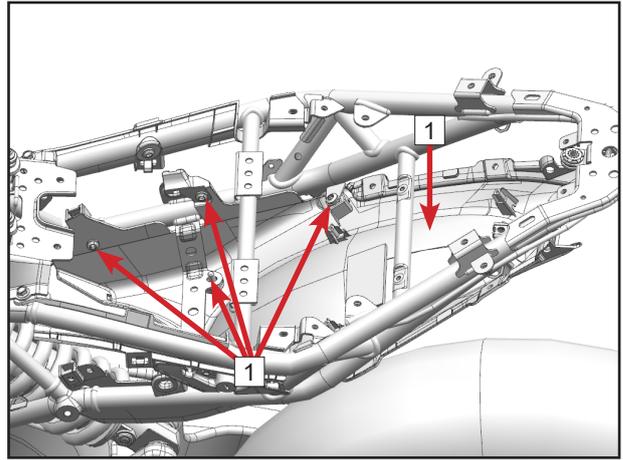
05 Body Covering Parts

Remove bolts **1**.

Remove rear vehicle base panel **2**.

Installation

Install in reverse order of disassembly.



06 Fuel System

6.1 Fuel Tank Removal.....	6-3
6.2 Fuel Evaporation System.....	6-3
6.3 Fuel Pump	6-4
6.4 Float Ball	6-5

⚠ DANGER:

Fuel is flammable, please service the fuel system in a ventilated area, and must 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 contact your skin, eyes or clothing. Do not breathe in fuel vapors.

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

In case of contacts 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 operation of the EFI system cannot be guaranteed.

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

During the process, EFI parts should be held up and put down gently.

When disconnecting or connecting the connectors, 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 lines also maintain a high pressure, so in the maintenance process be careful not to easily remove the fuel line.

When checking the ignition system, jump spark testing should be done only when necessary and for as short a time as possible, and the throttle can 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 serviced, 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 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. This system adopts negative override.

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

Before implementing electric welding on the 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.

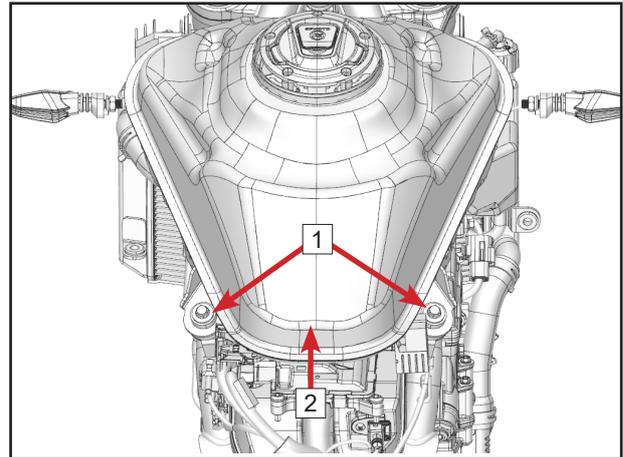
Establish the awareness of environmental protection and effectively dispose of the waste generated during the process.

6.1 Fuel Tank Removal

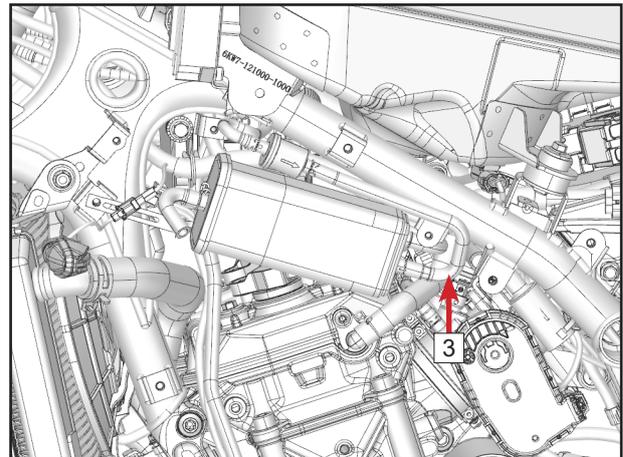
Remove bolts **1**.

Lift the rear part **2** of tank.

NOTE: Do not lost rubber washers.



Disconnect the fuel adsorption pipe II **3**.

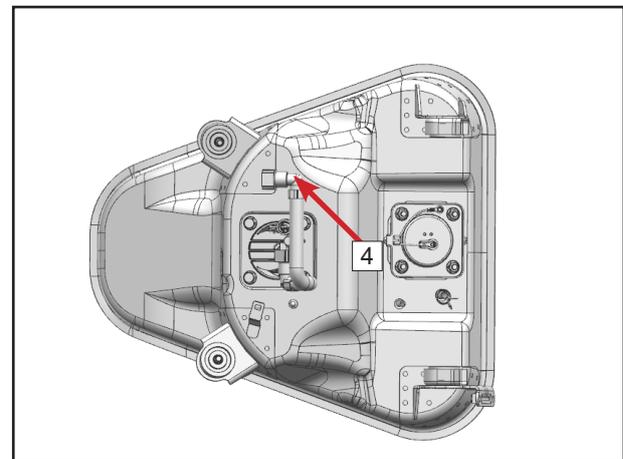


Disconnect the high pressure tubing quick connector **4**.

Remove fuel tank assembly.

⚠ DANGER: It is prohibited to invert the fuel tank to prevent fuel leakage.

⚠ WARNING: When installing the fuel tank, first install the quick joint of the high-pressure pipe and check that each pipeline cannot be extruded or damaged.

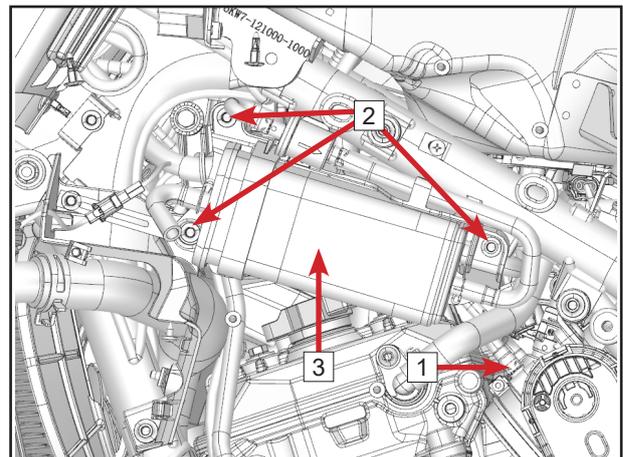


6.2 Fuel Evaporation System

Remove fuel vapor desorption hose on both sides of the throttle **1**.

Remove inner hex bolts **2**.

Remove canister **3**.



6.3 Fuel Pump

Depressurize the fuel system.

Ensure that the vehicle static electricity is discharged by grounding.

Disconnect the cable wires associated with the fuel pump.

Disconnect the quick joint and use a towel to prevent fuel leaks.

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 matter in the fuel tank can cause premature fuel pump wear or clog the fuel prefilter.

Remove bolts in sequence 1~4.

Carefully remove fuel pump 5.

NOTE: A certain amount of fuel will remain in the removed old fuel pump, which should be promptly transferred to a suitable container.

Check the fuel tank for debris and clean the inside of the tank thoroughly before reinstalling the new fuel pump.

Installation

Slide the fuel pump seal ring from bottom to top over the fuel pump assembly mounting location, then position the fuel pump properly into the tank assembly mounting hole.

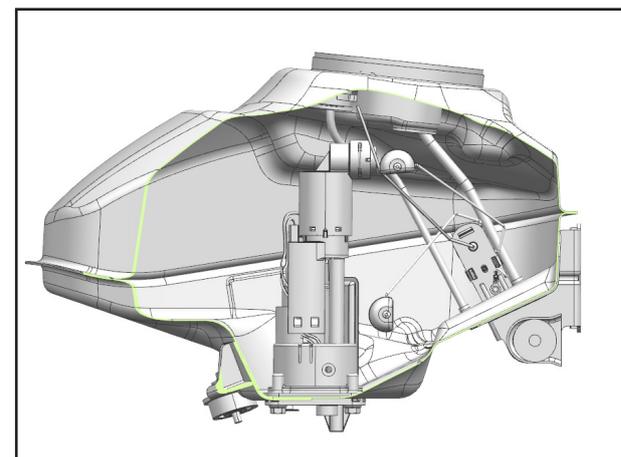
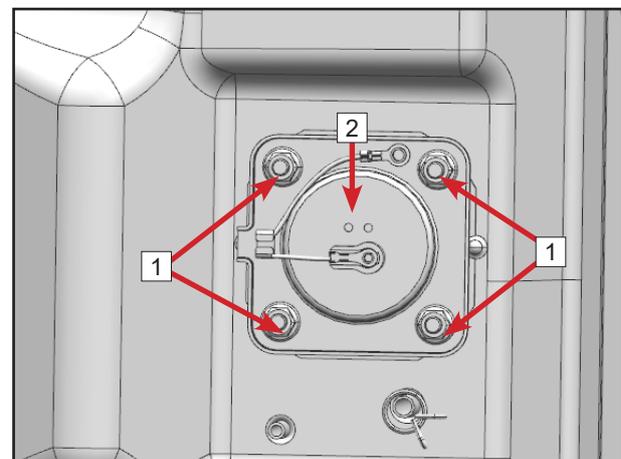
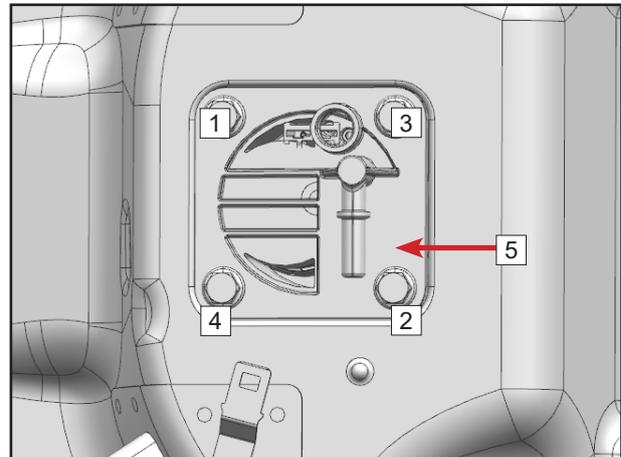
NOTE: The arrow of the fuel pump is always aligned with the tank's positioning mark.

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

Install the bolt 1 ~ bolt 4 in order.

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

See 08 Electrical System for fuel pump overhaul.



6.4 Float Ball

Depressurize the fuel system.

Ensure vehicle static is discharged by grounding.

Remove the four bolts diagonally [1].

Carefully remove float ball [2].

The float ball has a certain bend, when removing it, tilt the float ball to prevent damage to the float ball.

Installation

When installing the float ball, ensure that the float ball is oriented towards the rear end of the tank. incorrect float ball orientation will have an effect on the positioning of the fuel float ball.

Inspection

Check the appearance of the fuel tank for dents, cracks or other breakage, and replace the tank if found any.

Check whether the hose is ruptured, aging, leaking and other phenomena, and replace if found any.

Installation

Installation takes place in reverse order of disassembly.

NOTE: When installing the tank, there shall be no extrusion, excessive bending, etc. between each pipeline and cable line.

07 Lights, Dashboard and Switches

7.1 Maintenance Information	7-2
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7.1.2 Inspection Standard.....	7-2
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7.1 Maintenance Information

7.1.1 Operation Caution

CAUTION:

- When the battery is used for inspection, make sure there is no abnormality in the battery first.
- Conductivity test of the switch can be checked and measured in the vehicle installation state of the switch.
- After the inspection and overhaul of each part, the cables should be passed correctly according to the wiring diagram.

7.1.2 Inspection Standard

Project		Standard
fuse	main fuse	30A
	auxiliary fuse	1×5A 2×7.5A 2×10A 2×15A
lights	headlight	high-beam LED:16W low-beam LED:27.5W position light LED:14.5W
	turn light	LED: 0.5W×3
	tail light	rear position light LED: 4.5W brake light LED: 10.5W

7.2 Lights Troubleshooting

Switch on but no light, high/low beam cannot switch.

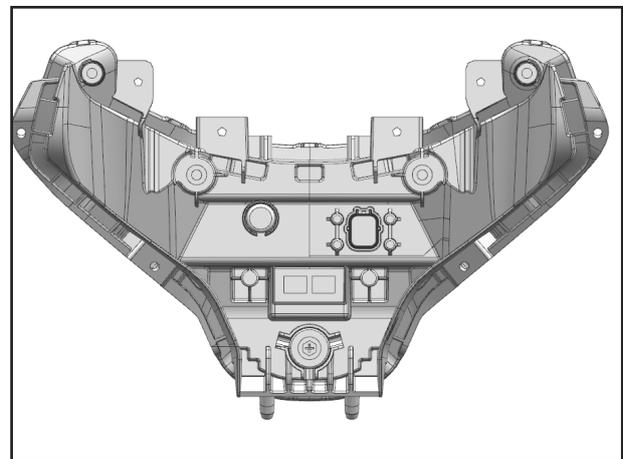
Possible reasons:

- 1)Fuse blowout.
- 2)Switch damaged.
- 3)Battery under voltage or poor connection.
- 4)Relevant connectors abnormal, withdrawing, crooked, or not in place.
- 5)BCM error.
- 6)Headlight controller error.

Headlight

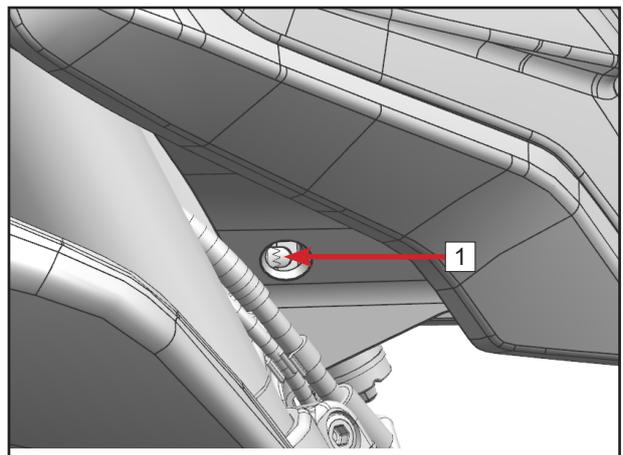
Disassembly

See 05 body covering parts chapter for headlight disassembly.



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

NOTE: Headlight is LED, replace the whole set when it is damaged.



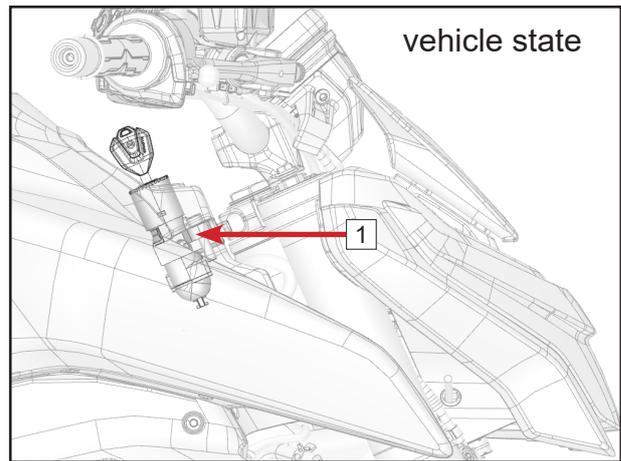
07 Lights, Dashboard and Switches

7.3 Ignition Lock Assembly

Inspection

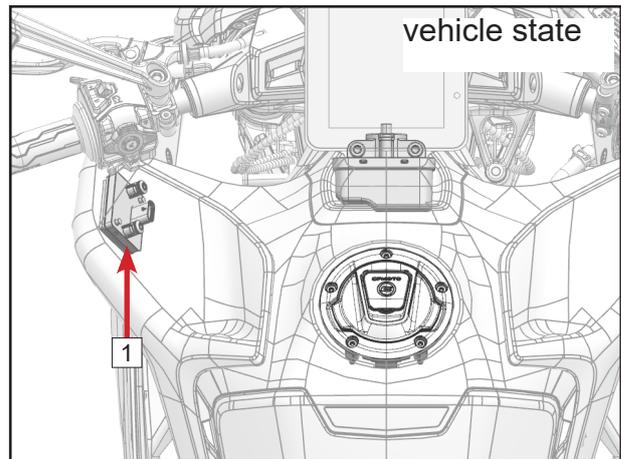
Pull out the connector connecting the ignition switch **1** with the main cable and check the connection of the ignition switch.

Ignition switch			
gear/color	red	black	pull out key
	●	●	NO
			YES
			YES



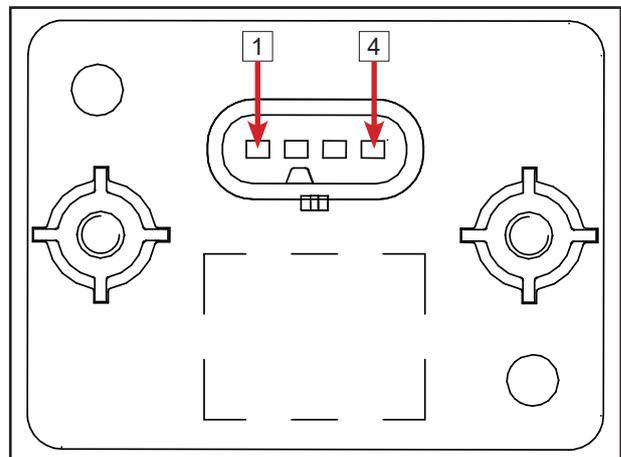
7.4 Key Base Station

The key base station **1** is on the left side of the vehicle.



Pin definition

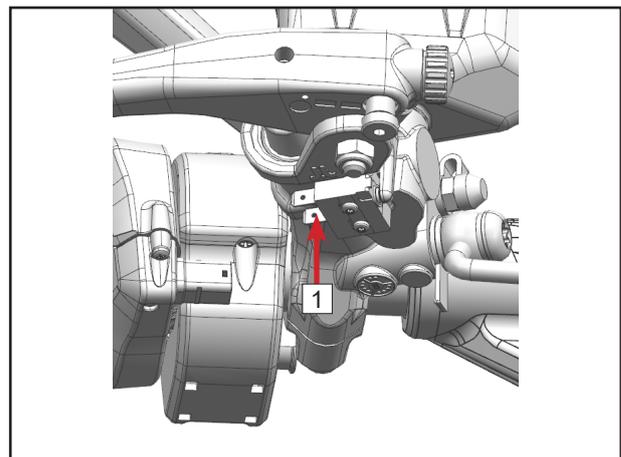
No.	definition
1	power positive
2	power positive
3	CAN-L
4	CAN-H



7.5 Front Brake Light Switch

Pull out the wiring switch plug **1** of the front brake light to check the wiring of the front brake light.

1. front brake handle pinched: brake light is on
2. front brake handle released: brake light is off

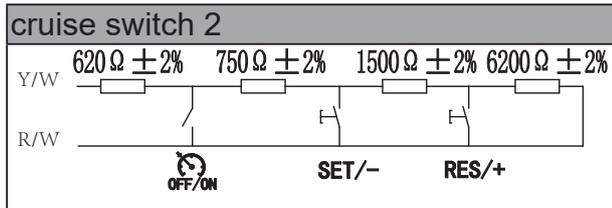


7.6 Handlebar Switch

7.6.1 LH Handlebar Switch (state 1)

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

dimmer switch 1		
function \ color	L	G
	●	●
	●	●



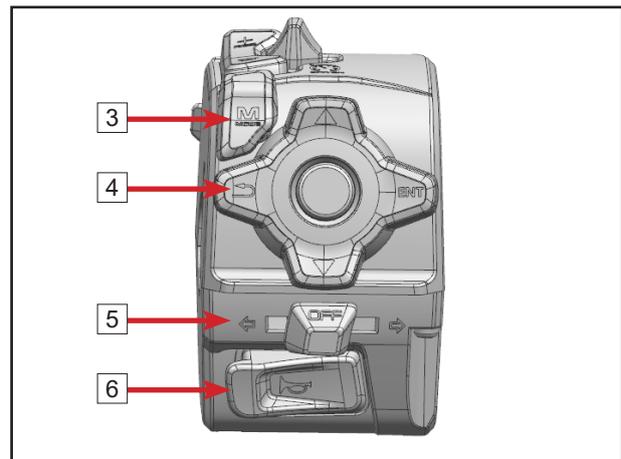
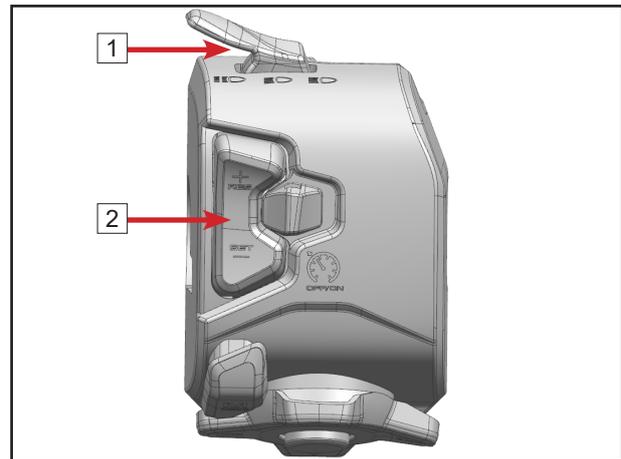
cruise switch 2		
funcio \ color	BR	G
+ RES	●	●
SET	●	●
-		

mode switch 3			
color	Y/G	G	BR
funcio	●	●	●

menu switch 4						
funcio \ color	G	B/W	B/L	V	L/W	BR
▲	●	●				●
ENT	●	●				●
↻	●		●			●
▼	●			●		●

turn switch 5				
funcio \ color	O	G	GR	SB
←	●	●		
OFF		●	●	
→		●		●

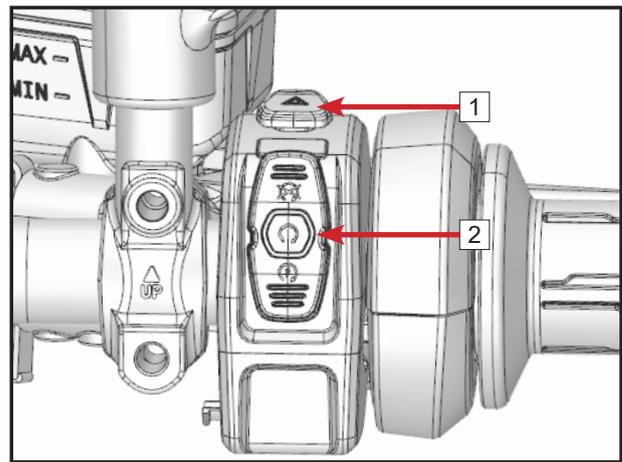
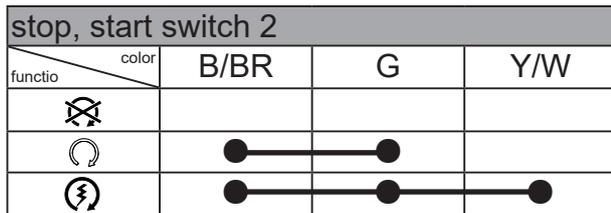
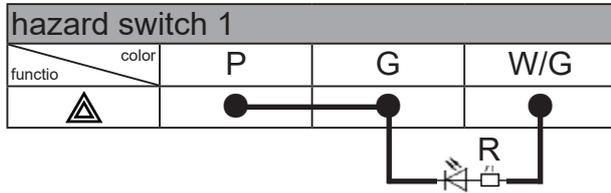
horn switch 6			
funcio \ color	LG	G	BR
	●	●	●



07 Lights, Dashboard and Switches

7.6.2 RH Handlebar Switch (state 1)

Disconnect connectors between RH handle switch wiring harness and main cable, check the on/off condition of each switch.



7.6.3 LH Handlebar Switch (state 2)

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

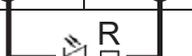
dimmer switch 1			
funcio	color	L	G
		●	●
		●	●

cruise switch 2			
Y/W	$620\ \Omega \pm 2\%$	$750\ \Omega \pm 2\%$	$1500\ \Omega \pm 2\%$
R/W			
	OFF/ON	SET/-	RES/+

cruise switch 2			
funcio	color	BR	G
+ RES		●	●
SET		●	●
-			



Fn switch 3			
funcio	color	Y/G	G
Fn		●	●



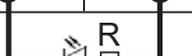
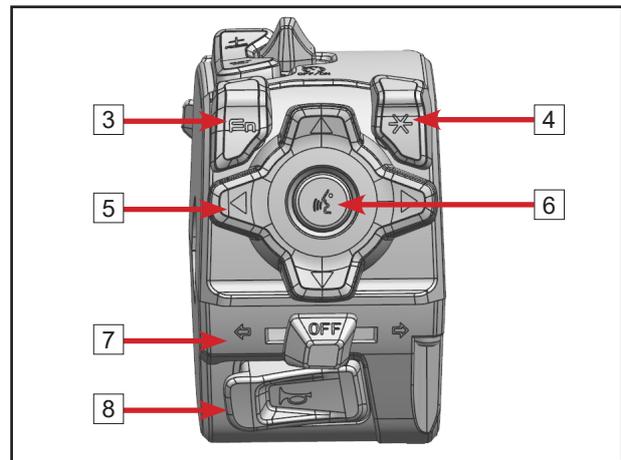
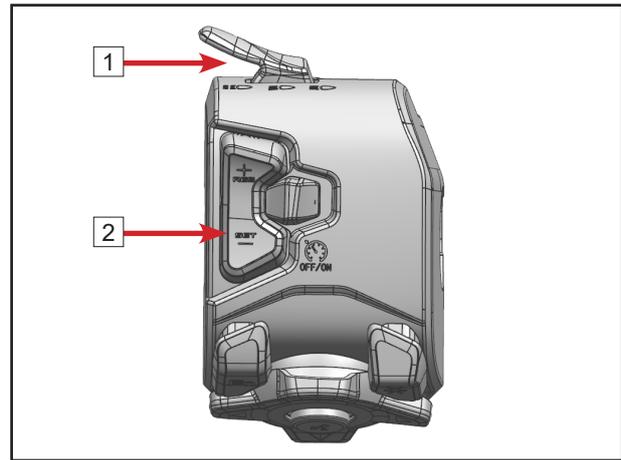
voice switch 4			
funcio	color	Y	G
		●	●



menu switch 5						
funcio	color	G	B/W	B/L	V	L/W
▲		●	●			
▶		●		●		
◀		●			●	
▼		●				●

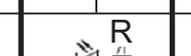


custom switch 6			
funcio	color	R	G
*		●	●

turn switch 7				
funcio	color	O	G	GR
↶		●	●	
OFF			●	●
↷			●	●

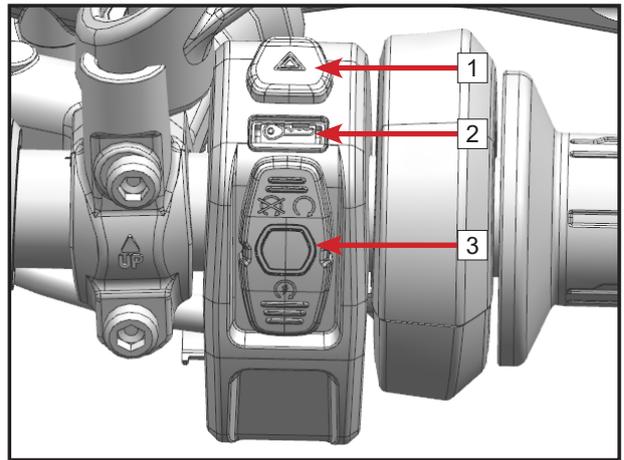
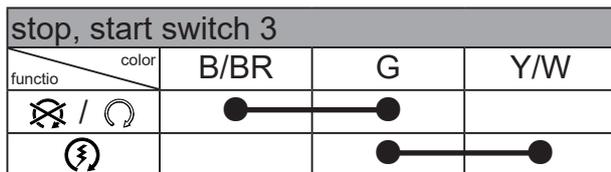
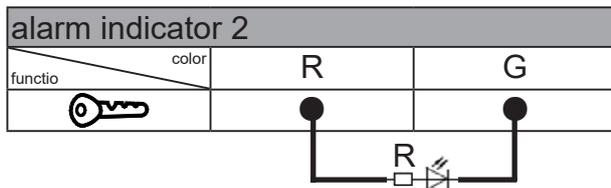
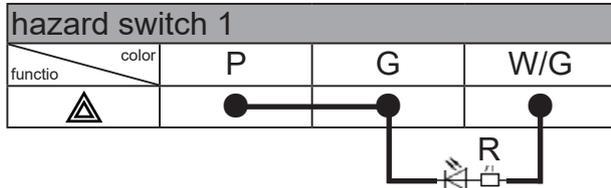
horn switch 8			
funcio	color	LG	G
		●	●



07 Lights, Dashboard and Switches

7.6.4 RH Handlebar Switch (state 2)

Disconnect connectors between RH handle switch wiring harness and main cable, check the on/off condition of each switch.



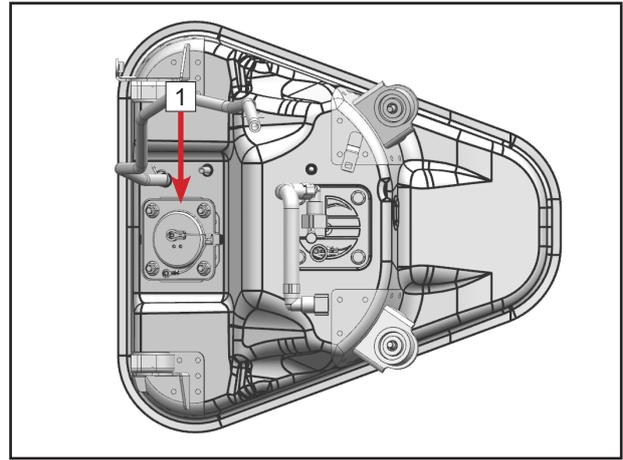
7.7 Fuel Level Sensor

Removal

See 06 chapter fuel system.

Remove 4 nuts, remove fuel level sensor

1.



Inspection

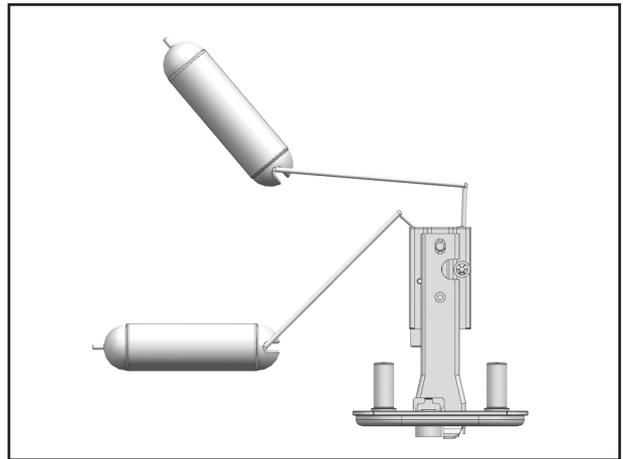
Check the fuel level sensor seal ring for deformation/damage/hardening, and replacing it if it is.

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 faulty, replace with a new one.

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

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

7.8 Battery

⚠ CAUTION:

Even if the battery is not used, it loses power every day.

The state of charge and the charging method are very important for the life of the battery, using high charging current and fast charging will have a negative impact on its life.

If the charging current, charging voltage and charging time are exceeded, the battery will be damaged.

If the battery is low due to repeated starting of the vehicle, it needs to be recharged immediately.

Leaving the battery in a discharged state for a long time can cause deep discharge and sulfation, which can damage the battery.

The battery does not need to be serviced and the acid level does not need to be checked.

It is not allowed to remove the battery cable when the engine is running.

It is forbidden to use the method of piercing the skin of the wire to detect the electrical signal of the input and output of the parts.

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

Battery removal

Remove seat.

Remove bolts **1** and seat front deco plate **2**.

Remove bolt **3** and front seat rear bracket **4**.

Remove battery **4**.

⚠ CAUTION: The negative cable must be removed before disassembling the battery, otherwise it will lead to a short circuit.

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.

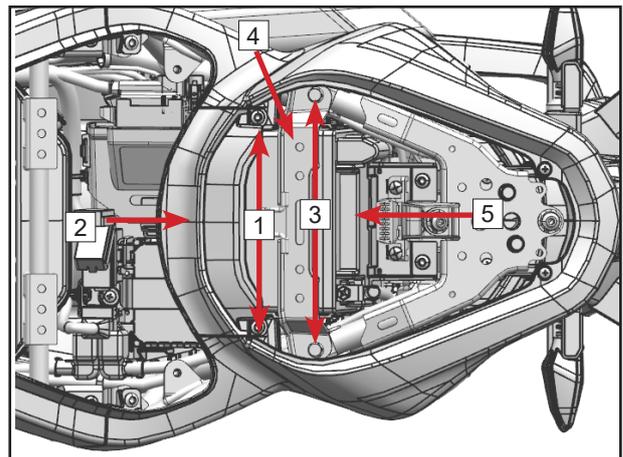
NOTE: If the vehicle is not in use, recharge its battery every 3 months.

Charging voltage inspection

The battery must be fully functional and fully charged.

Start the vehicle for voltage measurements.

The measurement point positive (+), 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.

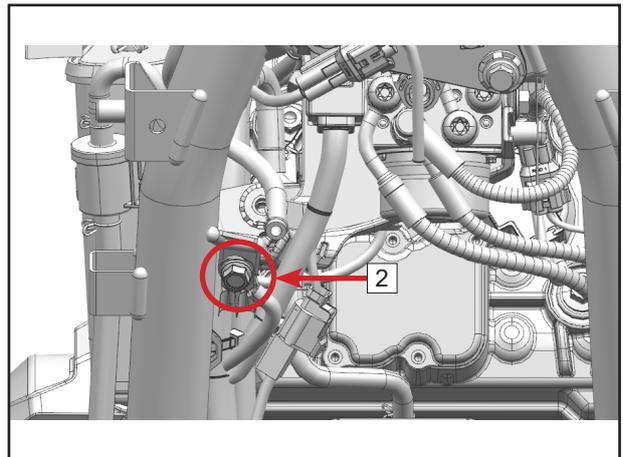
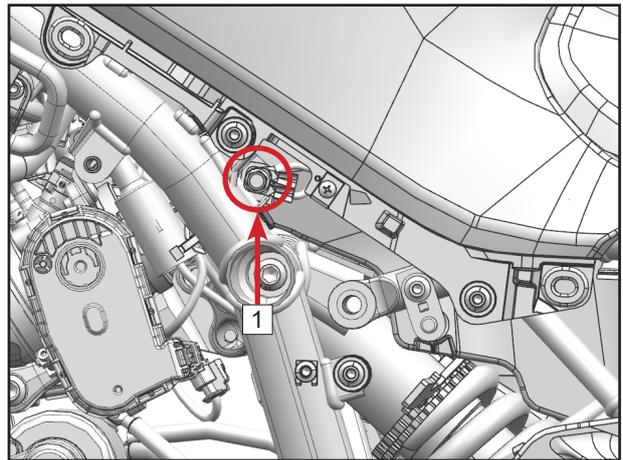
7.9 Ground Wire

Ground wire **1** is located inside the left front decoration plate of the vehicle body.
Ground wire **2** is located below the fuel tank.

Inspection

Shut down the engine and all electricals.
Inspect the ground wire harness for any abnormalities.

Check for loose bolts **1**.

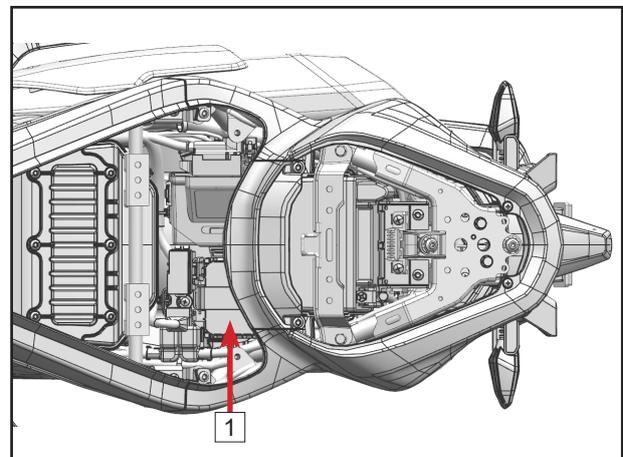


7.10 T-BOX

T-BOX is located under the middle cushion.

Remove the the T-BOX **1**.

Check the connectors connection.



07 Lights, Dashboard and Switches

T-BOX fault code

No.	DTC Display	DTC Meaning	Mature Condition	Demature Condition	Possible Fault Causes	Corrective Action
(demo)	B111716	Vehicle power supply voltage below threshold	1.Ignition state shall be IGN ON; 2.The engine status is not in Cranking;(FV only) 3.Power supply voltage <= 9V, and keep the status at least at t >= 1000ms;"	1.battery voltage >= 10V, and keep the status at least at t >= 1000ms;	Battery voltage too low	Check power supply battery;
1	B111716	Vehicle power supply voltage below threshold	1.Ignition state shall be IGN ON; 2.The engine status is not in Cranking;(FV only) 3.Power supply voltage < 9V, and keep the status at least at t >= 1000ms;	1.battery voltage >= 10V, and keep the status at least at t >= 500ms;	Battery voltage too low	Check power supply battery;
2	B111717	Vehicle power supply voltage above threshold	1.Ignition state shall be IGN ON; 2.The engine status is not in Cranking;(FV only) 3.Power supply voltage > 16V, and keep the status at least at t >= 1000ms;	1.battery voltage <= 15V, and keep the status at least at t >= 500ms;	Battery voltage too high	Check power supply battery;
3	U007388	CAN bus off fault of BICAN	1.Ignition state shall be IGN ON; 2.Power supply voltage is in the range of 9-16V; 3.BusOff fault definition Refer to ISO-11898-1 is met;	1.Refer the BusOff fault demature definition in ISO-11898-1;	CAN bus circuit is short or open	Check the CAN bus circuit or EMC.

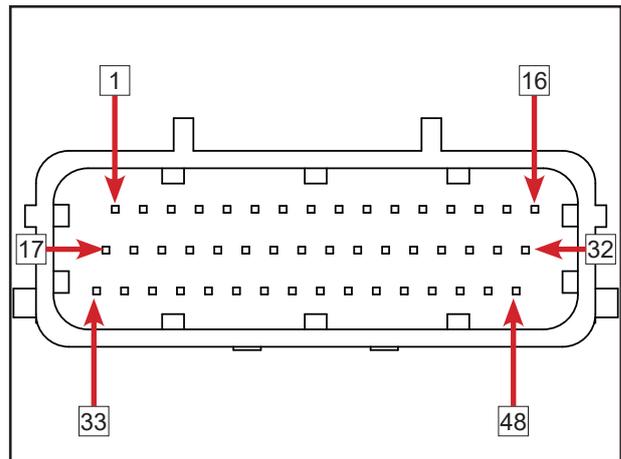
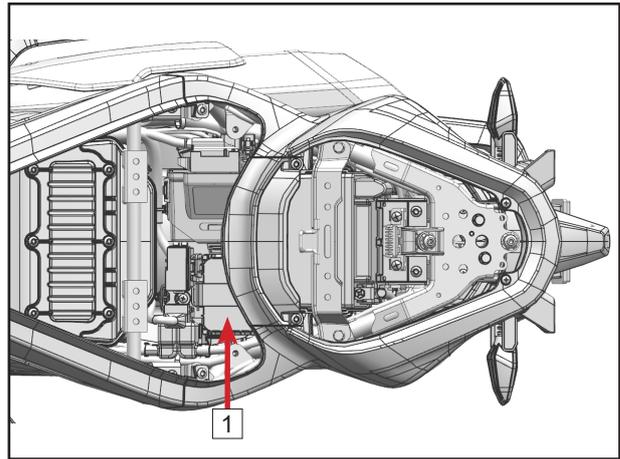
4	U118287	Lost communication of MMI	<ol style="list-style-type: none"> 1.Ignition state shall be IGN ON; 2.Power supply voltage is in the range of 9-16V; 3.The condition of diag enable time=1.5s is met; 4.Lost MMI(CANID=0x151) message time ≥ 10 times the transmission cycle and Lost MMI(CANID=0x151) message time ≥ 500ms; 	1.Received MMI (CANID = 0 x 151) message at least once;	CAN bus circuit is short or open	Check the CAN bus circuit or EMC.
5	U11C087	Lost communication of BCM	<ol style="list-style-type: none"> 1.Ignition state shall be IGN ON; 2.Power supply voltage is in the range of 9-16V; 3.The condition of diag enable time=1.5s is met; 4.Lost BCM(CANID=0x150) message time ≥ 10 times the transmission cycle and Lost BCM(CANID=0x150) message time ≥ 500ms; 	1.Received BCM (CANID = 0 x 130) message at least once;	CAN bus circuit is short or open	Check the CAN bus circuit or EMC.
6	B1A4087	KL15 powered, KL30 disconnect	when KL15 powered, KL30 disconnecting more than 30s	KL15 powered, KL30 connecting more than 1s	cable damage, malicious damage	
7	U220D00	LimpHome DTC	<ol style="list-style-type: none"> 1.Power supply voltage is in the range of 9-16V; 2.Nmrxcnt >4 or Nmtxcnt >8; 3.tLimpHomeDTC ≥ 2000ms. 	1.Received and sent ring message successfully at least once;	CAN bus circuit is short or open	Check the CAN bus circuit or EMC.

07 Lights, Dashboard and Switches

7.11 BCM

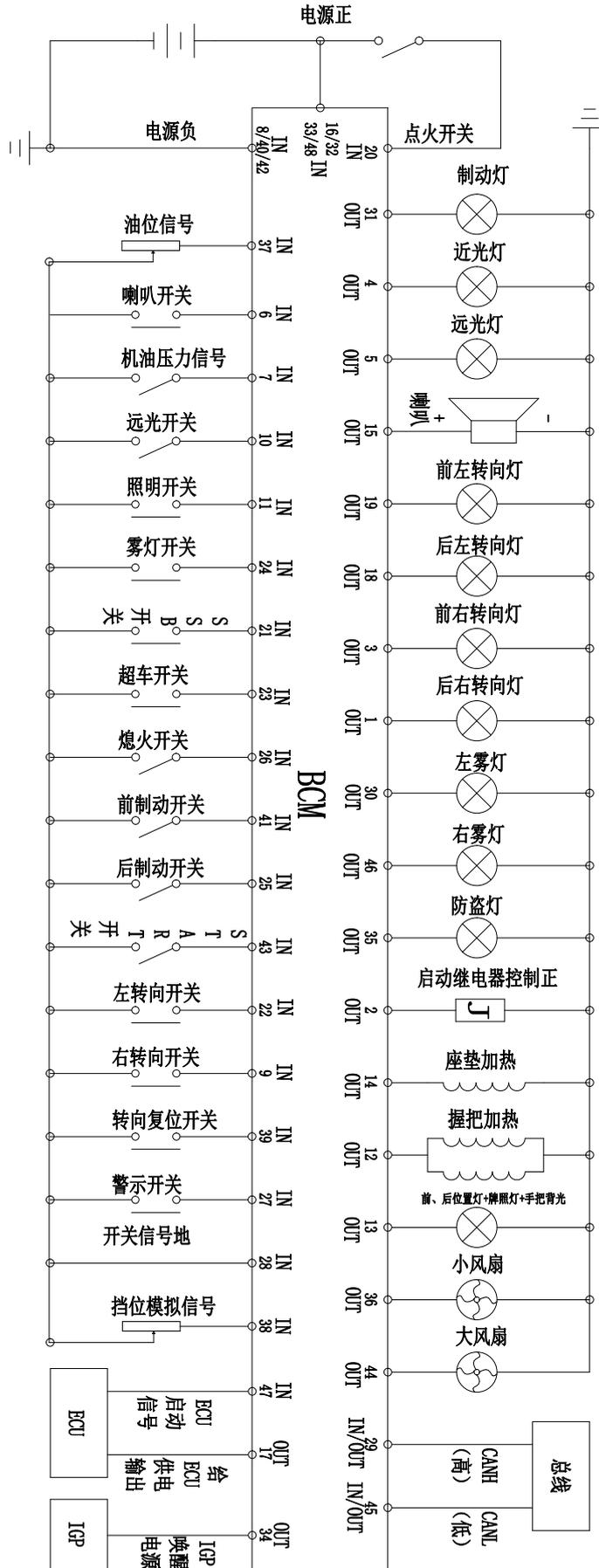
BCM is located underneath the middle cushion.

Pin	function	remark
1	rear RH turn light	high level
2	starter relay control positive	high level
3	front RH turn light	high level
4	low-beam	high level
5	high-beam	high level
6	horn switch	low level
7	oil pressure signal	low level
8	power negative	GND
9	RH turn switch	low level
10	high-beam switch	low level
11	illumination switch	low level
12	handlebar heating PWM	high level
13	front and rear position light + license light + handlebar backlight	high level
14	seat heating PWM	high level
15	horn	high level
16	power positive	power supply
17	to ECU power output	high level
18	rear LH turn light	high level
19	front LH turn light	high level
20	ignition switch (standard)	high level
21	SSB switch (deluxe) (wake-up power)	low level
22	LH turn switch	low level
23	overriding switch	low level
24	fog light switch	low level
25	rear brake switch	low level
26	kill switch	low level
27	hazard switch	low level
28	switch signal GND	low level
29	CAN-H	CAN2. 0
30	LH fog light	high level
31	brake light	high level
32	power positive	power supply
33	power positive	power supply
34	IGP wake-up power	high level



Pin	function	remark
35	anti-theft light (deluxe)	high level
36	small fan	high level
37	oil level acquisition signal	resistance value (0 500Ω)
38	gear analog signal	resistance value
39	reset switch	low level
40	power negative	GND
41	front brake switch	low level
42	power negative	GND
43	START switch	low level
44	big fan	high level
45	CAN-L	CAN2. 0
46	RH fog light	high level
47	ECU starter signal	low level
48	power positive	power supply

BCM working circuit



07 Lights, Dashboard and Switches

BCM fault code

No.	DTC Display	DTC Meaning	Mature Condition	Demature Condition	Possible Fault Causes	Corrective Action
(demo)	B111716	Vehicle power supply voltage below threshold	1.Ignition state shall be IGN ON; 2.The engine status is not in Cranking;(FV only) 3.Power supply voltage $\leq 9V$, and keep the status at least at $t \geq 1000ms$;	1.battery voltage $\geq 10V$, and keep the status at least at $t \geq 1000ms$;	Battery voltage too low	Check power supply battery;
1	B111716	Vehicle power supply voltage below threshold	1.Ignition state shall be IGN ON; 2.The engine status is not in Cranking;(FV only) 3.Power supply voltage $< 9V$, and keep the status at least at $t \geq 12s$;	1.battery voltage $\geq 10V$, and keep the status at least at $t \geq 500ms$;	Battery voltage too low	Check power supply battery;
2	B111717	Vehicle power supply voltage above threshold	1.Ignition state shall be IGN ON; 2.The engine status is not in Cranking;(FV only) 3.Power supply voltage $> 16V$, and keep the status at least at $t \geq 12s$;	1.battery voltage $\leq 15V$, and keep the status at least at $t \geq 500ms$;	Battery voltage too high	Check power supply battery;
3	U007388	CAN bus off fault of BICAN	1.Ignition state shall be IGN ON; 2.Power supply voltage is in the range of 9-16V; 3.BusOff fault definition Refer to ISO-11898-1 is met;	1.Refer the BusOff fault demature definition in ISO-11898-1;	CAN bus circuit is short or open	Check the CAN bus

4	U114087	ABS_ Wheel_ Speed_info lost	<p>1.Ignition state shall be IGN ON; 2.Power supply voltage is in the range of 9-16V; 3.The condition of diag enable time=1.5s is met; 4.Lost ABS_ Wheel_Speed_info(CANID=0x12B) message time >= 10 times the transmission cycle and Lost ABS_ Wheel_Speed_info(CANID=0x12B) message time >= (10*10 = 100)ms;</p>	ABS_ Wheel_ Speed_info (CANID =0x12B) message at least once;	CAN bus circuit is short or open	Check the CAN bus
5	U010087	ECM_ Engine_ RPM_and_ others lost	<p>1.Ignition state shall be IGN ON; 2.Power supply voltage is in the range of 9-16V; 3.The condition of diag enable time=1.5s is met; 4.Low configuration car flameout switch is effective; 5.Lost ECM(CANID=0x110) message time >= 10 times the transmission cycle and Lost ECM_ Engine_RPM_and_others(CANID=0x120) message time >= (20*10 = 200)ms;</p>	1.Received ECM_ Engine_ RPM_and_ others (CANID = 0 x 120) message at least once;	CAN bus circuit is short or open	Check the CAN bus

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6	U11C187	EHBL_Lock_Sts lost	<p>1.Ignition state shall be IGN ON;</p> <p>2.Power supply voltage is in the range of 9-16V;</p> <p>3.The condition of diag enable time=1.5s is met;</p> <p>4.Lost EHBL_Lock_Sts(CANID=0x232) message time ≥ 10 times the transmission cycle and Lost EHBL_Lock_Sts((CANID=0x232) message time $\geq (100 \times 10 = 1000)$ms;</p>	<p>1.EHBL_Lock_Sts ((CANID = 0 x 232) message at least once;</p>	CAN bus circuit is short or open	Check the CAN bus
7	U118287	MMI_Driv_Sens_Req lost	<p>1.Ignition state shall be IGN ON;</p> <p>2.Power supply voltage is in the range of 9-16V;</p> <p>3.The condition of diag enable time=1.5s is met;</p> <p>4.Lost MMI_Driv_Sens_Req(CANID=0x151) message time ≥ 10 times the transmission cycle and Lost MMI_Driv_Sens_Req(CANID=0x151) message time $\geq (50 \times 10 = 500)$ms;</p>	<p>1.MMI_Driv_Sens_Req (CANID = 0 x 151) message at least once;</p>	CAN bus circuit is short or open	Check the CAN bus
8	U118487	BRS_Info lost	<p>1.Ignition state shall be IGN ON;</p> <p>2.Power supply voltage is in the range of 9-16V;</p> <p>3.The condition of diag enable time=1.5s is met;</p> <p>4.Lost BRS_Info(CANID=0x155) message time ≥ 10 times the transmission cycle and Lost BRS_Info(CANID=0x155) message time $\geq (50 \times 10 = 500)$ms;</p>	<p>1.BRS_Info (CANID = 0 x 155) message at least once;</p>	CAN bus circuit is short or open	Check the CAN bus

9	B100913	K15 electric open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
10	B100911	K15 load short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
11	B101013	ECM electric open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
12	B101011	ECU short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
13	B101913	START electric open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
14	B101911	Start short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.

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15	B101513	horn open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
16	B101511	horn short circuit To the ground.	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
17	B110113	Front turn left lamp open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
18	B110111	Front left turn signal lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
19	B110213	Front turn right lamp open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
20	B110211	Front right turn signal lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.

21	B110313	Rear turn left lamp open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
22	B110311	Rear left turn signal lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
23	B110413	Rear turn right lamp open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
24	B110411	Rear right turn signal lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
25	B110513	Low beam open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
26	B110511	Low beam lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.

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27	B110613	High beam open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
28	B110611	High beam short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
29	B110813	Left foglight open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
30	B110811	Left fog lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
31	B110913	Right foglight open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
32	B110911	Right fog lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.

33	B110713	Parking lamp open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
34	B110711	Position lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
35	B110A13	Break lamp open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
36	B110A11	Brake lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
37	B110B11	Theft deterrent lamp short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
38	B110C13	Big fan open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.

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39	B110C11	Large fan short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
40	B110C19	Large fan overcurrent protection	" The over-current of the load is diagnosed continuously for one time or more." "	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
41	B110D11	Small fan open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
42	B110D13	Small fan short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
43	B110D19	Small fan overcurrent protection	" The over-current of the load is diagnosed continuously for one time or more." "	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
44	B110E11	Handle heat open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.

45	B110E13	Handle heating short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
46	B110F11	Seat heat open circuit	This open circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
47	B110F13	Seat heating circuit short circuit to ground	This short circuit has been detected for 1 consecutive times or more.	This normal circuit has been detected for 3 consecutive times or more.	Wiring harness failure or the load failure.	Check the wiring harness and the load.
48	U220D00	LimpHome DTC	1.Power supply voltage is in the range of 9-16V; 2.Nmrxcnt >4 or Nmtxcnt >8; 3.tLimpHomeDTC >= 2000ms.	1.Received and sent ring message successfully at least once;	CAN bus circuit is short or open	Check the CAN bus circuit or EMC.

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CFMOTO

8.1 Diagnostic Tools

CFMOTO DSCAN

Function :

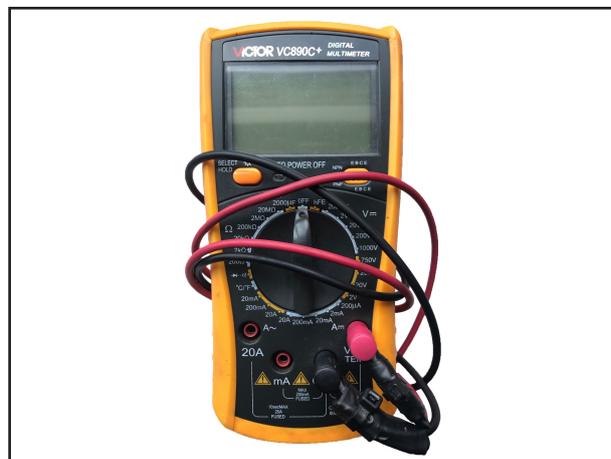
Read/clear the EFI system fault code, observe the data flow, update and scrub the ECU program, etc.



Digital multimeter

Function :

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



8.2 Charging System

8.2.1 Magneto Coil Resistance

Measure 3-phase magneto stator coil resistance.

If the resistance is out of specification, replace with a new stator.

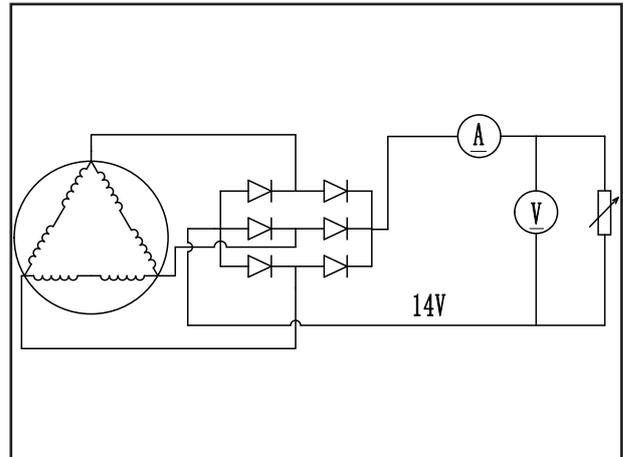
MAG Coil Resistance:

0.55Ω~1.5Ω (Yellow-Yellow)

Resistance between Stator Coil and Core:
∞Ω (Yellow-Ground)

Check for the insulation between stator coil and core.

Turn multimeter to 1×10Ω



8.2.2 Magneto Non-loaded Performance

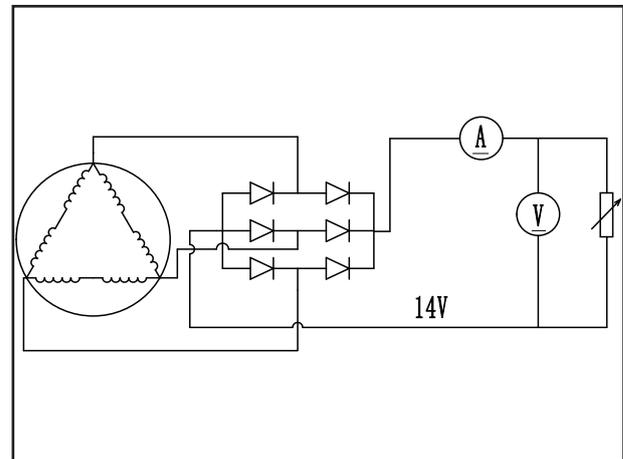
Start the engine and allow it run at 5000r/min. Use multimeter to measure the voltage between 3 output lines.

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

Turn Multimeter to **V(AC)**.

Voltage between Output Lines When MAG Non-loaded:

>50V(AC) at 5000r/min



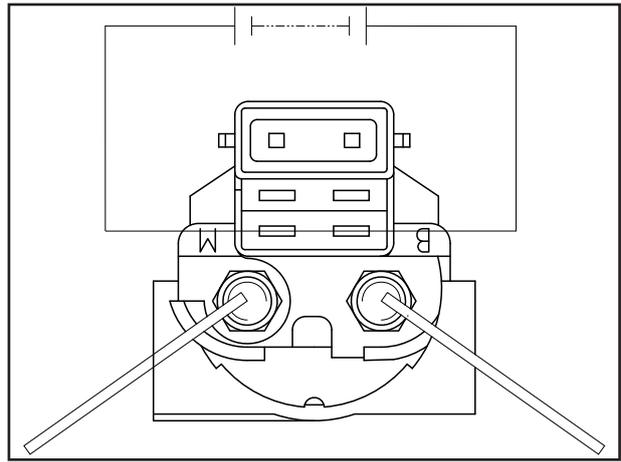
8.2.3 Starter Relay

Put DC12V between positive and negative terminal. Use multimeter to check connection between 2 contacts.

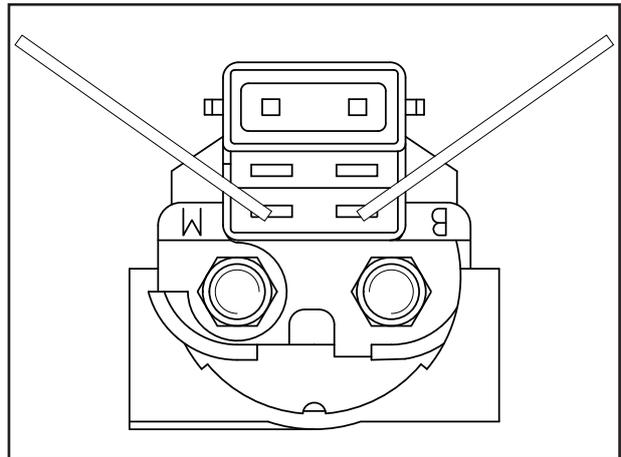
If multimeter clicks, there is connection.

If DC12V is removed, no connection between contacts.

If both above 2 items are proved, it indicates the replay is good. Turn multimeter to DIODE.



⚠ CAUTION: The voltage loaded between terminals can not exceed 2 minutes. Otherwise, starter relay may overheat or burn.



Use multimeter to measure the start relay coil resistance.

If the resistance is out of standard, replace with a new one.

Turn multimeter to $1 \times 10 \Omega$

Start auxiliary relay resistance: $3 \Omega \sim 5 \Omega$

Auxiliary Relay

Put DC12V between auxiliary starter relay positive and negative terminal. Use multimeter to check the continuity between A and B.

Turn multimeter to DIODE.

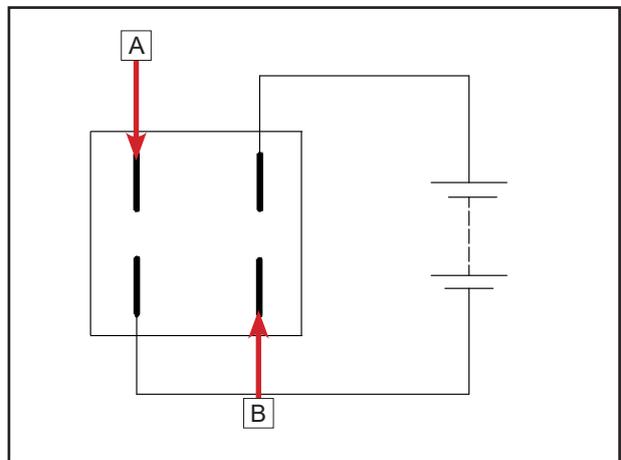
If multimeter clicks, it indicates there is connection between A and B.

If DC12V is removed, no connection remains between contacts.

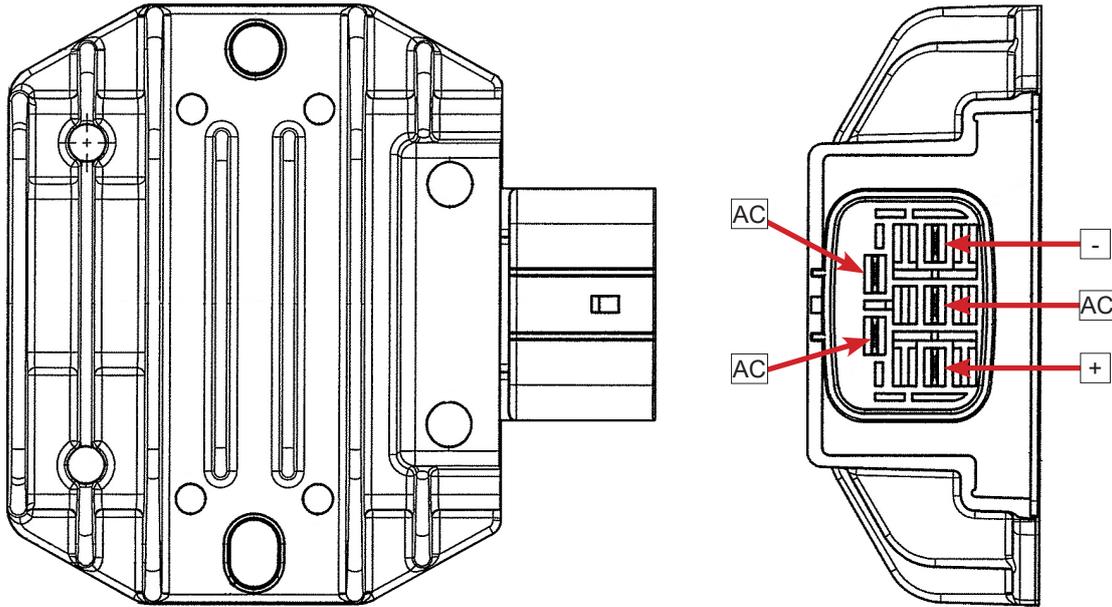
If both above 2 items are proved, it indicates the replay is good.

Turn multimeter to $1 \times 100 \Omega$ to measure the relay resistance.

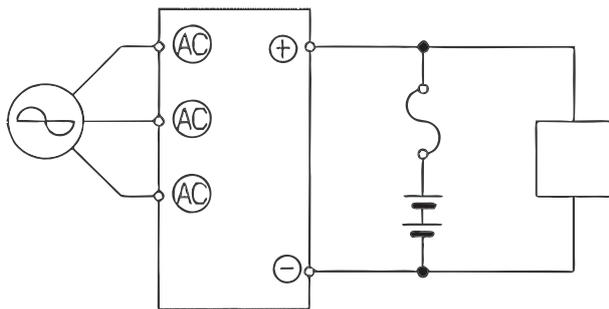
Auxiliary starter relay resistance: $90 \Omega \sim 100 \Omega$



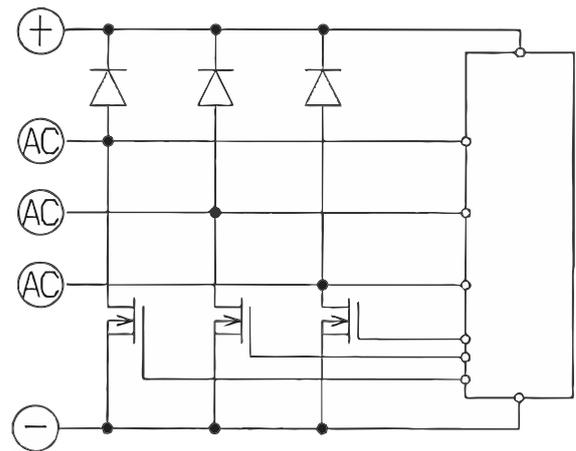
8.2.4 Regulator



Connecting diagram

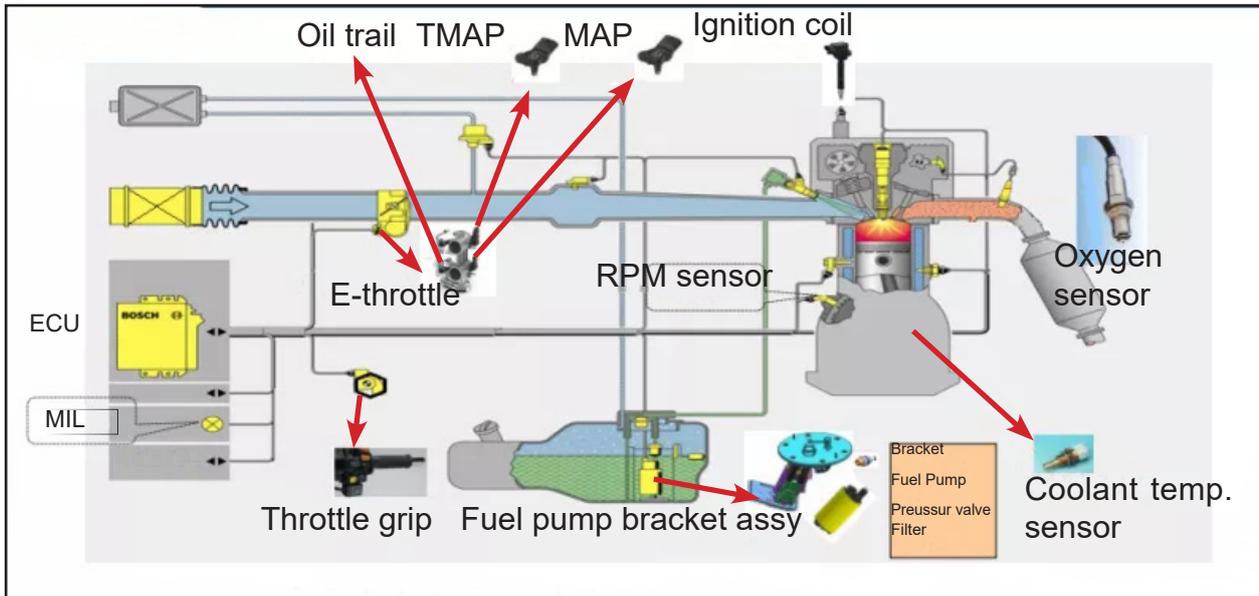


Wire diagram



8.3 EFI System

8.3.1 EFI Structure



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. Sensors in EFI system include:

- **Air pressure sensor** (Air density and pressure information)
- **Air temp. sensor** (Air density information)
- **TPS** (Load, load range, speed information)
- **Trigger** (crankshaft information)
- **Water temp. sensor** (engine temp.)
- **Speedometer sensor** (Output shaft RPM information)
- **Oxygen sensor** (Air factor= $\lambda > 1$ or < 1)
- **Roll-over gear sensor** (Output vehicle gradient information)

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 Actuators

Actuators execute the EFI instruction. Main actuators include:

Fuel Pump (Provide high-press fuel)

Fuel Injector (Inject the fuel to make it spray better)

Ignition Coil (Provide high ignition energy to spark plug)

Idle Air Control Valve (Provide idle inlet air)

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 break down 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 not permitted.
 - 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 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 ECU, so it's unadjustable.

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

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

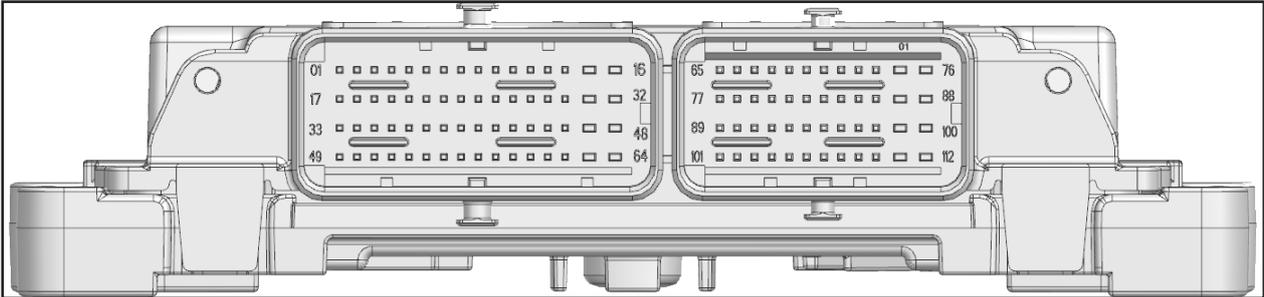
Fuel line removal and fuel filter replacement should be practiced by a professional person in a well-ventilated place.

- Don't reverse the battery cable connections. This may damage electrical components. This system adopts 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 Structure and Performance of EFI Parts

8.3.3.1 ECU

Electronic control unit, is the brain of EFI system. It analyzes and cope with the information provided by sensors, and send the conclusion in the form of instruction to actuator, then make the engine run in the optimal condition.



ECU pin function:

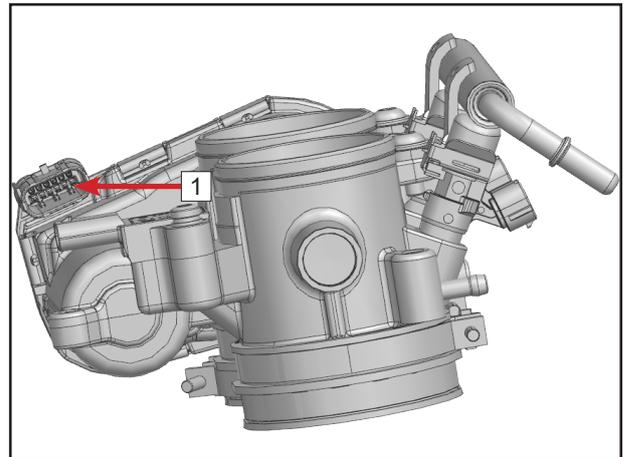
No.	Pin function	No.	Pin function	No.	Pin function
1	CAN H	39	NULL	77	TPS 1
2	NULL	40	NULL	78	TPS 2
3	NULL	41	Fuel pump relay	79	NULL
4	NULL	42	Headlight relay	80	Oxygen sensor 1 GND
5	Main relay	43	Oxygen sensor 2 GND	81	NULL
6	4WD lock switch	44	NULL	82	MIL
7	Pedal 1 to ground	45	Accelerator pedal sensor 1	83	NULL
8	NULL	46	NULL	84	Sensor GND
9	NULL	47	NULL	85	Intake manifold sensor to ground
10	Speed input	48	Oxygen sensor heating 2	86	TPS GND
11	NULL	49	NULL	87	Throttle actuator B
12	NULL	50	NULL	88	NULL
13	NULL	51	NULL	89	NULL
14	Overriding switch	52	NULL	90	NULL
15	Non-continuous power1	53	NULL	91	Air intake pressure sensor
16	Non-continuous power2	54	NULL	92	NULL
17	CAN L	55	NULL	93	NULL
18	NULL	56	Fan control 1	94	Canister control valve
19	NULL	57	NULL	95	NULL
20	Continuous power	58	Starter control relay	96	Engine RPM sensor A
21	Oxygen sensor 2	59	Pedal 2 GND	97	Engine RPM sensor B
22	NULL	60	NULL	98	NULL
23	Brake switch	61	NULL	99	Ignition coil 2
24	Low-speed switch	62	NULL	100	Ignition coil 1
25	Brake light switch	63	ECU GND 2	101	Engine temp sensor
26	NULL	64	ECU GND 1	102	Air intake temp sensor
27	N gear switch	65	NULL	103	NULL
28	NULL	66	NULL	104	Oxygen sensor 1
29	R gear switch	67	NULL	105	NULL
30	Accelerator pedal sensor 2	68	Injector 1(cylinder 1)	106	P gear switch
31	NULL	69	NULL	107	TPS 5V power
32	NULL	70	NULL	108	NULL
33	NULL	71	NULL	109	Intake manifold sensor 5V power
34	RPM output	72	Injector 2(cylinder 2)	110	NULL
35	Ignition switch	73	Oxygen sensor heating 1	111	ECU GND 4
36	Pedal 2-5V power	74	NULL	112	ECU GND 3
37	Pedal 1-5V power	75	Throttle actuator A		
38	NULL	76	NULL		

8.3.3.2 Throttle Body Assembly

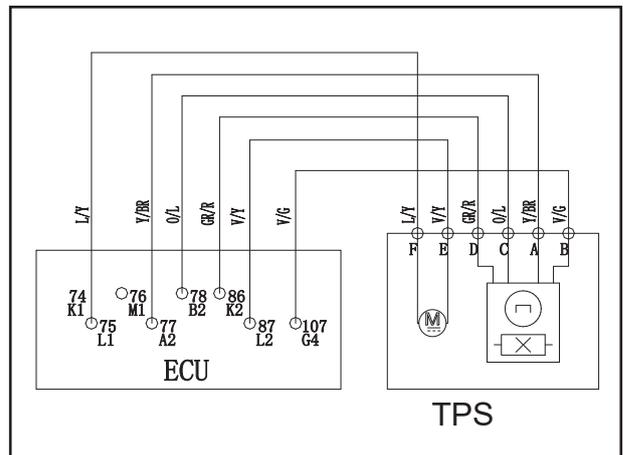
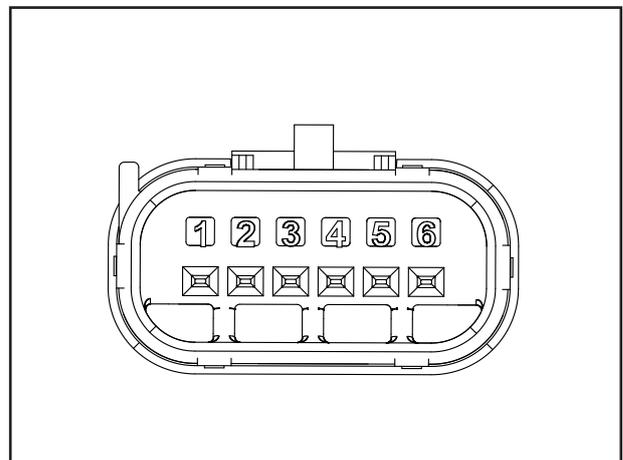
Connect with air filter and the engine, control the on-off angle of throttle by motor. Send out the angle signal through TPS 1 to ECU.

Pin Function:

1. Motor +
2. Motor -
3. Sensor to ground
4. Signal 2
5. Sensor power
6. Signal 1

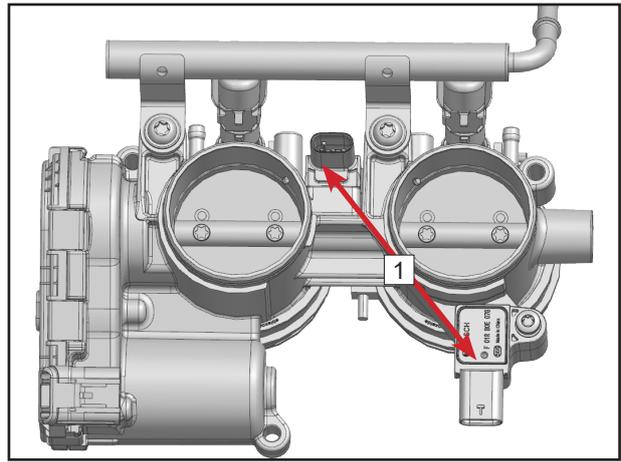


Wire diagram connecting with ECU.



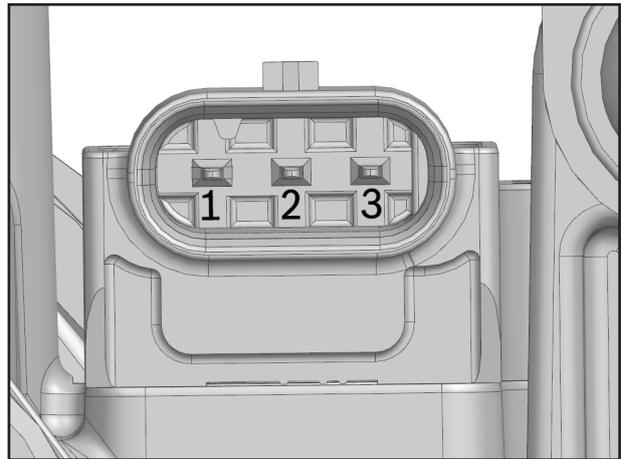
8.3.3.3 Air Intake Pressure Sensor

This sensor detects the pressure of air intake pipe, which provides the engine load signal to ECU.

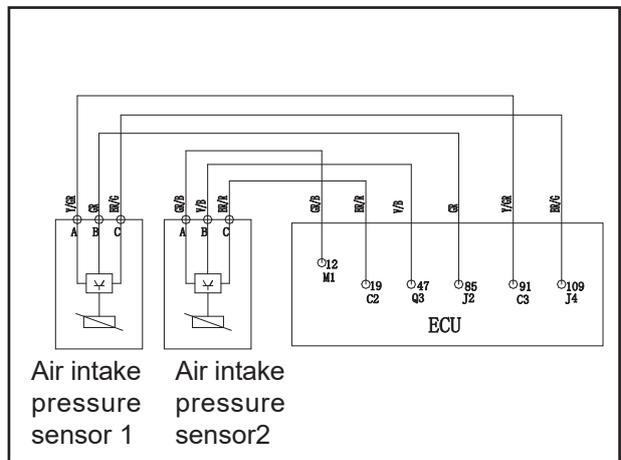


Pin Function:

- 2. Power
- 3. Ground
- 4. Output voltage

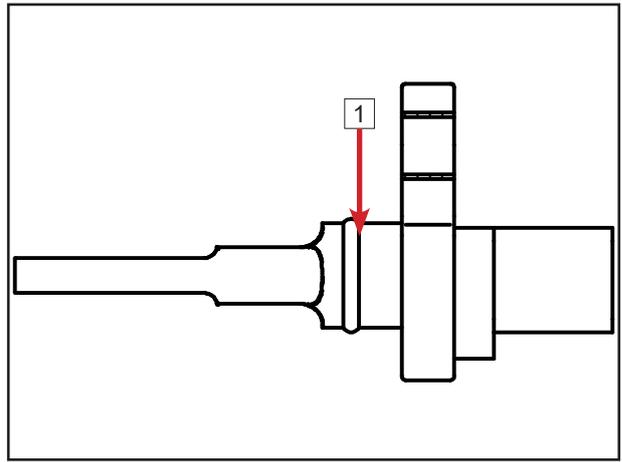


Circuit connecting with ECU.

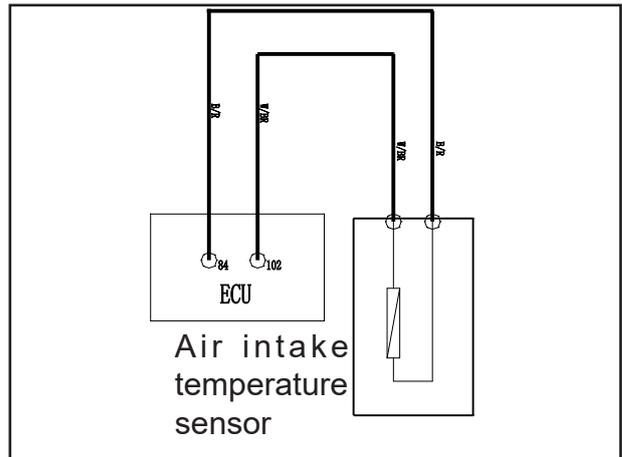


8.3.3.4 Air Intake Temperature Sensor

This sensor is a NTC thermo resistance. The resistance becomes lower when the air temperature becomes higher, but it is not a liner relationship.

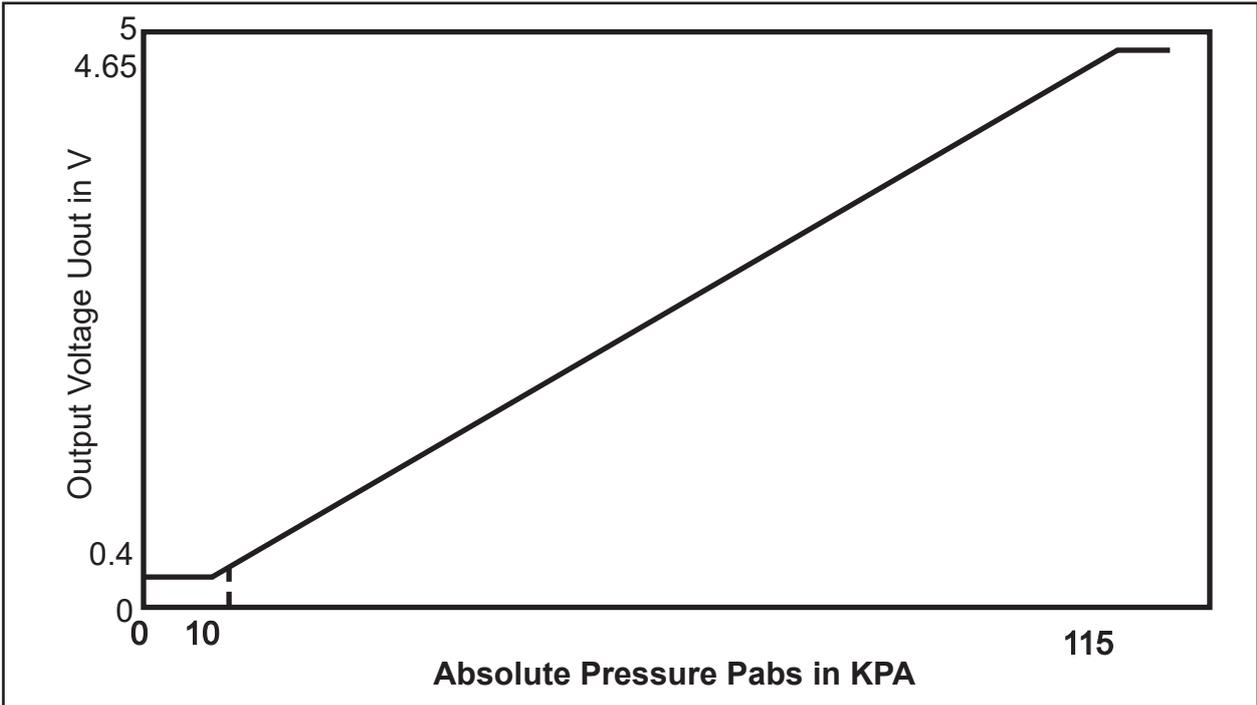


Circuit connecting with ECU.

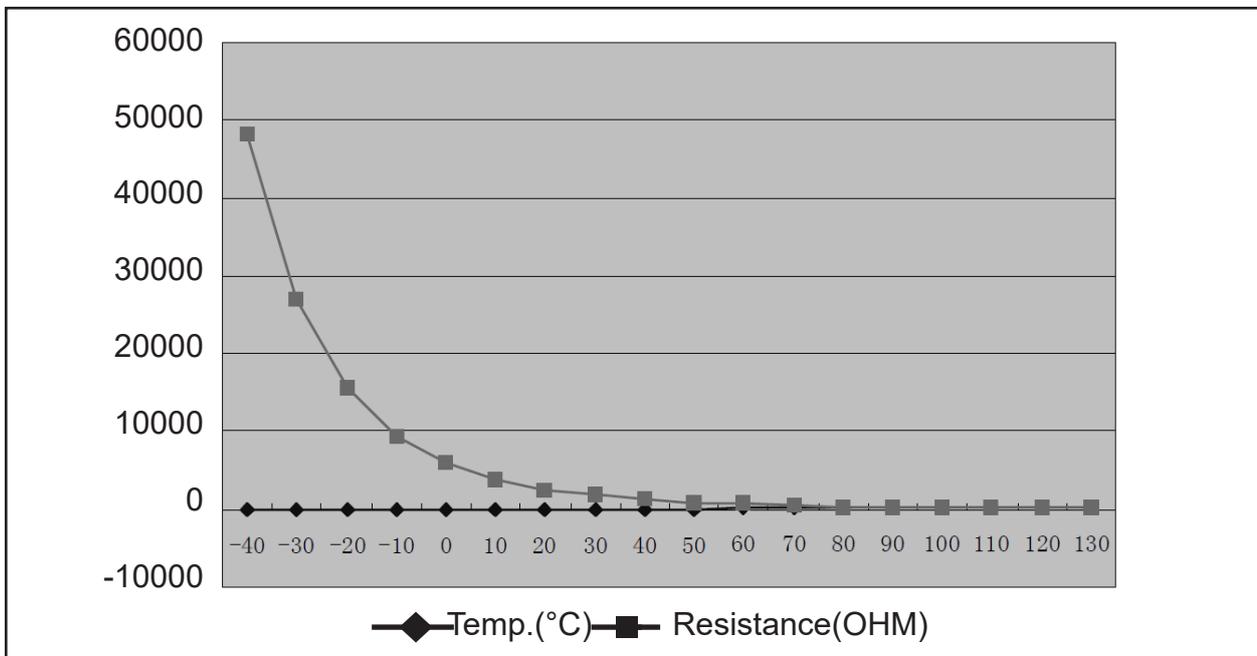


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The relationship between output voltage and pressure.
Pressure range: 10~115kPa



The relationship between sensor temperature and resistance.



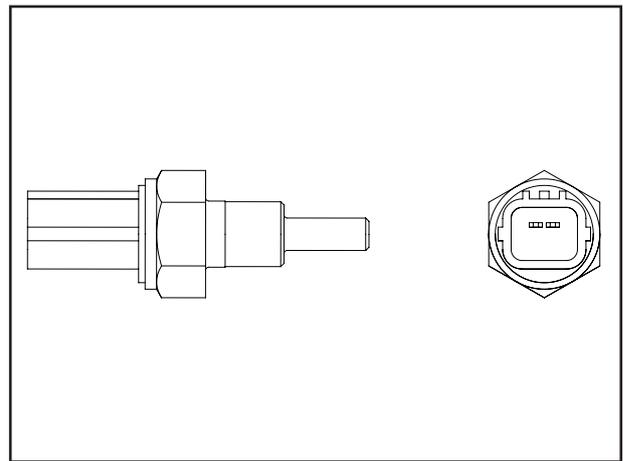
8.3.3.5 Water Temperature Sensor

This sensor is a NTC thermo resistance. The resistance becomes lower when the air temperature becomes higher.

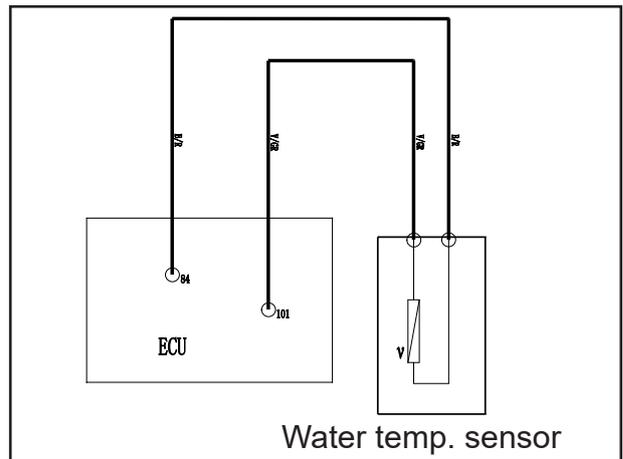
One group of parameters is sent to ECU to monitor engine temperature condition, One group is sent to dashboard to monitor coolant temperature condition.

A and C are one group which provides water temperature signal to the ECU.

Through ECU, B sends the water temperature signal to dashboard.



Circuit connecting with ECU.



The right table shows the relationship between A and C temperature and resistance. This signal is sent to ECU.

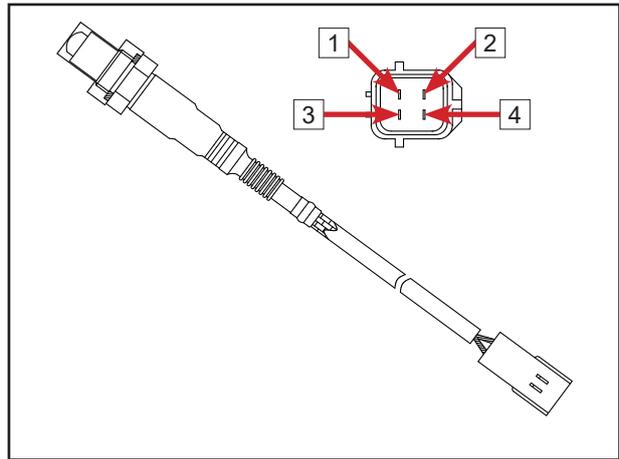
Temp.°C	Resistance between B and housing(Ω)
-20±0.1	13.71~16.94
25±0.1	1.825~2.155
80±0.1	0.303~0.326
110±0.1	0.1383~0.1451

8.3.3.6 Oxygen Sensor

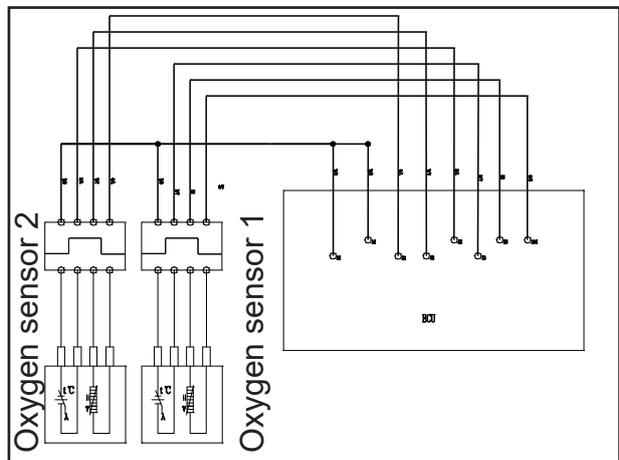
This sensor is used in closed-loop feedback controlled fuel injection to improve the air-to-fuel ratio accuracy and control the emission. It's located in the exhaust stream to measure the amount of oxygen in exhaust and send the signal to ECU, which can revise the fuel injector output, so as to reduce the amounts of unburnt fuel and make catalytic converter convert HC, CO and NO_x of Nitrogen efficiently.

Pin Function:

1. Output signal +
2. Output signal -
3. Heated ground -
4. Heated power +

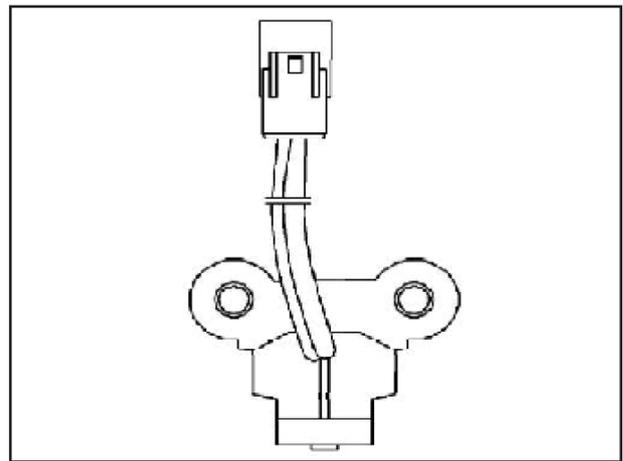


Circuit connecting with ECU.

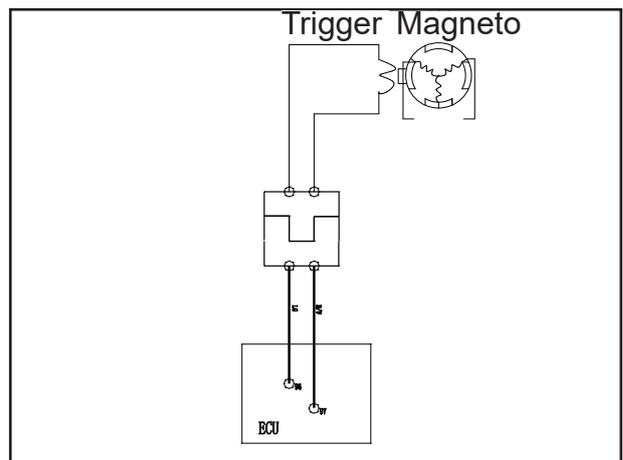


8.3.3.7 Trigger

The trigger transfers signal of engine speed to ECU and by which ECU to confirm engine speed ignition angle and injecting phase.



Circuit connecting with ECU.



Measure trigger resistance

Set multimeter to $1 \times 100\Omega$ range.

Trigger coil resistance: $260\Omega \sim 300\Omega (20^\circ\text{C})$

Replace a new one when resistance is not within above value range.

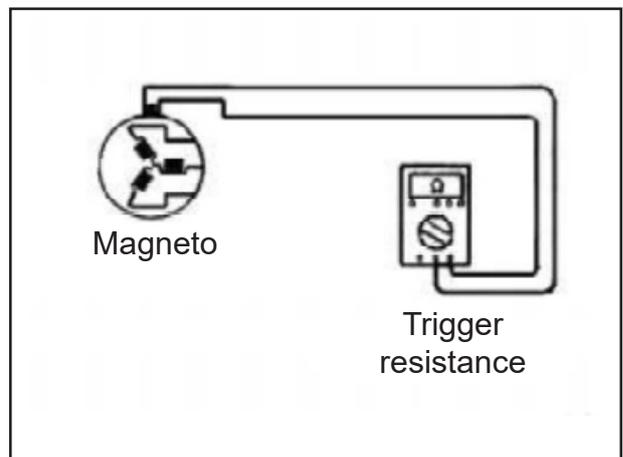
Measure trigger peak voltage

Connect multimeter and peak voltage adapter as shown as right picture

+Probe: Green (B) wire

-Probe: Blue (A) wire

NOTE: Refer to owner manual when using peak value voltage adapter.



Set multimeter to ACV range.

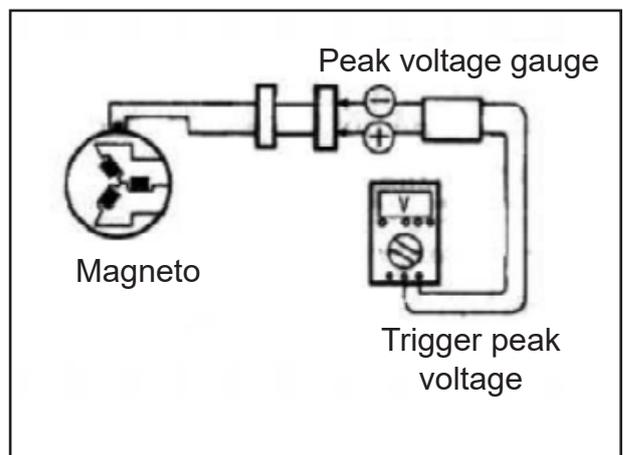
Set engine to Neutral gear, turn on ignition switch.

Press starter button and keep engine running for seconds, then measure trigger coil peak value voltage.

Repeat a few times and record the highest value.

Trigger coil peak value voltage: $\geq 20\text{V}$ (1300r/min)

Replace a new one when peak value voltage is not within above value range.



8.3.3.8 Fuel Pump

The right picture shows the fuel pump assy, fuel pump relay and ECU wiring diagram.

This fuel pump assy consists of fuel pump, plastic bracket, fuel strainer, fuel filter element and pressure-regulating valve. It delivers fuel from the tank to the engine at a certain oil pressure and flow rate.

Pin function:

- 1 Ground
- 2 Fuel pump relay output port

Performance parameter:

Pressure-regulating valve open pressure:

0.4MPa±0.007MPa

Flow rate: 80L/h

Do not run the fuel pump assy when there is no fuel inside the fuel tank, in case of fuel pump damage.

Handle the fuel pump gently. Do not drop it on hard surfaces.

The battery supplies power to the fuel pump through the relay. Only when starting or running the engine can the circuit be switched on.

Measure fuel pressure:

Connect oil pressure gauge and fuel pump oil port, lock with clamp to ensure there is no leak form the junction.

Connect the circuit as the picture shows.

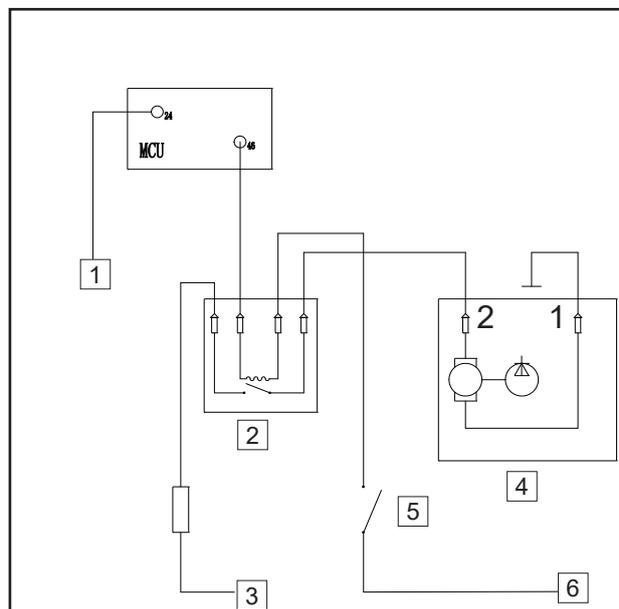
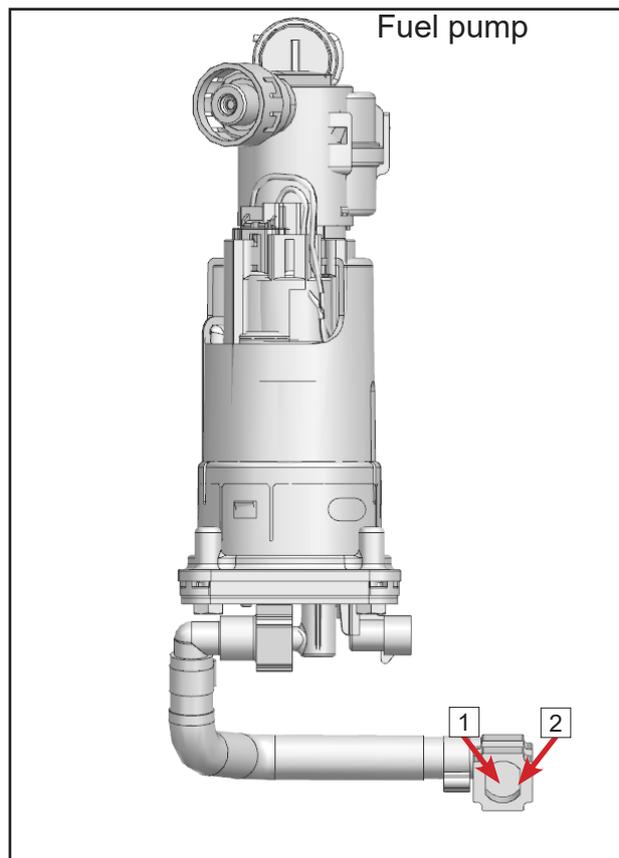
Turn on ignition switch and stop switch.

The fuel pump will work for 5 seconds. When stop working, the oil pressure should reach the specified value. Otherwise, replace with a new fuel pump.

After stopping working, the pressure should maintain **0.2MPa for at least 5 minutes**. Otherwise, replace fuel pump assy.

Fuel hose pressure release method:

The fuel supply pressure in EFI system is high, all fuel hoses are high-pressure resistance. Even the engine does not work, the pressure in fuel passage is still high. So when in the maintenance process, be careful not to remove the fuel hose causally. When servicing EFI system, release the pressure before removing the fuel hose. Remove the fuel pump relay. Start the engine and make it idle until the engine stops automatically.



1	ECU pin 41	3	Battery +	5	Stop switch
2	Fuel pump relay	4	Fuel pump assembly	6	Ignition switch

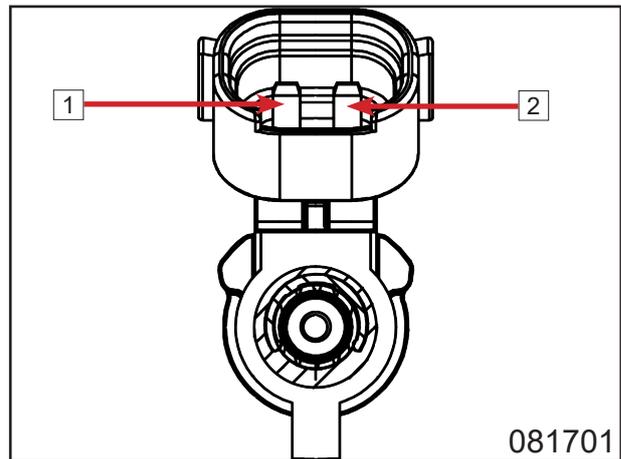
8.3.3.9 Fuel Injector

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.

Pin function:

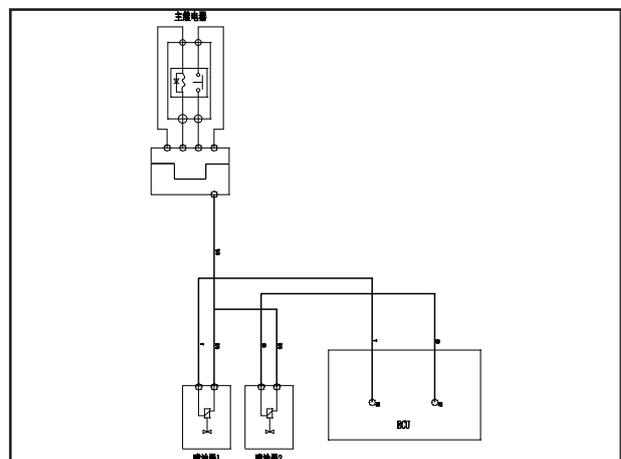
- 1: + connects fuel pump relay output
- 2: - connects ECU

Fuel injector resistance: $12\Omega \pm 0.6\Omega$ (20°C)



1	+Fuel pump relay	2	-ECU
---	------------------	---	------

Circuit connecting 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.

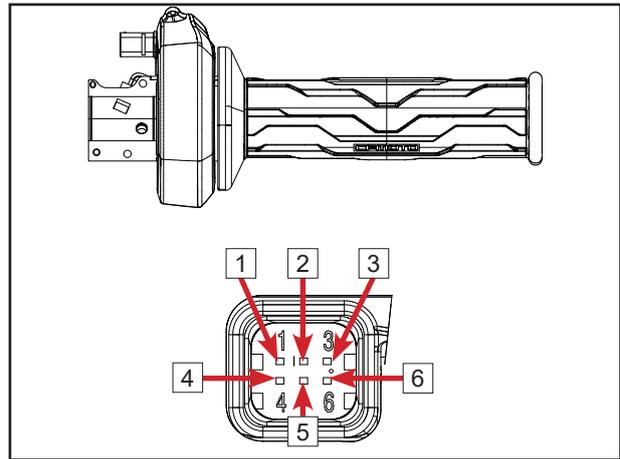
8.3.3.10 E-throttle

The vehicle adopts e-throttle assy. When the driver turns the throttle grip, ECU combines the throttle angle, engine PRM, gear, engine temperature, vehicle mode and other information to provide the best fuel supply.

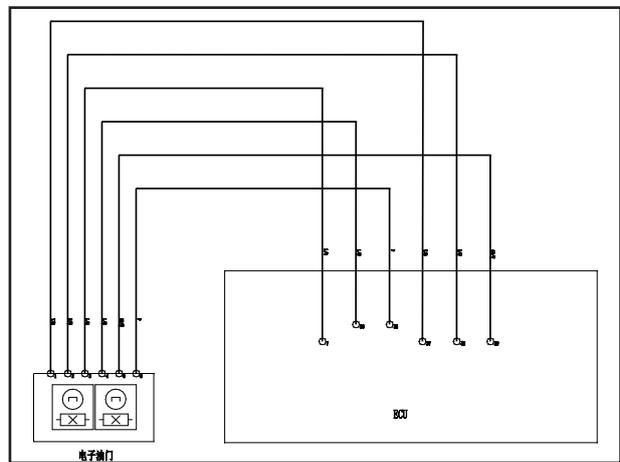
The e-throttle assy can provide the driver with more accurate fuel supply and more ideal throttle response.

Pin function:

1. Power 1
2. Signal 1
3. Ground 1
4. Signal 2
5. Ground 2
6. Power 2



Circuit connecting with ECU.

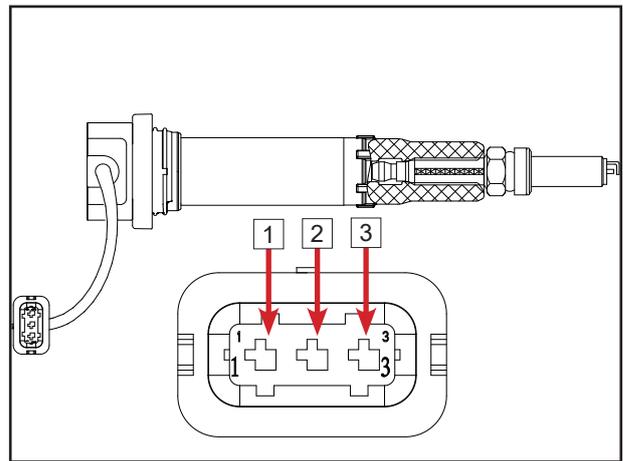


8.3.3.11 Ignition coil

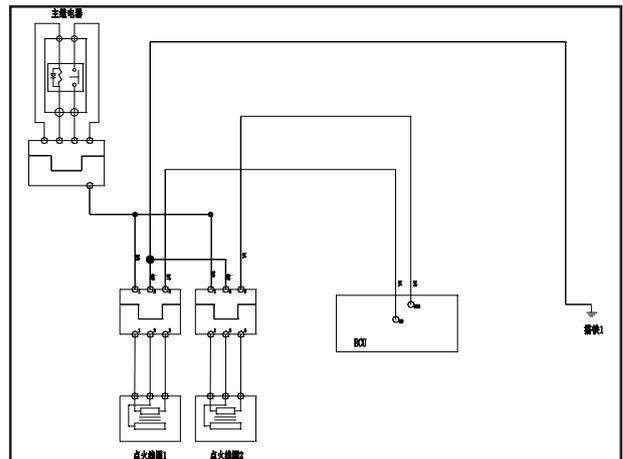
Ignition coil transforms the low voltage of primary coil to high voltage of secondary coil needed to spark the spark plug and ignite the mixture of air and fuel in cylinder.

Pin function:

1. Signal
2. Ground
3. Power



Circuit connecting with ECU.



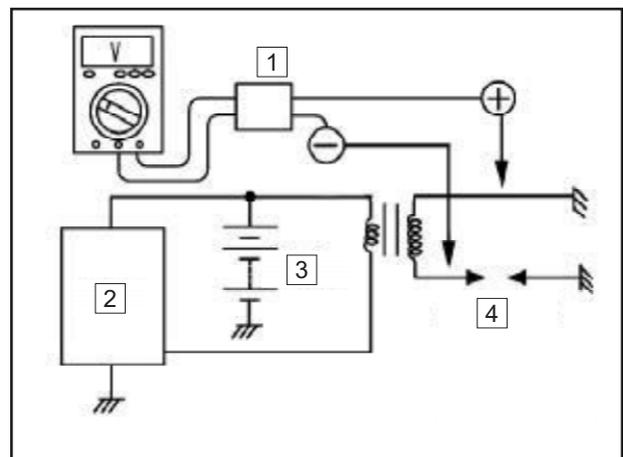
Secondary Ignition Voltage Test:

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 more than 15000V.



Ignition coil parameter chart table:

1	Peak voltage gauge	3	Battery
2	ECU	4	Spark plug

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

8.3.4 UP6.0 Fault Code

No.	Code	Instruction
1	P0322 00	Crankshaft signal loss
2	P0108 17	Manifold Absolute Pressure/Barometric Pressure Circuit High
3	P0107 16	Manifold Absolute Pressure/Barometric Pressure Circuit Low
4	P0106 29	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance
5	P0105 23	Manifold Absolute Pressure/Barometric Pressure Circuit
6	P2A0D 17	Manifold Absolute Pressure Sensor "B" Circuit High
7	P2A0C 16	Manifold Absolute Pressure Sensor "B" Circuit Low
8	P2A0B 29	Manifold Absolute Pressure Sensor "B" Circuit Range/Performance
9	P2A0A 23	Manifold Absolute Pressure Sensor "B" Circuit
10	P0113 17	Intake Air Temperature Sensor 1 Circuit High
11	P0112 16	Intake Air Temperature Sensor 1 Circuit Low
12	P0111 29	Intake Air Temperature Sensor 1 Circuit Range/Performance
13	P0118 17	Engine Coolant Temperature Sensor 1 Circuit High
14	P0117 16	Engine Coolant Temperature Sensor 1 Circuit Low
15	P0116 29	Engine Coolant Temperature Sensor 1 Circuit Range/Performance
16	P0688 16	ECM/PCM Power Relay Sense Circuit/Open
17	P0688 29	ECM/PCM Power Relay Sense Circuit/Open
18	P0650 12	MIL Control Circuit High
19	P0650 11	MIL Control Circuit Low
20	P0650 13	MIL Control Circuit Open
21	P0692 12	Fan 1 Control Circuit High
22	P0691 11	Fan 1 Control Circuit Low
23	P0480 13	Fan 1 Control Circuit
24	P0629 12	Fuel Pump "A" Control Circuit High
25	P0628 11	Fuel Pump "A" Control Circuit Low
26	P0627 13	Fuel Pump "A" Control Circuit /Open
27	P0459 12	Evaporative Emission System Purge Control Valve Circuit High
28	P0458 11	Evaporative Emission System Purge Control Valve Circuit Low
29	P0444 13	Evaporative Emission System Purge Control Valve Circuit Open
30	P0497 00	Evaporative Emission System Incorrect Purge Flow
31	P0917 17	Gear Shift Position Circuit High
32	P0916 16	Gear Shift Position Circuit Low
33	P0915 29	Gear Shift Position Circuit Range/Performance
34	P1001 00	Shaft Gears Position Sensor Self-learning Not plausible (Gangi=0)
35	P082C 00	Shaft Gears Position Sensor Circuit High
36	P082B 00	Shaft Gears Position Sensor Circuit Low
37	P1002 00	Shaft Gears Position Sensor Self-learning Not plausible (Gangi~=0)
38	P0412 12	Secondary Air Injection System Switching Valve "A" Circuit
39	P0414 11	Secondary Air Injection System Switching Valve "A" Circuit Shorted

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40	P0413 13	Secondary Air Injection System Switching Valve "A" Circuit Open
41	P0411 29	Secondary Air Injection System Incorrect Flow Detected
42	P0568 1C	Cruise Control Multi-Function Input "A" Circuit Range/Performance
43	P0568 24	Cruise Control Multi-Function Input "A" Circuit Stuck
44	P0568 13	Cruise Control Multi-Function Input "A" Circuit
45	P0262 12	Cylinder 1 Injector Circuit High
46	P0261 11	Cylinder 1 Injector Circuit Low
47	P0201 13	Injector Circuit/Open – Cylinder 1
48	P0265 12	Cylinder 2 Injector Circuit High
49	P0264 11	Cylinder 2 Injector Circuit Low
50	P0202 13	Injector Circuit/Open – Cylinder 2
51	P0268 12	Cylinder 3 Injector Circuit High
52	P0267 11	Cylinder 3 Injector Circuit Low
53	P0203 13	Injector Circuit/Open – Cylinder 3
54	P0271 12	Cylinder 4 Injector Circuit High
55	P0270 11	Cylinder 4 Injector Circuit Low
56	P0204 13	Injector Circuit/Open – Cylinder 4
57	P0563 17	System Voltage High
58	P0562 16	System Voltage Low
59	P0560 1C	System Voltage Not plausible
60	P0501 29	Vehicle Speed Sensor "A" Range/Performance
61	P0507 00	Idle Air Control System RPM Higher Than Expected
62	P0506 00	Idle Air Control System RPM Lower Than Expected
63	P1098 00	DUMP control Circuit low
64	P1099 00	DUMP control Circuit high
65	P0641 00	Sensor Reference Voltage "A" Circuit/Open
66	P0651 00	Sensor Reference Voltage "B" Circuit/Open
67	P0571 29	Brake Switch "A" Circuit
68	P0571 1C	Brake Switch "A" Circuit
69	P2138 00	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation
70	P0326 17	Max error of DFP_KS1: internal failure path number: knock sensor 1
71	P0325 17	Min error of DFP_KS1: internal failure path number: knock sensor 1
72	P0328 00	Knocksensor fault: short circuit sensor 1, line A, Max
73	P0327 00	Knocksensor fault: short circuit sensor 1, line A, Min
74	P0328 15	Knocksensor fault: short circuit sensor 1, line B, Max
75	P0327 14	Knocksensor fault: short circuit sensor 1, line B, Min
76	P1386 00	Diagnostic Fault Check knock control signal evaluation
77	P0300 00	Misfire detected
78	P0301 00	Misfire detected on cylinder 1
79	P0303 00	Misfire detected on cylinder 3
80	P0304 00	Misfire detected on cylinder 4
81	P0302 00	Misfire detected on cylinder 2
82	P130A 00	Cylinder selective fuel cutoff active due to catalyst damaging misfire

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83	P0300 22	Random/Multiple Cylinder Misfire Detected
84	P0300 21	Random/Multiple Cylinder Misfire Detected
85	P0300 29	Random/Multiple Cylinder Misfire Detected
86	P2301 00	Ignition Coil "A" Primary Control Circuit High
87	P2307 00	Ignition Coil "C" Primary Control Circuit High
88	P2310 00	Ignition Coil "D" Primary Control Circuit High
89	P2304 00	Ignition Coil "B" Primary Control Circuit High
90	P2300 00	Ignition Coil "A" Primary Control Circuit Low
91	P2306 00	Ignition Coil "C" Primary Control Circuit Low
92	P2309 00	Ignition Coil "D" Primary Control Circuit Low
93	P2303 00	Ignition Coil "B" Primary Control Circuit Low
94	P0123 17	Throttle/Pedal Position Sensor/Switch "A" Circuit High
95	P0122 16	Throttle/Pedal Position Sensor/Switch "A" Circuit Low
96	P0121 29	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/ Performance
97	P0223 17	Throttle/Pedal Position Sensor/Switch "B" Circuit High
98	P0222 16	Throttle/Pedal Position Sensor/Switch "B" Circuit Low
99	P0221 29	Throttle/Pedal Position Sensor/Switch "B" Circuit Range/ Performance
100	P2106 12	Throttle Actuator Control System Forced Limited Power
101	P2106 19	Throttle Actuator Control System Forced Limited Power
102	P2106 92	Throttle Actuator Control System Forced Limited Power
103	P2106 13	Throttle Actuator Control System Forced Limited Power
104	P1568 00	Idle Speed Contr.Throttle Pos. mechanical Malfunction
105	P1545 00	Throttle Pos.Contr. Malfunction
106	P1559 00	Idle Speed Contr.Throttle Pos. Adaptation Malfunction
107	P1545 22	Throttle Pos.Contr. Malfunction
108	P1545 21	Throttle Pos.Contr. Malfunction
109	P1579 00	Idle Speed Contr.Throttle Pos. adaptation not started
110	P1564 00	Idle Speed Contr.Throttle Pos. Low Voltage During Adaptation
111	P1565 00	Idle Speed Control Throttle Position lower limit not attained
112	P1559 29	Idle Speed Contr.Throttle Pos. Adaptation Malfunction
113	P2123 17	Throttle/Pedal Position Sensor/Switch "D" Circuit High
114	P2122 16	Throttle/Pedal Position Sensor/Switch "D" Circuit Low
115	P2138 29	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation
116	P2128 17	Throttle/Pedal Position Sensor/Switch "E" Circuit High
117	P2127 16	Throttle/Pedal Position Sensor/Switch "E" Circuit Low
118	P0606 94	ECM/PCM Processor
119	P0606 92	ECM/PCM Processor
120	P2106 29	Throttle Actuator Control System Forced Limited Power
121	P0606 64	ECM/PCM Processor
122	P0606 61	ECM/PCM Processor
123	P0606 67	ECM/PCM Processor
124	P0606 1C	ECM/PCM Processor
125	P0606 55	ECM/PCM Processor
126	P0606 00	ECM/PCM Processor
127	P0606 62	ECM/PCM Processor

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128	P0606 96	function monitoring: fault of ECU ADC - Null Load Test Pulse
129	P0606 97	function monitoring: fault of ECU ADC - test voltage
130	P0606 47	function monitoring: fault of ECU monitoring modul error
131	P0606 17	Reported OverVoltage of VDD5
132	P0606 16	Reported UnderVoltage of VDD5
133	P0606 49	Diagnostic fault check to report "WDA active"
134	P0606 48	Diagnostic fault check to report "WDA active" due to errors in query-/response communication
135	P0606 91	Diagnostic fault check to report "WDA active" due to overvoltage detection
136	P0053 1E	O2 Sensor Heater Resistance Bank 1 Sensor 1
137	P0059 1E	O2 Sensor Heater Resistance Bank 2 Sensor 1
138	P0030 13	O2 Sensor Heater Control Circuit Bank 1 Sensor 1
139	P0031 11	O2 Sensor Heater Control Circuit Low Bank 1 Sensor 1
140	P0032 12	O2 Sensor Heater Control Circuit High Bank 1 Sensor 1
141	P0050 13	O2 Sensor Heater Control Circuit Bank 2 Sensor 2
142	P0051 11	O2 Sensor Heater Control Circuit Low Bank 2 Sensor 1
143	P0052 12	O2 Sensor Heater Control Circuit High Bank 2 Sensor 1
144	P0130 29	O2 Sensor Circuit Bank 1 Sensor 1
145	P0131 16	O2 Sensor Circuit Low Voltage Bank 1 Sensor 1
146	P0132 17	O2 Sensor Circuit High Voltage Bank 1 Sensor 1
147	P0133 00	O2 Sensor Circuit Slow Response Bank 1 Sensor 1
148	P0134 13	O2 Sensor Circuit No Activity Detected Bank 1 Sensor 1
149	P0150 29	O2 Sensor Circuit Bank 2 Sensor 1
150	P0151 16	O2 Sensor Circuit Low Voltage Bank 2 Sensor 1
151	P0152 17	O2 Sensor Circuit High Voltage Bank 2 Sensor 1
152	P0153 00	O2 Sensor Circuit Slow Response Bank 2 Sensor 1
153	P0154 13	O2 Sensor Circuit No Activity Detected Bank 2 Sensor 1
154	P2177 00	System Too Lean Off Idle bank1
155	P2178 00	System Too Rich Off Idle bank1
156	P2179 00	System Too Lean Off Idle bank2
157	P2180 00	System Too Rich Off Idle bank2
158	U0073 88	Control Module Communication Bus Off
159	U0140 87	Lost Communication With Body Control Module
160	U0121 87	Lost Communication With Anti-Lock Brake System (ABS) Control Module
161	U0155 87	Lost Communication With Instrument Panel Cluster (IPC) Control Module
162	U0198 87	Lost Communication With Gateway "A"
163	U0131 87	Lost Communication With Power Steering Control Module
164	P062F 42	Internal Control Module EEPROM Error
165	P062F 43	Internal Control Module EEPROM Error
166	P1610 00	Manufacturer controlled computer and auxiliary outputs
167	P1611 00	Manufacturer controlled computer and auxiliary outputs
168	P1612 00	Manufacturer controlled computer and auxiliary outputs
169	P1613 00	Manufacturer controlled computer and auxiliary outputs
170	P1614 00	Manufacturer controlled computer and auxiliary outputs
171	P01980	roll-over switch fault

8.4 Fault Diagnosis

Engine Body:

Troubles	Possible Cause	Countermeasures
Cannot start or difficult to start	<p>Cylinder pressure too low</p> <ol style="list-style-type: none"> 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 <p>Spark plug cannot ignite or weak ignition</p> <ol style="list-style-type: none"> 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 <p>Insufficient fuel inside throttle body</p> <ol style="list-style-type: none"> 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 	<p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Repair or replace</p> <p>Tighten</p> <p>Check electrical parts</p> <p>Adjust</p> <p>Adjust</p> <p>Adjust or replace</p> <p>Clean & dry or replace</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Clean or replace</p> <p>Clean or replace</p> <p>Inspect or replace</p> <p>Inspect or replace</p> <p>Clean or replace</p>
No idle speed or unstable speed	<ol style="list-style-type: none"> 1. Improper valve clearance 2. Unsuitable valve seat 3. Defective valve 4. Rocker or rocker arm 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 	<p>Adjust</p> <p>Repair or replace</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Replace or adjust</p> <p>Replace</p> <p>Adjust or replace</p> <p>Replace</p>

08 Electrical System

Troubles	Possible Cause	Countermeasures
High RPM unstable	<ol style="list-style-type: none"> 1. Valve spring getting worn 2. Camshaft worn 3. Spark plug dirty 4. Spark plug gap too narrow 5. Valve timing incorrect 6. Ignition coil failure 7. Low pressure,oil pump 8. Air filter too dirty 	<p style="text-align: center;">Replace Replace Clean or replace Adjust or replace Adjust Replace Adjust or replace 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 worn 4. Cylinder worn or scraped 5. Valve stem worn 6. Oil seal of valve stem damaged 	<p style="text-align: center;">Check oil level and drain Replace Replace Replace Replace 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 gap 9. Injector blocked 10. Insufficient pressure,oil pump 11. Air filter too dirty 12. Rocker arm or camshaft worn 13. Air leakage of inlet pipe 14. Engine oil too much 	<p style="text-align: center;">Adjust Replace Adjust Replace Replace Replace or repair Clean or replace Clean or replace Clean or replace Adjust or replace Clean or replace Replace Tighten or replace 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. Fuel hose blocked 5. Air leakage of inlet pipe 6. Unsuitable engine oil 7. Cooling system failure(see7-5) 	<p style="text-align: center;">Clean Check and add or drain Replace Clean Tighten or replace Change oil</p>

Troubles	Possible Cause	Countermeasures
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:

Troubles	Possible Cause	Countermeasures
No spark or weak spark	1. Flame igniter 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

8.5 Fault Diagnosis by Engine Error

Before diagnosis by engine errors, 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.

Then check the following points:

1. Check fuel hoses if 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, then removal work should be done firstly, then go to next diagnosis.

Diagnosis helps:

1. Confirm engine without any trouble record.
2. Confirm there's 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.

Frequent troubles list:

- 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) Starting Failure/Hard Starting

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 35 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	Connect EFI system adapter, turn on ignition switch, check if power supply of ECU pin 35 and 20 is normal; check if pin 63, 64, 111 and 112 work normally.	YES	PDA assistance
		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 (the access point is the front end of the injector inlet line), 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	Check lines or change sensor
		NO	Next step
4	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
5	Connect EFI system adapter, turn on ignition switch, check if power supply of ECU pin 35 and 20 is normal; check if pin 63, 64, 111 and 112 work 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. Engine 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

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(5) Difficult to start in any conditions, normal RPM

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

(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, unsteady idle speed or flameout under partial load (e.g., headlights on)

General failure part: 1. Idle 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	Next step
		NO	Next step
3	Disassemble injector and use special tool to check if there is leakage or blocked or wrong fuel flow.	YES	Replace
		NO	Next step
4	Connect EFI system adapter, turn on ignition switch, check if power supply of ECU pin 35 and 20 is normal; check if pin 63, 64, 111 and 112 work normally.	YES	Use PDA to check
		NO	Repair related circuit

(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 T PS 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 PS 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

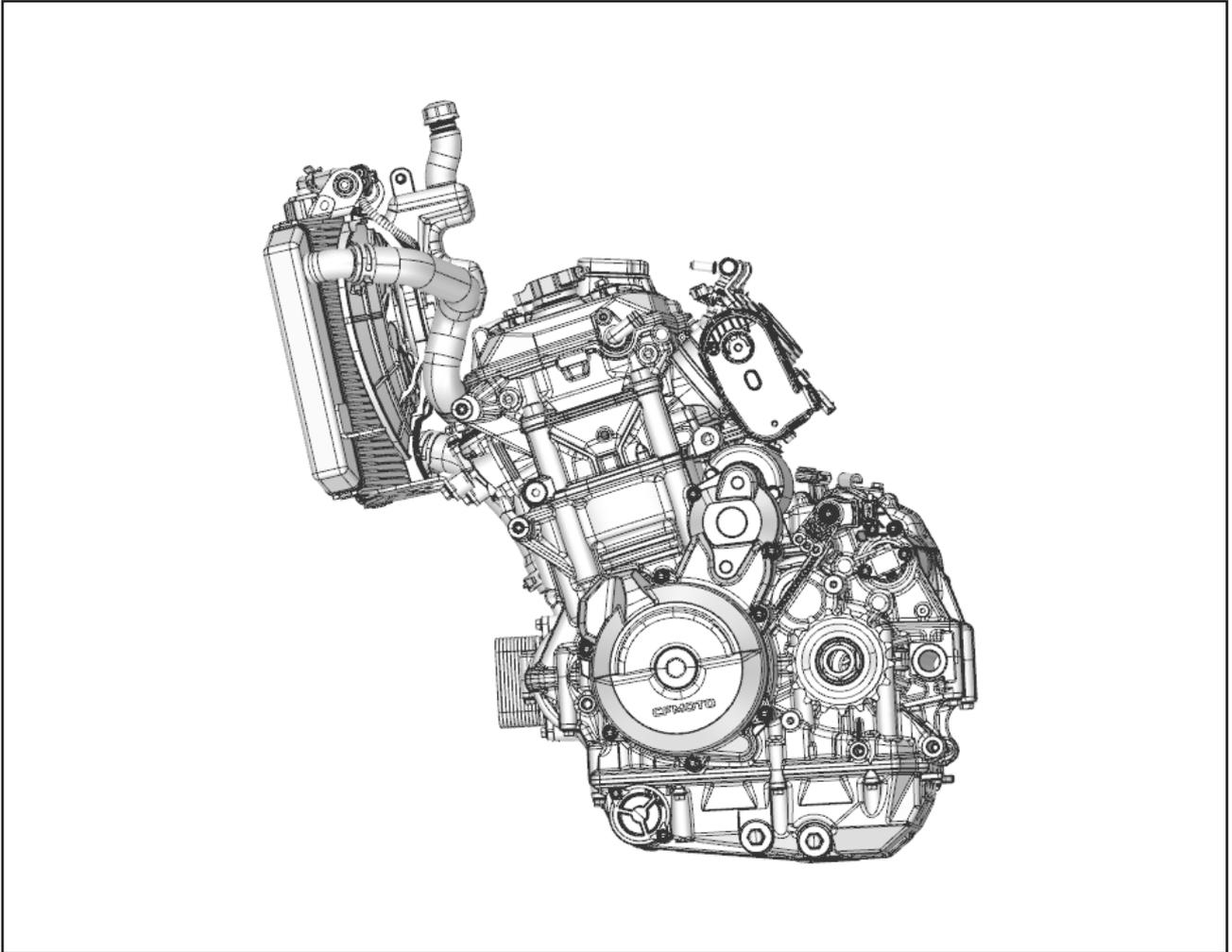
General diagnosis procedures:

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



⚠ DANGER:

Coolant is poisonous. Do not let it touch skin, eyes or clothes. Once swallowed, search medical help immediately. If contacted skin, flush with large amount of water immediately. If contacted eyes, flush with water thoroughly and go see a doctor. Change clothes if splashed. If motor or radiator become rusty, the corrosion residue must be dealt with by procedure, the chemical substances are bad for human.

⚠ CAUTION:

If tap water is added to the cooling system, scale will accumulate inside the cooling system. When the temperature is below zero, ice generate and cooling system will be seriously affected.

The bottled antifreeze sold on the market has added anti-rust, decay agent. When it is diluted, it will lose the ability to resist rust and decay. Antifreeze must be diluted at the concentration specified by the manufacturer.

When coolant is added to the cooling system, it is green in color and contains ethylene glycol. When the ambient temperature is -35°C , use a coolant with a freezing point below -35°C .

⚠ WARNING:

Never open the radiator cap, tube, resevoir or other parts of cooling system when the engine is still hot. Otherwise, the vapor or hot coolant will cause injury. Once caused burn injuries, flush under flowing water tap at least 10 min to relieve the pain then see a doctor.

9.2 Cooling System Assembly Removal

Place a container under the pump.

Remove drain bolt **1**.

Drain coolant.

Release clamp **2**.

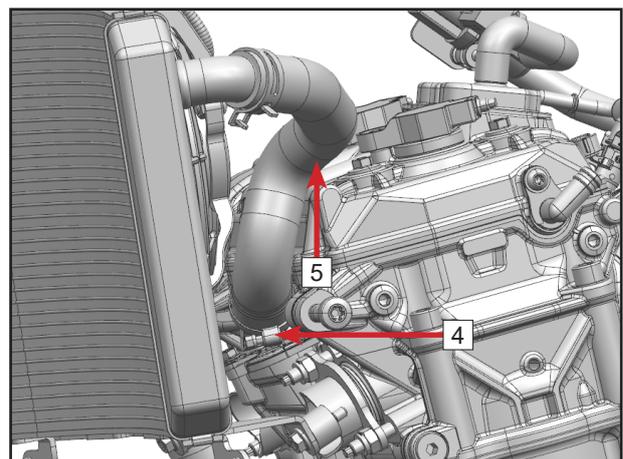
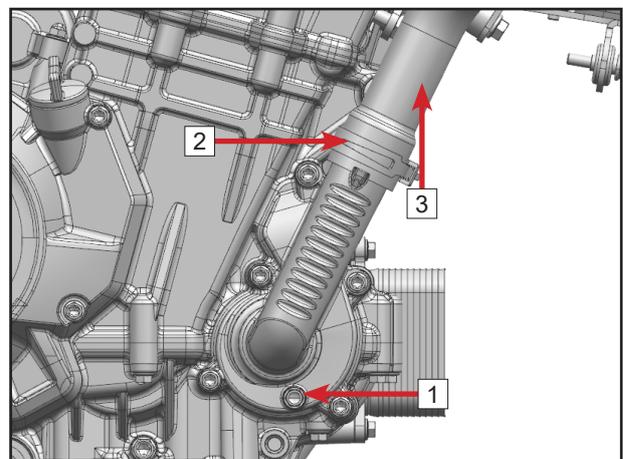
Remove fluid outlet pipe **3**.

NOTE: After the outlet pipe is removed, a small amount of coolant will continue to flow out of the pipe.

NOTE: There is a certain pressure in the cooling system, and when the drain bolt is removed, the coolant will shoot out for a long distance.

Release clamp **4**.

Remove fluid intake pipe **5**.



Remove bolts [1].

Remove bolts on both sides. [2].

Remove radiator [3].

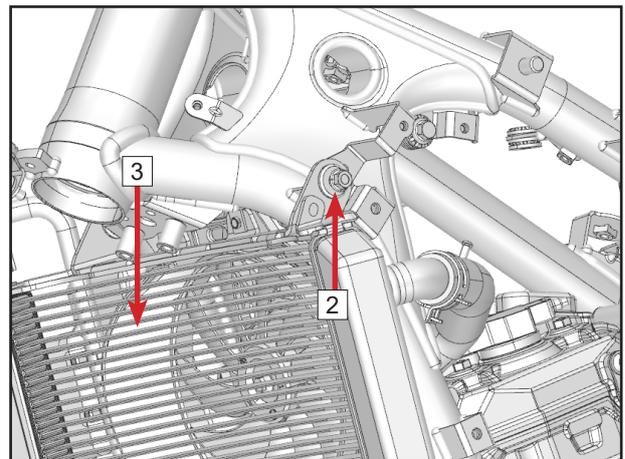
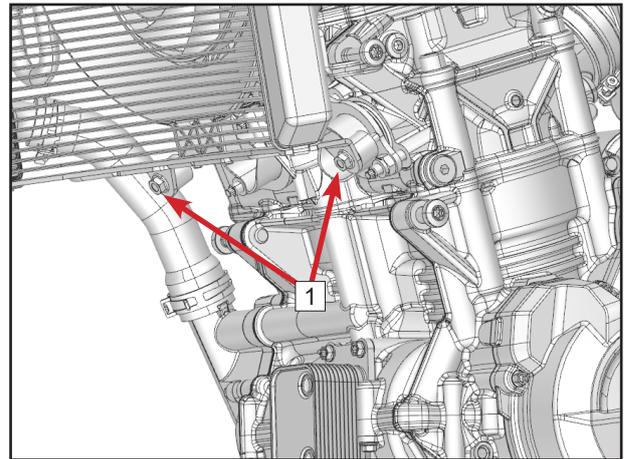
Installation

Installation takes place in reverse order of disassembly.

9.3 Engine Coolant

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

⚠ WARNING:
Use high-quality distilled water and glycol antifreeze mixture, do not mix with ethanol mixture or other brands of antifreeze.
Mixing ratio should not exceed 60% or less than 50%.
Do not use leak-proof additives.



9.4 Inspection of Cooling Cycle Sealing

Radiator cap inspection

Remove radiator cap.

Measure the open pressure of radiator cap with pressure gauge.

If the pressure cap does not meet standard, replace with a new part.

Radiator Cap Open Pressure

135kPa~160kPa

1.35kgf/cm²~1.6kgf/cm²

19.58psi~23.2psi

Standard::

140kPa

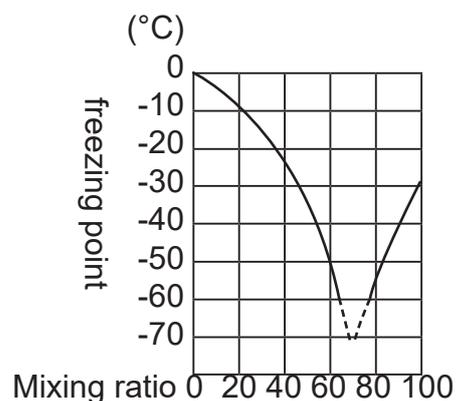
1.4kgf/cm²

20.3psi

Sealing inspection

Connect the tester to the connecting port of the reservoir.

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



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

Inflate to 135 kPa, 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.

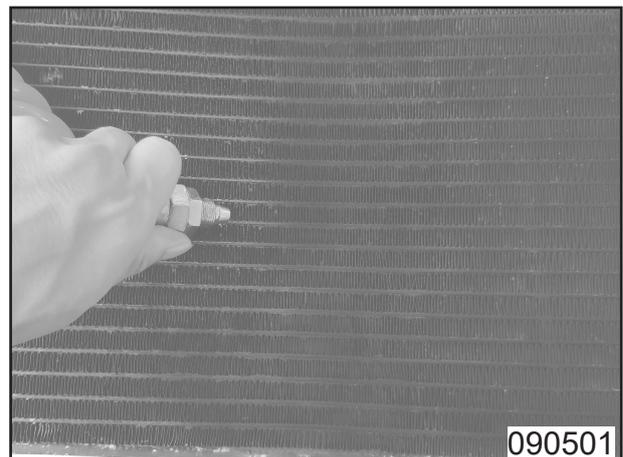
NOTE: When removing the gauge, cover radiator cap with cloth, in case the coolant spills out.

NOTE: The testing pressure does not exceed the open pressure.

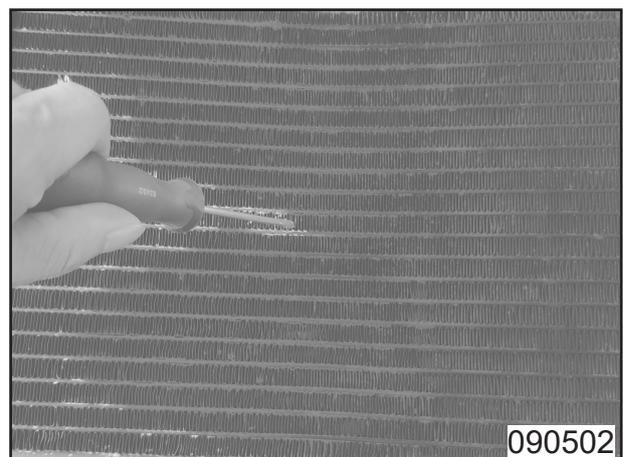
9.5 Radiator and Water Pipe Inspection and Cleaning

Radiator inspection and cleaning

Remove dirt and dust from the radiator with high-pressure air.



Repair radiator fins with a small screwdriver.



Radiator Water Pipes Inspection

Inspect radiator water pipes for leakage, damage. Replace if necessary.

Inspect radiator water pipe clamps. Replace if loose.

After checking the radiator and water pipe, check the coolant and add coolant if necessary.

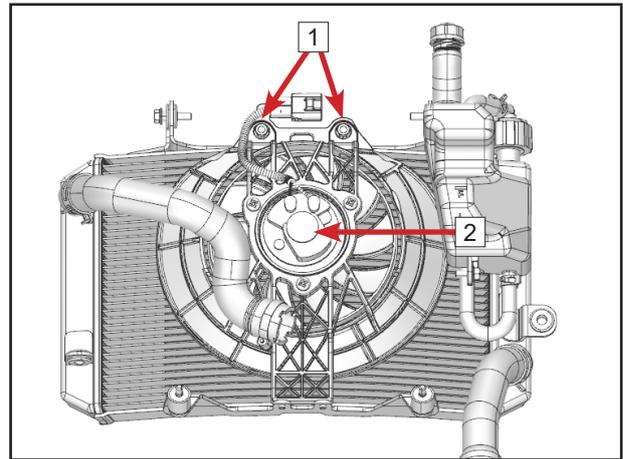
9.6 Fan Motor Inspection

Remove bolt [1].

Remove fan motor assembly [2].

Rotate the blade by hand to check its rotation flexibility and integrity. If the blade rotation is stuck or damaged, replace the fan motor assembly [2].

Battery voltage 12V, motor running at full speed, ammeter current does not exceed 5A. If the motor does not rotate or the current exceeds the specified amount, replace with a new fan motor assembly [2].



Installation

Installation takes place in reverse order of disassembly.

9.7 Coolant Inspection

Use side stand to support the vehicle on level ground.

Check the coolant level of the reservoir after confirming that the coolant is completely cooled.

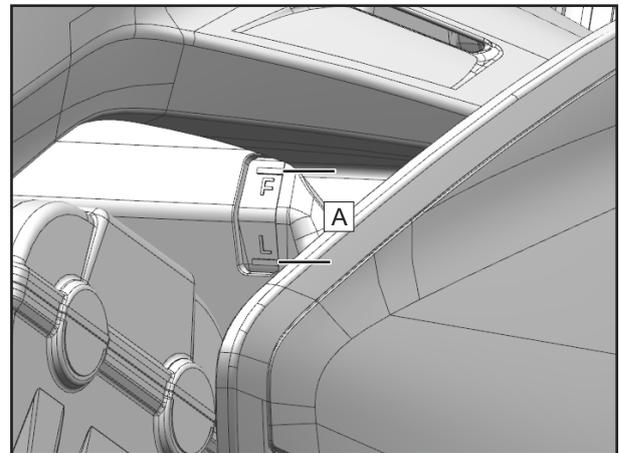
Coolant level should be at [A].

If above [A], drain excess coolant to [A].

If lower than [A], add coolant til [A].

⚠️ WARNING:

Never open the radiator cap, tube, reservoir or other parts of cooling system when the engine is still hot. Otherwise, the vapor or hot coolant will cause injury. Once caused burn injuries, flush under flowing water tap at least 10 min to relieve the pain then see a doctor.



9.8 Coolant Addition

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

⚠ WARNING: If the coolant needs to be replenished frequently, or if the coolant in the reservoir is frequently drained, there may be a leak in the cooling system, contact your dealer to check the cooling system.

It is only recommended to use the original coolant of CFMOTO, different coolants may cause motor damage after mixing, contact your dealer to replace the coolant.

9.9 Coolant Replacement

Use side stand to support the vehicle on level ground.

Put a container under the pump.

Remove the drain bolt **1**.

Release radiator pressure cap.

Discharge coolant.

Reinstall drain bolt.

Open radiator pressure cap **2**.

Use a funnel to fill the coolant.

Remove the drain bolt until the coolant is discharging stably and tighten the drain bolt immediately.

Continue to fill the coolant to the radiator filling port.

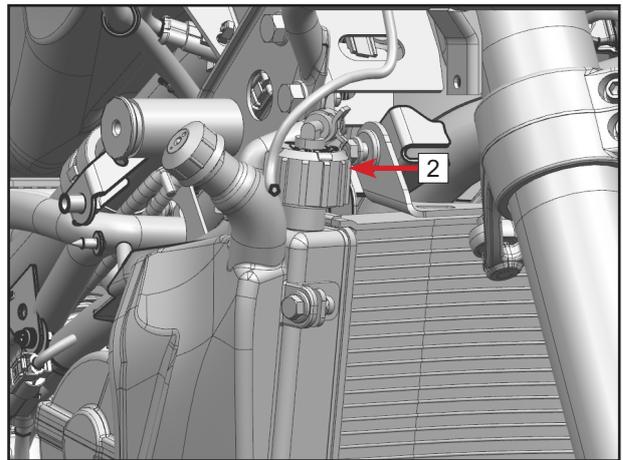
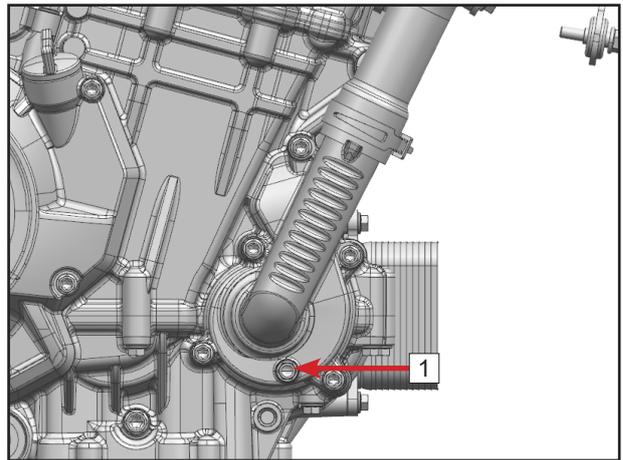
Reinstall the pressure cap.

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

Install the reservoir cover.

Idle the engine for 2~3 minutes.

Recheck coolant level after cooling the machine.



10 Exhaust System

10.1 Muffler Disassembly.....	10-2
10.1.1 Exhaust Pipe.....	10-2
10.1.2 Rear Muffler Body	10-4
10.2 Exhaust Pipe Inspection	10-4

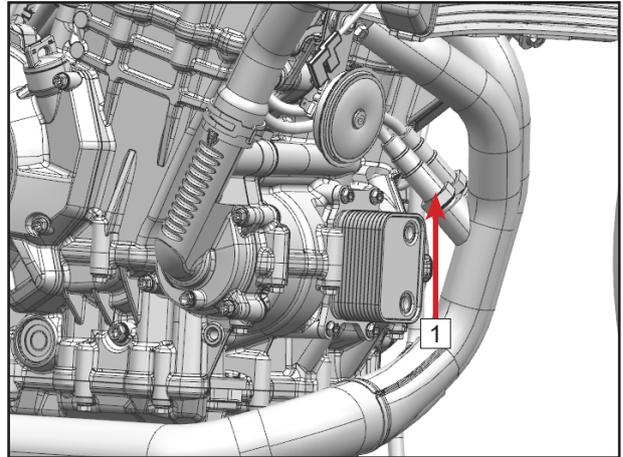
⚠ DANGER: The temperature of the muffler is very high after the engine has run. When removing and repairing the muffler, the vehicle must not be parked near flammable and explosive materials, which may ignite or detonate the flammable and explosive materials. Do not operate the muffler and other high-temperature 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 Disassembly

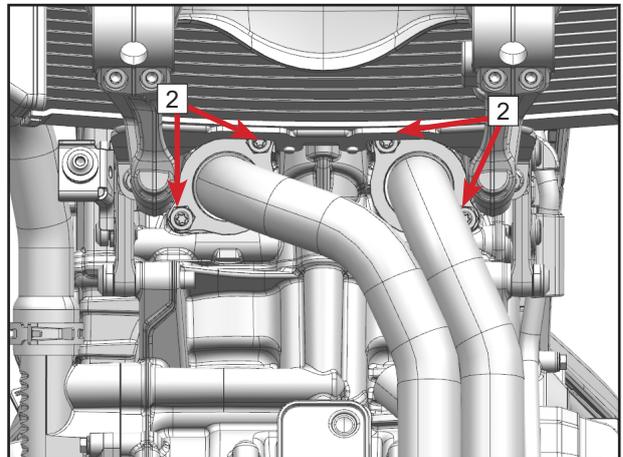
10.1.1 Exhaust Pipe

Disconnect oxygen sensor connector **1**.

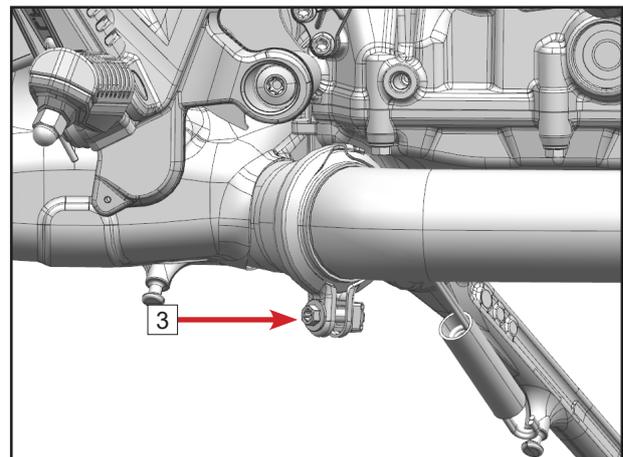
NOTE: Mark the oxygen sensor terminals so that they correspond to the "L" and "R" marks on the connector.



Remove nuts **2**.

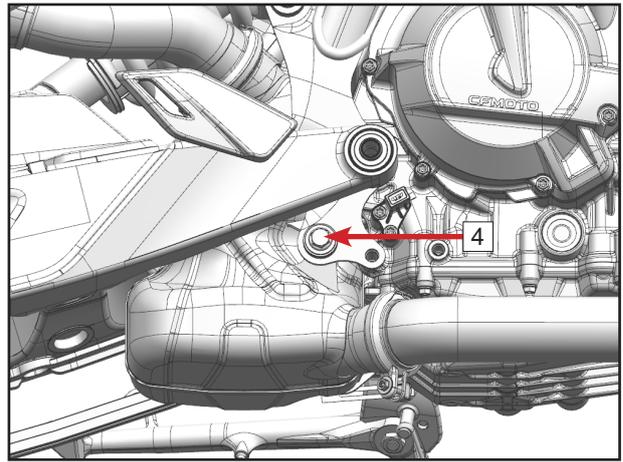


Remove clamp **3**.

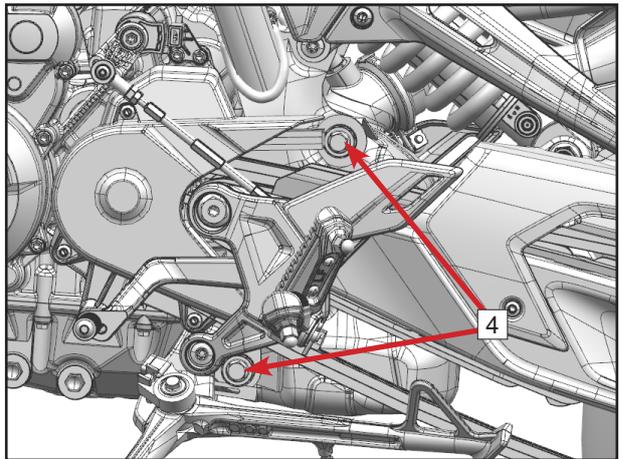


10 Exhaust System

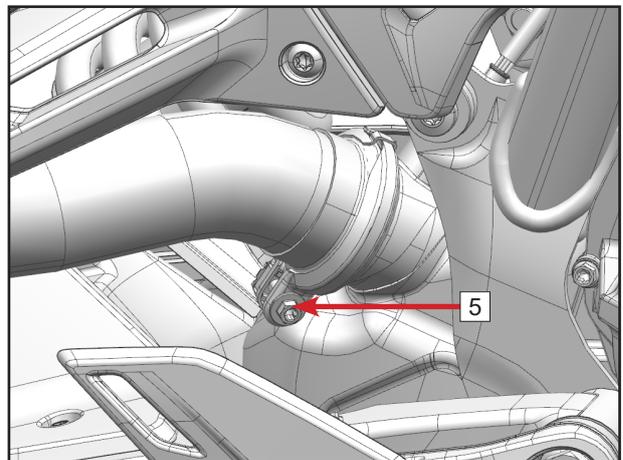
Remove bolt **4**.



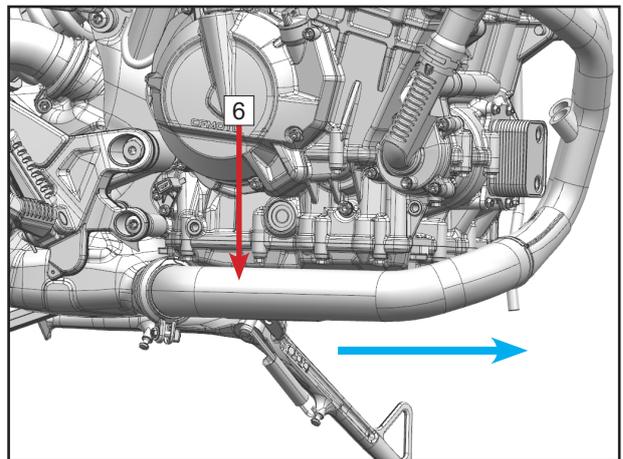
Remove bolts **4**.



Remove clasp **5**.



Remove the exhaust pipe to the front of the vehicle **6**.

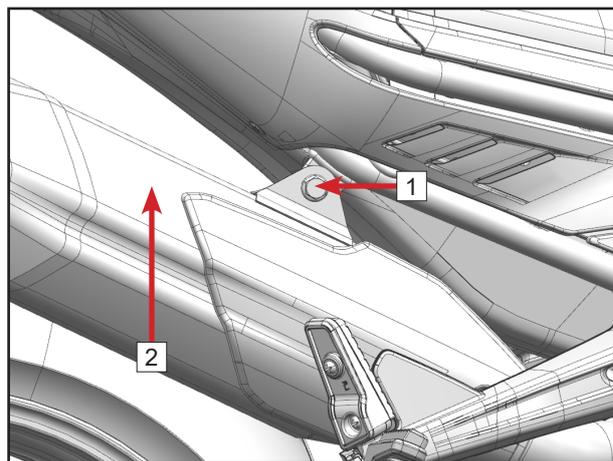


10.1.2 Rear Muffler Body

Remove inner hex bolt [1].

Remove rear muffler body [2].

NOTE: When disassembling, hold the end of the muffler steady to prevent it from falling suddenly



10.2 Exhaust Pipe Inspection

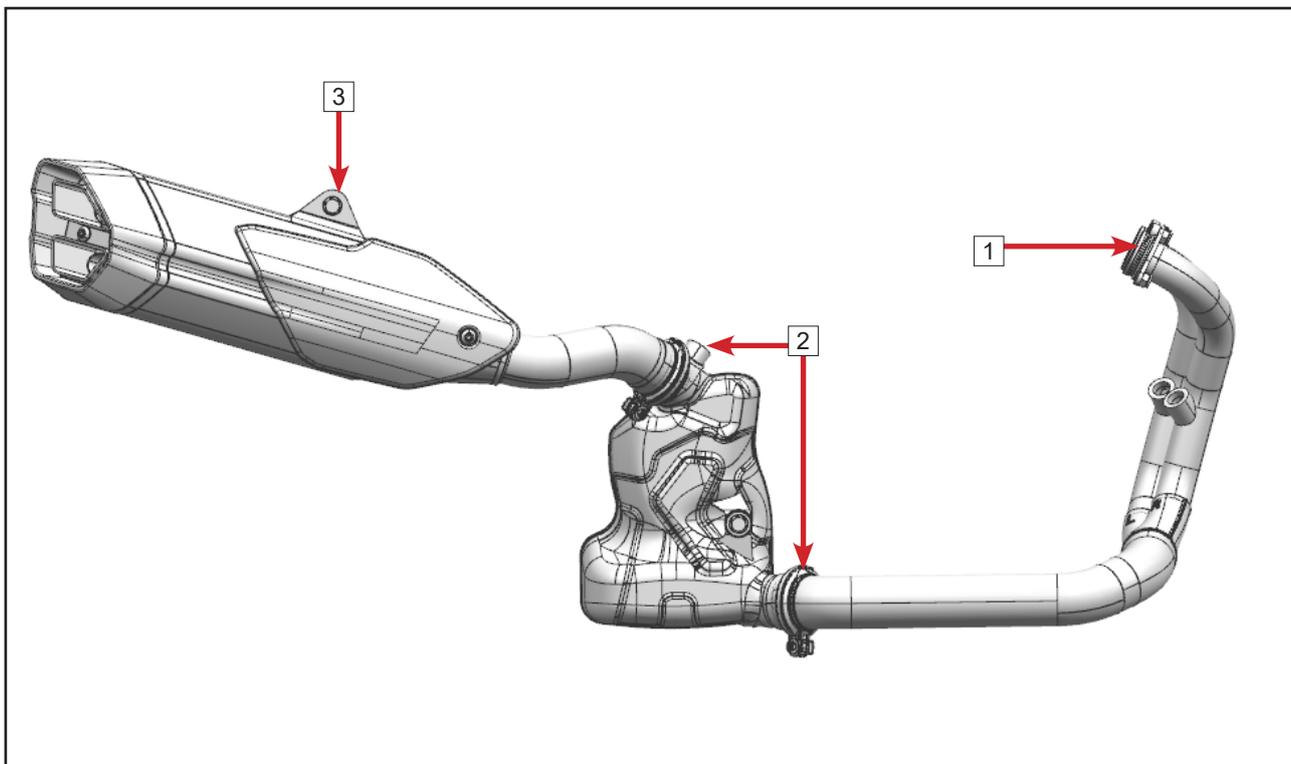
Check the appearance of the exhaust pipe for damage, if the exhaust pipe is broken, replace with new parts.

Check the exhaust pipe graphite sealing sleeve [1].

Check the exhaust gasket [2].

If there is corrosion, crack or deformation, replace with new parts.

Check the three buffer sleeves [3], if there are cracks, corrosion and other conditions, replace with new parts.



11 Wheels and Brake System

11.1 Front Brake Caliper	11-2
11.2 Front Wheel	11-2
11.3 Rear Wheel	11-3
11.4 Rear Brake Caliper.....	11-4
11.5 Brake Master Cylinder.....	11-5
11.6 ABS Execution Unit.....	11-5
11.7 Hand Brake Master Cylinder Assembly	11-6
11.8 Wheel Inspection	11-6
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11.8.2 Tire Appearance	11-7
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11.9 Brake System Inspection	11-9
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11.9.4 Brake Caliper and Brake disc Inspection.....	11-12
11.10 Free Play	11-13
11.10.1 Front Brake Lever Free Play.....	11-13
11.10.2 Rear Brake Pedal Free Play	11-13

NOTE: Before removing the tires, reinstall the center support/side stand or use a bracket to support the vehicle so that the front/rear wheels are off the ground

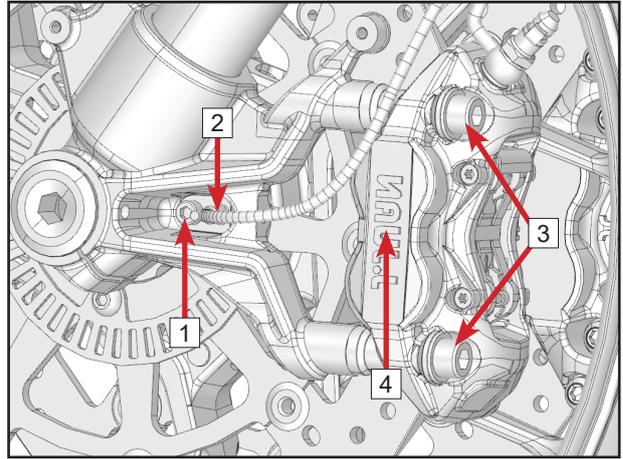
11.1 Front Brake Caliper

Remove bolt **1**.

Remove speed sensor **2**.

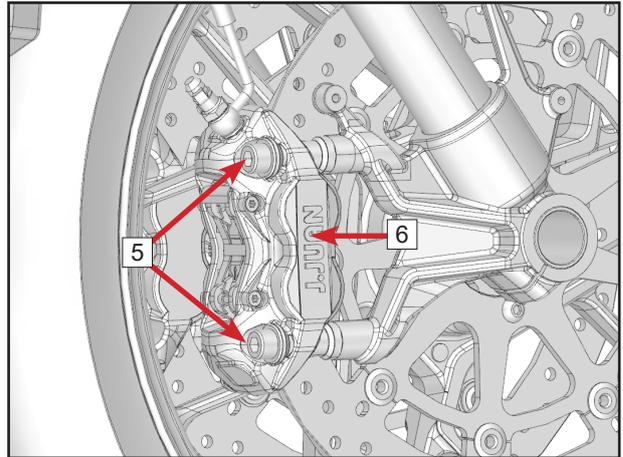
Remove bolts **3**.

Remove LH front brake caliper **4**.



Remove bolts **5**.

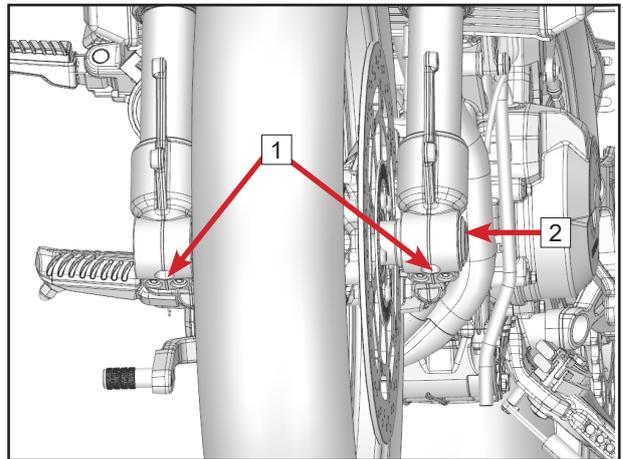
Remove RH front brake caliper **6**.



11.2 Front Wheel

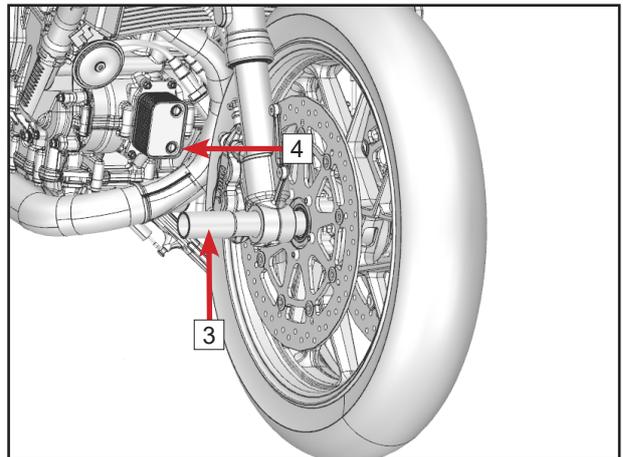
Remove bolts **1**.

Remove nut **2**.



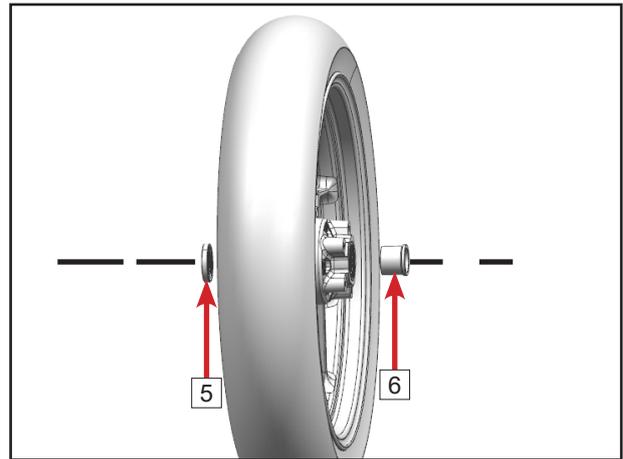
Push out front wheel shaft **3**.

Remove front wheel **4**.



11 Wheels and Brake System

Do not lose front wheel shaft bushing [5] and [6].

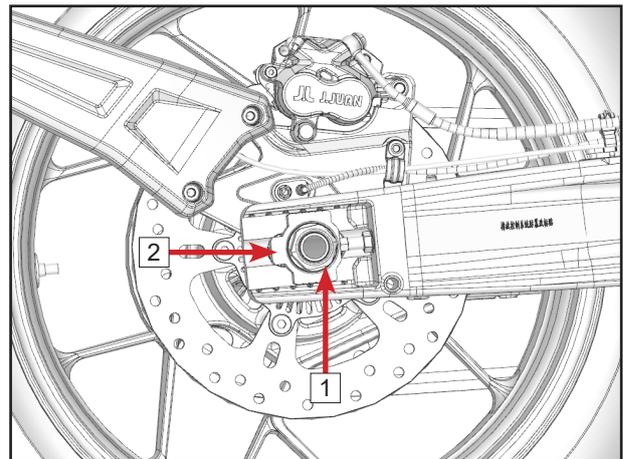


11.3 Rear Wheel

Removal

Remove nut [1].

Remove adjusting block [2].



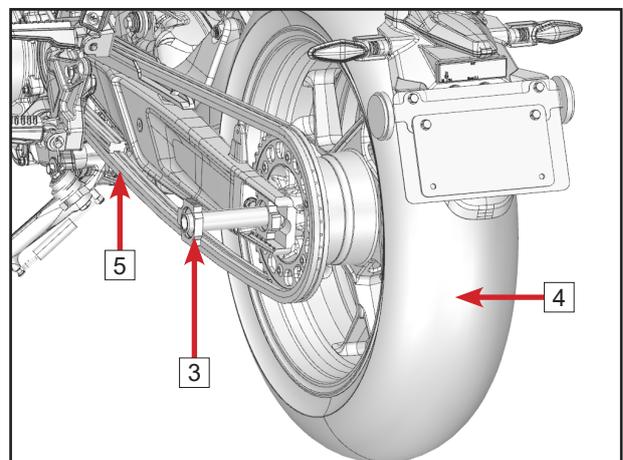
Push out rear wheel shaft [3].

Push the rear wheel [4] towards the front of the vehicle.

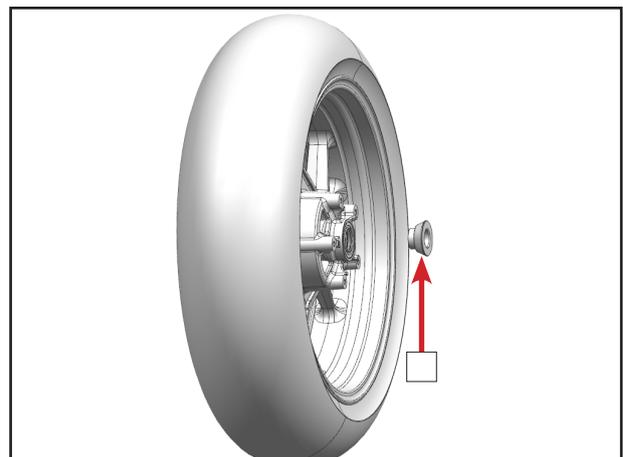
Remove the chain [5] from the sprocket.

Remove rear wheel [4].

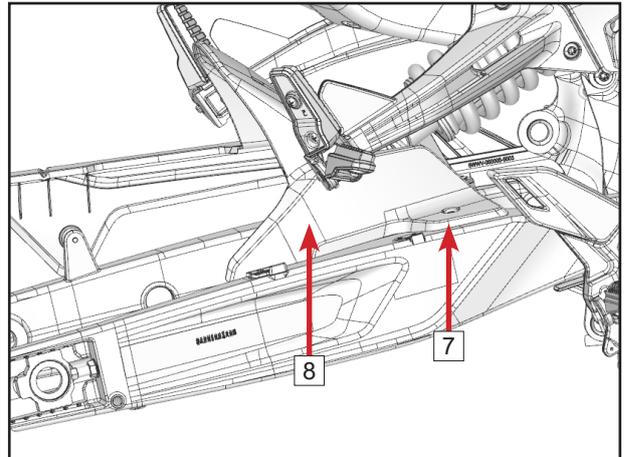
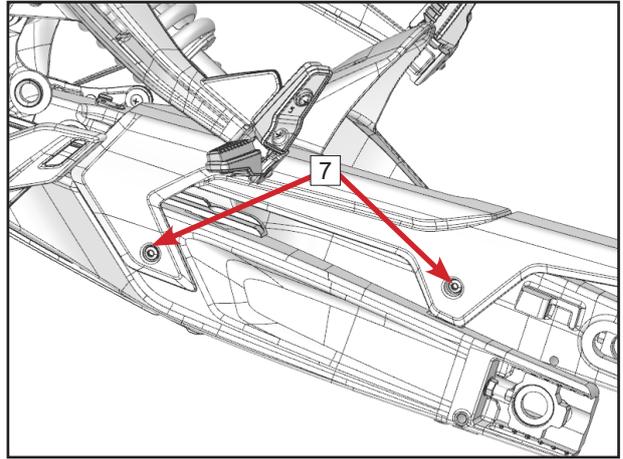
⚠ CAUTION: Tilt the tire slightly to the right when taking out the rear wheel to prevent the sprocket seat from falling off and hitting it.



Do not lose rear wheel RH shaft bushing [6].

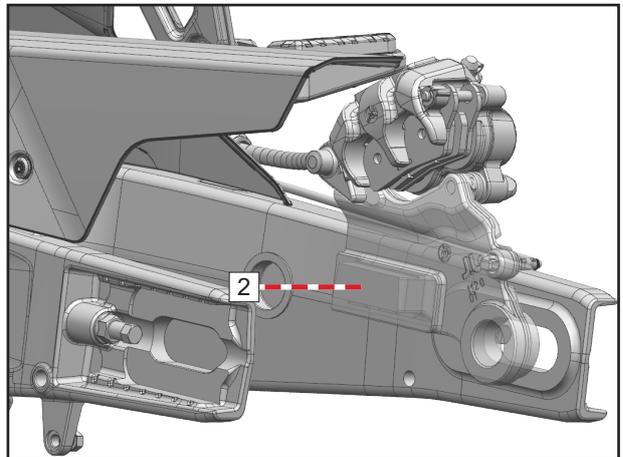


Remove bolts **7**.
Remove rear fender **8**.

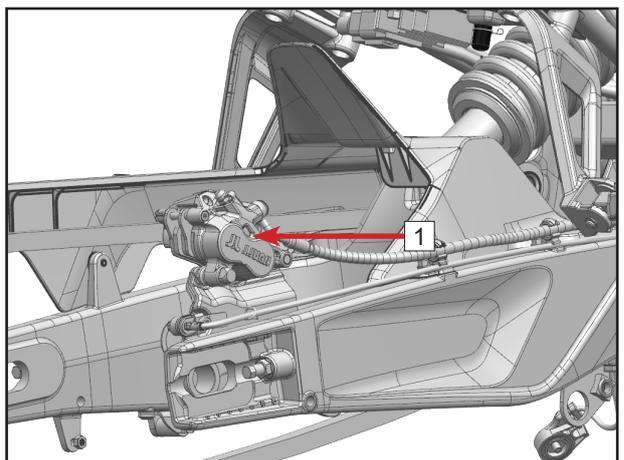


11.4 Rear Brake Caliper Removal

Remove rear brake caliper from limit block **2**.



Remove rear brake caliper **1**.



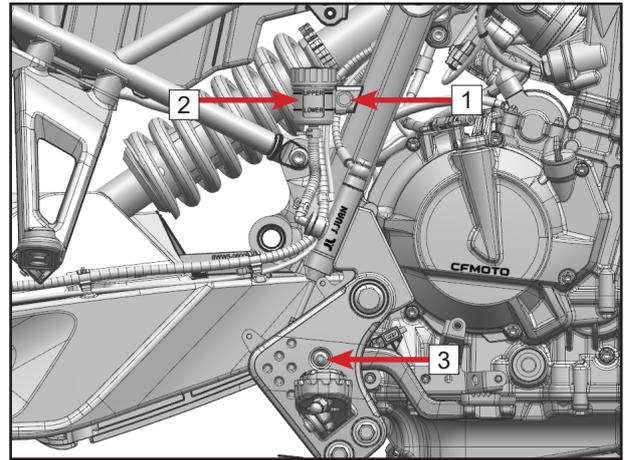
11 Wheels and Brake System

11.5 Brake Master Cylinder

Remove bolt [1].

Remove rear brake reservoir [2].

⚠ CAUTION: The brake reservoir should not be inverted to prevent air from entering the brake line and causing brake system failure.

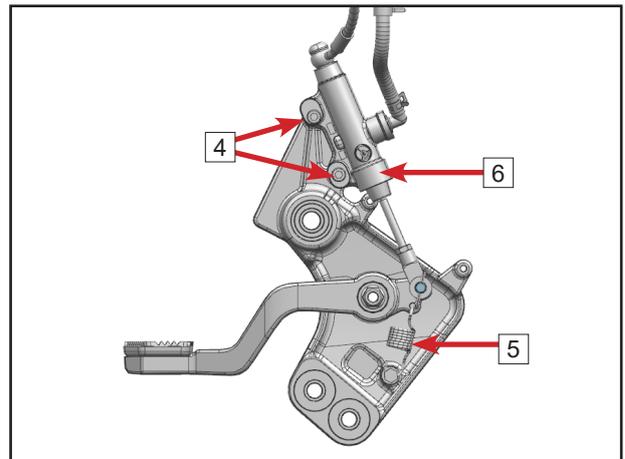


Remove bolt [3].

Remove bolts [4].

Remove spring [5] carefully.

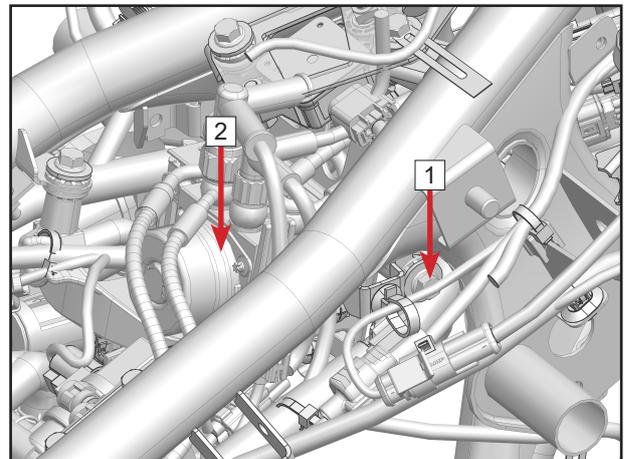
Remove brake master cylinder [6].



11.6 ABS Execution Unit

Remove bolts and gaskets on both sides [1].

Remove ABS execution unit [2].



11.7 Hand Brake Master Cylinder Assembly

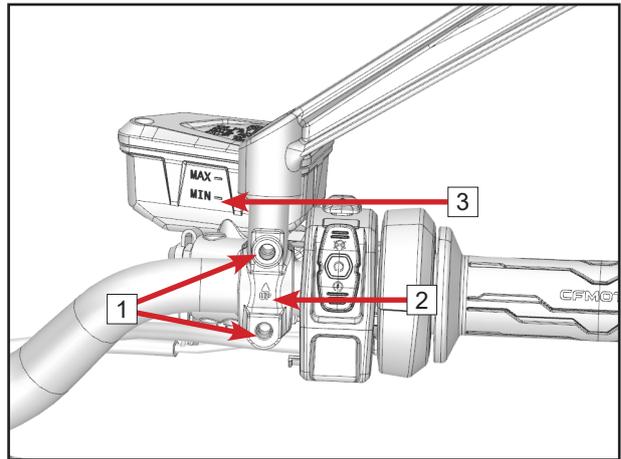
Removal

Remove bolts [1].

Remove cover [2].

Remove rearview mirror and hand brake master cylinder assembly [3].

⚠ CAUTION: The brake reservoir should not be inverted to prevent air from entering the brake line and causing brake system failure.



Remove brake system as a whole set.

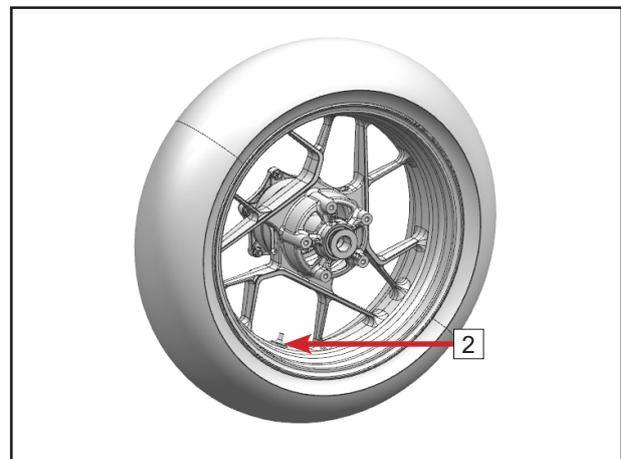
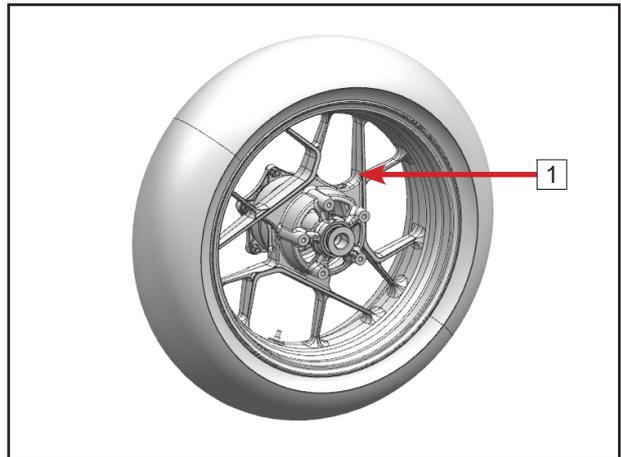
11.8 Wheel Inspection

CAUTION: Tire removal must involve using a special tire pressing tool, when picking tires, avoid the valve to prevent damage to the tire pressure sensor.

Inspect the rim [1] for damage such as twisting, fractures, cracks, etc. and replace the rim if necessary.

If equipped with a tire pressure sensor:

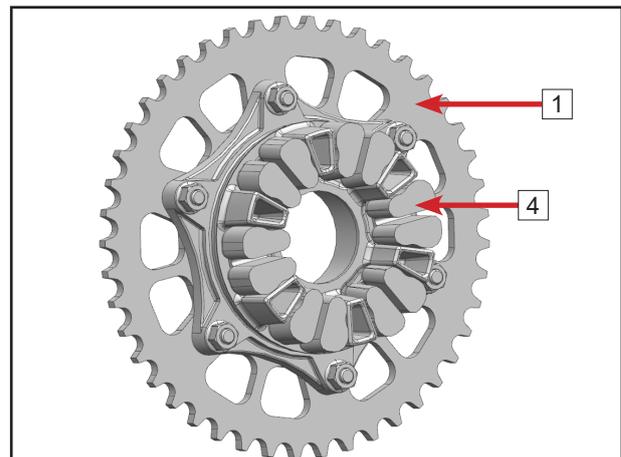
Check whether the valve [2] of the tire pressure sensor is broken and leaking, the vehicle uses tire pressure sensor, if the valve is broken or tire pressure display is not normal, replace the tire pressure sensor with a new one.



Check if the six rubber dampers [4] are aging or broken. If so, replace.

Check whether the sprocket seat [1] and rear sprocket are worn or broken. If so, replace.

Check if the sprocket seat or rear sprocket is worn or broken, if so, replace.



11 Wheels and Brake System

11.8.1 Tire Pressure

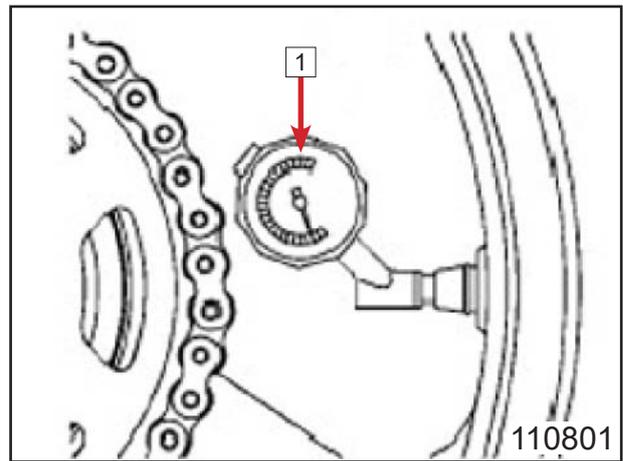
Remove tire inflation valve cap.

Measure the tire pressure with air gauge **1** when it is cool.

pressure	single
Front wheel	225kPa
Rear wheel	250kPa

Adjust the tire pressure according to the standard if necessary.

Install tire inflation valve cap.

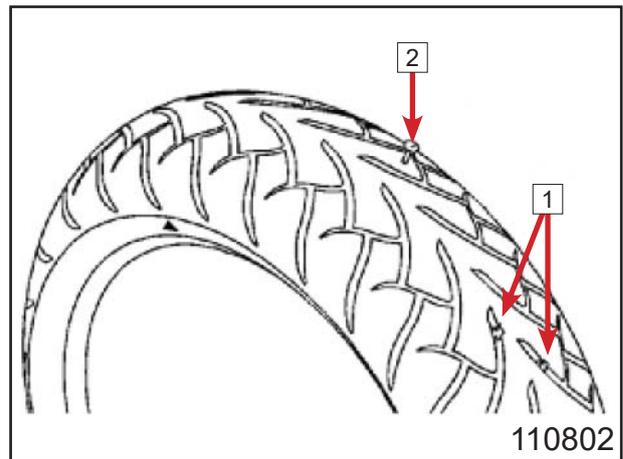


11.8.2 Tire Appearance

Clean the embedded stone **1** or other inclusions **2** on tires.

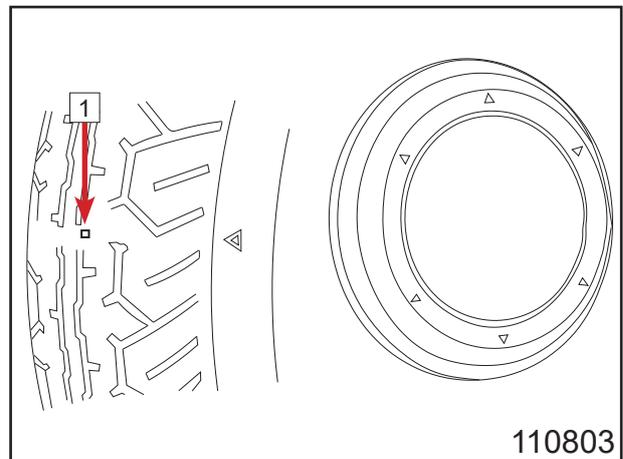
Inspect the tire for cracks or damages by watching it. Replace if any defect is found.

If tire expands or has bulges on it, replace with a new tire.



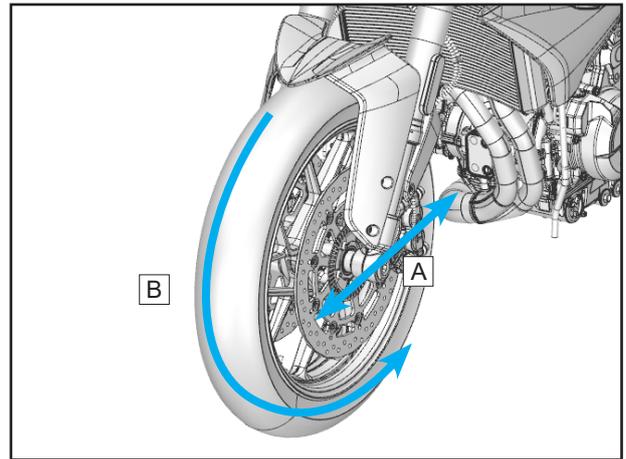
Inspect tire for wear condition. The tire may be punctured or damaged if beyond service limit. Majority of the tire accidents happen due to exceeding service limit. Pay attention not to use the tire if the pattern is worn in case of injury.

When the tire thread wears to the block **1** height, replace a new tire is a must.

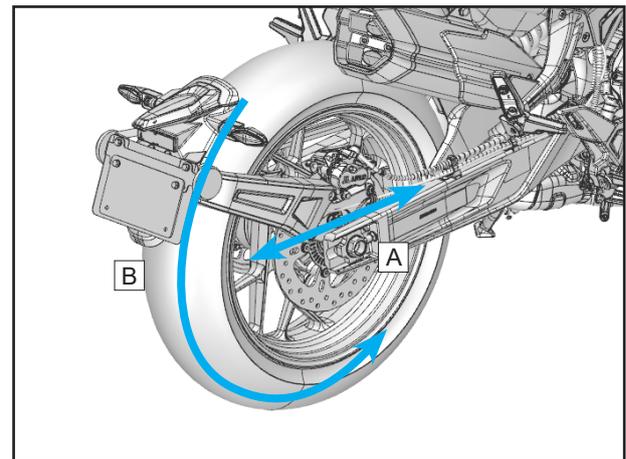


11.8.3 Wheel Bearing

Lift the front wheel off the ground.
Inspect the front wheel bearing for damage by pushing or pulling the wheel **A**.
Rotate the front wheel **B** gentle but fast to inspect smoothness and noise.
Replace bearing if any defect is found.



Lift the rear wheel off the ground.
Inspect the rear wheel bearing for damage by pushing or pulling the wheel **A**.
Rotate the rear wheel **B** to inspect the for the smooth movement and noise.
Replace bearing if any defect is found.



11.9 Brake System Inspection

⚠️WARNING:

Brake fluid can irritate the skin.

Keep the brake fluid out of reach of children.

Do not let brake fluid contact skin, eyes or clothing. Wear protective gears and goggles during operation.

If swallow brake fluid by accident, seek for medical attention immediately.

If you get brake fluid on skin, rinse contact area with clean water immediately.

If you get brake fluid in your eyes, immediately wash it off and seek for medical attention.

If you spill brake fluid on your clothing, change your clothing.

11.9.1 Hand Master Cylinder Inspection Front Brake Fluid Level Inspection

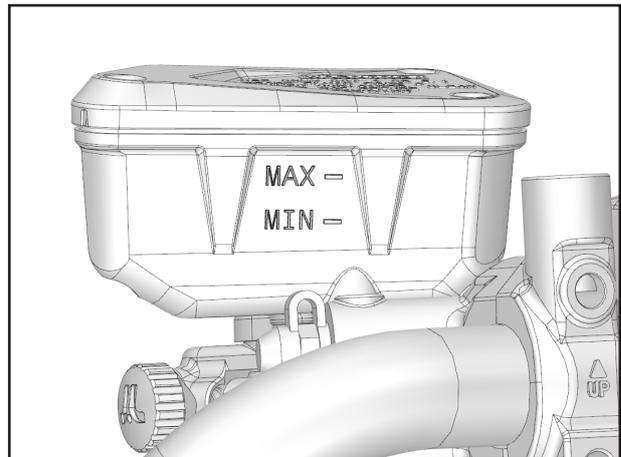
Straighten the vehicle to make the brake fluid reservoir parallel the ground.

Check the fluid level.

If the fluid level is above the reservoir gasket, 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 below MIN, add brake fluid to between MAX and MIN.



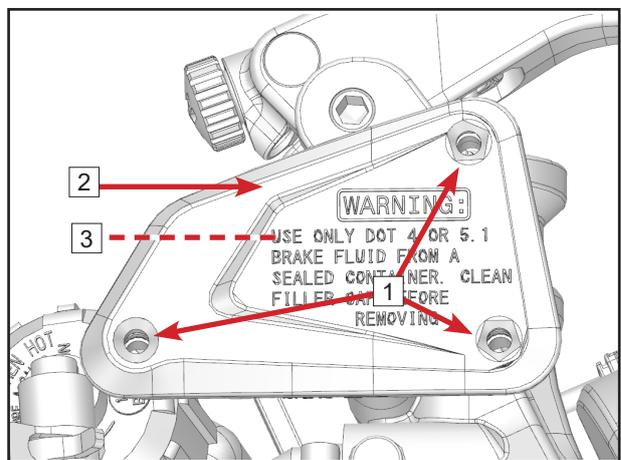
Brake Fluid Replacement

Remove four screws [1].

Remove reservoir cap [2].

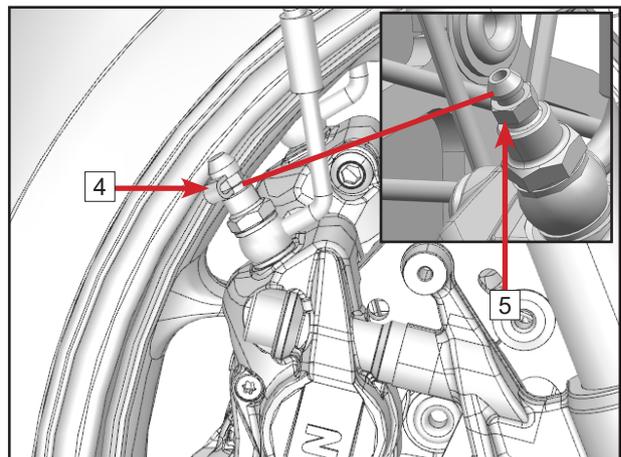
Remove reservoir gasket [3].

NOTE: Reservoir gasket may be sunk due to negative pressure caused by brake fluid reducing. It doesn't affect normal use but needs to be restored during installation.



Open air-bleed bolt rubber cap [4].

Connect a clean hose with air-bleed bolt [5] with other side into a container.



Repeatedly press and release **A** brake handle until it feels hard.

Loose air-bleed bolt **5** a little bit.

Wait for brake fluid stops draining or brake handle feels soft.

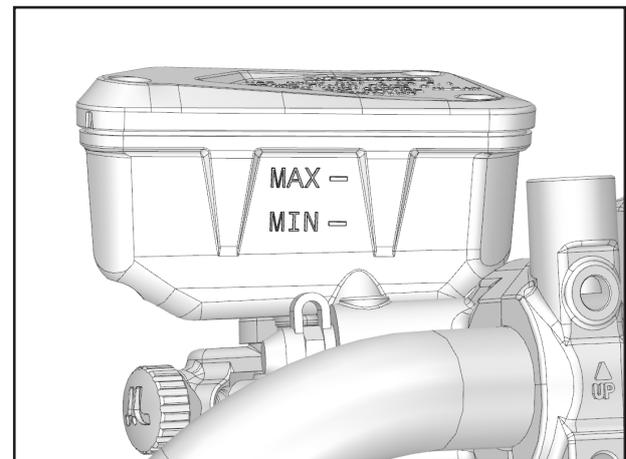
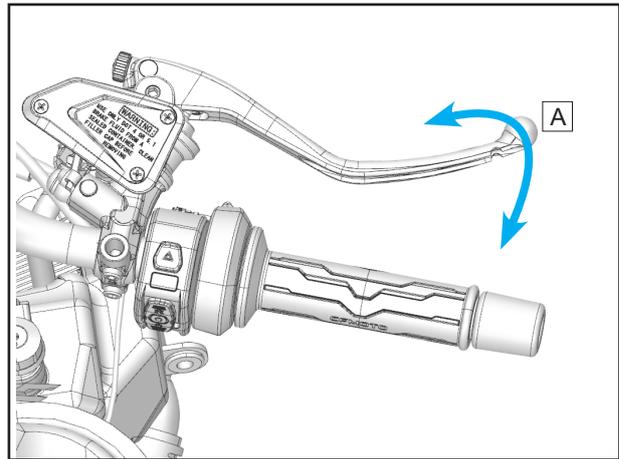
Tighten air-bleed bolt.

Add brake fluid.

Repeat the above procedures until the new brake fluid sprays out.

⚠ WARNING: Keep brake fluid level above LOWER, in case air gets into brake system, which results in brake system failure and injury.

⚠ WARNING: If there is air inside of brake system, replace brake fluid repeatedly until there is no air in drained brake fluid.



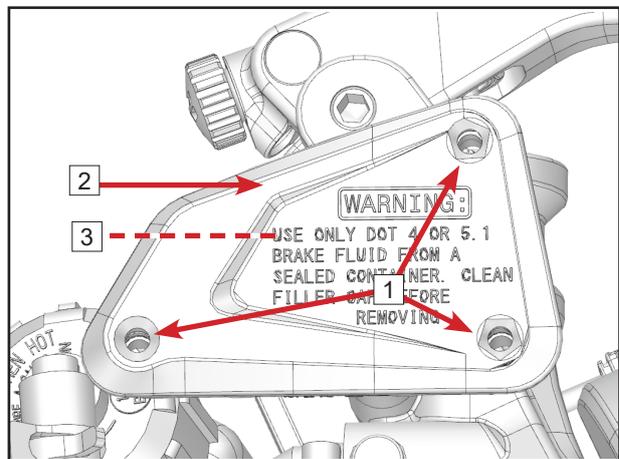
Brake Fluid Addition

Add brake fluid until the level is between gasket and MIN.

Install reservoir gasket **3**.

Install reservoir cap **2**.

Install four screws **1**.



11.9.2 Rear Brake Master Cylinder Inspection

Rear Brake Fluid Level Inspection

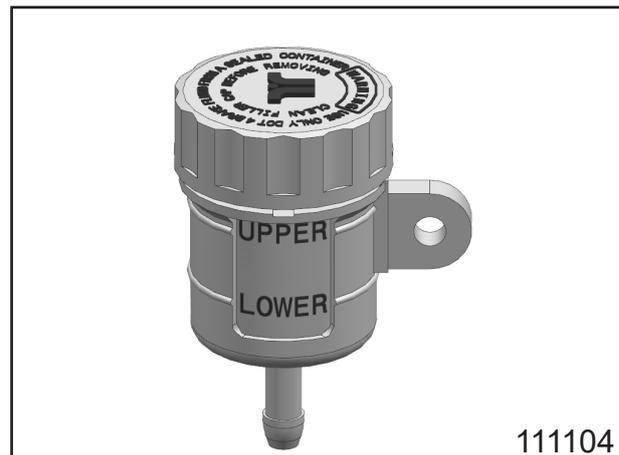
Straighten the vehicle to make the brake fluid reservoir parallel the ground.

Check the fluid level.

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.



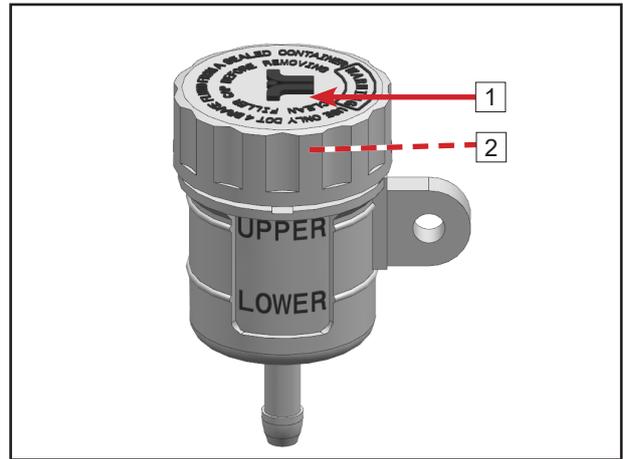
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Brake Fluid Replacement

Remove reservoir cap [1].

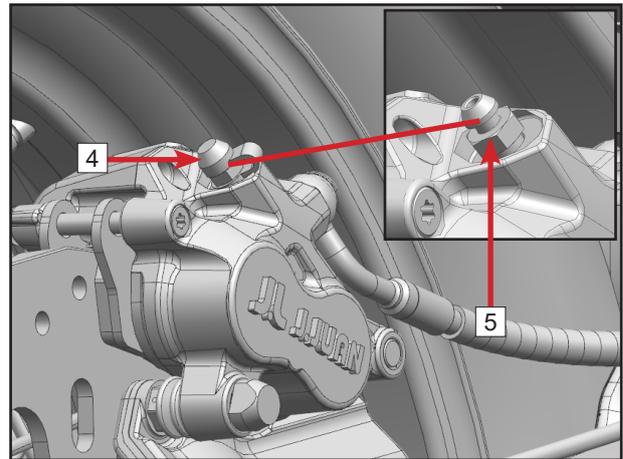
Remove reservoir gasket [2].

NOTE: Reservoir gasket may be sunk due to negative pressure caused by brake fluid reducing. It doesn't affect normal use but needs to be restored during installation.



Open air-bleed bolt rubber cap [4].

Connect a clean hose with air-bleed bolt [5] with other side into a container.



Repeatedly depress and release the brake lever [A] until it feels very hard and then depress the brake lever.

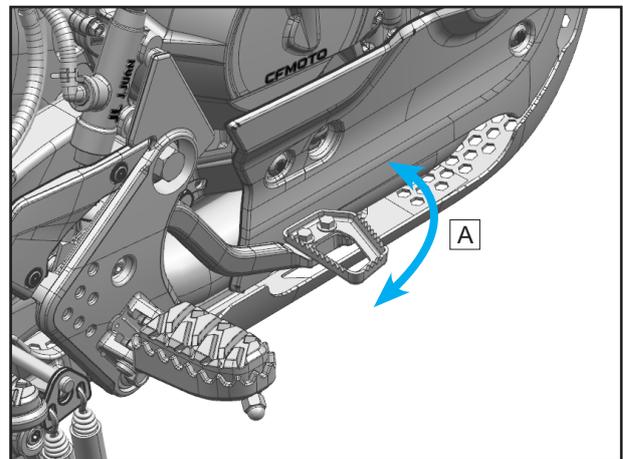
Loose air-bleed bolt [5] a little bit.

Wait for brake fluid stops draining or brake handle feels soft.

Tighten air-bleed bolt.

Add brake fluid between UPPER and LOWER.

Repeat the steps from "depress and release lever" to "retighten the air-bleed bolt" until fresh brake fluid is sprayed.



⚠ WARNING: Keep brake fluid level above LOWER, in case air gets into brake system, which results in brake system failure and injury.

⚠ WARNING: If there is air inside of brake system, replace brake fluid repeatedly until there is no air in drained brake fluid.

Brake fluid addition

Add brake fluid to between UPPER and LOWER.



Install reservoir gasket [3].

Install reservoir cap [2].

11.9.3 Brake Hose Inspection

Inspect brake hose, connectors and pipes for damage, cracks or leaking.

With improper maintenance, the high pressure inside the brake hose can cause fluid leaking [A] or hose burst.

Inspect brake hose for bending or twist. Replace with new hoses and pipes if crack [B], bulge [C] or leaking detected.

Tighten all the brake hose connecting bolts and nuts.

Inspect brake hose route. Reset the hose route if not proper or correct.

11.9.4 Brake Caliper and Brake disc Inspection

Front Brake Caliper

Remove brake caliper.

Inspect each brake pad thickness.

MIN brake pad thickness service limit: 2.5mm

Replace brake pads before it reaches to service limit. Replace brake pads in set.

Inspect brake pads for deep scratches or other damages. Replace if any defect is found.

⚠ WARNING: Do not run the vehicle right after replacing new brake discs or pads. Do break-in on brake pads. Operate the brake lever several times until brake pad and brake caliper engage well.

Front Brake Disc

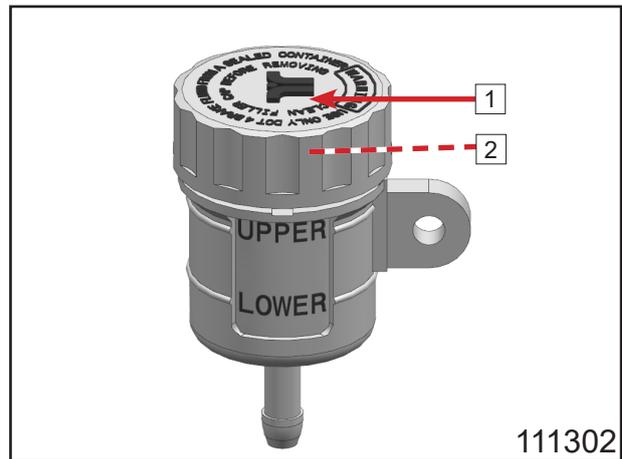
Inspect brake disc thickness.

MIN front brake disc thickness service limit: 3mm

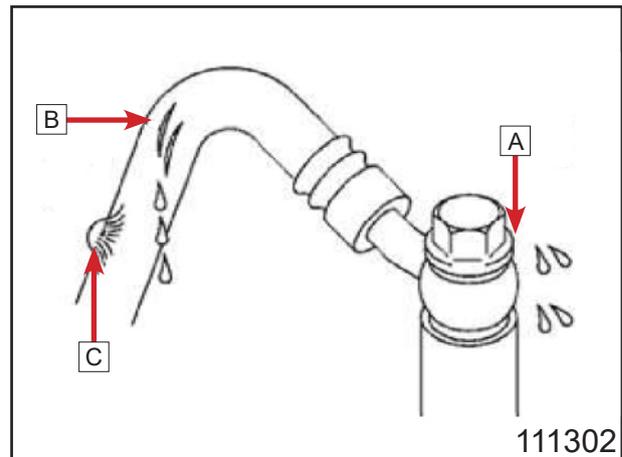
MIN rear brake disc thickness service limit: 4mm

Replace brake discs before it reaches to service limit.

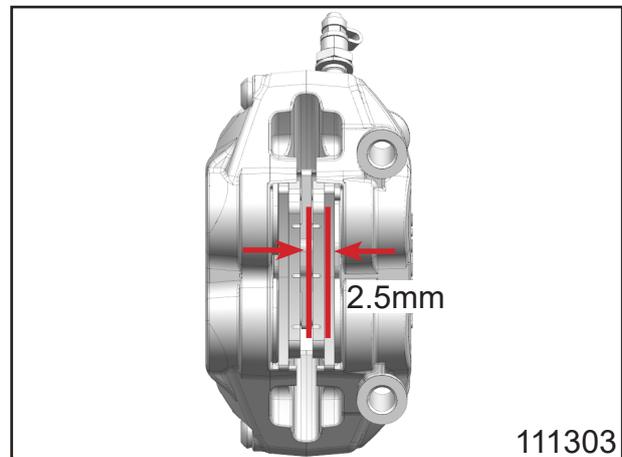
Inspect brake discs for deep scratches or other damages. Replace if any defect is found.



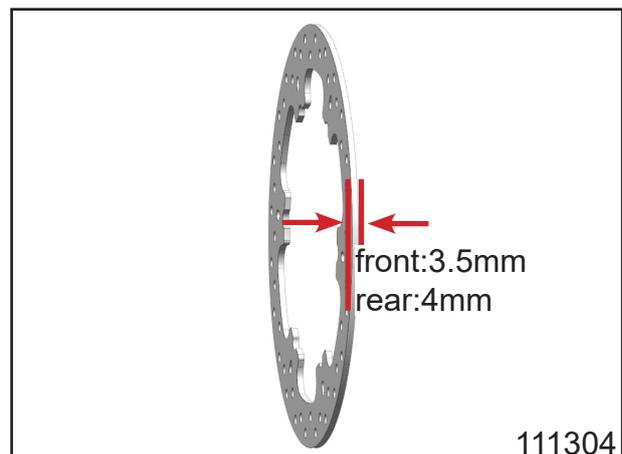
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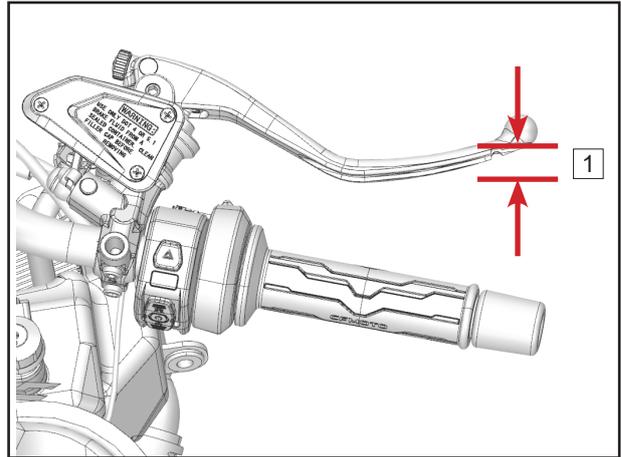
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11 Wheels and Brake System

11.10 Free Play

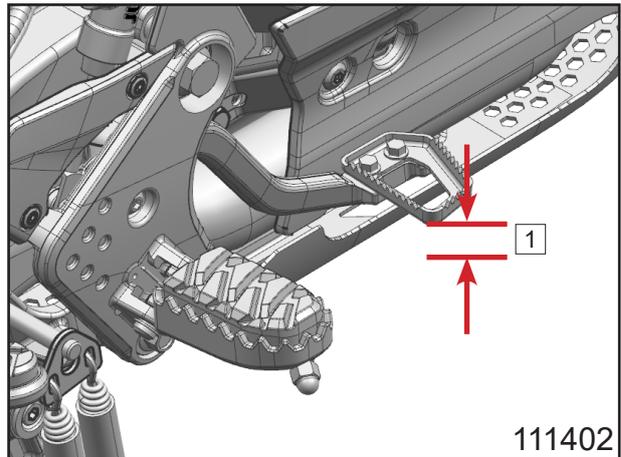
11.10.1 Front Brake Lever Free Play

Inspect front brake lever free play **1**.
Standard: 10mm~15mm



11.10.2 Rear Brake Pedal Free Play

Inspect rear brake pedal free play **1**.
Standard: 5mm~10mm



12 Shock Absorbers and Rear Fork

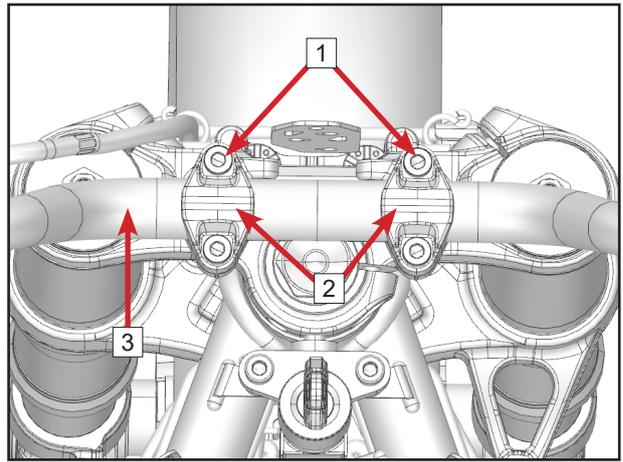
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12.1 Handlebar

Remove bolts [1].

Remove handlebar cover [2].

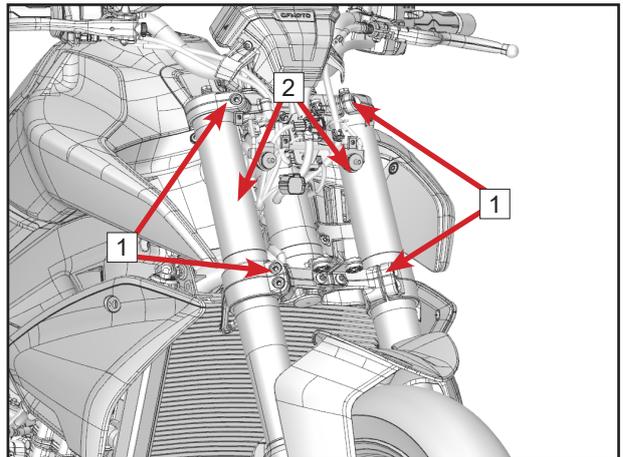
Place the handlebar properly [3].



12.2 LH+RH Front Shock Absorber

Remove bolts on both sides [1].

Remove LH+RH front shock absorbers.

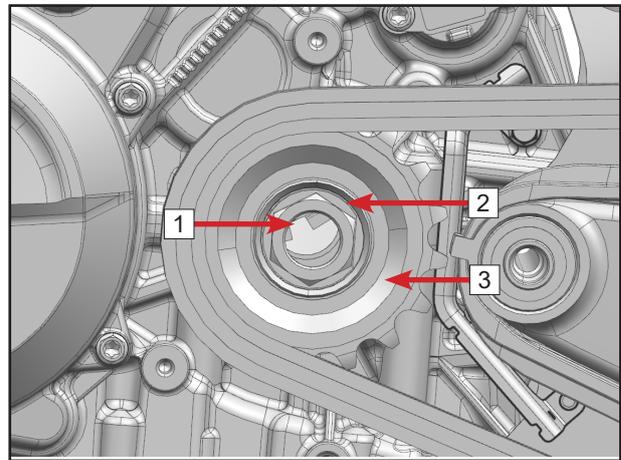


12.3 Chain

Turn up the locking gasket [2].

Remove nut [1].

Remove locking gasket [2].



Disengage the chain.

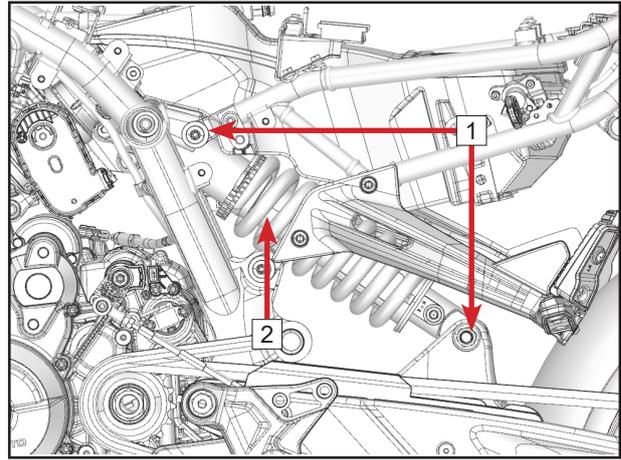
Prevent the chain from falling on the ground or touching other dirt. If the chain is dirty, use professional chain cleaner and chain oil to clean and lubricate the chain when reinstalling.

12 Shock Absorbers and Rear Fork

12.4 Rear Fork Assembly

Remove bolt and nut assembly **1**.

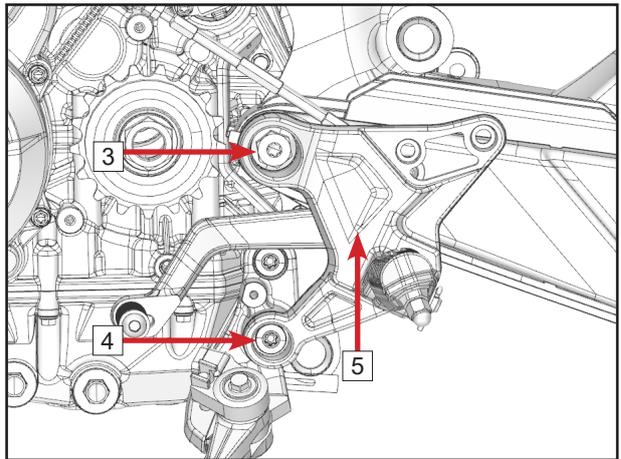
Remove rear shock absorber **2**.



Remove bolt **3**.

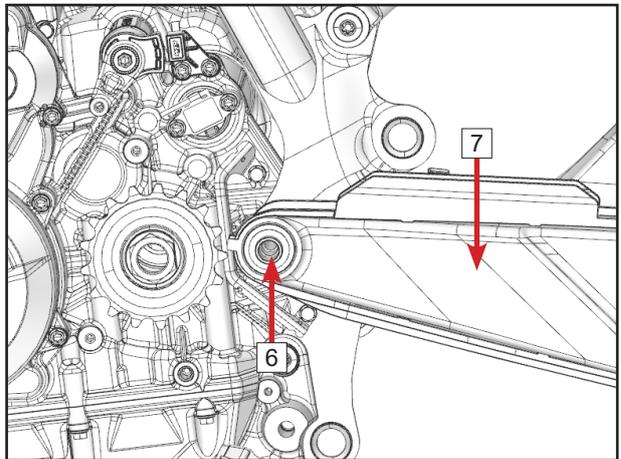
Remove bolt **4**.

Release LH footrest **5**.



Pull out rear fork shaft **6**.

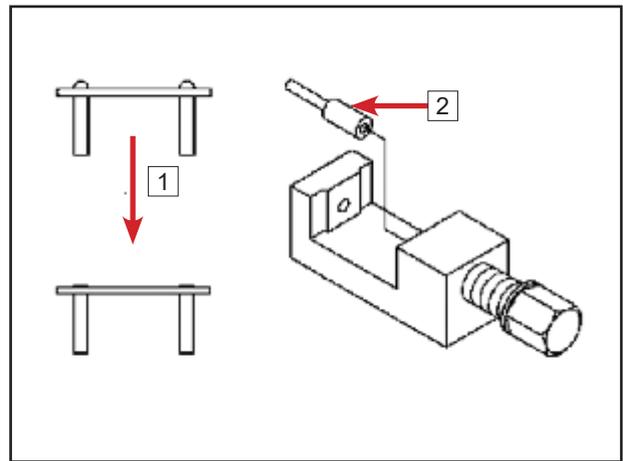
Remove rear fork **7**.



12.5 Drive Chain Inspection

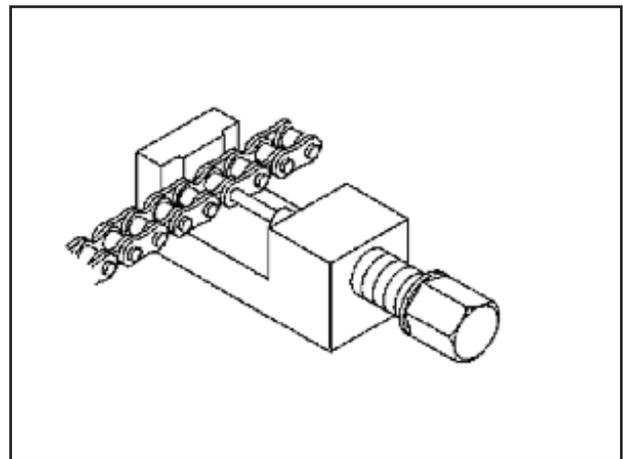
Squeeze **1** the pin head with force to flatten it.

Set the cutting and riveting pins **2** according to the illustration.

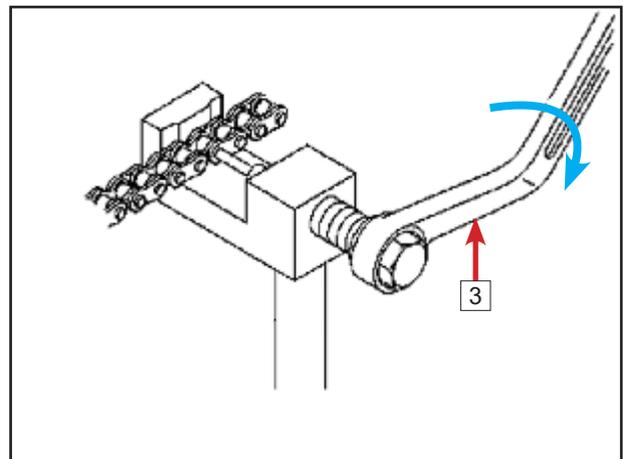


Tighten the pin holder with the bolt until it contacts the chain pin.

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



Turn the pin holder clockwise with a wrench **3** to remove the chain pin.



Drive chain installation

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

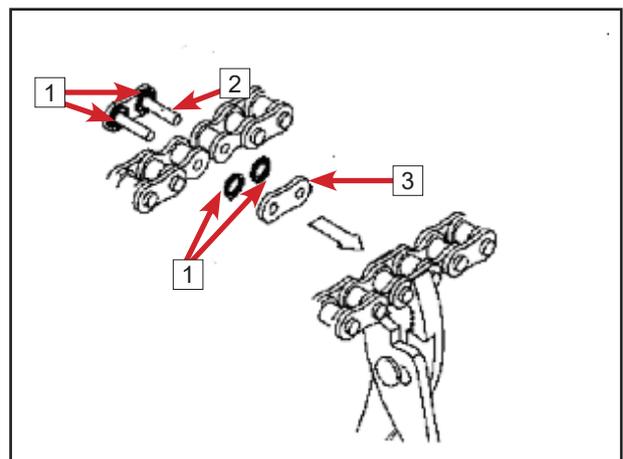
Insert the chain pin in the drive chain link.

Install the seals **1**.

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

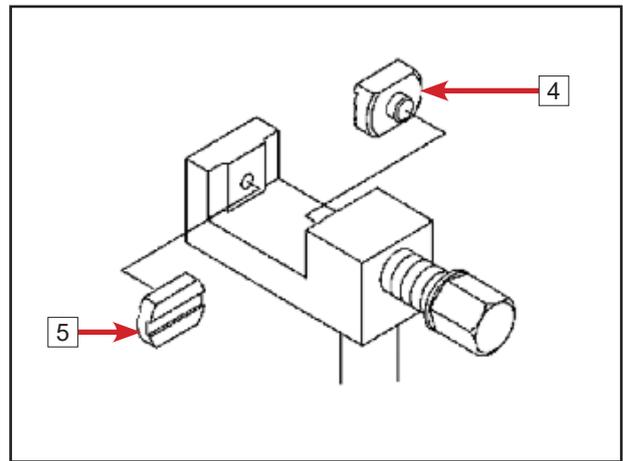
Fix the chain plate by pushing it by hand or with pliers.

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

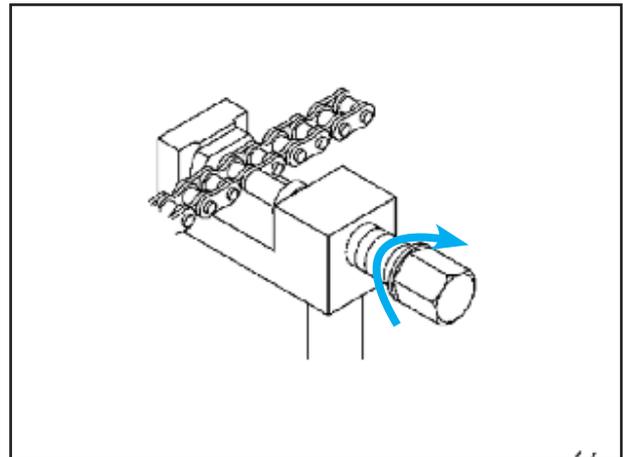


12 Shock Absorbers and Rear Fork

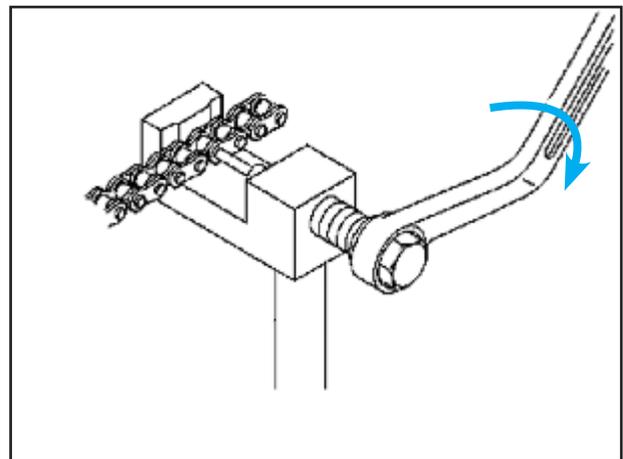
Set fixator **4** and plate setters **5** on the pin holder.



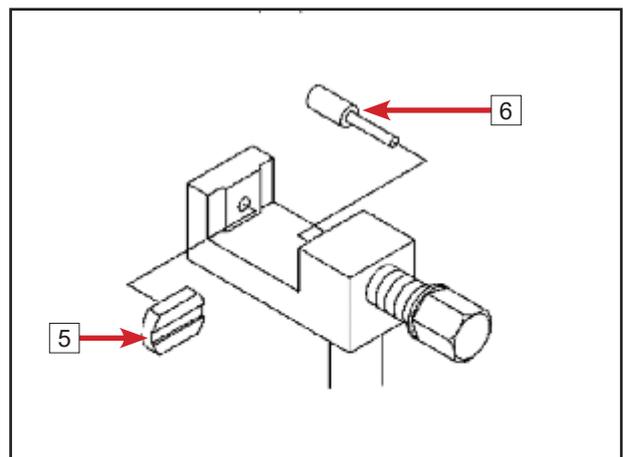
Install the fixator to the chain plate.
Rotate the pin holder by hand until the fixator contacts the chain plate.



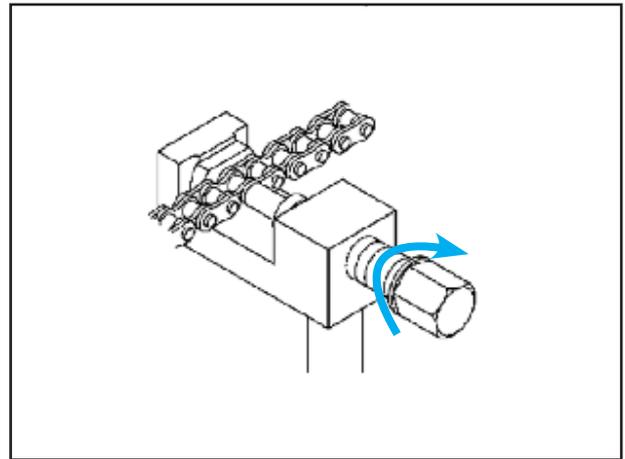
Turn the pin holder clockwise with a wrench until the two pins of the chain enter the slots of the fixator **4**.
Remove the fixator **4**.



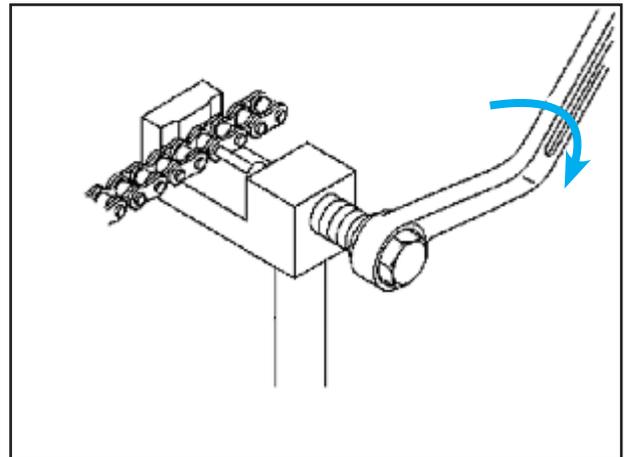
Set fixator **5**, cutting and riveting pins **6** according to the illustrations.



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



Turn the wrench 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.



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.

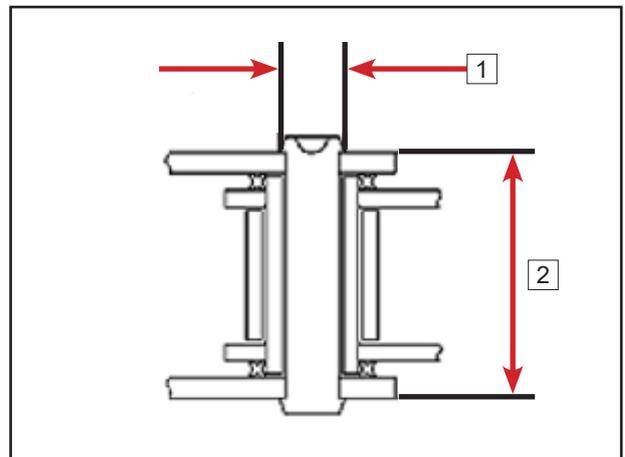
Outer diameter of chain pin:

Standard: 5.45mm~5.55mm

Outer width of the chain plate:

Standard: 17.25mm~17.45mm

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



12.5.1 Chain Tightness Adjustment

Chain tightness inspection

Put it in neutral.

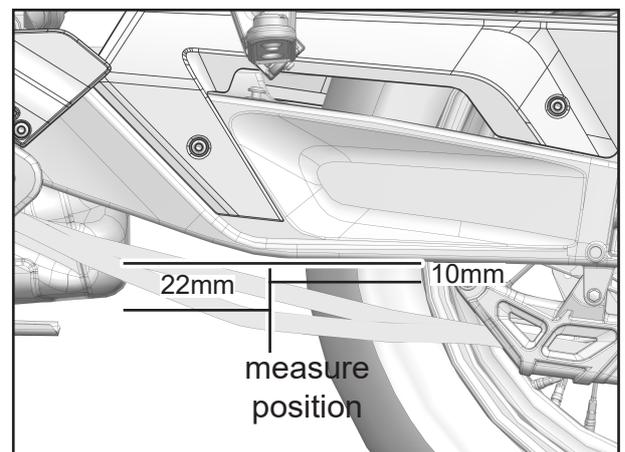
Prop up the vehicle with side stand.

In the natural state, the distance between the chain and the lowest point of the swing arm does not exceed 10mm.

Pull down the chain, the distance between the chain and the lowest point of the swing arm is not more than 22mm.

If the chain tightness is not in accordance with the regulations, adjust it to the standard value.

NOTE: The chain does not always wear evenly. Rotate the rear wheel and repeat the tightness measurement in different positions for several times.



12 Shock Absorbers and Rear Fork

Drive chain tightness adjustment

Loosen the rear wheel shaft nut **1**.

Loosen the left and right lock nuts **3**.

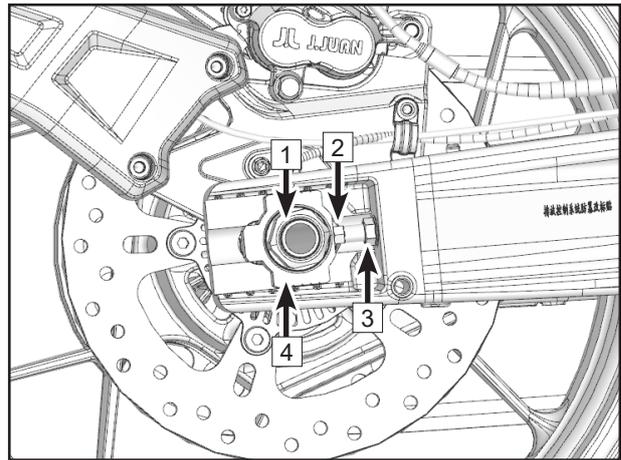
Turn the left and right adjusting bolts **2** to adjust the chain tightness.

Make sure the relative position between the left and right chain tensioner **4** marks and the reference mark is the same.

Make sure that the tensioner is tight against the adjusting bolt.

Tighten the left and right lock nuts **3**.

Tighten the rear wheel shaft nut (90N·m).



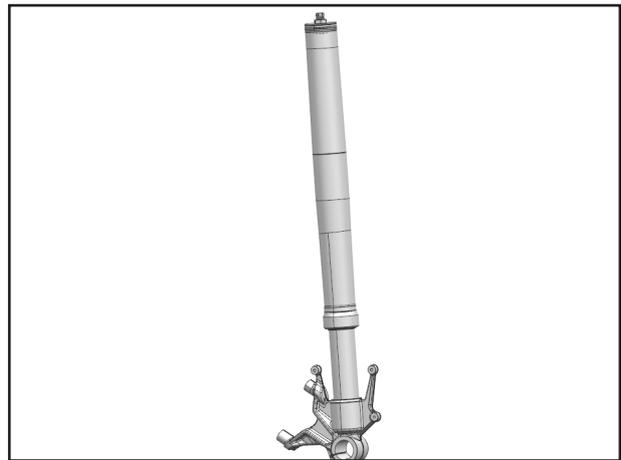
12.6 Front Shock Absorber Inspection

Inspection

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

Clean the dust and mud from the front shock absorber.

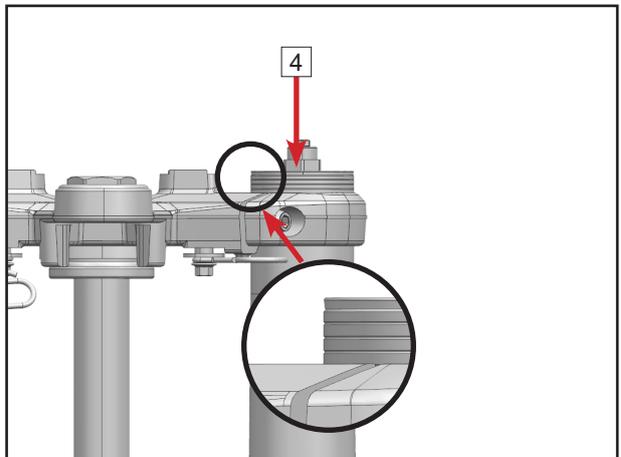
Hold the steering handle and press down several times to check if the front shock absorber compression rebound is normal.



Installation

Reverse the removal procedures for installation.

⚠ CAUTION: When installing the front shock absorber, the upper surface **4** of the 2 front shock absorber inner tubes should be flush, and the number of scale lines exposed on the upper end of the front shock absorber inner tubes should be the same



12.7 Rear Shock Absorber Inspection

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

Clean the dust and mud from the front shock absorber.

Hold the steering handle and press down several times to check if the rear shock absorber compression rebound is normal.



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13.1 Removing the Engine

Preparatory work

Switch off the ignition by turning the ignition key to the position \otimes .

Remove the seat.

Disconnect the negative cable of the 12-V battery.

Remove main silencer.

Raise motorcycle with rear lifting gear.

Remove the left side cover.

Remove the battery cover.

Remove left fuel tank cover.

Remove the right side cover.

Remove right fuel tank spoiler.

Remove engine guard.

Remove the fuel tank.

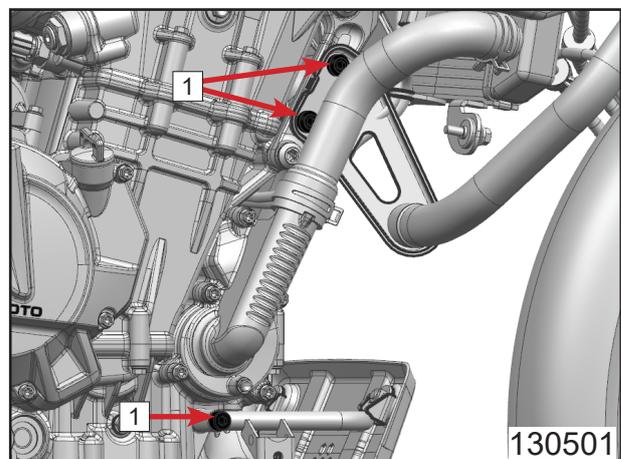
Remove the exhaust system.

Drain the coolant.

Main work

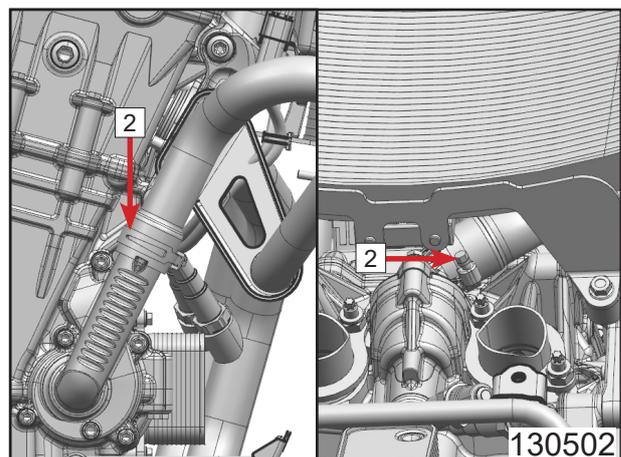
Remove screws **1**.

Hang the activated charcoal filter to the side.



Loosen hose clips **2**.

Pull off the radiator hoses.



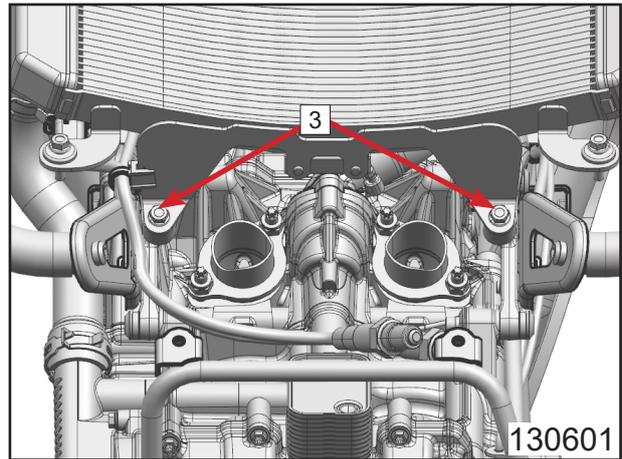
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Remove screws **3**.
Swing the radiator forward.

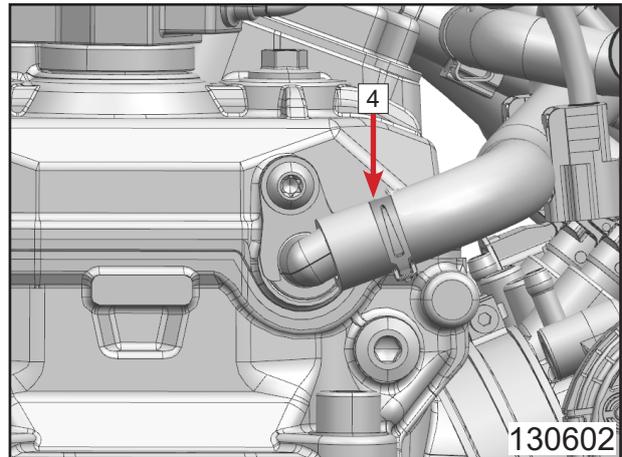
NOTE

Pay attention to the cooling fins.

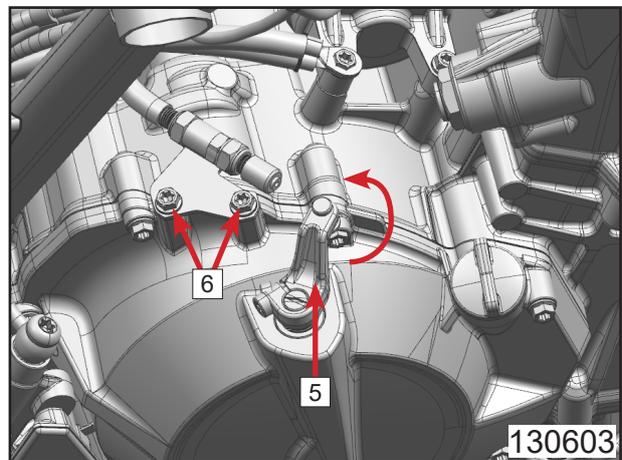
Remove the cable ties.
Disconnect plug-in connector.



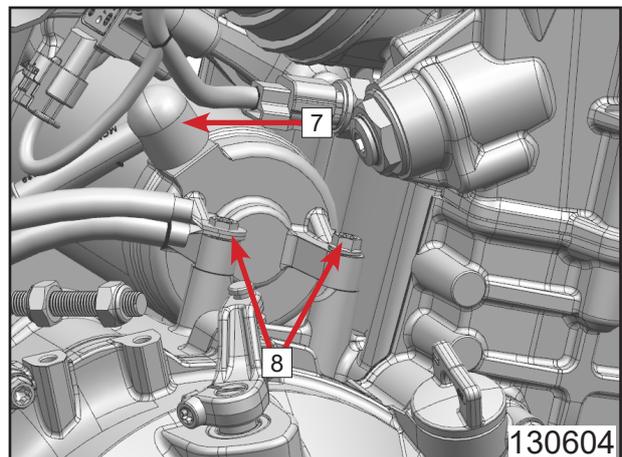
Remove hose clamp **4** and pull off the vent hose.



Swivel clutch release lever **5** counterclockwise and detach the inner clutch cable.
Remove screws **6**.
Hang the inner clutch cable with bracket to the side.

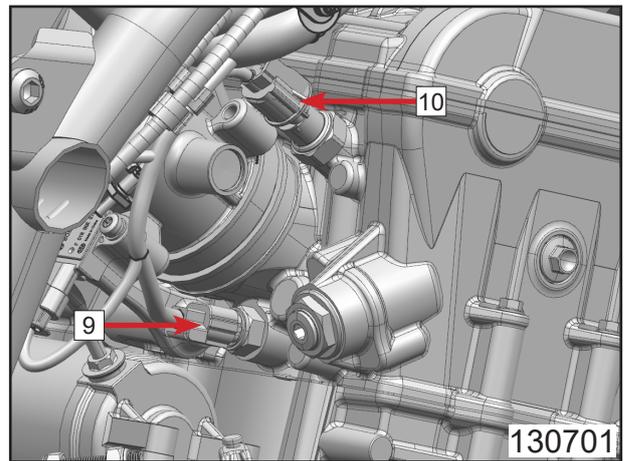


Push back protection cap **7** and remove the nut.
Hang the positive cable to the side.
Remove screws **8**.
Hang the ground wire to the side.

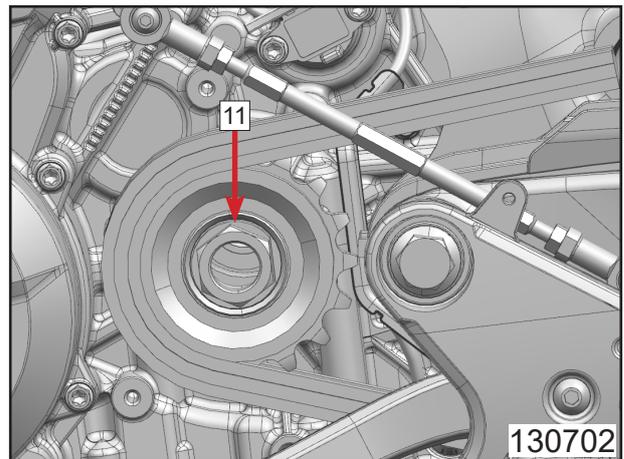


13 Engine Assembly

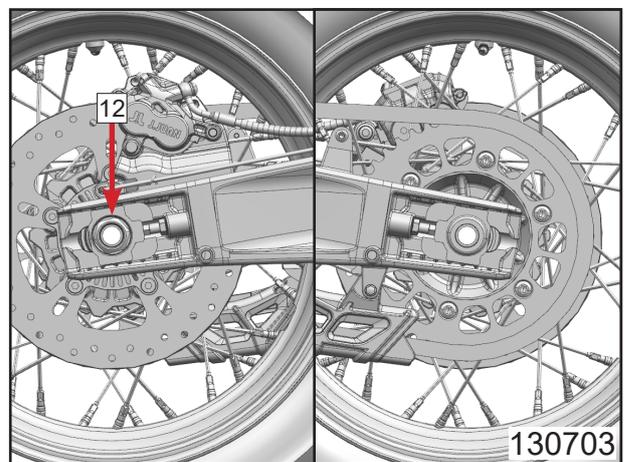
Disconnect connector **9** from the coolant temperature sensor.
Unplug connector **10** from the oil pressure sensor.



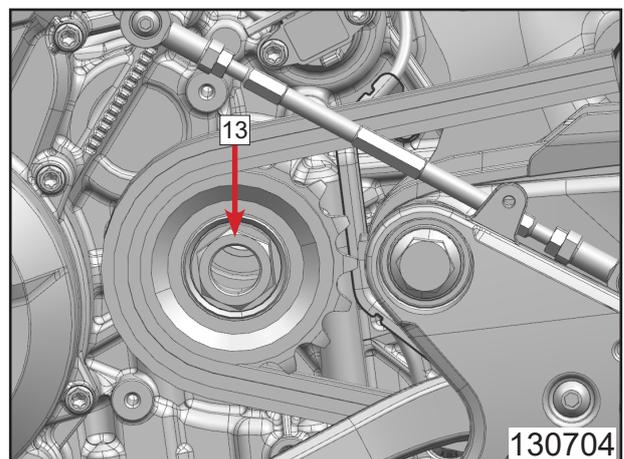
Bend up the lock washer.
Have an assistant operate the rear brake.
Loosen nut **11**.



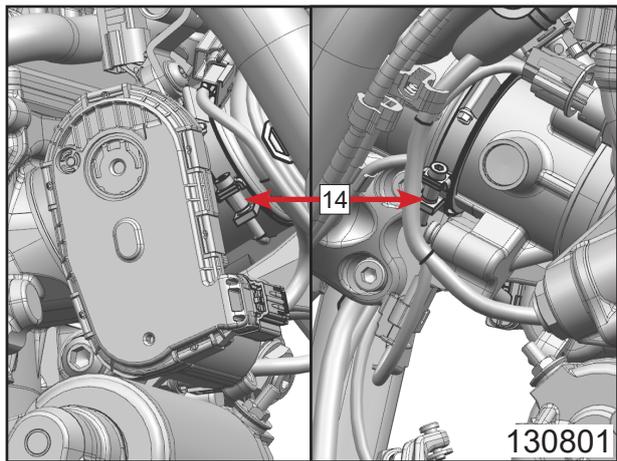
Remove nut **12**.
Remove the chain adjuster.
Push the rear wheel into the foremost position.



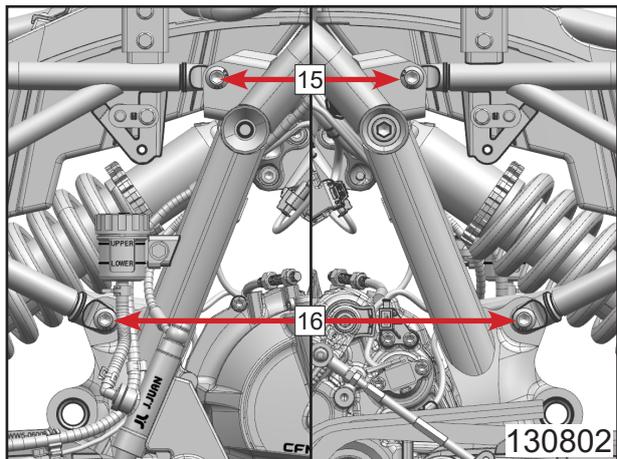
Remove nut **13** with the lock washer.
Take off the engine sprocket.



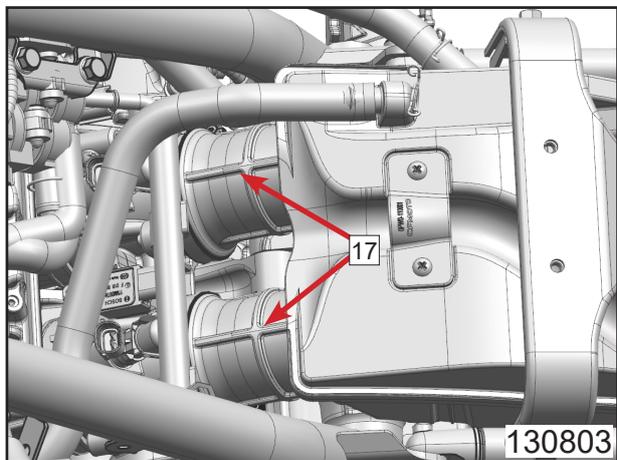
Loosen hose clips **14**.



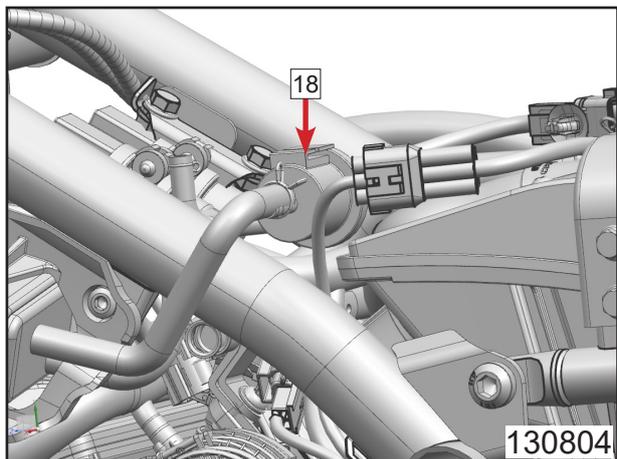
Loosen screws **15**.
Remove screws **16**.
Swivel the subframe downward.



Remove hose clips **17**.

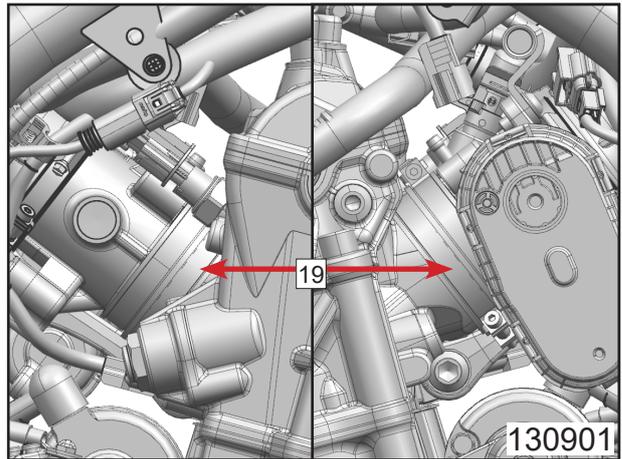


Pull off hose **18**.



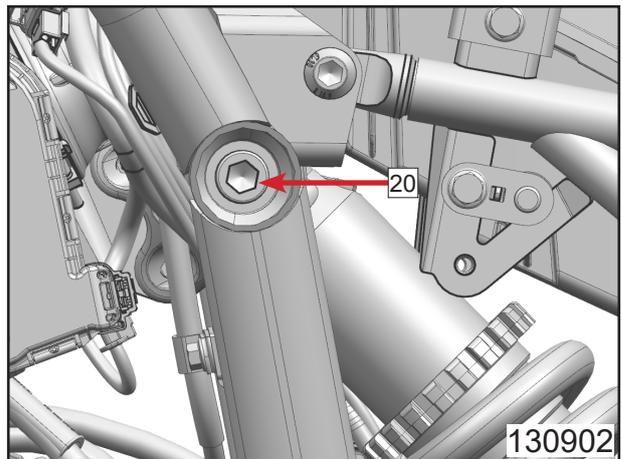
13 Engine Assembly

Loosen hose clips **19**.
Pull off the throttle valve body toward the rear and remove to the side.

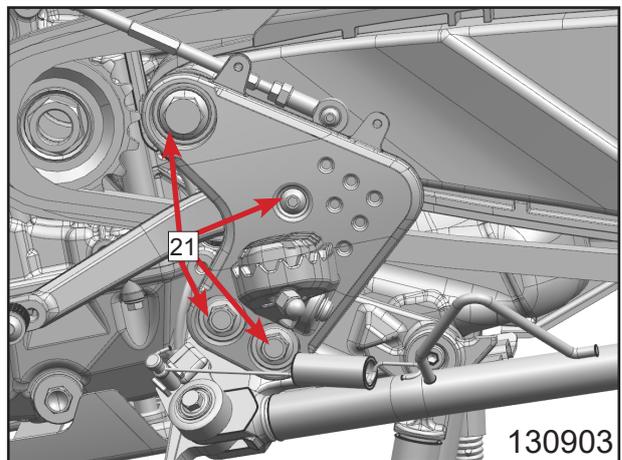


Use supports to support the bottom of the engine.

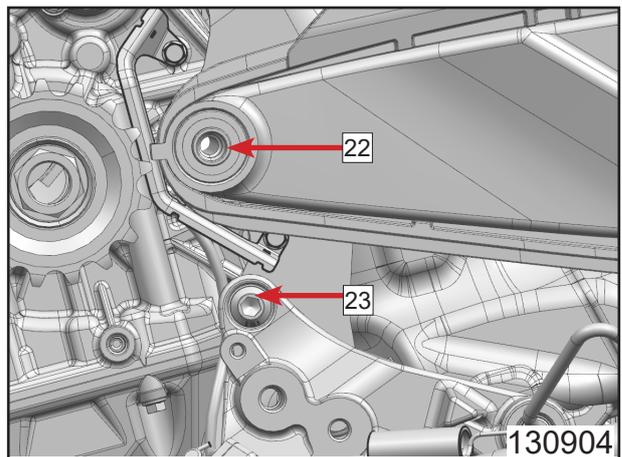
Remove protection cap.
Loosen screw **20**.



Remove screw **21**.
Remove the footrest bracket.

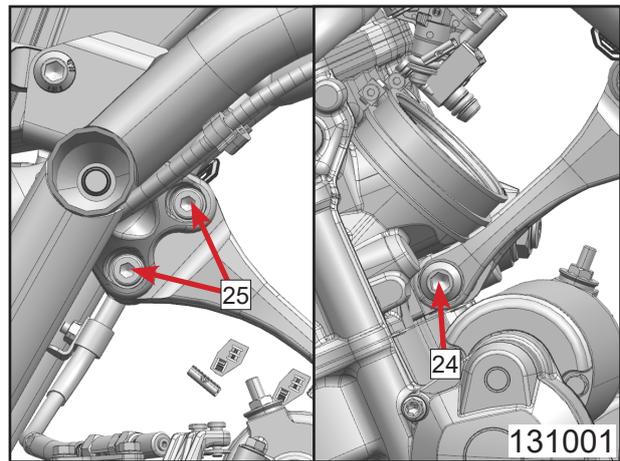


Remove screw **22**.
Pull out swingarm pivot **23** far enough so that the engine is released but the link fork remains secured.

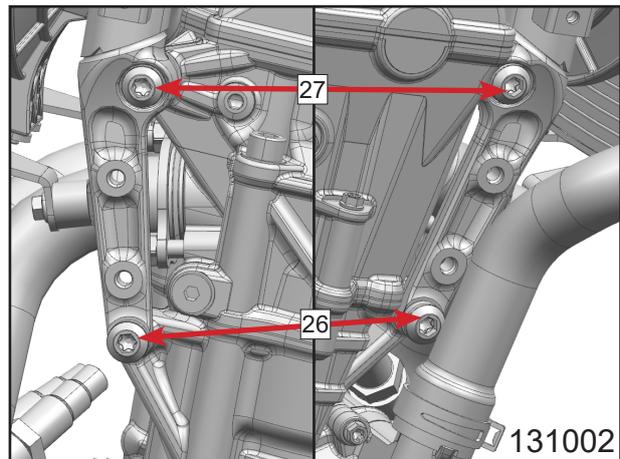


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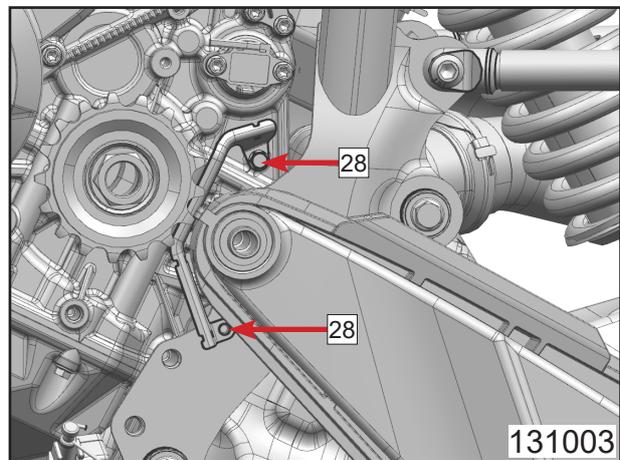
Remove screw 24.
Remove screws 25.
Take off the engine bearer.



Remove screws 26.
Remove screws 27.



Remove screws 28.



Remove engine.

NOTE

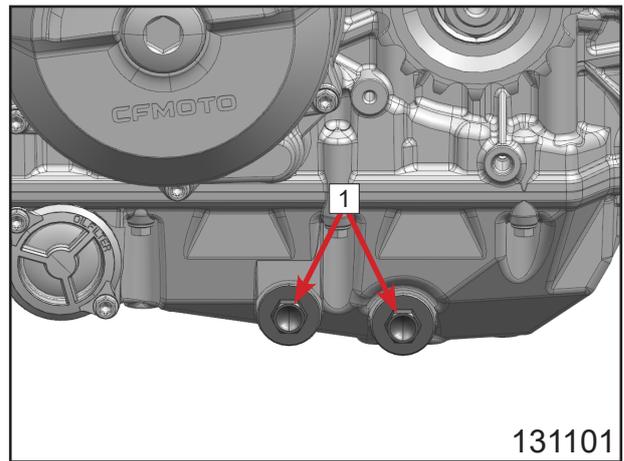
The help of an assistant is useful in this step.
Make sure that the motorcycle is sufficiently secured against falling over.
Cover the components them against damage.

13 Engine Assembly

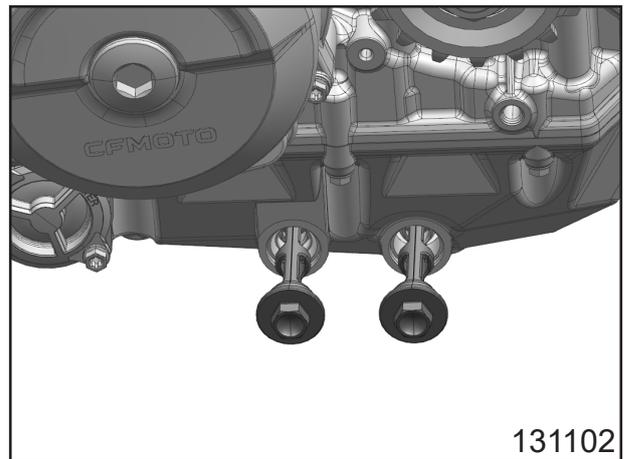
13.2 Engine Disassembly

13.2.1 Draining the Engine Oil

Remove oil drain plugs (1) with the magnet, O-rings, and oil screen. Completely drain the engine oil.



131101

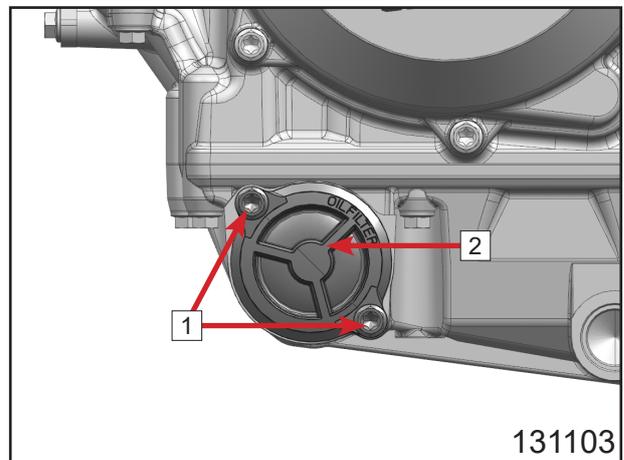


131102

13.2.2 Removing the Oil Filter

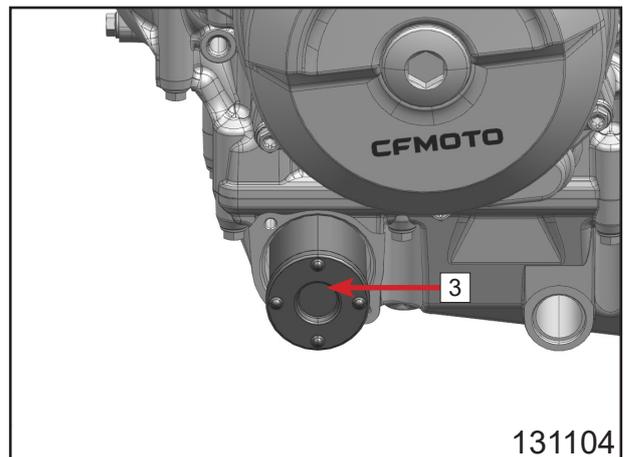
Remove screws (1).

Take off oil filter cover (2) with the O-ring.



131103

Remove oil filter (3).

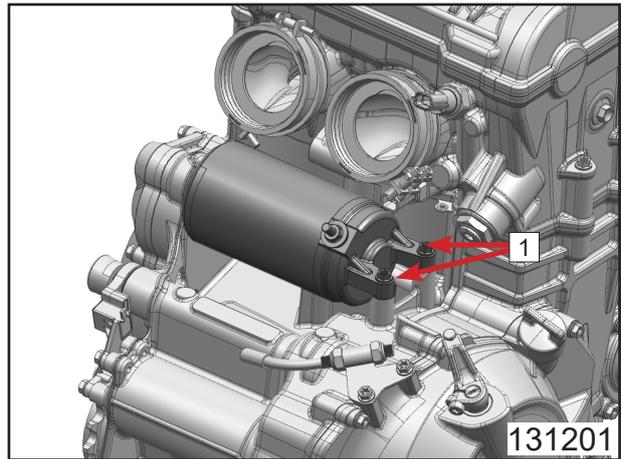


131104

13.2.3 Removing the Starter Motor

Remove screw (1).

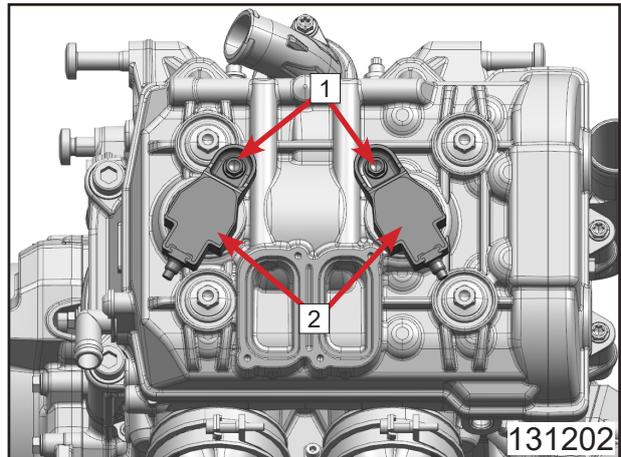
Remove the starter motor.



13.2.4 Removing the Valve Cover

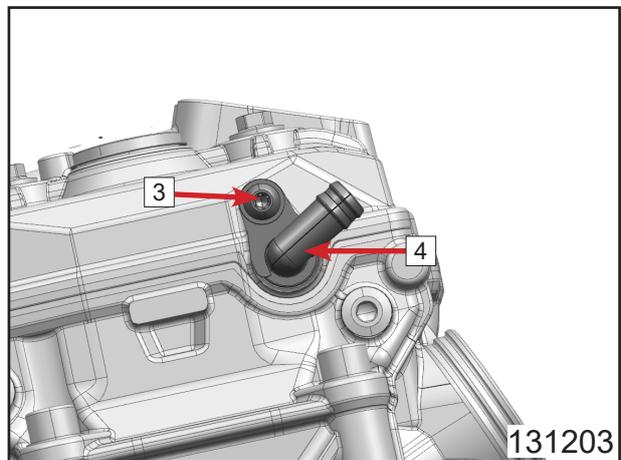
Remove screws (1).

Remove ignition coils (2).



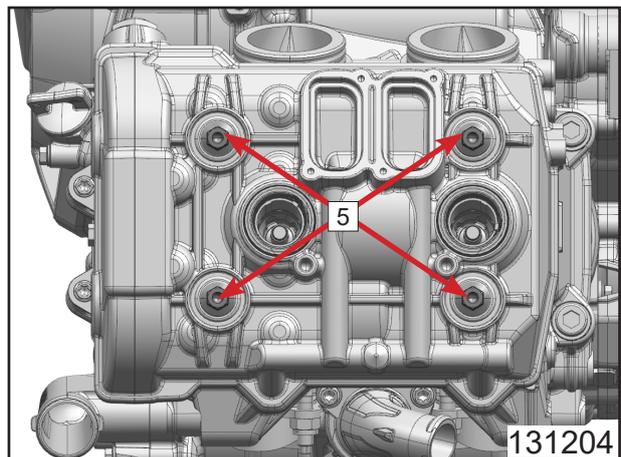
Remove screw (3) with retaining bracket.

Pull off bleeder flange (4)



Remove screws (5) with gaskets.

Take off the valve cover with the valve cover seal.

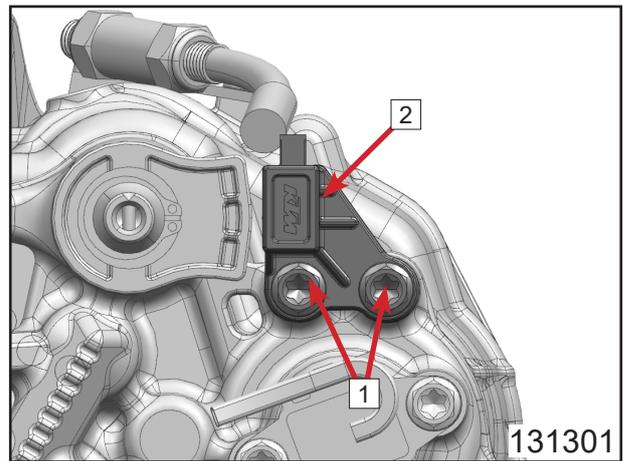


13 Engine Assembly

13.2.5 Removing Shift Shaft Sensor

Remove screws (1).

Take off the shaft sensor (2).

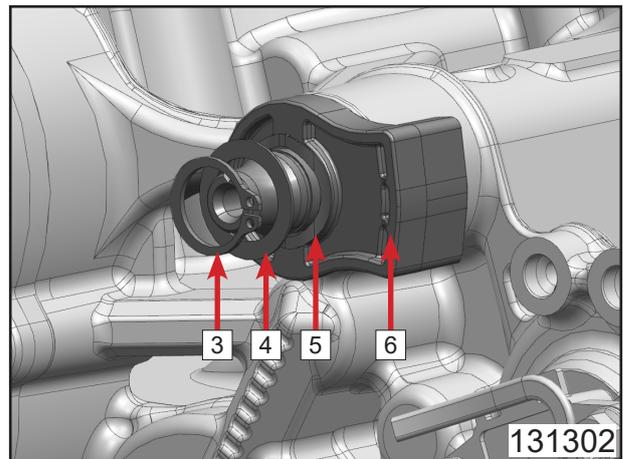


Remove lock ring (3).

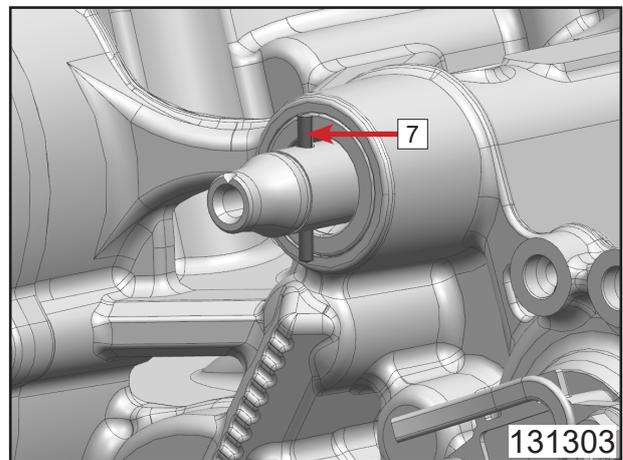
Remove washer (4).

Remove locating washer (5).

Take off magnetic holder (6).



Remove pin (7).

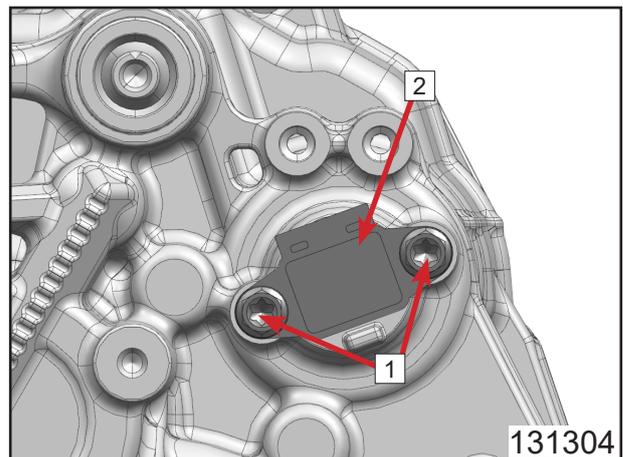


13.2.6 Removing the Gear Position Sensor

Remove the cable tie.

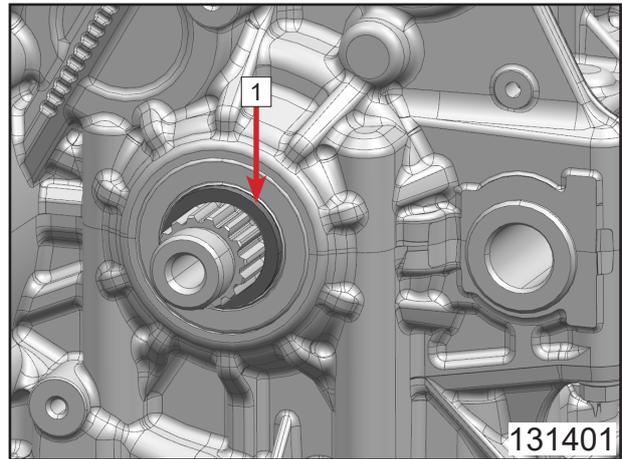
Remove screws (1).

Take off gear position sensor (2).



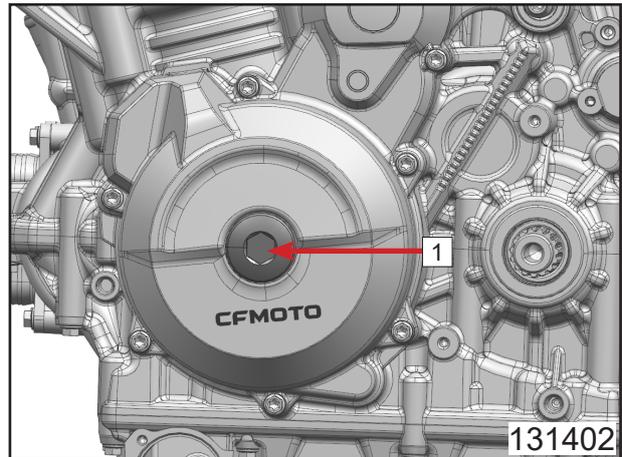
13.2.7 Removing the Spacer

Remove spacer (1) of the countershaft.
Remove the O-ring.

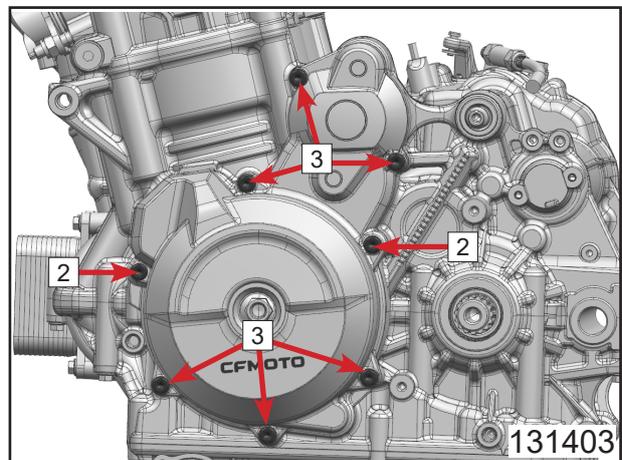


13.2.8 Removing the Magneto Cover

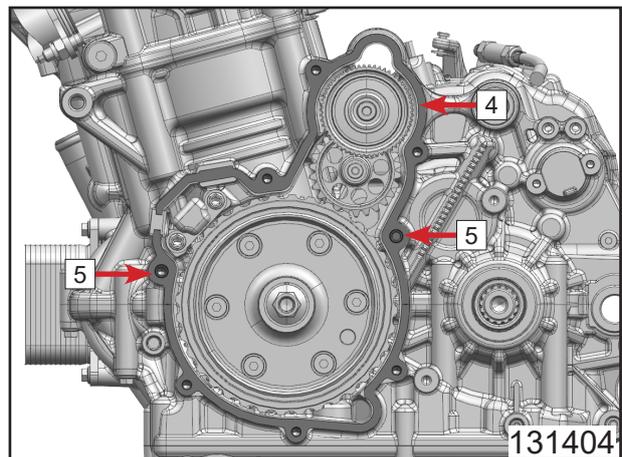
Remove screw plug (1) with the O-ring.



Remove screws (2) and (3).



Mount puller and pull off the magneto.
Take off magneto cover gasket (4).
Remove dowels pins (5).

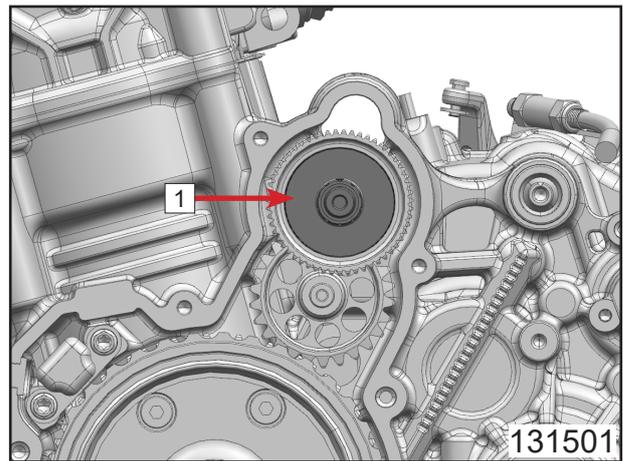


13 Engine Assembly

13.2.9 Removing the Torque Limiter and the Starter Intermediate Gear

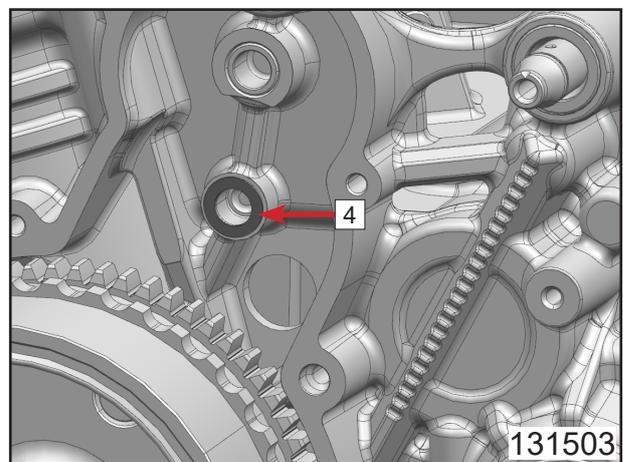
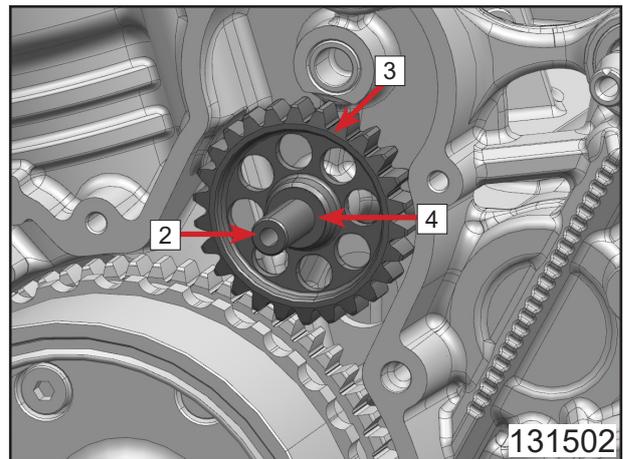
Take off torque limiter (1) with washer.

NOTE
The washer usually sticks to the engine case.



Take off shaft (2) and starter intermediate gear (3) with needle bearing and washers (4).

NOTE
The rear washer usually sticks to the engine case.

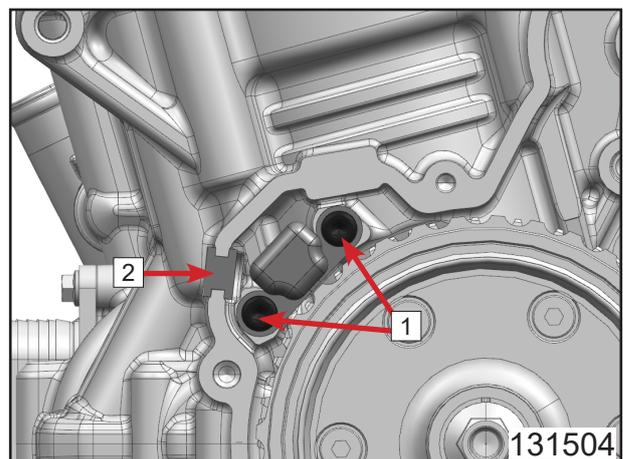


13.2.10 Removing the Crankshaft Speed Sensor

Remove screws (1).

Pull rubber grommet (2) out of the engine case.

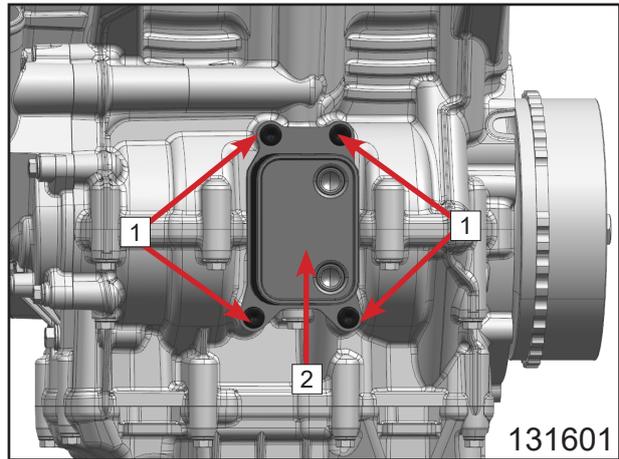
Remove the crankshaft speed sensor.



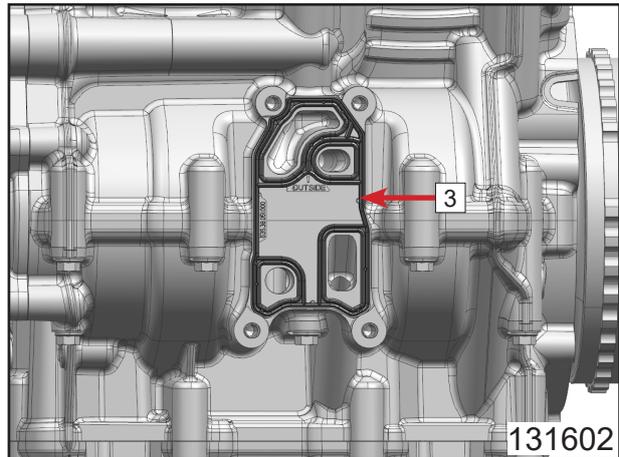
13.2.11 Removing the Heat Exchanger

Remove screws (1).

Take off heat exchanger (2).



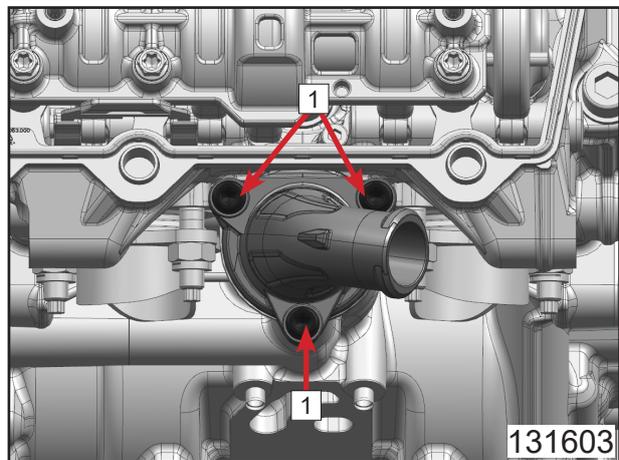
Remove gasket (3).



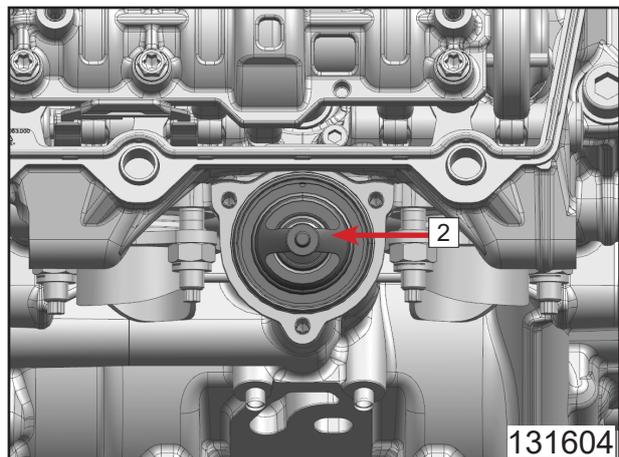
13.2.12 Removing the Thermostat

Remove screws (1).

Take off the thermostat case.



Remove thermostat (2).

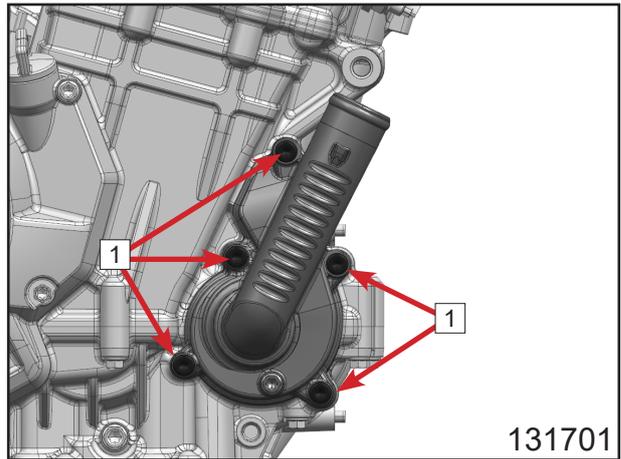


13 Engine Assembly

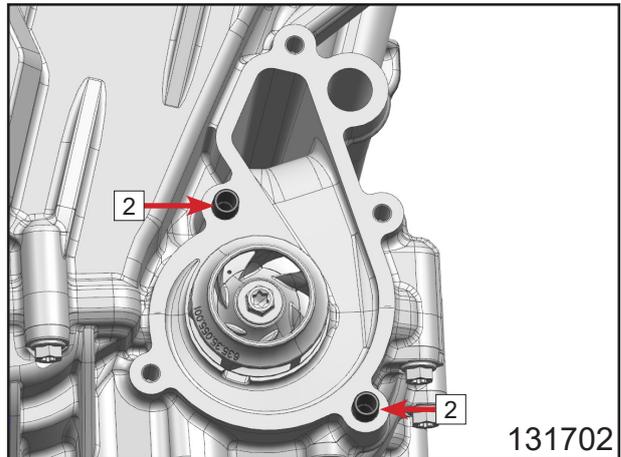
13.2.13 Removing the Water Pump Impeller

Remove screws (1).

Take off water pump cover with the gasket.

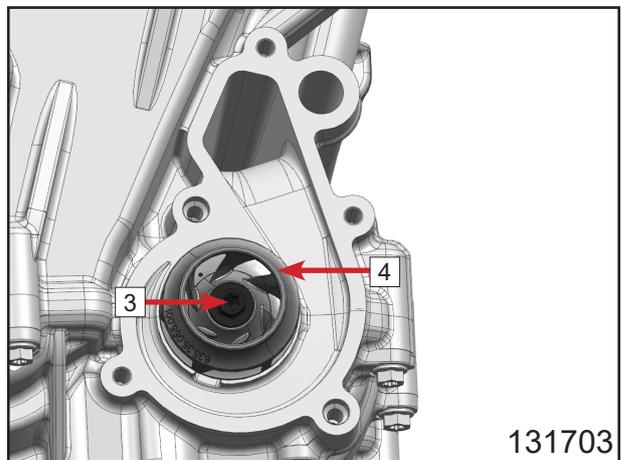


Remove dowels (2).

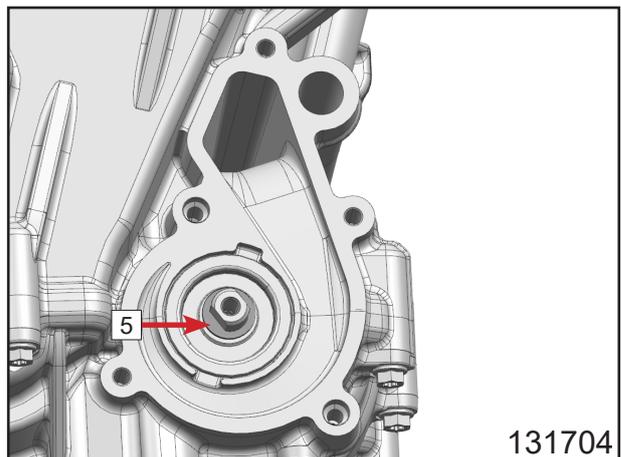


Remove screw (3).

Remove water pump impeller (4).

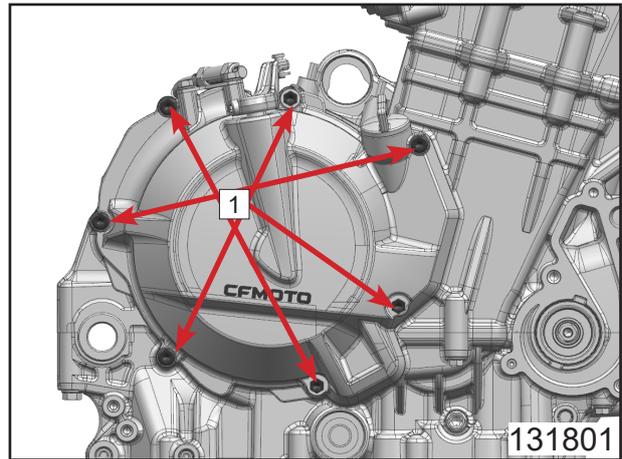


Remove washer (5).

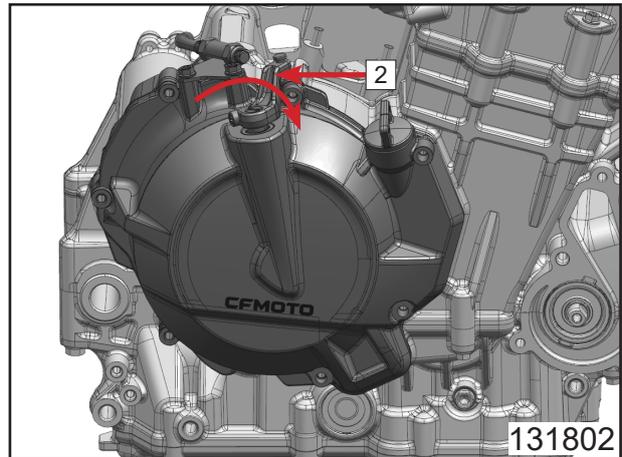


13.2.14 Removing the Clutch Cover

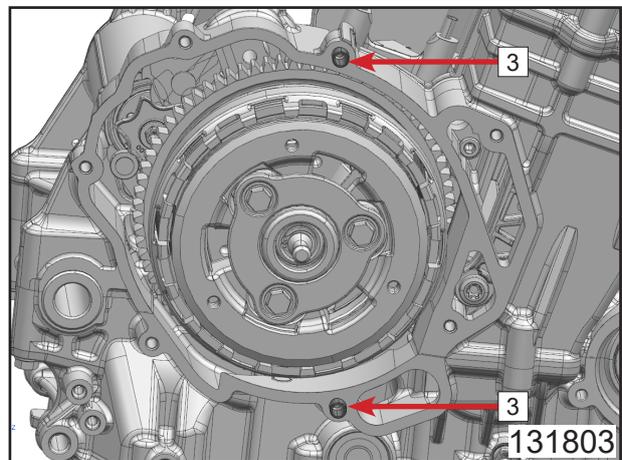
Remove screws (1).



Swivel the clutch lever (2) clockwise and take off clutch cover with clutch cover gasket.



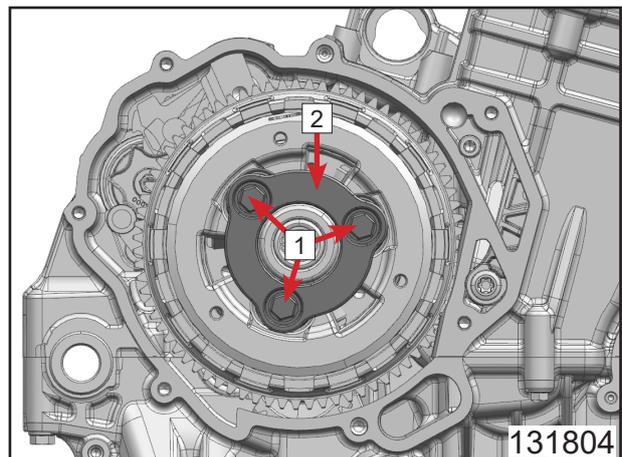
Remove dowels (3).



13.2.15 Removing the Clutch Discs

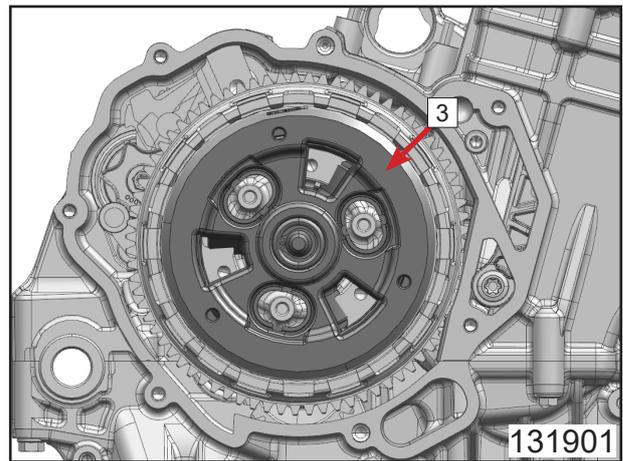
Remove screws (1).

Take off clutch center (2) and the springs.

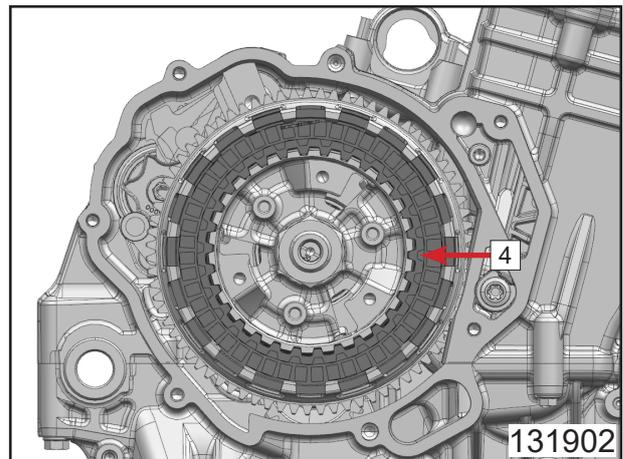


13 Engine Assembly

Remove clutch pressure cap (3).

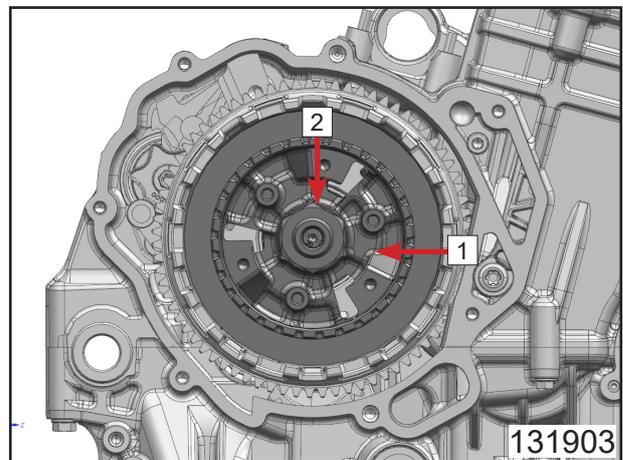


Remove clutch discs (4), support ring, and pretension ring.



13.2.16 Removing the Clutch Basket

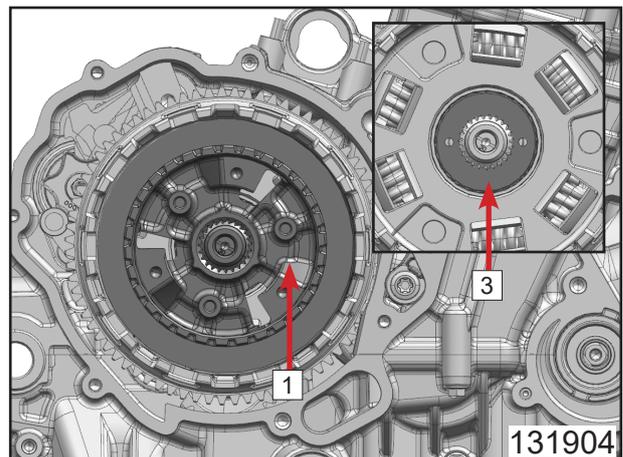
Hold the inner clutch hub (1) with the special tool (Holding tool).
Remove nut (2) with the washer.



Take off inner clutch hub (1) and washer (3).

NOTE

The washer usually sticks to the inner clutch hub.



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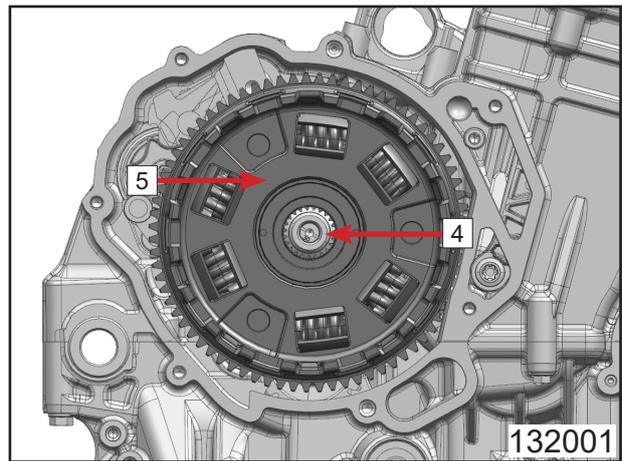
Remove needle bearing (4).

NOTE

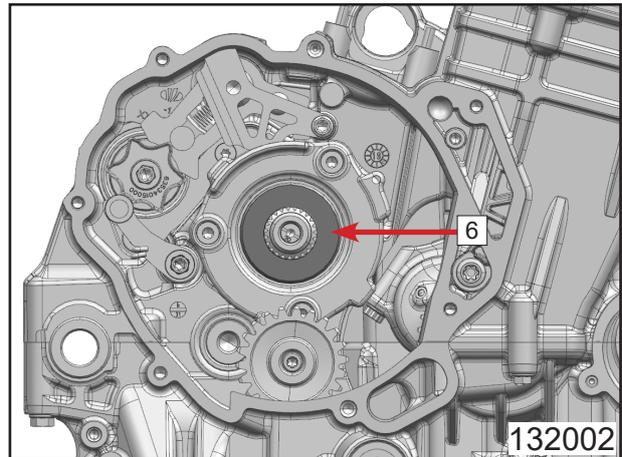
Use a magnetic rod to make disassembly easier.

Do not use pliers, otherwise the needle bearing will be damaged.

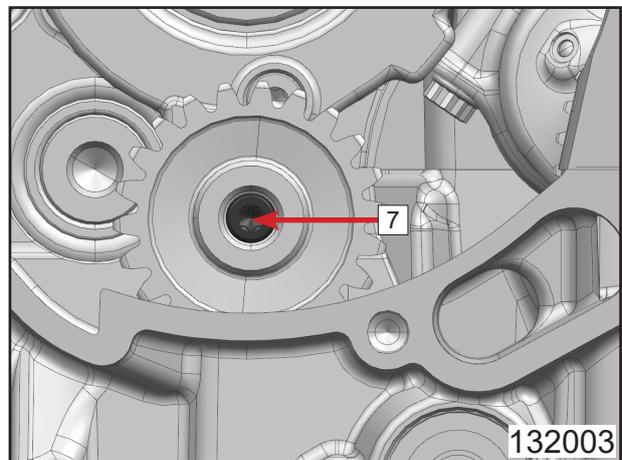
Take off clutch basket (5).



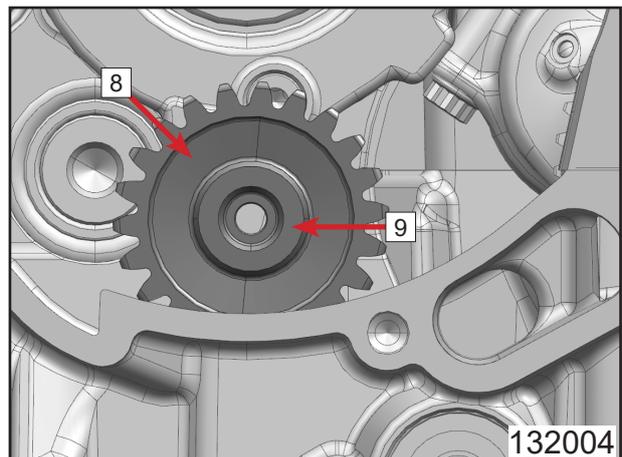
Remove washer (6).



Remove screw (7).



Take off intermediate gear (8) with collar bushing (9).

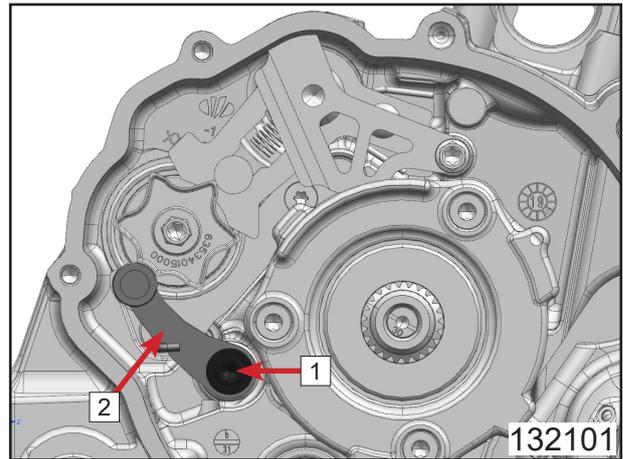


13 Engine Assembly

13.2.17 Removing Locking Lever

Remove screw (1).

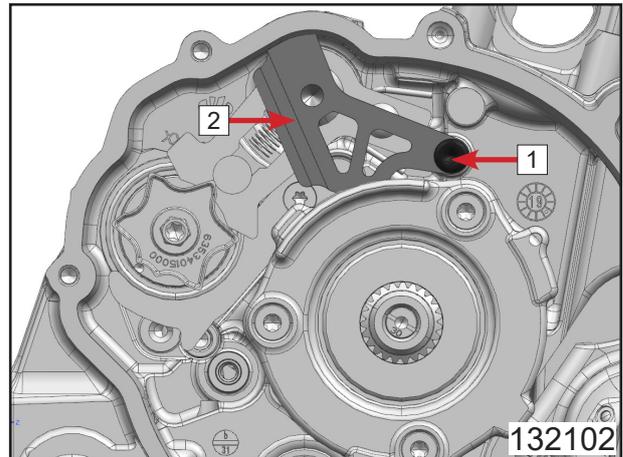
Take off locking lever (2) with the sleeve and spring.



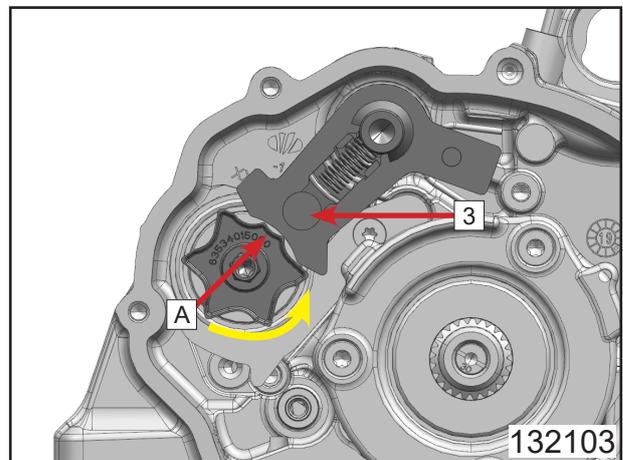
13.2.18 Removing the Shift Shaft

Remove screw (1).

Take off retaining bracket (2).



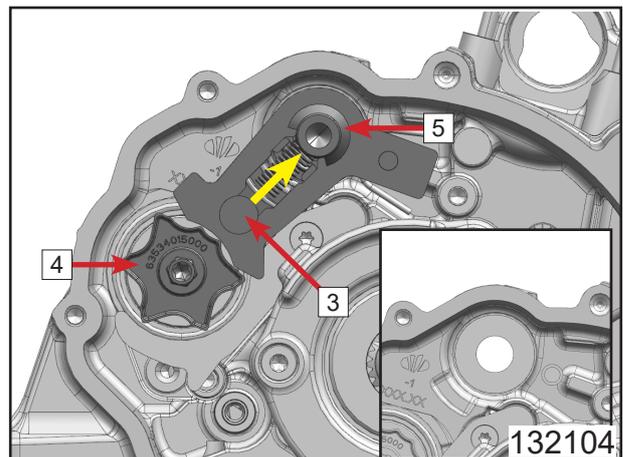
Twist shift drum until the neutral position (A) is aligned with the sliding plate (3).



Push sliding plate (3) away from shift drum locating unit (4).

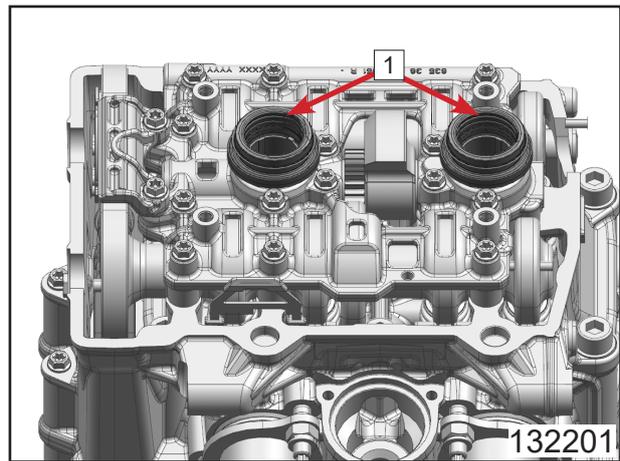
Remove shift shaft (5) with washer (6).

NOTE
The washer usually sticks to the engine case.

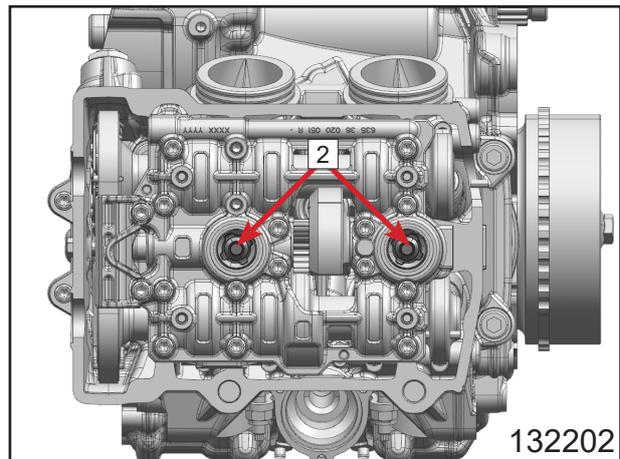


13.2.19 Removing the Spark Plugs

Remove spark plug shaft (1) with the gaskets.



Remove the spark plugs (2).



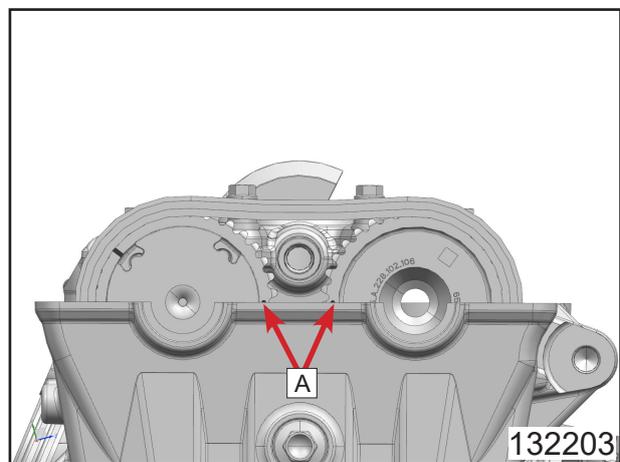
13.2.20 Removing the Camshafts

Turn the crankshaft counterclockwise and set it to ignition top dead center of cylinder 2.

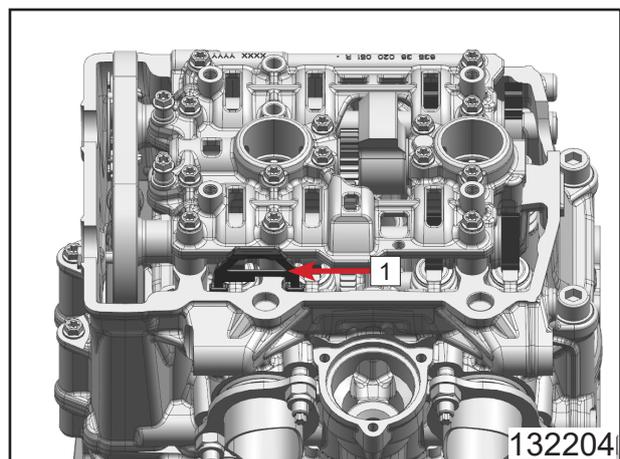
The cylinder 2 timing marking (A) are aligned with the sealing surface.

NOTE

The cylinder 2 timing markings are dot markings.

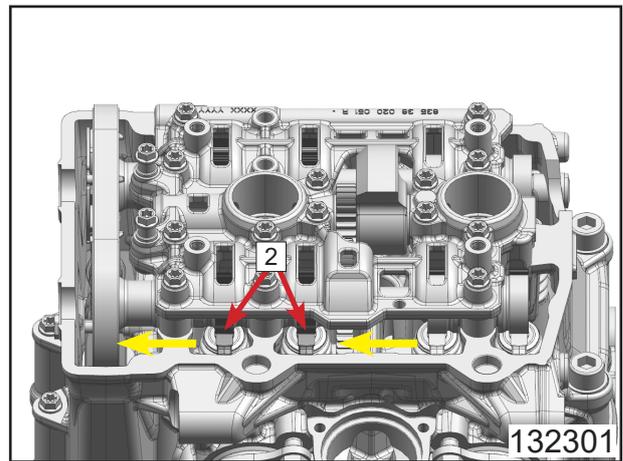


Remove cam lever clip (1).



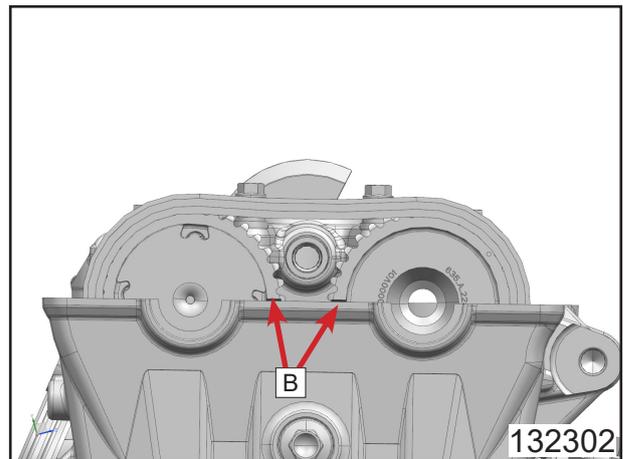
13 Engine Assembly

Push exhaust cam lever (2) on cylinder 2 to the side.



Set the crankshaft to ignition top dead center of cylinder 1.
The cylinder 1 timing marking (B) are aligned with the sealing surface.

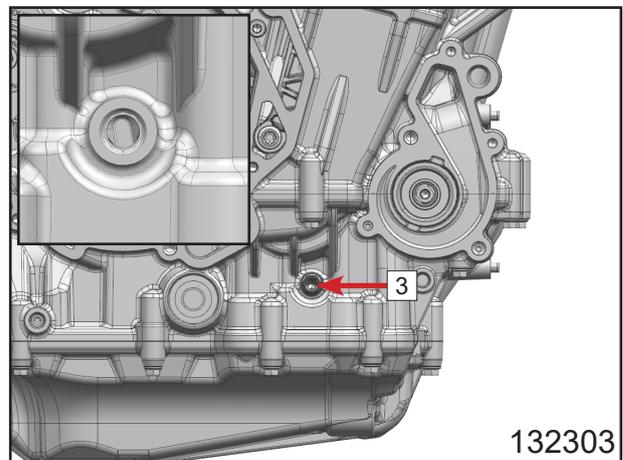
NOTE
The cylinder 1 timing markings are dot markings.



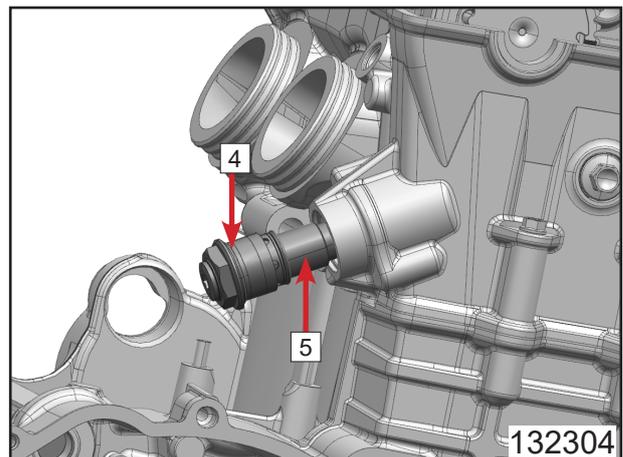
Remove screw (3) with the washer.

NOTE
Look through the hole to check that the position hole of the crankshaft is visible.

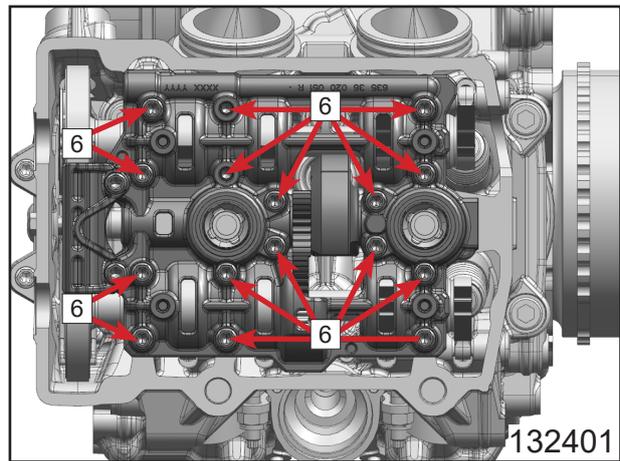
Mount special tool (locking screw).



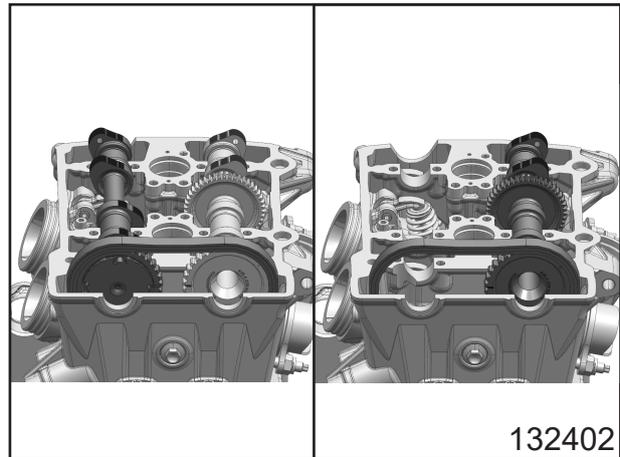
Remove screw (4) with the O-ring.
Take off timing chain tensioner (5) with O-ring.



Loosen and remove screws (7) from the outside to the inside.
Take off camshaft bearing bridge with balancer shaft.

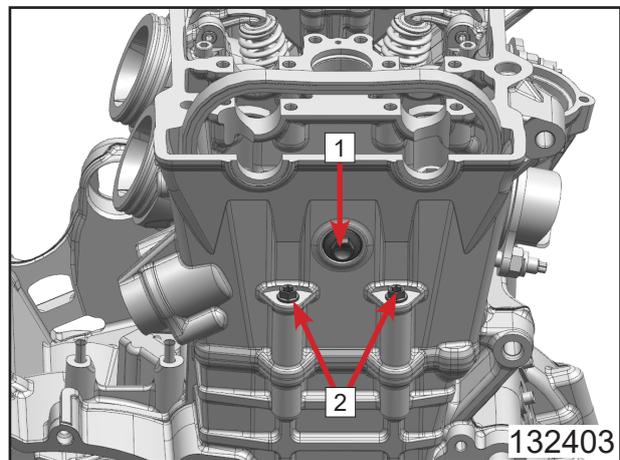


Raise the camshafts at the rear and take the timing chain off the rear sprocket.
Remove camshaft.

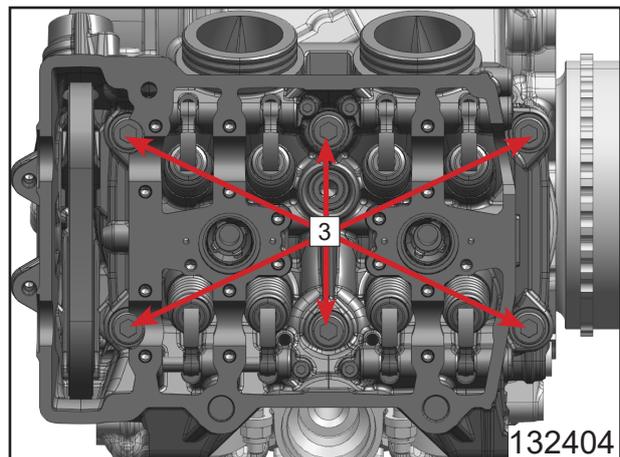


13.2.21 Removing the Cylinder Head

Remove screw (1) with gasket.
Remove screw (2).

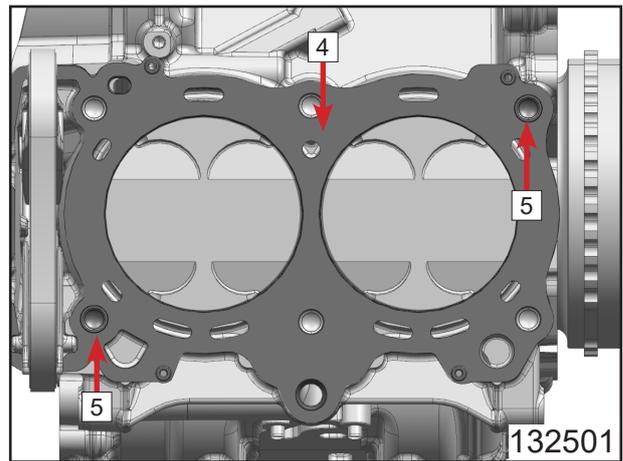


Loose screws (3) in a crisscross pattern and remove them with the washers.
Take off the cylinder head.



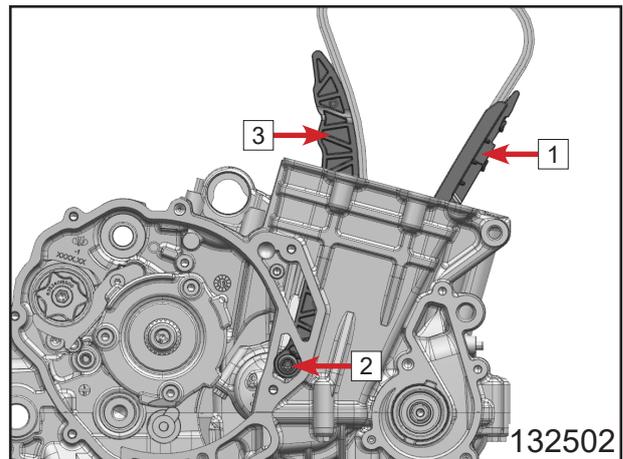
13 Engine Assembly

Take off cylinder head gasket (4).
Remove dowels pins (5).



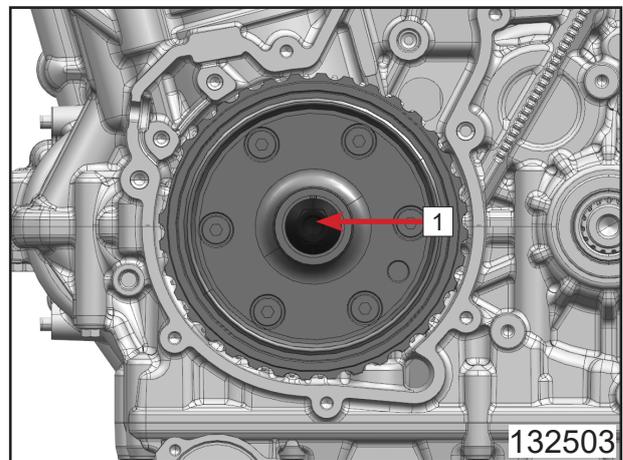
13.2.22 Removing the Timing Chain Rails

Remove guide rail (1) upward.
Remove screw (2).
Remove tensioning rail (3) with support bushing upward.

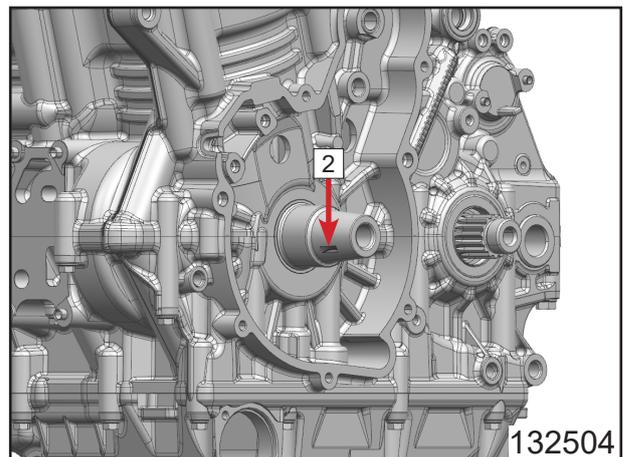


13.2.23 Removing the Rotor

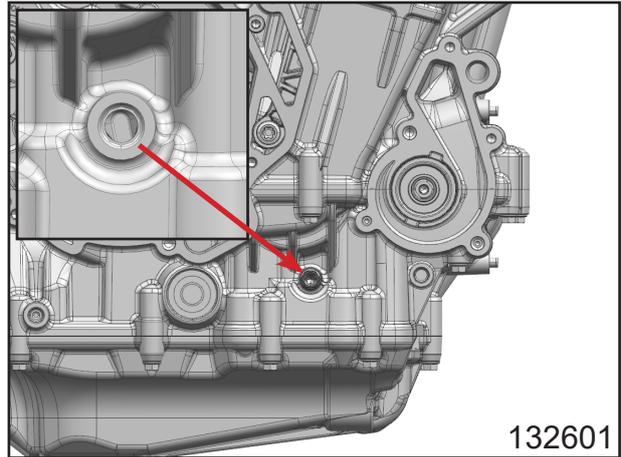
Remove screw (1).
Mount special tool (pressing tool).
Mount special tool (puller) on the rotor.
Hold it tight using the special tool and pull off the rotor by turning the screw in.
Remove the special tool.



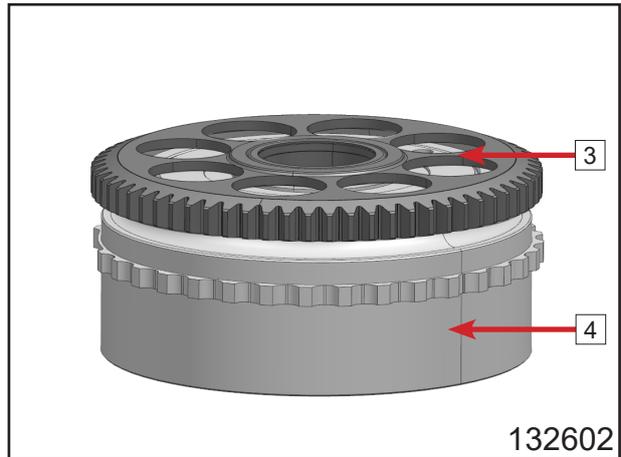
Remove woodruff key (2).



Remove special tool (locking screw).



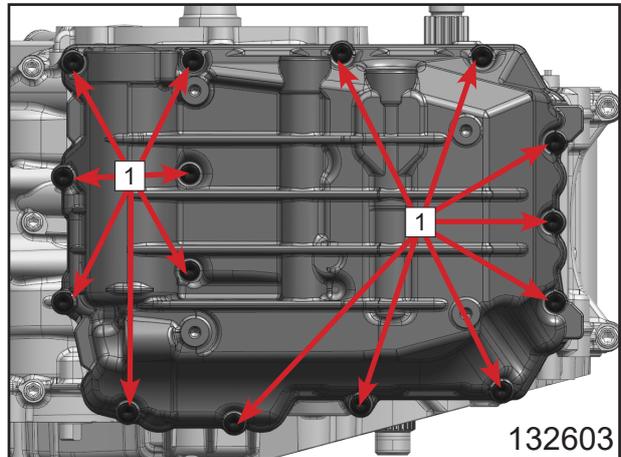
Take off freewheel gear (3) from rotor (4).



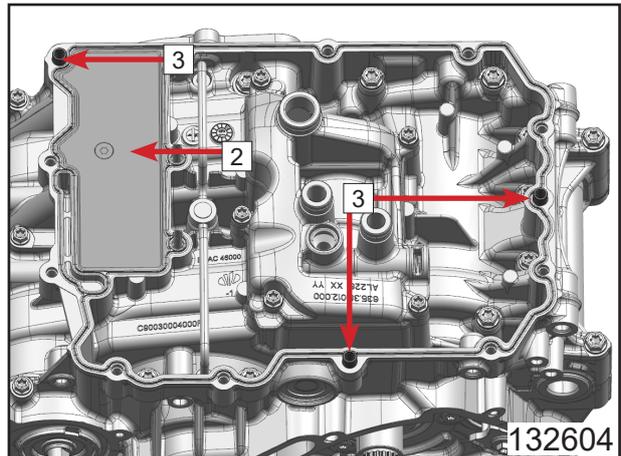
13.2.24 Removing the Oil Pan

Remove screws (1).

Take off oil pan.

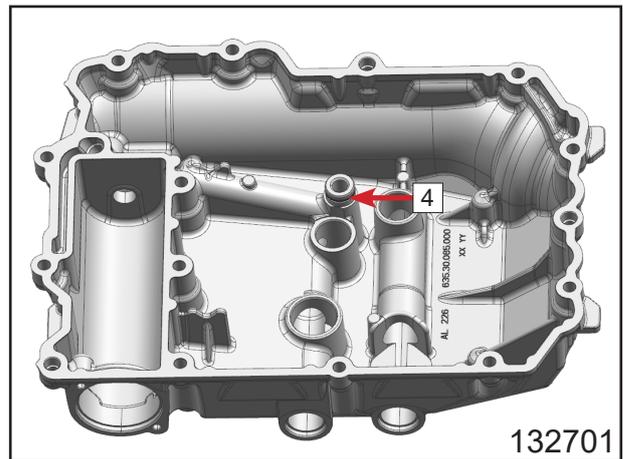


Take off gasket (2).
Remove dowels (3).

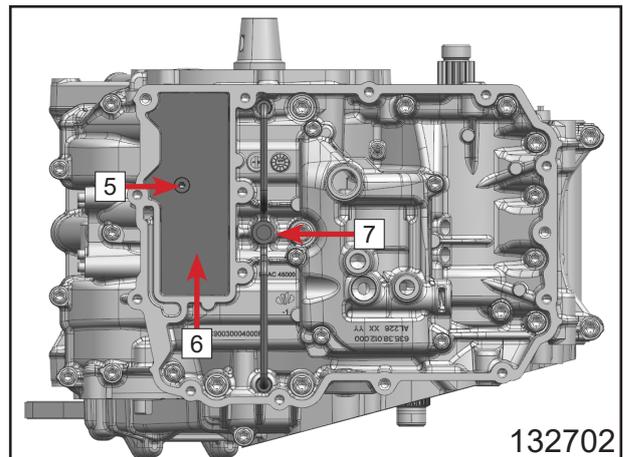


13 Engine Assembly

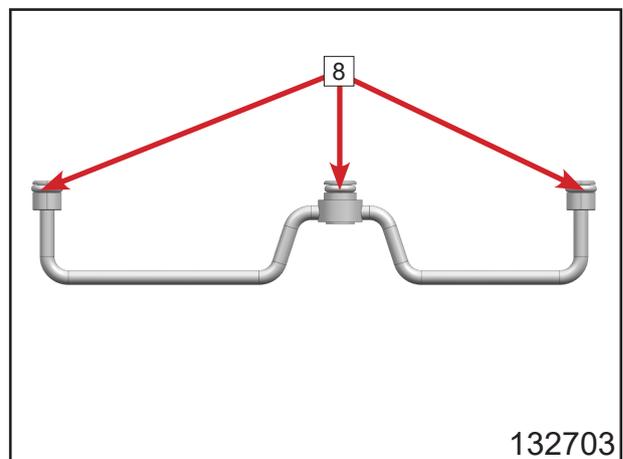
Remove O-ring (4).



Remove screw (5).
Remove pressure plate (6).
Take off oil line (7).

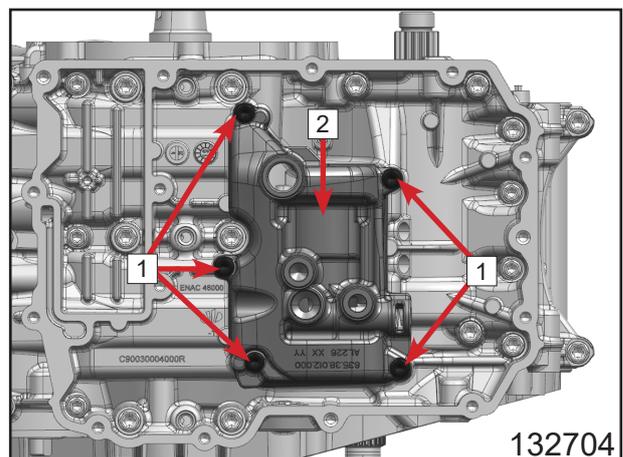


Take off O-rings (8) from the oil line.

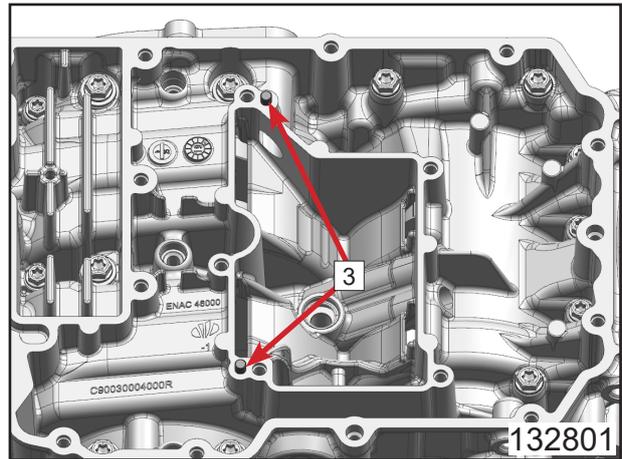


13.2.25 Removing the Oil Pump Assembly

Remove screws (1).
Take off oil pump assembly (2).

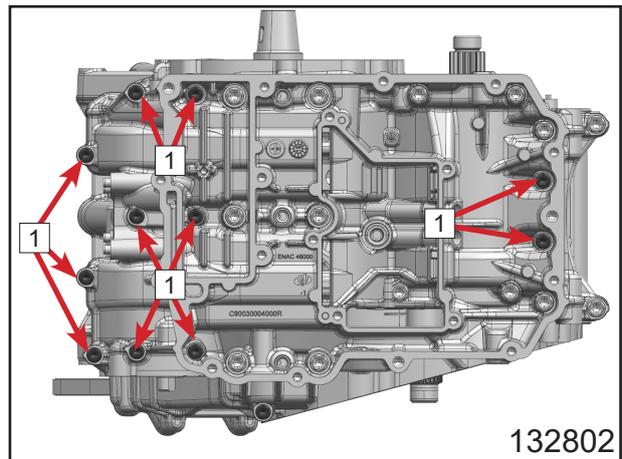


Remove dowel pins (3).

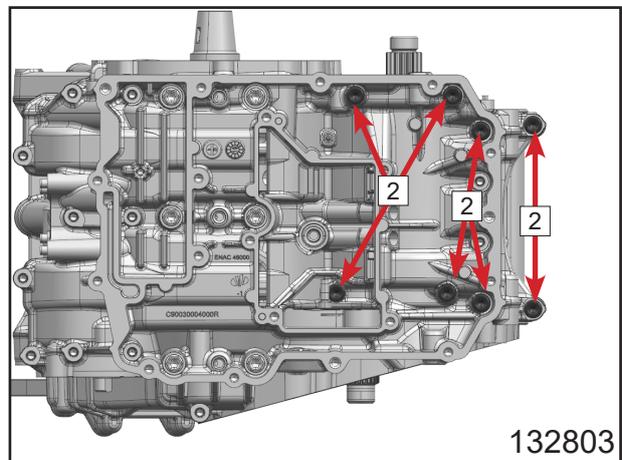


13.2.26 Removing the Engine Case Downwards

Remove screws (1).

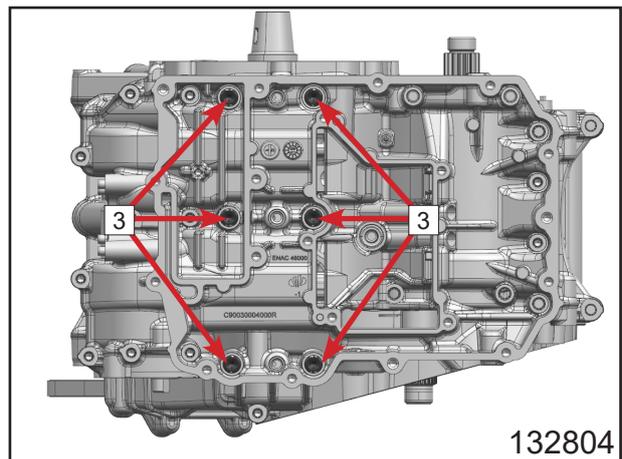


Remove screws (2).



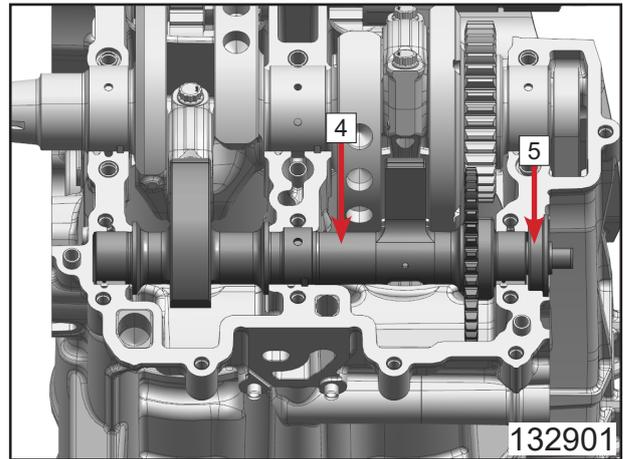
Loosen screws (3) in a crisscross pattern and remove them with the washers. Take off lower section of the engine case.

NOTE
Ensure that the bearing shells remain in place.



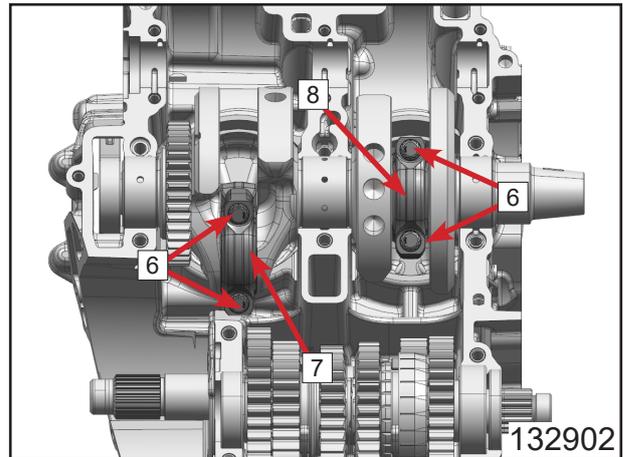
13 Engine Assembly

Remove balancer shaft (4) with radial shaft seal ring (5).

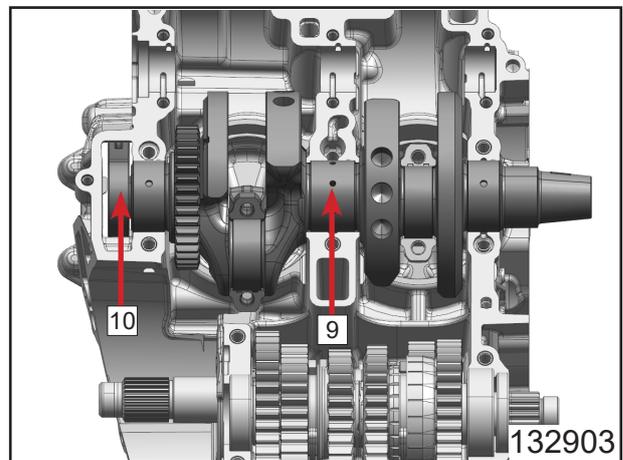


Remove screws (6).
Take off conrod bearing covers (7) and (8).

NOTE
The conrod bearing covers and connecting rods are marked together and must never be mixed up.

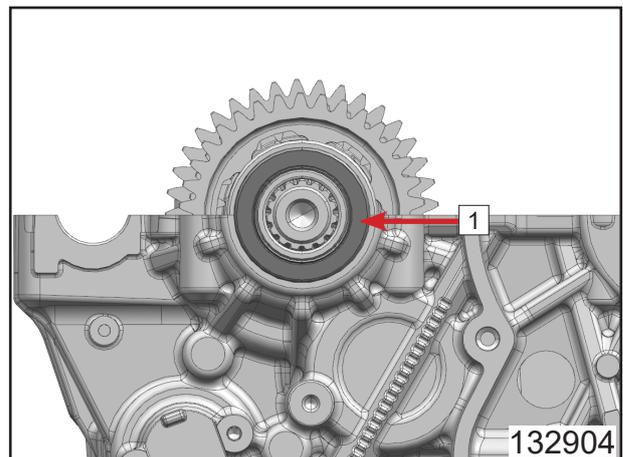


Remove crankshaft (9) with timing chain (10).

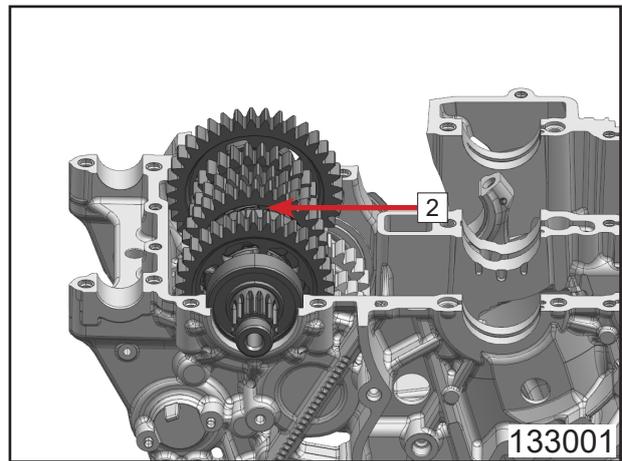


13.2.27 Removing the Transmission Shafts

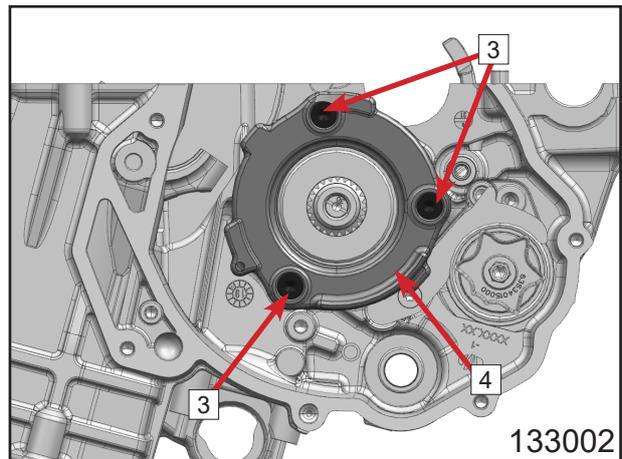
Remove radial shaft seal ring (1).



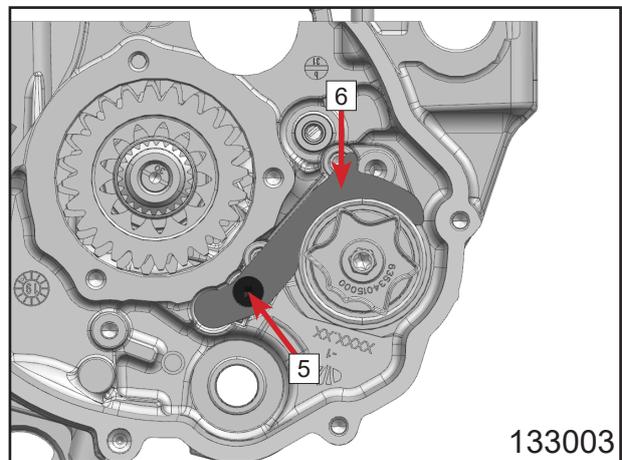
Take off countershaft (2).



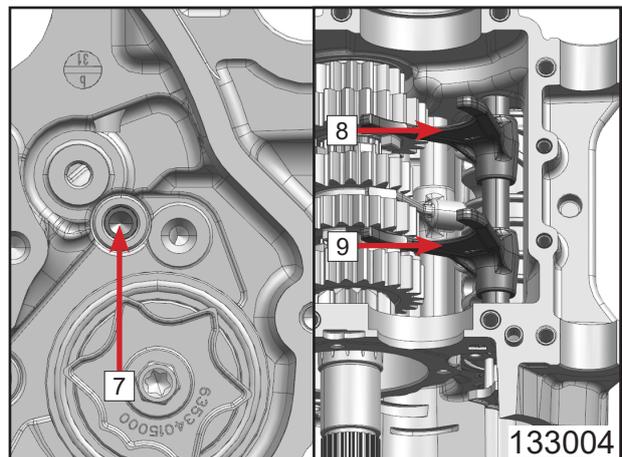
Remove screws (3).
Take off bearing support (4) with bearing.



Remove screw (5).
Take off retaining bracket (6).

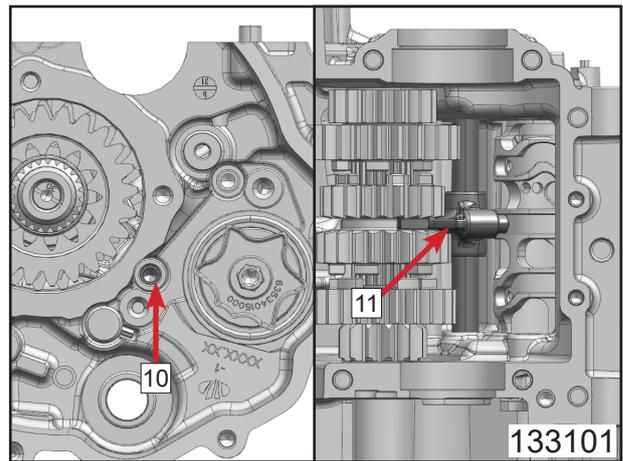


Mount appropriate M8 screw in the shift rail (7).
Remove shift rail (7).
Remove shift forks (8) and (9).

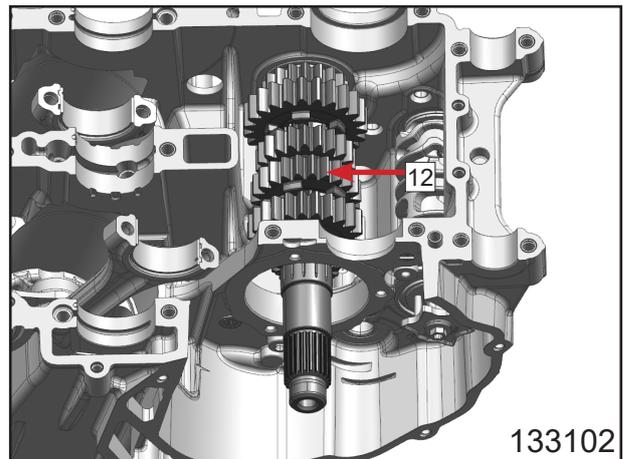


13 Engine Assembly

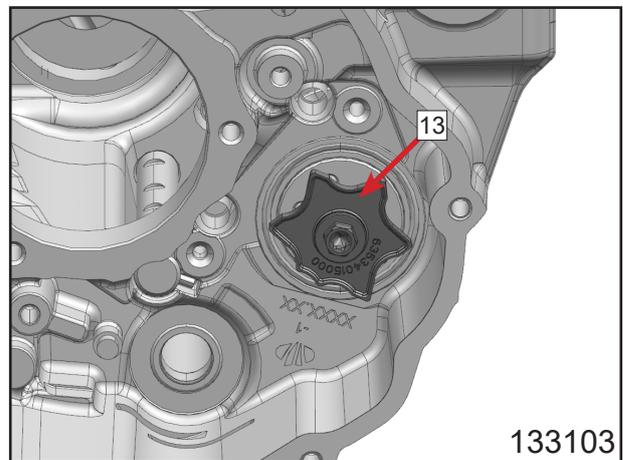
Mount appropriate M8 screw in the shift rail (10).
Remove shift rail (10).
Remove shift forks (11).



Remove main shaft (12).

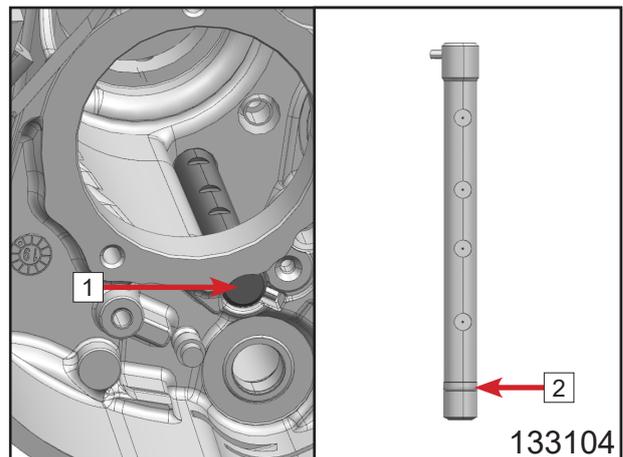


Remove shift drum (13).



13.2.28 Removing Oil Spray Tube

Remove oil spray tube (1).
Remove O-ring (2).



13.2.29 Removing the Piston

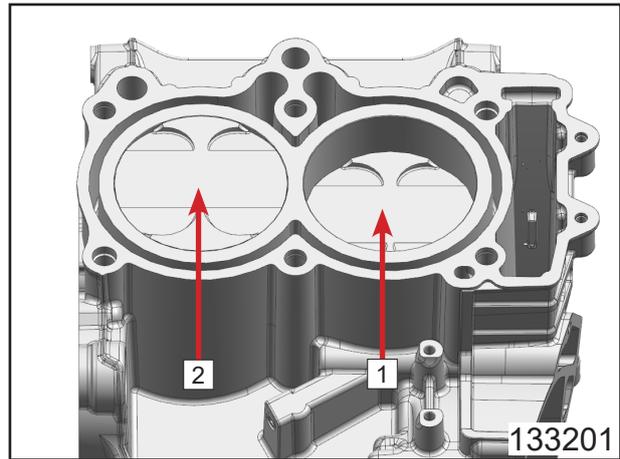
Swing the upper section of the engine case upward.

Mark the piston (1) and (2).

Remove any deposits in the upper area of the cylinders.

NOTE

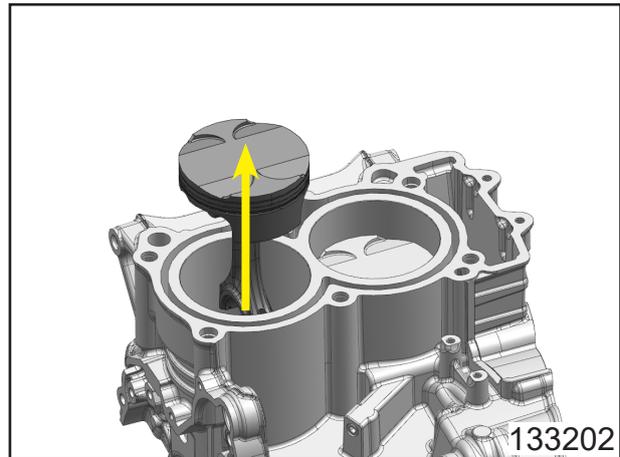
Ensure that the cylinders are not damaged.



Remove piston with connecting rod upward out of the cylinder.

NOTE

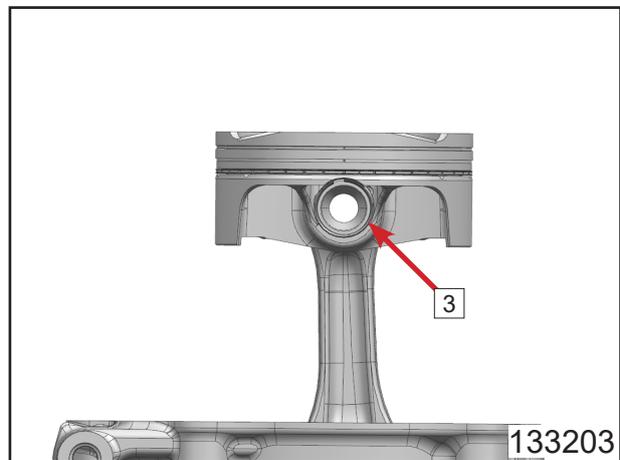
Make sure that the connecting rod does not damage the cylinder.



Clamp connecting rod in the vise.

Guide: Use soft jaws.

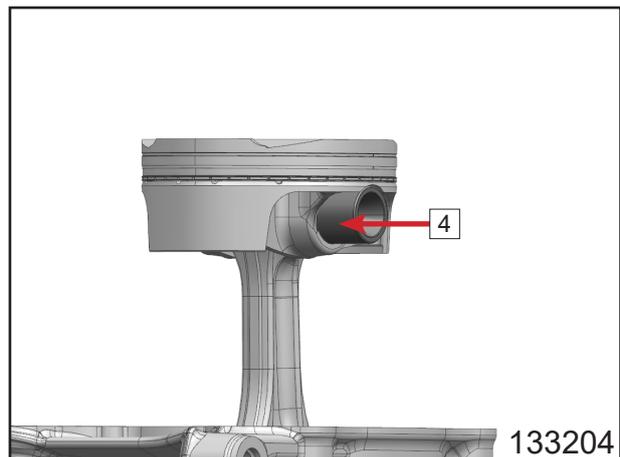
Remove piston (3).



Remove piston pin (4).

Take off the piston.

Place piston and connecting rod sets separately.



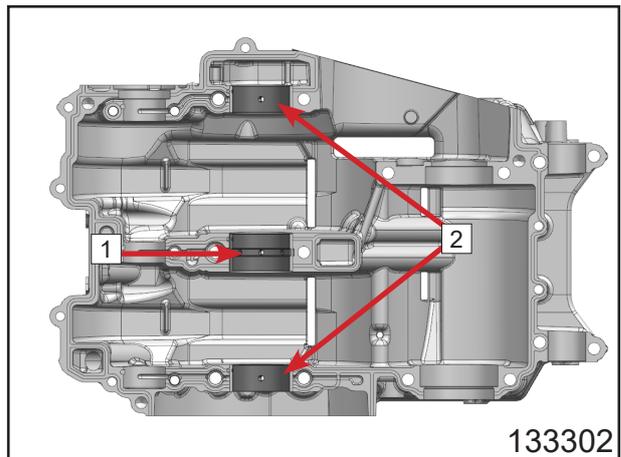
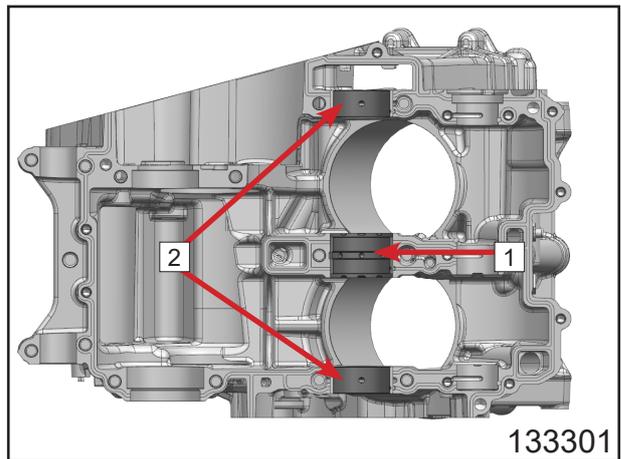
13 Engine Assembly

13.3 Working on Individual Parts

13.3.1 Checking the Radial Clearance of Crankshaft Bearings

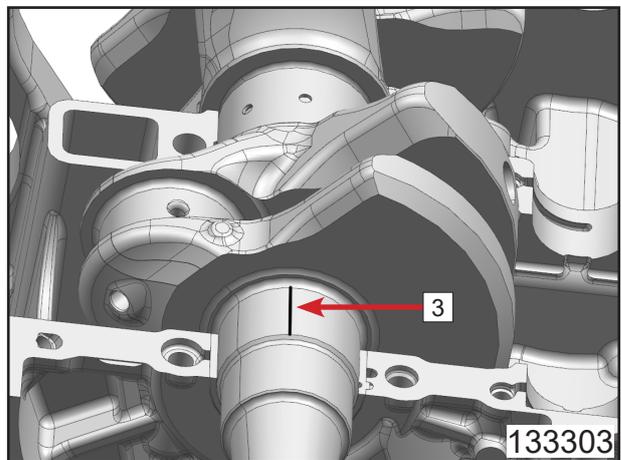
Remove any remnants of sealing compound and clean the sections of the engine case thoroughly.

Clean bearing shells (1) and (2).



Position crankshaft in the upper section of the engine case.

Insert plastigauge clearance gauge (3) 90° offset to the bearing joint.



Mount lower engine case.

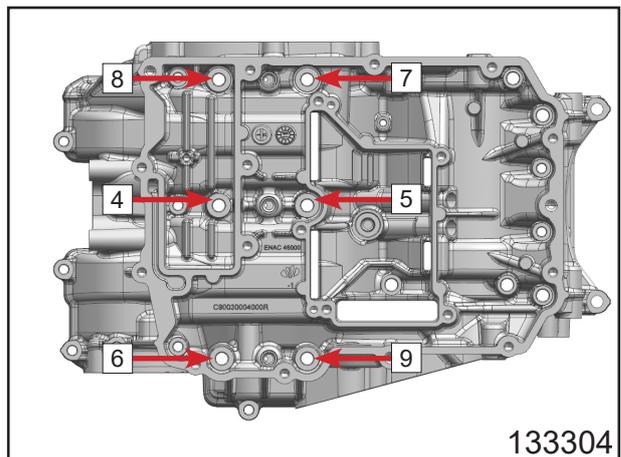
mount screws with washers and tighten in the order (4) to (9).

guideline:

Screw,engine case	M8×90	25N•m(18.4lbf•ft) Apply thread locker
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NOTE

Do not twist crankshaft.



CFMOTO

Remove lower section of the engine case again. Compare plastigauge clearance gauge with the data on the packaging.

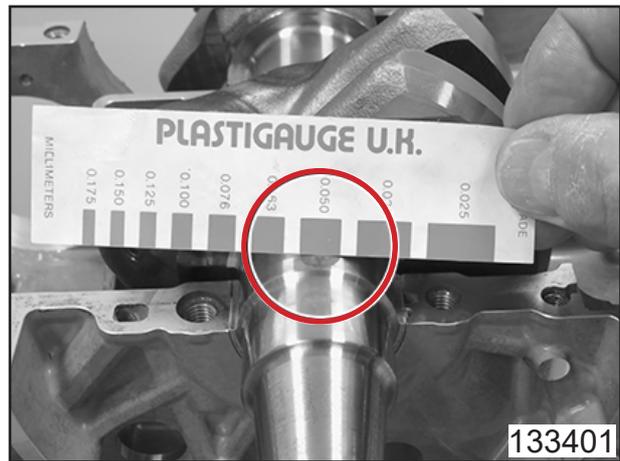
Guideline :

Crankshaft bearing	
New condition	0.030mm~0.060mm
Service limit	0.080mm

NOTE

The width of the plastigauge clearance gauge indicates the bearing play.

Clean the part.



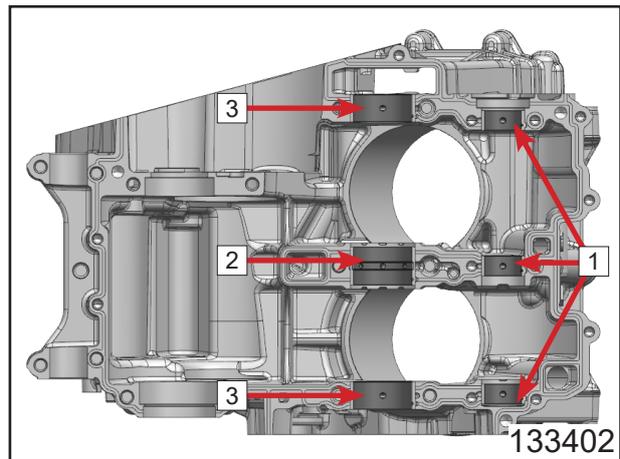
133401

13.3.2 Changing the Main Bearing Shells

Remove bearing shells (1) of the balancer shaft from the upper section of the engine case.

Remove bearing shells (2) and (3) of the crankshaft from the upper section of the engine case.

Clean seat of the bearing shells.



133402

Remove bearing shells (1) of the balancer shaft from the lower section of the engine case.

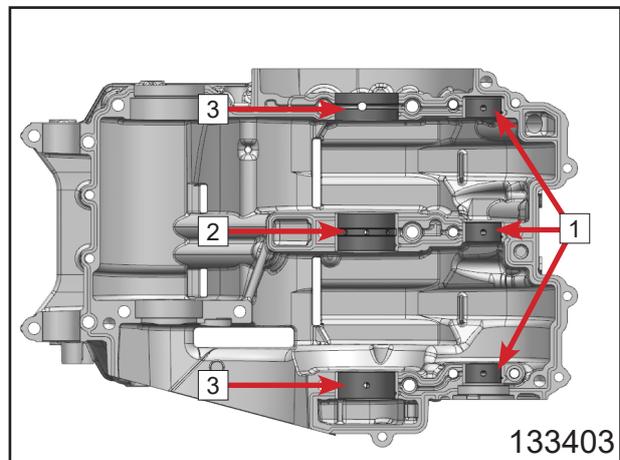
Remove bearing shells (2) and (3) of the crankshaft from the lower section of the engine case.

Clean seat of the bearing shells.

Select the main bearing shells.

Mount new bearing shells (2) and (3) in the lower section of the engine case.

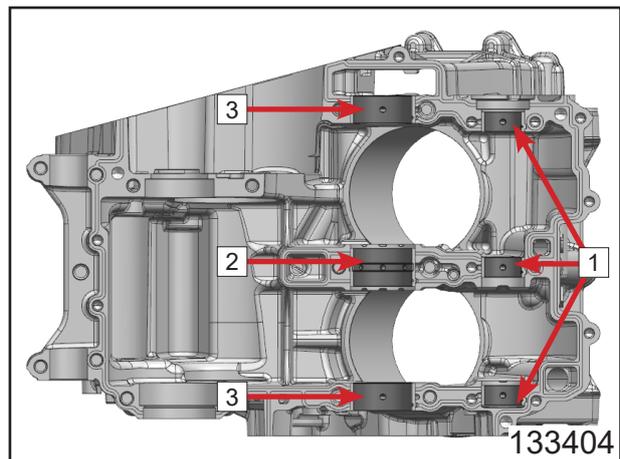
Mount new bearing shells (1) in the lower section of the engine case



133403

Mount new bearing shells (2) and (3) in the upper section of the engine case.

Mount new bearing shells and (1) in the upper section of the engine case.



133404

13.3.3 Checking the Balancer Shaft

Clean all parts well.

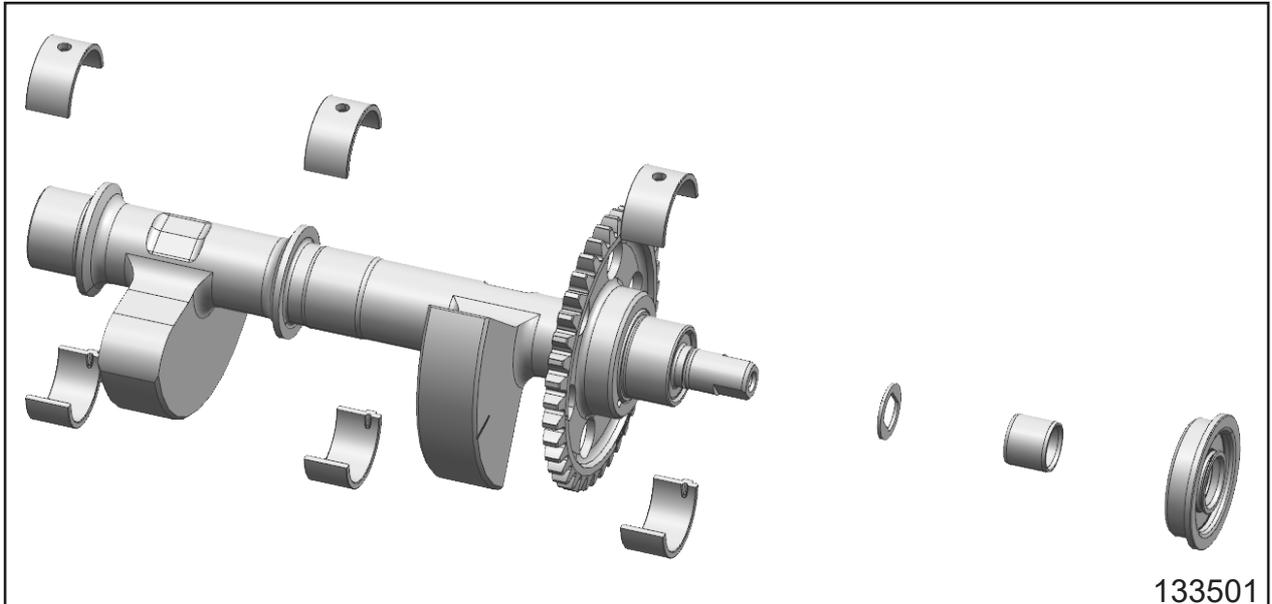
Check the pivot points of the balancer shaft for damage and wear.

If there is damage or wear:

Change the balancer shaft.

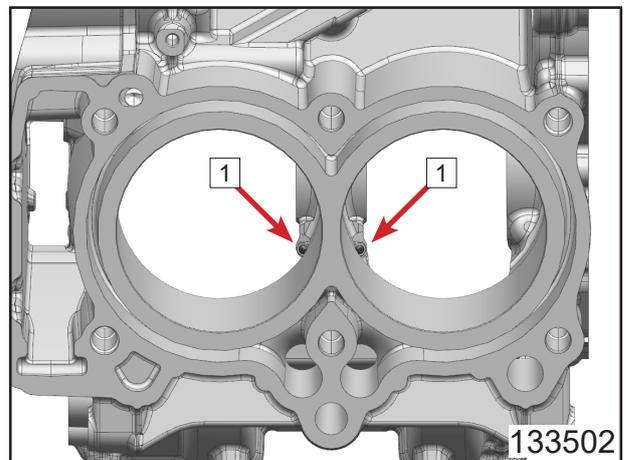
Check the bearing shells of the balancer shaft for damage, abrasion and wear.

If there is damage, abrasion or wear, change bearing shells.

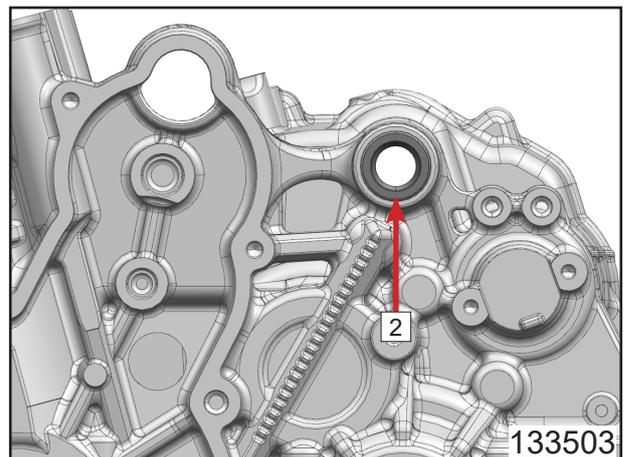


13.3.4 Working on the Upper Section of the Engine Case

Remove oil nozzles (1).



Remove radial shaft seal ring (2) of the shift shaft.



CFMOTO

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

Warm the section of the engine case.

Guideline

130 °C

Knock the section of the engine case with the right and left side against a level wooden board. This will cause the bearings to drop out of the bearing seats.

NOTE

Any bearings that remain in the section of the engine case must be removed using a suitable tool.

A washer is located behind the bearing (7). Make sure that this washer is not damaged.

Warm the section of the engine case again.

Guideline

130 °C

Insert new cold bearings (3) and (4) in the bearing seat on the left side of the heated section of the engine case; if necessary, use a suitable pressing tool to push them all the way in and make them flush.

NOTE

When pressing in, ensure that the section of the engine case lies flat in order to prevent damage.

Only press the bearings in using the outer bearing race; otherwise, the bearings will be damaged when they are pressed in.

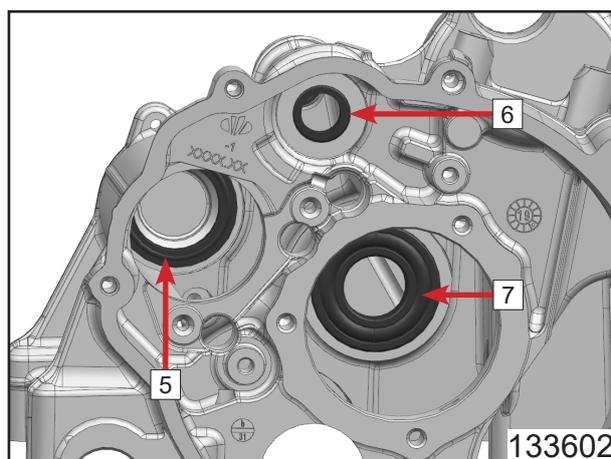
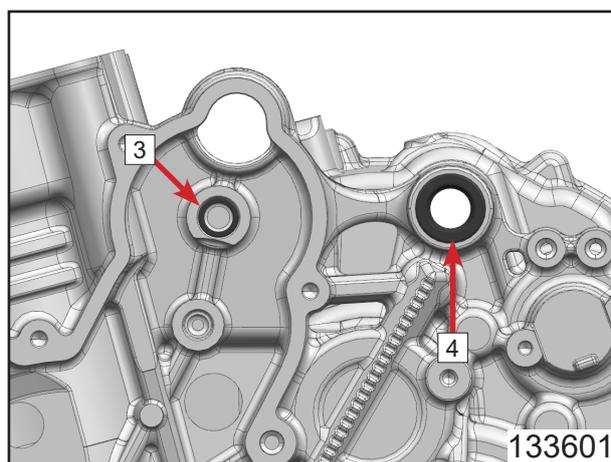
Insert new cold bearings (5), (6) and (7) in the bearing seat on the right side of the heated section of the engine case; if necessary, use a suitable pressing tool to push them all the way in and make them flush.

NOTE

Do not forget the washer under the bearing (7).

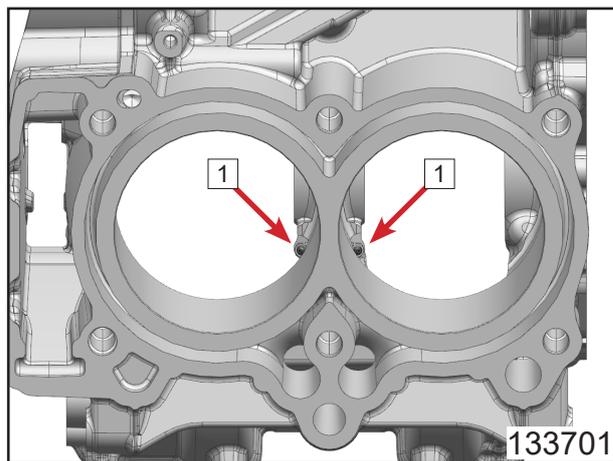
When pressing in, ensure that the section of the engine case lies flat in order to prevent damage.

Only press the bearings in using the outer bearing race; otherwise, the bearings will be damaged when they are pressed in.



After the section of the engine case has cooled, check that the bearings are firmly seated.

NOTE
If the bearings are not firmly seated after cooling, it is likely that they will rotate in the engine case when warm. In this case, the engine case must be replaced.

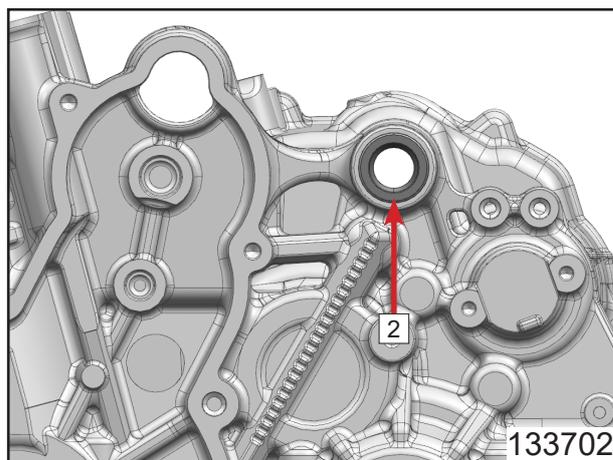


Press in new radial shaft seal ring (2) of the shift shaft from the outside to the inside with the open side facing in.

NOTE
The radial shaft seal ring must be flush on the outside.

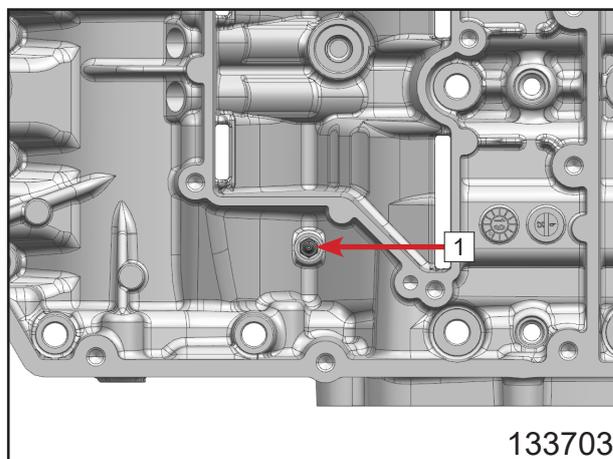
Blow compressed air through all oil channels and oil nozzles, and check that they are clear.

Mount and tighten oil nozzles (1).



Guideline

Oil nozzle for piston cooling	M5	2 N•m (1.5 lbf•ft) Apply thread locker
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13.3.5 Working on the Lower Section of the Engine Case

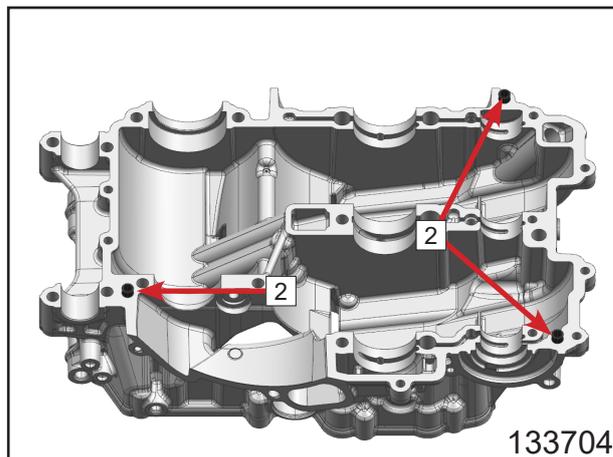
Remove oil nozzle (1).

Blow compressed air through all oil channels and oil nozzles, and check that they are clear.

Mount and tighten oil nozzle (1).

Guideline

Nozzle, engine vent	M5	2 N•m (1.5 lbf•ft) Apply thread locker
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Swivel section of the engine case.

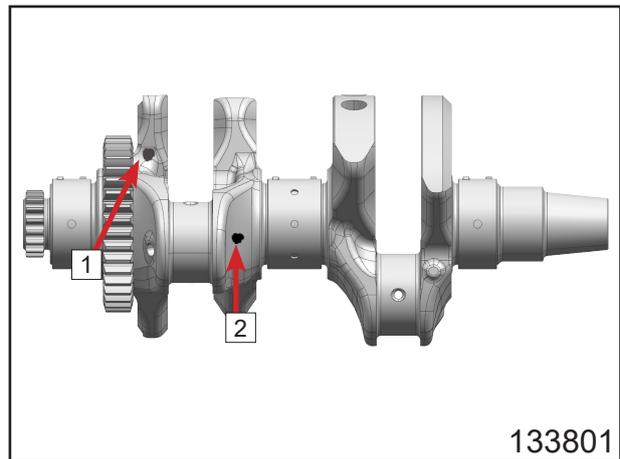
Check that dowel pins (2) are seated correctly.

13.3.6 Selecting the Main Bearing Shells

New crankshaft

Select the new bearing shells according to color coding (1).

NOTE
Color coding (2) refers to the conrod bearing.

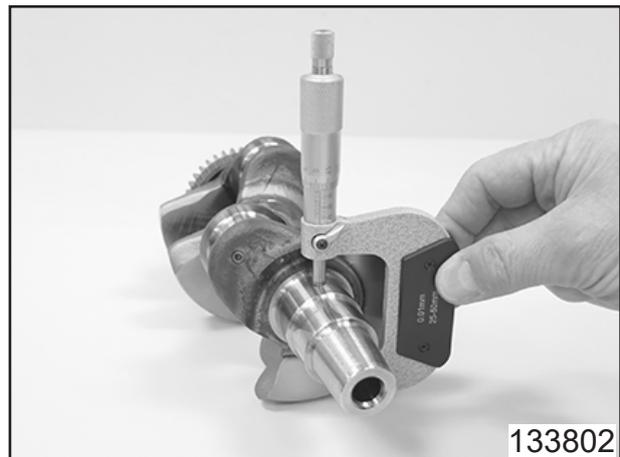


Used crankshaft

Measure all main bearing shells and select the new bearing shells accordingly.

Guideline

Crankshaft - main bearing diameter
Blue 37.985mm ~ 37.995 mm
Red 37.995mm ~ 38.005 mm



13.3.7 Installing the Primary Gear

Mount dowel pin (1) in the primary gear.

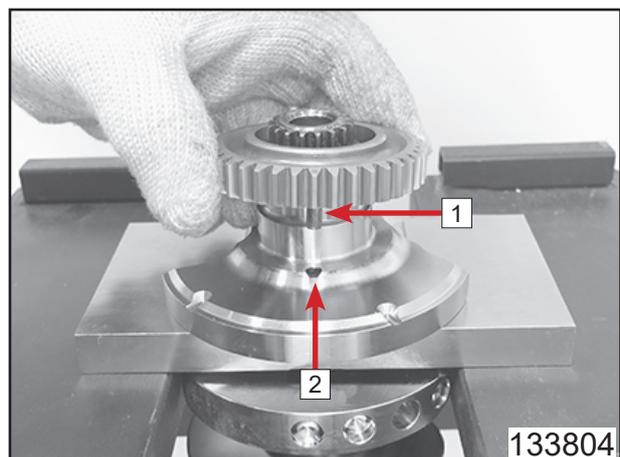
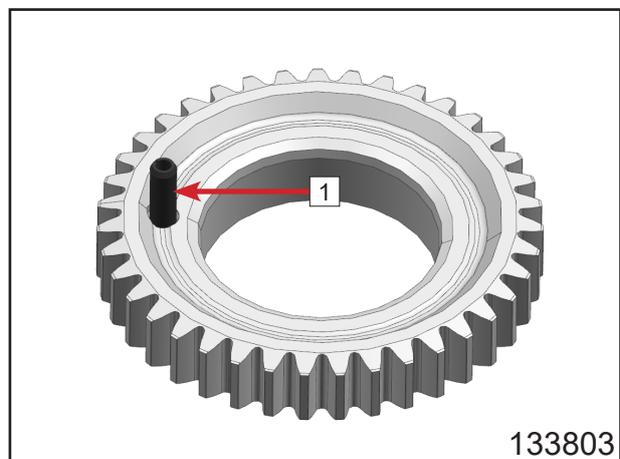
Position the crankshaft with special tool (Separator plate) in the press.

Heat up primary gear.

Guideline: 150 °C (302 °F)

Position primary gear on the crankshaft.

Dowel pin (1) engages in hole (2).



Mount primary gear all the way with special tool (Pressing tool).

The marking is visible after mounting.



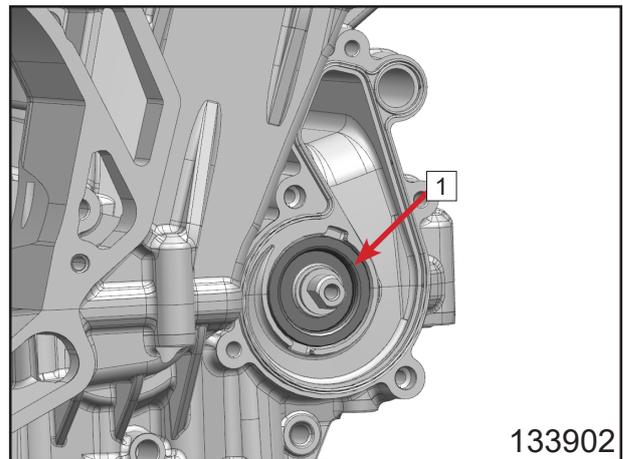
13.3.8 Installing and Changing Radial Shaft Seal Ring of Water Pump

Preparatory work

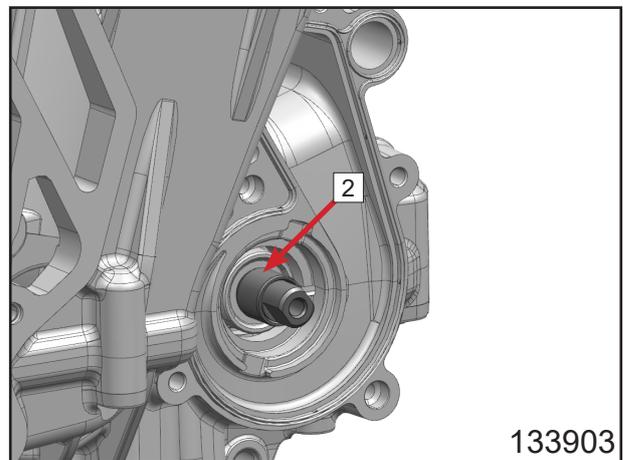
Remove the water pump impeller.

Main work

Remove radial shaft seal ring (1) of the water pump.



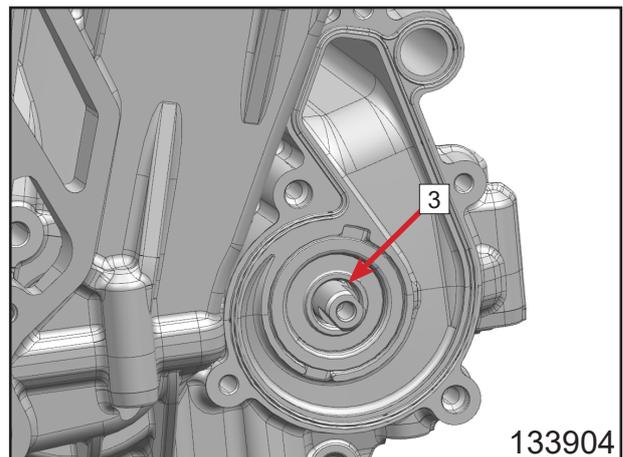
Remove water pump impeller (2).



Remove O-ring (3).

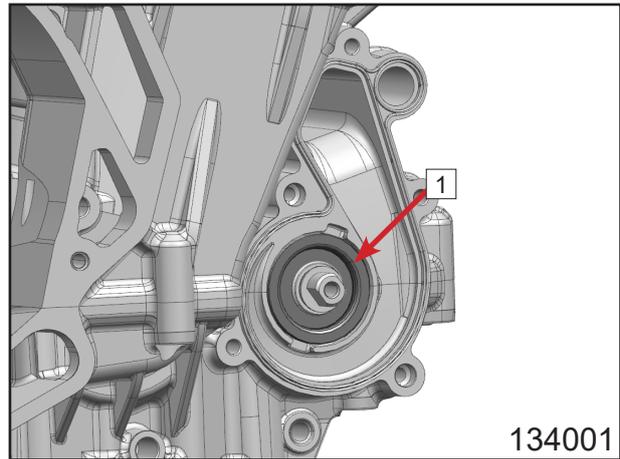
Grease and mount the new O-ring (3).

Apply long-life grease.



Grease and mount new radial shaft seal ring (1).

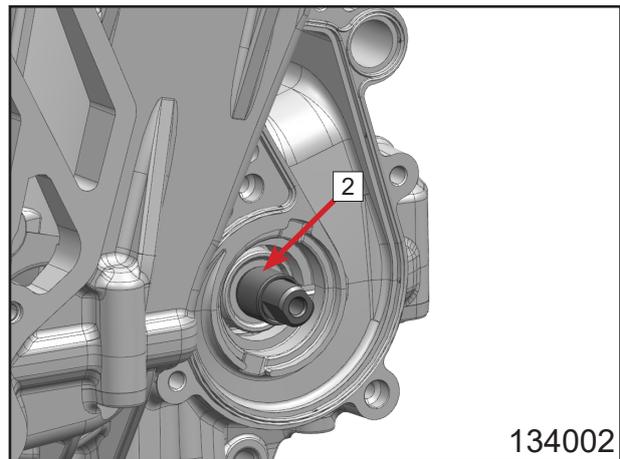
Apply long-life grease.



Mount the new water pump impeller (2).

Finishing work

Mount the water pump cover.

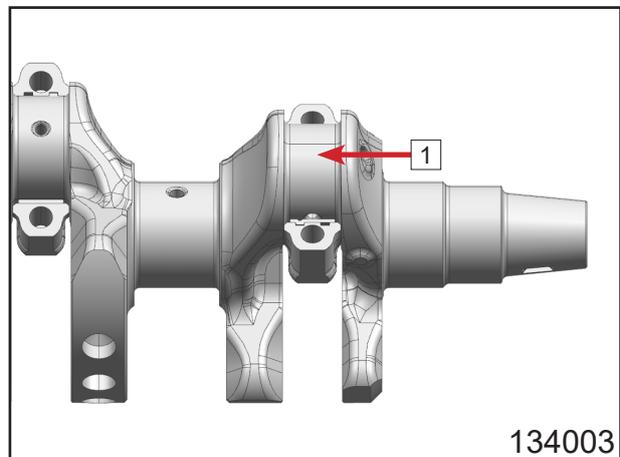


13.3.9 Checking the Radial Clearance of Lower Conrod Bearing

NOTE

Perform operations for both connecting rods.

Position the bearing shells. Insert Plastigauge clearance gauge (1) 90° offset to the bearing joint.



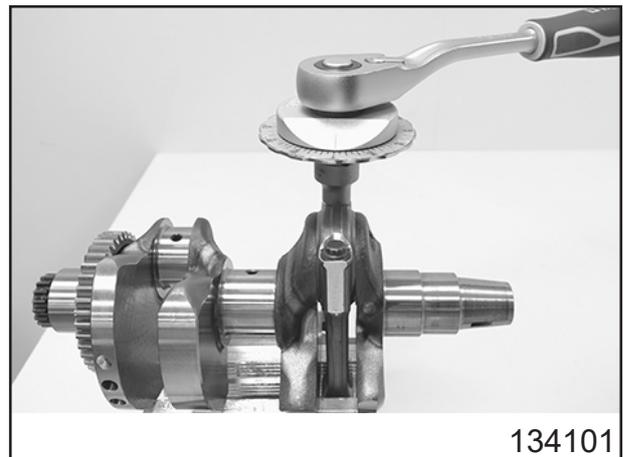
13 Engine Assembly

Position the conrod bearing cover. Mount and tighten the screws.

Guideline:

Screw, conrod bearing	M8	1st stage: 5 N•m (3.7 lbf•ft) 2nd stage: 15 N•m (11.1 lbf•ft) 3rd stage: 90°
		Apply to thread

Special tool :
Multi-tooth tool
Angle disc
NOTE
Do not twist connecting rod.



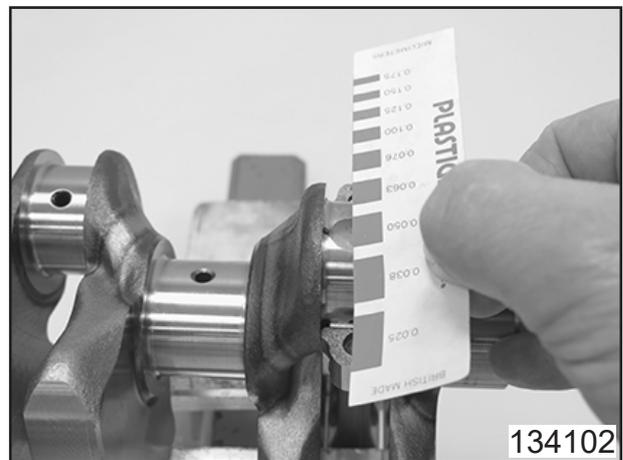
134101

Remove the conrod bearing cover again. Compare plastigauge clearance gauge with the data.

Guideline:

Connecting rod - radial clearance of lower conrod bearing
New condition:0.030mm~0.060 mm
Service limit:0.080 mm

NOTE
The width of the plastigauge clearance gauge indicates the bearing play.
Clean the parts.



134102

13.3.10 Changing the Conrod Bearing

NOTE
Perform operations for both connecting rods.

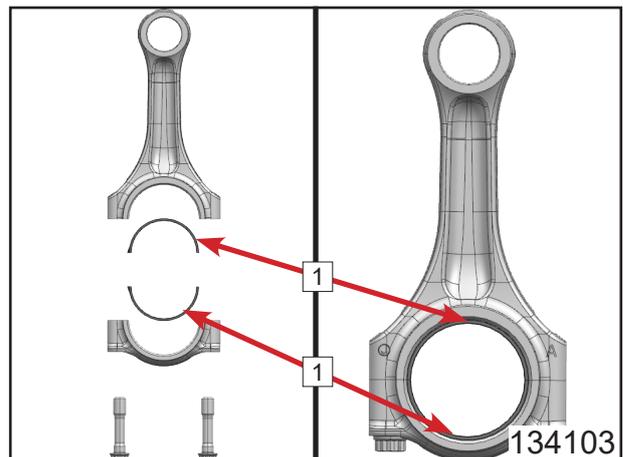
Condition

Connecting rod removed

Main work

Take off bearing cover and remove bearing shells (1).

NOTE
The conrod bearing cover and connecting rod are jointly marked. Make sure that each conrod bearing cover is mounted on the same connecting rod.

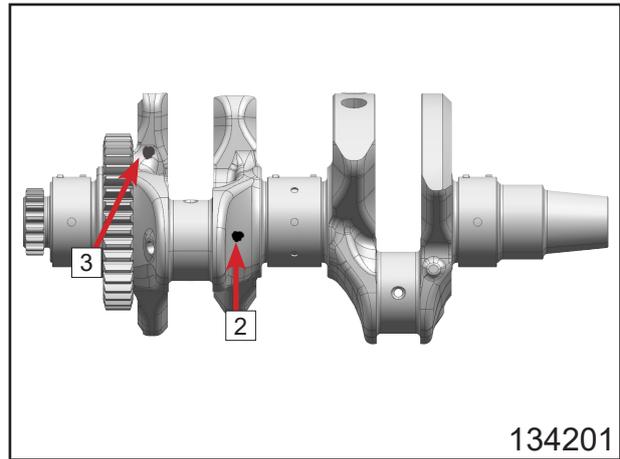


134103

New crankshaft

Select the new bearing shells according to color coding (2).

NOTE
Color coding (3) refers to the crankshaft bearing.



Used crankshaft

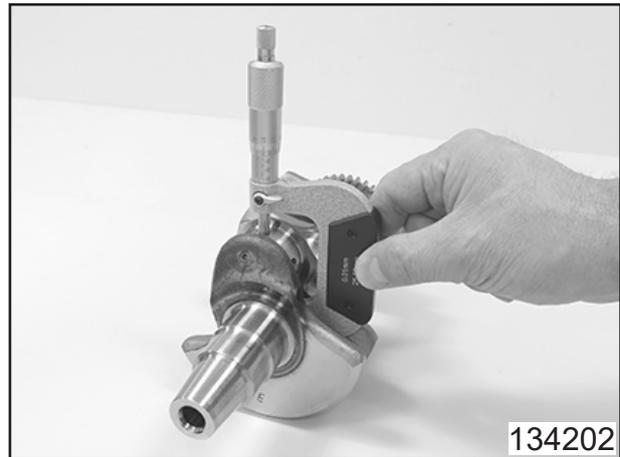
Measure the crank pin diameter and select the new bearing shells accordingly.

Guideline:

Crankshaft - crank pin diameter
Blue: 37.983 mm~ 37.993 mm
Red: 37.993 mm~ 38.003 mm

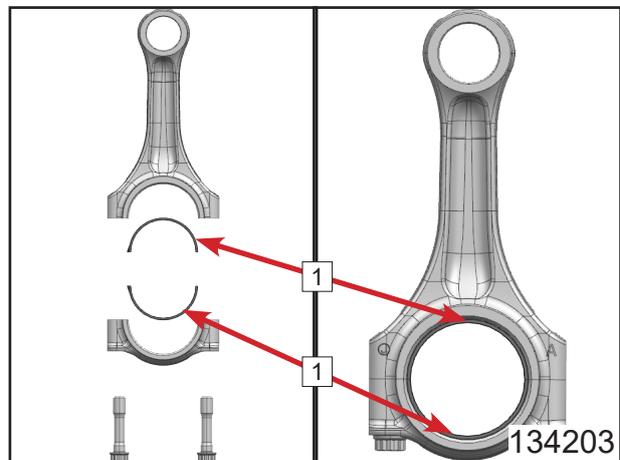
Check pivot points for damage and abrasion.

If damage or abrasion is discernible, change the crankshaft.



Mount new bearing shells (1) on conrod bearing cover and connecting rod.

NOTE
The conrod bearing cover and connecting rod are jointly marked. Make sure that each conrod bearing cover is mounted on the same connecting rod.



Finishing work

Check the radial clearance of lower conrod bearing.

13.3.11 Checking/Measuring the Cylinder

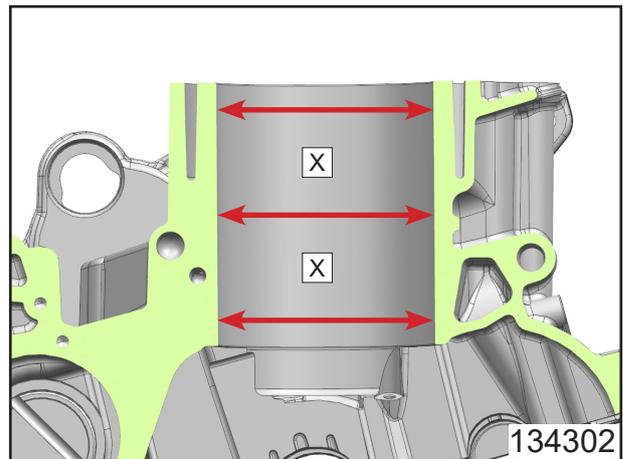
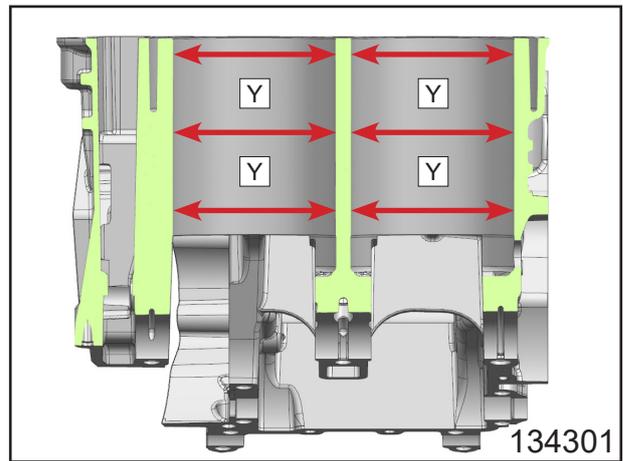
Check the O-ring of the chain adjuster for damage and wear.

If there is damage or wear: Change the O-ring.

Check the cylinder bearing surface for damage.

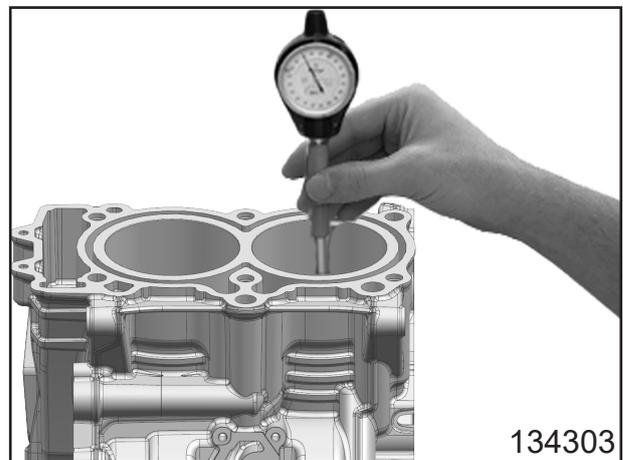
If the cylinder bearing surface is damaged: Change the cylinder and piston.

Measure the bore diameter at several locations on the (X)- and (Y)-axes using a micrometer to identify oval wear.



Guideline:

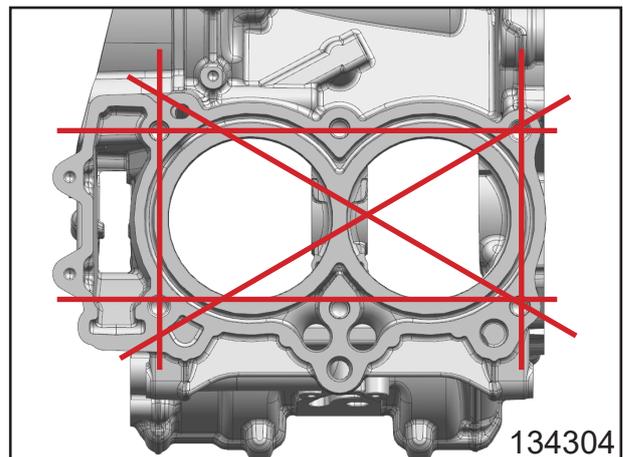
Cylinder - bore diameter
Size: 88.000mm~88.012 mm



Using a straightedge and the special tool (Feeler gauge), check the sealing surface of the cylinder head for distortion.

Cylinder/cylinder head - sealing area service limit
≤ 0.05 mm

If the measured value exceeds service limit, change engine case.



13.3.12 Checking/Measuring the Piston

Check the piston bearing surface for damage.

If the piston bearing surface is damaged:
Replace the piston and, if necessary, the cylinder.

Check that the piston rings move easily in the piston ring grooves.

If the piston ring is stiff: Clean the piston ring groove.

NOTE

An old piston ring can be used to clean the piston ring groove.

Check the piston rings for damage.

If the piston ring is damaged: Change the piston ring.

NOTE

Mount the piston ring with the marking facing upward.

Use the special tool (Feeler gauge) to measure clearance (A) of the piston rings in the piston ring groove.

Guideline

Piston ring - groove clearance
First ring (rectangular ring) ≤ 0.08 mm (≤ 0.0031 in)
Second ring (lower compression ring) ≤ 0.08 mm (≤ 0.0031 in)
Oil scraper ring ≤ 0.06 mm (≤ 0.0024 in)

If clearance (A) is larger than the specified value:

Change the piston and piston rings.

Check/measure the cylinder.

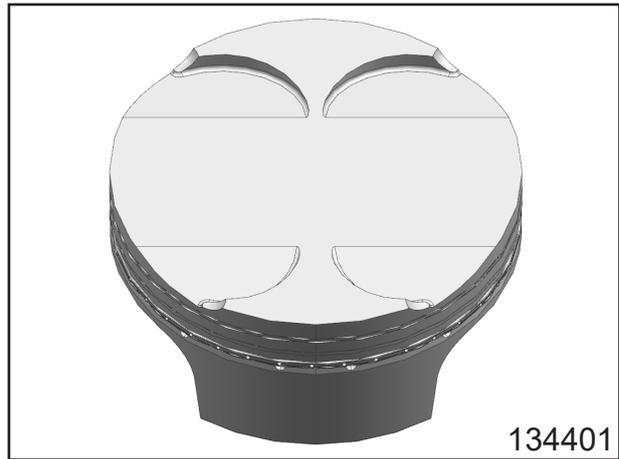
Check piston pin for discoloration, signs of wear or flaking of the coating.

If the piston pin exhibits significant discoloration/signs of wear, or the coating is flaking: Change the piston pin.

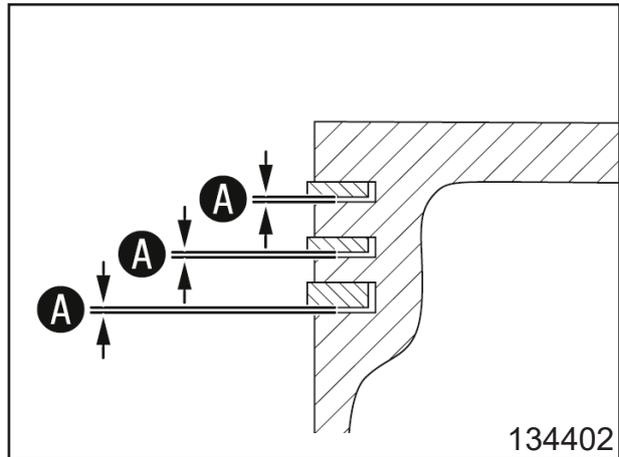
Place the piston pin in the connecting rod and check the seating for play.

If the piston pin seating has excessive play:

Change the connecting rod and piston pin.



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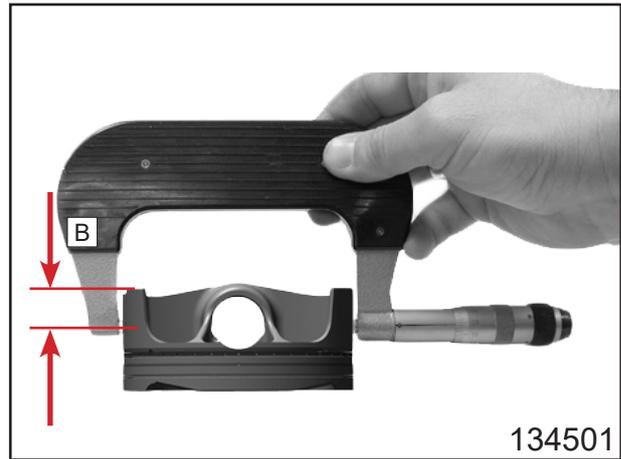


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Measure the piston at the piston skirt, at right angles to the piston pin, at a distance (B).

Guideline

Piston - diameter
Size
87.920mm~ 87.980 mm
Distance (B)
6 mm (0.24 in)



13.3.13 Checking the Piston Ring End Gap

Remove the piston ring from the piston.

Place the piston ring in the cylinder and align with the piston.

Guideline

Below the upper edge of the cylinder
10 mm

Measure end gap (A) with a feeler gauge.

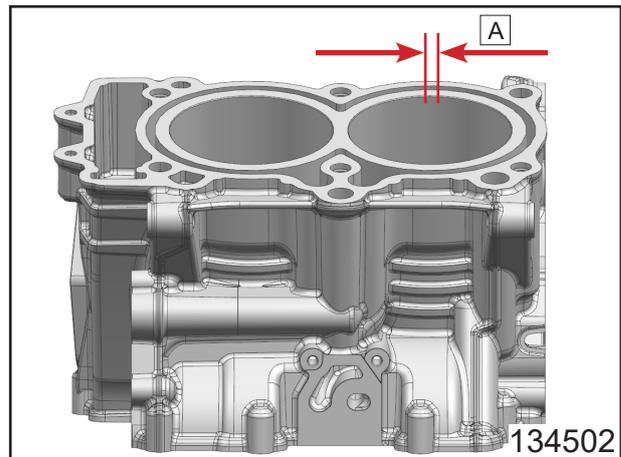
Guideline

Piston ring end gap
Compression rings: ≤ 0.80 mm
Oil scraper ring: ≤ 1.00 mm

If the end gap is greater than the service limit: Check/measure the cylinder.

If cylinder wear is within the service limit: Change the piston ring.

Mount the piston ring with the marking facing toward the piston head.



13.3.14 Determining the Piston/Cylinder Fit Clearance

Check/measure the cylinder.

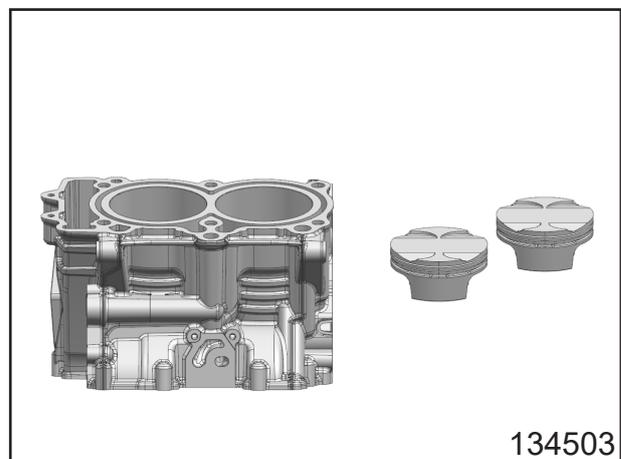
Check/measure the piston.

The smallest piston/cylinder fit clearance is the result of the smallest cylinder bore diameter minus the largest piston diameter.

The largest piston/cylinder fit clearance is the result of the largest cylinder bore diameter minus the smallest piston diameter.

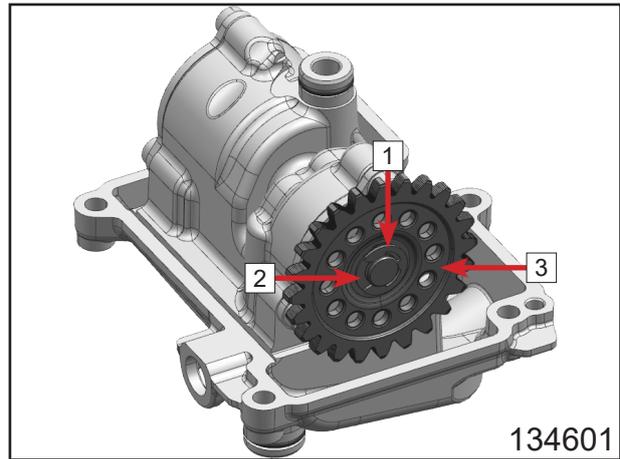
Guideline

Piston/cylinder - fit clearance
New condition: 0.035mm~0.070 mm
Service limit: 0.10 mm

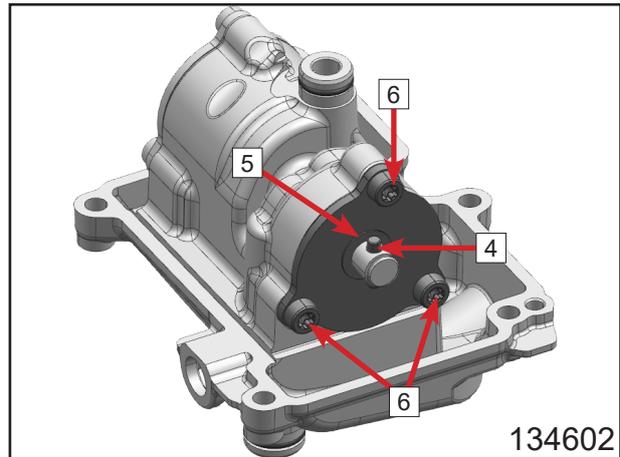


13.3.15 Removing the Oil Pumps

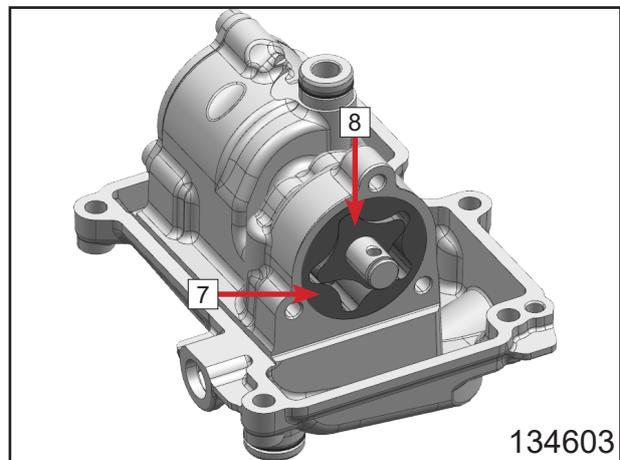
Remove lock ring (1) and washer (2).
Take off oil pump gear (3).



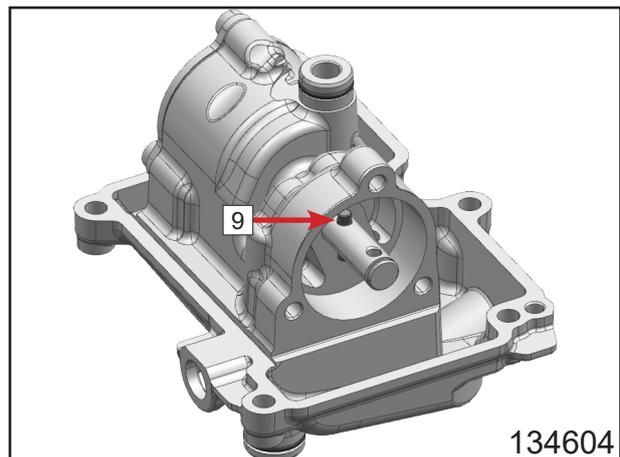
Remove pin (4) and washer (5).
Remove screws (6).
Take off the oil pump cover.



Remove external rotor (7).
Remove internal rotor (8).

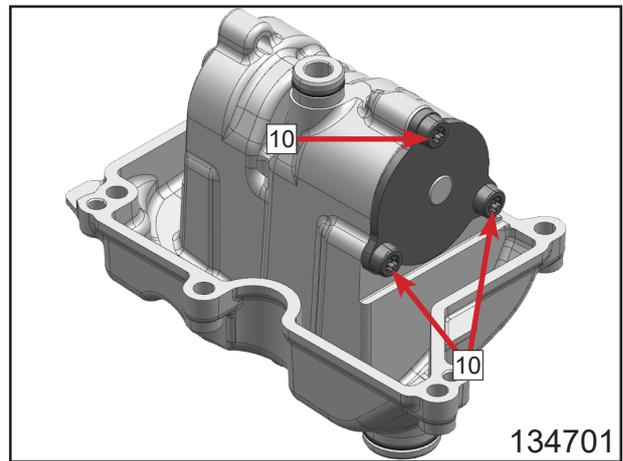


Remove pin (9).

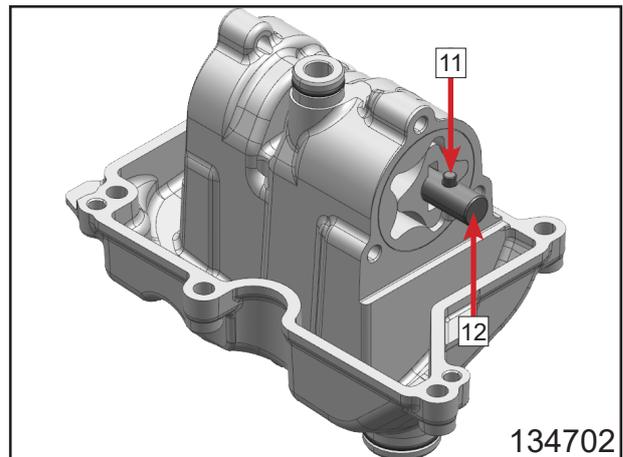


13 Engine Assembly

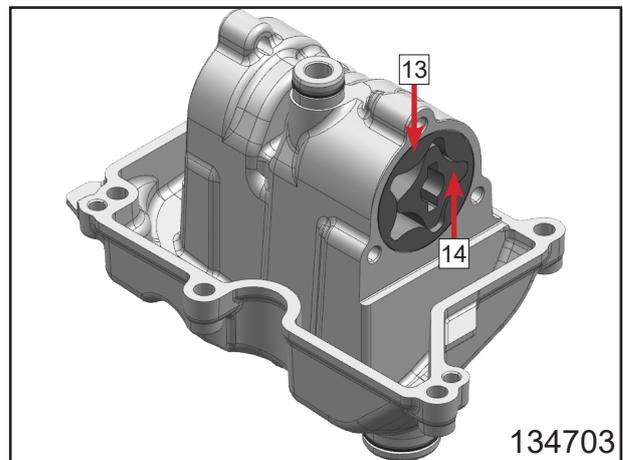
Remove screws (10).
Take off the oil pump cover.



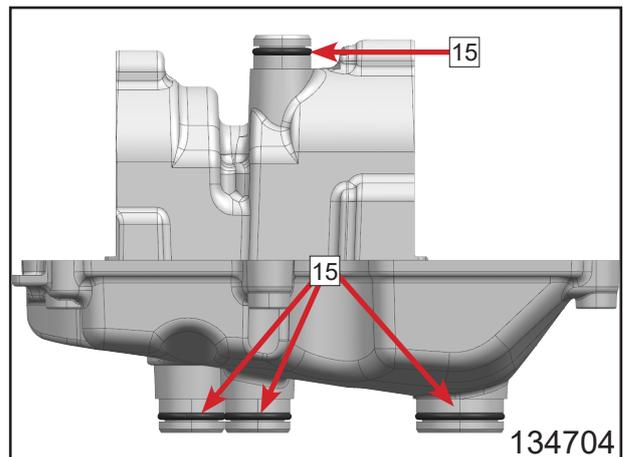
Remove pin (11) and oil pump shaft (12).



Remove external rotor (13) and internal rotor (14).



Remove O-rings (15).

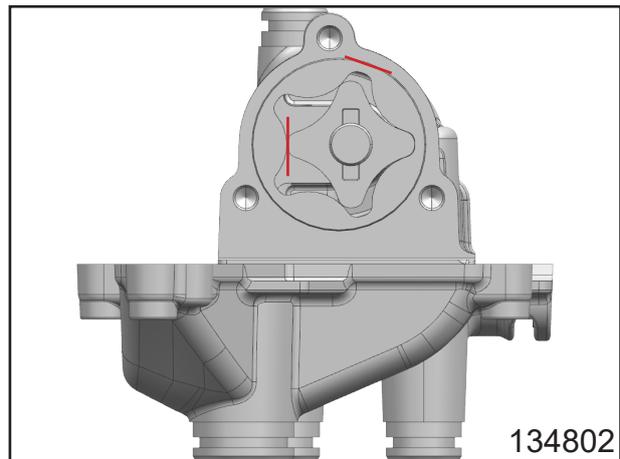
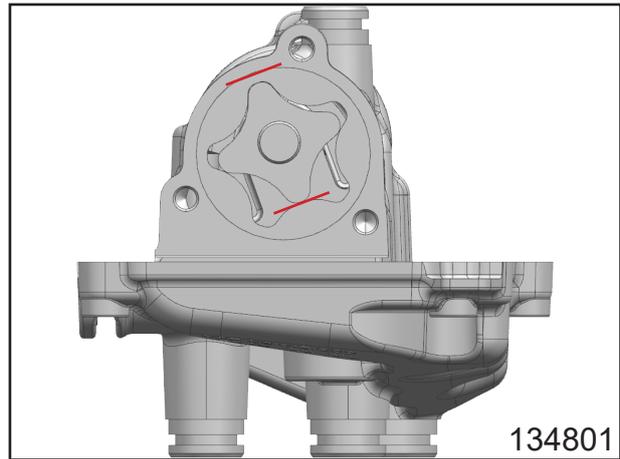


13.3.16 Checking the Oil Pumps

Use a feeler gauge to measure the play between the external rotor and oil pump housing as well as between the external rotor and internal rotor.

Oil pump
Play between external rotor and oil pump housing: ≤ 0.15 mm
Clearance, external rotor/internal rotor: ≤ 0.20 mm
Axial play: 0.03mm~0.08 mm

If the measured value exceeds limit:
Change the oil pump and, if necessary, the oil pump housing.



Check the internal rotor and external rotor of oil pumps (1) for damage and wear.

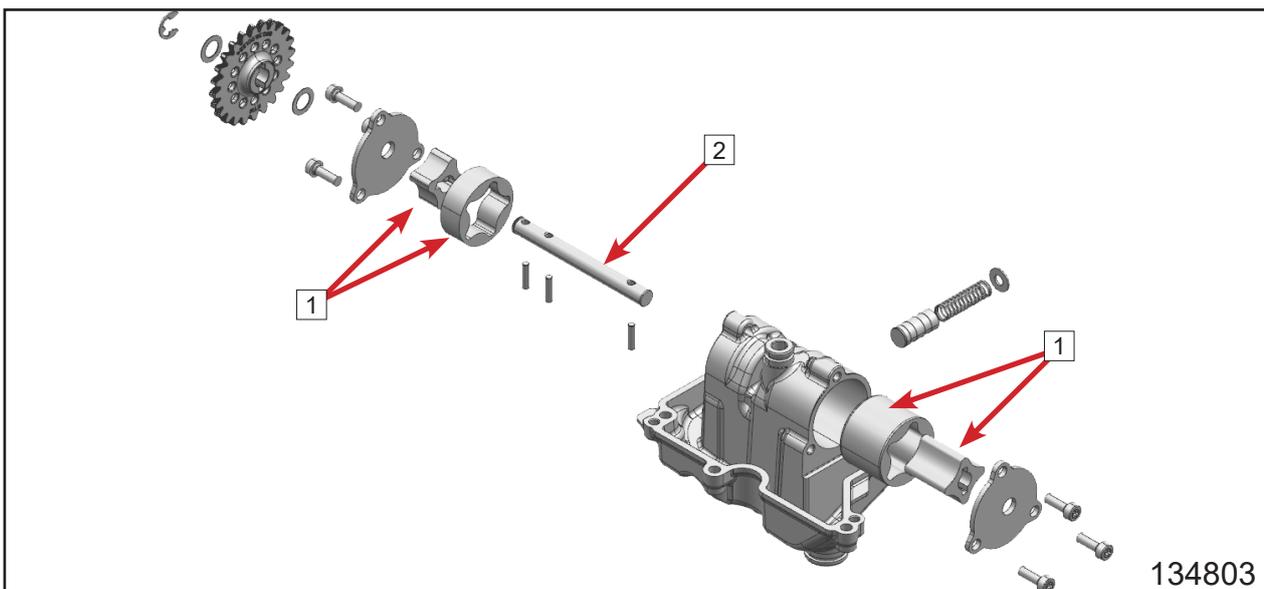
If there is damage or wear: Change the oil pumps.

Check oil pump shaft (2) for damage and wear.

If there is damage or wear: Change the oil pump shaft.

Check both oil pump covers for damage and wear.

If there is damage or wear: Change the oil pump cover.



13.3.17 Checking the Oil Pressure Control Valve

Remove washer (1).

Remove spring (2).

Measure the length of spring (2).

Oil pressure regulator valve - minimum length spring: 40.0 mm

If the measured length is less than the limit: Change the spring.

Check control piston (3) for damage and wear.

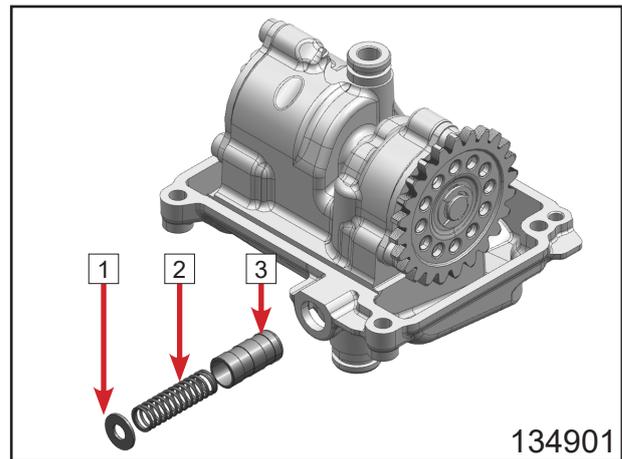
If there is damage or wear: Change the control piston.

Check the control piston for smooth operation in the oil pump housing.

If the control piston is stiff: Change the control piston or the oil pump housing.

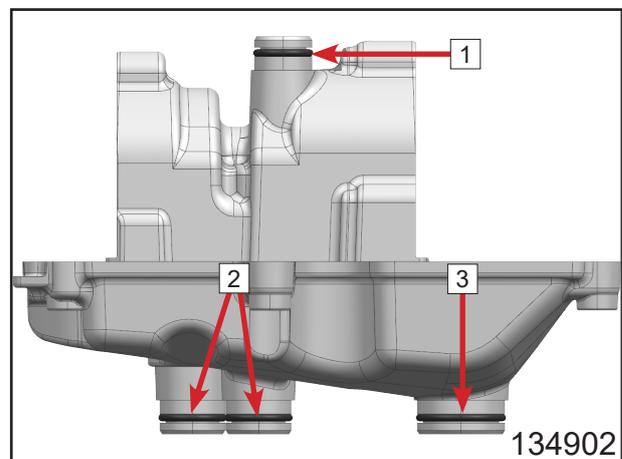
Thoroughly lubricate control piston (3) and spring (2) and mount them.

Mount washer (1).



13.3.18 Installing the Oil Pumps

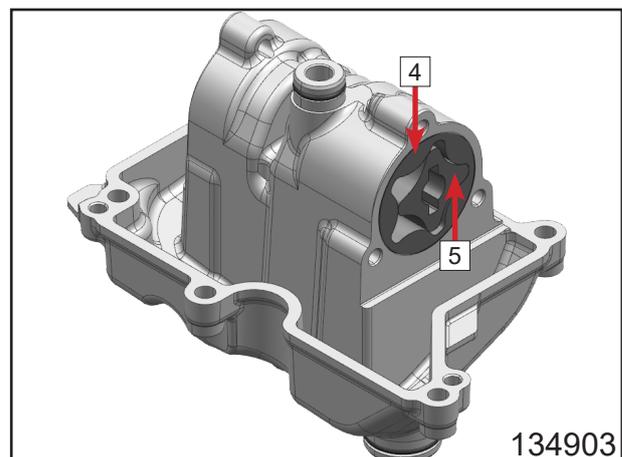
Mount and grease the new O-rings (1), (2) and (3).



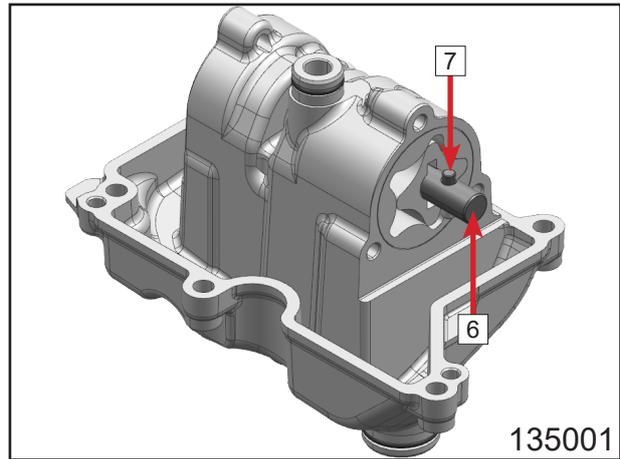
Mount external rotor (4) and internal rotor (5).

The rounded side of the external rotor must face the oil pump housing.

Lubricate the parts.



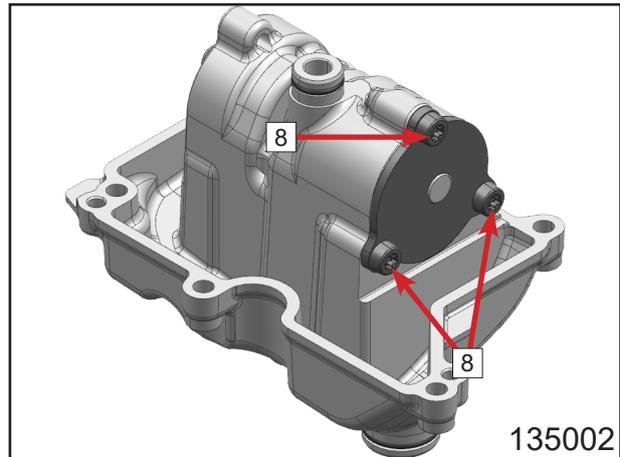
Mount oil pump shaft (6) with pin (7).



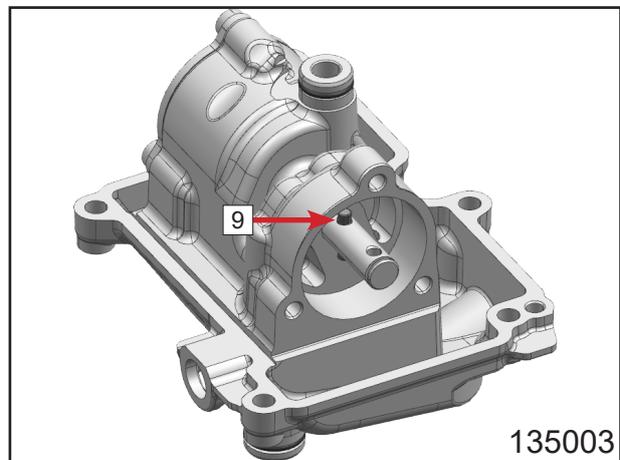
Position the oil pump cover.
Mount and tighten screws (8).

Guideline

Screw, oil pump cover	M6	10 N•m Apply thread locker
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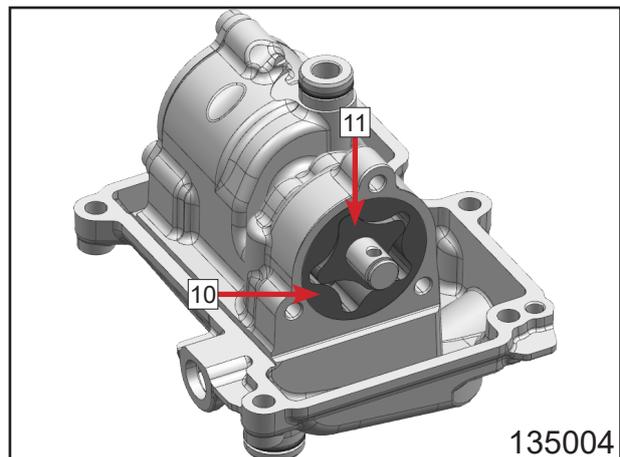
Mount pin (9).



Mount external rotor (10) and internal rotor (11).

The rounded side of the external rotor must face the oil pump housing.

Lubricate the parts.



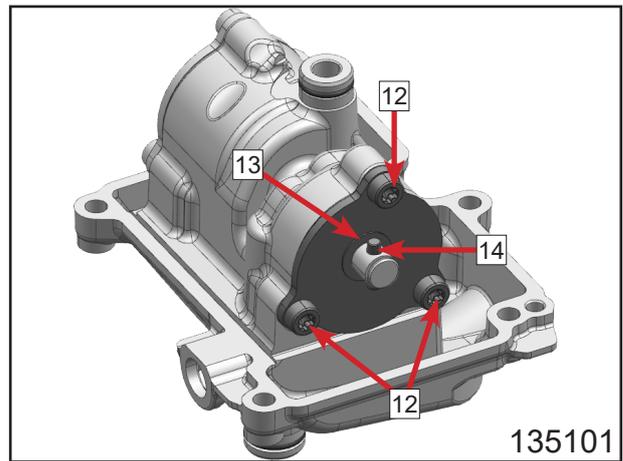
13 Engine Assembly

Position the oil pump cover.
Mount and tighten screws (12).

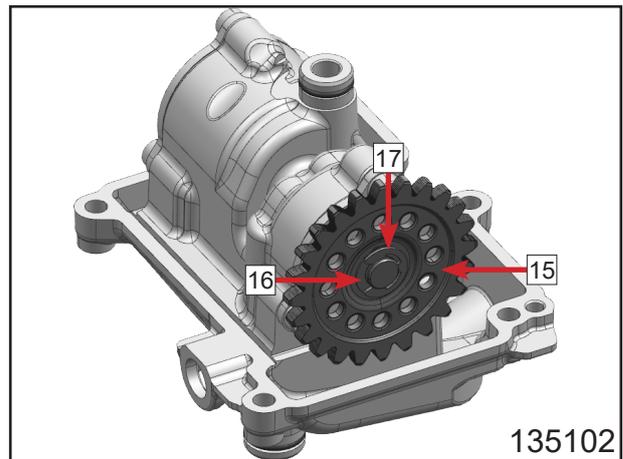
Guideline

Screw, oil pump cover	M6	10 N•m Apply thread locker
-----------------------	----	-------------------------------

Mount washer (13).
Mount pin (14).



Mount oil pump gear wheel (15).
Mount washer (16) and lock ring (17).



13.3.19 Installing Timing Chain Tensioner

Fully compress the timing chain tensioner.

NOTE

This requires considerable force since the oil has to be pressed out.

Release the timing chain tensioner.

Without pressure, the timing chain tensioner expands fully.



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Place two compensating disks or similar aids next to the piston of the timing chain tensioner. This should ensure that when pushed down, the piston does not fully withdraw.

Guideline

Thickness of the compensating disks

2mm~ 2.5 mm

Release the timing chain tensioner.

The latching system locks and the piston stops moving.
--

End position of piston after latching

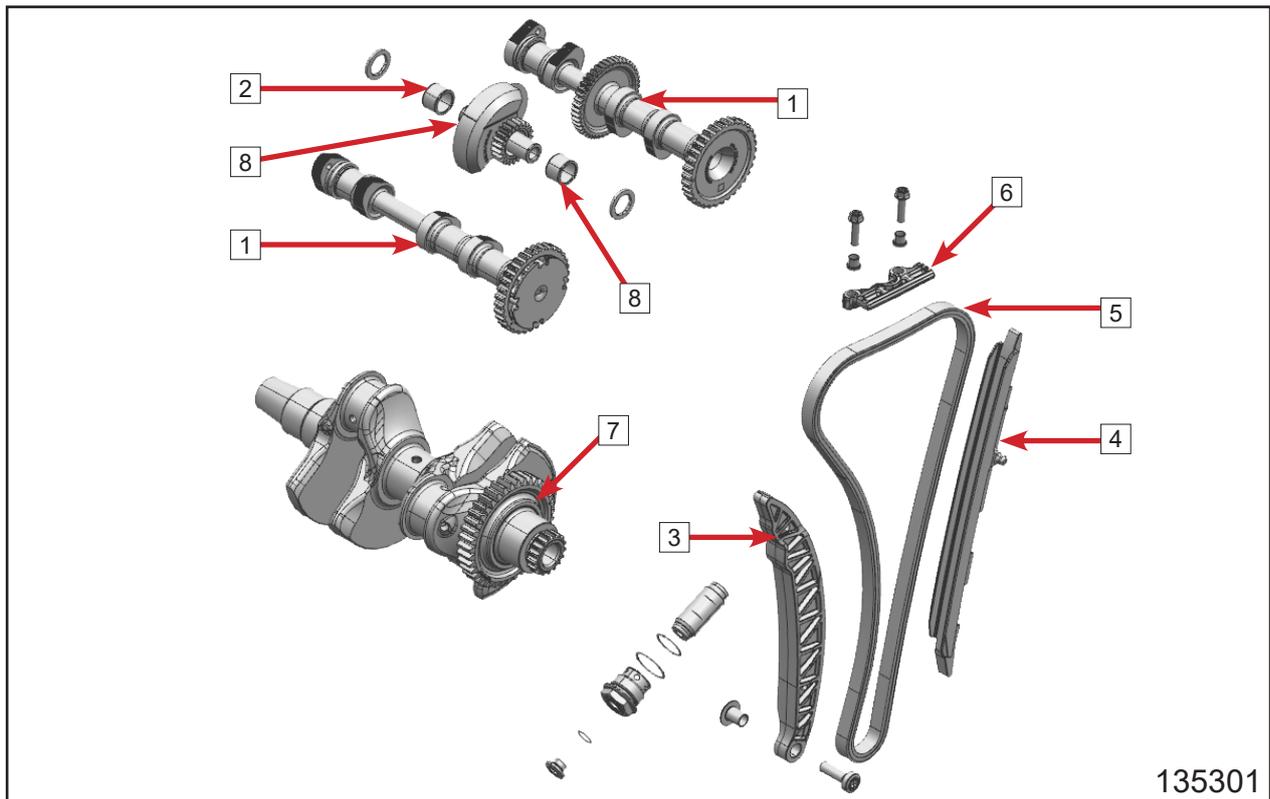
3 mm

NOTE

<p>This position is necessary for installation. If the timing chain tensioner is now pressed in once more (while it is installed) and then pulled out no more than halfway (preventing it from coming out fully), the latching system locks and the timing chain tensioner can no longer be compacted; this function is necessary to ensure sufficient tension of the timing chain, even at low oil pressure.</p>



13.3.20 Checking the Timing Assembly



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Clean all parts well.

Check camshafts (1) for damage and wear.

If there is damage or wear: Change the camshafts.

Check balancer shaft (2) for damage and wear.

If there is damage or wear: Change the balancer shaft.

Check tensioning rail (3) for damage and wear.

If there is damage or wear: Change the tensioning rail.

Check guide rail (4) for damage and wear.

If there is damage or wear: Change the guide rail.

Check timing chain (5) for damage and wear.

If there is damage or wear: Change the timing chain.

Check the timing chain links for smooth operation. Let the timing chain hang down freely.

The chain links no longer align in a straight line: Change the timing chain.

Check guide rail (6) for damage and wear.

If there is damage or wear: Change the guide rail.

Check timing chain sprocket (7) for damage and wear.

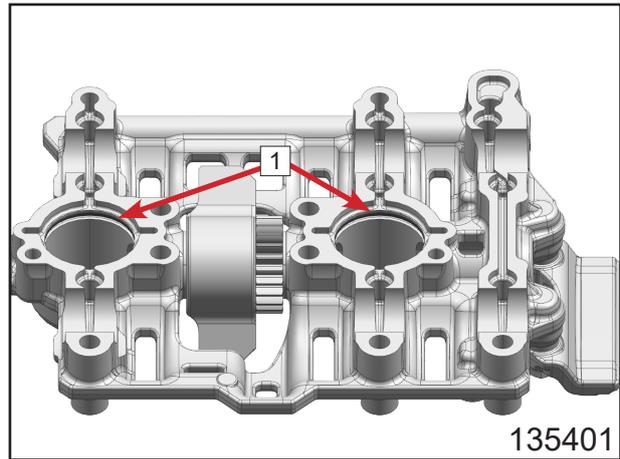
If there is damage or wear: Change the crankshaft.

Check balancer shaft bearing (8) for damage and wear.

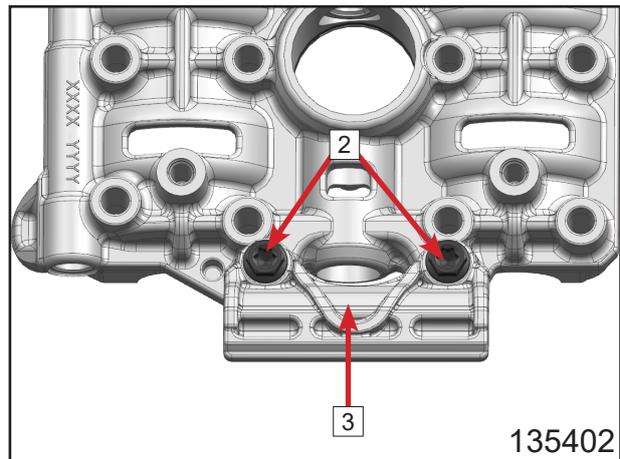
If there is damage or wear: Change the balancer bearing.

13.3.21 Working on the Camshaft Bearing Bridge

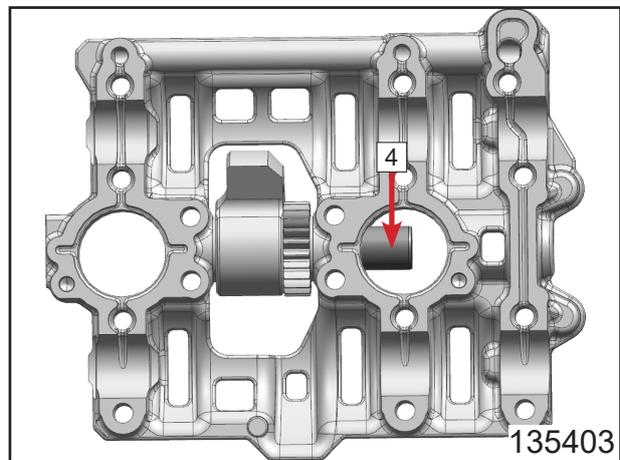
Remove O-rings (1).



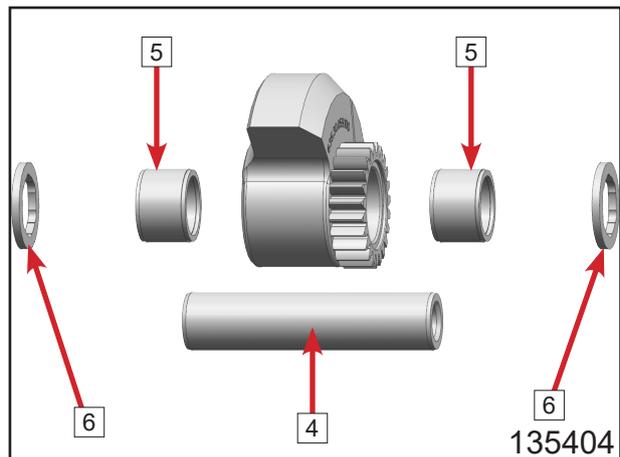
Remove screws (2).
Take off guide rail (3).



Pull out spindle (4) of the balancer shaft with appropriate screw M10.

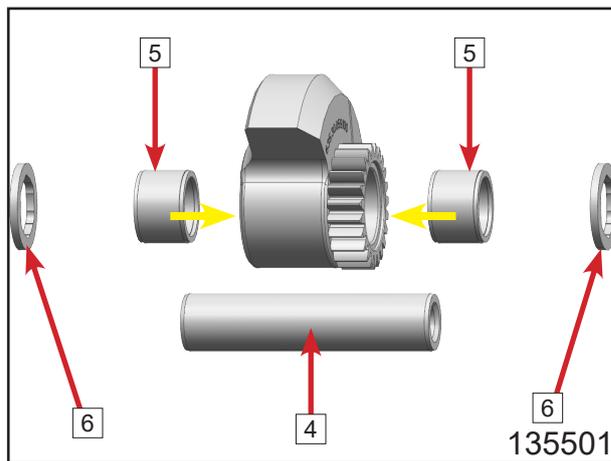


Remove balancer shaft with needle bearings (5) and washers (6).

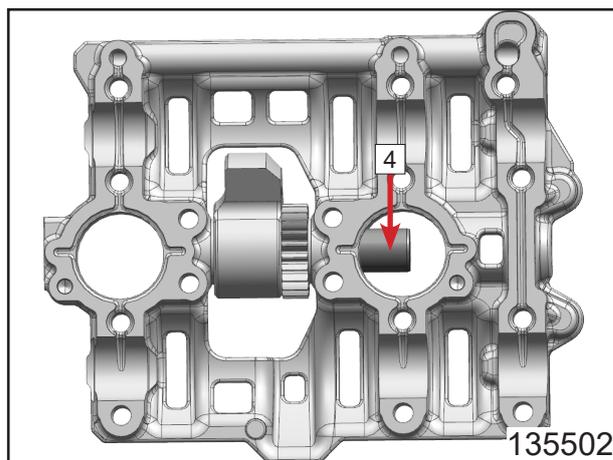


13 Engine Assembly

Mount new needle bearings (5) in the balancer shaft and oil.
Position balancer shaft with washers (6) in the camshaft bearing bridge.



Mount spindle (4) of the balancer shaft in the center between the spark plug shafts.
Remove screw M10.



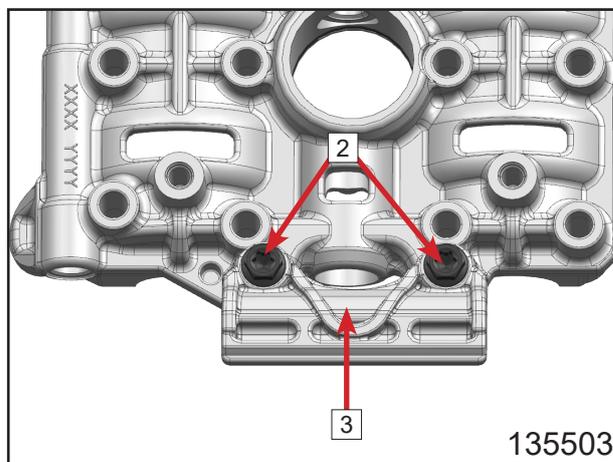
Position guide rail (3).
Mount and tighten screws (2).
Guideline

Screw, upper guide rail

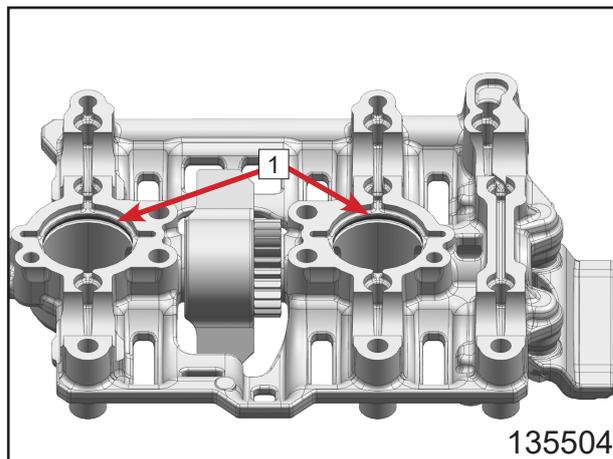
M6

8 N•m

Apply thread locker

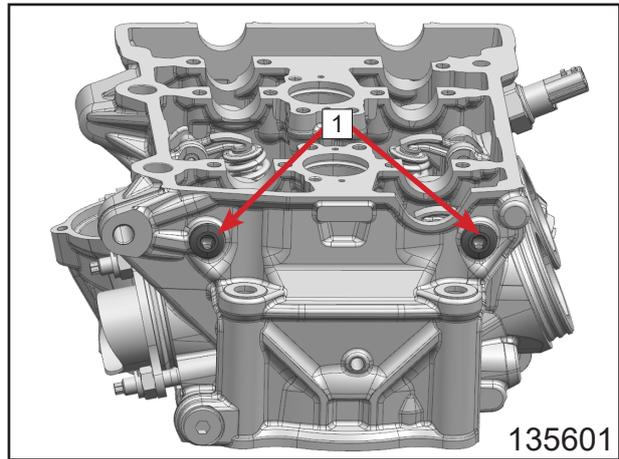


Mount and grease the new O-rings (1).

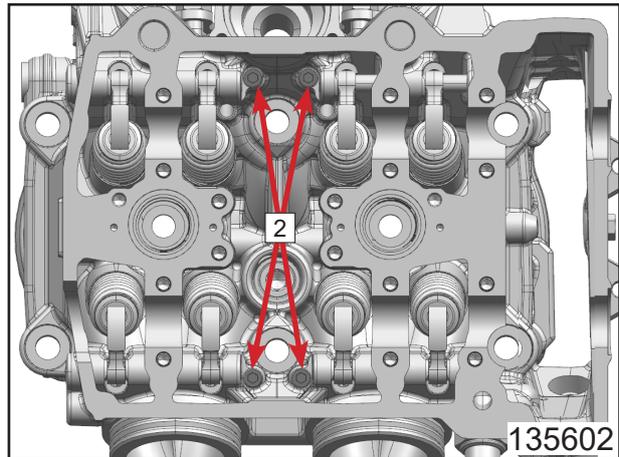


13.3.22 Working on the Cylinder Head

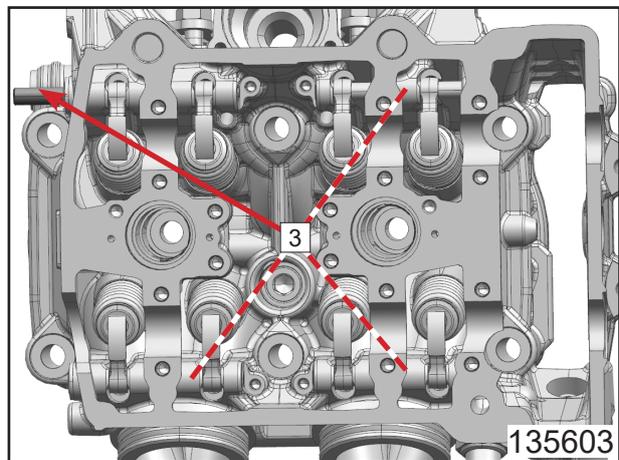
Remove screw plugs (1) with the O-rings.



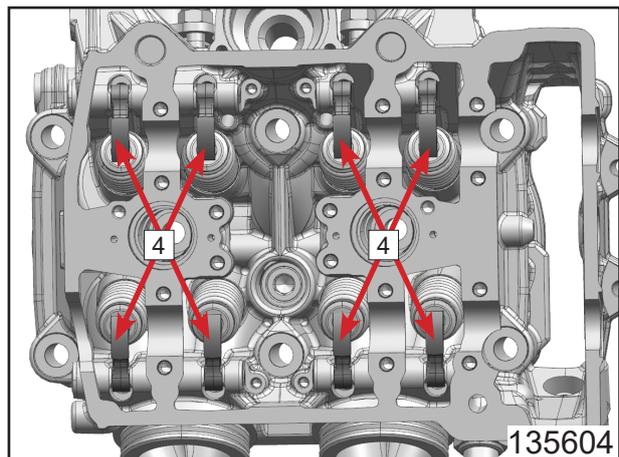
Remove screws (2).



Mount disassembly tool M4.
Remove cam lever shafts (3).

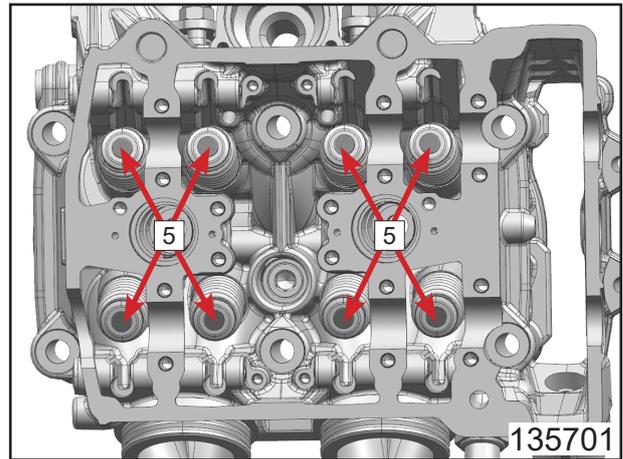


Take off cam lever (4).

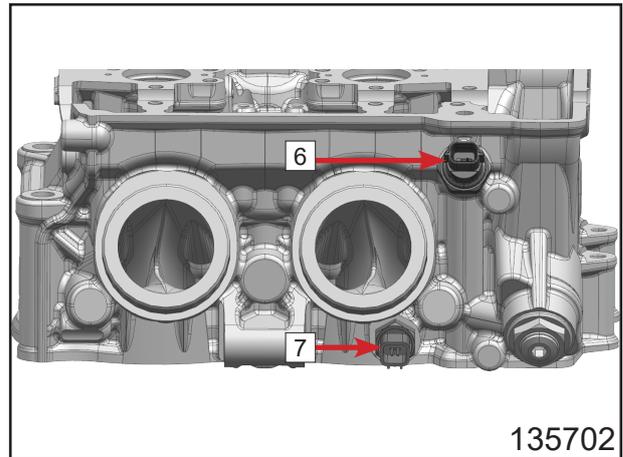


13 Engine Assembly

Remove shims (5) and label according to their normal built-in position.

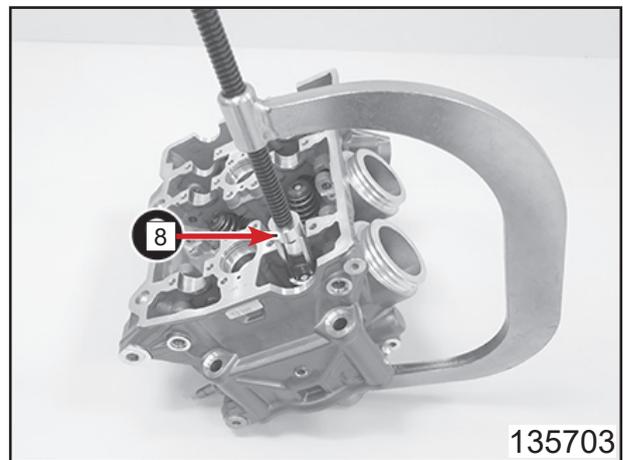


Remove oil pressure sensor (6) with O-ring.
Remove coolant temperature sensor (7) with the O-ring.

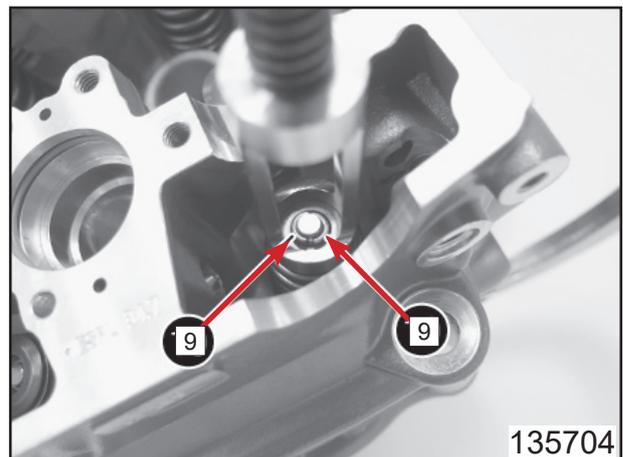


Tension valve spring with special tool (8).

Valve spring mounter for valve spring lever
--



Remove valve collets (9) and release the valve spring.

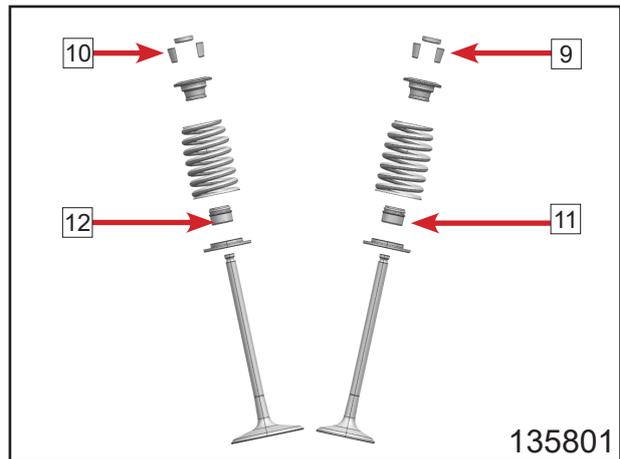


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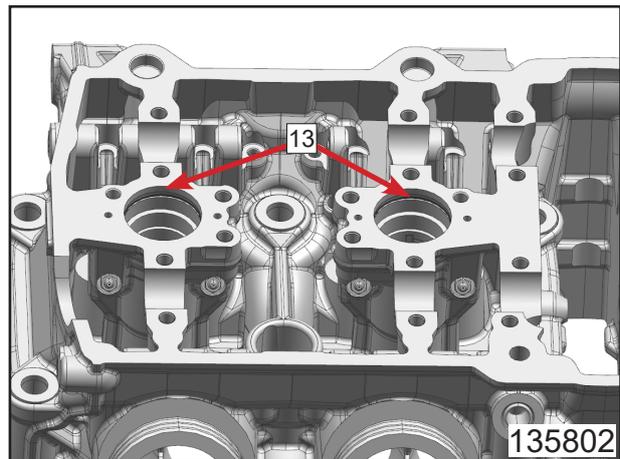
Remove valve spring retainers (10), valve springs, valve stem seals (11) and valve spring seats (12).

NOTE

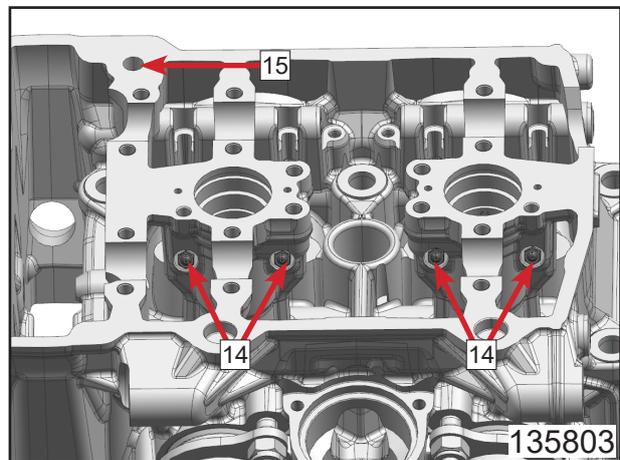
Place the valves in a box according to their normal built-in position and label them.



Remove O-rings (13).



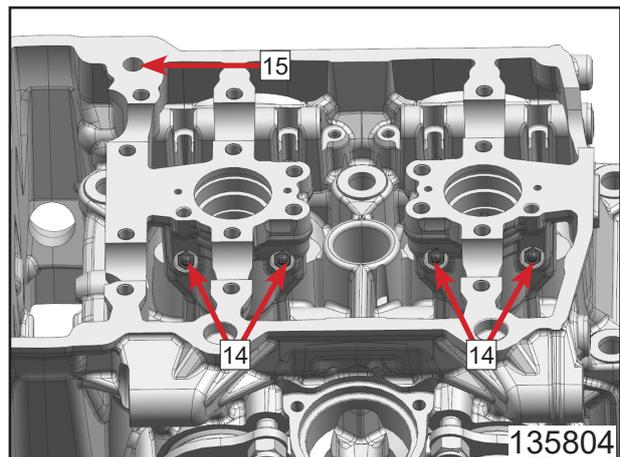
Remove oil nozzles (14).
Remove oil screen (15) and clean it.
Check the cylinder head.



Mount oil screen (15).
Mount oil nozzles (14).

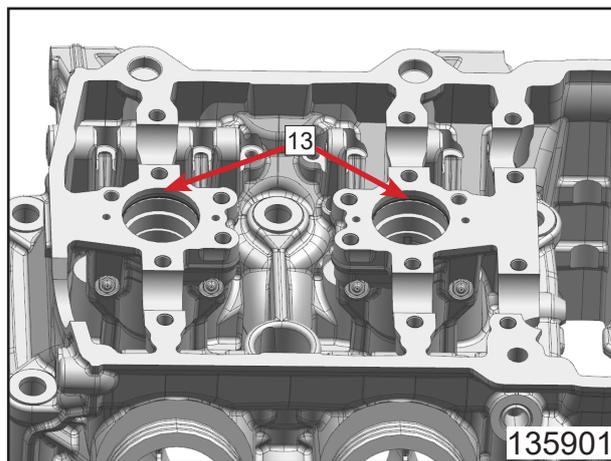
Guideline

Oil nozzle in cylinder head
M5
2 N•m
Apply thread locker

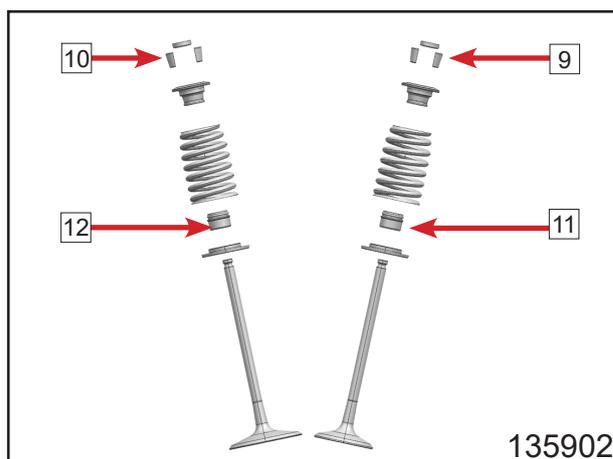


13 Engine Assembly

Mount and grease O-rings (13).



Mount valve spring seats (12) and new valve stem seals (11).
Mount valve spring retainers (10) and valve springs.



Tension valve spring with special tool (8).

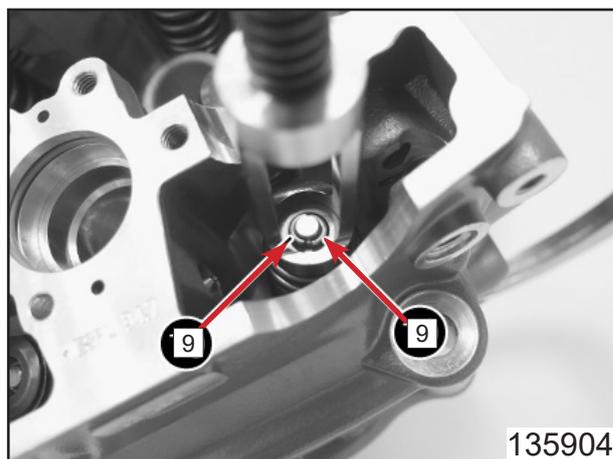
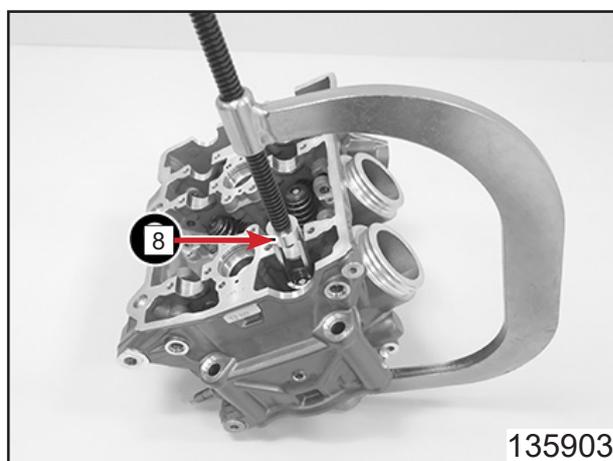
Valve spring mouter

Insert for valve spring lever

Mount valve collets (9). Release the tension on the valve spring.

NOTE

When mounting the valve collets, check they are seated properly; preferably use a little grease to secure the valve collets on the valve.



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Mount coolant temperature sensor (7) with the new O-ring.

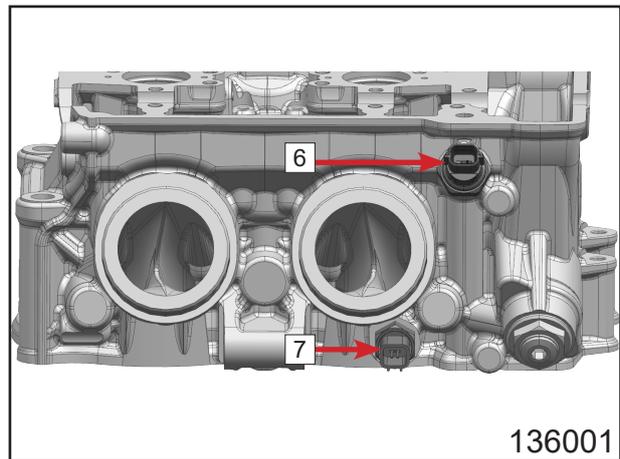
Guideline

Coolant temperature sensor
M10×1.25
10 N•m

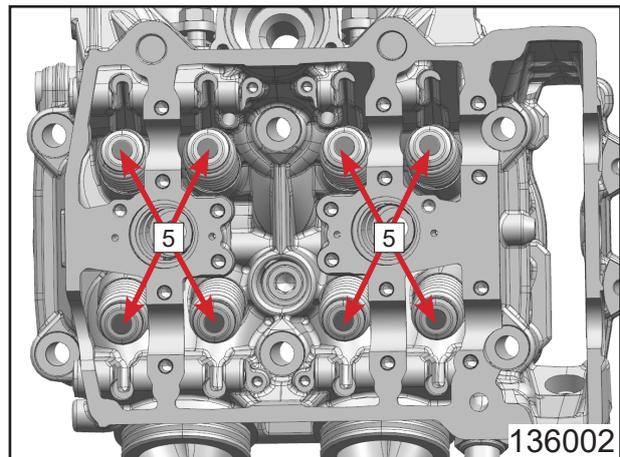
Mount oil pressure sensor (6) with new O-ring.

Guideline

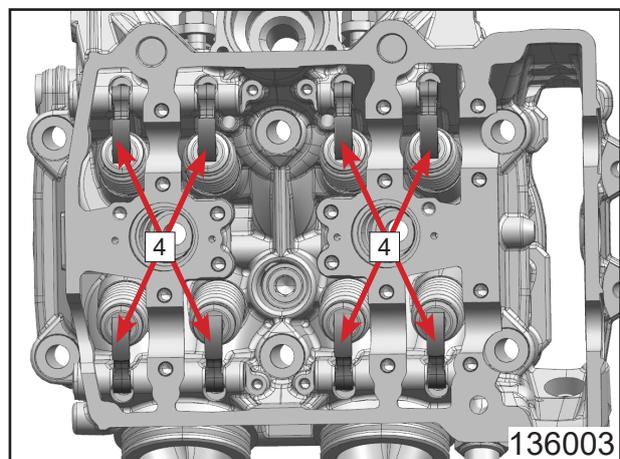
Oil pressure sensor
M10×1
10 N•m



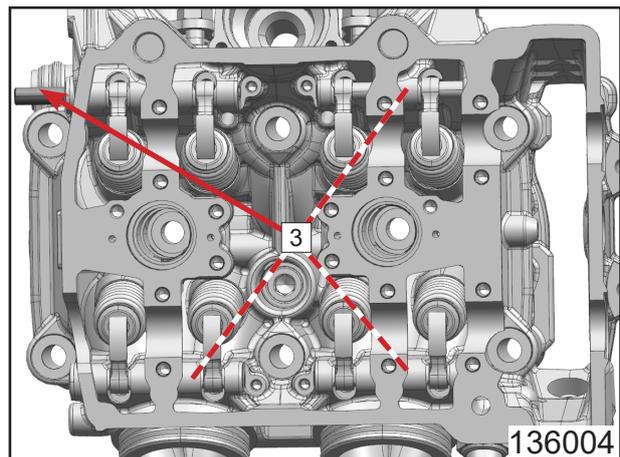
Place shims (5) into the valve spring retainer according to their normal built-in position.



Position cam levers (4).



Mount cam lever shafts (3).
Remove disassembly tool.



13 Engine Assembly

Mount and tighten screws (2).

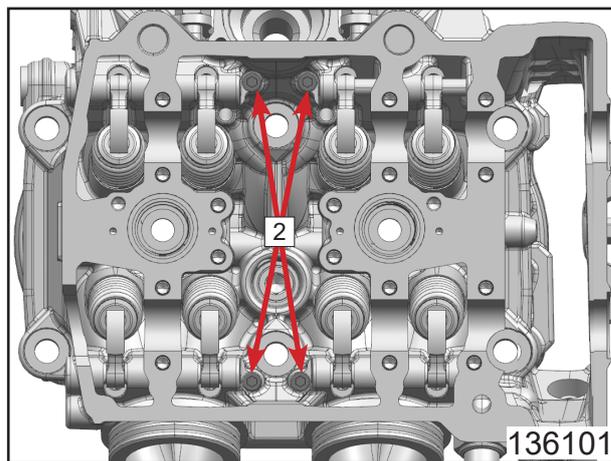
Guideline

Screw, cam lever axial lock

M5

6 N•m

Apply thread locker



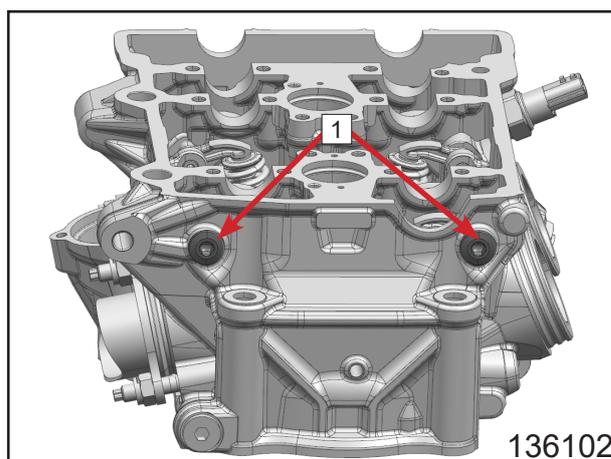
Mount screw plugs (1) with new O-rings.

Guideline

Screw plug, cam lever axis

M10×1

10 N•m



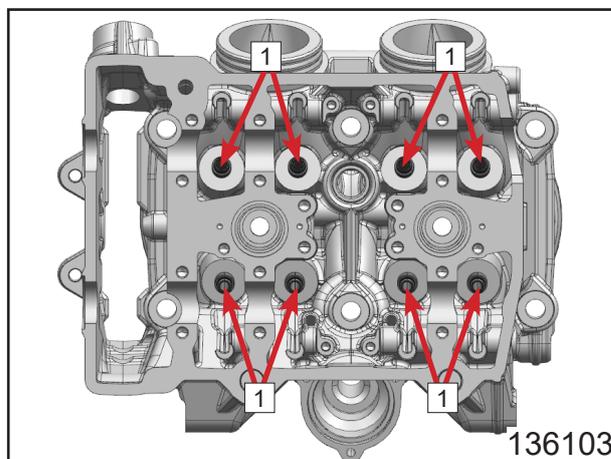
13.3.23 Checking the Cylinder Head

Check valve guides (1) using the special tool (Limit plug gauge).

If the special tool is easy to insert into the valve guide: Change the valve guide and valve.

Check the sealing surface of the spark plug thread and the valve seats for damage and cracking.

If there is damage or cracking: Change the cylinder head.

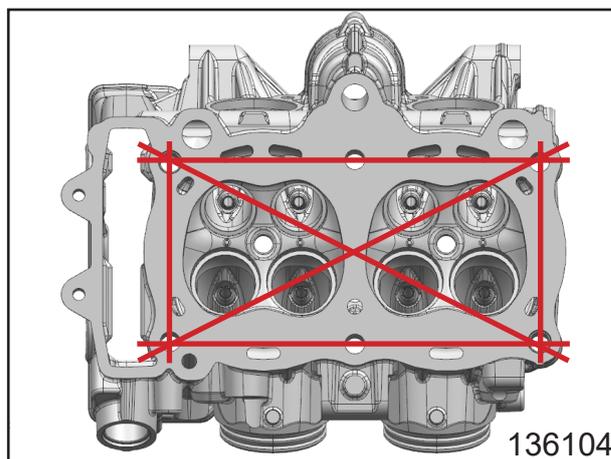


Check the sealing surface of the cylinder for distortion using a straightedge and the special tool (Feeler gauge).

Cylinder/cylinder head - sealing area distortion
--

≤ 0.05 mm

If the measured value exceeds limit: Change the cylinder head.



CFMOTO

Check sealing seat (A) of the valves.

Valve - sealing seat width	
Intake	2.80 mm
Valve - sealing seat width	
Exhaust	3.00 mm

If the measured value does not meet specifications: Machine the valve seat.

Blow compressed air through all oil channels and oil nozzles, and check that they are clear.

Check valve (2) for damage and wear.

If there is damage or wear: Change the valve.

Check the valve for run-out.

Valve - run-out	
On the valve plate	≤ 0.05 mm
On the valve stem	≤ 0.05 mm

If the measured value does not meet specifications: Change the valve.

Check the valve stem diameter.

Valve - valve stem diameter	
Exhaust	4.95mm~4.97 mm
Intake	4.97mm~4.99 mm

If the measured value does not meet specifications: Change the valve.

Check valve spring (3) for damage and wear.

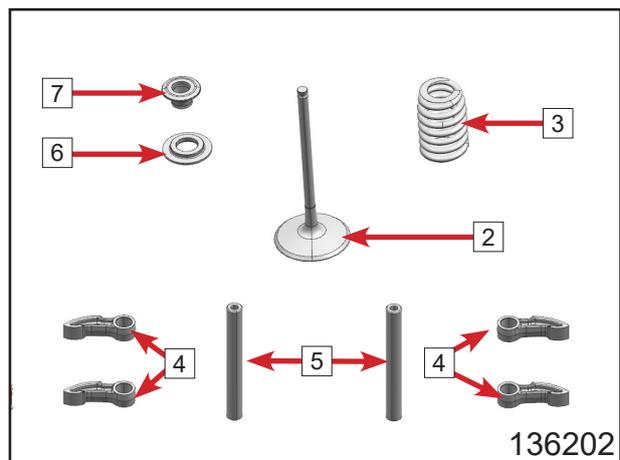
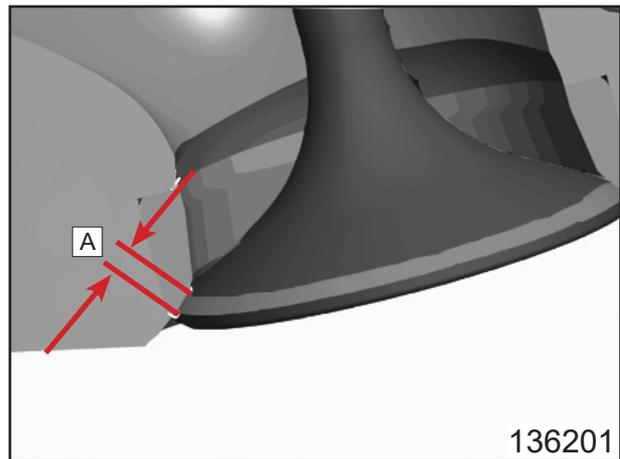
If there is damage or wear: Change the valve spring.

Measure the length of the valve springs.

Valve spring	
Minimum length (without valve spring seat)	
44.0 mm	

If the measured value does not meet specifications: Change the valve springs.

Check cam levers (4) for damage and wear. If there is damage or wear: Change the cam lever. Check cam lever shafts (5) for damage and wear. If there is damage or wear: Change the cam lever shaft. Check valve spring seat (6) for damage and wear. If there is damage or wear: Change the valve spring seat. Check valve spring retainer (7) for damage and wear. If there is damage or wear: Change the valve spring retainer.



13.3.24 Checking the Clutch

Check clutch push rod (1) for damage and wear.

If there is damage or wear: Change clutch push rod.

Check axial bearing (2) for damage and wear.

If there is damage or wear: Change the axial bearing.

Check the length of clutch springs (3).

Clutch spring - length	≥ 43.0 mm
------------------------	----------------

If the clutch spring length is shorter than specified: Change all clutch springs.

Check the contact surface of clutch pressure cap (4) for damage and wear.

If there is damage or wear: Change the clutch pressure cap.

Check the thrust surfaces of the clutch facing discs in clutch housing (5) for damage and wear.

If there is damage or wear: Change the clutch disc pack and the clutch basket.

Check needle bearing (6) for damage and wear.

If there is damage or wear: Change the needle bearing.

Check intermediate clutch discs (7) for damage and wear.

If the intermediate clutch discs are not level and are pitted: Change the clutch disc pack.

Check clutch facing discs (8) for discoloration and scoring.

If there is discoloration or scoring: Change the clutch disc pack.

Check the thickness of the clutch disc pack.

Clutch disc pack - thickness	
New condition	35.60mm~36.50 mm
Service limit	34.80 mm

If the clutch disc pack exceed limit: Change the clutch disc pack.

Check pretension ring (9) and support ring (10) for damage and wear.

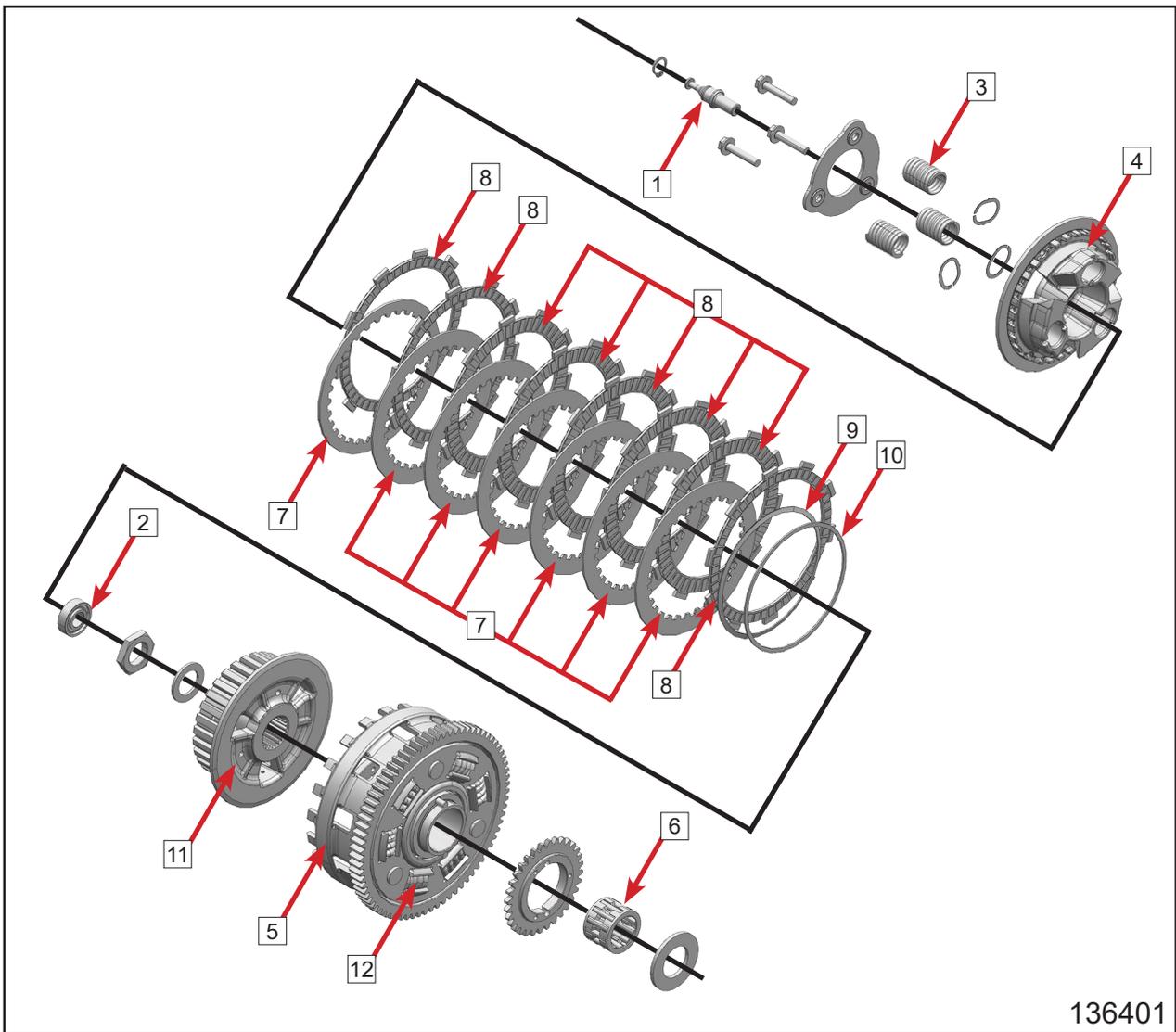
If there is damage or wear: Change the pretension ring and support ring.

Check inner clutch hub (11) for damage and wear.

If there is damage or wear: Change the inner clutch hub.

Check springs (12) of the clutch housing for damage and wear.

If there is damage, wear or play in the direction of rotation: Change the clutch housing.



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13.3.25 Removing the Shift Drum Locating Unit

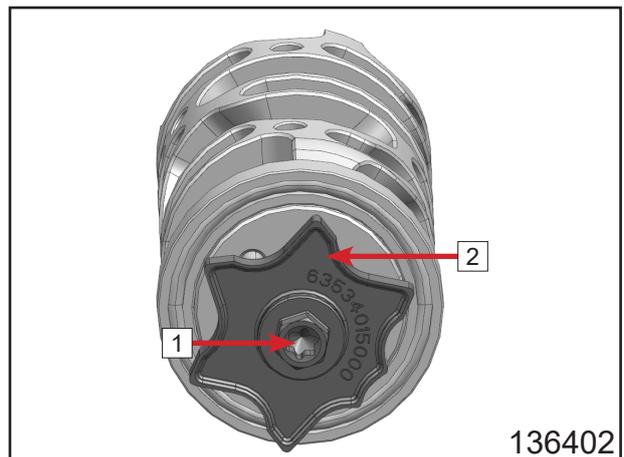
Clamp shift drum.

Guideline

Use soft jaws.

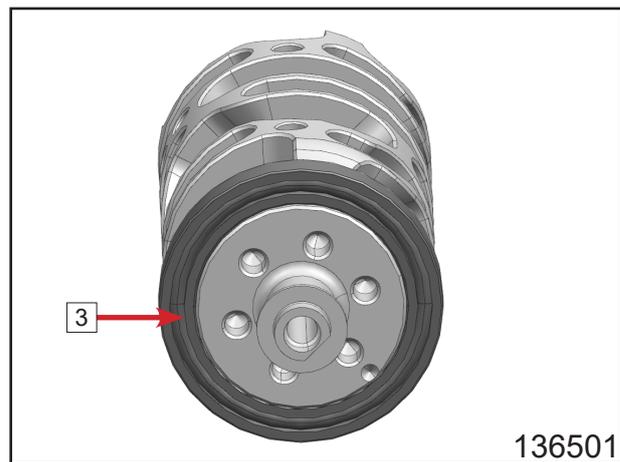
Remove screw (1).

Take off the shift drum locating unit (2).



136402

Remove bearing (3).



13.3.26 Checking the Shift Mechanism

Check shift forks (1) on plate (A) for damage and wear (visual check).

If there is damage or wear: Change the shift fork and gear wheel pair.

Check shift grooves (B) of shift drum (2) for wear.

If the shift groove is worn: Change the shift drum.

Check the seat of the shift drum in bearings (3).

If the shift drum is not seated correctly: Change the shift drum and/or the bearing.

Check bearings (3) for ease of movement and wear.

If the bearings are stiff or are worn: Change the bearings.

Check shift rails (4) on a flat surface for run-out.

If there is run-out: Change the shift rail.

Check the shift rails for scoring, wear and smooth operation in the shift forks.

If there is scoring or corrosion, or if the shift fork is stiff: Change the shift rail.

Check sliding plate (5) in contact areas (C) for wear.

If the sliding plate is worn: Change the sliding plate.

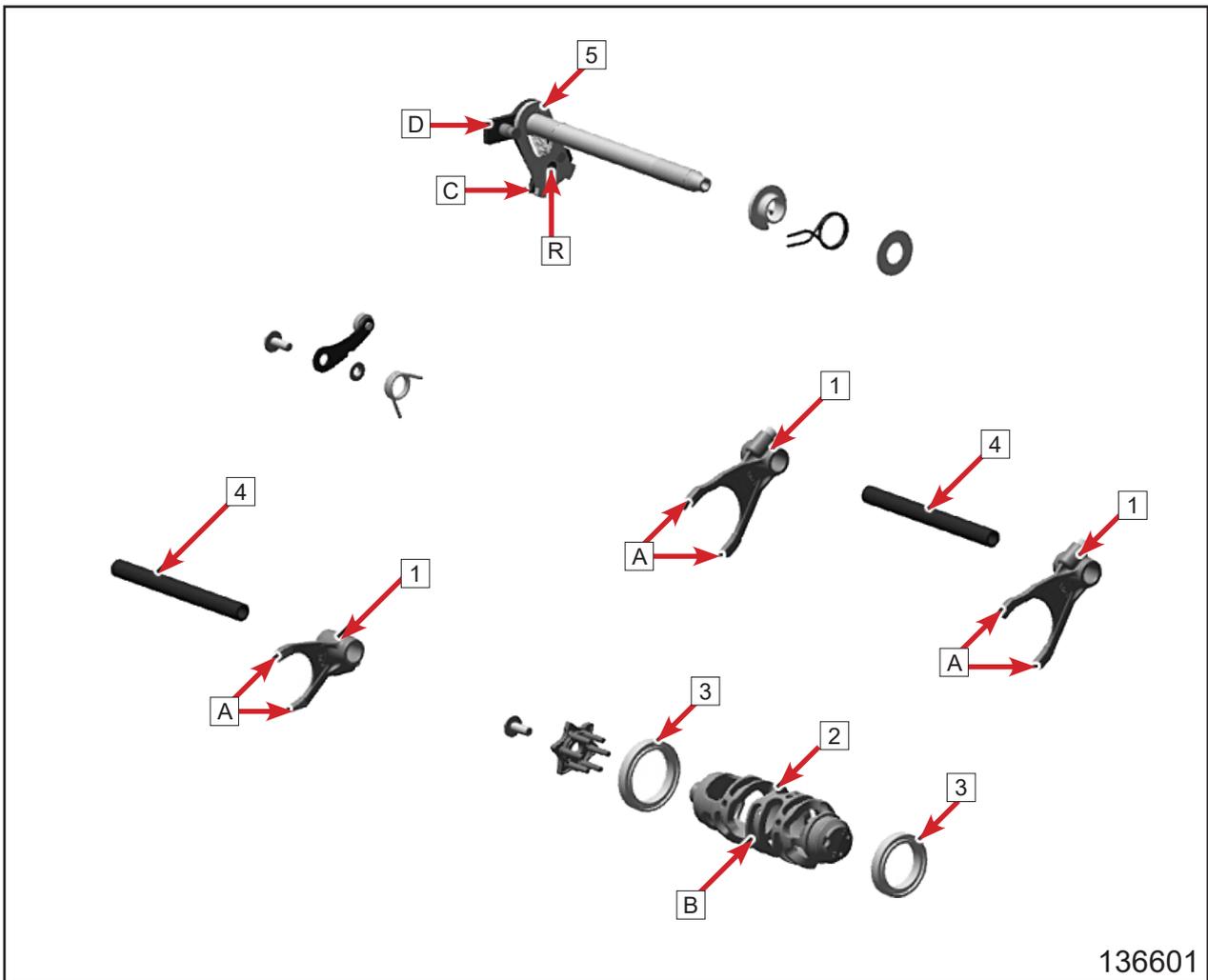
Check return surface (D) on the sliding plate for wear.

If deep notches are present: Change the sliding plate.

Check guide pin (E) for looseness and wear.

If the guide pin is loose and/or worn: Change the sliding plate.

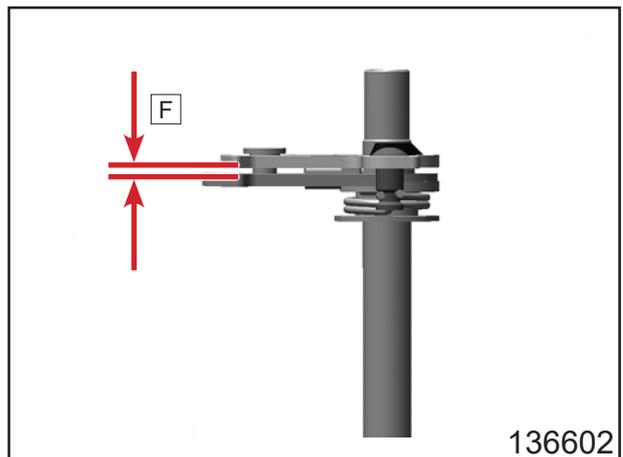
Reassemble the shift shaft.



Check clearance (F)

clearance
0.40mm~ 0.80 mm

If the measured value exceeds limit, change the sliding plate.



13.3.27 Assembling the Shift Shaft

Fix the short end of the shift shaft in a vise.

Guideline:

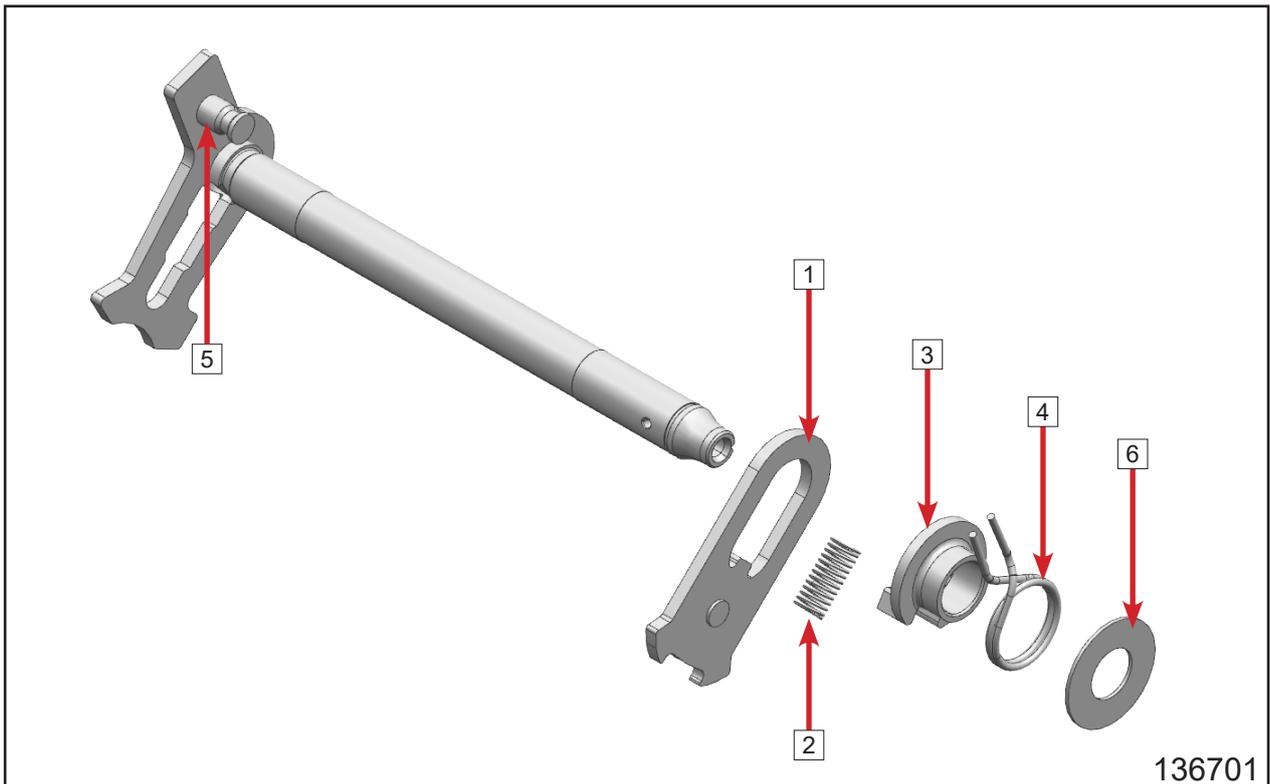
Use soft jaws.

Mount sliding plate (1) with the guide pin facing down and attach the guide pin to the shift quadrant.

Mount pressure spring (2).

Push on spring guide (3), push return spring (4) over the spring guide with the offset end facing upward and lift the offset end over abutment bolt (5).

Mount stop disk (6).



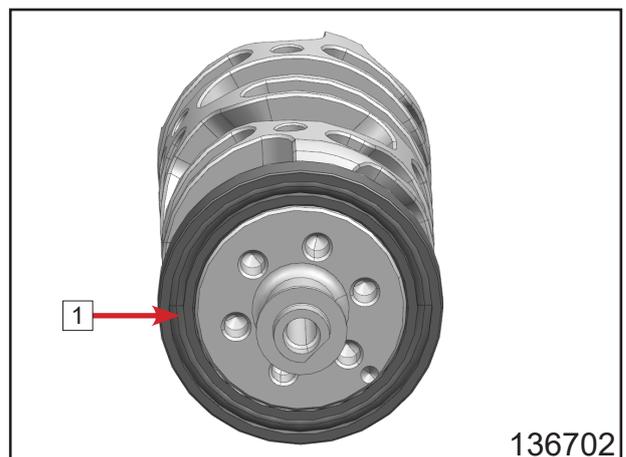
13.3.28 Installing the Shift Drum Locating Unit

Clamp shift drum.

Guideline

Use soft jaws.

Mount bearing (1).

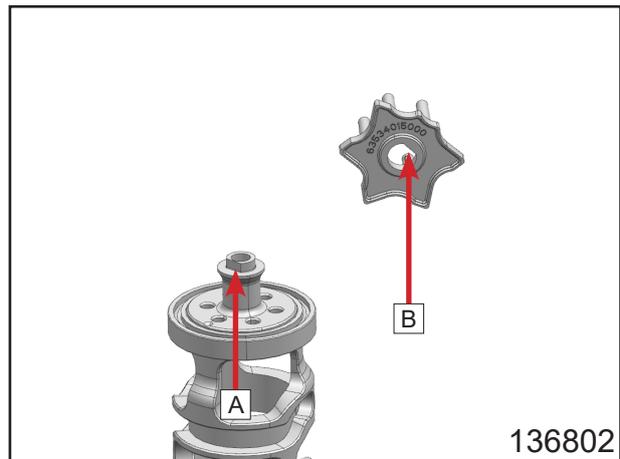
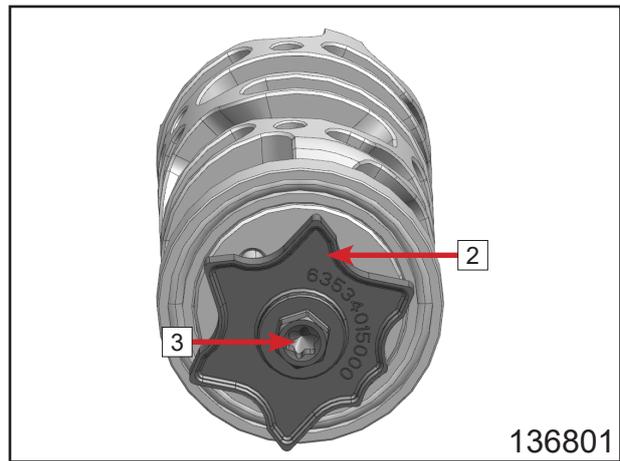


CFMOTO

Position shift drum locating unit (2).
]The flat surface (A) of the shift drum engages in the flat surface (B) of the shift drum locating unit.
Mount and tighten screw (3).

Guideline:

Screw, shift drum locating
M6
10 N•m
Apply thread locker



13.3.29 Disassembling the Main Shaft

Remove oil nozzle (1).

Secure the main shaft in the vise with the gear teeth facing downward.

Guideline

Use soft jaws.

Remove stop disk (2) and second-gear fixed gear (3).

Remove sixth-gear idler gear (4).

Remove needle bearing (5) and stop disk (6).

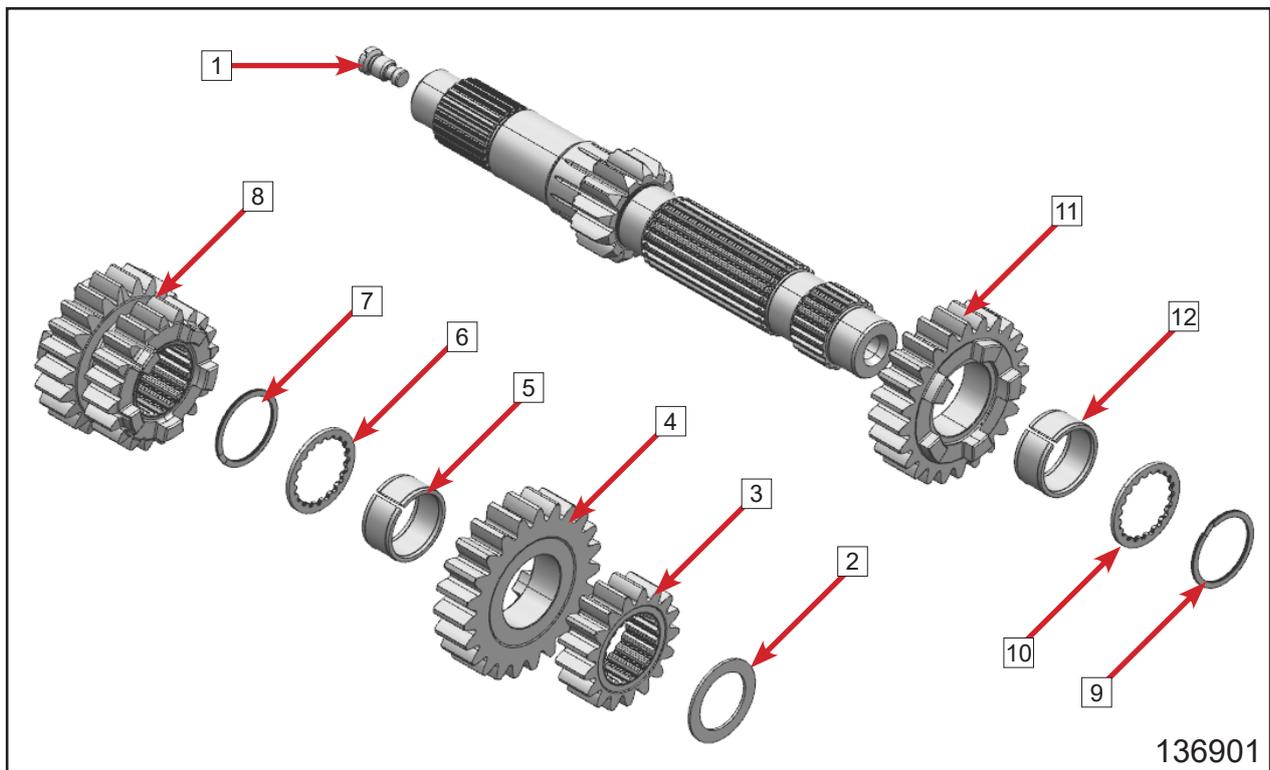
Remove lock ring (7).

Remove third/fourth-gear sliding gear (8).

Remove lock ring (9).

Remove stop disk (10) and fifth-gear idler gear (11).

Remove needle bearing (12).



13.3.30 Disassembling the Countershaft

Remove bearing (1) with distance sleeve (2).

Secure the countershaft in the bench vise with the toothed end facing downward.

Guideline

Use soft jaws.

Remove bearing (3).

Remove stop disk (4) and first-gear idler gear (5).

Remove needle bearing (6) and stop disk (7).

Remove the fifth-gear sliding gear (8) and lock ring (9).

Remove stop disk (10) and fourth-gear idler gear (11).

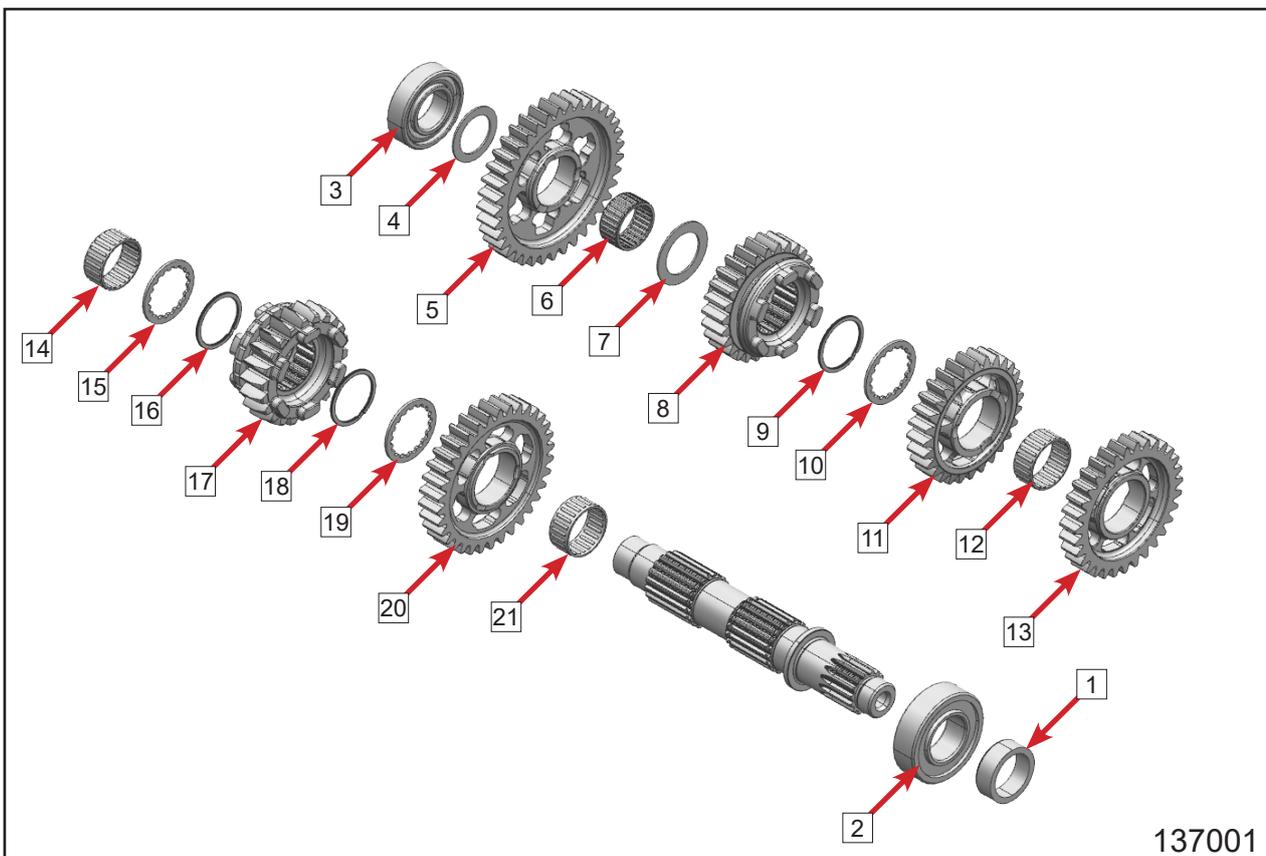
Remove needle bearing (12) and third-gear idler gear (13).

Remove needle bearing (14) and stop disk (15).

Remove lock ring (16) and sixth-gear sliding gear (17).

Remove lock ring (18) and stop disk (19).

Remove second-gear idler gear (20) and needle bearing (21).



137001

13.3.31 Checking the Transmission

Check needle bearings (1) for damage and wear.

If there is damage or wear:

Change the needle bearing.

Check the pivot points of main shaft (2) and countershaft (3) for damage and wear.

If there is damage or wear: Change the main shaft and/or countershaft.

Check the tooth profiles of main shaft (2) and countershaft (3) for damage and wear.

If there is damage or wear: Change the main shaft and/or countershaft.

Check the pivot points of idler gears (4) for damage and wear.

If there is damage or wear: Change the gear wheel pair.

Check the shift dogs of idler gears (4) and sliding gears (5) for damage and wear.

If there is damage or wear: Change the gear wheel pair.

Check the tooth faces of idler gears (4), sliding gears (5), and fixed gear (6) for damage and wear.

If there is damage or wear: Change the gear wheel pair.

Check the tooth profiles of sliding gears (5) for damage and wear.

If there is damage or wear: Change the gear wheel pair.

Check sliding gear (5) for smooth operation in the profile of main shaft (2).

If the fixed gear is stiff: Change the sliding gear or the main shaft.

Check sliding gears (5) for smooth operation in the profile of countershaft (3).

If the fixed gear is stiff: Change the sliding gear or the countershaft.

Check stop disks (7) for damage and wear.

If there is damage or wear: Change the stop disks.

Use new lock rings (8) with every repair.

Check bearings (9) for damage and wear.

If there is damage or wear: Change the bearings.

Check distance sleeve (10) for damage and wear.

If there is damage or wear: Change distance sleeve.

Check oil nozzle (11) to ensure that they are free.

If the oil nozzle is blocked: Clean the oil nozzle and change as necessary.

13.3.32 Assembling the Main Shaft

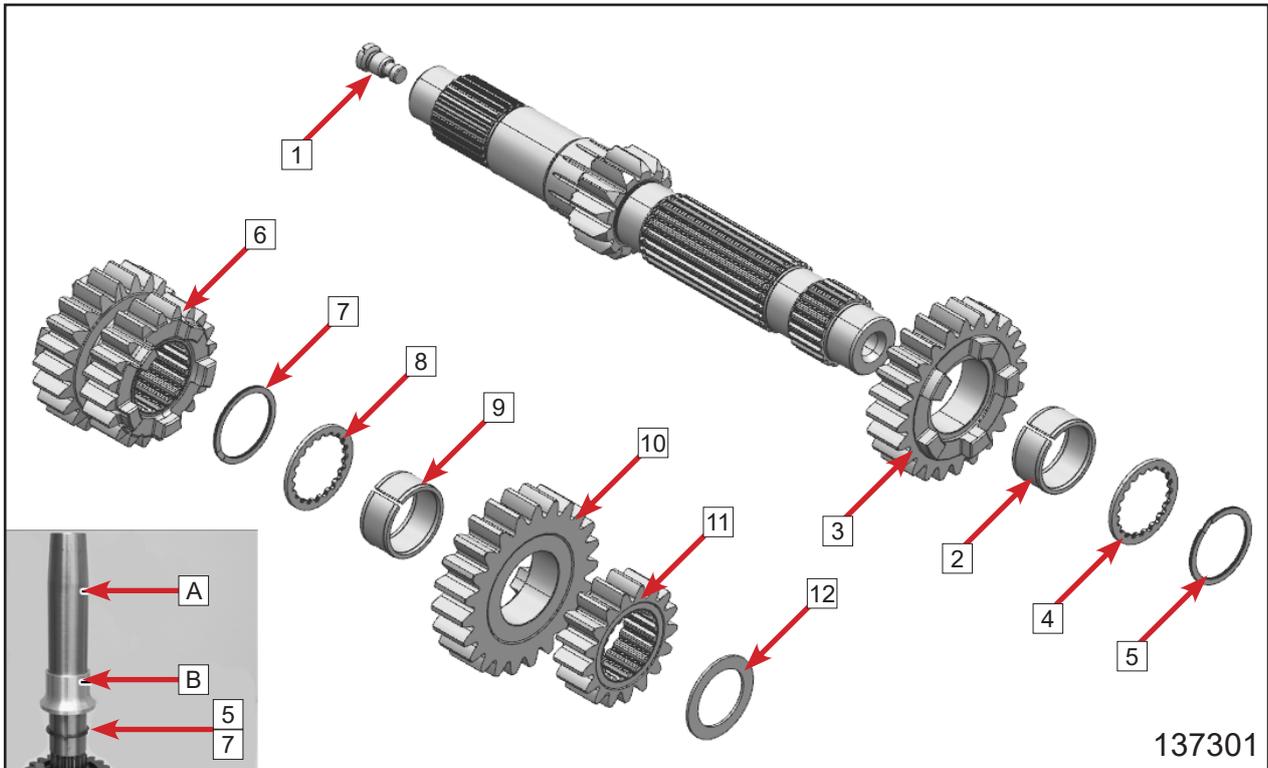
NOTE

Use new lock rings with every repair.

Preparatory work

Carefully lubricate all parts before assembling.

Check the shifting system.



Main work

Mount and tighten oil nozzle (1).

Guideline

Oil nozzle is for clutch lubrication.

M8

5 N•m

43 Thread locker

NOTE

Ensure that there is no thread locker in the hole.

Secure the main shaft in the vise with the gear teeth facing downward.

Guideline

Use soft jaws.

Mount needle bearing (2), and mount fifth-gear idler gear (3) with the shift slots facing up. Mount gaskets (4). Position special tool (Mounting tool for lock ring) on the transmission shaft. Position new lock ring (5) on special tool (A) and push down with sleeve (B). The lock ring engages in the groove of the transmission shaft. Attach third/fourth-gear sliding gear (6) with the small gear wheel facing up. Position special tool (Mounting tool for lock ring) on the gearshift shaft. Position new lock ring (7) on special tool (A) and push down with sleeve (B). The lock ring engages in the groove of the gearshift shaft. Mount stop disk (8) and needle bearing (9). Mount sixth-gear idler gear (10) with the small end facing upward. Mount second-gear fixed gear (11) with the teeth collar facing downward and mount stop disk (12). Finally, check all the gears for smooth operation.

13.3.33 Assembling the Countershaft

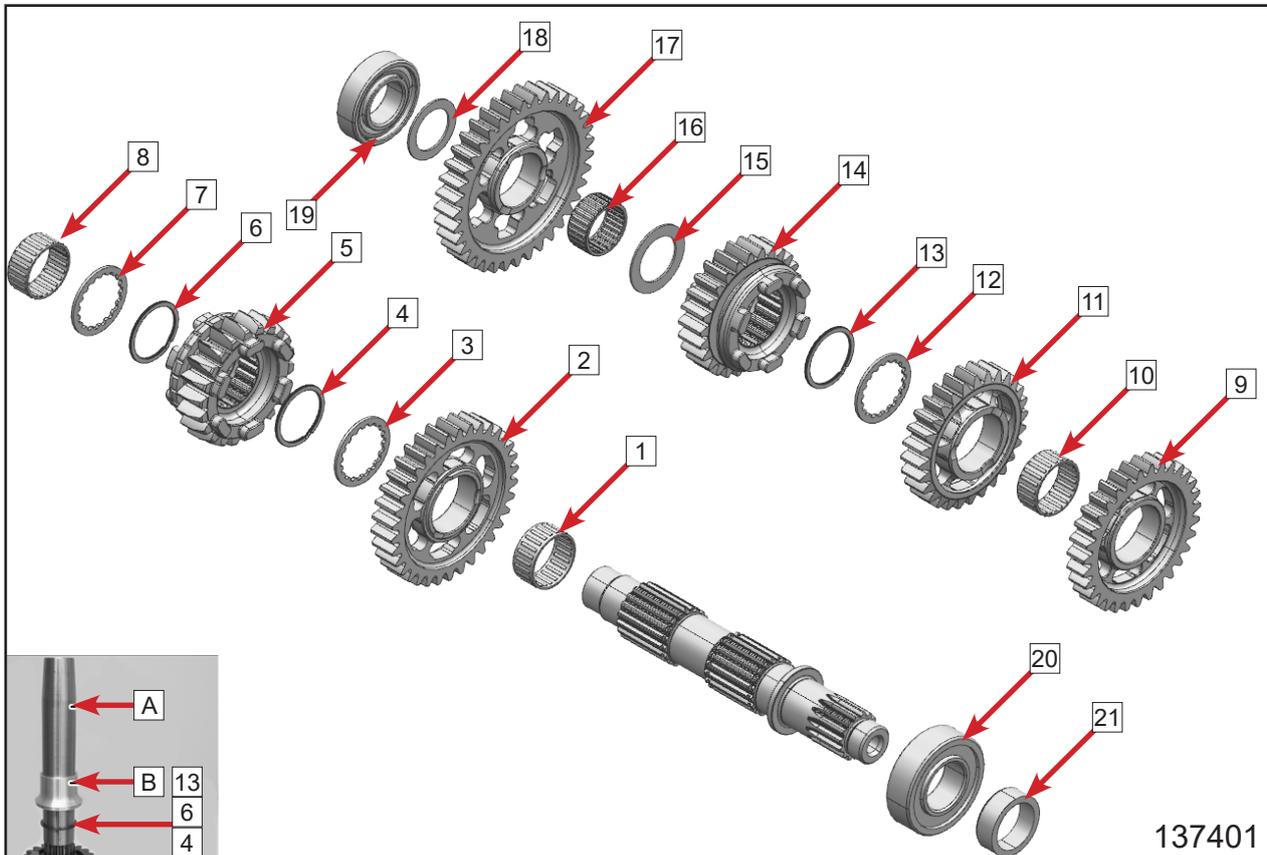
NOTE

Use new lock rings with every repair.

Preparatory work

Carefully lubricate all parts before assembling.

Check the shifting system.



Main work

Secure the countershaft in the bench vise with the toothed end facing downward.

Guideline

Use soft jaws.

Mount needle bearing (1) and second-gear idler gear (2) onto the countershaft with the tooth neck facing downward. Mount gasket (3). Position special tool (Mounting tool for lock ring) on the transmission shaft. Position new lock ring (4) on special tool (A) and push down with sleeve (B). The lock ring engages in the groove of the gearshift shaft. Mount the sixth-gear sliding gear (5) with the shift groove facing up. Position special tool (Mounting tool for lock ring) on the gearshift shaft. Position new lock ring (6) on special tool (A) and push down with sleeve (B). The lock ring engages in the groove of the gearshift shaft. Mount gasket (7). Mount needle bearing (8) and the third-gear idler gear (9) with the tooth neck facing up. Mount needle bearing (10) and the fourth-gear idler gear (11) with the tooth neck facing down. Mount gasket (12). Position special tool (Mounting tool for lock ring) on the gearshift shaft. Position new lock ring (13) on special tool (A) and push down with sleeve (B).

The lock ring engages in the groove of the gearshift shaft. Mount the fifth-gear sliding gear (14) with the shift groove facing down and install gasket (15). Mount needle bearing (16) and first-gear idler gear (17) with the recess facing down, and install gasket (18). Mount bearing (19). Take the countershaft out of the vise. Mount distance sleeve (20) with bearing (21). Finally, check all the gear for smooth operation.

13.3.34 Checking the Electronic Starter Motor

Check the gear teeth and bearing of starter intermediate gear (1) for damage and wear.

If there is damage or wear:

Change the starter intermediate gear.

Check the gear teeth and bearing of torque limiter (2) for damage and wear.

If there is damage or wear: Change torque limiter.

Check gear mesh and bearing of freewheel gear (3) for damage and wear.

If there is damage or wear: Change freewheel gear or bearing.

Check freewheel (4) for damage and wear.

If there is damage or wear: Change the freewheel.

Check the gear teeth of the starter motor (5) for damage and wear.

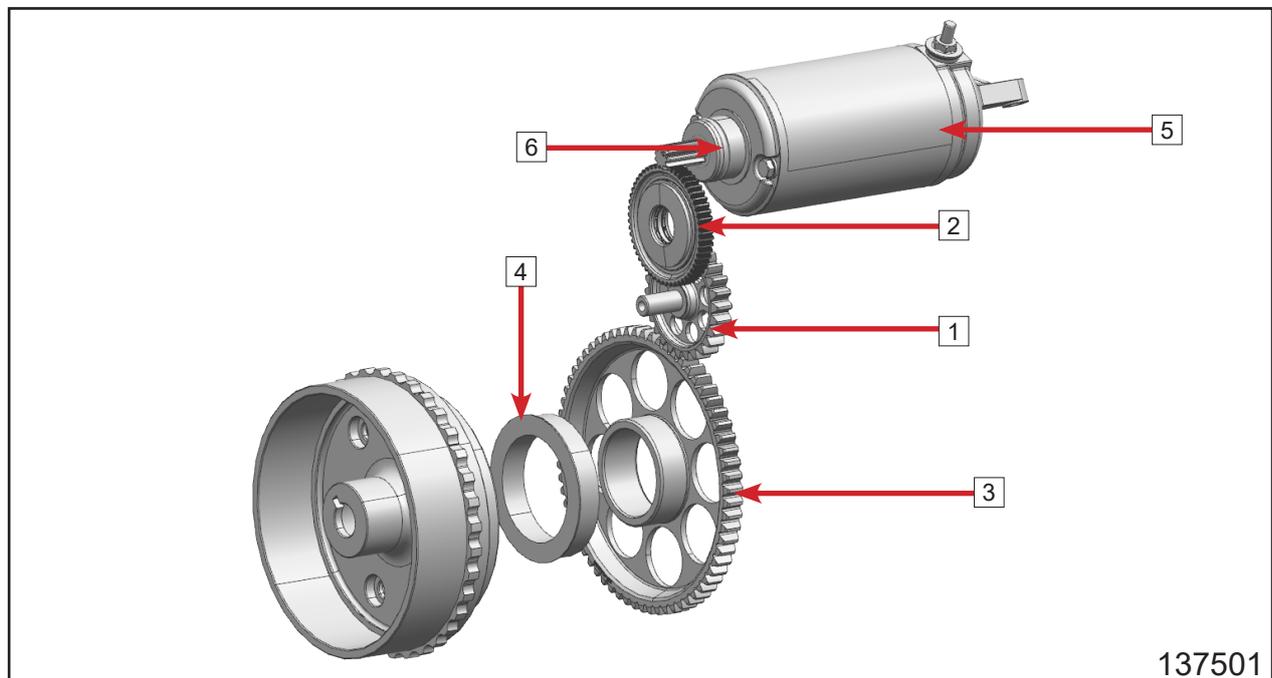
If there is damage or wear: Change starter motor.

Change O-ring (6) of the starter motor.

Connect negative cable of a 12-volt power supply to the housing of the starter motor.

Connect positive cable of the power supply briefly with the connector of the starter motor.

If the starter motor does not turn when the circuit is closed: Change starter motor.



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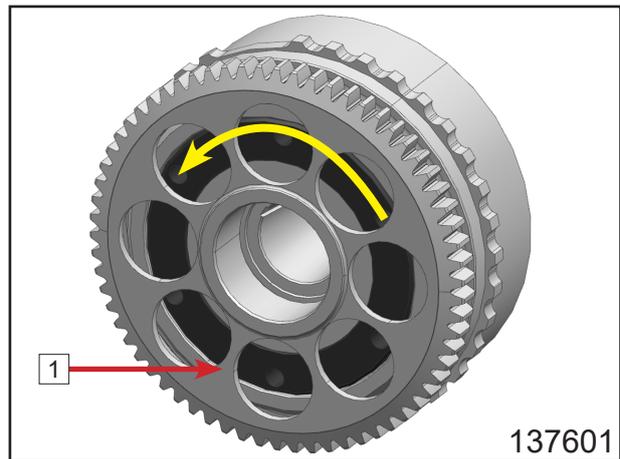
13.3.35 Checking the Flywheel

Insert flywheel gear (1) into the flywheel hub while turning the flywheel gear counterclockwise; do not wedge it.

Check the locking action of flywheel gear (1).

The flywheel gear cannot be turned counterclockwise and does not block clockwise:

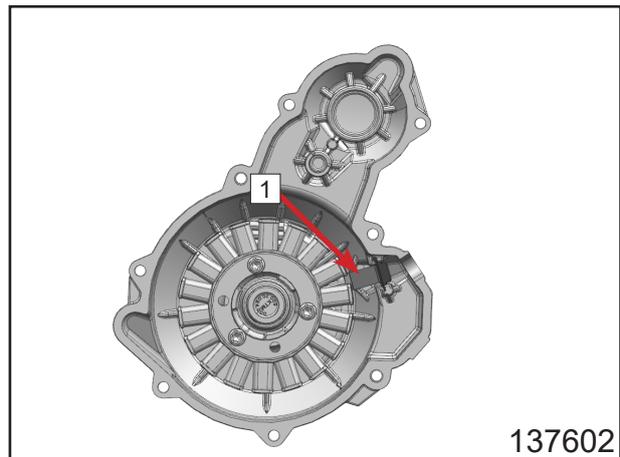
Change the flywheel.



13.3.36 Working on the Magneto Cover

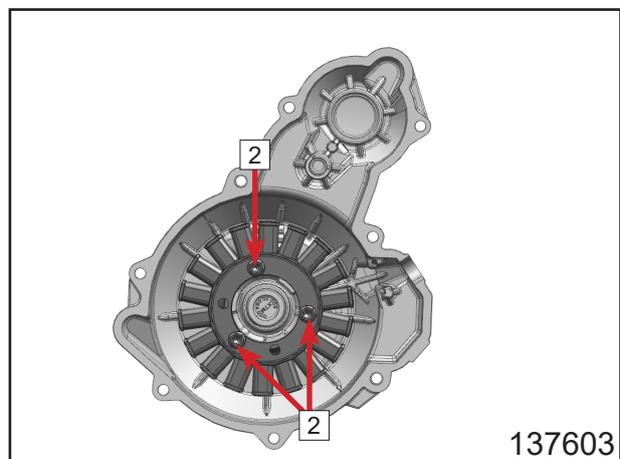
Remove the cable retainer (1).

Pull the rubber ring out of the engine case.



Remove screws (2).

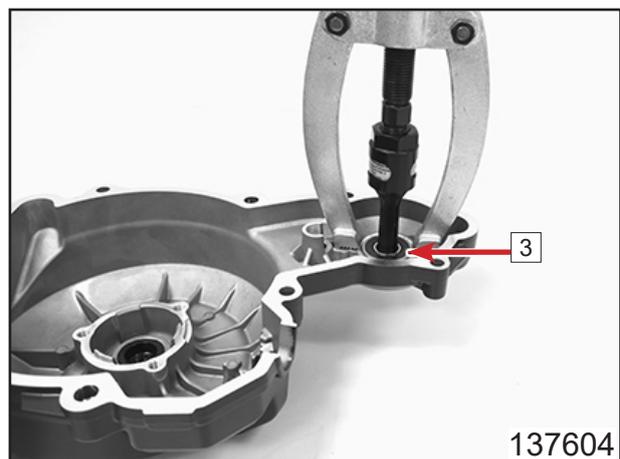
Remove the stator.



Remove bearing (3) using the special tool.

Bearing puller

Internal bearing puller

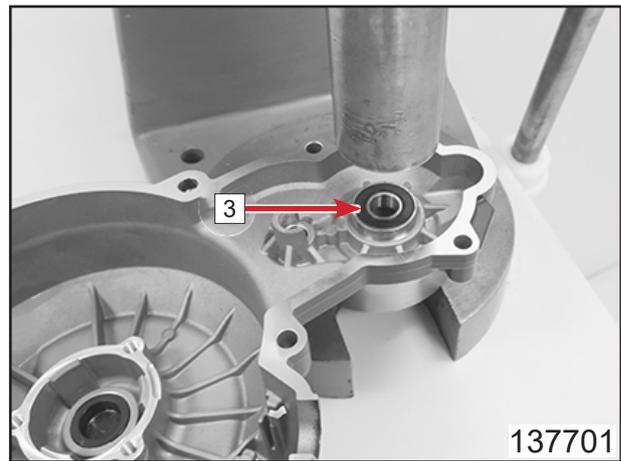


13 Engine Assembly

Press in new bearing (3) all the way using a suitable tool.

NOTE

Provide suitable support for the magneto cover while pressing in.



Position the stator.
Mount and tighten screws (2).

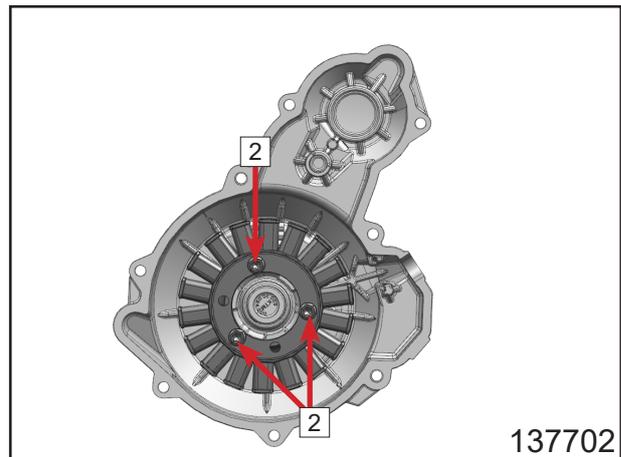
Guideline

Screw, stator

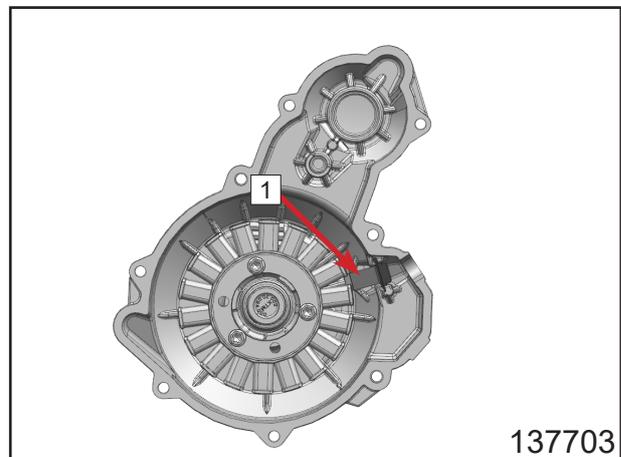
M6

10 N•m

Apply thread locker



Apply sealing compound in the area of the rubber grommet.
Position the rubber grommet in the magneto cover.
Position the cable retainer (1).
The retaining bracket engages in the attachment (A).



13.4 Engine Assembly

13.4.1 Installing the Piston

NOTE

The operations are the same for both pistons.

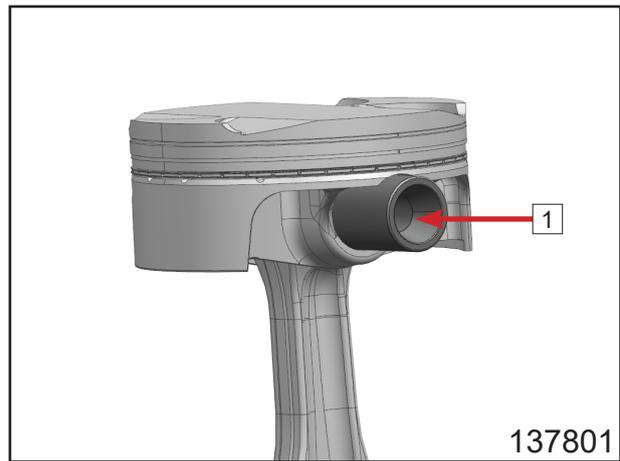
Clamp connecting rod in the vise.

Guideline

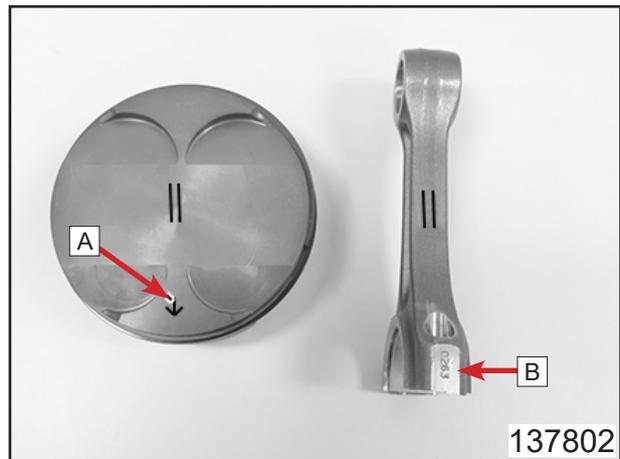
Use soft jaws.

Position piston on the associated connecting rod.

Mount piston pin (1).



The piston marking (A) and connecting rod marking (B) point to the same direction after assembly.

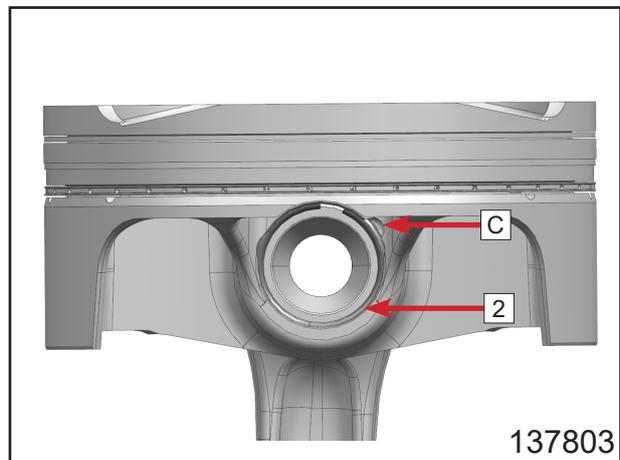


Position the new piston pin circlip (2).
Insert the special tool and press it with force towards the piston.

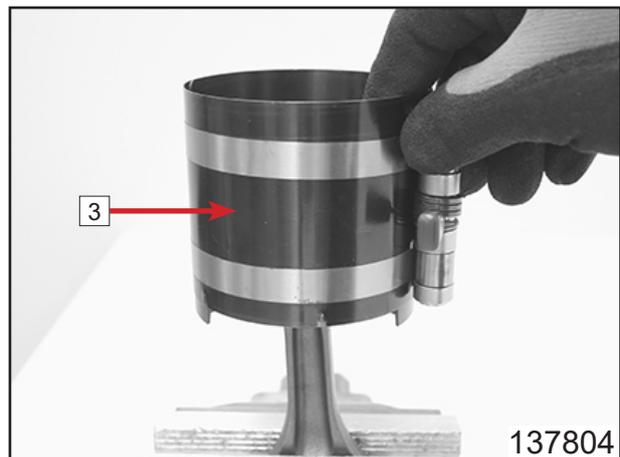
Turn the special tool (with piston pin circlip) clockwise, thereby pushing the piston pin circlip into the groove.

Ensure that the piston pin circlip is in the correct position on both sides.

The open side (C) of the piston pin circlip faces upwards.



Lubricate the cylinder and piston.
Shift the gap of the piston rings by 120°.
Mount special tool (Piston ring compressor 3) on the piston.
Clamp the piston rings together using the special tool.



13 Engine Assembly

Position the piston with the special tool on the cylinder.

Tap lightly on the piston ring compressor from the top with a rubber hammer so that it lies flush with the cylinder.

NOTE

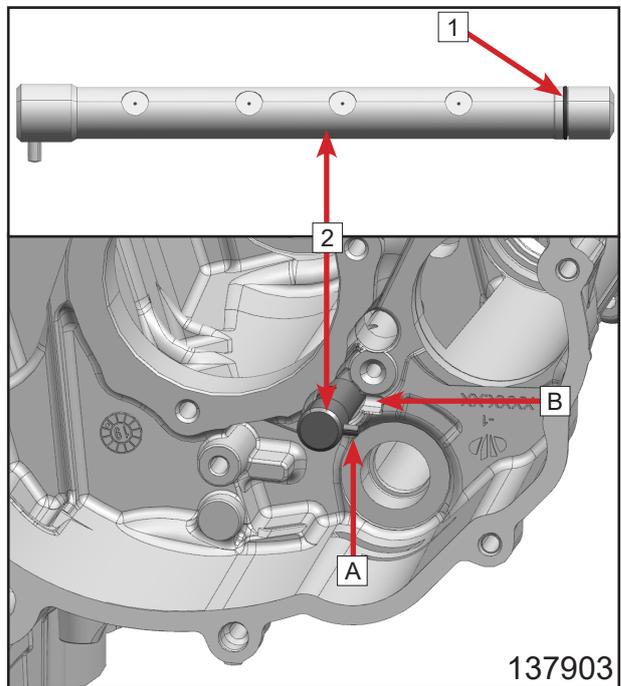
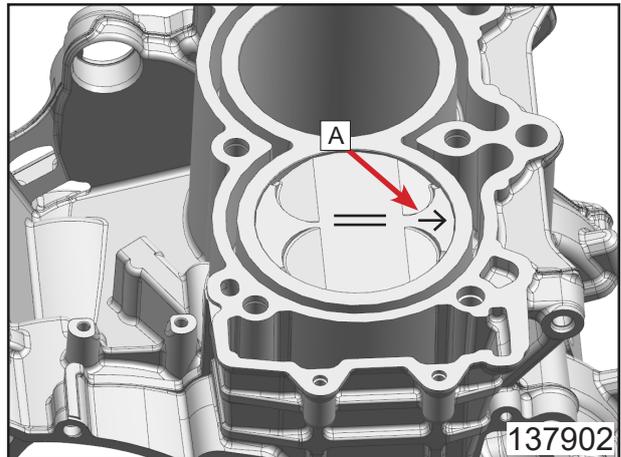
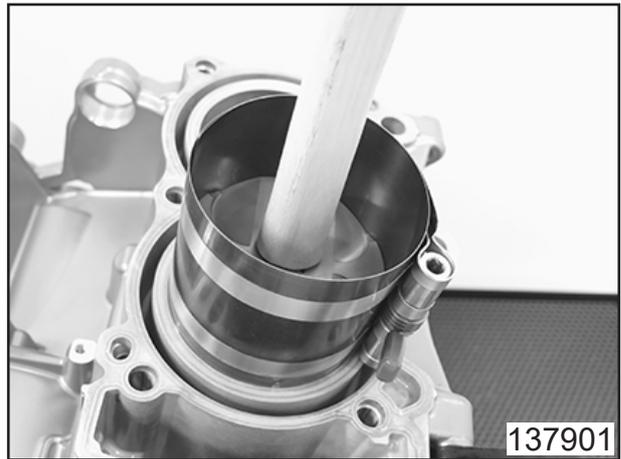
The special tool must press the piston rings together properly and lie flush with the cylinder.

Drive the piston into the cylinder by striking it carefully with the hammer handle.

NOTE

Do not hit piston rings with hammer, otherwise they will damage.

Ensure that piston marking (A) faces the exhaust side.



13.4.2 Installing the Oil Spray Tube

Mount the new O-ring (1) on the oil spray tube (2).

Mount the oil spray tube.

The pin (A) engages in the recess (B).

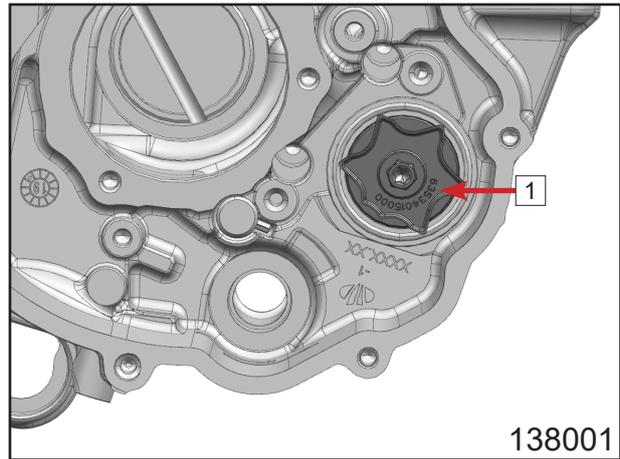
13.4.3 Installing the Shift Shafts

Preparatory work

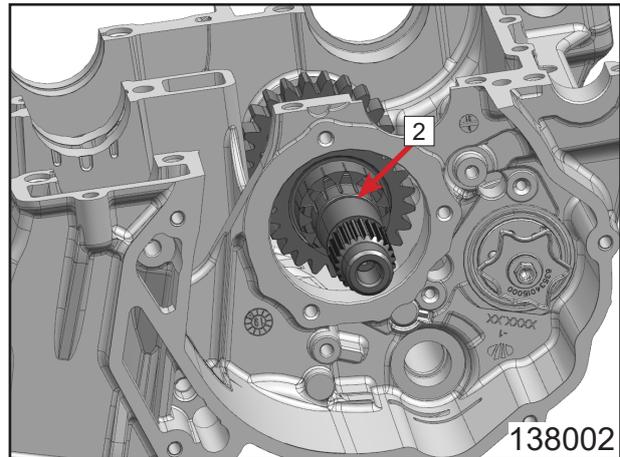
Lubricate all bearings.

Main work

Mount shift drum (1).

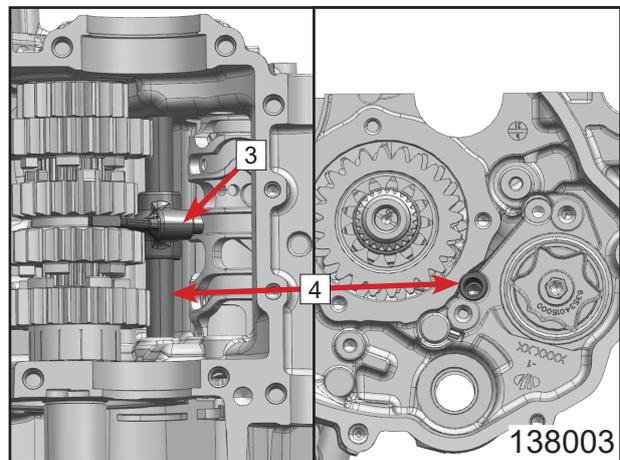


Mount main shaft (2).



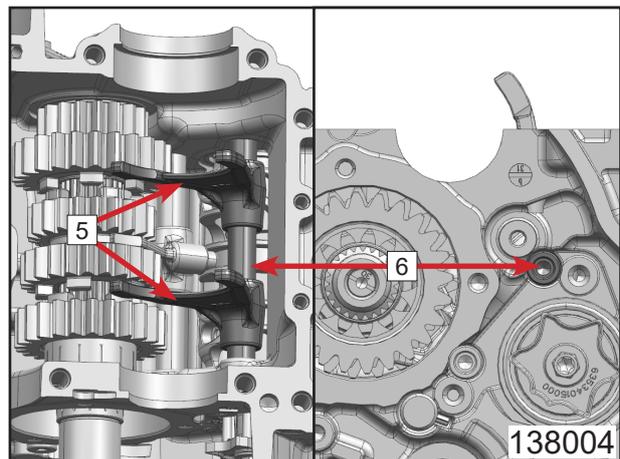
Position shift fork (3).

Mount fork shaft (4).



Position shift forks (5).

Mount fork shaft (6)

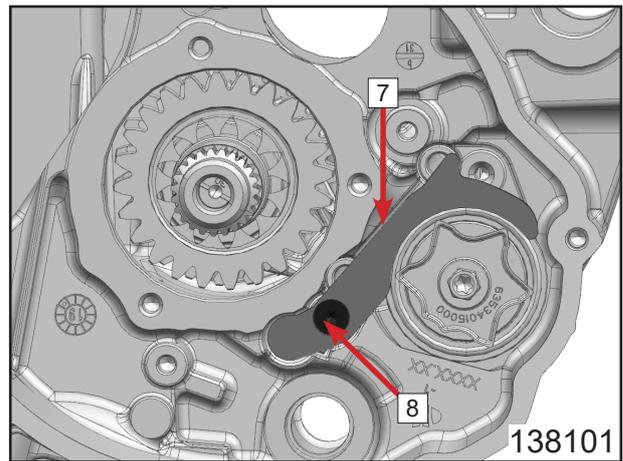


13 Engine Assembly

Position retaining bracket (7).
Mount and tighten screw (8).

Guideline

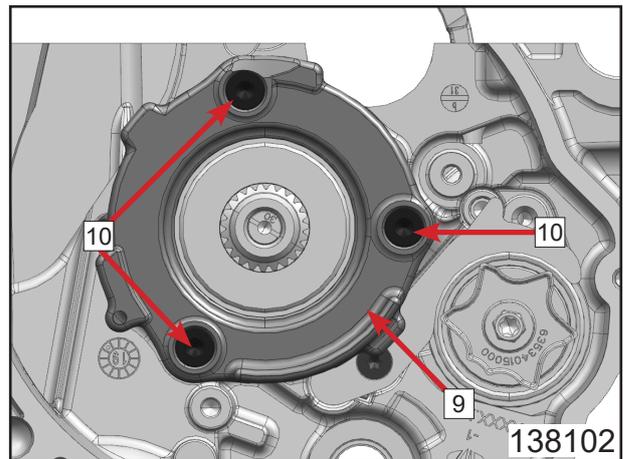
Screw, shift drum retaining bracket
M5
6 N•m
Apply thread locker



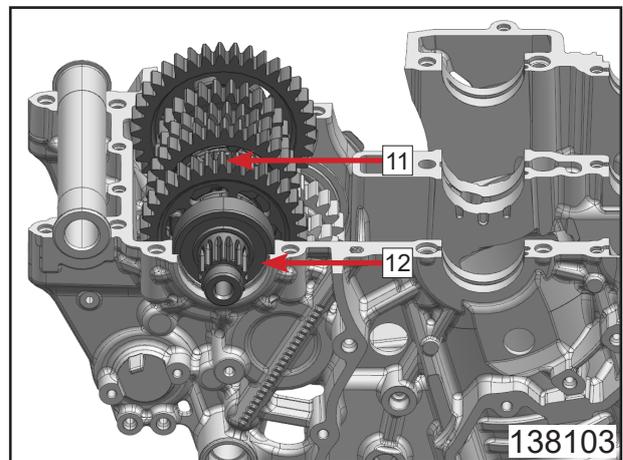
Position bearing support (9) with bearing.
Mount and tighten screws (10).

Guideline

Screw, main shaft bearing support
M6
10 N•m
Apply thread locker



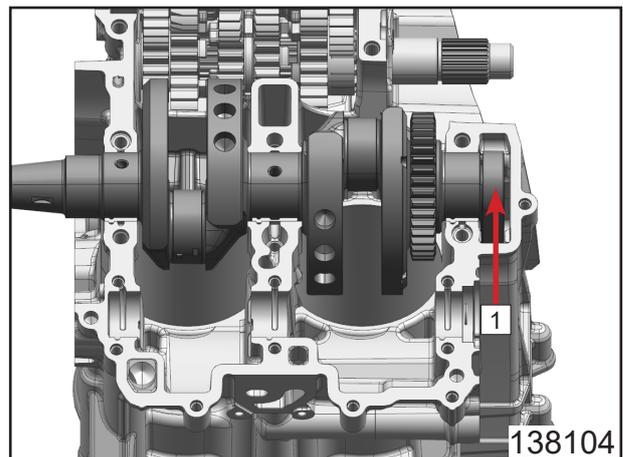
Position countershaft (11)
Mount radial shaft seal ring (12).



13.4.4 Installing the Lower Engine Case

Lubricate the bearing shells.

Position crankshaft (1) with timing chain.

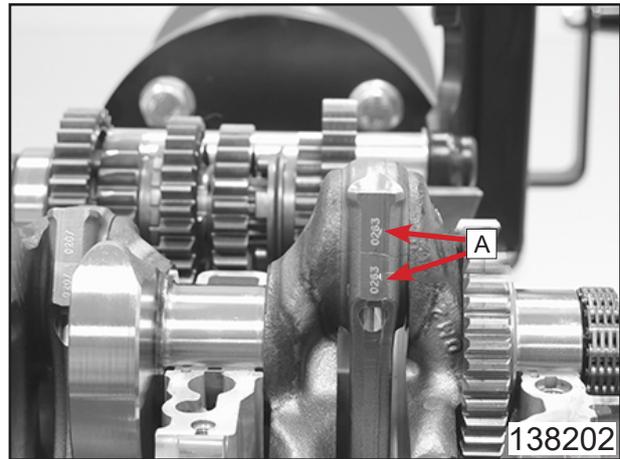
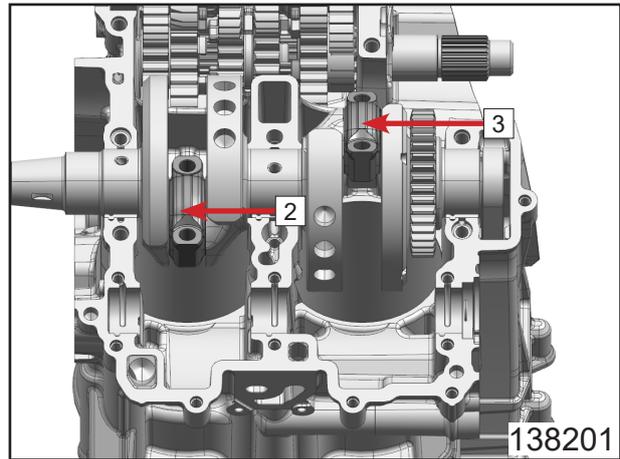


CFMOTO

Lubricate the bearing shells.
Make sure there is no oil or grease on the connecting rod joint face.
Position conrod bearing covers (2) and (3) on the connecting rod.

NOTE

The markings (A) on the connecting rod and on the cover must be identical and legible.



Mount and tighten new screws (4).

Guideline

Screw, conrod bearing

M8

1st stage

5 N•m

2nd stage

15 N•m

3rd stage

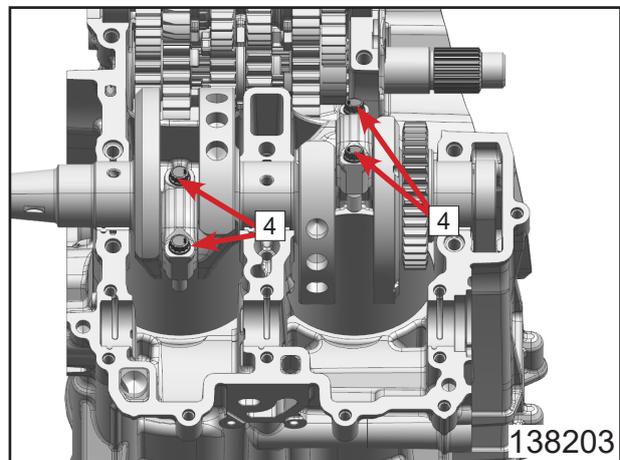
90°

Lubricate collar and thread

Special tool:

Multi-tooth tool

Angle disc

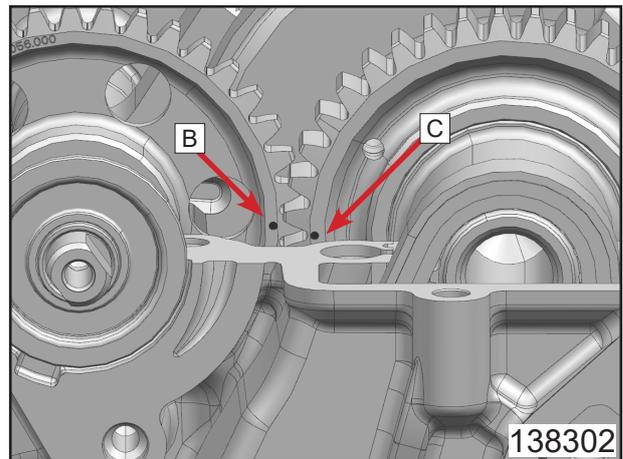
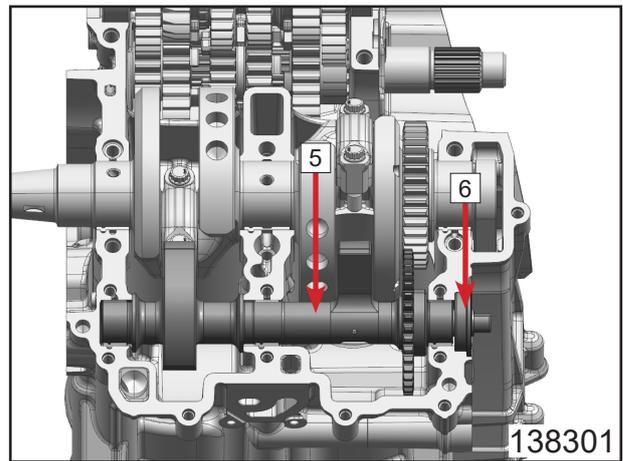


13 Engine Assembly

Lubricate the bearing shells.
Position balancer shaft (5) with new lubricated radial shaft seal ring (6).

Long-life grease

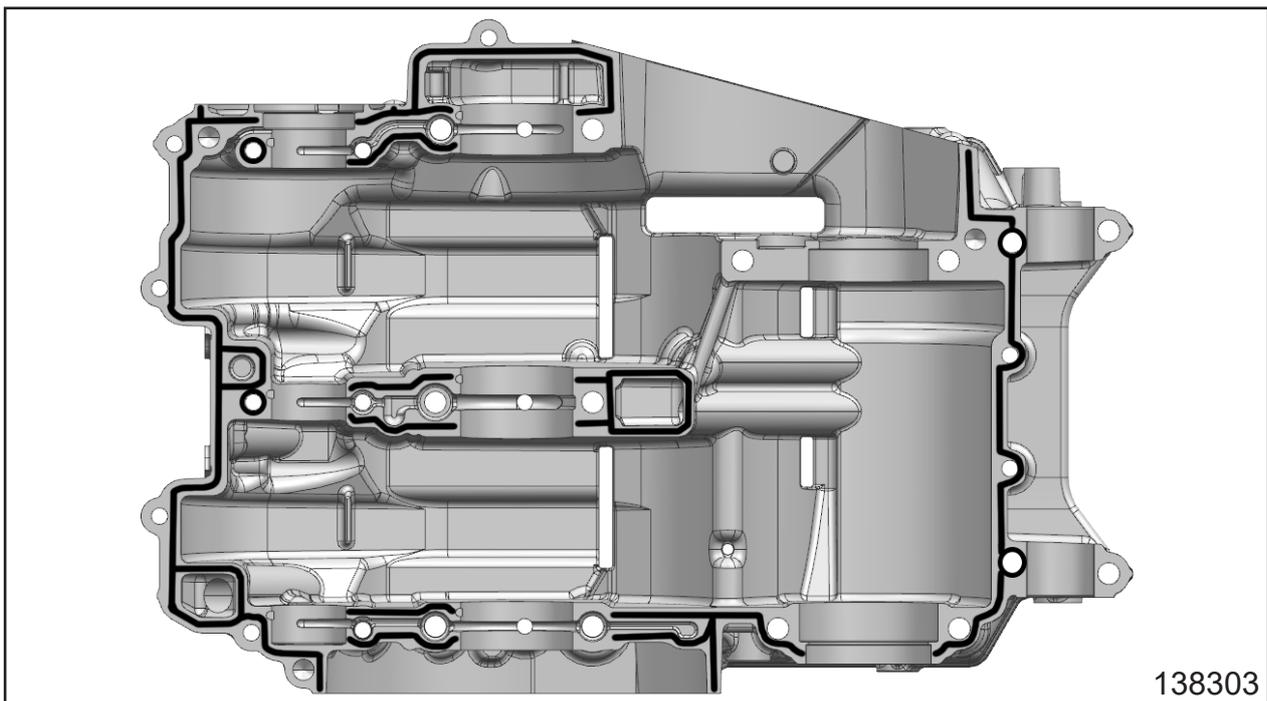
Align markings (B) and (C).



Degrease the sealing surface. Apply sealing compound to the lower section of the engine case.

NOTE

Ensure that the dowel pins are seated properly.



CFMOTO

Mount lower engine case. If necessary, strike lightly with a rubber hammer.

NOTE

Do not use the screws to pull the two sections of the engine case together.

Mount screws with washers and tighten in the order (7) to (12).

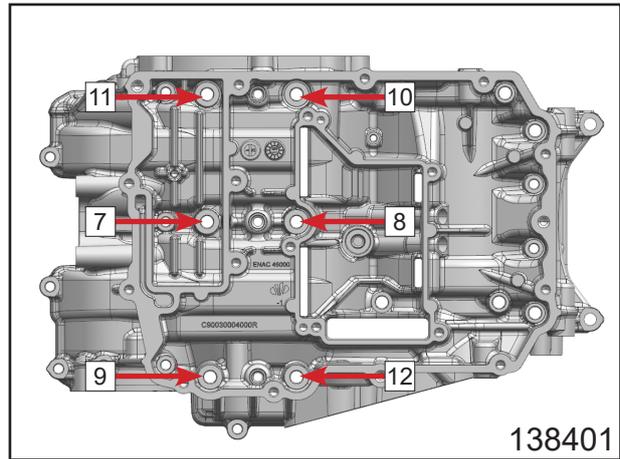
Guideline

Screw, engine case

M8x90

25 N•m

Apply thread locker



138401

Mount and tighten screws (13).

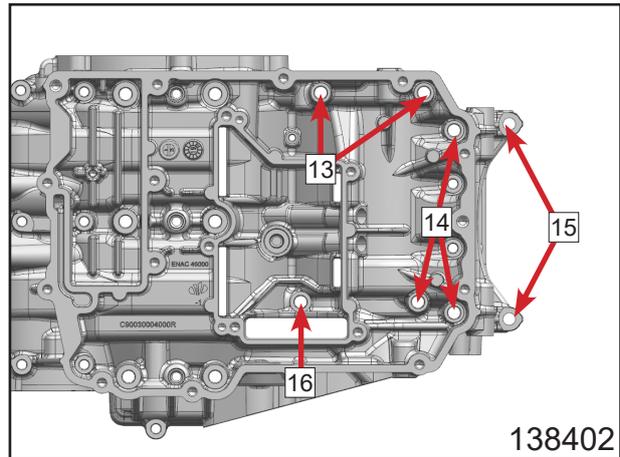
Guideline

Screw, engine case

M8x90

25 N•m

Apply thread locker



138402

Mount and tighten screws (14).

Guideline

Screw, engine case

M8x65

25 N•m

Apply thread locker

Mount and tighten screws (15).

Guideline

Screw, engine case

M8x55

25 N•m

Apply thread locker

Mount and tighten screw (16).

Guideline

Screw, engine case

M8x45

25 N•m

Apply thread locker

13 Engine Assembly

Mount and tighten screws (17).

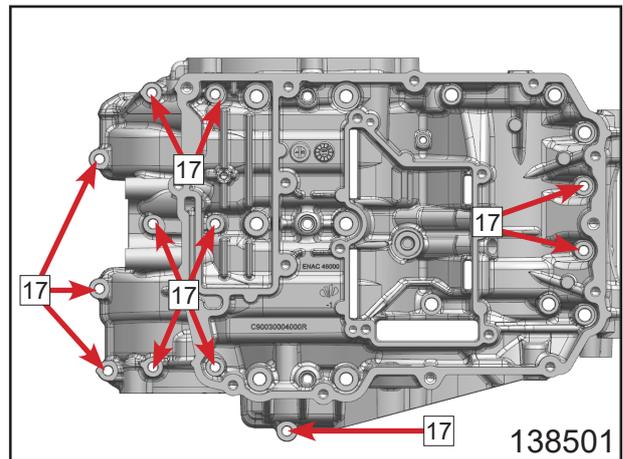
Guideline

Screw, engine case
M6×60
12 N•m

Mount and tighten screws (18).

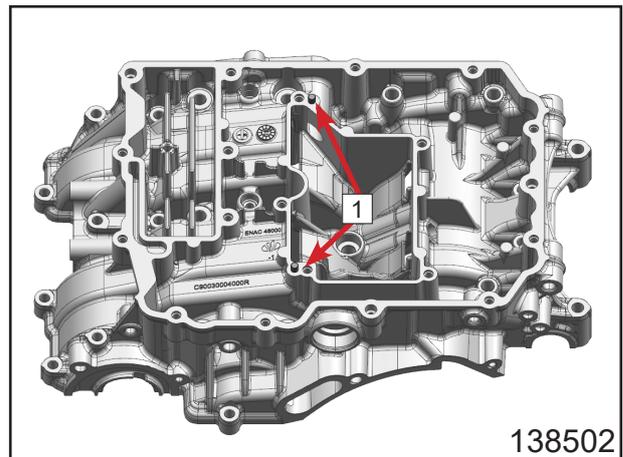
Guideline

Screw, engine case
M6×30
12 N•m



13.4.5 Installing the Oil Pump Assembly

Mount dowel pins (1).



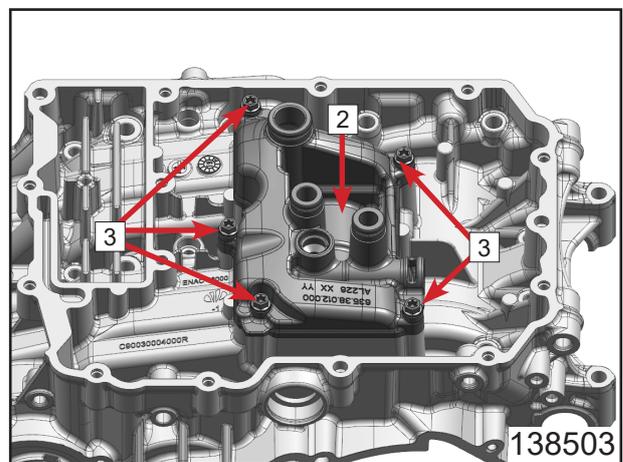
Lubricate O-rings of the oil pump.

Position oil pump assembly (2).

Mount and tighten screws (3).

Guideline

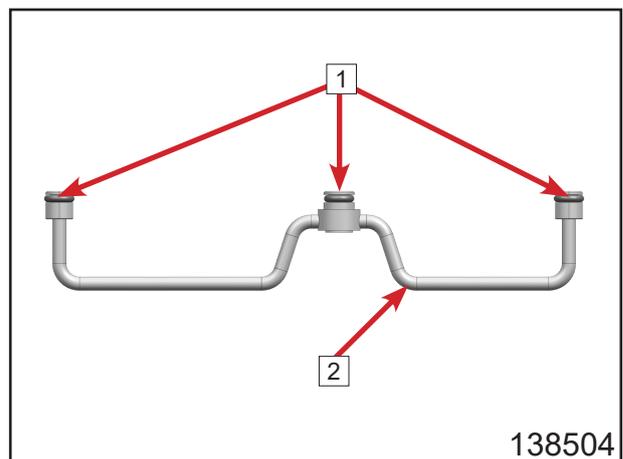
Screw, oil pump unit
M6
10 N•m



13.4.6 Installing the Oil Pan

Lubricate the new O-rings (1) and mount on the oil line (2).

Mount oil line (2).

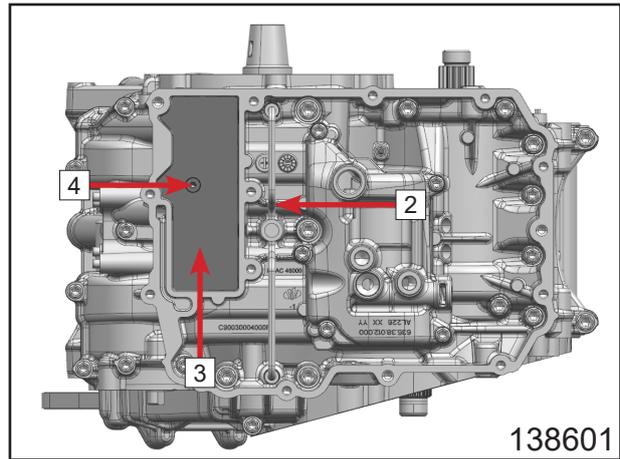


CFMOTO

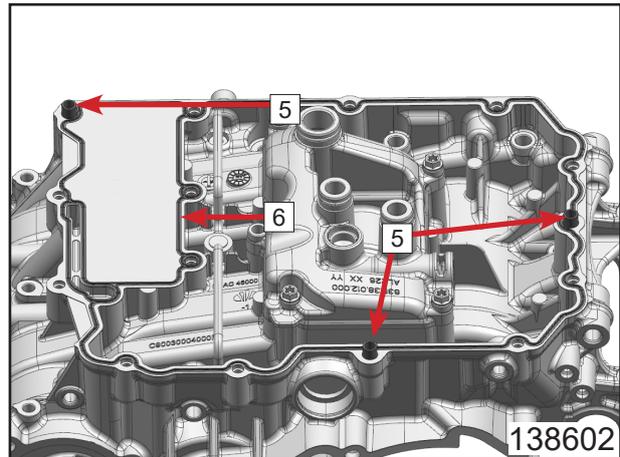
Position pressure plate (3).
Mount and tighten screw (4).

Guideline

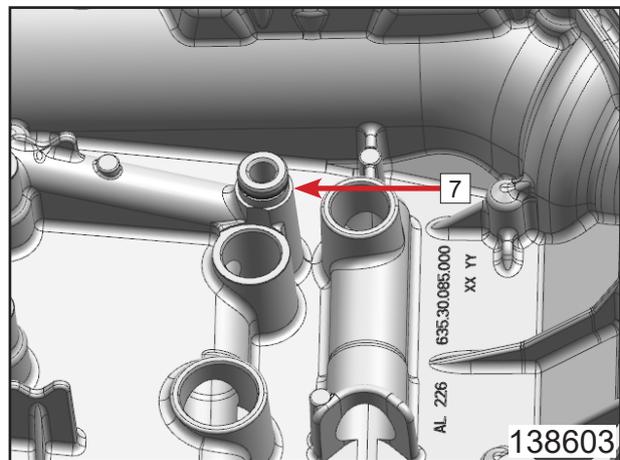
Screw, pressure plate
M5
3 N•m
Apply thread locker



Mount dowels pins (5).
Mount gasket (6).



Lubricate and mount the new O-ring (7).



Position oil pan.
Mount screws (8) but do not tighten yet.

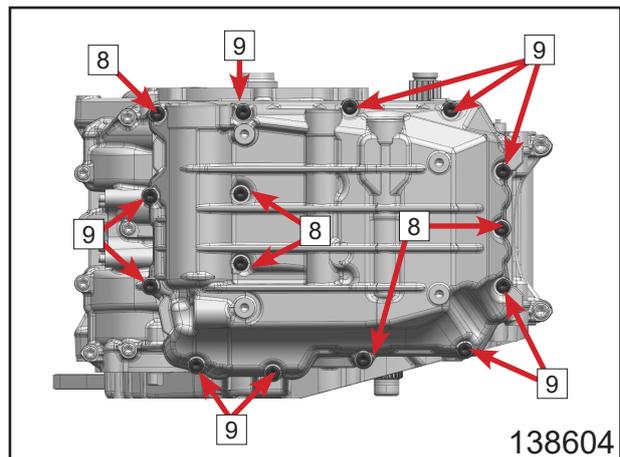
Guideline

Screw, oil pan
M6×35
10 N•m

Mount screws (9) and tighten all screws in a crisscross pattern.

Guideline

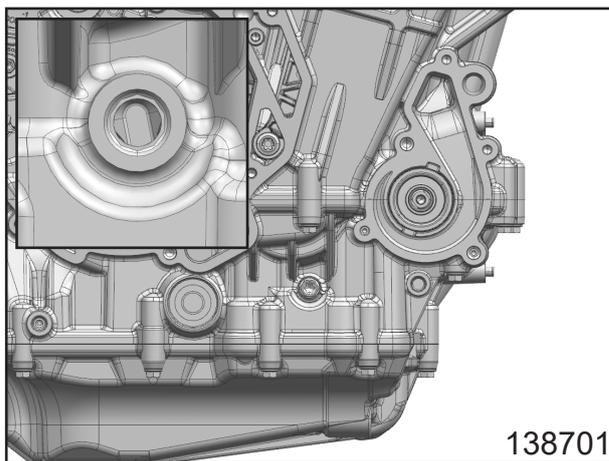
Screw, oil pan
M6×30
10 N•m



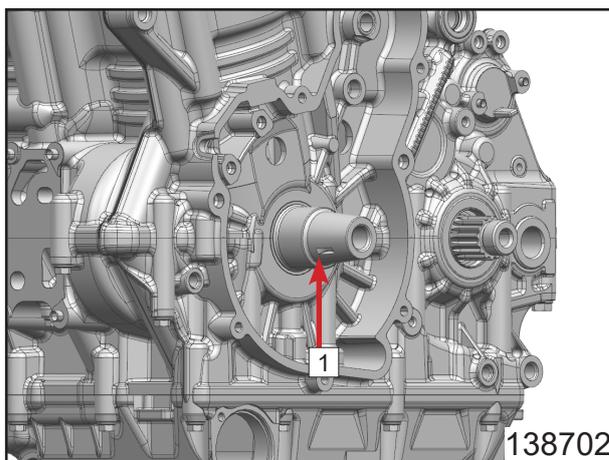
13 Engine Assembly

13.4.7 Installing the Rotor

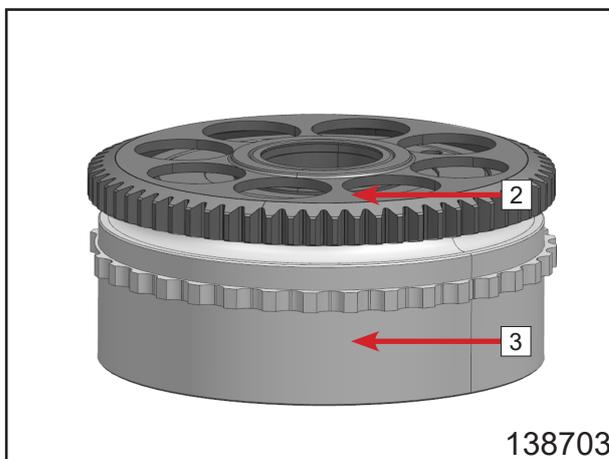
Position crankshaft to cylinder 1 TDC and lock with special tool (Locking screw).



Mount woodruff key (1).



Turn the flywheel gear (2) counterclockwise and mount in the rotor (3).



Mount the rotor with the flywheel gear.

NOTE

Ensure that the woodruff key is seated properly.

Mount and tighten screw (4).

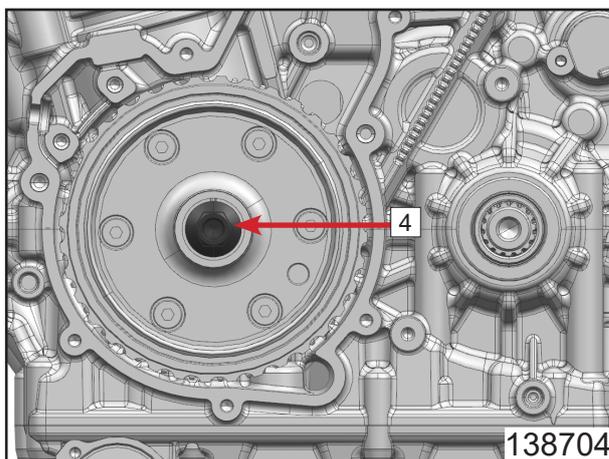
Guideline

Screw, rotor

M12x1.5

90 N•m

Lubricate thread



13.4.8 Installing the Timing Chain Plate

Position tensioning plate (1) with support bushing (2).

Mount and tighten screw (3).

Guideline

Screw, tensioning rail
M8
15 N•m
Apply thread locker

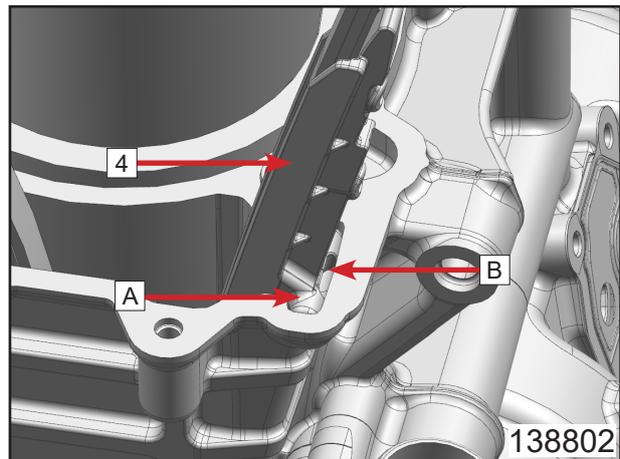
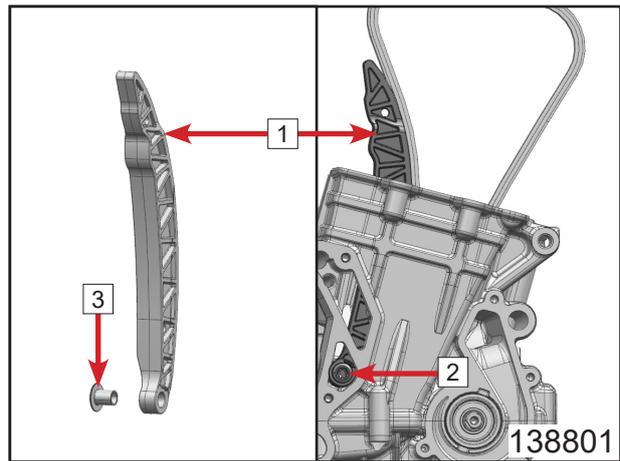
NOTE

Ensure that there is no thread locker on the screw; otherwise, the tensioning plate may lock and break.

Check the tensioning plate for fluent movement.

Position guide (4) from above in the engine case.

Holder (A) engages in the recess (B).

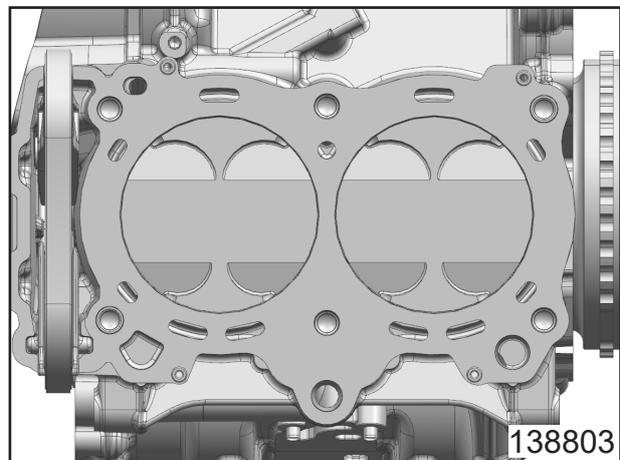


13.4.9 Installing the Cylinder Head

Put the new cylinder head gasket in place.

NOTE

Ensure that the dowel pins are seated properly.



13 Engine Assembly

Position the cylinder head.

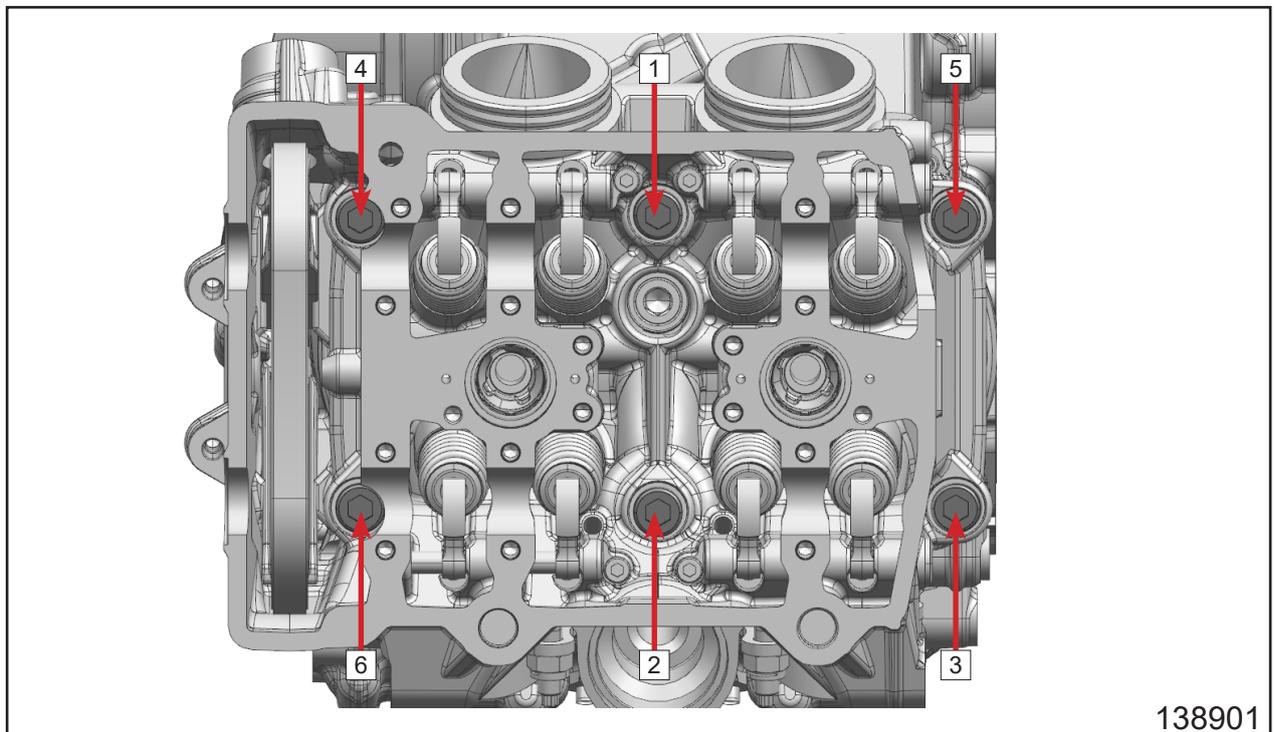
Mount cylinder head screws with washers and tighten step by step in the order from (1) to (6).

Guideline

Screw, cylinder head	M10x1.25	Tightening sequence: Refer to number order. 1st stage 5 N•m 2nd stage 15 N•m 3rd stage 90° 4th stage 90° Lubricate thread
----------------------	----------	--

NOTE

Always use new cylinder head screws.



CFMOTO

Mount and tighten screws (7).

Guideline

Screw, cylinder head

M6

10 N•m

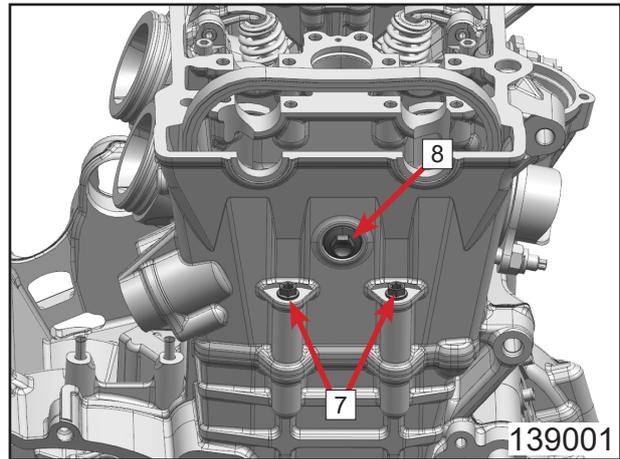
Mount and tighten screw (8) with gasket.

Guideline

Screw, timing chain shaft

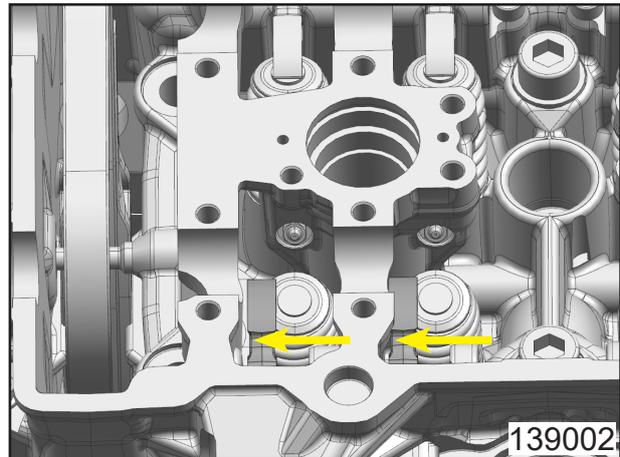
M6

10 N•m



13.4.10 Installing the Camshafts

Push the exhaust cam lever (1) towards the cylinder 2 position.



Pull up the timing chain and position the exhaust camshaft (2).

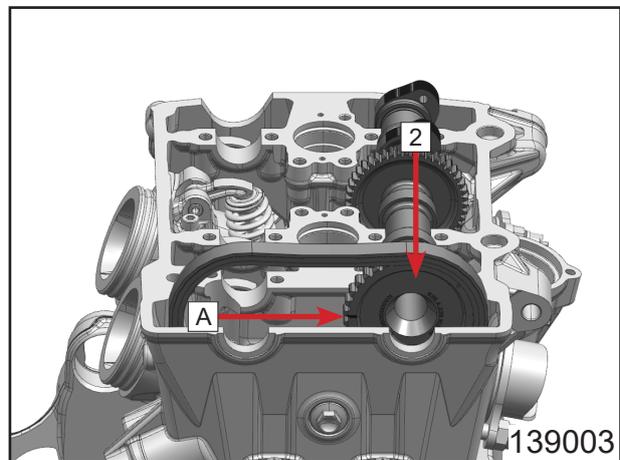
NOTE

The drive gear wheel for the balancer shaft is located in the exhaust camshaft.

Place timing chain over rear sprocket of the exhaust camshaft and keep taut. The OT1 marking (A) is aligned with the sealing surface.

NOTE

The OT1 markings are line markings.



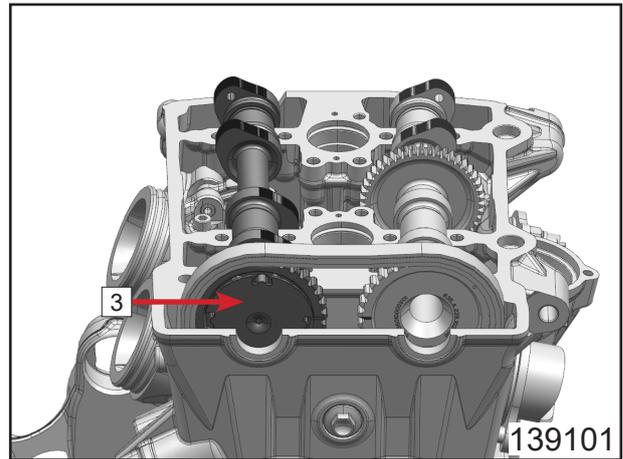
13 Engine Assembly

Slip in intake camshaft (3).

NOTE

The centrifuge of the engine vent is located on the intake camshaft.

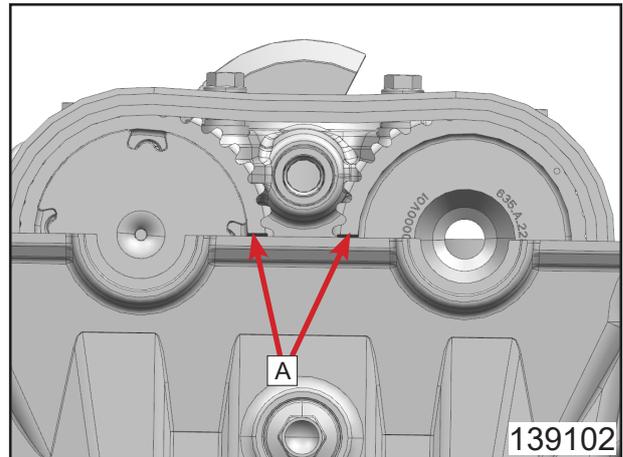
Keep the timing chain taut.



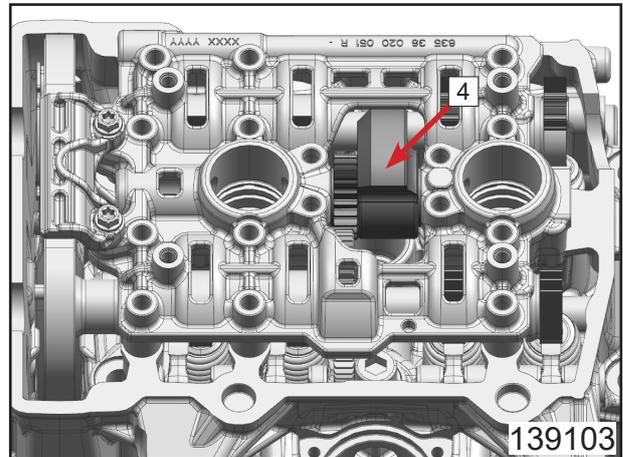
The OT1 markings (A) are aligned with the sealing surface.

NOTE

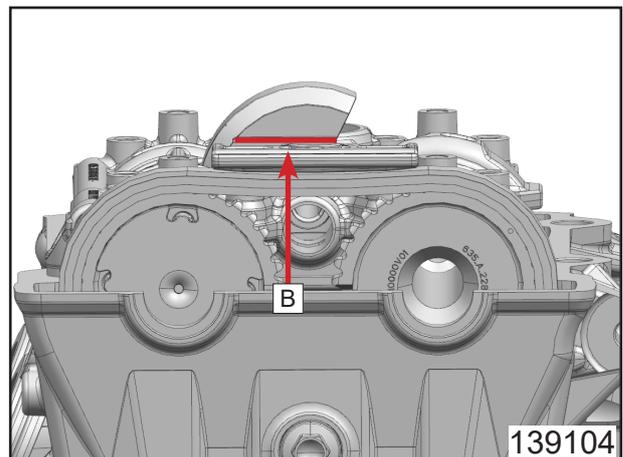
The OT1 markings are line markings.



Mount camshaft bearing bridge with balancer shaft (4).



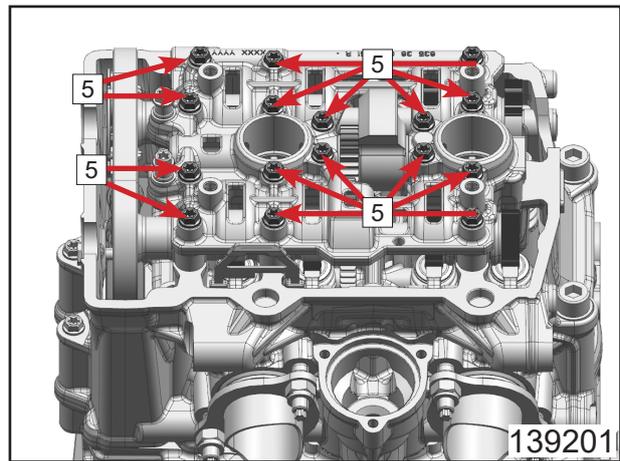
The marking (B) of the balancer shaft is aligned parallel to the sealing surface.



Mount screws (5) and tighten them from the inside to the outside.

Guideline

Screw, camshaft bearing bridge
M6
10 N•m

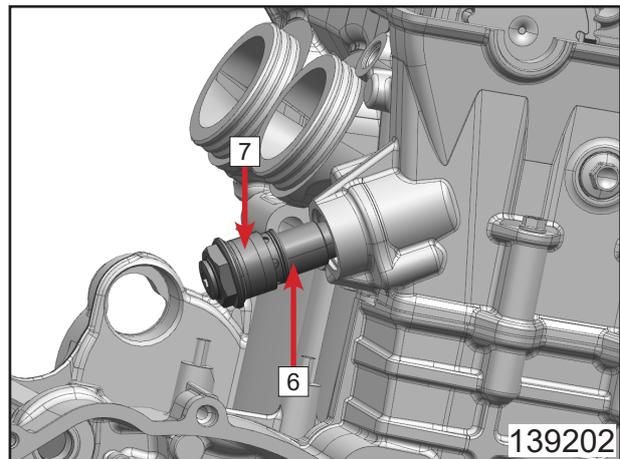


After it has been positioned in the installation location, insert timing chain tensioner (6) with a new O-ring.

Mount and tighten screw plug (7) with new O-ring.

Guideline

Plug, timing chain tensioner
M24×1.5
25 N•m



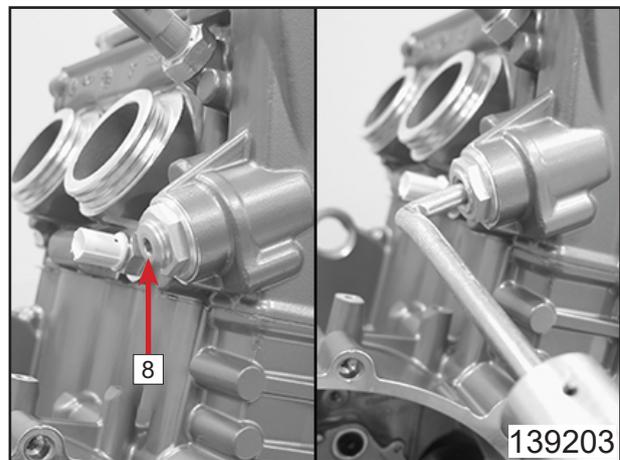
Remove screw (8) with the O-ring and use a special tool (Release tool for timing chain tensioner) to push the timing chain tensioner toward the timing chain.

The timing chain tensioner unlocks.

Mount and tighten screw (8) with the O-ring.

Guideline

Screw, unlocking of timing chain tensioner
M10×1
10 N•m

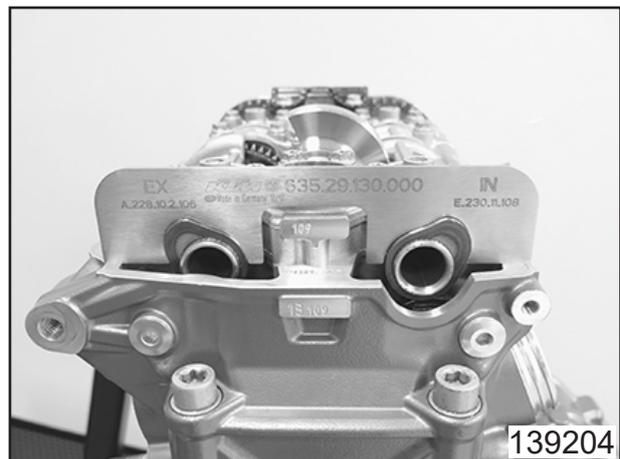


Remove the special tool (Locking screw).

Crank the engine several times.

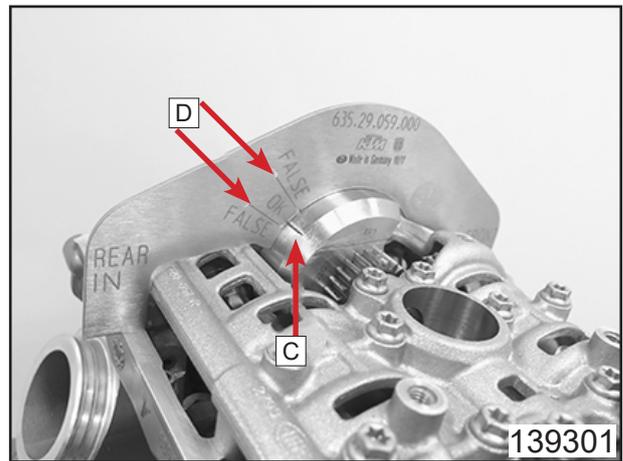
Turn the crankshaft counterclockwise to ignition top dead center of cylinder 1 and lock it using special tool. (Locking screw)

Check position of the camshafts with special tool (Setting gauge).



13 Engine Assembly

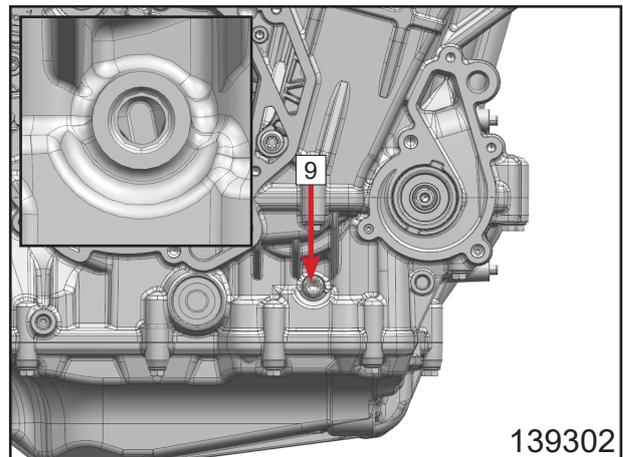
Check position of the balancer shaft with special tool (Setting gauge).
The marking (C) of the balancer shaft is located in the (D) area of the adjusting gauge.



Remove special tool (Locking screw).
Mount and tighten screw (9) with the washer.

Guideline

Screw plug, locking screw
M8
15 N•m



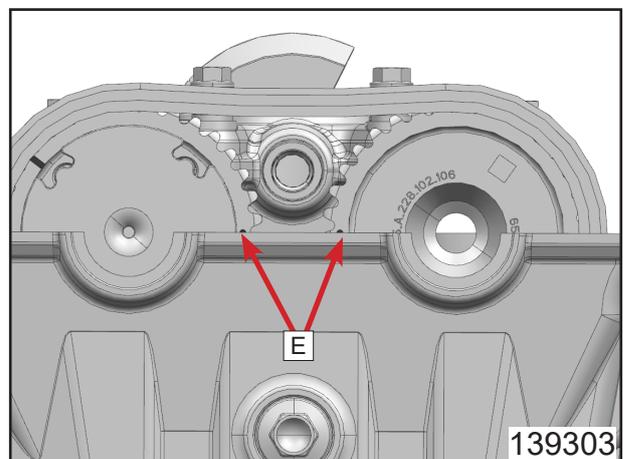
Turn the crankshaft counterclockwise and set it to ignition top dead center of cylinder 2.

Guideline

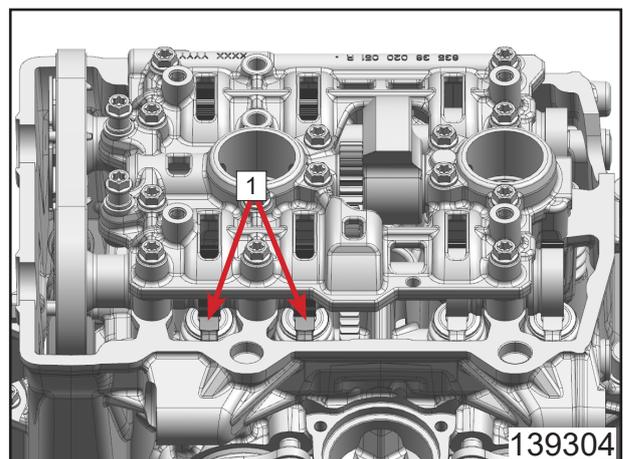
435°

The OT2 markings (E) are aligned with the sealing surface.

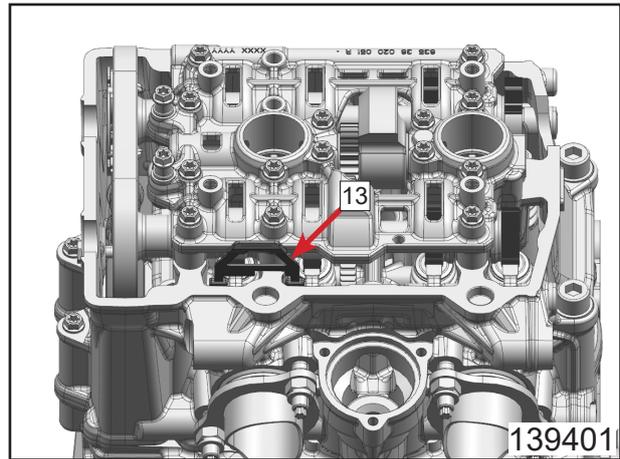
NOTE
The OT2 markings are dot markings.



Position exhaust cam lever (1) on cylinder 2.



Mount cam lever clip (13).

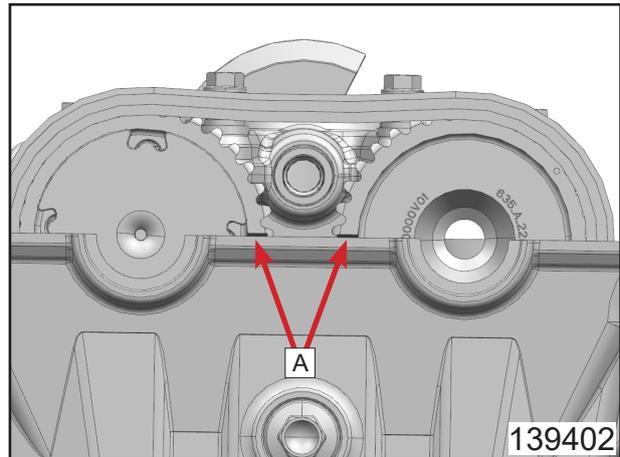


13.4.11 Checking the Valve Clearance

Rotate the engine crank several times.
Turn the crankshaft counterclockwise and set it to ignition top dead center of cylinder 1.

The OT1 markings (A) are aligned with the sealing surface.

NOTE
The OT1 markings are line markings.

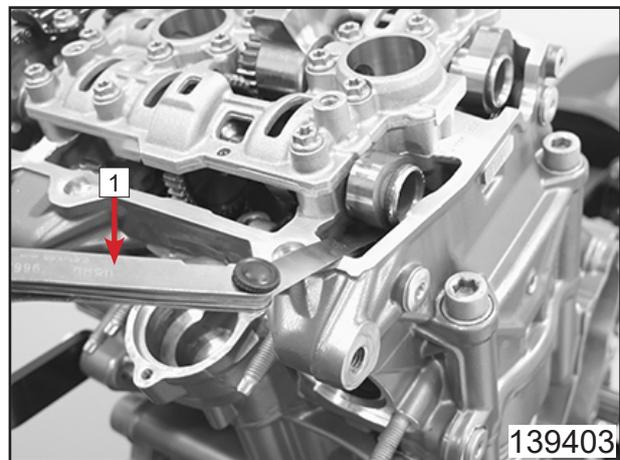


Check the valve clearance at the exhaust valves and the intake valves between the camshaft and cam lever using the special tool (1).

Guideline

Valve clearance, cold
Intake at: 20 °C 0.10mm~0.15 mm
Exhaust at: 20 °C 0.15mm~0.20 mm

Special tool: Feeler gauge
If the valve clearance exceeds limit:
Adjust the valve clearance.



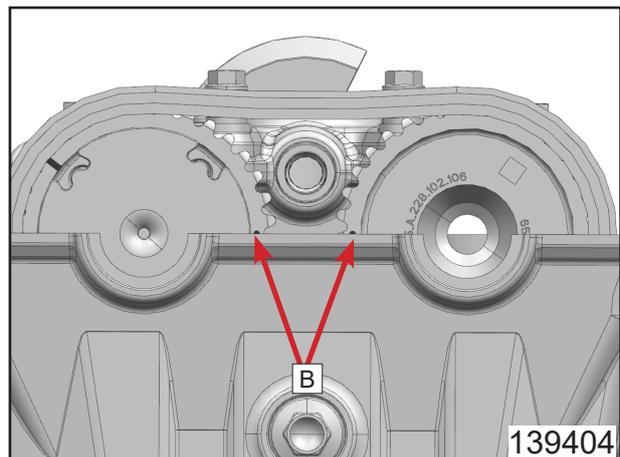
Turn the crankshaft counterclockwise and set it to ignition top dead center of cylinder 2.

Guideline

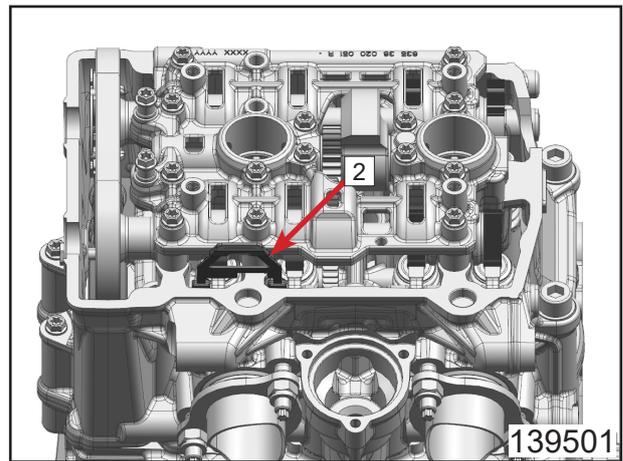
435°

The OT2 markings (B) are aligned with the sealing surface.

NOTE
The OT2 markings are dot markings.



Remove cam lever clip (2).



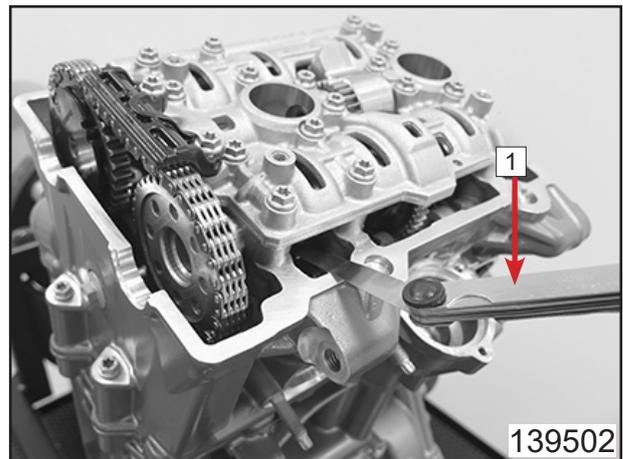
Check the valve clearance at the exhaust valves and the intake valves between the camshaft and cam lever using the special tool (1).

Guideline

Valve clearance, cold
Intake at: 20 °C 0.10mm~0.15 mm
Exhaust at: 20 °C 0.15mm~ 0.20 mm

Special tool: Feeler gauge

If the valve clearance exceeds limit:
Adjust the valve clearance.



13.4.12 Adjusting the Valve Clearance and Cleaning the Oil Screen

Preparatory work

Remove the camshafts.

Main work

Lift up cam lever (1).

Remove washers (2) and set them down according to the installation position.

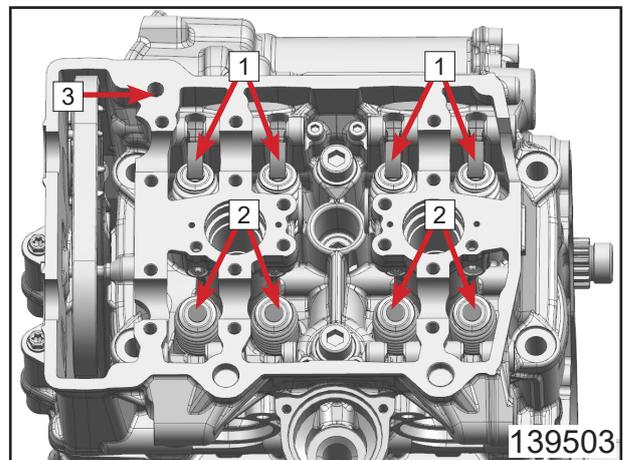
Choose the washer based on the results of the valve clearance check.

Insert suitable washers.

Clean oil screen (3).

Install the camshafts.

Check the valve clearance.

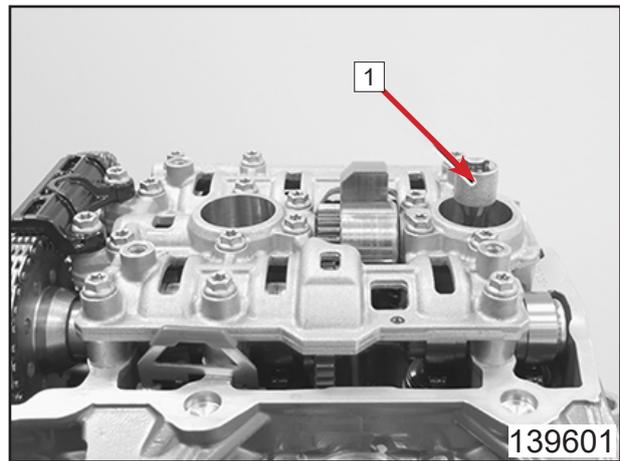


13.4.13 Installing the Spark Plugs

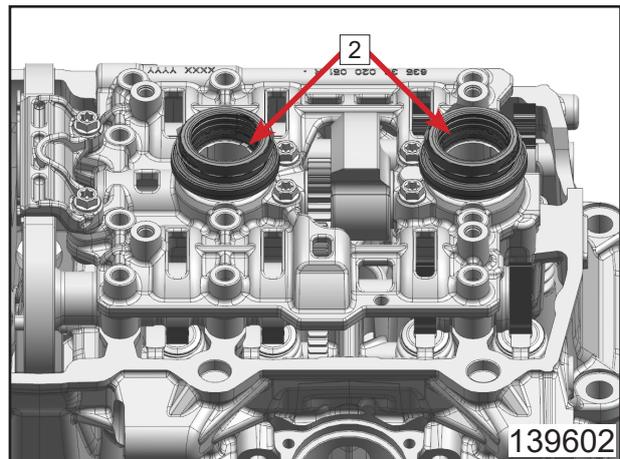
Mount and tighten the spark plugs using a special tool (Spark plug tool).

Guideline

Spark plug
M10
11 N•m



Lubricate the O-rings and mount spark plug shaft (2) with gasket.



13.4.14 Installing the Shift Shaft

Slide shift shaft (1) with the washer into the bearing seat.

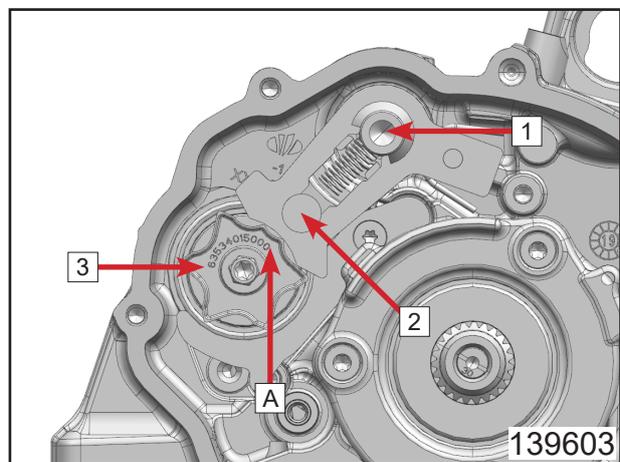
Push sliding plate (2) away from shift drum locating unit (3). Insert the shift shaft all the way.

NOTE

The neutral position (A) must be aligned with the sliding plate (2) for assembly.

Let the sliding plate engage in the shift drum locating unit.

Shift through the transmission.

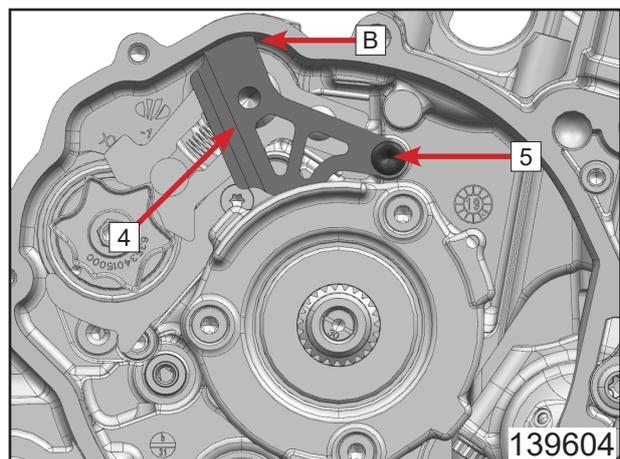


Position retaining bracket (4) in the groove (B).

Mount and tighten screw (5).

Guideline

Screw, shift shaft retaining bracket
M6
10 N•m
Apply thread locker



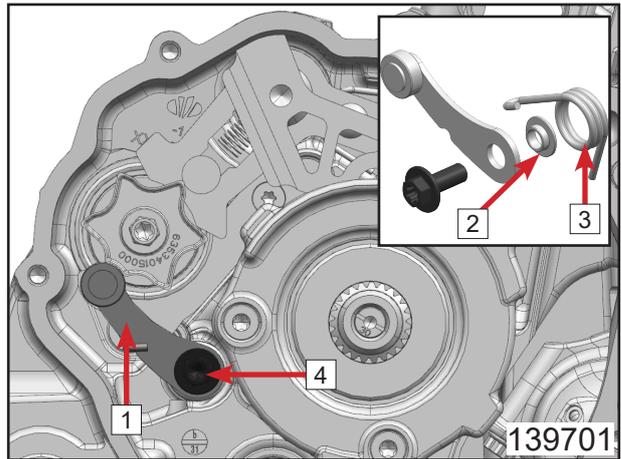
13 Engine Assembly

13.4.15 Installing the Locking Lever

Position locking lever (1) with sleeve (2) and spring (3).
Mount and tighten screw (4).

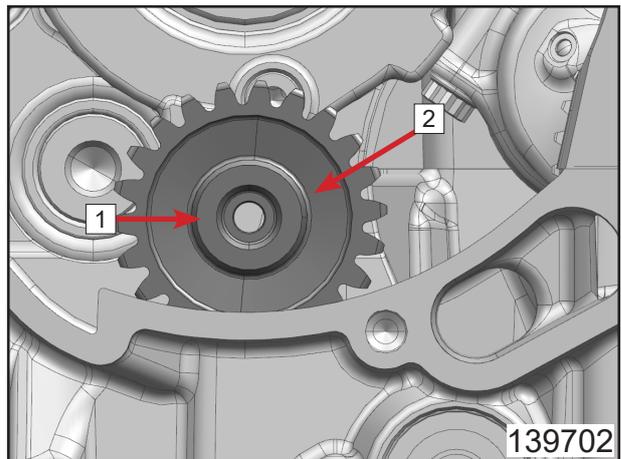
Guideline

Screw, locking lever
M6
10 N•m
Apply thread locker



13.4.16 Installing the Clutch Housing

Lubricate bushing (1) thoroughly.
Position bushing (1) and oil pump idler gear (2).



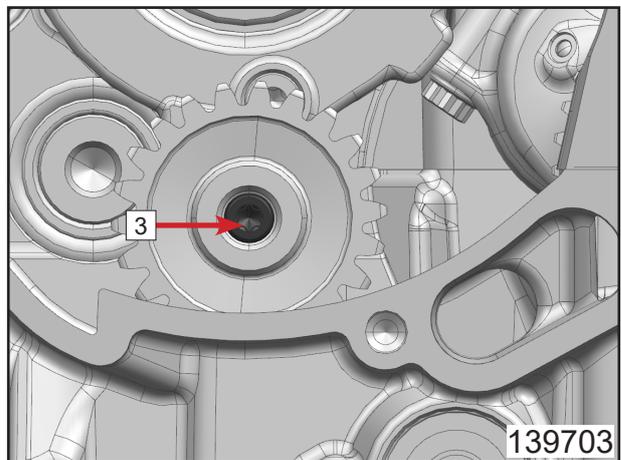
Mount and tighten screw (3).

Guideline

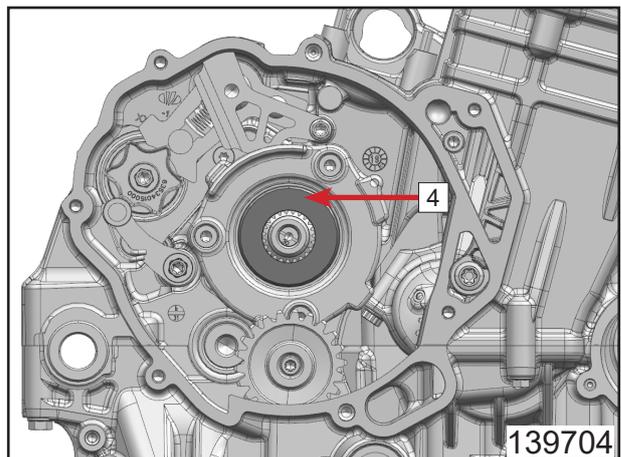
Screw, oil pump idler gear
M8
15 N•m
Apply thread locker

NOTE

The screw (3) must always be replaced.



Mount washer (4).



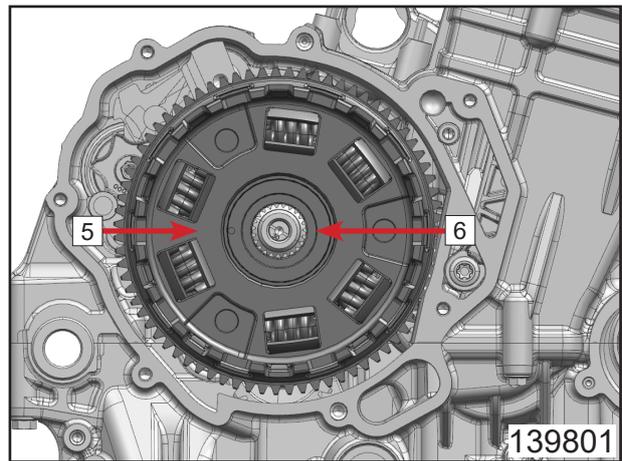
CFMOTO

Position the clutch housing (5).

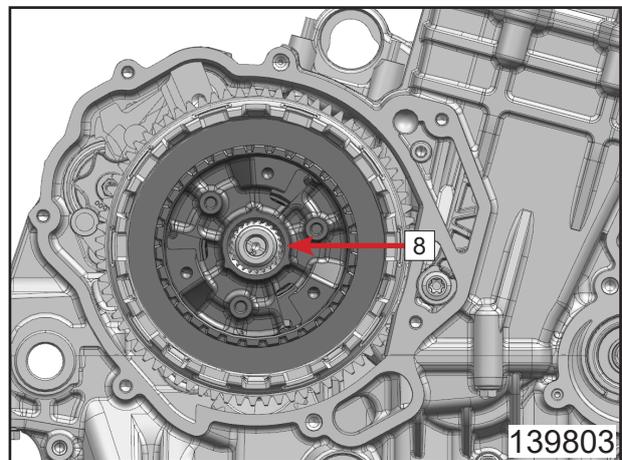
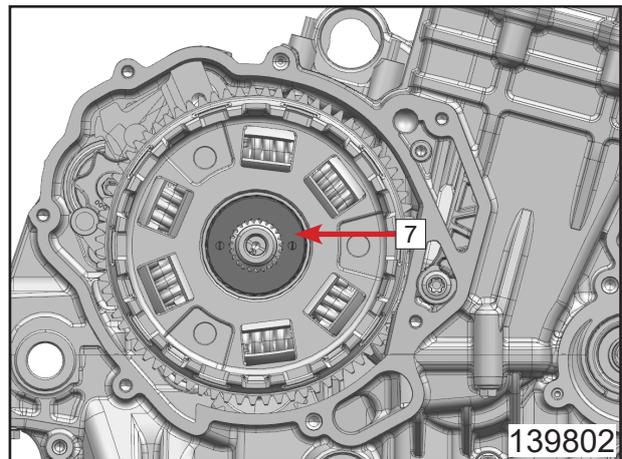
NOTE

Turn the clutch housing and oil pump idler gear backwards and forwards slightly to help them mesh more easily.

Mount needle bearing (6).



Mount washer (7) and inner clutch hub (8).



Mount nut (9) with the washer.

Use a special tool (Holding tool) to hold the inner clutch hub (8) and tighten the nut (9).

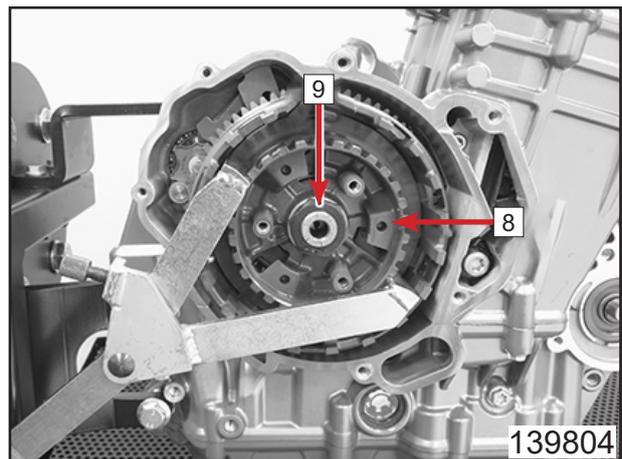
Guideline

Nut, inner clutch hub

M20×1.5

120 N•m

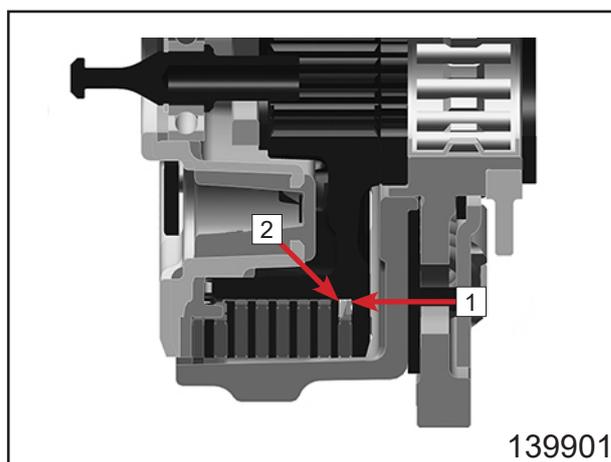
Apply thread locker



13.4.17 Installing the Clutch Discs

Mount support spring (1) and pretension spring (2).

The pretension spring rests against the support spring on the inside and the support spring on the outside and the outside faces away from the support spring.



139901

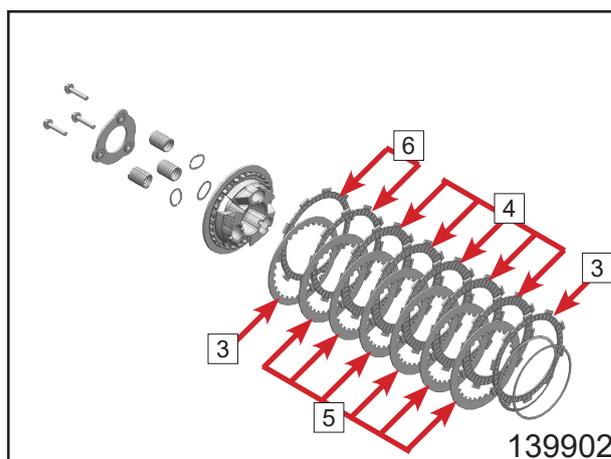
Thoroughly lubricate the clutch facing discs.

Mount a clutch facing disc (3) with a larger inside diameter.

Alternately mount 6 intermediate clutch discs (4) and 5 of the same clutch facing discs (5).

Alternately mount 2 clutch facing discs (3) and an intermediate clutch disc (6) with a larger inside diameter.

The outer clutch facing disc must be mounted offset by one mesh.

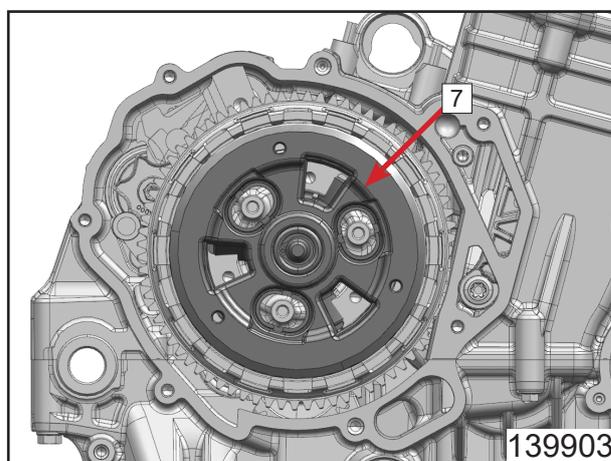


139902

Position clutch pressure plate (7).

The gear teeth of the outer intermediate clutch disc engage in the clutch pressure plate.

The clutch pressure plate rests flush against the outer clutch facing disc.

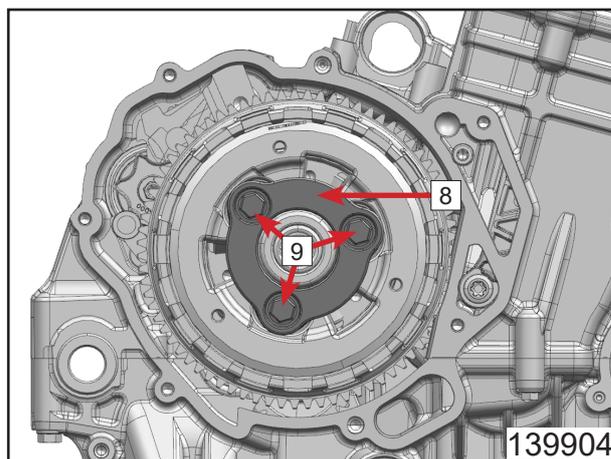


139903

Position clutch center (8) and the springs. Mount and tighten screws (9).

Guideline

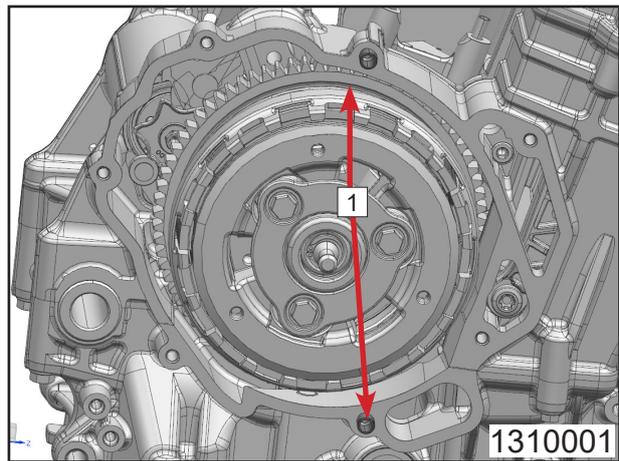
Screw, clutch spring
M6
10 N•m



139904

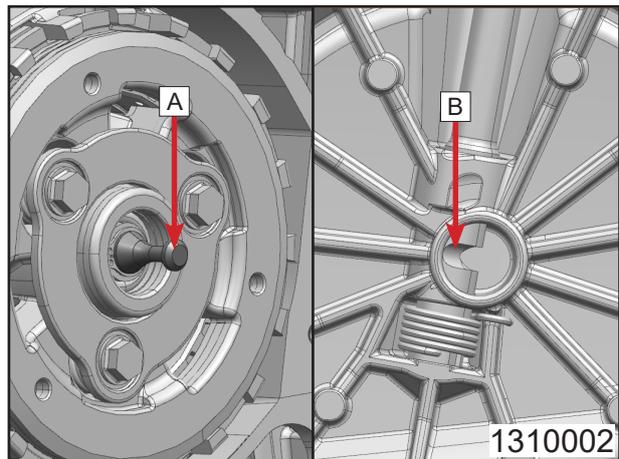
13.4.18 Installing the Clutch Cover

Mount dowel pins (1).



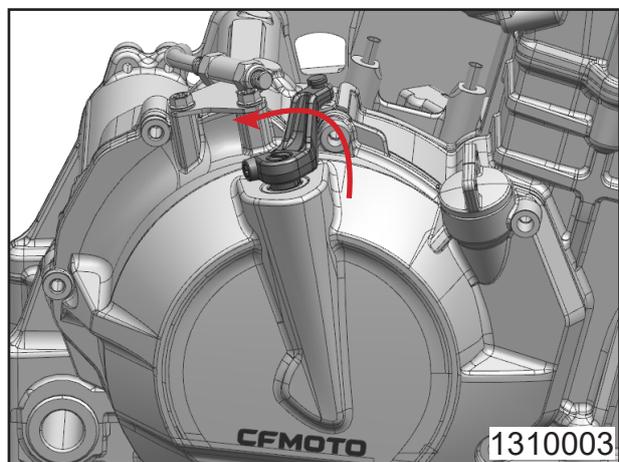
Position the clutch cover with the clutch cover gasket.

Clutch rod (A) engages in groove (B).



NOTE

Rotate clutch release lever counterclockwise.



13 Engine Assembly

Mount screws (2), but do not tighten yet.

Guideline

Screw, clutch cover

M6x30

10 N•m

Mount screws (3), but do not tighten yet.

Guideline

Screw, clutch cover

M6x25

10 N•m

Mount screw (4) and tighten all screws in a crisscross pattern.

Guideline

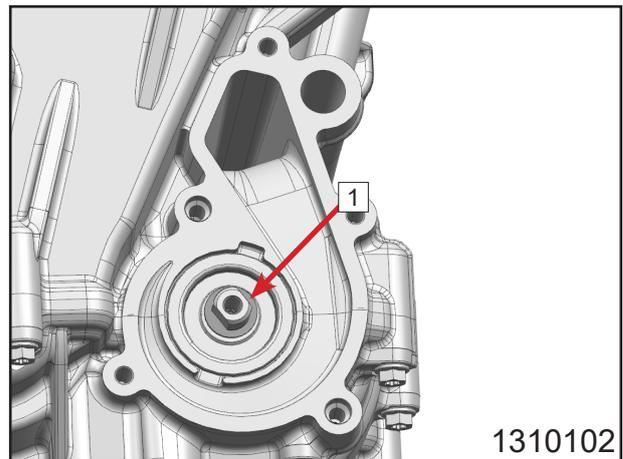
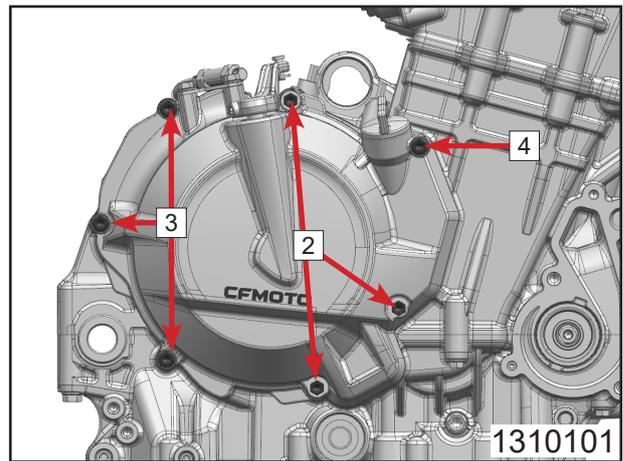
Screw, clutch cover

M6x35

10 N•m

13.4.19 Mounting the Water Pump Cover

Mount washer (1).



Mount water pump impeller (2).

Mount and tighten screw (3).

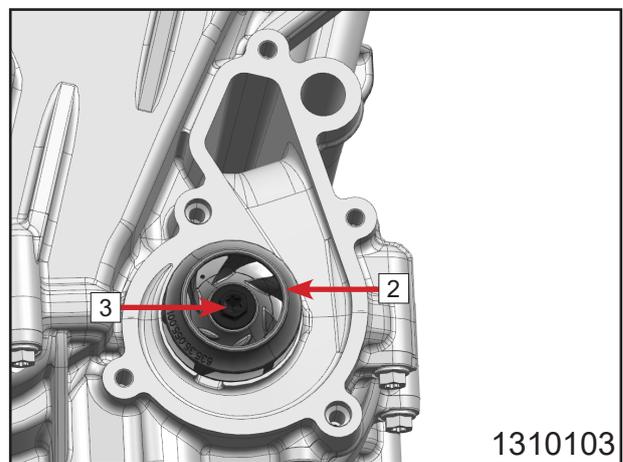
Guideline

Screw, water pump wheel

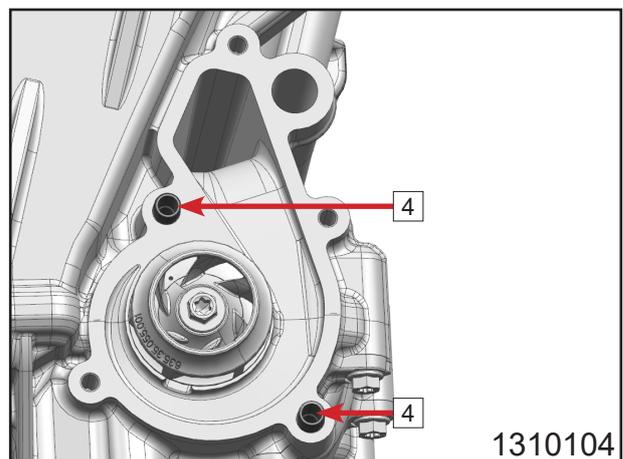
M6

10 N•m

Apply thread locker



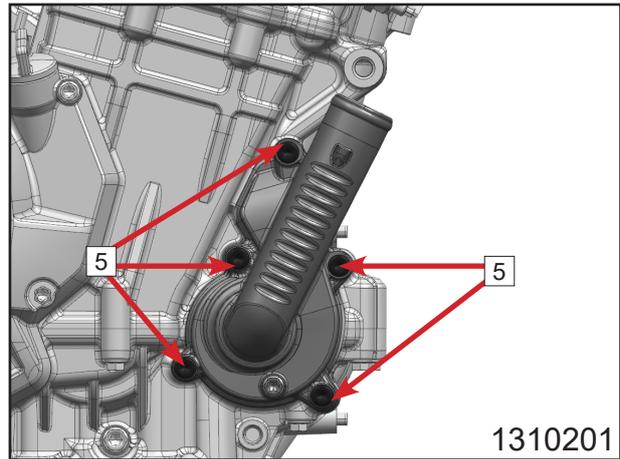
Mount dowels pins (4).



Position water pump cover with the gasket.
Mount and tighten screws (5).

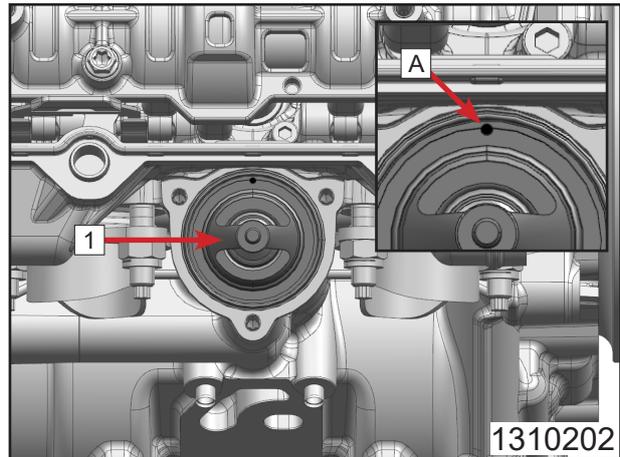
Guideline

Screw, water pump cover
M6
10 N•m
Apply thread locker



13.4.20 Installing the Thermostat

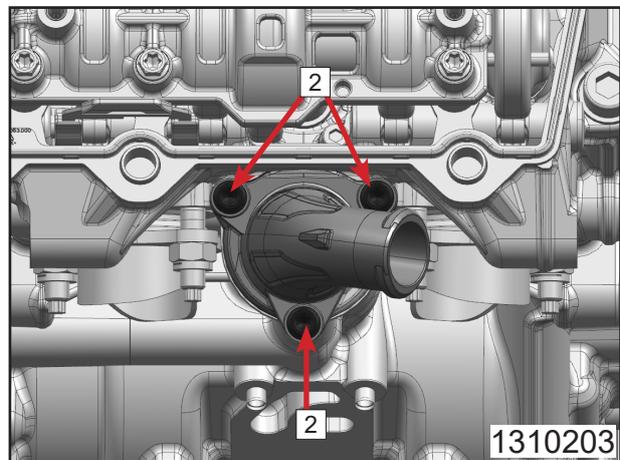
Position thermostat (1) with the gasket.
Drill hole (A) must face upward.



Position the thermostat cover.
Mount and tighten screws (2).

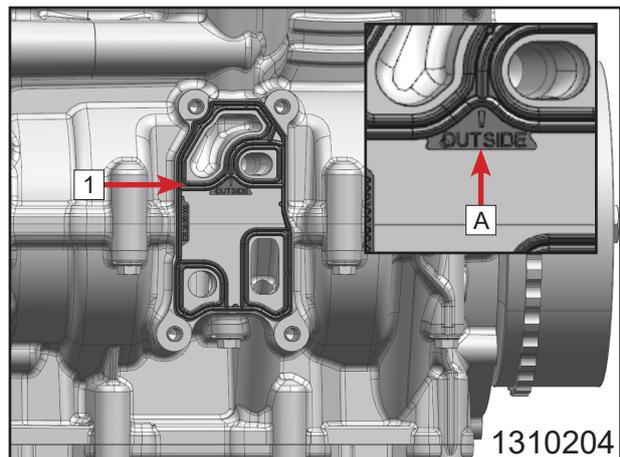
Guideline

Screw, thermostat case
M5
6 N•m
Apply thread locker



13.4.21 Installing the Heat Exchanger

Position gasket (1).
The **OUTSIDE** marking (A) is legible.

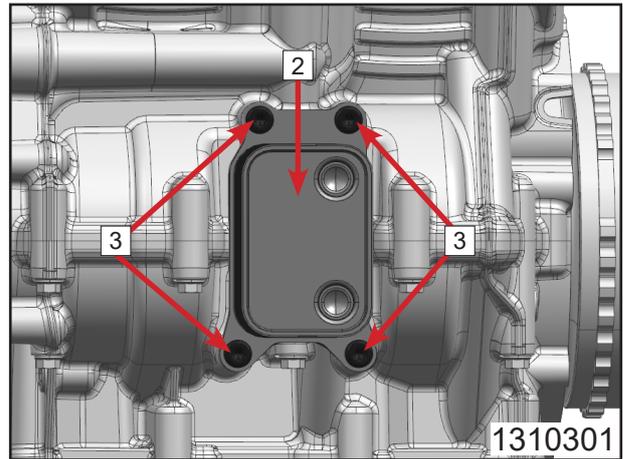


13 Engine Assembly

Position heat exchanger (2).
Mount and tighten screws (3).

Guideline

Screw, heat exchanger
M6
10 N•m
Apply thread locker



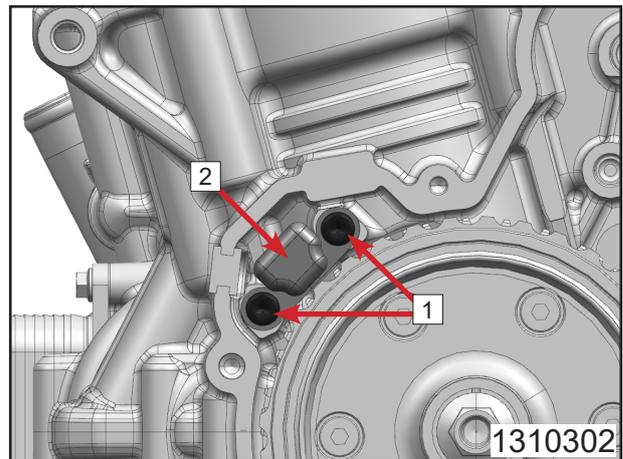
13.4.22 Installing the Crankshaft Speed Sensor

Position the crankshaft speed sensor.
Mount and tighten screws (1).

Guideline

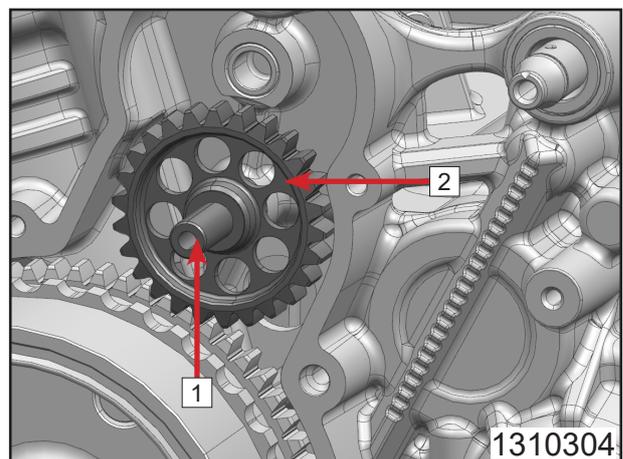
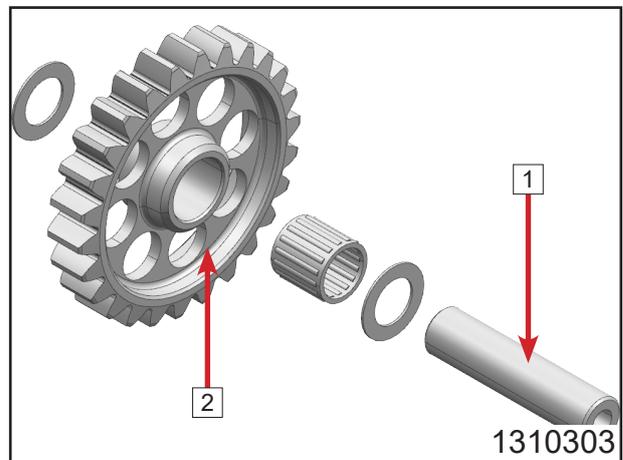
Screw, crankshaft speed sensor
M5
6 N•m
Apply thread locker

Position the cable and position rubber grommet (2) in the engine case.

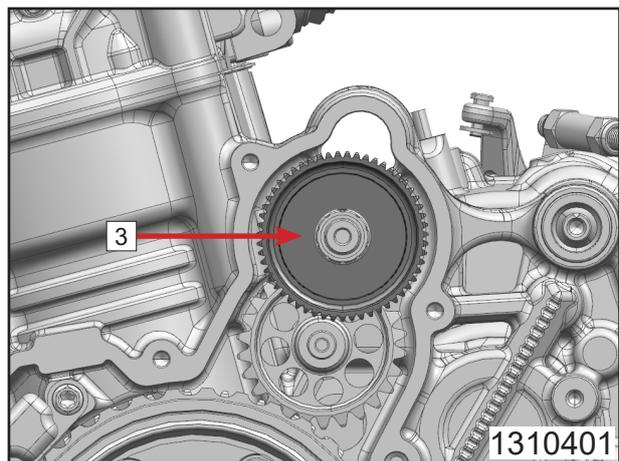


13.4.23 Installing the Torque Limiter and the Starter Intermediate Gear

Mount gear shaft (1) and starter intermediate gear (2) with the needle bearing and the washers.



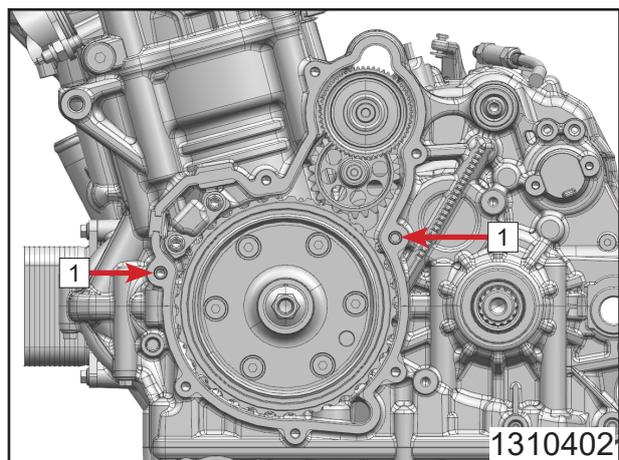
Mount torque limiter (3) with the washer.



13.4.24 Installing the Magneto Cover

Apply sealing compound in the area of the rubber grommet.

Mount dowel pins (1) and put magneto cover gasket (2) in place.



Position the magneto cover.
Mount and tighten screws (3).

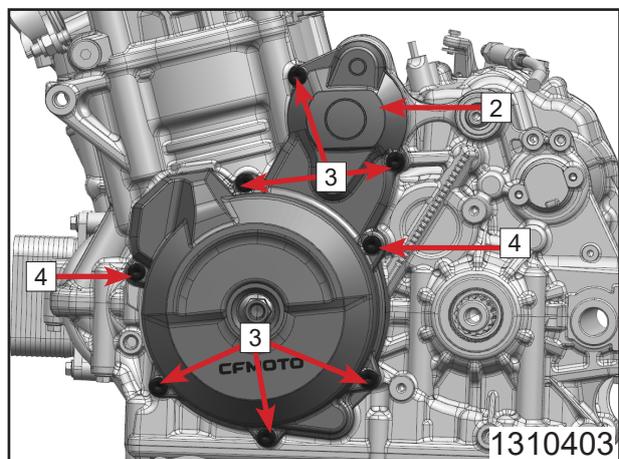
Guideline

Screw, magneto cover
M6x30
10 N•m

Mount and tighten screws (4).

Guideline

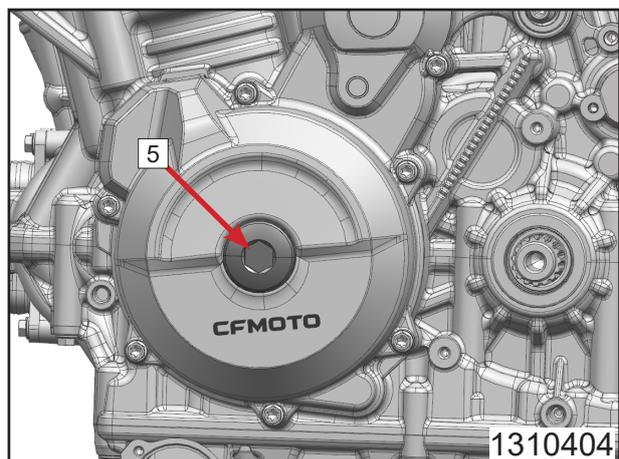
Screw, magneto cover
M6x35
10 N•m



Mount and tighten screw plug (5) with the O-ring.

Guideline

Screw plug, magneto cover
M24x1.5
8 N•m

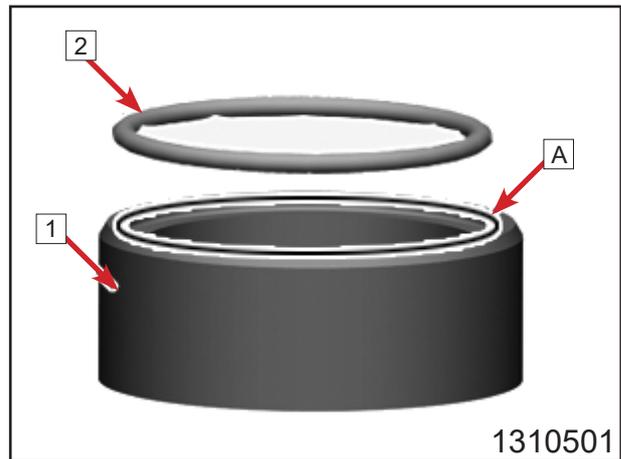


13.4.25 Installing the Spacer

Before mounting, lubricate spacer (1) in area (A) and O-ring (2).

Long-life grease

Position the O-ring in the recess of the spacer.

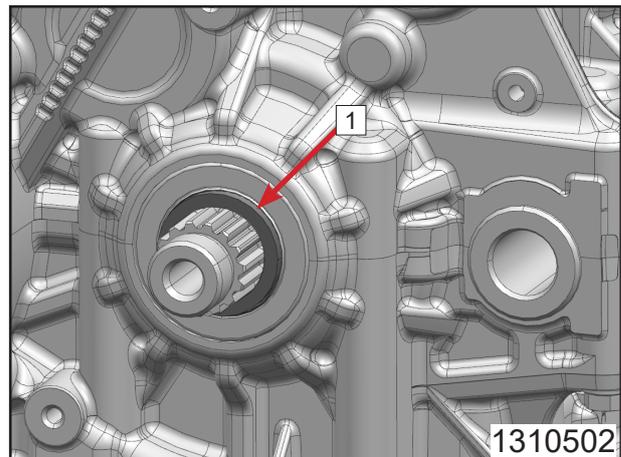


Lubricate the radial shaft seal ring.

Long-life grease

Push the spacer (1) with the O-ring to the recessed box with the O-ring on the countershaft.

The radial shaft seal ring rests against the spacer along its entire circumference.



13.4.26 Installing the Gear Sensor

Position gear sensor (1).

Mount and tighten screws (2).

Guideline

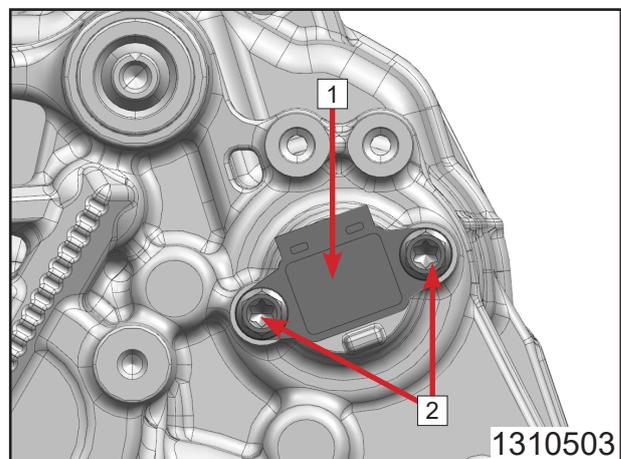
Screw, gear sensor

M5

6 N•m (4.4 lbf ft)

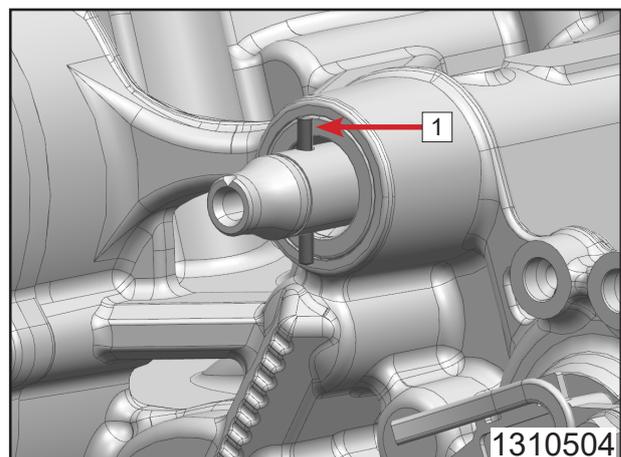
Apply thread locker

Secure the cable with a cable tie.

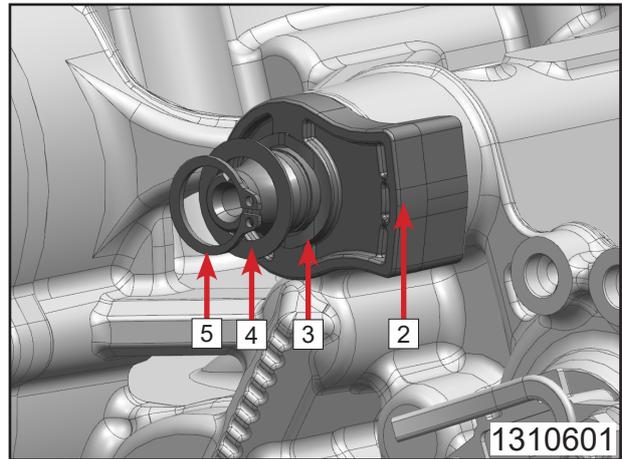


13.4.27 Installing the Shift Shaft Sensor

Mount pin (1).



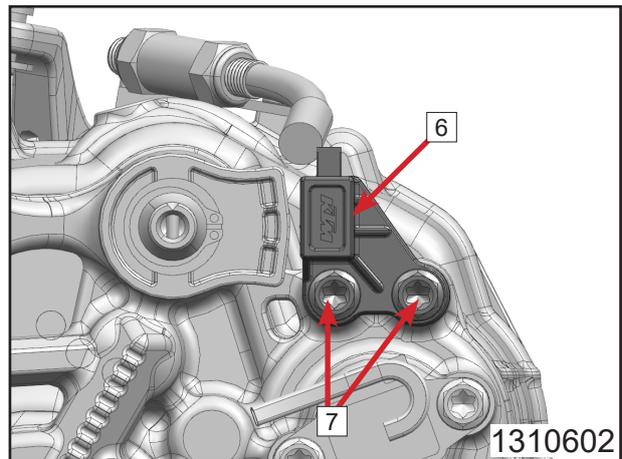
- Mount magnetic holder (2).
- Mount locating washer (3).
- Mount washer (4).
- Mount lock ring (5).



- Position the shift shaft sensor (6).
- Mount and tighten screws (7).

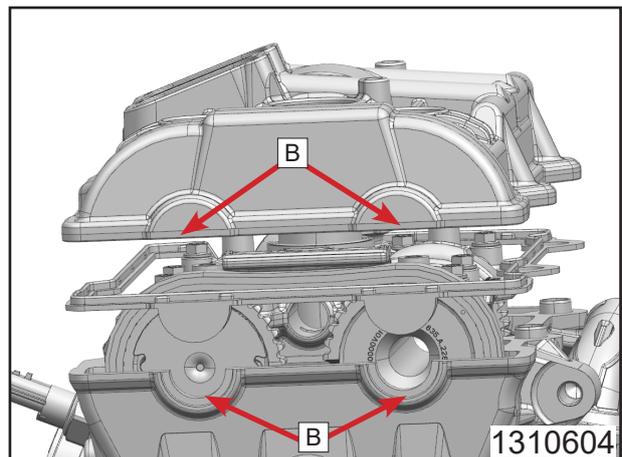
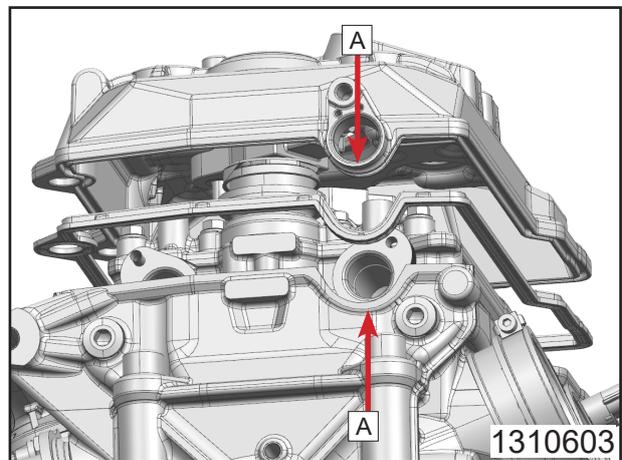
Guideline

Screw, shift shaft sensor
M5
6 N•m
Apply thread locker



13.4.28 Installing the Valve Cover

- Clean and degrease the valve cover.
- Apply a thin layer of sealing compound to area (A) and (B).

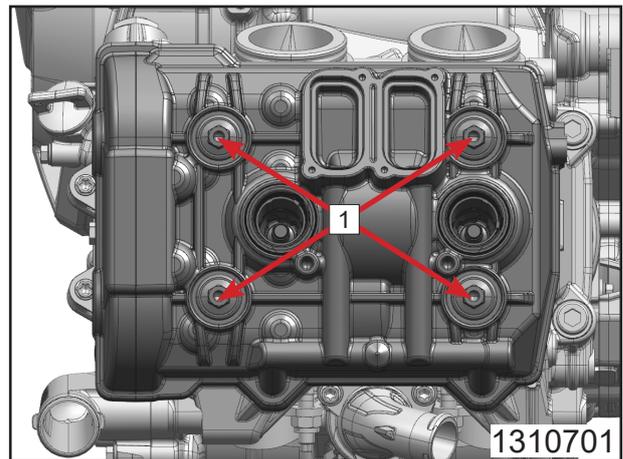


13 Engine Assembly

Position the valve cover with the valve cover seal.
Mount and tighten screws (1) with the gaskets.

Guideline

Screw, valve cover
M6
10 N•m



Lubricate O-ring (2).

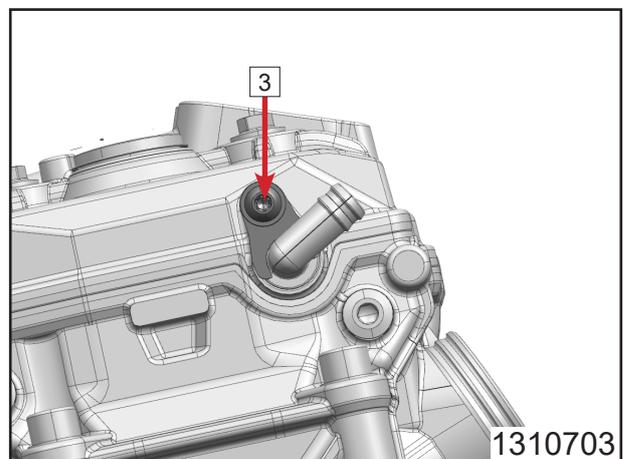
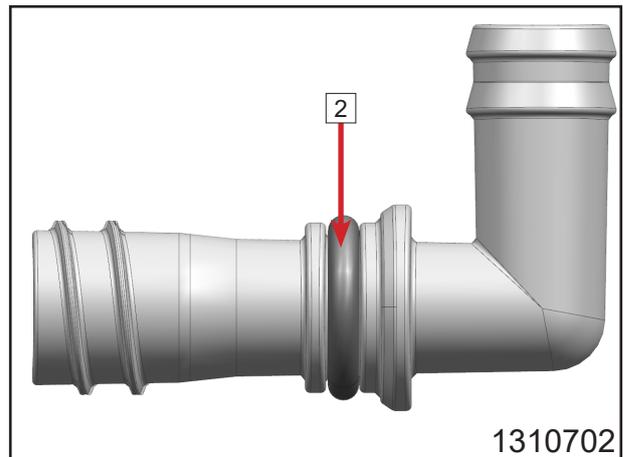
Long-life grease

Position the bleeder flange in the valve cover.

Mount and tighten screw (3) with retaining bracket.

Guideline

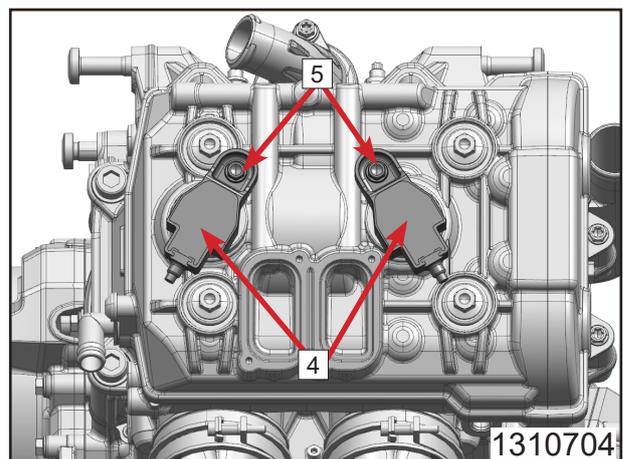
Screw, bleeder flange
M6×12
8 N•m
Apply thread locker



Mount ignition coils (4).
Mount and tighten screws (5).

Guideline

Screw, ignition coil
M6
8 N•m



13.4.29 Installing the Starter Motor

Lubricate the O-ring and mount the starter motor.

Long-life grease

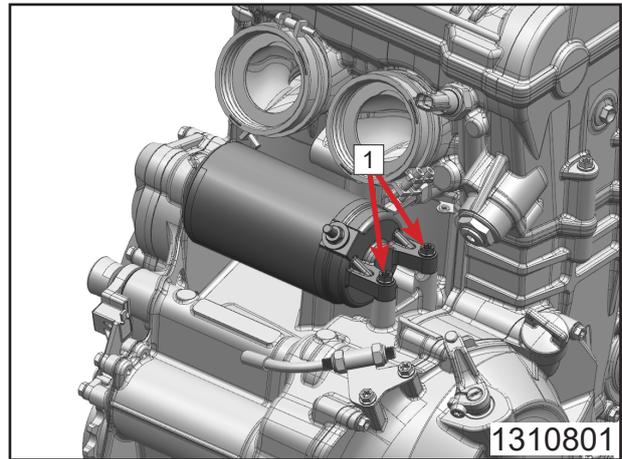
Mount and tighten screw (1).

Guideline

Screw, starter motor

M6

10 N•m

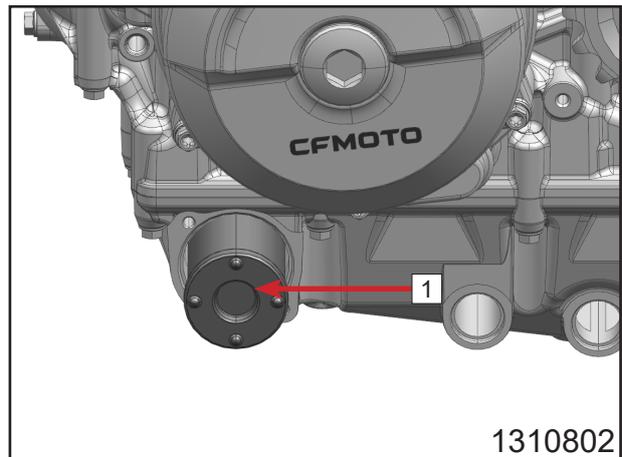


13.4.30 Installing the Oil Filter

Tilt the motorcycle to one side and fill the oil filter box to about $\frac{1}{3}$ full with engine oil.

Engine oil (SAE 10W/50)

Mount oil filter (1).



Lubricate the O-ring of oil filter cover (2).

Mount the oil filter cover.

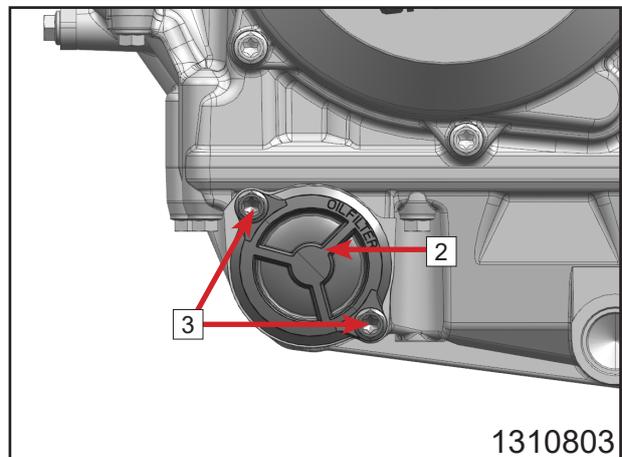
Mount and tighten screws (3).

Guideline

Screw, oil filter cover

M5

6 N•m



13.4.31 Installing the Oil Drain Plug

Mount the new O-rings.

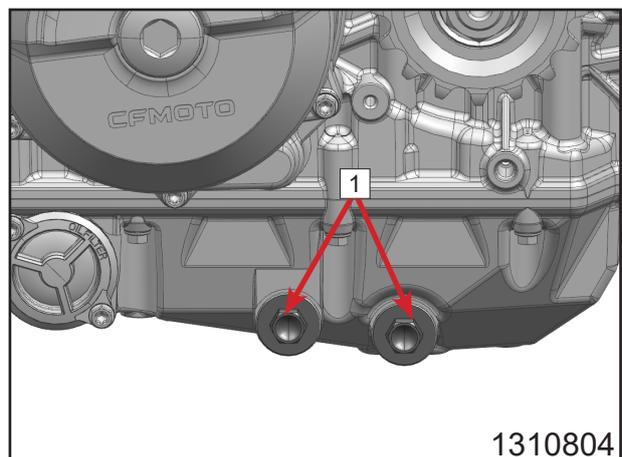
Mount and tighten the magnetic oil drain plugs (1), O-rings, and oil screen.

Guideline

Plug, oil screen

M20×1.5

20 N•m



Handlebar and Triple Clamps

14.1 Handlebar Switches	14-2
14.1.1 LH Handlebar Switches	14-2
14.1.2 RH Handlebar Switches	14-3
14.2 Throttle Handle	14-3
14.3 Handlebar Inspection	14-4
14.3.1 Clutch Handle Clearance Inspection	14-4
14.3.2 Clutch Cable Free Play Adjustment.....	14-4
14.3.3 Handlebar Interference Inspection	14-4
14.4 Triple Clamps Front Fork Pipe	14-5

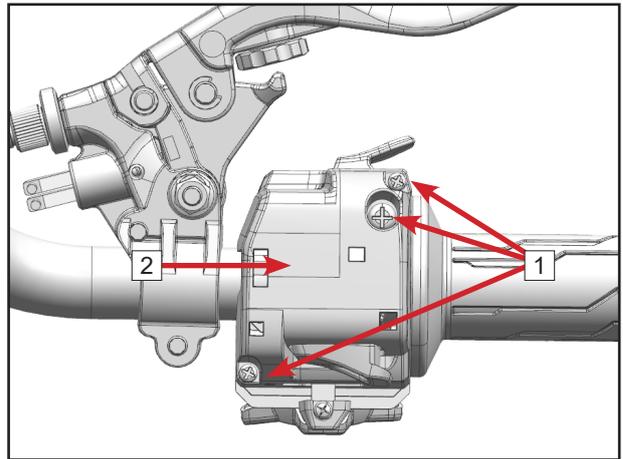
14.1 Handlebar Switches

14.1.1 LH Handlebar Switches

Removal

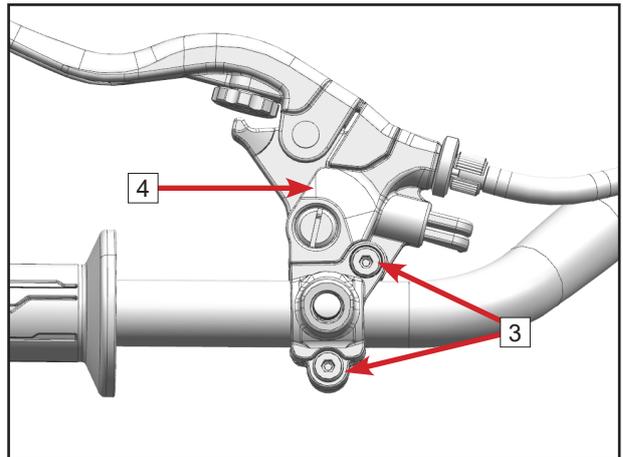
Remove screws **1**.

Remove switch **2**.



Remove bolts **3**.

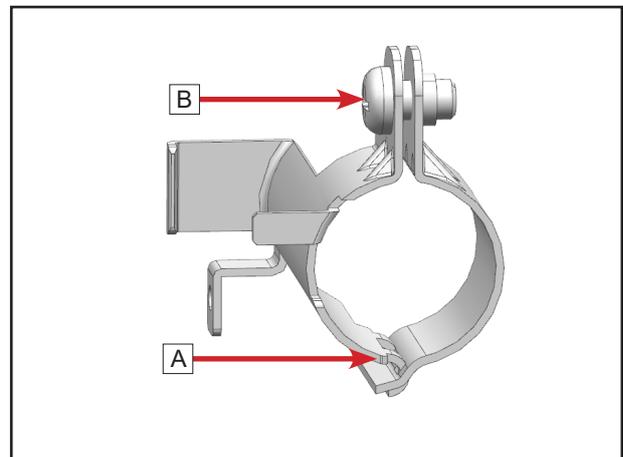
Remove clutch lever **4**.



Installation

Installation takes place in reverse order of disassembly.

NOTE: When installing the switch to the handlebar pipe, there is a fixing device inside the switch, connecting A, and then tighten the bolt B.



Handlebar and Triple Clamps

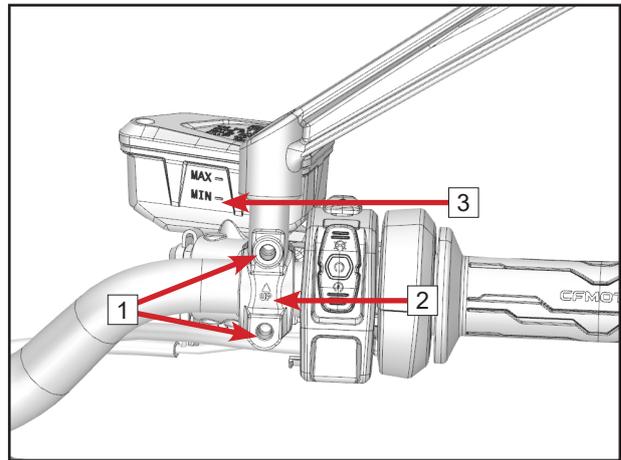
14.1.2 RH Handlebar Switches

Removal

Remove bolts [1].

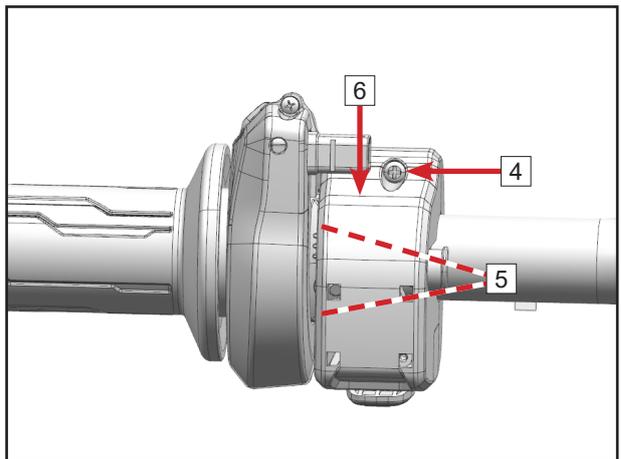
Remove cover [2].

Remove rearview mirror and hand brake master cylinder assembly [3].



Remove bolt [4].

No. [5] is two bayonet structure, you can directly take off the RH handlebar switch [6].

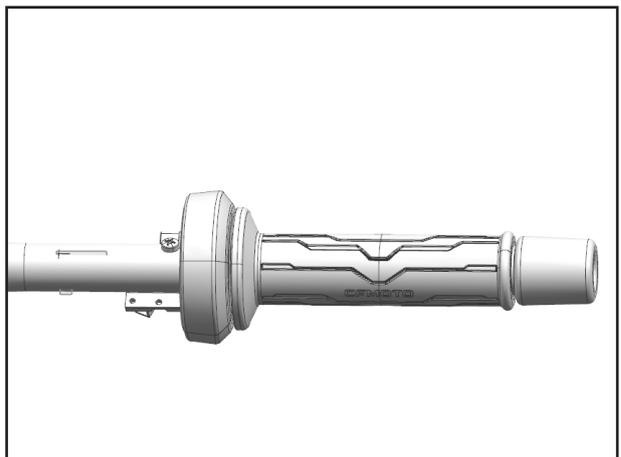


Installation

Installation takes place in reverse order of disassembly.

14.2 Throttle Handle

E-throttle refer to electricals chapter.



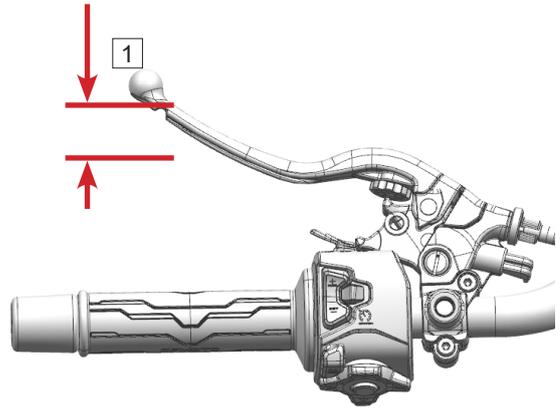
14.3 Handlebar Inspection

14.3.1 Clutch Handle Clearance Inspection

Check whether the returning of clutch handle is smooth.

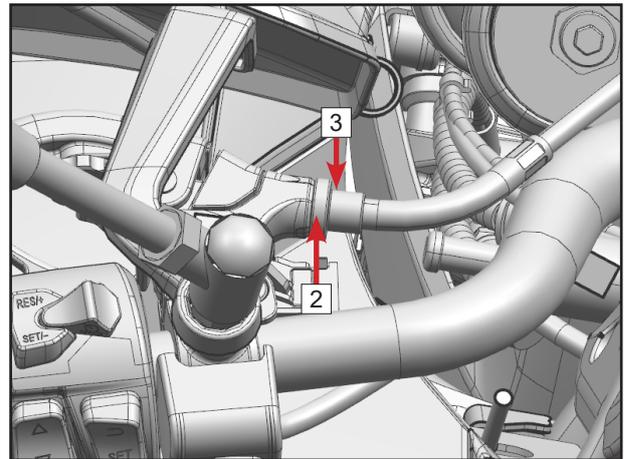
Check the clutch handle free play [1].

Free play : 3mm~6mm

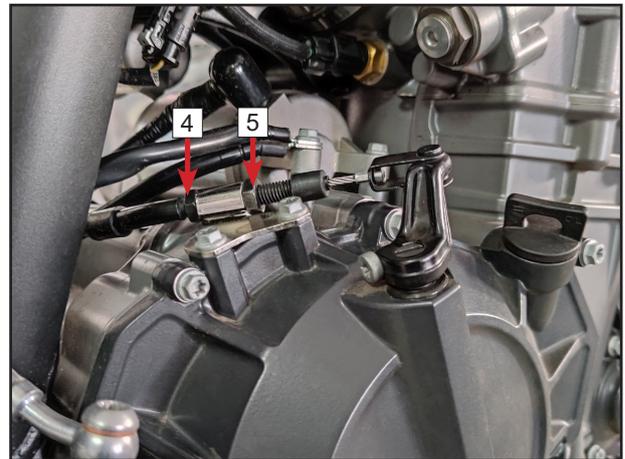


14.3.2 Clutch Cable Free Play Adjustment

When the handle end is fine-tuned, loosen the lock nut [2], rotate the adjusting nut [3] to adjust, and tighten the lock nut [2].



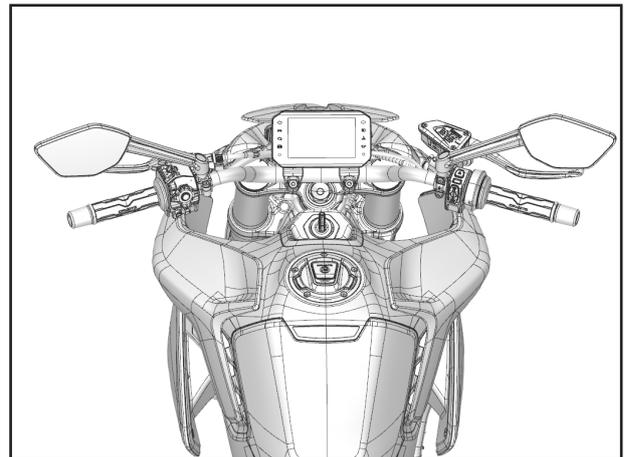
When the engine end is in major tuning, loosen the lock nut [5], rotate the adjusting nut [4] to adjust, and tighten the lock nut [5].



14.3.3 Handlebar Interference Inspection

Swing the handlebar left and right to check whether all kinds of wires interfere with the front wheel.

Check whether it interferes with the fuel tank when the handlebar turns to maximum.



Handlebar and Triple Clamps

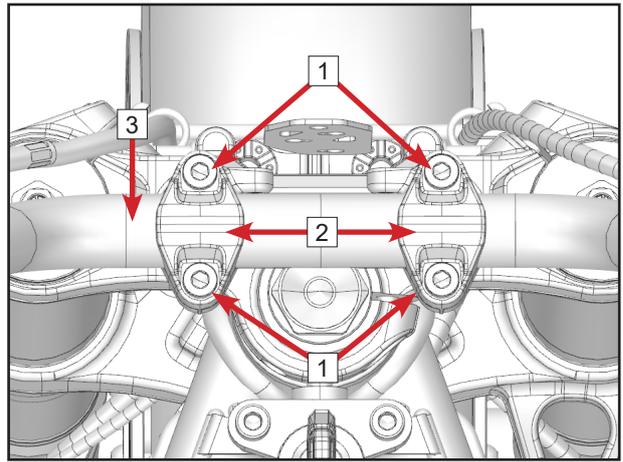
14.4 Triple Clamps Front Fork Pipe

Removal

Remove bolts [1].

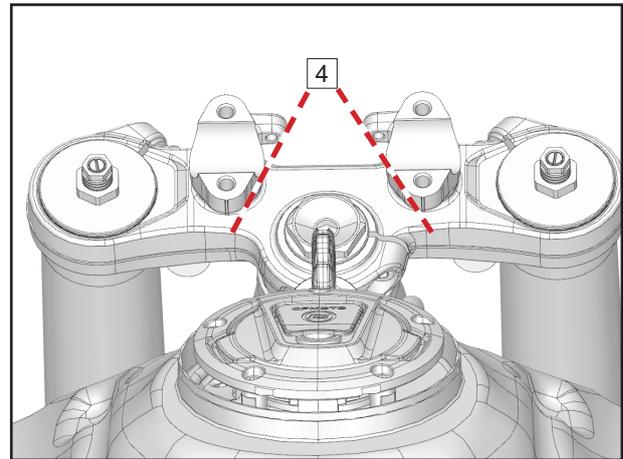
Remove handlebar covers [2].

Remove handlebar pipe [3].

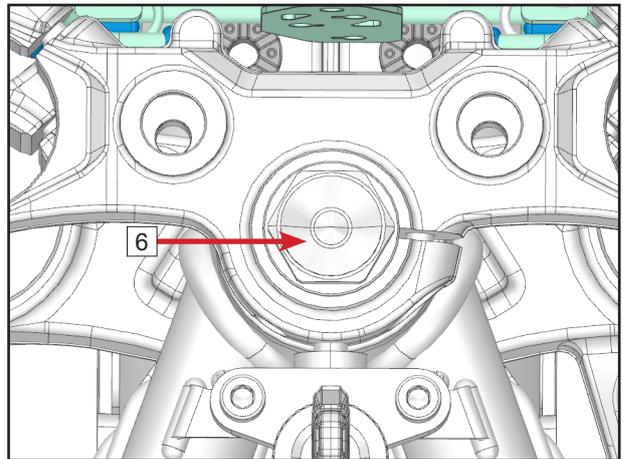


Remove the nuts and gaskets [4] below the upper triple clamp.

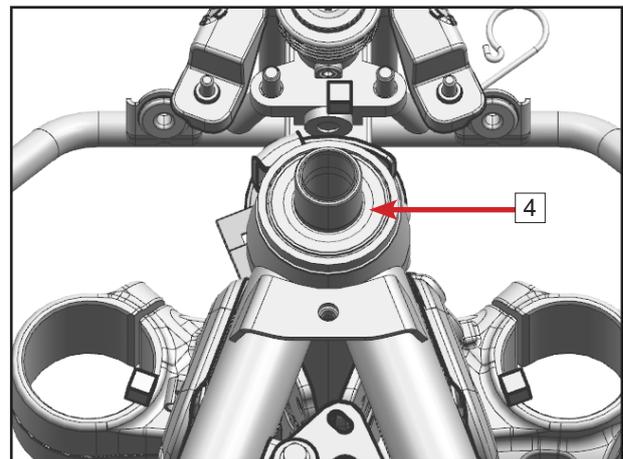
Remove handlebar pipe bracket [5].



Remove nut [6].

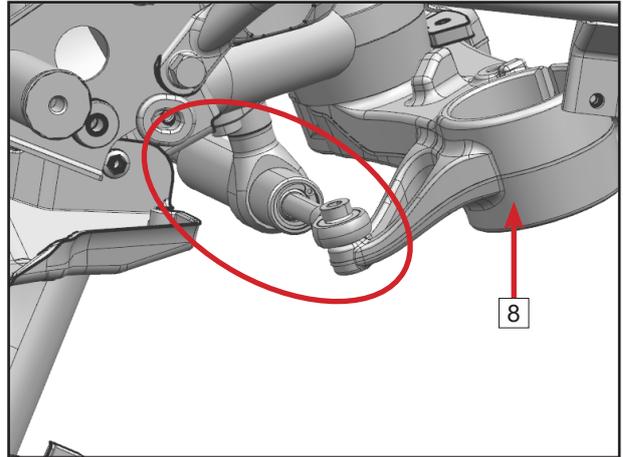


Remove the dust cover and dust ring assembly [7].



CFMOTO

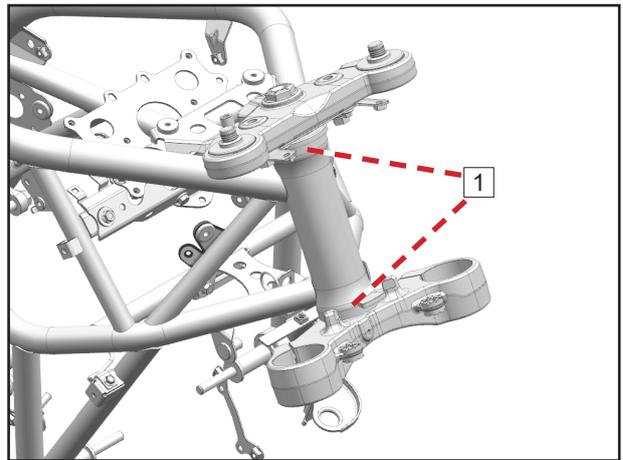
Remove bolt, separate steering damping and lower triple clamp (OFF-ROAD) .
Remove lower triple clamp [8].



Inspection

Check whether the upper and lower steering bearing assembly [1] is complete or worn, if so, replace it.

Check whether the bearing bowl is cracked or abnormally worn, if so, replace it.



Installation

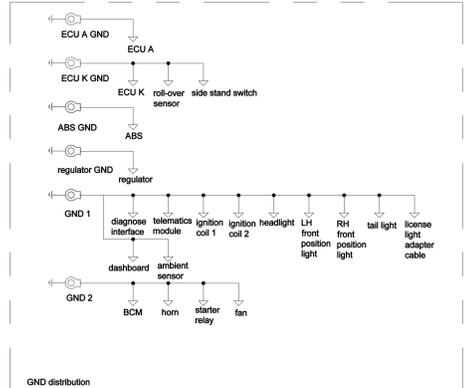
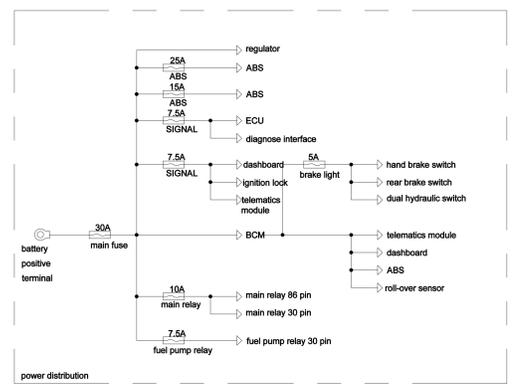
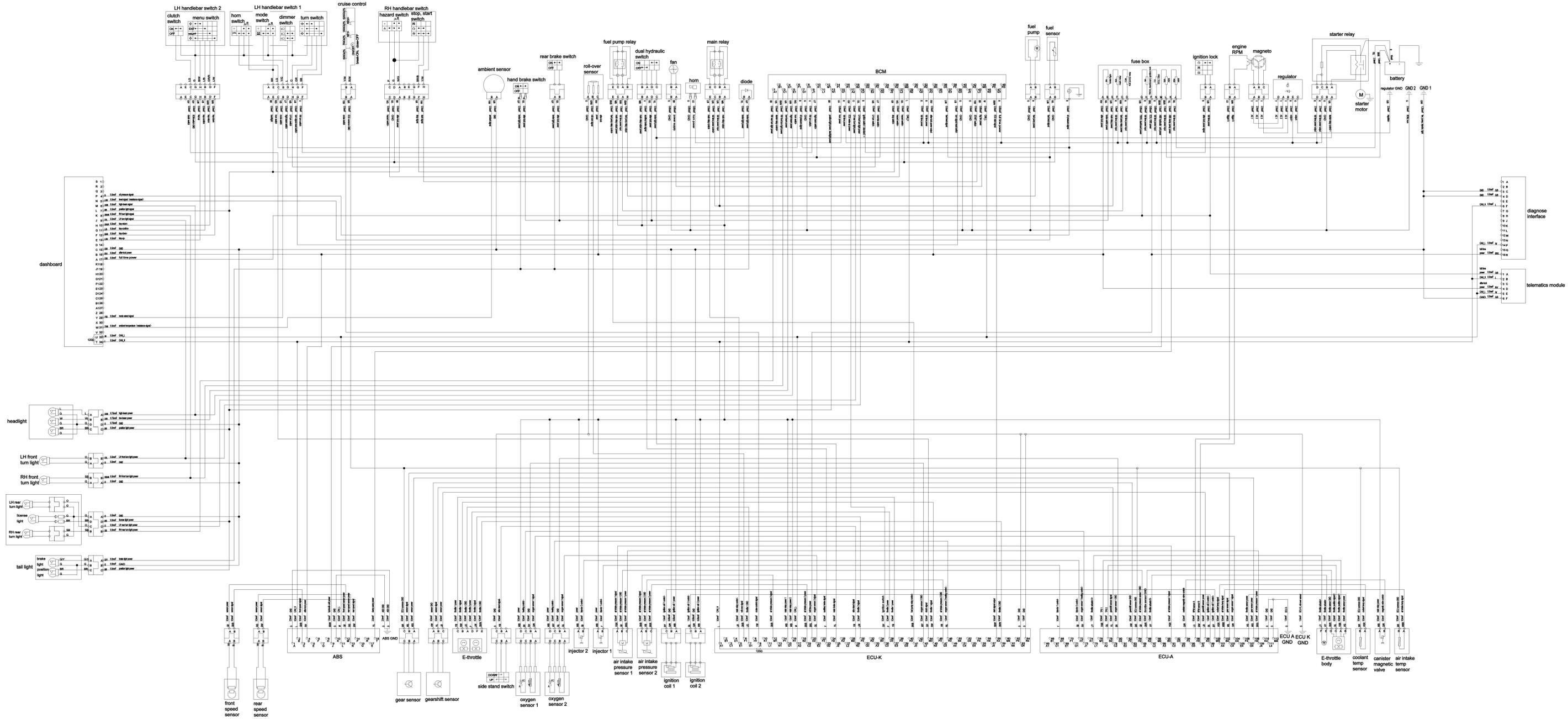
Installation takes place in reverse order of disassembly.

Torque value of column lock nut: 25 N•m

Torque value of upper triple clamp lock screw: 20 N•m

NOTE: When installing and replacing, apply sufficient grease in the bearing steel bowl.

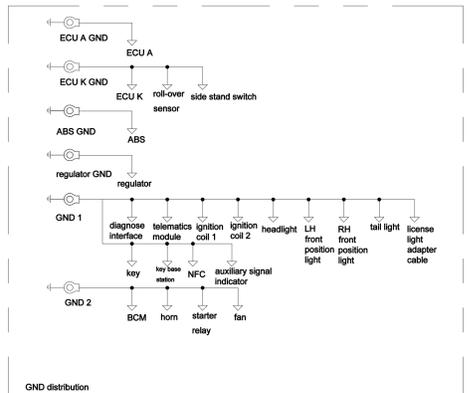
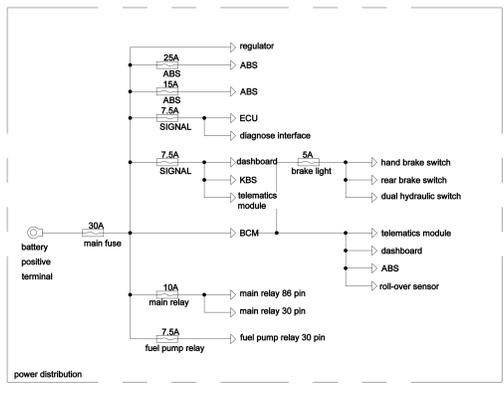
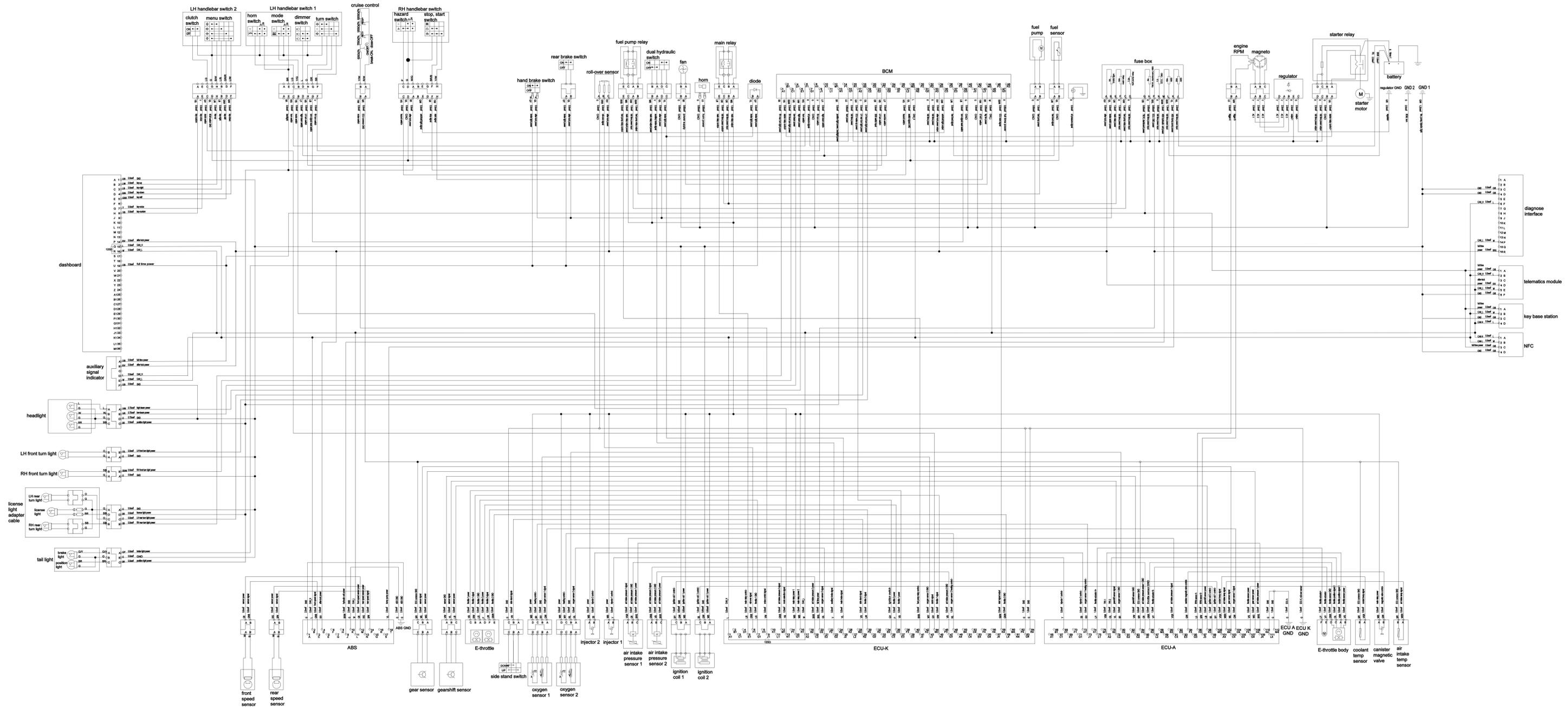
CF800-7F STANDARD



B	BLACK	黒色	P	PINK	桜色
L	BLUE	藍色	LD	LIGHT GREEN	薄緑色
BR	BROWN	褐色	V	VIOLET	紫色
G	GREEN	緑色	GR	GRAY	灰色
Y	YELLOW	黄色	SB	SKY BLUE	薄藍色
W	WHITE	白色	O	ORANGE	橙色
R	RED	赤色			

COLOR TABLE

CF800-7F DELUXE



B	BLACK	黒色	P	PINK	桃色
L	BLUE	青色	LG	LIGHT GREEN	浅緑色
BR	BROWN	茶色	V	VIOLET	紫色
G	GREEN	緑色	GR	GRAY	灰色
Y	YELLOW	黄色	SB	SKY BLUE	天蓝色
W	WHITE	白色	O	ORANGE	橙色

COLOUR TABLE