

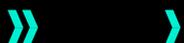
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MORE FUN.



# 700 MT

*Service Manual*



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Edition Date: 20250427

Edition Item: CF700-9A/CF700-9B (6GUJ-00WX01-11) SM -20250427

**Disclaimer:**

This manual is intended for use by experienced technicians in a fully equipped workshop and is intended primarily for reference. All references to left and right are made from the perspective of the driver while seated in the driving position.

Certain procedures outlined in this manual require a sound knowledge of mechanical or electrical theory, tool use and shop procedures in order to perform the work safely and correctly. Technicians should read the contents of this manual and understand the procedures before beginning repairs. Certain procedures require the use of specialized tools. Use only the proper tools specified. If you have any questions about your ability to perform any of the procedures outlined in this manual, contact an authorized dealer for service.

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## FOREWORD

This manual introduces CF700-9A/CF700-9B maintenance information, including disassembly procedure checking & adjustment methods, troubleshooting and technical specifications. There are some illustrations, drawing to guide your operation.

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

The rest 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 accuracy. But we are no response for any difference and 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 real model assembly and parts.

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## Forward

This manual is intended for use by experienced technicians in a fully equipped workshop. However, the detailed details and basic information contained in this manual are sufficient to enable the owner to carry out the basic maintenance and repair work of the motorcycle himself. In order to obtain more comprehensive maintenance and repair results, the basic knowledge of mechanics, the correct use of tools and the understanding of maintenance procedures are necessary. If you lack practical experience or are unsure of maintenance and repair work, all adjustment, maintenance and repair work must be done by a qualified mechanic. In order to improve work efficiency and avoid major errors, before operation, read this manual to make yourself thoroughly understand the repair procedure, and then work carefully in a clean area. Once you specify that special tools or equipment are required, do not use temporary tools or equipment instead. Only the use of appropriate tools or equipment can guarantee the mechanical properties of the vehicle, and the use of alternative tools can seriously affect the safety of operation. During the warranty period, we recommend that all repairs and regular maintenance be carried out in accordance with this repair manual. If the owner maintains or repairs by himself or does not follow the procedures of this maintenance manual, we will not be responsible for the consequences.

### How to get Long Service Life:

Follow scheduled maintenance and service operations based on service manual.

Non-periodical maintenance in special situations.

Use tools properly and use CFMOTO genuine parts.

Special tools, dashboard and tester have been listed into this service manual for necessary genuine parts.

Strictly operate based on the correct service procedures.

Keep fully service records and specify the date of new parts replacement.

### How to use this manual:

In this manual, the production will be separated as several systems. All the systems are shown up in the contents. That will help you to look the chapter. And each chapter has its own contents. For example, if you want to find ignition coil information, look the electrical system chapter by using the contents, and then find the ignition coil in electrical system chapter.

#### **NOTE:**

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

All connectors are unplugged by default during removal.

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

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## 1.1 About this Service Manual

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## 1.2 Danger Levels and Symbols

Whenever you see the warning or warning symbol, you must keep 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 to take precautions to prevent parts from damaging.

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

## 1.3 General Precautions

**⚠ DANGER:** Hazardous components in exhaust. Do not run the engine in a enclosed or poor ventilated place for a long time.



**⚠ WARNING:** Don't touch the engine and muffler with bare hands, the temperature of the engine and muffler is still very high when the engine is just shut down, so as to avoid burns. Wear long-sleeved overalls and gloves during maintenance.



**⚠ WARNING:** Battery liquid (dilute sulfuric acid) is highly caustic and there is a risk of burns and blindness when it gets on the 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:** Coolant is poisonous. Do not drink or splash to skin, eyes or clothes. Flush with plenty of soap water if splashed to skin. Flush with water and consult doctors if touches eyes. If drinking the coolant, induce vomiting and consult doctors. Keep coolant away from reach of children.



**⚠️ WARNING:** Wear proper work clothes, cap and boots. Wear safety gear such as dust-glass, gloves and mask to protect yourself if necessary.



**⚠️ DANGER:** Gasoline is highly flammable. No smoking or fire. Also keep against sparks. Vaporized gasoline is also explosive. Operate in a well-ventilated place.



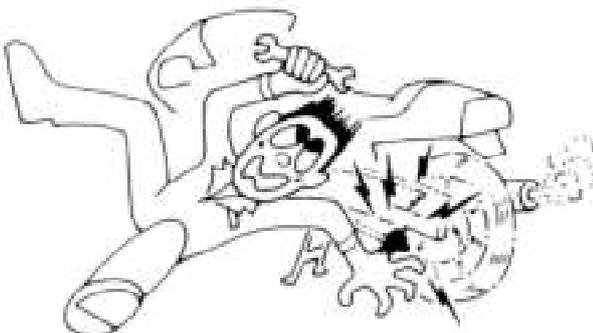
**⚠️ DANGER:** When charged, battery may generate hydrogen which is explosive. There is a risk of explosion as soon as a source of fire or electrical spark approaches. Charge the battery in a well-ventilated place.



**⚠️ Warning:** When more than two people are operating, keep reminding each other for safety purpose.

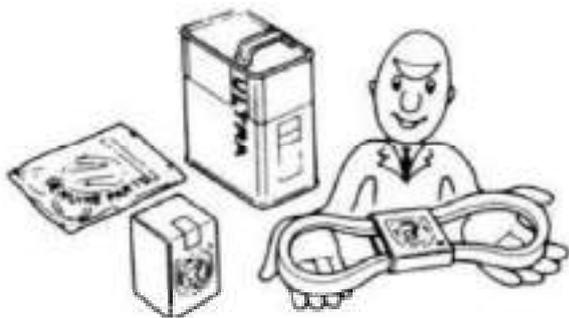


**⚠️ DANGER:** Be careful to get clamped by the turning parts like rear wheels and clutch.



## 1.4 Repair Precautions

■ Use genuine CFMOTO Parts, lubricants and grease.



■ Clean the mud, dust before overhauling.



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

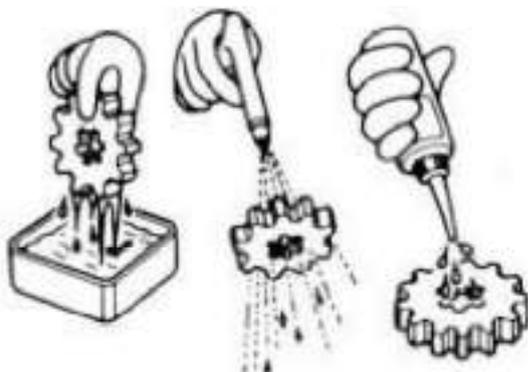


■ Replace the disassembled washers, O-rings, piston pin circlip and cotter pin with new ones.

■ Elastic circlips might get distorted after disassembled if the opening is opened too wide and will easily fall off after reassembly. Do not use the loosed circlips.



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

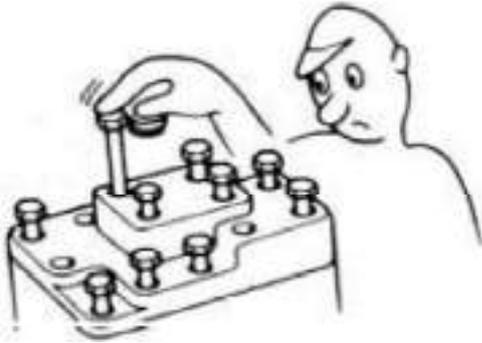


■ Check the necessary site during disassembly and determine the relevant data so that the assembly can be restored to the state before disassembly.

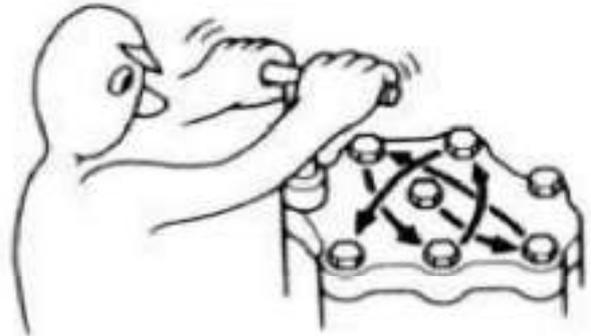


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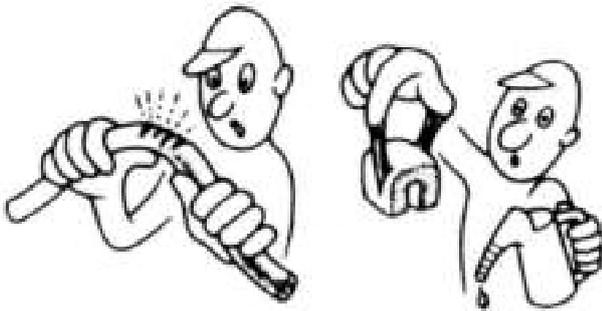
■ If not know the length of screws, install the screws one by one and tighten with same torque.



■ 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. Since rubber parts are not resistant to gasoline/kerosene, etc. Do not allow volatile oils/greases to attach to them.



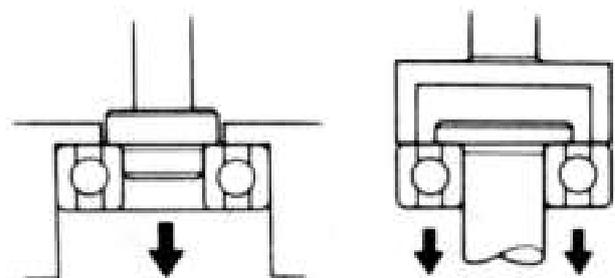
■ Apply or inject recommended lubricant to the specified parts.



■ Use special tools wherever necessary.



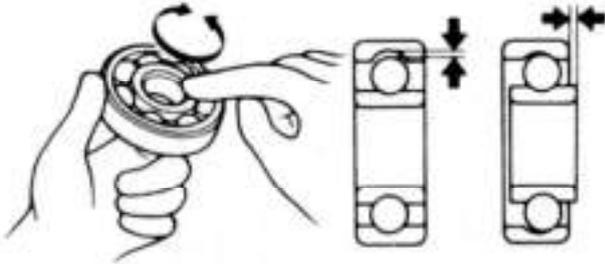
■ If the disassembling of pressed ball bearing is done by pressing the balls, the disassembled bearing should not be used again.



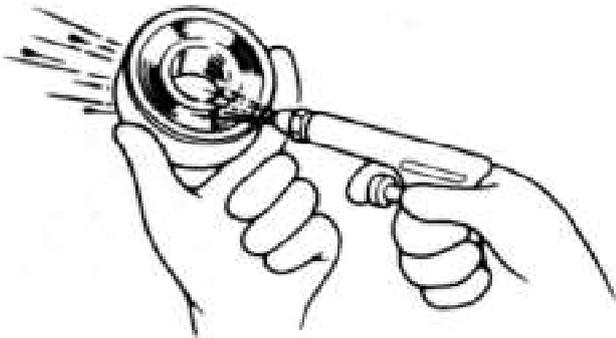
# 01 Safety Information

■ 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. (Double side dust-proof type can not be cleaned).

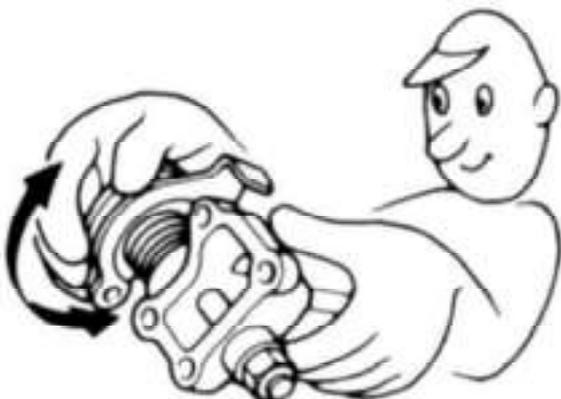
When pressing the bearing into the machine or to the shaft, replace the bearing if it could not be pressed tight.



■ When the ball bearing is washed and blown with compressed air, do not turn the bearing ring. If the bearing ring is rotated, its high-speed rotation speed will exceed the limit, which may damage the bearing. Apply oil or grease to the bearing before assembly.

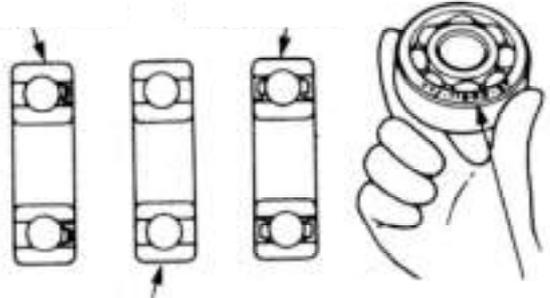


■ After assembling, check if all the tightened parts are properly tightened and can move smoothly.



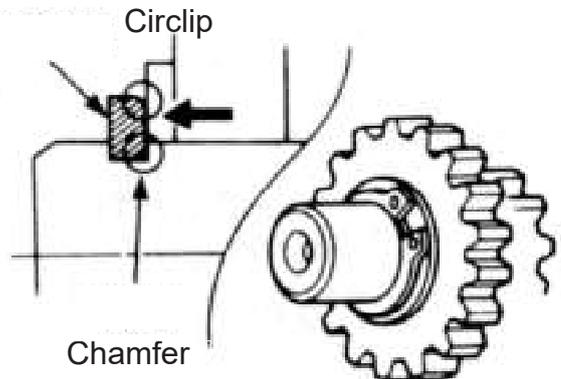
■ Install the one-side dust-proof bearing in the right direction. When assembling the open type or double-side dust-proof bearing, install with manufacturer's mark outward.

Single side dust-proof type      Double side dust-proof type



Open type

■ Install the elastic circlip with the chamfered side facing the direction of force. Do not use the circlip that has lost its elasticity. Install the elastic circlip after assembling to make sure it has been installed into the slot.



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

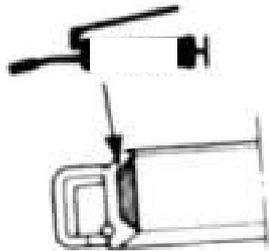


■ Install oil seal with the side of manufacturer's mark outward. (Direction without oil)  
Do not fold or scratch the oil seal lip.  
Apply grease to the oil seal lip before assembling.

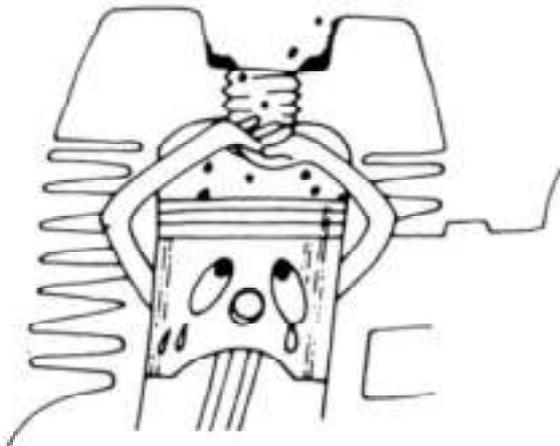
Manufacturer identification



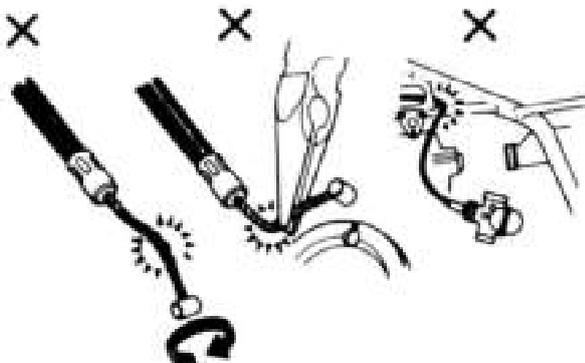
Grease



■ Do not mix mud or dust into engine or the hydraulic brake system.



■ Do not twist or bend the cables too distorted or damaged cables may cause poor operation.

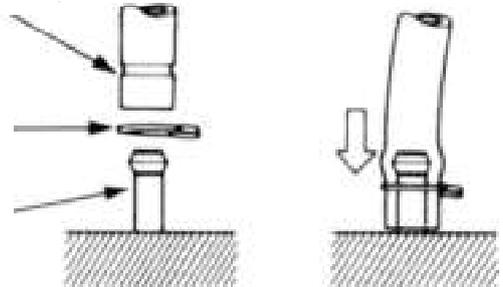


■ When installing pipes, insert the pipe till the end. Fit the pipe clip, if any, into the rove. Replace the pipes or hoses that cannot be tightened.

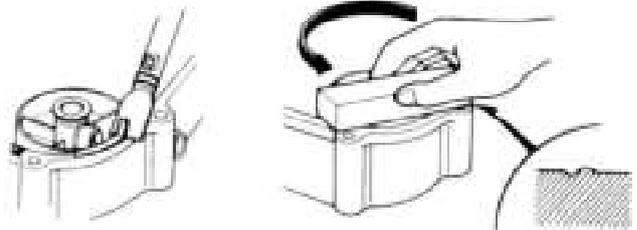
Dent

Clip

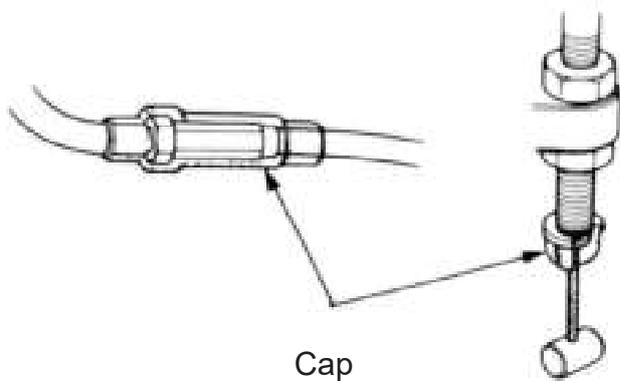
Joint



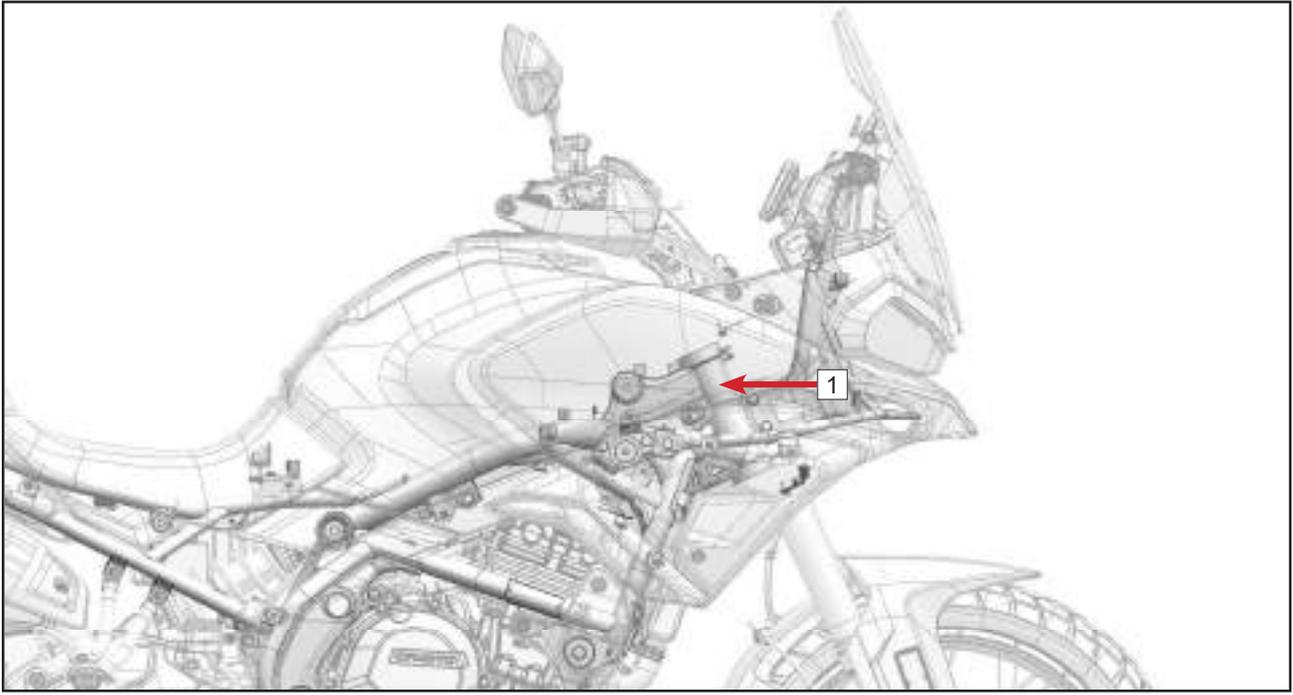
■ Clean the gaskets and washers of the engine cases before assembling. Remove the scratches on the contact surfaces by polishing evenly with an oil stone.



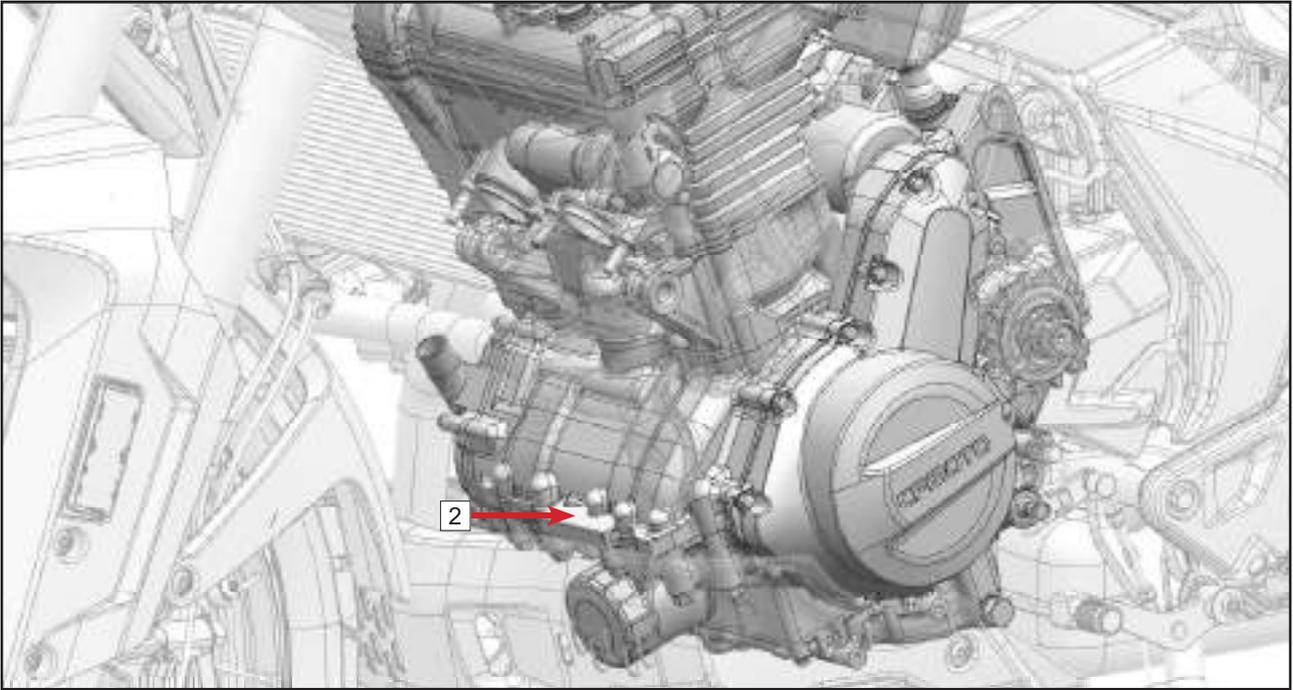
■ When assembling the parts of protection caps, insert the caps to the grooves, if any.



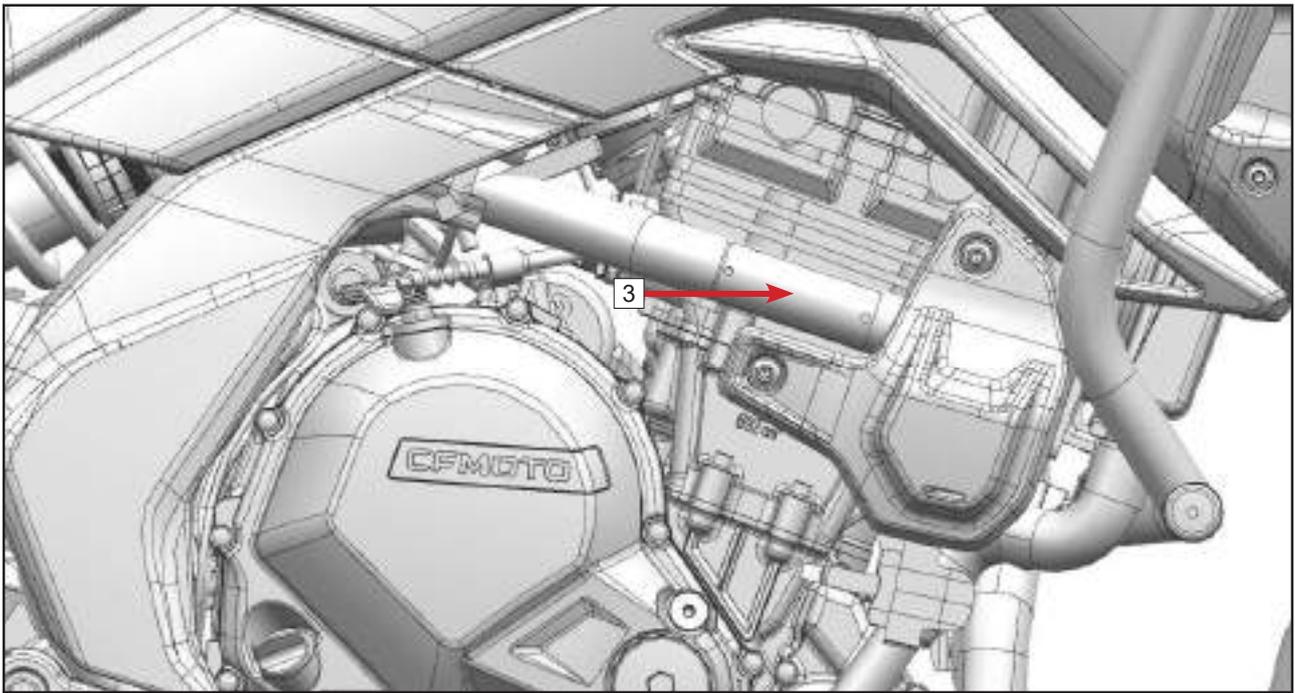
1.5 Number Engrave Place



1 | VIN



2 | Engine number



3	Vehicle nameplate position
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## 02 General Information

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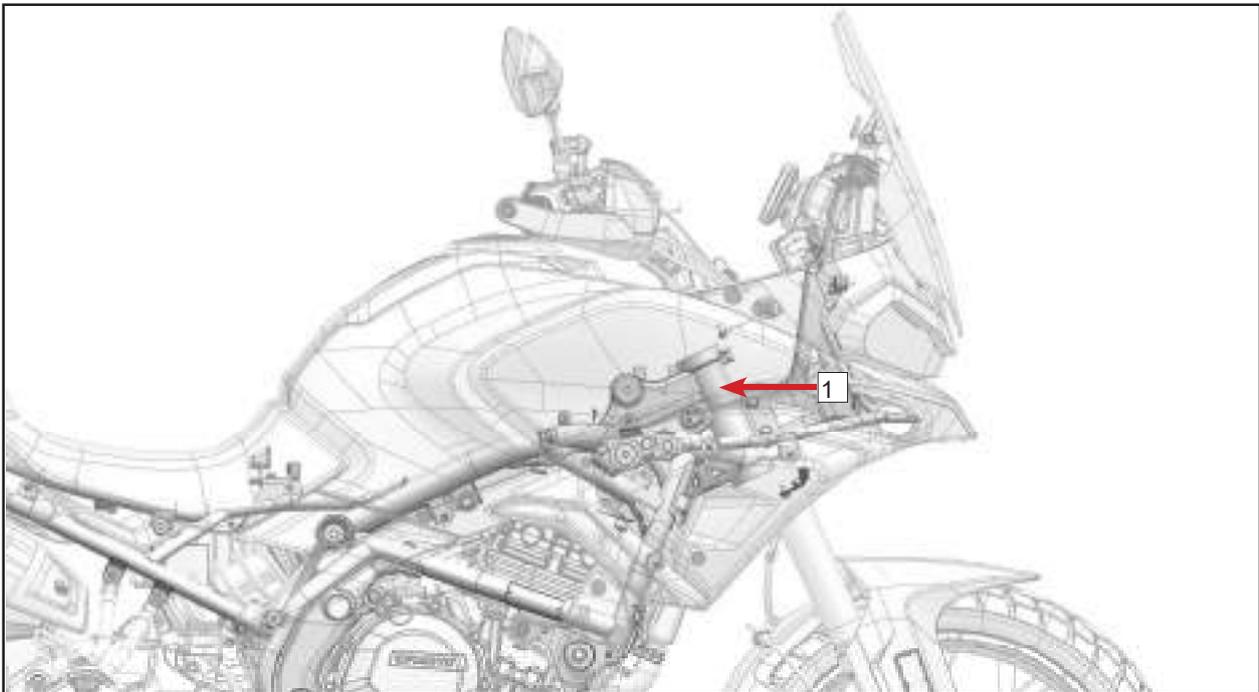
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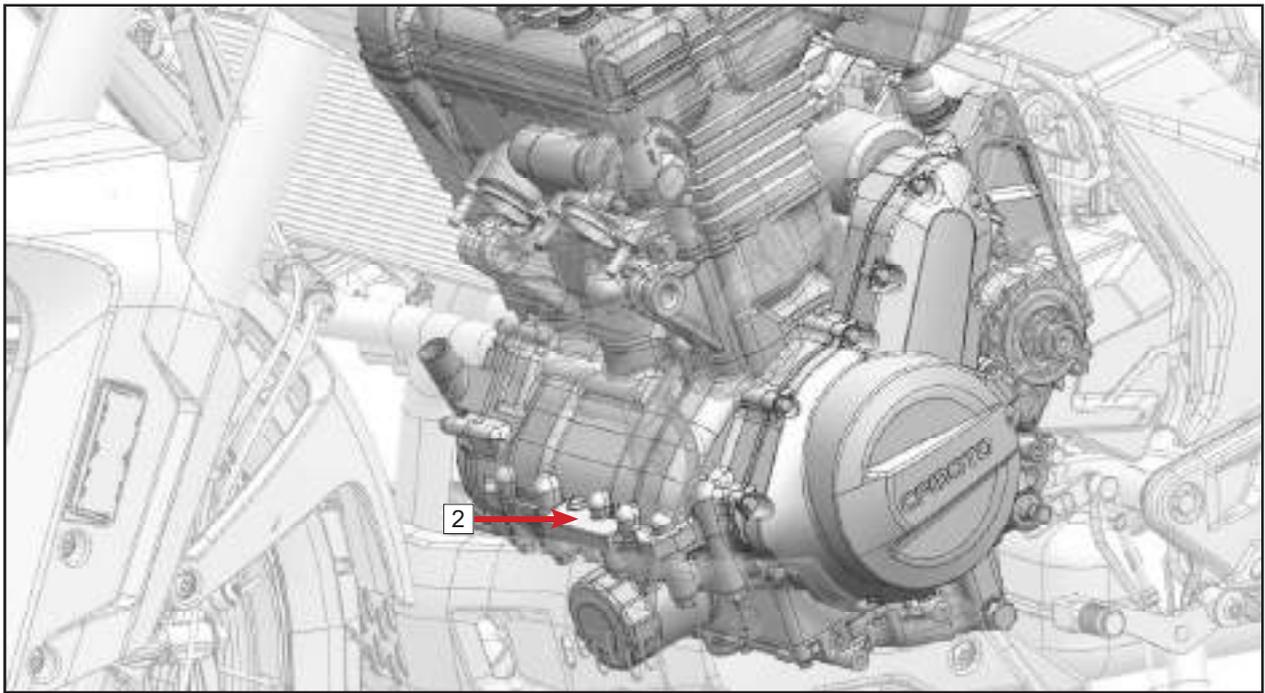
## 2.1 Conversion Table

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

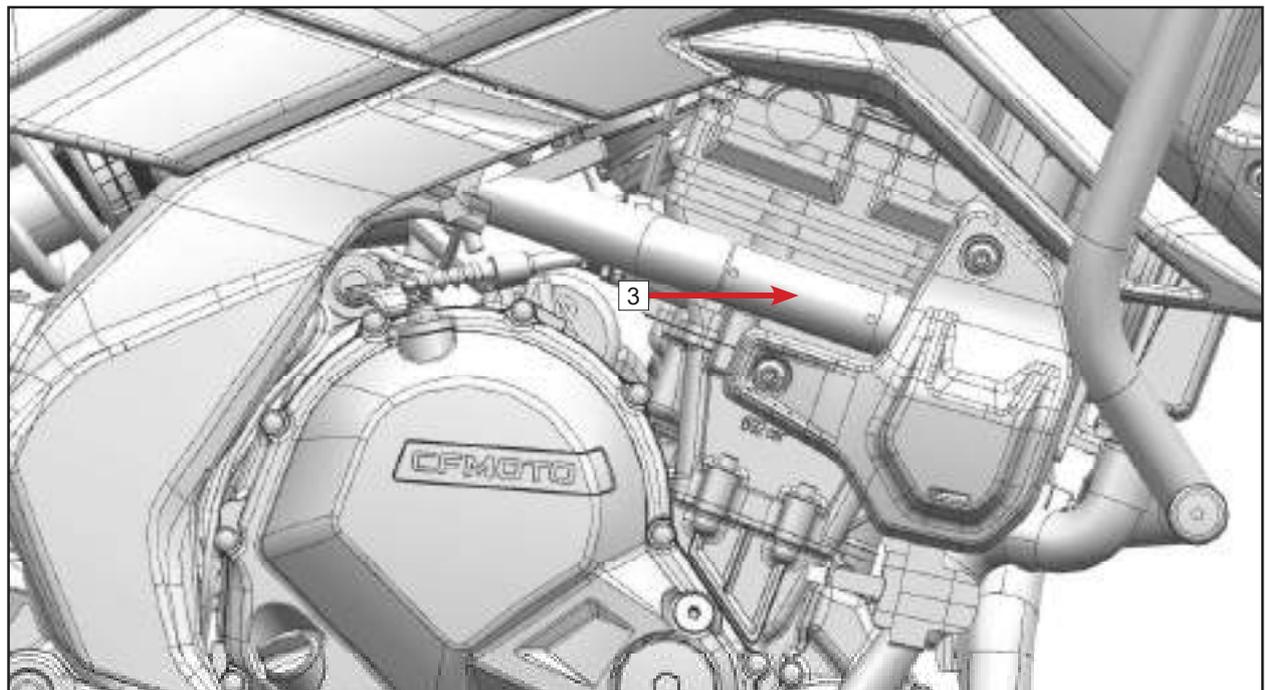
## 2.2 Number Engrave Place



1	VIN
---	-----



2	Engine number
---	---------------



3	Vehicle nameplate position
---	----------------------------

## 2.3 Vehicle Specifications

Item	Specification	
Model	700MT	
	CF700-9A	CF700-9B
Length	2245mm	2300mm
Width	955mm	
Height	1390mm	
Wheelbase	1445mm	
Height of seat	804mm	795mm
Engine model	283MU	
Displacement	693ml	
Fuel type	Gasoline	
Gross weight	240kg	258kg
Passengers	2 people (driver included)	
Ground clearance	192mm	
Maximum net power	50 Kw / 9500 rpm	
Maximum torque	60 N·m /6000 rpm	
<b>Engine</b>		
Model	Straight, 2-cylinder, 4-stroke, water-cooled	
Bore×Stroke	83mm x 64mm	
Compression ratio	11.6:1	
Starting system	Electric	
Fuel supply method	EFI	
Ignition type	ECU ignition	
Lubrication system	Pressure splash lubrication	
Oil and filter change	2.4L	
Oil type	SAE 10W-40 SJ JASO MA2	
Coolant capacity	1450mL + 215mL(reservoir)	
Cooling type	CFMOTO recommends the use of organic coolants, do not use inorganic coolants.	
Engine idle speed	1450r/min±145r/min	
<b>Powertrain System</b>		
Transmission type	Six-speed gears, international standard.	
Clutch	Wet multi-disc slipper clutch	
Drive system	Chain drive	
Primary reduction ratio	2.095	
Final reduction ratio	3.200	
Gear Ratio	1 <sup>st</sup>	2.353
	2 <sup>nd</sup>	1.714
	3 <sup>rd</sup>	1.333
	4 <sup>th</sup>	1.111
	5 <sup>th</sup>	0.966
	6 <sup>th</sup>	0.852
<b>Chassis</b>		
Tire Specification	Front tire	110/80 R19 M/C 59V
	Rear tire	150/70 R17 M/C 69V

## 02 General Information

Rim	Front tire	MT2.50×19
Specification	Rear tire	MT4.25×17
Fuel tank capacity		20L
Fuel reserve (max.) when gauge is flashing		3.2L
Comprehensive fuel consumption of 100 km		≤5.6L
<b>Electrical System</b>		
Battery		12V/11.2Ah
Headlight		Low-beam LED: L: 10W/R: 10W High-beam LED: 26W Position light LED: 6.5W
Turn light	Front	LED: 1.5W
	Rear	
Tail light		Brake light LED: 4.4W Rear position light LED: 2.3W
License Light		LED: 0.2W
<b>Shock Absorber</b>		
Front shock absorber stroke		150.9 mm
Front shock absorber reset damping adjustment		Initial gear: 10 gears Total gear: 20 gears±2 gears
Front shock absorber compression damping adjustment		Initial gear: 10 gears Total gear: 20 gears±2 gears
Front shock absorber spring preload		Unadjustable
Rear shock absorber stroke		52 mm
Rear shock absorber reset damping adjustment		Initial gear: 7 gears ±2 gears Total gear: 15 gears ±2 gears
Rear shock absorber compression damping adjustment		Unadjustable
Rear shock absorber spring preload		Initial gear: spring length 157mm±2mm
		Spring length adjustable range: 148.5mm~166mm

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## 2.4 Service Specification

### Front Tire

Item		Standard	Service Limit
Front tire	Front wheel shaft bent	-	0.2 mm
	Rim runout	Vertical	0.8 mm
		Horizontal	0.8 mm
	Tire	Residual grooves	-
Pressure		225 kPa±15 kPa	-

### Rear Tire

Item		Standard	Service Limit	
Rear tire	Rim runout	Vertical	0.8 mm	
		Horizontal	0.8 mm	
	Tire	Residual grooves	-	1.6 mm
		Pressure	250 kPa±15 kPa	-

### Brake System

Item		Standard	Service Limit
Front brake	Front (hand) brake free travel	5mm~10mm	-
	Brake disc wear	4.5 mm	4 mm
Rear brake	Rear (foot) brake free travel	10mm~20mm	-
	Brake disc wear	5 mm	4 mm

### Lights, Dashboard and Switches

Item	Standard	
Fuses	Primary fuse	30 A
	Secondary fuse	1×25A 3×10A 3×15A 2×5A
Light	Headlight	LED
	Position light	LED
	Rear tail light	LED
	Turn light	LED
	License light	LED

## 02 General Information

### Valve Mechanism + Cylinder Head

Item	Standard		Service Limit	Remark
	283MU			
Valve clearance (cold)	IN	0.1mm~0.15mm	-	
	EX	0.25mm~0.31mm	-	
Valve guide and valve stem fit clearance	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	-	
Valve spring free length	41.6mm		-	
Valve spring force	The elasticity is 103N~121N, when the length is compressed to 38.4mm.		-	
	The elasticity is 422N~466N, when the length is compressed to 30.5mm.		-	
	The elasticity is 455N~503N, when the length is compressed to 29.8mm.		-	
Valve CAM height	IN	36.543mm~36.657mm	-	
	EX	35.843mm~35.957mm	-	
Camshaft journal and camshaft bearing hole matching clearance	0.028mm~0.071mm		-	
O.D of camshaft	23.950mm~23.972mm		-	
Camshaft bearing hole diameter	24mm~24.021mm		-	
Camshaft runout	0.02mm		-	
Cylinder head joint surface flatness	0.05mm		-	

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## Lubrication System

Item	Standard	Service Limit	Remark
Inner, outer rotor clearance of oil pump	0.08mm~0.15mm	-	
Clearance of oil pump outer rotor and oil pump housing	0.15mm~0.193mm	-	
Oil pressure	3000r/min, 0.1MPa~0.3MPa	-	
Oil type	10W-40/SJ, JASOMA2 certified engine oil	-	
Oil level	Replace the oil and filter 2400 mL	-	
	Engine overhaul 2600 mL	-	

## Cylinder + Piston + Piston Pin + Crank Connecting Rod

Item	Standard		Service Limit	Remark
	283MU			
Piston and cylinder fit clearance	0.031mm~0.045mm		-	
Diameter of piston skirt	82.970mm~82.985mm		-	
I.D of cylinder	83.008mm~83.015mm		-	
Flatness of cylinder joint surface	0.05mm		-	
Piston ring closing clearance	1 Ring	0.25mm~0.40mm	-	
	2 Ring	0.40mm~0.55mm	-	
Piston ring groove fit clearance	1 Ring	0.03mm~0.07mm	-	
	2 Ring	0.02mm~0.06mm	-	
Piston pin thickness	1 Ring	0.87mm~0.89mm	-	
	2 Ring	0.97mm~0.99mm	-	
Piston ring groove width	1 Ring	0.92mm~0.94mm	-	
	2 Ring	1.01mm~1.03mm	-	
	Oil ring	1.510mm~1.525mm	-	
Piston pin diameter	18.996mm~19mm		-	
I.D of connecting rod small head	19.01mm~19.02mm		-	
Connecting rod big end radial clearance	41mm~41.015mm		-	
Connecting rod big end thickness	22.85mm~22.9mm		-	
Crankshaft runout	0.02mm		-	

## 02 General Information

### Clutch + Transmission

Item	Standard	Service Limit	Remark
Friction disc A		-	
Quantity	3	-	
Friction disc B		-	
Quantity	4	-	
Steel plate A		-	
Quantity	5	-	
Steel plate B		-	
Quantity	1	-	
Clutch driven plate deform	0.15mm	0.30mm	
Clutch spring free length	51.7mm~52.7mm	50.7mm	
Quantity	3	-	
Shift fork claw thickness	4.8mm~5.0mm	-	

### Cooling System

Item	Standard/Specification	Service Limit	Remark
Thermostat open temperature	72°C~85°C	-	
Thermostat valve lift	85°C, ≥8 mm	-	
Radiator cap opening pressure	135kPa~160kPa (Standard: 140kPa)	-	
Water temperature sensor temperature vs resistance	Water temperature (°C)	-	
	-20	-	
	20	-	
	80	-	
	120	-	
Coolant Type	-35°C anti-freezing, anti-corrosive and high boiling point	-	

### Air Intake System

Item	Standard	Remark
Throat size (mm)	φ42 mm	
Idle (r/min)	1450 r/min ± 145 r/min	

### Electrical System

Item	Standard		Remark
Spark plug	Model	CR8EI	
	Clearance	0.7 mm ~ 0.9 mm	
Spark character	> 8 mm, 1 kPa		
Ignition coil resistance	Primary	1.23 Ω	
	Secondary	6kΩ~13kΩ	
Magneto coil resistance	Trigger	400Ω	
Maximum output power of magneto	280W, 5000 r/min		
Stabilized voltage	13.5V~15.0V		
Ignition coil secondary voltage	≥27kV		
Trigger coil peak voltage	≥17V		

## 2.5 Tighten Torque

The fastening torque of common standard parts is performed according to the following table:

Type	Torque N•m	Type	Torque N•m(kgf•m)
5mm bolt, nut	5	5mm screw	4
6mm bolt, nut	10	6mm screw	9
8mm bolt, nut	20~30	6mm flange bolt and nut	12
10mm bolt, nut	30~40	8mm flange bolt and nut	20~30
12mm bolt, nut	40~50	10mm flange bolt and nut	30~40

### 2.5.1 Tighten Torque Table for Vehicle

Tighten to standard torque where not recorded in the table below.

**NOTE: 1: Apply thread locker on the joint surface of thread part.  
2: The self-locking bolt should be replaced when disassembling.**

Item	Type	QTY	Tighten Torque N•m	Thread Locker
Engine front hanger RH mounting bolt	M8×25	3	20~30	YES
Engine front hanger LH mounting bolt	M8×28	1	20~30	YES
Engine front LH mounting bolt	M10×1.25×110	1	40~50	YES
Engine front RH mounting bolt	M10×1.25×150	1	40~50	YES
Engine rear mounting nut	M10×1.25	2	40~50	YES
Front wheel shaft tighten screw	M25×1.5	1	40~50	NO
Front shock absorber lock front wheel shaft screw	M8×35	4	18~22	NO
Rear wheel shaft nut	M18×1.5	1	105~110	NO
Rear fork shaft nut	M20×1.5	1	175~185	NO
Upper triple clamp tighten screw	M26×1	1	81~99	NO
Upper triple clamp shock absorber lock screw	M8×35	2	18~22	YES
Lower triple clamp shock absorber lock screw	M8×35	4	18~22	YES
Rear shock absorber mounting bolt (upper)	M12×1.25	1	70~80	YES
Rear shock absorber mounting bolt (lower)	M12×1.25	1	55~65	YES
Engine rear upper mounting shaft	M10×240	1	40~50	YES
Engine rear lower mounting shaft	M10×202	1	40~50	YES

## 02 General Information

Rear sprocket disc lock nut	M10×1.25	6	57.5~62.5	NO
Rear sprocket disc stud	M10×25	6		YES
Steering column lock nut I、II	Lock nut II M35×1	1	Lock nut II hit 50N·m~60N·m, and then rotate the lower triple clamp three times each to the steering limit, and then tighten the lock nut II with 22N·m~28N·m after returning to the normal relaxation of 120~160°. Lock the lock nut I at torque not less than 2N·m.	YES
	Lock nut I M35×1			
Side bracket bolt	M10×32	1	9~12	YES
Side bracket nut	M10×1.25	1	25~30	YES
LH&RH front footrest bracket mounting bolt	M8×35	4	20~30	YES
Shift lever assembly mounting bolt	M6×12	1	9~12	YES
LH&RH rear footrest bracket mounting bolt	M8×25	4	20~30	YES
Rear rack front mounting bolt	M8×25	2	20~30	YES
Rear rack rear mounting bolt	M8×35	2	20~30	YES
Front brake caliper mounting bolt	M10×60	4	50~60	YES
Handlebar bracket fixing bolt	M10×60	2	40~45	YES
Rear brake lever tighten nut	M6×16	1	9~12	YES

## 2.5.2 Tighten Torque Table for Engine

Item	QTY	Diameter of thread (mm)	Torque (N·m)	Remark
Crankcase closing bolt	8	M7	20	
Crankcase closing bolt	6	M8	27.5	
Crankcase closing bolt	4	M8	35	Apply appropriate amount of oil, MoS2 grease mixture (weight ratio 10:1) on the flange surface and thread.
Crankcase closing bolt	6	M9	44	Apply appropriate amount of oil, MoS2 grease mixture (weight ratio 10:1) on the thread.
Breather guard mounting bolt	2	M6	10	Apply thread locker
Cylinder body mounting stud	1	M10	Tighten by hand, height permitted	Apply thread locker on the long thread. Apply appropriate amount of oil, MoS2 grease mixture (weight ratio 10:1) on the short thread.
Bushing press plate mounting screw (CF188)	1	M6	Tighten by hand	Apply thread locker
Cylinder body tighten nut	1	M10×1.25	Tighten by hand (49)	
Oil pipe IV mouting bolt (152MI)	2	M6	10	Apply thread locker
Breather assembly mounting bolt	4	M6	8	Apply thread locker
Lower housing cover mounting bolt (152MI)	6	M6	10	Apply thread locker
Oil shielding plate assembly mounting screw	2	M6	8	Apply thread locker
Trigger assembly mounting bolt	2	M5	6	Apply thread locker
Oil low pressure alarm switch	1	R1/8	Tighten by hand (15)	Apply silicone sealant
Oil relief valve assembly	1	M12×1.25	15	Apply thread locker
Lower crankshaft housing oil rail plug M6	1	M6	Tighten by hand, flat	Apply thread locker
Main oil rail plug	1	R23/8	20	Apply thread locker
Oil filter mounting bolt	1	3/4" (16-tooth/inch)	25	Apply thread locker
Shift shaft torsion spring positioning pin	1	M8	29	Apply thread locker
RH cover mounting bolt(152MI)	12	M6	12	

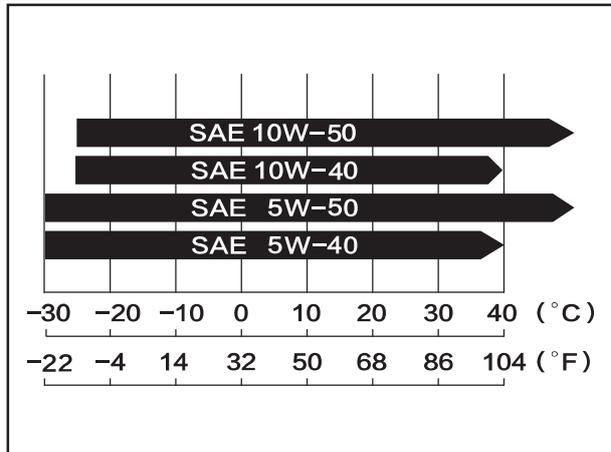
## 02 General Information

Timing view hole cover	1	M12×1.5	Tighten by hand	
Oil filler plug	1	3/4"	Tighten by hand	
Stainer cover(1P72MM)	1	M35×1.5	Tighten by hand (25)	Apply oil
LH cover mounting bolt (152MI)	11	M6	12	
LH cover mounting bolt (1P52MI)	1	M6	12	
Oil strainer press plate bolt (152MI)	2	M6	10	Apply thread locker

## 2.6 Fuel, Oil and Coolant Recommendation

The recommended minimum fuel for this vehicle is 95# octane gasoline, premium or medium gasoline (maximum 10% alcohol mix allowed). Oxygen-free (alcohol-free) fuel is recommended in all cases for the best performance.

Require the use of API "SJ" and above grade of oil, the preferred use of JASO MA2 certified oil, the second choice JASO MA certified oil. Although the 10W-40 is one of the recommended oils for most ambient temperature conditions, the viscosity of the oil needs to change when the ambient temperature conditions in the driving area change. Select from the table on the right.



Use organic coolant, do not use inorganic coolant. CFMOTO coolant is an Organic Acid Technology (OAT) formula. When replenishing or replacing coolant, verify the label states 'compatible with one or more of the following formulas: OAT or Si-OAT, G30, G40, G12++'.

## 2.7 Service Offering Recommendation

Lubricant grease recommendation #3 MoS<sub>2</sub> lithium grease.

### 2.8 Consumption Materials&Assembling Materials

Consumption materials include lubricating oil (oil), grease, etc.. Assembly materials include flange sealant, thread locker, etc..

#### 2.8.1 Vehicle Consumption Materials

Application Areas	Type
Steering column bearing Front/rear pedal rotating part Side bracket rotating part Front/rear LH/RH bushing Sprocket seat oil seal Seat cable Clutch cable Throttle cable Adjustable throttle cable Rear bracket bearings Rear brake pedal shaft sleeve Rotating parts of shift lever Rear fork needle roller bearing	Lithium grease GB/T5671

#### 2.8.2 Engine Consumption Materials&Assembling Materials

Item	Specification	Using parts	Remark
Lubricant oil/oil	SAE10W/40 SJ, JASOMA2	Rotation and moving section in cylinder, crankcase and cylinder head. See the lubrication system diagram.	Oil Capacity: 2600mL
Lubricant oil with molybdenum		Piston pin, valve stem, valve oil seal, camshaft	
Lubricant grease/grease	#3 MoS2 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	
Tread locker		Parts of thread	



## 03 Maintenance Information

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3.2 Maintenance Schedule During Break-in Period.....	3
3.3 Periodic Maintenance Schedule.....	5

## Maintenance information

### Cautions

- ▶ = Severe Use Item. Reduce interval by 50% on vehicles subjected to severe use.
- = Have an authorized dealer perform repairs that involve this component or system.

### 3.1 Daily Maintenance Schedule

Item	Maintenance Before Riding				
	Hour	Calendar	km	Remarks	
<b>Fuel system</b>					
	Fuel tank and hose	-	Daily	-	Inspect for aging, damage
<b>Electrical system</b>					
	Switches	-	Daily	-	Inspect
	Lights and horns	-	Daily	-	

## 03 Maintenance Information

### 3.2 Maintenance Schedule During Break-in Period

Item	Break-in Maintenance Interval (Service whichever interval comes first)			
	Hour	Calendar	km	Remarks
<b>Engine</b>				
■ Oil and oil filter	-	-	1000	Replace
■ Oil strainer	-	-	1000	Clean
Idle	-	-	1000	Inspect
■ Coolant	-	-	1000	
■ Throttle system	-	-	1000	
<b>Electrical system</b>				
■ Functions of electrical parts	-	-	1000	Inspect
Battery	-	-	1000	
Fuses or circuit breakers	-	-	1000	
<b>Brake system</b>				
Brake discs	-	-	1000	Inspect
Brake pads	-	-	1000	
Brake fluid level	-	-	1000	
■ Brake line	-	-	1000	Inspect for damage and sealing
Brake pedal	-	-	1000	Inspect for free play
<b>Wheels</b>				
Tire condition	-	-	1000	Inspect
Tire pressure	-	-	1000	
■ Rim spoke	-	-	1000	Check, adjust if necessary
<b>Suspension system</b>				
■ Rear shock absorber and front shock absorber	-	-	1000	Inspect for leaking (maintain front fork and rear shock absorber according to the requirement and use purpose)
<b>Cooling system</b>				
Coolant fluid level	-	-	1000	Check the fluid level for leakage
■ Coolant	-	-	1000	
■ Radiator fan function	-	-	1000	Check whether the function is normal
Cooling hose	-	-	1000	Check for leakage, clean
<b>Steering system</b>				
■ Steering bearings	-	-	1000	Inspect, lubricate
<b>Other parts</b>				
■ Diagnosis connector	-	-	1000	Read with DSCAN
■ All mobile parts	-	-	1000	Lubricate, inspect for flexibility
■ Bolts and nuts	-	-	1000	Inspect for fastness

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■	Cables	-	-	1000	Inspect for damage, bending and routing
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## 03 Maintenance Information

### 3.3 Periodic Maintenance Schedule

Item		Periodic Maintenance Interval (Service whichever interval comes first)			
		Hour	Calendar	km	Remarks
<b>Engine</b>					
	Oil and oil filter	-	6M	5000	Replace
	Oil strainer	-	6M	5000	Clean
■	Clutch	-	-	5000	Inspect, repair or replace if necessary
	Idle	-	-	5000	Inspect, adjust if necessary
■	Coolant	-	24M	35000	Replace
		-	-	5000	Inspect, adjust if necessary
■	Throttle system	-	-	5000	Clean
▶ ■	Throttle valve body	-	-	5000	Inspect, replace if necessary
	Air filter element	-	24M	20000	Replace
■		-	-	5000	Inspect, replace if necessary
	Spark plug	-	-	10000	Replace
■	Valve clearance	-	-	40000	Inspect, adjust if necessary
<b>Electrical system</b>					
■	Functions of electrical parts	-	12M	10000	Inspect, repair or replace if necessary
	Battery	-	6M	5000	Inspect, charge if necessary
	Fuses or overload protector	-	6M	5000	Inspect, replace if necessary
■	Wires	-	12M	10000	Inspect for damage, bending and routing
<b>Brake system</b>					
	Front and rear brake system	-	12M	10000	Inspect, repair or replace if necessary
	Brake discs	-	12M	10000	
▶	Brake pads	-	12M	10000	
	Brake fluid level	-	12M	10000	Inspect, add if necessary
	Brake pedal	-	12M	10000	Inspect for free play
■	Brake line	-	12M	10000	Inspect for damage and sealing
■	Brake fluid	-	24M	-	Replace
<b>Wheels</b>					
	Tire condition	-	12M	10000	Inspect, repair or replace if necessary

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	Tire pressure	-	12M	10000	Inspect, replenishment pressure if necessary
■	Wheel bearings	-	-	10000	Inspect, repair or replace if necessary
■	Rim spoke	-	-	5000	Inspect, adjust if necessary

## 03 Maintenance Information

Item		Periodic Maintenance Interval (Service whichever interval comes first)			
		Hour	Calendar	km	Remarks
<b>Suspension system</b>					
■	Suspension systems	-	-	5000	Inspect, repair or replace if necessary
■	Rear shock absorber and front forks	-	12M	10000	Inspect for leakage. (maintain front fork and rear shock absorber according to the requirement and use purpose)
■	Swing arms	-	-	10000	Inspect
<b>Cooling system</b>					
	Coolant fluid level	-	12M	10000	Inspect, add if necessary
■	Radiator fan function	-	12M	10000	Inspect, repair or replace if necessary
■	Cooling hoses	-	12M	10000	
<b>Frame system</b>					
	Frame system	-	-	30000	Inspect
<b>Steering system</b>					
■	Steering bearing	-	12M	10000	Inspect
<b>Chain</b>					
▶	Chain lubrication	-	-	1000	Check immediately after riding in rainy day
▶	Chain tightness	-	-	1000	Inspect, adjust if necessary
■	Chain guard	-	12M	10000	Inspect, replace if necessary
▶ ■	Chain, rear sprocket and engine sprocket	-	12M	10000	Inspect, replace if necessary
<b>Other parts</b>					
■	Diagnosis connector	-	12M	10000	Read with DSCAN
■	All mobile parts	-	12M	10000	Lubricate; inspect for flexibility
■	Bolts and nuts	-	12M	10000	Inspect for fastness
■	Cables	-	12M	5000	Inspect for damage, bending and layout.

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■	All hoses and sleeves	-	12M	10000	Check for cracks, seals and correct layout.
■	Windshield	-	-	25000	Check whether there is shaking, if the front and rear, left and right shaking clearance is more than 5mm, then replace the windshield bracket, windshield gear.

## 04 Clutch and Transmission

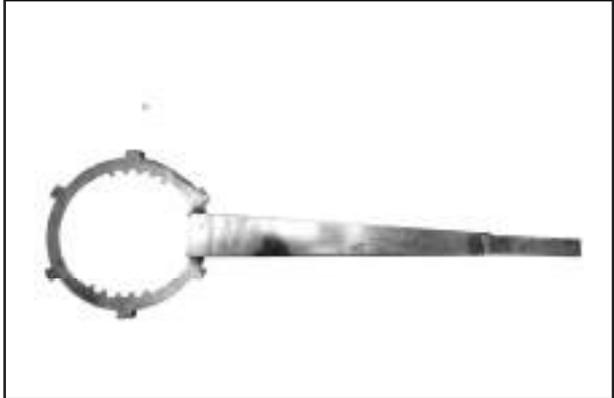
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## 4.1 Special Tool

### Clutch Stopping Tool

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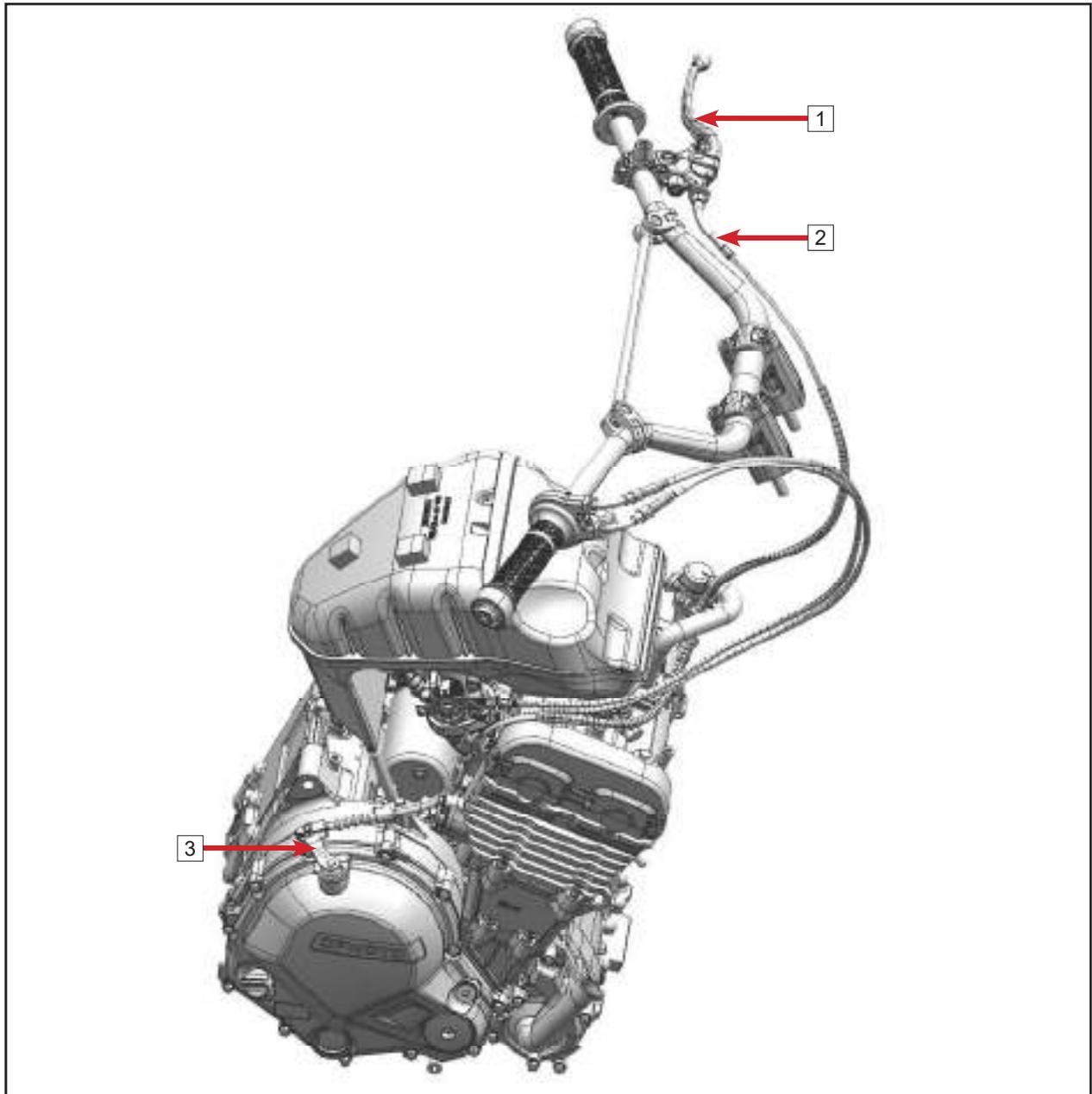


### 4.2 Clutch System Description

The system is equipped with clutch handle [1], clutch cable [2], clutch control shaft assembly [3] (including clutch release lever and clutch control shaft) and clutch.

When the left hand grip the clutch handle, pull the clutch release rod through the clutch cable, clutch control shaft press the clutch pull rod, the clutch pull rod moves outward along the axis, the clutch friction plate and the steel plate are separated, and the power transmission between the engine crankshaft and the gearbox is cut off.

When the clutch handle is released with the left hand, the clutch is in the combined state (the clutch friction plate is in contact with the steel plate), and the output power of crankshaft is transmitted to the gearbox through the clutch.



## 4.3 How to Avoid Clutch Failure / Overheating and Diagnosis

### Develop good driving habits to avoid overheating of the clutch:

- Always start in first gear.
- Reduce gear when slowing down for corners or pedestrians.
- Do not pinch the clutch halfway at high speed.
- When the vehicle is expected to operate at a sustained low speed, it is appropriate to use a low gear.

### Troubleshooting

#### Clutch Slipping

- Clutch control system is improperly adjusted or damaged.
- Clutch friction pad is worn or damaged.
- Clutch spring loses elasticity or size shortening.

#### Clutch Incomplete Disengagement

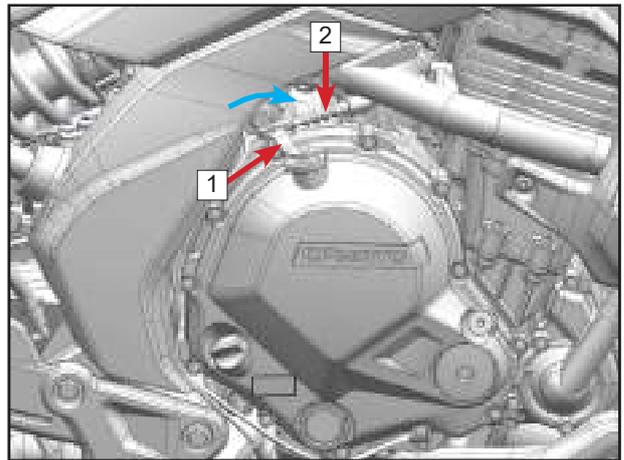
- The separation stroke is not suitable.
- Clutch friction pad thickness is not appropriate.
- Uneven clutch spring elasticity.

## 4.4 Clutch Removal

Use side stand to park the vehicle on level ground.

Turn the clutch release lever **1** clockwise and detach the clutch cable **2**.

Hang the clutch cable to the side.

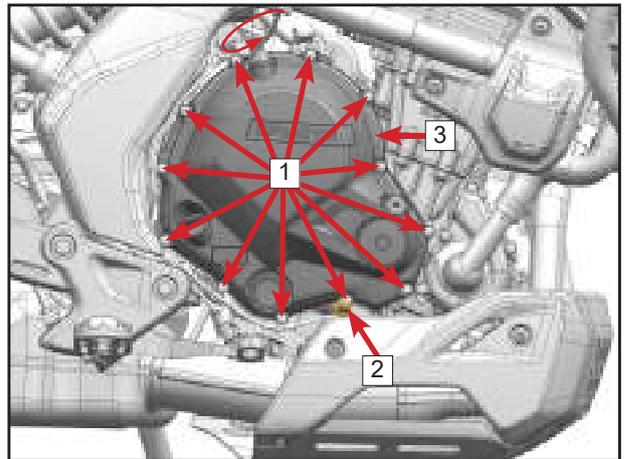


Cross diagonally loosen the bolts **1** then remove them.

Remove clip **2**.

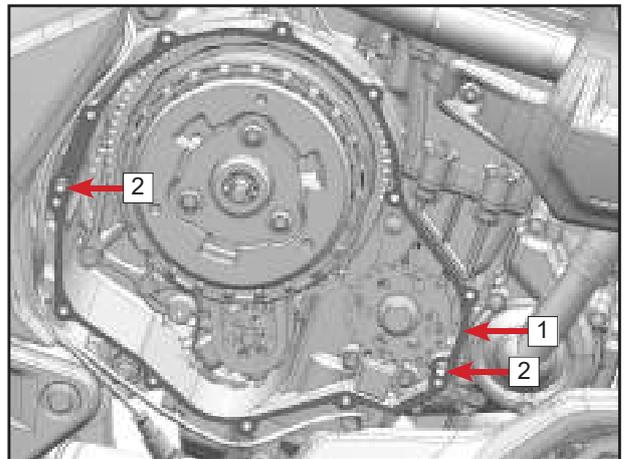
Turn the clutch control shaft counterclockwise to release it from the clutch pull rod.

Remove RH side cover **3**.



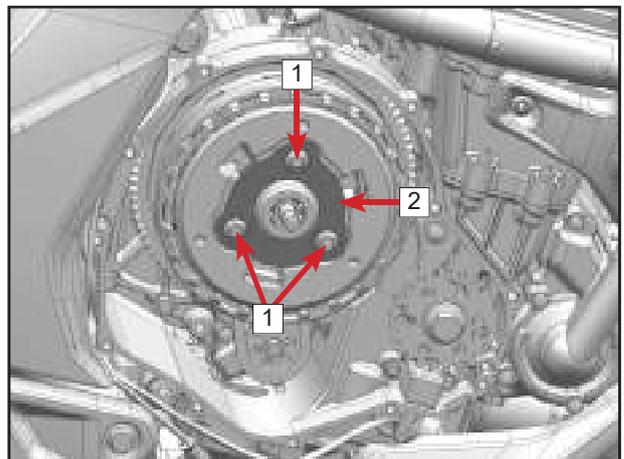
Remove RH side cover seal gasket **1** and discard.

Remove dowel pins **2**.

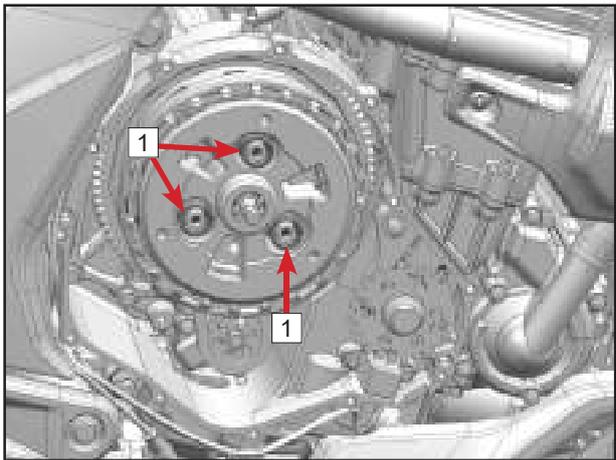


Remove bolts **1**.

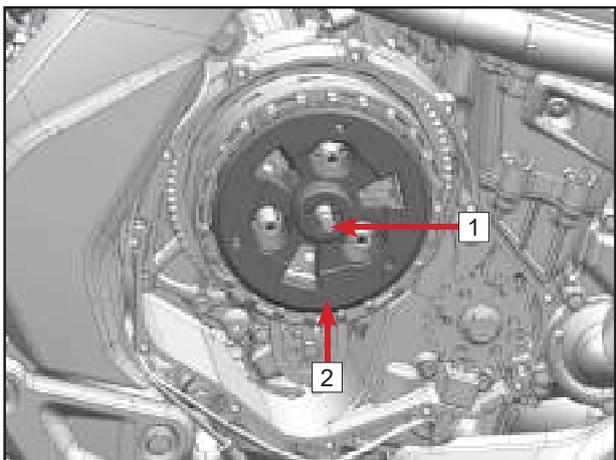
Remove clutch spring press plate **2**.



Remove clutch spring [1].

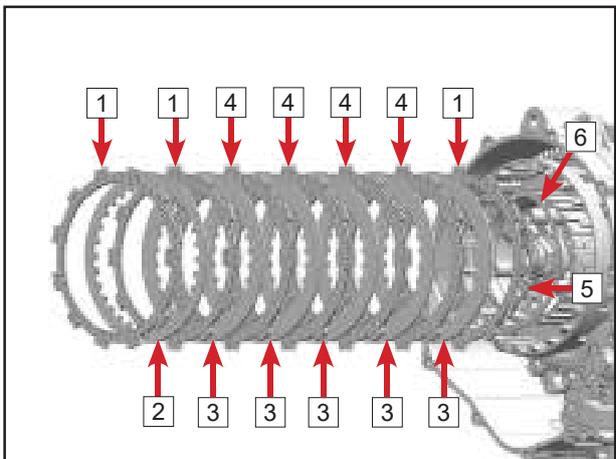


Pull onto the pull rod [1] and pull out the disc assembly [2].



Remove friction plate/steel plate assembly. Check the sequence of friction plate/steel plate assembly, as follows:

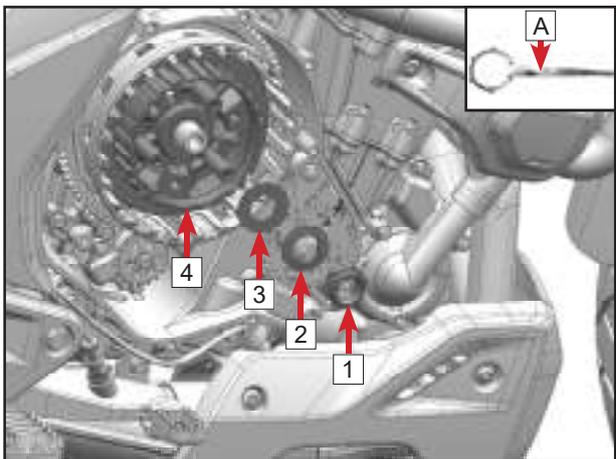
- Friction plate A [1]--Steel plate B [2]
- Friction plate A [1]--Steel plate A [3]
- Friction plate B [4]--Steel plate A [3]
- Friction plate A [1]--Elastic washer [5]
- Washer [6]



Use the clutch stopping tool [A] to fix the center sleeve.

Clutch Stopping Tool  
(See section 4.2 for details.)

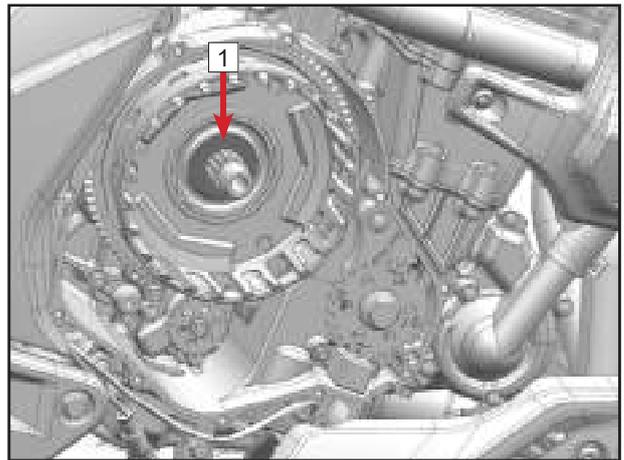
- Remove nut [1].
- Remove elastic washer [2].
- Remove washer [3].
- Remove center sleeve [4].



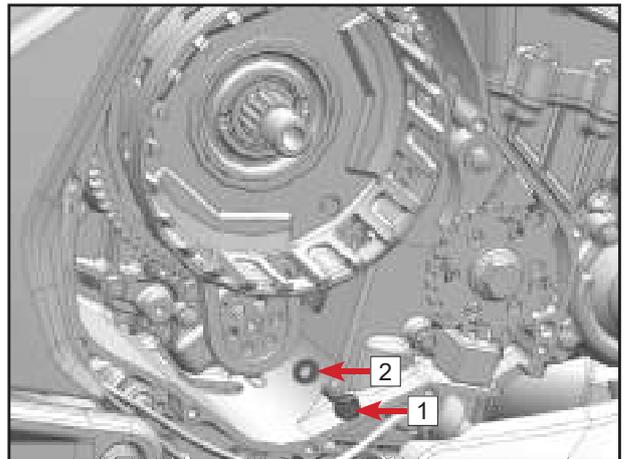
## 04 Clutch and Transmission

Remove washer [1].

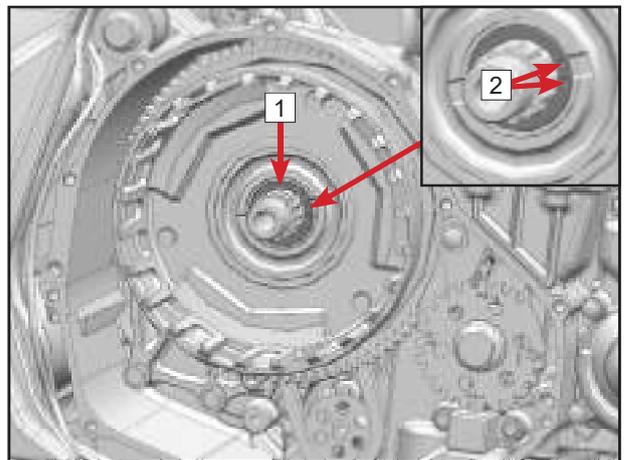
**NOTE:** The washer [1] may adhere to the center sleeve and should not be lost during removal.



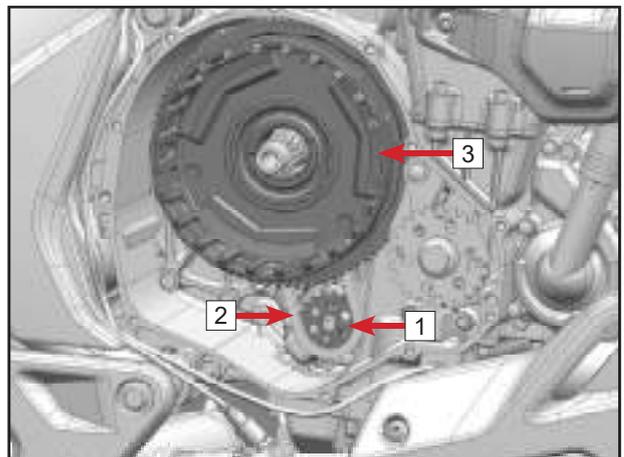
Remove bolt [1] (LH-hand thread) and washer [2].



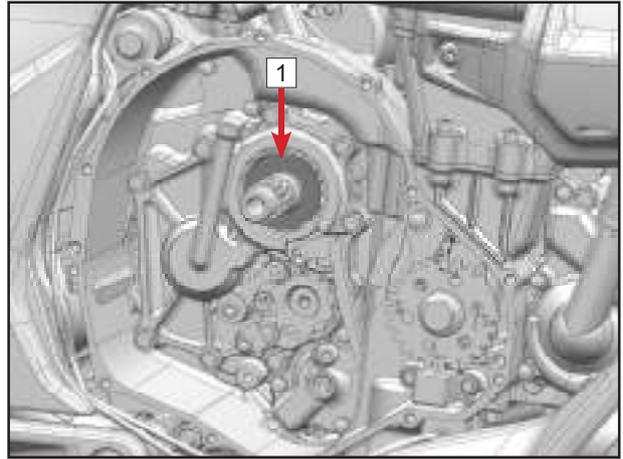
Use a straight-nosed circlip clamp to hold the hole [2], and pull out the clutch shaft sleeve [1].



Hold the oil pump sprocket [1] with needle-nose pliers, then remove the housing assembly [3], oil pump sprocket [1] and oil pump chain [2] together.



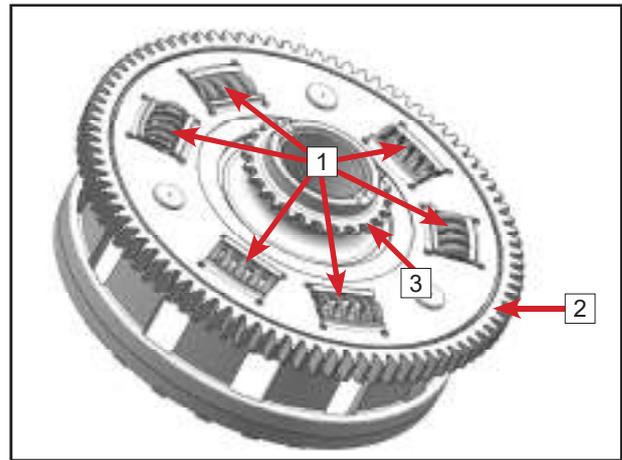
Remove washer 1.



## 4.5 Clutch - Inspection / Replacement

### Clutch Cover

Check whether the internal buffer spring **1** is worn, if worn, there will be shaking between the gear and clutch housing, and produce abnormal noise, such as shaking larger, then need to replace the primary driven gear assembly **2**.



### Friction Disc or Driven Disc

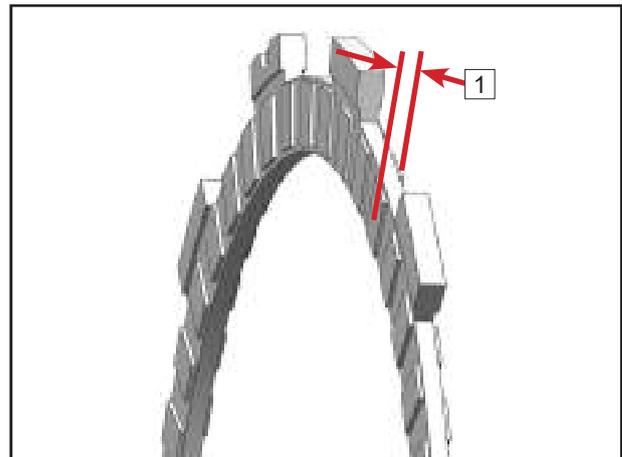
Check friction disc and driven disc one by one.

If the friction material fall off, loose and other defects.

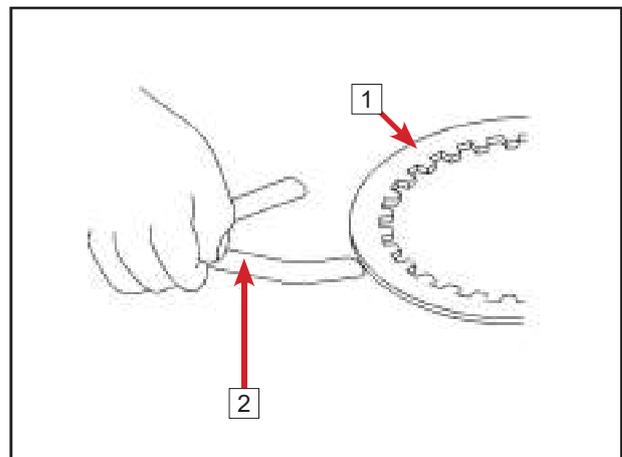
If the friction surface has discoloration or uneven wear caused by overheating.

Measure the thickness **1** of each friction disc at different points.

If any piece shows signs of damage or wear exceeds the maintenance limit, replace with a new one.



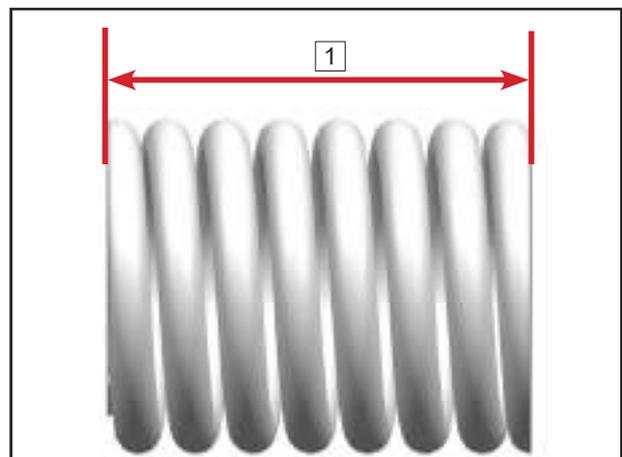
Friction Disc Thickness	
New Part	2.90 ~ 3.10 mm (0.11412 ~ 0.12205 in)
Service Limit	2.80 mm (0.11024 in)



Place friction disc or driven disc **1** on the plate.

Use a feeler gauge **2** to measure the clearance between the friction disc or driven disc and the plate from multiple directions. The clearance is the flatness of the friction disc or driven disc.

Flatness of The Friction Disc or Driven disc	
New Part	≤0.15 mm (0.00591 in)
Service Limit	0.3 mm (0.01181 in)



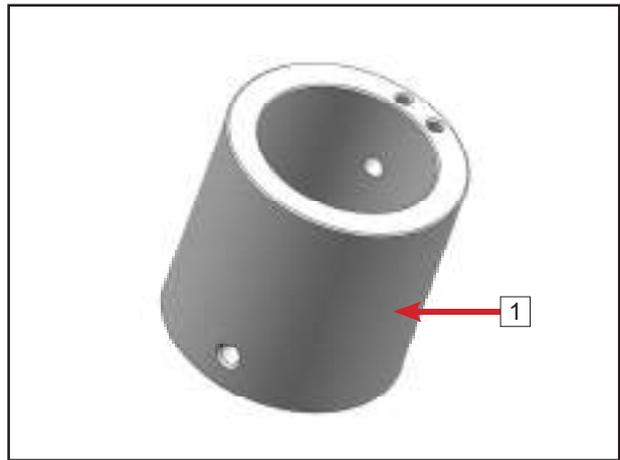
### Clutch Spring

Measuring the free length **1** of clutch spring. If the measured value is less than the maintenance limit, replace the pressure spring.

Clutch Spring Free Length	
Service Limit	51 mm (2.00787 in)

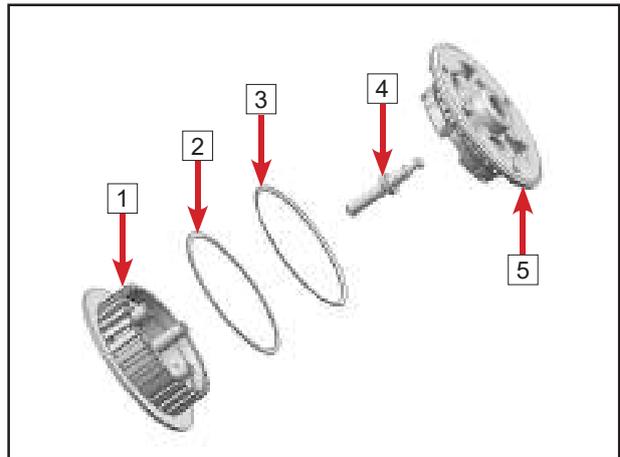
## Clutch Sleeve

Check the clutch sleeve [1] for severe wear or damage. Replace if any.



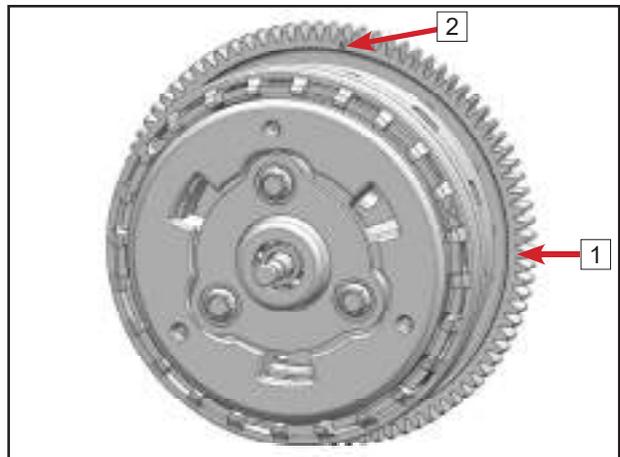
## Other Parts

Check central sleeve [1], washer [2], Elastic washer [3], tie rod [4], press plate [5] for severe wear or damage, replace if any.



## Clutch Grouping

The clutch is divided into group A and group B according to its primary driven gear [1]. Grouping mark [2] is carved onto the primary driven gear.



The clutch and the output gear installed on the crankshaft are paired according to the following table:

Clutch Grouping Mark	Output Gear (on crankshaft) Grouping Mark
A	B
B	A

The grouping of the output gear is detailed in section 5.4.16.

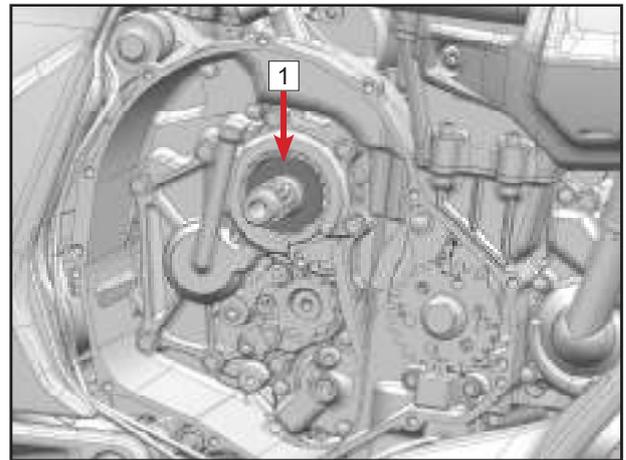
## 4.6 Clutch Installation

The clutch and the output gear installed on the crankshaft are paired according to the table below.

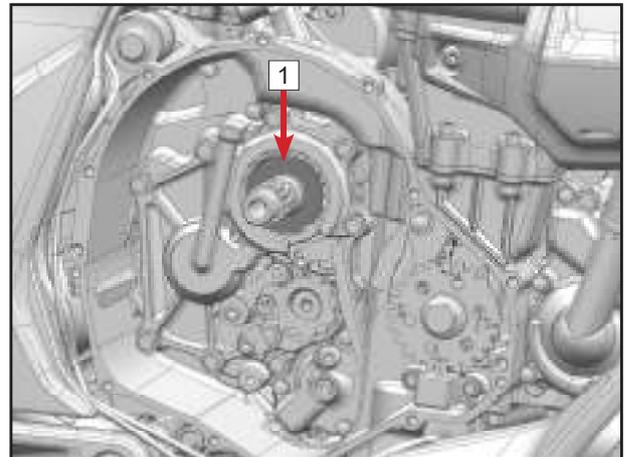
Clutch Grouping Mark	Output Gear (on Crankshaft) Grouping Mark
A	B
B	A

The grouping of the clutch is detailed in section 4.5.

The grouping of the output gear is detailed in section 5.4.16.



Install washer 1.



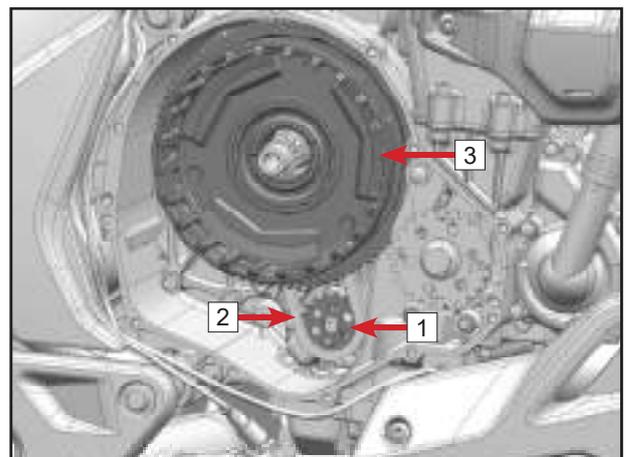
Hang oil pump chain 2 on the sprocket of outer cover 3.

Hang oil pump sprocket 1 on oil pump chain.

Install outer cover assembly 3.

**NOTE: Align primary driven gear of outer cover with output gear of crankshaft.**

Rotate oil pump shaft to the right position, and align the central hole of oil pump gear with oil pump shaft. Install oil pump gear on the shaft.

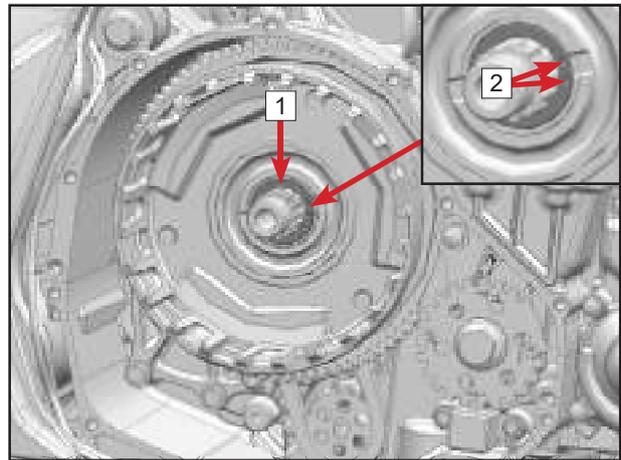


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Apply engine oil on clutch sleeve 1.

Install clutch sleeve 1.

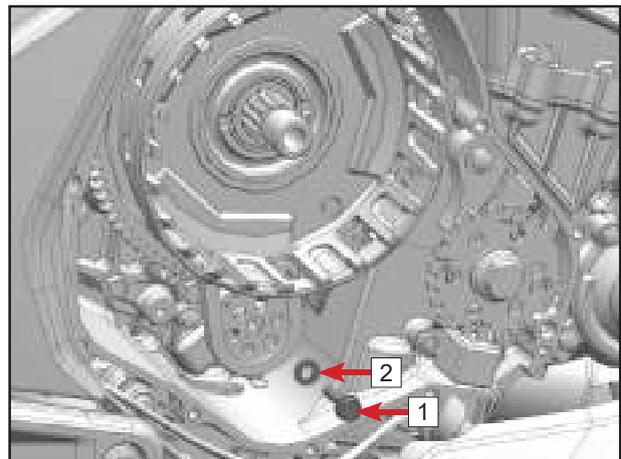
**NOTE: The holes 2 on clutch sleeve face outside.**



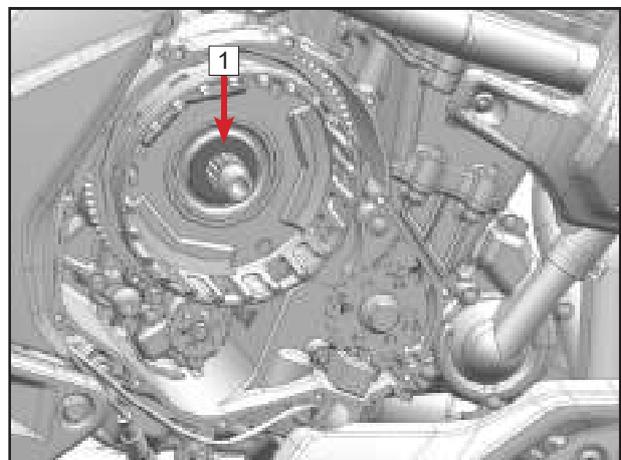
Apply bolt 1 (left-hand thread) with 243 thread locker.

Install washer 2 and bolt 1, and tighten to the specified torque.

Oil Pump Sprocket Bolt 1	
Torque	12 N·m (8.8 ft-lb.)



Install washer 1.



Install central sleeve 4.

Install washer 3.

Install elastic washer 2 (The surface with mark faces outside).

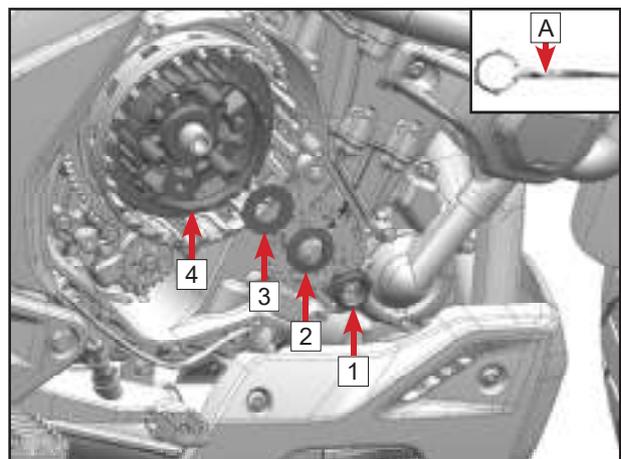
Use clutch stopping wrench A to fix the central sleeve.

Clutch Stopping Tool  
(See section 4.2 for details.)

Apply nut 1 with 243 thread locker.

Install nut 1, and tighten to the specified torque.

Clutch Nut 1	
Torque	132 N·m (97.3 ft-lb.)

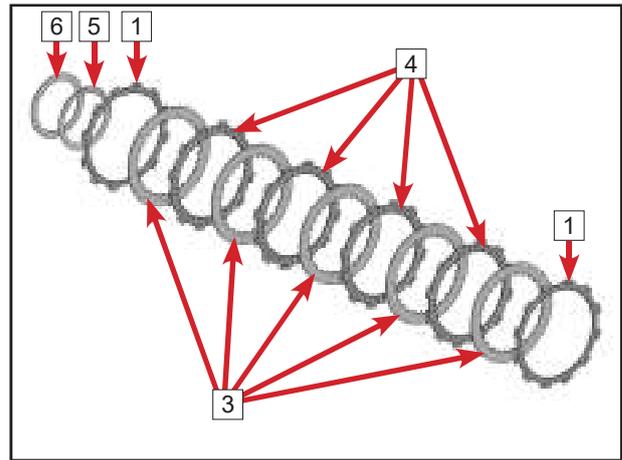


## 04 Clutch and Transmission

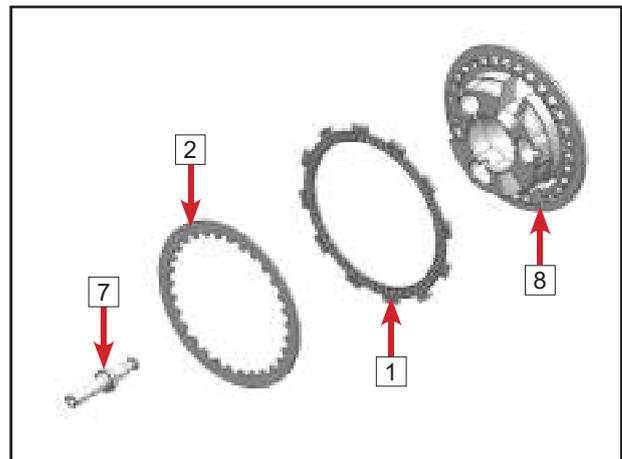
**⚠ CAUTION:** If installing new, dry friction plate and steel plate, the surface of each clutch plate should be coated with engine oil to avoid seizure.

Install the following parts on the center sleeve in turn:

- Washer **6**
- Elastic washer **5** (the large end of the cone faces outward)
- Friction plate A **1**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate A **1**



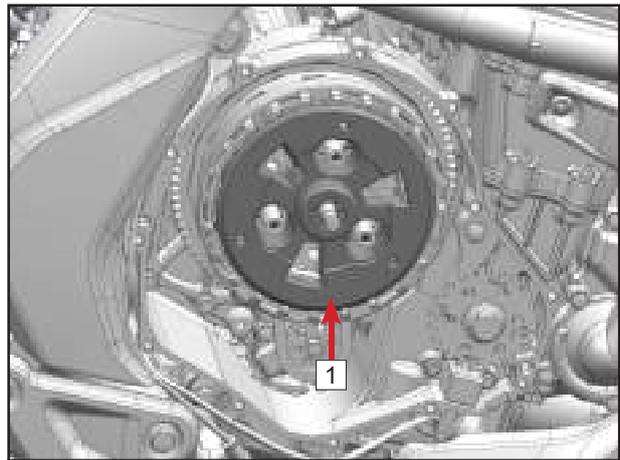
Install friction plate A **1** and steel plate B **2** on the press disc assembly **8**.  
Insert the pull rod **7** into the rolling bearing of the press disc assembly **8**.



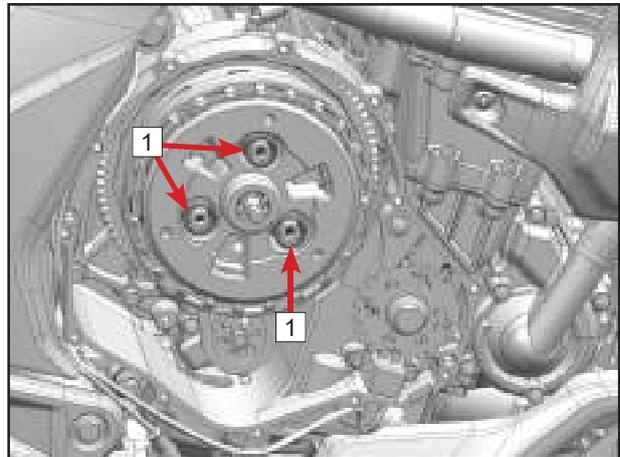
# CFMOTO

Install the press disc assembly **1**.

**NOTE: The outermost friction plate A **A** shall be misaligned.**

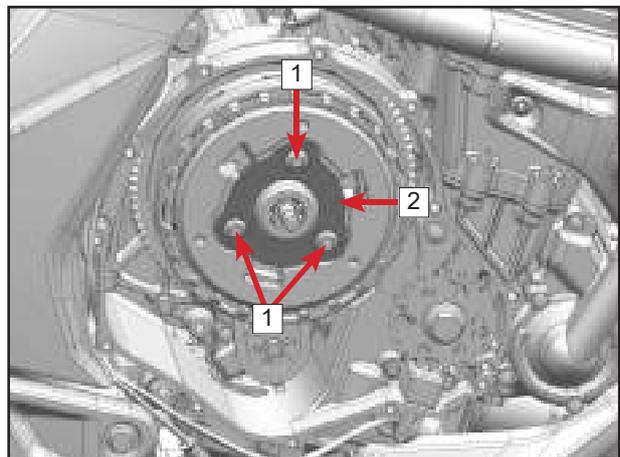


Install clutch spring **1**.



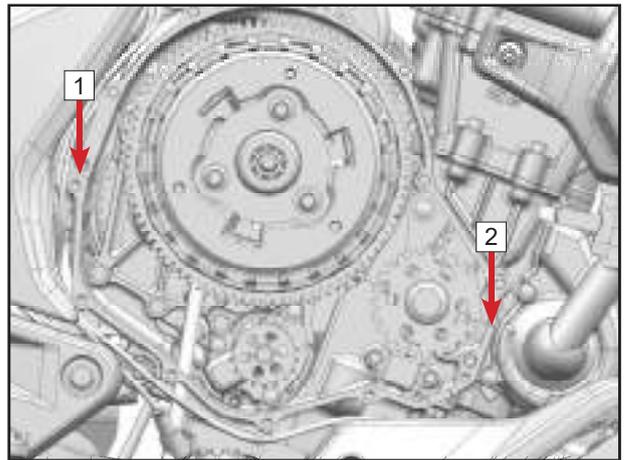
Place the clutch spring press plate **2** in place.  
Install bolts **1**, and tighten to the specified torque.

Clutch Spring Press Plate Bolt <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)

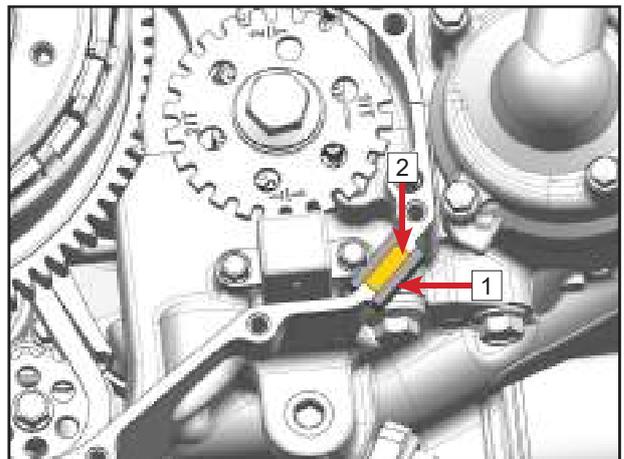


## 04 Clutch and Transmission

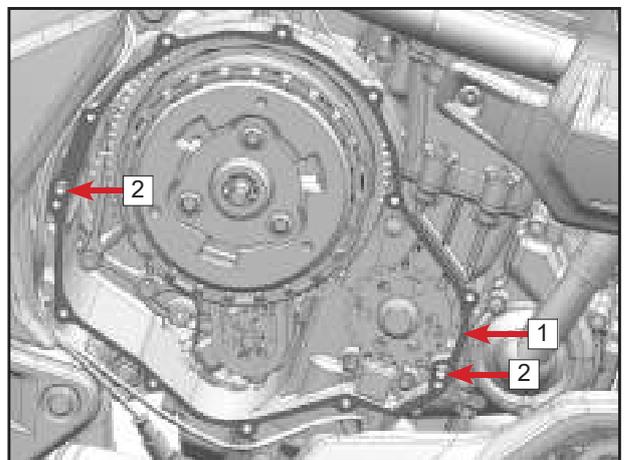
Clean the sealing surface of the crankcase thoroughly.  
Apply KB598 flange sealant on the crankcase joint **1** **2**.



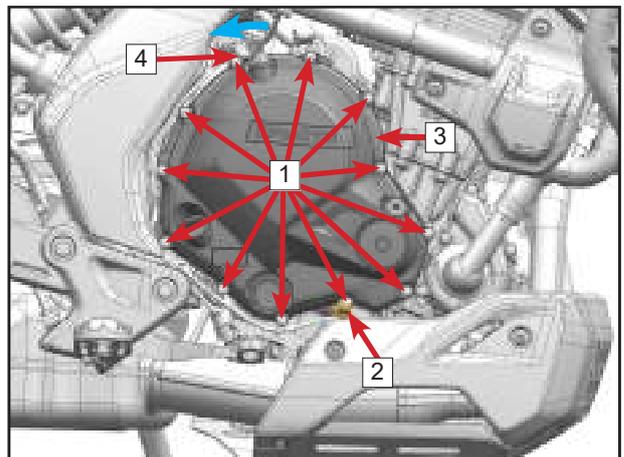
Apply KB598 flange sealant on the area **2** of trigger rubber seal block.



Install dowel pins **1**.  
Install new RH side cover seal gasket **2**.



Clean the sealing surface of the RH side cover thoroughly.  
Rotate the clutch control shaft counterclockwise and place the RH side cover **3** in place.  
Install clip **2** and bolts **1**.  
Tighten the bolts **1** diagonally to the specified torque.

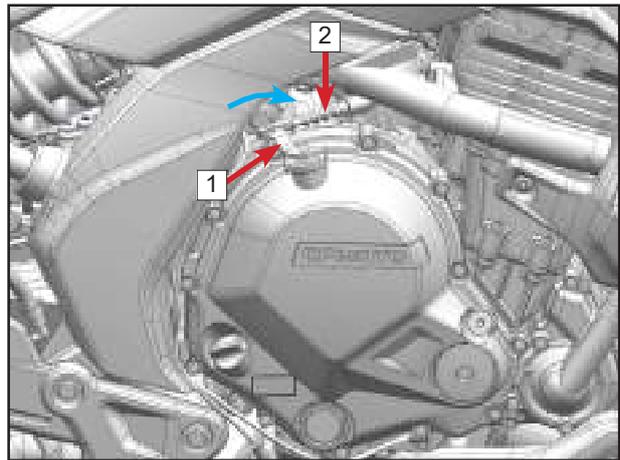


<b>RH Side Cover Bolt <b>1</b></b>	
Torque	12 N·m (8.8 ft-lb.)

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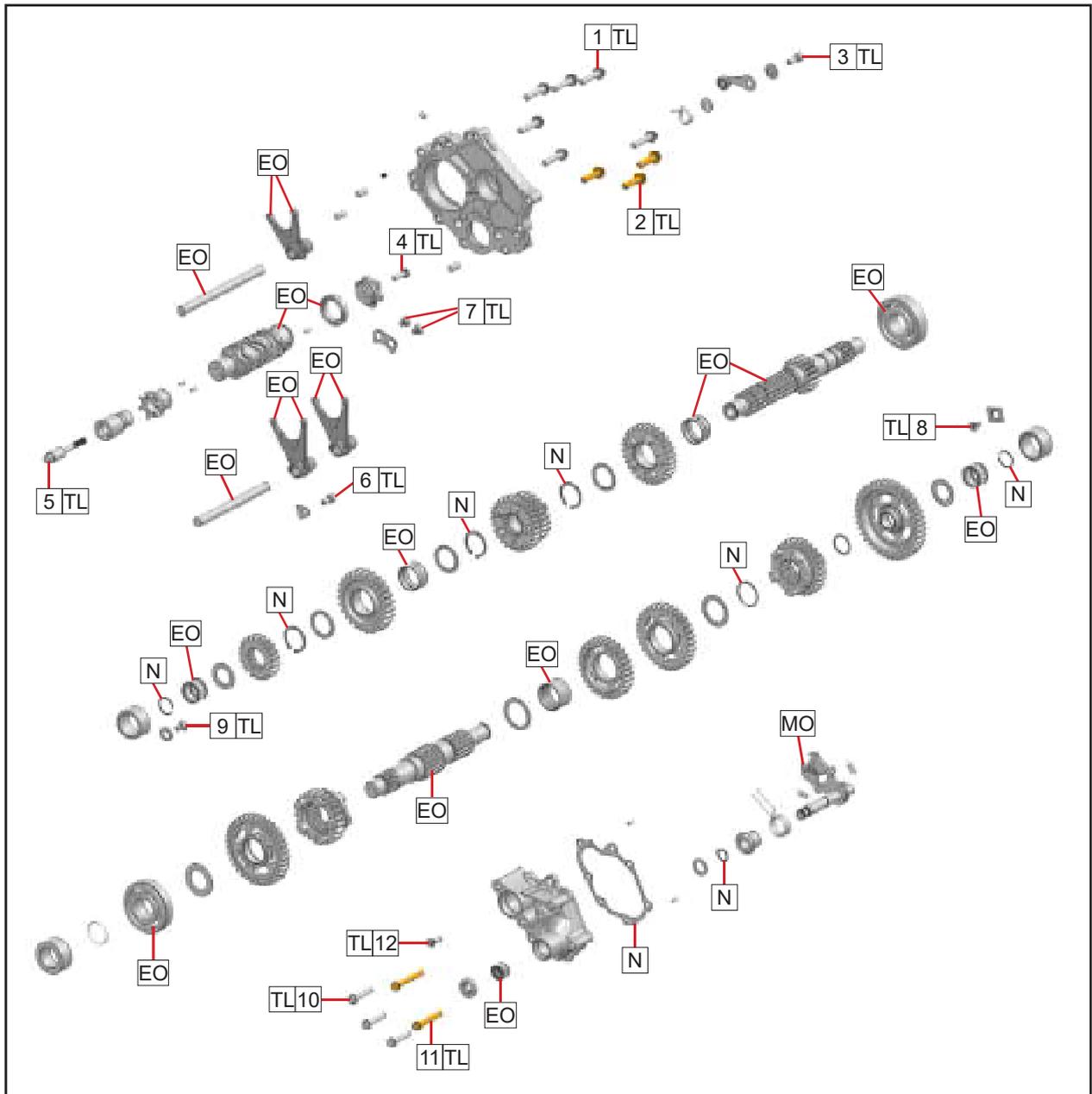
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Turn the clutch release lever **1** clockwise,  
install clutch cable **2**.



## 4.7 Transmission (Engine)

### 4.7.1 Exploded View



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No.	Tighten Part	扭矩		备注
		N·m	ft-lb.	
1	Gearshift cover bolt	20	14.7	TL
2	Gearshift cover bolt	20	14.7	TL
3	Gearshift swing arm screw	12	8.8	TL
4	Gearshift drum cam bolt	12	8.8	TL
5	Gear drive shaft bolt	12	8.8	TL
6	Fork shaft panel bolt	10	7.3	TL
7	Bearing press plate screw	6	4.4	TL
8	Bearing press plate screw	6	4.4	TL
9	Bearing sleeve limit washer screw	6	4.4	TL
10	Gearshift shaft cover bolt	12	8.8	
11	Gearshift shaft cover bolt	12	8.8	
12	Gearshift shaft cover screw	6	4.4	

EO: Apply engine oil.

MO: Apply molybdenum disulfide oil solution.

(A mixture of the engine oil and molybdenum disulfide grease in a weight ratio 10:1)

TL: Apply thread locker.

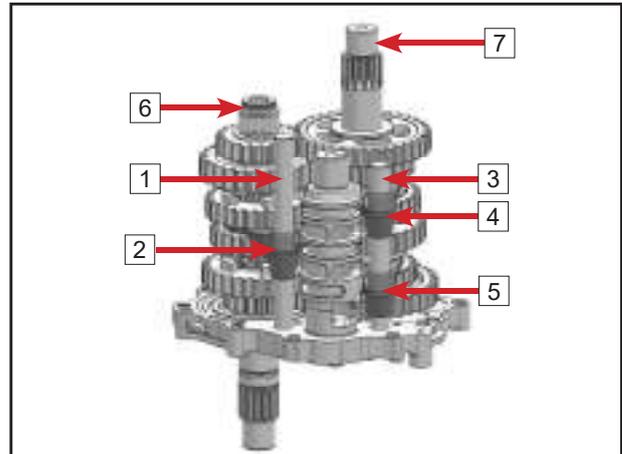
N: Parts that must be replaced after removal.

## 4.7.2 Transmission Overhaul

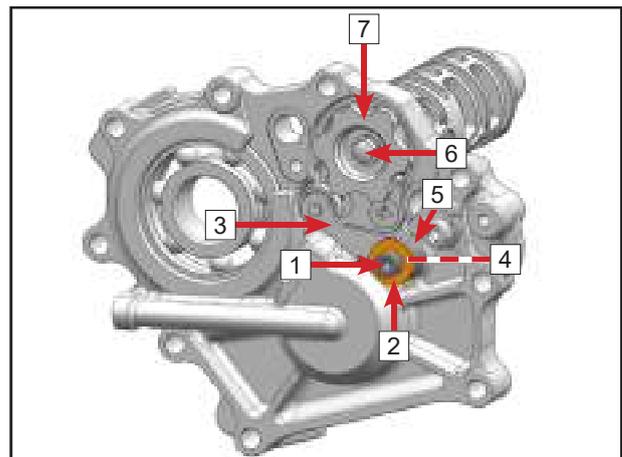
The removal of transmission parts refers to the section “Engine Overhaul” in Chapter 5. The installation of transmission parts refers to the section “Engine Assembly” in Chapter 5.

### 4.7.2.1 Transmission Disassembly

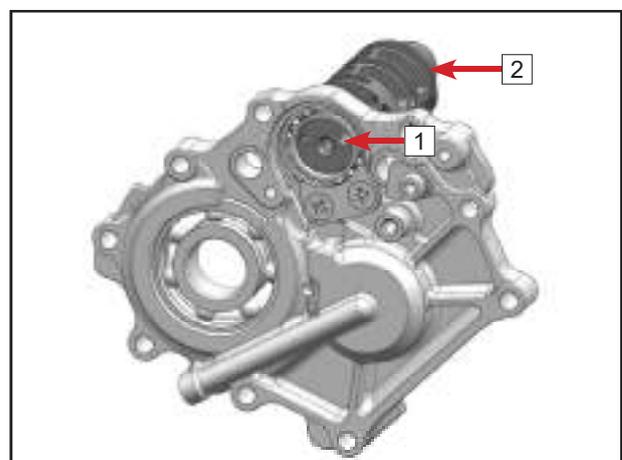
Remove main shaft fork shaft [1].  
Remove main shaft fork [2].  
Remove countershaft fork shaft [3].  
Remove countershaft fork [4] and [5].  
Remove main shaft assembly [6] and countershaft assembly [7].



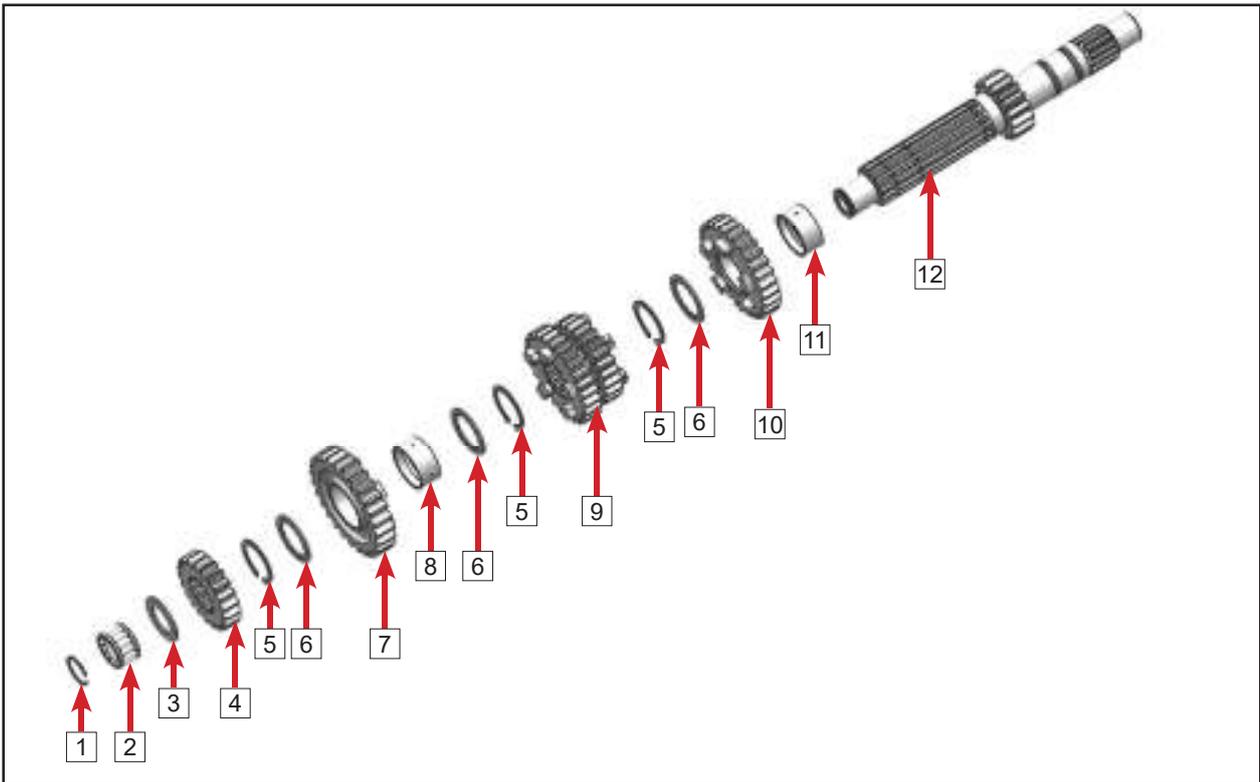
Remove inner hex bolt [1].  
Remove swing arm sleeve [2].  
Remove swing arm [3].  
Remove washer [4].  
Remove gearshift swing arm spring [5].  
Remove bolt [6].  
Remove gearshift drum CAM [7].



Remove needle roller [1].  
Remove gearshift drum [2].



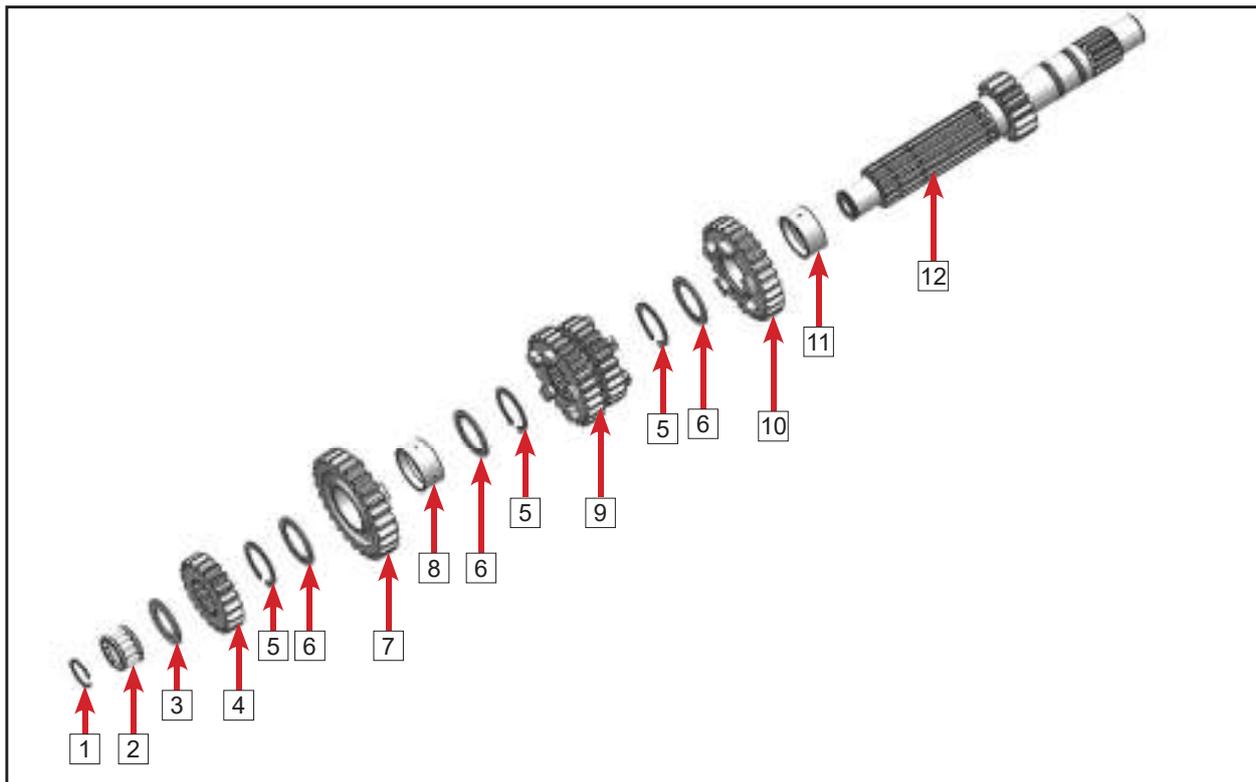
## 4.7.2.2 Main Shaft Assembly Disassembly



Remove the following parts from the main shaft 12:

<span style="border: 1px solid black; padding: 0 2px;">1</span>	Circlip for shaft 20	<span style="border: 1px solid black; padding: 0 2px;">7</span>	Main shaft sixth gear
<span style="border: 1px solid black; padding: 0 2px;">2</span>	Needle bearing K20×28×16	<span style="border: 1px solid black; padding: 0 2px;">8</span>	Shaft sleeve 28×14.7
<span style="border: 1px solid black; padding: 0 2px;">3</span>	Washer 20.5×32×1.5	<span style="border: 1px solid black; padding: 0 2px;">9</span>	Main shaft third, fourth gear
<span style="border: 1px solid black; padding: 0 2px;">4</span>	Main shaft second gear	<span style="border: 1px solid black; padding: 0 2px;">10</span>	Main shaft fifth gear
<span style="border: 1px solid black; padding: 0 2px;">5</span>	Circlip for shaft 28	<span style="border: 1px solid black; padding: 0 2px;">11</span>	Shaft sleeve 28×14
<span style="border: 1px solid black; padding: 0 2px;">6</span>	Spline washer		

## Inspection



1	Circlip for shaft 20	7	Main shaft sixth gear
2	Needle bearing K20×28×16	8	Shaft sleeve 28×14.7
3	Washer 20.5×32×1.5	9	Main shaft third, fourth gear
4	Main shaft second gear	10	Main shaft fifth gear
5	Circlip for shaft 28	11	Shaft sleeve 28×14
6	Spline washer	12	Main shaft

Check shaft sleeve **8** and **11** for serious wear or damage. If yes, replace the shaft sleeve.

Check needle bearing **2** for excessive wear or damage. If yes, replace the needle bearing.

Check the tooth surfaces and internal splines of gear **4** and **9** for excessive wear or damage. If so, replace gears in pairs.

Check the tooth surfaces of gear **7** and **10** for excessive wear or damage. If so, replace gears in pairs.

Check the shift claws of gear **7**, gear **9**, and gear **10** for excessive wear or damage. If so, replace gears in pairs.

Check that the gear **9** can slide freely and smoothly on the main shaft. If stuck, replace the gear **9** or main shaft **12**.

Inspect washer **3** and spline washer **6** for excessive wear or damage. If so, replace the washer or spline washer.

Use new circlip **1** and **5** for each service.

Check the main shaft **12** for the following conditions:

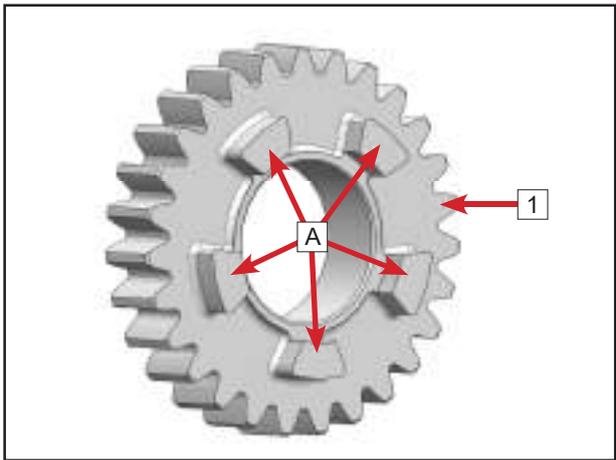
- Excessive wear or damage to the bearing journal
- Excessive wear or damage to the external spline
- Excessive wear or damage to the gear tooth surface

Replace main shaft if any abnormality is found.

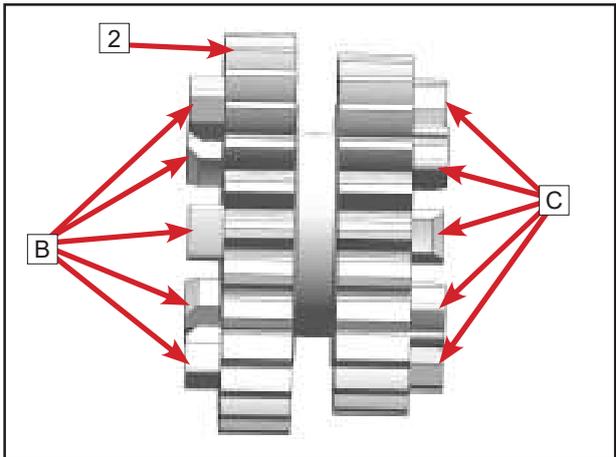
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The picture on the right is a typical example.

- 1: Shift gear
- A: Shift claw

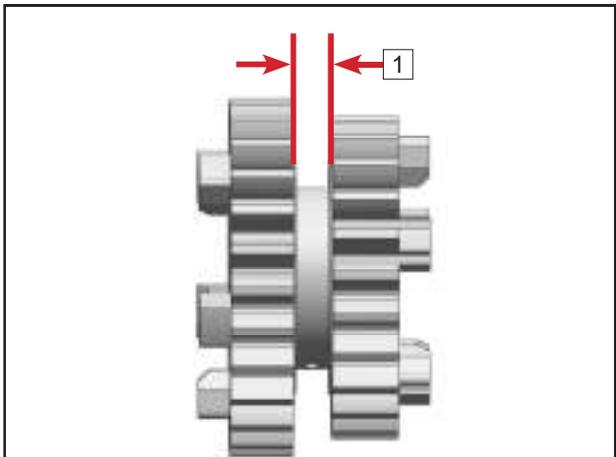


- 2: Shift sliding gear
- B, C: Shift claw



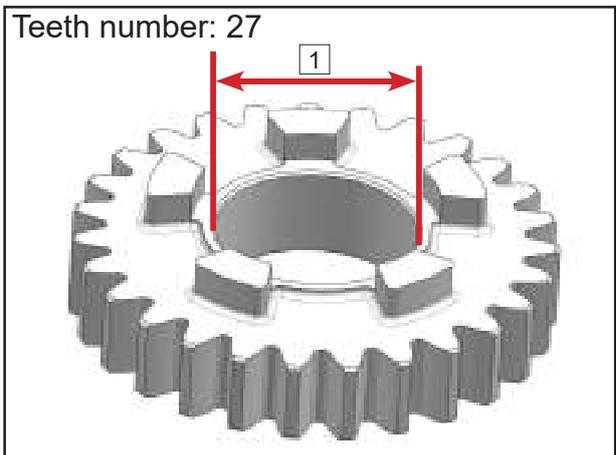
Measure the width 1 of the main shaft third and fourth gear fork groove. If the service limit is exceeded, replace with a new part.

Fork Slot Width 1	
New Part	6.05 ~ 6.15 mm (0.23819 ~ 0.24213 in)
Service Limit	6.25 mm (0.24606 in)



Measure the inner diameter 1 of the main shaft sixth gear. If the service limit is exceeded, replace with a new part.

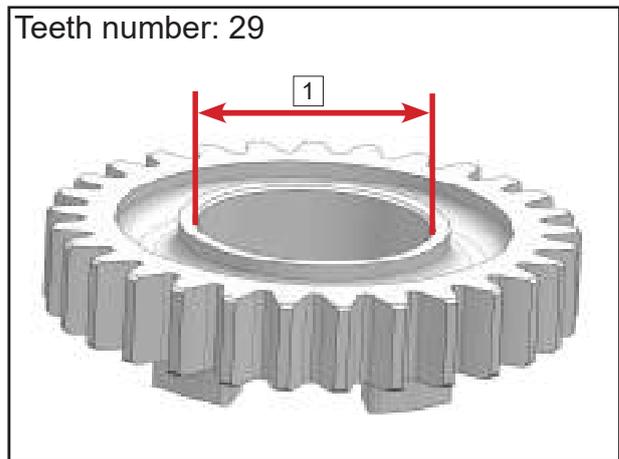
Inner Diameter of Main Shaft Sixth Gear 1	
New Part	31 ~ 31.025 mm (1.22047 ~ 1.22146 in)
Service Limit	31.031 mm (1.22169 in)



Measure the inner diameter 1 of main shaft fifth gear. If the service limit is exceeded, replace with a new part.

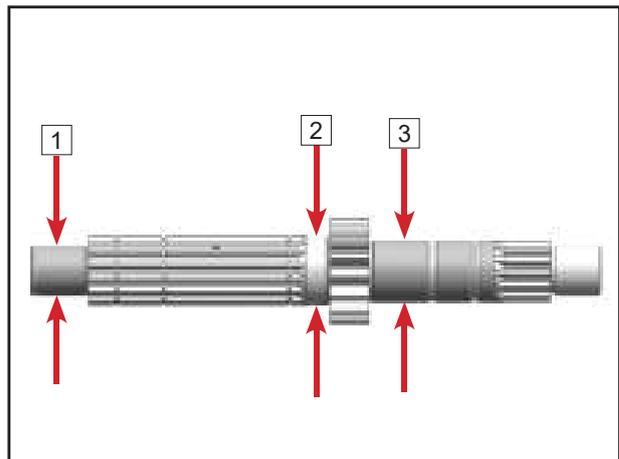
<b>Inner Diameter of Main Shaft Fifth Gear <span style="border: 1px solid black; padding: 0 2px;">1</span></b>	
New Part	31 ~ 31.025 mm (1.22047 ~ 1.22146 in)
Service Limit	31.031 mm (1.22169 in)

Teeth number: 29

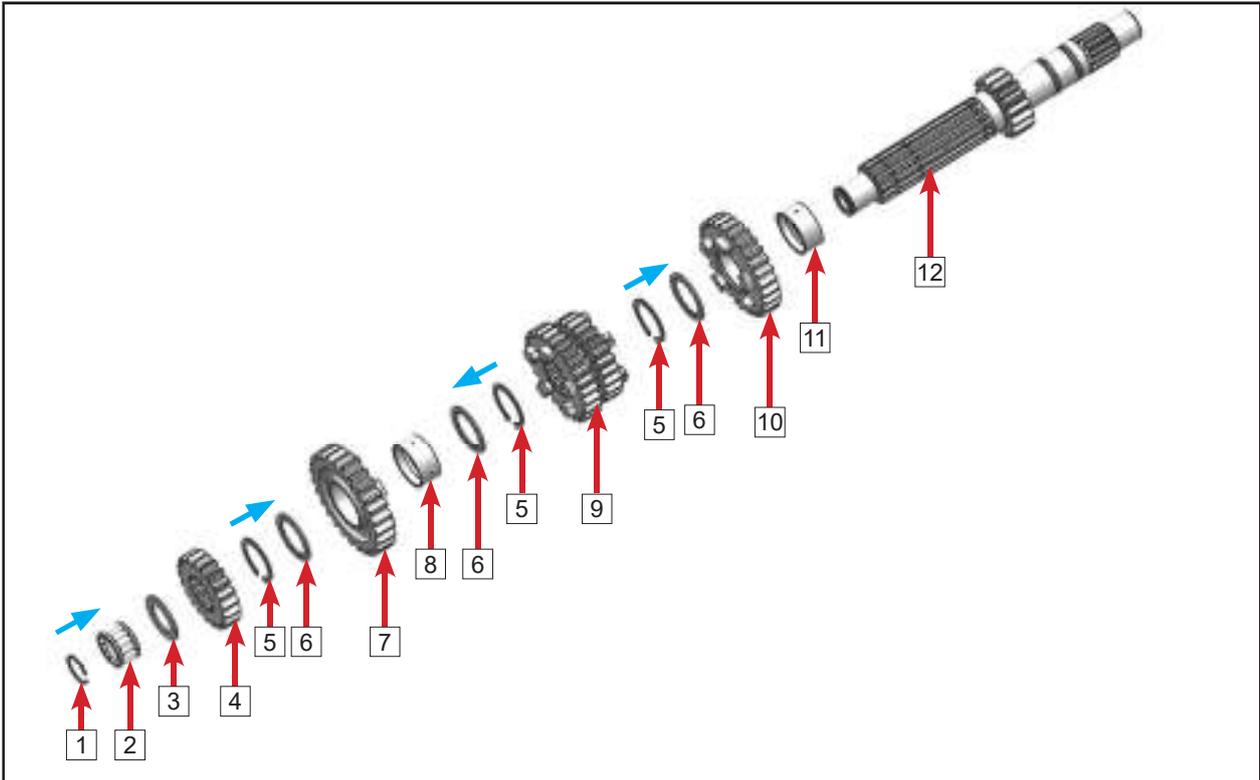


Measure the outer diameter 1, outer diameter 2 and outer diameter 3 of main shaft. If it is less than the service limit, replace the main shaft with a new one.

<b>Outer Diameter of Main Shaft <span style="border: 1px solid black; padding: 0 2px;">1</span></b>	
New Part	19.987 ~ 20.000 mm (0.78689 ~ 0.78740 in)
Service Limit	19.980 mm (0.78661 in)
<b>Outer Diameter of Main Shaft <span style="border: 1px solid black; padding: 0 2px;">2</span></b>	
New Part	27.972 ~ 27.993 mm (1.10126 ~ 1.10209 in)
Service Limit	27.965 mm (1.10098 in)
<b>Outer Diameter of Main Shaft <span style="border: 1px solid black; padding: 0 2px;">3</span></b>	
New Part	24.980 ~ 24.993 mm (0.98346 ~ 0.98398 in)
Service Limit	24.973 mm (0.98319 in)



## Assembly



**NOTE: The removed retainer must not be used again and must be replaced with a new one. When installing the retainer, the side with rounded corners should face the direction indicated by the arrow in the above figure, and the circumferential direction should be assembled as shown in the following figure. Make sure the retainer is fully installed in the slot.**

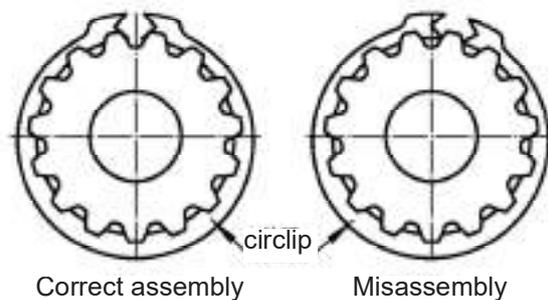
Clean and lubricate all parts thoroughly before assembly.

Install the following parts to the main shaft **12** in turn:

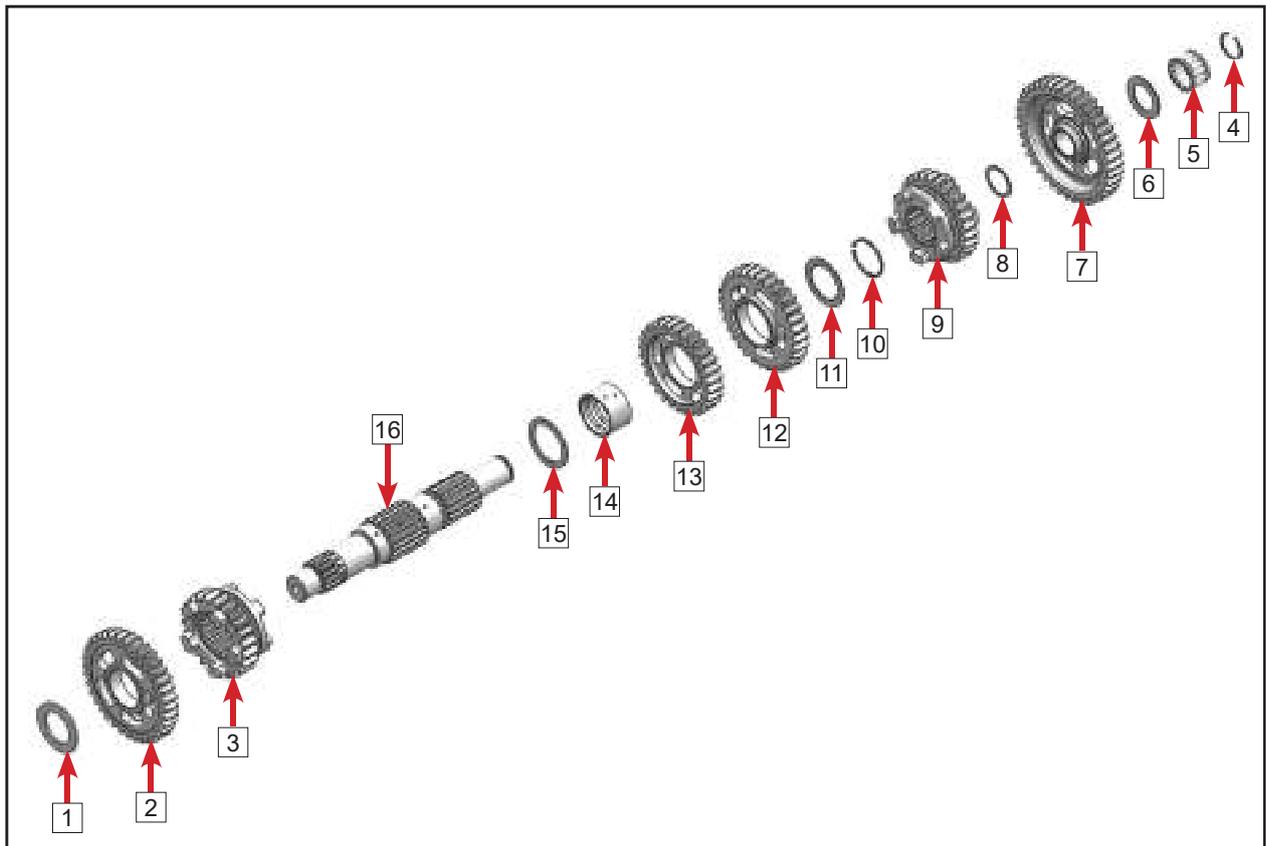
- Shaft sleeve 28×14 **11**
- Main shaft fifth gear **10**
- Spline washer **6**
- New circlip for shaft 28 **5**
- Main shaft third, fourth gear **9**
- New circlip for shaft 28 **5**
- Spline washer **6**
- Shaft sleeve 28×14.7 **8**
- Main shaft sixth gear **7**
- Spline washer **6**
- New circlip for shaft 28 **5**
- Main shaft second gear **4**
- Washer 20.5×32×1.5 **3**
- Needle bearing K20×28×16 **2**
- New circlip for shaft 20 **1**

Finally check the motion smoothness of all gears.

Circumferential assembly diagram of circlip



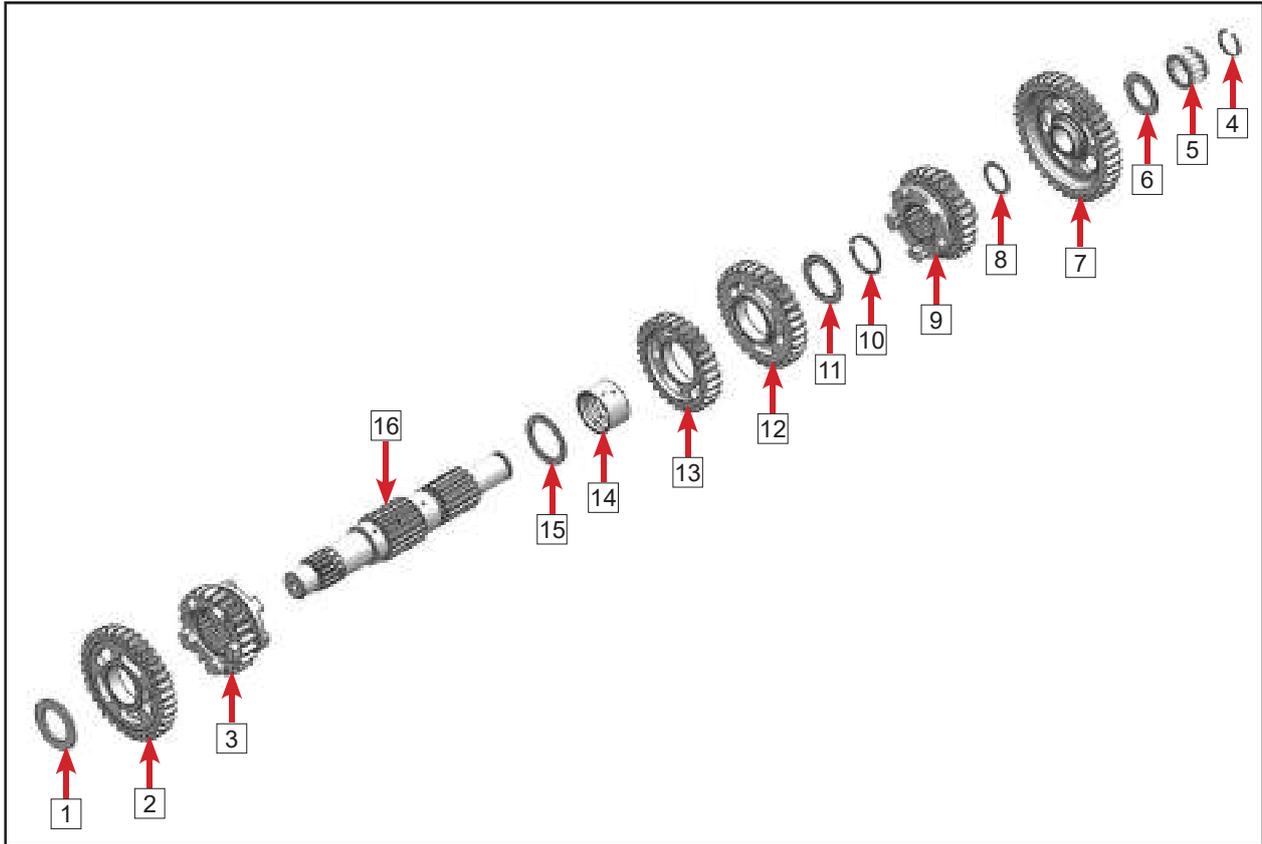
## 4.7.2.3 Countershaft Assembly Disassembly



Remove the following parts from the countershaft [16]:

[1]	Washer 25×39×2	[9]	Countershaft fifth gear
[2]	Countershaft second gear assembly	[10]	Circlip 30
[3]	Countershaft sixth gear	[11]	Spline washer
[4]	Circlip for shaft 20	[12]	Countershaft third gear
[5]	Needle bearing K20×28×16	[13]	Countershaft fourth gear
[6]	Washer 20.4×32×1.2	[14]	Shaft sleeve 29.65
[7]	Countershaft first gear assembly	[15]	Washer 30×38.5×1.5
[8]	Washer 20.4×25×0.5		

## Inspection



1	Washer 25×39×2	9	Countershaft fifth gear
2	Countershaft second gear assembly	10	Circlip 30
3	Countershaft sixth gear	11	Spline washer
4	Circlip for shaft 20	12	Countershaft third gear
5	Needle bearing K20×28×16	13	Countershaft fourth gear
6	Washer 20.4×32×1.2	14	Shaft sleeve 29.65
7	Countershaft first gear assembly	15	Washer 30×38.5×1.5
8	Washer 20.4×25×0.5	16	Countershaft

Check shaft sleeve [14] for excessive wear or damage. If yes, replace the shaft sleeve.

Check needle bearing [5] for excessive wear or damage. Replace with needle roller bearing if found.

Check the tooth surface of gear [2], [7], [12], [13] for excessive wear or damage. Replace gear in pairs if found.

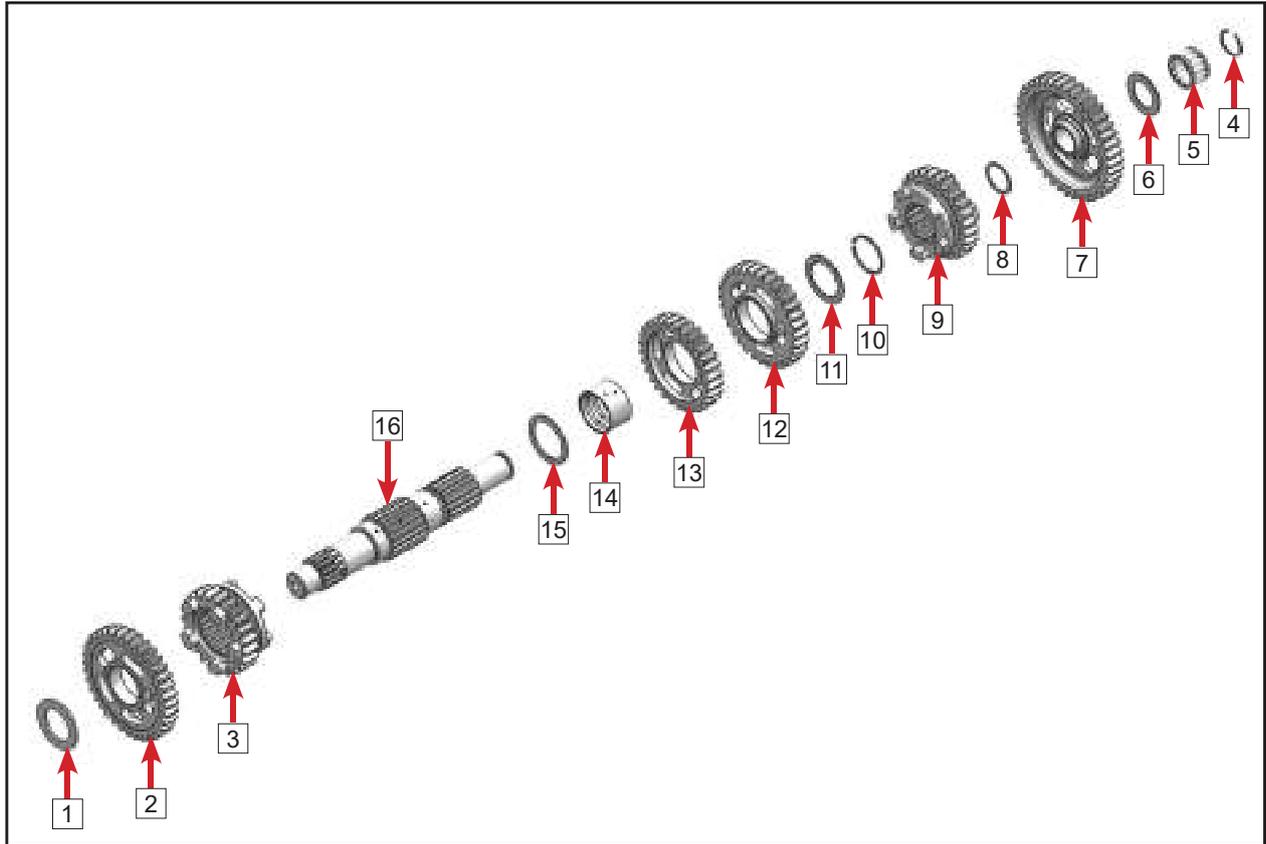
Check the tooth surface and inner spline of gear [3], [9] for excessive wear or damage. Replace gear in pairs if found.

Check the shifting engagement pawl or hole of gear [2], [3], [7], [9], [12], [13] for excessive wear or damage. Replace gear in pairs if found.

Check that gear [3] and gear [9] slide freely and smoothly on the countershaft. If stuck, replace the gear [3] or gear [9] or countershaft [16].

Check washer [1], [6], [8], [15] and spline washer [11] for excessive wear or damage. Replace washer or spline washer if found.

Use new circlip [4] [10] for every service.



1	Washer 25×39×2	9	Countershaft fifth gear
2	Countershaft second gear assembly	10	Circlip 30
3	Countershaft sixth gear	11	Spline washer
4	Circlip for shaft 20	12	Countershaft third gear
5	Needle bearing K20×28×16	13	Countershaft fourth gear
6	Washer 20.4×32×1.2	14	Shaft sleeve 29.65
7	Countershaft first gear assembly	15	Washer 30×38.5×1.5
8	Washer 20.4×25×0.5	16	Countershaft

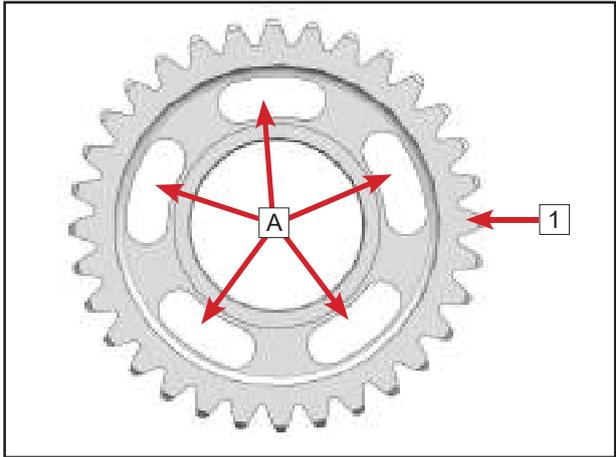
Check whether countershaft 16 has the following conditions:

- Excessive wear or damage to the bearing journal
- Excessive wear or damage to the external spline

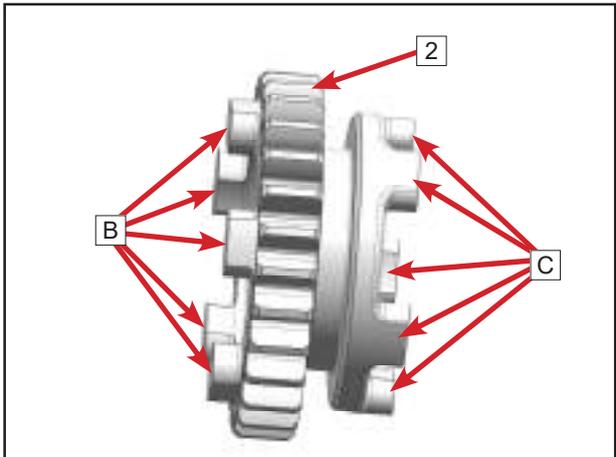
If any abnormality is found, replace the countershaft.

The picture on the right is a typical example.

- 1: Shift gear
- A: Shift hole

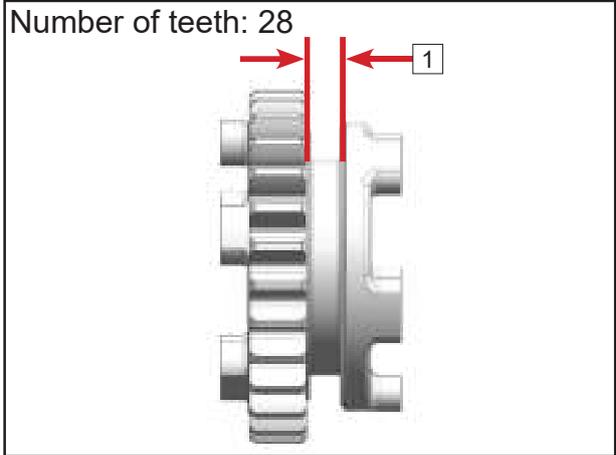


- 2: Shift sliding gear
- B, C: Shift claw



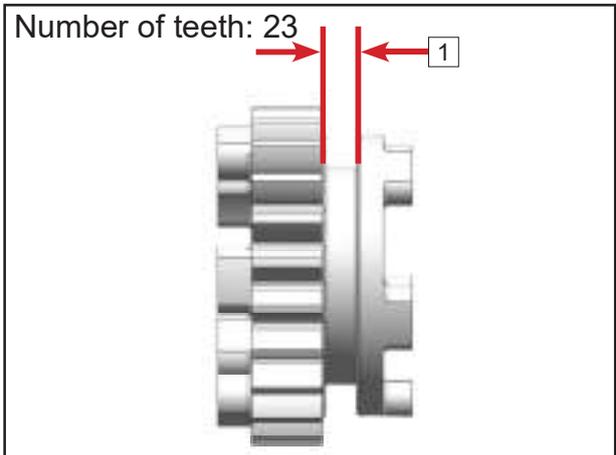
Measure the width 1 of countershaft fifth gear fork slot. If it is greater than the service limit, replace with new part.

Countershaft Fifth Gear Fork Slot Width 1	
New Part	6.05 ~ 6.15 mm (0.23819 ~ 0.24213 in)
Service Limit	6.25 mm (0.24606 in)



Measure the width 1 of countershaft sixth gear fork slot. If it is greater than the service limit, replace with new part.

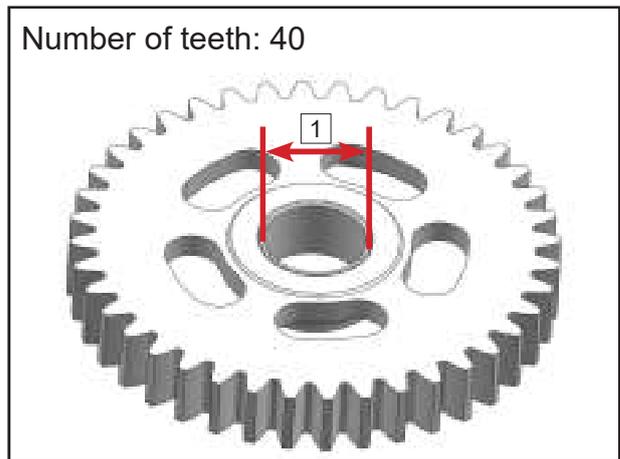
Countershaft Sixth Gear Fork Slot Width 1	
New Part	6.05 ~ 6.15 mm (0.23819 ~ 0.24213 in)
Service Limit	6.25 mm (0.24606 in)



Measure the inner diameter 1 of the countershaft first gear assembly. If it is greater than the service limit, replace it with a new part.

<b>Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft First Gear</b>	
New Part	20.020 ~ 20.041 mm (0.78819 ~ 0.78902 in)
Service Limit	20.048 mm (0.78929 in)

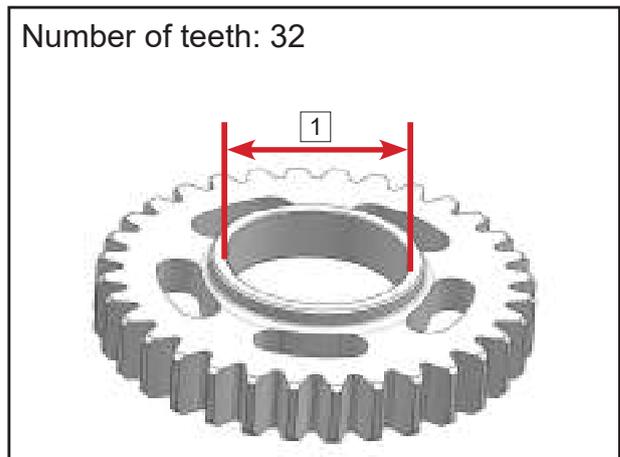
Number of teeth: 40



Measure the inner diameter 1 of the countershaft third gear. If it is greater than the service limit, replace it with a new part.

<b>Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft Third Gear</b>	
New Part	33.000 ~ 33.025 mm (1.29921 ~ 1.30020 in)
Service Limit	33.032 mm (1.30047 in)

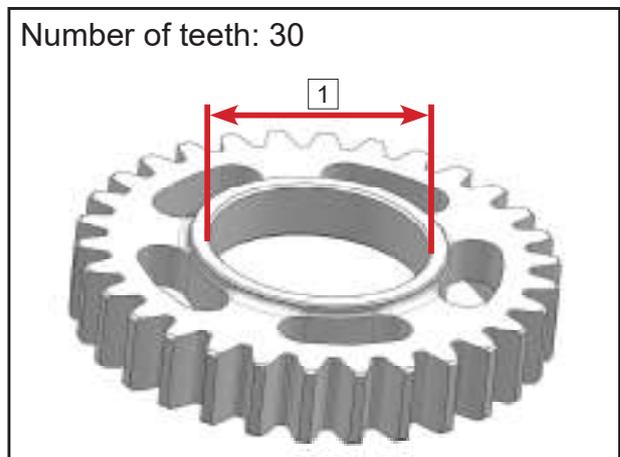
Number of teeth: 32



Measure the inner diameter 1 of the countershaft fourth gear. If it is greater than the service limit, replace it with a new part.

<b>Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft Fourth Gear</b>	
New Part	33.000 ~ 33.025 mm (1.29921 ~ 1.30020 in)
Service Limit	33.032 mm (1.30047 in)

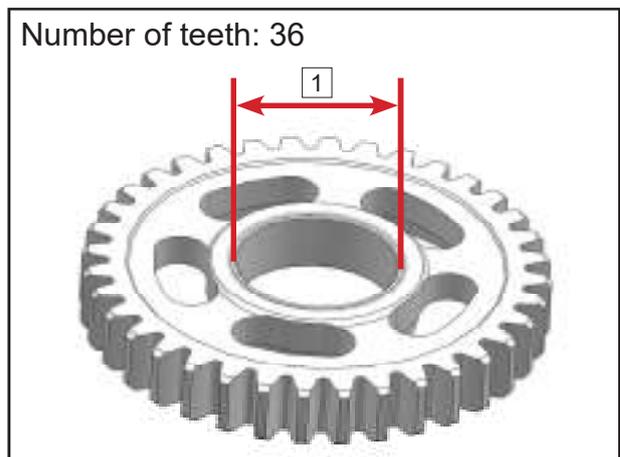
Number of teeth: 30



Measure the inner diameter 1 of the countershaft second gear assembly. If it is greater than the service limit, replace it with a new part.

<b>Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft Second Gear</b>	
New Part	30.020 ~ 30.041 mm (1.18189 ~ 1.18272 in)
Service Limit	30.048 mm (1.18299 in)

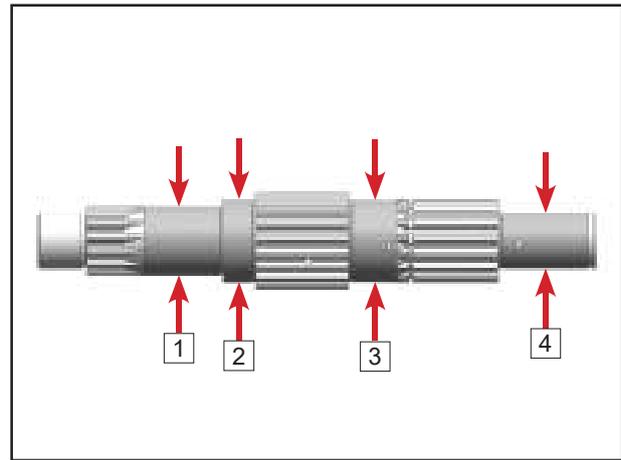
Number of teeth: 36



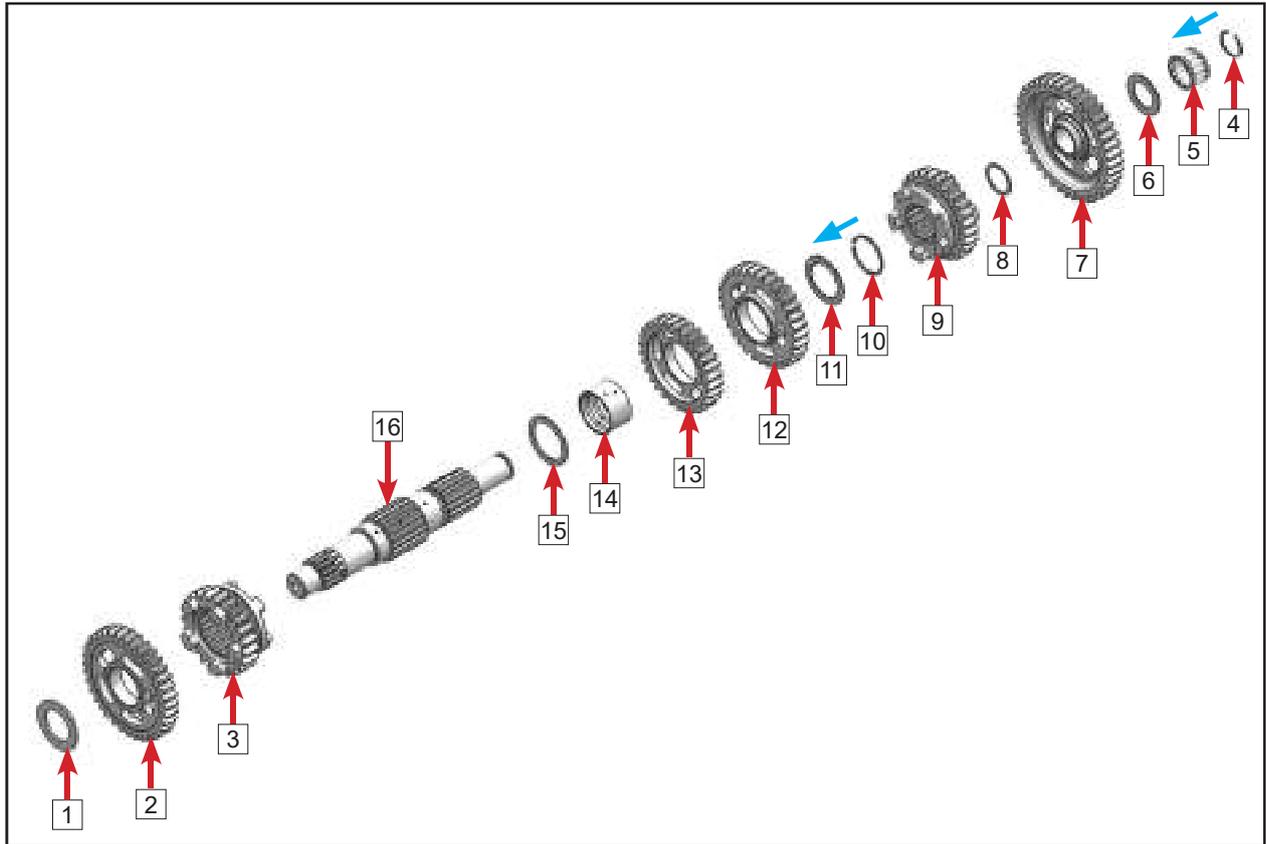
# CFMOTO

Measure the outer diameter [1], outer diameter [2], outer diameter [3] and outer diameter [4] of the countershaft. If it is less than the service limit, replace a new countershaft.

<b>Outer Diameter of Countershaft [1]</b>	
New Part	24.980 ~ 24.993 mm (0.98346 ~ 0.98398 in)
Service Limit	24.973 mm (0.98319 in)
<b>Outer Diameter of Countershaft [2]</b>	
New Part	29.959 ~ 29.980 mm (1.17949 ~ 1.18031 in)
Service Limit	29.952 mm (1.17921 in)
<b>Outer Diameter of Countershaft [3]</b>	
New Part	29.622 ~ 29.643 mm (1.16622 ~ 1.16705 in)
Service Limit	29.615 mm (1.16594 in)
<b>Outer Diameter of Countershaft [4]</b>	
New Part	19.987 ~ 20.000 mm (0.78689 ~ 0.78740 in)
Service Limit	19.980 mm (0.78661 in)



## Assembly



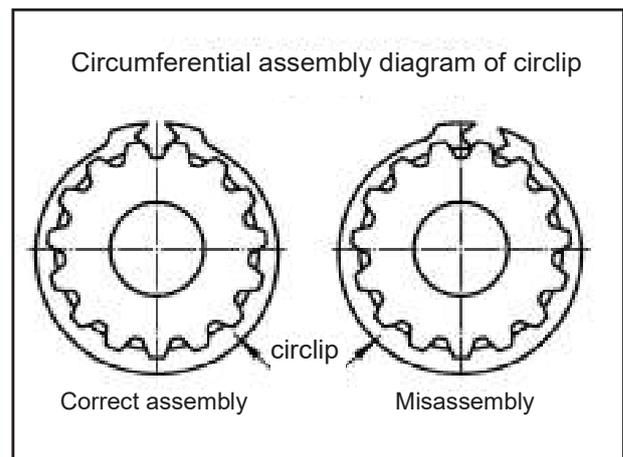
**NOTE:** The removed circlip must not be used again and must be replaced with a new one. When installing the circlip, the side with rounded corners should face the direction indicated by the arrow in the above figure, and the circumferential direction should be assembled as shown in the following figure. Make sure the circlip is fully installed in the slot.

Clean and lubricate all parts thoroughly before assembly.

Install the following parts to the countershaft 16 in turns:

- Washer 30×38.5×1.5 15
- Shaft sleeve 29.65 14
- Countershaft fourth gear 13
- Countershaft third gear 12
- Spline washer 11
- New circlip 30 10
- Countershaft fifth gear 9
- Washer 20.4×25×0.5 8
- Countershaft first gear assembly 7
- Washer 20.4×32×1.2 6
- Needle bearing K20×28×16 5
- New circlip for shaft 20 4
- Countershaft sixth gear 3
- Countershaft second gear assembly 2
- Washer 25×39×2 1

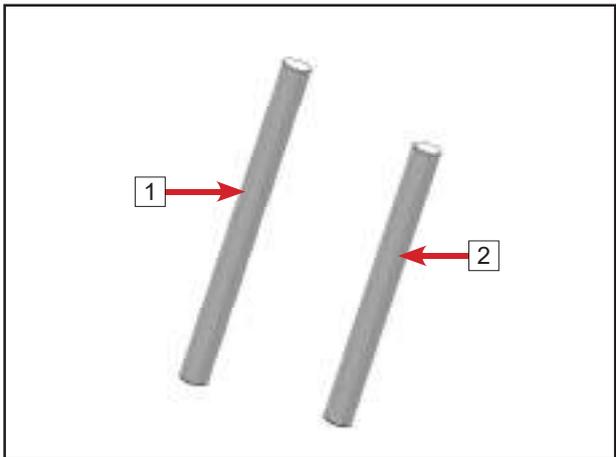
Finally check the motion smoothness of all gears.



## 4.7.2.4 Gearshift Fork Shaft and Fork

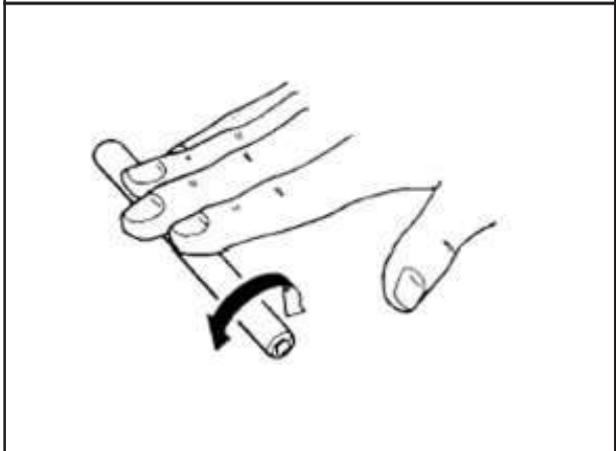
Check the main shaft fork shaft [1] and countershaft fork shaft [2] for excessive wear or damage.

**NOTE: The main shaft fork shaft is longer than the countershaft fork shaft.**



Put the shift fork shaft on the plate to roll. Replace the new part if find bending.

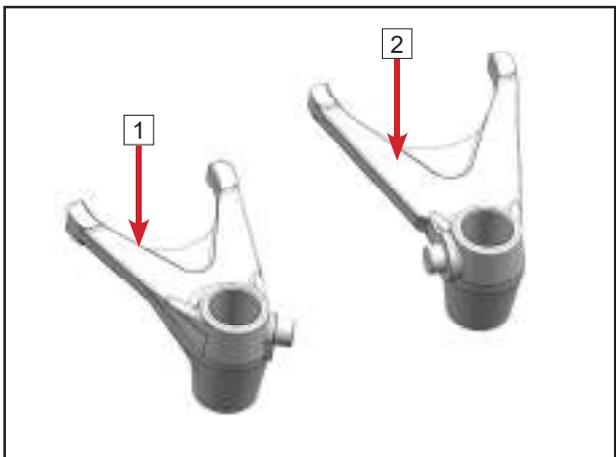
**⚠ CAUTION: Do not attempt to straighten the bent fork shaft.**



### Fork Identification

Main shaft fork [1]

Countershaft fork [2]

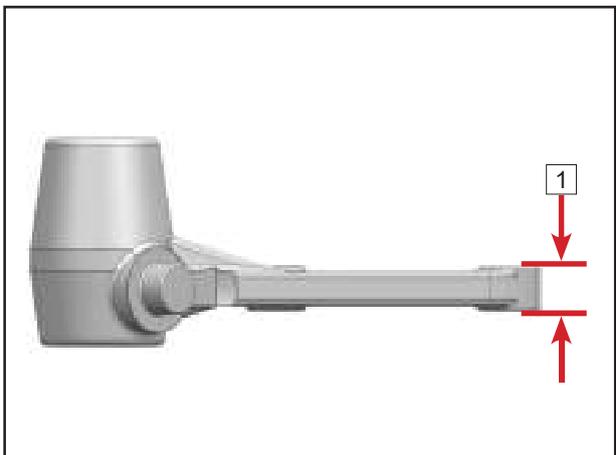


Check the three shift forks for excessive wear or damage, and the fork claws for bending.

The three shift forks have the same claw thickness.

Measure the thickness of fork claw [1]. If the service limit is exceeded, replace it with a new part.

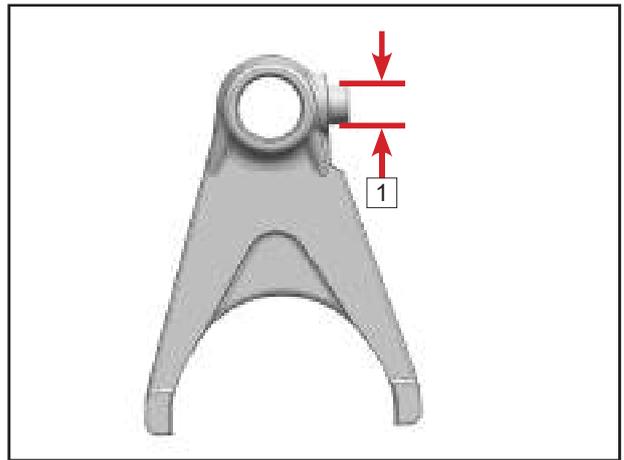
Fork Claw Thickness [1]	
New Part	5.9 ~ 6.0 mm (0.23228 ~ 0.23622 in)
Service Limit	5.8 mm (0.22835 in)



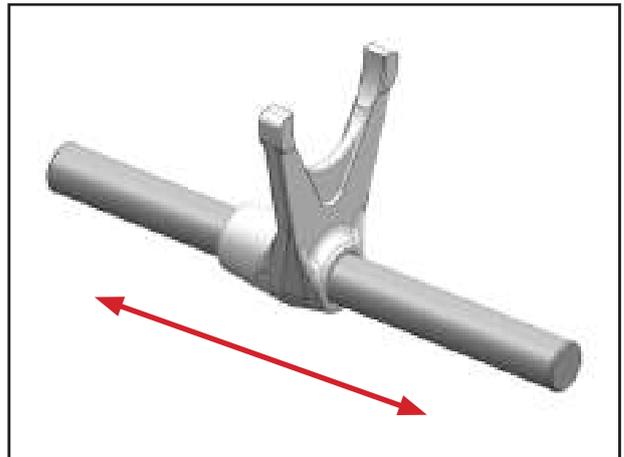
The three shift forks have the same fork pin diameter.

Measure the diameter 1 of fork pin. If the service limit is exceeded, replace it with a new part.

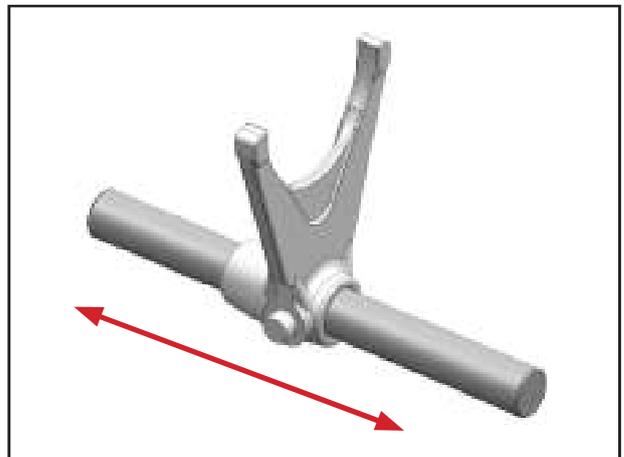
Fork Pin Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span>	
New Part	6.9 ~ 7.0 mm (0.27165 ~ 0.27559 in)
Service Limit	6.8 mm (0.26772 in)



Set the main shaft fork on the main shaft fork shaft, move left and right. Replace with new parts if not smooth.

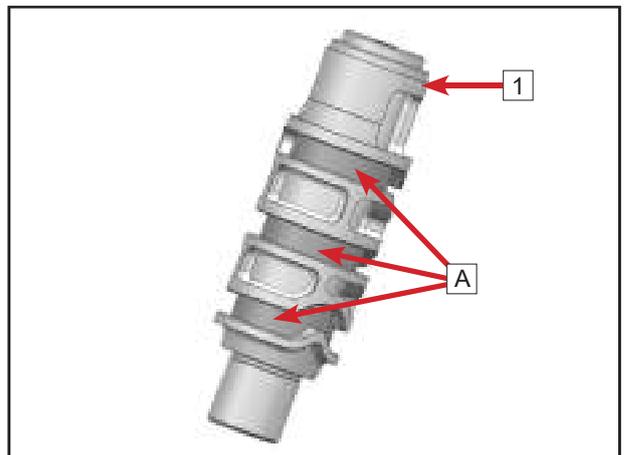


Set the countershaft fork on the countershaft fork shaft, move left and right. Replace with new parts if not smooth.

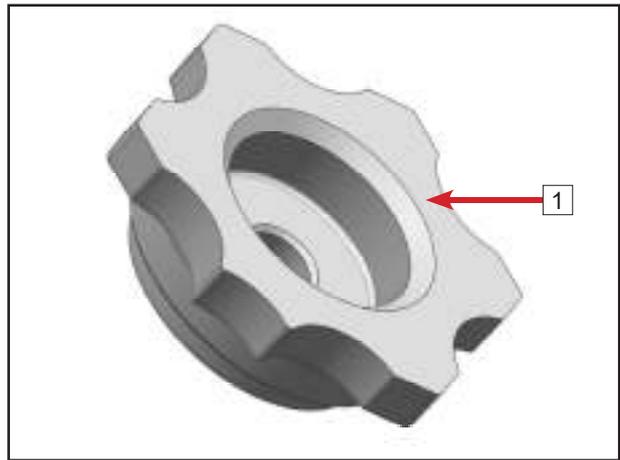


### 4.7.2.5 Gearshift Drum and Gearshift Drum CAM

Check the gearshift drum 1 for excessive wear or damage (especially the rail A). Replace if necessary.



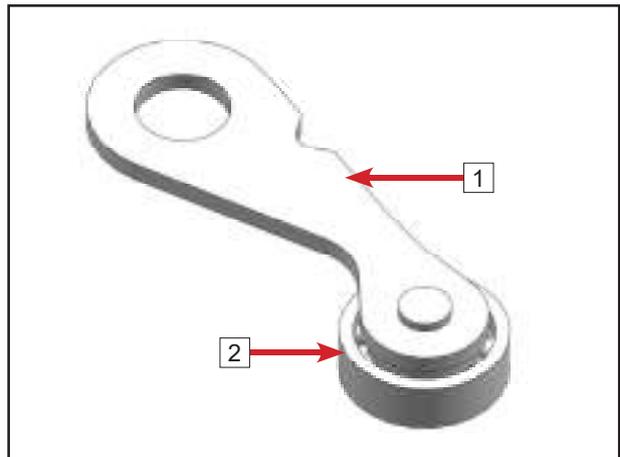
Check the gearshift drum cam **1** for cracks, excessive wear or damage. Replace if necessary.



### 4.7.2.6 Gearshift Positioning Swing Arm Sub Assembly

Check gearshift swing arm **1** for beanding or deformation. Replace with new assembly if necessary.

Check whether the roller bearing **2** rotates flexibly. Replace with new gearshift swing arm sub assembly if stuck.



### 4.7.2.7 Gearshift Cover

Check gearshift cover **1** for cracks or other damage. Replace if necessary.

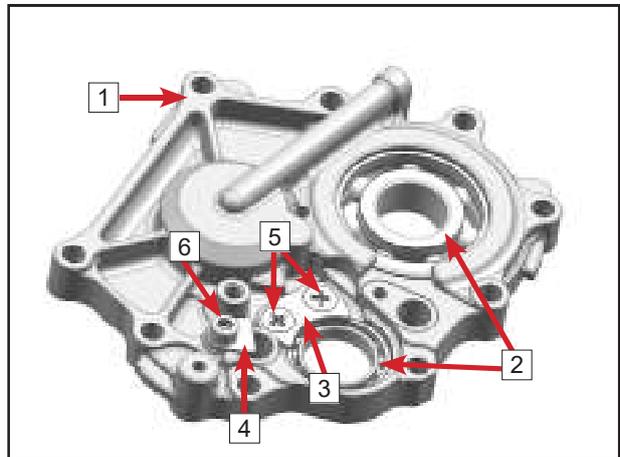
Check whether the rolling bearing **2** rotates flexibly, and there is no stuck or abnormal sound. If anything is abnormal, replace it with a new one.

Pay attention to the following details when installing the panel:

— The chamfer **A** of panel **3** faces upwards

— The smooth side of panel **4** faces upward

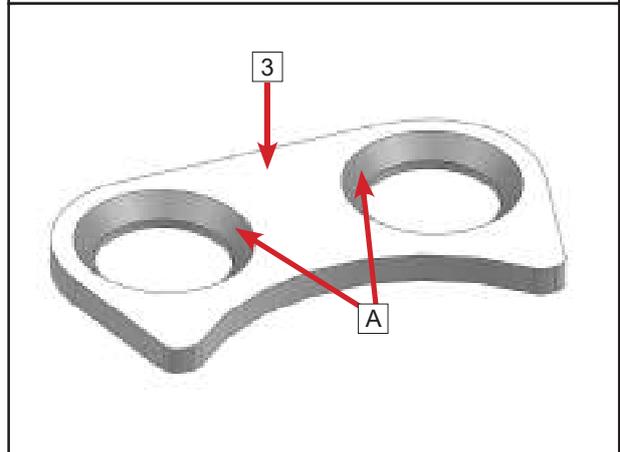
— Apply 243 thread locker to the bearing press plate screw **5** and tighten to the specified torque.



<b>Bearing Press Plate Screw <b>5</b></b>	
Torque	6 N·m (4.4 ft-lb.)

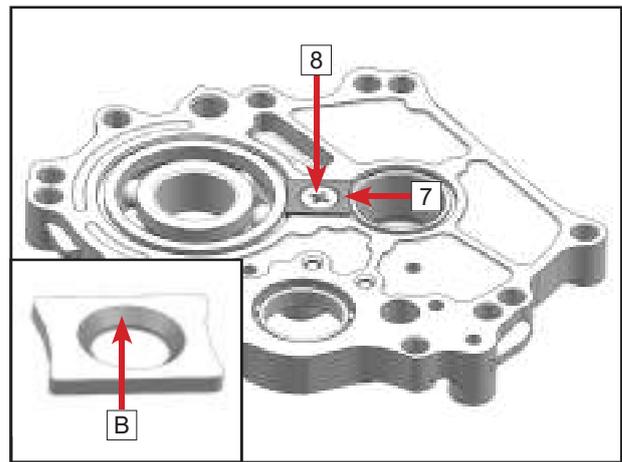
— Apply 243 thread locker to the bolt **6**, and tighten to the specified torque.

<b>Fork Shaft Panel Bolt <b>6</b></b>	
Torque	10 N·m (7.3 ft-lb.)



- The chamfer **B** of panel **7** faces upwards
- Apply 243 thread locker to the bearing press plate screw **8** and tighten to the specified torque.

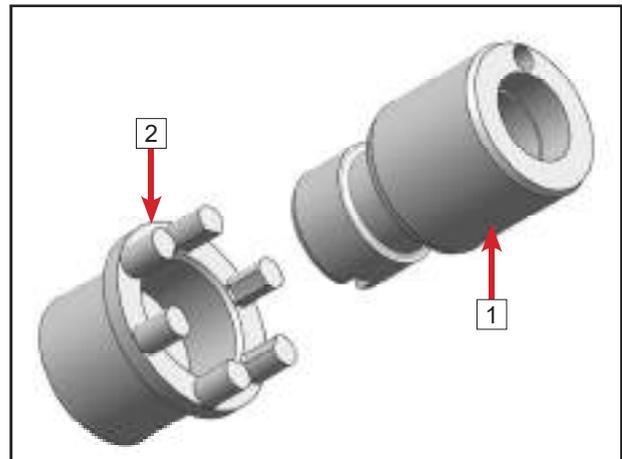
Bearing Press Plate Screw <b>8</b>	
Torque	6 N·m (4.4 ft-lb.)



### 4.7.2.8 Gearshift Assembly Inspection

Inspect gear drive shaft **1** for severe wear or damage. Replace it if it does.

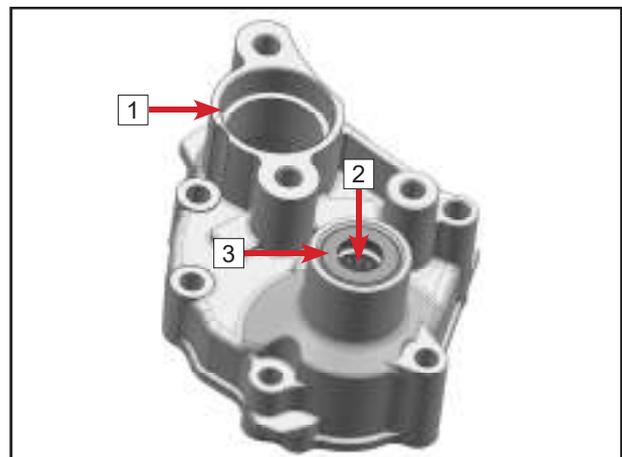
Inspect shift location drum **2** for severe wear or damage. Replace it if it does.



Inspect gearshift shaft cover **1** for cracks or other damage. Replace new part if so.

Inspect needle bearing **2**. Replace new part if damaged or stuck in rotation.

Inspect oil seal **3** for brittleness, hardening or damage. Replace it if it does.



## Gearshift Shaft Assembly

### Disassembly

Remove the following parts from the shaft assembly 1 :

- Washer 5
- Circlip 4
- shaft sleeve 3
- Return torsion spring 2
- Spring 6

### Inspection

Check the washer 5 for severe wear or damage. Replace if it does.

Check shaft sleeve 3 for severe wear or damage. Replace if it does.

Check return torsion spring 2 and spring 6 for damage or serious deformation . Replace if it does.

Check the assembly 1 for the following conditions:

- Shift shaft bending
- The external spline A is severely worn or damaged
- The claw B is severely worn or damaged
- The shift plate C is seriously worn or damaged

If any abnormality is found, replace with new gearshift shaft assembly 1.

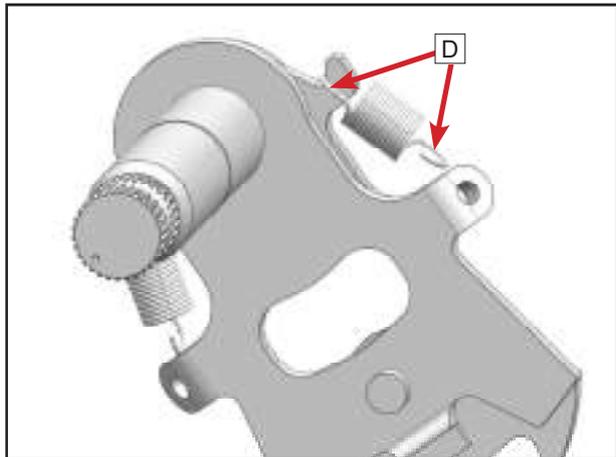
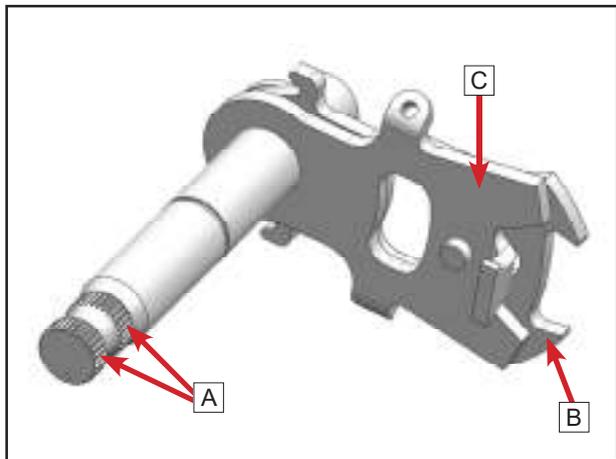
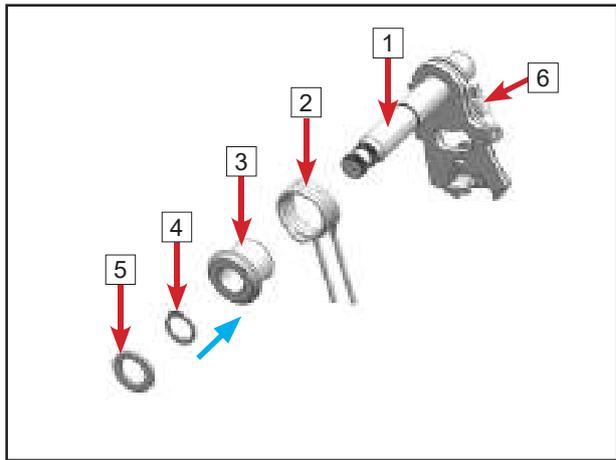
### Assembly

Reverse the disassembly procedures for assembly. The following details should be noted:

Replace with new circlip 4.

When installing the circlip, the side with rounded corner faces the direction indicated by the arrow in the figure. Make sure the circlip is completely stuck in the slot.

The direction of the spring 6 hook D is shown in the figure.

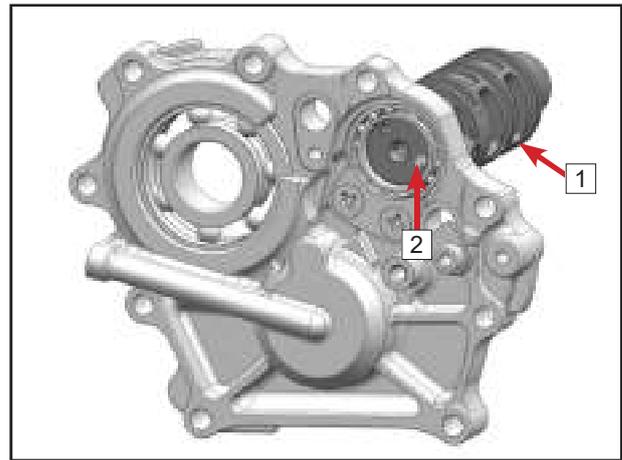


## 4.7.2.9 Transmission Assembly

Thoroughly lubricate the bearings, bearing journals, and gears before assembly.

Install gearshift drum **1**.

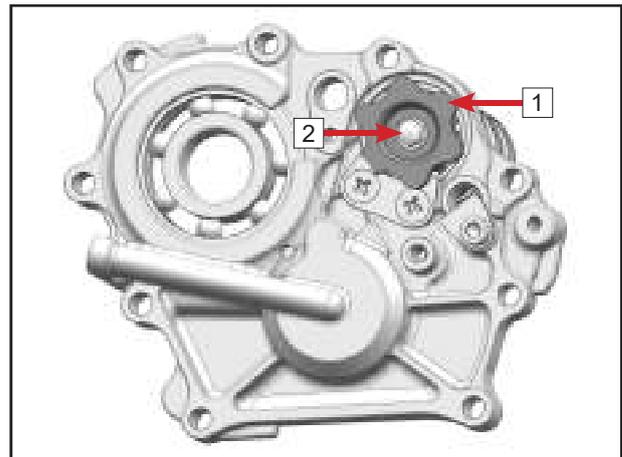
Install needle roller P4×7.8**2**.



Align the position slot of gearshift drum CAM with the needle roller on the gearshift drum, and install gearshift drum CAM **1**.

Apply 243 thread locker on the bolt **2**.

Install bolt **2**, and tighten to the specified torque.



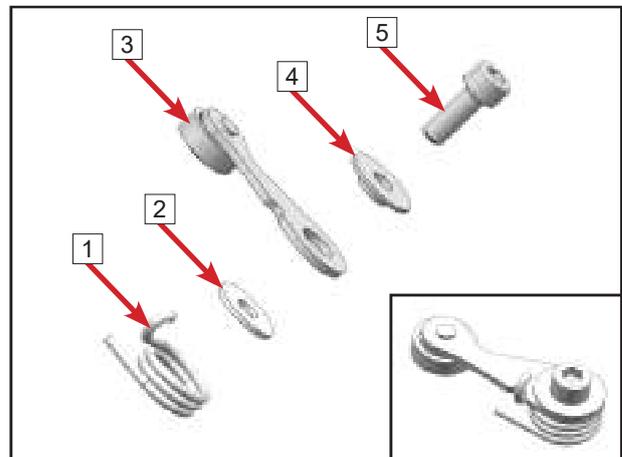
Gearshift Drum CAM Bolt <b>2</b>	
Torque	12 N·m (8.8 ft-lb.)

Assemble the torsion spring **1**, washer **2**, gearshift swing arm sub assembly **3**, shaft sleeve **4**, screw **5** together.

The end of torsion spring should be stuck into the groove of the gearshift swing arm.

The gearshift swing arm sub assembly should rotate flexibly on the shaft sleeve.

**NOTE: The smooth surface of washer faces the gearshift swing arm sub assembly.**

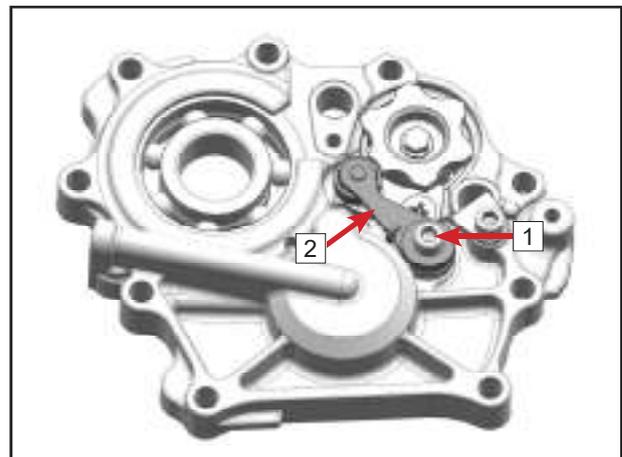


Apply 243 thread locker on the screw **1**.

Install gearshift swing arm assembly **2**,

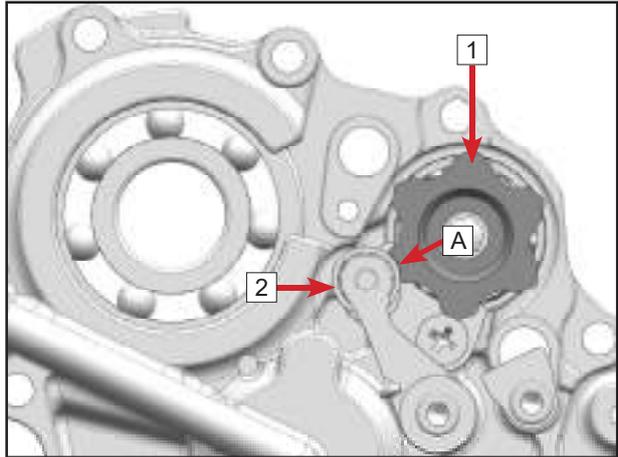
and tighten the screw **1** to the specified torque.

Gearshift Swing Arm Screw <b>1</b>	
Torque	12 N·m (8.8 ft-lb.)



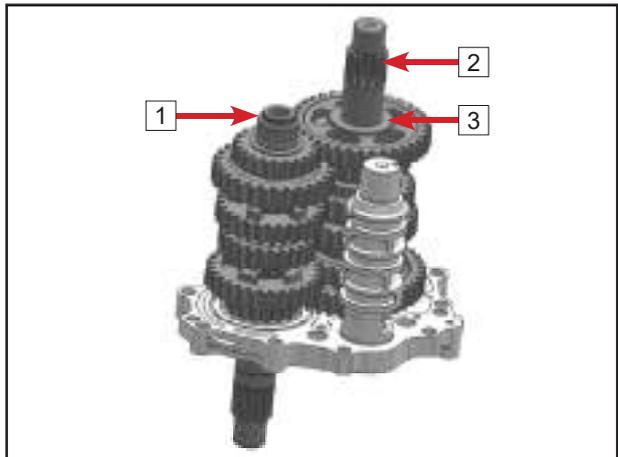
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Turn gearshift drum CAM **1** , and align neutral position **A** with the bearing **2**.



Install main shaft assembly **1** and countershaft assembly **2**.

**NOTE: Make sure the washer **3** is not missing.**



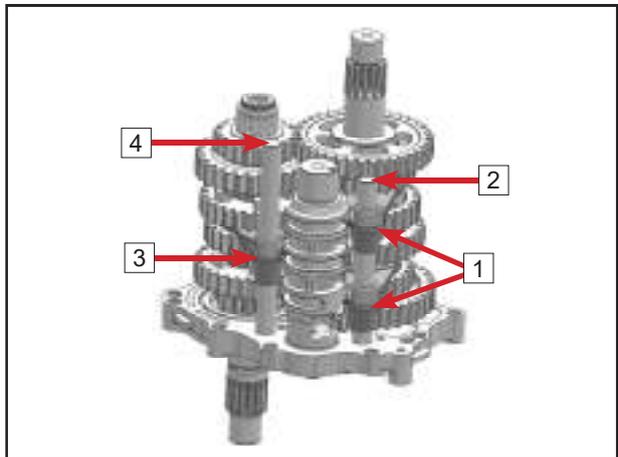
Insert the fork pawl into the fork slot of sliding gear, insert the fork pin into the shift slot on the shift drum, and then install the countershaft fork **1**.

Install countershaft fork shaft **2**.

Insert the fork pawl into the fork slot of sliding gear, insert the fork pin into the shift slot on the shift drum, and then install the main shaft fork **3**.

Install main shaft fork shaft **4**.

**NOTE: The main shaft fork shaft is longer than the countershaft fork shaft.**

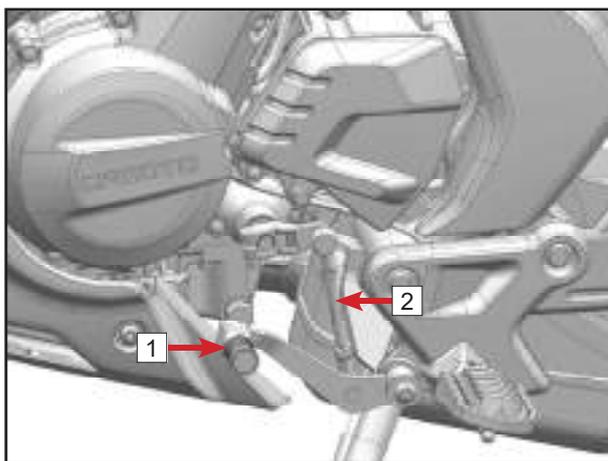


## 4.7.3 Gearshift Lever Assembly

### 4.7.3.1 Checking the Basic Position of Shift Lever

Sit on the riding position of the vehicle, perform the shifting operation, and check whether the basic position of shift lever **1** meets your riding requirements. If the position of shift lever is lower, the foot often cannot hook or is not easy to hook to the shift lever when the lifting gear. If the position of shift lever is upper, it can cause rough shifting. By adjusting the connecting rod **2**, you can adjust the shift lever to the most comfortable and safest position to perfectly fit your left foot.

Please adjust the basic position of shift lever as described below.



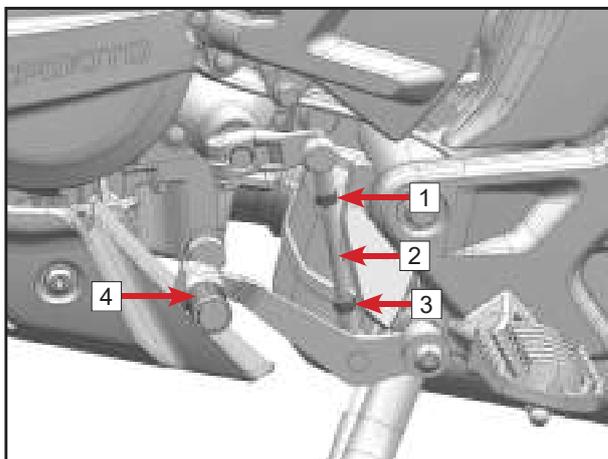
### 4.7.3.2 Adjusting the Basic Position of Shift Lever

Loosen nut **1**, grip the connecting rod **2**.  
Loosen nut **3**, grip the connecting rod **2**.

**NOTE: The nut **1** is left-hand threaded.**

Turn the connecting rod **2** to adjust the shift lever **4**.

**NOTE: The range of adjustment is limited. During shifting, the shift lever must not come into contact with any other vehicle parts.**



Grip connecting rod **2**, tighten nut **3**.

Nut <b>3</b> (M6)	
Torque	6N·m (4.42 ft-lb.)

Grip connecting rod **2**, tighten nut **1**.

Nut <b>1</b> (M6, left-hand thread)	
Torque	6N·m (4.42 ft-lb.)

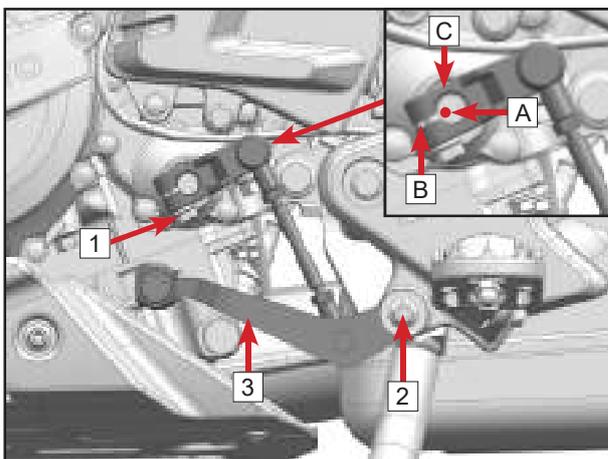
### 4.7.3.3 Gearshift Lever Assembly Removal

**NOTE: Before removal, mark **A** the shift shaft and align the mark **A** with the notch **B** of the swing arm **C**.**

Remove bolt **1**.

Remove screw **2** and washer.

Remove shift lever assembly **3**.



## 4.7.3.4 Gearshift Lever Assembly Installation

Place shift lever assembly [3].

**NOTE: Align the mark [A] made on the shift shaft when disassembly with the notch [B] of swing arm [C].**

Apply 243 thread locker on the screw [2].  
Install screw [2], and tighten to the specified torque.

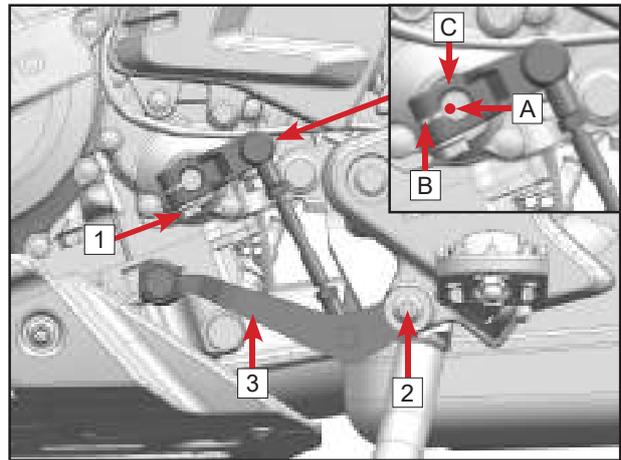
Screw [2] (M6)	
Torque	10N·m (7.3 ft-lb.)

Apply 243 thread locker on the bolt [1].  
Install bolt [1], and tighten to the specified torque.

Bolt [1] (M6)	
Torque	10N·m (7.3 ft-lb.)

Adjust the basic position of the shift lever, please refer to the above content.

**NOTE: During shifting, the shift lever must not come into contact with any other vehicle parts.**



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## 5.1 Special Tools

### Magneto rotor removal tool

0700-031000-922-002



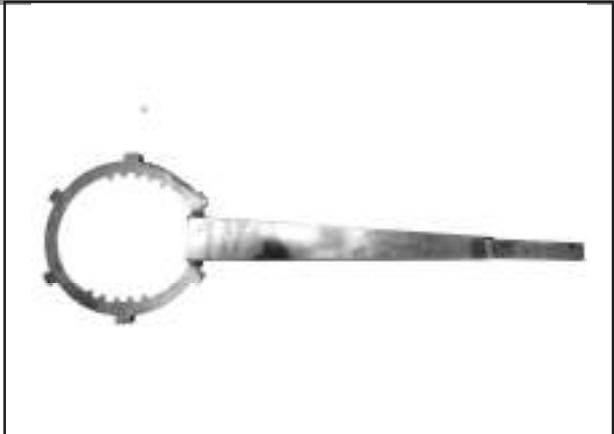
### Magneto rotor stopping tool

0700-031000-922-001



### Clutch stopping tool

0HU0-051000-922-001



### Output Sprocket Stopping Tool

0700-062030-922-001

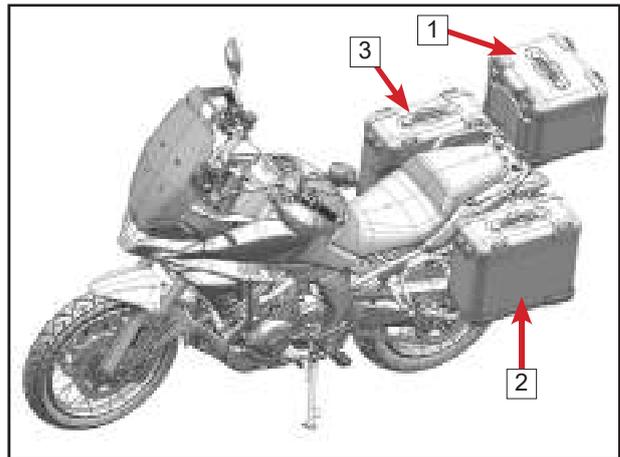


## 5.2 Engine Removal

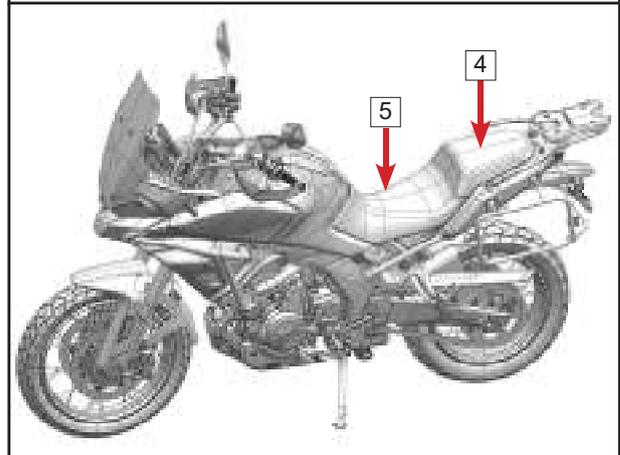
### Pre-work

Remove by referring to related chapters:

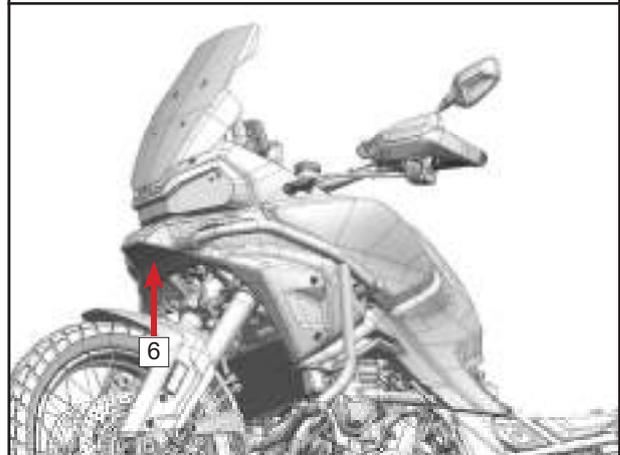
— Three boxes: tail box assembly **1**, LH side box assembly **2**, RH side box assembly **3** (if quipped).



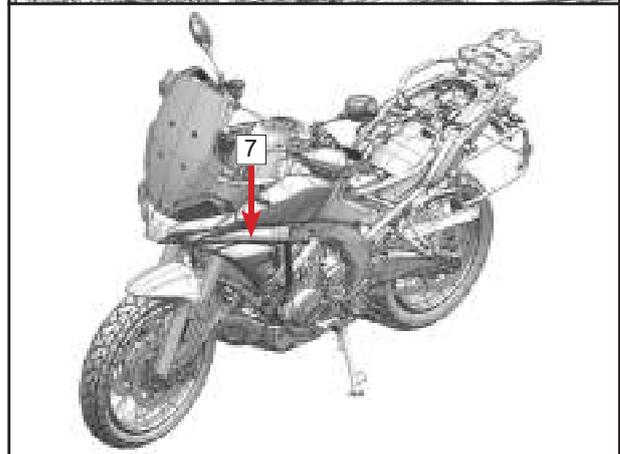
— Rear seat **4**.  
— Front seat **5**.



— Front lower panel **6**.

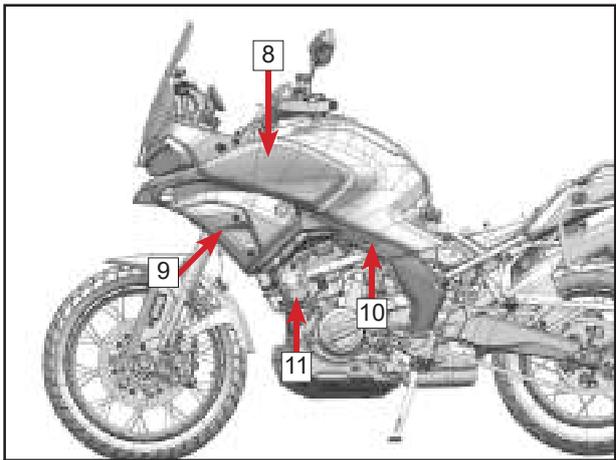


— Bumper assembly **7**.

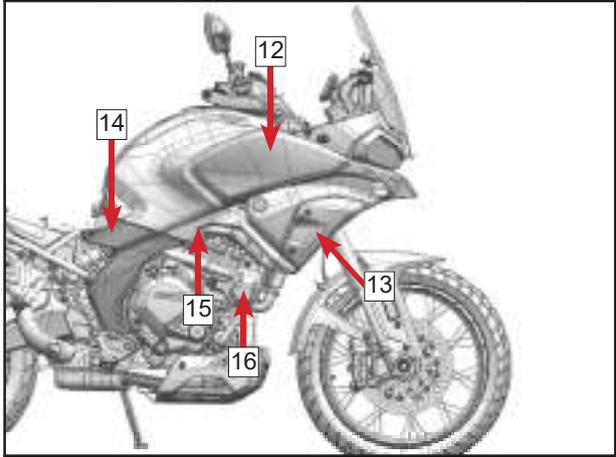


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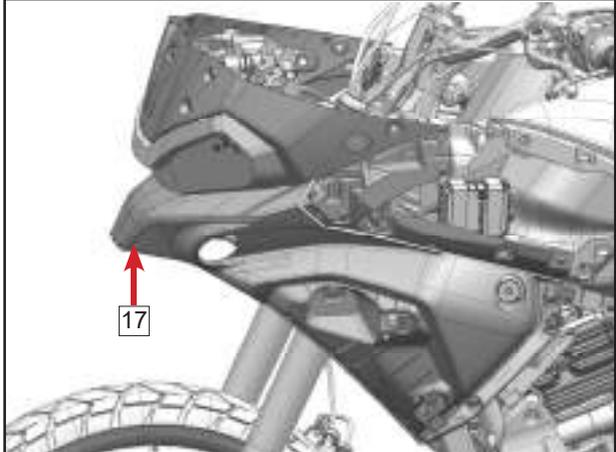
- Fuel tank front LH panel **8**.
- Radiator LH deco guard **9**.
- Radiator rear LH panel/Frame LH panel assembly **10**.
- Engine hanging point LH deco cover **11**.



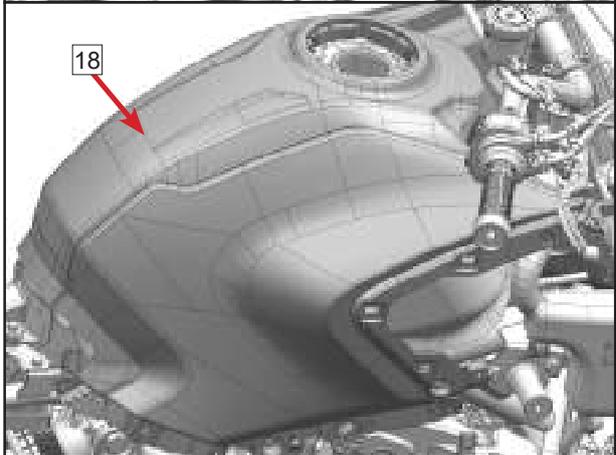
- Fuel tank front RH panel **12**.
- Radiator RH deco guard **13**.
- Shock absorber adjustment port/Frame RH panel assembly **14**.
- Radiator rear RH panel **15**.
- Engine hanging point RH deco cover **16**.



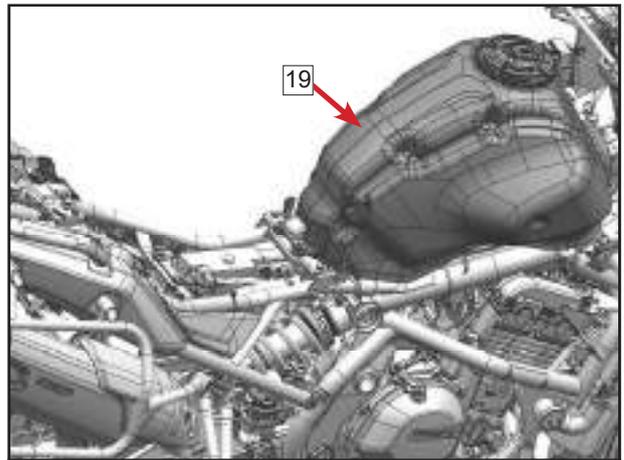
- Headlight deco guard assembly **17**.



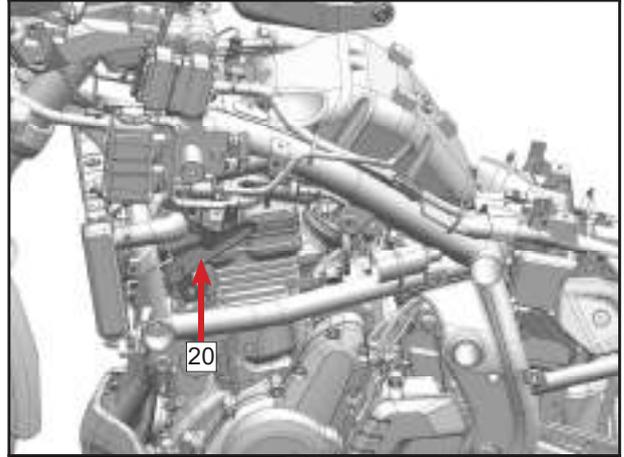
- Fuel tank panel assembly **18**.



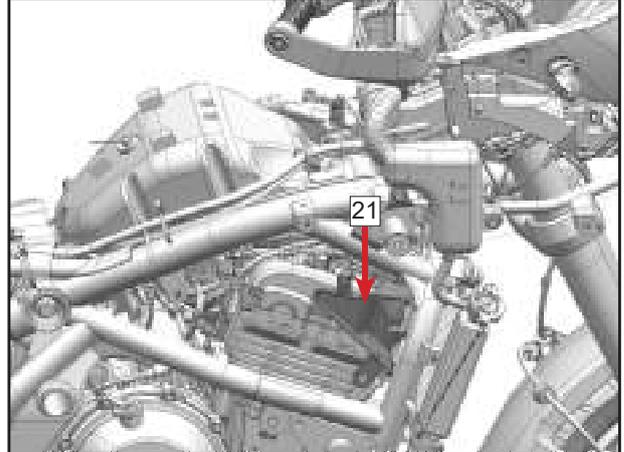
— Fuel tank 19.



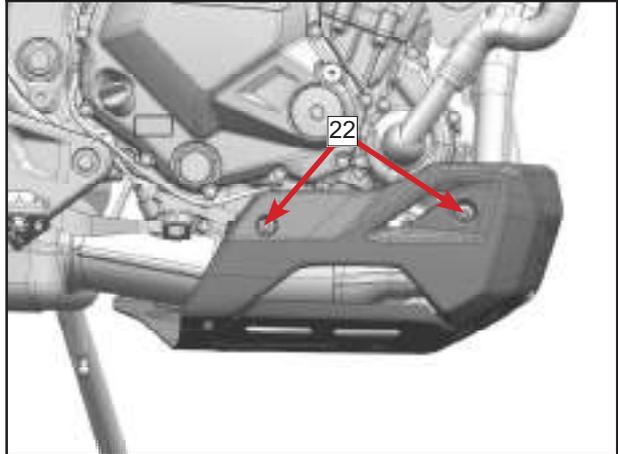
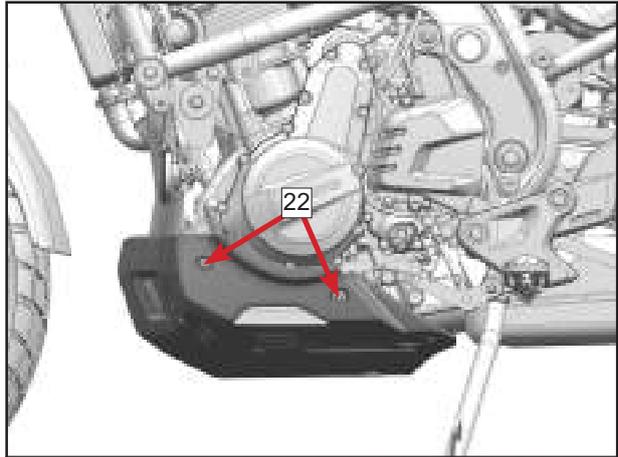
— Reservoir rear LH panel 20.



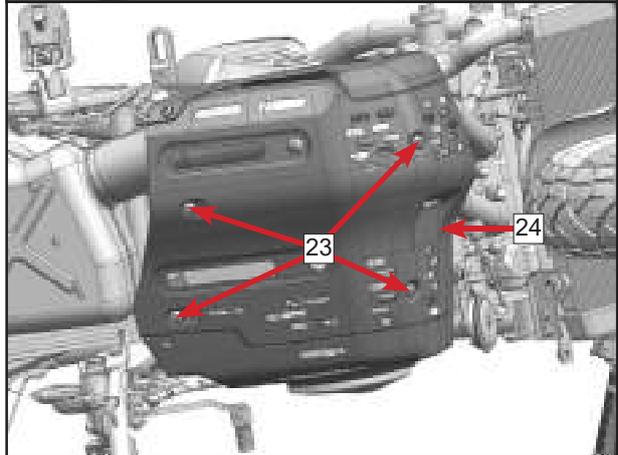
— Reservoir rear RH panel 21.



Remove screws **22**.



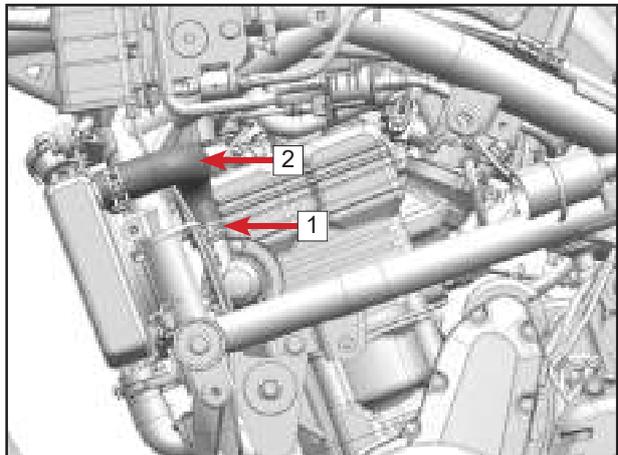
Remove screws **23**.  
Remove engine panel assembly **24**.



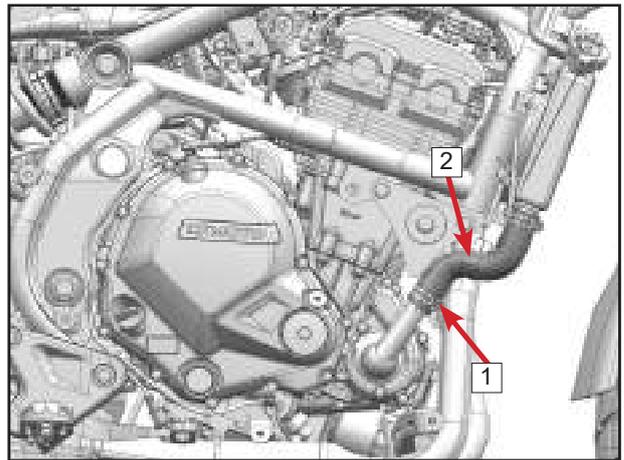
Drain the coolant.

## Main Work

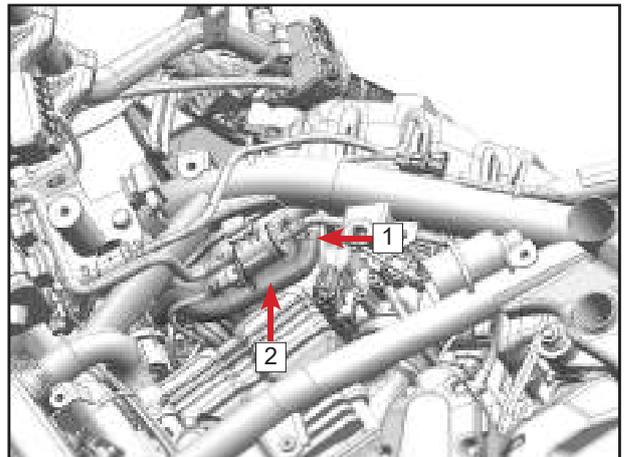
Loosen clamp **1**.  
Unplug the radiator inlet hose **2** from the thermostat cap.



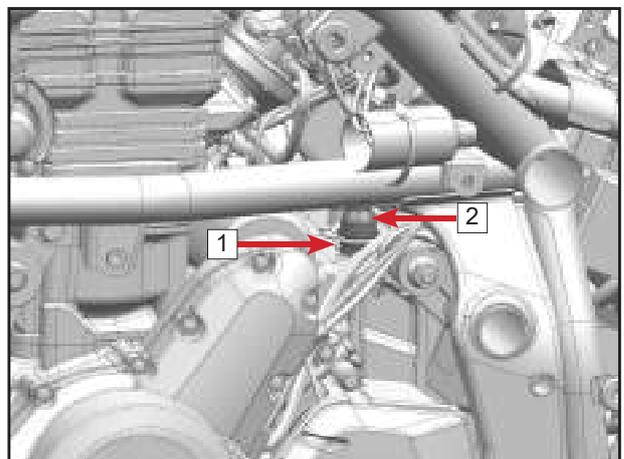
Loosen clamp **1**.  
Remove the radiator outlet pipe **2** from the water pump cover.



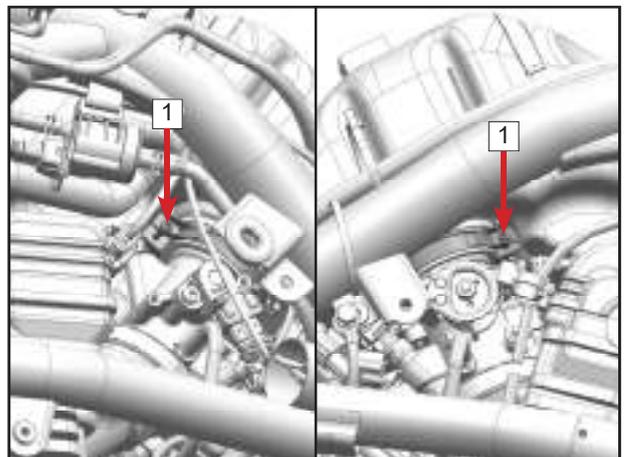
Loosen clamp **1**.  
Remove SAS intake pipe **2** from air filter lower housing.



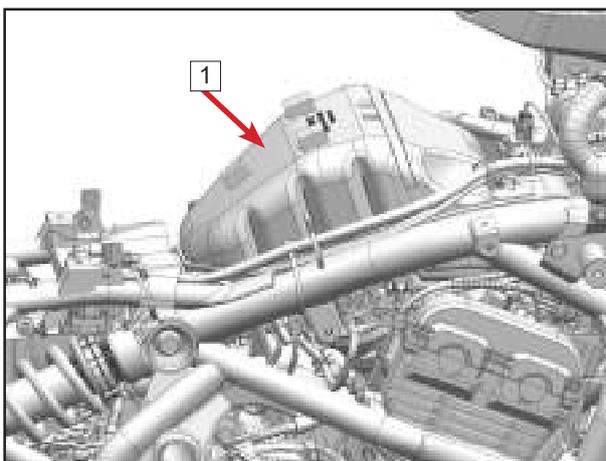
Loosen clamp **1**.  
Unplug the crankcase breather **2** from the engine.



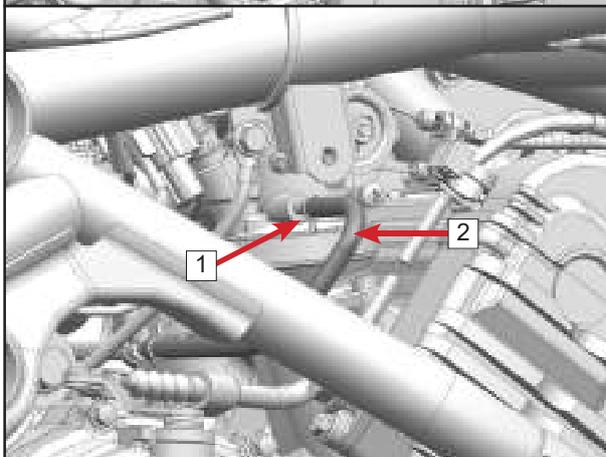
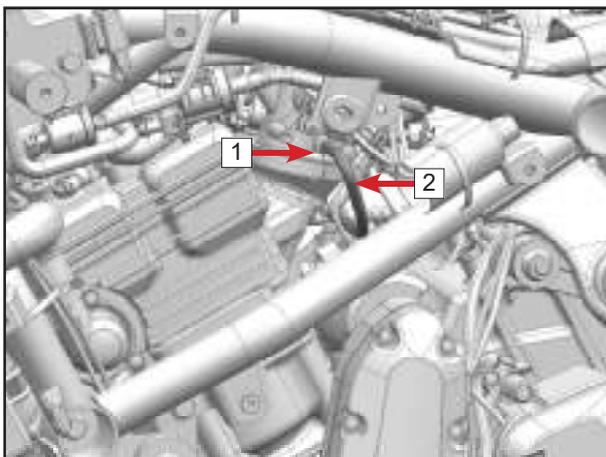
Loosen clamp **1**.



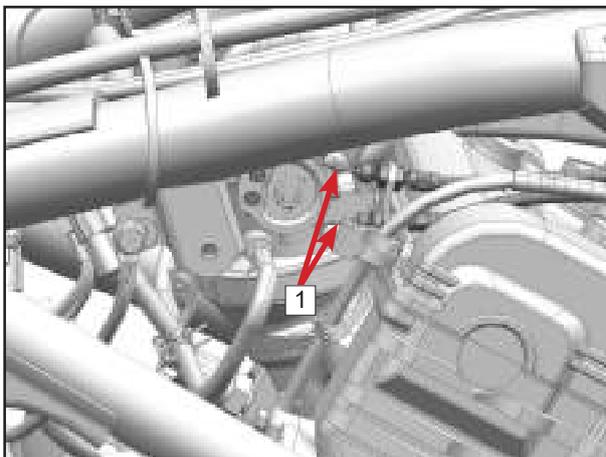
Remove air filter housing assembly **1**.



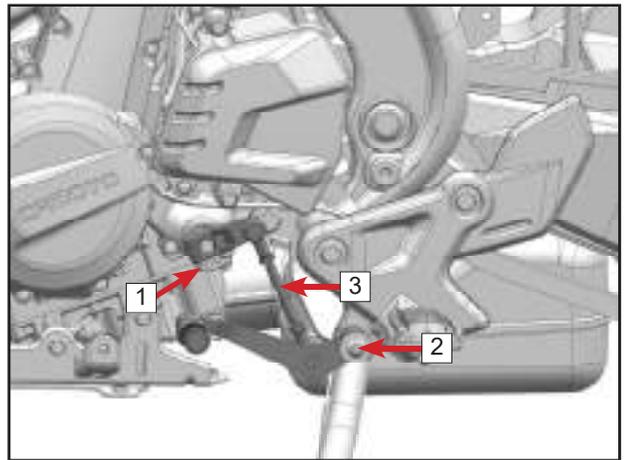
Loosen clamp **1**.  
Remove fuel vapor hose **2** from throttle body.



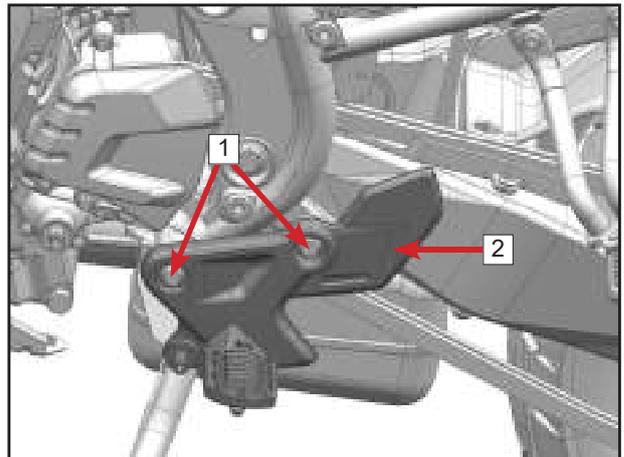
Remove throttle cable **1** from throttle body.



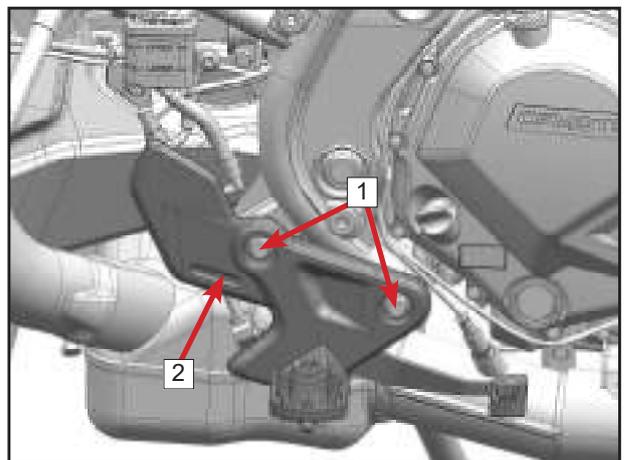
Remove bolt **1**.  
Remove screw **2** and washer.  
Remove gearshift lever assembly **3**.



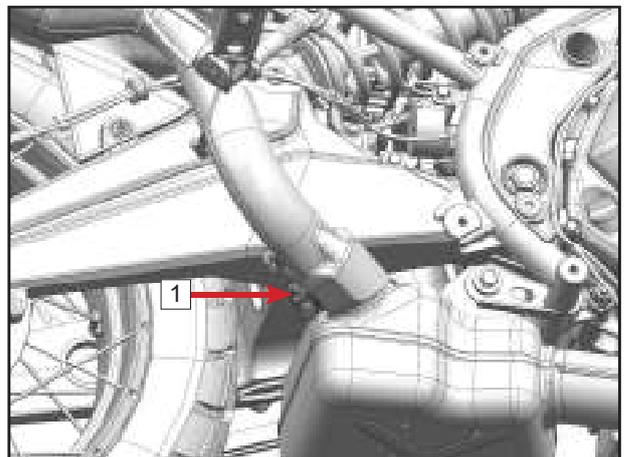
Remove bolts **1**.  
Remove front LH footrest bracket assembly **2**.



Remove bolts **1**.  
Remove front RH footrest bracket assembly **2**.

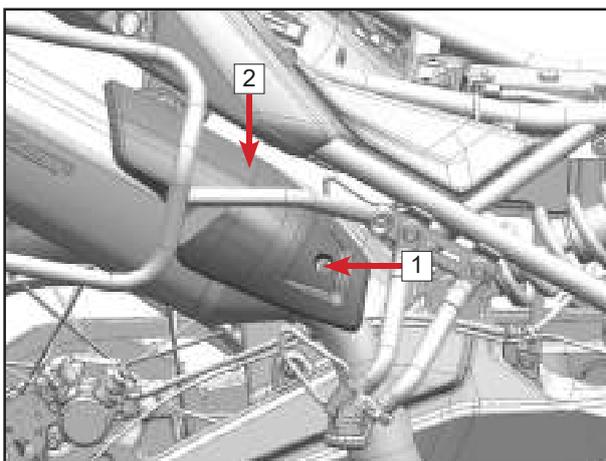


Loosen clamp **1**.

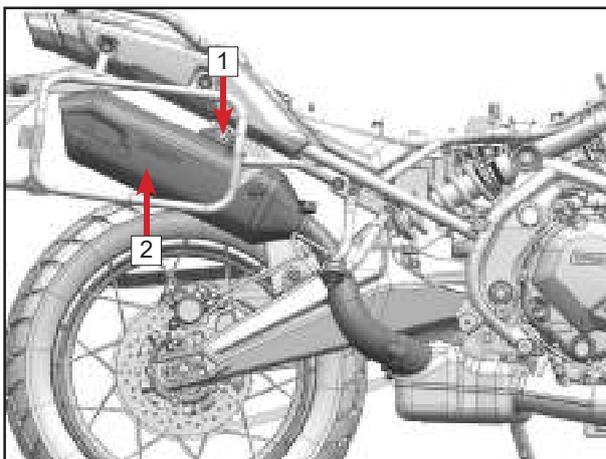


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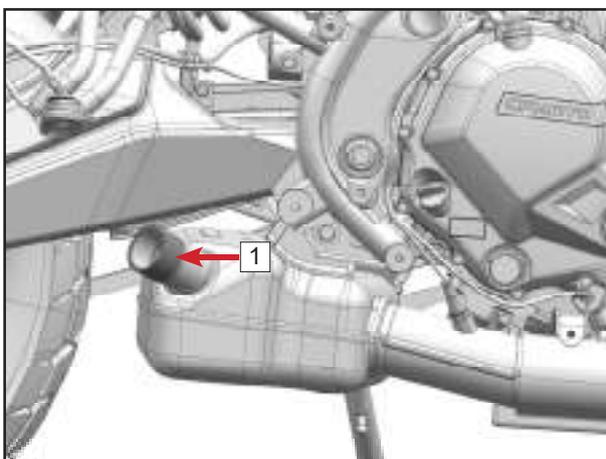
Remove screw **1**.  
Remove muffler guard **2**.



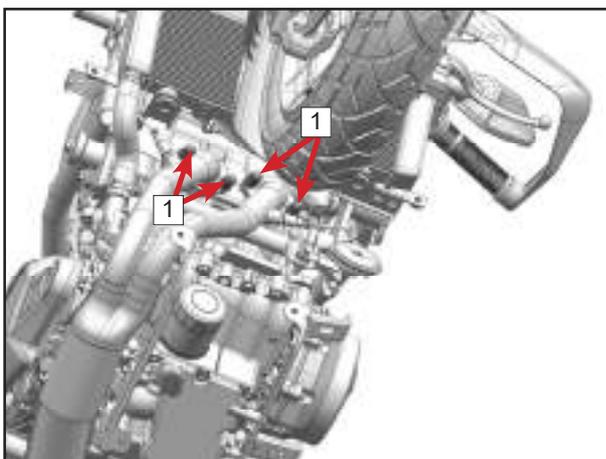
Remove bolt **1**, washer and nut.  
Remove muffler body assembly **2**.



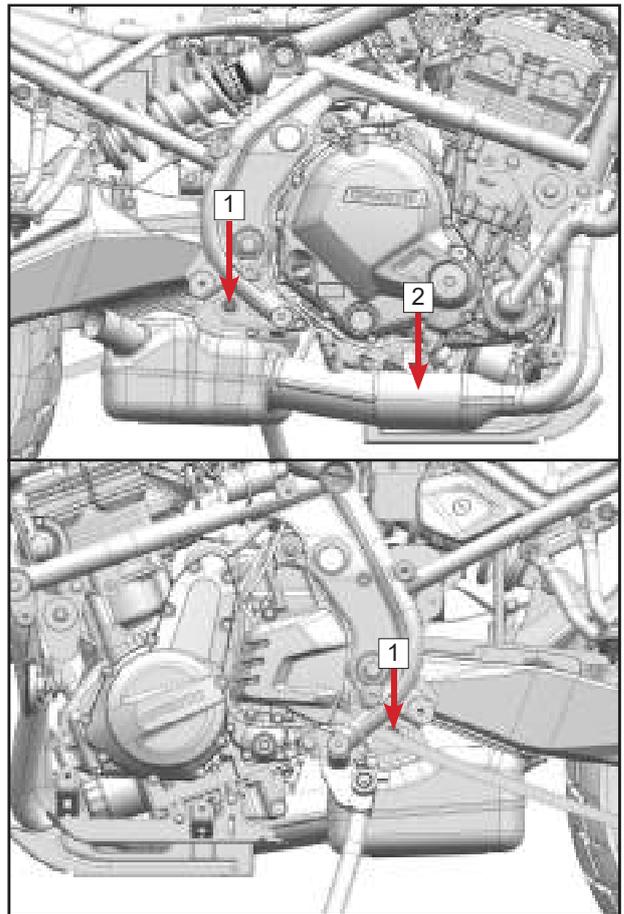
Remove graphite seal sleeve **1**.



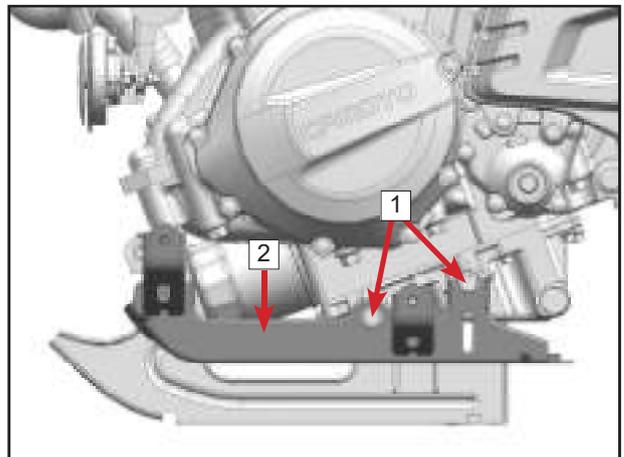
Disconnect oxygen sensor connector.  
Remove muffler joint nuts **1**.



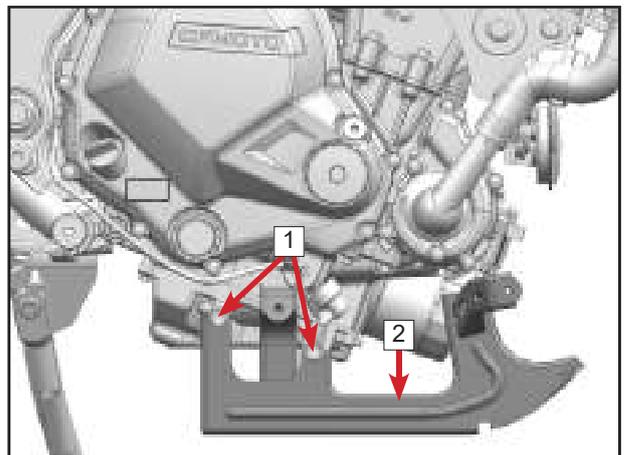
Remove bolt **1**.  
Remove exhaust muffler assembly **2** and  
exhaust port gasket.



Remove bolts **1**.  
Remove engine lower panel LH bracket  
assembly **2**.

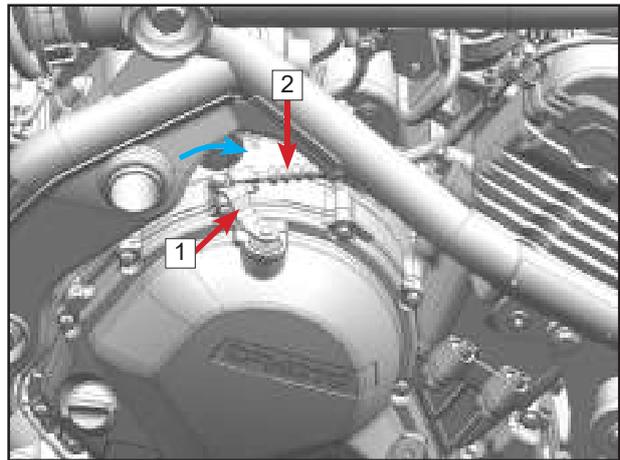


Remove bolts **1**.  
Remove engine lower panel RH bracket  
assembly **2**.

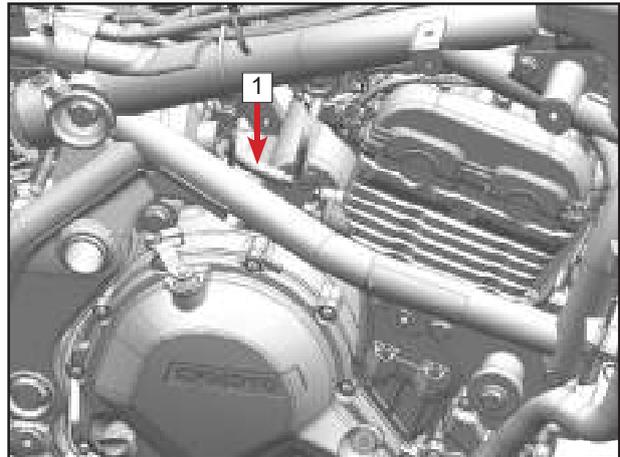


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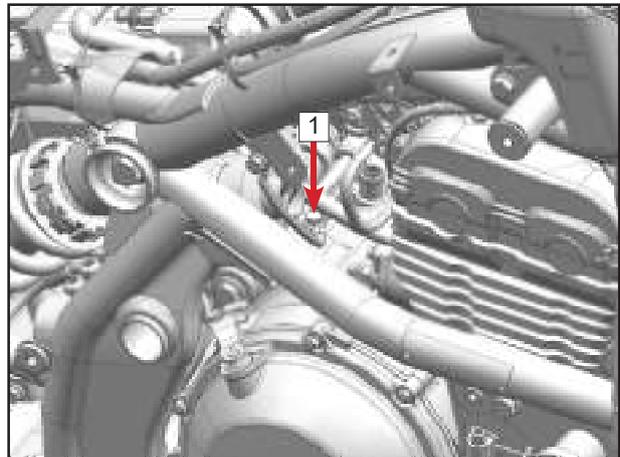
Rotate the clutch release lever **1** clockwise and disengage the clutch cable **2**.  
Hang the clutch cable to the side.



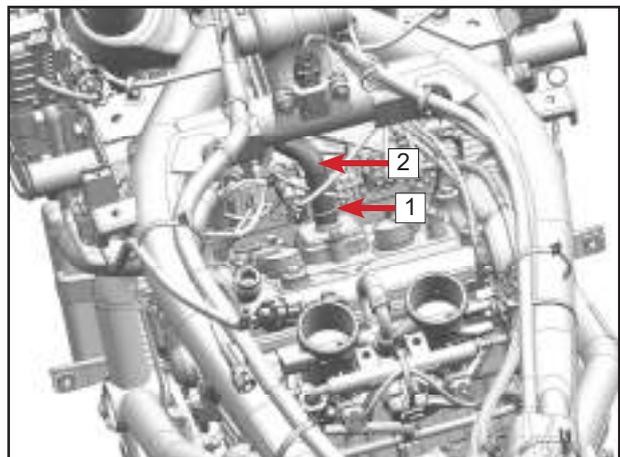
Remove the fixing nut for the positive cable **1**.  
Hang the positive cable to the side.



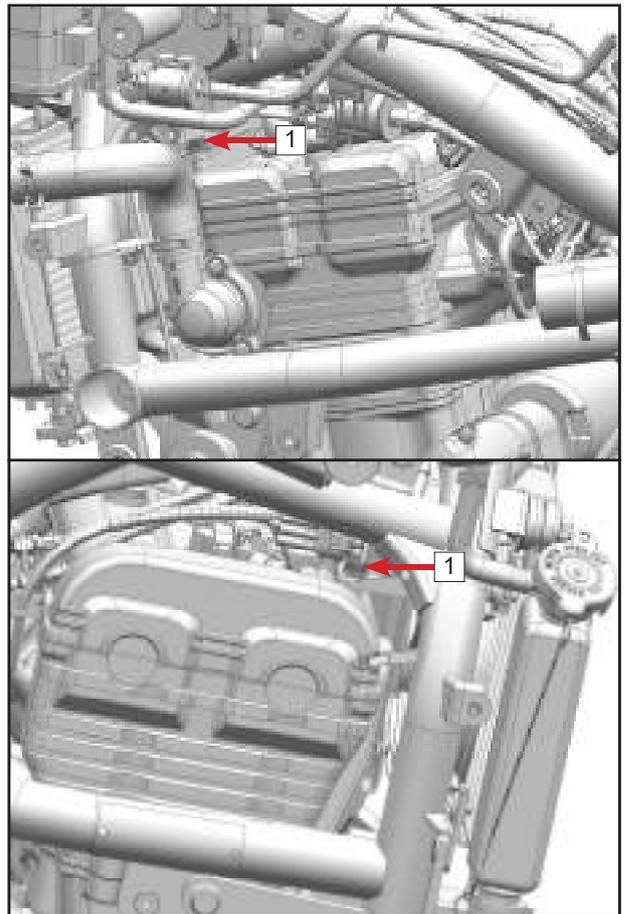
Remove bolt **1**.  
Hang the GND cable to the side.



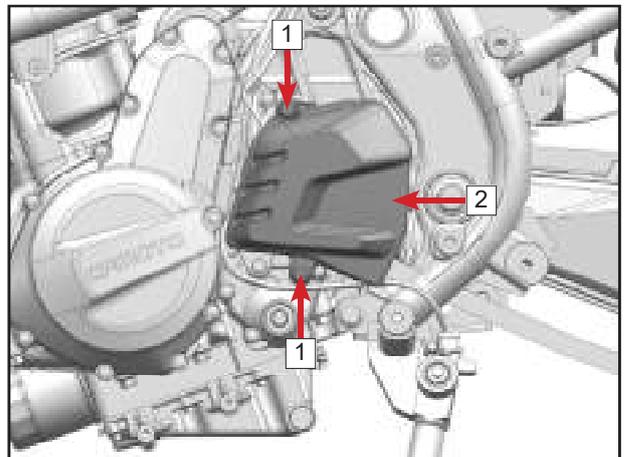
Release clamp **1**.  
Remove SAS outlet pipe **2** from engine.



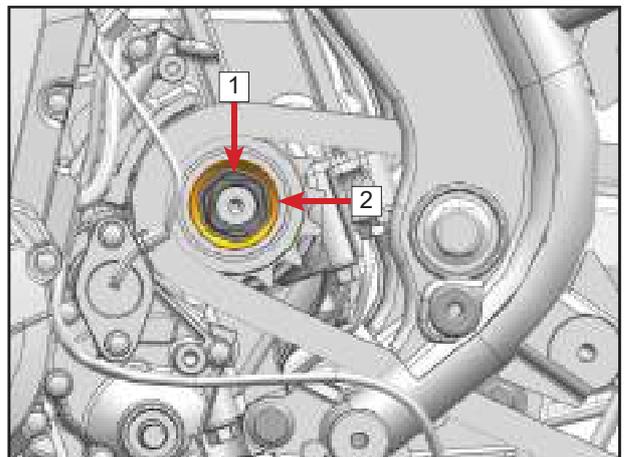
Remove bolts **1**.



Remove bolts **1**.  
Remove small sprocket guard **2**.

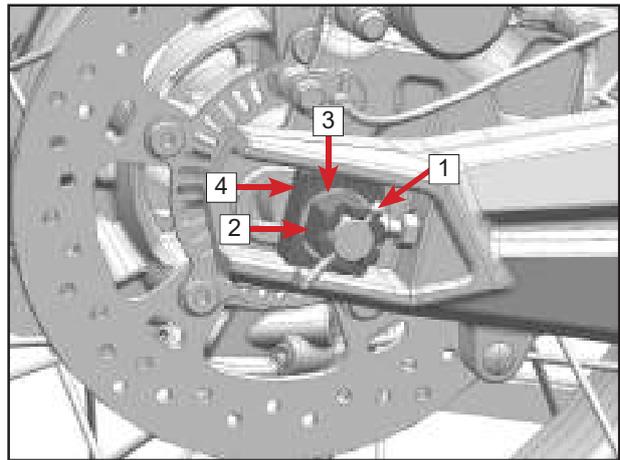


Flat the lock washer **2**.  
Have an assistant operate the rear brake.  
Loosen nut **1**.

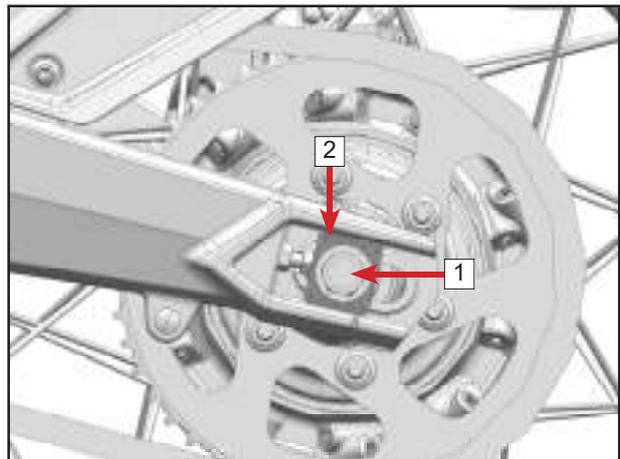


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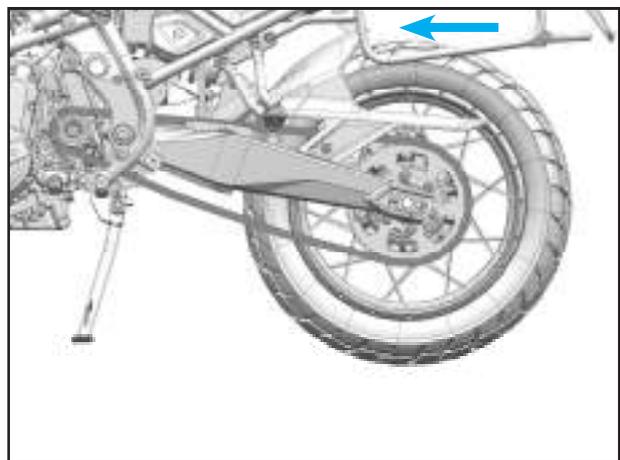
- Remove cotter pin **1**.
- Remove rear wheel shaft nut **2**.
- Remove plain washer **3**.
- Remove chain adjuster **4**.



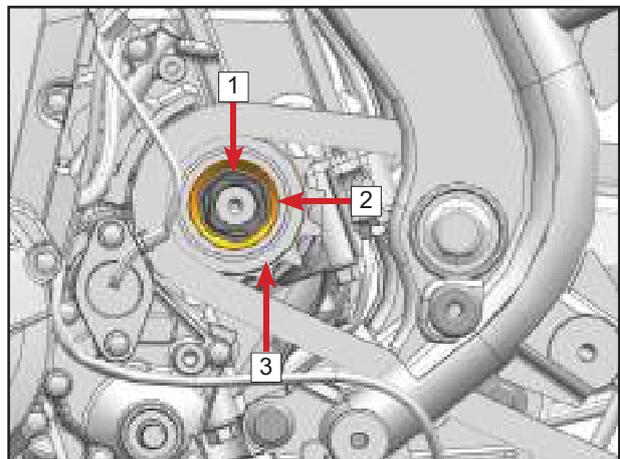
- Remove rear wheel shaft **1**.
- Remove chain adjuster **2**.



Push the rear wheel forward.

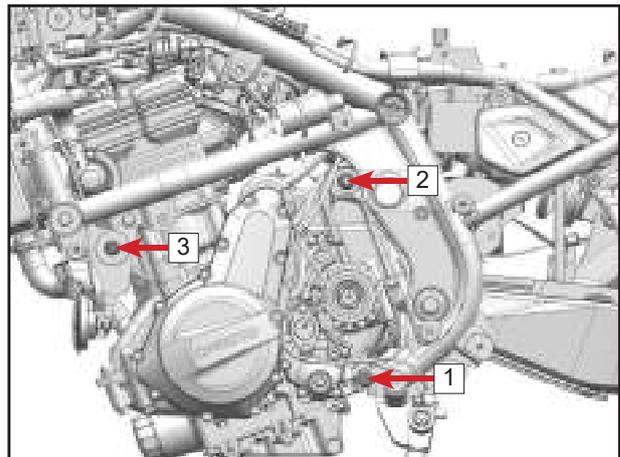


- Remove nut **1**.
- Remove lock washer **2**.
- Remove output sprocket **3** (along with chain).

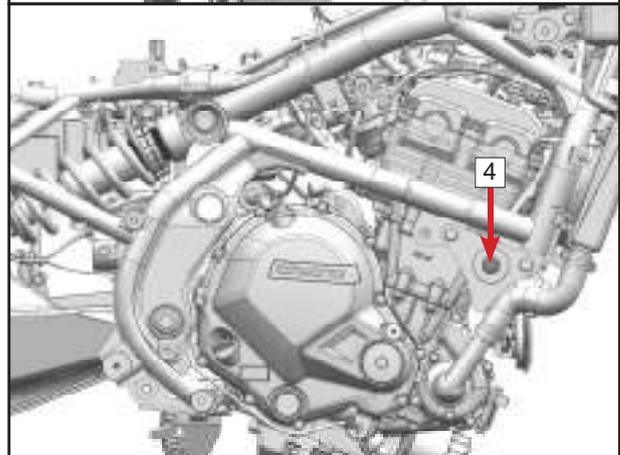


Disconnect ignition coil connector.  
Disconnect fuel injector connector.  
Disconnect T-MAP connector.  
Disconnect stepper motor connector.  
Disconnect TPS connector.  
Disconnect coolant temperature sensor connector.  
Disconnect gear sensor connector.  
Disconnect oil pressure sensor connector.  
Disconnect magneto stator connector.

Remove bolt **1** and nut.  
Remove bolt **2** and nut.  
Remove bolt **3** and nut.



Remove bolt **4** and nut.  
Carefully remove the engine and transfer it to a work bench.



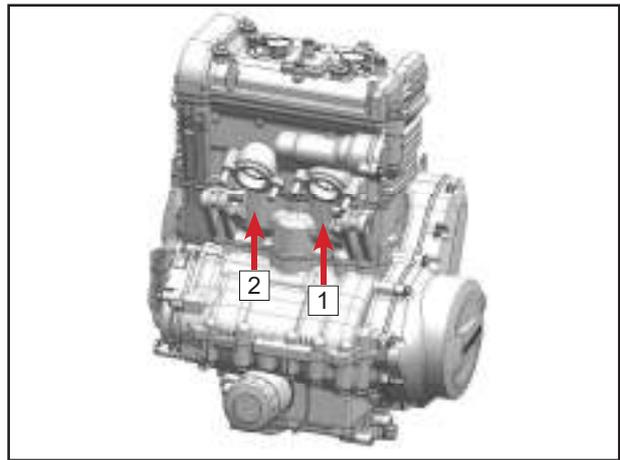
## 5.3 Engine Overhaul (transmission overhaul will refer to chapter 4)

**NOTE:** Fix the engine firmly on the platform to prevent the engine from falling and injuring the operator or damaging the engine.

**NOTE:** The position of each cylinder is shown on the right.

1: Cylinder 1 (Magneto side)

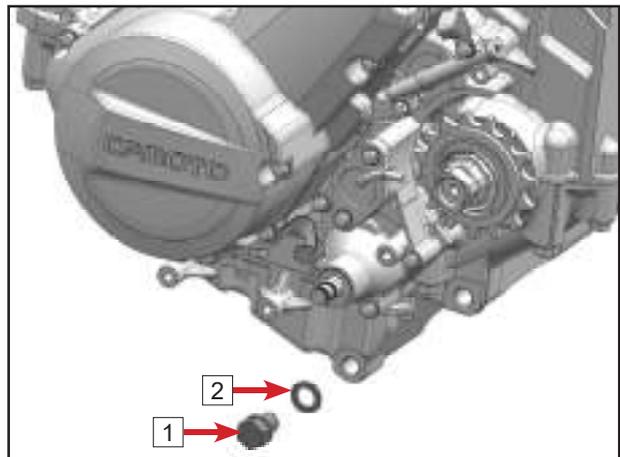
2: Cylinder 3 (Clutch side)



### 5.3.1 Engine Oil Drain

Place a container under the magnetic drain bolt to store the drained oil.

Remove the magnetic drain bolt 1 and washer 2 and allow the engine oil to drain completely.



### 5.3.2 Output Sprocket Assembly Removal

Flat the lock washer 2.

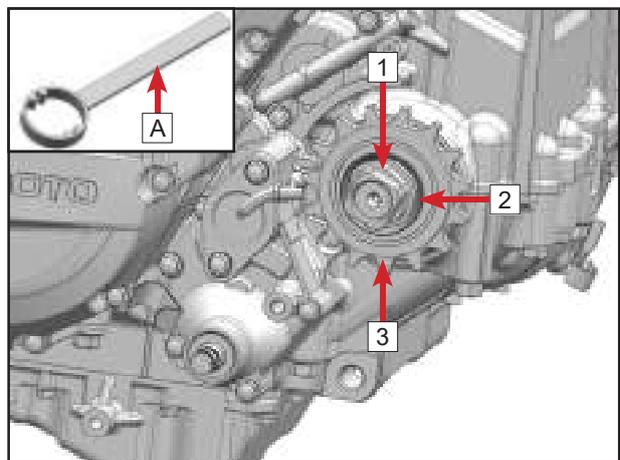
Use the output sprocket stopping tool A to fix the output sprocket assembly 3.

Output Sprocket Stopping Tool  
(See section 13.1 for details.)

Remove nut 1.

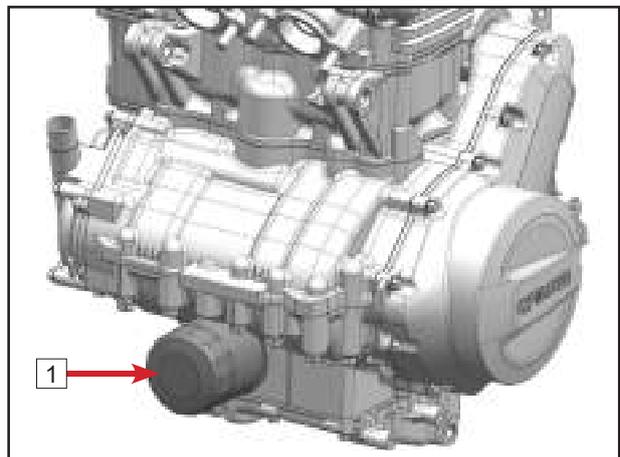
Remove lock washer 2.

Remove output sprocket assembly 3.



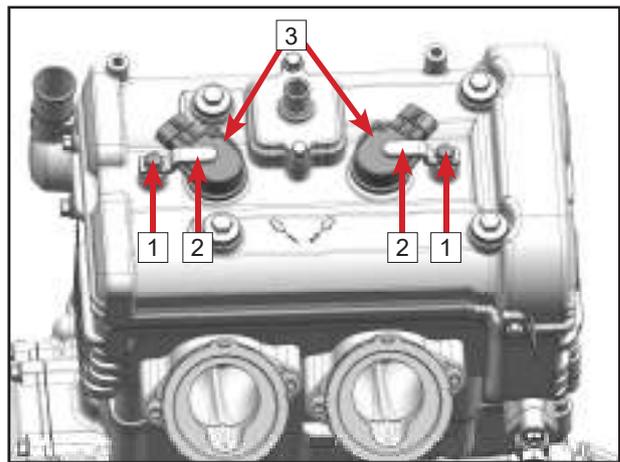
### 5.3.3 Oil Filter Removal

Remove oil filter 1.

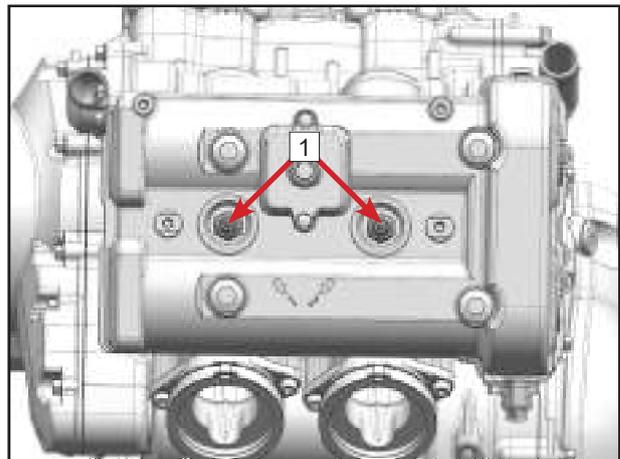


### 5.3.4 Ignition Coil and Spark Plug Removal

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



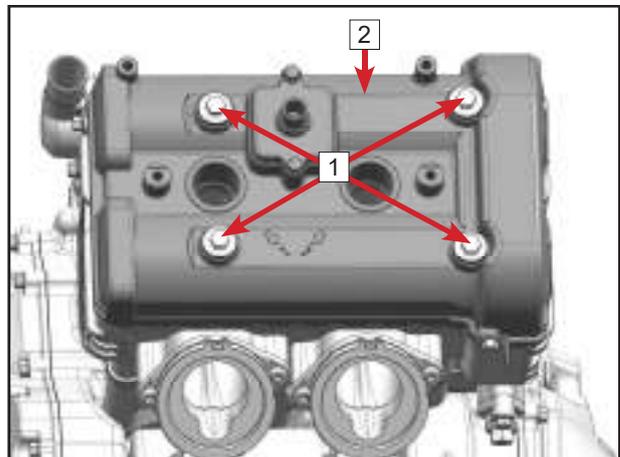
Remove spark plug **1**.



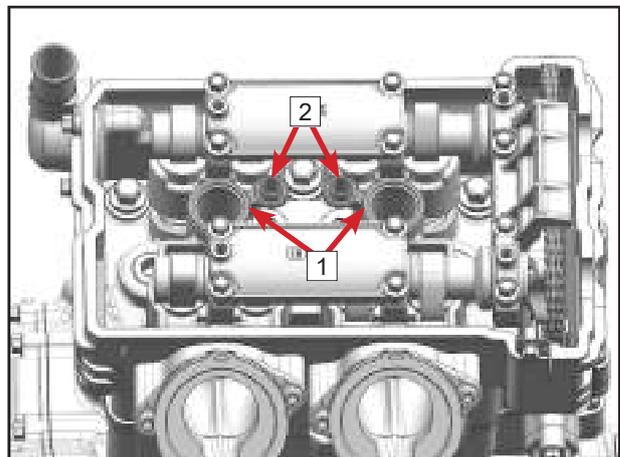
### 5.3.5 Cylinder Head Cover Removal

Cross diagonally loosen the cylinder head cover bolts **1** and seal rings then remove them.

Remove cylinder head cover **2** and seal ring.



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

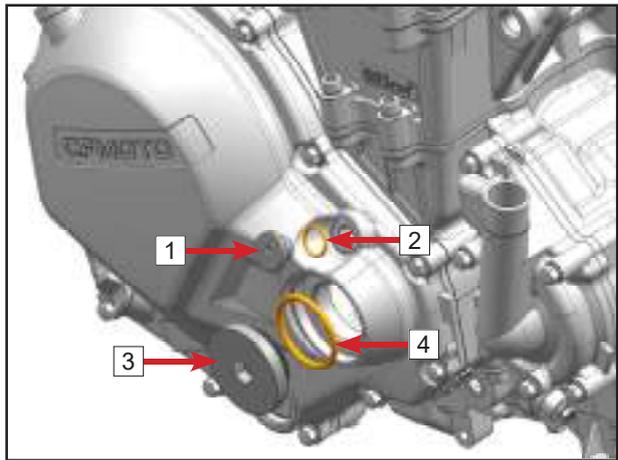


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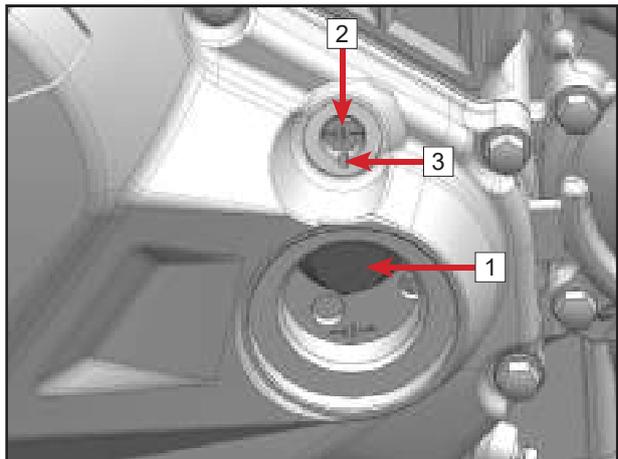
## 5.3.6 Camshaft and Cylinder Head Removal

Remove timing observation hole cover **1** and O-ring **2**.

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



Use a socket wrench to rotate the bolt **1** clockwise until the 2IT marking line **2** on the crankshaft pulsing rotor aligns with the marking groove **3** on the RH side cover.



**⚠ CAUTION:** This is a non-return type camshaft chain tensioner. The push rod does not return to its original position once it moves out to take up camshaft chain slack.

Observe all the rules listed below:

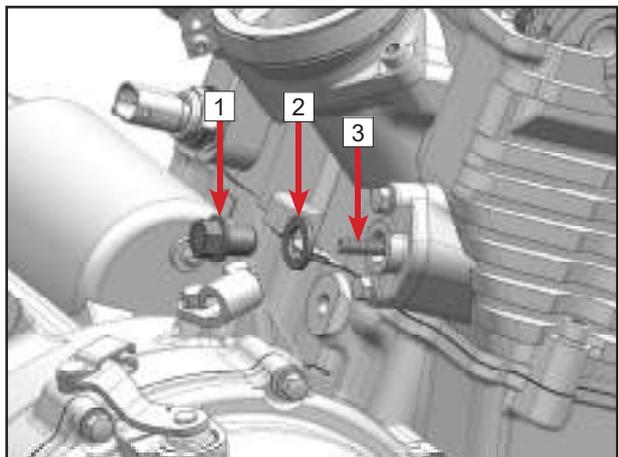
When removing the tensioner, do not take out the mounting bolts only halfway. Retightening the mounting bolts from this position could damage the tensioner and the camshaft chain. Once the bolts are loosened, the tensioner must be removed and reset as described in the "Tensioner Installation" section of the "Engine Assembly" chapter.

Do not turn the crankshaft while the tensioner is removed. This could upset the camshaft chain timing, and damage the valves.

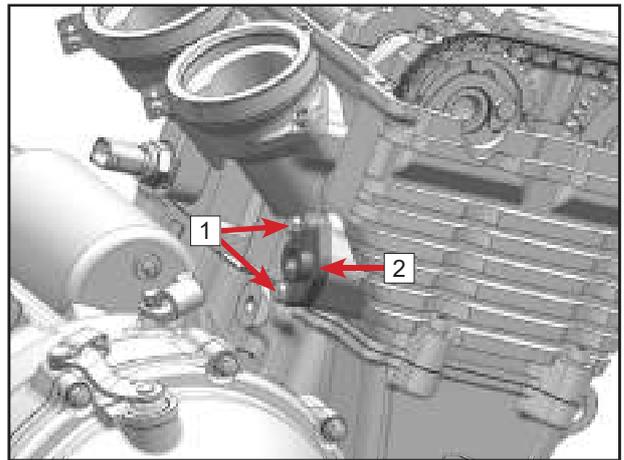
Remove spring seat bolt **1**.

Remove washer **2**.

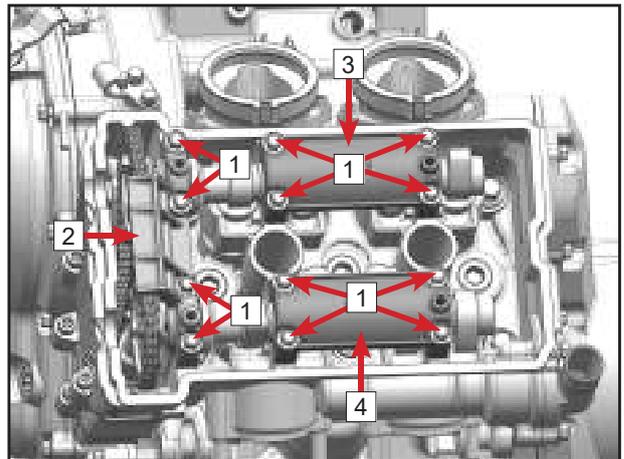
Remove tension spring **3**.



Remove bolts [1].  
Remove tensioner [2].

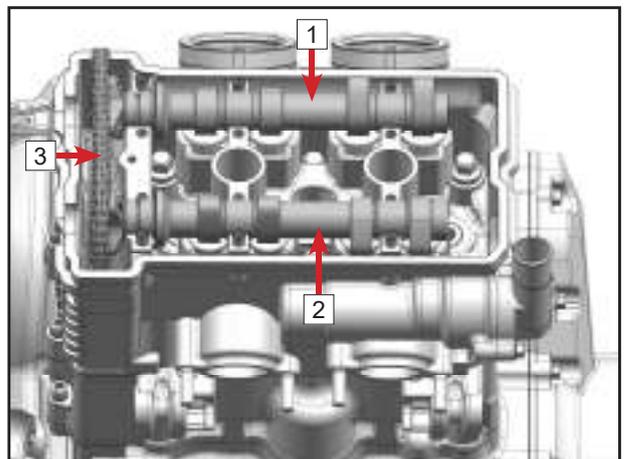


Cross diagonally loosen the bolts [1] then remove them.  
Remove camshaft plate [2].  
Remove air intake camshaft seat (IN) [3].  
Remove air exhaust camshaft seat (EX) [4].

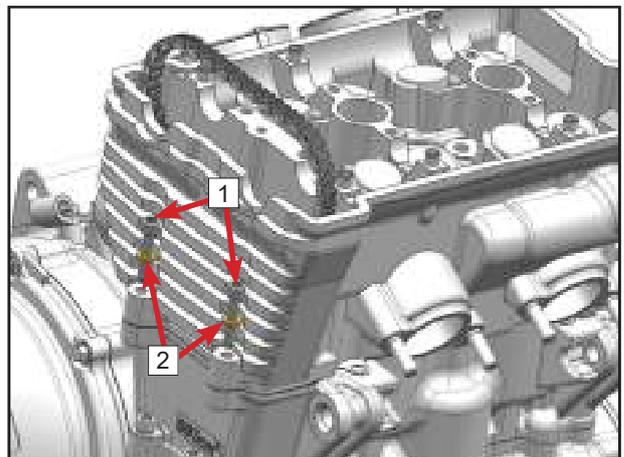


**NOTE: Hook timing chain [3] to prevent it falling into crankcase.**

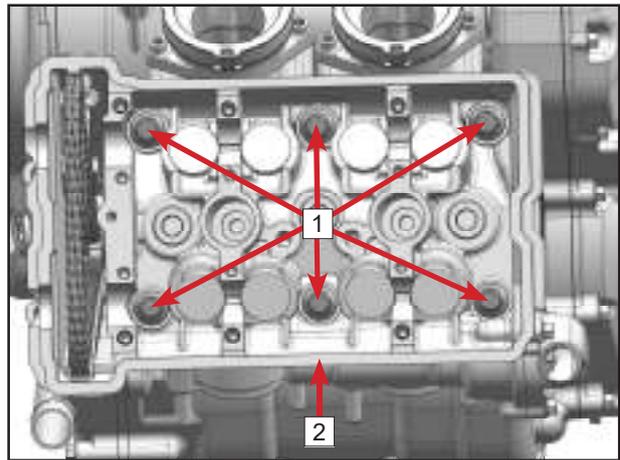
Remove intake camshaft assembly [1].  
Remove exhaust camshaft assembly [2].



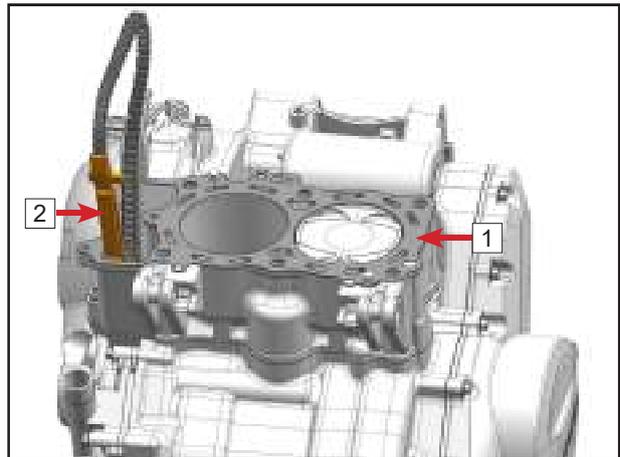
Remove inner hex bolt [1] and washer [2].



Cross diagonally loosen the bolts **1** and washers then remove them.  
Remove cylinder head assembly **2**.

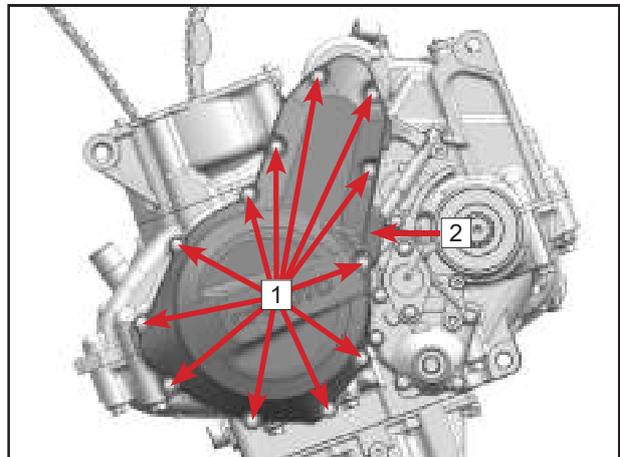


Remove cylinder head gasket **1** and discard.  
Remove chain guide **2**.

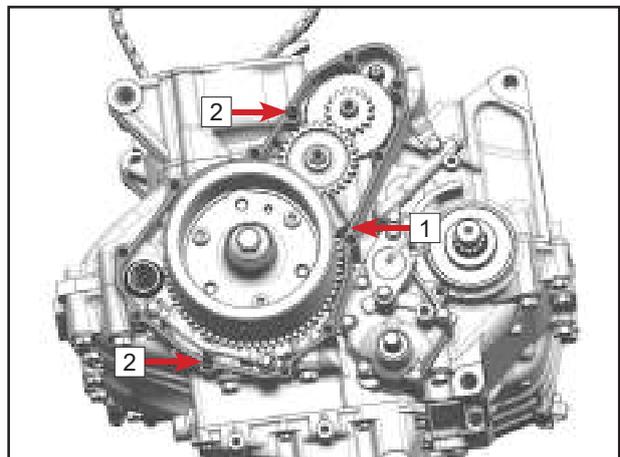


### 5.3.7 LH Side Cover Removal

Cross diagonally loosen the bolts **1** then remove them.  
Remove LH side cover **2**.



Remove LH side cover seal gasket **1** and discard.  
Remove dowel pins **2**.



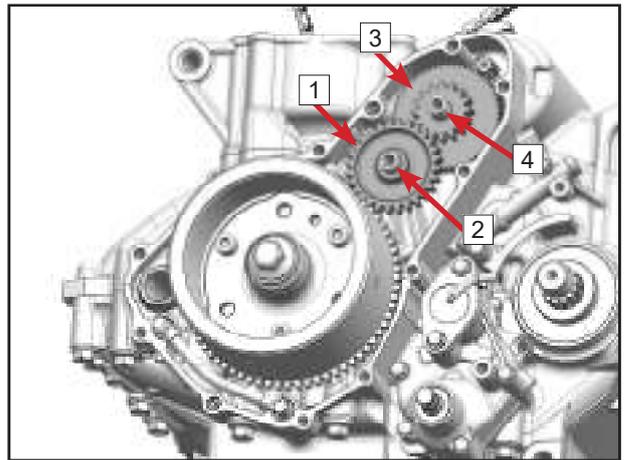
## 5.3.8 Magneto Rotor and Starter Gear Removal

Remove starter middle gear **1**.

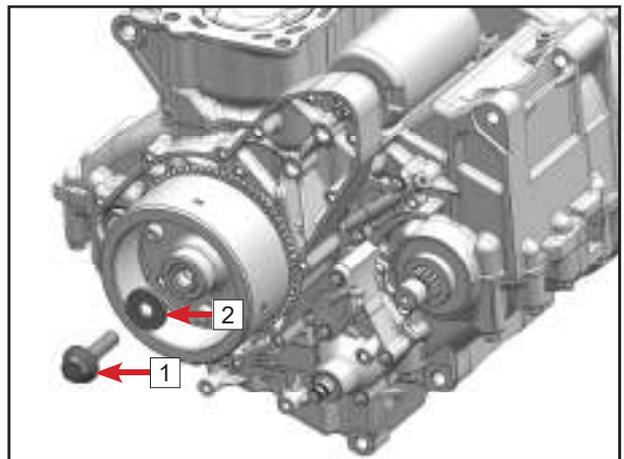
Remove middle gear shaft **2**.

Remove dual gear **3**.

Remove middle gear shaft **4**.

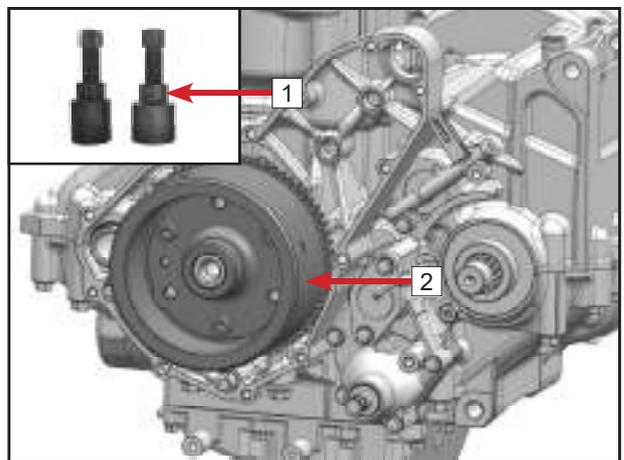


Remove bolt **1** and washer **2**.



Use magneto rotator removal tool **1** to remove magneto rotor **2**.

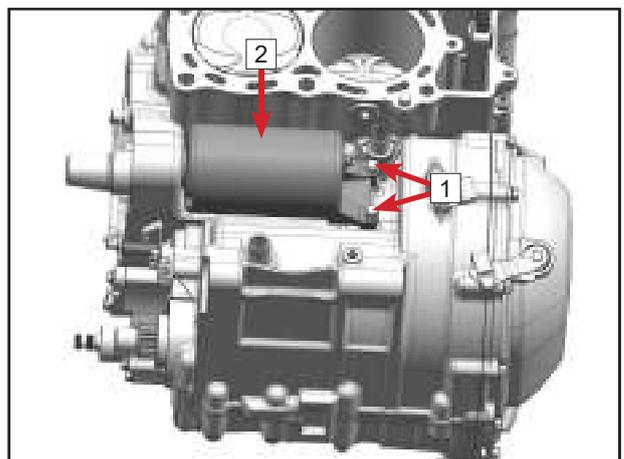
Magneto Rotor Removal Tool  
(See section 5.1 for details.)



## 5.3.9 Stator Motor Assembly Removal

Remove bolts **1**.

Remove stator motor assembly **2**.



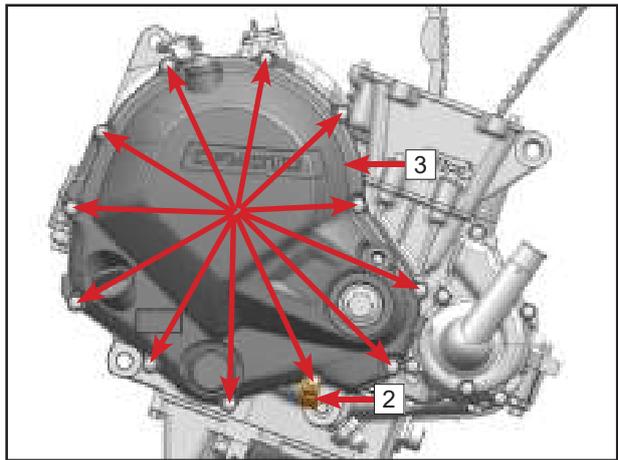
## 5.3.10 RH Side Cover Removal

Cross diagonally loosen the bolts **1** then remove them.

Remove the clip **2**.

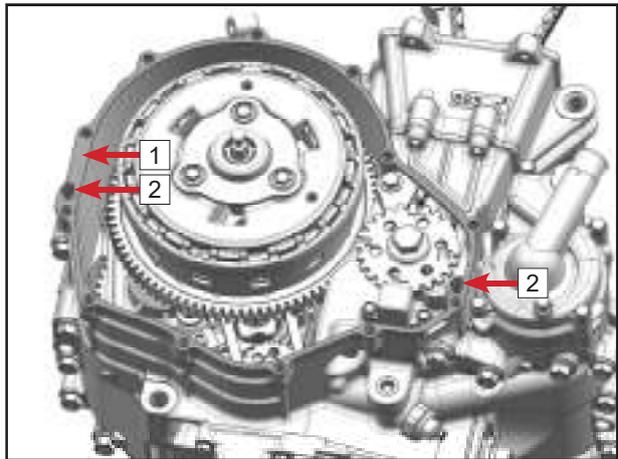
Turn the clutch control shaft **4** counterclockwise to release it from the clutch pull rod.

Remove RH side cover **3**.



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

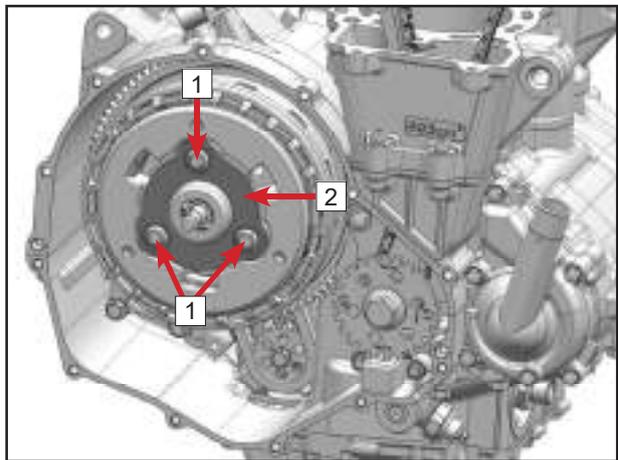
Remove dowel pins **2**.



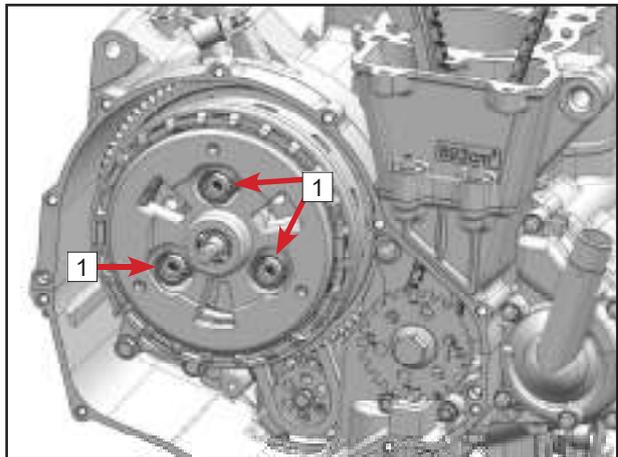
## 5.3.11 Clutch Removal

Remove bolts **1**.

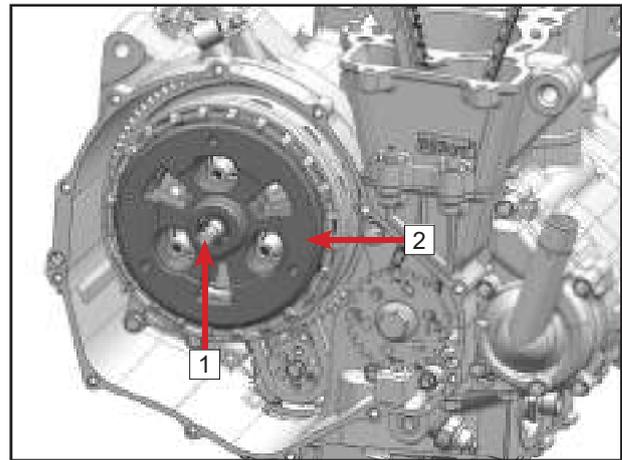
Remove clutch spring press plate **2**.



Remove clutch spring **1**.

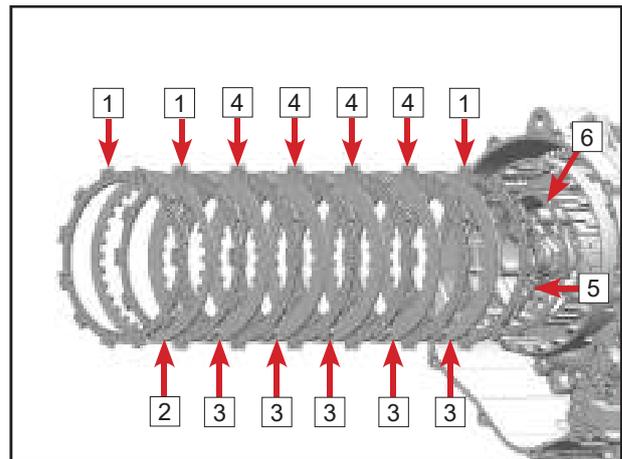


Pull onto the pull rod **1** and pull out the disc assembly **2**.



Remove friction plate/steel plate assembly. Check the sequence of friction plate/steel plate assembly, as follows:

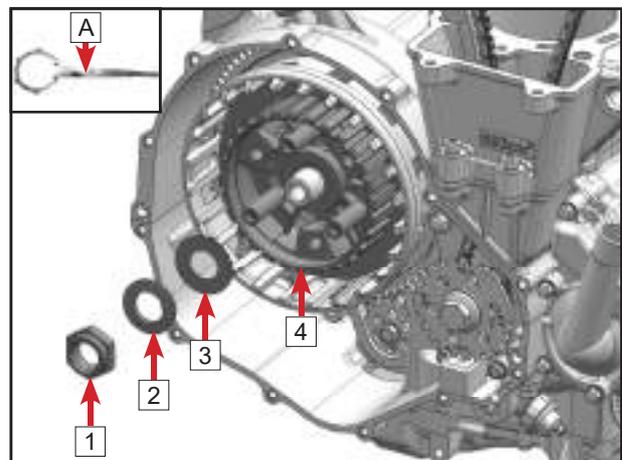
- Friction plate A **1**--Steel plate B **2**
- Friction plate A **1**--Steel plate A **3**
- Friction plate B **4**--Steel plate A **3**
- Friction plate A **1**--Elastic washer **5**
- Washer **6**



Use the clutch stopping tool **A** to fix the center sleeve.

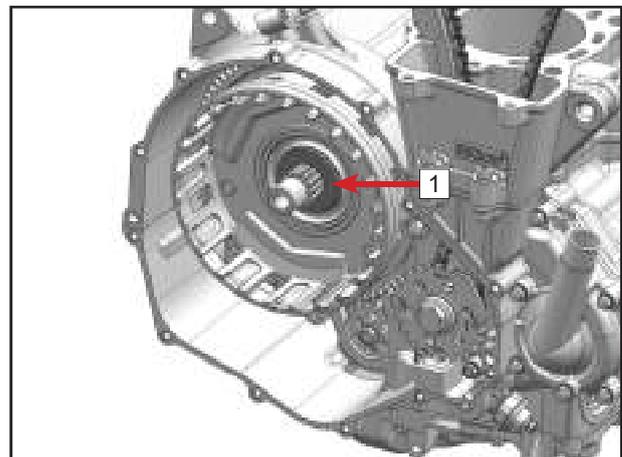
Clutch Stopping Tool  
(See section 5.1 for details.)

- Remove nut **1**.
- Remove elastic washer **2**.
- Remove washer **3**.
- Remove center sleeve **4**.



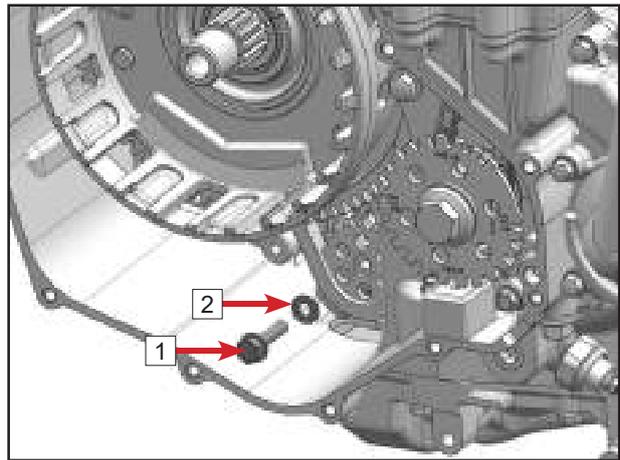
Remove washer **1**.

**NOTE: The washer **1** may adhere to the center sleeve and should not be lost during removal.**

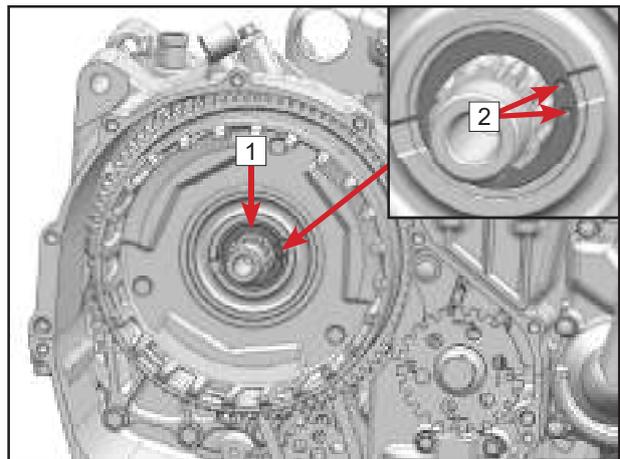


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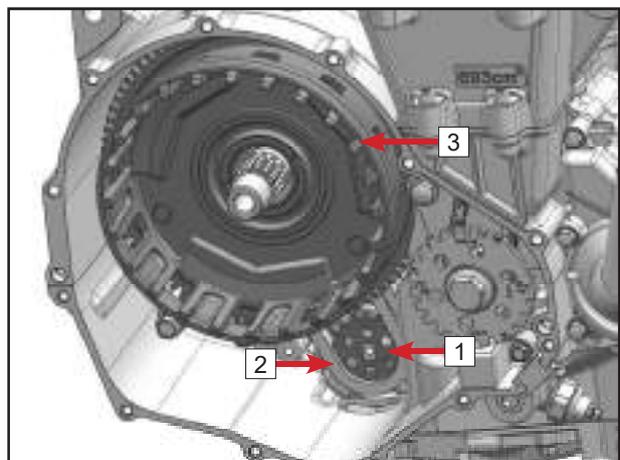
Remove bolt **1** (LH-hand thread) and washer **2**.



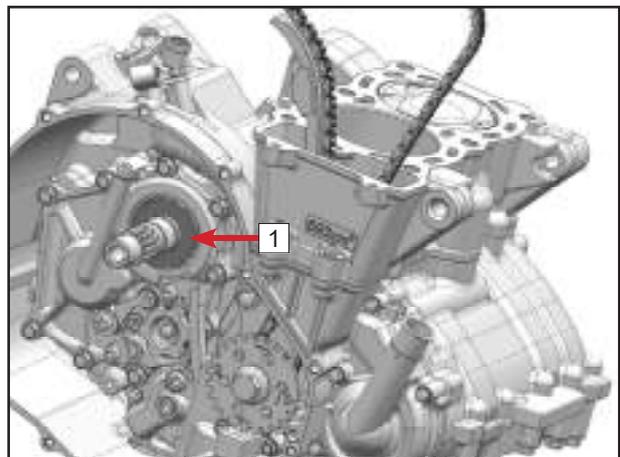
Use a straight-nosed circlip clamp to hold the hole **2**, and pull out the clutch shaft sleeve **1**.



Hold the oil pump sprocket **1** with needle-nose pliers, then remove the housing assembly **3**, oil pump sprocket **1** and oil pump chain **2** together.



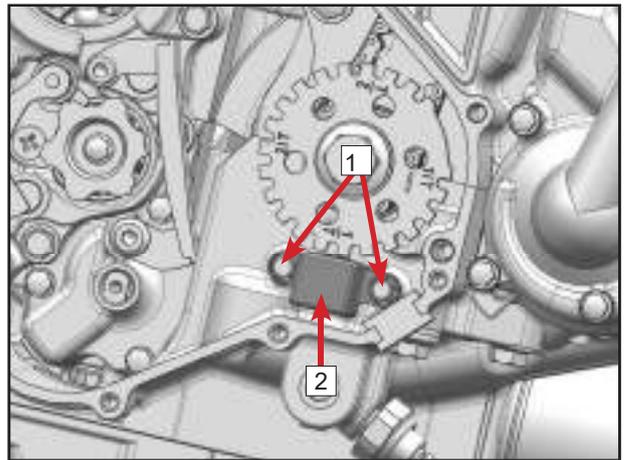
Remove washer **1**.



## 5.3.12 Crankshaft Pulsing Rotor Removal

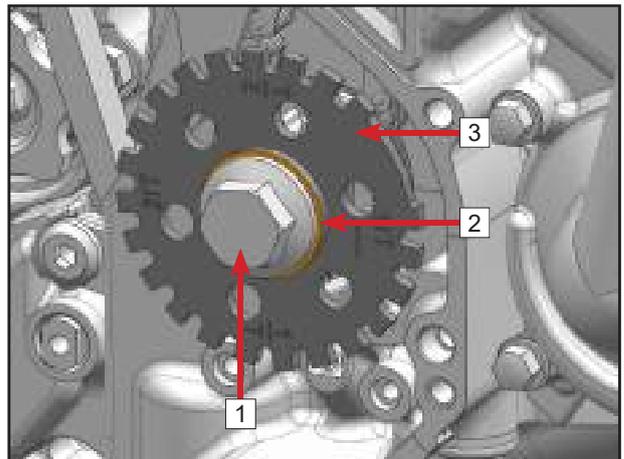
Remove bolts **1**.

Remove trigger assembly **2**.



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

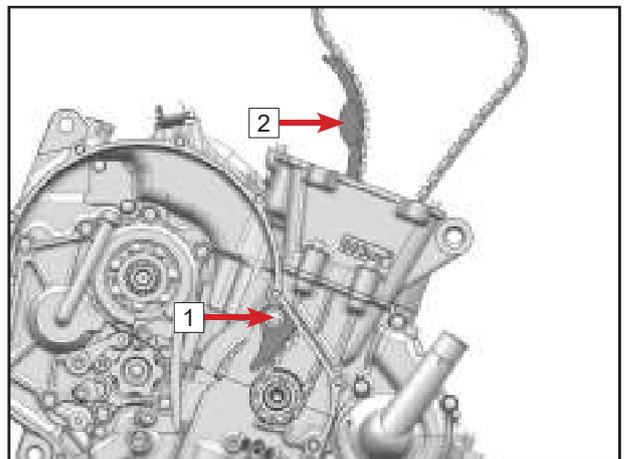
Remove crankshaft pulsing rotor **3**.



## 5.3.13 Tensioner Plate Removal

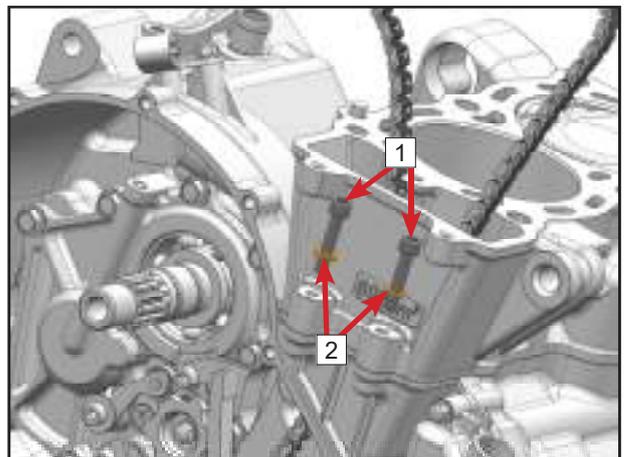
Remove pin shaft **1**.

Remove tensioner plate **2**.

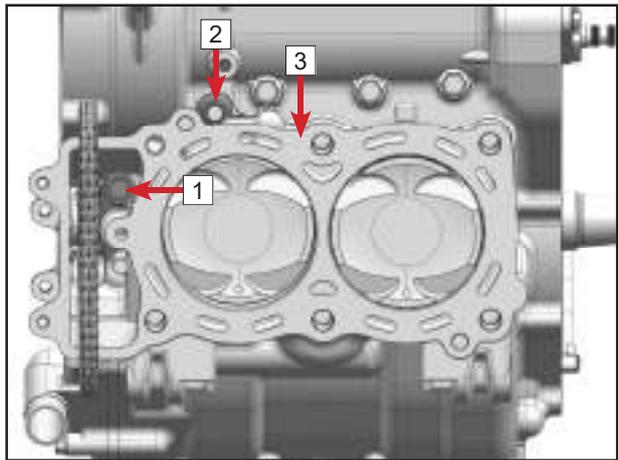


## 5.3.14 Cylinder Body and Piston Removal

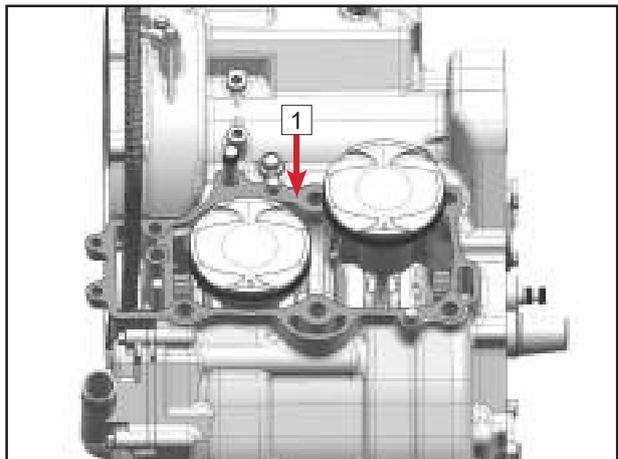
Remove inner hex bolt **1** and washer **2**.



Remove bolt **1** and washer.  
Remove nut **2** and washer.  
Remove cylinder body **3**.



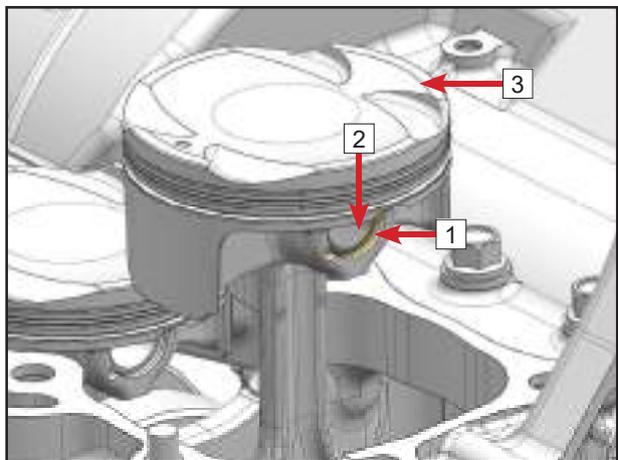
Remove cylinder body gasket **1** and discard.



Rotate the crankshaft and adjust the piston to a suitable position for Removal.  
Remove one piston pin retainer **1** and discard it.

**NOTE: It is not necessary to remove both piston pin retainers when removing the piston pin.**

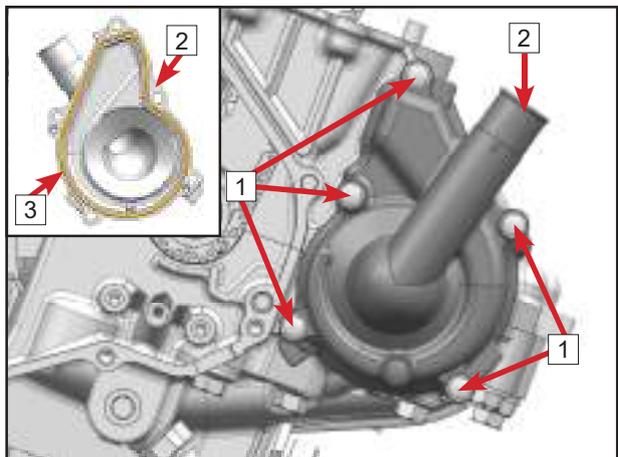
Push the piston pin **2** out of the piston.  
Separate the piston **3** from the connecting rod.



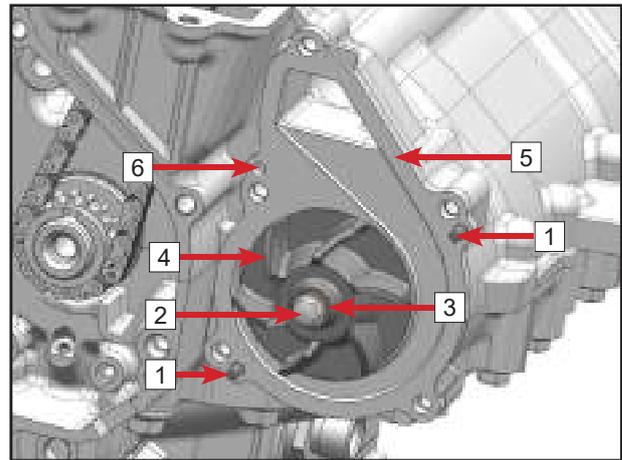
Correspondingly mark the piston and connecting rod as a set (cylinder 1 or cylinder 2), so that they can be reinstalled in their original position during reassembly.  
Remove the other piston using the same method.

### 5.3.15 Water Pump Removal

Remove bolts **1**.  
Remove water pump cover **2** and seal ring **3**.

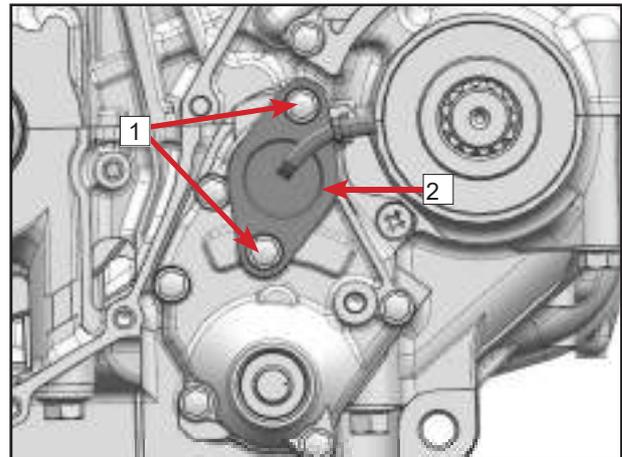


Remove needle **1**.  
Remove bolt **2** and washer **3**.  
Remove water pump impeller **4**.  
Remove water pump body **5** and needle **6**.

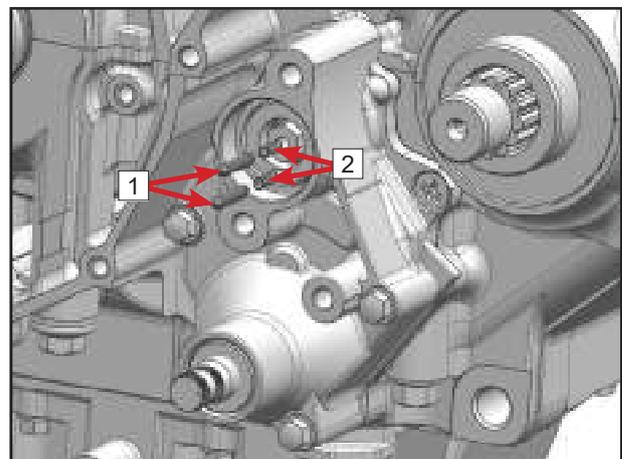


### 5.3.16 Transmission Assembly Removal

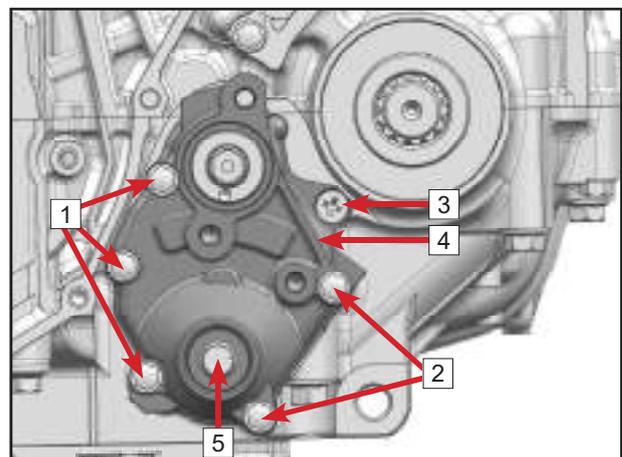
Remove bolt **1**.  
Remove gear sensor **2**.



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

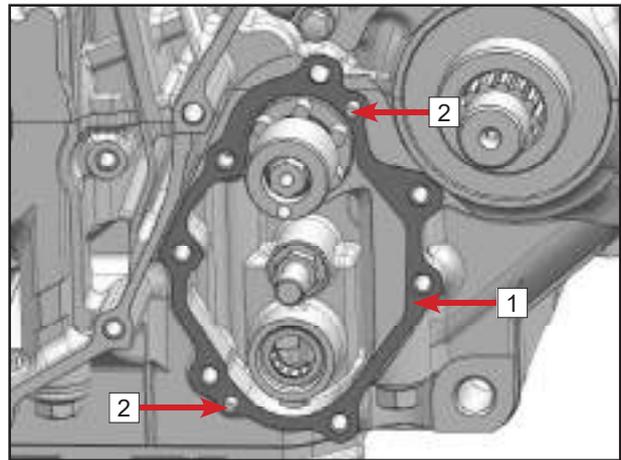


Remove bolts **1** and bolts **2**.  
Remove screw **3**.  
Remove gearshift shaft cover **4** and gearshift sub assembly **5**.

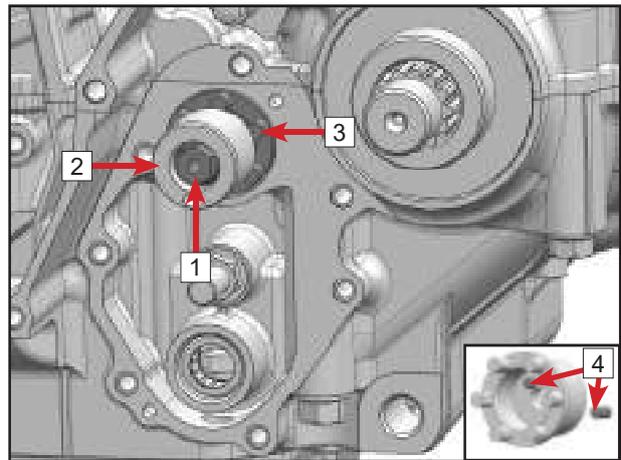


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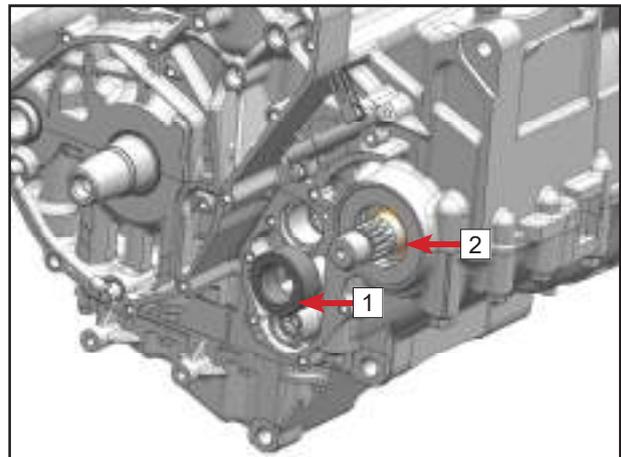
Remove gearshift shaft cover gasket [1] and discard.  
Remove roller needle [2].



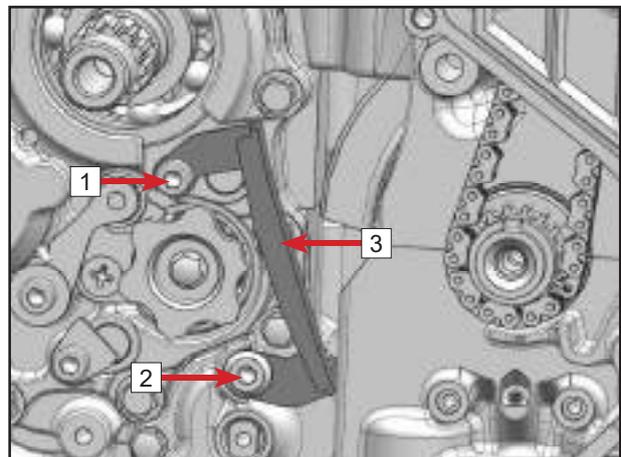
Remove contactor bolt [1].  
Remove gear drive shaft [2].  
Remove shift location drum [3].  
Remove roller needle [4].



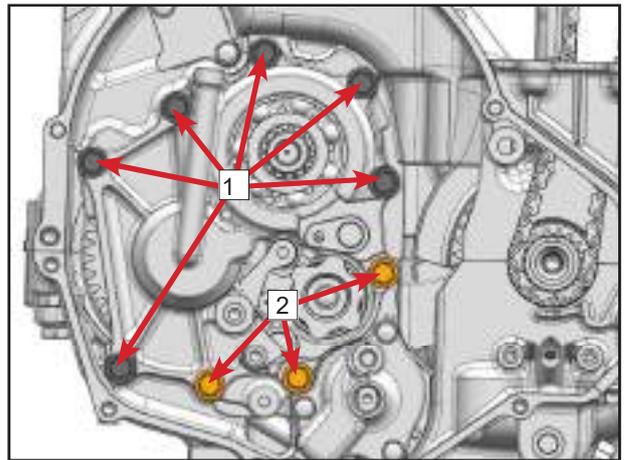
Remove countershaft sleeve [1].  
Remove O-ring [2].



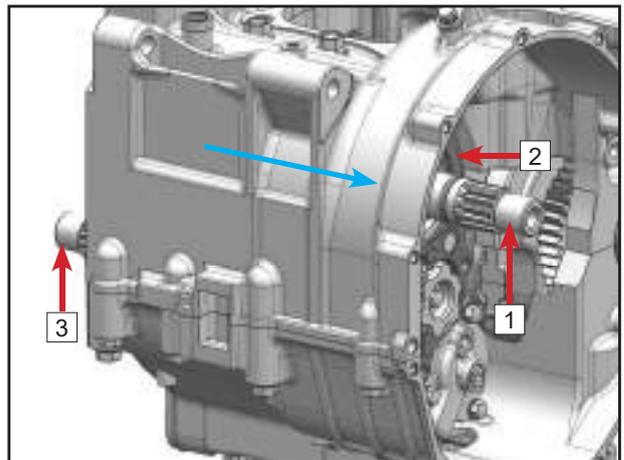
Remove inner hex screw [1] and screw [2].  
Remove oil pump chain guide [3].



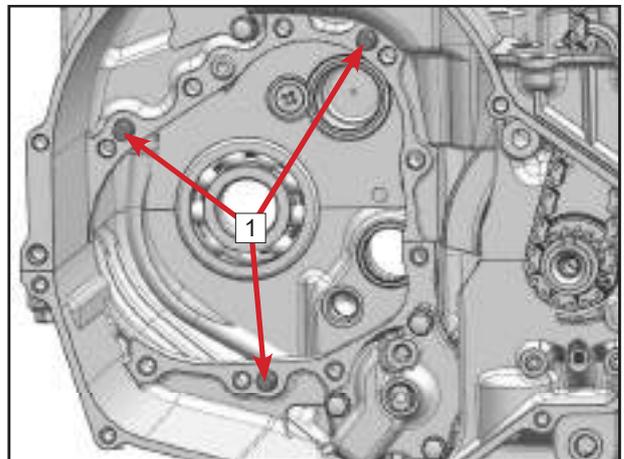
Cross diagonally loosen the bolts **1** and bolts **2** then remove them.



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

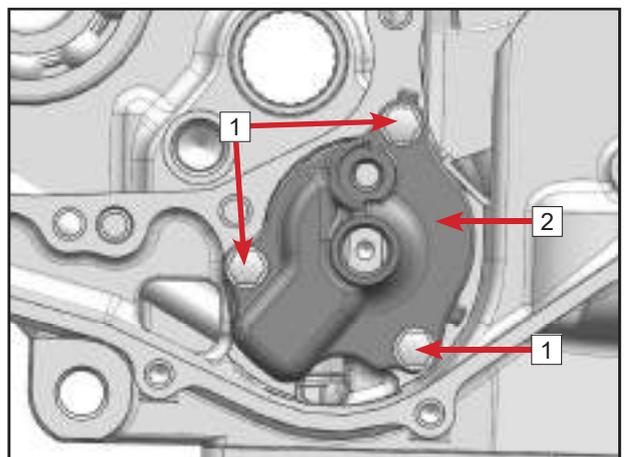


Remove needle rollers **1**.

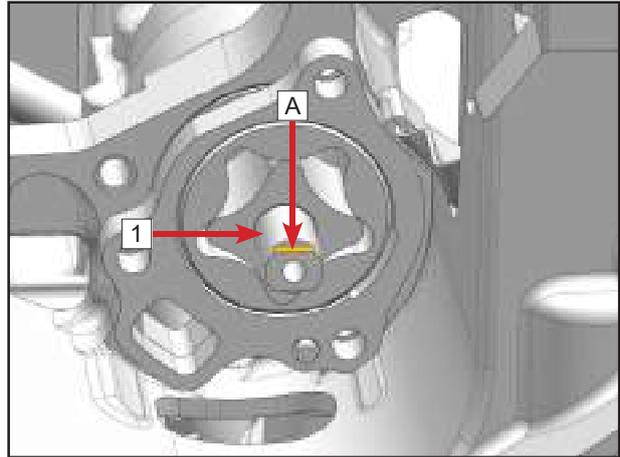


### 5.3.17 Oil Pump Assembly Removal

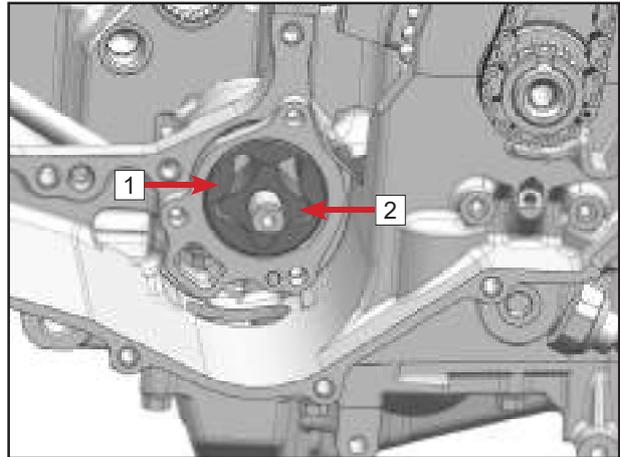
Remove bolts **1**.  
Remove oil pump cover **2**.



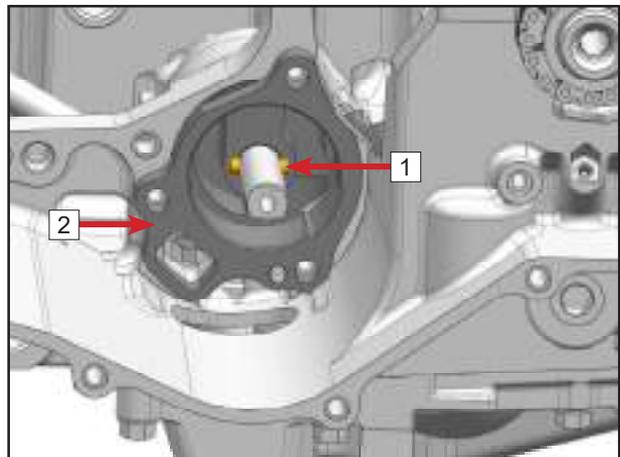
**Note:** Before removing the oil pump rotor, it is strongly recommended to rotate the oil pump shaft ① so that plane A is in a horizontal position, which is to avoid the needle roller mounted on the oil pump shaft falling into the oil pan or missing.



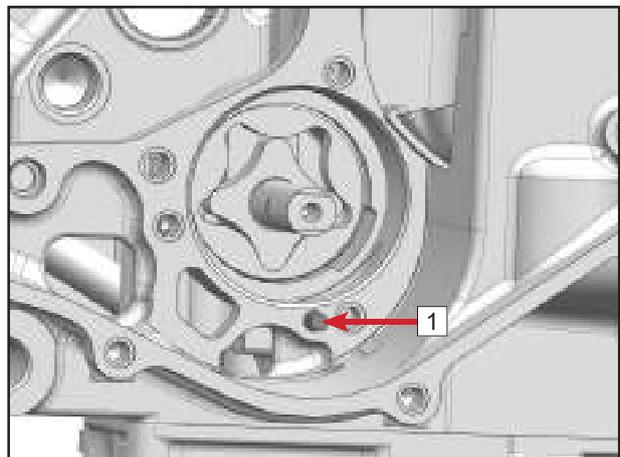
Remove auxiliary oil pump outer rotor ①.  
Remove auxiliary oil pump inner rotor ②.



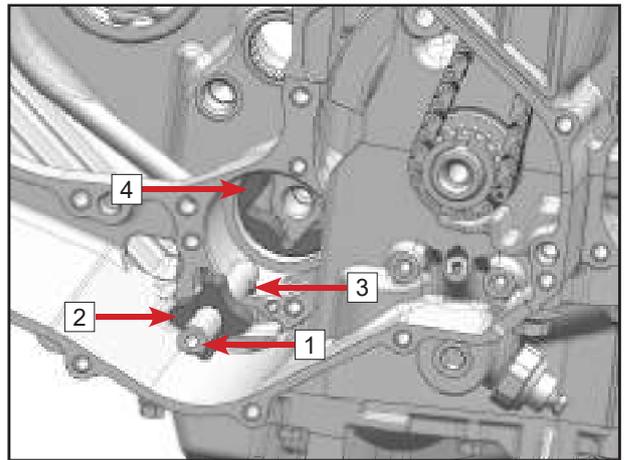
Remove roller needle ①.  
Remove oil pump body ②.



Remove roller needle ①.

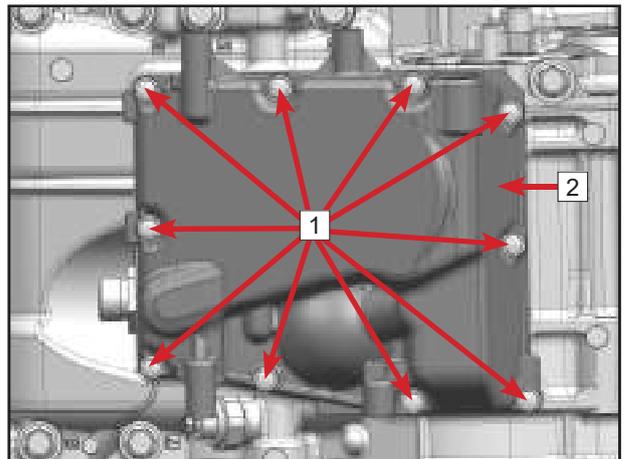


Remove oil pump shaft **1**, oil pump inner rotor **2** and needle **3** at the same time.  
Remove oil pump outer rotor **4**.

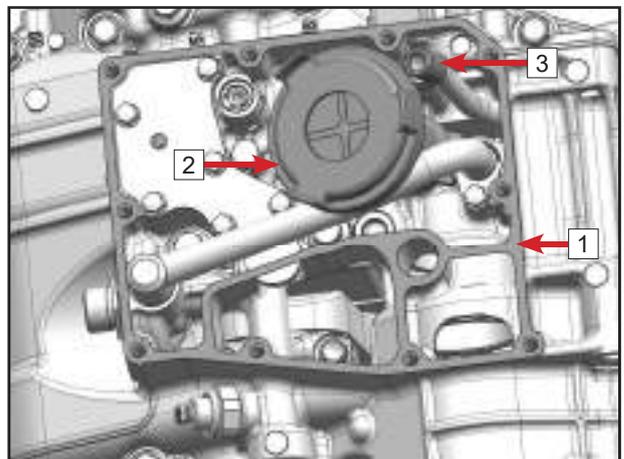


### 5.3.18 Oil Pan Removal

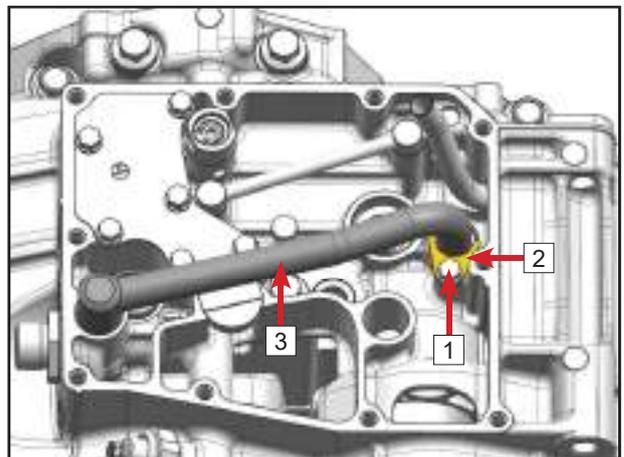
Cross diagonally loosen the bolts **1** then remove them.  
Remove oil pan **2**.



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

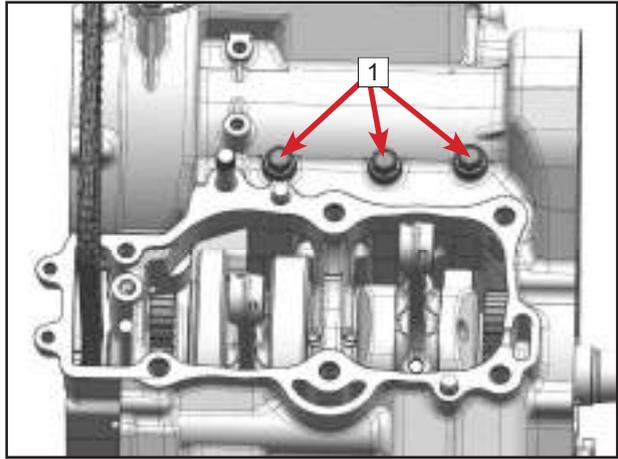


Remove bolt **1** and oil pipe I press plate **2**.  
Remove oil pipe I **3**.

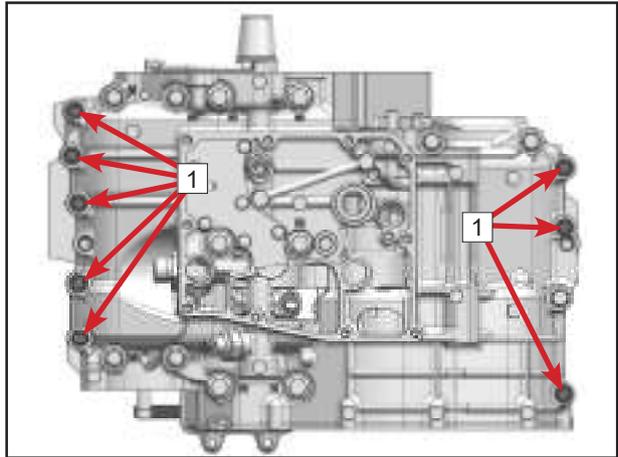


## 5.3.19 Lower Crankcase Removal

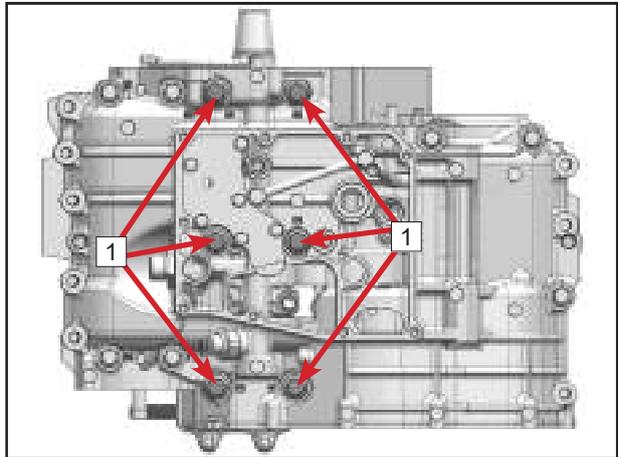
Remove bolts **1** and washers.



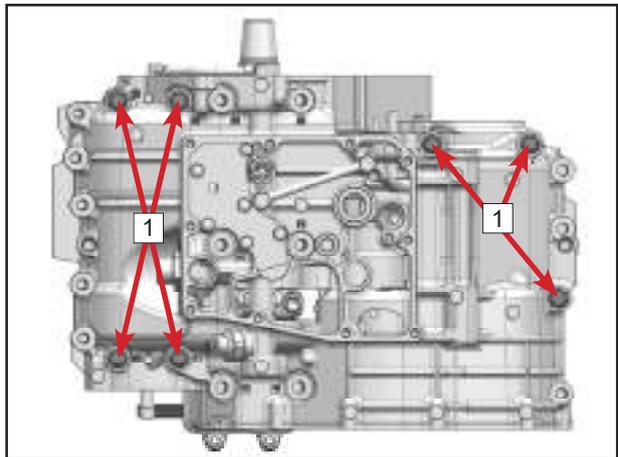
Cross diagonally loosen the bolts **1** then remove them.



Cross diagonally loosen the bolts **1** and washers then remove them.

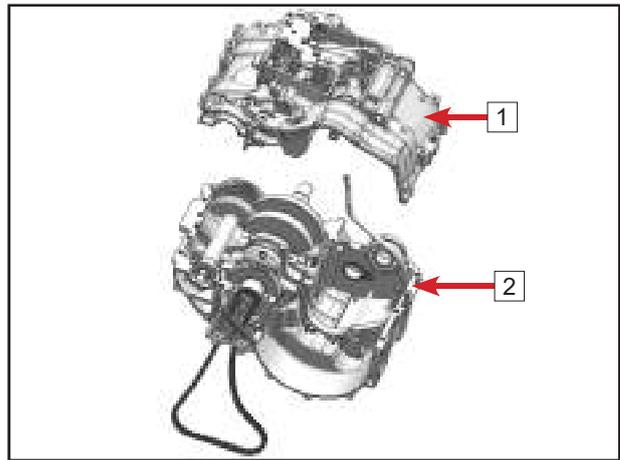


Cross diagonally loosen the bolts **1** then remove them.

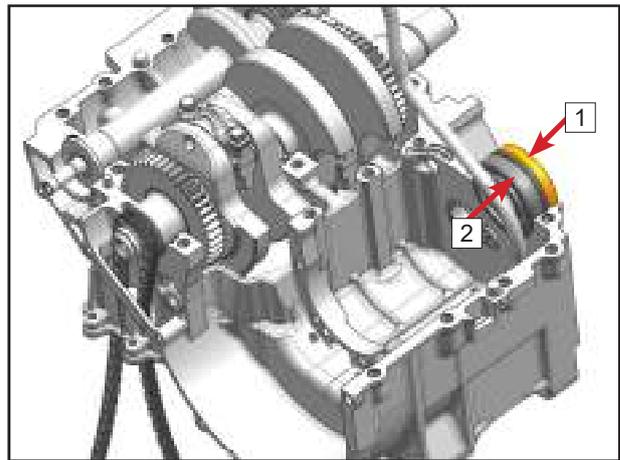


Remove the lower crankcase **1** from the upper crankcase **2**.

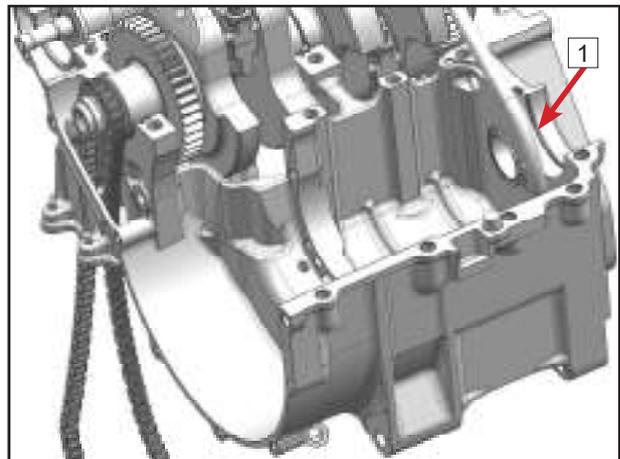
**NOTE: Make sure the plain bearing remains in place.**



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

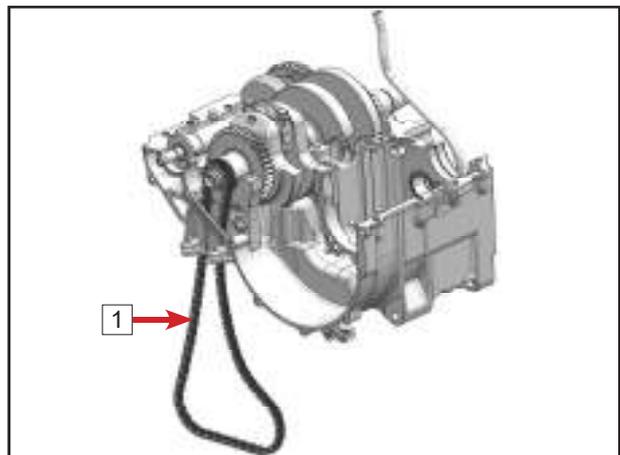


Remove bearing stop ring **1**.



### 5.3.20 Balance Shaft Assembly and Crankshaft Assembly Removal

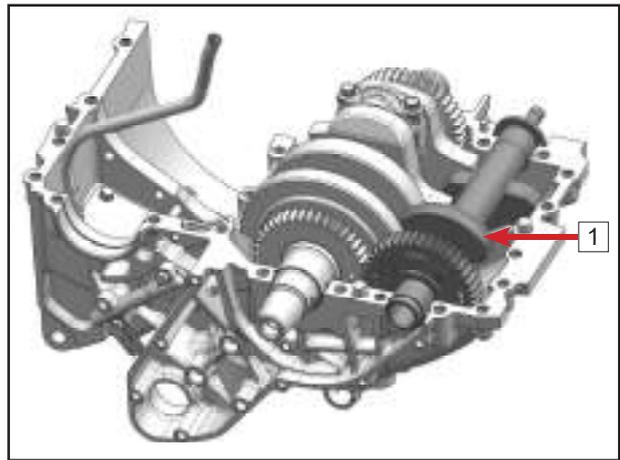
Remove timing chain **1**.



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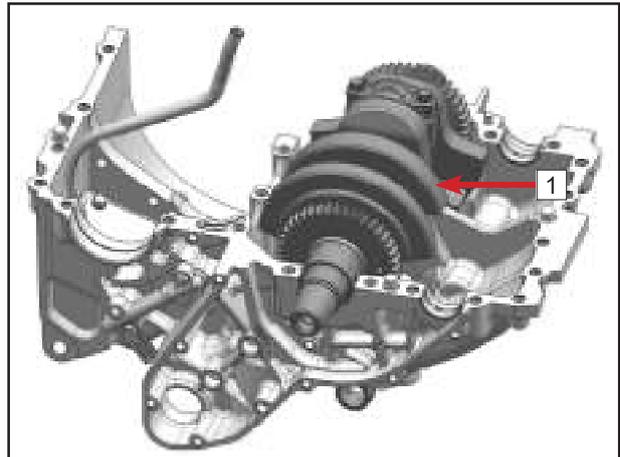
Remove balance shaft assembly 1.

**NOTE: Make sure the balance shaft plain bearing remains in place.**



Remove crankshaft assembly 1.

**NOTE: Make sure the main plain bearing remains in place.**

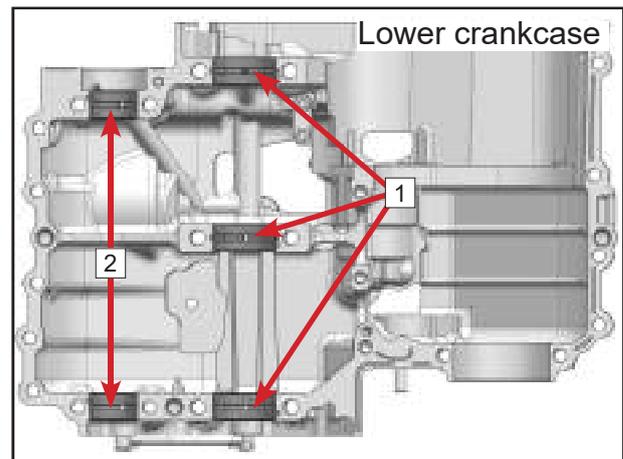
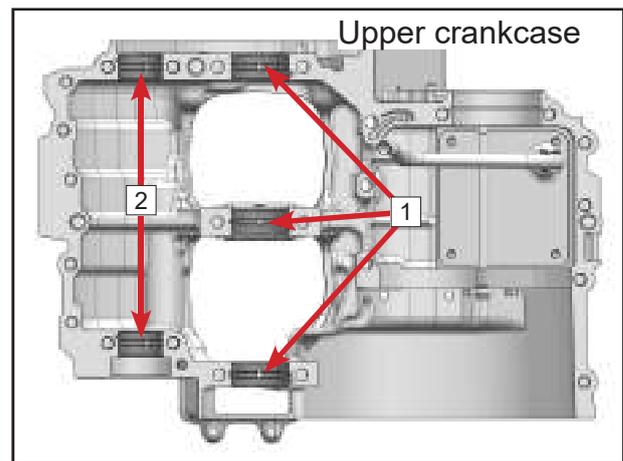


## 5.4 Engine Parts Inspection

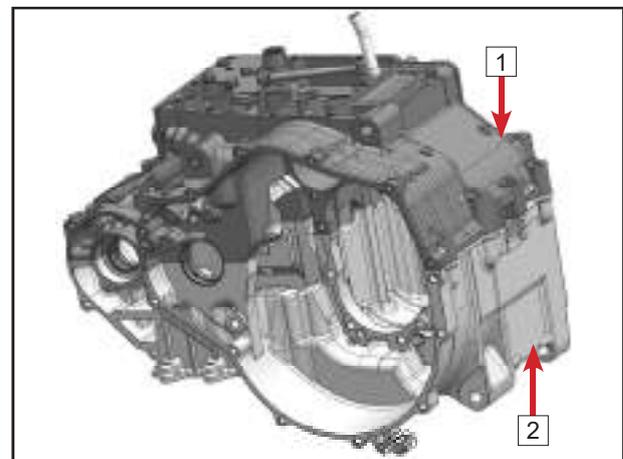
### 5.4.1 Crankshaft Main Plain Bearing and Balance Shaft Plain Bearing Radial Clearance Inspection

Remove all residual sealant and thoroughly clean the crankcase.

Clean main plain bearing [1] and balance shaft plain bearing [2].

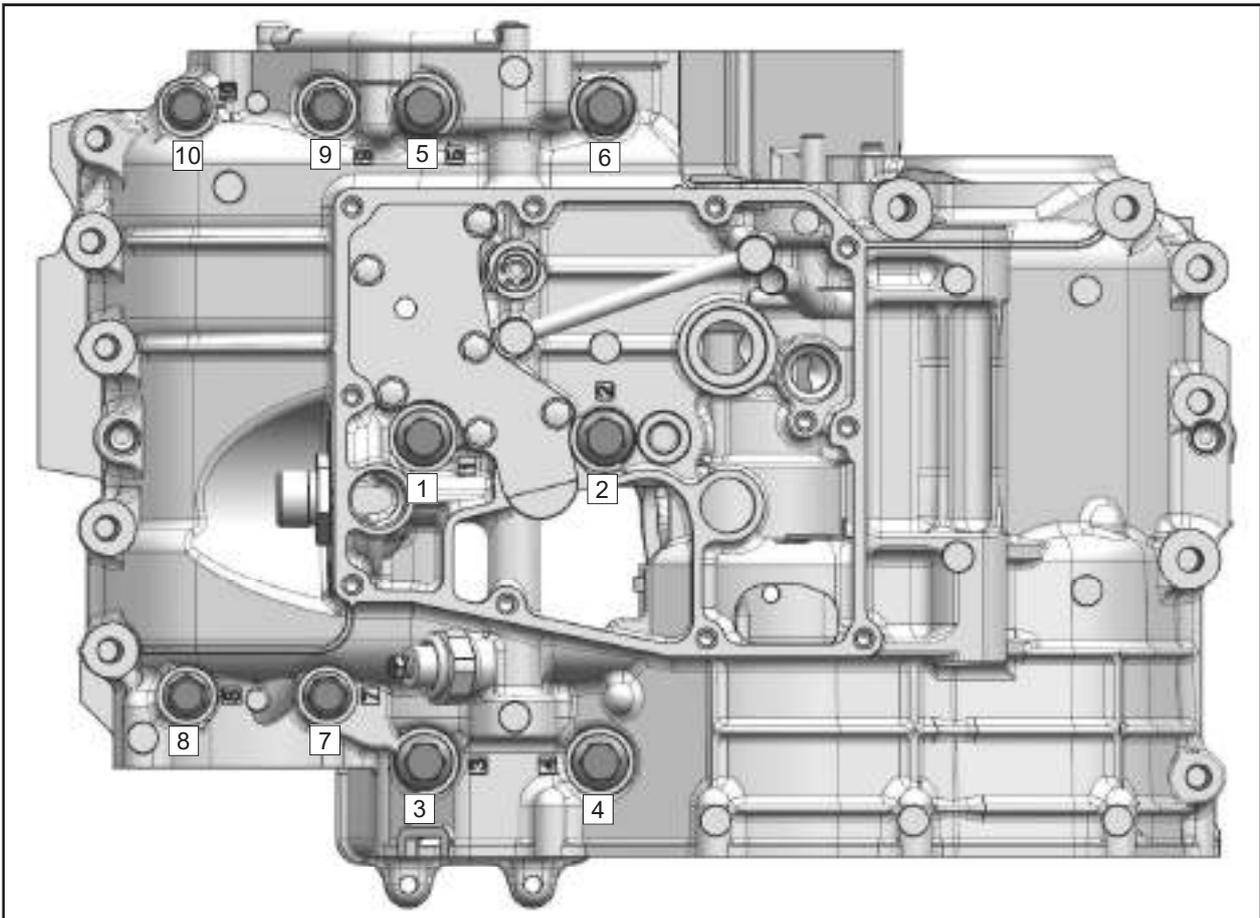


Install lower crankcase [1] onto the upper crankcase [2].



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



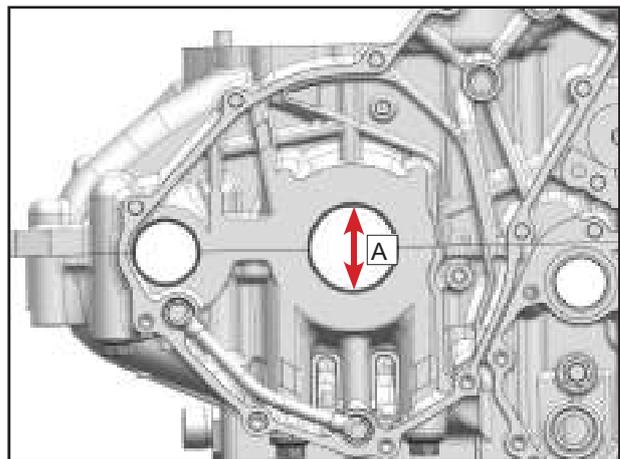
Tighten crankcase bolt as following numbers and steps:

Tighten steps	Bolt number	Torque
Step 1	1 ~ 10	8 N•m (5.9 ft-lb.)
Step 2	1 ~ 10	20 N•m (14.7 ft-lb.)
Step 3	1 ~ 10	35 N•m (25.8 ft-lb.)
Step 4	1 ~ 6	44 N•m (32.4 ft-lb.)

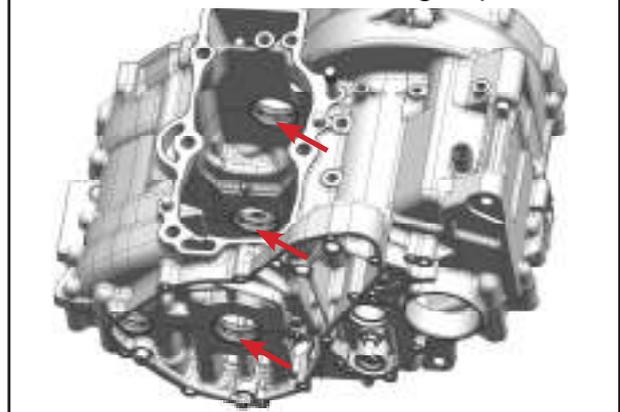
**NOTE:** Apply liquid mixed with oil and MoS<sub>2</sub> grease ( weight ratio 10:1) on thread and washer of bolt 1~10.

Perpendicular to the direction of crankcase joint, measure the inner diameter of the crankshaft main bearing **A** (a total of 4 places), and compare the outer diameter of the crankshaft main journal **D** at the corresponding position (refer to the chapter “Selecting Main Plain Bearing”). The difference between **A** and **D** is the radial clearance of crankshaft main bearing.

Crankshaft Main Bearing Radial Clearance	
Service Limit	$A - D \leq 0.07 \text{ mm}(0.00276 \text{ in})$

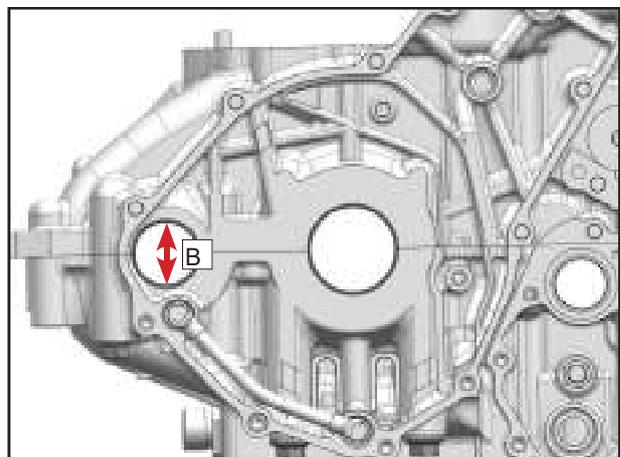


Crankshaft main bearing: 3 places

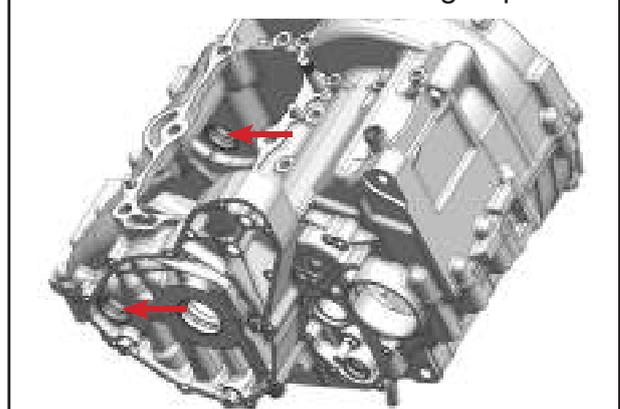


Perpendicular to the direction of crankcase joint, measure the diameter of the balance shaft bearing **B**, and compare the diameter of the balance shaft journal **E** at the corresponding position (refer to the chapter “Select Blance Shaft Plain Bearing”). The difference between **B** and **E** is the radial clearance of balance shaft bearing.

Balance Shaft Bearing Radial Clearance	
Service Limit	$B - E \leq 0.07 \text{ mm}(0.00276 \text{ in})$



Balance shaft bearing: 2 places

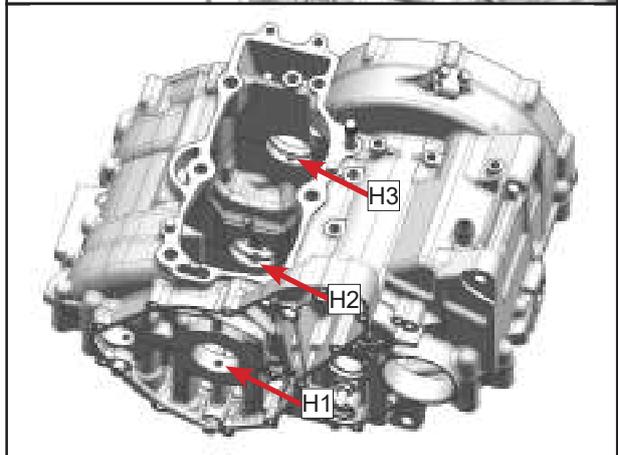
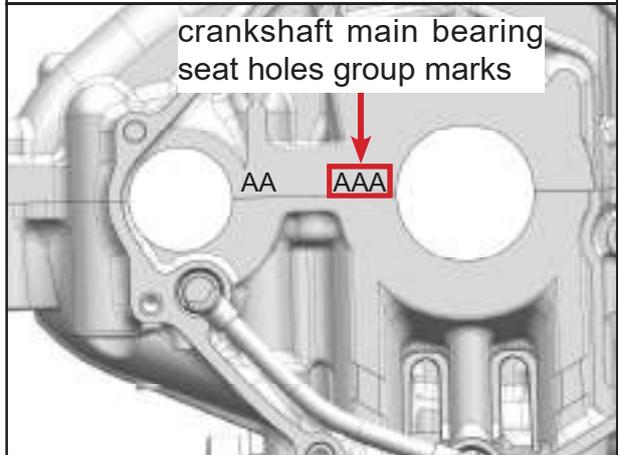
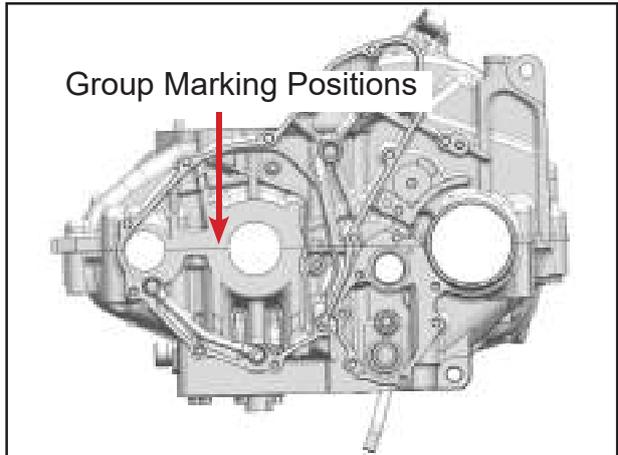
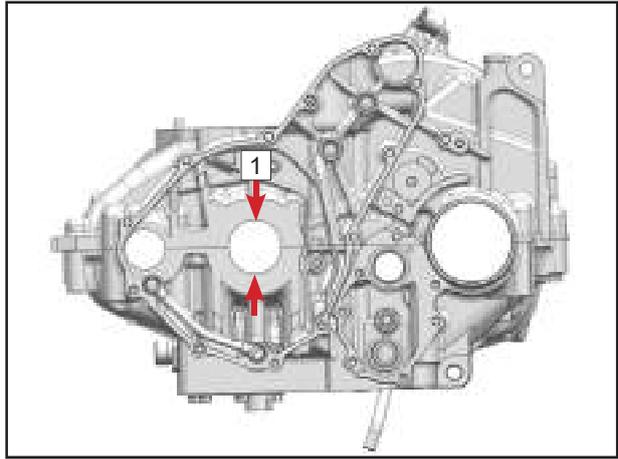


## 5.4.2 Selecting Main Plain Bearing and Balance Shaft Plain Bearing Crankshaft Main Bearing Seat Hole

The diameter 1 groups of crankshaft main bearing seat holes are shown in the table below.

Crankshaft Main Bearing Seat Hole (New Part)	
Mark	Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span>
A	41.000 ~ 41.008 mm (1.61417 ~ 1.61449 in)
B	41.008 ~ 41.016 mm (1.61449 ~ 1.61480 in)

The grouping marks are carved on the upper crankcase, as shown on the right. From left to right are the grouping marks of holes H1, H2, and H3.

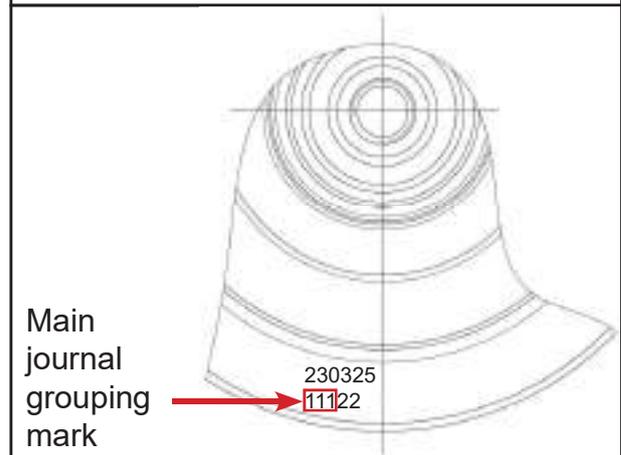
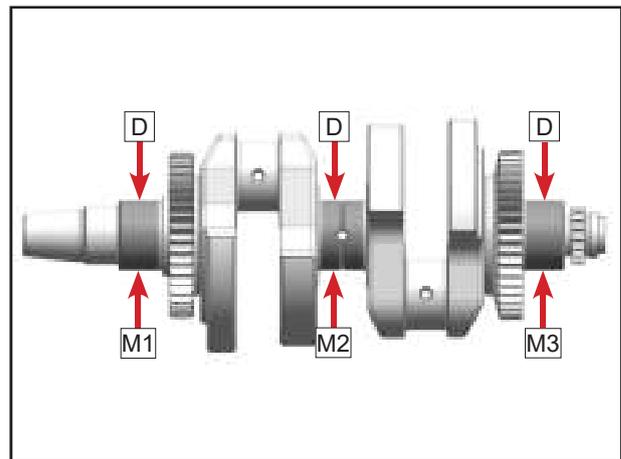


## Crankshaft Main Journal

Crankshaft main journal diameter  $\square D$  is grouped in the table below.

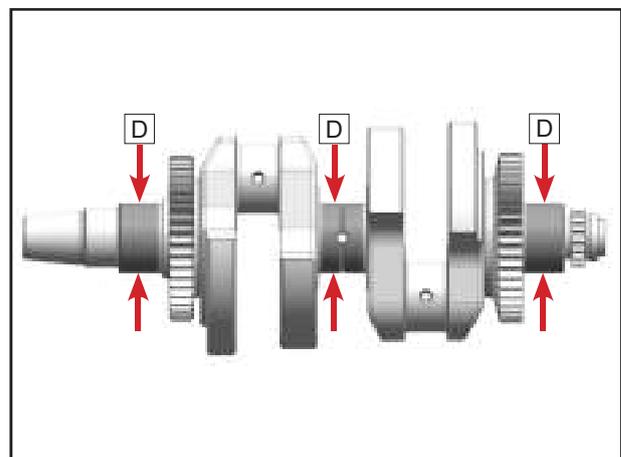
Crankshaft Main Journal (New Part)	
Mark	Diameter $\square D$
2	37.969 ~ 37.977 mm (1.49484 ~ 1.49516 in)
1	37.977 ~ 37.985 mm (1.49516 ~ 1.49547 in)

The location of grouping marks is shown on the right. From left to right are the grouping marks of the main journal M1, M2, and M3.



Measure crankshaft main journal diameter  $\square D$ . If it is less than the service limit, replace with a new part.

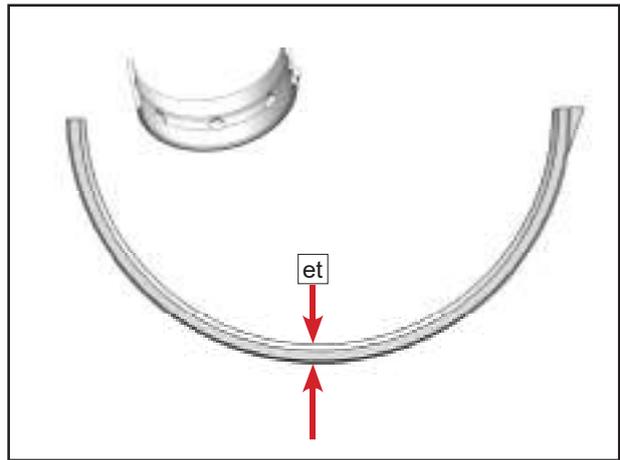
Crankshaft Main Journal Diameter $\square D$	
Service Limit	37.950 mm (1.49409 in)



## Main Plain Bearing

The main plain bearing central wall thickness  $\text{et}$  grouping is shown in the following table.

Main Plain Bearing (New Part)	
Color Mark	Central Thickness $\text{et}$
Brown	1.496 ~ 1.500 mm (0.05890 ~ 0.05906 in)
Black	1.500 ~ 1.504 mm (0.05906 ~ 0.05921 in)
Blue	1.504 ~ 1.508 mm (0.05921 ~ 0.05937 in)



## Selecting Main Plain Bearing

Select the main plain bearing according to the table below.

Crankshaft Main Bearing Seat Hole Mark	Crankshaft Main Journal Mark	Main Plain Bearing Color
A	1	Brown
A	2	Black
B	1	Black
B	2	Blue

## Balancer Shaft Plain Bearing Seat Hole

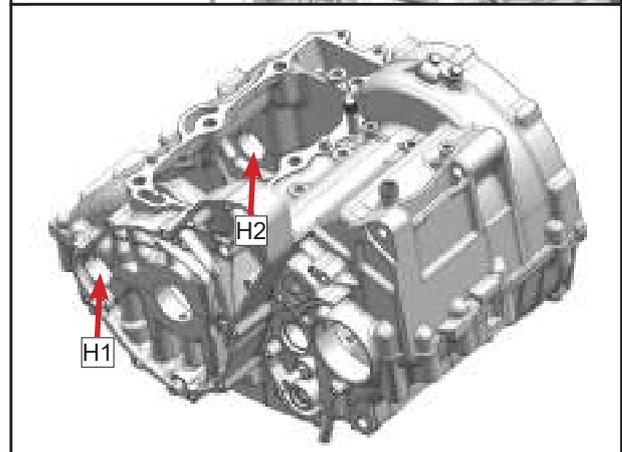
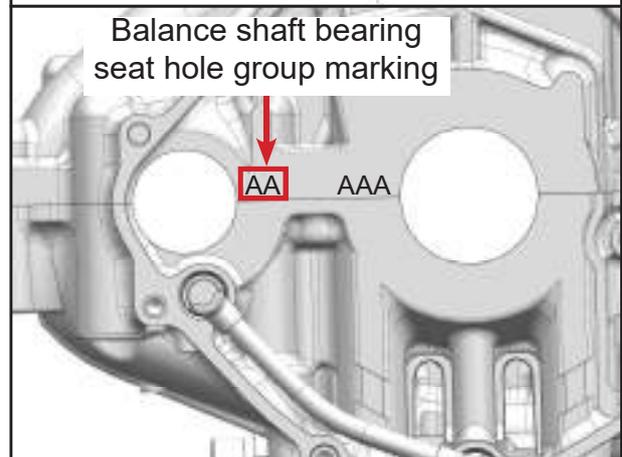
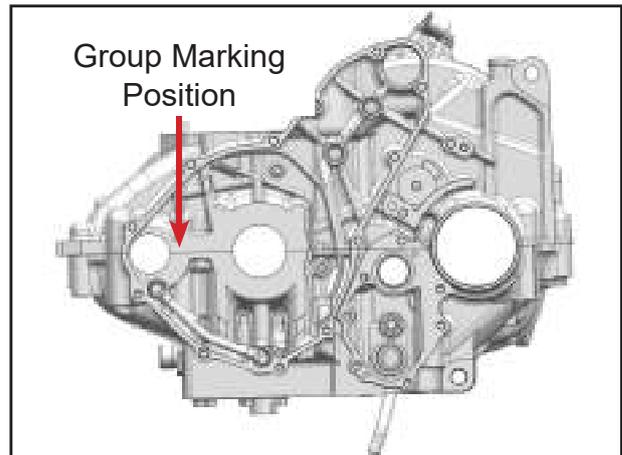
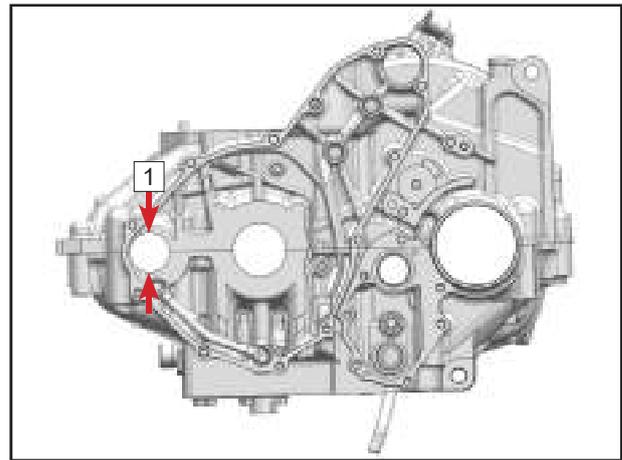
Balance shaft bearing seat hole diameter

① grouping see table below.

Balance Shaft Bearing Seat Hole (New Part)	
Mark	DIA ①
A	31.000 ~ 31.008 mm (1.22047 ~ 1.22079 in)
B	31.008 ~ 31.016 mm (1.22079 ~ 1.22110 in)

Group marks are engraved on the upper crankcase, as shown in the example on the right.

From left to right are the group marks of hole H1 and hole H2.



## Balance Shaft Journal

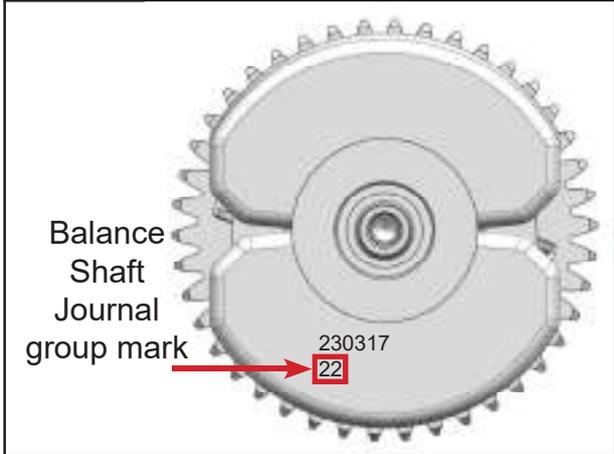
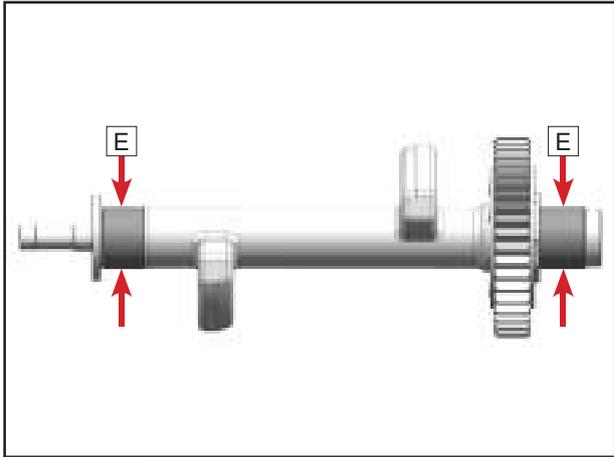
Balance shaft journal diameter [E] grouping see table below.

Balance Shaft Journal Diameter (New Part)	
Mark	DIA [E]
1	27.979 ~ 27.986 mm (1.10154 ~ 1.10181 in)
2	27.986 ~ 27.992 mm (1.10181 ~ 1.10205 in)

Group marks are as shown in the example on the right. From left to right are the group marks of journal [J1] and [J2].

Measure the journal diameter [E] of the balance shaft, if less than service limit, replace with new parts.

Balance Shaft Journal Diameter [E]	
Service Limit	27.950 mm (1.00039 in)



## Balance Shaft Assembly Grouping

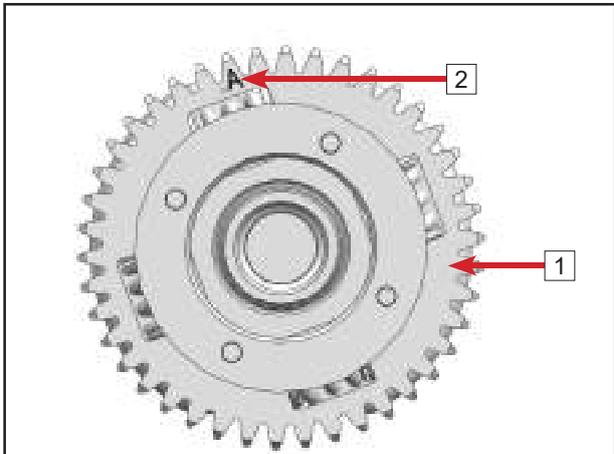
Check the tooth surface of the balance shaft gear [1] for excessive wear or other damage. Replace with a new balance shaft assembly if necessary.

The balance shaft assembly is divided into A and B groups according to its balance shaft gear [1]. The group mark (A or B) [2] is engraved on the balance shaft gear.

The balance shaft assembly and the balance shaft drive gear installed on the crankshaft are paired according to the following table.

Balance Shaft Assembly Group Marking	Balance Shaft Drive Gear (on crankshaft) Group Marking
A	B
B	A

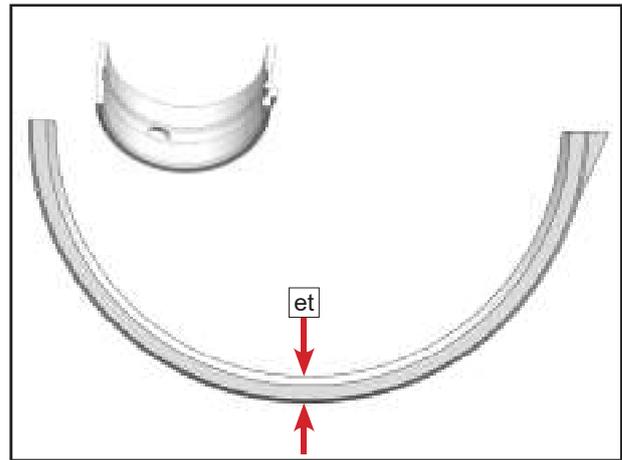
The grouping of the balance shaft drive gear is detailed in section 5.4.16.



## Balance Shaft Plain Bearing

The central wall thickness  $\text{et}$  of the balance shaft plain bearing is grouped in the following table.

Balance Shaft Plain Bearing (New Part)	
Color Mark	Central wall thickness $\text{et}$
Brown	1.490 ~ 1.494 mm (0.05866 ~ 0.05882 in)
Black	1.494 ~ 1.498 mm (0.05882 ~ 0.05898 in)
Blue	1.498 ~ 1.502 mm (0.05898 ~ 0.05913 in)



## Selecting Balance Shaft Plain Bearing

Select the balance shaft plain bearing according to table below.

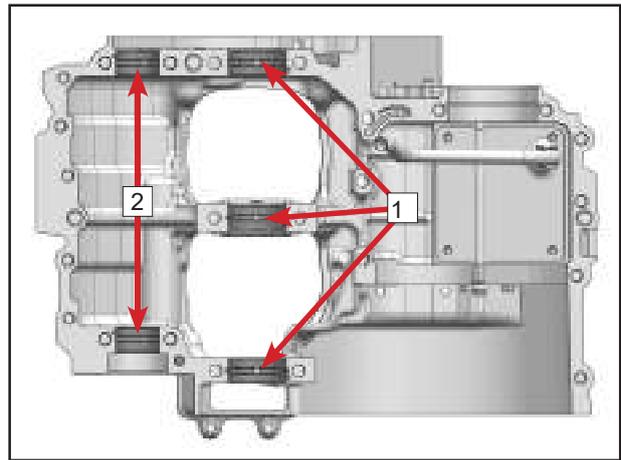
Balance Shaft Bearing Seat Hole Mark	Balance Shaft Journal Mark	Balance Shaft Plain Bearing Color
A	2	Brown
A	1	Black
B	2	Black
B	1	Blue

## 5.4.3 Main Plain Bearing and Balance Shaft Plain Bearing Replacement

Remove the main plain bearing **1** from the upper crankcase.

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

Clean the bearing seat hole.



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

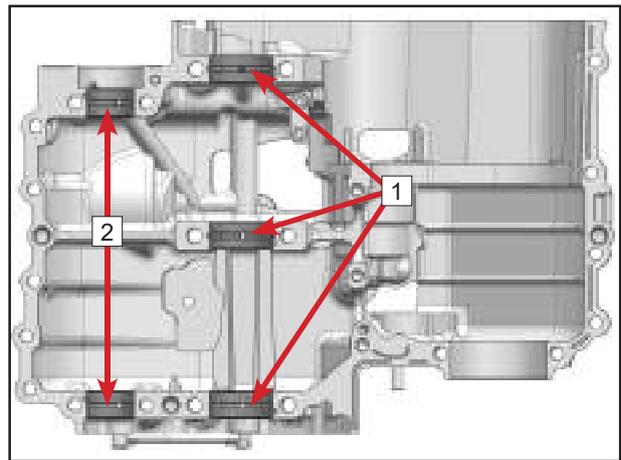
Remove balance shaft plain bearing **2** from lower crankcase.

Clean the bearing seat hole.

Select the appropriate plain bearing.

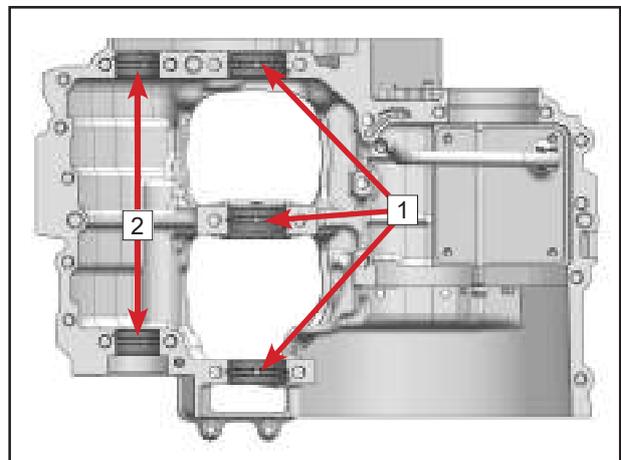
Install new main plain bearing **1** on lower crankcase.

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



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

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



### Pay attention to the following details when installing the plain bearing:

- The bearing must be flush with the split surface of crankcase.
- The bearing locating lip must fit with the bearing lock groove on the crankcase.

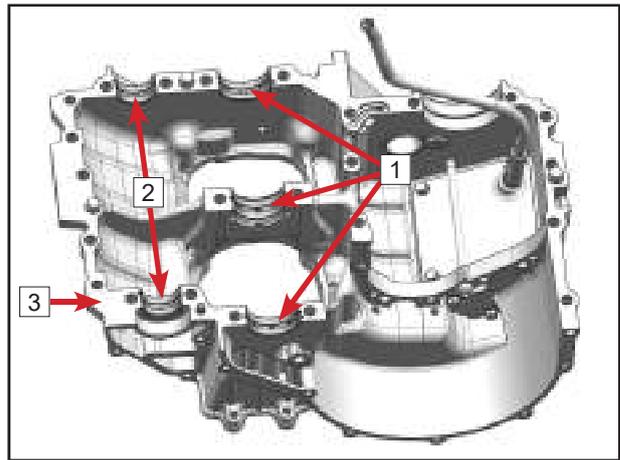
## 5.4.4 Upper Crankcase Operation

Remove all residual sealant and thoroughly clean the upper crankcase.

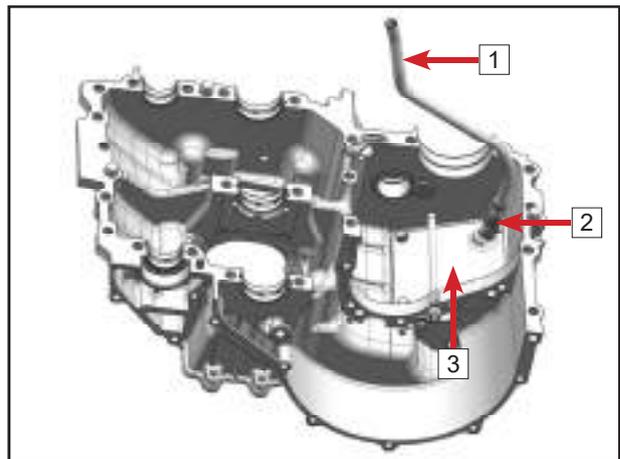
Check upper crankcase **3** for cracks or other damage. Replace if necessary.

**NOTE: Replace upper crankcase and lower crankcase as a set.**

Check main plain bearing **1** and balance shaft plain bearing **2** for damage, scratches or excessive wear. Replace it if it does.



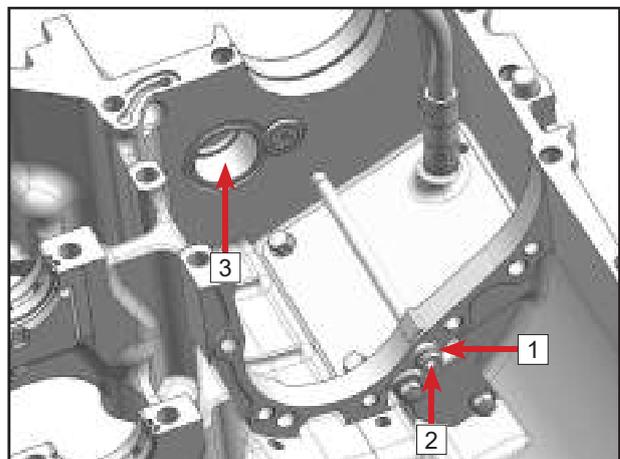
Inspect oil return hose **1**, breather connecting pipe **2**, breather assembly **3** for damage. Replace it if it does.



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

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

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

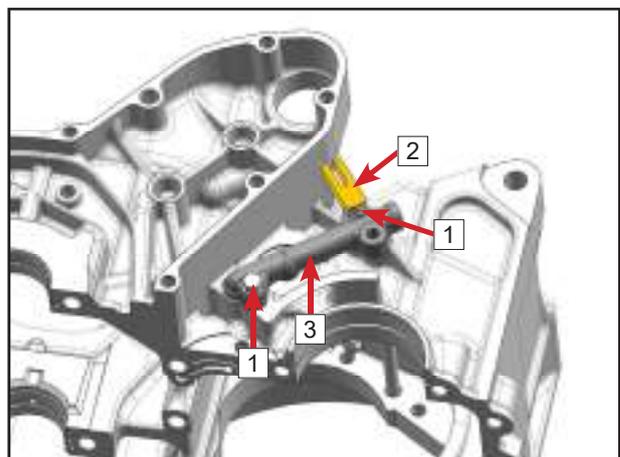


## Oil Pipe IV Assembly

### Removal

Remove bolt **1** and clip **2**.

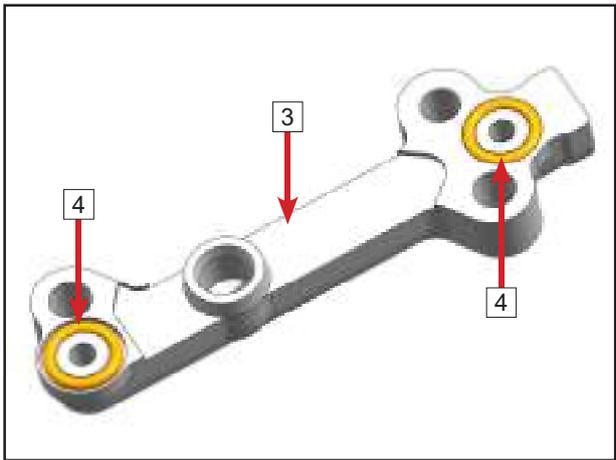
Remove oil pipe IV assembly **3** and O-ring.



## Inspection

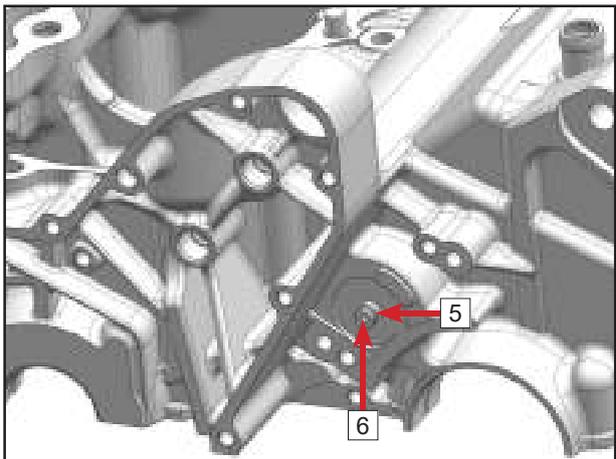
Inspect O-ring **4** for crack, harden or other damage. Replace it if it does.

Clean the oil pipe **3** with compressed air to ensure smooth oil flow.



Inspect O-ring **5** for crack, harden or other damage. Replace it if it does.

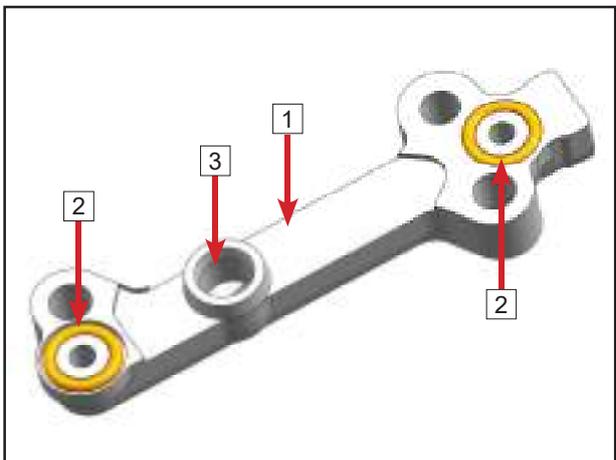
Clean the oil hole **6** with compressed air to ensure that the oil hole is smooth.



## Installation

Ensure that the O-ring **2** was installed on the oil pipe IV assembly **1**.

Apply engine oil on the installation hole **3**.

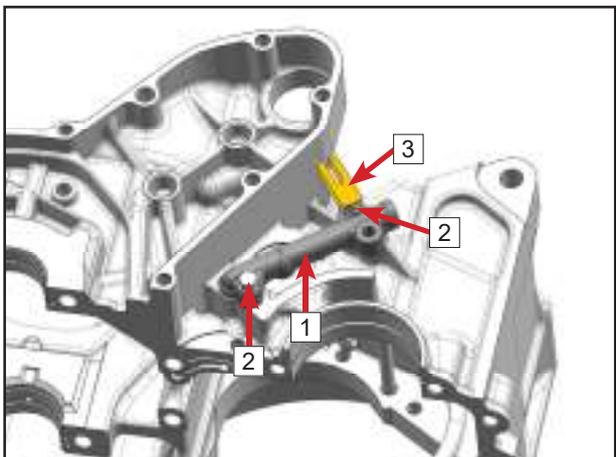


Install oil pipe IV assembly **1**.

Install bolt **2** and wire clip **3**.

Tighten bolt **2** to the specified torque.

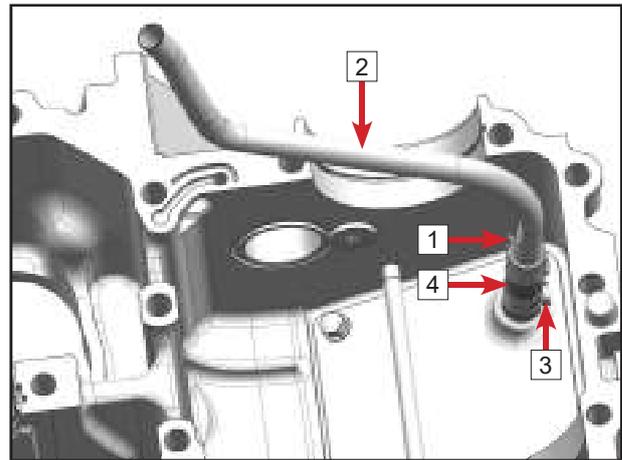
Oil Pipe IV Bolt <b>2</b>	
Torque	10 N•m (7.3 ft-lb.)



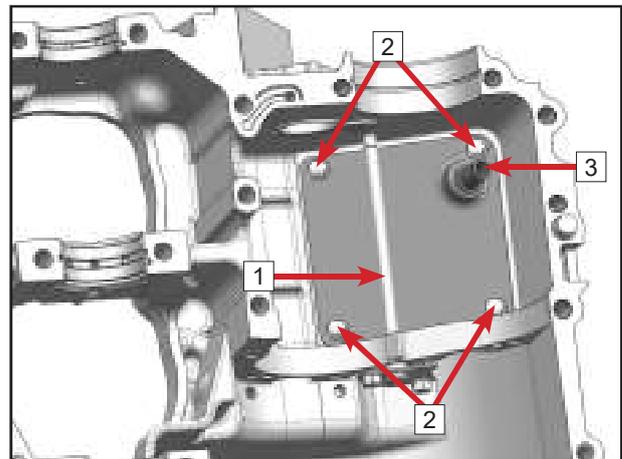
## Breather Assembly

### Removal

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



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



### Installation

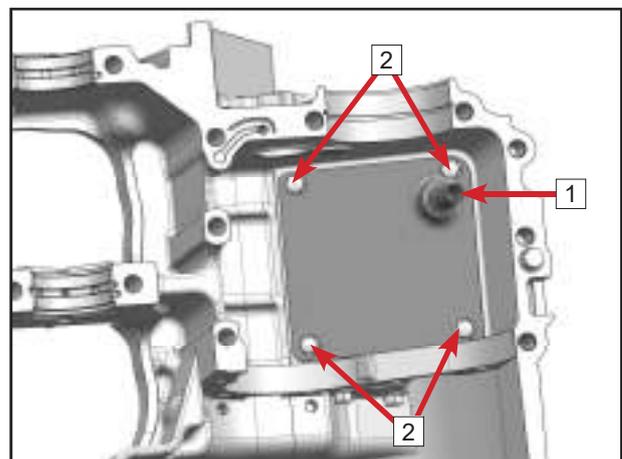
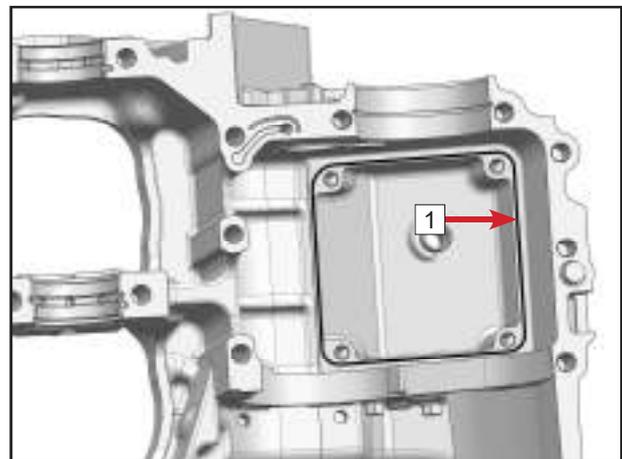
- Clean flange sealant remaining on the upper crankcase.
- Apply evenly and continuously 599 flange sealant along the track **1** shown on the right picture.

**NOTE: From applying the flange sealant to completing the installation of the breather assembly and tightening the fixing bolts, it should be controlled within 10 minutes. It is recommended that you keep everything needed close to your hand to save time.**

- Install breather assembly **1**.
- Install bolt **2** and tighten diagonally to the specified torque.

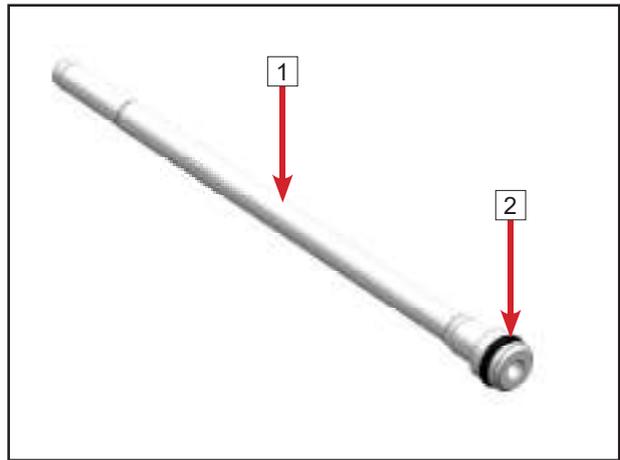
Breather Assembly Bolt <b>2</b>	
Torque	10 N•m (7.3 ft-lb.)

Remove spilled flange sealant.

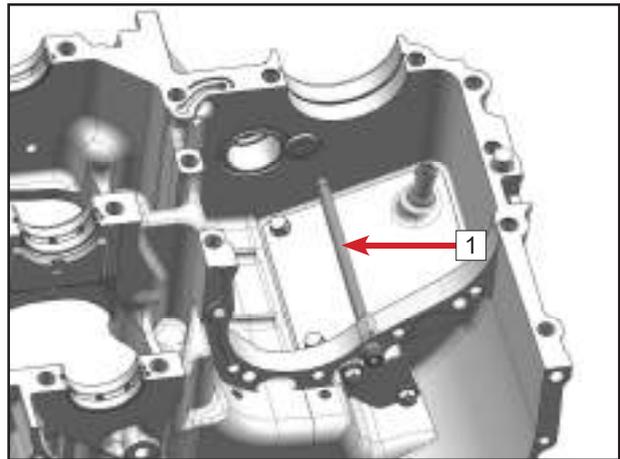


# CFMOTO

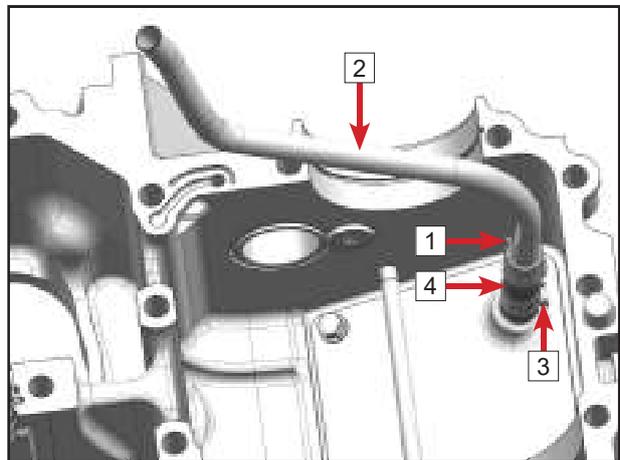
Ensure that O-ring **2** was installed on oil pipe **5** **1**.



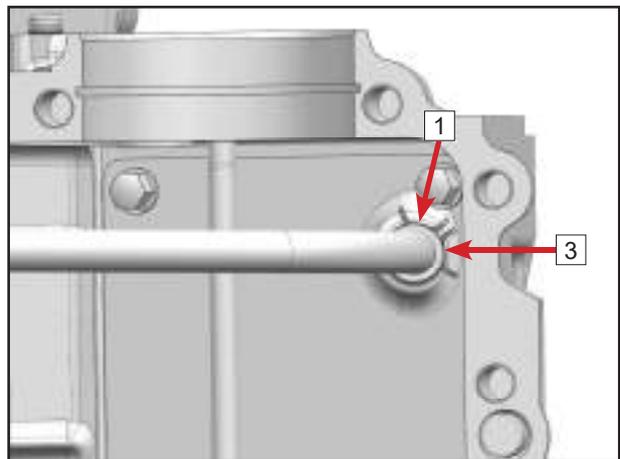
Install oil pipe **5** **1**.



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



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



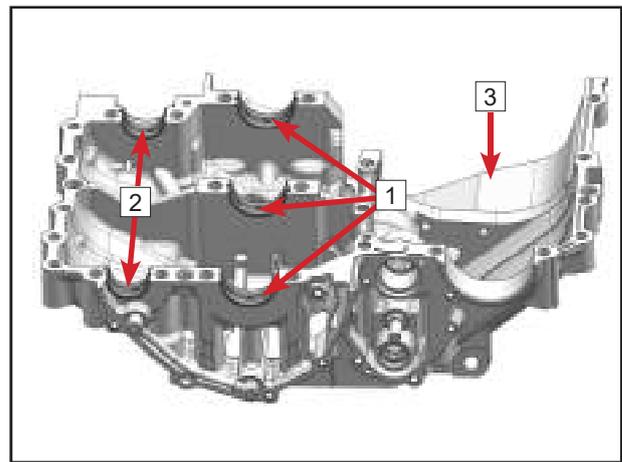
## 5.4.5 Lower Crankcase Operation

Remove all residual sealant and thoroughly clean the lower crankcase.

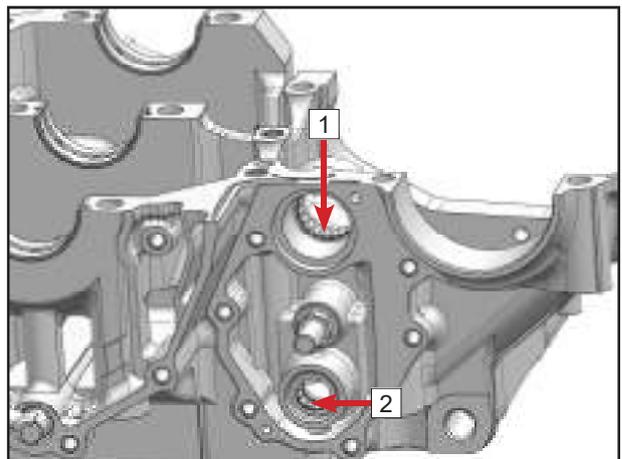
Check lower crankcase **3** for cracks or other damage. Replace it if it does.

**NOTE: Replace upper crankcase and lower crankcase as a set.**

Check main plain bearing **1** and balance shaft plain bearing **2** for damage, scratches or excessive wear. Replace it if it does.

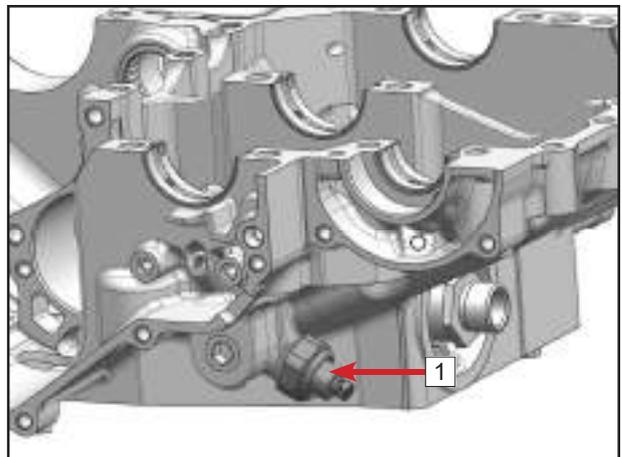


Inspect needle bearing **1** and **2** for over wear or damage. Replace it if it does.



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

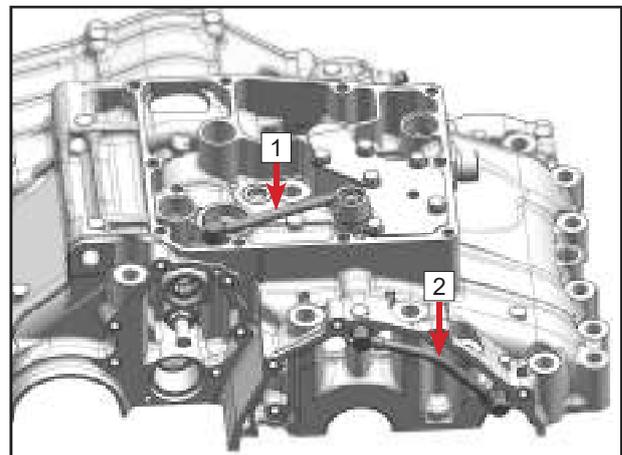
Oil Pressure Switch <b>1</b>	
Torque	15 N•m (11.1 ft-lb.)



### Oil Pipe Removal

Remove oil pipe 3 **1**.

Remove oil pipe 2 **2**.

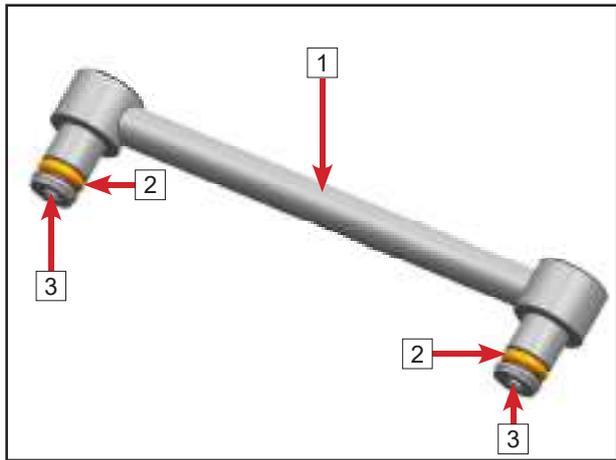


## Inspection

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

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

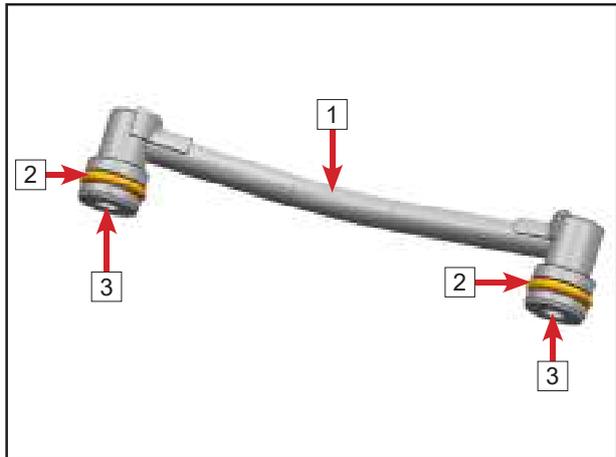
Clean the oil hole **3** with compressed air to ensure that the oil hole is smooth.



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

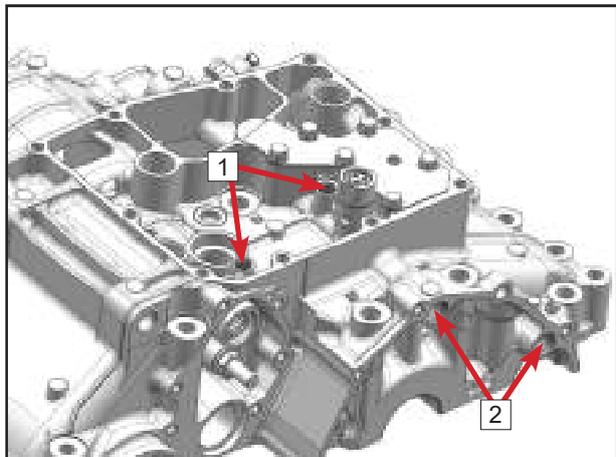
Inspect O-ring **2** for crack, harden or other damage. Replace it if it does.

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



## Installation

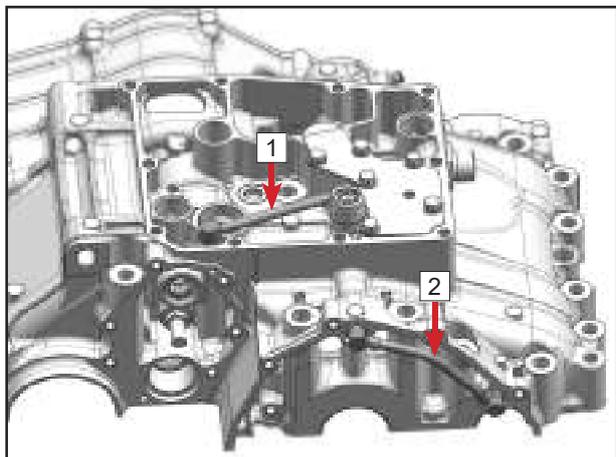
Apply oil on the hole **1** and **2**.



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

Install oil pipe 3 **1**.

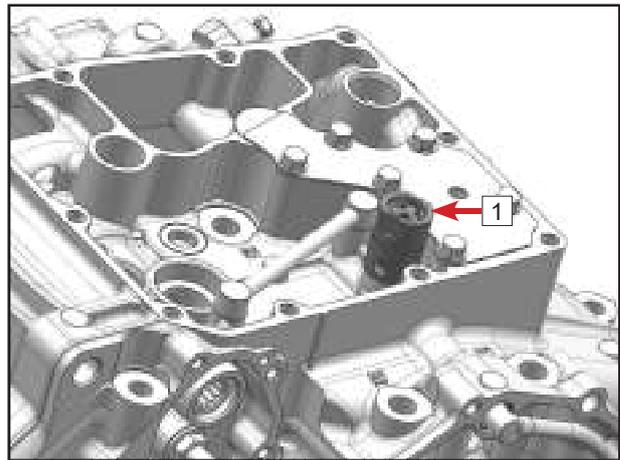
Install oil pipe 2 **2**.



## Oil Pressure Relief Valve

### Removal

Remove oil pressure relief valve [1].



### Disassembly

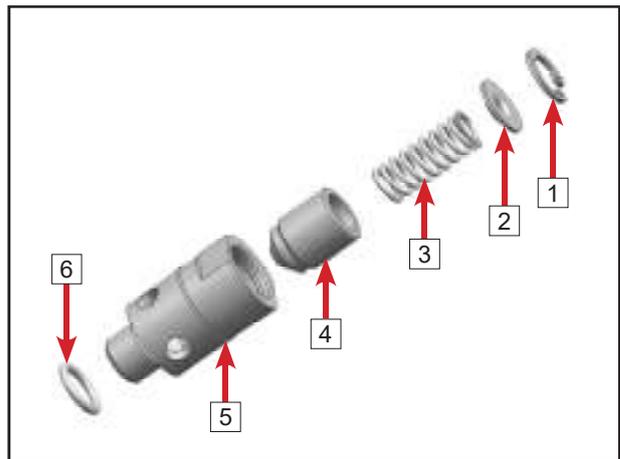
Remove circlip for hole [1].

Remove relief valve spring seat [2].

Remove relief valve spring [3].

Remove relief valve core [4].

Remove O-ring [6].



### Inspection

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

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

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

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

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

Measure relief valve spring [3] free length.

Replace spring if it is lower than limit value.

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

### Assembly

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

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

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

Install relief valve spring seat [2].

Install circlip for hole [1].

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

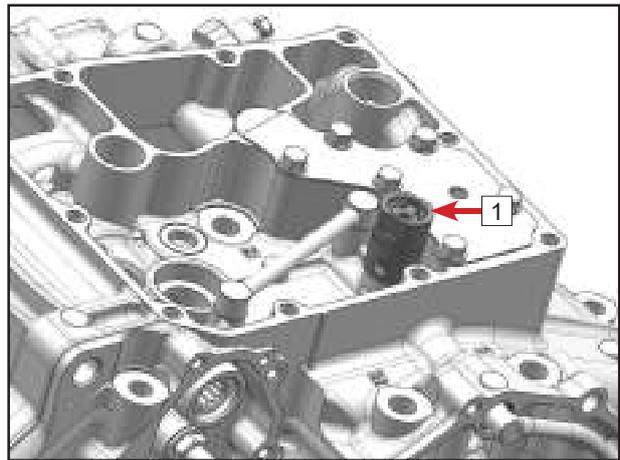
Install O-ring [6] on relief valve body [5].

## Installation

Apply engine oil to the O-ring of the oil pressure relief valve.

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

Oil Pressure Relief Valve <b>1</b>	
Torque	15 N•m (11.1 ft-lb.)



## 5.4.6 Oil Pan Operation

### Disassembly

Remove bolt **1**.

Remove oil strainer holder **2**.

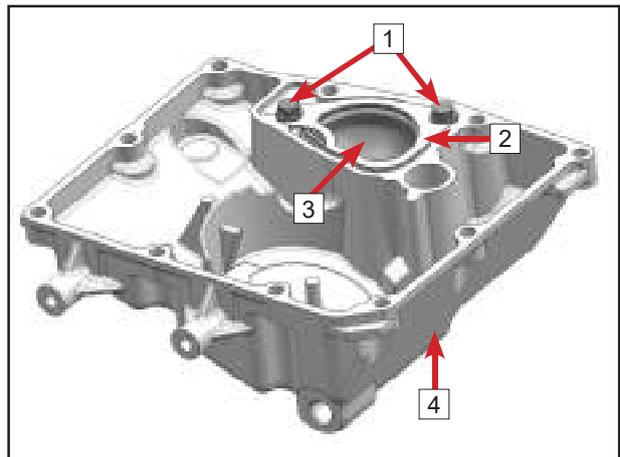
Remove oil strainer **3**.

### Inspection

Inspect oil pan **4** for crack or other damage. Replace it if necessary.

Inspect oil strainer **3** for crack or other damage. Replace it if necessary.

Remove oil strainer holder **2** for damage. Replace it if necessary.



### Assembly

Clean all parts.

Install oil strainer **3**.

Install oil strainer holder **2**.

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

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

Oil Strainer Holder Bolt <b>1</b>	
Torque	10 N•m (7.3 ft-lb.)

## 5.4.7 LH Side Cover Operation

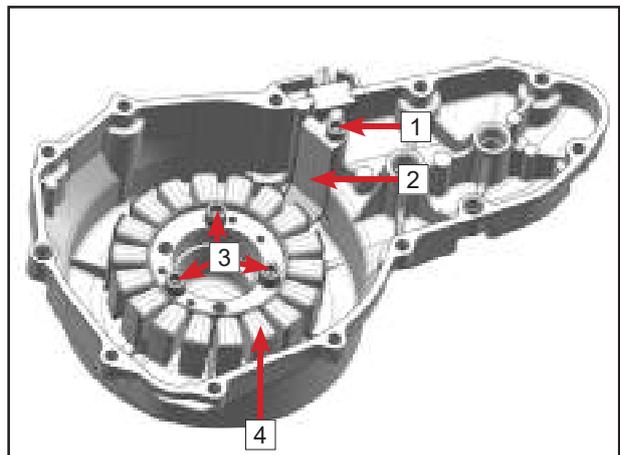
### Disassembly

Remove screw **1**.

Remove wire press plate **2**.

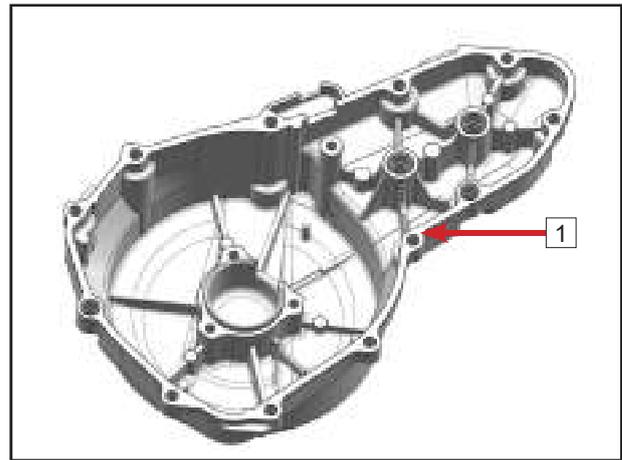
Remove screw and washer **3**.

Remove magneto stator **4**.



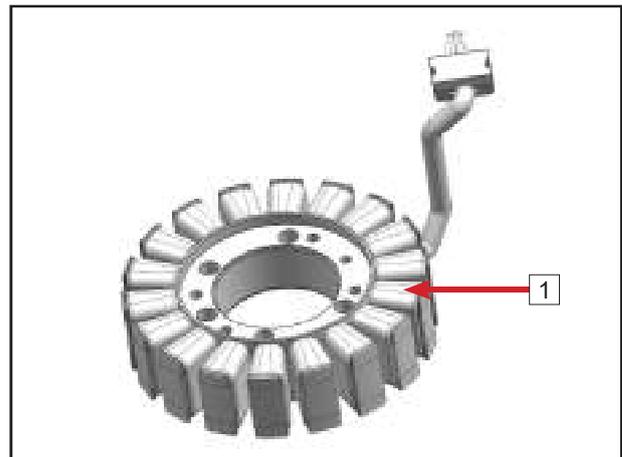
## Inspection

Check LH side cover **1** for cracks or other damage. Replace if necessary.



Check the magneto stator **1** for damage. Replace if necessary.

Check metal coils for breakage, aging, or other damage. Replace the stator if necessary.



## Assembly

Clean all parts.

Place magneto stator **4** in place.

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

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

Magneto Stator Screw <b>3</b>	
Torque	12 N•m (8.8 ft-lb.)

Place the stator wire in place.

**⚠ WARNING:** When installing the stator, each part of the wire should be installed to the corresponding position (wire reservation slot).

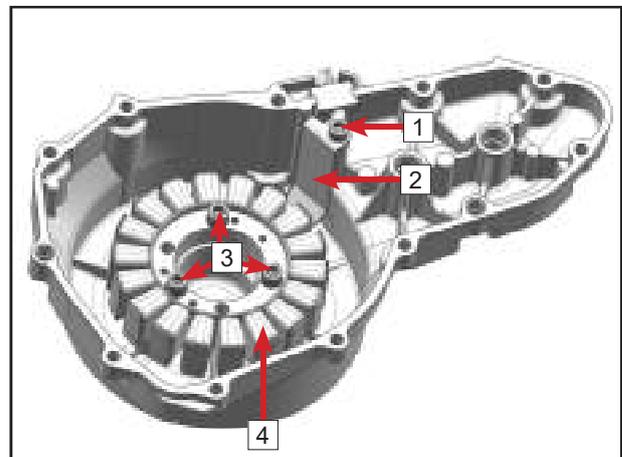
Install wire press plate **2**.

**NOTE:** Make sure the stator wire is under the press plate.

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

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

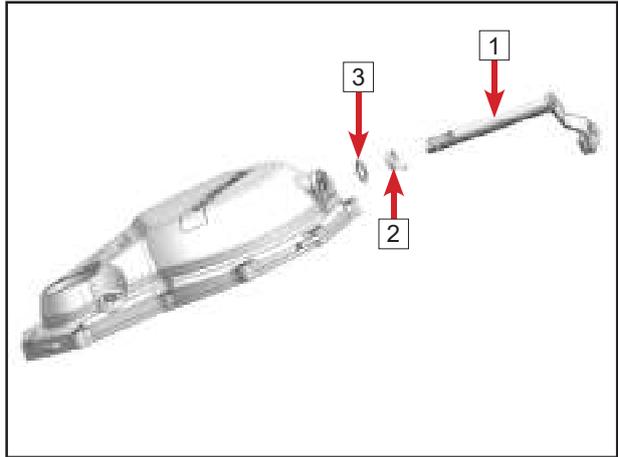
Wire Press Plate Screw <b>1</b>	
Torque	12 N•m (8.8 ft-lb.)



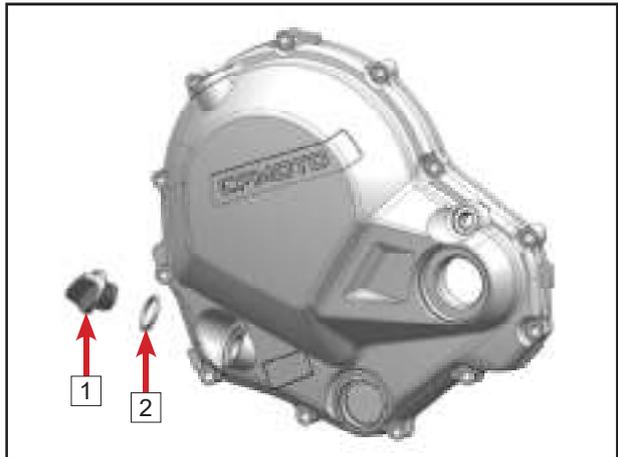
## 5.4.8 RH Side Cover Operation

### Disassembly

- Remove clutch control shaft assembly **1**.
- Remove clutch control lever return spring **2**.
- Remove washer **3**.

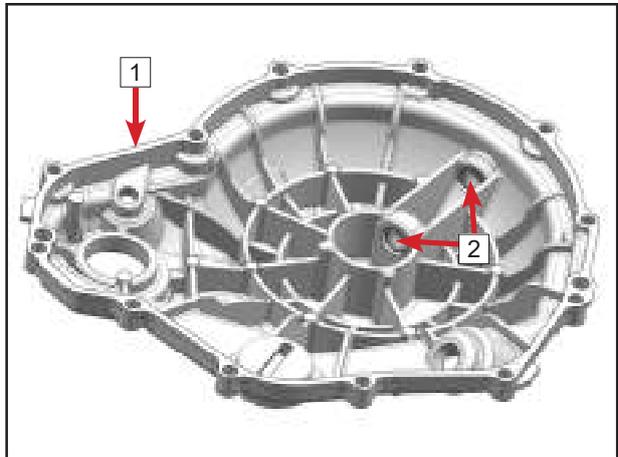


- Remove oil filling plug **1** and O-ring **2**.
- Check O-ring **2** for brittleness, hardening, or damage. If found, replace it.

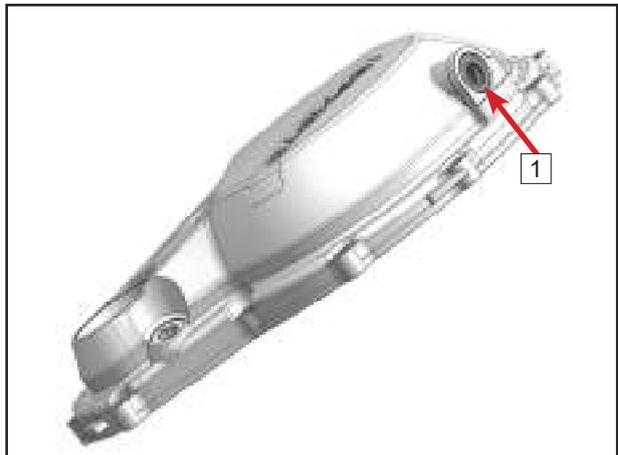


### Inspection

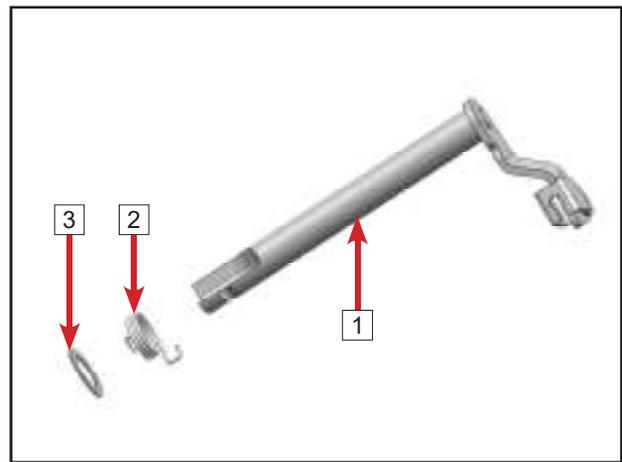
- Check RH side cover **1** for cracks or other damage. Replace if necessary.
- Check whether the needle bearing **2** is seriously worn or damaged, and whether the rotation is flexible. Replace if necessary.



- Check oil seal **1** for brittleness, hardening, or damage. If yes, replace it.

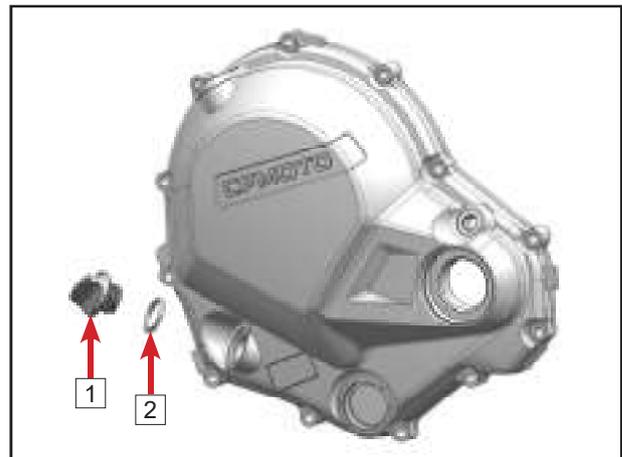


Check clutch control shaft assembly **1** for severe worn or damaged. If yes, replace it.  
Check clutch control lever return spring **2** for severe deformation, worn or damaged. If yes, replace it with a new one.  
Check the washer **3** for severe wear or damage. If yes, replace it with a new one.

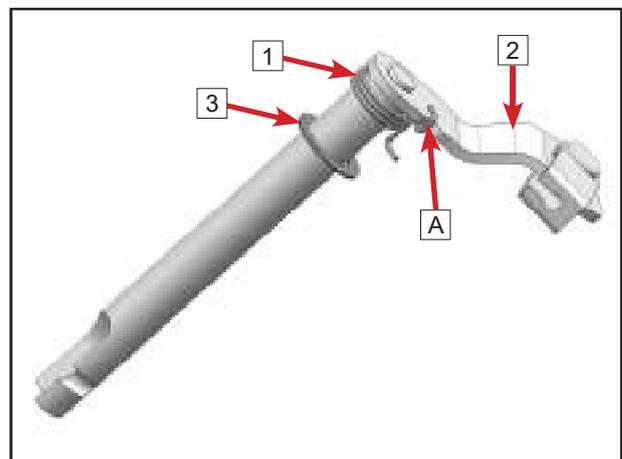


### Assembly

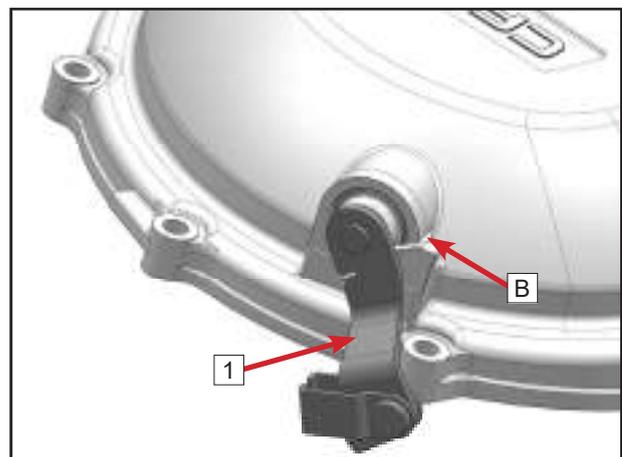
Apply oil on the O-ring **2**.  
Install O-ring **2** on the oil filling plug **1**.  
Install oil filling plug on the RH side cover, and tighten.



Install the clutch control lever return spring **1** on the clutch control shaft, and the end **A** of the spring is stuck into the gap of clutch control arm **2**.  
Install washer **3** on the clutch control shaft.

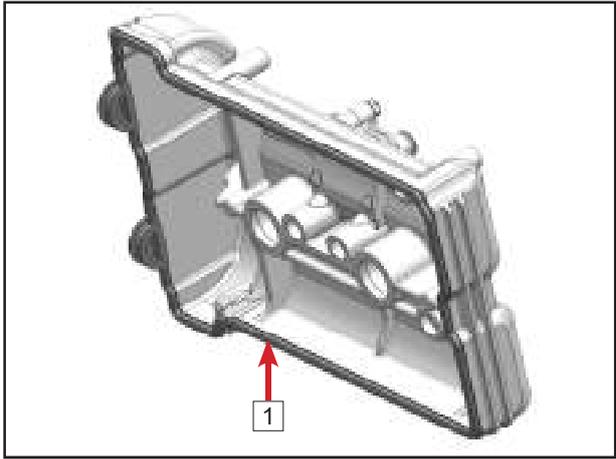


Install the clutch control shaft assembly **1** on the RH side cover, and the other end **B** of the spring is stuck to the RH side cover.



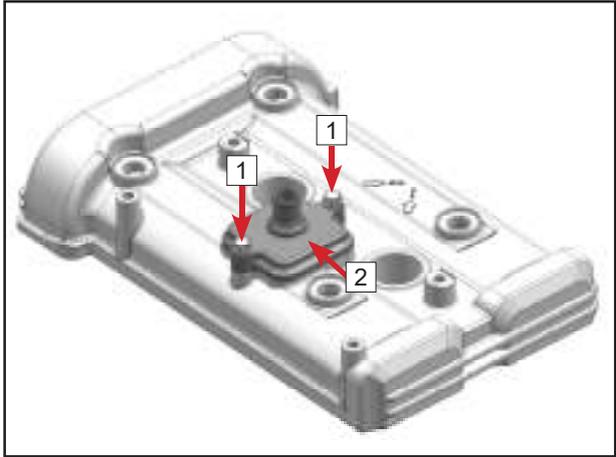
## 5.4.9 Cylinder Head Cover Operation Disassembly

Remove cylinder head cover seal ring **1**.

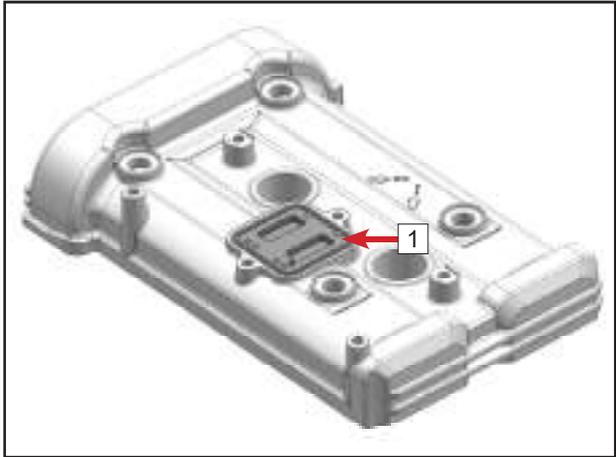


Remove bolts **1**.

Remove one-way valve cover **2**.



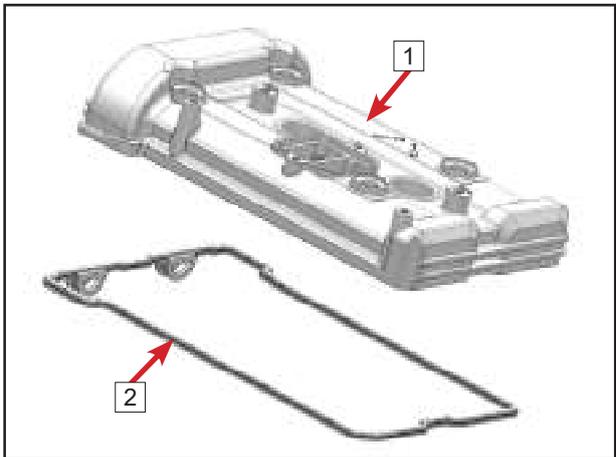
Remove reed valve assembly **1**.



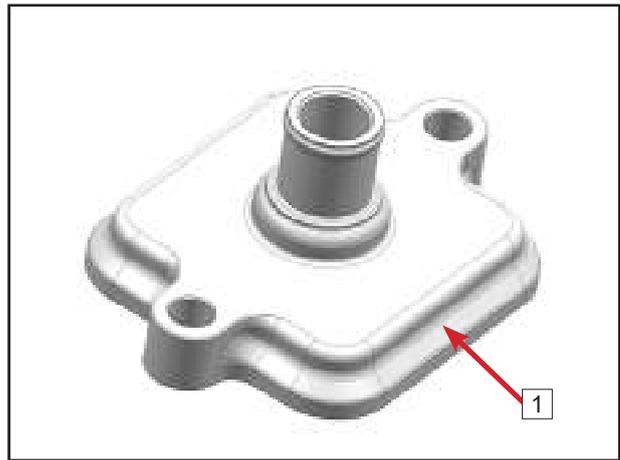
### Inspection

Check cylinder head cover **1** for cracks or other damage. Replace if it does.

Check cylinder head cover seal ring **2** for cracks, hardening or other damage. Replace if it does.



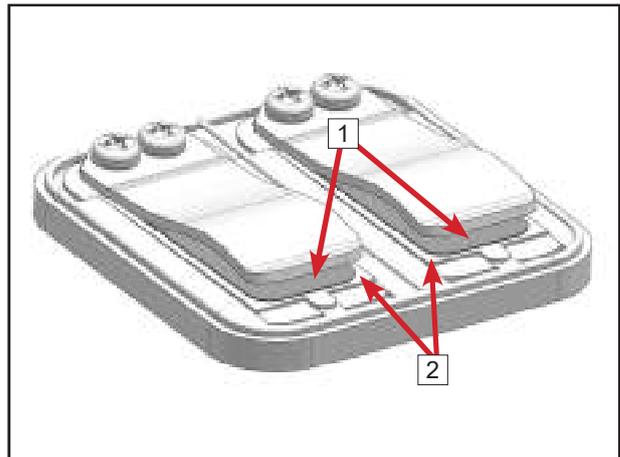
Check one-way valve cover **1** for cracks or other damage. Replace if it does



Visually check the reeds **1** for cracks, folds, warps, heat damage or other damage. If there is any doubt about the condition of reeds **1**, replace the reed valve assembly.

Check the reed contact areas **2** of the valve seat for grooves, scratches, any signs of separation from the seat or heat damage. If there is any doubt about the reed contact areas **2**, replace the reed valve assembly.

If any carbon or other foreign particles have accumulated between the reed and the reed contact area, wash the valve assembly clean with a high-flash point solvent.



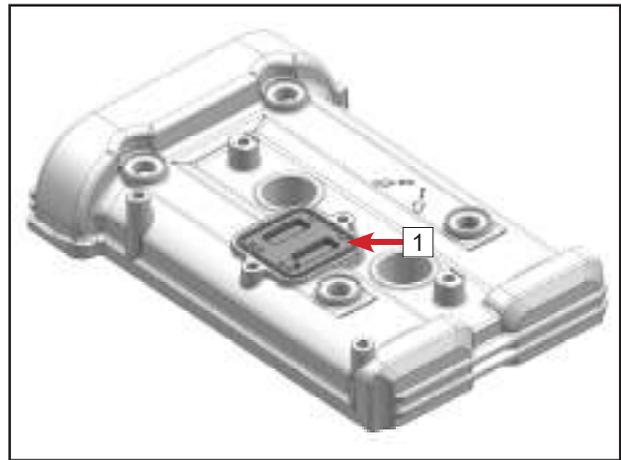
**⚠ CAUTION: Do not scrape off the deposits with a scraper, as this could damage the rubber, which in turn will require replacement of the reed valve assembly.**

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## Assembly

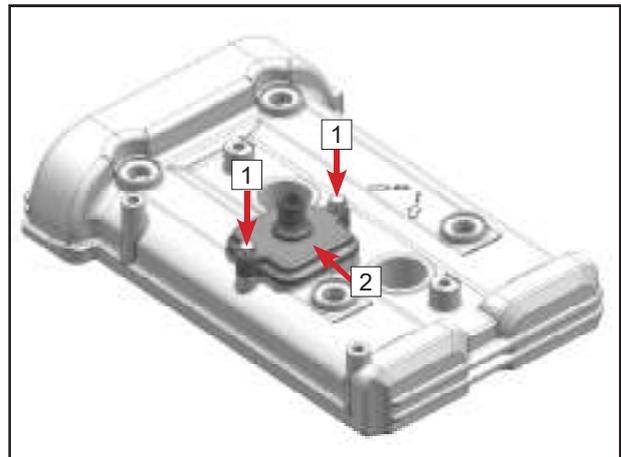
Place the reed valve assembly **1** in place.

**NOTE: Make sure that the reed valve assembly is installed in the correct direction.**

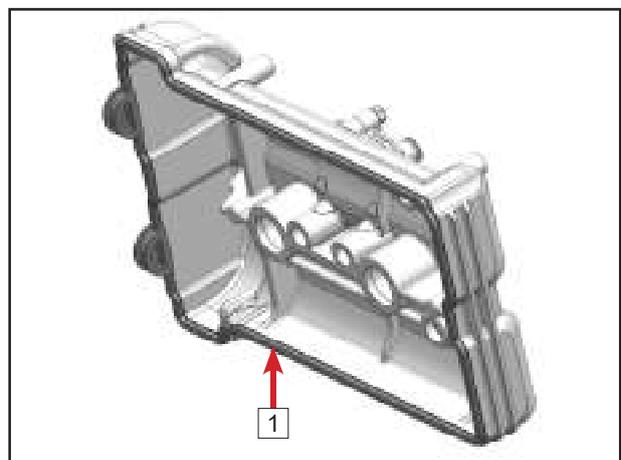


Place the one-way valve cover **2** in place. Install bolts **1**, and tighten to the specified torque.

<b>One-way Valve Cover Bolt</b> <b>1</b>	
Torque	10 N•m (7.3 ft-lb.)



Install the cylinder head cover seal ring **1** on the cylinder head cover.

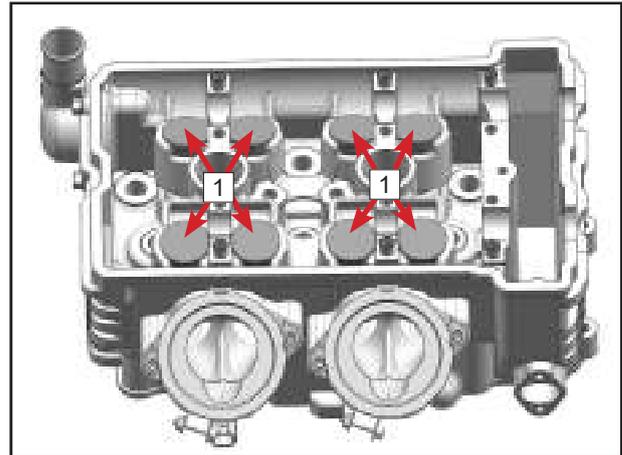


## 5.4.10 Cylinder Head Disassembly

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

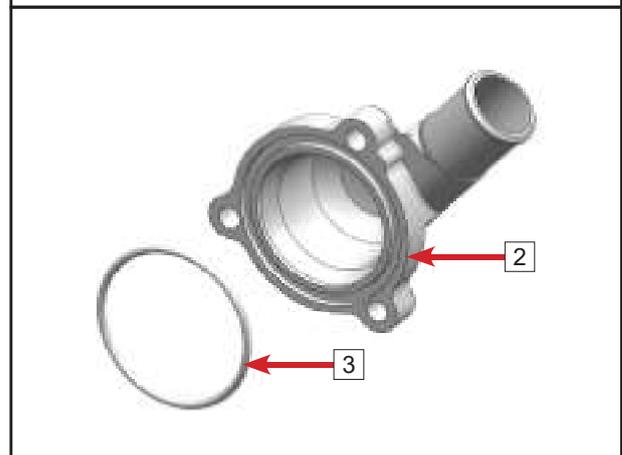
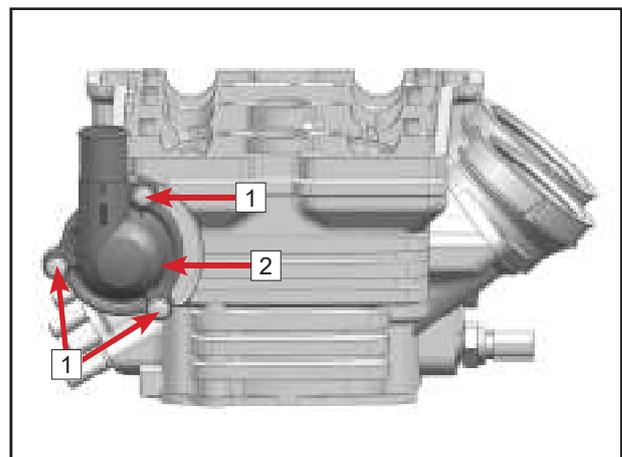
Remove valve tappets **1**.

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

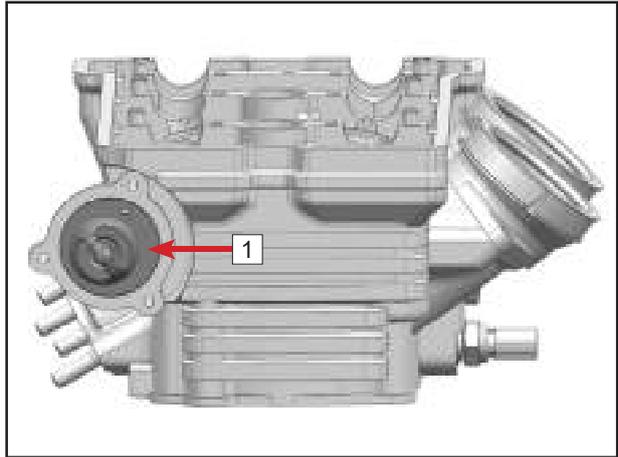


Remove bolts **1**.

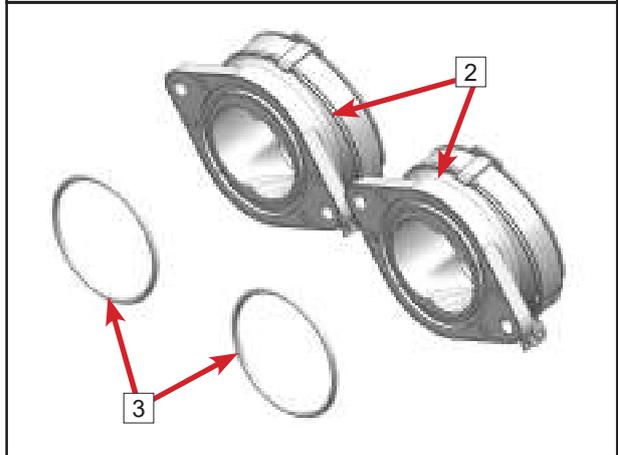
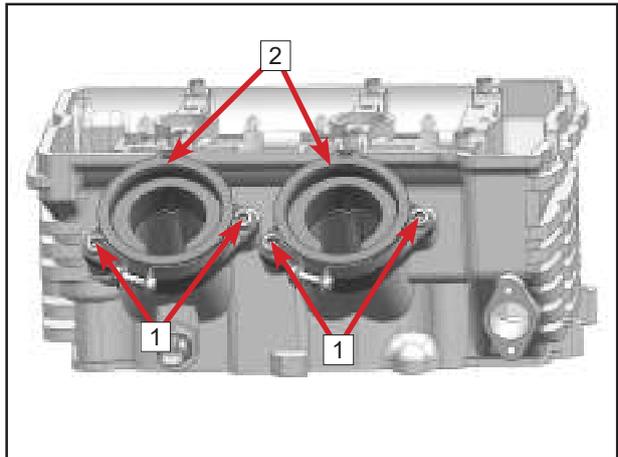
Remove thermostat cover **2** and O-ring **3**.



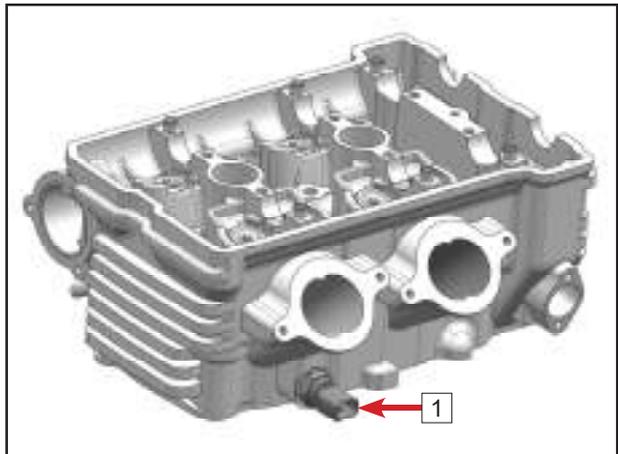
Remove thermostat **1**.



Remove screws **1**.  
Remove intake pipe assembly **2** and O-ring **3**.

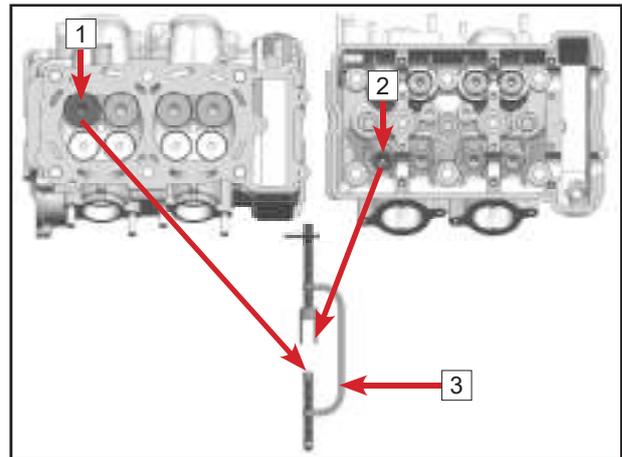


Remove coolant temperature sensor **1**.  
Check the coolant temperature sensor for details in the chapter Electrical System.

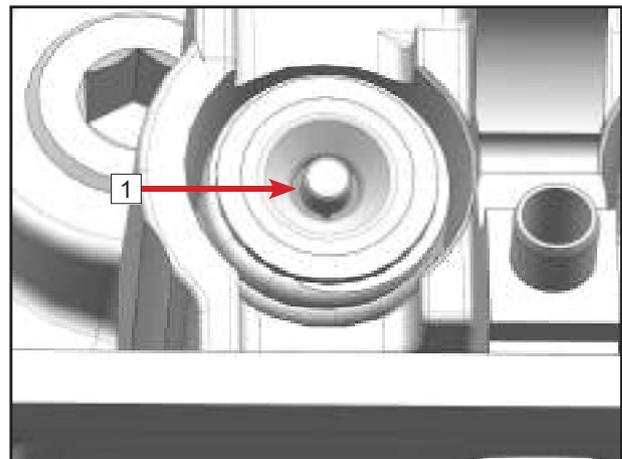


**⚠️WARNING:** Wear safety goggles when compressing valve spring. Non-standard operation may cause the valve spring to fly out and hurt people under the action of strong pre-pressure.

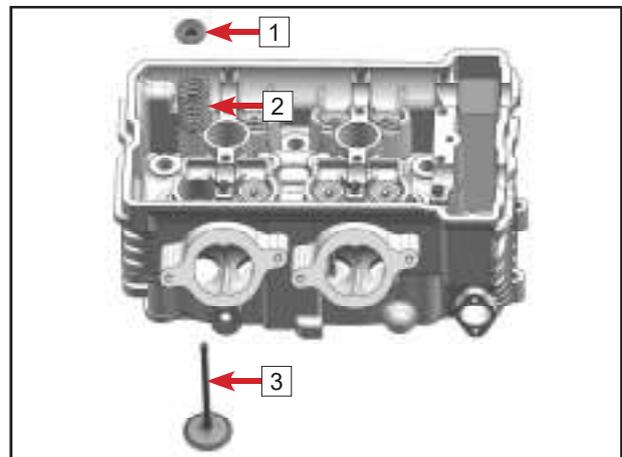
Install valve spring compressing tool [3].  
 Hold the lower part of the valve spring compressing tool against the valve disc [1], and press the upper part against the valve spring upper seat [2].  
 Rotate slowly the rod on the top of valve spring compressing tool to compress valve spring until valve lock clip is fully exposed.



Remove valve lock clip [1].



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

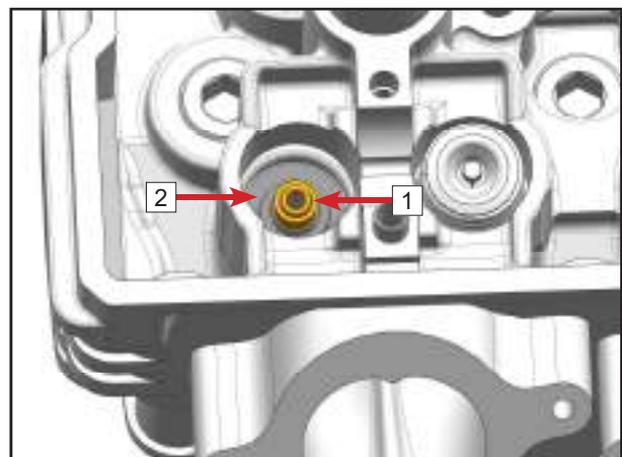


Remove and discard valve stem seal ring [1].

Remove valve spring lower seat [2].

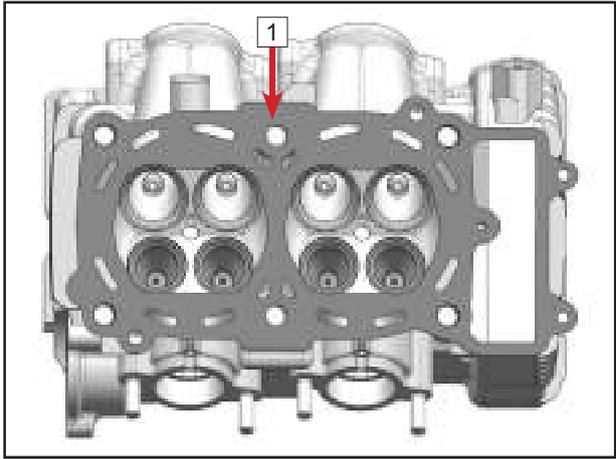
Remove other valve in the same way.

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



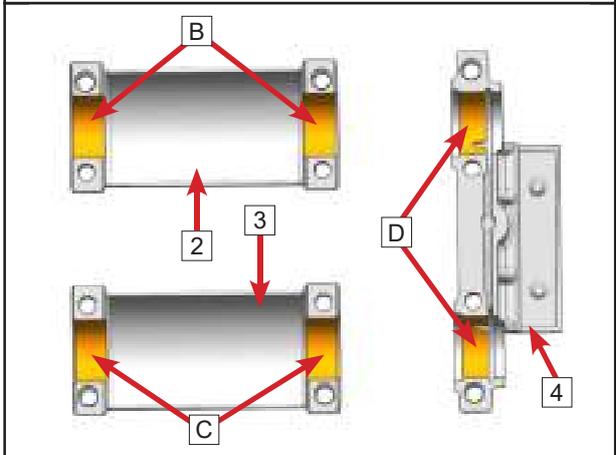
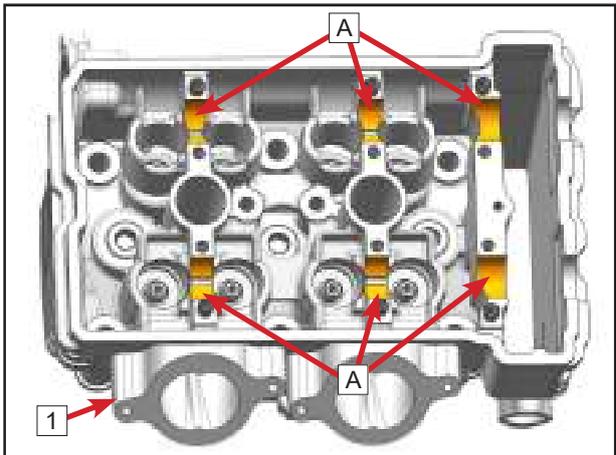
## 5.4.11 Cylinder Head Inspection

Clean carbon deposits from the combustion area and sealing surface **1**.  
Check for cracks between valve seats. If any, replace cylinder head.



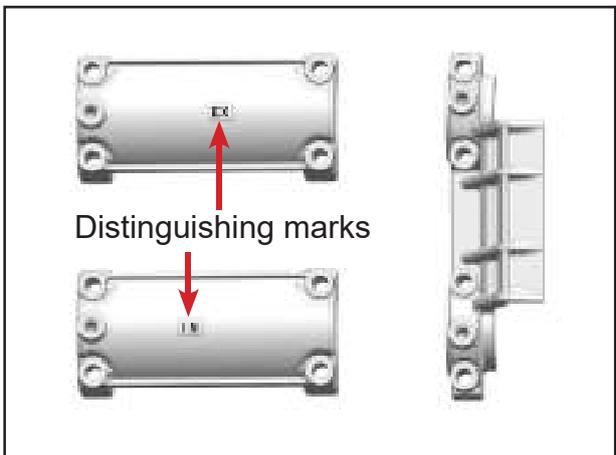
Inspect camshaft bearing hole **A**, **B**, **C** and **D** for serious wear or other damage. Replace it if found.

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



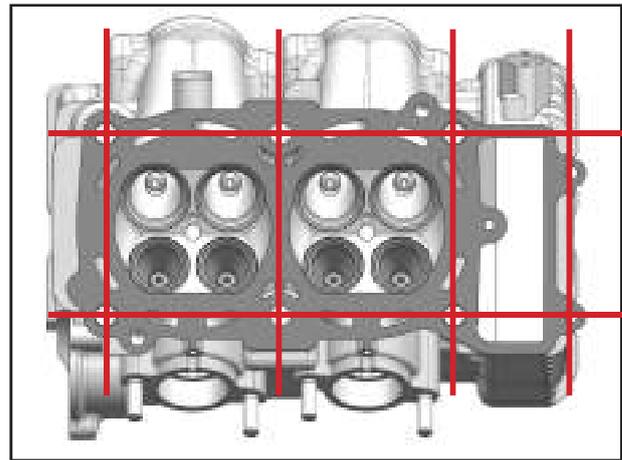
### Camshaft Seat Distinguishing Mark

IN: Air intake camshaft seat  
EX: Exhaust camshaft seat



Check the sealing surface of the cylinder head for distortion using a straightedge and a feeler gauge. Replace the cylinder head if the measured value is greater than the service limit.

Cylinder Head Sealing Surface Distortion	
Service Limit	0.05 mm (0.00197 in)

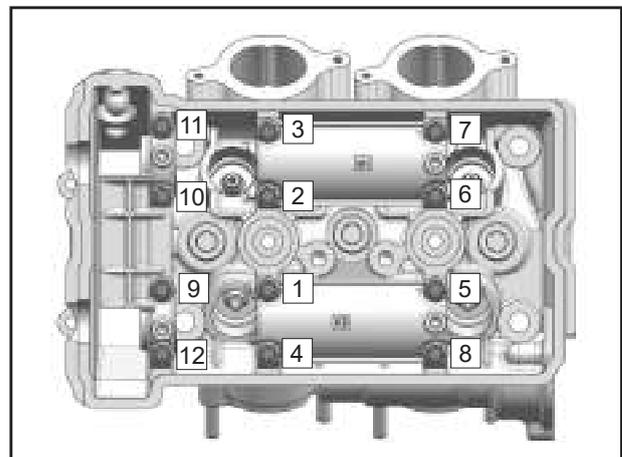


Clean cylinder head, camshaft seat and camshaft position press plate thoroughly. Install camshaft seat and camshaft position press plate on the cylinder head.

**NOTE: The cylinder head, camshaft seat and camshaft position press plate are fitted according to the matching marks.**

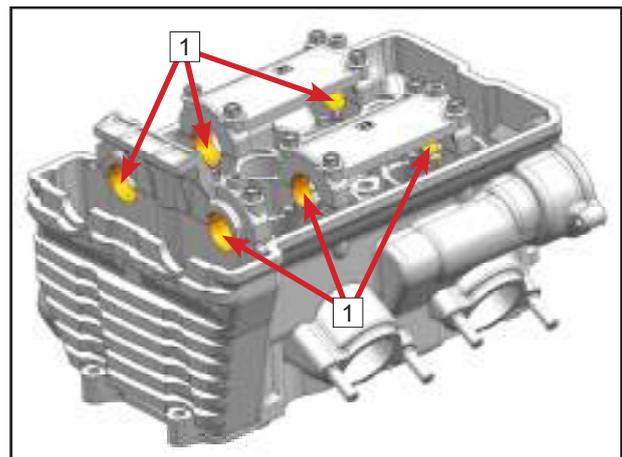
Install camshaft seat bolt and tighten it according to the sequence of ① ~ ⑫ in three steps.

Camshaft Seat Bolt Torque	
Step 1	5N•m (3.7 ft-lb.)
Step 2	8N•m (5.9 ft-lb.)
Step 3	12N•m (8.85 ft-lb.)



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

Camshaft Bearing Hole Diameter	
New Part	24 ~ 24.021 mm (0.94488 ~ 0.94571 in)
Service Limit	24.05 mm (0.94685 in)



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

Measure the inner diameter 1 of valve guide with an inner diameter gauge. If beyond the service limit, replace the cylinder head.

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

Valve Guide Inner Diameter (IN&EX)	
New Part	4.5 ~ 4.512 mm (0.17717 ~ 0.17764 in)
Service Limit	4.54 mm (0.17874 in)

## Valve

Check valve stem for abnormal wear or bend. Replace the valve if it does.

Use a micrometer to measure valve stem diameter 1. If beyond the service limit, replace the valve.

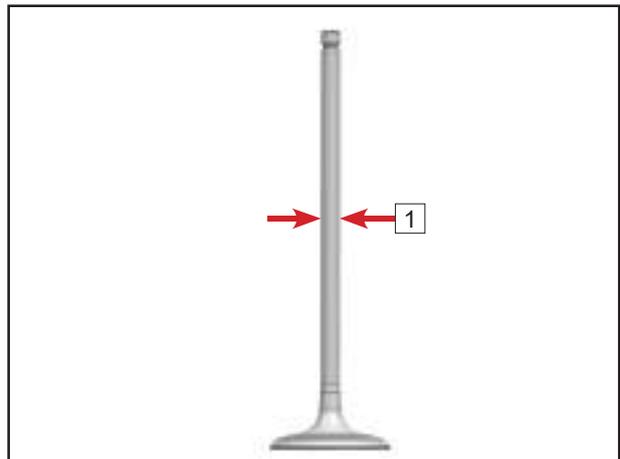
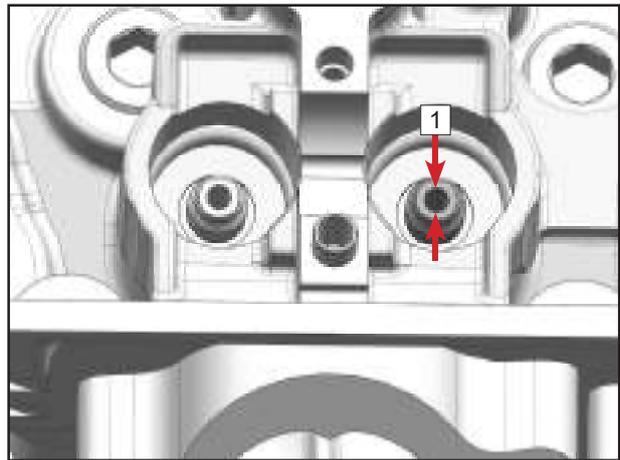
Valve Stem Diameter (Intake Valve)	
New Part	4.475 ~ 4.490 mm (0.17618 ~ 0.17677 in)
Service Limit	4.465 mm (0.17579 in)

Valve Stem Diameter (Exhaust Valve)	
New Part	4.455 ~ 4.470 mm (0.17539 ~ 0.17598 in)
Service Limit	4.445 mm (0.17500 in)

## Clearance between Valve Stem and Valve Guide

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

Clearance between Valve Stem and Valve Guide	
<b>Intake Valve</b>	
New Part	0.01 ~ 0.037 mm (0.00039 ~ 0.00146 in)
Service Limit	0.08 mm (0.00315 in)
<b>Exhaust Valve</b>	
New Part	0.03 ~ 0.057 mm (0.00118 ~ 0.00224 in)
Service Limit	0.1 mm (0.00394 in)



## Valve Cone and Valve Seat

**NOTE: Clean valve cone and valve seat before inspection to remove carbon.**

Check valve cone and valve seat for evidence of being burnt or sunk. Replace the valves or cylinder head as necessary.

Apply grinding agent to the valve cone and grind valve with a grinding tool.

**NOTE: Make sure valve sealing is qualified. Apply identification agent to inspect valve contact area condition.**

**NOTE: The valve seat contact marking agent should appear at the center of the valve cone.**

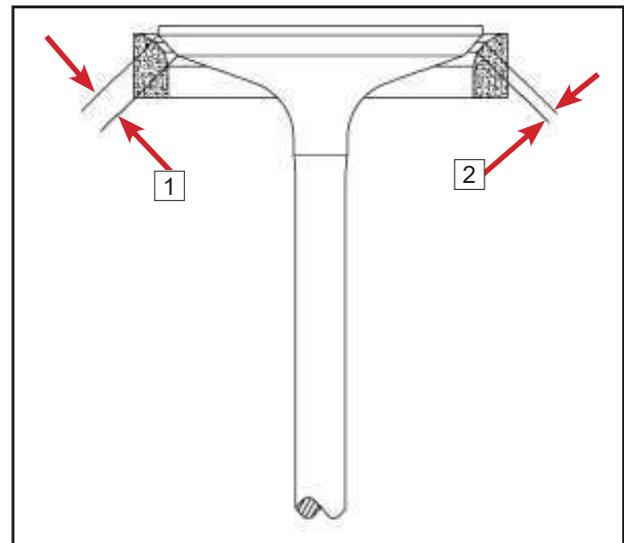
Grind the valve as necessary until the sealing between valve and seat is qualified.

Thoroughly clean the valve cone and seat, then check the contact width.

**NOTE: Any remaining grinding agent must be cleaned before measuring.**

Measure valve seat contact width 2 with a calliper.

Valve Seat Contact Width (IN&EX)	
New Part	0.9 ~ 1.1 mm (0.03543 ~ 0.04331 in)
Service Limit	1.4 mm (0.05512 in)

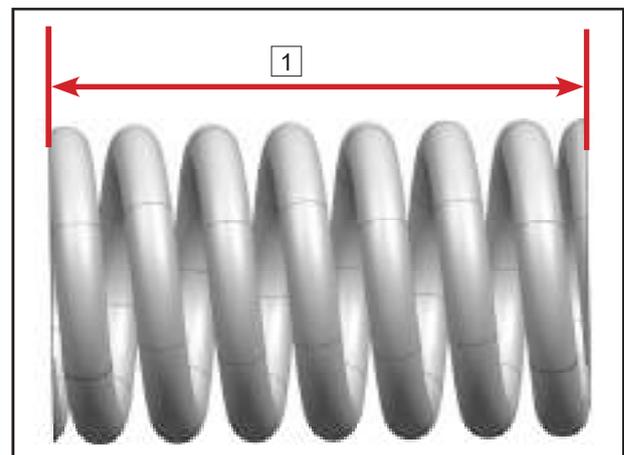


## Valve Spring

Inspect valve spring for visible damage. Replace it if it does.

Measure the free length 1 of valve spring. Replace valve spring if smaller than service limit.

Free Length of Valve Spring	
New Part	41.6 mm
Service Limit	39.8 mm



# CFMOTO

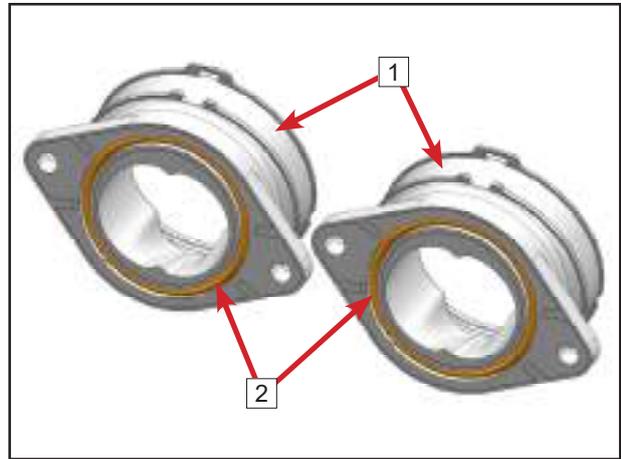
Measure the elasticity of valve spring when compressed to a specified length. Replace the spring if the elasticity is not within the specified range.

Valve Spring Elasticity	
Compress to 38.4mm	103N ~ 121N
Compress to 30.5mm	422N ~ 466N
Compress to 29.8mm	455N ~ 503N

## Intake Pipe Assembly

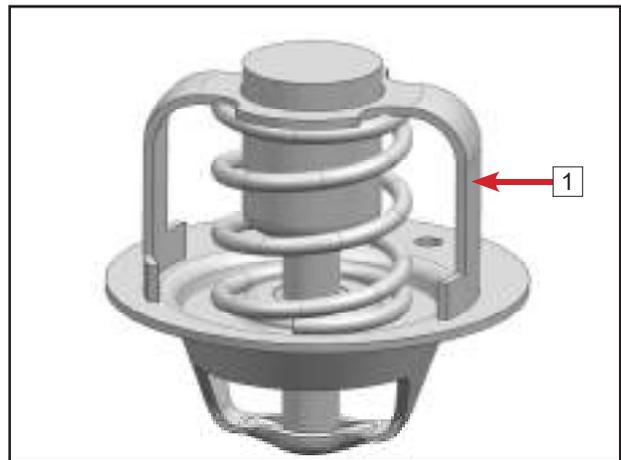
Check whether the intake pipe assembly **1** is broken or damaged, and whether the flange surface is warped. Replace if necessary.

Check O-ring **2** for brittleness, hardening, or damage. If yes, replace it.



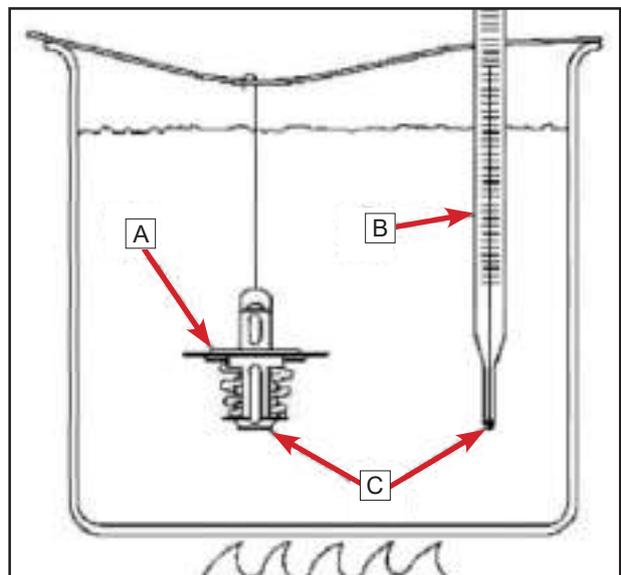
## Thermostat

Check the thermostat **1** at room temperature and replace it with a new thermostat if the valve is open.



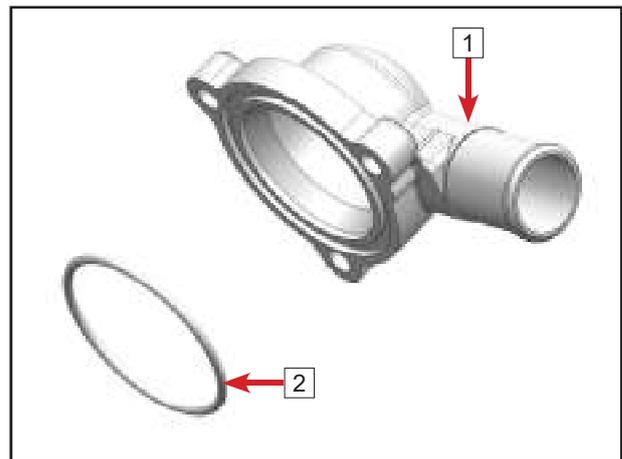
For valve open temperature inspection, hang thermostat **A** in a container of water. The thermostat should be fully immersed without touching container wall or bottom. Hang a thermometer **B** at the same level without touching wall or bottom. The thermal position **C** must be equal. Heat the water slowly, take note of the temperature that the thermostat begins to open, and its full open temperature. Replace with a new thermostat if beyond the specification.

Thermostat Valve Open Temperature	
Open	70°C ~74°C
Full open	83°C ~87°C
	Full open range ≥8mm



Check the thermostat cover **1** for cracks or other damage. If found, replace it with a new one.

Check O-ring **2** for brittleness, hardening, or damage. If yes, replace it.



## 5.4.12 Cylinder Head Assembly

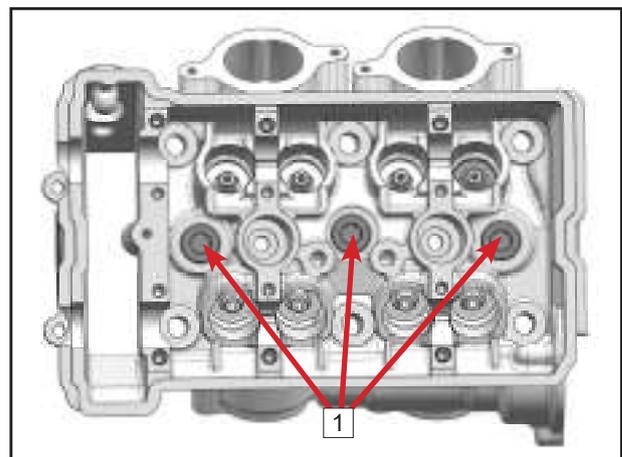
**NOTE: The cylinder head, camshaft seat and camshaft position press plate are fitted according to the matching marks.**

Clean all parts thoroughly before assembly.

Apply 567 thread locker on the taper plug **1**.

Install taper plug **1**, and tighten to the specified torque.

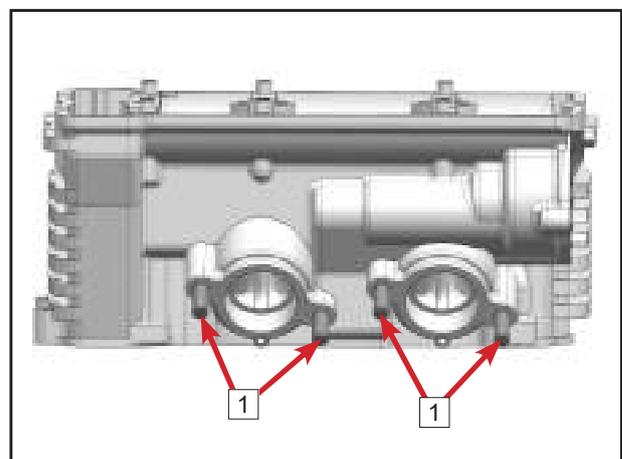
<b>Cylinder Head Taper Plug <b>1</b></b>	
Torque	54 N•m (39.8 ft-lb.)



Apply 243 thread locker on the end of stud **1** with short screw .

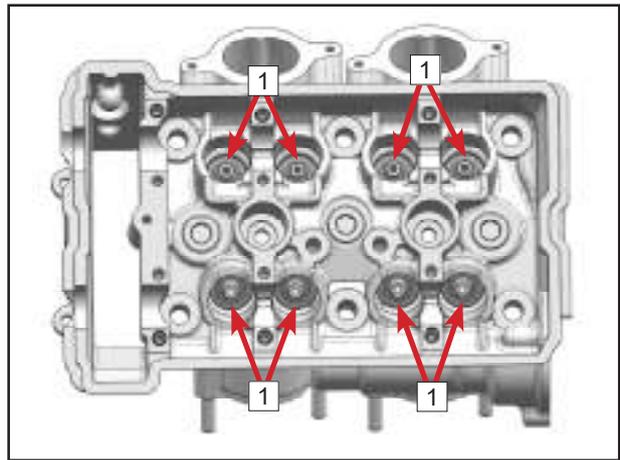
Install stud **1**, and tighten to the specified torque.

<b>Cylinder Head Stud <b>1</b></b>	
Torque	25 N•m (18.4 ft-lb.)

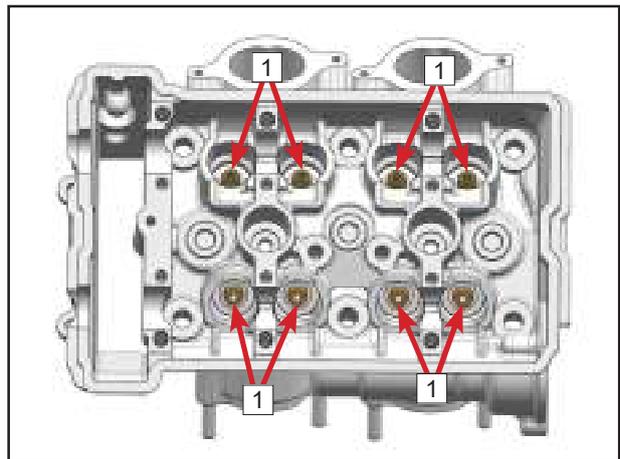


# CFMOTO

Install valve spring lower seat **1** (The big end faces down).

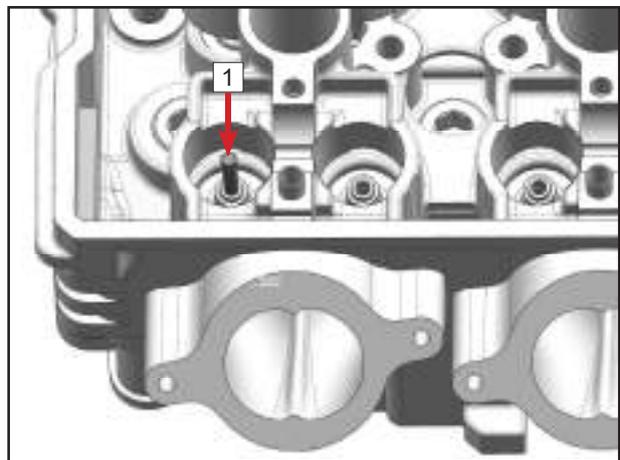


Apply appropriate amount of oil to the valve guide.  
Install new valve stem seal ring assembly **1** on valve guide.



Apply oil on the valve stem and install the valve **1** (shown is the intake valve).

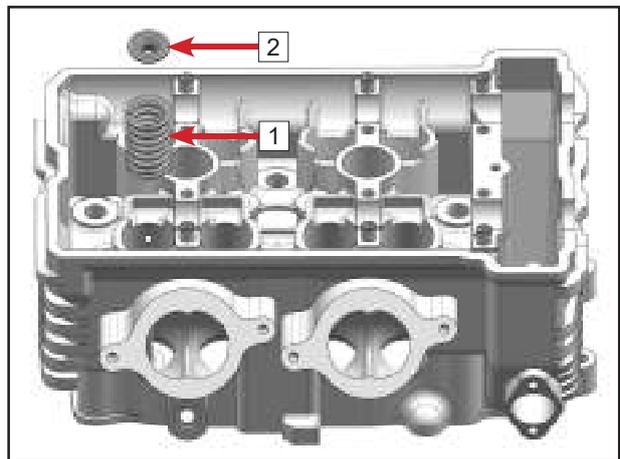
**NOTE: Be careful when sliding the valve stem over the seal lip of the seal.**



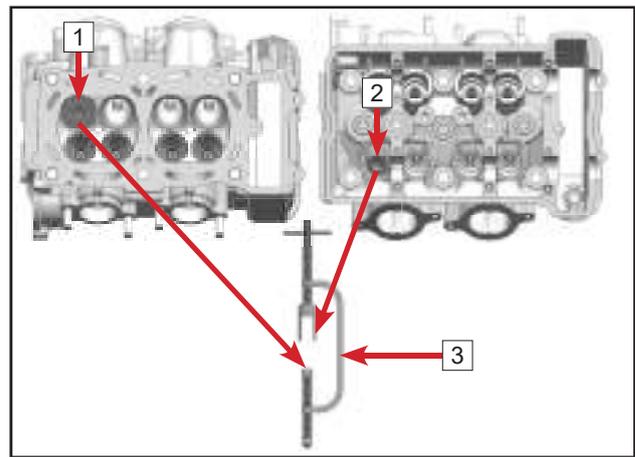
Install valve spring **1**.

**NOTE: The painted end of valve spring faces up.**

Install valve spring upper seat **2**.

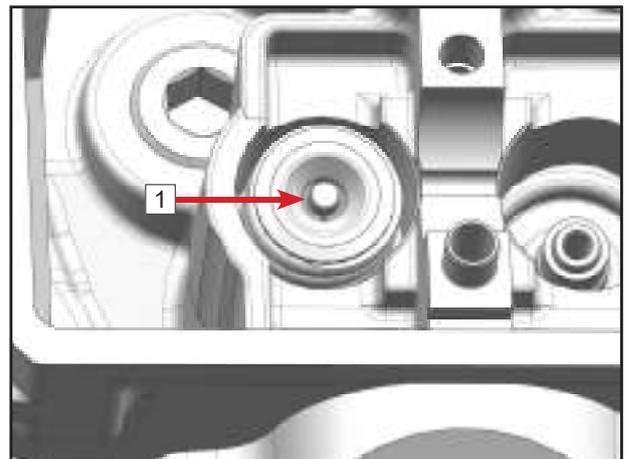


Install valve spring compressing tool **3**. Hold the lower part of valve spring compressing tool against the valve disc **1**, and press the upper part on the valve spring upper seat **2**. Rotate slowly the rod at the top of valve spring compressing tool to compress the valve spring until the lock clip slot on the valve is completely exposed.



Install valve lock clip **1**, then slowly release valve spring compressing tool.

**NOTE:** To make lock clip installation easier, coat the lock clips with grease. The lock clips must fit properly into the locking slot on the valve stem and stay in position.



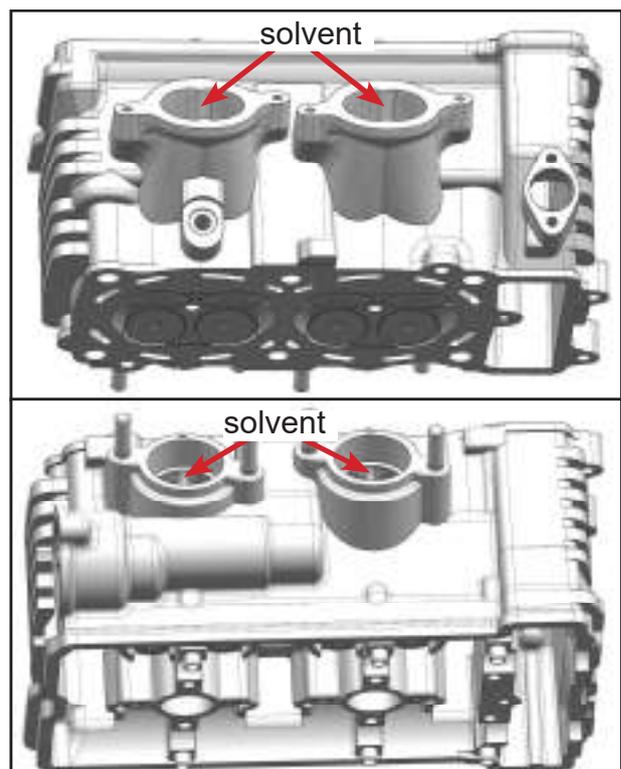
After installing the valve spring, tap the end of valve stem with a soft hammer several times to open and close the valve several times to ensure that the valve spring is properly locked.

**⚠ WARNING:** Improper installation of valve lock clips can damage the engine.

Install all valves in the same way.

Check the sealing of cylinder head.  
**Cylinder Head Sealing Inspection**  
**— Liquid Inspection**

Clean the bottom of the cylinder head and the valve disc with lint-free cloth. Inject proper amount of cleaning solvent into the intake and exhaust channels. After five minutes, check whether solvent is flowing from the valve seat ring **1**.



## — Light Inspection

When there is no suitable cleaning solvent, use light inspection.

Align the bottom of the cylinder head with the light source.

Observe the valve seat ring from the intake and exhaust channel for light leakage **1**.

If the seal of the cylinder head does not pass the oil test or light test, remove the valve and check the surface of the corresponding valve and valve seat ring. If there is no problem, clean the valve and valve seat ring again after assembly. If the cylinder head still does not pass the liquid test or light test, replace with new part.

Apply 569 thread locker on water temperature sensor.

Install water temperature sensor **1**, and tighten to the specified torque.

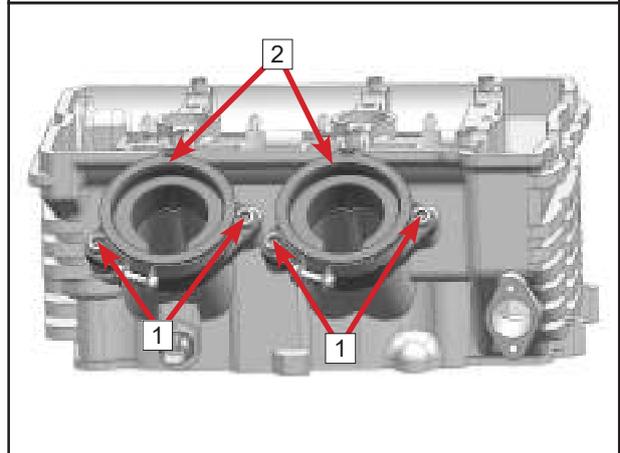
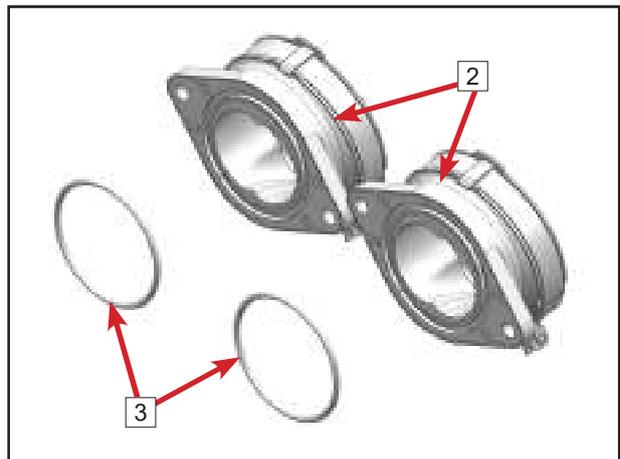
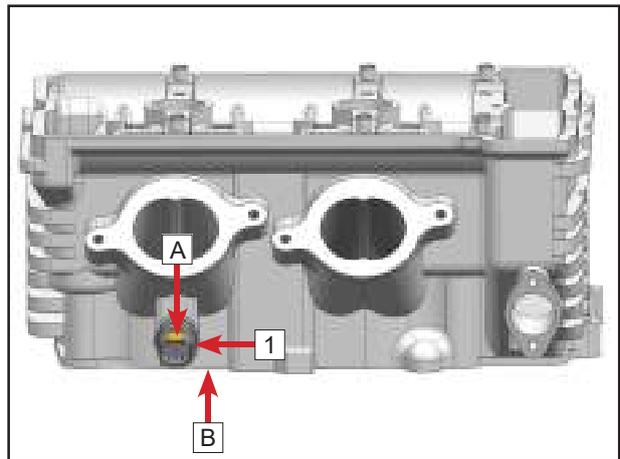
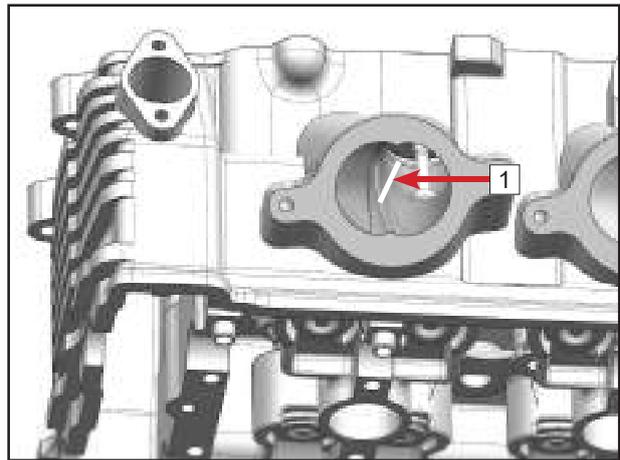
Water Temp. Sensor Torque	
	14 N•m (10.3 ft-lb.)

**NOTE:** After tightening water temperature sensor, its plane **A** should be basically parallel to the seal surface **B** of cylinder head. If the angle **A** and **B** is not appropriate, add washer for adjustment until it meets the requirements.

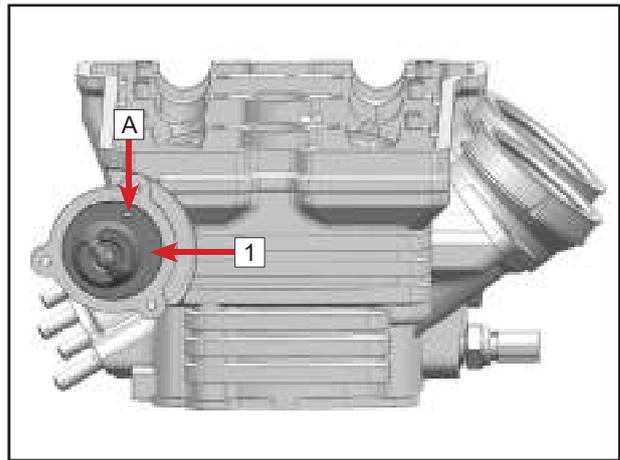
Install the O-ring **3** on the intake pipe assembly **2**.

Place the intake pipe assembly **2** in place. Install screws **1**, and tighten to the specified torque.

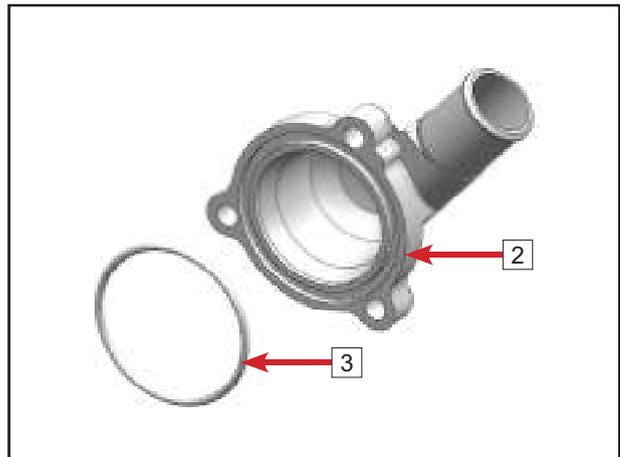
Intake Pipe Screw <b>1</b>	
Torque	10 N•m (7.3 ft-lb.)



Install thermostat **1**, hole **A** faces up.

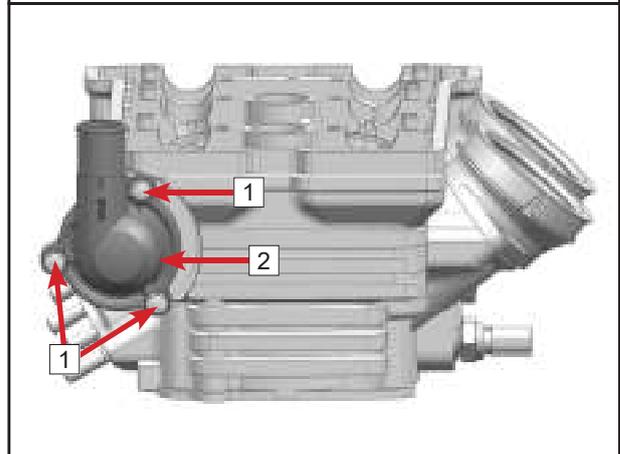


Install O-ring **3** to thermostat cover **2**.



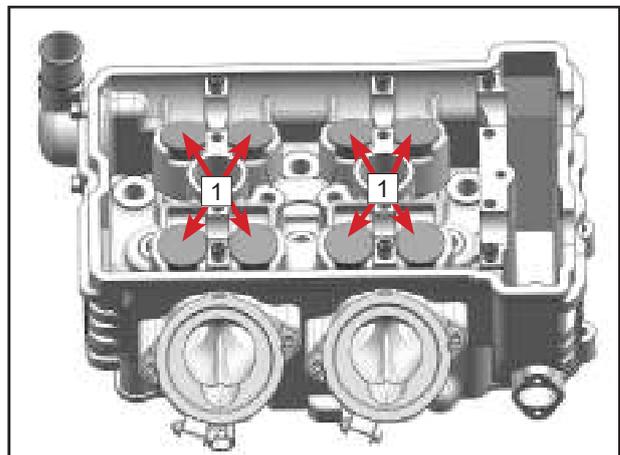
Place the thermostat cover **2** in place. Install bolts **1** and tighten to specified torque.

Thermostat Cover Bolt <b>1</b>	
Torque	12 N•m (8.8 ft-lb.)



Apply a mixture of oil and MoS2 grease (weight ratio 10:1) on the outer surface of the valve tappet **1**.

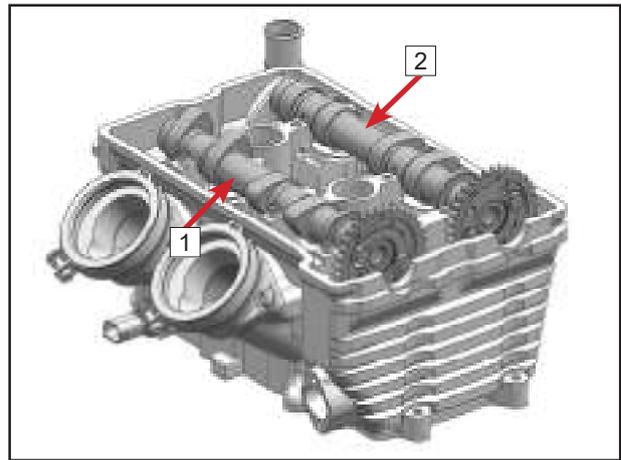
Install the corresponding tappet **1** in each corresponding tappet hole.



## Pre-inspection and Adjustment of Valve Clearance

Check and confirm whether the removed camshaft can still be used. Replace the camshaft if necessary.

Install intake camshaft assembly 1 and exhaust camshaft assembly 2.

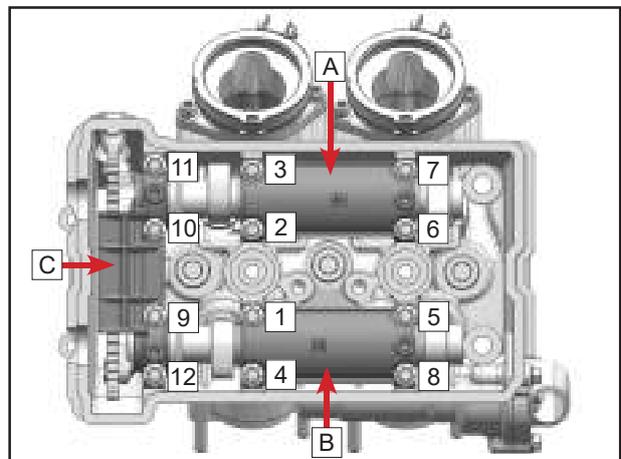


Install air intake camshaft seat A, exhaust camshaft seat B and camshaft position plate C on the cylinder head.

**NOTE: The cylinder head, camshaft seat and camshaft position press plate are fitted according to the matching marks.**

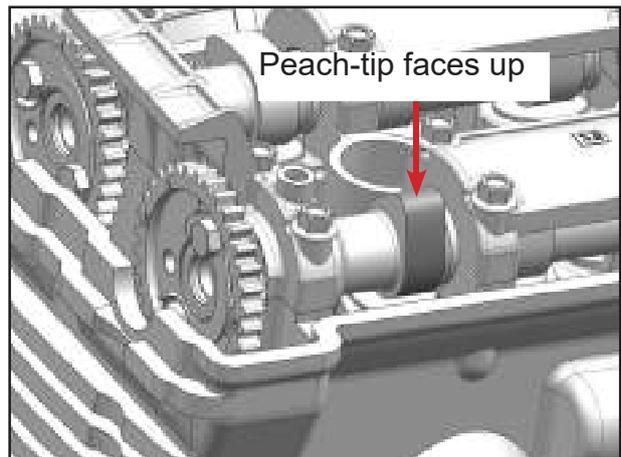
Install camshaft seat bolt, and tighten according to the sequence of 1~12 in three steps.

Camshaft Seat Bolt Torque	
Step 1	5N•m (3.7 ft-lb.)
Step 2	8N•m (5.9 ft-lb.)
Step 3	12N•m (8.85 ft-lb.)



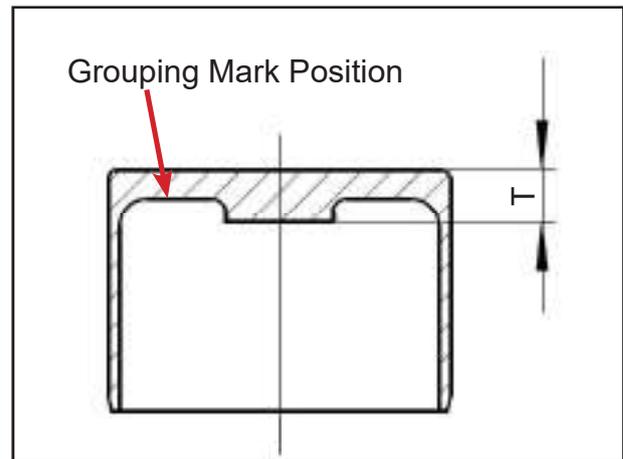
Turn the camshaft to make the peach-tip of each CAM face up, and measure the clearance between the cylinder surface of CAM and the tappet with a feeler. If it does not meet the requirements, replace the tappet with the appropriate thickness and measure again until it meets the requirements.

Valve Clearance (Cold Engine)	
Intake Valve	0.09 ~ 0.12 mm (0.00354 ~ 0.00472 in)
Exhaust Valve	0.23 ~ 0.27 mm (0.00906 ~ 0.01063 in)



Valve tappets are grouped according to thickness T as follows:

Valve Tappets T Size Grouping			
Mark	T (mm)	Mark	T (mm)
320	3.20	376	3.76
322	3.22	378	3.78
324	3.24	380	3.80
326	3.26	382	3.82
328	3.28	384	3.84
330	3.30	386	3.86
332	3.32	388	3.88
334	3.34	390	3.90
336	3.36	392	3.92
338	3.38	394	3.94
340	3.40	396	3.96
342	3.42	398	3.98
344	3.44	400	4.00
346	3.46	402	4.02
348	3.48	404	4.04
350	3.50	406	4.06
352	3.52	408	4.08
354	3.54	410	4.10
356	3.56	412	4.12
358	3.58	414	4.14
360	3.60	416	4.16
362	3.62	418	4.18
364	3.64	420	4.20
366	3.66	422	4.22
368	3.68	424	4.24
370	3.70	426	4.26
372	3.72	428	4.28
374	3.74		

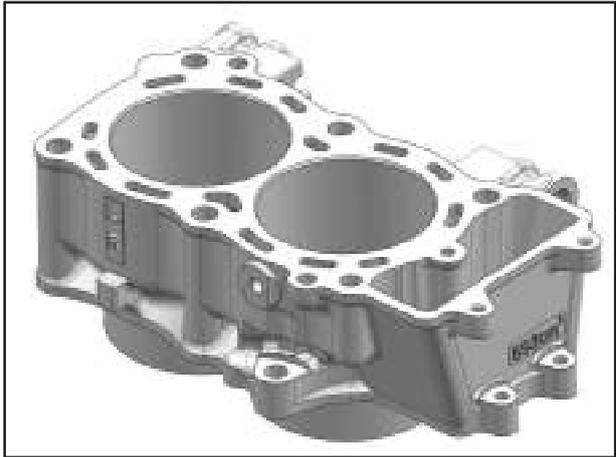


## 5.4.13 Cylinder Body Inspection/ Measurement

Check the cylinder body for cracks or other damage.

Check the cylinder bore for cracks, strains and wear steps at the upper and lower ends.

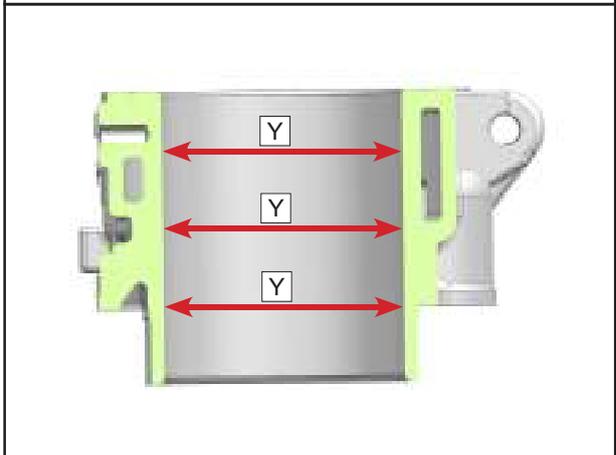
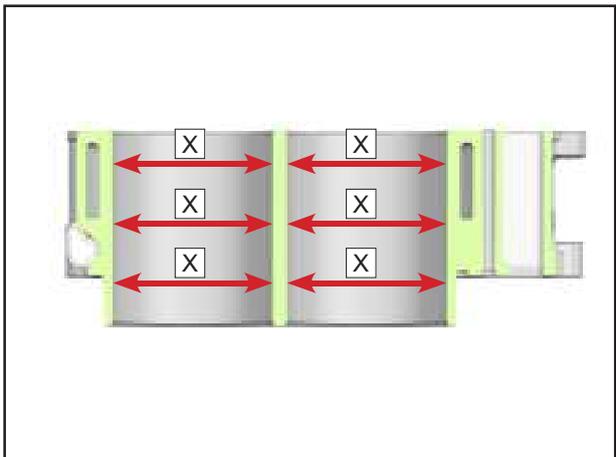
Replace the cylinder body if necessary.



Measure the cylinder bore at different positions along the X and Y axes. If the bore diameter of any cylinder exceeds the service limit, replace the cylinder body.

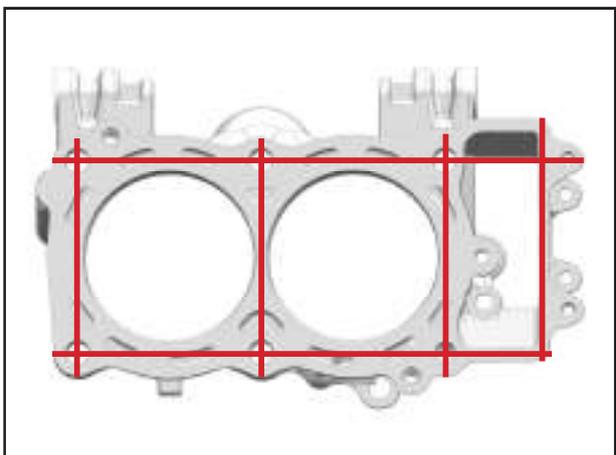
Cylinder Bore Diameter	
New Part	83.008 ~ 83.023 mm (3.26803 ~ 3.26862 in)
Service Limit	83.07 mm (3.27047 in)

**NOTE: Replace with new piston ring when replacing cylinder body.**



Check the sealing surface of the cylinder for distortion using a straightedge and a feeler gauge. Replace cylinder body if the measurement value is larger than service limit.

Cylinder Sealing Surface Distortion	
Service Limit	0.05 mm (0.00197 in)



## Cylinder Bore Grouping

The bore diameter of the cylinder is grouped according to the following table, and the position of the grouping marks is shown in the figure on the right.

Cylinder Body (New Part)	
Mark	Bore
I	83.008 ~ 83.015 mm (3.26803 ~ 3.26831 in)
II	83.016 ~ 83.023 mm (3.26835 ~ 3.26862 in)

The cylinder body and piston are paired according to the table below.

Cylinder Bore Grouping Mark	Piston Skirt Diameter Grouping Mark
I	I
II	II

The grouping of piston skirt diameters is detailed in the section 5.4.14.

### 5.4.14 Piston Inspection/Measurement

#### Piston Inspection

Check piston for scratches, cracks or other damage. If so, replace the piston. If necessary, replace the cylinder at the same time.

Measure the skirt diameter of piston 1 at the distance B and perpendicular to the direction of pin hole. Replace piston if it is less than service limit.

Distance <span style="border: 1px solid black; padding: 0 2px;">B</span>	10.5 mm (0.41339 in)
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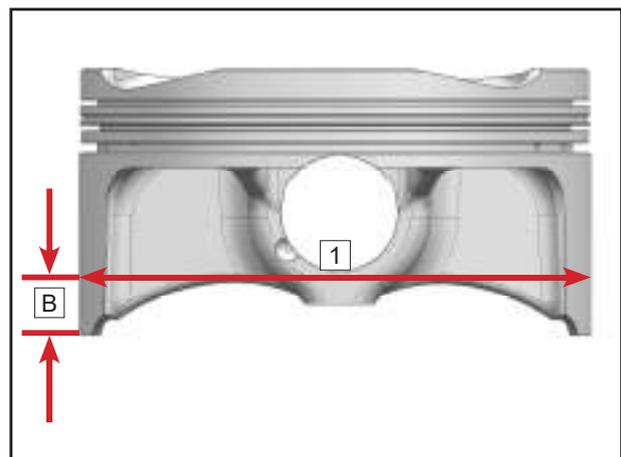
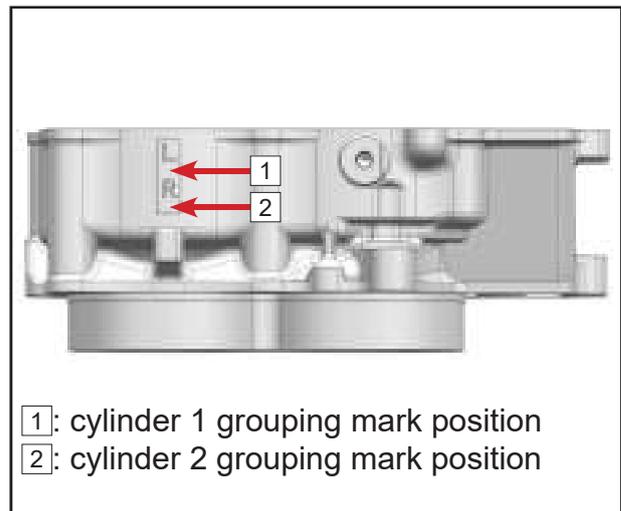
Diameter of Piston Skirt <span style="border: 1px solid black; padding: 0 2px;">1</span>	
New Part	82.970 ~ 82.985 mm (3.26654 ~ 3.26713 in)
Service Limit	82.920 mm (3.26457 in)

#### Piston / Cylinder Clearance

Piston/cylinder clearance: The difference between cylinder bore diameter and piston skirt diameter.

According to the above measurement results, calculate the fit clearance between piston and cylinder. Replace piston and repeat measurement procedures if the clearance is larger than service limit.

Piston / Cylinder Clearance	
Standard	0.031 ~ 0.045 mm (0.00122 ~ 0.00177 in)
Service Limit	0.1 mm (0.00394 in)



## Piston Ring/Piston Ring Groove Clearance

Check whether the piston ring can move freely in the piston ring groove. If stuck, clean piston ring groove.

**NOTE: The old piston ring can be used to clean the piston ring groove.**

Check the piston ring for damage. If damaged, replace with a new one.

**NOTE: Install the piston ring with the marked side facing up.**

Measure the clearance of every piston ring and piston ring groove with feeler gauge **1**. Replace piston and piston ring if the clearance is larger than service limit.

Piston Ring/Piston Ring Groove Clearance	
The First Gas Ring	
New Part	0.03 ~ 0.07 mm (0.00118 ~ 0.00276 in)
Service Limit	0.16 mm (0.00630 in)
The Second Gas Ring	
New Part	0.02 ~ 0.06 mm (0.00079 ~ 0.00236 in)
Service Limit	0.16 mm (0.00630 in)

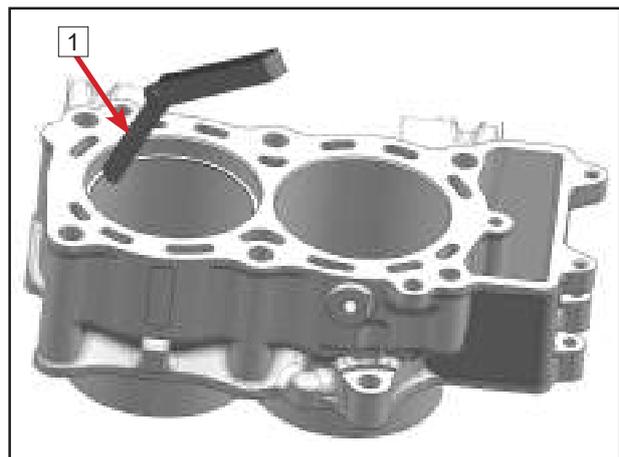
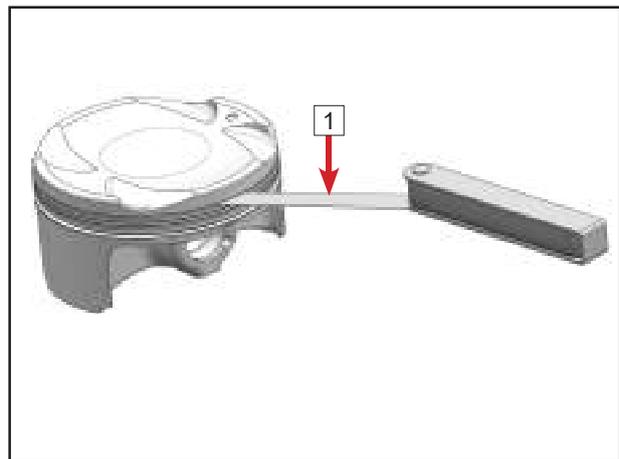
## Piston Ring Opening Clearance

Remove the piston ring from the piston.  
Place the piston ring in the cylinder in the area of 8 mm ~ 16 mm (5/16 in ~ 5/8 in) from the top of the cylinder.

**NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.**

Use a feeler **1** to measure the piston ring opening clearance. If the clearance exceeds the standard, replace the piston ring.

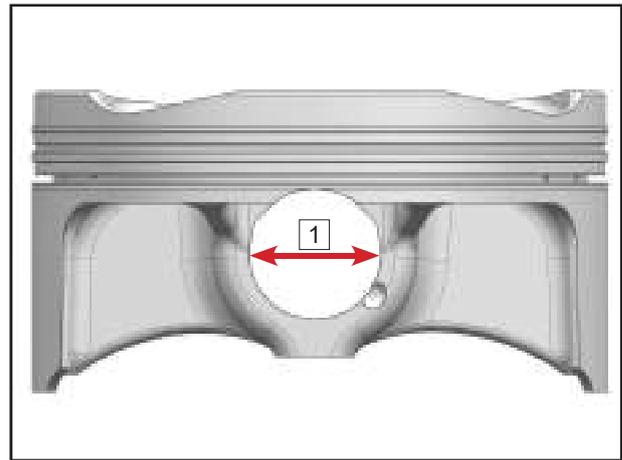
Piston Ring Opening Clearance	
The First Gas Ring	
New Part	0.25 ~ 0.40 mm (0.00984 ~ 0.01575 in)
Service Limit	0.65 mm (0.02559 in)
The Second Gas Ring	
New Part	0.4 ~ 0.55 mm (0.00394 ~ 0.01181 in)
Service Limit	0.75 mm (0.02953 in)
Oil Ring	
Service Limit	1.2 mm (0.04724 in)



## Piston Pin Hole Diameter

Measure the diameter 1 of piston pin hole. Replace piston if the measurement value is larger than service limit.

Piston Pin Hole Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span>	
New Part	19.004 ~ 19.010 mm (0.74819 ~ 0.74843 in)
Service Limit	19.04 mm (0.74961 in)



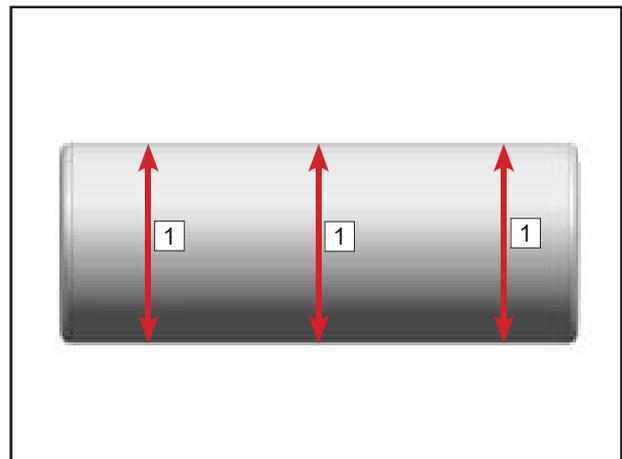
## Piston Pin Diameter

Use lint-free cloth to clean piston pin from deposits.

Check the piston pin for scratches, cracks, or other damage. If yes, replace it.

Use micrometer to measure piston pin diameter 1 in multiple places. Replace piston pin if the measurement value is smaller than service limit.

Piston Pin Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span>	
Standard	18.996 ~ 19 mm (0.74787 ~ 0.74803 in)
Service Limit	18.980 mm (0.74724 in)



## Piston Grouping

The skirt diameter 1 and weight of the piston are grouped in the table below, and the marked position is shown in the figure on the right.

2: Exhaust side mark

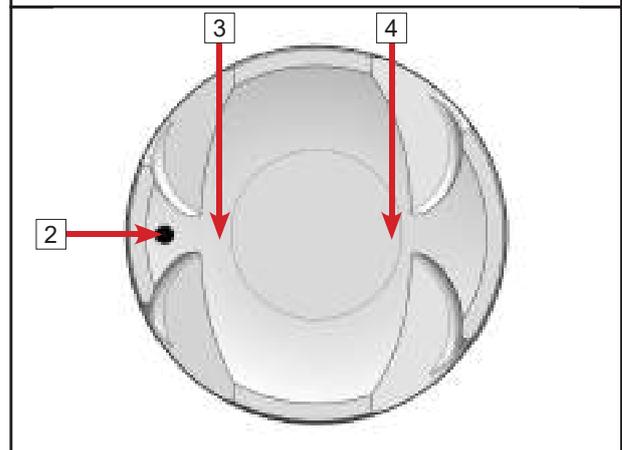
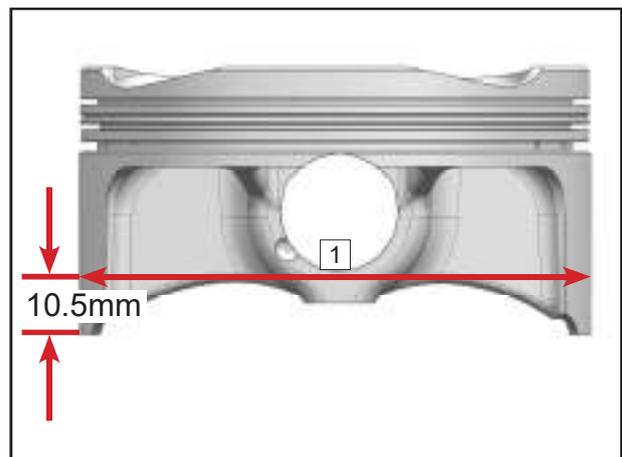
3: Skirt diameter grouping mark

4: Weight grouping mark

Piston (New Part)	
Mark	Skirt diameter <span style="border: 1px solid black; padding: 0 2px;">1</span>
I	82.970 ~ 82.977 mm (3.26654 ~ 3.26681 in)
II	82.978 ~ 82.985 mm (3.26685 ~ 3.26713 in)

Piston (New Part)	
Mark	Weight
A	209 ~ 213 g
B	214 ~ 218 g

**NOTE: The same engine must be equipped with pistons of the same weight group.**



# CFMOTO

The piston and cylinder body are paired according to the table below.

Piston Skirt Diameter Grouping Mark	Cylinder Bore Grouping Mark
I	I
II	II

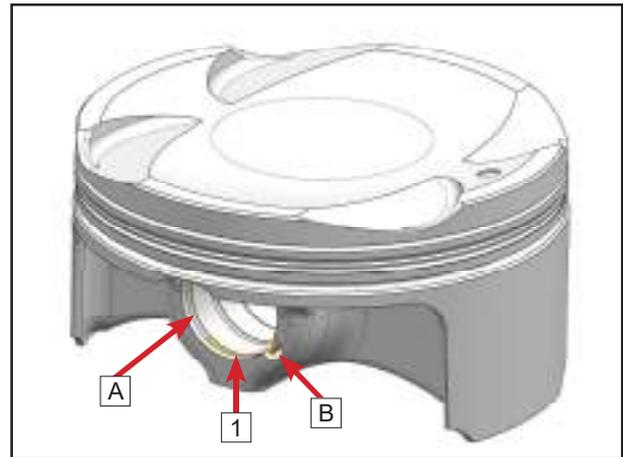
The grouping of cylinder bore is detailed in the section 5.4.13.

## Piston Assembly

Use needle-nose pliers to fit the piston pin retainer **1** on one side.

**NOTE: The removed piston pin retainer cannot be used again and must be replaced with a new one.**

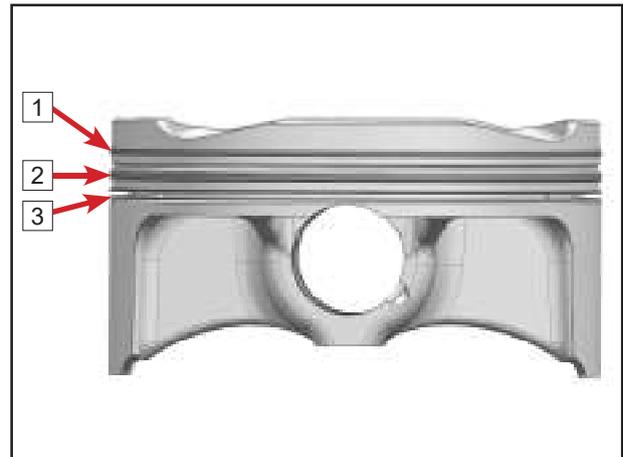
Stagger the piston pin retainer opening **A** with the piston groove notch **B**.



Install oil ring **3**, the second gas ring **2** and the first gas ring **1** into the corresponding piston ring groove .

**NOTE: The mark on the piston ring faces up.**

Make sure that the piston ring rotates smoothly after installation.



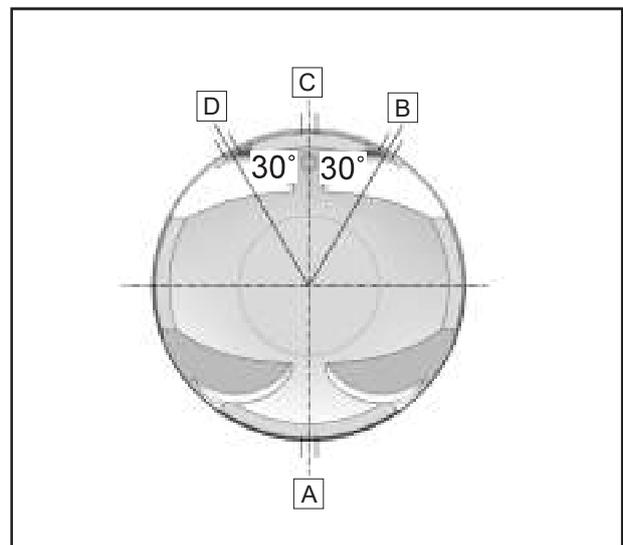
Adjust the piston ring to the correct position as shown on the right.

**A**: Opening position of oil ring lining ring and second gas ring

**B**: Oil ring scraper ring opening position

**C**: The first gas ring opening position

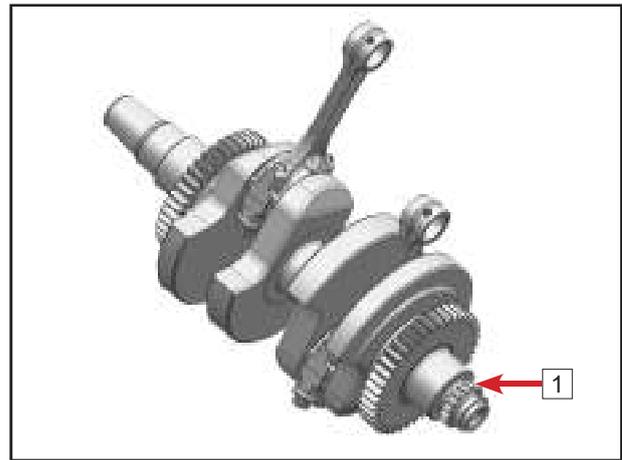
**D**: Oil ring scraper ring opening position



## 5.4.15 Timing Assembly Inspection

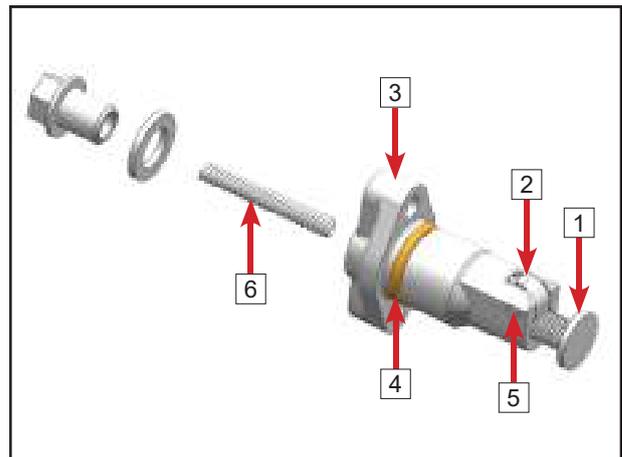
Clean all parts.

Check timing drive sprocket **1** for serious wear or damage. Replace crankshaft assembly if it does.



Inspect tensioner for following conditions:

- Tensioner rack **1** worn or other damage.
  - Release the locking block **2**, inspect rack **1** smooth movement inside tensioner body **3**. See if rack **1** sticks.
  - Locking block **2** damaged or pin **5** cannot rotate freely.
  - Tensioner body **3** damaged.
- If found, replace the tensioner.



Inspect O-ring **4** for brittle or hard or damaged. If found, replace O-ring.

Inspect tension spring **6** for cracks, severe deformation or other damage. If found, replace spring.

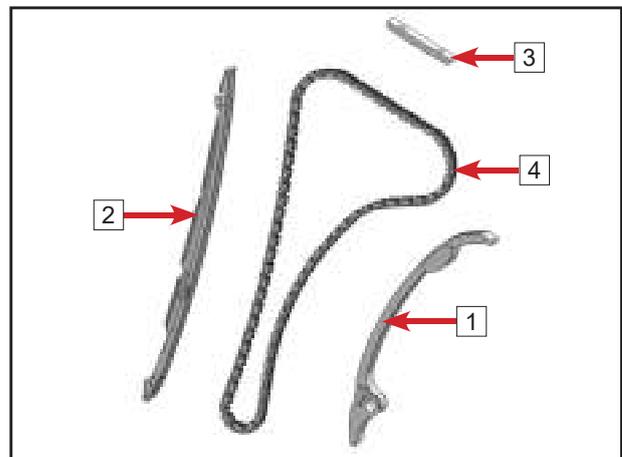
Inspect tension plate **1** for serious wear or damage. Replace tension plate if it does.

Inspect chain guide **2** for serious wear and damage. Replace chain guide if it does.

Inspect chain guide block **3** for serious wear or damage. Replace chain guide block if it does.

Inspect timing chain **4** for serious wear or damage. Replace timing chain and camshaft timing sprocket if it does.

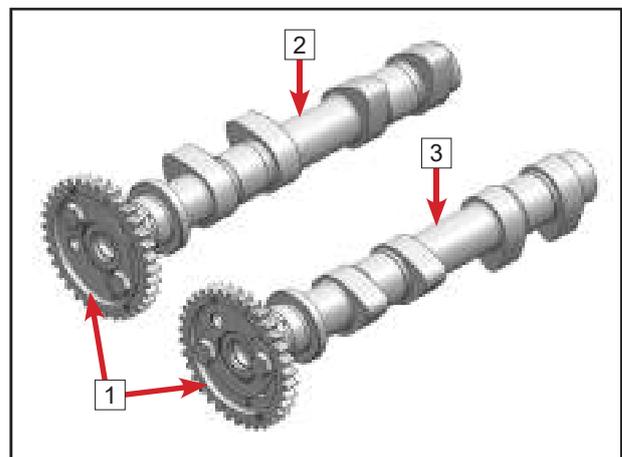
Inspect whether the link of timing chain **4** moves freely. If it is stiff, replace the timing chain.



### Camshaft Assembly

Check timing sprocket **1** for serious wear or damage. Replace the timing sprocket and timing chain as a set if it does.

Inspect each cam and bearing journal of air intake camshaft **2** and exhaust camshaft **3** for nicks, scratches, cracks or other damages. Replace the camshaft if necessary.



# CFMOTO

Measure camshaft journal diameter. If the measured value is less than the service limit, replace the camshaft with a new one.

<b>Camshaft Journal Diameter 1 (IN&amp;EX)</b>	
New Part	23.950 ~ 23.972 mm (0.94291 ~ 0.94378 in)
Service Limit	23.920 mm (0.94173 in)

The difference between the camshaft bearing hole diameter and the camshaft journal diameter is the camshaft journal/camshaft bearing hole clearance.

Inspect the clearance between the camshaft journal and the camshaft bearing hole. If the clearance exceeds service limit, replace the camshaft or cylinder head with a new one.

The diameter measurement of camshaft bearing hole refers to the chapter "Cylinder Head Inspection".

<b>Camshaft Journal/Camshaft Bearing Hole Clearance</b>	
New Part	0.028 ~ 0.071 mm (0.0011 ~ 0.0028 in)
Service Limit	0.13 mm (0.00512 in)

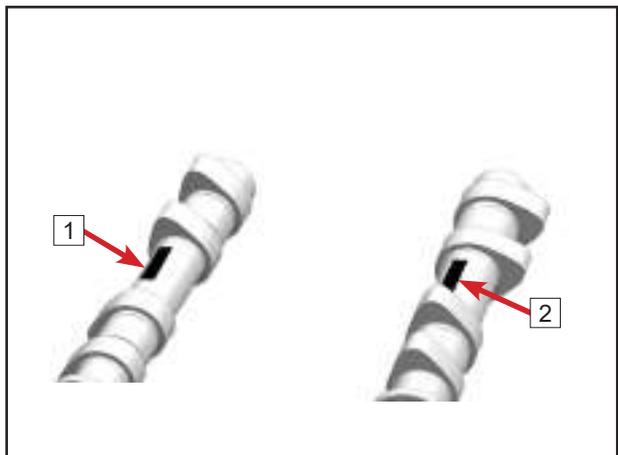
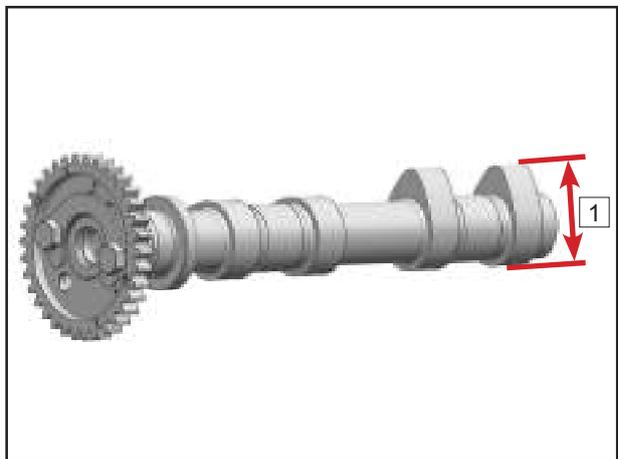
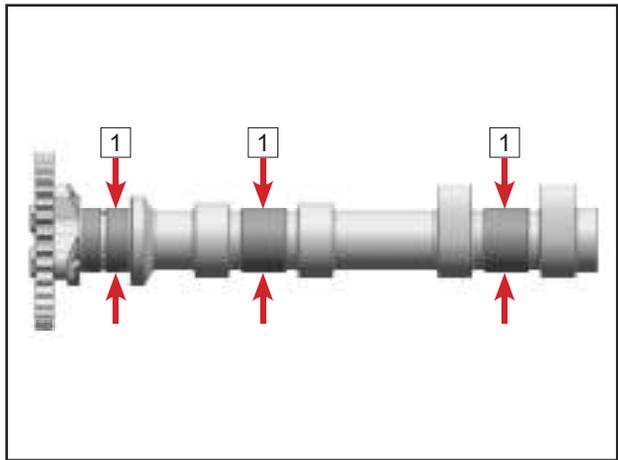
Measure the cam height 1 of the intake and exhaust camshafts respectively. If less than the service limit, replace the camshaft with a new one.

<b>Cam Height 1</b>	
<b>Exhaust Camshaft</b>	
New Part	35.843 ~ 35.957 mm (1.41114 ~ 1.41563 in)
Service Limit	35.74 mm (1.40709 in)
<b>Intake Camshaft</b>	
New Part	36.543 ~ 36.657 mm (1.43870 ~ 1.44319 in)
Service Limit	36.44 mm (1.43465 in)

## Camshaft Identification

The camshaft is cast with a distinguishing mark between the cylinder 1 CAM and the cylinder 2 CAM.

- 1: Intake camshaft assembly (IN)
- 2: Exhaust camshaft assembly (EX)

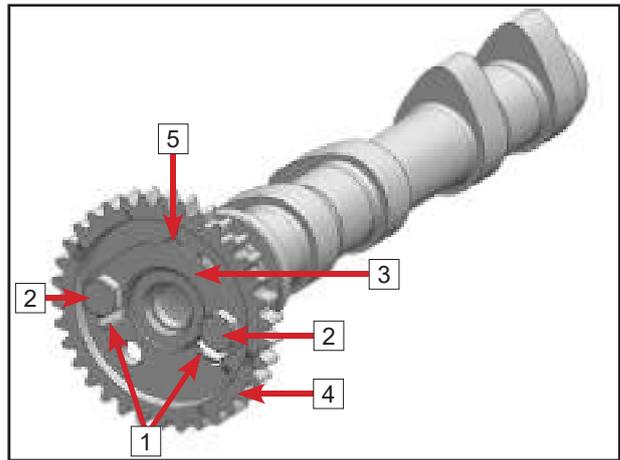


## Camshaft Assembly Disassembly and Assembly

**NOTE:** The intake camshaft assembly and exhaust camshaft assembly are disassembled in the same way.

### Disassembly

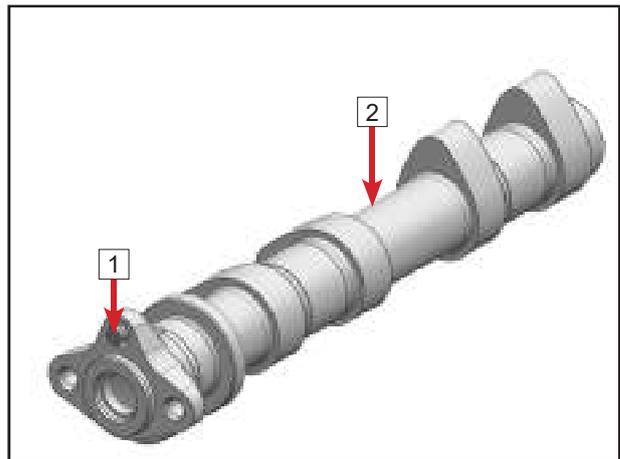
- Turn over the tightening part of stop plate **1**.
- Remove bolts **2**.
- Remove and abandon stop plate **3**.
- Remove timing sprocket **4**.
- Remove needle roller **5**.



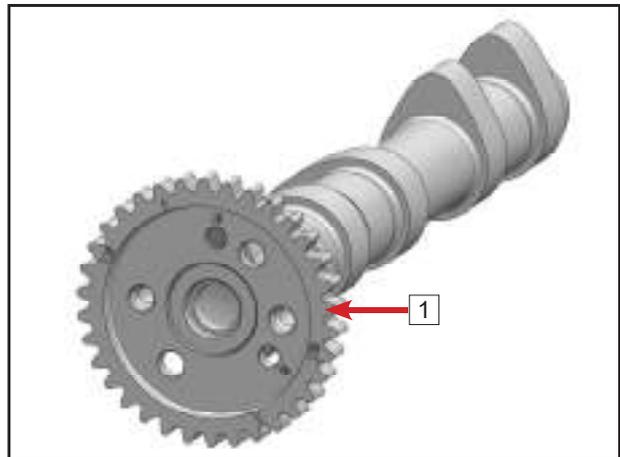
### Assembly

#### Intake Camshaft

- Install needle roller **1** on the intake camshaft **2**.

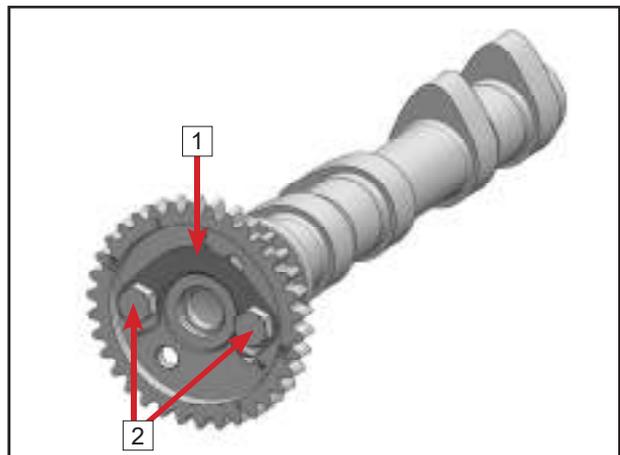


- Align the “IN” marking hole on timing sprocket with the needle roller on the intake camshaft, and install the timing sprocket **1** on the intake camshaft.



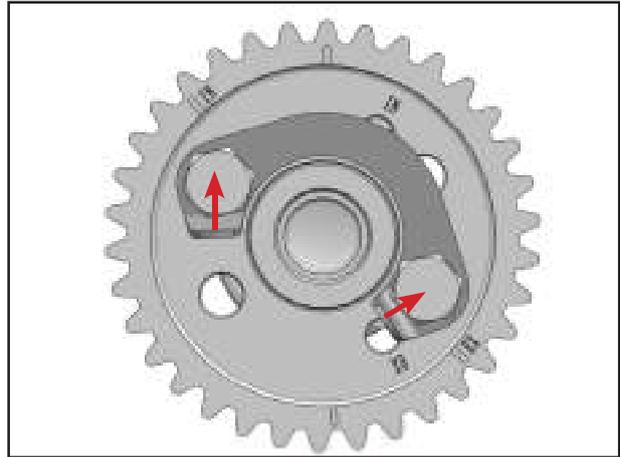
- Apply 243 thread locker on the bolts **2**.
- Install retainer **1** and bolts **2**, and tighten bolts to the specified torque.

Timing Sprocket Bolt <b>2</b>	
Torque	15 N•m (11.1 ft-lb.)



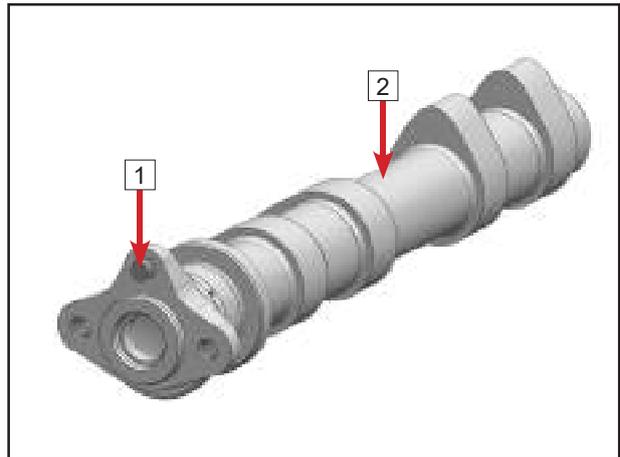
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Flange the retainer to prevent the bolts from loosening.

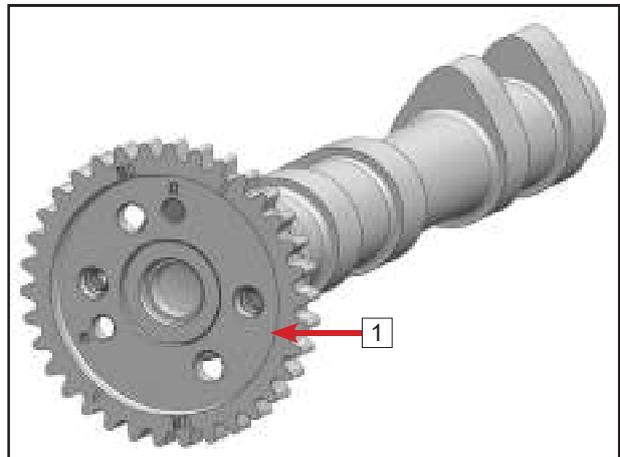


## Exhaust Camshaft

Install needle roller **1** on the exhaust camshaft **2**.

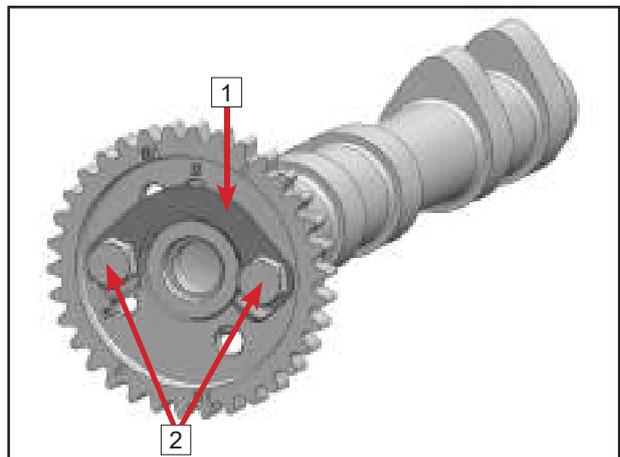


Align the “EX” marking hole on timing sprocket with the needle roller on the exhaust camshaft and install the timing sprocket **1** on the exhaust camshaft.

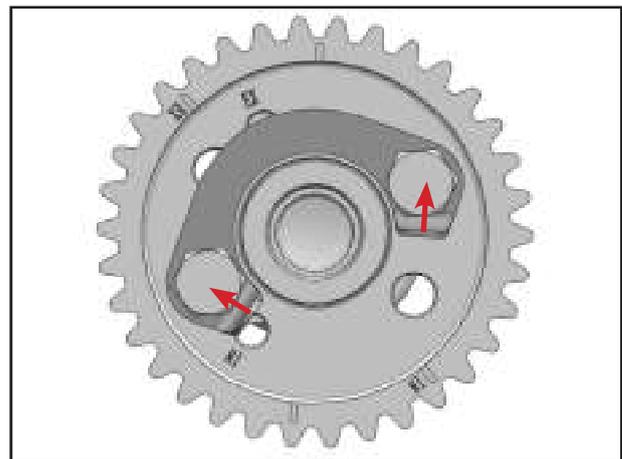


Apply 243 thread locker on the bolts **2**. Install retainer **1** and bolts **2**, and tighten bolts to the specified torque.

Timing Sprocket Bolt <b>2</b>	
Torque	15 N•m (11.1 ft-lb.)



Flange the retainer to prevent the bolts from loosening.



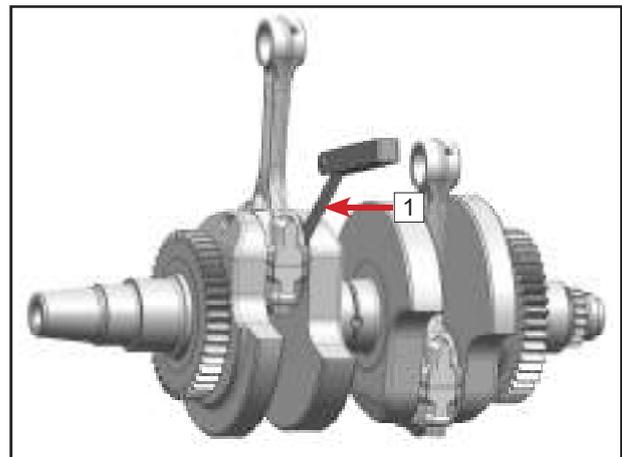
## 5.4.16 Crankshaft Connecting Rod Assembly Inspection

### Axial Clearance of Connecting Rod Big End

**NOTE: Measure the big end axial clearance before the connecting rod is removed from the crankshaft.**

Use a feeler 1 to measure the clearance between the end surface of connecting rod big end and the end surface of the crankshaft crank arm.

Use the same method to measure the big end axial clearance of the other connecting rod.



### Axial Clearance of Connecting Rod Big End

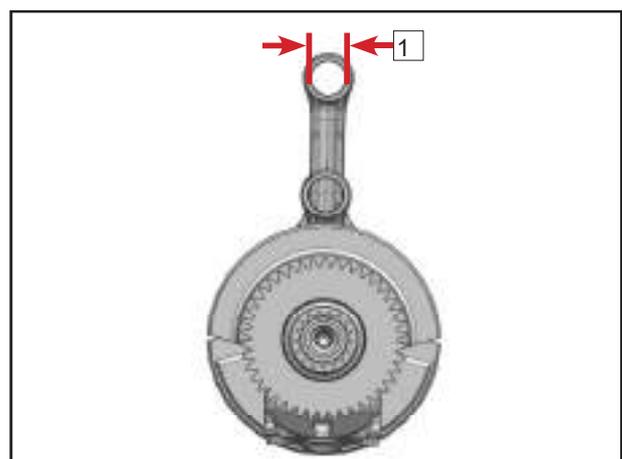
New Part	0.15 ~ 0.3 mm (0.00591 ~ 0.01181 in)
Service Limit	0.55 mm (0.02165 in)

If the clearance is greater than the service limit, replace with new connecting rod and re-measure the clearance. If the clearance still exceeds the limit after replacement, the crankshaft must be replaced.

### Inner Diameter of Connecting Rod Small End Hole

Measure the inner diameter 1 of connecting rod small end hole.

Inner Diameter of Connecting Rod Small End Hole <span style="border: 1px solid black; padding: 0 2px;">1</span>	
New Part	19.010 ~ 19.020 mm (0.74843 ~ 0.74882 in)
Service Limit	19.050 mm (0.75 in)



## Disassembly of Crankshaft Connecting Rod Assembly

Remove connecting rod bolts [1].

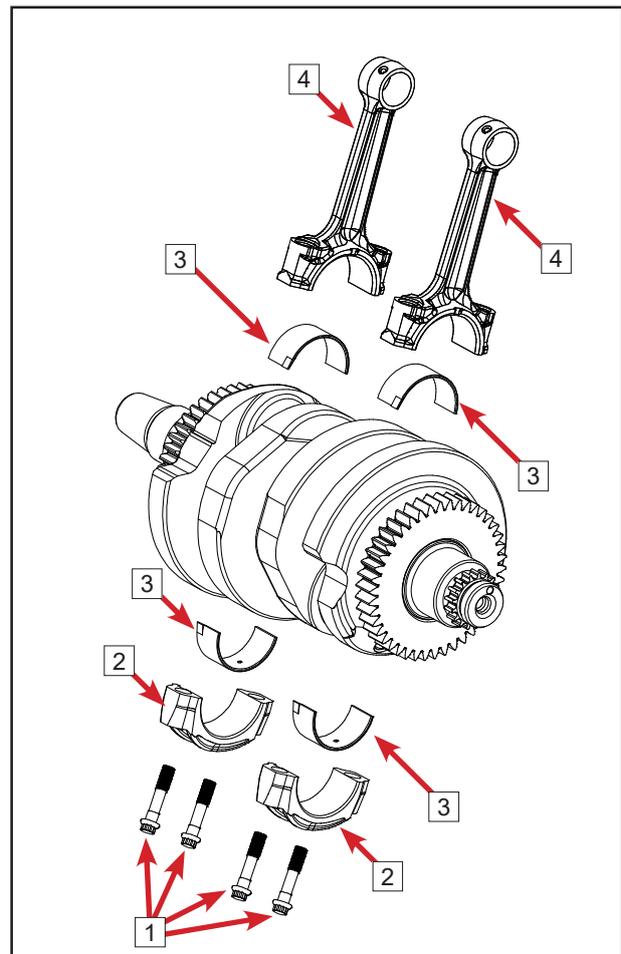
Remove connecting rod cap [2].

Remove connecting rod [4].

From connecting rod cap [2] and connecting rod [4] remove connecting rod bearing [3].

**NOTE:** When disassembling, the connecting rod cover, connecting rod body and connecting rod bearing should be marked and placed one by one, so that they can be quickly installed to the original position when reassembling.

**⚠ WARNING:** If the connecting rod bolt is removed, it is recommended to replace new connecting rod bearing when reinstalling the connecting rod.

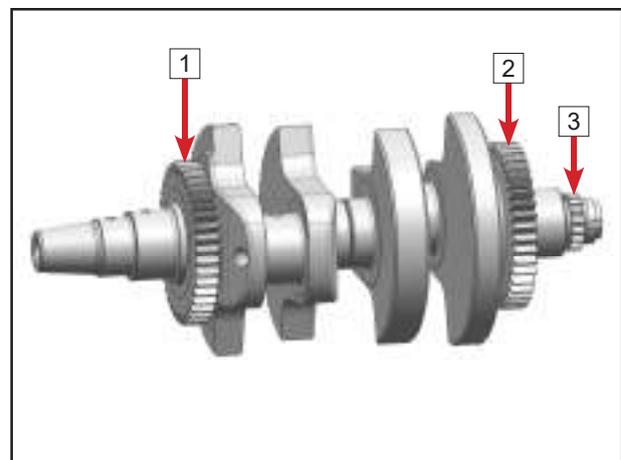


## Crankshaft Assembly

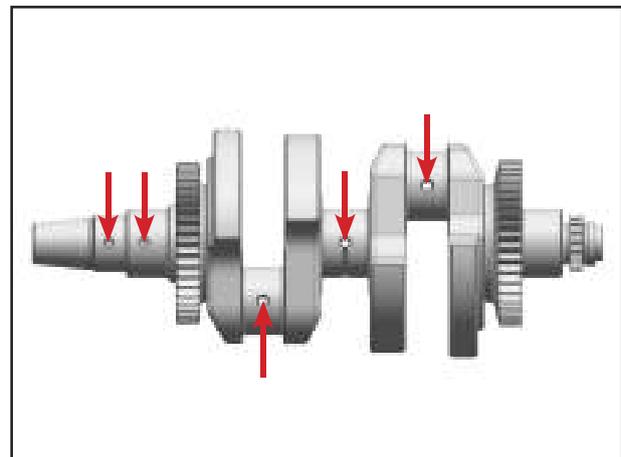
Check each supporting journal for scratches, cracks or other damage.

Check balance shaft drive gear [1], output gear [2] and timing drive sprocket [3] for excessive wear or other damage.

Replace with new crankshaft assembly if necessary.

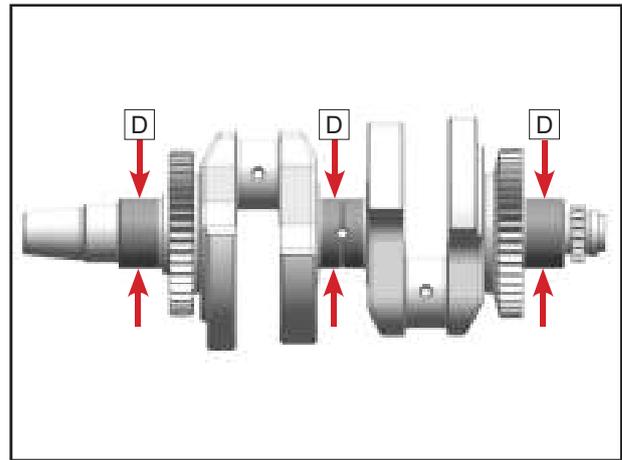


Use compressed air to blow the oil holes and make sure they are not clogged.



Measure the diameter  $\square D$  of crankshaft main journal. Replace new part if it is smaller than service limit.

Crankshaft Main Journal Diameter $\square D$	
New Part	37.969 ~ 37.985 mm (1.49484 ~ 1.49547 in)
Service Limit	37.950 mm (1.49409 in)



## Connecting Rod Big End Radial Clearance

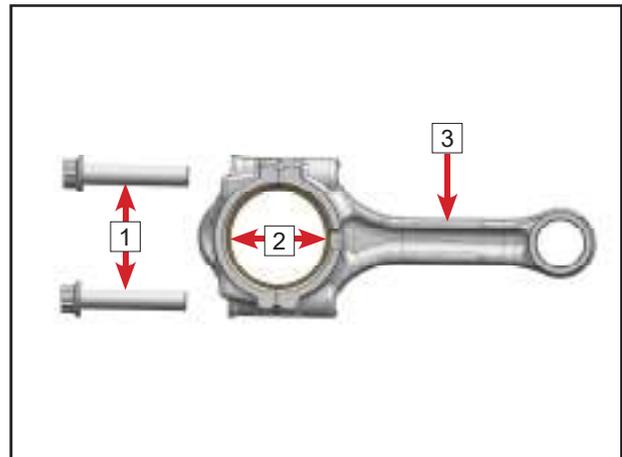
**NOTE: It must be assembled according to the pairing mark on the side of connecting rod big head, and each cylinder connecting rod cannot be exchanged.**

- $\square 1$ : Connecting rod bolt
- $\square 2$ : Connecting rod bearing
- $\square 3$ : Connecting rod

Install the connecting rod bearing  $\square 2$  as in the initial state.

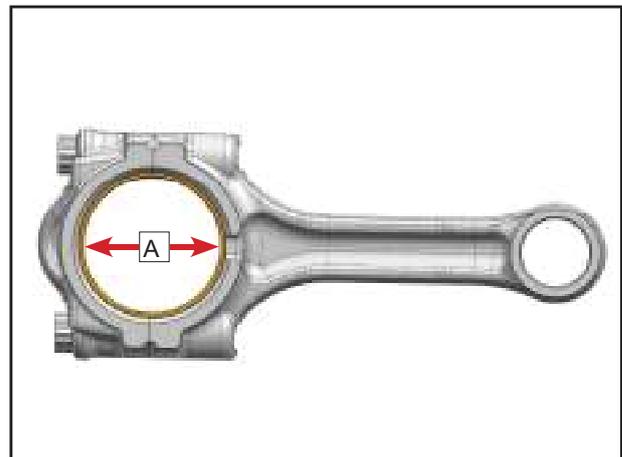
Install the connecting rod bolts  $\square 1$ , and tighten them in two steps:

<b>Step 1 Torque</b>	20 N·m (14.74 ft-lb.)
<b>Step 2 Angle</b>	150° ±5°



Measure the inner diameter  $\square A$  of the big end bearing of the connecting rod.

Inner Diameter of Connecting Rod Big End Bearing $\square A$	
Service Limit	38.06 mm (1.49843 in)



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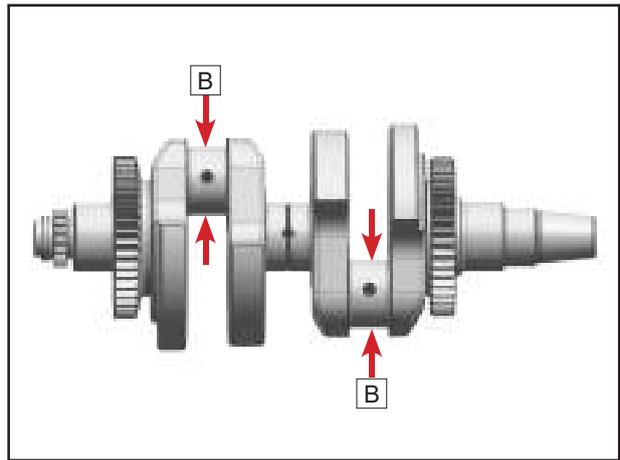
Measure the diameter **B** of the connecting rod journal.

<b>Connecting Rod Journal Diameter <b>B</b></b>	
New Part	37.985 ~ 38.000 mm (1.49547 ~ 1.49606 in)
Service Limit	37.970 mm (1.49488 in)

Compare the inner diameter **A** of the big end bearing of connecting rod with the connecting rod journal diameter **B**, and determine the radial clearance.

<b>Radial Clearance of Big End of Connecting Rod</b>	
Service Limit	$A - B \leq 0.07 \text{ mm (0.00276 in)}$

If the radial clearance of big end of connecting rod exceeds service limit, replace connecting rod bearing or crankshaft, or both.



## Connecting Rod Grouping

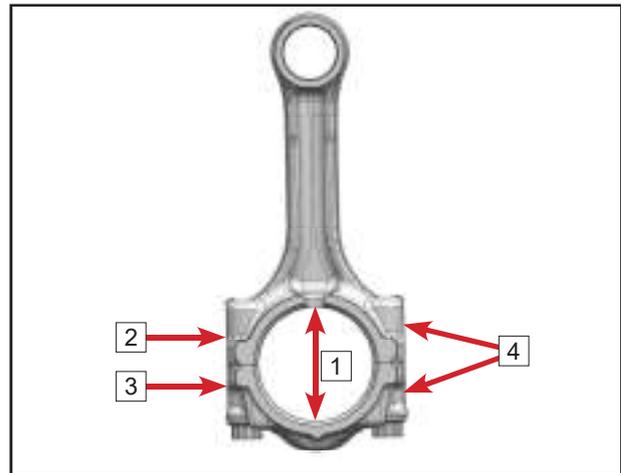
The diameter 1 of the crank bore of the connecting rod and the weight of the connecting rod are grouped in the following table. The position of grouping mark shows on the right.

2: Crank bore diameter 1 grouping mark

3: Connecting rod weight mark

4: Matching mark

The matching marks of connecting rod cap and connecting rod are the same.



Crank Bore (New Part)	
Mark	Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span>
1	41.000 ~ 41.005 mm (1.61417 ~ 1.61437 in)
2	41.005 ~ 41.010 mm (1.61437 ~ 1.61457 in)
3	41.010 ~ 41.015 mm (1.61457 ~ 1.61476 in)

Connecting Rod Weight G (New Part)	
Mark	Weight (g)
367	$366\text{g} \leq G < 368\text{g}$
369	$368\text{g} \leq G < 370\text{g}$
371	$370\text{g} \leq G < 372\text{g}$
373	$372\text{g} \leq G < 374\text{g}$
375	$374\text{g} \leq G < 376\text{g}$
377	$376\text{g} \leq G < 378\text{g}$
379	$378\text{g} \leq G < 380\text{g}$
381	$380\text{g} \leq G < 382\text{g}$
383	$382\text{g} \leq G < 384\text{g}$
385	$384\text{g} \leq G \leq 386\text{g}$

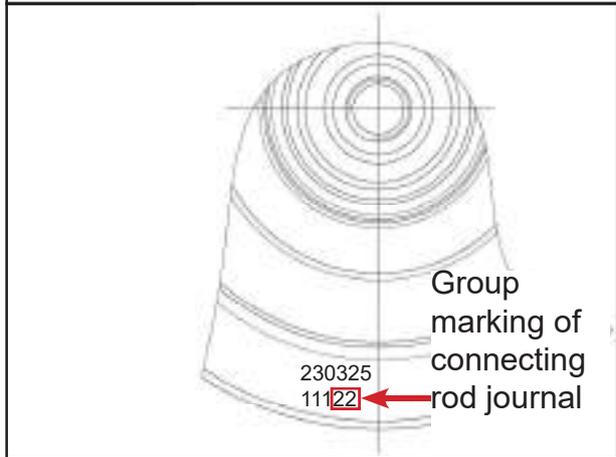
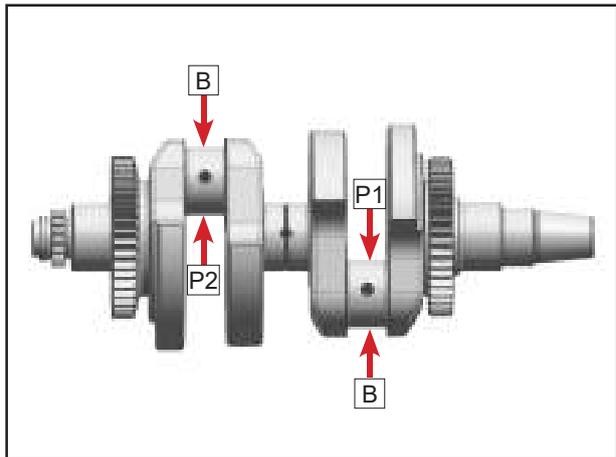
**NOTE: The same crankshaft must be fitted with the same weight group marked connecting rod.**

## Crankshaft Connecting Rod Journal Grouping

Crankshaft connecting rod journal diameter [B] grouping is shown in the table below.

Connecting Rod Journal (New Part)	
Mark	Diameter [B]
3	37.985 ~ 37.990 mm (1.49547 ~ 1.49567 in)
2	37.991 ~ 37.995 mm (1.49571 ~ 1.49587 in)
1	37.996 ~ 38.000 mm (1.49591 ~ 1.49606 in)

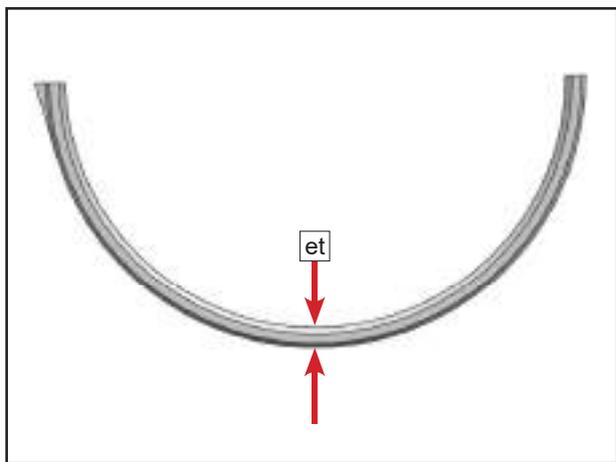
The group marking position of crankshaft connecting rod journal is shown in the example on the right, from left to right are the group marking of P1 and P2.



## Connecting Rod Bearing Grouping

The grouping of connecting rod bearing thickness [et] is shown in the table below.

Connecting Rod Bearing (New Part)	
Color Mark	Thickness [et]
Black	1.485 ~ 1.488 mm (0.05846 ~ 0.05858 in)
Blue	1.488 ~ 1.491 mm (0.05858 ~ 0.05870 in)
Green	1.491 ~ 1.494 mm (0.05870 ~ 0.05882 in)
Yellow	1.494 ~ 1.497 mm (0.05882 ~ 0.05894 in)



## Connecting Rod Bearing Selection

Select connecting rod bearing as following table.

Connecting Rod Bore Mark	Crankshaft Connecting Rod Journal Mark	Connecting Rod Bearing Color
1	1	Black
1	2	
2	1	
1	3	Blue
2	2	
3	1	Green
2	3	
3	2	Yellow
3	3	

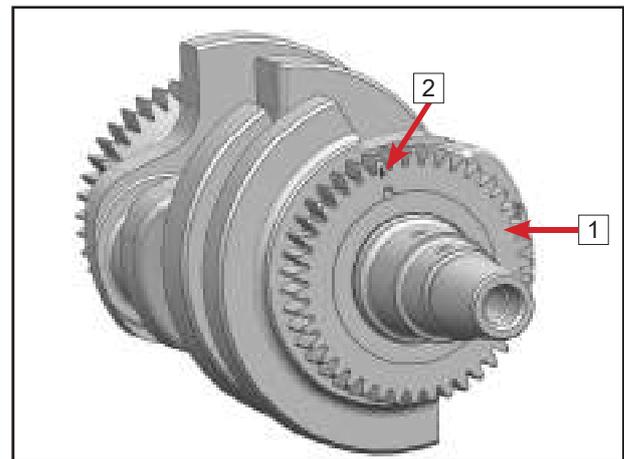
## Balance Shaft Drive Gear / Output Gear Grouping

The balance shaft drive gear [1] is divided into group A and B, and the position of the grouping mark (A or B) [2] is shown on the right.

The balance shaft drive gear and the balance shaft assembly are paired according to the following table.

Balance Shaft Drive Gear (on crankshaft) Grouping Mark	Balance Shaft Assembly Grouping Mark
A	B
B	A

The grouping of the balance shaft assembly is detailed in section 5.4.2.

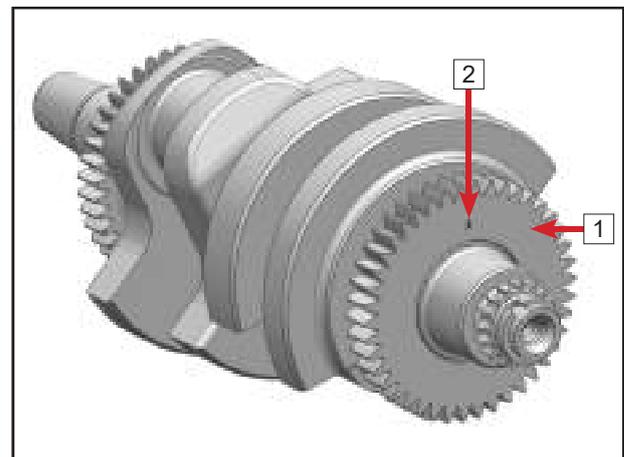


The output gear [1] is divided into group A and B, and the position of the grouping mark (A or B) [2] is shown on the right.

The output gear and the clutch are paired according to the following table.

Output Gear (on crankshaft) Grouping Mark	Clutch Grouping Mark
A	B
B	A

The grouping of the clutch is detailed in section 4.5.



## Assembly of Crankshaft Connecting Rod Assembly

Carefully clean with compressed air the surface of the connecting rod and bearing. Install the connecting rod bearing [3] correctly onto the connecting rod cap [2] and connecting rod [4].

Carefully clean the section surface of the connecting rod and bearing.

**NOTE: Before installing the connecting rod, apply oil to the surfaces of the rod bearing and crankshaft journal.**

**NOTE: The "CF" mark on the connecting rod is facing towards the crankshaft magneto side.**

Install the matching connecting rod cap [2] and rod [4] on the crankshaft.

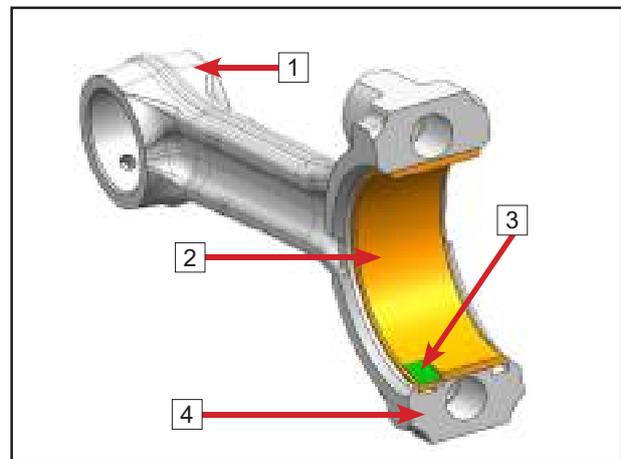
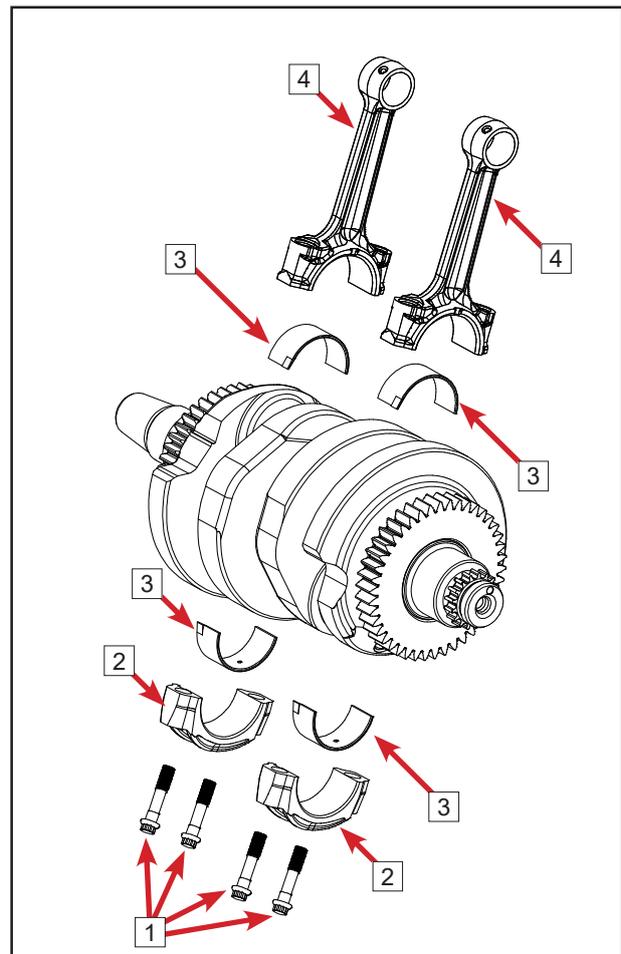
Apply an appropriate amount of engine oil to the threads and flange surfaces of the connecting rod bolts [1].

Install the connecting rod bolts [1], and tighten them in two steps:

<b>Step 1 Torque</b>	20 N•m (14.74 ft-lb.)
<b>Step 2 Angle</b>	150°±5°

**⚠ WARNING: If not properly installed, connecting rod bolts can loosen and cause engine damage.**

- [1]: Connecting rod body
- [2]: Connecting rod bearing
- [3]: Bearing locating lip
- [4]: Connecting rod section surface

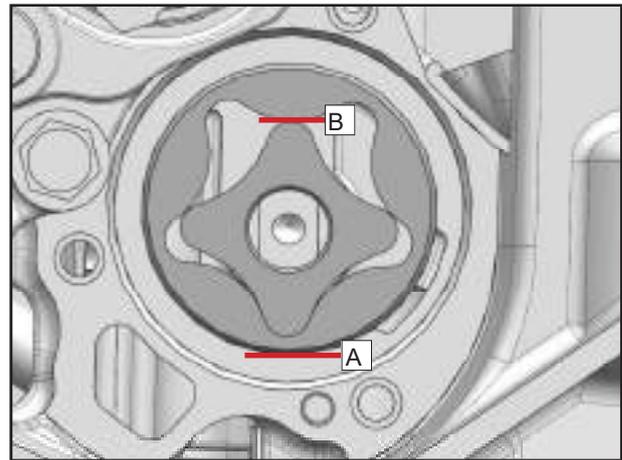


## 5.4.17 Oil Pump Inspection

Use a feeler to measure the clearance **A** between the outer rotor and the oil pump cavity, and the clearance **B** between the inner rotor and outer rotor.

Oil Pump	
Clearance between the outer rotor and the oil pump cavity	$A \leq 0.15\text{mm}$
Clearance between inner rotor and outer rotor	$B \leq 0.2\text{mm}$

If the measured value exceeds the specified range: replace the oil pump inner rotor and outer rotor in sets. If necessary, replace the crankcase.



Inspect oil pump inner rotor **1**, outer rotor **2** for severe wear or damage. Replace oil pump inner and outer rotor as a set if it does.

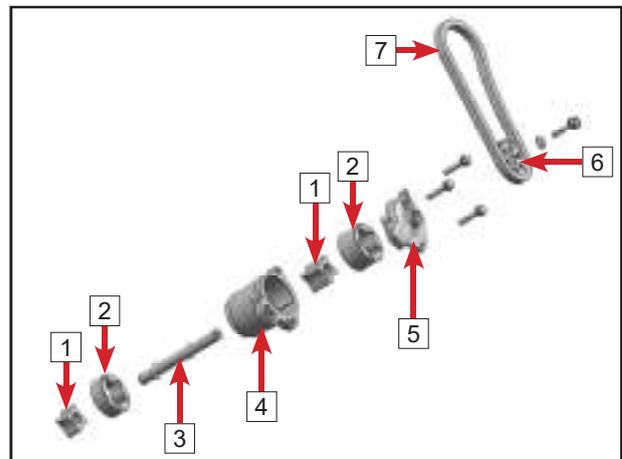
Inspect oil pump shaft **3** for severe wear or damage. Replace oil pump shaft if it does.

Inspect oil pump body **4** for severe wear or damage. Replace oil pump body if it does.

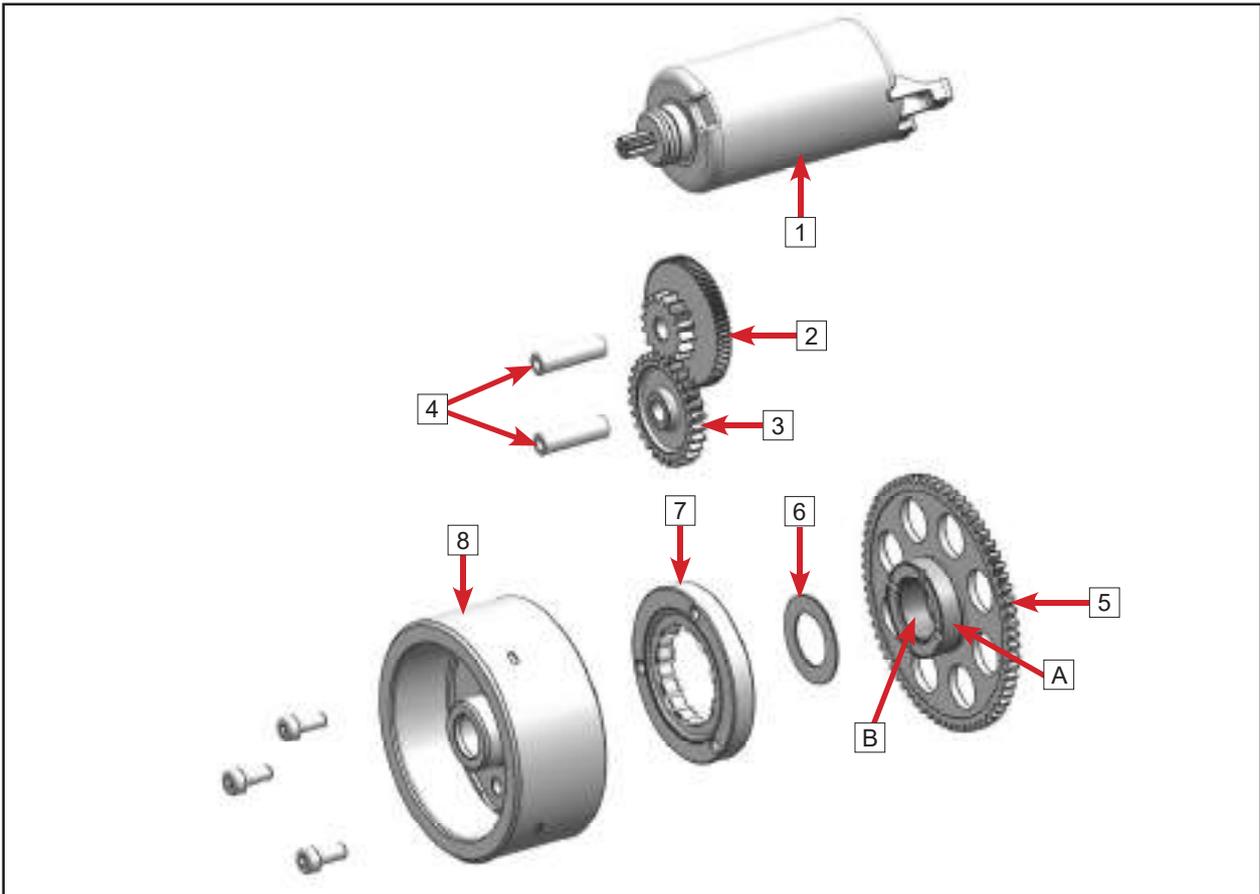
Inspect oil pump cover **5** for severe wear or damage. Replace oil pump cover if it does.

Inspect oil pump sprocket **6** for severe wear or damage. Replace oil pump sprocket if it does.

Inspect oil pump chain **7** for severe wear or damage. Replace oil pump chain if it does.



## 5.4.18 Electric Starting Drive Inspection



Check the gear tooth surface of starter motor **1** for excessive wear or damage. If yes, replace the starter motor.

Check the dual gear **2** for excessive wear or damage. If yes, replace the dual gear.

Check the starting middle gear **3** for excessive wear or damage. If yes, replace the starting middle gear.

Check the gear shaft **4** for excessive wear or damage. If yes, replace the gear shaft.

Check the starter big gear assembly **5** for the following conditions:

- Excessive wear or damage of gear tooth surface
- Excessive wear or damage of clutch cylinder **A**
- Excessive wear or damage of bushing **B**

Replace the starter big gear assembly if there is excessive wear or damage in any part.

Check the washer **6** for excessive wear or damage. If yes, replace the washer.

Check the overriding clutch assembly **7** for excessive wear or damage. If yes, replace the overriding clutch assembly.

Check whether the magneto rotor **8** has the following conditions:

- Internal cone is scratched or damaged

If any part is abnormal, replace the magneto rotor.

## 5.4.18.1 Overriding Clutch Assembly Inspection

Turn the starter big gear **1** counterclockwise **A** and insert it into the overriding clutch, do not squeeze it in. Check the locking of starter big gear **1**: If the starter big gear can not rotate counterclockwise **A** or can not be locked clockwise, replace the overriding clutch.

**NOTE: Overriding clutch, overriding clutch seat and starter big gear should be replaced at the same time if damaged.**

### Removal

Remove starter big gear assembly **1**.  
Remove washer **2**.  
Remove inner hex screws **5**.  
Remove overriding clutch assembly **3**.

**NOTE: If there is no defect of the overriding clutch, it is not necessary to remove it.**

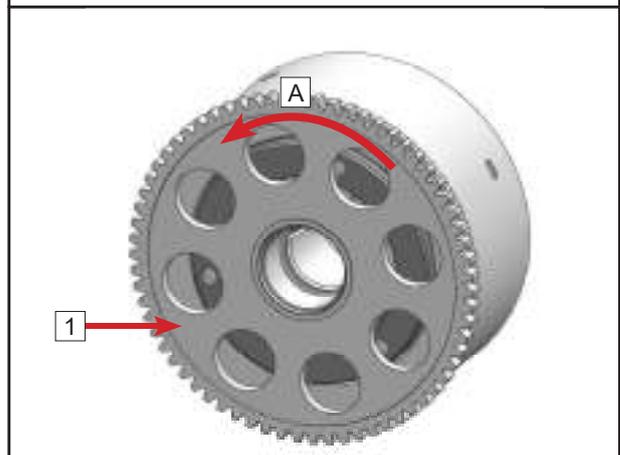
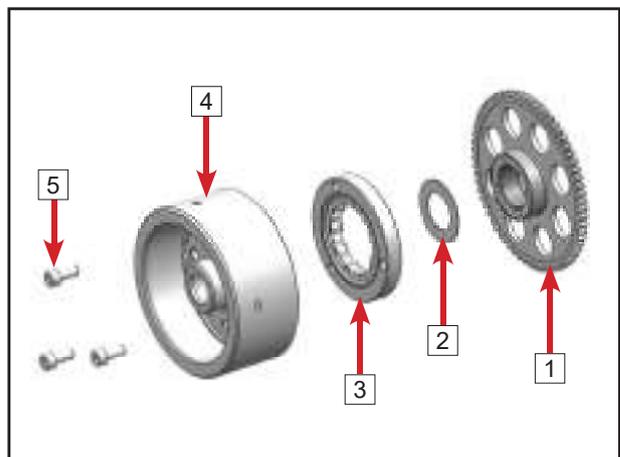
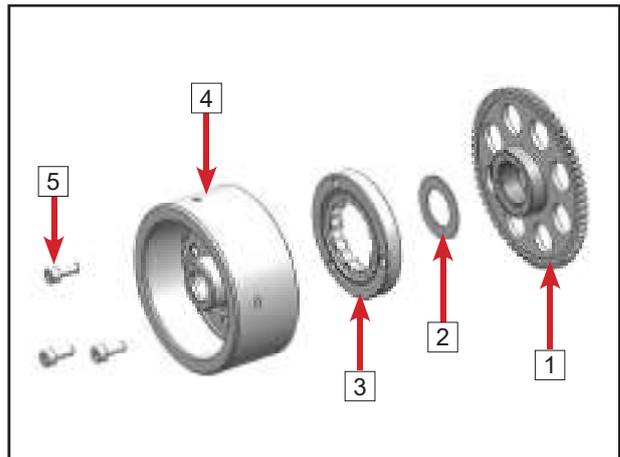
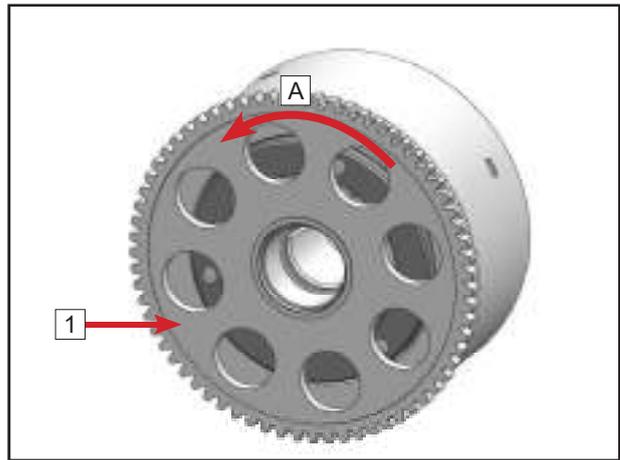
### Assembly

Install the overriding clutch assembly **3** on the magneto rotor **4**.  
Apply 263 thread locker on inner hex screws **5**.  
Install inner hex screws **1**, and tighten to the specified torque.

Overriding Clutch Screw <b>5</b>	
Torque	34 N·m (25.1 ft-lb.)

Install washer **2** on the starter big gear assembly **1**.

Turn the starter big gear **1** counterclockwise **A** and insert it into the overriding clutch, do not squeeze it in.



## 5.5 Engine Assembly

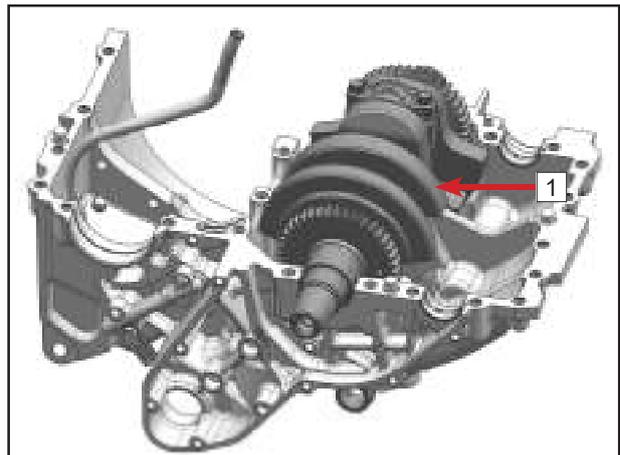
**⚠ WARNING:** Once a retainer is removed, it cannot be reused. The open end of a retainer cannot be opened too wide. Check that retainers are fully in place after installation.

**NOTE:** Before engine assembly, clean all parts, check and confirm whether there are damaged or missing parts.

**NOTE:** Removed gaskets cannot be reused. Replace with new ones during reassembly. Any remaining gasket material on the parts must be cleaned.

### 5.5.1 Crankshaft Assembly and Balance Shaft Assembly Installation

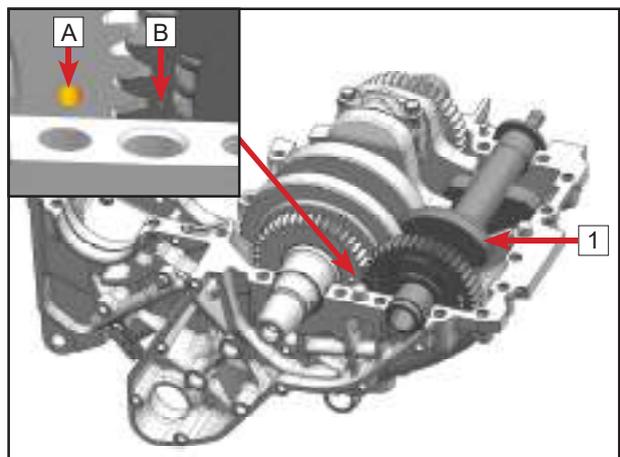
Apply oil on the main plain bearing.  
Place crankshaft assembly **1** in place.



Apply oil to balance shaft plain bearing.  
Install balance shaft assembly **1**.

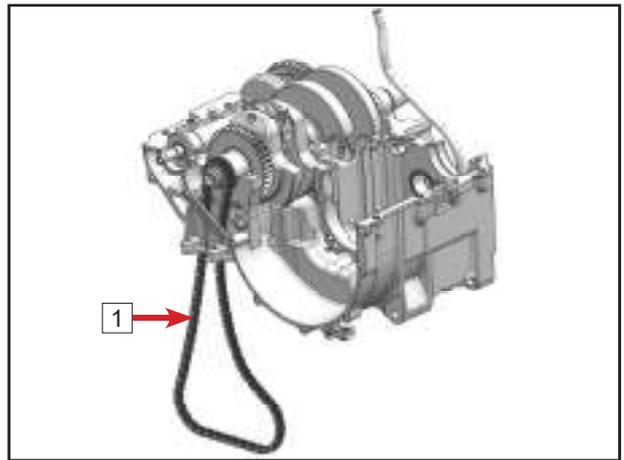
**NOTE:** Balance shaft assembly and crankshaft assembly must be paired according to the table below.

Balance Shaft Assembly Grouping Mark	Balance Shaft Drive Gear (on crankshaft) Grouping Mark
A	B
B	A



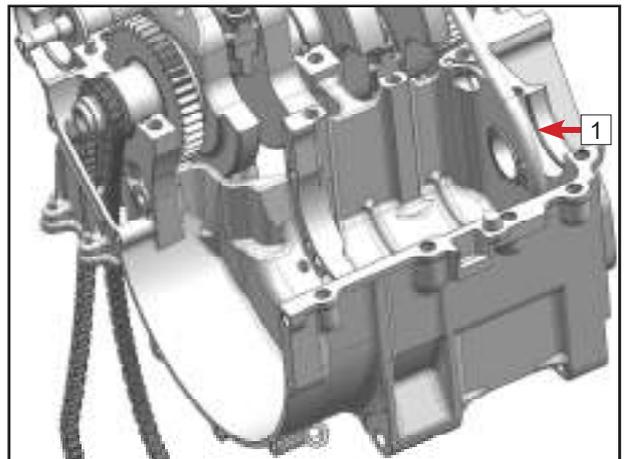
**NOTE:** Ensure that mark **A** is aligned with mark **B**.

Place timing chain **1** on correct position.



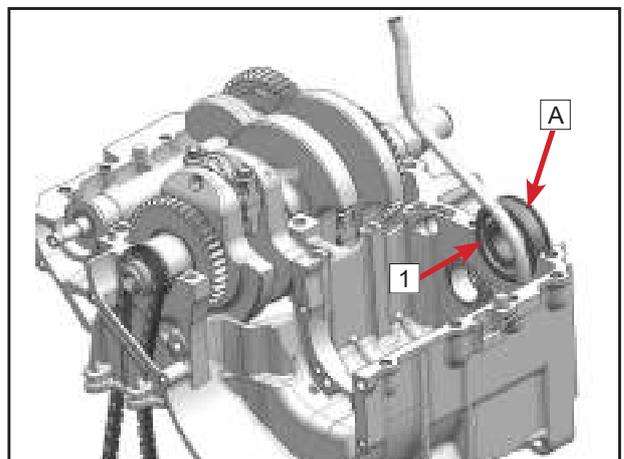
### 5.5.2 Lower Crankcase Installation

Install bearing stop ring **1** into the groove of the upper crankcase to ensure full entry into the groove.

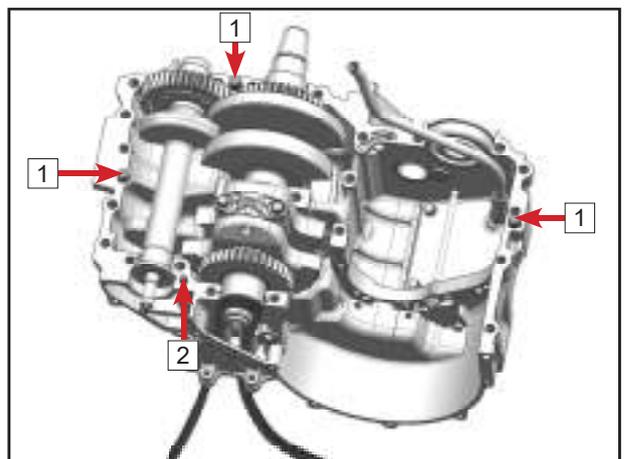


Install countershaft bearing **1**.

**NOTE: Ensure that the bearing stop ring is engaged in the ring groove **A** of the countershaft bearing.**



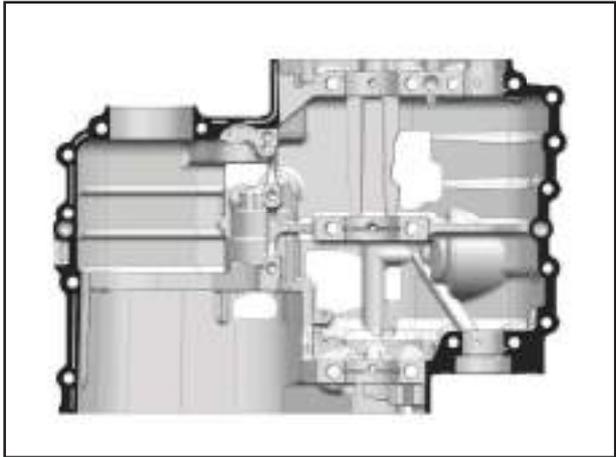
Ensure that the sealing surface of the crankcase is clean, dry and free of oil. Ensure that needle rollers **1** and **2** are installed.



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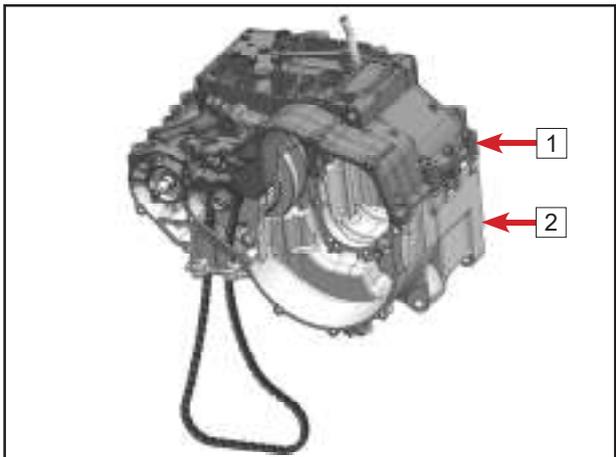
Apply an appropriate amount of KB598 flange sealant on the sealing surface of lower crankcase, and the coating should be uniform and continuous. The gluing position is shown on the right picture.

**NOTE: From applying the flange sealant to completing the installation of the lower crankcase and tightening the crankcase bolts, it should be controlled within 10 minutes. It is recommended that you keep everything needed close to your hand to save time.**



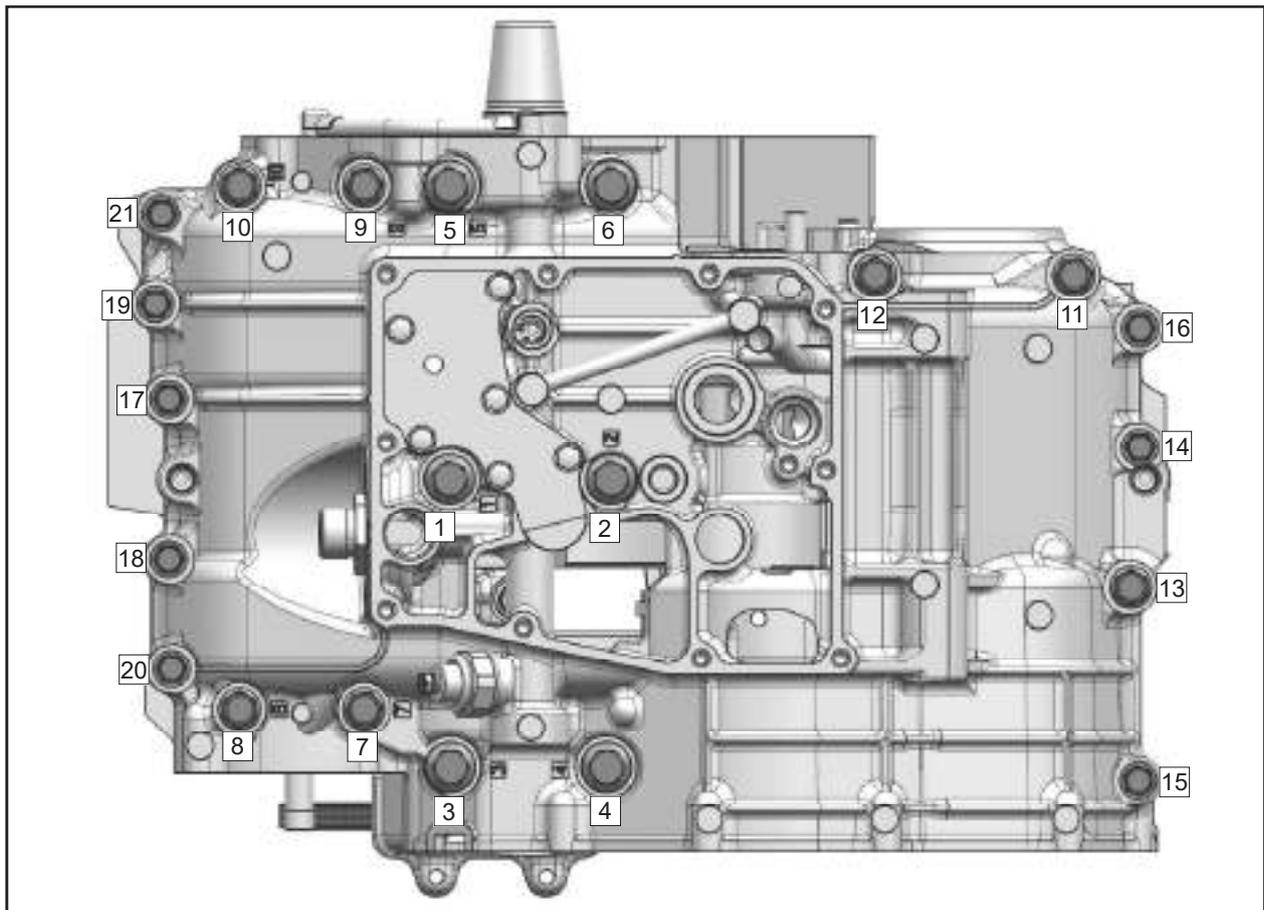
Apply oil on the main plain bearing and the balance shaft plain bearing.

Install lower crankcase 1 onto the upper crankcase 2.



## 05 Engine

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



Tighten Steps	Bolt Number	Torque (N·m)
Step 1	1~21	8
Step 2	1~10	20
Step 3	1~10	35
Step 4	1~6	44
Step 5	11~13	27.5
Step 6	14~21	20

**NOTE:** Apply liquid mixed with oil and MoS<sub>2</sub> grease ( weight ratio 10:1) on thread and washer of bolt 1~10 .

Bolt Number	Part Name
1 , 2 , 5 , 6	Bolt M9×113
3 , 4	Bolt M9×83
7 , 9	Bolt M8×73
8 , 10 , 11	Bolt M8×60
12	Bolt M8×110
13	Bolt M8×50
14 , 16 , 17 , 18 , 19 , 20	Bolt M7×40
15	Bolt M7×34
21	Bolt M7×47

Install bolts and washers [1] and tighten to the specified torque.  
 Install bolt and washer [2] and tighten to the specified torque.

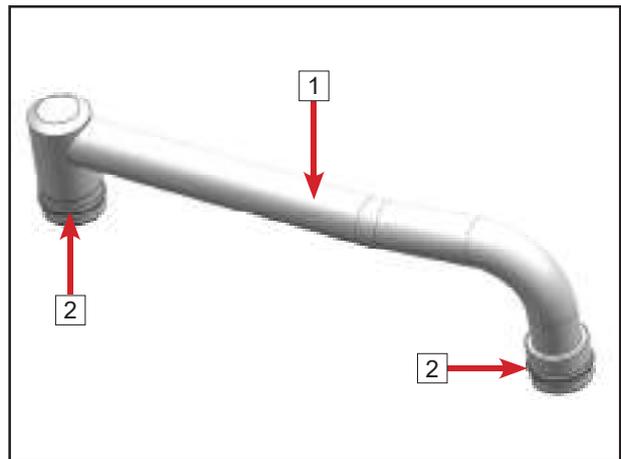
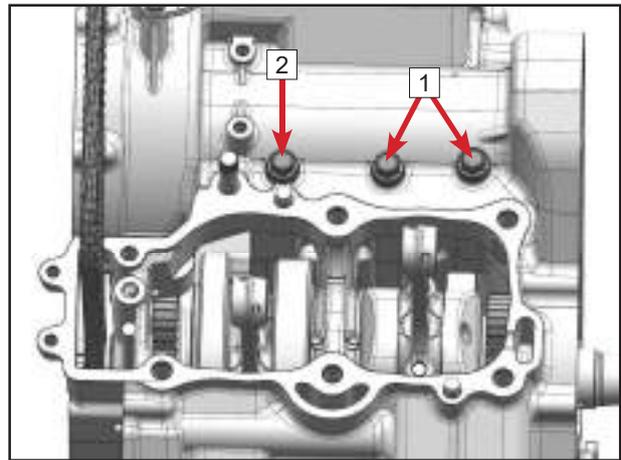
Crankcase Bolt [1] [2]	
Torque	27.5 N·m (20.3 ft-lb.)

**NOTE: Apply engine oil on the bolt thread before installing.**

Remove spilled flange sealant.

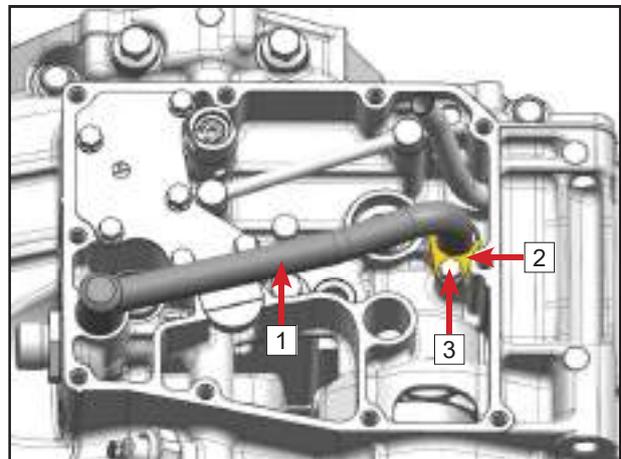
### 5.5.3 Oil Pan Installation

Ensure that the O-ring [2] is installed on the oil pipe I [1].  
 Apply oil on O-ring [2].



Apply oil on mounting holes of oil pipe I [1].  
 Install oil pipe I [1] on lower crankcase.  
 Install oil pipe I press plate [2].  
 Apply 243 thread locker on bolt [3].  
 Install bolt [3] and tighten to specified torque.

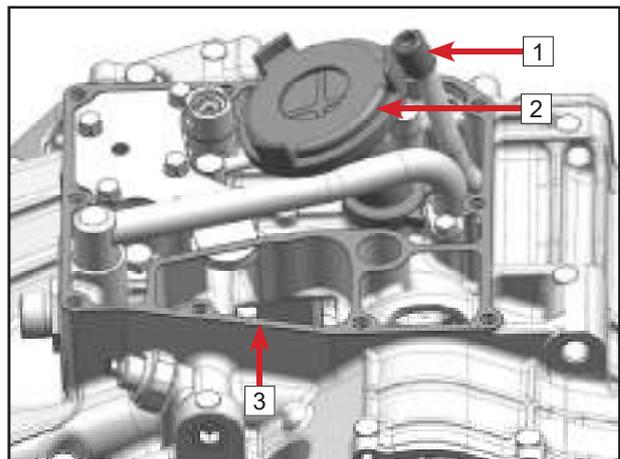
Oil Pipe I	Press Plate Bolt [3]
Torque	10 N·m (7.3 ft-lb.)



Ensure that the seal ring [2] is installed on the oil suction filter [1].



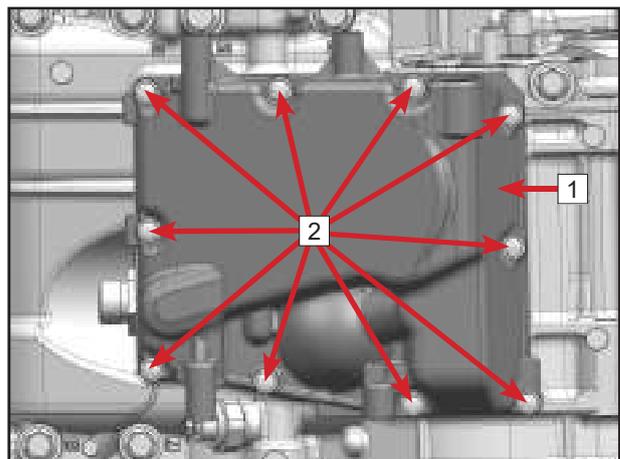
Install damper, oil return hose [1].  
 Install oil suction filter assembly [2] on correct position.  
 Place oil pan gasket [3] in place.



Align oil return hose with installation slot of oil pan.

Install oil pan [1].  
 Install bolt [2] and tighten it to the specified torque in criss-cross way.

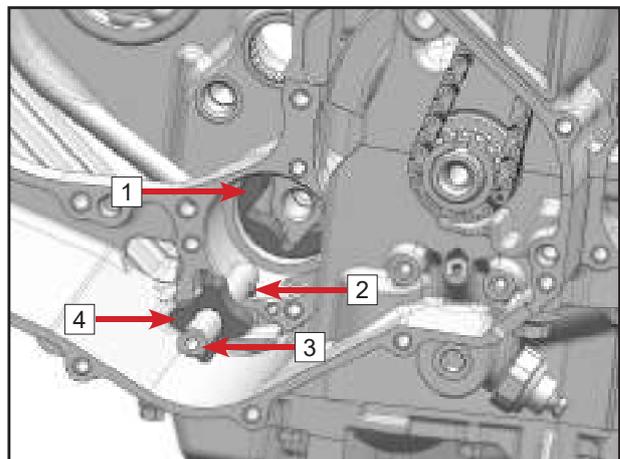
Oil Pan Bolt [2]	
Torque	12 N·m (8.8 ft-lb.)



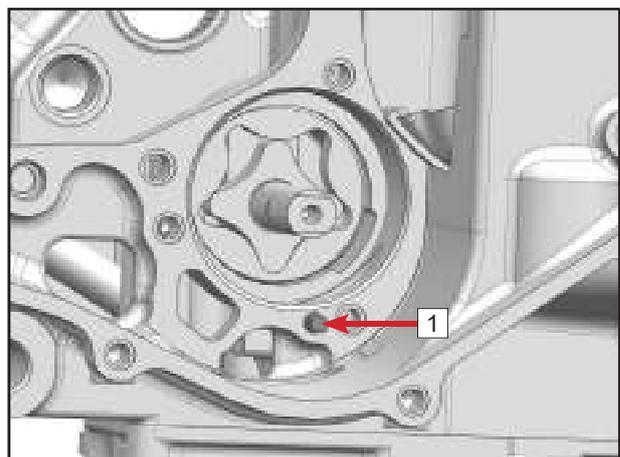
### 5.5.4 Oil Pump Assembly Installation

Apply oil on main oil pump rotors and oil pump shaft.

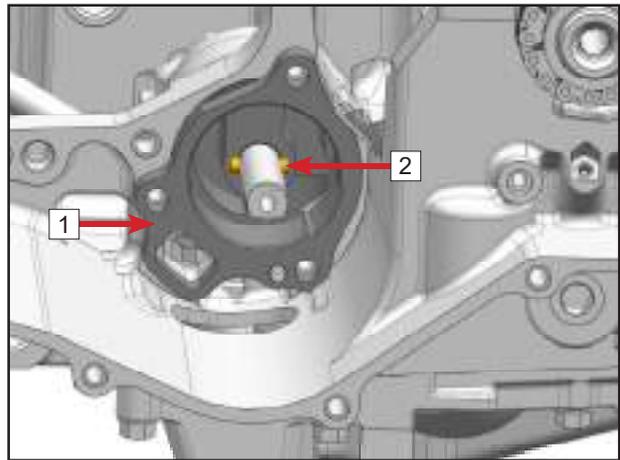
Install **main oil pump outer rotor** [1].  
 Install roller needle [2] on oil pump shaft [3].  
 Install main oil pump inner rotor [4] on oil pump shaft [3], and stick roller needle [2] into the groove of inner rotor [4].  
 Install oil pump shaft with inner rotor [3] on the lower crankcase. (Rotate to the right angle when installing)



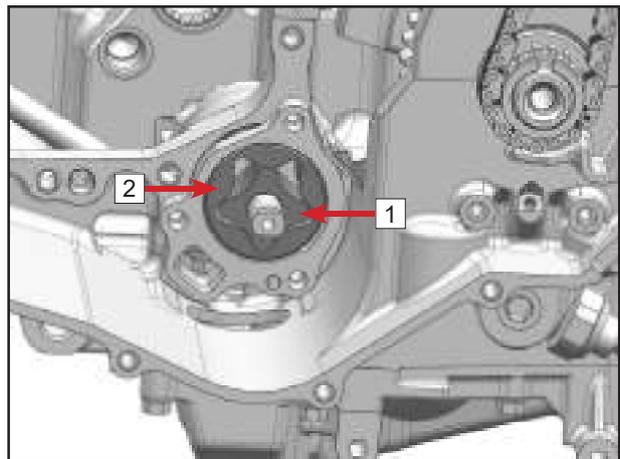
Install roller needle [1].



Install oil pump body **1**.  
Install roller needle **2**.



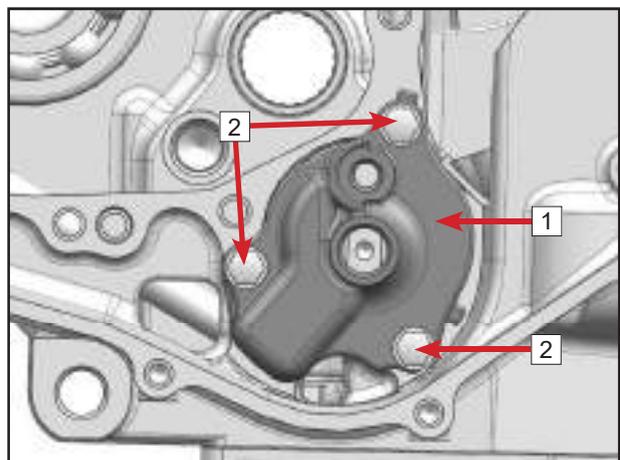
Apply oil on auxiliary oil pump rotors.  
Install auxiliary oil pump inner rotor **1** and stick roller needle into the groove of inner rotor.  
Install auxiliary oil pump outer rotor **2**.  
(Rotate to the right angle when installing)



Install oil pump cover **1**.  
Install bolts **2** and tighten to the specified torque.

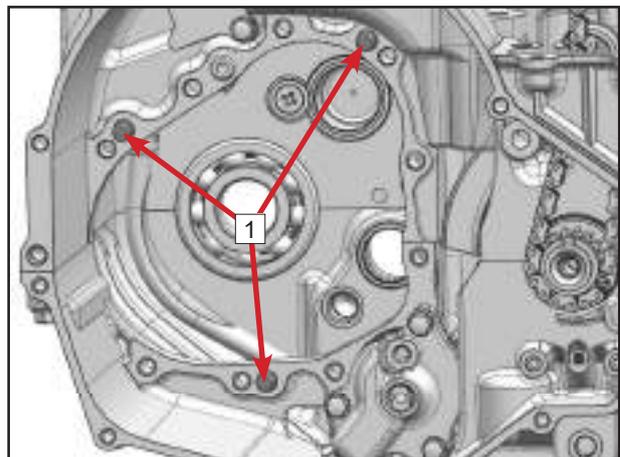
Oil Pump Cover Bolt <b>2</b>	
Torque	12 N·m (8.8 ft-lb.)

Rotate oil pump shaft to make sure it rotates freely.

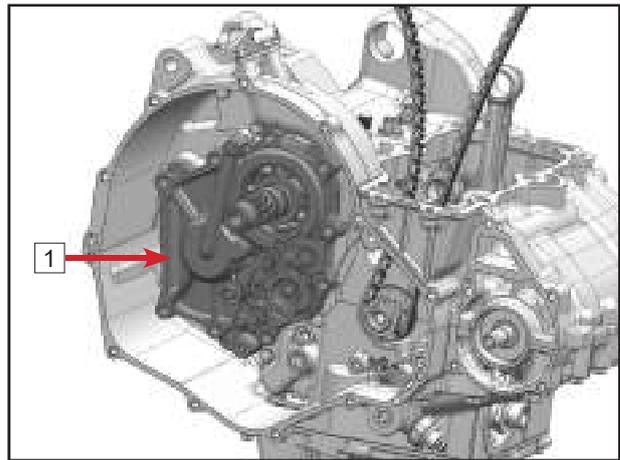


## 5.5.5 Transmission Assembly Installation

Install roller needle **1**.  
Apply engine oil on all bearing holes.

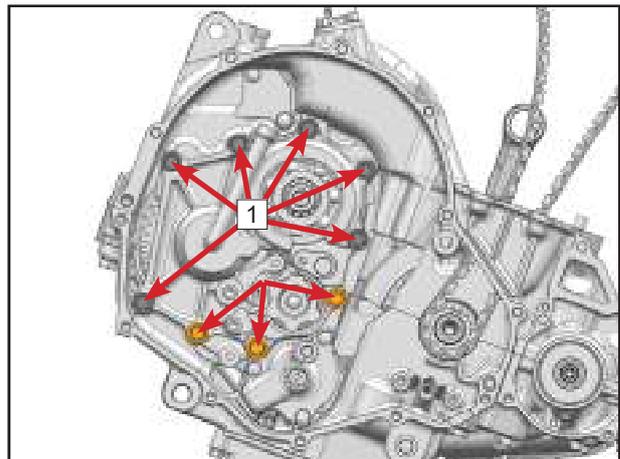


Apply engine oil on all bearing journal.  
Install transmission assembly **1**.



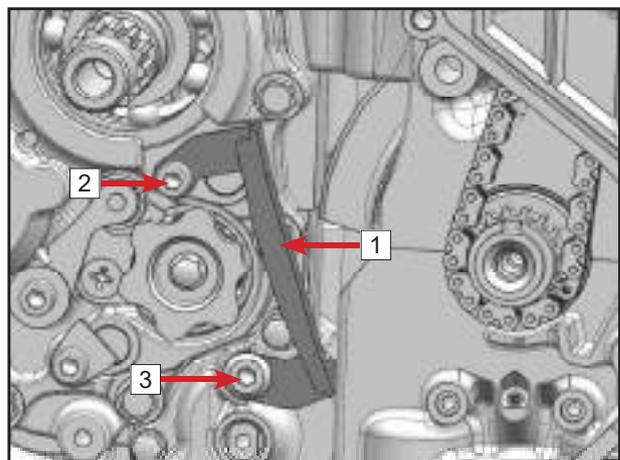
Apply 243 thread locker on bolt **1** and bolt **2**.  
Install bolt **1** and bolt **2**, and tighten to the specified torque in criss-cross way.

<b>Gearshift Cover Bolt</b> <b>1</b> <b>2</b>	
Torque	20 N·m (14.7 ft-lb.)

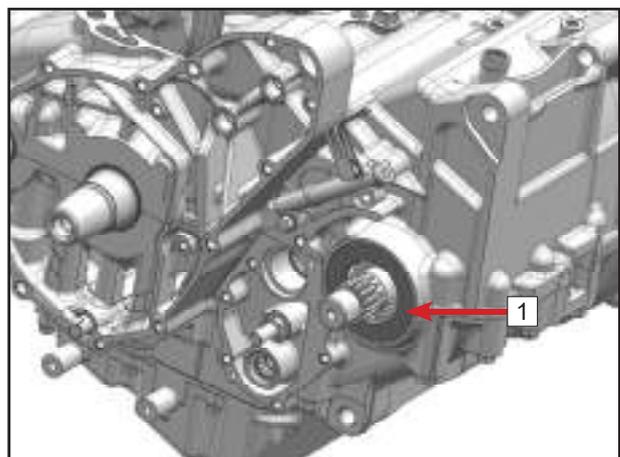


Apply 243 thread locker on inner hex screw **2** and **3**.  
Install oil pump chain guide **1**.  
Install inner hex screw **2** and **3**, and tighten to the specified torque.

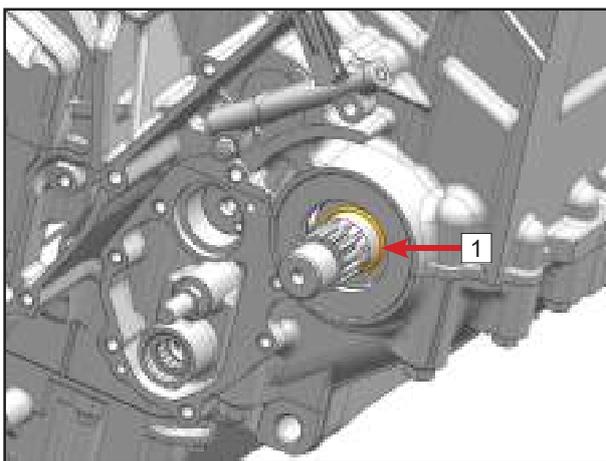
<b>Oil Pump Chain Guide Screw</b> <b>2</b> <b>3</b>	
Torque	10 N·m (7.3 ft-lb.)



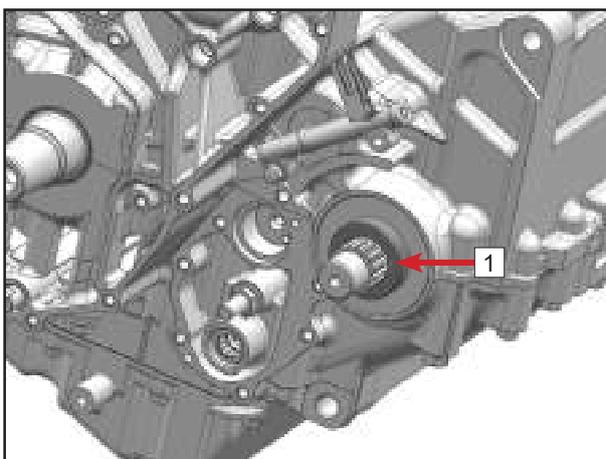
Install countershaft oil seal **1** with right tool.



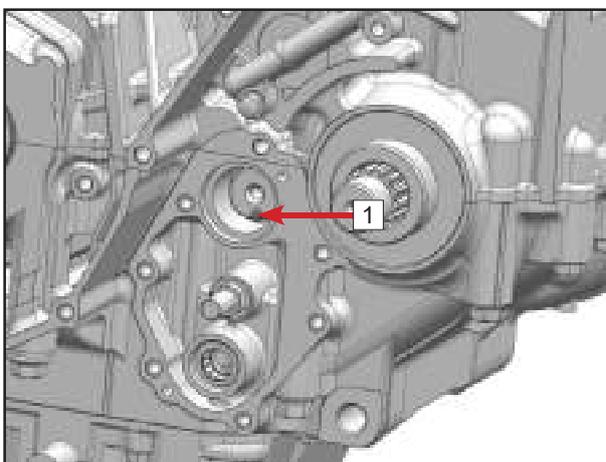
Install O-ring **1**.



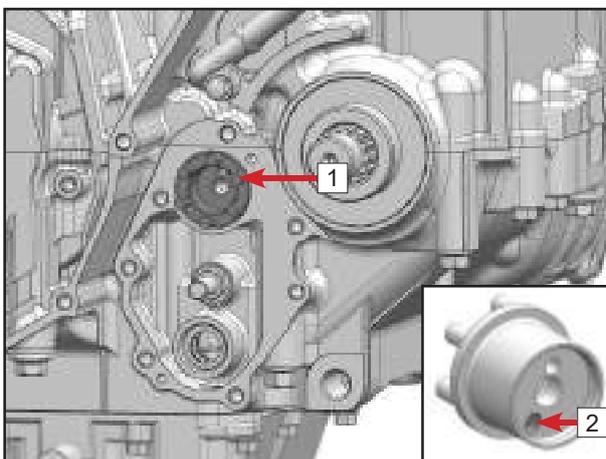
Install countershaft sleeve **1**.



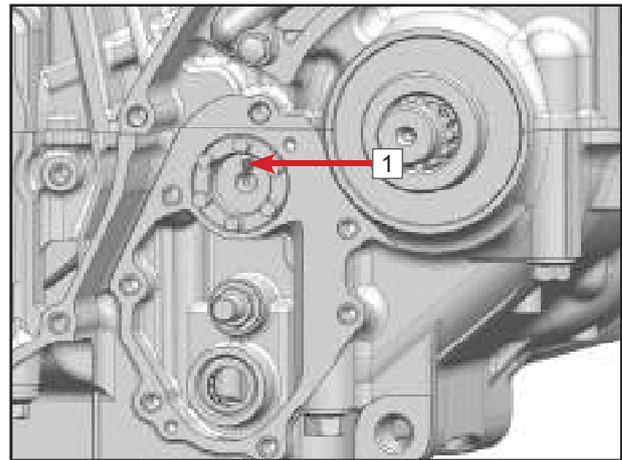
Install roller needle **1** on the position hole of shift drum.



Align position hole **2** of shift drum with roller needle, and install shift drum **1**.



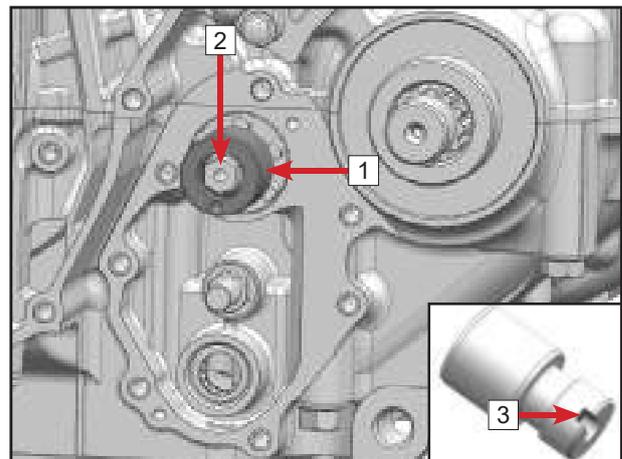
Install roller needle **1** on position hole of shift drum.



Align position slot **3** of gear drive shaft with roller needle, and install gear drive shaft **1**.

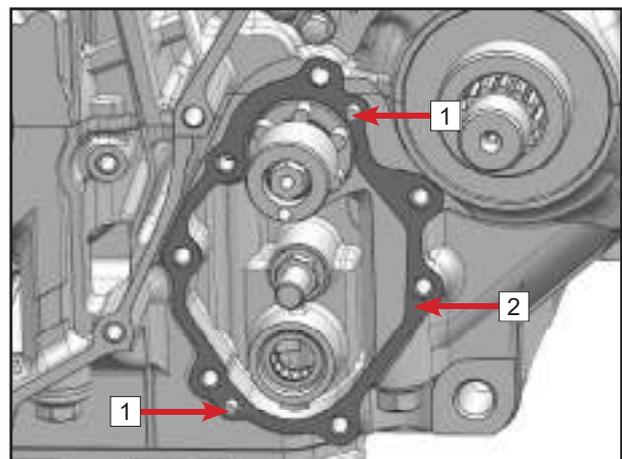
Apply contact bolt **2** with 243 thread locker, install contact bolt **2**, and tighten to the specified torque.

Contact Bolt <b>2</b>	
Torque	12 N·m (8.8 ft-lb.)



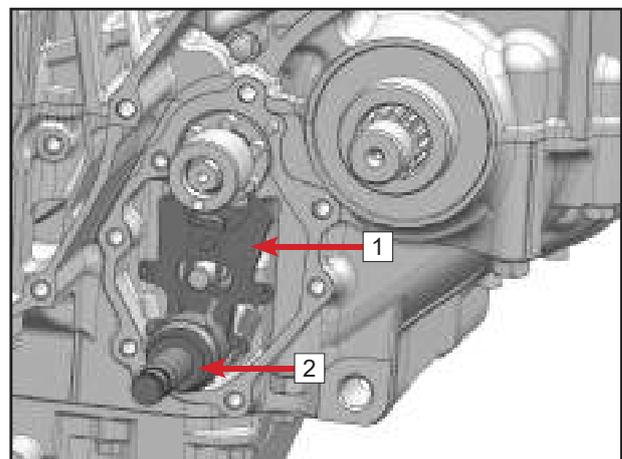
Install roller needle **1**.

Install new gearshift shaft cover gasket **2**.



Install gearshift shaft sub assembly **1**.

**NOTE: Make sure the washer **2** is not missing.**

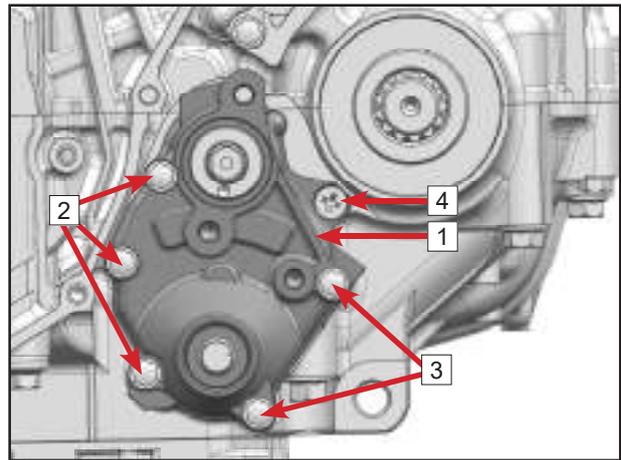


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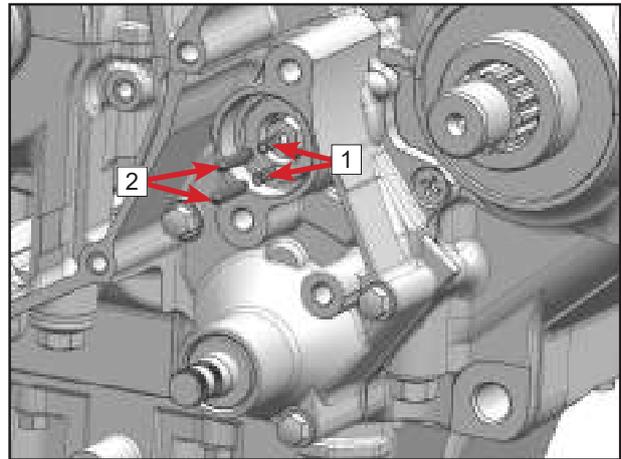
Install gearshift shaft cover **1**.  
Install bolts **2**, **3** and screw **4**, and tighten to the specified torque.

<b>Gearshift Shaft Cover Bolt</b> <b>2</b> <b>3</b>	
Torque	12 N·m (8.8 ft-lb.)

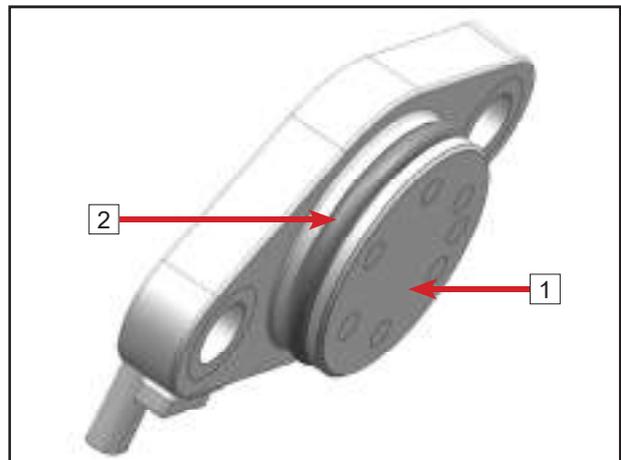
<b>Gearshift Shaft Cover Screw</b> <b>4</b>	
Torque	6 N·m (4.4 ft-lb.)



Install contact spring **1**.  
Install ball contact **2**.

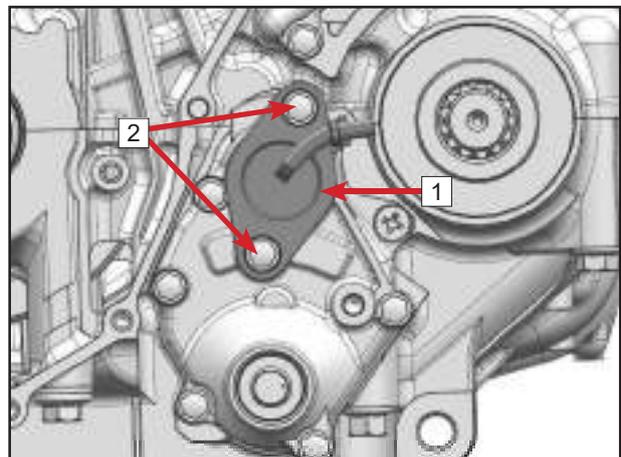


Ensure that the O-ring **2** is installed on the gear sensor **1**.  
Apply O-ring **2** with engine oil.



Install gear sensor **1**.  
Install bolt **2**, and tighten to the specified torque.

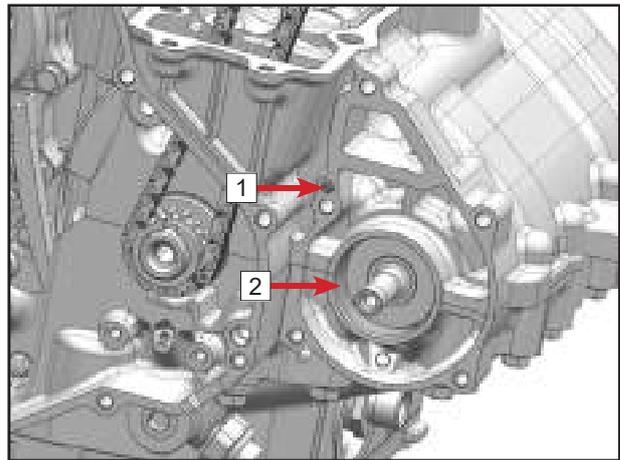
<b>Gear Sensor Bolt</b> <b>2</b>	
Torque	10 N·m (7.3 ft-lb.)



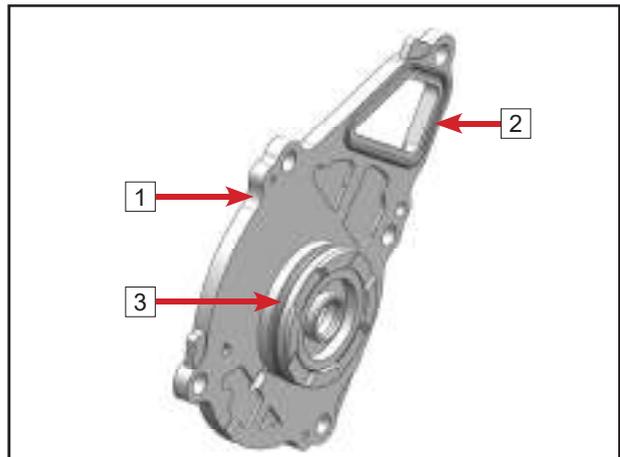
### 5.5.6 Water Pump Installation

Install roller needle **1**.

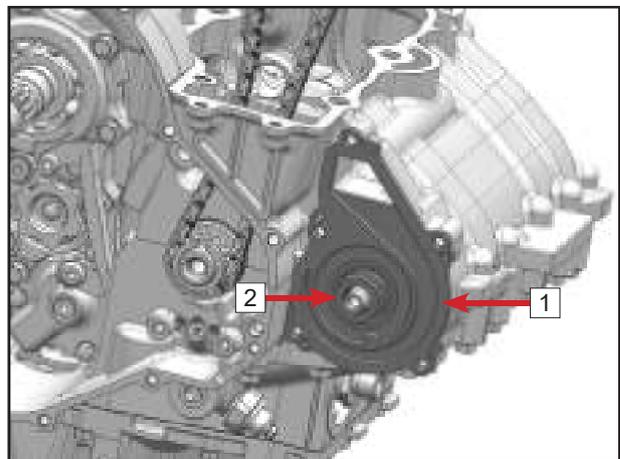
Apply installation hole **2** with engine oil.



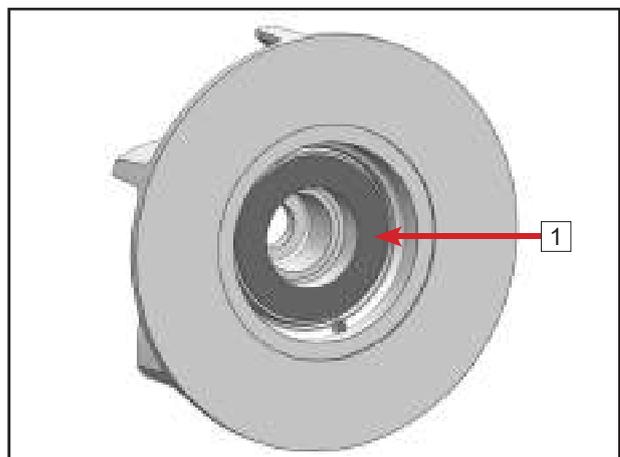
Ensure that the water pump body seal ring **2** and O-ring **3** are installed on the water pump body.



Install water pump body assembly **1**.  
Clean water seal static ring surface **2** with ethyl alcohol. Make sure the working surface is clean without foreign matters.



Clean water seal moving ring surface **1** with ethyl alcohol. Make sure the working surface is clean without foreign matters.



Install water pump impeller assembly **1**.  
Install washer **2** and bolt **3**, and tighten to the specified torque.

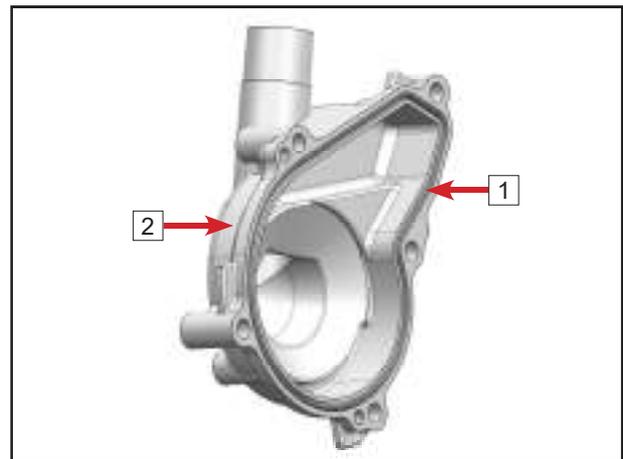
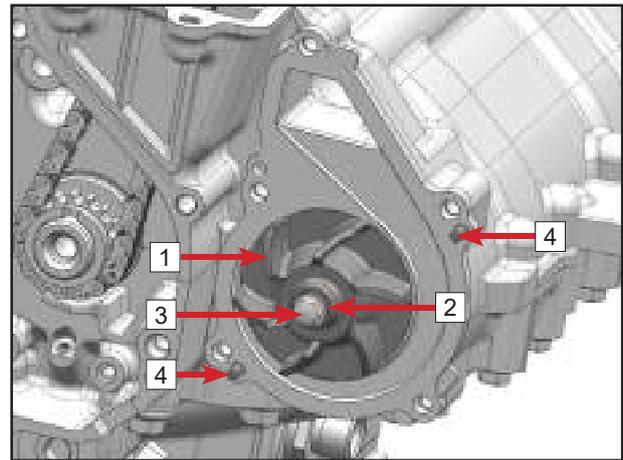
<b>Water Pump Impeller Bolt <b>3</b></b>	
Torque	10 N·m (7.3 ft-lb.)

Inspect the clearance between impeller and water pump body with feeler gauge. The clearance should be within the scope of the table below.

<b>Clearance standard</b>
0.2 ~ 0.85 mm (0.00787 ~ 0.03346 in)

Install roller needle **4**.

Ensure that the water pump cover seal ring **1** is installed on the water pump cover **2**.

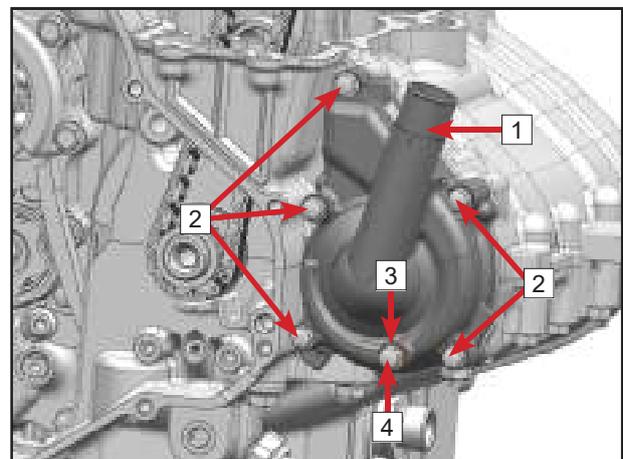


Install water pump cover assembly **1**.  
Install bolt **2**, and tighten in criss-cross way to the specified torque.

<b>Water Pump Cover Bolt <b>2</b></b>	
Torque	12 N·m (8.8 ft-lb.)

Install washer **3** and drain bolt **4**, tighten to the specified torque.

<b>Drain Bolt <b>4</b></b>	
Torque	7 N·m (5.2 ft-lb.)



## 5.5.7 Cylinder Body and Piston Installation

The cylinder body and piston are paired according to the following table.

<b>Cylinder Bore Grouping Mark</b>	<b>Piston Skirt Diameter Grouping Mark</b>
I	I
II	II

The grouping of cylinder bore is detailed in section 5.4.13.

The grouping of piston skirt diameter is detailed in section 5.4.14.

Rotate crankshaft to make the connecting rod at a suitable position.

Apply engine oil on piston pin **1**.

Insert the piston pin **1** into the piston **2** and connecting rod.

Install new piston pin retainer **3**.

**NOTE: The removed piston pin retainer cannot be used again and must be replaced with a new one.**

Ensure that the piston pin retainer opening **A** is staggered with the piston groove notch **B**.

Ensure that the dot mark **C** on the top of the piston is facing towards the exhaust side.

**⚠ CAUTION: When installing the piston, if the dot mark **C** in the wrong direction, it will cause serious damage to the engine.**

The other piston applies the same procedures.

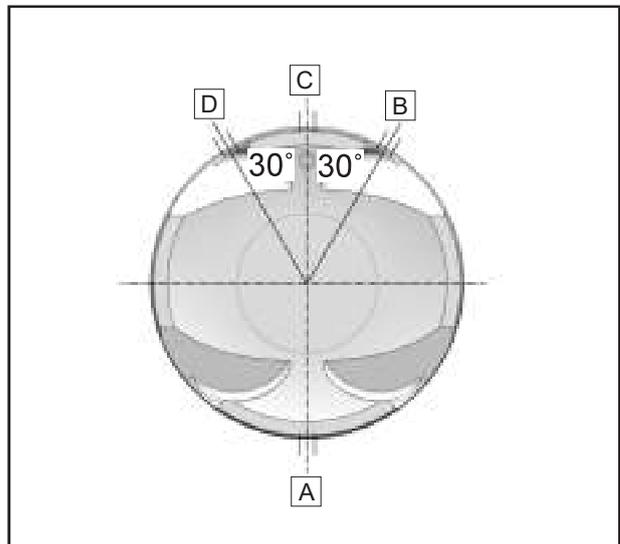
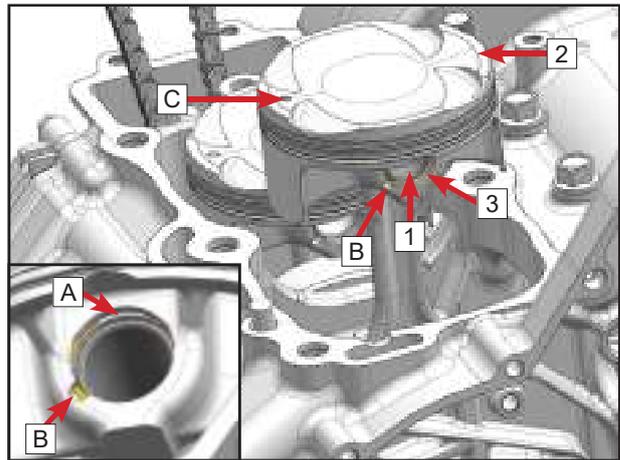
Make sure the opening of piston ring is in the correct position, as shown on the right.

**A**: Oil ring bushing ring and the second gas ring opening

**B**: Oil ring scraper ring opening

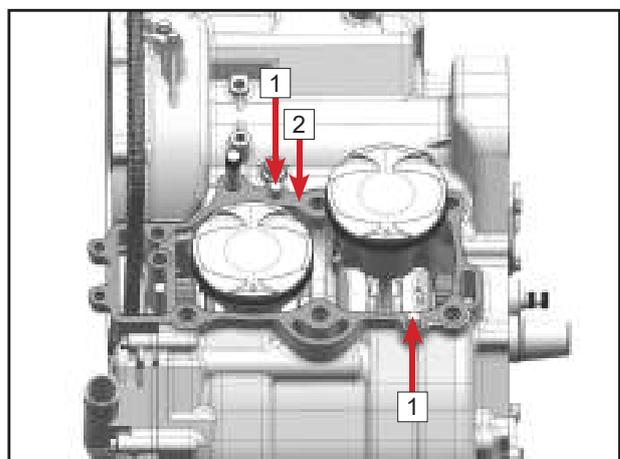
**C**: The first gas ring opening

**D**: Oil ring scraper ring opening



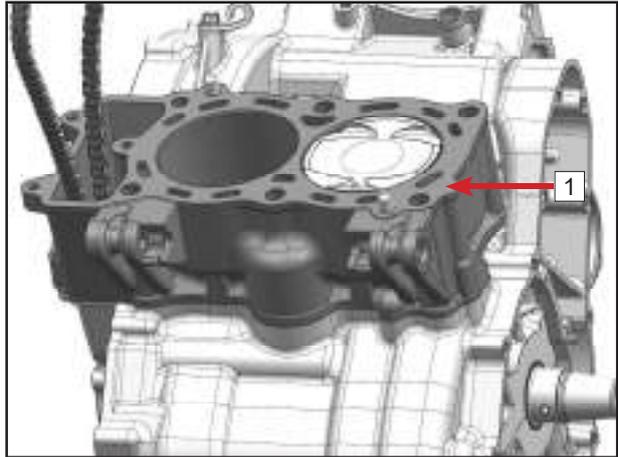
Ensure that the needle roller **1** is installed.

Install new cylinder body gasket **2**.



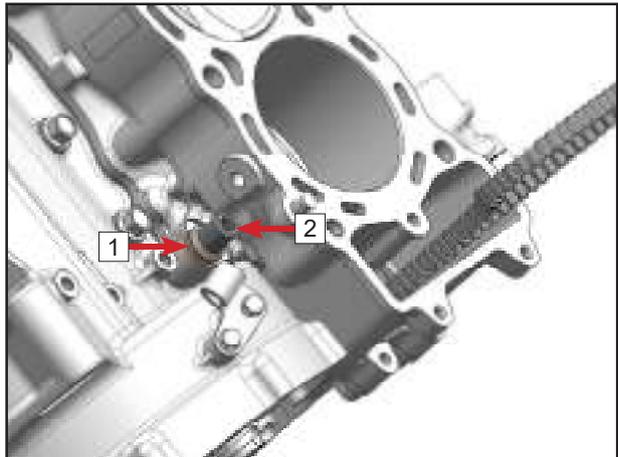
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Apply engine oil to cylinder bores, piston rings, and pistons.  
Install cylinder body **1**.



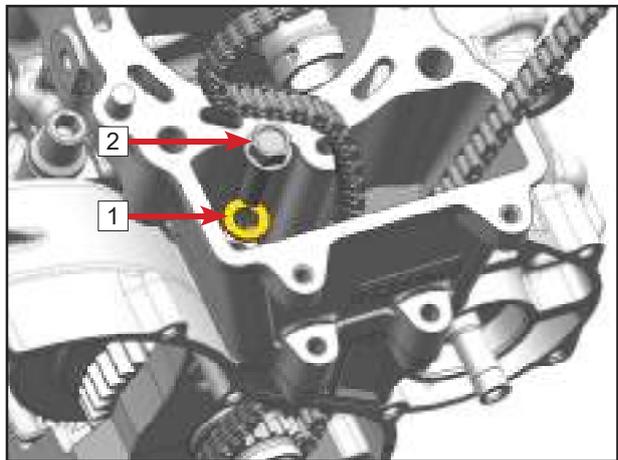
Install washer **1** and nut **2**, and tighten to the specified torque.

Cylinder Body Nut <b>2</b>	
Torque	25 ~ 30 N·m (18.4 ~ 22.1 ft-lb.)



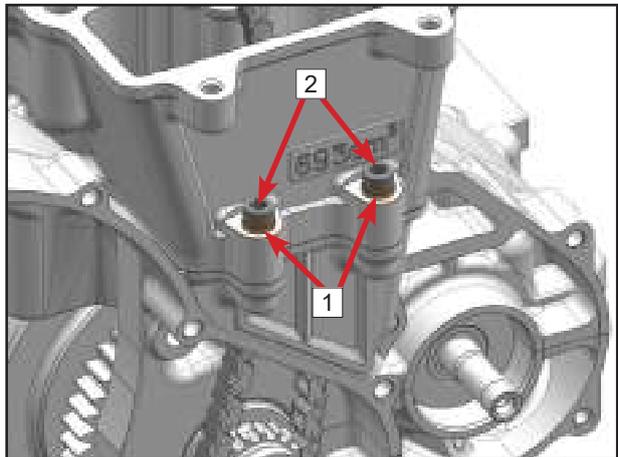
Install washer **1** and bolt **2**, and tighten to the specified torque.

Cylinder Body Bolt (M8) <b>2</b>	
Torque	27.5 N·m (20.3 ft-lb.)



Install washers **1** and inner hex bolts **2**, and tighten to the specified torque.

Inner Hex Bolt <b>2</b>	
Torque	12 N·m (8.8 ft-lb.)



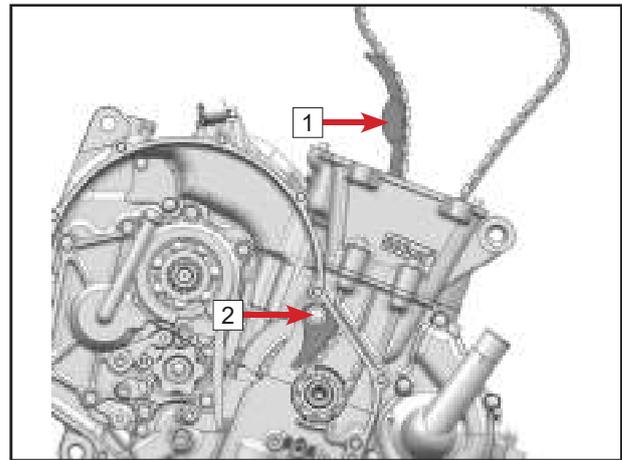
## 5.5.8 Tension Plate Installation

Apply thread pin shaft [2] with 243 thread locker.

Install tension plate [1].

Install thread pin shaft [2], and tighten to the specified torque.

Tension Plate Thread Pin Shaft [2]	
Torque	20 N·m (14.7 ft-lb.)



## 5.5.9 Crankshaft Pulsing Rotor Installation

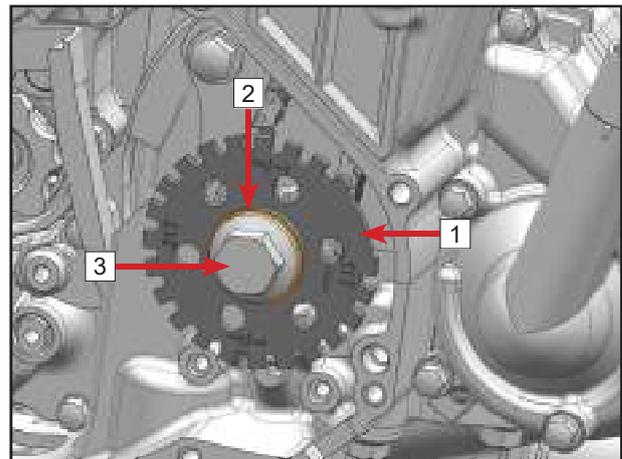
Align the convex on crankshaft pulsing rotor [1] with the slot of timing drive sprocket.

Install crankshaft pulsing rotor [1].

Apply bolt [3] with 243 thread locker.

Install washer [2] and bolt [3], and tighten to the specified torque.

Crankshaft Pulsing Rotor Bolt [3]	
Torque	40 N·m (29.5 ft-lb.)

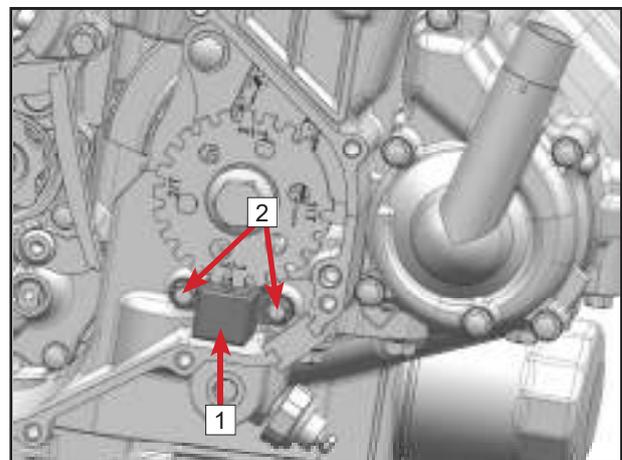


Apply bolt [2] with 243 thread locker.

Install trigger assembly [1].

Install bolt [2], and tighten to the specified torque.

Trigger Assembly Bolt [2]	
Torque	6 N·m (4.4 ft-lb.)



## 5.5.10 Clutch Installation

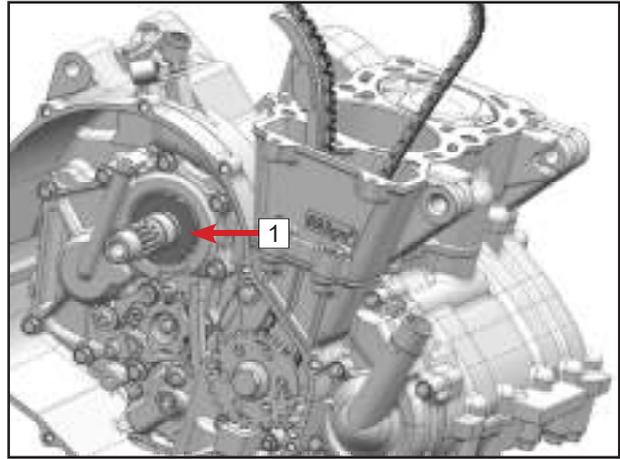
The clutch and the output gear installed on the crankshaft are paired according to the table below.

Clutch Grouping Mark	Output Gear (on Crankshaft) Grouping Mark
A	B
B	A

The grouping of the clutch is detailed in section 4.5.

The grouping of the output gear is detailed in section 5.4.16.

Install washer **1**.

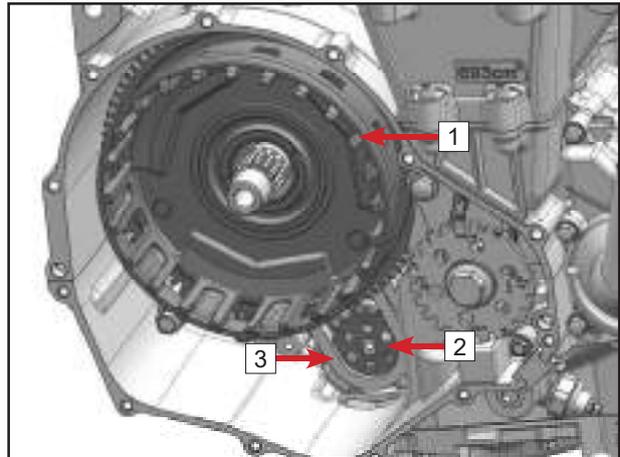


Hang oil pump chain **3** on the sprocket of outer cover **1**.

Hang oil pump sprocket **2** on oil pump chain.

Install outer cover assembly **1**.

**NOTE: Align primary driven gear of outer cover with output gear of crankshaft.**

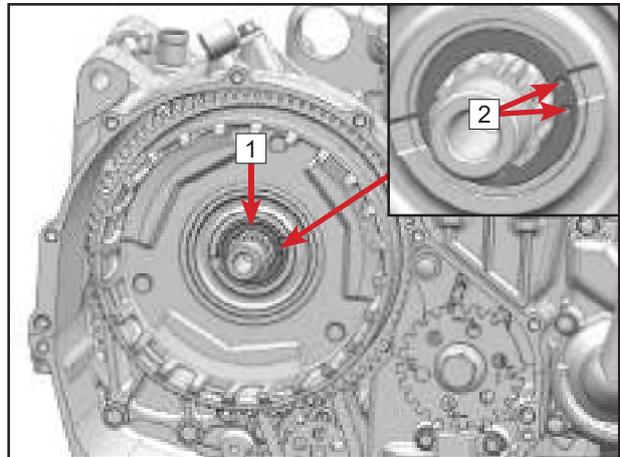


Rotate oil pump shaft to the right position, and align the central hole of oil pump gear with oil pump shaft. Install oil pump gear on the shaft.

Apply engine oil on clutch sleeve **1**.

Install clutch sleeve **1**.

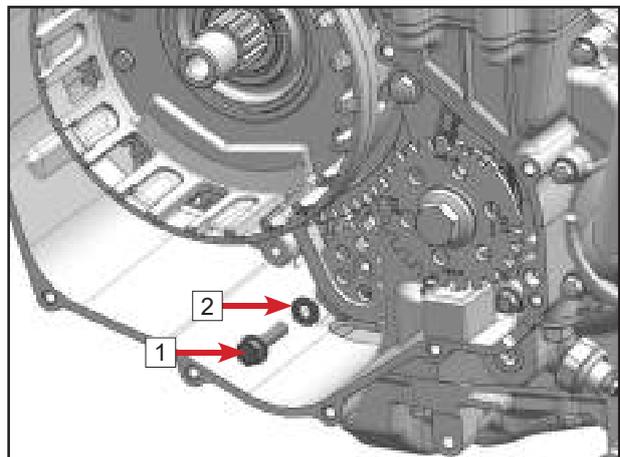
**NOTE: The holes 2 on clutch sleeve face outside.**



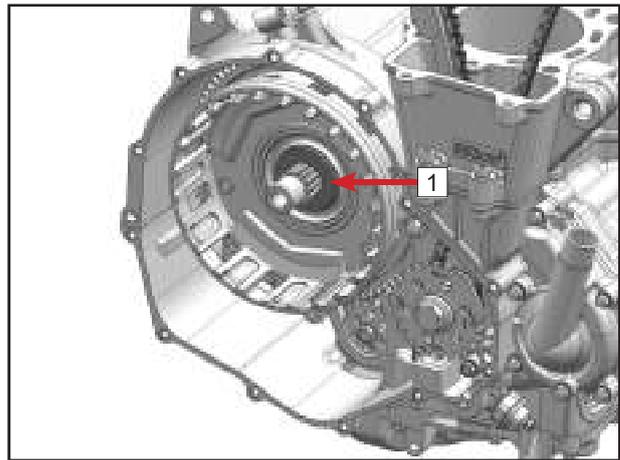
Apply bolt **1** (left-hand thread) with 243 thread locker.

Install washer **2** and bolt **1**, and tighten to the specified torque.

Oil Pump Sprocket Bolt <b>1</b>	
Torque	12 N·m (8.8 ft-lb.)



Install washer **1**.

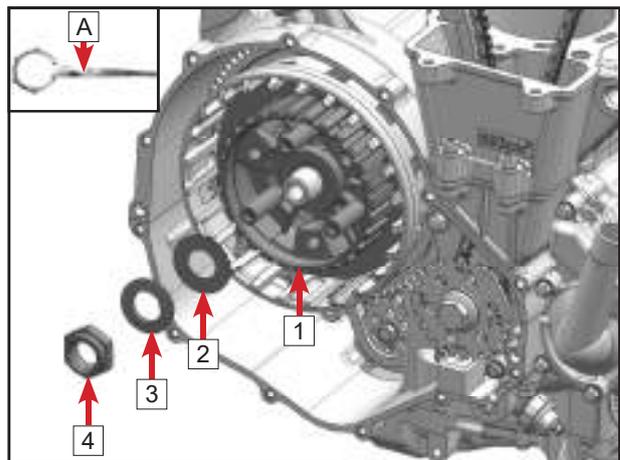


Install central sleeve **1**.

Install washer **2**.

Install elastic washer **3** (The surface with mark faces outside).

Use clutch stopping wrench **A** to fix the central sleeve.



Clutch Stopping Tool  
(See section 5.1 for details.)

Apply nut **4** with 243 thread locker.

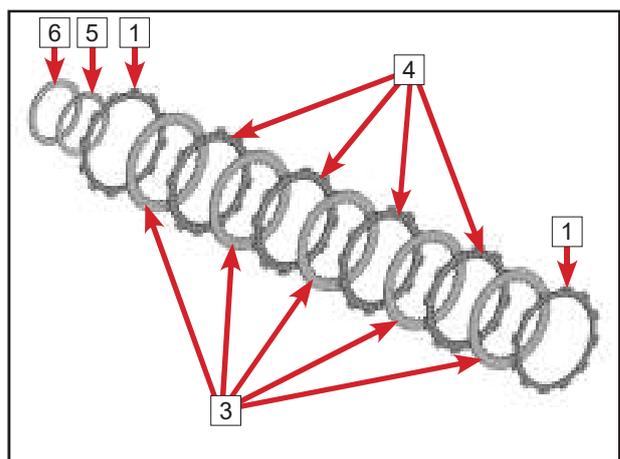
Install nut **4**, and tighten to the specified torque.

Clutch Nut <b>4</b>	
Torque	132 N·m (97.3 ft-lb.)

**⚠ CAUTION:** If installing new, dry friction plate and steel plate, the surface of each clutch steel plate should be coated with engine oil to avoid seizure.

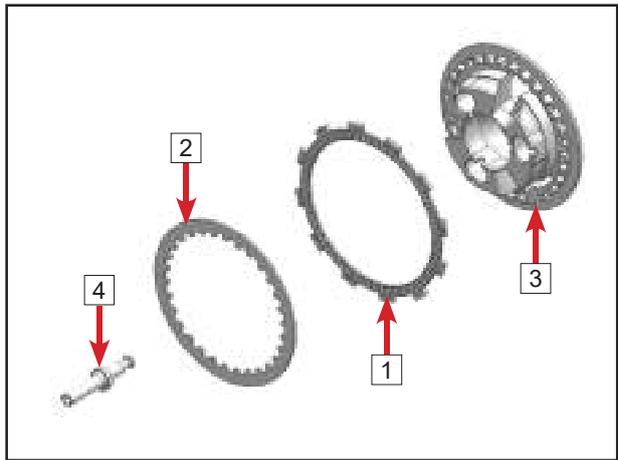
Install the following parts on the center sleeve in turn:

- Washer **6**
- Elastic washer **5** (the large end of the cone faces outward)
- Friction plate A **1**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate B **4**
- Steel plate A **3**
- Friction plate A **1**



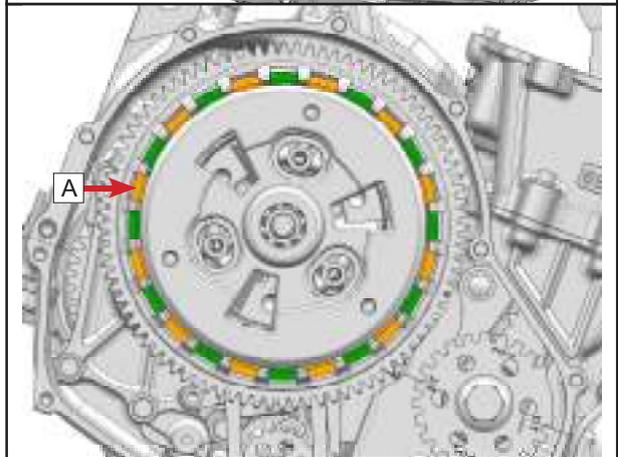
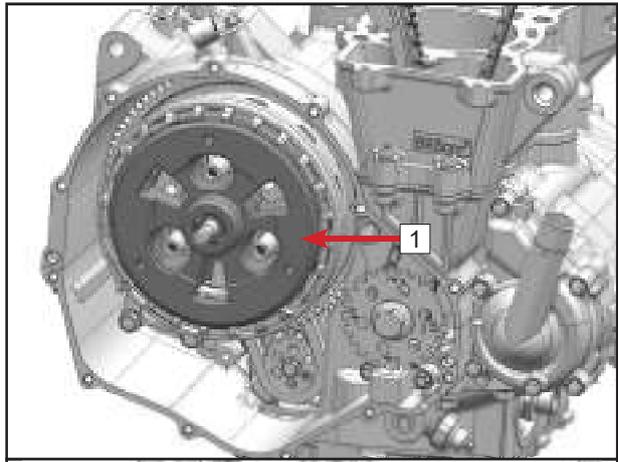
# CFMOTO

Install friction plate A **1** and steel plate B **2** on the press disc assembly **3**.  
Insert the pull rod **4** into the rolling bearing of the press disc assembly **3**.

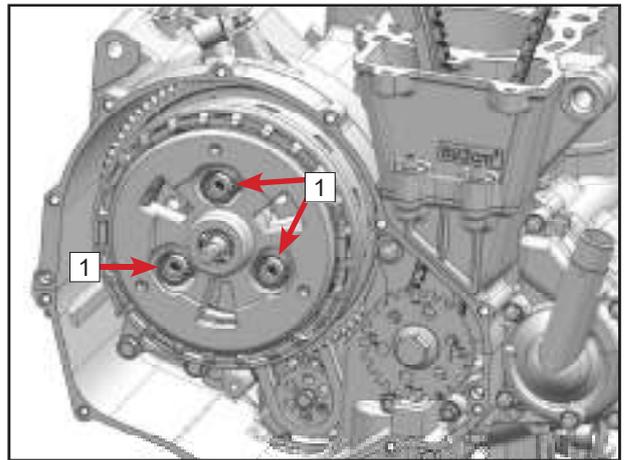


Install the press disc assembly **1**.

**NOTE: The outermost friction plate A **A** shall be misaligned.**

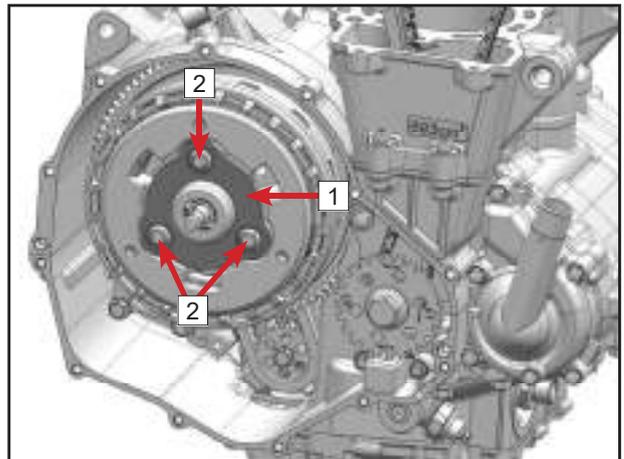


Install clutch spring **1**.



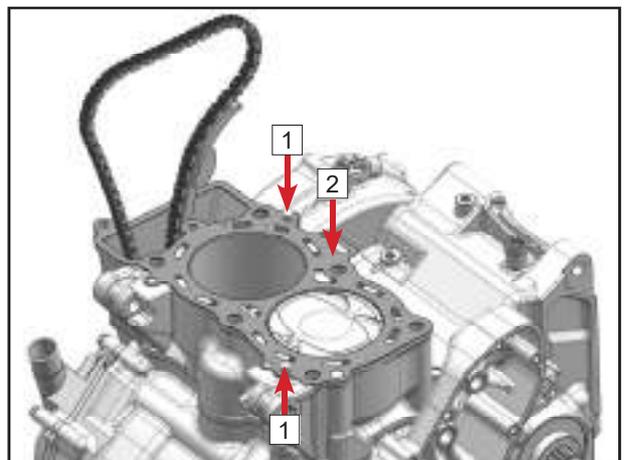
Place the clutch spring press plate **1** in place.  
Install bolts **2**, and tighten to the specified torque.

Clutch Spring Press Plate Bolt <b>2</b>	
Torque	10 N·m (7.3 ft-lb.)

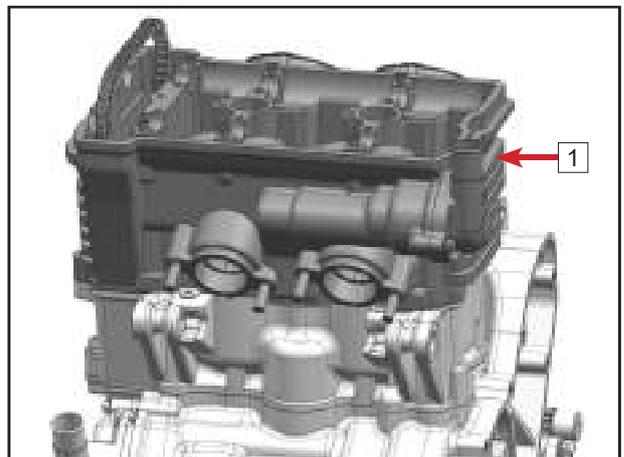


### 5.5.11 Cylinder Head and Camshaft Installation

Make sure the needle rollers **1** are installed.  
Install new cylinder head gasket **2**.



Install cylinder head assembly **1**.



# CFMOTO

Apply the mixture of oil and MoS<sub>2</sub> grease (weight ratio 10:1) on cylinder head bolt thread and washer .

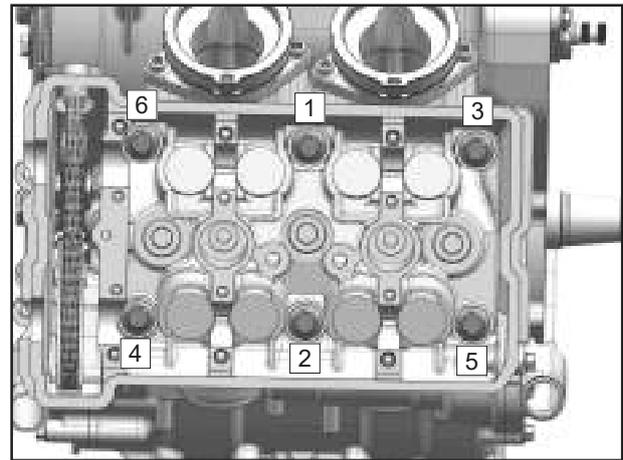
Install cylinder head bolt and washer, and tighten according to the sequence of 1~6 in two steps.

Cylinder Head Bolt Torque	
Step 1	20 N·m (14.7 ft-lb.)
Step 2	54 N·m (39.8 ft-lb.)

1, 3, 4, 5: Cylinder head bolt M10×158

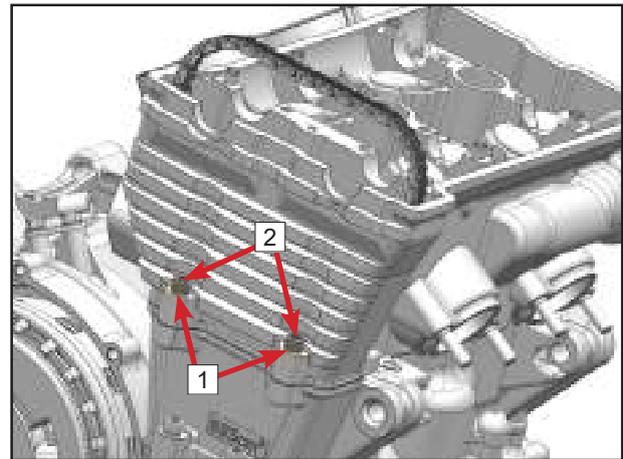
2: Cylinder head bolt M10×176

6: Cylinder head bolt 10×1.25×80



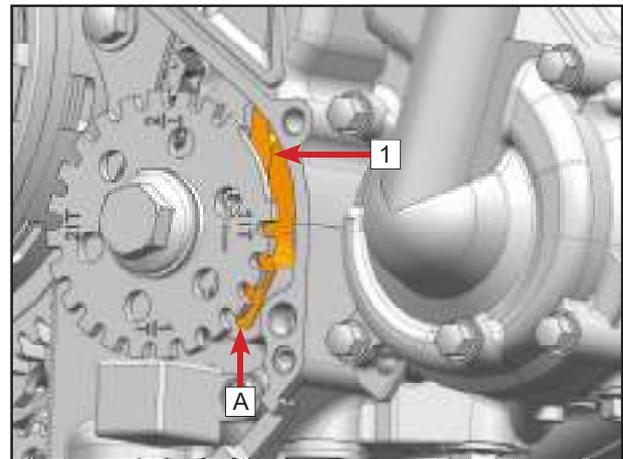
Install washer 1 and inner hex bolt 2, and tighten to the specified torque.

Inner Hex Bolt 2	
Torque	12 N·m (8.8 ft-lb.)

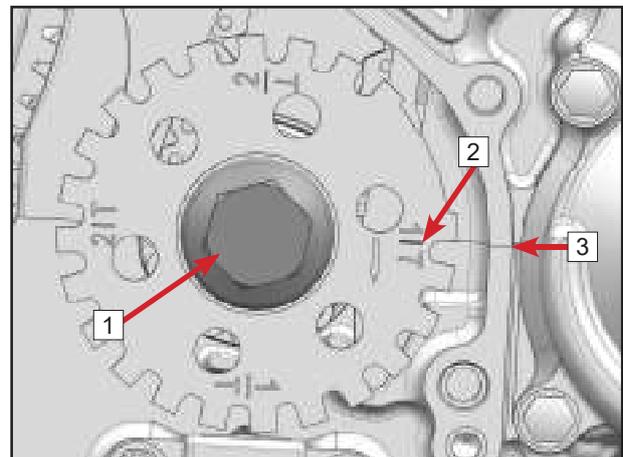


Install chain guide 1.

Stick the lower end of chain guide 1 into crankcase groove A.



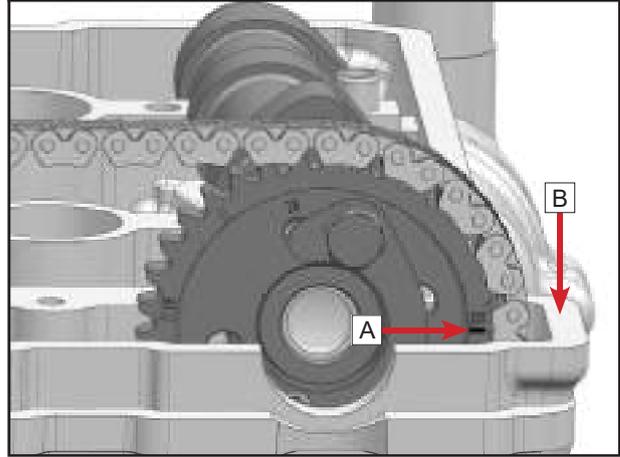
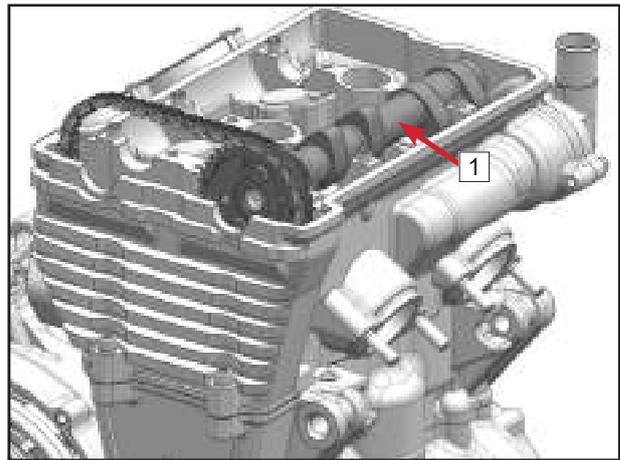
Use a socket wrench to rotate the bolt 1 clockwise until the 1IT marking line 2 on the crankshaft pulsing rotor aligns with the joint 3 of the crankcase.



Apply oil to the exhaust camshaft bearing journal.

Pull up the timing chain and place the exhaust camshaft assembly **1**.

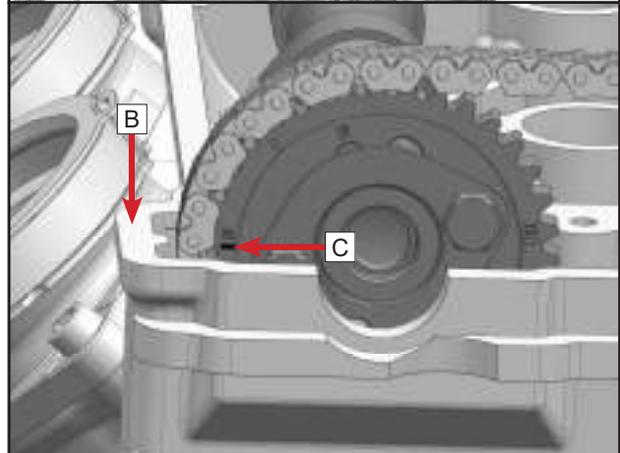
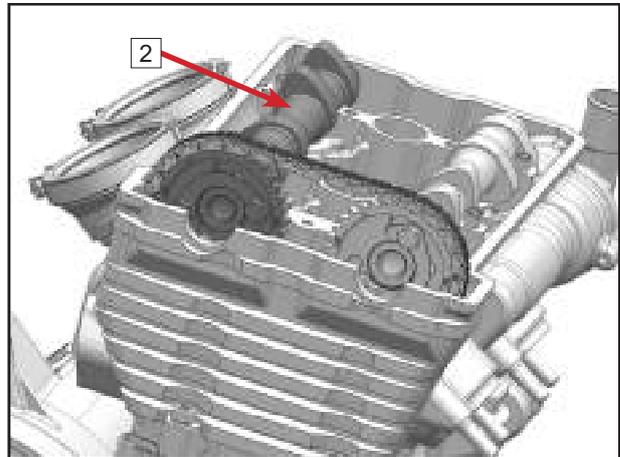
Hang the timing chain on the sprocket of exhaust camshaft, tension the exhaust side of the chain, and ensure that the "EX" line mark **A** is flush with cylinder head sealing surface **B**.



Apply oil to the intake camshaft bearing journal.

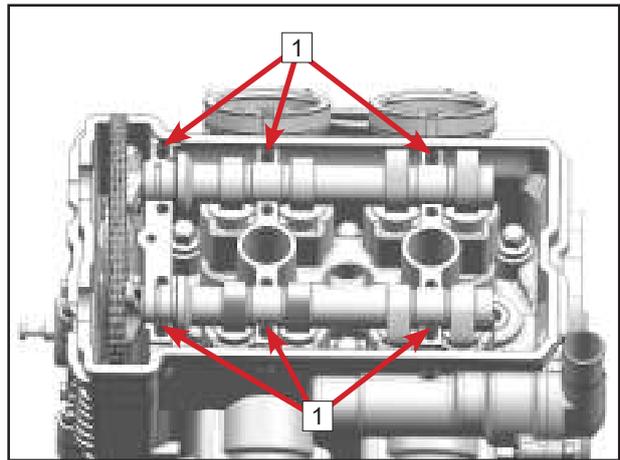
Install intake camshaft assembly **2**.

Hang the timing chain on the sprocket of intake camshaft, tension chain, and ensure that the "IN" line mark **C** is flush with cylinder head sealing surface **B**.



**⚠ WARNING: Do not turn crankcase pulsing rotor when installing camshaft, or will cause the engine timing failure.**

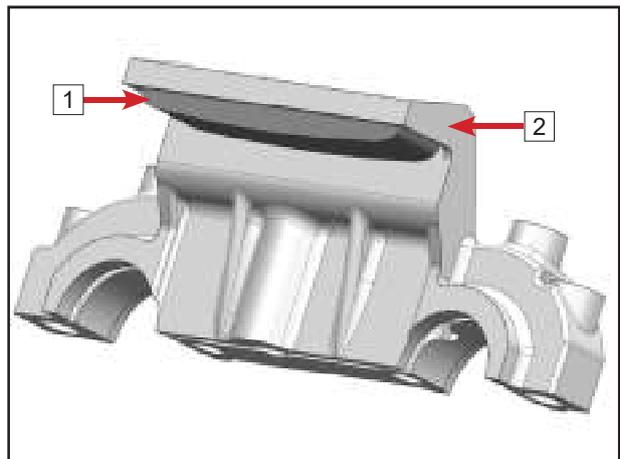
Make sure the dowel pins **1** are not missing.



**NOTE: The cylinder head, camshaft seat and camshaft position press plate are fitted according to the matching marks.**

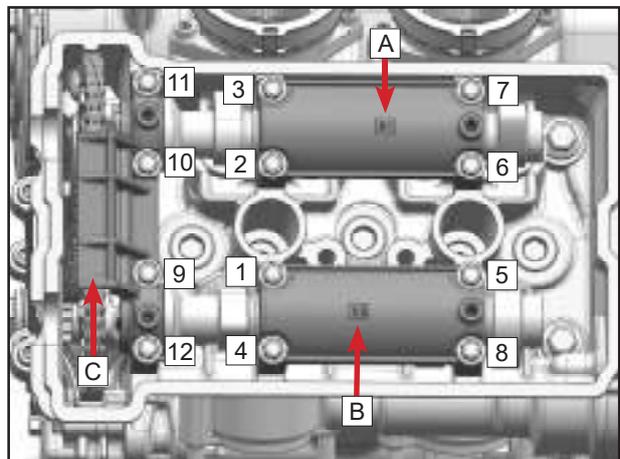
Ensure that the chain guide block **1** is installed on the camshaft position press plate **2**.

**NOTE: The marked side of chain guide block faces outside.**



Install air intake camshaft seat (IN) **A**.  
 Install exhaust camshaft seat (EX) **B**.  
 Install camshaft position press plate **C**.  
 Install camshaft seat bolt, and tighten it according to the sequence of **1**~**12** in three steps.

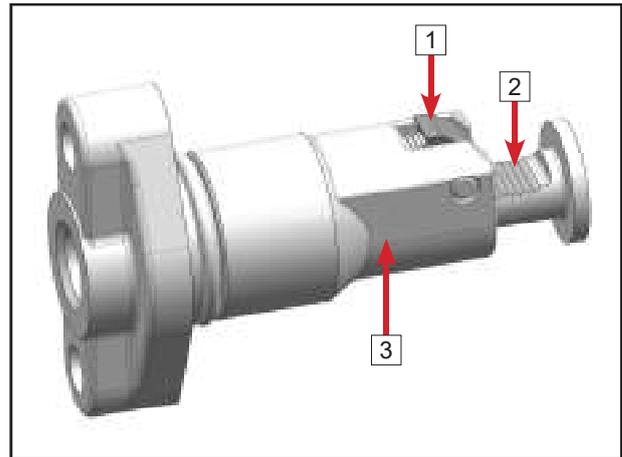
Camshaft Seat Bolt Torque	
Step 1	5N•m (3.7 ft-lb.)
Step 2	8N•m (5.9 ft-lb.)
Step 3	12N•m (8.85 ft-lb.)



**⚠ CAUTION:** This is a non-return type camshaft chain tensioner. The push rod does not return to its original position once it moves out to take up camshaft chain slack.  
**Do not turn the crankshaft before installing the tensioner. This could upset the camshaft chain timing, and damage the valves.**

The following is the tensioner installation procedure:

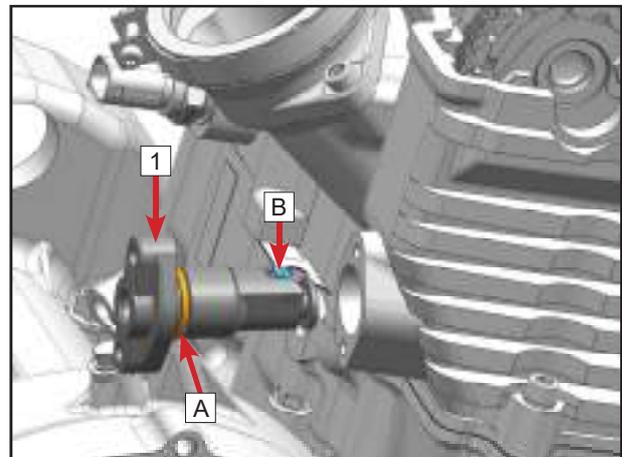
Release the locking block **1**, push the rack **2** into the tensioner body **3**.



Make sure the O-ring **A** is installed to the tensioner body.

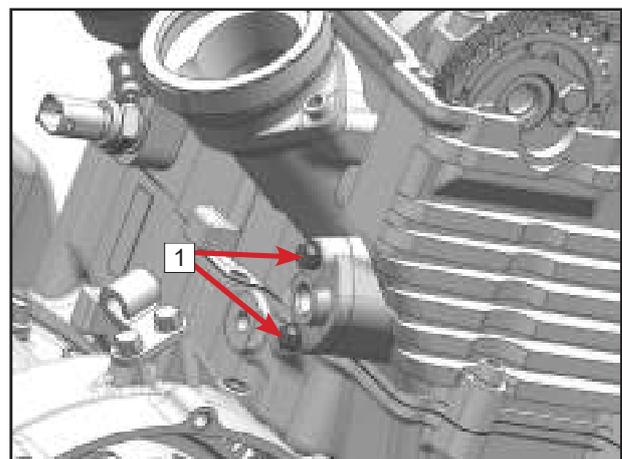
Apply oil to O-ring **A**.

Install tensioner **1**, locking block **B** faces up.



Install bolts **1**, and tighten to the specified torque.

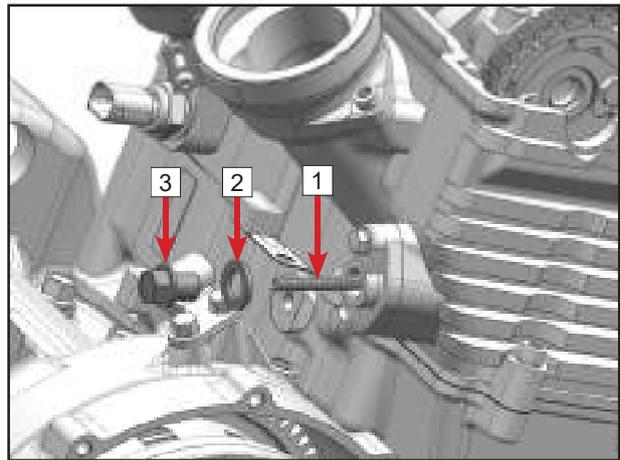
Tensioner Bolt <b>1</b>	
Torque	12 N·m (8.8 ft-lb.)



Install tension spring [1].  
 Install washer [2] and spring seat bolt [1],  
 tighten bolt to specified torque.

Spring Seat Bolt [1] (tensioner)	
Torque	20 N·m (14.7 ft-lb.)

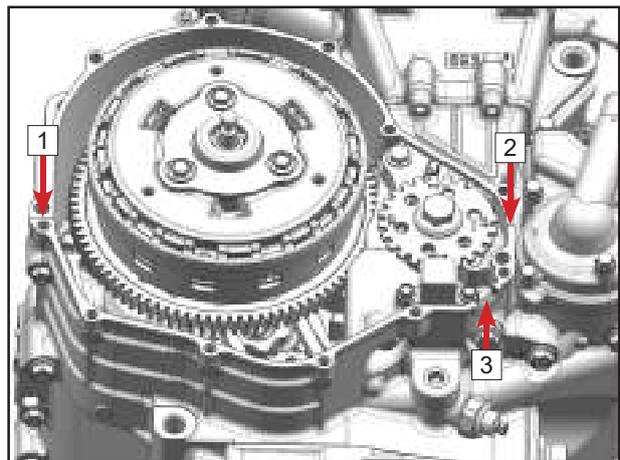
On the clutch side, turn the crankshaft two turns clockwise to make the tensioner tighten the chain and recheck the camshaft timing.



### 5.5.12 RH Side Cover Installation

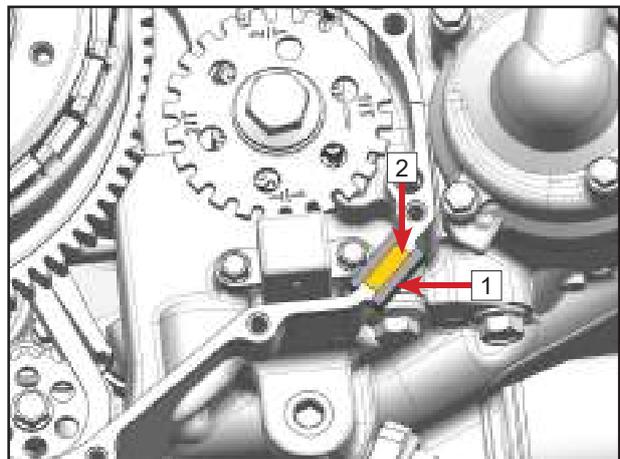
Apply KB598 flange sealant on the crankcase joint [1][2].

Apply KB598 flange sealant on the installation slot of trigger rubber seal block [3].



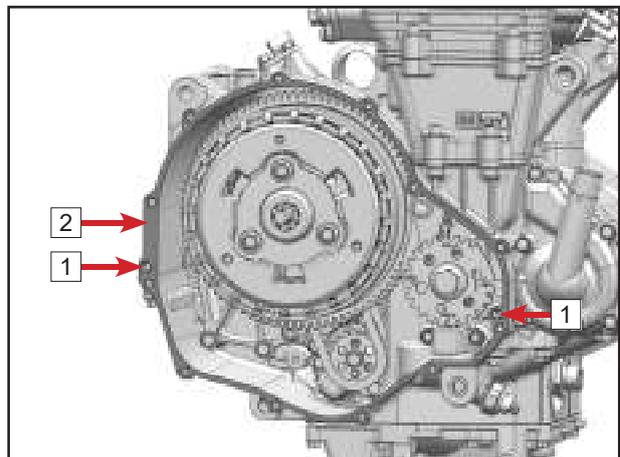
Install trigger rubber seal block [1] on crankcase.

Apply KB598 flange sealant on the area [2] of trigger rubber seal block.



Install dowel pins [1].

Install new RH side cover seal gasket [2].

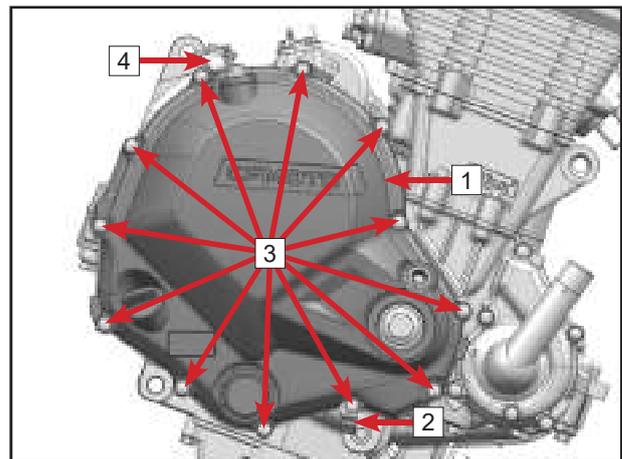


Rotate the clutch control shaft **4** counterclockwise and place the RH side cover **1** in place.

Install clip **2** and bolts **3**.

Tighten the bolts **3** in criss-cross way to the specified torque.

<b>RH Side Cover Bolt <b>3</b></b>	
Torque	12 N·m (8.8 ft-lb.)



### 5.5.13 Valve Clearance Inspection

Rotate the bolt **1** clockwise, and measure the clearance between the CAM base cylinder and the tappet with a feeler when the peach-tip of the CAM on the camshaft is facing upwards.

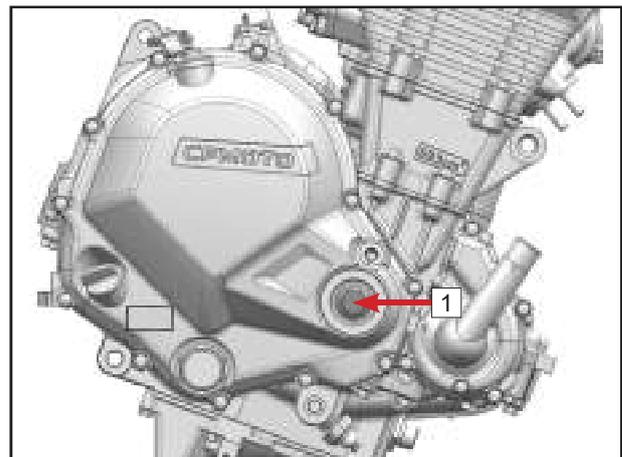
**NOTE: Only turn the bolt **1** clockwise.**

**NOTE: Inspect and adjust valve clearances on a cold engine.**

Record the measurement data, if it does not meet the requirements, replace the valve tappet with the appropriate thickness, and then measure again until it meets the requirements.

Please refer to the section " Cylinder Head Assembly".

<b>Valve Clearance (Cold Engine)</b>	
Air Inlet Valve	0.09 mm ~ 0.12 mm
Exhaust Valve	0.23 mm ~ 0.27 mm



Check and confirm that the O-ring **2** and **4** are not hardened or damaged.

Apply engine oil to the O-ring **2** and install it into the corresponding hole on the RH side cover.

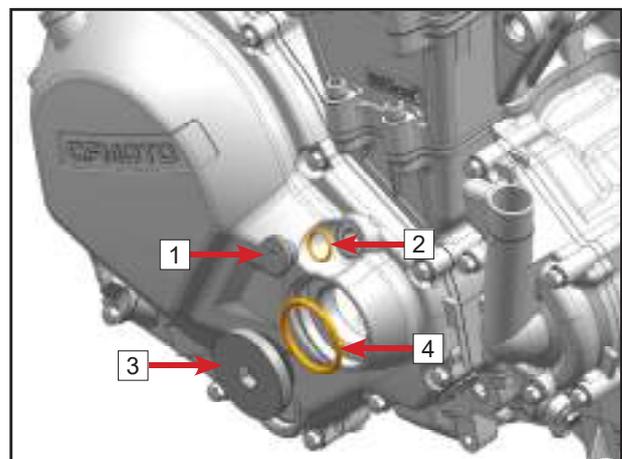
Install timing inspection hole cap **1** on RH side cover, and tighten to the specified torque.

<b>Timing Inspection Hole Cap <b>1</b></b>	
Torque	6 N·m (4.4 ft-lb.)

Apply engine oil to the O-ring **4** and install it onto the strainer cover **3**.

Install strainer cover **3** on RH side cover, and tighten to the specified torque.

<b>Strainer Cover <b>3</b></b>	
Torque	20 N·m (14.7 ft-lb.)



## 5.5.14 Starter Motor Assembly Installation

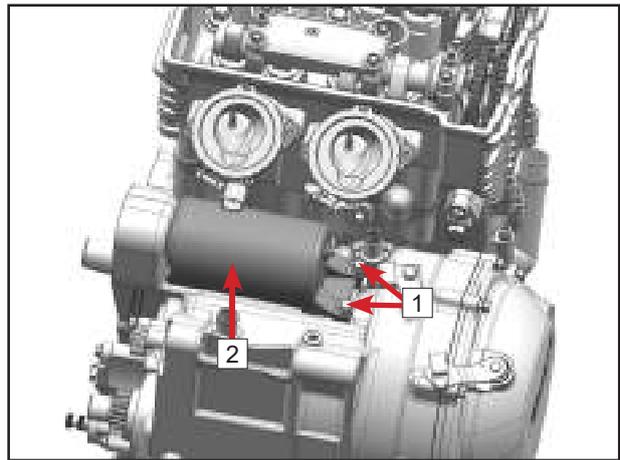
Apply oil to the O-ring and gear of starter motor assembly **2**.

Install starter motor assembly **2**.

Apply 569 thread sealant to the bolt **1**.

Install bolts **1**, and tighten to the specified torque.

Starter Motor Bolt <b>1</b>	
Torque	12 N·m (8.8 ft-lb.)

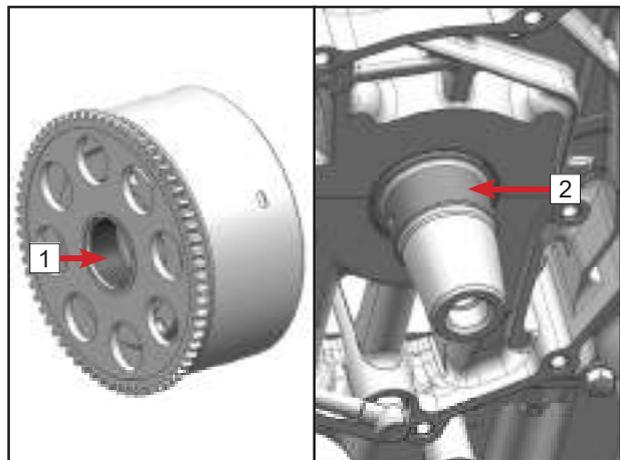
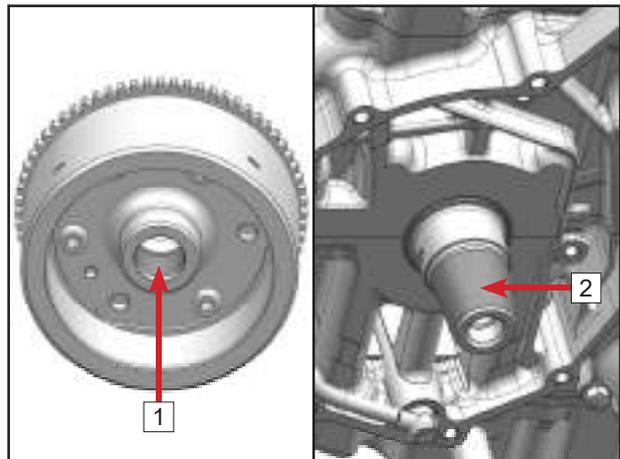


## 5.5.15 Magneto Rotor and Starting Gear Installation

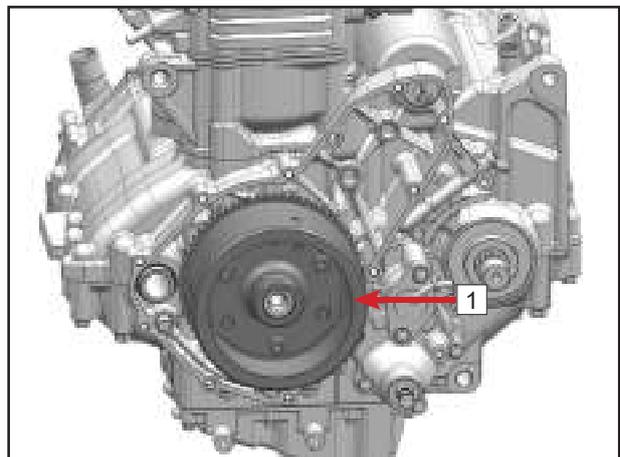
Clean the taper hole of magneto rotor **1** and the cone of crankshaft **2** with dust-free paper.

Apply engine oil on bushing **1** and crankshaft journal **2**.

**NOTE:** There should not be oil on the taper hole of magneto and the cone of crankshaft.



Install magneto rotor assembly **1**.

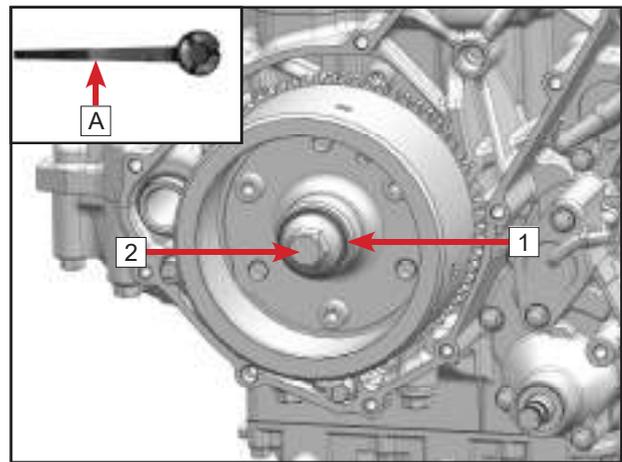


Install washer [1] and bolt [2].  
 Fix the magneto rotor with magneto rotor stop wrench [A].

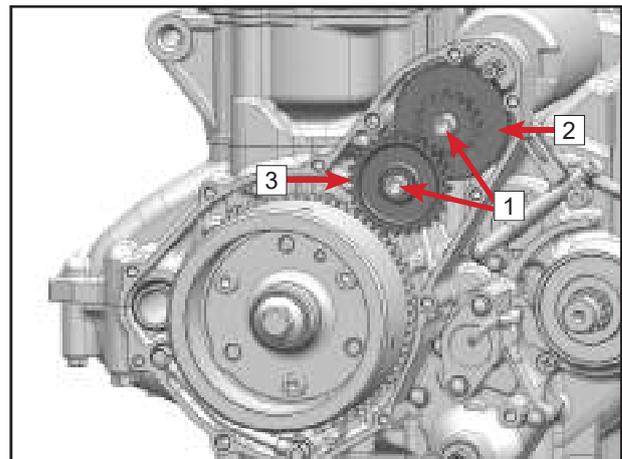
Magneto Rotor Stopping Tool  
 (See section 5.1 for details.)

Tighten bolt [2] to the specified torque.

Magneto Rotor Bolt [2]	
Torque	180 N·m (132.7 ft-lb.)

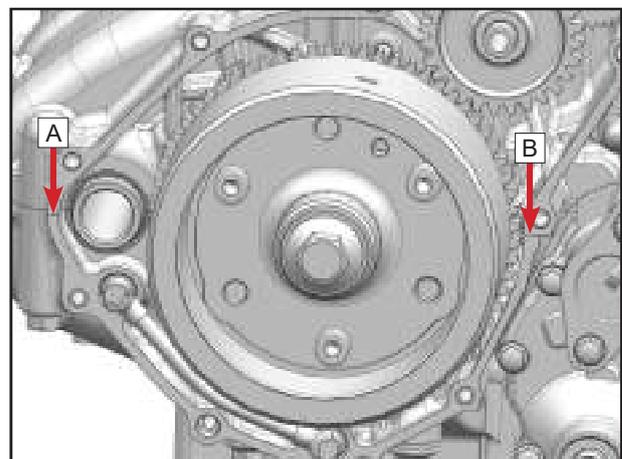


Apply engine oil to the middle gear shaft [1].  
 Install middle gear shaft [1] and dual gear [2].  
 Install middle gear shaft [1] and starting middle gear [3].

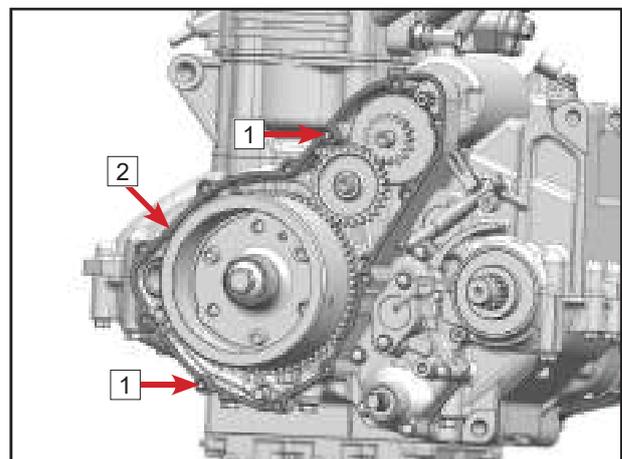


### 5.5.16 LH Side Cover Installation

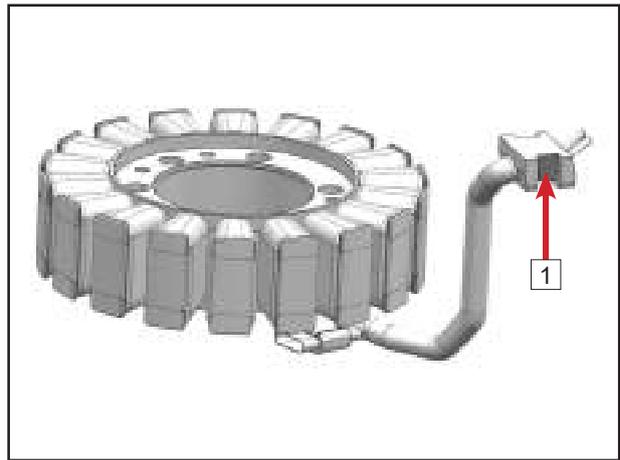
Apply KB598 flange sealant on crankcase joint [A] and [B].



Install dowel pins [1].  
 Install new LH side cover seal gasket [2].

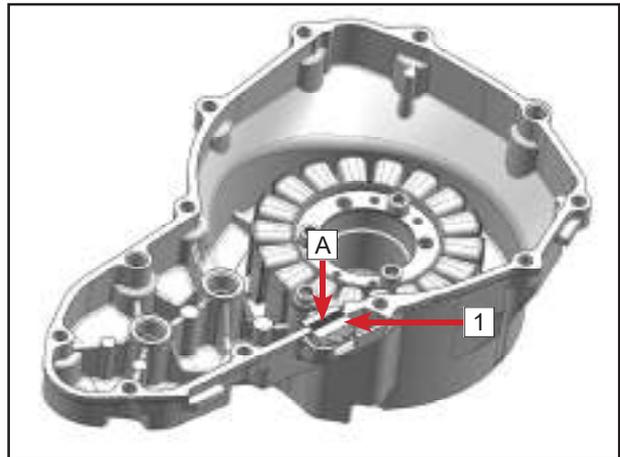


Apply KB598 flange sealant on the seal slot of magneto stator cable rubber sleeve **1**.



Install magneto stator cable rubber sleeve **1** on LH side cover.

Apply KB598 flange sealant on the area **A** of magneto stator cable rubber sleeve.

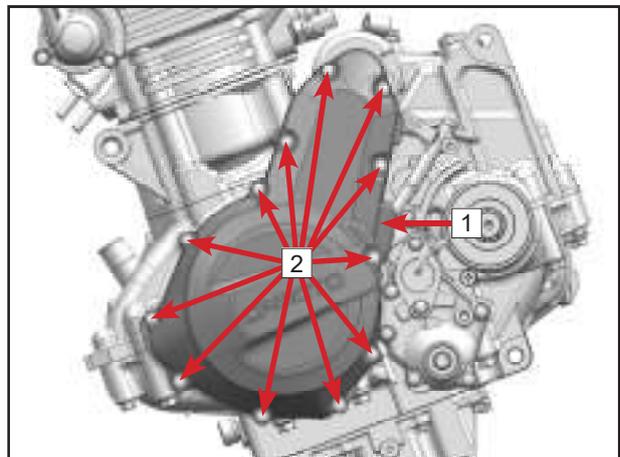


Carefully install the LH side cover **1** on the crankcase.

**⚠ CAUTION:** The magnetic force between the magneto rotor and the stator is very large, do not put your finger between the LH side cover and the crankcase to prevent injury.

Install bolts **2**, and tighten in criss-cross way to the specified torque.

LH Side Cover Bolt <b>2</b>	
Torque	12 N·m (8.8 ft-lb.)

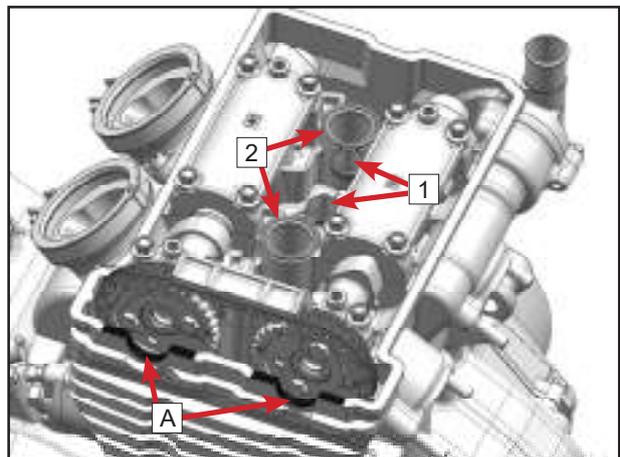


## 5.5.17 Cylinder Head Cover Installation

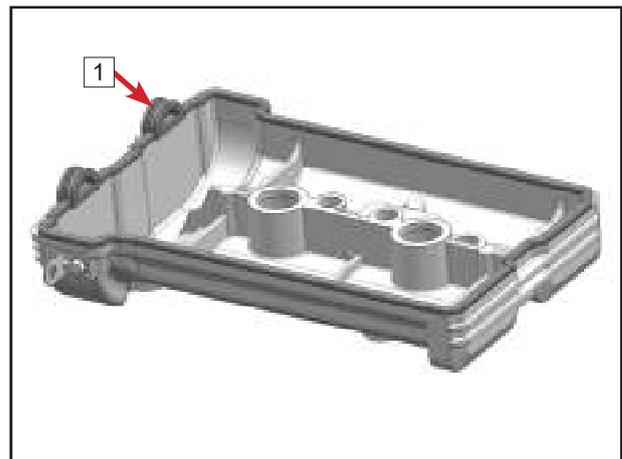
Install gulp pins **1**.

Install spark plug seal rings **2**.

Apply KB598 flange sealant **A** on the cylinder head, as shown on the right.

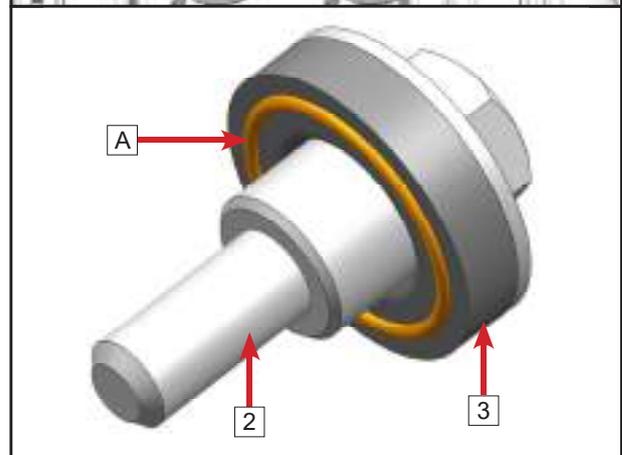
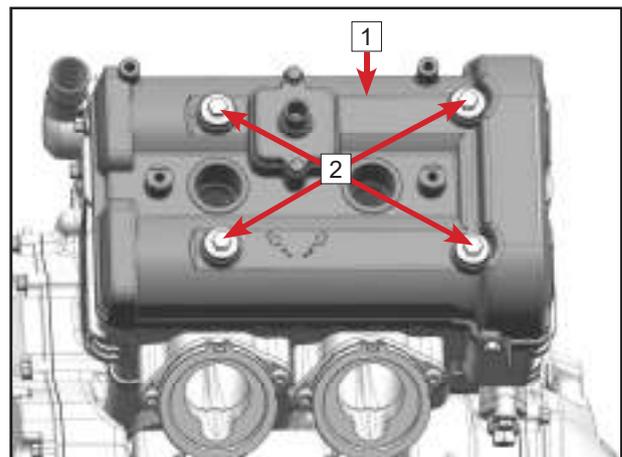


Ensure that the cylinder head cover seal ring **1** is installed on the cylinder head cover.



Install cylinder head cover assembly **1**.  
 Install cylinder head cover bolt **2** and seal ring **3**.  
 Pay attention to the direction of the sealing tape **A**.  
 Tighten the cylinder head cover bolts **2** diagonally to the specified torque.

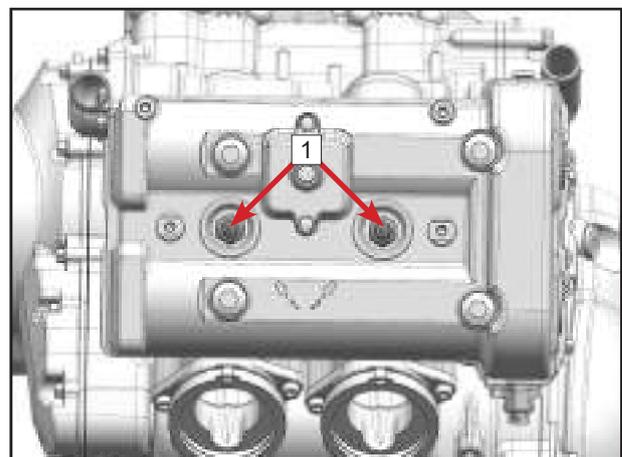
Cylinder Head Cover Bolt <b>2</b>	
Torque	12 N·m (8.8 ft-lb.)



### 5.5.18 Spark Plug and Ignition Coil Installation

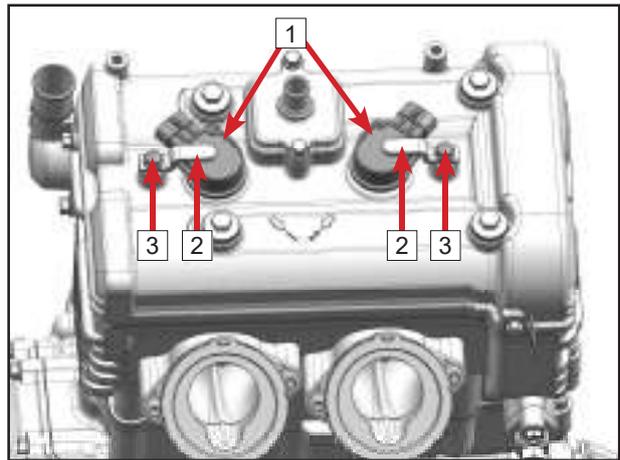
Install spark plug **1**, and tighten to the specified torque.

Spark Plug <b>1</b>	
Torque	15 N·m (11.1 ft-lb.)



Install ignition coil **1**, the direction of the connector is shown on the right.  
 Install press plate **2**.  
 Install bolts **3**, and tighten to the specified torque.

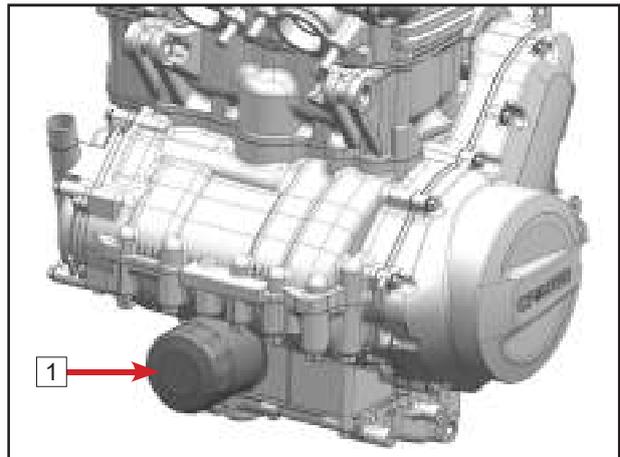
<b>Ignition Coil Press Plate Bolts <b>3</b></b>	
Torque	10 N·m (7.3 ft-lb.)



### 5.5.19 Oil Filter Installation

Apply oil to the seal ring of oil filter.  
 Install oil filter **1**, and tighten to the specified torque.

<b>Oil Filter <b>1</b></b>	
Torque	17 N·m (12.5 ft-lb.)



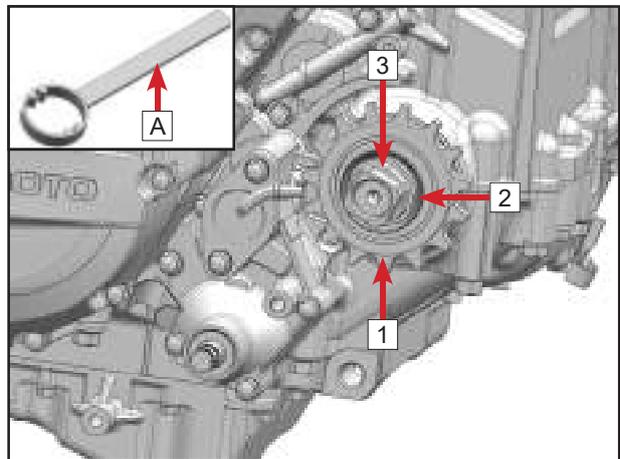
### 5.5.20 Output Sprocket Assembly Installation

Install the output sprocket assembly **1** and lock washer **2** on the countershaft in turn.  
 Apply 243 thread locker to the nut **3**.  
 Install nut **3**.  
 Use the output sprocket stopping tool **A** to fix the output sprocket assembly **1**, and tighten the nut **3** to the specified torque.

Output Sprocket Stopping Tool  
 (See section 13.1 for details.)

<b>Output Sprocket Nut <b>3</b></b>	
Torque	125 N·m (92.2 ft-lb.)

Use a flat-head screwdriver and hammer to hem the lock washer **2** to prevent the nut **3** from loosening.

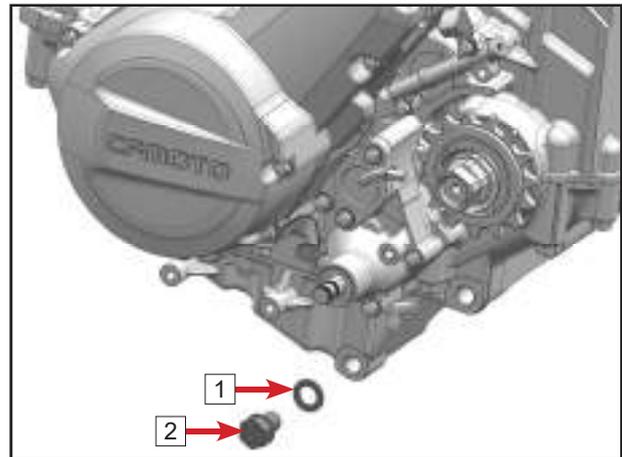


## 5.5.21 Drain Bolt Installation and Oil Filling

Place the washer **1** over the magnetic drain bolt **2**.

Install magnetic drain bolt **2** and tighten to specified torque.

Magnetic Drain Bolt <b>2</b>	
Torque	35N·m (25.8 ft-lb.)

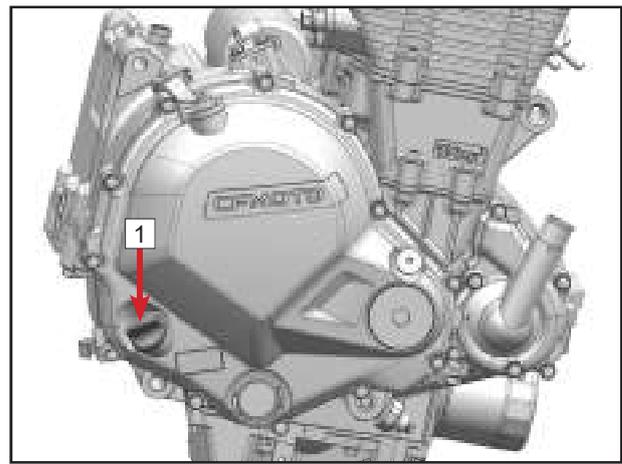


Remove the oil filling plug **1**.

Fill the engine with the recommended oil through the oil filling plug mounting hole.

Oil Capacity (Engine Overhaul)	
Capacity	2.6L
Oil Type	SAE 10W-40, API SJ or above

Reinstall the oil filling plug.



## 5.6 Engine Installation

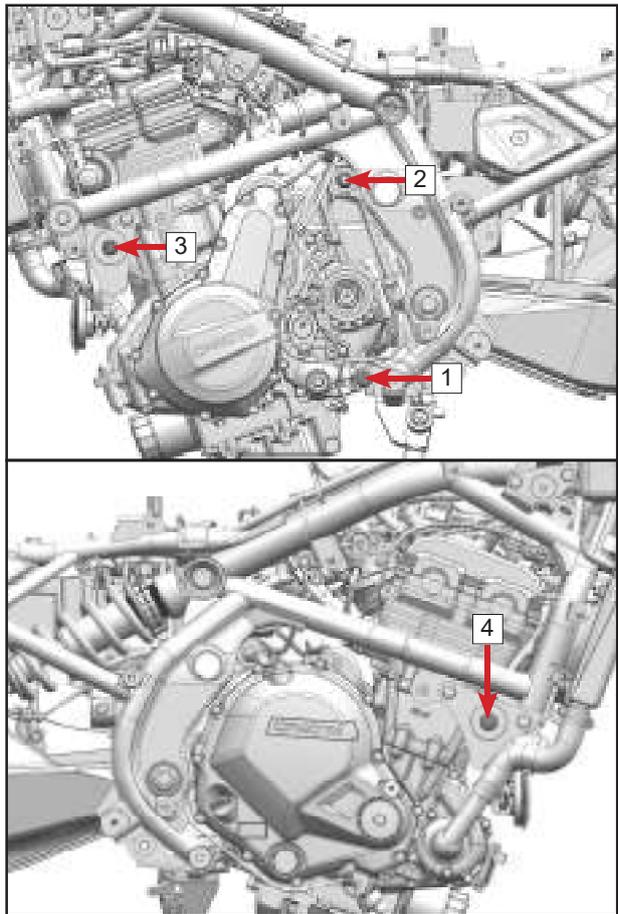
Carefully place the engine into the frame and align the mounting holes.

Install bolt **4** and nut.

Install bolt **3** and nut.

Install bolt **2** and nut.

Install bolt **1** and nut.



Plug in the magneto stator connector.

Plug in the oil pressure sensor connector.

Plug in the gear sensor connector.

Plug in the coolant temperature sensor connector.

Plug in the TPS sensor connector.

Plug in the stepper motor connector.

Plug in the T-MAP sensor connector.

Plug in fuel injector connector.

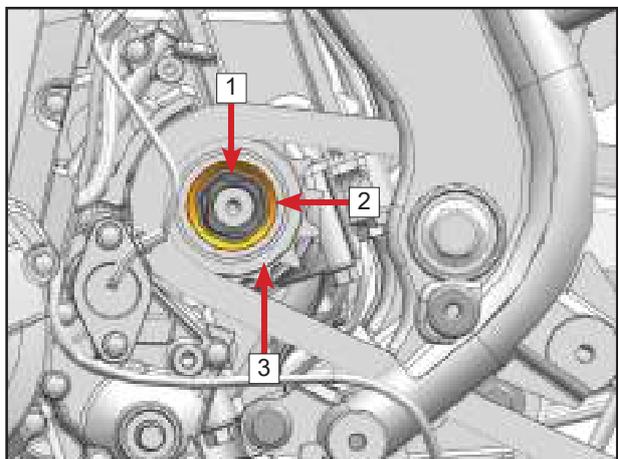
Plug in the ignition coil connector.

Hang the chain on the output sprocket **3**.

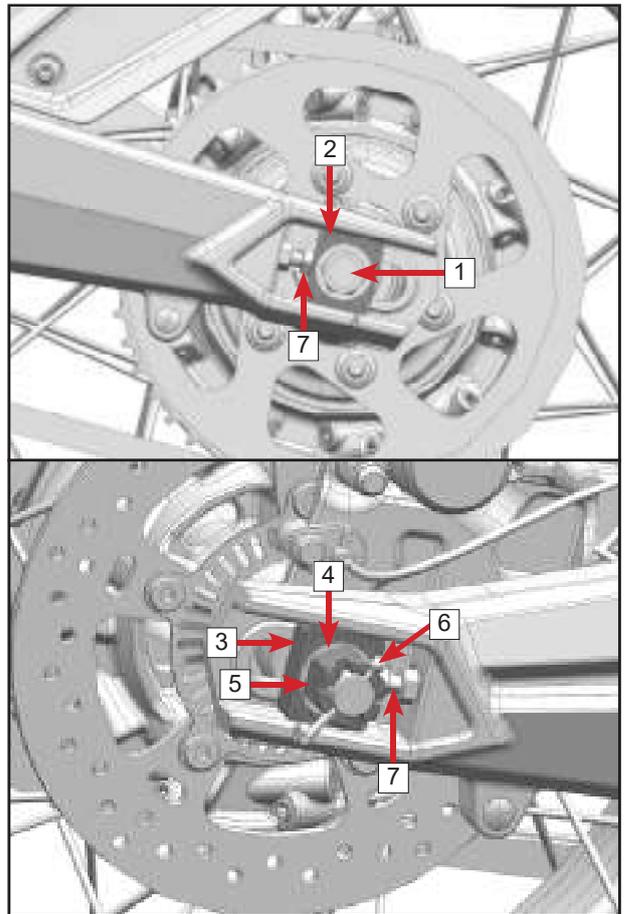
Install output sprocket **3**.

Install lock washer **2**.

Install nut **1**, but do not tighten it.



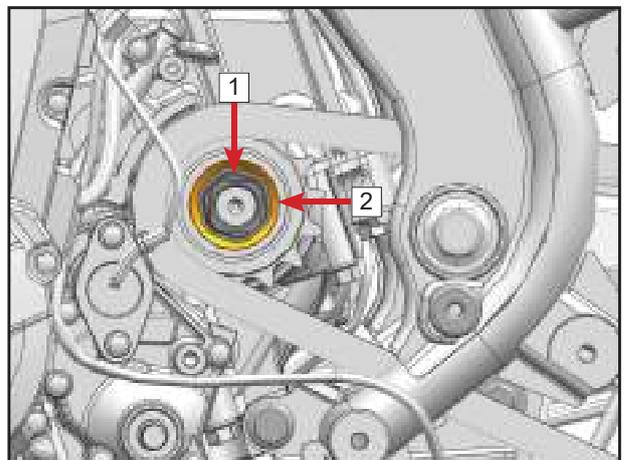
Place the rear wheel in place.  
 Install rear wheel shaft **1** and LH chain adjusting block **2**.  
 Install RH chain adjusting block **3**.  
 Install plain washer **4**.  
 Push the rear wheel forward until the chain adjusting block makes contact with the chain adjusting bolt **7**, then install and tighten the rear wheel shaft nut **5**.  
 Install cotter pin **6**, clamp it into the nut groove.



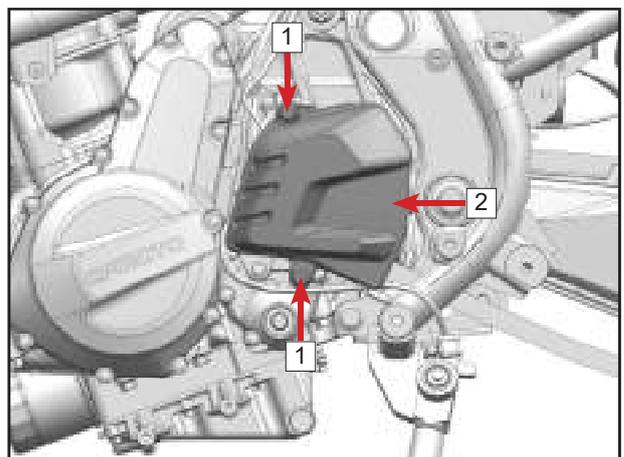
Have an assistant operate the rear brake.  
 Tighten nut **1** to the specified torque.

Output Sprocket Nut <b>1</b>	
Torque	125 N·m (92.2 ft-lb.)

Use a flat-head screwdriver and hammer to hem the lock washer **2** to prevent the nut **1** from loosening.

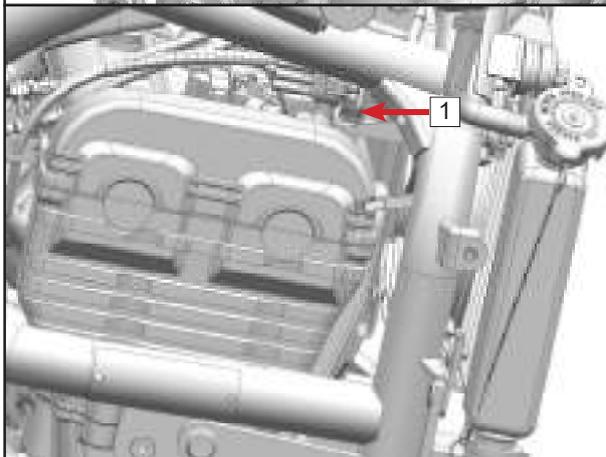
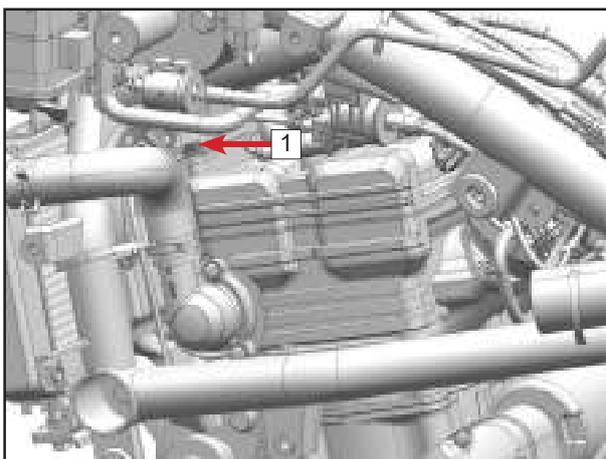


Install small sprocket guard **2**.  
 Install bolts **1**.

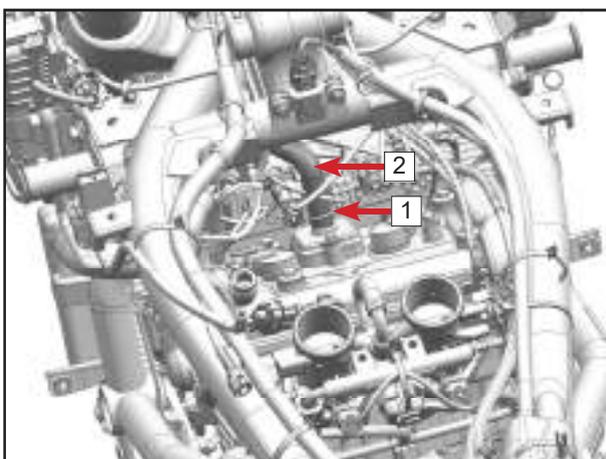


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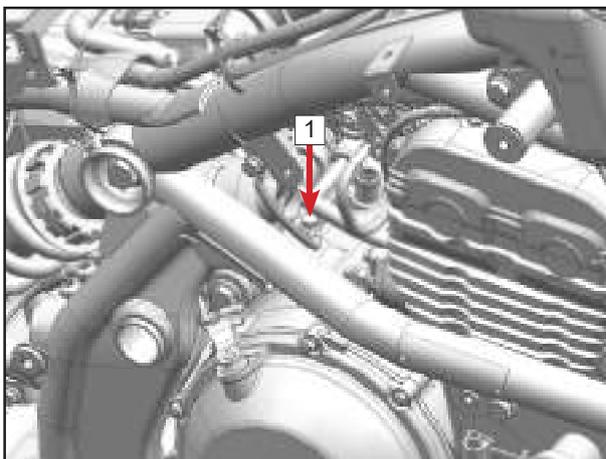
Install bolt **1**, attach the handlebar plug-in bracket and reservoir rear center panel to the engine.



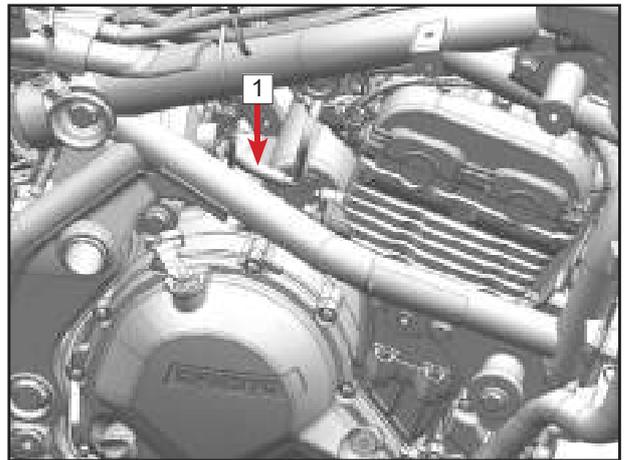
Install SAS outlet pipe **2** to engine.  
Tighten the clamp **1**.



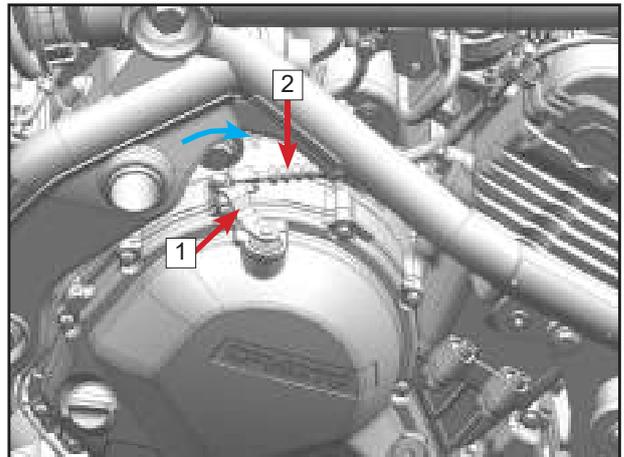
Place GND in place, and then Install bolt **1**.



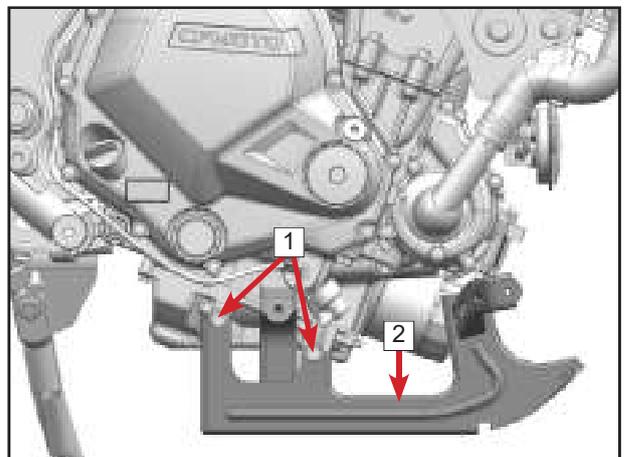
Install positive cable **1** and its fixing nut.



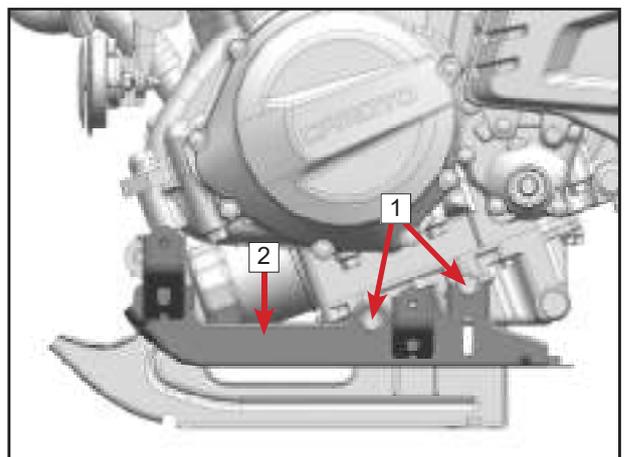
Rotate the clutch release lever **1** clockwise and install the clutch pull cable **2**.



Install engine lower panel RH bracket assembly **2**.  
Install bolts **1**.

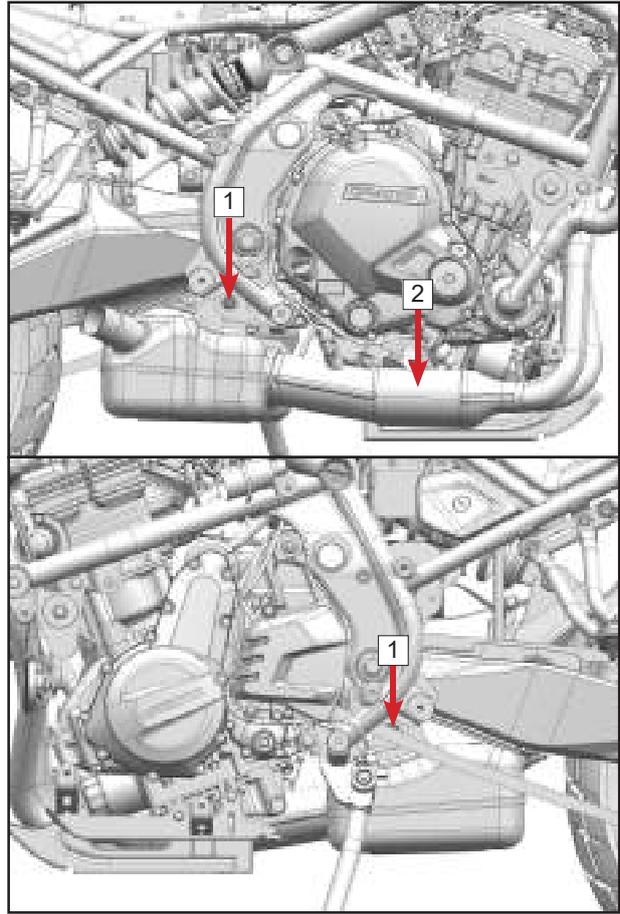


Install engine lower panel LH bracket assembly **2**.  
Install bolts **1**.

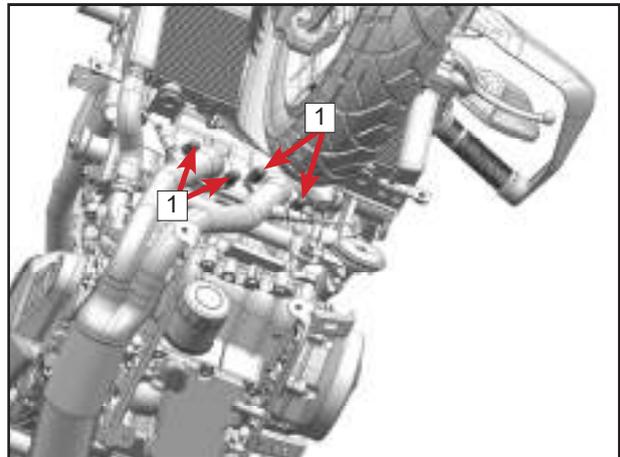


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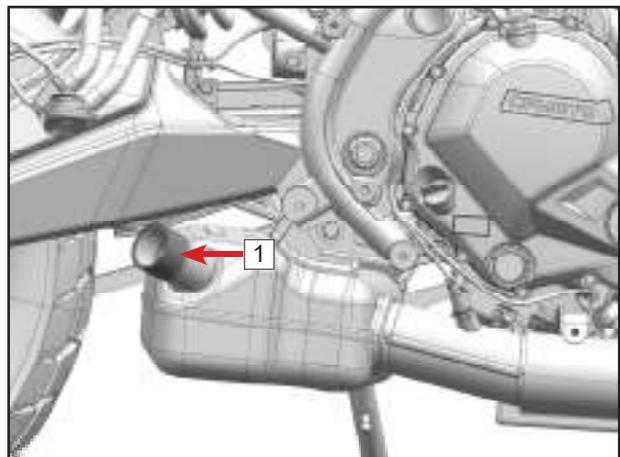
Make sure exhaust port gasket is installed.  
(If the exhaust gasket is aged or damaged,  
replace)  
Install exhaust muffler assembly **2** in  
place.  
Install bolts **1**.



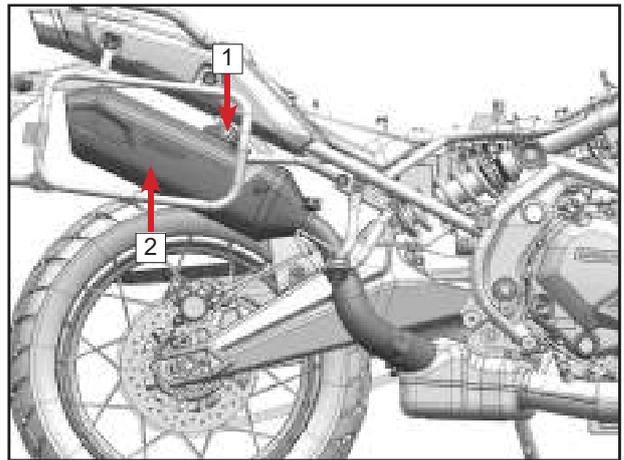
Install muffler joint nuts **1**.  
Plug in oxygen sensor connector.



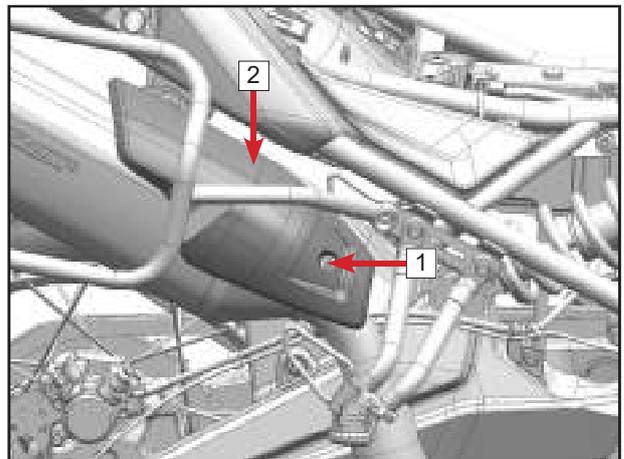
Install graphite seal sleeve **1**.  
(If the graphite seal sleeve is aged or  
damaged, replace)



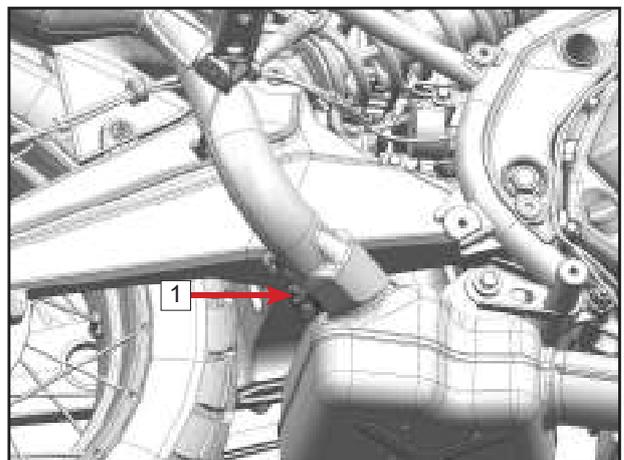
Install muffler body assembly **2**.  
Install bolt **1**, washer and nut.



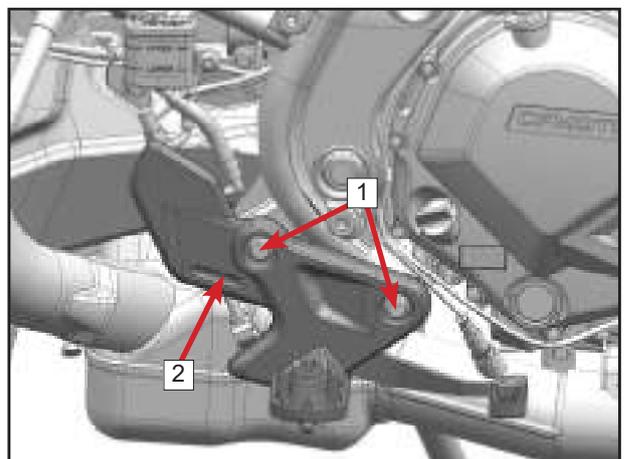
Install muffler guard **2**.  
Install screw **1**.



Tighten clamp **1**.

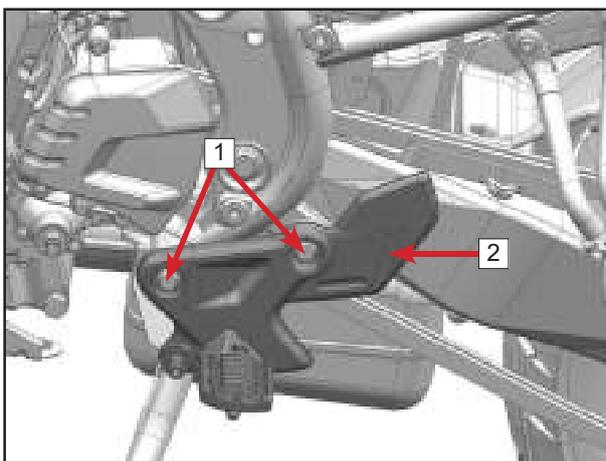


Install front RH footrest bracket assembly **2** in place.  
Install bolts **1**.

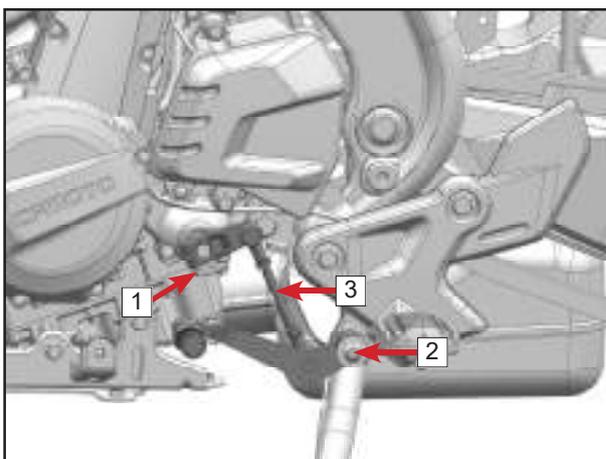


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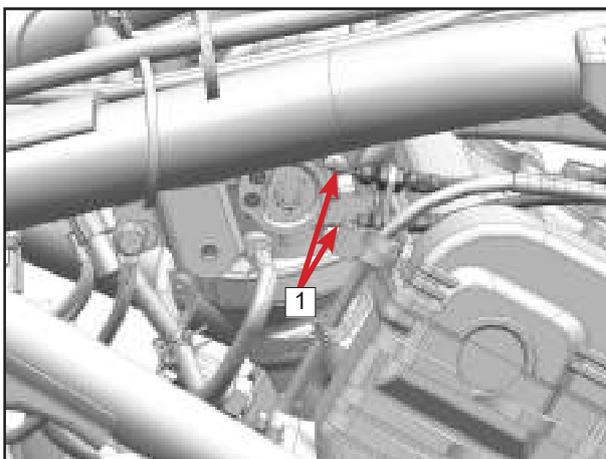
Install front LH footrest bracket assembly **2** in place.  
Install bolts **1**.



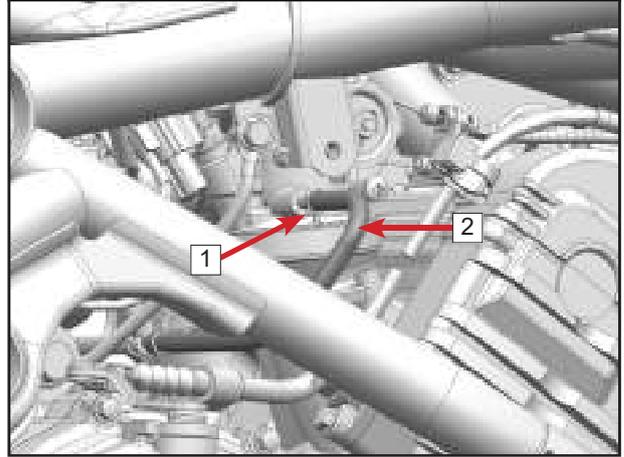
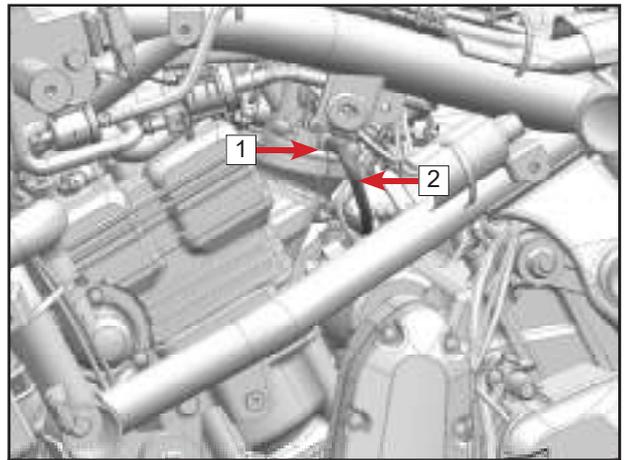
Install gearshift lever assembly **3**.  
Install screw **2** and washer.  
Install bolt **1**.



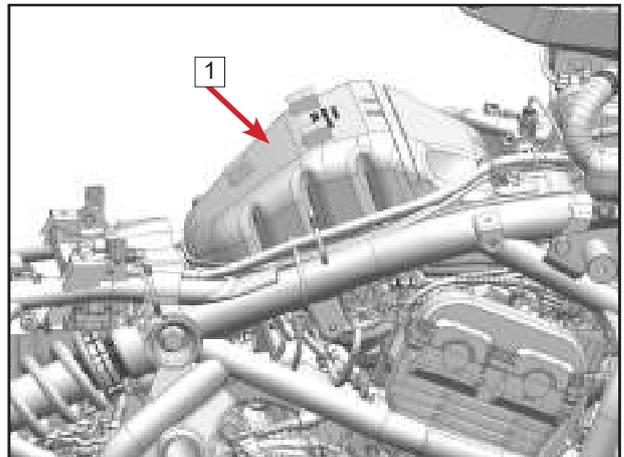
Install throttle cable **1** to throttle valve body.



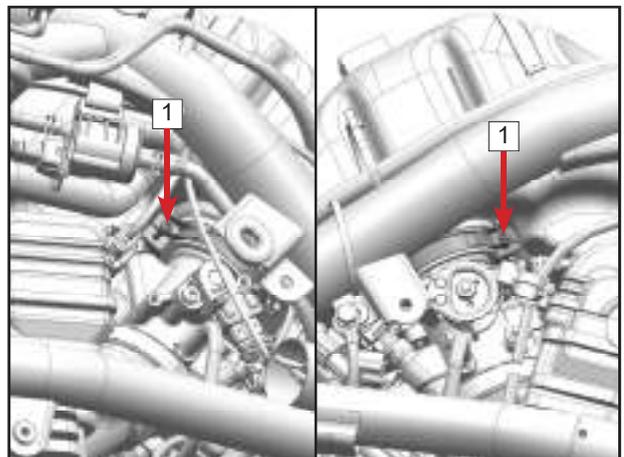
Install fuel vapor hose 2 [2] to throttle body.  
Tighten clamp 1 [1].



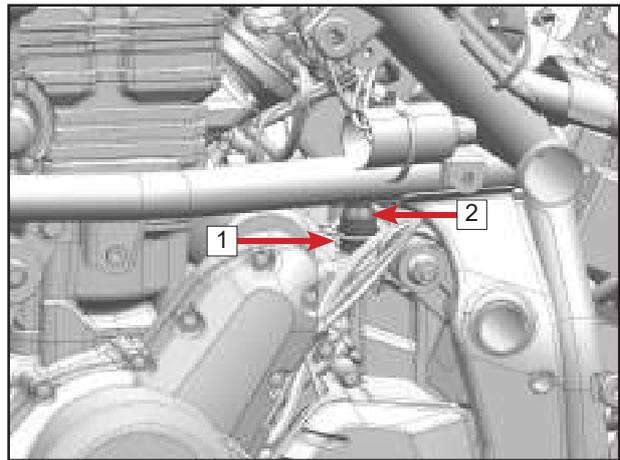
Place air filter housing assembly 1 [1] in place.



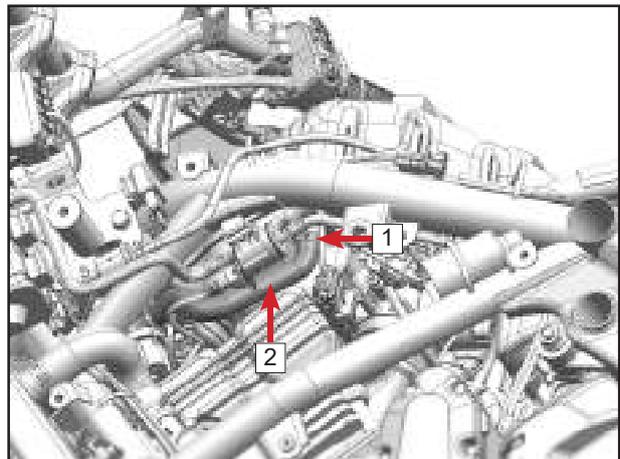
Tighten clamp 1 [1].



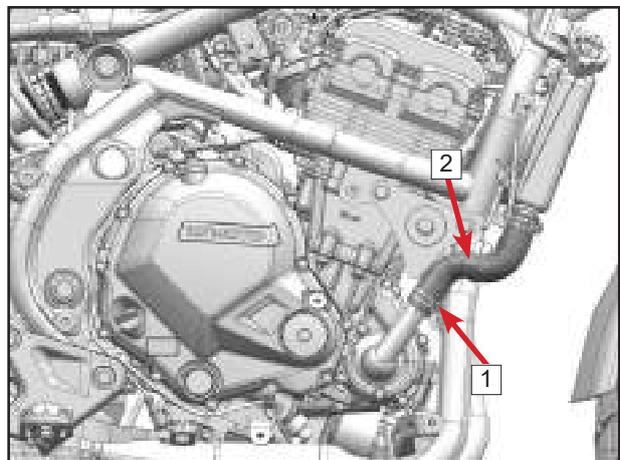
Install breather **2** onto engine.  
Tighten clamp **1**.



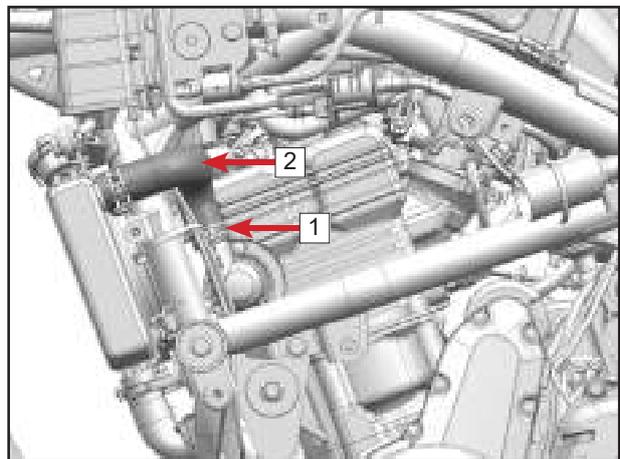
Install SAS inlet pipe **2** onto air filter lower housing.  
Tighten clamp **1**.



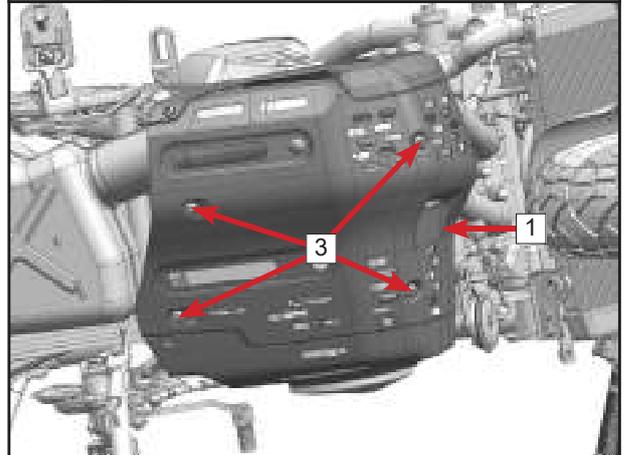
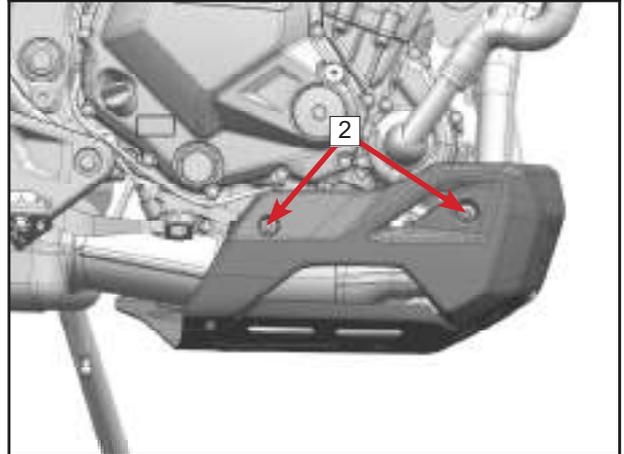
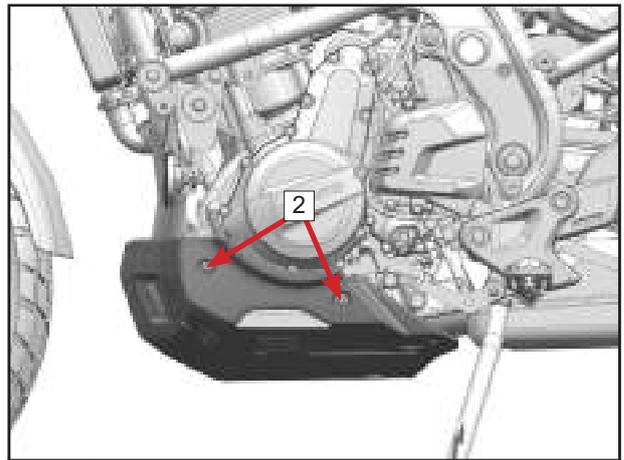
Install radiator water outlet hose **2** to water pump cover.  
Tighten the clamp **1**.



Install the radiator inlet hose **2** to the thermostat cover.  
Tighten the clamp **1**.



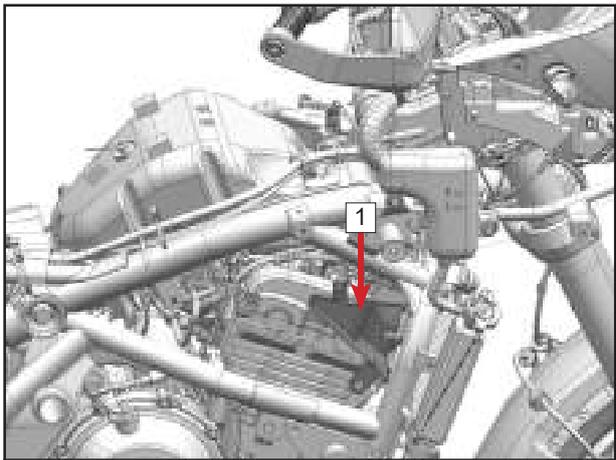
Install engine panel assembly **1** in place.  
Install screw **2** and screw **3**.



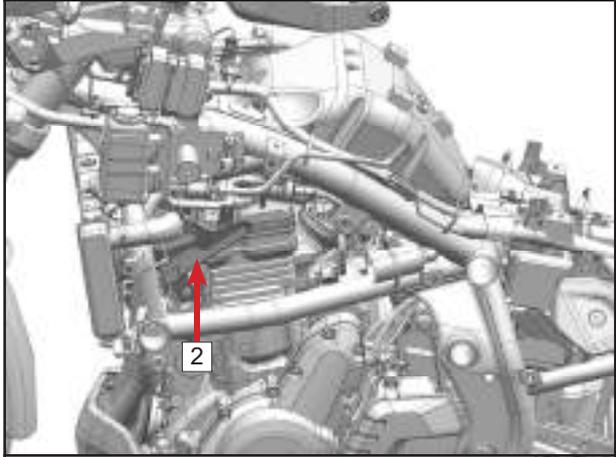
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Refer to the relevant sections to install:

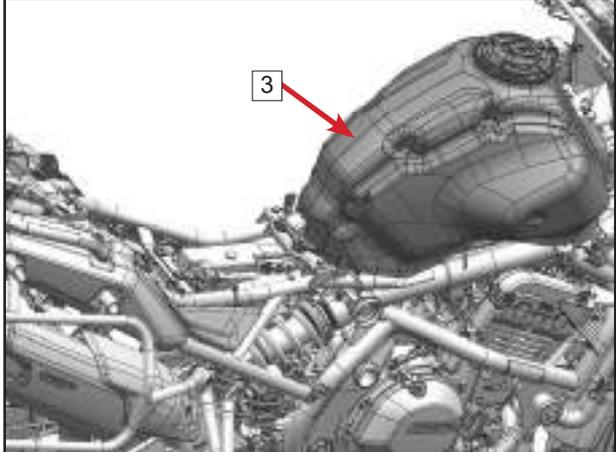
— Reservoir rear RH panel 1



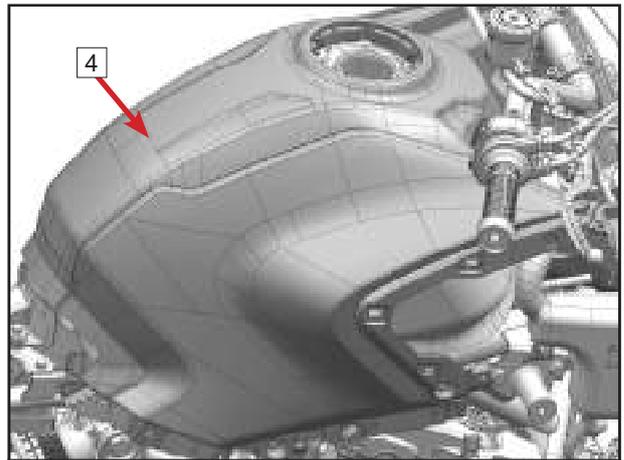
— Reservoir rear LH panel 2



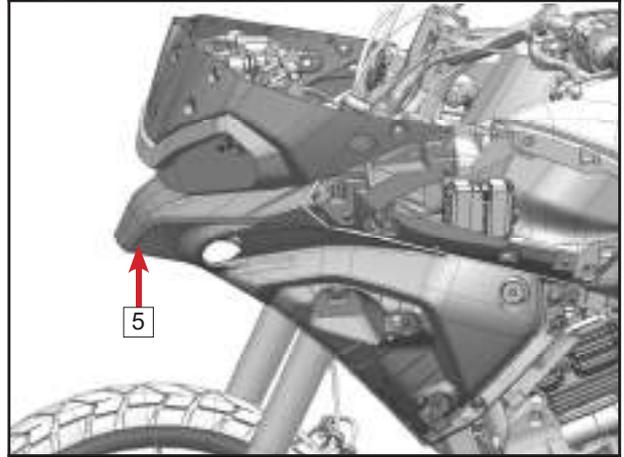
— Fuel tank 3



— Fuel tank panel assembly 4



— Headlight deco guard assembly 5



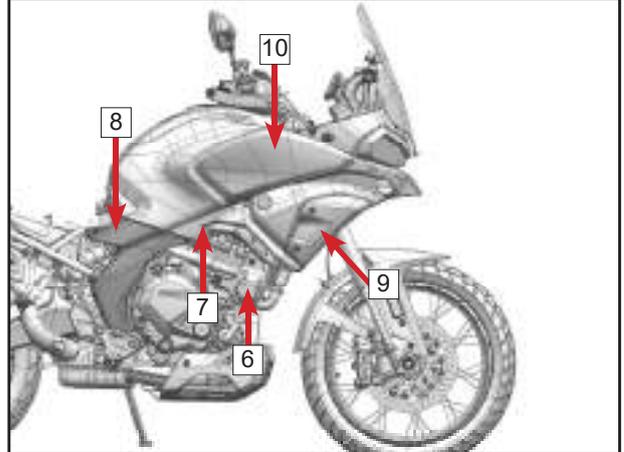
— Engine hanging point RH deco cover 6

— Radiator rear RH panel 7

— Shock absorber adjustment port/Frame RH panel assembly 8

— Radiator RH deco guard 9

— Fuel tank front RH panel 10

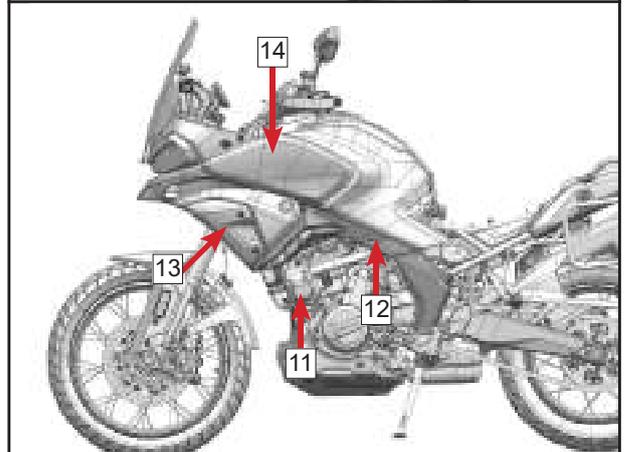


— Engine hanging point LH deco cover 11

— Radiator rear LH panel/Frame LH panel assembly 12

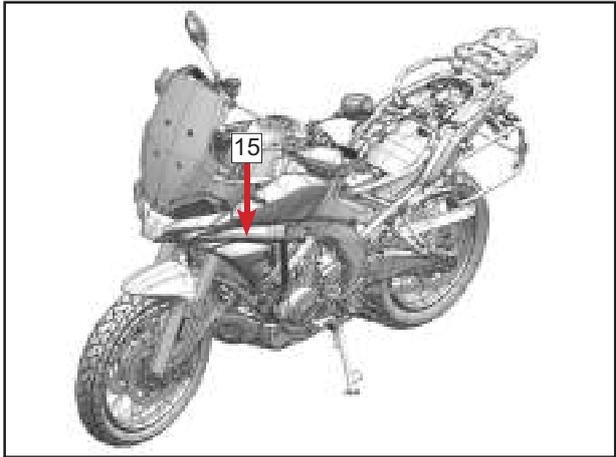
— Radiator LH deco guard 13

— Fuel tank front LH panel 14

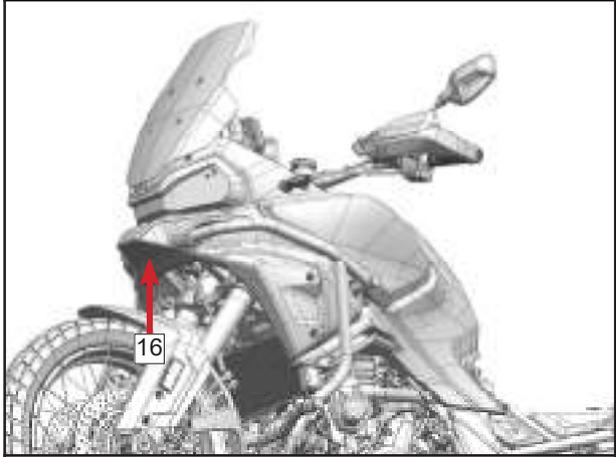


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— Bumper assembly **15**

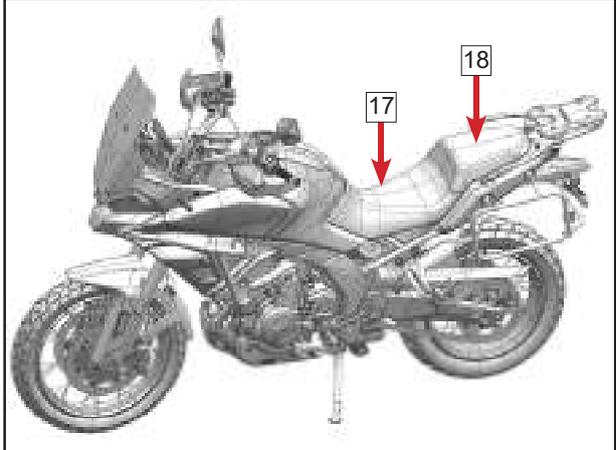


— Front lower panel **16**

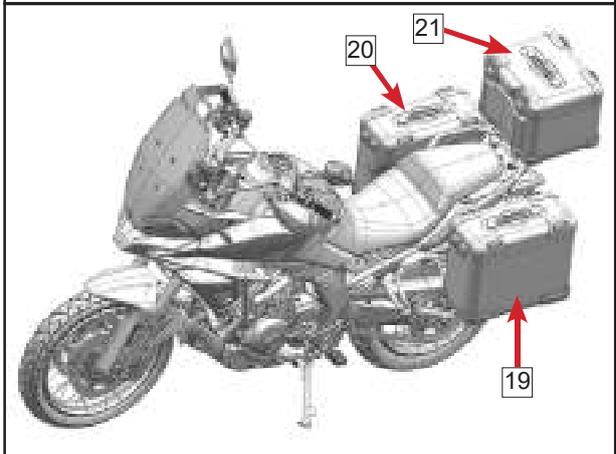


— Front seat **17**

— Rear seat **18**

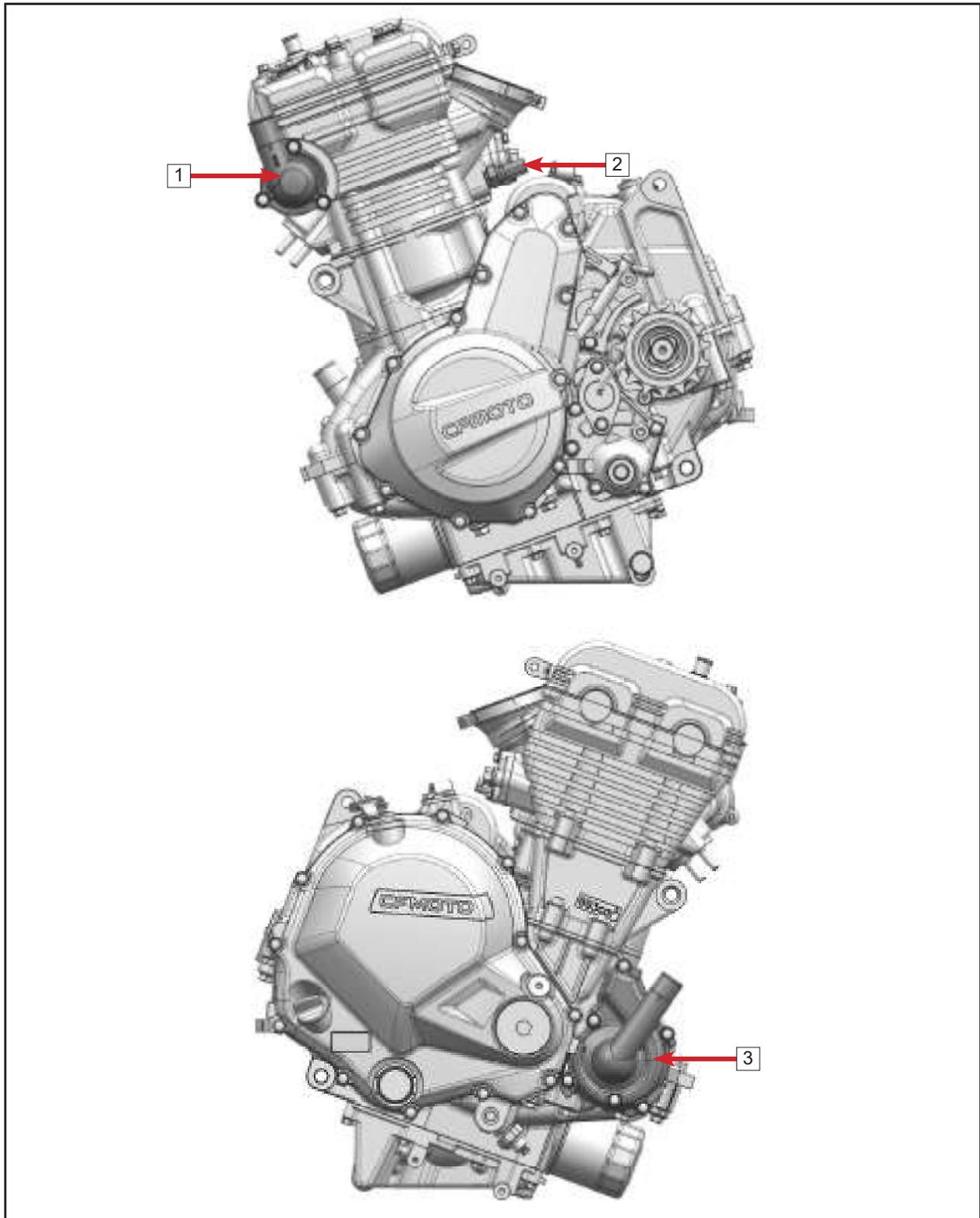


— Three boxes: LH side box assembly **19**, RH side box assembly **20**, tail box assembly **21** (if quipped).



**NOTE: Before the vehicle body covering parts are fully installed, fill with coolant and exhaust the cooling system.**

## 5.7 Engine Cooling System



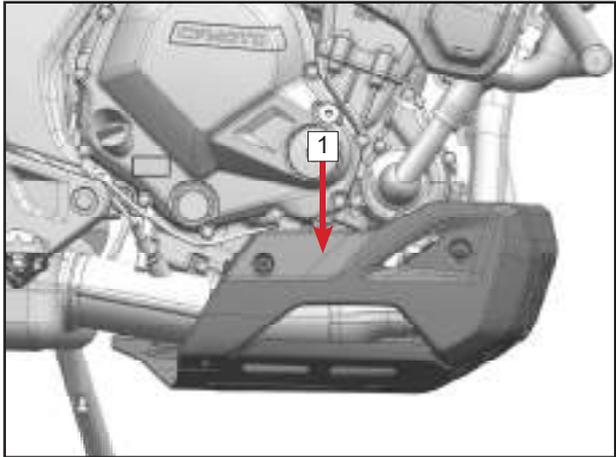
Number	Name of Parts
1	Thermostat cover
2	Coolant temperature sensor
3	Water pump cover

## 5.7.1 Water Pump Assembly

### 5.7.1.1 Removal

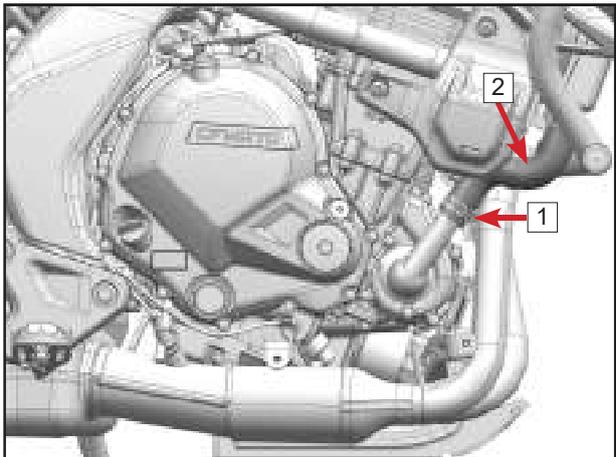
Remove engine panel assembly **1**. (Refer to Engine Removal chapter)

Drain the coolant.



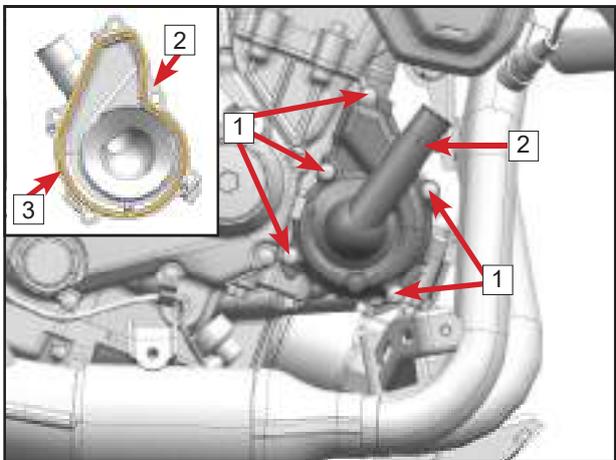
Loosen the clamp **1**.

Remove radiator outlet pipe **2** from water pump cover.



Remove bolts **1**.

Remove water pump cover **2** and water pump cover seal ring **3**.

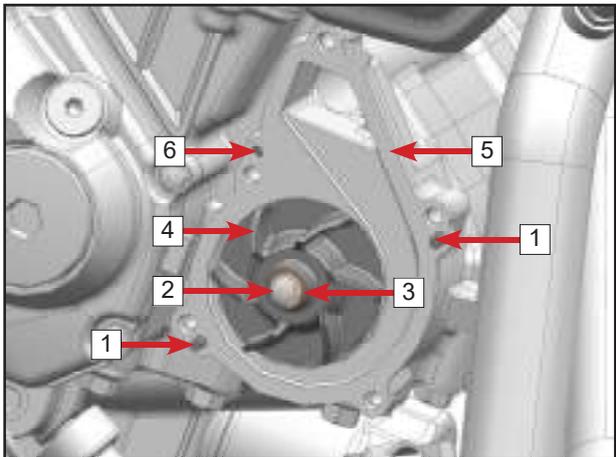


Remove needle **1**.

Remove bolt **2** and washer **3**.

Remove water pump impeller **4**.

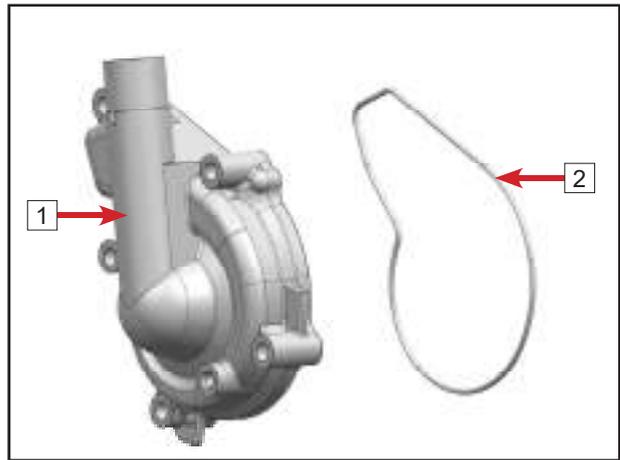
Remove water pump body **5** and needle **6**.



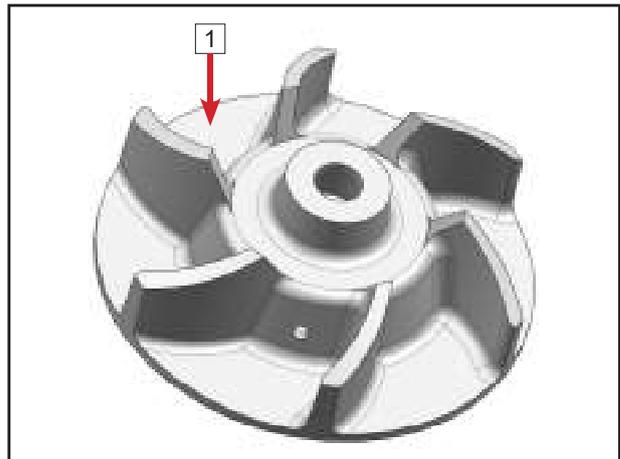
### 5.7.1.2 Inspection

Inspect water pump cover **1** for cracks or damage. Replace it if necessary

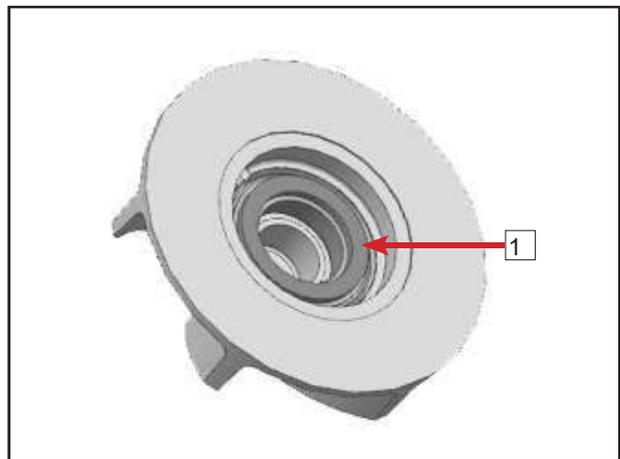
Inspect water pump cover seal ring **2** for breakage, hardening or damage. Replace it if necessary.



Inspect water pump impeller **1** for cracks or damage. Replace it if necessary.



Before installing water seal ring **1**, use a medical cotton swab dipped in alcohol to clean the water seal ring.



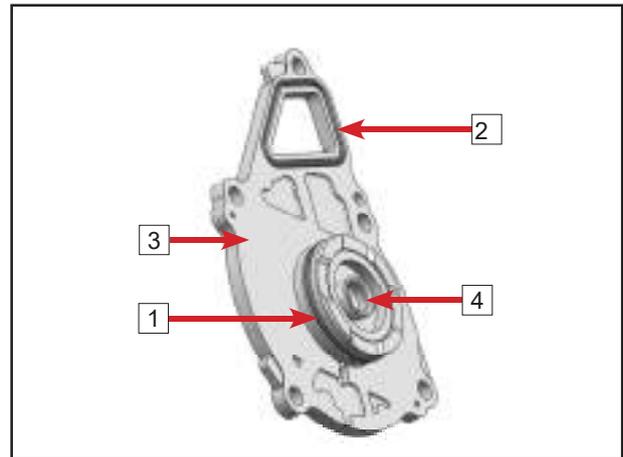
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## Water Pump Body

Inspect O-ring **1** and water pump body seal ring **2** for cracks, hardening or damage. Replace it if it does.

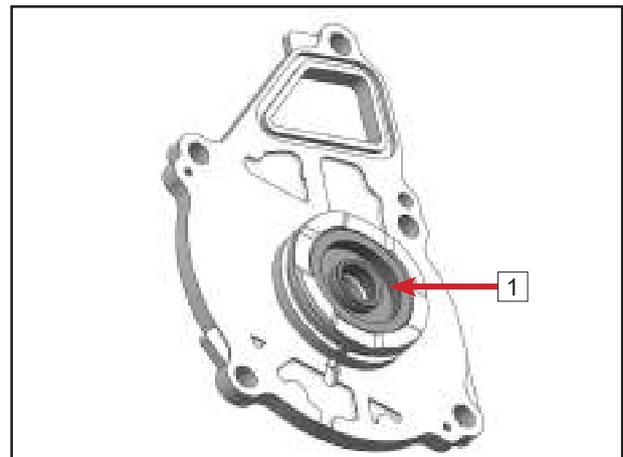
Inspect water pump body **3** for cracks or damage. Replace it if necessary.

Inspect oil seal **4** for brittleness, hardening or damage. Replace it if it does.



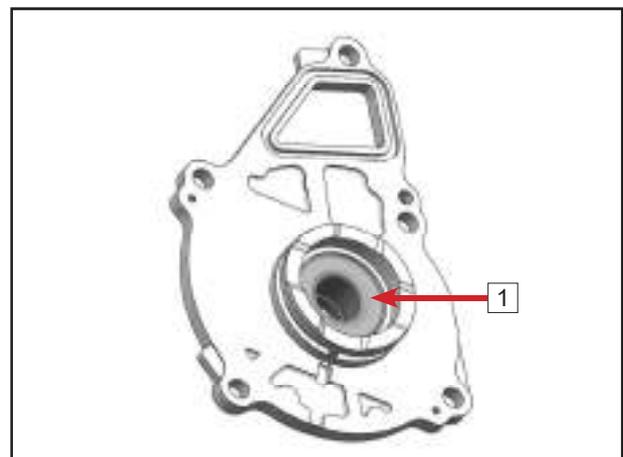
## Disassembly

Remove oil seal **1** and discard it.



Use suitable tools to press the water seal ring **1** out of pump body.

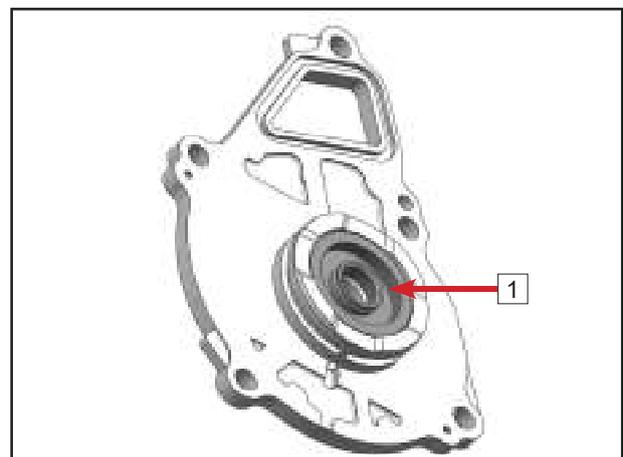
**NOTE: The removed water seal should be scrapped, and new water seal must be used when installing.**



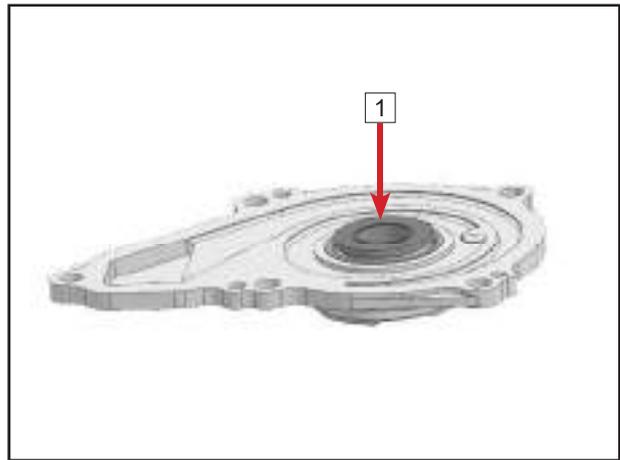
## Assembly

Apply 648 cylindrical bonding sealant on the outer cylinder of oil seal, and install oil seal **1**.

**NOTE: The marked side of oil seal faces outside.**



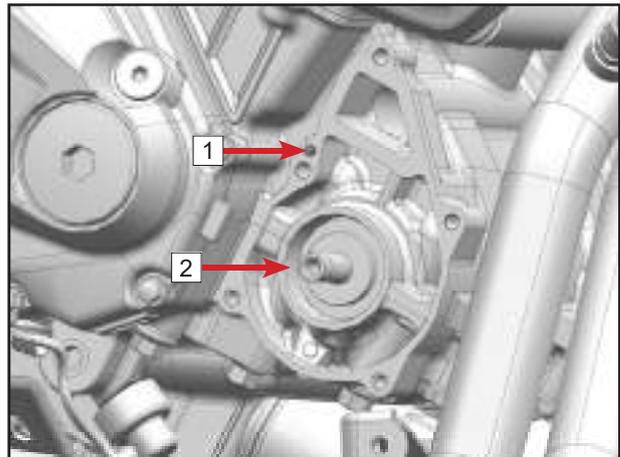
Apply sealant to the mounting surface of water seal static ring assembly **1**, and install it into the mounting hole of water pump body with appropriate tool.



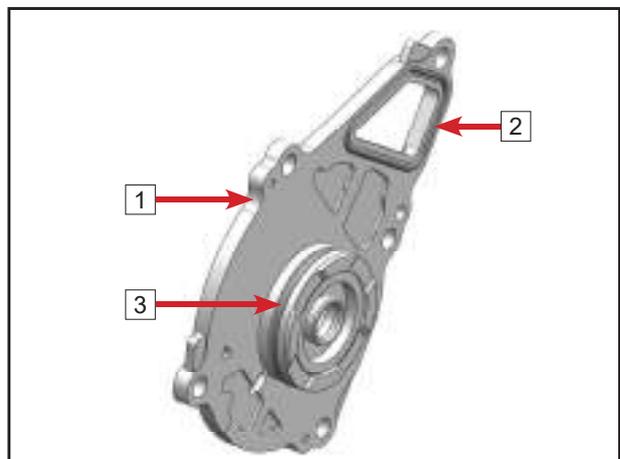
### 5.7.1.3 Installation

Install needle **1**.

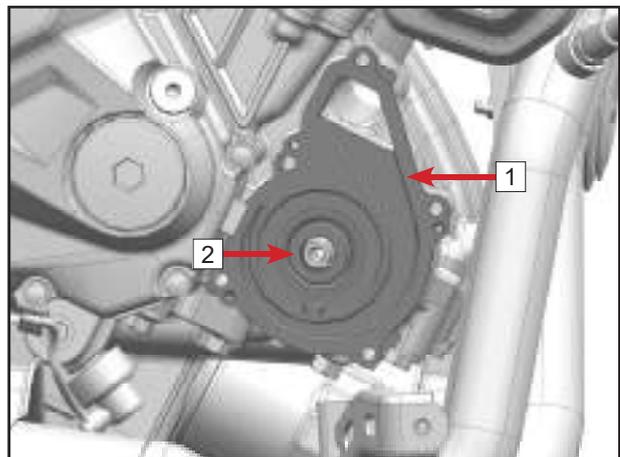
Apply engine oil to the installation hole **2**.



Ensure that the water pump body seal ring **2** and O-ring **3** are installed on the water pump body **1**.

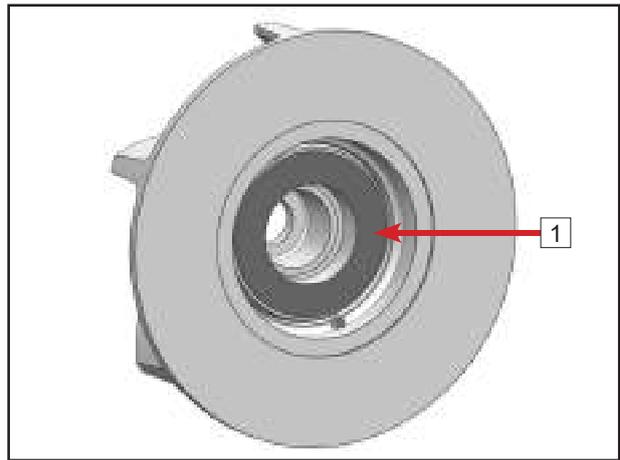


Install water pump body assembly **1**.  
Clean water seal static ring surface **2** with ethyl alcohol. Make sure the working surface is clean without foreign matters.



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Clean water seal moving ring surface **1** with ethyl alcohol. Make sure the working surface is clean without foreign matters.

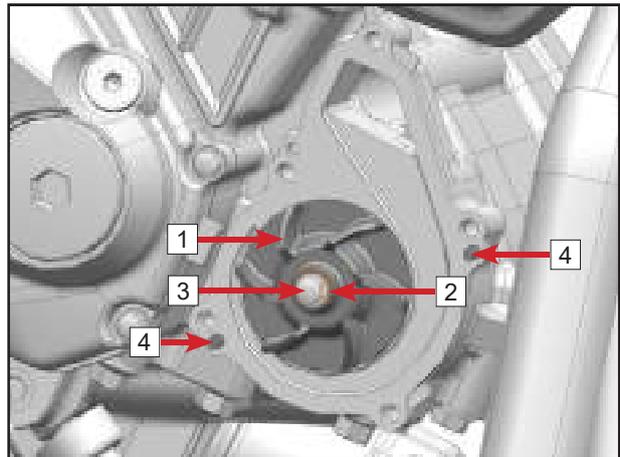


Install water pump impeller assembly **1**. Install washer **2** and bolt **3**, and tighten to the specified torque.

<b>Water Pump Impeller Bolt <b>3</b></b>	
Torque	10 N·m (7.3 ft-lb.)

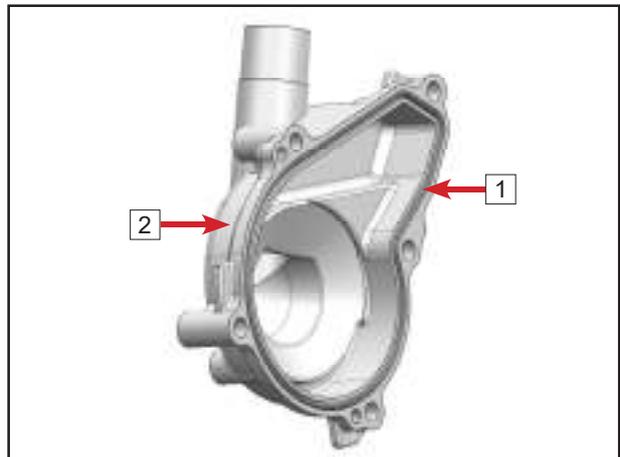
Inspect the clearance between impeller and water pump body with feeler gauge. The clearance should be within the scope of the table below.

<b>Clearance standard</b>	
0.2 ~ 0.85 mm (0.00787 ~ 0.03346 in)	



Install roller needle **4**.

Ensure that the water pump cover seal ring **1** is installed on the water pump cover **2**.

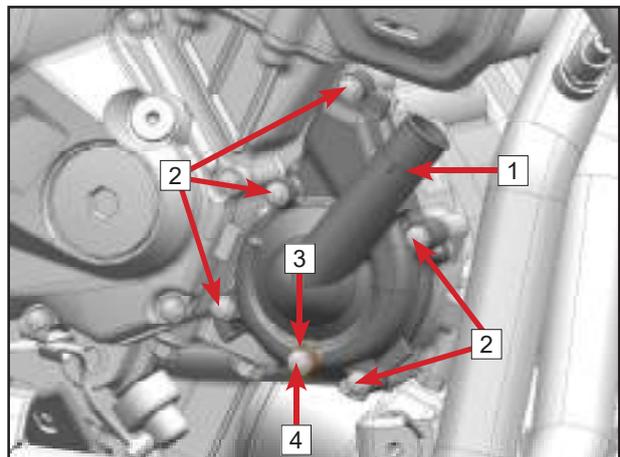


Install water pump cover assembly **1**. Install bolt **2**, and tighten in criss-cross way to the specified torque.

<b>Water Pump Cover Bolt <b>2</b></b>	
Torque	12 N·m (8.8 ft-lb.)

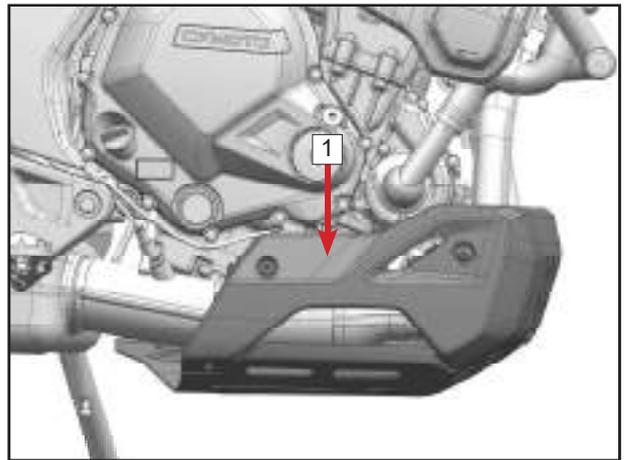
Install washer **3** and drain bolt **4**, tighten to the specified torque.

<b>Drain Bolt <b>4</b></b>	
Torque	7 N·m (5.2 ft-lb.)



Install engine panel assembly **1**. (Refer to Engine Installation chapter)

Fill with coolant and bleed the cooling system.

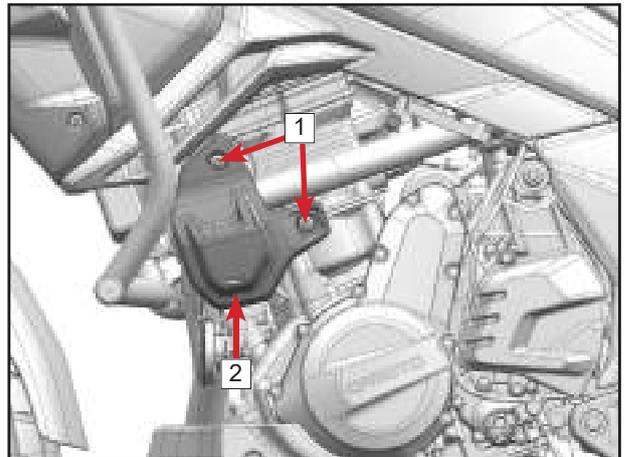


### 5.7.2 Thermostat Removal

Drain the coolant.

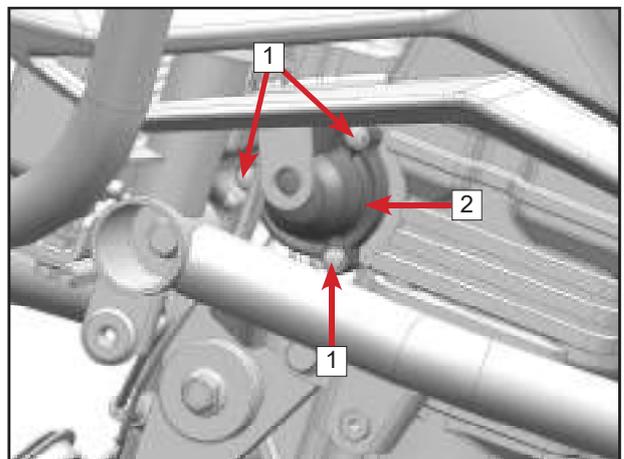
Remove screws **1**.

Remove engine hanging point LH deco cover **2**.

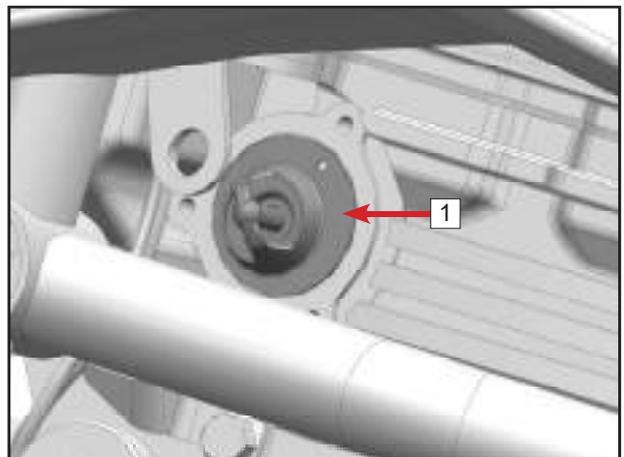


Remove bolts **1**.

Remove thermostat cover **2**.



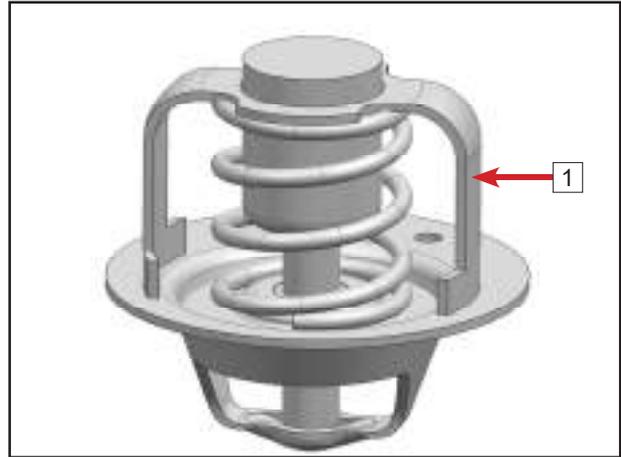
Remove the thermostat **1**.



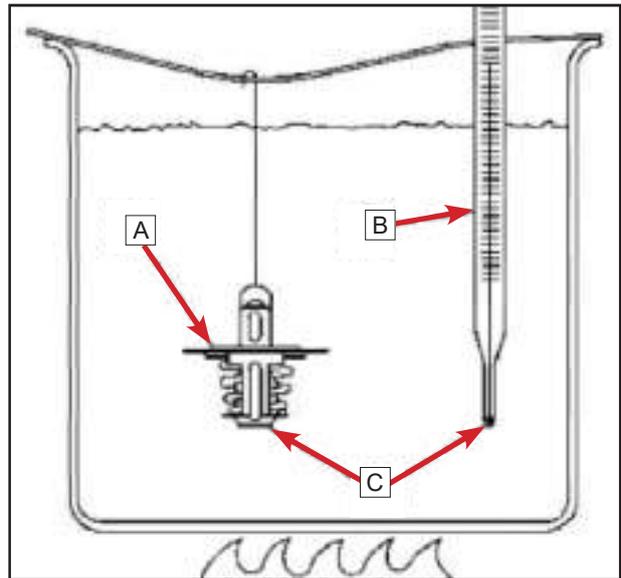
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## Inspection

Inspect the thermostat **1** at room temperature. Replace with a new thermostat if the valve is open.



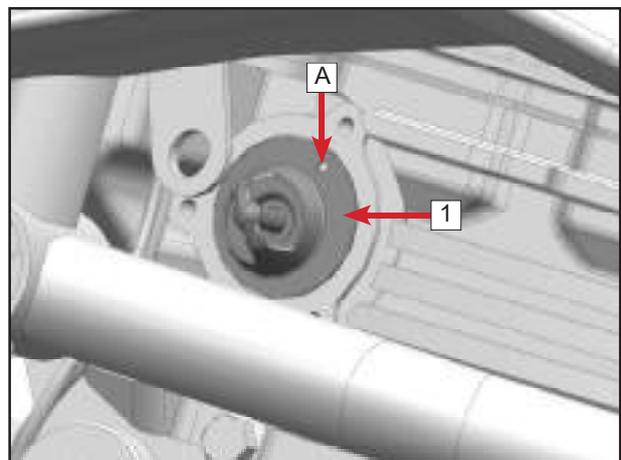
For valve open temperature inspection, hang thermostat **A** in a container of water. The thermostat should be fully immersed without touching container wall or bottom. Hang a thermometer **B** at the same level without touching wall or bottom. The thermal position **C** must be equal. Heat the water slowly, take note of the temperature that the thermostat begins to open, and its full open temperature. Replace with a new thermostat if beyond the specification.



Thermostat Open Temperature	
Open	70°C ~74°C
Full open	83°C ~87°C Full open range ≥8mm

## Installation

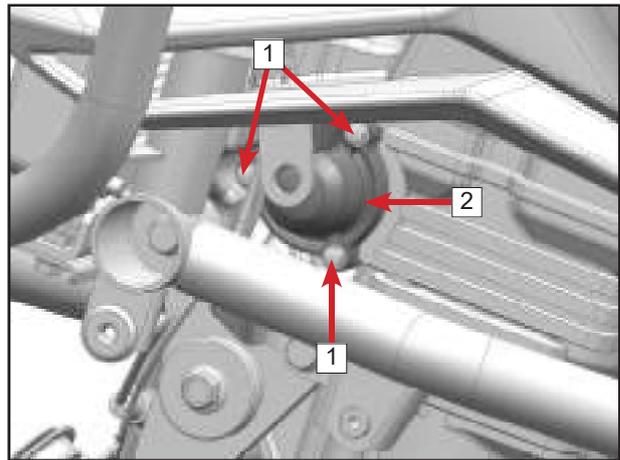
Install the thermostat **1**, hole **A** faces up.



Install thermostat cover **2**.

Install bolts **1**, and tighten to the specified torque.

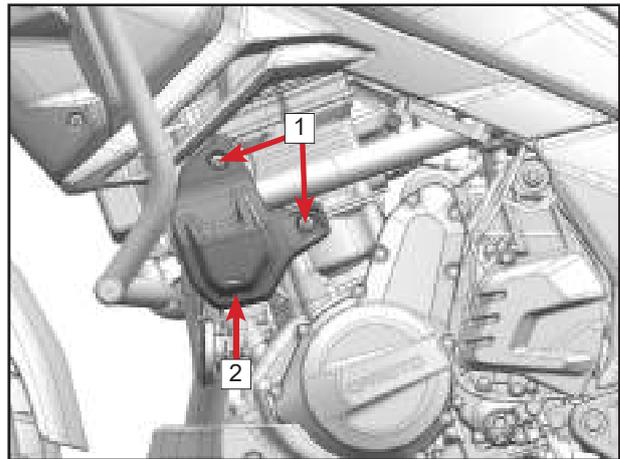
Thermostat Cover Bolt <b>1</b>	
Torque	12 N•m (8.8 ft-lb.)



Install engine hanging point LH deco cover **2** in place.

Install screws **1**.

Fill with coolant and bleed the cooling system.



## 5.8 Engine Lubrication System

### 5.8.1 Engine Oil Level Inspection

Ensure the vehicle is on a level surface. Start the engine and allow it to idle for a few minutes.

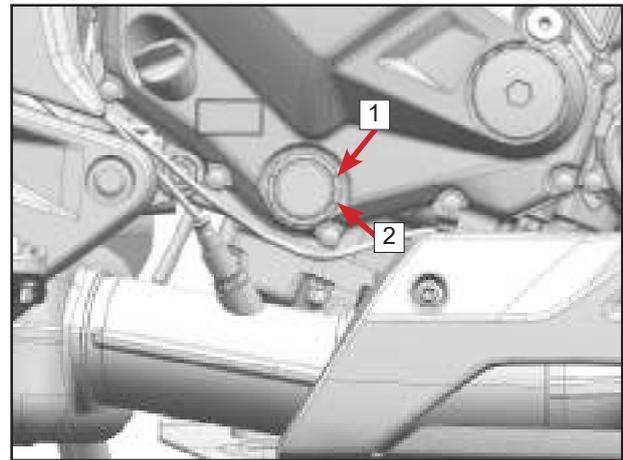
Stop the engine and wait for a few minutes, until all the oil flows back to the oil pan.

Upright the vehicle on the level surface, and then observe the oil level through the oil level viewer.

Maintain the level between “upper” **1** and “lower” **2** line.

Add or remove engine oil until the oil level is right.

**NOTE: Strictly follow the procedure to prevent a wrong oil level indication.**



### 5.8.2 Engine Oil Replacement

**NOTE: Wait until engine temperature is appropriate for replacement. Replace engine oil and filter at the same time when the engine is warm.**

Support the vehicle on level ground with side stand.

Wipe the area of magnetic oil drain bolt clean.

Place a suitable oil container at the bottom of the engine (where the magnetic oil drain bolt is located).

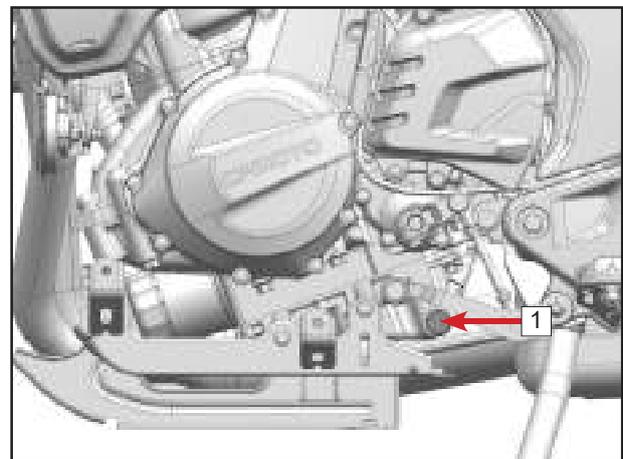
Remove magnetic oil drain bolt **1** and seal ring.

Wait for several minutes to drain the oil completely from the oil pan.

**NOTE: Oil condition reflects engine condition. Check the engine oil for metal shavings or heavy residue. Presence of a small amount of fine particles is considered normal wear. Presence of heavy debris indicates a potential failure inside the engine, which should be investigated.**

Clean the drain bolt, then reinstall it with a new seal washer and torque to specification.

Magnetic Oil Drain Bolt	
Torque	35N·m (25.8 ft-lb.)



### Oil Filter Replacement

For oil filter element removal and installation, refer to the sections Engine Disassembly and Engine Assembly.

## Oil Filling

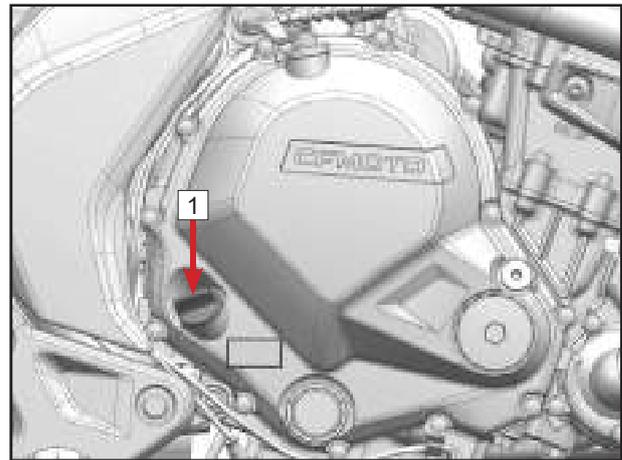
Remove the oil filling plug **1**.

Fill the engine with the recommended oil through the oil filling plug mounting hole.

Engine Oil Capacity (Replace oil and oil filter at the same time)	
Capacity	2.4L
Oil Type	SAE 10W-40, API SJ or higher

Install the oil filling plug, start the engine, and ensure that there is no leakage at the oil filter or drain bolt.

After filling the oil, check the oil level (refer to the engine oil level inspection described above).



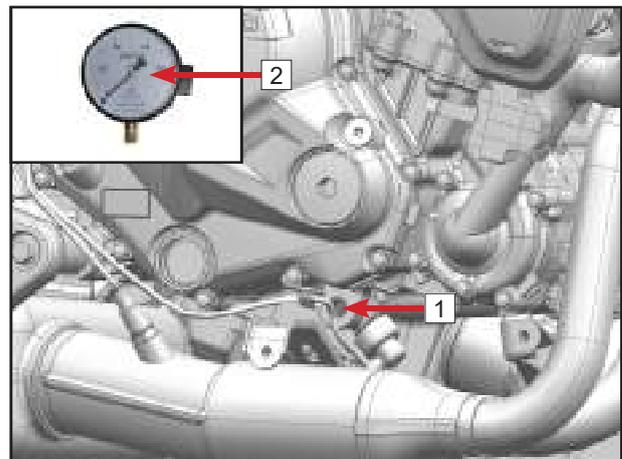
## 5.8.3 Engine Oil Pressure Inspection

**NOTE: The engine oil pressure should be checked when using the recommended oil and under heat engine condition (oil temperature of about 90 °C).**

Remove engine panel assembly. (Refer to Engine Removal chapter)

Remove main oil rail plug **1**, and install the adapter and dashboard **2** into the plug hole.

Tool: Oil pressure gauge, 10kgf/cm<sup>2</sup>  
Oil pressure gauge adapter, PT3/8



Start and run the engine until it reaches the test temperature.

The engine oil pressure (Oil temperature approximately 90°C) should be within the following range:

Engine Speed/RPM	Oil Pressure/kPa
Idle Speed	≥0.12MPa
4000	≥0.3MPa

If the engine oil pressure is out of range. Troubleshoot to find the problematic part.

Remove oil pressure gauge and adapter after inspection.

Reinstall the main oil rail plug (apply 243 thread locker), and tighten to the specified torque.

Main Oil Rail Plug	
Torque	20 N·m (14.7 ft·lb.)

## 5.9 Air Intake System

### 5.9.1 Air Filter Element Maintenance

**NOTE: If the vehicle is used in severe conditions, increase the frequency of air filter inspections and maintenance (refer to Maintenance Chart).**

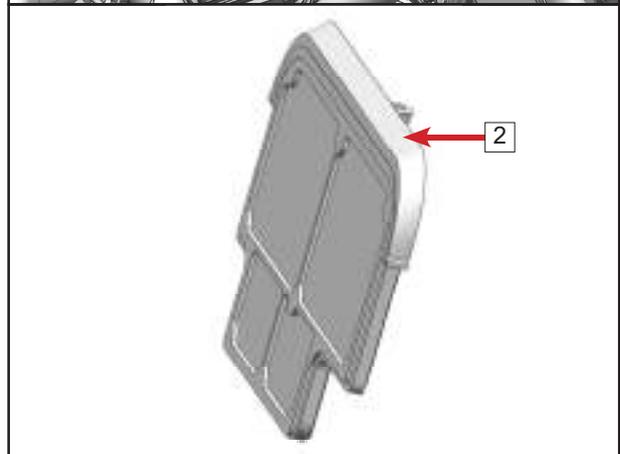
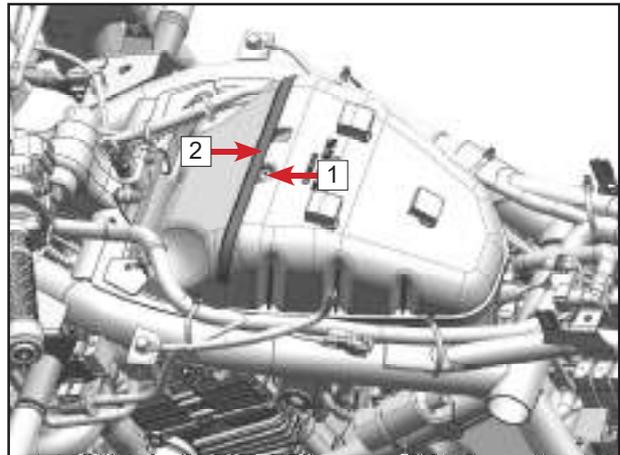
#### Removal

Refer to the related sections to remove:

- Rear seat
- Front seat
- Front lower panel
- Bumper assembly
- Fuel tank front LH panel
- Radiator LH deco guard
- Radiator rear LH panel/Frame LH panel assembly
- Fuel tank front RH panel
- Radiator RH deco guard
- Shock absorber adjustment port/Frame RH panel assembly
- Radiator rear RH panel
- Radiator LH inner panel assembly
- Fuel tank LH panel
- Radiator RH inner panel assembly
- Fuel tank RH panel
- Fuel tank upper panel
- Fuel tank

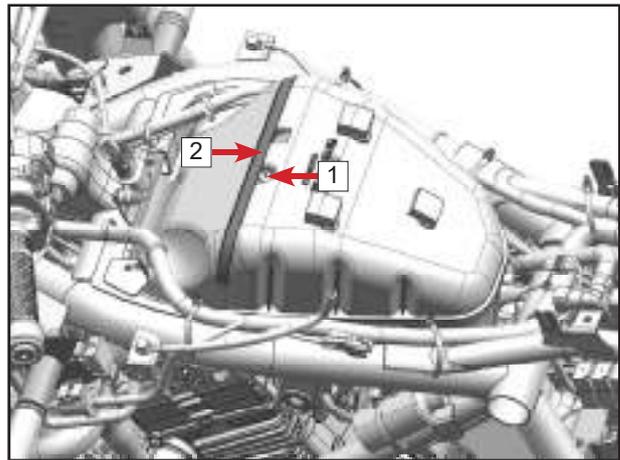
Remove screw **1**.

Remove air filter element **2**.



### Installation

Place a new air filter element **2**.  
Install and tighten screw **1**.



Refer to the related sections to install:

- Fuel tank
- Fuel tank upper panel
- Fuel tank RH panel
- Radiator RH inner panel assembly
- Fuel tank LH panel
- Radiator LH inner panel assembly
- Radiator rear RH panel
- Shock absorber adjustment port/Frame RH panel assembly
- Radiator RH deco guard
- Fuel tank front RH panel
- Radiator rear LH panel/Frame LH panel assembly
- Radiator LH deco guard
- Fuel tank front LH panel
- Bumper assembly
- Front lower panel
- Front seat
- Rear seat

## 5.9.2 Air Filter Housing Assembly

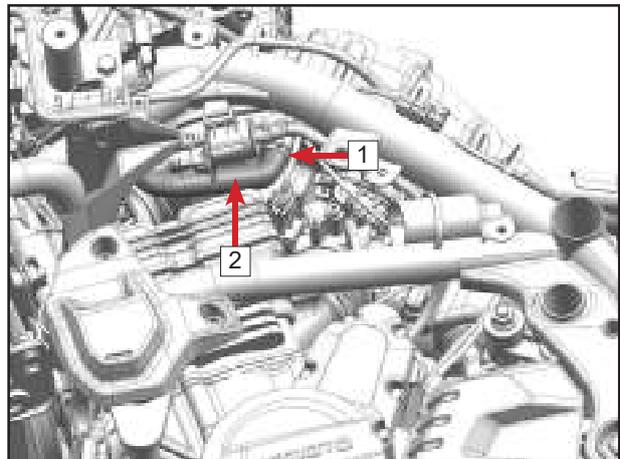
### 5.9.2.1 Removal

Refer to the related sections to remove:

- Rear seat
- Front seat
- Front lower panel
- Bumper assembly
- Fuel tank front LH panel
- Radiator LH deco guard
- Radiator rear LH panel/Frame LH panel assembly
- Fuel tank front RH panel
- Radiator RH deco guard
- Shock absorber adjustment port/Frame RH panel assembly
- Radiator rear RH panel
- Radiator LH inner panel assembly
- Fuel tank LH panel
- Radiator RH inner panel assembly
- Fuel tank RH panel
- Fuel tank upper panel
- Fuel tank

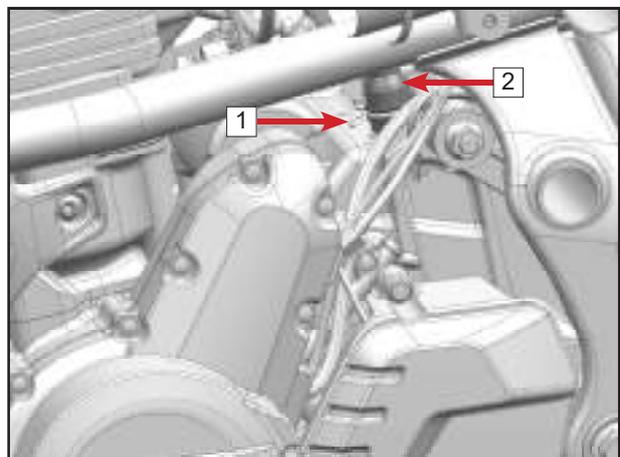
Release clamp **1**.

Remove SAS inlet pipe **2** from air filter lower housing.

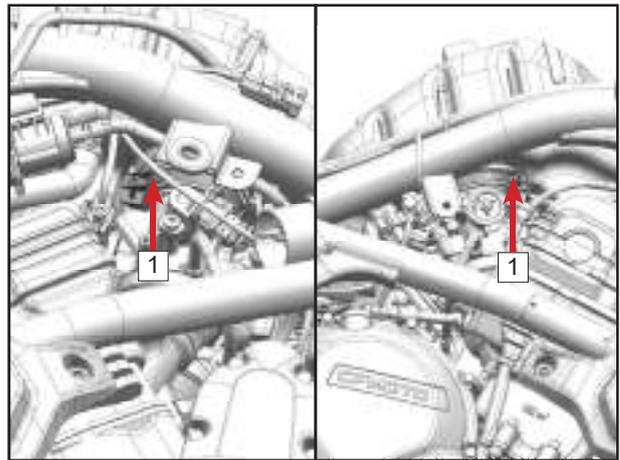


Release clamp **1**.

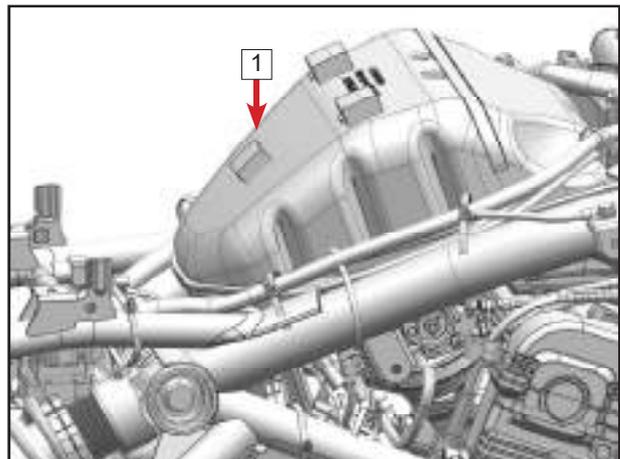
Remove breather **2** from engine.



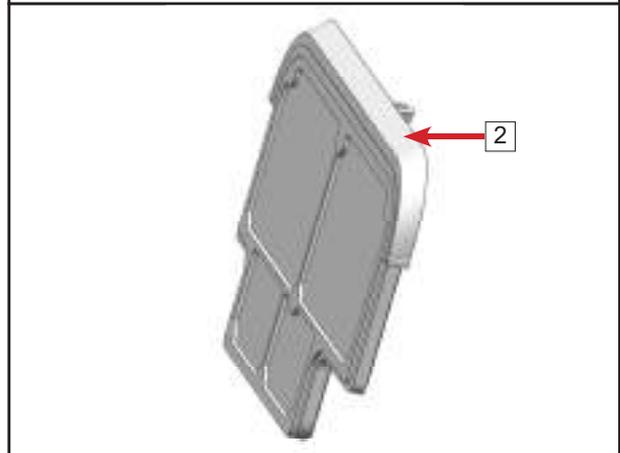
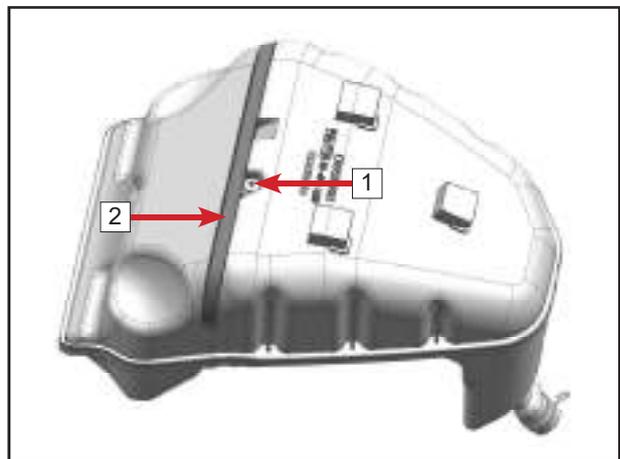
Release clamp **1**.



Remove air filter housing assembly **1**.



Remove screw **1**.  
Remove air filter element **2**.



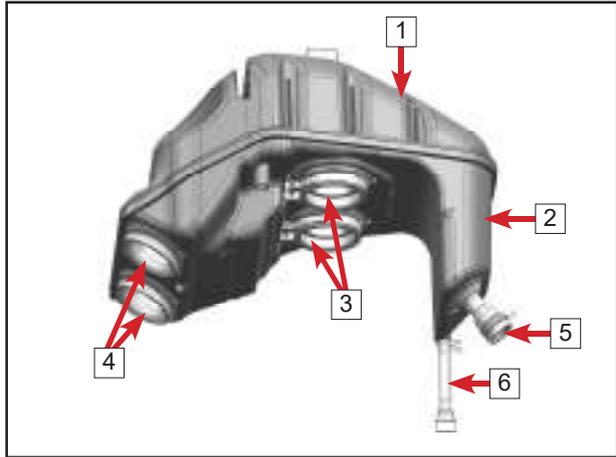
## 5.9.2.2 Inspection

Inspect upper housing [1], lower housing [2] and air outlet pipe [3] for breakage or other damage. If any part is problematic, replace the whole set.

Clean air filter housing.

Inspect air inlet pipe [4], breather [5] and oil storage hose [6] for aging or other damage.

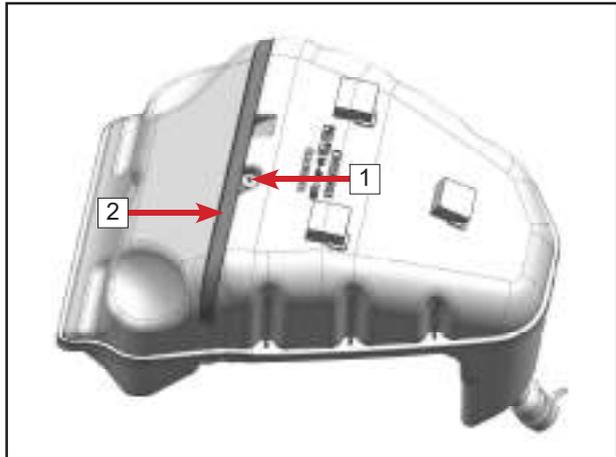
Replace if found.



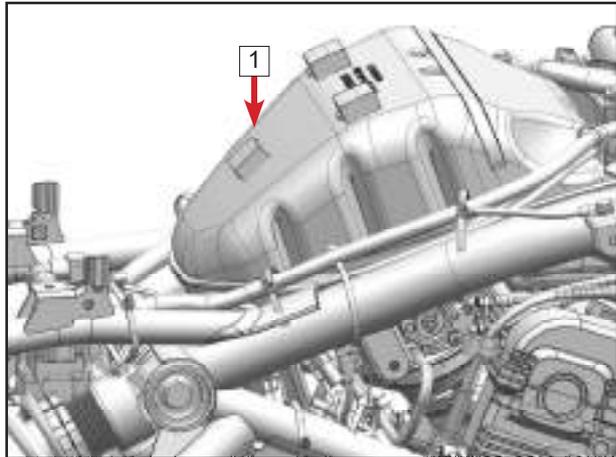
## 5.9.2.3 Installation

Place a new air filter element [2].

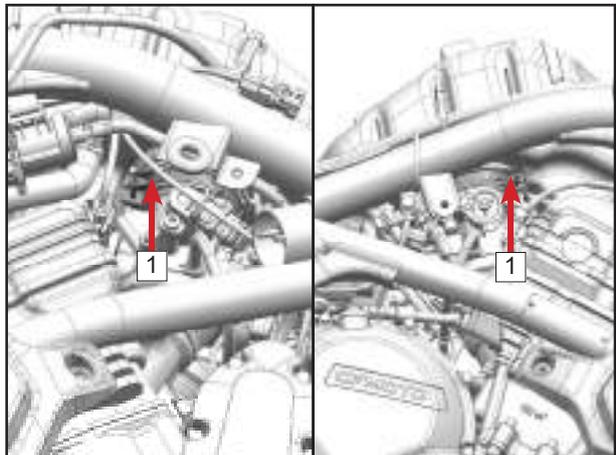
Install and tighten screw [1].



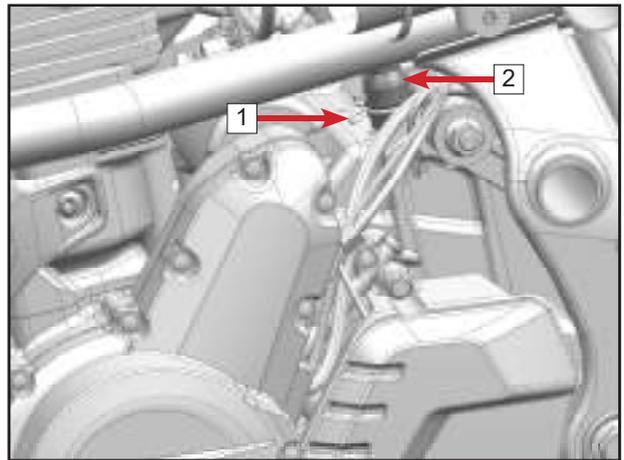
Install air filter housing assembly [1] in place.



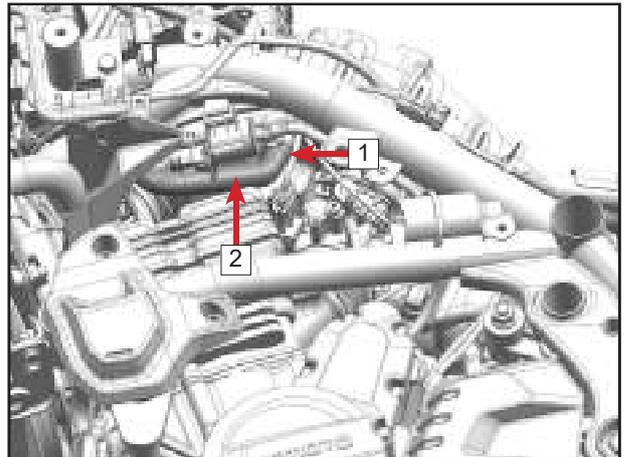
Tighten the clamp [1].



Install breather **2** onto engine.  
Tighten clamp **1**.



Install SAS inlet pipe **2** onto air filter lower housing.  
Tighten clamp **1**.



Refer to the related sections to install:

- Fuel tank
- Fuel tank upper panel
- Fuel tank RH panel
- Radiator RH inner panel assembly
- Fuel tank LH panel
- Radiator LH inner panel assembly
- Radiator rear RH panel
- Shock absorber adjustment port/Frame RH panel assembly
- Radiator RH deco guard
- Fuel tank front RH panel
- Radiator rear LH panel/Frame LH panel assembly
- Radiator LH deco guard
- Fuel tank front LH panel
- Bumper assembly
- Front lower panel
- Front seat
- Rear seat

## 5.9.3 Throttle Body Assembly

### 5.9.3.1 Throttle Body Assembly Removal

Remove air filter housing assembly (see section Air Filter Housing Assembly).

Disconnect the fuel injector connector.

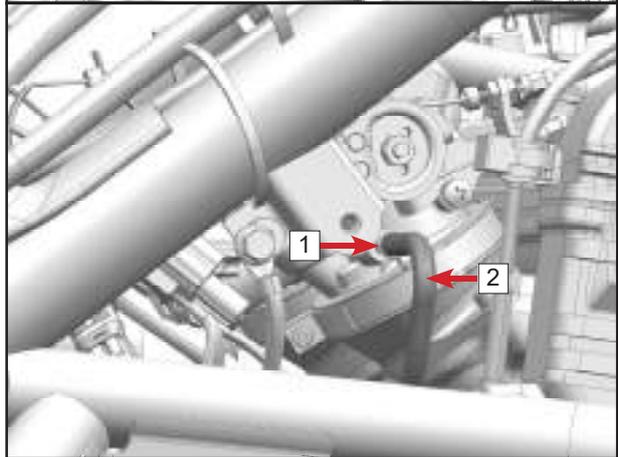
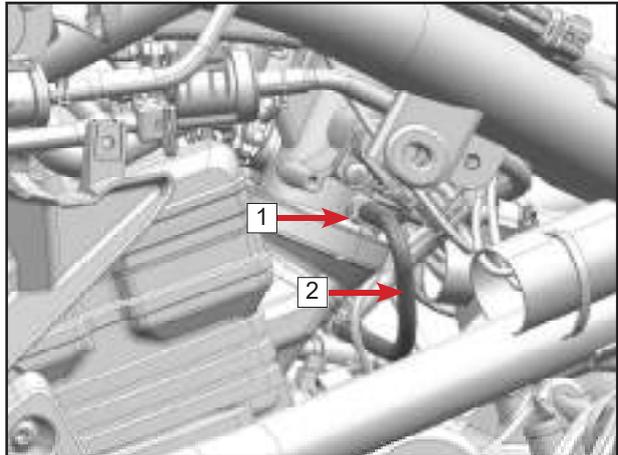
Disconnect the T-MAP connector.

Disconnect TPS connector.

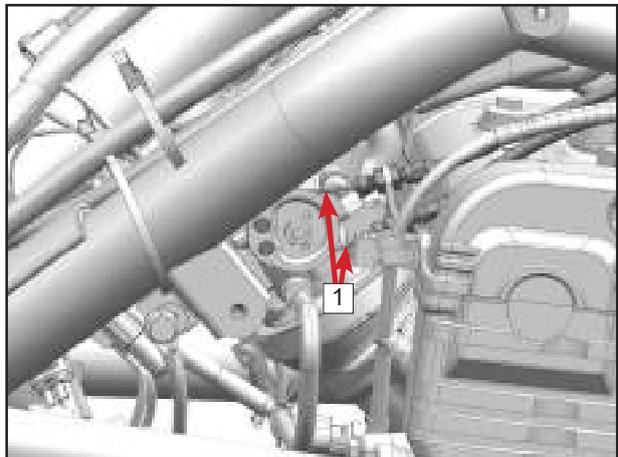
Disconnect the stepper motor connector.

Loosen the clamp **1**.

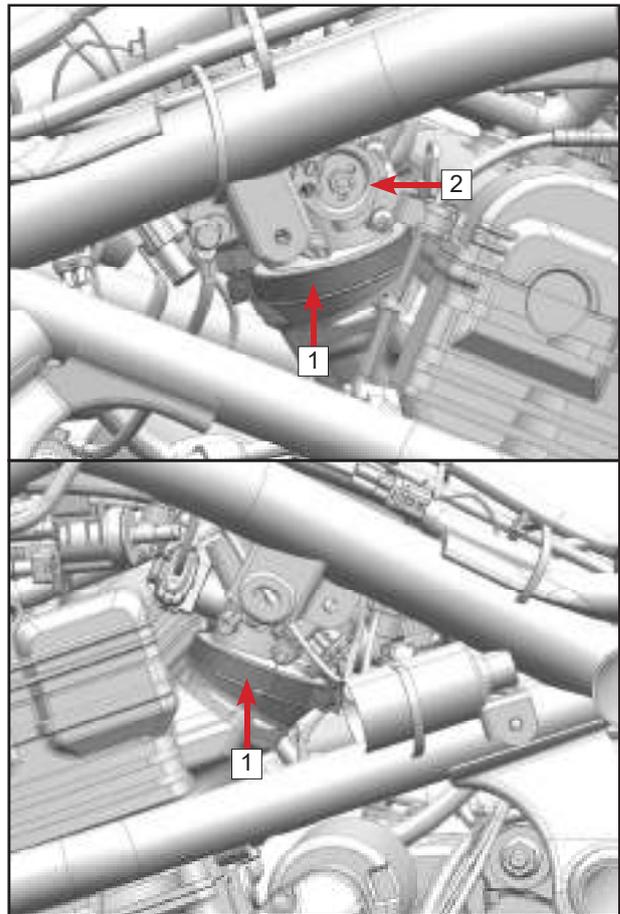
Remove fuel vapor hose **2** from throttle body.



Remove throttle cable **1** from throttle body.

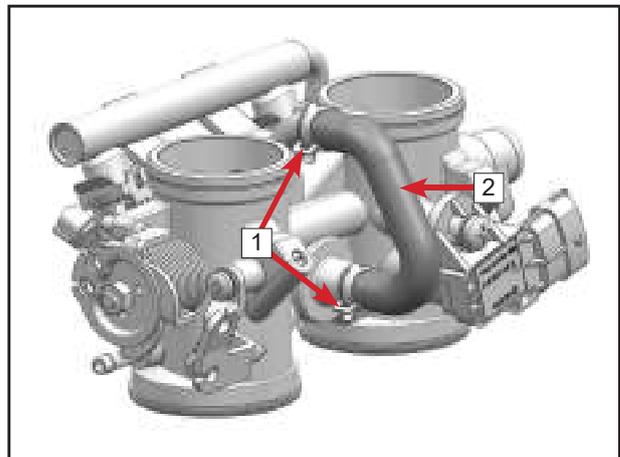


Loosen the clamp **1**.  
Remove throttle body assembly **2**.

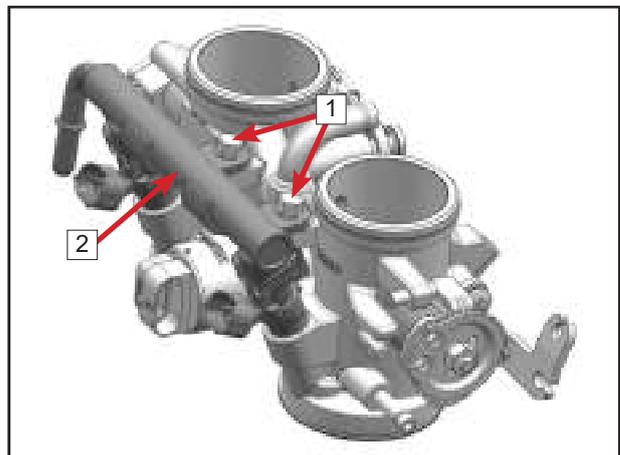


## 5.9.3.2 Throttle Body Assembly Disassembly

Loosen the clamp **1**.  
Remove air inlet hose **2**.

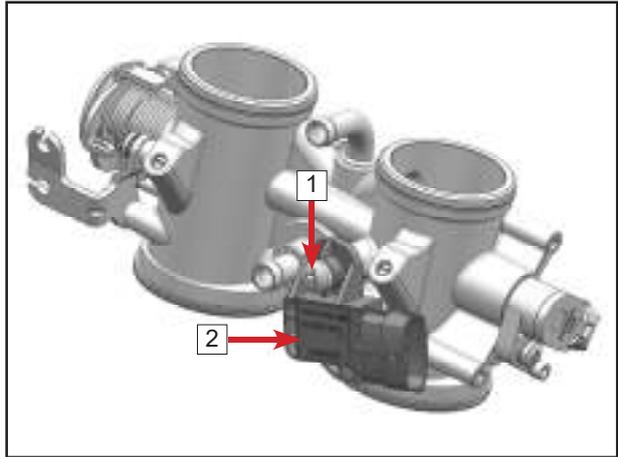


Remove bolts **1**.  
Remove fuel distribution pipe assembly **2**.

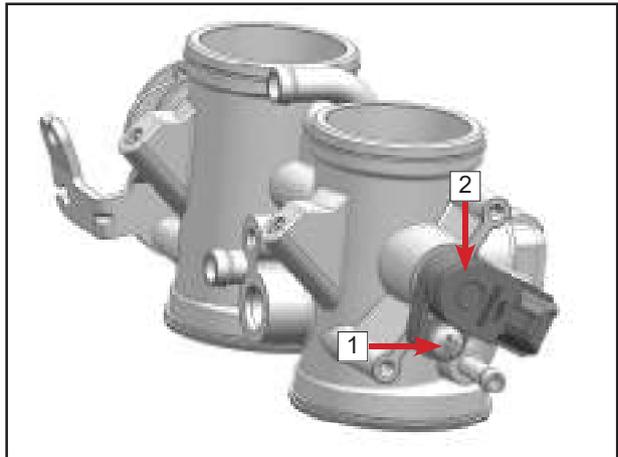


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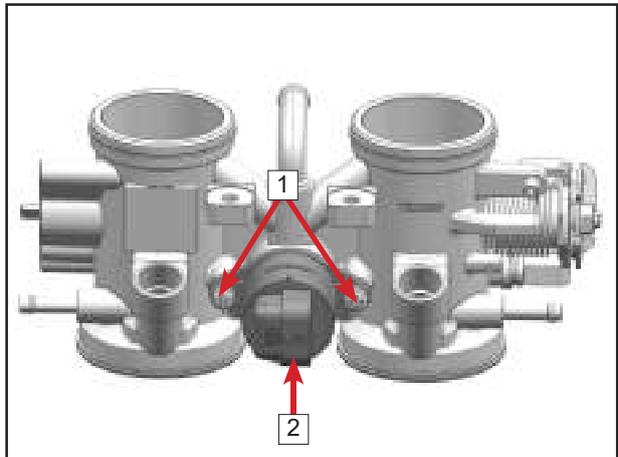
Remove screw **1**.  
Remove T-MAP **2**.



Remove screw **1**.  
Remove TPS **2**.



Remove screw **1**.  
Remove idle stepper motor **2**.

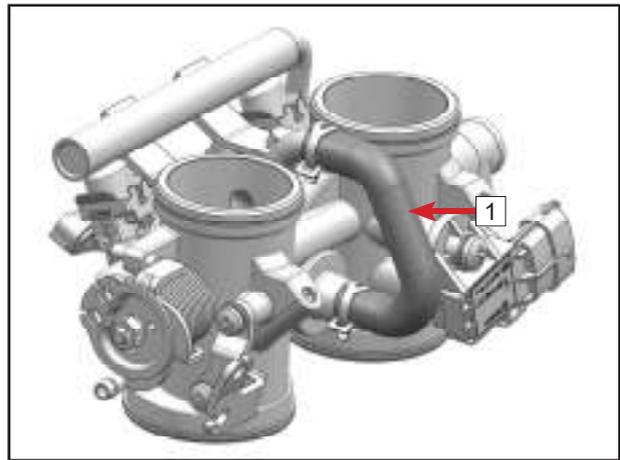


## 5.9.3.3 Throttle Body Assembly Inspection

Check throttle body for cracks or other damage. Replace if it does.

Check air inlet hose **1** for breakage or other damage. Replace if found.

The maintenance of idle stepper motor, TPS and T-MAP is detailed in the electrical chapter.



## Fuel Distribution Pipe Assembly Disassembly

Remove the circlip **1**.

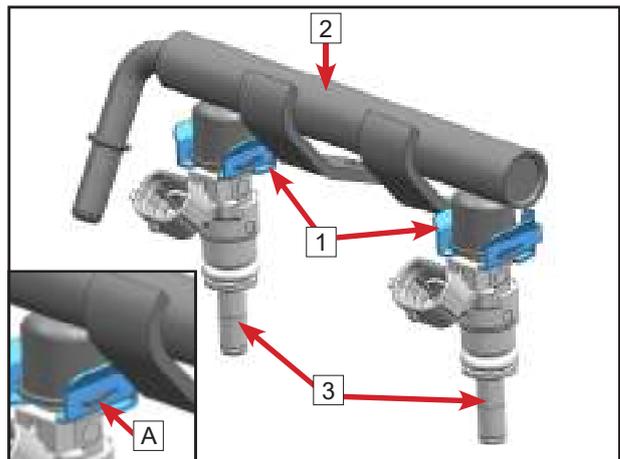
Separate fuel rail **2** and injector **3**.

The maintenance of injector see the electrical chapter.

### Assembly

Install fuel injector **3** on the fuel rail **2**, and then install circlip **1**.

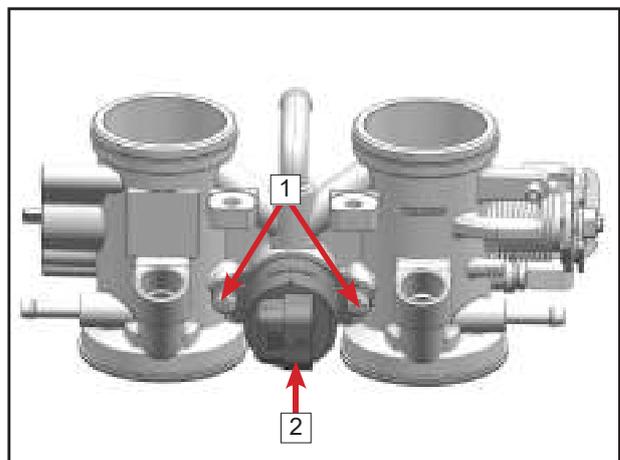
The boss **A** of injector cap must be clamped into the groove of the circlip **1**.



## 5.9.3.4 Throttle Body Assembly Assembly

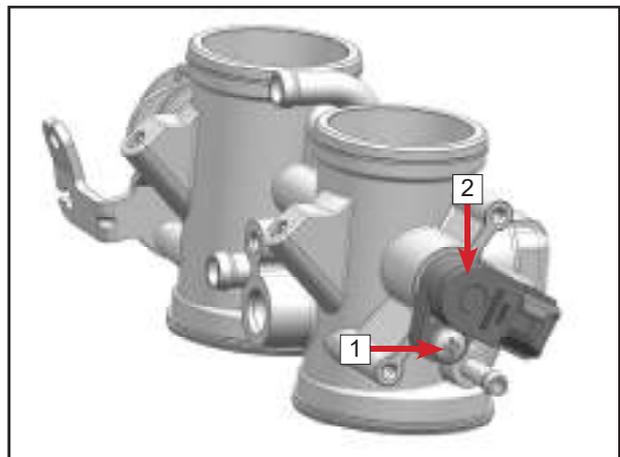
Install idle stepper motor **2**.

Install screws **1** (torque: 2 N•m~3 N•m).



Install TPS **2**.

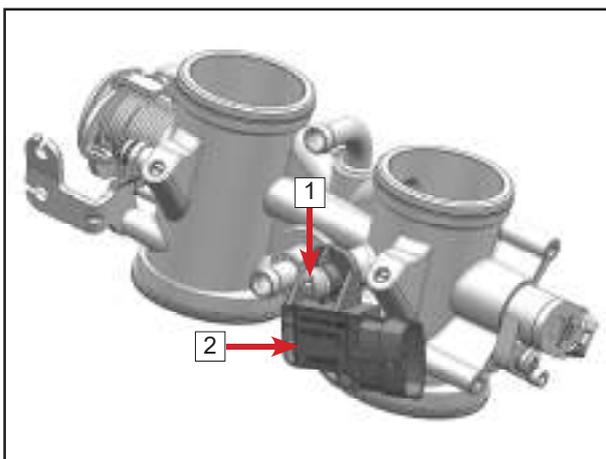
Install screw **1** (torque: 3 N•m~4 N•m).



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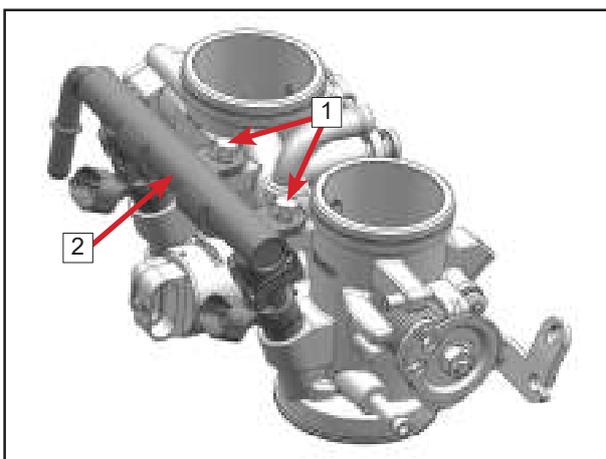
Install T-MAP 2.

Install screw 1 (torque: 3.5 N•m~4.5 N•m).

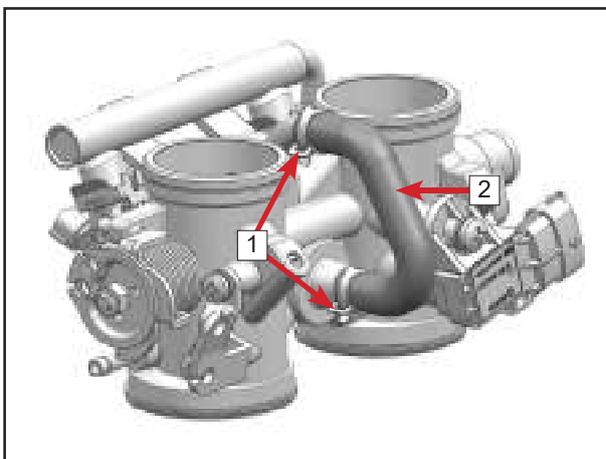


Install fuel distribution pipe assembly 2.

Install bolts 1 (torque: 10 N•m).

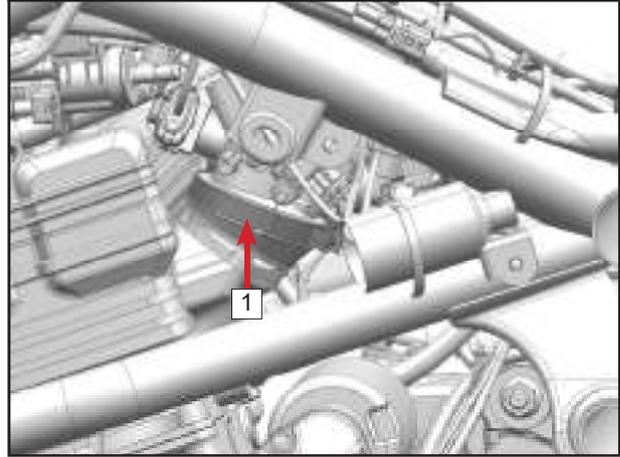
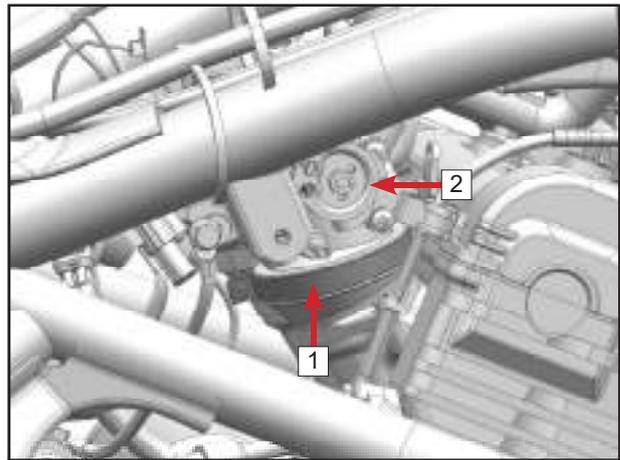


Install air inlet hose 2 onto throttle body.  
Tighten the clamp 1.

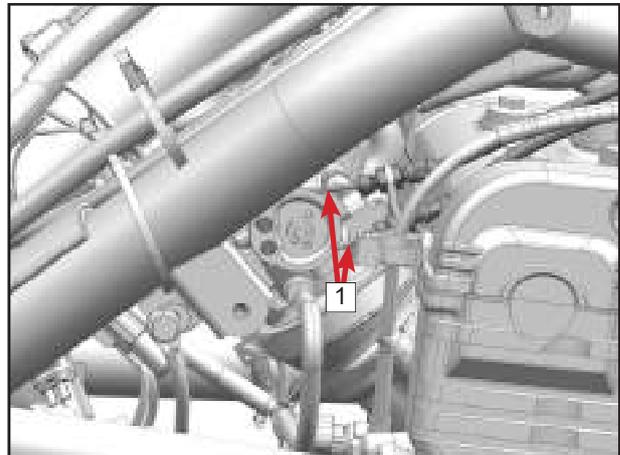


### 5.9.3.5 Throttle Body Assembly Installation

Install the clamp **1** on the air intake pipe.  
Install throttle body assembly **2**.  
Tighten the clamp **1**.



Install throttle cable **1** on the throttle body.

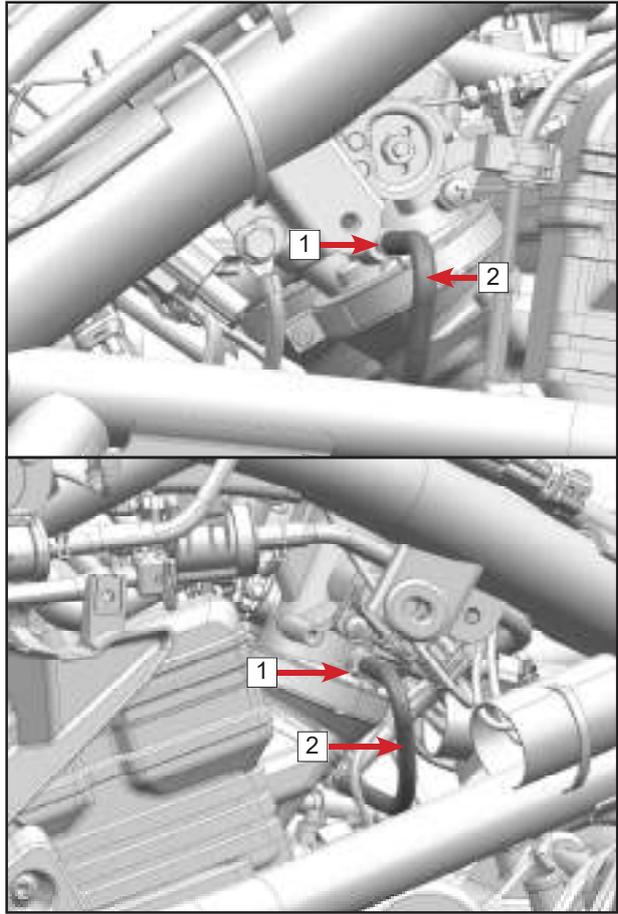


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Install fuel vapor hose 2 [2] onto throttle body.

Tighten the clamp 1 [1].



Plug in the stepper motor connector.

Plug in TPS connector.

Plug in T-MAP connector.

Plug in fuel injector connector.

Install air filter housing assembly and other removed parts. (Refer to “Air Filter Housing Assembly” section).

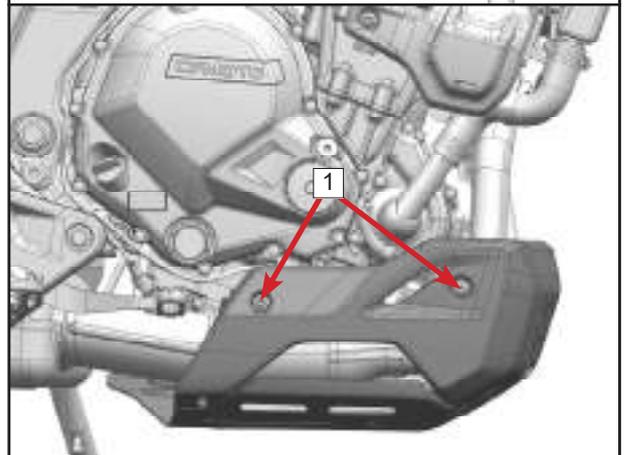
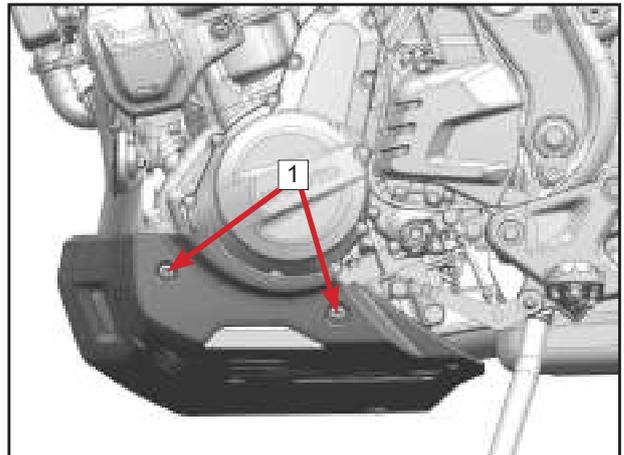
## 5.10 Exhaust System

### 5.10.1 Removal

**⚠ WARNING: Do not touch exhaust system parts immediately after the engine has been running.**

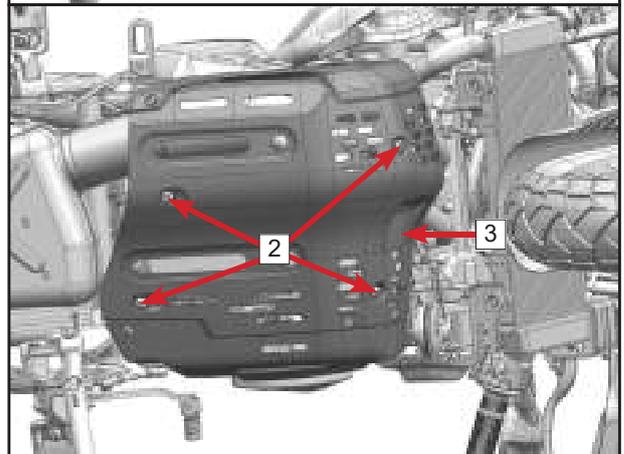
Remove relevant vehicle body panels.  
(Refer to Engine Removal chapter)

Remove screws **1**.



Remove screws **2**.

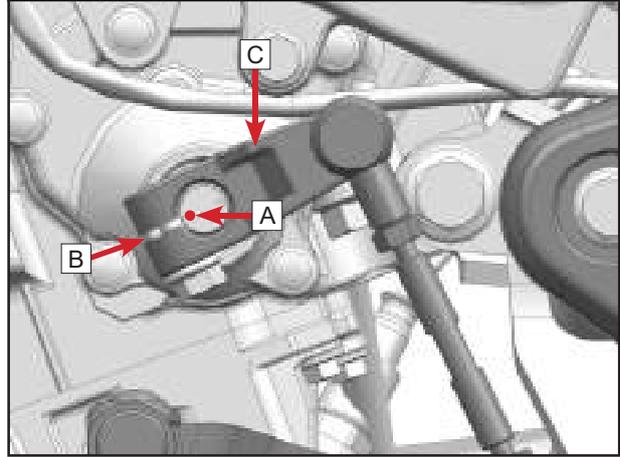
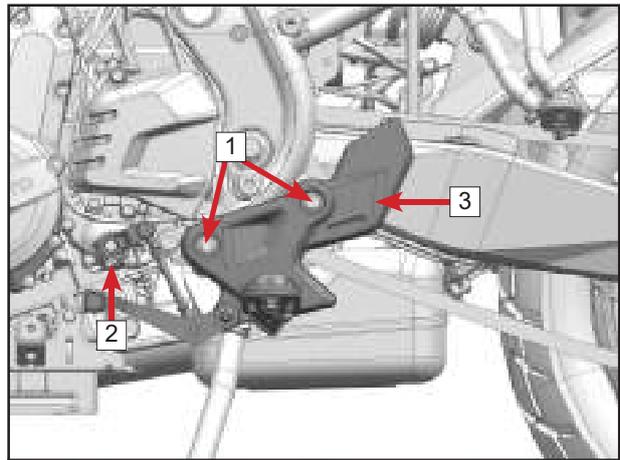
Remove engine panel assembly **3**.



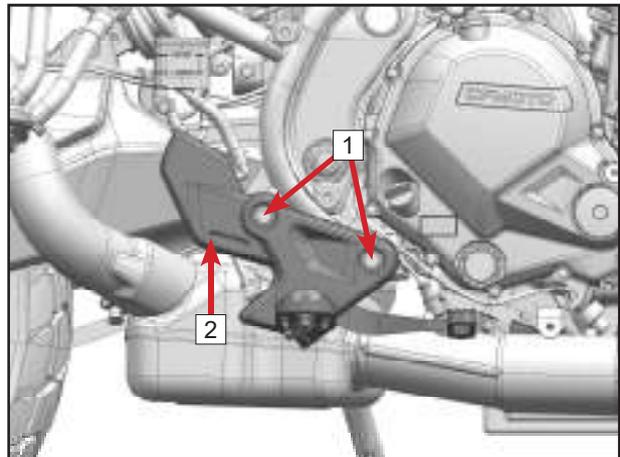
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Remove bolts **1**.  
Remove bolt **2**.  
Remove front LH footrest bracket assembly **3**.

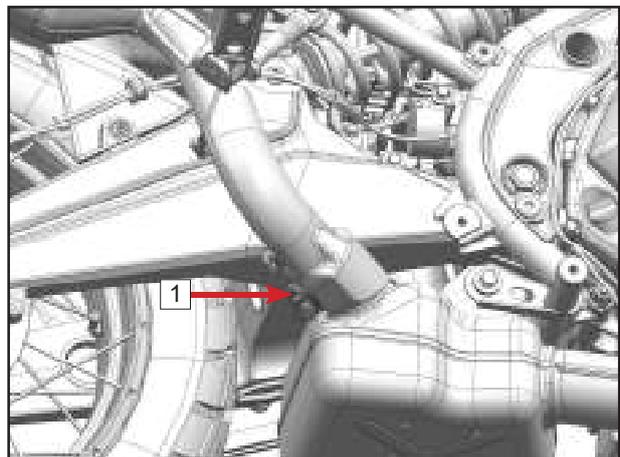
**NOTE:** Before removal, mark **A** the gearshift shaft and align the mark **A** with the notch **B** of the swing arm **C** so that it can be put back in place when reassembling.



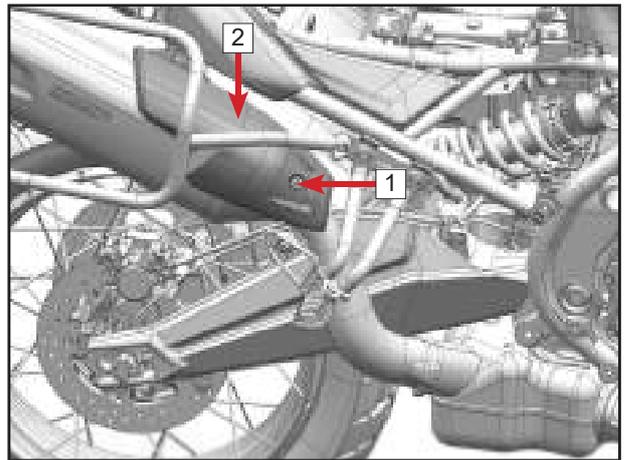
Remove bolts **1**.  
Remove front RH footrest bracket assembly **2**.



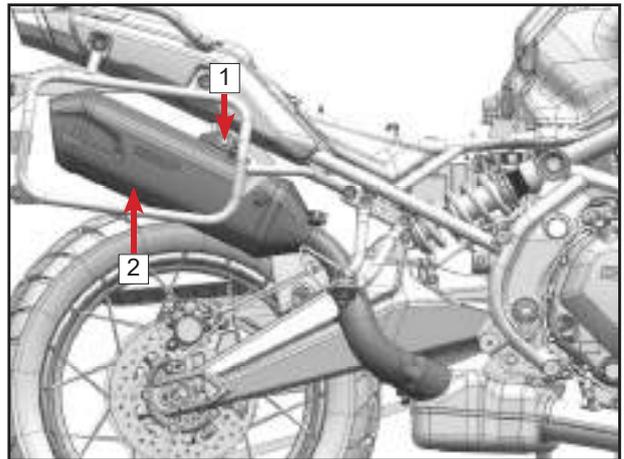
Release the clamp **1**.



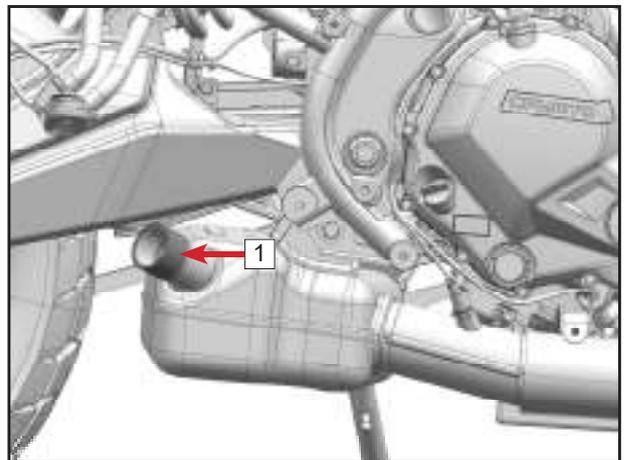
Remove screw **1**.  
Remove muffler guard **2**.



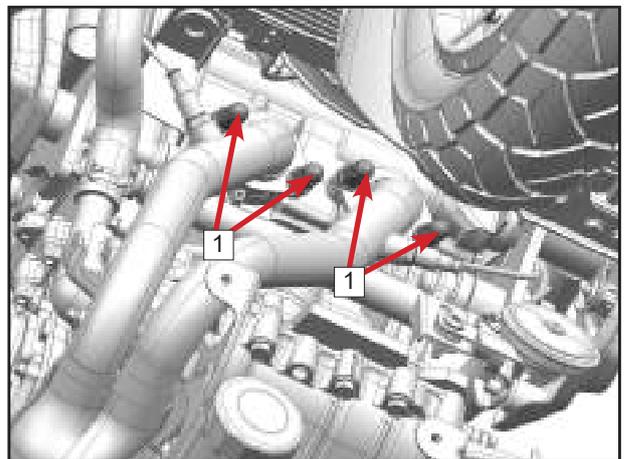
Remove bolt **1**, washer and nut.  
Remove muffler body assembly **2**.



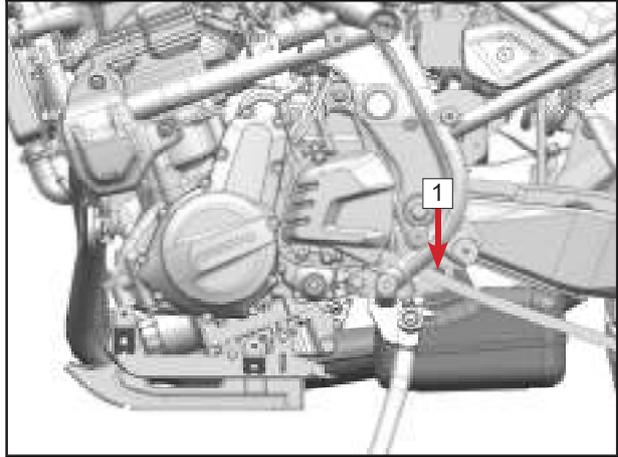
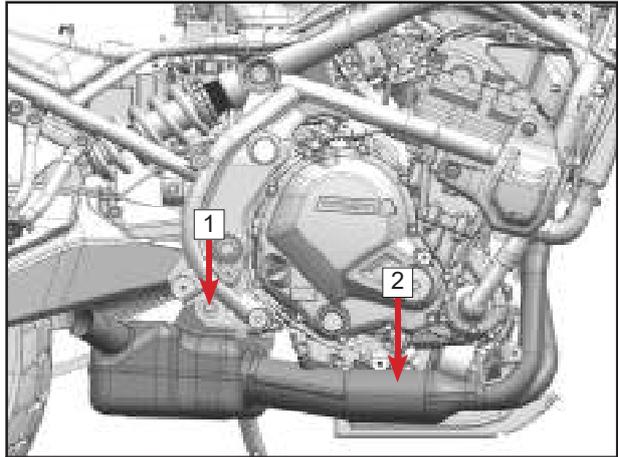
Remove graphite seal sleeve **1**.



Disconnect oxygen sensor connector.  
Remove muffler joint nuts **1**.

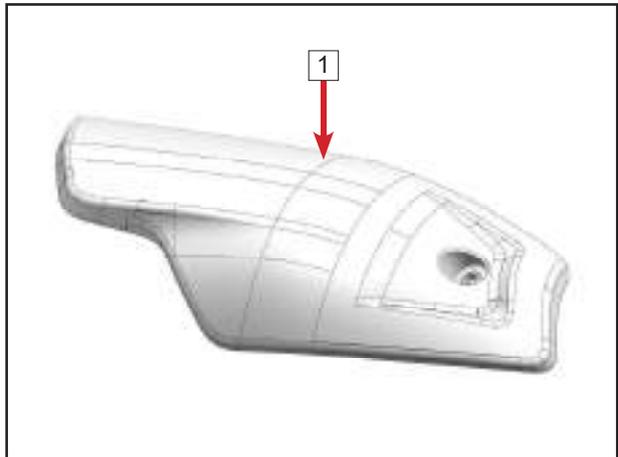


Remove bolts **1**.  
Remove exhaust muffler assembly **2** and  
exhaust gasket.

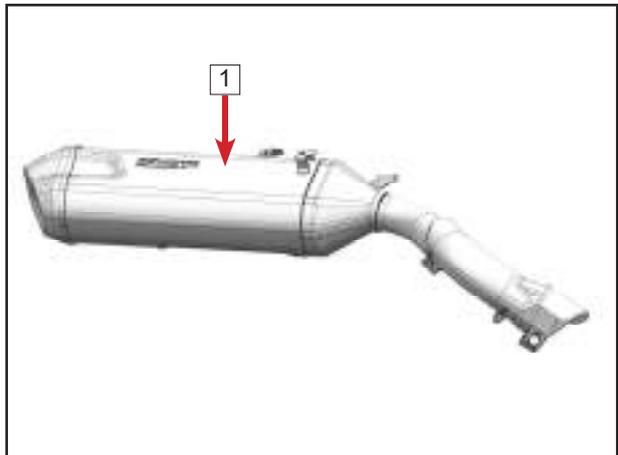


### 5.10.2 Inspection

Check the muffler guard **1** for cracks or  
other damage. Replace if necessary.



Check the muffler body assembly **1**  
for cracks or other damage. Replace if  
necessary.



Check the exhaust muffler assembly **1** for cracks or other damage. Replace if necessary.

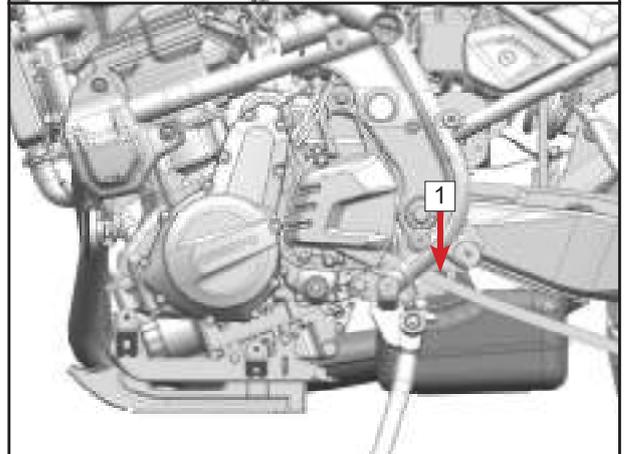
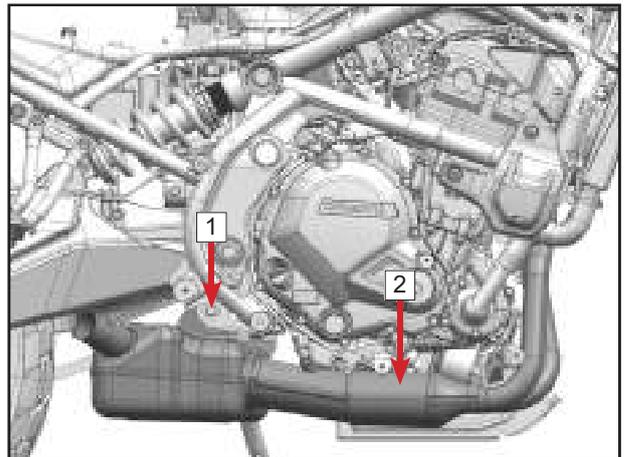


### 5.10.3 Installation

Ensure that the exhaust port gasket is installed. (If the exhaust port gasket is deteriorated or broken, replace it)

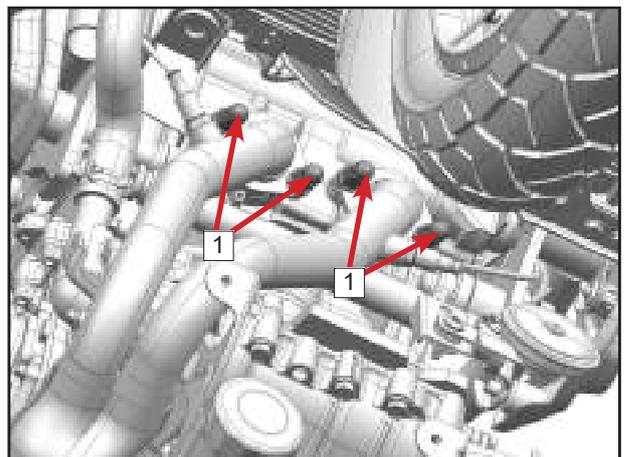
Place the exhaust muffler assembly **2** in place.

Install bolts **1**.



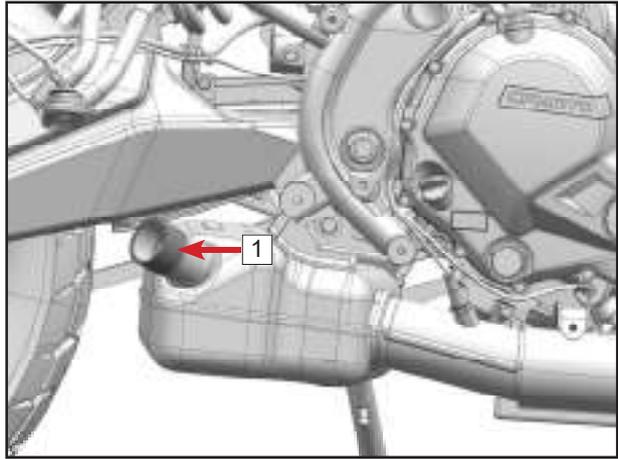
Install muffler joint nuts **1**.

Plug in oxygen sensor connector.

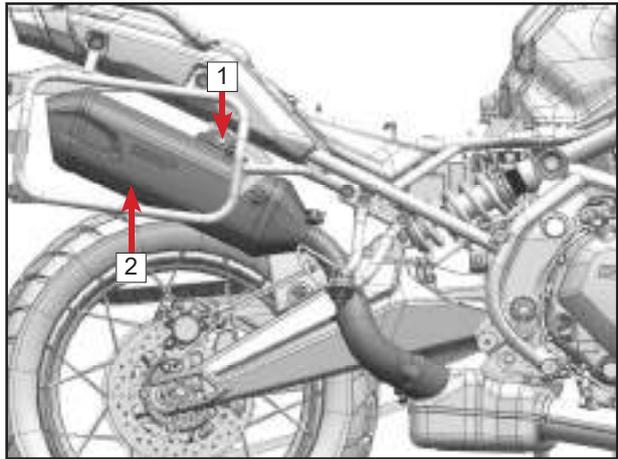


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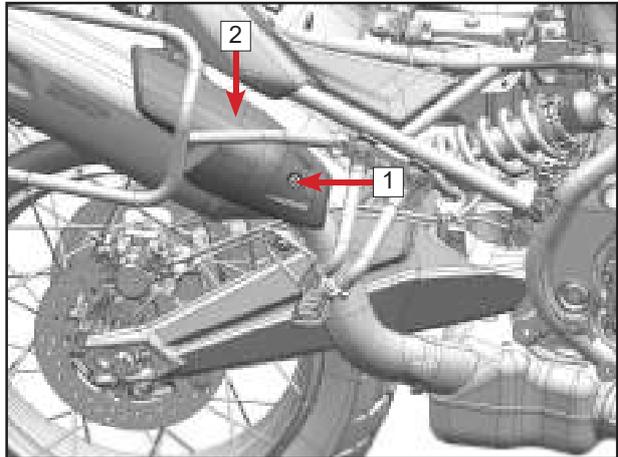
Install graphite seal sleeve **1**. (If the graphite seal sleeve is aged or damaged, replace)



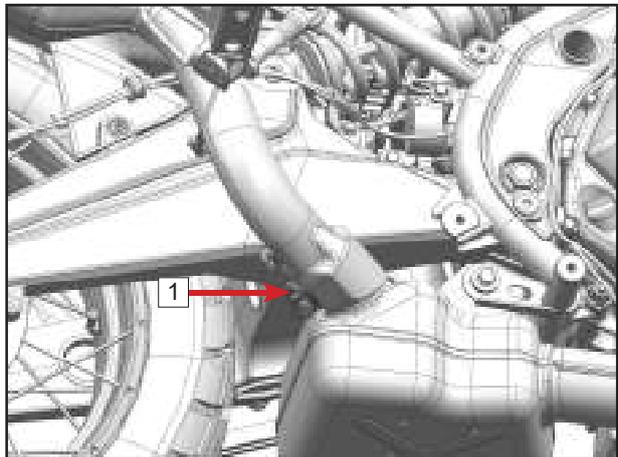
Install muffler body assembly **2**.  
Install bolt **1**, washer and nut.



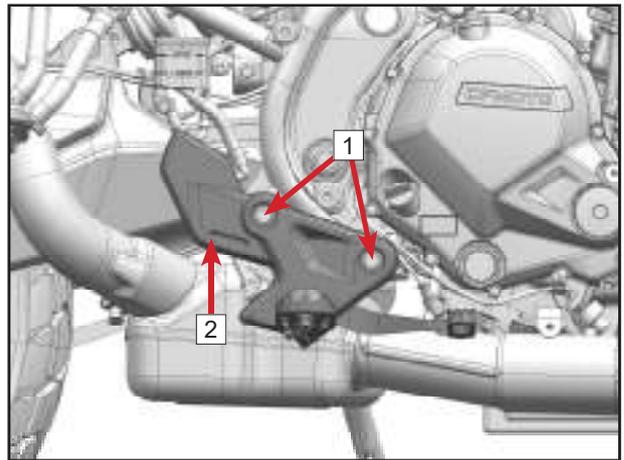
Install muffler guard **2** in place.  
Install screw **1**.



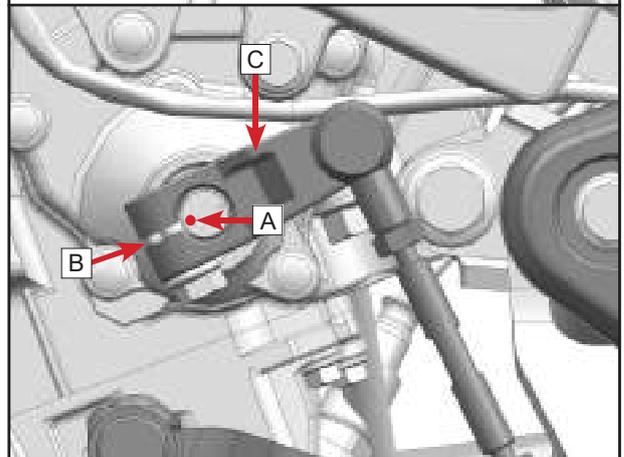
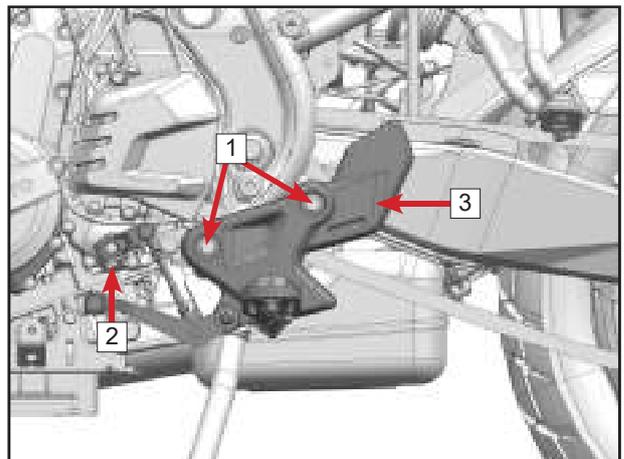
Tighten clamp **1**.



Install front RH footrest bracket assembly **2** in place.  
Install bolts **1**.

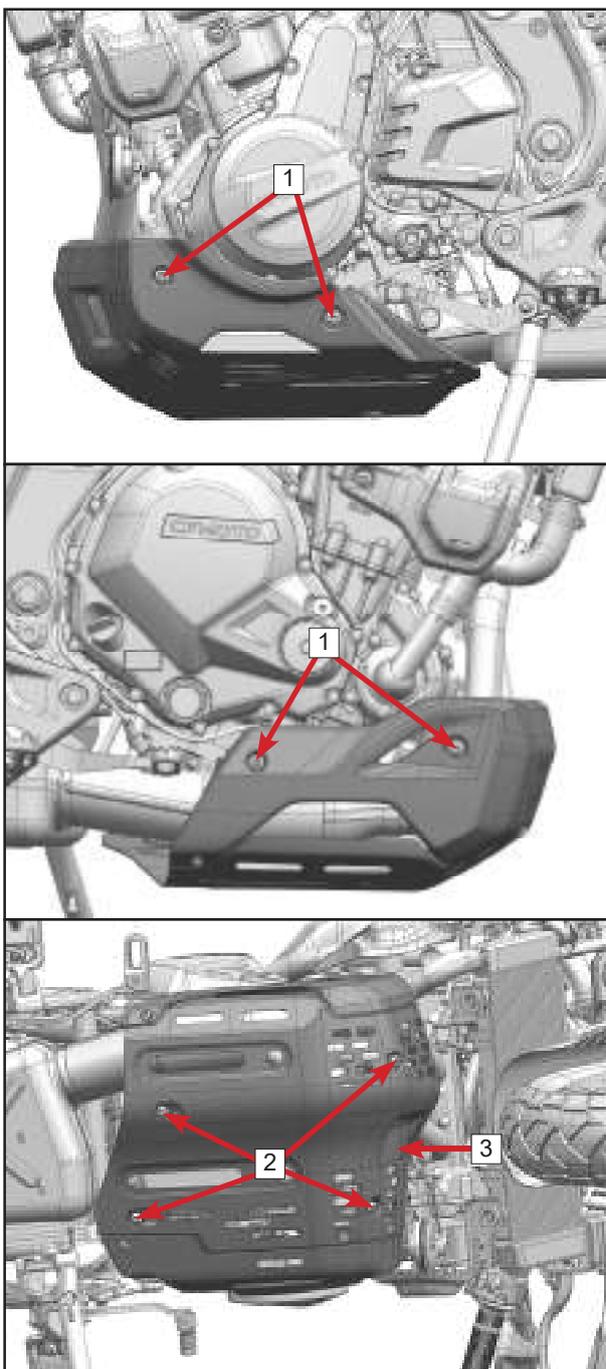


Install front LH footrest bracket assembly **3** in place.  
Align the mark **A** made on the shift shaft during disassembly with the notch **B** of the swing arm **C**.  
Install bolt **2** and bolts **1**.



# CFMOTO

Install engine panel assembly **3** in place.  
Install screws **1** and screws **2**.



Install other removed parts. (Please refer to the relevant chapters)

## 06 Body Panels and Frame

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### 6.1 Preparation Before Maintenance

**NOTE:** In this chapter, disassemble the vehicle in a standard complete disassembly sequence. Note the following:

1. Some parts can be disassembled independently without following the sequence in this chapter.
2. Some parts can be maintained without all disassembly or operation in this order.
3. No further disassembly is required for some simple sub-assembly parts.
4. With the update of the vehicle, the structure of some parts will change. The contents of this manual are based on the vehicle structure at the time of preparation.
5. The disassembly of some parts is attached to the nearby parts chapter rather than a separate chapter. For example: The seat lock is attached to the chapter “LH&RH Panel”.

Turn off the vehicle completely.

Park on the solid and level ground/ use motorcycle wheel brace to secure the vehicle/ use professional vehicle bracket to secure.

### 6.2 Seat Removal

Place the vehicle on the level ground and park it.

Completely turn off the vehicle engine and power supply.

Insert the key **1** into the seat lock **2**, turn the lock clockwise to unlock the rear seat.

Remove rear seat **3**.

Remove bolts **4**.

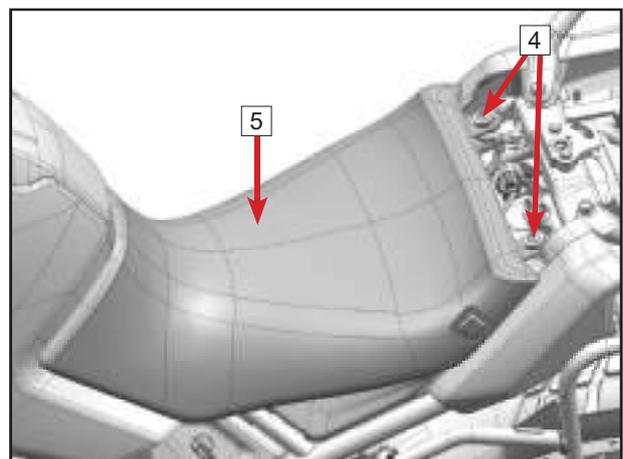
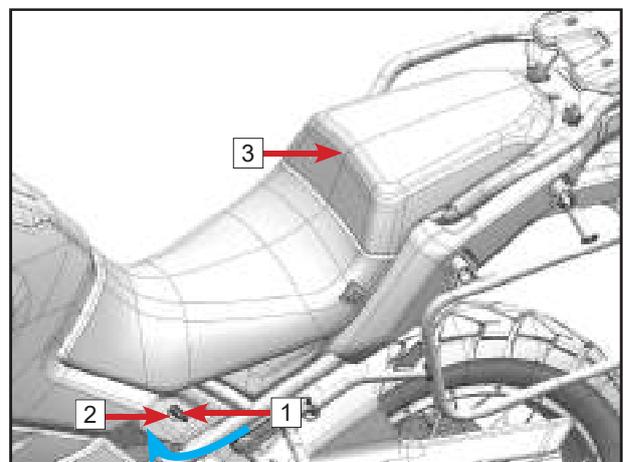
Remove front seat assembly **5**.

### Installation

Reverse the removal procedures for installation.

#### NOTE

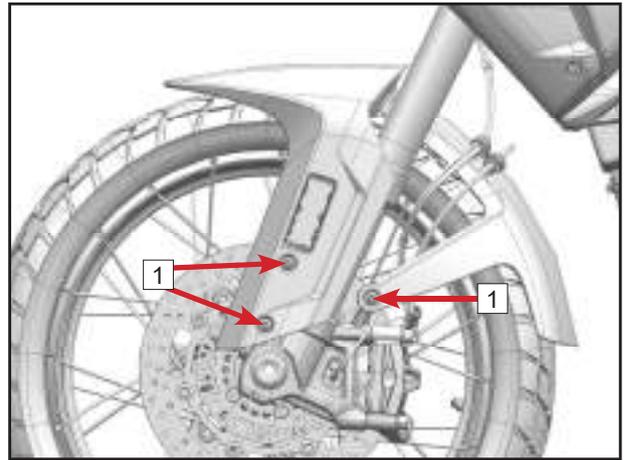
If the seat is not assembled normally, it may be loosened. Pull up the seat to check if the seat cushion is locked normally.



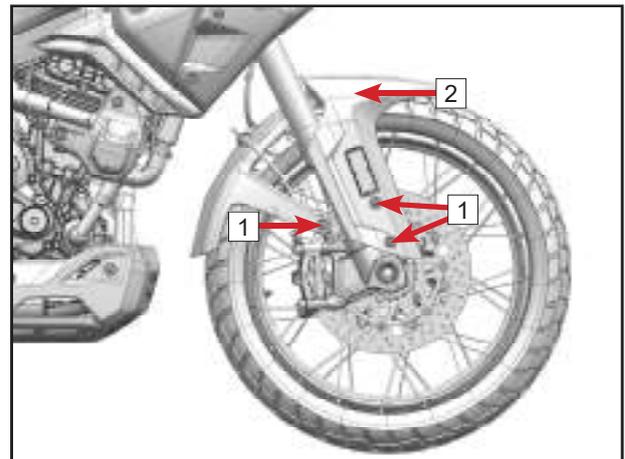
## 6.3 Front Fender

### Removal

Remove three bolts **1** from each side.



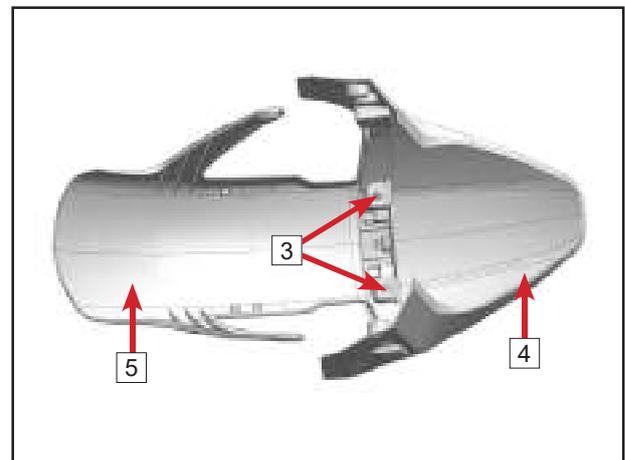
Remove front fender assembly **2**.



Remove two step screws **3**.

Remove the front part **4** of front fender.

Remove the rear part **5** of front fender.



### Installation

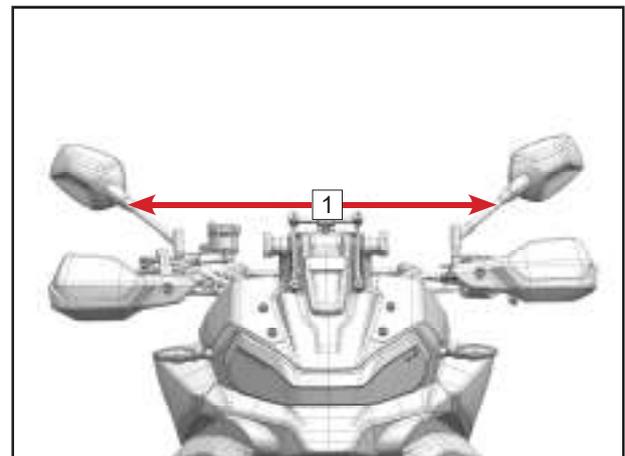
Reverse the removal procedures for installation.

## 6.4 Handlebar Guard

### Removal

Rotate to remove the two rearview mirrors **1**.

**1**.

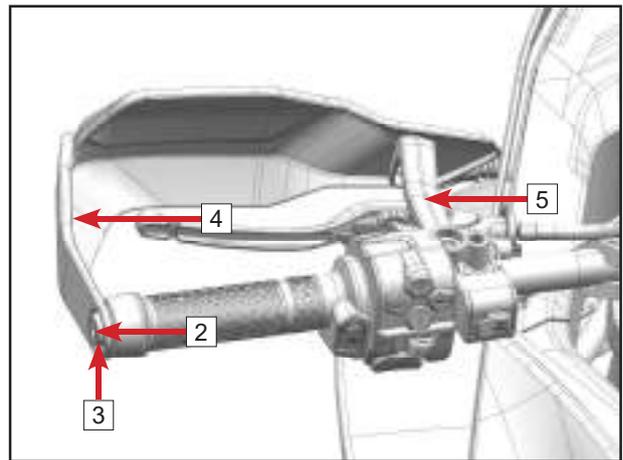


Remove screw [2].  
Remove glove bushing [3].  
Remove LH hand guard [4] and [5] assembly.

### Installation

Reverse the removal procedures for installation.

The RH hand guard is assembled and disassembled in the same way as the LH hand guard.



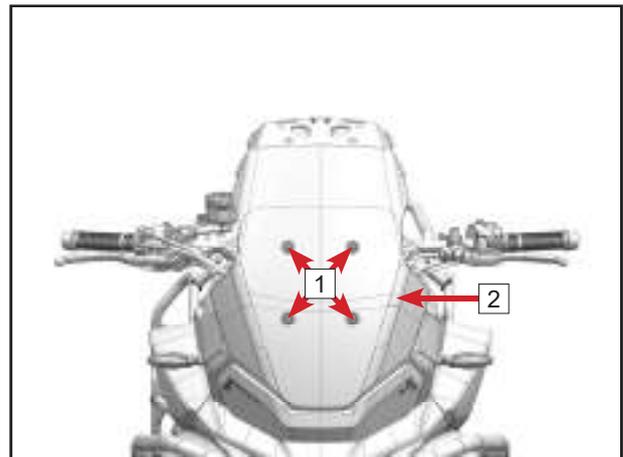
### 6.5 Windshield Removal

#### Removal

Remove inner hex bolts [1].  
Remove windshield [2].

#### Installation

Reverse the removal procedures for installation.



### 6.6 LH Deflector

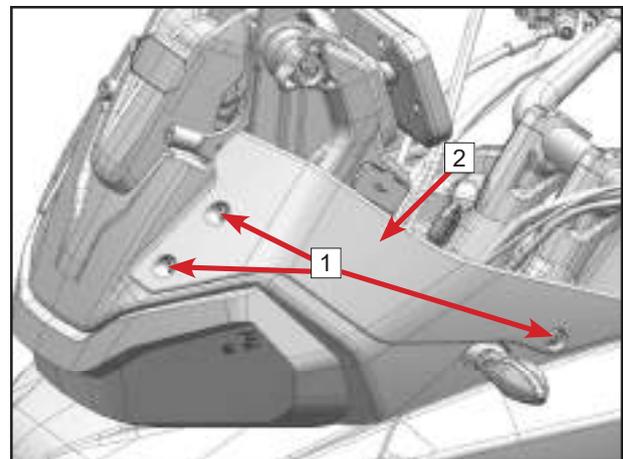
#### Removal

Remove three screws [1].  
Remove LH deflector [2].

#### Installation

Reverse the removal procedures for installation.

The RH deflector is assembled and disassembled in the same way as the LH deflector.



### 6.7 Dashboard Front Guard

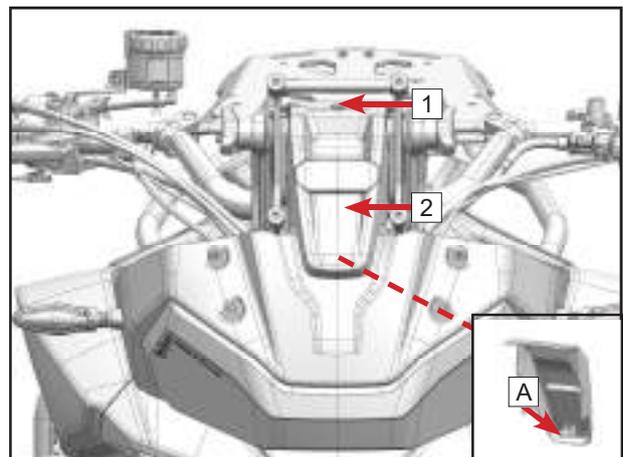
#### Removal

Remove expansion screw [1].  
Remove dashboard front guard [2].

NOTE
The buckle [A] should be prevented from breaking during disassembly.

#### Installation

Reverse the removal procedures for installation.



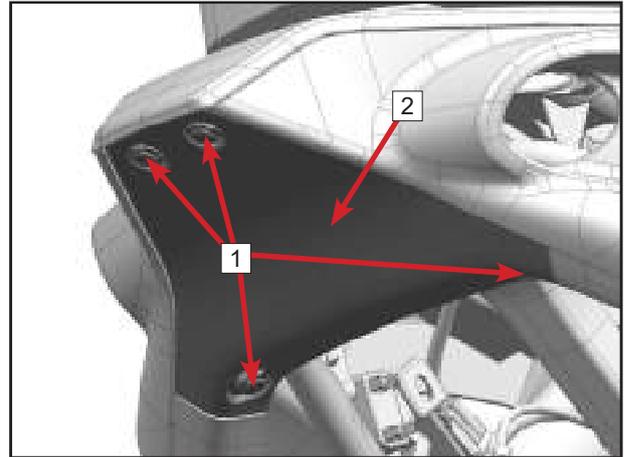
## 6.8 Front Lower Panel

### Removal

Remove four screws [1].  
Remove front lower panel [2].

### Installation

Reverse the removal procedures for installation.



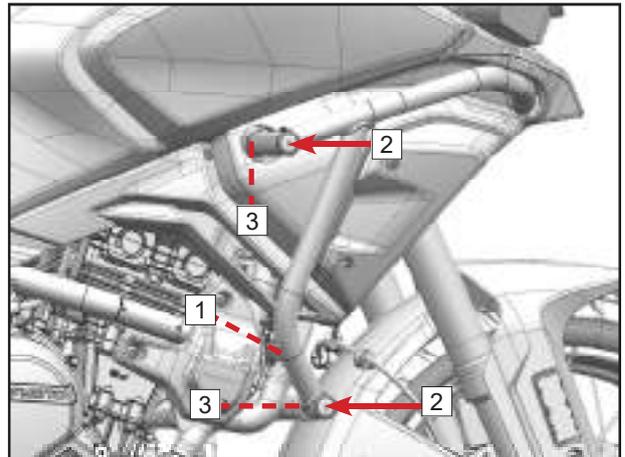
## 6.9 Bumper

### Pre-work

Remove front lower panel. (see this chapter for details)

### Removal

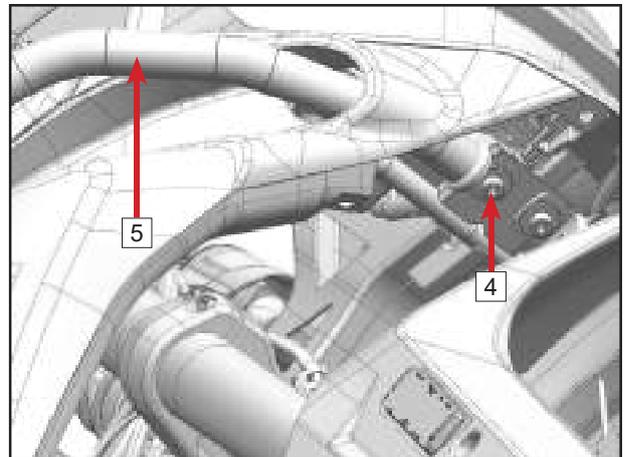
Remove one screw [1].  
Remove two bumper deco cover [2].  
Remove two screws [3].



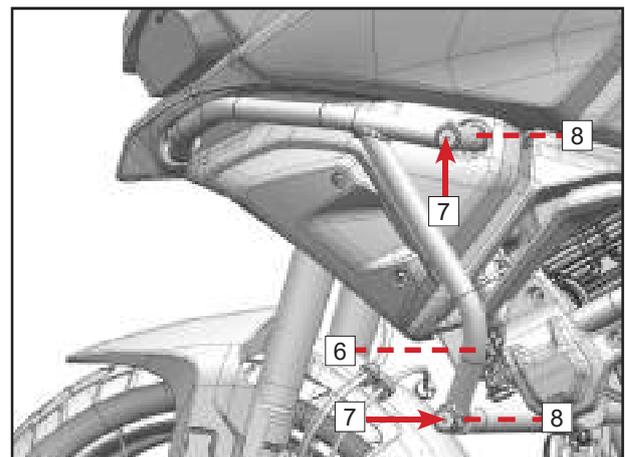
Remove bolt [4].  
Remove RH bumper [5].

### NOTE

When disassembling, the bumper should be prevented from falling and damaging.



Remove one bolt [6].  
Remove two bumper deco covers [7].  
Remove two bolts [8].

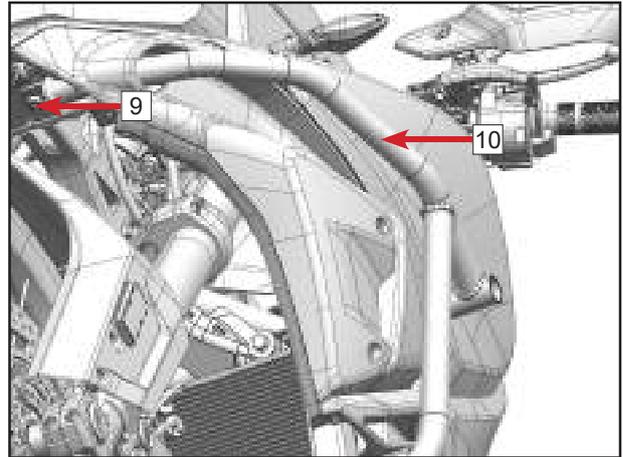


Remove bolt [9].

Remove LH bumper [10].

**NOTE**

When disassembling, the bumper should be prevented from falling and damaging.



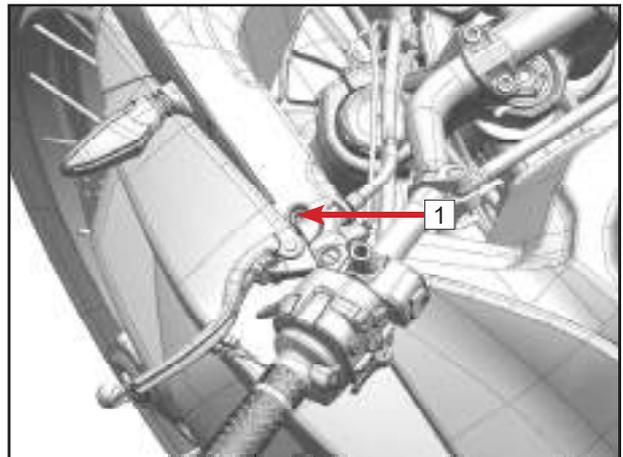
**Installation**

Reverse the removal procedures for installation.

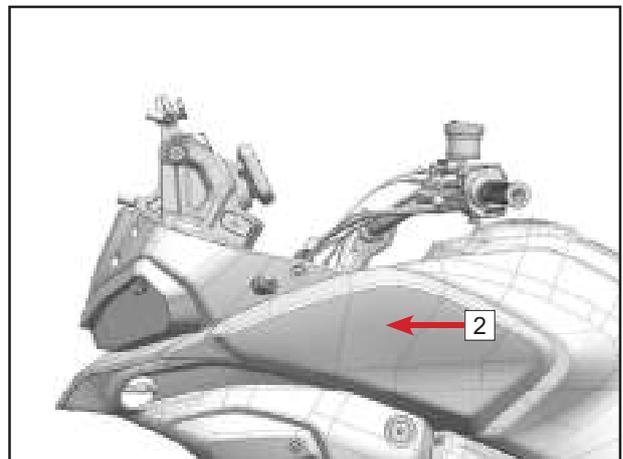
## 6.10 Fuel Tank Front LH Panel

**Removal**

Remove screw [1].



Remove fuel tank front LH panel [2].



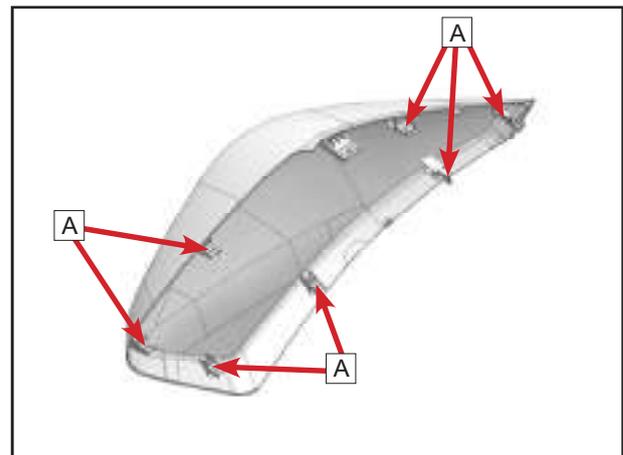
**NOTE**

The buckle [A] should be prevented from breaking during disassembly.

**Installation**

Reverse the removal procedures for installation.

The fuel tank front RH panel is assembled and disassembled in the same way as the fuel tank front LH panel.



## 6.11 Radiator LH Deco Guard

### Pre-work

Remove shock absorber adjusting port. (See this chapter for details)

### Removal

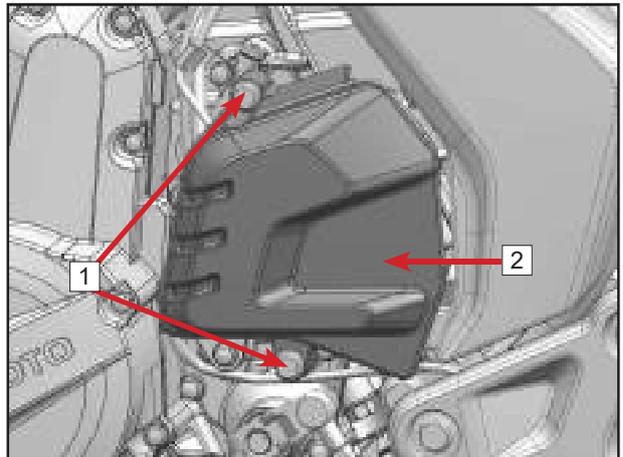
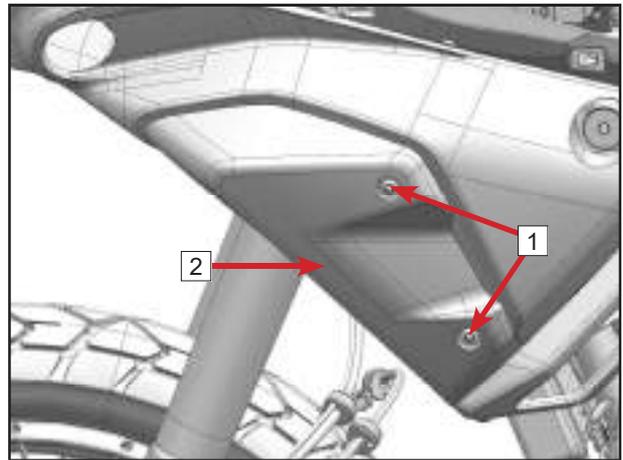
Remove two screws [1].

Remove radiator LH deco guard [2].

### Installation

Reverse the removal procedures for installation.

The radiator RH deco guard is assembled and disassembled in the same way as the radiator LH deco guard.



## 6.12 Small Sprocket Guard

### Removal

Remove two bolts [1].

Remove small sprocket guard [2].

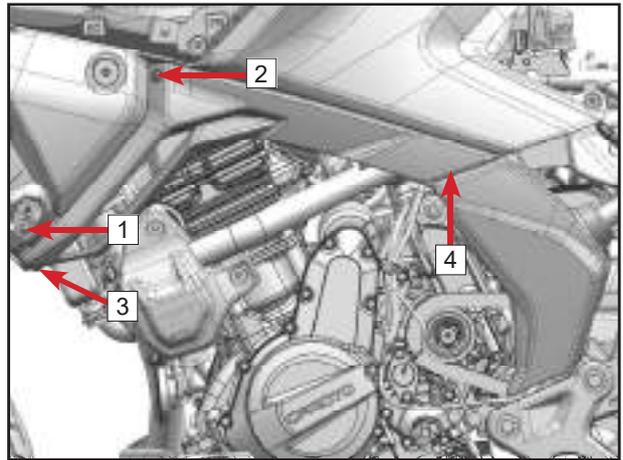
### Installation

Reverse the removal procedures for installation.

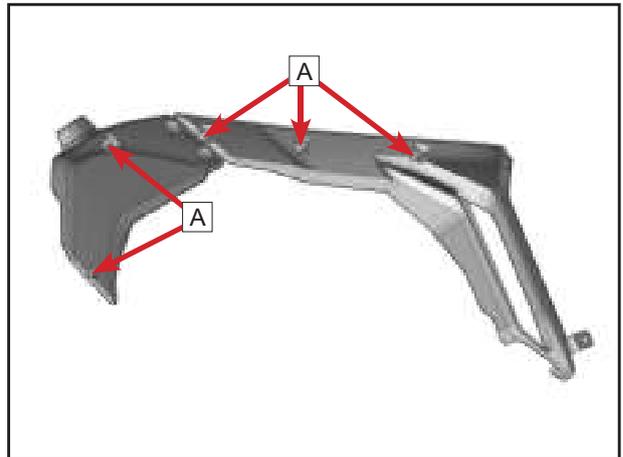
### 6.13 Radiator Rear LH Panel Assembly

#### Removal

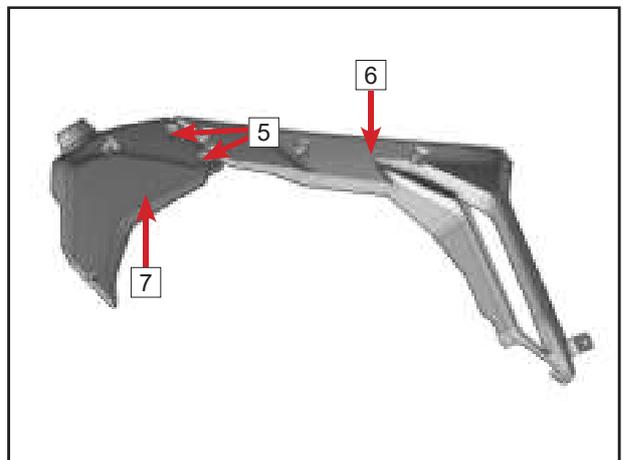
- Remove one self-tapping screw [1].
- Remove one plastic expansion screw [2].
- Remove one screw [3].
- Remove radiator rear LH panel and frame LH panel assembly [4].



NOTE
The buckle [A] should be prevented from breaking during disassembly.



- Remove two self-tapping screws [5].
- Remove radiator rear LH panel [6].
- Remove frame LH panel [7].



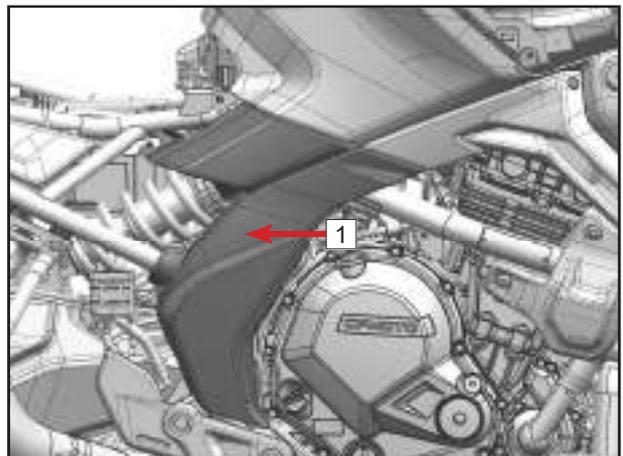
#### Installation

Reverse the removal procedures for installation.

### 6.14 Frame RH Panel and Shock Absorber Adjustment Port Assembly

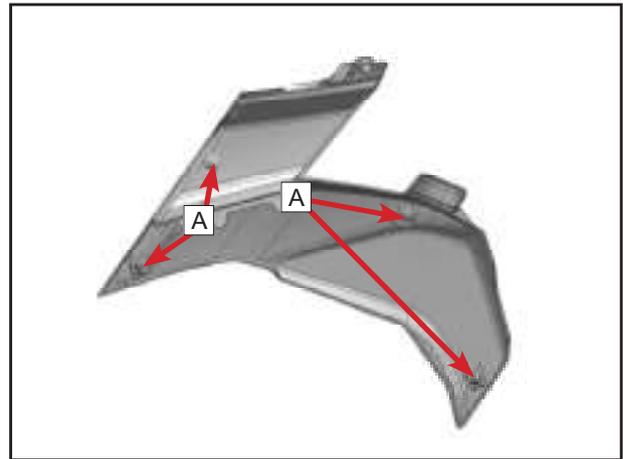
#### Removal

- Remove frame RH panel and shock absorber adjustment port assembly [1].

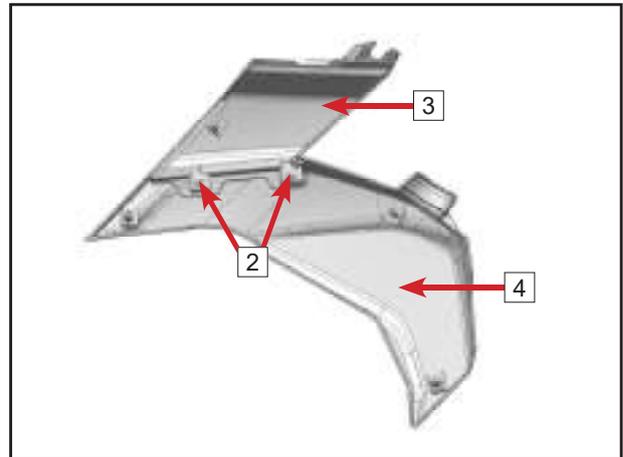


## NOTE

The buckle [A] should be prevented from breaking during disassembly.



- Remove two self-tapping screws [2].
- Remove radiator RH panel [4].
- Remove shock absorber adjustment port [3].



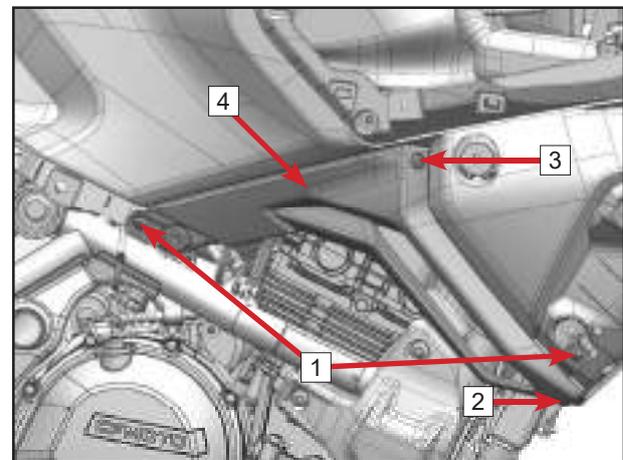
## Installation

Reverse the removal procedures for installation.

## 6.15 Radiator Rear RH Panel Assembly

### Removal

- Remove two self-tapping screws [1].
- Remove one expansion screw [3].
- Remove one screw [2].
- Remove radiator rear RH panel [4].



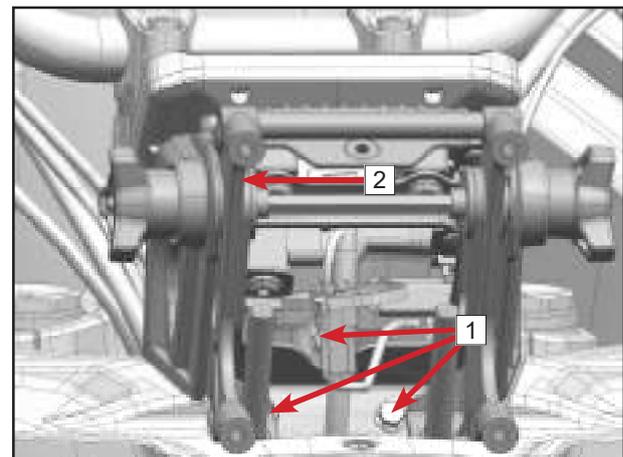
## Installation

Reverse the removal procedures for installation.

## 6.16 Adjustable Windshield Bracket Assembly

### Removal

- Remove three bolts [1].
- Remove the adjustable windshield bracket assembly [2].



## 6.17 Dashboard

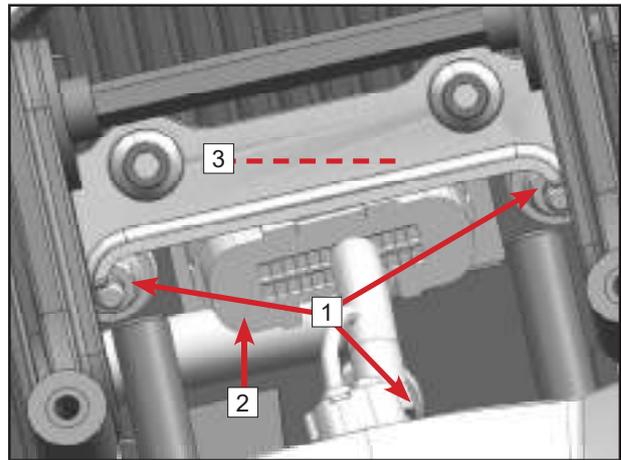
### Removal

Remove three bolts [1].  
Remove the connector [2].

Remove dashboard [3].

### Installation

Reverse the removal procedures for installation.



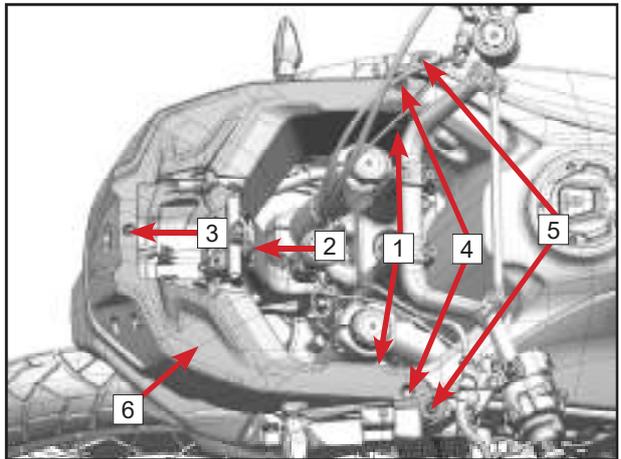
## 6.18 Front Upper Guard

### Removal

Remove two expansion screw [1].  
Remove one inner hex screw [2].  
Remove one self-tapping screw [3].  
Remove two stepped screws [4].  
Remove two self-tapping screws [5].  
Remove front upper guard [6].

### Installation

Reverse the removal procedures for installation.

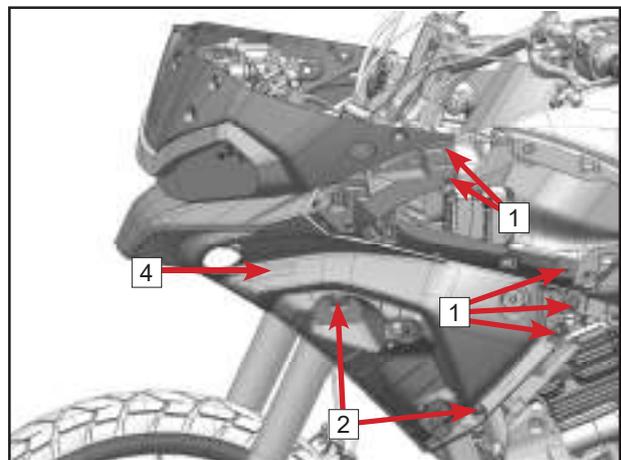


## 6.19 Headlight Deco Guard Assembly

### 6.19.1 Headlight Deco Guard Assembly

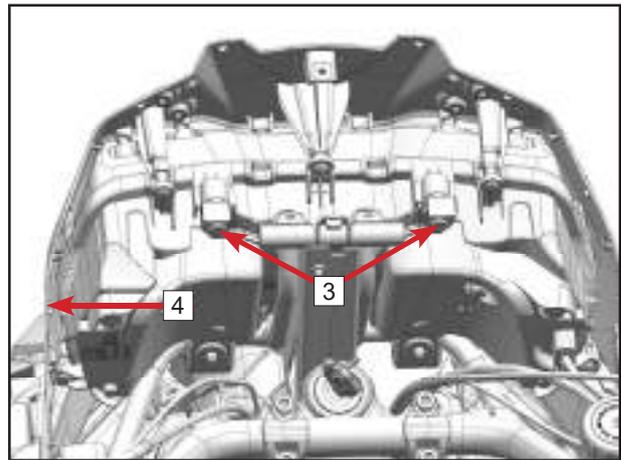
#### Removal

Remove five self-tapping screws [1] from each side.  
Remove two inner hex screws [2] from each side.



Remove two bolts [3].

Remove headlight deco guard assembly [4].



### Installation

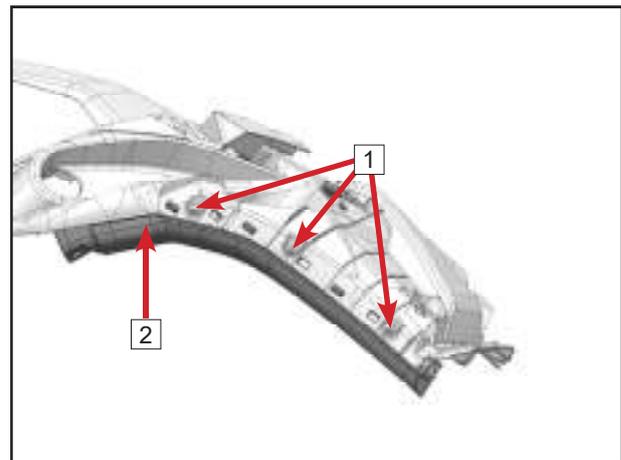
Reverse the removal procedures for installation.

### 6.19.2 Front LH Lower Panel

#### Removal

Remove three self-tapping screws [1].

Remove front LH lower panel [2].



### Installation

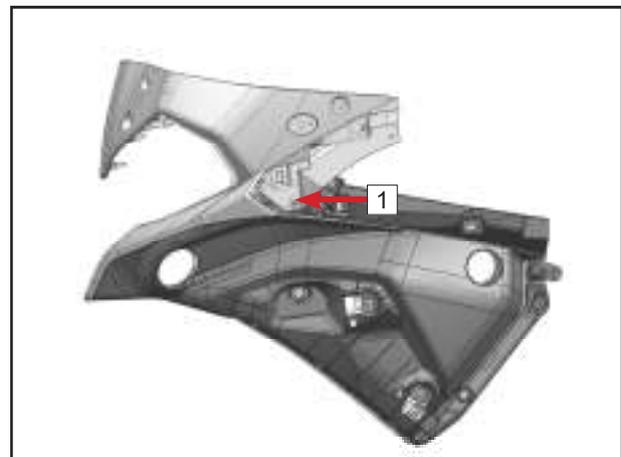
Reverse the removal procedures for installation.

The front RH lower panel is disassembled and assembled in the same way as the front LH lower panel.

### 6.19.3 Radiator LH Inner Panel

#### Removal

Remove four self-tapping screws [1].



Remove radiator LH inner panel [2].

### Installation

Reverse the removal procedures for installation.

The radiator RH inner panel is disassembled and assembled in the same way as the radiator LH inner panel.

### 6.19.4 Headlight Deco Guard

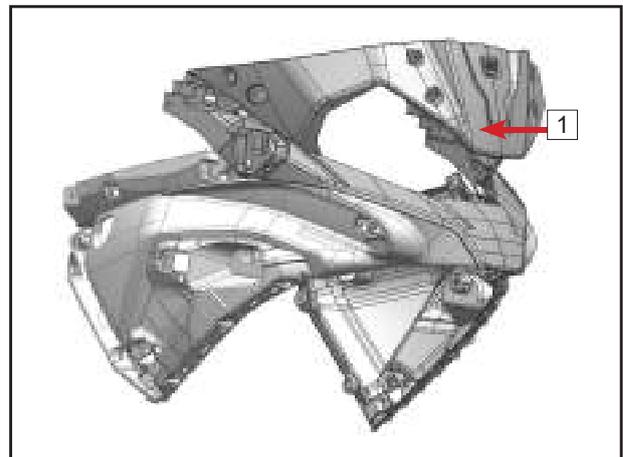
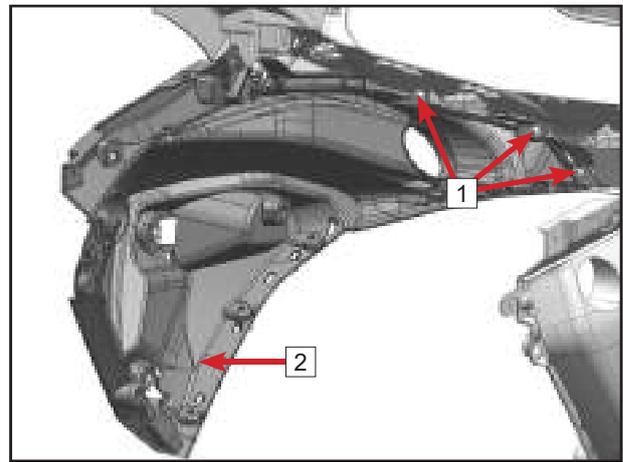
#### Removal

Separate the radiator LH inner panel and the radiator RH inner panel. (See this chapter for details)

Remove headlight deco guard [1].

#### Installation

Reverse the removal procedures for installation.



### 6.20 Headlight

#### Removal

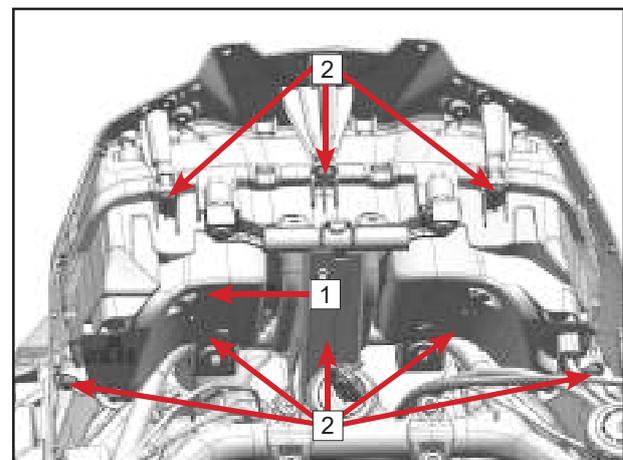
Remove headlight deco guard. (see this chapter for details)

Remove eight self-tapping screws [2].

Remove headlight [1].

#### Installation

Reverse the removal procedures for installation.



### 6.21 LH&RH Front Turn Light Assembly

#### Removal

Remove two nuts [1].

Disconnect the harness [2].

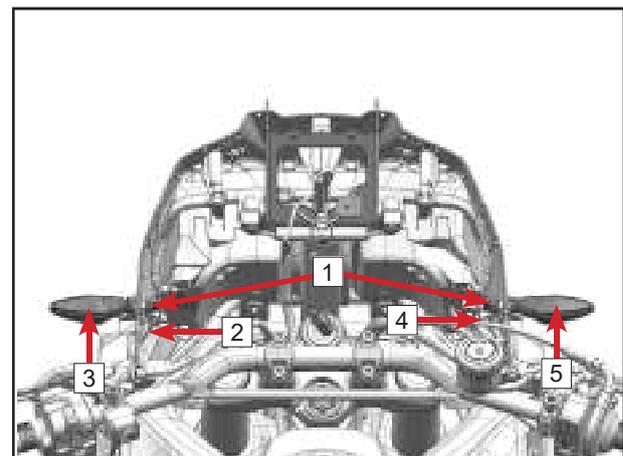
Disconnect the harness [4].

Remove front LH turn light [3].

Remove front RH turn light [5].

#### Installation

Reverse the removal procedures for installation.



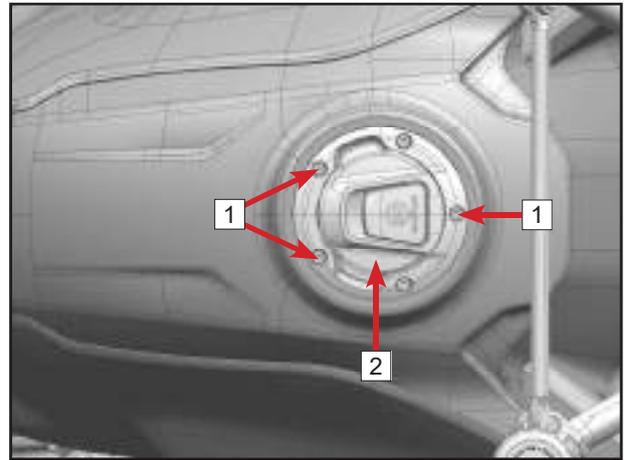
## 6.22 Fuel Tank Panel Assembly

### 6.22.1 Fuel Tank Panel Assembly

#### Removal

Remove three bolts [1].

Remove fuel tank cover [2].



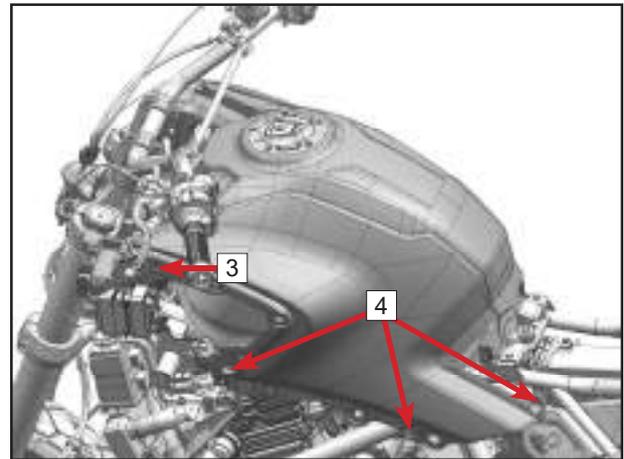
#### WARNING

When removing the bolt [1], care should be taken to prevent the bolt from falling into the fuel tank.

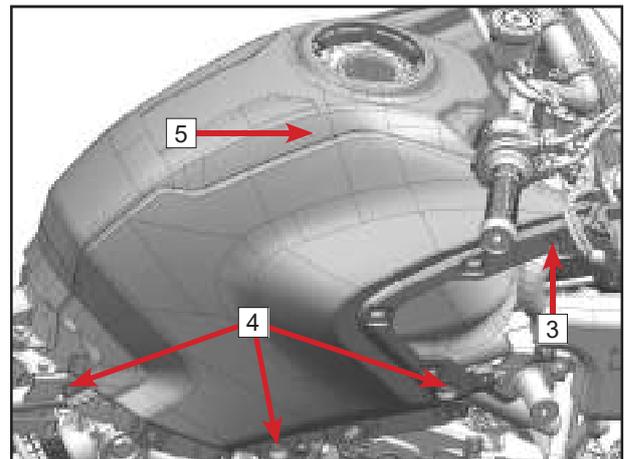
After removing the fuel tank upper guard, install the fuel tank lock back in time or use a large dust-free paper to block the fuel tank, which is to avoid environmental dirt or parts falling into the fuel, or being ignited by sparks to ignite the fuel steam, resulting in accidents.

Remove fuel tank LH&RH panel [3].

Remove three screws [4] from each side.



Remove fuel tank panel assembly [5].



#### Installation

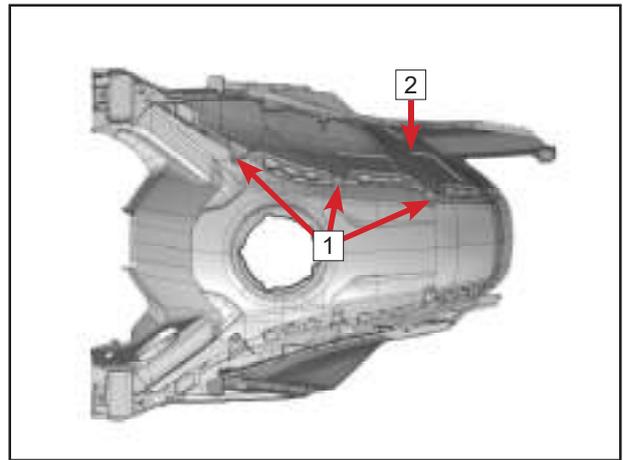
Reverse the removal procedures for installation.

### 6.22.2 Fuel Tank LH Panel

#### Removal

Remove three self-tapping screws [1].

Remove fuel tank LH panel [2].



#### Installation

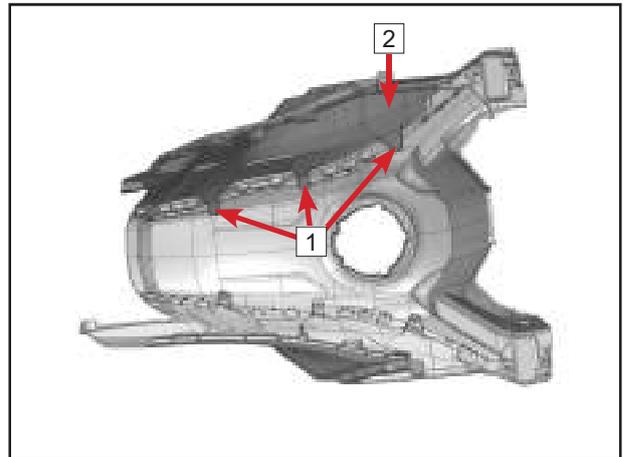
Reverse the removal procedures for installation.

### 6.22.3 Fuel Tank RH Panel

#### Removal

Remove three self-tapping screws [1].

Remove fuel tank RH panel [2].



#### Installation

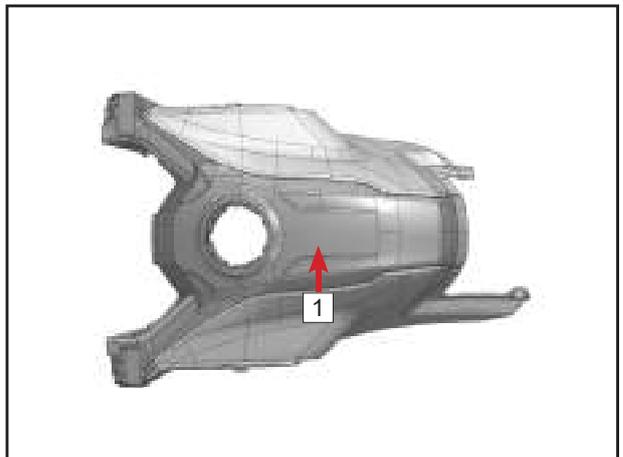
Reverse the removal procedures for installation.

### 6.22.4 Fuel Tank Upper Panel

#### Removal

Separate the fuel tank LH and RH panel.  
(see this chapter for details)

Remove fuel tank upper panel [1].



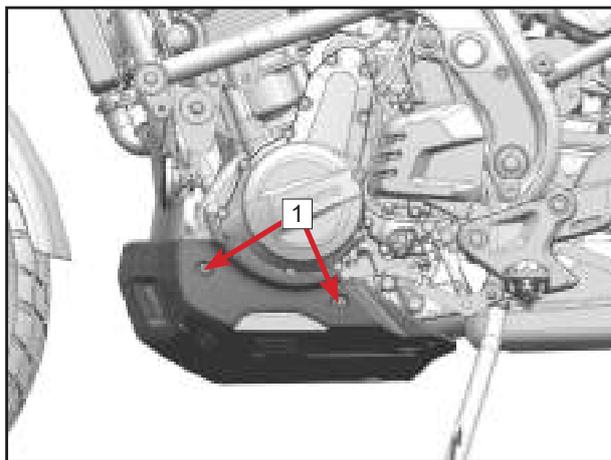
#### Installation

Reverse the removal procedures for installation.

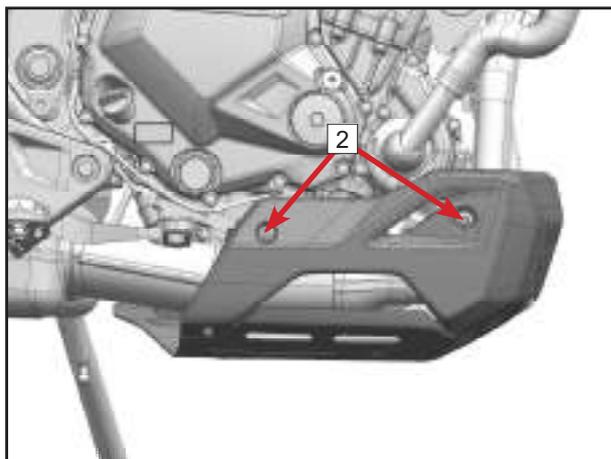
## 6.23 Engine Panel

### Removal

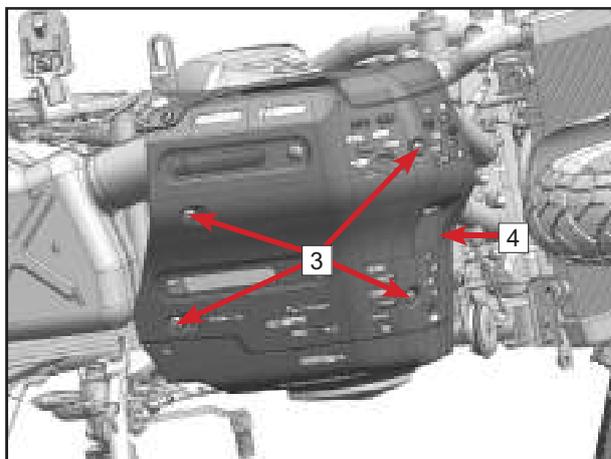
Remove two screws [1].



Remove two screws [2].



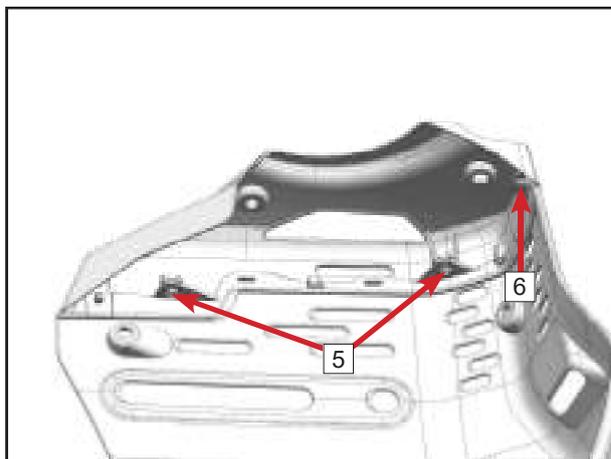
Remove four screws [3].



Remove engine panel assembly [4].

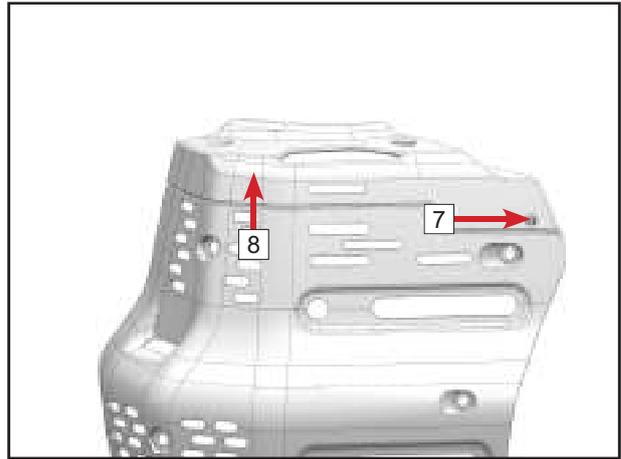
Remove two bolts [5].

Remove one self-tapping screw [6].

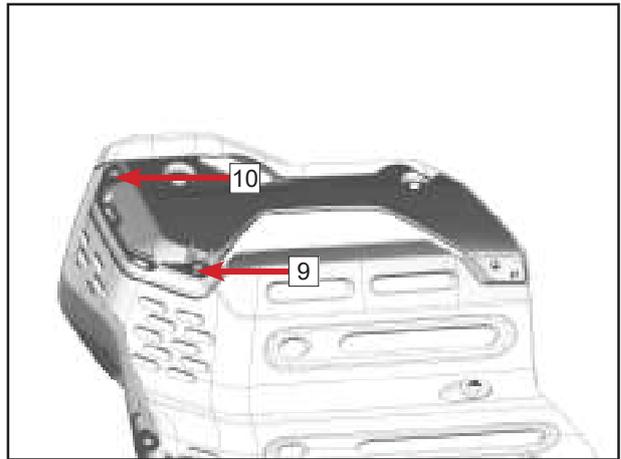


## 06 Body Panels and Frame

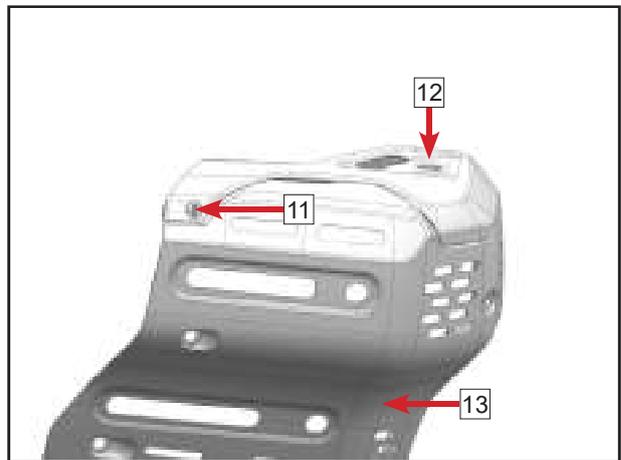
Remove one screw 7.  
Remove engine LH panel 8.



Remove one bolt 9.  
Remove one self-tapping screw 10.



Remove one screw 11.  
Remove engine RH panel 12.  
Remove engine skid plate 13.



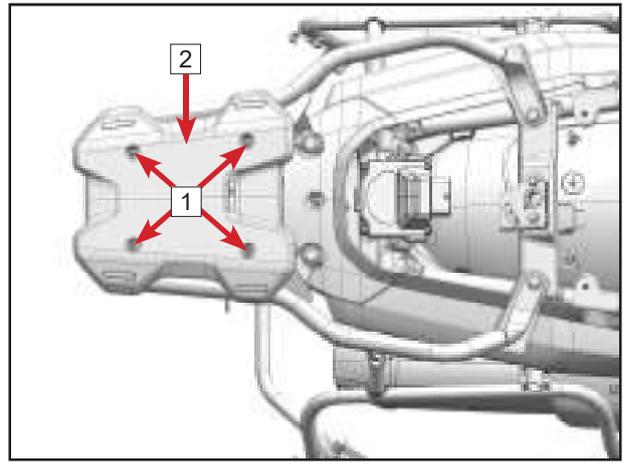
### Installation

Reverse the removal procedures for installation.

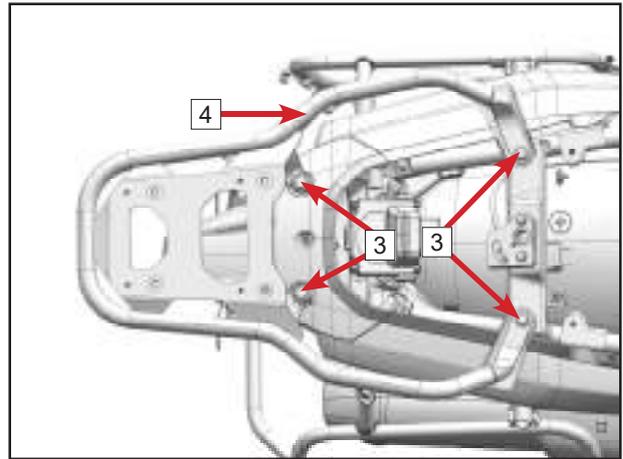
## 6.24 Rear Armrest

### Removal

Remove inner hex bolts **1**.  
Remove tail box pallet **2**.



Remove bolts **3**.  
Remove rear armrest **4**.



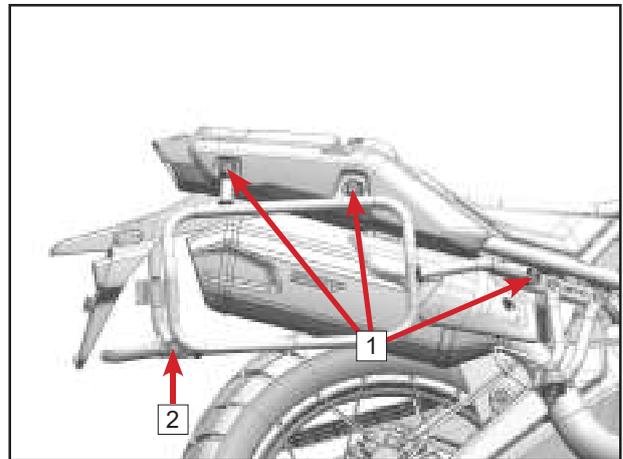
### Installation

Reverse the removal procedures for installation.

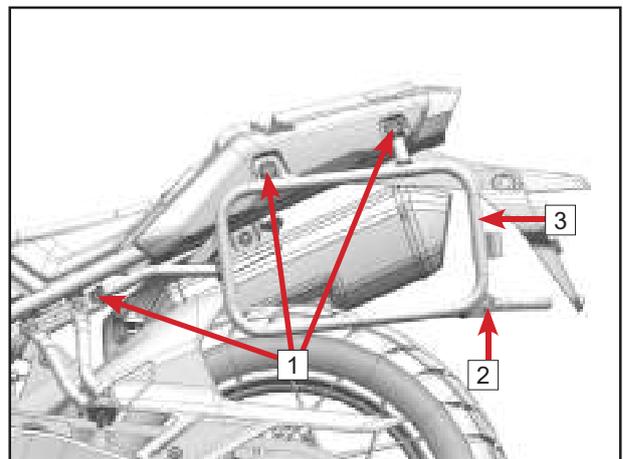
## 6.25 Side Box Bracket

### Removal

Remove six inner hex bolts **1**.



Loosen the bolt **2**.  
Remove side box bracket **3**.



### Installation

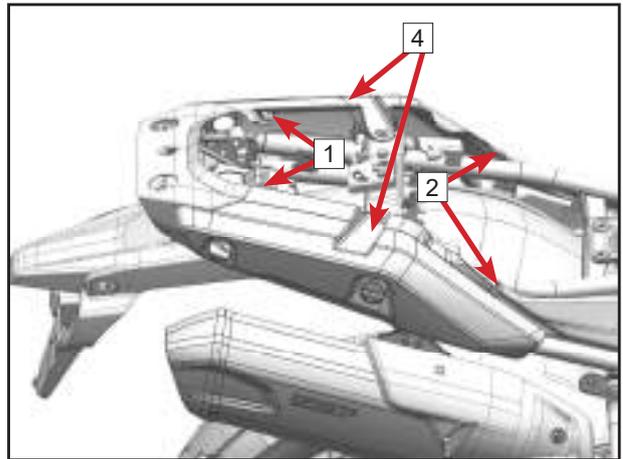
Reverse the removal procedures for installation.

### 6.26 Tail Light LH&RH Panel

#### Removal

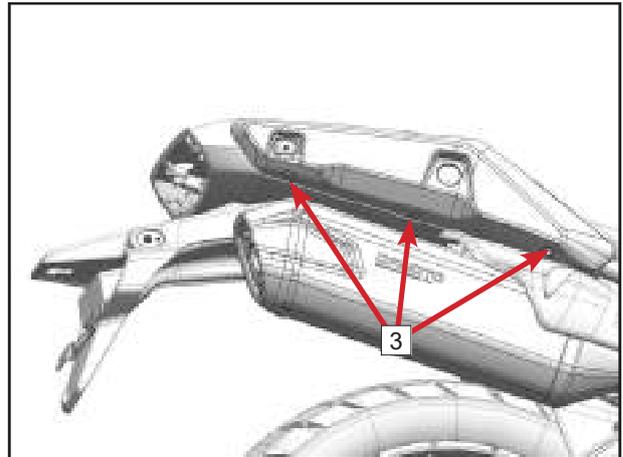
Remove two screws [1].

Remove two expansion screws [2].



Remove three expansion screws [3] from each side.

Remove tail light LH&RH panel [4].



#### Installation

Reverse the removal procedures for installation.

### 6.27 Tail Light Upper Cover

#### Removal

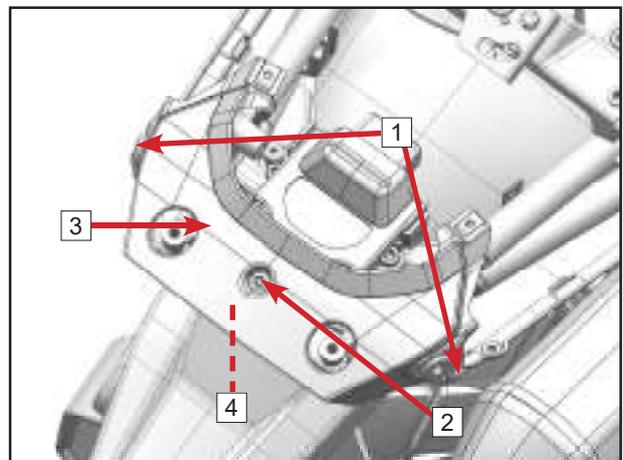
Remove two self-tapping screws [1].

Remove inner hex bolt [2].

Remove tail light upper cover [3].

<b>NOTE</b>
-------------

Prevent the loss of the fixed rubber strip [4].
---



#### Installation

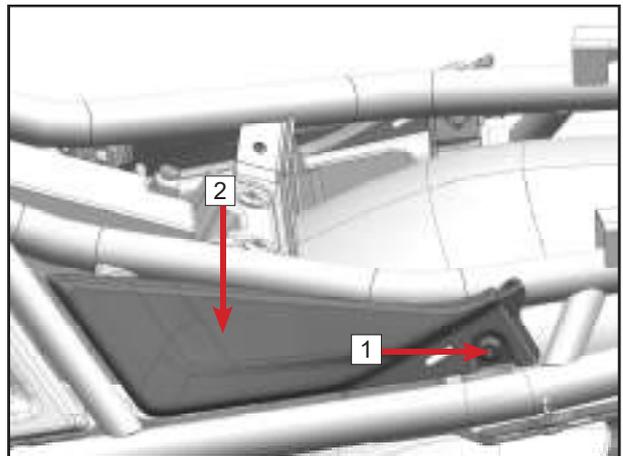
Reverse the removal procedures for installation.

### 6.28 Vehicle LH Deco Cover

#### Removal

Remove one screw [1].

Remove vehicle LH deco cover [2].



#### Installation

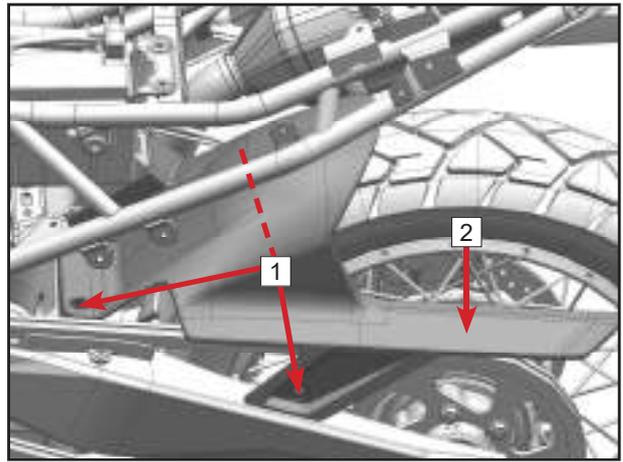
Reverse the removal procedures for installation.

The vehicle RH deco cover is disassembled and assembled in the same way as the vehicle LH deco cover.

## 6.29 Rear Fork Panel

### Removal

Remove three bolts [1].  
Remove rear fork panel [2].



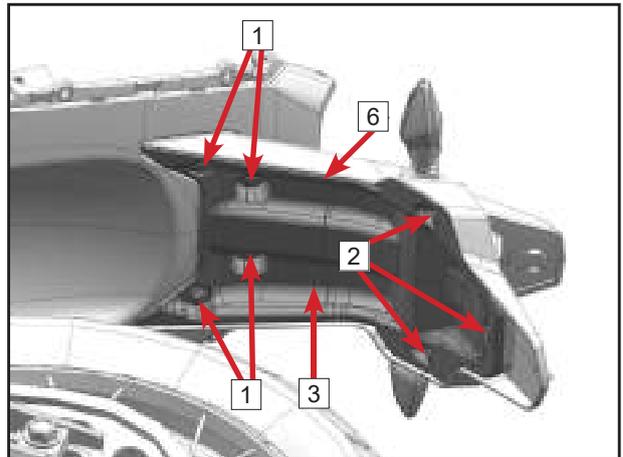
### Installation

Reverse the removal procedures for installation.

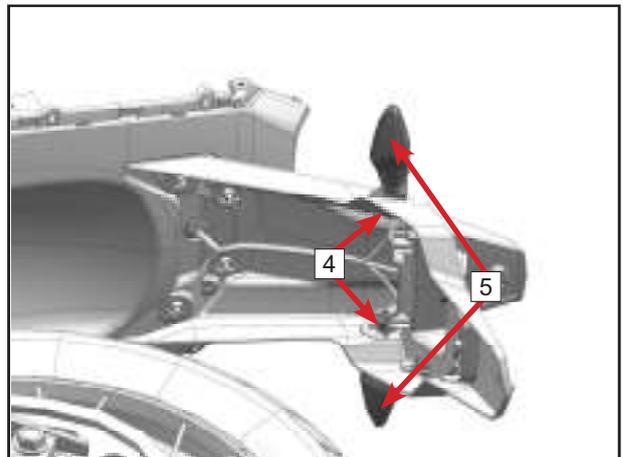
## 6.30 Rear Fender

### Removal

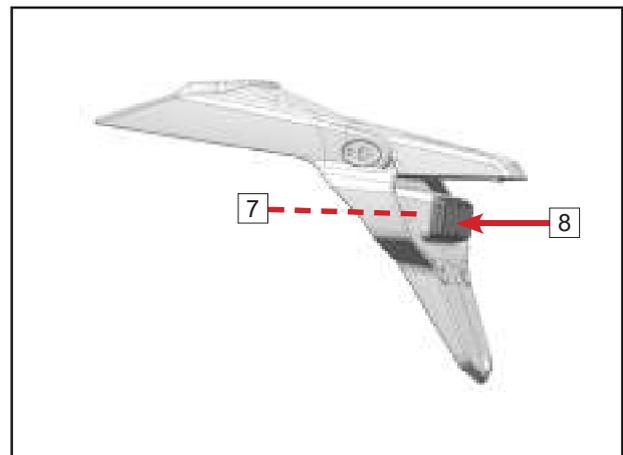
Remove four bolts [1].  
Remove rear fender assembly [6].  
Remove three self-tapping screws [2].  
Remove rear fender inner bushing [3].



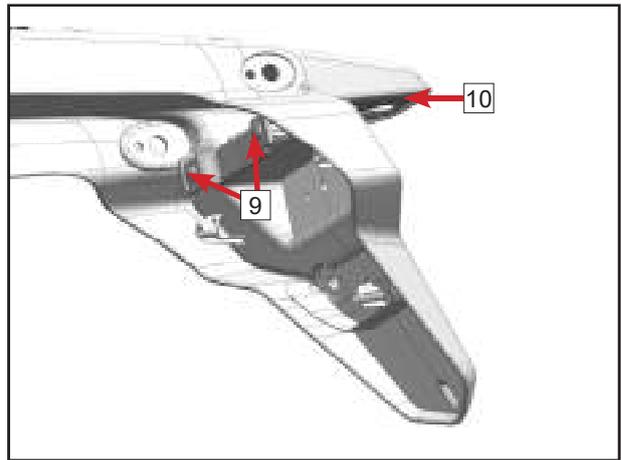
Remove two bolts [4].  
Disconnect the connector.  
Remove rear LH&RH turn lights [5].



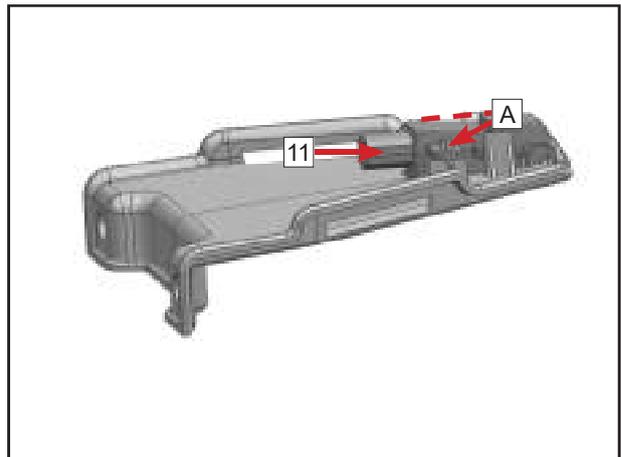
Remove bolts [7].  
Remove the rear reflector [8].



Remove two self-tapping screws [9].  
Remove rear license light mounting plate [10].



Remove rear license light mounting plate [11].



### NOTE

The buckle [A] should be prevented from breaking during disassembly.

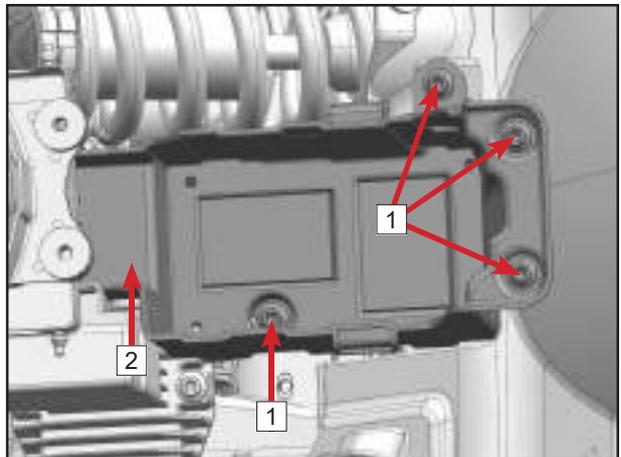
## 6.31 Battery Box

### Removal

Remove four screws [1].  
Remove battery box [2].

### Installation

Reverse the removal procedures for installation.



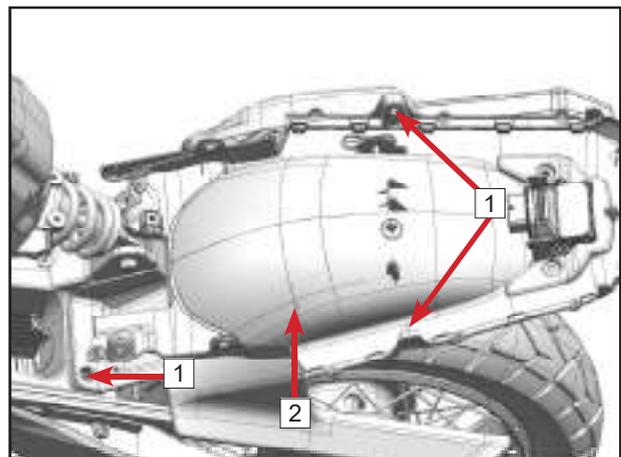
## 6.32 Frame Base Plate

### Removal

Remove three screws [1].  
Remove frame base plate [2].

### Installation

Reverse the removal procedures for installation.





<b>7.1 Maintenance Information .....</b>	<b>7-2</b>
7.1.1 Operation Notice .....	7-2
7.1.2 Service Specification .....	7-2
7.1.3 Tighten Torque .....	7-2
<b>7.2 Rear Wheel .....</b>	<b>7-3</b>
7.2.1 Rear Wheel View.....	7-3
<b>7.3 Front Wheel.....</b>	<b>7-7</b>
<b>7.4 Chain and Sprocket Removal and Installation .....</b>	<b>7-10</b>
7.4.1 Chain .....	7-10
7.4.2 Sprocket.....	7-11

## 7.1 Maintenance Information

### 7.1.1 Operation Notice

**NOTE**

When installing the drive chain joint clamp, the notch should be installed in the opposite direction of wheel rotation.

After adjusting the drive chain, it is necessary to reconfirm that the brake pedal stroke is properly adjusted.

### 7.1.2 Service Specification

Item			Standard	Service Limit
Front wheel	Front wheel shaft bent	-	-	0.2mm
	Rim runout	Vertical	0.6mm	0.8mm
		Horizontal	0.6mm	0.8mm
	Tire	Residual grooves	-	0.8mm
Pressure		225kPa±15kPa	-	

Item			Standard	Service Limit
Rear wheel	Rear wheel shaft bent	-	-	0.2mm
	Rim runout	Vertical	0.6mm	0.8mm
		Horizontal	0.6mm	0.8mm
	Tire	Residual grooves	-	0.8mm
Pressure		250kPa±15kPa	-	

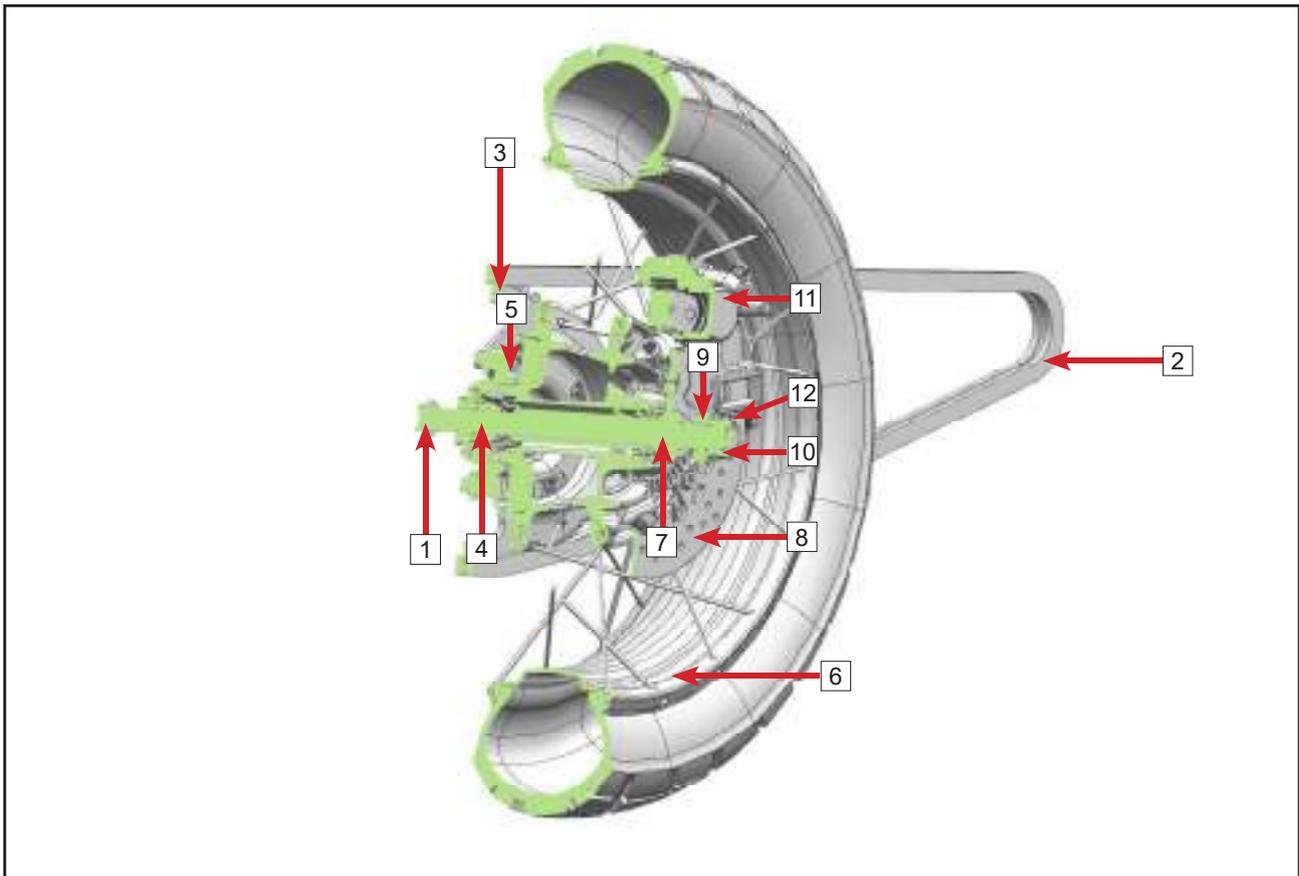
### 7.1.3 Tighten Torque

Rear wheel shaft nut torque: 105N·m~110N·m

Front wheel shaft tighten screw torque: 45N·m ± 5N·m

## 7.2 Rear Wheel

### 7.2.1 Rear Wheel View



1	Rear wheel shaft assembly	5	Rubber damper	9	RH chain adjusting block
2	Chain	6	Rear rim assembly	10	Rear wheel shaft nut
3	Rear sprocket	7	Rear wheel RH sleeve	11	Rear brake assembly
4	Sprocket seat assembly	8	Brake disc	12	Cotter Pin

#### Removal

Support the vehicle body securely using the main maintenance brace.

Remove the LH and RH footrest bracket pedal and bracket. (see chapter 09 Suspension System for details)

Remove rear fork panel. (see the chapter 06 for details)

Remove cotter pin **1**.

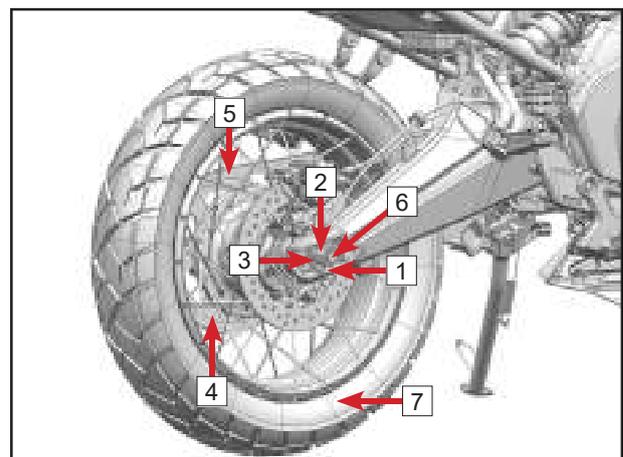
Unscrew the rear wheel shaft nut **2**.

Loosen RH chain adjusting block **3**.

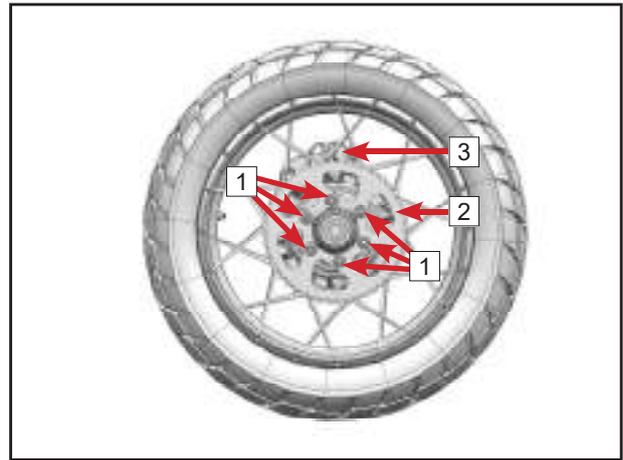
Remove the chain **5** from the sprocket **4**. (see this chapter for details)

Pull out the rear wheel shaft **6**.

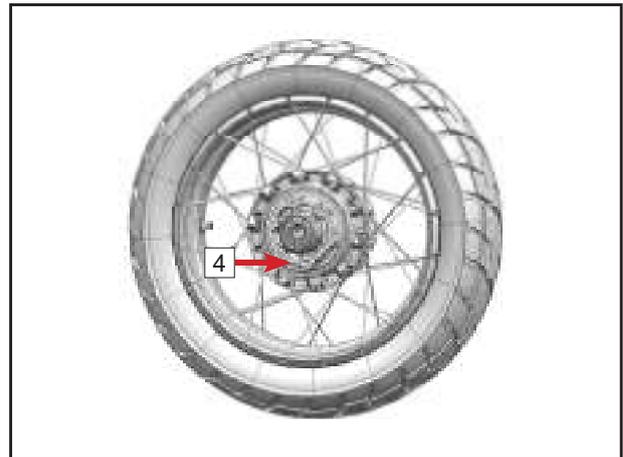
Remove rear wheel assembly **7**.



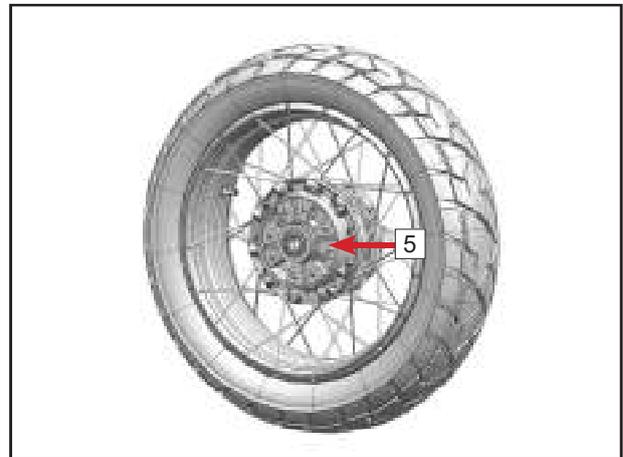
- Remove six screws [1].
- Remove rear sprocket [2].
- Remove rear brake assembly [3].



- Remove sprocket seat assembly [4].



Take out the rubber damper [5]. If the rubber damper is damaged by aging, replace it in time.



Check rear wheel bearing. If the clearance is too large, replace it. When installing rear wheel, reserve the removal procedures for installation, and apply grease to the dust-free oil sealing.

**Rear wheel shaft nut torque:  
105N·m~110N·m**

### Inspection

#### Rear wheel shaft

Put the rear wheel shaft on the V-shaped iron block, and measure the tortuosity of rear wheel shaft with the dial indicator.

**Service limit: 0.2mm**

Place the rear wheel on the rotating table to check the ring runout.

**Service limit:**

**Horizontal: 0.8mm**

**Vertical: 0.8mm**

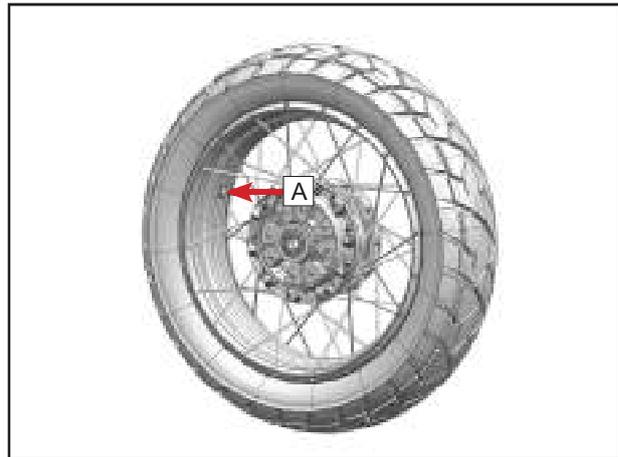
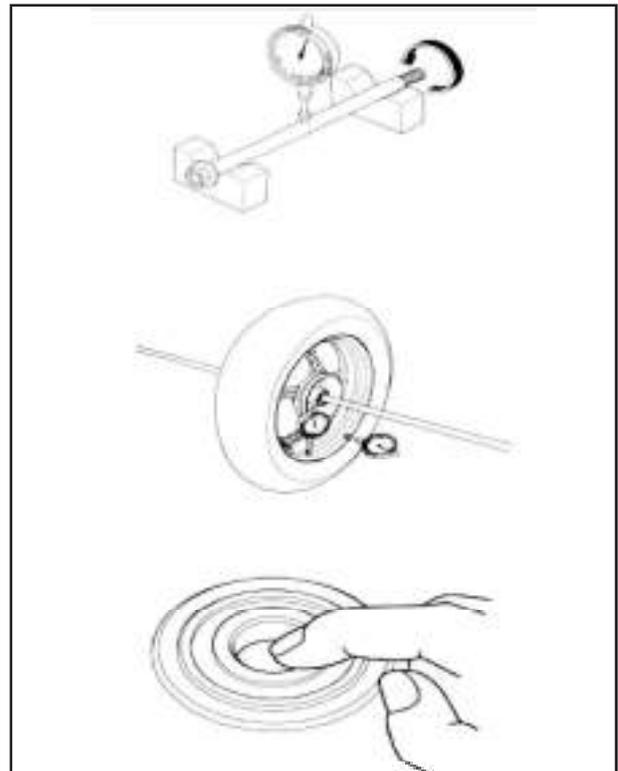
Check the rear wheel bearing clearance. If the clearance is too large, replace the bearing.

Check the sprocket condition, if the wear is serious or damaged, replace the sprocket or chain.

Check the status and length of drive chain, and replace new ones if necessary.

#### If equipped with the tire pressure sensor:

Check tire pressure sensor valve nozzle **A** for damage and leakage. The vehicle uses the tire pressure sensor, if the valve nozzle is broken or the tire pressure display is abnormal, replace the tire pressure sensor with a new one.



# CFMOTO

Clean the embedded stone or other inclusions on tires.

Check all parts of the tire tread for cracks, cuts, or dents.

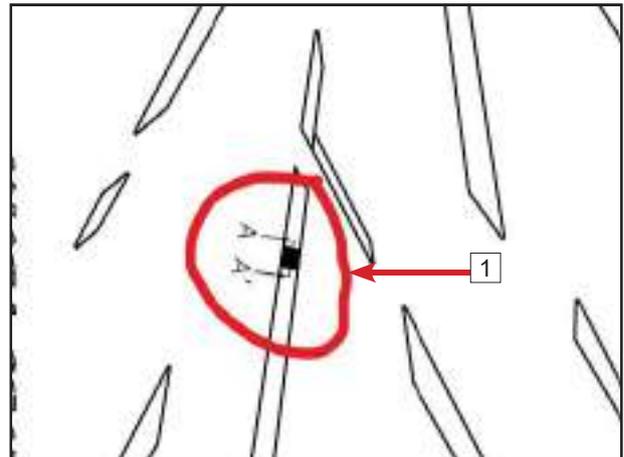
Check tire appearance for expansion or pulge. Expansion or pulge indicates damage inside the tire.

Replace it if any issues are found to avoid rapid expansion of tire damage.

Check the tire for wear. when the tire surface wear exceeds the use limit, it will be punctured and broken. In general, 90% of tire failures occur during the last 10% of tire life.

Therefore, continued use will cause unsafe factors when the tire surface is worn to the smooth surface.

When the tire pattern is worn to the height of the bump 1 , replace the tire.



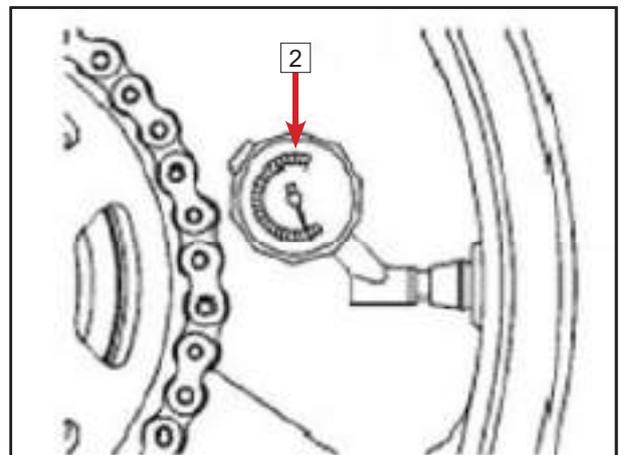
Remove tire inflation valve cap.

Measure the tire pressure with tire gauge 2 when it is cool.

T i r e pressure	Single person
F r o n t wheel	225kPa±15kPa
R e a r wheel	250kPa±15kPa

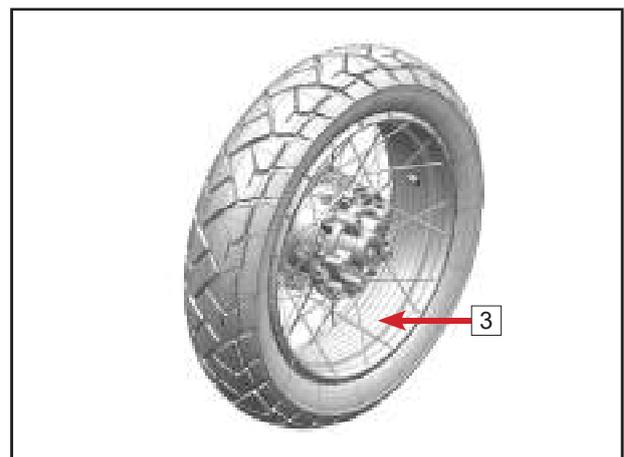
Adjust the tire pressure according to the standard if necessary.

Install tire inflation valve cap.

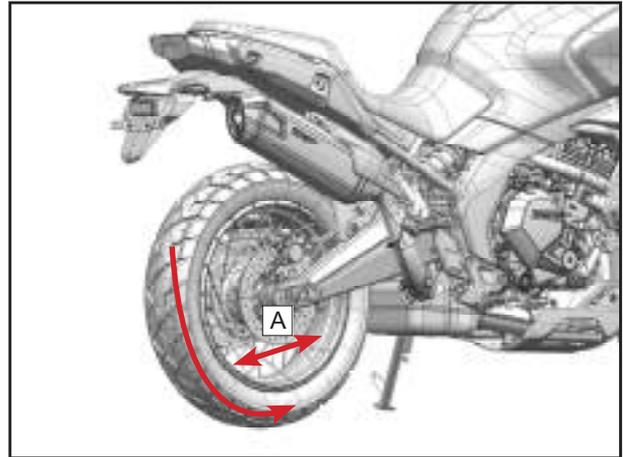


Check the rim 3 for sinking or damage.

When the rim is sunk or broken, check the front or rear wheels thoroughly. Replaced if necessary.



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



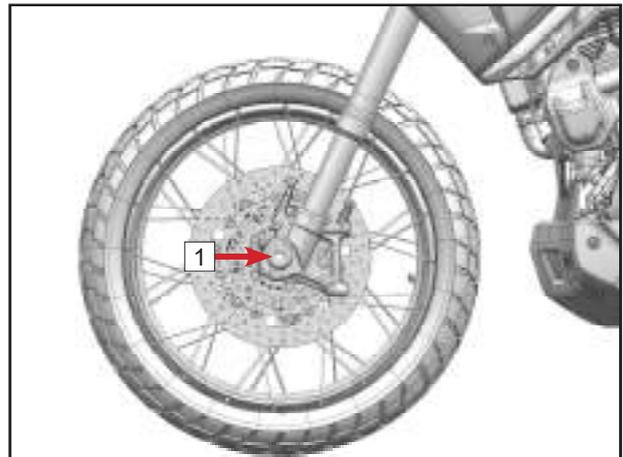
## 7.3 Front Wheel

After lifting the main support, place a jack under the engine or a weight on the shelf to lift the front wheel off the ground.

Remove front fender. (see chapter 06 for details).

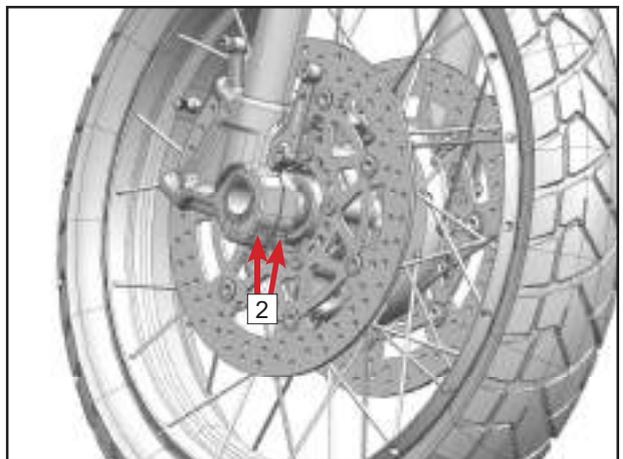
Remove front brake caliper (see chapter 08 Brake System).

Remove front wheel shaft tighten screw **1**.



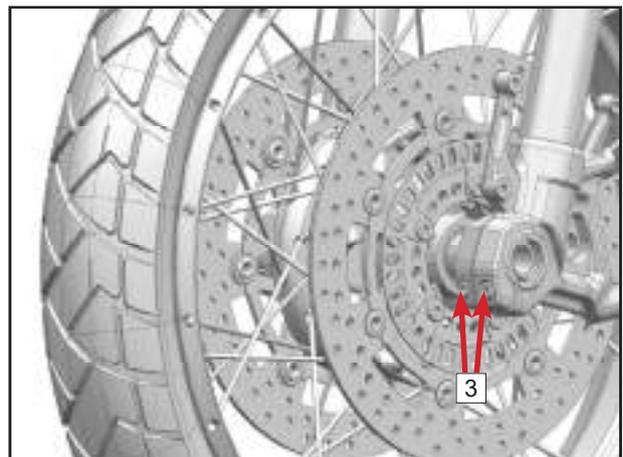
**Screw torque: 45N·m ± 5N·m**

Remove front wheel RH screws **2**.



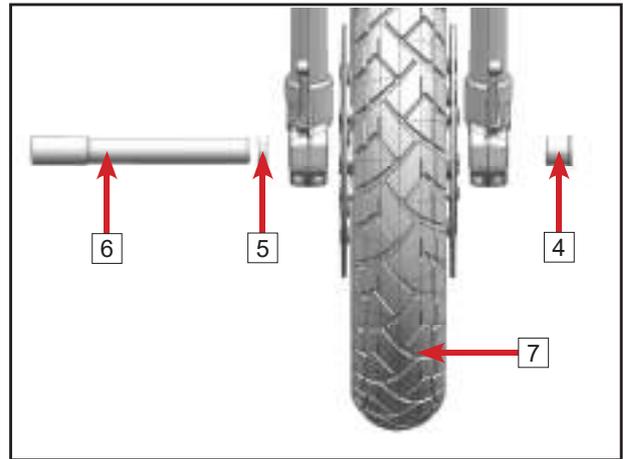
**Screw torque: 20N·m ± 2N·m**

Remove front wheel LH screws **3**.



**Screw torque: 20N·m ± 2N·m**

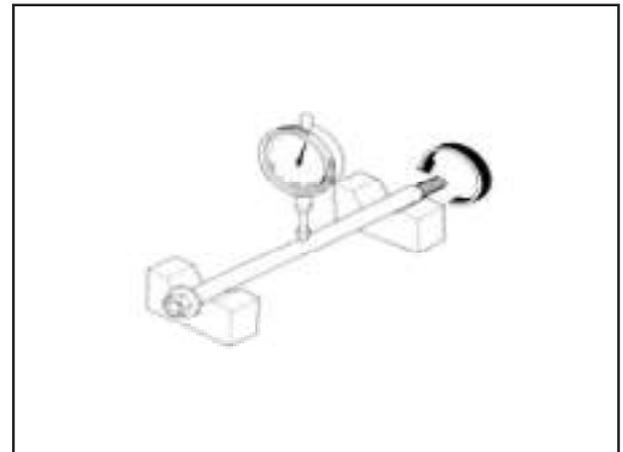
- Remove front wheel shaft [6].
- Remove front wheel LH bushing [4].
- Remove front wheel RH bushing [5].
- Remove front wheel [7].



## Front Wheel Shaft Inspection

Put the front wheel shaft and shaft core on the V-shaped iron block to measure the tortuosity of front wheel shaft.

**Service limit: 0.2mm above.**



## Precautions for protecting vehicle tires:

1. When the environment temperature is below 14°F (-10°C), it is recommended to place the vehicle indoors if required to be stored for a long time.
2. Do not use side stand to park the vehicle for long time in winter. Use the frame to park the vehicle, to let the tires be free of the wheel weight.
3. Do not allow the tires to sink into snow or ice for a long time when parking the vehicle in winter.
4. When parking the vehicle for a long time outside in winter, it is recommended to put objects that can preserve the heat such as branches, paper or sand under the tires.

## Front Wheel Rim Inspection

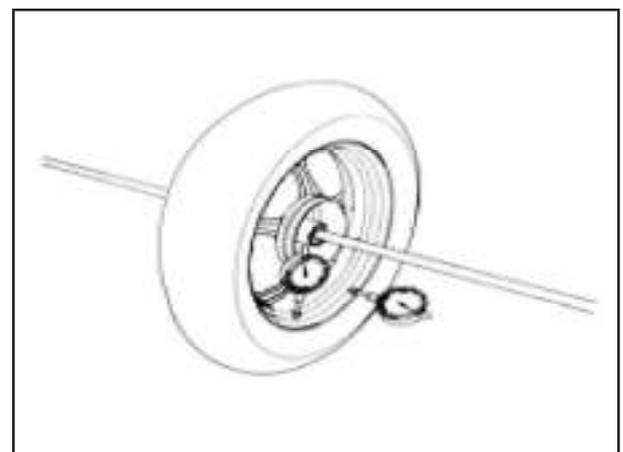
Place the front wheel on the rotating table to check the ring runout.

Use a dial indicator to measure, and rotate the rim to check the rim runout.

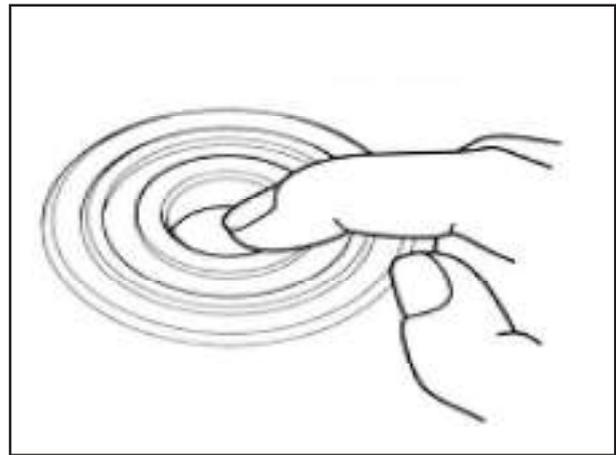
**Service limit:**

**Axial: 0.8mm**

**Radial: 0.8mm**

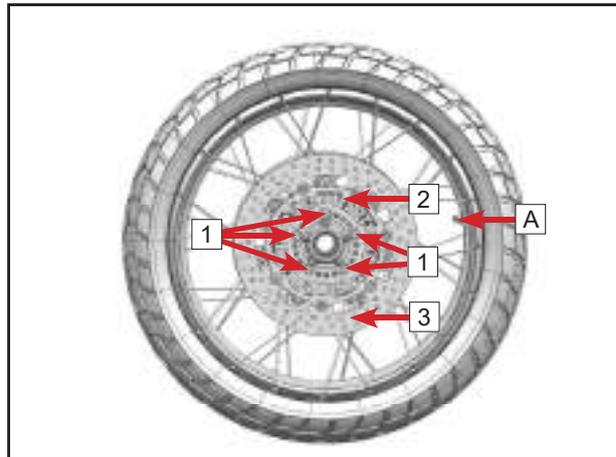


Check whether the bearing is loosen.  
Turn the bearing inner ring to check whether the bearing can rotate flexibly and smoothly.  
Install it on the rim, and check for looseness.  
If the rotation is not smooth, loosen, abnormal noise, please replace with the new bearing.



## Brake Disc Removal

Remove front wheel.  
Remove brake disc tighten screws [1].  
Remove counter induction disk [2].  
Remove brake disc [3].



## If equipped with the tire pressure sensor:

Check tire pressure sensor valve nozzle [A] for damage and leakage. The vehicle uses the tire pressure sensor, if the valve nozzle is broken or the tire pressure display is abnormal, replace the tire pressure sensor with a new one.

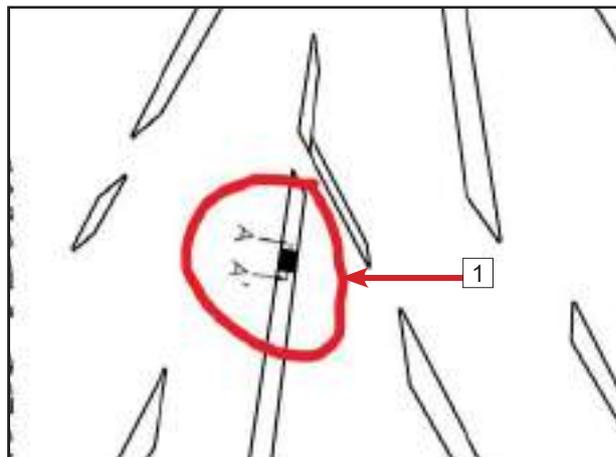
## Inspection

Clean the embedded stone or other inclusions on tires.  
Check all parts of the tire tread for cracks, cuts, or dents.  
Check tire appearance for expansion or pulge. Expansion or pulge indicates damage inside the tire.  
Replace it if any issues are found to avoid rapid expansion of tire damage.

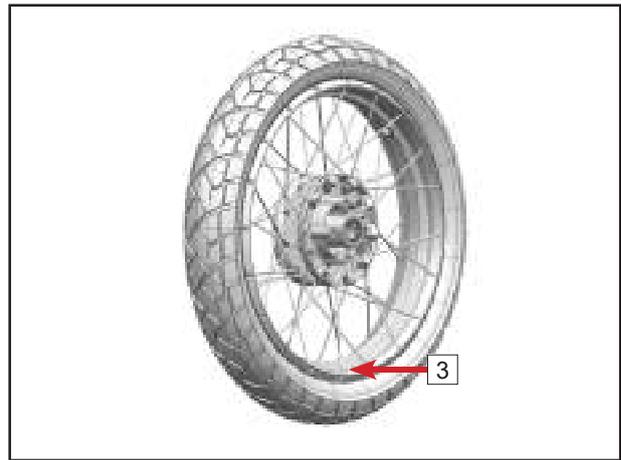
Check the tire for wear. when the tire surface wear exceeds the use limit, it will be punctured and broken. In general, 90% of tire failures occur during the last 10% of tire life.

Therefore, continued use will cause unsafe factors when the tire surface is worn to the smooth surface.

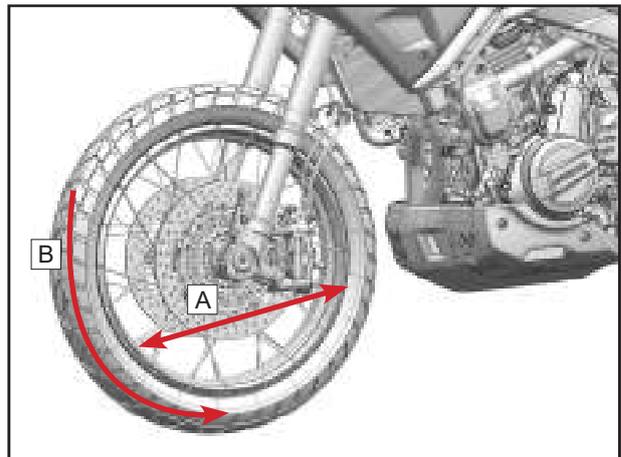
When the tire pattern is worn to the height of the bump [1], replace the tire.



Check the rim **3** for dented or broken.  
When the rim is dented or broken, the front or rear wheels need to be thoroughly inspected and replaced if necessary.



Lift the front wheel off the ground.  
Check the front wheel bearing for damage by pushing or pulling the wheel **A**.  
Rotate the front wheel **B** to inspect for the smooth movement and noise.  
Replace the front wheel bearing if any issues are found.

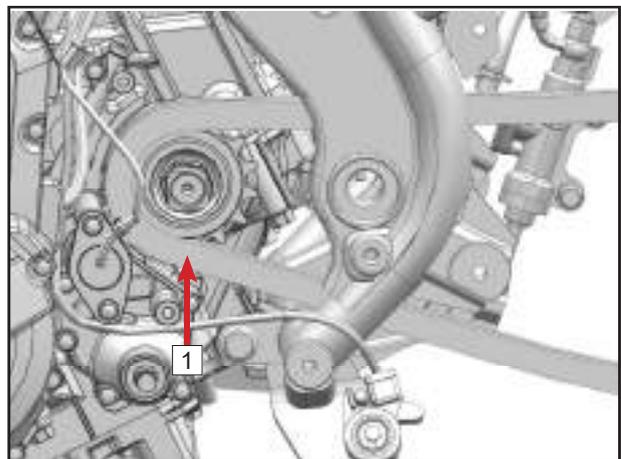


## 7.4 Chain and Sprocket Removal and Installation

### 7.4.1 Chain

#### Pre-work

Remove the shift and small sprocket guard .  
(See chapter 06 for details)  
Loosen rear shock absorber, and remove rear fork. (See chapter 09 Suspension System for details)



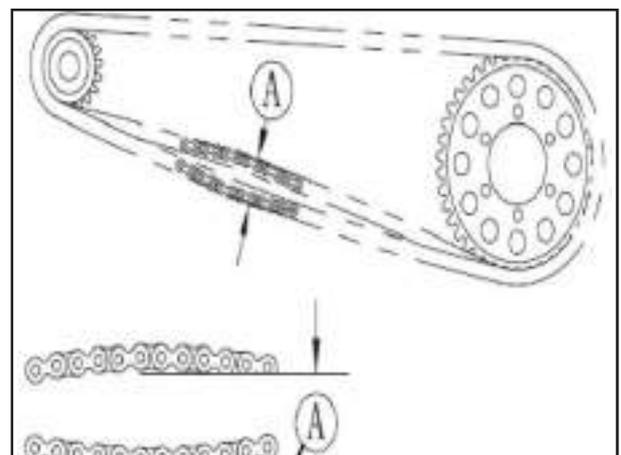
#### Removal

Remove the chain **1** .

#### Inspection

Check whether the chain is broken or corroded, and replace it if it is.

**Check the looseness of drive chain:**  
**Standard looseness: 30mm ~ 40mm**



## Drive Chain Tightness Adjustment

Remove cotter pin **1**.

Remove rear wheel shaft nut **2**.

Loosen LH&RH lock nut **3**.

Rotate the LH&RH adjusting bolt **4** to adjust the tightness of chain.

Make sure the marks on the LH&RH chain adjustment blocks **5** are in the same position relative to the reference marks.

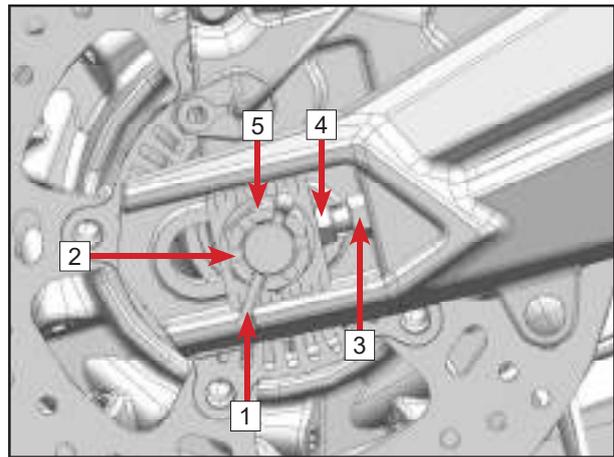
Make sure the LH&RH adjusting bolts **4** are tight against the chain adjusting block **3**.

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

Tighten the rear shaft nut **2** to the specified torque.

**Rear wheel shaft nut torque:  
105N•m~110N•m**

Install cotter pin **1**.



## Installation

Reverse the removal procedures for installation.

## 7.4.2 Sprocket

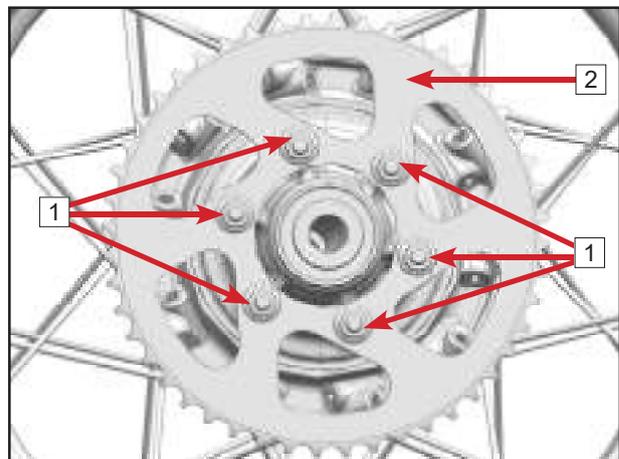
### Removal

Remove rear wheel assembly. (See chapter 07 for details)

Remove six screws **1**.

Remove sprocket **2**.

**Nut torque: 57.5N•m~62.5N•m**

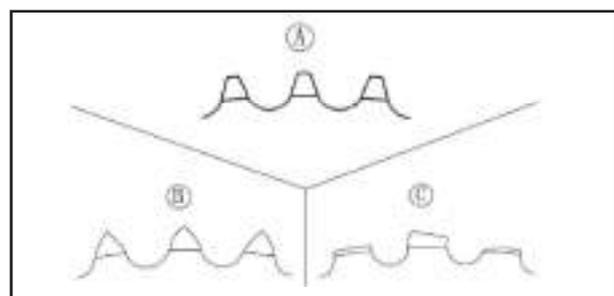


### Inspection

Check whether the sprocket gear is complete and replace it if not complete.

### Installation

Reverse the removal procedures for installation. Apply thread sealant to the six nuts (stud) **1**.

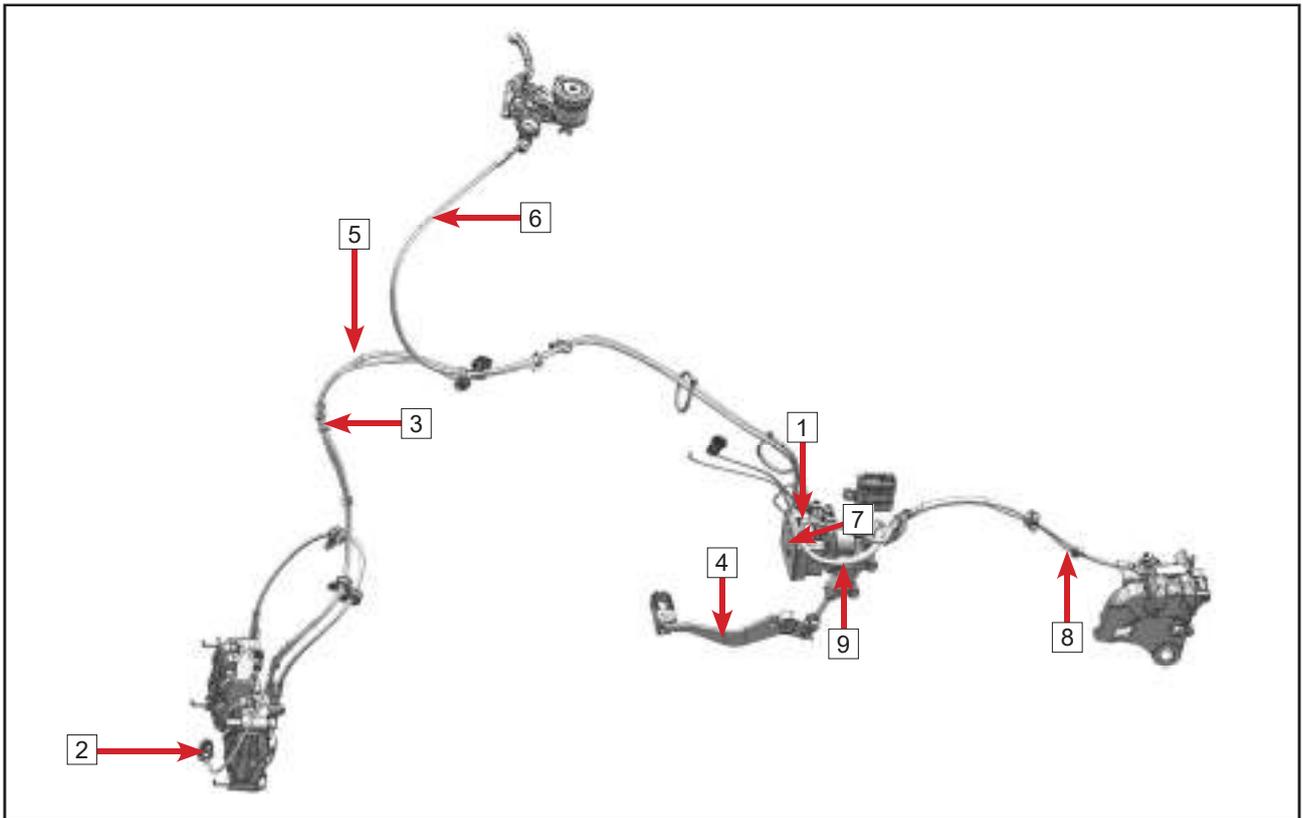


A. standard tooth type, B. Worn tooth type, C. damaged tooth type. In case of B or C, replace the chain or sprocket with a new one.



<b>8.1 Brake System View.....</b>	<b>2</b>
<b>8.2 Brake Noise Troubleshooting.....</b>	<b>3</b>
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## 8.1 Brake System View



1	MAB hydraulic brake assembly	2	Front wheel speed sensor	3	Front wheel speed sensor
4	Rear brake pedal assembly	5	Front brake inlet hose	6	Front brake inlet hose
7	ABS controller	8	Rear brake inlet hose	9	Rear brake inlet hose

## 8.2 Brake Noise Troubleshooting

Reason	Method
Dirt, dust or inserts on brake pads or brake discs	Spray the non-flammable aerosol brake cleaner on brake discs and pads. Remove the brake pads or disc hub and remove the inserts from the disc or disc.
Wheel hub or bearing loose	Check wheels and hubs for abnormal movement.
Brake disc distorted or excessively worn	Replace brake disc
Brake disc not aligned or released	Inspection. Make repairs if necessary.
Noise from other sources (axle, hub, wheel or brake disc)	If the noise does not change when the brake is used, check other sources. Repair if necessary.

### Brake pads drag brake discs for the following reasons:

Misalignment	Adjust the brake pads
Master cylinder reservoir is too full	Adjust to the proper liquid level
Master cylinder compensation port limited	Clean compensating port
Master cylinder piston cannot fully return	Inspection. Repair if necessary.
Caliper piston not returned	Clean the piston cup

## 8.3 Brake Caliper

### 8.3.1 Front Brake Caliper

#### Removal

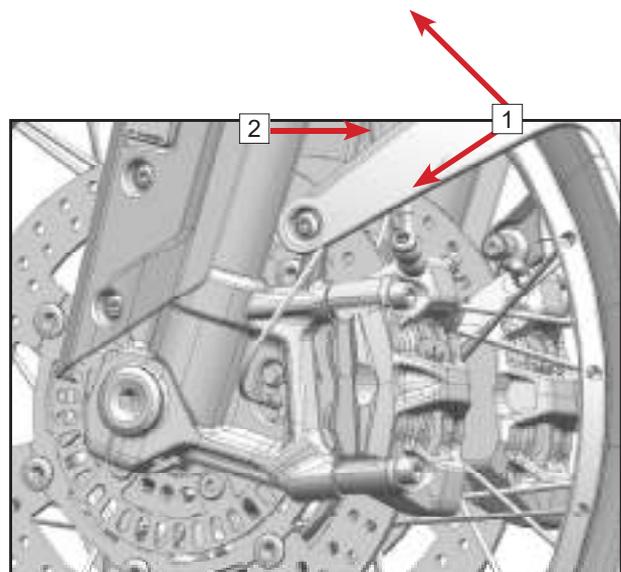
Remove two screws 1.

Remove front LH brake caliper 2.

#### Installation

Reverse the removal procedures for installation.

The front RH brake caliper is disassembled in the same way as the front LH brake caliper.

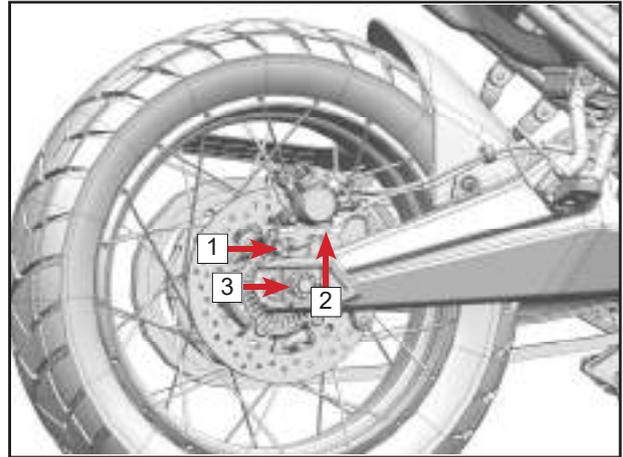


## 8.3.2 Rear Brake Caliper and Rear Wheel Removal

Remove hexagon flange bolt **1**.

Remove wheel speed sensor **2**.

Remove rear wheel shaft nut **3**.



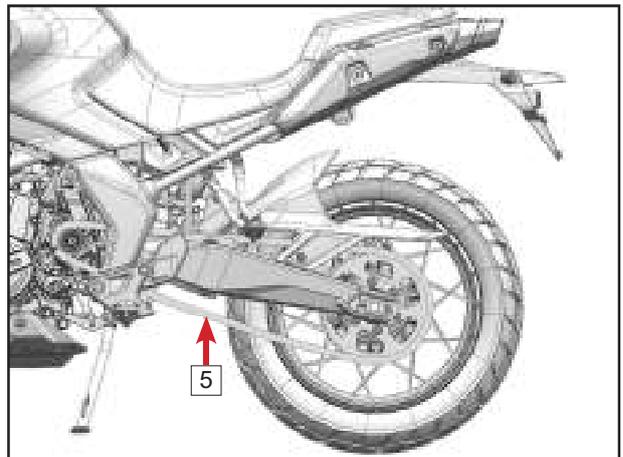
Pull out rear wheel shaft **4**.

Prevent loss of chain tensioner on both sides.



Push the rear wheel forward to loosen the chain.

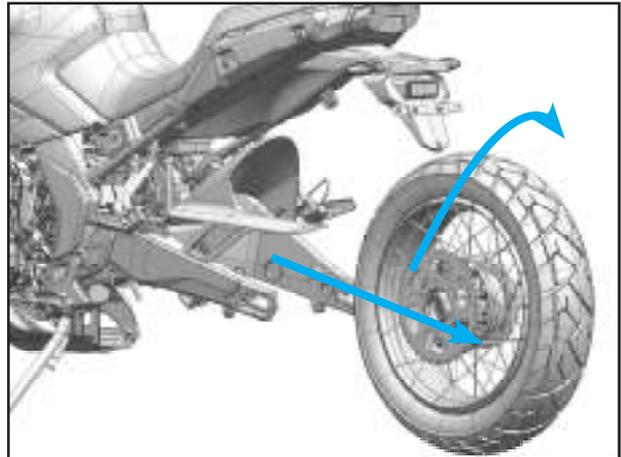
Remove the chain **5** from rear sprocket.



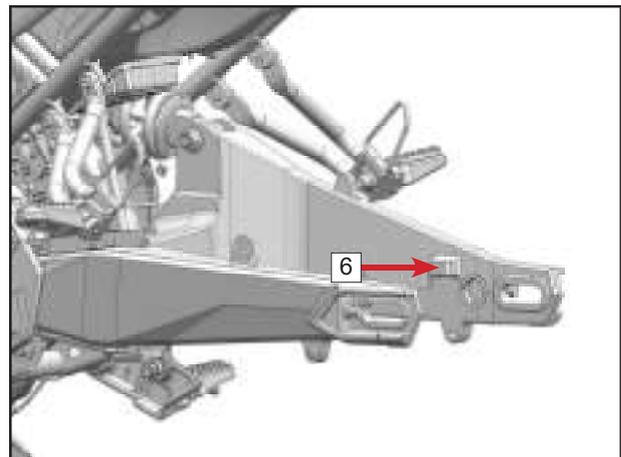
Remove rear wheel.

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

Prevent loss of bushings on both sides.



Remove rear brake caliper from limit block 6.



### Inspection

Check the minimum thickness of brake friction pad.

Brake pad minimum thickness  $A \geq 1.3\text{mm}$ ;

Replace if less than minimum thickness.

Inspect brake pad for damage or cracks.

Replace with new brake friction pads if any defect is found.

### **⚠ WARNING**

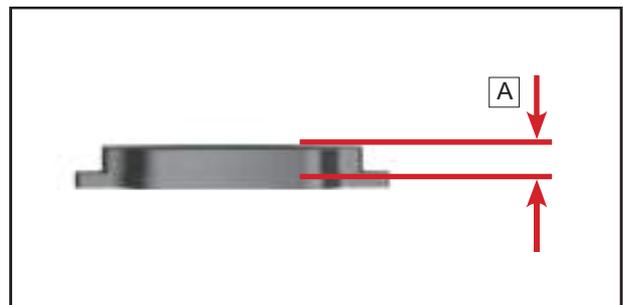
Brake pad damage will reduce braking effect, which can cause accidents. If the brake pad is replaced too late, steel bracket will rub the brake disc, which will severely reduce the braking effect and damage the brake disc. Inspect brake pad periodically.

### **NOTE**

Replace brake pads in pairs.

Inspect brake caliper for damage or crack.

Replace if any defect is found.



### Installation

Reverse the removal procedures for installation.

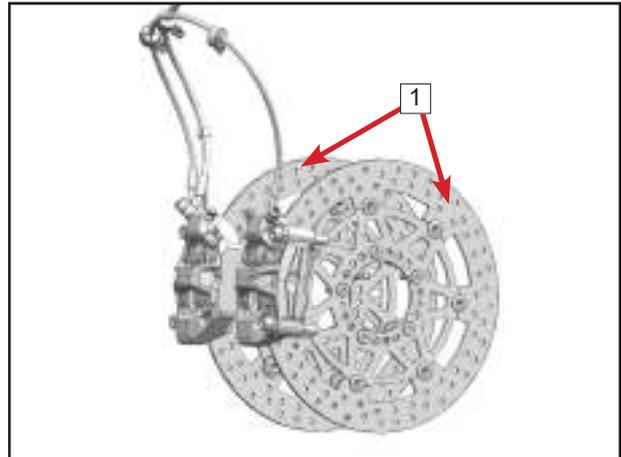
## 8.4 Brake Disc

### 8.4.1 Front Brake Disc

#### Removal

Remove front wheel assembly. (see chapter 07 Powertrain System)

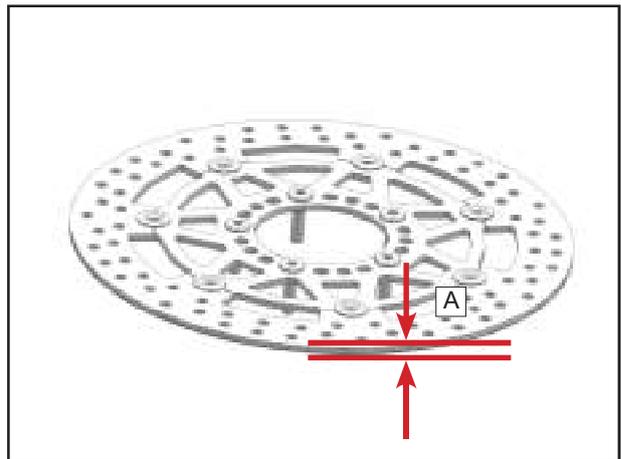
Remove brake disc **1**.



#### Inspection

Check brake disc sliding surface for wear or damage. Replace if necessary.

Brake disc thickness **A**  $\leq 4\text{mm}$ , replace in time.



#### Brake Disc Replacement

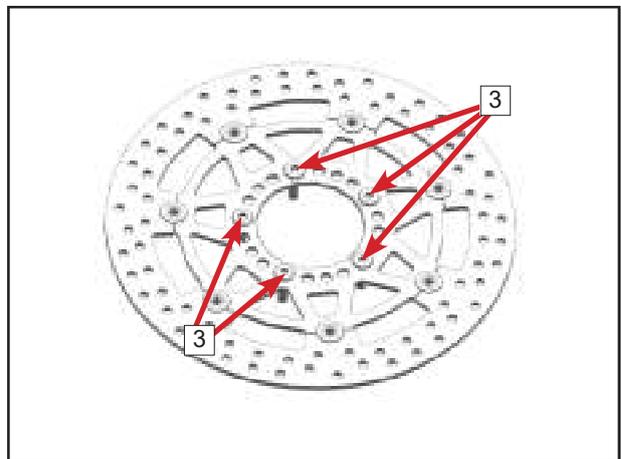
Remove five front brake disc inner hex bolts **3**.

Replace brake disc and install front brake disc inner hex bolts.

**Front brake disc inner hex bolt torque: 22N·m~28N·m, and apply thread locker.**

#### Installation

Reverse the removal procedures for installation.

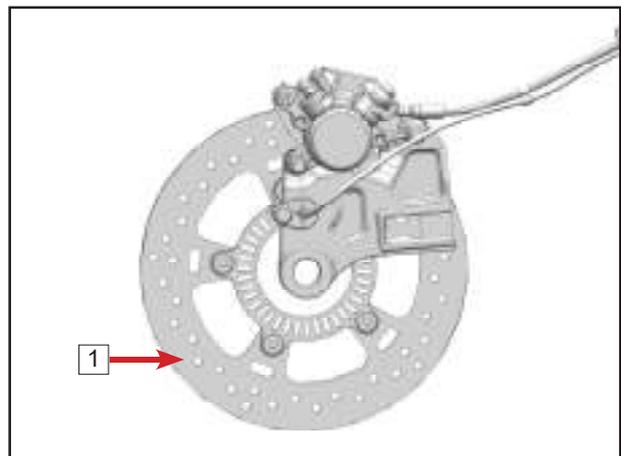


### 8.4.2 Rear Brake Disc

#### Removal

Remove rear wheel (see chapter 9).

Remove brake disc **1**.



## Inspection

Inspect brake disc sliding surface for wear or damage. Replace if necessary.  
Brake disc thickness  $A \leq 4\text{mm}$ , replace in time.

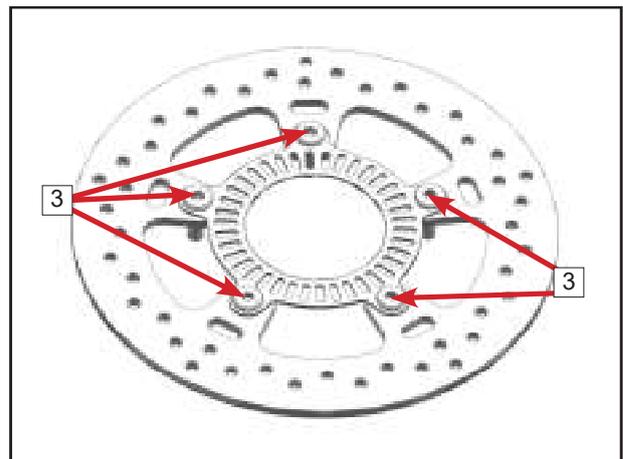
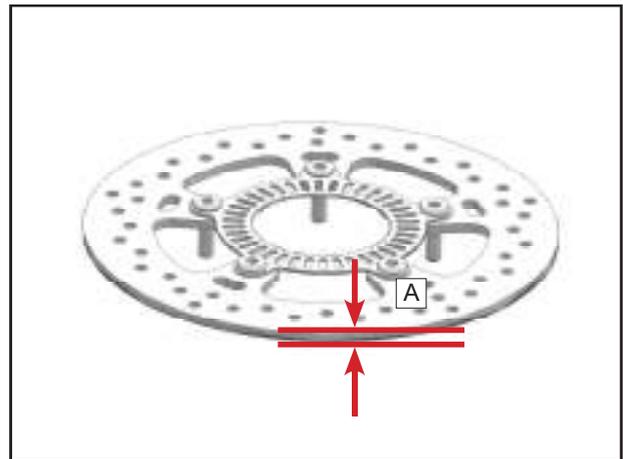
## Brake Disc Replacement

Remove five rear brake disc inner hex bolts [3].  
Replace brake disc and install rear brake disc inner hex bolts.

**Rear brake disc inner hex bolt torque:  $22\text{N}\cdot\text{m} \sim 28\text{N}\cdot\text{m}$ , and apply thread locker.**

## Installation

Reverse the removal procedures for installation.



## 8.5 Brake Fluid

### NOTE

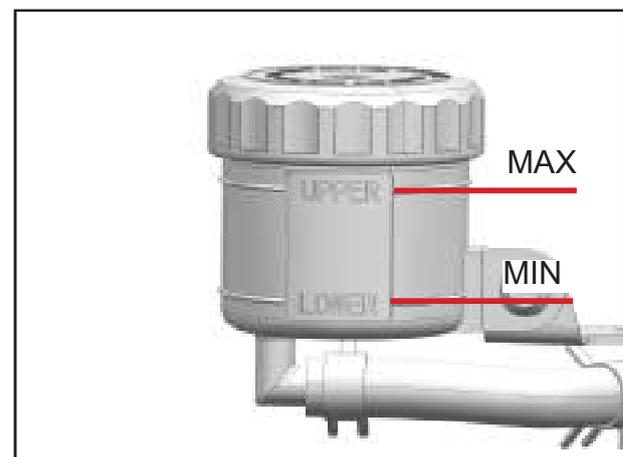
Brake fluid has a strong water absorption. If there is water into the brake fluid, it will cause the boiling point to drop, may cause brake failure. So the brake fluid storage should be sealed well, away from the wet environment.  
Brake fluid should not be reused if contaminated.

## Inspection

When the brake fluid is lower than or near the lower limit line, the brake fluid should be added between the upper and lower limits.  
When the brake fluid is above or near the upper limit line, the brake fluid should be reduced between the upper and lower limits.

### NOTE

Brake fluid will reduce the braking effect after using for a long time. Replace the brake fluid according to maintenance schedule.



## NOTE

1. Do not mix dirt and water with brake fluid when adding.
2. Use CFMOTO recommended brake fluid in case of chemical changes.
3. Contact with brake fluid may irritate the skin.
4. Do not let the brake fluid contact with the painted parts, because the brake fluid will corrode the paint.
5. Flash with water if brake fluid spills.
6. Do not open the brake fluid reservoir cap for a long time.

## Brake Fluid Replacement and Brake Exhaust

**Please use CFMOTO recommended brake fluid for replacement.**

**Brake fluid type: DOT4**

If there is a special exhaust device, please follow the exhaust device operation manual. If there is no exhaust device, please exhaust as follows:

Remove the dust sleeve.

Connect a clean and transparent hose to the bleed screw of brake caliper, place the other end of the hose in a clean container, and ensure that the hose is fastened to the exhaust interface 1.

Please ask assistant to lower brake pedal and maintain.

Loosen the drain bolt, immediately lock the drain bolt and make the brake pedal return.

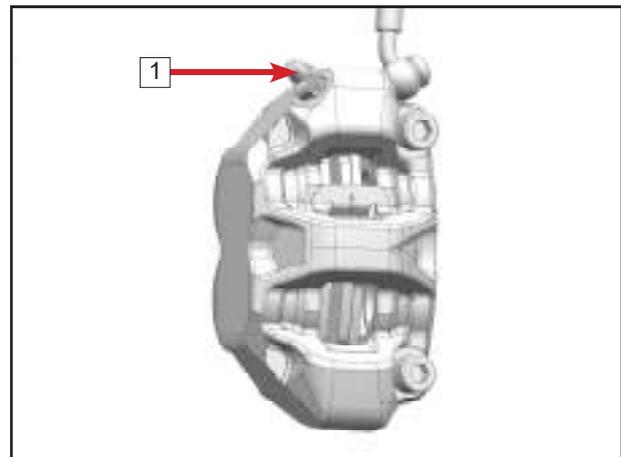
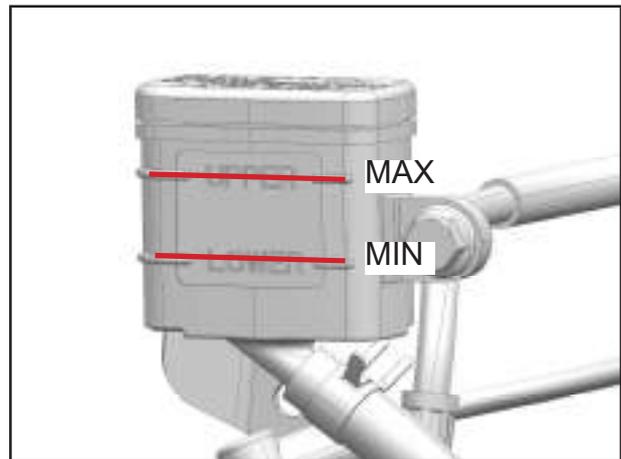
## NOTE

Make sure the fluid level is more than a half and under upper line in brake fluid reservoir during exhausting.

## NOTE

Do not release brake pedal before tightening bleed screw. Otherwise, there will be air inside master cylinder.

Repeat until there is clean brake oil in the hose and there is no air in the discharged brake oil.



Tighten the drain bolt and keep the oil level in the oil storage chamber after exhaust or brake oil change.

Check brake effect after operation to make sure the brake function works and brake pedal free play is qualified.

Repeat above procedures if the brake effect is bad.

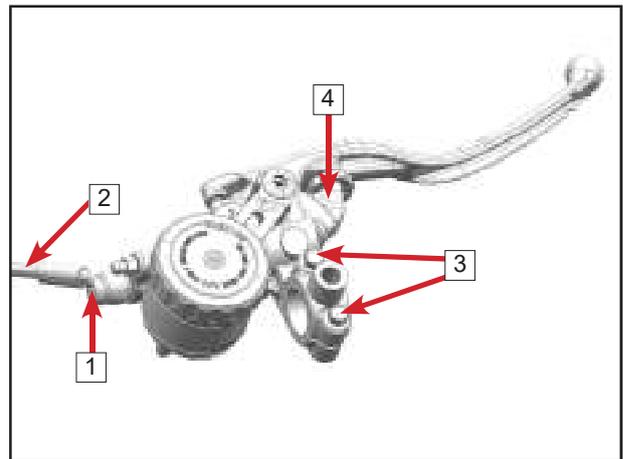
## Installation

Reverse the removal procedures for installation.

## 8.6 Handbrake Master Cylinder

### Removal

- Remove bolt [1].
- Remove front brake outlet pipe [2].
- Remove two bolts [3].
- Remove handbrake master cylinder [4].



### Inspection

Check handbrake master cylinder for wear or damage. Replace in time if it does.

### Installation

Reverse the removal procedures for installation.

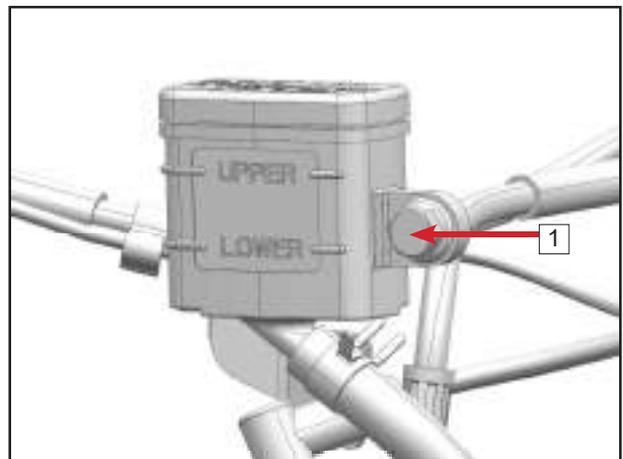
## 8.7 Rear Brake Master Cylinder

### Pre-work

Remove RH footrest. (see chapter 06 for details)

### Removal

- Remove oil cup retaining bolt [1].
- Remove bolt [2].
- Remove rear brake outlet pipe [3].
- Remove two bolts [4].
- Remove brake pedal bolt [6], and remove cotter pin [7].
- Remove rear brake master cylinder [5].

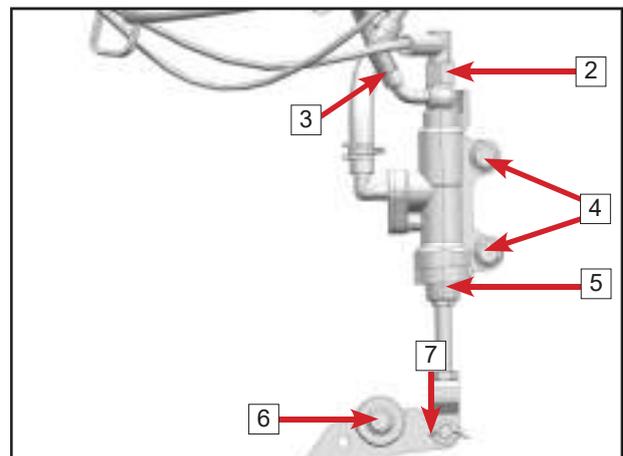


### Inspection

Check rear brake master cylinder for wear or damage. Replace in time if it does.

### Installation

Reverse the removal procedures for installation.



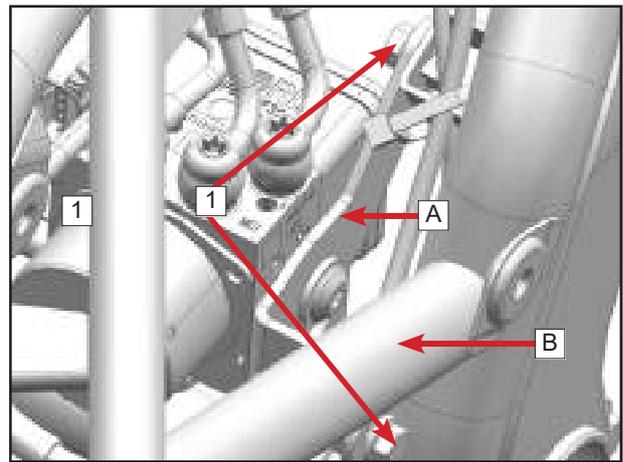
## 8.8 ABS System Removal and Installation

### Removal

Remove ABS harness joint.

Remove two bolts [1].

Remove ABS bracket [A] from the frame [B].



Remove two oil pipe bolts [2].

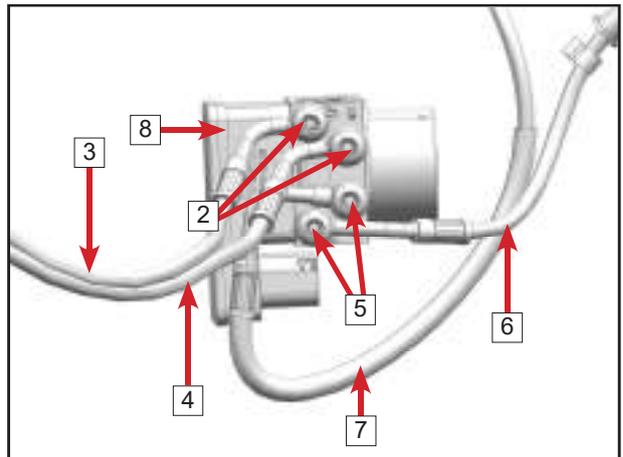
Remove front brake inlet hose [3].

Remove front brake outlet hose [4].

Remove two oil pipe bolts [5].

Remove rear brake inlet hose [6].

Remove rear brake outlet hose [7].



Remove ABS controller [8].

### Inspection

Check ABS system for wear or damage.

Replace in time if it does.

### Installation

Reverse the removal procedures for installation.

## 09 Suspension System

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9.1 Front Shock Absorber.....	9-2
9.2 Rear Shock Absorber.....	9-3
9.3 Rear Fork.....	9-5

## 9.1 Front Shock Absorber

### Pre-work

Remove front fender. (see chapter 06 for details)

Remove front brake. (see chapter 08 Brake System for details)

Remove front wheel. (see chapter 07 Powertrain System for details)

Remove LH and RH panels and front plastic parts of vehicle. (see chapter 06 for details)

### Removal

Remove upper and lower triple clamp shock absorber lock screws [1].

Remove front LH shock absorber [2].

**Screw torque: 18N·m~22N·m**

### Inspection

Check whether the appearance of front shock absorber is damaged, cracked and other damages. If so, replace the parts.

Clean the dust and mud from the front shock absorber.

Hold the handlebar and press down several times to check whether the compression and rebound of front shock absorber are normal.

### Installation

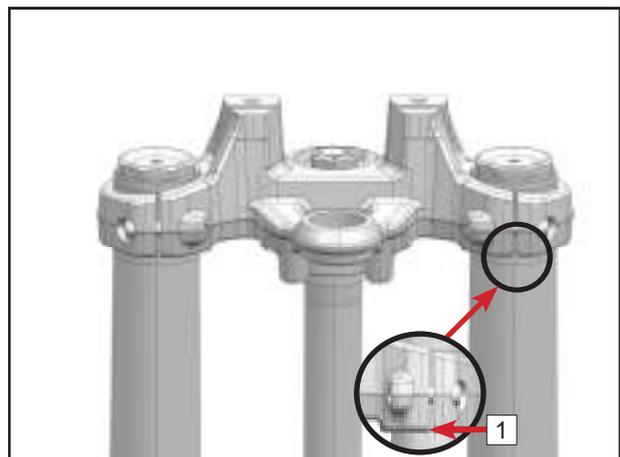
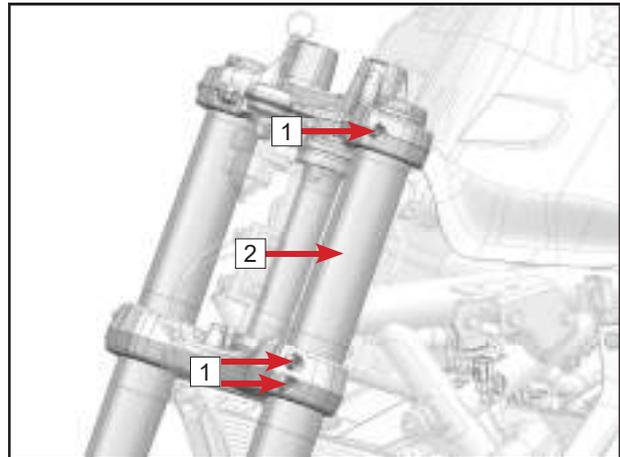
Reverse the removal procedures for installation.

### Adjustment

The front shock absorber has been adjusted to the best condition when the vehicle leaves the factory, and is suitable for most situations.

### Installation

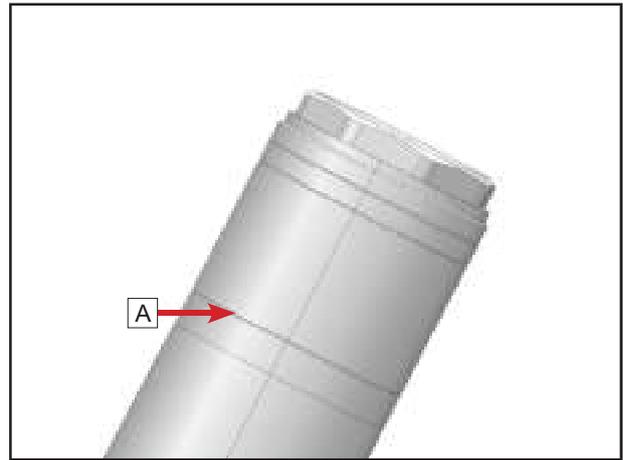
Reverse the removal procedures for installation.



## ⚠ CAUTION

When installing the front shock absorber, the scale **A** of shock absorber should be aligned with the lower plane **1** of upper triple clamp.

The front RH shock absorber is disassembled and installed in the same way as the front LH shock absorber.



## 9.2 Rear Shock Absorber

### Pre-work

Remove seat, shock absorber adjustment port and rear footrest bracket assembly. (see chapter 06 for details)

### Removal

Remove bolt nut assembly **1**.

Remove bolt **2**.

Remove rear shock absorber **3**.

**Bolt nut assembly 1 torque: 55N·m~65N·m**

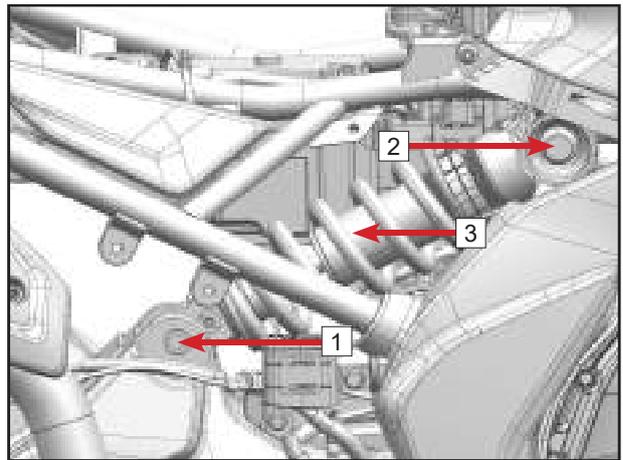
**Bolt 2 torque: 70N·m~80N·m**

### Inspection

Check whether the appearance of rear shock absorber is damaged, cracked and other damages. If so, replace the parts.

Clean the dust and mud from the rear shock absorber.

Hold the handlebar and press down several times to check whether the compression and rebound of rear shock absorber are normal.



### Adjustment

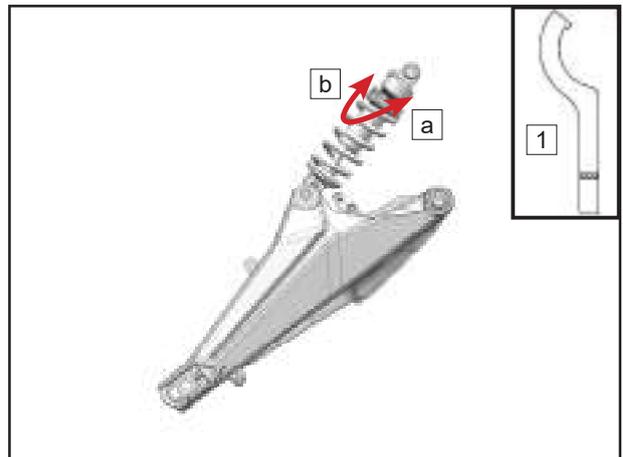
The rear shock absorber spring preload can be adjusted to suit the rider's weight and riding conditions.



### Adjust the spring preload by following these steps:

Use a special tool **1** to turn counterclockwise in the direction **a** to reduce spring preload.

Use a special tool **1** to turn clockwise in the direction **b** to increase the spring preload.



<b>NOTE</b>
-------------

The shock absorber has been adjusted to the best condition when the vehicle leaves the factory, and is suitable for most situations.
--

 <b>DANGER</b>
---

<b>This component contains high-pressure nitrogen. Improper operation may result in explosion. Read the relevant instructions and do not put it in the fire, open the hole or open it.</b>
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## **Installation**

Reverse the removal procedures for installation. Damping adjustment is to the right of the vehicle.

## 9.3 Rear Fork

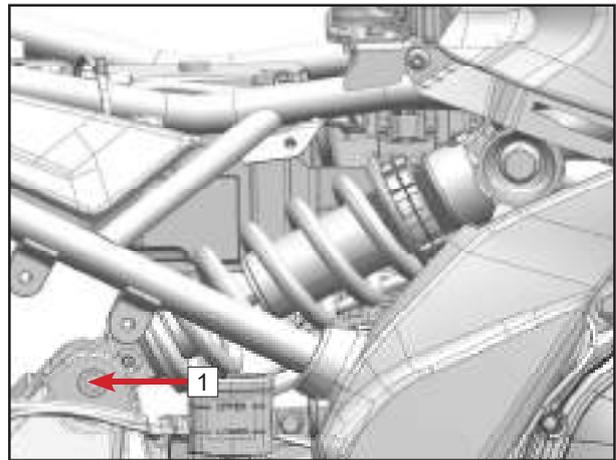
### Pre-work

Remove chain adjusting block, rear wheel shaft nut, rear wheel shaft and rear wheel. (see chapter 07 Powertrain System for details)

Remove rear fender and frame LH&RH panel. (see chapter 06 for details)

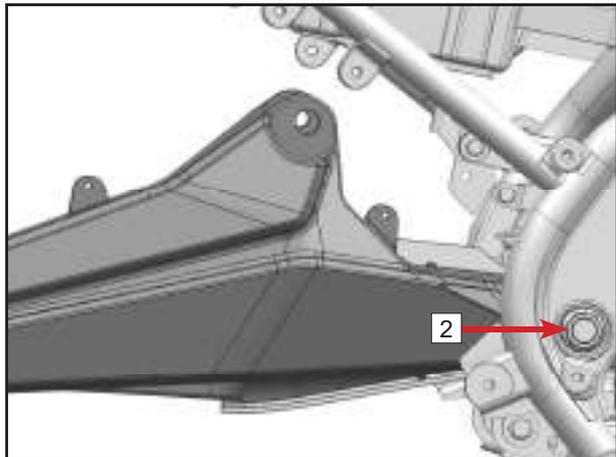
### Removal

Remove bolt nut assembly **1**.



**Bolt nut assembly 1: 55N·m~65N·m**

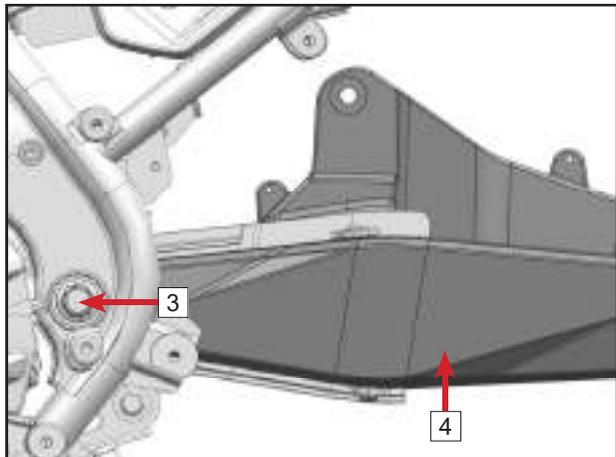
Remove nut **2**.



**Nut torque: 175N·m~185N·m**

Remove rear fork shaft **3**.

Remove rear fork **4**.



## Rebound Damping Adjustment

The rebound damping end is inscribed with TEN.

The rebound damping affects the reaction speed during the shock absorber rebound. The lower the damping gear 1, the slower the suspension rebound speed, and the higher the damping gear, the faster the suspension rebound speed.

**Initial gear: 10 gear**

**Total gear: 20 gear  $\pm$  2 gear**

Use a flat-head screwdriver to rotate the gear counterclockwise ("-") direction) and record the number of times to reduce the rebound damping.

Use a flat-head screwdriver to rotate the gear clockwise ("+" direction) and record the number of times to increase the rebound damping.

Reverse rotation according to the recorded rotation numbers to restore the factory settings. Or rotate counter-clockwise ("-") direction) to the minimum, clockwise ("+" direction) to the shock absorber 10 gear.

**Contact the engineer to adjust the damping. Do not adjust it yourself.**

## Compression Damping Adjustemnt

The compression damping end is inscribed with COMP.

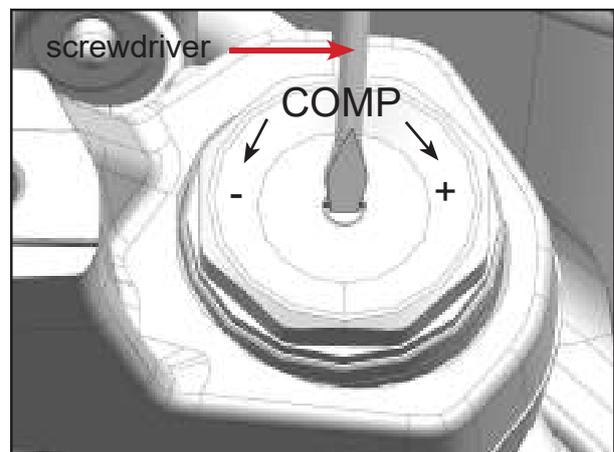
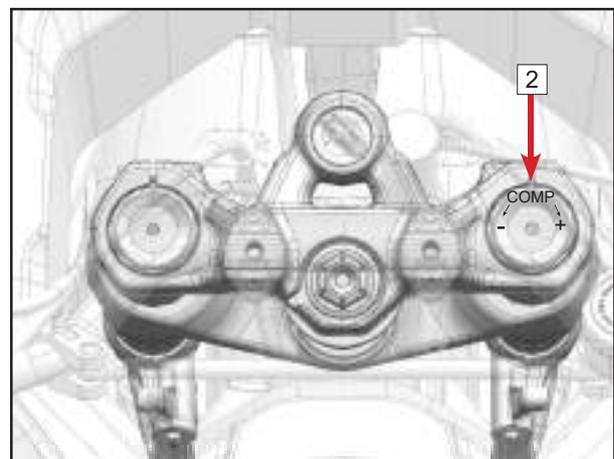
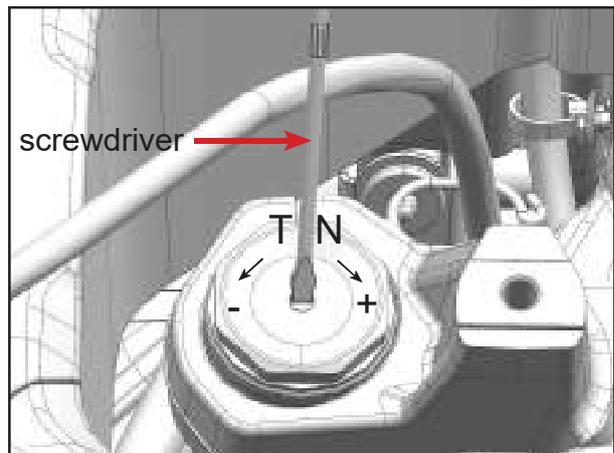
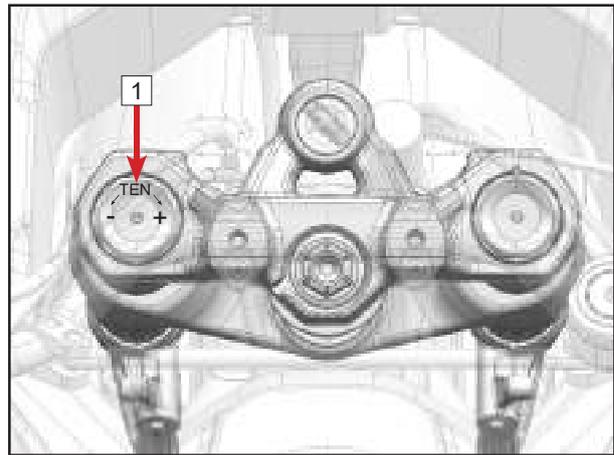
The compression damping affects the reaction speed during the shock absorber compress. The lower the damping gear 2, the slower the suspension compress speed, and the higher the damping gear, the faster the suspension compress speed.

**Initial gear: 10 gear**

**Total gear: 20 gear  $\pm$  2 gear**

Use a flat-head screwdriver to rotate the gear counterclockwise ("-") direction) and record the number of times to reduce compression damping.

Use a flat-head screwdriver to turn the gear clockwise ("+" direction) and record



the number of times to increase the compression damping.

Reverse rotation according to the recorded rotation numbers to restore the factory settings. Or rotate counter-clockwise ("-") direction) to the minimum, clockwise ("+" direction) to the shock absorber 10 gear.

**Contact the engineer to adjust the damping. Do not adjust it yourself.**

**Front shock absorber oil: SA46**

**Front shock absorber oil capacity:  
542±3mL**

# CFMOTO

## Rebound Damping Adjustment

The rebound damping affects the reaction speed during the shock absorber rebound. The lower the damping gear **1**, the slower the suspension rebound speed, and the higher the damping gear, the faster the suspension rebound speed.

**Initial gear: 7 gear**

**Total gear: 15 gear  $\pm$  2 gear**

Adjust the Angle as shown on the right.

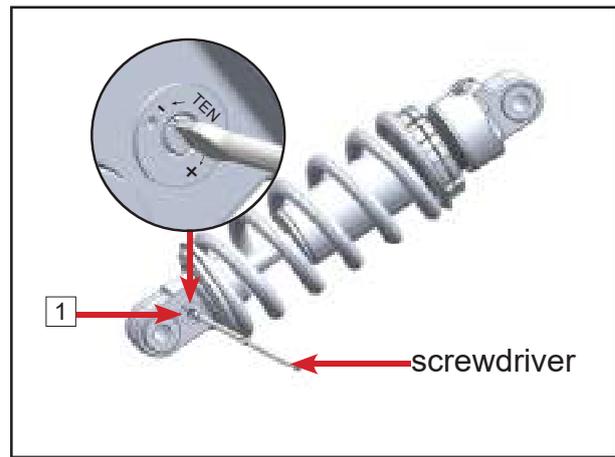
Use a flat-head screwdriver clockwise ("+" direction) to rotate the gear and record the number of times to increase the rebound damping.

Use a flat-head screwdriver counterclockwise ("- " direction) to rotate the gear and record the number of times to reduce the rebound damping.

## Restore the Rebound Damping to Factory Settings

Reverse rotation according to the recorded rotation numbers to restore the factory settings. Or rotate clockwise ("+" direction) to the maximum, counter-clockwise ("- " direction) to the shock absorber 7 gears.

**Contact the engineer to adjust the rebound damping. Do not adjust it yourself.**



### DANGER

This component contains high-pressure nitrogen. Improper operation may result in explosion. Read the relevant instructions and do not put it in the fire, open the hole or open it.

**Rear shock absorber oil: 6#**

**Rear shock absorber oil capacity:  
78 $\pm$ 1mL**

## 09 Suspension System

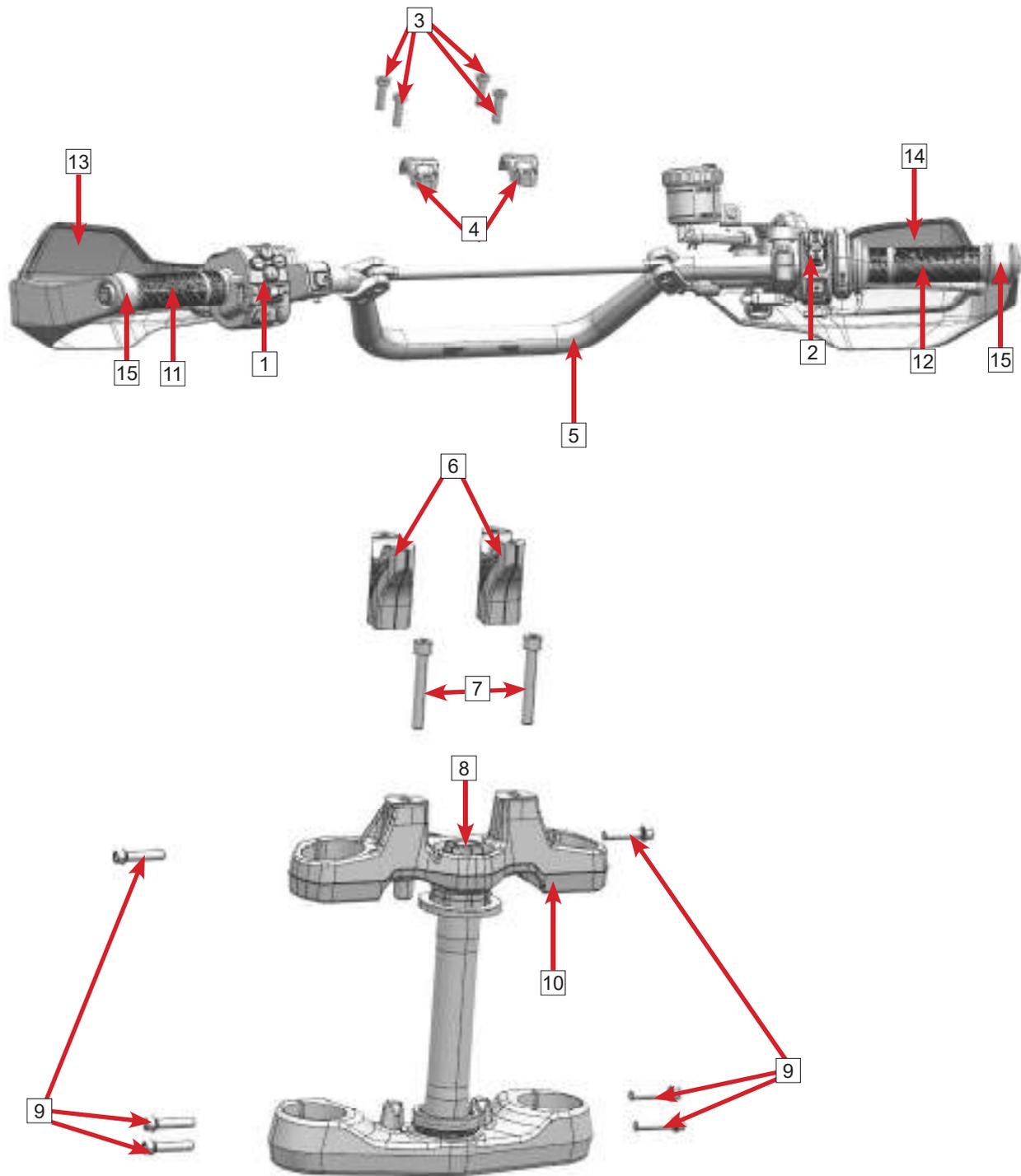
### Shock Absorber Adjustment Recommendation

Shock absorber Use condition	Major adjustment item		Auxiliary adjustment item	
	Rear shock absorber		Front shock absorber	
	Spring pre-load	Rebound Damping	Compression Damping	Rebound Damping
Factory setting state	6 laps	7±2	10±2	10±2
1 people (75kg)+equipment (3 cases load)	9 laps	4±2	10±2	10±2
1 person (75kg)+1 person (75kg)	10 laps	3±2	14±2	14±2
1 person (75kg)+1 person (75kg)+equipment (3 cases load)	12 laps	1±2	16±2	16±2
1 person (75kg) + continuous rough road	6 laps	8±2	8±2	8±2
*Recommended for general and light off-road use	<p>The front shock absorber is rotated counterclockwise to the limit position, and then rotated clockwise to increase the number of damping segments.</p> <p>The rear shock absorber is rotated clockwise to maximum gear and then rotated counterclockwise to reduce the number of damping segments.</p> <p>This is the recommended value, users need to adjust according to personal preferences and actual conditions.</p>			



<b>10.1 Exposed View .....</b>	<b>10-2</b>
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## 10.1 Exposed View



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<b>1</b>	LH handlebar switch assembly	<b>2</b>	RH grip switch assembly	<b>3</b>	Inner hex bolt	<b>4</b>	Grip upper press cover
<b>5</b>	Grip	<b>6</b>	Handlebar mounting seat	<b>7</b>	Bolt	<b>8</b>	Upper triple clamp fixed screw
<b>9</b>	Inner hex screw	<b>10</b>	Upper triple clamp assembly	<b>11</b>	LH heating grip	<b>12</b>	RH heating grip
<b>13</b>	LH grip guard	<b>14</b>	RH grip guard	<b>15</b>	Balancer		

## 10.2 Handlebar Switch

### Pre-work

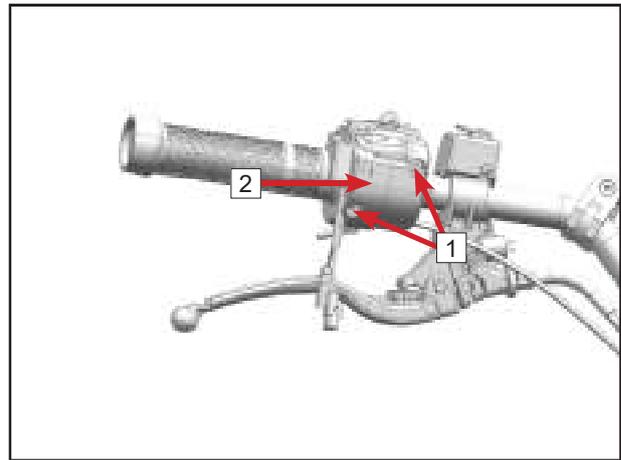
Remove the LH and RH handlebar guard.  
(refer to the 06 vehicle body and frame chapter)

### 10.2.1 LH Handlebar Switch Assembly

#### Removal

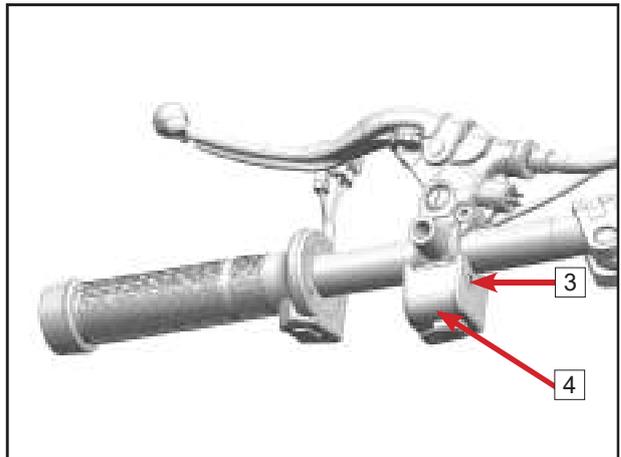
Remove screws [1].

Remove the switch [2].



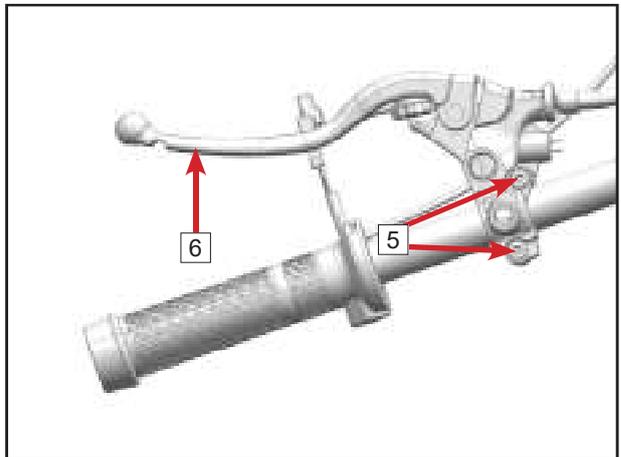
Remove the self-tapping screw [3].

Remove the ABS switch [4].



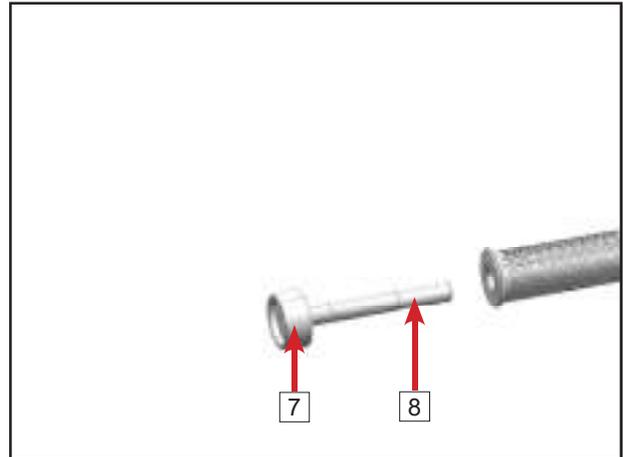
Remove the inner hex bolts [5].

Remove the clutch lever [6].

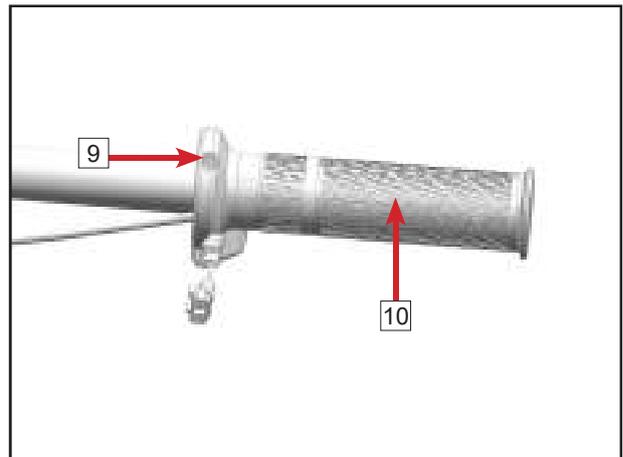


# 10 Steering System

Remove the balancer [7].  
Remove the balancer I [8].



Remove the bolt [9].  
Remove the LH grip [10].

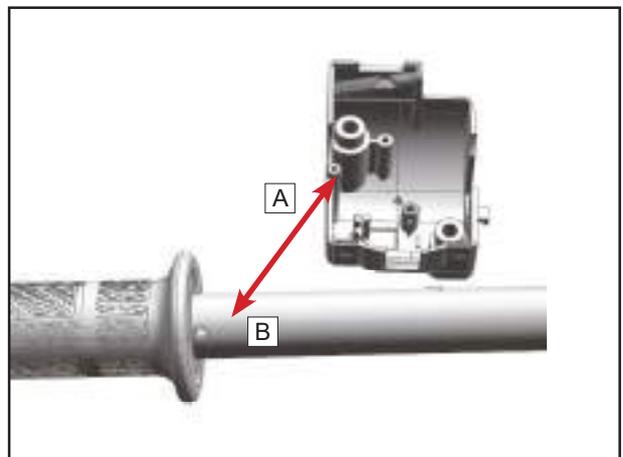


## Installation

Reverse the removal procedures for installation.

### NOTE

When the switch is installed on the handlebar tube, there is a positioning structure inside the switch. Connect device A to the fixing point B of the steering tube and then tighten the bolt.

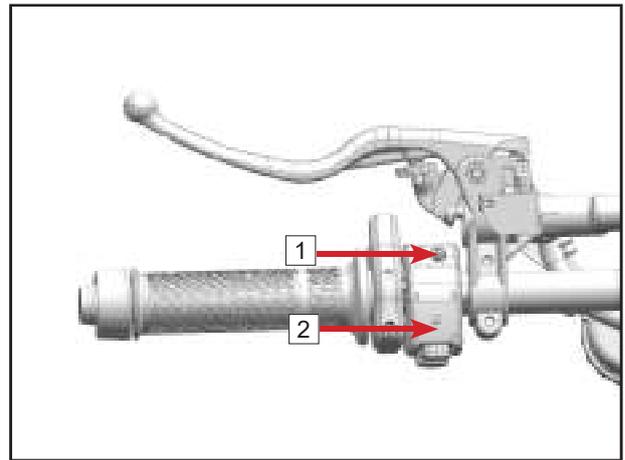


## 10.2.2 RH Handlebar Switch Assembly

### Removal

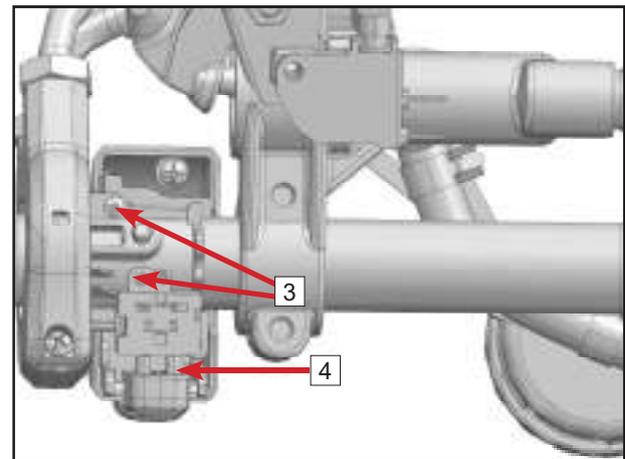
Remove the bolt **1**.

Remove the RH grip switch cover **2**.



Remove two screws **3**.

Remove the RH grip switch **4**.



### Installation

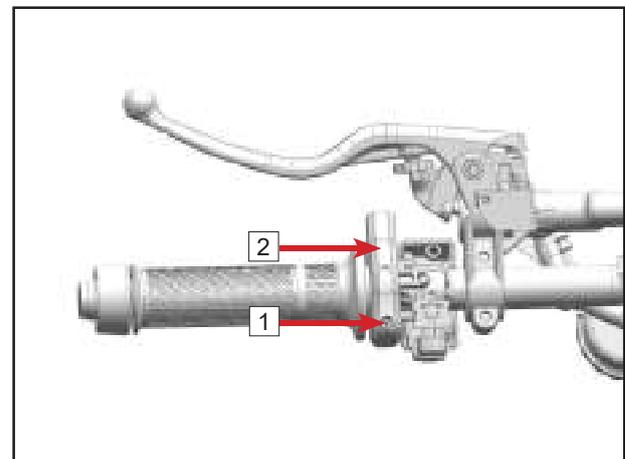
Reverse the removal procedures for installation.

## 10.2.3 Throttle Grip

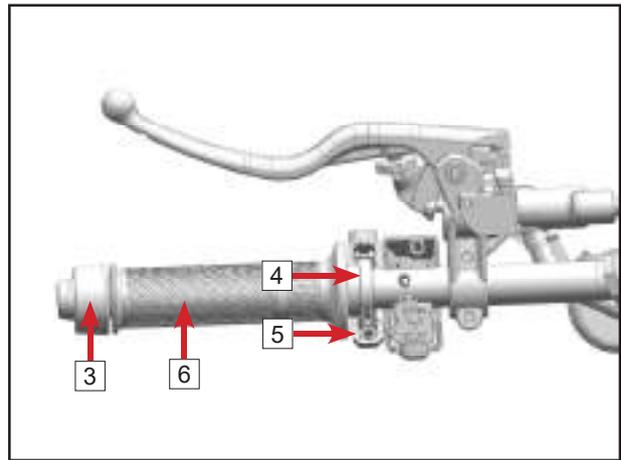
### Removal

Remove the bolt **1**.

Remove the throttle seat upper cover **2**.

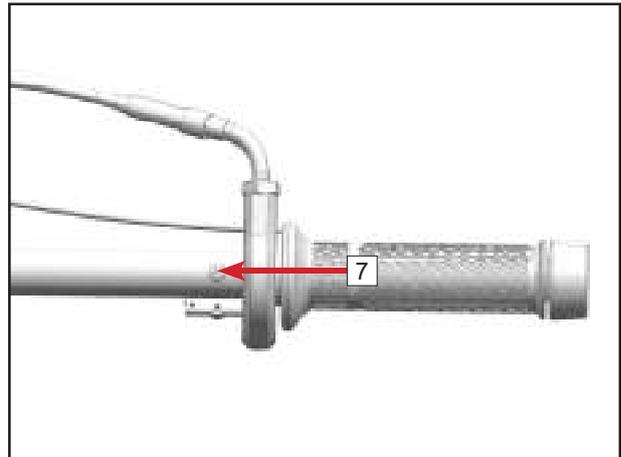


- Remove the RH grip balancer [3].
- Separate throttle wire throttle seat [4].
- Remove the screw [7].
- Remove the throttle seat lower cover [5].
- Remove the throttle grip [6].



## Installation

Reverse the removal procedures for installation.



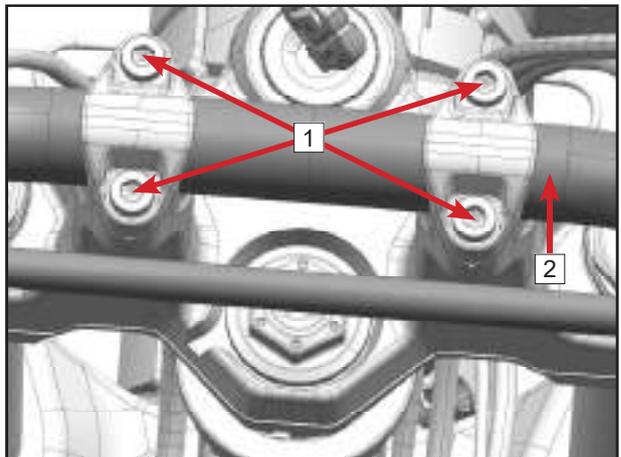
## 10.2.4 Handlebar

### Pre-work

Remove the LH grip and throttle grip (refer to this chapter)

### Removal

Remove four fixed screws to remove the lower handlebar.



## Installation

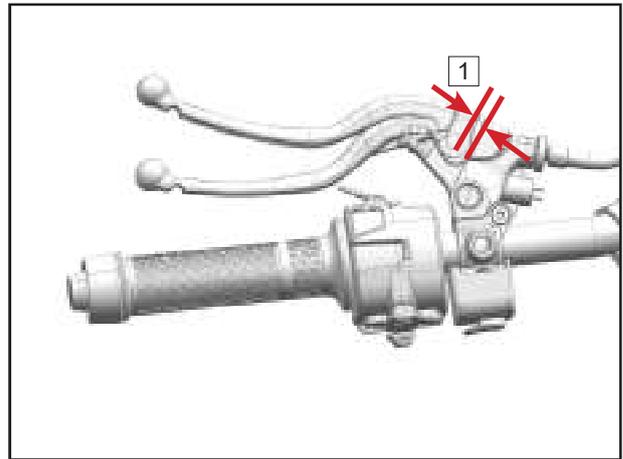
Reverse the removal procedures for installation.

## 10.3 Handlebar Service

### 10.3.1 Clutch Lever Clearance Inspection

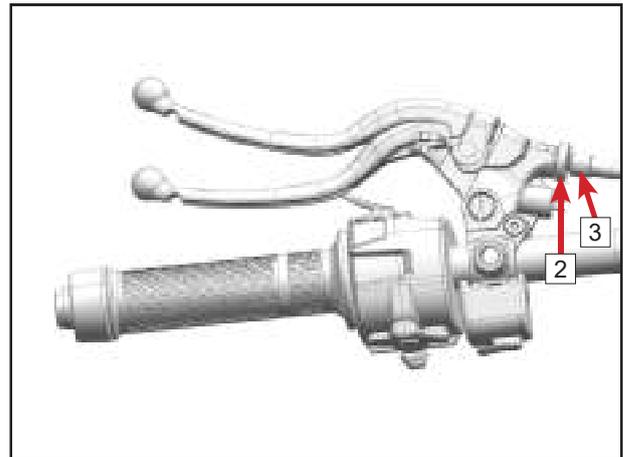
Check if the clutch lever returns smoothly.  
Check the free play **1** of clutch lever.

**Free play: 2mm.**

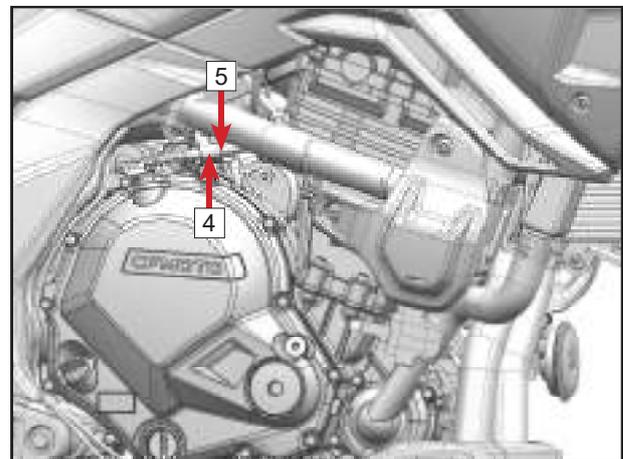


### 10.3.2 Clutch Cable Free Play Adjustment

When the hand lever end is slightly adjusted, loosen the lock nut **2**, turn the adjusting nut **3** for adjustment, and tighten the lock nut **2**.



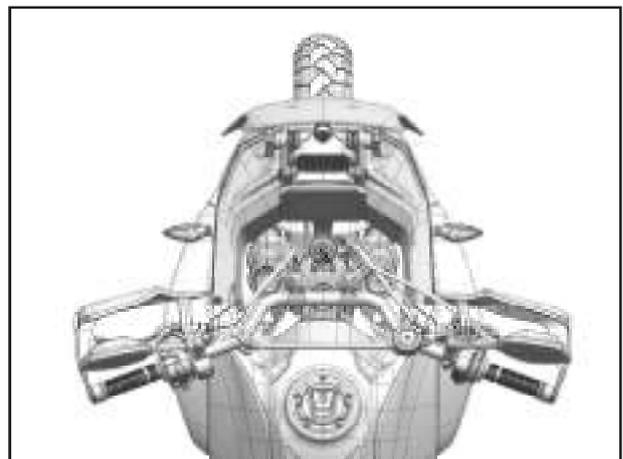
When the engine end is heavily adjusted: loosen the lock nut **5**, turn the adjusting nut **4** for adjustment, then tighten the lock nut **5**.



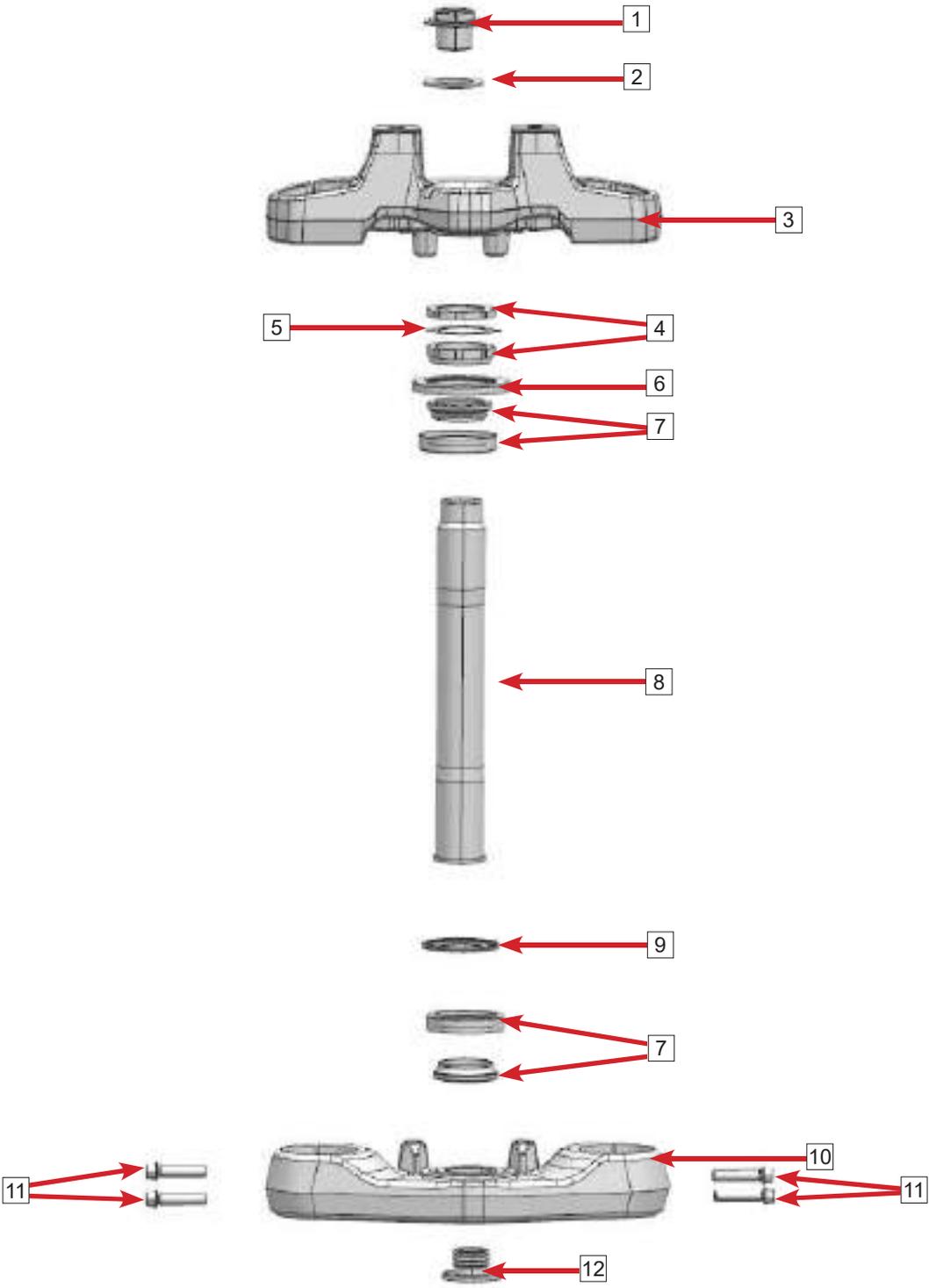
### 10.3.3 Handlebar Interference Inspection

Swing the handlebar to the left and right to check if all kinds of wires interfere with the front wheel.

Whether the direction of the maximum steering interferes with the fuel tank.



## 10.4 Triple Clamps Assembly Exposed View



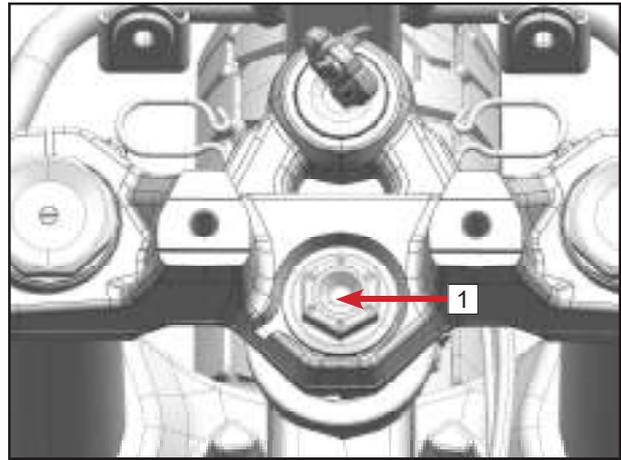
1	Upper triple clamp tighten screw	2	Gasket	3	Upper triple clamp	4	Locking nut
5	Washer	6	Upper retainer anti-dust cap	7	Steering bearing assembly	8	Front fork pipe
9	Lower retainer anti-dust cap	10	Lower triple clamp	11	Inner hex screw	12	Front fork pipe plug

## 10.5 Upper&Lower Triple Clamp Front Fork Pipes

### Pre-work

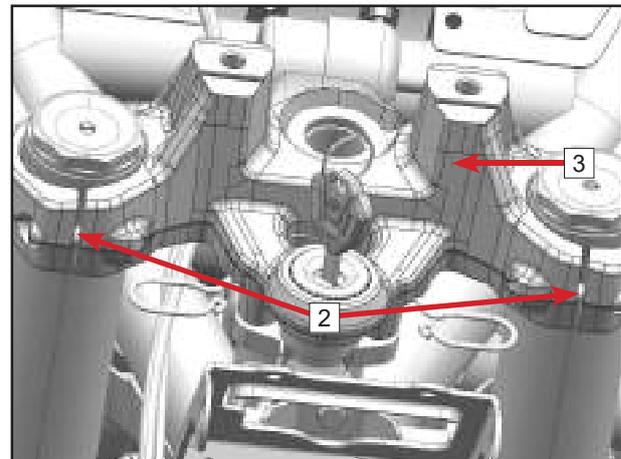
Remove vehicle LH&RH panel, front plastic parts (see chapter 06 Frame).

Remove the nut **1** under the upper triple clamp.



Remove bolts **2**.

Remove upper triple clamp **3**.

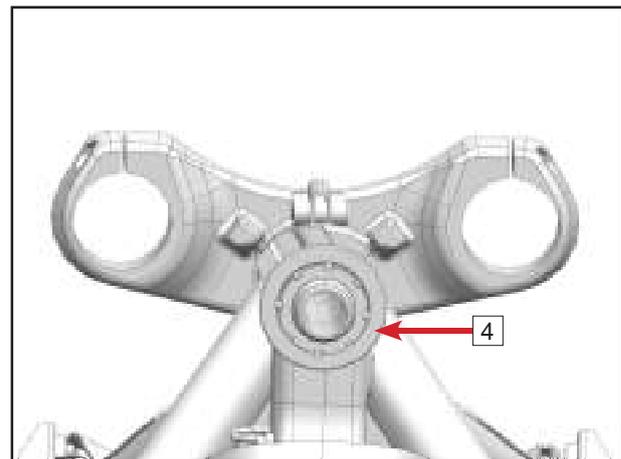


Remove two locking nuts **A**.



Remove LH&RH front shock absorber (see chapter 09 Suspension System for details).

Remove anti-dust cap and it's assembly **4**.

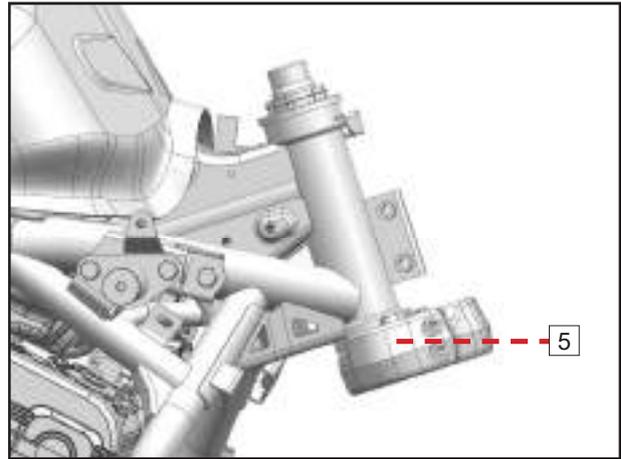


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Remove the lower triple clamp front fork pipe [5].

### Installation

Reverse the removal procedures for installation.



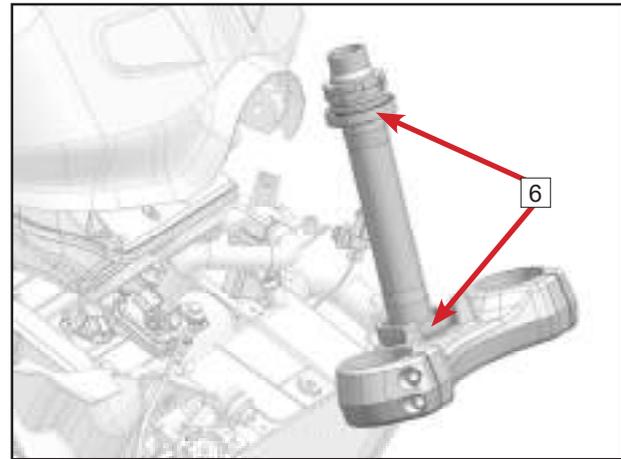
### Inspection

Inspect upper&lower steering bearing assembly [6] for completeness or wear. Replace in time if it does.

Inspect whether the bearing steel bowl has cracks or abnormal wear. Replace in time if it does.

### Installation

Reverse the removal procedures for installation.



### NOTE

When installing and replacing, apply sufficient grease in the bearing steel bowl.



# 11 Cooling System

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## 11.1 Coolant Specification

The coolant used in the cooling system is a mixture of 51.5% water, 46% ethylene glycol, and 2.5% additives. This mixture has good anti-corrosion and heat absorption functions. Its freezing point is  $-35\text{ }^{\circ}\text{C}$ . If the engine works under  $-35\text{ }^{\circ}\text{C}$ , the coolant with freezing points of  $-40\text{ }^{\circ}\text{C}$  and  $-50\text{ }^{\circ}\text{C}$  is selected.

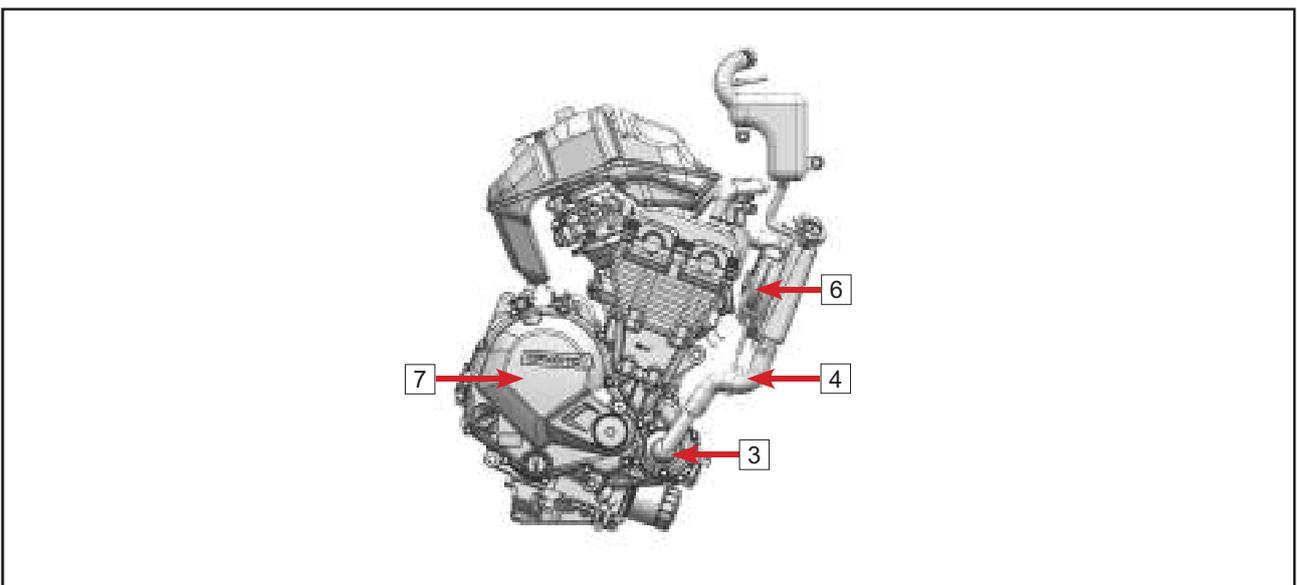
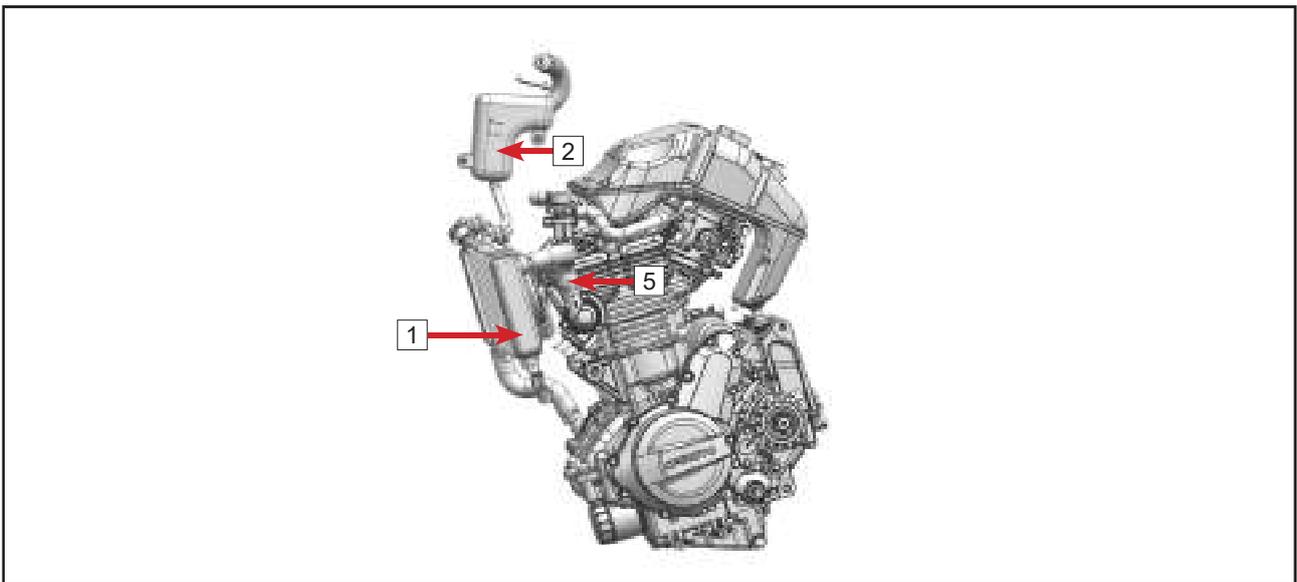
### ⚠ CAUTION

The mixture made of high-quality distilled water and ethylene glycol antifreeze shall not be mixed with ethanol mixture or other brands of antifreeze.

The mixing ratio shall not exceed 60% or be less than 50%.

Do not use leak proof additives.

## 11.2 Cooling System View



1	R a d i a t o r a s s e m b l y	2	R e s e r v o i r t a n k a s s e m b l y	3	W a t e r p u m p a s s e m b l y	4	R a d i a t o r w a t e r o u t l e t p i p e
5	R a d i a t o r w a t e r i n l e t p i p e	6	F a n m o t o r a s s e m b l y	7	E n g i n e a s s e m b l y		

 **DANGER**

Coolant is toxic and harmful to health.

Don't drink nor spill on skin, eyes, clothing.

If coolant is swallowed, induce vomit and seek for medical attention.

In case of contact with skin, wash the contact part with plenty of water immediately.

Once the coolant comes into contact with the eyes, immediately flush the eyes thoroughly with water and then seek medical advice.

If you spill coolant on your clothing, change your clothing.

Rust and corrosion residues in the engine and radiator must be treated according to regulations. The chemical inside can do harm to humans.

 **CAUTION**

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

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

The coolant added into the cooling system is green and contains ethylene glycol.

When the ambient temperature is at  $-35^{\circ}\text{C}$ , please choose the coolant whose freezing point is lower than  $-35^{\circ}\text{C}$ .

 **WARNING**

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

Do not open the radiator, radiator hose, auxiliary water tank and other parts of the cooling system before the engine or cooling system is completely cooled.

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

## 11.3 Cooling System Assembly Removal

Place a basin under the water pump.

Remove the drain bolt **1**.

Drain the coolant.

Loosen the clamp **2**.

Remove the outlet pipe **3**.

### NOTE

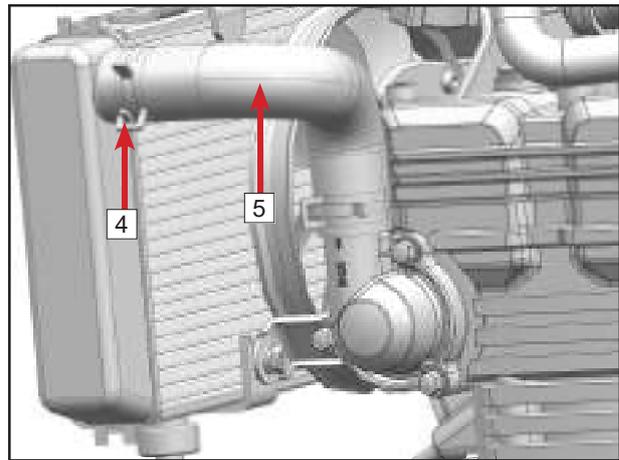
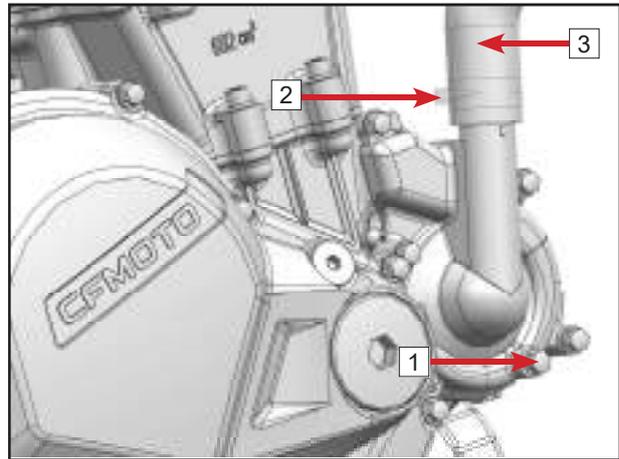
After water outlet pipe removal, there is still some coolant spilling out.

### NOTE

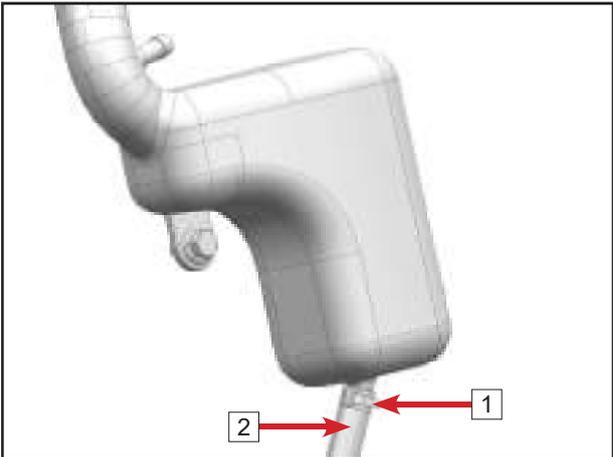
The cooling system has a certain pressure, and the coolant will shoot a long distance after removing the drain bolt.

Loosen the clamp **4**.

Remove the inlet pipe **5**.

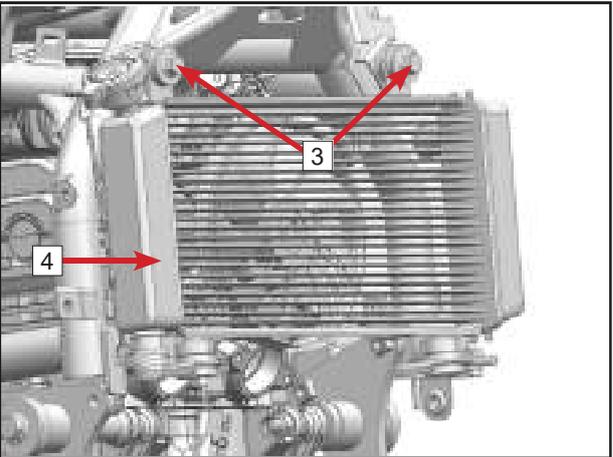


Loosen the clamp [1].  
 Remove reservoir tank siphon pipe [2].



Remove the bolt [3].  
 Remove the radiator [4].

**Installation**  
 Reverse the removal procedures for installation.



## 11.4 Cooling Cycle Tightness Inspection

### Radiator Cap Inspection

Remove the radiator cap.  
 Use a barometer to test the opening pressure of the radiator cap.  
 If the radiator cap cannot meet the pressure requirements, replace it with a new one.

### Opening pressure of radiator cap

135kPa~160kPa  
 1.35kgf/cm<sup>2</sup>~1.6kgf/cm<sup>2</sup>  
 19.58psi~23.2psi

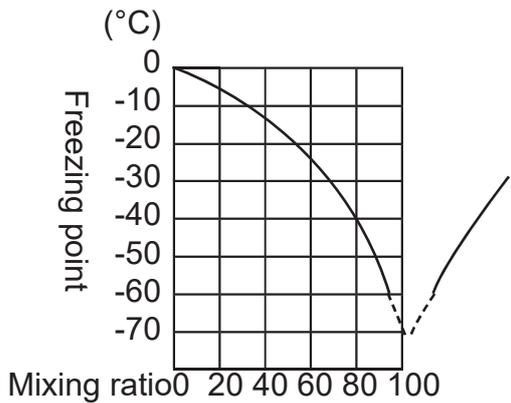
### Standard value:

140kPa  
 1.4kgf/cm<sup>2</sup>  
 20.3psi

### Tightness Inspection

Connect the tester to the connection port of the reservoir tank.

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



**⚠ WARNING**

**Do not open the radiator cap before the engine is cooled to avoid high temperature steam burns.**

Pressurize 135 kPa and hold for 10 seconds.

If the pressure drops within 10 seconds, it indicates there is leakage in the cooling cycle. At this time, inspect the whole cooling cycle, and replace with new parts in case of leakage.

**NOTE**

When taking out the tester, cover the radiator cap with a piece of rag to prevent the coolant from splashing out.

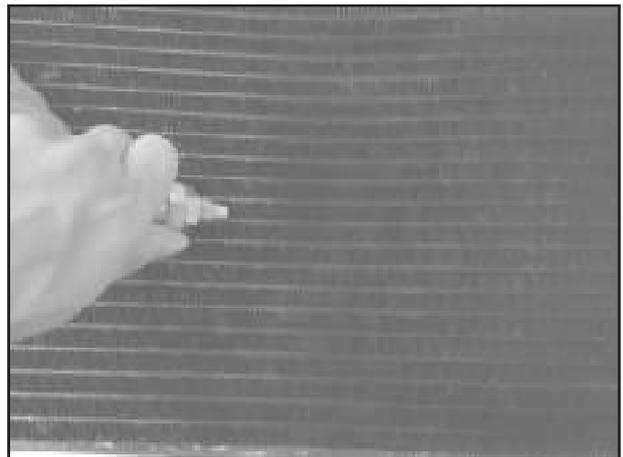
**NOTE**

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

## 11.5 Radiator and Water Pipe Inspection and Cleaning

### Radiator Inspection and Cleaning

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



Repair the radiator fin with a small screwdriver.



### Radiator Water Pipe Inspection

Check the water leakage and damage of radiator hose, and replace with a new one in case of water leakage and damage.

Check the radiator hose clamp and replace it with a new one in case of failure in fastening. Check the coolant after checking the radiator and hose, and add coolant if necessary.

## 11.6 Fan Motor Inspection

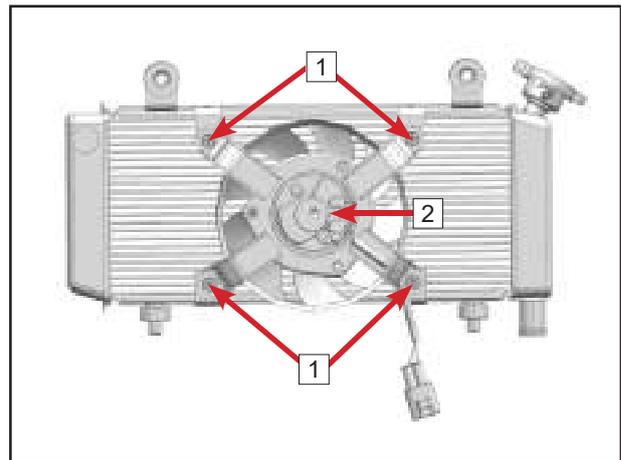
Remove bolts [1].

Remove the fan motor assembly [2].

Rotate the blade by hand and check its rotation flexibility and completeness.

If the blade is jammed or damaged, replace with a new fan motor assembly [2].

The battery voltage is 12V, the motor operates at full speed, and the ammeter current does not exceed 5A. If the motor does not rotate or the current exceeds the specified value, replace with a new fan motor assembly [2].



### Installation

Reverse the removal procedures for installation.

## 11.7 Coolant Inspection

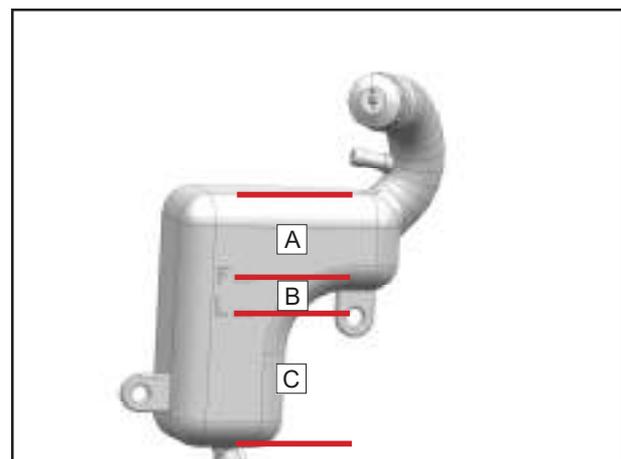
Lift the vehicle on level ground with the side brace.

Check the reservoir coolant level after coolant has cooled down.

If coolant level is in level A: drain excess coolant to level B.

If coolant level is in level B: the level is right.

If coolant level is in level C or not visible: Refill the same coolant to level B.



### **⚠ WARNING**

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

**Do not open the radiator cap, radiator hose, reservoir tank and other parts of the cooling system before the engine or cooling system is completely cooled.**

**In the event of a burn, rinse the wound with running cold water for 10 minutes or more until the wound is no longer painful and then seek medical attention.**

## 11.8 Coolant Addition

Open the reservoir cap and add the same coolant to area B

### ⚠ CAUTION

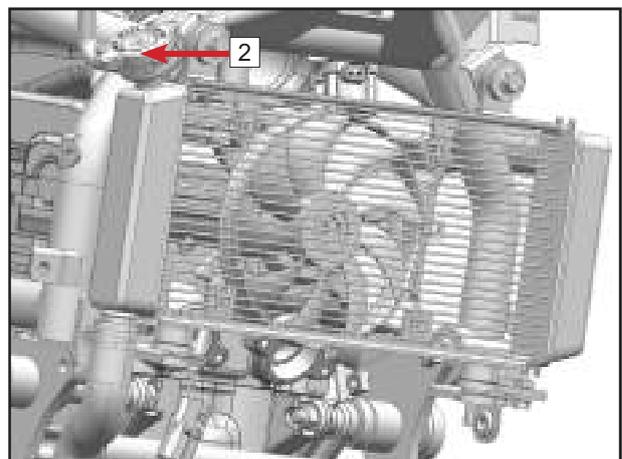
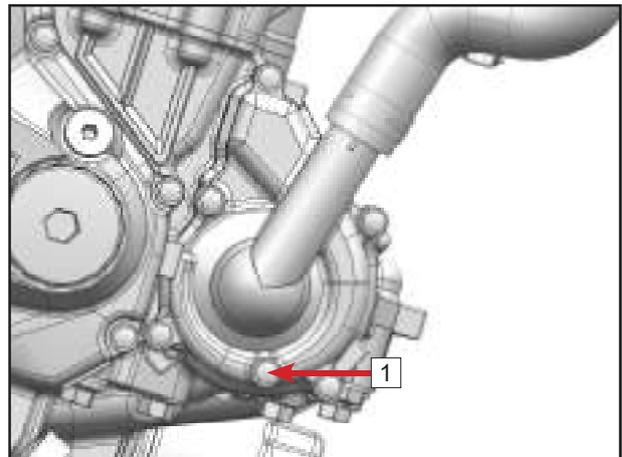
**If the coolant needs to be replenished frequently, or if the coolant in the reservoir is frequently backed up and drained, there may be leakage in the cooling system, contact the engineer to have the cooling system checked.**

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

## 11.9 Coolant Replacement

**Preconditions: Prop up the vehicle using side stand on the level ground or fix the vehicle on the level control console, so that the vehicle is perpendicular to the ground.**

1. Place a container under the water pump.
2. Remove the drain bolt **1**.
3. Release the radiator pressure cap **2**.
4. Drain the coolant (Make sure that the coolant in the reservoir is cleared).
5. Install the drain bolt.
6. Open radiator pressure cap **2**.
7. Use a funnel to fill the coolant from the radiator mouth to the radiator neck.
8. Start the vehicle to heat engine for 2 to 3 minutes (do not close the radiator pressure cover during vehicle starting).
9. After heating the engine, add coolant from radiator mouth to radiator neck.
10. Close the radiator pressure cap **2**.
11. Start the vehicle until the fan runs, and observe the reservoir at the same time to check whether the coolant in the radiator is flowing into the reservoir through the reservoir connecting pipe.
12. If no coolant flows out, repeat steps 6 to 11 above (make sure the engine is cooled).
13. If any coolant flows out, fill the reservoir tank with coolant between the UPPER and LOWER limit line.
14. After the engine is cooled, check the level of reservoir. If the level is lower than the Lower limit line, add the coolant



level is higher than the Upper limit line, drain out the excess coolant to restore the level to the Upper and Lower limits.

between the Upper and Lower limits. If the

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### 12.1 Service Tool

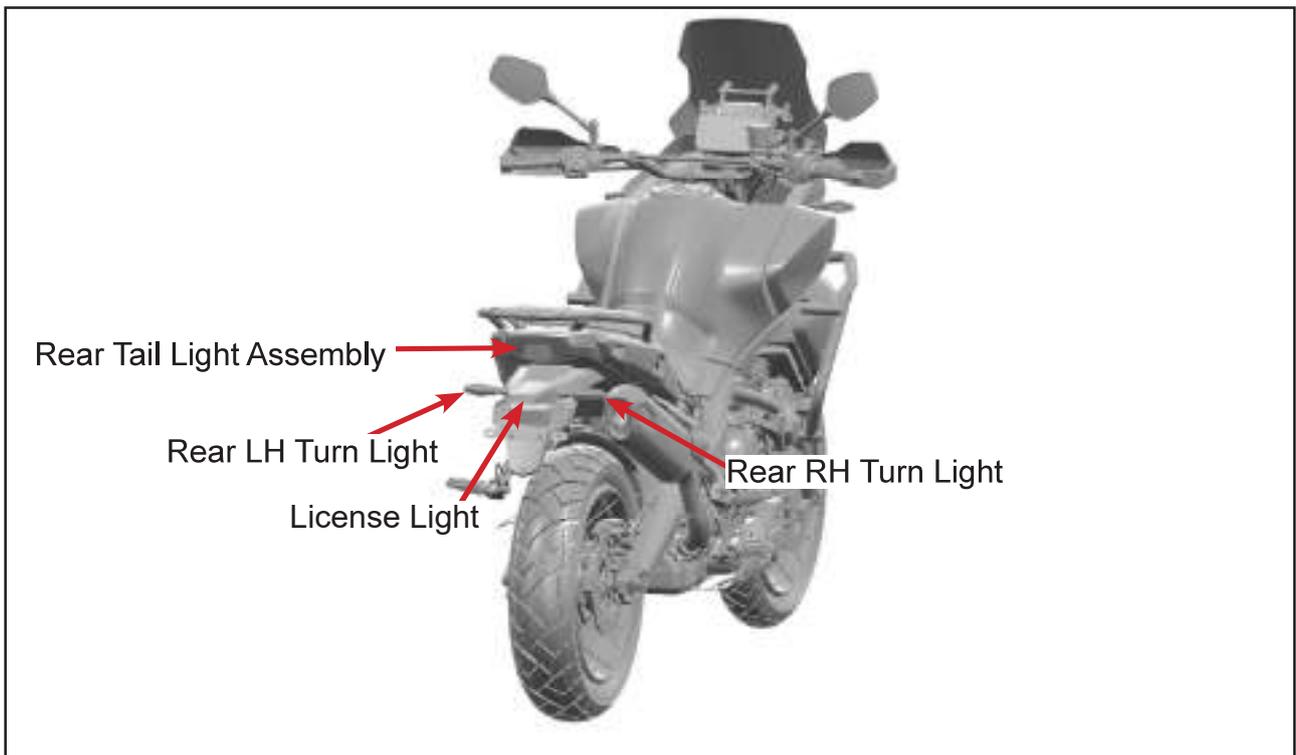
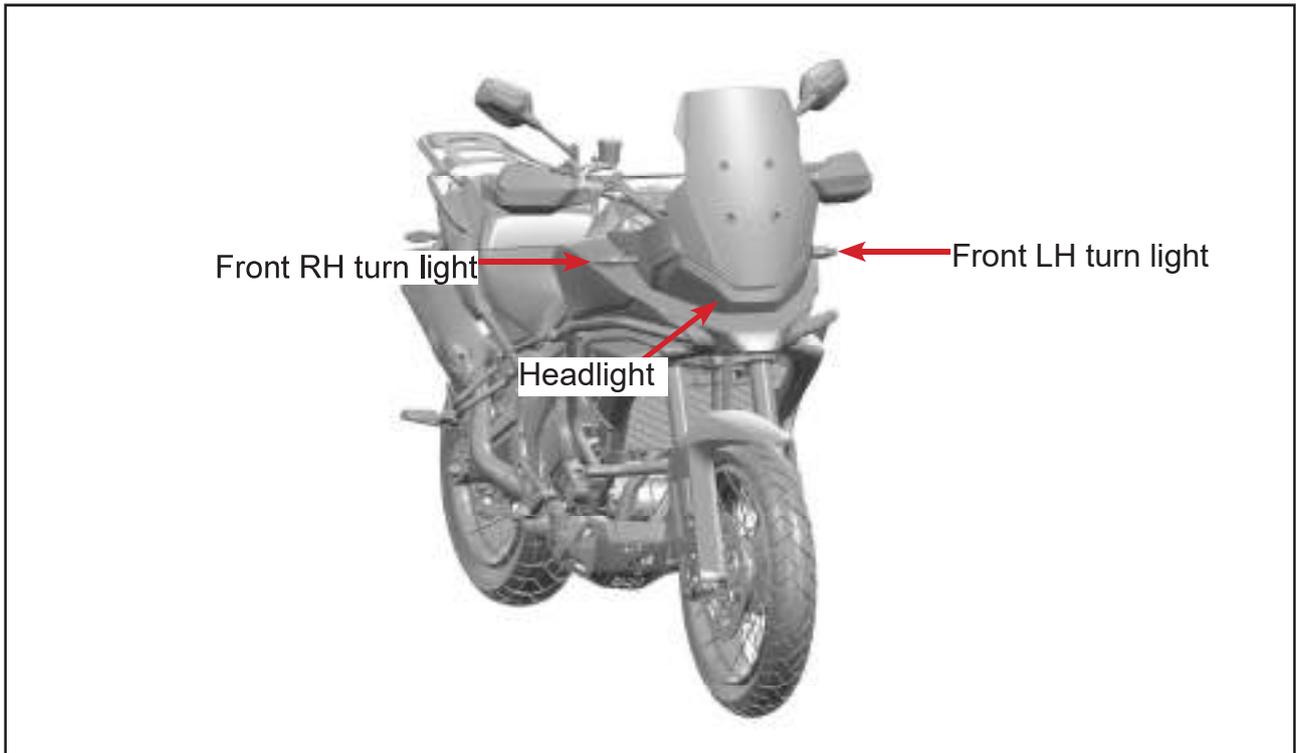
#### CFMOTO DSCAN

**Function: Read/clear EFI system fault codes, observe data stream, update and write ECU programs.**

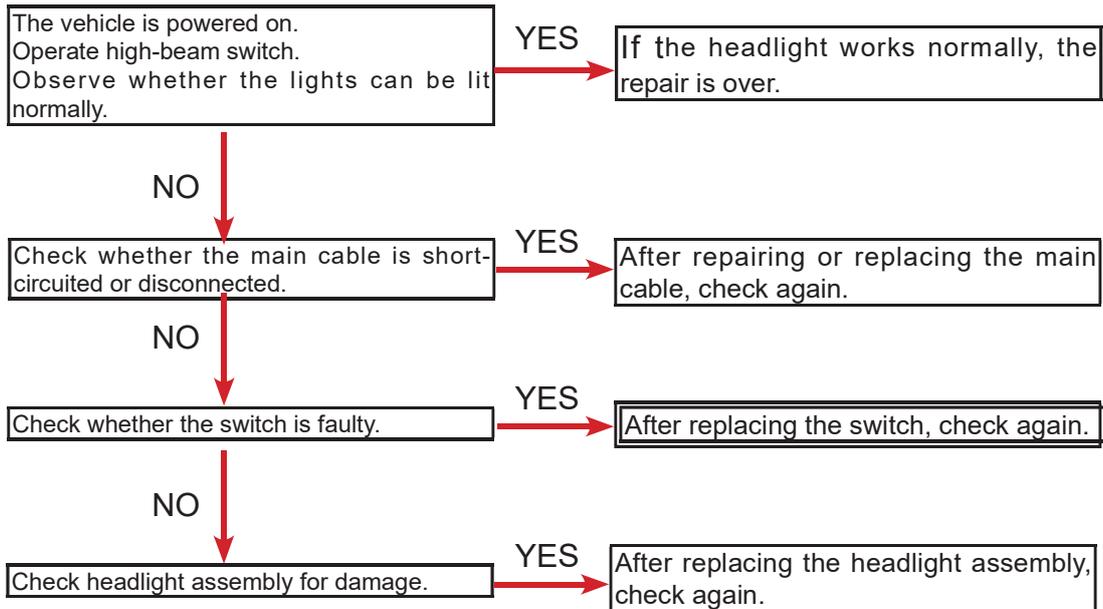


## 12.2 Lights

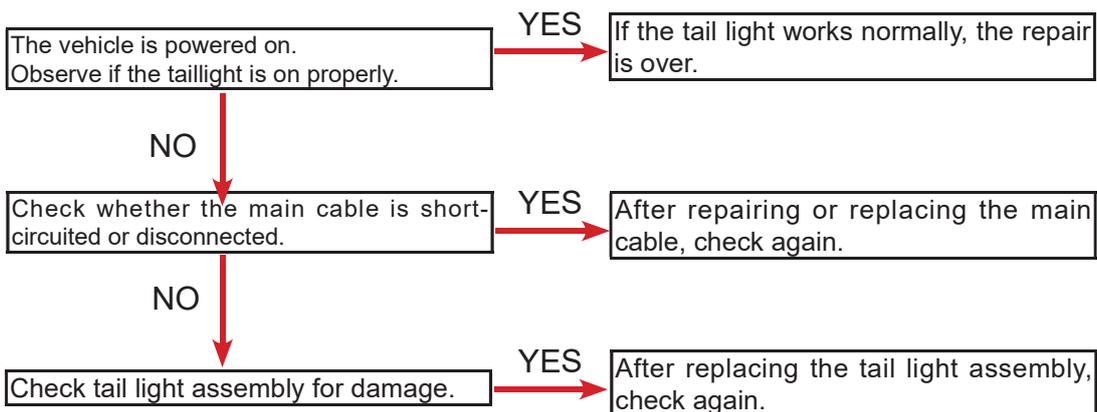
### 12.2.1 Lights View



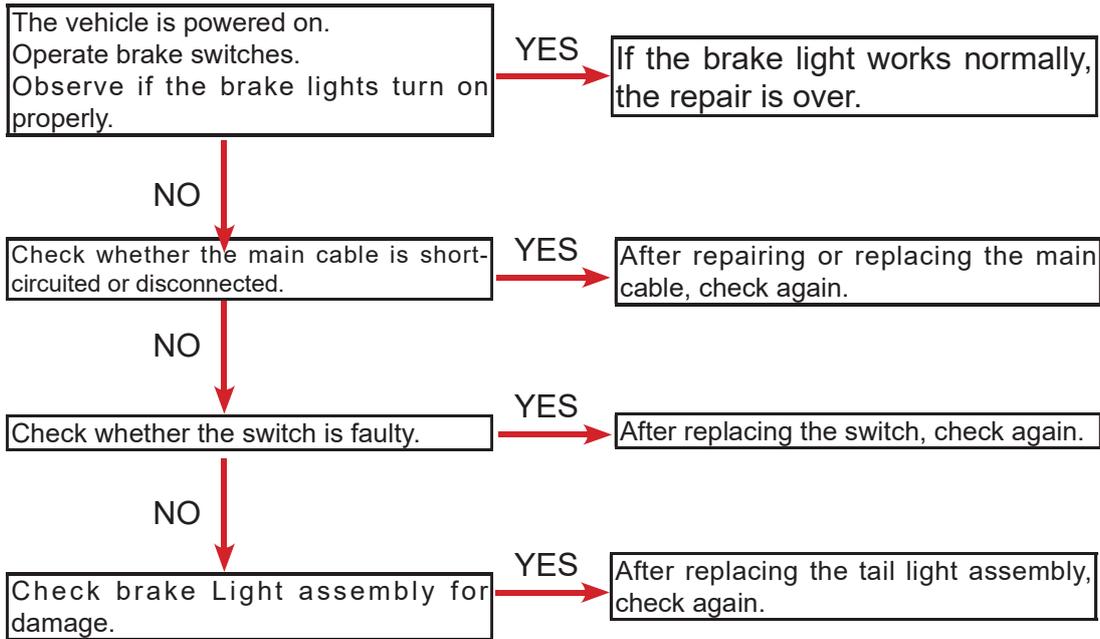
## 12.2.2 Headlight Inspection



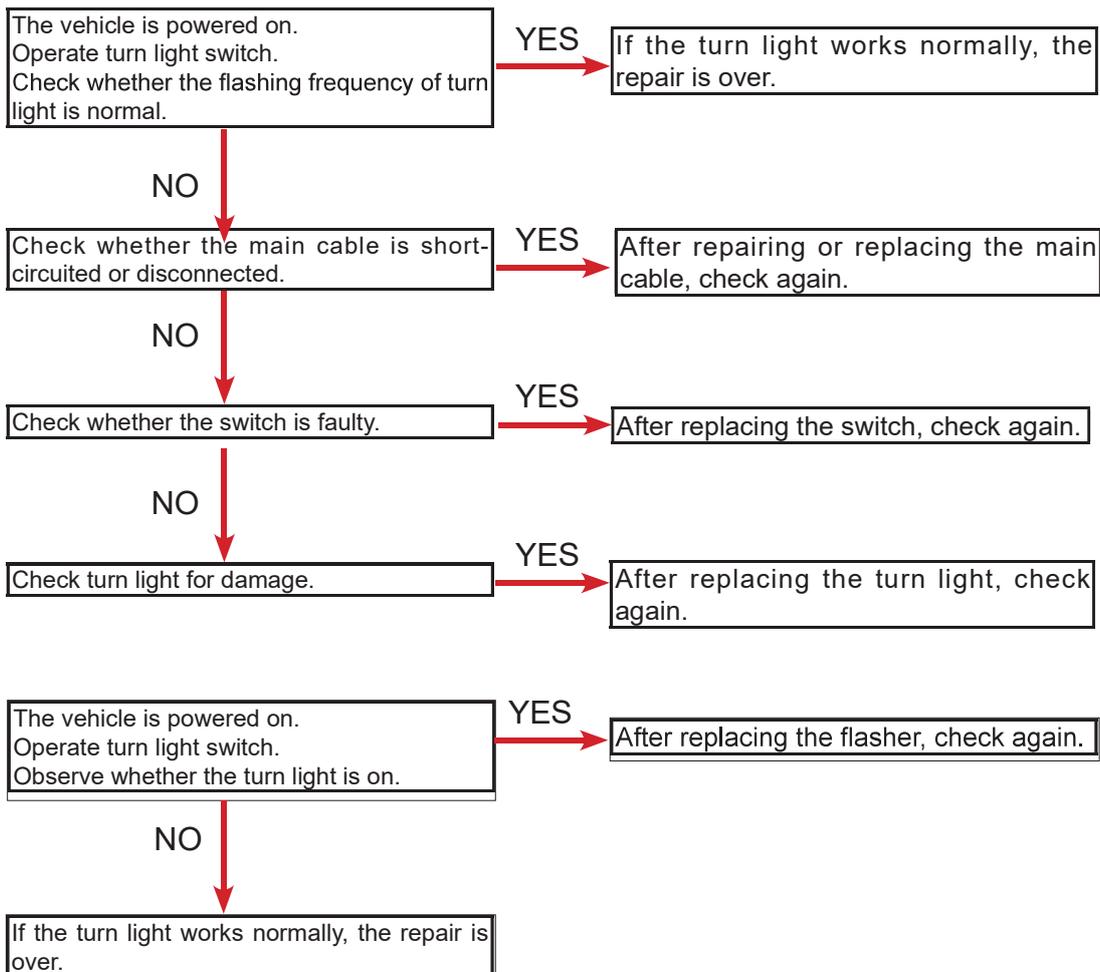
## 12.2.3 Tail Light Inspection



## 12.2.4 Brake Light Inspection

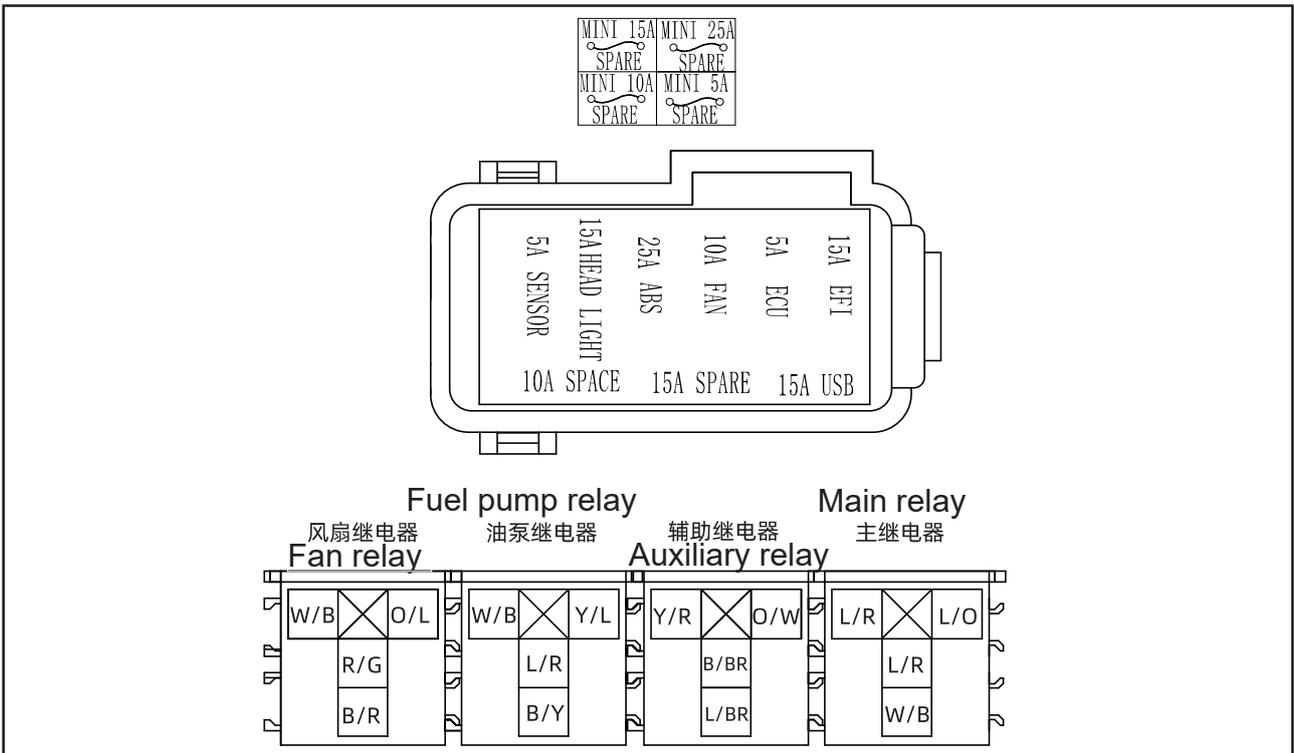
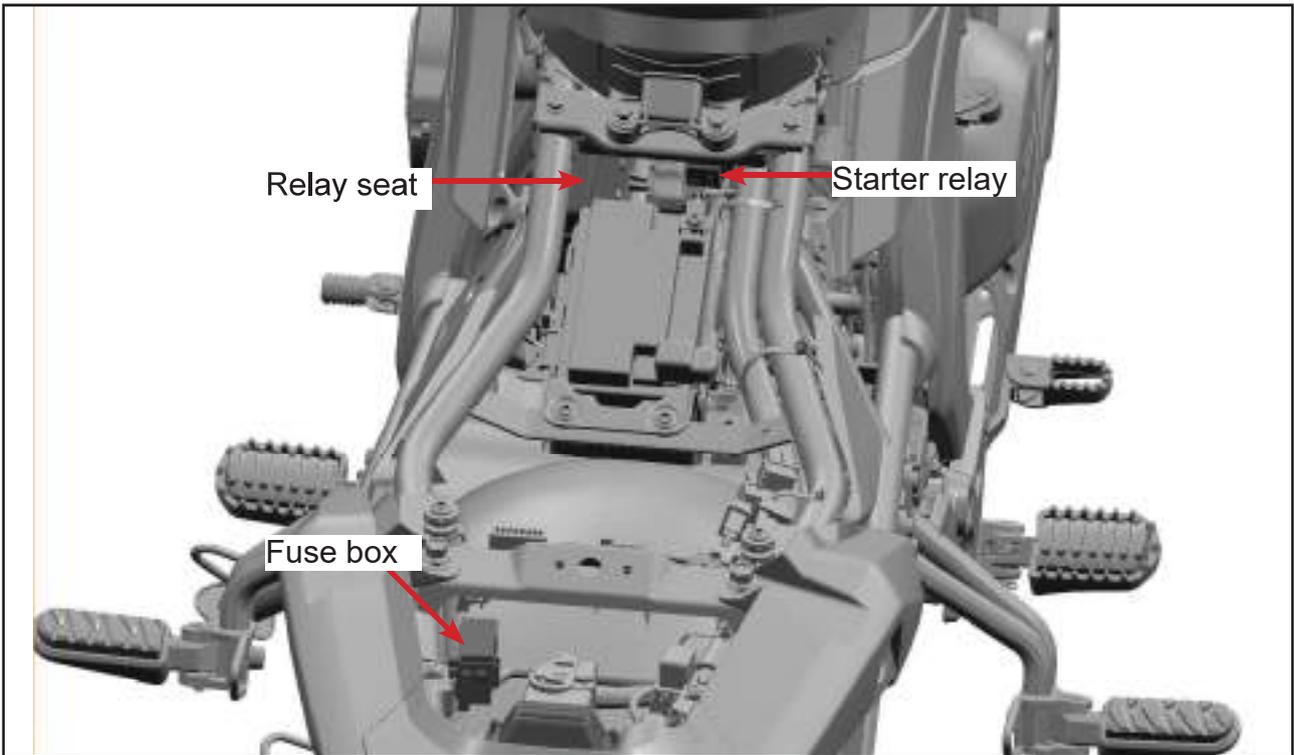


## 12.2.5 Turn Light Inspection



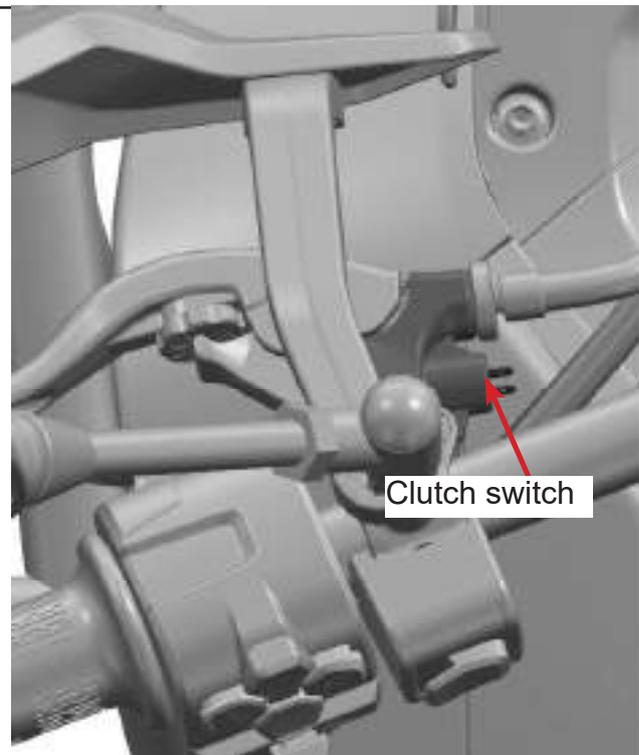
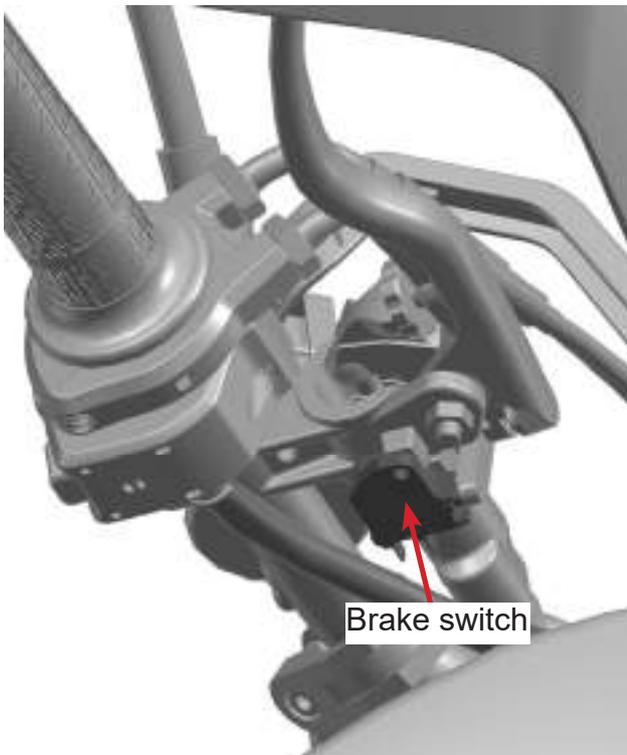
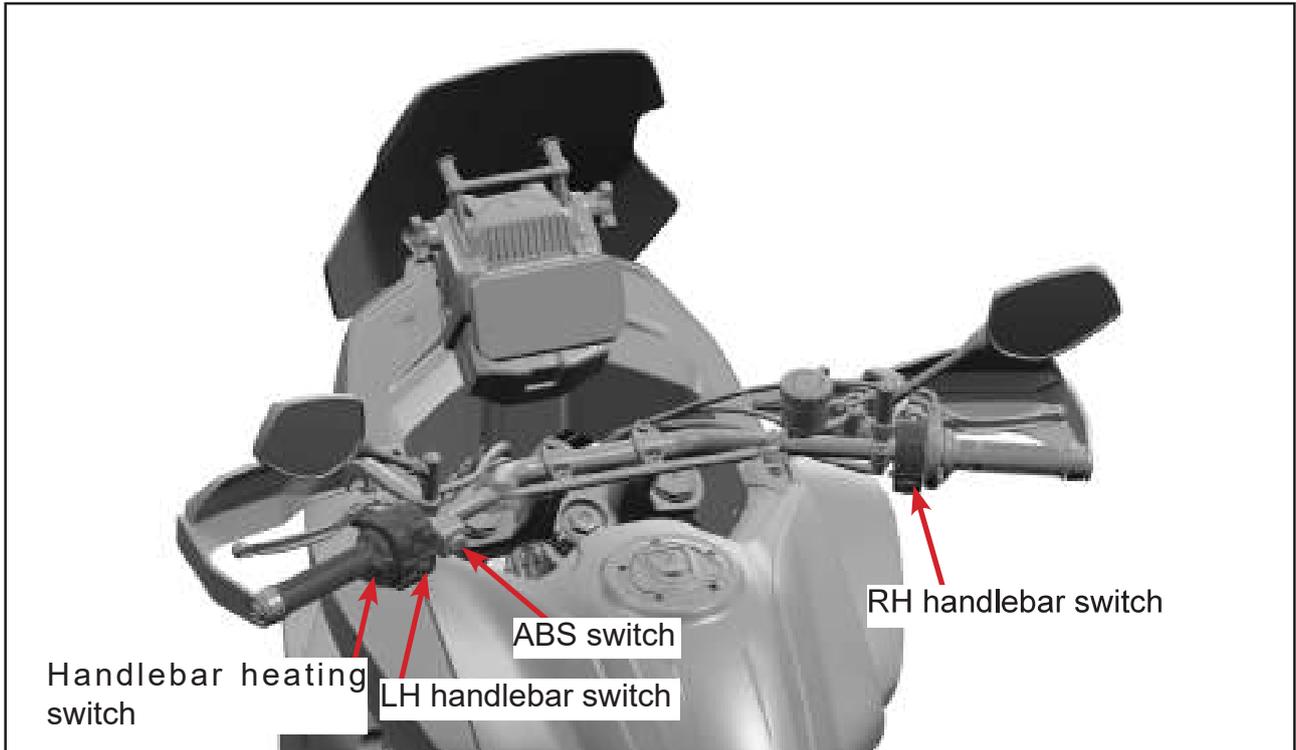
## 12.3 Fuse and Relay

### 12.3.1 Fuse and Relay Position



## 12.4 Switch

### 12.4.1 Switch Position

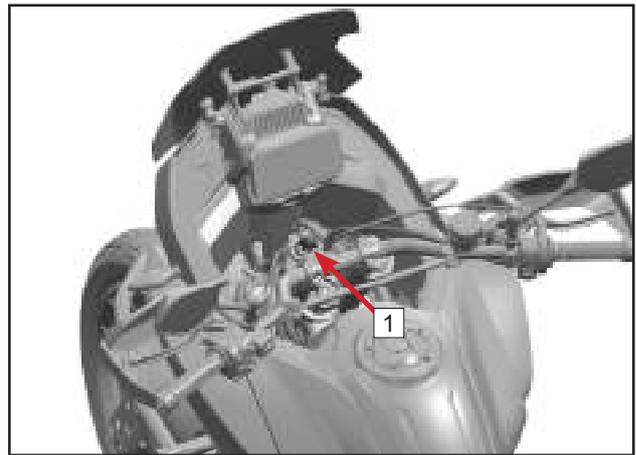


## 12.4.2 Ignition Lock

### Inspection

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

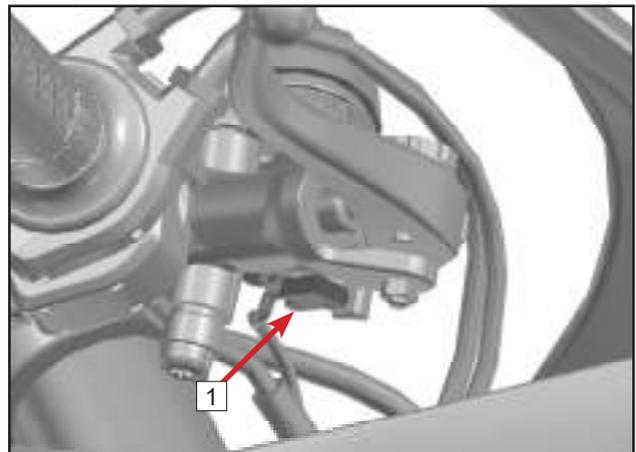
Ignition Switch			
Gear/Color	R	BL	Can key pull out
	●	●	NO
			YES
			YES



## 12.4.3 Front Brake Light Switch

Pull out the plug **1** of front brake light wiring switch to check whether the wiring harness end and the pin are good:

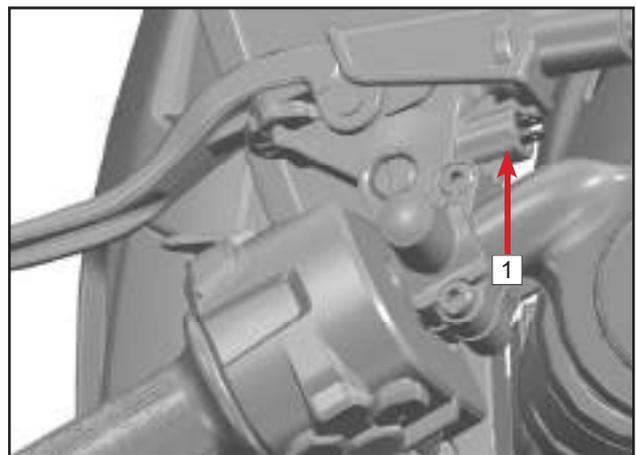
1. When the front brake handle is kneaded: the brake light on.
2. When the front brake handle is released: the brake light off.



## 12.4.4 Clutch Switch

Pull out the plug **1** of front brake light wiring switch to check whether the wiring harness end and the pin are good:

1. When the clutch handle is kneaded: with the side stand down:
  - Cut into gear and turn off normally.
2. If not, check the clutch switch.

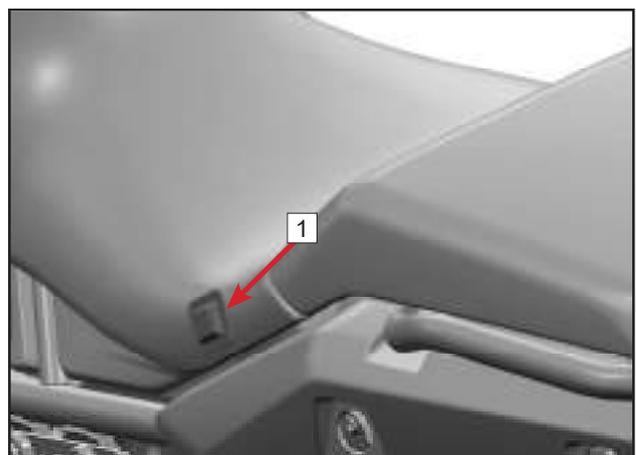


## 12.4.5 Seat Heating Switch

The heating function can be turned on after the engine is started, and the heating function will be automatically turned off after the engine is turned off.

Press the seat heating switch **1**.

Check whether the seat cushion is heated. If there is no sign of heating, check whether the wiring harness of the switch connector or the seat heating switch is disconnected.



## 12.4.6 Handlebar Switch

### 12.4.6.1 LH/RH Handlebar Switch

#### LH Handlebar Switch

Remove the connector connecting the LH handlebar switch harness with the main cable, and check whether each switch is on or off.

Dimmer switch 1		
Function \ Color	G/W	L
	● ——— ●	
	● ——— ●	
	● ——— ●	

Menu switch 2						
Function \ Color	G	B/W	L/B	GR/R	L/W	G/W
▲	●	●				●
SET	●		●			●
BACK	●			●		●
▼	●				●	●

R

Turn switch 3			
Function \ Color	O	GR	SB
↶	●	●	
↷		●	●

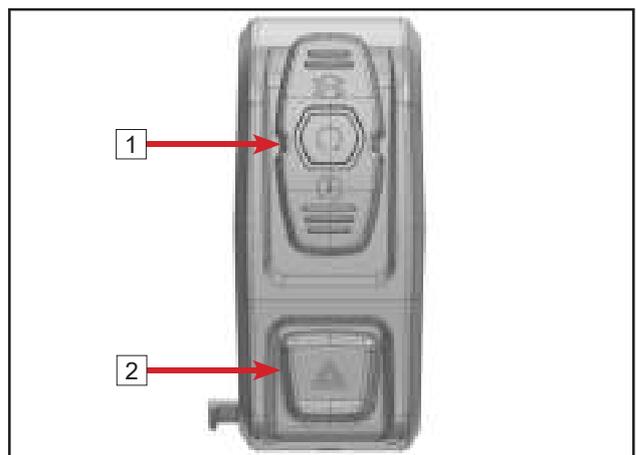
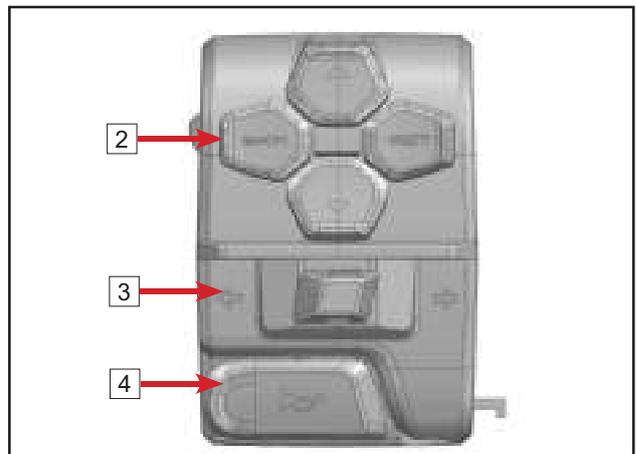
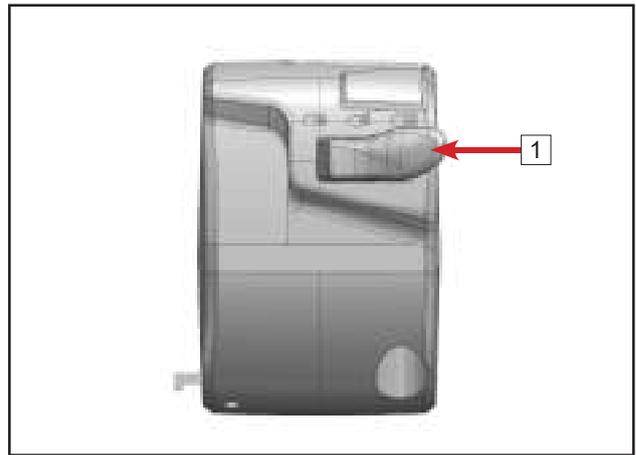
Horn switch 4		
Function \ Color	G/W	LG
	● ——— ●	

#### RH Handlebar Switch

Remove the connector connecting the RH handlebar switch harness with the main cable, and check whether each switch is on or off.

Start/stop switch 1			
Function \ Color	B/BR	BR/B	Y/R
	●	●	
	●	●	●

Warning switch 2			
Function \ Color	Y	GR	SB
	●	●	●
	●	●	●



## 12.4.6.2 ABS Switch

Remove the connector connecting ABS switch with the main cable, and check whether each switch is on or off.

ABS switch 1			
Function	Color	L/Y	G/B
Press		●	●
Bounce			



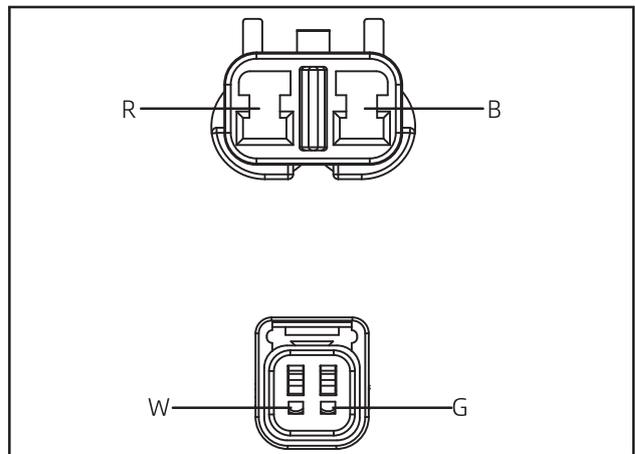
## 12.4.6.3 Handlebar Heating Switch

The heating function can be turned on after the engine is started, and the heating function will be automatically turned off after the engine is turned off.

Remove the connector connecting the handlebar heating switch harness with the main cable, and check whether each switch is on or off.

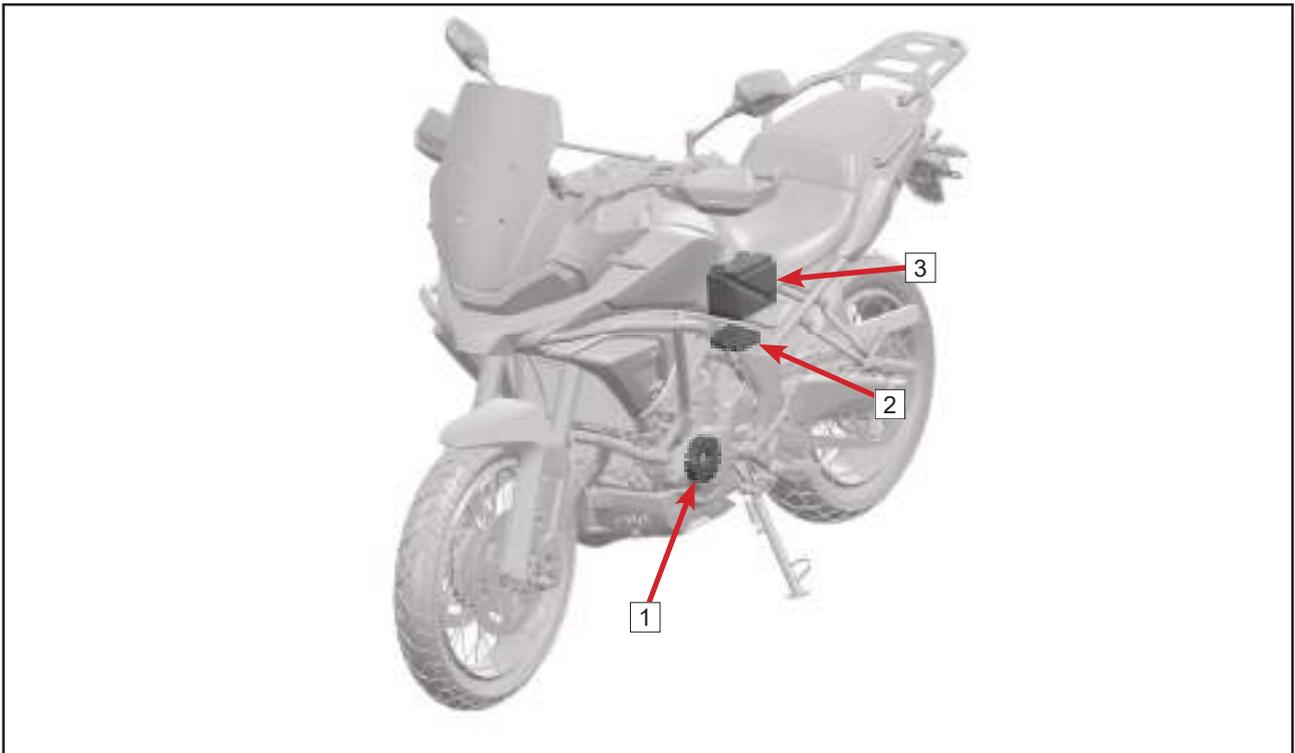
Pin Function 1		
Color	R	B
Function	Positive	Negative

Pin Function 2		
Color	W	G
Function	Positive	Negative



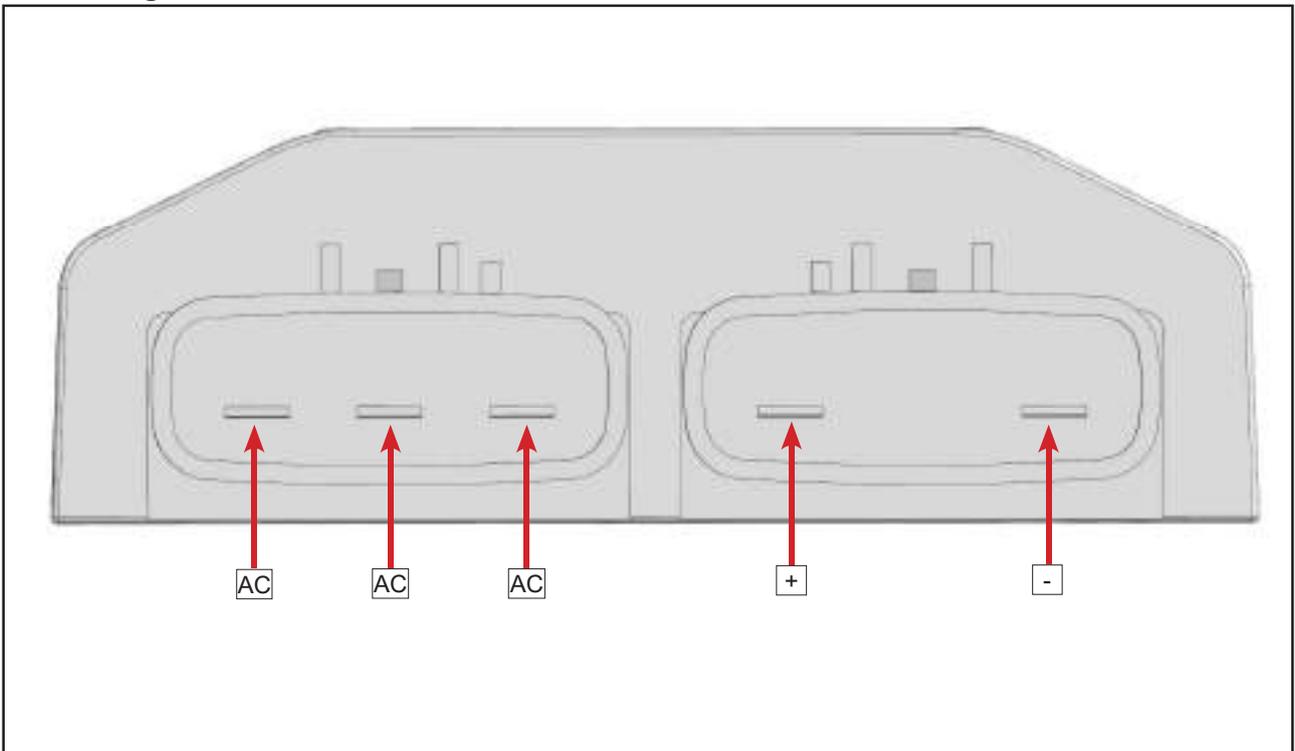
## 12.5 Charging System/Battery

### 12.5.1 Charging System Position



1	Stator	2	Regulator	3	Battery
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### 12.5.2 Regulator



## 12.5.3 Charging Voltage Inspection

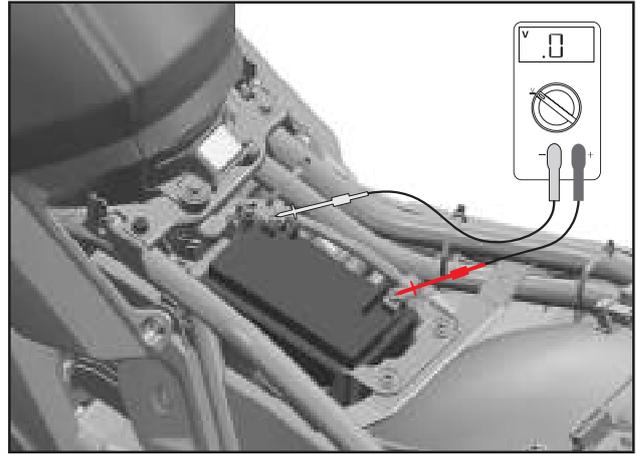
The battery must function properly and be fully charged.

Start the vehicle for voltage measurement.

Measure point positive (+), measure point GND (-).

Charging Voltage	
5000rpm	13.2V~14.8V

If the charging voltage is abnormal, check the stator or regulator.

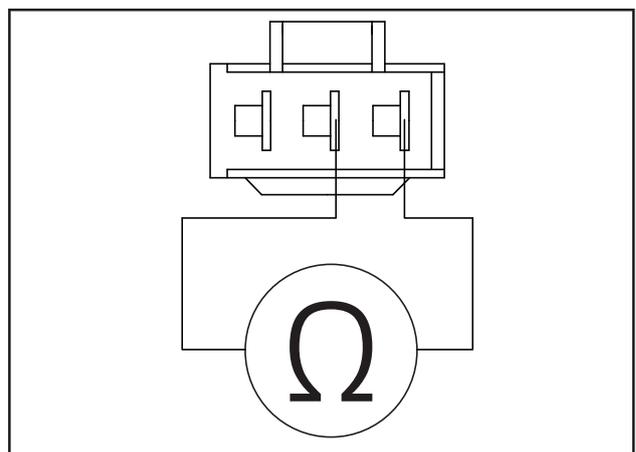
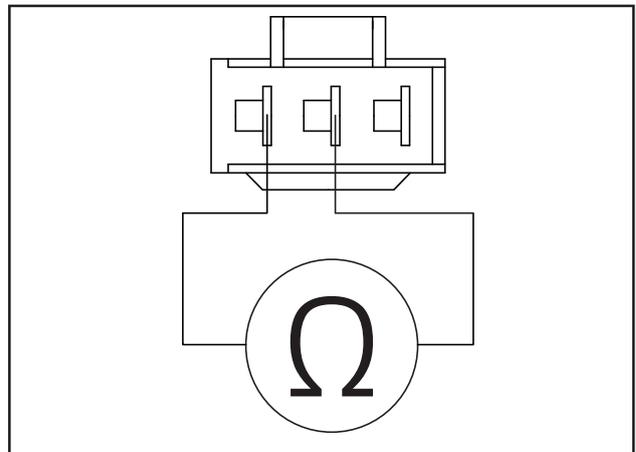
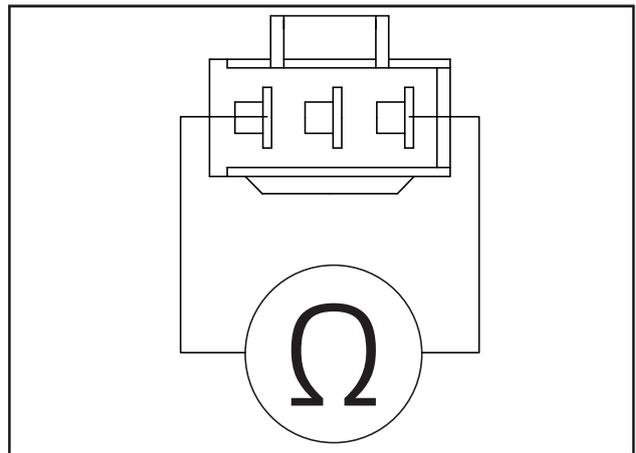


## 12.5.4 Stator Path Inspection

Set the multimeter to buzzer.

As shown in the figure, use the multimeter to check whether there is a beep between the stator pins.

If there is no beep, replace the new part and check the stator body and charging voltage again.

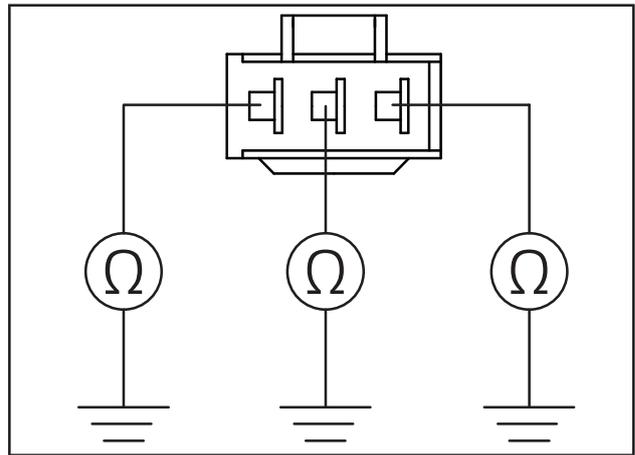


## 12.5.5 Stator GND Inspection

Set the multimeter to buzzer.

As shown in the figure, use the multimeter to check whether there is a beep between the stator pin GND.

If there is no beep, replace the new part and check the stator body and charging voltage again.

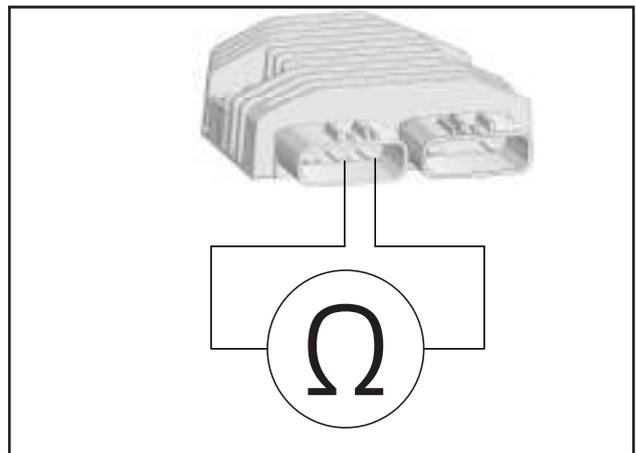
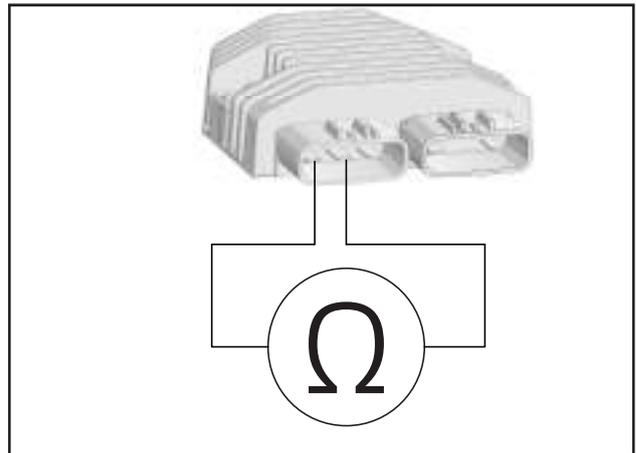
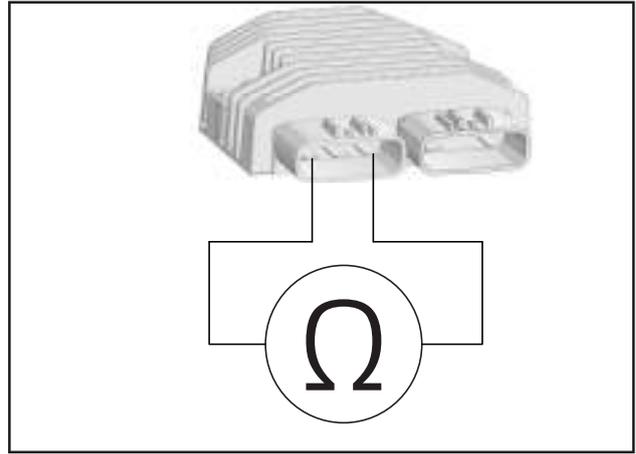


## 12.5.6 Regulator Path Inspection

Set the multimeter to buzzer.

As shown in the figure, use the multimeter to check whether there is a beep between the AC pins.

If there is no beep, replace the new part and check the regulator body and charging voltage again.



## 12.5.7 Regulator Input Voltage Test

The battery must function properly and be fully charged.

Set the multimeter to the appropriate DC gear.

Disconnect the positive and negative connectors of regulator.

Start the vehicle for voltage measurement.

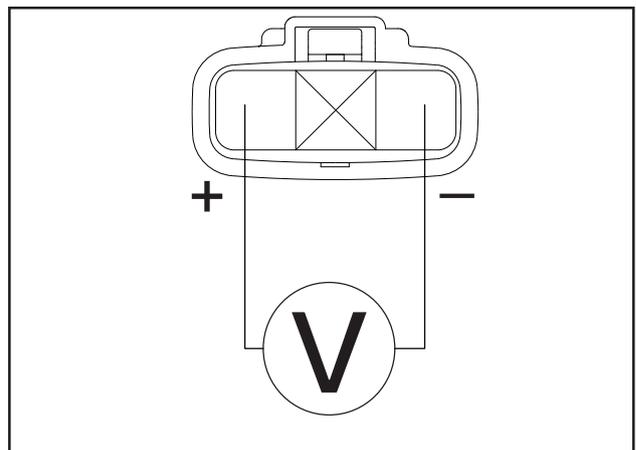
Measure point positive (+), and measure point GND (-).

Input Voltage	
5000rpm	≤14.8V

If the charging voltage is abnormal, check the stator or regulator.

Tips: It is normal to have flameout during the test.

After the test, please fully charge the battery with a special charger.

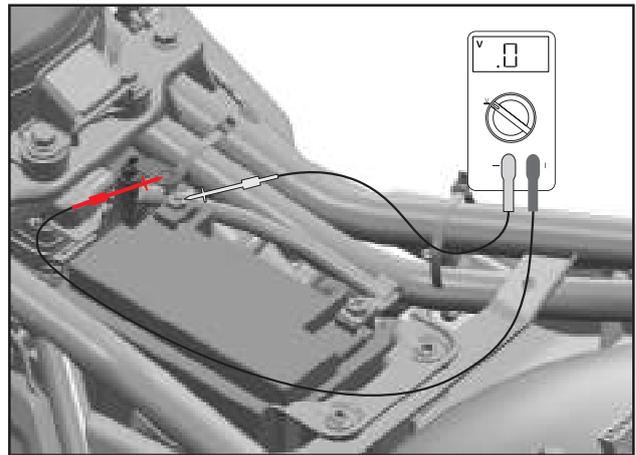


## 12.5.8 Battery Leakage Inspection

Turn off the vehicle power supply.  
Detect the battery current leakage as shown in the figure.

**Maximum current leakage does not exceed: 1.8mA.**

If it exceeds the value, check the current leakage of each appliance.



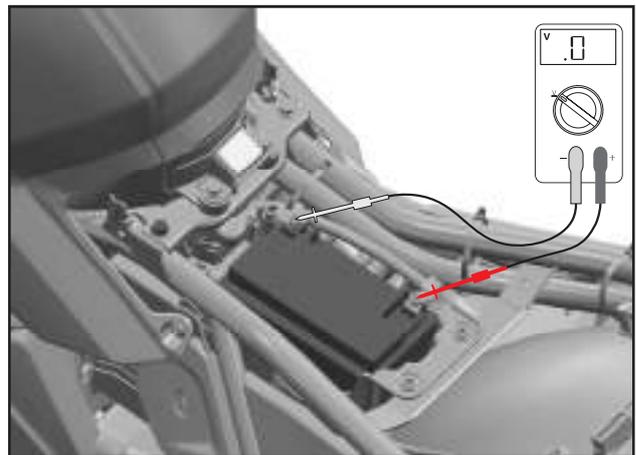
## 12.5.9 Battery Inspection

Turn off the vehicle power supply.  
Check the battery voltage as shown in the figure.

CFMOTO recommends for vehicles not used within 30 days (battery remains in the vehicle) to charge the battery monthly or keep the battery connected to a trickle charger (battery maintainer).

**Battery voltage: about 12.75V.**

1. If the battery voltage is lower than 12V.
2. Remove the battery and charge it with a special charger.
3. If the battery cannot be charged, the battery may be damaged. Replace the battery with a new one.



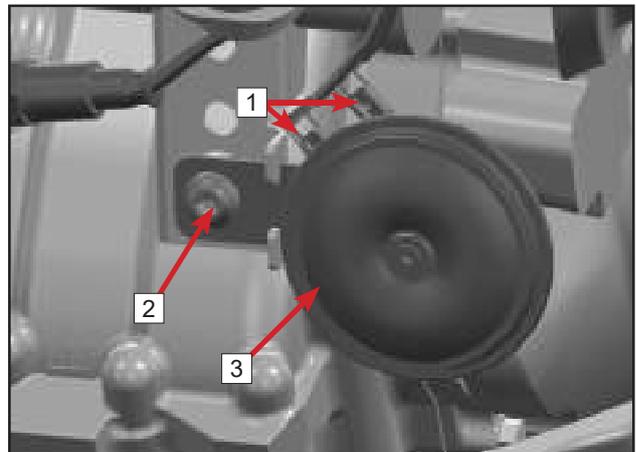
## 12.6 Horn

### Removal

1. Disconnect the connectors.
2. Remove bolt.
3. Remove horn.

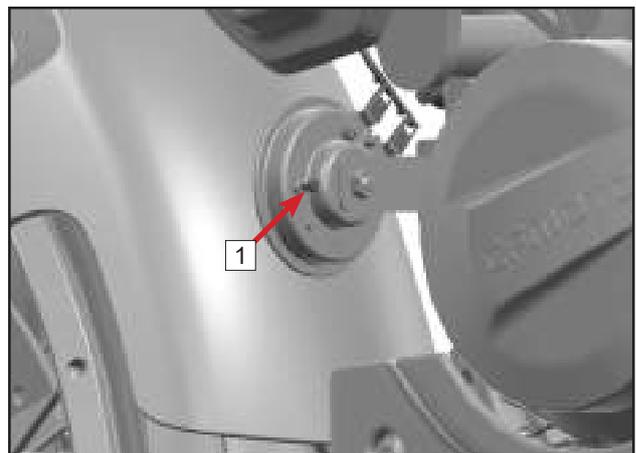
### Installation

Reverse the removal procedures for installation.



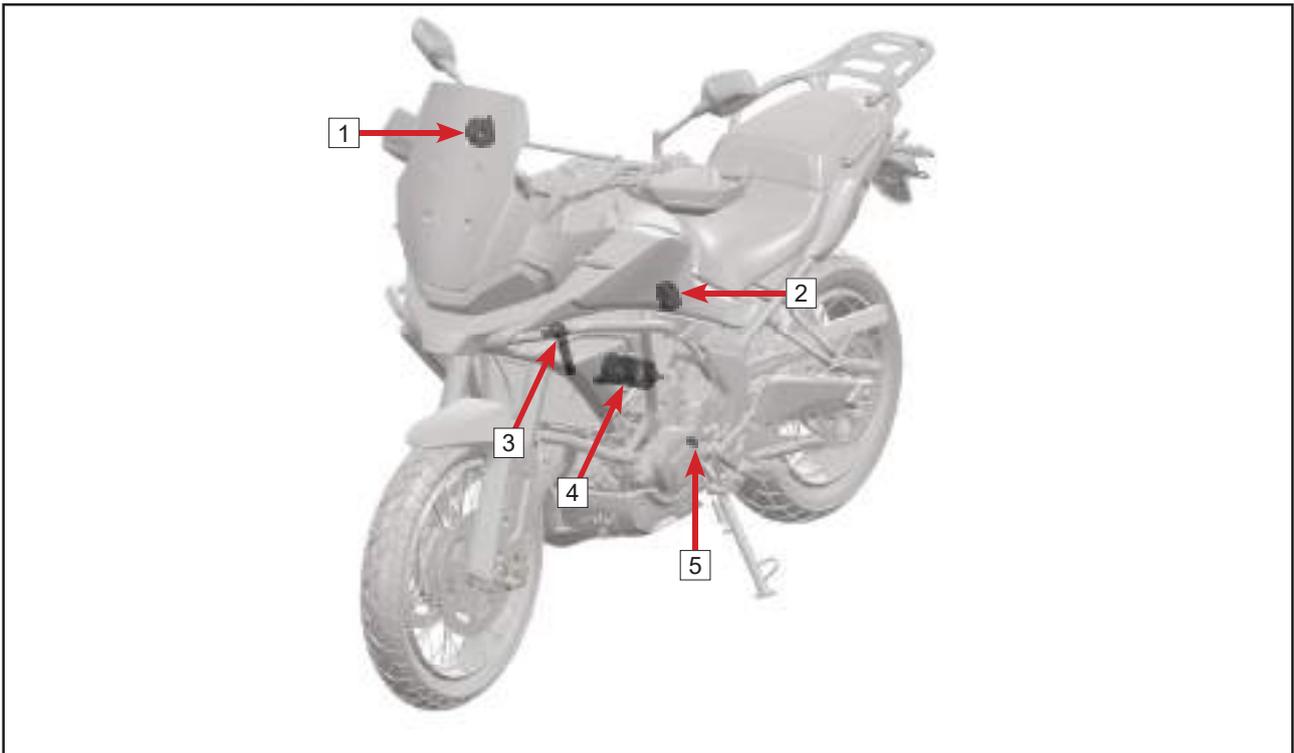
### Inspection

1. Turn on the vehicle power supply.  
Operate horn switch.  
Check whether the horn works.  
If the speaker has no sound or the sound is muted.  
Adjust the bolt.



## 12.7 Starting System

### 12.7.1 Starting System Position



1	Starting switch	2	Starter relay	3	Ignition coil
4	Starter motor	5	Trigger		

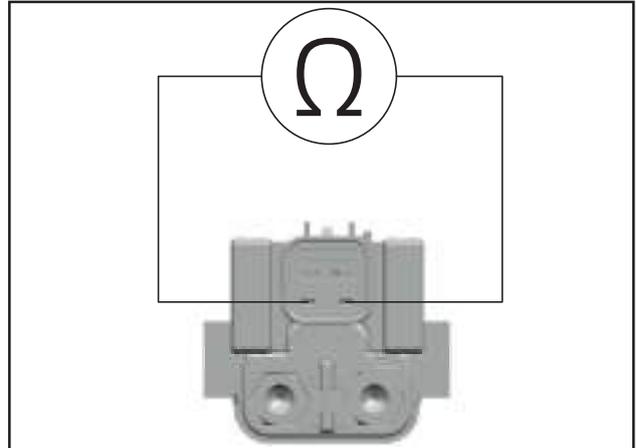
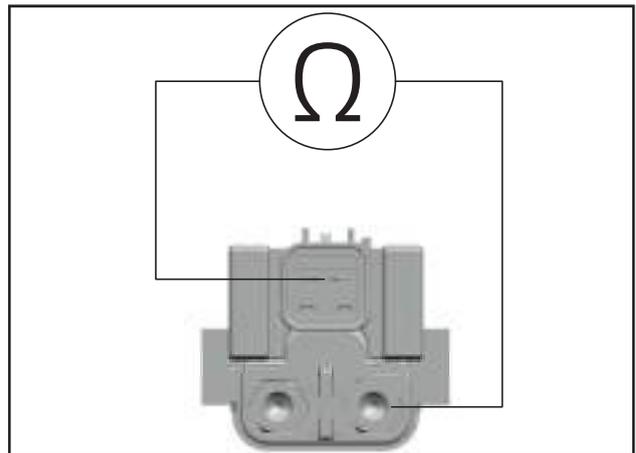
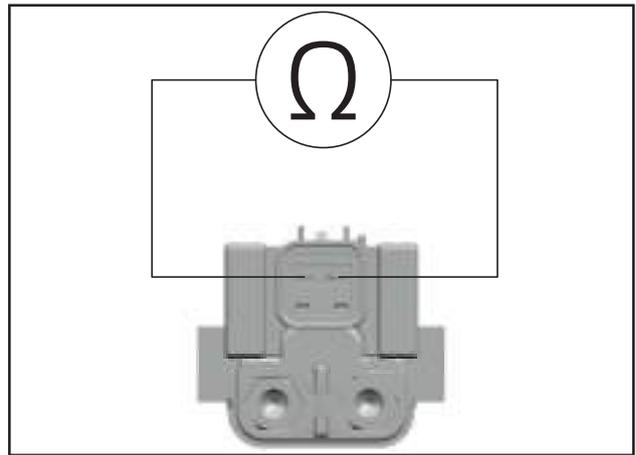
## 12.7.2 Starter Relay

### 12.7.2.1 Starter Relay Path Inspection

Set the multimeter to buzzer.

As shown in the figure, use the multimeter to check whether there is a beep between the pins.

If there is no beep, the starter relay may be damaged, please replace it with a new part.



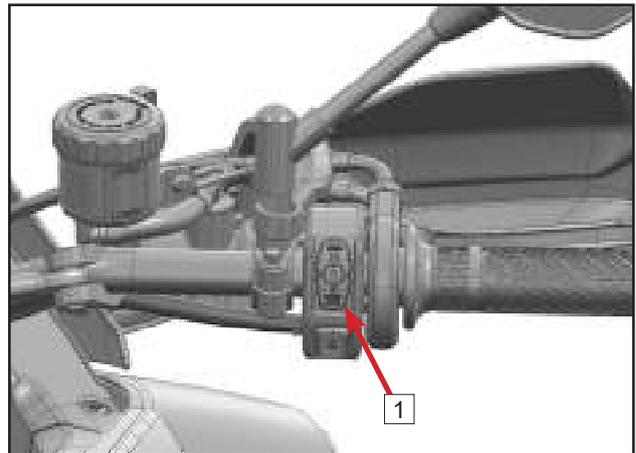
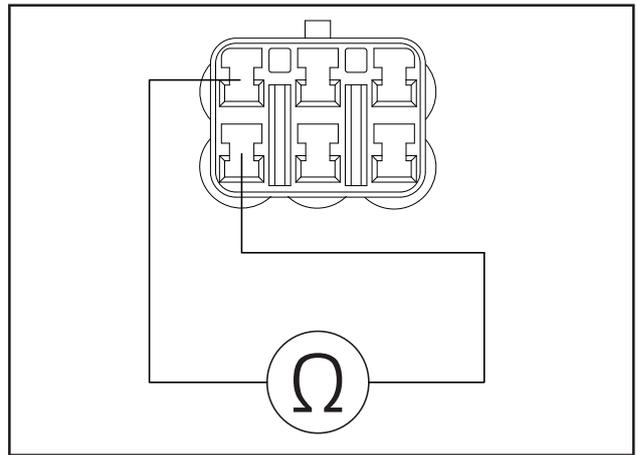
## 12.7.3 Starting Switch

### 12.7.3.1 Starting Switch Path Inspection

Turn off the vehicle power supply.

1. Disconnect the connector of RH handlebar starting switch.
2. Set the multimeter to buzzer, as shown in the picture.
3. Turn on the ignition switch 1.
4. Use the multimeter to check whether there is a beep between pins.

If there is no beep, the starting switch may be in poor contact or damaged. Please replace it with a new one.

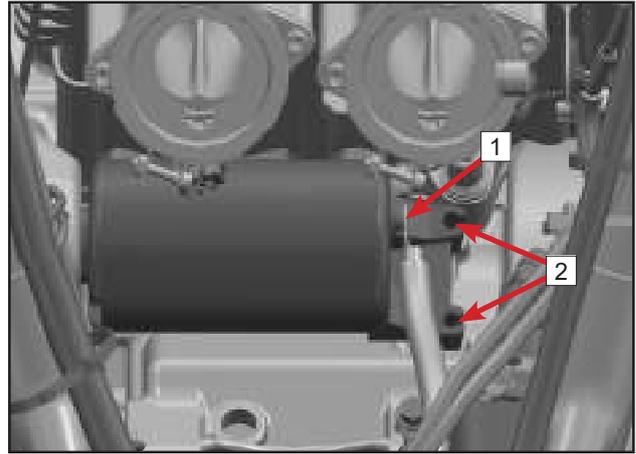


## 12.7.4 Starter Motor

### Removal

Remove nut **1**.

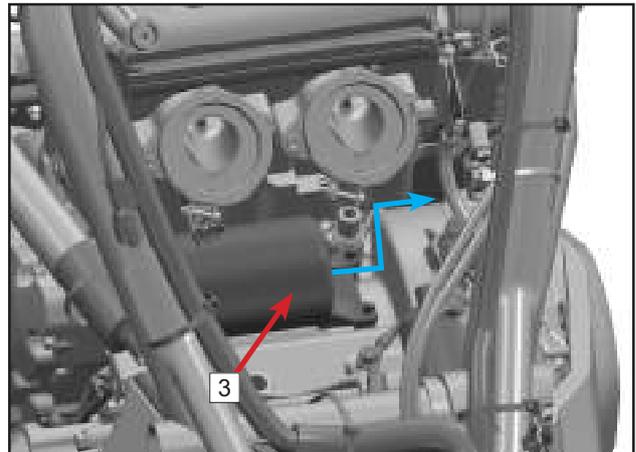
Remove bolts **2**.



Remove starter motor **3**.

### Installation

Reverse the removal procedures for installation.



### 12.7.4.1 Starter Motor Appearance Inspection

Check the position **1** for ablative marks. If any ablative marks appear, replace them with new parts.



### 12.7.4.2 Starter Motor Working Inspection

Press the ignition switch.

1. Observe whether the starter motor has no noise.

2. Observe whether the starter motor works. In any of the above cases, check whether the wiring harness, starter relay, and ignition switch are faulty. If the above parts are not faulty, the starter motor may be faulty, please replace a new part.

### 12.7.5 Trigger

#### 12.7.5.1 Trigger Peak Voltage Inspection

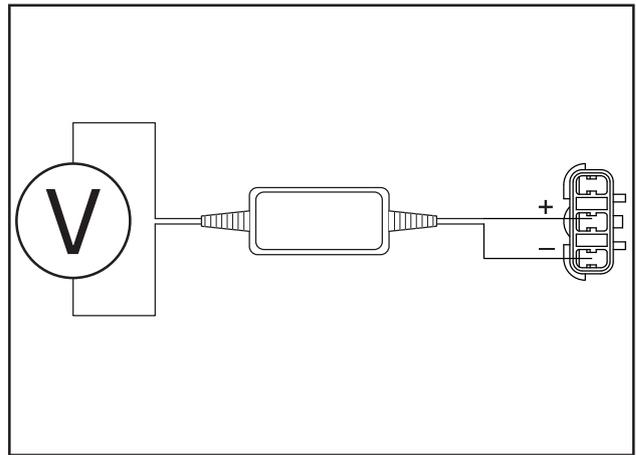
The detection connection of peak voltage is shown in the figure.

Turn on the vehicle power supply.

Start the ignition switch for about 4-5 seconds.

The standard value (AC) of peak voltage: above 3V.

If it is lower than 3V, please replace it with a new part.



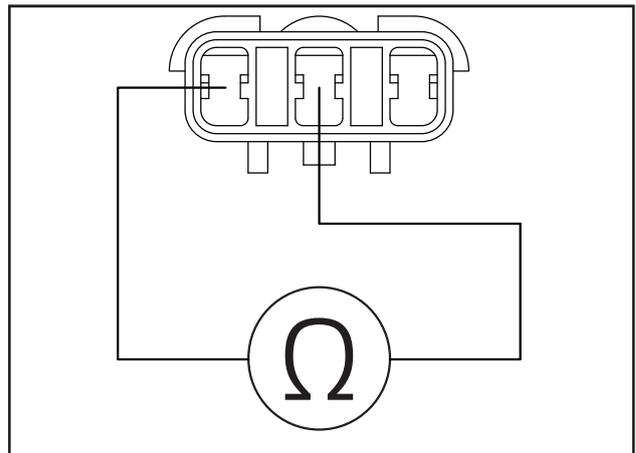
#### 12.7.5.2 Trigger Resistance Inspection

Remove the trigger connector.

The detection connection of peak voltage is shown in the figure.

Trigger resistance value: 200Ω~300Ω(room temperature)

If the resistance value is lower than 200Ω or close to zero, replace it with a new part.



## 12.7.6 Ignition Coil

### 12.7.6.1 Ignition Coil Peak Voltage Inspection

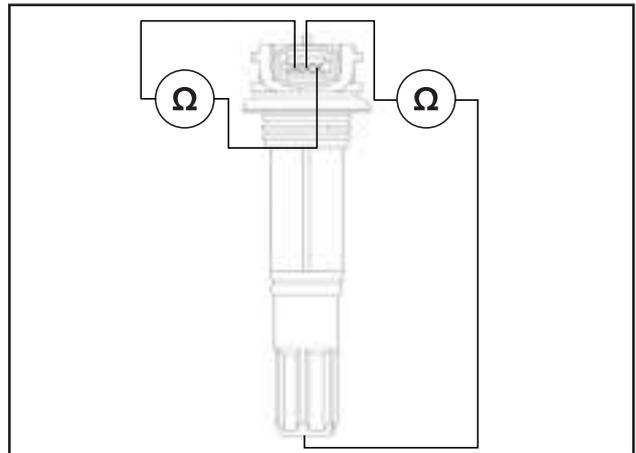
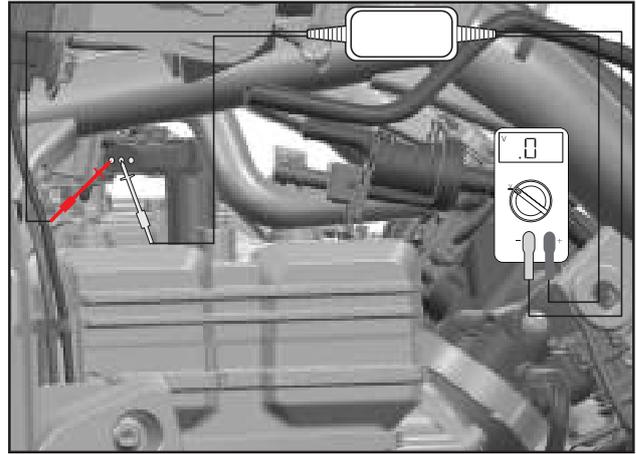
1. Connect the peak voltage detection tool using a multimeter, and connect the ignition coil to the spark plug assembly.

2. Keep the ignition coil and spark plug assembly grounded.

The detection method is shown in the figure on the right.

Turn on the electric door lock and press the ignition switch.

After starting, the secondary ignition voltage should  $\leq 27\text{kV}$ .



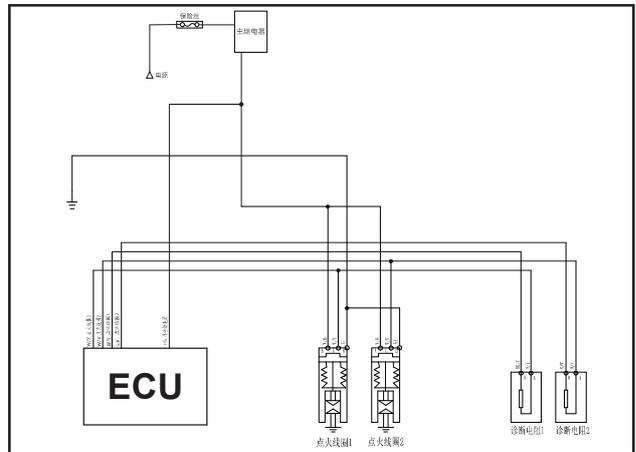
### 12.7.6.2 Ignition Coil Resistance Inspection

Remove ignition coil.

Use the multimeter to measure the ignition coil resistance, as shown in the figure.

**Primary resistance value:  $1.1 \pm 0.3\Omega$**

**Secondary resistance value:  $13 \pm 0.5\text{k}\Omega$**



The circuit of connection between the sensor and ECU.

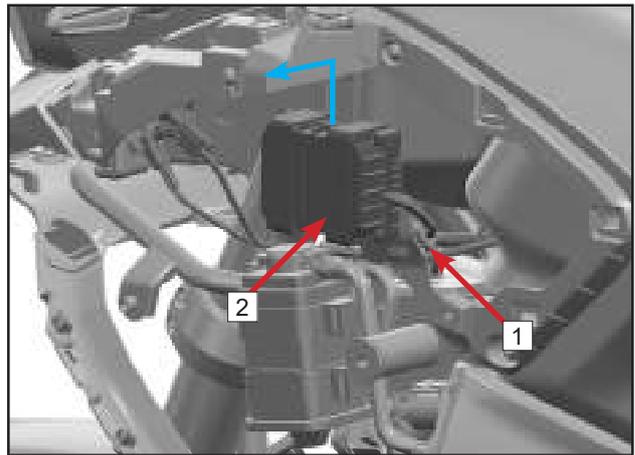
## 12.8 T-BOX

### Removal

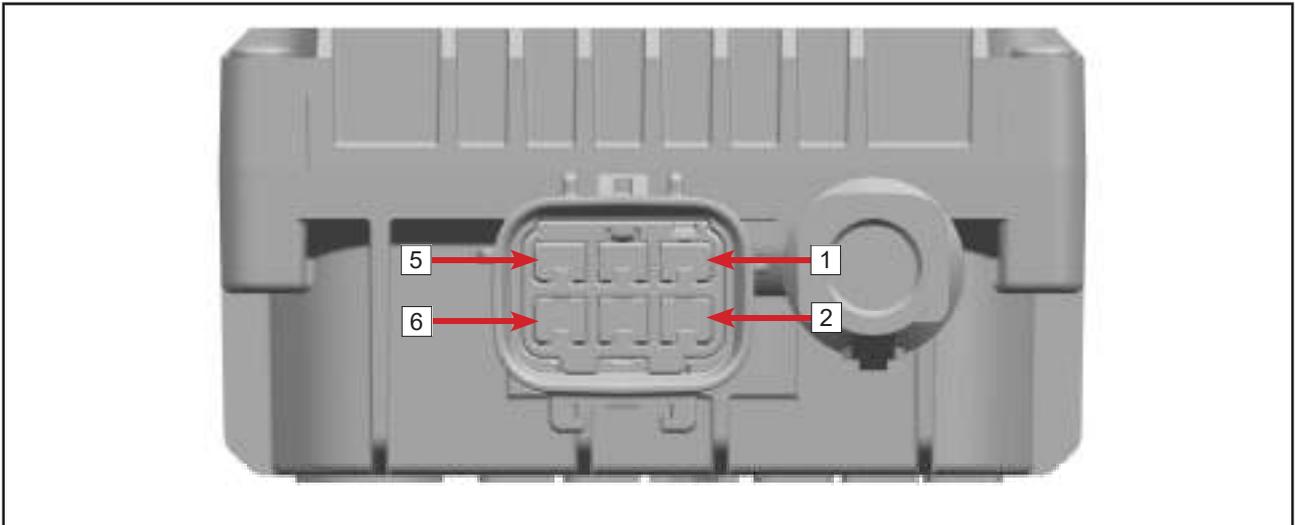
Turn off the vehicle power supply.  
Remove radiator LH pedal.  
Disconnect the connector **1**.  
Remove T-BOX **2**.

### Installation

Reverse the removal procedures for installation.



### 12.8.1 T-BOX Pin Function



1	VBAT	2	KL.15	3	CAN H
4	CAN L	5	Diagnose Interface	6	GND

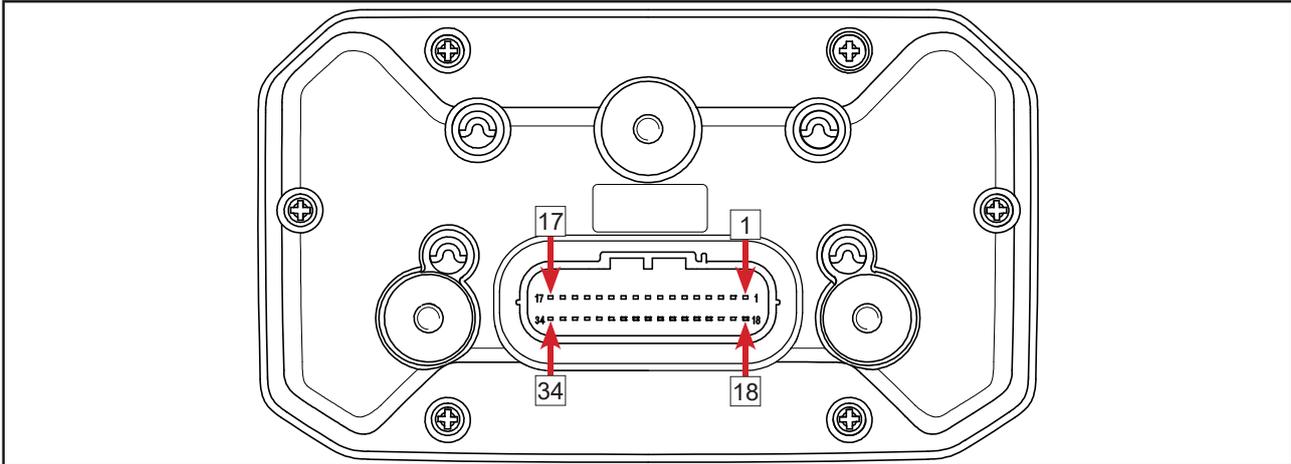
## 12.8.2 T-BOX Fault Code

No.	Code	Information	Countermeasures
1	B111716	Vehicle power supply voltage below threshold	1. Check battery. *NOTE: After performing the repair recommendations, clear the fault code before powering on the vehicle and starting the engine. Wait for 10s, and then read whether the fault code exists. If the fault code still exists, please contact customer service.
2	B111717	Vehicle power supply voltage above threshold	1. Check battery. *NOTE: After performing the repair recommendations, clear the fault code before powering on the vehicle and starting the engine. Wait for 10s, and then read whether the fault code exists. If the fault code still exists, please contact customer service.
3	U007388	C A N b u s o f f f a u l t o f B I C A N	Condition: The vehicle is powered off. Remove the battery. 1. Use a multimeter to measure the resistance between CAN_H [PIN6] and CAN_L [PIN14] at the OBD port. The measured resistance should range from 54Ω to 66Ω. If the measured resistance is not within the range, check the cable harness. 2. Use a multimeter to measure the connection between the CAN_H [PIN3] of TBOX part and the CAN_H [PIN6] of OBD port. If the connection is not normal, check the wiring harness. 3. Use a multimeter to measure the connection between the CAN_L [PIN4] of TBOX part and the CAN_L [PIN14] of OBD port. If the connection is not normal, check the wiring harness. *NOTE: After performing the repair recommendations, clear the fault code before powering on the vehicle and starting the engine. Wait for 10s, and then read whether the fault code exists. If the fault code still exists, please contact customer service.

4	U220D00	L i m p H o m e D T C	<p>Condition: The vehicle is powered off. Remove the battery.</p> <ol style="list-style-type: none"><li>1. Use a multimeter to measure the resistance between CAN_H [PIN6] and CAN_L [PIN14] at the OBD port. The measured resistance should range from 54Ω to 66Ω. If the measured resistance is not within the range, check the cable harness.</li><li>2. Use a multimeter to measure the connection between the CAN_H [PIN3] of TBOX part and the CAN_H [PIN6] of OBD port. If the connection is not normal, check the wiring harness.</li><li>3. Use a multimeter to measure the connection between the CAN_L [PIN4] of TBOX part and the CAN_L [PIN14] of OBD port. If the connection is not normal, check the wiring harness.</li></ol> <p>*NOTE: After performing the repair recommendations, clear the fault code before powering on the vehicle and starting the engine. Wait for 10s, and then read whether the fault code exists. If the fault code still exists, please contact customer service.</p>
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## 12.9 Dashboard

### 12.9.1 Dashboard Pin Function



Pin	Function	Description
1	Keyless system indicator	High side control signal 12V (reserved)
2	EFI fault light	Low side control signal (reserved)
3	ABS warning light	Low side control signal (Turn-off lighting, reserved)
4	Oil pressure signal	Low side control signal
5	Oil signal (450Ω high resistance )	Resistance signal
6	High-beam light signal	High side control signal 12V
7	Position light signal	High side control signal 12V
8	RH turn light signal	High side control signal 12V
9	LH turn light signal	High side control signal 12V
10	Handlebar switch: return	Low side control signal
11	Handlebar switch: confirm	Low side control signal
12	Handlebar switch: down	Low side control signal
13	Handlebar switch: up	Low side control signal
14	Gear signal (N,1-6)	Resistance signal (reserved)
15	Power negative	Power GND
16	E-door lock	High side control signal 12V
17	Power Positive	Power +
18	Oil signal (100Ω low resistance)	Resistance signal (reserved)
19	Speed signal	Square wave input signal (reserved)
20	Starting GND signal	Output suspension/GND signal (control 200mA internal relay) (reserved)
21	Gear signal 6	Low side control signal
22	Gear signal 5	Low side control signal
23	Gear signal 4	Low side control signal
24	Gear signal 3	Low side control signal
25	Gear signal 2	Low side control signal
26	Gear signal 1	Low side control signal
27	Gear signal N	Low side control signal
28	ABS set switch signal	Low side control signal
29	/	Low side control signal (reserved)

## 12 Electrical System

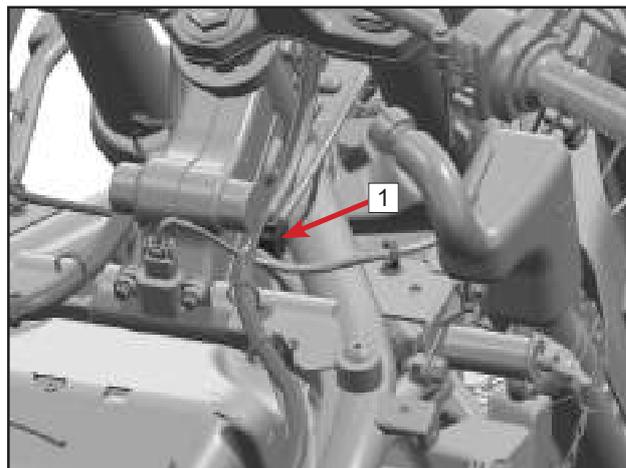
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30	K-LINE	K line CAN (reserved)
31	Air temperature sensor	Resistance signal (reserved)
32	Stop switch signal	High side control signal 12V
33	CAN-L	CAN signal: water temperature, speed, RPM, ABS failure light, EFI failure light, ABS switch, TC switch.
34	CAN-H	

## 12.10 Front/Rear Wheel Speed Sensor

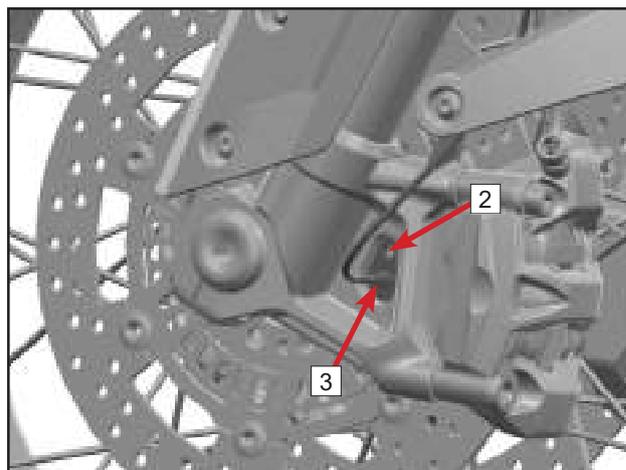
### 12.10.1 Front Wheel Speed Sensor Removal

Disconnect the connector **1**.



Remove bolt **2**.

Remove front wheel speed sensor **3**.

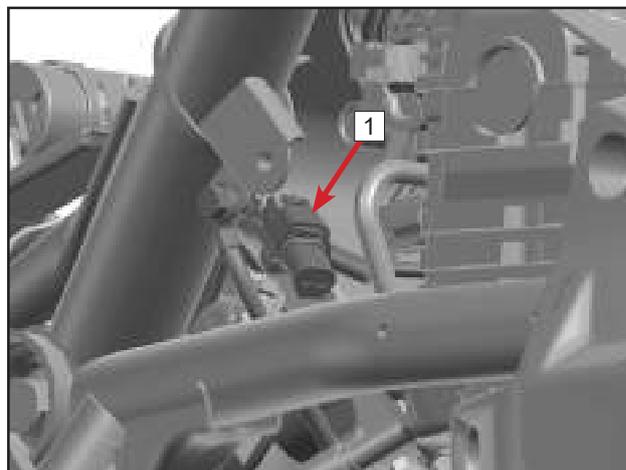


### Installation

Reverse the removal procedures for installation.

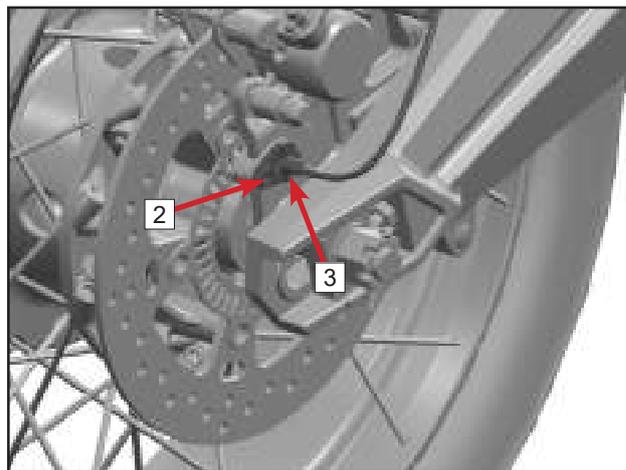
### 12.10.2 Rear Wheel Speed Sensor Removal

Disconnect the connector **1**.



Remove bolt **2**.

Remove rear wheel speed sensor **3**.



### Installation

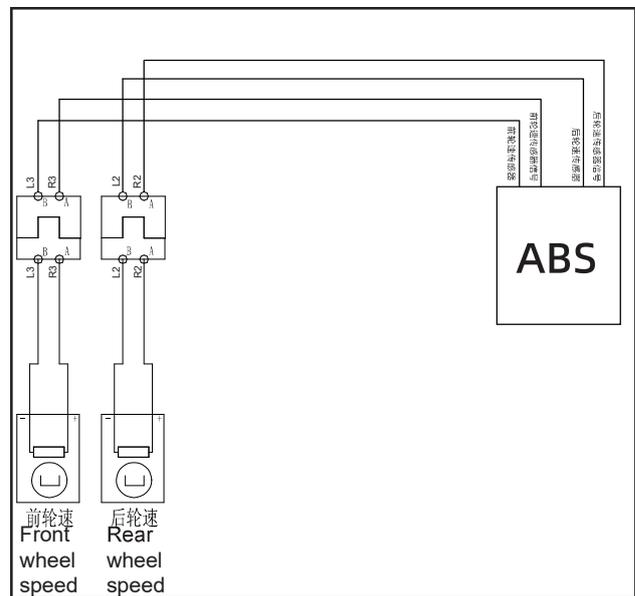
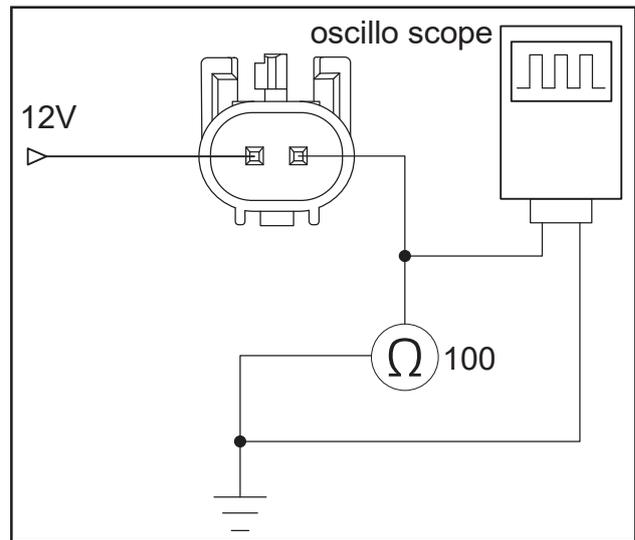
Reverse the removal procedures for installation.

## 12.10.3 Front/Rear Wheel Speed Sensor Inspection

The speed is calculated by ABS reading wheel speed sensor, and then sent to the dashboard for display after sending to CAN through ABS. At the same time, the work of ABS also needs to read the wheel speed sensor data.

The inspection method is shown in the figure.

1. After connecting the test electrical components, rotate the front wheel hub and observe whether the frequency displayed by the oscilloscope is linear.
2. If the frequency displayed by the oscilloscope is abnormal, check the front gear ring or replace it with a new one.



The circuit of front and rear wheel speed sensors.

## 12.11 Normal Troubles

### Engine Body

Troubles	Possible Cause	Countermeasure
Cannot start or difficult to start	<b>Cylinder pressure too low</b> 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 <b>Spark plug cannot ignite or weak ignition</b> 1. Improper spark plug clearance 2. Spark plug dirty or wet 3. Ignition coil failure 4. Trigger short circuit or open circuit 5. Magneto malfunction <b>Insufficient fuel inside throttle body</b> 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	Replace Replace Replace Service or replace Tighten Check electrical parts Adjust Adjust  Adjust or replace Clean & dry or replace Replace Replace Replace  Clean or replace Clean or replace Check or replace Check or replace Clean or replace
	1. Improper valve clearance 2. Defective valve pipe 3. Defective valve pipe 4. Rocker or rocker arm wear 5. Dirty spark plug 6. Incorrect valve clearance 7. Ignition coil failure 8. In & Ex air hose blocked, idle valve 9. Magneto failur	Adjust Replace or repair Replace Replace Replace Replace or repair Replace Replace or repair Replace

## 12 Electrical System

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

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Troubles	Possible Cause	Countermeasures
Engine abnormal noise	<b>Valve abnormal noise</b> 1. Valve clearance too big 2. Valve spring worn or broken 3. Swing arm or camshaft worn	Adjust Replace Replace
	<b>Piston abnormal noise</b> 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
	<b>Timing chain abnormal noise</b> 1. Chain stretched out 2. Chain sprocket worn 3. Timing tensioner failure	Replace chain and sprocket Replace chain and sprocket Repair or replace
	<b>Clutch abnormal noise</b> 1. Clutch gear worn or damaged 2. Cushion rubber aging or damaged	Replace clutch gear Replace clutch gear
	<b>Crankshaft abnormal noise</b> 1. Bearing noise 2. Crankshaft pin bearing down 3. Clearance too big	Replace Replace Replace
	<b>Transmission abnormal noise</b> 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 or damaged 2. Clutch driven disc worn or damaged 3. Clutch spring getting weak	Replace Replace Replace

## Ignition System:

Troubles	Possible Cause	Countermeasures
No spark or spark too weak	1. Ignition failure 2. Spark plug ablation 3. Spark plug clearance too big or too small 4. Carbon deposit in spark plug 5. Magnetor failure 6. Battery voltage insufficient or failure 7. Ignition coil failure 8. Trigger coil failure 9. Trigger clearance too big or too small 10. Other line failure	Replace Replace Adjust Clean Replace Charge or replace Replace Replace Adjust Inspect

## 12.12 Trouble Diagnosis In Accordance With Engine Error

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

1. Confirm if engine trouble light is ok.
2. Confirm there's no trouble code record by DSCAN 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:**

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

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## (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:

Item	Procedures	Results	Next
1	Use multi-meter to check battery voltage if voltage is between 8V~12V or not when engine starts.	YES	Next step
		NO	Replace battery
2	Turn on ignition switch, stop switch and 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 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 lubrication
		NO	Next step
6	Check if mechanical resistance is too big inside engine, which causes starter engine does not work or rotates slowly.	YES	Check and repair engine inside resistance
		NO	Repeat

## (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:

Item	Procedures	Results	Next
1	Connect fuel pressure gauge, turn on ignition switch, repeat several times if necessary, or start engine, check if fuel pressure is around 330kPa.	YES	Next step
		NO	Check and repair fuel supply system
2	Connect DSCAN, observe the data of "RPM", 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 ignition system
4	Test cylinder pressure and check if pressure is enough.	YES	Eliminate engine mechanical failures
		NO	Next step
5	Use EFI system adaptor, turn on ignition switch, check if power supply of ECU pin 32# and 33# is normal, check if ECU pin 5# and 10# works normally.	YES	Use DSCAN to check
		NO	Repair related circuit

### (3)Difficult to start hot engine

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

#### General diagnosis procedures:

Item	Procedures	Results	Next
1	Connect fuel pressure gauge, turn on engine, check if fuel pressure is around 330kPa.	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 ignition system
3	Disconnect engine water temp. sensor joint, start the engine, and check whether the engine starts successfully. (Or replace the engine temp. sensor with a 300 ohm resistance in series at the engine water temp. sensor junction, and check whether the engine successfully starts at this time.)	YES	Check and repair circuit or replace sensor
		NO	Next step
4	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
5	Use EFI system adaptor, turn on ignition switch, check if power supply of ECU pin 32# and 33# is normal, check if ECU pin 5# and 10# works normally.	YES	Use DSCAN 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 water temp. sensor; 4. Injector; 5. Ignition coil; 6. Throttle body and by-pass; 7. Mechanical parts of engine.

### General diagnosis procedures:

Item	Procedures	Results	Next
1	Connect fuel pressure gauge, turn on engine, check if fuel pressure is around 400kPa.	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 engine water temp. sensor joint, start the engine, and check whether the engine starts successfully. (Or replace the engine temp. sensor with a 2500 ohm resistance in series at the engine water temp. sensor junction, and check whether the engine successfully starts at this time.)	YES	Check and 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
		NO	Next step
6	Check whether the failure happens right after filling fuel.	YES	Change fuel
		NO	Next step
7	Check if cylinder pressure is insufficient.	YES	Eliminate engine mechanical failures
		NO	Next step

## (5) Difficult to start in any conditions

General failure part: 1. Water in fuel tank; 2. Fuel pump; 3. Water temp. sensor; 4. Injector; 5. Ignition coil; 6. Throttle body and by-pass; 7. Air intake pipe; 8. Ignition timing; 9. Spark plug; 10. Mechanical part of engine.

### General diagnosis procedures:

Item	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 engine water temp. sensor joint, start the engine, and check whether the engine starts successfully.	YES	Check and 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 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. Ignition timing; 8. Spark plug; 9. Mechanical part of engine.

### General diagnosis procedures:

Item	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 cylinder spark plug, and observe whether its type and clearance meet the specification.	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, block or flow overshoot.	YES	Replace
		NO	Next step
6	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
7	Check engine cylinder pressure, observe whether there is large difference in the engine cylinder pressure.	YES	Eliminate engine mechanical failures
		NO	Next step
8	Check if the mechanical ignition timing is beyond specification.	YES	Next step
		NO	Check ignition timing

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### (7) Normal starting, but unstable idle speed after engine warming

General failure part: 1. Water in fuel tank; 2. Engine water temp. sensor; 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:

Item	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	Disassemble air control valve and check if there is carbon deposit inside throttle body, idle adjustment and by-pass.	YES	Clean
		NO	Next step
4	Disconnect water temp. sensor connector and start engine to check idle speed is stable or not.	YES	Check circuit and replace sensor
		NO	Next step
5	Disassemble injector and use special tool to check if there is leakage, block or flow overshoot.	YES	Replce
		NO	Next step
6	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
7	Check engine cylinder pressure, observe whether there is large difference in the engine cylinder pressure.	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. Water temp. sensor; 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:

Item	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	Disassemble air control valve and check if there is carbon deposit inside throttle body, idle adjustment and by-pass.	YES	Clean
		NO	Next step
4	Disconnect the engine water temp. sensor joint, start engine, and observe whether engine is unsteady at idle during engine warming.	YES	Check and repair circuit or replace sensor
		NO	Next step
5	Disassemble injector and use special tool to check if there is leakage, block or flow overshoot.	YES	Replace
		NO	Next step
6	Check whether the failure happens right after fueling.	YES	Change fuel
		NO	Next step
7	Check engine cylinder pressure, observe whether there is large difference in the engine cylinder pressure.	YES	Eliminate engine mechanical failure
		NO	Next step

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

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

### General diagnosis procedures:

Item	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 DSCAN to test if ignition advance angle, fuel spray and air intake volume is normal.	YES	To step 4
		NO	Next step
		NO	Check and repair air conditioner system
3	Disassemble injector and use special tool to check if there is leakage or blocked or wrong fuel flow.	YES	Replace
		NO	Next step
4	Use EFI system adaptor, turn on ignition switch, check if power supply of ECU pin 32# and 33# is normal, check if ECU pin 5# and 10# works normally.	YES	Use DSCAN 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:

Item	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	Disassemble air control valve and check if there is carbon deposit inside throttle body, idle adjustment and by-pass.	YES	Clean
		NO	Next step
4	Remove water temp. sensor connector, start engine to check if idle speed is too high.	YES	Check circuit and replace sensor
		NO	Next step
5	Check if ignition timing complies with standard regulation.	YES	Next step
		NO	Check and repair ignition timing

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### (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:

Item	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 the engine, check if fuel pressure is around 330kPa.	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 intake pressure sensor, TPS and its circuit is normal.	YES	Next step
		NO	Check circuit and 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:

Item	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 the engine, check if fuel pressure is around 330kPa.	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

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Item	Procedures	Results	Next
5	Check if TPS and its circuit is normal.	YES	Next step
		NO	Check circuit and 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

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### (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:

Item	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 engine, check if fuel pressure is around 330kPa.	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 system
5	Check if spark plug is suitable for requirement including its type and clearance.	YES	Next step
		NO	Adjust or 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 TPS and its circuit is normal.	YES	Next step
		NO	Check circuit and 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



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## DANGER

Fuel is extremely flammable and can be explosive under certain conditions. Always maintain it in a well-ventilated area, turn off the engine in advance and wait for the engine and muffler to cool. No smoking or any acts that cause sparks is allowed in the fuel filling area or fuel storage area.

Never tilt or place upside down the tank. Avoid overflowing onto high temperature parts.

Fuel is toxic and harmful to health. Avoid touching with skin, eyes and clothes. Do not inhale fuel vapor.

If touched skin, wash with plenty of clean water.

If touched to eyes, wash eyes immediately with clean water and see a doctor immediately.

If touched to clothes, change the clothes immediately.

Seek medical attention immediately if accidentally contact your eyes or swallow gasoline.

Dispose of fuel properly to avoid damage to the environment.

## WARNING

Please use genuine parts for maintenance. Otherwise, the normal operation of the electronic injection system cannot be guaranteed.

During maintenance, do not disassemble EFI parts.

Carefully handle EFI parts during maintenance.

Turn the ignition switch off during unplugging or plugging in connectors to prevent damaging EFI parts.

Do not electrify the oil pump during removal to prevent electric spark and fire.

The fuel pump is not allowed to run in dry condition or in water. Otherwise, its service life will be reduced. The positive and negative wires of the fuel pump can't be connected backwards.

The pressure is high (around 330kPa) in fuel system. All fuel hoses are high-pressure resistance. The fuel rail keeps high fuel pressure even the engine doesn't work. Do not remove fuel hose during maintenance.

Spark jumping test should be carried out only when necessary. The testing time should be as short as possible. The throttle valve should not be opened during the test. Otherwise, a large amount of unburned fuel will enter the exhaust pipe and damage the three-way catalytic converter.

When the fuel system needs to be repaired, the fuel system should be decompressed before the oil hoses are removed. The method of pressure relief: to remove the oil pump relay and start the engine to idle until the engine stops by itself.

Fuel hoses removal and fuel filter replacement shall be operated by professional technicians in a well-ventilated place.

Do not mis-connect the positive and negative pole of battery. Remove the negative wire first if disassembling battery, in case it damages electrical elements. The system of this vehicle uses negative earth mode.

Battery wires are not allowed to be removed while the engine is working.

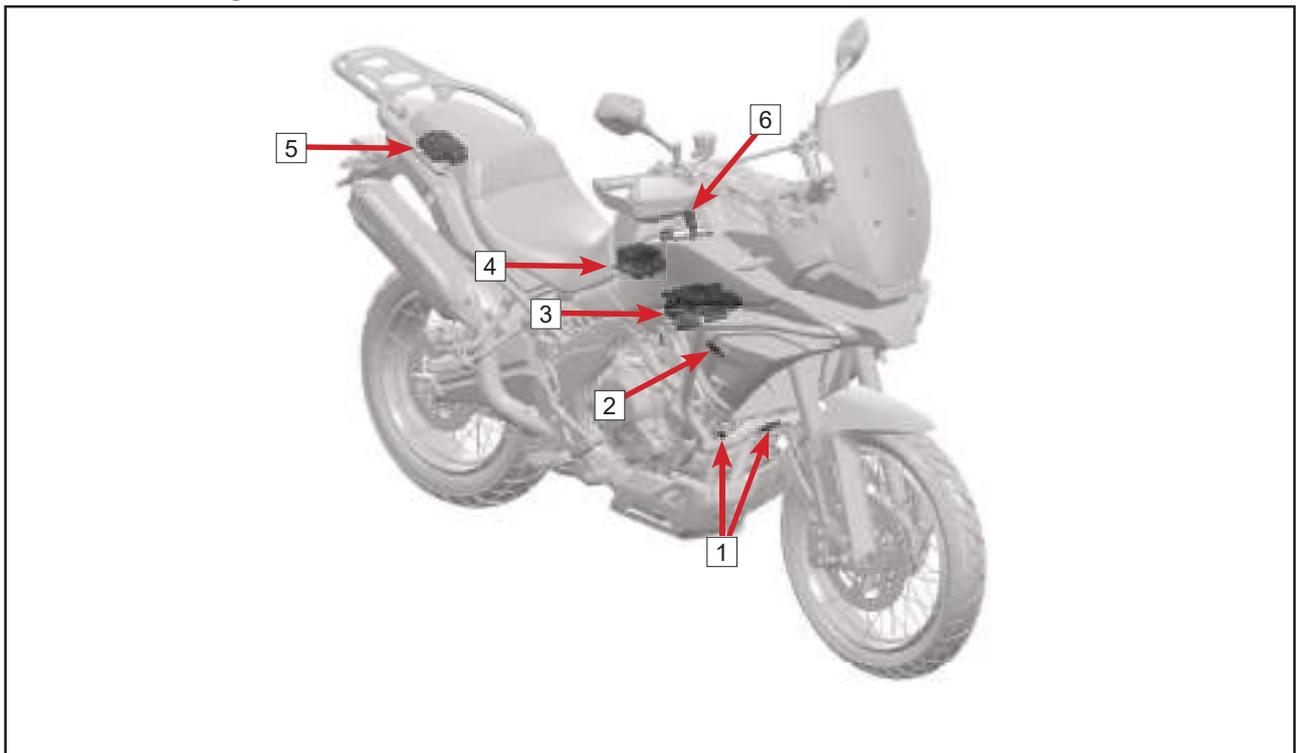
Battery positive/negative wires and electrical control units have to be removed before welding on the vehicle.

It is forbidden to puncture the wire to test the input/output electrical signals.

Establish the awareness of environmental protection and effective disposal of waste generated during maintenance.

## 13.1 Fuel System

### 13.1.1 Fuel System Location



1	Oxygen Sensor	2	Coolant Temperature Sensor	3	Throttle Body Assembly
4	Gasoline Pump	5	ECM	6	Fuel Level Sensor

## 13.2 Fuel Tank

### Removal

Remove bolts [1].

**Tip: The following steps are for fuel line pressure relief.**

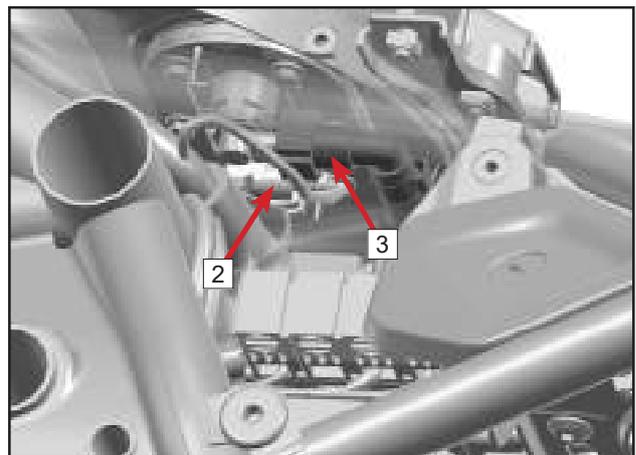
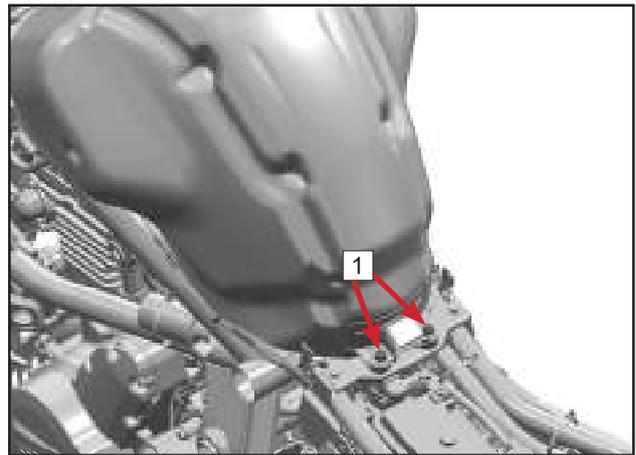
Remove the fuel pump connector [2].

Remove the fuel pump connector [2].

Unlock the vehicle and press the ignition switch.

Start the vehicle and idle the engine to stop.

Turn off the vehicle power and disconnect the positive and negative terminals of battery.



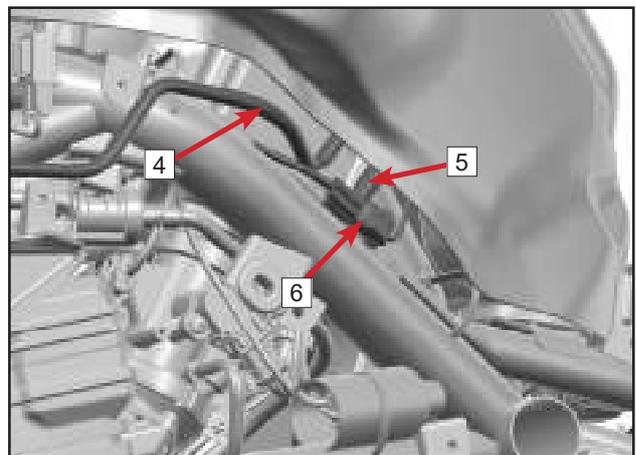
 <b>CAUTION</b>
<b>Before disassembly, please relieve the fuel pressure. Prevent a large amount of fuel overflow when disassembling the tubing, resulting in safety hazards.</b>

Disconnect the overflow pipe [3].

Disconnect the fuel evaporator line [4].

Disconnect the overflow pipe [5].

Disconnect fuel level sensor connector [6].



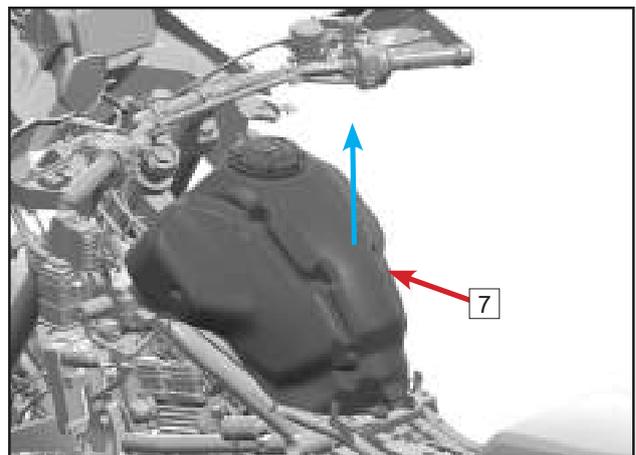
Remove fuel tank [7].

 <b>DANGER</b>
<b>Do not invert the fuel tank to prevent fuel leakage.</b>

 <b>WARNING</b>
<b>When installing the fuel tank, install the quick joint of high-pressure oil pipe first, and check that the pipes cannot be squeezed or damaged.</b>

### Installation

Reverse the removal procedures for installation.



## 13.3 Fuel Pump Assembly

Release pressure in fuel system.

Ensure that static electricity is released by grounding the vehicle.

Unplug cables related to fuel pump.

Unplug quick joint. Cover with cloth to prevent fuel from leaking.

Remove fuel pump cables and connectors. Clean fuel tank and fuel pump to prevent foreign matters into fuel tank.

### NOTE

Excessive foreign matter in the tank may cause the fuel pump to wear out prematurely or block fuel filter.

Remove bolt 1 ~ bolt 6 in sequence.

Remove fuel pump 7 carefully.

### NOTE

There is still some fuel remained in removed fuel pump. Be careful to transfer the fuel pump into a proper container.

Check the fuel tank for impurities. Clean the tank thoroughly with clean fuel before reinstalling a new fuel pump. Do not use water or other chemicals to clean the tank.

### Installation

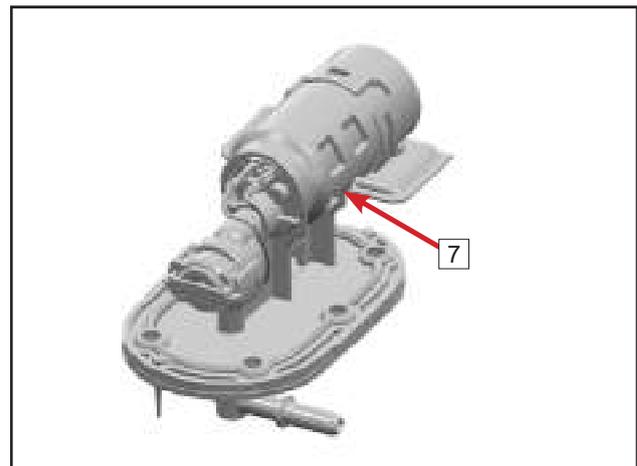
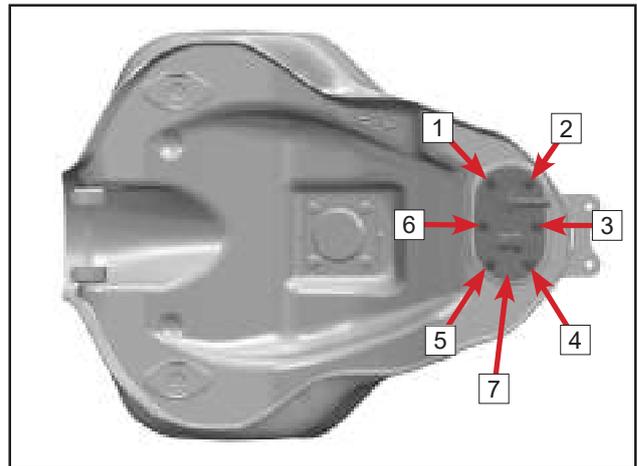
Position the fuel pump correctly into the tank assembly mounting hole.

### NOTE

The arrow on fuel pump aligns to fuel tank mark all the way.

Remove bolt 1 ~ bolt 6 in sequence.

Reconnect the quick joint, cable and other components, start the power supply to test whether the fuel pump starts normally.



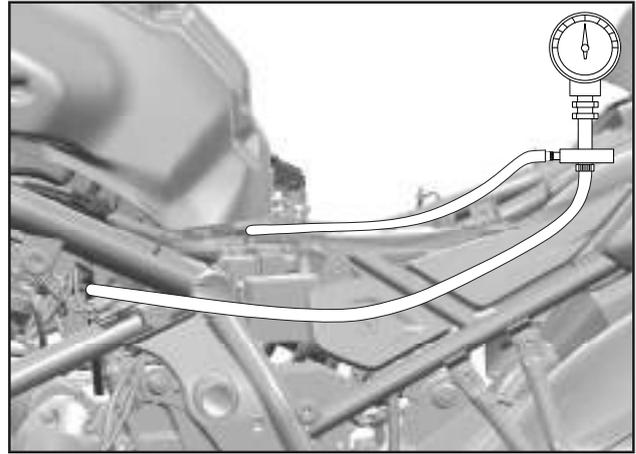
## 13.3.1 Fuel Pump Pressure Test

Connect the fuel pump pressure tester as shown in the figure.

Unlock the vehicle and turn on the stop switch.

At this time, the self-test of the fuel pump is carried out. The rated working pressure of fuel pump is 330kpa.

If the fuel pump is lower than 330kpa, the fuel pump assembly is damaged and replace it with a new one.



## 13.3.2 Fuel Level Sensor Detection

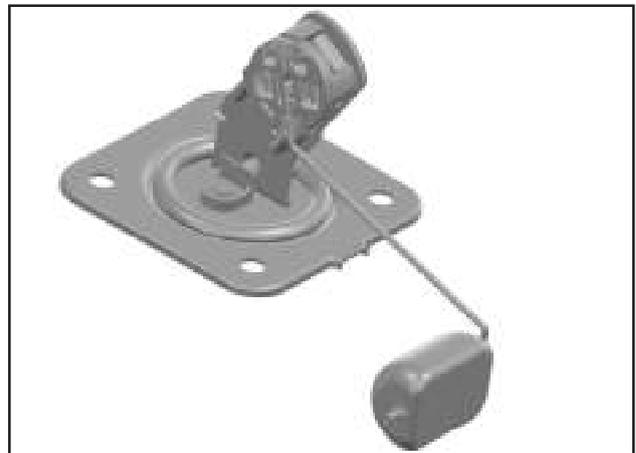
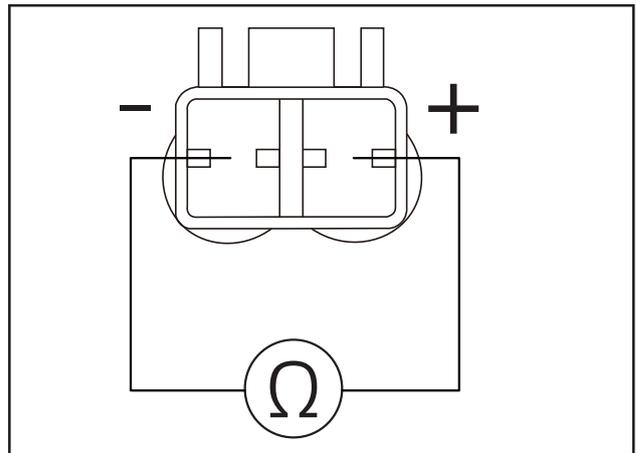
1.The detection method is shown in the figure.

2.Swing the float chamber up and down  
As the Angle changes, the multimeter will display different resistance values.

3.Resistance value detection parameters are as follows:

Float position	Resistance ( $\Omega$ )	Error
75°(F)	10	$\pm 1.5$
70°	50	$\pm 1.5$
55°	130	$\pm 2$
44°	210	$\pm 3$
32.5°	290	$\pm 3$
23°	370	$\pm 5$
9.5°	450	$\pm 5$
0°(E)	450	$\pm 5$

If the resistance value is not within the preceding range, the fuel level sensor is damaged. Replace it with a new one.

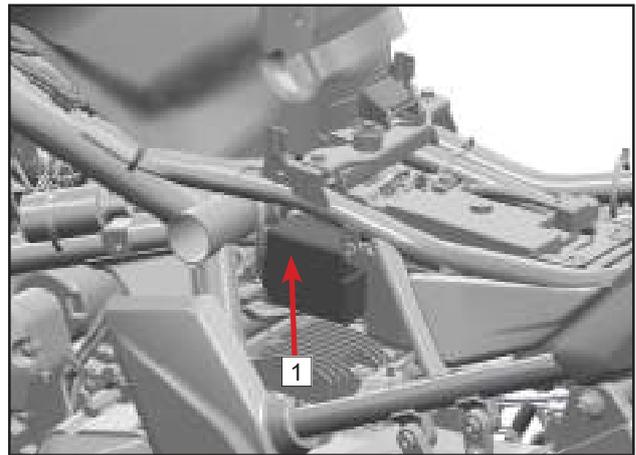


## 13.3.3 Fuel Pump Relay

### Removal

Turn off the vehicle power.

Turn on fuel bushing 1.



Remove fuel relay 2.

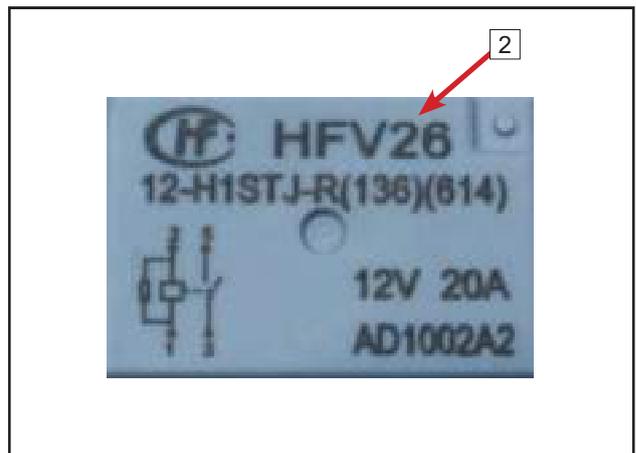
Check the fuel relay pin for breakage.

**⚠ CAUTION**

**Avoid violent disassembly when disassembling, otherwise it may cause the relay pin to break and damage the relay.**

### Installation

Reverse the removal procedures for installation.



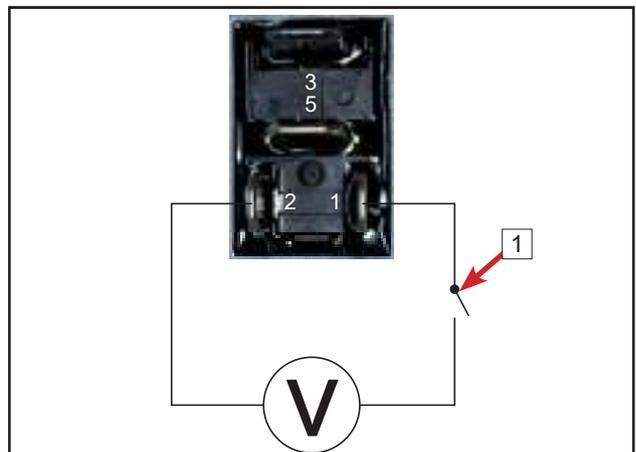
### 13.3.3.1 Fuel Pump Relay Operation Test

1. Connect 12V power supply as shown in the figure.

2. Operate the switch 1 intermittently.

3. Observe whether the fuel pump relay has the ticking sound.

If there is no ticking sound, the fuel pump relay may be damaged. Please replace it with a new one.



## 13.4 ECU

### Removal

Remove rear seat.

Remove the vehicle power supply.

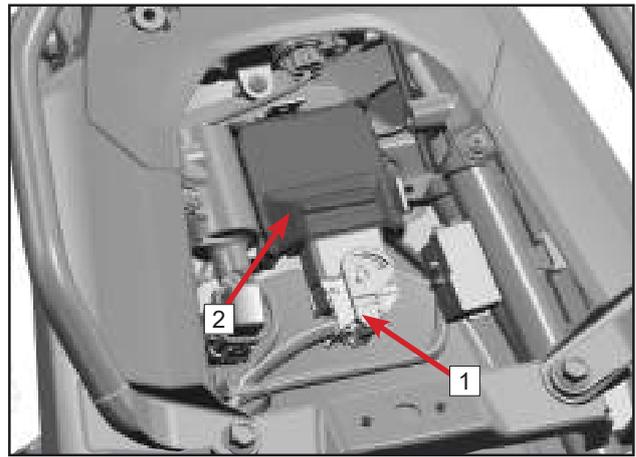
Remove the positive and negative terminals of battery.

Remove the connector **1**.

Remove ECU **2**.

### Installation

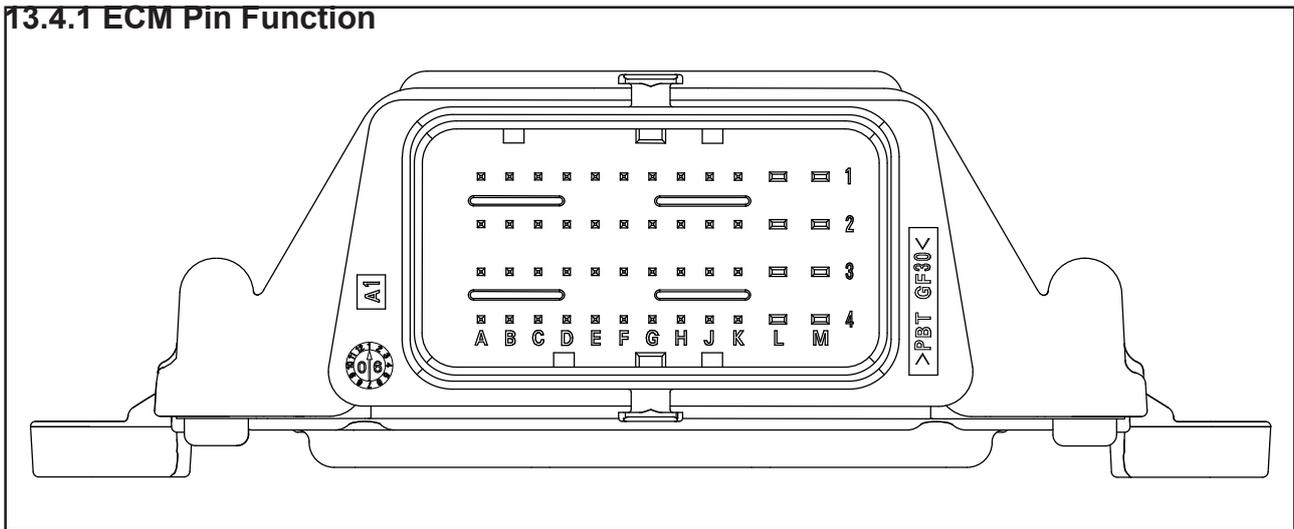
Reverse the removal procedures for installation.



### CAUTION

Before disassembly, power off the vehicle and disconnect the positive and negative terminals of battery. Prevent damage to ECU caused by thermal short circuit. After installing the ECU, wait five minutes before installing battery to prevent ECU self-learning faults.

## 13.4.1 ECM Pin Function



Pin	Function	Pin	Function	Pin	Function
1(M1)	Oxygen sensor heating 2	2(L1)	Oxygen sensor heating 1	3(M2)	Ignition sensor heating 1
4(L2)	Canister valve fuel evaporation control	5(M3)	Ignition GND	6(L3)	Rear oxygen sensor heating
7(M4)	Ignition coil 2	8(L4)	Non-sustained power UBR1	9(K1)	Air intake pressure sensor 1(DS)
10(J1)	Sensor GND 1	11(H1)	Air intake temperature sensor(TANS)	12(G1)	TPS (DKG)
13(F1)	Engine temperature sensor (TMOT)	14(E1)	Main relay	15(D1)	CAN L
16(C1)	CAN H	17(B1)	Stepper motor phase D	18(A1)	Stepper motor phase C
19(K2)	Oxygen sensor signal 1	20(J2)	Oxygen sensor signal 2	21(H2)	Ignition diagnose 2
22(G2)	Downstream oxygen sensor	23(F2)	Side stand switch	24(E2)	NULL
25(D2)	Downstream oxygen sensor	26(C2)	Starter relay	27(B2)	Stepper motor phase A
28(A2)	Stepper motor phase B	29(K3)	MIL light	30(J3)	5V output 1
31(H3)	Secondary gulp magnetic valve	32(G3)	Ignition switch KL15	33(F3)	Sustained power (UBD)
34(E3)	K Line	35(D3)	Neutral switch	36(C3)	Ignition diagnose 1
37(B3)	Clutch switch	38(A3)	Tipping switch	39(K4)	Comfort/Sport mode switch
40(J4)	Engine RPM output	41(H4)	Speed sensor	42(G4)	Engine RPM sensor B(DGB)
43(F4)	Engine RPM sensor B(DGA)	44(E4)	Headlight relay	45(D4)	Cooling fan relay
46(C4)	Fuel pump relay	47(B4)	Injector 2	48(A4)	Injector 1

## 13.4.2 EFI Fault Code Table

No.	Code	Description
1	P0030	1 路氧传感器加热控制电路开路
2	P0031	1 路氧传感器加热控制电路电压过低
3	P0032	1 路氧传感器加热控制电路电压过高
4	P0130	1 路氧传感器信号不合理
5	P0131	1 路氧传感器信号过低
6	P0132	1 路氧传感器信号电路电压过高
7	P0134	1 路氧传感器电路信号故障
8	P0050	2 路氧传感器加热控制电路开路
9	P0051	2 路氧传感器加热控制电路电压过低
10	P0052	2 路氧传感器加热控制电路电压过高
11	P0059	2 路氧传感器信号不合理
12	P0151	2 路氧传感器信号过低
13	P0152	2 路氧传感器信号电路电压过高
14	P0154	2 路氧传感器电路信号故障
15	P0107	进气压力传感器对地短路
16	P0108	进气压力传感器对电源短路
20	P0112	进气温度传感器信号电压过低
21	P0113	进气温度传感器信号电压过高
22	P0117	发动机冷却液温度传感器电路电压过低
23	P0118	发动机冷却液温度传感器电路电压过高
24	P0122	节气门位置传感器电路电压超低限值
25	P0123	节气门位置传感器电路电压超高限值
26	P0201	一缸喷油器控制电路开路
27	P0261	一缸喷油器控制电路对地短路
28	P0262	一缸喷油器控制电路对电源短路
29	P0322	无转速传感器脉冲信号 ( 开路或短路 )
30	P0560	系统蓄电池电压信号不合理
31	P0562	系统蓄电池电压过低
32	P0563	系统蓄电池电压过高
33	P0627	油泵继电器控制电路开路
34	P0628	油泵继电器控制电路对地短路
35	P0629	油泵继电器控制电路对电源短路
36	P0650	MIL 灯驱动级电路故障
37	P1105	怠速执行器控制电路对电源短路
38	P1117	怠速执行器控制电路对地短路
39	P1118	怠速执行器控制电路开路
40	P1099	侧倾传感器电路故障

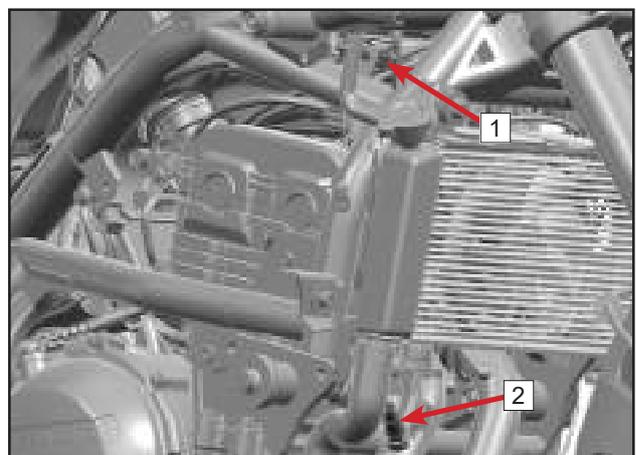
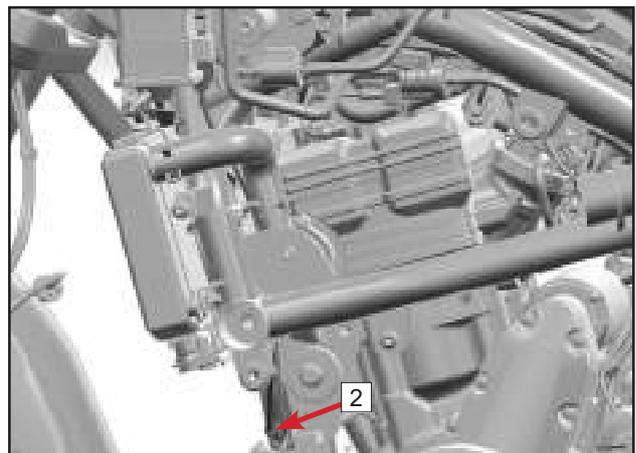
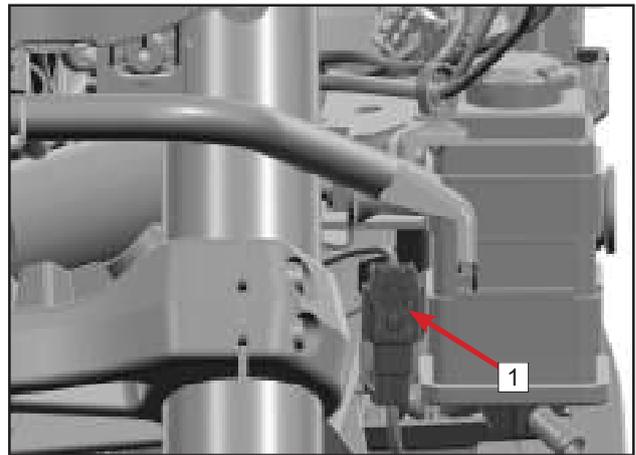
## 13.5 Oxygen Sensor

### Removal

Remove the connector **1**.  
Remove oxygen sensor **2**.

### Installation

Reverse the removal procedures for installation.



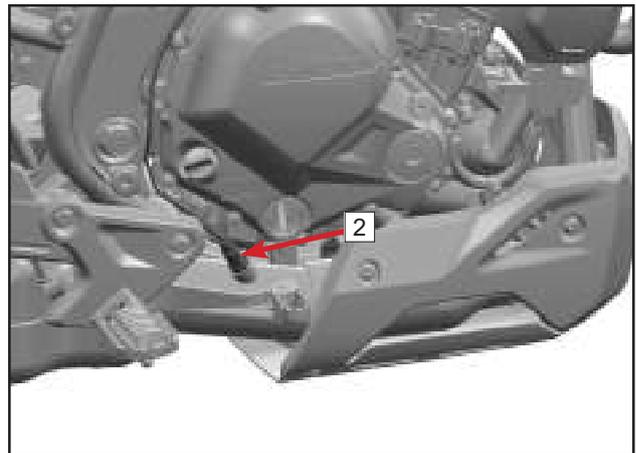
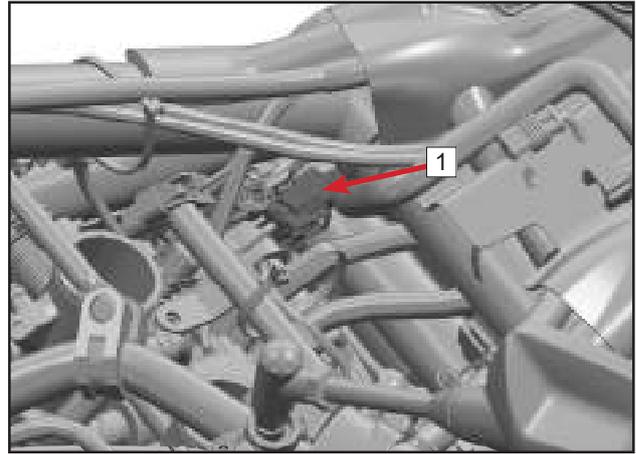
## 13.5.1 Oxygen Sensor (EU5 + )

### Removal

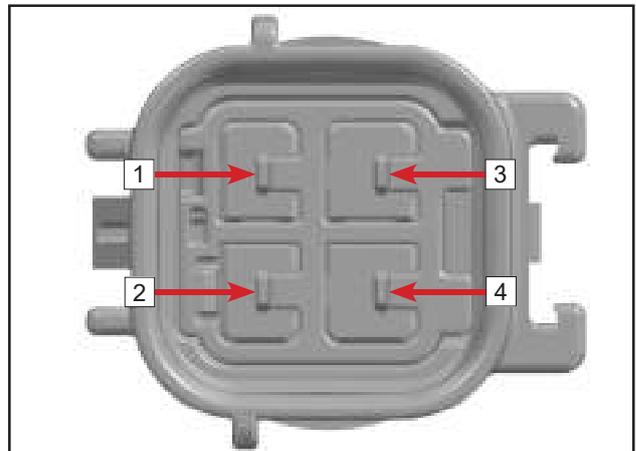
Remove the connector [1].  
Remove oxygen sensor [2].

### Installation

Reverse the removal procedures for installation.



This sensor is used in closed-loop feedback controlled fuel injection to improve the air-to-fuel ratio accuracy and control the emission, which is to improve the control accuracy of the air-fuel ratio of ECU. It's located in the exhaust stream to measure the amount of oxygen in exhaust, and determine whether the gasoline and air are completely burned so as to make catalytic converter convert HC, CO and NOX of Nitrogen efficiently.



### Pin function:

- 1: Heating
- 2: GND
- 3: Heating
- 4: Sensor signal

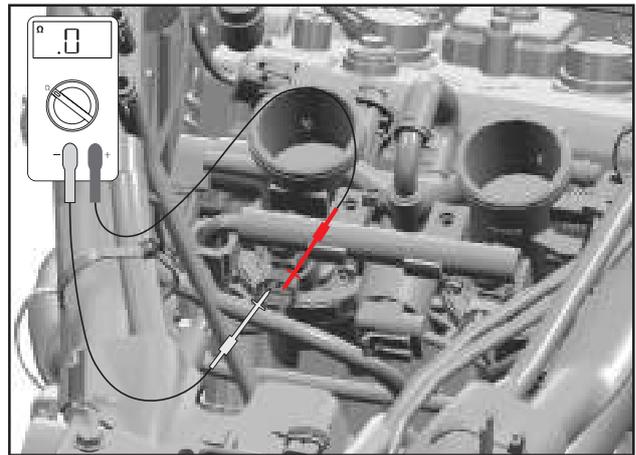
## 13.6 Injector

### 13.6.1 Injector Resistance Detection

1. The detection method is shown in the figure.

**Injector resistance value:  $12 \pm 0.6 \Omega$**

If the resistance value is not within the above range, it indicates that the fuel injector is damaged, please replace it with a new part.



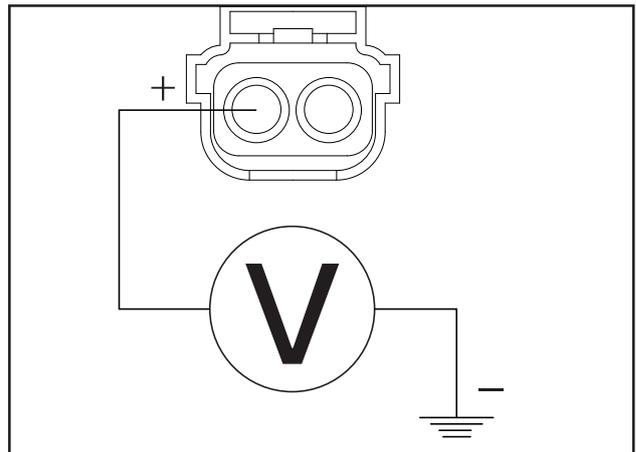
### 13.6.2 Injector Input Voltage Detection

1. Use a multimeter to connect the harness terminal, as shown in the figure.

2. Unlock the vehicle and turn on the ignition switch.

3. Whether the voltage is about 12V.

If no voltage is displayed or the voltage is too low, check whether the wiring harness is open or the battery is out of power.



## 13.7 Throttle Body Assembly

### Removal

Turn off the vehicle power.

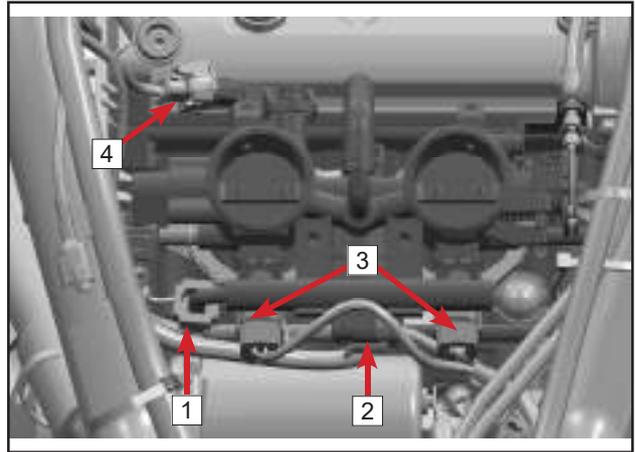
Disconnect the positive and negative terminals of battery.

Disconnect the fuel line [1].

Remove idle stepper motor connector [2].

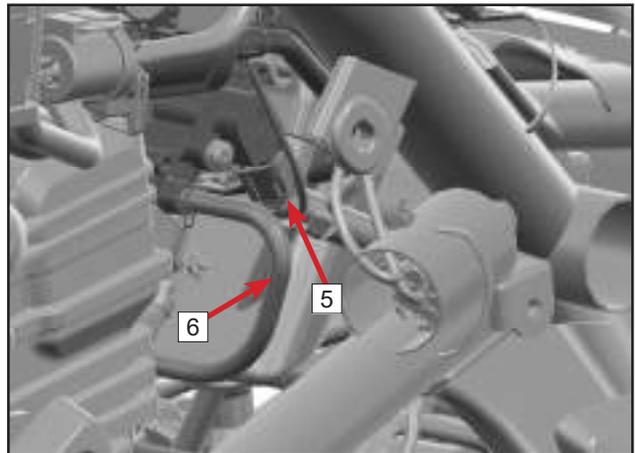
Remove the nozzle connector [3].

Remove air intake pressure/ temperature sensor connector [4].



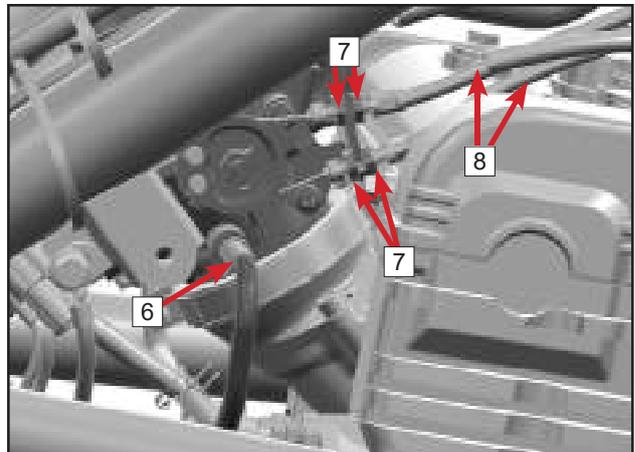
Disconnect the connector [5] of TPS.

Disconnect fuel vapor hose [6].

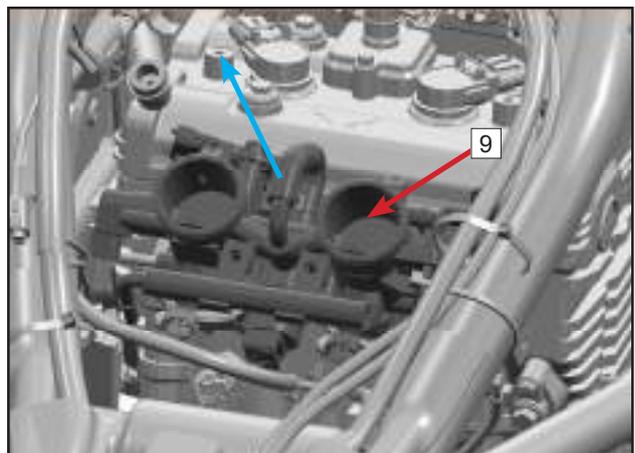


Loosen the nut [7].

Remove throttle cable [8].



Remove throttle body assembly [9].

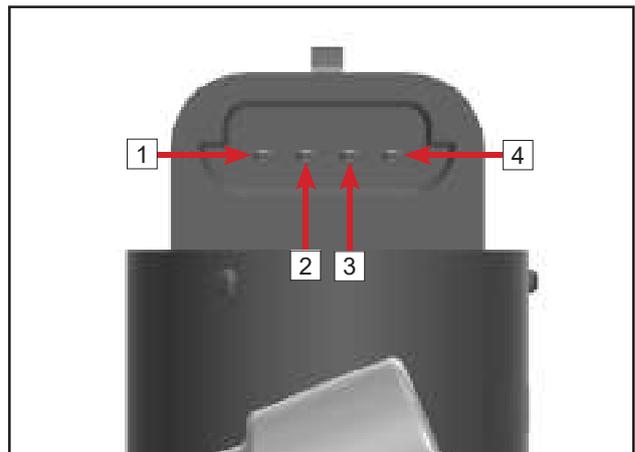
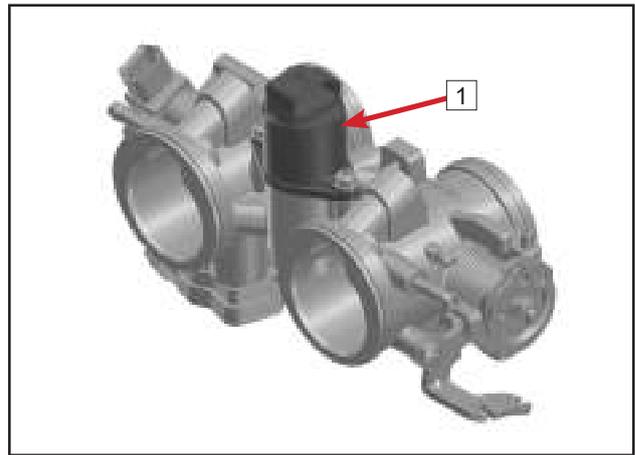


### Installation

Reverse the removal procedures for installation.

## 13.7.1 Idle Stepper Motor

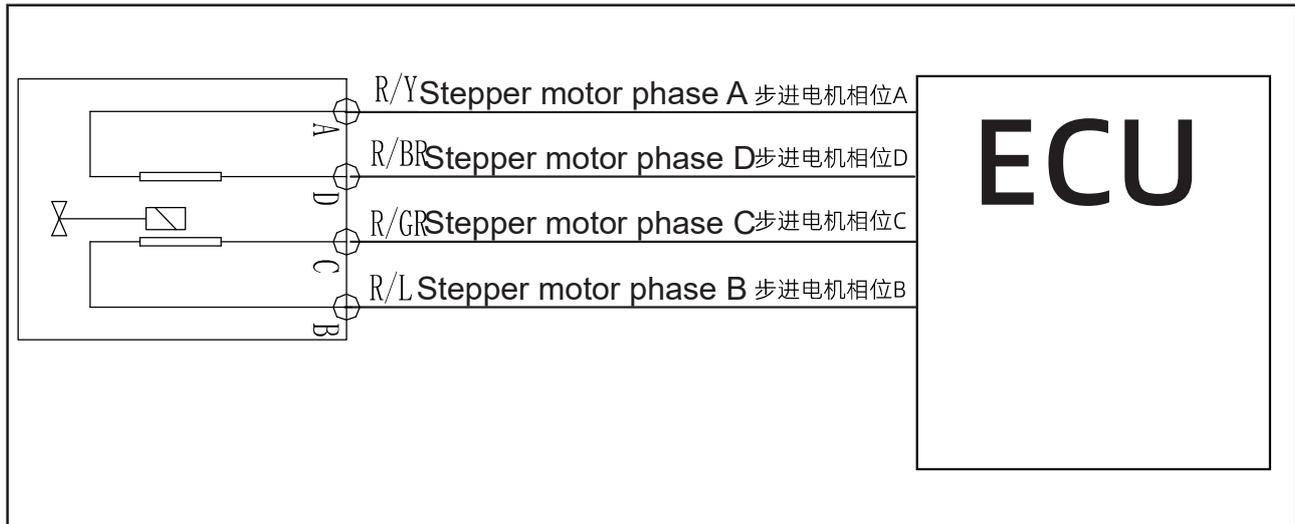
The idle stepper motor **1** sends the signal to the ECU by controlling the intake air flow, and the ECU controls the injection amount according to the intake air flow, so as to achieve the normal idle speed of the engine.



### Idle Stepper Motor Pin Function

- 1**: Stepper motor phase A
- 2**: Stepper motor phase B
- 3**: Stepper motor phase C
- 4**: Stepper motor phase D

## 13.7.1.1 Idle Stepper Motor Troubleshooting



### Harness Inspection

Use to DSCAN check the sensor voltage, whether the voltage is about 0V.

NO

The connector is in poor contact due to intermittent fault.

YES

### Sensor Power Inspection

1. Use a multimeter to connect the R/Y and R/BR harness, whether the voltage is about 12V.  
2. Use a multimeter to connect the R/GR and R/L harness, whether the voltage is about 12V.

NO

Check whether R/Y and R/BR are short-circuited or disconnected. If no short circuit or open circuit exists, replace the ECU and check it again.  
Check whether R/GR and R/L are short-circuited or disconnected. If no short circuit or open circuit exists, replace the ECU and check it again.

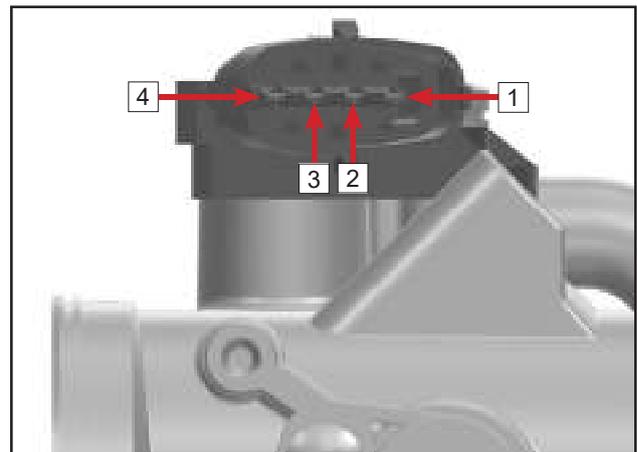
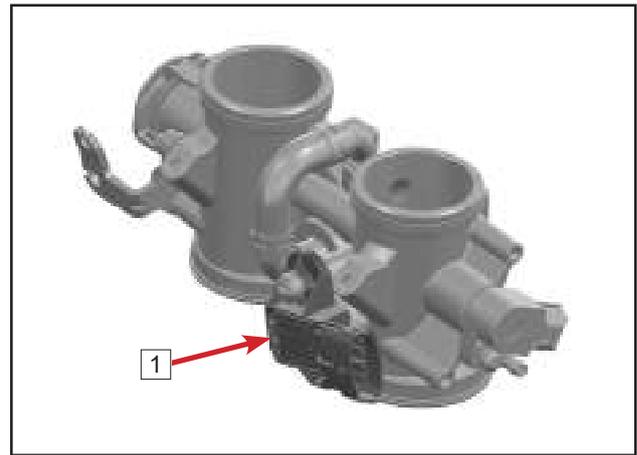
YES

Replace it with a new one and then check it again.

## 13.7.2 Air Intake Pressure/Temperature Sensor

The intake pressure/temperature sensor **1** monitors the pressure in the intake pipe and provides the ECU with information about the load of engine.

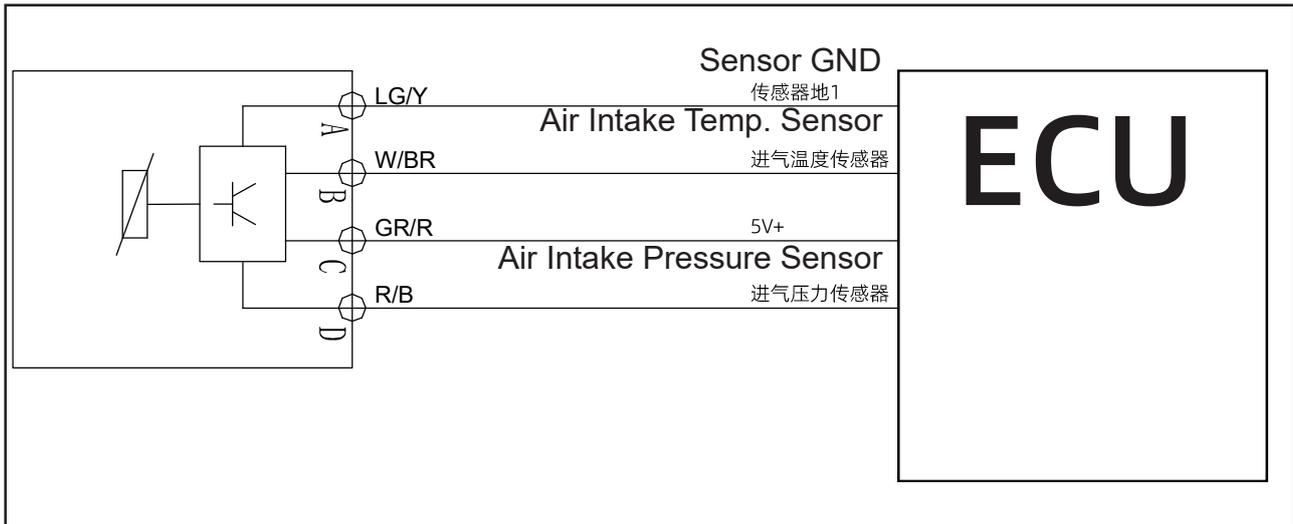
The temperature sensor is a negative temperature coefficient (NTC) thermistor whose resistance value decreases as the coolant temperature rises, but the relationship is not linear.



### Air Intake/Temperature Sensor Pin Function

- 1**: Masse Ground
- 2**: NTC
- 3**: +5V
- 4**: Output Signal

## 13.7.2.1 Air Intake Pressure/Temperature Sensor Troubleshooting



### Harness Inspection

Use to DSCAN check the sensor voltage, whether the voltage is about 0V. **NO** → The connector is in poor contact due to intermittent fault.

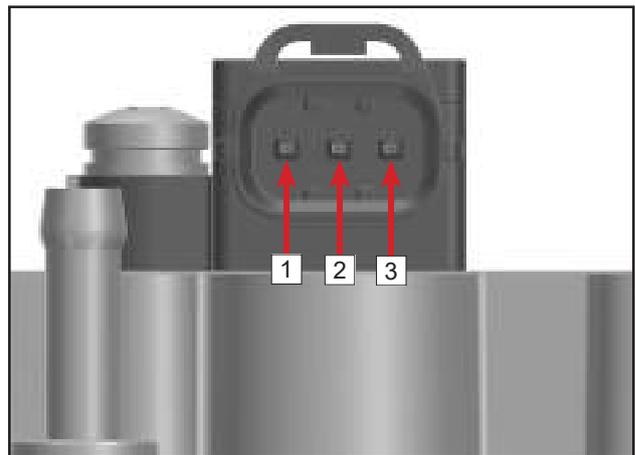
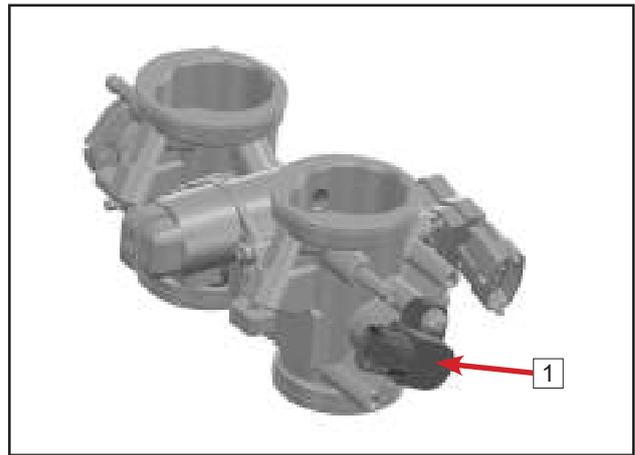
### Sensor Power Inspection

Use a multimeter to connect the LR/Y and GR/R harness, whether the voltage is about 5-5.25V. **NO** → Check whether LR/Y and GR/R are short-circuited or disconnected. If no short circuit or open circuit exists, replace the ECU and check it again.

**YES** → Replace it with a new one and then check it again.

## 13.7.3 TPS

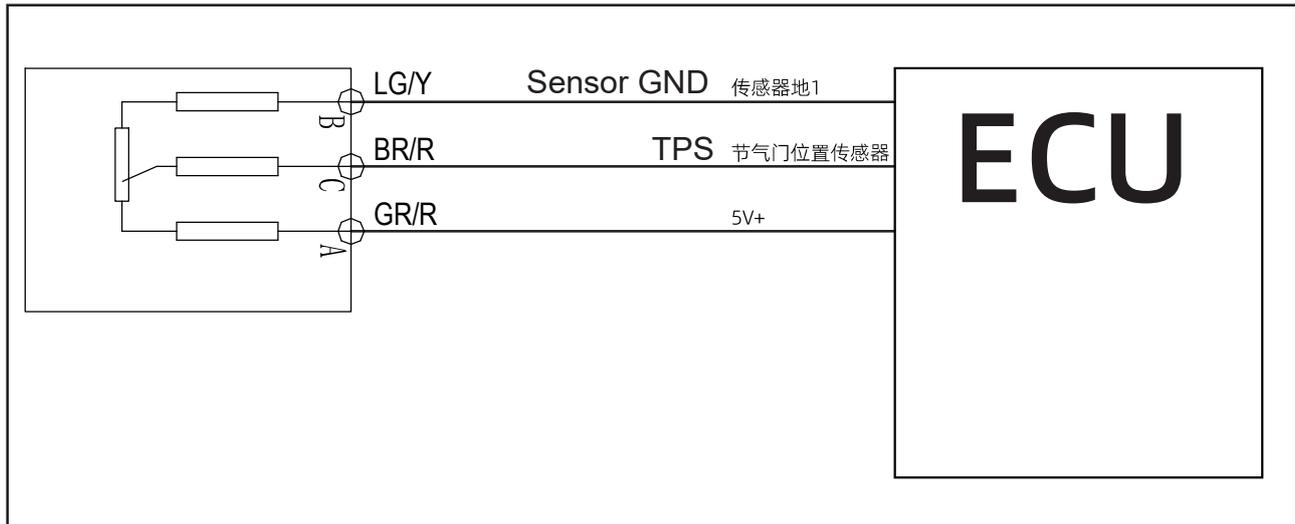
The throttle sensor [1] provides the Angle information of throttle disc to the ECU to obtain high flow intake pressure and temperature data to calculate the fuel injection volume.



### TPS Pin Function:

- [1]: OUTPUT
- [2]: GND
- [3]: INPUT

## 13.7.3.1 TPS Troubleshooting



### Harness Inspection

Use to DSCAN check the sensor voltage, whether the voltage is about 0V. **NO** → The connector is in poor contact due to intermittent fault.

### Sensor Power Inspection

Use a multimeter to connect the LG/Y and GR/R harness, whether the voltage is about 5-5.25V. **NO** → Check whether LG/Y and GR/R are short-circuited or disconnected. If no short circuit or open circuit exists, replace the ECU and check it again.

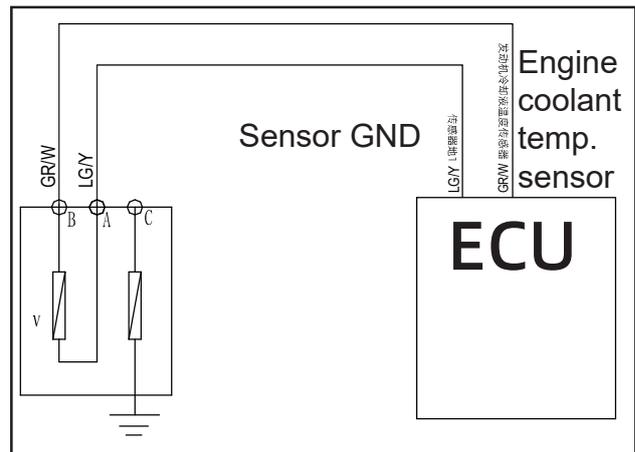
**YES** → Replace it with a new one and then check it again.

## 13.8 Coolant Temperature Sensor

The sensor is two groups of negative temperature coefficient (NTC) thermistors, whose resistance value decreases as the coolant temperature increases, but the relationship is not linear. The ECU reads the temperature value of sensor and provides the value to the meter for display.

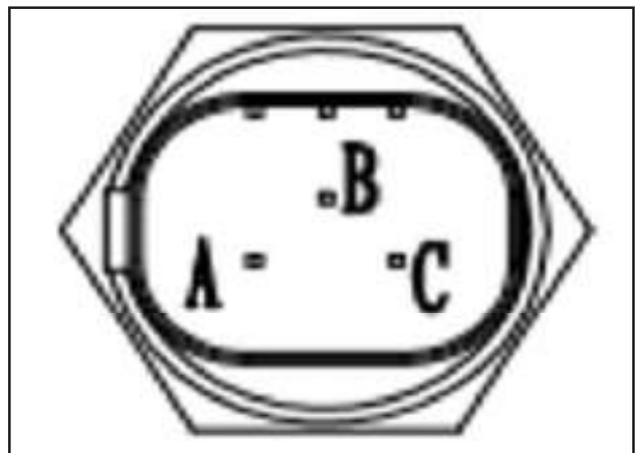


The circuit of connection between the sensor and ECU.



### Coolant Temperature Sensor Pin Function:

- [A]: ECU
- [B]: Water-thermometer
- [C]: ECU



Temperature°C	Resistance(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

The right table shows the resistance value of the sensor at different temperatures.

## 13.9 Tipping Sensor

### Removal

Remove the connector [1].

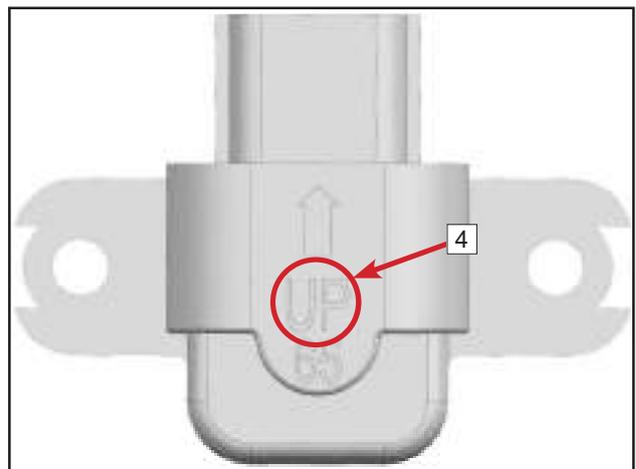
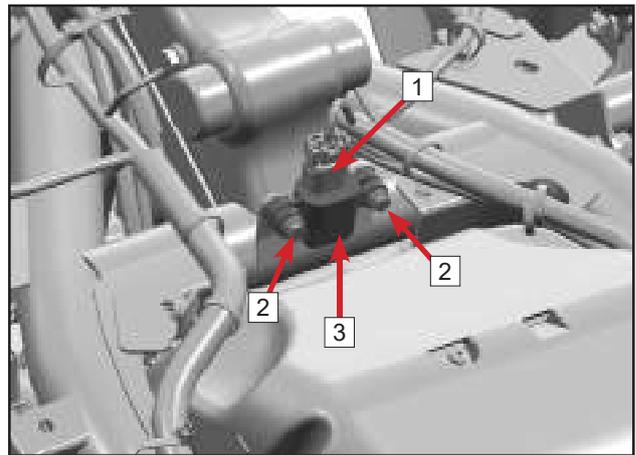
Remove bolts [2].

Remove tipping sensor [3].

### Installation

Reverse the removal procedures for installation.

**NOTE:** When installing the tipping sensor, the use mark [4] faces up.



### 13.9.1 Tipping Sensor Inspection

Remove the tipping sensor from the fixing seat.

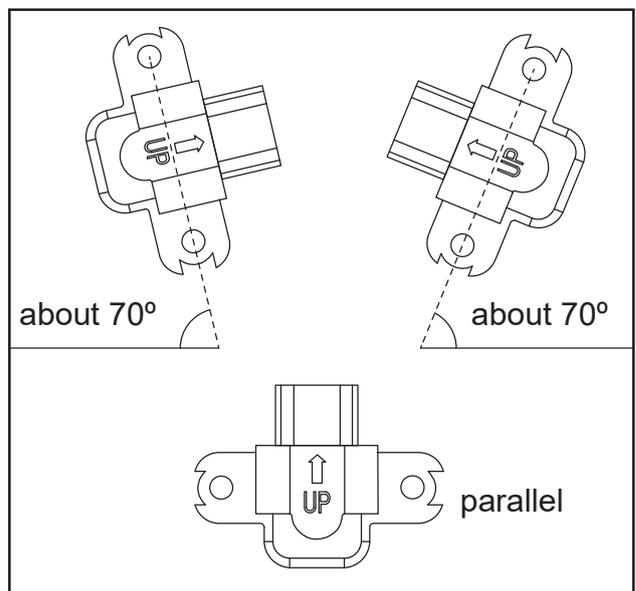
Attach the connector.

Place the tipping sensor in parallel.

Open the electric door lock, operate the ignition switch, and check whether the vehicle can start normally.

1. The wiring harness cannot be started properly, check whether the wiring harness is short-circuited or disconnected.

2. If the wiring harness is correct, replace the tipping sensor.

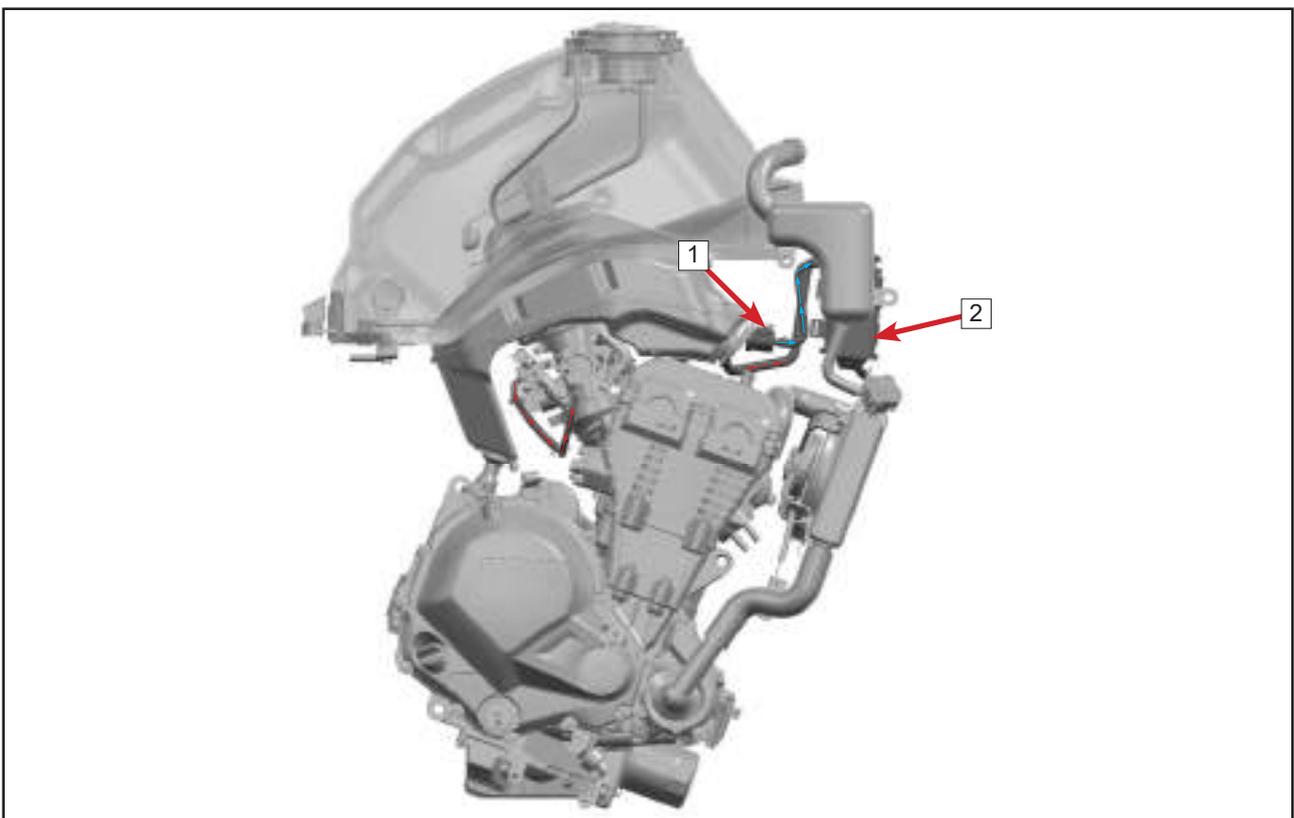
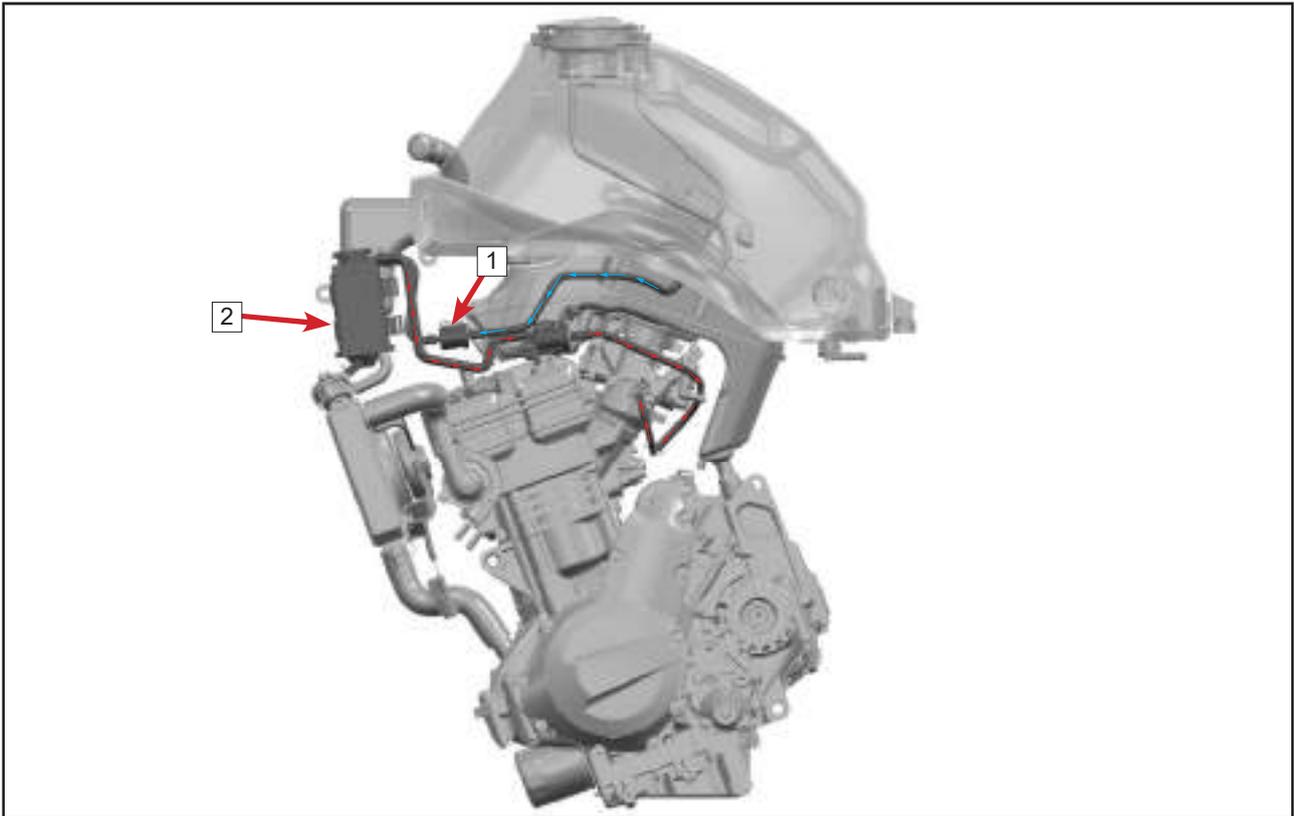


Place the tipping sensor about 70° to the left or right, as shown in the figure.

Open the electric door lock, operate the ignition switch, and check whether the vehicle cannot start.

1. If the vehicle starts abnormally, please replace the tipping sensor.

## 13.10 EVAP System Work Guide



Due to the volatile characteristics of fuel, in order to adapt to the current environmental protection laws and regulations, a set of fuel evaporation system is designed. The blue arrow shows the evaporated oil and gas, after the volatilized oil and gas passing through the two-way valve [1] enters the carbon tank [2].

The red arrow shows that after the engine starts, the carbon tank produces negative pressure, the air enters the carbon tank from the vent of carbon tank, desorbates the fuel vapor adsorbed on the carbon tank, passes through the fuel steam desorption pipe, enters the throttle and flows into the combustion chamber for combustion.

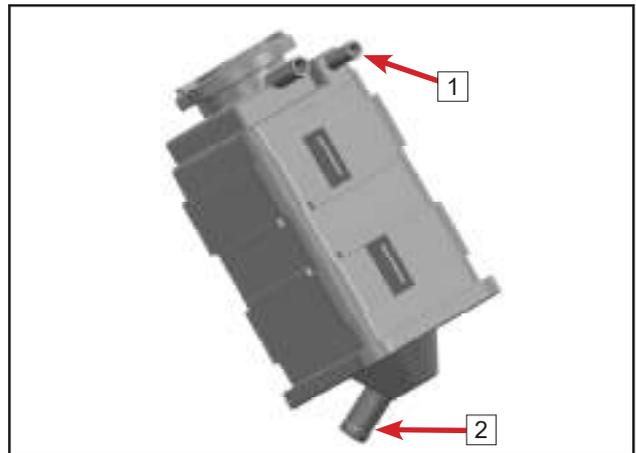
## 13.10.1 Two-way Valve Test

Close one end of the two-way valve, input air from the other end and keep for 10 seconds, no leakage situation is normal. If there is air leakage or body damage during the test, please replace it with a new part.



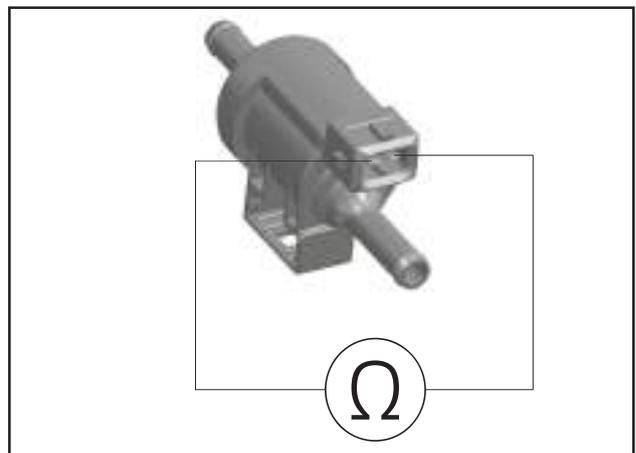
## 13.10.2 Canister Test

1. Inject air on the one end [1] of the adsorption port, and the vent port exits normally [2].  
2. Plug other ports, and pass 14.0kpa compressed air through the adsorption port [1], and keep no leakage for 30 seconds. If there is air leakage or body damage during the test, please replace it with a new part.



## 13.10.3 Canister Magnetic Valve Test

The resistance value of canister magnetic valve is measured as shown in the figure. If the resistance value in the test is greater than or less than the normal value, please replace the new part.



**Canister magnetic valve resistance value:  $17 \pm 2 \Omega$ .**





