

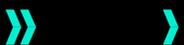
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MORE FUN.



# 675 NK

*Service Manual*



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Edition Date: 20250812

Edition Item: CF650-11 (6GUV-00WX01-11) SM -20250812

**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 CF650-11 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 shows up in the contents. That will help you to lock the chapter. And each chapter has its own contents. For example, if you want to find ignition coil information, lock 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.

# 01 Safety Information

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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.



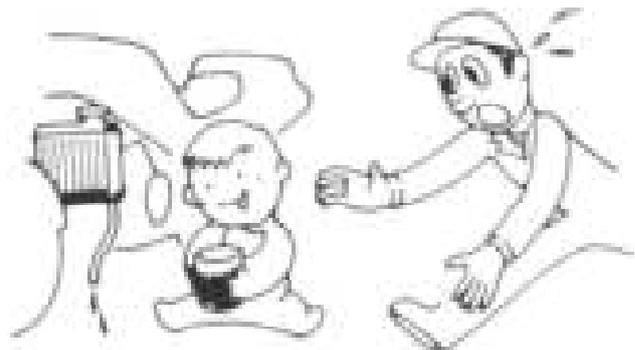
**⚠ WARNING:** Don't touch the engine and muffler with bare hands, the temperature of the engine and muffler is still very high when the engine is just shut down, so as to avoid burns. Wear long-sleeved overalls and gloves during maintenance.



**⚠ 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.

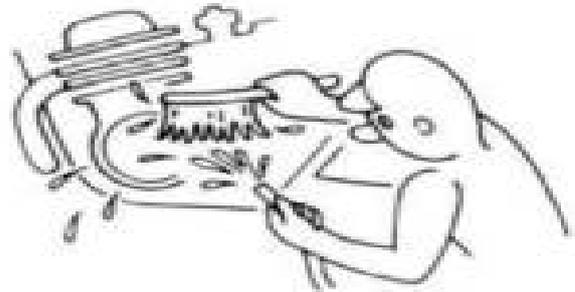


## 1.4 Repair Precautions

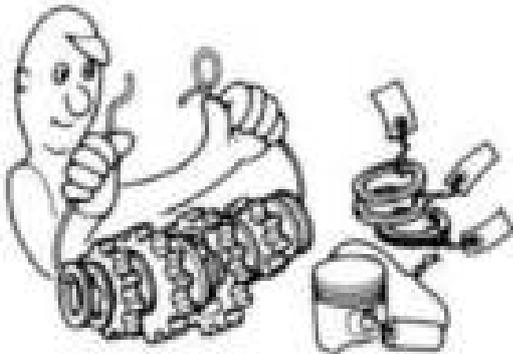
■ Use genuine CFMOTO Parts, lubricants and grease.



■ Clean the mud, dust before overhauling.



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

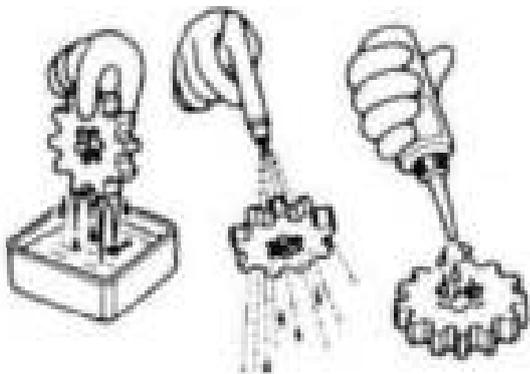


■ Replace the disassembled washers, O-rings, piston pin circlip and cotter pin with new ones.

■ 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.



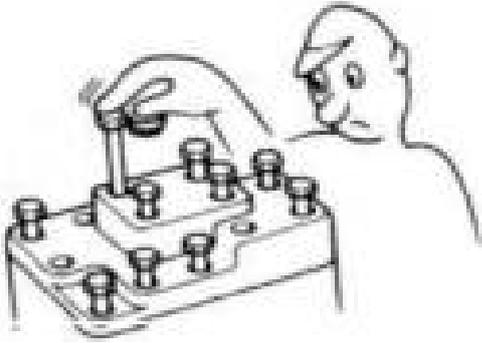
■ Clean and blow off the detergent after disassembling the parts. Apply lubricants on the surface of moving parts.



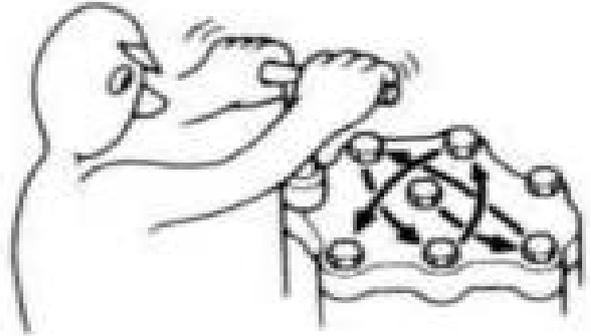
■ Check the necessary site during disassembly and determine the relevant data so that the assembly can be restored to the state before disassembly.



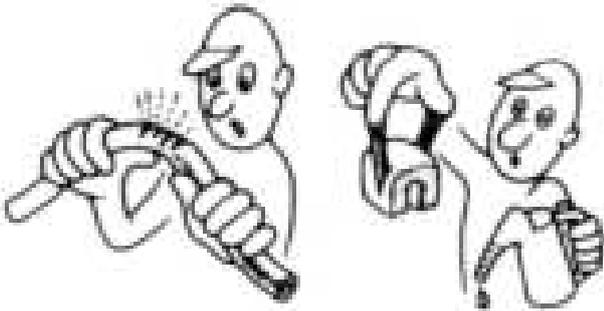
■ If not know the length of screws, install the screws one by one and tighten with same torque.



■ 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.



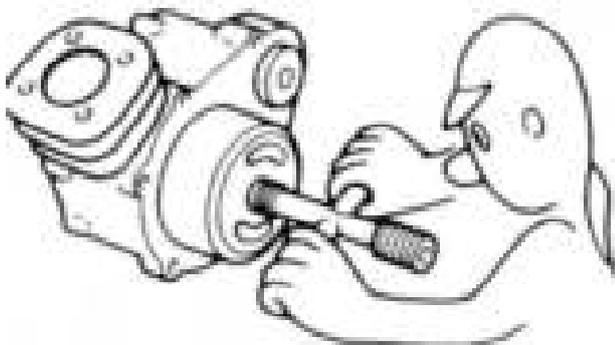
■ Check if the disassembled rubber parts are aged and replace it if necessary. Since rubber parts are not resistant to gasoline/kerosene, etc. Do not allow volatile oils/greases to attach to them.



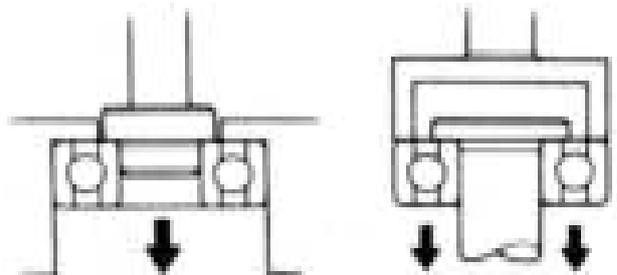
■ Apply or inject recommended lubricant to the specified parts.



■ Use special tools wherever necessary.

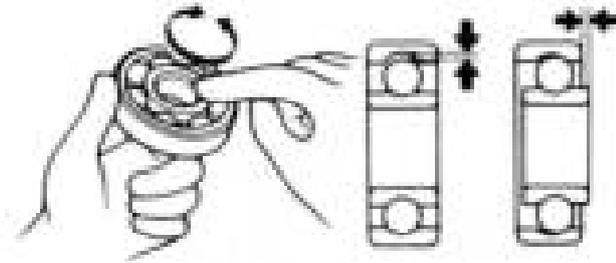


■ If the disassembling of pressed ball bearing is done by pressing the balls, the disassembled bearing should not be used again.



# 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.

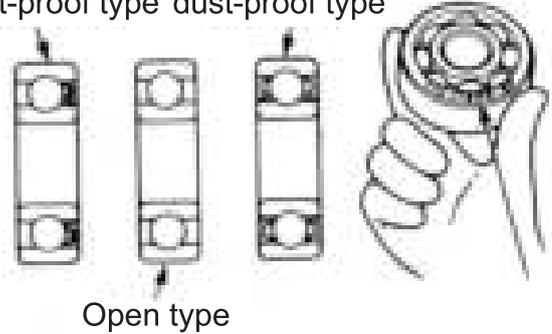


■ After assembling, check if all the tightened parts are properly tightened and can move smoothly.

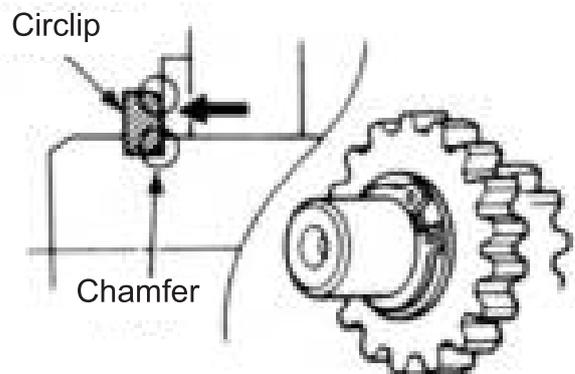


■ Install the one-side dust-proof bearing in the right direction. When assembling the open type or double-side dust-proof bearing, install with manufacturer's mark outward.

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



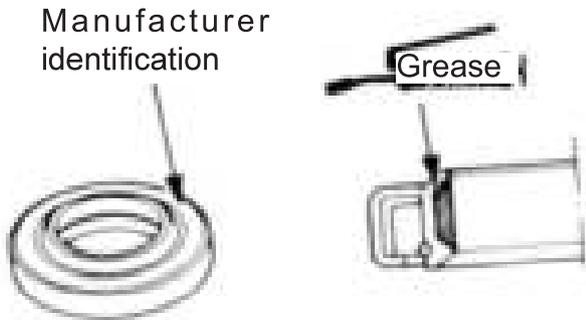
■ Install the elastic circlip with the chamfered side facing the direction of force. Do not use the circlip that has lost its elasticity. Install the elastic circlip after assembling to make sure it has been installed into the slot.



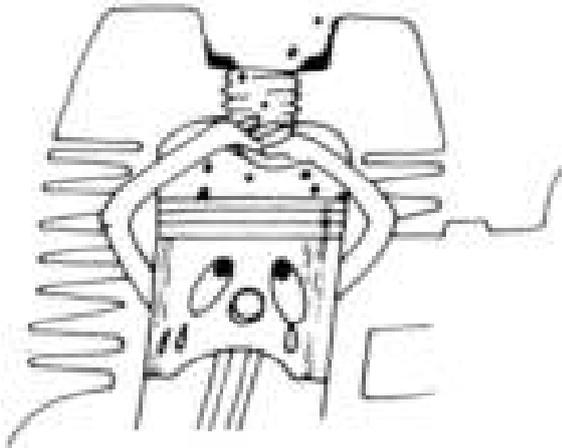
■ Brake fluid and coolant may damage coating, plastic and rubber parts. Flush these parts with water if splashed.



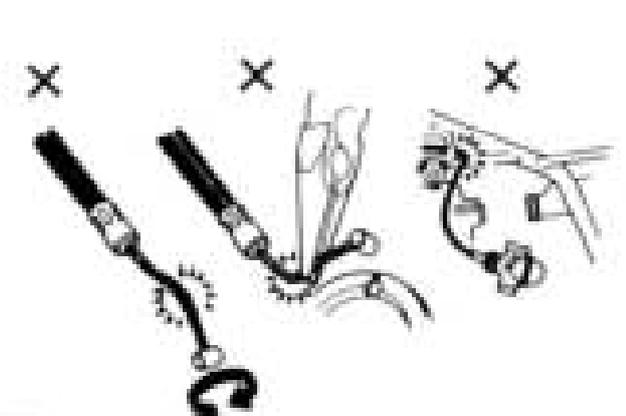
■ Install oil seal with the side of manufacturer's mark outward. (Direction without oil)  
Do not fold or scratch the oil seal lip.  
Apply grease to the oil seal lip before assembling.



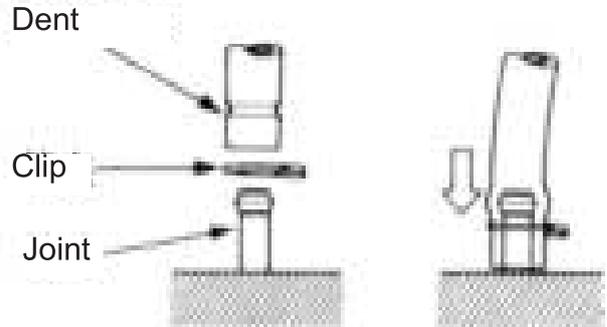
■ Do not mix mud or dust into engine or the hydraulic brake system.



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



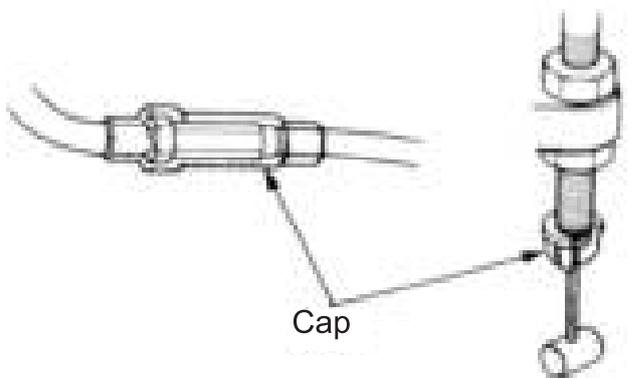
■ When installing pipes, insert the pipe till the end. Fit the pipe clip, if any, into the rove. Replace the pipes or hoses that cannot be tightened.



■ 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.



## 02 General Information

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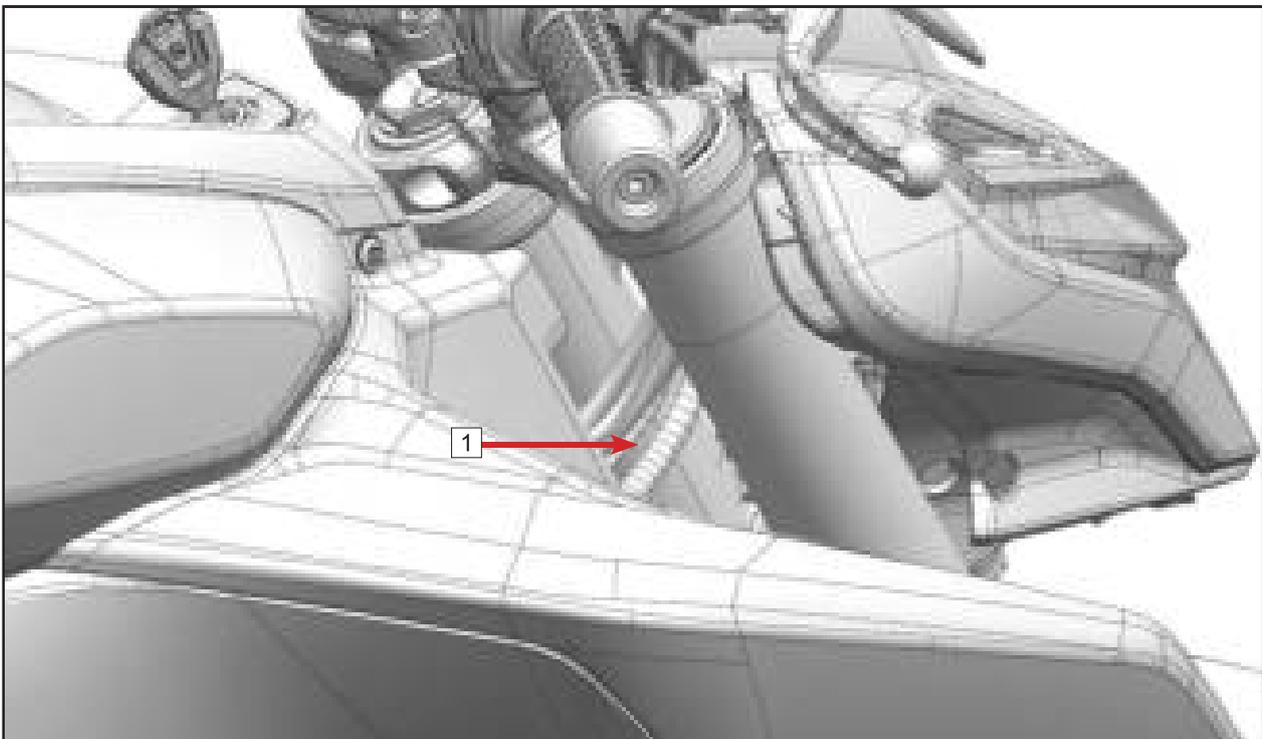
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## 2.1 Conversion Table

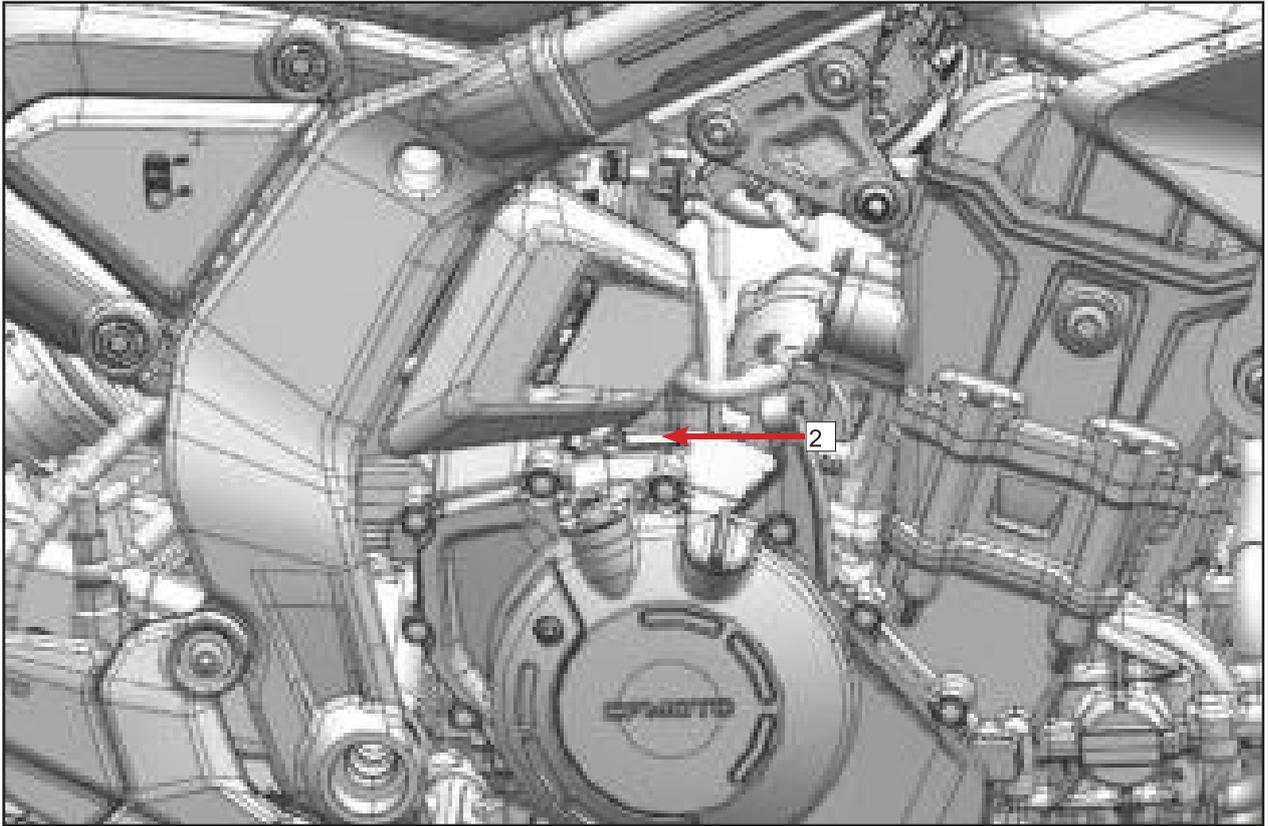
A	Ampere	lb	Pound
ABDC	After bottom dead center	m	Meter
AC	Alternating current	min	Minute
ATDC	After top dead center	N	Newton
BBDC	Before bottom dead center	Pa	Pascal
BDC	Bottom dead center	PS	Metric horse power
BTDC	Before top dead center	Psi	Pound/Square Inch
°C	Centigrade	r	Revolutions
DC	Direct current	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

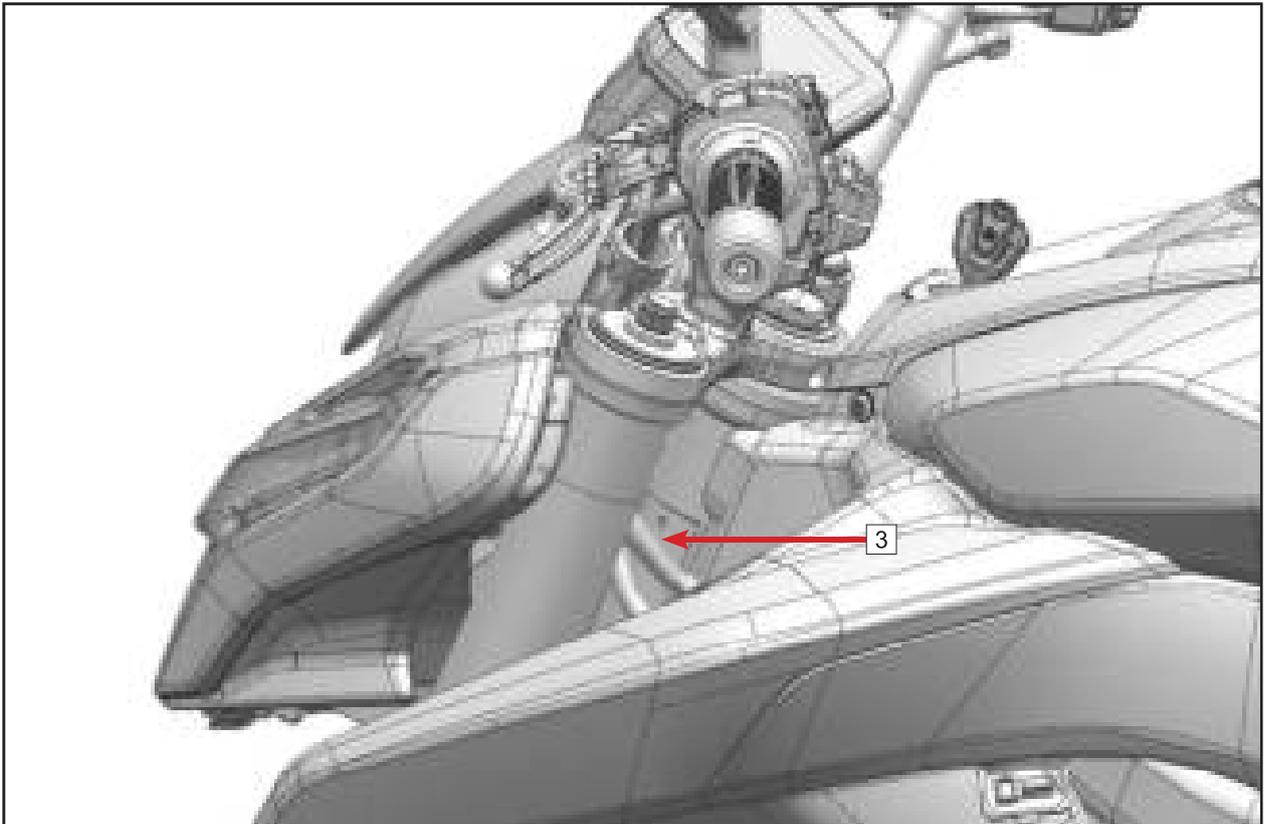


1	VIN
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## 02 General Information



2 Engine number



3 Vehicle nameplate position

## 2.3 Vehicle Specifications

Item	Specification	
Model	675NK	
	CF650-11	
Length	2020mm	
Width	849mm	
Height	1155mm	
Wheelbase	1400mm	
Height of seat	810mm	
Engine model	372MT	
Displacement	674mL	
Fuel type	Gasoline	
Gross weight	189kg	
Passengers	2 people (driver included)	
Ground clearance	145mm	
Maximum net power	70 Kw / 11000 rpm	
Maximum torque	70 N·m /8250 rpm	
<b>Engine</b>		
Model	Straight, 3-cylinder, 4-stroke, water-cooled	
Bore×Stroke	72mm x 55.2mm	
Compression ratio	11.5:1	
Starting system	Electric	
Fuel supply method	EFI	
Ignition type	ECU ignition	
Lubrication system	Pressure splash lubrication	
Oil and filter change	3.3L	
Oil type	SAE 10W-40 SN and above JASO MA2	
Coolant capacity	1700mL + 284 mL ± 20mL(reservoir)	
Cooling type	CFMOTO recommends the use of organic coolants, do not use inorganic coolants.	
Engine idle speed	1300r/min±130r/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	1.786	
Final reduction ratio	3.200	
Gear Ratio	1 <sup>st</sup>	2.867
	2 <sup>nd</sup>	2.053
	3 <sup>rd</sup>	1.565
	4 <sup>th</sup>	1.286
	5 <sup>th</sup>	1.107
	6 <sup>th</sup>	0.967
<b>Chassis</b>		
Tire Specification	Front tire	120/70 ZR17 M/C 58W
	Rear tire	180/55 ZR17 M/C 73W

## 02 General Information

Rim	Front tire	MT3.5×17
Specification	Rear tire	MT5.5×17
Fuel tank capacity		15L
Fuel reserve (max.) when gauge is flashing		1.9L
Comprehensive fuel consumption of 100 km		≤5L
<b>Electrical System</b>		
Battery		12V11.2Ah
Headlight		LED
Turn light		LED
Tail light		LED
<b>Shock Absorber and Steering Damper</b>		
Front shock absorber stroke		130 mm
Front shock absorber stroke		Initial height: 11.5mm(Front shock absorber upper screw exposure height)
		Front shock absorber pre-pressure adjustment
		Initial gear: 10 gears Total gear: 20 gears ±2 gears
Front shock absorber reset damping adjustment (Based on configuration)		Initial gear: 10 gears Total gear: 20 gears ±2 gears
Front shock absorber compression damping adjustment (Based on configuration)		44.5 mm
Rear shock absorber stroke		Initial gear: 10 gears Total gear: 20 gears ±2 gears
Rear shock absorber reset damping adjustment (Based on configuration)		Unadjustable
Rear shock absorber compression damping adjustment		Initial gear: 4 gears Total gear: 10 gears
Rear shock absorber spring preload		

## 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		230 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	260 kPa	-

### Brake System

Item		Standard	Service Limit
Front brake	Front (hand) brake free travel	8mm~10mm	-
	Brake disc wear	4 mm	3 mm
Rear brake	Rear (foot) brake free travel	10mm	-
	Brake disc wear	4 mm	3 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
Valve clearance (cold)	IN	0.10mm~0.15mm	-	
	EX	0.25mm~0.31mm	-	
Valve guide and valve stem fit clearance	IN	0.01mm~0.037mm	0.08mm	
	EX	0.03mm~0.057mm	0.1mm	
Valve guide diameter	IN&EX	4.500mm~4.512mm	4.540mm	
Valve stem diameter	IN	4.475mm~4.490mm	4.455mm	
	EX	4.455mm~4.470mm	4.435mm	
Valve spring free length	40.1mm		39.3mm	
Valve spring force	The elasticity is 106N~124N, when the length is compressed to 33mm		-	
	The elasticity is 423N~467N, when the length is compressed to 25mm		-	
Valve CAM height	IN	33.945mm~34.055mm	33.845mm	
	EX	32.945mm~33.055mm	32.845mm	
Camshaft journal and camshaft bearing hole matching clearance	IN&EX	0.028mm~0.071mm	0.13mm	
Camshaft journal diameter	IN&EX	23.950mm~23.972mm	23.920mm	
Camshaft bearing hole diameter	IN&EX	24mm~24.021mm	24.05mm	
Camshaft runout	≤0.02mm		0.1mm	

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## Lubrication System

Item	Standard		Service Limit	Remark
Inner, outer rotor clearance of oil pump	-		0.2mm	
Clearance of oil pump outer rotor and oil pump housing	-		0.21mm	
Oil pressure	1300±130r/min ( idle ), about 50kPa 6000r/min, about 350kPa		-	
Oil type	SAE 10W-40 SN or above JASO MA2		-	
Oil level	Replace the oil and filter	3.1 L	-	
	Engine overhaul	3.5 L	-	

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

Item	Standard		Service Limit	Remark
Cylinder pressure	≥1.0 MPa		-	
Piston and cylinder clearance	0.033mm~0.052mm		0.08mm	
Diameter of piston skirt	71.960~71.975mm		71.930mm	Measure 10mm from the lower edge of the piston
Cylinder bore diameter	72.000mm~72.019mm		72.05mm	
Piston pin opening clearance	1 Ring	0.15mm~ 0.30mm	0.55mm	
	2 Ring	0.10mm~ 0.30mm	0.55mm	
	Oil ring	0.20mm~0.70mm	1.2mm	
Piston pin/Piston ring groove clearance	1 Ring	0.02mm~0.06mm	0.15mm	
	2 Ring	0.02mm~0.06mm	0.15mm	
	Oil ring	0.01mm~0.15mm	0.17mm	
Piston pin thickness	1 Ring	0.97mm~0.99mm	0.93mm	
	2 Ring	0.97mm~0.99mm	0.93mm	
	Oil ring	1.38mm~1.50mm	-	
Piston ring groove width	1 Ring	1.01mm~1.03mm	1.10mm	
	2 Ring	1.01mm~1.03mm	1.10mm	
	Oil ring	1.51mm~1.53mm	-	
Piston pin hole diameter	17.002mm~17.008mm		17.035mm	
Piston pin diameter	16.992mm~16.997mm		16.980mm	
Connecting rod small head hole diameter	17.015mm~17.025mm		17.055mm	
Connecting rod big end side clearance	0.15mm~0.3mm		0.45mm	
Crankshaft main journal diameter	31.985mm~32.000mm		31.965mm	

## 02 General Information

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Crankshaft main journal radial clearance	0.024mm~0.046mm	0.08mm	
Crankshaft connecting rod journal diameter	31.985mm~32.000mm	31.970mm	
Connecting rod big end radial clearance	0.028mm~0.052mm	0.08mm	
Crankshaft runout	≤0.02mm	0.05mm	

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## Clutch + Transmission

Item	Standard	Service Limit	Remark
Clutch disc assembly 1	-	-	
Quantity	4		
Clutch disc assembly 2	-	-	
Quantity	2		
Clutch disc assembly 3	-	-	
Quantity	1		
Clutch disc assembly thickness	2.9mm~3.1mm	2.8 mm	
Driven disc 1	-	-	
Quantity	1		
Driven disc 2	-	-	
Quantity	5		
Flatness of clutch friction discs or clutch driven discs	≤0.15mm	0.30mm	
Clutch spring free length	45.9mm~46.9mm	44.9mm	
Shift fork claw thickness	4.93mm~5.00mm	4.83mm	
Width of shift sliding gear fork slot	5.10mm~5.17mm	5.27mm	

## Cooling System

Item	Standard/Specification			Service Limit	Remark
Thermostat open temperature	80°C~84°C			-	
Thermostat full open clearance	95°C, ≥8mm			-	
Radiator cap opening pressure	135kPa~160kPa(Standard: 140kPa)			-	
Water temperature sensor temperature vs resistance	Water temperature(°C)	Resistance B terminal Earth (Ω)	Resistance A-C terminals (kΩ)	-	
	-20	-	13.71~16.94	-	
	25	-	1.825~2.155	-	
	50	176~280	-	-	
	80	63.4~81.4	0.303~0.326	-	
	110	24.6~30.6	0.1383~0.1451	-	
Coolant Type	-35°C anti-freezing, anti-corrosive and high boiling point			-	

## Air Intake System

Item	Specification	Remark
Throat size (mm)	φ36mm	
Idle (r/min)	1300r/min ± 130 r/min	

## Electrical System

Item	Specification	Remark
------	---------------	--------

## 02 General Information

Spark plug	Model	TORCH BN8RTI	
	Electrode gap	0.8mm~1.0mm	
Spark character		> 8 mm (100kPa)	
Ignition coil resistance	Primary	0.8Ω~1.4Ω	
	Secondary	12.5kΩ~13.5kΩ	
Trigger resistance		100Ω~120Ω	Normal temperature measurement
Magneto nominal power		310W (5000r/min)	
Stabilized voltage		13.5V~15.0V	
Ignition coil secondary voltage		≥27kV	
Trigger peak to peak voltage $V_{pp}$		≥3.0V (200r/min)	

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## 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.**  
**3: The parts in this table need to be threaded.**

Position	Type	QTY	Tighten Torque N•m
Power lock	M8×25	2	8 ~ 10
Frame and engine LH front mounting bolt	M10×30	1	50 ~ 55
Engine LH upper mounting seat (upper)	M8×16	2	25 ~ 30
Engine LH upper mounting seat (lower)	M10×60	1	45 ~ 50
Shift lever mounting seat	M8×16	2	25 ~ 30
Frame and engine rear mounting bolt (LH)	M10×1.25×155	2	45 ~ 50
Frame and engine rear mounting bolt (RH)	M10×1.25	2	45 ~ 50
Engine RH upper mounting seat (upper)	M8×16	2	25 ~ 30
Engine RH upper mounting seat (lower)	M10×30	1	45 ~ 50
Frame and engine RH front mounting bolt	M10×30	1	50 ~ 55
Main and subframe fastening bolt	M10×22	4	50 ~ 55
Rear fender connecting seat	M8X16	3	25 ~ 30
Side bracket	M10×1.25	1	25 ~ 30
Headlight bracket assembly	M8×20	2	20 ~ 25
Lower triple clamp	M8×30	4	25
Head lock mounting bracket I	M8×20	2	25
LH&RH front shock absorber (lower)	M8×20	4	20
Rear shock absorber	M12×75	2	60 ~ 70

## 02 General Information

Front brake caliper	M10×1.25×60	4	45
Rear brake pedal assembly	M8×25	1	25
Rear sprocket	M8X28	6	25
Gearshift assembly (middle)	M8×25	1	20
LH&RH front footrest seat	M5×20	4	5
LH&RH rear footrest seat	M6X10	2	6
LH&RH front footrest bracket	M8×25	4	25
LH&RH rear footrest bracket	M8×20	4	25

**NOTE: The parts in this table need to be threaded.**

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**NOTE: 1: The self-locking bolt should be replaced when disassembling.  
2: The parts in this table need to be threaded.**

Position	Type	QTY	Tighten Torque N•m
Fuel tank lock	M5×25	3	4 ~ 6
Seat lock	M5×11	2	1.5 ~ 2
Exhaust muffler assembly	M8	6	20 ~ 22
Exhaust muffler assembly	M8×35	2	22 ~ 25
ABS mounting seat	M6×20	2	10
Side bracket bolt	M10X1.25X32	1	5 ~ 10
Upper triple clamp tighten screw	M25X1.5	1	Tighten the upper triple clamp by 100N•m before locking and then loosen, and tighten the upper triple clamp by 20N•m after locking
Rear fork shaft	M16X1.5X274.5	1	Tighten
Chain guard	M6×14	2	6
Rear fork (LH)	M16×1.5	1	100
Rear fork (RH)	M22X1.5	1	100
Front wheel shaft tighten screw	M25X1.5	1	50
Inflation valve	M8X12	2	2 ~ 4
Banjo bolt II	M10X1X19.5	5	28 ~ 32
Banjo bolt I	M10X1X19	2	28 ~ 32
Rear brake light switch	M10X1X21	1	28 ~ 32
Balancer	M6×45	2	8
LH&RH grip	M4×30	2	3
Handlebar assembly	M8×25	3	25
Rear wheel shaft nut	M25X1.5	1	90
Fuel tank assembly	M6×35	2	10
Fuel pump assembly	M6×16	4	4 ~ 5
Seat lock seat	M6×16	2	5
Front seat assembly	M6×25	2	5
Gearshift assembly (upper)	M6×22	1	Tighten
LH&RH front footrest bracket panel	M5×14	4	5
LH&RH handlebar switch	M4×12	2	1 ~ 2
RH handlebar switch (inner)	ST2.5×12	2	0.5 ~ 1
Radiator fan assembly (LH)	M8×30	1	20
Radiator fan assembly (LH&RH)	M6×25	2	10
Reservoir tank assembly	M6×14	2	5
LH&RH rear view mirror assembly	M6×25	4	8
Valve body mounting bracket	M5×8	2	4 ~ 5

**NOTE: The parts in this table do not need to be threaded.**

### 2.5.2 Tighten Torque Table for Engine

Item	QTY	Specification	Torque (N·m)	Remark
Crankcase closing bolt	14	M6	10	
Crankcase closing bolt	3	M8	8→20→32	
Crankcase closing bolt	4	M8	8→20→36	At balance shaft
Crankcase closing bolt	8	M9	8→20→36	
Maze gate retainer bolt	2	M6	10	
Shift spindle bearing seat retainer bolt	3	M6	10	Apply thread locker
Oil rail plug	2	R <sub>2</sub> 1/8	15	Apply silicone sealant
Nozzle bolt	1	M6	10	
Oil pressure switch	1	R 1/8	15	Apply thread sealant
Main oil rail plug	3	R <sub>2</sub> 3/8	20	Apply thread sealant
Screw plug	1	R <sub>2</sub> 1/4	15	Apply thread sealant
Oil filter mounting bolt	1	M20×1.5	25	Apply thread locker
Shift position spring pin	1	M8	20	Apply thread locker
RH side cover bolt	13	M6	10	
Timing view hole cover	1	M12×1.5	4	
Oil filler plug	1	3/4"	Tighten by hand	
Crankshaft end cover	1	M35×1.5	10	
LH side cover bolt	8	M6	10	
Magneto stator bolt	3	M6	10	Apply thread locker
Magneto stator wire clamp bolt	2	M5	5	Apply thread locker
Chain guard bolt	1	M6	10	
Cylinder head guard bolt	6	M6	10	
Maze head bolt	6	M6	10	
Cylinder head bolt	8	M10	30N·m →30N·m→110°	
Cylinder head bolt	2	M6	10	
Cylinder head shock absorber bolt	1	M6	10	
Water temp. sensor	1	M12×1.5	14	
Thermostat housing bolt	3	M6	10	
Oil rail plug	1	R <sub>2</sub> 1/8	15	Apply thread sealant

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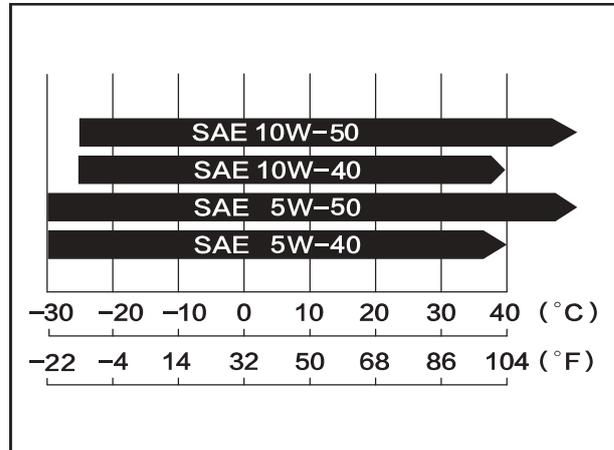
Item	Qty	Specification	Torque (N·m)	Remark
Spark plug	3	M10×1	14	
Stud	6	M8	15	
Cylinder head plug	2	R <sub>2</sub> 3/8	20	Apply thread sealant
Camshaft bearing cover bolt	16	M6	5→8→12	
Tensioner bolt	2	M6	10	
Throttle body connecting pipe bolt	4	M6	10	
Timing sprocket bolt	4	M6	15	
Tensioner plate thread pin shaft	1	M8	20	Apply thread locker
Magneto rotor bolt	1	M12×1.25	125	
Connecting rod bolt	6	M8×0.75	(20 N·m±2 N·m) +(100°±5°)	Apply oil to the thread
Clutch spring press plate bolt	3	M6	10	
Clutch nut	1	M20×1.25	125	Apply thread locker
Output sprocket nut	1	M20×1.5	125	Apply thread locker
Positioning gear bolt	1	M6	10	Apply thread locker
Gearshift swing arm bolt	1	M6	10	Apply thread locker
Gearshift sensor bolt	2	M6	10	
Fork shaft retainer bolt	1	M6	10	Apply thread locker
Fork shaft limit washer bolt	1	M6	10	Apply thread locker
Oil pump bolt	4	M6	10	
Oil filter	1	M20×1.5	17	Apply oil to the seal ring
Oil cooler bolt	4	M6	10	
Water pump bolt	5	M6	10	
Drain bolt	1	M12×1.5	25	
Oil pan bolt	13	M6	10	
Starter motor bolt	2	M6	10	
R e m a i n i n g unmarked bolts		M5	4.5 ~ 6	
		M6	10	
		M8	18 ~ 25	

### 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 "SN" 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.



## 03 Maintenance Information

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3.3 Periodic Maintenance Schedule.....	3-4

## 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
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	
<b>Suspension system</b>				
■ Rear shock absorber and front forks	-	-	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	Inspect
■ Coolant	-	-	1000	
■ Radiator fan function	-	-	1000	
Cooling hose	-	-	1000	
<b>Steering system</b>				
■ Steering bearings	-	-	1000	Inspect
<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
■ Cables	-	-	1000	Inspect for damage, bending and routing

## 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
■	Clutch	-	-	10000	Inspect
	Idle	-	-	10000	
■	Coolant	-	-	10000	
	Throttle system	-	24M	30000	Replace
	Throttle valve body	-	-	10000	Inspect
■	Throttle valve body	-	-	5000	Clean
▶ ■	Air filter element	-	-	10000	Inspect
		-	24M	-	Replace
■	Spark plug	-	-	10000	
■	Valve clearance	-	-	40000	Inspect
<b>Electrical system</b>					
■	Functions of electrical parts	-	12M	10000	Inspect
	Battery	-	6M	5000	
	Fuses or overload protector	-	6M	5000	
■	Wires	-	12M	10000	Inspect for damage, bending and routing
<b>Brake system</b>					
	Front and rear brake system	-	12M	10000	Inspect
			-	24M	
	Brake discs	-	12M	10000	
			-	24M	
▶	Brake pads	-	12M	10000	
			-	24M	
	Brake fluid level	-	12M	10000	
			-	-	
	Brake pedal	-	24M	20000	Inspect for free play
			-	12M	
■	Brake line	-	24M	20000	Inspect for damage and sealing
			-	12M	
■	Brake fluid		24M	-	Replace
<b>Wheels</b>					
	Tire condition	-	12M	10000	Inspect
			-	24M	
	Tire pressure	-	12M	10000	
			-	24M	
■	Wheel bearings	-	-	10000	
			-	-	

## 03 Maintenance Information

Item		Periodic Maintenance Interval (Service whichever interval comes first)			
		Hour	Calendar	km	Remarks
<b>Suspension system</b>					
■	Suspension systems	-	-	5000	Inspect
		-	-	10000	
		-	-	15000	
■	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)
		-	24M	20000	
■	Swing arms	-	-	10000	Inspect
		-	-	30000	
<b>Cooling system</b>					
	Coolant fluid level	-	12M	10000	Inspect
		-	24M	20000	
■	Coolant	-	12M	10000	
		-	24M	20000	
■	Radiator fan function	-	12M	10000	
		-	24M	20000	
■	Cooling hoses	-	12M	10000	
		-	48M	30000	
<b>Frame system</b>					
	Frame system	-	-	30000	Inspect
<b>Steering system</b>					
■	Steering bearing	-	12M	10000	Inspect
		-	24M	20000	
<b>Chain</b>					
▶	Chain, rear sprocket and engine sprocket	-	12M	10000	Inspect
		-	24M	20000	
<b>Other parts</b>					
■	Diagnosis connector	-	12M	10000	Read with DSCAN
		-	24M	20000	
■	All mobile parts	-	12M	10000	Lubricate; inspect for flexibility
		-	48M	30000	
■	Bolts and nuts	-	12M	10000	Inspect for fastness
		-	48M	30000	
■	Cables	-	12M	5000	Inspect for damage, stuck and flexible pulling.
		-	24M	15000	
■	All hoses and sleeves	-	12M	10000	Check for cracks, seals and correct layout.
		-	48M	30000	

## **04 Clutch and Transmission**

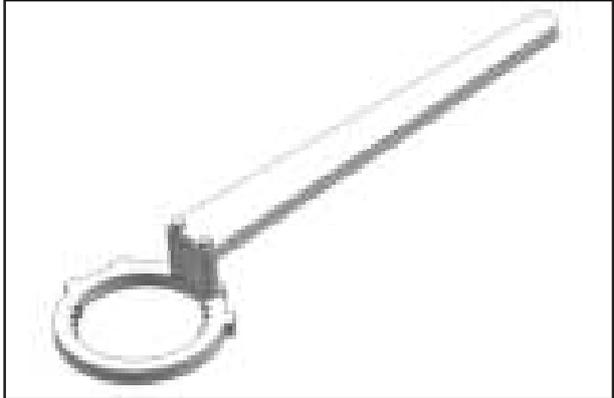
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## 4.1 Special Tool

### Clutch Stopping Tool

0WR0-051000-922-001



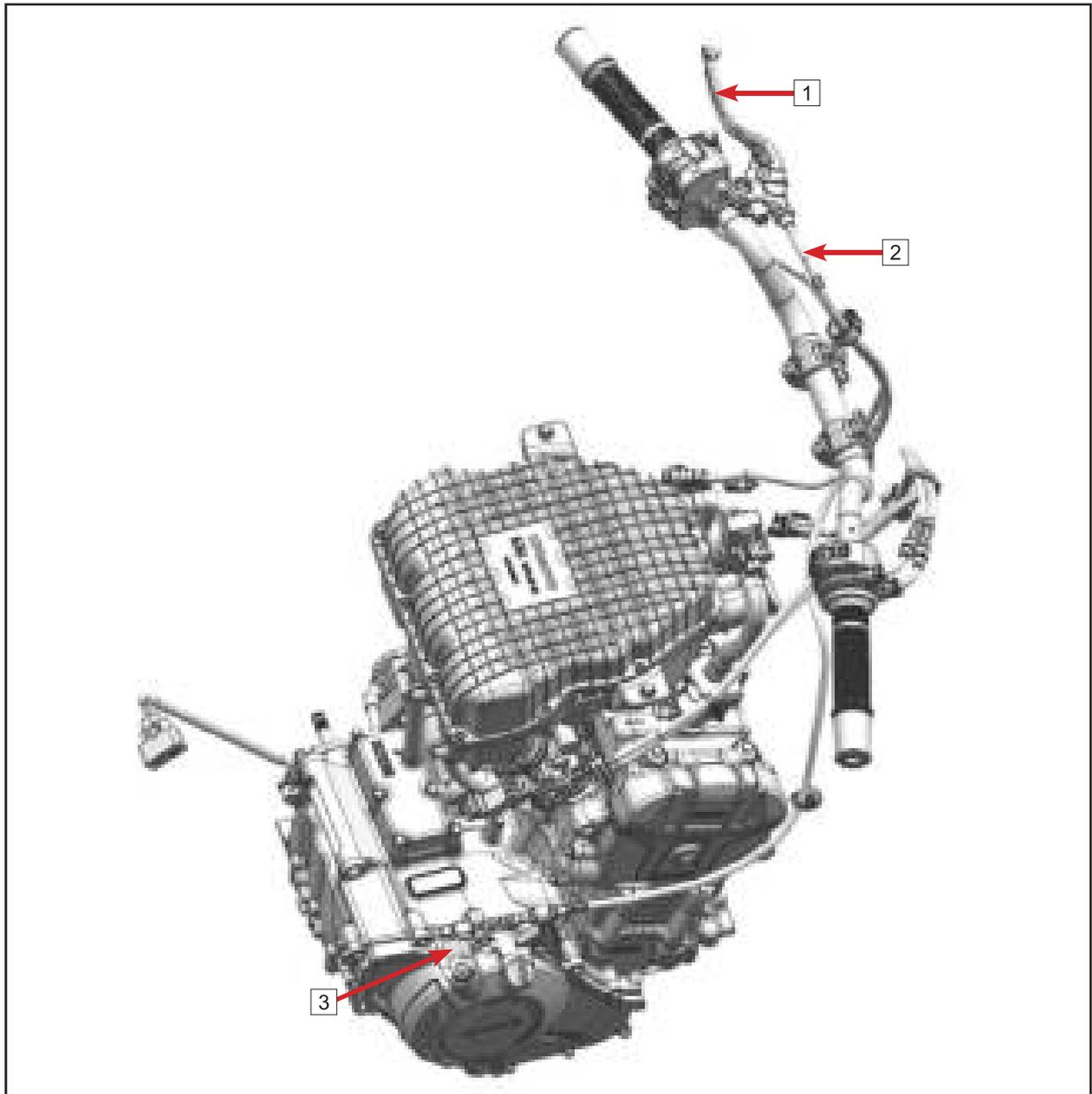
## 04 Clutch and Transmission

### 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.

## 04 Clutch and Transmission

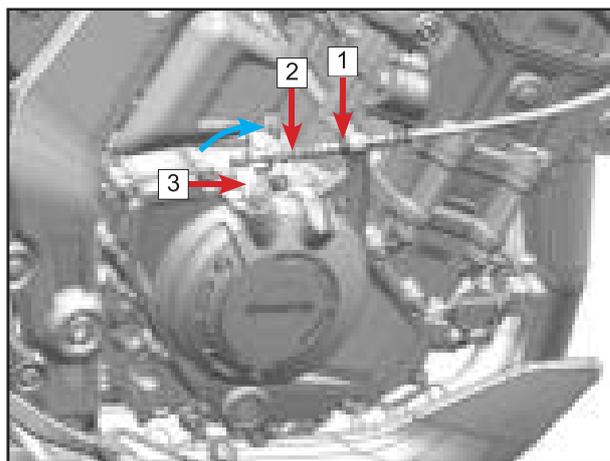
### 4.4 Clutch Removal

Use side stand to park the vehicle on level ground.

Release nut **1**.

Turn the clutch release lever **3** clockwise and detach the clutch cable **2**.

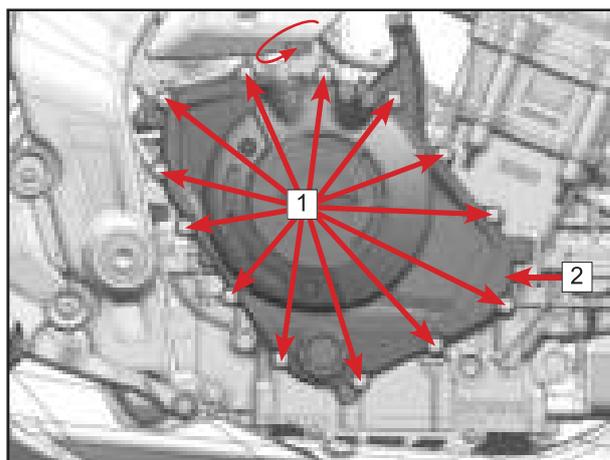
Hang the clutch cable to the side.



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

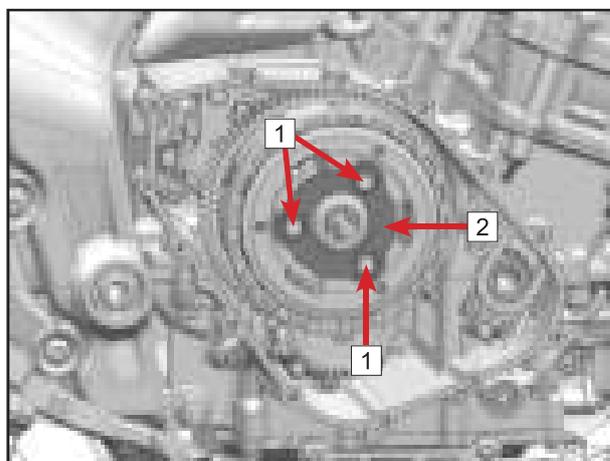
Turn the clutch control shaft counterclockwise to release it from the clutch pull rod.

Remove RH side cover **2**.

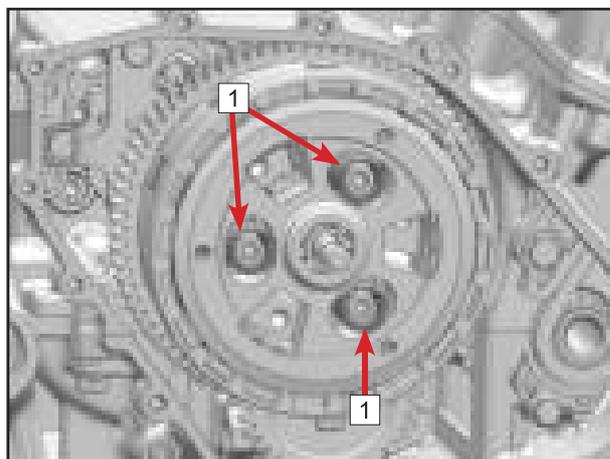


Remove bolts **1**.

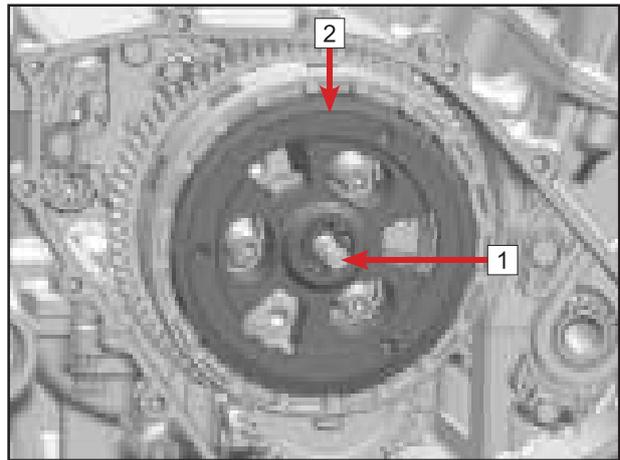
Remove clutch spring press plate **2**.



Remove clutch spring **1**.



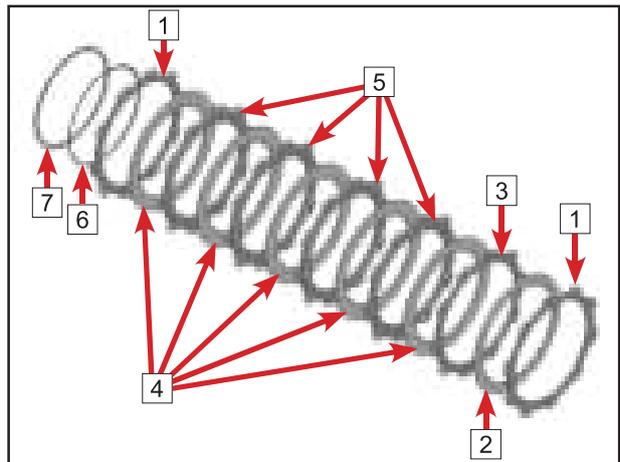
Hold the pull rod **1** to pull out the pressure plate assembly **2**.



Remove friction plate/driven plate assembly.

Check the assembly sequence of friction plate/driven plate, which is as follows:

Friction plate assembly 2 **1**--driven plate 1 **2**--friction plate assembly 3 **3**--driven plate 2 **4**--friction plate assembly 1 **5**--driven plate 2 **4**--friction plate assembly 1 **5**--driven plate 2 **4**--friction plate assembly 1 **5**--driven plate 2 **4**--friction plate assembly 2 **1**--disc spring **6**--disc spring seat **7**.

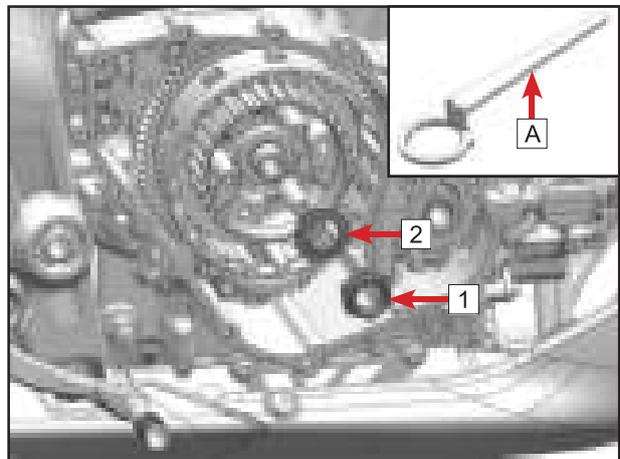


Use the clutch stopping tool **A** to fix the center sleeve.

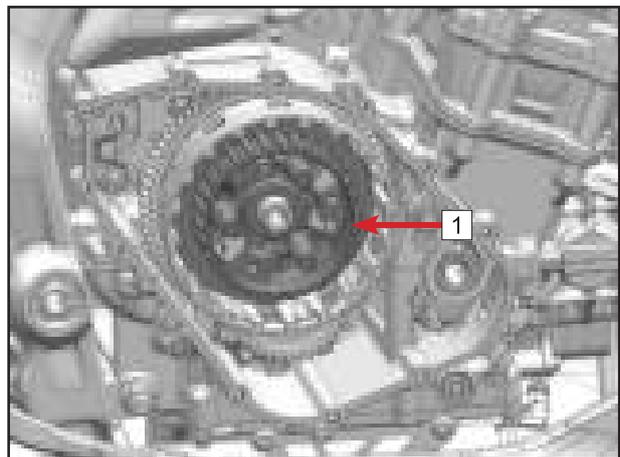
Clutch stopping tool  
(See section 4.1 for details.)

Remove nut **1**.

Remove elastic washer **2**.



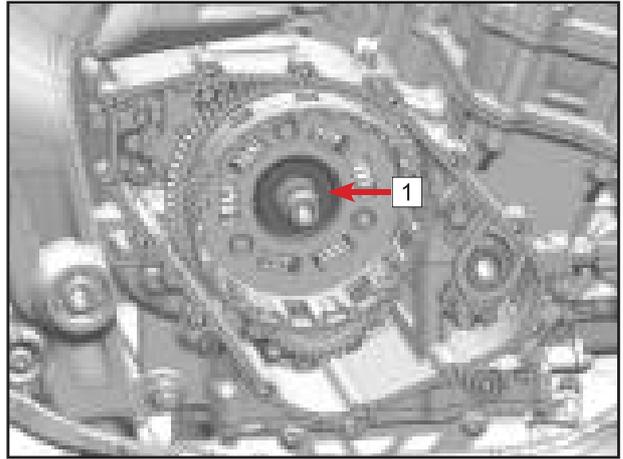
Remove the center sleeve **1**.



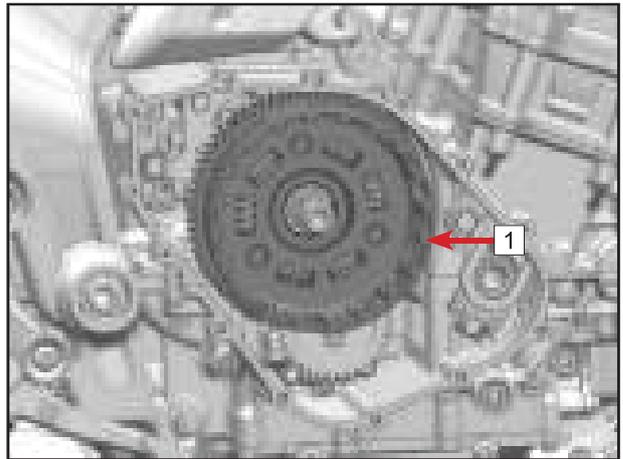
## 04 Clutch and Transmission

Remove washer **1**.

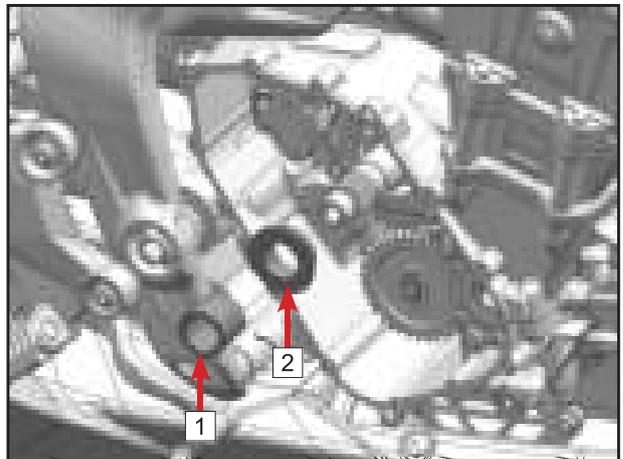
**NOTE:** The washer **1** may adhere to the center sleeve and should not be lost during removal.



Remove the primary driven gear assembly **1**.



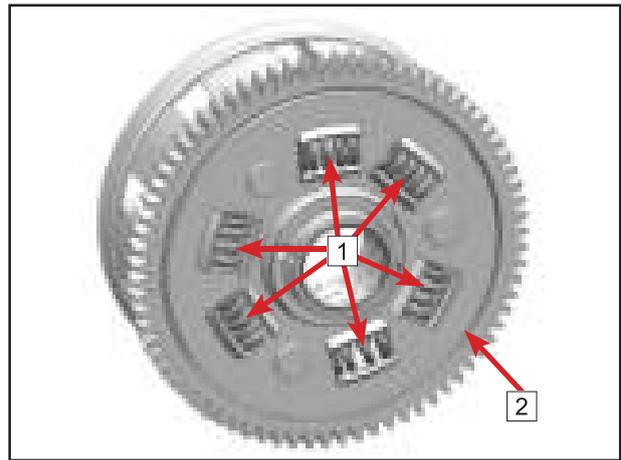
Remove clutch shaft sleeve **1**.  
Remove washer **2**.



## 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

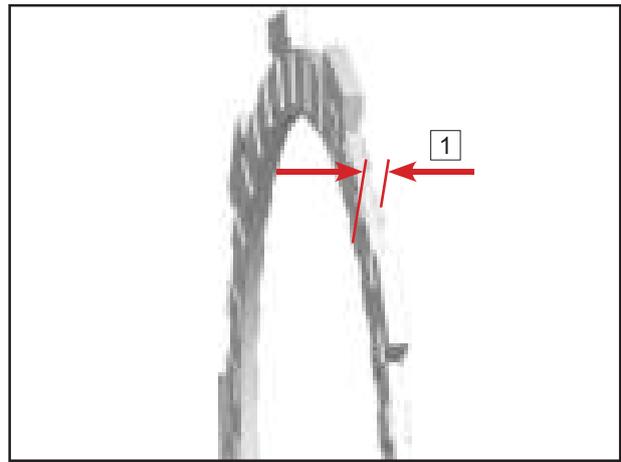
Check friction disc and driven disc one by one.

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.

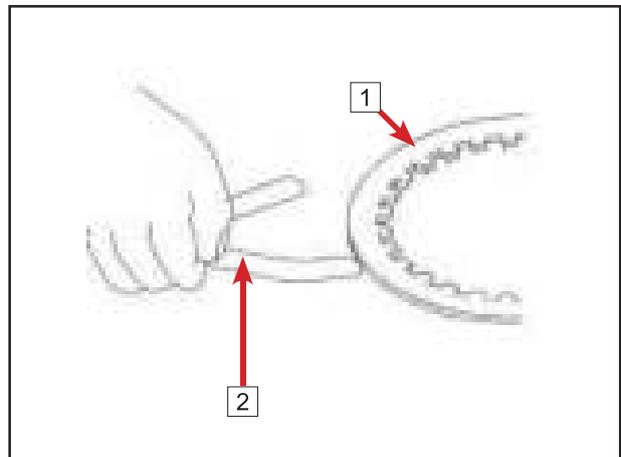
If any piece shows signs of damage or wear exceeds the maintenance limit, replace with a new one.



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.

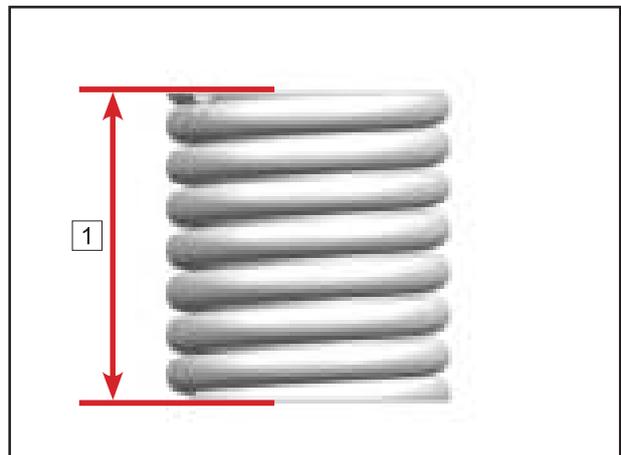


Flatness of The Friction Disc or Driven disc	
New Part	≤0.15 mm (0.00591 in)
Service Limit	0.3 mm (0.01181 in)

### Clutch Spring

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

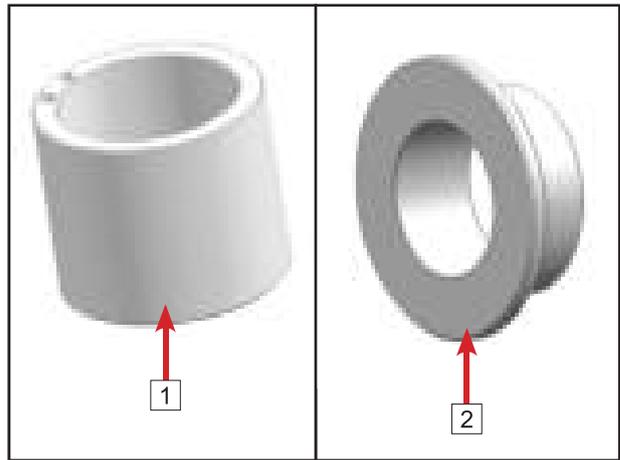
Clutch Spring Free Length	
New Part	45.9 mm ~ 46.9 mm
Service Limit	44.9 mm



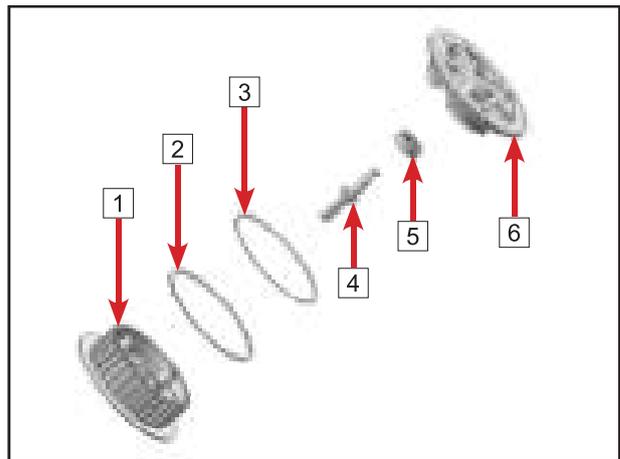
## 04 Clutch and Transmission

### Clutch Sleeve and Washer

Check the clutch sleeve [1] and washer [2] for severe wear or damage. Replace if any.

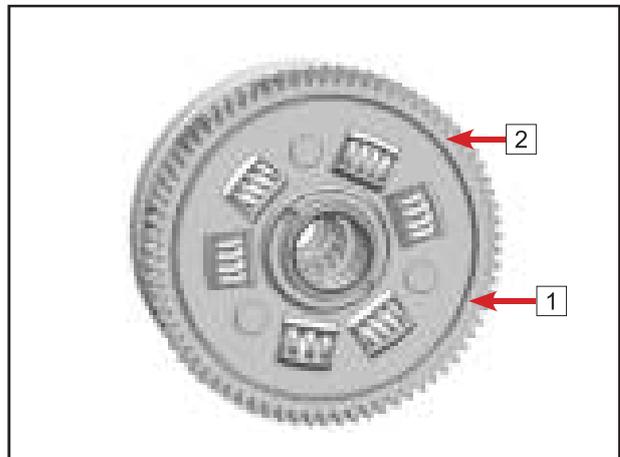


Check central sleeve [1], disc spring seat [2], disc spring [3], tie rod [4], rolling bearing [5], press plate [6] for severe wear or damage, replace if any.



### 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.



Assemble clutch and crankshaft assembly in pairs according to the following:

Clutch Grouping Mark	Crankshaft Grouping Mark
A	B
B	A

The grouping of crankshaft refers to section 5.4.2.

## 4.6 Clutch Installation

**NOTE: Assembly clutch and crankshaft assembly in pairs according to the following.**

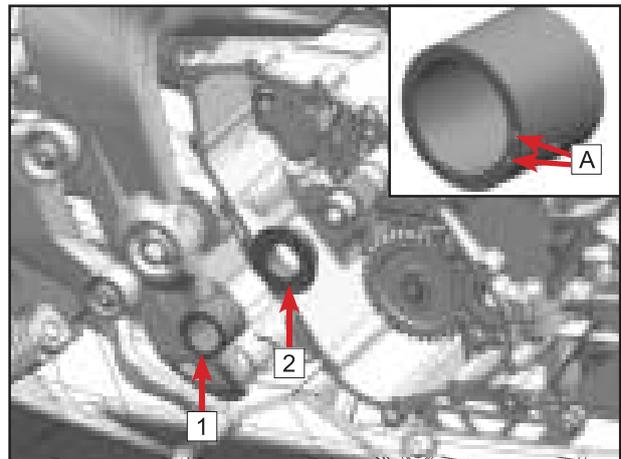
Clutch Grouping Mark	Crankshaft Grouping Mark
A	B
B	A

The grouping of clutch refers to section 4.5. The grouping of crankshaft refers to section 5.4.2.

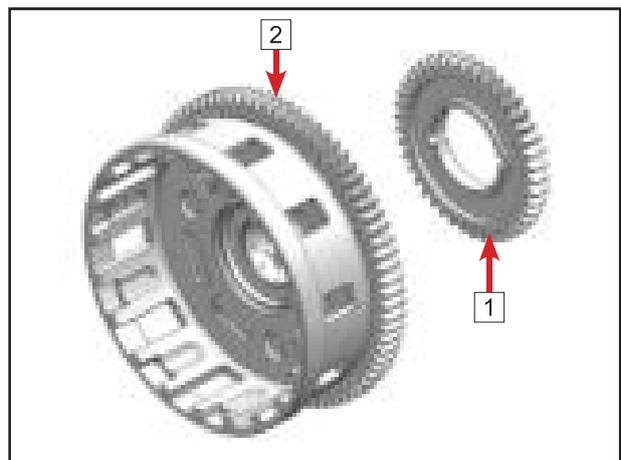
Apply oil on the washer [2] and clutch shaft sleeve [1].

Install washer [2] and have the big end facing outward.

Install clutch shaft sleeve [1] and have the hole [A] facing outward.

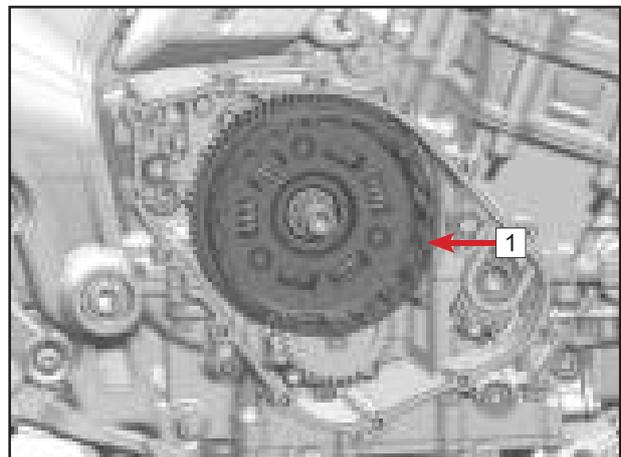


Install the oil pump drive gear [1] to primary driven gear assembly [2].



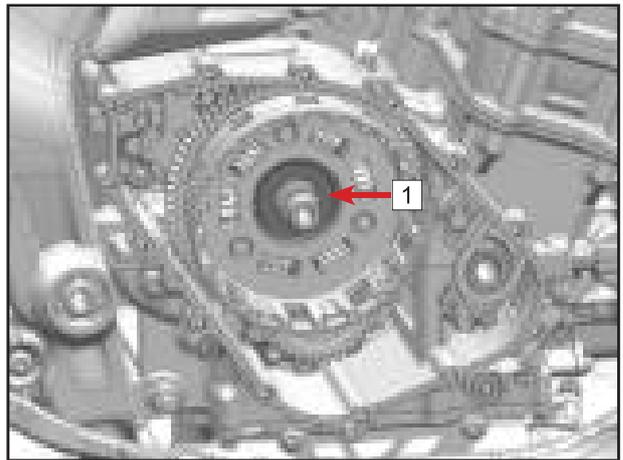
Apply oil to primary driven gear assembly bushing.

Install primary driven gear assembly [1].

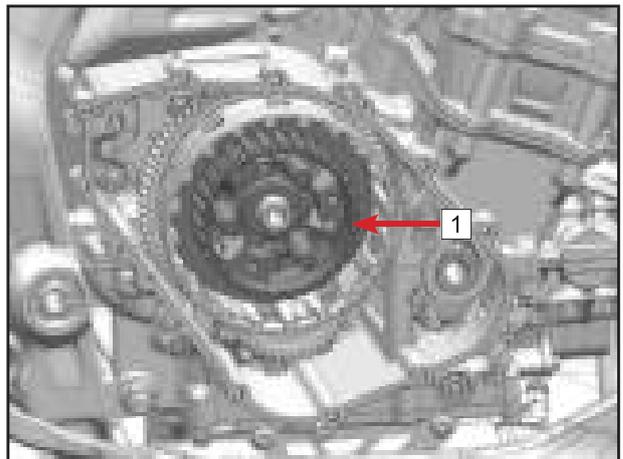


## 04 Clutch and Transmission

Install washer **1**.



Install center sleeve **1**.



Install elastic washer **2** (the small end of the cone facing the nut **1**).

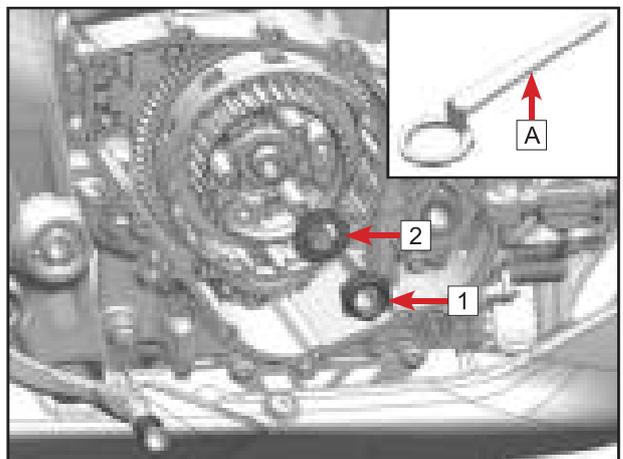
Install nut **1**.

Use clutch stopping tool **A** to secure center sleeve.

Clutch stopping tool  
(See section 4.1 for details.)

Tighten nut **1** to the specified torque.

Clutch Nut <b>1</b>	
Torque	125 N·m (92.2 ft·lb.)



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

**NOTE:** The friction plate assembly 1 is wider than the friction plate assembly 2 and 3. The driven plate 2 is wider than the driven plate 1. Friction plate assembly 2 and 3 use different materials.

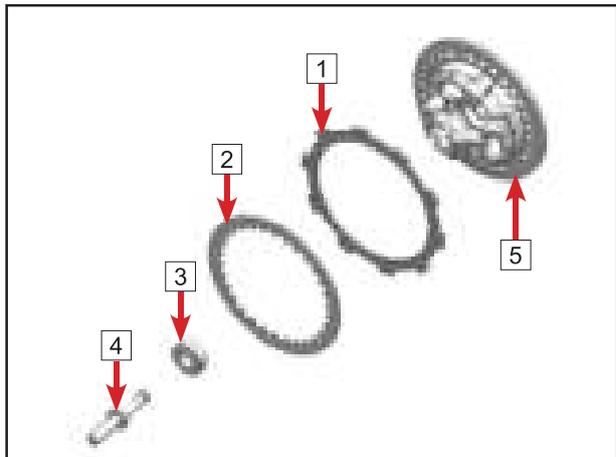
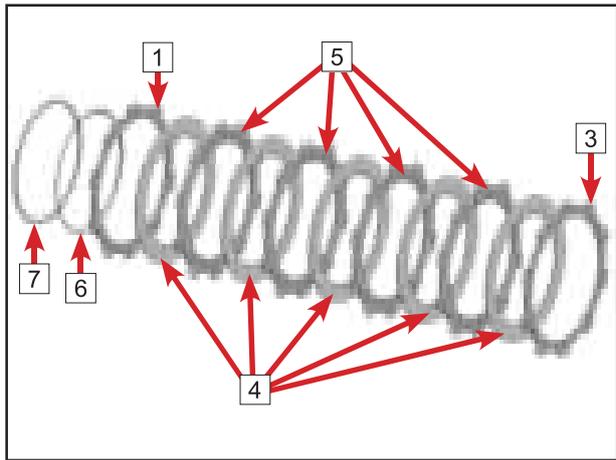
Install the following parts onto the center sleeve in turn:

- Disc spring seat [7]
- Disc spring [6] (the large end of the cone faces outward)
- Friction plate assembly 2 [1]
- Driven plate 2 [4]
- Friction plate assembly 1 [5]
- Driven plate 2 [4]
- Friction plate assembly 1 [5]
- Driven plate 2 [4]
- Friction disc assembly 1 [5]
- Driven plate 2 [4]
- Friction plate assembly 1 [5]
- Driven plate 2 [4]
- Friction plate assembly 3 [3]

Install friction plate assembly 2 [1] and driven plate 1 [2] on the press disc [5].

Install the rolling bearing [3] into the bearing hole of the press disc [5], with the marked side of the bearing facing outward (magneto side).

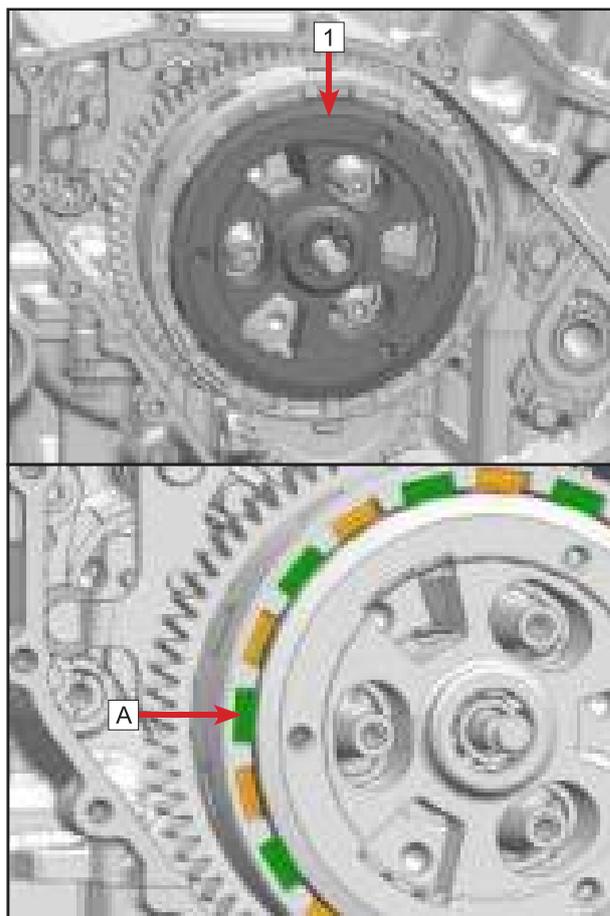
Insert the pull rod [4] into the rolling bearing [3].



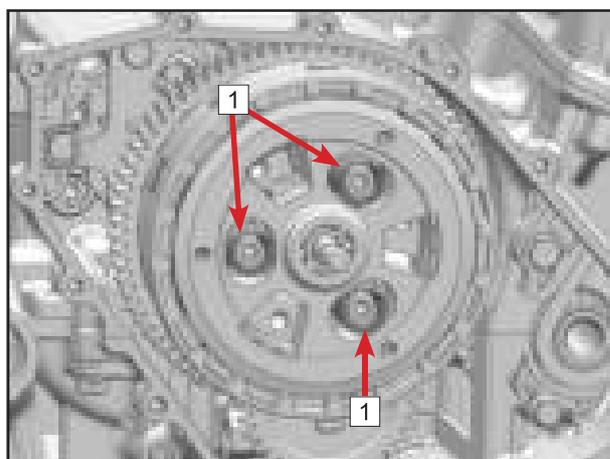
## 04 Clutch and Transmission

Install press disc assembly **1**.

**NOTE:** The outermost friction plate assembly **2 A** shall be misaligned.



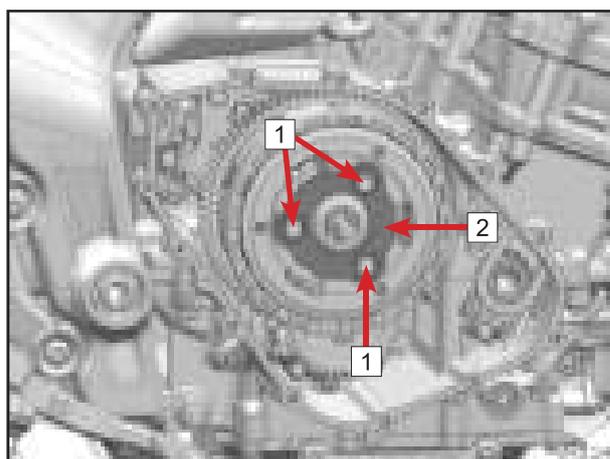
Install clutch spring **1**.



Place clutch spring pressure plate **2** in place.

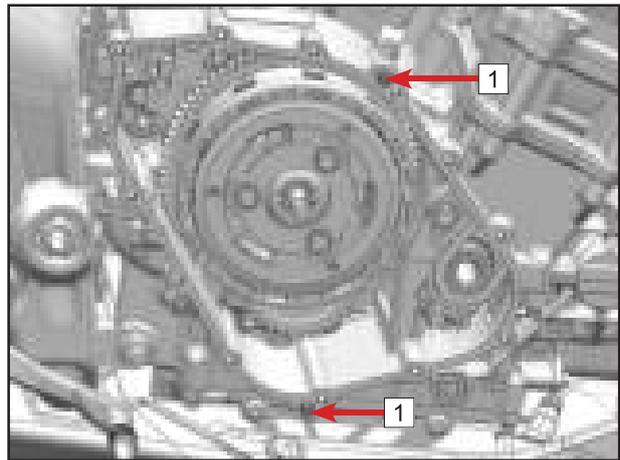
Install bolts **1** and tighten to the specified torque.

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



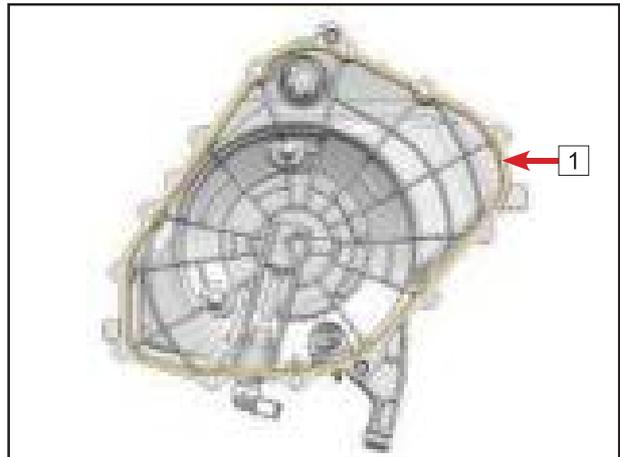
# CFMOTO

Ensure that the cylindrical roller **1** is installed.



Ensure that the RH side cover and crankcase sealing surface are clean, dry and free of oil.

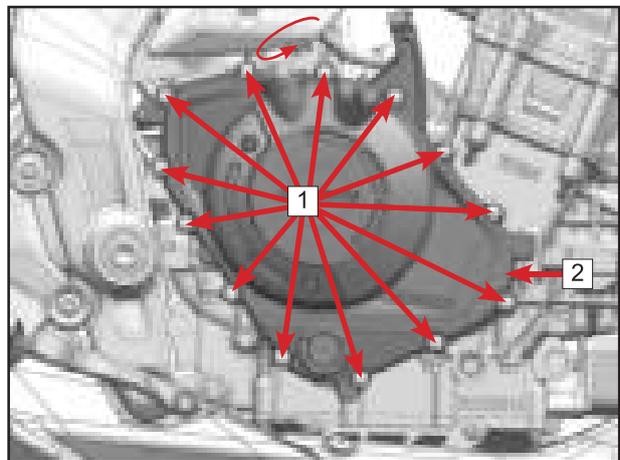
As shown in the picture on the right, apply an appropriate amount of 5900 flange sealant **1** on the sealing surface of the RH side cover, the coating should be uniform and continuous.



**NOTE: From applying the flange sealant to completing the installation of the RH side cover 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.**

Rotate the clutch control shaft counterclockwise and place the RH side cover **2** in place.

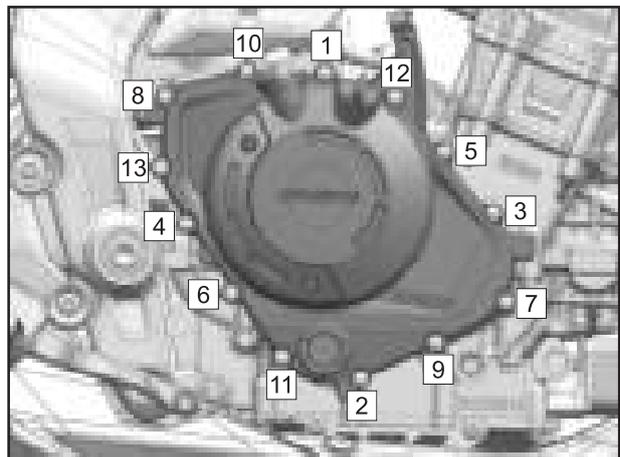
Install RH side cover bolts **1**.



Tighten the RH side cover bolts to the specified torque in the sequence shown on the right.

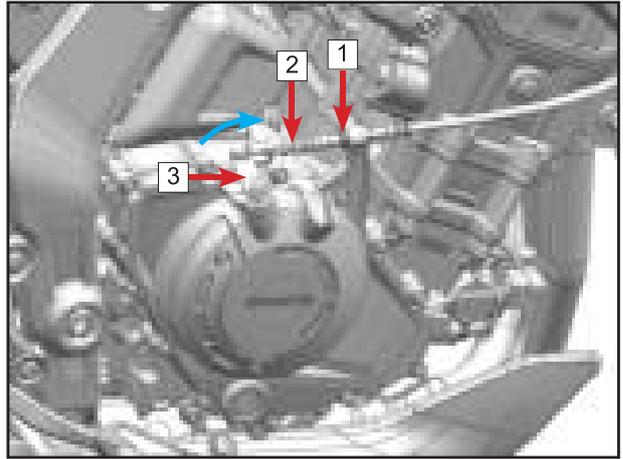
RH Side Cover Bolt	
Torque	10 N·m (7.3 ft-lb.)

Remove spilled flange sealant.



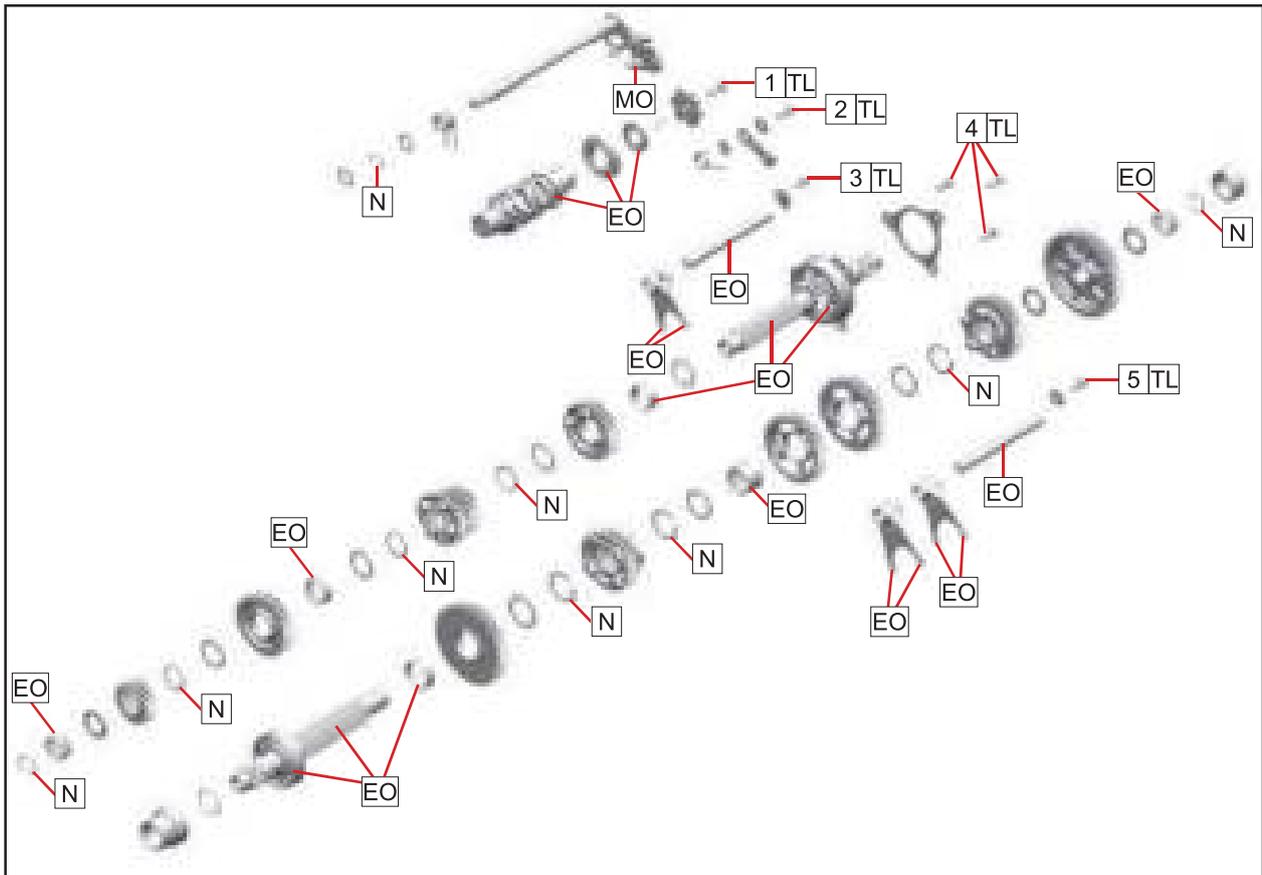
## 04 Clutch and Transmission

Turn the clutch release lever **3** clockwise,  
install clutch cable **2**.  
Tighten nut **1**.



## 4.7 Transmission (Engine)

### 4.7.1 Exploded View



No.	Tighten Part	Torque		Remark
		N·m	ft·lb.	
1	Gearshift drum cam bolt	10	7.3	TL
2	Gearshift swing arm screw	10	7.3	TL
3	Fork shaft positioning plate bolt	10	7.3	TL
4	Bearing seat retainer bolt	10	7.3	TL
5	Fork shaft positioning washer bolt	10	7.3	TL

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.

## 04 Clutch and Transmission

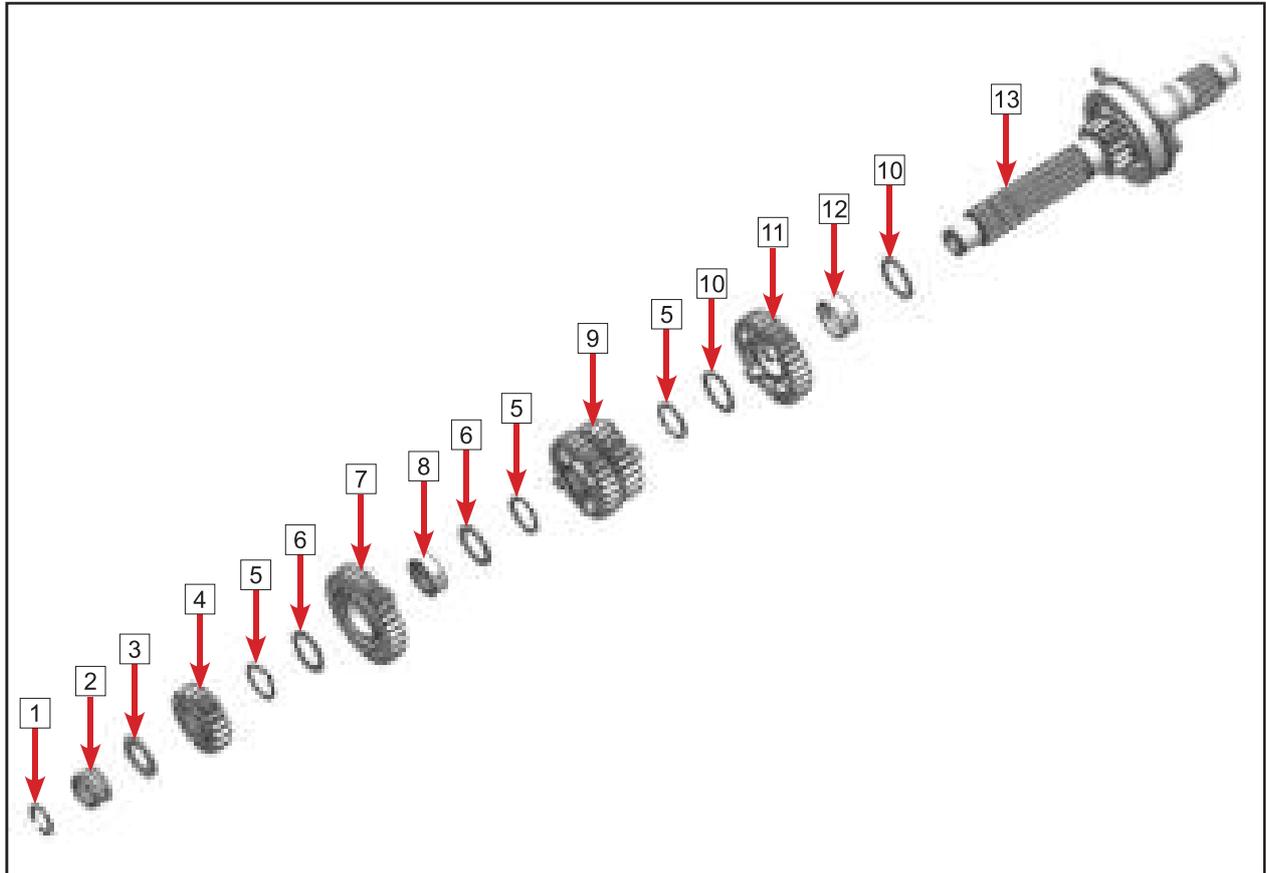
### 4.7.2 Transmission Overhaul

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

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

#### 4.7.2.1 Main Shaft Assembly

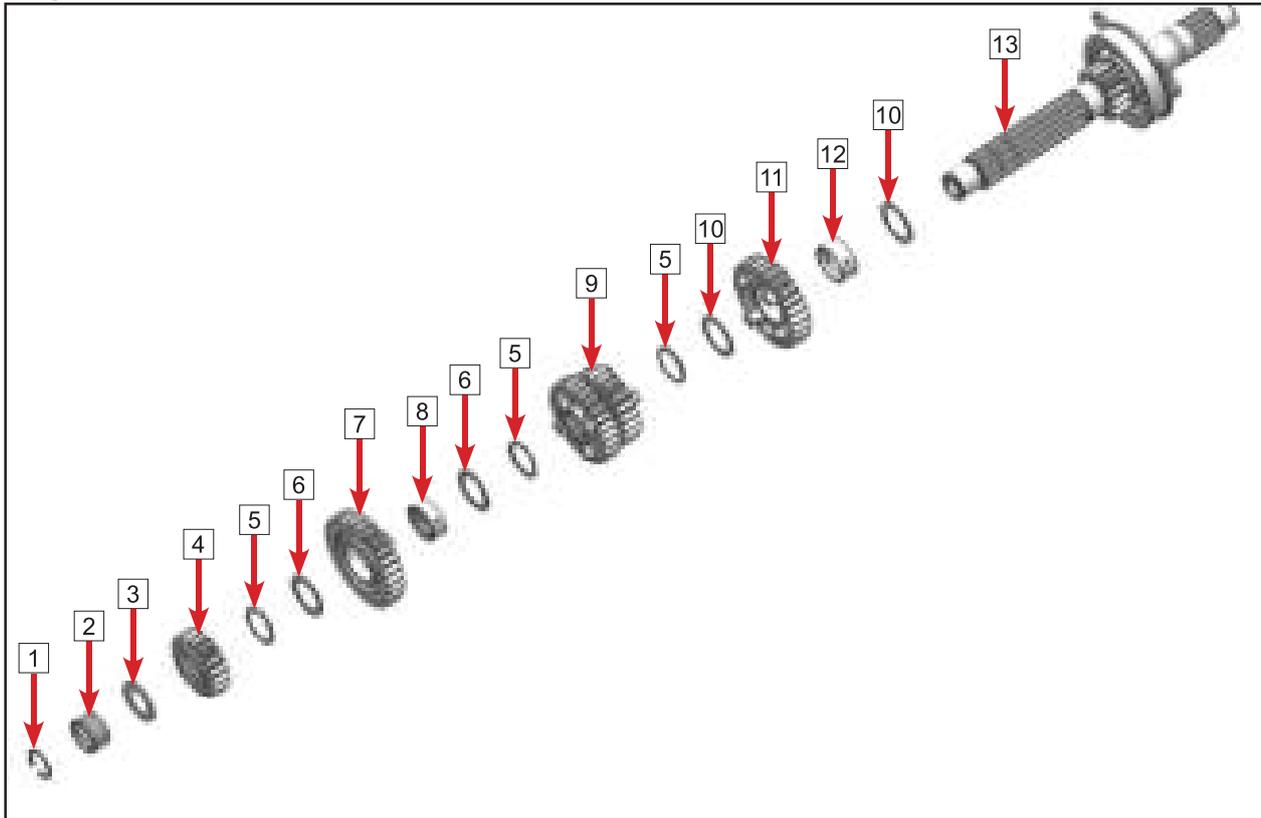
##### Disassembly



Remove the following parts from the main shaft assembly [13]:

[1]	Circlip for shaft 20	[8]	Spline sleeve 25×10
[2]	Needle bearing	[9]	Main shaft third, fourth gear
[3]	Washer 20.2×31×1.5	[10]	Washer 25.2×30×1
[4]	Main shaft second gear	[11]	Main shaft fifth gear
[5]	Circlip for shaft 25	[12]	Bushing 25×28×12
[6]	Spline washer 25×31×1		
[7]	Main shaft sixth gear		

## Inspection



1	Circlip for shaft 20	8	Spline sleeve 25×10
2	Needle bearing	9	Main shaft third, fourth gear
3	Washer 20.2×31×1.5	10	Washer 25.2×30×1
4	Main shaft second gear	11	Main shaft fifth gear
5	Circlip for shaft 25	12	Bushing 25×28×12
6	Spline washer 25×31×1	13	Main shaft assembly
7	Main shaft sixth gear		

Check spline sleeve [8] and bushing [12] for excessive wear or damage. If yes, replace it with a new one.

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 [11] for excessive wear or damage. If so, replace gears in pairs.

Check the shift claws of gear [7], gear [9], and gear [11] 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 assembly [13].

Inspect washer [3], [10] and spline washer [6] for excessive wear or damage. If so, replace the washer or spline washer.

Use new retainer [1] and [5] for each service.

Check the main shaft assembly [13] for the following conditions:

- Excessive wear or damage to the bearing journal of main shaft
- Excessive wear or damage to the external spline of main shaft
- Bearing seat excessive wear or damage
- When rotating the main shaft bearing, the bearing appears stuck and noise

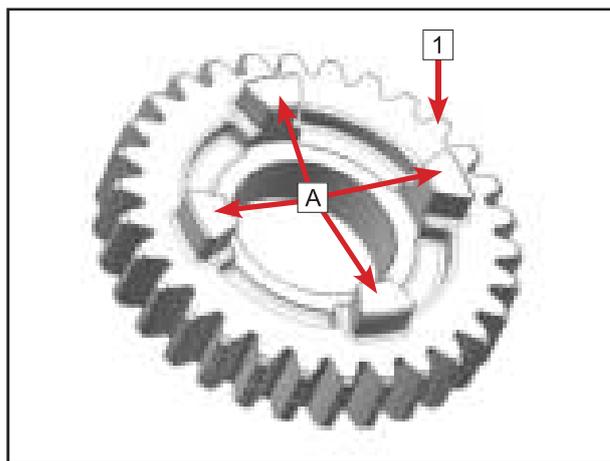
Replace main shaft assembly if any abnormality is found.

## 04 Clutch and Transmission

The picture on the right is a typical example.

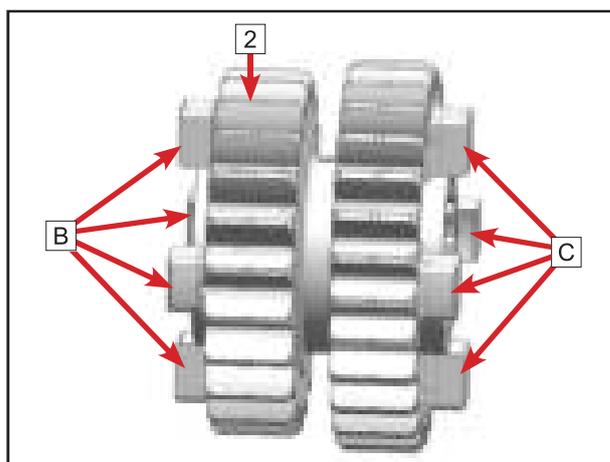
1: Shift gear

A: Shift claw



2: Shift sliding gear

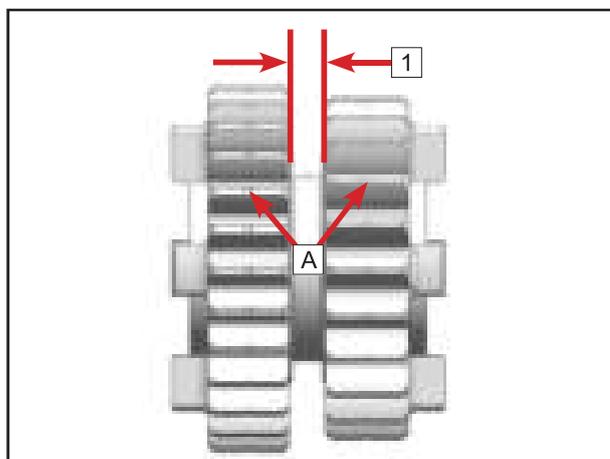
B, C: Shift claw



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	5.10 ~ 5.17 mm (0.20079 ~ 0.20354 in)
Service Limit	5.27 mm (0.20748 in)

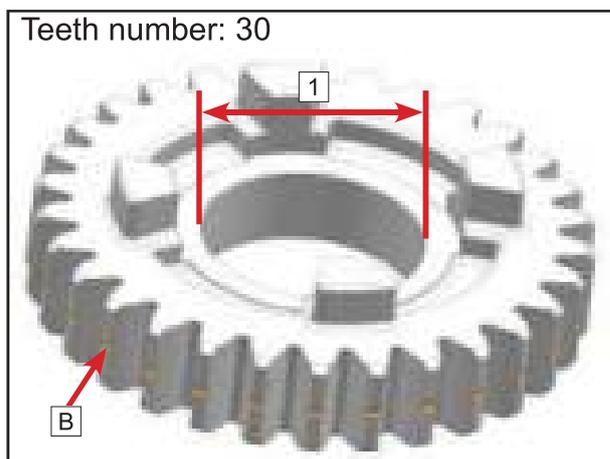
**NOTE: The third and fourth gears have (1 circle) marking slot A.**



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	28 ~ 28.021 mm (1.10236 ~ 1.10319 in)
Service Limit	28.027 mm (1.10343 in)

**NOTE: The main shaft sixth gear has (1 circle) marking slot B.**



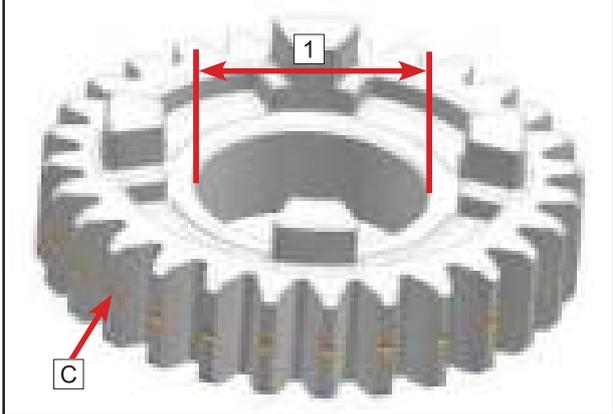
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Measure the inner diameter [1] of main shaft fifth gear. If the service limit is exceeded, replace with a new part.

Inner Diameter of Main Shaft Fifth Gear [1]	
New Part	28 ~ 28.021 mm (1.10236 ~ 1.10319 in)
Service Limit	28.027 mm (1.10343 in)

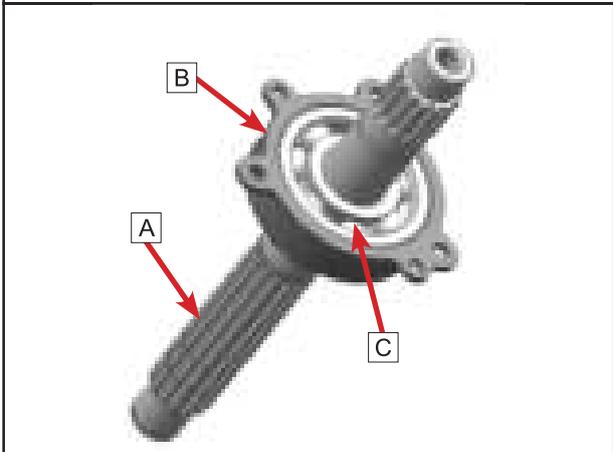
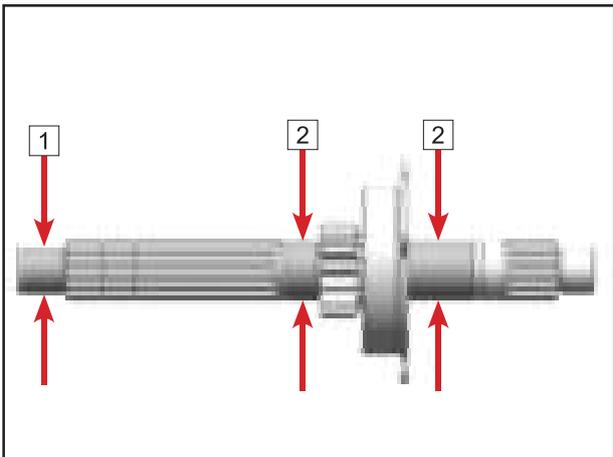
**NOTE: The main shaft fifth gear has (1 circle) marking slot [C].**

Teeth number: 28

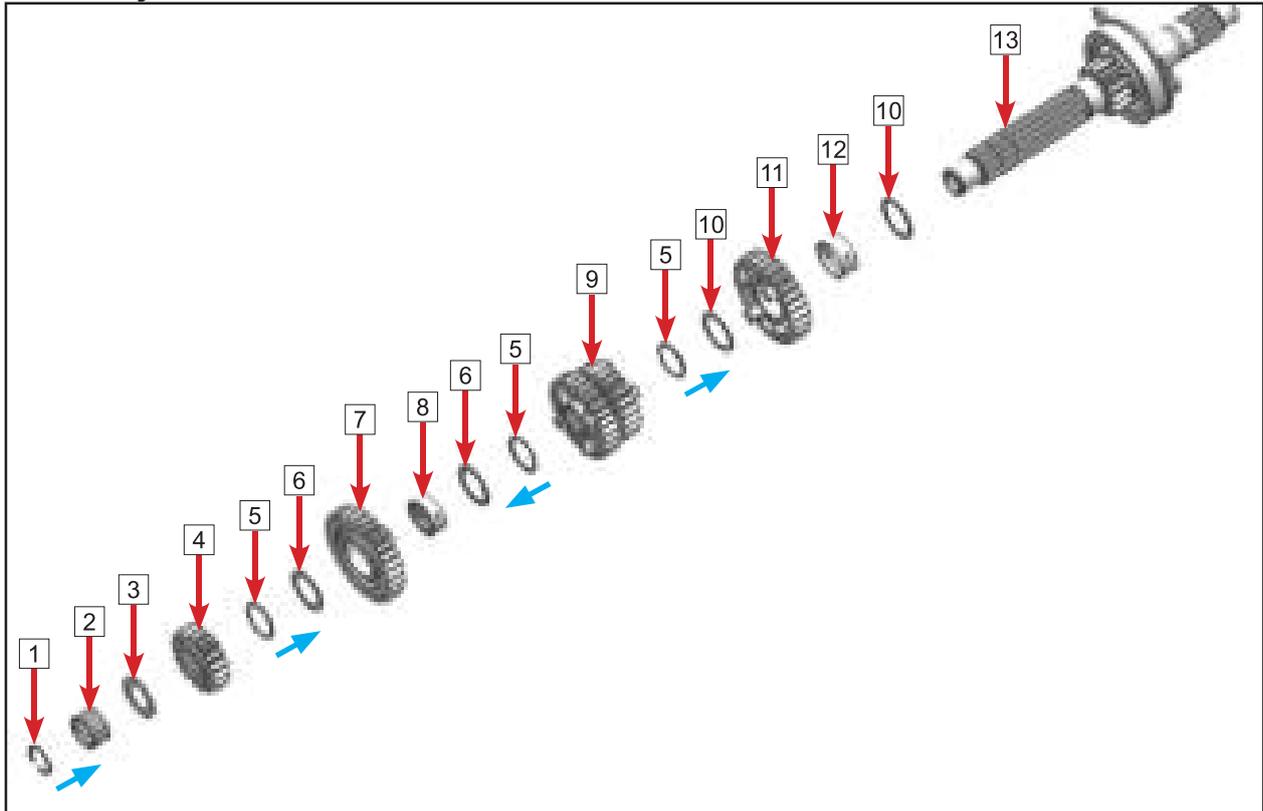


Measure the outer diameter [1] and outer diameter [2] of main shaft. If it is less than the service limit, replace the main shaft assembly (including main shaft [A], bearing seat [B] and main shaft bearing [C]) with a new one.

Outer Diameter of Main Shaft [1]	
New Part	19.987 ~ 20.000 mm (0.78689 ~ 0.78740 in)
Service Limit	19.980 mm (0.78661 in)
Outer Diameter of Main Shaft [2]	
New Part	24.967 ~ 24.980 mm (0.98295 ~ 0.98346 in)
Service Limit	24.960 mm (0.98268 in)



## Assembly

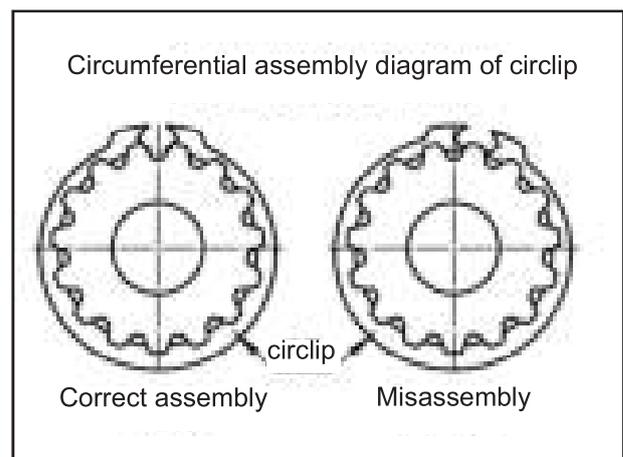


**NOTE:** The removed retainer must not be used again and must be replaced with a new one. When installing the retainer, the side with rounded corners should face the direction indicated by the arrow in the above figure, and the circumferential direction should be assembled as shown in the following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

Clean and lubricate all parts thoroughly before assembly.

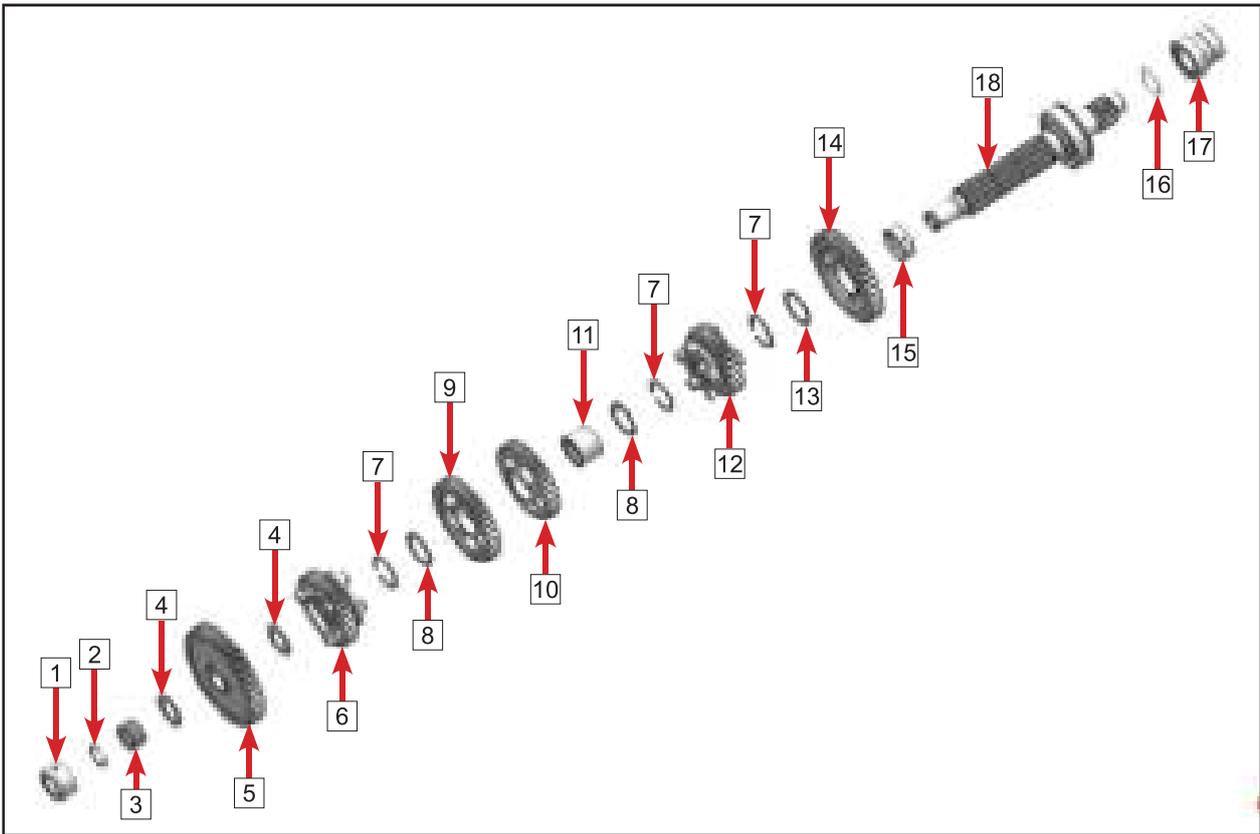
Install the following parts to the main shaft assembly 13 in turn:

- Washer 25.2×30×1 10
- Bushing 25×28×12 12
- Main shaft fifth gear 11
- Washer 25.2×30×1 10
- New circlip for shaft 25 5
- Main shaft third, fourth gear 9
- New circlip for shaft 25 5
- Spline washer 25×31×1 6
- Spline sleeve 25×10 8
- Main shaft sixth gear 7
- Spline washer 25×31×1 6
- New circlip for shaft 25 5
- Main shaft second gear 4
- Washer 20.2×31×1.5 3
- Needle bearing 2
- New circlip for shaft 20 1



Finally check the motion smoothness of all gears.

## 4.7.2.2 Countershaft Assembly Disassembly



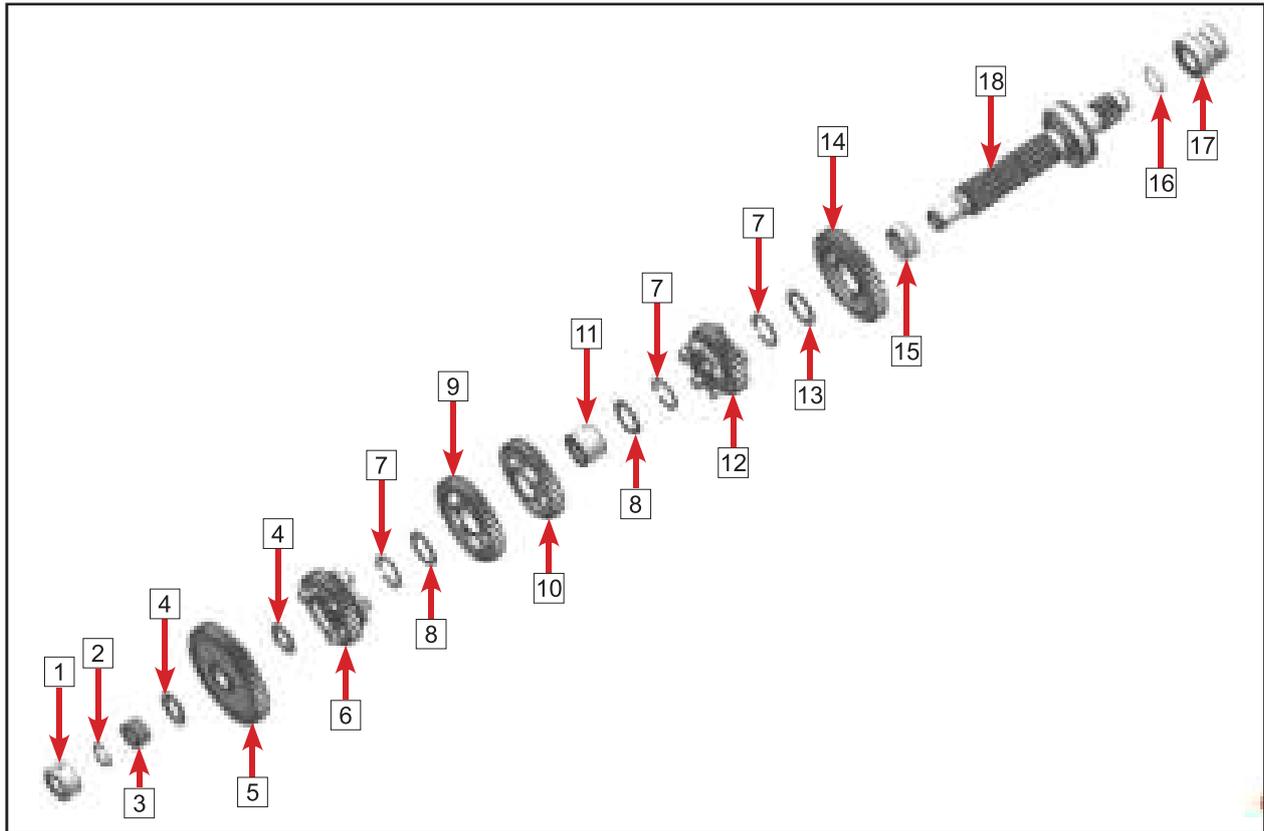
Remove the following parts from the countershaft assembly **18**:

<b>1</b>	Bearing sleeve	<b>10</b>	Countershaft fourth gear
<b>2</b>	Circlip for shaft 20	<b>11</b>	Spline sleeve
<b>3</b>	Needle bearing	<b>12</b>	Countershaft sixth gear
<b>4</b>	Washer 20.2×31×1.5	<b>13</b>	Washer 28.2×36×1
<b>5</b>	Countershaft first gear assembly	<b>14</b>	Countershaft second gear
<b>6</b>	Countershaft fifth gear	<b>15</b>	Shaft sleeve 28×10.5
<b>7</b>	Circlip for shaft 25.5	<b>16</b>	O-ring 25×2
<b>8</b>	Spline washer	<b>17</b>	Countershaft sleeve
<b>9</b>	Countershaft third gear		

**NOTE:** The countershaft third gear is very similar to the countershaft fourth gear. Mark it when disassembling so that it can be quickly installed back to the original position when reassembling.

## 04 Clutch and Transmission

### Inspection



1	Bearing sleeve	10	Countershaft fourth gear
2	Circlip for shaft 20	11	Spline sleeve
3	Needle bearing	12	Countershaft sixth gear
4	Washer 20.2×31×1.5	13	Washer 28.2×36×1
5	Countershaft first gear assembly	14	Countershaft second gear
6	Countershaft fifth gear	15	Shaft sleeve 28×10.5
7	Circlip for shaft 25.5	16	O-ring 25×2
8	Spline washer	17	Countershaft sleeve
9	Countershaft third gear	18	Countershaft assembly

Check bearing sleeve [1], spline sleeve [11], shaft sleeve [15], countershaft sleeve [17] for excessive wear or damage. Replace with new part if found.

Check needle bearing [3] for excessive wear or damage. Replace with needle roller bearing if found.

Check the tooth surface of gear [5], [9], [10], [14] for excessive wear or damage. Replace gear in pairs if found.

Check the tooth surface and inner spline of gear [6], [12] for excessive wear or damage. Replace gear in pairs if found.

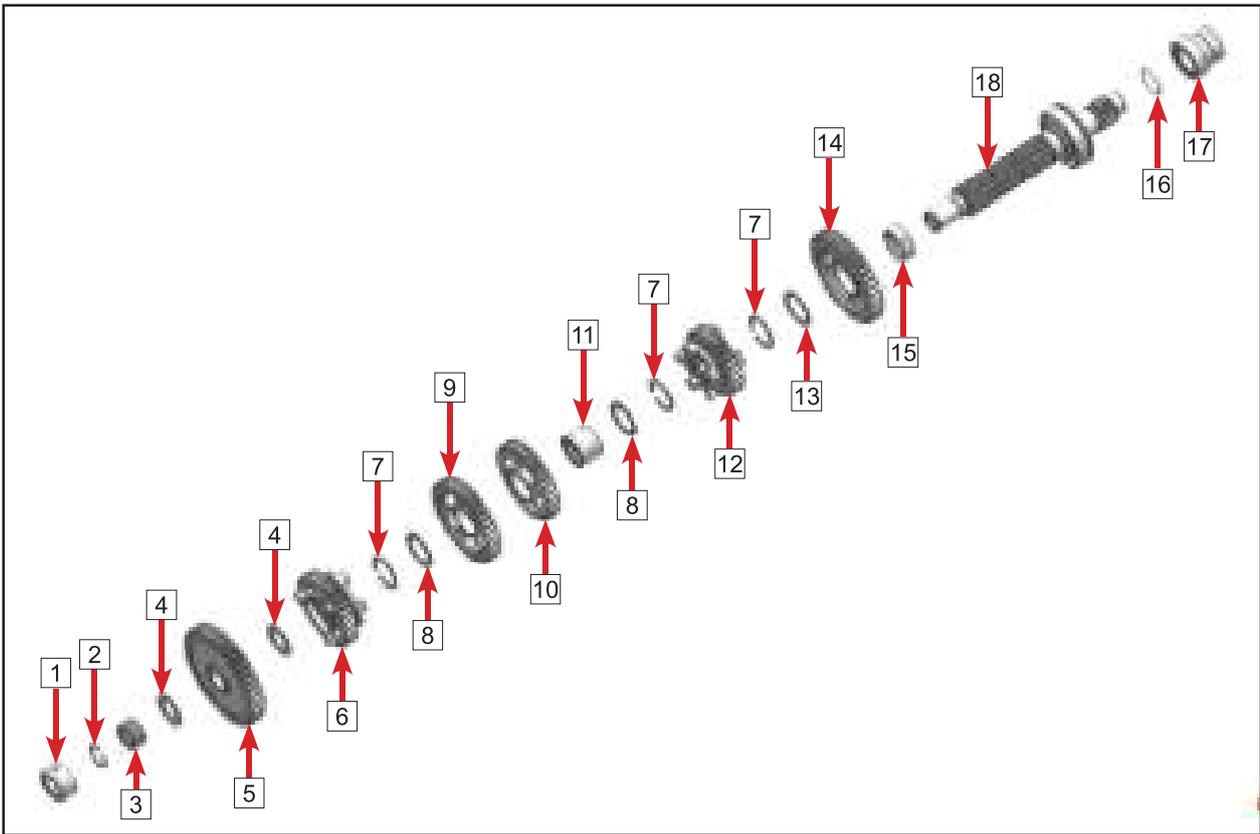
Check the shifting engagement pawl or hole of gear [5], [6], [9], [10], [12], [14] for excessive wear or damage. Replace gear in pairs if found.

Check that gear [6] and gear [12] slide freely and smoothly on the countershaft. If stuck, replace the gear [6] or gear [12] or countershaft assembly [18].

Check washer [4], [13] and spline washer [8] for excessive wear or damage. Replace washer or spline washer if found.

Check O-ring [16] for crack, hardening or other damage. Replace O-ring if found.

Use new circlip [2] [7] for every service.



1	Bearing sleeve	10	Countershaft fourth gear
2	Circlip for shaft 20	11	Spline sleeve
3	Needle bearing	12	Countershaft sixth gear
4	Washer 20.2×31×1.5	13	Washer 28.2×36×1
5	Countershaft first gear assembly	14	Countershaft second gear
6	Countershaft fifth gear	15	Shaft sleeve 28×10.5
7	Circlip for shaft 25.5	16	O-ring 25×2
8	Spline washer	17	Countershaft sleeve
9	Countershaft third gear	18	Countershaft assembly

Check whether countershaft assembly 18 has the following conditions:

- Excessive wear or damage to the bearing journal of countershaft
- Excessive wear or damage to the external spline of countershaft
- When the countershaft bearing is rotated, the bearing appears stuck and noise

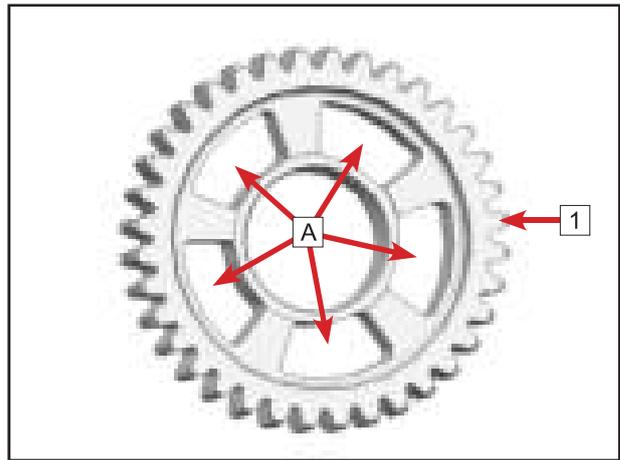
If any abnormality is found, replace the countershaft assembly.

## 04 Clutch and Transmission

The picture on the right is a typical example.

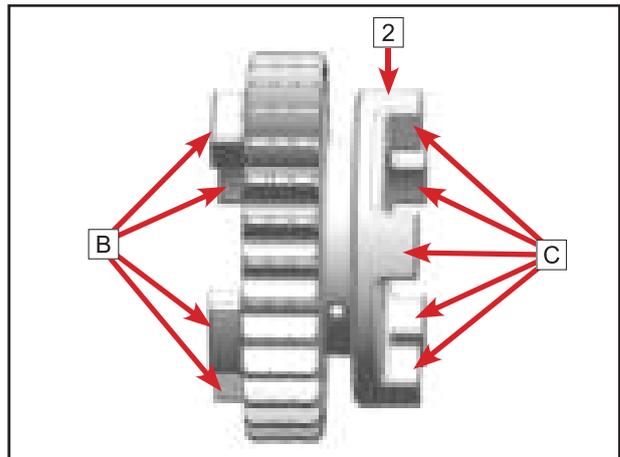
1: Shift gear

A: Shift hole



2: Shift sliding gear

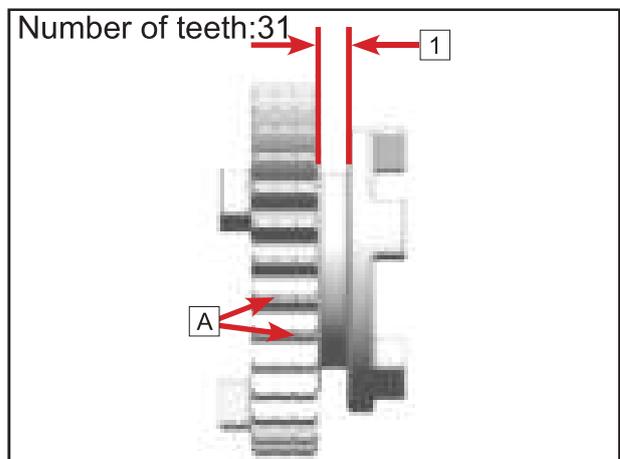
B, C: Shift claw



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	5.10 ~ 5.17 mm (0.20079 ~ 0.20354 in)
Service Limit	5.27 mm (0.20748 in)

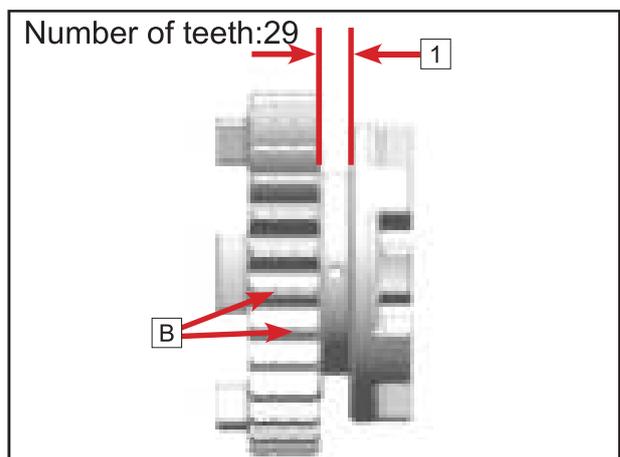
**NOTE: The countershaft fifth gear has (two rings) marking slots A.**



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	5.10 ~ 5.17 mm (0.20079 ~ 0.20354 in)
Service Limit	5.27 mm (0.20748 in)

**NOTE: The countershaft sixth gear has (two rings) marking slots B.**

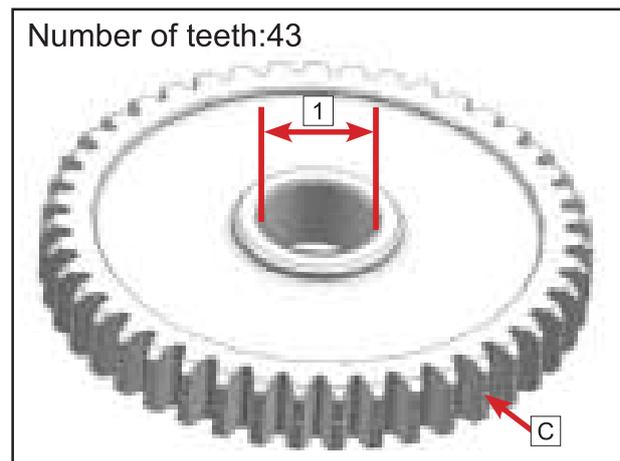


# CFMOTO

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.

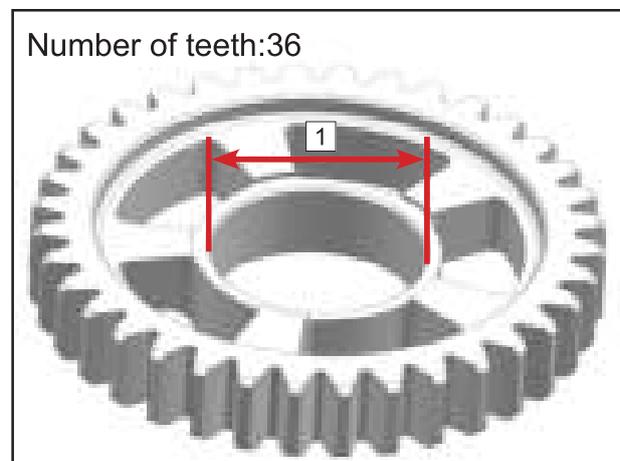
Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft First Gear	
New Part	20.020 ~ 20.041 mm (0.78819 ~ 0.78902 in)
Service Limit	20.048 mm (0.78929 in)

**NOTE: The countershaft first gear has (one ring) marking slot C.**



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

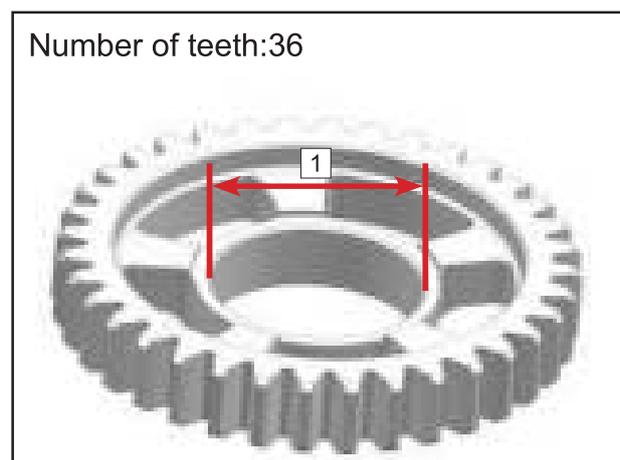
Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft Third Gear	
New Part	31.000 ~ 31.025 mm (1.22047 ~ 1.22146 in)
Service Limit	31.032 mm (1.22173 in)



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

Inner Diameter <span style="border: 1px solid black; padding: 0 2px;">1</span> of Countershaft Fourth Gear	
New Part	31.000 ~ 31.025 mm (1.22047 ~ 1.22146 in)
Service Limit	31.032 mm (1.22173 in)

**NOTE: The tip circle diameter of the countershaft fourth gear is slightly smaller than that of the countershaft third gear.**

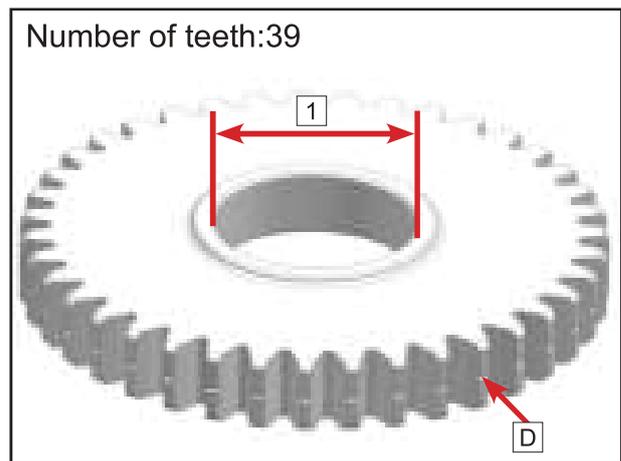


## 04 Clutch and Transmission

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

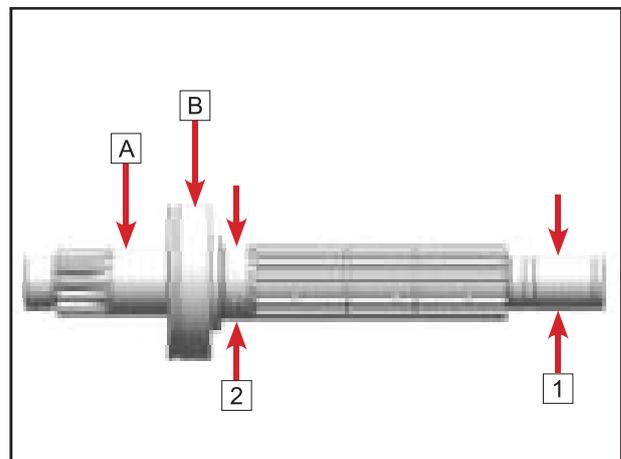
Inner Diameter [1] of Countershaft Second Gear	
New Part	31.000 ~ 31.025 mm (1.22047 ~ 1.22146 in)
Service Limit	31.032 mm (1.22173 in)

**NOTE: The countershaft second gear has (one ring) marking slot [D].**

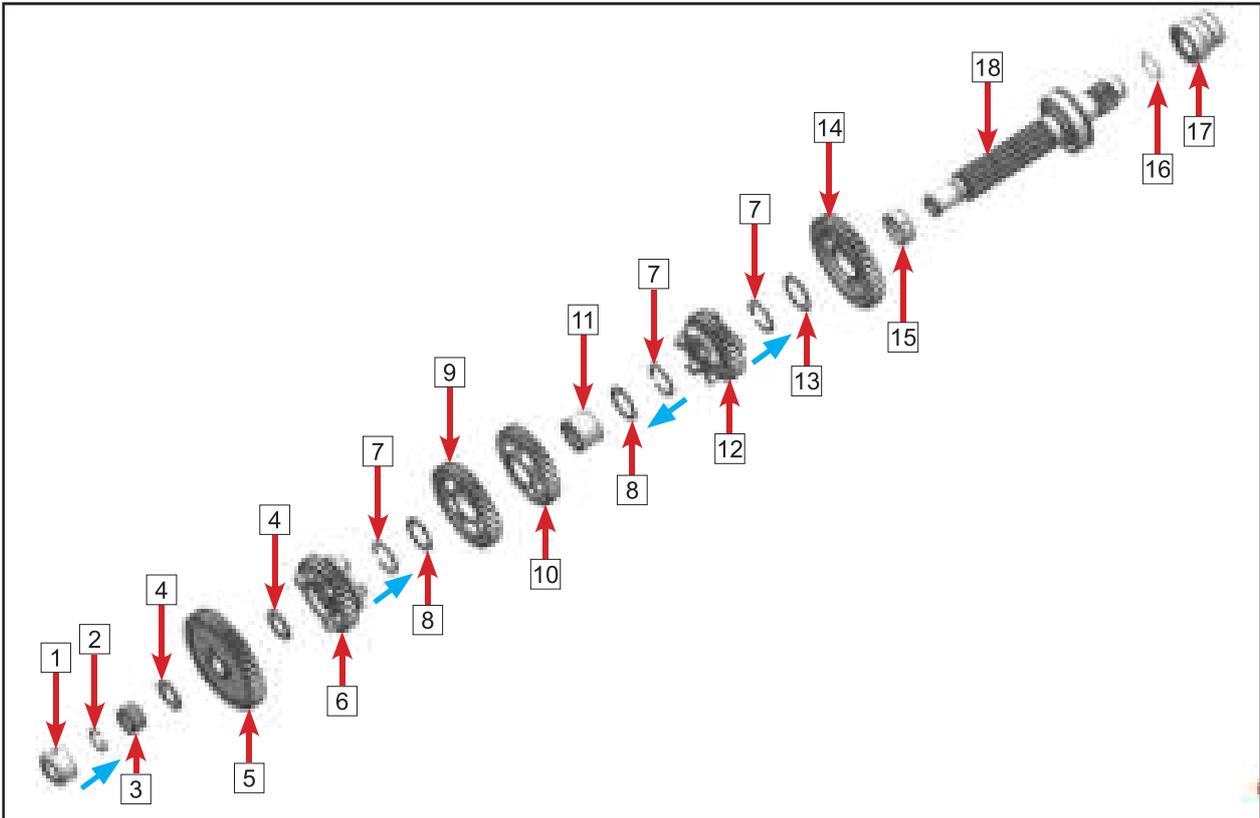


Measure the outer diameter [1] and outer diameter [2] of the countershaft. If it is less than the service limit, replace a new countershaft assembly (including the countershaft [A] and countershaft bearing [B]).

Outer Diameter of Countershaft [1]	
New Part	19.987 ~ 20.000 mm (0.78689 ~ 0.78740 in)
Service Limit	19.980 mm (0.78661 in)
Outer Diameter of Countershaft [2]	
New Part	27.967 ~ 27.980 mm (1.10106 ~ 1.10157 in)
Service Limit	27.960 mm (1.10079 in)



## Assembly

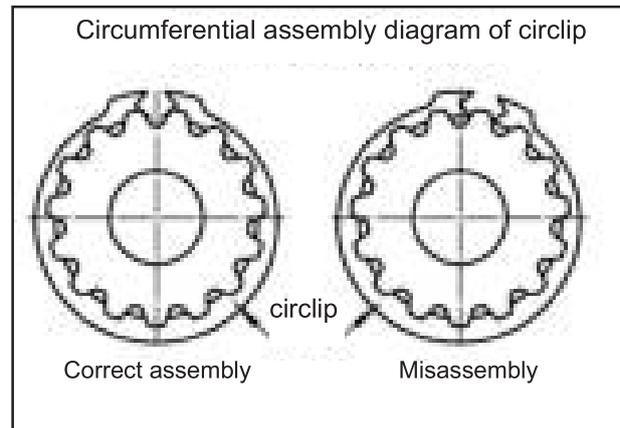


**NOTE: The removed circlip must not be used again and must be replaced with a new one. When installing the circlip, the side with rounded corners should face the direction indicated by the arrow in the above figure, and the circumferential direction should be assembled as shown in the following figure. 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 assembly **18** in turns:

- Shaft sleeve 28×10.5 **15**
- Countershaft second gear **14**
- Washer 28.2×36×1 **13**
- New circlip for shaft 25.5 **7**
- Countershaft sixth gear **12**
- New circlip for shaft 25.5 **7**
- Spline washer **8**
- Spline sleeve **11**
- Countershaft fourth gear **10**
- Countershaft third gear **9**
- Spline washer **8**
- New circlip for shaft 25.5 **7**
- Countershaft fifth gear **6**
- Washer 20.2×31×1.5 **4**
- Countershaft first gear assembly **5**
- Washer 20.2×31×1.5 **4**
- Needle bearing **3**
- New circlip for shaft 20 **2**
- Bearing sleeve **1**



Install the following parts to the countershaft assembly **18** in turns:

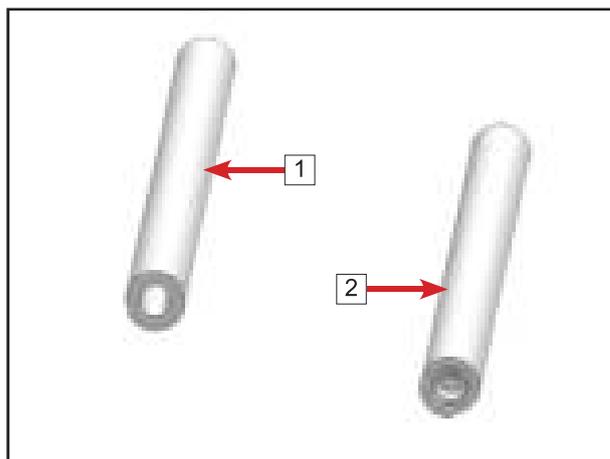
- New O-ring 25×2 **16**
- Countershaft sleeve **17**

Finally check the motion smoothness of all gears.

## 04 Clutch and Transmission

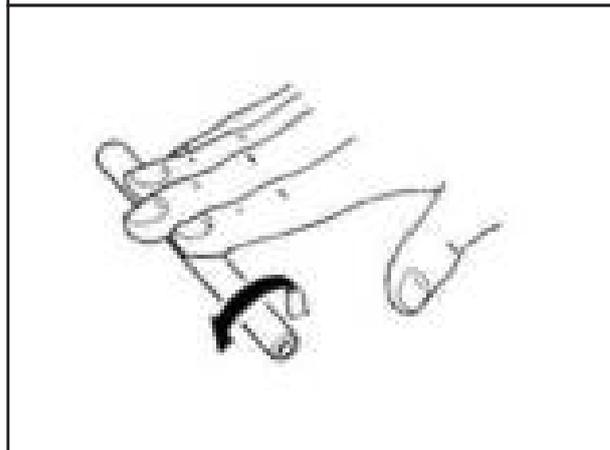
### 4.7.2.3 Gearshift Fork Shaft and Fork

Check the shift fork shaft 2  and shift fork shaft assembly  for excessive wear or damage.



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

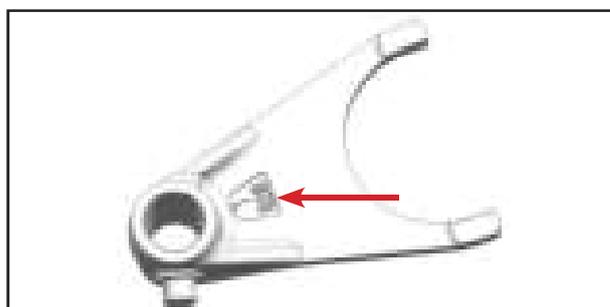
**⚠ CAUTION: Do not attempt to straighten the bent fork shaft.**



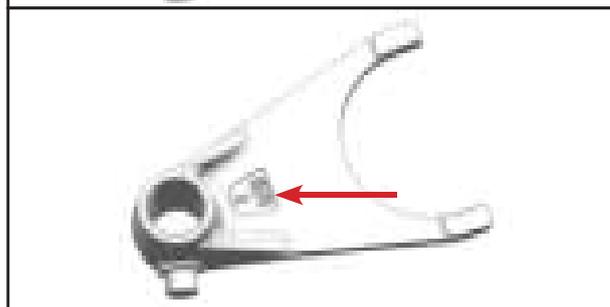
### Fork Identification

The fork body is with identification mark.

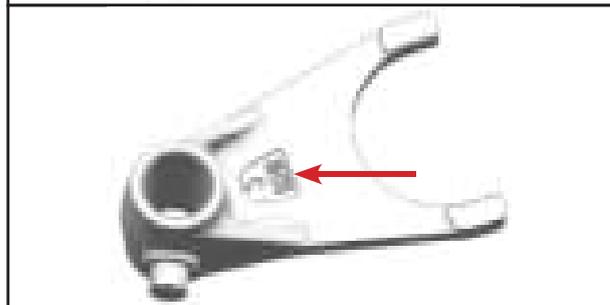
Shift fork (LH): 0HT0 L



Shift fork (RH): 0HT0 R



Shift fork (middle): 0HT0 C



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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 <span style="border: 1px solid black; padding: 0 2px;">1</span>	
New Part	4.93 ~ 5.00 mm (0.19409 ~ 0.19685 in)
Service Limit	4.83 mm (0.19016 in)

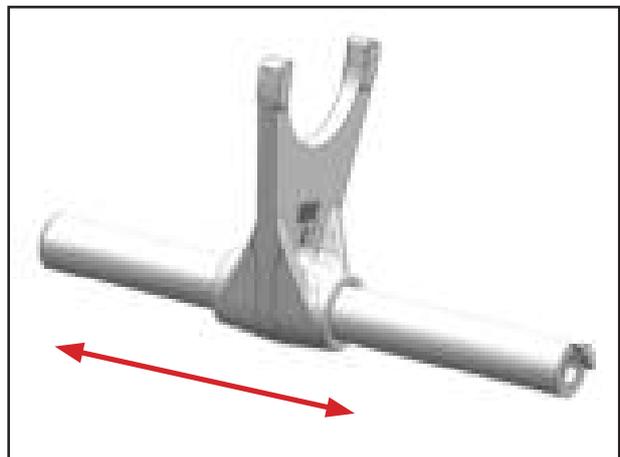
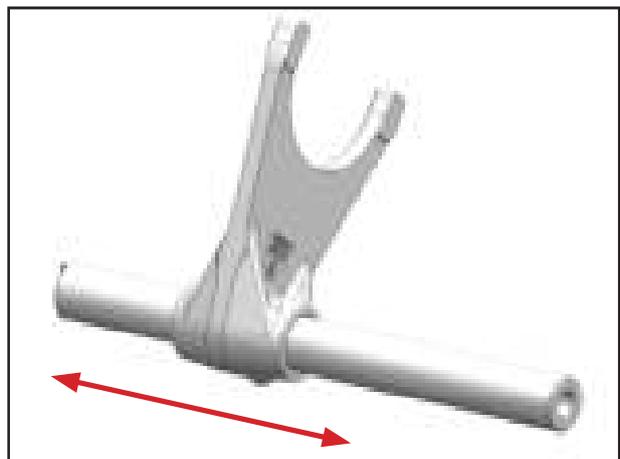
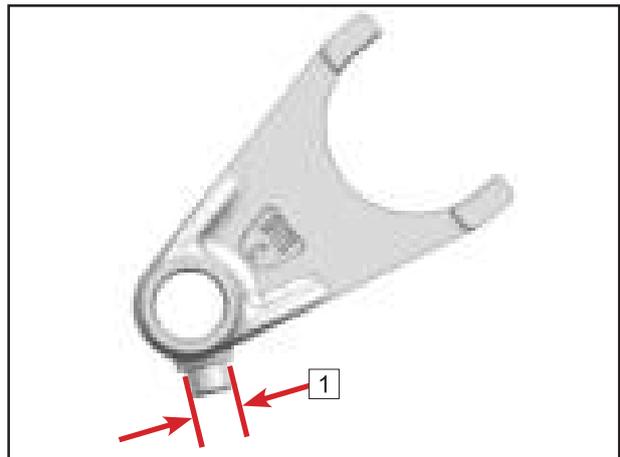
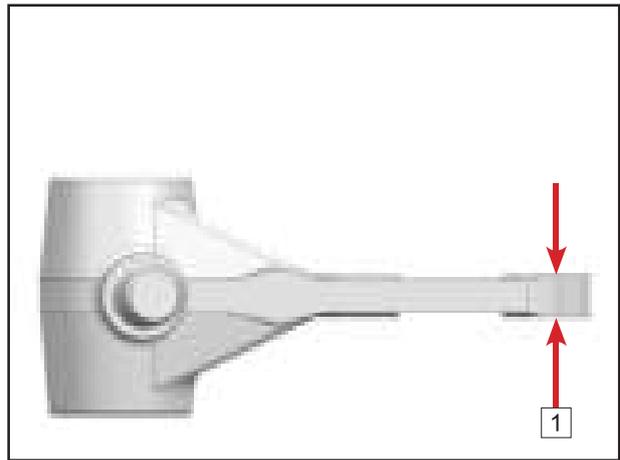
The three shift forks have the same fork pin diameter.

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	6.942 ~ 7.000 mm (0.27331 ~ 0.27559 in)
Service Limit	6.850 mm (0.26969 in)

Respectively set the shift fork (LH) and shift fork (RH) on the fork shaft 2, move left and right. Replace with new parts if not smooth.

Set the shift fork (middle) on the fork shaft assembly, move left and right. Replace with new parts if not smooth.

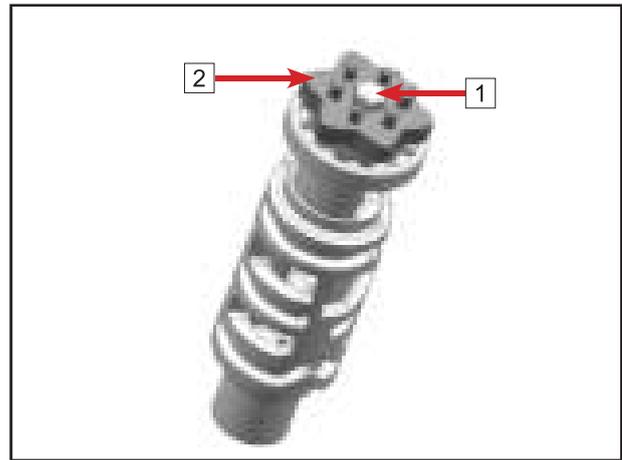


### 4.7.2.4 Shift Drum Assembly

#### Disassembly

Remove bolt [1].

Remove gearshift drum cam assembly [2].

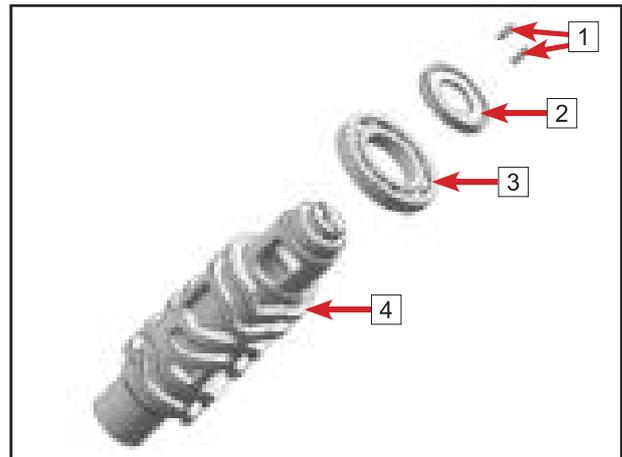


Remove from shift drum [4] in turns:

— Needle roller [1]

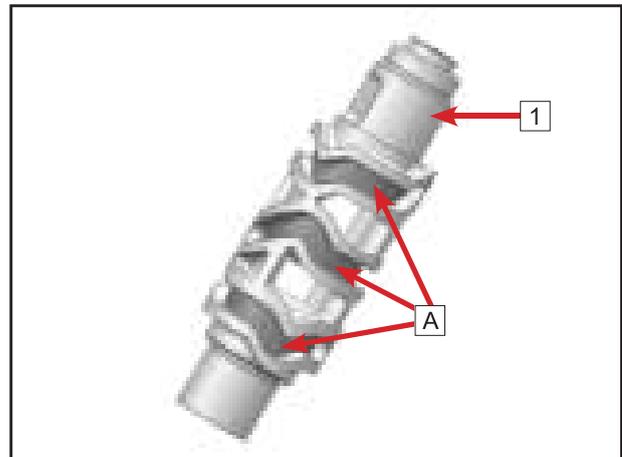
— Shift drum bushing [2]

— Roller bearing [3]



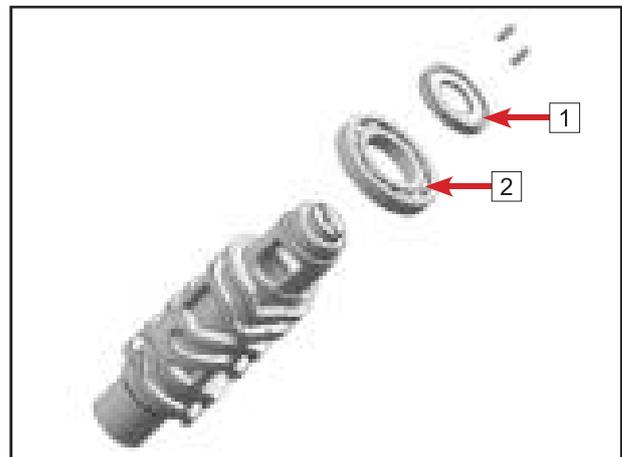
#### Inspection

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



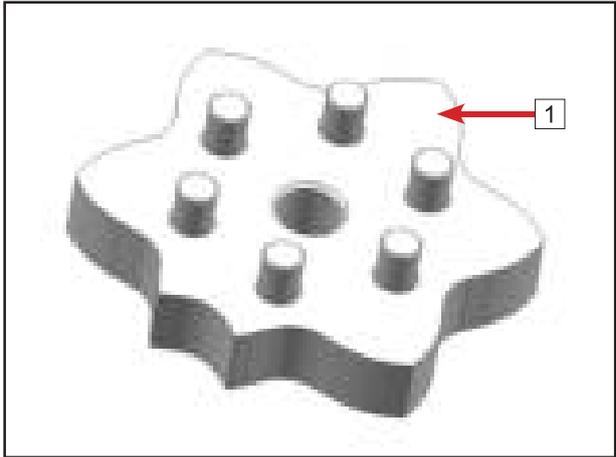
Check the shift drum bushing [1] for excessive wear or damage. Replace if it necessary.

Check whether the roller bearing [2] rotates flexibly, and whether there is stuck or abnormal sound. Replace if necessary.



# CFMOTO

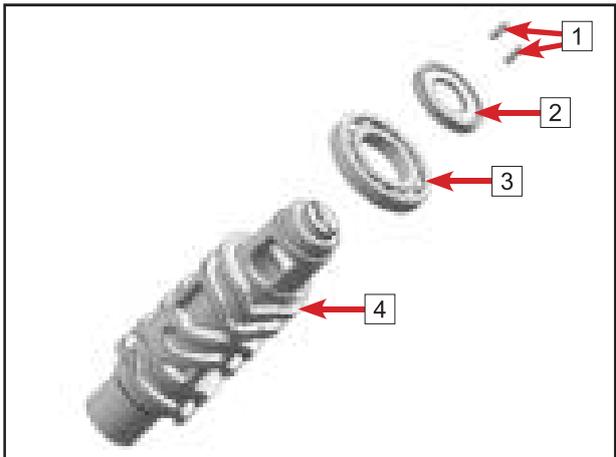
Check the shift drum cam assembly **1** for cracks, excessive wear or damage. Replace if necessary.



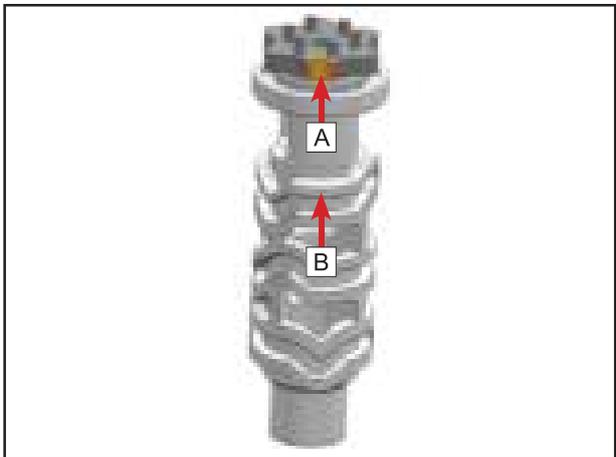
## Assembly

Apply oil on the matching surface of shift drum, roller bearing and shift drum bushing.

Install roller bearing **3**, shift drum bushing **2** and needle roller **1** onto the shift drum **4**.

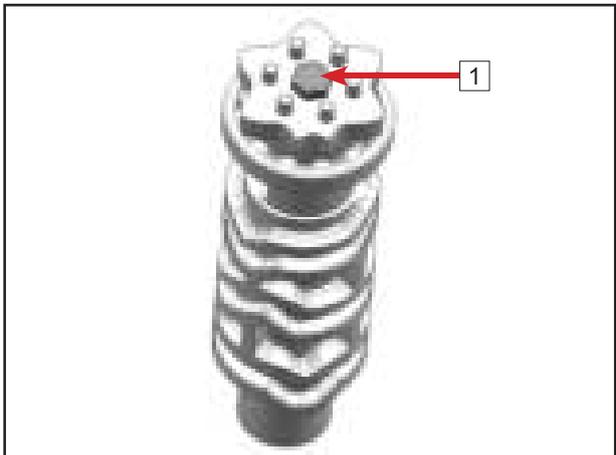


Align position **A** with position **B**, and install shift drum cam assembly **1** onto the shift drum.



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

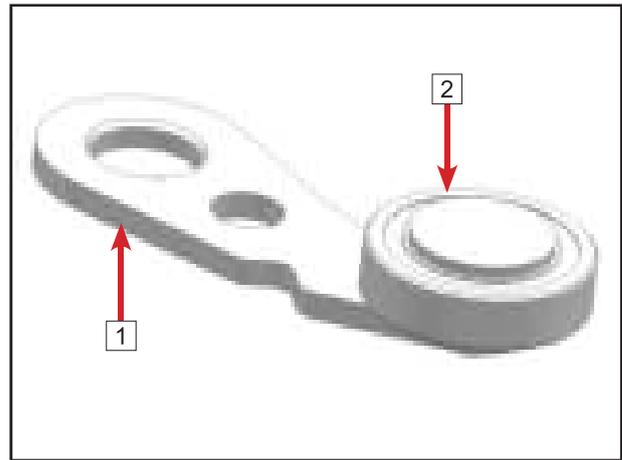
<b>Shift Drum Cam Bolt <b>1</b></b>	
Torque	10N·m (7.3 ft-lb.)



### 4.7.2.5 Gearshift Positioning Swing Arm Sub Assembly

Check gearshift swing arm [1] for beading 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.



### 4.7.2.6 Gearshift Shaft Assembly Disassembly

Remove the following parts from the shaft assembly [1]:

- Washer [3]
- Circlip for shaft [4]
- Washer [3]
- Lever return spring [2]

#### Inspection

Check the washer [3] for severe wear or damage. Replace if necessary.

Check the return spring [2] for damage or serious deformation. Replace if necessary.

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
- Any damage to the return spring [D]

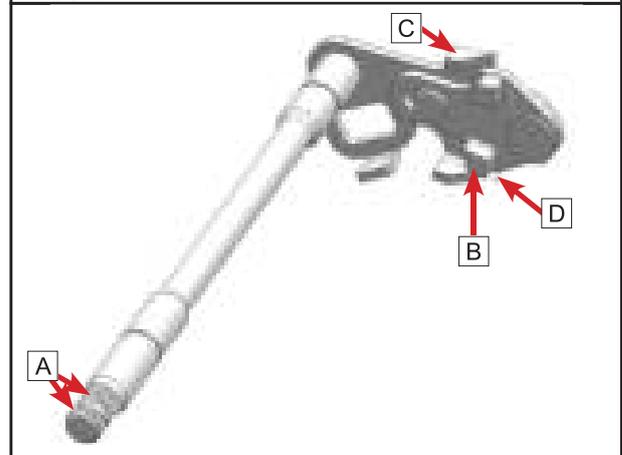
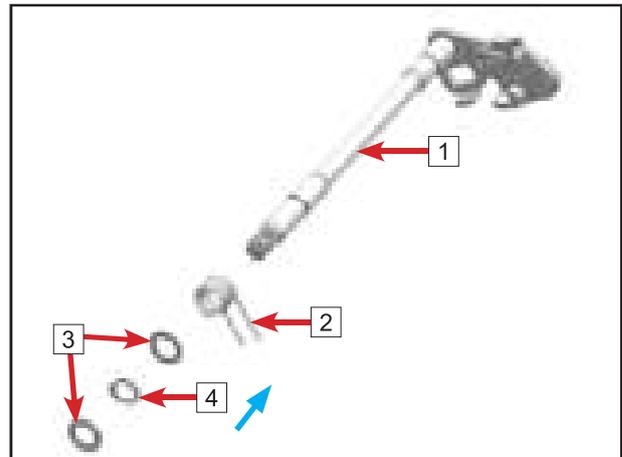
If any abnormality is found, replace with new gearshift shaft assembly.

#### Installation

Reverse the removal procedures for installation. 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.

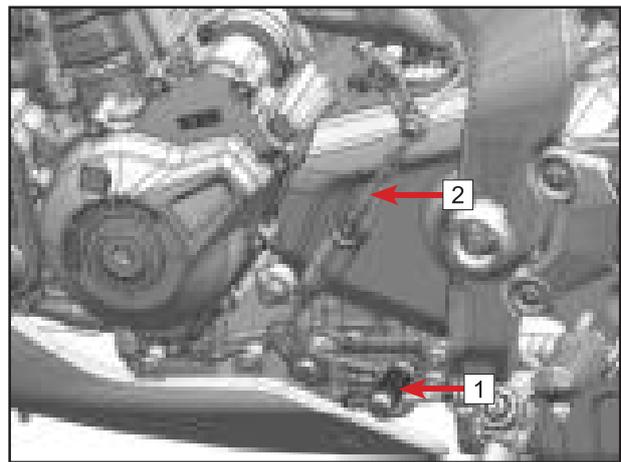


## 4.7.3 Gearshift Lever Assembly

### 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.



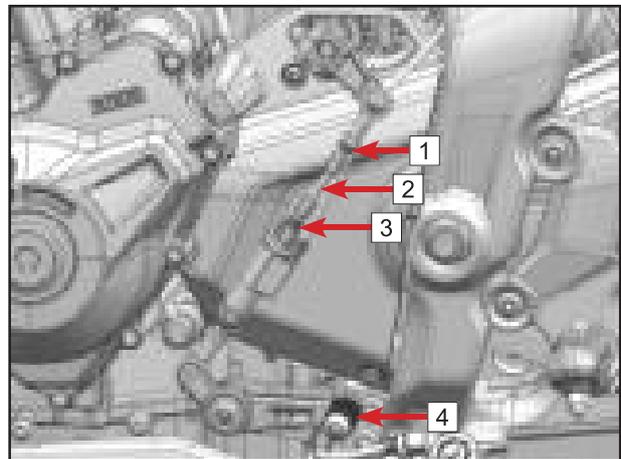
### 4.7.3.2 Adjusting the Basic Position of Shift Lever

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

**NOTE: The nut **3** 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, left-hand thread)	
Torque	6N·m (4.42 ft-lb.)

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

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

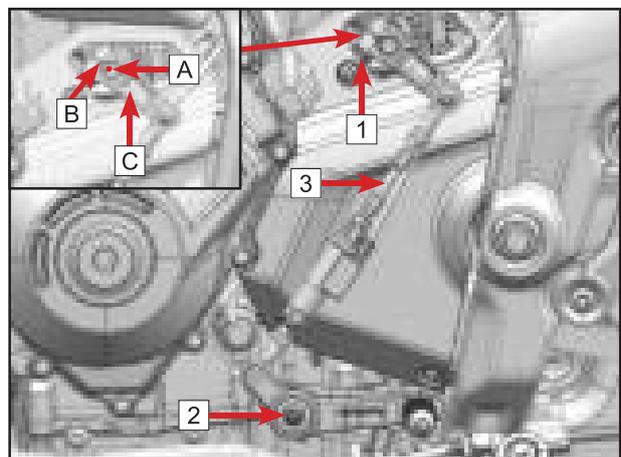
### 4.7.3.3 Gearshift Lever Assembly Removal

**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**.

Remove shift lever assembly **3**.



## 04 Clutch and Transmission

### 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**.

**NOTE:** The quick shift sensor is facing towards the rear of the vehicle, as shown in the figure.

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

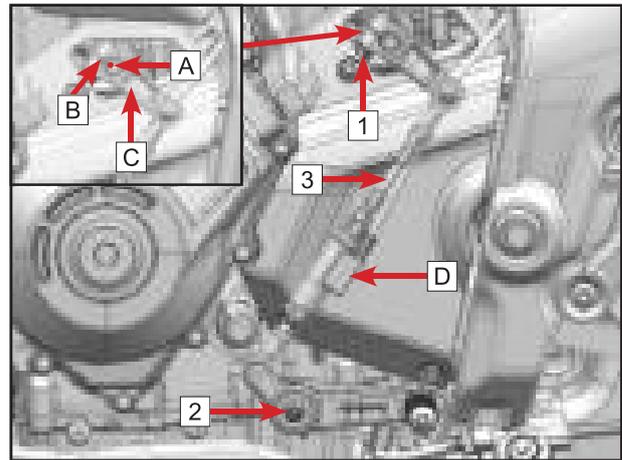
Screw <b>2</b> (M8)	
Torque	20N·m (14.7 ft-lb.)

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

Bolt <b>1</b> (M6)	
Torque	10N·m (7.3 ft-lb.)

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

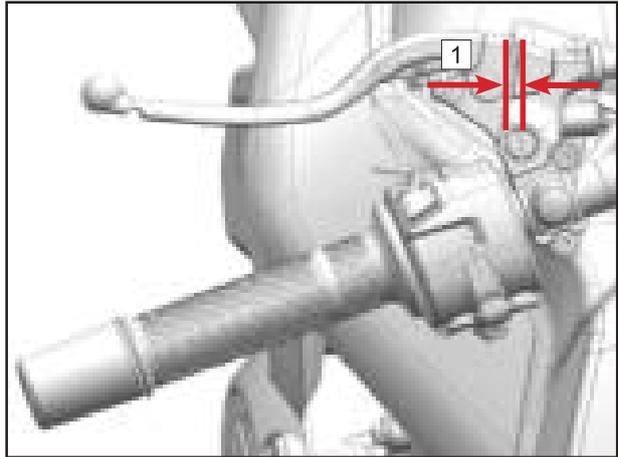
**NOTE:** During shifting, the shift lever must not come into contact with any other vehicle parts.



## 4.8 Clutch Lever Clearance Inspection

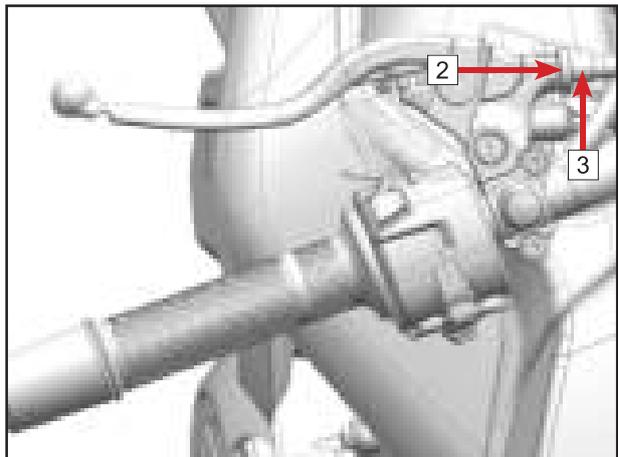
Check if the clutch lever returns smoothly.  
Check the free play [1] of clutch lever.

**Free play: 2mm**

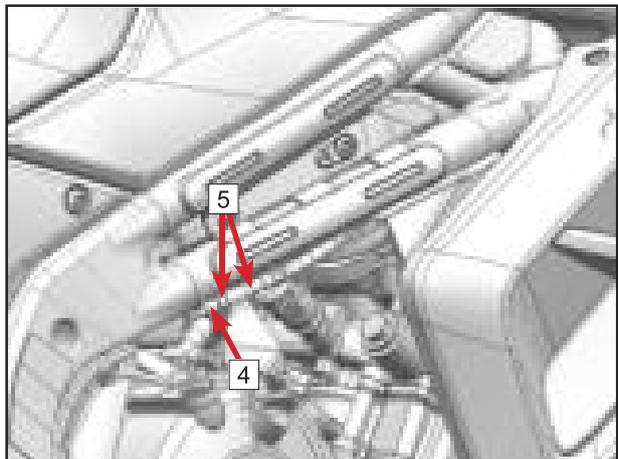


## 4.9 Clutch Cable Free Play Adjustment

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 two lock nut [5], adjust the position of cable thread pipe [4], then tighten the lock nut [5].



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5.10.3 Installation .....	5-183

## 5.1 Engine Special Tool

(The following special tools are available for dealers' reference)

### Magneto Rotor Removal Tool

0SQ0-031000-922-002



### Magneto Rotor Stopping Tool

0WR0-031000-922-001



### Countershaft Oil Seal Punch

0SQ0-010001-923-001



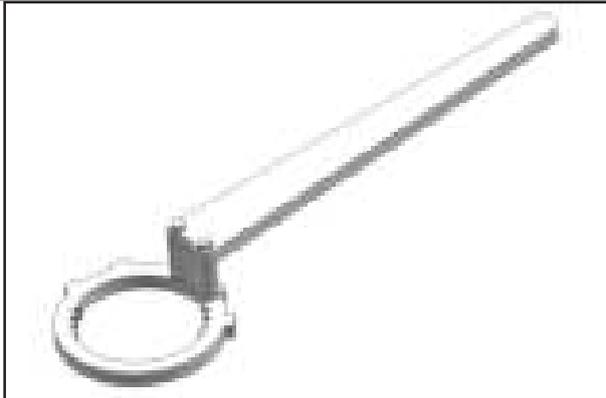
### Output Sprocket Stopping Tool

0700-062030-922-001



## Clutch Stopping Tool

0WR0-051000-922-001

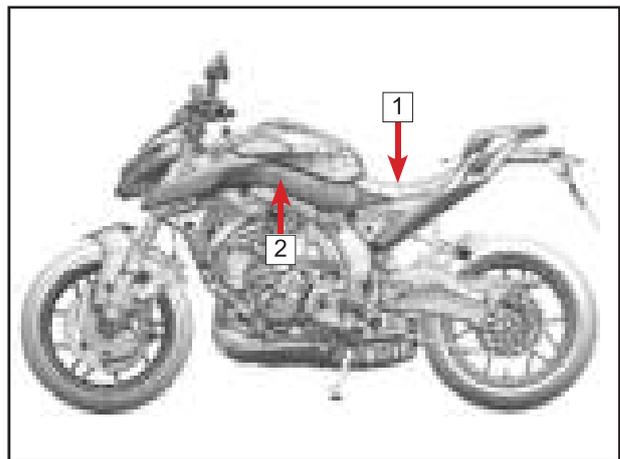


## 5.2 Engine Removal

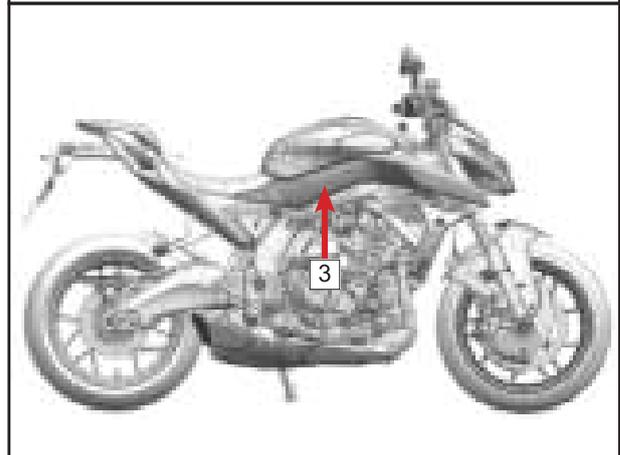
### Pre-work

Remove by referring to related chapters:

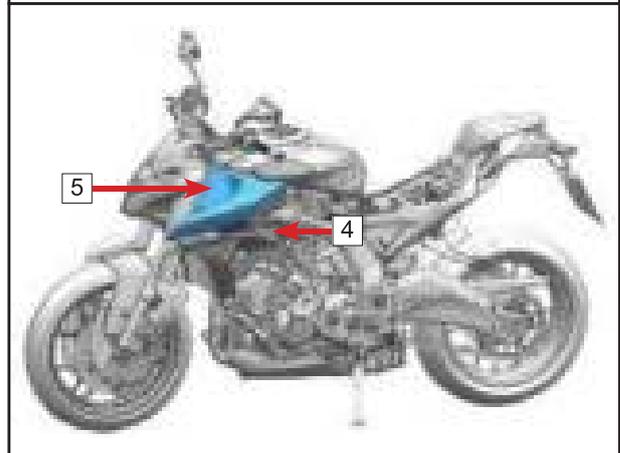
- Front seat **1**.
- Vehicle rear LH deco plate **2**.



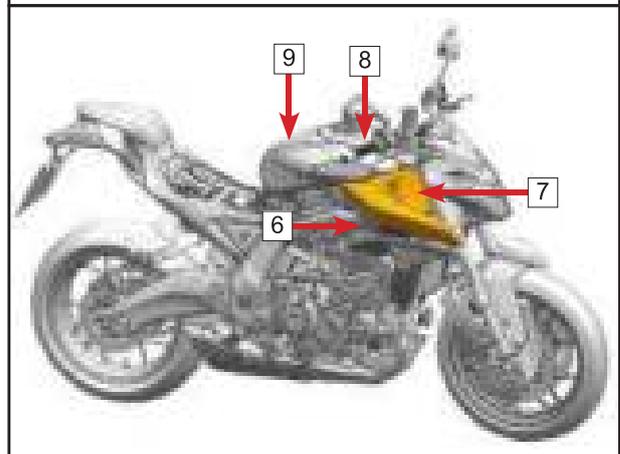
- Vehicle rear RH deco plate **3**.



- Radiator LH inner panel assembly **4**.
- Fuel tank front LH deco plate assembly **5**.



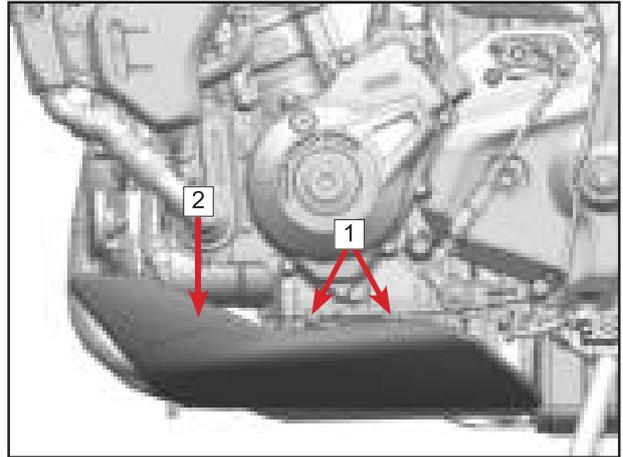
- Radiator RH inner panel assembly **6**.
- Fuel tank front RH deco plate assembly **7**.
- Fuel tank upper deco plate **8**.
- Fuel tank **9**.



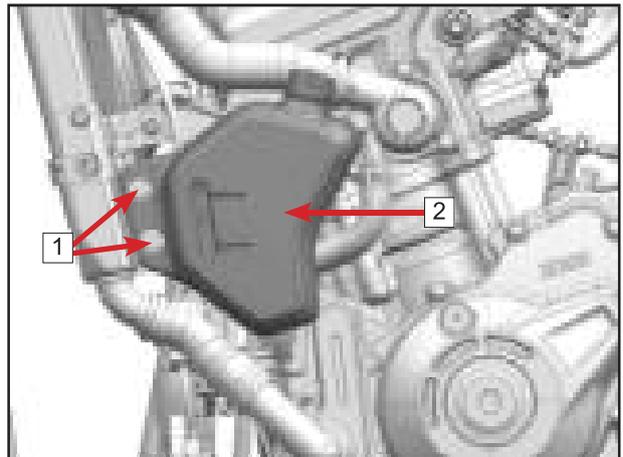
Drain the coolant.

## Main Work

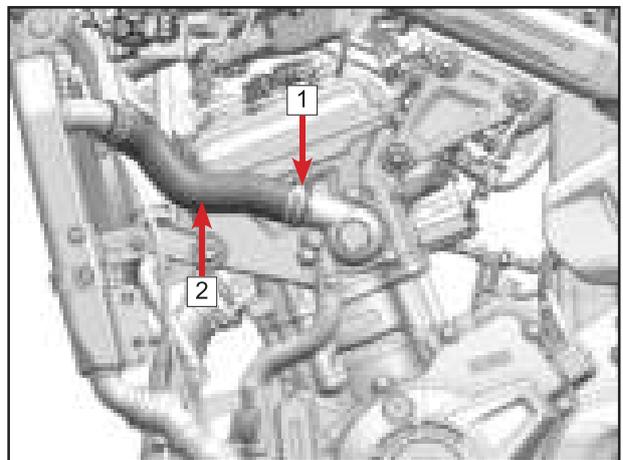
Remove screws **1**.  
Remove muffler rear LH deco guard assembly **2**.



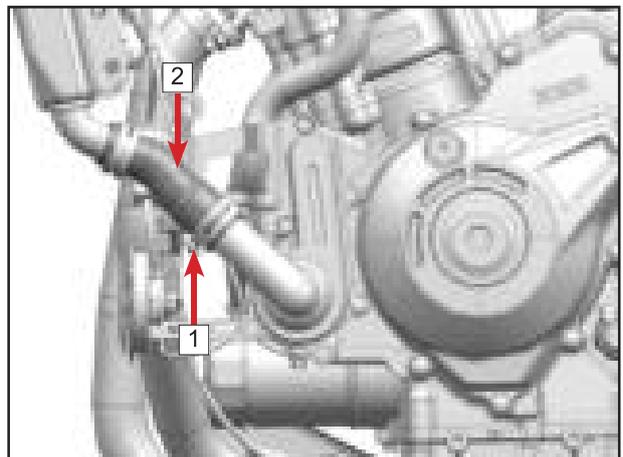
Remove bolts **1**.  
Remove auxiliary water bottle deco cover **2** and reservoir assembly.



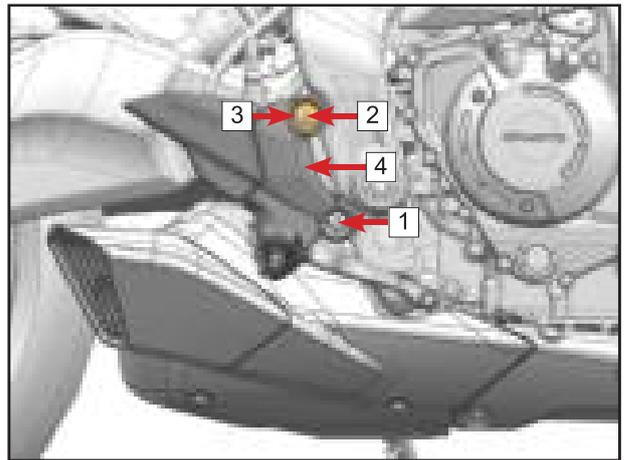
Loosen the clamp **1**.  
Unplug the radiator inlet hose **2** from the thermostat cap.



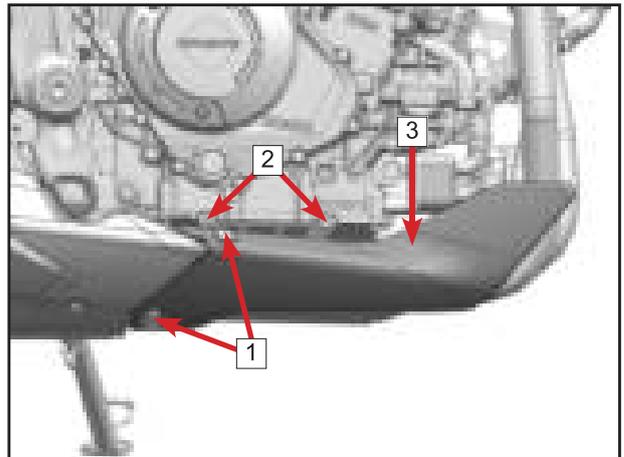
Loosen clamp **1**.  
Remove the radiator outlet pipe **2** from the water pump cover.



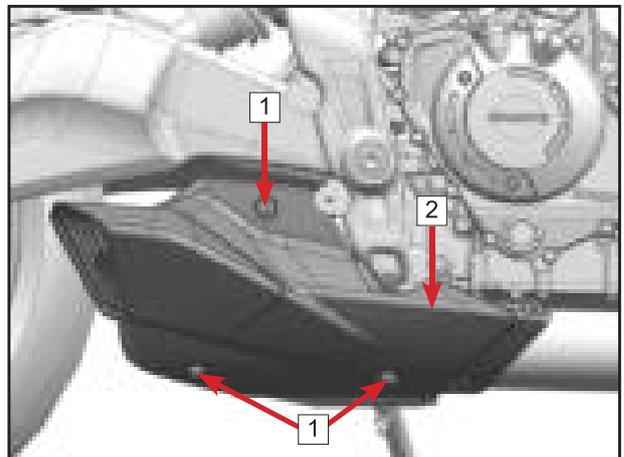
Remove screw **1**.  
Remove screw **2** and washer **3**.  
Remove front RH footrest bracket assembly **4**, and hang it to the side.



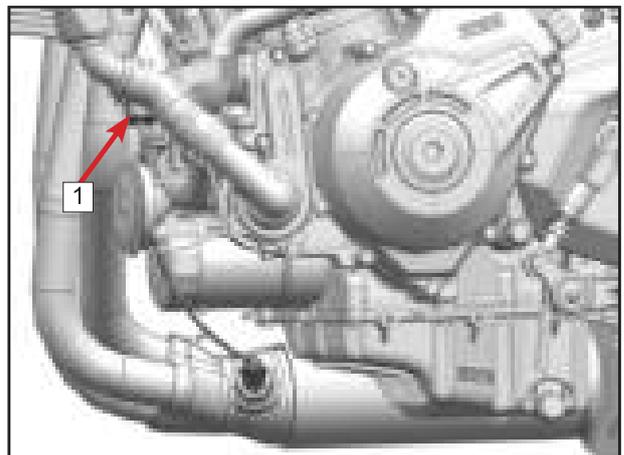
Remove screws **1**.  
Remove screws **2**.  
Remove muffler rear RH deco guard assembly **3**.



Remove screws **1**.  
Remove muffler guard assembly **2**.



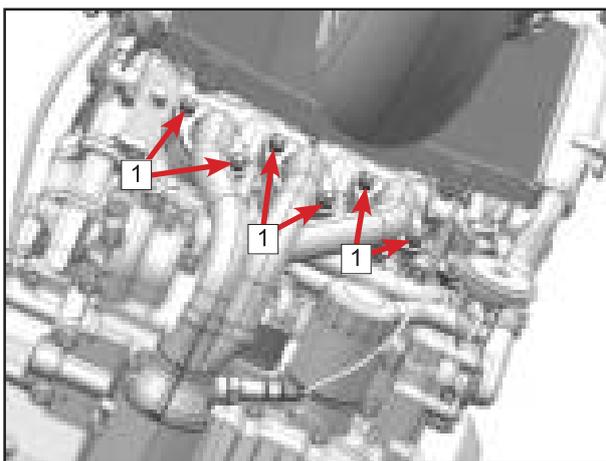
Disconnect oxygen sensor connector **1**.



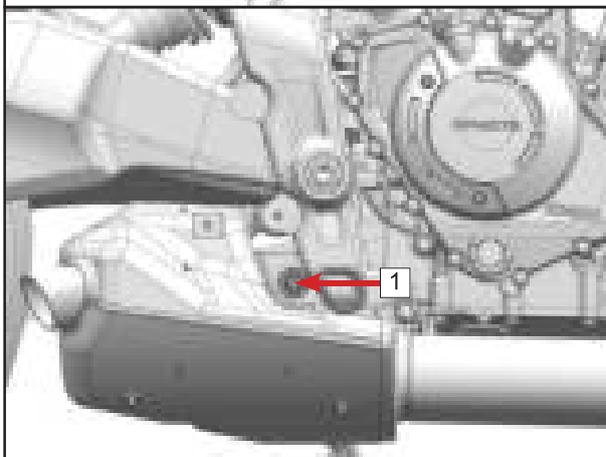
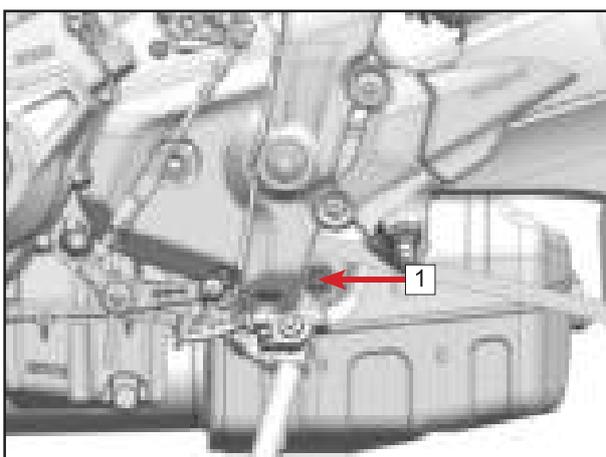
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Remove the radiator. (Refer to the "Cooling System" chapter)

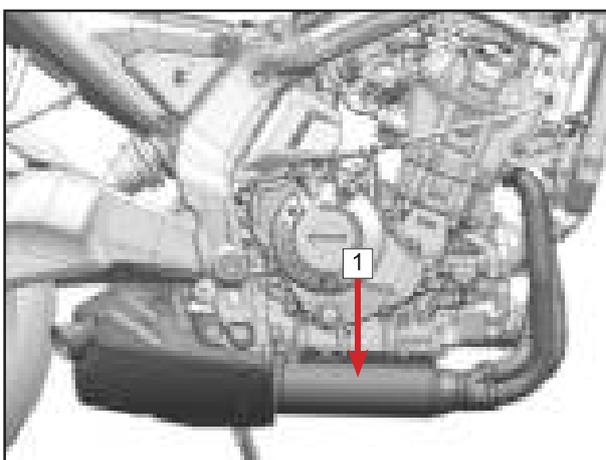
Remove lock nuts **1**.



Remove bolts **1**.



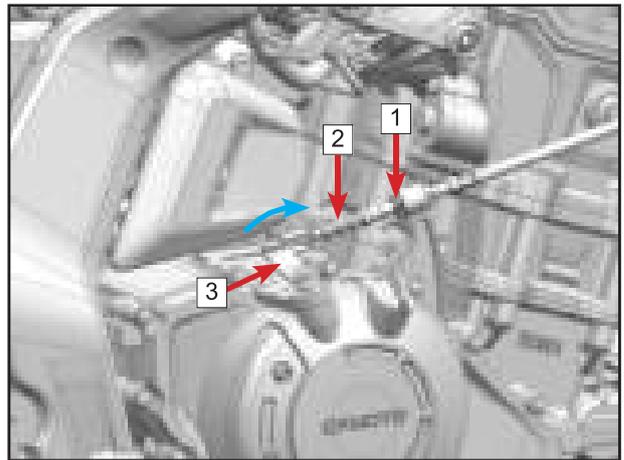
Remove exhaust muffler assembly **1** and exhaust port gasket.



Release nut **1**.

Rotate the clutch release lever **3** clockwise and disengage the clutch cable **2**.

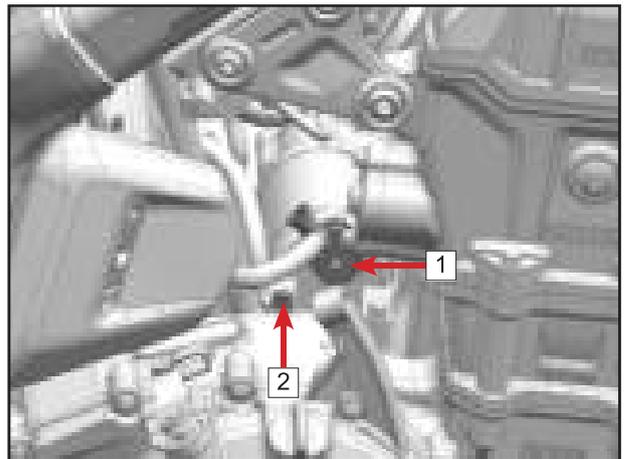
Hang the clutch cable to the side.



Push the protective cap **1** back and remove the fixing nut for the positive cable. Hang the positive cable to the side.

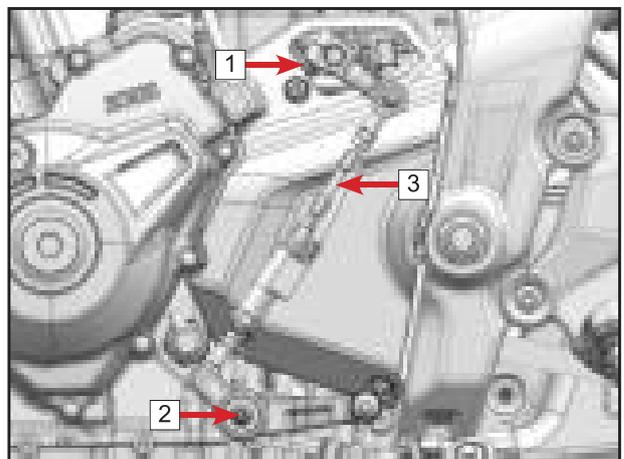
Remove bolt **2**.

Hang the GND cable to the side.



Remove bolt **1** and screw **2**.

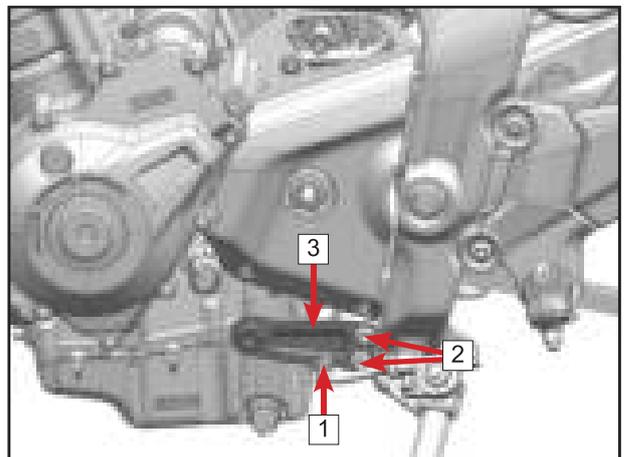
Remove gearshift lever assembly **3**.



Remove cable clip **1**.

Remove screws **2**.

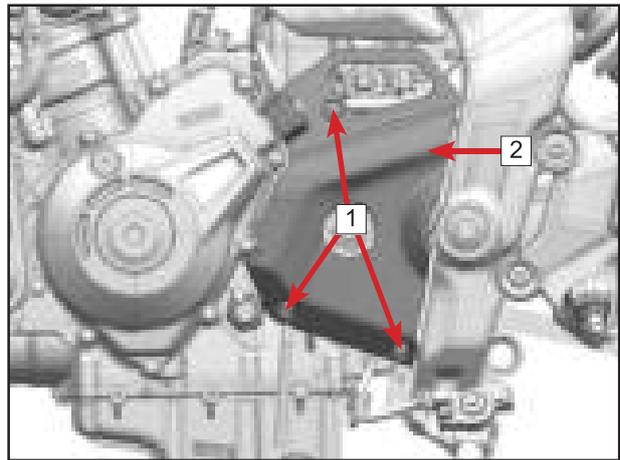
Remove gearshift lever bracket **3**.



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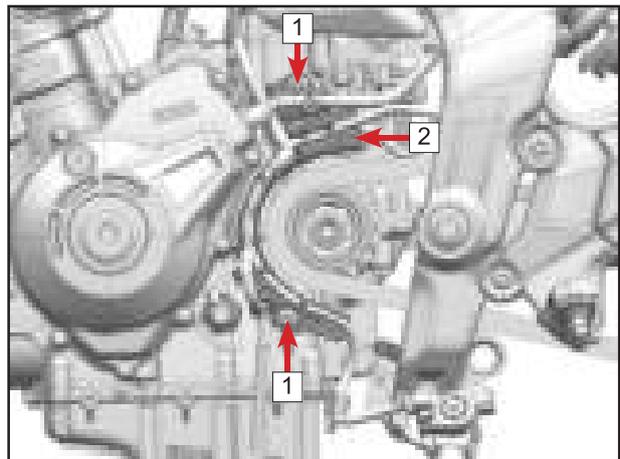
Remove screws [1].

Remove small sprocket deco guard [2].

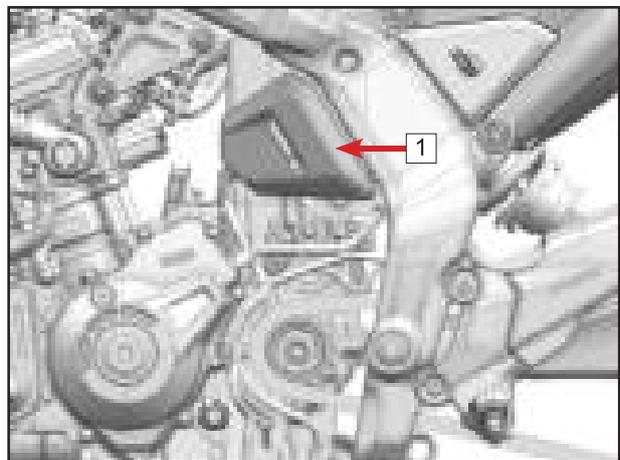


Remove screws [1].

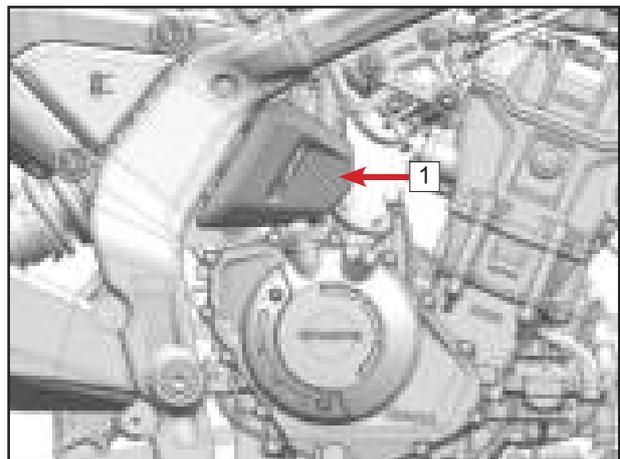
Remove small sprocket deco guard bracket [2].



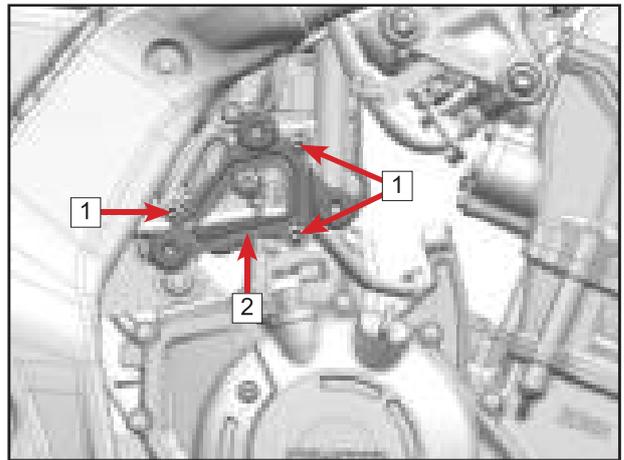
Remove vehicle LH middle deco plate [1].



Remove vehicle RH middle deco plate [1].



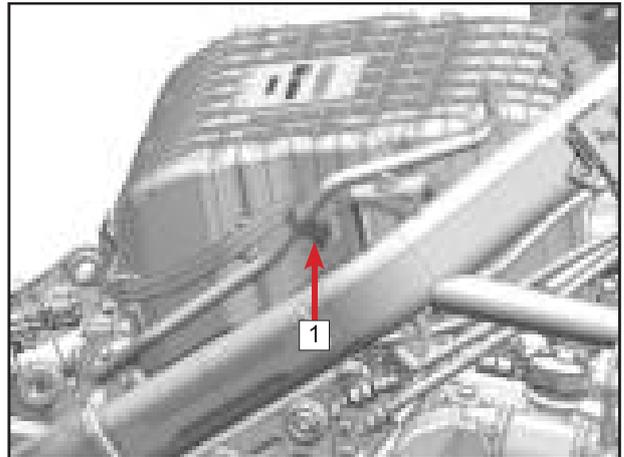
Remove screws **1**.  
Remove ABS deco guard bracket assembly **2**.



{ } is the operating procedures for vehicles equipped with fuel evaporation system.

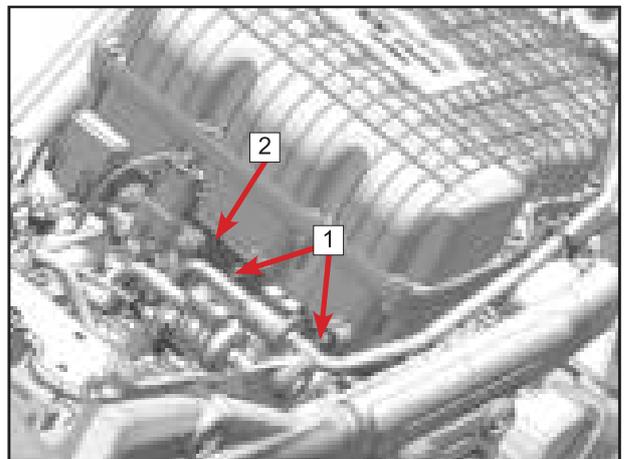
{

Separate tie band **1** with air filter housing.



Remove screws **1**, separating valve bracket **2** and air filter housing.

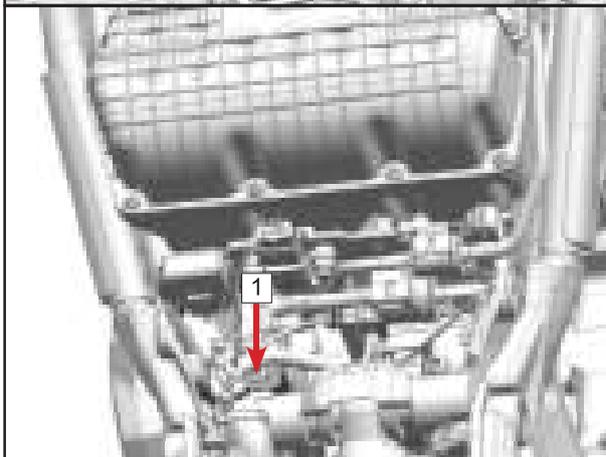
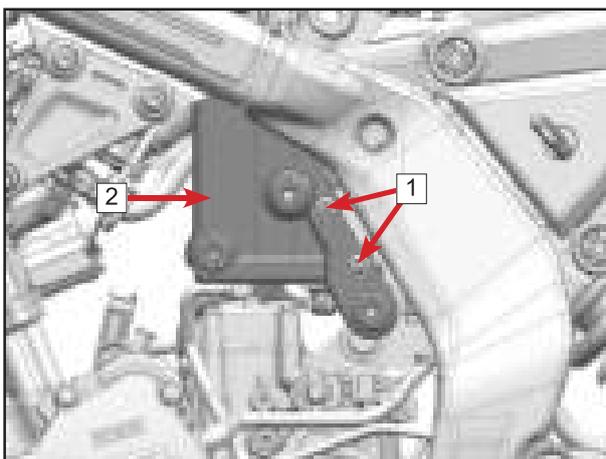
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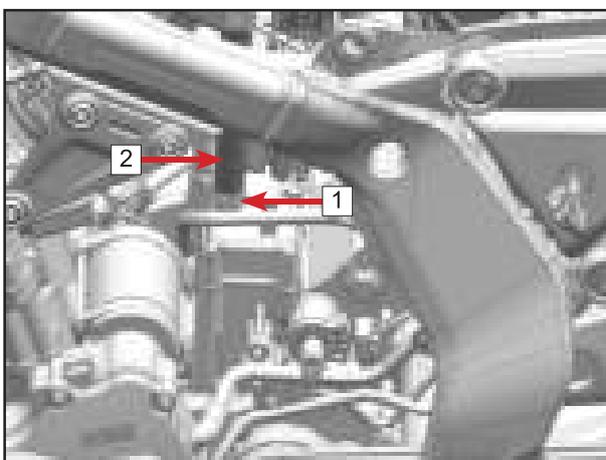
Remove screws **1**.

Remove canister bracket assembly **2**.



Release clamp **1**.

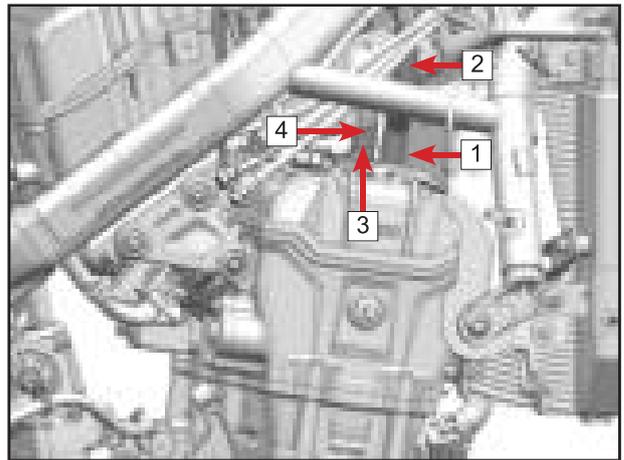
Unplug the crankcase breather **2** from the engine.



{ } is the operating procedures for vehicles equipped with secondary air supply system-SAS.

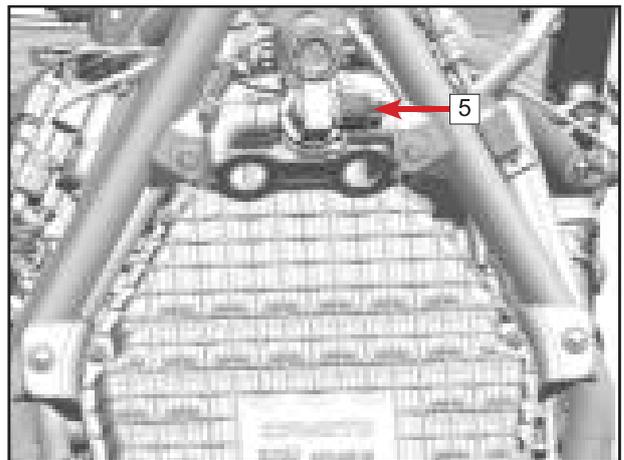
{

- Release clamp [1].
- Unplug SAS outlet pipe [2] from engine.
- Release clamp [3].
- Unplug SAS outlet pipe [4] from engine.

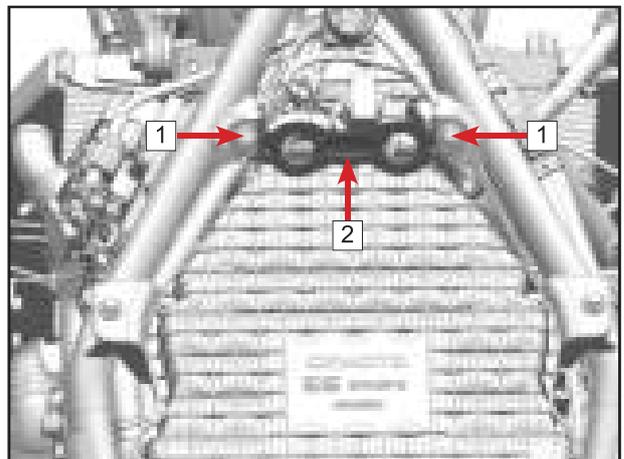


- Disconnect SAS valve connector [5].

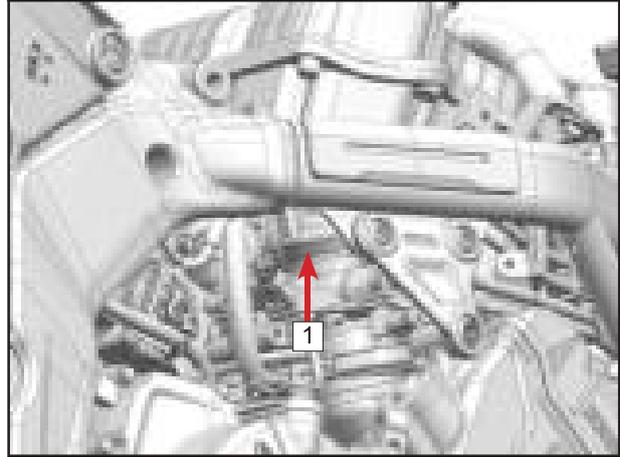
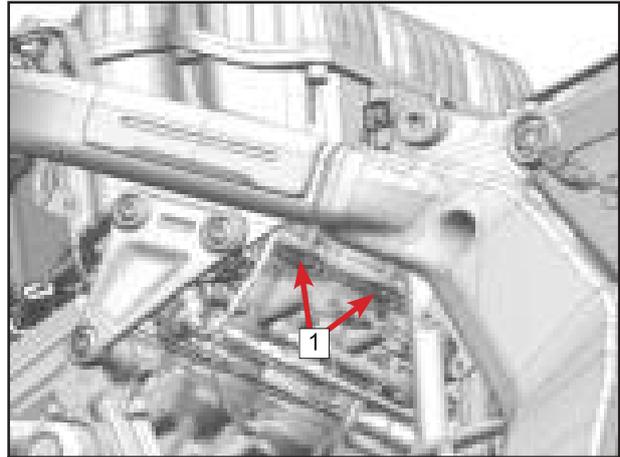
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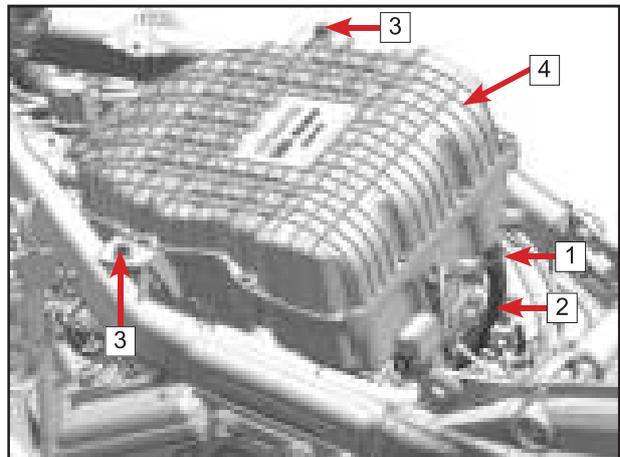
- Remove bolts [1].
- Remove fuel tank bracket [2].



Release clamp 1.



Release clamp 1.  
Unplug the intake compensation pipe assembly 2 from the air filter housing.  
Remove bolts 3.  
Remove air filter housing assembly 4.

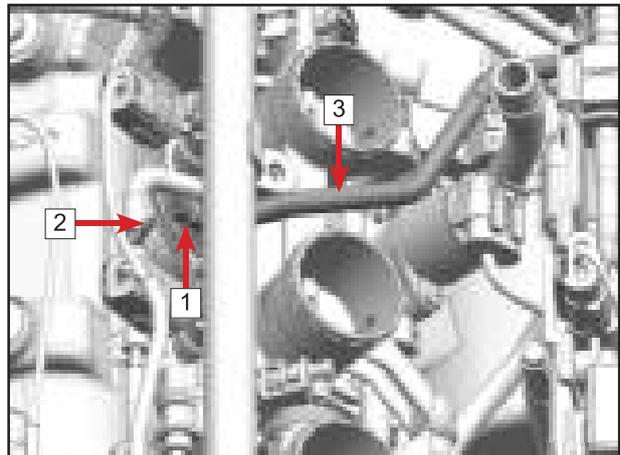


{ } is the operating procedures for vehicles equipped with fuel evaporation system.

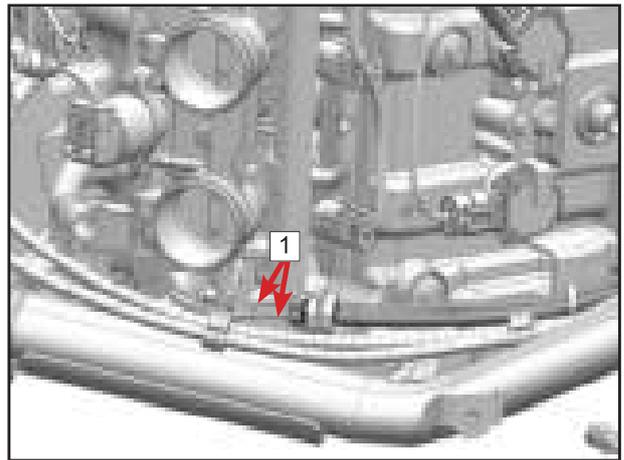
{

Release clamp 1.  
Unplug fuel vapor desorption hose 2 3 from joint 2.

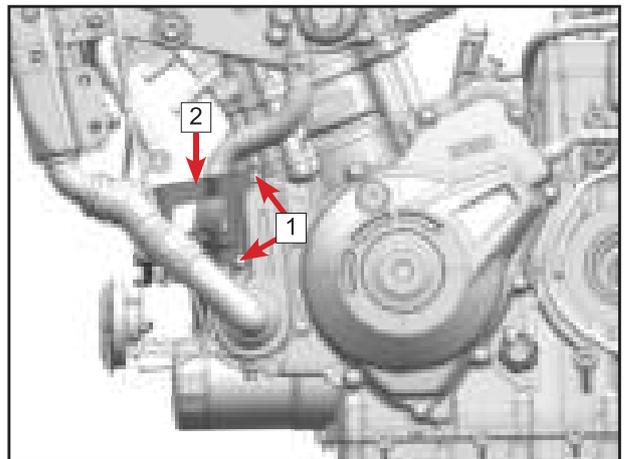
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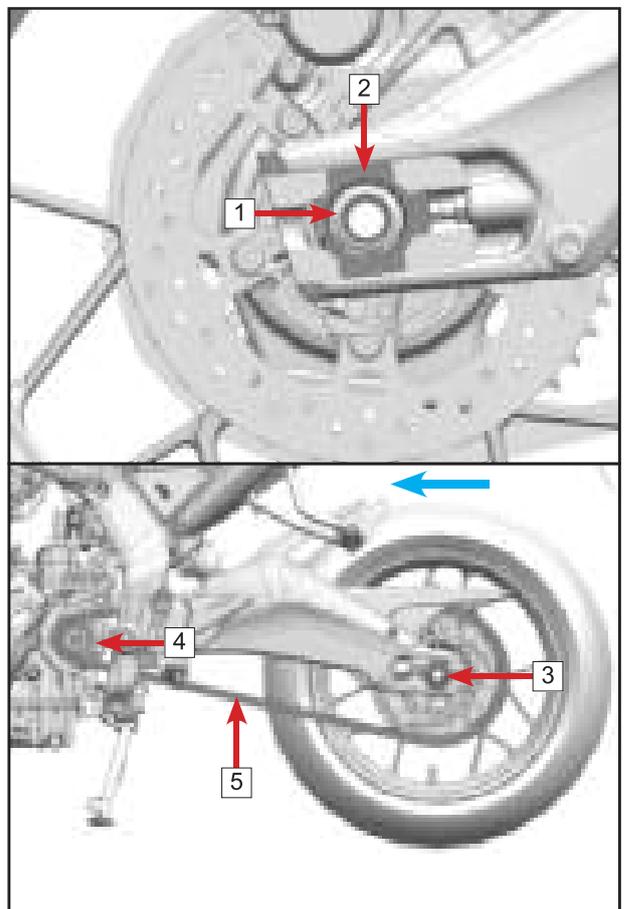
Remove throttle cable **1** from throttle body.



Remove bolt **1**.  
Disengage horn bracket **2** with engine.



Remove rear wheel shaft nut **1**.  
Remove RH chain adjusting block **2** and  
rear wheel shaft assembly **3**.  
Push the rear wheel forward.  
Remove chain **5** from output sprocket **4**.



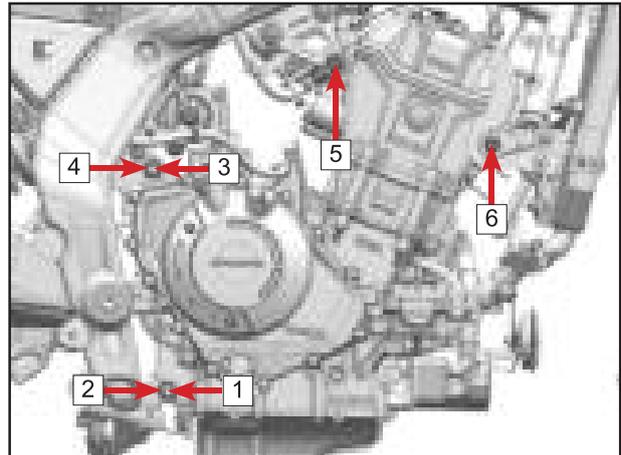
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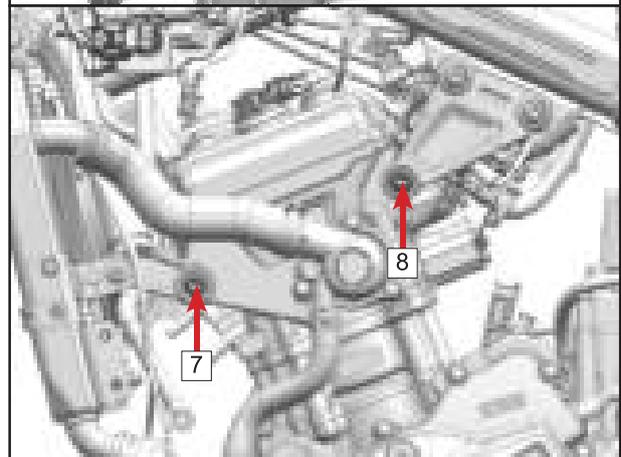
- Disconnect ignition coil connector.
- Disconnect fuel injector connector.
- Disconnect T-MAP connector.
- Disconnect stepper motor connector.
- Disconnect TPS connector.
- Disconnect coolant temperature sensor connector.
- Disconnect gear sensor connector.
- Disconnect oil pressure sensor connector.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

Support engine.

- Remove bolt **1** and nut **2**.
- Remove bolt **3** and nut **4**.
- Remove screw **5**.
- Remove screw **6**.



- Remove screw **7**.
- Remove screw **8**.
- Carefully remove the engine and transfer it to a work bench.



## 5.3 Engine Disassembly

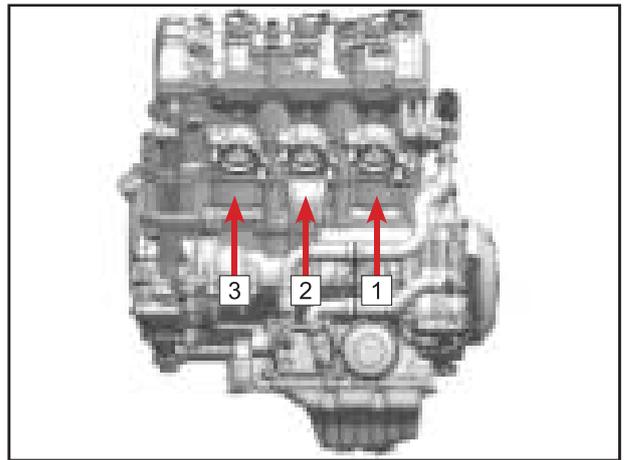
**NOTE:** Fix the engine firmly on the platform to prevent the engine from falling and injuring the operator or damaging the engine.

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

1: Cylinder 1 (Magneto side)

2: Cylinder 2

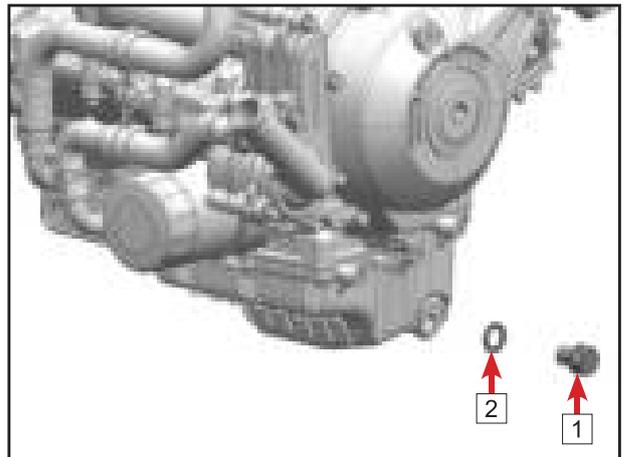
3: Cylinder 3 (Clutch side)



### 5.3.1 Engine Oil Drain

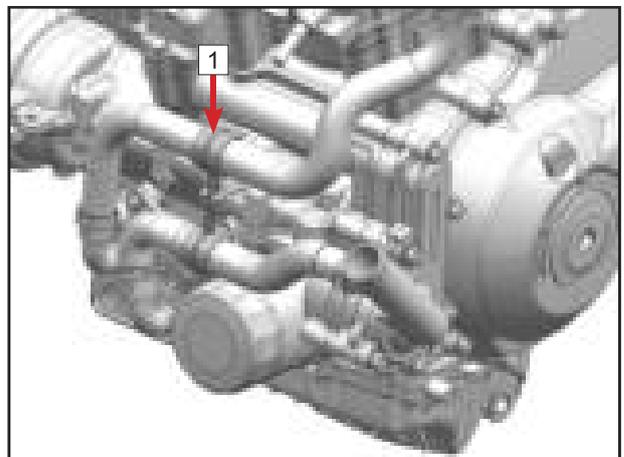
Place a container under the magnetic drain bolt to store the drained oil.

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



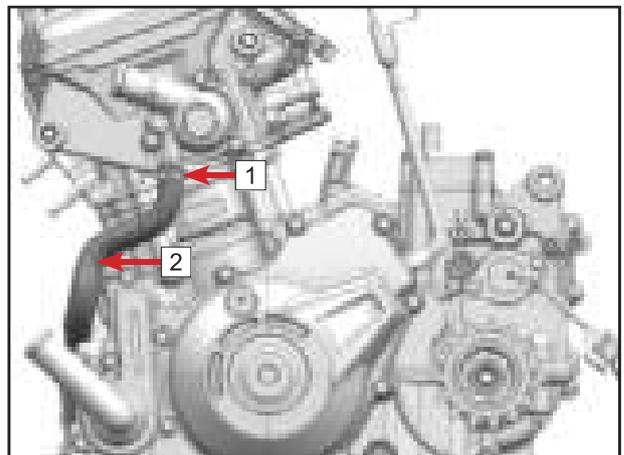
### 5.3.2 Oil Cooler and Water Pipe Assembly Removal

Remove clip 1.

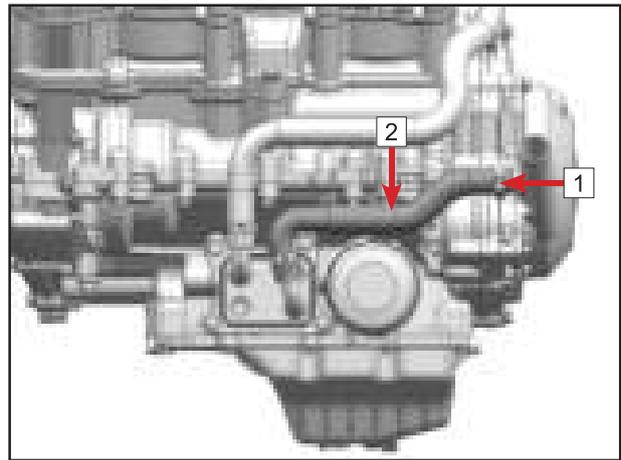


Release clamp 1.

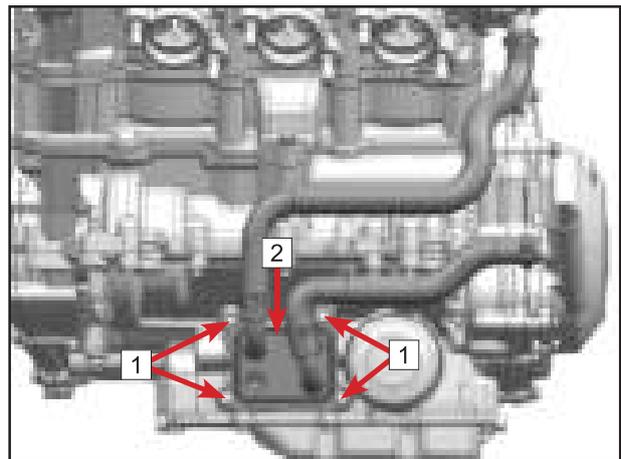
Unplug the oil cooler inlet pipe 2 from the thermostat cover.



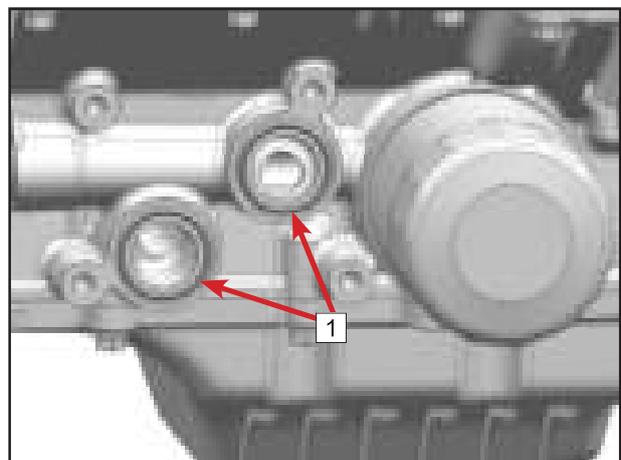
Release clamp **1**.  
Unplug the oil cooler outlet pipe **2** from the pump cover.



Cross diagonally loosen the bolts **1** then remove them.  
Remove oil cooler and water pipe assembly **2**.

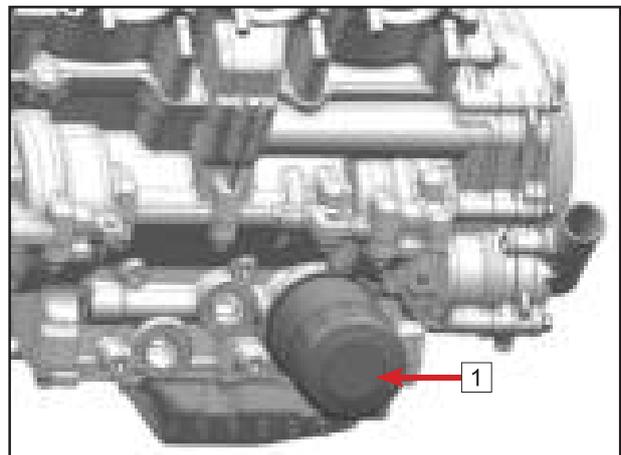


Remove O-ring **1**.  
Check the O-ring **1** for brittleness, hardening, or damage. Replace if necessary.



### 5.3.3 Oil Filter Removal

Remove oil filter **1**.



## 5.3.4 Output Sprocket Assembly Removal

Flat the lock washer [2].

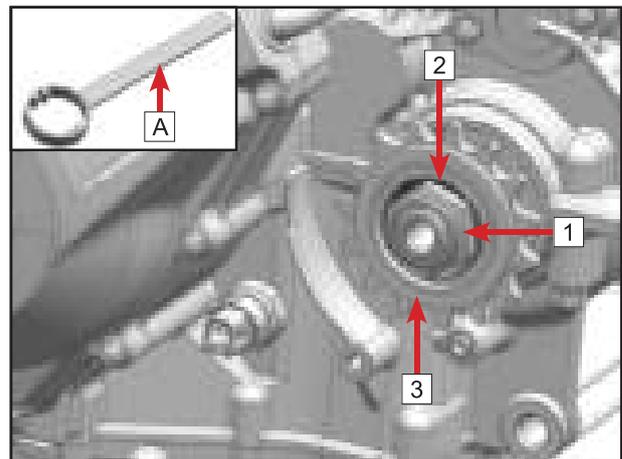
Use the output sprocket stopping tool [A] to fix the output sprocket assembly [3].

Output Sprocket Stopping Tool  
(See section 5.1 for details.)

Remove nut [1].

Remove lock washer [2].

Remove output sprocket assembly [3].

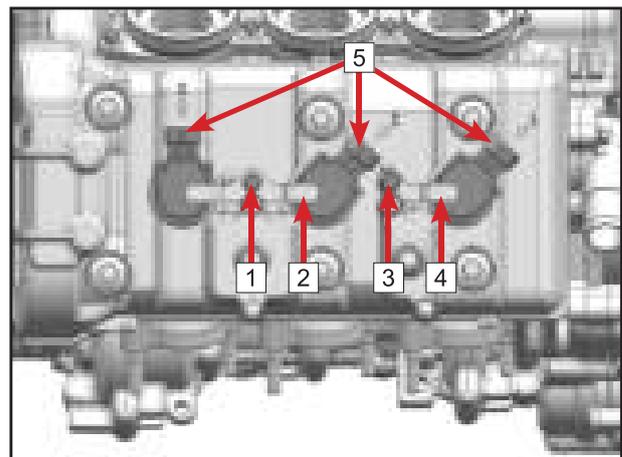


## 5.3.5 Ignition Coil and Spark Plug Removal

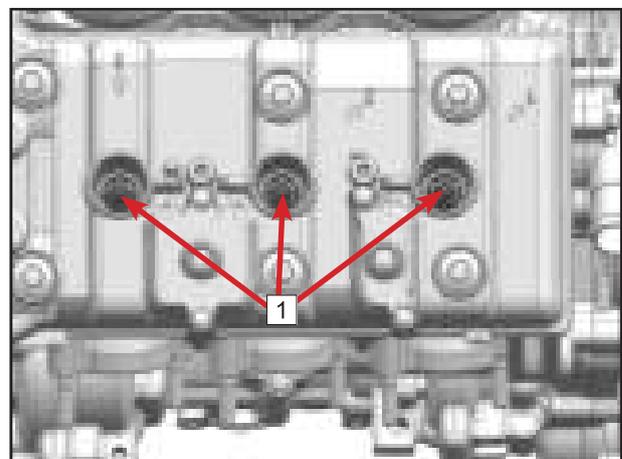
Remove bolt [1] and press plate [2].

Remove bolt [3] and press plate [4].

Remove ignition coils [5].



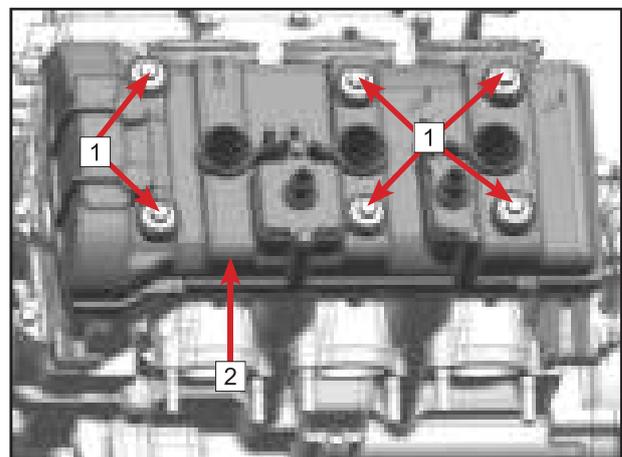
Remove spark plug [1].



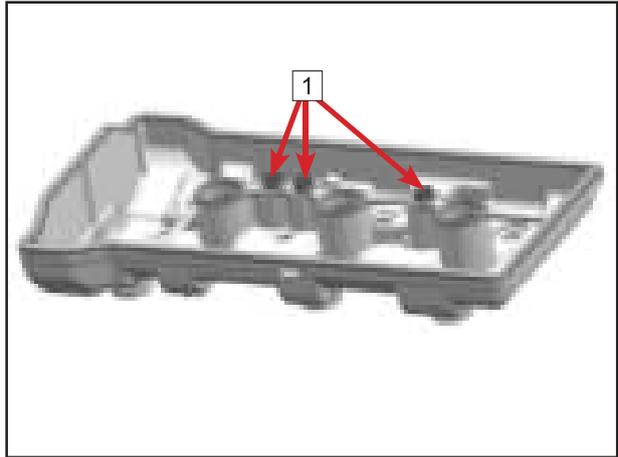
## 5.3.6 Cylinder Head Cover Removal

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

Remove cylinder head cover [2] and seal ring.

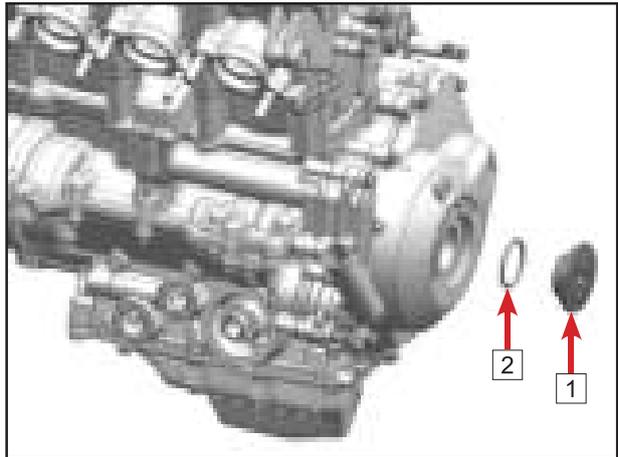


The air-supply pins **1** are retained on the cylinder head cover.

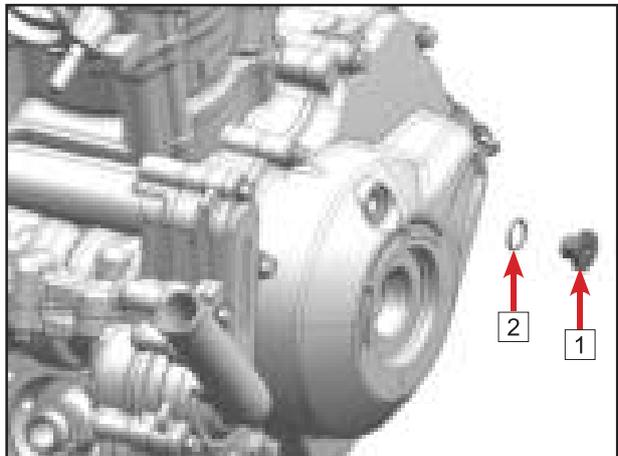


### 5.3.7 Camshaft and Cylinder Head Removal

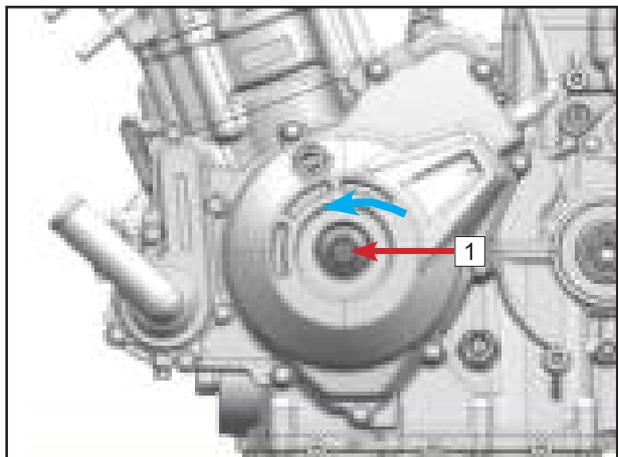
Remove crankshaft end cover **1** and O-ring **2**.



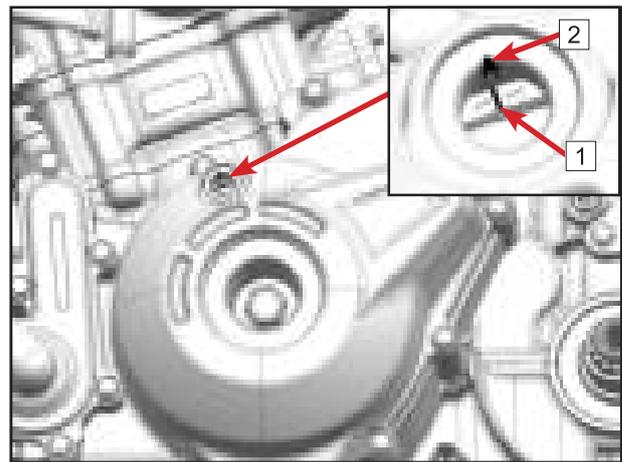
Remove timing observation hole cover **1** and O-ring **2**.



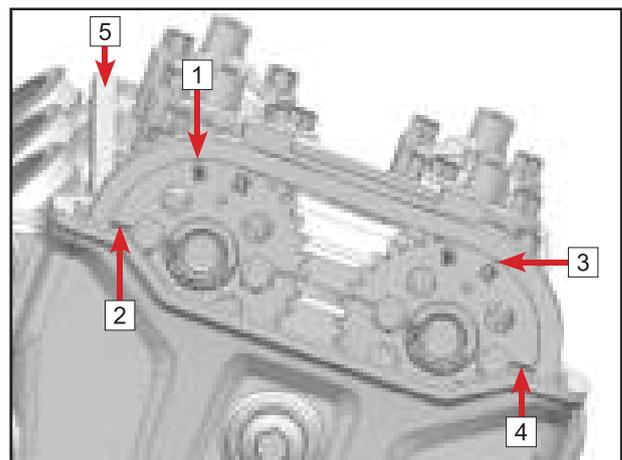
Turn the bolt **1** counterclockwise to place the crankshaft at the TDC of cylinder 1.



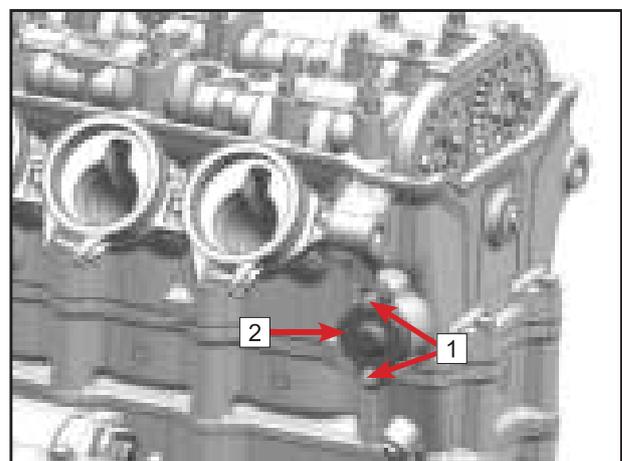
At the TDC of cylinder 1:  
The "T1" mark **1** on the magneto rotor is aligned with the center of the slot **2**.



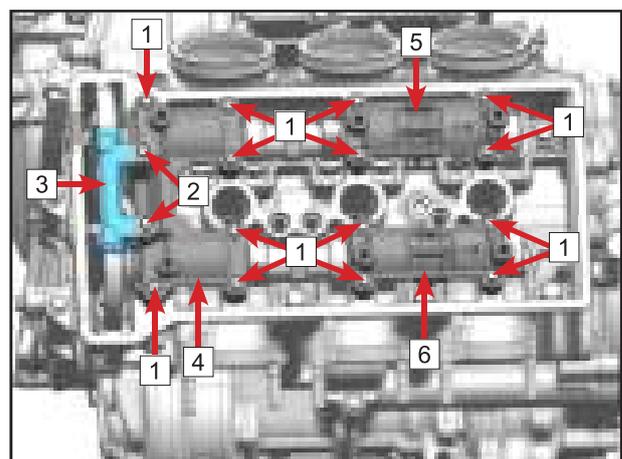
The "IN" dot mark **1** on the timing sprocket on the intake side faces upward, and the line mark **2** is flush with the sealing surface **5** of the cylinder head.  
The "EX" dot mark **3** on the timing sprocket on the exhaust side faces upward, and the line mark **4** is flush with the sealing surface **5** of the cylinder head.



Remove bolts **1**.  
Remove tensioner **2**.

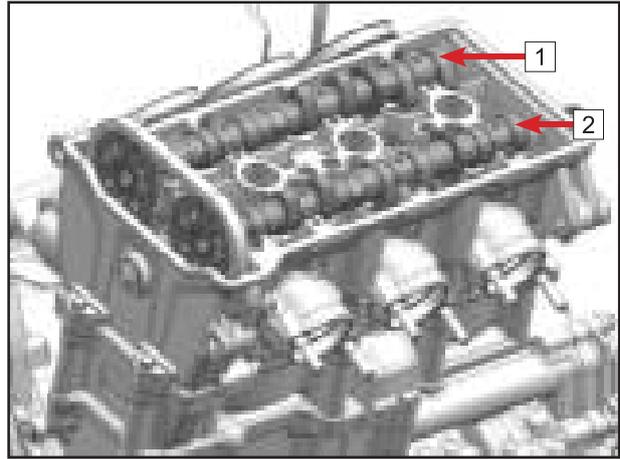


Cross diagonally loosen the bolts **1** and **2** then remove them.  
Remove chain guide block **3**.  
Remove cam bearing cover **4**.  
Remove intake cam bearing cover (IN) **5**.  
Remove exhaust cam bearing cover (EX) **6**.

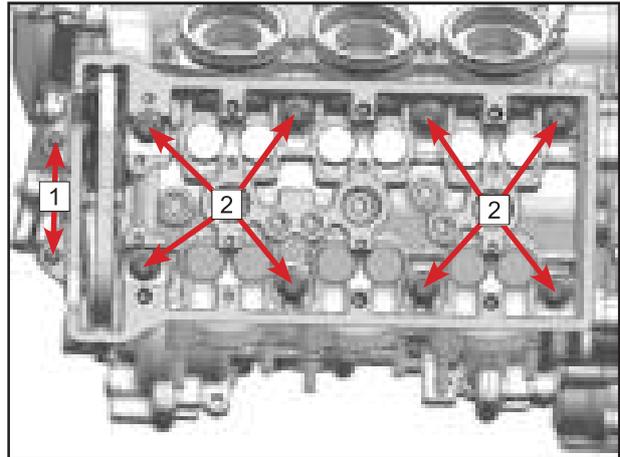


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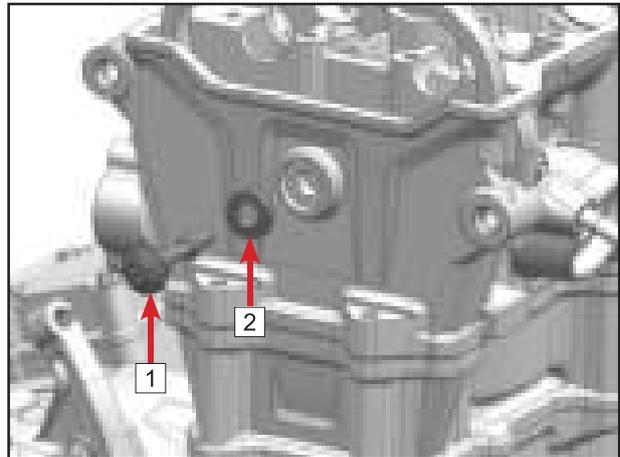
Remove intake camshaft assembly **1**.  
Remove exhaust camshaft assembly **2**.



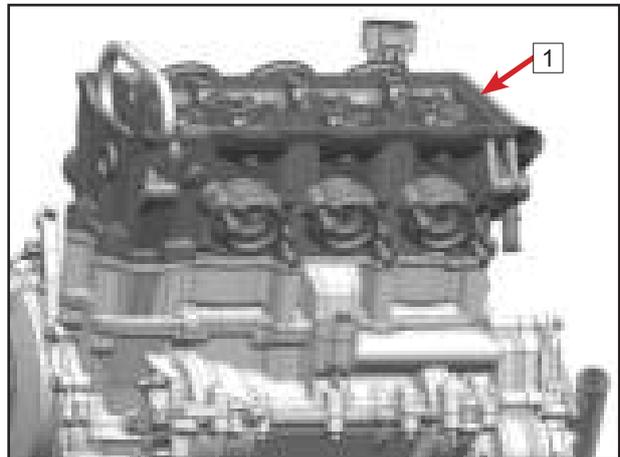
Remove bolts **1**.  
Cross diagonally loosen the bolts **2** and washers then remove them.



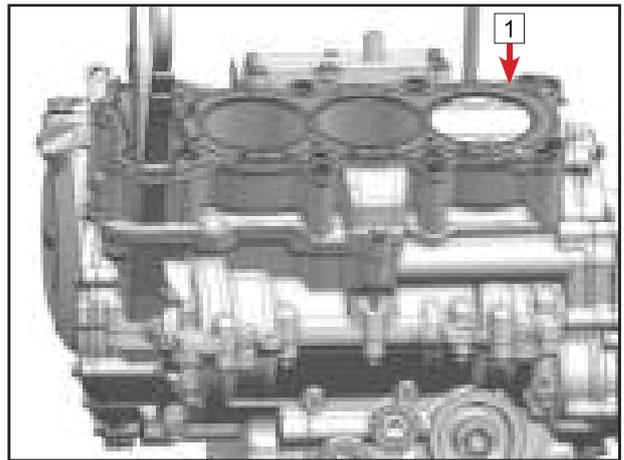
Hook the timing chain to prevent it from falling into the case.  
Remove shock absorbing bolt **1** and its seal ring **2**.



Remove cylinder head assembly **1**.



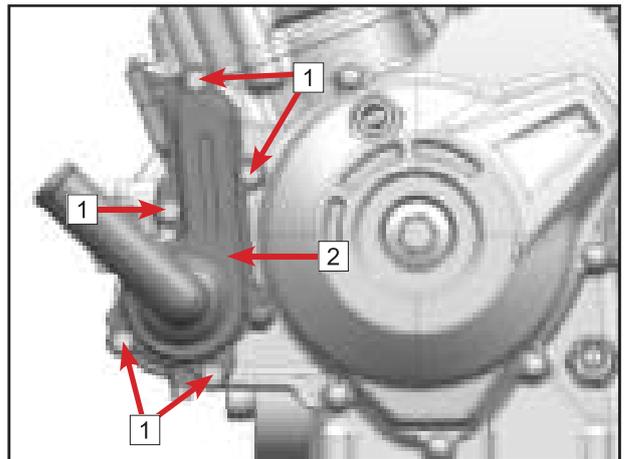
Remove cylinder head gasket **2** and discard.



### 5.3.8 Water Pump Assembly and LH Side Cover Removal

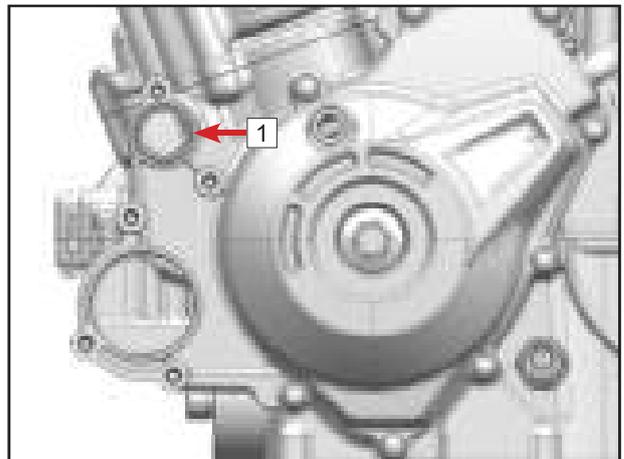
Cross diagonally loosen the bolts **1** then remove them.

Remove water pump assembly **2**.



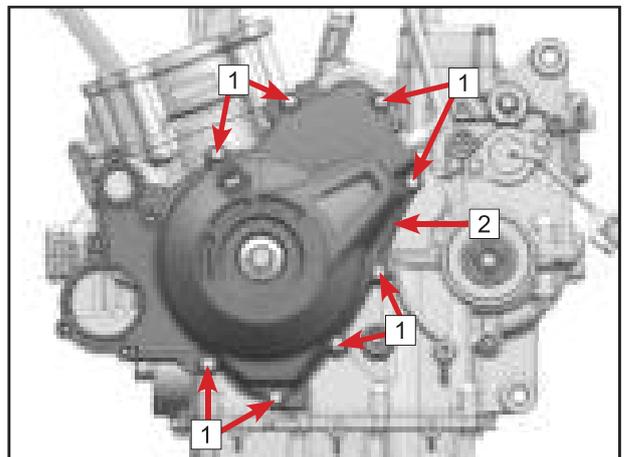
Remove O-ring **1**.

Check the O-ring **1** for brittleness, hardening, or damage. Replace if necessary.



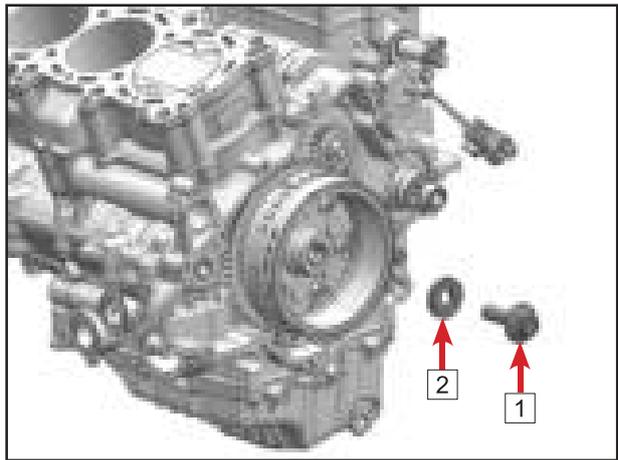
Cross diagonally loosen the bolts **1** then remove them.

Remove LH side cover **2**.



## 5.3.9 Magneto Rotor and Starter Gear Removal

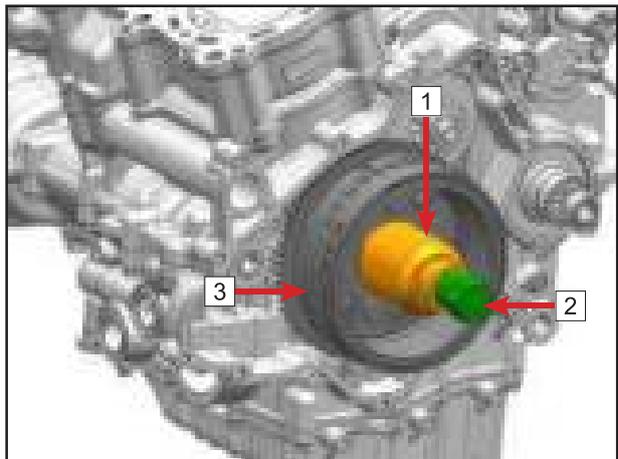
Remove bolt [1] and washer [2].



Install magneto rotor removal tool [1].

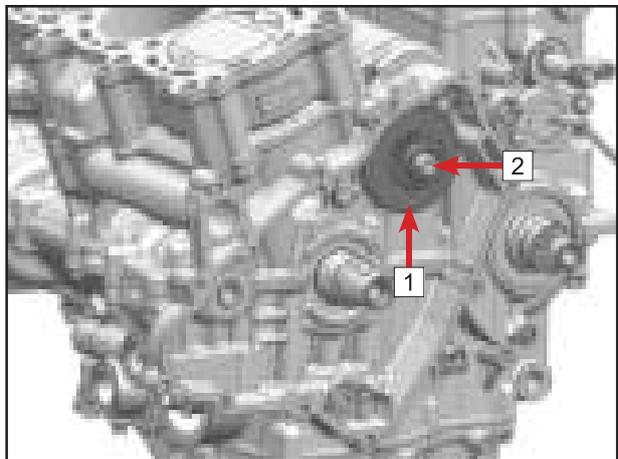
Magneto Rotor Removal Tool  
(See section 5.1 for details.)

Screw in the bolt [2] of the removal tool to remove the magneto rotor assembly [3].



Remove dual gear [1].

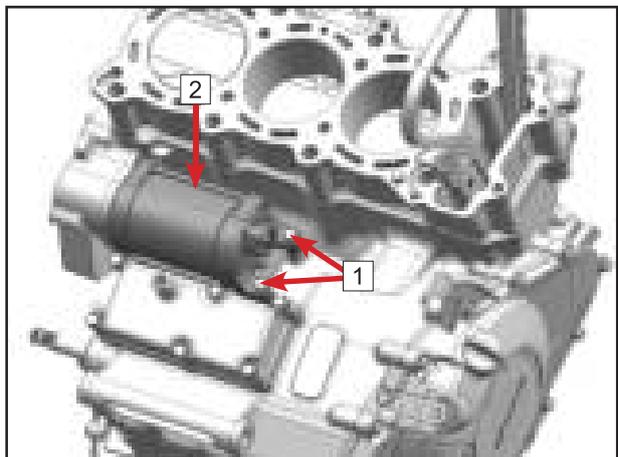
Remove gear shaft [2].



## 5.3.10 Stator Motor Assembly Removal

Remove bolts [1].

Remove stator motor assembly [2].

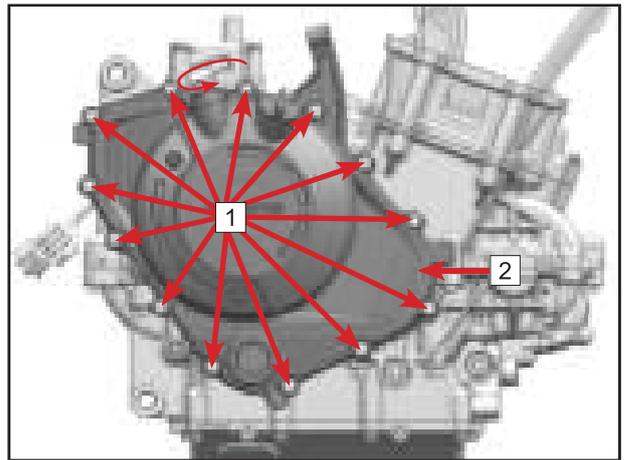


## 5.3.11 RH Side Cover Removal

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

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

Remove RH side cover **2**.



## 5.3.12 Timing Chain and Chain Plate Removal

Remove chain guide plate **1**.

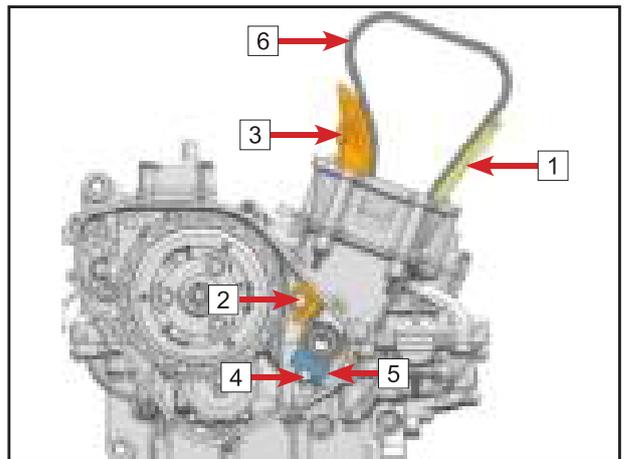
Remove threaded pin shaft **2**.

Remove tension plate **3**.

Remove bolt **4**.

Remove chain guard **5**.

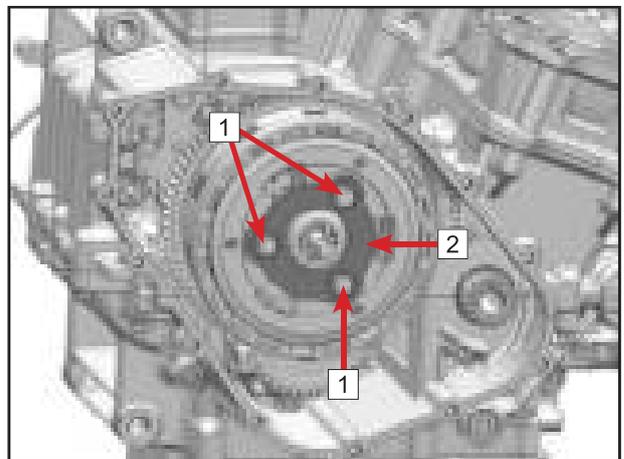
Remove timing chain **6**.



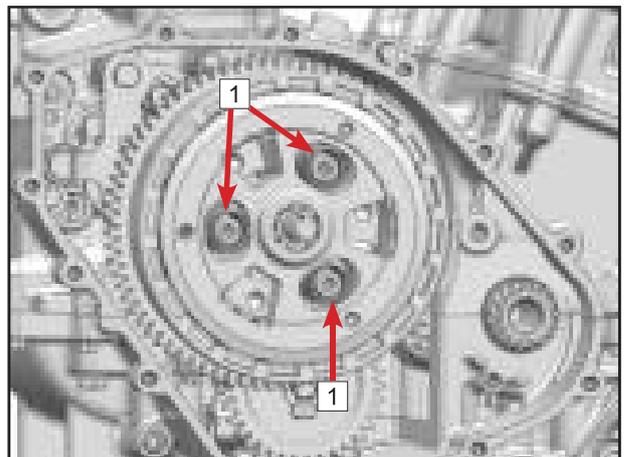
## 5.3.13 Clutch Removal

Remove bolts **1**.

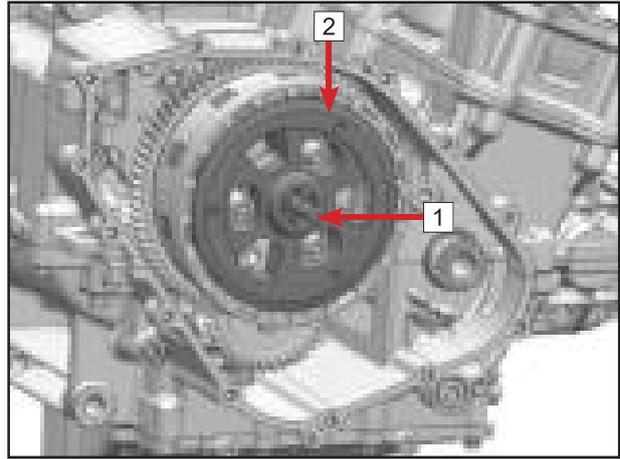
Remove clutch spring press plate **2**.



Remove clutch spring **1**.

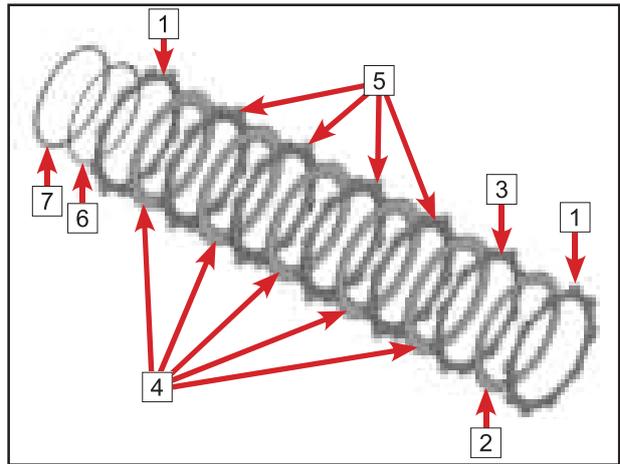


Pull onto the pull rod **1** and pull out the disc assembly **2**.



Remove friction disc/driven disc assembly. Check the sequence of friction disc/driven disc assembly, as follows:

Friction disc assembly 2 **1**--Driven disc 1 **2**--Friction disc assembly 3 **3**--Driven disc 2 **4**--Friction disc assembly 1 **5**--Driven disc 2 **4**--Friction disc assembly 2 **1**--Disc spring **6**--Disc spring seat **7**

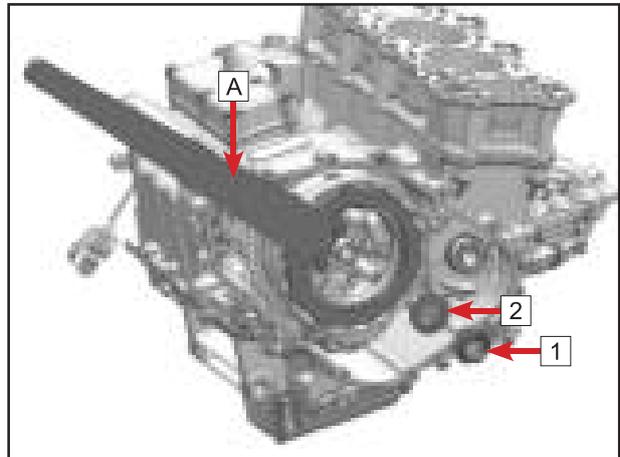


Use the clutch stopping tool **A** to fix the center sleeve.

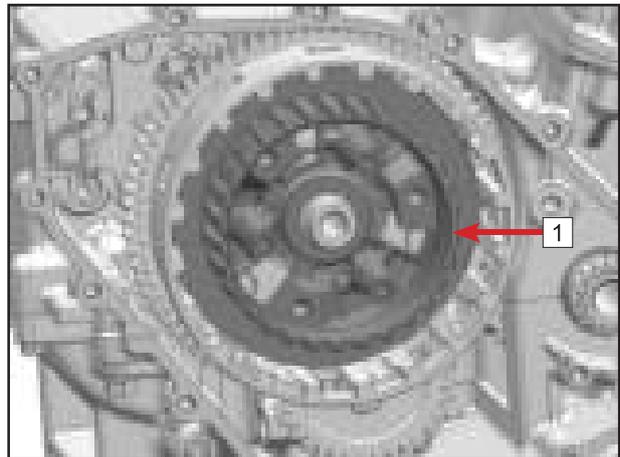
Clutch Stopping Tool  
(See section 5.1 for details.)

Remove nut **1**.

Remove elastic washer **2**.

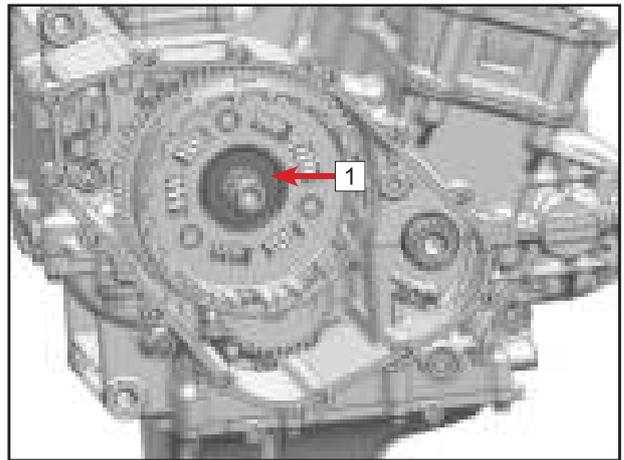


Remove center sleeve **1**.

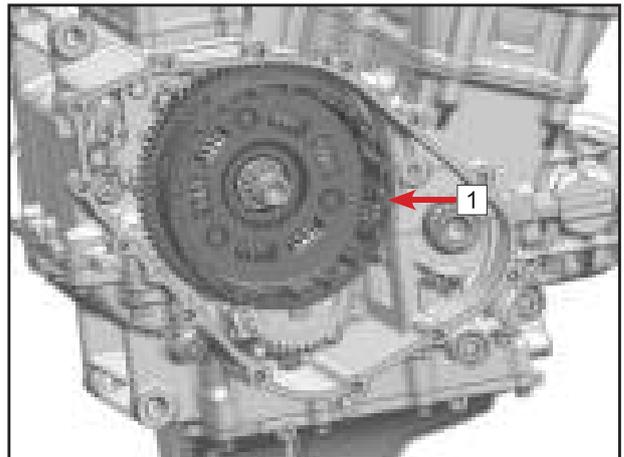


Remove washer [1].

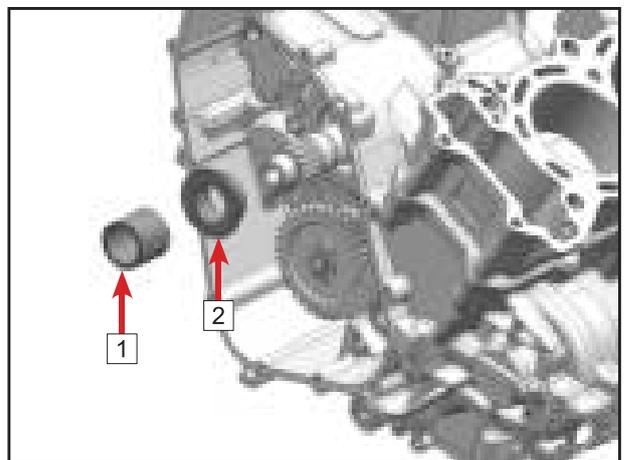
**NOTE:** The washer [1] may adhere to the center sleeve and should not be lost during removal.



Remove primary driven gear assembly [1].



Remove clutch shaft sleeve [1].  
Remove washer [2].

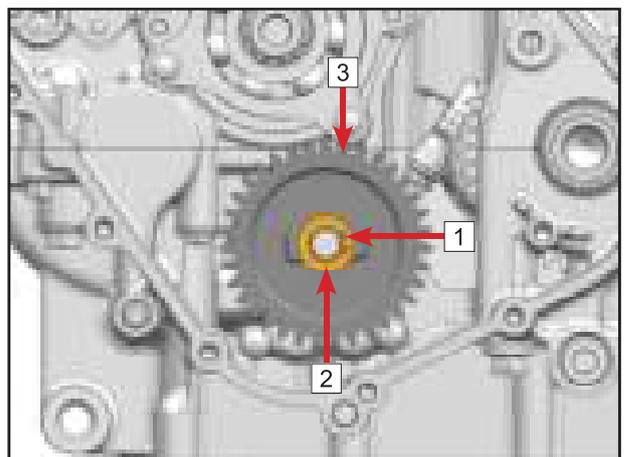


### 5.3.14 Oil Pump Removal

Remove circlip [1].

Remove washer [2].

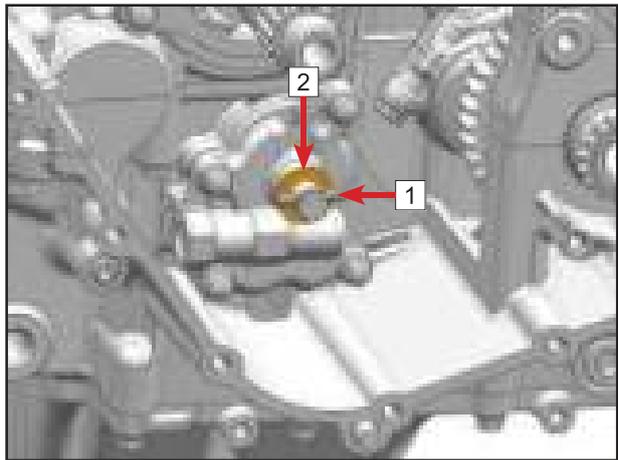
Remove oil pump gear [3].



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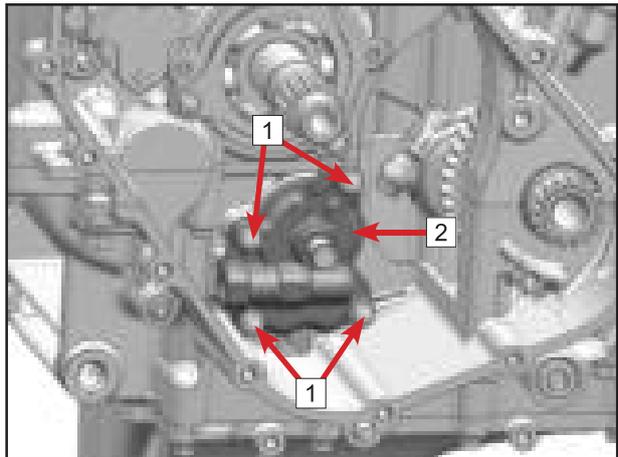
Remove needle roller **1**.

Remove washer **2**.

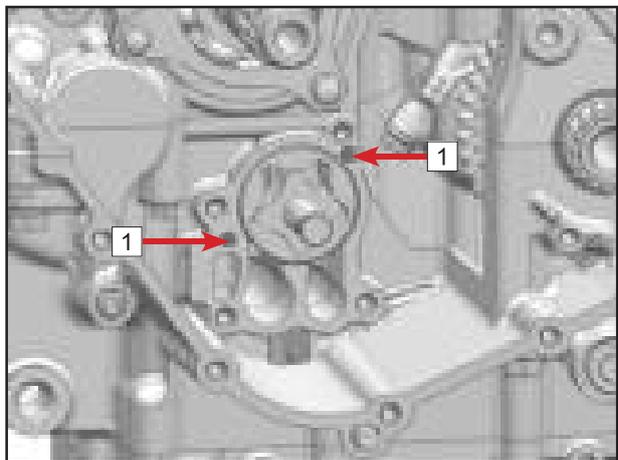


Remove bolts **1**.

Remove oil pump cover assembly **2**.

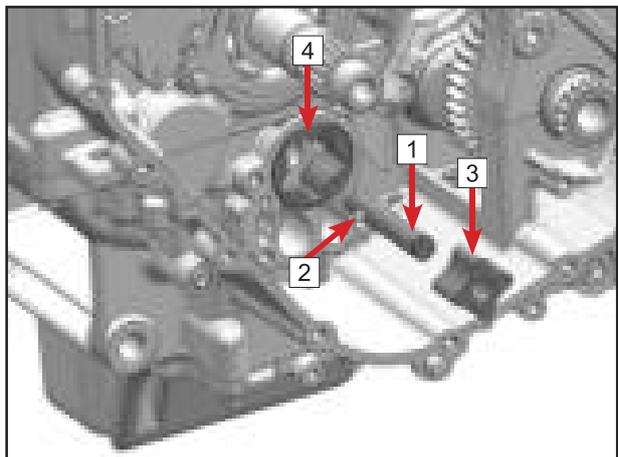


Remove needle roller **1**. (if easily done)



Remove oil pump shaft **1**, needle roller **2**  
and oil pump inner rotor **3**.

Remove oil pump outer rotor **4**.

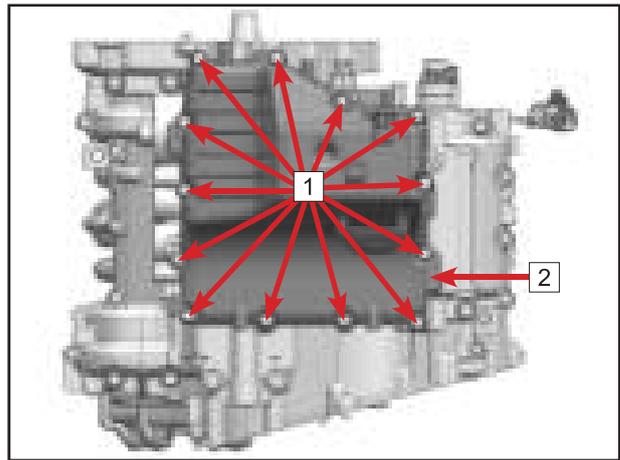


## 5.3.15 Oil Pan Removal

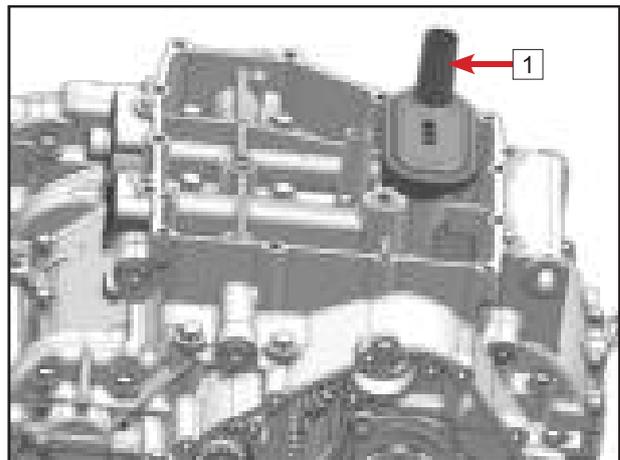
Flip crankcase.

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

Remove oil pan **2**.



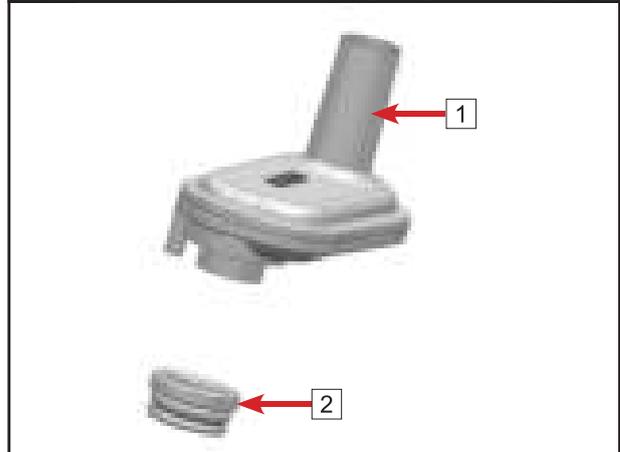
Remove suction filter assembly **1** and oil suction pan seal ring **2**.



Inspect the suction filter assembly for breakage or other damage. If so, replace with new parts.

Clean the suction filter assembly.

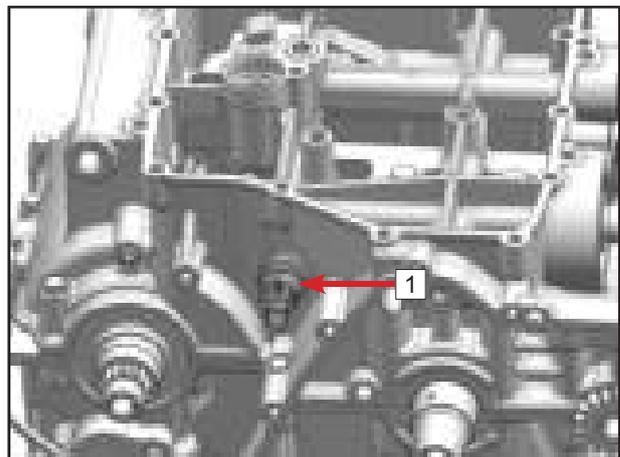
Check for brittle, hardened, or damaged suction pan seals. If so, replace with new parts.



## 5.3.16 Oil Pressure Switch Removal

Remove oil pressure switch **1**.

Oil pressure switch maintenance see electrical chapter.



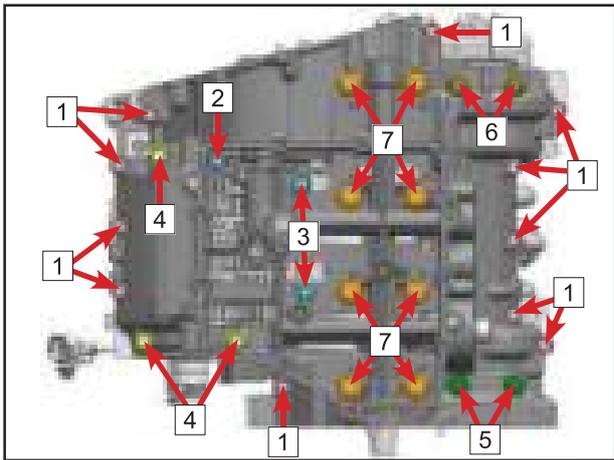
## 5.3.17 Lower Crankcase Removal

Cross diagonally loosen the bolts M6×25 **1** then remove them.

Remove bolt M6×42 **2** and M6×85 **3**.

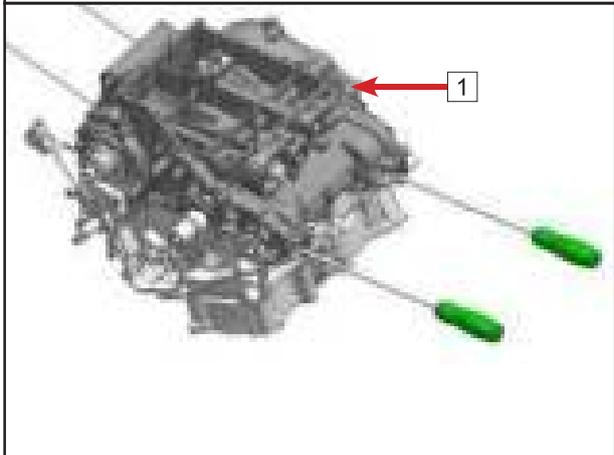
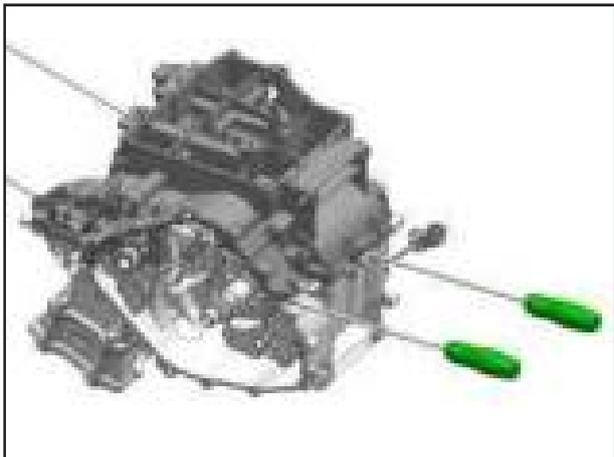
Cross diagonally loosen the bolts M8×45 **4**, bolt assembly M8×65 **5** and bolt assembly M8×55 **6** then remove them.

Cross diagonally loosen the bolts assembly M9×96 **7** then remove them.

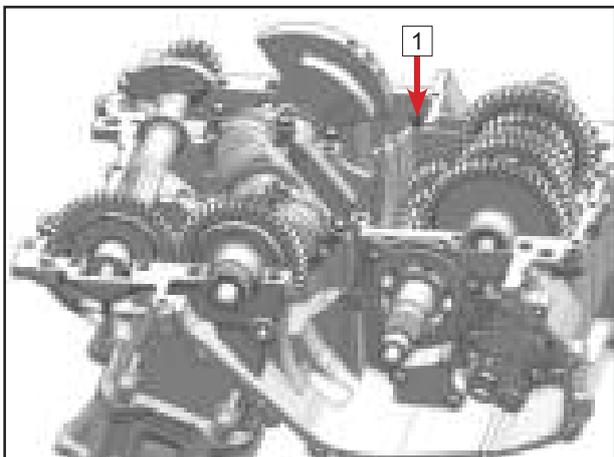


Use a flat-head screwdriver to separate the lower crankcase **1** from the upper crankcase.

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



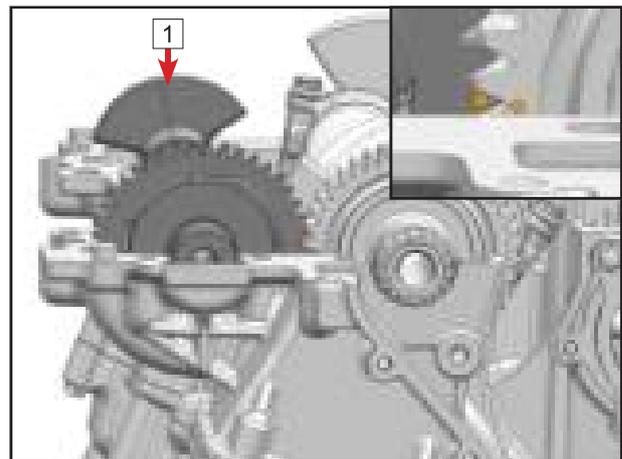
Remove orifice plug **1**.



## 5.3.18 Balance Shaft Assembly and Crankshaft Assembly Removal

Remove balance shaft assembly **1**.

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

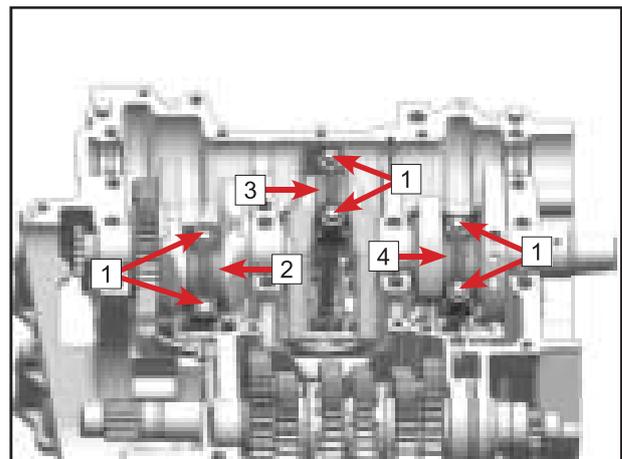


**NOTE:** Before removing the connecting rod cover, measure the axial clearance of the big end of the connecting rod. Refer to Section 5.4.16.

Remove connecting rod bolts **1**.  
Remove connecting rod cover **2**, **3** and **4**.

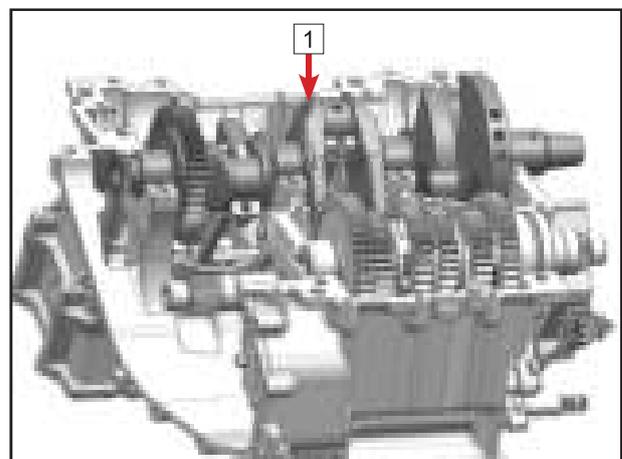
**NOTE:** Make sure the connecting rod plain bearing remains in place.

**NOTE:** Connecting rod cover and connecting rod body are marked in pairs and must never be mixed up.



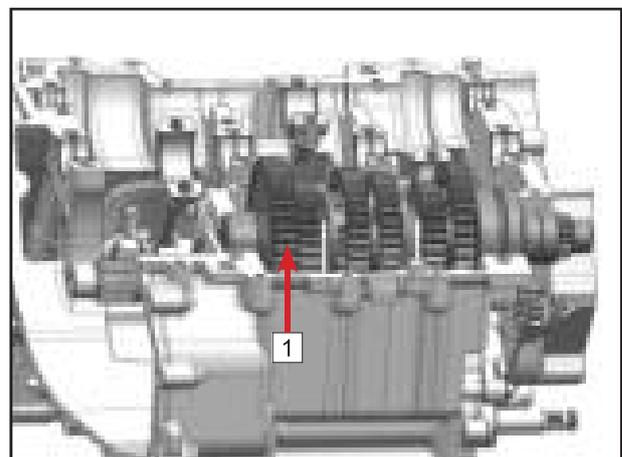
Remove crankshaft assembly **1**.

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



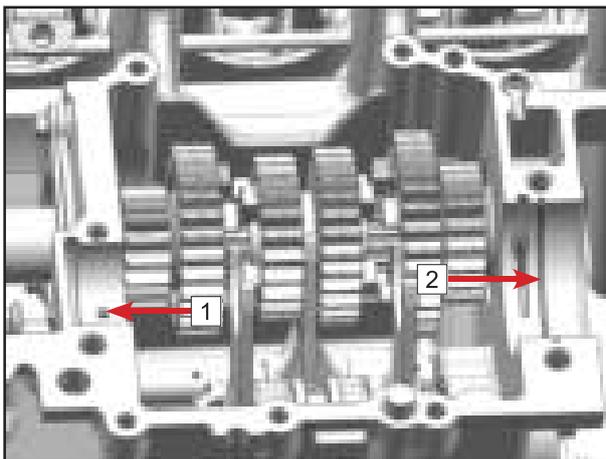
## 5.3.19 Shift Assembly Removal

Remove countershaft assembly **1**.

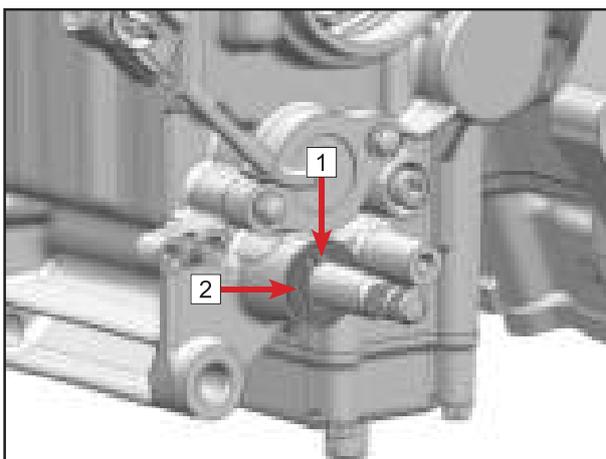


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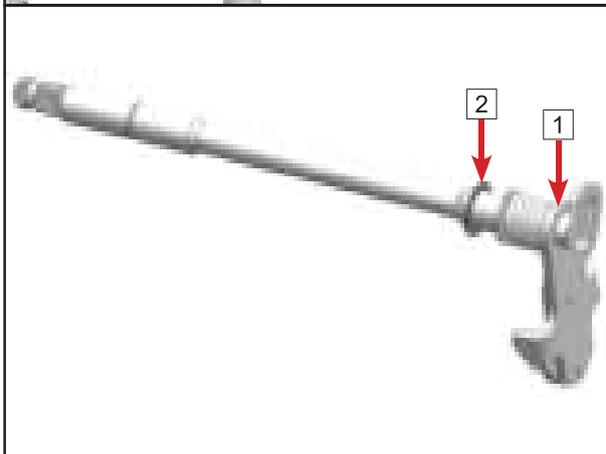
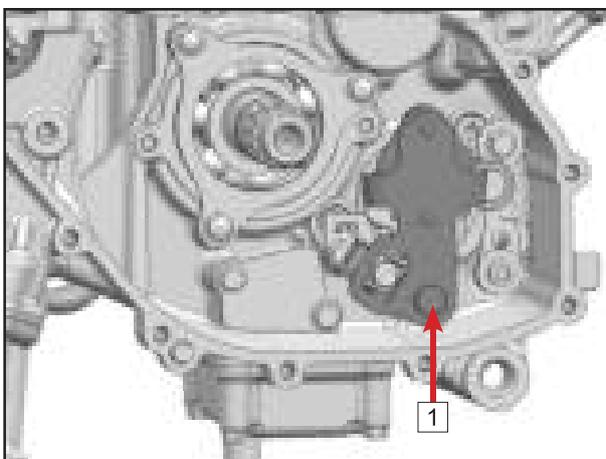
Remove P4×7.8 needle roller **1**.  
Remove 62-28 bearing stop ring **2**.



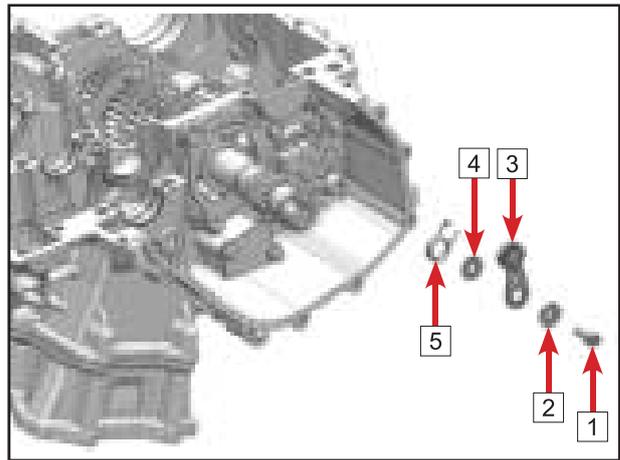
Remove the circlip **1** and discard.  
Remove washer **2**.



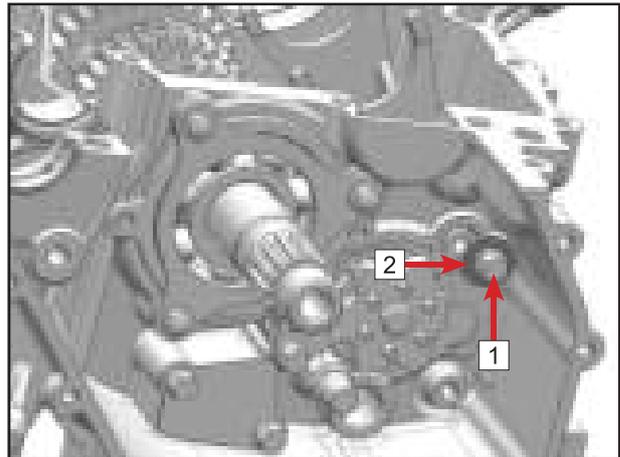
Remove shift rod assembly **1** and washer **2**.



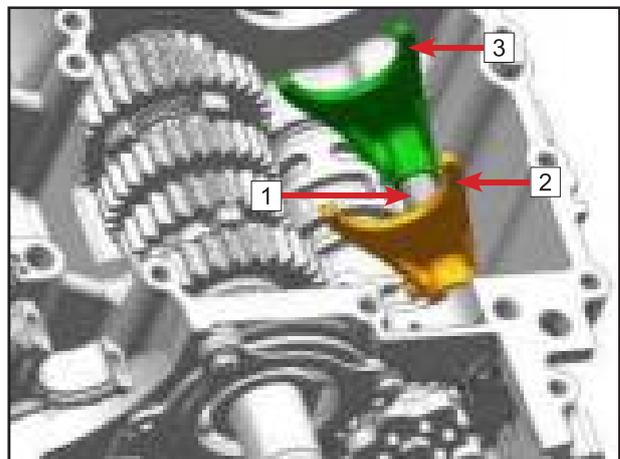
Remove screw [1], shift positioning swing arm shaft sleeve [2], shift positioning swing arm parts [3], washer [4] and shift positioning swing arm spring [5].



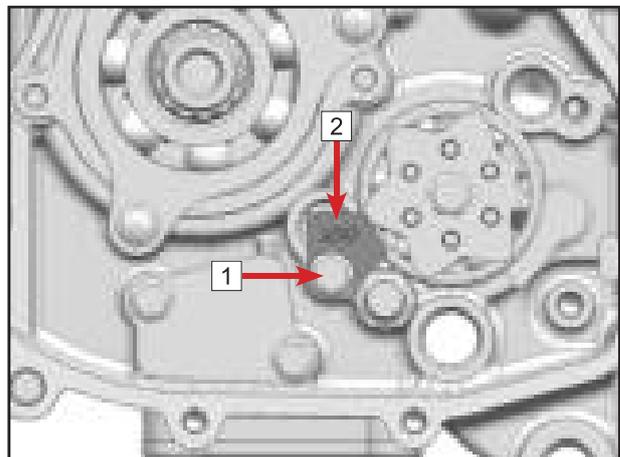
Remove bolt [1].  
Remove washer [2].



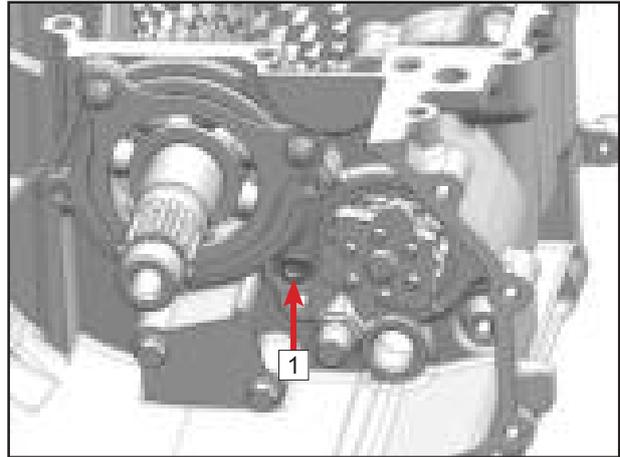
Remove fork shaft 2 [1].  
Remove shift fork (RH) [2] and shift fork (LH) [3].



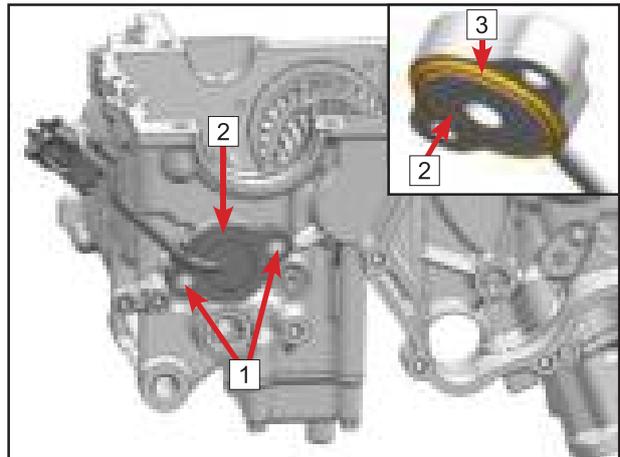
Remove bolt [1] and fork shaft retaining plate [2].



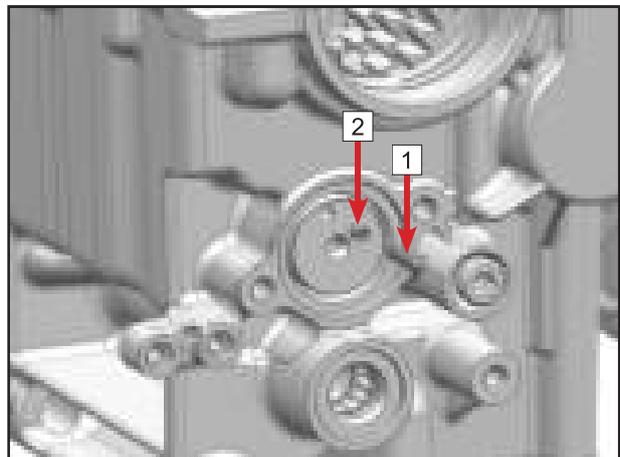
Remove fork shaft assembly **1**.



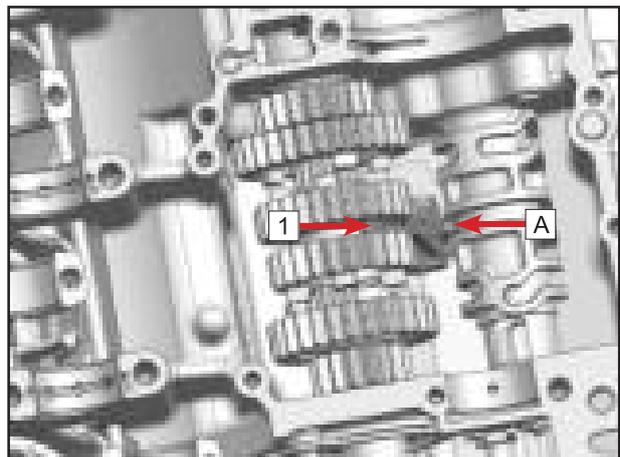
Remove bolts **1**.  
Remove gear sensor **2** and O-ring **3**.  
Gear sensor inspection see electrical chapter.



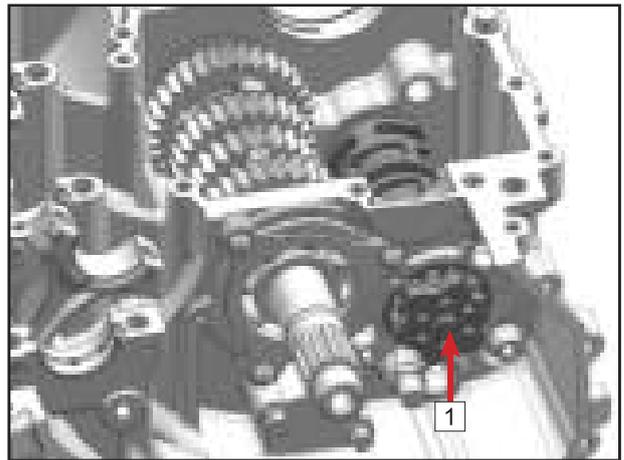
Remove the ball contact **1** and contact spring **2** from the shift hub.



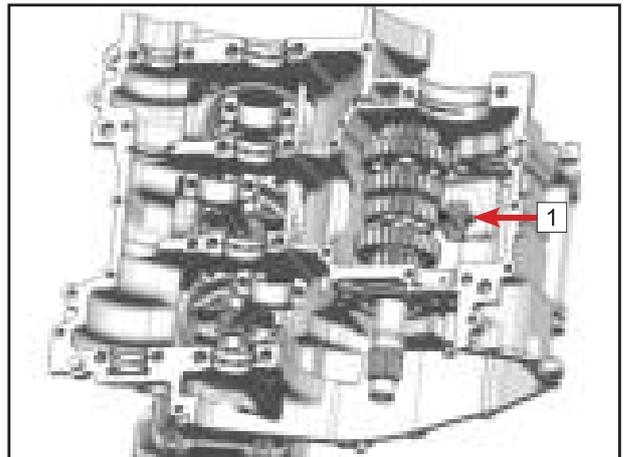
Rotate the shift fork (middle) **1** so that the shift fork pin **A** is detached from the shift hub groove.



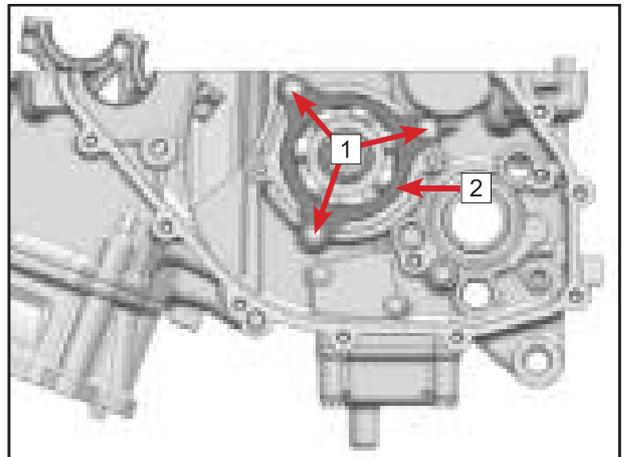
Remove shift hub assembly **1**.



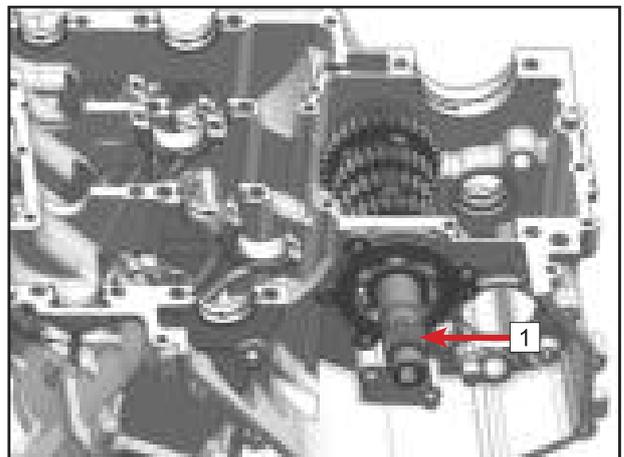
Remove shift fork (middle) **1**.



Remove bolts **1**.  
Remove bearing seat plate **2**.



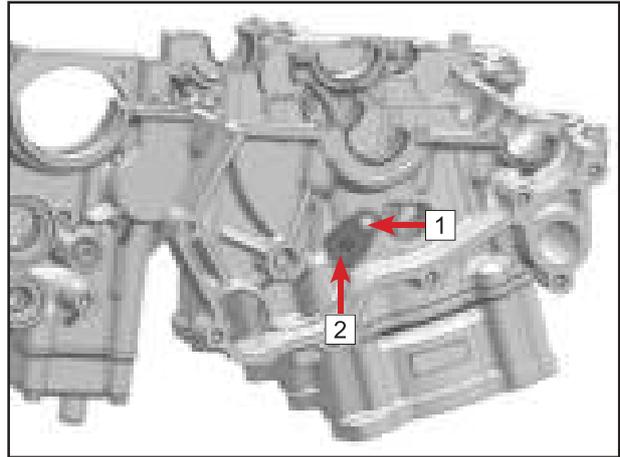
Remove main shaft assembly **1**.



## 5.3.20 Piston and Connecting Rod Removal

Remove bolt **1**.

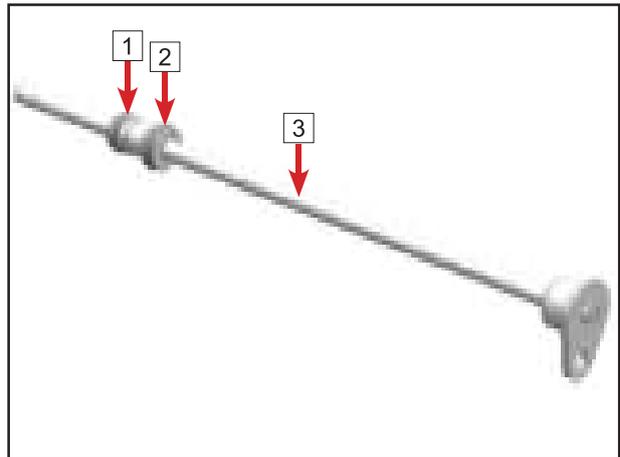
Remove oil injection pipe assembly **2**.



Check the O-ring **1** and **2** for brittleness, hardening, or damage. If found, replace with new ones.

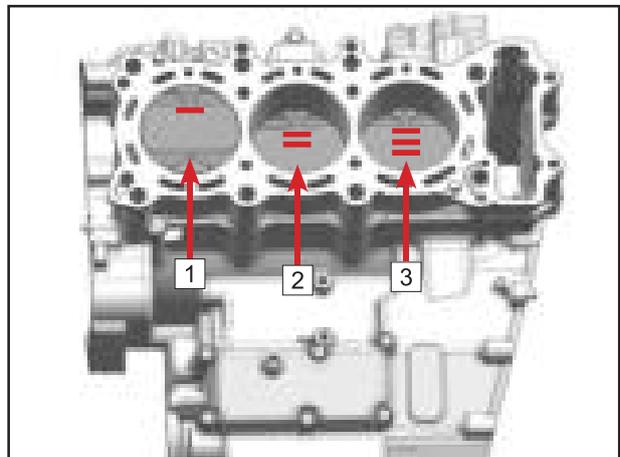
Check oil injection pipe assembly **3** for damage. Replace if necessary.

Check whether the injection pipe passage is blocked. Clean the passage with compressed air to ensure smoothness.



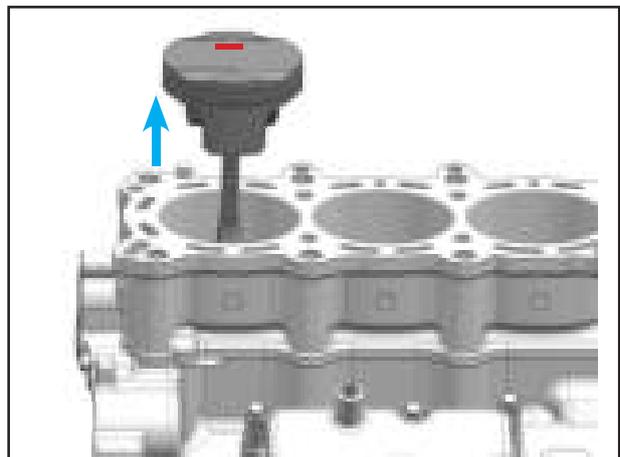
Keep the cylinder facing up.

Mark the piston **1**, **2** and **3** according to the cylinder position.



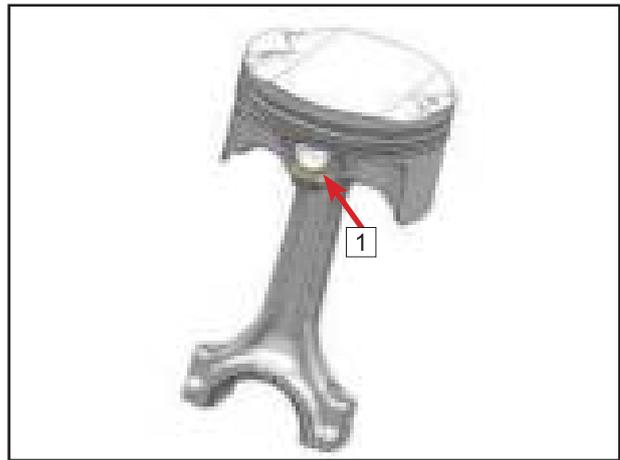
Remove piston with connecting rod upward out of the cylinder.

**NOTE: Make sure the connecting rod does not damage the cylinder.**

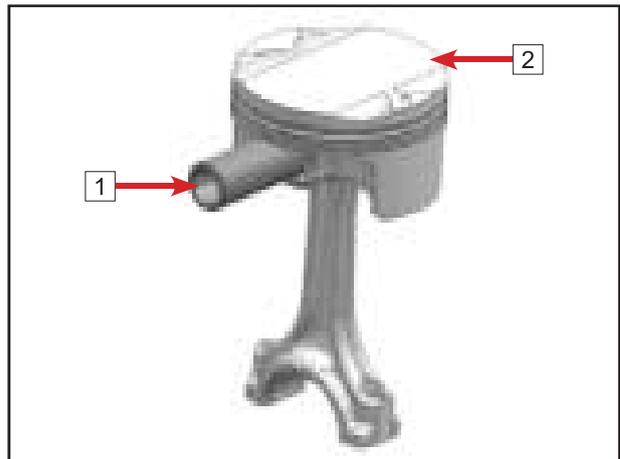


Remove one piston pin retainer **1** and discard it.

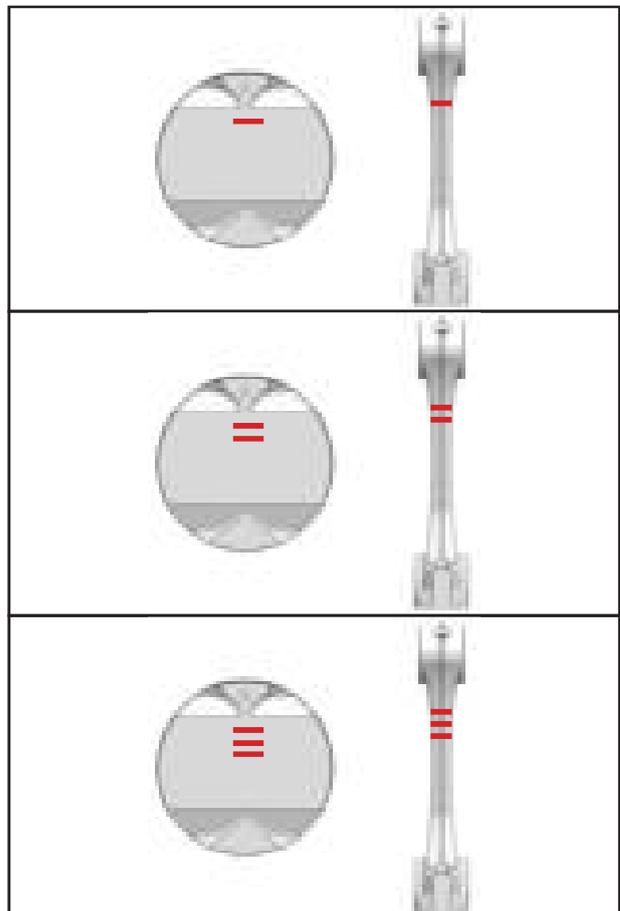
**NOTE: It is not necessary to remove both piston pin retainers when removing the piston pin.**



Push the piston pin **1** out of the piston. Separate the piston **2** from the connecting rod.



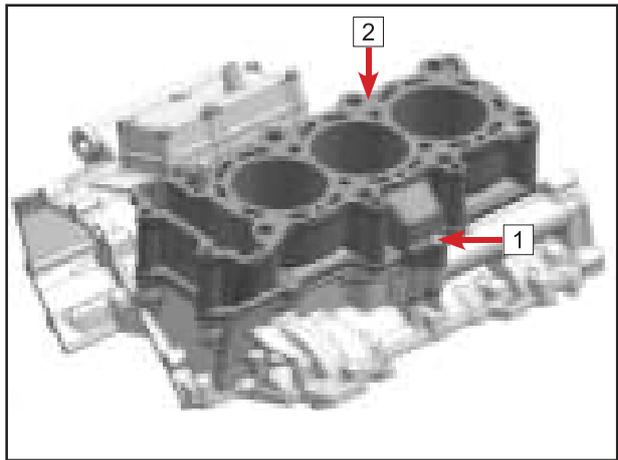
Mark the piston and connecting rod sets accordingly.



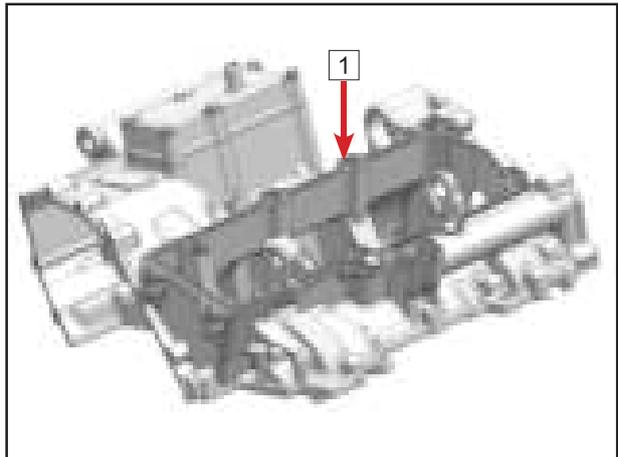
## 5.3.21 Cylinder Removal

Remove bolt **1**.

Remove cylinder **2**.



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

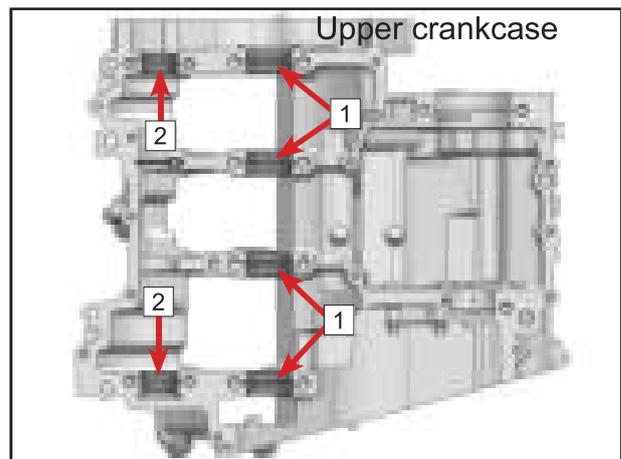
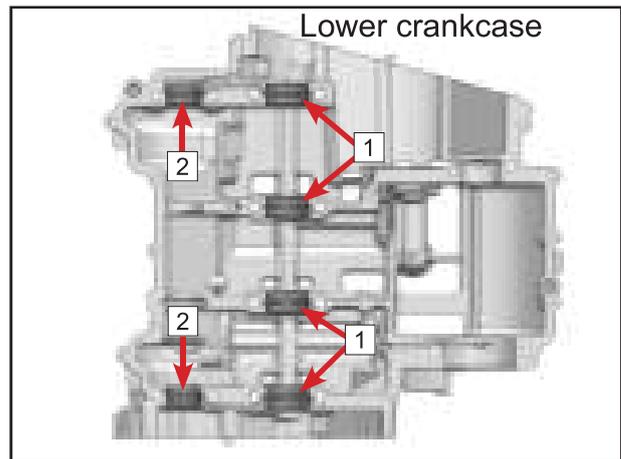


## 5.4 Engine Parts Inspection

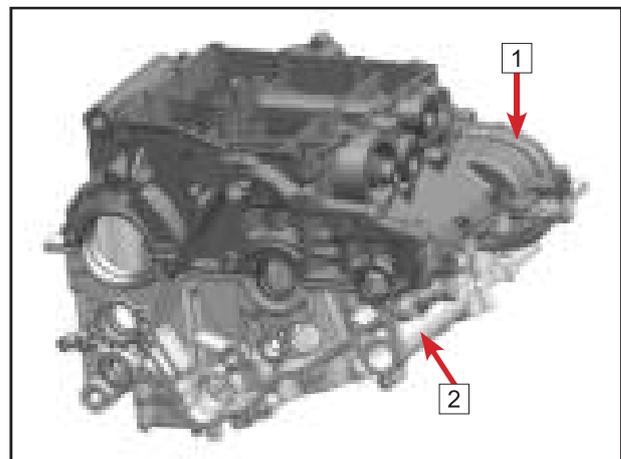
### 5.4.1 Crankshaft Main Plain Bearing and Balance Shaft Plain Bearing Radial Clearance Inspection

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].



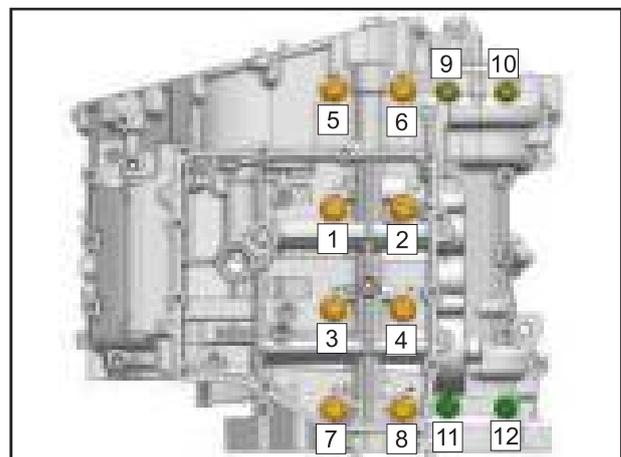
Install the crankcase bolts and tighten them to the specified torque in three steps in the sequence shown on the right.

Tighten Torque	
Step 1	8 N•m (5.9 ft-lb.)
Step 2	20 N•m (14.7 ft-lb.)
Step 3	36 N•m (26.5 ft-lb.)

[1]~[8]: assembly bolt M9×96

[9], [10]: assembly bolt M8×55

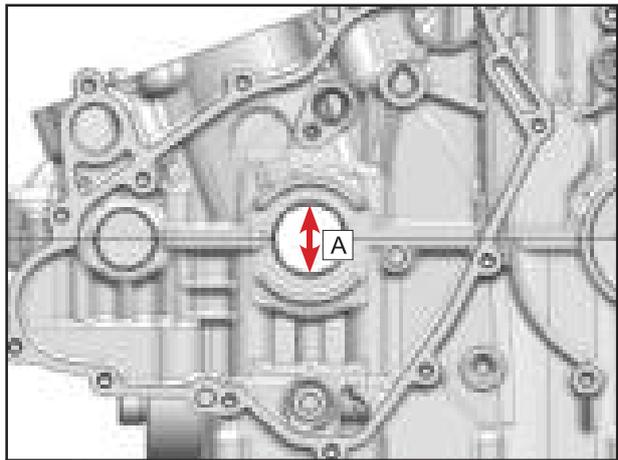
[11], [12]: assembly bolt M8×65



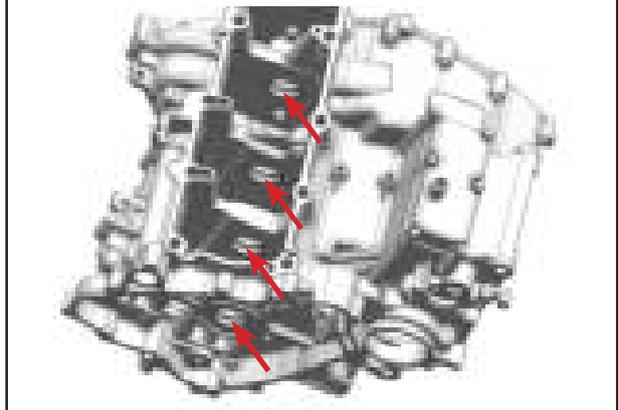
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Perpendicular to the direction of crankcase joint, measure the inner diameter of the crankshaft main bearing **A** (a total of 4 places), and compare the outer diameter of the crankshaft main journal **D** at the corresponding position (refer to the 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	$A - D \leq 0.08 \text{ mm}(0.00315 \text{ in})$

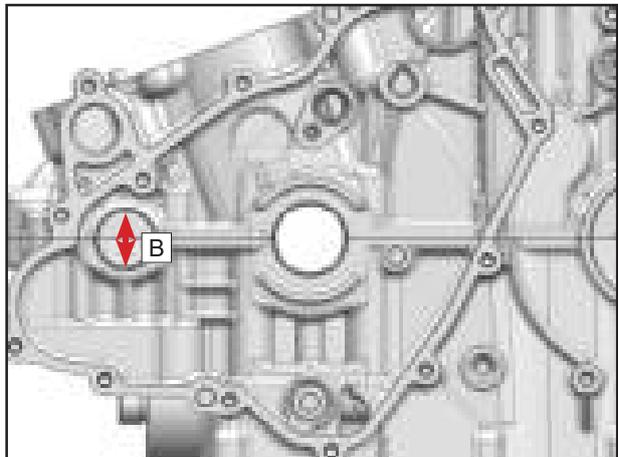


Crankshaft main bearing: 4 places

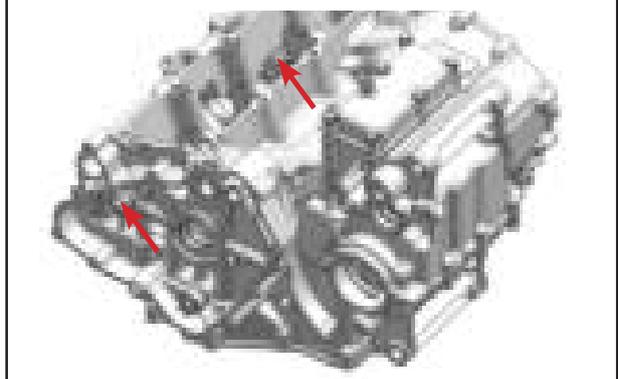


Perpendicular to the direction of crankcase joint, measure the diameter of the balance shaft bearing **B**, and compare the diameter of the balance shaft journal **E** at the corresponding position (refer to the chapter “Select Blance Shaft Plain Bearing”). The difference between **B** and **E** is the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

Balance Shaft Bearing Radial Clearance	
Service Limit	$B - E \leq 0.08 \text{ mm}(0.00315 \text{ in})$



Balance shaft bearing: 2 places

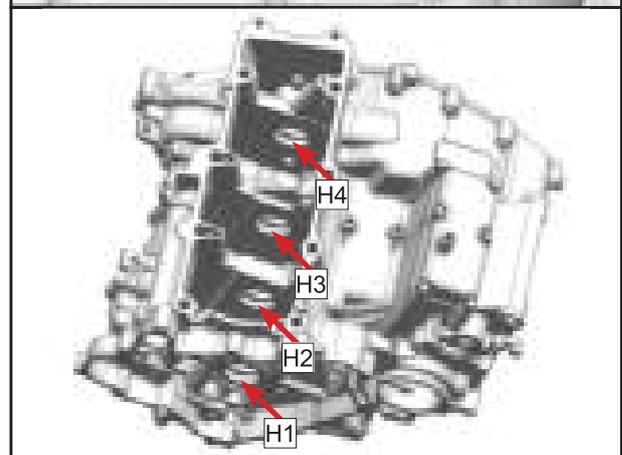
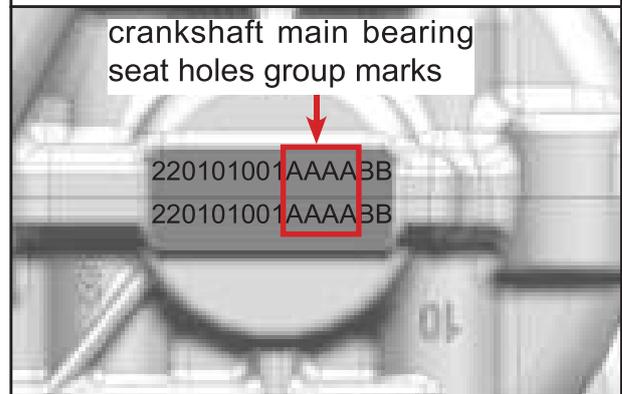
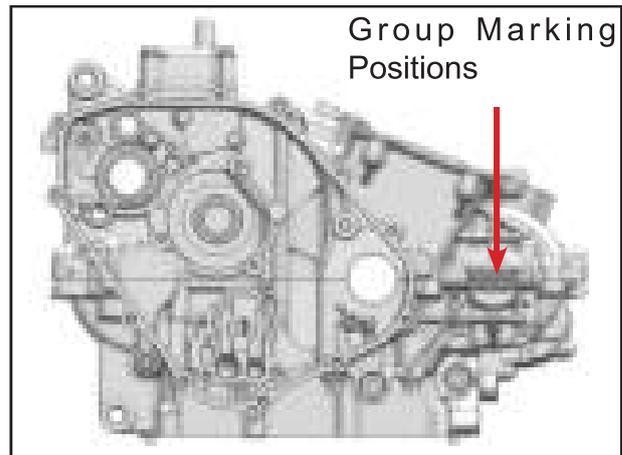
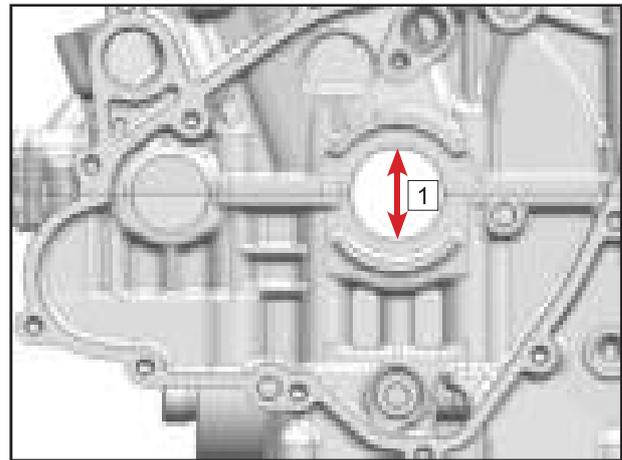


## 5.4.2 Selecting Main Plain Bearing and Balance Shaft Plain Bearing Crankshaft Main Bearing Seat Hole

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	35.000 ~ 35.008 mm (1.37795 ~ 1.37827 in)
B	35.008 ~ 35.016 mm (1.37827 ~ 1.37858 in)

The grouping marks are carved on the crankcase, as shown on the right. From left to right are the grouping marks of holes H1, H2, H3, and H4.



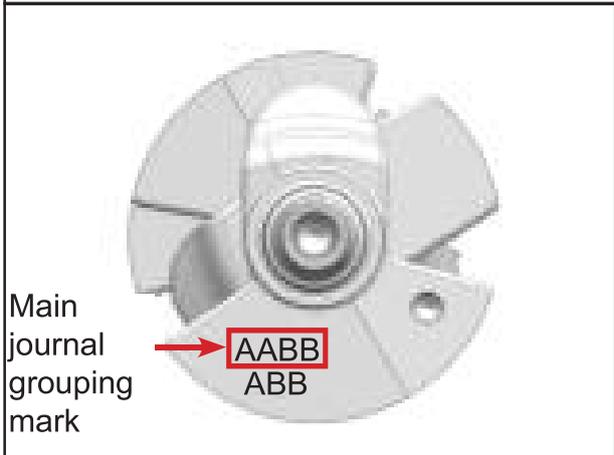
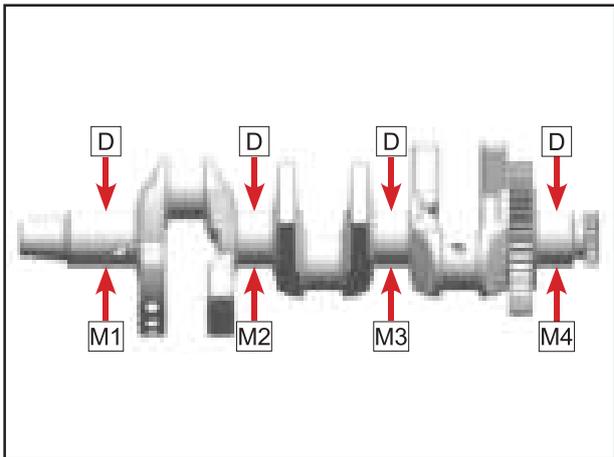
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## Crankshaft Main Journal

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

Crankshaft Main Journal (New Part)	
Mark	Diameter $\square D$
B	31.985 ~ 31.992 mm (1.25925 ~ 1.25953 in)
A	31.992 ~ 32.000 mm (1.25953 ~ 1.25984 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, M3, and M4.



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	31.965 mm (1.25846 in)

## Crankshaft Assembly Grouping

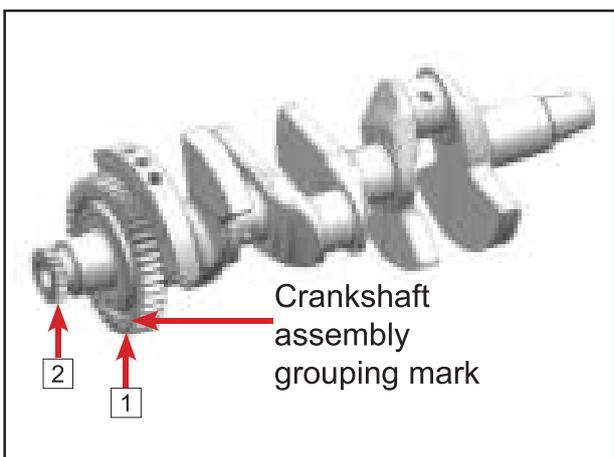
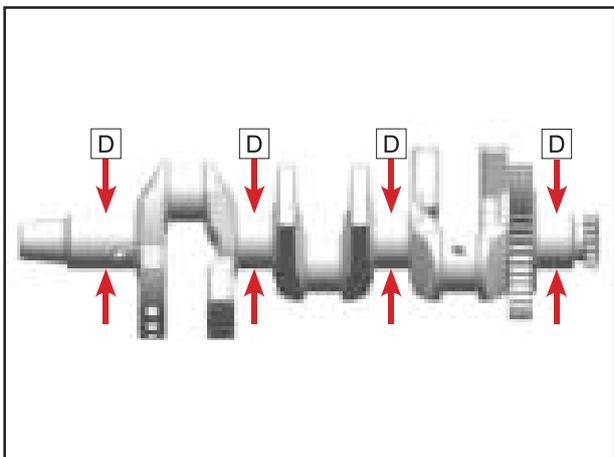
Check the tooth surface of output gear  $\square 1$  and timing drive sprocket  $\square 2$  for excessive wear or other damage. If yes, replace the crankshaft assembly.

The crankshaft assembly is divided into groups A and B according to the output gear  $\square 1$ . The grouping mark (A or B) is engraved on the output gear.

The crankshaft assembly is paired with the balance shaft assembly according to the following table:

Crankshaft Assembly Grouping Mark	Balance Shaft Assembly Grouping Mark
A	B
B	A

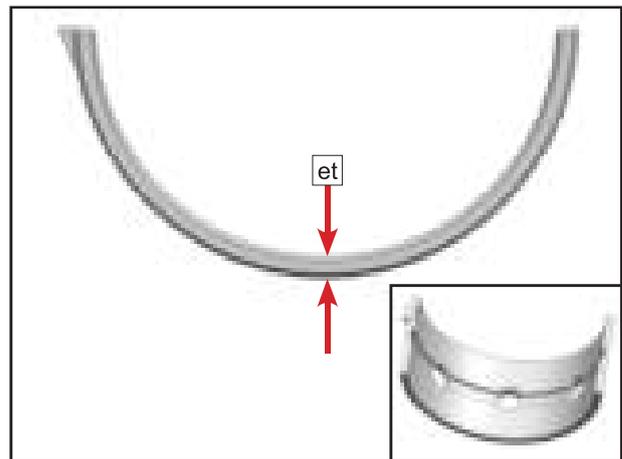
The grouping of balance shaft assembly is detailed in this section.



## Main Plain Bearing

The main plain bearing center thickness et grouping is shown in the following table.

Main Plain Bearing (New Part)	
Color Mark	Central Thickness <span style="border: 1px solid black; padding: 0 2px;">et</span>
Red	1.486 ~ 1.490 mm (0.05850 ~ 0.05866 in)
Black	1.490 ~ 1.494 mm (0.05866 ~ 0.05882 in)
Blue	1.494 ~ 1.498 mm (0.05882 ~ 0.05898 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	A	Red
A	B	Black
B	A	Black
B	B	Blue

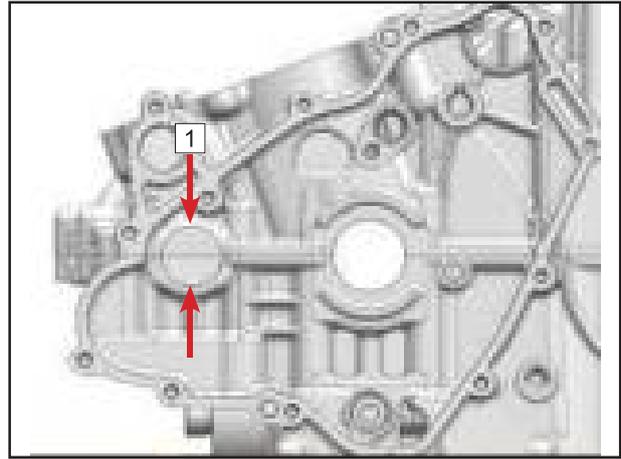
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## Balance Shaft Bearing Seat Hole

Balance shaft bearing seat hole diameter

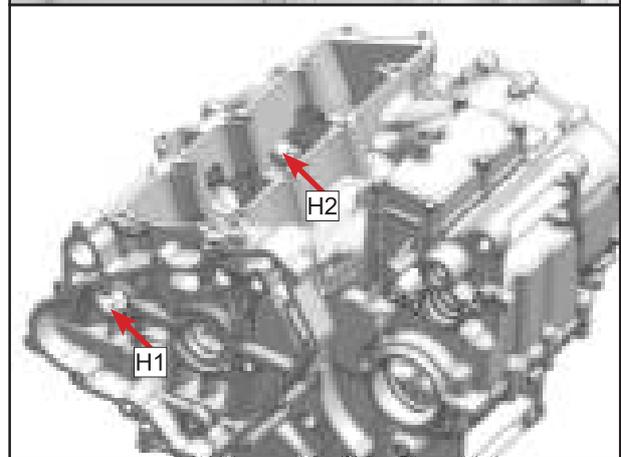
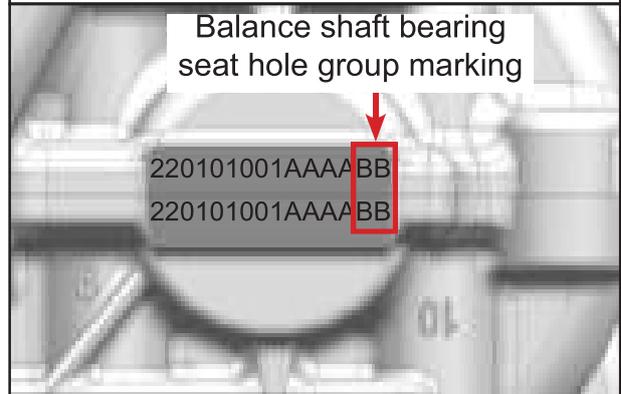
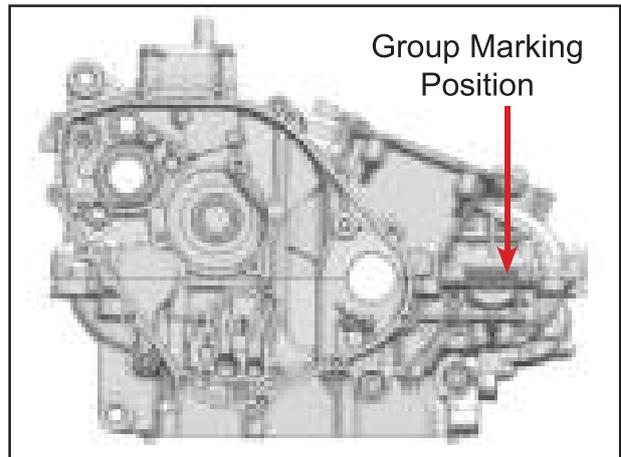
1 grouping see table below.

Balance Shaft Bearing Seat Hole (New Part)	
Mark	DIA 1
A	29.000 ~ 29.006 mm (1.14173 ~ 1.14197 in)
B	29.006 ~ 29.013 mm (1.14197 ~ 1.14224 in)



Group marks are engraved on the 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.

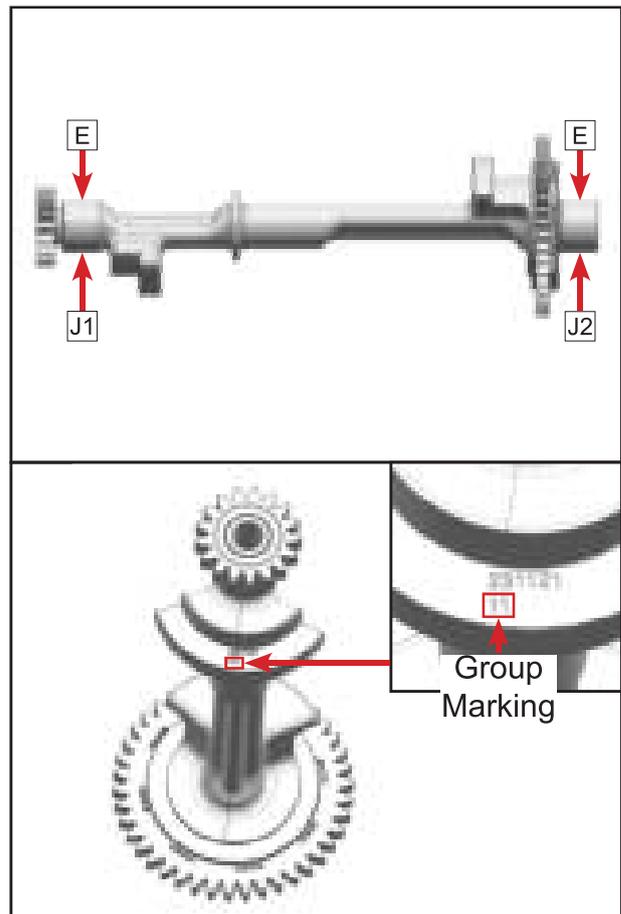
Balance Shaft Journal Diameter (New Part)	
Mark	DIA <span style="border: 1px solid black; padding: 0 2px;">E</span>
1	25.987 ~ 25.993 mm (1.02311 ~ 1.02335 in)
2	25.993 ~ 26.000 mm (1.02335 ~ 1.02362 in)

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.

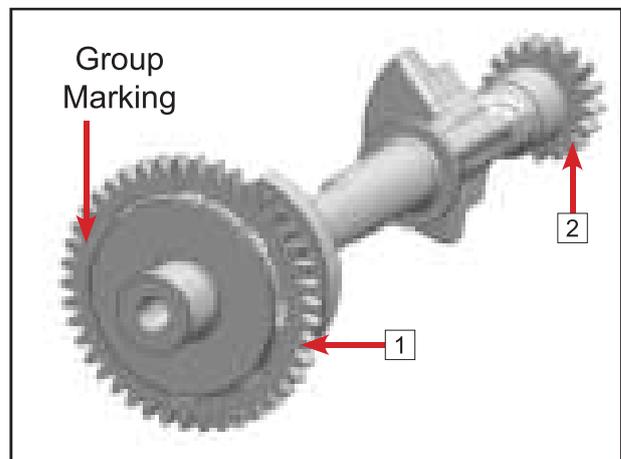
Balance Shaft Journal Diameter <span style="border: 1px solid black; padding: 0 2px;">E</span>	
Service Limit	25.960 mm (1.02205 in)



## Balance Shaft Assembly Grouping

Check the tooth surface of driven gear 1 of the balance shaft and the drive gear 2 of the water pump 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 driven gear 1. The group mark (A or B) is engraved on the balance shaft driven gear.



Balance shaft assembly and crankshaft assembly are paired according to the table below.

Balance Shaft Assembly Group Marking	Crankshaft Assembly Group Marking
A	B
B	A

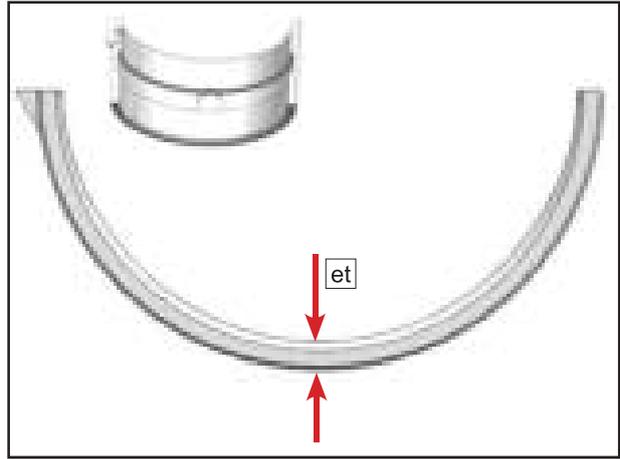
The grouping of crankshaft assembly is detailed in this section.

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## Balance Shaft Plain Bearing

The central wall thickness  $t$  of the balance shaft plain bearing is grouped in the following table.

Balance Shaft Plain Bearing (New Part)	
Color Mark	Central wall thickness $t$
Red	1.484 ~ 1.488 mm (0.05843 ~ 0.05858 in)
Black	1.488 ~ 1.492 mm (0.05858 ~ 0.05874 in)
Blue	1.492 ~ 1.496 mm (0.05874 ~ 0.05890 in)



## Selecting Balance Shaft Plain Bearing

Select the balance shaft plain bearing according to table below.

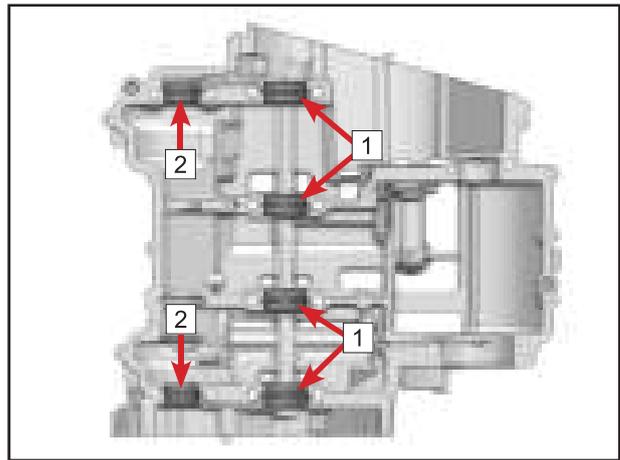
Balance Shaft Bearing Seat Hole Mark	Balance Shaft Journal Mark	Balance Shaft Plain Bearing Color
A	1	Black
A	2	Red
B	1	Blue
B	2	Black

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

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

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

Clean the bearing seat hole.



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

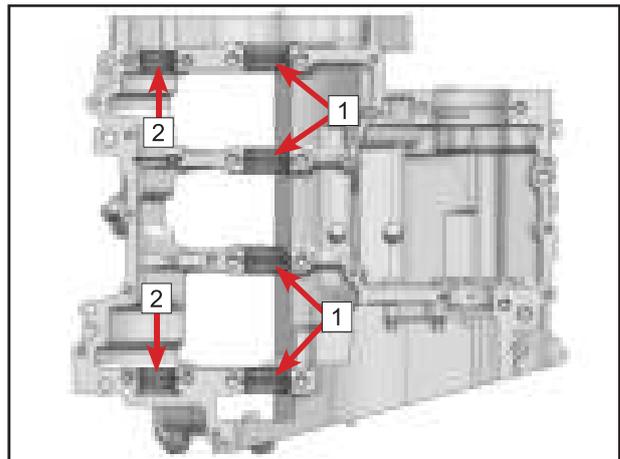
Remove balance shaft plain bearing **2** from upper crankcase.

Clean the bearing seat hole.

Select the appropriate plain bearing.

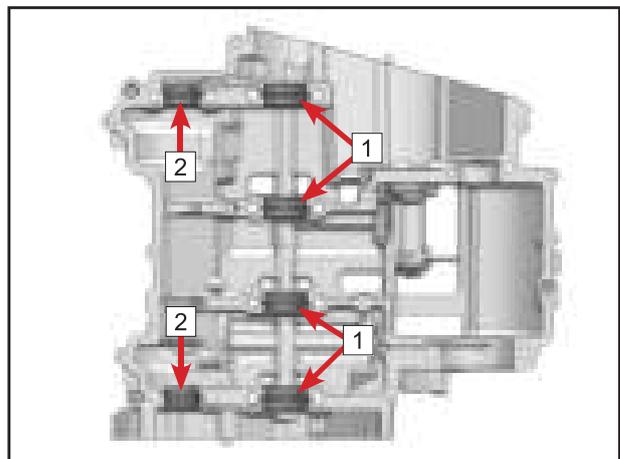
Install new main plain bearing **1** on upper crankcase.

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



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

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

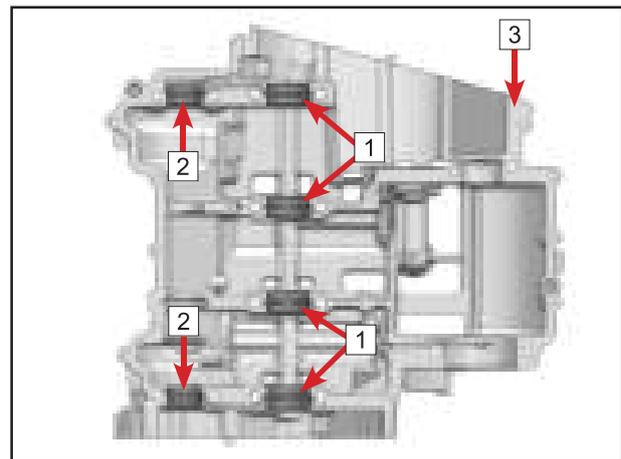
## 5.4.4 Lower Crankcase Operation

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.



## Oil Filter Mounting Bolt

### Removal

Remove oil filter mounting bolt.

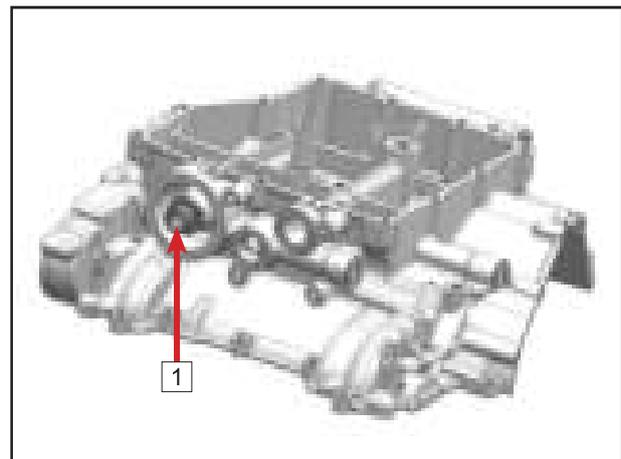
### Installation

Reverse the removal procedures for installation. Pay attention to following details:

Apply 243 thread locker to the mounting bolt.

Oil Filter Mounting Bolt	
Torque	25 N•m (18.4 ft-lb.)

Remove spilled thread locker after installation.



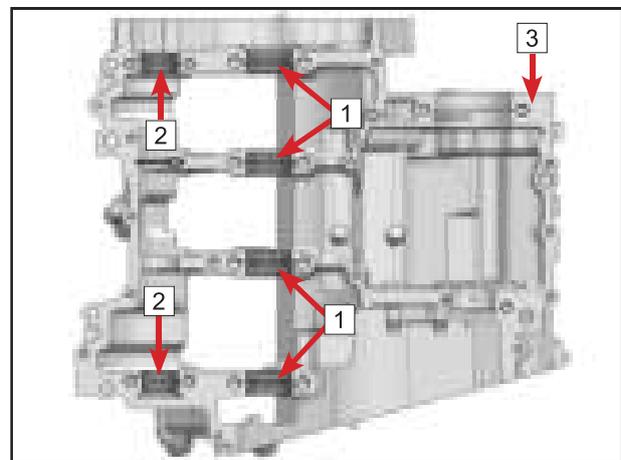
## 5.4.5 Upper Crankcase Operation

Remove all residual sealant and thoroughly clean the upper crankcase.

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

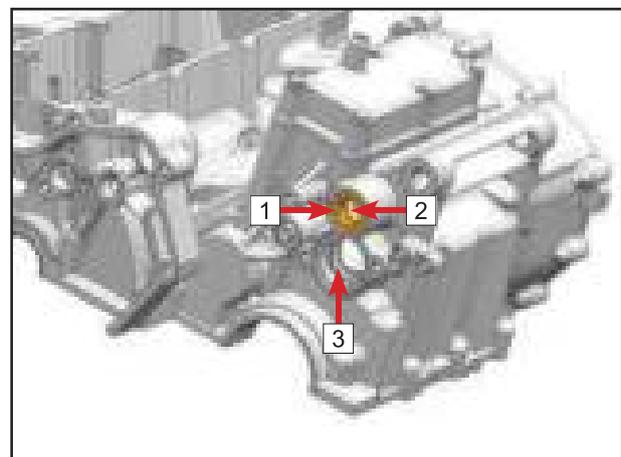
**NOTE: Replace upper crankcase and lower crankcase as a set.**

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

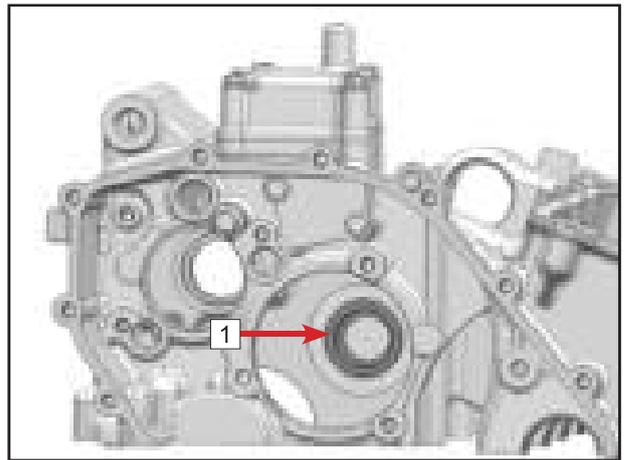


Check the oil seal **1** for brittleness, hardening, or damage. If found, replace it.

Check whether the needle bearing **2** and **3** is severely worn or damaged, and whether the rotation is flexible. Replace if necessary.



Check the bearing sleeve **1** for serious wear or damage. Replace if necessary.



### Maze Cover

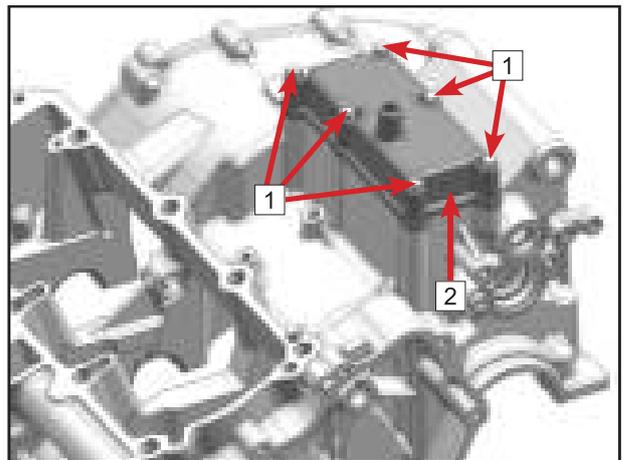
Check the maze cover for cracks or other damage. Replace if necessary.

#### Removal

**NOTE: Remove maze cover as needed.**

Remove bolts **1**.

Remove maze cover **2**.

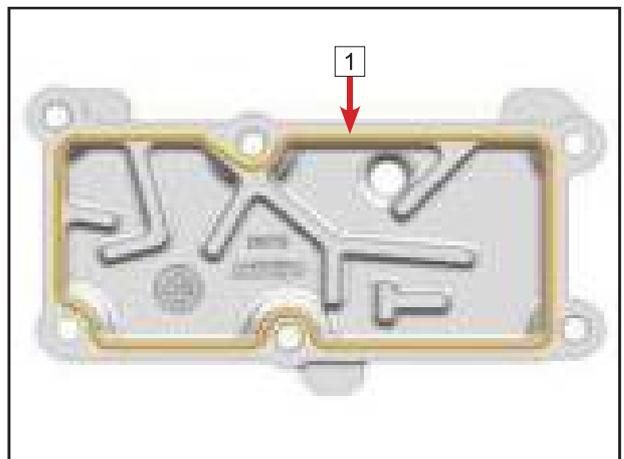


#### Installation

Make sure the sealing surface of upper crankcase and maze cover is clean, dry and free of oil.

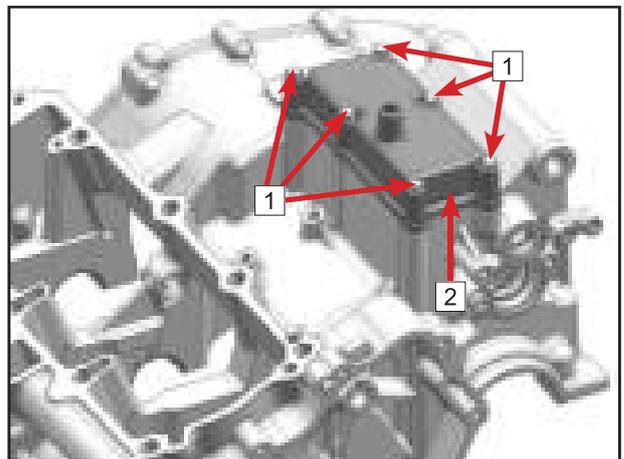
As shown in the picture on the right, apply an appropriate amount of 5900 flange sealant **1** on the sealing surface of maze cover, and the coating should be uniform and continuous.

**NOTE: From applying the flange sealant to completing the installation of the maze cover 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.**



Place the maze cover **2** in place.

Install bolts **1**.

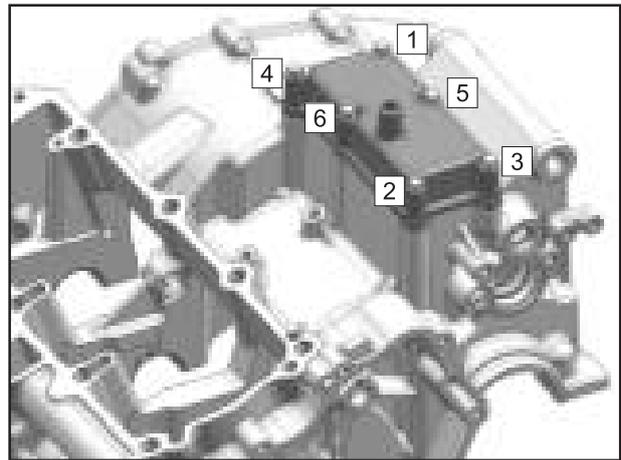


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Tighten the maze cover bolts to the specified torque in the sequence shown on the right.

Maze Cover Bolt	
Torque	10 N•m (7.3 ft-lb.)

Remove spilled flange sealant.



## Shift Position Spring Pin Removal

**NOTE: Remove the shift position spring pin as needed.**

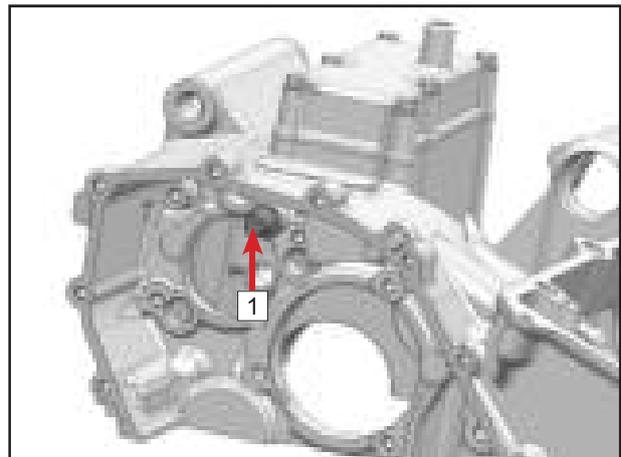
Remove shift position spring pin **1**.

### Installation

Reverse the removal procedures for installation. Pay attention to following details:

Apply 243 thread locker to the shift position spring pin.

Shift Position Spring Pin <b>1</b>	
Torque	20 N•m (14.7 ft-lb.)



## Maze Retainer Removal

**NOTE: Remove maze retainer as needed.**

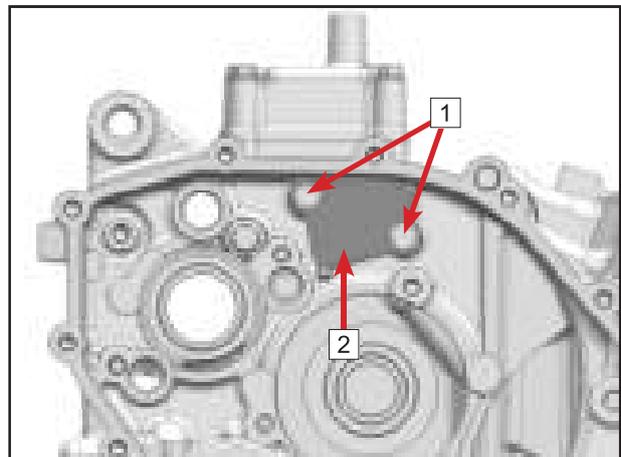
Remove bolts **1**.

Remove maze retainer **2**.

### Installation

Reverse the removal procedures for installation.

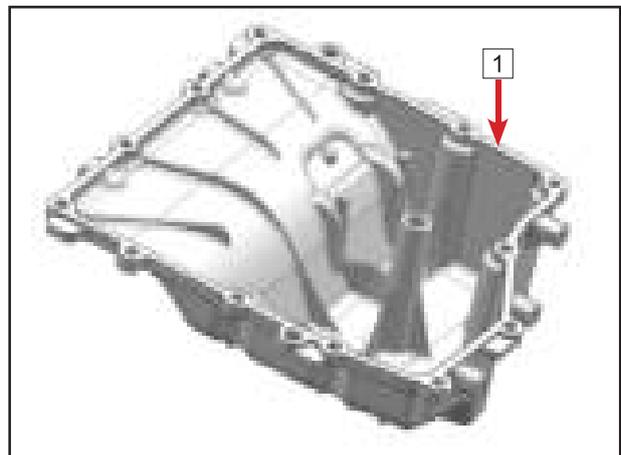
Maze Retainer Bolt <b>1</b>	
Torque	10 N•m (7.3 ft-lb.)



## 5.4.6 Oil Pan Inspection

Remove all residual sealant and clean the oil pan thoroughly.

Check oil pan **1** for cracks or other damage. Replace if necessary.

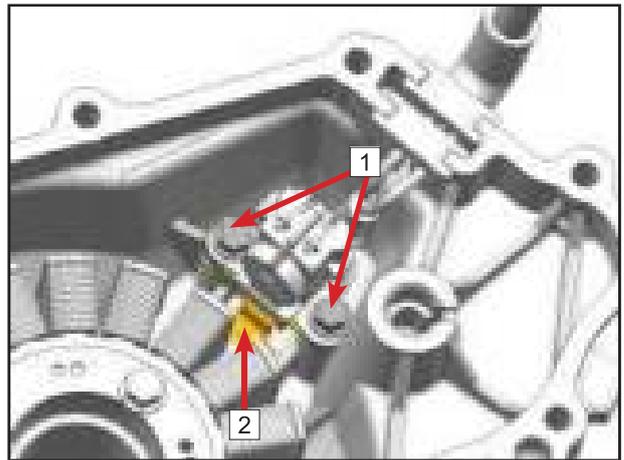


## 5.4.7 LH Side Cover Operation

### Disassembly

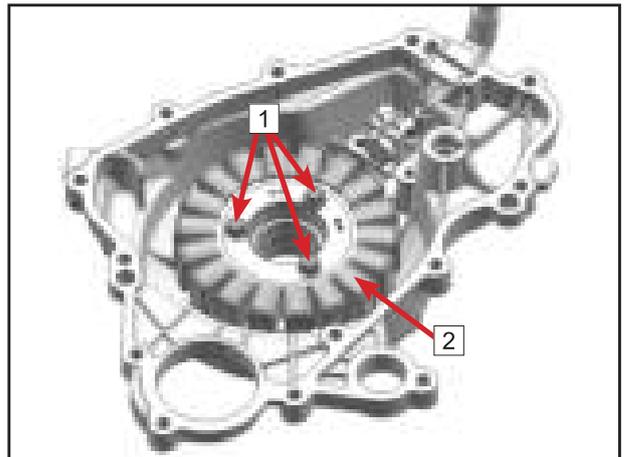
Remove bolts [1].

Remove wire press plate [2].



Remove bolts [1].

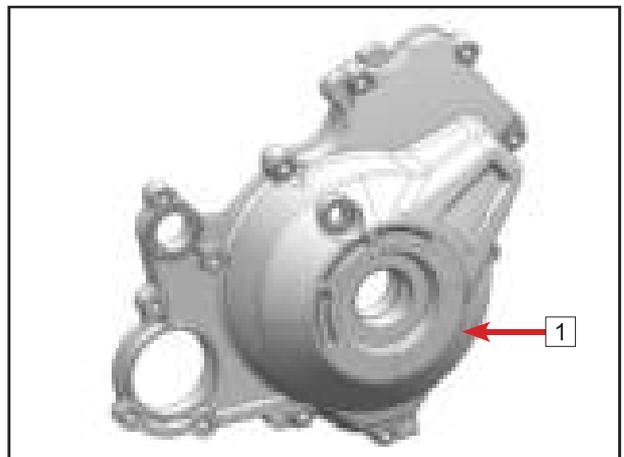
Remove magneto stator [2].



### Inspection

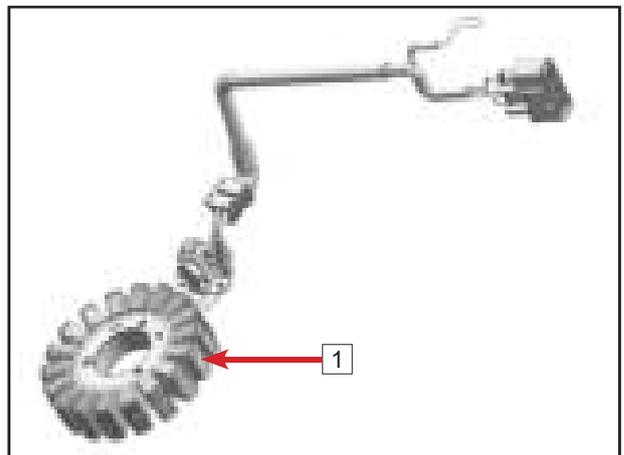
Remove all residual sealant and thoroughly clean the LH side cover.

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.



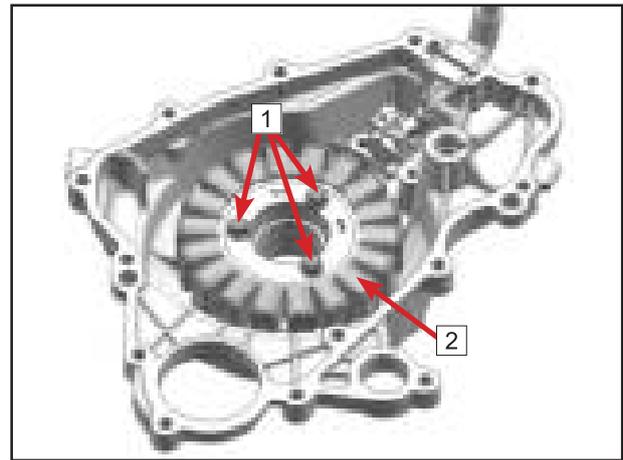
## Assembly

Place magneto stator **2** in place.  
 Apply 243 thread locker on the bolts **1**.  
 Install bolts **1**, and tighten to the specified torque.

Magneto Stator Bolt <b>1</b>	
Torque	10 N•m (7.3 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).

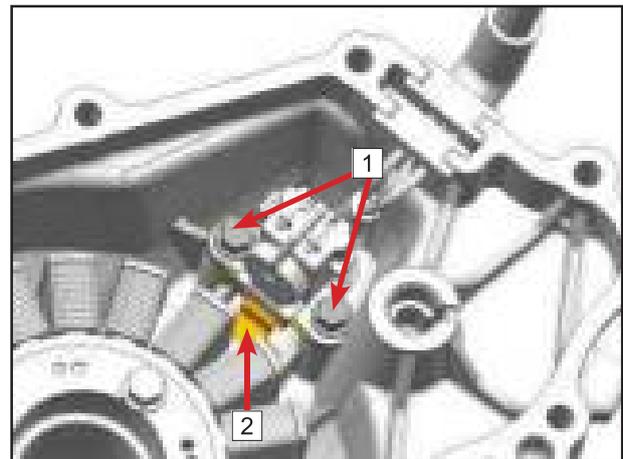


Install wire press plate **2**.

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

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

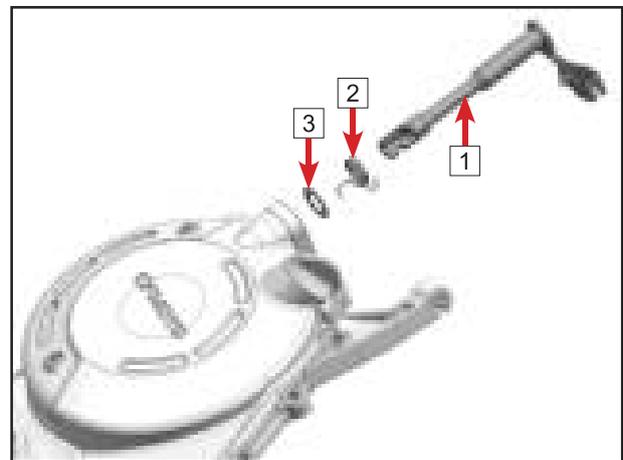
Stator Wire Press Plate Bolt <b>1</b>	
Torque	5 N•m (44.25 in-lb.)



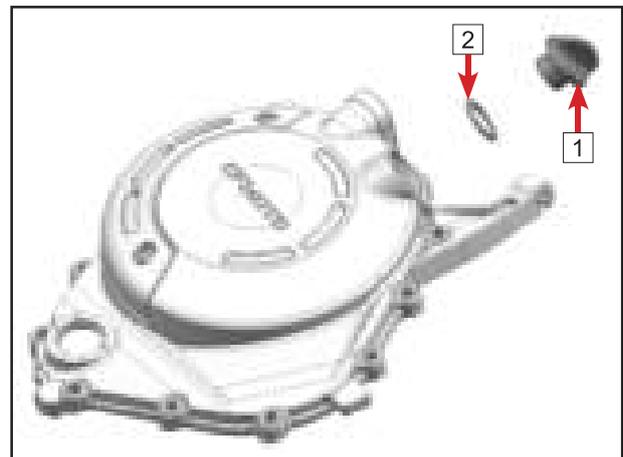
## 5.4.8 RH Side Cover Operation

### Disassembly

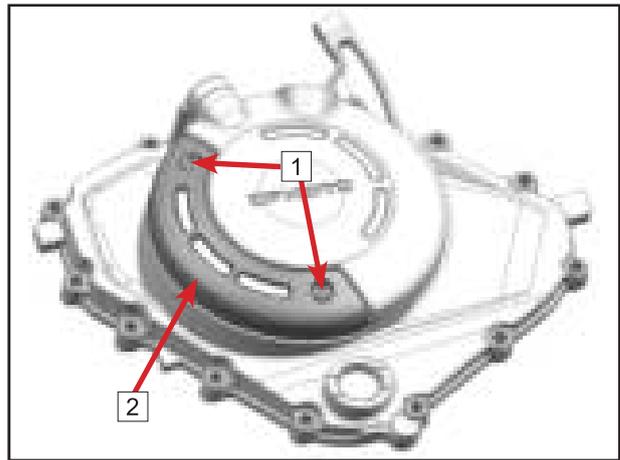
Remove clutch control shaft assembly **1**.  
 Remove clutch control lever return spring **2**.  
 Remove washer **3**.



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



Remove M5×10 inner hex bolts [1].  
Remove deco guard assembly [2].



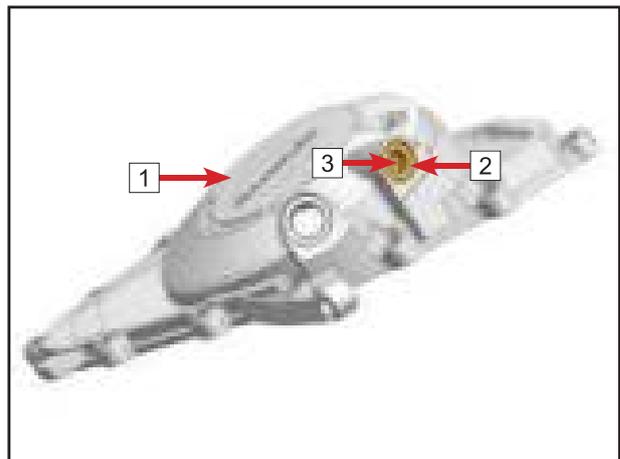
## Inspection

Remove all residual sealant and thoroughly clean the RH side cover.

Check RH side cover [1] for cracks or other damage. Replace if necessary.

Check oil seal [2] for brittleness, hardening, or damage. If yes, replace it.

Check whether the needle bearing [3] is seriously worn or damaged, and whether the rotation is flexible. Replace if necessary.

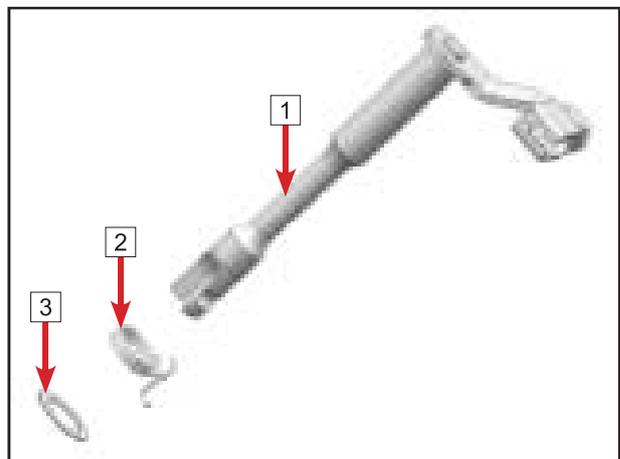


Check clutch control shaft assembly [1] for severe worn or damaged. If yes, replace it.

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.



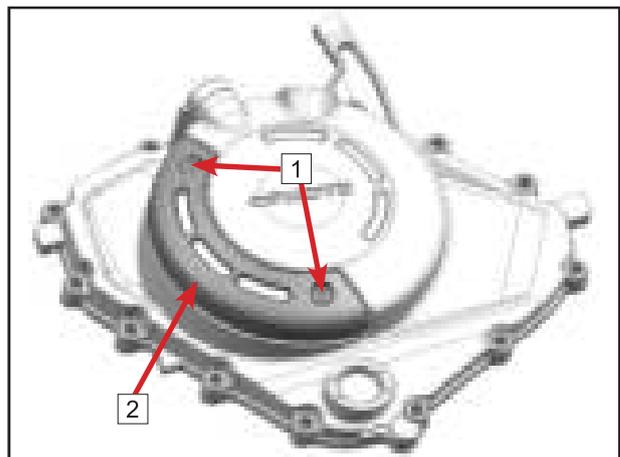
## Assembly

Place deco guard assembly [2] in place.

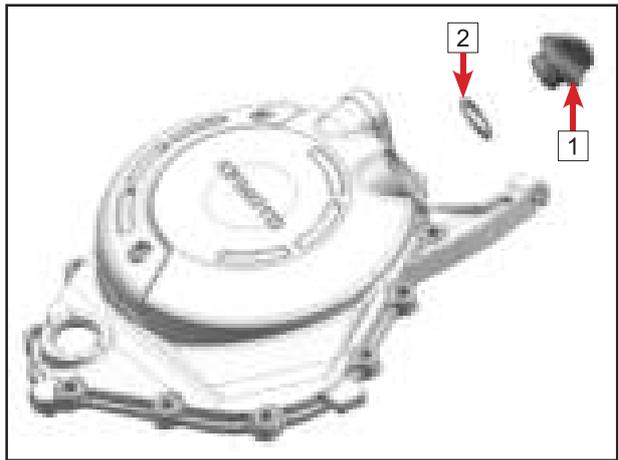
Apply 243 thread locker to M5×10 inner hex bolts [1].

Install M5×10 inner hex bolts [1], tighten to the specified torque.

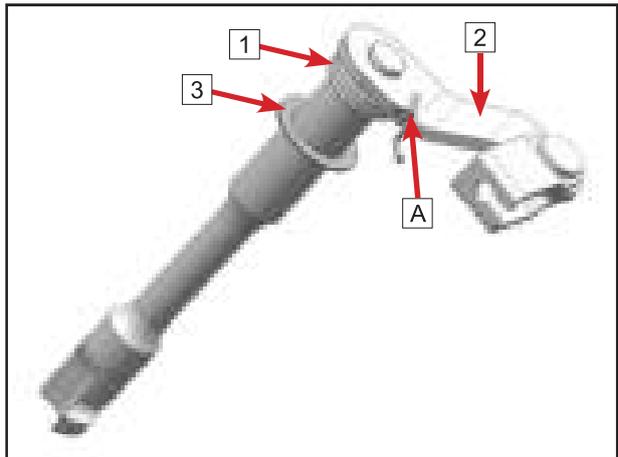
Deco Guard Bolt [1]	
Torque	5 N•m (44.25 in-lb.)



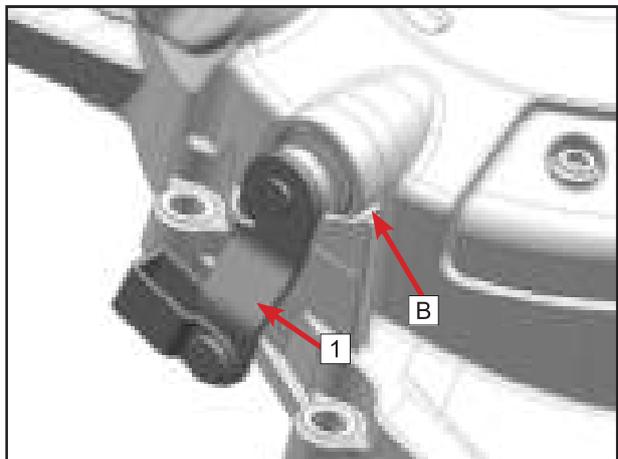
Apply oil on the O-ring [2].  
Install O-ring [2] on the oil filling plug [1].  
Install oil filling plug on the RH side cover,  
and tighten.



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.

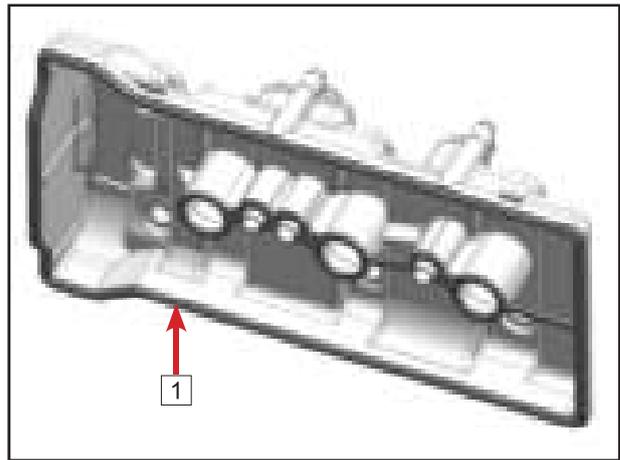


Install the clutch control shaft assembly [1] on the RH side cover, and the other end [B] of the spring is stuck to the RH side cover.



## 5.4.9 Cylinder Head Cover Operation Disassembly

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

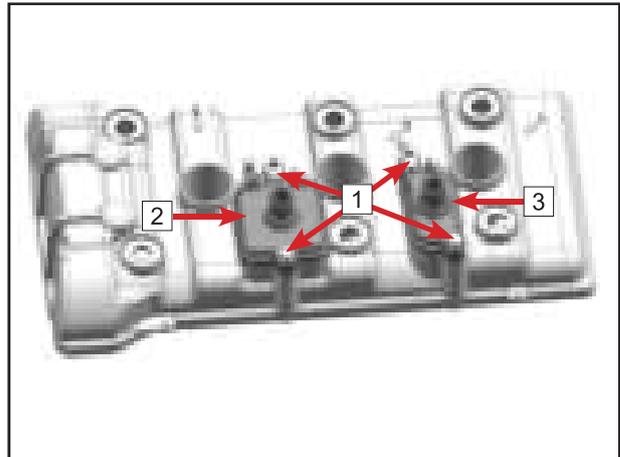


{ } is the operating procedures for vehicles equipped with secondary air supply system-SAS.

{

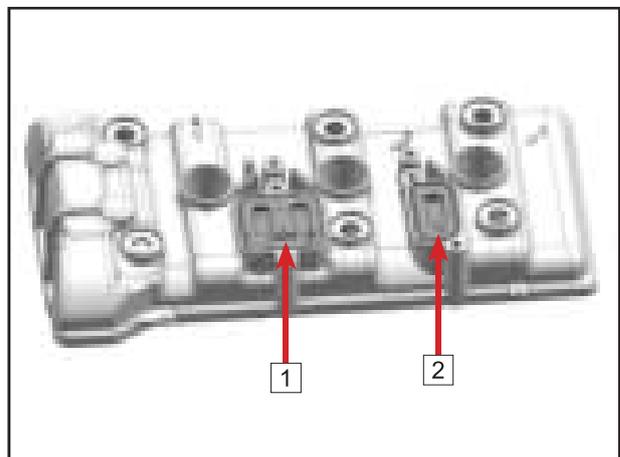
Remove bolts **1**.

Remove one-way valve cap **2** and **3**.



Remove reed valve assembly **1** and **2**.

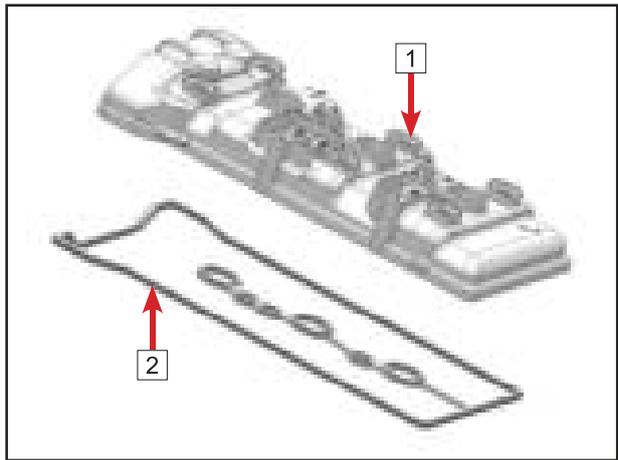
}



## Inspection

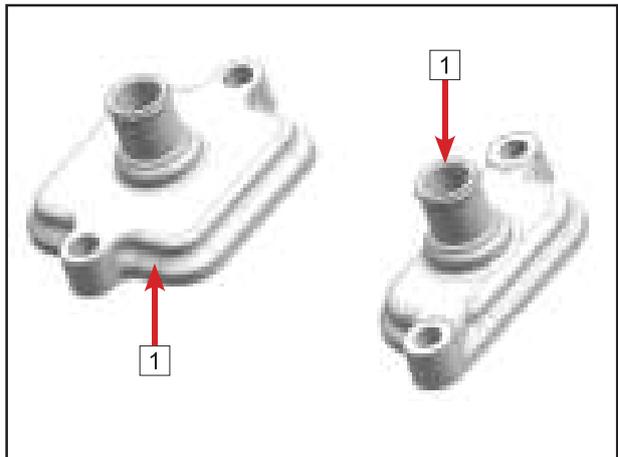
Check cylinder head cover **1** for cracks or other damage. Replace if it does.

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



**If the vehicle is equipped with a secondary air supply system-SAS, check as follows:**

Check one-way valve cover **1** and **2** for cracks or other damage. Replace if it does.

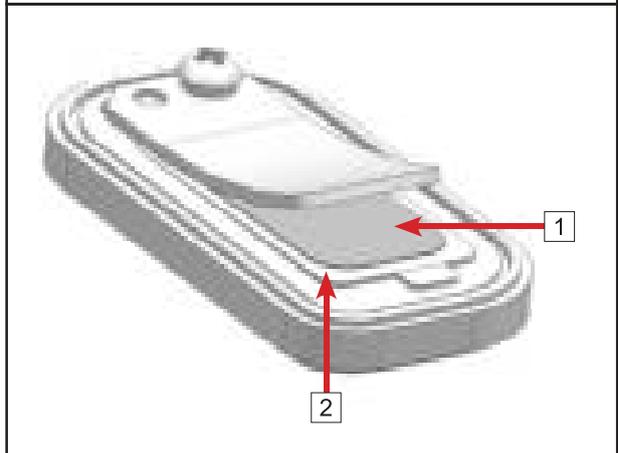
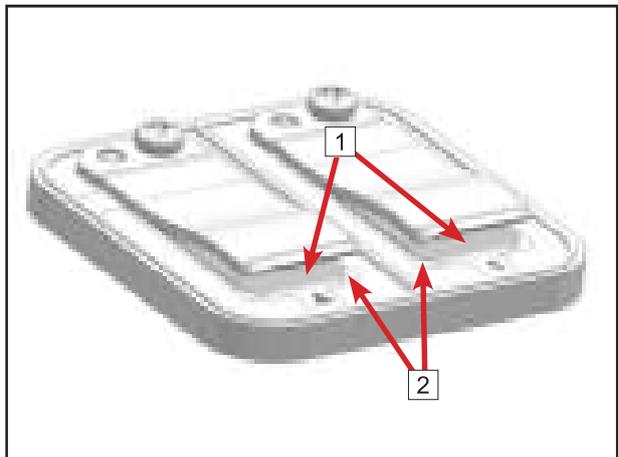


Visually check the reeds **1** for cracks, folds, warps, heat damage or other damage. If there is any doubt about the condition of reeds **1**, replace the reed valve assembly.

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.**



## Assembly

{ } is the operating procedures for vehicles equipped with secondary air supply system-SAS.

{

Place the reed valve assembly **1** and **2** in place.

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

Place the one-way valve cover **2** and **3** in place.

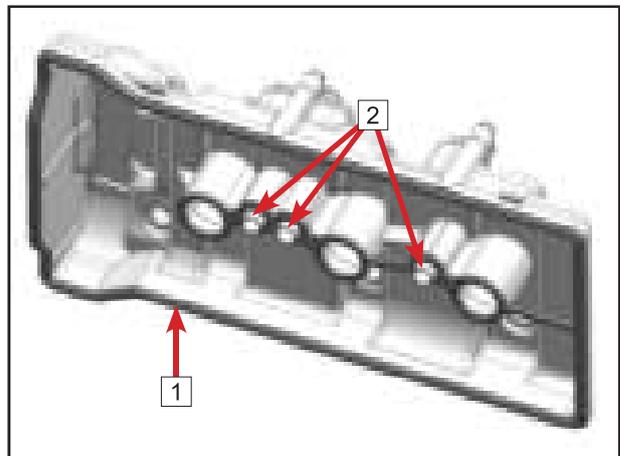
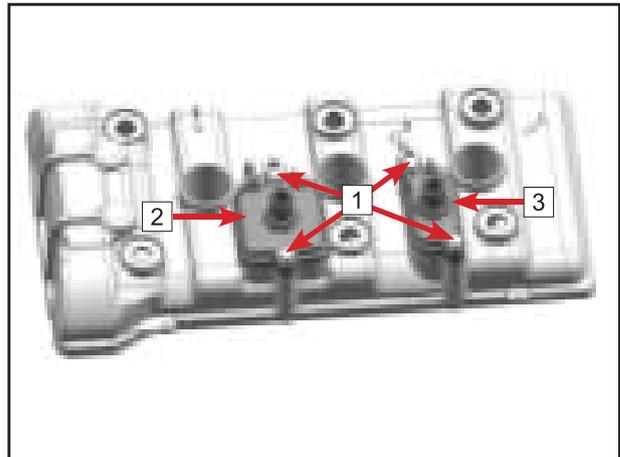
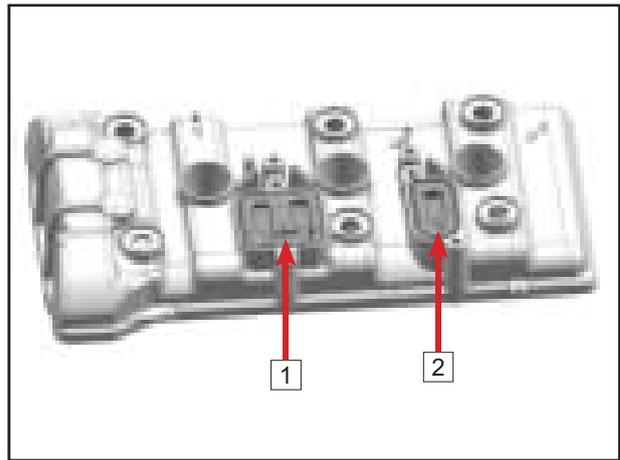
Install bolts **1**, and tighten to the specified torque.

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

}

Make sure that the dowel pins **2** are not missing.

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

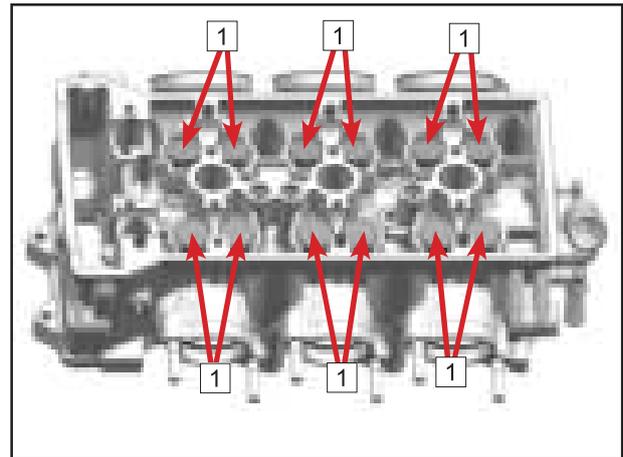


## 5.4.10 Cylinder Head Disassembly

**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.

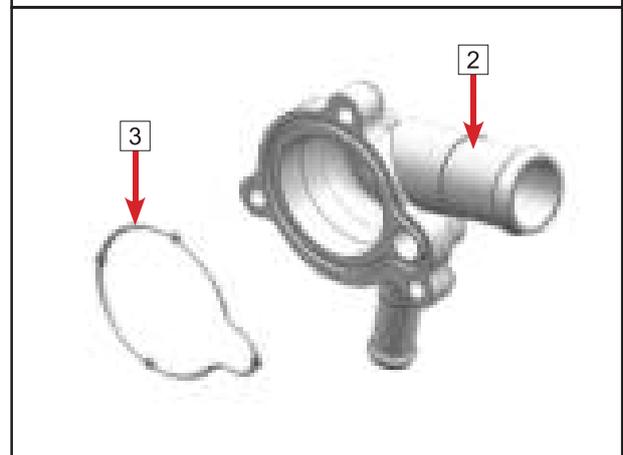
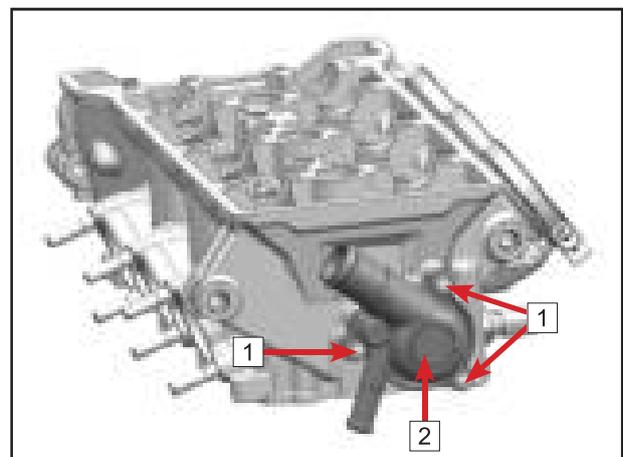
Remove valve tappets **1**.

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

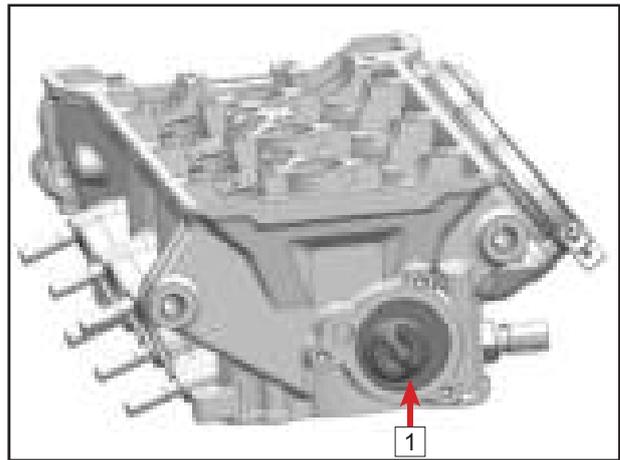


Remove bolts **1**.

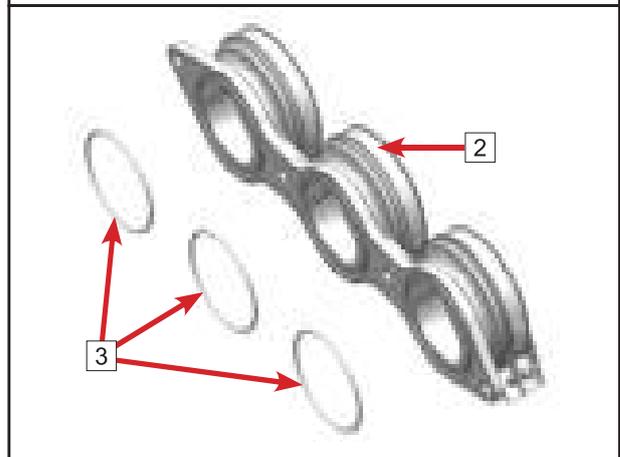
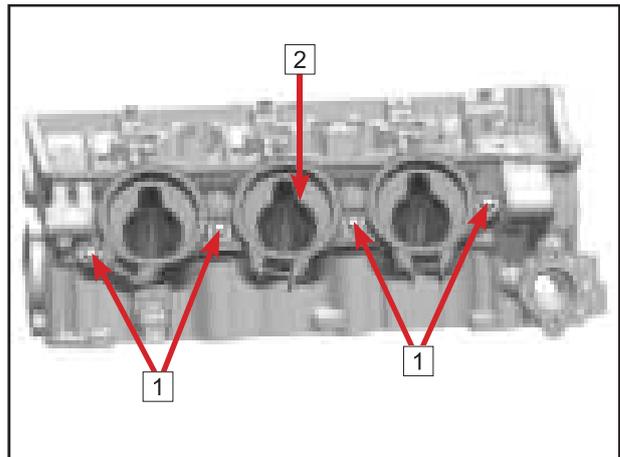
Remove thermostat cover **2** and thermostat cover seal ring **3**.



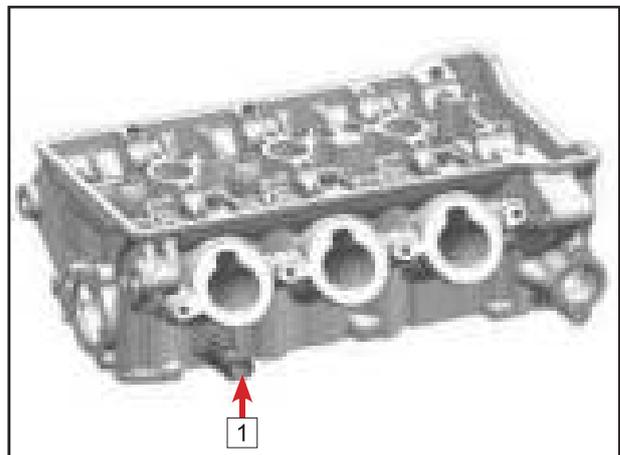
Remove thermostat **1**.



Remove bolts **1**.  
Remove throttle body connecting 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].

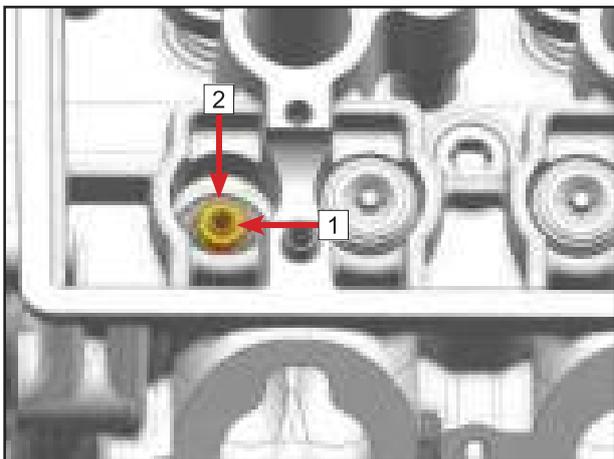
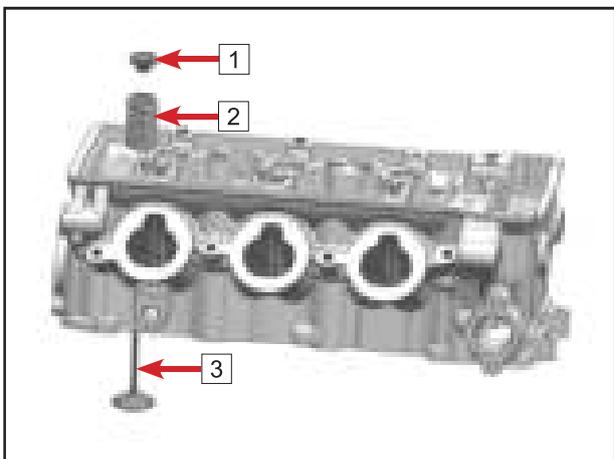
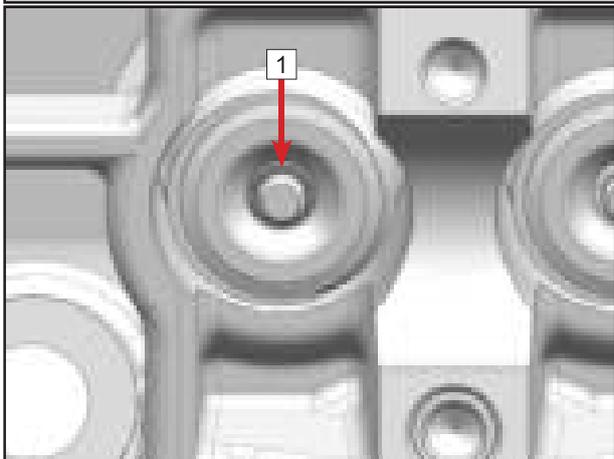
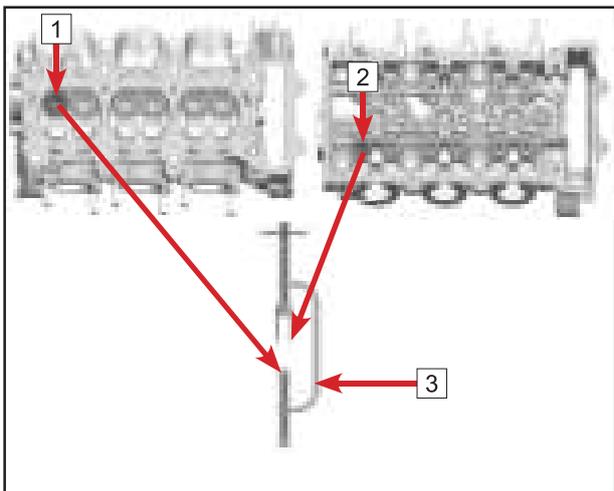
Remove valve [3].

Remove and discard valve stem seal ring [1].

Remove valve spring lower seat [2].

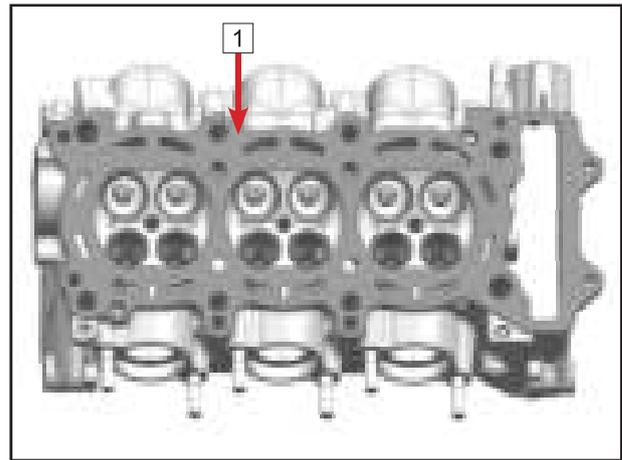
Remove other valve in the same way.

**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.**



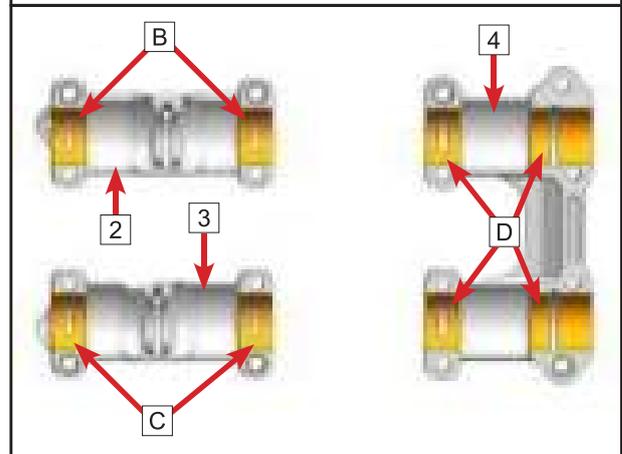
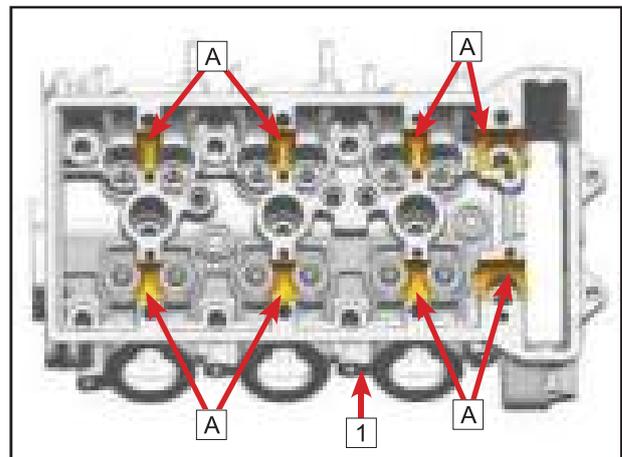
## 5.4.11 Cylinder Head Inspection

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



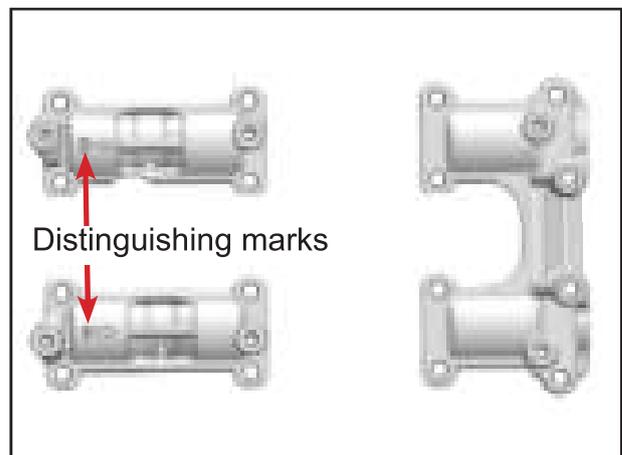
Inspect camshaft bearing hole **A**, **B**, **C** and **D** for serious wear or other damage. Replace it if found.

**NOTE: Replace cylinder head **1**, air intake cam bearing cover **2**, air exhaust cam bearing cover **3** and cam bearing cover **4** in sets.**



## Cam Bearing Cover Distinguishing Marks

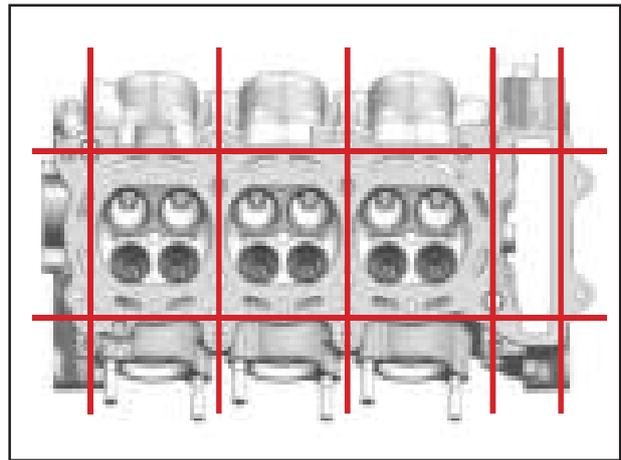
IN: intake side cam bearing cover  
EX: exhaust side cam bearing cover



# CFMOTO

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	0.07 mm

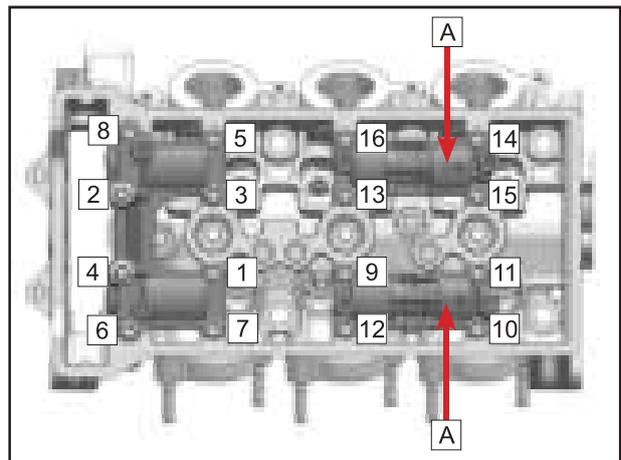


Clean cylinder head and each cam bearing cover thoroughly.

Install cam bearing cover on the cylinder head.

Arrow mark **A** towards the chain chamber side of cylinder head.

**NOTE: The cylinder head and each cam bearing cover are fitted according to the matching marks.**



Install cam bearing cover bolts and tighten them in three steps according to the sequence of 1~16.

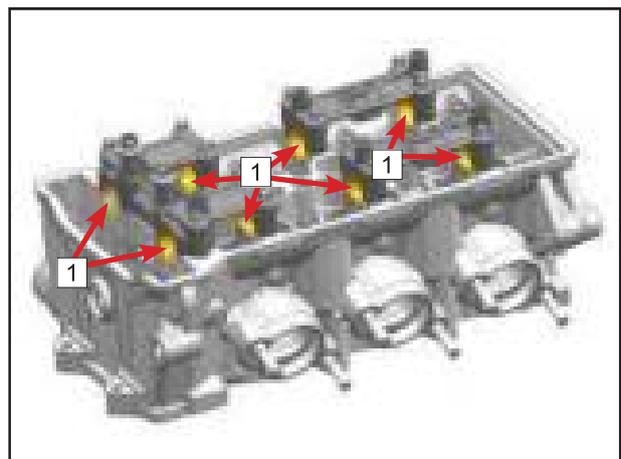
Cam bearing cover bolts 2 4: M6×65

Rest cam bearing cover bolts: M6×45

Cam Bearing Cover 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 and all the cam bearing covers at the same time if it exceeds the service limit.

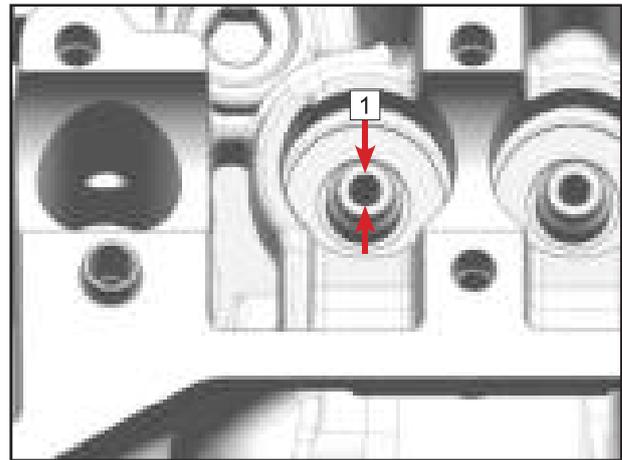
Camshaft Bearing Hole Diameter	
New Part	24 ~ 24.021 mm (0.94488 ~ 0.94571 in)
Service Limit	24.05 mm (0.94685 in)



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.**

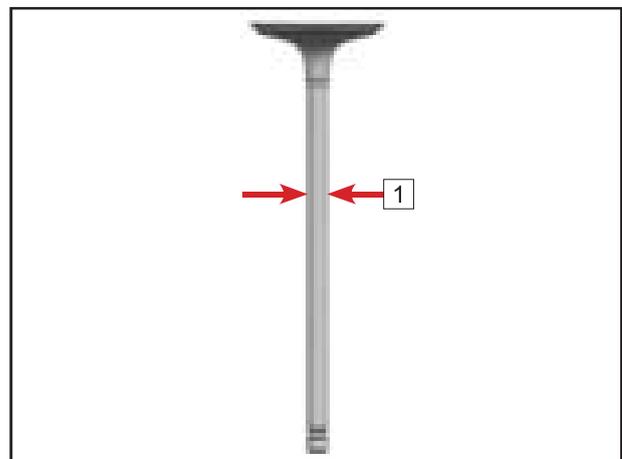


Valve Guide Inner Diameter (IN&EX)	
New Part	4.5 ~ 4.512 mm (0.17717 ~ 0.17764 in)
Service Limit	4.54 mm (0.17874 in)

### 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	4.455 mm (0.17539 in)

Valve Stem Diameter (Exhaust Valve)	
New Part	4.455 ~ 4.470 mm (0.17539 ~ 0.17598 in)
Service Limit	4.435 mm (0.17461 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)

# CFMOTO

## 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.

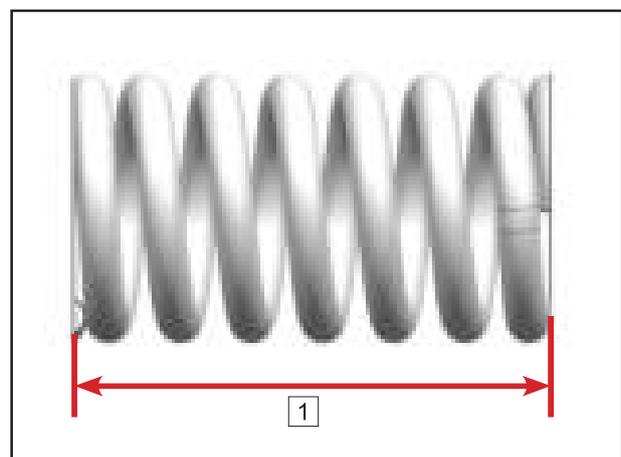
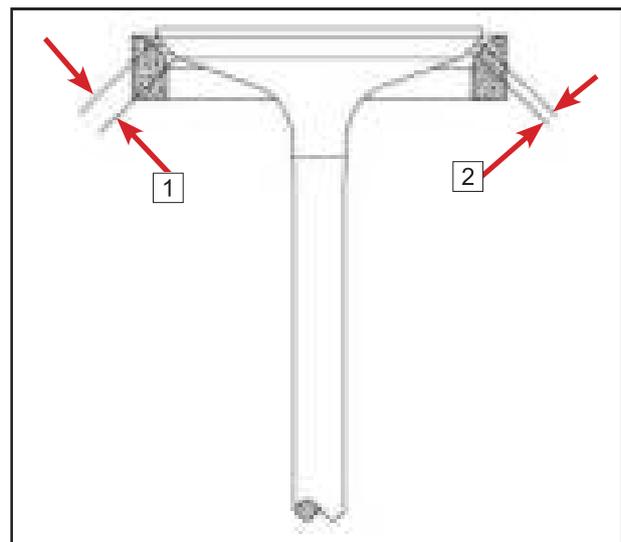
Valve Seat Contact Width (IN&EX)	
New Part	0.9 ~ 1.1 mm (0.03543 ~ 0.04331 in)
Service Limit	1.4 mm (0.05512 in)

## 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	40.1 mm
Service Limit	39.3 mm



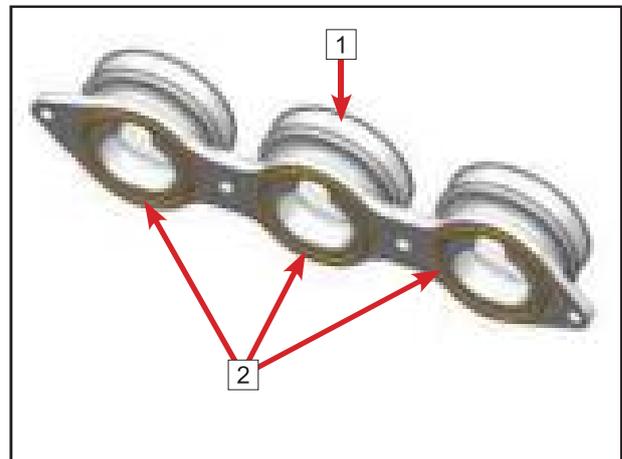
Measure the elasticity of valve spring when compressed to a specified length. Replace the spring if the elasticity is not within the specified range.

Valve Spring Elasticity	
Compress to 33mm	106N~124N
Compress to 25mm	423N~467N

### Throttle Body Connecting Pipe Assembly

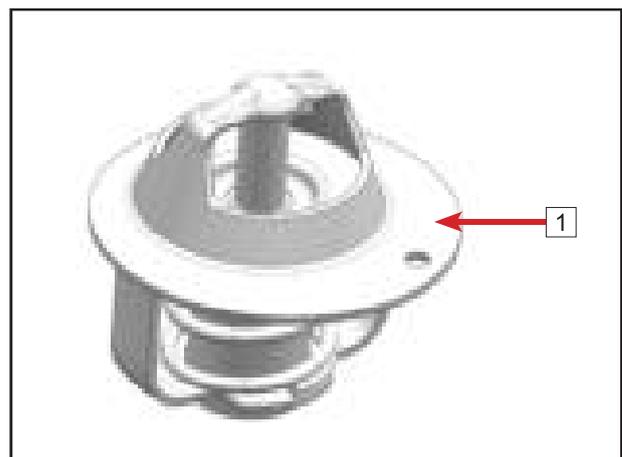
Check whether the throttle body connecting pipe assembly **1** is broken or damaged, and whether the flange surface is warped. Replace if necessary.

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.



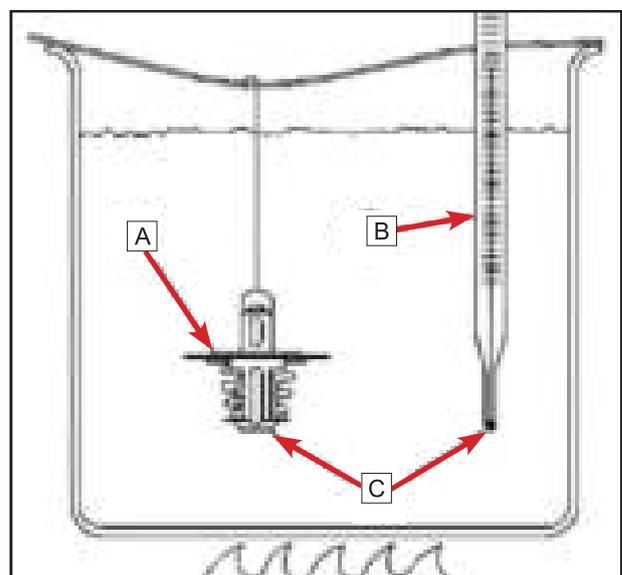
For valve open temperature inspection, hang thermostat **A** in a container of water. The thermostat should be fully immersed without touching container wall or bottom.

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.

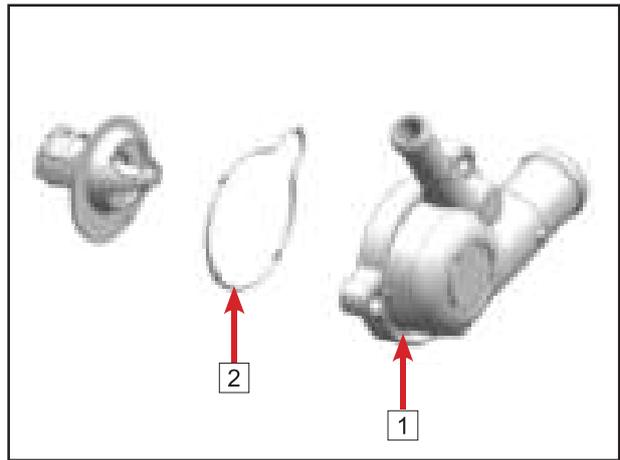
Replace with a new thermostat if beyond the specification.

Thermostat Valve Open Temperature	
Open	80°C ~84°C
Full open	95°C Full open range ≥8mm



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

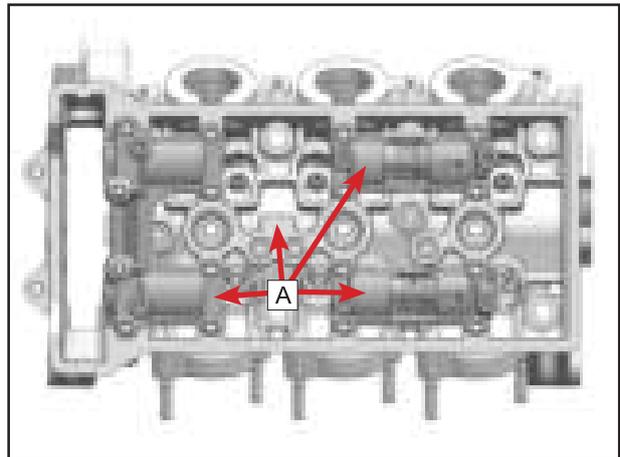
Check the thermostat seat seal ring **2** for cracking, hardening or other damage. If found, replace it with a new one.



## 5.4.12 Cylinder Head Installation

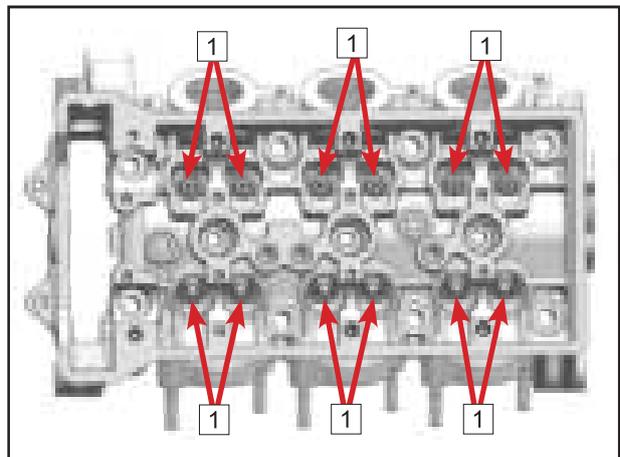
**NOTE: The cylinder head and each cam bearing covers are installed according to matching marks.**

**A**: Matching marks



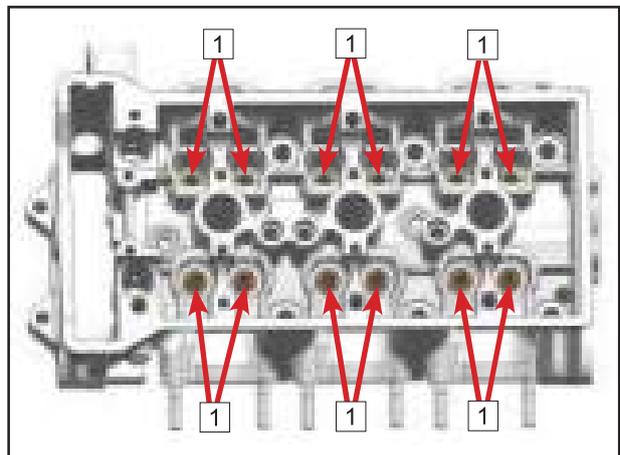
Clean all parts thoroughly before assembly.

Install valve spring lower seat **1**.



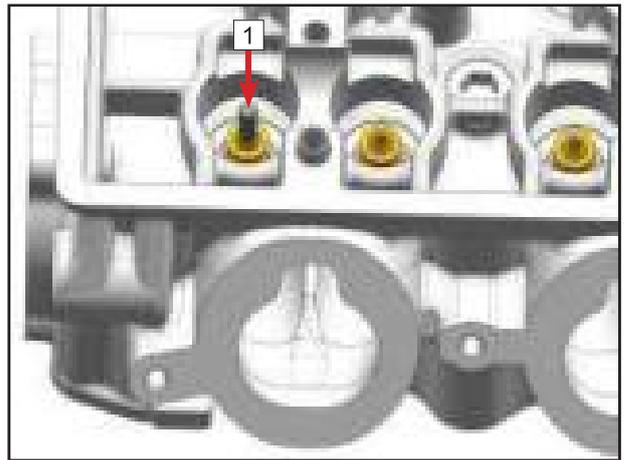
Apply appropriate amount of oil to the valve guide.

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).

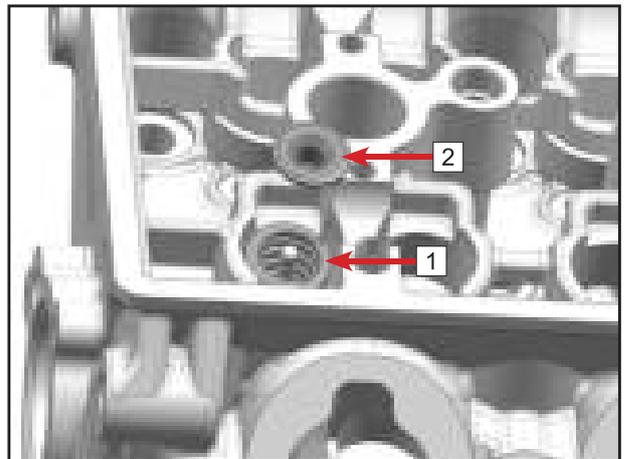
**NOTE: Be careful when sliding the valve stem over the seal lip of the seal.**



Install valve spring **1**.

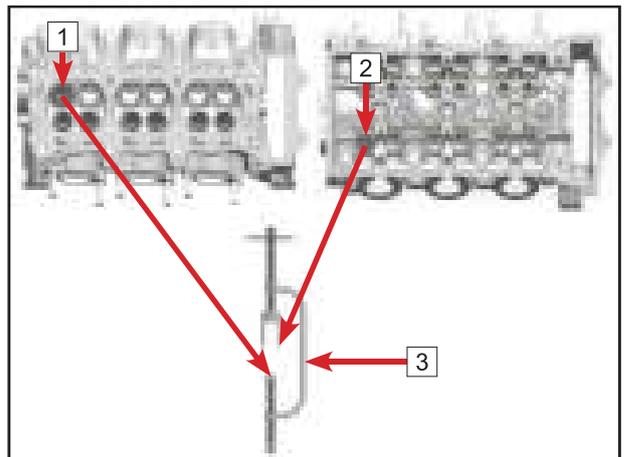
**NOTE: The painted end of valve spring faces up.**

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.



# CFMOTO

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.

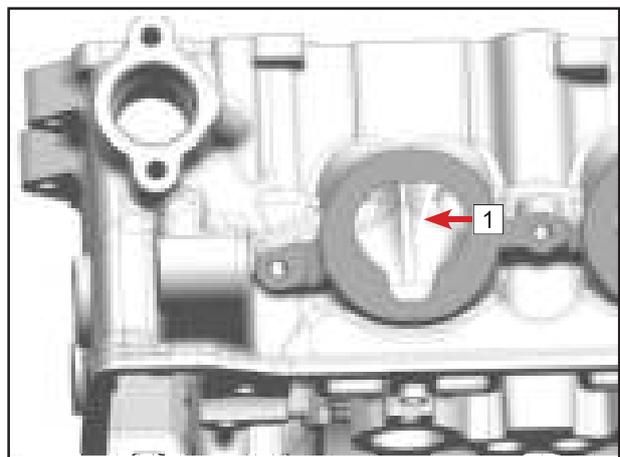
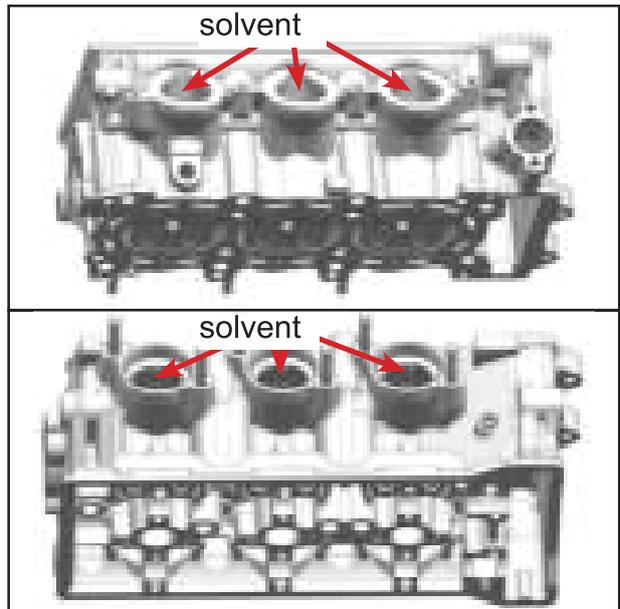
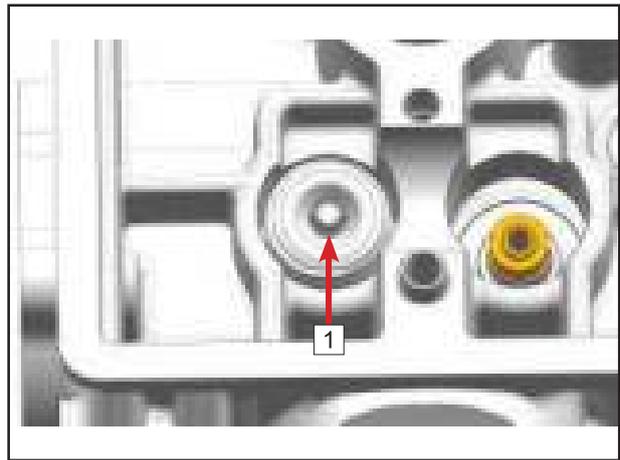
Check the sealing of cylinder head.  
**Cylinder Head Sealing Inspection**  
— **Liquid Inspection**

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**

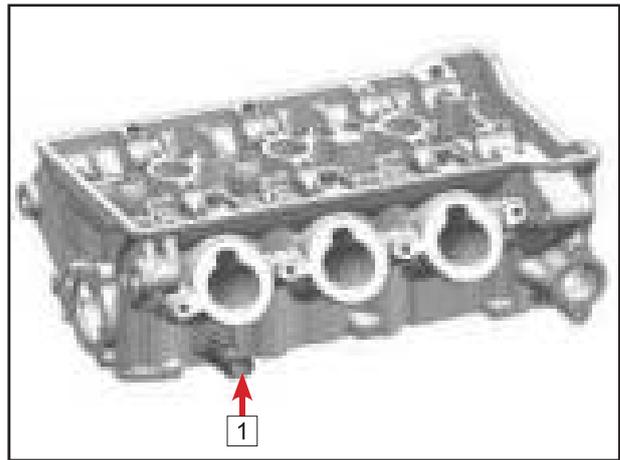
When there is no suitable cleaning solvent, use light inspection. Align the bottom of the cylinder head with the light source. Observe the valve seat ring from the intake and exhaust channel for light leakage **1**.

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.

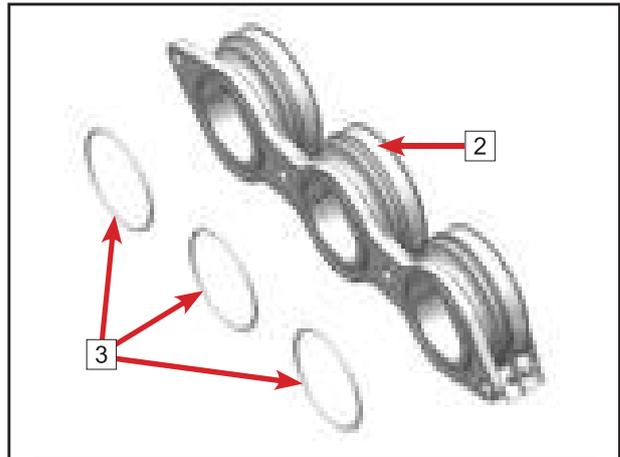


Install coolant temperature sensor and tighten to specified torque.

<b>Coolant Temperature Sensor</b> 1	
Torque	14 N•m (10.3 ft-lb.)

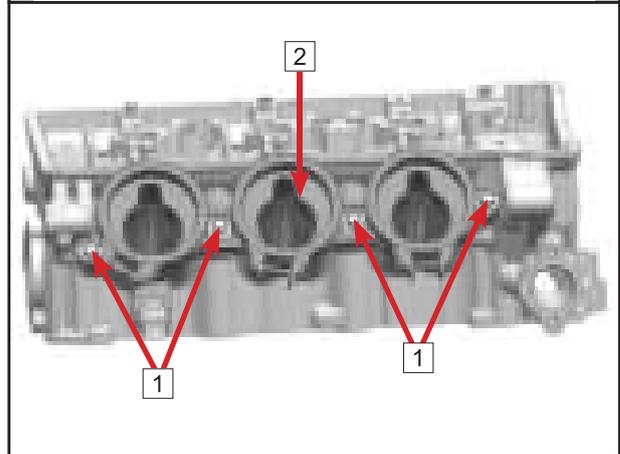


Install the O-ring (3) on the throttle body connecting pipe assembly (2).

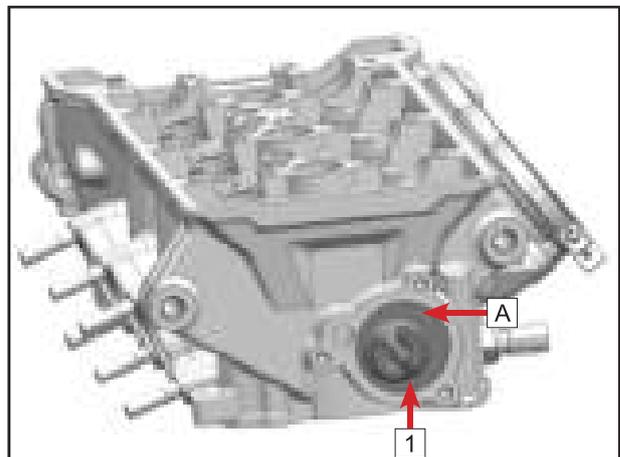


Place the throttle body connecting pipe assembly (2) in place. Install bolts (1), and tighten to the specified torque.

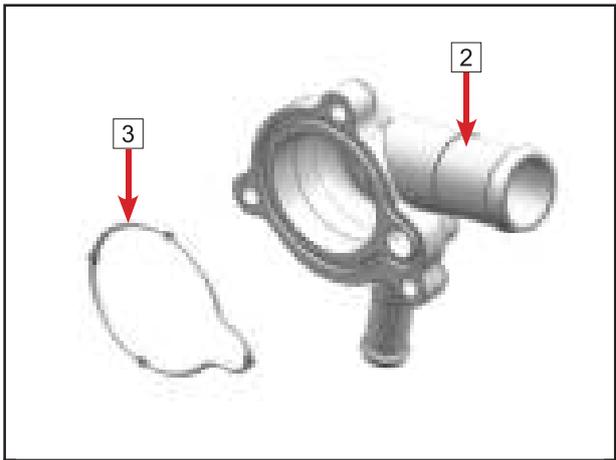
<b>Throttle Body Connecting Pipe Bolt</b> 1	
Torque	10 N•m (7.3 ft-lb.)



Install thermostat (1), hole (A) faces up.

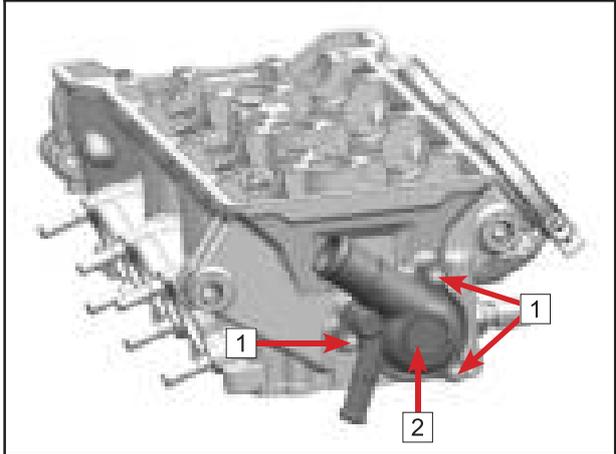


Install thermostat cover seal ring **3** to thermostat cover **2**.



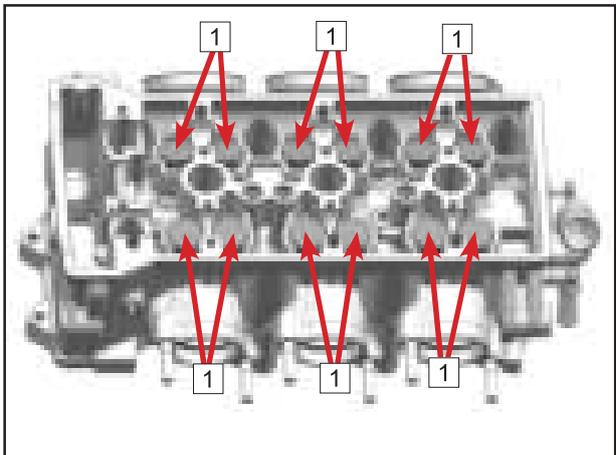
Place the thermostat cover **2** in place. Install bolts **1** and tighten to specified torque.

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



Apply a mixture of oil and MoS<sub>2</sub> grease (weight ratio 10:1) on the outer surface of the valve tappet **1**.

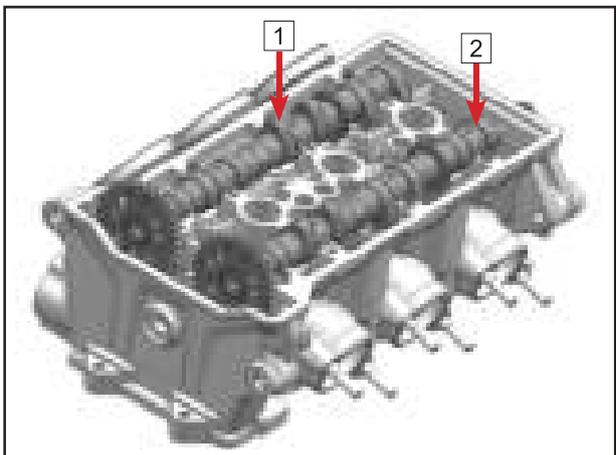
Install the corresponding tappet **1** in each corresponding tappet hole.



### 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 cam bearing cover on the cylinder head.

Arrow marks **A** toward the side of cylinder head chain chamber.

**NOTE: The cylinder head and each cam bearing covers are fitted according to the matching marks.**

Install cam bearing cover bolts and tighten them in three steps according to the sequence of **1~16**.

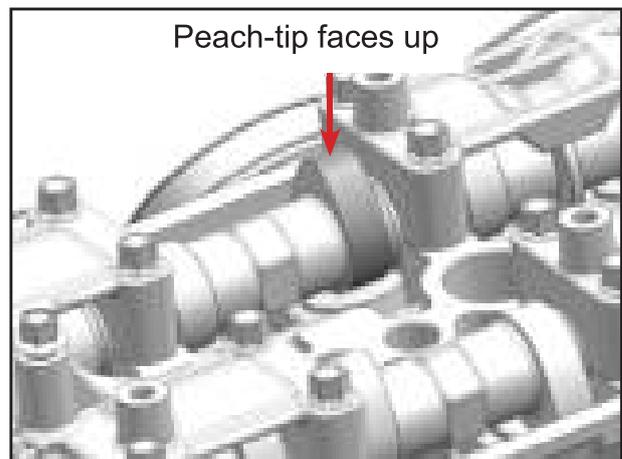
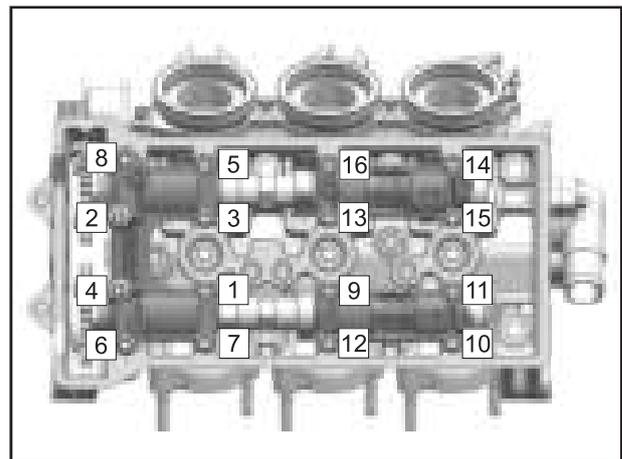
Cam bearing cover bolts **2 4**: M6×65

Rest cam bearing cover bolts: M6×45

Cam Bearing Cover 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.

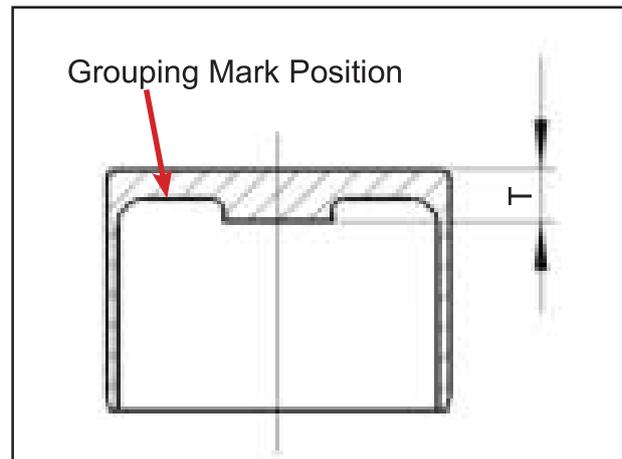
Valve Clearance (Cold Engine)	
Intake Valve	0.1 ~ 0.15 mm (0.00394 ~ 0.00591 in)
Exhaust Valve	0.25 ~ 0.31 mm (0.00984 ~ 0.01220 in)



# CFMOTO

Valve tappets are grouped according to thickness T as follows:

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

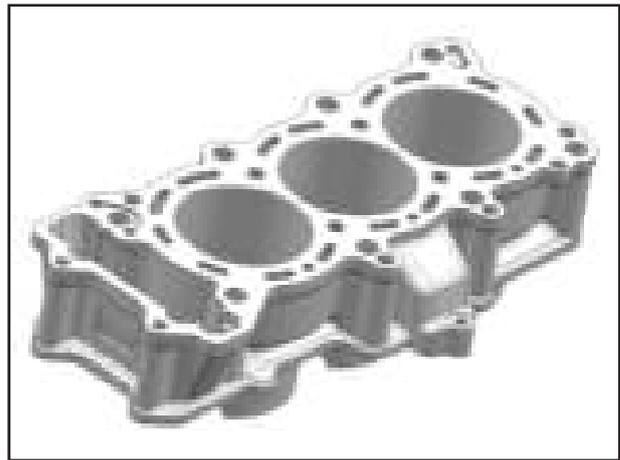


## 5.4.13 Cylinder Body Inspection/ Measurement

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.

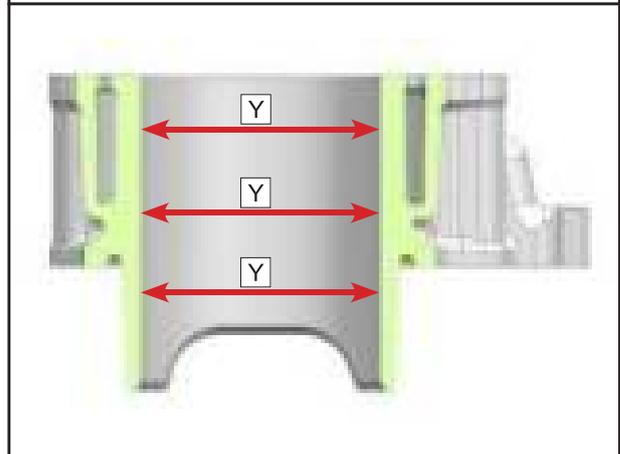
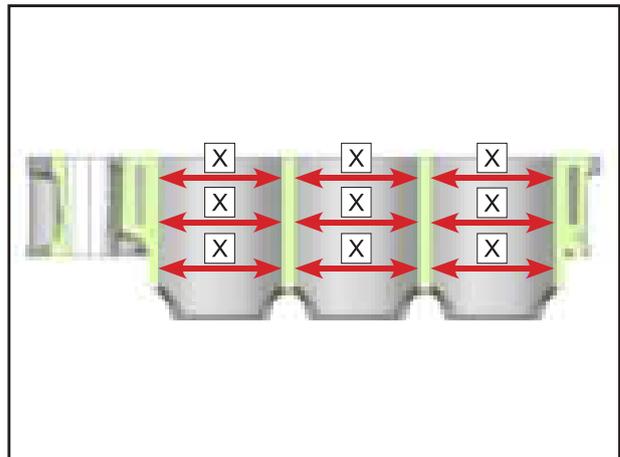
Replace the cylinder body if necessary.



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.

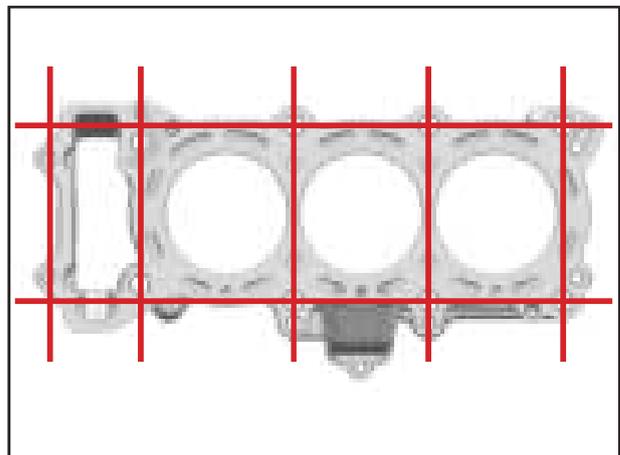
Cylinder Bore Diameter	
New Part	72.000 ~ 72.019 mm (2.83465 ~ 2.8539 in)
Service Limit	72.05 mm (2.83661 in)

**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	72.000 ~ 72.010 mm (2.83465 ~ 2.83501 in)
II	72.010 ~ 72.019 mm (2.83501 ~ 2.8539 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 mm (0.3937 in)
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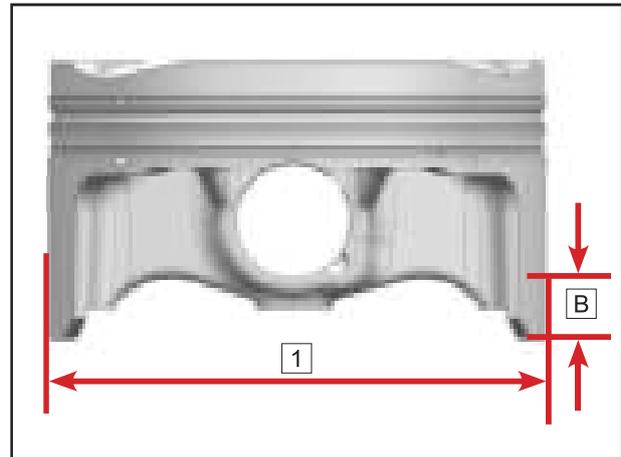
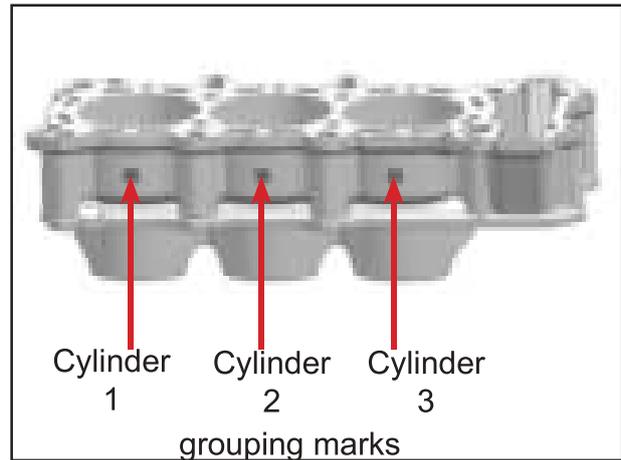
Diameter of Piston Skirt <span style="border: 1px solid black; padding: 0 2px;">1</span>	
New Part	71.960 ~ 71.975 mm (2.83307 ~ 2.83366 in)
Service Limit	71.930 mm (2.83189 in)

#### 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	0.033 ~ 0.052 mm (0.00130 ~ 0.00205 in)
Service Limit	0.08 mm (0.00315 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.

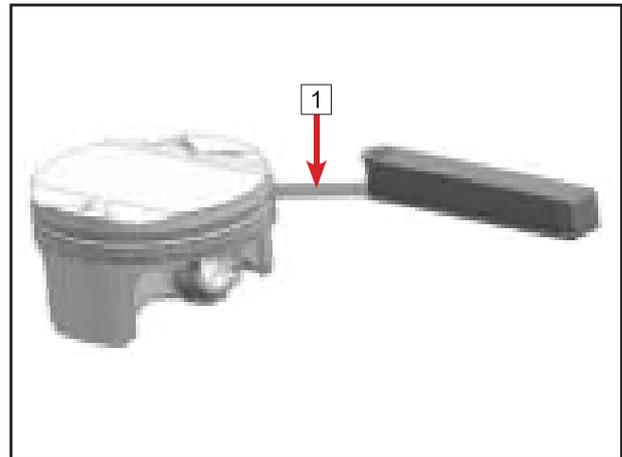
**NOTE: The old piston ring can be used to clean the piston ring groove.**

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	
<b>The First Gas Ring</b>	
New Part	0.02 ~ 0.06 mm (0.00079 ~ 0.00236 in)
Service Limit	0.15 mm (0.00591 in)
<b>The Second Gas Ring</b>	
New Part	0.02 ~ 0.06 mm (0.00079 ~ 0.00236 in)
Service Limit	0.15 mm (0.00591 in)
<b>Oil Ring</b>	
New Part	0.01 ~ 0.15 mm (0.00039 ~ 0.00591 in)
Service Limit	0.17 mm (0.00669 in)

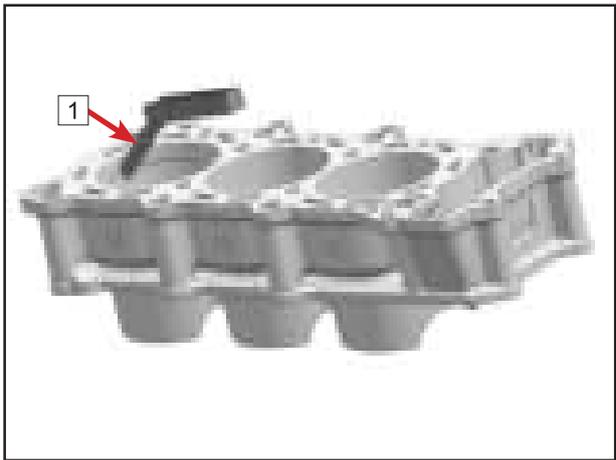


## Piston Ring Opening Clearance

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.

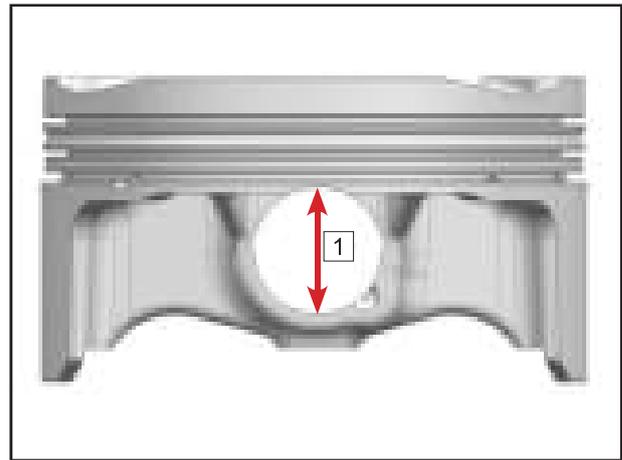


<b>Piston Ring Opening Clearance</b>	
<b>The First Gas Ring</b>	
New Part	0.15 ~ 0.30 mm (0.00591 ~ 0.01181 in)
Service Limit	0.55 mm (0.02165 in)
<b>The Second Gas Ring</b>	
New Part	0.10 ~ 0.30 mm (0.00394 ~ 0.01181 in)
Service Limit	0.55 mm (0.02165 in)
<b>Oil Ring</b>	
New Part	0.2 ~ 0.7 mm (0.00787 ~ 0.02756 in)
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 [1]	
Standard	17.002 ~ 17.008 mm (0.66937 ~ 0.66961 in)
Service Limit	17.035 mm (0.67070 in)



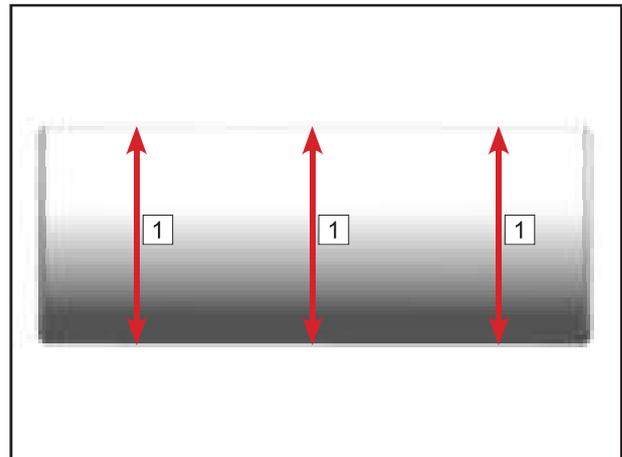
## Piston Pin Diameter

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 [1]	
Standard	16.992 ~ 16.997 mm (0.66898 ~ 0.66917 in)
Service Limit	16.980 mm (0.66850 in)



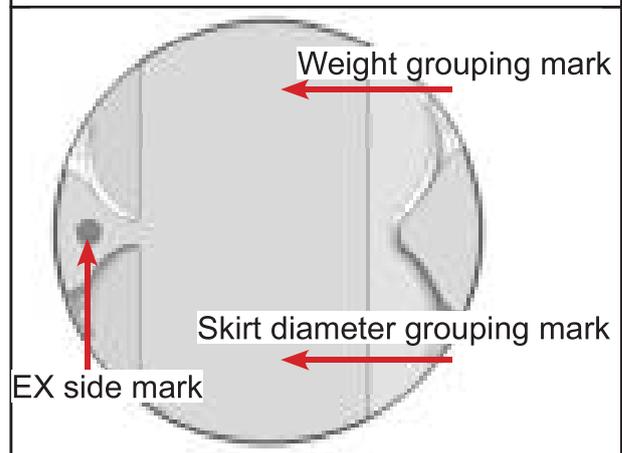
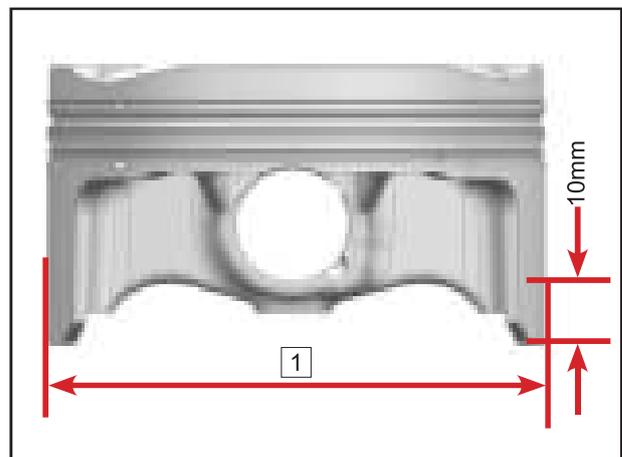
## Piston Grouping

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.

Piston (New Part)	
Mark	Skirt diameter [1]
I	71.960 ~ 71.967 mm (2.83307 ~ 2.83335 in)
II	71.967 ~ 71.975 mm (2.83335 ~ 2.83366 in)

Piston (New Part)	
Mark	Weight
O	152.3 ~ 155.3 g
no Mark	155.4 ~ 158.3 g

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



# CFMOTO

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

Piston Skirt Diameter Grouping Mark	Cylinder Bore Grouping Mark
1	1
2	2

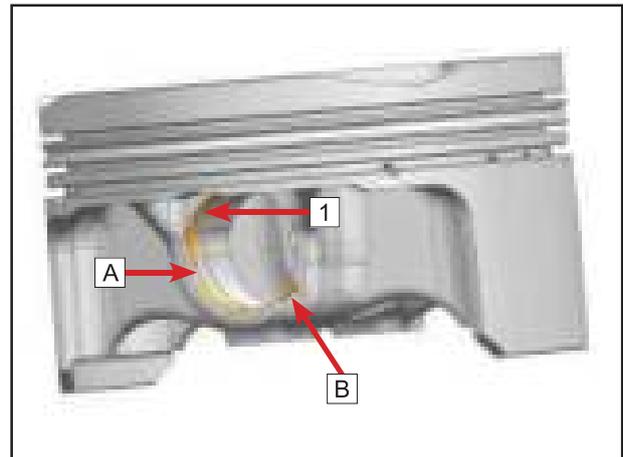
The grouping of cylinder bore is detailed in the section 5.4.13.

## 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.**

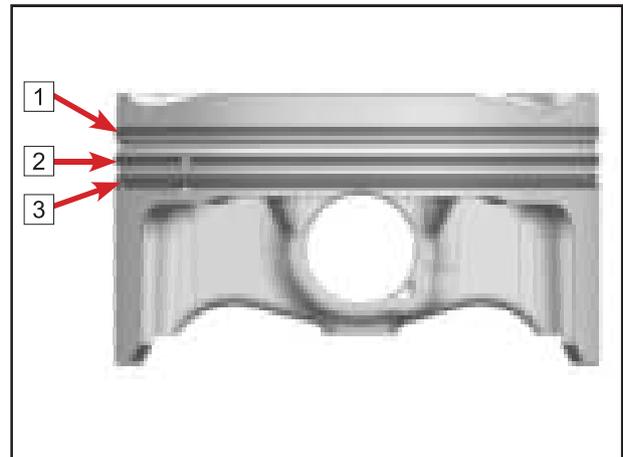
Stagger the piston pin retainer opening **A** with the piston groove notch **B**.



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

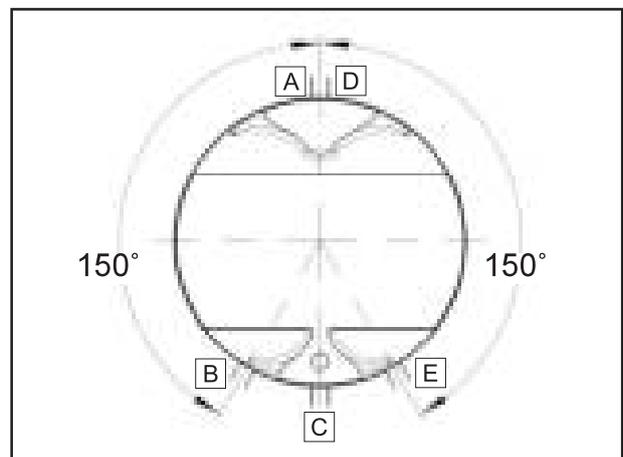
**NOTE: The mark on the piston ring faces up.**

Make sure that the piston ring rotates smoothly after installation.



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

- A**: Oil ring bushing opening position
- B**: Oil ring scraper ring (upper) opening position
- C**: The first gas ring opening position
- D**: The second gas ring opening position
- E**: Oil ring scraper ring (lower) 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.

Check the plunger **1** for serious wear or damage. Replace the tensioner if it does.

Check the housing **2** for damage. Replace the tensioner if it does.

Press plunger spring, and check whether the plunger bounces smoothly. If the rebound is rough or stuck, replace the tensioner.

Check tensioner seal ring **3** and O-ring **4** for brittleness, hardening or damage. If yes, replace with new ones.

Check the tensioner plate **1** for serious wear or damage. Replace tensioner plate if it does.

Check chain guide **2** for serious wear or damage. Replace chain guide if it does.

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

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

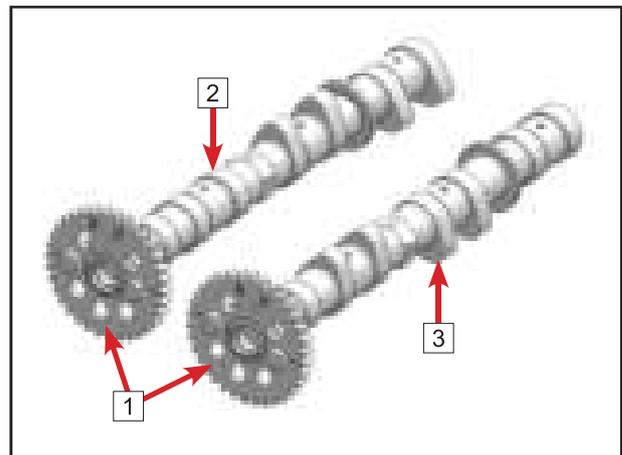
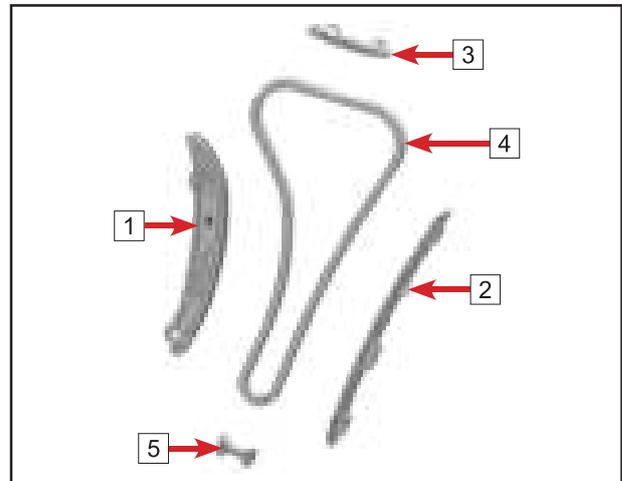
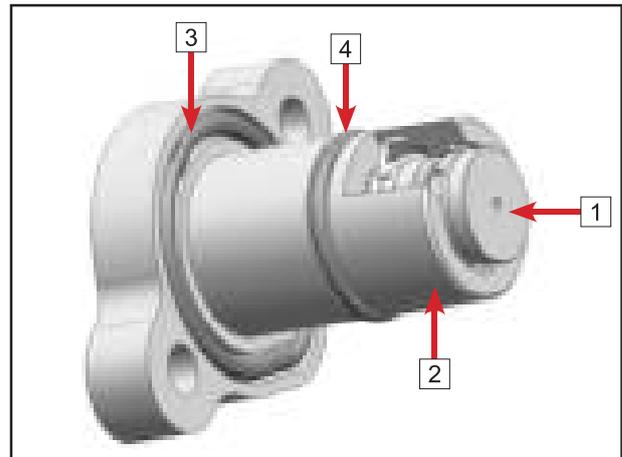
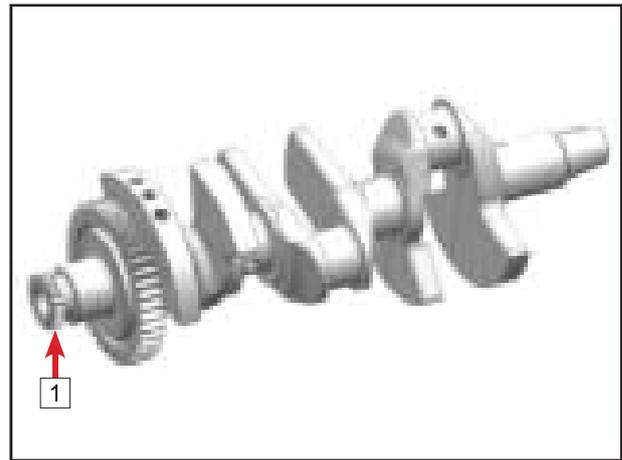
Check whether the link of timing chain **4** moves freely. If stiff, replace the timing chain.

Check the chain guard **5** for excessive wear or damage. If yes, replace the chain guard.

### Camshaft Assembly

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

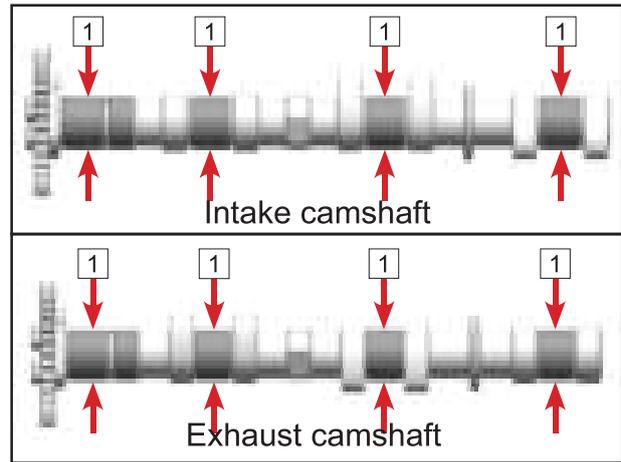
Inspect each cam and bearing journal of air intake camshaft **2** and exhaust camshaft **3** for nicks, scratches, cracks or other damages. Replace the camshaft if necessary.



# CFMOTO

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

Camshaft Journal Diameter 1 (IN&EX)	
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.

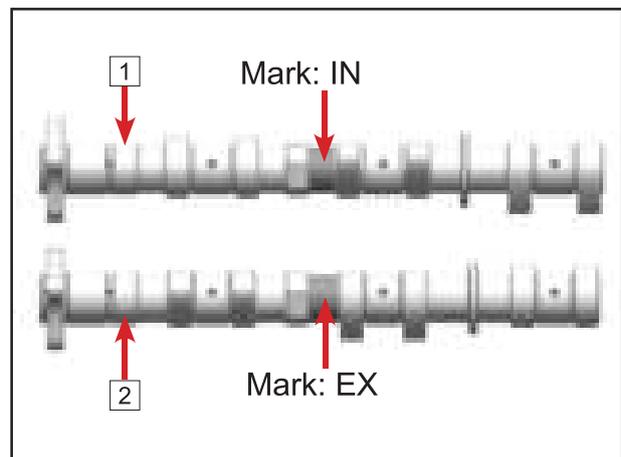
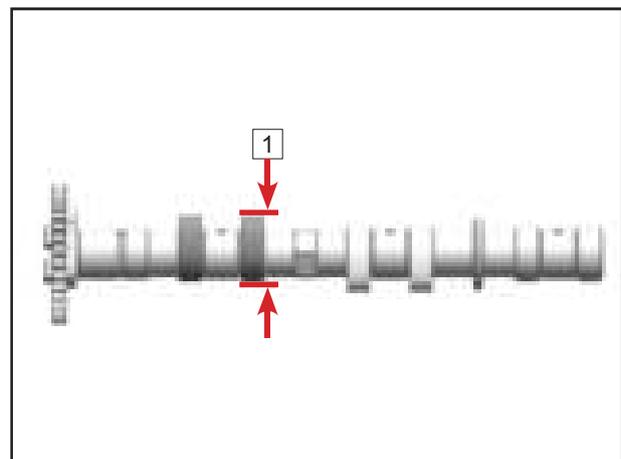
Inspect the clearance between the camshaft journal and the camshaft bearing hole. If the clearance exceeds service limit, replace the camshaft or cylinder head with a new one.

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

Camshaft Journal/Camshaft Bearing Hole Clearance	
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.

Cam Height 1	
<b>Intake Camshaft</b>	
New Part	33.945 ~ 34.055 mm (1.33642 ~ 1.34075 in)
Service Limit	33.845 mm (1.33248 in)
<b>Exhaust Camshaft</b>	
New Part	32.945 ~ 33.055 mm (1.29705 ~ 1.30138 in)
Service Limit	32.845 mm (1.29311 in)



## Camshaft Identification

- 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 and assembled in the same way.**

### Removal

Remove bolts [1].

Remove the timing sprocket [2] from camshaft assembly [3].

### Assembly

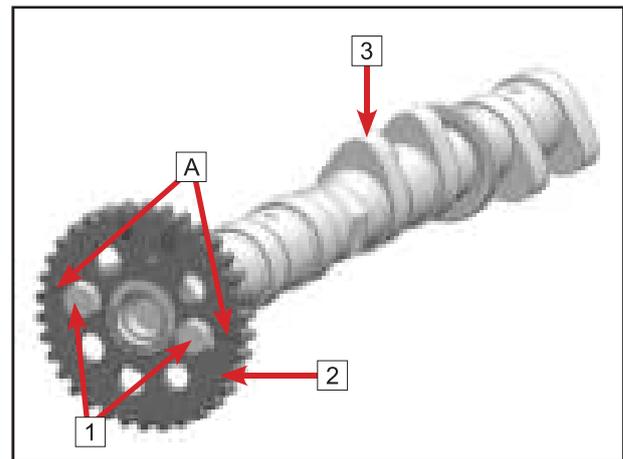
Align the timing sprocket roller hole with the needle roller on the camshaft, and install the timing sprocket [2] to the camshaft assembly [3].

**NOTE: The line mark [A] on the timing sprocket faces outward.**

Apply 243 thread locker to the bolts [1].

Install bolts [1], and tighten to the specified torque.

Timing Sprocket Bolt	
Torque	15 N•m (11.1 ft-lb.)



## 5.4.16 Crankshaft Assembly and Connecting Rod Assembly Inspection

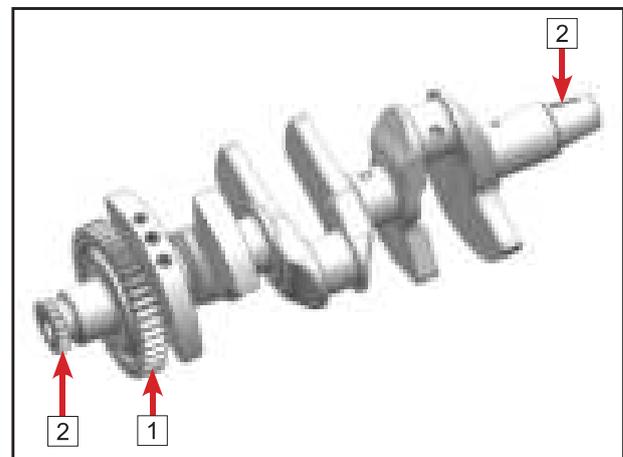
### Crankshaft Assembly

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

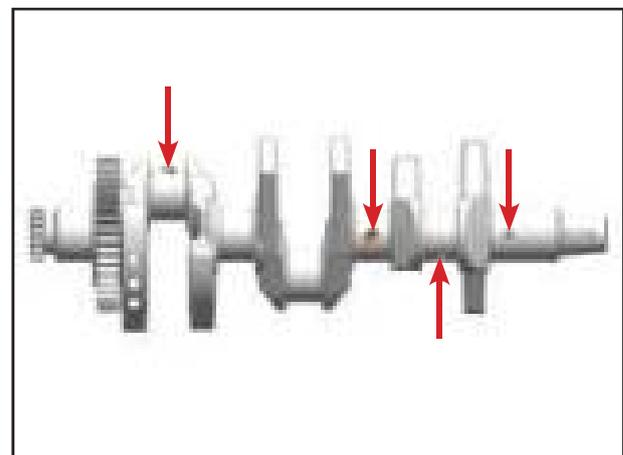
Check output gear [1] and timing drive sprocket [2] for excessive wear or other damage.

Check the keyway [A] on the crankshaft for excessive wear or other damage.

Replace with new crankshaft assembly if necessary.



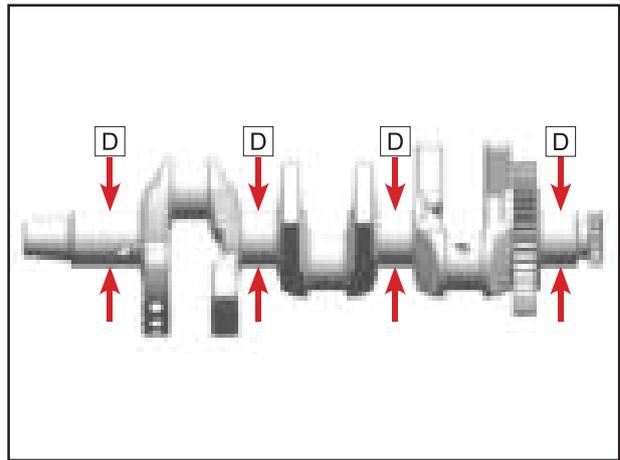
Use compressed air to blow the oil holes and make sure they are not clogged.



# CFMOTO

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	31.985 ~ 32.000 mm (1.25925 ~ 1.25984in)
Service Limit	31.965 mm (1.25746 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

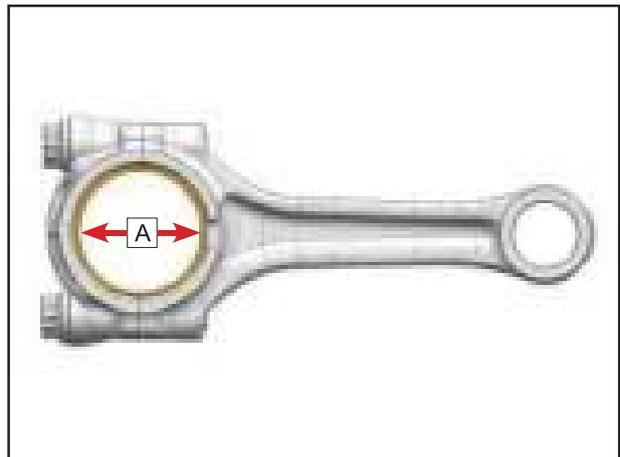
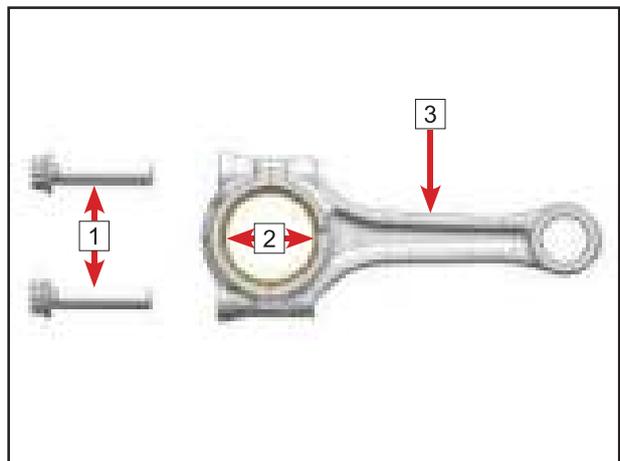
Install the connecting rod bearing  $\square 2$  as in the initial state.

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

Step 1 Torque	20 N·m $\pm$ 2 N·m (14.74 ft-lb. $\pm$ 1.47 ft-lb.)
Step 2 Angle	100° $\pm$ 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	32.06 mm (1.26220 in)



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

<b>Connecting Rod Journal Diameter <b>B</b></b>	
New Part	31.985 ~ 32.000 mm (1.25925 ~ 1.25984 in)
Service Limit	31.970 mm (1.25866 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	$A - B \leq 0.08 \text{ mm (0.00315 in)}$

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

### 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 two connecting rods.

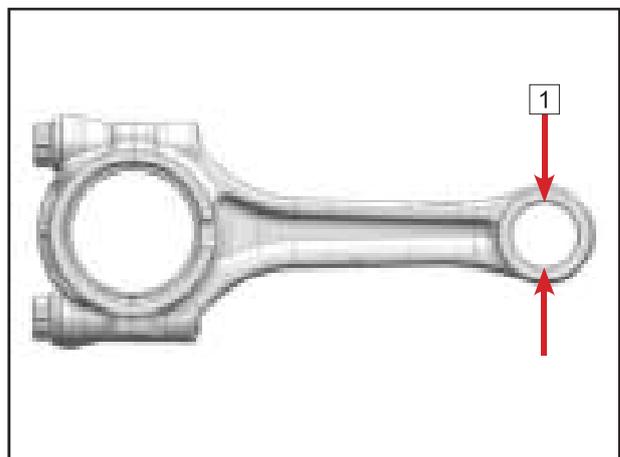
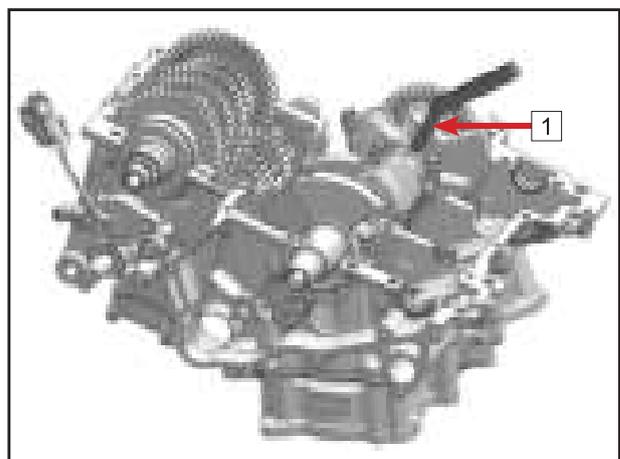
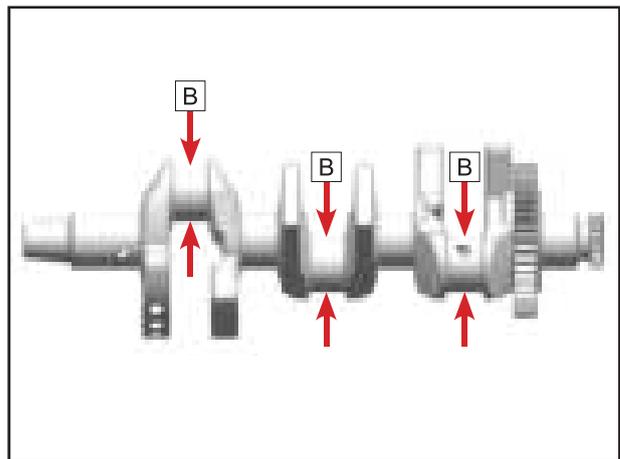
<b>Axial Clearance of Connecting Rod Big End</b>	
New Part	0.15 ~ 0.3 mm (0.00591 ~ 0.01181 in)
Service Limit	0.45 mm (0.01772 in)

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.

<b>Inner Diameter of Connecting Rod Small End Hole <b>1</b></b>	
New Part	17.015 ~ 17.025 mm (0.66988 ~ 0.67028 in)
Service Limit	17.055 mm (0.67146 in)



## 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.

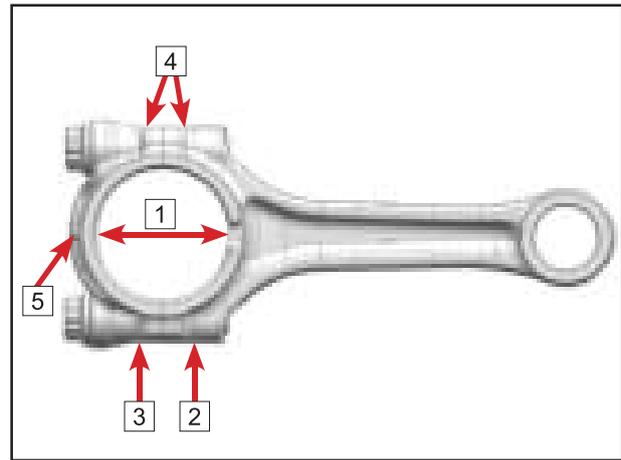
[2]: Crank bore diameter [1] grouping mark

[3]: Connecting rod weight mark position

[4]: Matching mark

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

[5]: Mounting orientation mark (the bulge on the connecting rod)



**Crank Bore (New Part)**

Mark	Diameter [1]
1	35.000 ~ 35.008 mm (1.37795 ~ 1.37827 in)
2	35.008 ~ 35.015 mm (1.37827 ~ 1.37854 in)

**Connecting Rod Weight G (New Part)**

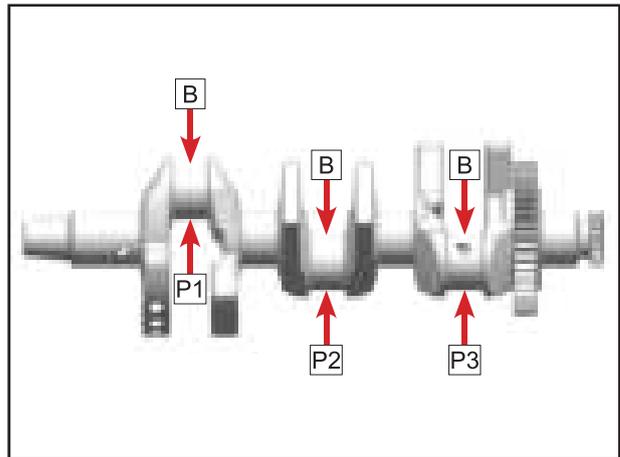
Mark	Weight (g)
296	$295 \leq G < 297$
298	$297 \leq G < 299$
300	$299 \leq G < 301$
302	$301 \leq G < 303$
304	$303 \leq G < 305$
306	$305 \leq G < 307$
308	$307 \leq G < 309$
310	$309 \leq G < 311$
312	$311 \leq G < 313$
314	$313 \leq G < 315$

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

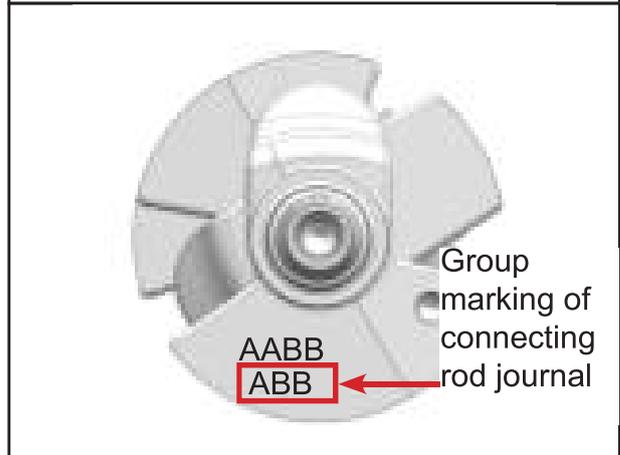
## Crankshaft Connecting Rod Journal Grouping

Crankshaft connecting rod journal diameter  $\square B$  grouping is shown in the table below.

Connecting Rod Journal (New Part)	
Mark	Diameter $\square B$
B	31.985 ~ 31.992 mm (1.25925 ~ 1.25953 in)
A	31.992 ~ 32.000 mm (1.25953 ~ 1.25984 in)



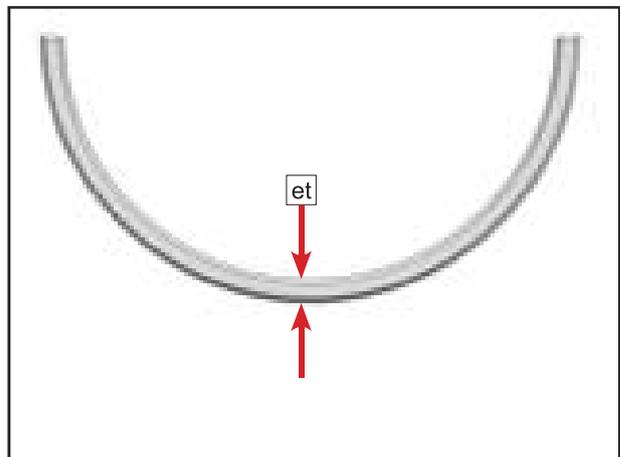
The group marking position of crankshaft connecting rod journal is shown in the example on the right, from left to right are the group marking of P1, P2, and P3.



## Connecting Rod Bearing Grouping

The grouping of connecting rod bearing thickness  $\square et$  is shown in the table below.

Connecting Rod Bearing (New Part)	
Color Mark	Thickness $\square et$
Red	1.482 ~ 1.486 mm (0.05835 ~ 0.05850 in)
Black	1.486 ~ 1.490 mm (0.05850 ~ 0.05866 in)
Blue	1.490 ~ 1.494 mm (0.05866 ~ 0.05882 in)

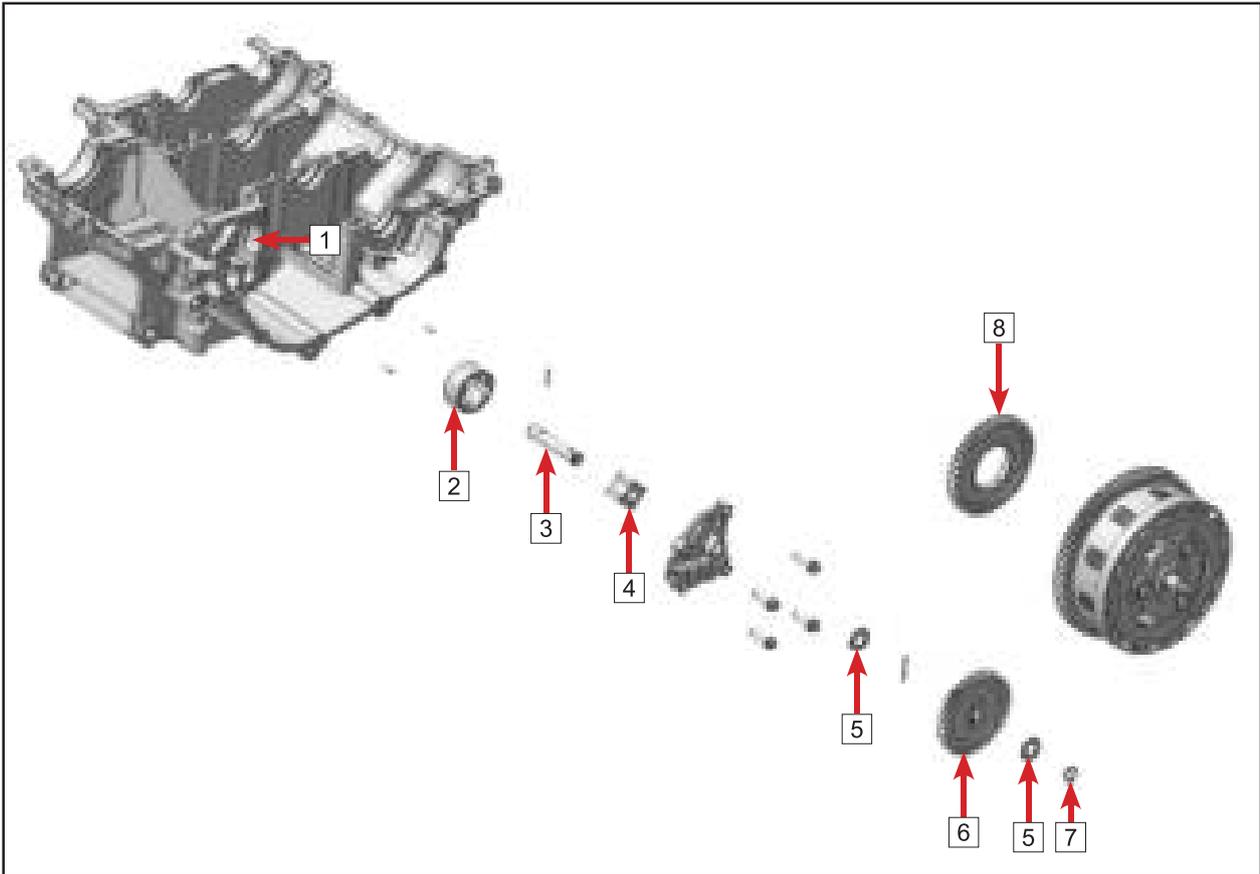


## Connecting Rod Bearing Selection

Select connecting rod bearing as following table.

Connecting Rod Bore Mark	Crankshaft Connecting Rod Journal Mark	Connecting Rod Bearing Color
1	A	Red
1	B	Black
2	A	Black
2	B	Blue

## 5.4.17 Oil Pump Inspection



Check oil pump cavity [1] of lower crankcase for excessive wear or damage. If found, replace crankcase.

Check oil pump inner rotor [4] and outer rotor [2] for excessive wear or damage. If found, replace oil pump rotors as a set.

Check oil pump shaft [3] for excessive wear or damage. If found, replace oil pump shaft.

Check oil pump gear [6] for excessive wear or damage. If found, replace oil pump gear.

Check oil pump drive gear [8] for excessive wear or damage. If found, replace oil pump drive gear.

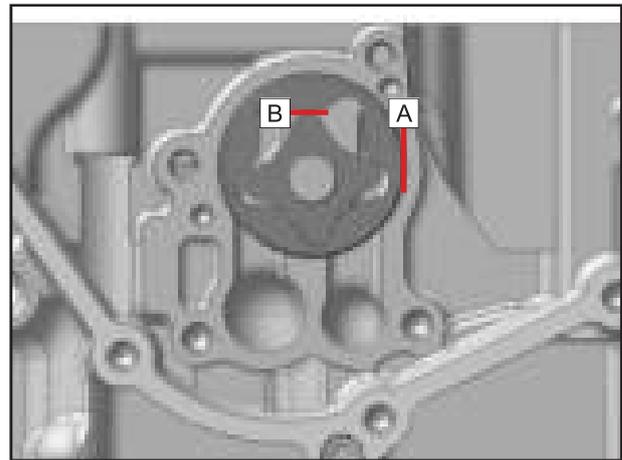
Check washer [5] for excessive wear or damage. If found, replace washer.

Use new retainer [7] for each service.

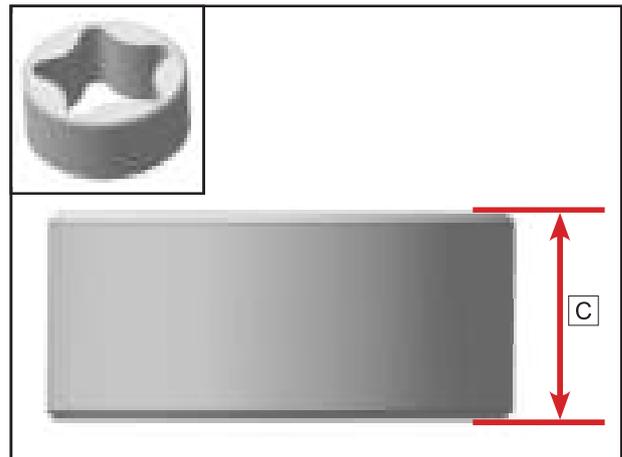
Use a feeler to measure the clearance **A** between the outer rotor and the oil pump cavity, and the clearance **B** between the inner rotor and outer rotor.

Oil Pump	
Clearance between the outer rotor and the oil pump cavity	<b>A</b> ≤0.21 mm
Clearance between inner rotor and outer rotor	<b>B</b> ≤0.2 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.



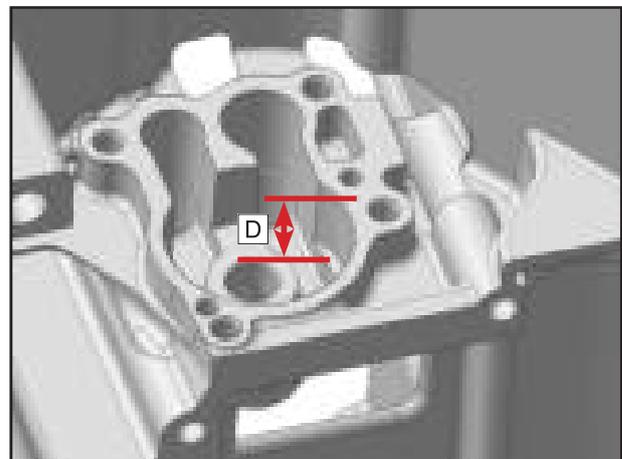
Use a micrometer to measure the thickness **C** of outer rotor .



Measure the depth **D** of oil pump mounting hole with a depth ruler.

The axial clearance of oil pump is obtained by subtracting the hole depth **D** from the rotor thickness **C**.

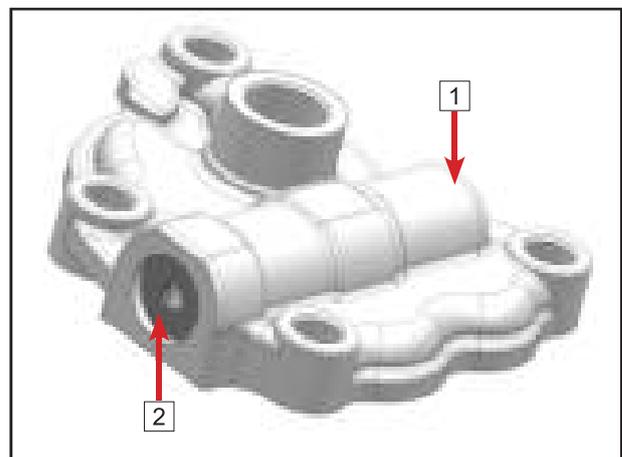
Oil Pump Axial Clearance	
Service Limit	0.15mm



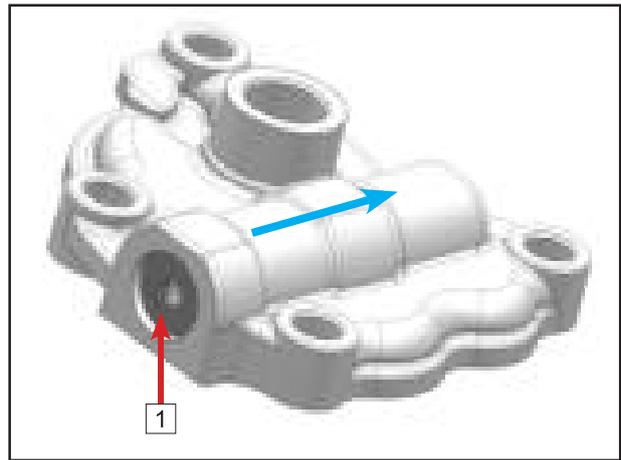
### 5.4.17.1 Oil Pump Cover/Oil Pressure Relief Valve

Check oil pump cover **1** for excessive wear or damage. If found, replace with new part.

The pressure relief valve **2** is installed on the oil pump cover.



Press the gasket **1** of the oil pressure relief valve with an appropriate tool in the direction indicated by the arrow on the right to feel whether the spring movement is smooth or not. If stuck, remove the oil pressure relief valve and carefully check the parts.

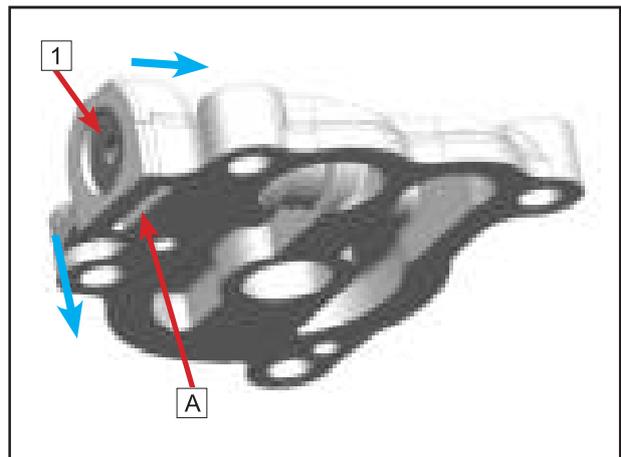


## Oil Pressure Relief Valve Removal

Push the gasket **1** to the gap **A** position of the oil pump cover with an appropriate tool, and remove the gasket **1** from the gap.

Remove spring **2**.

Remove plunger **3**.



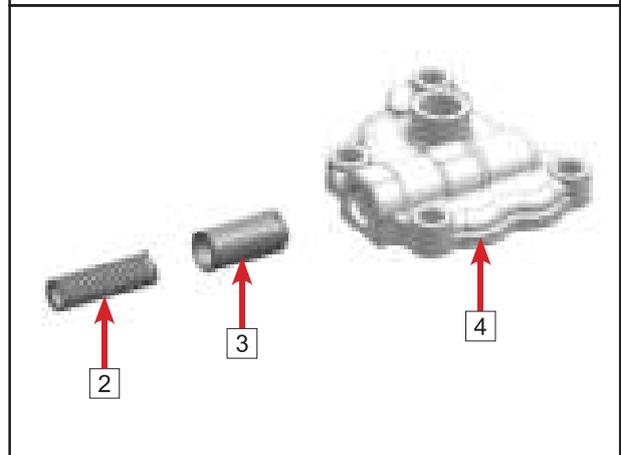
## Inspection

Check the gasket **1** for excessive wear or damage. If found, replace the gasket.

Inspect the plunger **3** for excessive wear or damage. If found, replace the plunger.

Check whether the plunger **3** can move smoothly in the oil pump cover hole. If the plunger is stuck, replace the plunger or oil pump cover **4**.

Measure the free length of the spring **2**. If the measured length is less than the limit value, replace the spring.



Spring <b>2</b> Free Length	
Service Limit	38.5 mm (1.51575 in)

## Installation

Clean all parts thoroughly.

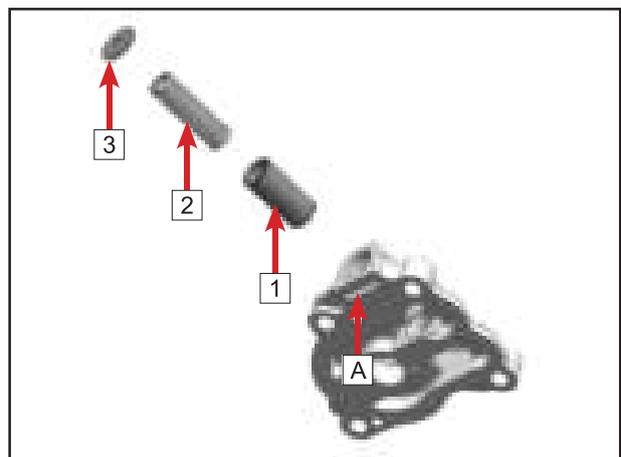
Oil the plunger and spring.

Install the plunger **1**.

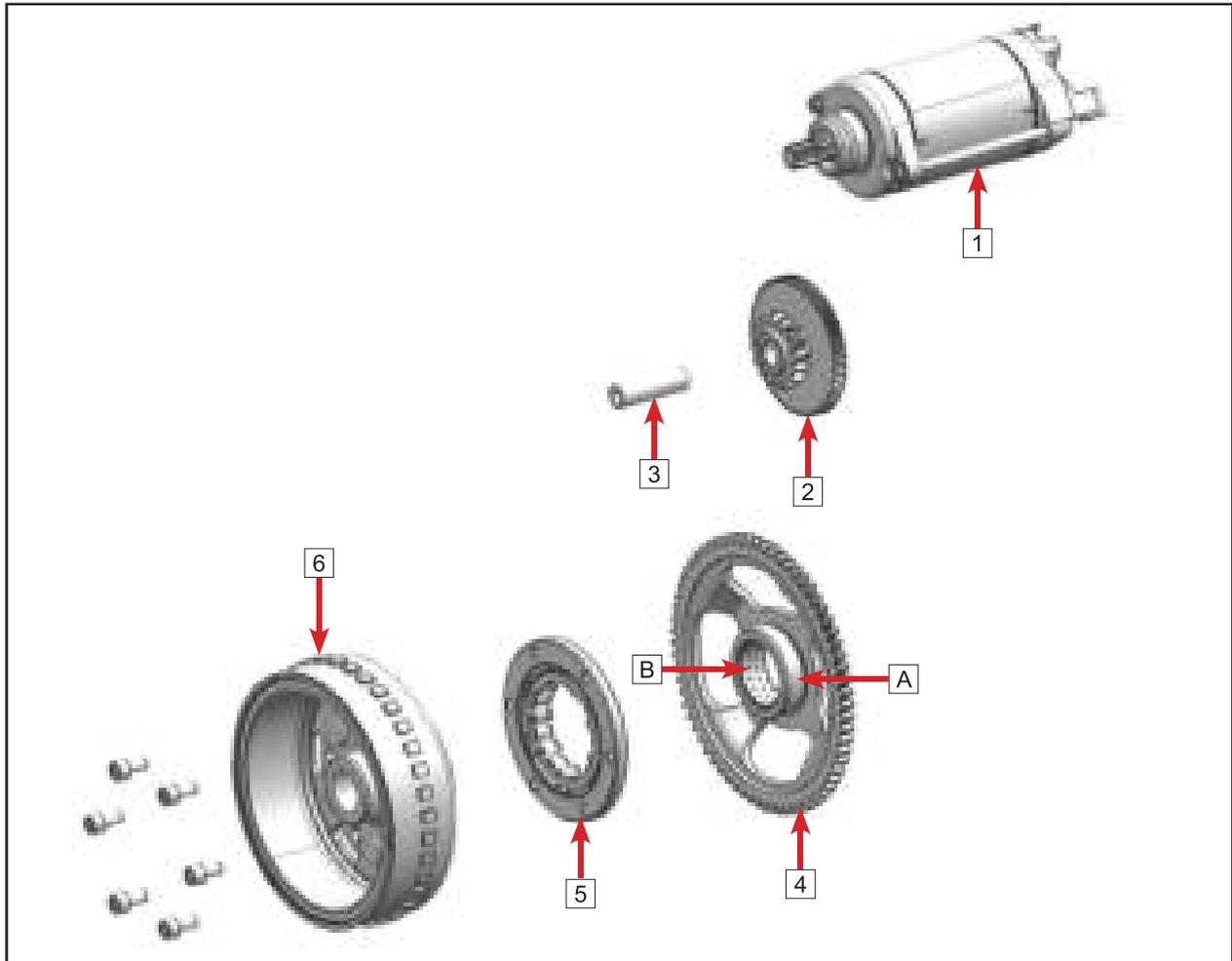
Install the spring **2**.

Use a suitable tool to compress the spring **2**, insert the gasket **3** through the gap **A** in the oil pump cover, and ensure that the gasket **3** is fully seated.

After assembly, press the gasket **3** with an appropriate tool to ensure smooth spring **2** movement without sticking.



## 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 gear shaft **3** for excessive wear or damage. If yes, replace the dual gear shaft.

Check the starter big gear assembly **4** 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 overriding clutch assembly **5** for excessive wear or damage. If yes, replace the overriding clutch assembly.

Check whether the magneto rotor **6** has the following conditions:

- Internal cone is scratched or damaged
- Excessive wear or damage to the keyway
- The trigger teeth on the rotor outer ring are tilted 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 bolts **2**.

Remove overriding clutch assembly **3**.

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

### Assembly

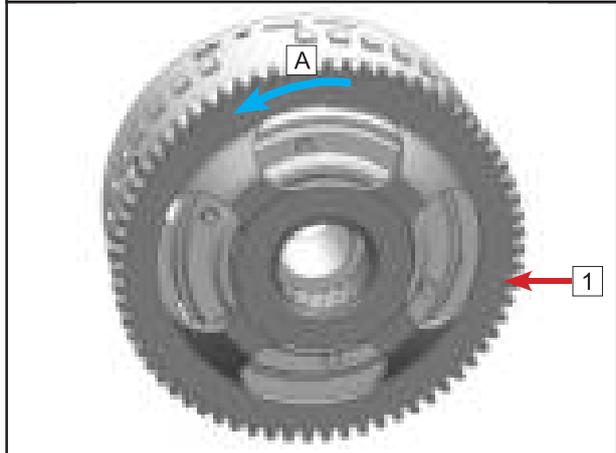
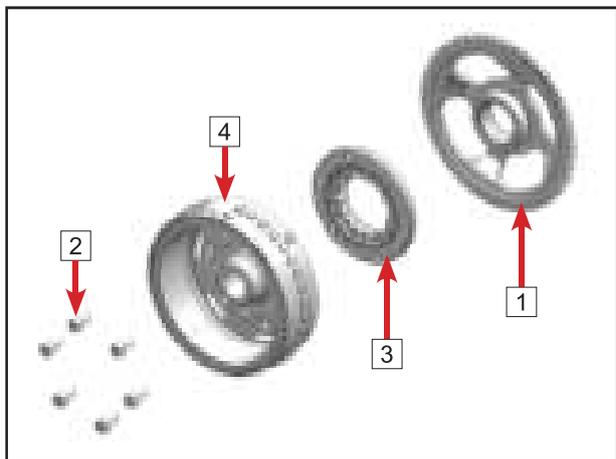
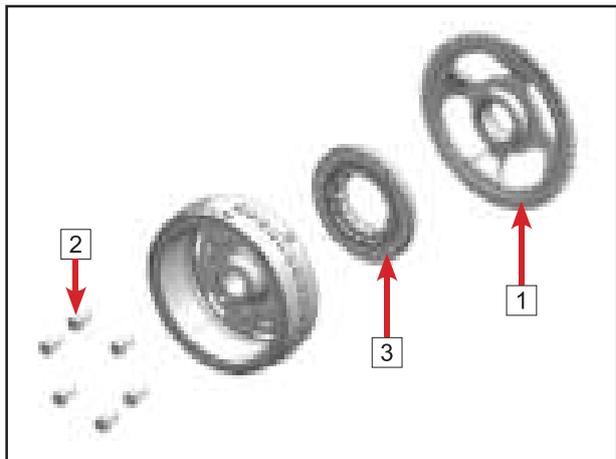
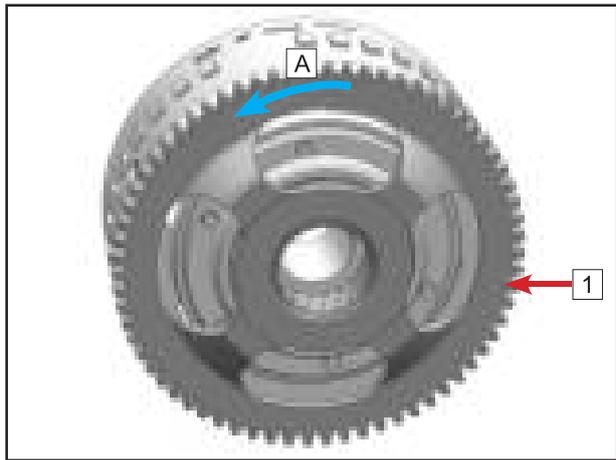
Install the overriding clutch assembly **3** on the magneto rotor **4**.

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

Install bolts **2** and cross diagonally tighten to specified torque.

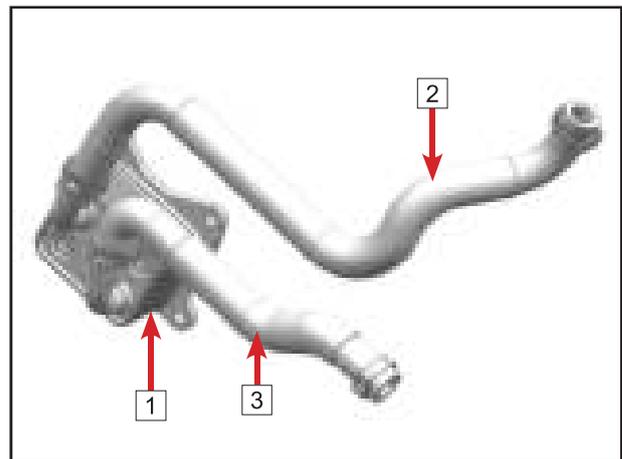
Overriding Clutch Bolt <b>2</b>	
Torque	10 N·m (7.3 ft-lb.)

Insert the starter big gear assembly **1** counterclockwise **A** into the overriding clutch, do not squeeze it in.

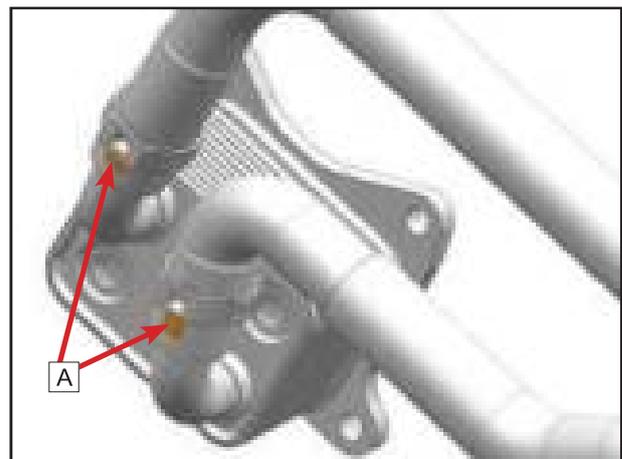


### 5.4.19 Oil Cooler and Water Pipe Inspection

Check oil cooler **1** for cracks or other damage. Replace with new parts if it does. Check oil cooler inlet hose **2**, oil cooler outlet hose **3** for damage or aging. Replace with new parts if it does.



When installing the water pipe, the mark direction **A** is as shown on the right.



## 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.

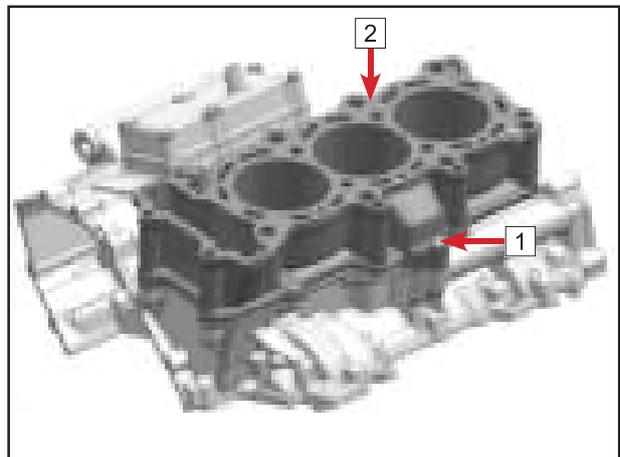
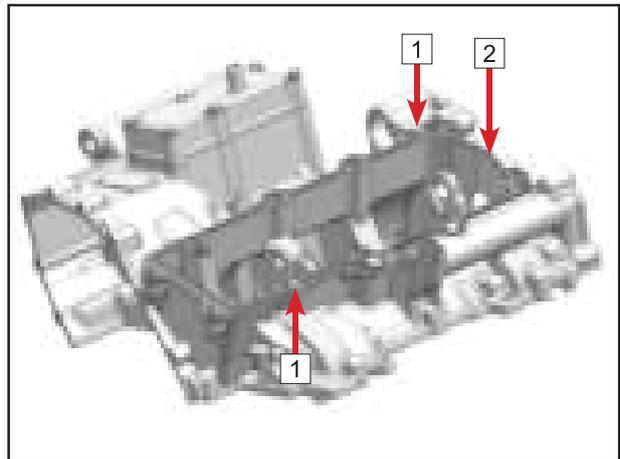
**NOTE:** Removed gaskets cannot be reused. Replace with new ones during reassembly. Any remaining gasket material on the parts must be cleaned.

### 5.5.1 Cylinder Installation

Ensure that rollers **1** are installed.  
Install new cylinder gasket **2**.

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

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



## 5.5.2 Piston and Connecting Rod Installation

**NOTE:** The operations are the same for all three pistons.

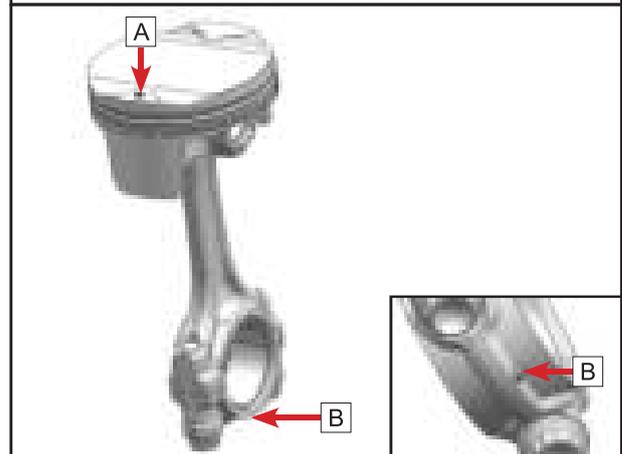
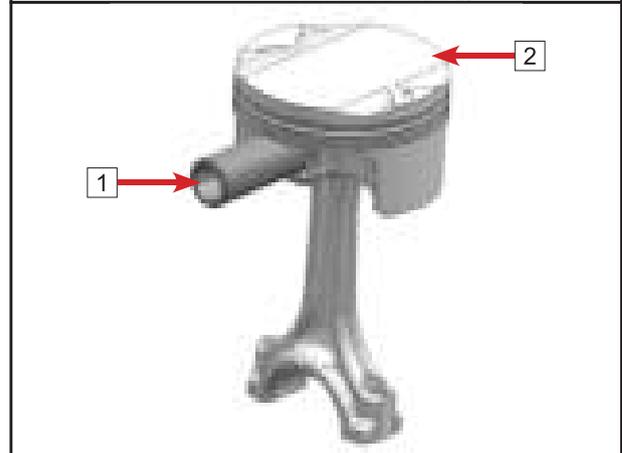
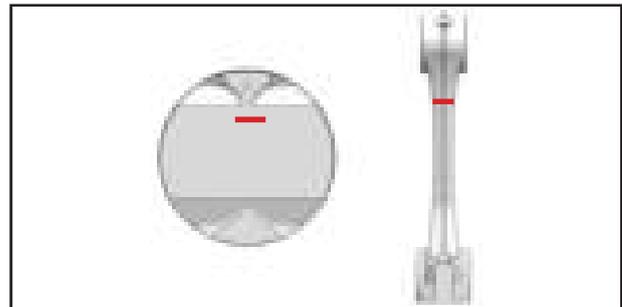
**NOTE:** Ensure that all parts are installed to the initial position marked during disassembly.

Place the piston on the related connecting rod.

**NOTE:** After the connecting rod is finally installed, the direction of the dot mark **A** on the top of piston and the bump **B** on the connecting rod cover should be as shown on the right.

Apply oil on the piston pin.

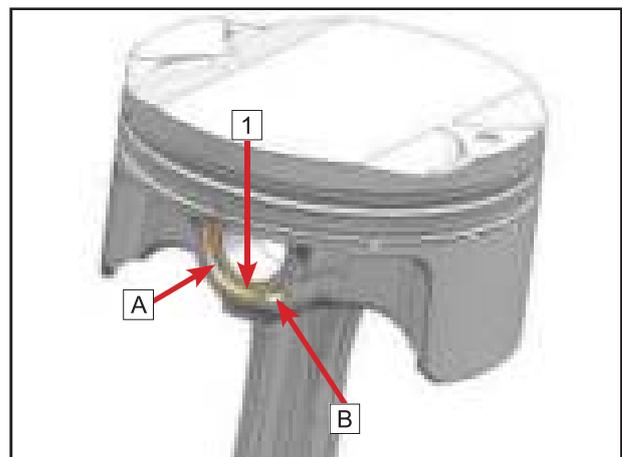
Insert the piston pin **1** into the piston and connecting rod.



Install new piston pin retainer **1**.

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

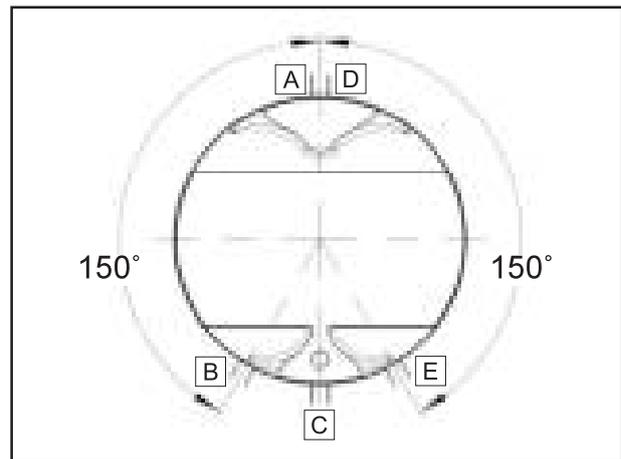
Ensure that the piston pin retainer opening **A** is staggered with the piston groove notch **B**.



# CFMOTO

Make sure the opening of piston ring is in the correct position, as shown on the right.

- [A]: Oil ring bushing ring opening
- [B]: Oil ring scraper ring (top) opening
- [C]: The first gas ring opening
- [D]: The second gas ring opening
- [E]: Oil ring scraper ring (lower) opening

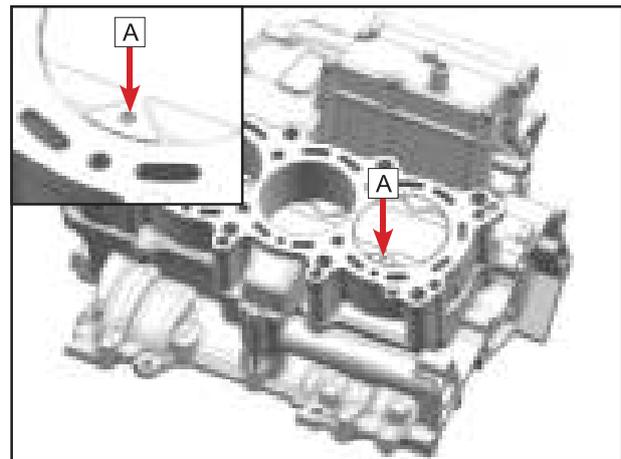


Apply oil on the cylinder bore.  
Install piston and connecting rod into the cylinder.

**NOTE: Do not damage the cylinder and piston ring.**

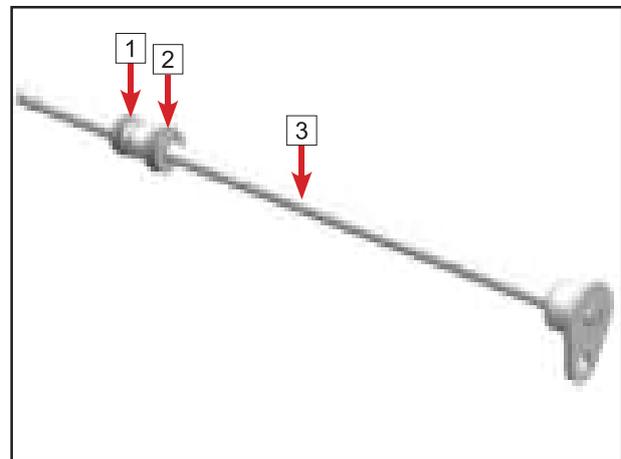
Make sure the dot mark [A] on the top of piston is facing the exhaust side.

**NOTE: When installing the piston, if the dot mark [A] in the wrong direction, it will cause serious damage to the engine.**



Make sure the O-rings [1] and [2] are installed on the oil injection pipe assembly [3].

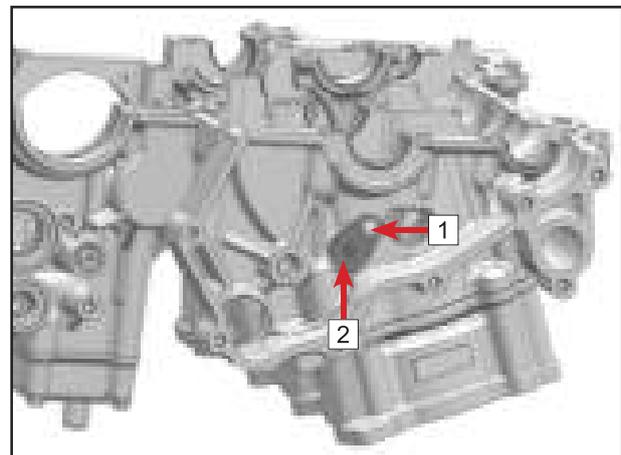
Apply oil on the O-rings [1] and [2].



Insert the oil injection pipe assembly [2] into the upper crankcase.

Install bolt [1], and tighten to the specified torque.

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

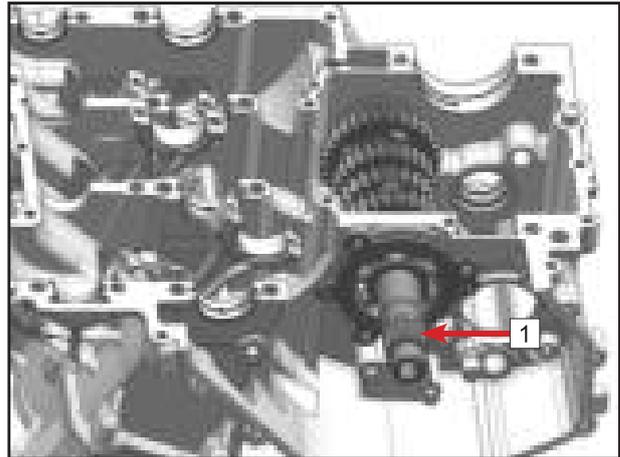


## 5.5.3 Gearshift Assembly Installation

**NOTE:** Before installation, clean all parts thoroughly and check that there is no wrong or missing installation of each part.

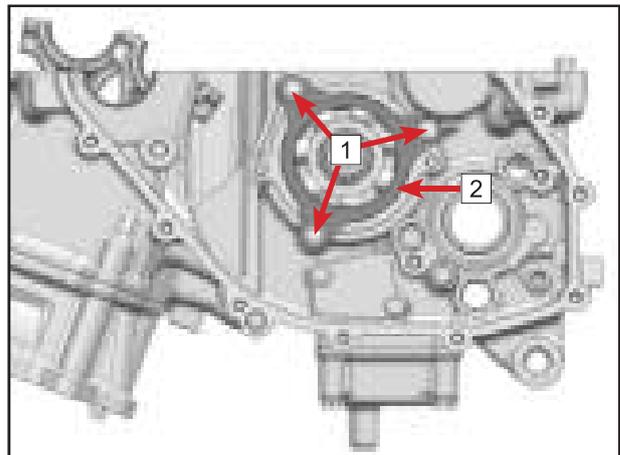
**NOTE:** Carefully lubricate each bearing journal, bearing and gear before installation.

Install main shaft assembly 1.

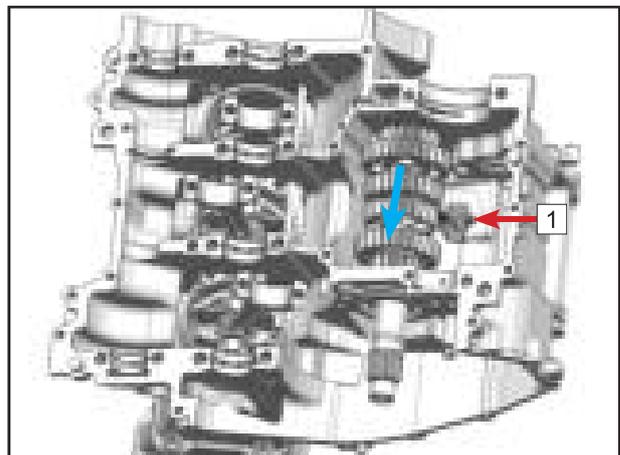


Place the bearing seat retainer 2 in place ("OUT" mark facing outward). Apply 243 thread locker on the bolts 1. Install bolts 1, and tighten to the specified torque.

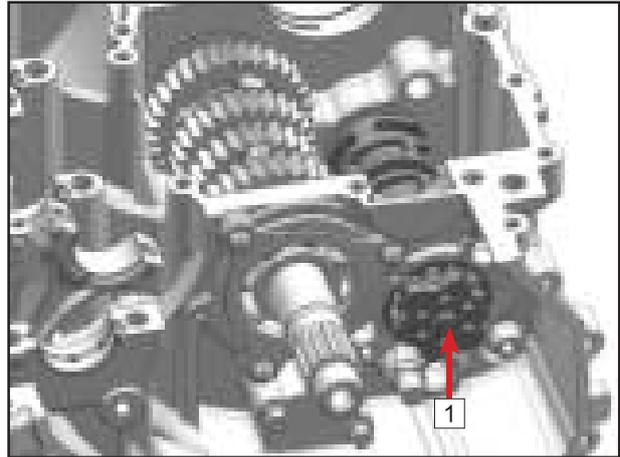
Bearing Seat Retainer Bolt <span style="border: 1px solid black; padding: 0 2px;">1</span>	
Torque	10 N·m (7.3 ft-lb.)



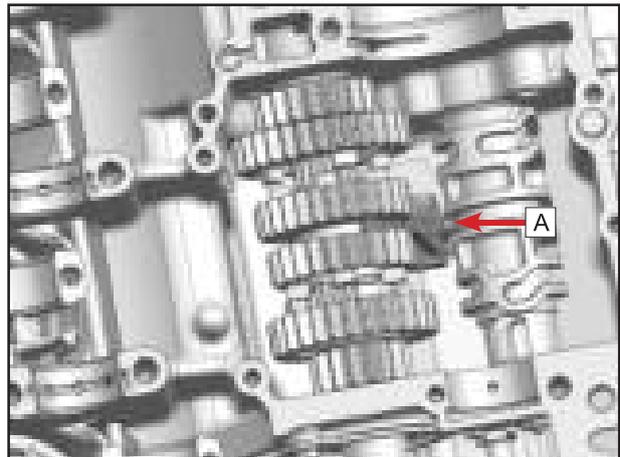
Insert the shift fork (middle) 1 into the third and fourth gear fork slot of the main shaft, as shown on the right. The mark "OHT0 C" on the fork faces the direction indicated by the arrow.



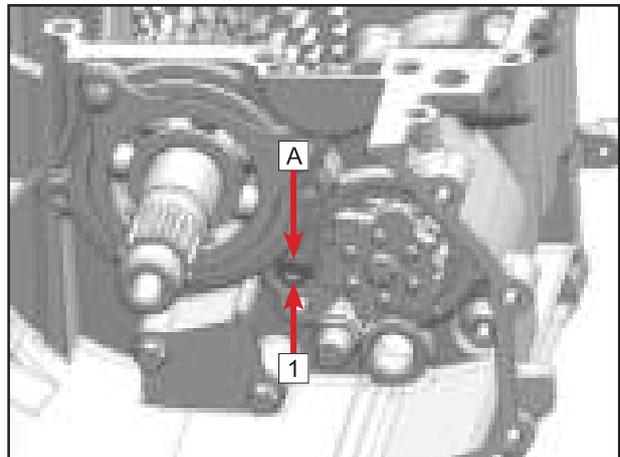
Install shift hub assembly **1**.



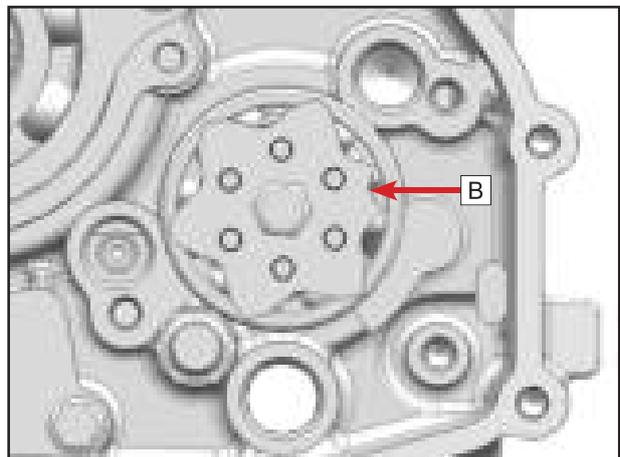
Ensure that the fork pin **A** is stuck in the shift hub groove.



Install the fork shaft assembly **1** with the boss **A** facing outward and upward.



Rotate the shift hub to neutral position, the locating star wheel neutral position **B** is as shown in the figure on the right.

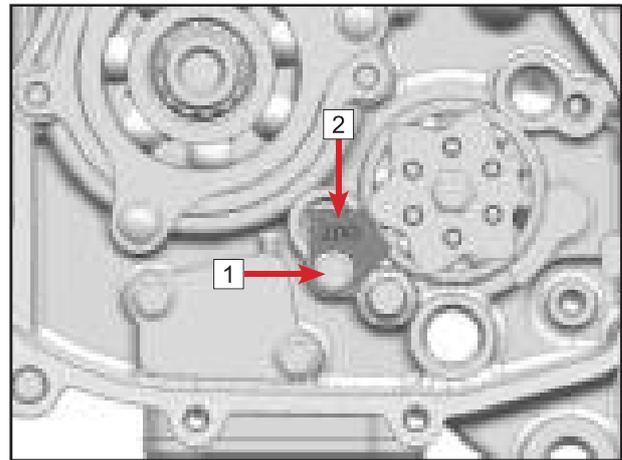


Rotate the fork shaft properly, and then place the fork shaft retainer **2** ("OUT" mark facing outward) in place. Ensure that the retainer can limit the fork shaft and bearing in the axial direction.

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

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

Fork Shaft Retainer Bolt <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)



Pass the fork shaft **2** **1** (with the boss end facing outward) through the shift fork (right) **2** and the shift fork (left) **3** in turn and install them in place.

Pay attention the following details:

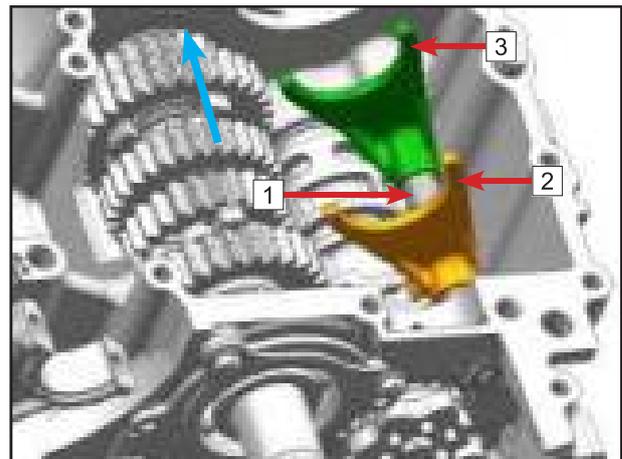
Stuck the shift fork pin in the corresponding shift hub slot.

There are distinguishing marks on the fork, as follows:

Shift fork (left) : "OHT0 L"

Shift fork (right) : "OHT0 R"

The fork marks are oriented towards the direction indicated by the arrow.

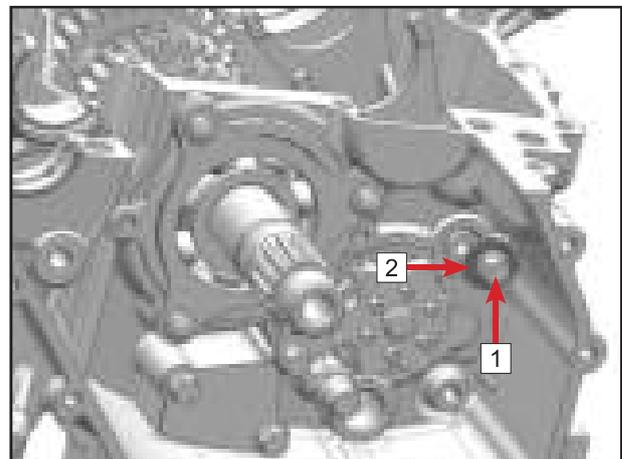


Rotate the fork shaft properly, and place the washer **2** to ensure the washer can limit the fork shaft axially.

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

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

Fork Shaft Limit Washer Bolt <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)

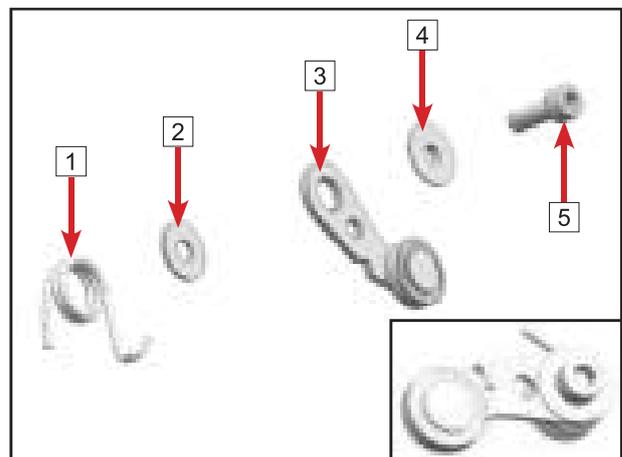


Assemble the torsion spring **1**, washer **2**, gearshift swing arm sub assembly **3**, shaft sleeve **4**, screw **5** together.

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.

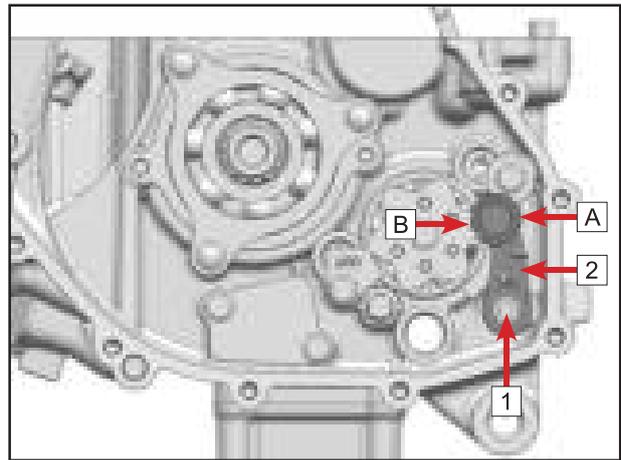
**NOTE: The smooth surface of washer faces the gearshift swing arm sub assembly.**



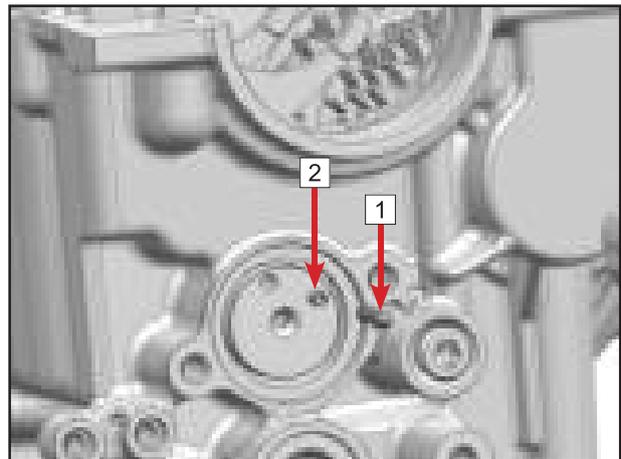
Apply 243 thread locker on the screw **1**.  
Install gearshift swing arm assembly **2**, and tighten the screw **1** to the specified torque.

Gearshift Swing Arm Screw <b>1</b>	
Torque	10N·m (7.3 ft-lb.)

Align the bearing **A** with the positioning star wheel neutral position **B**.

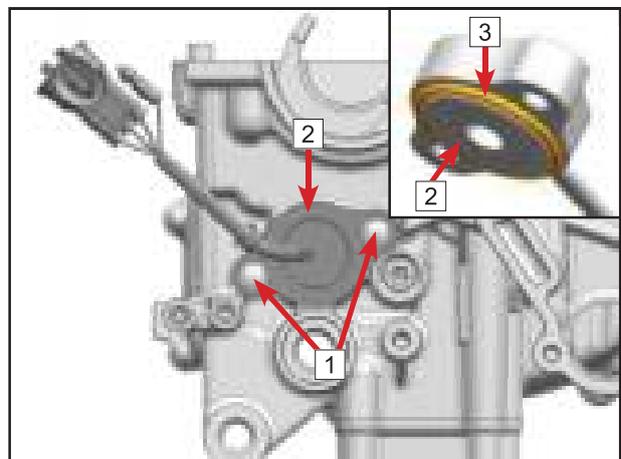


Install the contact spring **2** and the ball contact **1** in turn into the shift hub hole.



Oil the O-ring **3** of the gear sensor **2**.  
Insert the gear sensor **2** into the upper crankcase.  
Install bolts **1** and tighten to specified torque.

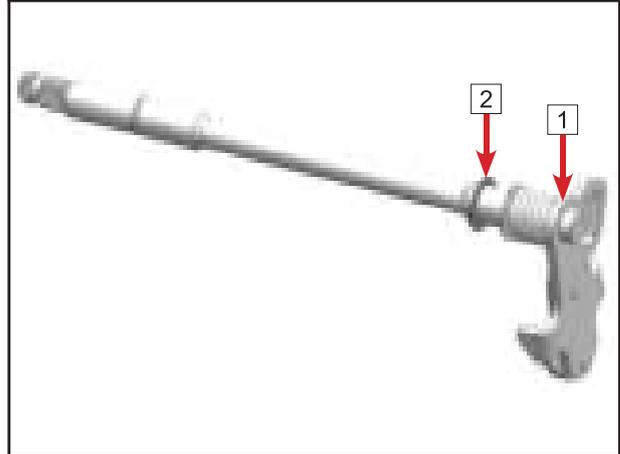
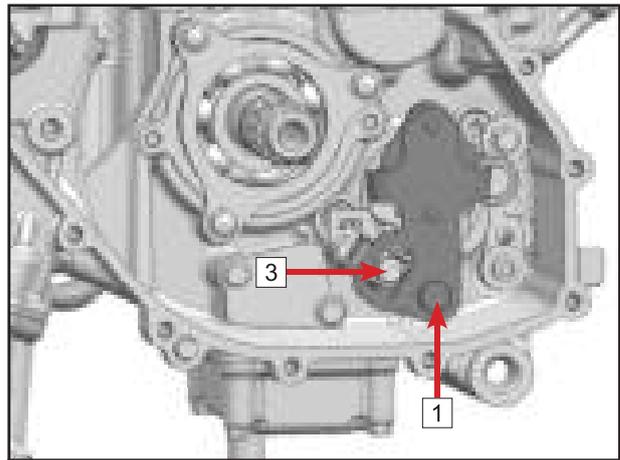
Gear Sensor Bolt <b>1</b>	
Torque	10N·m (7.3 ft-lb.)



Make sure the washer **2** is installed on the gearshift shaft.

Install gearshift shaft assembly **1** and washer **2**.

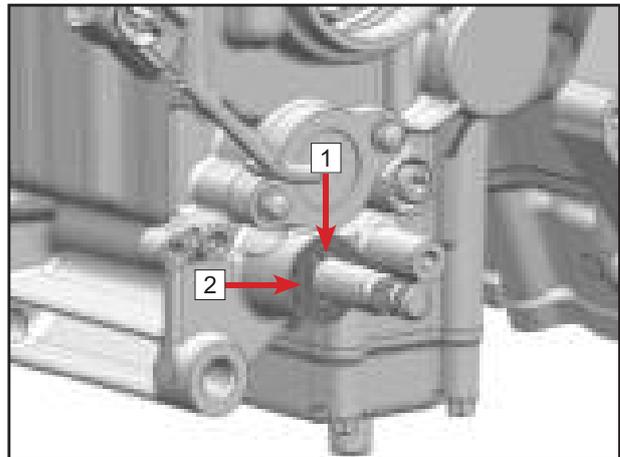
Make sure the torsion spring is stuck in the gearshift torsion spring pin **3**.



Install washer **2**.

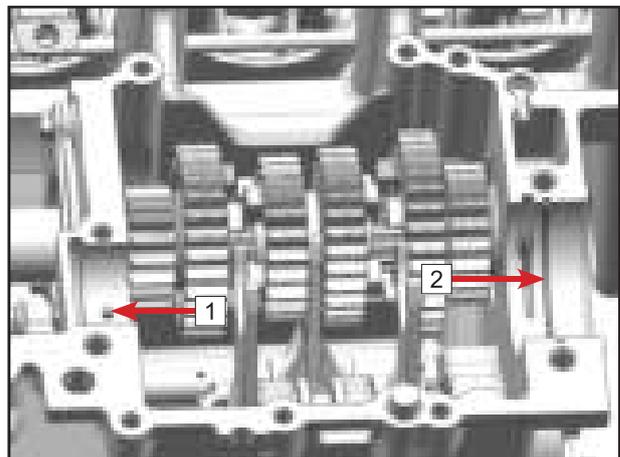
Install new retainer **1**.

**NOTE: The rounded side of the retainer faces the washer.**

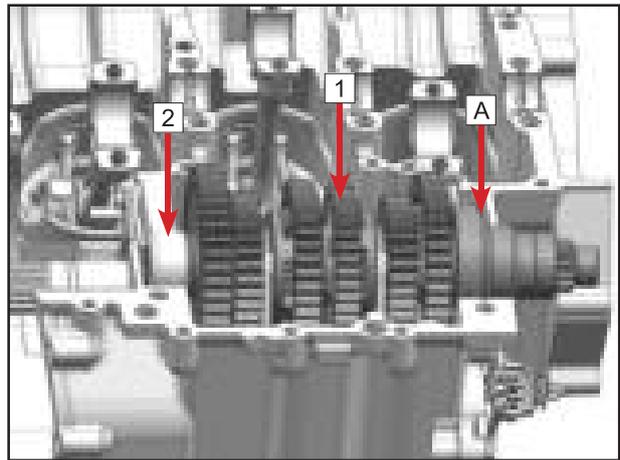


Install P4×7.8 needle roller **1** into the upper crankcase hole.

Install 62-28 bearing stop ring **2** into the groove of the upper crankcase to ensure full entry into the groove.

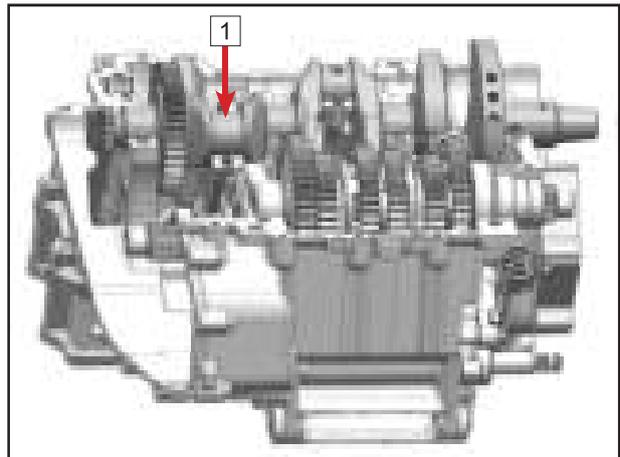


Evenly apply appropriate amount of oil to the inner surface of bearing sleeve [2]. Install the bearing sleeve [2] to the countershaft assembly [1]. Insert the shift fork claw into the shift groove of the corresponding gear, align the bearing thrust groove [A] of the countershaft assembly [1] with the bearing stop ring, align the limit hole of the bearing sleeve [2] with the needle roller, and install the countershaft assembly [1] on the upper crankcase.



## 5.5.4 Crankshaft Assembly and Balance Shaft Assembly Installation

Apply oil on the main plain bearing and connecting rod plain bearing. Place crankshaft assembly [1] in place.



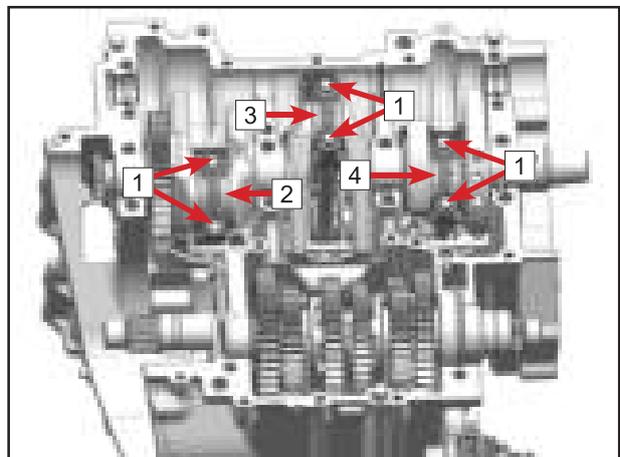
Apply oil on the connecting rod plain bearing.

Install the connecting rod cover [2], [3] and [4] onto the related connecting rod.

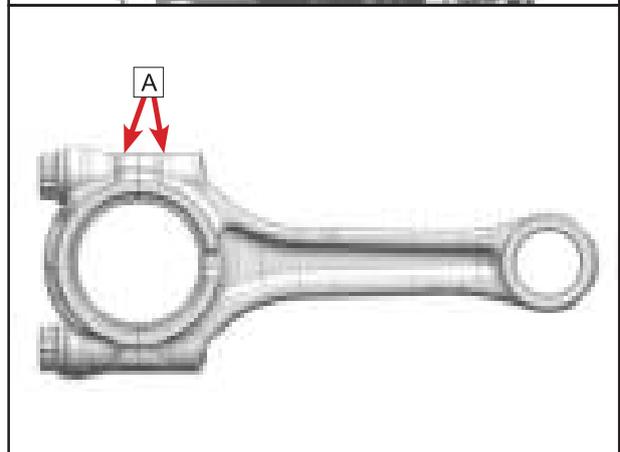
**NOTE: The matching marks [A] on the connecting rod and the connecting rod cover must be identical and clear.**

**NOTE: Be sure to use new connecting rod bolts and strictly follow tightening procedures.**

Install new connecting rod bolts [1], and tighten in two steps.



<b>Step 1 Torque</b>	20N•m ± 2N•m (14.7 ft-lb. ± 1.47 ft-lb.)
<b>Step 2 Angle</b>	100° ± 5°



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	Crankshaft Assembly Grouping Mark
A	B
B	A

The grouping of balance shaft assembly and crankshaft assembly is detailed in the section "Selecting Main Plain Bearing and Balance Shaft Plain Bearing".

**NOTE: Make sure the mark **A** is aligned with the mark **B**.**

### 5.5.5 Lower Crankcase Installation

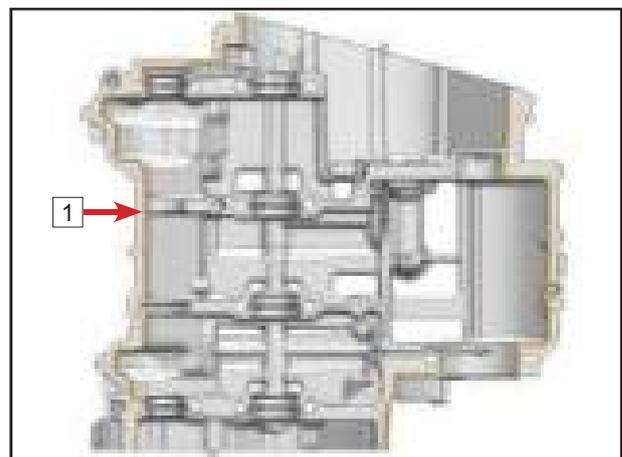
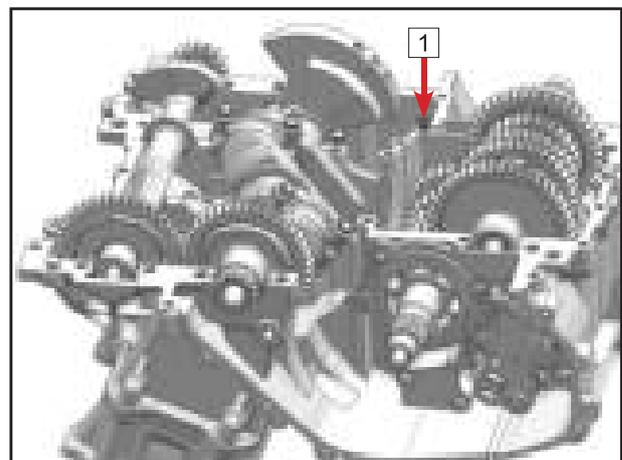
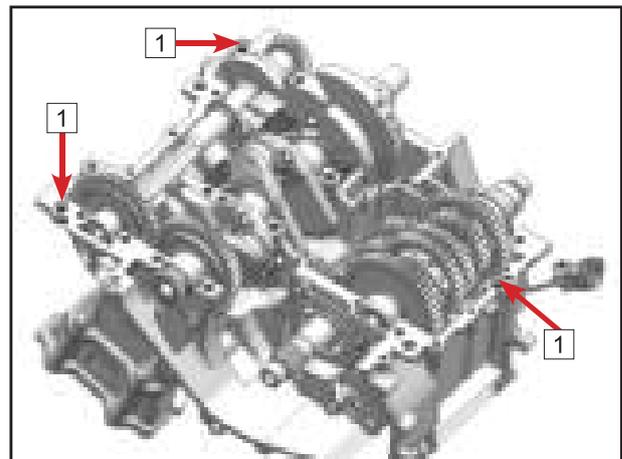
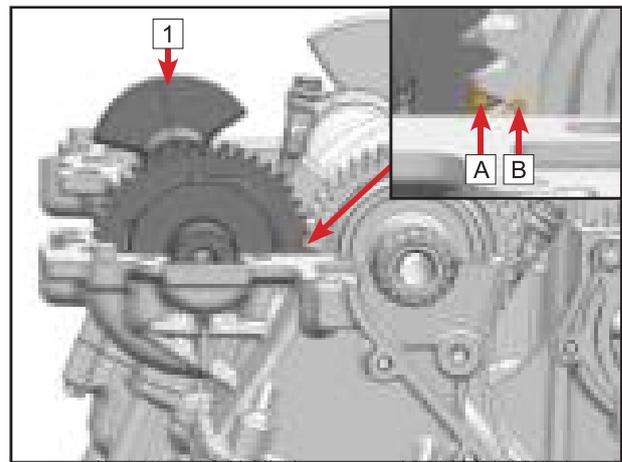
Ensure that the sealing surface of the crankcase is clean, dry and free of oil.  
Ensure that cylindrical rollers **1** are installed.

Install orifice plug **1** (big hole faces outward).

As shown in the picture on the right, apply an appropriate amount of 5900 flange sealant **1** on the sealing surface of lower crankcase, and the coating should be uniform and continuous.

**OTE: 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.

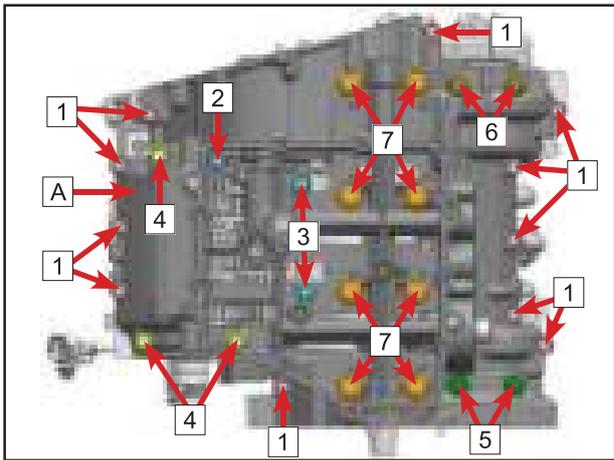


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Install lower crankcase **A** onto the upper crankcase.

Install assembly bolts M9×96 **7**, assembly bolts M8×55 **6**, assembly bolts M8×65 **5**, assembly bolts M8×45 **4**, bolts M6×85 **3** and bolt M6×42 **2**.

**NOTE: Be sure to use new bolts **7**, and strictly follow tightening procedures.**



Tighten the crankcase bolts in the sequence shown on the right with the following steps:

Step 1: Tighten bolt **1** ~ **15** to 8 N·m (5.9 ft-lb.) in order.

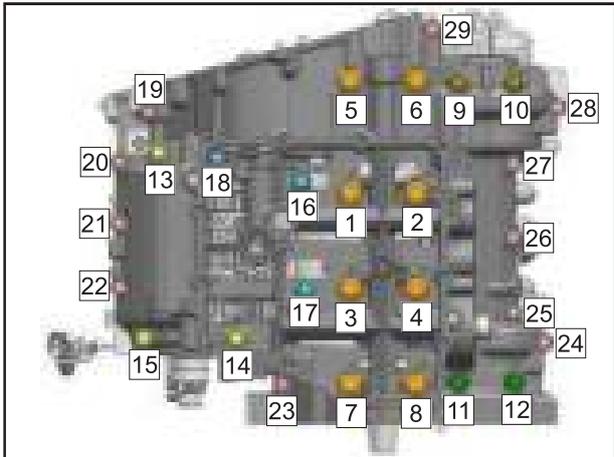
Step 2: Tighten bolt **1** ~ **15** to 20 N·m (14.7 ft-lb.) in order.

Step 3: Tighten bolt **1** ~ **12** to 36 N·m (26.5 ft-lb.) in order.

Step 4: Tighten bolt **13** ~ **15** to 32 N·m (23.6 ft-lb.) in order.

Step 5: Tighten bolt **16** ~ **29** to 10 N·m (7.3 ft-lb) in order.

Remove spilled flange sealant.

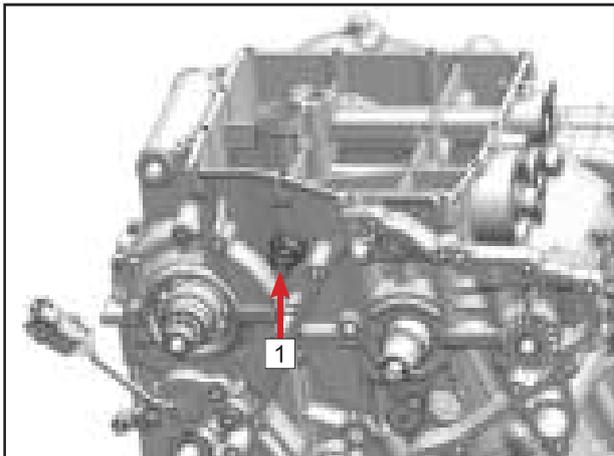


## 5.5.6 Oil Pressure Switch Installation

Apply 567 thread locker to oil pressure switch thread.

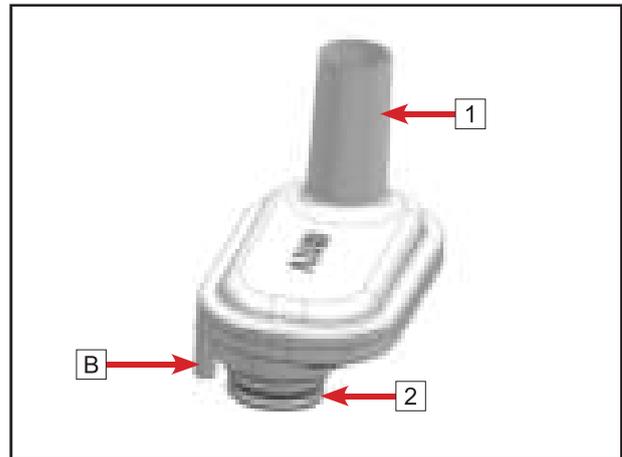
Install oil pressure switch **1**, tighten to specified torque.

Oil Pressure Switch	
Torque	15 N·m (11.1 ft-lb.)

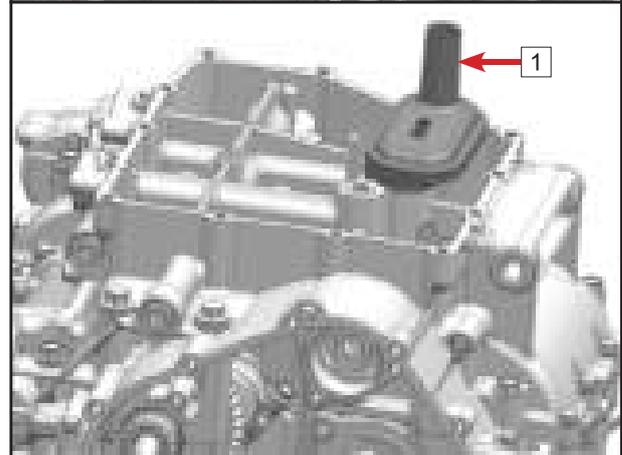
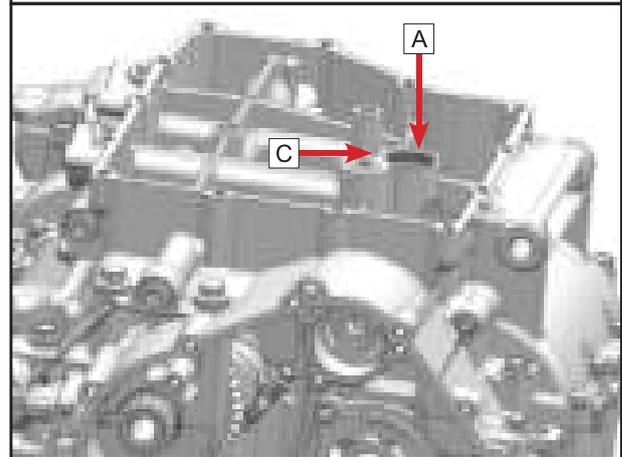


## 5.5.7 Oil Pan Installation

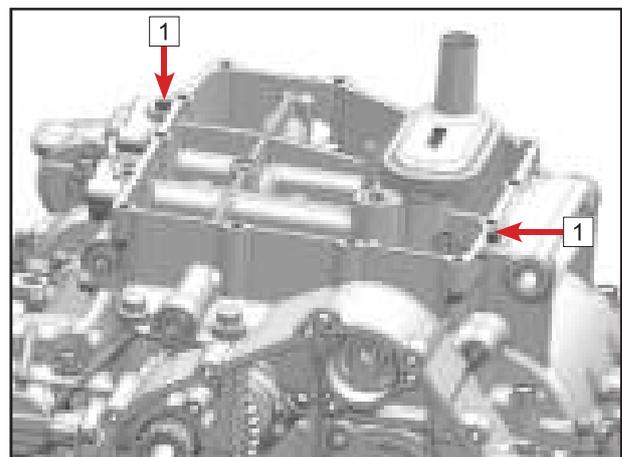
Install oil pan seal ring **2** to suction filter assembly **1**.



Apply oil on the mounting hole **A**.  
Align the positioning column **B** with the positioning hole **C**, and insert the suction filter assembly **1** into the lower crankcase mounting hole **A**.



Ensure that cylindrical rollers **1** are installed.



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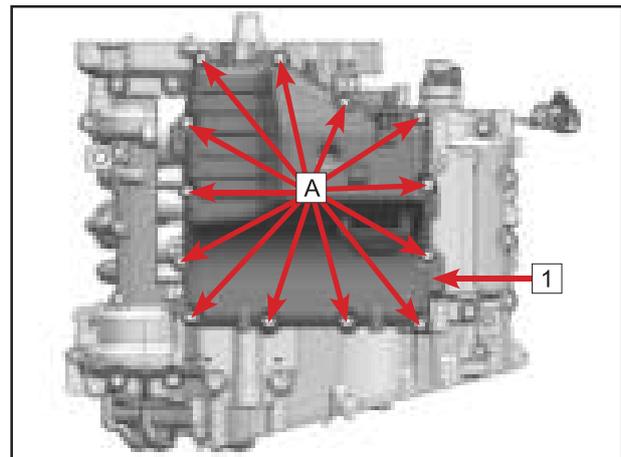
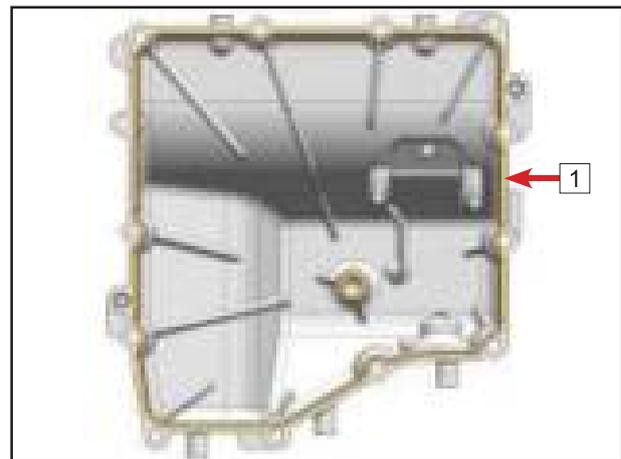
Ensure that the sealing surface of lower crankcase and oil pan is clean, dry and free of oil.

As shown in the picture on the right, apply an appropriate amount of 5900 flange sealant **1** on the sealing surface of oil pan. The coating should be uniform and continuous.

**NOTE: From applying the flange sealant to completing the installation of the oil pan 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 oil pan **1**.

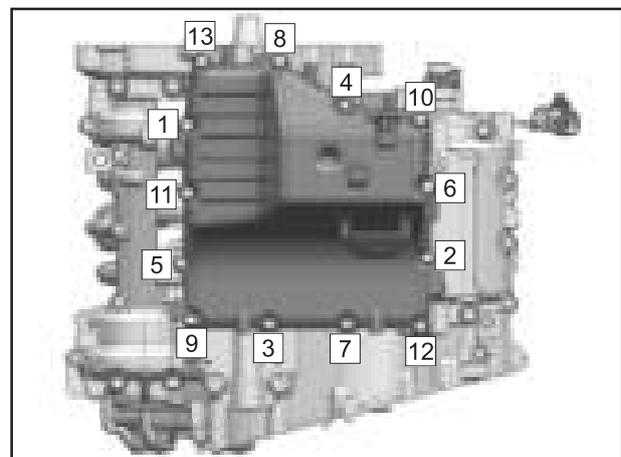
Install oil pan bolts **A**.



Tighten the oil pan bolts to the specified torque in the sequence shown on the right.

Oil Pan Bolt <b>A</b>	
Torque	10 N·m (7.3 ft-lb.)

Remove spilled flange sealant.



## 5.5.8 Oil Pump Installation

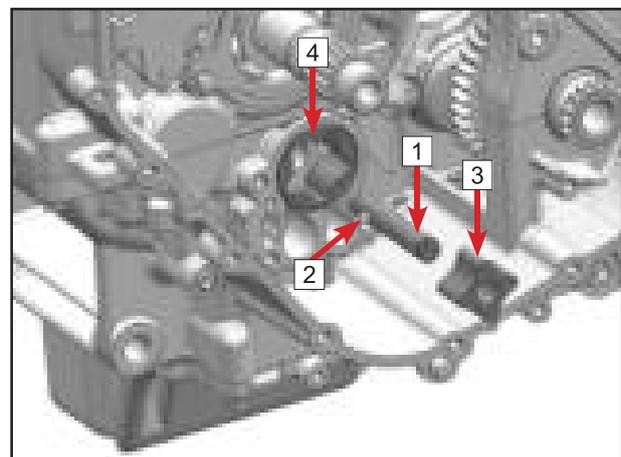
Apply oil to oil pump shaft and oil pump rotors.

Install oil pump outer rotor **4** into lower crankcase.

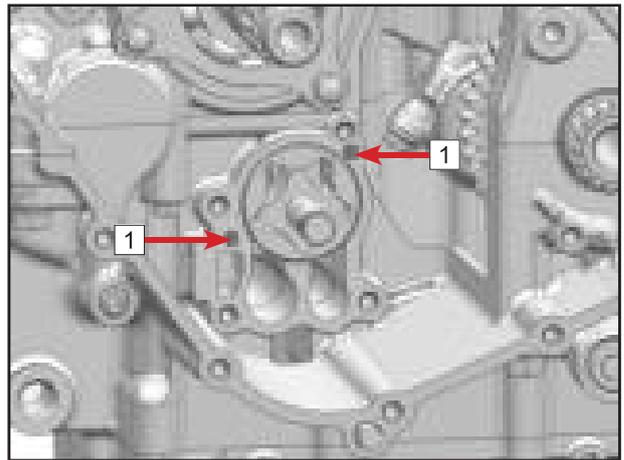
Install needle roller **2** to oil pump shaft **1**.

Install the oil pump inner rotor **3** on the oil pump shaft **1**, and make the needle **2** stuck into the groove on the inner rotor **3**.

Install the oil pump shaft **1** with the inner rotor into the lower crankcase. (appropriate angle of rotation is needed for installation)

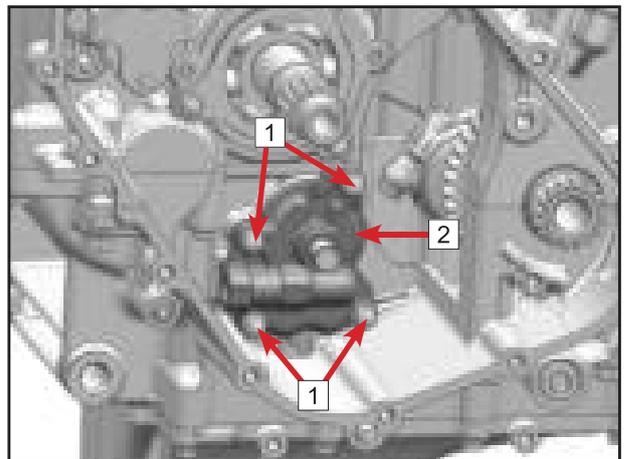


Install needle roller **1**.

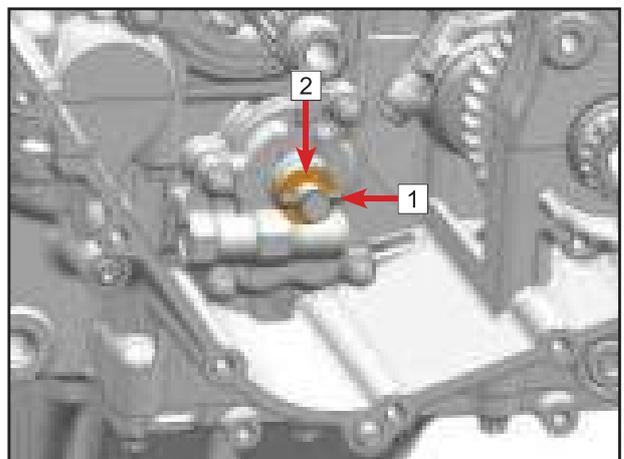


Install oil pump cover assembly **2**.  
Install bolts **1**, then cross diagonally tighten to specified torque.

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

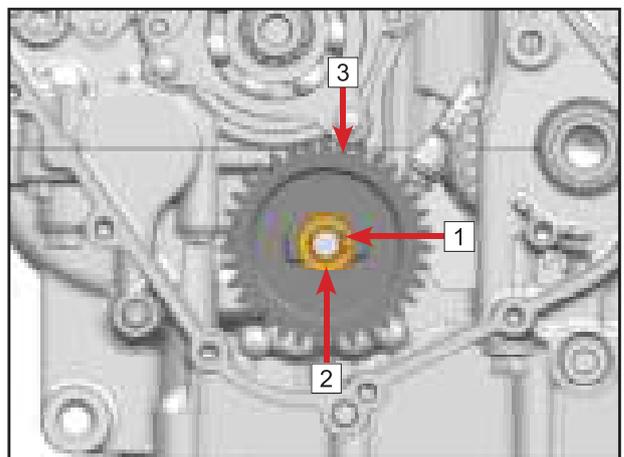


Install washer **2**.  
Install needle roller **1**.



Install the oil pump gear **3**, and make the needle roller stuck in the groove of the gear.  
Install washer **2**.  
Install new retainer **1**, make sure the retainer is in place.

**NOTE: The rounded side of the retainer faces the washer **2**.**



## 5.5.9 Clutch Installation

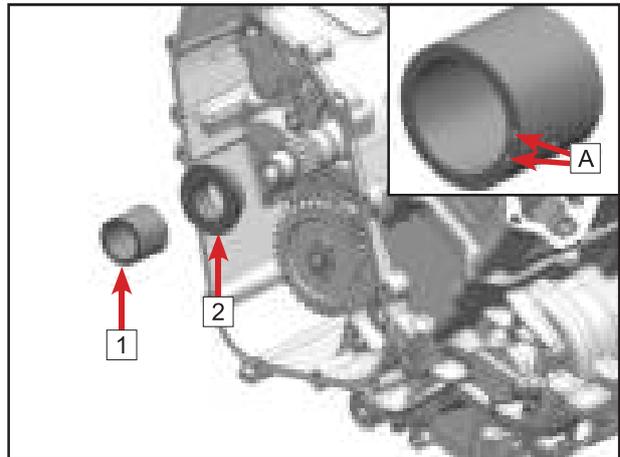
**NOTE: The clutch and crankshaft assembly must be paired according to the table below.**

Clutch Grouping Mark	Crankshaft Assembly Grouping Mark
A	B
B	A

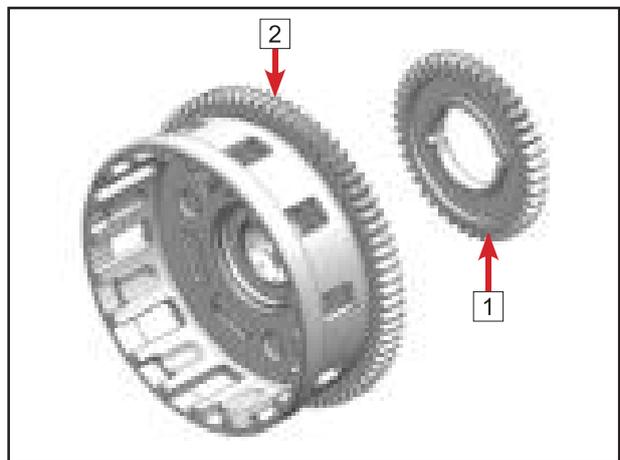
The grouping of clutch refers to section 4.5. The grouping of crankshaft assembly refers to section 5.4.2.

Apply oil to washer [2] and clutch shaft sleeve [2].

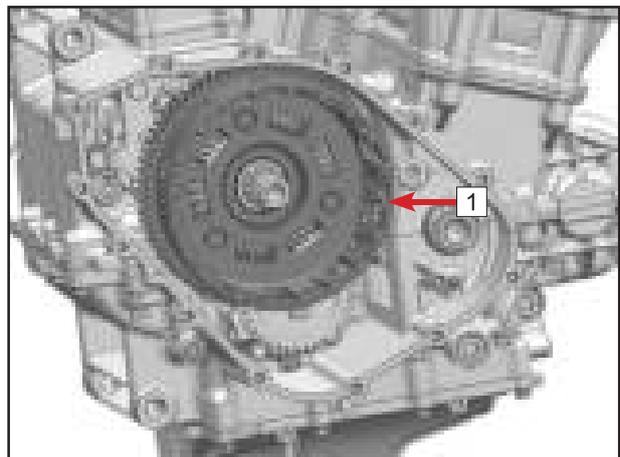
Install washer [2], big end facing outward. Install the clutch shaft sleeve [1] with the hole [A] facing outward.



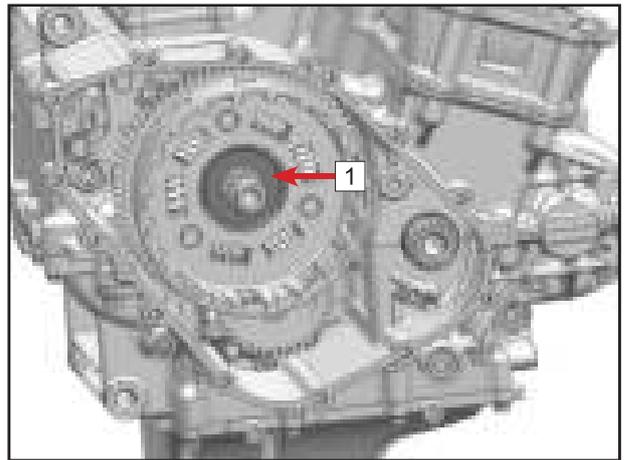
Install the oil pump drive gear [1] to the primary driven gear assembly [2].



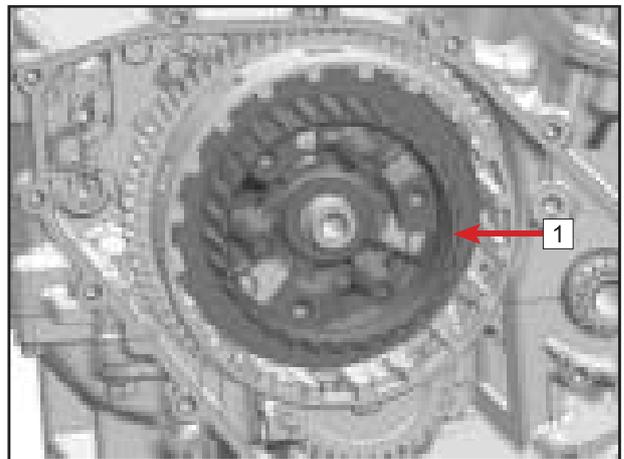
Apply oil to the bushing of primary driven gear assembly [1].  
Install primary driven gear assembly [1].



Install washer **1**.



Install center sleeve **1**.

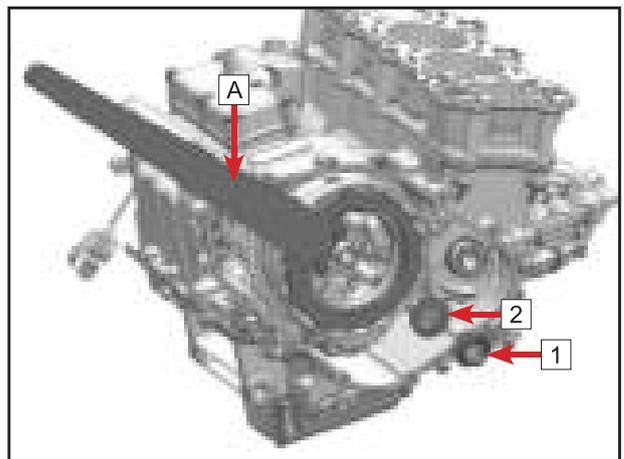


Install elastic washer **2** (the small end of the cone faces the nut **1**).  
 Apply 243 thread locker on the nut **1**.  
 Install nut **1**.  
 Use clutch stopping tool **A** to secure center sleeve.

Clutch Stopping Tool  
 (See section 5.1 for details.)

Tighten the nut **1** to the specified torque.

Clutch Nut <b>1</b>	
Torque	125 N·m (92.2 ft-lb.)



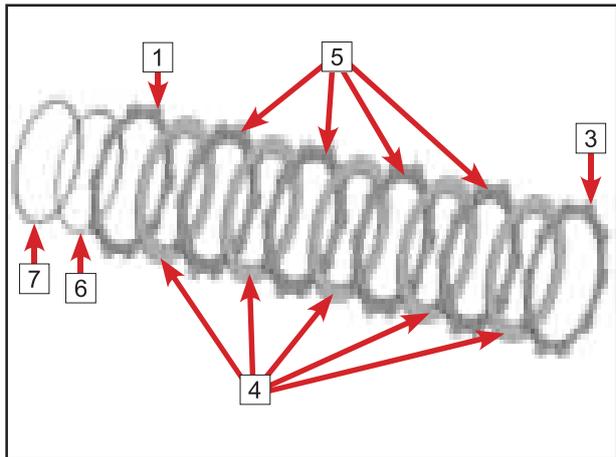
# CFMOTO

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

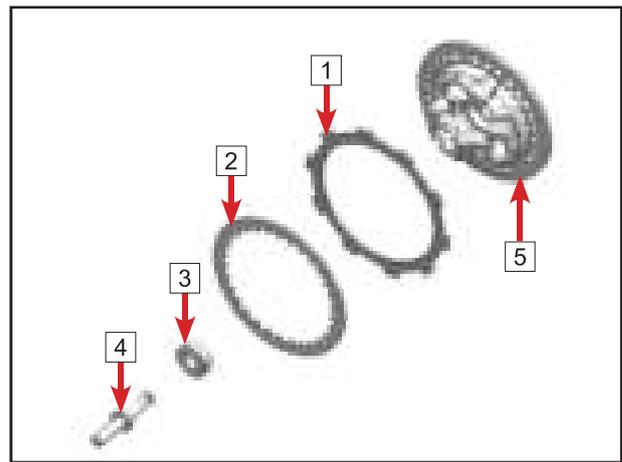
**NOTE:** The friction disc assembly 1 is wider than the friction disc assembly 2 and 3. The driven disc 2 is wider than the driven disc 1. The friction disc assembly 2 and driven disc assembly 3 use different material.

Install the following parts on the center sleeve in turn:

- Disc spring seat [7]
- Disc spring [6] (the large end of the cone faces outward)
- Friction disc assembly 2 [1]
- Driven disc 2 [4]
- Friction disc assembly 1 [5]
- Driven disc 2 [4]
- Friction disc assembly 1 [5]
- Driven disc 2 [4]
- Friction disc assembly 1 [5]
- Driven disc 2 [4]
- Friction disc assembly 1 [5]
- Driven disc 2 [4]
- Friction disc assembly 3 [3]

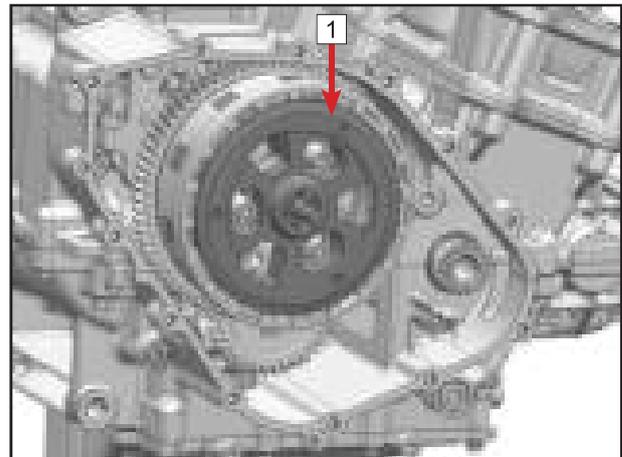


Install friction disc assembly 2 **1** and driven disc 1 **2** on the press disc **5**.  
Install the rolling bearing **3** into the bearing hole of the press disc **5**, with the marked side of the bearing facing outward (magneto side).  
Insert the pull rod **4** into the rolling bearing **3**.

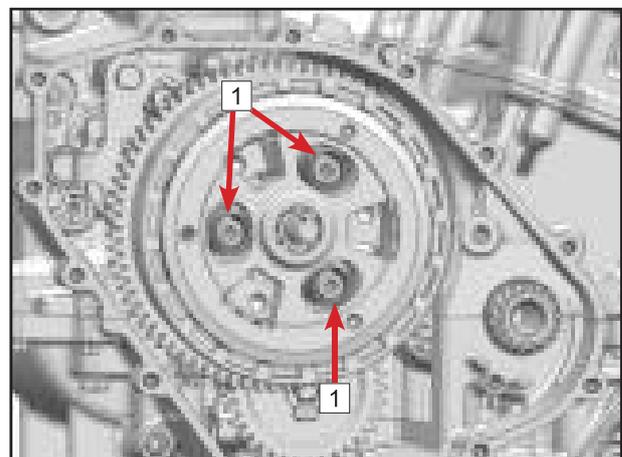


Install the press plate assembly **1**.

**NOTE: The outermost friction disc assembly 2 **A** shall be misaligned.**

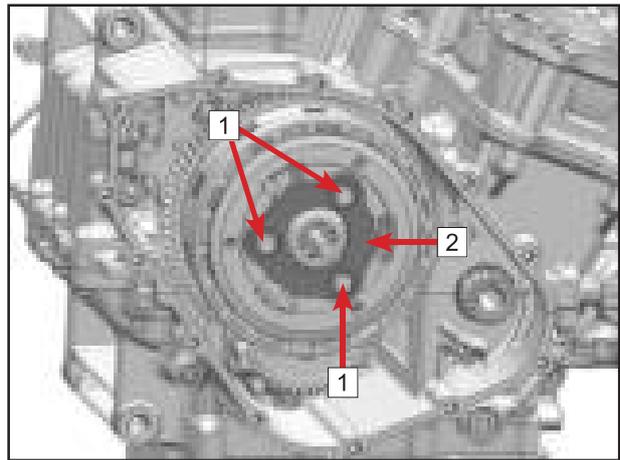


Install clutch spring **1**.



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.)



### 5.5.10 Timing Chain and Chain Plate Installation

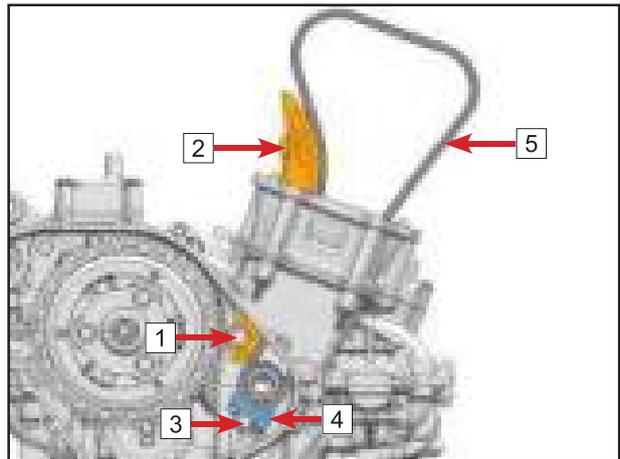
Put down the timing chain **5** from the cylinder body chain cavity and suspend the chain on the crankshaft timing sprocket.  
Install chain guard **4**.  
Install bolt **3** and tighten to specified torque.

Chain Guard Bolt <b>3</b>	
Torque	10 N·m (7.3 ft-lb.)

Install tension plate **2**.  
Apply 243 thread locker to thread pin shaft **1**.

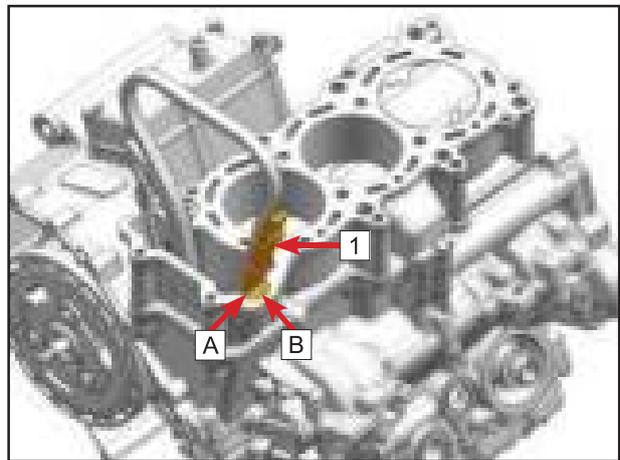
Install thread pin shaft **1**, tighten to specified torque.

Tension Plate Thread Pin Shaft <b>1</b>	
Torque	20 N·m (14.7 ft-lb.)



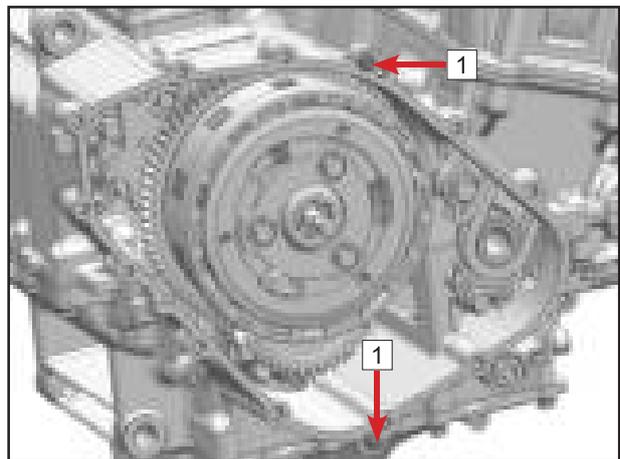
Make sure the tension plate can rotate freely.

Install chain guide **1**.  
Make sure location **A** is inserted into slot **B**.



### 5.5.11 RH Side Cover Installation

Make sure the cylindrical rollers **1** are installed.



Ensure that the sealing surface of RH side cover and crankcase is clean, dry and free of oil.

As shown in the picture on the right, apply an appropriate amount of 5900 flange sealant [1] on the sealing surface of RH side cover, and the coating should be uniform and continuous.

**NOTE: From applying the flange sealant to completing the installation of the RH side cover 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.**

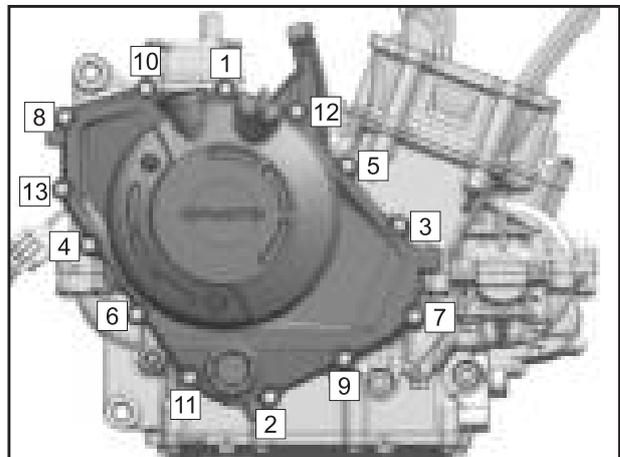
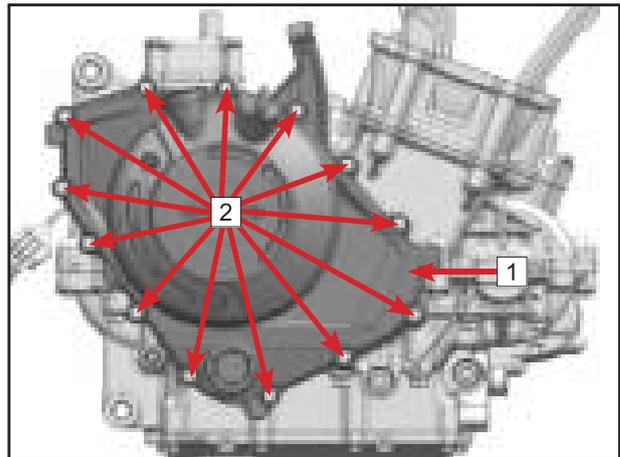
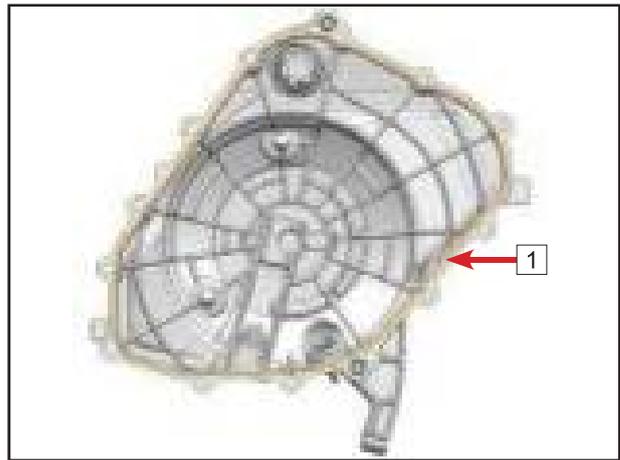
Install RH side cover [1].

Install RH side cover bolts [2].

Tighten the RH side cover bolt to the specified torque in the sequence shown on the right.

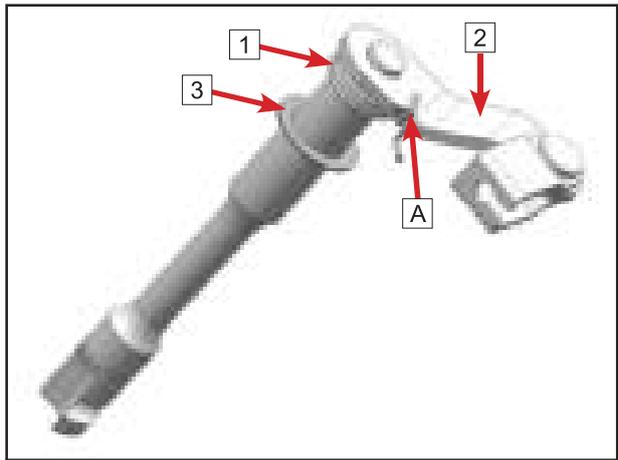
RH Side Cover Bolt	
Torque	10 N·m (7.3 ft-lb.)

Remove the spilled flange sealant.



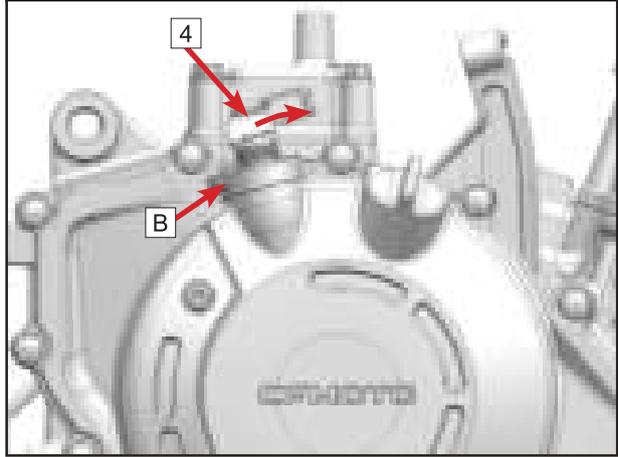
Install the return spring **1** of the clutch lever on the clutch control shaft, and the end of the spring is clamped into the gap of the clutch control arm **2**.

Install the washer **3** on the clutch control shaft.



Install the clutch control shaft assembly **4** on the RH side cover, and the other end **B** of the clutch control lever return spring **1** is hung on the RH side cover.

Rotate the clutch control shaft assembly **4** clockwise to feel it fit the clutch pull rod.



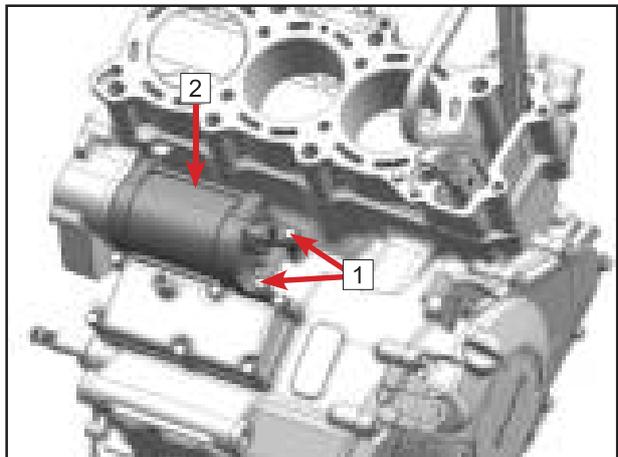
## 5.5.12 Starter Motor Assembly Installation

Apply oil to the O-ring and gear of starter motor assembly **2**.

Install starter motor assembly **2**.

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

Starter Motor Bolt <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)

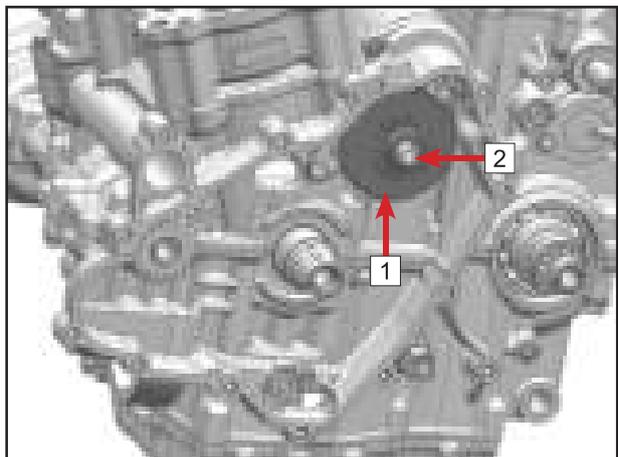


## 5.5.13 Magneto Rotor Installation

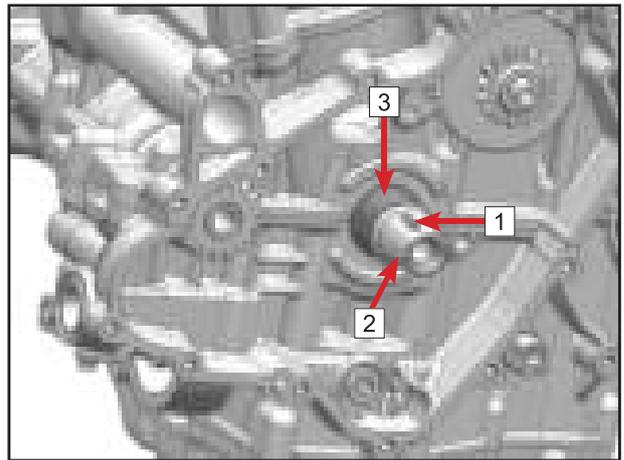
Apply oil to the gear shaft **2**.

Install dual gear shaft **2**.

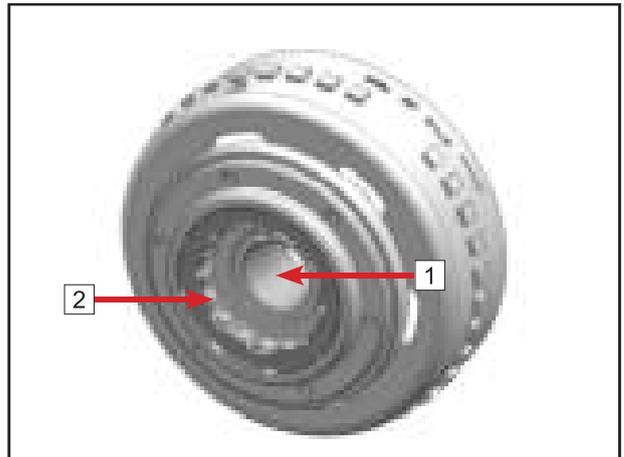
Install dual gear **1**.



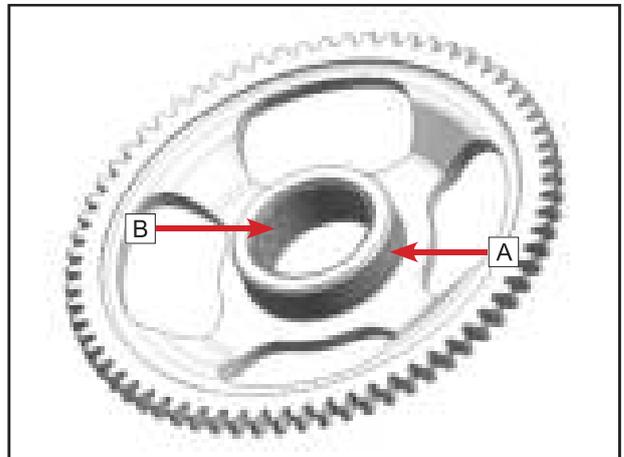
Ensure that the woodruff key **1** is installed on the crankshaft.  
Wipe the cone **2** of the crankshaft clean.  
Apply appropriate amount of oil to the mating surface **3** of the crankshaft.



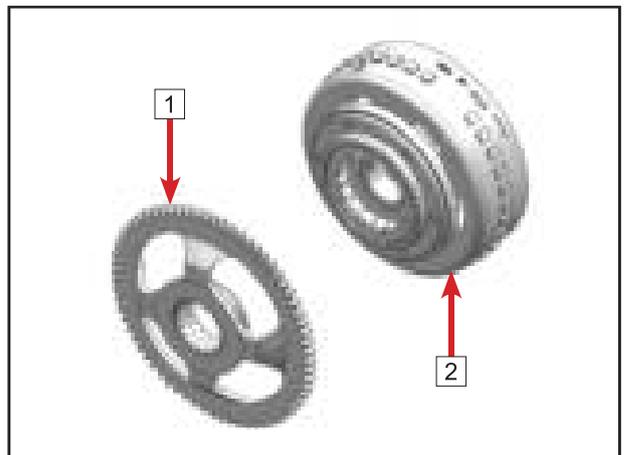
Wipe the cone **1** of the magneto rotor clean.  
Apply proper amount of oil to overriding clutch **2**.



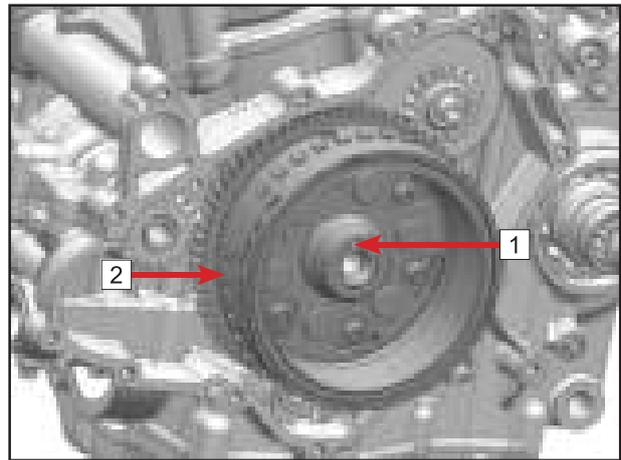
Apply appropriate amount of oil to the mating surface **A** and shaft sleeve **B** of the starting big gear assembly.



Rotate the starting big gear **1** counterclockwise and install it on the magneto rotor **2**.



Align the key slot **1** on the magneto rotor with the woodruff key on the crankshaft, and install the magneto rotor assembly **2** on the crankshaft.

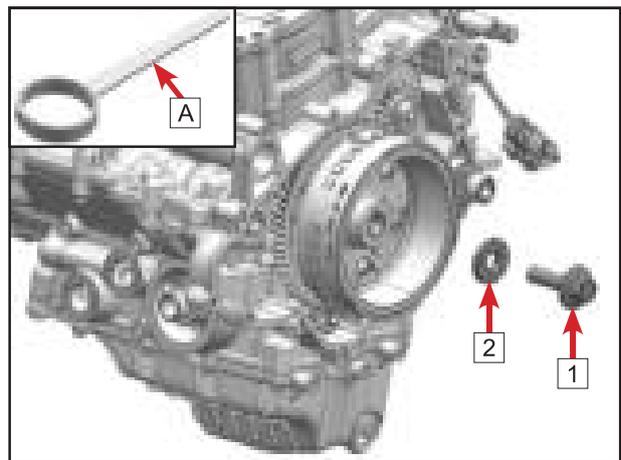


Install washer **2** and bolt **1**.  
Use magneto rotor stopping tool **A** to fix magneto rotor.

**Magneto Rotor Stopping Tool**  
(See section 5.1 for details.)

Tighten bolt **1** to specified torque.

<b>Magneto Rotor Bolt 1</b>	
Torque	125 N·m (92.2 ft-lb.)

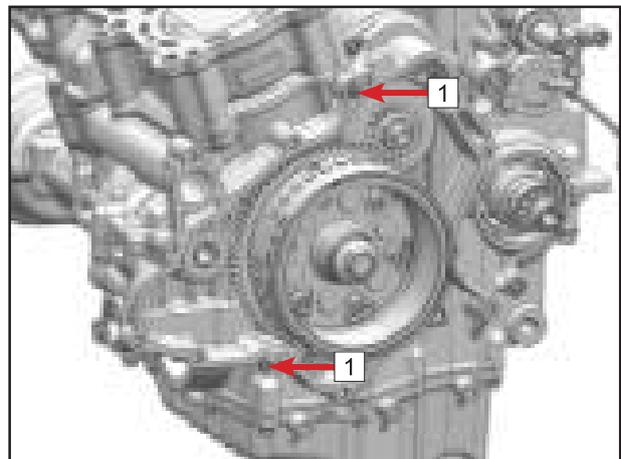


## 5.5.14 LH Side Cover and Water Pump Assembly Installation

Ensure that cylindrical rollers **1** are installed.

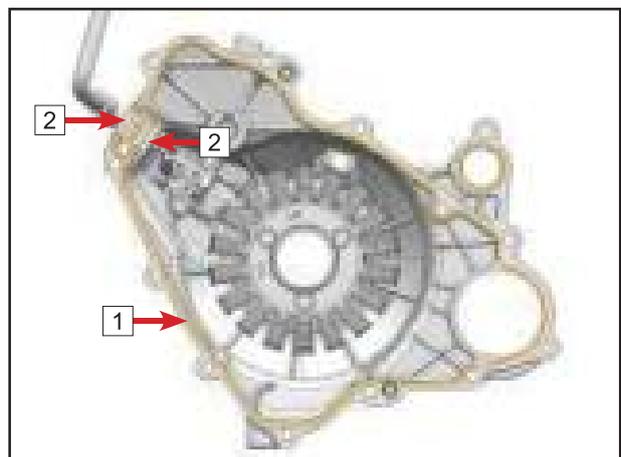
Ensure that the sealing surface of LH side cover and crankcase is clean, dry and free of oil.

As shown in the picture on the right, apply an appropriate amount of 5900 flange sealant **1** on the sealing surface of LH side cover, and the coating should be uniform and continuous.



**NOTE: From applying the flange sealant to completing the installation of the LH side cover 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.**

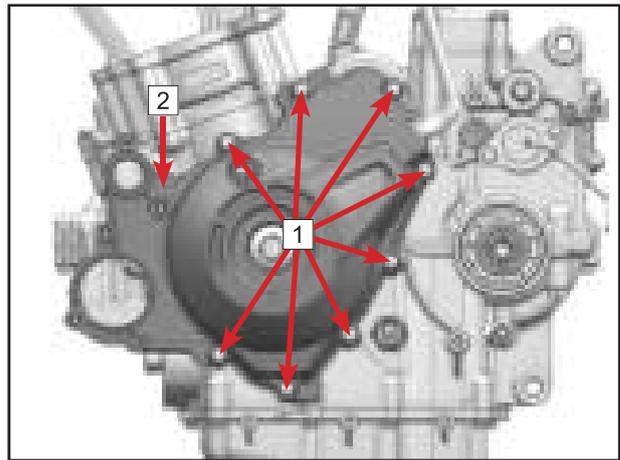
Apply appropriate amount of 5900 flange sealant to the rubber sealing sleeve **2** on the magneto stator cable and install it on the LH side cover.



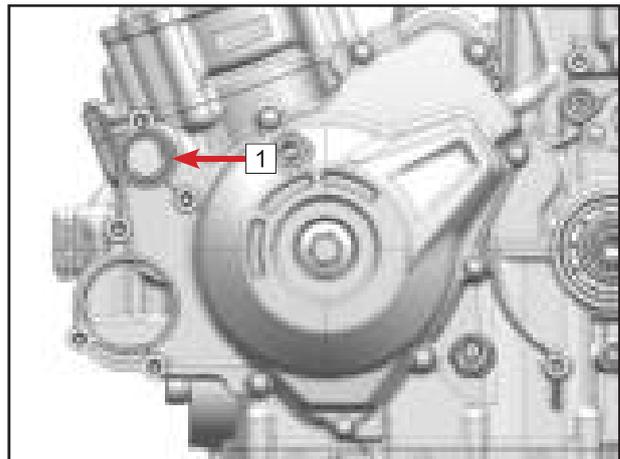
Carefully install the LH side cover **2** on the crankcase.

**⚠ 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.

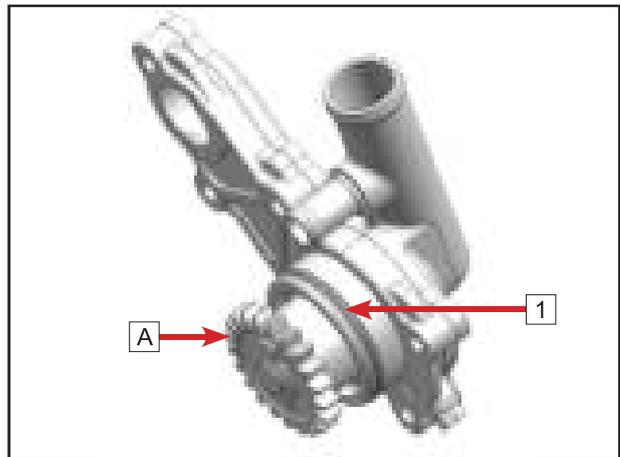
Install LH side cover bolts **1** (M6×30) but do not tighten.



Install O-ring **1**.



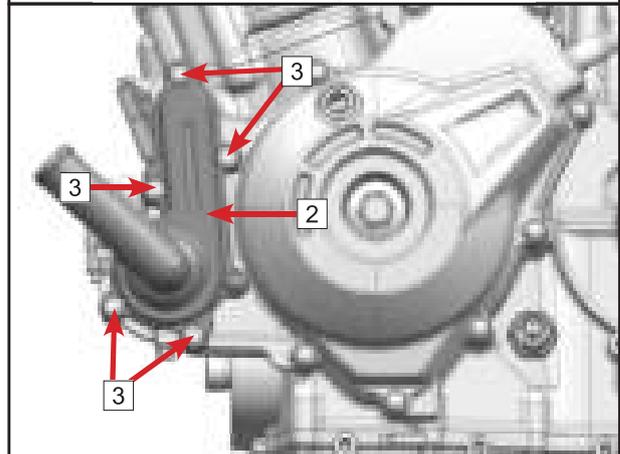
Apply oil to water pump assembly O-ring **1**.



Install water pump assembly **2**.

**NOTE:** When installing the pump, if the pump gear **A** is stuck, rotate the pump gear to align the gear teeth.

Install water pump bolts **3** (M6×42) but do not tighten.



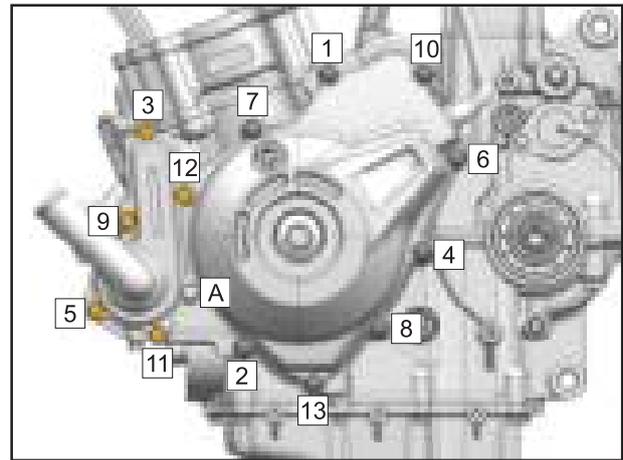
Tighten the LH side cover bolts/water pump bolts to the specified torque in the sequence shown on the right.

LH Side Cover Bolt/Water Pump Bolt	
Torque	10 N·m (7.3 ft-lb.)

Tighten bolt **A** to specified torque.

Water Pump Cover Bolt <b>A</b>	
Torque	10 N·m (7.3 ft-lb.)

Remove the spilled flange sealant.

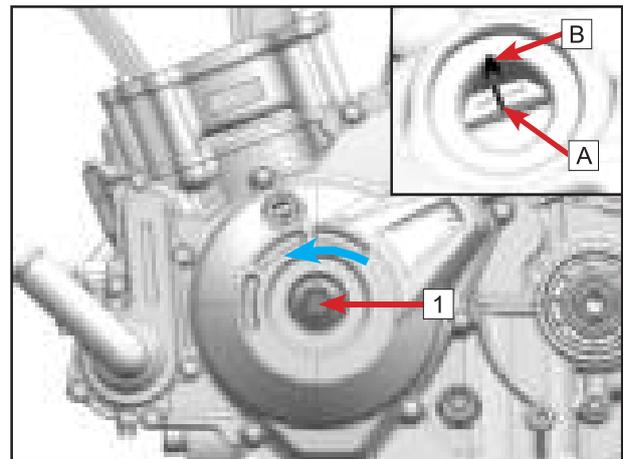


## 5.5.15 Cylinder Head and Camshaft Installation

Turn the bolt **1** counterclockwise to place the crankshaft at the TDC of cylinder 1.

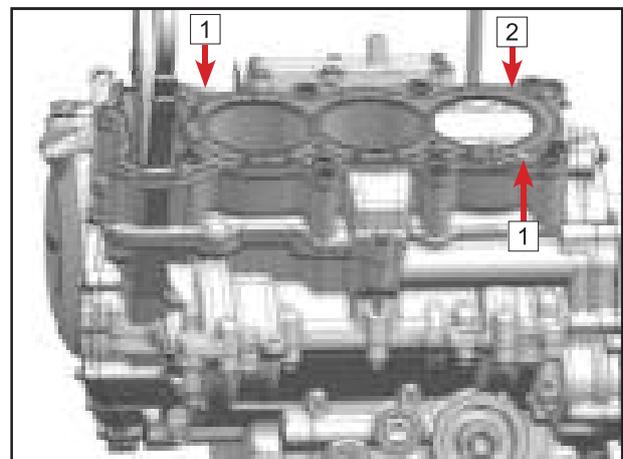
At the TDC of cylinder 1:

The "T1" mark **A** on the magneto rotor is aligned with the center of the slot **B**.

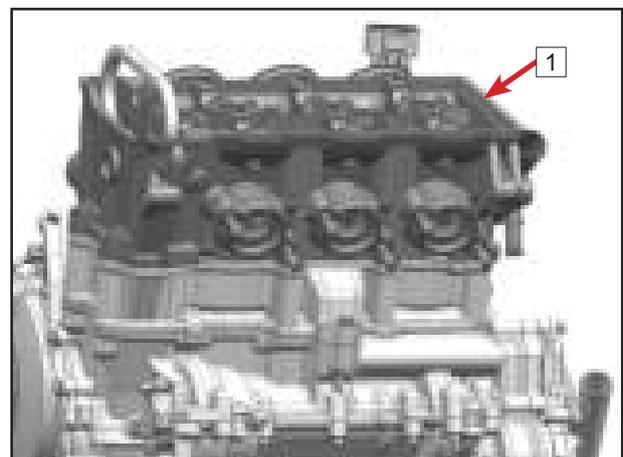


Ensure that cylindrical rollers **1** are installed.

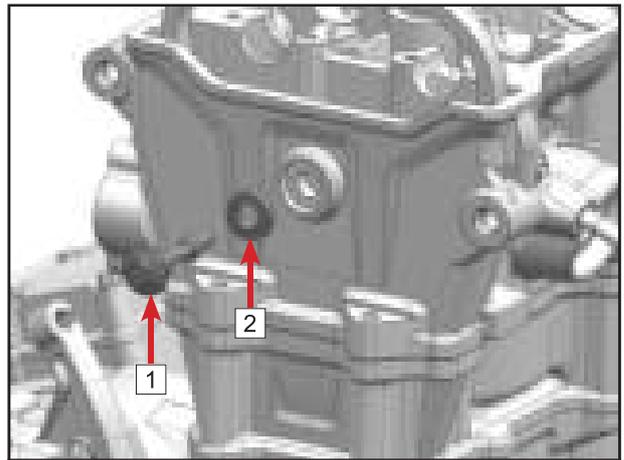
Install new cylinder head gasket **2**.



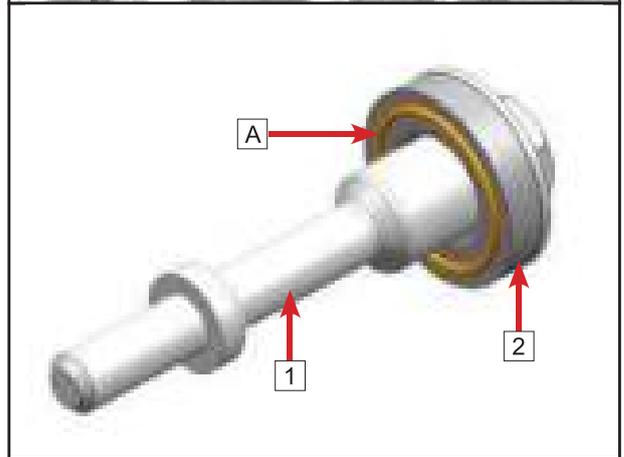
Install cylinder head assembly **1**.



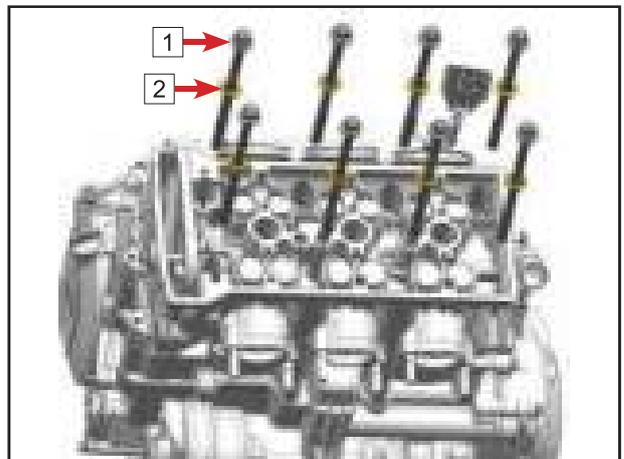
Install shock absorbing bolt **1** and its seal ring **2**.



Pay attention to the direction of the seal **A**.



Install cylinder head bolt **1** and washer **2**.



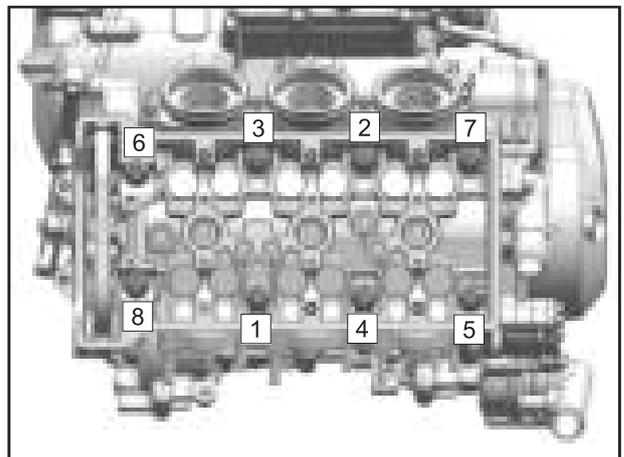
Tighten the cylinder head bolts (M10) step by step in the sequence shown on the right:

Step 1: Tighten to 10 N·m (7.3 ft-lb.)

Step 2: Tighten to 20 N·m (14.7 ft-lb.)

Step 3: Tighten to 30 N·m (22.1 ft-lb.)

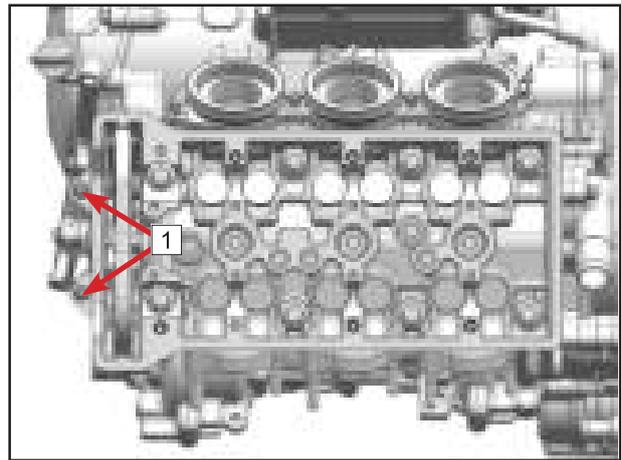
Step 4: Twist angle 110°



# CFMOTO

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

<b>Cylinder head Bolt (M6) <b>1</b></b>	
Torque	10 N·m (7.3 ft-lb.)



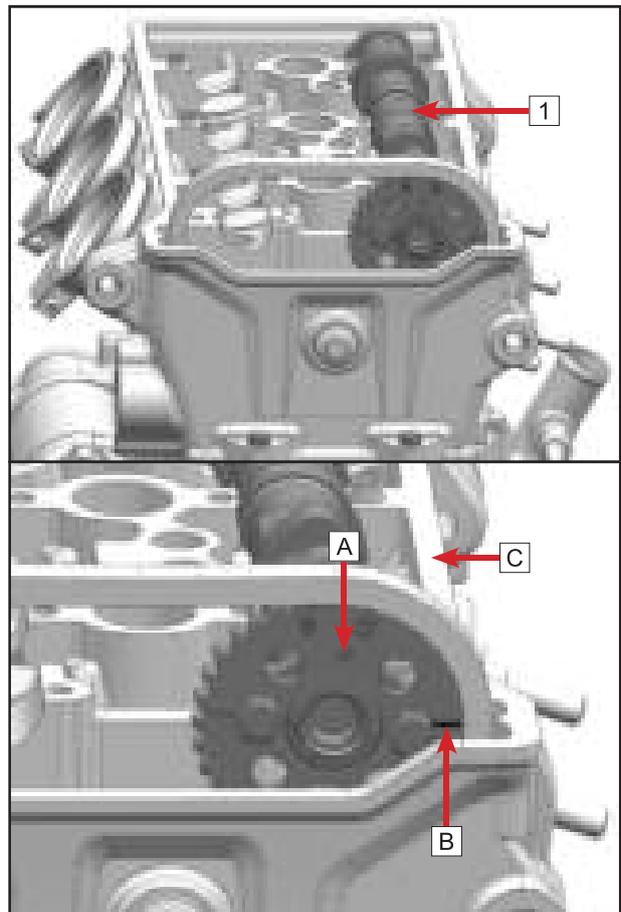
**NOTE: Make sure the crankshaft is at top dead center of cylinder 1 when installing camshaft.**

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:

- sprocket positioning hole **A** faces up
- line mark **B** is flush with cylinder head sealing surface **C**



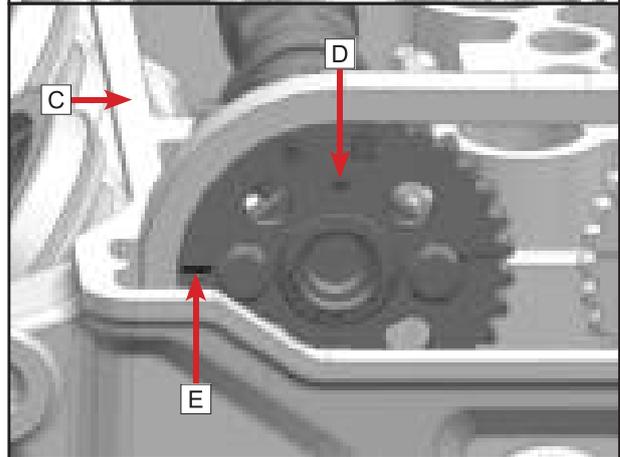
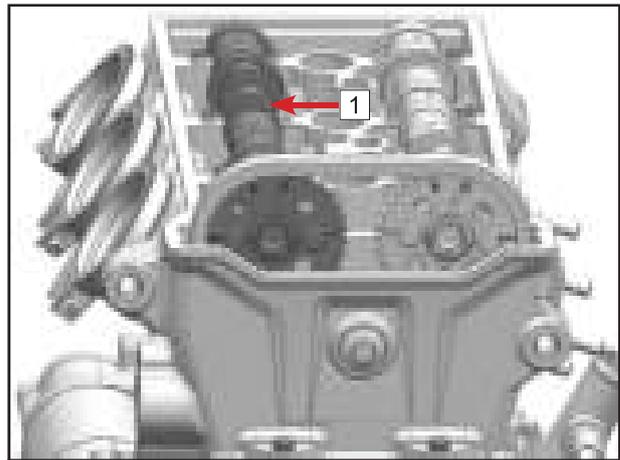
Apply oil to the intake camshaft bearing journal.

Install intake camshaft assembly **1**.

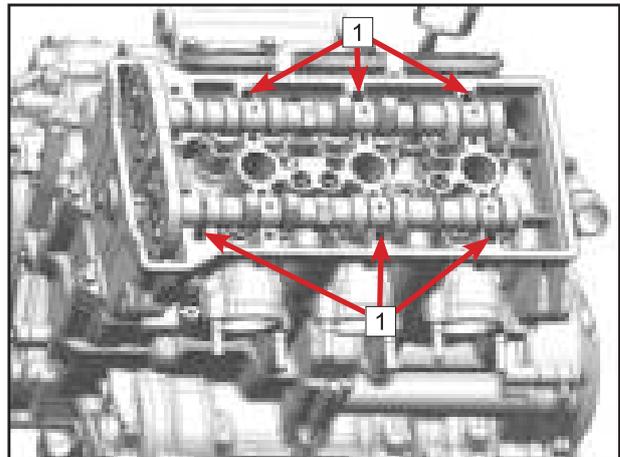
Hang the timing chain on the sprocket of intake camshaft, tension chain, and ensure:

—sprocket positioning hole **D** faces up

—line mark **E** is flush with cylinder head sealing surface **C**



Make sure the dowel pins **1** are not missing.



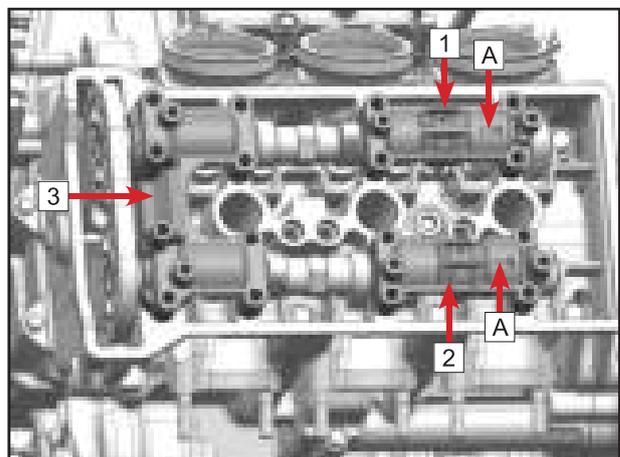
**NOTE: The cylinder head and each cam bearing cover are fitted according to the matching mark.**

Install intake cam bearing cover (IN) **1**.

Install exhaust cam bearing cover (EX) **2**.

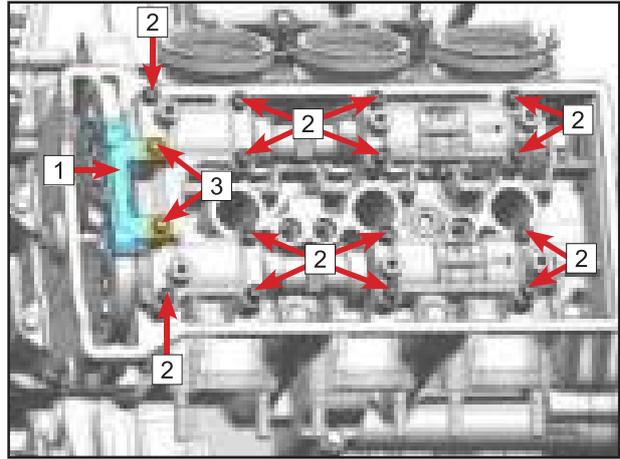
Arrow mark **A** faces chain side.

Install cam bearing cover **3**.



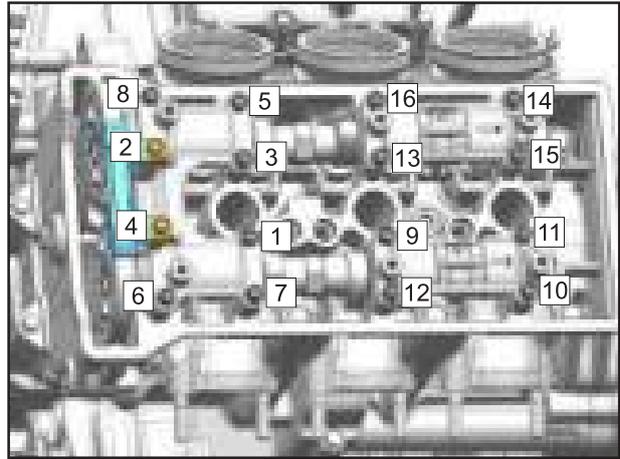
# CFMOTO

Place guide chain block **1** in place.  
 Install cam bearing cover bolts **2** and **3**.  
 Cam bearing cover bolts **2**: M6×45  
 Cam bearing cover bolts **3**: M6×65



In order of **1**~**16** tighten cam bearing cover bolts in 3 steps.

Cam Bearing Cover 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.)



Check and adjust the valve clearance, refer to the "Cylinder Head Assembly" section.

Valve Clearance (Cold Engine)	
IN	0.1 ~ 0.15 mm (0.00394 ~ 0.00591 in)
EX	0.25 ~ 0.31 mm (0.00984 ~ 0.01220 in)

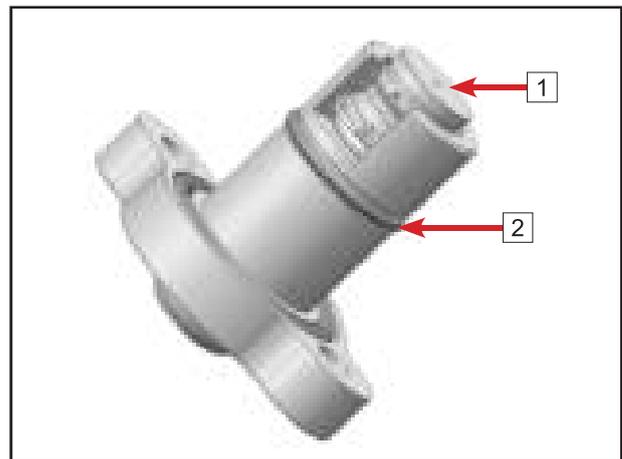
## Install Tensioner:

### New Tensioner Installation

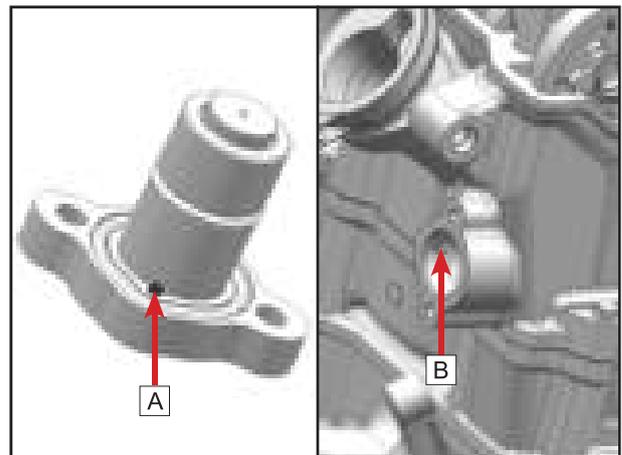
Apply oil to the tensioner plunger [1].

Apply oil to the O-ring [2].

**⚠ WARNING: When installing the tensioner, do not point the plunger towards people to prevent the plunger from flying out and causing injury.**



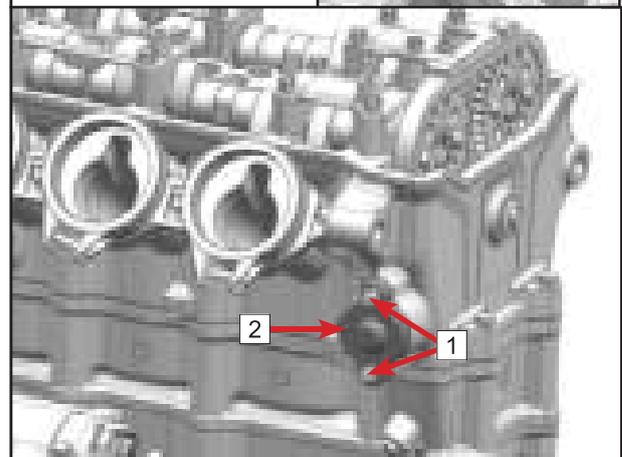
Align the tensioner oil hole [A] with cylinder head oil hole [B].



Install tensioner assembly [2].

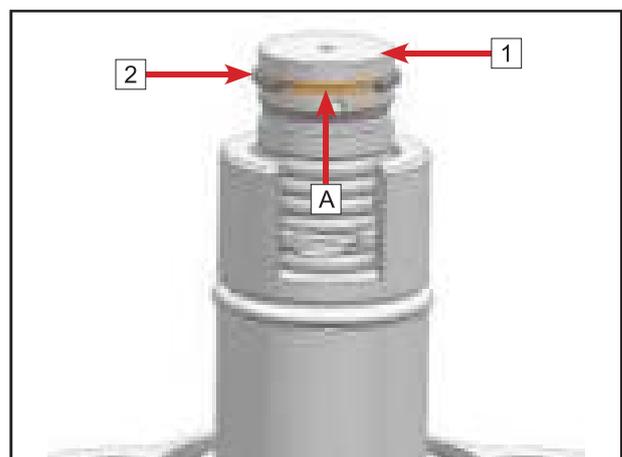
Install bolts [1], tighten to the specified torque.

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



Turn the crankshaft slightly clockwise on the magneto side or use a suitable tool to gently press the tension plate towards the tensioner side, so that the tension plate presses the tensioner plunger [1], the C ring [2] slides into the slot [A], and the plunger releases and pops out.

Ensure that the timing chain is reliably tensioned.



## Used Tensioner Installation

**NOTE: When reinstalling the used tensioner, the tensioner must be reset to the initial state and then installed according to the new tensioner installation procedures.**

The following is the tensioner reset operation procedure:

Move the C ring **1** located in the groove **A** to the groove **B**, and the C ring opening is shown on the right.

Place the tensioner on the flat surface (tensioner plunger faces down).

Pinch the retaining ring **2** with fingers, and press the tensioner housing **3** down with force until the tensioner plunger is locked.

Move the retaining ring **2** into the slot **D**, and the tensioner is reset to the initial state.

**NOTE: Make sure the retaining ring **2** is in the same slot.**

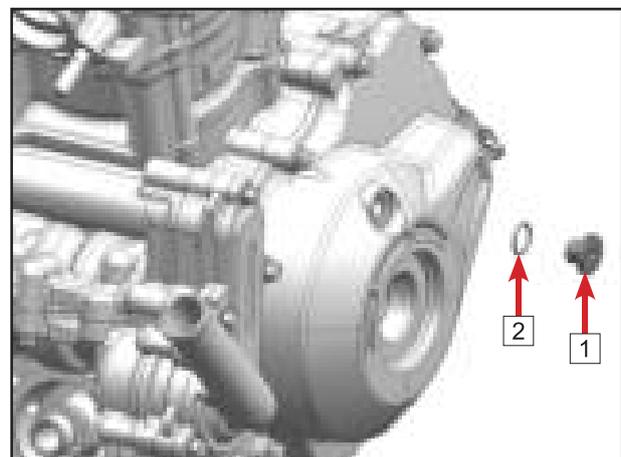
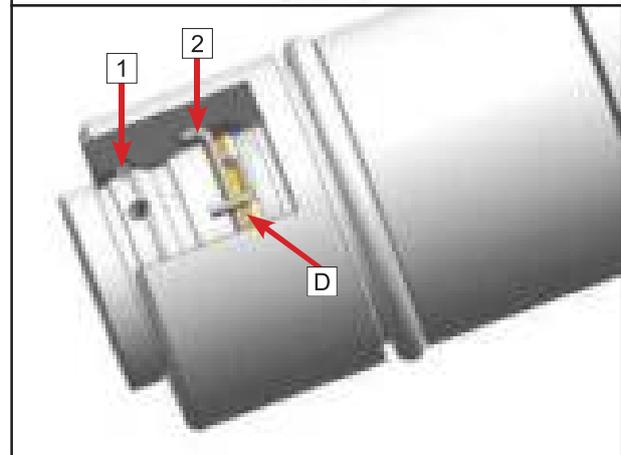
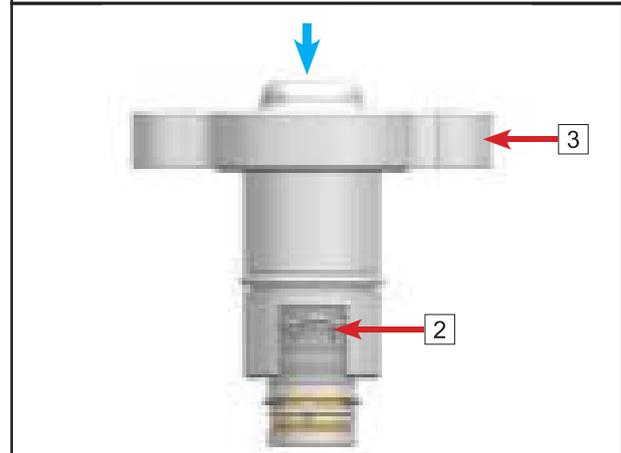
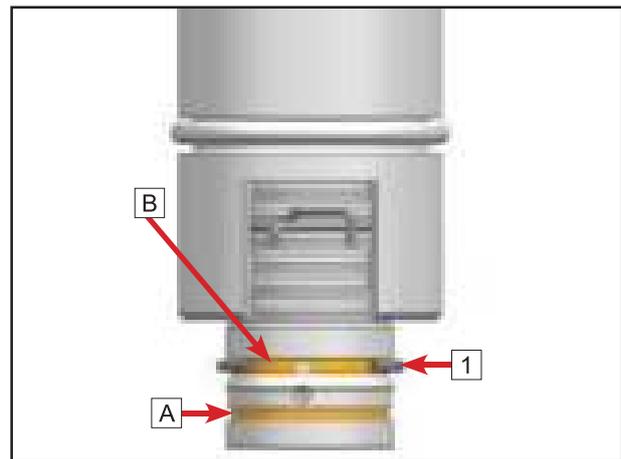
In the initial state, the position of the C ring **1** is shown on the right.

Check and confirm O-ring **2** has no damage.

Apply oil to O-ring **2** then install it into LH side cover corresponding hole.

Install timing observation hole cover **1** to LH side cover, tighten to specified torque.

Timing Observation Hole Cover <b>1</b>	
Torque	4 N·m (35.4 in-lb.)

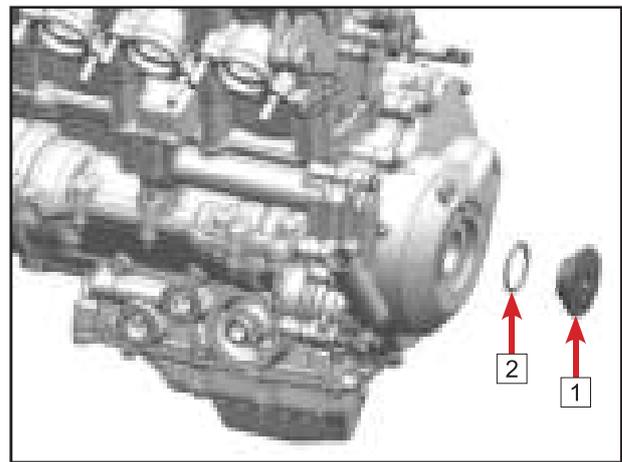


Check and confirm O-ring **2** has no damage.

Apply oil to O-ring **2** then install it on crankshaft end cover **1**.

Install crankshaft end cover **1** to LH side cover, tighten to specified torque.

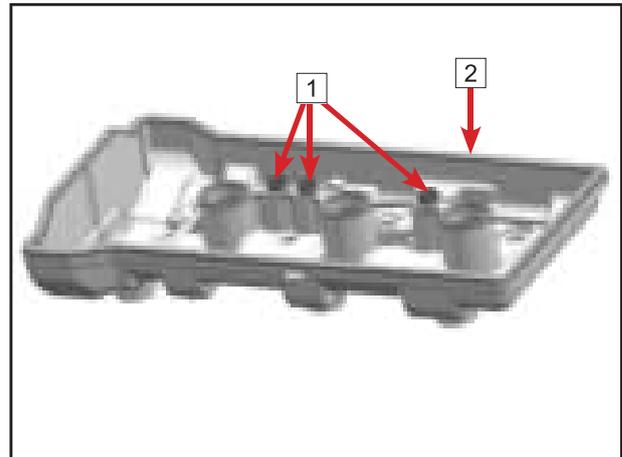
Crankshaft End Cover <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)



### 5.5.16 Cylinder Head Cover Installation

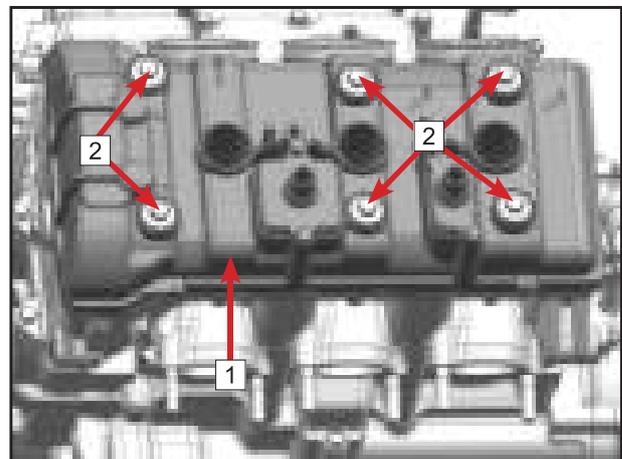
Make sure the air pins **1** are not missing.

Install the cylinder head cover seal ring **2** on the cylinder head cover.

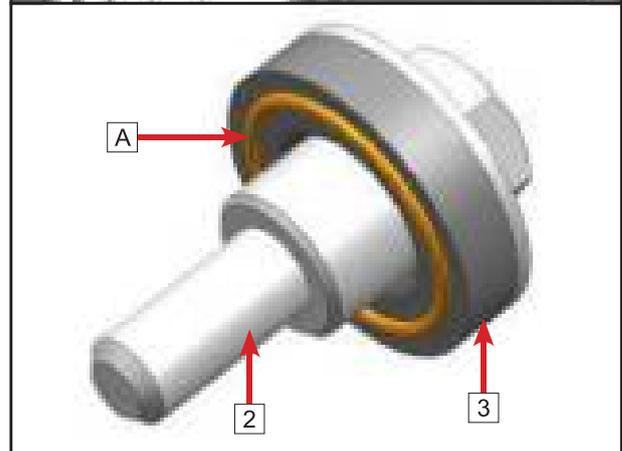


Install cylinder head cover assembly **1**.

Install cylinder head cover bolt **2** and seal ring **3**.



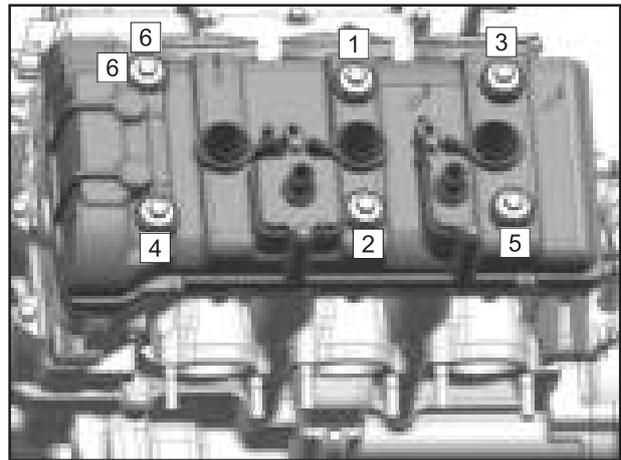
Pay attention to the direction of the sealing tape **A**.



# CFMOTO

Tighten the cylinder head cover bolts in three steps in the sequence shown on the right:

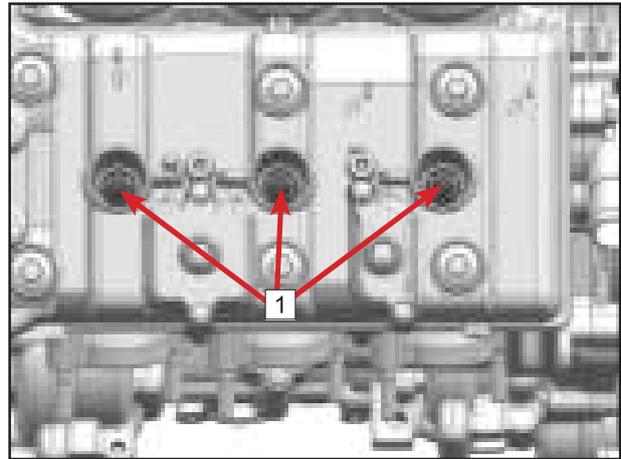
Step 1	5 N·m (3.7 ft-lb.)
Step 2	8 N·m (5.9 ft-lb.)
Step 3	10 N·m (7.3 ft-lb.)



## 5.5.17 Spark Plug and Ignition Coil Installation

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

<b>Spark Plug <b>1</b></b>	
Torque	14 N·m (10.3 ft-lb.)



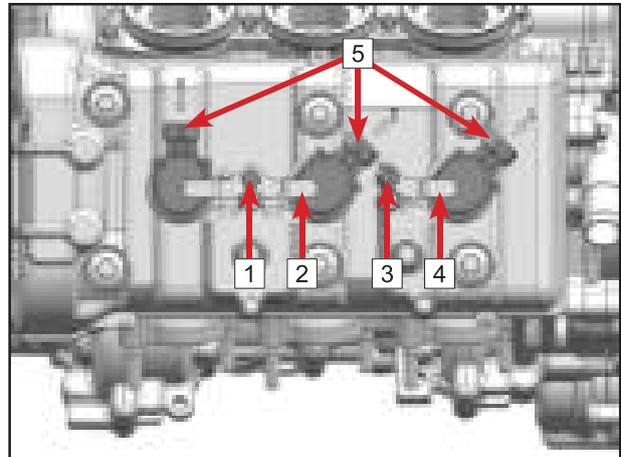
Install ignition coil **5**, ignition coil connector faces the direction pointed by the arrow on the cylinder head cover, as shown.

Install plate **2** and bolt **1**.

Install plate **4** and bolt **3**.

Tighten bolt **1** and **3** to the specified torque.

<b>Ignition Coil Press Plate Bolts <b>1</b> <b>3</b></b>	
Torque	10 N·m (7.3 ft-lb.)



## 5.5.18 Output Sprocket Assembly Installation

Apply 648 cylinder retaining adhesive to the outer cylinder of the countershaft oil seal **1**.

Install the countershaft oil seal **1** into the crankcase hole with the countershaft oil seal punch **A**.

Countershaft Oil Seal Punch (See section 5.1 for details.)
---

Install the output sprocket assembly **2** and lock washer **3** on the countershaft in turn.

Apply 243 thread locker to the nut **4**.

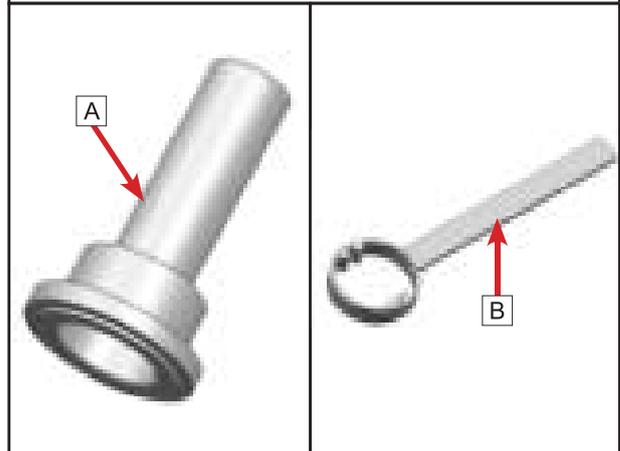
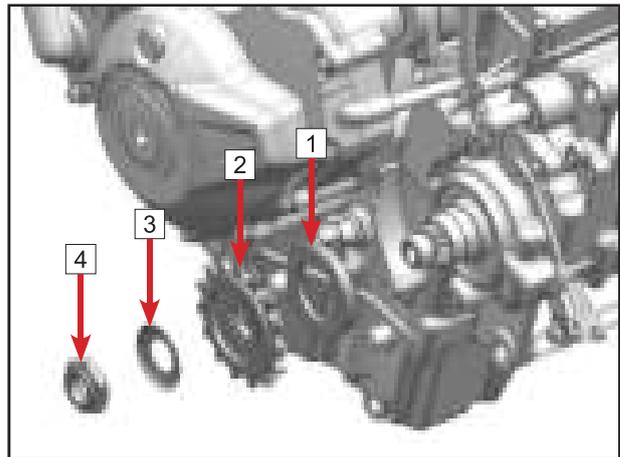
Install nut **4**.

Use the output sprocket stopping tool **B** to fix the output sprocket assembly **2**, and tighten the nut **4** to the specified torque.

Output Sprocket Stopping Tool (See section 5.1 for details.)
---

Output Sprocket Nut <b>4</b>	
Torque	125 N·m (92.2 ft-lb.)

Use a flat-head screwdriver and hammer to hem the lock washer **3** to prevent the nut **4** from loosening.

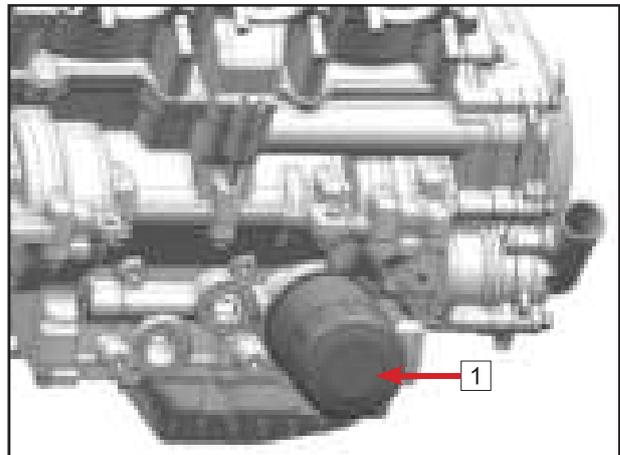


## 5.5.19 Oil Filter Installation

Apply oil to the seal ring of oil filter.

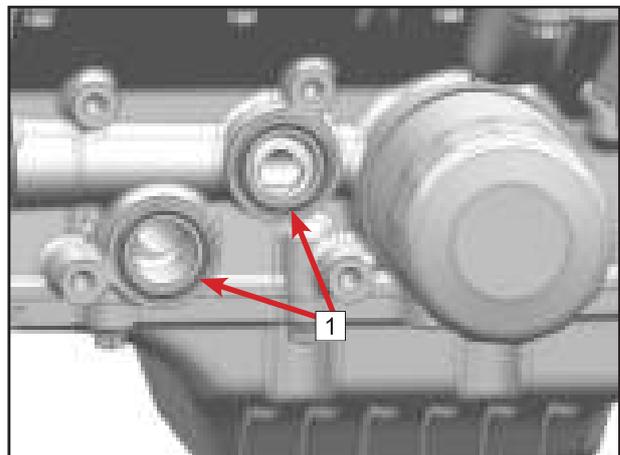
Install oil filter **1**, and tighten to the specified torque.

Oil Filter <b>1</b>	
Torque	17 N·m (12.5 ft-lb.)



## 5.5.20 Oil Cooler and Water Pipe Assembly Installation

Install O-ring **1**.

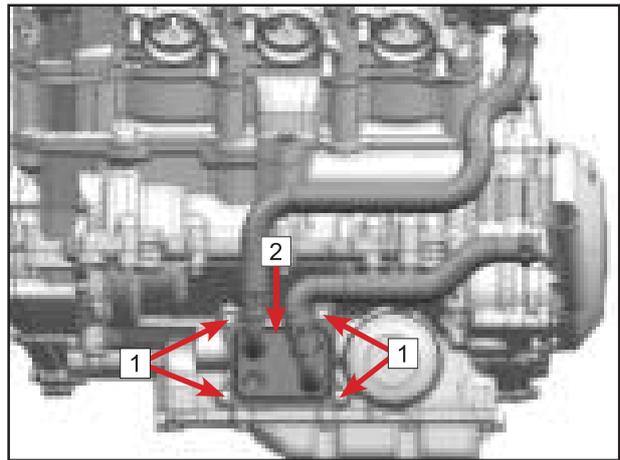


# CFMOTO

Install oil cooler and water pipe assembly **2**.

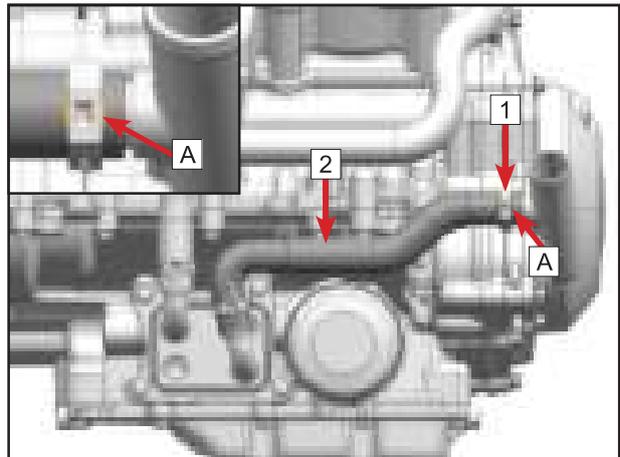
Install bolts **1**, and tighten to the specified torque.

Oil Cooler Bolt <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)



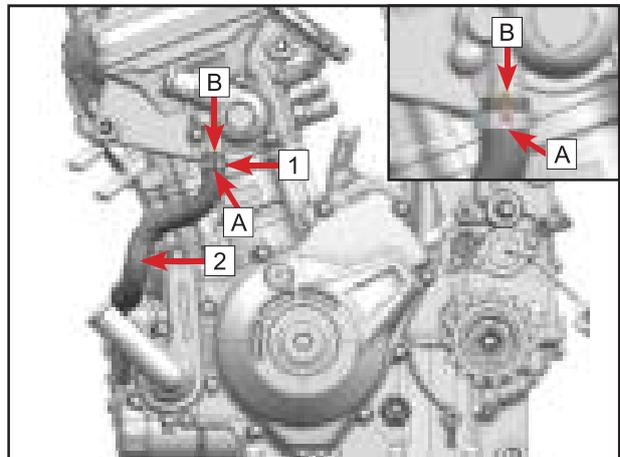
Install oil cooler outlet pipe **2** to water pump cover, the pipe mark **A** direction is as shown.

Tighten the clamp **1**.



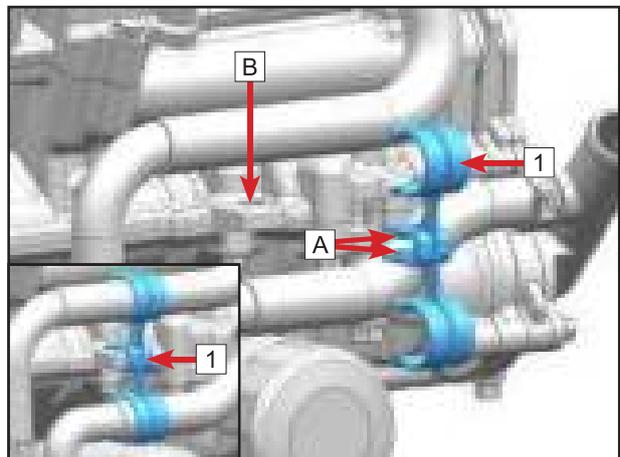
Align the mark **A** and mark **B**, and install the oil cooler inlet pipe **2** to the thermostat cover.

Tighten the clamp **1**.



Clamp the oil cooler inlet/outlet water pipe respectively into the pipe clip **1** bayonet.

Install the clip **1** on the upper crankcase, ensuring that the boss **A** is stuck into the crankcase hole **B**.

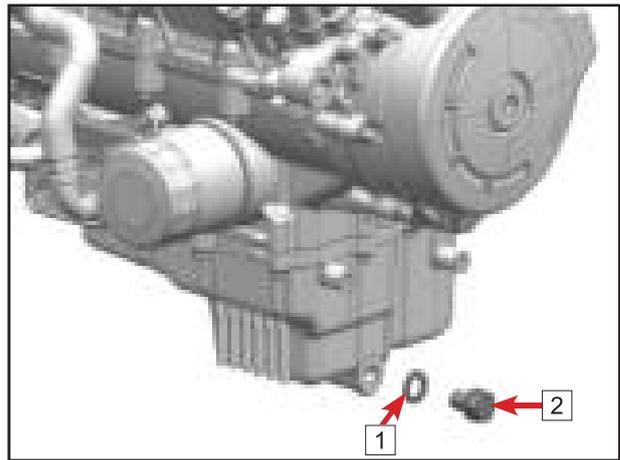


## 5.5.21 Drain Bolt Installation and Oil Filling

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	25N·m (18.4 ft-lb.)



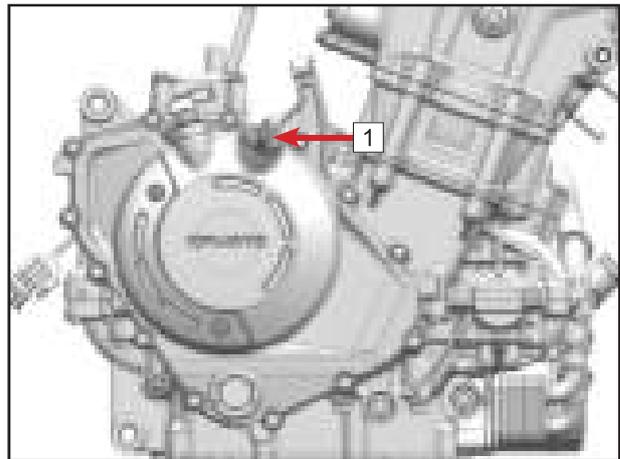
## Oil Filling

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	3.7L
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 screw **1**.

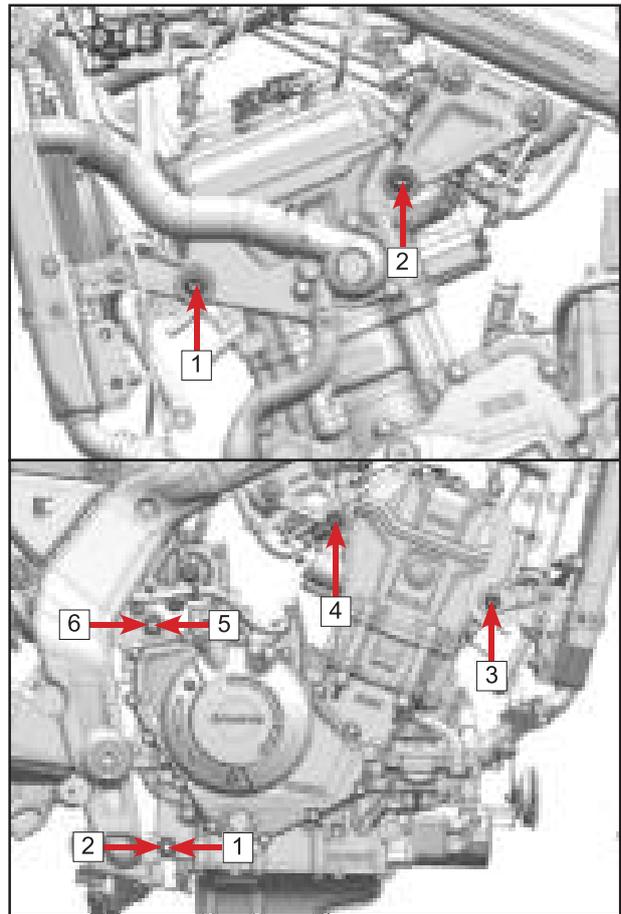
Install screw **2**.

Install screw **3**.

Install screw **4**.

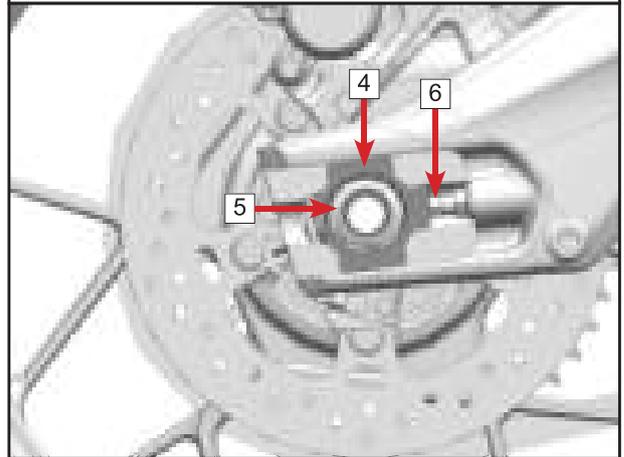
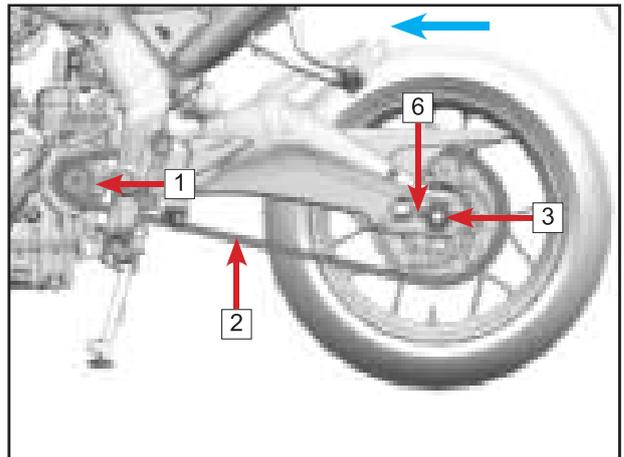
Install bolt **5** and nut **6**.

Install bolt **7** and nut **8**.

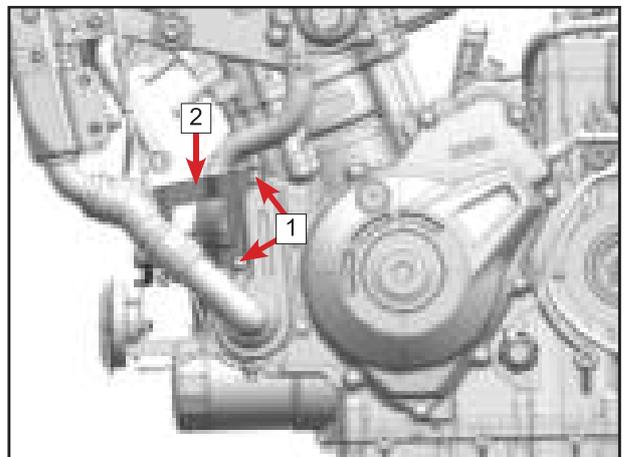


Plug in the magneto stator connector.  
Plug in the oil pressure sensor connector.  
Plug in the gear sensor connector.  
Plug in the coolant temperature sensor connector.  
Plug in the TPS sensor connector.  
Plug in the stepper motor connector.  
Plug in the T-MAP sensor connector.  
Plug in fuel injector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

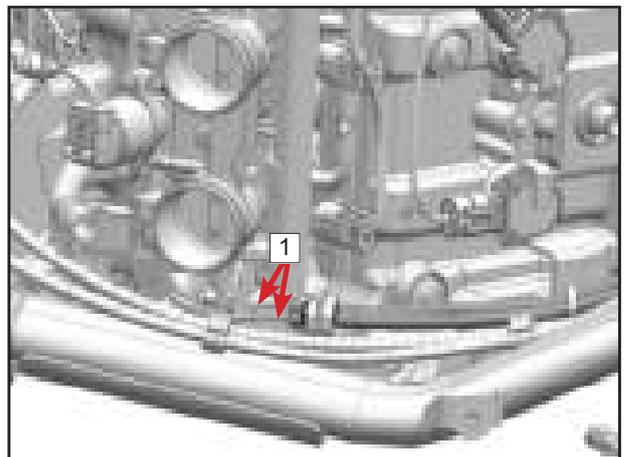
Push the rear wheel forward.  
Install the chain **2** to the outlet sprocket **1**.  
Place the rear wheel in place.  
Install rear wheel shaft assembly **3** and  
RH chain adjusting block **4**.  
Push the rear wheel forward until the chain  
adjusting block makes contact with the  
chain adjusting bolt **6**, then install and  
tighten the rear wheel shaft nut **5**.



Place horn bracket **2** in place.  
Install bolts **1**.



Install throttle cable **1** to throttle valve  
body.



# CFMOTO

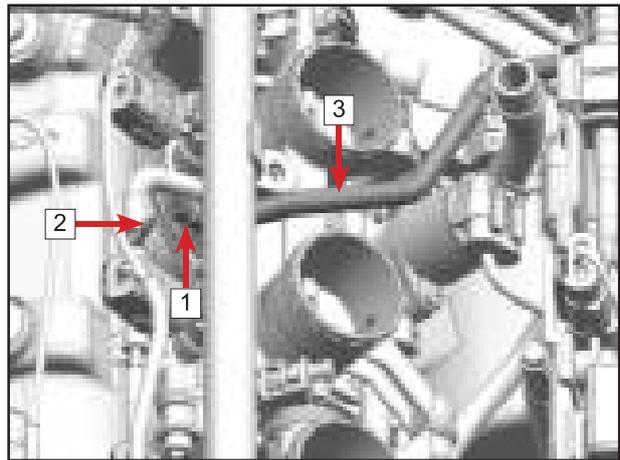
{ } is the operating procedures for vehicles equipped with fuel evaporation system.

{

Install fuel vapor desorption hose 2 [3] to connector [2].

Tighten the clamp [1].

}

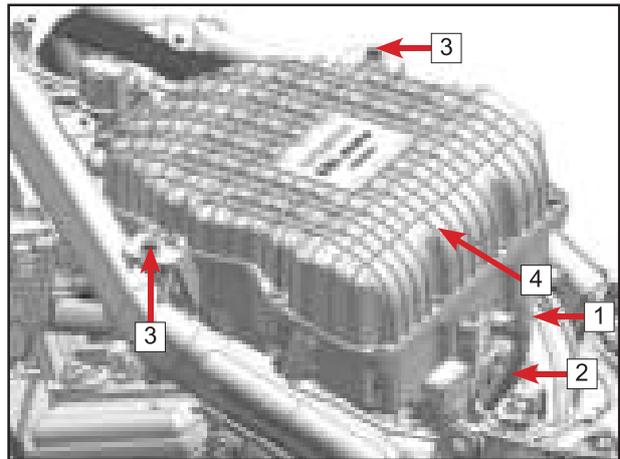


Place air filter housing assembly [4] in place.

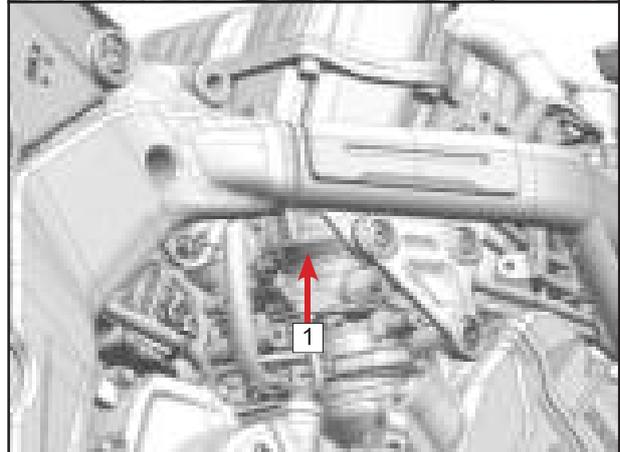
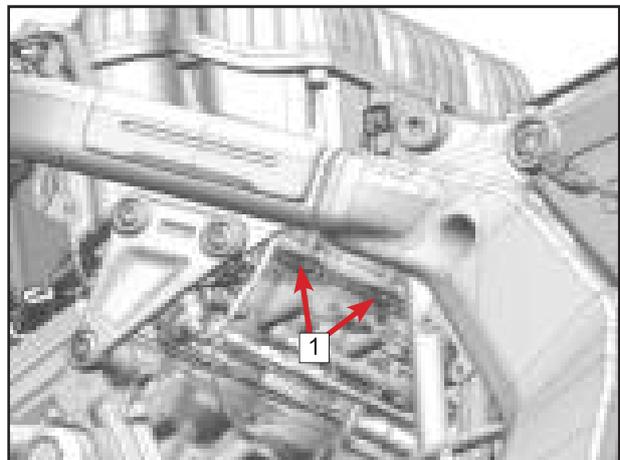
Install bolt [3].

Install intake compensation pipe assembly [2] to air filter housing.

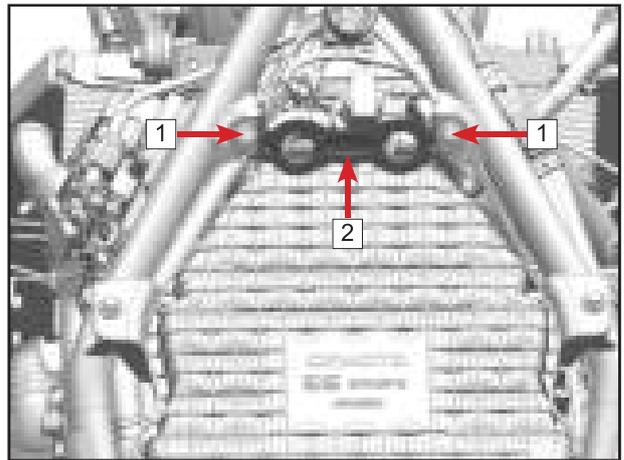
Tighten the clamp [1].



Tighten the clamp [1].



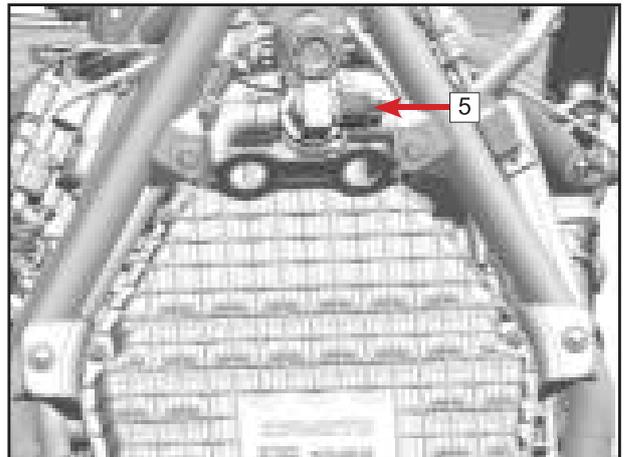
Place fuel tank bracket **2** in place.  
Install bolts **1**.



{ } is the operating procedures for  
vehicles equipped with secondary air  
supply system-SAS.

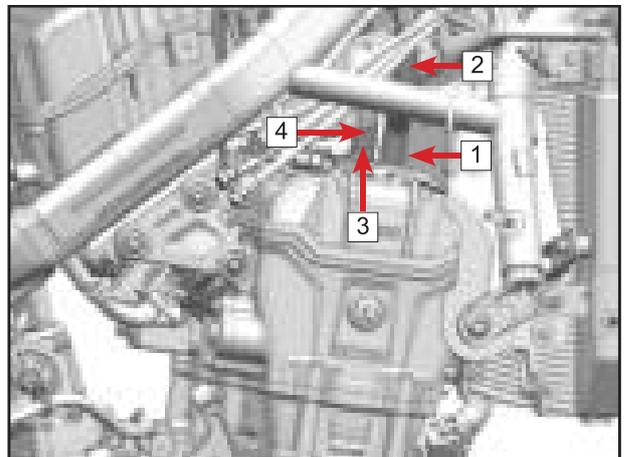
{

Plug in SAS valve connector **5**.

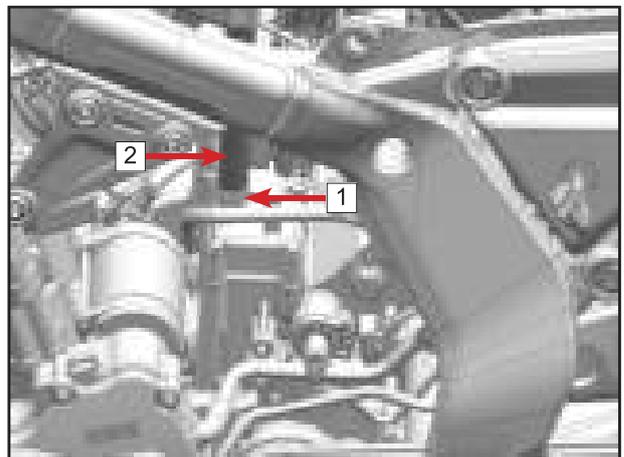


Install SAS outlet pipe **4** to engine.  
Tighten the clamp **3**.  
Install SAS outlet pipe **2** to engine.  
Tighten the clamp **1**.

}

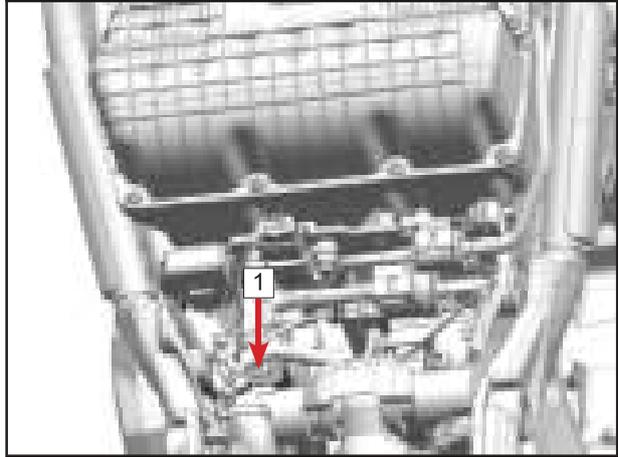
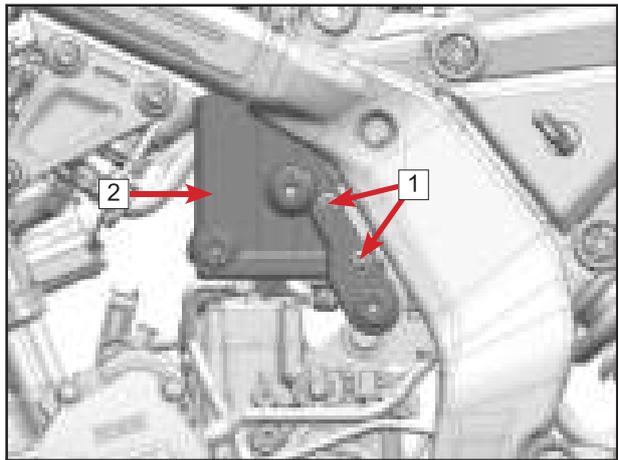


Install crankcase breather **2** to engine.  
Tighten the clamp **1**.



# CFMOTO

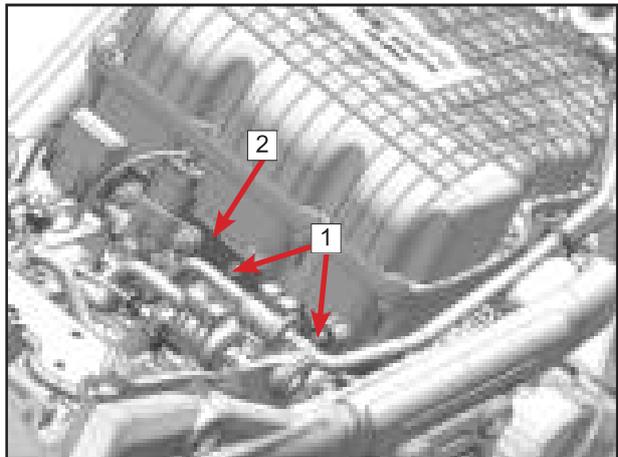
Place canister bracket assembly **2** in place.  
Install screws **1**.



**{ }** is the operating procedures for vehicles equipped with fuel evaporation system.

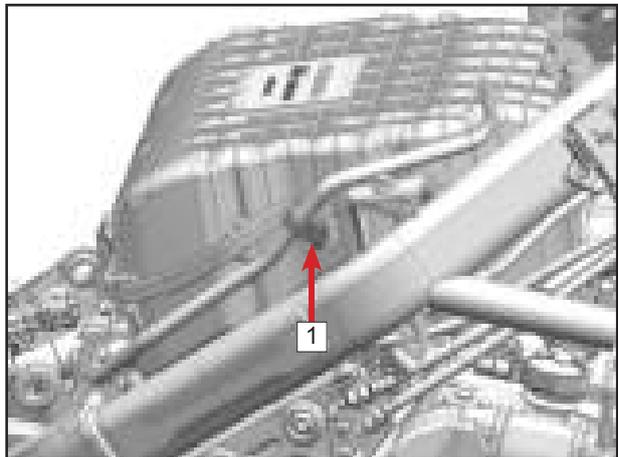
{

Place valve body bracket **2** in place.  
Install screws **1**.

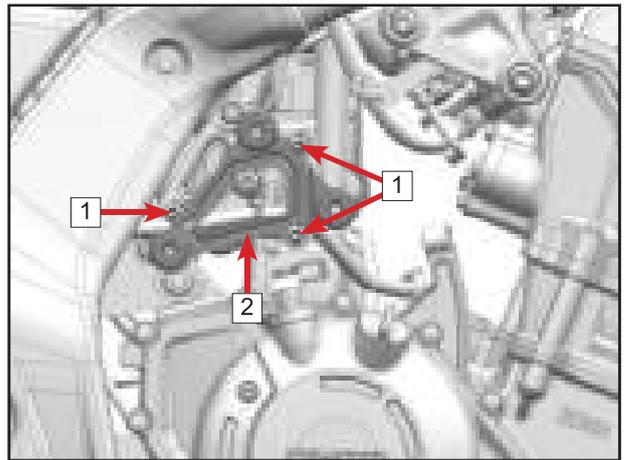


Insert tie band **1** into air filter housing.

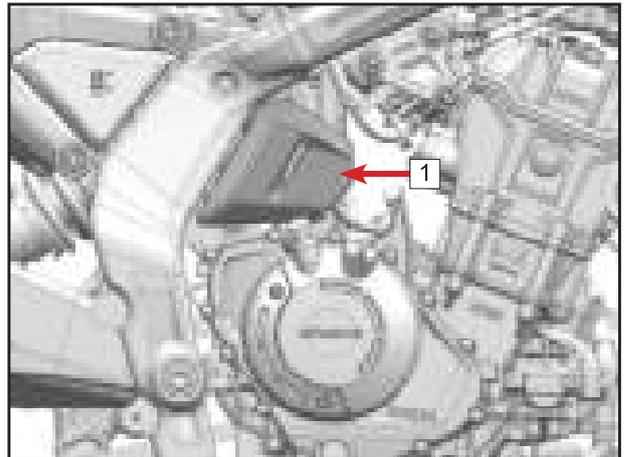
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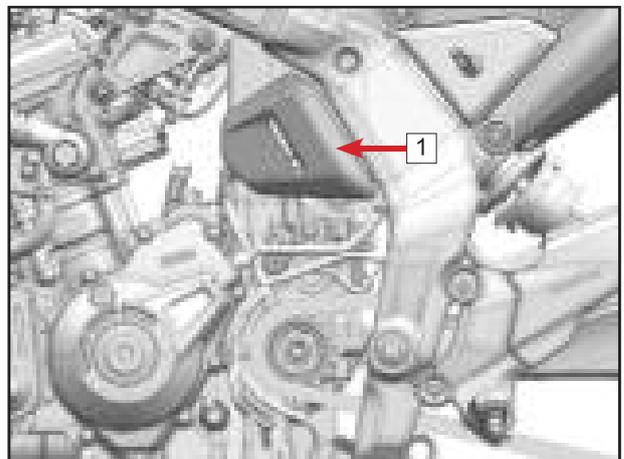
Place ABS deco guard bracket assembly **2** in place.  
Install screws **1**.



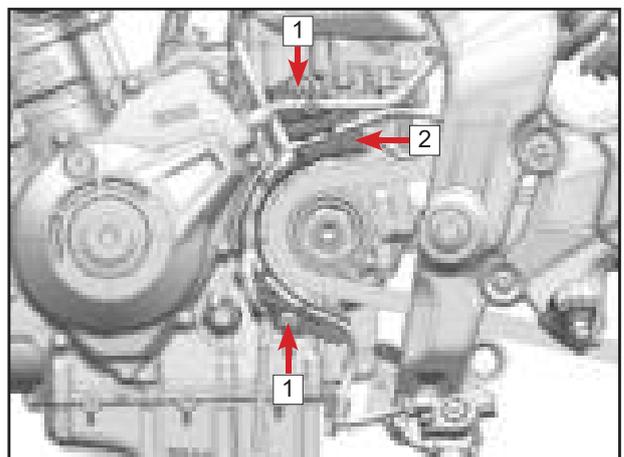
Install vehicle RH middle deco plate **1**.



Install vehicle LH middle deco plate **1**.

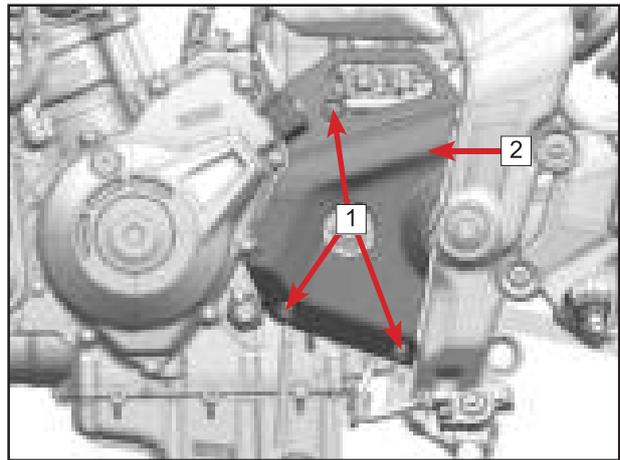


Place small sprocket deco guard bracket **2** in place.  
Install screws **1**.  
Arrange the hose and cable along the bracket slot, as shown in the picture.

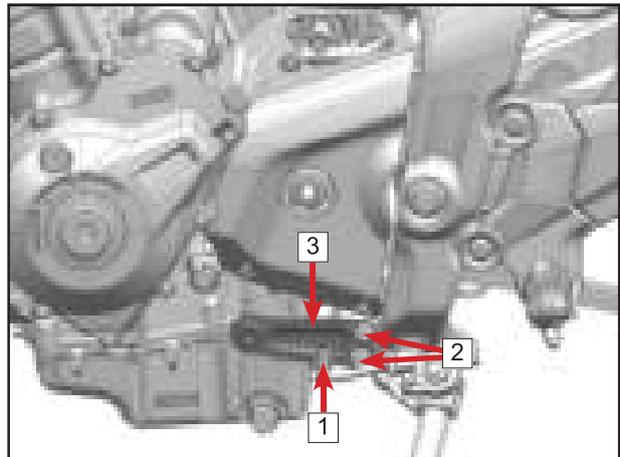


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Place small sprocket deco guard **2** in place.  
Install screws **1**.



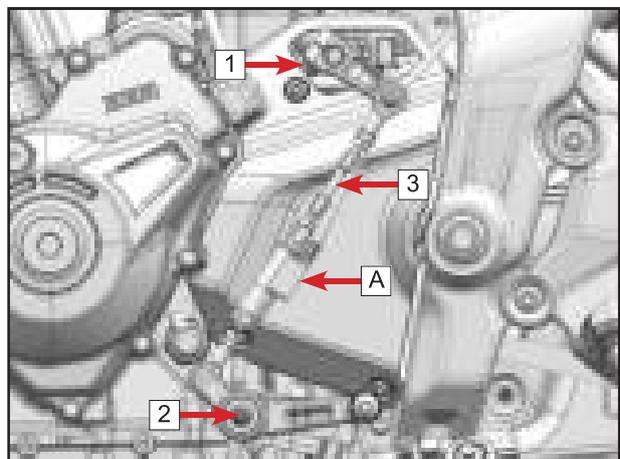
Install gearshift lever bracket **3** to place.  
Install screws **2**.  
Install cable clip **1** to gearshift lever bracket **3**.



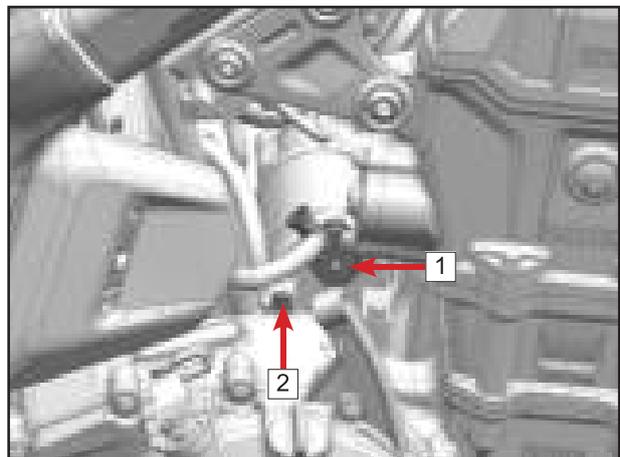
Install gearshift lever assembly **3**.

**NOTE: The quick shift sensor **A** is facing towards the rear of the vehicle, as shown in the figure.**

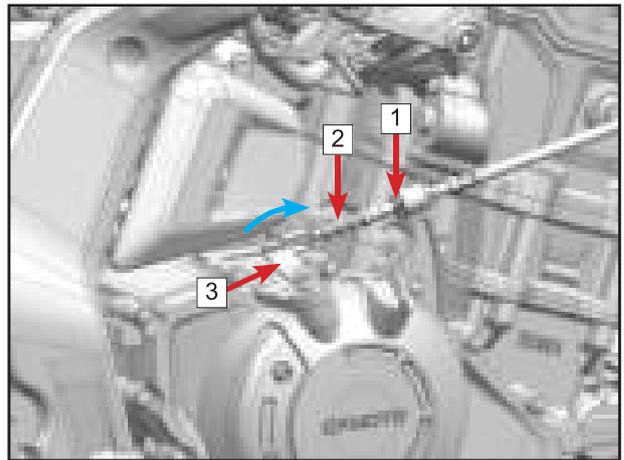
Install bolt **1** and screw **2**.



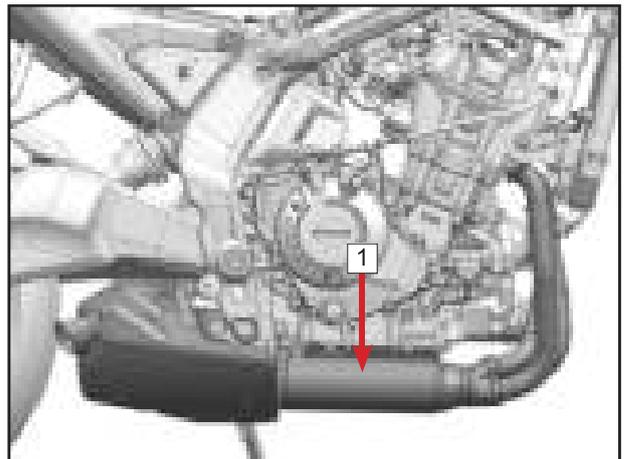
Install GND to place.  
Install bolt **2**.  
Install positive cable and its fixing nut.  
Install protective cap **1** to place.



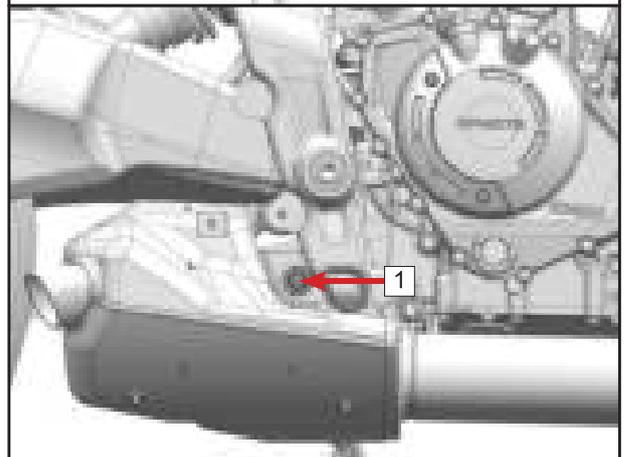
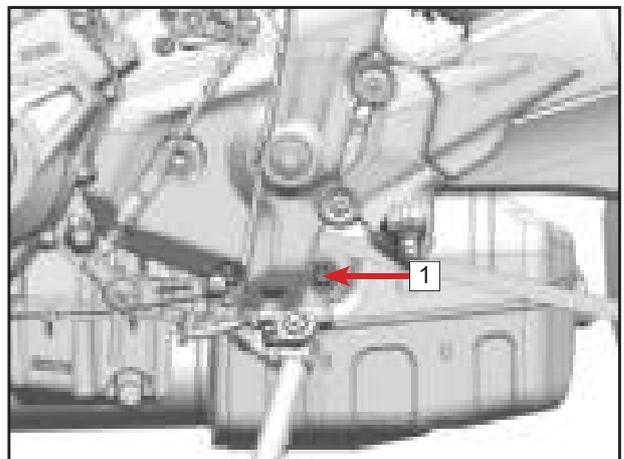
Rotate the clutch release lever **3** clockwise and install the clutch pull cable **2**.  
Tighten nut **1**.



Make sure exhaust port gasket is installed. Install exhaust muffler assembly **1** to place.

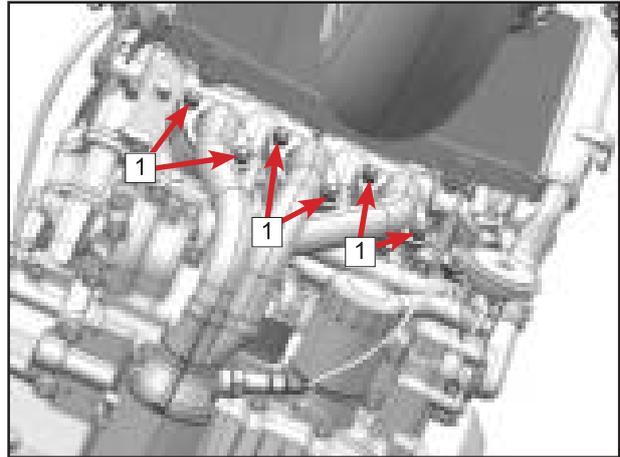


Install bolts **1**.

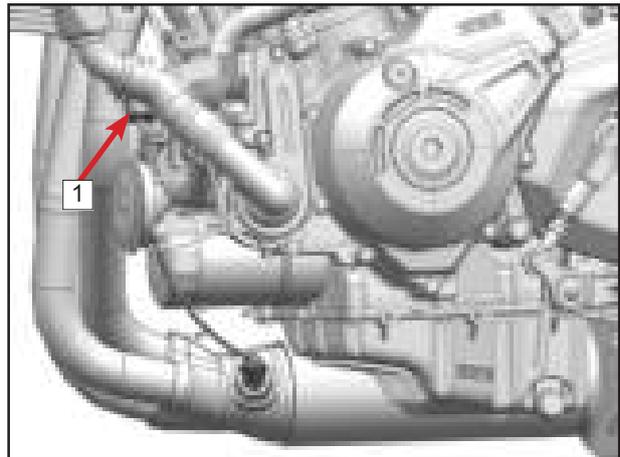


Install lock nuts **1**.

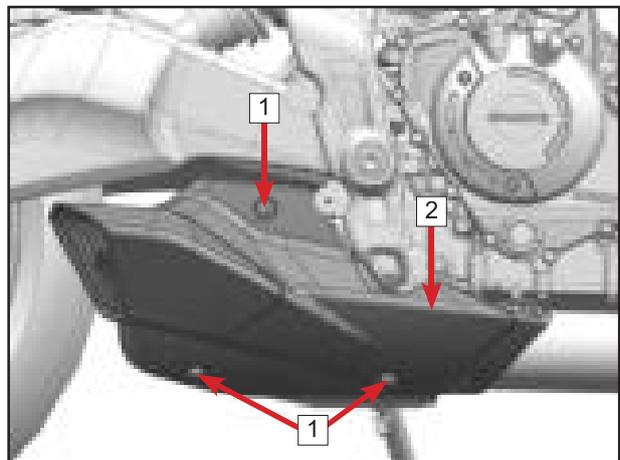
Install the radiator. (Refer to the "Cooling System" chapter)



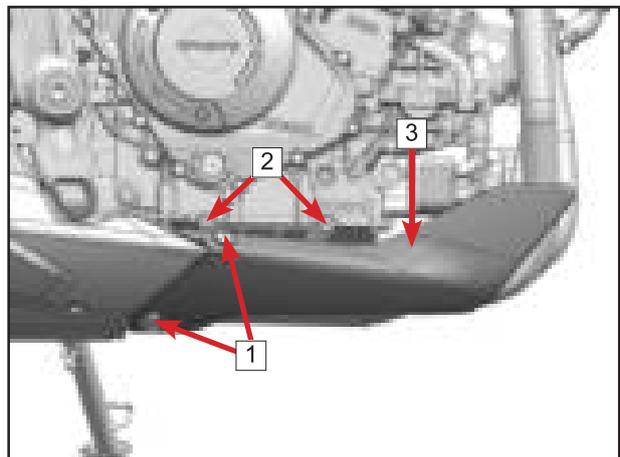
Plug in oxygen sensor connector **1**.



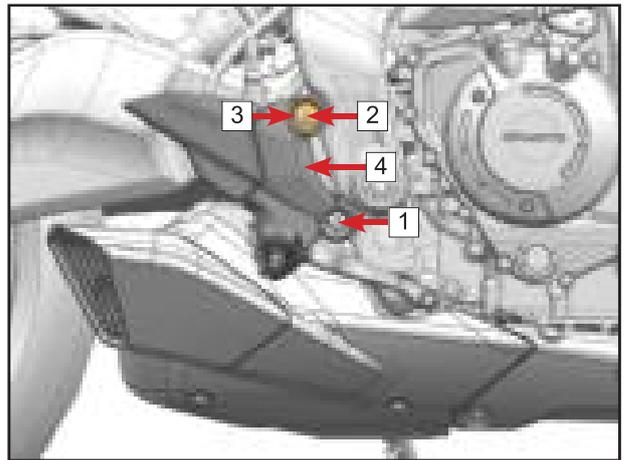
Place muffler guard assembly **2** in place.  
Install screws **1**.



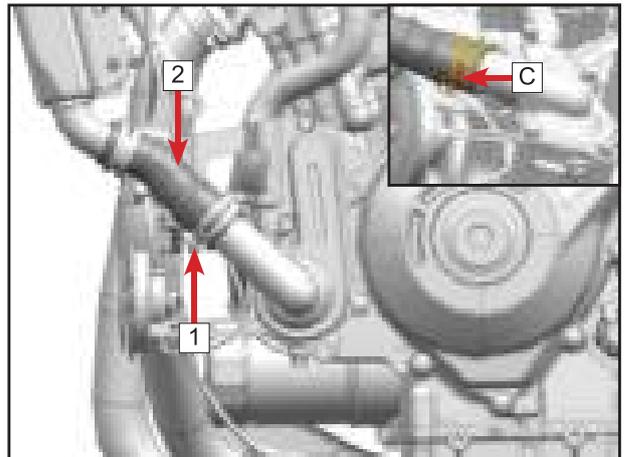
Install muffler rear RH deco guard assembly **3** to place.  
Install screws **2** and screws **1**.



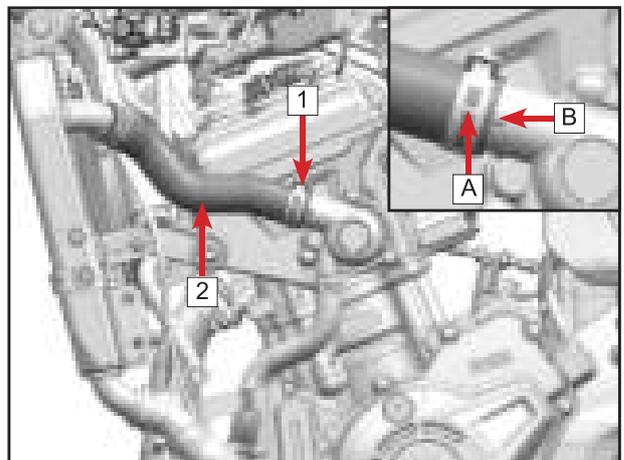
Install front RH footrest bracket assembly **4** to place.  
Install washer **3** and screw **2**.  
Install screw **1**.



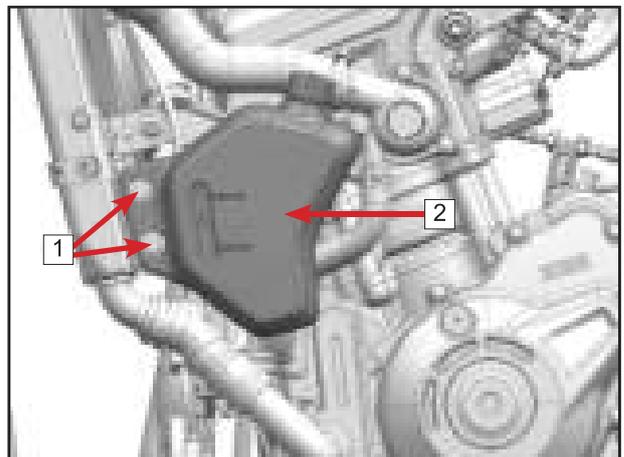
Install radiator water outlet hose **2** to water pump cover.  
The mark **C** location is as shown on the right.  
Tighten the clamp **1**.



Install the radiator inlet hose **2** to the thermostat cover, align the mark **A** with the mark **B**.  
Tighten the clamp **1**.

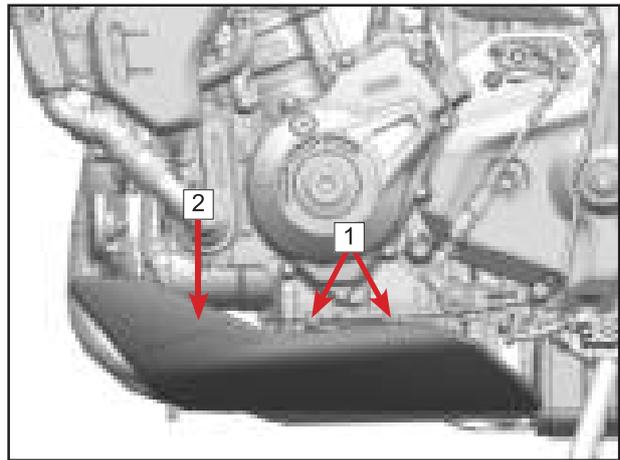


Install auxiliary water bottle deco cover **2** and reservoir assembly to place.  
Install bolts **1**.



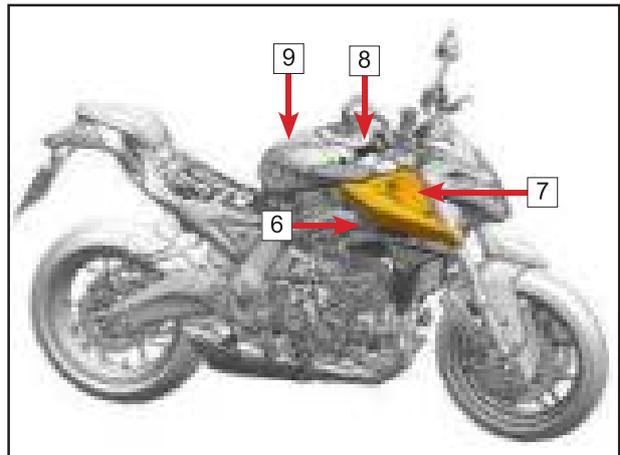
# CFMOTO

Install muffler rear LH deco guard assembly **2** to place.  
Install screws **1**.

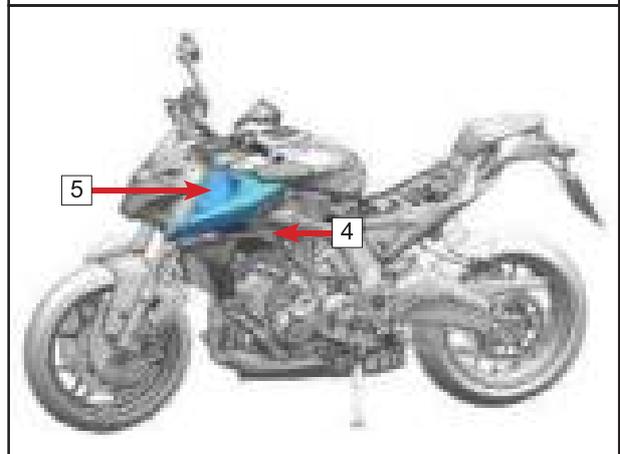


Refer to the relevant sections to install:

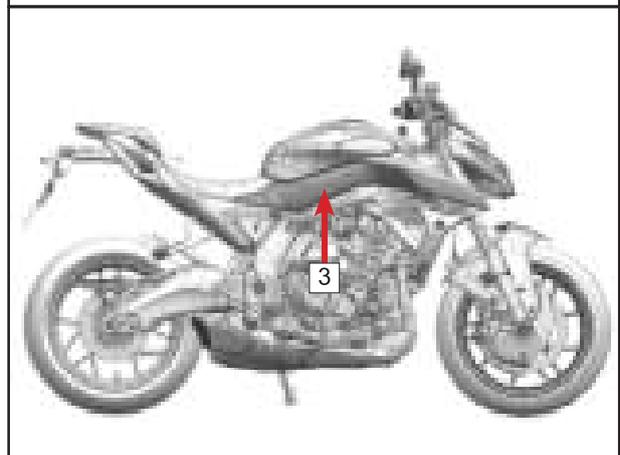
- Fuel tank **9**
- Fuel tank upper deco plate **8**
- Fuel tank front RH deco plate assembly **7**
- Radiator RH inner panel assembly **6**



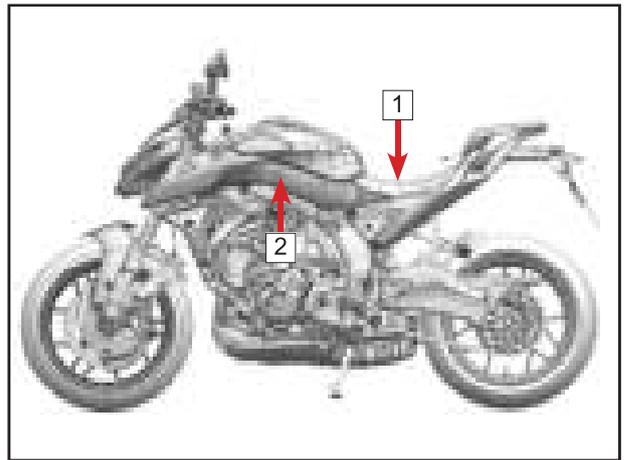
- Fuel tank front LH deco plate assembly **5**
- Radiator LH inner panel assembly **4**



- Vehicle rear RH deco plate **3**

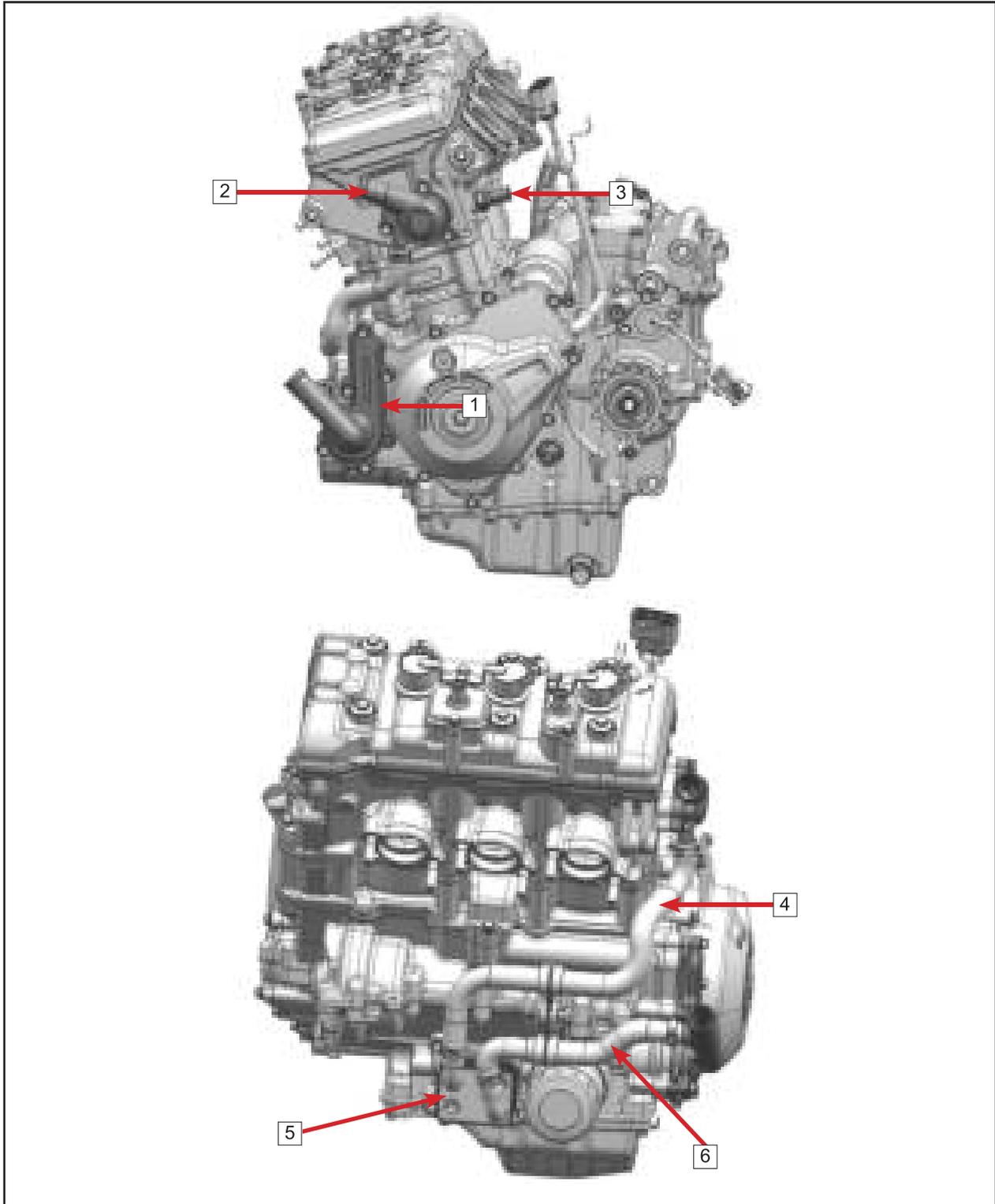


- Vehicle rear LH deco plate [2]
- Front seat [1]



**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	Number	Name of Parts
1	Water pump assembly	5	Oil cooler assembly
2	Thermostat cover	6	Oil cooler water outlet hose
3	Coolant temperature sensor		
4	Oil cooler water inlet hose		

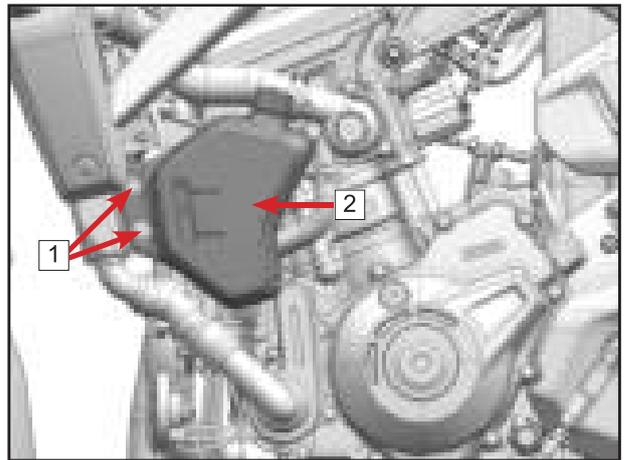
## 5.7.1 Water Pump Assembly

### 5.7.1.1 Removal

Drain the coolant.

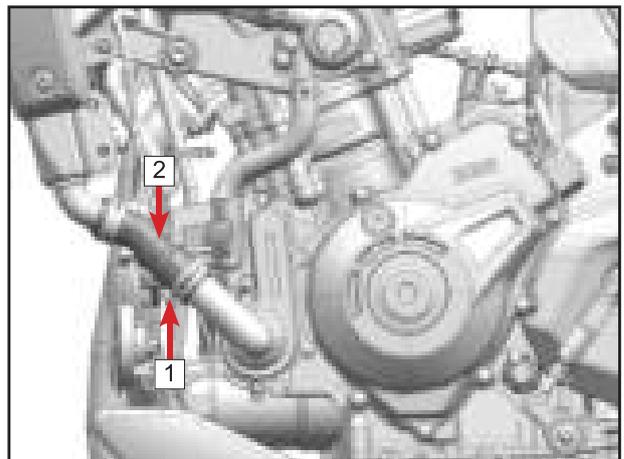
Remove bolts **1**.

Remove auxiliary water bottle deco cover **2** and reservoir assembly.



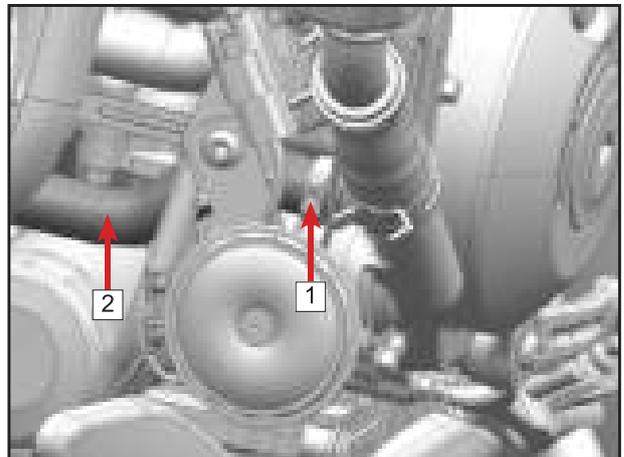
Loosen the clamp **1**.

Remove radiator outlet pipe **2** from water pump cover.



Loosen the clamp **1**.

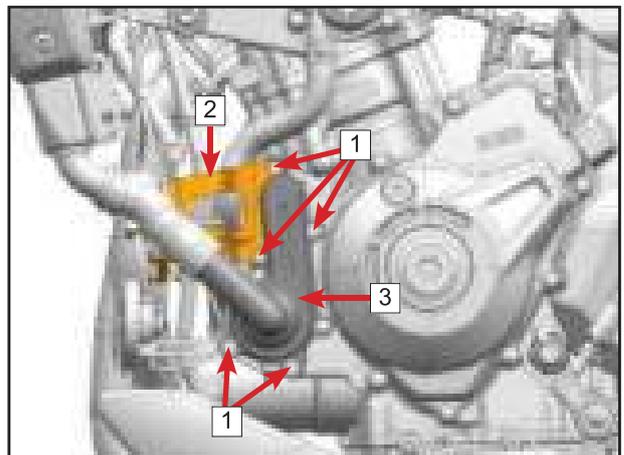
Remove oil cooler water outlet hose **2** from water pump cover.



Remove bolts **1**.

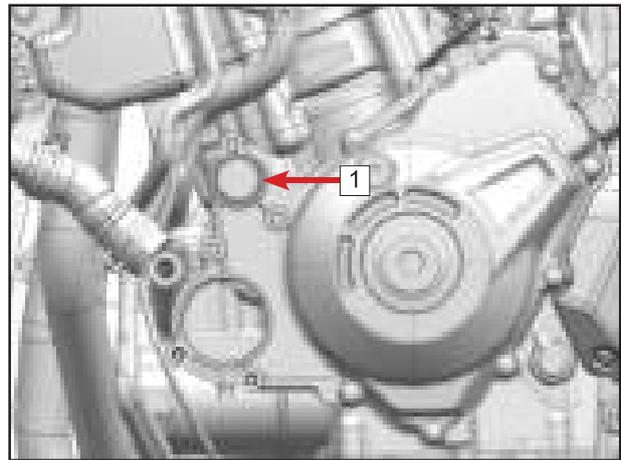
Hang horn bracket **2** to the side.

Remove water pump assembly **3**.



Remove O-ring **1**.

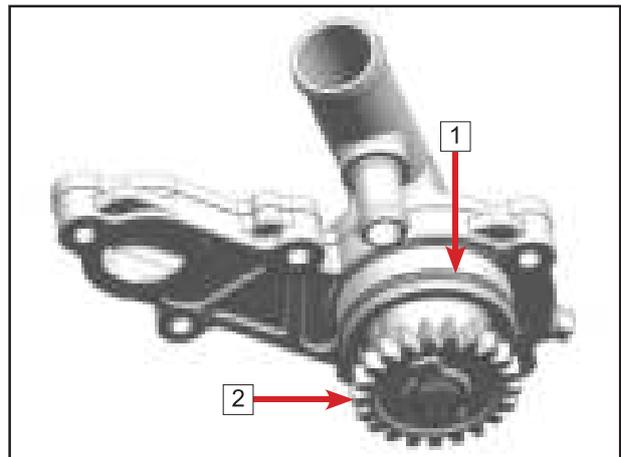
Check O-ring **1** for cracks, hardening or other damage. Replace if necessary.



### 5.7.1.2 Inspection

Check O-ring **1** for cracks, hardening or other damage. Replace if necessary.

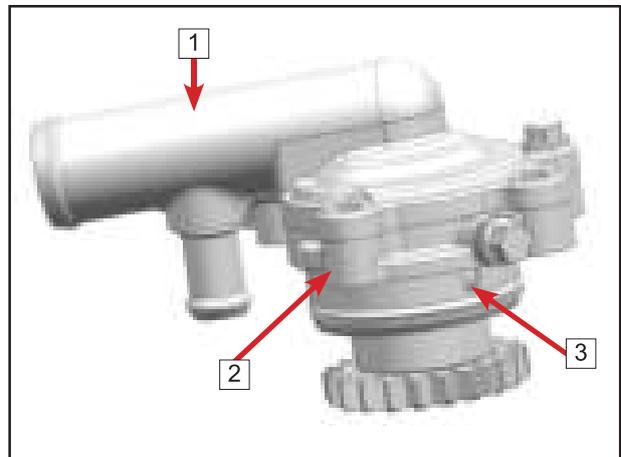
Check water pump gear **2** for cracks, severe wear or damage. Replace if necessary.



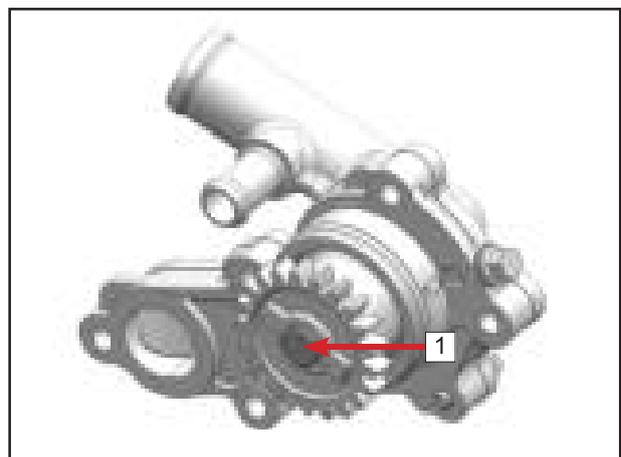
Check water pump cover **1** and water pump housing **2** for cracks or damage. Replace if necessary.

Check whether there is coolant leakage at the joint surface of water pump cover and water pump housing. If yes, it indicates that there is a problem with the seal ring of the pump, or the water pump cover or the water pump housing is seriously deformed, and a new part must be replaced.

Check for liquid flowing from the leak hole **3**. If there is a continuous outflow of coolant, indicating that there is a problem with the water seal. If the engine oil flows out, it indicates that there is a problem with the oil seal and a new part must be replaced.



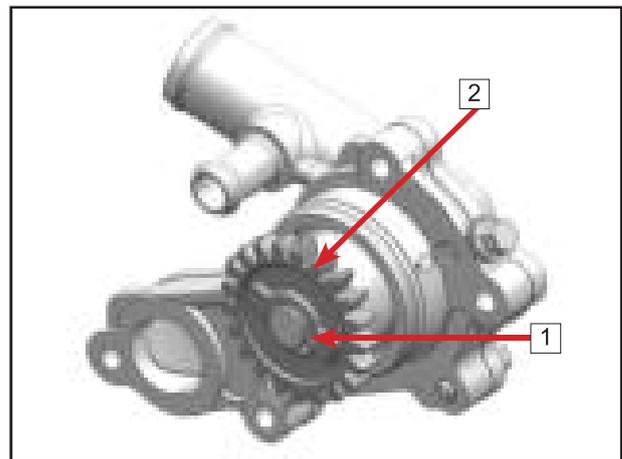
Check water pump shaft **1** for flexible rotation. If the bearing is stuck, replace it with a new part.



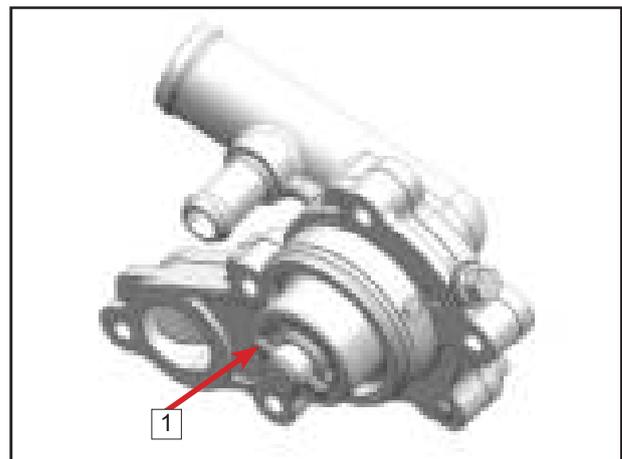
### Water Pump Gear Removal/Installation

Remove retainer **1**.

Remove water pump gear **2**.



Remove needle roller **1**.



### Installation

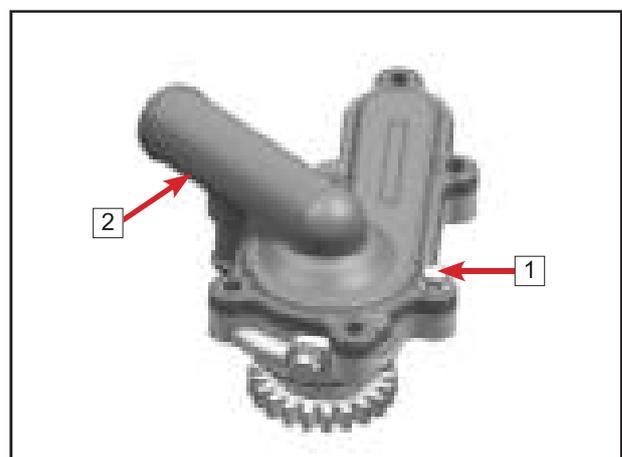
To install, perform the removal procedure in reverse. Pay attention to the following details:

- Ensure that the needle roller is stuck in the groove of the water pump gear.
- Use a new retainer, with the rounded side of it facing the pump gear, to ensure it is fully slotted.

### Water Pump Cover Removal

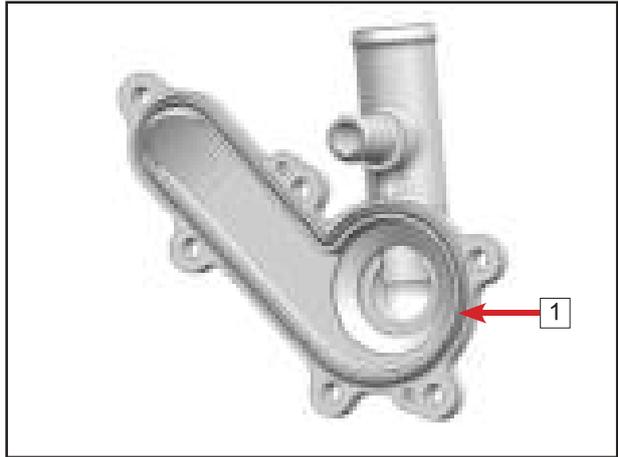
Remove bolt **1**.

Remove water pump cover **2**.



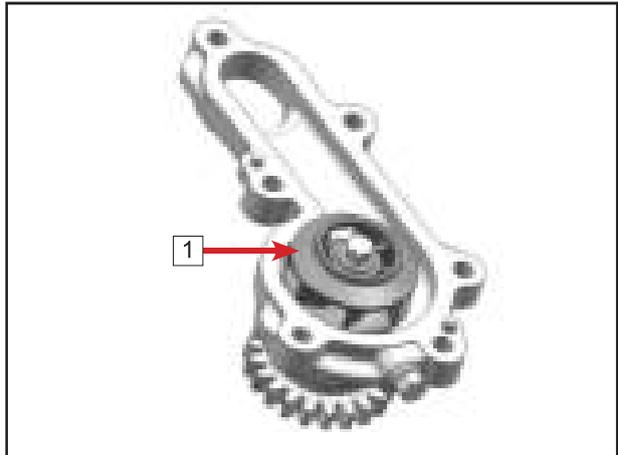
# CFMOTO

Remove water pump seal ring **1**.  
Check water pump seal ring for cracks, hardening or other damage. Replace if necessary.



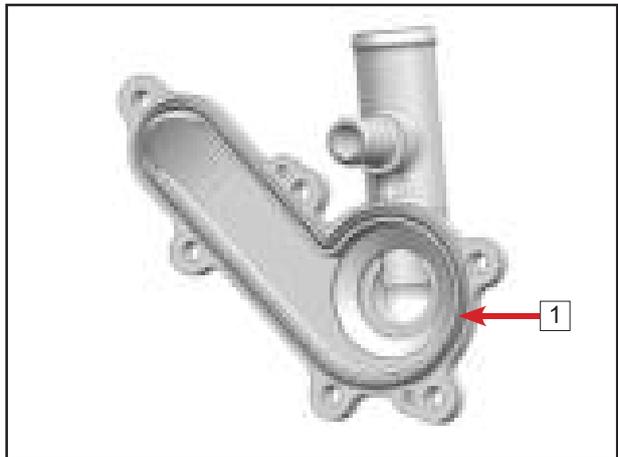
Check water pump impeller **1** for cracks or damage. Replace if necessary.

**NOTE: Water pump assembly is a part requiring very tight sealing. The water pump cover, water pump seal ring and O-ring can be replaced separately, the rest should be replaced as a whole when servicing. It is recommended to replace the entire water pump assembly.**

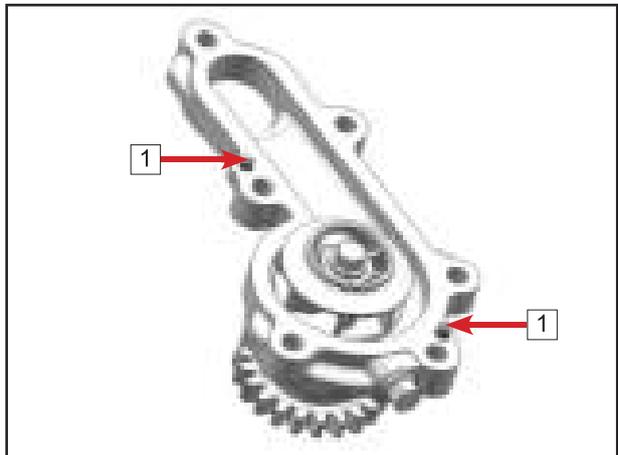


## Water Pump Cover Installation

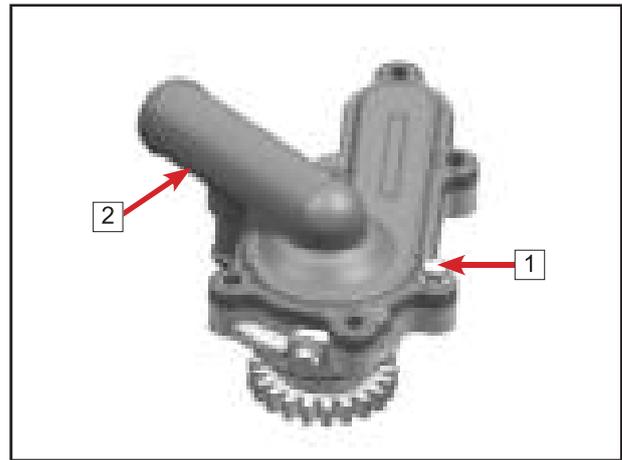
Install water pump seal ring **1** to the groove of water pump cover.



Make sure the dowel pins **1** are not missing.

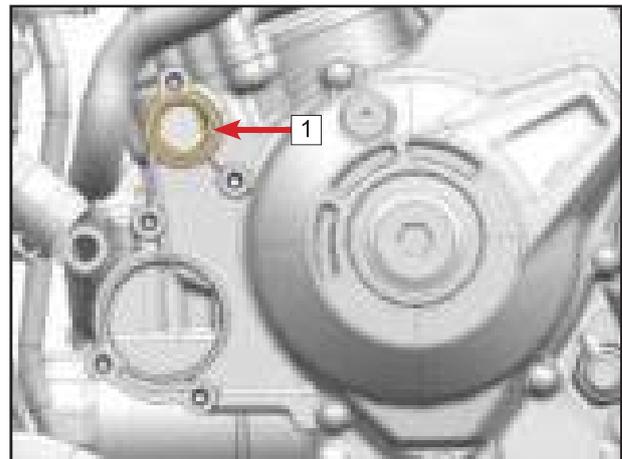


Install water pump cover **2**.  
Install bolt **1** and pre-tighten.

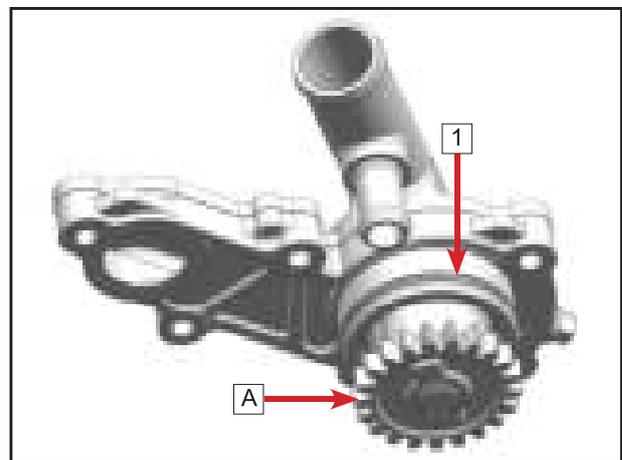


### 5.7.1.3 Installation

Install O-ring **1**.



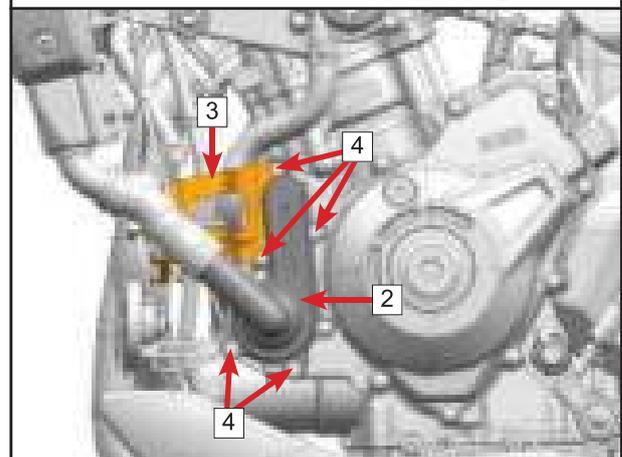
Make sure the O-ring **1** is installed on the water pump assembly.  
Apply proper amount of oil to the O-ring **1**.



Install water pump assembly **2**.

**NOTE: When installing the pump, if the pump gear **A** is stuck, rotate the pump gear to align the gear teeth.**

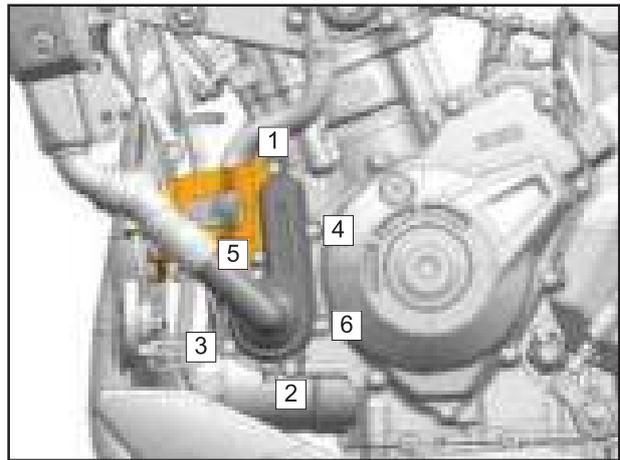
Install horn bracket **3** to place.  
Install water pump bolts **4** (M6×42).



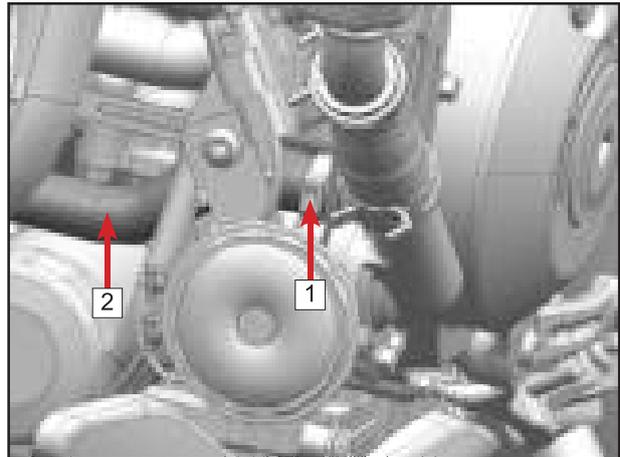
# CFMOTO

Tighten pump bolts to specified torque in the sequence shown on the right.

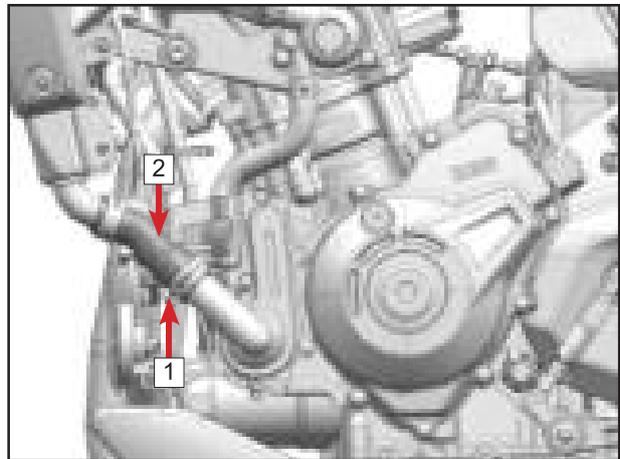
Water Pump Bolt	
Torque	10 N·m (7.3 ft-lb.)



Install oil cooler outlet pipe **2** on the water pump cover.  
Tighten the clamp **1**.

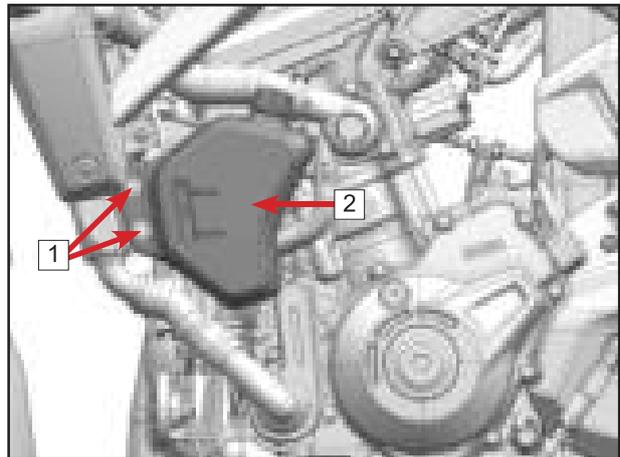


Install radiator outlet pipe **2** on the water pump cover.  
Tighten the clamp **1**.



Install auxiliary water bottle deco cover **2**  
and reservoir assembly to place.  
Install bolts **1**.

Fill with coolant and bleed the cooling system.



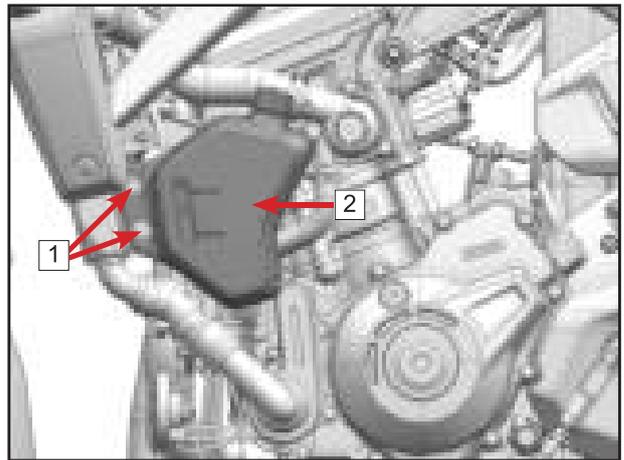
### 5.7.2 Thermostat

#### Removal

Drain the coolant.

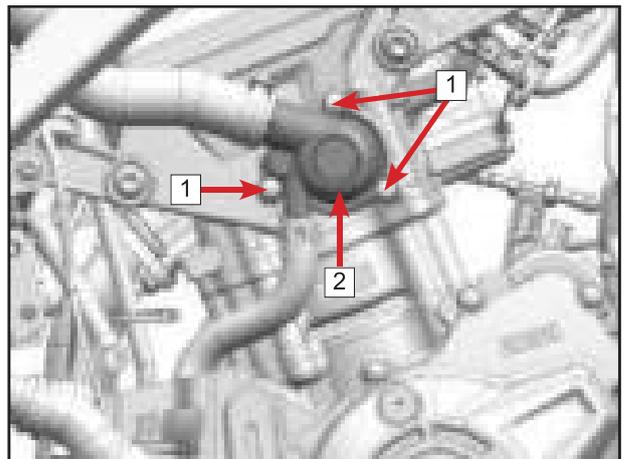
Remove bolts **1**.

Remove auxiliary water bottle deco cover **2** and reservoir assembly

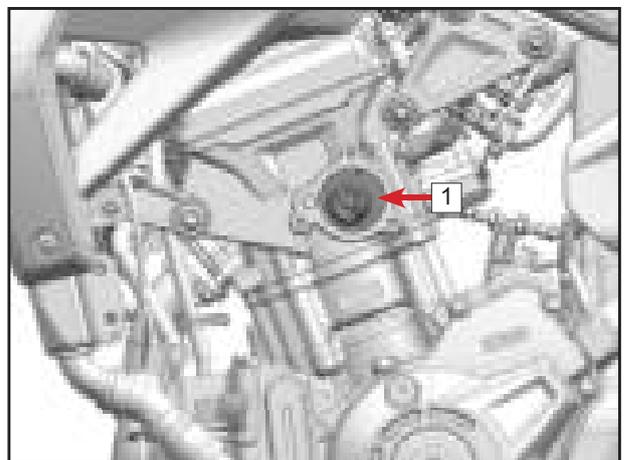


Remove bolts **1**.

Remove thermostat cover **2**.



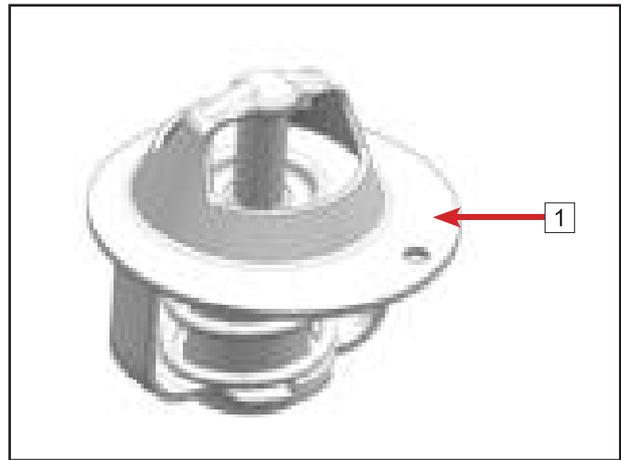
Remove the thermostat **1**.



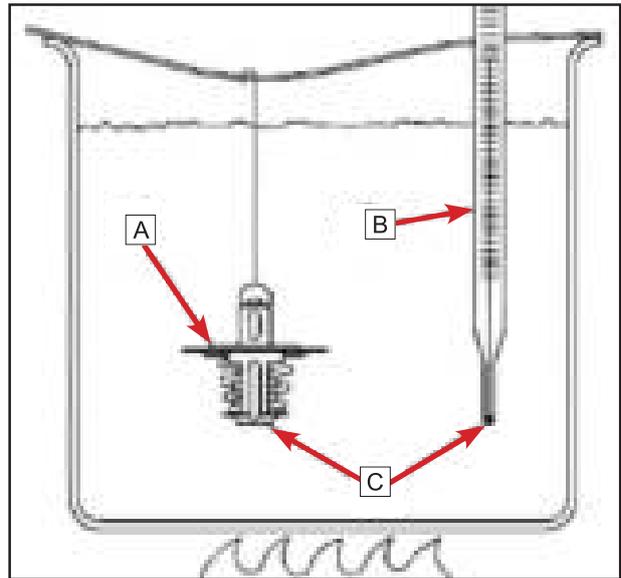
# CFMOTO

## Inspection

Inspect the thermostat **1** at room temperature. Replace with a new thermostat if the valve is open.



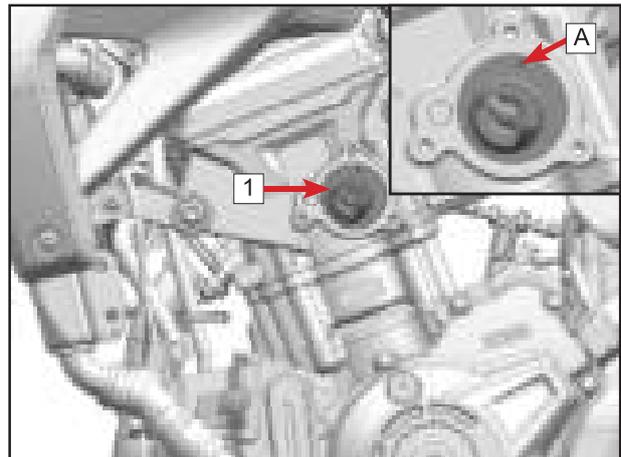
For valve open temperature inspection, hang thermostat **A** in a container of water. The thermostat should be fully immersed without touching container wall or bottom. Hang a thermometer **B** at the same level without touching wall or bottom. The thermal position **C** must be equal. Heat the water 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	80°C ~84°C
Full open	95°C Full open range ≥8mm

## Installation

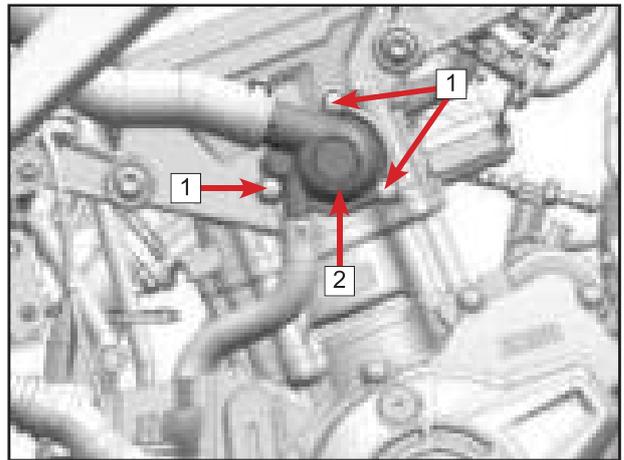
Install the thermostat **1**, hole **A** faces up.



Install thermostat cover **2**.

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

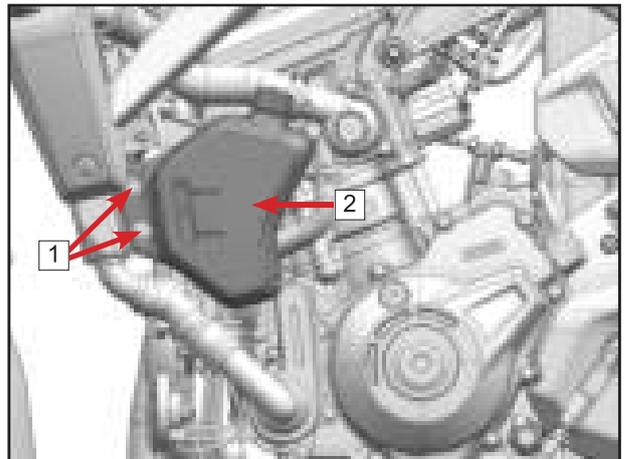
Thermostat Cover Bolt <b>1</b>	
Torque	10 N·m (7.3 ft-lb.)



Install auxiliary water bottle deco cover **2** and reservoir assembly to place.

Install bolts **1**.

Fill with coolant and bleed the cooling system.



### 5.7.3 Oil Cooler

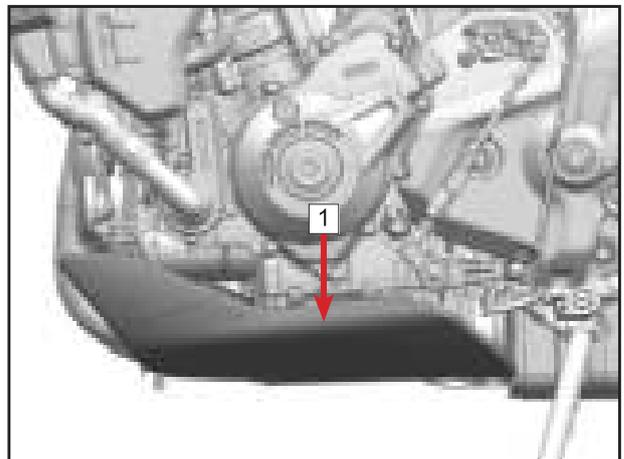
#### Removal

Refer to the related sections for removing:

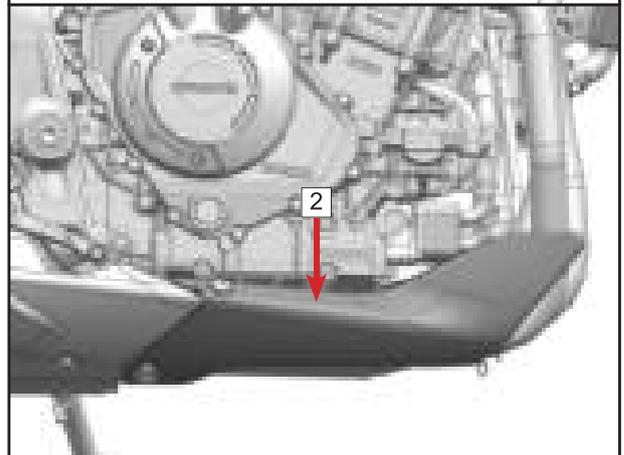
- Muffler rear LH deco guard assembly **1**
- Muffler rear RH deco guard assembly **2**

Drain engine oil.

Drain coolant.

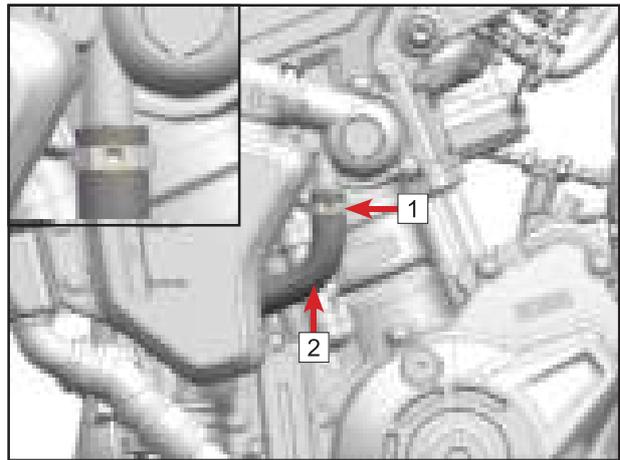


Place a rag or towel under the oil cooler to collect residual oil and coolant.

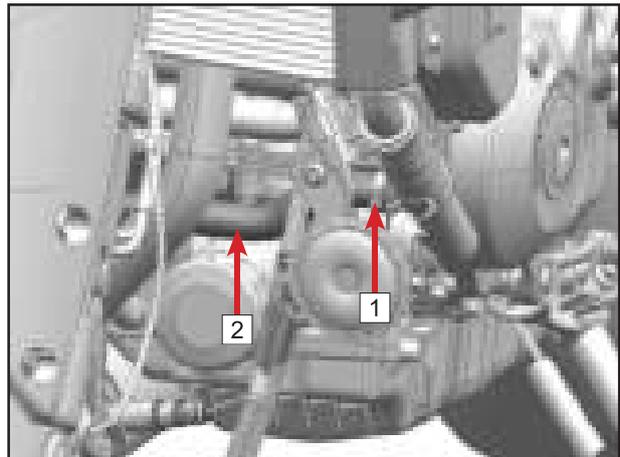


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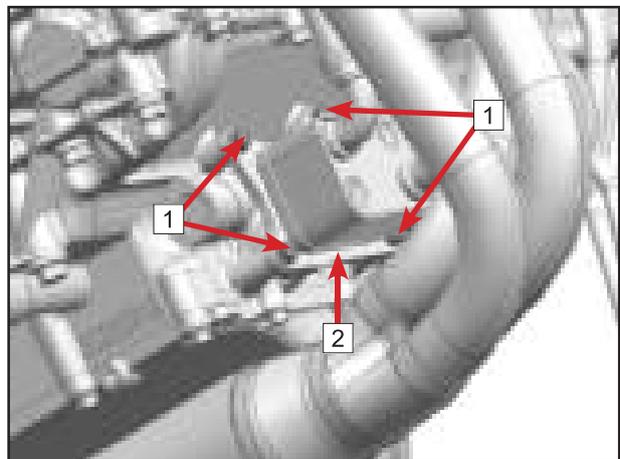
Loosen the clamp **1**.  
Remove oil cooler water inlet hose **2** from the thermostat cover.



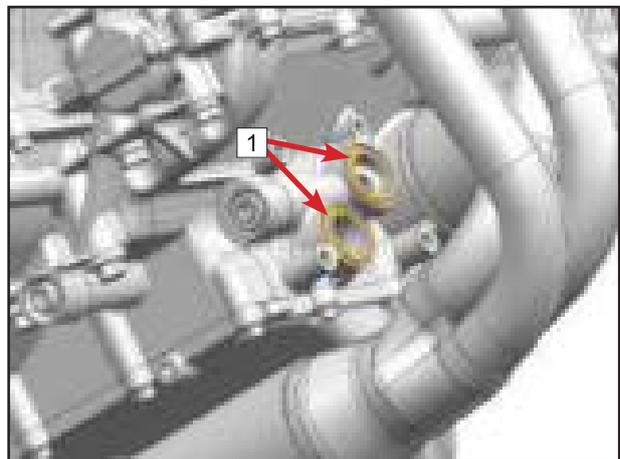
Loosen the clamp **1**.  
Unplug oil cooler water outlet pipe **2** from water pump cover.



Remove bolts **1**.  
Remove oil cooler and pipe assembly **2**.



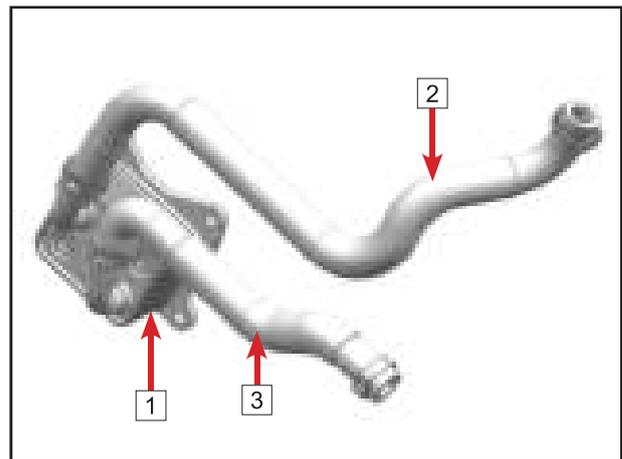
Remove O-ring **1**.  
Check O-ring **1** for damage and hardening. Replace with new parts if it does.



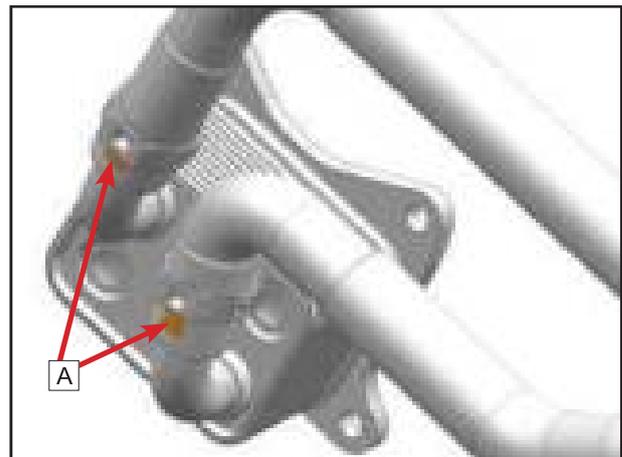
## Inspection

Check the oil cooler [1] for cracks or other damage. Replace if necessary.

Check the oil cooler inlet hose [2] and outlet hose [3] for damage or aging. Replace if necessary.



When installing the water pipes, mark [A] direction as shown in the figure on the right.

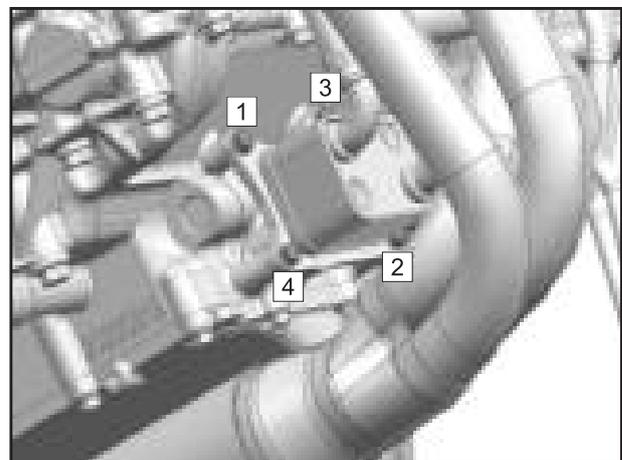


## Installation

Reverse the removal procedure for installation. Pay attention to the following details:

Tighten the oil cooler bolt to the specified torque in two steps according to the sequence shown on the right.

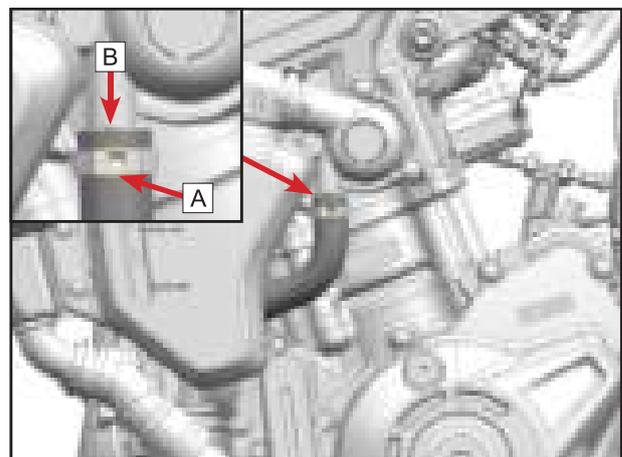
Oil Cooler Bolt Torque	
Step 1	5N·m (3.7 ft-lb.)
Step 2	10N·m (7.3 ft-lb.)



Align the oil cooler inlet pipe mark [A] with the thermostat cover mark [B].

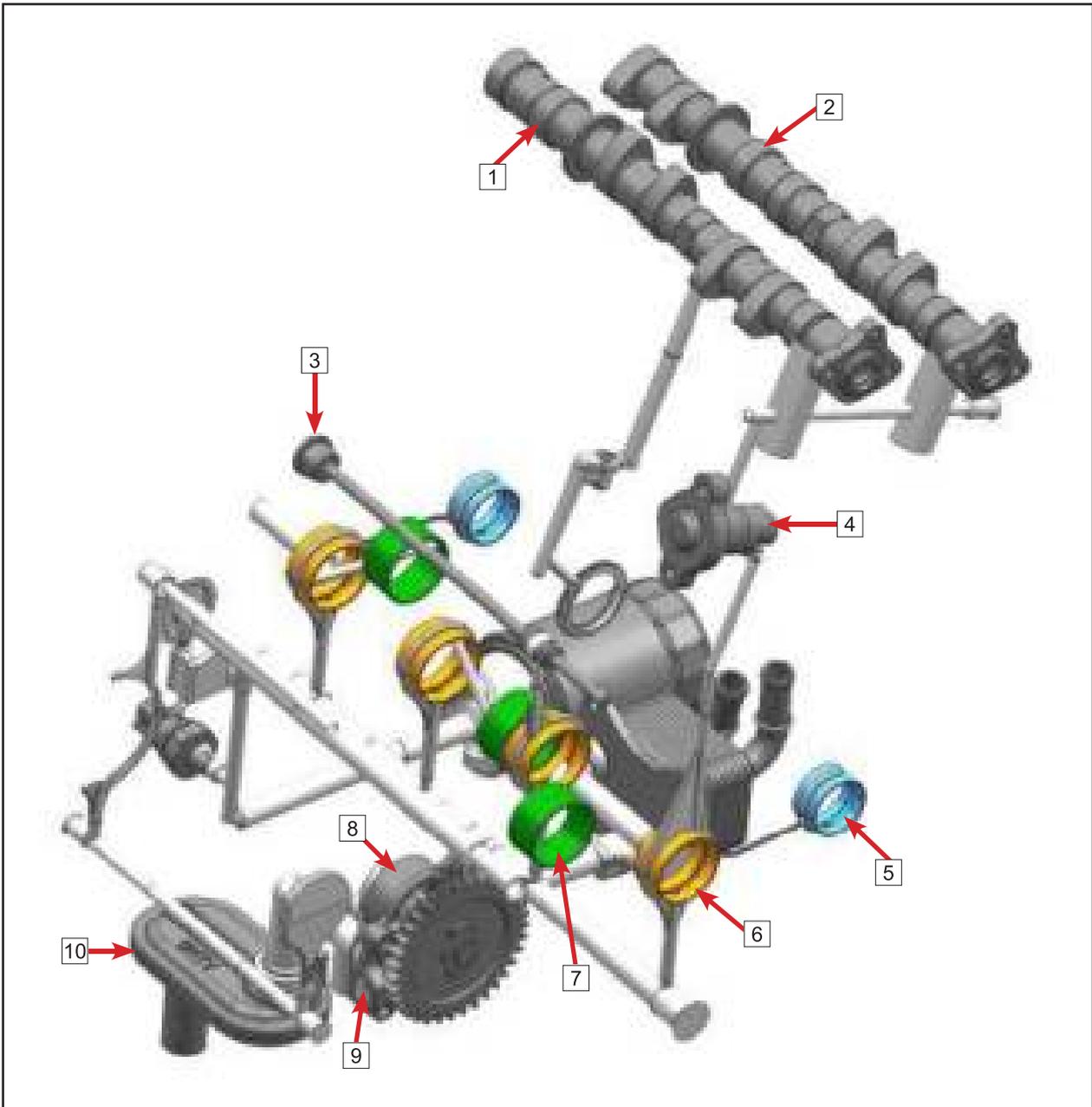
Refer to the related sections:

- Fill in engine oil and check oil level.
- Fill with coolant and bleed the cooling system.

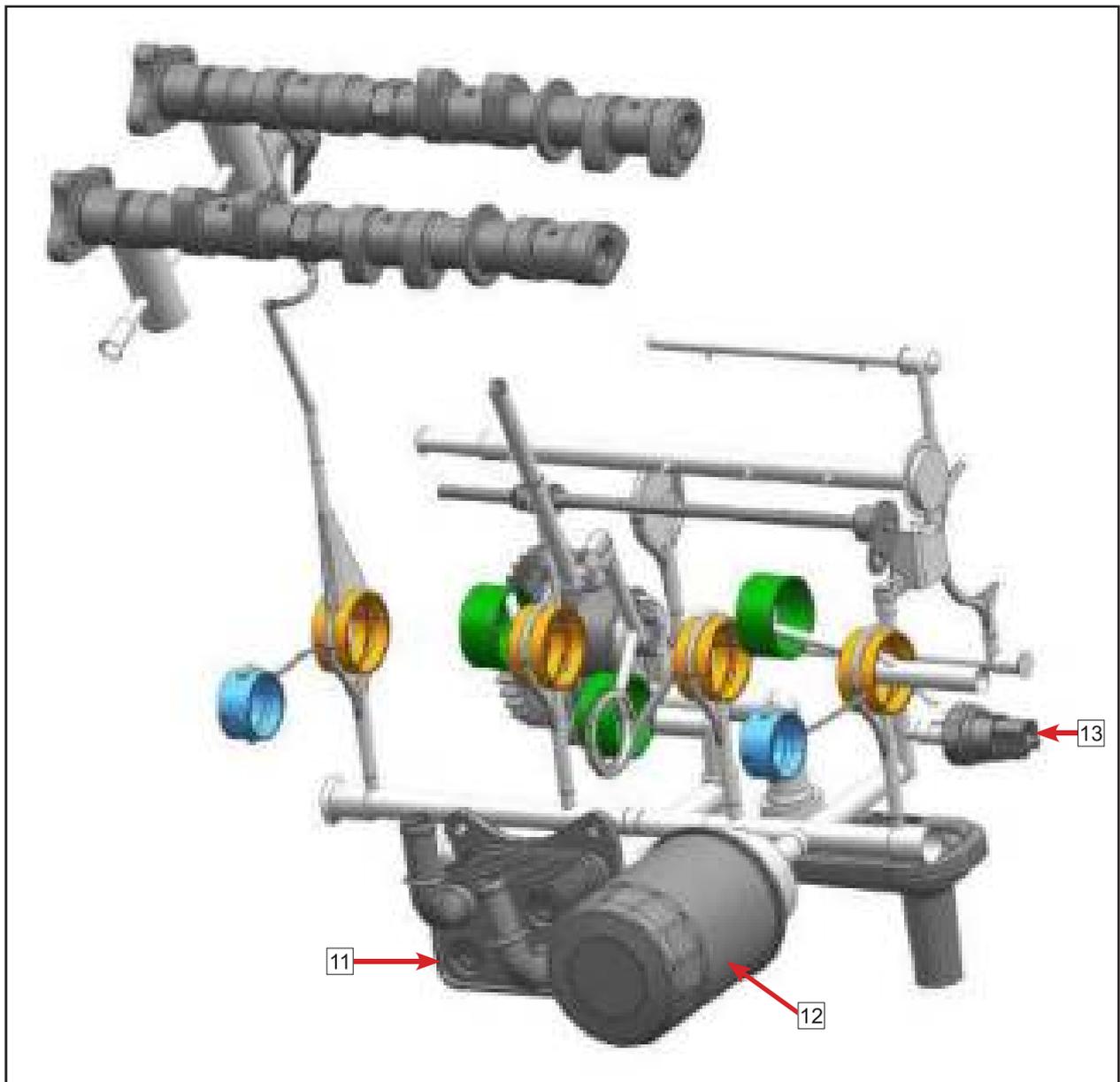


## 5.8 Engine Lubrication System

### 5.8.1 Lubricating Chart



Number	Name of Parts	Number	Name of Parts
1	Intake camshaft assembly	6	Main plain bearing
2	Exhaust camshaft assembly	7	Connecting rod bearing
3	Oil injection pipe assembly	8	Oil Pump
4	Tensioner	9	Oil pressure relief valve
5	Balance shaft plain bearing	10	Oil suction filter assembly



Number	Name of Parts	Number	Name of Parts
11	Oil cooler	13	Oil pressure switch
12	Oil filter		

## 5.8.2 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.**

## 5.8.3 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.**

Remove muffler rear LH deco guard assembly. (refer to Engine Removal chapter)

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).

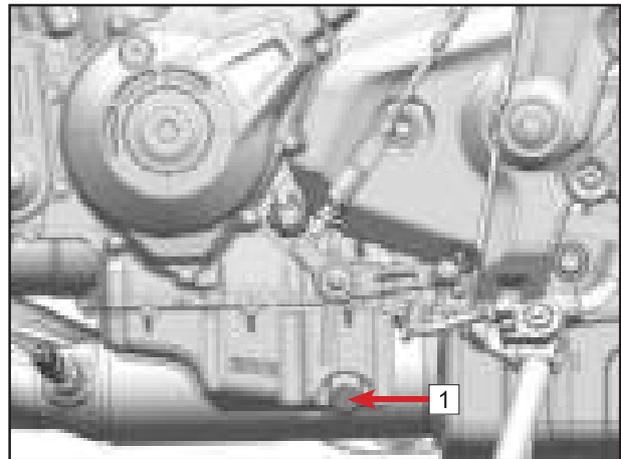
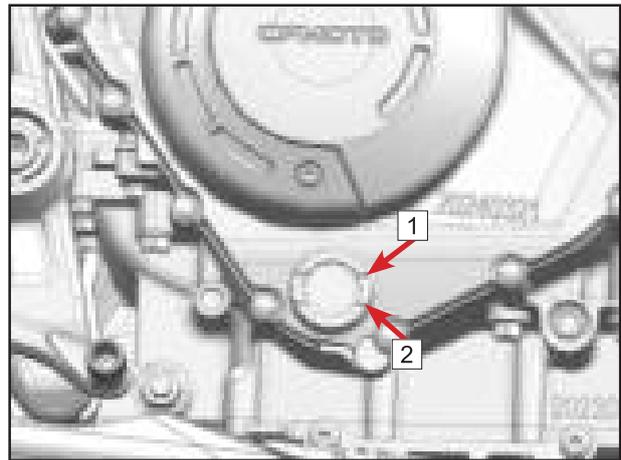
Remove magnetic oil drain bolt 1 and seal ring.

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	25N·m (18.4 ft-lb.)



## Oil Filter Replacement

For oil filter element removal and installation, refer to the sections Engine Disassembly and Engine Assembly.

## Oil Filling

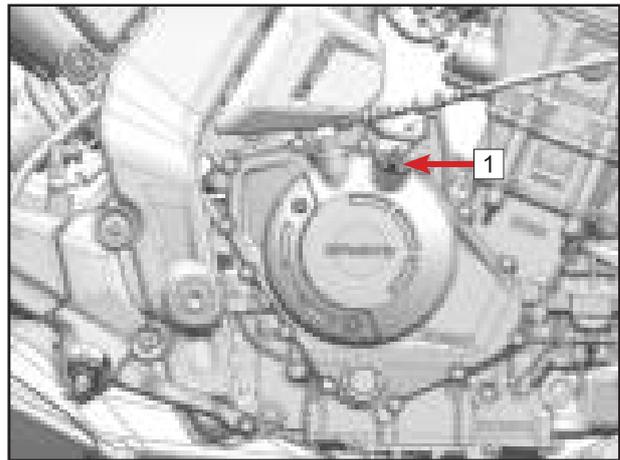
Remove the oil filling plug **1**.

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	3.3L
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).



## 5.8.4 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 the engine oil pressure switch.

Install a suitable oil pipe joint (R1/8 thread) and oil gauge **1**.

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: 1300 ± 130	about 50
6000	about 350

If the engine oil pressure is out of range.

Troubleshoot to find the problematic part.

Remove the oil pipe joint and oil pressure gauge after inspection.

Reinstall the engine oil pressure switch (apply 567 thread locker to the thread of oil pressure switch).

Oil Pressure Switch	
Torque	16N·m (11.8 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).**

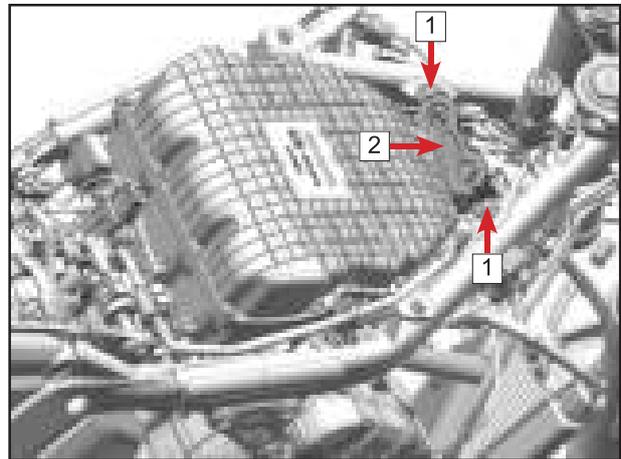
#### Removal

Refer to the related sections to remove:

- Front seat
- Vehicle rear LH deco plate
- Vehicle rear RH deco plate
- Radiator LH inner panel assembly
- Fuel tank front LH deco plate assembly
- Radiator RH inner panel assembly
- Fuel tank front RH deco plate assembly
- Fuel tank upper deco plate
- Fuel tank

Remove bolts [1].

Remove fuel tank bracket [2].

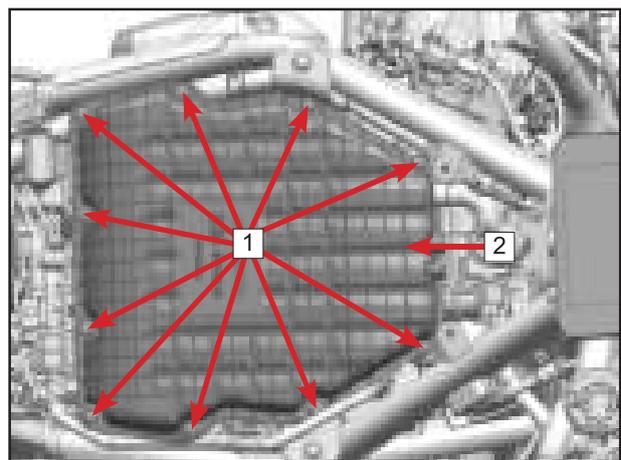


Separate the SAS system from the upper housing of the air filter.

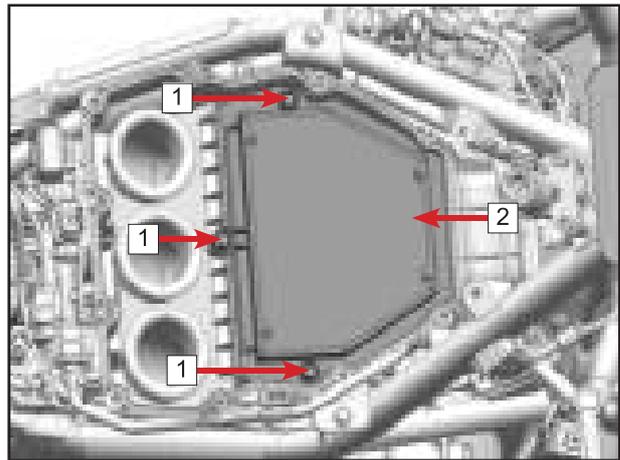
(if vehicle equipped with Secondary Air Supply System-SAS)

Remove screws [1].

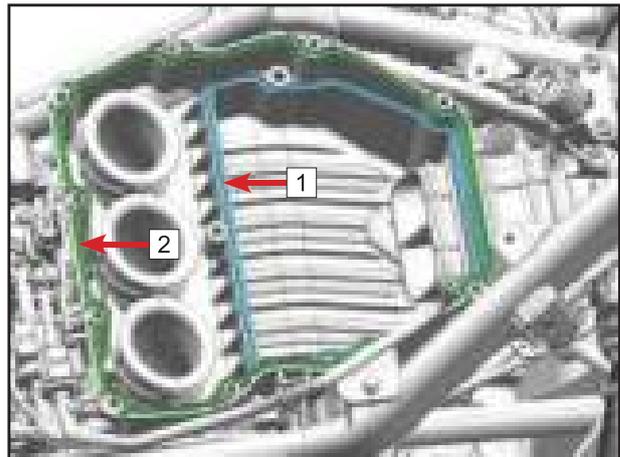
Remove air filter upper housing [2].



Remove screws [1].  
Remove air filter element [2].

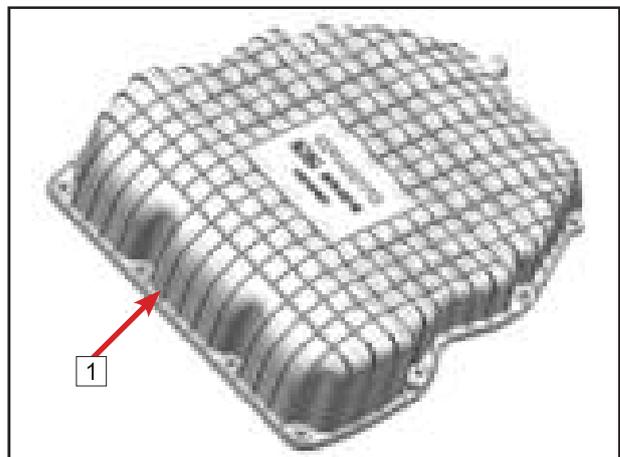


Remove filter element seal ring [1] and housing seal ring [2] from air filter lower housing.

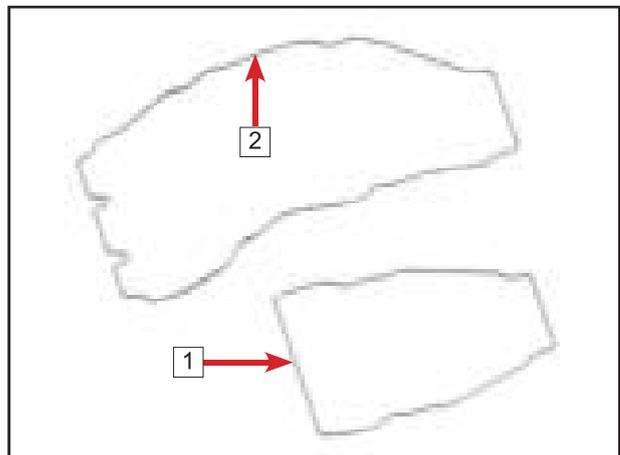


### Inspection

Check air filter upper housing [1] for cracks or other damage. Replace it if it does.  
Clean air filter upper housing.



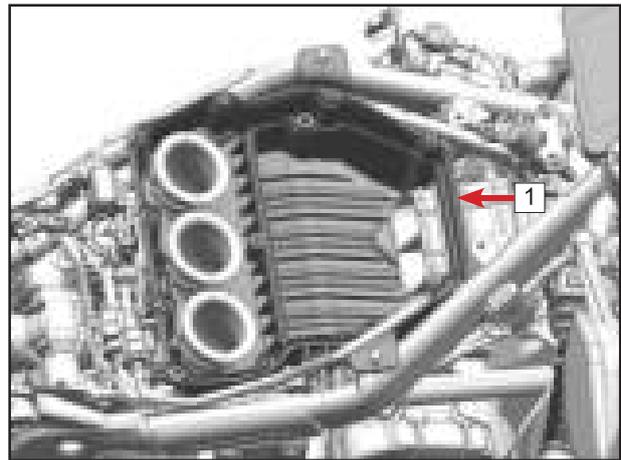
Check filter element seal ring [1] and housing seal ring [2] for cracks, hardening or other damages, replace if found any.



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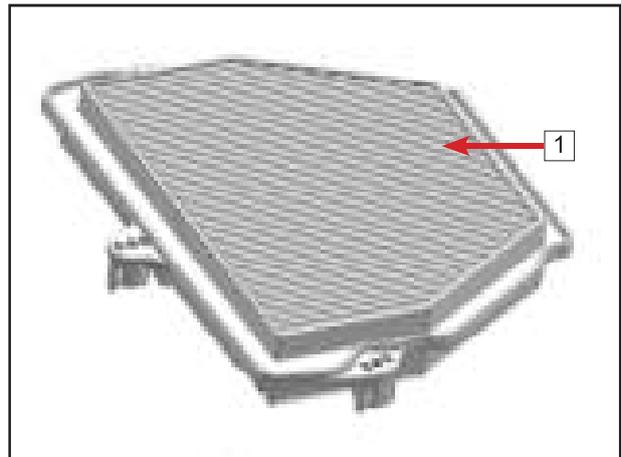
Clean air filter lower housing **1**.

**NOTE: If sand or other particles are found in the air filter lower housing, use the vacuum cleaner to clean it.**



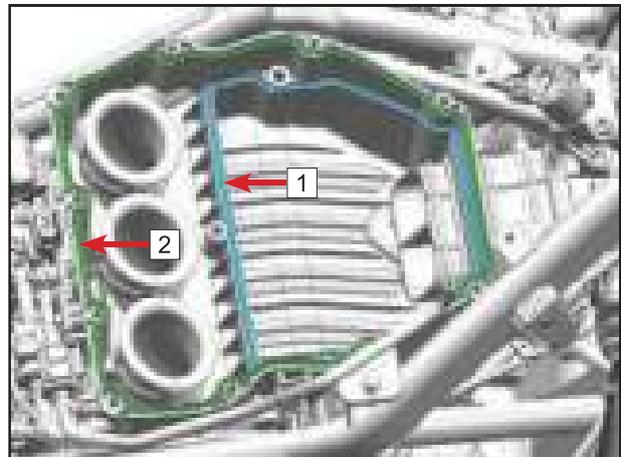
Check the air filter element **1** to determine whether the element needs to be replaced. If the filter does not need to be replaced, clean the filter. Flick the thick dust from the paper filter.

**NOTE: It is not recommended to blow compressed air into the paper filter element. When used in the dusty environment, doing so may damage the paper fibers and reduce their filtration capacity. If the air filter element is too dirty, replace.**

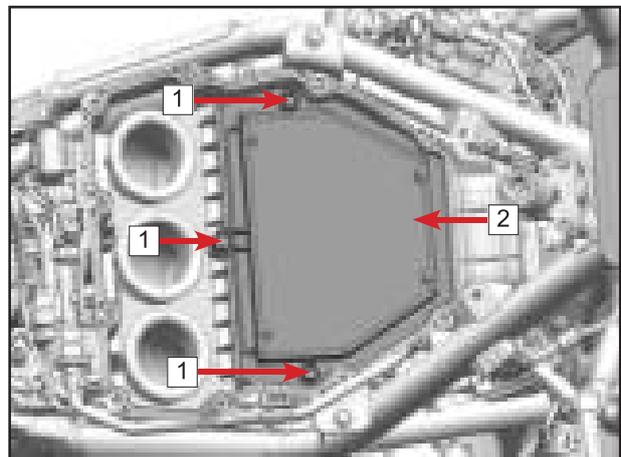


## Installation

Install filter element seal ring **1** and housing seal ring **2** on the air filter lower housing.



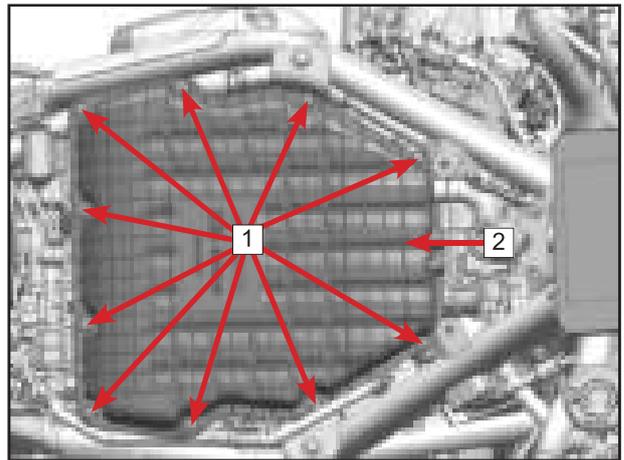
Place air filter element **2** in place. Install screws **1**.



Install air filter upper housing [2].

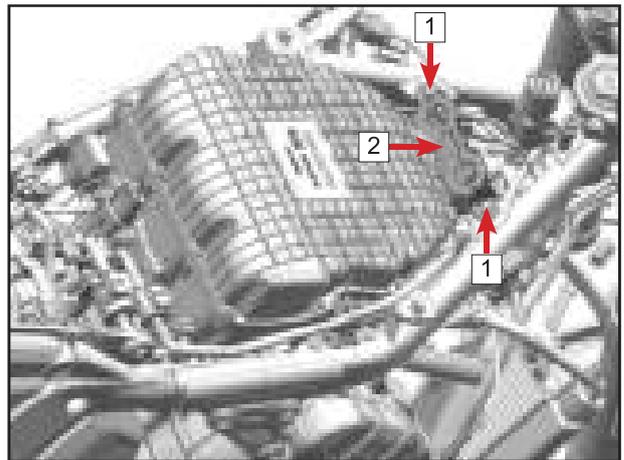
Install screws [1].

Connect the SAS system with the upper housing of the air filter. (if vehicle equipped with Secondary Air Supply System-SAS)



Place fuel tank bracket [2] in place.

Install bolts [1].



Refer to the related sections to install:

- Fuel tank
- Fuel tank upper deco plate
- Fuel tank front RH deco plate assembly
- Radiator RH inner panel assembly
- Fuel tank front LH deco plate assembly
- Radiator LH inner panel assembly
- Vehicle rear RH deco plate
- Vehicle rear LH deco plate
- Front seat

## 5.9.2 Air Filter Housing Assembly

### 5.9.2.1 Removal

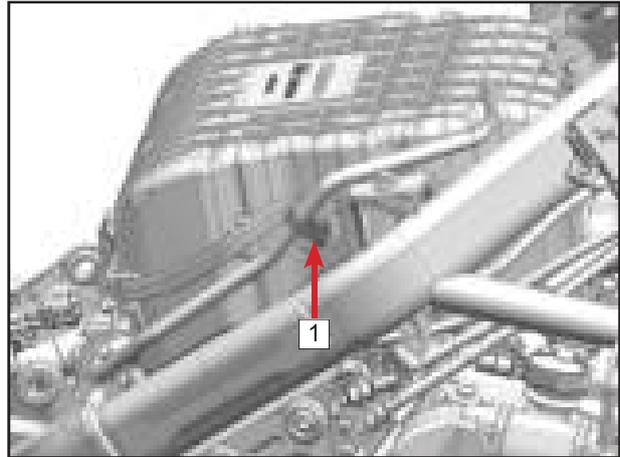
Refer to the related sections to remove:

- Front seat
- Vehicle rear LH deco plate
- Vehicle rear RH deco plate
- Radiator LH inner panel assembly
- Fuel tank front LH deco plate assembly
- Radiator RH inner panel assembly
- Fuel tank front RH deco plate assembly
- Fuel tank upper deco plate
- Fuel tank

{ } is the operating procedures for vehicles equipped with fuel evaporation system.

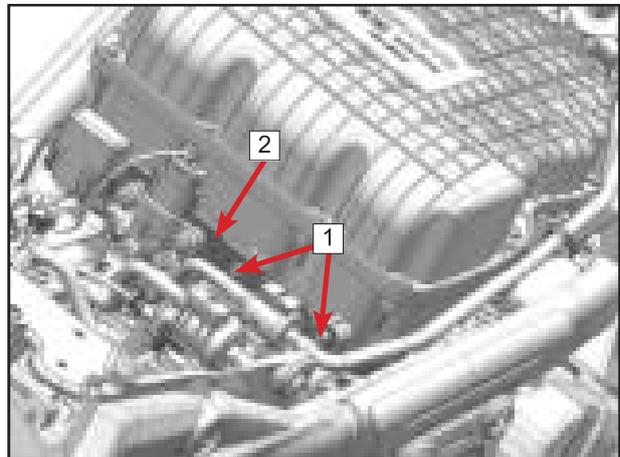
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Separate tie band **1** from air filter housing.

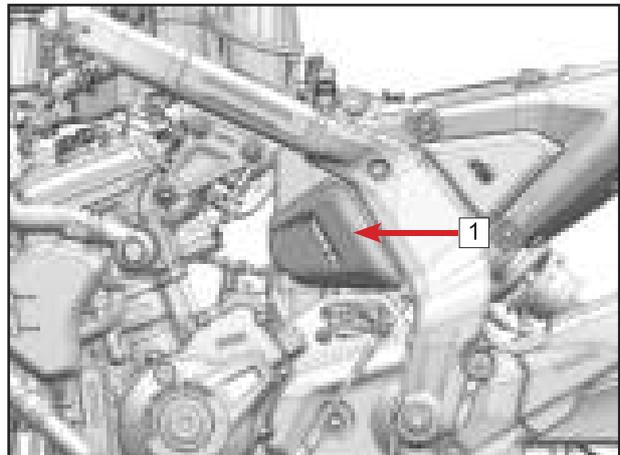


Remove screws **1**, separate valve body bracket **2** from air filter housing.

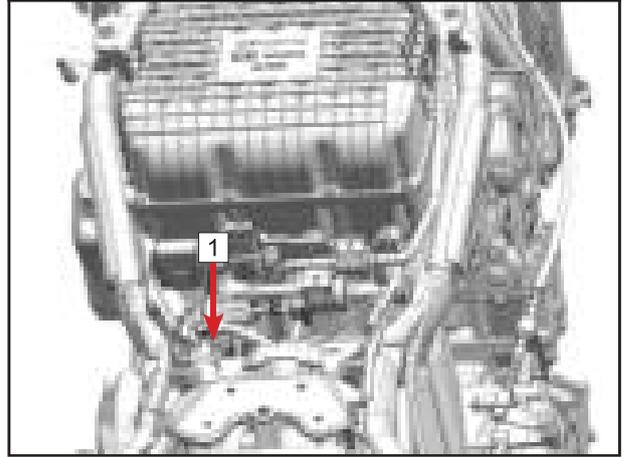
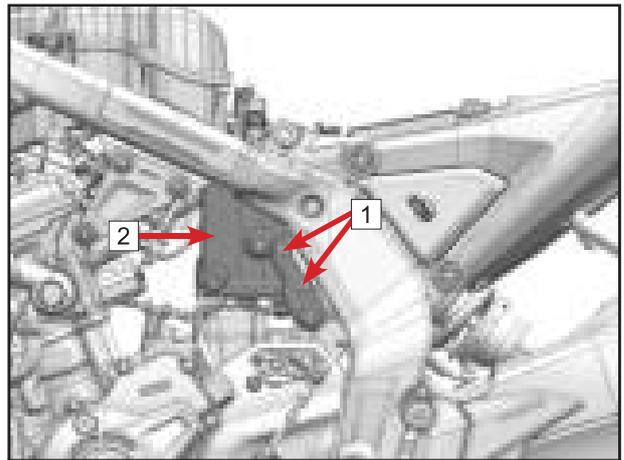
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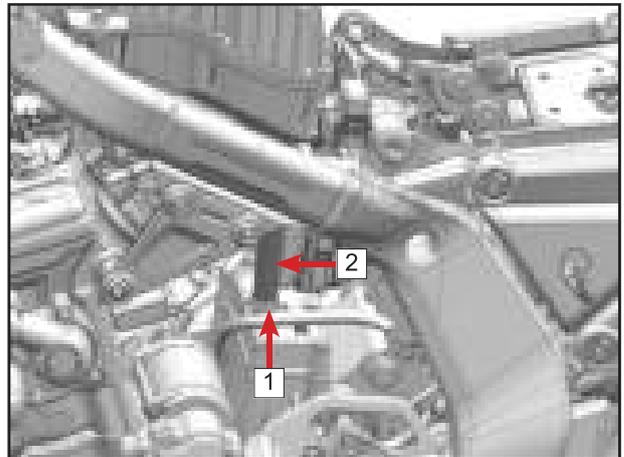
Remove vehicle LH middle deco plate **1**.



Remove screws **1**.  
Remove canister bracket assembly **2**.



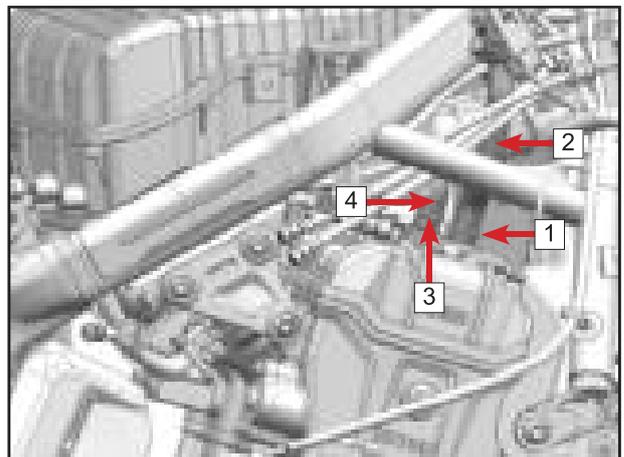
Release clamp **1**.  
Unplug the crankcase breather **2** from the engine.



**{ }** is the operating procedures for vehicles equipped with secondary air supply system-SAS.

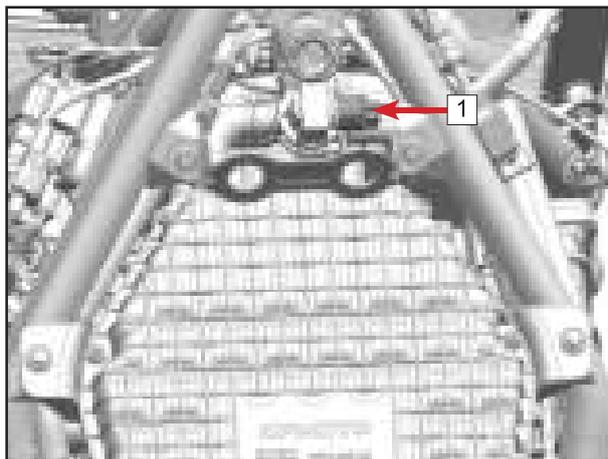
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Release clamp **1**.  
Unplug SAS outlet pipe **2** from engine.  
Release clamp **3**.  
Unplug SAS outlet pipe **4** from engine.

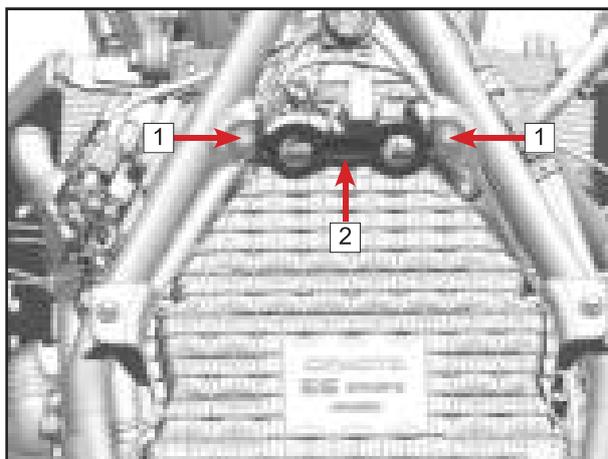


Disconnect SAS valve connector [5].

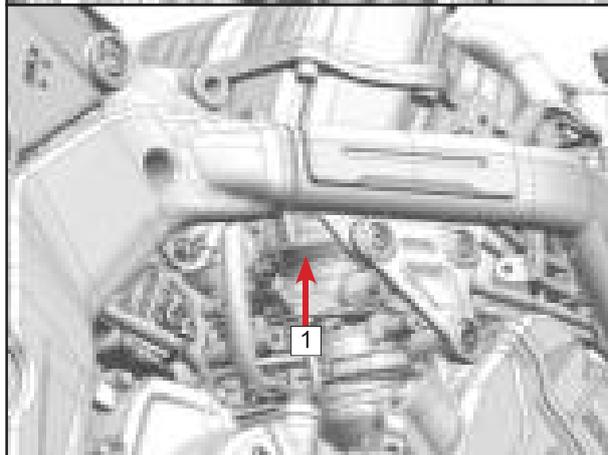
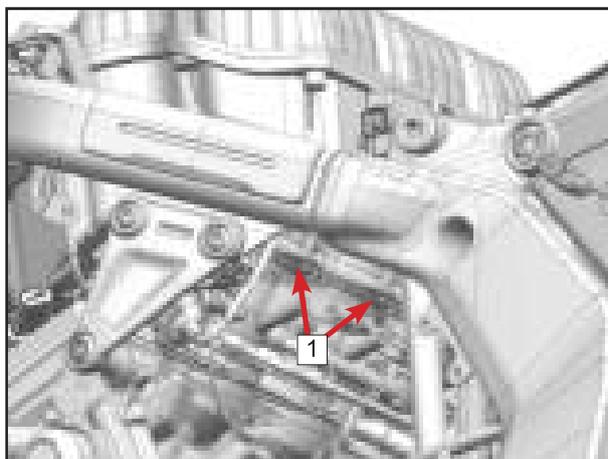
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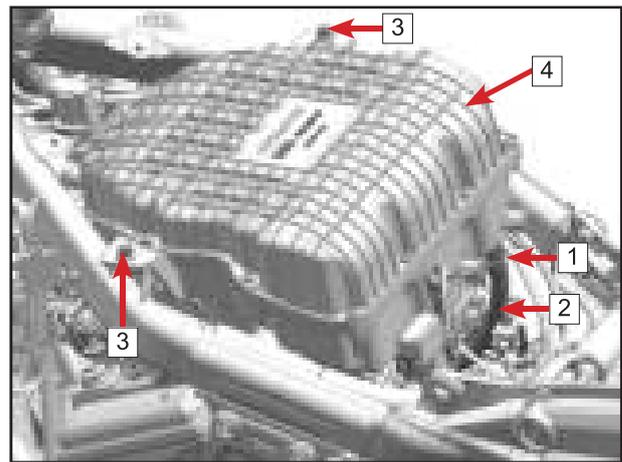
Remove bolts [1].  
Remove fuel tank bracket [2].



Release clamp [1].



Loosen the clamp **1**.  
Unplug the intake compensation pipe assembly **2** from the air filter housing.  
Remove bolt **3**.  
Remove air filter housing assembly **4**.

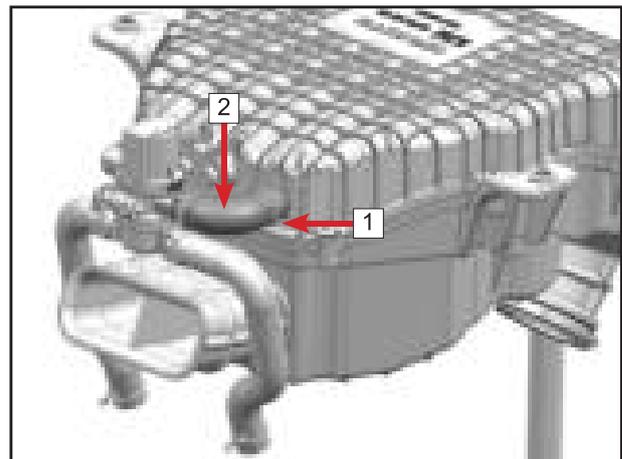


## Air Filter Housing Assembly Disassembly

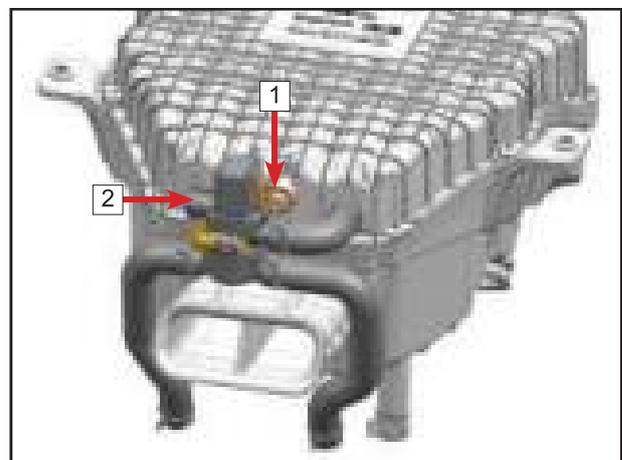
{ } is the operating procedures for vehicles equipped with secondary air supply system-SAS

{

Loosen the clamp **1**.  
Unplug the SAS intake pipe **2** from the air filter upper housing.

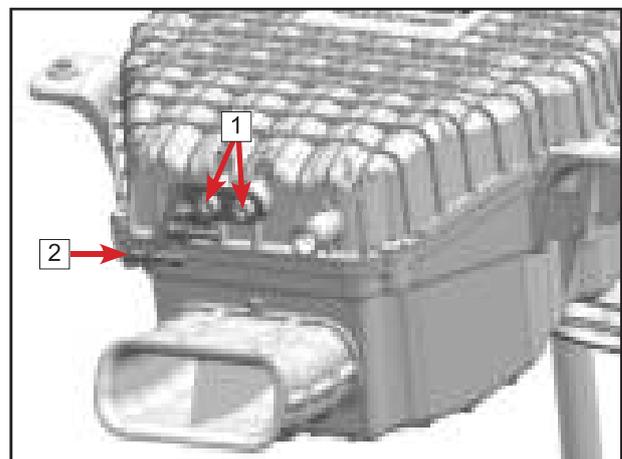


Remove SAS valve assembly **2** from SAS valve bracket **1**.



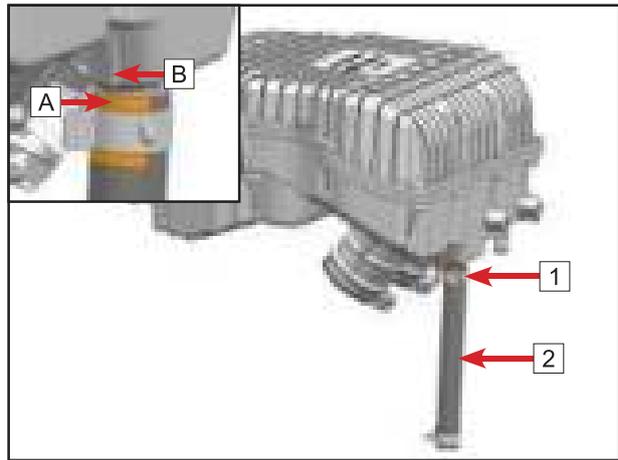
Remove screws **1**.  
Remove SAS valve bracket **2**.

}

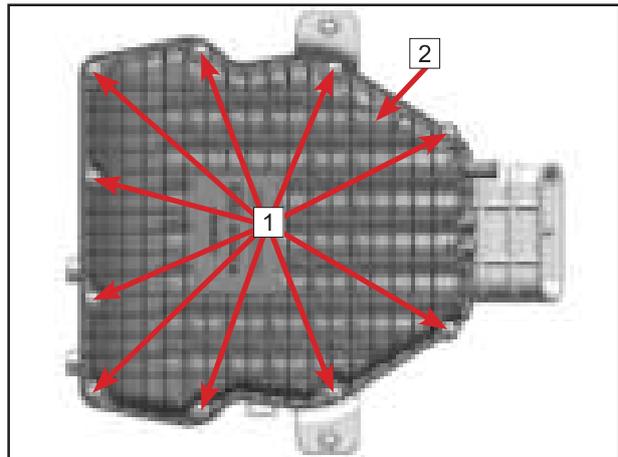


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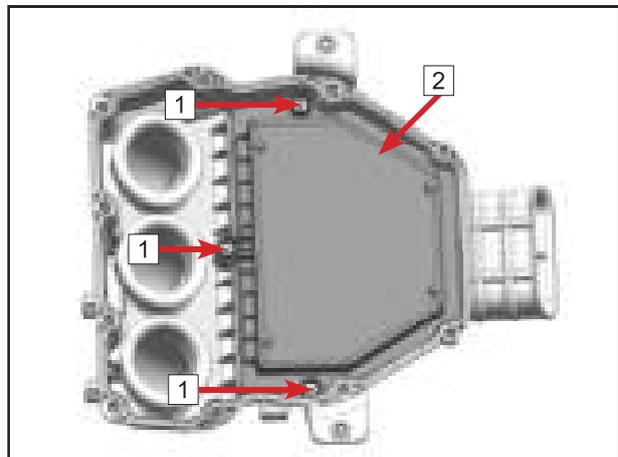
Loosen the clamp **1**.  
Unplug the crankcase breather **2** from the  
air filter lower housing.



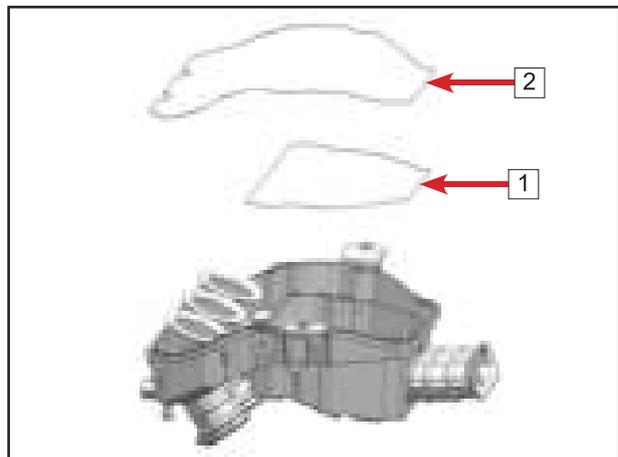
Remove screws **1**.  
Remove air filter upper housing **2**.



Remove screws **1**.  
Remove filter element **2**.



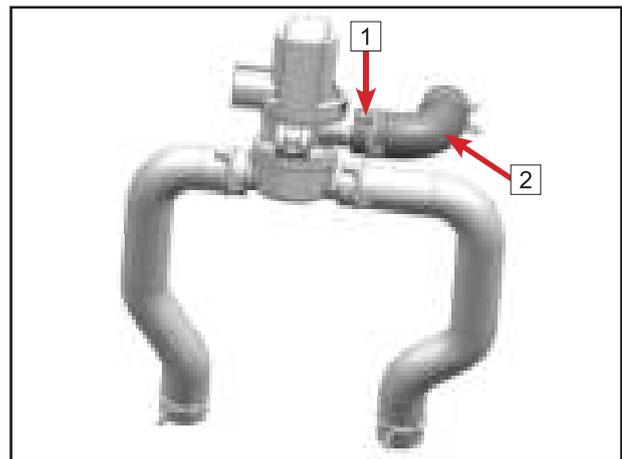
Remove filter element seal ring **1** and  
housing seal ring **2** from air filter lower  
housing.



## SAS Valve Assembly Disassembly (if vehicle equipped with SAS system)

Loosen the clamp **1**.

Remove SAS intake pipe **2** from SAS valve.

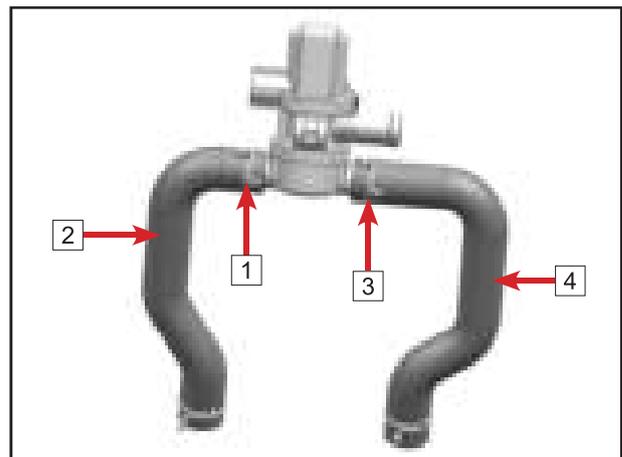


Loosen the clamp **1**.

Remove SAS outlet pipe **2** from SAS valve.

Loosen the clamp **3**.

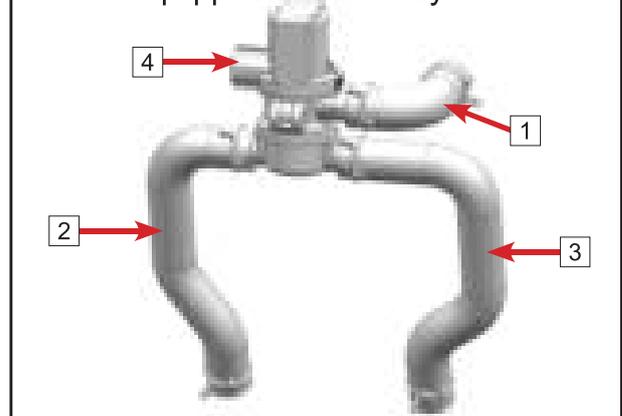
Remove SAS outlet pipe **4** from SAS valve.



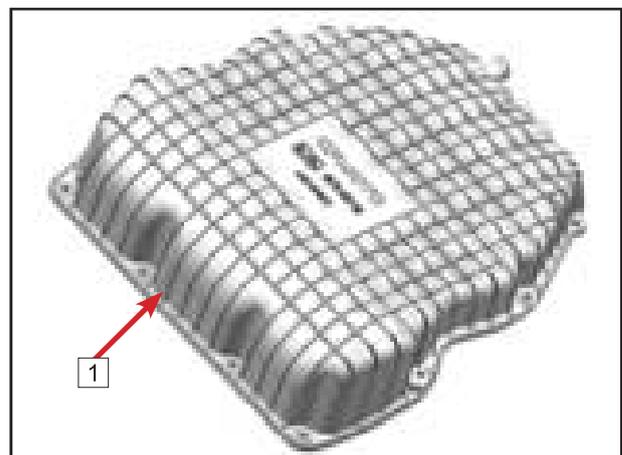
### 5.9.2.2 Inspection

Check whether the SAS intake pipe **1** and outlet pipe **2** **3** are broken, aged or otherwise damaged. Replace if necessary. See maintenance details of SAS valve **4** in Electricals Chapter.

vehicle equipped with SAS system



Check air filter upper housing **1** for cracks or other damage. Replace if it does. Clean the upper housing.



# CFMOTO

Check crankcase breather **1** for cracks, aging or other damage. Replace if necessary.

Check air filter intake pipe **2** for cracks or other damage. Replace if it does.

Clean air filter intake pipe.

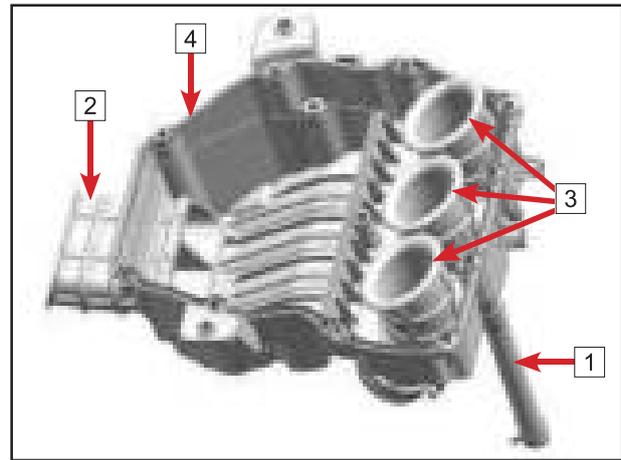
Check air filter outlet pipe **3** for cracks or other damage. Replace if it does.

Clean air filter outlet pipe.

Check air filter lower housing **4** for cracks or other damage. Replace if it does.

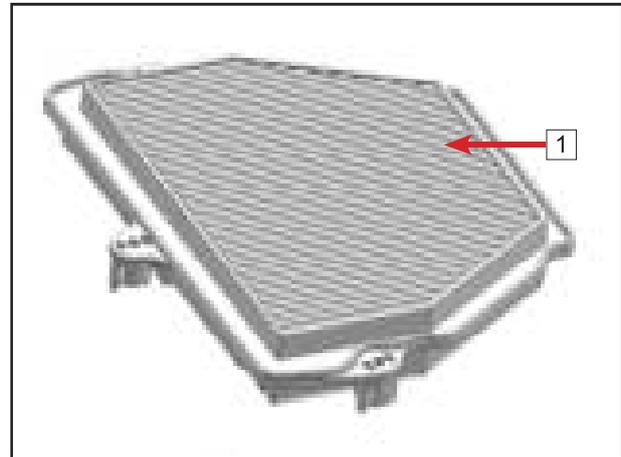
Clean air filter lower housing.

**NOTE: Replace the air filter lower housing and the air filter outlet pipe in sets.**

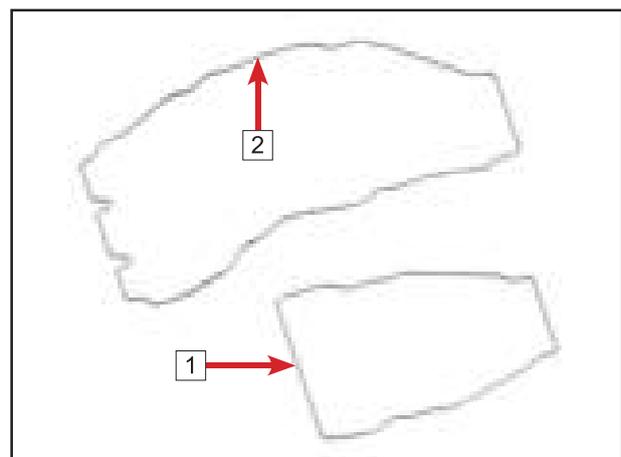


Check the air filter element **1** to determine whether the element needs to be replaced. If the filter does not need to be replaced, clean the filter. Flick the thick dust from the paper filter.

**NOTE: It is not recommended to blow compressed air into the paper filter element. When used in the dusty environment, doing so may damage the paper fibers and reduce their filtration capacity. If the air filter element is too dirty, replace.**



Check air filter seal ring **1** and housing seal ring **2** for cracks, hardening or other damage. Replace if it does.



## 5.9.2.3 Installation

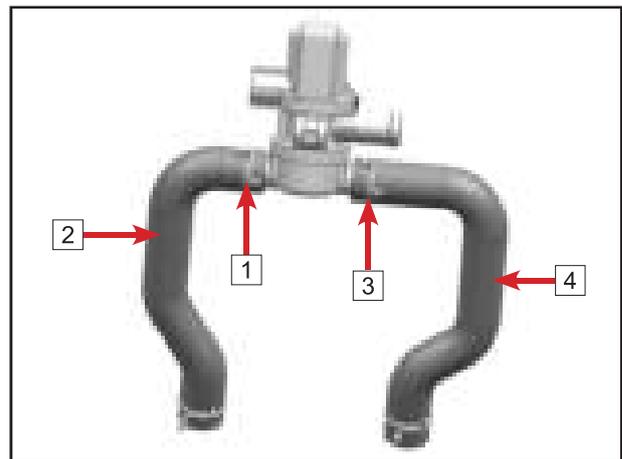
### SAS Valve Assembly Installation (if vehicle equipped with SAS system)

Install the SAS outlet pipe **2** to the SAS valve as shown.

Tighten the clamp **1**.

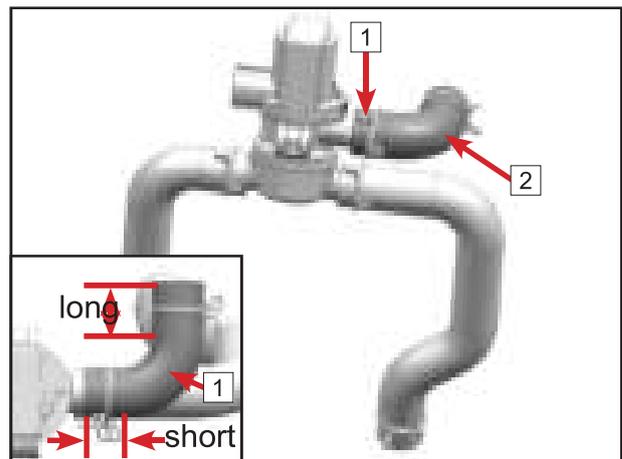
Install the SAS outlet pipe **4** to the SAS valve as shown.

Tighten the clamp **3**.



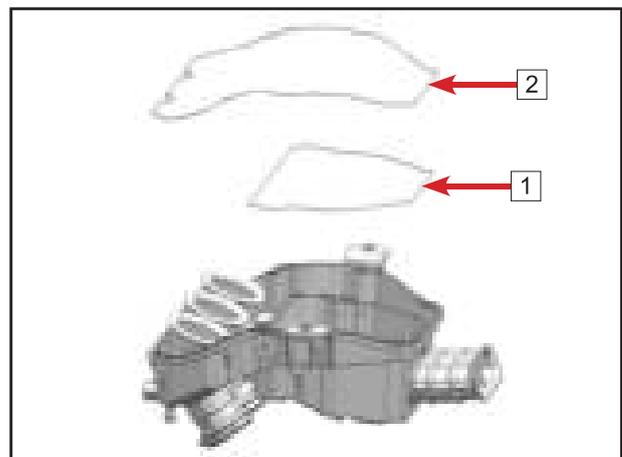
Install the SAS intake pipe **2** to the SAS valve as shown.

Tighten the clamp **1**.



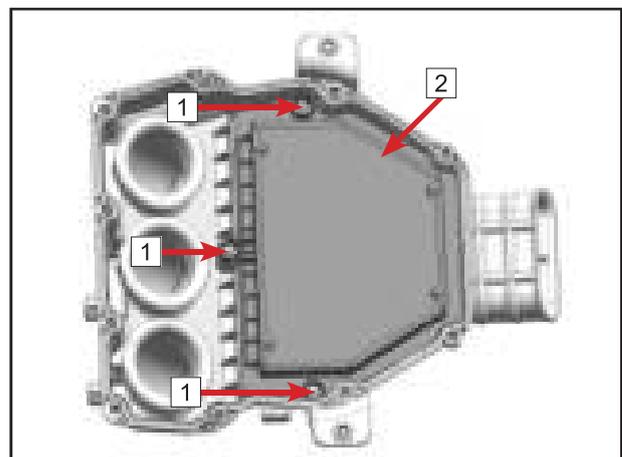
### Air Filter Housing Assembly Installation

Install filter element seal ring **1** and housing seal ring **2** in place.



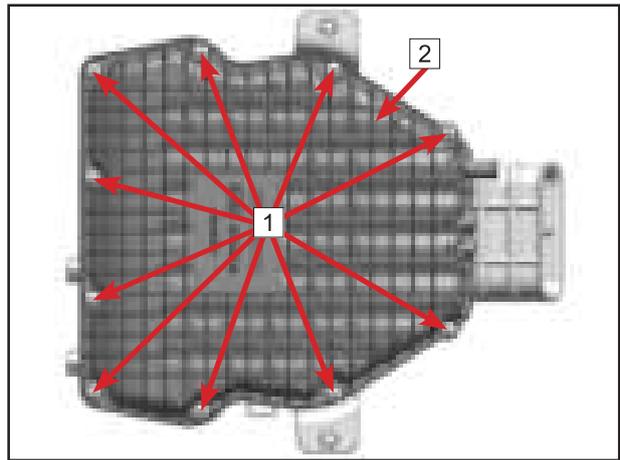
Place the filter element assembly **2** in place.

Install screws **1**.



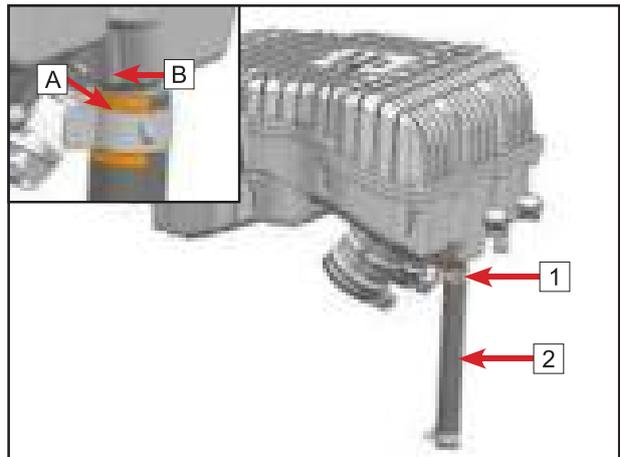
Install air filter upper housing [2].

Install screws [1].



Install crankcase breather [2] to air filter lower housing, align mark [A] with boss [B].

Tighten the clamp [1].

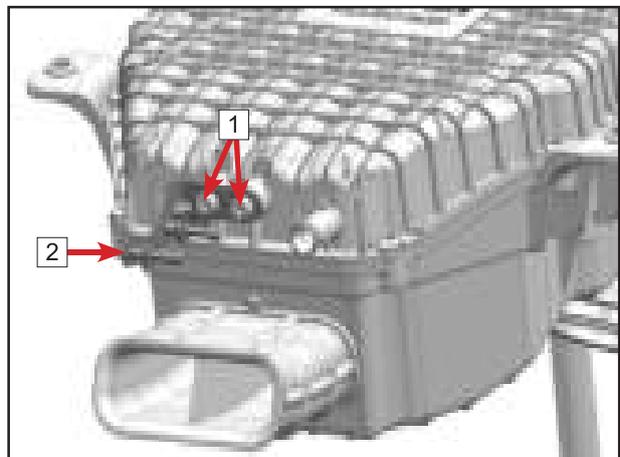


{ } is the operating procedures for vehicles equipped with secondary air supply system-SAS.

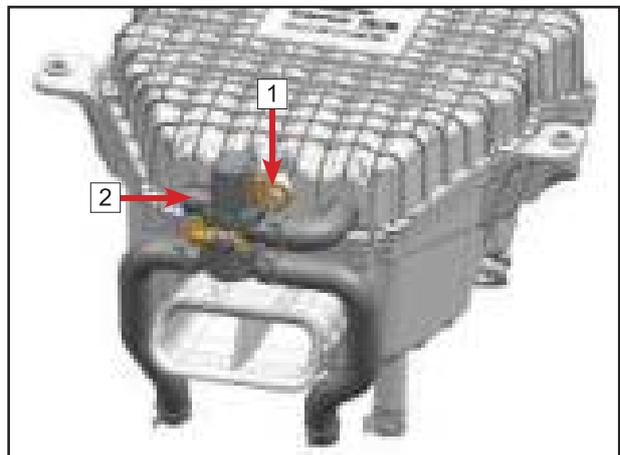
{

Place SAS valve bracket [2] in place.

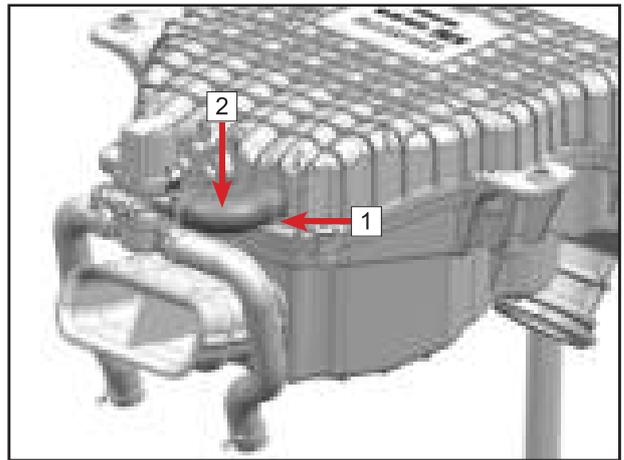
Install screws [1].



Install SAS valve assembly [2] on the SAS valve bracket [1].

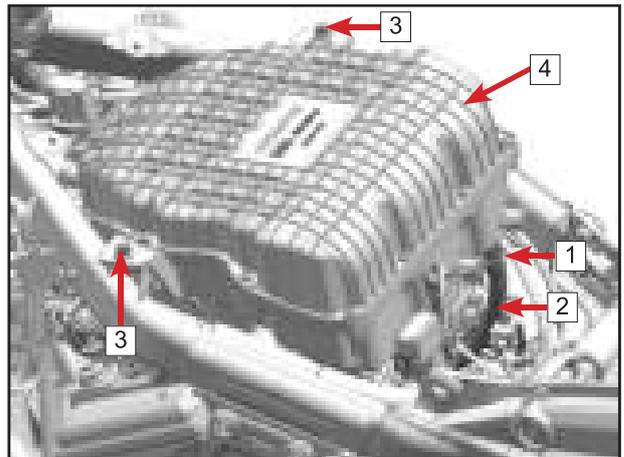


Install SAS valve intake pipe **2** on the air filter upper housing.  
Tighten the clamp **1**.

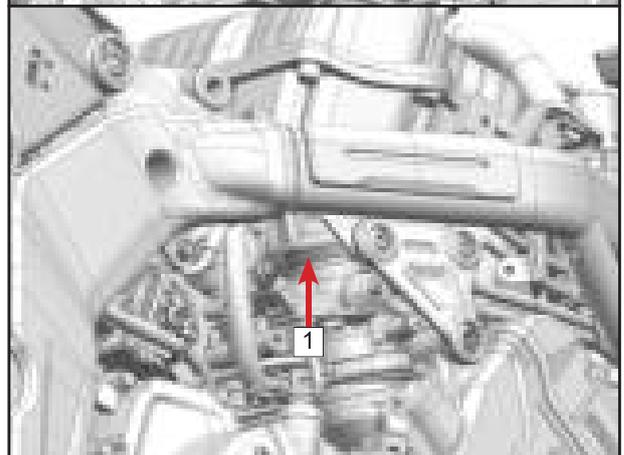
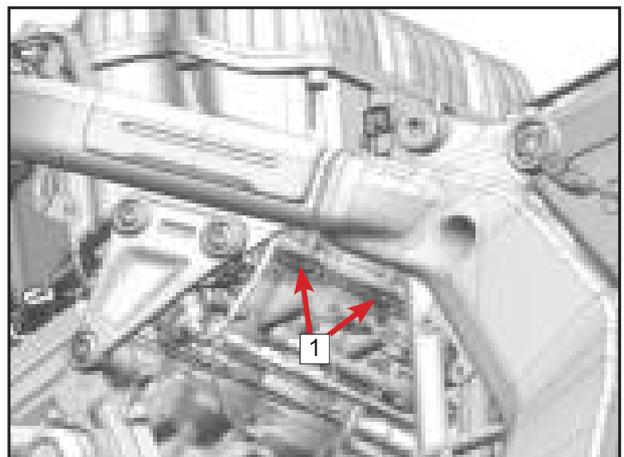


### Air Filter Housing Assembly Installation

Install air filter housing assembly **4** in place.  
Install bolts **3**.  
Install inlet compensation pipe assembly **2** to air filter lower housing.  
Tighten the clamp **1**.

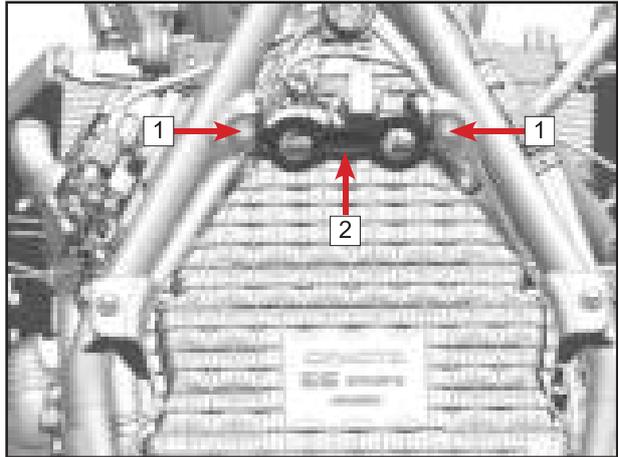


Tighten the clamp **1**.



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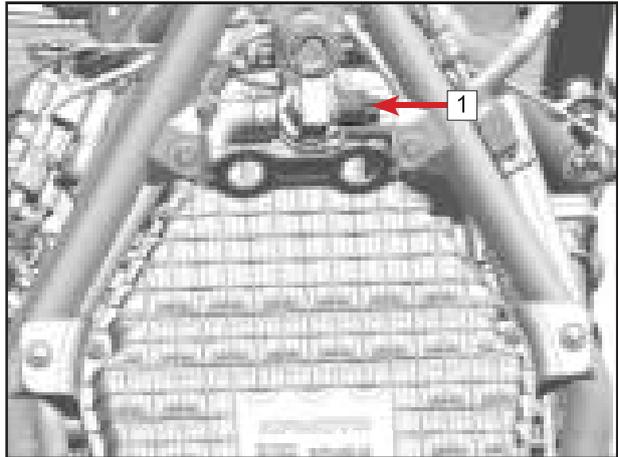
Place fuel tank bracket **2** in place.  
Install bolts **1**.



{ } is the operating procedures for  
vehicles equipped with secondary air  
supply system-SAS.

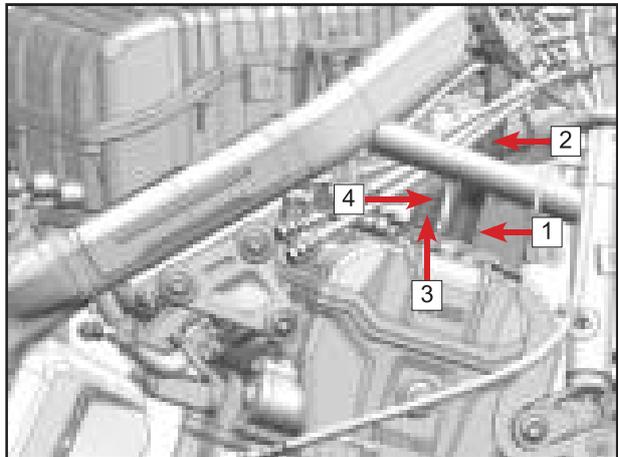
{

Plug in SAS valve connector **5**.

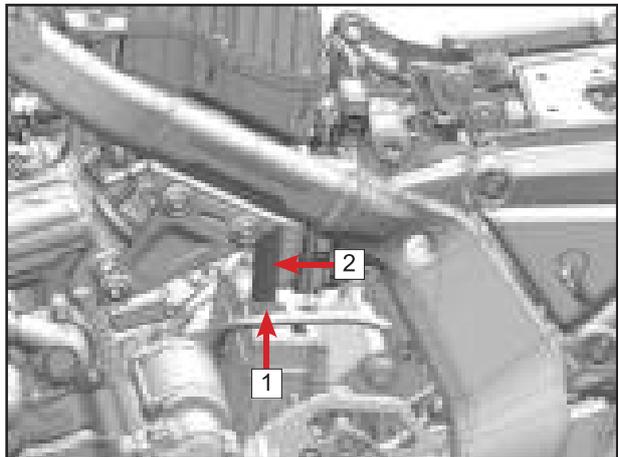


Install SAS outlet pipe **4** on the engine.  
Tighten the clamp **3**.  
Install SAS outlet pipe **2** on the engine.  
Tighten the clamp **1**.

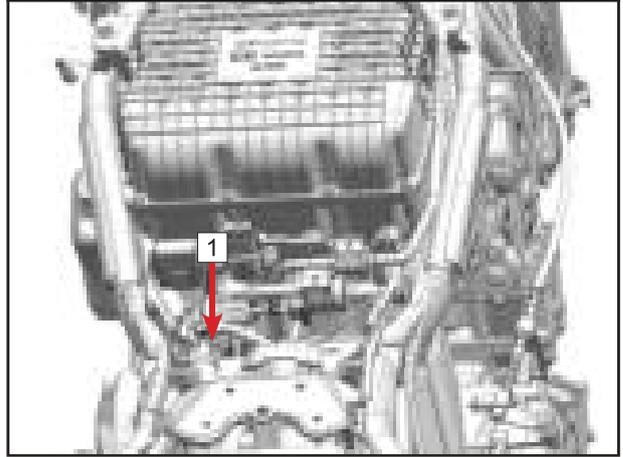
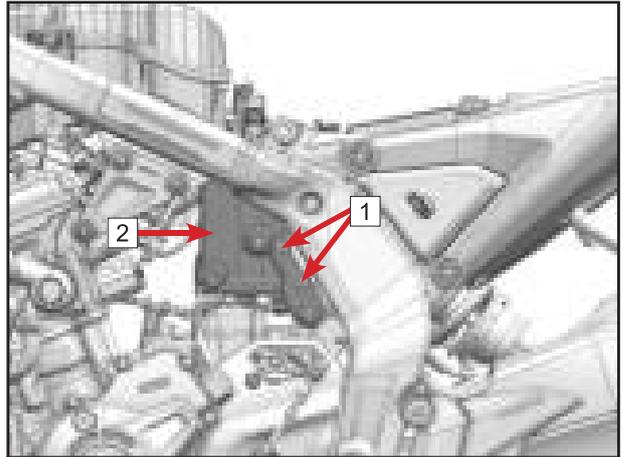
}



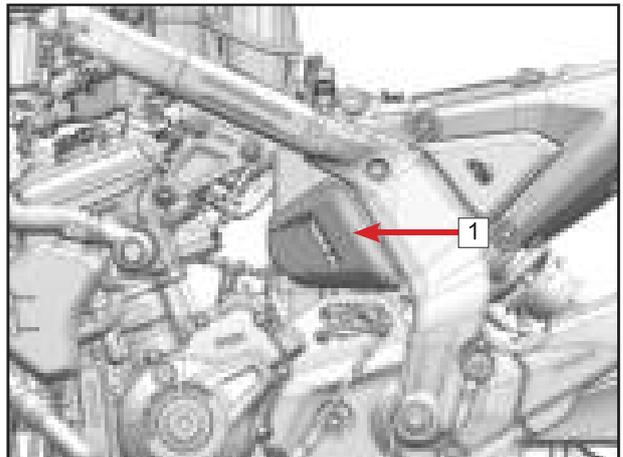
Install crankcase breather **2** to the engine.  
Tighten the clamp **1**.



Place canister bracket assembly **2** in place.  
Install screws **1**.



Install vehicle LH middle deco plate **1**.

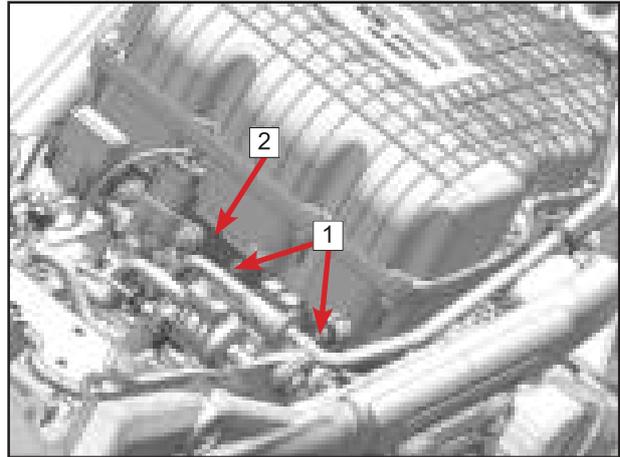


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{ } is the operating procedures for vehicles equipped with fuel evaporation system.

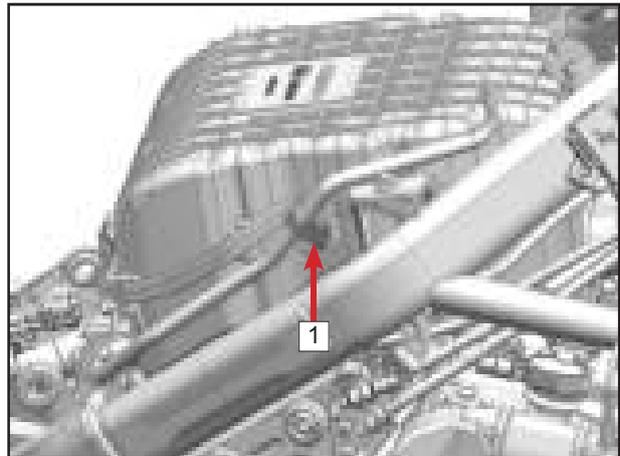
{

Place valve bracket **2** in place.  
Install screws **1**.



Insert tie band **1** into air filter housing.

}



Refer to the related sections to install:

- Fuel tank
- Fuel tank upper deco plate
- Fuel tank front RH deco plate assembly
- Radiator RH inner panel assembly
- Fuel tank front LH deco plate assembly
- Radiator LH inner panel assembly
- Vehicle rear RH deco plate
- Vehicle rear LH deco plate
- Front 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.

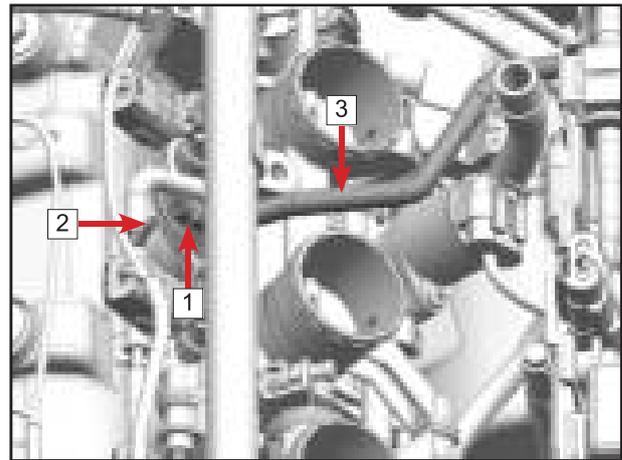
{ } is operating steps for vehicles equipped with fuel evaporation system:

{

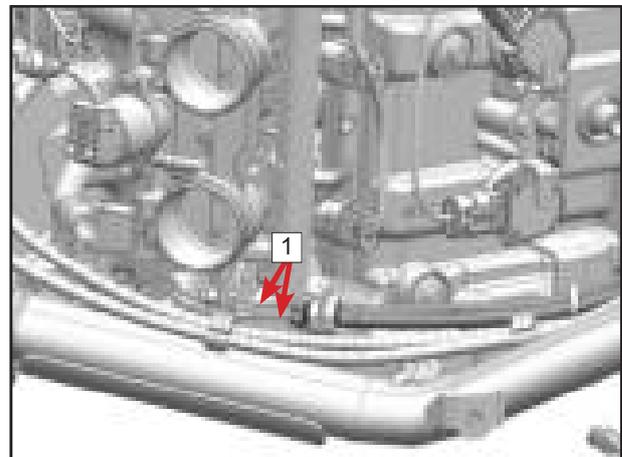
Loosen the clamp 1.

Unplug the fuel vapor desorption pipe 2 3 from the joint 2.

}

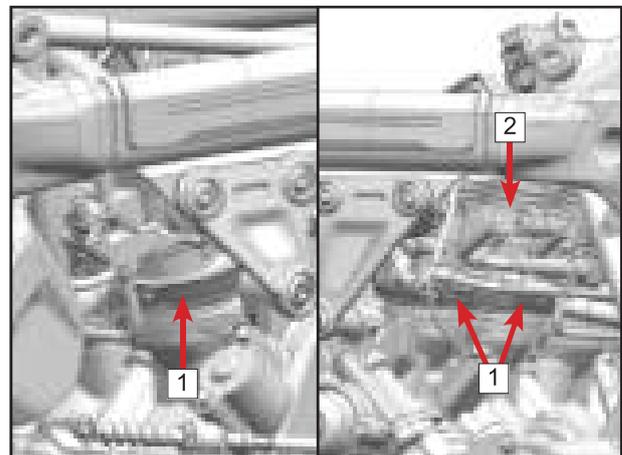


Remove throttle cable 1 from throttle body.



Loosen the clamp 1.

Remove throttle body assembly 2.

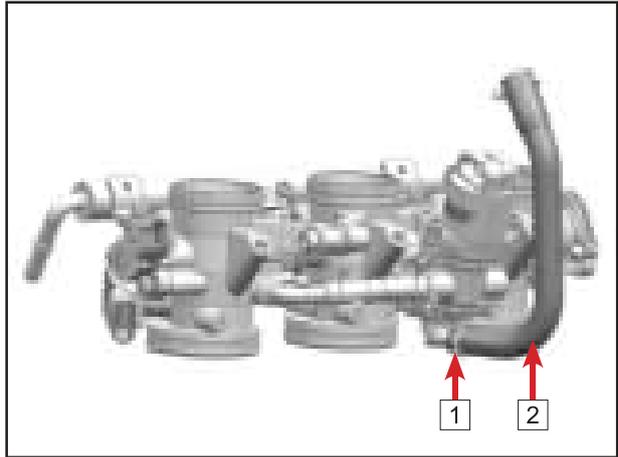


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## 5.9.3.2 Throttle Body Assembly Disassembly

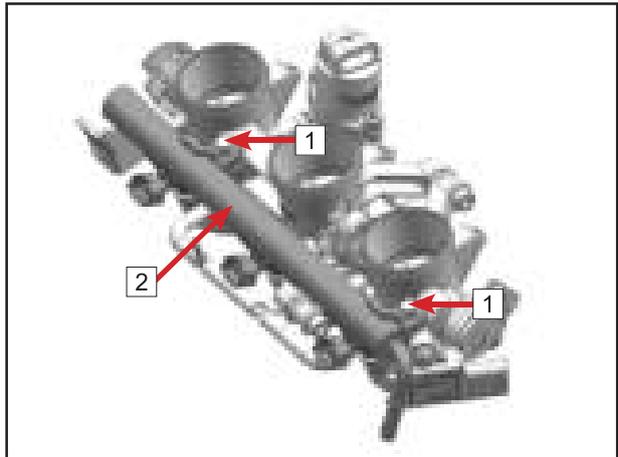
Loosen the clamp **1**.

Remove air intake compensation pipe assembly **2**.



Remove bolts **1**.

Remove fuel distribution pipe assembly **2**.

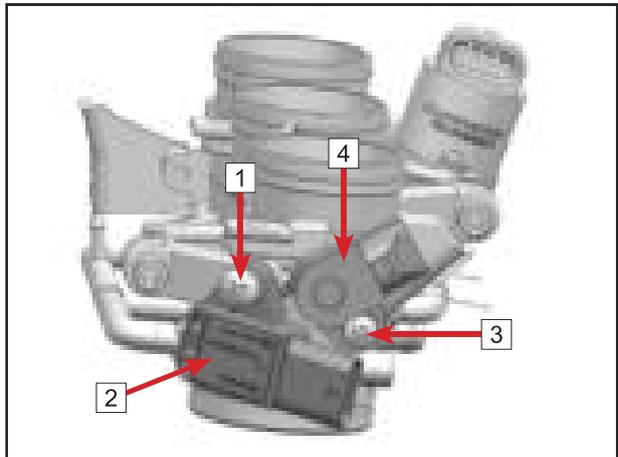


Remove screw **1**.

Remove T-MAP **2**.

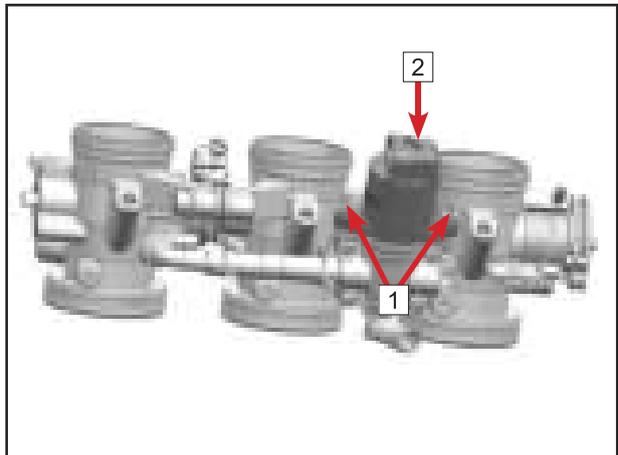
Remove screw **3**.

Remove TPS **4**.



Remove screws **1**.

Remove idle stepper motor **2**.

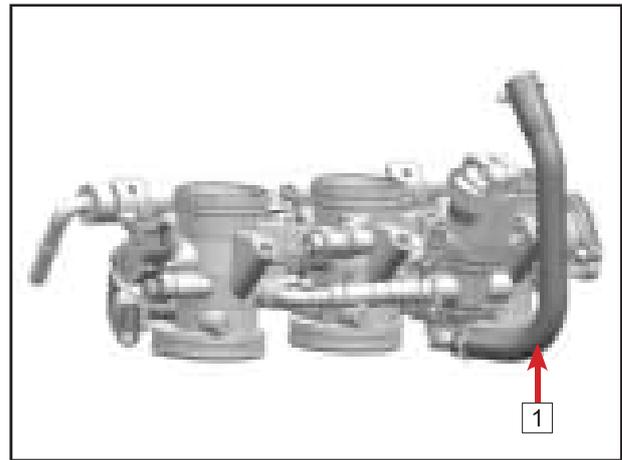


## 5.9.3.3 Throttle Body Assembly Inspection

Check throttle body for cracks or other damage. Replace if it does.

Check air intake compensation pipe assembly **1** and other hoses for cracks or other damage. If found, replace it with a new one.

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**.

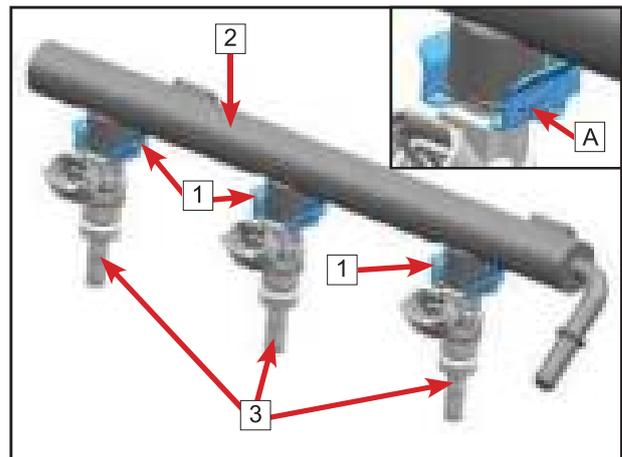
Separate fuel rail **2** and injector **3**.

The maintenance of injector see the electrical chapter.

## Assembly

Install fuel injector **3** on the fuel rail **2**, and then install circlip **1**.

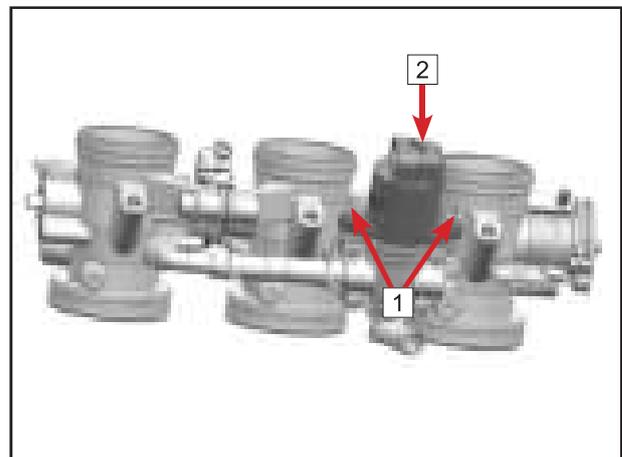
The boss **A** of injector cap must be clamped into the groove of the circlip **1**.



## 5.9.3.4 Throttle Body Assembly Assembly

Install idle stepper motor **2**.

Install screws **1** (torque: 2 N•m~3 N•m).

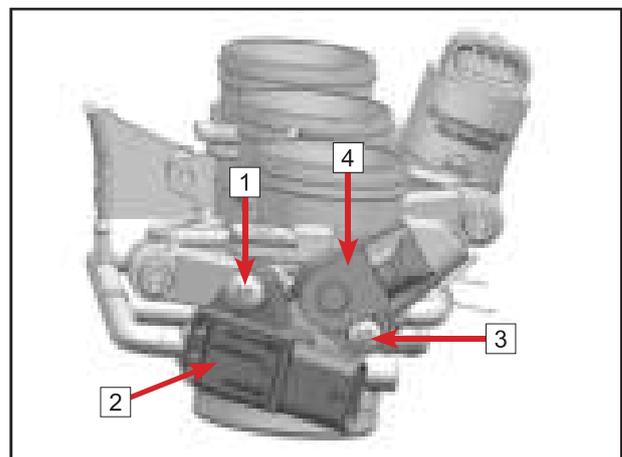


Install TPS **4**.

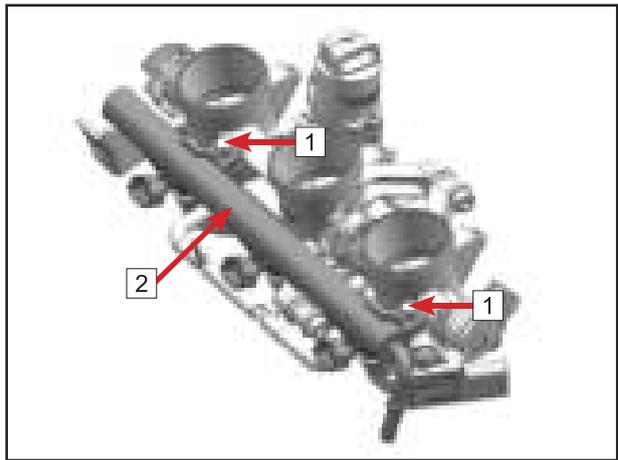
Install screw **3** (torque: 3 N•m~4 N•m).

Install T-MAP **2**.

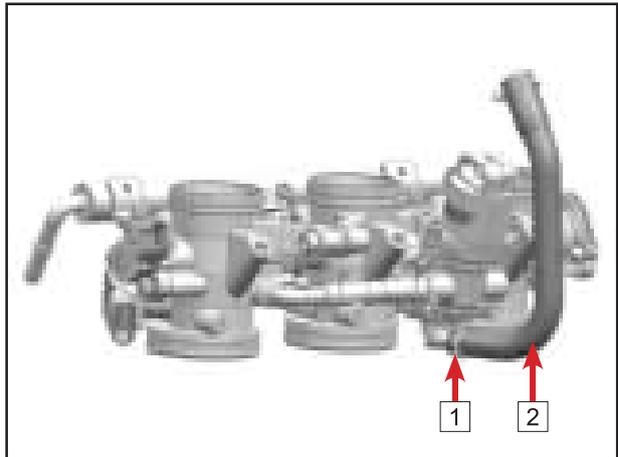
Install screw **1** (torque: 3.5 N•m~4.5 N•m).



Install fuel distribution pipe assembly **2**.  
Install bolts **1** (torque: 10 N•m).

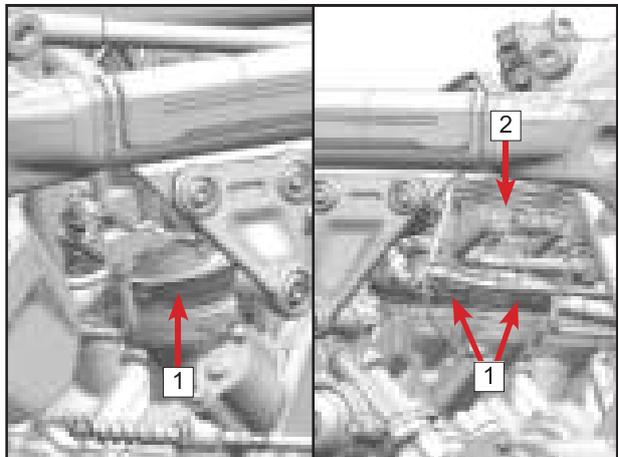


Install intake compensation pipe assembly **2** to throttle body.  
Tighten the clamp **1**.

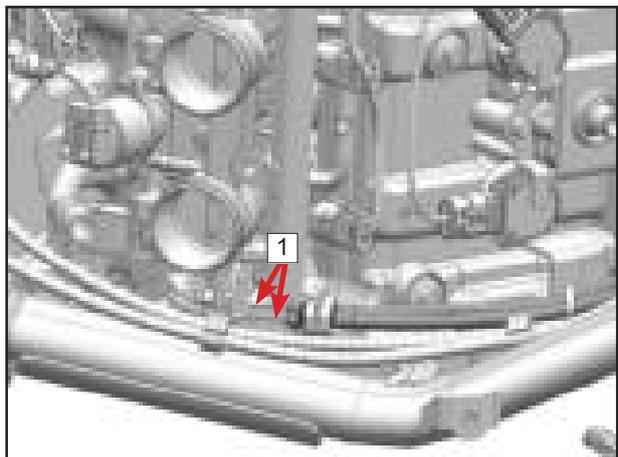


### 5.9.3.5 Throttle Body Assembly Installation

Install the clamp **1** on the throttle body connecting pipe.  
Install throttle body assembly **2**.  
Tighten the clamp **1**.



Install throttle cable **1** on the throttle body.



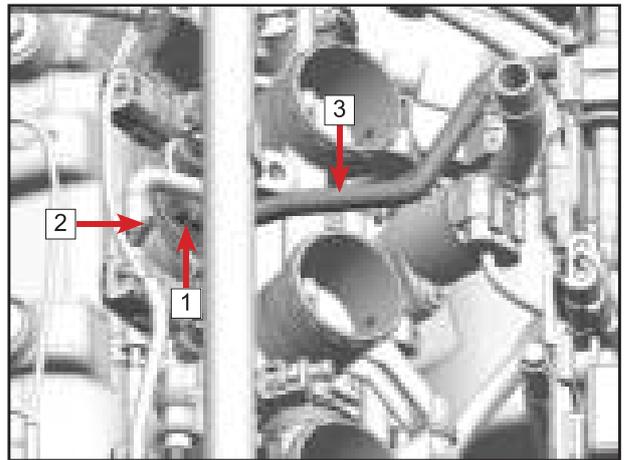
{ } is operating steps for vehicles equipped with fuel evaporation system:

{

Install fuel vapor desorption hose 2 [3] to the joint [2].

Tighten the clamp [1].

}



Plug in the stepper motor connector.

Plug in TPS connector.

Plug in T-MAP connector.

Plug in fuel injector connector.

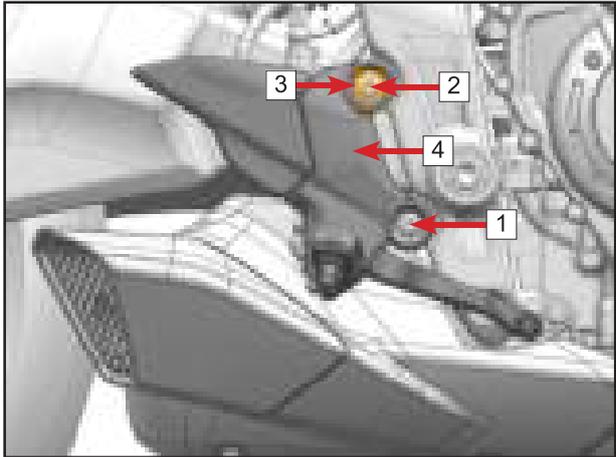
Install air filter housing assembly and other removed parts. (Refer to "Air Filter Housing Assembly" section).

## 5.10 Exhaust System

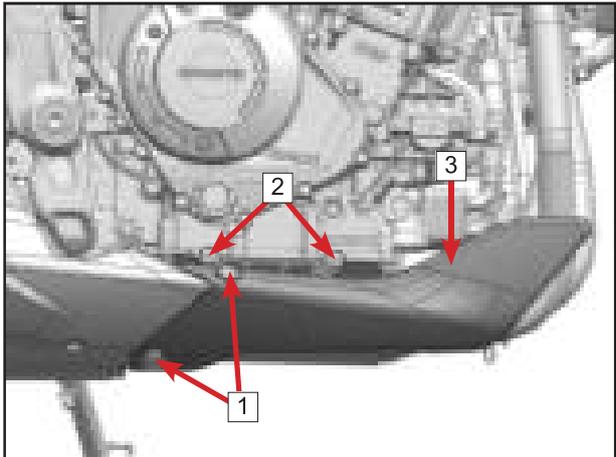
### 5.10.1 Removal

**⚠ CAUTION: Do not touch exhaust system parts immediately after the engine has been running.**

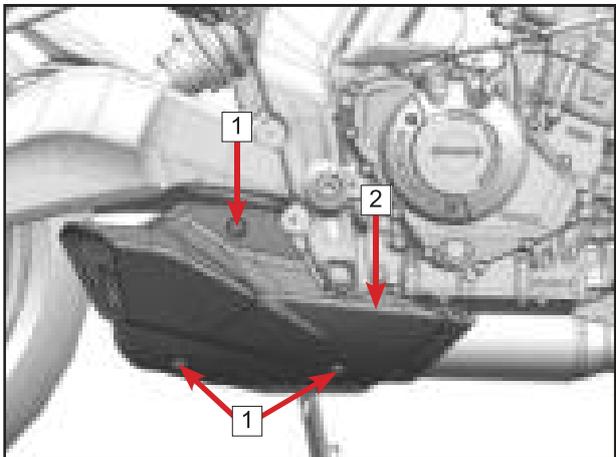
Remove screw **1**.  
Remove screw **2** and washer **3**.  
Remove front RH footrest bracket assembly **4**, and hang it to the side.



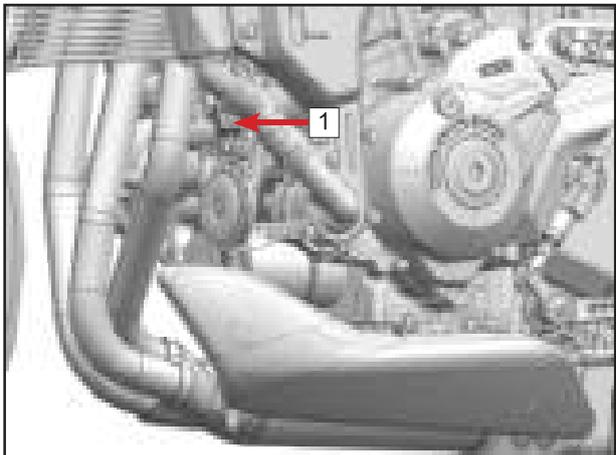
Remove screws **1**.  
Remove screws **2**.  
Remove muffler rear RH deco guard assembly **3**.



Remove screws **1**.  
Remove muffler guard assembly **2**.

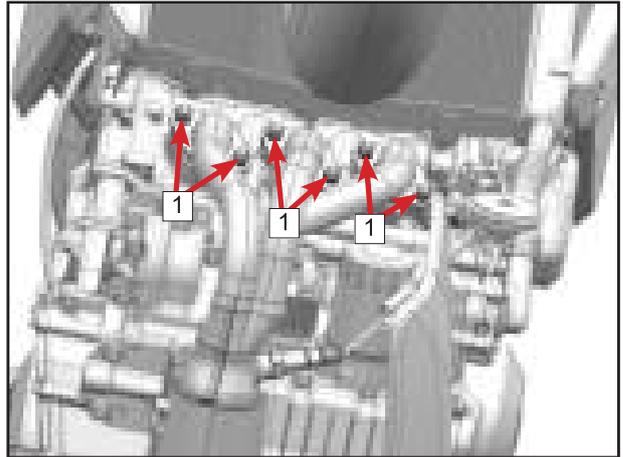


Disconnect oxygen sensor connector **1**.

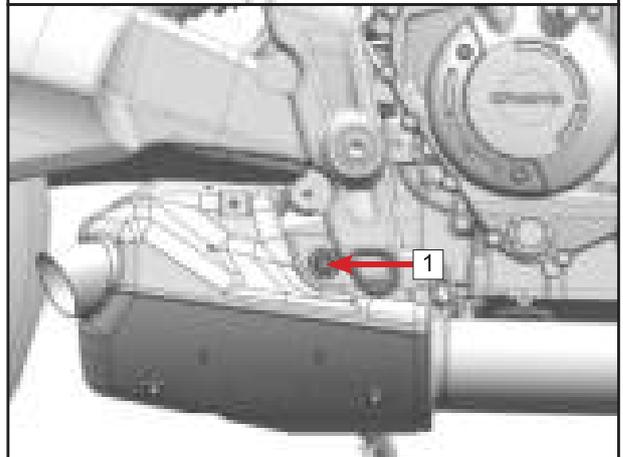
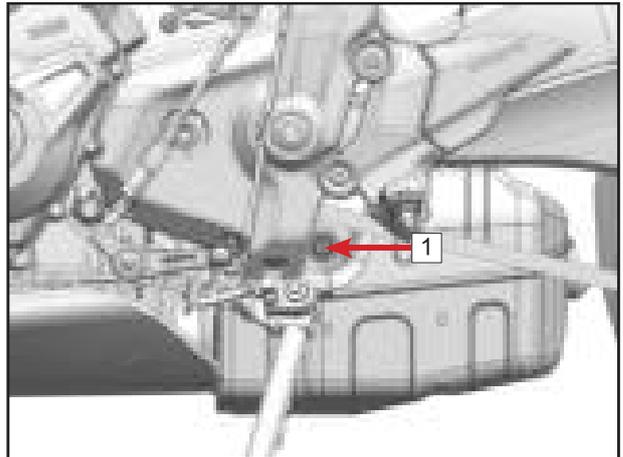


Remove the radiator. (Refer to the "Cooling System" chapter)

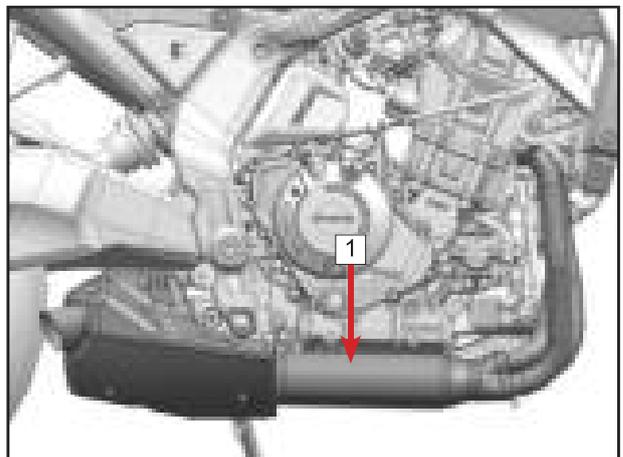
Remove lock nuts **1**.



Remove bolt **1**.

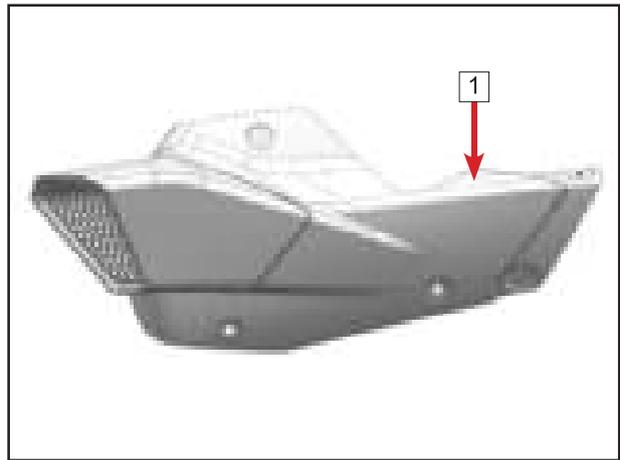


Remove exhaust muffler assembly **1** and exhaust gasket.

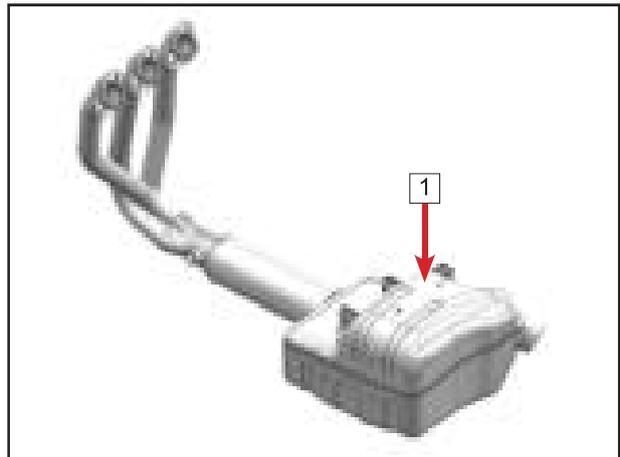


## 5.10.2 Inspection

Check muffler guard assembly **1** for cracks or damage. Replace if necessary.



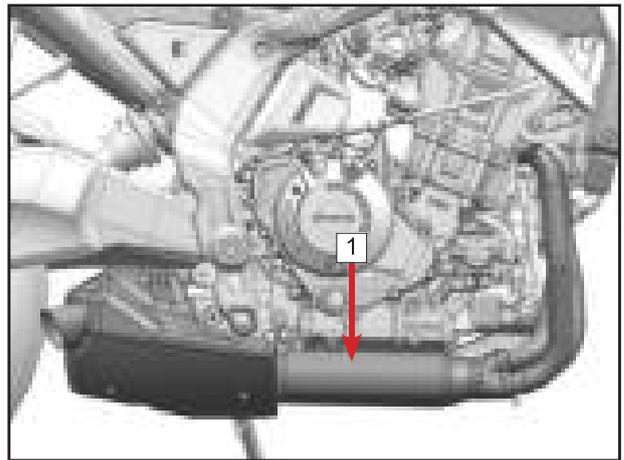
Check exhaust muffler assembly **1** for cracks, bending or other damage. Replace if necessary.



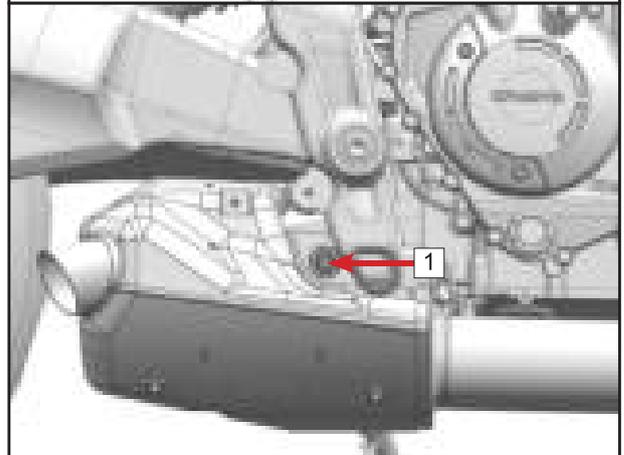
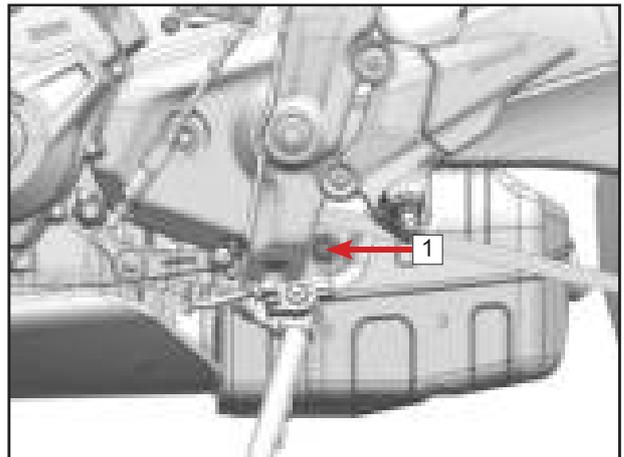
### 5.10.3 Installation

Ensure that the exhaust seal gasket is installed.

Install exhaust muffler assembly **1** in place.

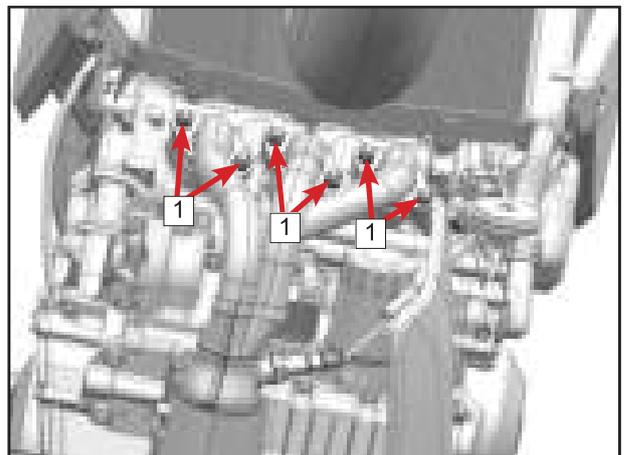


Install bolt **1**.

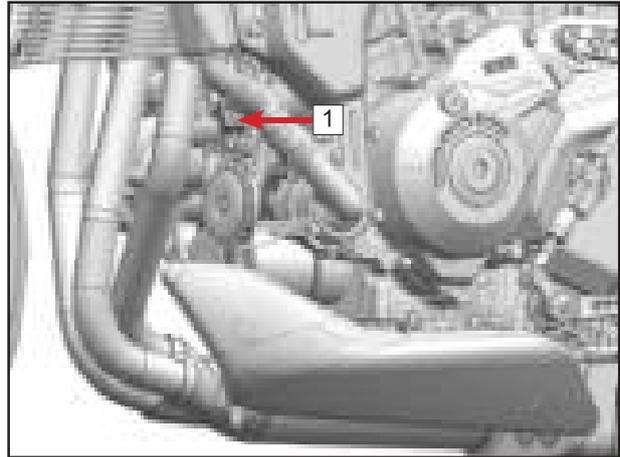


Install lock nuts **1**.

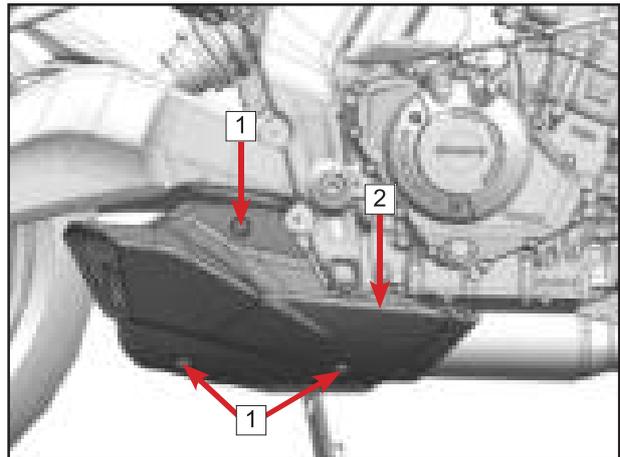
Install the radiator. (Refer to the "Cooling System" chapter)



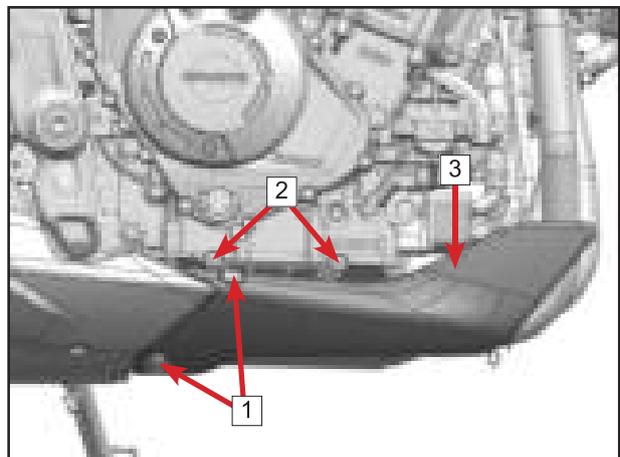
Plug in oxygen sensor connector **1**.



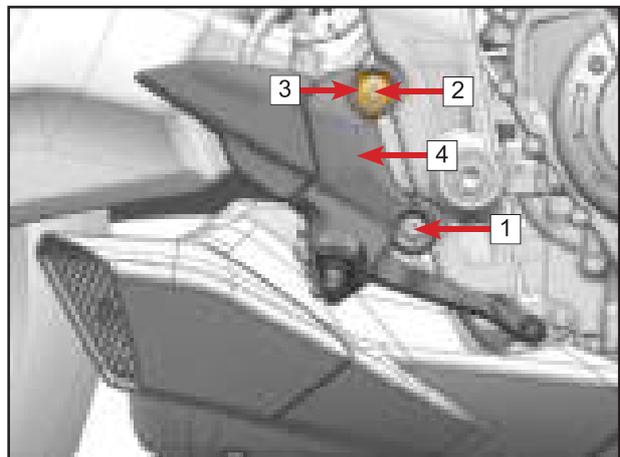
Place muffler guard assembly **2** in place.  
Install screws **1**.



Place muffler rear RH deco guard assembly **3** in place.  
Install screws **2**.  
Install screws **1**.



Place front RH footrest bracket assembly **4** in place.  
Install washer **3** and screw **2**.  
Install screw **1**.



## 06 Vehicle Body 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 secur.

## 6.2 Seat Removal

Place the vehicle on the level ground and park it.

Insert the key **1** into the seat lock.

Turn the key clockwise to unlock the seat lock.

Remove rear seat assembly **2**.

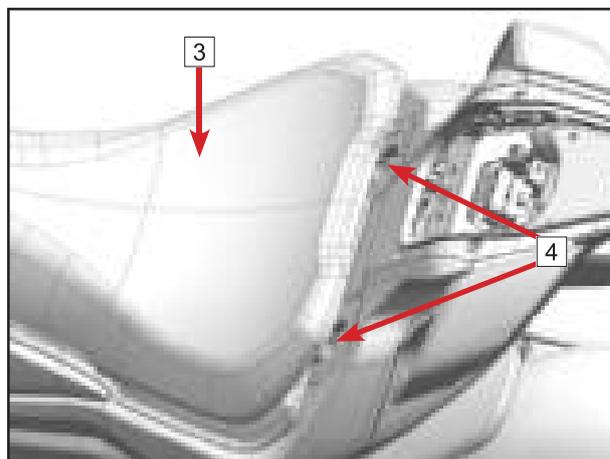
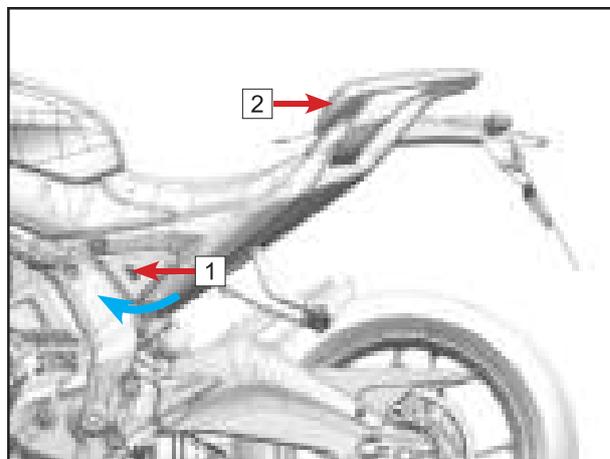
Lift up the tail part of front seat assembly **3**.

Remove bolts **4**.

Remove front seat assembly **3**.

### Installation

Reverse the removal procedures for installation.



### NOTE

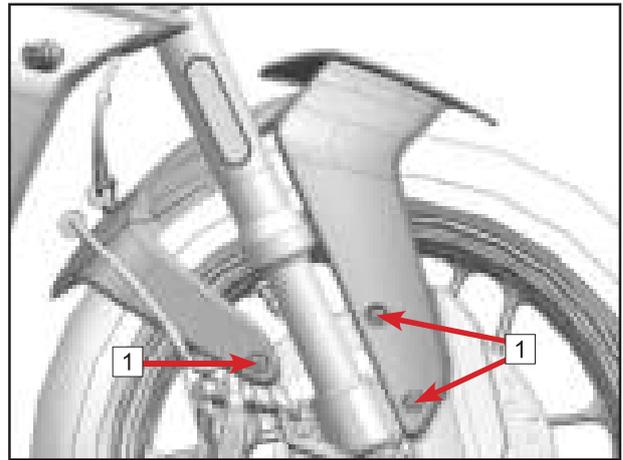
If the seat is not assembled normally, it may be loosened. Pull up the seat to check if the seat cushion is locked normally.

## 6.3 Body Covering Parts

### 6.3.1 Front Fender

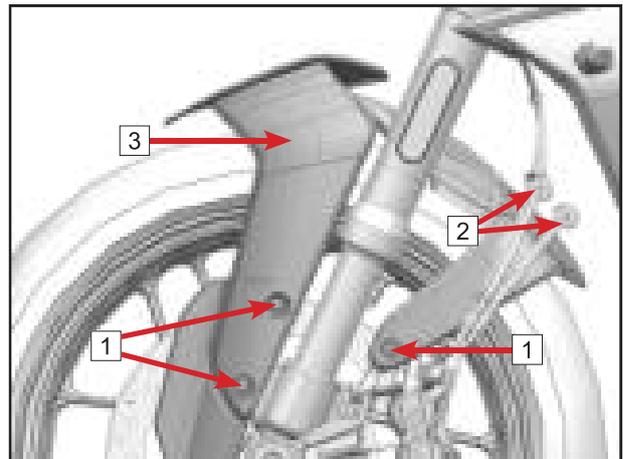
#### Removal

Remove six screws **1**.



Separate brake hose **2**.

Remove front fender **3**.



#### Installation

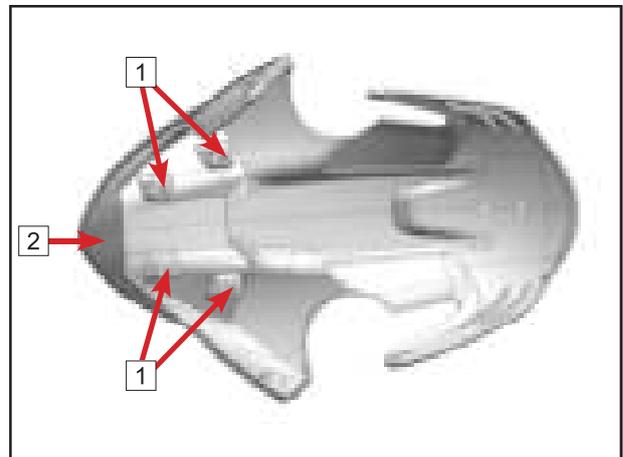
Reverse the removal procedures for installation.

### 6.3.2 Front Fender Deco Plate

#### Removal

Remove four self-tapping screws **1**.

Remove front fender deco plate **2**.



#### Installation

Reverse the removal procedures for installation.

### 6.3.3 Front Caliper LH&RH Ventilation Guard

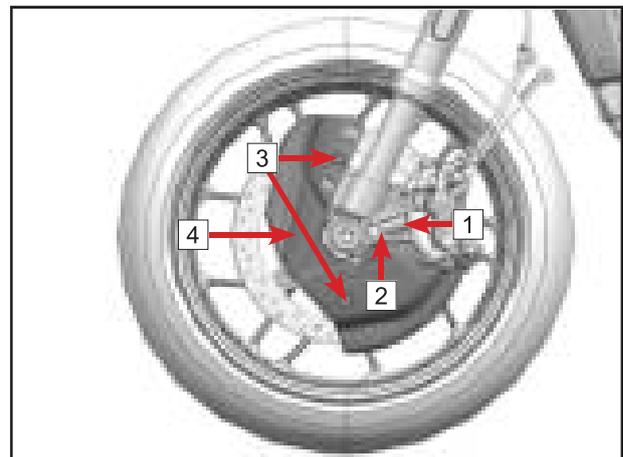
#### Removal

Remove inner hex screws **1**.

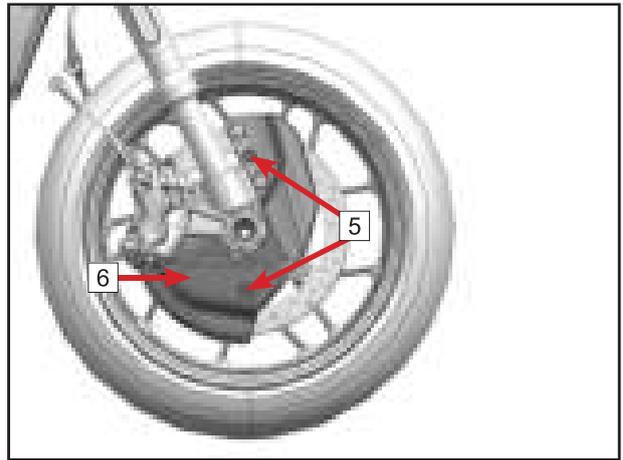
Remove deco guard **2**.

Remove two stepped screws **3**.

Remove front caliper LH ventilation guard **4**.



Remove two stepped screws [5].  
Remove front caliper RH ventilation guard [6].



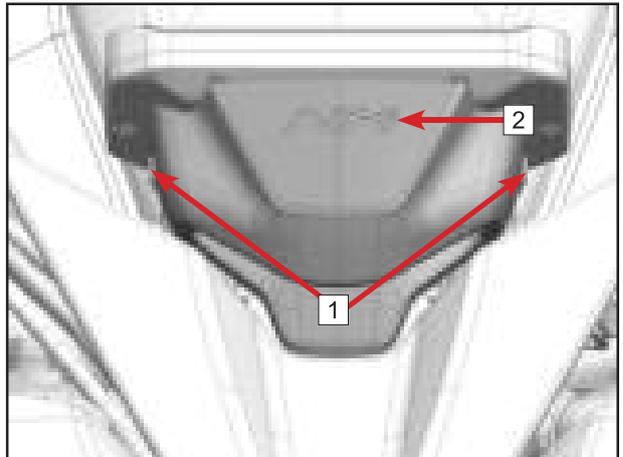
### Installation

Reverse the removal procedures for installation.

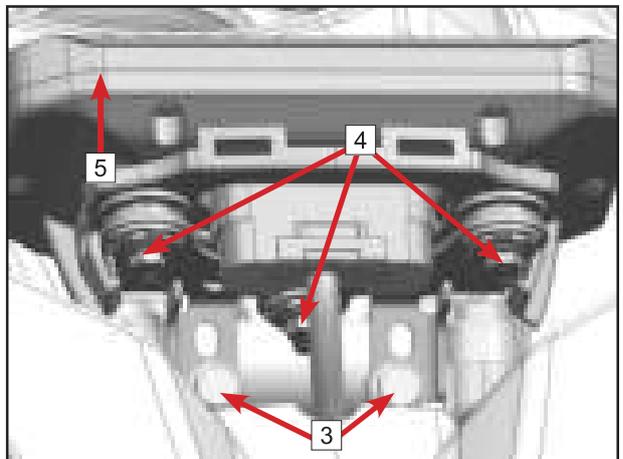
## 6.4 Dashboard Assembly

### Removal

Remove two plastic expansion screws [1].  
Remove dashboard upper deco guard [2].



Remove two bolts [3].  
Remove the dashboard plug-in.  
Remove three nuts [4].  
Remove the dashboard [5].

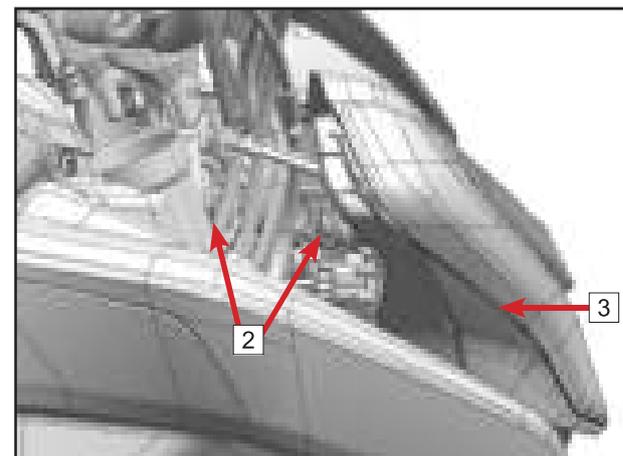


### Installation

Reverse the removal procedures for installation.

## 6.5 Headlight Assembly

Remove two screws.  
Remove headlight assembly .



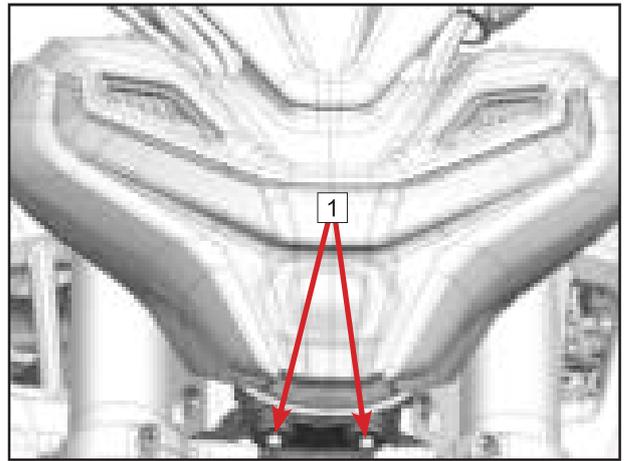
### Installation

Reverse the removal procedures for installation.

## Removal

Lift the headlight assembly upwards to separate the base head from the fixed point **1**.

Pull out the headlight connector.



## 6.5.1 Dashboard Lower Deco Guard

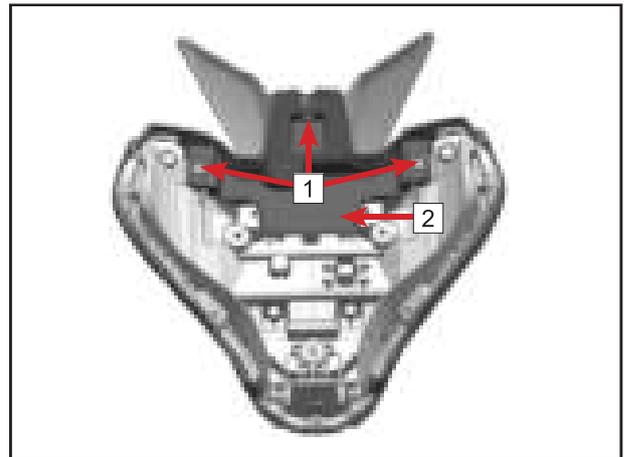
### Pre-work

Remove headlight assembly. (see this chapter)

### Removal

Remove three screws **1**.

Remove dashboard lower deco guard **2**.



### Installation

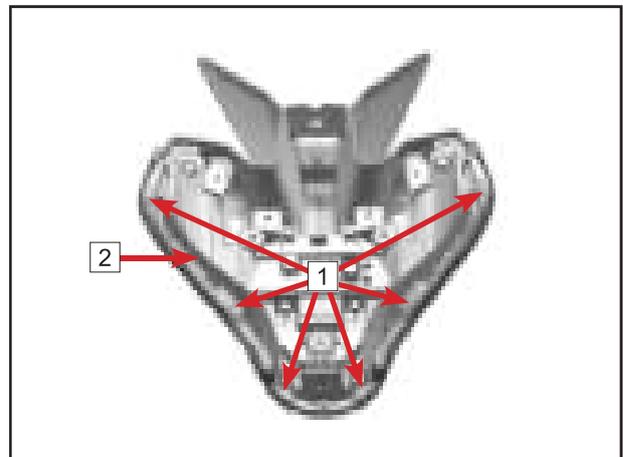
Reverse the removal procedures for installation.

## 6.5.2 Headlight

### Removal

Remove six screws **1**.

Remove the headlight **2**.



### Installation

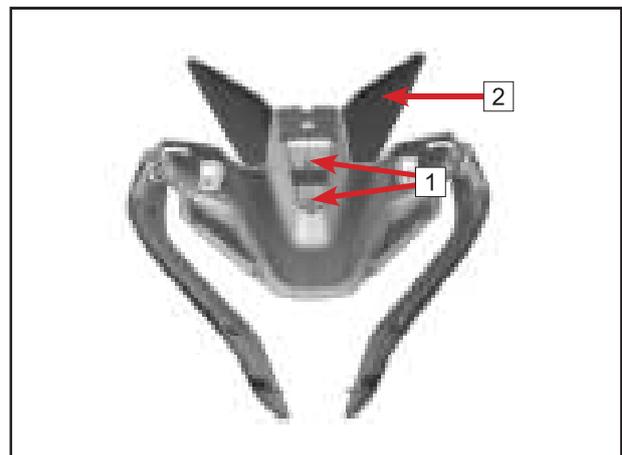
Reverse the removal procedures for installation.

## 6.5.3 Deflector Deco Guard

### Removal

Remove two screws **1**.

Remove deflector deco guard **2**.



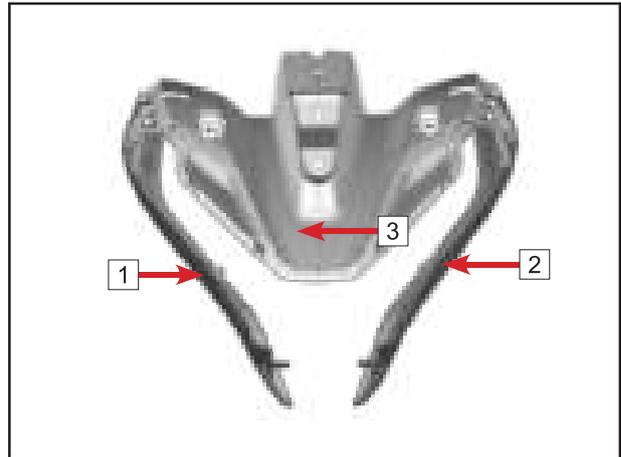
### Installation

Reverse the removal procedures for installation.

## 6.5.4 Headlight Deco Guard

### Removal

- Remove headlight LH upper deco guard **1**.
- Remove headlight RH upper deco guard **2**.
- Remove headlight upper deco plate **3**.



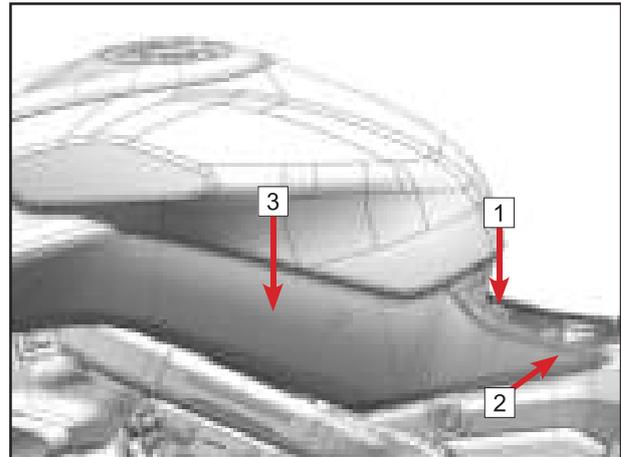
### Installation

Reverse the removal procedures for installation.

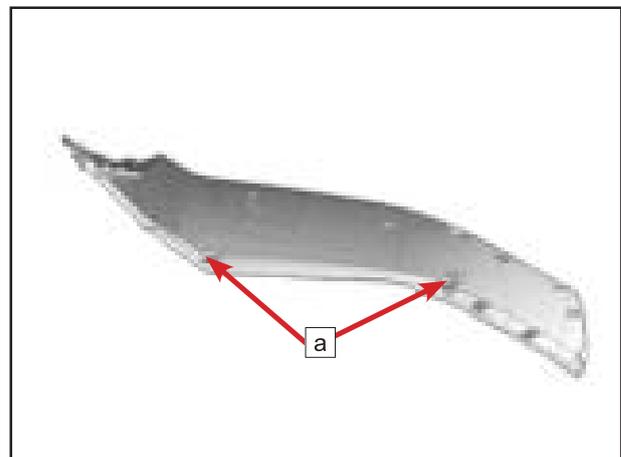
## 6.6 Vehicle LH Rear Deco Plate

### Removal

- Remove the screw **1**.
- Remove self-tapping screw **2**.
- Remove vehicle LH rear deco plate **3**.



NOTE
Prevent the plastic buckle <b>a</b> from breaking during disassembly.



### Installation

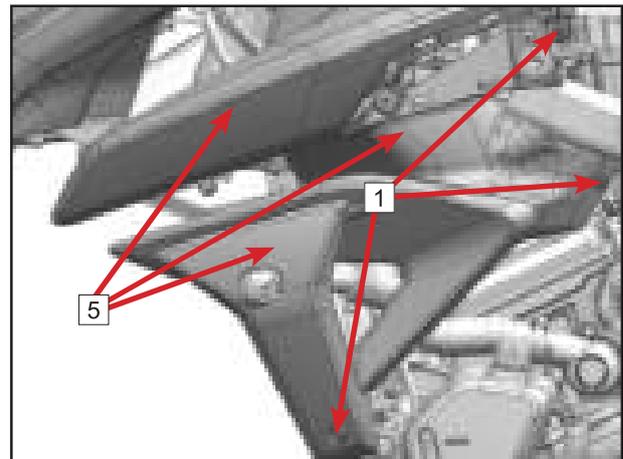
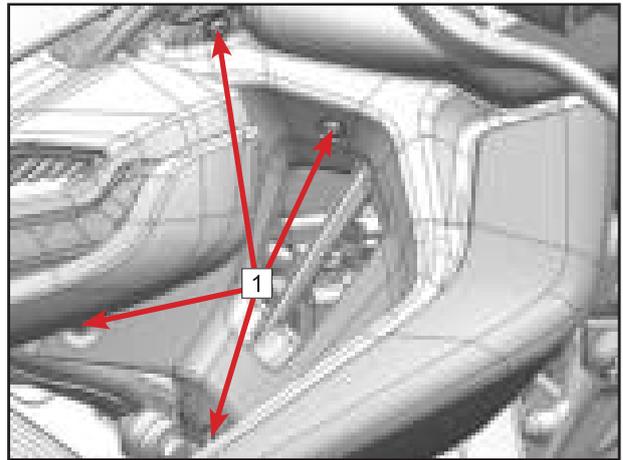
Reverse the removal procedures for installation.

The assembly and disassembly method of the vehicle rear RH deco plate is the same as that of the vehicle rear LH deco plate.

## 6.7 Vehicle LH Panel

### Removal

Remove seven screws [1].

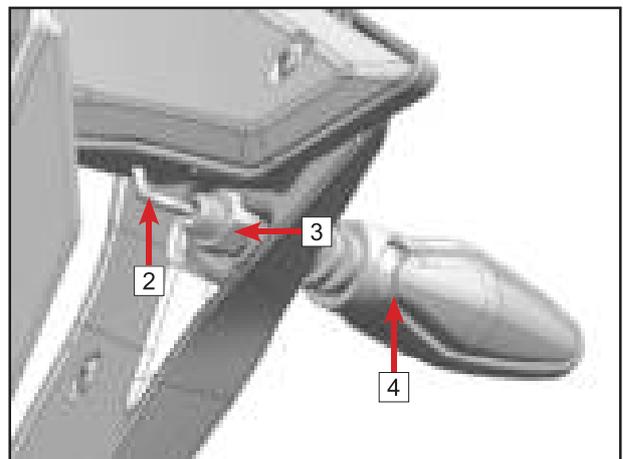


Remove the harness [2].

Remove vehicle LH panel [5].

Remove bolt [3].

Remove LH turn light [4].



### Installation

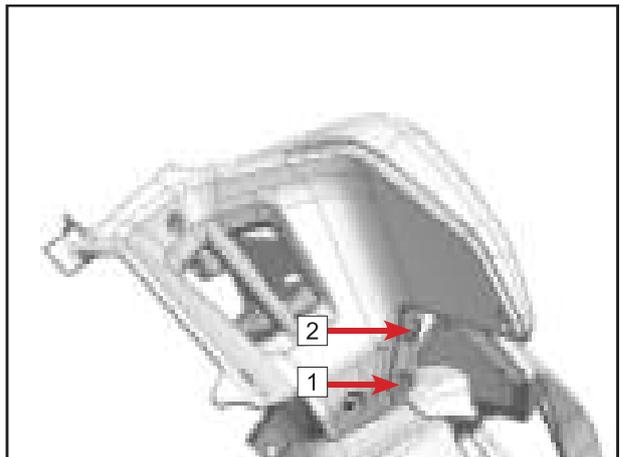
Reverse the removal procedures for installation.

## 6.7.1 Fuel Tank Front LH Deco Plate

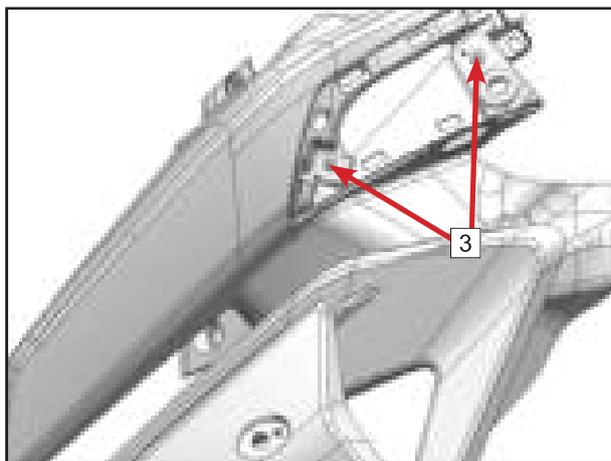
### Removal

Remove screw [1].

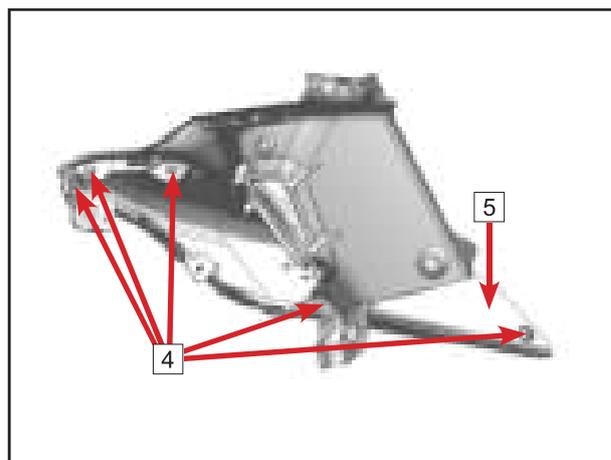
Remove expansion screw [2].



Remove two self-tapping screws **3**.



Remove five self-tapping screws **4**.  
Remove fuel tank front LH deco plate **5**.



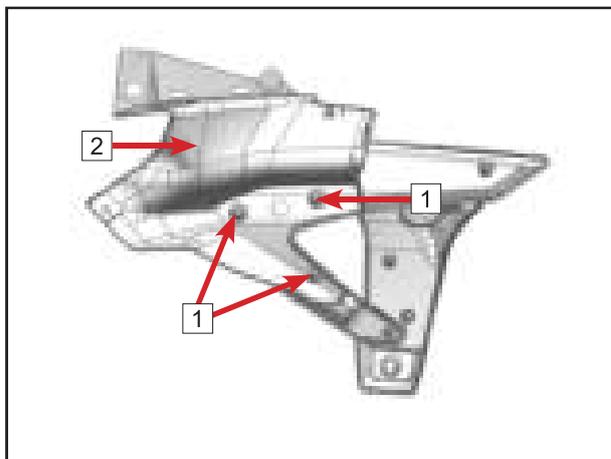
### Installation

Reverse the removal procedures for installation.

### 6.7.2 Radiator LH Inner Panel

#### Removal

Remove self-tapping screws **1**.  
Remove radiator LH inner panel **2**.



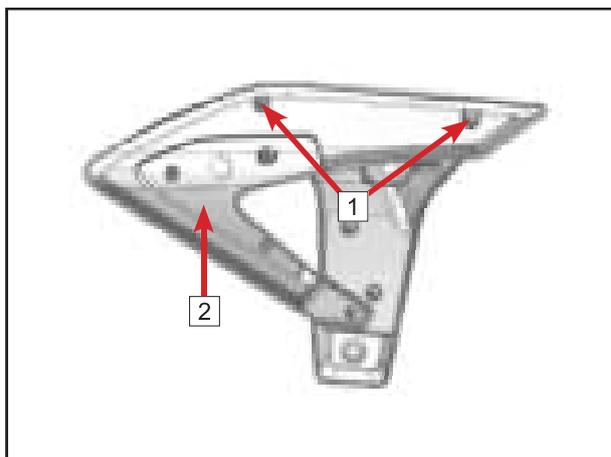
### Installation

Reverse the removal procedures for installation.

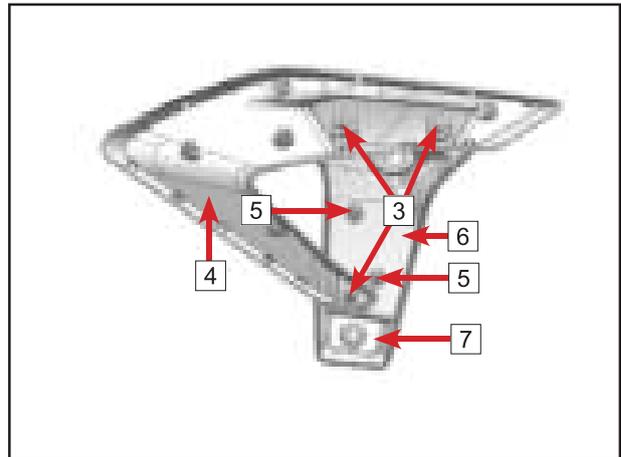
### 6.7.3 Radiator LH Deco Plate and Vehicle LH Wing

#### Removal

Remove self-tapping screws **1**.  
Remove radiator LH deco plate inner plate **2**.



- Remove self-tapping screws [3].
- Remove radiator LH deco plate [4].
- Remove self-tapping screws [5].
- Remove vehicle LH wing inner plate [6].
- Remove vehicle LH wing [7].



### Installation

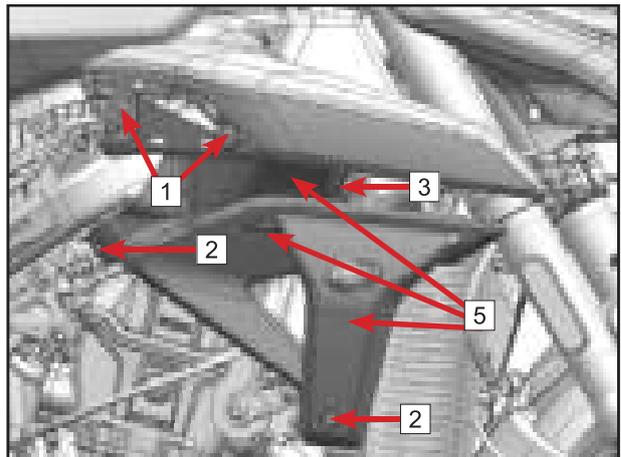
Reverse the removal procedures for installation.

## 6.8 Vehicle RH Panel

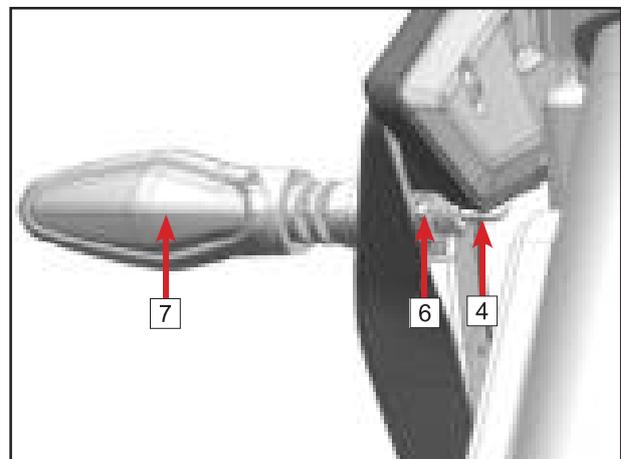
### 6.8.1 Radiator RH Panel Assembly

#### Removal

- Remove self-tapping screws [1].
- Remove screws [2].
- Remove expansion screws [3].



- Remove the harness [4].
- Remove radiator RH panel assembly [5].
- Remove bolt [6].
- Remove RH turn light [7].

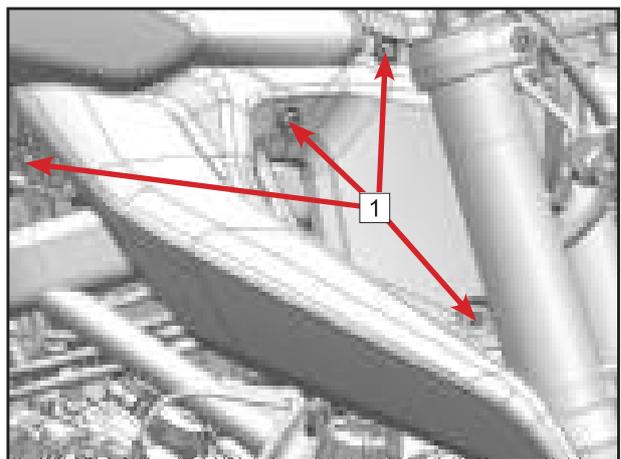


### Installation

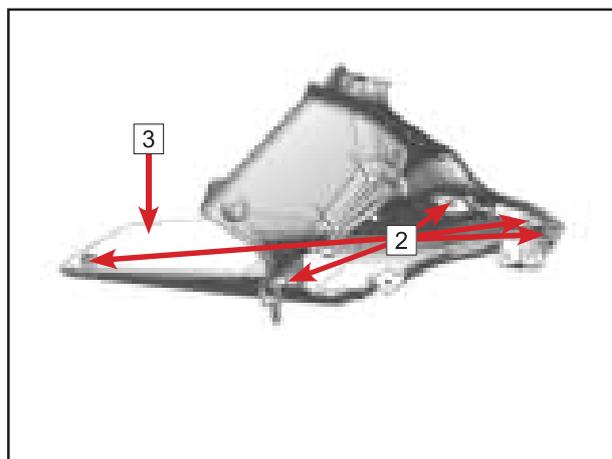
Reverse the removal procedures for installation.

### 6.8.2 Fuel Tank Front RH Deco Plate

- Remove four screws [1].



Remove five self-tapping screws [2].  
Remove fuel tank front RH deco plate [3].

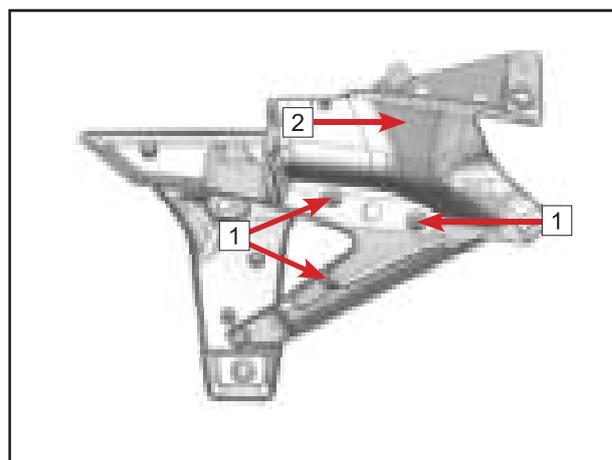


### Installation

Reverse the removal procedures for installation.

### 6.8.3 Radiator RH Inner Panel Removal

Remove self-tapping screws [1].  
Remove radiator RH inner panel [2].

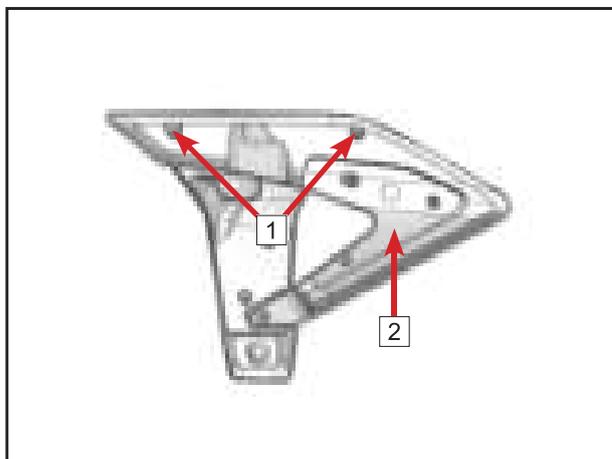


### Installation

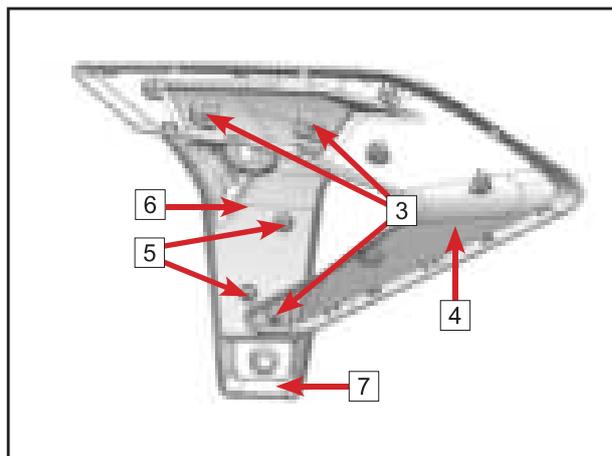
Reverse the removal procedures for installation.

### 6.8.4 Radiator RH Deco Plate and Vehicle RH Wing Removal

Remove self-tapping screws [1].  
Remove radiator RH deco plate inner plate [2].



Remove self-tapping screws [3].  
Remove radiator RH deco plate [4].  
Remove self-tapping screws [5].  
Remove vehicle RH wing inner plate [6].  
Remove vehicle RH wing [7].



### Installation

Reverse the removal procedures for installation.

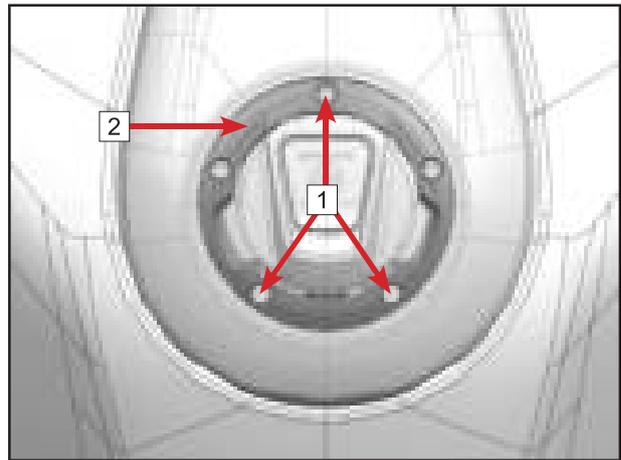
## 6.8.5 Fuel Tank Lock Assembly

### Removal

Use the mechanical key to open the fuel tank cap.

Remove bolts [1].

Remove fuel tank cap lock assembly [2].



### Installation

Reverse the removal procedures for installation.

### ⚠ CAUTION

When removing the bolt [2], care should be taken to prevent the bolt from falling into the tank.

After removing the fuel tank cover, install the fuel tank lock back in time or use a large dust-free paper to block the fuel tank to avoid environmental dirt or parts falling into the fuel, or being ignited by sparks to ignite the fuel steam, resulting in accidents.

## 6.8.6 Fuel Tank Upper Deco Plate

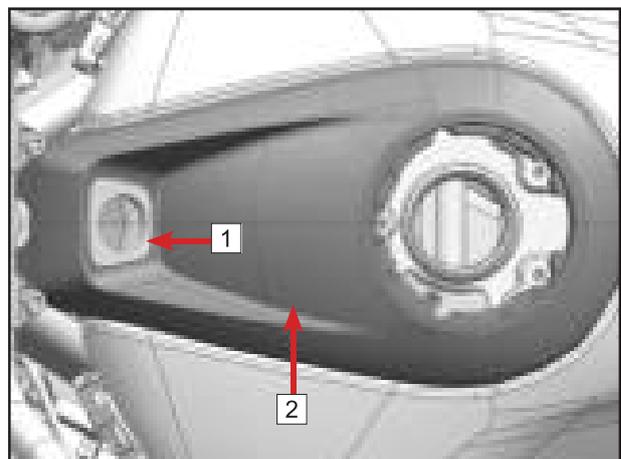
### Pre-work

Remove fuel tank cap lock assembly. (see this chapter for details)

### Removal

Remove ignition lock rubber ring [1].

Remove fuel tank upper deco plate [2].



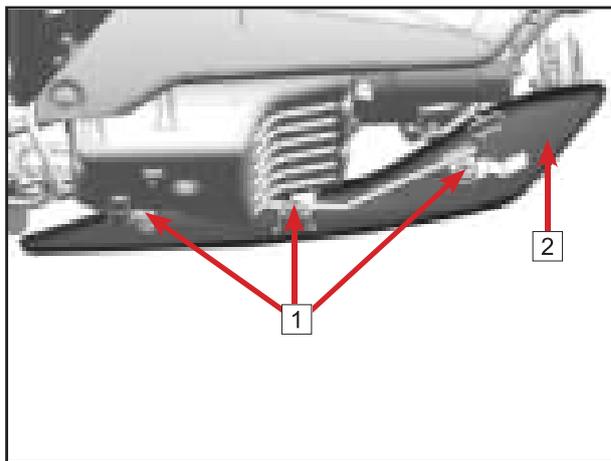
### Installation

Reverse the removal procedures for installation.

### 6.9 Middle Plastic Parts

#### 6.9.1 Engine LH Lower Guard Removal

Remove three screws [1].  
Remove engine LH lower guard [2].

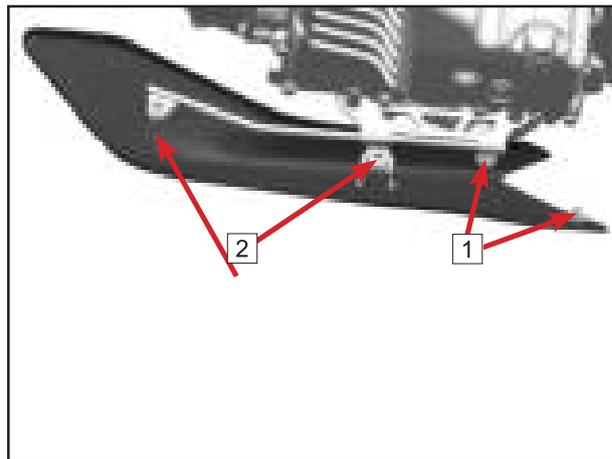


#### Installation

Reverse the removal procedures for installation.

#### 6.9.2 Engine RH Lower Guard Removal

Remove two screws [1].  
Remove two screws [2].  
Remove engine RH lower guard [2].

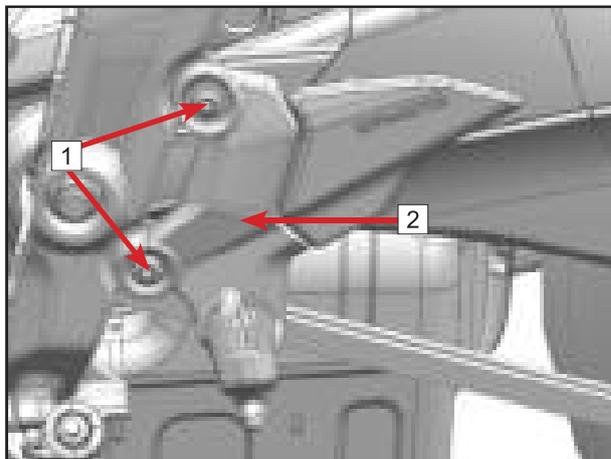


#### Installation

Reverse the removal procedures for installation.

#### 6.10 Front LH Footrest Removal

Remove two screws [1].  
Remove front LH footrest [2].



#### Installation

Reverse the removal procedures for installation.

The front RH footrest is assembled and disassembled in the same way as the front LH footrest.

## 6.10.1 Rear LH Footrest Bracket Removal

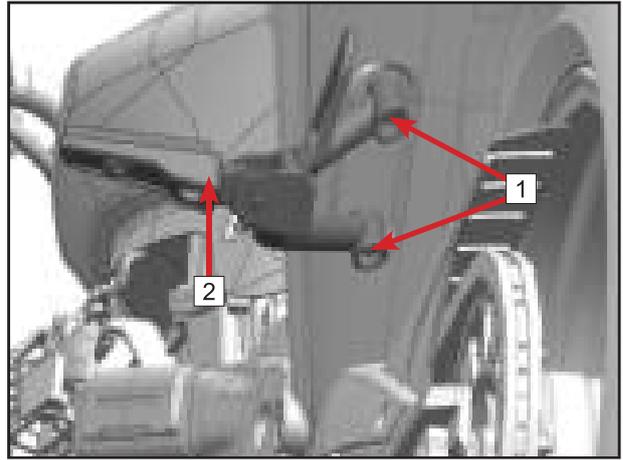
Remove screws [1].

Remove rear LH footrest [2].

### Installation

Reverse the removal procedures for installation.

The rear RH footrest is assembled and disassembled in the same way as the rear LH footrest.



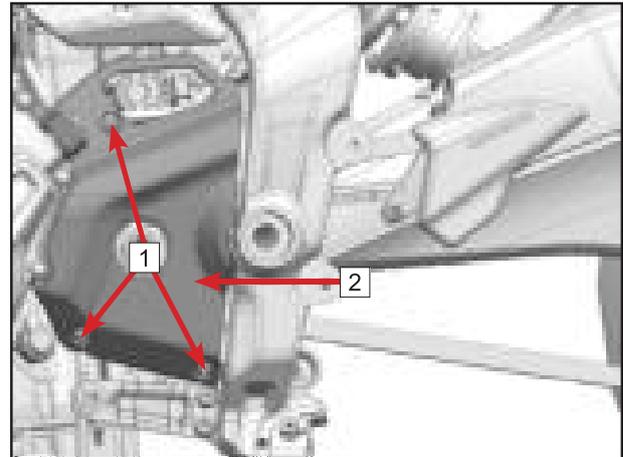
## 6.10.2 Small Sprocket Guard Removal

Remove three inner hex screws [1].

Remove small sprocket guard [2].

### Installation

Reverse the removal procedures for installation.



## 6.10.3 Vehicle LH Middle Deco Plate Removal

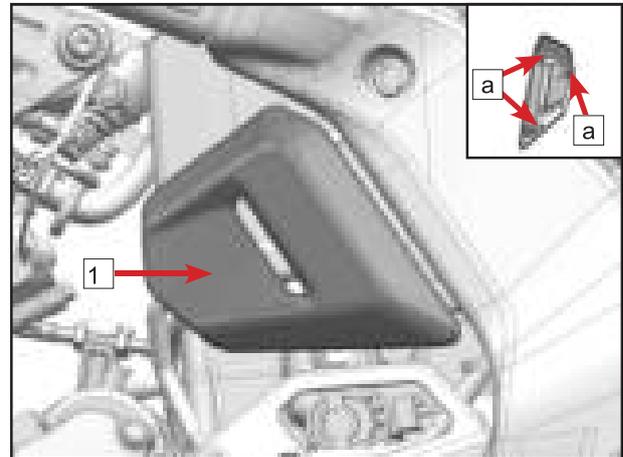
Remove the LH center deco plate [1] from the LH center part of frame.

Prevent the buckle [a] from breaking during disassembly.

### Installation

Reverse the removal procedures for installation.

The vehicle RH middle deco plate is assembled and disassembled in the same way as the vehicle LH middle deco plate.



### 6.11 Tail Plastic Parts Assembly

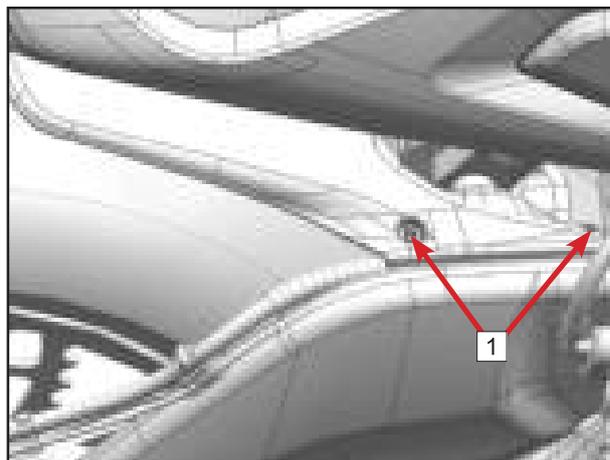
#### 6.11.1 Rear Fork Panel

##### Pre-work

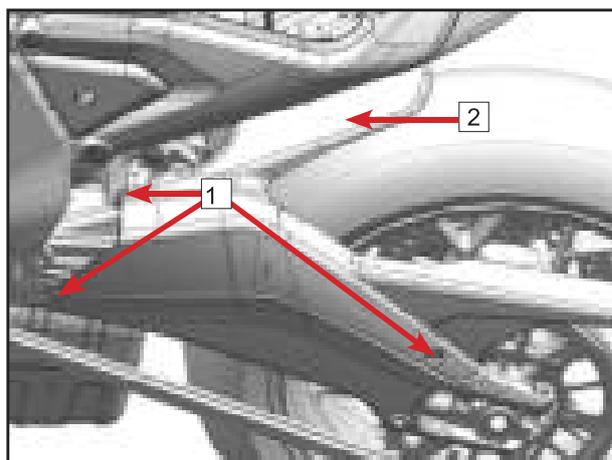
Remove the front LH & RH footrest panel and the front LH & RH footrest. (See this chapter for details)

##### Removal

Remove five screws **1**.



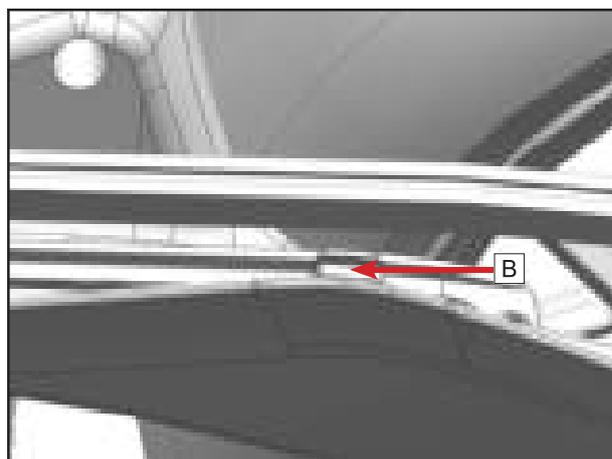
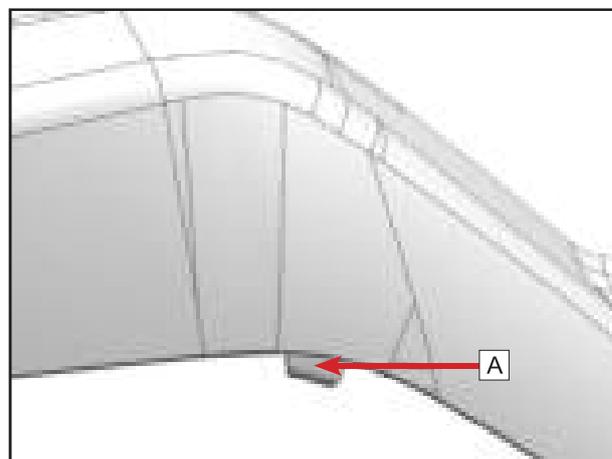
Remove rear fork panel **2**.



##### Installation

Reverse the removal procedures for installation.

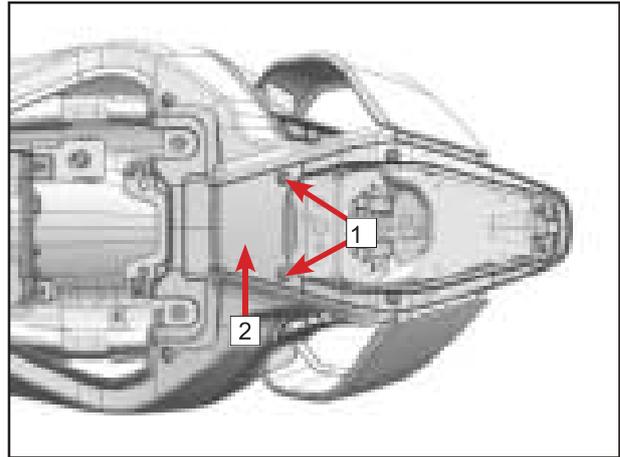
During installation, the LH side **A** of panel is clamped into the rear fork slot **B**.



## 6.11.2 ECU Service Plate

### Removal

Remove two self-tapping screws [1].  
Remove ECU service plate [2].



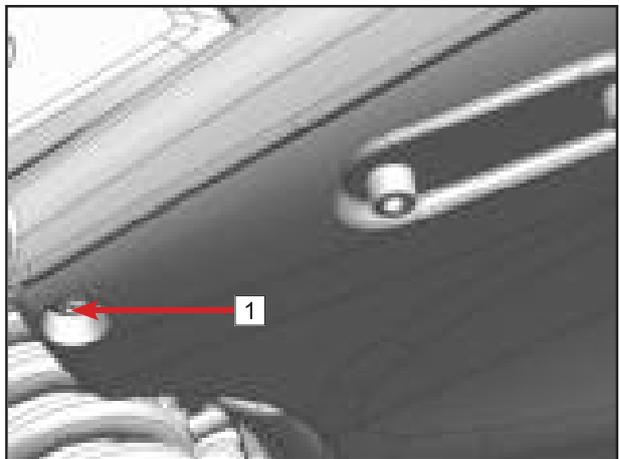
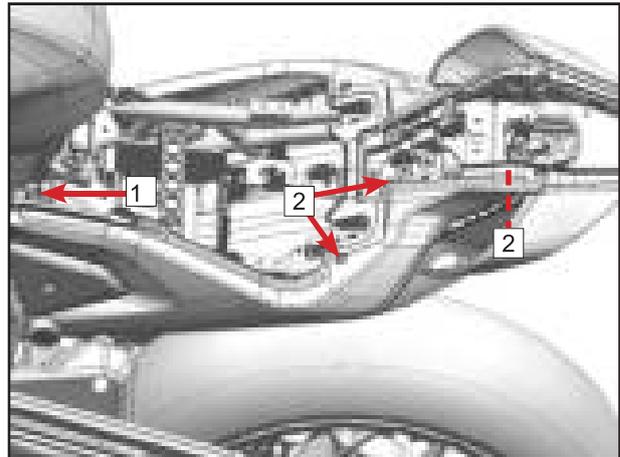
### Installation

Reverse the removal procedures for installation.

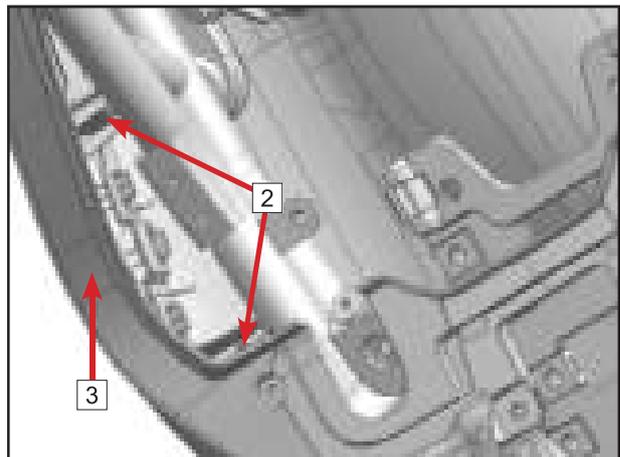
## 6.11.3 Seat LH Lower Panel

### Removal

Remove screw [1].  
Remove five self-tapping screws [2].



Remove seat LH lower panel [3].



### Installation

Reverse the removal procedures for installation.

The seat RH lower panel and the seat LH lower panel are removed and installed in the same sequence.

### 6.11.4 Rear Tail Upper Deco Plate Removal

- Remove two screws [1].
- Remove six self-tapping screws [2].
- Remove rear tail upper deco plate [3].

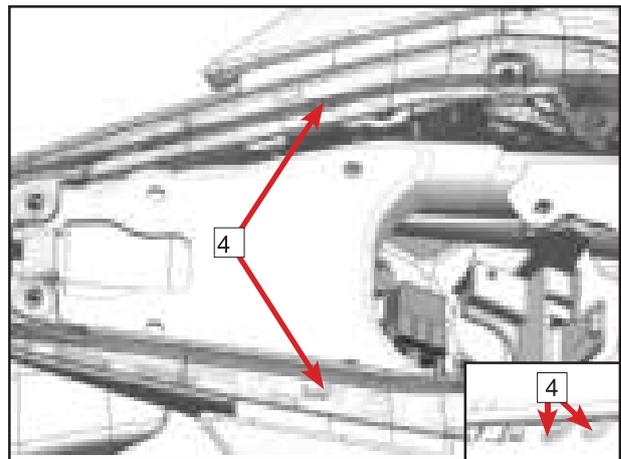
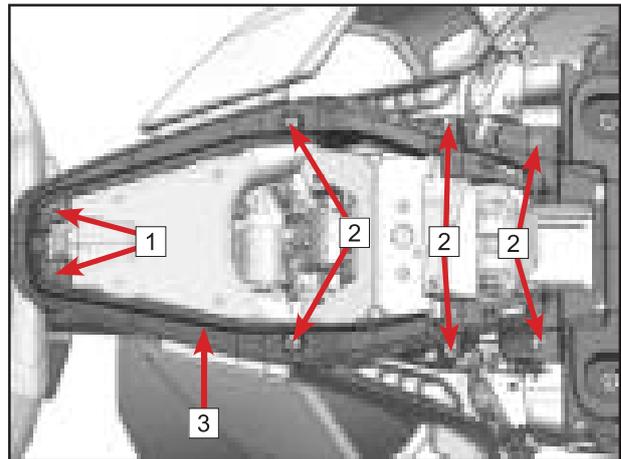
#### Installation

Reverse the removal procedures for installation.

**NOTE:** Prevent the buckle [4] from breaking during removal.

#### Installation

Reverse the removal procedures for installation.



### 6.11.5 Battery Box Removal

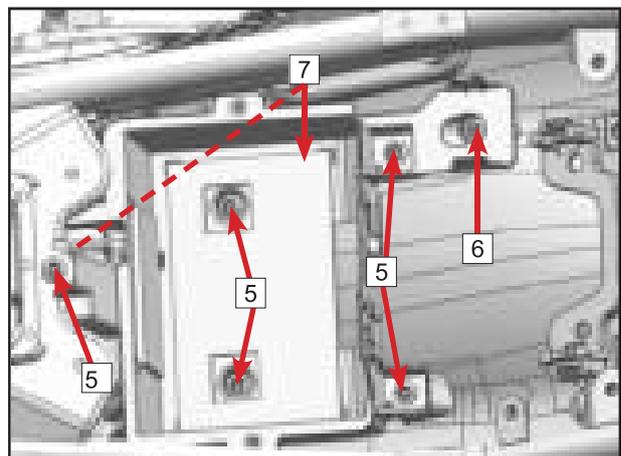
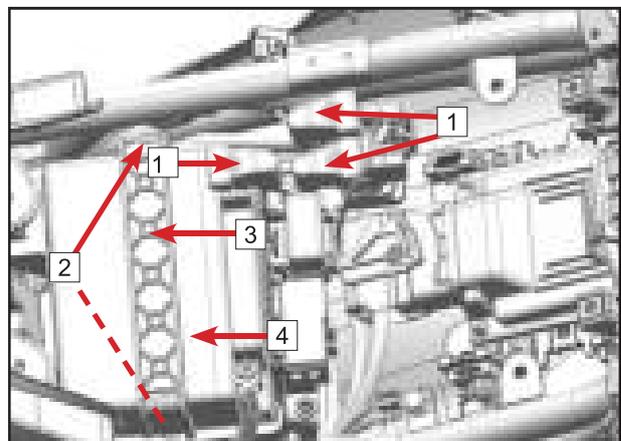
#### Removal

- Remove anti-dust cap.
- Remove two bolts.
- Remove battery press strip [3].
- Disconnect the connector.
- Remove battery [4].

- Remove five bolts [5].
- Remove one self-tapping screw [6].
- Remove battery box and electrical parts assembly [7].
- Separate the electrical parts.
- Remove battery box.

#### Installation

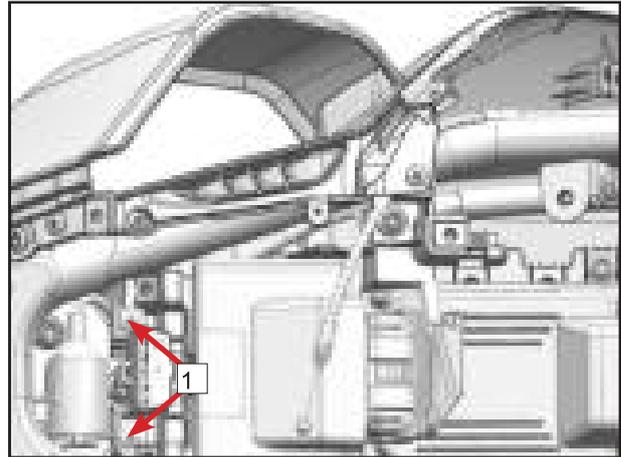
Reverse the removal procedures for installation.



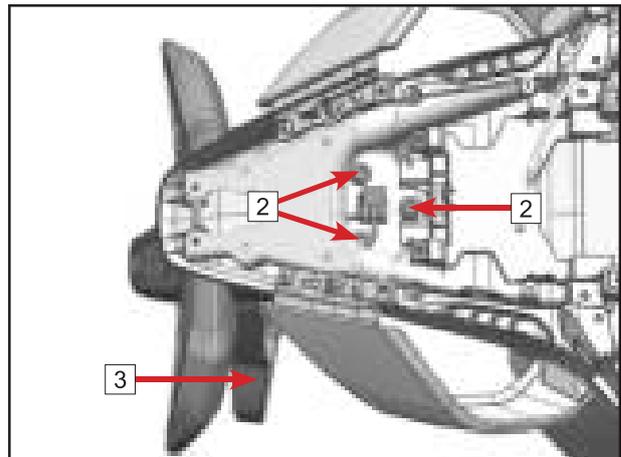
## 6.11.6 Rear Fender

### Removal

Remove four self-tapping screws [1].  
Disconnect the connector and remove the electrical parts.



Remove three bolts [2].  
Remove rear fender [3].



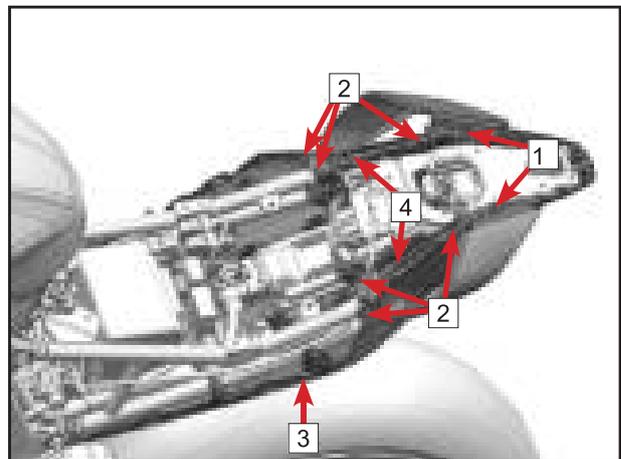
### Installation

Reverse the removal procedures for installation.

## 6.11.7 Frame Base Plate

### Removal

Remove six self-tapping screws [2].  
Remove LH&RH deco guard of tail part [4].  
Remove two screws [1].  
Remove frame base plate [3].



### Installation

Reverse the removal procedures for installation.

# 7 Powertrain System

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## 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	Rear wheel shaft bent	-	-	0.2mm
	Rim runout	Vertical	0.6mm	0.8mm
		Horizontal	0.6mm	0.8mm
	Tire	Residual grooves	-	0.8mm
Pressure		230kPa	-	

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		260kPa	-	

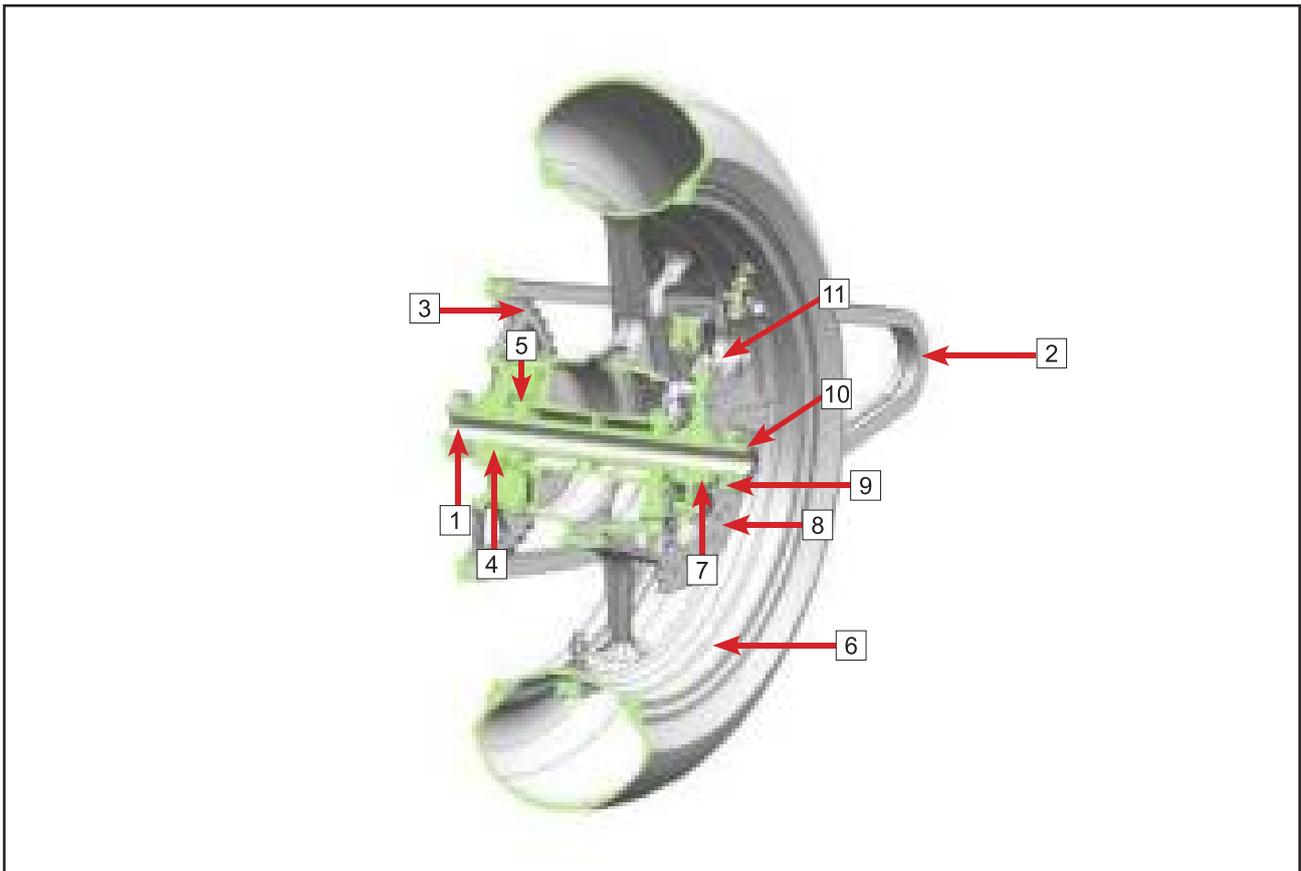
### 7.1.3 Tighten Torque

Rear wheel shaft nut torque: 90N·m

Front wheel shaft tighten screw torque: 50N·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		

#### 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 lower rear fork panel [1]. (see the chapter 06 for details)

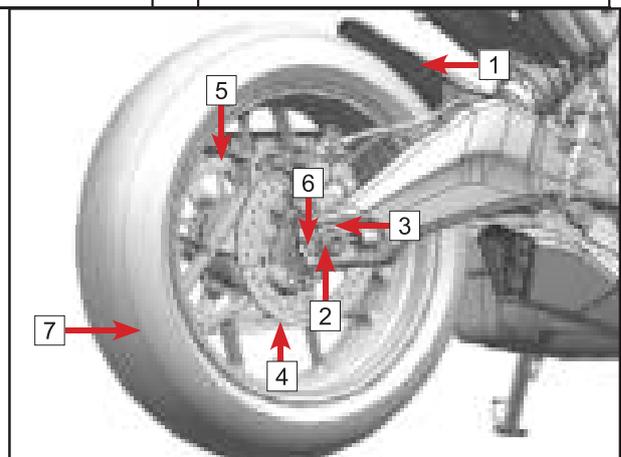
Unscrew the rear wheel shaft nut [2].

Loosen RH chain adjusting block [3].

Remove the chain [5] from the sprocket [4]. (see this chapter for details)

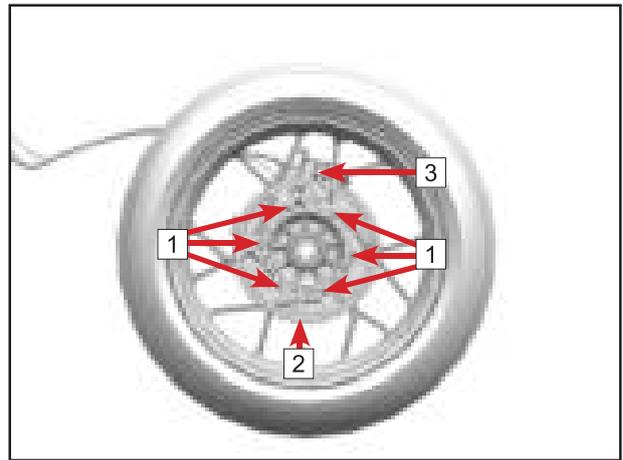
Pull out the rear wheel shaft [6].

Remove rear wheel assembly [7].

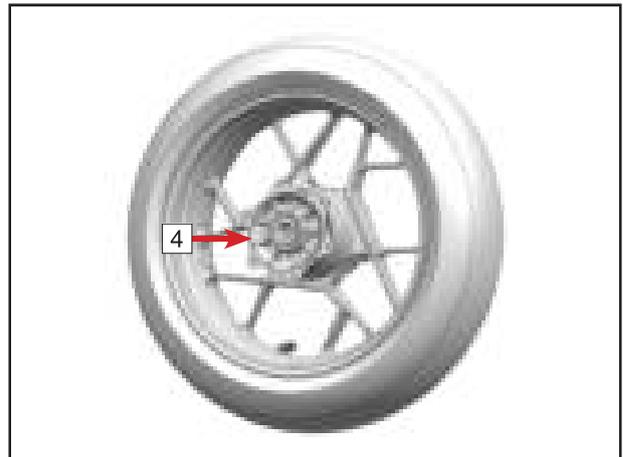


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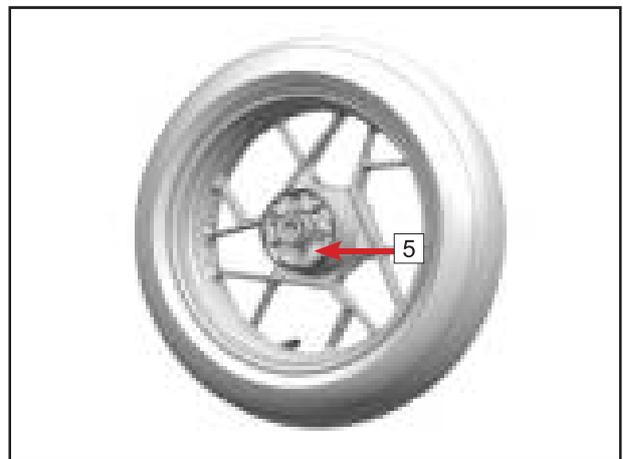
- Remove six screws [1].
- Remove rear sprocket [2].
- Remove rear brake assembly [3].



- 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: 90N·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:**

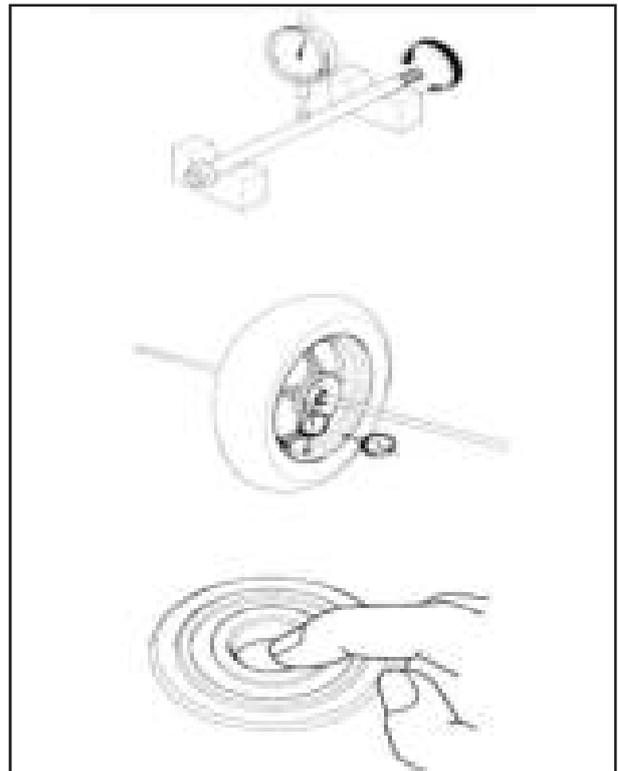
**Horizontal: 0.8mm**

**Vertical: 0.8mm**

Check the rear wheel bearing clearance. If the clearance is too large, replace the bearing.

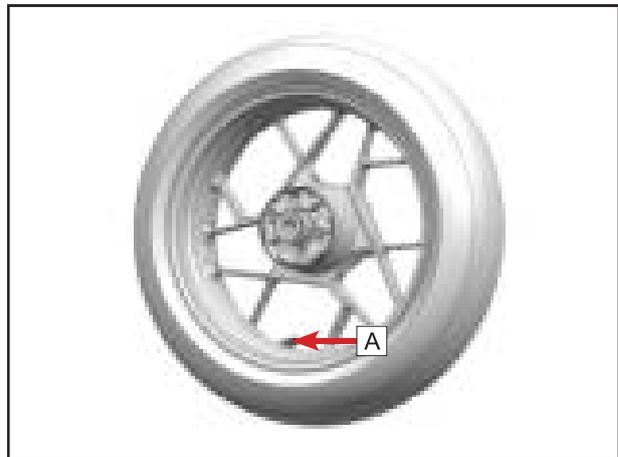
Check the sprocket condition, if the wear is serious or damaged, replace the sprocket or chain.

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.

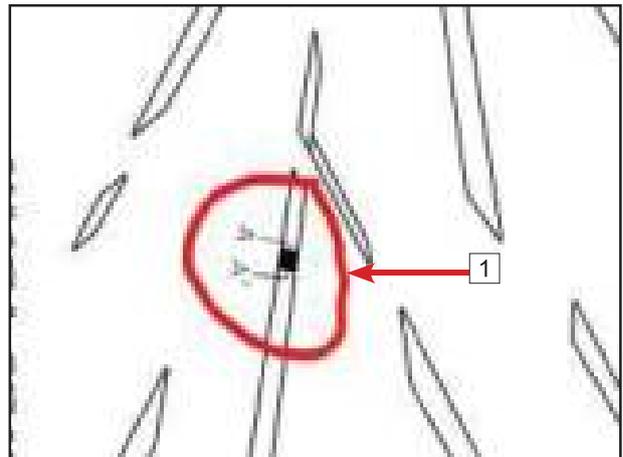
Check tire appearance for expansion or pulge. Expansion or pulge indicates damage inside the tire.

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.



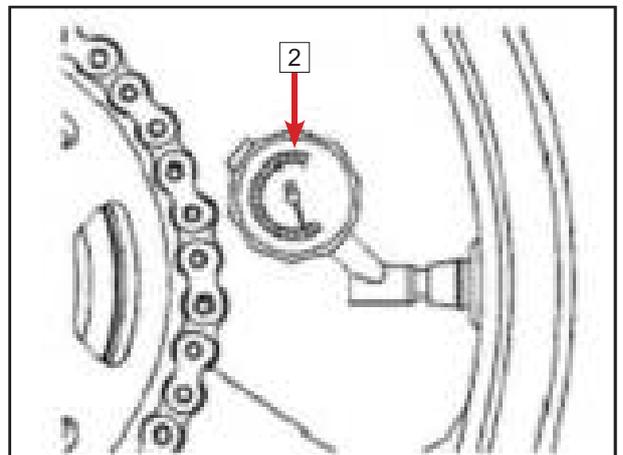
Remove tire inflation valve cap.

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	230kPa
R e a r wheel	260kPa

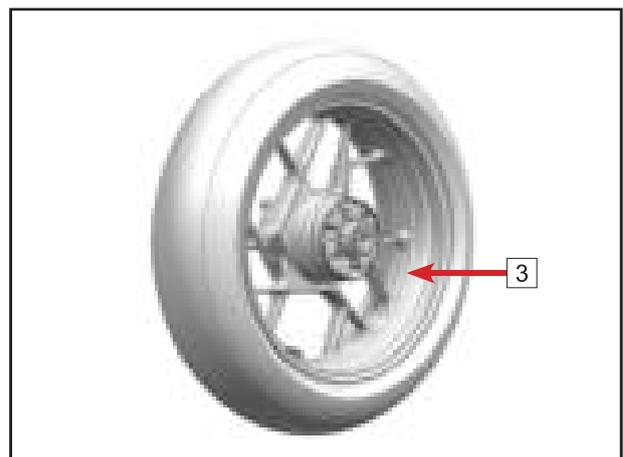
Adjust the tire pressure according to the standard if necessary.

Install tire inflation valve cap.



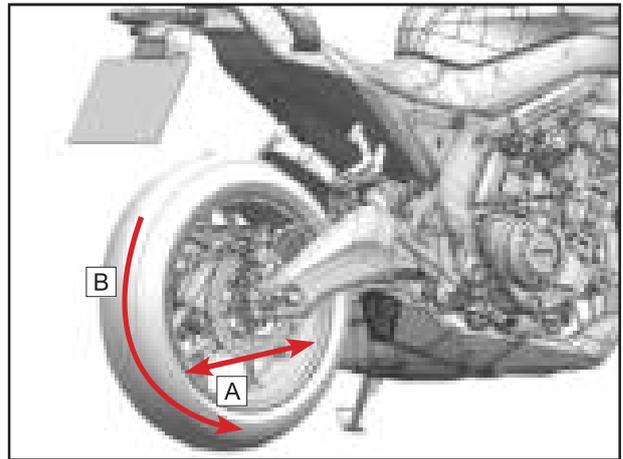
Check the rim 3 for sinking or damage.

When the rim is sunk or broken, check the front or rear wheels thoroughly. Replaced if necessary.



# 7 Powertrain System

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.



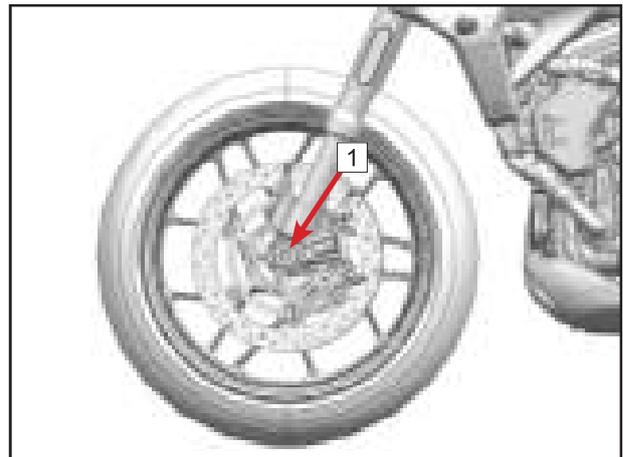
## 7.3 Front Wheel

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, caliper guard (see chapter 06 for details).

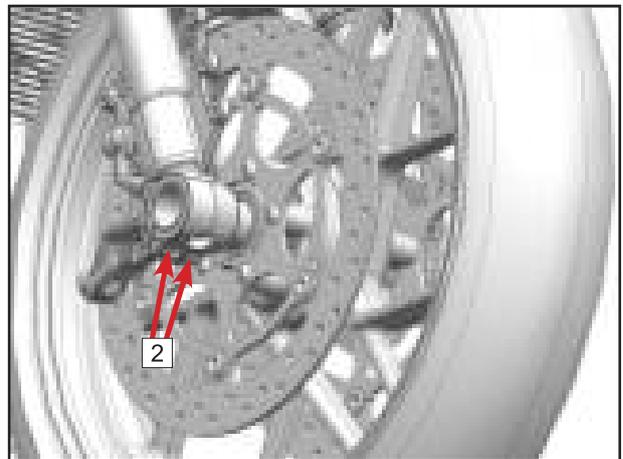
Remove front brake caliper (see chapter 08 Brake System).

Remove front wheel shaft tighten screw [1].



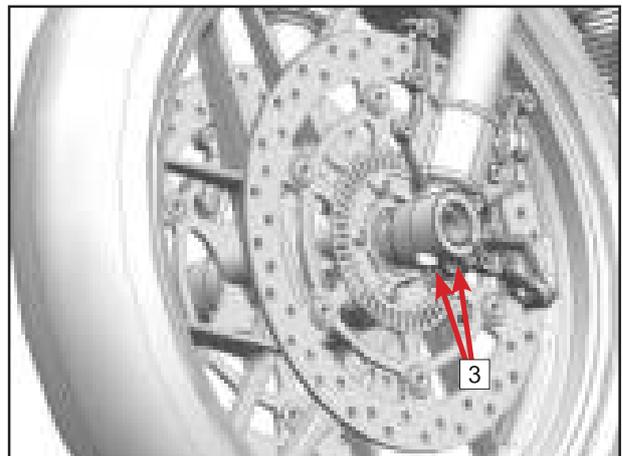
**Screw torque: 50N·m**

Remove front wheel RH screws [2].



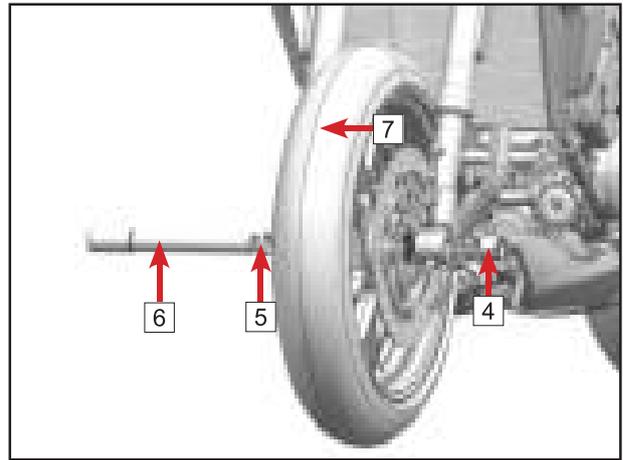
**Screw torque: 20N·m**

Remove front wheel LH screws [3].



**Screw torque: 20N·m**

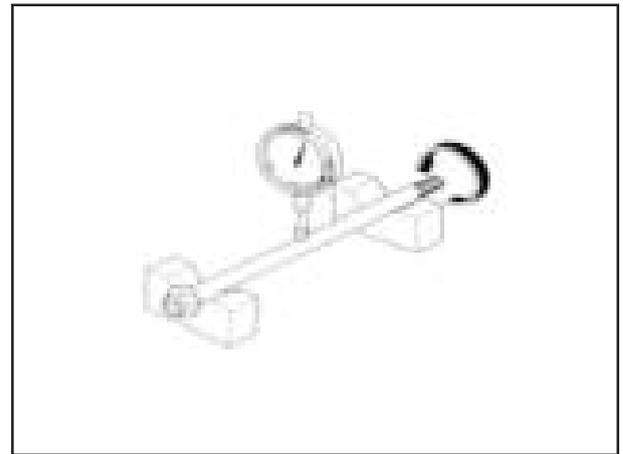
- Remove front wheel shaft [6].
- Remove front wheel LH bushing [4].
- Remove front wheel RH bushing [5].
- Remove front wheel [7].



### 7.3.1 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.

### 7.3.2 Front Wheel Rim Inspection

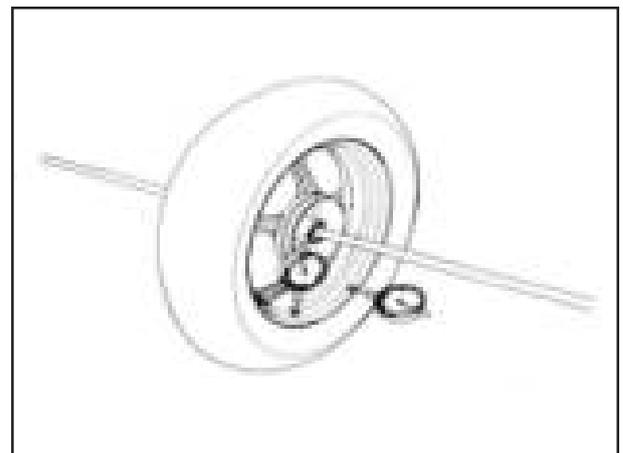
Place the front wheel on the rotating table to check the ring runout.

Use a dial indicator to measure, and rotate the rim to check the rim runout.

**Service limit:**

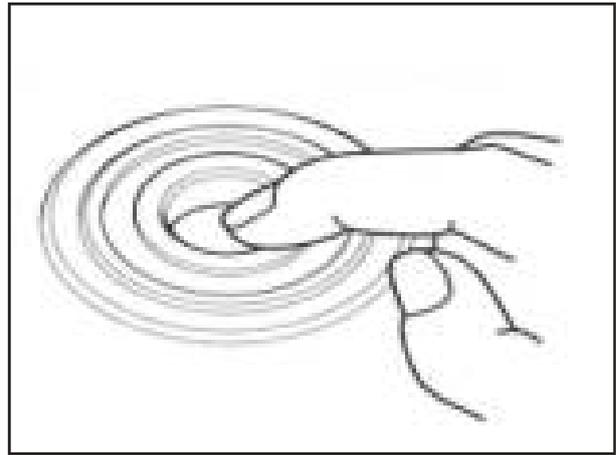
**Axial: 0.8mm**

**Radial: 0.8mm**



## 7 Powertrain System

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.

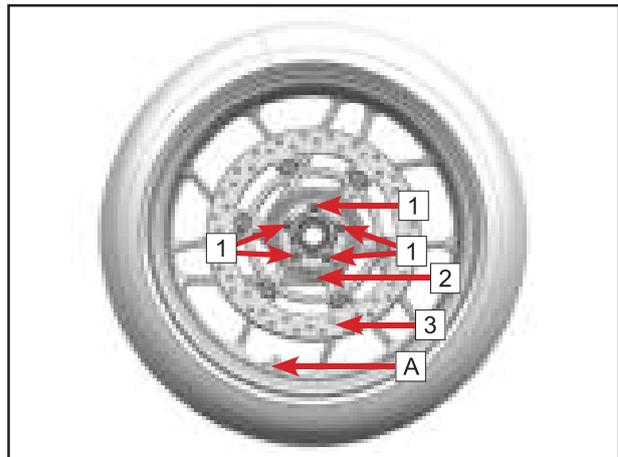


### Brake Disc Removal

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:

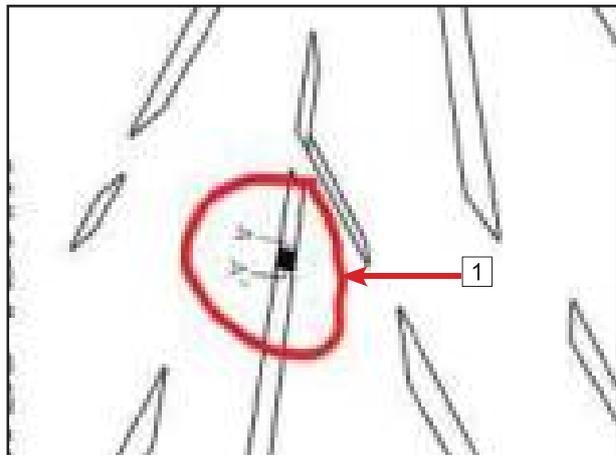
Check tire pressure sensor valve nozzle [A] for damage and leakage. The vehicle uses the tire pressure sensor, if the valve nozzle is broken or the tire pressure display is abnormal, replace the tire pressure sensor with a new one.



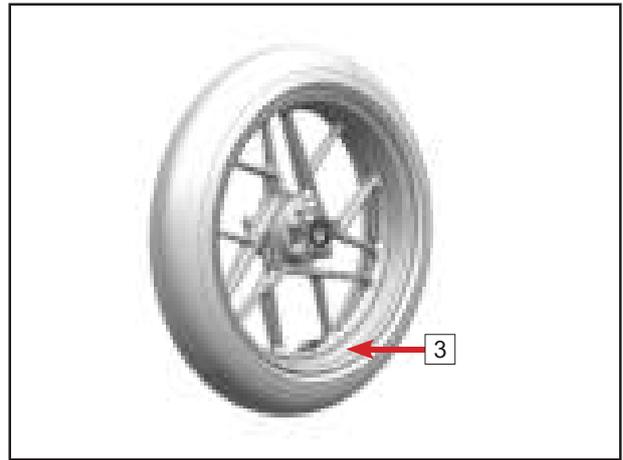
### Inspection

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.

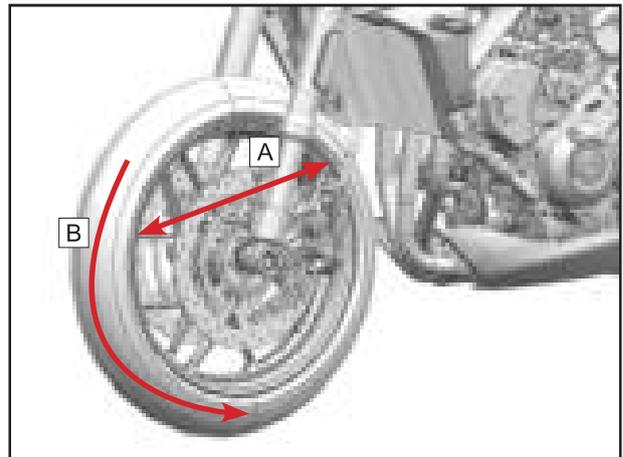
Check the tire for wear. when the tire surface wear exceeds the use limit, it will be punctured and broken. In general, 90% of tire failures occur during the last 10% of tire life.  
Therefore, continued use will cause unsafe factors when the tire surface is worn to the smooth surface.  
When the tire 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 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 front wheel bearing if any issues are found.

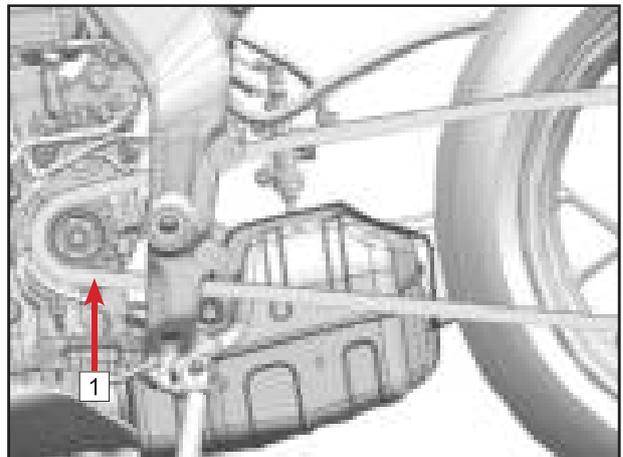


## 7.4 Chain and Sprocket Removal and Installation

### 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)

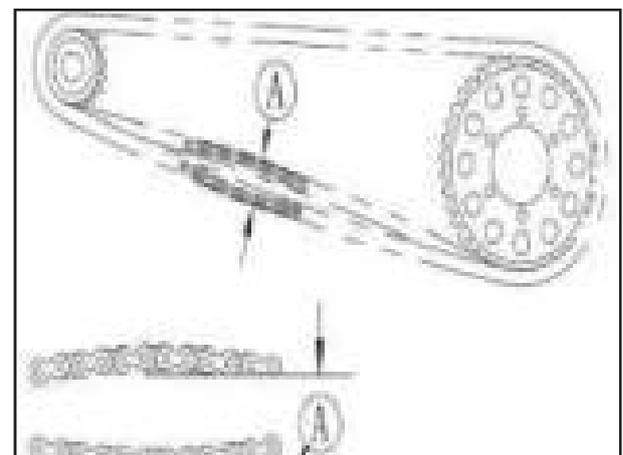


#### Removal

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**

Chain adjustment method:

Loosen rear wheel shaft nut.

Loosen the chain regulator nut and adjust the LH and RH chain regulators so that the scales are the same on both sides.

Rotate the rear wheel and check the chain for looseness.

First lock the regulator nut, then lock the rear wheel shaft nut.

## Installation

Reverse the removal procedures for installation.

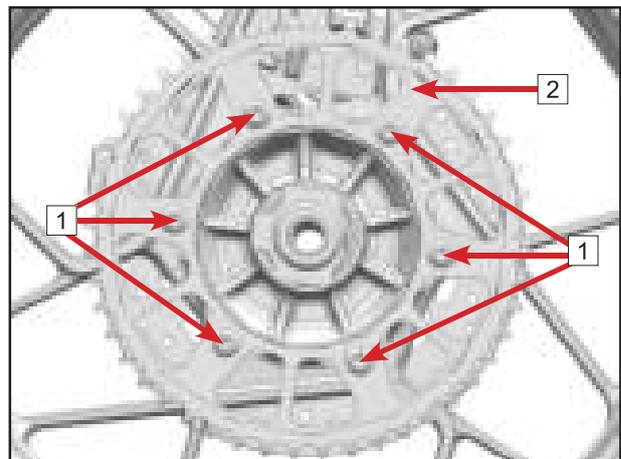
### 7.4.2 Sprocket

#### Removal

Remove rear wheel assembly. (See chapter 07 for details).

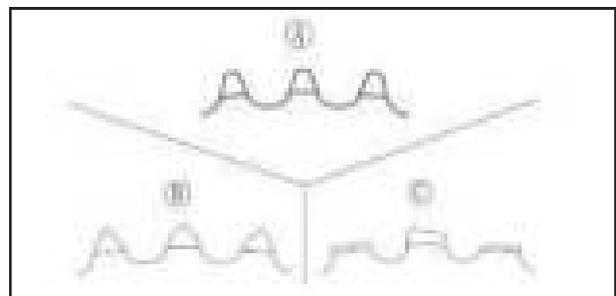
Remove six screws **1**.

Remove sprocket **2**.



#### Inspection

Check whether the sprocket gear is complete and replace it if not complete.



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.

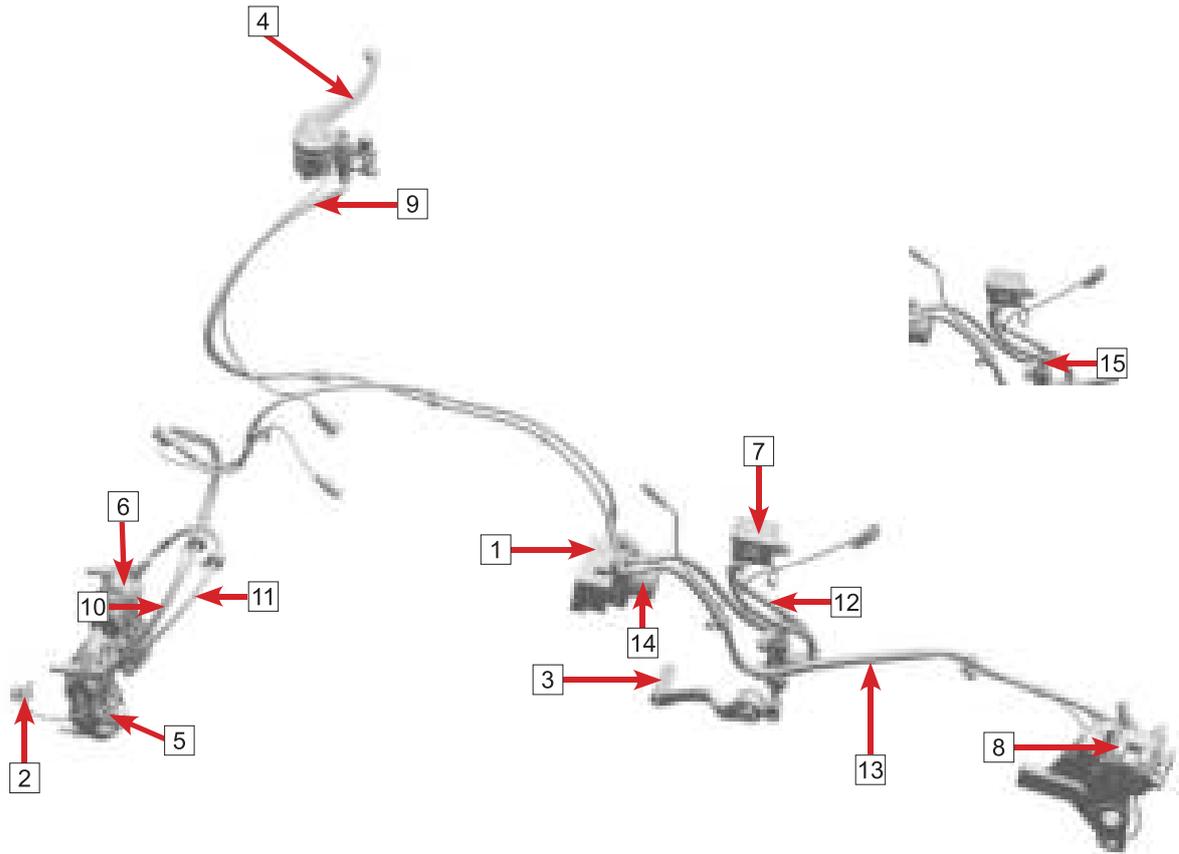
#### Installation

Reverse the removal procedures for installation.



<b>8.1 Brake System View.....</b>	<b>8-2</b>
<b>8.2 Brake Noise Troubleshooting.....</b>	<b>8-3</b>
<b>8.3 Brake Caliper .....</b>	<b>8-3</b>
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8.3.2 Rear Brake Caliper and Rear Wheel .....	8-4
<b>8.4 Brake Disc .....</b>	<b>8-6</b>
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<b>8.5 Brake Fluid .....</b>	<b>8-7</b>
<b>8.6 Handbrake Master Cylinder .....</b>	<b>8-9</b>
<b>8.7 Rear Brake Master Cylinder.....</b>	<b>8-9</b>
<b>8.8 ABS System Removal and Installation.....</b>	<b>8-10</b>

## 8.1 Brake System View



1	MAB hydraulic brake assembly	2	Front wheel speed sensor	3	Rear brake pedal assembly
4	Hand brake pump	5	Front LH brake caliper assembly	6	Front RH brake caliper assembly
7	Rear brake master pump assembly	8	Rear brake caliper assembly	9	Front brake outlet hose
10	Front brake inlet hose	11	Front brake lower hose	12	Rear brake outlet hose
13	Rear brake inlet hose	14	Rear brake switch	15	Long banjo bolt

## 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

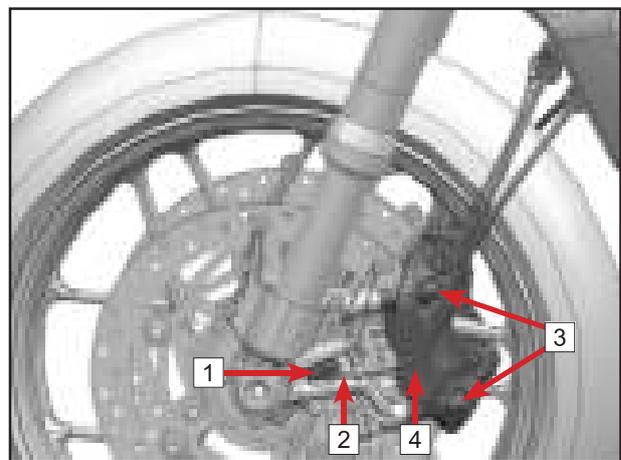
Remove front fender. (see chapter 06 for details)

Remove screw [1].

Remove speed sensor [2].

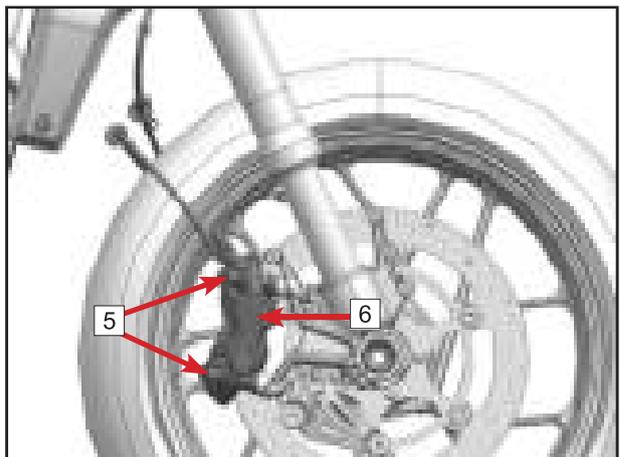
Remove two screws [3].

Remove front LH brake caliper [4].



Remove two screws [5].

Remove front RH brake caliper [6].



#### Installation

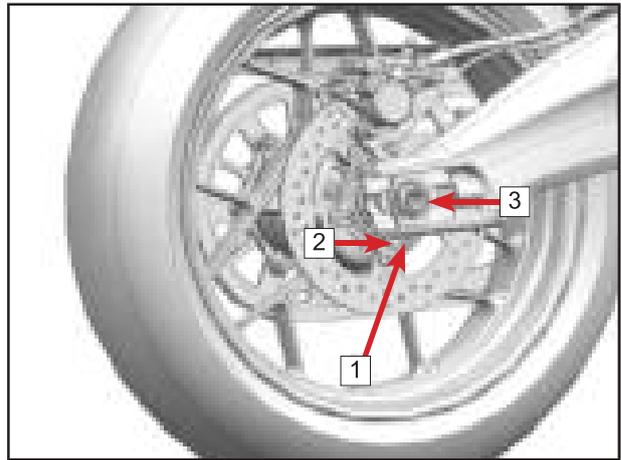
Reverse the removal procedures for installation.

## 8.3.2 Rear Brake Caliper and Rear Wheel Removal

Remove the hex flange bolt **1**.

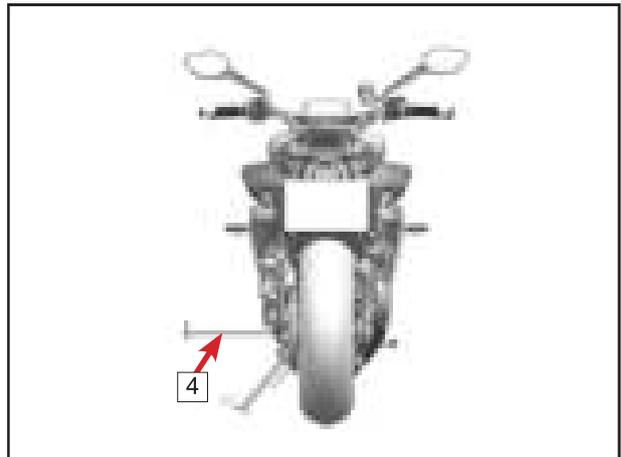
Remove wheel speed sensor **2**.

Remove rear wheel shaft nut **3**.



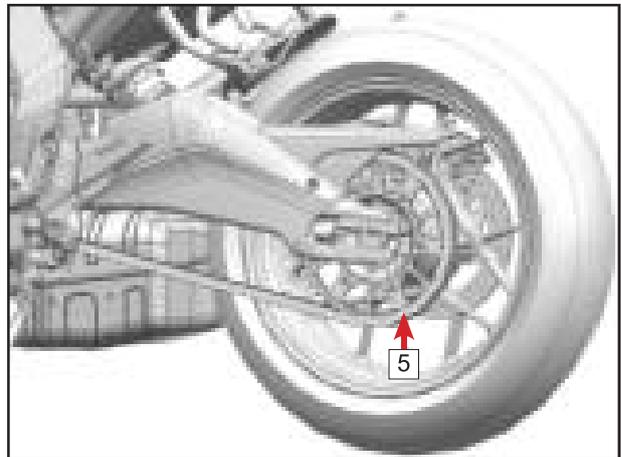
Pull out rear wheel shaft **4**.

Prevent loss of chain tensioner on both sides.



Push the rear wheel forward to loosen the chain.

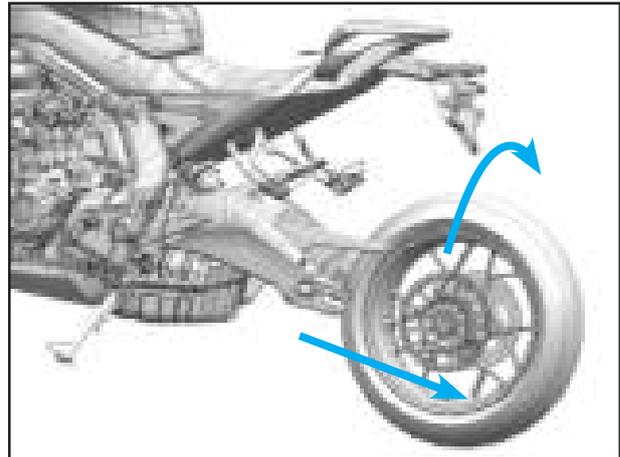
Remove the chain **5** from rear sprocket.



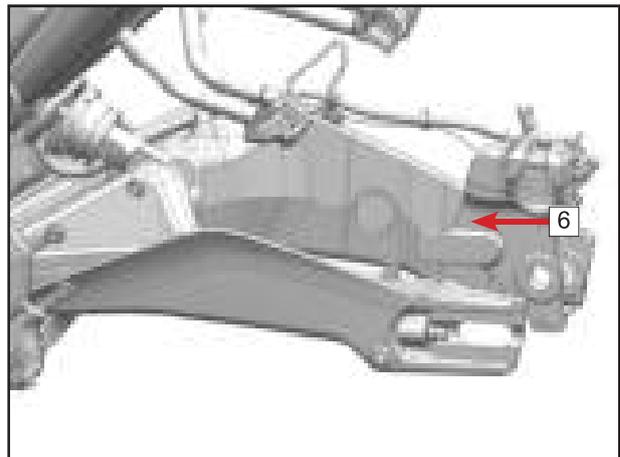
Remove rear wheel.

**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  $A \geq 1\text{mm}$ ;

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

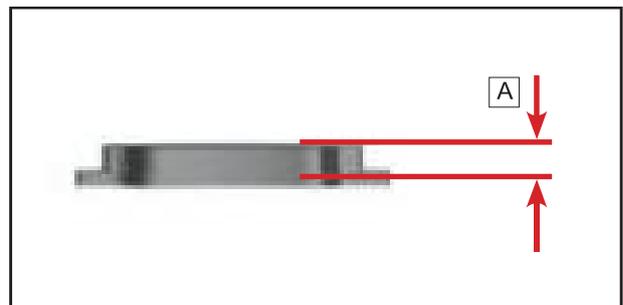
Brake pad damage will reduce braking effect, which can cause accidents. If the brake pad is too thin, steel bracket will rub the brake disc, which will severely reduce the braking effect and damage the brake disc. Inspect brake pad periodically.

### 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.

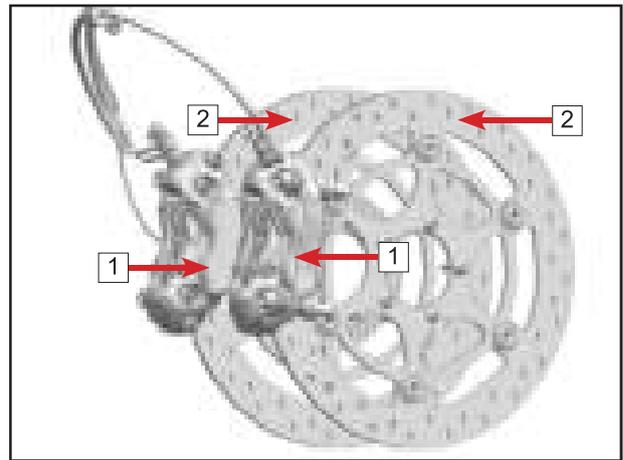
## 8.4 Brake Disc

### 8.4.1 Front Brake Disc

#### Removal

Remove brake caliper [1] (see this chapter).

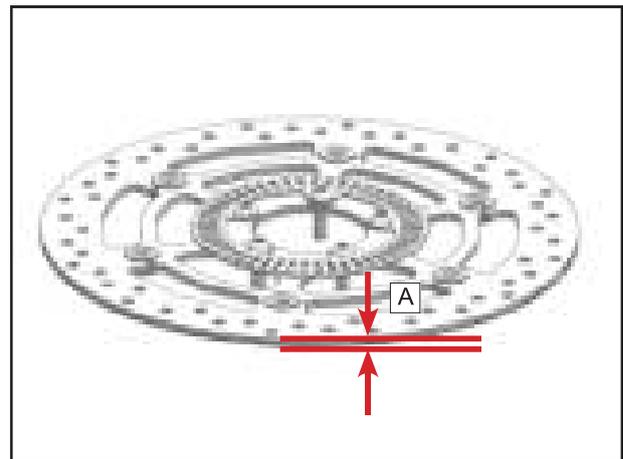
Remove brake disc [2].



#### 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

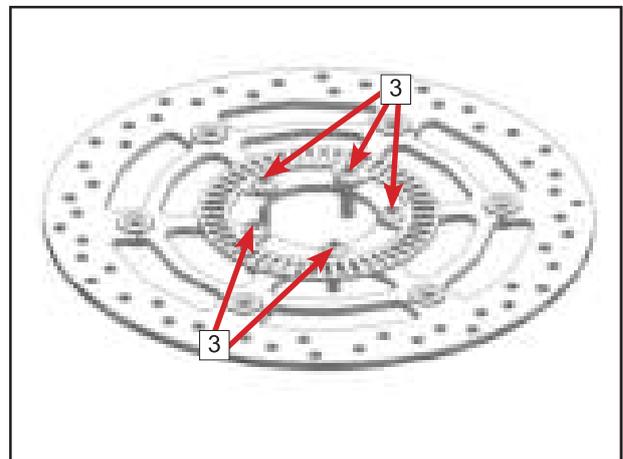
Remove five front brake disc inner hex bolts [3].

Replace brake disc and install front brake disc inner hex bolts.

**Front brake disc bolt tighten torque:  
25N•m~35N•m**

#### Installation

Reverse the removal procedures for installation.



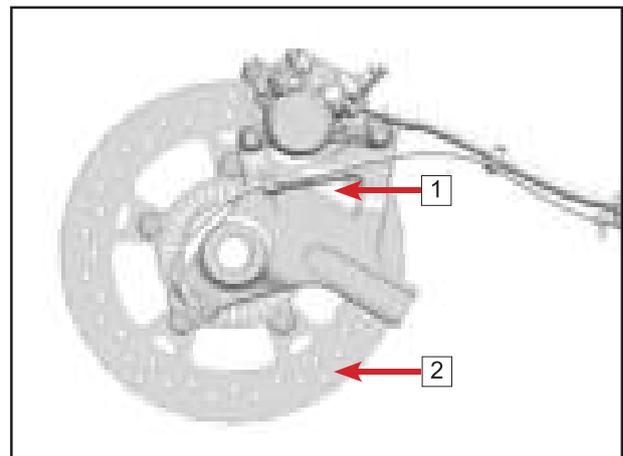
### 8.4.2 Rear Brake Disc

#### Removal

Remove rear wheel (see chapter 9).

Remove brake caliper [1] (see this chapter).

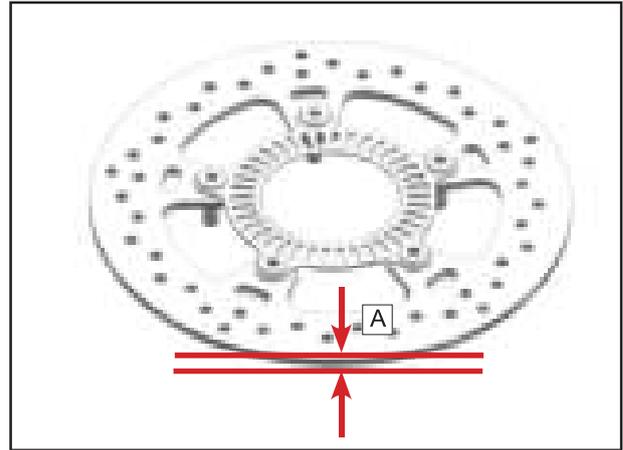
Remove brake disc [2].



## 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

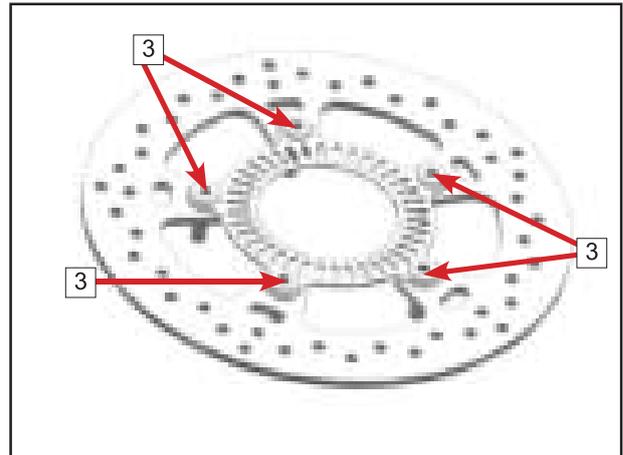
Remove four rear brake disc inner hex bolts [3].

Replace brake disc and install rear brake disc inner hex bolts.

**Rear brake disc inner hex bolt tighten torque:  $25\text{N}\cdot\text{m} \sim 35\text{N}\cdot\text{m}$**

## 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.

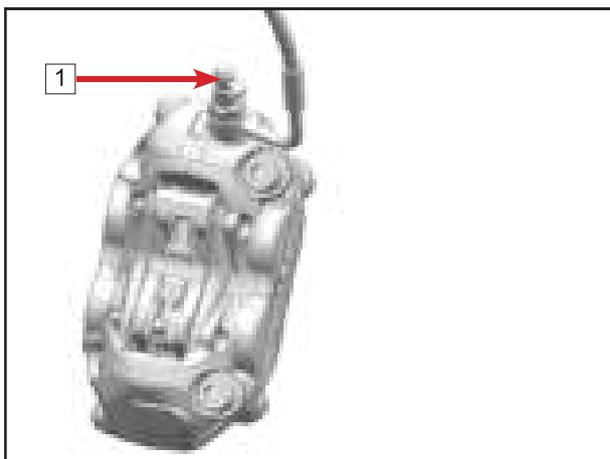
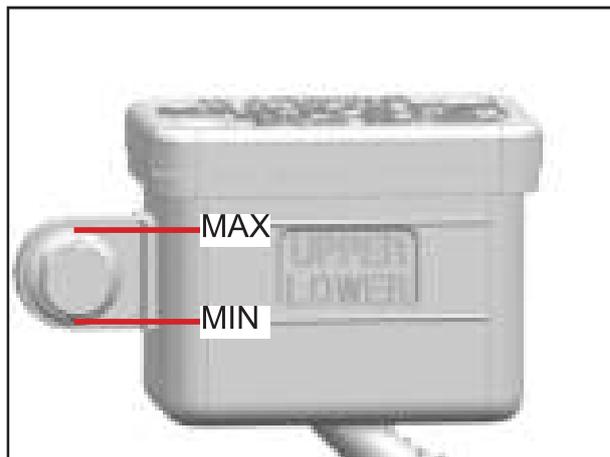
## NOTE

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.

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.

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.

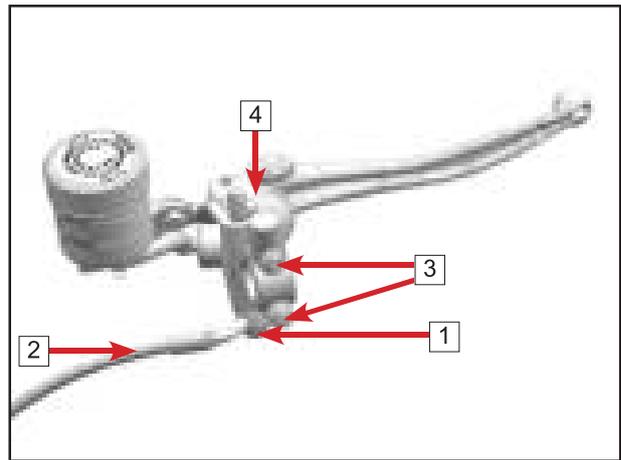
## Installation

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.

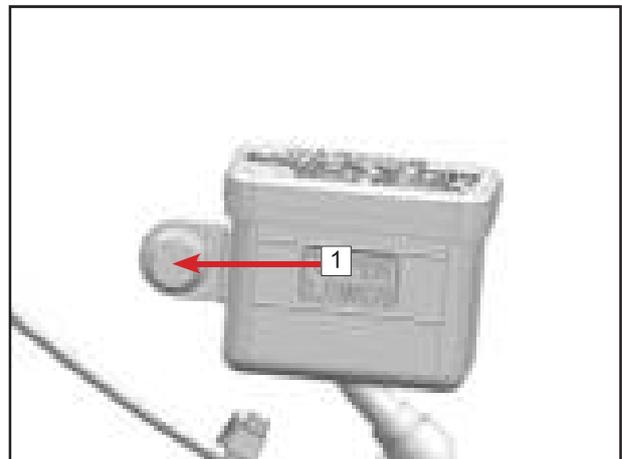
## 8.7 Rear Brake Master Cylinder

### Pre-work

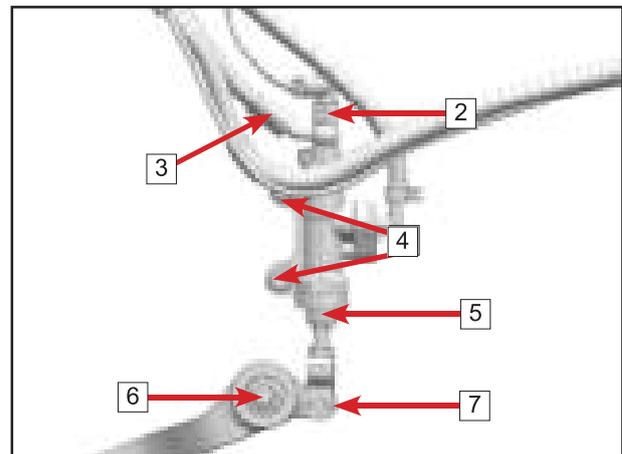
Remove RH footrest. (see chapter 06 for details)

### 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.

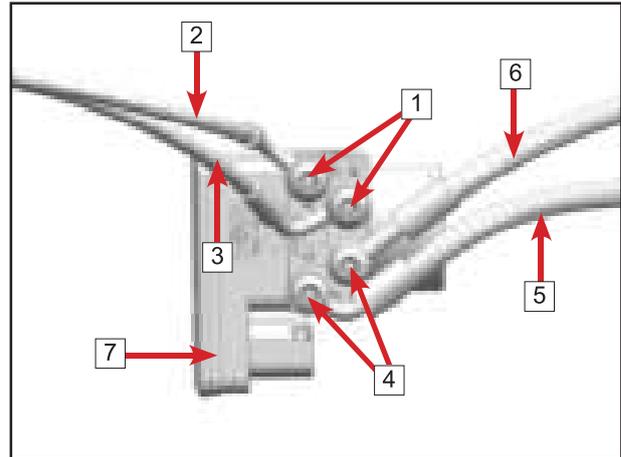
### Installation

Reverse the removal procedures for installation.

## 8.8 ABS System Removal and Installation

### Removal

- Remove two oil pipe bolts [1].
- Remove front brake inlet hose [2].
- Remove front brake outlet hose [3].
- Remove two oil pipe bolts [4].
- Remove rear brake inlet hose [5].
- Remove rear brake outlet hose [6].
- Remove ABS controller [7].



### 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 Front LH Footrest Bracket Panel .....	9-3
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9.6 Rear Shock Absorber Inspection.....	9-6

## 9.1 Front Shock Absorber

### Pre-work

Remove front fender and front caliper LH and RH deflector. (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 bolt [1].

**Bolt torque: 20N·m~30N·m**

Remove two screws [2].

Remove front LH shock absorber [3].

### Inspection

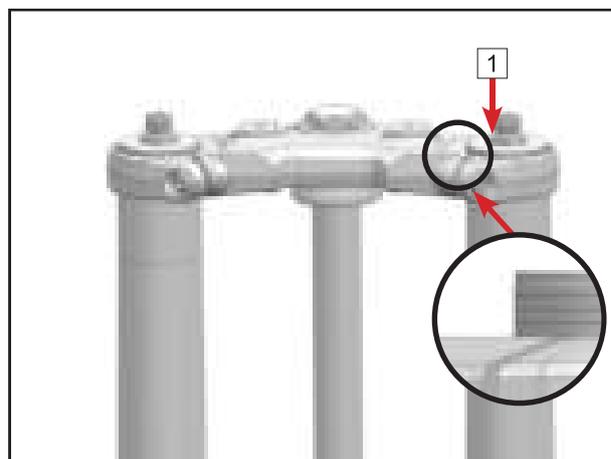
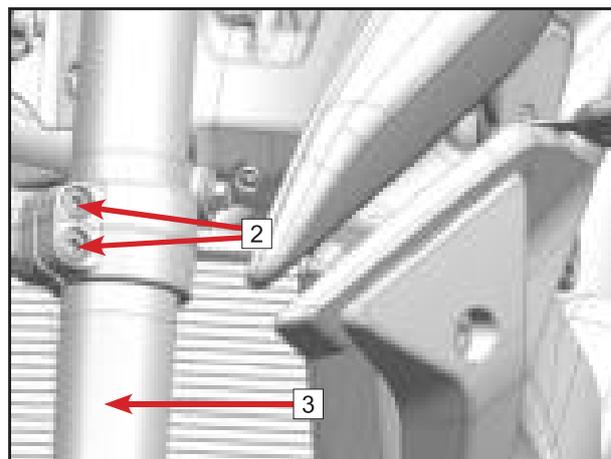
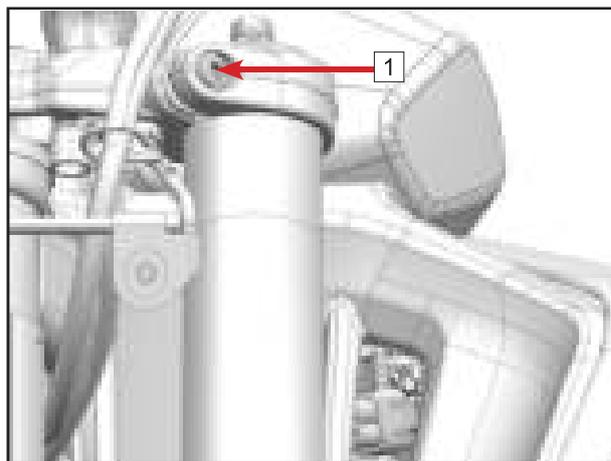
Check whether the appearance of front shock absorber is damaged, cracked and other damages. If so, replace the parts.

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.

### Adjustment

The shock absorber has been adjusted to the best condition when the vehicle leaves the factory, and is suitable for most situations.

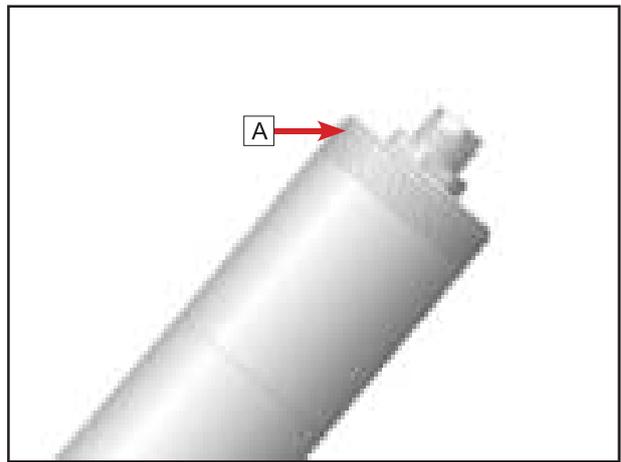


### ⚠ CAUTION

When installing front shock absorbers, ensure that the inner tubes upper ends [1] of two front shock absorbers are flush, and that the scales number exposed on the inner tubes upper ends of front shock absorbers should be the same.

### Installation

Reverse the removal procedures for installation. The shock absorber needs to be exposed to the highest scale **A**.

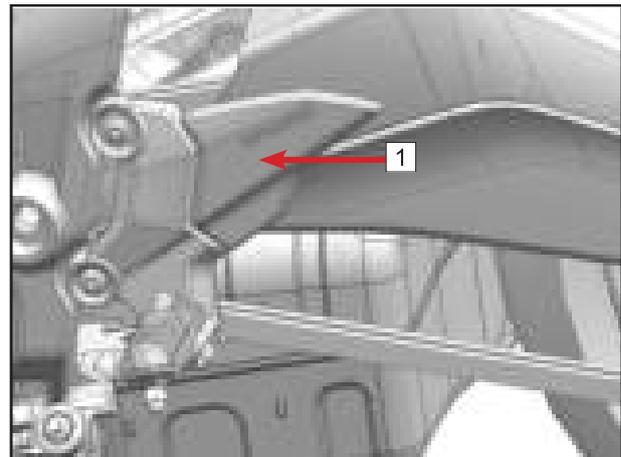


The front RH shock absorber is disassembled and installed in the same way as the front LH shock absorber.

### 9.2 Front LH Footrest Bracket Panel

#### Removal

Remove front LH footrest bracket panel **1**.



#### Installation

Reverse the removal procedures for installation.

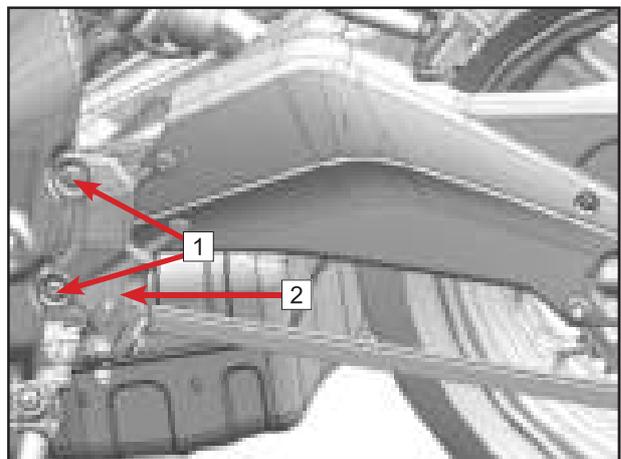
The front RH footrest bracket pedal is disassembled and installed in the same way as the front LH footrest bracket pedal.

### 9.3 Front LH Footrest Bracket

#### Removal

Remove two screws **1**.

Remove front LH footrest bracket **2**.



**Screw torque: 25N·m**

#### Installation

Reverse the removal procedures for installation.

The front RH footrest bracket is disassembled and installed in the same way as the front LH footrest bracket.

## 9.4 Rear Shock Absorber

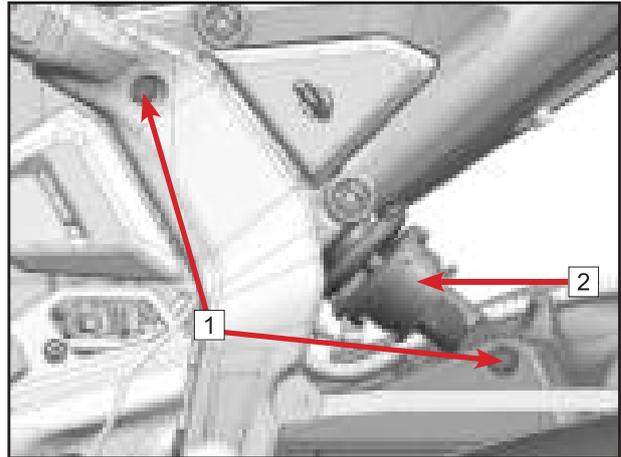
### Pre-work

Remove rear fork panel [1]. (see chapter 06 for details)

### Removal

Remove bolts [1].

Remove rear shock absorber [2].



**Bolt torque: 60N·m~70N·m**

### Installation

Reverse the removal procedures for installation. Adjust the damping to the left of vehicle.

## 9.5 Rear Fork

### Pre-work

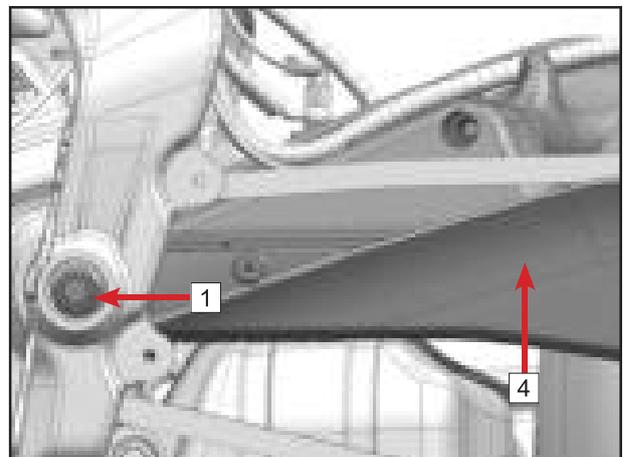
Remove chain adjusting block, rear wheel shaft nut, rear wheel shaft and rear wheel. (see chapter 07 Powertrain System for details)

Remove rear shock absorber and frame LH panel. (see chapter 06 for details)

### Removal

Remove nut [1].

**Nut torque: 95N·m~105N·m**



Remove lock nut [2].

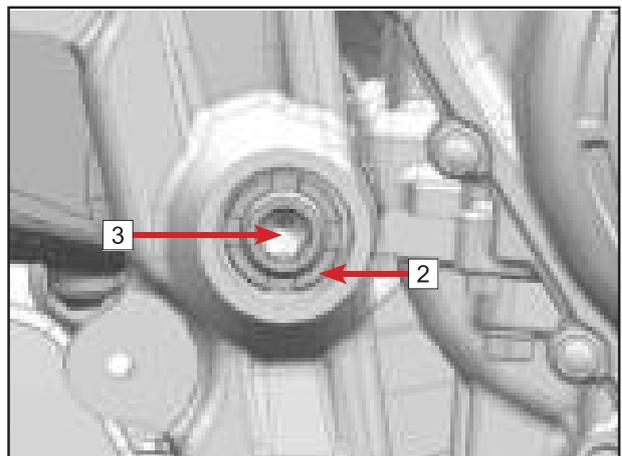
**Lock nut torque: 95N·m~105N·m**

Remove rear fork shaft [3].

Remove rear fork [4].

### Installation

Reverse the removal procedures for installation.



### 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 (S direction) and record the number of times to reduce the rebound damping. Use a flat-head screwdriver to rotate the gear clockwise (H 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 clockwise (H direction) to the minimum, counter-clockwise (S direction) to the shock absorber 10 gear.

**Contact the engineer to adjust the damping. Do not adjust it yourself.**

### Compression Damping Adjustemnt

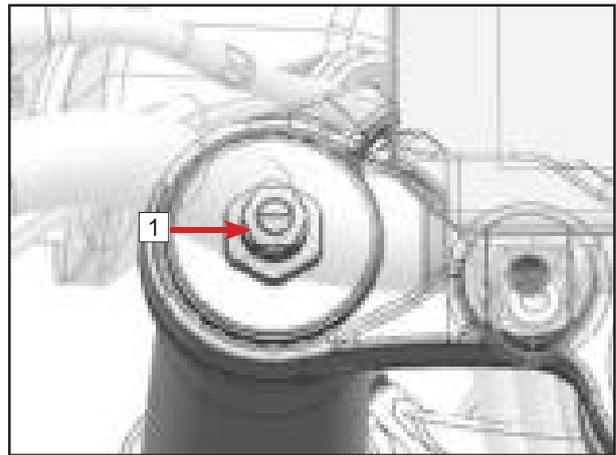
The compression damping end is inscribed with COMP.

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

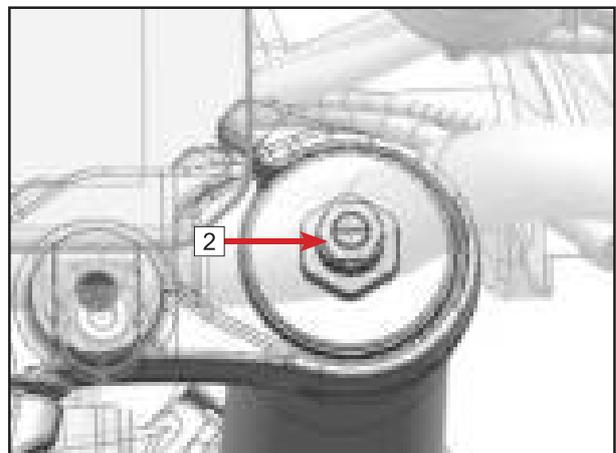
Total gear: 20 gear  $\pm$  2 gear

Use a flat-head screwdriver to rotate the gear counterclockwise (S direction) and record the number of times to reduce compression damping. Use a flat-head screwdriver to turn the gear clockwise (H direction) and record the number of times to increase the compression damping.



Shock absorber oil: OILNO-00M01

Shock absorber oil capacity:  
450mL $\pm$ 2mL



Shock absorber oil: OILNO-00M01

Shock absorber oil capacity:  
450mL $\pm$ 2mL

Turn clockwise until it does not move, counterclockwise back to a gear is first gear.

Reverse rotation according to the recorded rotation numbers to restore the factory settings. Or rotate clockwise (H direction) to the minimum, counter-clockwise (S direction) to the shock absorber 10 gear.

**Contact the engineer to adjust the damping. Do not adjust it yourself.**

## 9.6 Rear Shock Absorber Inspection

### Inspection

Check whether the appearance of rear shock absorber is damaged, cracked. If so, replace the parts.

Clean the dust and mud on the rear shock absorber.

Press down on the seat several times to check whether the compression and rebound of rear shock absorber is normal.

### Adjustment

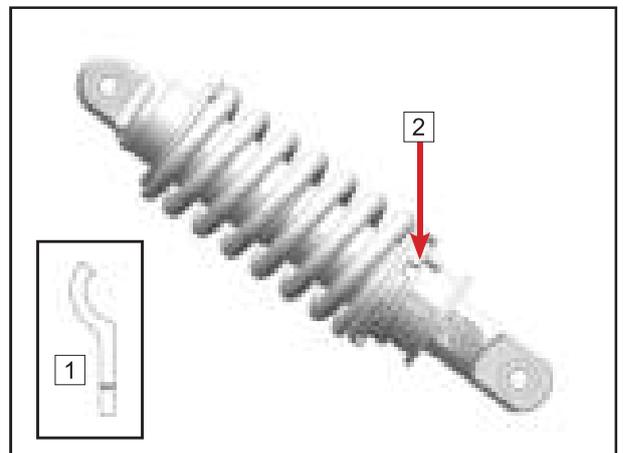
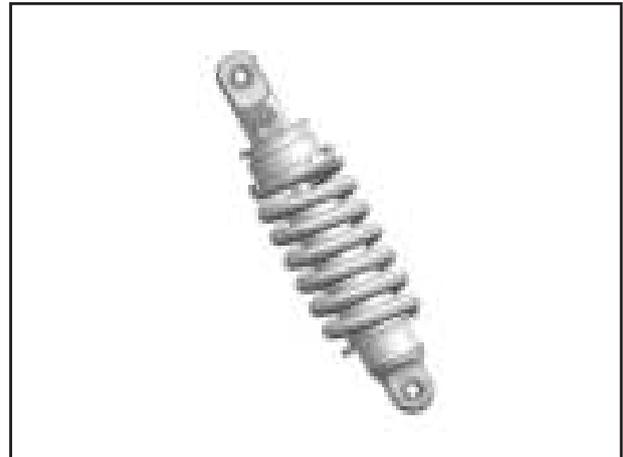
The rear shock absorber spring preload can be adjusted to suit the rider's weight and riding conditions.

### Adjust the spring preload by following these steps:

Adjust the rear shock absorber spring preload to adapt to different road conditions and riding needs.

Initial gear: 4 gear

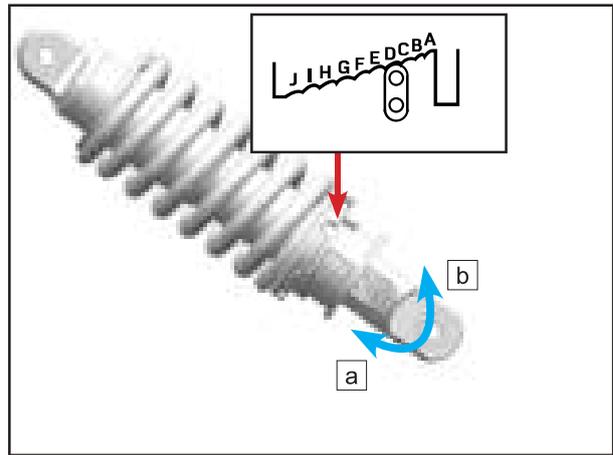
Total gear: 10 gear



Adjust the spring preload by turning the spring seat **2** with the shock absorber adjusting wrench **1**.

Use the wrench **1** to turn the adjusting seat **2** in the direction **a** to reduce the spring preload.

Use the wrench **1** to turn the adjusting seat **2** in the direction **b** to increase the spring preload.



### NOTE

The shock absorber has been adjusted to the best condition when the vehicle leaves the factory, and is suitable for most situations.

### 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.**

### 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.

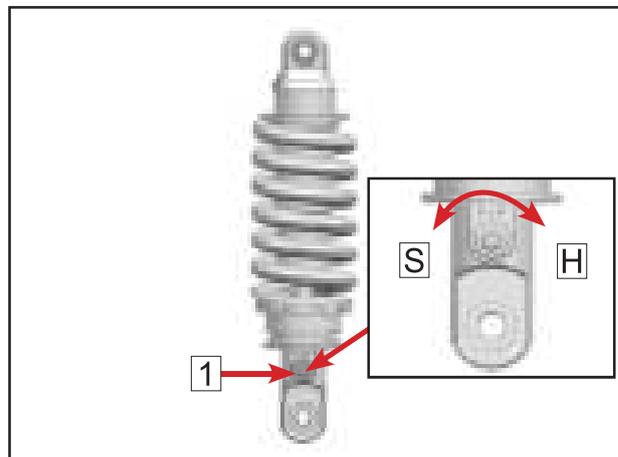
Initial gear: 10 gear

Total gear: 20 gear  $\pm$  2 gear

Adjust the Angle as shown on the right.

Turn the adjusting knob clockwise (H direction) to rotate the gear and record the number of times to increase the rebound damping.

Turn the adjusting knob counterclockwise (S 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 (H direction) to the minimum, counter-clockwise (S direction) to the shock absorber 10 gear.

**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.

## STEERING DAMPER ADJUSTMENT

Steering damper helps to increase the stability when riding the motorcycle. When riding along the turning road, the steering damper will provide the damping force to prevent the turning angle too large to meet the dangerous situation. When the wheels hit a pothole on the road and cause the front wheels to wobble, the steering damping quickly stops the wheels from wobbling.

Factory setting: 10                      Total available settings:  $24 \pm 2$

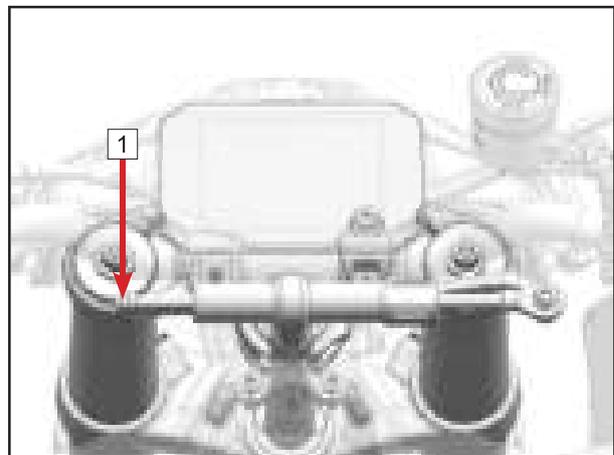
Manually rotate the adjuster **1**, clockwise (“+” direction) rotate the gear and record the number of clicks to increase damping.

Manually rotate the adjuster **1**, counterclockwise (“-” direction) rotate the gear and record the number of clicks to decrease damping.

### Steering Damper Restore Factory Setting

Fully rotate the adjuster back from the recorded clicks to restore the factory setting. Or rotate the adjuster counterclockwise (- direction) to the end, and then rotate it clockwise (+ direction) to the 10<sup>th</sup> click

Contact your CFMOTO authorized dealer to adjust the steering damper. Please do not adjust it without having proper knowledge of the effects of such an adjustment.

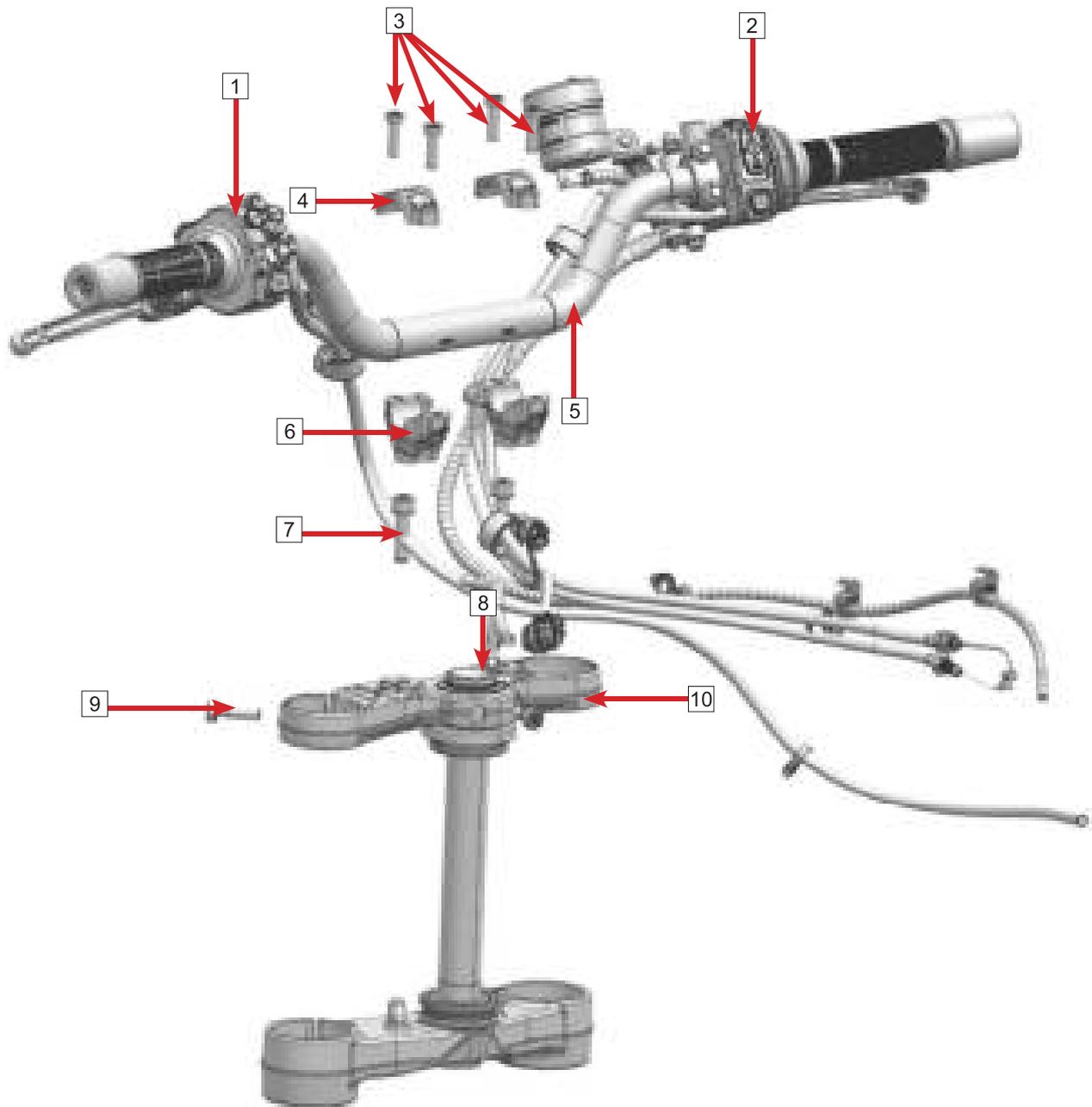


# 10 Steering System

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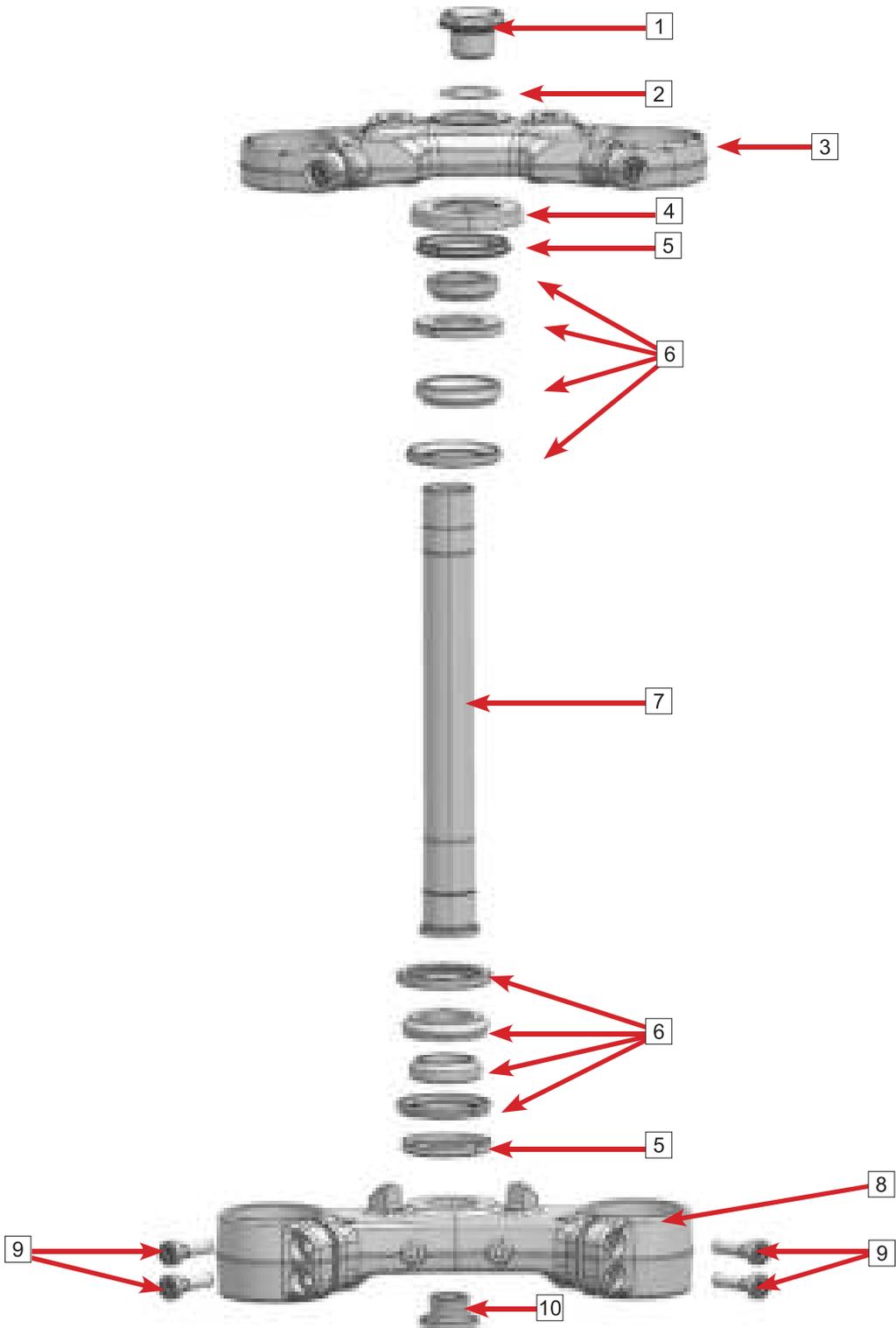
- 10.1 Exploded View ..... 2
- 10.2 Upper&Lower Triple Clamp Assembly ..... 3
  - 10.2.1 Upper Triple Clamp Assembly ..... 4
  - 10.2.2 Front Fork and Lower Triple Clamp Assembly ..... 5
- 10.3 Throttle Grip..... 6
- 10.4 Handlebar Service ..... 7
  - 10.4.1 Handlebar Interference Inspection ..... 7

## 10.1 Exploded View



1	LH handlebar switch assembly	2	RH handlebar switch assembly	3	Inner hex bolt	4	Handle bar upper press cover
5	Handlebar	6	Handle bar mounting seat	7	Bolt	8	Upper triple clamp tighten screw
9	Hexagon socket head cap screw	10	Upper triple clamp assembly				

10.2 Upper&Lower Triple Clamp Assembly



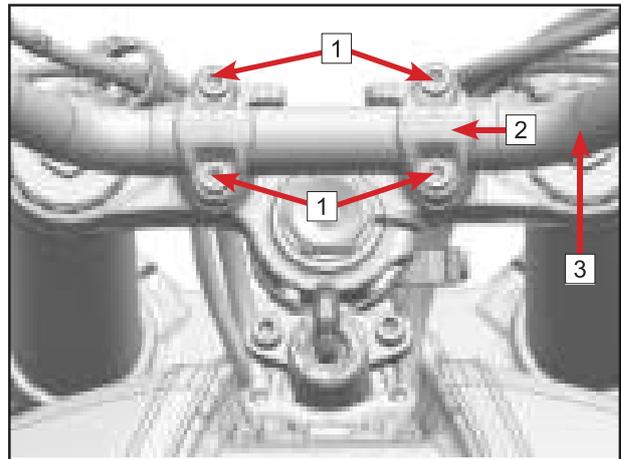
1	Upper triple clamp tighten screw	2	Gasket	3	Upper triple clamp	4	Anti-dust cap
5	Anti-dust ring assembly	6	Steering bearing assembly	7	Front fork pipe	8	Lower triple clamp
9	Hexagon socket head cap screw	10	Front fork pipe plug				

## 10.2.1 Upper Triple Clamp Assembly Removal

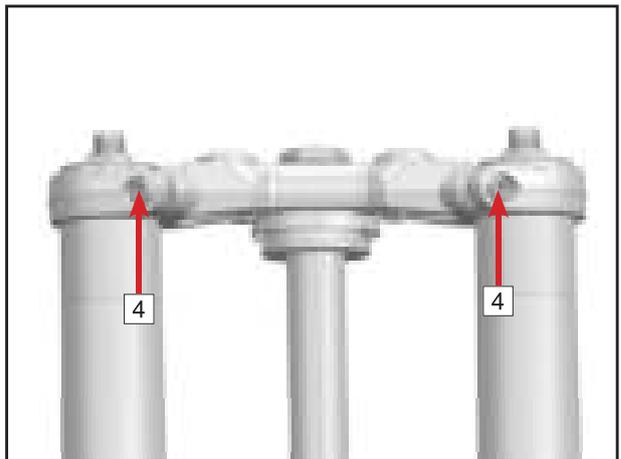
Remove inner hex bolts **1**.

Remove handlebar press cover **2**.

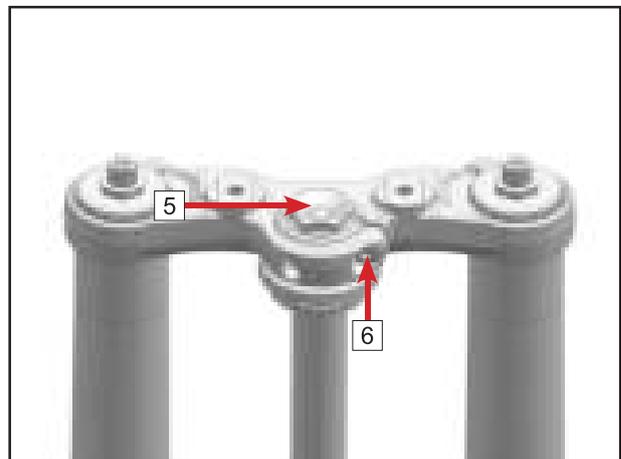
Remove handlebar pipe **3**.



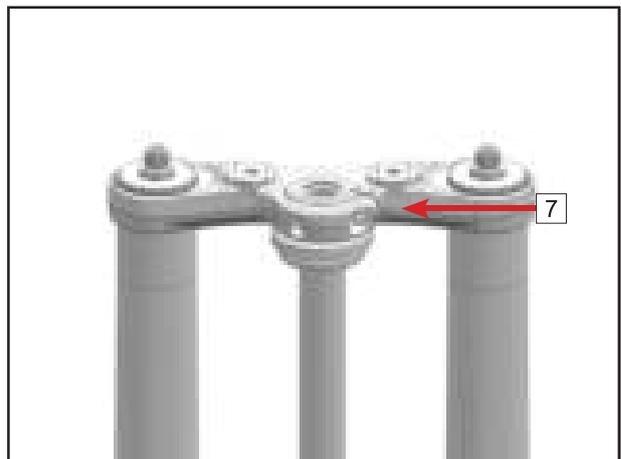
Remove shock absorber tighten bolts **4** of upper triple clamp.



Remove nut **5**.  
Remove bolt **6**.



Remove upper triple clamp **7**.



## Installation

Reverse the removal procedures for installation.

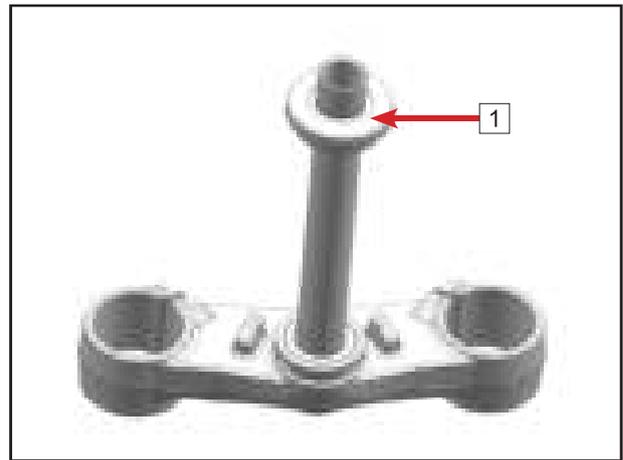
## 10.2.2 Front Fork and Lower Triple Clamp Assembly

### Pre-work

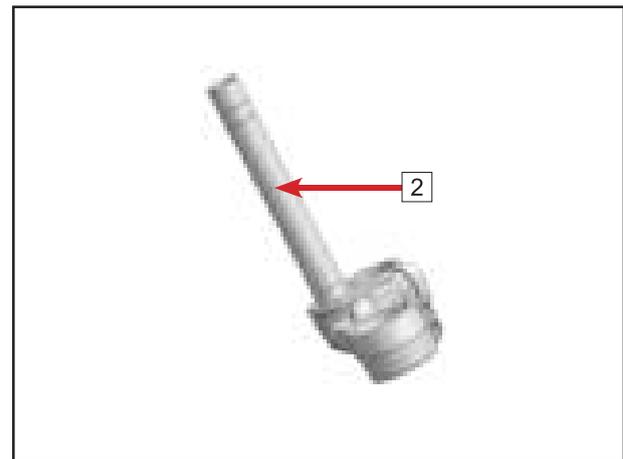
Remove front LH&RH shock absorber. (see chapter 09 Suspension System)

### Removal

Remove anti-dust cover and anti-dust ring assembly **1**.



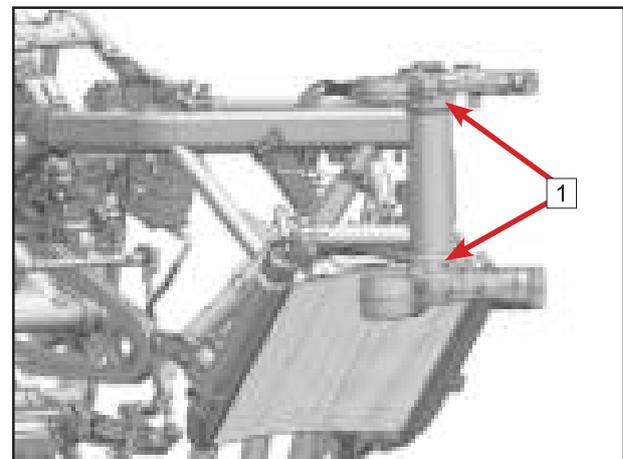
Remove lower triple clamp front fork pipe assembly **2**.



### Inspection

Check upper&lower steering bearing assembly **1** for completeness or wear. Replace in time if it does.

Check whether the bearing steel bowl has cracks or abnormal wear. Replace in time if it does.



### Installation

Reverse the removal procedures for installation.

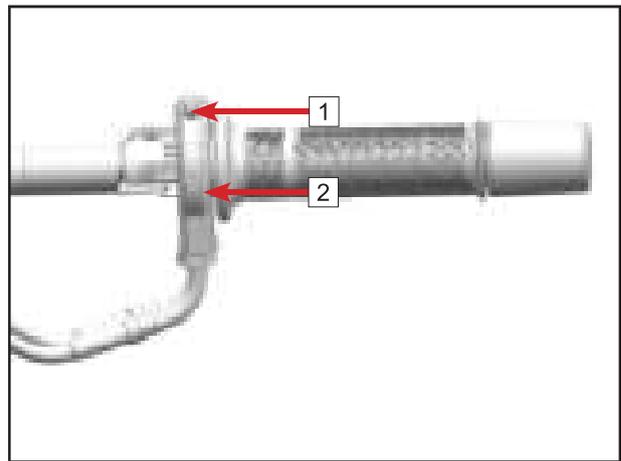
**Upper triple clamp tighten screw torque: 20 N•m**

NOTE
When installing and replacing, apply sufficient grease in the bearing steel bowl.

## 10.3 Throttle Grip

Remove bolt **1**.

Separate throttle seat upper cover **2**.

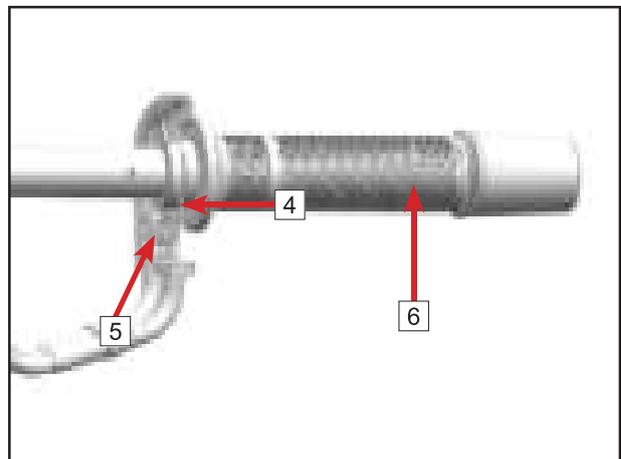
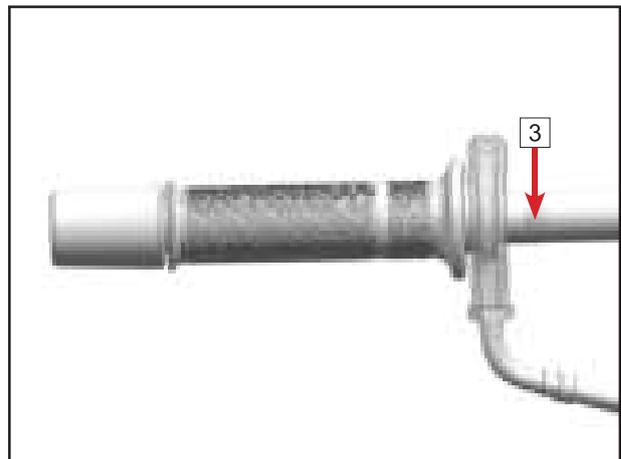


Remove self-tapping screw **3**.

Separate throttle wire throttle seat **4**.

Remove throttle seat lower cover **5**.

Remove throttle grip **6**.

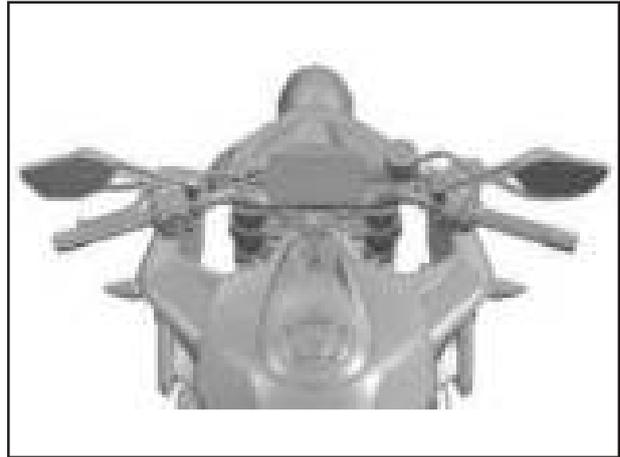


### 10.4 Handlebar Service

#### 10.4.1 Handlebar Interference Inspection

Swing the handlebar to the left and right to check if all kinds of wires interfere with the front wheel.

When the handlebar is shifted to the maximum, whether it interferes with the fuel tank, windshield, and dashboard.



# 11 Coolant System

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11.4 Cooling Cycle Tightness Inspection.....	11-7
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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.

### 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.

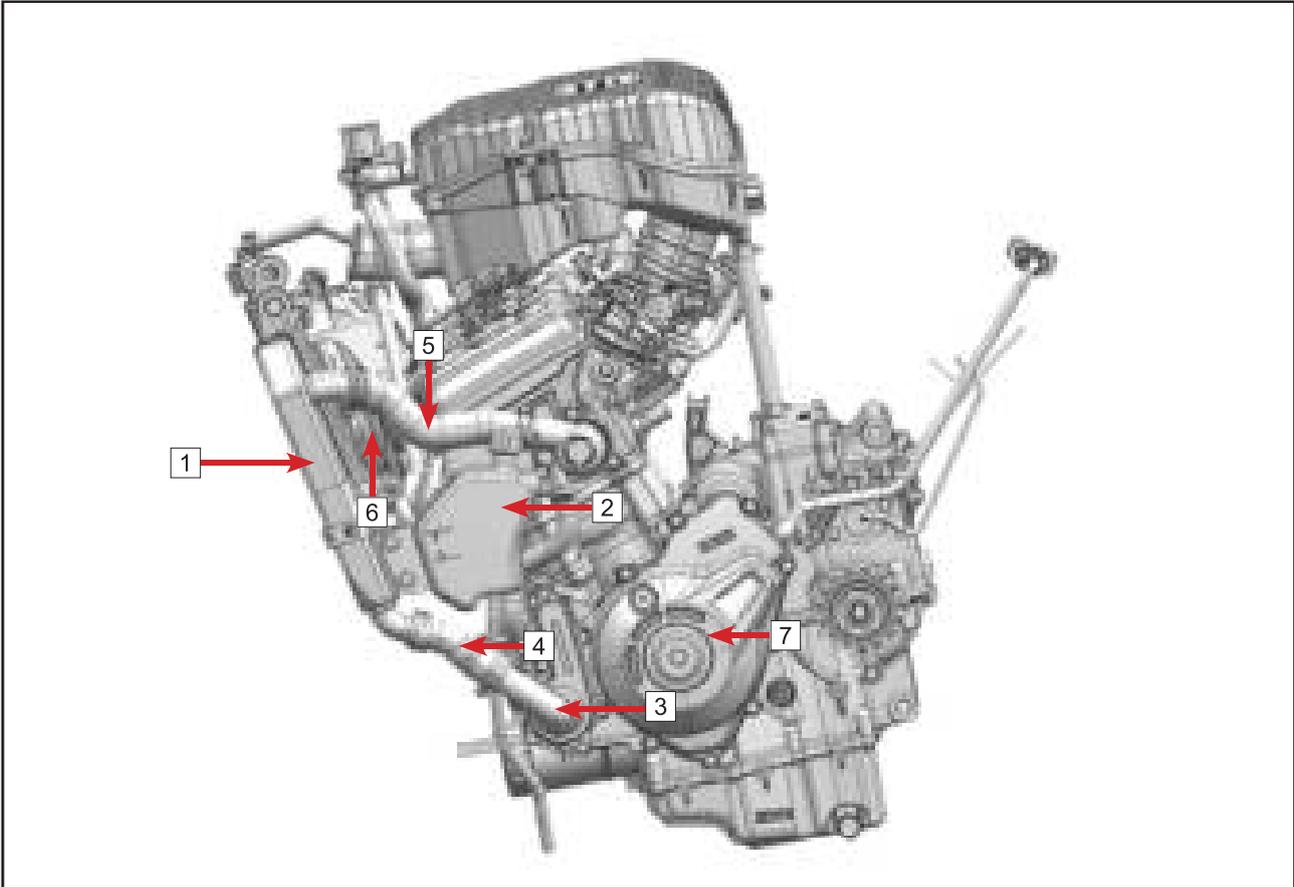
### CAUTION

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.

11.2 Cooling System View



1	R a d i a t o r assembly	2	Reservior tank assembly	3	W a t e r p u m p assembly	4	Radiator water outlet pipe
5	Radiator water inlet pipe	6	F a n m o t o r assembly	7	Engine assembly		

## Inlet Pipe and Outlet Pipe Inspection

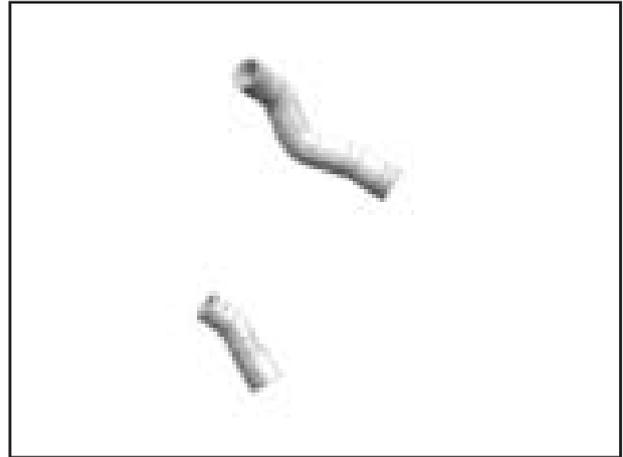
Check whether the radiator inlet and outlet pipes are damaged or broken.

The rubber hose will naturally age due to heat and long use time, and the cooling system will cause the pipe to break when heated.

Pinch the water pipe with fingers to check whether there are cracks. Replace it if there is damage and rupture.

Check the tightness of coolant pipe ring. Replace or tighten if loosen.

Check water pump, water pipe and all connecting parts for leakage. Replace if it does.



## Reservoir Tank

Check the reservoir tank for damage or cracks. Replace in time if it does.

Check the water pipe of reservoir tank for damage or cracks. Replace in time if it does.



## Clamp

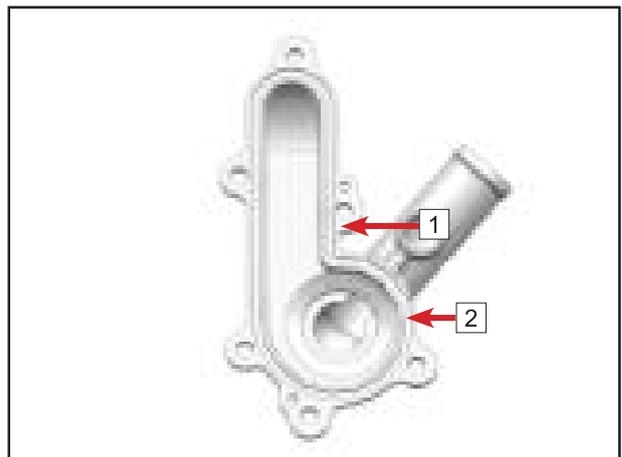
Check whether the clamp is worn, deformed or cracked. If it does, replace it with a new one in time.



## Water Pump Cover

Check the water pump cover **1** for cracks, sealing surface for pits or protrusions. Replace if it does.

Check whether the water pump seal ring **2** has hardened, broken, damaged. Replace with new parts if it does.



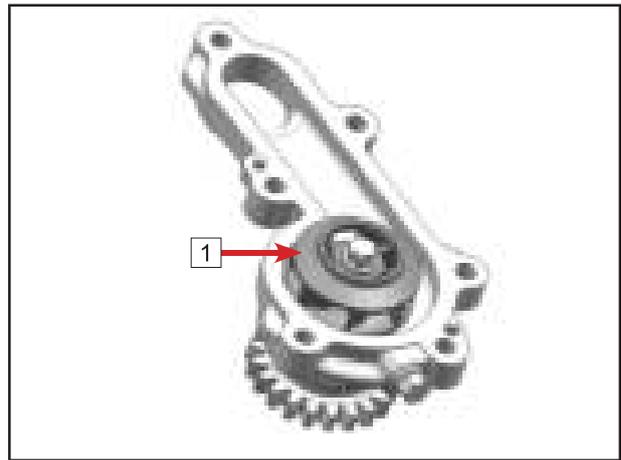
# 11 Coolant System

## Water Pump Inspection

(Water pump removal see chapter 05-Water Pump Impeller Removal for details)

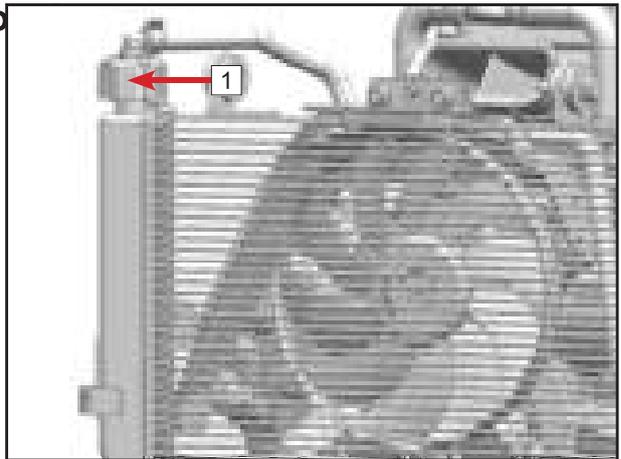
## Water Pump Impeller

Check water pump impeller **1** for damage. Replace with new parts if it does.



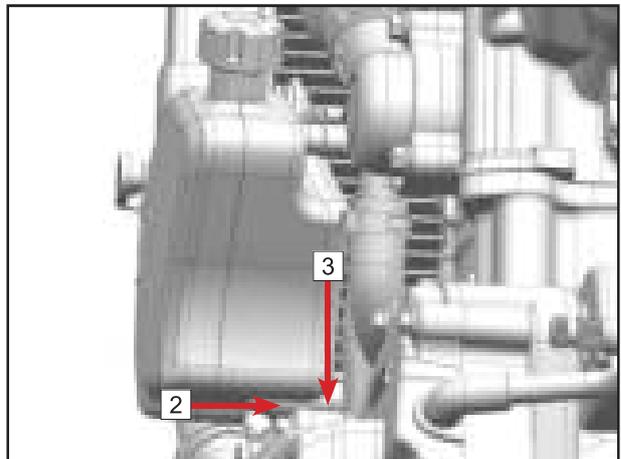
## 11.3 Cooling System Assembly Removal

Open the radiator cap **1**.



Loosen the clamp **2**.

Disconnect reservoir tank connecting pipe **3**.

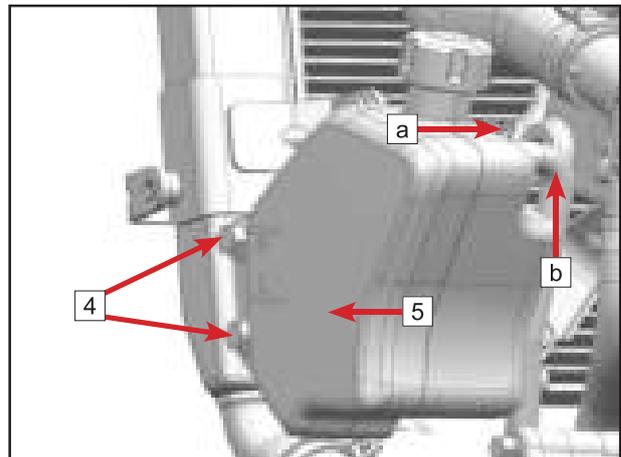


Loosen the clamp **a**.

Remove reservoir tank siphon pipe **b**.

Remove two bolts **4**.

Remove reservoir tank **5**.

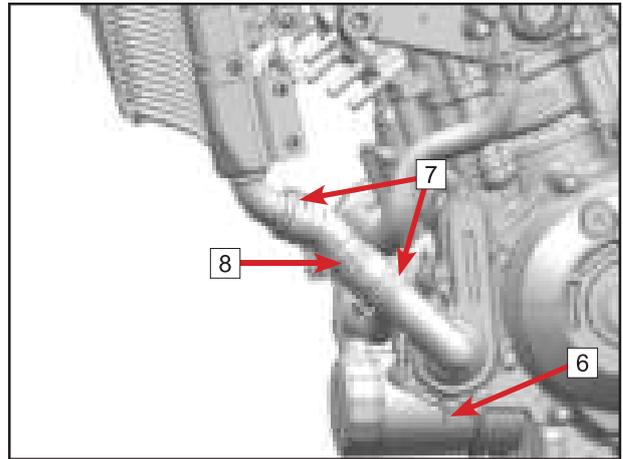


# CFMOTO

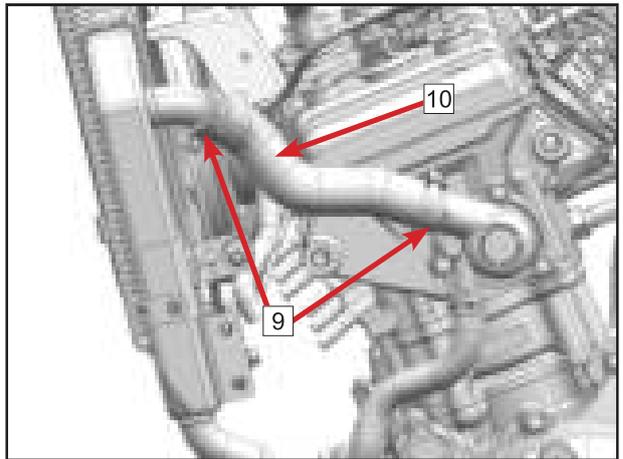
Place a basin under the water pump.  
Remove the drain bolt [6].  
Drain the coolant.  
Loosen the clamp [7].  
Remove the outlet pipe [8].

<b>NOTE</b>
After water outlet pipe removal, there is still some coolant spilling out.

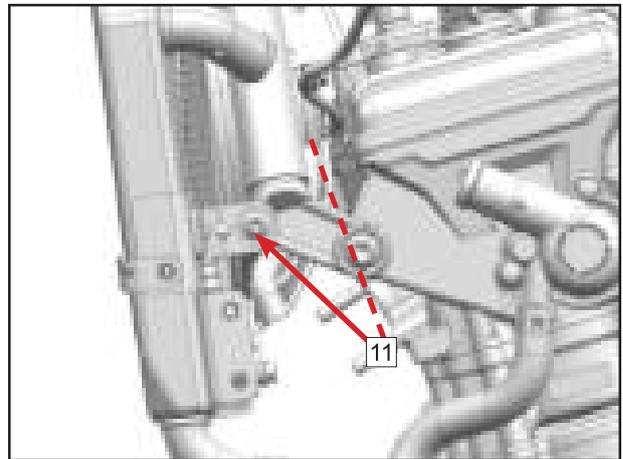
<b>NOTE</b>
The cooling system has a certain pressure, and the coolant will shoot a long distance after removing the drain bolt.



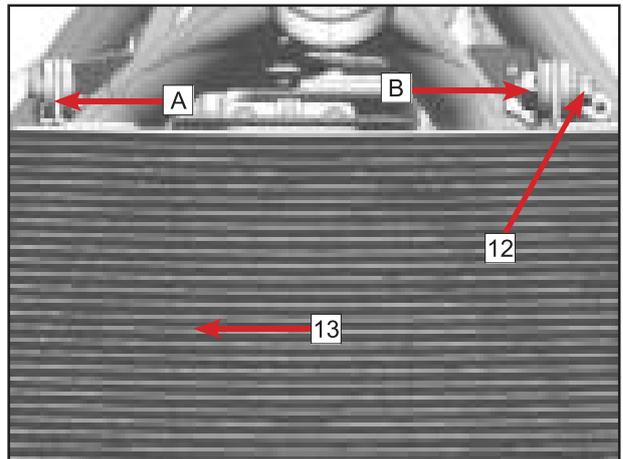
Loosen the clamp [9].  
Remove the inlet pipe [10].



Remove the bolts [11] on both sides.



Remove the LH bolt [12].  
Remove the radiator [13].



## Installation

Reverse the removal procedures for installation. When installing the radiator, the RH side [A] is suspended from the frame and the LH side [B] is bolted.

## 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

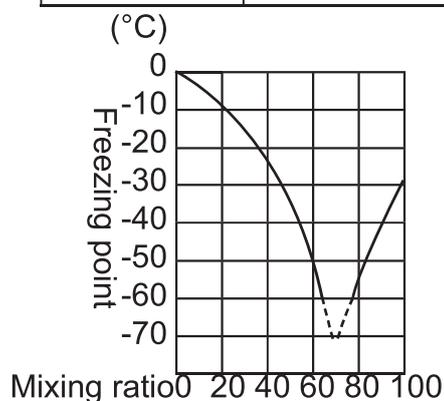
1.4kgf/cm<sup>2</sup>

20.3psi

Standard value:

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.

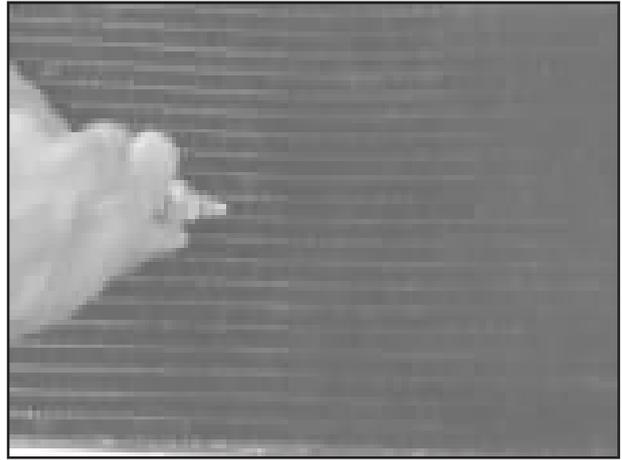
### **NOTE**

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

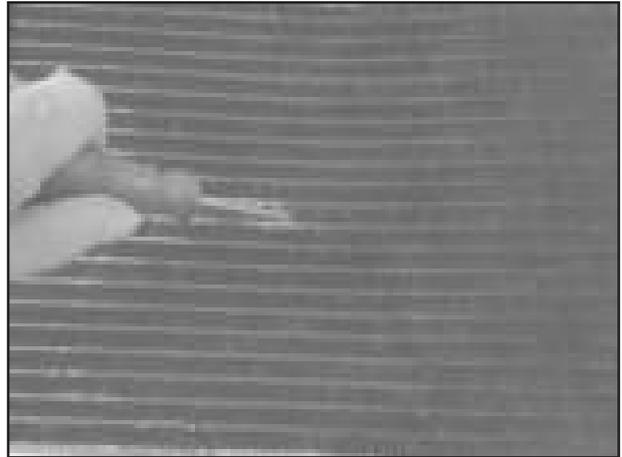
## 11.5 Radiator and Water Pipe Inspection and Cleaning

### 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

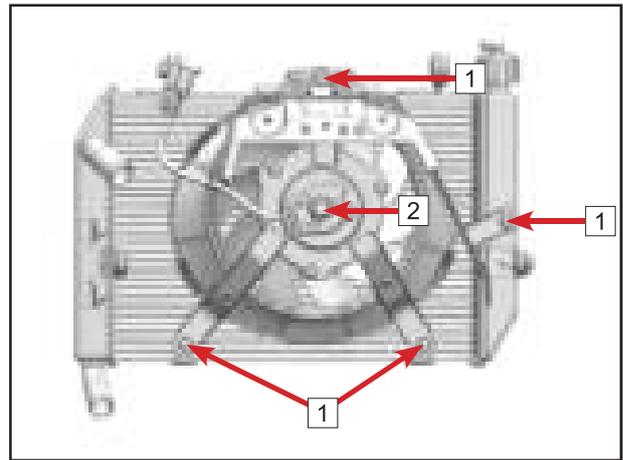
Remove bolts [1].

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

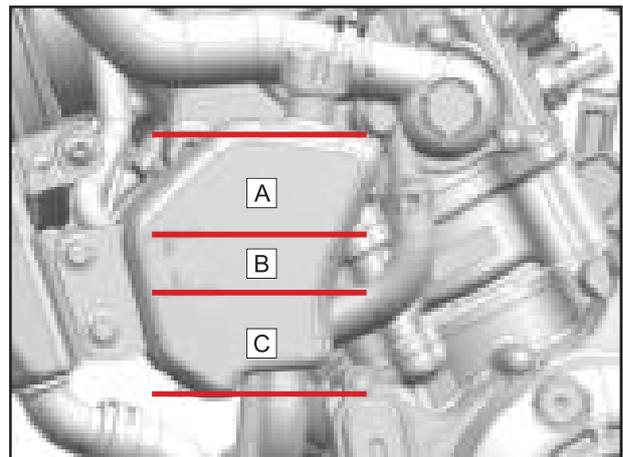
Lift the vehicle on level ground with the side brace.

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

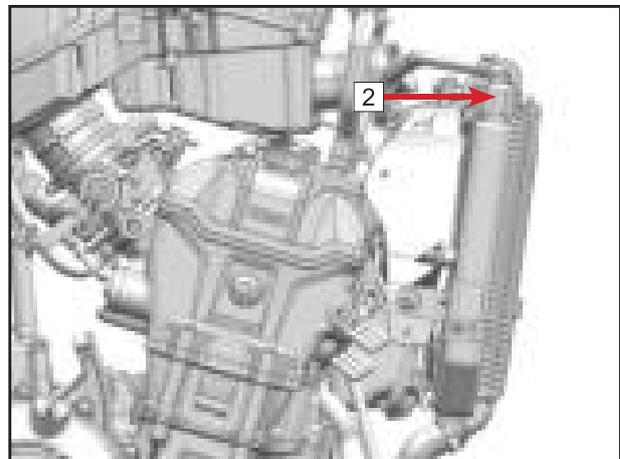
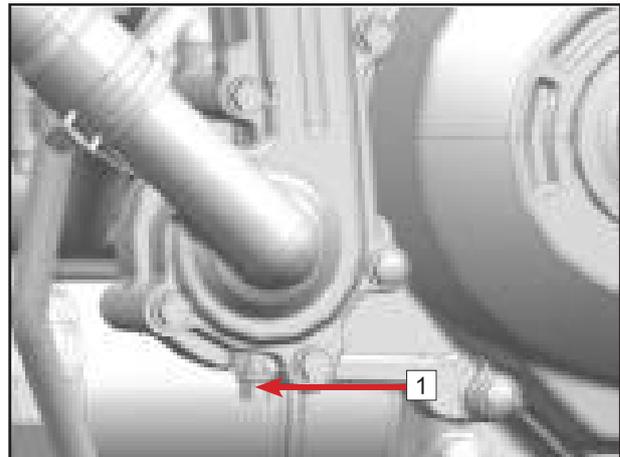
**If the coolant needs to be replenished frequently, or if the coolant in the reservoir is frequently backed up and drained, there may be leakage in the cooling system, contact the engineer to have the cooling system checked.**

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.
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 between the Upper and Lower limits. If the



level is higher than the Upper limit line, drain out the excess coolant to restore the level to the Upper and Lower limits.

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## 12.1 Service Tool

### CFMOTO DSCAN

**The DSCAN module and its associated software (PC or Android only) is only available for purchase and use by authorized CFMOTO dealers.**

**Functions:** Read/clear EFI, EPS and ABS system fault codes, observe live data flow, update ECU programming, etc.



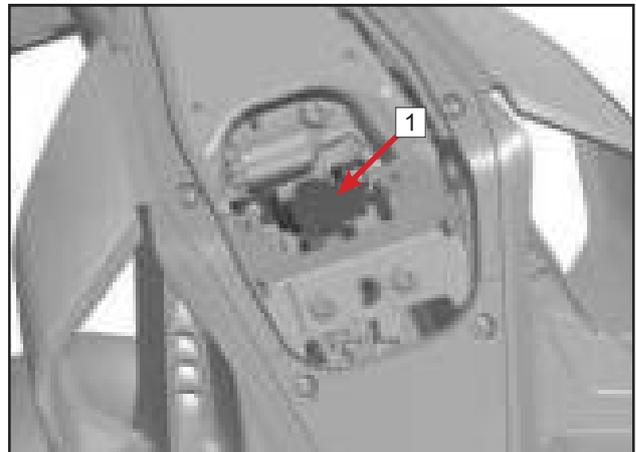
#### 12.1.1 Diagnostic Port

The 16-pin diagnostic port 1 is located under the front service cover.

The 16-pin interface on DSCAN connects to the diagnostic port on the vehicle, and a fully charged battery installed in the vehicle is required for the module to function properly.

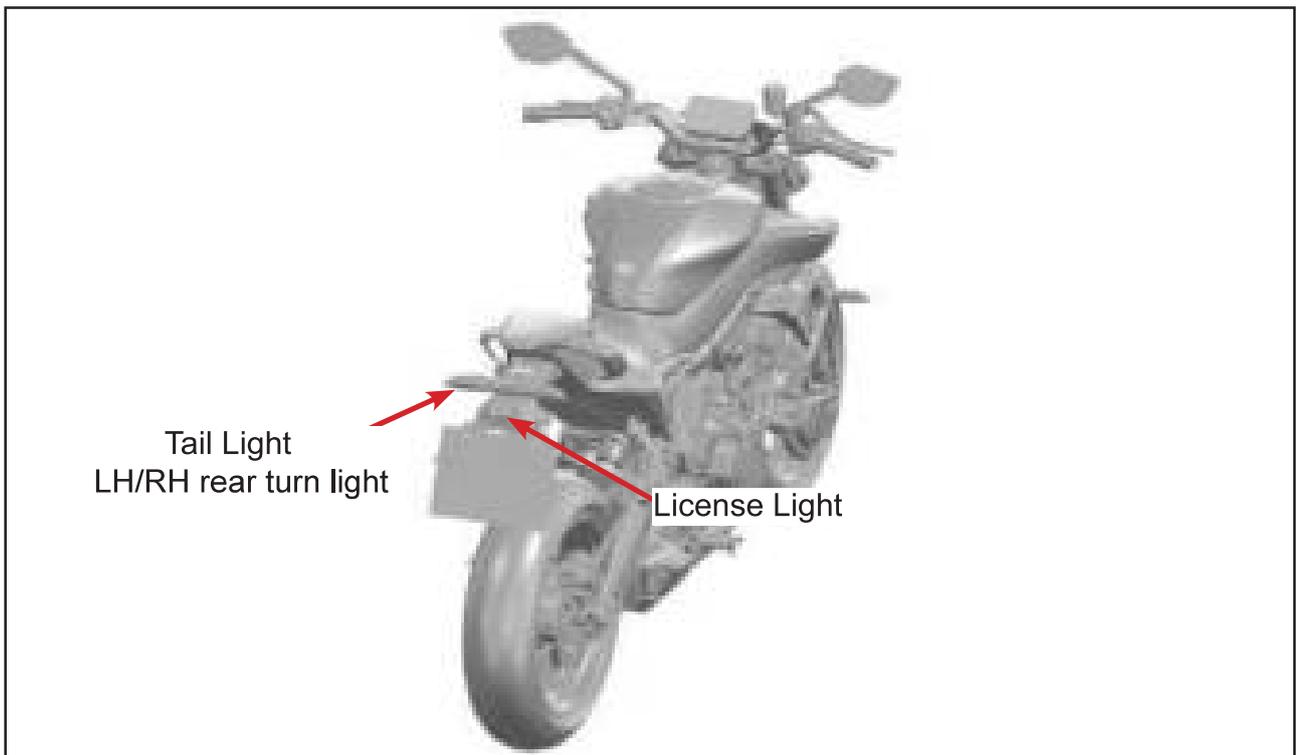
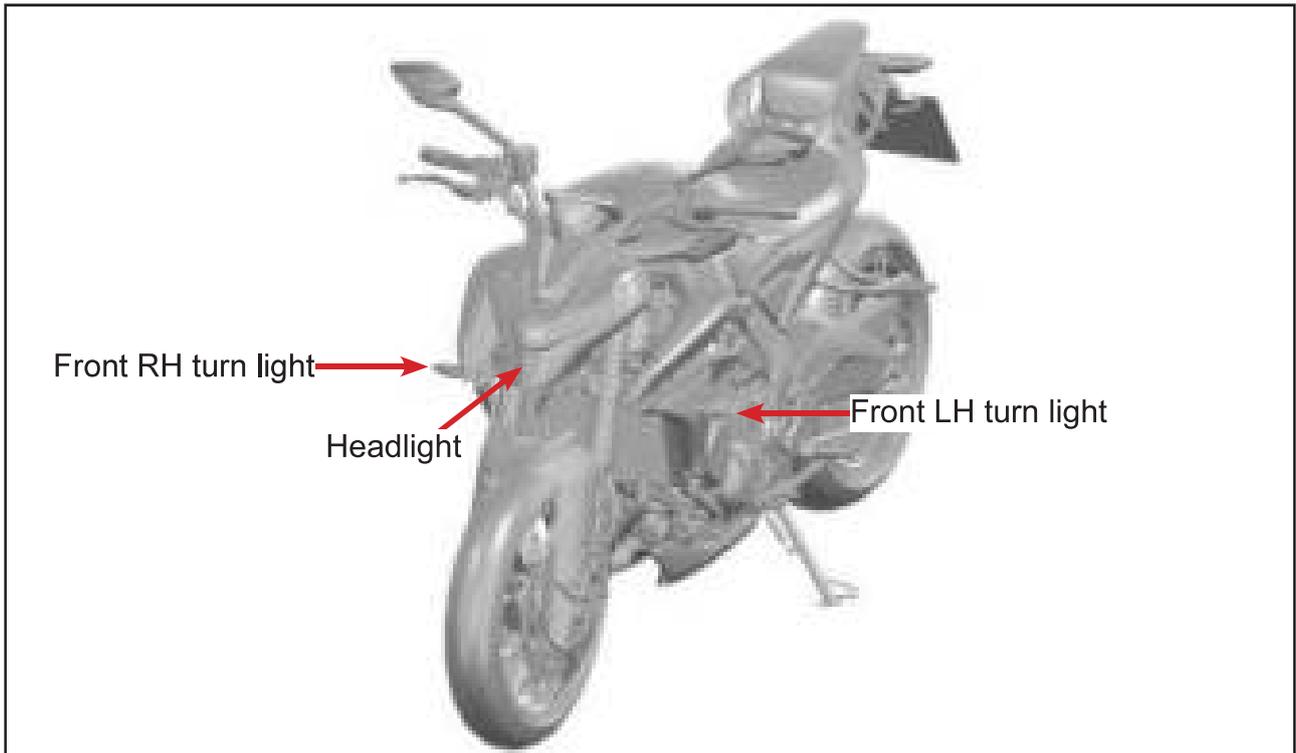
For detailed operation and functions, refer to the DSCAN documentation and software help files.

**NOTE:** Using non-CFMOTO scan devices to read fault codes is not recommended.

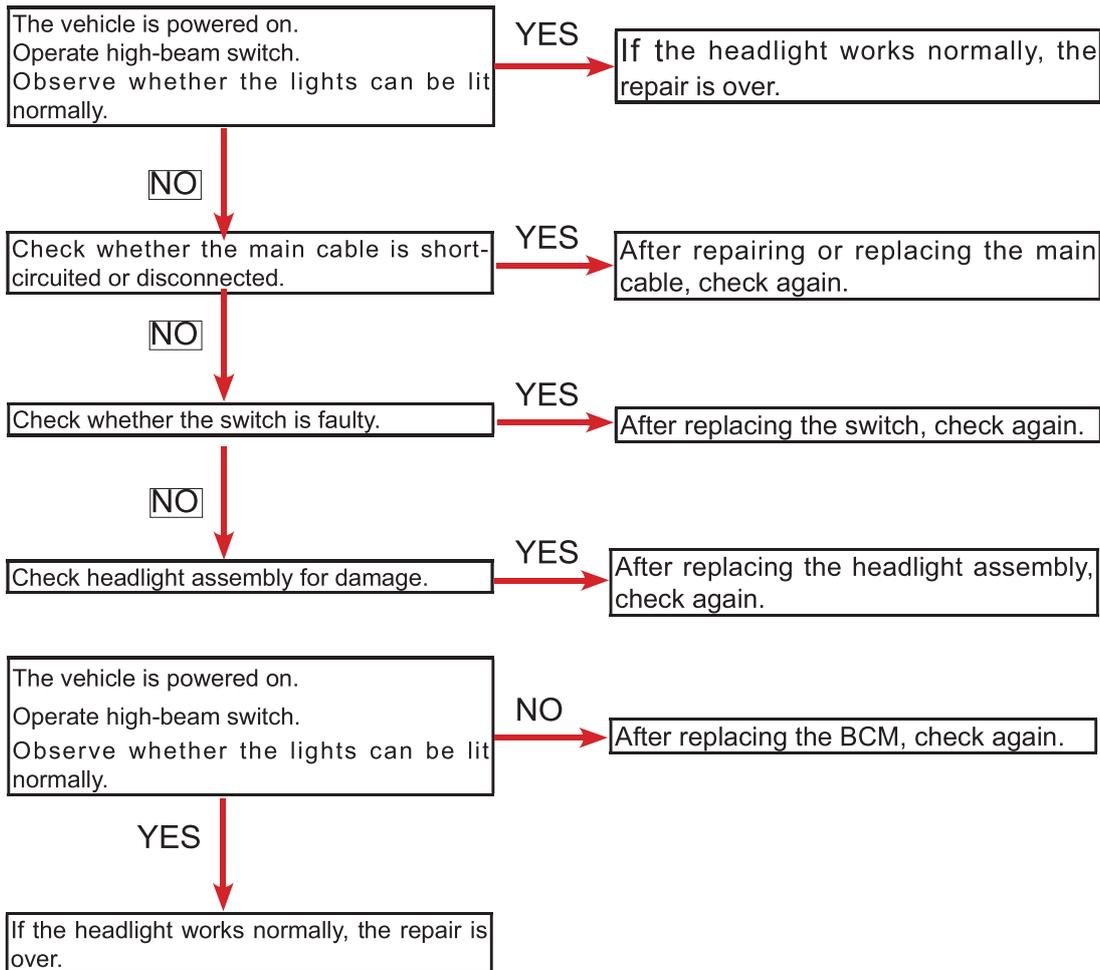


## 12.2 Lights

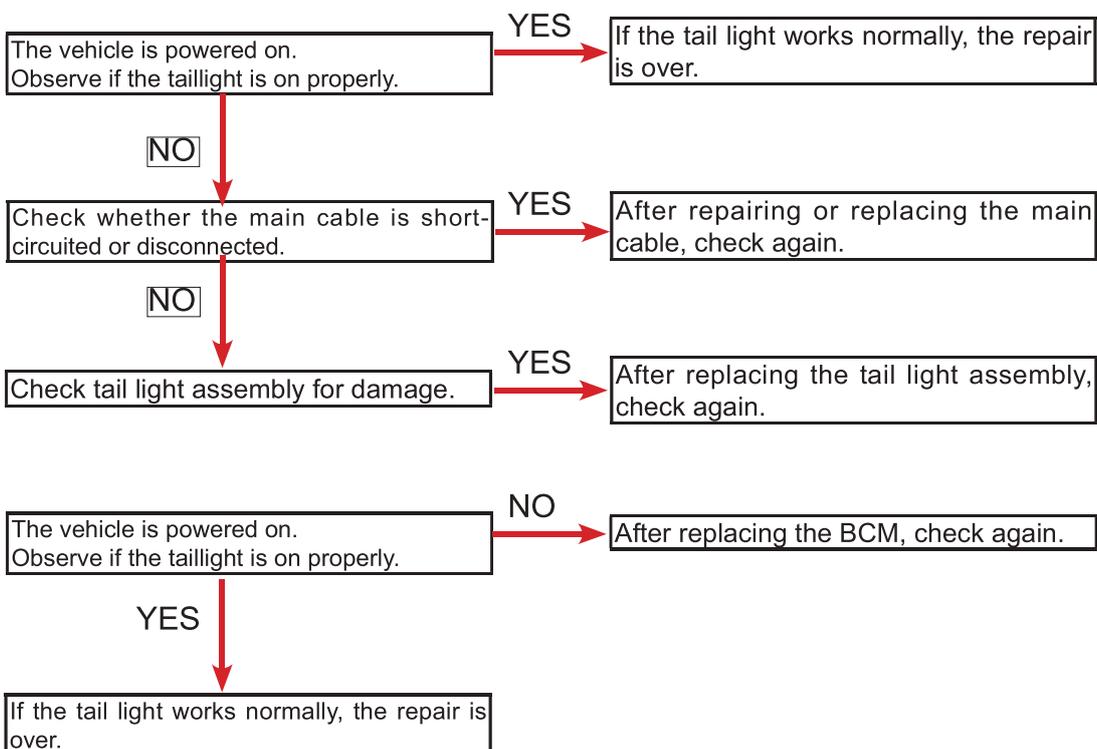
### 12.2.1 Lights View



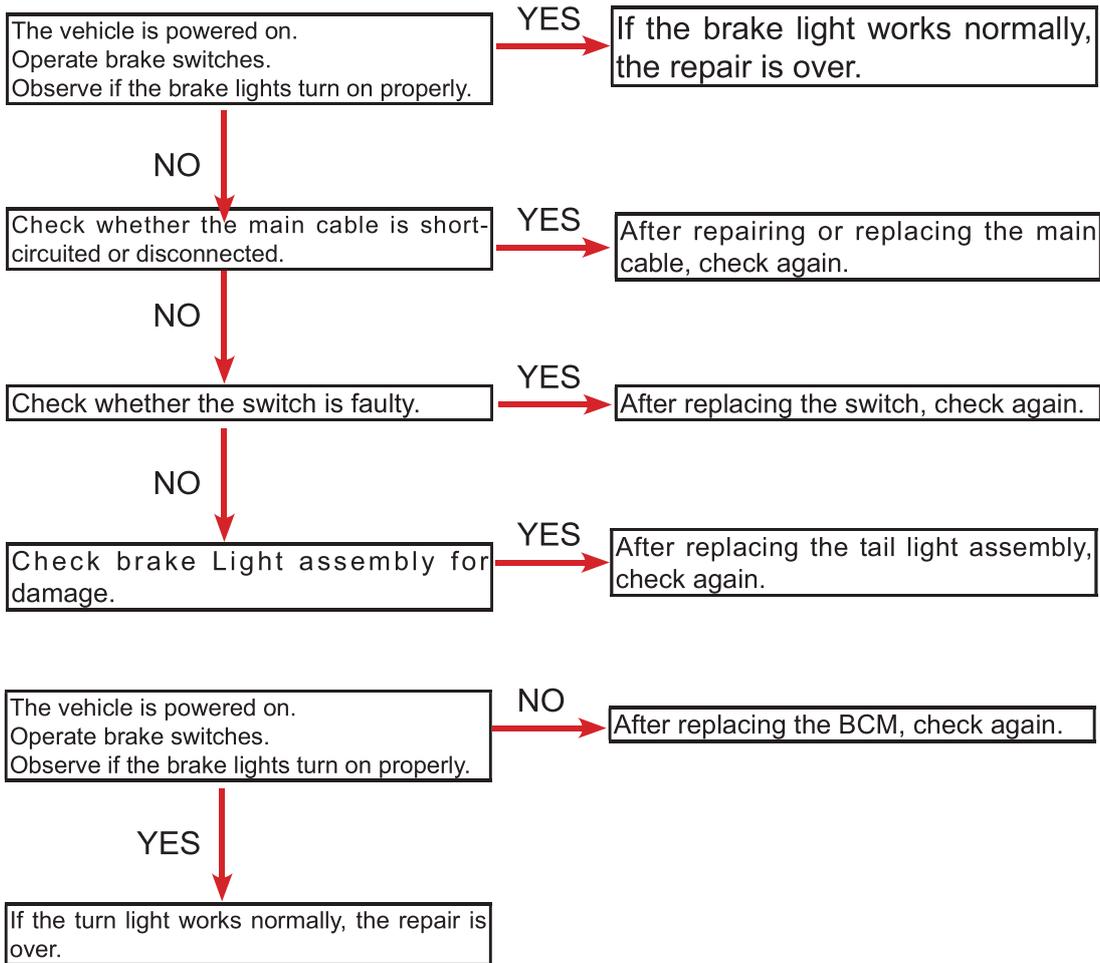
## 12.2.2 Headlight Inspection



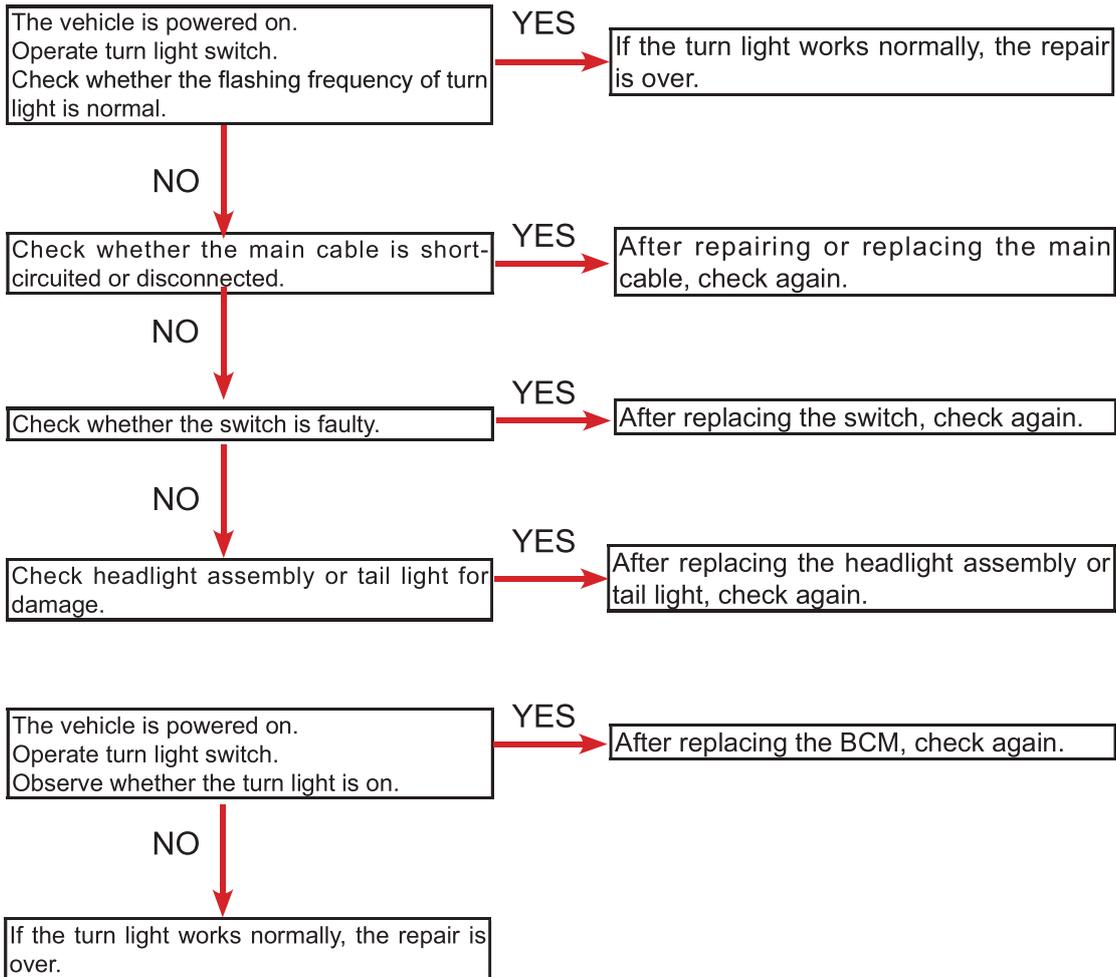
## 12.2.3 Tail Light Inspection



## 12.2.4 Brake Light Inspection

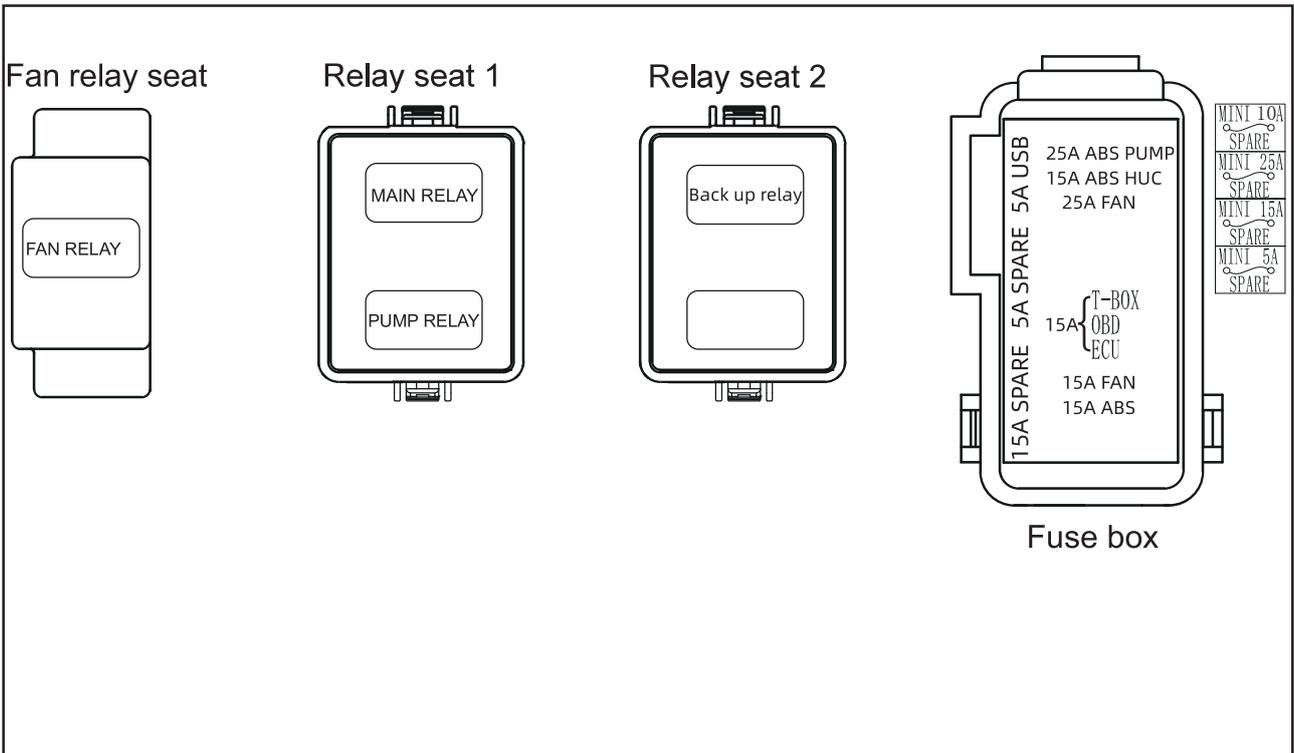
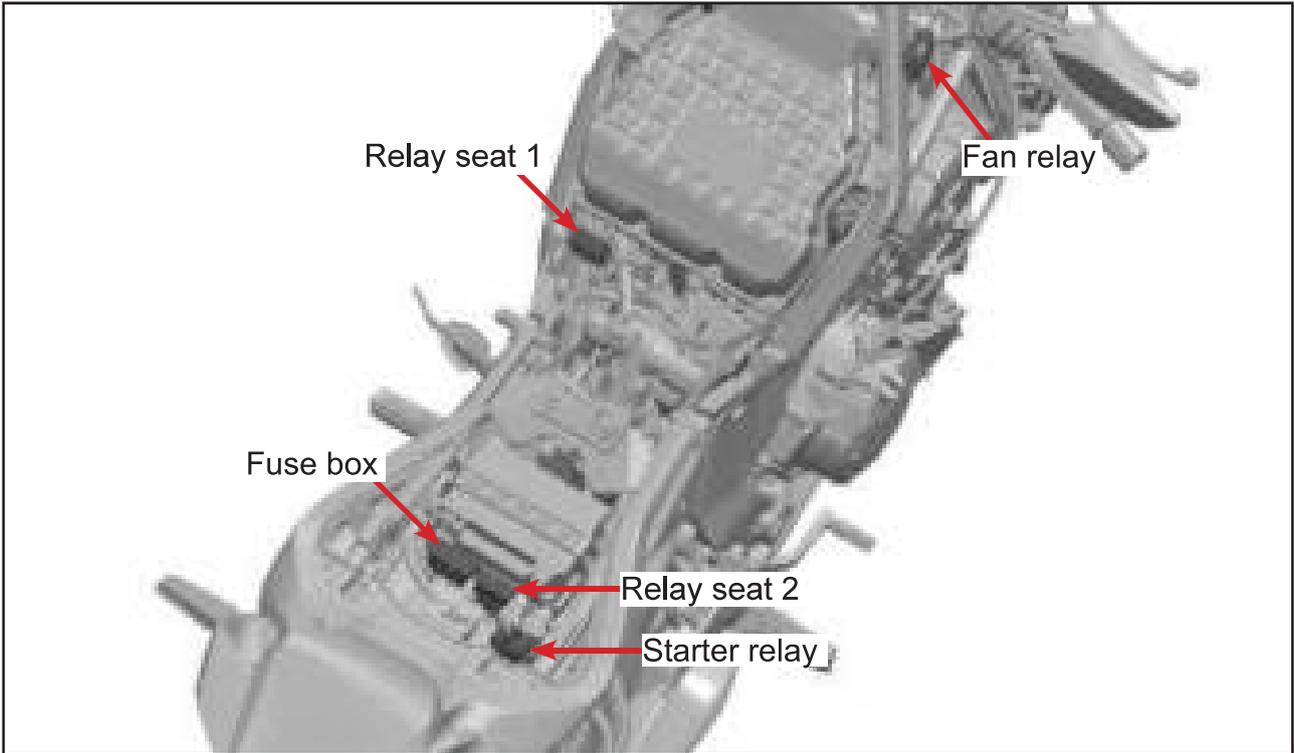


## 12.2.5 Turn Light Inspection



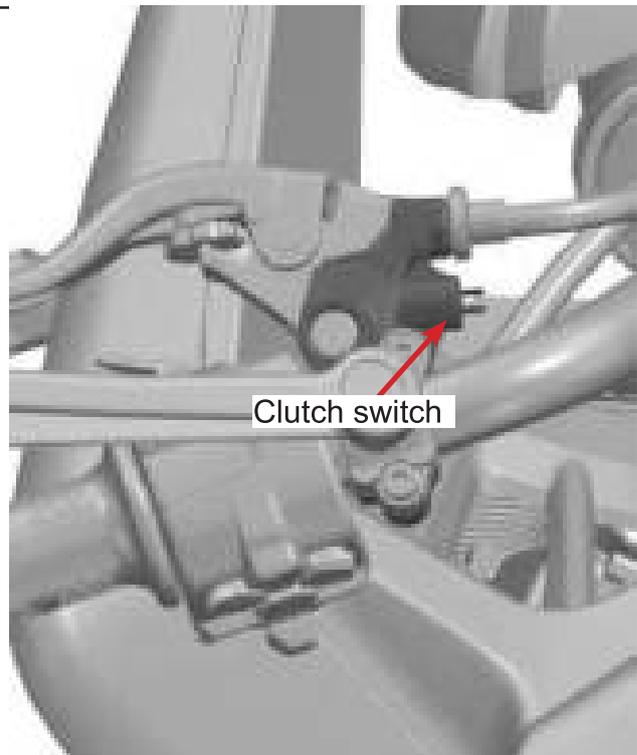
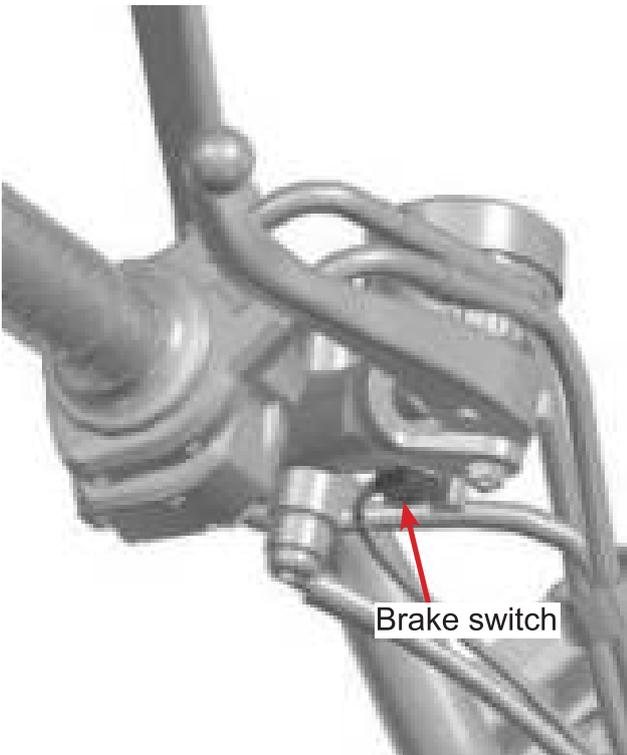
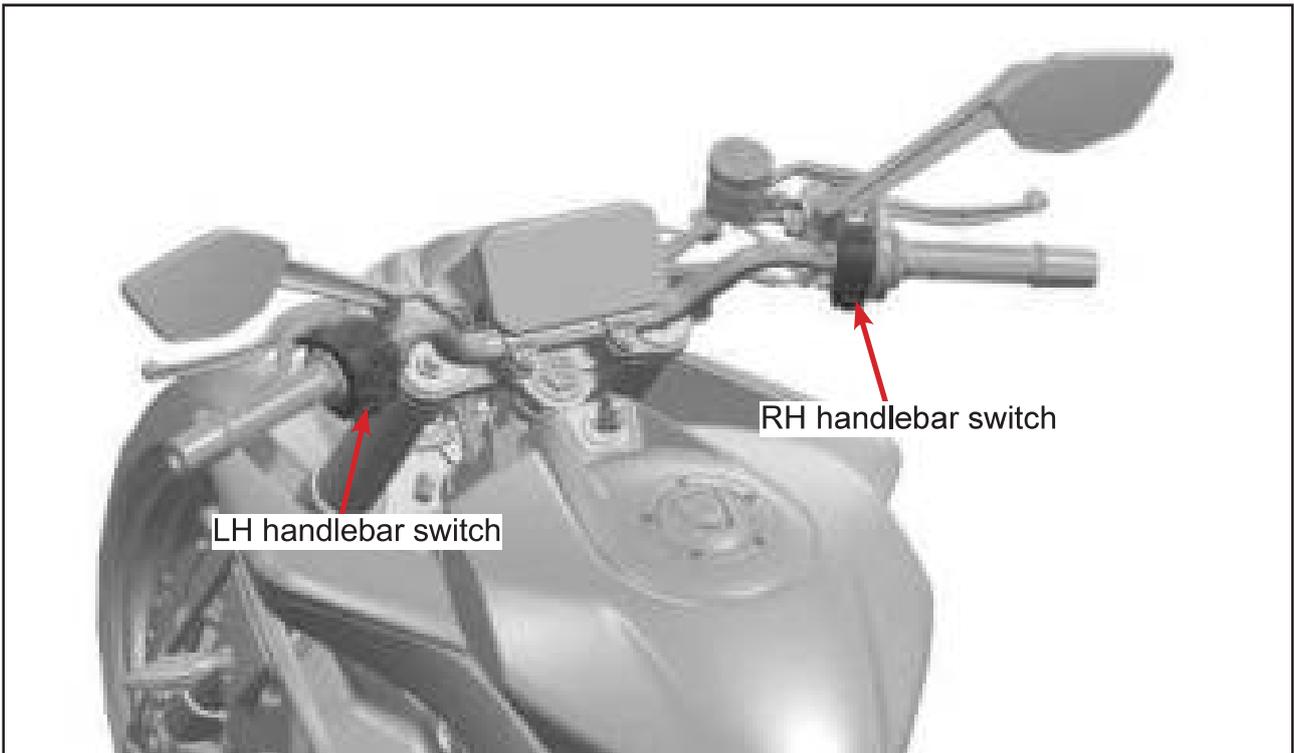
## 12.3 Fuse and Relay

### 12.3.1 Fuse and Relay Position



## 12.4 Switch

### 12.4.1 Switch Position

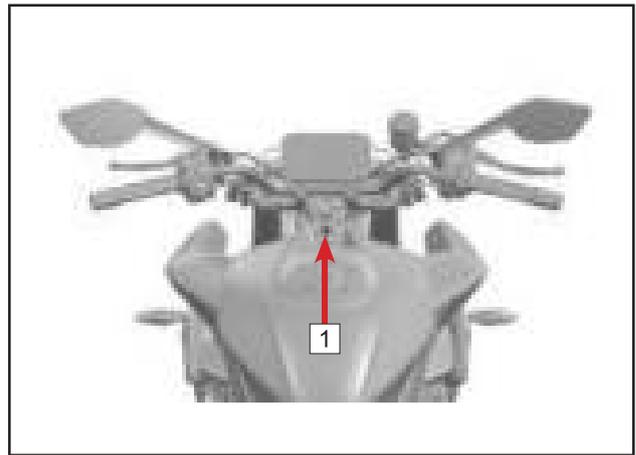


## 12.4.2 Ignition Lock

### Inspection

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

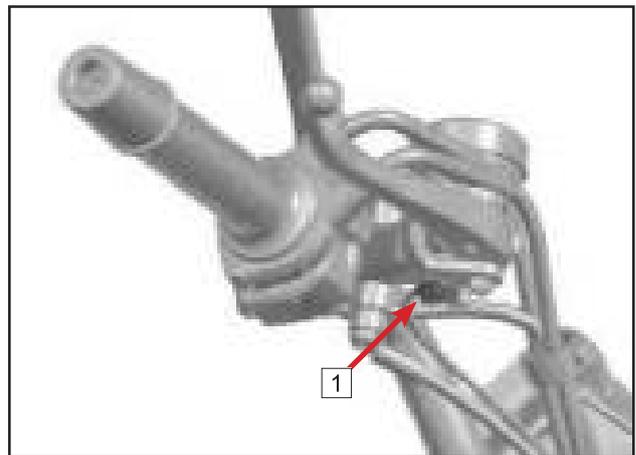
Ignition Switch			
Gear/Color	R	BL	Can key pull out
	●	●	NO
			YES
			YES



## 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:

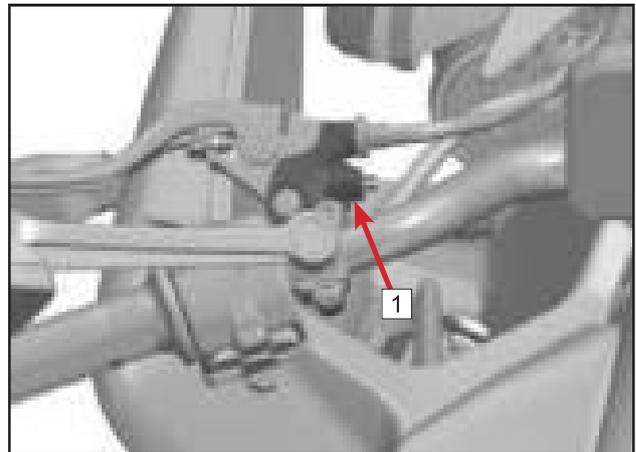
1. When the front brake handle is kneaded: the brake light on.
2. When the front brake handle is released: the brake light off.



## 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 Handlebar Switch

### 12.4.5.1 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.

TC switch 1		
Function \ Color	G	Y
	●	●

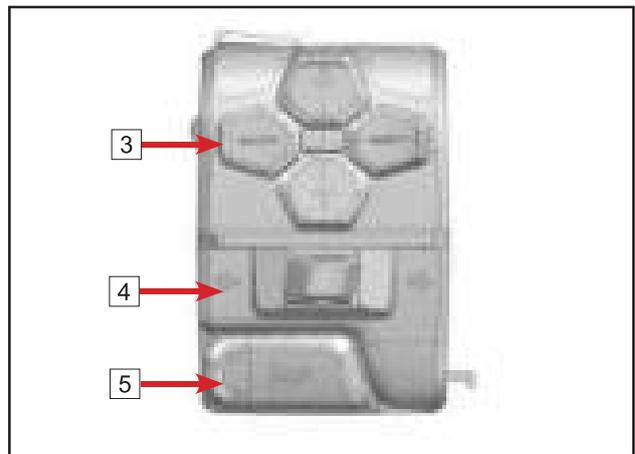
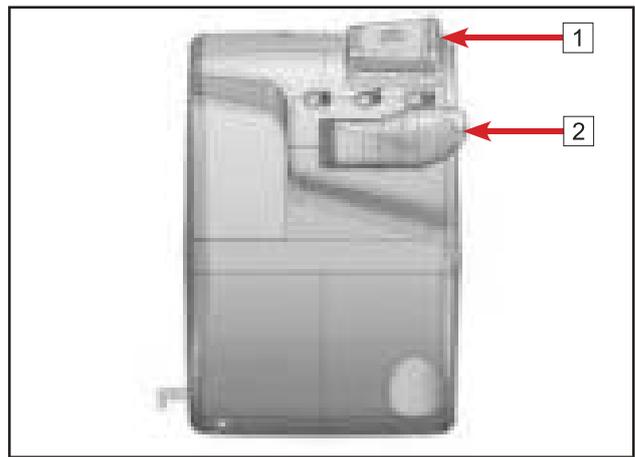
Dimmer switch 2		
Function \ Color	G	L
	●	●
	●	●

Menu switch 3						
Function \ Color	G	B/W	L/B	GR/R	L/W	G/W
	●	●				●
SET	●		●			●
BACK	●			●		●
	●				●	●

R

Turn switch 4				
Function \ Color	O	G	BR	SB
	●	●		
OFF		●	●	
		●		●

Horn switch 5		
Function \ Color	G	LG
	●	●



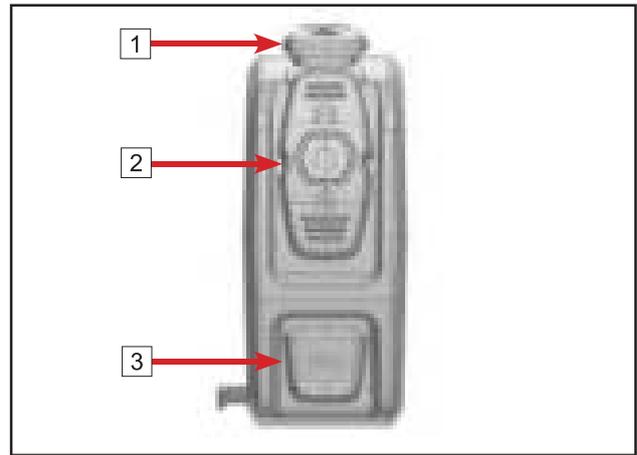
## RH Handlebar Switch

Remove the connector connecting the RH handlebar switch harness with the main cable, and check whether each switch is on or off.

Warning switch 1			
Function \ Color	P	G	G/W
▲	●	●	●

Start/stop switch 2			
Function \ Color	B/BR	G	Y/R
⊗			
⊙	●	●	
⊕	●	●	●

FN switch 3			
Function \ Color	Y	G	G/W
FN	●	●	●



## 12.5 Handlebar Switch

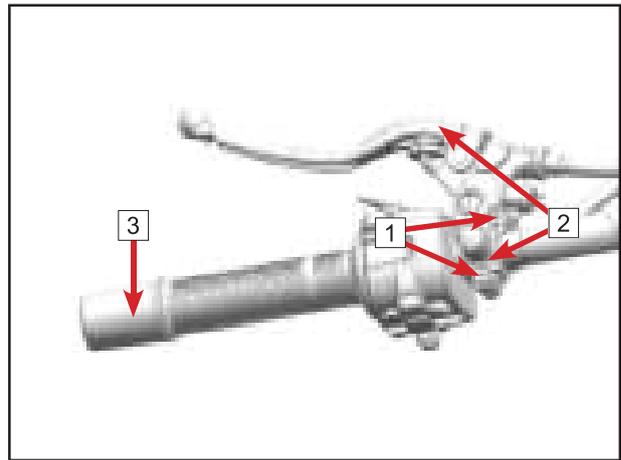
### 12.5.1 LH Handlebar Switch Assembly

#### Removal

Remove two inner hex bolts [1].

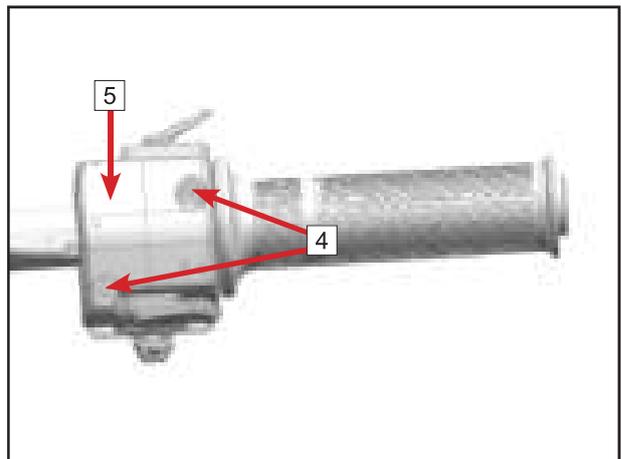
Remove the clutch lever assembly [2].

Remove LH handlebar balancer [3].



Remove self-tapping screws [4].

Remove LH handlebar switch assembly [5].

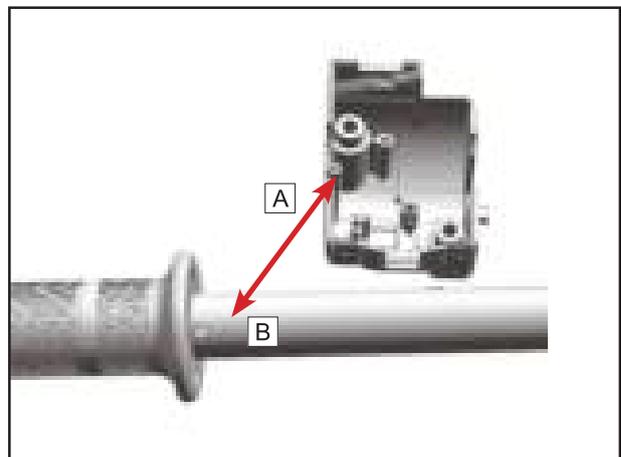


#### Installation

Reverse the removal procedures for installation.

#### NOTE:

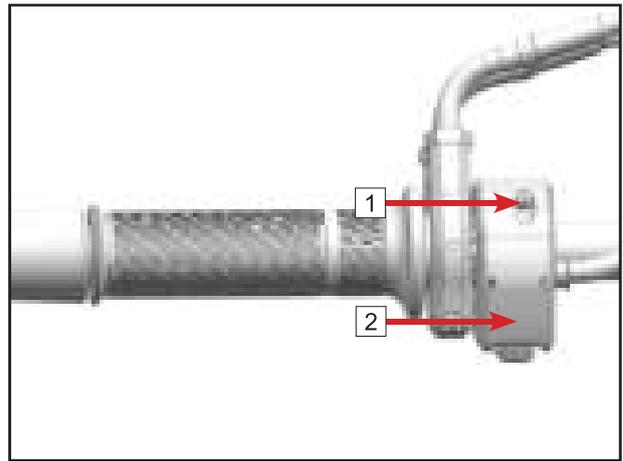
When the switch is installed on the handlebar tube, there is a positioning structure inside the switch. Connect device A to the fixing point B of the steering tube and then tighten the bolt.



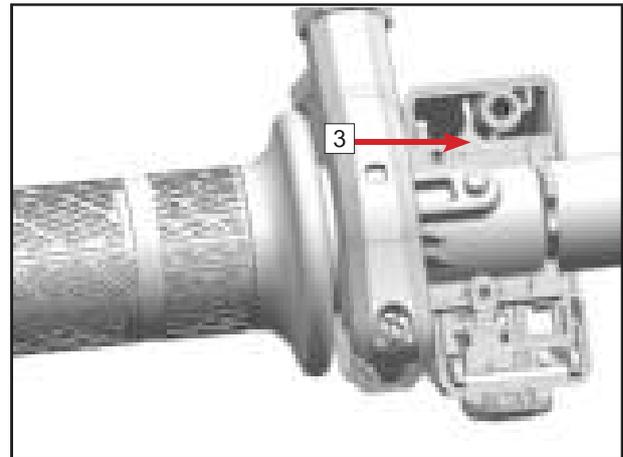
## 12.5.2 RH Handlebar Switch Upper&Lower Housing Removal

Remove screw [1].

Remove lower housing [2].



Remove upper housing [3].

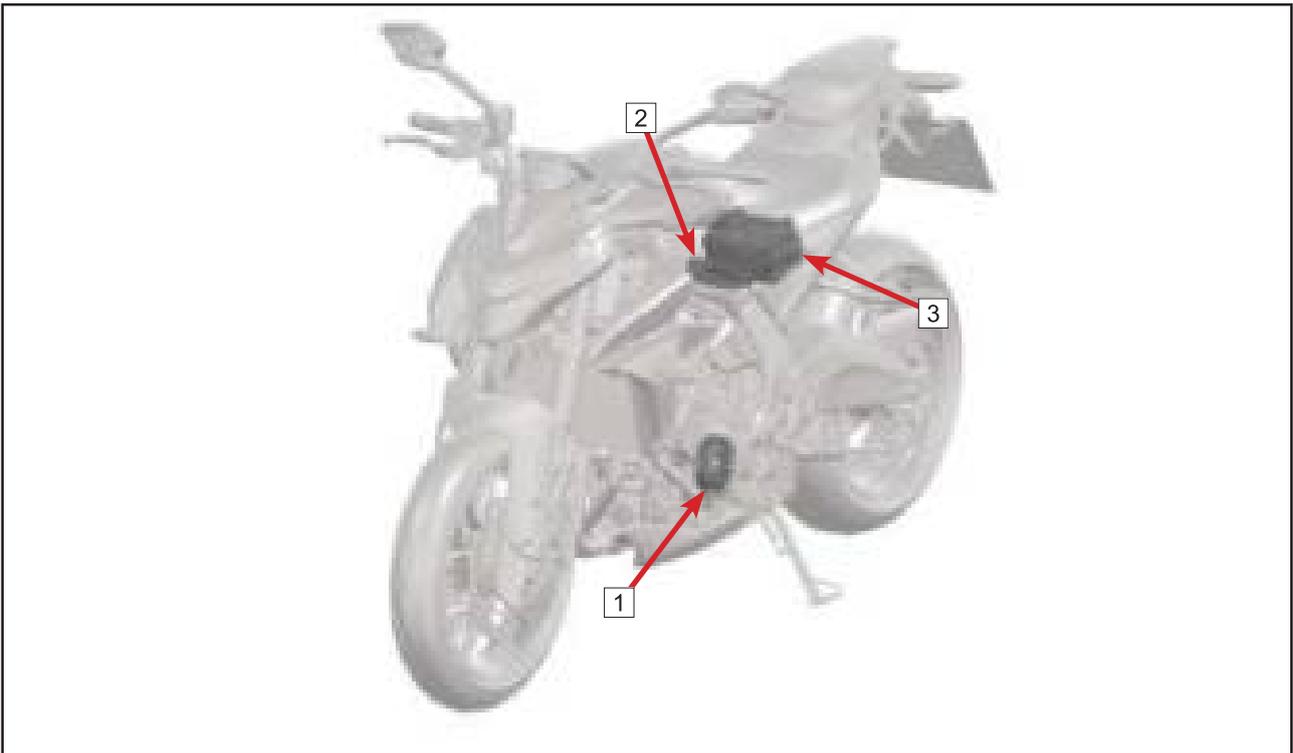


## Installation

Reverse the removal procedures for installation.

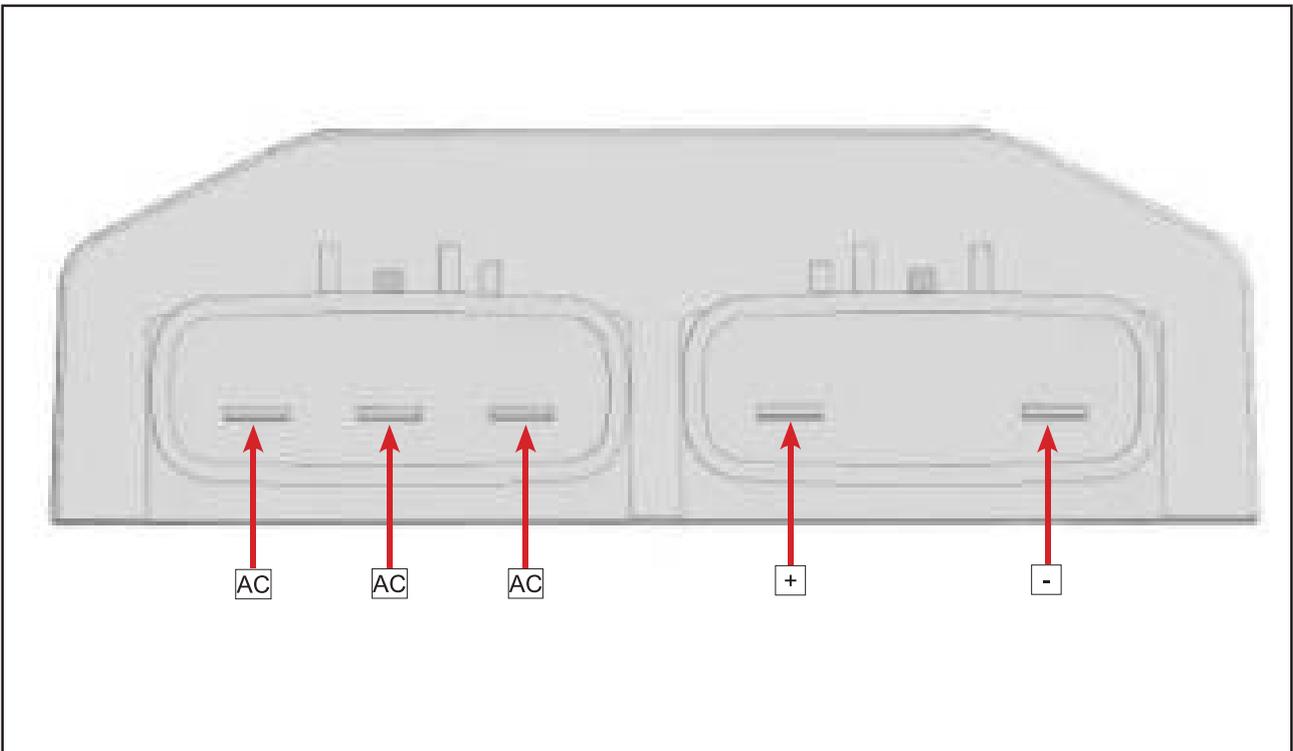
## 12.6 Charging System/Battery

### 12.6.1 Charging System Position



1	Stator	2	Regulator	3	Battery
---	--------	---	-----------	---	---------

### 12.6.2 Regulator



## 12.6.3 Charging Voltage Inspection

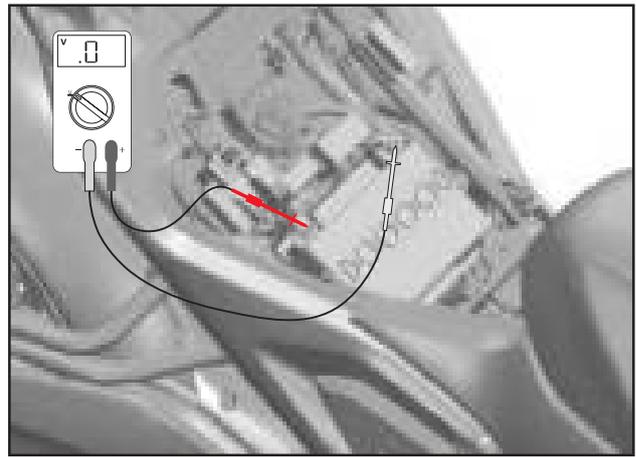
The battery must function properly and be fully charged.

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.

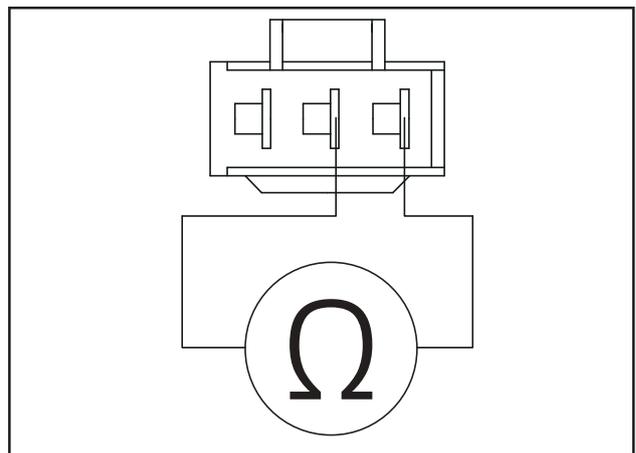
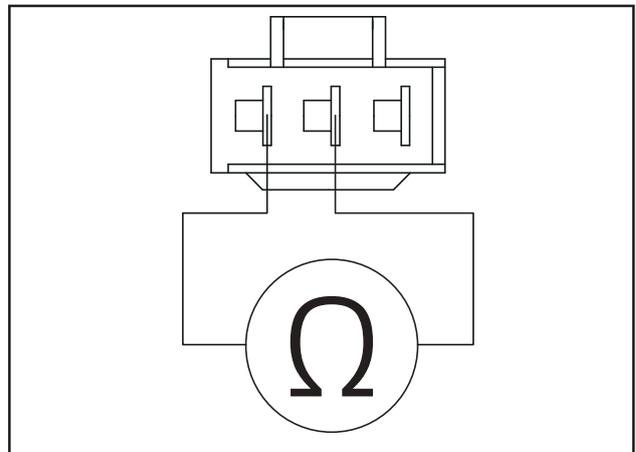
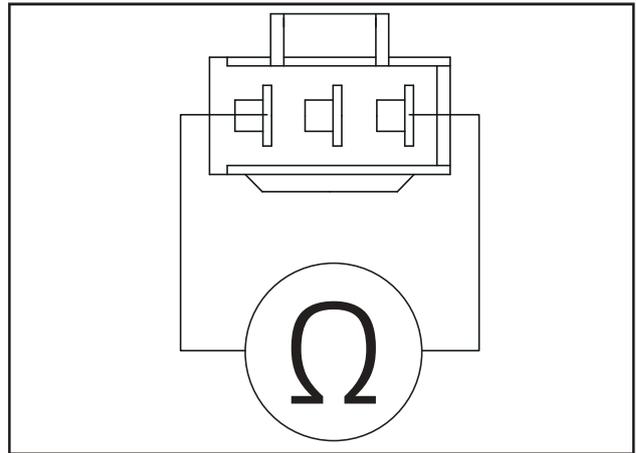


## 12.6.4 Stator Path Inspection

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.

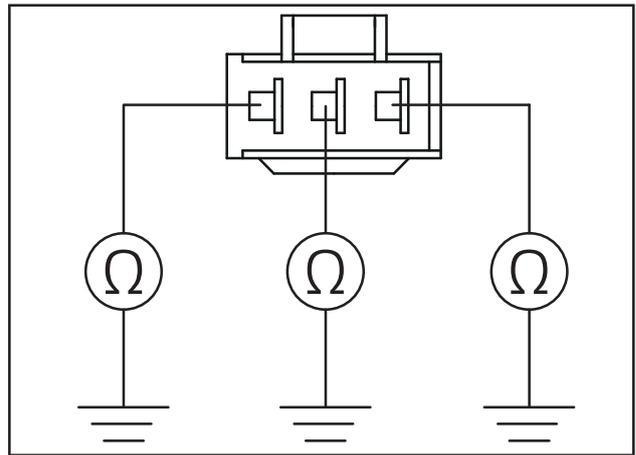


### 12.6.5 Stator GND Inspection

Regulator Path Inspection.

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.

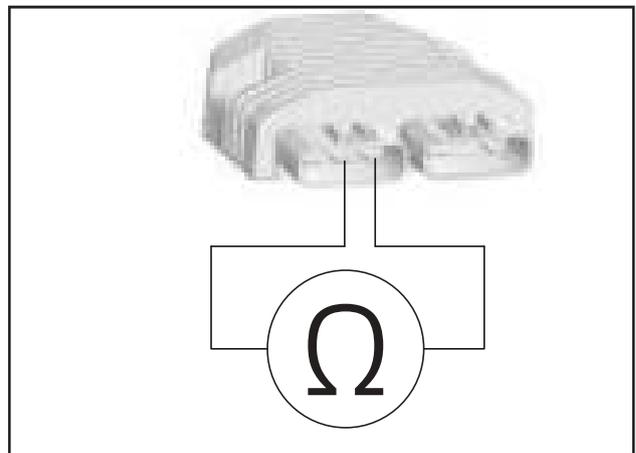
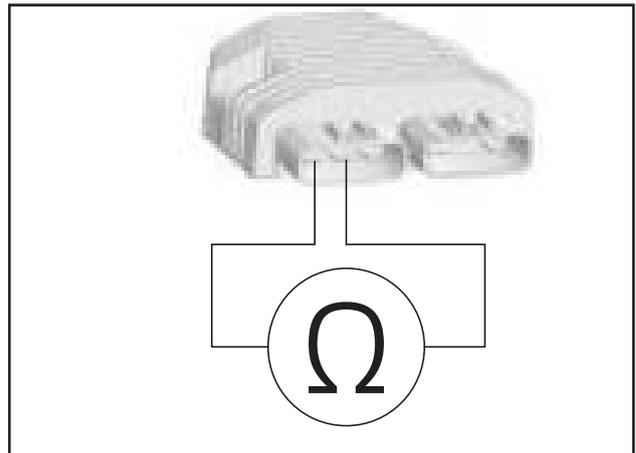
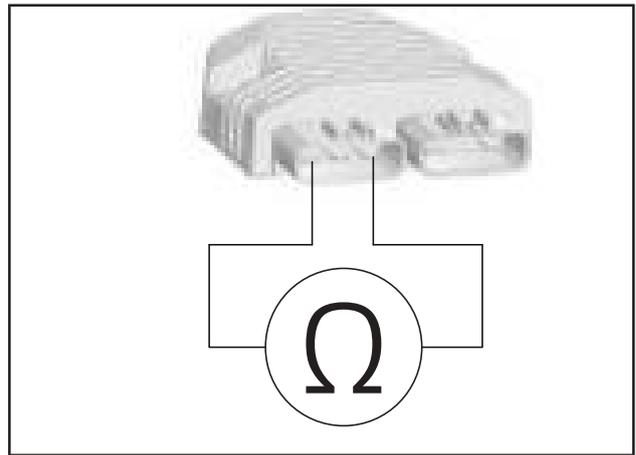


## 12.6.6 Regulator Path Inspection

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.



## 12.6.7 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.

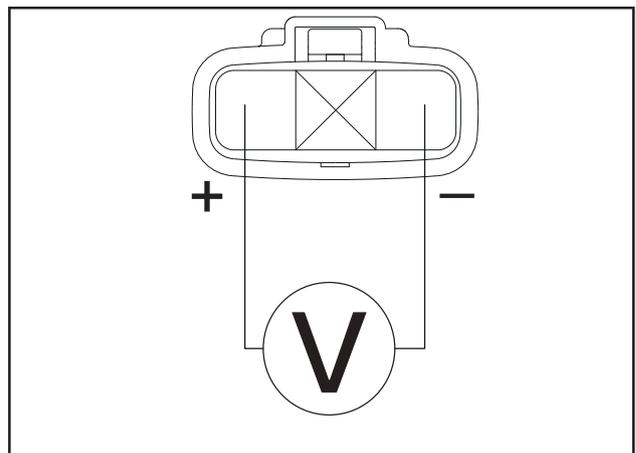
Measure point positive (+), and measure point GND (-).

Input Voltage	
5000rpm	$\leq 14.8V$

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.

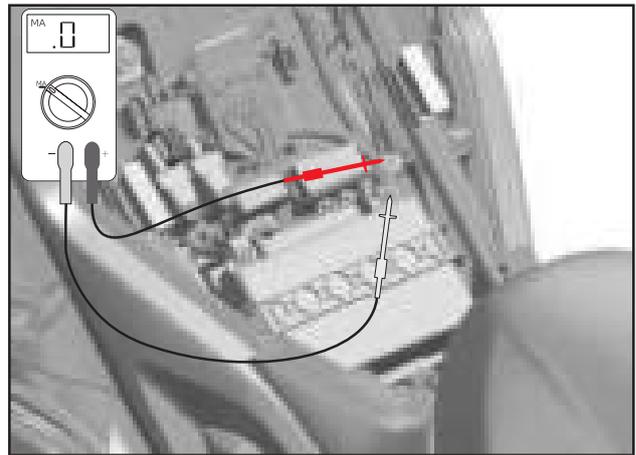


## 12.6.8 Battery Leakage Inspection

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.

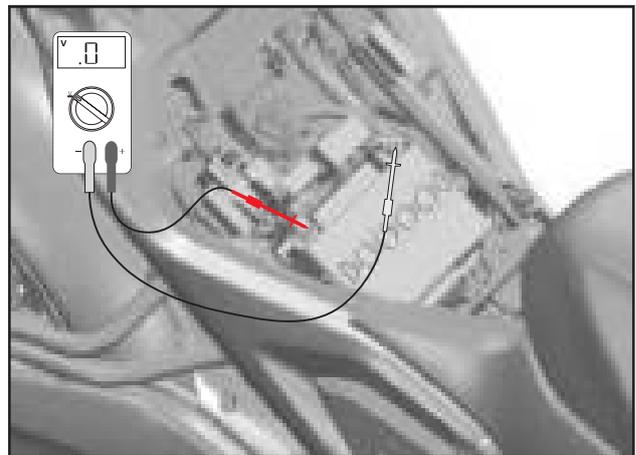


## 12.6.9 Battery Inspection

Turn off the vehicle power supply.  
Check the battery voltage as shown in the figure.

**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.



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).

## 12.7 Horn

### Removal

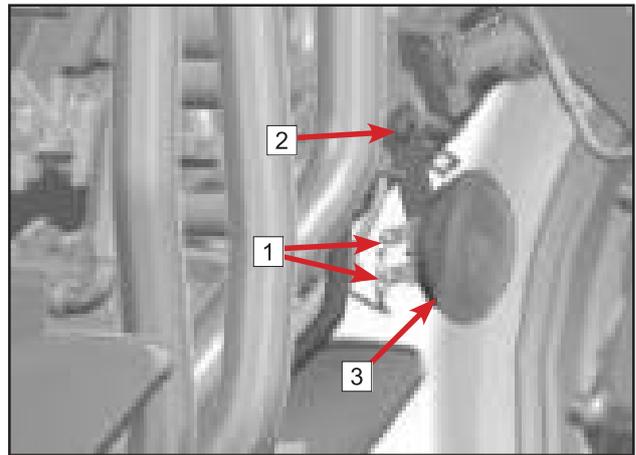
Disconnect the connectors **1**.

Remove bolt **2**.

Remove horn **3**.

### Installation

Reverse the removal procedures for installation.



### Inspection

Turn on the vehicle power supply.

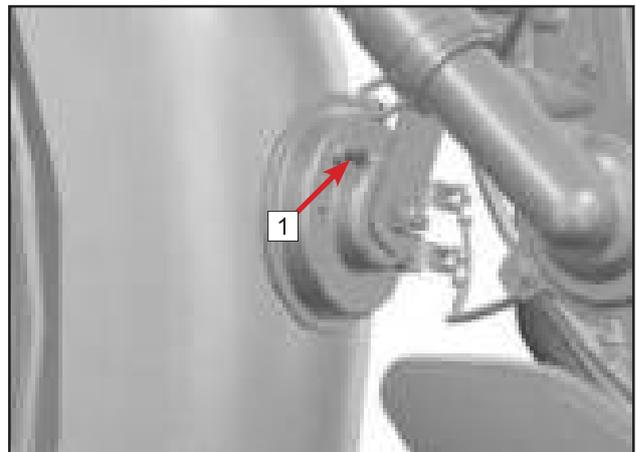
Operate horn switch.

Check whether the horn works.

If the speaker has no sound or the sound is muted.

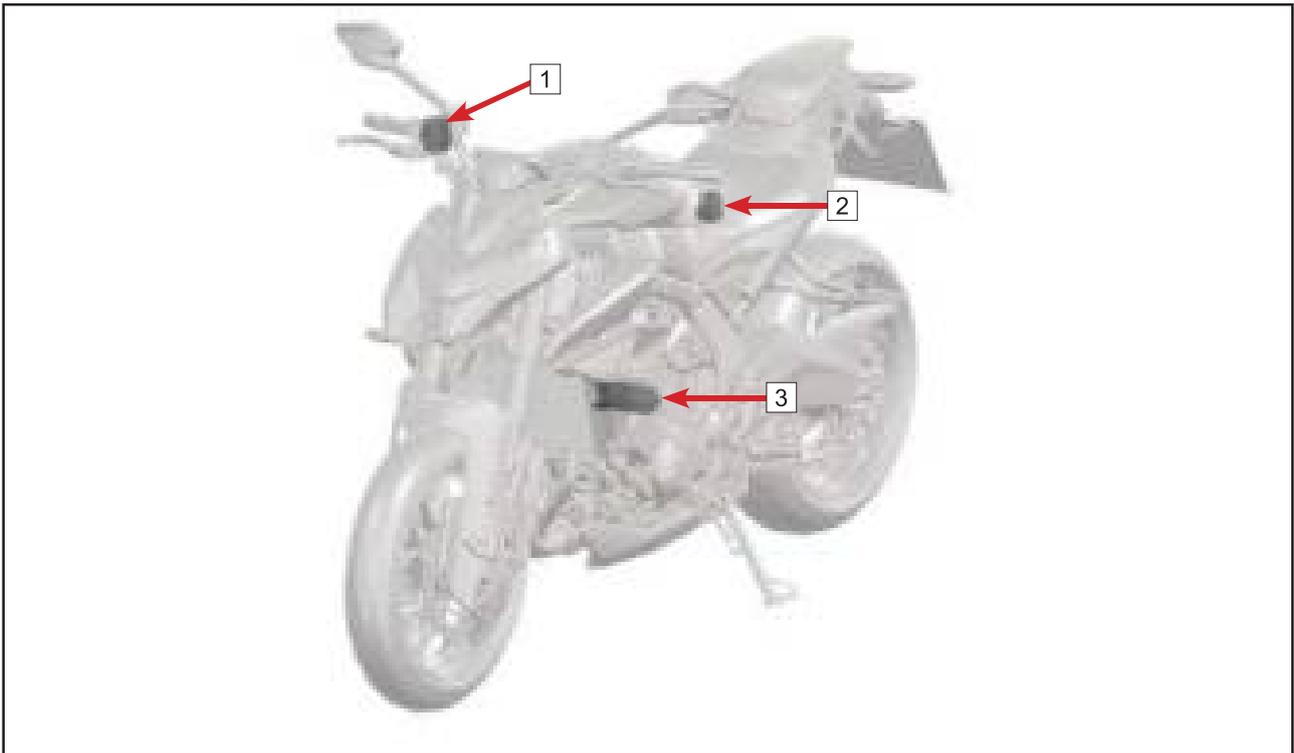
Adjust the bolt **1**.

If the horn fails after adjusting the bolt **1** replace it with a new part.



## 12.8 Starting System

### 12.8.1 Starting System Position



1	Starting switch	2	Starter relay	3	Starter motor
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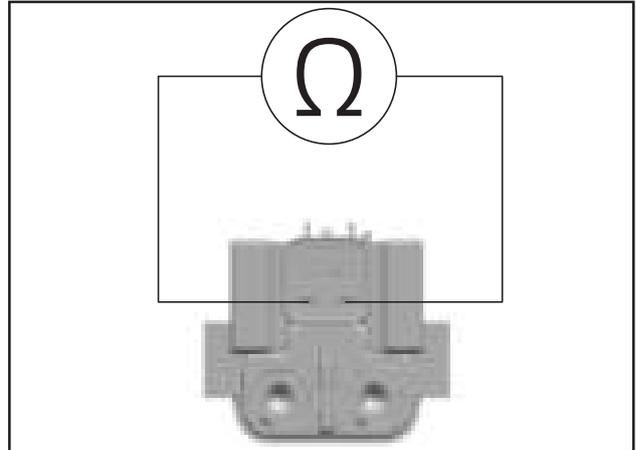
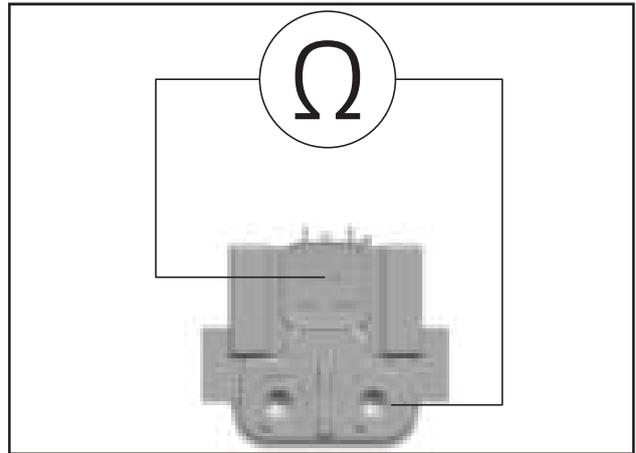
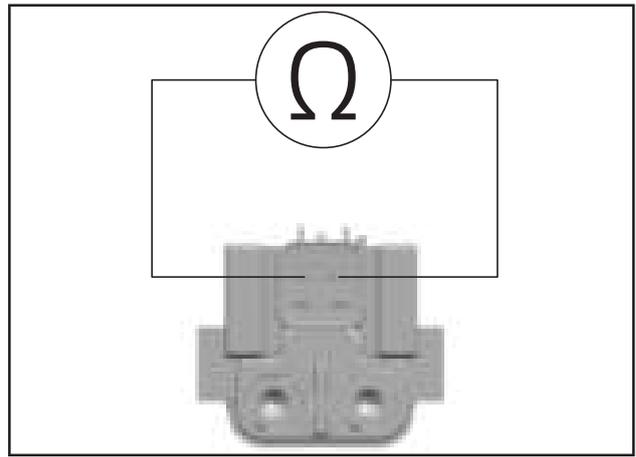
## 12.8.2 Starter Relay

### 12.8.2.1 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.

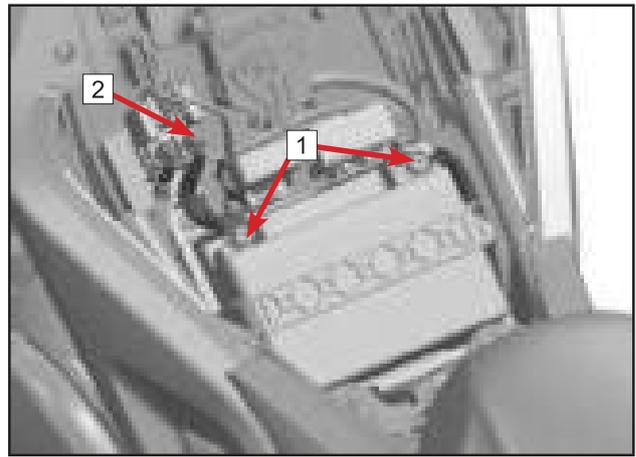
If there is no beep, the starter relay may be damaged, please replace it with a new part.



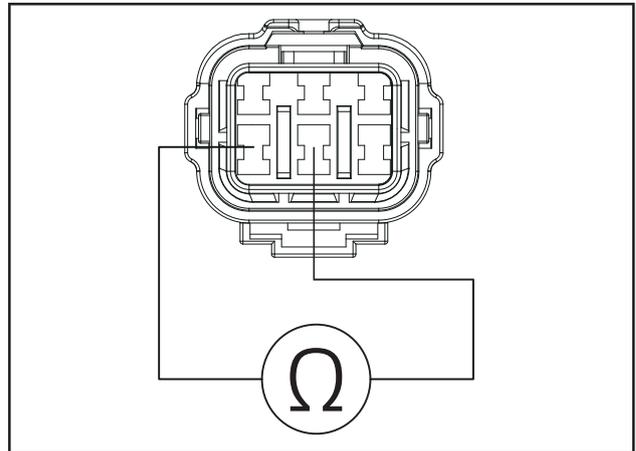
## 12.8.2.2 Starter Relay Operation Inspection

1. Disconnect the positive and negative terminals of battery [1].
2. Disconnect the starter relay starter motor power cord [2]. And do the insulation between the power supply terminals of the starting relay.
3. Connect the positive and negative terminals of battery [1].
4. Operate the ignition switch for about 5 seconds, at this time you will hear the starter relay ticking, indicating that the starter relay works normally.

If there is no ticking sound, the start switch or starter relay may be in poor contact or damaged. Check the start switch or starter relay and replace the damaged part.



<b>⚠ CAUTION</b>
<b>The voltage time applied to the relay coil should not exceed two minutes, otherwise it will cause the coil to overheat and cause the coil to burn.</b>



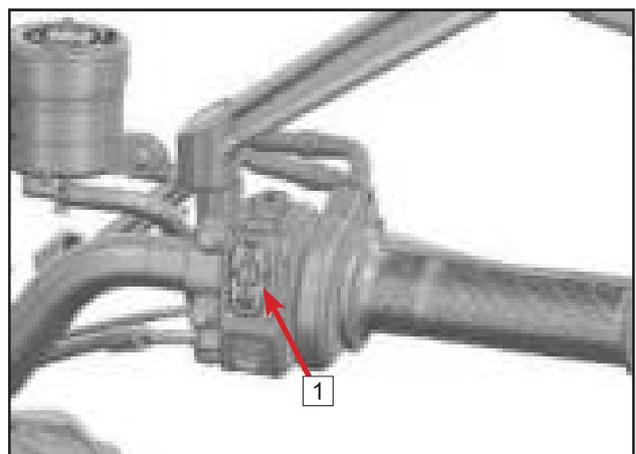
## 12.8.3 Starting Switch

### 12.8.3.1 Starting Switch Path Inspection

Turn off the vehicle power off.

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.

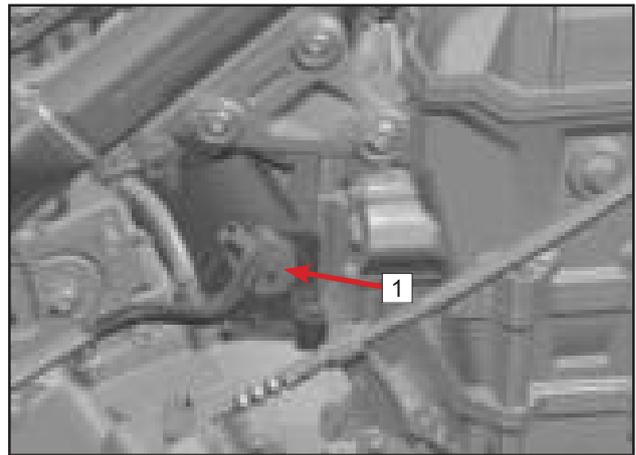
If there is no beep, the starting switch may be in poor contact or damaged. Please replace it with a new one.



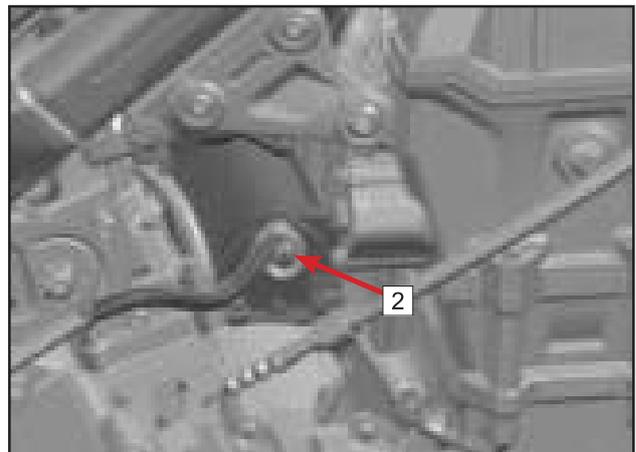
## 12.8.4 Starter Motor

### Removal

Remove protective sleeve **1**.



Remove nut **2**.

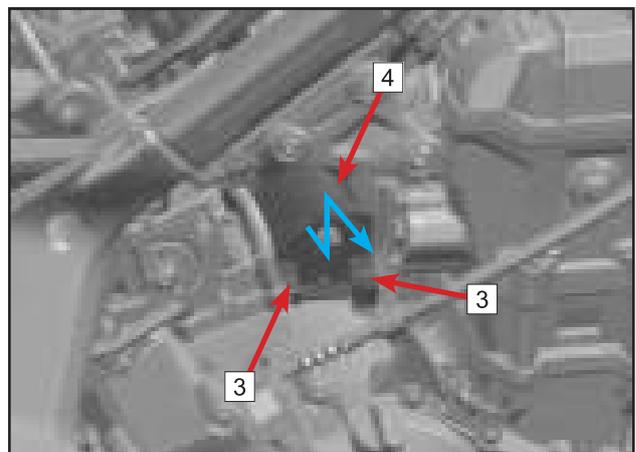


Remove bolt **3**.

Remove starter motor **4**.

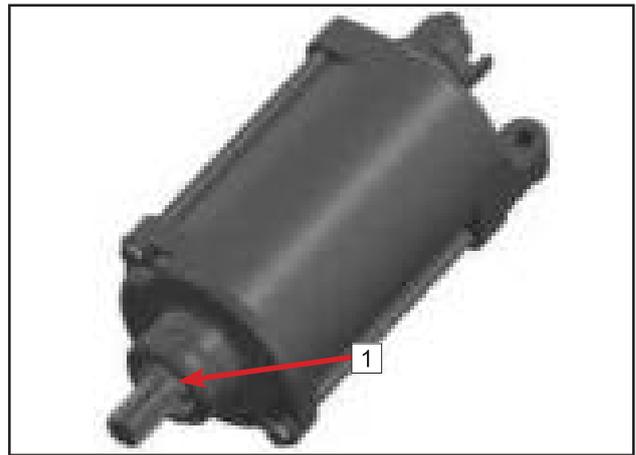
### Installation

Reverse the removal procedures for installation.



## 12.8.4.1 Starter Motor Appearance Inspection

Check the position 1 for ablativ marks. If any ablativ marks appear, replace them with new parts.



## 12.8.4.2 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.

## 12.9 Tipping Sensor

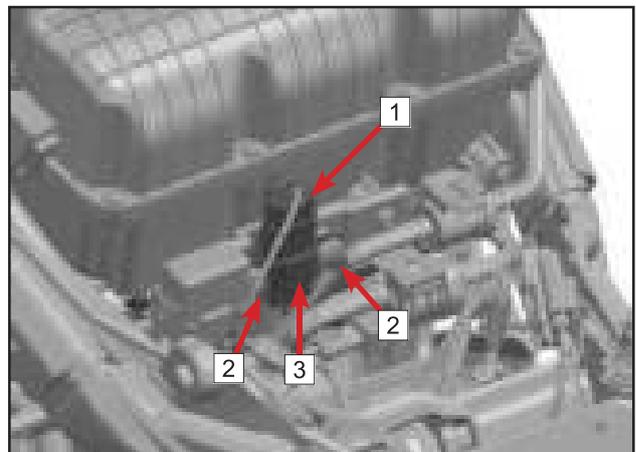
### Removal

- 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.



## 12.9.1 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.

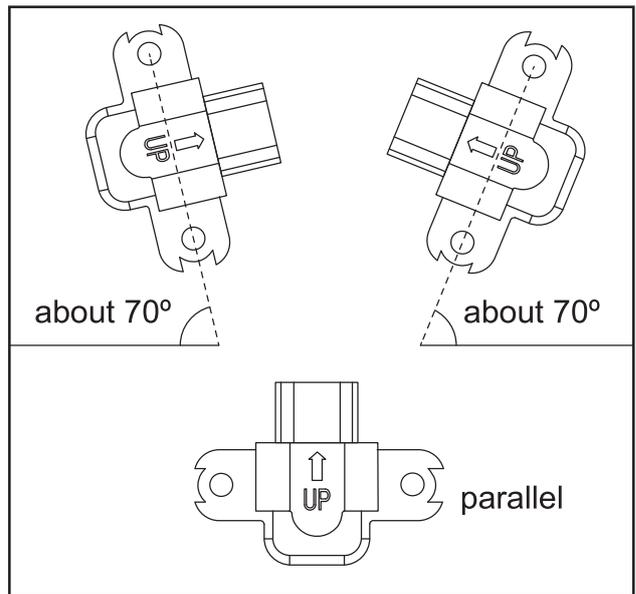
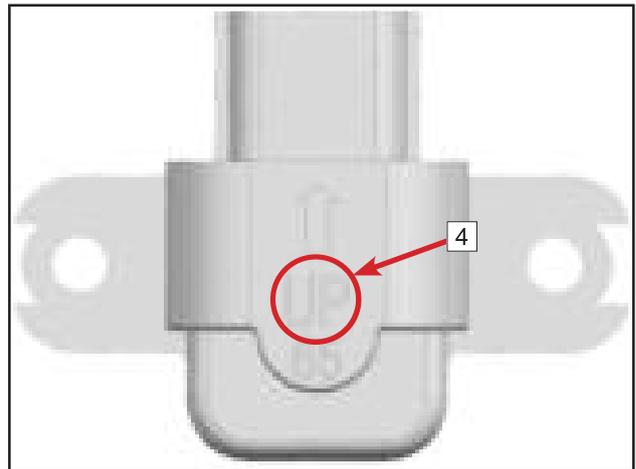
1. The wiring cable cannot be started properly, check whether the wiring cable is short-circuited or disconnected.

2. If the wiring cable is correct, replace the tipping sensor.

Place the tipping sensor about  $70^\circ$  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.



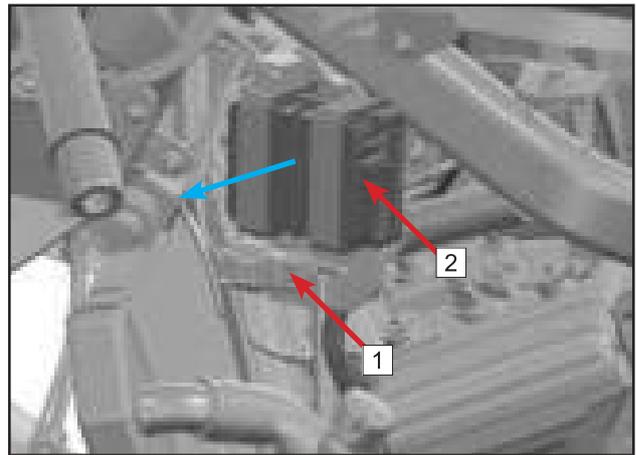
## 12.10 T-BOX

### Removal

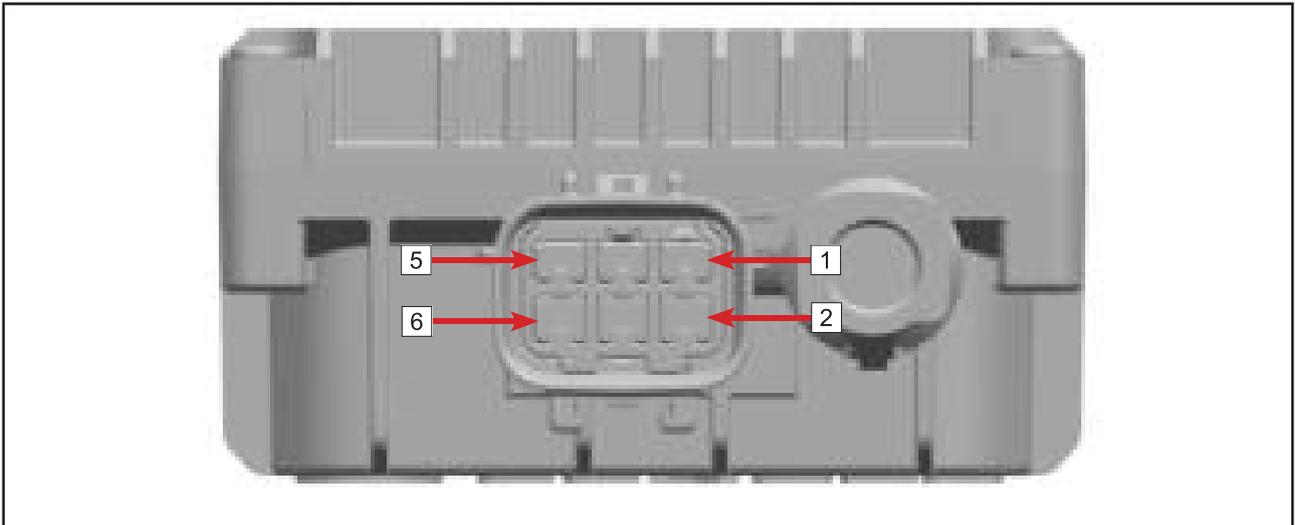
Turn off the vehicle power supply.  
Remove radiator LH pedal (see chapter 06).  
Disconnect the connector **1**.  
Remove T-BOX **2**.

### Installation

Reverse the removal procedures for installation.



### 12.10.1 T-BOX Pin Function



1	VBAT	2	KL.15	3	CAN H
4	CAN L	5	NC	6	GND

## 12.10.2 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_H [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.

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4	U118287	Lost communication of M M I	<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. Check MMI 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>
5	U11C087	Lost communication of B C M	<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. Check BCM 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>
6	B1A4087	KL30 Disconnected	<p>Condition: The vehicle is powered off. Remove the battery.</p> <ol style="list-style-type: none"> <li>1. Use the multimeter to measure the battery voltage.</li> <li>2. Use a multimeter to measure the connectivity between the VBAT of TBOX part and the vehicle B+. If the communication does not occur,, check the wiring harness.</li> <li>3. Use a multimeter to measure the connectivity between the GND of TBOX part and the vehicle GND. If the communication does not occur, 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>

7	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>
8	U110B87	L o s t F A M D c o m m u n i c a i t o n	<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. Check FAMD 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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9	U110C87	L o s t R A M D c o m m u n i c a i t o n	<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. Check RAMD 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>
10	U010587	L o s t D A S H c o m m u n i c a i t o n	<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. Check DASH 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>
11	U012187	Lost ABS communicaiton	<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. Check ABS 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>

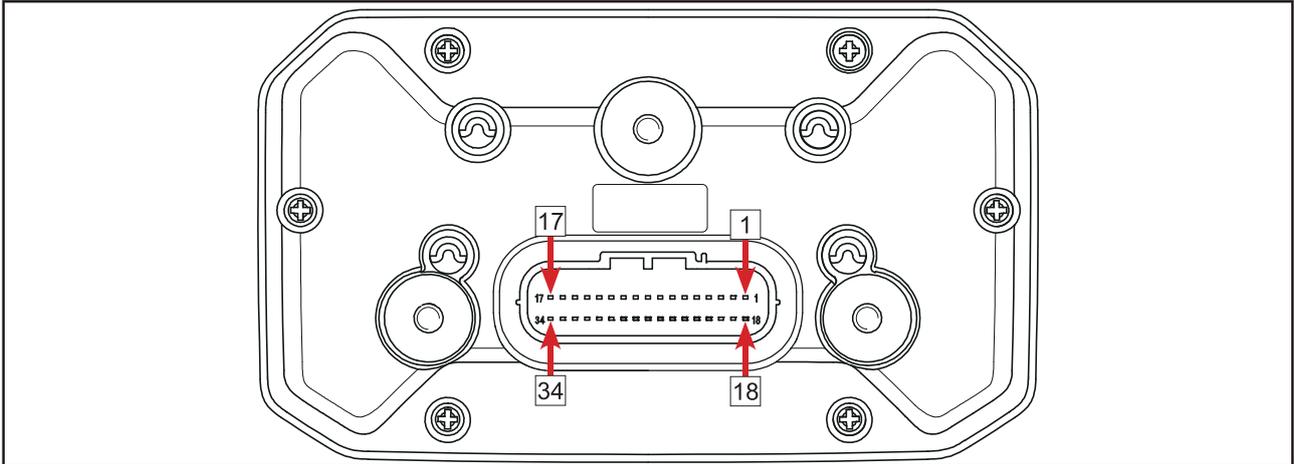
12	U018087	L o s t L a m p c o m m u n i c a i t o n	<p>Condition: The vehicle is powered off. Remove the battery.</p> <ol style="list-style-type: none"> <li>1. Use a multimeter to measure the resistance between CAN_H [PIN6] and CAN_L [PIN14] at the OBD port. The measured resistance should range from 54Ω to 66Ω. If the measured resistance is not within the range, check the cable harness.</li> <li>2. Check Lamp 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>
13	U014087	L o s t M C U c o m m u n i c a i t o n	<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. Check MCU 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>
14	U015587	L o s t D A S H c o m m u n i c a i t o n	<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. Check DASH 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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15	U114087	Lost communication of A B S / M S C	<p>Condition: The vehicle is powered off.</p> <p>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. Check ABS/MS C 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>
16	U118187	Lost communication of D A S H	<p>Condition: The vehicle is powered off.</p> <p>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. Check DASH 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>

## 12.11 Dashboard

### 12.11.1 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 (reserved)
4	Oil pressure signal	Low side control signal (reserved)
5	Fuel signal	Resistance signal (450Ω big resistance)
6	High-beam light signal	High side control signal 12V (reserved)
7	Position light signal	High side control signal 12V (reserved)
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	Power negative	Power GND
15	Power negative	Power GND
16	E-door lock	High side control signal 12V
17	Power Positive	Power +
18	Fuel signal (90Ω low resistance)	Resistance signal (reserved)
19	Speed signal	Square wave input signal (reserved)
20	Starting GND signal	Output suspension/GND signal (control 200mA 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	Fn key	Low side control signal
29	TC signal	Low side control signal
30	12V power output	Buzzer output (reserved)

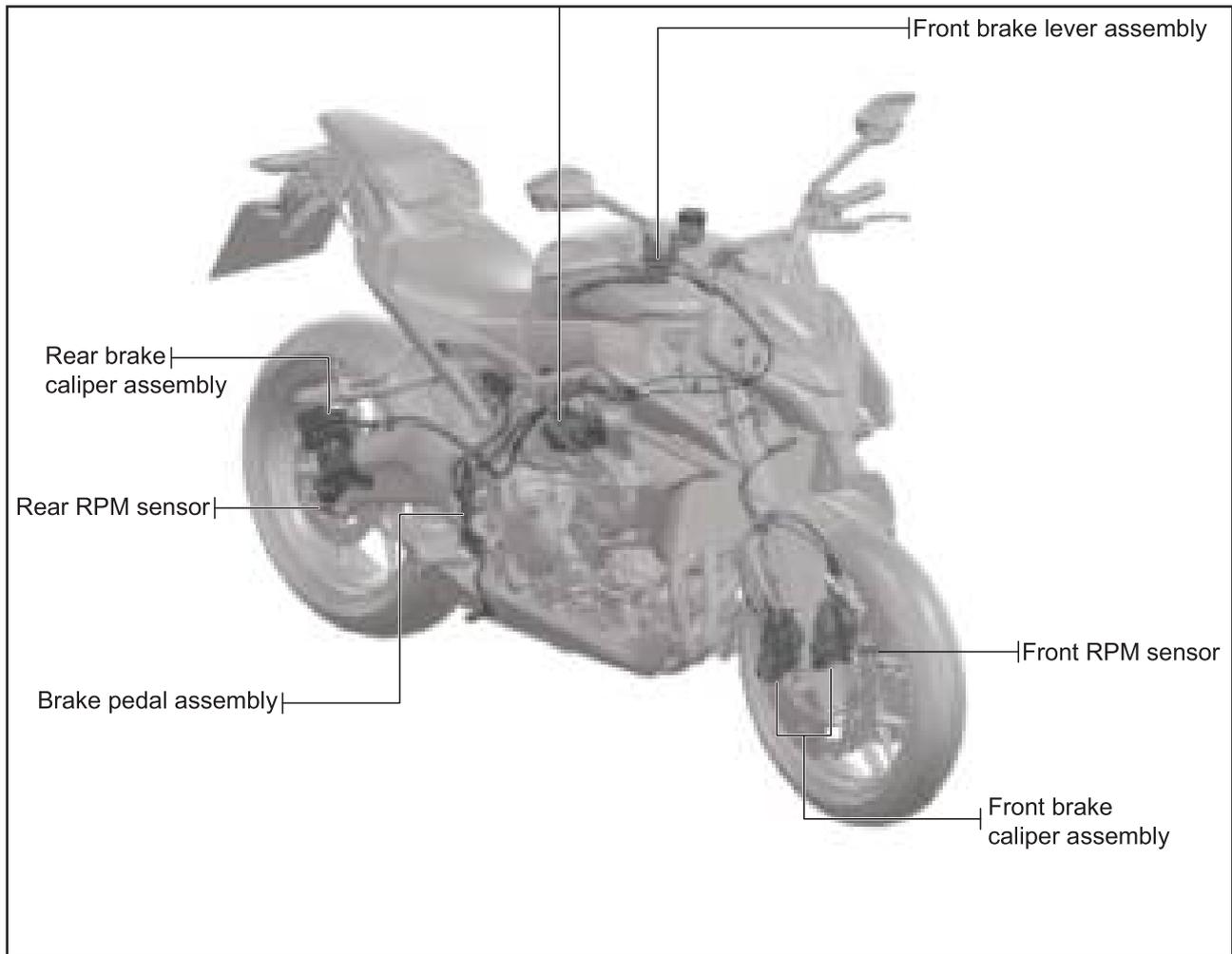
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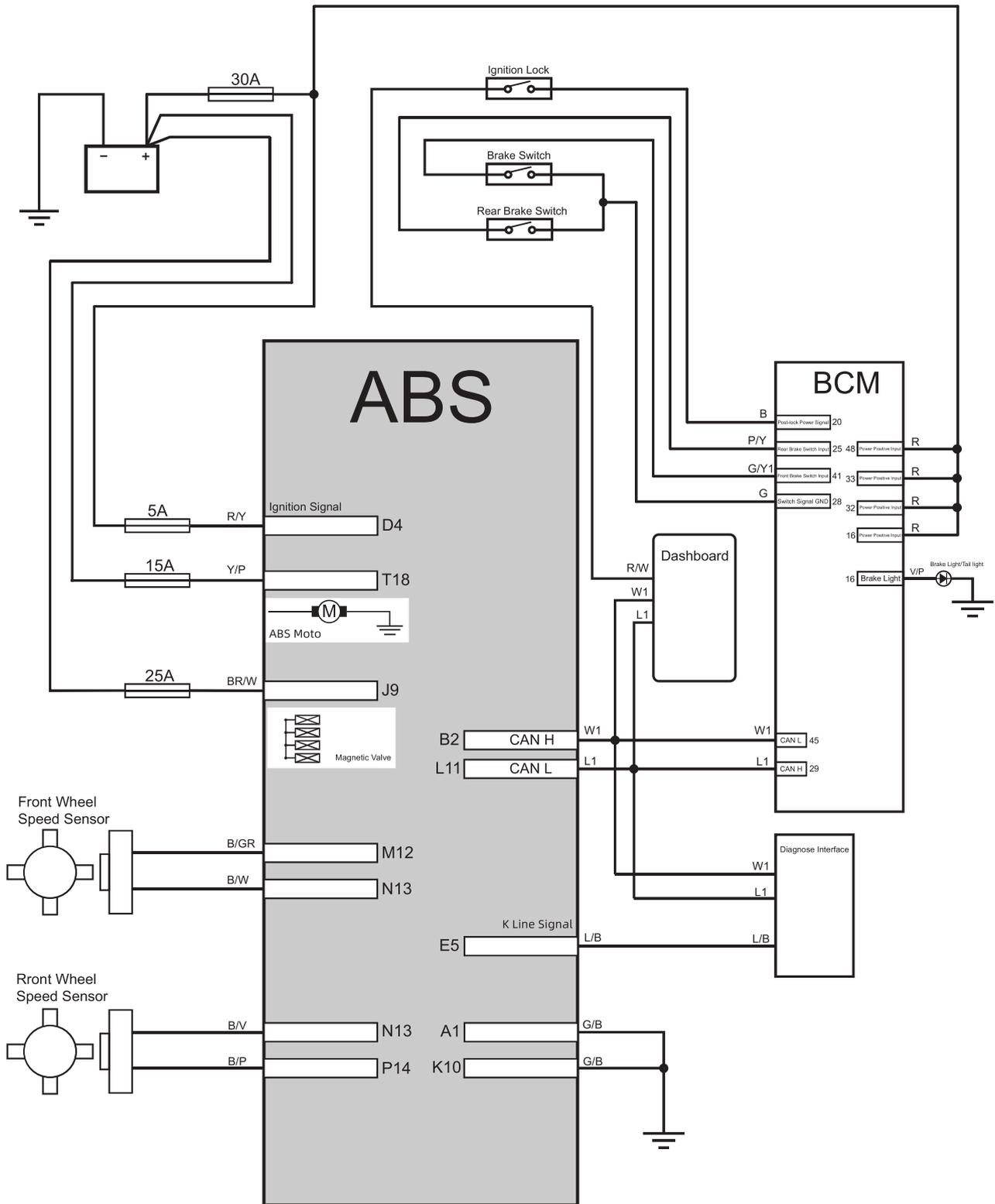
31	Environment temp. sensor	Resistance signal (reserved)
32	Stop switch signal	High side control signal 12V (reserved)
33	CAN-L	CAN signal
34	CAN-H	CAN signal

## 12.12 Anti-lock Braking System (ABS)

### 12.12.1 Anti-lock Braking System (ABS) Position



## 12.12.2 ABS Diagram



## 12.12.3 ABS Fault Code

**Tip: The ABS fault indicator may flash under the following conditions.**

1. Excessive or insufficient tire pressure.
2. Install non-standard tires or modify the tire hub size without permission.
3. Tire or hub deformation.
4. Replace non-original parts after vehicle accident.

**The ABS light may flash when driving under the following conditions.**

1. ABS continuous work.
2. After the vehicle is powered on and started, drive at a low speed for 10S.
3. Acrobatic maneuver.
4. ABS is disturbed by strong magnetic field.

Number	DTC	Description
1	C080860	ECU voltage low
2	C080863	ECU voltage high
3	C080706	ECU error (hardware, microcontroller error)
4	U13445F	CAN Bus offline error
5	C080904	Front shaft wheel speed sensor: (signal failure) out of range, loss, noise, discontinuity
6	C080901	Front shaft wheel speed sensor: signal line and GND short circuit or open, power supply line open
7	C080914	Rear shaft wheel speed sensor: (signal failure) out of range, loss, noise, discontinuity
8	C080911	Rear shaft wheel speed sensor: the signal line is short to GND or open, power supply line open
9	C080703	Oil valve failure
10	C08071A	Return pump failure
11	C08070E	Valve relay error
12	U135430	Lost communication with 110
13	U135440	Lost communication with 123

## 12.12.4 ABS Troubleshooting

### ABS Controller Power Supply Detection

1. The ignition switch is off.
2. Check whether the ABS fuse is blown.

#### Whether the fuse is blown:

YES - Replace fuses of the same specification and retest.

NO - Check whether the cable cable end is short-circuited.

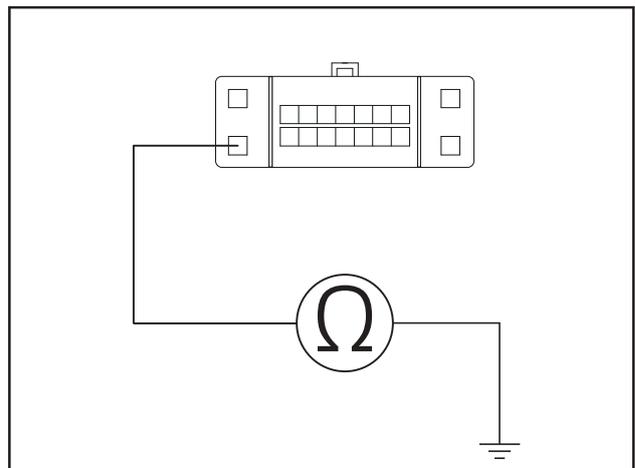
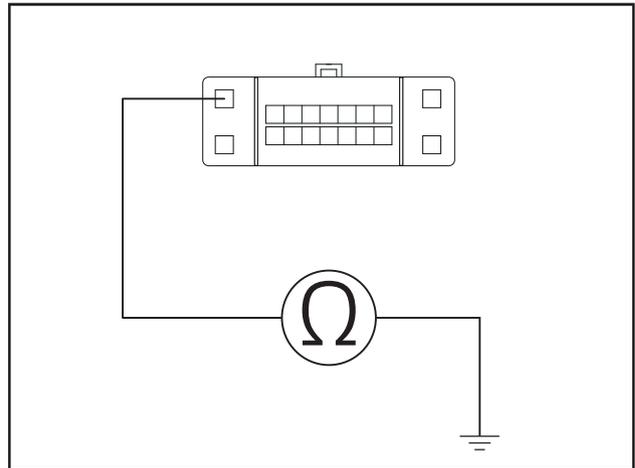
### ABS Controller Wire Cable End Short Circuit Detection

1. Turn off the ignition switch.
2. Remove the ABS fuse.
3. Disconnect the ABS controller connector
4. Check whether the ABS controller wire cable is properly connected to the GND.

#### Whether connected

YES - Replace the cable and check again.

NO - Intermittent failure, poor contact or loose connector.



## DTC C080860 (Battery Voltage Too Low)

1. The ignition switch is off.
2. Use a multimeter to check whether the battery voltage is too low.

### Whether the battery voltage is too low

YES - Charge or replace the battery.

NO - Use DSCAN to eliminate fault codes and redetect them.

## DTC C080863 (Battery Voltage Too High)

1. The ignition switch is off.
2. Use a multimeter to check whether the battery voltage is too high.

### Whether the battery voltage is too High

YES - Replace the battery or check whether the charging system is faulty.

NO - Use DSCAN to eliminate fault codes and redetect them.

## DTC 480706 (ECU Error)

1. Turn on the ignition switch.
2. Use DSCAN to eliminate fault codes.
3. Turn off the ignition switch and turn it on again. After starting the vehicle and running for about 2 minutes, turn off the vehicle. Use DSCAN again to check whether the fault code is displayed.

Whether the fault code is displayed.

YES - Replace the ECU and check again.

NO - Intermittent failure, poor contact or loose connector.

## DTC 13445F U135430 U135440 (CAN BUS offline error, loss communication with 110 and 123)

### CAN Line On-off Detection

1. Turn off the ignition switch.
2. Disconnect ABS/ dashboard /BCM connector.

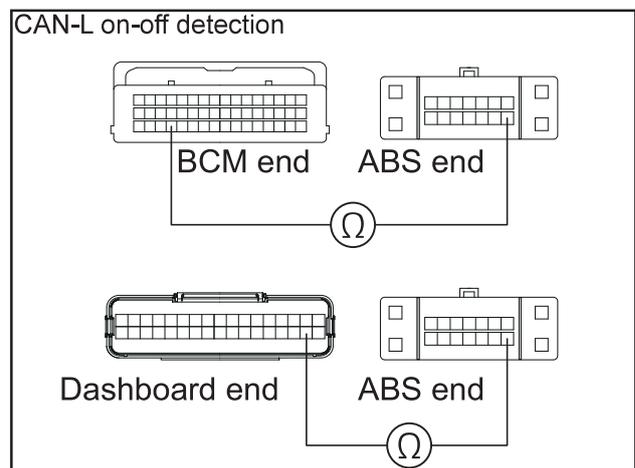
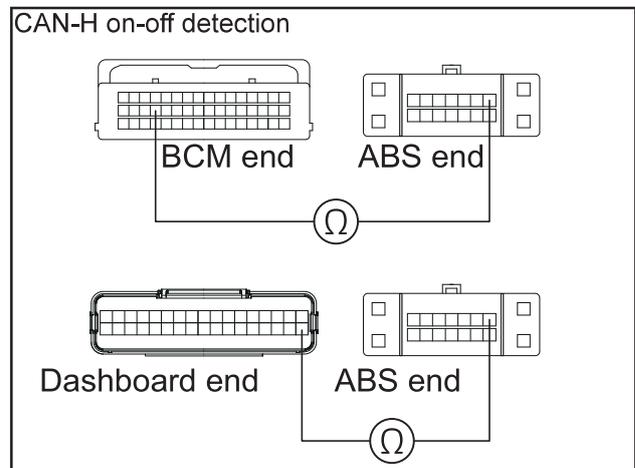
3. Use a multimeter to check whether the CAN line at the end of each cable harness is disconnected.

### Check whether the connection is normal

YES - Intermittent failure, poor contact or loose connector.

Or ABS controller is damaged.

NO - Check again after replacing the main cable.



## CAN Line Voltage Detection

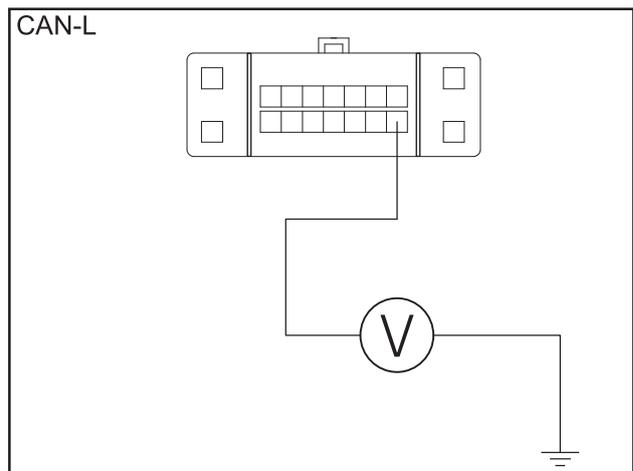
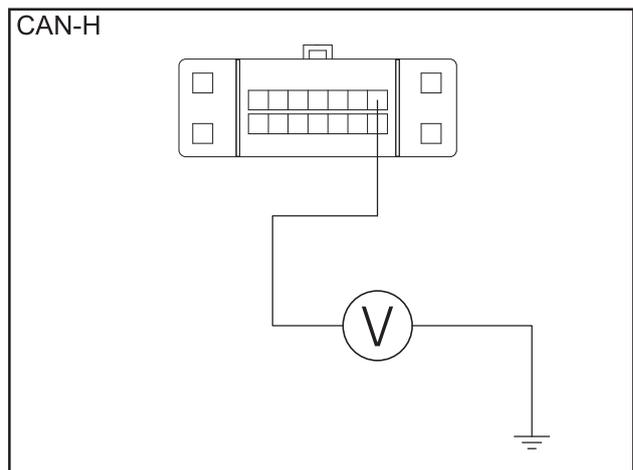
1. Turn off the ignition switch.
2. Disconnect the ABS controller connector.
3. Turn on the ignition switch and use a multimeter to detect whether the CAN line voltage fluctuates within 5V.

**Whether the voltage fluctuates within 5V**

YES - Intermittent failure, poor contact or loose connector.

Or ABS controller is damaged.

NO - Check again after replacing the main cable.



**DTC C080904 C080901 C080914 C080911 (Front and rear wheel speed sensors (signal failure) out of range, loss, noise, discontinuity, short circuit or open circuit between signal line and GND, open power supply line)**

## Signal Detection

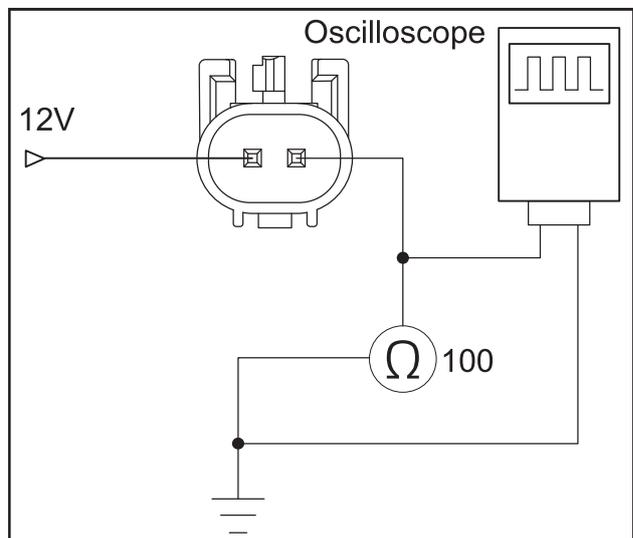
1. Use oscilloscope to detect as shown on the right.
2. Turn the wheel hub and observe whether the frequency displayed by the oscilloscope is linear.

**Whether the frequency is linear**

YES- Check whether the gear ring is damaged. Check whether the clearance between the gear ring and the sensor is normal, and check whether the tire is abnormal.

Intermittent failure, poor contact or loose connector.

NO - Replace with new parts and check again.



## Wheel Speed Sensor Voltage Detection

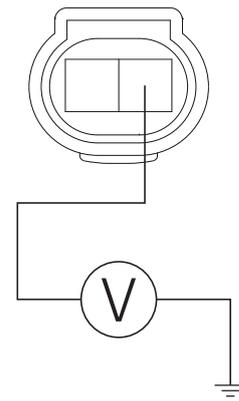
1. Disconnect the wheel speed sensor connector.
2. Turn on the ignition switch.
3. Use a multimeter to check whether the voltage of cable cable terminal is within 0.25V-1.8V.

**Whether the voltage is within 0.25V-1.8V.**

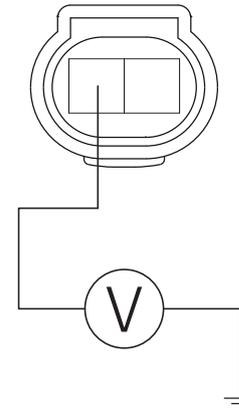
YES - Intermittent failure, poor contact or loose connector.

NO - Replace the ABS controller and check it again.

Front wheel speed sensor



Rear wheel speed sensor



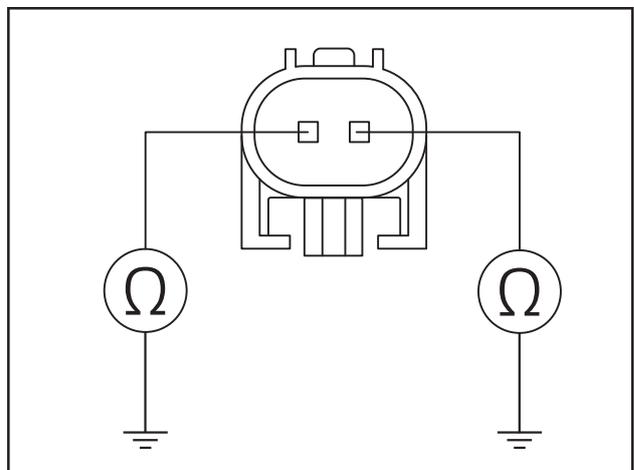
## Wheel Speed Sensor Short Circuit Detection

1. Disconnect the wheel speed sensor connector.
2. Check whether the wheel speed sensor is properly connected to the GND.

**Connect or not**

YES - Replace with new parts and check again.

NO - Intermittent failure, poor contact or loose connector.



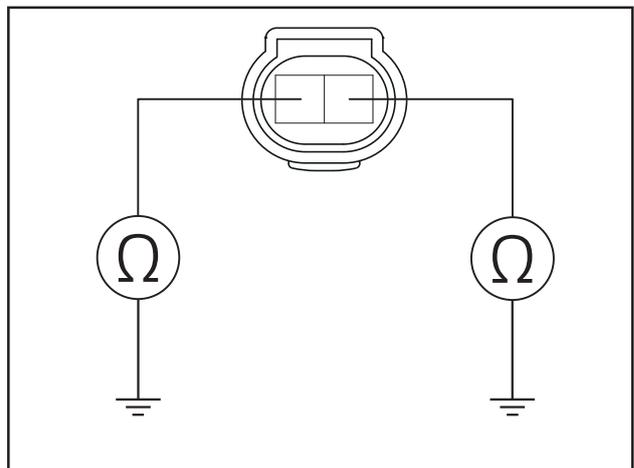
## Wheel Speed Sensor Cable Short Circuit Detection

1. Disconnect the ABS controller connector.
2. Check whether the wire cable of the wheel speed sensor is properly connected to the GND.

**Connect or not**

YES - Replace the cable and check again.

NO - Intermittent failure, poor contact or loose connector.



## Wheel Speed Sensor Cable End On and Off Detection

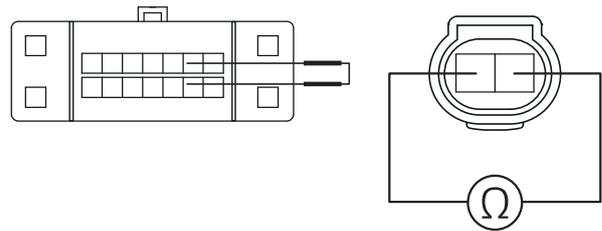
1. Disconnect the ABS controller connector.
2. ABS wire cable end short with positive and negative pins.
3. Check whether the cable end of the wheel speed sensor is properly connected.

### Connect or not

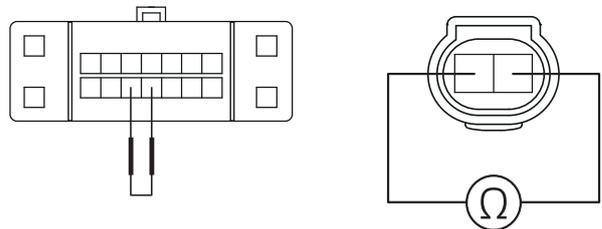
YES - Intermittent failure, poor contact or loose connector.

NO - Replace the cable and check again.

Front wheel speed sensor



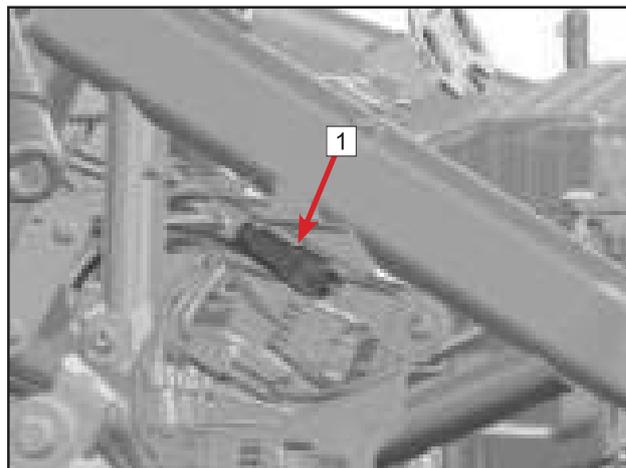
Rear wheel speed sensor



## 12.13 Front/Rear Wheel Speed Sensor

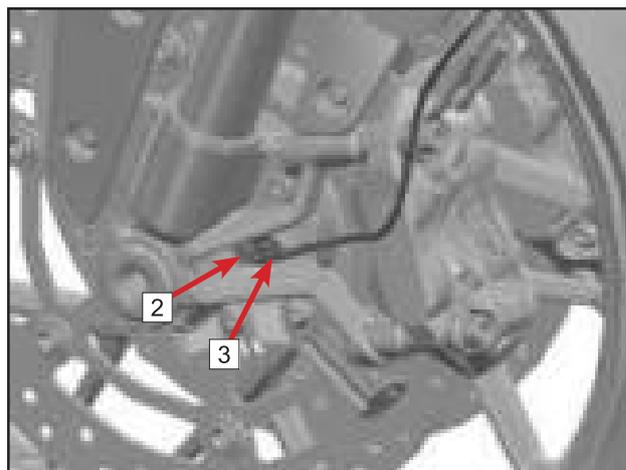
### 12.13.1 Front Wheel Speed Sensor Removal

Disconnect the connector **1**.



Remove bolt **2**.

Remove front wheel speed sensor **3**.

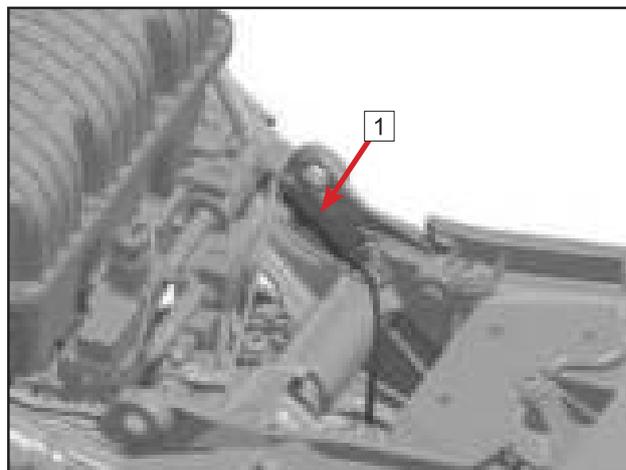


### Installation

Reverse the removal procedures for installation.

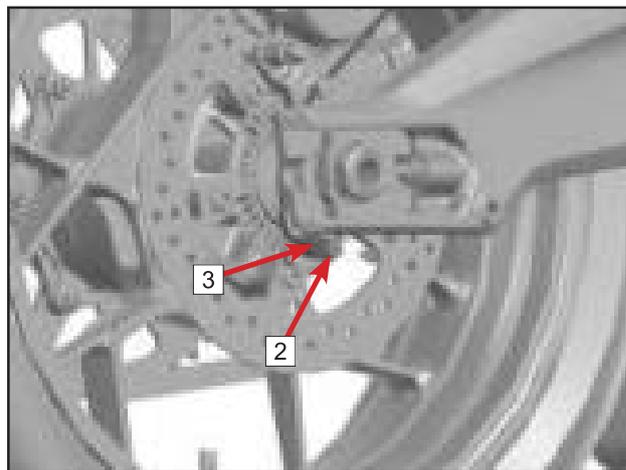
### 12.13.2 Rear Wheel Speed Sensor Removal

Disconnect the connector **1**.



Remove bolt **2**.

Remove rear wheel speed sensor **3**.



### Installation

Reverse the removal procedures for installation.

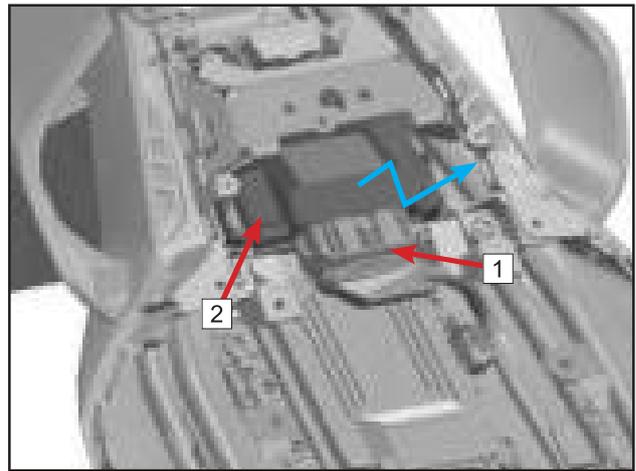
## 12.14 BCM

### Removal

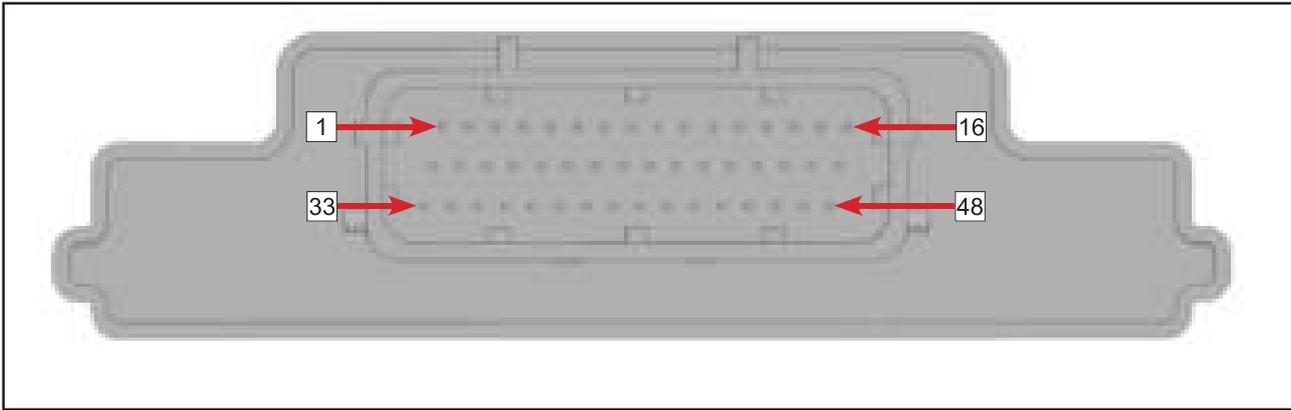
Turn off the vehicle power supply.  
Disconnect the connector **1**.  
Remove BCM **2**.

### Installation

Reverse the removal procedures for installation.



## 12.14.1 BCM Pin Function



Pin	Function	Remark	Pin	Function	Remark
1	Rear RH turn light	High pressure	25	Rear brake switch	Low pressure
2	Starter relay control +	High pressure	26	Stop switch	Low pressure
3	Front RH turn light	High pressure	27	Warning switch	Low pressure
4	Low-beam light	High pressure	28	Switch signal GND	Low pressure
5	High-beam light	High pressure	29	CAN_H	CAN2.0
6	Horn switch	Low pressure	30	/	/
7	Oil pressure signal	Low pressure	31	Brake light	High pressure
8	Power negative	GND	32	Power +	Power supply
9	RH turn switch	Low pressure	33	Power +	Power supply
10	High-beam switch	Low pressure	34	IGP wakeup power	High pressure
11	/	/	35	/	/
12	Grip heating PWM (reserved)	High pressure	36	/	/
13	Front/rear position light+License light+Handlebar backlight	High pressure	37	/	/
14	/	/	38	/	/
15	Horn	High pressure	39	Turn return switch	Low pressure
16	Power positive	Power supply	40	Power -	GND
17	Supply power to EC ECU	High pressure	41	Front brake switch	Low pressure
18	Rear LH turn switch	High pressure	42	Power -	GND
19	Front LH turn switch	High pressure	43	START switch	Low pressure
20	Ignition switch	High pressure	44	/	/
21	/	/	45	CAN_L	CAN2.0
22	LH turn switch	Low pressure	46	Shutdown animation	High pressure
23	/	/	47	ECU enable start signal	Low pressure
24	/	/	48	Power +	Power supply

# 12 Electrical System

## 12.14.2 BCM Fault Code

Number	Code	DTC Meaning	Corrective Action
1	B111716	Vehicle power supply voltage below threshold	Check power supply battery
2	B111717	Vehicle power supply voltage above threshold	Check power supply battery
3	U007388	CAN bus off fault of BICAN BICANBusOff	Check power supply battery
4	U114087	Lost communication of ABS_Wheel_Speed_info	Check the CAN bus.
5	U010087	Lost communication of ECM_Engine_RPM_and_others ECM_Engine_RPM_and_others	Check the CAN bus.
6	U118287	Lost communication of MMI_Driv_Sens_Req DASH/MMI_Driv_Sens_Req	Check the CAN bus.
7	B100911	K15 load short circuit to ground	Check the CAN bus.
8	B101011	ECU short circuit to ground	Check the wiring cable and the load.
9	B101913	START electric open circuit	Check the wiring cable and the load.
10	B101911	Start short circuit to ground	Check the wiring cable and the load.
11	B101513	horn open circuit	Check the wiring cable and the load.
12	B101511	horn short circuit To the ground.	Check the wiring cable and the load.
13	B110113	Front turn left lamp open circuit	Check the wiring cable and the load.
14	B110111	Front left turn signal lamp short circuit to ground	Check the wiring cable and the load.
15	B110213	Front turn right lamp open circuit	Check the wiring cable and the load.
16	B110211	Front right turn signal lamp short circuit to ground	Check the wiring cable and the load.
20	B110313	Rear turn left lamp open circuit	Check the wiring cable and the load.
21	B110311	Rear left turn signal lamp short circuit to ground	Check the wiring cable and the load.
22	B110413	Rear turn right lamp open circuit	Check the wiring cable and the load.
23	B110411	Rear right turn signal lamp short circuit to ground	Check the wiring cable and the load.
24	B110513	Low beam open circuit	Check the wiring cable and the load.
25	B110511	Low beam lamp short circuit to ground	Check the wiring cable and the load.
26	B110613	High beam open circuit	Check the wiring cable and the load.

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<b>Number</b>	<b>Code</b>	<b>DTC Meaning</b>	<b>Corrective Action</b>
27	B110611	High beam short circuit to ground	Check the wiring cable and the load.
28	B110713	Parking lamp open circuit	Check the wiring cable and the load.
29	B110711	Position lamp short circuit to ground	Check the wiring cable and the load.
30	B110A13	Break lamp open circuit	Check the wiring cable and the load.
31	B110A11	Brake lamp short circuit to ground	Check the wiring cable and the load.
32	B110E11	Handle heat open circuit	Check the wiring cable and the load.
33	B110E13	Handle heating short circuit to ground	Check the wiring cable and the load.
34	U220D00	LimpHome DTC	Check the wiring cable and the load.

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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 400kPa) 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.

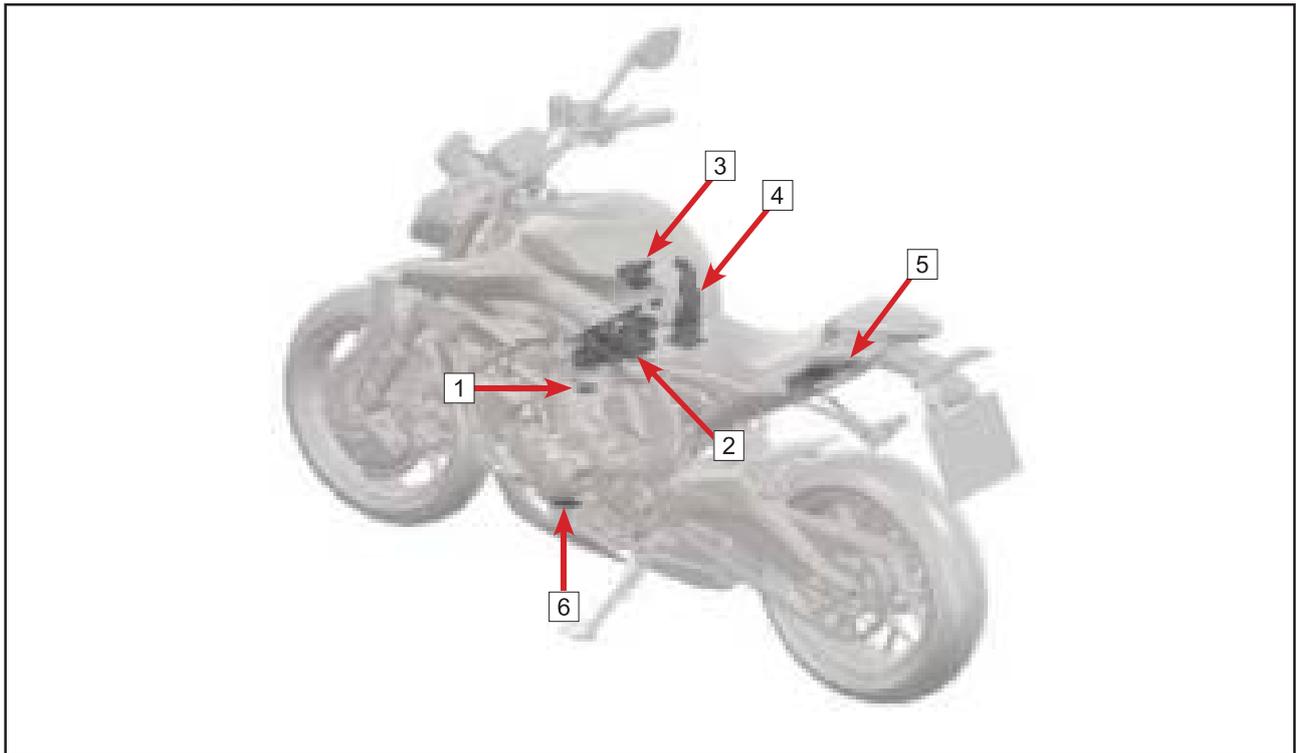
Battery positive/negative wires and electrical control units have to be removed before welding on the vehicle.

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	Water Temperature Sensor	2	Throttle Body Assembly	3	Fuel Level Sensor
4	Gasoline Pump	5	ECU	6	Oxygen 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**.

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.

**⚠ CAUTION**

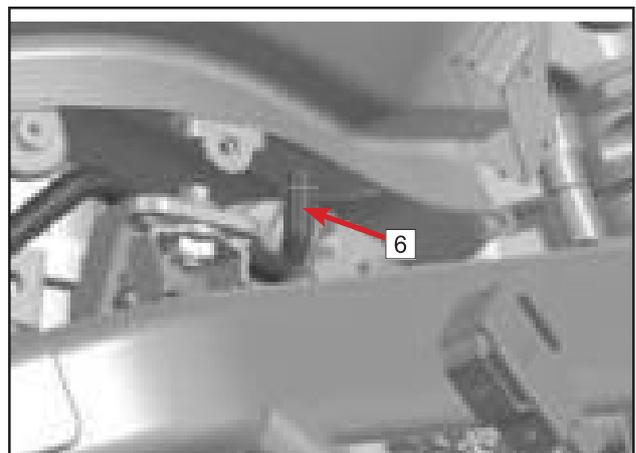
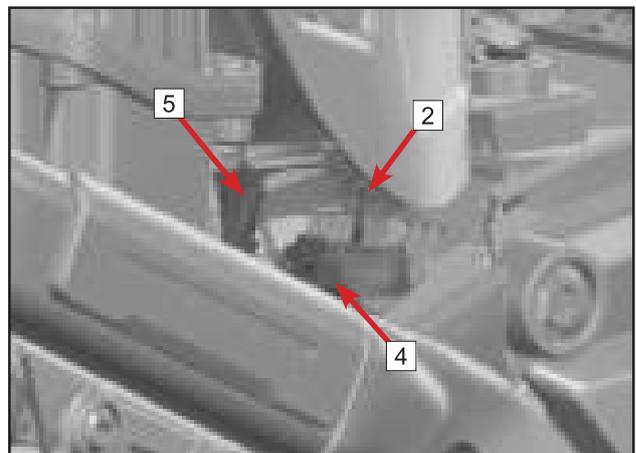
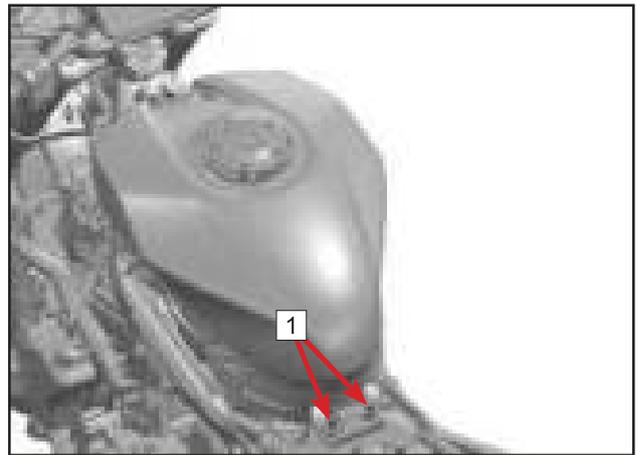
**Before disassembly, please relieve the fuel pressure. Prevent a large amount of fuel overflow when disassembling the tubing, resulting in safety hazards.**

Disconnect the overflow pipe **3**.

Disconnect fuel level sensor connector **4**.

Disconnect the fuel line **5**.

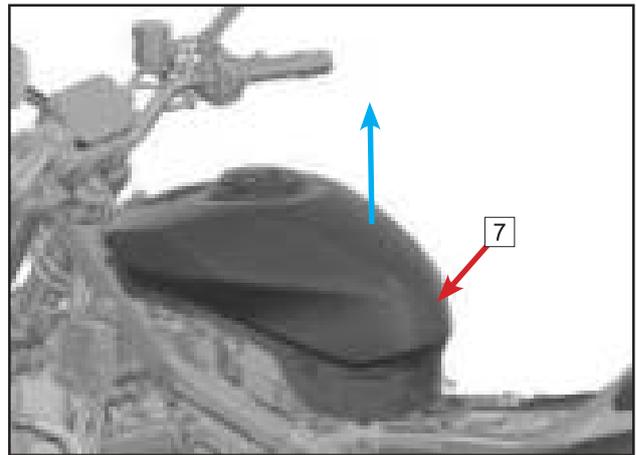
Disconnect the fuel evaporator line **6**.



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

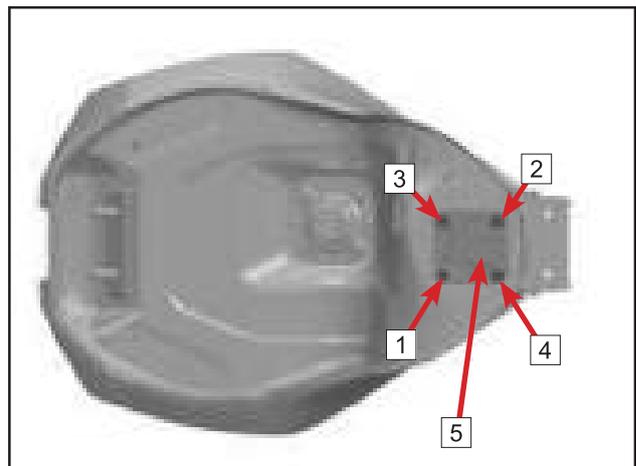
Release pressure in fuel system.

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 leaking.

Remove fuel pump cables and connectors. Clean fuel tank and fuel pump to prevent foreign matters into fuel tank.



<b>NOTE</b>
Excessive foreign matter in the tank may cause the fuel pump to wear out prematurely or block fuel filter.

Remove bolt [1] ~ bolt [4] in sequence.

Remove fuel pump [5] carefully.

<b>NOTE</b>
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.

<b>NOTE</b>
The arrow on fuel pump aligns to fuel tank mark all the way.



Reconnect the quick connector, cable and other parts, start the power supply to test whether the fuel pump starts normally.

Remove bolt [1] ~ bolt [4] in sequence.

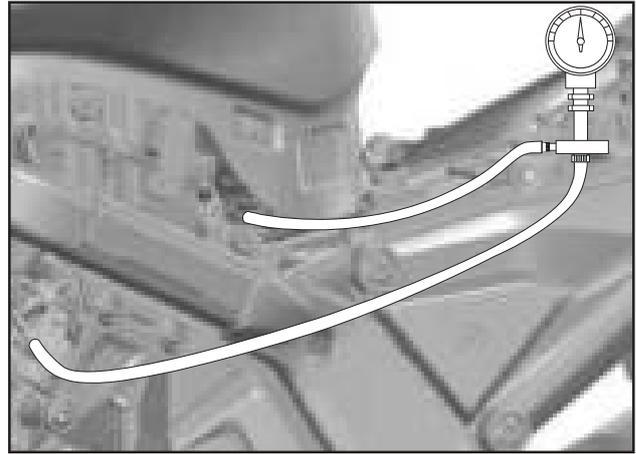
## 13.3.1 Fuel Pump Pressure Test

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 400kpa.

If the fuel pump is lower than 400kpa, the fuel pump assembly is damaged and replace it with a new one.



## 13.3.2 Fuel Level Sensor Detection

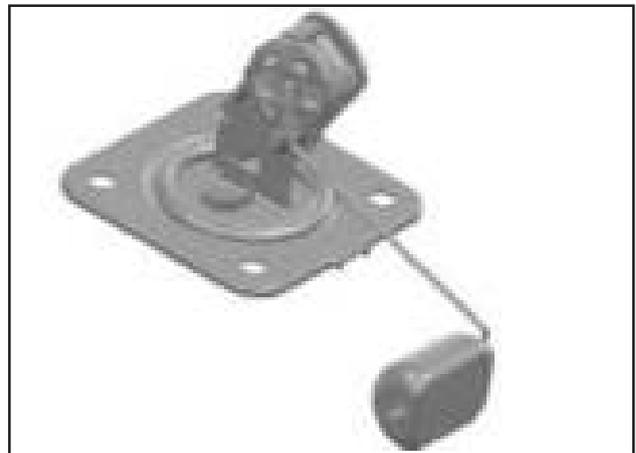
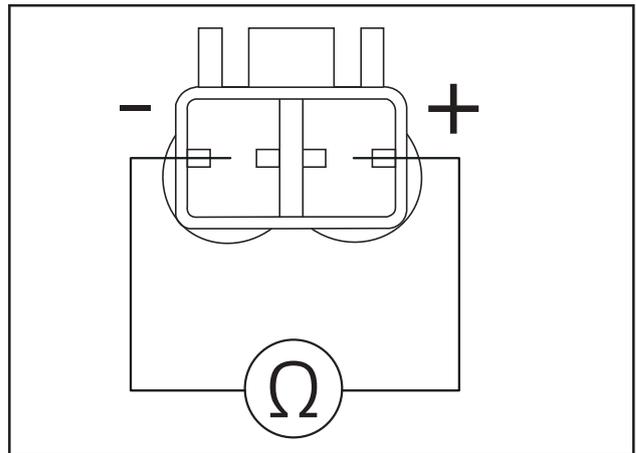
1.The detection method is shown in the figure.

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
80°(F)	10	$\pm 1.5$
76°	50	$\pm 1.5$
67°	130	$\pm 2$
58.3°	210	$\pm 3$
48.5°	290	$\pm 3$
37.5°	370	$\pm 4$
4°	450	$\pm 5$
0°(E)	450	$\pm 5$

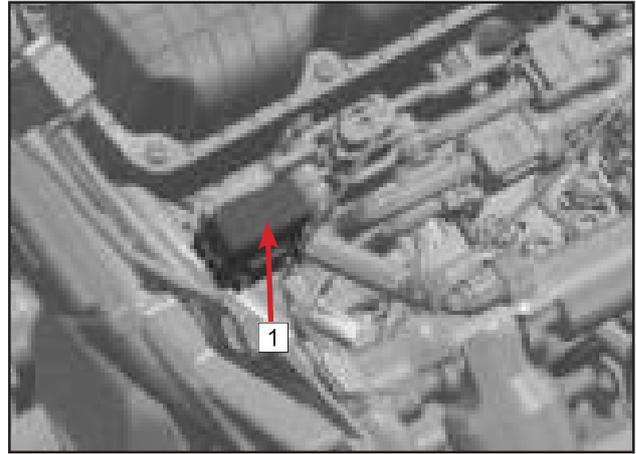
If the resistance value is not within the preceding range, the fuel level sensor is damaged. Replace it with a new one.



## 13.3.3 Fuel Pump Relay

### Removal

Turn off the vehicle power.  
Turn on fuel relay cover 1.



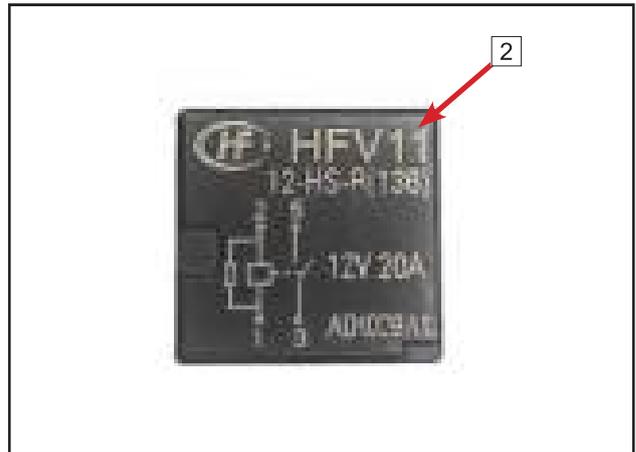
Remove fuel relay 2.  
Check the fuel relay pin for breakage.

**⚠ 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.



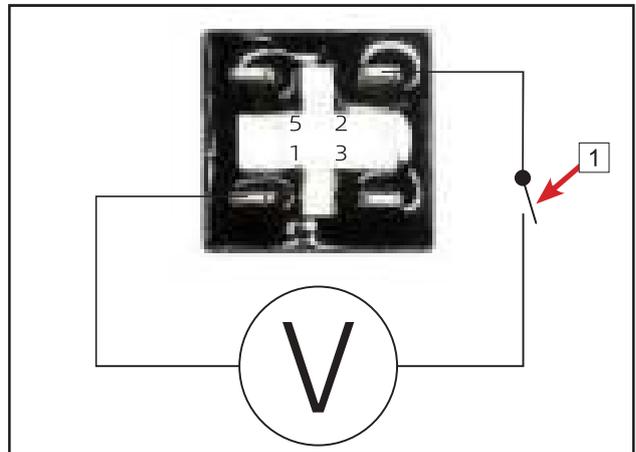
### 13.3.3.1 Fuel Pump Relay Operation Test

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 the vehicle power supply.  
Remove the positive and negative terminals of battery.

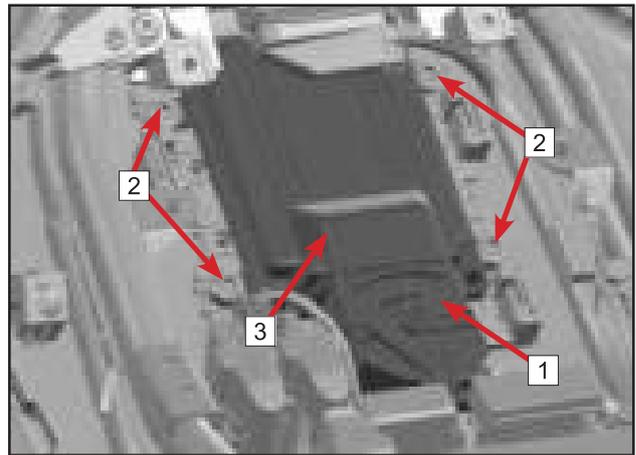
Remove the connector **1**.

Remove bolts **2**.

Remove ECU **3**.

### Installation

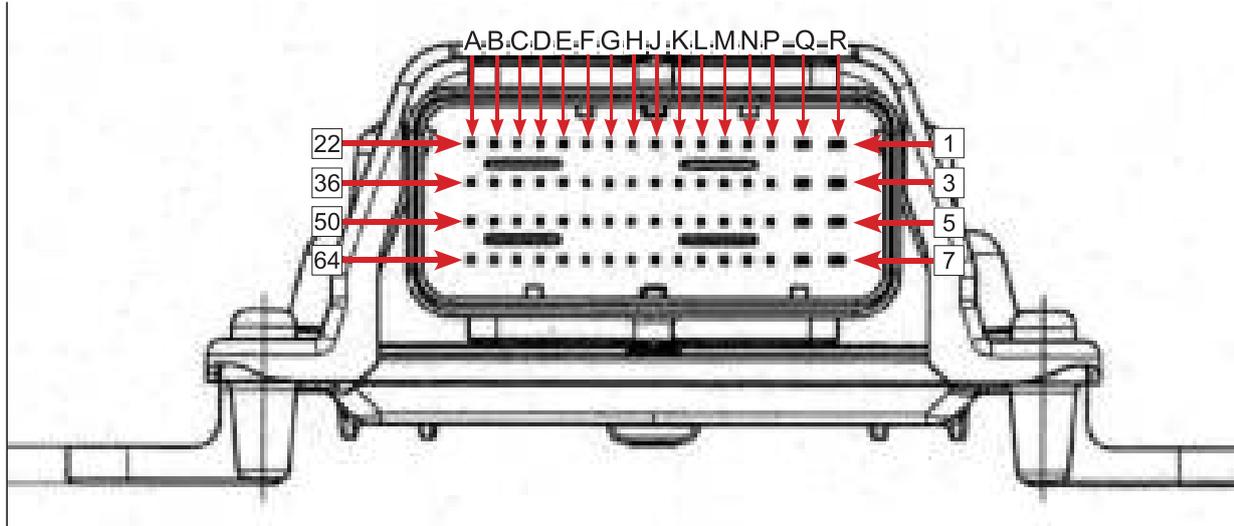
Reverse the removal procedures for installation.



### 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 ECM self-learning faults.

## 13.4.1 ECU Pin Function



Pin	Function	Pin	Function	Pin	Function
1(R1)	Ignition Coil3	2(Q1)	Upstream Oxygen Sensor Heating	3(R2)	Ignition Coil1
4(Q2)	Secondary Gulp Valve	5(R3)	Ignition GND	6(Q3)	/
7(R4)	Ignition Coil2	8(Q4)	Non-sustained Power	9(P1)	/
10(N1)	/	11(M1)	Tipping Switch	12(L1)	Clutch Switch
13(K1)	/	14(J1)	Neutral Switch	15(H1)	/
16(G1)	Sustained Power	17(F1)	IGP Wakeup Output	18(E1)	5V Power 2
19(D1)	5V Power 1	20(C1)	/	21(B1)	Stepper Motor Phase B
22(A1)	Stepper Motor Phase A	23(P2)	Auxiliary Starter Relay	24(N2)	/
25(M2)	Air Intake Temperature Sensor	26(L2)	TPS	27(K2)	/
28(J2)	Second Air Intake Pressure Sensor	29(H2)	/	30(G2)	/
31(F2)	/	32(E2)	Main Relay	33(D2)	CAN H
34(C2)	CAN L	35(B2)	Stepper Motor Phase C	36(A2)	Stepper Motor Phase D
37(P3)	Canister Magnetic Valve	38(N3)	/	39(M3)	Sensor GND 1
40(L3)	Sensor GND 2	41(K3)	Coolant Temp. Sensor	42(J3)	Side Stand Switch
43(H3)	Sensor Power GND1	44(G3)	ECU Wakeup Power	45(F3)	Upstream Oxygen Sensor
46(E3)	Engine RPM Sensor B	47(D3)	Engine RPM Sensor A	48(C3)	Output GND
49(B3)	Injector 2	50(A3)	Injector 1	51(P4)	Non-sustained Power
52(N4)	/	53(M4)	/	54(L4)	/
55(K4)	/	56(J4)	/	57(H4)	/
58(G4)	Quick Shift Signal	59(F4)	Air Intake Pressure Sensor	60(E4)	Fuel Pump Relay
61(D4)	/	62(C4)	Fan Relay	63(B4)	/
64(A4)	Injector 3				

## 13.4.2 EFI Fault Code Table

No.	Code	Description
1	P0122	Throttle/Pedal Pos.Sensor Circ. Low Input
2	P0123	Throttle/Pedal Pos.Sensor Circ. High Input
3	P0602	Control Modul Programming Error
4	P0604	Internal Contr.Module Random Access Memory (RAM) Error
5	P0605	Internal Contr.Module ROM Test Error
6	P1098	DUMP control Circuit low
7	P1099	DUMP control Circuit high
8	P0201	Cylinder 1- Injector Circuit open
9	P0261	Cylinder 1- Injector Circuit Low
10	P0262	Cylinder 1- Injector Circuit High
11	P0202	Cylinder 2- Injector Circuit open
12	P0264	Cylinder 2- Injector Circuit Low
13	P0265	Cylinder 2- Injector Circuit High
14	P0203	Cylinder 3- Injector Circuit open
15	P0267	Cylinder 3- Injector Circuit Low
16	P0268	Cylinder 3- Injector Circuit High
20	P2177	System Too Lean bank1
21	P2178	System Too Rich bank1
22	P2179	System Too Lean bank2
23	P2180	System Too Rich bank2
24	P0053	O2 Sensor Heater Resistance(Bank(1)Sensor 1)
25	P0059	O2 Sensor Heater Resistance(Bank(2)Sensor 2)
26	P0030	O2 Sensor Heater Contr. Circ.(Bank(1)Sensor 1)open
27	P0031	O2 Sensor Heater Contr. Circ.(Bank(1)Sensor 1) Low
28	P0032	O2 Sensor Heater Contr. Circ.(Bank(1)Sensor 1) High
29	P0050	O2 Sensor Heater Contr. Circ.(Bank(2)Sensor 2)open
30	P0051	O2 Sensor Heater Contr. Circ.(Bank(2)Sensor 2) Low
31	P0052	O2 Sensor Heater Contr. Circ.(Bank(2)Sensor 2) High
32	P2300	Ignition Coil "A" Primary Control Circuit low
33	P2303	Ignition Coil "B" Primary Control Circuit low
34	P2306	Ignition Coil "B" Primary Control Circuit low
35	P2309	Ignition Coil "B" Primary Control Circuit low
36	P0508	Idle Air Control Circuit Low
37	P0509	Idle Air Control Circuit Low High
38	P0511	Idle Air Control Circuit
39	P0627	Fuel Pump "A" Control Circuit /Open
40	P0628	Fuel Pump "A" Control Circuit Low
41	P0629	Fuel Pump "A" Control Circuit High
42	P0133	O2 Sensor Circ.,Bank1-Sensor1 Slow Response
43	P0153	O2 Sensor Circ.,Bank1-Sensor2Slow Response
44	P0506	Idle Control System RPM Lower than Expected
45	P0507	Idle Control System RPM Higher than Expected
46	P0105	Manifold Abs.Pressure or Bar.Pressure Circuit
47	P0106	Manifold Abs.Pressure or Bar.Pressure Range/Performance
48	P0107	Manifold Abs.Pressure or Bar.Pressure Low Input
49	P0108	Manifold Abs.Pressure or Bar.Pressure High Input
50	P0130	O2 Sensor Circ.,Bank1-Sensor1 Malfunction

# CFMOTO

51	P0131	O2 Sensor Circ.,Bank1-Sensor1 Low Voltage
52	P0132	O2 Sensor Circ.,Bank1-Sensor1 High Voltage
53	P0134	O2 Sensor Circ.,Bank1-Sensor1 No Activity Detected
54	P0150	O2 Sensor Circ.,Bank1-Sensor2 Malfunction
55	P0151	O2 Sensor Circ.,Bank1-Sensor2 Low Voltage
56	P0152	O2 Sensor Circ.,Bank1-Sensor2 High Voltage
57	P0154	O2 Sensor Circ.,Bank1-Sensor2 No Activity Detected
58	P0480	Electric fan output stage A open
59	P0691	Electric fan output stage A low
60	P0692	Electric fan output stage A high
61	P0300	Random/Multiple Cylinder Misfire Detected
62	P0301	Cyl.1 Misfire Detected
63	P0302	Cyl.2 Misfire Detected
64	P0303	Cyl.3 Misfire Detected
65	P0650	Malfunction Indicator Lamp Control Circ.
66	P0322	Eng.Speed Inp.Circ. No Signal
67	P0615	Starter Relay Circuit open
68	P0616	Starter Relay Circuit low
69	P0617	Starter Relay Circuit high
70	P0413	second air system valve Circuit open
71	P0414	second air system valve Circuit low
72	P0412	second air system valve Circuit high
73	P0411	Secondary Air Injection System Incorrect Flow Detected
74	P0511	Idle Air Control Circuit
75	P0650	Malfunction Indicator Lamp Control Circ.
76	P0111	Intake Air Temp.Circ. struck/Performance
77	P0112	Intake Air Temp.Circ. Low Input/range
78	P0113	Intake Air Temp.Circ. High Input
79	P0441	Evaporative Emission System Incorrect Purge Flow
80	P0444	Canister purge valve Circuit open
81	P0458	Canister purge valve Circuit low
82	P0459	Canister purge valve Circuit high
83	P0116	Engine Coolant Temp.Circ. Range/Performance
84	P0117	Engine Coolant Temp.Circ. Low Input
85	P0118	Engine Coolant Temp.Circ. High Input
86	P0119	Engine Coolant Temperature Sensor 1 Circuit Intermittent
87	P1116	Engine Coolant Temp.over Range
88	P0560	System Voltage Malfunction
89	P0562	System Voltage Low Voltage
90	P0563	System Voltage High Voltage
91	U0198	Lost Communication With Telematic Control Module
92	U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module
93	U0073	Control Module Communication Bus Off
94	U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module

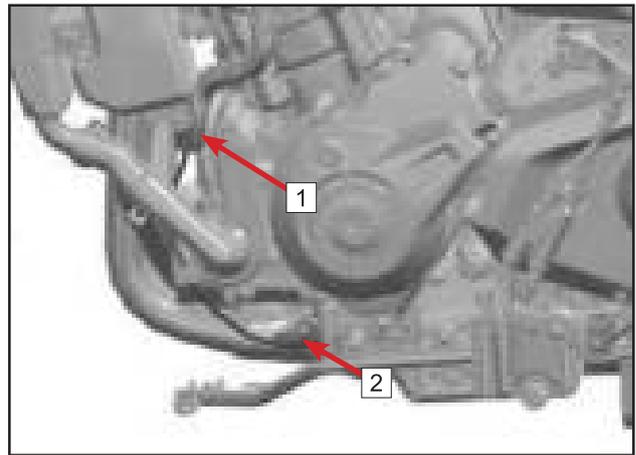
## 13.5 Oxygen Sensor

### Removal

Remove the connector **1**.  
Remove oxygen sensor **2**.

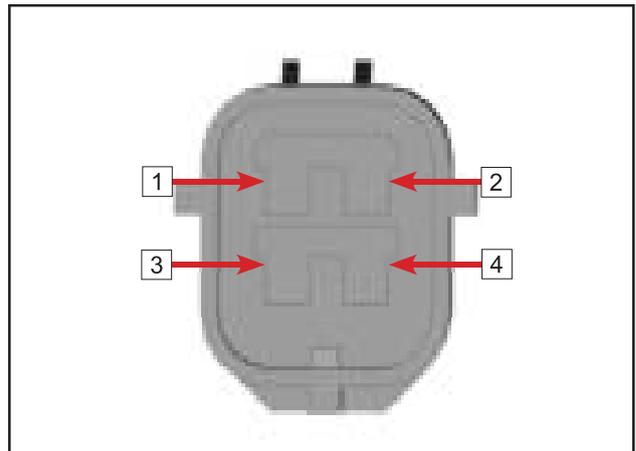
### Installation

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: GND
- 2: 12V+
- 3: Oxygen sensor signal
- 4: Oxygen sensor heating signal

## 13.6 Ignition Coil

### 13.6.2.1 Ignition Coil Peak Voltage Inspection

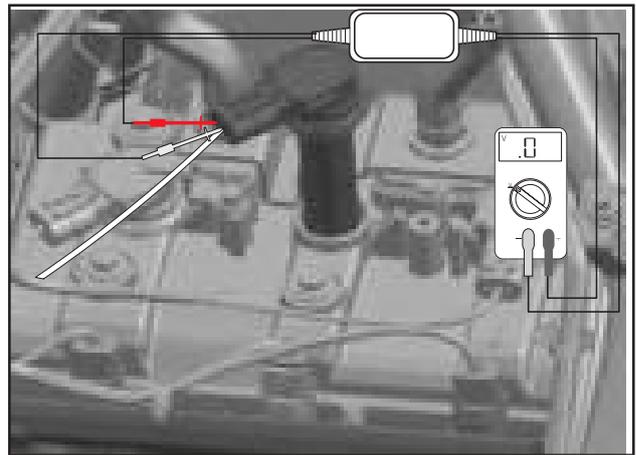
1. Connect the peak voltage detection tool using a multimeter, and connect the ignition coil to the spark plug assembly.

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  $\leq 27\text{kV}$ .



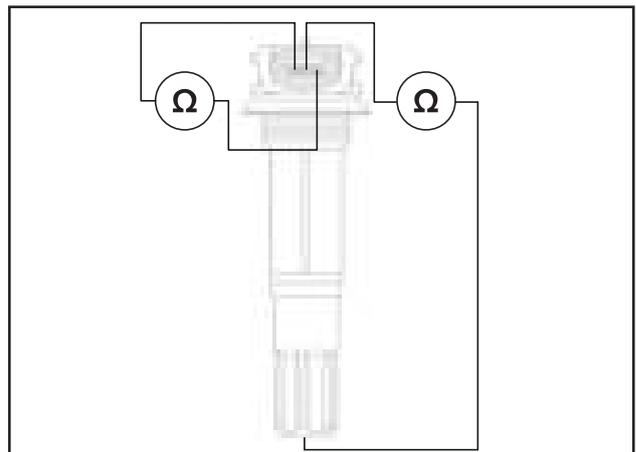
### 13.6.2.2 Ignition Coil Resistance Inspection

Remove ignition coil.

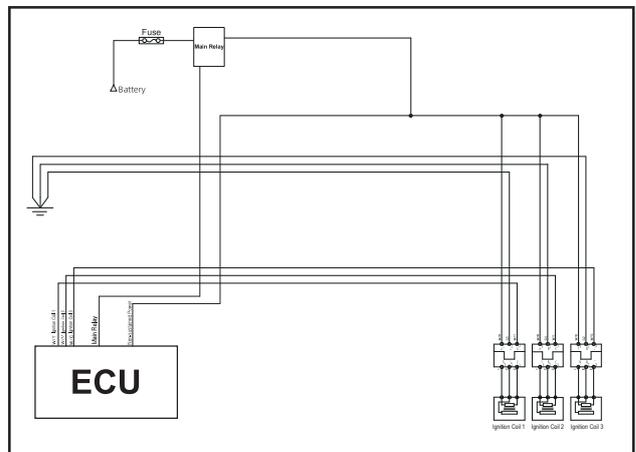
Use the to measure ignition coil resistance  
Use the multimeter to measure the ignition coil resistance, as shown in the figure.

**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.



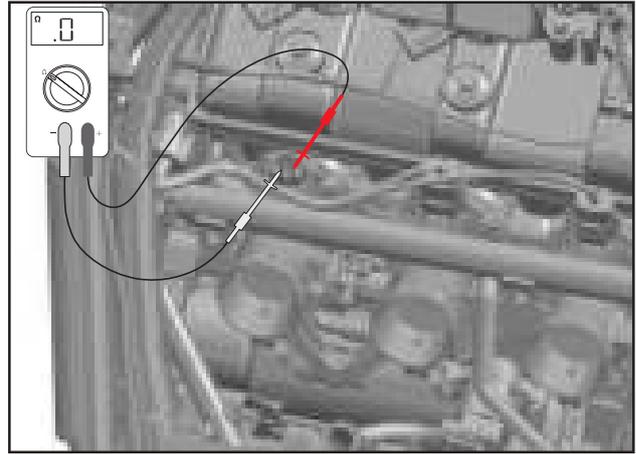
## 13.7 Injector

### 13.7.1 Injector Resistance Detection

1. The detection method is shown in the figure.

**Injector resistance value: 11.5-12.5Ω.**

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.



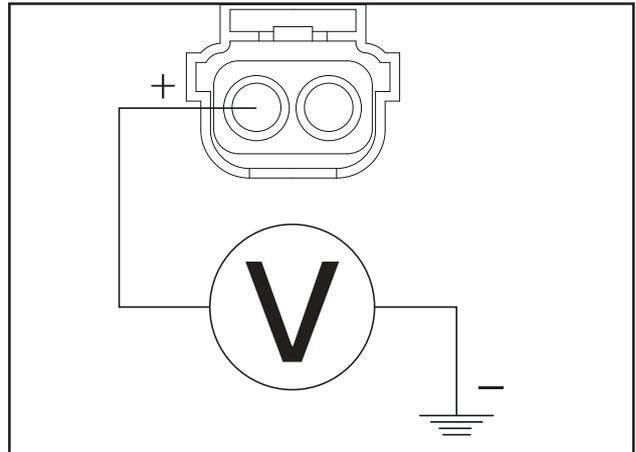
### 13.7.2 Injector Input Voltage Detection

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.



## 13.8 Throttle Body Assembly

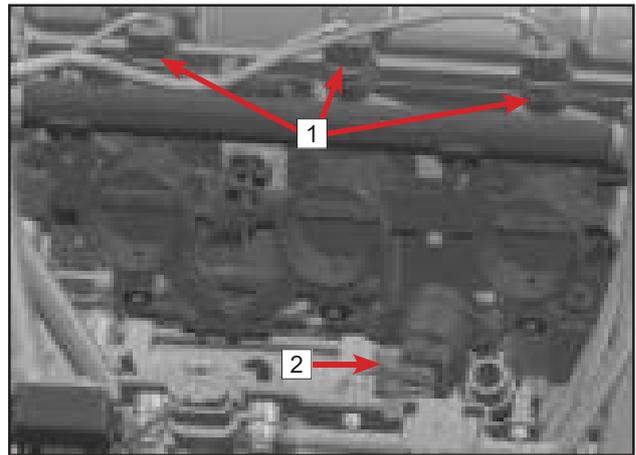
### Removal

Turn off the vehicle power.

Disconnect the positive and negative terminals of battery.

Remove the nozzle connector **1**.

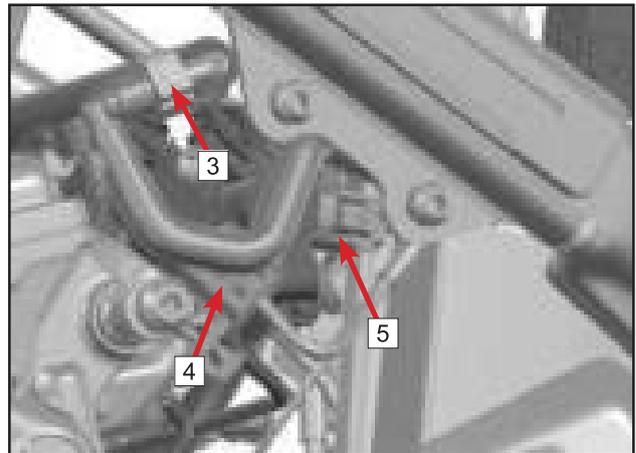
Remove idle sensor connector **2**.



Disconnect the fuel line **3**.

Remove air intake pressure/ temperature sensor **4**.

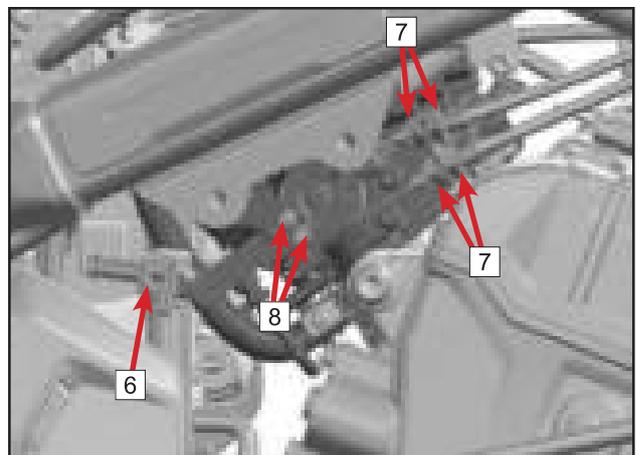
Disconnect the connector **5** of TPS.



Disconnect the vacuum connector **6**.

Loosen the nut **7**.

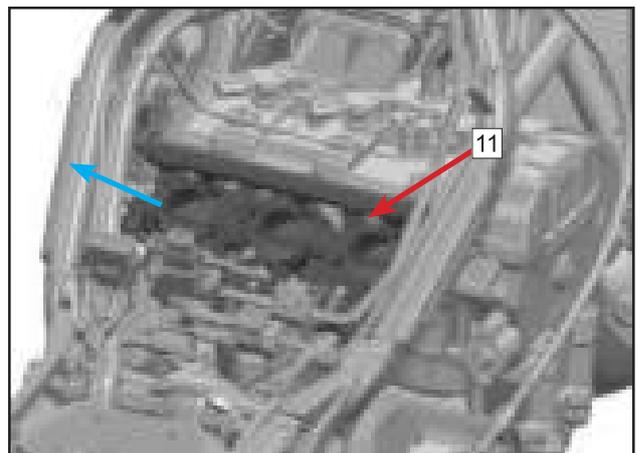
Remove throttle cable **8**.



Remove throttle body assembly **9**.

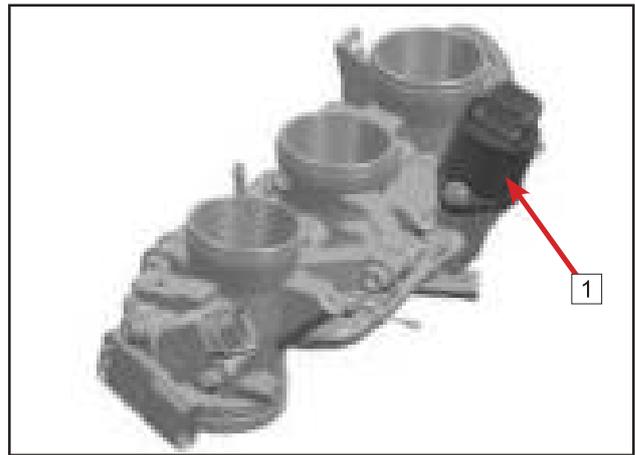
### Installation

Reverse the removal procedures for installation.



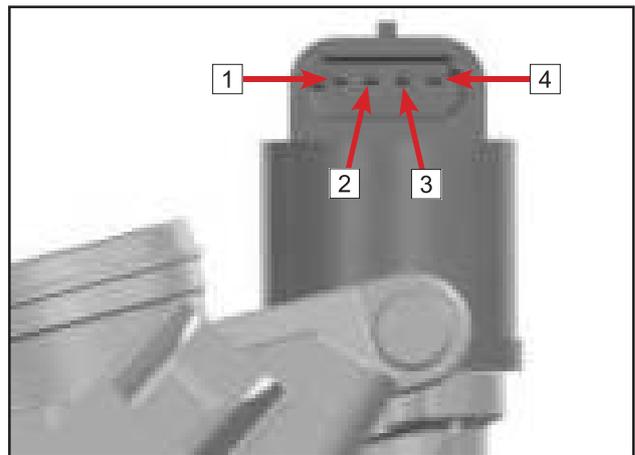
## 13.8.1 Idle Stepper Motor

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.

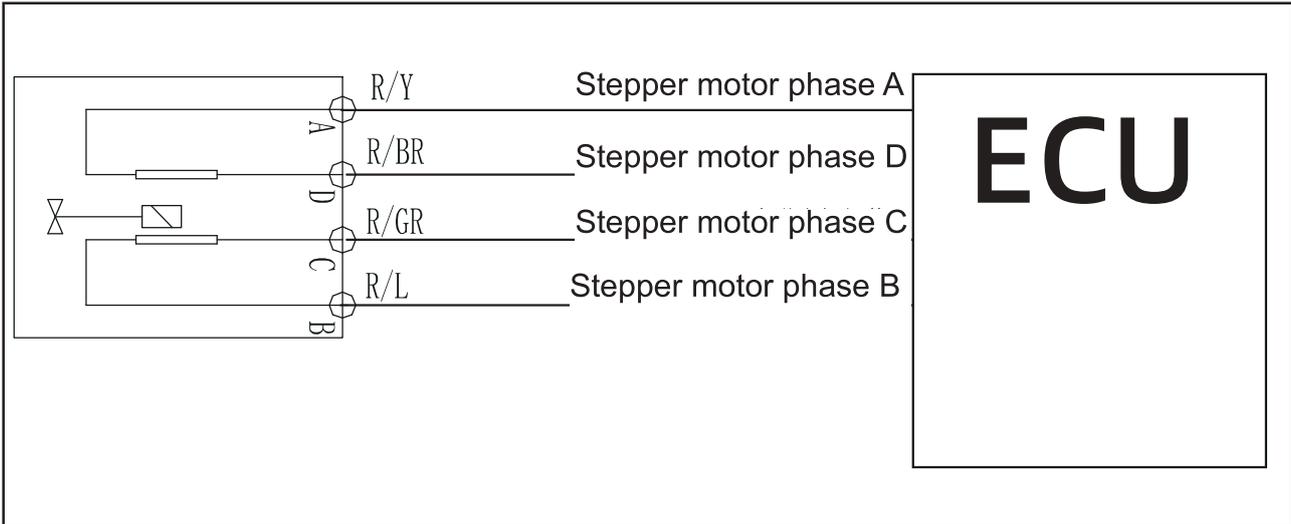


## Idle Stepper Motor Pin Function

- 1**: Stepper motor phase A
- 2**: Stepper motor phase B
- 3**: Stepper motor phase C
- 4**: Stepper motor phase D



## 13.8.1.1 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.

### Sensor Power Inspection

YES

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.

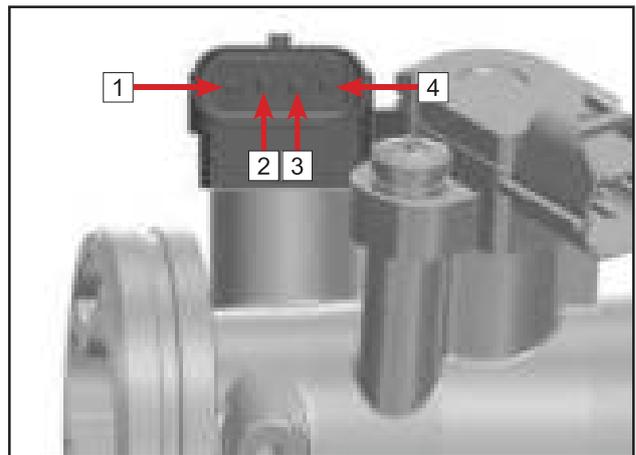
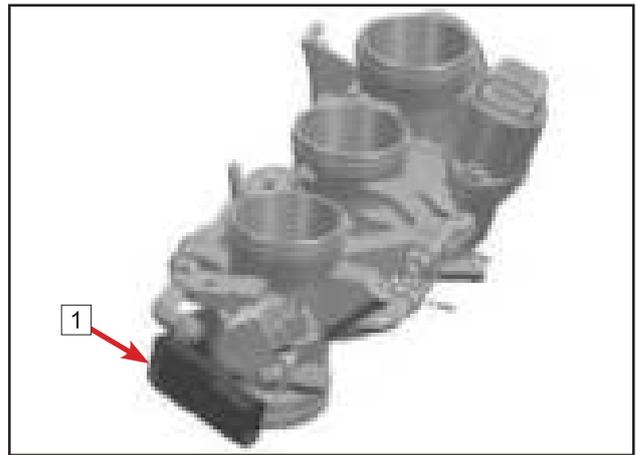
YES

Replace it with a new one and then check it again.

## 13.8.2 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.

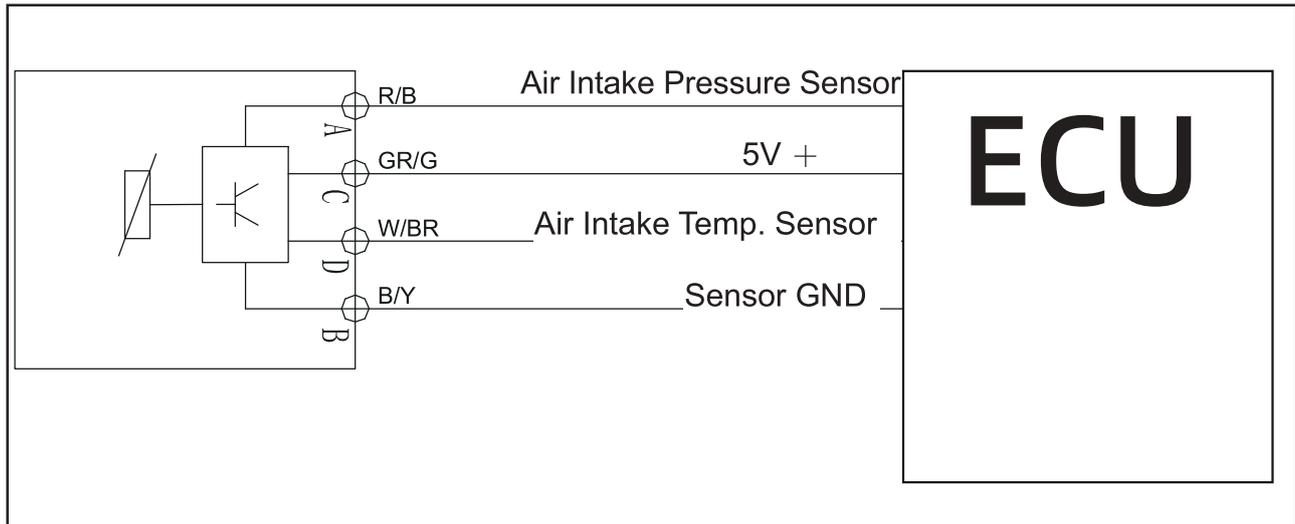
The temperature sensor is a negative temperature coefficient (NTC) thermistor whose resistance value decreases as the coolant temperature rises, but the relationship is not linear.



### Air Intake/Temperature Sensor Pin Function

- 1**: OUT
- 2**: +5V
- 3**: NTC
- 4**: GND

## 13.8.2.1 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.

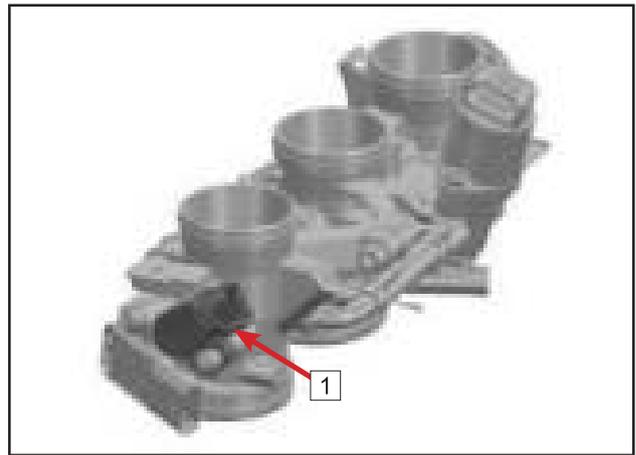
### Sensor Power Inspection

Use a multimeter to connect the GR/G and B/Y harness, whether the voltage is about 5-5.25V. **NO** → Check whether GR/R and B/Y 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.

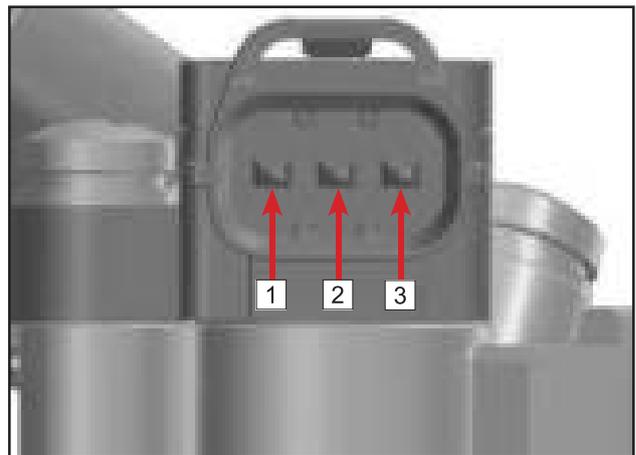
## 13.8.3 TPS

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.

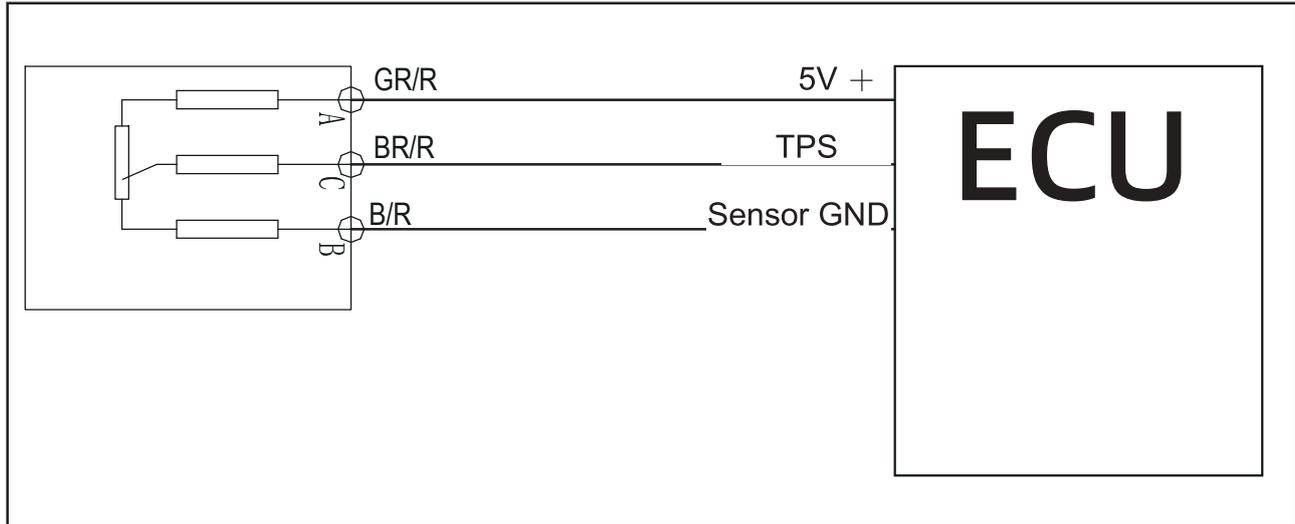


### TPS Pin Function:

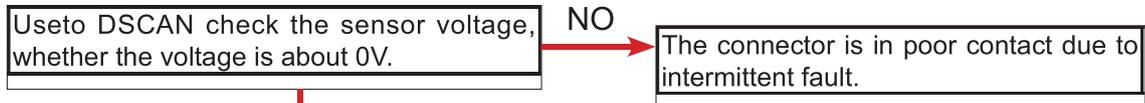
- [1]: OUTOUT
- [2]: GND
- [3]: INPUT



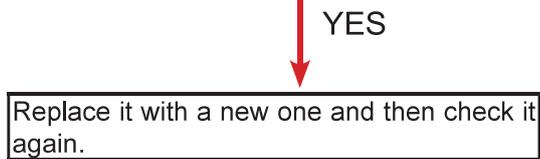
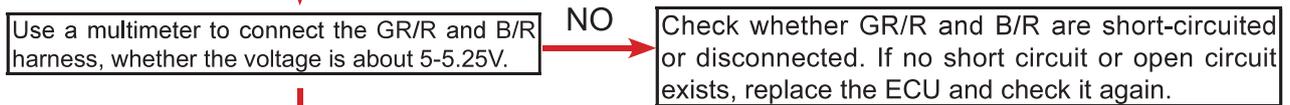
## 13.8.3.1 TPS Troubleshooting



### Harness Inspection



### Sensor Power Inspection

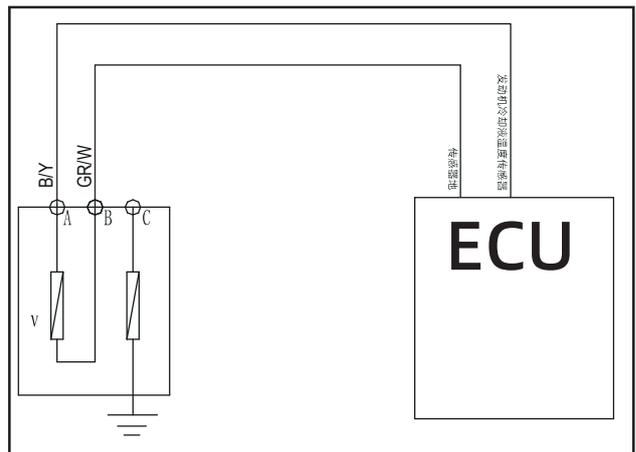


## 13.9 Water Temperature Sensor

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.

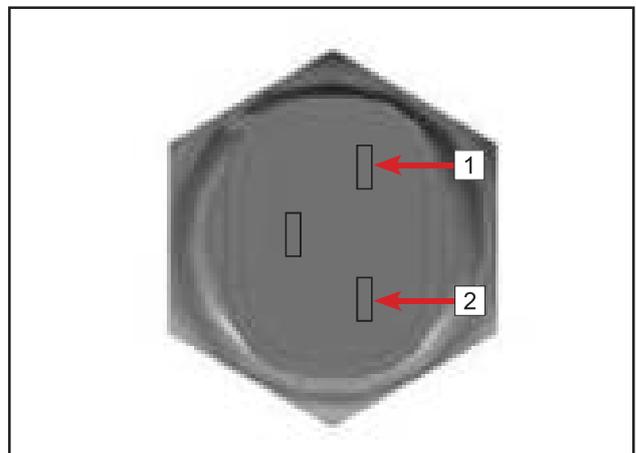


The circuit of connection between the sensor and ECU.



### Water Temperature Sensor Pin Function:

- 1: GND
- 2: Coolant temperature signal sensor



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.

## 13.10 Trigger

### 13.10.3.1 Trigger Peak Voltage Inspection

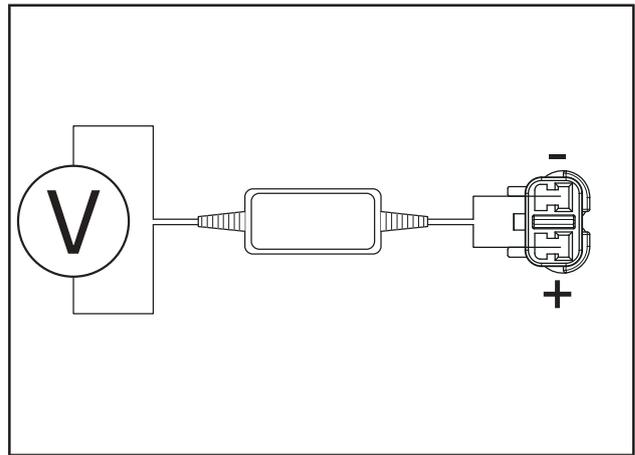
The detection connection of peak voltage is shown in the figure.

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.



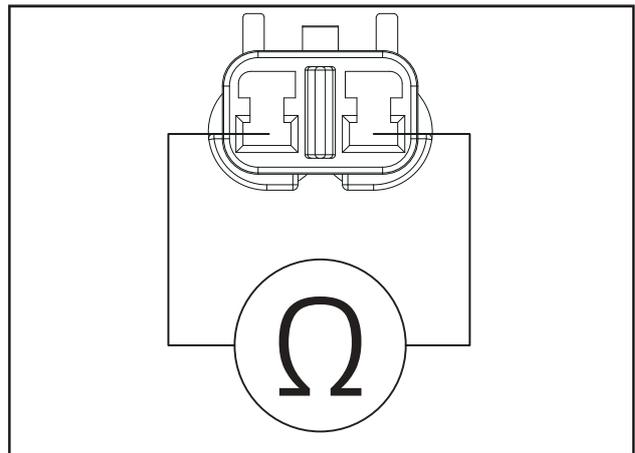
### 13.10.3.2 Trigger Resistance Inspection

Remove the trigger connector.

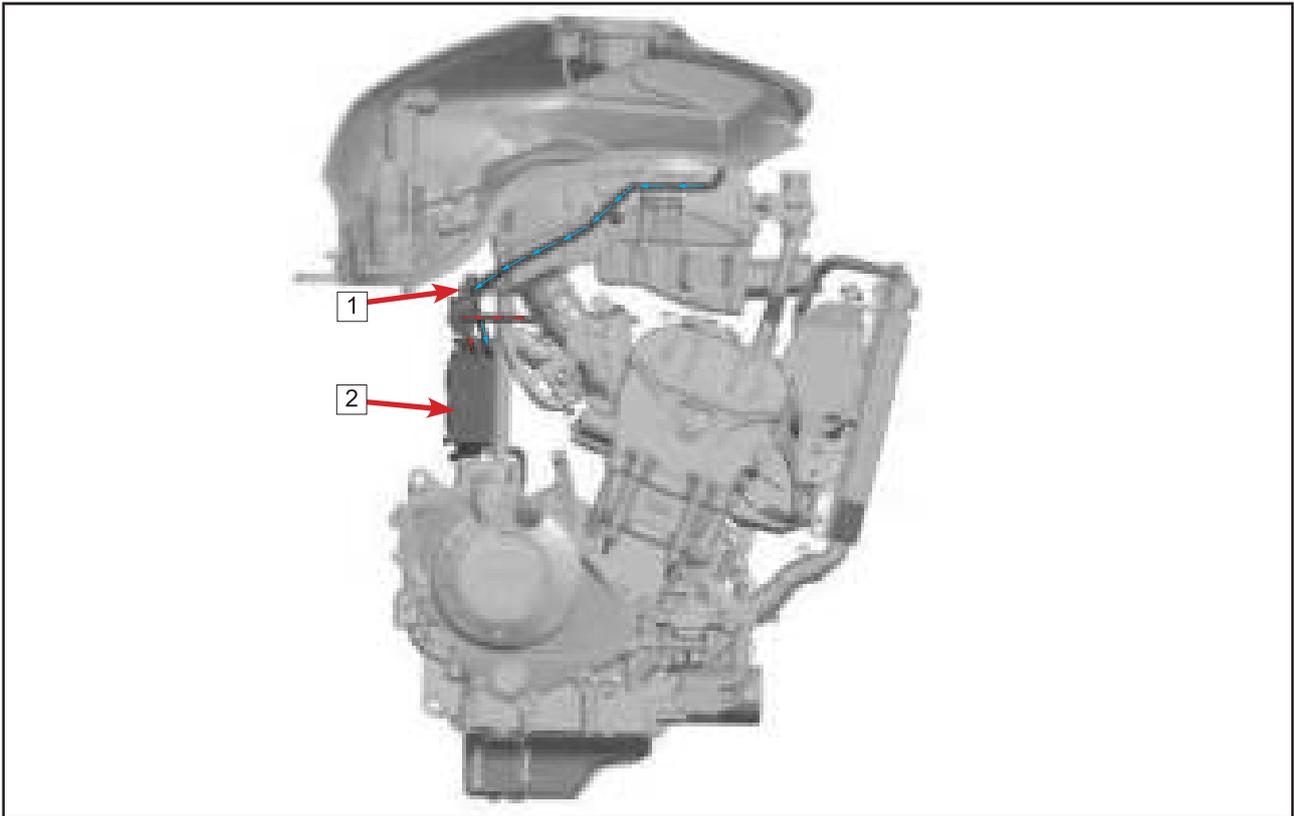
The detection connection of peak voltage is shown in the figure.

Trigger resistance value:  $100\Omega \sim 120\Omega$  (room temperature)

If the resistance value is lower than  $100\Omega$  or close to zero, replace it with a new part.



## 13.11 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.

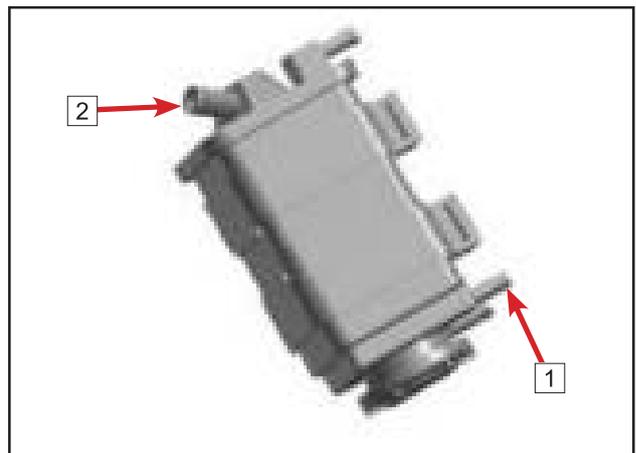
### 13.11.1 Two-way Valve Test

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.



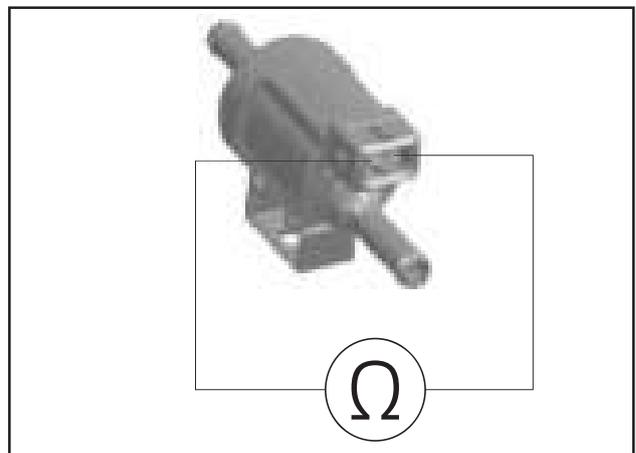
### 13.11.2 Canister Test

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.



### 13.11.3 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±2 Ω.**

## 13.12 Normal Troubles

### Engine Body

Troubles	Possible Cause	Countermeasure
Cannot start or difficult to start	Cylinder pressure too low 1. Cylinder worn 2. Piston ring worn 3. Air leakage of cylinder gasket 4. Valve stem worn or unsuitable valve seat 5. Spark plug loosen 6. Starting motor rotate too slowly 7. Improper valve timing 8. Improper valve clearance Spark plug cannot ignite or weak ignition 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 Insufficient fuel inside throttle body 1. Breather hole block 2. Injector blocked or failure 3. High pressure oil pump failure 4. Low pressure, oil pump 5. Oil pump filter net blocked	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
No idle speed or unstable speed	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 failure	Adjust Replace or repair Replace Replace Replace Replace or repair Replace Replace or repair Replace

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>

# 13 Fuel System

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

## 13.13 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.

## (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 400kPa.	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 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 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

## (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
		Adjust or replace	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
		Next step	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
		Next step	Next step
5	Disassemble injector and use special tool to check if there is leakage, block or flow overshoot.	YES	Replce
		Next step	Next step
6	Check whether the failure happens right after fueling.	YES	Change fuel
		Next step	Next step
7	Check engine cylinder pressure, observe whether there is large difference in the engine cylinder pressure.	YES	Eliminate engine mechanical failures
		Next step	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

## (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

## (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 400kPa.	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 400kPa.	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

## 13 Fuel System

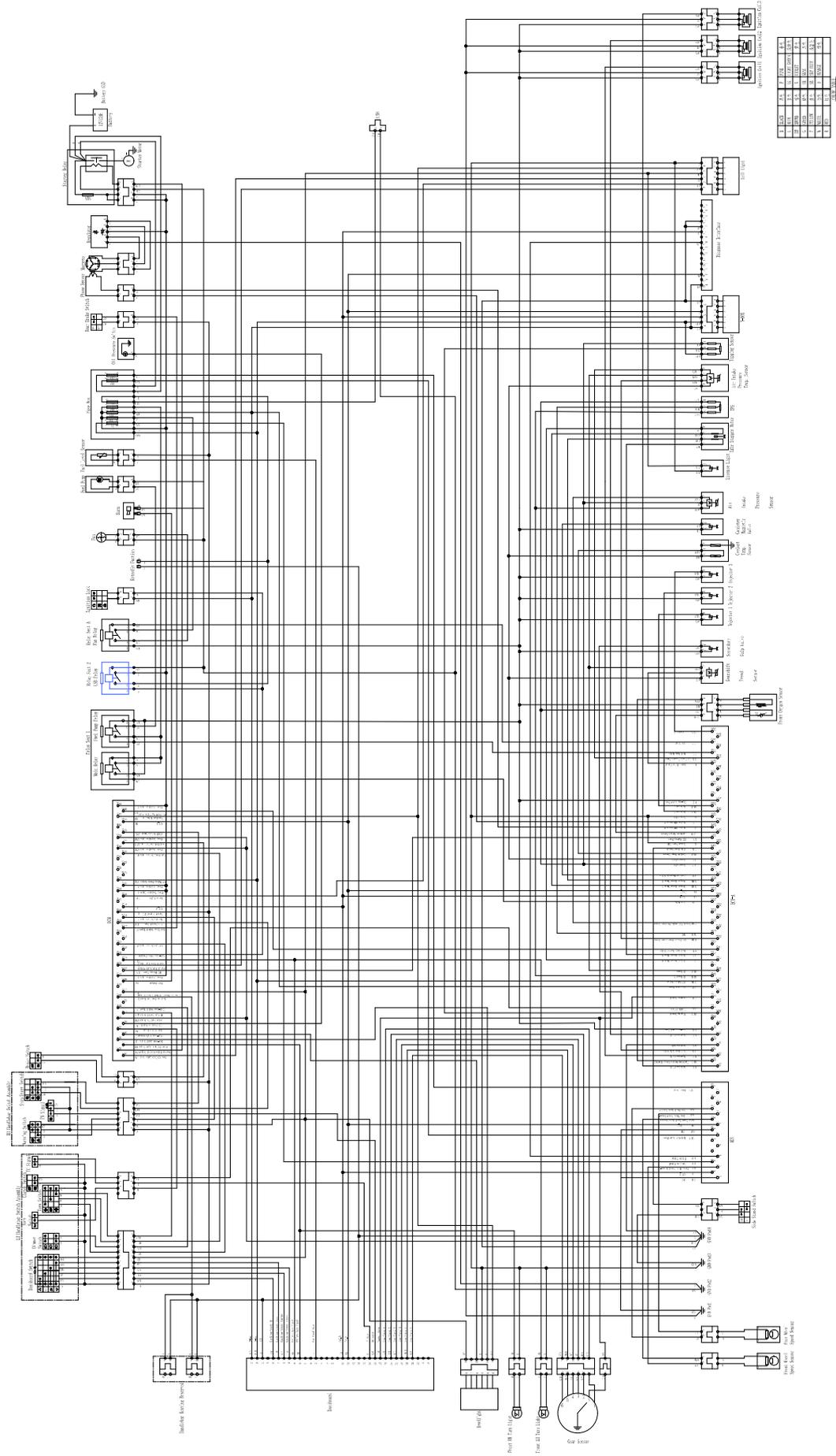
Item	Procedures	Results	Next
5	Check if TPS and its circuit is normal.	YES	Next step
		NO	Check circuit and replace sensor
6	Disassemble injector and use special tool to check if there is leakage or block.	YES	Replace
		NO	Next step
7	Check whether the failure happens right after filling fuel.	YES	Change 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

## (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 400kPa.	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



Color	Wire Color	Wire Color	Wire Color	Wire Color
Red	Red	Red	Red	Red
Blue	Blue	Blue	Blue	Blue
Green	Green	Green	Green	Green
Yellow	Yellow	Yellow	Yellow	Yellow
Black	Black	Black	Black	Black
White	White	White	White	White
Grey	Grey	Grey	Grey	Grey
Brown	Brown	Brown	Brown	Brown
Purple	Purple	Purple	Purple	Purple
Pink	Pink	Pink	Pink	Pink
Orange	Orange	Orange	Orange	Orange
Light Blue				
Light Green				
Light Yellow				
Light Grey				
Light Brown				
Light Purple				
Light Pink				
Light Orange				
Light Light Blue				
Light Light Green				
Light Light Yellow				
Light Light Grey				
Light Light Brown				
Light Light Purple				
Light Light Pink				
Light Light Orange				

