

MX450 Motocross Motorcycle Maintenance Manual

Rev. 1 (March 2023)

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## Preface

This motorcycle manual introduces the basic structure, working principle, disassembly and maintenance, fault diagnosis and troubleshooting methods of MX450 Motocross Motorcycle to readers in detail. In addition, it also introduces the technical specifications, performance parameters and maintenance adjustment data of this model. This manual is informative, illustrated and practical. We hope that this manual can provide technical support and guidance for KOVE motorcycle users and after-sales service personnel in terms of maintenance.

The technical specifications, performance parameters and maintenance adjustment data marked in this manual are determined according to the latest state. We will improve this model later without notice and may cause any inconsistency between the latest model and that described in this manual. We apologize for any inconvenience caused thereof.

We sincerely hope that you will give us your valuable opinions and comments on the design, manufacture and quality of this model to improve it in time. Thank you for your support and cooperation.

All the information, charts, data, and performance indicators published in this manual are as of the printing of this manual. Please understand that TIBET NEW SUMMIT MOTORCYCLE CO., LTD. reserves the right to modify this manual without prior notice. Any part of this manual is the property of TIBET NEW SUMMIT MOTORCYCLE CO., LTD. No unit or individual is allowed to reprint it without our consent. Otherwise, they will be held legally responsible.

Due to the limited abilities of the editor, errors and omissions are inevitable in this manual. We kindly welcome criticism and correction from users and readers.

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## Chapter I

### Overview:

#### How to use this manual

This manual describes the maintenance procedures of MX450 Motocross.

Chapters II and III apply to the complete motorcycle. Chapter IV describes the procedure for removing/installing components that may be used to provide the services described in the following sections. Chapters IV to XII describe the parts of the motorcycle that are grouped according to their positions. If you are not familiar with this motorcycle, please read the technical characteristics in Chapter II. Please comply with the recommendations in the Maintenance Cycle List to ensure that the motorcycle is in the best running condition and the emission level meets the local environmental protection requirements. Then go to the contents on the first page of this part, most of which start with procedure set or system descriptions, maintenance instructions, and troubleshooting. The detailed process is described in the following pages. Refer to Troubleshooting in each section to eliminate the fault or symptom.


Your safety and the safety of others are very important. To help you make an informed decision, we provide safety information and other information in this manual.

You must use your good judgment, and you will find important safety information in various forms.

Including:

\* Safety labels on the motorcycle












\* Safety Information - Add one of three signal words before the safety warning symbol, i.e. Warning, Caution, or Notice, meaning:

	This symbol indicates a dangerous situation. This dangerous situation will lead to fatality or serious injury if not avoided.
<p><b>Note</b></p>	This is the [Notes] symbol. This symbol indicates the specified precautionary measures that you must follow to avoid damage to the motorcycle or financial loss.
<p>Note</p>	This is the [Note] symbol. This symbol indicates some key information that can make certain procedure steps easy to perform.

Note: How to properly and safely repair this motorcycle.

Symbol

The symbols used in this manual indicate specific maintenance procedures. If supplementary information related to these symbols is needed, they will be explained in detail in the text without using these symbols.

	Replace parts with new ones before assembly
	Unless otherwise specified, use the recommended engine oil
	Use molybdenum oil solution (oil and molybdenum grease are mixed in a ratio of 1:1)
	Multi-purpose high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330G/F grease or equivalent product)
	Use molybdenum disulfide grease (SU-T330Y or equivalent product containing more than 3% molybdenum disulfide)
	Use molybdenum disulfide paste (SU-T330Y or equivalent product containing more than 40% molybdenum disulfide)
	Use silicone grease
	Apply thread fastening. Unless otherwise specified, use medium strength
	Apply sealant
	Unless otherwise specified, use the recommended brake fluid. (Use DOT4 brake fluid.)
	Use shock absorber oil

**Basic Information**

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### Maintenance Instructions

1. Please use KOVE original parts and lubricants or equivalents recommended by KOVE. Parts that do not meet the design specifications of KOVE may damage the motorcycle.
2. Use special tools designed for this product to avoid damage and incorrect assembly.
3. Only tools using metric unit can be used to repair motorcycles, and bolts, nuts and bolts using metric unit cannot be interchanged with fasteners using imperial unit.
4. Use new gaskets, O-rings, cotter pins and lock plates when reassembling.
5. Unless a specific order is specified, when tightening bolts or nuts, start with the one with larger diameter or internal bolts, and then tighten them to the specified torque in diagonal increments.
6. Clean the parts with detergent before disassembly and lubricate all sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Do not bend or twist the control cable. Damaged control cables may not function properly and may get stuck or tangled.

#### Abbreviations

In this manual, the following abbreviations are used to identify respective components or systems.

Abbreviations	Full name
DTC	Diagnostic trouble code
ECU	Engine control module
ECT sensor	Engine coolant temperature sensor
IAT sensor	Intake air temperature sensor
MAP sensor	Intake manifold pressure sensor
OBD Service connector	Maintenance diagnostic interface
TP sensor	Throttle position sensor

Model Mark: MX450 - Motocross



### Basic Information

	Item	Parameter
Size	L × W × H	2168 x 805 x 1265 mm
	Seat height	960 mm
	Shaft distance	1490 mm
	Ground clearance	340 mm
	Minimum turning radius	-
	Curb weight	102 kg
	Maximum payload	75 kg
	Carrying capacity	1 person
Frame structure	Frame type	High-strength steel twin-cradle frame
	Front shock absorber	Inverted fully adjustable damper shock absorber
	Front shock absorber stroke	303 mm
	Rear shock absorber	Fully adjustable external airbag shock absorber
	Rear shock absorber stroke	132 mm
	Front tire size/model	80/100-21 M/C 51M / CST CM-736
	Rear tire size/model	110/90-19 M/C 62M / CST CM-739
	Front wheel rim	21x WM1.60 / 7050-T6
	Rear wheel rim	19x WM2.15 / 7050-T6
	Front brake/disc	One-way double-piston floating caliper/single brake disc 260 mm
	Rear brake/disc	Single-piston floating caliper / single brake disc 240 mm
	Forward tilt angle	29.36°
Engine	Model	Z196MQ
	Displacement	449.6 ml
	Type	SOHC, single-cylinder, water-cooled, four-valve
	Cylinder diameter × stroke	96 mm×62.15 mm
	Compression ratio	14:1
	Maximum power	48 kW / 9500 rpm
	Maximum torque	49 N·m / 7500 rpm
	Valve mechanism	SOHC / Chain drive / Titanium valves
	Lubrication system	Forced pressure lubrication + splash lubrication
	Cooling System	Closed coolant circulation cooling

	Item	Parameter
Drivetrain	Clutch	Manual wet multi-plate
	Shift mode	Constant-mesh two-stage transmission with five-gear speed shifting
	Reducer gear	5-speed international transmission
	Primary transmission ratio	2.357 (66/28)
	Final transmission ratio	3.64 (51/14)
	Gear transmission ratio	1st gear: 2.000; 2nd gear: 1.667; 3rd gear: 1.400; 4th gear: 1.180; 5th gear: 1.000
	Shift mode/sequence	Mechanical reciprocating type / 1-N-2-3-4-5
Electric system	Ignition mode	ECU-controlled digital ignition
	Starting mode	Electric starting
	Spark plug manufacturer/model	NGK / SILMAR10A-9S
	Spark plug clearance	0.80 – 0.90 mm
	Regulating rectifier	Three-phase full-wave rectification
	Stator coil (resistance)	0.2Ω±20%
	Trigger (resistance)	260Ω
	Maximum magneto output power	119W

Specification of EFI system Unit: mm

Item	Specification
Engine idle speed (high/low)	2200±100 r/min
Water temperature sensor (output resistance at 20 °C)	2318-2550Ω
Throttle position sensor (idle) output voltage	0.6-0.8 V
Intake pressure voltage: at 35 kPa	1.365-1.459 V
Intake air temperature sensor resistance: at 25°C	1.990-2.123KΩ
Fuel injector resistance (20°C/68°F)	12Ω

Fuel System Specification Unit: mm

Item	Specification	
Throttle valve body identification number	-	
Fuel pressure at idle speed	300±10kpa	
Fuel pump flow (at 12V and 300 ± 10 kPa)	≥30L/h	
Fuel supply system	Type	BOSCH EFI
	Throttle orifice	46mm
Fuel type	Gasoline	
Fuel tank capacity	No.95 GB17930 - 2016 6.5 L	

Lubrication System Specifications Unit: mm

Item		Standard value	Ultimate state
Oil capacity	Oil level (new or disassembled)	1.1 L	-
	Replace the oil fine filter	1.2 L	-
	Complete disassembly and reassembly	1.4 Litre	-
Recommended oil	Brand	-	-
	Model	SAE10W-50	-
	Grade	API service category: SL or above (Do not use energy-saving oils marked with the API "donut" symbol)/ JASO T903 Standard: MA/ GB 11121-2006	
Engine oil filter type		-	
Oil pump rotor	Clearance between the outer rotor and case	Full flow paper filter element	
	Axial clearance between the inner and outer rotors and the fuel pump	0.14mm - 0.22mm	0.30mm
	Clearance between the inner and outer rotor and the pump body	0.05 mm - 0.12 mm	0.18mm

Cooling System Specification Unit: mm

Item		Specification	Ultimate state
Coolant capacity	Radiator (including all water channels)	1.2 L	-
Radiator cap relief pressure		1.7 bar	-

Hydraulic Brake Specifications Unit: mm

Item		Standard	Ultimate state
Front brake	Designated brake fluid	DOT4	-
	Total thickness of brake pads	8.00	To groove
	Brake disc thickness	3.00	2.5
	Brake discs runout	0.08	0.15
	Inner diameter of master cylinder	11.00	-
	Brake caliper piston inner diameter/1	27.00	-
	Brake caliper piston inner diameter/2	30.20	-
Rear brake	Specified brake fluid	DOT4	-
	Total thickness of brake pads	9.60	To groove
	Brake disc thickness	3.00	2.5
	Brake discs runout	0.08	0.15
	Inner diameter of master cylinder	9.52	-
	Inner diameter of brake caliper piston cylinder	22.62	-

Front Wheel/Suspension/Steering System Specifications

Unit: mm

Item		Standard	Ultimate state
Tire tread depth		13	Tire wear limit marks at $\Delta$ T.W.I mark on sidewall and center of tire
Tire pressure		100 kPa(1.0 kgf/cm <sup>2</sup> , 15 psi)	-
Shaft runout		0.05	0.1
Wheel rim runout	Radial	0.8	1.0
	Axial	0.8	1.0
Front shock absorber	Free length of spring	475	-
	Tube runout	-	0.2
	Shock absorber oil specifications	AMSOIL Thunderbolt High-Performance Shock Absorber Oil 10W	
	Shock absorber fluid adding capacity	Shock absorber inner chamber (damper): 260 $\pm$ 3 mL Shock absorber outer chamber (spring chamber) 350 $\pm$ 3ml Equal amount of filling for both sides	

Rear Wheel/Suspension/System Specifications

Unit: mm

Item		Standard	Ultimate state
Tire tread depth		17	Tire wear limit marks at $\Delta$ T.W.I mark on sidewall and center of tire
Tire pressure		100 kPa(1.0 kgf/cm <sup>2</sup> , 15 psi)	
Shaft runout		0.05	0.1
Rim runout	Radial	0.8	1.0
	Axial	0.8	1.0
Drive chain	Size/link	DID 520 DMA 4K SDH / 116 sections	-
	Slack	35-45	-
Rear shock absorber	Free length of spring	238	
	Shock absorber oil specifications	AMSOIL Thunderbolt High-Performance Shock Absorber Oil 10W	
	Shock absorber oil adding volume	380 $\pm$ 3ml	
	Nitrogen volume of gas cylinder	1.2 MPa (standard)	

Battery/Charging System Specifications

Unit: mm

Item		Specification	
Battery	Model	HJ12-FPZ	
	Capacity	12V2.3Ah	
	Leakage value	It can be stored for more than one year at 25 °C, and the higher the temperature, the shorter the storage time.	
	Voltage (28 °C, 68°F)	Fully charged	>13.2V
		Need to be charged	<12.8V
	Charging current	Normal	1.2A
Fast		12A	
Magneto	Charging capacity	8000r/min>8.5A	
	Charging coil resistance (28 °C, 68 °F)	0.2Ω±20%	

### Vehicle Body Bolt Torque Value

Installment position	Specification status	Torque force value N·m	Notes
Seat cushion assembly and rear tailgate	M6	8	
Fuel tank center (seat cushion stopper bushing mounting point)	M5	5	
Fuel tank front trim (left and right) and radiator	M5	5	Step
Front fuel tank trim (left and right) and fuel tank	M5	5	Step
Fuel tank front trim (left and right) and frame	M5	5	Step
Fuel tank front trim (left and right) and subframe	M5	5	Step
Vehicle body (left and right) and subframe	M6	8	Step
Rear tailgate (upper) and subframe	M6	8	Step
Rear tailgate (lower) and subframe	M6	8	Step
Tailpipe plug and subframe	M6	5	Step
Rear splash guard and front section of rear fender	ST4.8	2	
Front windshield (number plate) and upper connecting plate	M5	5	Step
Front brake hose clip and lower connecting plate	M6	10	Step
Front fender and lower connecting plate	M6	12	
Front brake hose pressure plate and left front shock absorber trim	M5	3	
Front shock absorber trim (left and right) and front shock absorber bottom cylinder	M6	8	Step
Front wheel axle locking (nut)	M16	88	
Front shock absorber bottom cylinder (left and right) locking	M8	22	
Front brake discs and wheel hub	M6	12	(Sealing)
Front brake caliper and left front shock absorber	M8	32	(Sealing)
Brake hose and front brake caliper	M10x1.25	32	
Brake hose and front brake pump	M10x1.25	32	
Front brake caliper and exhaust bolt	M6	9	
Front brake caliper bracket and main/sub sliding shaft bolts	M8	20	(Sealing and oiling)
Front brake caliper brake pad guide pin	M10	15	
Upper connecting plate and front shock absorber (locking)	M8	22	
Lower connecting plate and front shock absorber (locking)	M8	22	
Handlebar switch (right) and handlebar	M4	4	
Handlebar switch (left) and handlebar	M4	3	
Clutch pump body and mounting base	M6	8	
Clutch lever shoulder bolt	M6	6	
Clutch reservoir cover mounting screw	M4	1	
Clutch switch and clutch pump body	M10x1.25	22	
Throttle and handlebar	M6	8	
Accelerator cable adjustment assembly A/B nut (handlebar side)	M6/M7	5	
Accelerator cable adjustment assembly A/B nut (throttle side)	M6	4	

Installment position	Specification status	Torque force value N·m	Notes
Front brake pump body and mounting base	M6	8	
Front brake pump reservoir cover mounting screw	M4	1	
Front hand brake lever shoulder bolt	M6	5	
Front brake pump rocker arm adjustment assembly	M5	6	
Steering handlebar and upper/lower socket	M8	22	
Steering handlebar lower socket and double-threaded stud - upper	M8	30	(Sealing)
Upper triple clamp and double-threaded stud (self-locking nut) - lower	M8	22	
Fastening nut between upper connecting plate and steering stem	M24x1	108	(Shim lubrication)
Engine lower protector and frame	M5	5	Step
Front sprocket cover, chain baffle and engine	M6	10	
OBD diagnostic interface and fuel tank	M5	2	
Front of fuel tank and frame	M6	10	
Rear of fuel tank and frame	M6	10	
Fuel pump and fuel tank	M5	4	
Radiator and radiator grille	M5	5	
Radiator (left and right) and frame	M6	10	
Muffler heat shield mounting screw	M5	5	
Muffler front section and exhaust port (nut)	M8	16	
Muffler rear section and front muffler section (pipe clamp)	M7	22	
Muffler rear section and subframe (front)	M8x20	22	
Muffler rear section and subframe (rear)	M8x20	22	
Regulating rectifier and air filter box housing	M6x20	10	
Battery box and battery box cover	M5	5	Step
Battery terminal mounting bolt	M5	5	
Battery box and frame	M6	8	
Battery box and frame 2	M6	8	Step
Front and rear rim spoke nipple caps	M4	6	
Front and rear tire clamp locking nuts	M8	12	
Upper guide sprocket and subframe	M8	22	(Sealing)
Fuel injector cap and throttle body	M6x20	8	
Starting motor and engine case	M6x30	10	
Starting motor to positive wire connecting nut	M6	6	
Starter relay terminal installation	M6	5	
Shift rocker arm and engine	M6	10	
Rear brake pedal and brake rocker arm	M5	8	(Sealing)
Rear brake rocker arm and frame	M8	22	(Sealing)
Rear brake pump and frame	M6	12	(Sealing)

Installment position	Specification status	Torque force value N·m	Notes
Rear brake pump reservoir cover fastening bolt	M4	2	
Brake hose and rear brake cylinder	M10x1.25	32	
Rear brake hose and rear brake caliper	M10x1	32	
Rear brake pump push rod adjusting and tightening nut	M6	6	
Oil pipe clamp and swingarm	M5	5	
Rear brake caliper bracket upper and lower slide shaft bolt	M8	20	(Sealing and oiling)
Rear brake pad guide pin (bolt)	M10	15	(Sealing)
Rear brake caliper and exhaust bolt	M6	9	
Rear wheel axle locking (nut)	M22x1.5	128	
Drive chain adjusting block locking nut	M8	16	
Rear brake discs and wheel hub	M6	12	(Sealing)
Rear sprocket and rear wheel hub	M8	38	
Chain guide and swingarm	M6	10	
Chain guide and chain guide wear block	M5	5	
Chain clip with swingarm	Philips screw	8	(Sealing)
Rear shock absorber upper mount to frame	M10	44	
Rear shock lower mount to triangular cradle	M10x1.25	44	
U swingarm (left and right) and frame	M10x1.25	60	
U swingarm (left and right) and triangular cradle	M12x1.25	60	
Triangular cradle and swingarm	M12	60	
Swingarm axle locking nut	M16x1.5	88	
Drive sprocket locking (bolt)	M10	60	
Lower chain slider and frame	M6	10	
Engine upper suspension (left and right) and engine	M10	54	
Engine upper suspension (left and right) and frame	M8	36	
Engine front suspension (left and right) and frame	M8	26	
Engine front suspension(left and right) and engine	M10	54	
Engine lower-front suspension and frame	M10	54/60	
Engine lower-rear suspension and frame	M10	54/60	
Subframe and main frame	M8x25	34	(Sealing)
Air filter housing and subframe	M5	5	Step
Eccentric wheel cover and throttle valve	M5	2	

Installment position	Specification status	Torque force value N·m	Notes
Engine water pump drain bolt	M6	10	
Engine oil filter cap	M6	10	
Quick shifting sensor and engine	M5	6	
Gear sensor and engine	M4	6	
Harness pressure plate (left and right) and frame	M6	8	Step
Frame trims (left and right) and frame	M5	5	
Rear fender and rear air filter tank housing	ST4.8	2	
Air filter tank to metal strainer	ST4.8	2	
Air filter intake hose (clamp)	M5	5	
Engine intake pipe assembly (clamp)	M5	5	
Ignition coil and cylinder head	M6	10	
Rear shock absorber spring locking (nut)	M60	44	
Front shock absorber bleed screw	M4	1.3	
Front shock absorber spring chamber upper adjustment cap	M50	30	
Split-type ignition coil and frame	M6	10	
Steering stem locking nut (4-slot nut, 8-slot nut)	M25x1	First torque to 40N.m, then loosen and torque to 10N.m, and finally back off by 1/4 turn	

### Lubrication and sealing points - vehicle body

Material	Position	Notes
Lithium-based multipurpose grease (Universal SU-T330Y or equivalent product)	Front wheel bearing dustproof lip (left and right)	
	Sliding area of shift pedal pin	
	Front and rear wheel bearing chambers	
	Outer surface of front/rear wheel axle	
	Outer surface of wingarm axle	
	Contact area between air filter tank and sponge filter element	
	Outer surface of suspension assembly pivot bolt	
Use molybdenum disulfide grease (SU-T330Y or equivalent product containing more than 3% molybdenum disulfide)	Needle roller bearing rolling area of swingarm pivot	
	Flat thrust bearing rolling area of swingarm pivot	
	Dustproof sealing lip of swingarm pivot	
	Dustproof sealing lip of U swingarm	
	Dustproof sealing lip of triangular cradle	
	Rolling area of U swingarm needle roller bearing	
	Rolling area of triangular cradle needle roller bearing	
	Dustproof sealing lip installed on the upper part of the rear shock absorber	
	Rolling area of rear shock absorber spherical bearing	
	Contact area of rear brake pedal pivot bolt	
	Rear brake pedal pivot oil sealing lip	
	Contact surface between steering stem fastening nut gasket and upper connecting plate	
	Lithium-based multi-purpose extreme pressure grease (Universal SU-T330Y or equivalent product)	Throttle cable end (handlebar side)
Throttle eccentric wheel cable groove		
Urea-based multi-purpose pressure grease (Universal SU-T330Y or equivalent product)	Rolling areas of steering head upper and lower bearing	
	Contact area of upper and lower bearings of steering stem	
	Upper and lower dustproof seal cover lip of steering stem	
Use silicone grease	Clutch handlebar return spring	
	Sliding area of clutch handlebar pivot bolt	
	Contact area of clutch adjuster (thread)	
	Clutch push rod circular surface and rubber grommet installation area	
	Front brake handlebar return spring dual ends	
	Sliding area of front brake handlebar pivot bolt	
	Contact area of front brake pump push rod, piston and rockerarm	
	Sliding area of smooth portion of front brake caliper upper and lower guide pins	
	Contact area of smooth portion of guide pin of front brake caliper	
	Rear brake pump shift fork pin contact area	
	Rear brake pump push rod circular surface and rubber grommet installation area	
	Sliding area of smooth portion of upper and lower sliding shafts of rear brake caliper	
	Contact area of smooth portion of guide pin of rear brake caliper	
	Contact area of O-ring in the front/rear wheel axle bushing	
	Contact area of front brake pump piston/front and rear cup	
	Contact area of front brake caliper dustproof washer/piston	

Material	Position	Notes
Use silicone grease	Contact area of rear brake pump piston/front and rear cup	
	Contact area of rear brake caliper dustproof washer/piston	
Engine lubricant	Fuel pump unit rubber gasket	
Chain lubricant or equivalent product	Entire surface of chain	
DOT brake fluid	Front brake caliper piston sliding surface	
	Rear brake caliper piston sliding surface	
	Inner surface of front brake pump body	
	Inner surface of rear brake pump body	
	Contact area of front brake caliper seal ring/piston	
	Contact area of rear brake caliper seal ring/piston	
Special shock absorber oil (viscosity 10W)	Dust-proof seal lip of front fork tube	
	Front fork tube oil seal lip	
	Full sliding surface of compression and floating piston combination sliding bushing	
	Entire sliding surface of front fork and outer-tube bushing	
	Sliding surface of front fork damper piston rod	
	Entire sliding surface of front fork tube	
	Front fork spring retainer sliding bushing and each O-ring of the fork	
Thread locker (Huitian 7272)	Front/rear brake disc mounting bolts	
	Left and right front engine suspension to frame	
	Engine upper suspension (left and right) - frame	
	Steering handlebar lower socket and special through bolt	
	Driving sprocket mounting bolt	
Thread locker (Huitian 7262)	Front brake caliper bracket and front shock absorber bottom cylinder	
	Subframe and main frame	
	Rear brake pump and frame	
	Rear brake rocker arm and frame	
	Rear brake rocker arm and pedal	
	Chain clip with swingarm	
	Guide sprocket and subframe	

### Regular Maintenance And Adjustment

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## Care Instructions

### Overview:

This chapter contains all relevant information for conducting the recommended inspections and adjustments. Regular implementation of these maintenance procedures will make motorcycle operation smoother, extend its lifespan, and reduce maintenance costs. The information described in this Chapter applies to motorcycles both already in use and not sold yet.

All maintenance technicians shall be familiar with all the information described in this Chapter.

### Maintenance Interval Table

During each regular maintenance period, please conduct a pre-driving inspection.

**I: Inspect, clean, adjust, lubricate or replace if necessary. C: Clean R: Replace A: Adjust L: Lubricate.**

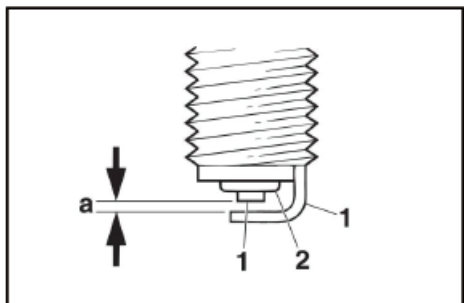
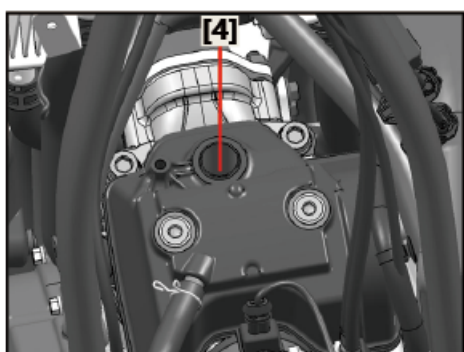
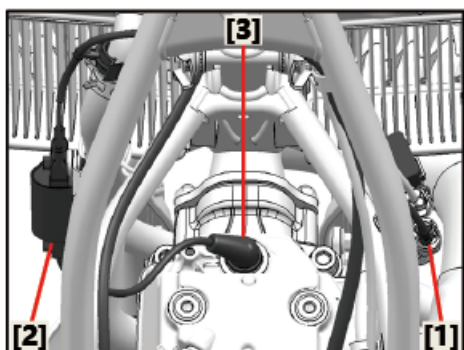
Item	Frequency	Notes	Each use for approximately 2.5 hours	Every 3 races for approximately 7.5 hours	Every 6 races for approximately 15 hours	Every 9 races for approximately 22.5 hours	Every 12 races for approximately 30 hours
Gasoline pipeline		(Notes 6)	I				R,*
Fuel pump filter element		(Notes 6)					R,*
Accelerator stroke clearance adjustment			I				
Air filter		(Notes 1)	C				
Crankcase vent pipe			I				
Spark plug			I				
Valve clearance		(Notes 4)			I,*		
Engine lubricant		(Notes 3)					
		(Notes 5)	I	R			
Engine oil filter element		(Notes 5)			R		
Engine idle speed check			I				
Piston, piston ring					R,*		
Piston pin					R,*		
Radiator coolant		(Notes 2)	I				
Cooling System			I				
Drive chain			I,L	R			
Chain guide/chain clip			I				
Guide sprocket/guide chain slider			I				
Driving sprocket			I				
Driven sprocket			I				
Brake fluid		(Notes 2)	I				
Brake pad wear			I				
Brake system			I				
Clutch system		(Notes 5)	I				
Control cable			I,L				
Exhaust pipe/muffler			I				
Friction ring			I				
Swingarm/Shock absorber connecting rod mechanism				L,*			
Front shock absorber oil		(Notes 3)				R,*	
Nuts, bolts, fasteners			I,*				
Wheels/tires			I				
Steering head bearing						I,*	

We recommend that you refer to KOVE official maintenance manual to repair these items. This maintenance plan is based on average riding conditions. Frequent use of the vehicle requires more frequent maintenance.

**Note:**

1. Clean your motorcycle promptly after each ride.
2. Replace every two years and mechanical components are required for replacement.
3. Replace after the first running-in period.
4. Inspect after the first running-in period.
5. Replace the engine oil if the clutch friction plate is replaced.
6. Replace annually.

**Mark\*For safety reasons, we recommend that these items be serviced only by the dealer.**



**Notes**  
Before installing the spark plug, clean the surfaces of the spark plug and the shim first.

※ **Inspection of spark plug**

1. Stand the vehicle on a flat surface.

**Warning**

· The vehicle shall be supported firmly without the danger of overturning.

2. Disassemble

- Seat cushion assembly;
- Fuel tank front trim assembly;

See "Frame, body trim and exhaust system" on page for details.

- Fuel tank assembly

See "Fuel system" on page 177 for details

3. Disassemble

- Ignition coil harness plug [1];
- Ignition coil [2];
- Spark plug cap [3]; spark plug [4].

**Notes**

Before removing the spark plugs, use an air gun to blow around the spark plug seats while ensuring no dust falls into the cylinder.

1. Inspection

- Spark plug type

Mistake → Replace.

Manufacturer/model

**NGK / SILMAR10A – 9S**

2. Inspection

- Electrode "1"

Damage/Consume → Replace the spark plug.

- Insulator "2"

Abnormal color → Replace the spark plug.

The normal color shall be tan or light tan.

3. Cleaning

- Spark plug

(using spark plug detergent or wire brush)

4. Measurement:

- Spark plug clearance "a"

(measured with a feeler gauge)

Non-conformance → Replace.

Spark plug clearance

0.80-0.90 mm

5. Installation

- Spark plug and ignition coil

Install the above components and tighten them to the specified torque:

**Spark plug**

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

**Ignition coil mounting bolt**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)

※ **Inspection and adjustment of valve clearance**

**Instruction:**

Valve clearance: The gap between the valve rockerarm and valve adjusting gasket.

Compression TDC: When the timing on the left crankcase cover aligns with the timing mark on the magneto rotor, the timing driven sprocket mark should be parallel to the cylinder surface.

Valve clearance:

**Intake (IN): 0.10mm - 0.16mm**

**Exhaust (EX): 0.22mm - 0.28mm**

**Notes**

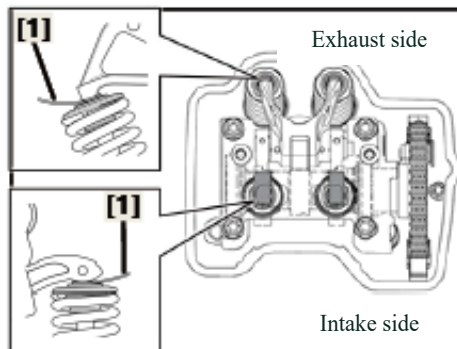
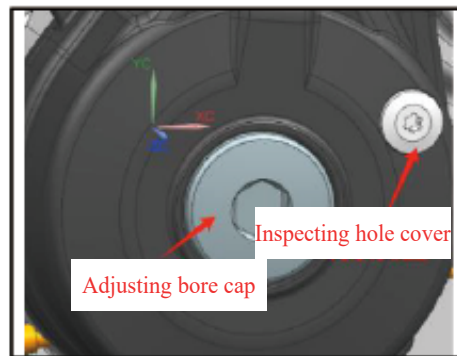
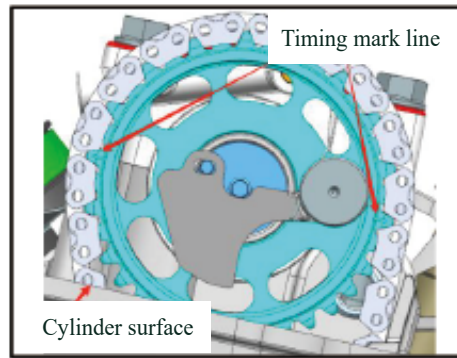
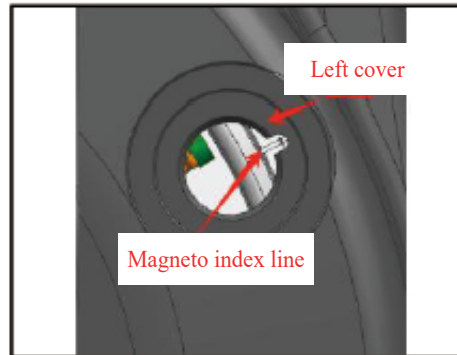
· Use a feeler gauge to record the clearance corresponding to each valve during inspection to facilitate the selection of valve gasket specifications later.

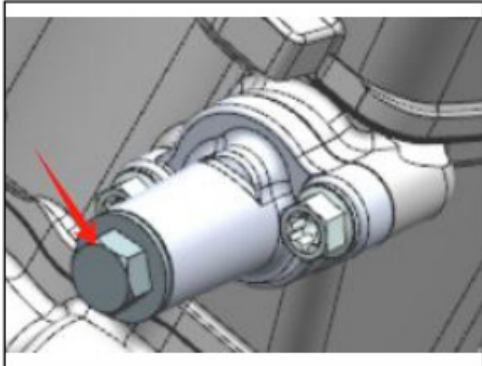
**Inspection steps:**

1. Remove all the vehicle accessories that block the engine cylinder head, generally including the seat cushion, body panels, and fuel tank;

2. Remove the engine cylinder head cover assembly, adjust the hole cover, and inspect the hole cover;

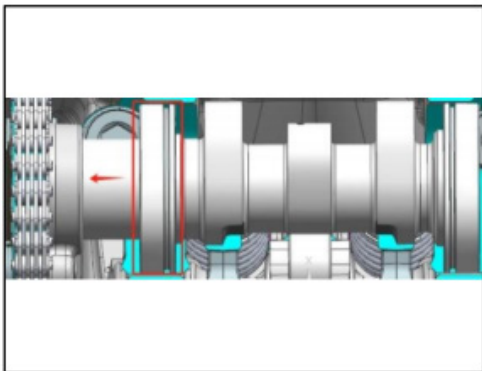
3. Rotate the crankshaft to adjust the engine to the top dead center (TDC) of the compression stroke, then use a feeler gauge [1] to check the intake and exhaust valve clearance.





**Adjustment procedures:**

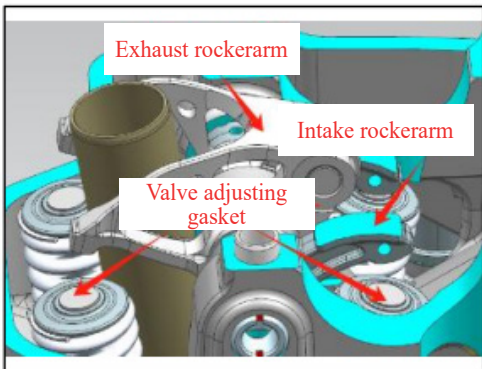
1. Rotate the crankshaft to adjust the engine to the TDC of compression stroke (**see the instructions on the previous page for details**);
2. Disassemble the top bolt of the tensioner to release it into a free state;
3. Disassemble the four camshaft gland bolts in reverse order according to the tightening sequence specified in "Bolt tightening methods for key parts" **on page 6**;
4. When removing the camshaft, move the bearing in the direction indicated by the arrow in the illustration, then remove the camshaft. According to the actual values recorded during the inspection, lift the rockerarm of the abnormal valve clearance, remove the corresponding valve washer, and calculate and replace it with a suitable valve shim according to the actual clearance;



5. After replacing the valve gasket, lower the rockerarm. At this time, check that the timing index line of the magneto still aligns with the index line of the inspection hole cover. If it is offset, rotate the crankshaft to adjust the alignment. Then reinstall the camshaft, install the camshaft cover, tighten the camshaft cover and the tensioner according to the "Bolt tightening methods for key parts" **on page 79**. For the detailed assembly steps, see "Valve train system" **on page 85**.

**Notes**

- When the camshaft is not installed and the tensioner pops up, the chain must be tightened to prevent the chain from being stuck in the rotating crankshaft.



6. Use a socket and a wrench to rotate the magneto rotor 360 degrees clockwise through the installation hole of the adjustment hole cover. Then re-check each valve clearance according to the inspection steps. If all are qualified, reinstall the cylinder head cover assembly, the adjustment hole cover and the inspection hole cover. At this point, the valve clearance adjustment is completed;
7. If the valve clearance still exceeds the required range from the standard range, repeat adjustment steps 2 - 6.

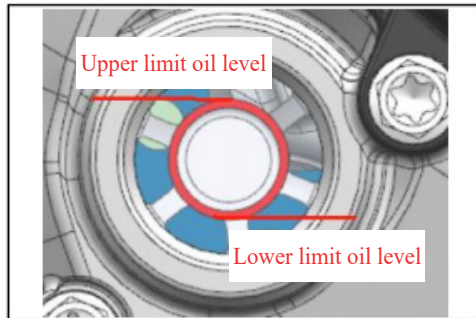
**Notes**

1. During the reassembly process, an appropriate amount of engine oil should be applied to each moving friction pair;
2. The calculation formula for the new valve gasket:  $A=(B - C)+D$ . Select the valve gasket group closest to the calculated result.;
  - A: Thickness of the new gasket
  - B: Recorded valve clearance value
  - C: Specified valve clearance value
  - D: Thickness of the removed gasket
3. There are 41 groups of valve gaskets available for adjusting valve clearance, with a thickness range of 1.72 mm to 2.60 mm.  
Gasket markings: 1720 = 1.72 mm, 1740 = 1.74 mm, ..., 2600 = 2.60 mm;
4. It is recommended to use a magnetic bar to remove the valve gasket to prevent the valve gasket from falling into the engine.

※ **Inspection and replacement of engine oil**

Inspection steps:

1. Start the engine and let it idle for 3-5 minutes.
2. Turn off the engine and wait for 3-5 minutes;
3. Place the motorcycle in an upright position on a level surface and check the engine oil level through the oil inspection window. If the fuel level is below the lower level line, remove the fuel filler cap and refuel the crankcase up to the upper level line with the specified engine oil.

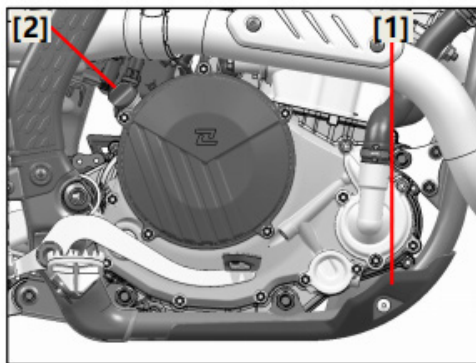


**Replace**

Start the engine, warm the motorcycle for several minutes and then turn off the engine. Support the motorcycle upright on a flat surface and place a container under the engine oil bleed bolt.

Disassemble the following parts:

- Engine lower protector [1].
  - Engine oil filler cap [2];
  - Engine oil bleed bolt and element [3];
- Drain the engine oil.



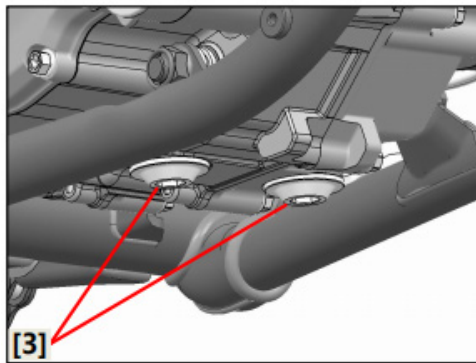
After completely draining the engine oil  
First, clean the oil drain bolt and strainer, then coat engine oil to the thread and seat surface of the oil drain bolt.

Apply engine oil to the new sealing ring;  
Install a new O-ring on the engine oil drain bolt.  
Install the engine oil bleed bolt and tighten it to the specified torque.

Torque: 20 N·m (2.0 kgf·m, 15 lbf·ft)

**Notes**

The recommended replacement intervals for engine oil and engine oil elements are:  
Every 6 races for approximately 15 hours.



**Inspection**

1. Check the engine oil bleed bolt to ensure there is no oil leakage.
2. Check the O-ring on the engine oil filler cap [4], and replace it if damaged.

**Engine oil capacity**

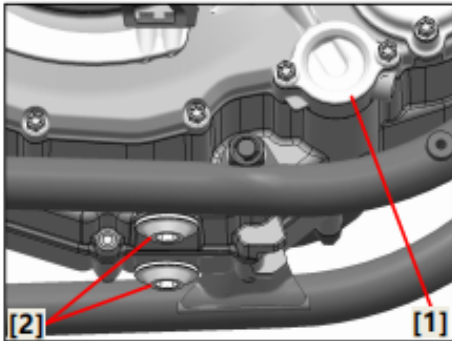
**Notes**

Requirements for oil filling volume:

1. Only after draining from the oil drain bolt: **1.1L**;
2. After replacing the oil fine filter: **1.2L**;
3. After disassembly and reassembly of the entire machine: **1.4L**.

**Notes**

- API service category: SL or above
- (Do not use engine oils marked with the API "Energy-Saving" symbol).
- Recommended SAE viscosity grade for engine oil: 10W-50.
- JASO T903 Standard: MA
- GB 11121-2006



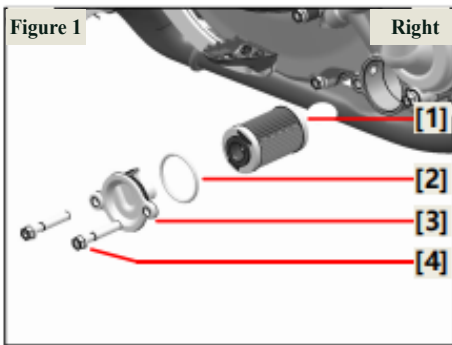
※ **Replacement and inspection of engine oil strainer**

After completely draining the engine oil

Disassemble the following parts:

- Remove the engine oil strainer cover on the right crankcase [1] to take out the fine-filter strainer;
- Remove the engine oil strainer bolt [2] at the case bottom to take out the coarse filter strainer.

When replacing the engine oil strainer components, the required engine oil volume: **1.1L**



**Installation of engine oil strainer:**

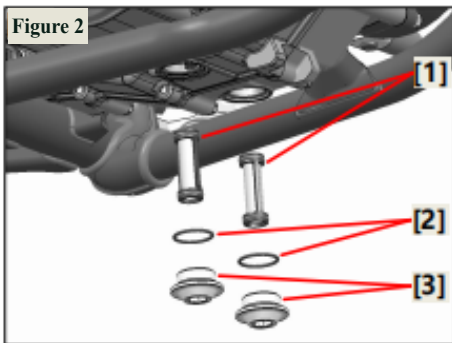
1. Installation of the engine oil strainer on the right case (as shown in Figure 1)

Install the engine oil element component [1] into the corresponding hole on the right crankcase. Fit the O-ring [2] of the fine filter cover into the groove of the fine filter cover [3]. Take 2 small-plate bolts [4], insert them into the corresponding mounting bores of the fine filter cover, and tighten to the specified torque.

Torque: 10 N·m (1.0 kgf·m, 7.0 lbf·ft)

**Notes**

- The paper element printed with letters should be intalled outward-facing.



2. Installation of the engine oil strainer at the case bottom (as shown in Figure 2)

Apply a small amount of engine oil to the 2 coarse filter strainers [1], and install it into the corresponding engine oil strainer bore. Install the O-ring [2] of the engine oil strainer bolt onto the engine oil filter bolt, apply an appropriate amount of grease to the inner bore of the engine oil strainer bolt [3], and fasten it to the case, tightening it to the specified torque.

Torque: 20 N·m (2.0 kgf·m, 15 lbf·ft)

**Inspection of engine oil fine filter element and engine oil strainer**

- Check the engine oil strainer (coarse filter)  
Damaged → Replace. If not → Clean it.
- Check the engine oil strainer component and the engine oil filter element (fine filter). The oil filter element must be replaced every time the oil is changed.

※ **Inspection of exhaust pipe**

**Notes**

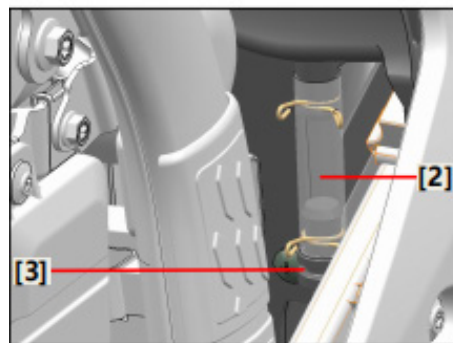
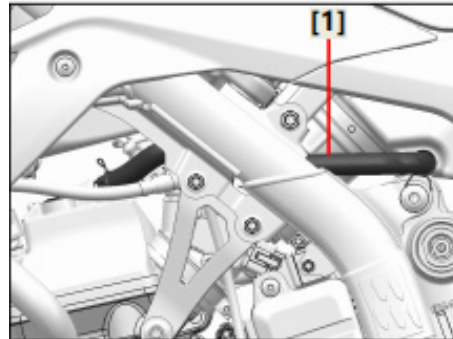
Maintenance shall be carried out more frequently after the throttle is fully opened in the rain, the motorcycle is washed, or reversed. If a sediment layer can be seen in the transparent tube [2], it needs to be cleaned.

Remove the plug of the transparent air tube [3], drain the sediment into an appropriate container, and then reinstall the plug.

Inspect the crankcase vent hose [1]

Crack/damage → Replace.

Loose connection → Correct connection.



※ **Vehicle starting (choke lever)**

Always follow the correct startup procedure as described below.

Pulling out the knob aids in vehicle starting during cold weather.

Before starting the engine, check the engine oil and coolant levels.

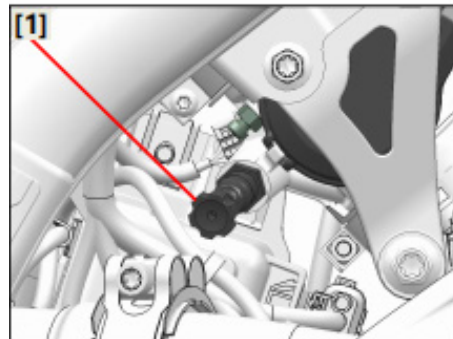
See "Inspection and replacement of engine oil" on page 23 for details.

Engine cold start

1. Shift the transmission into neutral
2. If the temperature is 10°C or lower, fully pull out the damper knob before ignition.
3. Start the engine and let it warm up for 2-3 minutes.

Push the choke knob all the way back to the closed position.

If the idle speed is unstable, slightly rotate the accelerator handle.



※ **Adjustment of front hand brake lever Adjust**

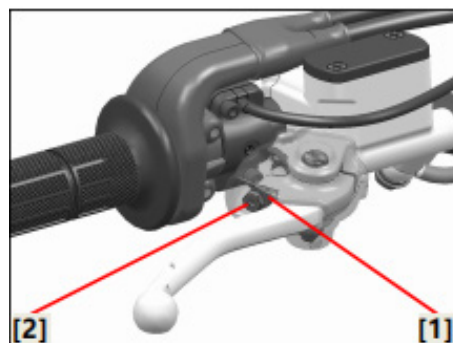
- Front hand brake lever position

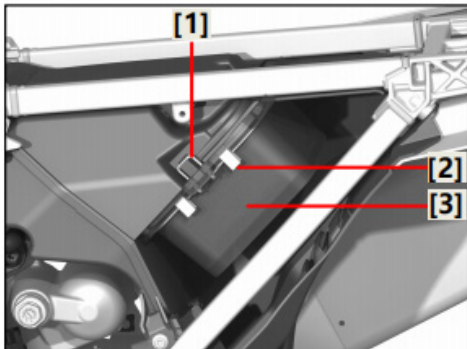
The distance between the hand hand brake lever and the accelerator handle can be adjusted by rotating the adjusting bolt.

- a. Loosen the locking nut [1] of the hand brake lever adjusting bolt.
- b. Rotate the adjusting bolt [2] clockwise to increase the distance, and counterclockwise to decrease the distance.
- c. After adjustment, tighten the locking nut of the hand brake lever adjuster.

Torque

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)





※ **Cleaning and replacement of air filter sponge element**

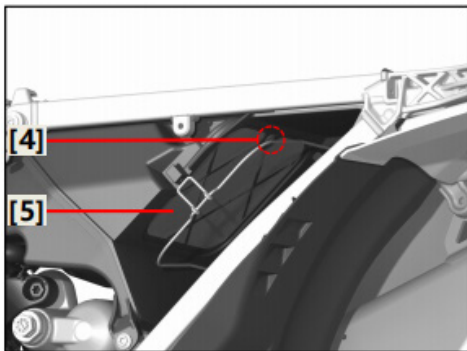
① . Sponge filter element and filter element bracket

**Disassembly/installation**

Disassemble the following parts:

- Release the retaining spring [1] of the sponge filter element;
- Sponge filter element [2] and element bracket [3];
- Remove the screws [4] for fixing the metal strainer;
- Take out the metal strainer [5].

The installation sequence is reversed from the removal sequence.



**Note**

- Remove the sponge filter element [7] from the filter element bracket [6].

**Notes**

- Be careful not to damage the sponge filter element [8].

Thoroughly clean the sponge filter element [1] in a cleaning solvent, and then clean it in hot water with detergent or soap solution.

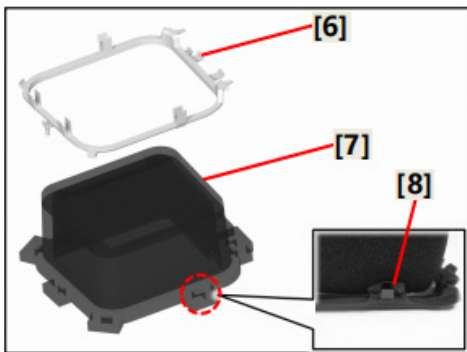
Ensure that there is no dirt or dust in the air filter element. Clean it again if necessary. After cleaning, squeeze out the moisture from the air filter element and let it dry thoroughly.

**Notes**

- Since gasoline or low-flash-point solvents are highly flammable, it is prohibited to use them to clean the air filter sponge filter element.

Apply 50cm<sup>3</sup> of KOVE foam air filter oil or equivalents to the inner side of the sponge filter element.

Put the air filter sponge filter element into a plastic bag and evenly apply the air filter oil with both hands.



**Warning**

- Do not use engine oil on the sponge filter element.

※ **Hydraulic clutch lever position adjustment**

Depending on the hand size, use the adjustment knob [1] to adjust the clutch lever position [a].

**Notes**

• Rotate the adjustment knob in the (+) direction to move the clutch lever away from the steering handlebar, and rotate it in the (-) direction to move the clutch lever closer to the steering handlebar.

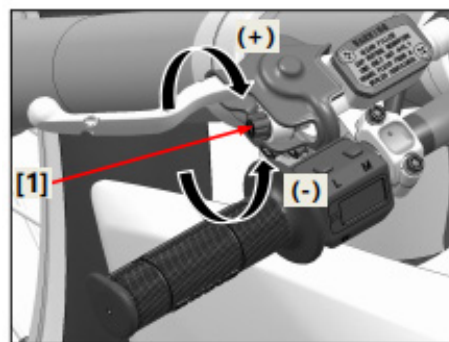
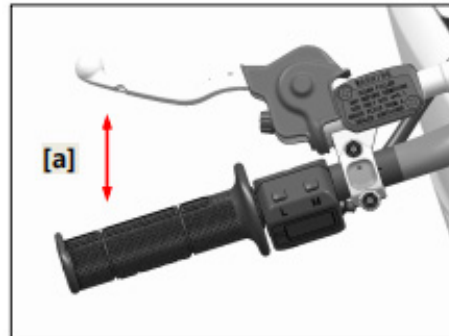
(+) Increasing the distance to the steering handlebar;

(-) Reduce the distance to the steering handlebar;

One notch of the adjustment knob is 1/8 turn.

**Liquid level inspection and replacement**

See "Regular Maintenance and Adjustment" on page 17 for details.



**Warning**

• The adjustment range of the knob is limited. Only rotate it by hand—never use tools or apply excessive force.

**Liquid level inspection and replacement**

**Notes**

• The fluid level rises as the wear on the clutch friction plate increases.

• Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.

1. Disassemble

- Place the hydraulic clutch reservoir in a horizontal position;

- Screw [1]

- Cover [2];

- Gasket [3];

The liquid level [a] should be 4 mm below the upper edge of the reservoir.

If not compliant → Add brake fluid

2. Replace the brake fluid

- Loosen the exhaust bolt [4].

- Use a syringe and a suitable hose to inject fresh brake fluid from the exhaust bolt until the proper level is reached and the system is exhausted.

3. Installation

The installation sequence is reversed from the removal sequence.

Torque:

**Clutch reservoir cover mounting screw**

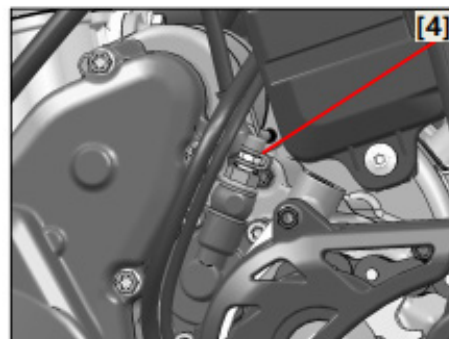
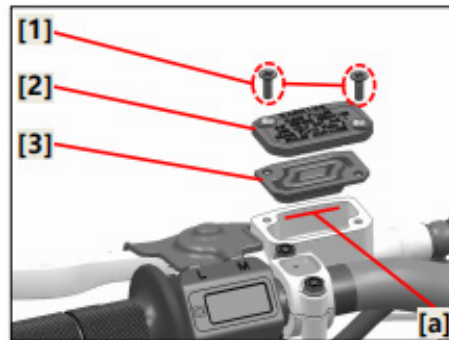
1.0 N·m(0.1 kgf·m, 0.7 lbf·ft)

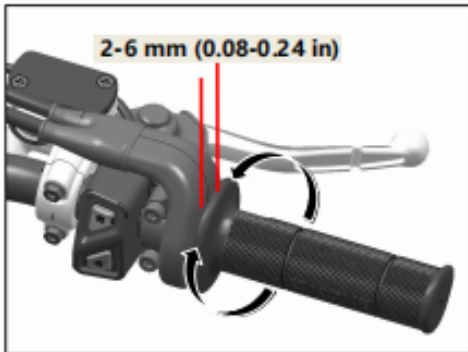
**Hose connecting bolt**

32 N·m(3.2 kgf·m, 24 lbf·ft)

**Exhaust bolt**

9.0 N·m(0.9 kgf·m, 6.6 lbf·ft)





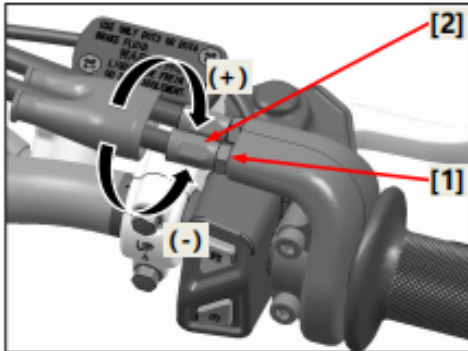
※ **Inspection and adjustment of accelerator free stroke**

Check whether the throttle cable is aged, damaged or kinked. Turn the accelerator handle and check that the throttle opens smoothly and closes automatically in any steering position.

If the accelerator handle does not rotate well, check that the cables are wired correctly, the accelerator is clean with recommended lubricant (engine oil or proper cable lubricant), and the accelerator drum rotates normally.

If Ok, but the throttle does not rotate well, replace the accelerator cable (oil inlet and oil return).

Measure the free play at the accelerator handle flange. Free play: 2-6mm (0.08-0.24 in)



**1. Fine-tune on the accelerator side**

Loosen the lock nut [1] and turn the adjuster [2].

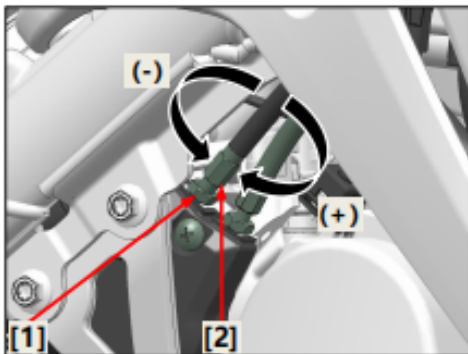
Turning the adjuster in the (-) direction will reduce the free play, and turning the adjuster in the (+) direction will increase the free play.

After adjustment, hold the adjuster and tighten the locking nut.

If the correct free play cannot be obtained despite turning the regulator to the end, turn it back in the (+) direction until it lightly touches the end, make one turn in the (-) direction, and then make more adjustments on the throttle side.

Nut [1] torque:

5.0 N·m (0.5 kgf·m, 4.0 lbf·ft)



**2. Adequately adjust on the throttle body side**

Loosen the accelerator cable adjuster lock nut [1] and turn the adjuster [2] in the (-) direction to reduce the free clearance and in the (+) direction to increase the free clearance. After the adjustment, hold the adjuster and tighten the locking nut of the inlet accelerator cable adjuster to the specified torque.

Torque:


4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)

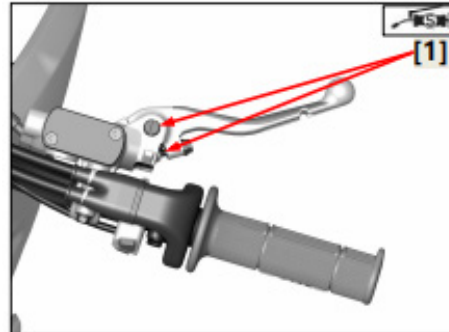
(The oil inlet and oil return cables are subjected to the same adjustment).

**Notes**


· Re-check whether the accelerator rotates smoothly or not.


※ **Lubrication of front brake handle**  
Apply lubrication to the pivot point of the handle and the contact areas of the metal parts [1].

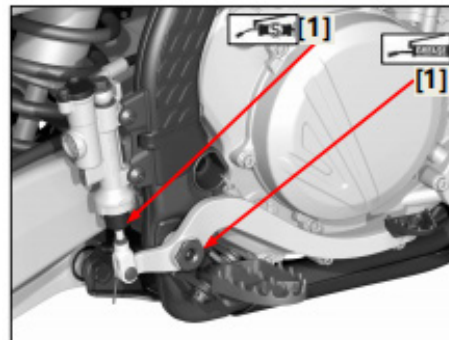
	Recommended lubricating oil Use silicone grease
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※ **Lubrication of rear brake rocker arm**  
Apply lubrication to the pivot point of the brake rocker arm and the contact areas of the metal parts [1].

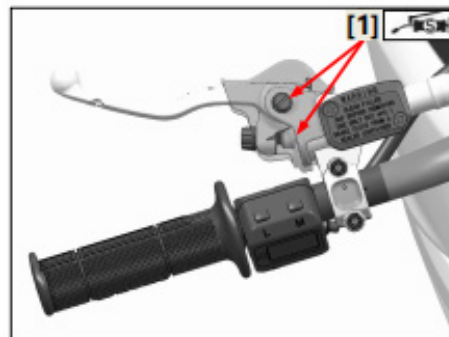
	Recommended lubricating oil Lithium-based multipurpose grease
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	Recommended lubricating oil Use silicone grease
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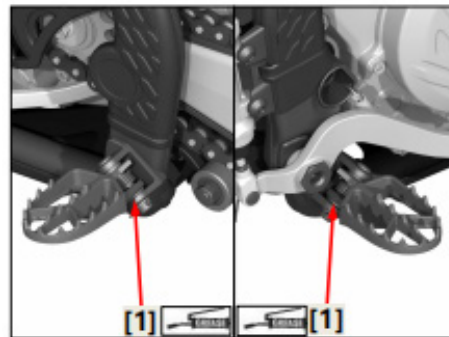
※ **Lubrication of clutch handle**  
Apply lubrication to the pivot point of the handle and the contact areas of the metal parts [1].

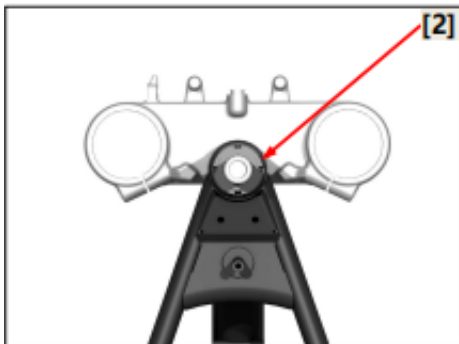
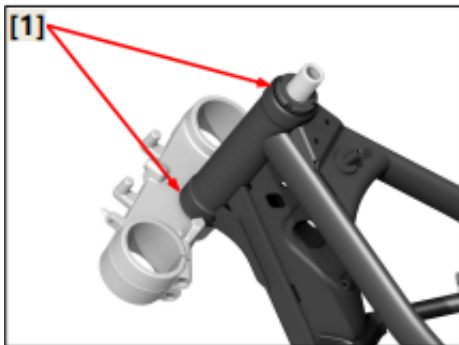
	Recommended lubricating oil Use silicone grease
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※ **Inspection and lubrication of pedal**  
The anti-slip teeth of the pedal can be repaired by filing the grooves between the teeth with a triangular file. However, be aware that filing too much will reduce the lifespan of the sole. Only file the tips of the anti-slip teeth. Filing the grooves too deep will weaken the pedal. Make sure that the bolts can rotate freely and keep the cotter pins of the pivot pins in good condition.  
Apply lubrication to the pivot point of the pedal and the contact areas of the metal parts [1].

	Recommended lubricating oil Lithium-based multipurpose grease
---	--





**Warning**

• Do not over-tighten the steering stem 4-slot nut.

※ **Inspection and adjustment of steering head**

1. Stand the vehicle on a flat ground.

**Warning**

• Ensure that the vehicle is securely supported and not at risk of tipping over.

**Note**

• Use a suitable stand to lift the front wheels of the motorcycle.

1. Inspection

- Upper and lower dustproof washers [1]  
Cracked/broken → Replace.

2. Inspection

- Steering head

Hold the front shock absorber bottom cylinder and gently shake the front fork.

Stuck/loose → Adjust steering head.

3. Disassembly

- Steering handle

- Upper connecting plate

4. Adjustment

- Steering head

a. Loosen the steering stem 4-slot nut [2].

b. Use a torque wrench to lock the nut to the specified torque.

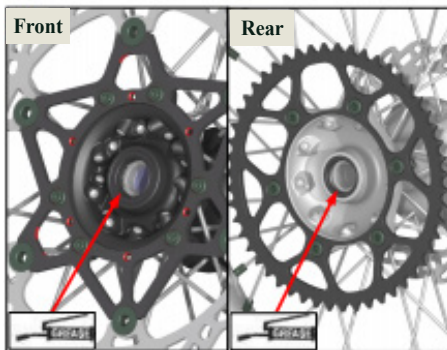
**Note**

• Make sure that the torque wrench is aligned perpendicular to the 4-slot nut socket.

Steering stem 4-slot nut (locking torque)

First torque to 40N·m, then loosen and torque to 10N·m, and finally back off by 1/4 turn.

c. After installing the upper bracket and handlebar, rotate the front shock absorber fully to both sides and check for any looseness or sticking in the steering head. In case of dry sticktion, remove the steering stem assembly from the lower bracket and inspect the upper and lower bearings.



※ **Inspection and lubrication of front and rear wheel bearing seal**


Regularly clean, inspect and lubricate oil seals, particularly when riding on wet, muddy, or dusty roads. Make sure all dustproof seals are in good condition. During installation, apply grease in the groove between the main and auxiliary lips of the oil seal.

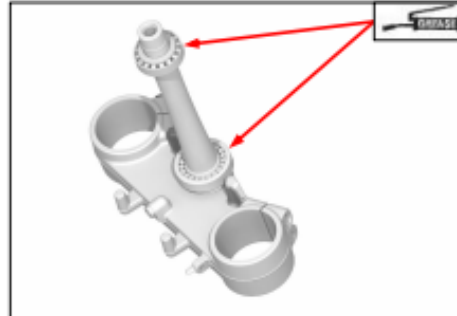
Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent).

※ **Inspection and lubrication of steering head Bearing**

Regularly clean, inspect and lubricate steering head bearings, particularly when riding on wet, muddy, or dusty roads.

Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent) .


	Recommended lubricating oil Lithium-based multipurpose grease
---	--

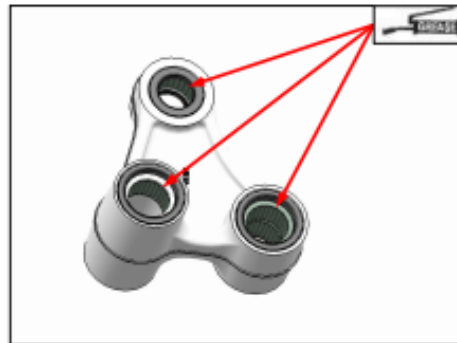


※ **Inspection and Lubrication of triangular cradle**

Clean, inspect and lubricate the triangular cradle bearing regularly. Make sure all dustproof seals are in good condition. During installation, apply a small amount of grease in the groove between the main and auxiliary lips of the oil seal.


Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent) .

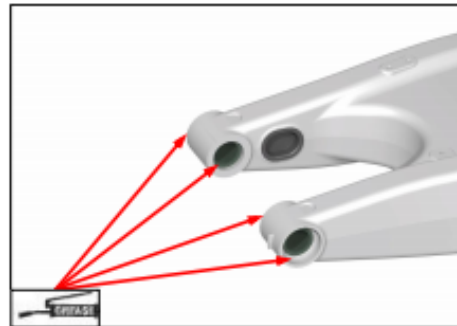
	Recommended lubricating oil Lithium-based multipurpose grease
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※ **Inspection and lubrication of swingarm axle**

Clean, inspect and lubricate the swingarm bearing regularly. Make sure all dustproof seals are in good condition. Apply the grease in the groove between the main and auxiliary lips of the oil seal. Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent). Do not attempt to weld or repair damaged swingarms, as welding can weaken the strength of the swingarms.


	Recommended lubricating oil Lithium-based multipurpose grease
---	--

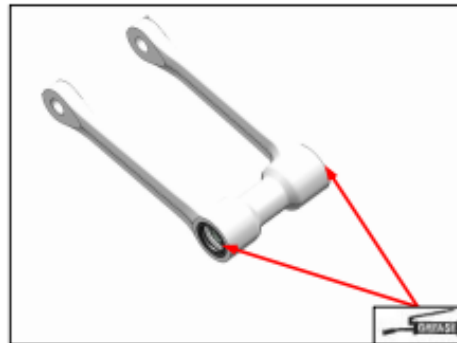


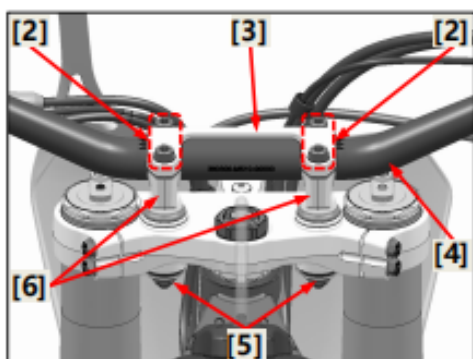
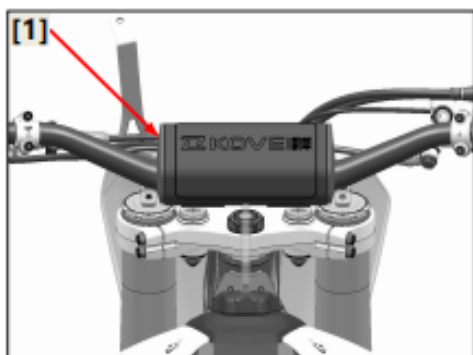
※ **Inspection and Lubrication of U-cradle**

Clean, inspect and lubricate the U-cradle bearing regularly. Make sure all dustproof seals are in good condition. Apply the grease in the groove between the main and auxiliary lips of the oil seal.

Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent).

	Recommended lubricating oil Lithium-based multipurpose grease
---	--





※ **Adjustment of steering handlebar position**

**Notes**

• The mounting position of the steering handlebar socket on this motorcycle can be adjusted, allowing a choice between forward and reverse installation.

The steps for adjusting and installing the steering handlebar position are as follows:

1. Disassemble

Steering handlebar chest protector [1];

Bolt [2];

Steering handlebar upper socket [3];

Temporarily remove the steering handlebar [4];

Lower socket bolt and flat gasket [5];

Lower socket [6].

2. Adjustment

After adjusting the distance of the lower socket on the steering handlebar, install the steering handlebar in the optional position.

3. Installation

The installation sequence is reversed from the removal sequence.

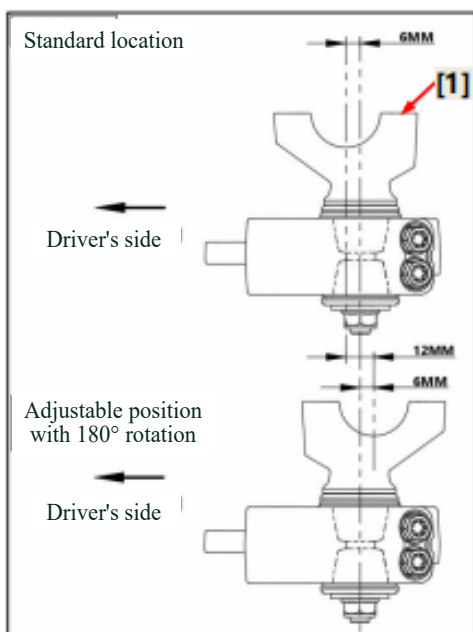
Torque:

**Steering handlebar and upper/lower socket**

22 N·m (2.2 kgf·m, 16 lbf·ft)

**Upper connecting plate and lower double-threaded stud (self-locking nut)**

22 N·m (2.2 kgf·m, 16 lbf·ft)



The handlebar distance position can be adjusted by changing the direction of the lower socket [1].

**Notes**

• The steering handlebar lower socket is offset by 6 mm from the centerline of the socket. The steering handlebar socket position can be set with an offset distance of 12 mm, positioned behind the standard location.

※ **Inspection of front shock absorber**

1. Stand the vehicle on a flat ground.

**Warning**

- Support the vehicle firmly so as not to turn over.

2. Inspection:

- Front swingarm hose

Damage/scratch → Replace.

Front shock absorber bottom cylinder

Oil leaks between swingarm hose and outer tube → Replace oil seal.

3. Keep the vehicle upright and engage the front brake.

4. Inspection:

- Front shock absorber actuation

Press down firmly on the handlebar several times to check for smooth rebound of the front shock absorber.

Unsmooth movement → Maintenance.

See "Front Wheels, Suspension, Steering" on page 193 for details.



※ **Inspection of rear shock absorber**

1. Stand the vehicle on a flat ground.

**Warning**

- Support the vehicle firmly so as not to turn over.

2. Inspection:

- Rear shock absorber inner rod

Bend/damage → Replace rear shock absorber.

- Rear shock absorber

Oil leaks → Replace rear shock absorber.

- Spring

Damage/wear → Replace rear shock absorber.

- Size of Bolts

Bend/damage/wear → Replace.

3. Inspection:

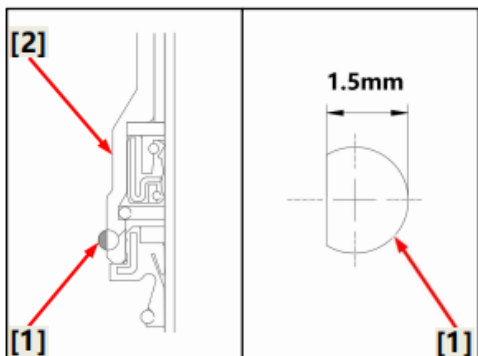
- Rear shock absorber actuation

Press down firmly on the rear of the vehicle seat cushion several times to check for smooth rebound of the rear shock absorber.

Irregular movement → Adjust

See "Regular Maintenance and Adjustment" on page 17 for details.

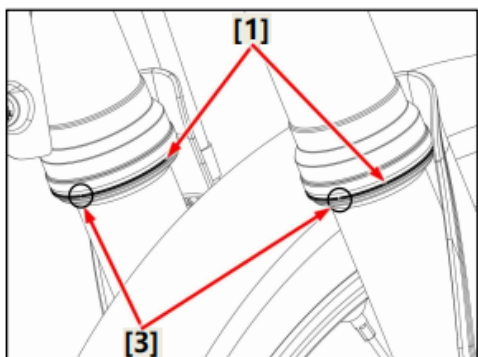




※ **Front shock absorber wear ring**

Check the operation of the front shock absorber by operating the front brake and compressing the front shock absorber several times.

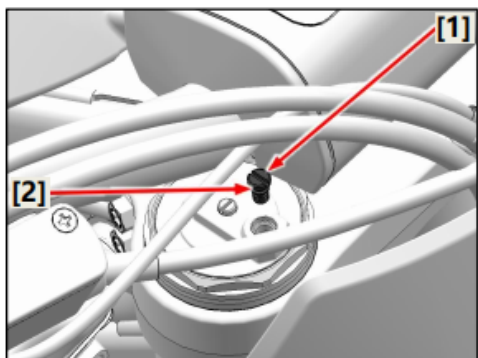
Check the entire front shock absorber assembly for signs of leakage, damage, or loose fasteners. Check if the decorative protector and the dustproof seal ring of the front shock absorber are clean, free of dirt or dust. Remove the dirt or dust accumulated at the bottom of the front shock absorber seal.



Check the wear ring [1] for wear or damage.

If the wear ring is less than 1.5 mm or flush with the front fork tube [2], replace the wear ring.

Ensure that the end clearance [3] of the wear ring faces backward.



※ **Adjustment of air pressure inside front shock absorber**

The shock absorber generates internal air pressure during operation, which acts like a progressive resistance, subsequently affecting the performance of the shock absorber. So as the race conducts, the front shock absorber on this motorcycle will become stiff.

After the race or practice, it is necessary to release the accumulated air pressure in the front shock absorber in a timely manner.

Ensure the front shock absorber is fully extended, the front wheel is off the ground, and completely loosen the front shock absorber bleed bolt [1]. Check if the O-ring [2] of the bleed bolt is damaged, and replace it if necessary. Apply the recommended silicon grease to the O-ring.

Install and tighten the front bleed bolt to the specified torque.

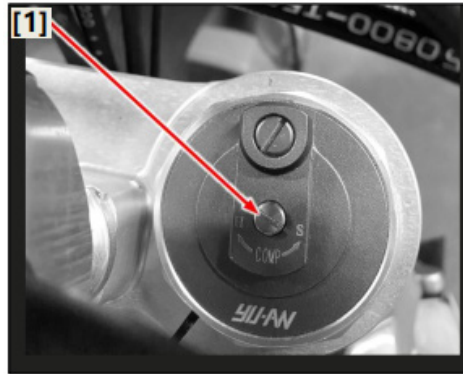
1.3 N·m (0.1 kgf·m, 1.0 lbf·ft)

※ **Front shock absorber settings and adjustments**

**1. Compression damping adjustment**

The adjustment of the compression damping affects the speed at which the front shock absorber compresses. The front shock absorber features 22 stages of compression damping. Each segment is a quarter turn. Turning the compression damping adjustment bolt one full turn will rotate the adjuster by 4 segments.

The compression damping increases when the adjuster is rotated clockwise (H), and the compression damping decreases when the adjuster is rotated counterclockwise (S).



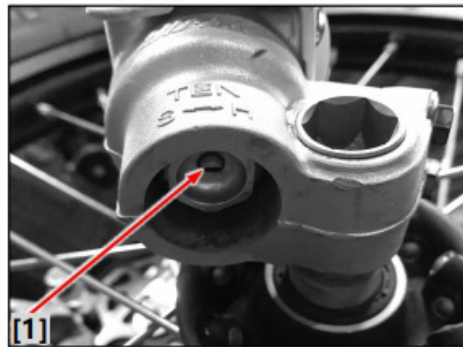
Set standard compression damping:

1. Clockwise rotate the compression damping adjuster until it cannot be rotated.
2. 5% Rotate the adjusting bolt in a counterclockwise direction (lightly). The standard compression damping is to rotate 10 segments counterclockwise from the hardest position (the position where a click sound is heard). You can make adjustments based on your weight and riding conditions. Ensure that the adjustment bolt stops at the click position and both ends are set to the same level after each adjustment.

**2. Rebound damping adjustment**

The adjustment of rebound damping will affect the rebound speed of the front shock absorber. The front shock absorber features 22 stages of rebound damping. Each segment is a quarter turn. Rotating the rebound damping adjustment bolt one full turn will advance the adjuster by 4 stages.

Turn the adjustment bolt clockwise to increase the rebound damping (hard), and turn it counterclockwise to decrease the rebound damping (soft).

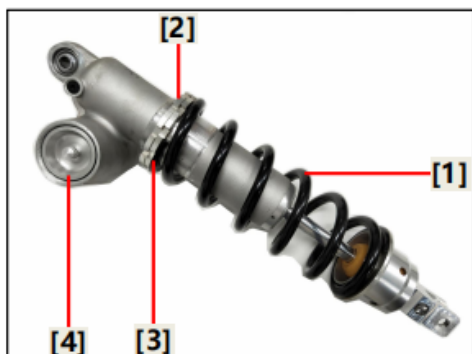


Set the standard rebound damping:

1. Rotate the rebound damping adjustment bolt clockwise until it can no longer be turned.
2. Rotate the adjusting bolt in a counterclockwise direction (lightly). The standard rebound damping is to rotate 10 segments counterclockwise from the hardest position (the position where a click sound is heard). You can make adjustments based on your weight and riding conditions. Ensure that the adjustment bolt stops at the click position and both ends are set to the same level after each adjustment.

**Notes**

- Gently rotate the adjusting bolt to prevent damage to the shock absorber.
- When adjusting compression damping or rebound damping, always use a properly sized tool to avoid damaging the device.
- Do not continue to rotate the adjusting bolt after it has been turned to the bottom, otherwise it may damage the adjusting device. The adjusting torque shall not exceed 0.5N·m.



※ Rear shock absorber adjustment

**Warning**

• The rear shock absorber includes a shock absorber gas cylinder [4] containing high pressure nitrogen. Do not attempt to remove, repair or dispose of the device. Piercing or exposure to flame may also cause an explosion, causing serious injury. Repair or disposal shall be completed by special repair shop.

**Spring preload adjustment**

**Adjustment method:**

1. Securely support your motorcycle with a maintenance bracket or a crane and lift the rear wheels off the ground.
2. Check if the spring preload force is at the standard length (228mm).
3. Loosen the shock absorber spring locking nut [2] and rotate the adjusting nut. The spring [1] length will change by 1.5 mm for each turn of the adjusting nut.
4. Make corresponding adjustments as needed.
5. After the adjustment is completed, hold the adjusting nut [2] and tighten the shock absorber spring locking nut [3].

Torque: 44 N·m

**Increase spring preload:**

Loosen the shock absorber spring locking nut [2] with a special tool, rotate the adjusting nut [3], and shorten the spring [1] length. The minimum length shall not be less than 220mm.

**Reduce spring preload:**

Loosen the shock absorber spring locking nut [2] with a special tool, rotate the adjusting nut [3], and increase the spring [1] length. The minimum length shall not be higher than 235mm. Each turn of the adjusting nut will change the spring length and spring preload.

**Rear shock compression damping adjustment**

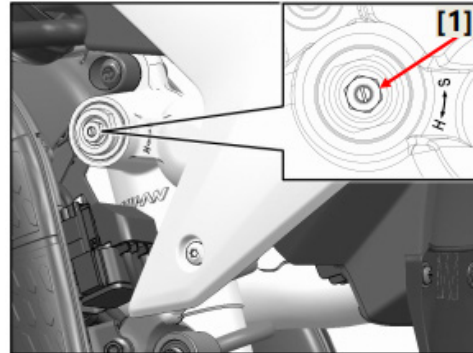
The compression damping can be adjusted separately for the bolt to conduct high-speed compression damping and low-speed compression damping. You can adjust it according to your weight and riding conditions.

**1. High-speed compression damping adjustment**

The high-speed compression damping adjuster is effective when rebound damping adjustment is needed for high-speed operation. High-speed damping can be adjusted by rotating the hexagonal part of the compression damping adjuster. The high-speed compression damping adjuster is incremented in 1/4-turn steps. Ensure the high-speed adjuster is securely in the braking position, not between positions.

**Adjust to the standard position:**

Turn the adjusting bolt [1] clockwise (H) until it no longer rotates (hardest position). Rotate the adjusting bolt [1] counterclockwise for 2 turns from the hardest position.



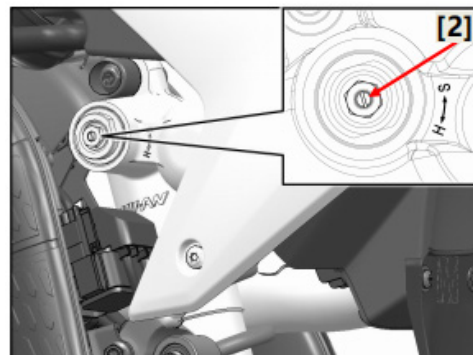
**2. Low-speed compression damping adjustment**

When damping adjustment is required at a relatively low speed, the low-speed compression damping adjusting bolt should be used. The low-speed compression damping adjuster has 16 segments, each with a 1/4 turn.

Turning clockwise (H) increases damping and makes the shock absorber stiffer, while rotating counterclockwise (S) increases damping and makes the shock absorber softer.

**Adjust to the standard position:**

1. Rotate the adjusting bolt [2] clockwise (H) until it no longer turns (maximum hardness).
2. Rotate the adjusting bolt [2] for 8 segments counterclockwise from the hardest position (until a click sound is heard).

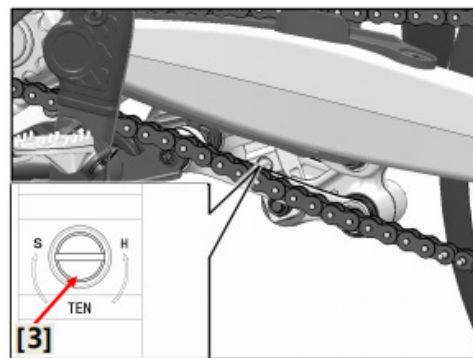


**3. Rebound damping adjustment**

The rebound damping adjusting bolt is located at the left lower end of the rear shock absorber with 24 segments in total. The rebound damping increases when the adjuster is rotated clockwise(H), and the rebound damping decreases when the adjuster is rotated counterclockwise(S).

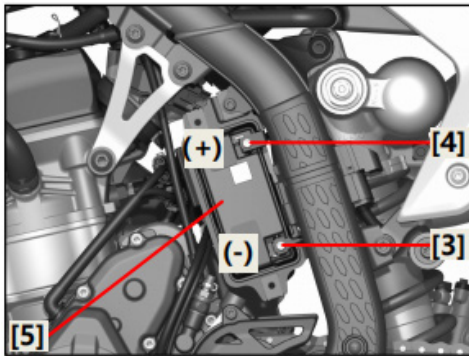
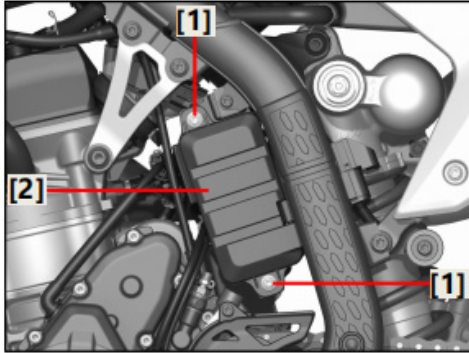
**Set the standard rebound damping:**

1. Rotate the rebound damping adjusting bolt (H) clockwise until it stops rotating.
2. Turn the adjusting bolt counterclockwise (S, lighter) to set the standard rebound damping by rotating it 8 segments from the hardest position, stopping at the click sound.



**Notes**

- Gently rotate the adjusting bolt to prevent damage to the shock absorber.
- When adjusting compression damping or rebound damping, always use a properly sized tool to avoid damaging the device.
- Do not continue to rotate the adjusting bolt after it has been turned to the bottom, otherwise it may damage the adjusting device. The adjusting torque shall not exceed 0.5N·m.



※ **Battery inspection and charging**

**Warning**

· The negative wire must be disconnected before disassembling the battery, otherwise the battery will be short-circuited.

**Disassembly/installation**

Disassemble the following parts:

- After the vehicle get stall;
- Step screw [1];
- Battery box cover [2];
- Disconnect the negative battery electrode (-) cable with screw [3].
- Disconnects the positive (+) cable with screw [4];
- Remove the battery rubber grommet [5].

**Note**

· Battery is designed with over-charge protection, and the voltage for over-charge protection is 15.6±0.3V.

**Charging**

- a. Turn off the vehicle and disconnect the positive and negative electrodes of the battery from the battery terminals.
  - b. Remove battery;
  - c. Connect the charger to the battery, turn on the charger
- When the charging is completed, turn off the charger, and unplug it from the battery;

**Notes**

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

**Check charging voltage**

The battery must function properly and be fully charged. Start the vehicle for a voltage test; Measuring point positive (+), measuring point grounding (-).

**Notes**

· When measuring the battery voltage after charging, it shall be maintained for at least 30 minutes, otherwise accurate results cannot be obtained due to battery voltage fluctuations after charging.

Charging voltage	
5000rpm	14.4±0.5V

**Torque:**  
 Battery box cover mounting bolts  
 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)  
 Battery terminal mounting screw  
 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Battery specification:**

Battery model: HJ12-FPZ (lithium battery)  
 Full charging voltage: > 13.2V  
 Required charging voltage: < 12.8V  
 Charging current: standard 1.2A, max. 12.0A  
 Operating temperature: -20°C - 60°C  
 Battery capacity: 12V/2.3Ah  
 Overall dimension: Length × Width × Height:  
 112×49×85(±1mm)

### Frame, Body Trim, Exhaust System

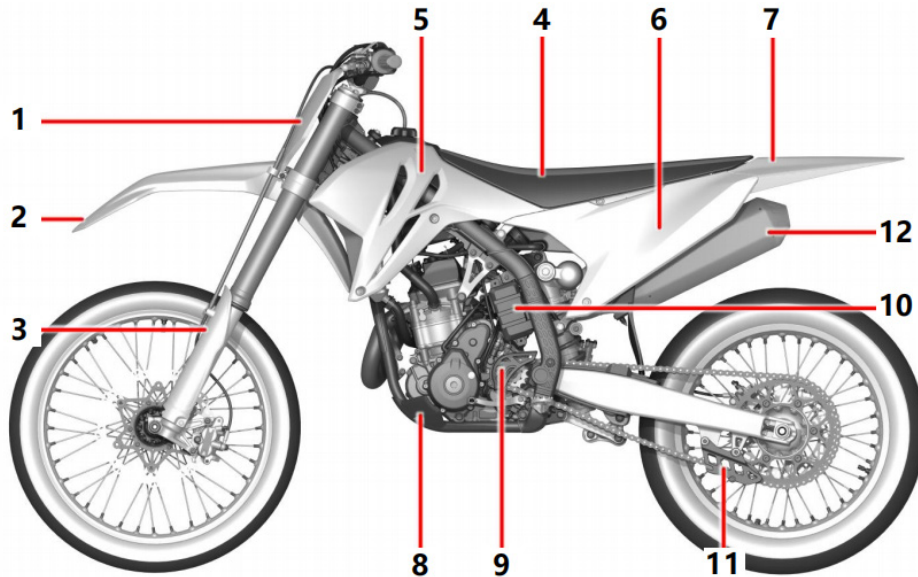
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## Maintenance Instructions

### Overview:

- This section describes the disassembly and reassembly of body trim and exhaust system;
  - For disassembly, mark and store the mounting fasteners to ensure that they are reinstalled in their original positions;
  - For bonnet installation, ensure that the matching areas are correctly aligned before tightening the fasteners;
  - After removing the exhaust system, be sure to use new washers;
  - When installing the exhaust system, loosen all fasteners first. Be sure to tighten the exhaust pipe joint nut before tightening the mounting bolts;
  - Be sure to check the exhaust system for leaks after installation.
- ### Troubleshooting
- Excessive exhaust noise.
  - Exhaust system damage;
  - Inadequate exhaust gas leak performance;
  - Exhaust system deformation;
  - Exhaust pipe blockage.

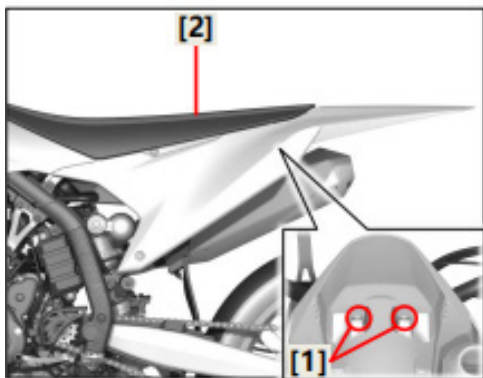
**Body Trim Position**



(1) Windshield (number plate)	(5) Fuel tank front trims (left and right)	(9) Engine front sprocket cover
(2) Front fender	(6) Vehicle body (left and right)	(10) Battery box cover
(3) Front shock absorber trim (left and right)	(7) Rear tailgate	(11) Chain guide assembly
(4) Seat cushion assembly	(8) Engine lower protector	(12) Muffler/exhaust pipe

After the motorcycle is powered off, carry out disassembly in this order below:

Seat cushion assembly → Front fuel tank trim (left and right) → Vehicle body (left and right) → Tailgate → Front windshield → Front fender → Front shock absorber trim (left and right) → Engine lower protector → Engine front sprocket cover → Gear shift arm assembly → Front brake assembly → Front wheel assembly → Front shock absorber → Hydraulic clutch lever assembly → Steering handlebar (assembly) → Upper connecting plate → Lower connecting plate and steering stem assembly → Rear wheel assembly → Rear brake assembly → Rear brake pedal assembly → Suspension components → Drive chain → Rear shock absorber → Swingarm → Chain guide assembly → Rear splash guard → Exhaust pipe assembly → Radiator hose → Radiator (left and right) → OBD diagnostic interface → Fuel tank assembly → ECU control unit → Exhaust pipe → Regulating rectifier → Subframe → Air filter assembly → Full vehicle wiring harness and electrical components → Throttle valve body assembly → Battery box → Engine assembly.

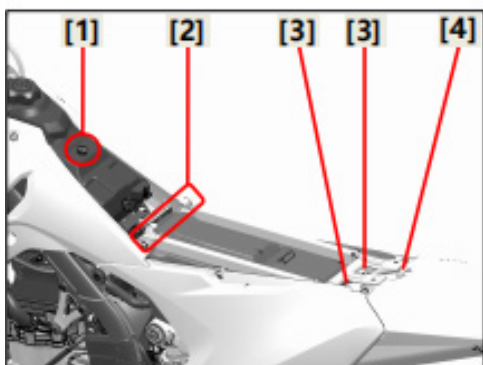


※ **Seat cushion assembly**

**Disassembly/installation**

Disassemble the following parts:

- Remove 2 hexalobular pan head bolts [1];
- Press down and then push back to remove the seat cushion [2].

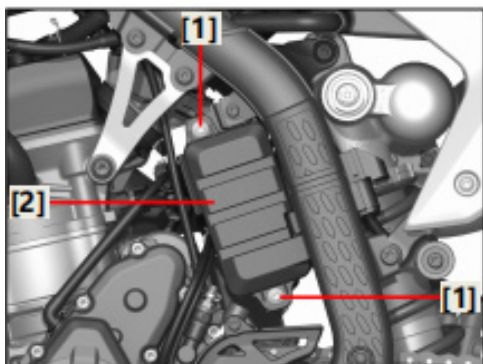


Install the following components:

Insert the seat cushion's bottom rod into frames [1], [2], [3], and [4] in sequence, then install the rear tailgate cushion locking bolt.

Torque:

**Seat cushion assembly and rear tailgate**  
8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)



※ **Battery box cover**

**Disassembly/installation**

Disassemble the following parts:

- Hexalobular pan head bolt[1];
- Battery box cover [2].

The installation sequence is reversed from the removal sequence.

Torque:

**Battery box cover mounting bolts**  
5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

※ **Front tank trim (left and right)**

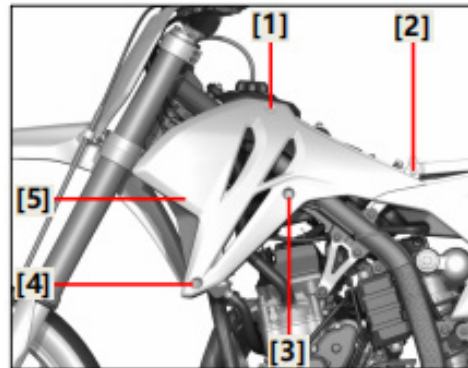
Disassembly/installation  
Disassemble the following parts:

- Hexalobular pan head step bolt [1], [2], [3], [4];
- Front fuel tank trim - left [5].

The installation sequence is reversed from the removal sequence.

**Notes**

Front fuel tank trim - right: The disassembly and installation method are the same as above.



Torque:

- Front fuel tank trim - left and right with fuel tank**
- Front fuel tank trim - left and right with subframe**
- Front fuel tank trim - left and right with frame**
- Front fuel tank trim - left and right with radiator**
- 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

※ **Vehicle body (left and right)**

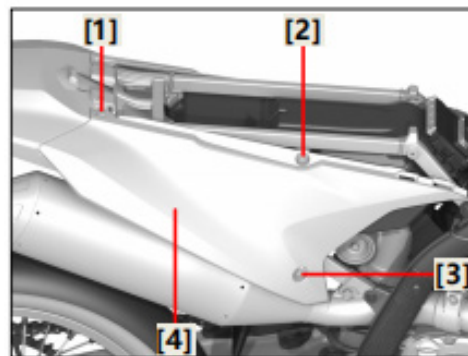
Disassembly/installation  
Disassemble the following parts:

- Hexalobular pan head bolts [1], [2], [3];
- Vehicle body - right [4].

The installation sequence is reversed from the removal sequence.

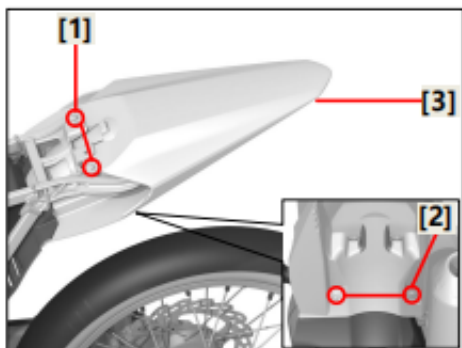
**Notes**

· Vehicle body - left: The disassembly and installation method is the same as above.



Torque:

- Vehicle body - left and right with subframe**
- 8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)



※ **Rear tailgate**

Disassembly/installation

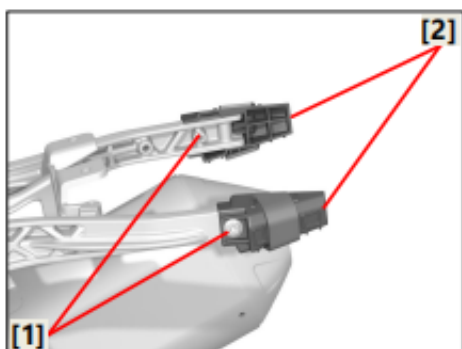
Disassemble the following parts:

- Hexalobular pan head step screw[1];
- Hexalobular pan head step screw[2];
- Rear tailgate [3].

The installation sequence is reversed from the removal sequence.

Torque:

**Rear tailgate (upper and lower) and subframe**  
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



※ **Tailpipe plug**

Disassembly/installation

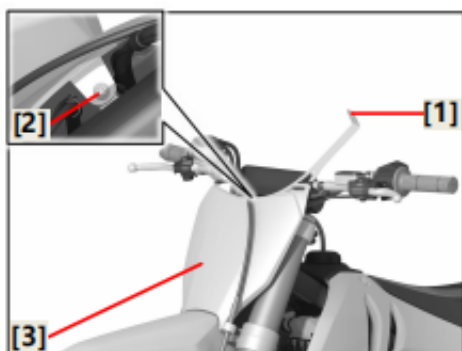
Disassemble the following parts:

- Hexalobular pan head step screw[1];
- Subframe tailpipe plug[2].

The installation sequence is reversed from the removal sequence.

Torque:

**Rear tailgate plug and subframe**  
5.0 N·m (0.5 kgf·m, 3.7 lbf.ft)



※ **Windshield (number plate)**

Disassembly/installation

Disassemble the following parts:

- Remove the strap[1] from the back of the windshield;
- Hexalobular pan head step screw[2];
- Front windshield[3].

The installation sequence is reversed from the removal sequence.

Torque:

**Front windshield and upper connecting plate**  
5.0 N·m (0.5 kgf·m, 3.7 lbf.ft)

※ **Front fender**

Disassembly/installation

Disassemble the following parts:

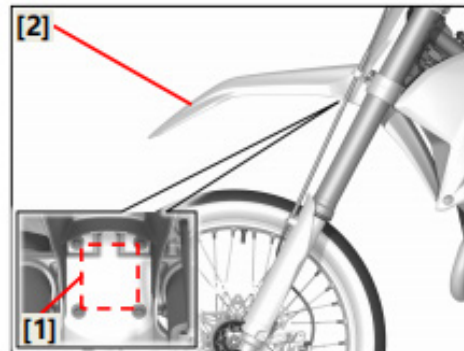
- Bolt, flat gasket, flanged bushing [1];
- Front fender [2].

The installation sequence is reversed from the removal sequence.

Torque:

**Front fender and lower connecting plate**

12 N·m (1.2 kgf·m, 9.0 lbf·ft)



※ **Front shock absorber trims (left and right), oil pipe pressure plate**

1. Oil pipe pressure plate

Disassembly/installation

Disassemble the following parts:

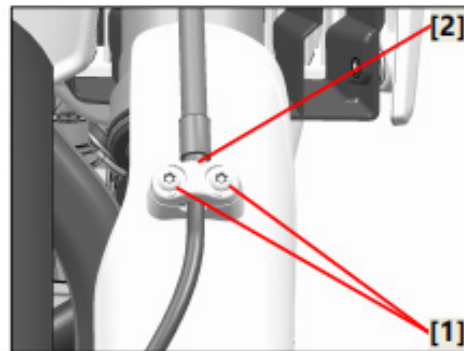
- Screw [1]
- Remove the pressure plate [2].

The installation sequence is reversed from the removal sequence.

Torque:

**Brake hose pressure plate mounting bolt**

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



2. Front shock absorber trim

Disassembly/installation

Disassemble the following parts:

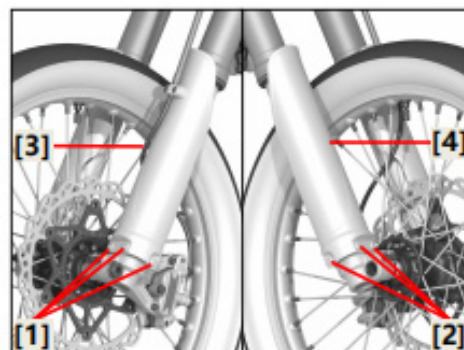
- Hexalobular pan head step screw [1],[2];
- Front shock absorber trim [3], [4].

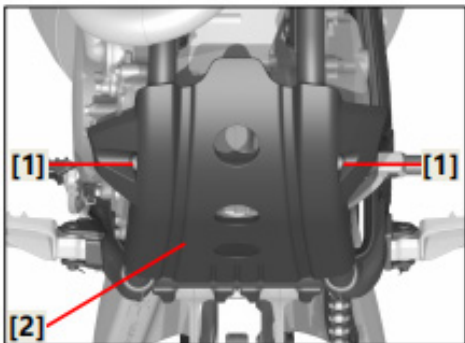
The installation sequence is reversed from the removal sequence.

Torque:

**Mounting bolts of front shock absorber trims**

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





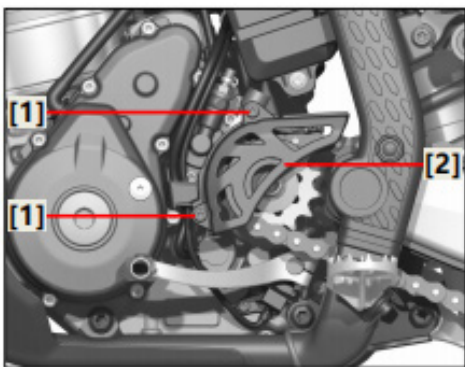
※ **Engine lower protector**

Disassembly/installation  
Disassemble the following parts:

- Hexalobular pan head bolt [1];
- Engine lower protector [2].

The installation sequence is reversed from the removal sequence.

Torque:  
**Engine lower protector mounting screws**  
5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



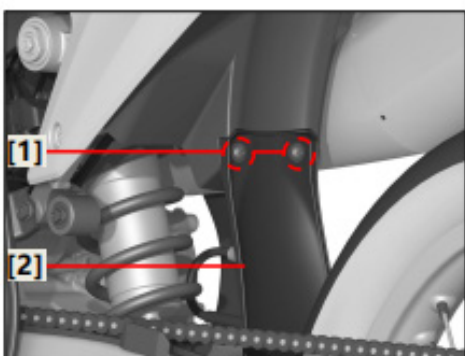
※ **Engine front sprocket cover and chain pressure plate**

Disassembly/installation  
Disassemble the following parts:

- Bolt [1];
- Front sprocket cover and chain baffle [2].

The installation sequence is reversed from the removal sequence.

Torque:  
**Front sprocket cover and pressure plate mounting bolt**  
10 N·m (1.0 kgf·m, 7.0 lbf·ft)



※ **Rear splash guard**

Disassembly/installation  
Disassemble the following parts:

- Self-tapping screw ST4.8×15 [1];
- Rear splash guard.

The installation sequence is reversed from the removal sequence.

Torque:  
**Rear splash guard mounting screw**  
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

**Note:** Replace the rear splash guard promptly if it is damaged or cracked.

※ **Chain guide**

Disassembly/installation

Disassemble the following parts:

- Guide slider mounting bolt [1];
- Guide slider wear block [2];
- Bolt [3];
- Chain guide [4].

The installation sequence is reversed from the removal sequence.

Torque:

**Chain guide mounting bolt**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)

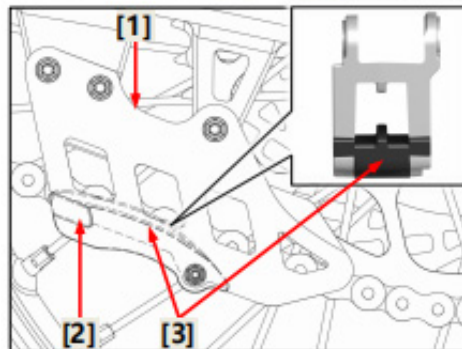
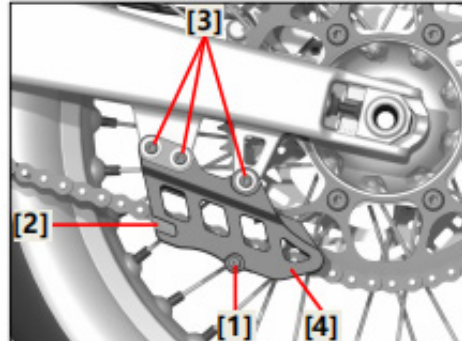
**Guide slider wear block mounting bolt**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

Check if the chain guide [1] is deformed or damaged.

**Notes**

- If the frame of the chain guide box is deformed, it may hit the drive chain, causing the drive chain to fall off, wear or generate noise.
- Check if the wear block [2] of the chain slider has wear.
- If the wear block of the guide chain wears down to the position at the bottom [3], replace the wear block of the drive chain guide.



※ **Chain guard clip**

Disassembly/installation

Disassemble the following parts:

- Screw [1]
- Screw [2];
- Chain clip [3].

The installation sequence is reversed from the removal sequence.

Torque:

**Chain clip mounting screw**

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Inspect the chain clip for excessive wear.

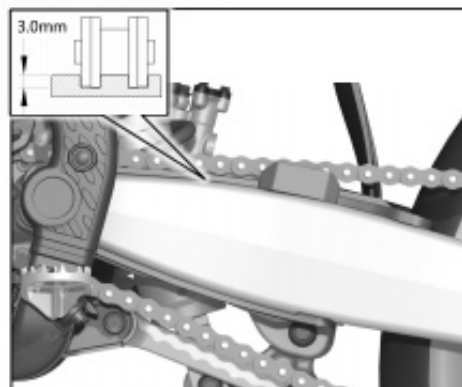
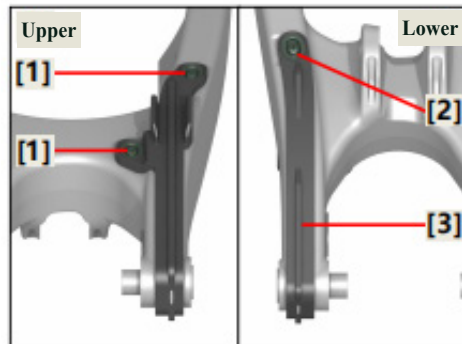
Wear limit not exceed:

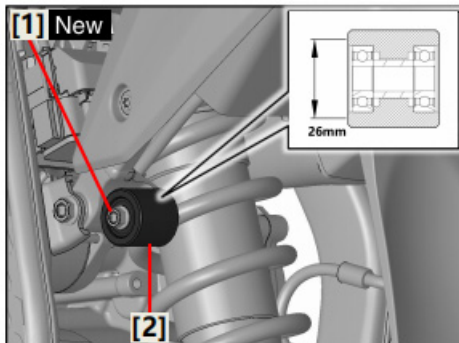
Top: 3mm

Bottom: 2mm

**Notes**

- Please replace the chain clip in time if it exceeds the wear limit.
- If the chain clip reaches its wear limit or is damaged, it can lead to damage in the swingarm or drive chain.





※ **Guide sprocket and guide chain slider**

Disassembly/installation  
Disassemble the following parts:

- Screw [1]
- Guide sprocket [2].

**Inspection**

Check if the sprocket (black) is excessively worn or stuck.

Wear limit not less than:

Diameter: 26 mm

**Notes**

- Each time you disassemble the guide sprocket bolt, replace it with a new one.
- The installation sequence is reversed from the removal sequence.

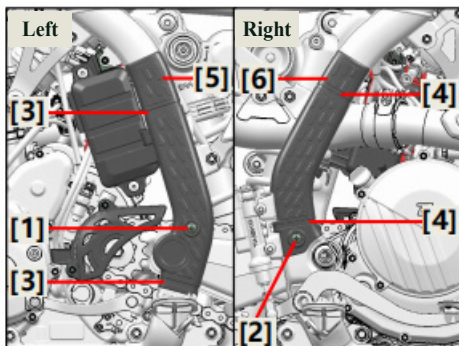
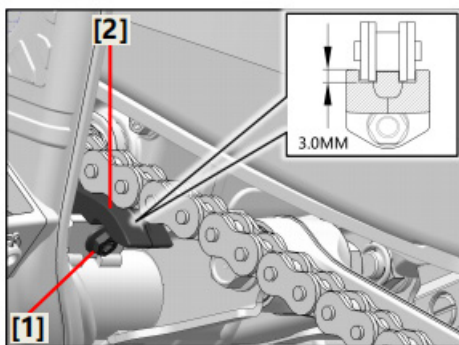
Torque:

**Guide sprocket and subframe**

22 N·m (2.2 kgf·m, 16 lbf·ft)

**Chain slider and frame**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)



※ **Frame trim (left and right)**

Disassembly/installation  
Disassemble the following parts:

- Screw [1][2];
- Cable ties [3], [4];
- Frame trim - left and right [5][6].

The installation sequence is reversed from the removal sequence.

**Notes**

- If the frame trim is worn or damaged, please replace it promptly.

Torque:

**Frame trims (left and right) and frame**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

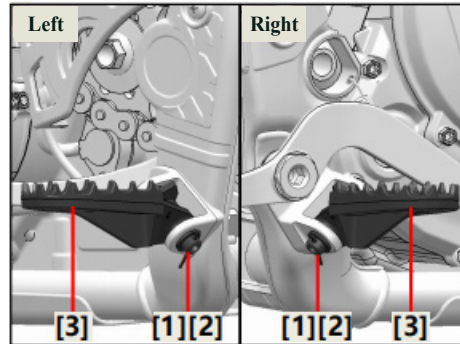
※ **Pedal assembly**

Disassembly/installation

Disassemble the following parts:

- Cotter pin and shim [1];
- Pedal pin [2];
- Left and right pedals [3].

The installation sequence is reversed from the removal sequence.



※ **Oil pipe clip**

Disassembly/installation

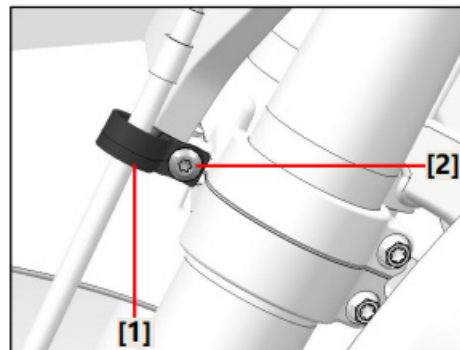
Disassemble the following parts:

- Bolt [1];
- Front brake hose clamp [2];

The installation sequence is reversed from the removal sequence.

Torque:

**Oil pipe clamp and lower connecting plate**  
10 N·m (1.0 kgf·m, 7.0 lbf·ft)



※ **Gear shift assembly**

Disassembly/installation

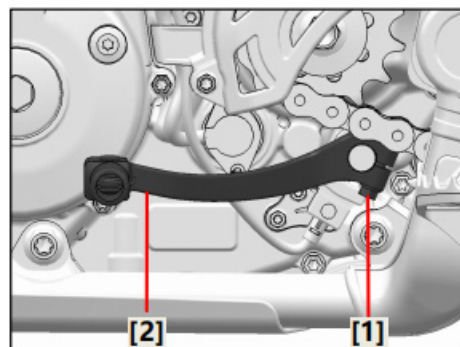
Disassemble the following parts:

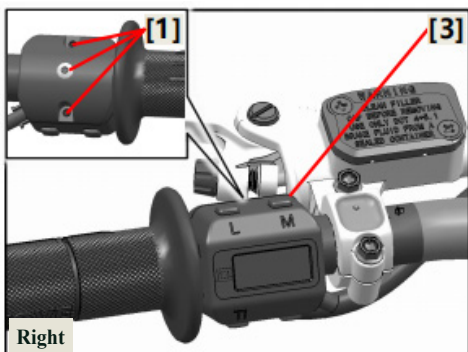
- Bolt [1];
- Gear shift rocker arm assembly [2].

The installation sequence is reversed from the removal sequence.

Torque:

**Shift rocker arm and engine**  
10 N·m (1.0 kgf·m, 7.0 lbf·ft)





※ **Handlebar switch-left**

Disassembly/installation  
Disassemble the following parts:

- Screw [1]
- Cable plug [2];
- Left handlebar switch assembly [3].

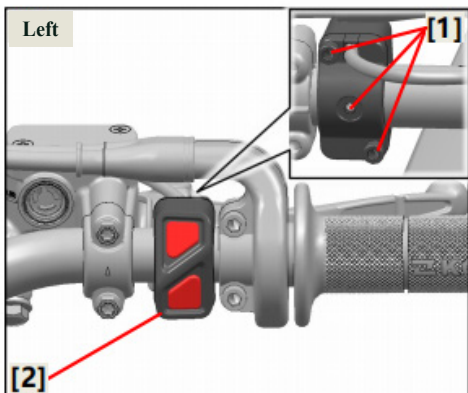
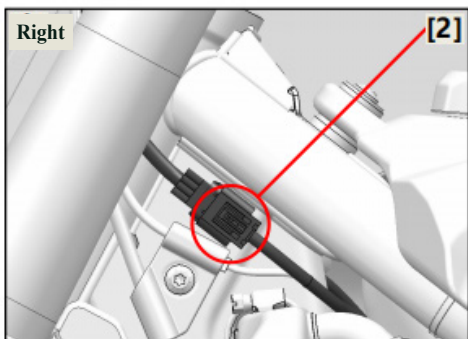
The installation sequence is reversed from the removal sequence.

Torque:

**Handlebar switch - left mounting screw**

3.0 N·m (0.3 kgf·m, 2.2 lbf·ft)

**Handlebar switch - left positioning screw**



※ **Handle switch-right**

Disassembly/installation  
Disassemble the following parts:

- Screw [1]
- Cable plug [2];
- Handlebar switch - right [3].

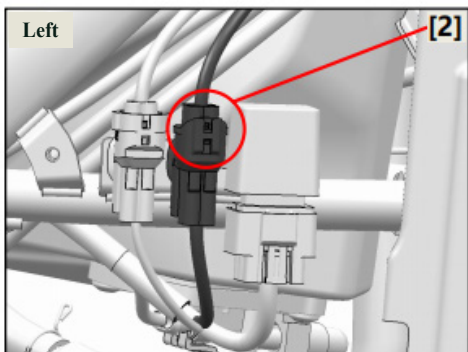
The installation sequence is reversed from the removal sequence.

Torque:

**Handlebar switch - right mounting screw**

4.0 N·m(0.4 kgf·m, 3.0 lbf.ft)

**Handlebar switch - left positioning screw**



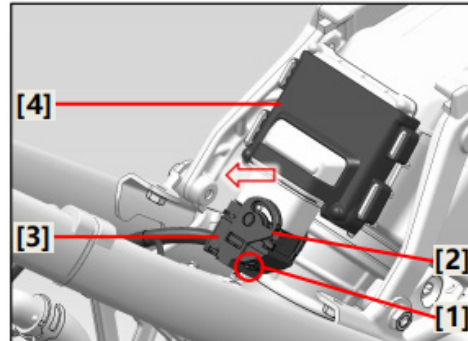
※ **Electronic control unit (ECU)**

Disassembly/installation

Disassemble the following parts:

- Press position [1] while simultaneously turning position [2] clockwise to disconnect ECU from the connection plug [3];
- Remove ECU control unit and rubber grommet from the clip [4].

The installation sequence is reversed from the removal sequence.



※ **Ignition coil**

Disassembly/installation

Disassemble the following parts:

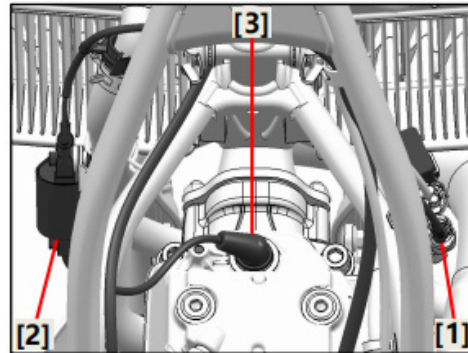
- Ignition coil harness plug [1];
- Ignition coil [2];
- Spark plug cap [3].

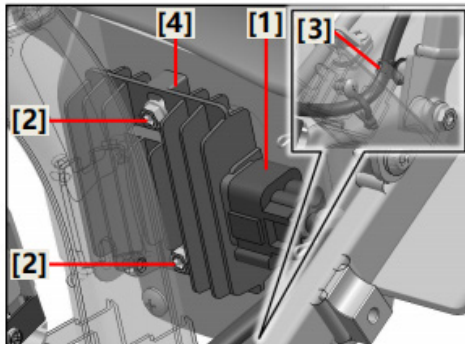
The installation sequence is reversed from the removal sequence.

Torque:

**Ignition coil mounting bolt**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)





※ **Regulating rectifier**

Disassembly/installation

Disassemble the following parts:

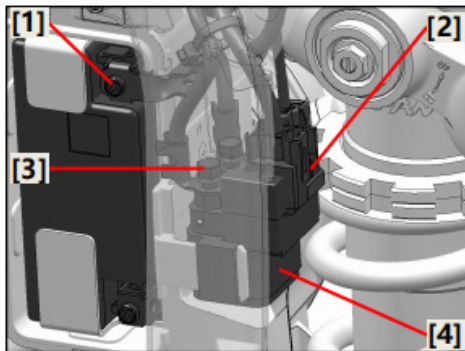
- 6-pin plug [1];
- Screw [2];
- Wire clip [3];
- Regulating rectifier [4].

The installation sequence is reversed from the removal sequence.

Torque:

**Regulating rectifier and air filter tank**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)



※ **Starting relay**

Disassembly/installation

Disassemble the following parts:

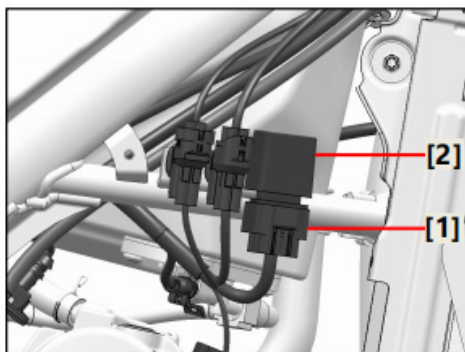
- Screw [1]
- 4-pin plug [2];
- Relay and rubber grommet [4];
- Screw [3].

The installation sequence is reversed from the removal sequence.

Torque:

**Starting relay connecting bolt**

5.0 N·m(0.5 kgf·m, 3.7 lbf.ft)



※ **Main relay**

Disassembly/installation

Disassemble the following parts:

- 8-pin plug [1];
- Main relay and rubber grommet [2].

The installation sequence is reversed from the removal sequence.

※ **Battery box**

**Warning**

· Disassemble only after disconnecting the negative battery terminal.

1. Disassembly:

- Seat cushion assembly;
- Front tank trim (left);

See "Frame, body trim and exhaust system" on page 39 for details.

2. Disassembly:

- Battery box
- Screw [1]
- Battery box cover [2];
- Negative battery cable [3];
- Positive battery cable [4];
- Battery [5];
- Rubber gasket[6];
- Wire clip [7];
- Screw [8];
- Wire clip [9];
- Starter relay [10];
- Screw [11]
- Battery box [12].

The installation sequence is reversed from the removal sequence.

**Notes**

When installing, correctly route the wiring harness and plugs.

**Torque:**

**Battery box cover mounting bolts**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

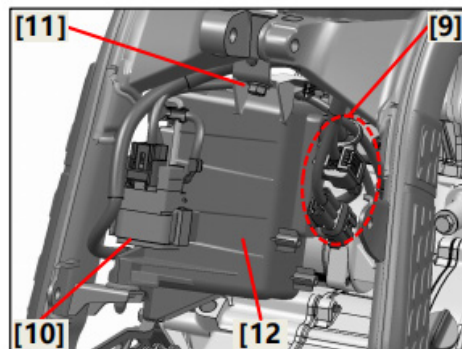
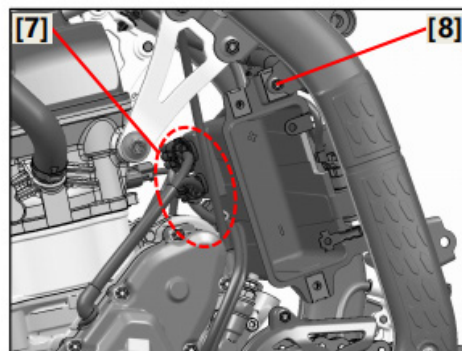
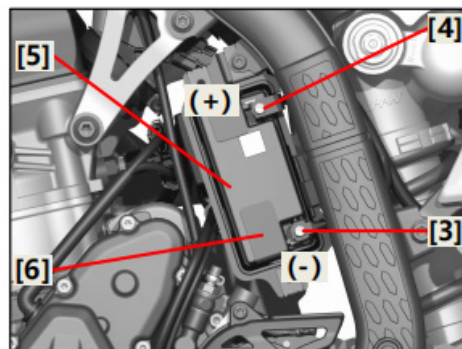
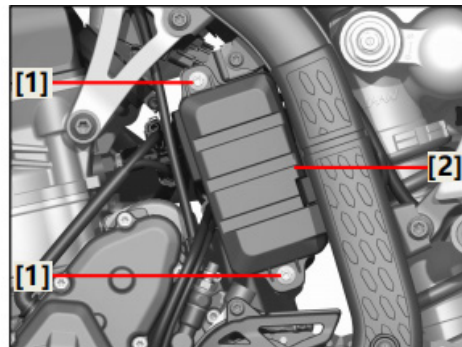
**Battery terminal mounting screw**

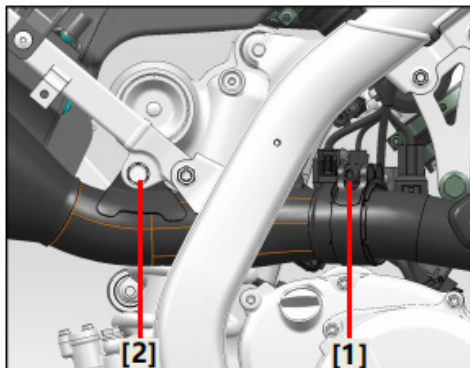
5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Battery box and frame**

**Battery box and frame 2**

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





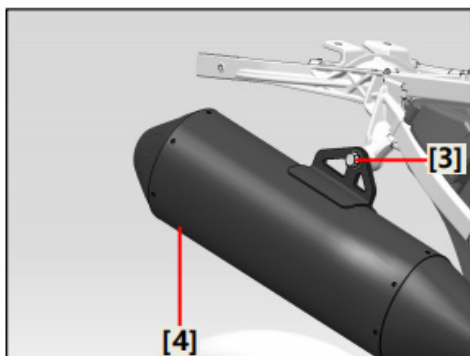
※ **Muffler assembly**

**▲ Warning**

· Wait for the muffler to cool down before disassembly to avoid burns.

1. Disassemble Muffler rear section
  - Pipe clamp locking bolt [1];
  - Bolt [2];
  - Bracket mounting bolt [3];
  - Muffler rear section [4].

2. Disassemble Muffler front section
  - Nut [5];
  - Muffler front section [6].



3. Inspection:
  - Muffler gasket
  - Exhaust leakage → Replace
  - Muffler pipe
  - Crack/damage → Replace.

4. Installation  
The installation sequence is reversed from the removal sequence.

**Notes**

· If the muffler becomes louder after the vehicle has been used for a period of time, please contact your local dealer promptly for inspection or repair.

**Torque:**

**Muffler front section guard mounting screw**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Muffler front section and engine exhaust port (nut)**

16 N·m (1.6 kgf·m, 12 lbf·ft)

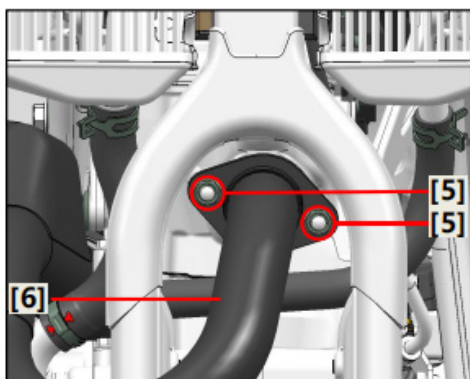
**Muffler rear section and subframe**

**Muffler rear section and subframe**

22 N·m (2.2 kgf·m, 16 lbf·ft)

**Muffler front and rear section (clamp)**

22 N·m (2.2 kgf·m, 16 lbf·ft)



※ **Subframe and air filter assembly**

Disassembly/installation  
Disassemble the following parts:

- Clamp [1];
- Exhaust pipe [2];
- Right bolt [3];
- Left bolt [4];
- Subframe and air filter assembly [5];
- Screw [6];
- Air filter assembly [7].

The installation sequence is reversed from the removal sequence.

Inspection

As shown in Figures 2 and 3:

- Check if the mounting bolts and clamps of the air filter tank are loose.

Loose → Tighten.

- Replace the air filter element according to the maintenance schedule or whenever too dirty or damaged → Replace.

**Note**

- If you frequently ride in wet or dusty areas, maintain the air filter more frequently.

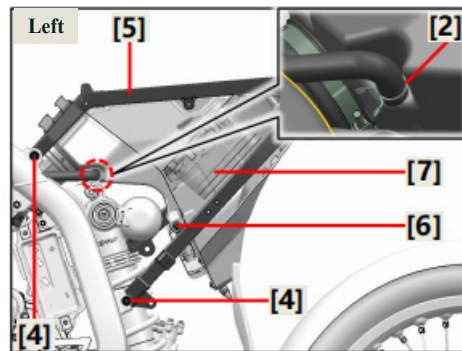
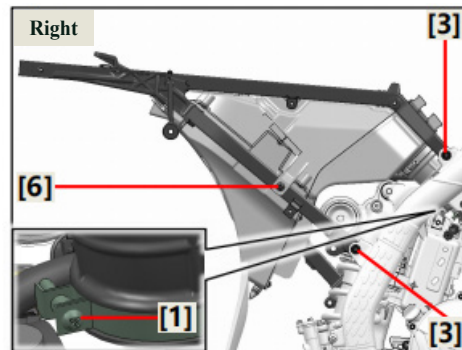
Torque:

**Air filter and subframe mounting bolt**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Connecting bolt between subframe and main frame**

34 N·m (3.4 kgf·m, 18 lbf·ft)



**Note**

- When installing the subframe, coat thread locker (Huitian 7262) to the bolt threads.

※ **Rear fender**

Disassembly/installation  
Disassemble the following parts:

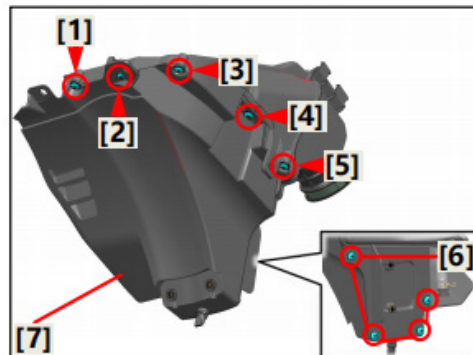
- ST4.8×15 self-tapping screws [1]-[5], [6].
- Rear fender [7].

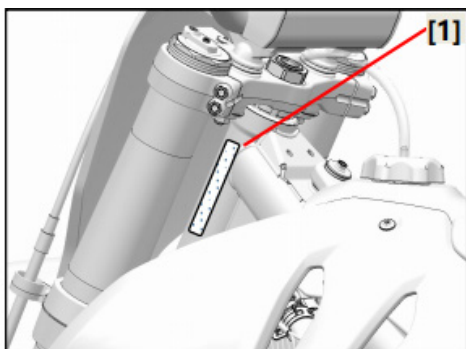
The installation sequence is reversed from the removal sequence.

Torque:

**Rear fender and air filter (rear housing)**

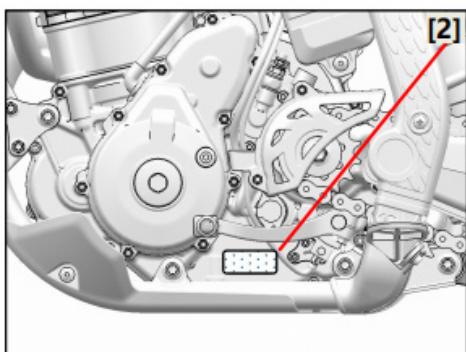
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)





※ **Frame serial number and engine number**

When registering a motorcycle, the frame number and engine number need to be provided. These numbers are unique and used to identify your vehicle. (Tampering without informing is strictly prohibited.) They may also be required when ordering accessories. You can record this number in this manual. The VIN [1] is printed on the right side of the frame's head tube.



The engine SN [2] is printed on the left-hand crankcase.

**Cooling System**

Section 1 Maintenance Information .....	58
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Section 3 Position of Components .....	60
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Section 6 Pressure Relief Pipe and Pressure Relief Fixing Socket.....	63
Section 7 Radiator Inlet and Outlet Pipes and Connecting Pipes for Left and Right Radiators.....	63
Section 8 Radiator, Radiator Grille.....	64
Section 9 Engine Water Pump.....	65

## Maintenance Instructions

## Overview:

**Warning**

- Do not remove the radiator cap before the engine and radiator have cooled down, to prevent the coolant from splashing and scalding people.

**Note:**

- Using tap water will cause engine damage.
- Do not disassemble the radiator cap except when adding or draining the coolant.
- It is not necessary to remove the engine from the frame when servicing the cooling system.
- Avoid spilling coolant on painted surfaces.

## Cooling system specification

Item		Specification
Coolant capacity	Radiator (including water channel)	1.2 L
Radiator cap relief pressure		1.7bar

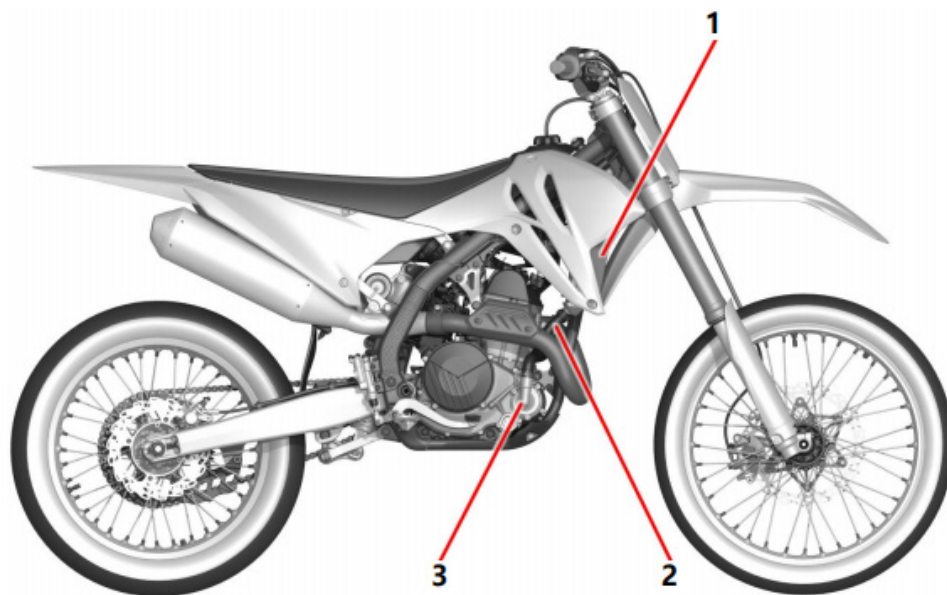
**Troubleshooting****Engine temperature too high**

- Water temperature sensor failure
- Insufficient coolant
- Radiator outlet
- Radiator passages, hoses, water pipes blocked
- Circulatory system intake
- Water pump failure
- Insufficient coolant

**Coolant leakage**

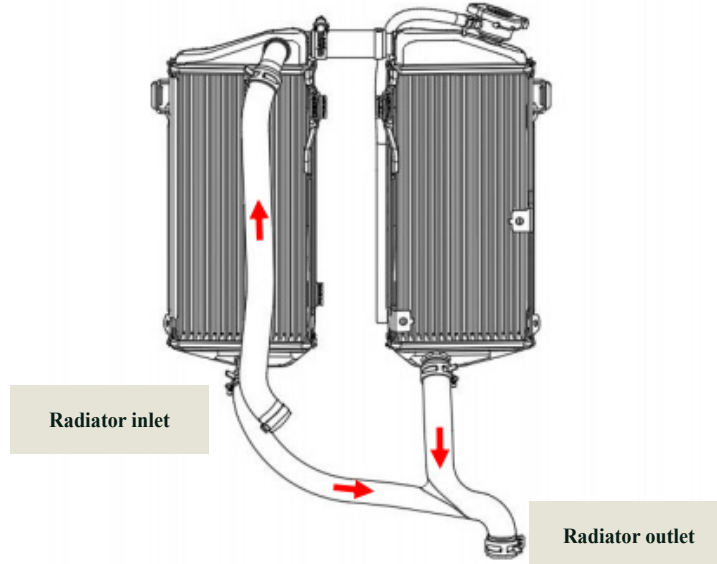
- Defects in water pump mechanical mechanism
- O-ring seal ring aged
- Radiator outlet
- Leakage or damage of cylinder head gasket
- Loosen connection of hose or untightened clamp
- Hoses damaged or aged
- Radiator damaged
- Thermostat cover and water pump cover pipe joints loose

**Position of Components**



S/N	Component Name
1	Radiator and grille
2	Radiator inlet and outlep pipes
3	Engine water pump
4	-

**Flow Chart of Cooling System**



※ **Cooling system test**

Radiator cap/system pressure detection  
- Remove the radiator cap [1].

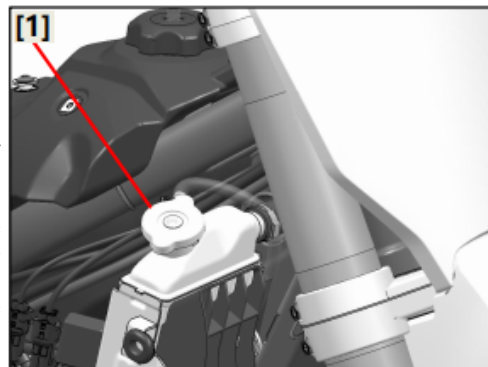
Install the radiator cap tester [1] and radiator cap tester adapter [2] to the radiator cap [3].

Pressurize the radiator cap with a tester.

If the radiator cap cannot maintain the pressure or the released pressure is too high or too low, replace the radiator cap.

The radiator cap must maintain the specified pressure for at least 6 seconds.

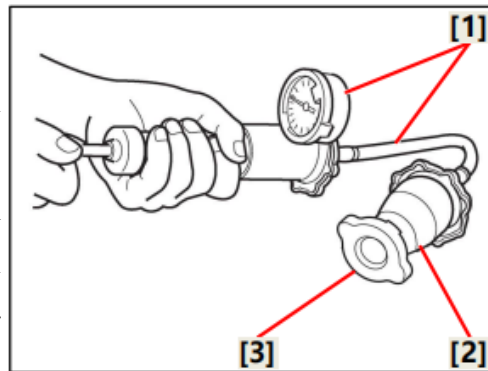
**Release the pressure of the radiator cap :**  
**130-170Kpa** (Standard value: 1.7bar)

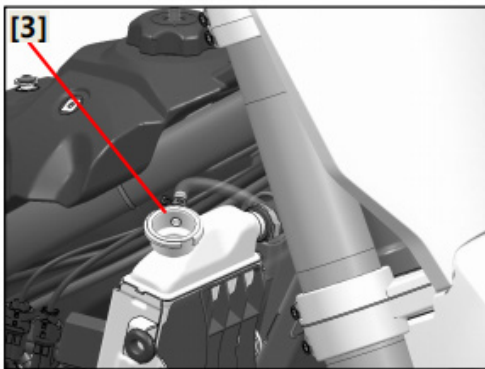
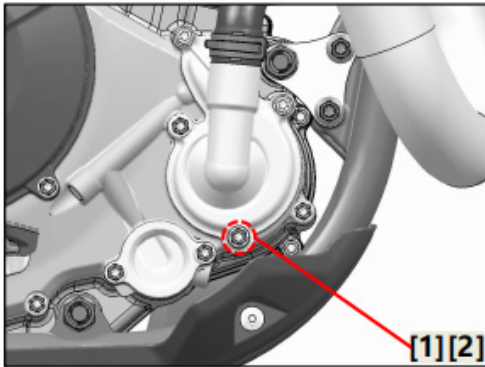


Connect the detector to the radiator.  
Use the detector to pressurize the radiator, engine and hose to check their air tightness.

**Notes**

- This operation shall be conducted when the vehicle is in cold status.
- Excessive pressure will damage cooling system components. Do not exceed 170 kPa.
- If the system cannot maintain the specified pressure for at least 6s, repair or replace the component.





※ **Coolant replacement**

1. Stand the vehicle on a flat surface.

**Note**

- Place the motorcycle on the appropriate bracket.
- **Make sure** the motorcycle stays upright.

**Warning**

• The pressure of the hot radiator will rise. Therefore do not remove the radiator cap when the engine is hot. Serious injury may occur when hot liquid and vapor are sprayed out. When the engine is cold, open the radiator cap as follows: cover the radiator cap with a thick cloth such as a towel, rotate the cap slowly counterclockwise until it touches the slot, allowing residual pressure to release. Wait for the hissing sound to stop before pressing down on the radiator cap and rotating it counterclockwise to remove it.

2. Disassembly:

- Remove water pump drain bolt [1] and flat gasket [2].
- Remove the radiator cap and drain the coolant.

Torque:

**Water pump drain bolt**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)

3. Add:

- Using the water hole, fill the cooling system with the recommended coolant up to the neck [3].

**Notes**

- If water is used instead of coolant, check and correct the coolant concentration if necessary.
- Use distilled water only. In the absence of distilled water, soft water can be used as an alternative.
- Ensure not to mix different types of coolants.

Recommended antifreeze:

-25°C ethylene glycol light-duty engine coolant NB/SH/T 0521-2010

Radiator (including all water channels and pipelines)

**Dosage: 1.2 liters**

**Warning**

• If coolant splashes on your eyes, please rinse your eyes thoroughly with clear water and seek medical advice.

**Air venting inside the radiator**

Exhaust air from the radiator system as follows:

1. Shift the engine into neutral, start it, and let it idle for 2-3 minutes.
2. Open and close the accelerator 3 or 4 times to exhaust the air inside completely.
3. Install the radiator cap.
4. Turn off the engine and, if necessary, add coolant to the radiator up to the neck.
5. Check the coolant for leaks.

※ **Pressure relief pipe**

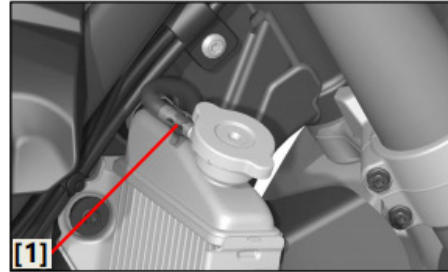
**Notes**

- Try to operate when the engine is in cold status.

**Disassembly/installation**

Disassemble the following parts:

- Pressure relief pipe fixing clamp [1].



※ **Radiator inlet pipe, outlet pipe, and left/right radiator connecting pipes**

**Notes**

- Try to thoroughly drain antifreeze in the radiator and water channel in advance when the vehicle is in cold state.

**Note**

- Use special water pipe clamps and similar tools for disassembly and assembly.

**1. Disassemble**

**Radiator inlet pipe**

- Inlet pipe spring clamp [1];
- Inlet single-ear clamp [2];
- Radiator inlet pipe [3].

**Radiator outlet pipe**

- Outlet pipe spring clamp [4], [5];
- Outlet pipe single-ear clamp [6];
- Radiator outlet pipe [7].

**Left and right radiator connecting pipes**

- Connecting pipe threaded clamp [8];
- Connecting pipe single-ear clamp [9];
- Left/right radiator connecting pipes [10].

**2. Inspection**

**Radiator hose**

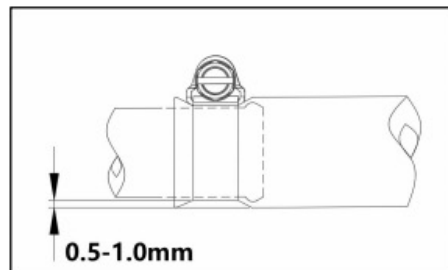
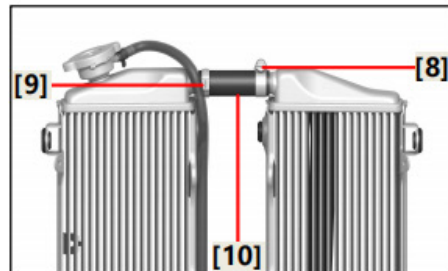
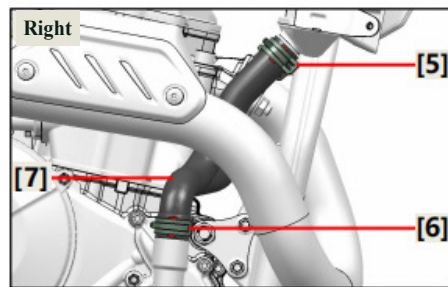
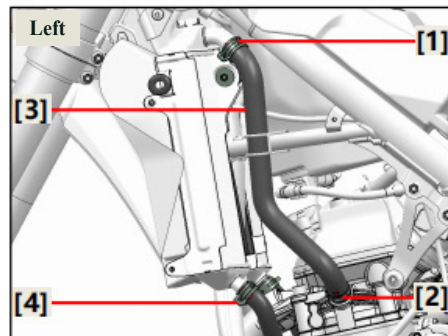
Crack/damage → Replace.

- Radiator hose connection

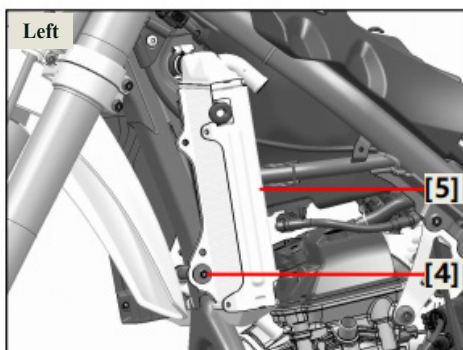
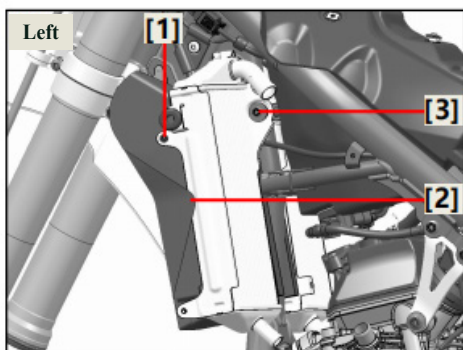
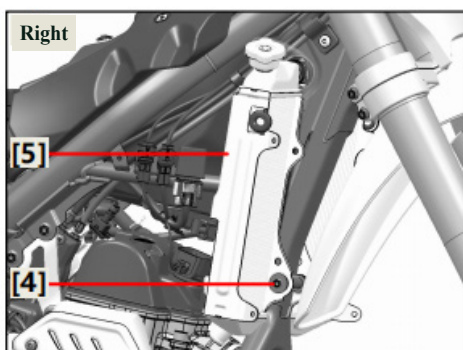
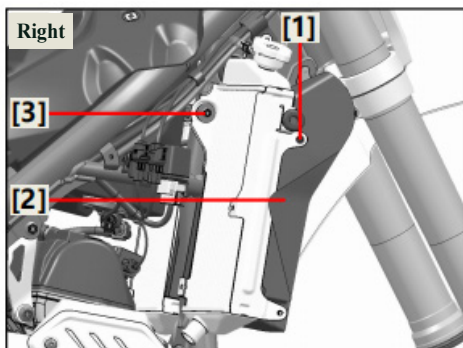
Coolant leakage → repair or replace.

**3. Installation**

The installation sequence is reversed from the removal sequence.



**As shown in the left figure:** It is a diagram of the connecting pipe clamps of the left and right radiators.



※ Radiator, radiator grille

1. Disassemble  
 Right radiator and grille  
 - Screw [1]  
 - Radiator grille [2];  
 - Radiator mounting bolts [3], [4];  
 - Radiator [5]

- Left radiator and grille  
 - Screw [1]  
 - Radiator grille [2];  
 - Radiator mounting bolts [3], [4];  
 - Radiator [5]

2. Inspection  
 - Heat sink  
 Blocked → Stuck.  
 Purged the rear of the radiator with compressed air.  
 Damage → Repair or replace.

**Note**  
 · Use a fine flat-head screwdriver to straighten the flattened radiator pieces.

3. Installation  
 The installation sequence is reversed from the removal sequence.

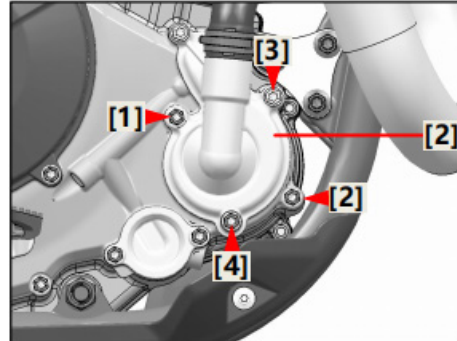
**Radiator and radiator grille**  
 5.0 N·m (0.5 kgf·m, 4.0 lbf·ft)  
**Connecting bolts between left radiator and frame**  
 10 N·m (1.0 kgf·m, 7.0 lbf·ft)

※ **Water pump**

Disassembly/installation

Disassemble the following parts:

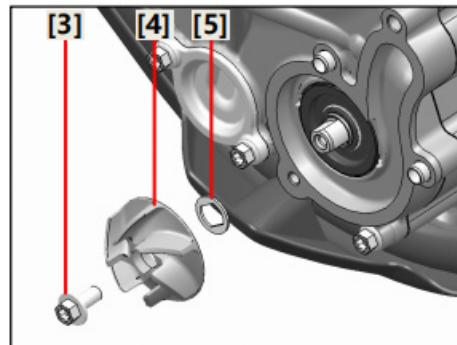
- Drain the coolant;
- 4 water pump cover fastening bolts [1];
- Water pump cover [2] (including the sealing ring and dowel pin);



- Water pump impeller fastening bolt [3];
- Water pump impeller [4].
- Flat gasket [5].

**Notes**

· If the clutch assembly has been disassembled when removing the water pump cover impeller fastening bolt, the clutch housing needs to be reinstalled to fix the oil pump drive sprocket. Do not touch the water pump impeller during disassembly to prevent injury;



- Use a slotted screwdriver [6] to remove the oil-water seal through the process disassembly position. Do not damage the sealing surface of the water pump cover on the box body.

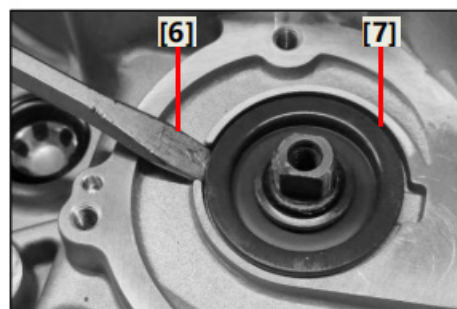
- The installation sequence is reversed from the removal sequence.

Torque:

**Water pump cover fastening bolt**

**Water pump impeller fastening bolt**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)





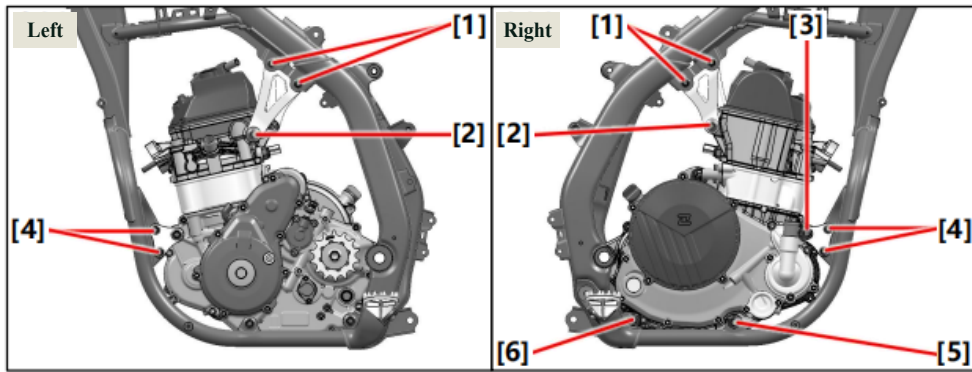
## Engine

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## Maintenance Instructions

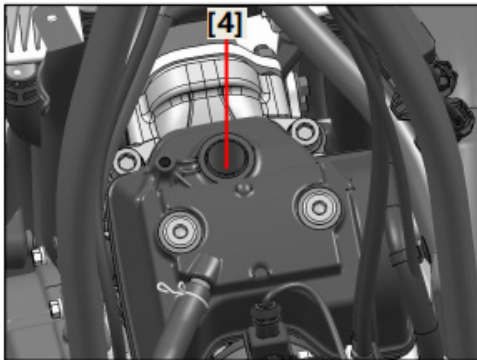
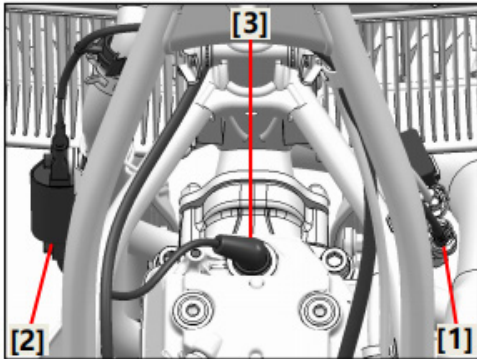
1. Please use the parts, lubricating oils or other auxiliary materials produced by or approved and recommended by Xinchiyue Power Equipment Co., Ltd. If the materials used fail to meet the specifications or requirements, the motorcycle may be damaged.
2. Before maintenance, clean up the dirt and dusts on the car. Immersion of dust and dirt into the engine and the oil hydraulic system of the brake is prohibited.
3. When removing and installing the engine, use a professional workbench or equivalent to support the motorcycle.
4. When disassembling, it is required to sort out and keep the parts of each system separately, so that each part can be reassembled onto its original position.
5. Do not use the non-metric tools at the time of maintenance. Metric bolts, nuts and screws cannot be interchanged with inch fasteners.
6. When reassembling, replace the washer, O-ring, cotter pin and lock plate with new ones.
7. When the circlip is disassembled, if its opening is too large, it will deform and fall off easily after reassembly. Do not use the circlip that has been loose or inelastic.
8. When tightening the bolts or nuts, tighten the bolts with larger diameter or inside bolts, and then gradually tighten other bolts one by one to the specified torque value in diagonal order, unless a special order is specified.
9. Any part shall be cleaned before determination after disassembly for inspection, and the cleaning agent must be removed with compressed air. Apply lubricating oil to the moving surface before assembly.
10. During disassembly, check the necessary places and measure relevant data, so that the parts can be reassembled to their original position.
11. Check rubber parts for aging at the time of disassembly, and replace them in advance if necessary. In addition, as rubber parts are not resistant to the erosion of gasoline/kerosene, ensure that no volatile oils or greases are attached onto them as much as possible.
12. When installing the circlip, the chamfered side shall face the stress direction. Do not use the circlip that has been loose and inelastic. Upon assembly, turn the circlip to verify that it has been firmly installed in the slot.
13. When the ball bearing is purged with compressed air after it is cleaned, ensure the bearing race is not rotary. In case of failure to do this, its high-speed rotation speed will exceed the limit, potentially causing damage to the bearing. The bearing shall be applied with oil or grease before assembly.
14. When removing the press-in ball bearing, if the removal method of applying force on the ball is used, the removed bearing shall not be reused.
15. Since brake fluid and coolant will damage the coating surface, plastic parts and rubber parts, etc., such fluid and coolant shall not be attached onto these parts. In case of attachment, rinse with water immediately.
16. After reassembly, check the parts in each position for correct installation, proper operation, rotation and movement.

**Position of Components**



Tightening torque by position and name:

S/N	Installment position	Quantity	Specification status	Torque force value N·m
1	Engine upper suspension and frame	4		36
2	Engine upper suspension and engine	2		54
3	Engine front suspension and engine	1		54
4	Engine front suspension and frame	4		26
5	Engine lower-front suspension and frame	1		54
6	Engine lower-rear suspension and frame	1		54



※ **Engine inspection**

Measurement of cylinder pressure  
The following steps apply to all cylinders.

**Note**

· Insufficient cylinder pressure will cause the engine performance to decline.

1. Measurement
- Valve clearance

Off-specification → Adjust

See "Valve clearance adjustment" on page 21 for details.

2. Start the engine, warm the motorcycle for several minutes and then turn off the engine.

3. Disassemble

- Plug [1], ignition coil [2], spark plug [3].

4. Disassemble

- Spark plug [4].

**Notes**

· Before removing the spark plug, blow off the dust accumulated around the spark plug hole with compressed air to prevent dust from falling into the cylinder.

5. Installation

- Adapter [1]

- Cylinder pressure gauge [2]

6. Measurement

- Cylinder pressure

Off-specification → See steps (c) and (d) for details.

Compression pressure value:

**400–600 kPa/390 rpm**

**4.08–6.12 kgf/cm<sup>2</sup>/390 rpm**

**58–87 psi/390 rpm**

- a. Press the vehicle start button.

- b. Fully open the accelerator and let the starting motor run until the reading on the pressure gauge is stable.

**Warning**

· To avoid sparks, make sure to disconnect all spark plug connectors before starting the engine.

- c. If the cylinder pressure exceeds the specified upper limit, check whether there is carbon deposit on the cylinder head, valve surface and piston top.

Carbon deposit → Clean up.

- d. If the cylinder pressure is below the specified lower limit, pour a small amount of engine oil into the spark plug hole and then measure it again.

Please refer to the table on the left.

**Cylinder pressure (after pouring oil into the cylinder)**

Reading	Diagnosis
Higher than when no oil is poured	The piston ring is worn or damaged → Repair.
The same as when no oil is poured	The piston, valve, cylinder head gasket or piston ring may be damaged → Repair.

7. Installation:

- Spark plug

Spark plug

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

※ **Removing and installing of engine**

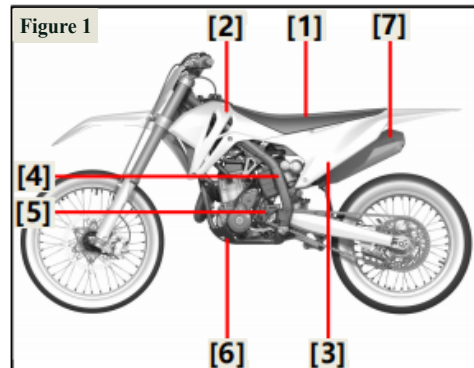
1. Stand the vehicle on a flat surface.

**Warning**

• Ensure that the vehicle is securely supported and not at risk of tipping over.

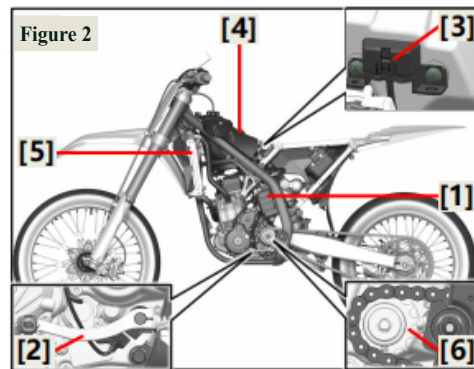
2. Disassembly: As shown in Figure 1
- Seat cushion assembly [1];
  - Front fuel tank trim - left and right [2];
  - Vehicle body - left and right [3];
  - Frame trim - left and right [4];
  - Front sprocket cover and chain baffle [5];
  - Engine lower protector [6];
  - Muffler/exhaust pipe assembly [7].

See "Frame, body trim, exhaust system" on page 39 for details.



3. Disassembly: as shown in Figure 2

- Battery box cover [1];
  - Disconnect the positive and negative terminals of the battery;
  - Gear shift pedal assembly [2];
  - See "Frame, body trim, exhaust system" on page 39 for details.
  - OBD detection interface [3];
  - Fuel tank assembly [4];
  - See "Fuel system" on page 177 for details
  - Radiator assembly - left and right [5];
  - See "Cooling system" on page 57 for details.
  - Front sprocket (driving sprocket) [6].
- See "Rear Wheel, Suspension" on Page 205 for details.

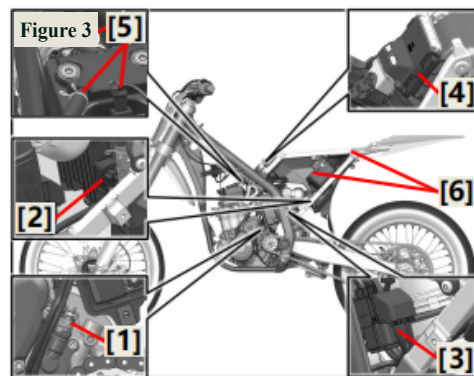


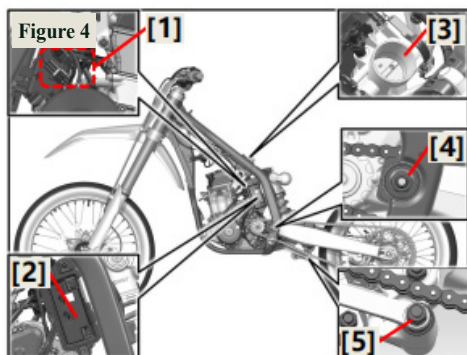
4. Disassembly: As shown in Figure 3

**Notes**

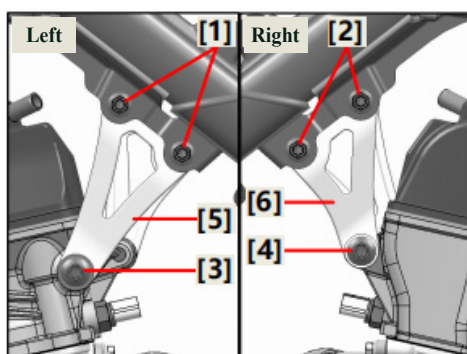
• Before disassembling the hydraulic clutch oil pipe, loosen the bleed screw and connect the hose to drain the internal fluid.

- Hydraulic clutch (oil passing bolt) [1];
- See "Regular Maintenance and Adjustment" on page 17 for details.
- Regulating rectifier [2];
- Starting Relay [3];
- ECU control unit [4];
- See "Frame, body trim, exhaust system" on page 39 for details.
- Disconnect the engine harness plug;
- Exhaust pipe, spark plug cap [5];
- Subframe and air filter assembly [6].
- See "Frame, body trim, exhaust system" on page 39 for details.





5. Disassembly: As shown in Figure 4
- Plug on the back of the battery box [1];
  - Battery box [2];
- See "Frame, body trim, exhaust system" on page 39 for details.
- Throttle body assembly[3];
- See "Fuel system" on page 177 for details
- Swingarm axle[4];
  - U swingarm bolt [5].
- See "Rear wheels, suspension" on page 205 for details

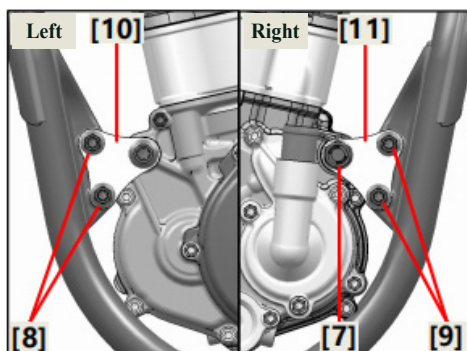


**Note**

- Place the engine on a jack or other adjustable bracket under the frame.
- The height of the jack must be adjusted continuously to reduce the pressure and facilitate the installation of the bolt.

6. Disassemble

- Engine upper suspension bracket/left and right
- Engine upper suspension bracket and frame mounting bolt [1]
  - Engine upper suspension bracket and frame mounting bolt [2]
  - Engine upper suspension bracket and engine mounting bolt [3]
  - Engine upper suspension bracket and engine mounting bolt [4]
  - Engine upper suspension bracket/left and right [5],[6].



7. Disassemble

- Engine front suspension bracket/left and right
- Engine front suspension bracket and engine mounting nut [7]
  - Engine front suspension bracket and frame mounting bolt [8]
  - Engine front suspension bracket and frame mounting bolt [9]
  - Engine suspension bracket/left and right [10], [11].

8. Disassemble

- Engine lower front and rear mounting brackets (bolts/nuts)
- Engine lower front mounting bracket bolt [12]
  - Engine lower rear mounting bracket bolt [13]
  - Engine lower right mounting bracket bushing [14]
  - Engine assembly [15].

**9. Installation**

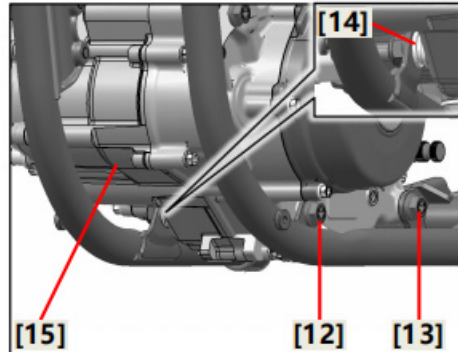
- The installation sequence is reversed from the removal sequence.
  - Torque of engine mounting bolts
- See "Engine disassembly" on page 73 for details.

**Notes**

- The following parts require threadlocker application. (Huitian 7272)

**Engine front suspension - left and right and frame mounting bolts [4]**

**Engine upper suspension - left and right and frame mounting bolts [5]**



Torque:

**Engine upper suspension and frame**

36 N·m (3.6 kgf·m, 27 lbf·ft)

**Engine upper suspension and engine**

54 N·m (5.4 kgf·m, 40 lbf·ft)

**Engine front suspension and engine**

54 N·m (5.4 kgf·m, 40 lbf·ft)

**Engine front suspension and frame**

26 N·m (2.6 kgf·m, 19 lbf·ft)

**Engine lower-front suspension and frame**

54 N·m (5.4 kgf·m, 40 lbf·ft)

**Engine lower-rear suspension and frame**

54 N·m (5.4 kgf·m, 40 lbf·ft)

**Engine installation**

**Precautions:**

- The height of the jack must be adjusted continuously to reduce the pressure and facilitate the installation of the bolt;
- Carefully align the engine mounting points with the frame to prevent damage to the engine and frame;
- First, align the engine lower front and rear suspension mounting points, upper suspension bracket, and front suspension bracket with the frame mounting bores in sequence, then tighten the bolts (nuts).
- Finally, tighten the bolts and nuts to the specified torque.

### Auxiliary Materials for Engine Operation and Installation

Name of auxiliary material	Specification and brand	Usage position	Notes
Plane sealant	Loctite 5910	Left and right joint surface, magneto outlet port, left and right case surface joint	
Engine oil	SL 10W-50 GB 11121-2006	Rotating and sliding parts in cylinder, rotating and sliding parts in crankcase, rotating and sliding parts in cylinder head. See lubrication system diagram for details. Piston pin, valve rod, valve oil seal, camshaft	Capacity: 1.30L
Multipurpose grease	Lithium-based grease No.2 GB/T5671 - 2014	Lip of oil seal, O-ring seal, sealing surface of other rubber sealing materials	
Thread locker	Loctite 243	Some of threads	
Antifreeze	-25°C ethylene glycol light-duty engine coolant NB/SH/T 0521-2010	Cooling System	The capacity is determined according to the radiator water pipe system

### Bolt Torque Value

#### Standard Torque Value

Fastener Specification	Torque Value N·m	Fastener Specification	Torque Value N·m
M5 bolt or nut	5±1	M5 screw	4±1
M6 bolt or nut	10±1	M6 screw	9±1
M8 bolt or nut	25±5	M6 flange bolt or nut	12±1
M10 bolt or nut	35±5	M8 flange bolt or nut	25±5
M12 bolt or nut	45±5	M10 flange bolt or nut	35±5

#### Engine Torque Value

System	Position	Quantity	Thread Specification	Torque Value N·m	Notes
Valve train system	Spark plug	1	M10×1	12±2	
	Camshaft gland bolt	4	M7×1	15±2	
	Intake seat bolt	2	M6×1	10±2	Apply an appropriate amount of thread locker
	Tensioner mounting bolt	2	M5×0.8	6±1	
	Tensioner mounting bolt	1	M10×1	10±2	
	Cylinder head fastening bolt	4	M10×1.25	-	See page 78 for details
		1	M6×1	10±1	
	Tensioning panel, cylinder head cover bolt	1	M6×1	10±2	
	Exhaust through bolt	2	M8	15±2	Apply an appropriate amount of thread locker
	Oil-gas separation cover bolt	2	M5×0.8	6±1	
Chain baffle fastening bolt	1	M5×0.8	6±1		

System	Position	Quantity	Thread Specification	Torque Value N·m	Notes
Crank connecting rod mechanism	Balance shaft locking nut	1	M12×1.25	65±5	
	Bearing pressure plate screw	3	M6×1	10±2	Apply an appropriate amount of thread locker
Case section	M6 bolt for case assembly	15	M6×1	12±1.2	
	Left cover bolt	9	M6×1	10±2	
	Right cover bolt	5	M6×1	10±2	
	Clutch cover	5	M6×1	10±2	
	Adjusting bore cap	1	M30×1.5	12±2	Apply an appropriate amount of grease to the O-ring
	Inspecting hole cover	1	M10×1.25	10±2	Apply an appropriate amount of grease to the O-ring
Clutch and shift mechanism	Clutch nut	1	M18×1.5	100±5	
	Clutch spring rod bolt	6	M6×1	10±2	
	Driving gear nut	1	M14×1.5	120±6	Apply an appropriate amount of thread locker
	Hydraulic actuator bolt	3	M6×1	10±2	
	Main shaft right bearing baffle bolt	2	M5×0.8	6±1	Apply an appropriate amount of thread locker
	Counter shaft right bearing baffle bolt	2	M5×0.8	6±1	Apply an appropriate amount of thread locker
	Transmission drum right bearing limit bolt	2	M5×0.8	5±0.5	Apply an appropriate amount of thread locker
	Setbolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Five-star plate mounting bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Gear display mounting screw	2	M4×0.7	1.8±0.2	Apply an appropriate amount of thread locker
	Sprocket fastening bolt	1	M10×1.25	45±3	Apply an appropriate amount of thread locker
Lubrication cooling system	Water pump cover mounting bolt	4	M6×1	10±2	
	Fine filter cover mounting bolt	2	M6×1	10±2	
	Oil pump mounting bolt	3	M6×1	10±2	
	Water pump impeller mounting bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Oil drain bolt	2	M22×1.5	20±2	
	Fuel injection nozzle bolt	1	M6×1	10±2	
	Water temperature sensor	1	M10×1.25	10±2	
Starting system	Starting motor bolt	2	M6×1	10±2	
	Trigger mounting bolt	2	M5×0.8	6±1	Apply an appropriate amount of thread locker
	Stator mounting bolt	3	M5×0.8	6±1	Apply an appropriate amount of thread locker
	Rotor mounting bolt	1	M12×1.25	115±5	Apply an appropriate amount of thread locker

### Bolt Tightening Methods for Key Parts

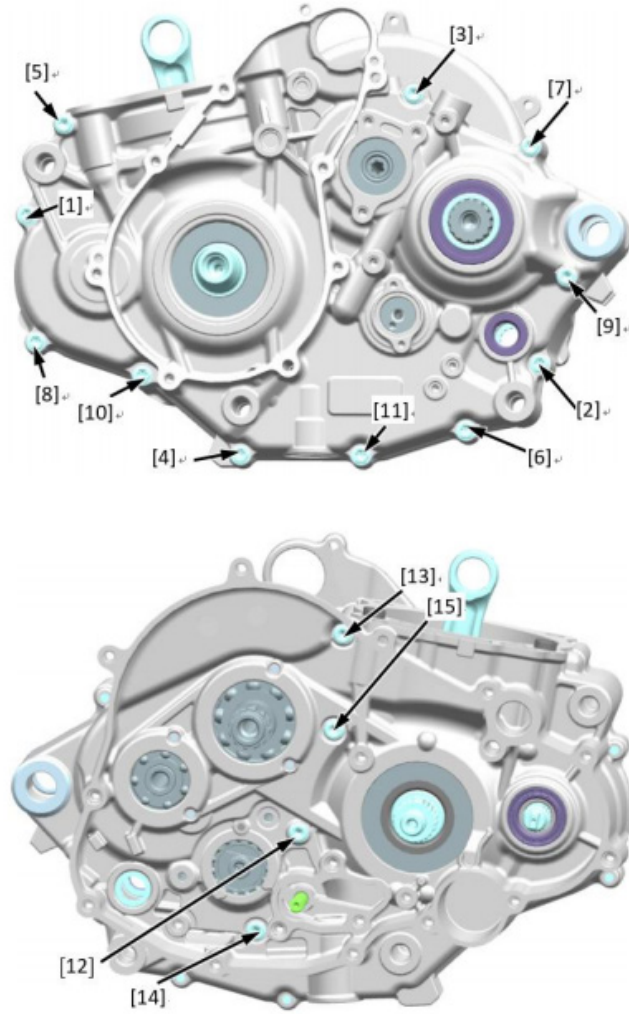
#### Cylinder head bolt

The cylinder head bolts should be tightened as follows:

1. Apply lubricating oil to the bolt supporting surface and threads;
2. Tighten each bolt to 5N·m respectively;
3. Tighten each bolt to 15N·m respectively;
4. Tighten each bolt by twice with an angle of 90° respectively.
5. When tightening the cylinder head bolts, place the torque wrench flat to prevent the bolt head from slipping.

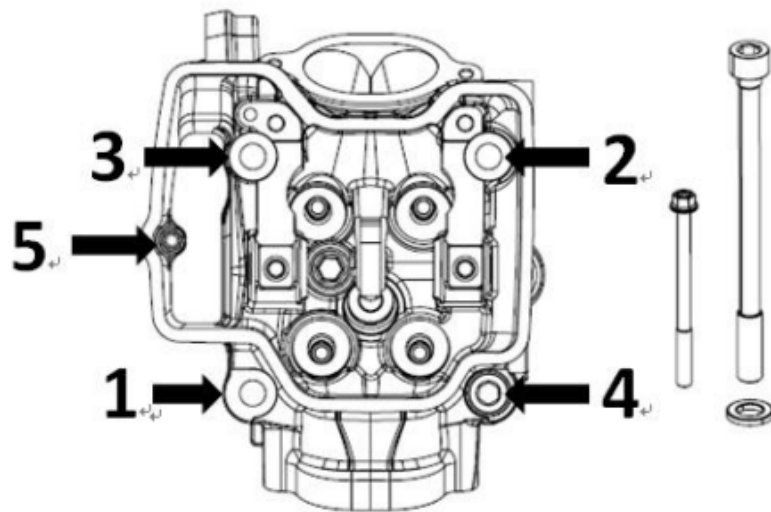


**Crankcase bolt**

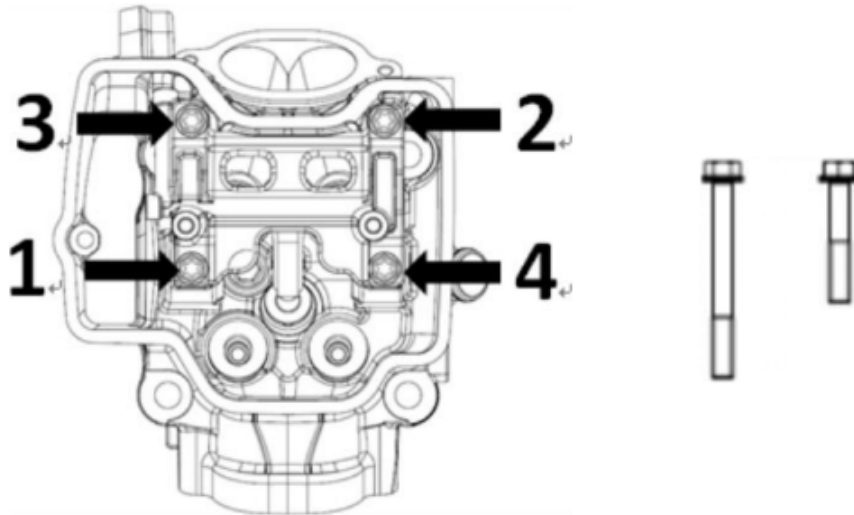


The tightening steps are as follows:

1. Tighten in the order of marks 1 - 15, with a tightening torque of  $(12 \pm 1.2)\text{N}\cdot\text{m}$ .

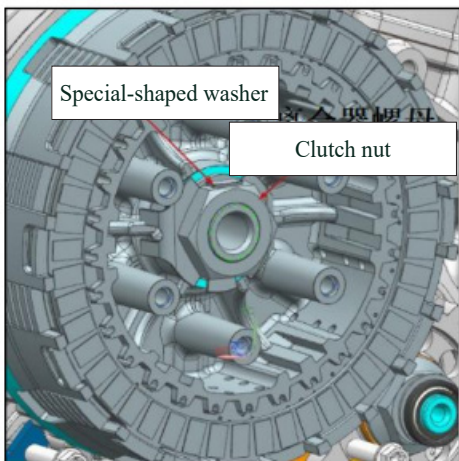
**Cylinder head bolt****The bolt tightening sequence is as follows:**

1. Apply an appropriate amount of lubricating oil to the threads and joint surfaces of all M10 bolts;
2. Tighten in the order of marks 1 - 4 in the above figure, with a tightening torque of  $(5 \pm 0.5)N \cdot m$ ;
3. Tighten in the order of marks 1 - 4 in the above figure, with a tightening torque of  $(15 \pm 1)N \cdot m$ ;
4. Tighten each bolt in the order of marks 1 - 4 in the above figure by an angle of  $90^\circ$ ;
5. Tighten each bolt in the order of marks 1 - 4 in the above figure by an angle of  $90^\circ$  again;
6. The tightening torque is  $(10 \pm 1)N \cdot m$  as mark 5 in the above figure.

**Camshaft gland bolt**

The bolt tightening sequence is as follows:

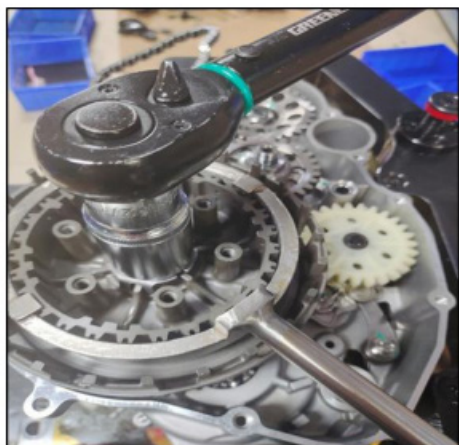
1. Tighten in the order of marks 1 - 4 in the above figure, with a tightening torque of  $(15 \pm 3)\text{N}\cdot\text{m}$ ;



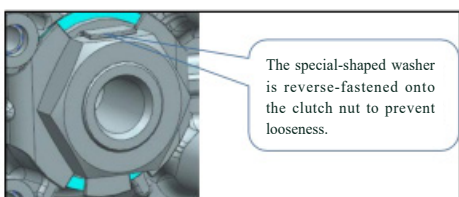
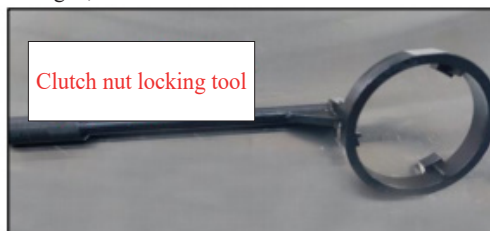
※ Clutch nut

**Clutch nut fastening methods:**

1. Install the clutch gasket and the clutch center assembly;
2. Install the special-shaped washer as shown in the following figure, and then screw the clutch nut until it touches the washer. Pay attention to the direction of the washer;



3. Install the special tool into the clutch center assembly. Pay attention to keeping the tool flat, otherwise the clutch center assembly is likely to be damaged;

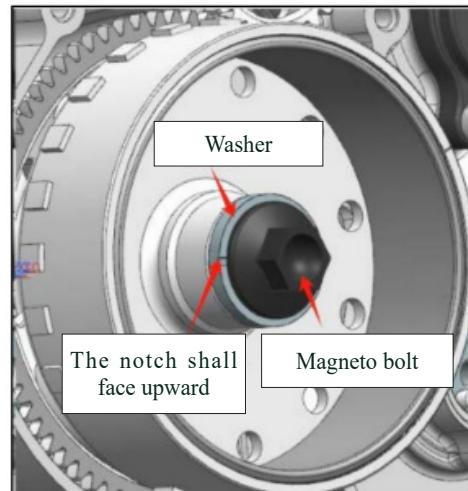


The special-shaped washer is reverse-fastened onto the clutch nut to prevent looseness.

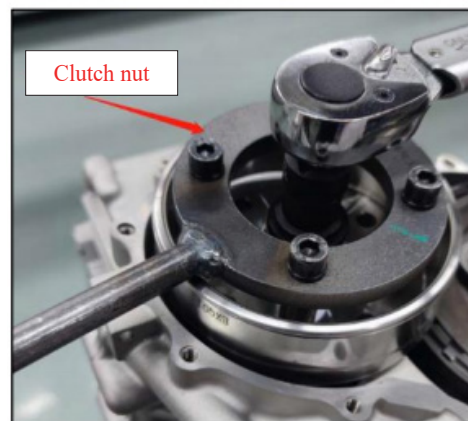
4. Use a torque wrench in conjunction with the special tool to tighten clockwise, with a tightening torque of  $(100 \pm 5)N \cdot m$ .

※ **Magneto bolt tightening method:**

1. After removing the oil and dirt from the conical surfaces of the rotor and crankshaft, install the rotor onto the crankshaft;
2. Install the magneto bolt gasket on the magneto bolt, and pay attention to the direction of the gasket (the notch faces upward);
3. Apply an appropriate amount of thread locker to the 4th - 8th threads of the magneto bolt. Do not let the thread adhesive enter the bolt oil hole. Then screw the magneto bolt and the gasket until they touch the rotor;



4. Install the special tool into the magneto. Pay attention to keeping the tool flat;



5. Use a torque wrench in conjunction with the special tool to tighten clockwise, with a tightening torque of  $(115 \pm 5)N \cdot m$ .

### Common Engine Faults

Fault Phenomenon	Fault Cause	Treatment Measures
The engine cannot start or has difficulty starting	1. The cylinder pressure is too low: Cylinder wear Piston ring wear Cylinder gasket air leakage Valve guide wear Improper valve seat Loose spark plug Starting motor rotating too slowly Improper valve timing Improper valve clearance	Replace Replace Replace Repair Replace Tighten Check the electrical part Adjust Adjust
	2. No ignition or weak ignition on spark plug: Incorrect spark plug gap The spark plug is wet or dirty Faulty ignition coil Trigger circuit open or short Magneto failure	Adjust or replace Clean, dry or replace Replace Replace Replace
	3. The throttle valve body lacks fuel: The fuel tank vent hole is blocked The fuel injector is blocked The faulty high-pressure fuel pump does not work Low pressure of the high-pressure fuel pump The filter screen of the high-pressure fuel pump is blocked	Clean or replace Clean or replace Check or replace Check or replace Clean or replace
The engine has no idle speed or the idle speed is unstable	Improper valve clearance adjustment Improper valve seat Defective valve guide Worn rockerarm or rockerarm shaft Dirty spark plug Incorrect spark plug gap Ignition coil fault Idle valve inlet and exhaust pipe blockage Magneto failure	Adjust Replace or repair Replace Replace Replace Replace or repair Replace Replace or repair Replace
The engine runs unstably at high speed	The engine lacks power Camshaft wear Dirty spark plug The spark plug gap is too small Incorrect valve timing Ignition coil fault Insufficient oil supply pressure of the high-pressure fuel pump The air filter is too dirty	Replace Replace Clean or replace Adjust or replace Adjust Replace Adjust or replace Clean or replace

Fault Phenomenon	Fault Cause	Treatment Measures
The engine exhaust emits blue or black smoke	Excessive lubricating oil  Piston ring wear Valve guide wear Cylinder wall wear Or valve rod scratching and wear Valve rod seal damaged	Check the oil level and drain the excessive oil Replace Replace Replace Replace Replace
The engine lacks power	Improper valve clearance The engine lacks power Incorrect valve timing Cylinder wear Piston ring wear Improper valve seat Dirty spark plug Improper spark plug gap The fuel injector nozzle is blocked Insufficient oil supply pressure of the high-pressure fuel pump The air filter is too dirty The rockerarm or camshaft is worn Air leakage in the intake pipe Too much engine oil	Adjust Replace Adjust Replace Replace Replace or repair Clean or replace Clean or replace Clean or replace Adjust or replace Clean or replace Replace Fasten or replace Reduce the oil volume
Engine overheating	Carbon deposits on the top of the piston Too little or too much engine oil Oil pump fault Oil passage blockage Air leakage in the intake pipe Inappropriate lubricating oil Cooling system fault Insufficient antifreeze Abnormal combustion	Clean Check and then add or reduce Replace Clean Fasten or replace Change the oil Repair Add Inspection
The clutch slips	The clutch driving piece is worn or damaged The clutch driven piece is worn or damaged The spring force of the clutch spring becomes weaker	Replace Replace Replace
Ignition system	ECU fault Spark plug ablation The spark plug gap is too small The spark plug gap is too large or too small Magneto fault Insufficient voltage or invalidation of battery Faulty ignition coil Faulty ignition coil The trigger plug gap is too small Other pipeline faults	Replace Replace Adjust Clean Replace Charge or replace Replace Replace Adjust Inspection

Fault Phenomenon	Fault Cause	Treatment Measures
Abnormal noise of engine	1. Valve abnormal knocking: The valve clearance is too large The valve spring is worn or broken The rockerarm or camshaft is worn	Adjust Replace Replace
	2. Abnormal knocking from the piston section: Piston wear Cylinder wear Combustion chamber in combustion chamber Wear of piston pin or piston pin hole Wear of piston ring or ring groove	Replace Replace Clean Replace Replace
	3. Abnormal knocking from the timing chain section: The chain is stretched The sprocket is worn The timing chain tensioner is malfunctioning	Replace the chain and sprocket Replace the chain and sprocket Repair or replace
	4. Clutch abnormal knocking: The clutch gear is worn or damaged The clutch buffer spring is worn or broken	Replace the clutch gear Replace the clutch gear
	5. Crankshaft abnormal knocking: Bearing liner abnormal knocking Crank pin bearing liner wear or sintering Excessive fit clearance	Replace Replace Replace
	6. Abnormal knocking from the drive system: Gear wear or gear damage Main shaft or counter shaft wear Bearing wear Bushing wear	Replace Replace Replace Replace

**Valve Train System**

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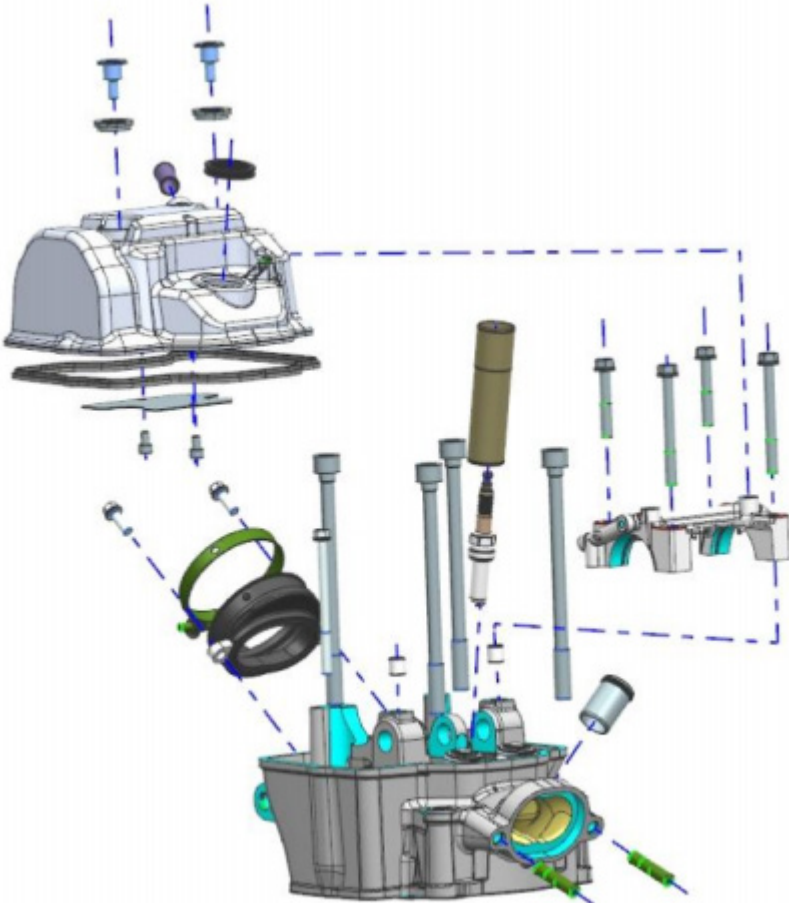
### Maintenance Instructions

#### Notes

1. When repairing the cylinder head cover, camshaft and tensioner, it is necessary to determine whether to remove the engine from the frame according to the model and the shielding; when repairing the cylinder head and valve, the engine must be removed from the frame;
2. When disassembling, mark the disassembled parts and put them away to ensure that they are correctly repositioned during reassembly;
3. The camshaft lubricating oil is injected through the oil pipes of the cylinder head and camshaft bracket, so the oil pipes shall be cleaned before assembling the cylinder head and cam shaft bracket;
4. When disassembling the cylinder head and cylinder head cover, be careful not to damage the joint surface;
5. Before disassembling the cylinder head components, a cylinder compression test shall be carried out for preliminary diagnosis. The test steps are as follows:  
See "Engine inspection" on page 70 for details.

Valve train system

Component arrangement



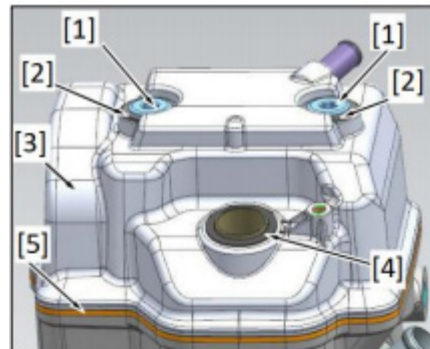
## Valve Train System

Unit: mm

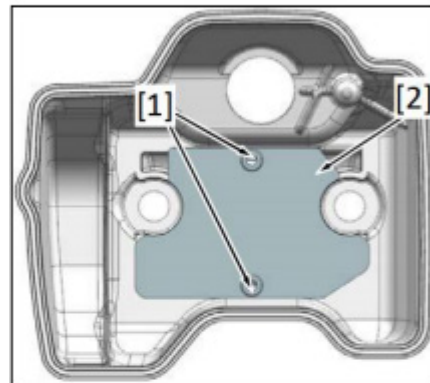
Item		Standard value	Maintenance limit value	
Cylinder pressure for electric starting (at normal temperature and pressure)		4-6 bar 390 rpm	-	
Valve clearance (between camshaft and rocker arm, 20°C)	Intake valve	0.10 - 0.16	-	
	Exhaust valve	0.22 - 0.28	-	
	Steel exhaust valve	0.25 - 0.31		
Camshaft	Cam protrusion height	Intake	35.7045-35.7745	
		Exhaust	29.3887-29.4587	
	Clearance between journal and bracket		0.038 - 0.08	0.105
	End face runout		0.005	0.01
Valve guide	Valve rod diameter	Intake	Φ5.478 - Φ5.492	
		Exhaust	Φ5.463 - Φ5.477	
	Inner diameter of valve guide	Intake/exhaust	Φ5.504 - Φ5.516	Φ5.55
		Clearance between valve rod and valve guide	Intake	0.012 - 0.038
	Exhaust		0.027 - 0.053	0.117
Free length of valve spring		Intake/exhaust	38.85 / 40.65	
Installation length of valve spring		Intake/exhaust	34.4 / 35.4	
Flatness of cylinder head		0.03	0.05	

**Disassembly steps:**

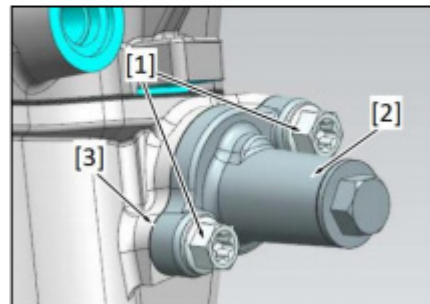
1. Remove the tensioning panel bolt [1] and rubber gasket [2], then take off the cylinder head cover [3], spark plug shaft sleeve seal ring [4], and head cover gasket [5];



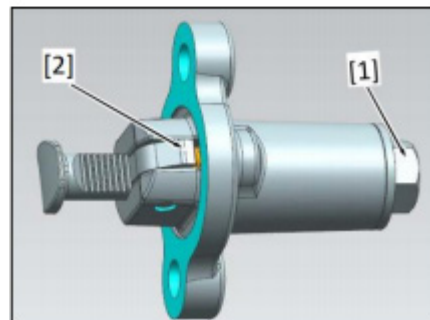
2. Remove the bolt [1] shown in the right figure and detach the oil and gas separation cover plate [2];

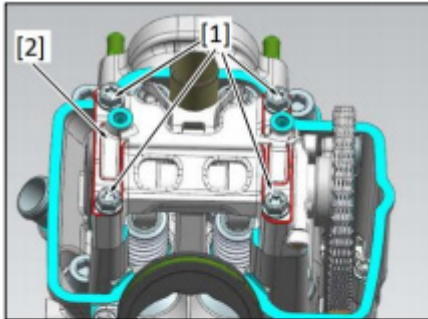


3. Adjust the engine to top dead center according to the "Valve clearance" on page 21; remove bolt [1] in the left figure, then remove the tensioner assembly [2] and tensioner gasket [3];

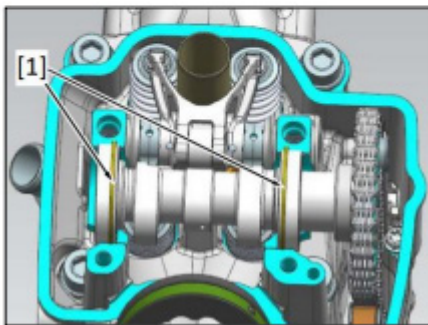


4. Remove the bolt [1], take out the spring inside, press the pawl [2], and compress the rack to the bottom to fully retract the tensioner;

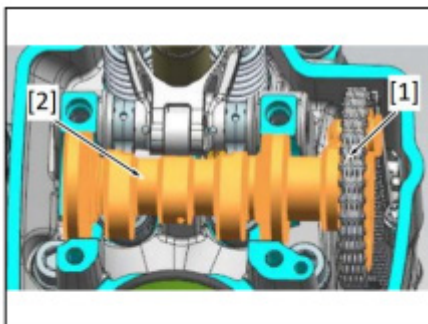




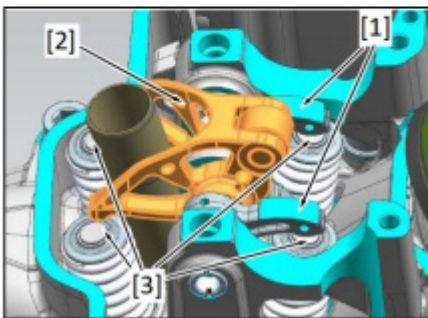
5. Loosen the 4 camshaft gland bolts [1] shown in the diagram in reverse order over 2-3 times according to the "Bolt tightening methods for key parts" on page 79, then remove the camshaft cover assembly [2]. During disassembly, apply even force to protect the camshaft bore and dowel pin bore of the gland, avoiding any deform or damage to the gland.



6. Remove the semi-circular snap-ring [1]. Be careful during disassembly to prevent the semi-circular snap-ring from falling into the Engine;



7. Remove the timing chain [1] from the camshaft [2] and disassemble the camshaft assembly. During the camshaft disassembly process, handle it with care to avoid scratching the camshaft journals;



8. Open the intake rockerarm [1] and exhaust rockerarm [2], then use a magnetic rod to remove the four valve adjusting gasket [3];

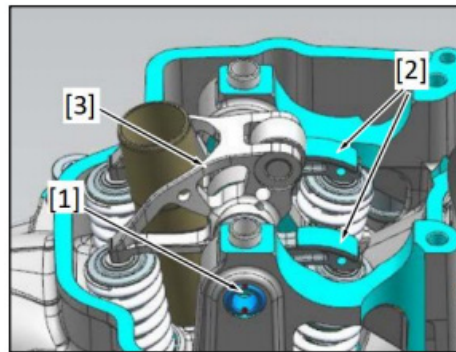
**Notes**

- Be careful to prevent the valve adjustment gasket from falling into the engine.
- Make corresponding marks on the gaskets and rockers for the assembly position to ensure they are installed in the original positions.

9. Remove the rockerarm shaft [1], two intake rockerarms [2], and the exhaust rockerarm [3];

**Notes**

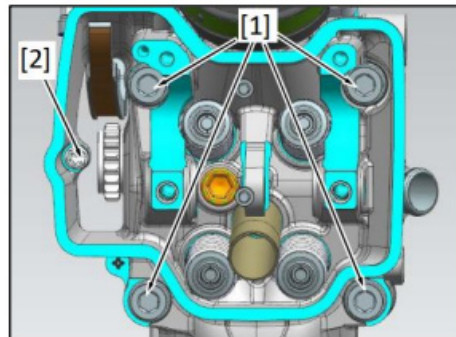
- When disassembling the rockerarm shaft, handle it gently and avoid scratching the surface of the rockerarm shaft;



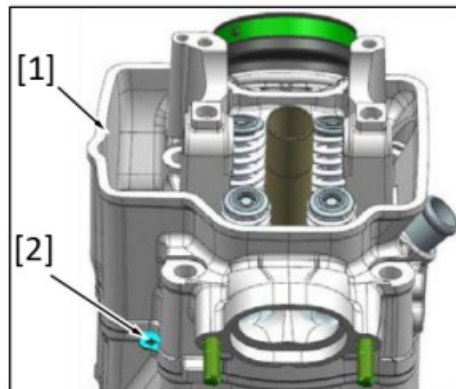
10. Disassemble 4 cylinder head bolts [1], then loosen the cylinder head bolts for 2 to 3 times in reverse order according to the sequence of "Bolt tightening methods for key parts" on page 72, and remove the flat gasket with a magnetic rod or tweezers; remove the M6 bolt [2];

**Notes**

- Do not let the gaskets fall into the engine.



11. Disassemble the cylinder head assembly [1] and the cylinder head gasket assembly [2];

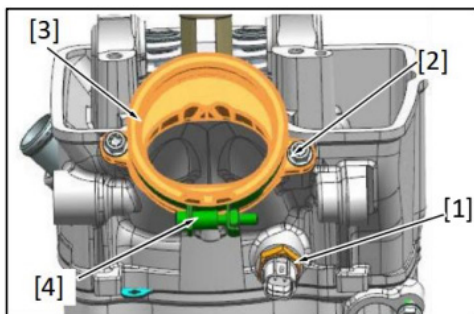
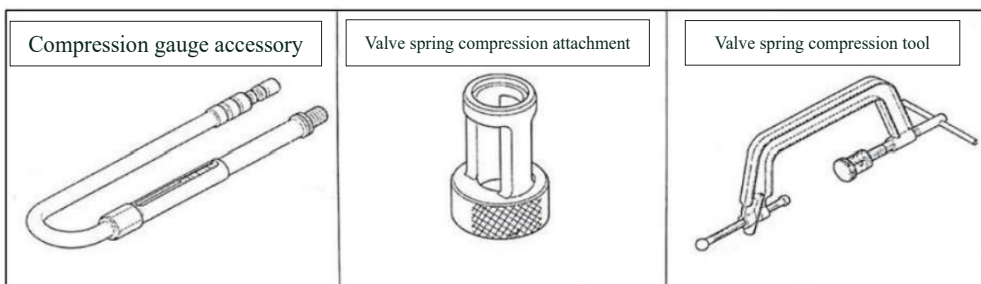


12. To disassemble the timing chain, guide panel, and tensioning panel, you need to remove the clutch and driving gear. Refer to "crank connecting rod" on page 99 and "Clutch operating mechanism" on page 119.

**Disassembly steps of the cylinder head assembly**

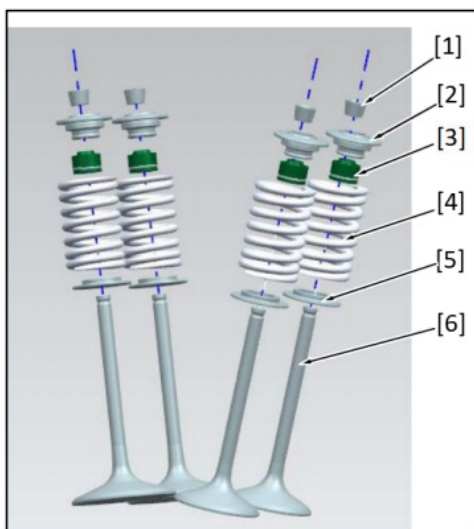
Please use special disassembly tools:  
Valve spring compression tool and accessories.

**Tools**



**Disassembly steps:**

1. Disassemble the water temperature sensor assembly [1]; remove the two bolts [2] and take off the intake seat [3] and pipe clamp [4];



2. Use the valve spring compression tool and its accessories to disassemble the following components:

- Valve lock clip [1];
- Valve spring cover [2];
- Valve rod seal [3];
- Valve spring [4];
- Valve spring seat [5];
- Valve [6].

**Notes**

- Do not damage the cylinder block joint surface and valve seat surface;
- To prevent permanent deformation of the valve spring, do not compress the valve spring excessively during removal;
- When disassembling, make marks on each corresponding part for convenient installation.

## Inspection

### Notes

· Before inspection, all removed parts (except rubber parts and oil sealing parts) shall be cleaned with detergent and blown dry with compressed air.

1. Check the following components for damage, abnormal wear, deformation, burning or blockage of oil passages;

Timing driven sprocket	Camshaft	Rocker arm
Timing chain	Valve rocker arm	Rockerarm shaft
Valve	Valve spring	Cylinder head
Valve guide	Chain guide panel	Chain tensioning panel

Check each part according to "Maintenance parameter table" on page 88 and replace the components that exceed the limit values in a timely manner.

2. Check the camshaft runout:

Fix the camshaft with V-blocks. Rotate the camshaft two full turns ( $720^\circ$ ), read the runout value, and refer to the maintenance parameter table on page 147. If the value exceeds the limit, replace the camshaft.

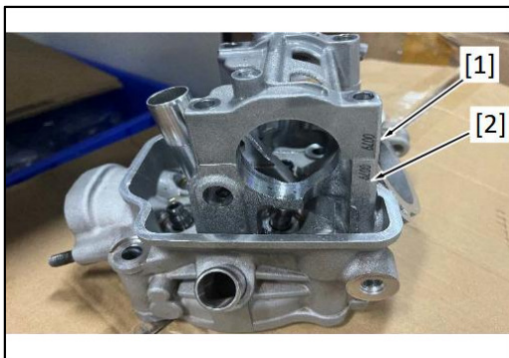
3. Check and adjust the valve clearance; refer to "Valve clearance" on page 21;

4. Check whether each sealing ring and gasket is deformed or damaged. Replace them if necessary.

## Assembly

### Notes

1. When the camshaft is not installed and the tensioner pops up, the chain must be tightened to prevent the chain from being stuck in the rotating crankshaft;
2. The camshaft cover code [1] and cylinder head code [2] must match;



3. Before assembly, clean the carbon deposits in the combustion chamber and the surface of the cylinder head gasket assembly. Wash each part (except rubber parts and oil sealing parts) with solvent, and blow each part with compressed air, including all oil passages and water channels;
4. Once the cylinder head assembly is disassembled, the valve rod seals need to be replaced with new ones;
5. The assembly of the cylinder head assembly can only be completed with the help of the valve spring compression tool and its accessories. Incorrect assembly methods can lead to component damage;
6. For bolt tightening methods and torque values not otherwise specified, **please refer to "Bolt Torque Value" on page 74 for details.**
7. After installing the valve lock clips, the valve seals need to be tested with kerosene or gasoline (using a high-pressure gun to blow). If there is any leakage, the valves and the cylinder head need to be lapped;
8. Apply an appropriate amount of lubricating oil between all moving pairs, and apply an appropriate amount of grease to all O-rings;
9. During the entire assembly process, prevent dust and debris from entering the cylinder.

**Assembly steps:**

1. Sub-assemble the cylinder head assembly:

A) : Lubricate the new valve rod seal [3] with engine oil;

**Installation**

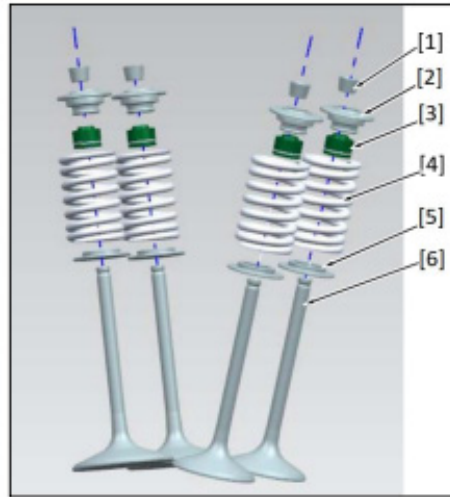
Valve spring retainer [5] and valve rod seal [3];

B) : Lubricate the sliding surface and the end of each valve rod with engine oil. Insert the valve [6] into the valve guide, and rotate the valve slowly during insertion to prevent damaging the valve rod oil seal;

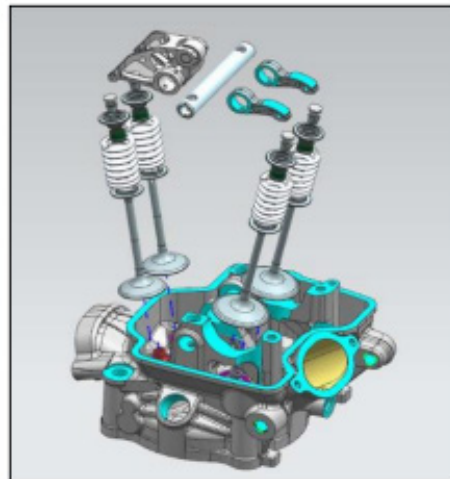
C) : Install the valve spring [4] with the seal coil facing down (the colored mark on top);

D) : Install the valve spring cover [2];

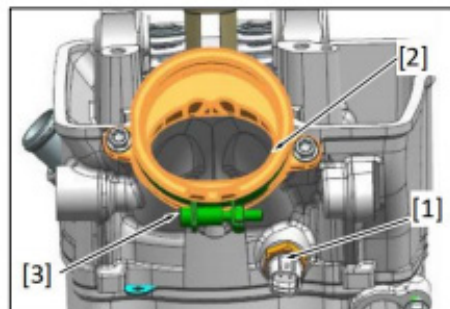
E) : Install the valve lock clip [1] with a special tool.



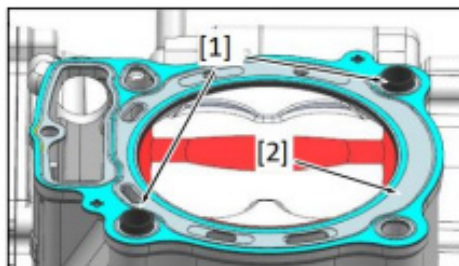
F): Install the camshaft assembly and the intake rockerarm (according to the marks made during disassembly), exhaust rockerarm and rockerarm axle into the cylinder head assembly. Then install the valve adjustment gaskets back to their original positions according to the marks. (After reinstalling the cam cover, the valve clearance needs to be checked. If the clearance is abnormal, the valve gaskets need to be replaced in this step)



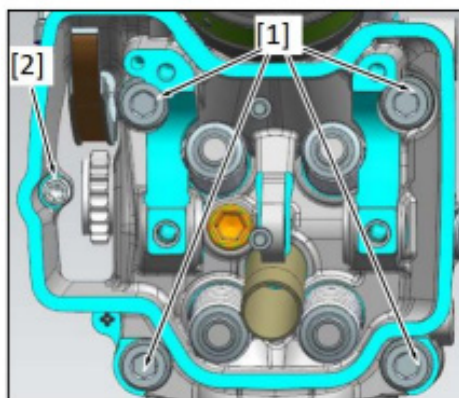
G) Install the water temperature sensor assembly [1], intake seat [2], and pipe clamp [3];



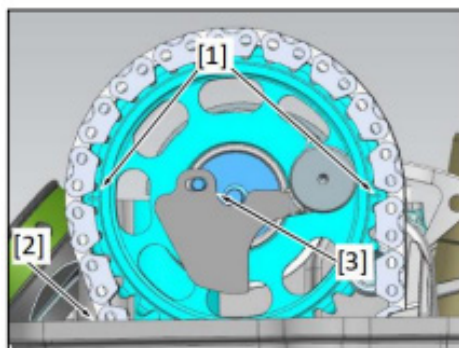
2. Ensure that the timing chain, guide panel and tension panel have been correctly installed on the case part. Install the cylinder head dowel pins [1] and the cylinder head gasket assembly [2];



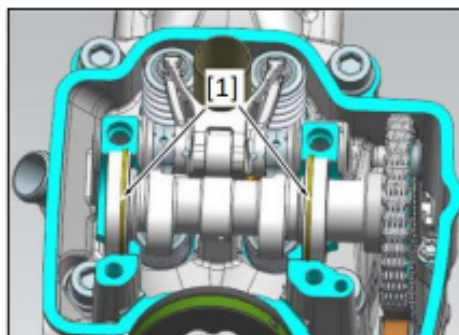
3. Assemble the subassembly cylinder head component onto the upper case, then tighten cylinder head bolt [1] and bolt [2] according to the "Bolt tightening methods for key parts" specifications on page 78.



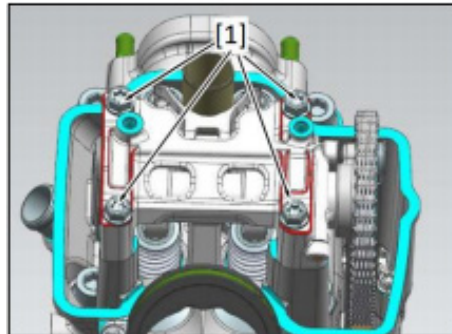
4. Ensure the engine is at the compression TDC status. After aligning the right cover with the rotor timing marks, install the camshaft assembly. Mount the timing chain onto the camshaft assembly, then hold the assembly with one hand while tightening the timing chain inward from the tensioner position with the other hand. At this stage, verify that the timing mark [1] on the camshaft assembly and the cylinder head cover surface [2] are level, and ensure the flyweight [3] is oriented downward;



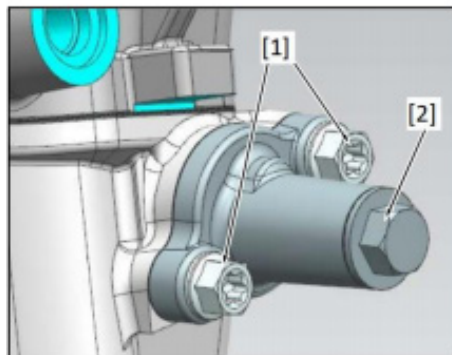
5. Install the semi-circular snap-ring [1] onto the camshaft bearing;



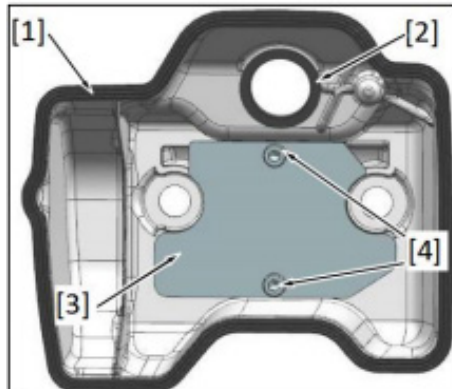
6. Install the camshaft cover assembly into the cylinder head. Note: Coat the moving pairs with a proper amount of lubricating oil, and tighten the 4 cam gland bolts [1] according to the "Bolt tightening methods for key parts" on page 79.



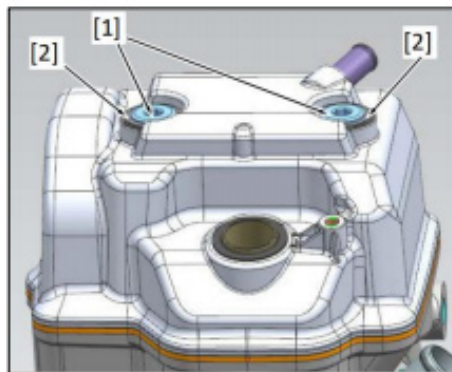
7. Next, assemble the tensioner gasket and tensioner assembly. When assembling the tensioner, first compress the rod to the bottom. Refer to "Crank connecting rod" on page 99, tighten the two M5 bolts [1], install the tension spring, and tighten the bolts [2] as required. **Note:** After assembly, rotate the crankshaft 360° through the adjusting bore cover and re-check the valve clearance. If any abnormality is found, the valve gasket group needs to be replaced in step 1 (F) to make sure the valve clearance is normal according to "Inspection and adjustment of valve clearance" on page 21;



8. Install the top cover gasket [1], spark plug shaft sleeve seal ring [2], oil and gas separation cover plate [3], and fastening bolts [4] on the cylinder head cover.



9. After the assembly in Step 8, correctly install the whole assembly onto the cylinder head. Install 2 cylinder head cover fastening bolts [1] and rubber gaskets [2]. Pre-tighten the 2 bolts respectively before applying the final torque.





**Crank Connecting Rod**

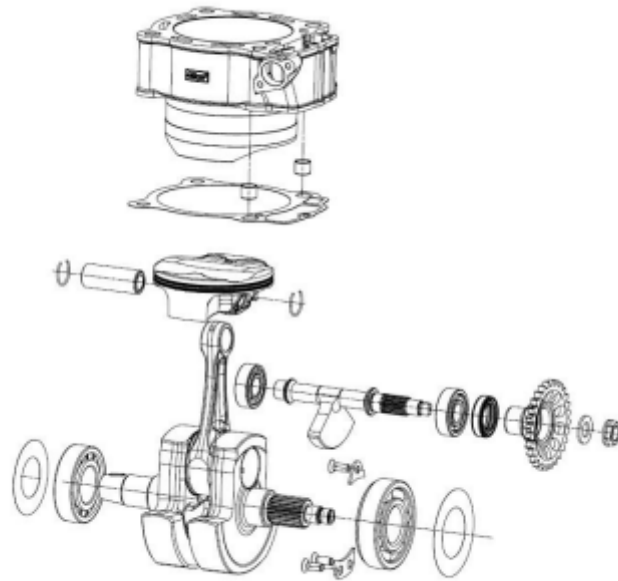
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### Maintenance Instructions

Note:

1. When maintaining the cylinder, crankshaft, balance shaft and piston ring, please separate the left and right cases first. For the method of separating the cases, refer to "Case section";
2. After disassembly, mark and store the cylinder, crankshaft, balance shaft and piston ring, piston pin and snap ring to ensure that these components are installed in their original positions (except for the replaced components);

**Crankshaft connecting rod**  
**Component arrangement**



### Crank Connecting Rod Mechanism Unit: mm

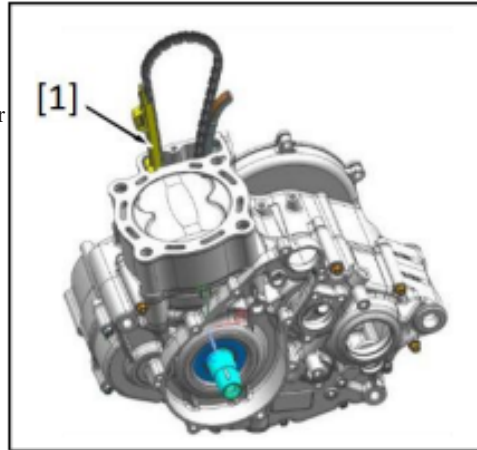
Item		Standard Value	Maintenance Limit Value	
Crankshaft	Connecting rod big-end side clearance with crank	0.3~0.5	0.55	
	Crankshaft end runout	0.03	0.05	
	Crankshaft journal runout	0.02	0.04	
Cylinder block	Cylinder diameter	Φ96.00~Φ96.015	Φ96.10	
Piston, piston pin, piston ring	Diameter of piston base circle	Φ95.96~Φ95.975	Φ95.86	
	Piston pin bore diameter	Φ19.004~Φ19.01	Φ19.04	
	Outer diameter of piston pin	Φ18.992~Φ19.00	Φ18.972	
	Closed clearance of piston ring	First ring	0.2~0.3	0.5
	Closed clearance of piston ring	Oil ring	0.2~0.7	1.4
	Side clearance between piston ring and ring groove	Side clearance between the first ring and groove	0.02~0.06	0.07
	Side clearance between piston ring and ring groove	Side clearance between oil ring and groove	0.04~0.11	0.012
	Height of piston ring groove	First ring	1.01~1.03	1.04
	Piston ring height	First ring	0.97~0.99	0.96
	Height of piston ring groove	Second ring	1.51~1.53	1.54
Cylinder clearance		0.025~0.055	0.06	
Inner diameter of connecting rod small end		Φ19.007~Φ19.013	Φ19.028	
Fit clearance between connecting rod and pin		0.007~0.021	0.04	

**Disassembly**

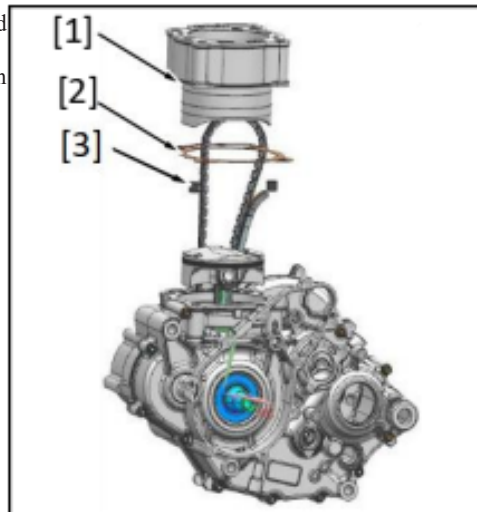
**Disassembly steps:**

Cylinder disassembly

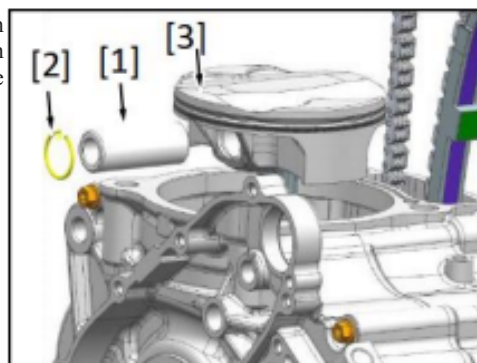
1. After disassembling the cylinder head and cylinder head gasket, remove the chain guide panel [1];



2. Remove the cylinder [1], cylinder gasket [2], and dowel pin [3] in sequence; When removing the cylinder, clean the carbon deposition and debris from the cylinder surface.



3. Use needle-nose pliers to remove the piston pin retainer [2], then take out the piston pin [1] and piston [3]. Be careful not to drop the snap ring into the crankcase when removing it.

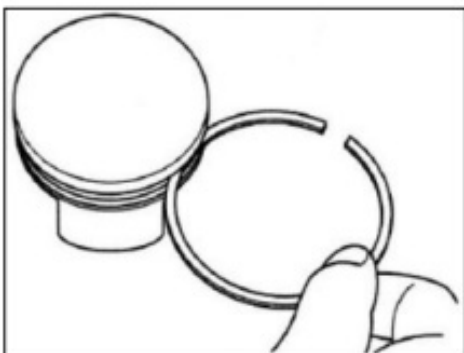




4. Disassemble the piston ring assembly;

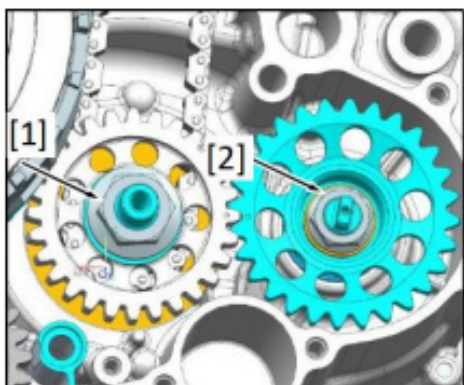
Disassembly method of the piston rings:

- Separate the ends of each piston ring, and then lift the ring out upwards from the position reverse to the opening of the piston ring.



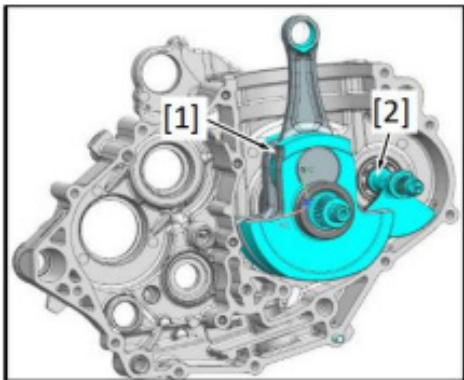
**Notes**

- Do not separate the ends too far to avoid damaging the piston rings.
- Do not scratch the piston when removing the piston rings.



5. Use a torque wrench to loosen the main drive gear nut [1] and the balance shaft gear nut [2], then remove the main drive gear, balance shaft gear, timing sprocket, and chain. Note:

The main drive gear nut [1] has a left-hand thread, and loosens in the clockwise direction.

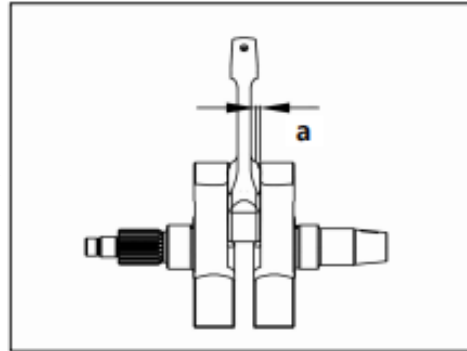


6. Refer to the "Crankcase section" **on page 111** to separate the left case from the right case. Remove the two dowel pins and extract the crankshaft [1] and balance shaft assembly [2] from the crankcase. Take care not to damage the crankshaft journal or balance shaft journal.

**Inspection**

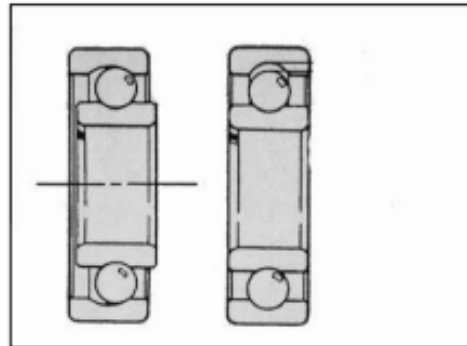
**- Connecting rod side clearance**

Check the connecting rod side clearance [a] in the way shown in the figure, and refer to "Maintenance parameter table" **on page 102**. If the clearance exceeds the maintenance limit value, replace the crankshaft and recheck the clearance.



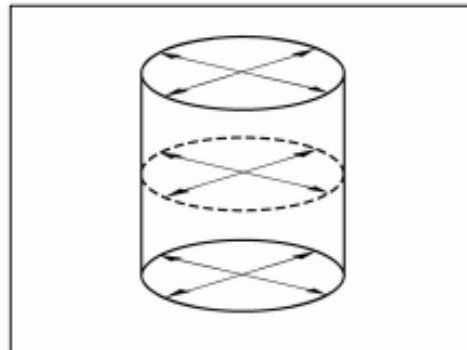
**- Bearing**

Check whether all the bearings in the left and right cases rotate flexibly. If they do not rotate flexibly or get stuck, replace the bearings with the same model.



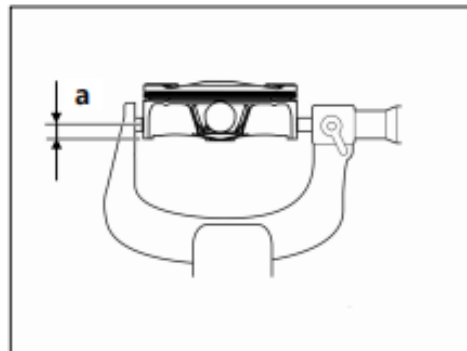
**- Cylinder inspection**

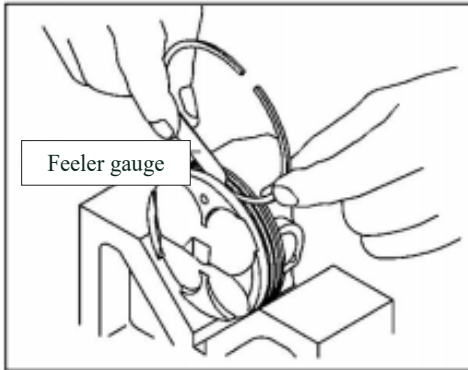
Check whether the cylinder block has any wear or damage. Measure the inner diameter of the cylinder block at three positions: the top, middle, and bottom of the piston stroke. When measuring, take measurements in two directions perpendicular to each other.



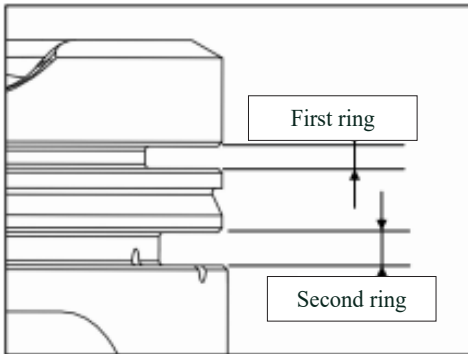
**- Piston inspection**

Measure the outer diameter at [a] 9 mm above the piston skirt. Refer to the maintenance parameter table **on page 102**. If the limit value is exceeded, replace the piston ring kit and the piston when necessary.

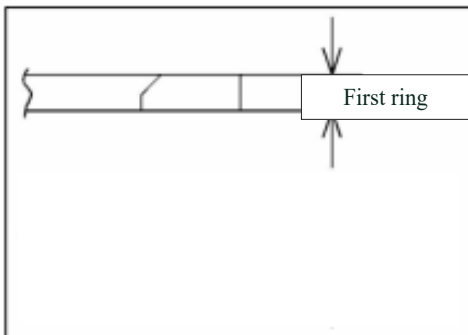




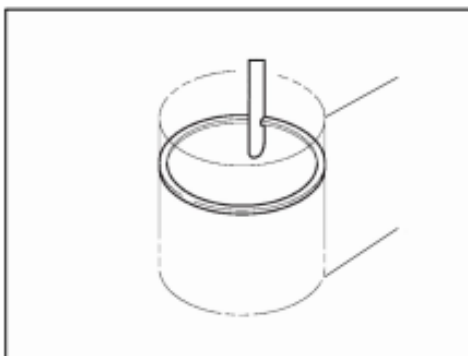
**- Side clearance between piston ring and ring groove**  
As shown in the figure, use a feeler gauge to measure the clearances between the first and oil piston rings and the piston respectively. Refer to the maintenance parameter table **on page 102**. If the values exceed the limit, replace the piston ring kit. Replace the piston if necessary.



**- Ring groove height**  
As shown in the figure, use a feeler gauge to measure the height of the first and second piston ring (oil ring) grooves. Refer to the maintenance parameter table **on page 102**. If the values exceed the limit, replace the piston ring.



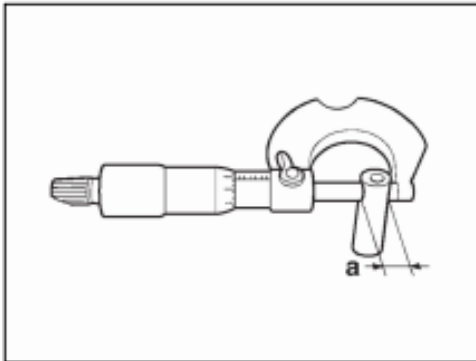
**- Piston ring height**  
As shown in the figure, use a feeler gauge to measure the height values of the first piston rings respectively. Refer to the maintenance parameter table **on page 102**. If the values exceed the limit, replace the piston ring kit.



**- Closed clearance of piston ring**  
After confirming that the cylinder bore size is within the usable range, use the bottom of the piston to push the piston ring to a position near the middle - lower part of the cylinder bore. Make sure the end face of the piston ring is parallel to the cylinder surface. Use a feeler gauge to measure the closed gap values of each piston ring. Refer to the maintenance parameter table on page 102. If the values exceed the limit, replace the piston ring kit.

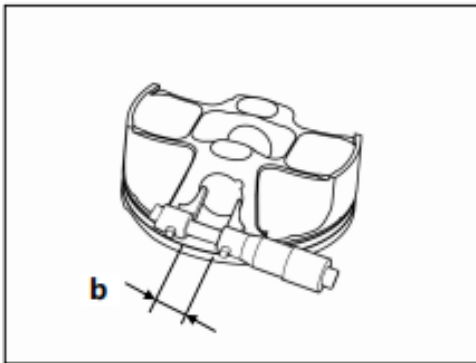
**- Outer diameter of piston pin**

Measure the outer diameter of the piston pin. Refer to the "Maintenance Parameter Table" **on page 102**, and replace the piston pin if it exceeds the limit value.



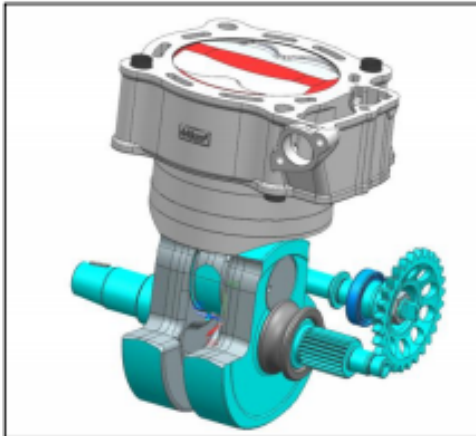
**- Piston pin bore diameter**

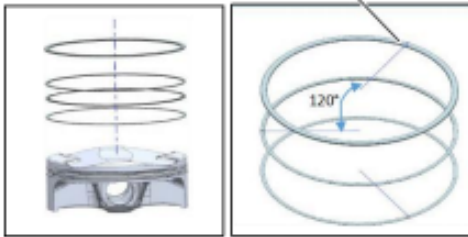
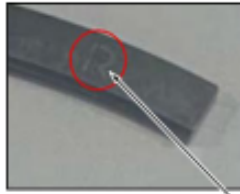
Measure the inner diameter of the piston pin bore; compare it with the maintenance parameter table **on page 102**, and replace the piston pin if it exceeds the limit value.



**- Piston, connecting rod**

Check whether the cylinder block, piston, piston rings, piston pin, and small end of the connecting rod have scratches, damage, abnormal wear, deformation, burns, or oil passage blockages. Measure each component and, according to the technical specifications in the maintenance parameter table **on page 102**, calculate the corresponding clearances and replace any components that exceed the maintenance limit values.





### Assembly

#### 1. Assemble the piston ring kit

Assemble the piston ring kit to the piston as shown in the figure. The installation method of the piston is the reverse of the disassembly method.

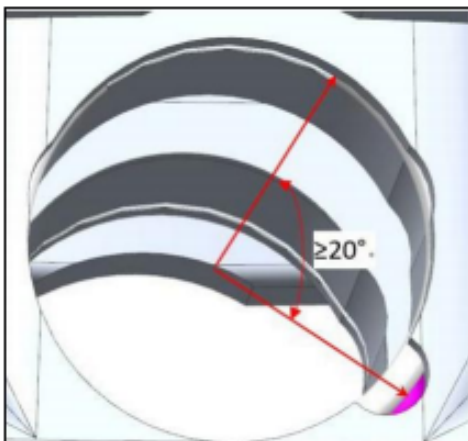
#### Notes

- Apply engine oil to the entire surface of the piston ring and the piston ring groove;
- Prevent damage to the piston and piston ring during installation.;
- When installing, the marked side of the piston ring shall face up; the first ring: R.
- When installing the oil ring assembly, first install the spacer ring, and then install the oil scraper ring (lower) and the upper oil scraper ring (upper);
- Cross the openings of the piston rings 120° apart, avoiding alignment with the intake and exhaust ends (the piston dot mark indicates the exhaust side).



#### 2. Install the piston pin snap ring

Install the piston pin retainer [1] into the piston groove using the special tooling.



#### Notes

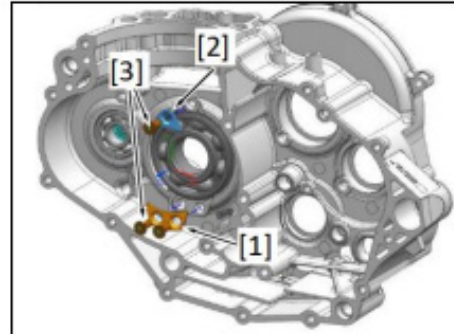
- The piston pin retainer [1] must be installed at an angle of more than 20° with the piston groove to avoid overlap;

**3. Assemble the bearing and pressure plate**

After pressing the bearing into the case, assemble the bearing pressure plate [2] and the bearing pressure plate [1] as shown in the figure, and tighten the pressure plate bolt [3].

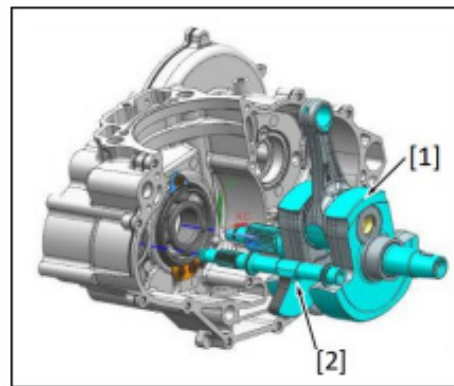
**Notes**

- Coat thread adhesive to the pressure plate bolt [3];



**4. Assembly the crankshaft and balance shaft**

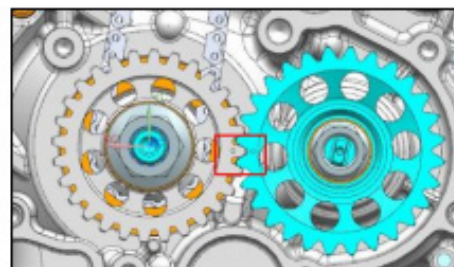
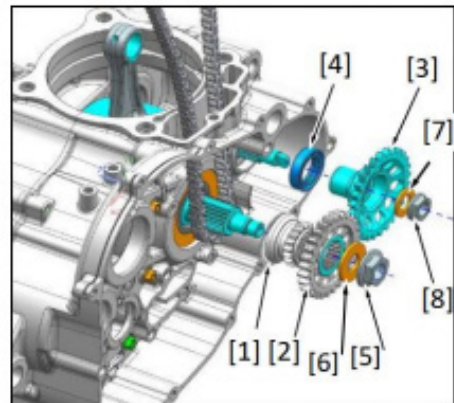
Install the crankshaft [1] and balance shaft [2] into the case, assemble the main/counter shaft and transmission drum, then merge the case.

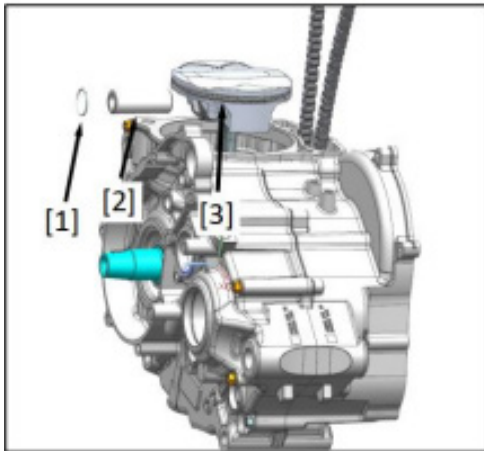


**5. Assemble the main drive gear and balance shaft gear**  
Install the driving sprocket [1], main drive gear [2], balance shaft gear [3], oil seal [4], nut [5], nut [8], flat gasket [6], and flat gasket [7] sequentially as shown in the figure and tighten them securely.

**Notes**

- Align the main drive gear [2] with the balance shaft gear [3] during assembly;
- Nut [5] is a left-hand nut, and the tightening direction is counterclockwise;
- Coat thread adhesive to nut [5];
- The oil seal [4] must be press-fitted onto the right case using a special tooling.

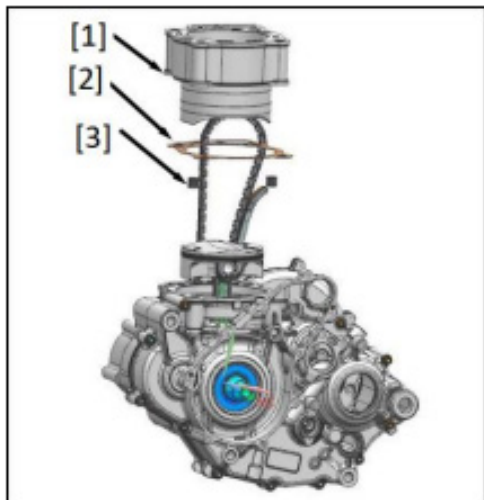




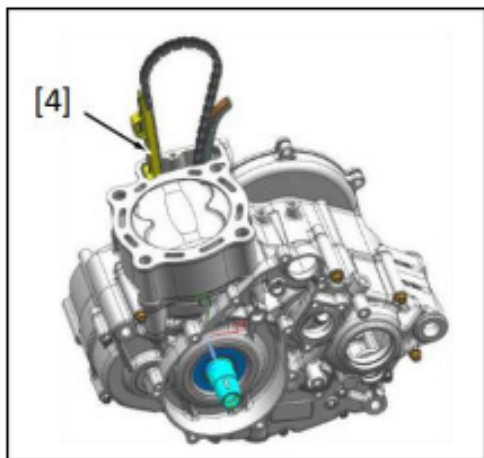
6. Install the piston  
After aligning the assembly piston [3] bore with the connecting rod small end bore, insert the piston pin [2] through the connecting rod small end of piston [3], then use a special tooling to install the piston pin retainer [1] into the corresponding groove on the piston.

**Notes**

- When installing the piston, the dot on the piston top should face the exhaust side;
- The piston pin snap ring opening should face downward;
- If the piston pin retainers are severely deformed, replace them with new ones;
- Do not allow the piston pin retainer to fall into the crankcase.



7. Install the cylinder  
1. Install the cylinder block dowel pin [3] and the new cylinder block gasket [2];  
2. Apply lubricating a layer of oil evenly on the surfaces of the cylinder block [1], piston, and piston rings;  
3. First, stagger the openings between the piston rings by 120° from each other, then gently assemble the cylinder block into place;  
4. Install the chain guide panel [4] in place.



**Notes**

- Avoid damaging the piston rings when installing the cylinder block.

**Case Section**

1. Maintenance Instructions.....	112
2. Component Arrangement .....	113
3. Disassembly.....	114
4. Inspection .....	116
5. Assembly .....	116

### Maintenance Instructions

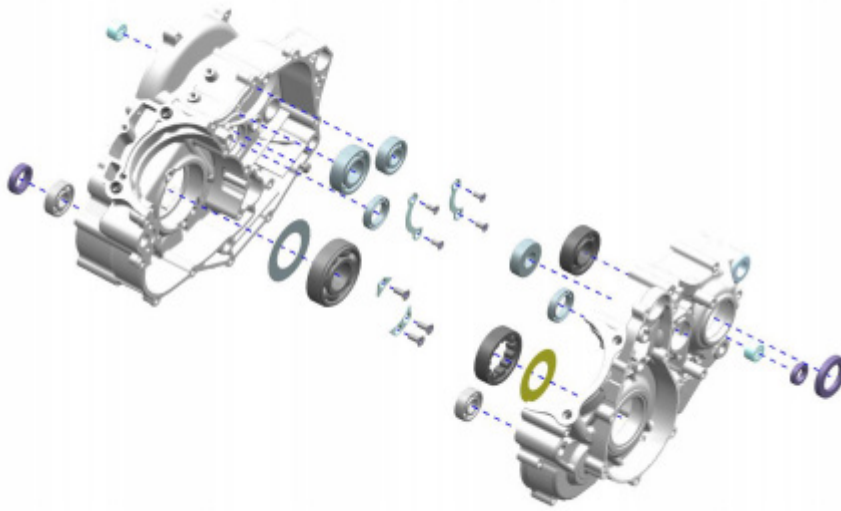
**N**

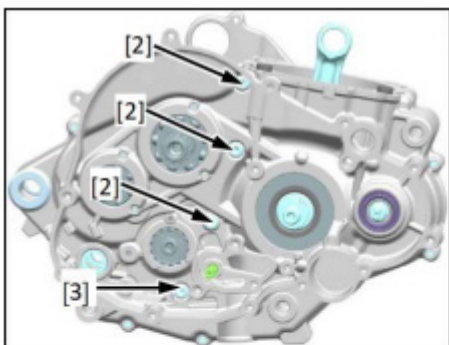
**otes**

1. Before disassembling the crankcase components, the following components must be removed:
  - A) Components related to the valve mechanism
  - B) Components related to the clutch operating mechanism
  - C) Components related to the cooling and lubrication mechanism
  - D) Components related to the starting system
2. Pay attention not to damage the joint surface of the case during maintenance;
3. Clean the joint surface and oil passage before assembly of the crankcase;
4. Before closing the case, evenly apply the end sealant on the closing surface, and clean up the excess sealant;

Case section

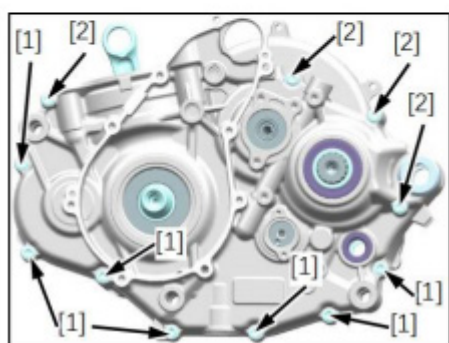
Component arrangement



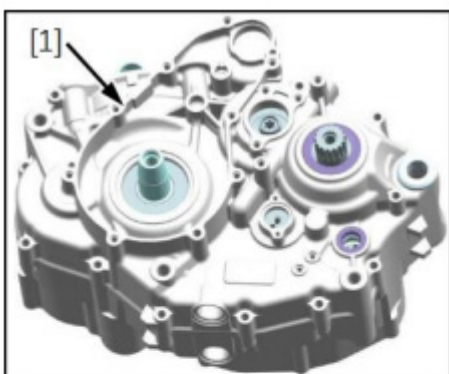


**Disassembly**  
**Disassembly steps:**

1. Turn the right case side up and remove bolts [2] and [3];



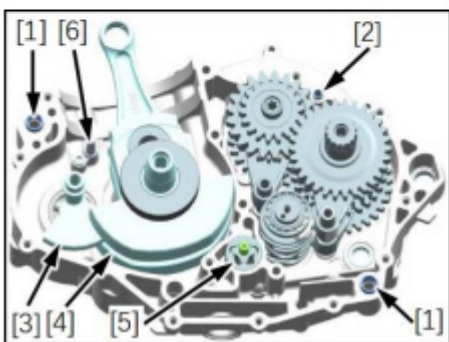
2. Turn the engine over with the left case side facing up, and disassemble bolts [1] and [2] diagonally;



3. Remove the left crankcase assembly [1] from the right crankcase assembly;

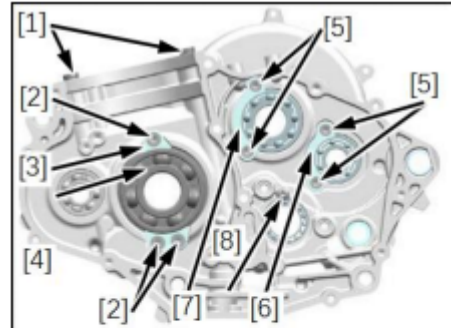
**Notes**

· Do not use tools to pry the crankcase closing surface. You can gently tap the non-machined surface with a rubber mallet to facilitate removal.

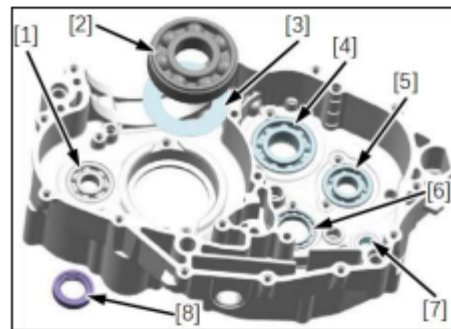


4. After separating the cases, remove the dowel pin [1], pin [2], disassemble the balance shaft [3], remove the crank connecting rod [4], transmission shift mechanism, oil pump [5], and fuel injection [6]. (See page 99 for disassembly and assembly of the crank connecting rod and balance shaft, page 129 for the transmission shift mechanism, and page 135 for the oil pump and fuel injection); Pay attention to the storage of small parts;

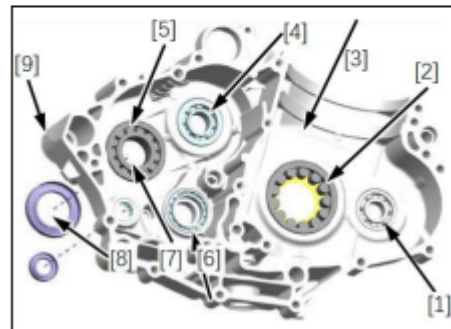
5. On the right case assembly, remove the dowel pin [1]; remove the screw [2] and take off the bearing pressure plates [3] and [4]; remove the screw [5] and take off the bearing pressure plates [6] and [7]; remove the screw [8].



6. Remove the right balance shaft bearing [1], the right crankshaft bearing [2], and the bearing retainer [3]. Then remove the right main shaft bearing [4], the right countershaft bearing [5], the right transmission drum bearing [6], the right shift shaft bearing [7], and the countershaft oil seal [8].



7. Remove the left balance shaft bearing [1], the left crankshaft bearing [2], and the bearing retainer [3]. Then remove the left main shaft bearing [4], the left countershaft bearing [5], the left transmission drum bearing [6], the left shift shaft bearing [7], the shift shaft oil seal [8], and the countershaft oil seal [9].



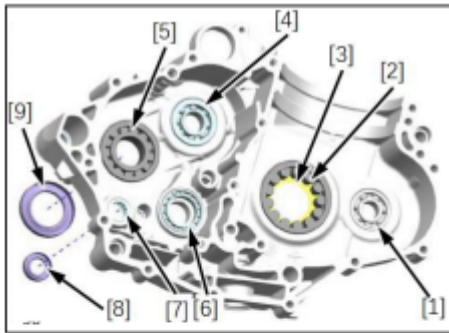
### Inspection

1. Check whether the each bearing has abnormal wear, scratches, etc.;
2. Check whether all the sealing surfaces of the case are scratched or damaged, especially for through-scratches. If any, treat it, such as grinding with an oilstone and then applying sealant;
3. Use a high-pressure air gun to check all the oil and water channels of the left and right case assemblies to ensure that all the passages are clear and free of foreign matters.

### Assembly

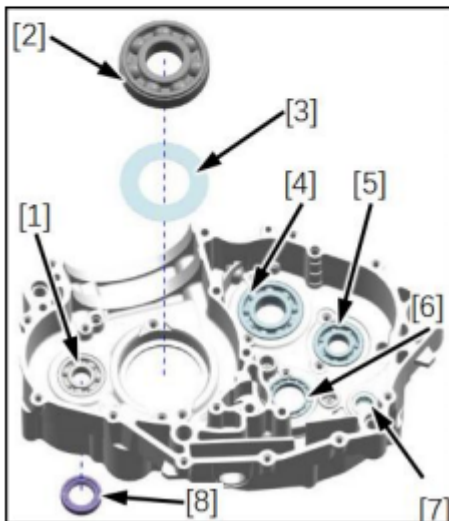
#### Notes

1. Before assembly, clean the left case assembly and the right case assembly, being careful not to damage the joint surfaces;
2. Do not apply too much case closing sealant, and there shall be no break points at any position when applying the sealant;
3. Check whether the oil and water passages of the case are blocked. Clean the passages if necessary;
4. During assembly, check the interference fit between the bearing bore of the case and the bearing, and replace the case assembly if necessary.



#### Assembly steps:

1. Take out the left case assembly and install the bearing retainer [3];  
Use a press to press-fit the left balance shaft bearing [1], left crankshaft bearing [2], left main shaft bearing [4], left counter shaft bearing [5], left transmission drum bearing [6], and left shift shaft bearing [7] onto the left case. Use tooling to assemble the shift shaft oil seal [8] and counter shaft oil seal [9] onto the left case.

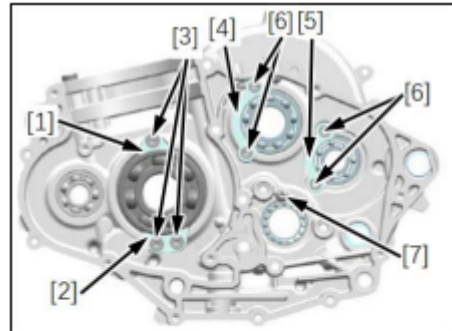


2. Remove the right case assembly and install the bearing retainer [3];  
Use a press to press-fit the right balance shaft bearing [1], right crankshaft bearing [2], right main shaft bearing [4], right counter shaft bearing [5], right transmission drum bearing [6], and right shift shaft bearing [7] onto the right case. Use tooling to assemble the shift shaft oil seal [8] onto the right case.

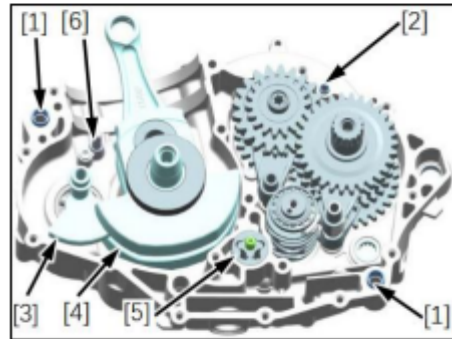
#### Notes

- Check whether the bearings are press-fitted in place and rotating smoothly, and whether the case is damaged.

3. Install crankshaft bearing pressure plates [1] and [2], then mount screw [3] according to tightening specifications; install bearing pressure plates [4] and [5], mount screw [6] according to tightening specifications, and assemble screw [7] according to tightening specifications.



4. Install dowel pin [1], dowel pin [2], balance shaft [3], crank connecting rod [4], transmission shift mechanism, oil pump [5], and fuel injection nozzle [6] on the right case assembly. (See page 99 for disassembly and assembly of the crank connecting rod and balance shaft, page 129 for the transmission shift mechanism, and page 135 for the oil pump and fuel injection);

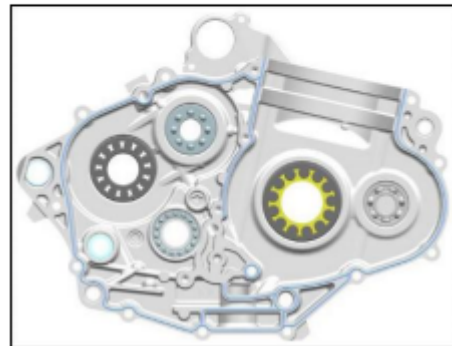


5. Evenly apply plane sealant on the joint surface of the lower case in the blue area shown in the right figure.

**Notes**

- The sealant should not have any break points and should not be applied excessively; do not apply sealant to the oil pump area.

6. After checking that all the case closing fittings before assembly are free of omissions and abnormalities, install the lower case onto the upper case, install the case closing bolts, and tighten them according to “Bolt tightening methods for key parts” on page 77.



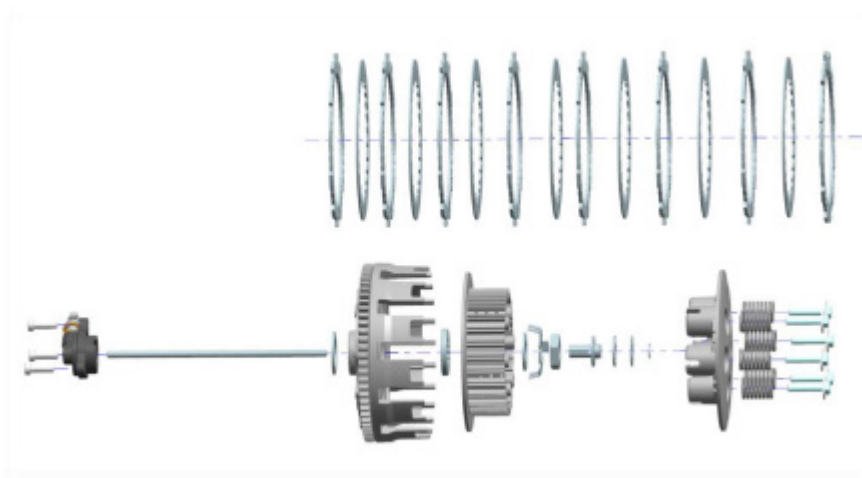


### Clutch Operating Mechanism

1. Component Arrangement .....	120
2. Maintenance Parameter Table.....	121
3. Disassembly.....	122
4. Inspection .....	125
5. Assembly .....	126

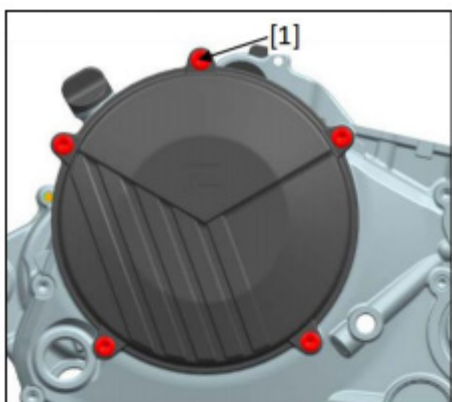
### Clutch operating mechanism

#### Component arrangement



### Clutch And Operating Mechanism Unit: mm

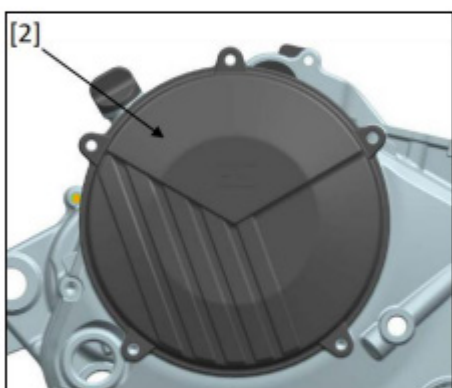
Item		Standard Value	Maintenance Limit Value
Clutch	Free length of spring		-
	Number of springs	6	-
	Thickness of friction plate	2.75 - 2.85	2.65
	Flatness of driven plate	0.08	0.1
	Number of friction plate I	2	-
	Number of friction plate II	6	-
	Number of steel plates	7	-
Clutch copper bushing main shaft outer diameter		$\Phi 24.977 - \Phi 24.987$	-



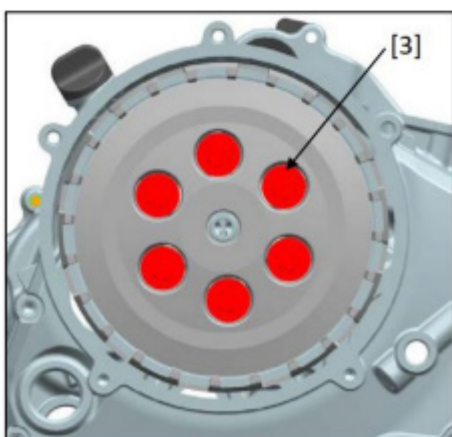
### Disassembly

Disassembly steps:

1. Unscrew all M6 bolts [1] in the figure in a diagonal manner;

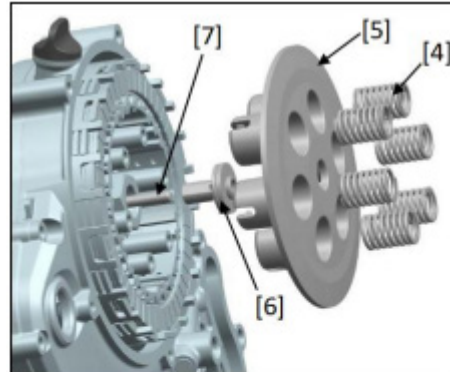


2. Remove the clutch cover [2], and do not to let the O-ring in the groove inside the clutch cover fall off during disassembly;

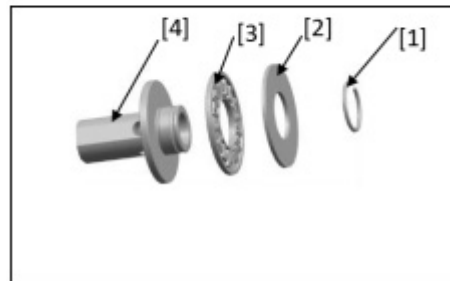


3. Loosen and unscrew the 6 bolts [3] in the figure alternately in 2-3 times;

4. Remove 6 compression springs [4], pressure plate [5], push rod component [6], and clutch push rod [7];



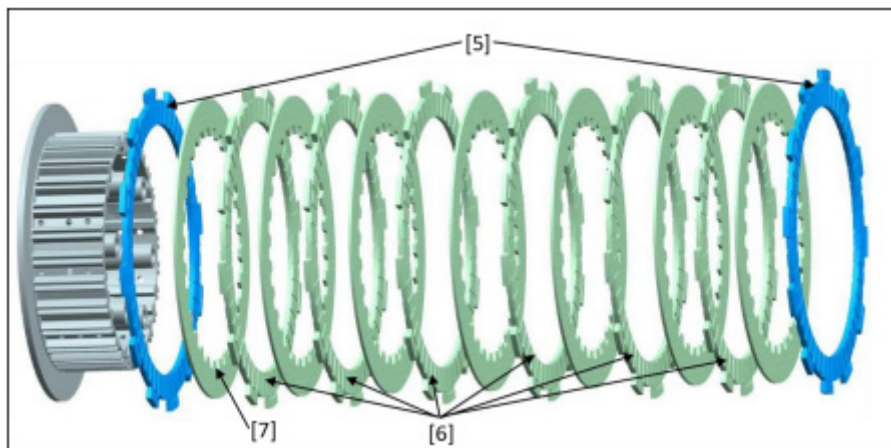
5. Disassemble the push rod components as shown in the figure: first remove the snap ring [1], take off the flat gasket [2], then remove the needle roller bearing [3], and finally leave the clutch push rod sleeve [4].

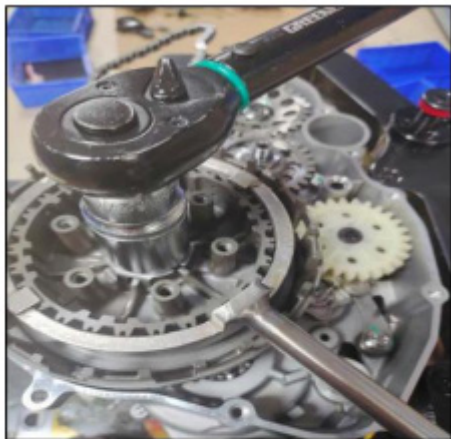


**Notes**

· After disassembling the push rod components, the snap ring should be replaced. If the component is in good condition, the push rod sleeve does not need to be disassembled.

9. Remove the clutch friction plateII [5], friction plate I [6], steel plate [7]. Pay attention to marking the order when disassembling the friction plates (The top and bottom friction plates **have color markings**). The assembly diagram of the clutch friction plates is as follows;

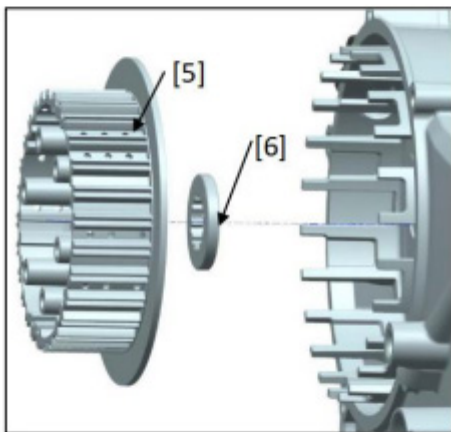




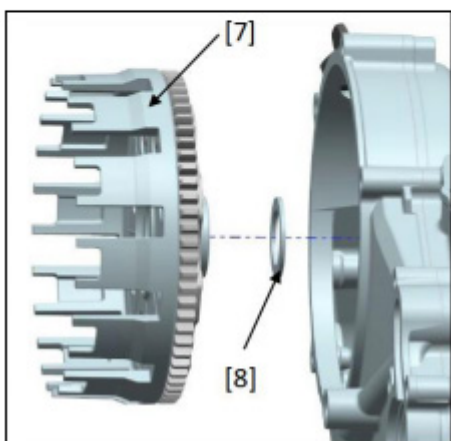
7. Use special tools to prevent the main shaft from rotating and remove it.  
Clutch hex nut, special-shaped washer, flat gasket.

**Notes**

· Before disassembling the hex nut, use a tool to flatten the flange of the special-shaped washer. **For details, refer to "Bolt tightening methods for key parts" on page 80;**

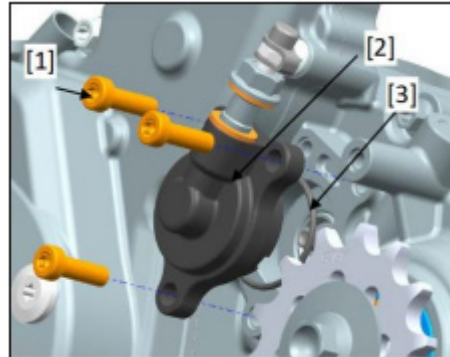


8. Remove the center bushing [5] and the spline washer [6] below it;



9. Remove the clutch housing assembly [7] and flat gasket [8];

10. Remove 3 bolts [1], detach the clutch hydraulic actuator [2], and then remove the O-ring [3]. The O-ring is usually embedded in the actuator groove during disassembly, so take care to prevent it from falling out during removal;



**Notes**

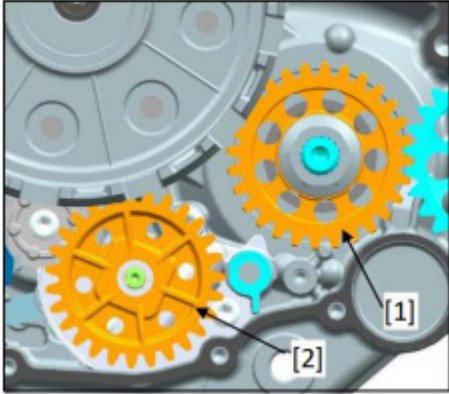
• If only the clutch friction plates and steel plates need to be replaced, it is sufficient to perform steps 1, 2, 3, 4, and 6 as listed above to complete the replacement.

**Inspection**

1. Check whether the following components have scratches, damage, abnormal wear, and deformation. Replace them if necessary: C

Clutch cover plate	Compression spring	Center bushing
Friction plate	Steel plate	Outer cover assembly (gear)
Flat gasket		

2. Measure each part according to the specification of the clutch and the shift mechanism. If any part exceeds the maintenance limit, please replace it;
3. Check whether the clutch hydraulic actuator, clutch push rod, and clutch push rod sleeve have abnormal wear. Replace them if necessary.

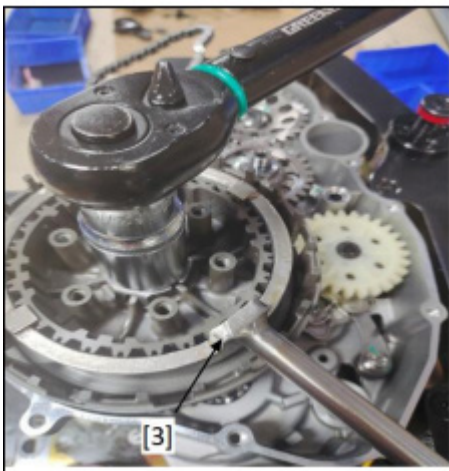


**Assembly**

**Notes**

1. Apply lubricating oil to all moving pairs. In particular, lubricating oil must also be applied between the clutch friction plates and the steel plates;
2. Before the assembly of the clutch housing, the main drive gear [1] and oil pump gear [2] should be assembled first;

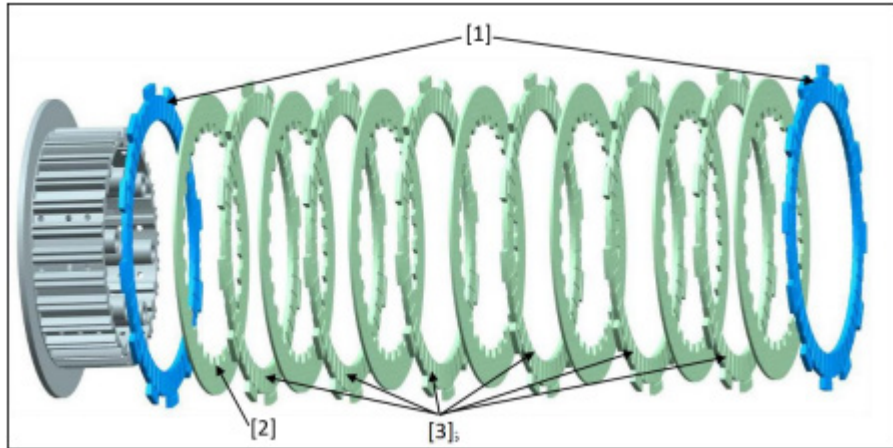
3. Replace the clutch compression springs and driven friction plates in groups;
4. For bolt tightening torque and method not otherwise specified, refer to "Bolt Torque Value" on page 74.
5. The overall assembly sequence of the clutch control mechanism is the reverse of the disassembly method. The assembly methods for special positions are as follows:



**Clutch center bushing assembly method:**

1. After installing the spline washer and the center bushing, place the flat gasket and special-shaped washer, use a special tool [3] to tighten the center bushing and clutch nut. For tightening torque and method, refer to "Bolt tightening methods for key parts" **on page 80**;

2. Install friction plate II [1], friction plate [2], and friction plate I [3] in the order shown in the figure below. Note that friction plate II should be used for both the bottom plate and top plate.

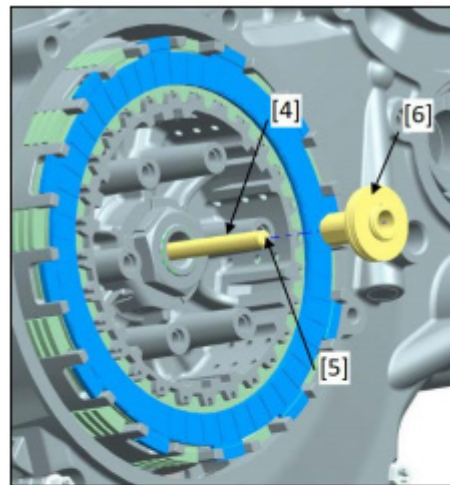


**Clutch push rod and rod sleeve assembly method and instructions:**

After installing the center bushing and friction plate, insert the clutch push rod [4] into the main shaft center bore, ensuring the push rod flat surface [5] faces the push rod sleeve [6]. Then, install the clutch push rod sleeve [6] into the main shaft center bore.

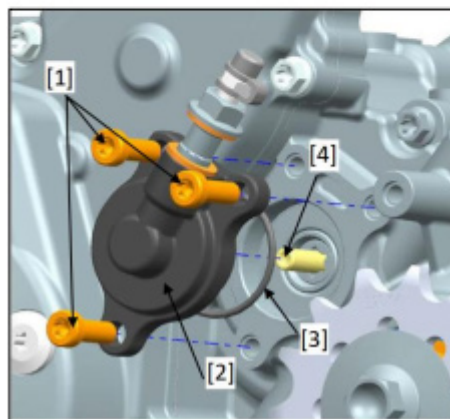
**Notes**

- If the hydraulic clutch actuator is not installed, the clutch push rod should not be installed at this time, and only the clutch push rod sleeve assembly needs to be installed.



**Hydraulic clutch actuator assembly method:**

Before installing the hydraulic clutch actuator [2], first embed the O-ring [3] into the groove of the actuator. Then insert the push rod into the central bore of the main shaft, ensuring the spherical surface [4] of the push rod faces the actuator. If the clutch assembly is not installed on the right side, do not install the push rod. Next, mount the hydraulic clutch actuator onto the case and tighten the three bolts [1] to the specified torque.





**Drive And Shifting Mechanism**

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5. Assembly .....	134



### Drive And Shifting Mechanism Unit: mm

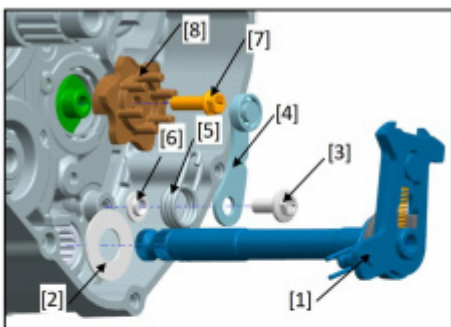
Item		Standard Value	Maintenance Limit Value
Main/counter shaft journal	Main shaft left journal	Φ16.98 - Φ16.99	
	Main shaft right journal	Φ24.977 - Φ24.987	
	Countershaft left journal	Φ16.98 - Φ16.99	
	Countershaft right journal	Φ24.977 - Φ24.987	
Shift fork and shift fork shaft	Shift fork shaft journal	Φ11.77 - Φ11.78	
	Shift fork inner diameter	Φ11.8 - Φ11.18	
	Thickness of shift fork tip	4.81 - 4.89	
	Shift fork pin bushing inner diameter	Φ6.014 - Φ6.02678	
	Shift fork pin bushing outer diameter	Φ7.991 - Φ8	
	Shift fork pin	Φ5.993 - Φ6	

**Disassembly**

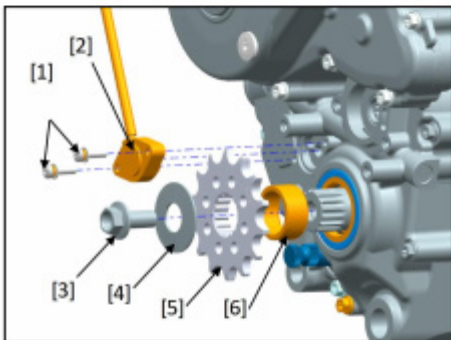
**Notes**

1. Place the disassembled gear, bushing, washer and snap ring in a special container or in a straight line; Do not expand the snap ring beyond its limit. When disassembling the snap ring, first expand it, and then use the gear behind the snap ring to push the snap ring out;
2. After the main/counter shaft assemblies are disassembled and reassembled, pay attention that the shaft diameter and needle roller must be re-lubricated;
3. During the disassembly process, pay attention to the disassembly and storage of small parts. Take photos for record if necessary.

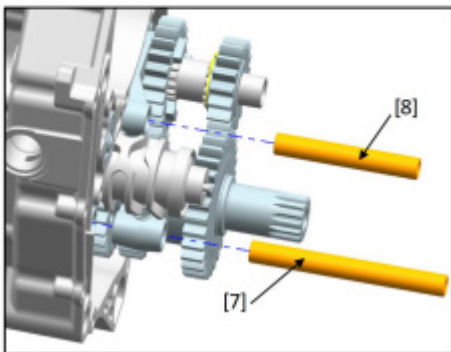
**Disassembly steps:**



1. After disassembling the right crankcase cover and removing the clutch with its shielding components, remove the shift shaft component [1] and flat gasket [2], then unscrew bolt [7], take out the star-shaped wheel [8], then remove bolt [3], and sequentially detach the lower limit plate [4], limit plate torsion spring [5] and stepped bushing [6];

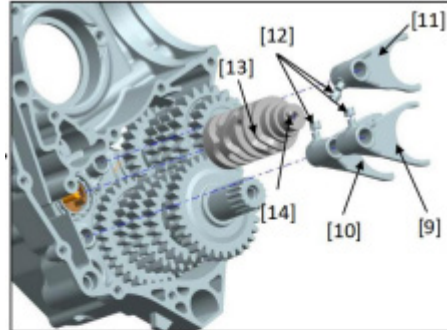


2. Remove the two screws [1] and the gear sensor [2], taking care to preserve the O-ring. Then, remove the bolt [3], disc washer [4], sprocket [5], and bushing [6] in sequence.

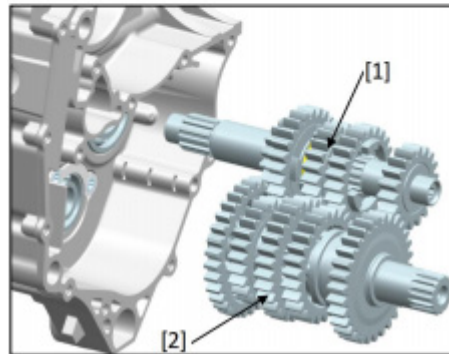


3. After disassembling the left case, remove the counter shift shaft [7] and the main shaft [8];

4. Move the shift fork away from the transmission drum groove. First remove the transmission drum [13], then remove the left shift fork [9] of the counter shaft, the right shift fork [10] of the counter shaft, and the main shaft shift fork [11] in sequence. During disassembly, the shift fork pin bushing [12] and the gear display contact [14] may easily fall off, so take care to keep them secure;



5. Remove the main shaft assembly [1] and the countershaft assembly [2];



### Inspection

1. Check the transmission gears and transmission bearings for scratches, damage, abnormal wear and deformation. Replace parts if necessary;
2. Measure the dimensions of each part of the main and countershaft assemblies, calculate the fit clearance according to the standards. Replace components if the fit clearance exceeds the standard limit value;
3. Check the torsion spring of the star wheel, limit plate and gear positioning plate for damage, abnormal wear and deformation. Replace parts if necessary;
4. Check whether the torsion springs of the shift shaft components and the shift plate are fatigued or worn; check whether the shift shaft is worn or bent; check whether the shift slide plate and the shift baffle are worn, damaged or deformed. Replace parts if necessary.

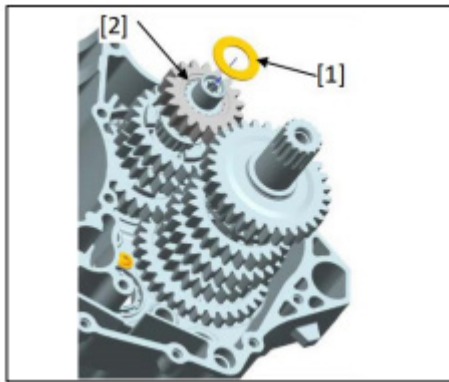
## Assembly

### Notes

1. Clean all parts with solvent before assembly and let them dry thoroughly. Apply engine oil to the gear tooth surface, rotating surface and bearing;
2. Apply engine oil to the outer surface of the gear spline sleeve, the rolling bearing rotation area and the gear transmission groove area;
3. The installation method of the main and countershaft assembly is the opposite to the disassembly method;
4. Apply engine oil to each gear and check whether it rotates smoothly;
5. Always push along the axial thrust surface of the gear when installing the thrust washer;
6. Apply thread fastener to all bolts of the transmission and shift mechanism. **Refer to page 74** for the bolt tightening torque and method.

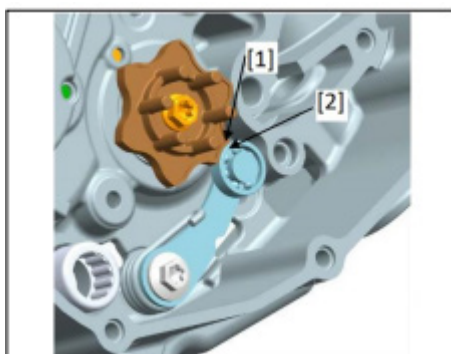
### Assembly steps:

**The installation sequence of the shift mechanism is the reverse of the disassembly sequence. The following are key precautions for the assembly process.**



1. Install the main shaft assembly and the counter shaft assembly as a complete set into the right case, paying special attention to ensure the flat gasket [1] at the left end of the main shaft is properly embedded in the main second gear groove [2] before assembly;

2. Assemble the main shaft shift fork, counter shaft right shift fork, counter shaft left shift fork, shift fork pin bushing, and transmission drum assembly (the shift fork pin head must be correctly engaged in the transmission drum groove) in sequence, followed by the main and auxiliary shift fork shafts. Coat engine oil to all moving pairs. The assembly process is the reverse of disassemble.



3. When assembling the star wheel, pay special attention to the alignment between the square slot and the transmission drum. Once properly installed, the surface of the star wheel [1] should be lower than the ball bearing surface of the limit plate [2].

4. After case closing and installing the shift mechanism, check if the shifting is normal and smooth, and whether the main/counter shafts have axial play. If there is no play or the shifting is abnormal, disassemble and check whether the main/counter shaft bearings and shafts are properly installed;

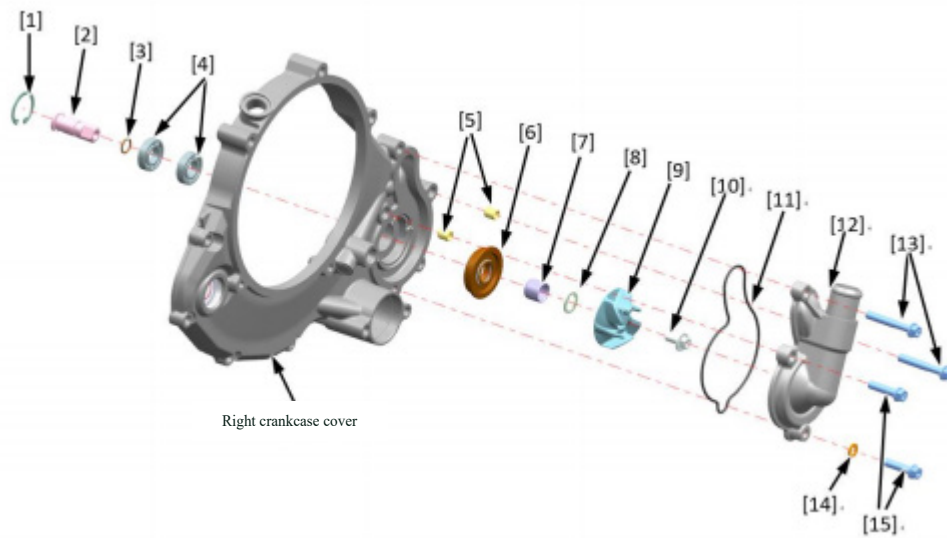
**Cooling And Lubrication Mechanism**

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**Cooling and lubrication mechanism**

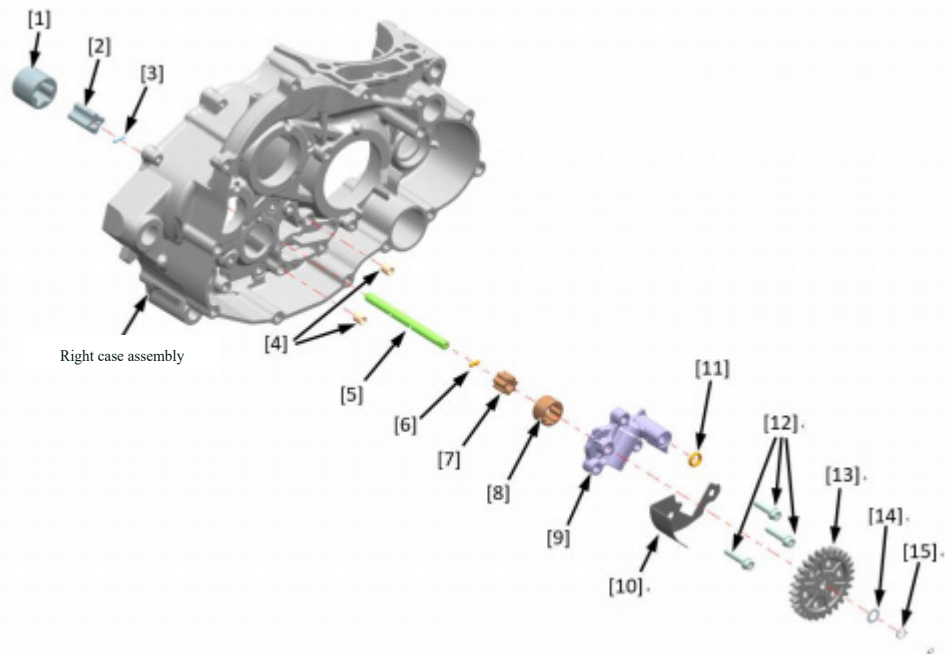
**Component arrangement**

Water Pump Section:



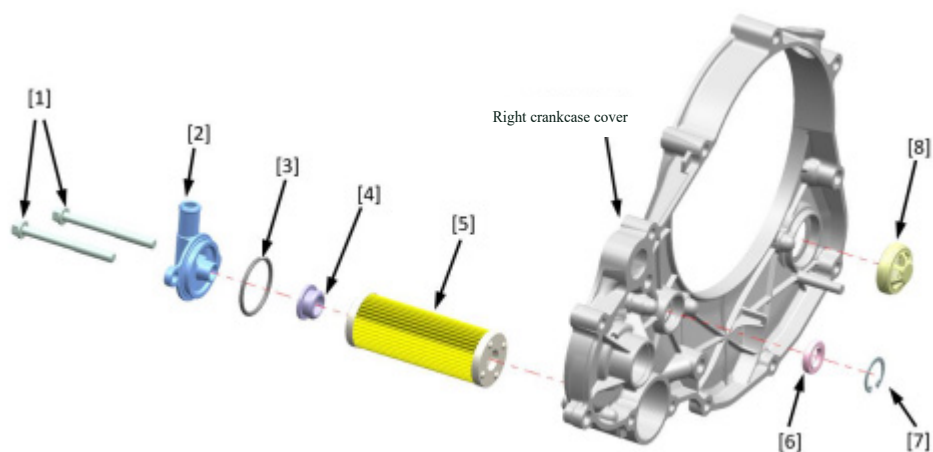
S/N	Installment position	Quantity	S/N	Installment position	Quantity
[1]	Snap ring (for $\phi 24$ bore)	1	[9]	Water pump impeller	1
[2]	Water pump shaft	1	[10]	Hexalobular flange bolt (M6×13)	1
[3]	O-ring ( $\phi 9 \times \phi 1.5$ )	1	[11]	Water pump cover seal ring	1
[4]	Ball bearing (6901-C3)	2	[12]	Water pump cover assembly	1
[5]	Dowel pin ( $\phi 8 \times 9$ )	2	[13]	Hexalobular flange bolt (M6×40)	2
[6]	Oil and water seal	1	[14]	Copper washer	1
[7]	Oil-water seal bushing	1	[15]	Hexalobular flange bolt (M6×25)	2
[8]	Flat gasket	1			

Water Pump Section:



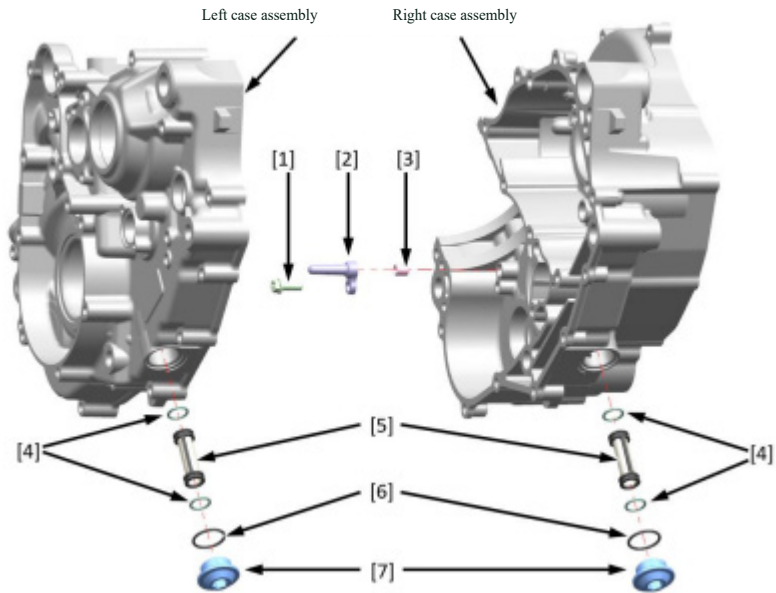
S/N	Installment position	Quantity	S/N	Installment position	Quantity
[1]	Outer rotor of inner pump	1	[9]	Oil pump cover assembly	1
[2]	Inner rotor of inner pump	1	[10]	Oil baffle	1
[3]	Cylindrical pin ( $\phi 2.5 \times 12$ )	1	[11]	D-ring	1
[4]	Dowel pin ( $\phi 8 \times 9$ )	2	[12]	Hexalobular flange bolt (M6 $\times$ 25)	3
[5]	Oil pump shaft	1	[13]	Oil pump sprocket	1
[6]	Cylindrical pin ( $\phi 3 \times 10$ )	1	[14]	Flat gasket ( $\phi 8.2 \times 0.5$ )	1
[7]	Inner rotor of outer pump	1	[15]	Snap ring (for $\phi 8$ shaft)	1
[8]	Outer rotor of outer pump	1			

Cooling and Lubrication System Accessories - Right Crankcase Cover Section:



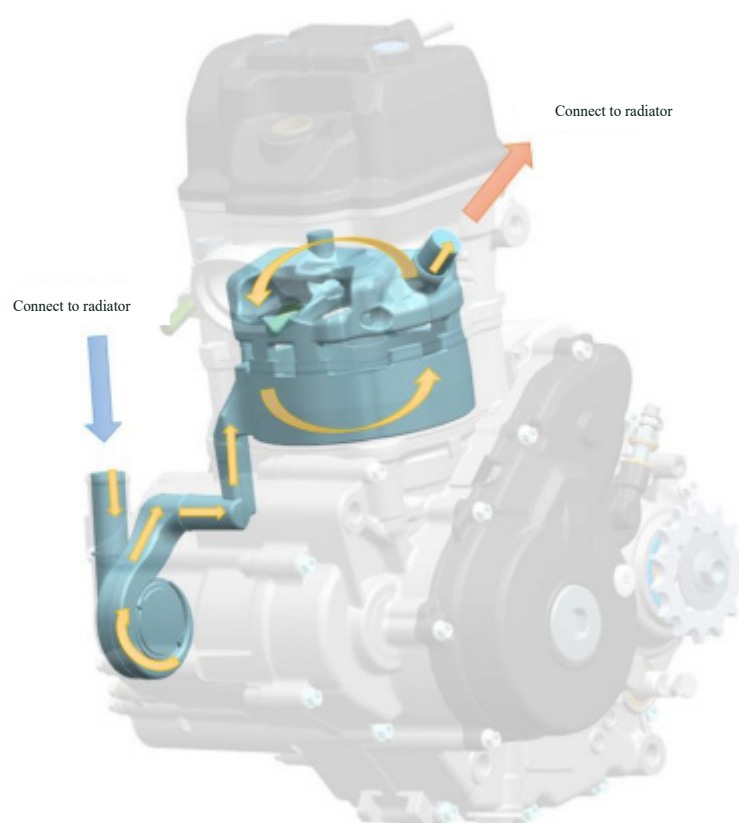
S/N	Installment position	Quantity	S/N	Installment position	Quantity
[1]	Hexalobular flange bolt (M6×60)	2	[5]	Oil fine filter	1
[2]	Oil fine filter cover	1	[6]	Crankshaft oil seal	1
[3]	O-ring (φ31×φ2.5)	1	[7]	Snap ring (for φ20 bore)	1
[4]	Rubber grommet	2	[8]	Oil level sight glass	1

Cooling and Lubrication System Accessories - Case Section:

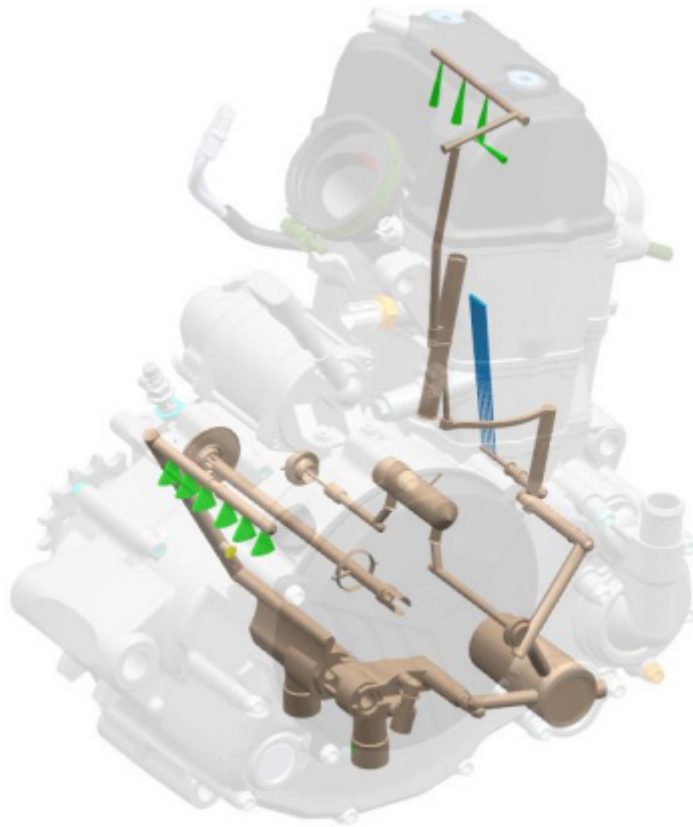


S/N	Installment position	Quantity	S/N	Installment position	Quantity
[1]	Hexalobular flange bolt (M6×16)	1	[5]	Oil full-flow filter	2
[2]	Fuel injector	1	[6]	O-ring (φ20×φ2)	2
[3]	Dowel pin (φ8×9)	1	[7]	Oil drain bolt	2
[4]	O-ring (φ11.8×φ1.8)	4			

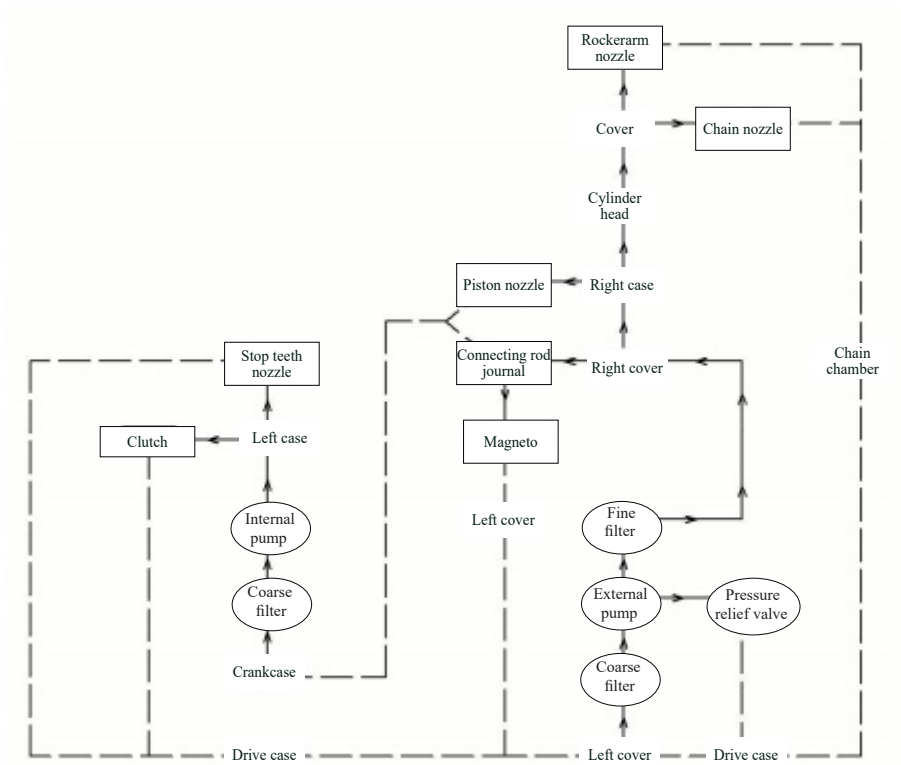
**Cooling Water Channel Diagram:**



**Lubricating Oil Passage Diagram:**

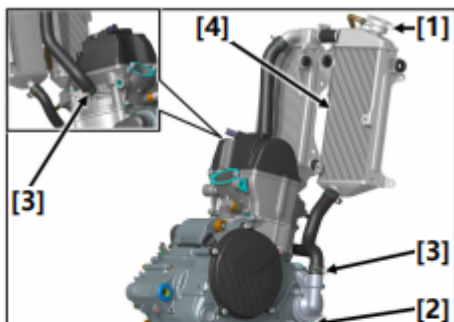


**Oil Passage Schematic:**



### Cooling and Lubrication Mechanism Unit: mm

Item		Standard Value	Ultimate State
Coolant capacity	Radiator (including all water channels)	1.2 L	-
	Auxiliary reservoir (above maximum level)	-	-
Radiator cap relief pressure		1.3bar	-
Oil capacity	Only after draining through the oil drain bolt	1.0 L	-
	After replacing the engine oil fine filter	1.1 L	-
	After complete disassembly and reassembly of the engine	1.3 Litre	
Recommended oil	Brand	Shell	
	Model	SAE10W-50	-
	Grade	API service grade: SL or above specification (do not use the oil listed at the circular API service label marks as "Energy-efficient")/ (JASO T903 standard); MA/GB 11121-2006	-
Engine oil filter type		Full flow paper filter element	
Oil pump rotor	Clearance between the outer rotor and case	0.14 - 0.22 mm	0.30mm
	Axial clearance between the inner and outer rotors and the fuel pump	0.05 - 0.12 mm	0.18mm



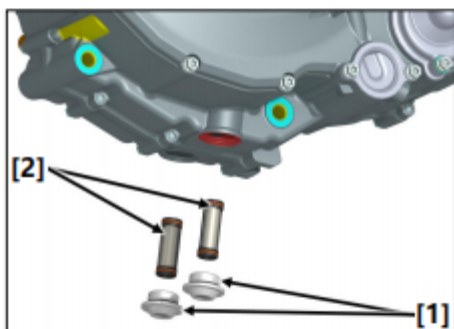
**Disassembly**

1. Drain the coolant and remove radiator-related accessories

- a. When the engine is completely cooled, open the radiator cap [1];
- b. Disassemble the drain bolt [2] on the water pump cover to drain the coolant.
- c. Use special tools to disassemble the clamps [3] on the cylinder head and water pump cover, then detach the radiator [4] and hose accessories.

**Notes**

- a. Strictly do not open the radiator cap when the engine is not cooled [1];
- b. Be cautious of liquid splashes;
- c. Coolant is toxic and corrosive, so take proper precautions during operation. If accidentally ingested or exposed to the eyes, seek medical attention immediately;
- d. The single-ear clamp [3] is a disposable product and cannot be reused;
- e. The removed radiator [4] should be properly protected to prevent damage to the fins.



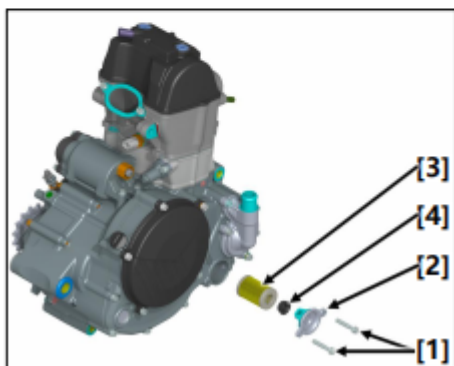
2. Drain engine oil and related accessories

- A. After the engine is completely cooled, disassemble the two oil drain bolts [1], take off the engine coarse filter [2], and drain the engine oil from the case.

**Notes**

- a. Be careful of liquid splashes;
- b. Be careful not to slip;
- c. Engine oil is corrosive; please take precautions when handling it.

Do not dispose of waste engine oil without authorization; it must be handed over to professionals or authorized facilities for disposal.



3. Remove the engine oil fine filter

- a. Disassemble the two locking bolts [1] on the engine oil fine filter cover;
  - b. Remove the fine filter cover [2] and the fine filter assembly [3];
- Remove the rubber grommet [4] from the engine oil fine filter assembly and set it aside for later use.

**Notes**

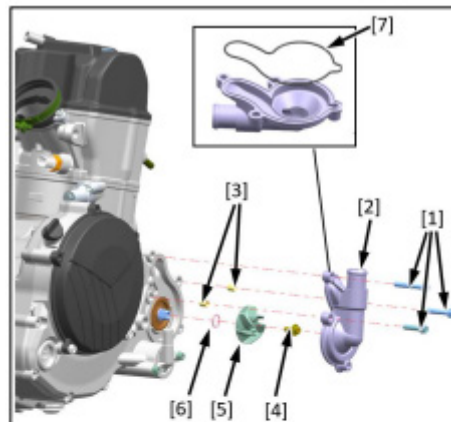
- a. The rubber grommet [4] on the engine oil fine filter is a non-consumable item; please store it properly after disassembly.
- b. Engine oil is corrosive; please take precautions when handling it.

4. Disassemble the water pump cover assembly and the water pump impeller

a. Remove the remaining fastening bolts [1] on the water pump cover, then disassemble the water pump cover assembly [2] and dowel pins [3];  
Disassemble the fastening bolt [4] on the water pump, and remove the water pump impeller [5] and flat gasket [6].

**Notes**

a. Please remove the water pump cover seal ring [7] after the water pump cover assembly has cooled to room temperature; otherwise, it may not be possible to reinstall it.

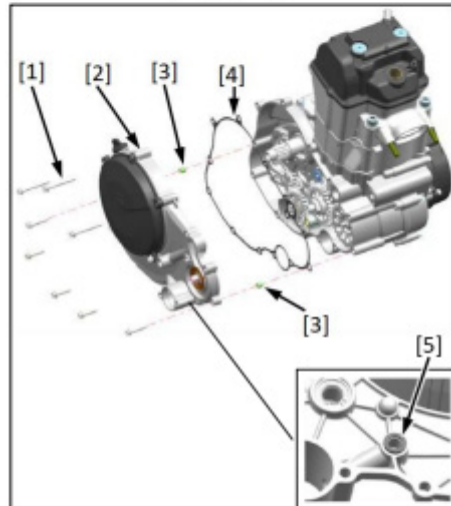


5. Disassemble the right crankcase cover assembly

a. Disassemble the bolts [1] on the outer periphery of the right crankcase cover diagonally;  
b. Remove the right crankcase cover assembly [2], the dowel pin [3], and the right crankcase cover gasket [4].

**Notes**

A. When disassembling the right crankcase cover, the O-ring [5] on the oil pump cover may adhere to the corresponding oil passage of the Right Cover. Take care to prevent it from falling.

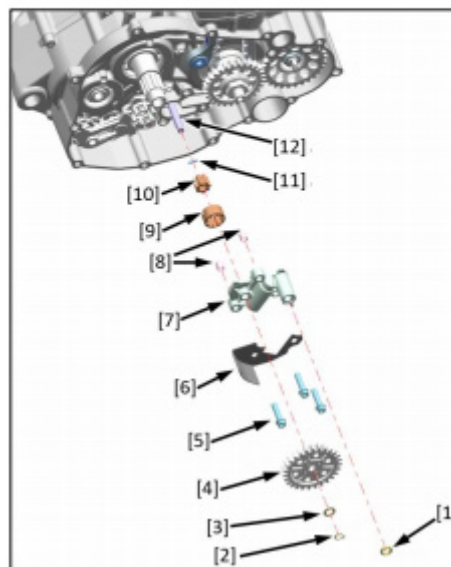


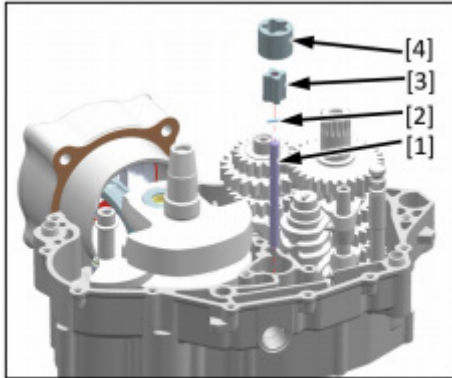
6. Disassemble the outer pump assembly of the oil pump

a. Disassemble the clutch (see "**Clutch Operation Mechanism**" on page 119 for details);  
b. Remove the O-ring [1];  
c. Use circlip pliers to disassemble the snap ring [2], then take out the flat gasket [3] and oil pump gear [4];  
d. Disassemble the oil pump mounting bolt [5], then take off the oil baffle plate [6], oil pump cover assembly [7], and dowel pins [8];  
e. Use a magnetic rod to remove the outer pump outer rotor [9], outer pump inner rotor [10], and cylindrical pin [11].

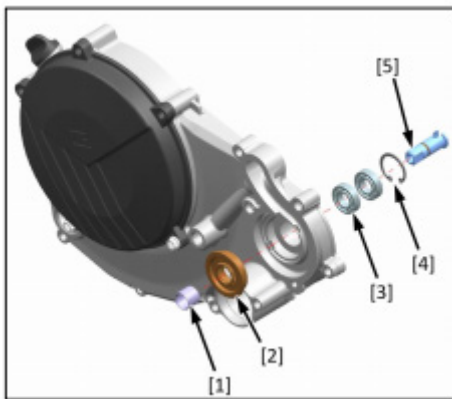
**Notes**

a. The O-ring may adhere to the corresponding oil passage on the right crankcase cover; take care to prevent it from falling.  
b. When removing the cylindrical pin [11], rotate the oil pump shaft [12] to the specific direction.





7. Disassemble the internal pump components of the oil pump  
 a. Remove the left case assembly (see "Case section" on page 111 for details);  
 b. Remove the outer rotor [4], rotor [3], cylindrical pin [2], and oil pump shaft [1] of the inner pump.



8. Remove the water pump section from the right crankcase cover  
 a. Remove the water pump shaft + O-ring [5] assembly and the oil seal bushing [1];  
 b. Use a slotted screwdriver to pry out the oil seal [2] from the process notch of the mounting bore.  
 c. Use circlip pliers to disassemble the snap ring [4];  
 d. To replace the bearing [3], use a special tool [6] to press it out from the oil seal mounting side.

**Notes**

A. When prying the oil seal [2], protect the water pump cover mounting surface to prevent damage.

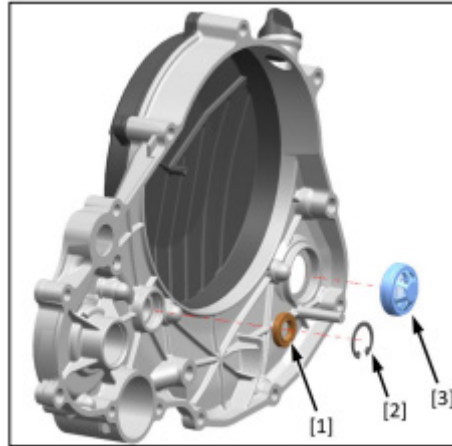


9. Remove the accessories from the right crankcase cover

- a. Use circlip pliers to disassemble the snap ring [2] on the crankshaft oil seal;
- b. Pry out the crankshaft oil seal [1] with a slotted screwdriver;
- c. Use a special tool to remove the oil level sight glass [3].

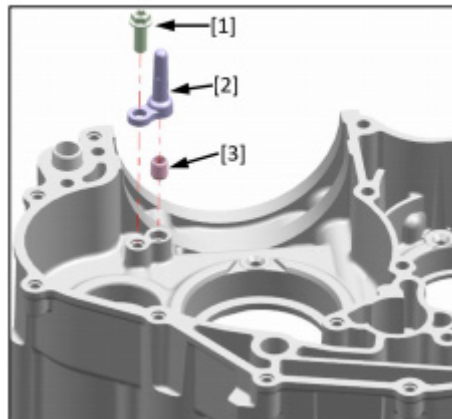
**Notes**

· The crankshaft oil seal and oil level sight glass should not be reused after disassembly.



10. Remove the fuel injection nozzle

- a. Remove the left case assembly (see "Case section" on page 111 for details);
- b. Disassemble the fuel injection nozzle mounting bolt, then take out the dowel pin and nozzle.



## Inspection

### Inspection Items During Disassembly

1. When disassembling the water pump cover, right crankcase cover, fine filter cover, and oil drain bolt, carefully check for any oil leaks, water leaks, or seepage around the mating surfaces. If any leakage is found, replace the corresponding gasket or seal ring;
2. After the right crankcase cover section is removed, check if the water pump shaft rotates smoothly, if there is any abnormal knocking, and if there is proper resistance. If it is stuck, has abnormal knocking, or lacks continuous resistance, the bearing or oil-water seal needs to be replaced;
3. When disassembling the water pump, check if the pump impeller has looseness. If it does, confirm whether the pump impeller and ball bearing have looseness. If the pump impeller is loose, fasten the impeller mounting bolts. If the ball bearing is loose, replace it with a new bearing or the right crankcase cover;
4. When disassembling the oil pump assembly, first rotate the oil pump shaft to check if it rotates smoothly. If there is any stuck or abnormal knocking, the oil pump rotor or shaft should be replaced.

### Parts Inspection Items

#### Pump Section

1. Check whether the seal ring on the water pump cover has a cut edge or is aging;
  2. Check whether the surface of the water pump impeller and the inner chamber of the water pump cover assembly are scratched;
  3. Check the outer surface of the oil-water seal bushing for any abnormal wear;
  4. Check whether the main and auxiliary lips of the oil-water seal are damaged and whether the outer circumferential surface has a cut edge.
  5. Check whether the ball bearing rotates smoothly without getting stuck;
  6. Check whether there are deep marks in the U-shaped groove of the water pump shaft, and whether there are cracks in the groove walls and limit steps.
  7. Check whether the snap ring is severely deformed or twisted;
- Please always replace the part if necessary.

#### Oil Pump Section

1. Check whether the snap ring is severely deformed or twisted;
  2. Check whether the gear teeth of the oil pump are severely worn or have deep marks;
  3. Check whether the contact surface between the oil pump cover assembly and the rotor has abnormal wear;
  4. Check whether the meshing surfaces of the rotors are visibly damaged and whether the cross section shows abnormal wear;
  5. Check whether the oil pump shaft is bend or has any deformation;
  6. Measure the oil pump clearance according to the lubrication system specifications. If any measured value exceeds the specified maintenance limit value, please replace the corresponding parts and components;
- Please always replace the part if necessary.

#### Cooling and Lubrication System Related Accessories

1. Check whether the inner hexagon of the oil drain bolt has been severely squeezed and deformed;
  2. Check whether the oil coarse filter is damage or severely deformed;
  3. Check whether there is any crack around the mounting bore of the fine filter cover bolt.
  4. Check whether the O-ring on the fine filter cover is nicked or cut.
  5. Check whether there are excessive impurities in the wrinkles of the fine filter;
  6. Check for any leaks at the mounting point of the oil level sight glass on the right crankcase cover.
  7. Check whether the crankshaft oil seal lip has any abnormal wear;
  8. Check whether the crankshaft oil seal and snap ring have looseness;
  9. Check whether the fuel injector is damaged and whether the oil injection hole is blocked;
- Please always replace the part if necessary.

**Assembly**

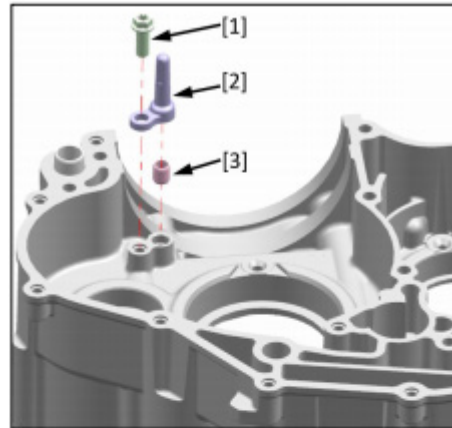
**Notes**

• The fastening torque for the cooling lubrication system bolt is

M5 bolt: (5–6) N·m,  
M6 bolt: (8–10) N·m.

1. Install the fuel injection nozzle

a. Install the dowel pin [3] on the right case assembly, and secure the fuel injection nozzle [2] to the right case assembly using an M6×16 hexalobular flange bolt [1];



**Notes**

• The bolt head should be coated with a proper amount of thread locker;

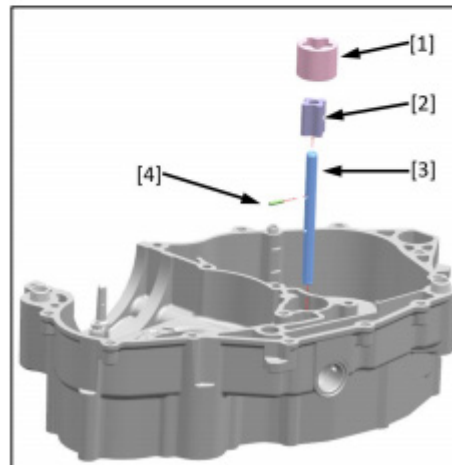
• Before assembly, ensure that the oil bore on the fuel injection nozzle is not blocked.

2. Install the oil pump internal components

a. Insert the cylindrical pin [4] into the pin hole on the chamfered end of the oil pump shaft [3], then fit the inner pump rotor [2] onto the oil pump shaft, ensuring the dowel pin is embedded with its mounting groove;

b. Install the oil pump shaft [3] with the dowel pin [4] and inner rotor [2] into the oil pump shaft mounting bore of the right case assembly;

c. Install the inner pump outer rotor [1] into the bore of the right case assembly, then rotating the oil pump shaft to meshing it with the rotor.

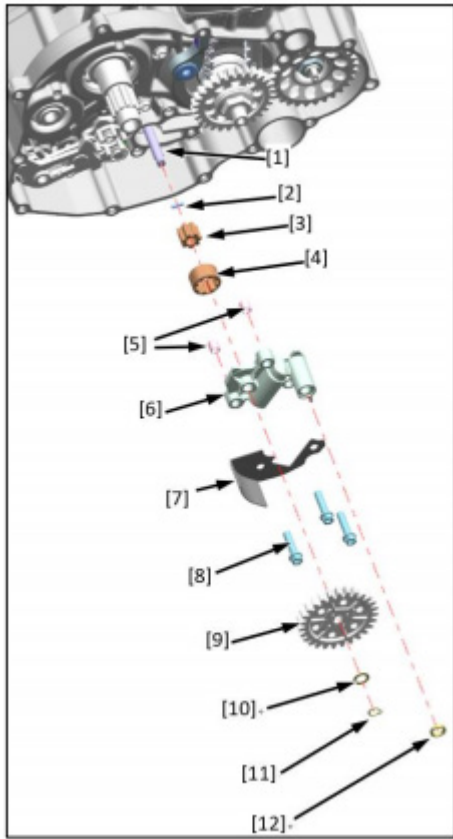


**Notes**

• Coat a proper amount of lubricating oil to the outer peripheral surface of the oil pump shaft before assembly.

• The inner rotor pin groove side faces the right case assembly;

• After installation, apply a proper amount of lubricating oil into the cavity between the inner and outer rotors. Rotate the oil pump shaft to ensure smooth operation without any stuck.



3. Install the outer pump assembly of the oil pump
  - a. Rotate the oil pump shaft [1] to check if it turns smoothly;
  - b. Use tweezers to insert the cylindrical pin [2] into the pin hole of the oil pump shaft;
  - c. Install the outer pump inner rotor [3] onto the oil pump shaft, ensuring the cylindrical pin is properly embedded in its mounting groove;
  - d. Install the outer pump outer rotor [4] into the bore of the right case, then rotating the oil pump shaft to meshing it with the rotor;
  - e. Insert the dowel pin [5] into the corresponding mounting bore on the right case assembly, then install the oil pump cover assembly [6] and the oil baffle plate [7] in sequence, and tighten the three M6×25 hexalobular flange bolts [8];
  - f. Mount the oil pump gear [9], flat gasket [10], and snap ring [11] onto the oil pump shaft;
  - g. Install the O-ring [12] on the counterbore of the oil outlet of the oil pump cover assembly.

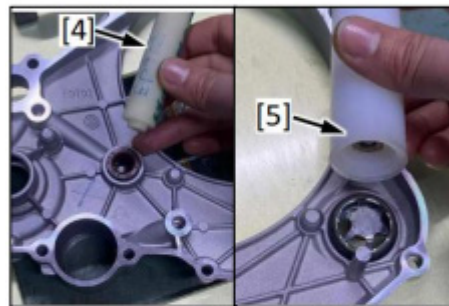
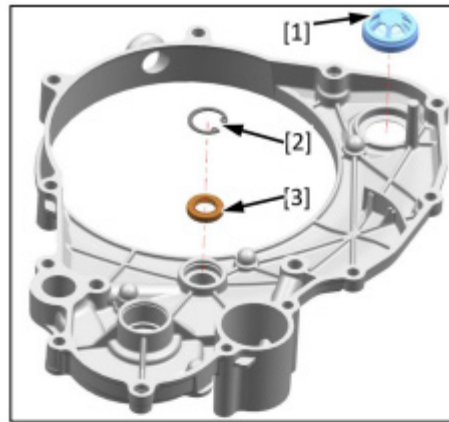
**Notes**

- The inner rotor pin groove side faces the right case assembly;
- After the outer rotor is installed, drip a proper amount of lubricating oil into the cavity between the inner and outer rotors.
- After assembly is completed, rotate the oil pump shaft, ensuring it has a continuous damping feel and does not get stuck during rotating.
- When installing the snap ring, ensure that it is fully snapped into the mounting groove.

4. Accessory assembly on the right crankcase cover
- Press-fit the oil level sight glass [1] using the dedicated press head [5];
  - Press-fit the crankshaft oil seal [3] using the dedicated press head [4];
  - Use circlip pliers to install the snap ring [2] into the groove of the crankshaft oil seal bore.

**Notes**

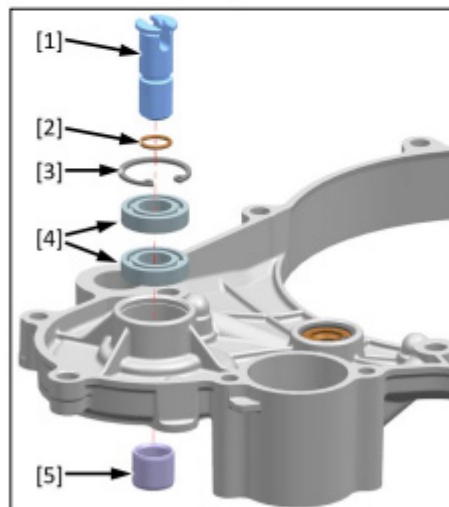
- After press-fitting, the rubber end face of the oil level sight glass is in full contact with the limit step;
- When pressing the crankshaft oil seal, the ON end should face the bore.
- The snap ring must be securely snapped into place; otherwise, it should be replaced with a new one.

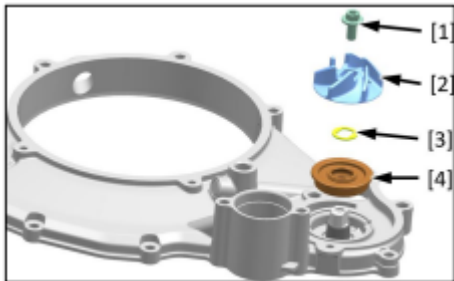


5. Install the water pump component on the right crankcase cover - Step 1
- Press-fit two ball bearings [4] onto the right crankcase cover using a special press head;
  - Use circlip pliers to install the snap ring [3] into the groove of the ball bearing bore.
  - Fit the O-ring [2] into the installation groove of the water pump shaft [1], then insert the water pump shaft section [1] into the ball bearing and push firmly until the shaft shoulder contacts the end face of the bearing inner ring.
  - Install the oil seal bushing [5] onto the water pump shaft and press firmly to bring it into contact with the ball bearing.

**Notes**

- Coat a proper amount of grease evenly to the outer peripheral surface of the O-ring [6].
- The snap ring must be securely snapped into place; otherwise, replace it with a new one [7].

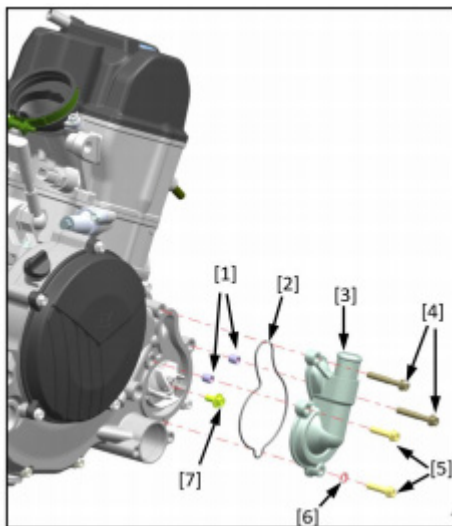




6. Install the water pump component on the right crankcase cover - Step 2  
 a. Slide the sleeve [5] onto the water pump shaft, then press-fit the oil seal [4] using the dedicated head [6].  
 b. Remove the lip-protecting sleeve [5], then sequentially install the flat gasket [3], water pump impeller [2], and M6×13 hexalobular flange bolt [1] onto the water pump shaft, and screw in the bolt.

**Notes**

- Apply a proper amount of lubricating oil to the outer peripheral surface of the oil seal during press fitting. If the outer peripheral surface is damaged, replace it with a new oil seal.
- M6 × 13 bolt – do not apply thread locker at this step.



7. Install the water pump cover assembly  
 a. Install the right crankcase cover onto the case assembly (see "Case section" on page 111 for details);  
 b. Install the M6×13 hexalobular hexagon flange bolt [7], apply a proper amount of thread locker to the bolt head, and fasten it onto the water pump shaft;  
 c. Install the water pump cover seal ring [2] onto the water pump cover assembly;  
 d. Install the 2 dowel pins [1] on the right crankcase cover, assemble the water pump cover [3], and then tighten the 4 mounting bolts (2 M6×40 bolts [4] and 2 M6×25 bolts [5]).

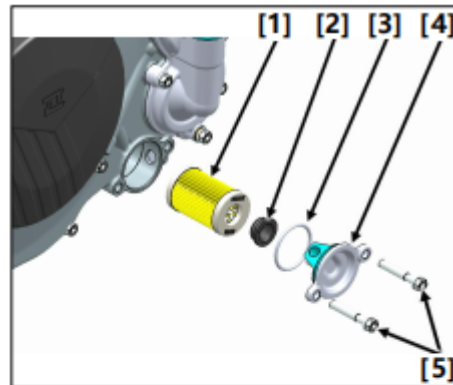
**Notes**

- The seal ring of the water pump cover must be fully engaged into the locking point of the installation groove on the pump cover.
- The copper washer [6] should be installed at the drain bolt [6].

8. Install the fine filter assembly and fine filter cover
- Fit the rubber grommet [2] onto the fine filter [1];
  - Fit the O-ring [3] into the mounting groove of the fine filter cover [4], then install the fine filter with the rubber grommet onto the fine filter cover;
  - Install the fine filter cover together with the fine filter onto the right cover, and tighten the two M6 × 60 hexalobular flange bolts [5].

**Notes**

- The engine oil fine filter must not be installed backwards.
- Coat a proper amount of lubricating oil to the outer circumference of the O-ring on the fine filter cover.

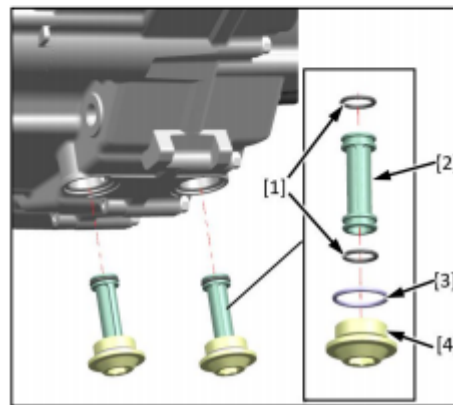


9. Install the engine oil fine filter assembly and oil drain bolt

- Install the O-ring ( $\phi 11.8 \times \phi 1.8$ ) [1] into the mounting grooves at both ends of the coarse filter [2];
- Install the O-ring ( $\phi 20 \times \phi 2$ ) [3] into the mounting groove of the oil drain bolt [4];
- Install the coarse filter assembly with the O-ring onto the counterbore of the oil drain bolt;
- Install the oil drain bolt together with the coarse filter assembly into the mounting bores below the left and right cases, and fasten them securely.

**Notes**

- Apply a proper amount of lubrication to the outer peripheral surface of the O-ring on the fine filter;
- The fasten torque for the oil drain bolt is (18–20) N·m.



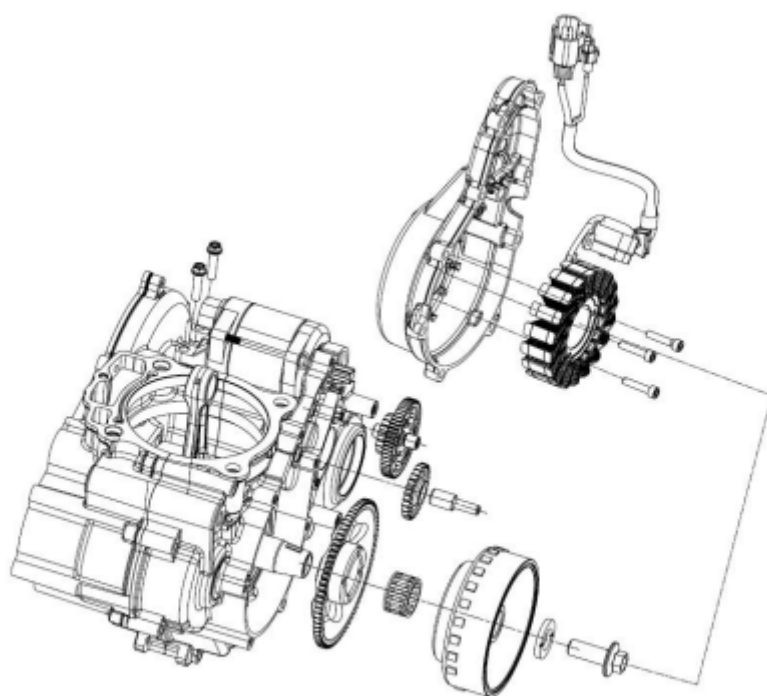


**Starting System**

1. Component Arrangement .....	156
2. Disassembly.....	157
3. Inspection .....	159
4. Assembly.....	159

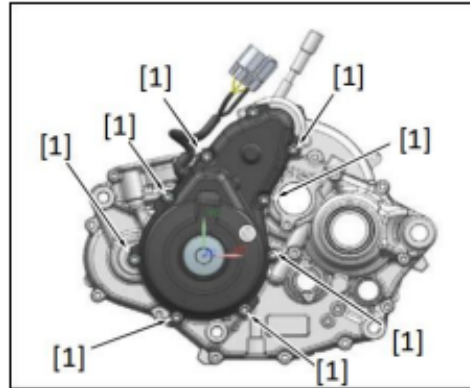
## Starting system

### Component arrangement

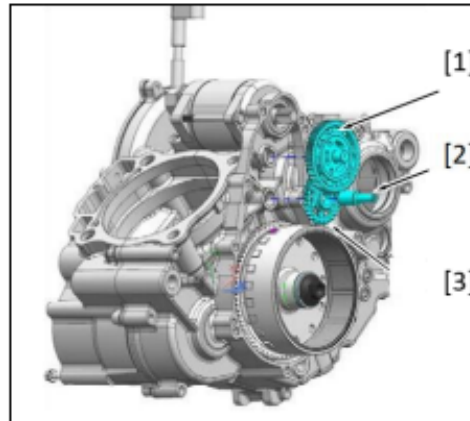


**Disassembly**

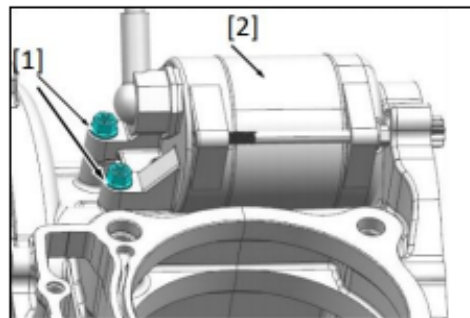
1. Remove the 9 bolts [1] shown in the figure in a diagonal manner. Then remove the left crankcase cover, the dowel pin and the left crankcase cover gasket;



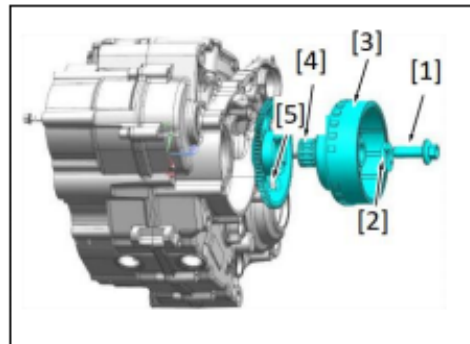
2. Disassemble the duplex gear [1], idler wheel shaft [2], and idler gear [3];

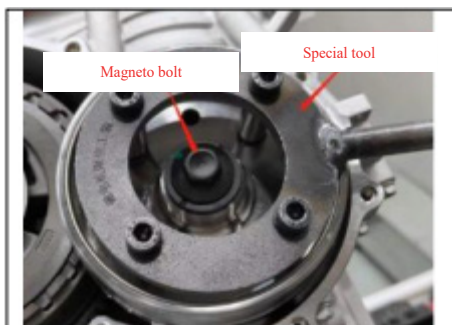


3. Remove 2 fastening bolts [1] of the starting motor and take off the starting motor [2];



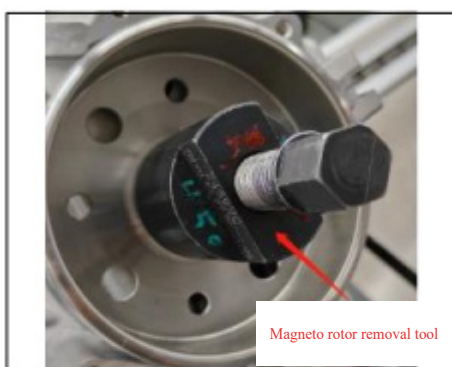
4. Unscrew the magneto bolt [1], then disassemble the flat gasket [2], magneto rotor [3], electric starter gear [5], and bearing [4].



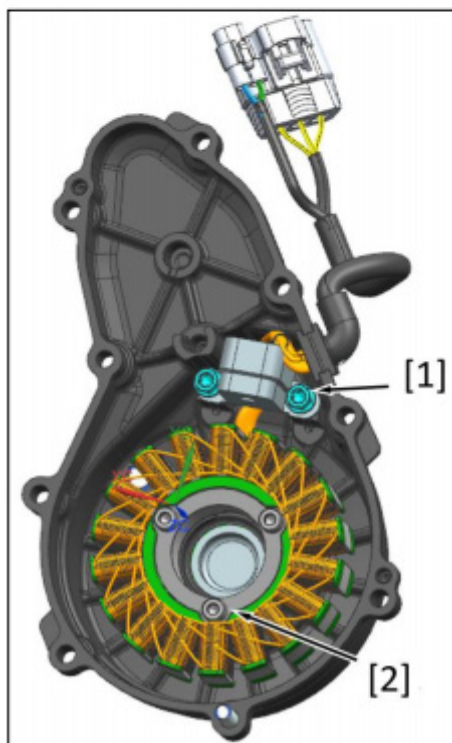


**Notes**

- Fix the crankshaft with a special tool and unscrew the magneto bolt [1]. Pay attention to keeping the special tool flat during disassembly. Electric or pneumatic tools can also be used for disassembly;
- Use the magneto disassembly tool to disassemble the magneto;



5. Remove 2 trigger fastening bolts [1], disassemble the trigger, remove 3 magneto stator fastening bolts [2], and then disassemble the magneto stator.



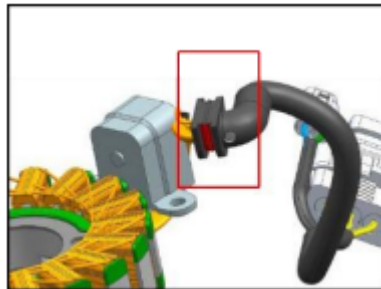
### Inspection

1. Disassemble and check whether the double gears and the duplex gear shaft are scratched, damaged, abnormally worn or deformed. Replace if necessary;
2. Check whether the woodruff key for positioning the magneto rotor is abnormally damaged. Replace it if necessary;
3. Check whether the conical surfaces of the magneto rotor and the crankshaft are abnormally worn or damaged. Replace them if necessary;
4. After removing the starting clutch, check whether the disc teeth rotate smoothly counterclockwise and do not rotate clockwise. If there are any abnormalities, replace the entire starting clutch assembly;
5. Check whether the large gear, the raceway of the starting clutch housing, and the balls of the starting clutch are scratched, damaged, abnormally worn or deformed. Replace them if necessary.

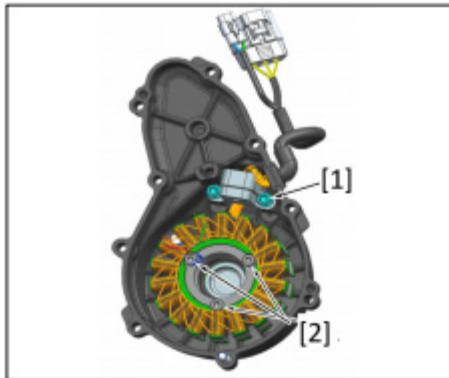
### Assembly

#### Notes

- Before assembly, check whether the O-ring of the starting motor is abnormally damaged such as having cut edges. Replace the O-ring of the starting motor if necessary;
- When assembling the trigger and rubber grommet, apply glue around the rubber grommet in the red area shown in the figure;



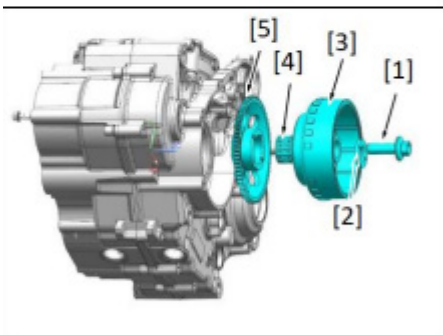
- Refer "Bolt tightening methods for key parts" **on page 81** for the installation method and tightening torque of the magneto bolts and gaskets. Before installing the magneto rotor, thoroughly clean the oil stains and debris on the conical surfaces of the magneto and the crankshaft that fit together;
- Bolt fastening methods and torque values not otherwise specified shall be carried out in accordance with "Bolt Torque Value" **on page 74**;
- The left cover bolts shall be tightened in a diagonal manner;



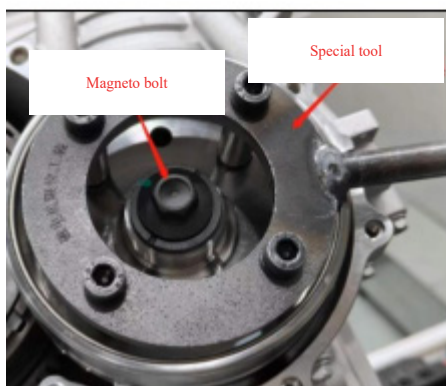
1. Align the positioning grooves of the magneto stator with those on the right cover. Then screw in three stator fastening bolts for more than 3 threads each. Subsequently, tighten the stator fastening bolts in 2 to 3 times and then tighten the trigger screw [1];



2. Apply an appropriate amount of plane sealant to the rubber grommet of the magneto wiring harness in the red area shown in the figure;



3. Install the parts in the order shown in the figure: electric starter gear [5], bearing [4], magneto rotor [3], flat gasket [2], magneto bolt [1], and tighten to the specified torque.



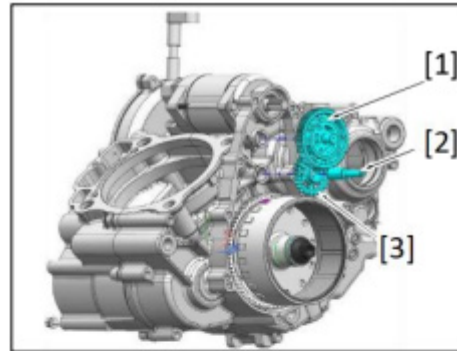
**Notes**

- The bearing [4] and the magneto rotor [3] need to be coated with engine oil;
- Coat both sides of the flat gasket [2] with engine oil;
- The magneto cone surface must be cleaned thoroughly and must not be stained with engine oil;
- Coat thread locker to magneto bolt [1];
- When tightening the magneto bolts, the crankshaft must be secured. The tooling is shown in the left figure.

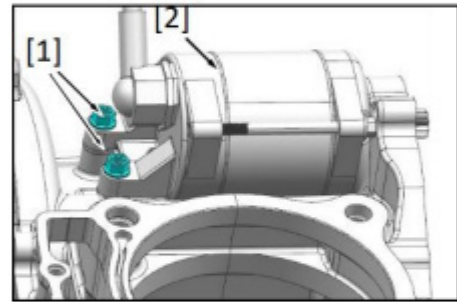
4. Assemble the duplex gear [1], wheel shaft [2], and idler [3] in sequence as shown in the figure.

**Notes**

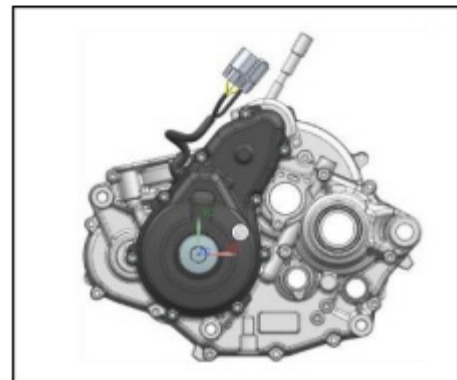
· The shaft end of the parts needs to be coated with engine oil.



5. Assemble the starting motor [2] and tighten the mounting bolt [1].



6. Assemble the left cover and tighten the bolt.





**Electronic Fuel Injection (Efi) System**

Section 1 Maintenance Instructions ..... 164

Section 2 Position Of Components ..... 165

Section 3 Introduction Of System Troubleshooting..... 166

Section 4 Maintenance And Troubleshooting Process..... 170

Section 5 Troubleshoot According To Fault Codes ..... 170

Section 6 Troubleshoot According To Fault Phenomena..... 173

Section 7 Attachment/Fault Code List ..... 176

## Maintenance Instructions

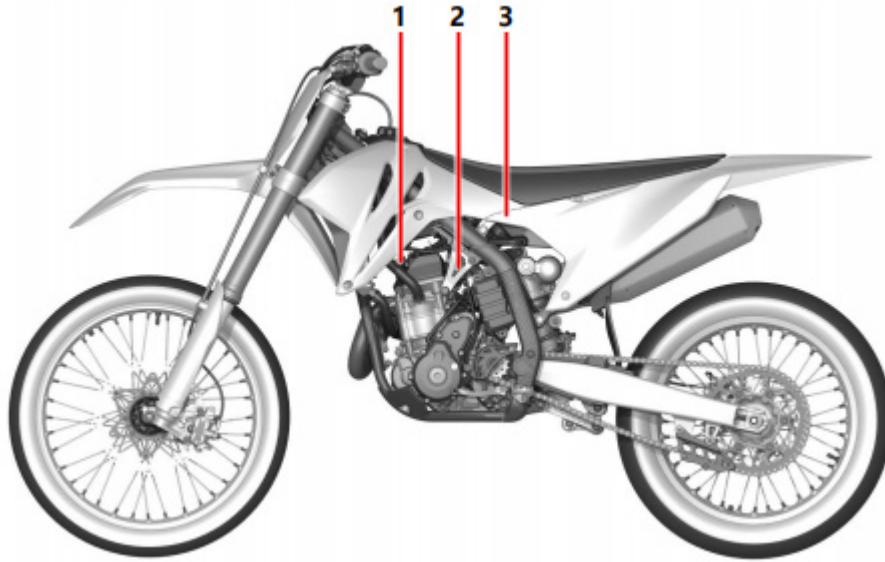
### Overview:

- This section introduces UMC's MSE6.0 EFI system equipped with self-diagnostic capabilities. For troubleshooting, please check and rectify faults according to the diagnostic codes and symptoms.
- EFI system failures are usually caused by connector disconnection or connector corrosion. Please check the connector before troubleshooting.

### Precautions:

- During maintenance, it is forbidden to disassemble the parts of EFI system.
- During maintenance, extreme care shall be exercised on work with electronic components (ECUs, sensors, etc.) to prevent missing. Furthermore, do not touch the pins of electrical components at will to avoid damage caused by electrostatic breakdown.
- Do not remove the connectors of any components of the EFI system from their installation positions without authorization, to avoid accidental damage or foreign matters such as water and oil entering the connectors, which may affect the normal operation of the EFI system.
- When disconnecting or connecting the connector, always ensure the vehicle is in a stalled state to prevent damage to electrical components.
- Since idle speed adjustment is completely completed by EFI system, manual adjustment is not needed. The limit screw of the throttle body has been adjusted at the factory, and the user is not allowed to change its initial position at will.
- This vehicle uses **24-2 teeth** trigger signal to identify the speed.

**Position of Components**



S/N	Component Name
1	Ignition coil and spark plug
2	Throttle valve body assembly and three-in-one sensor
3	ECU control unit

### Introduction of System Troubleshooting

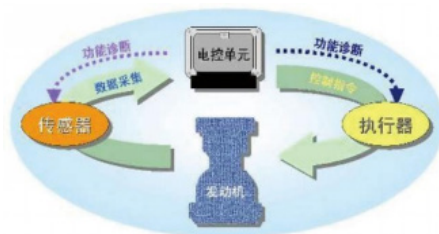
On-board diagnosis system (OBD system) refers to the diagnosis system integrated in the engine control system, which can monitor the components that affect exhaust emissions and the main functional states of the engine. It has the function of identifying and storing EFI faults. When repairing vehicles with OBD system, maintenance personnel can quickly and accurately locate the faulty parts through diagnostic instrument, which greatly improves the efficiency and quality of maintenance.

OBD technology involves many brand-new concepts. First of all, some basic knowledge related to OBD technology is introduced in order to facilitate understanding.

#### Fault information record

The ECU constantly monitors sensors, actuators, related circuits, fault indicators, battery voltages, etc., and even the ECU itself, and detects the reliability of sensor output signals, actuator drive signals and internal signals (such as closed-loop control, coolant temperature, idle speed control, etc.). Once any fault is identified, or any signal value exceeds the normal range, the electronic control unit immediately records the fault information in the fault memory of RAM. Fault information is stored in the form of fault code and displayed in the order of fault occurrence.

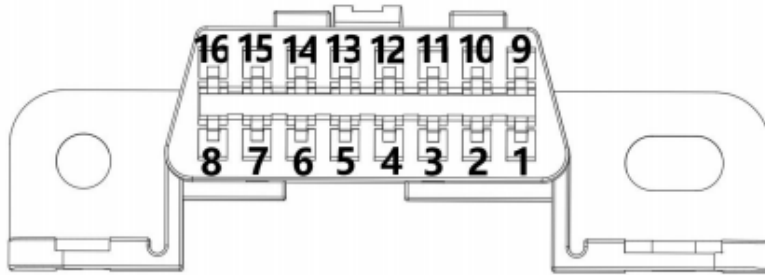
Faults can be divided into "current faults" and "historical faults" according to their occurrence time.



Schematic of Fault Diagnosis of EFI System

**Introduction of OBD Interface**

For keyless power-on, connecting the diagnostic instrument to read faults requires shorting pins L4 and F3 or starting the vehicle. The pins for connecting the engine management system (EMS) are pins 4, 7 and 16 on the OBD diagnostic interface. Pin 4 of the standard diagnostic connector is connected to the battery negative terminal. Pins 7 is connected to pins E3 of ECU, that is, the "K" line of ECU. Pin 16 is connected to the battery positive terminal.



**ISO9141-2 Standard Diagnostic Interface Pin Sequence Number**

The diagnostic instrument can communicate with the ECU through the "K" line and can read the following information:

• **Version information display**

ECU hardware number, ECU software number.

• **Fault code display**

Intake pressure sensor, intake air temperature sensor, engine water temperature sensor, throttle position sensor, fuel injector, fuel pump relay, system voltage, ECU, fault lamp, and other fault information.

• **Engine parameter display**

Battery voltage, engine speed, target idle speed, vehicle speed, engine temperature, engine temperature sensor signal voltage, intake air temperature, intake air temperature sensor signal voltage, intake pressure, intake volume, throttle position sensor signal voltage, throttle opening, relative throttle position, charging time, fuel injection pulse width, ignition advance angle, engine relative load, ambient pressure, altitude correction factor, fuel injection phase, and other parameters.

List of Maintenance Tools



Tool name:

**Diagnostic instrument for EFI system:**  
(XCM-PT100X/PT300X)

Function:

This diagnostic instrument can perform data brushing, read fault and data flow, etc.

The diagnostic instrument kit includes diagnostic instrument, USB cable and OBD cable.



Tool name:

**Adapter of EFI system**

Function:

Check the electrical signal of each ECU pin, check the circuit condition, etc.



Tool name:

**Ignition timing lamp**

Function:

Check engine ignition timing, etc.



Tool name:

**Digital multimeter**

Function:

Check the characteristic parameters such as voltage, current and resistance in EFI system.

Tool name:

**Vacuum meter**

Function:

Check the pressure in the intake manifold.



Tool name:

**Cylinder pressure gauge**

Function:

Check the cylinder pressure of each cylinder.



Tool name:

**Fuel pressure gauge**

Function:

Check the pressure of the fuel system for finding out the working conditions of the fuel pump and fuel pressure regulator in the fuel system.



Tool name:

**Exhaust gas analyzer**

Function:

Checking vehicle exhaust emission is helpful to troubleshooting of EFI system.



Tool name:

**Fuel injector cleaning analyzer**

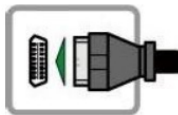
Function:

The fuel injector can be cleaned and analyzed.

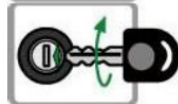


## Maintenance and Troubleshooting Process

### Usage of diagnostic instrument



1.Connect the diagnostic instrument to the diagnostic interface.



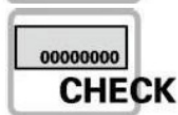
2. Press the "Electric starter button" to start the vehicle. (keyless power on)



3.Read fault related information (fault code, frozen frame, etc.) ; read the maintenance manual to confirm the faulty parts and types; make the maintenance plan according to fault related information.



4.Troubleshooting.



5.Turn on the ignition switch again, start the vehicle to read the fault information, and confirm that the fault has been eliminated.

### Preliminary check

Before starting the troubleshooting steps based on engine fault codes, a preliminary check shall be performed:

- 1.Confirm that the engine fault indicator lamp works normally;
- 2.Confirm the existence of the fault phenomena complained by the vehicle owner, and confirm the conditions under which the fault occurs. Then make a visual inspection:
  - Check whether there is leakage in the fuel pipeline;
  - Check whether the vacuum pipeline is broken, kinked and connected correctly;
  - Check whether the air intake pipeline is blocked, leaked, squashed or damaged;
  - Check whether the high-voltage wire of the ignition system is broken and aged, and whether the ignition sequence is correct;
  - Check whether the harness ground joint is clean and firm;
  - Check whether the sensors and actuator connectors are secured or in poor contact.

Important note: If the above phenomenon exists, the maintenance operation shall be carried out. If not, it will affect the subsequent fault diagnosis and maintenance work.

### Troubleshoot according to Fault Codes

This Section introduces the meaning of fault codes used in MSE 6.0 system, the corresponding diagnosis strategy, possible fault causes and fault treatment strategy, which can be used as a reference in the process of vehicle maintenance.

For details of the relevant ECU pins mentioned below, the actual harness diagram of the project may prevail.

Fault code: P0105 Intake pressure sensor signal malfunction

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) ECU detects that the fluctuation amplitude of intake pressure is too small when the sensor signal is running normally;</li> <li>2) Intake pressure sensor sampling port icing or blockage</li> <li>3) Intake pressure sensor severely aging.</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Severe intake system leakage;</li> <li>2) The sampling port of the pressure sensor is mounted downstream of the throttle valve;</li> <li>3) Reinstall after the ice inside the sensor has melted at room temperature</li> <li>4) Replace the intake pressure sensor</li> </ol>
---	--

Fault code: P0107 Intake pressure sensor circuit voltage too low

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) The ECU sensor signal circuit is shorted to ground</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Resistance between ECU pin and ground</li> </ol>
---	--

Fault code: P0108 Intake pressure sensor circuit voltage too high.

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) ECU detects that the sensor signal circuit is short-circuited to the power supply</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Voltage of ECU pin</li> </ol>
--	---

Fault code: P0112 Intake temperature sensor signal voltage too low

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Sensor signal circuit connected to ECU pin is short-circuited to ground</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure the resistance between the sensor signal circuit at the ECU pin and ground</li> </ol>
--	---

Fault code: P0113 Intake air temperature sensor signal voltage too high

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Sensor signal circuit connected to ECU pin short circuit to ground</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure whether the voltage of the sensor signal circuit of ECU pin is normal</li> </ol>
---	--

Fault code: P0117 Engine coolant temperature sensor signal voltage is too low

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Fault code: P0122 Circuit connected to ECU pin short to ground</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure the resistance between the ECU pin and ground</li> </ol>
---	--

Fault code: P0118 Engine coolant temperature sensor signal voltage too high

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Short circuit between circuit connected to ECU pin and other power supply circuit</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure whether the voltage connected to the ECU pin is normal</li> </ol>
--	---

Fault code: P0122 Throttle position sensor circuit voltage too low

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Fault code: P0122 Circuit connected to ECU pin short to ground</li> </ol>	<p>Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure the resistance between the ECU pin and ground</li> </ol>
---	--

Fault code: P0123 Throttle position sensor circuit voltage too high

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Short circuit between circuit connected to ECU pin and other power supply circuit</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure whether the voltage connected to the ECU pin is normal</li> </ol>
--	---

Fault code: P0627 Fuel pump relay control circuit malfunction

Fault code: P0629 Oil pump relay control circuit voltage too high

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Open circuit/short circuit to power supply between pump relay control circuit connected to ECU and pump relay.</li> <li>2) Open circuit between relay and main relay</li> <li>3) Open circuit of electromagnetic coil of relay</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure the resistance or voltage of the fuel pump relay control circuit connected to ECU</li> <li>2) Resistance between relay and main relay</li> <li>3) Resistance between relay pins</li> </ol>
---	--

Fault code: P0827 Quick shifter sensor control circuit shorted to ground

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Sensor signal circuit connected to ECU pin is short-circuited to ground</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure the resistance between the sensor signal circuit at the ECU pin and ground</li> </ol>
--	---

Fault code: P0828 Quick shifter control circuit short to power supply

<p>Maintenance tips: The fault has been confirmed and may have the following problems</p> <ol style="list-style-type: none"> <li>1) Sensor signal circuit connected to ECU pin short circuit to ground</li> </ol>	<p>Maintenance tips: Check the followings</p> <ol style="list-style-type: none"> <li>1) Measure whether the voltage of the sensor signal circuit of ECU pin is normal</li> </ol>
---	--

### Troubleshoot according to Fault Phenomena

This section introduces the meaning of current fault phenomena, corresponding diagnosis strategies, possible fault causes, and fault treatment strategies, which can be used as a reference in the process of vehicle maintenance.

#### (1) Start normally but idle at high speed.

Common fault locations: 1. Throttle body and idle bypass air passage; 2. Vacuum pipe; 3. Engine temperature sensor; 4. Ignition timing.

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the accelerator cable is stuck or overtightened.	Yes	Adjust
		No	Next step
2	Check the air intake system and the connected vacuum pipe for air leakage.	Yes	Maintain the air intake system
		No	Next step
3	Remove the engine temperature sensor connector, start the engine, and observe whether the engine is idling too high at this time.	Yes	Maintain the line or replace the sensor
		No	Next step
4	Check whether the mechanical ignition timing of the engine meets the specifications.	Yes	Next step
		No	Maintain the ignition timing
5	Connect the EFI system adapter, power on the ignition switch (ON), and check if the power supply to the L4# pin is normal; check if the ground connection of the M3# pin is normal.	Yes	Diagnostic help
		No	Maintain corresponding lines

#### (2) When accelerating, the engine speed does not increase or flames out during acceleration.

Common fault location: 1. water in fuel; 2. air intake pressure sensor and throttle position sensor; 3. spark plug; 4. throttle body and idle bypass air passage; 5. air intake duct; 6. fuel injector; 7. ignition timing; 8. exhaust pipe.

General diagnostic process

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the air filter is clogged.	Yes	Maintain the air intake system
		No	Next step
2	Connect the fuel pressure gauge (the connection point is at the front end of the fuel injector inlet pipe), start the engine, and check that the fuel pressure is around 300 kPa at idle.	Yes	Next step
		No	Maintain the fuel supply system
3	Check the spark plug of the cylinder to see whether its model and clearance meet the specifications	Yes	Next step
		No	Adjust or replace
4	Remove the throttle body and check for carbon deposition on the throttle body and idle bypass air passage.	Yes	Clean related parts
		No	Next step
5	Check whether the intake pressure sensor, throttle position sensor and their lines are normal.	Yes	Next step
		No	Maintain the line or replace the sensor
6	Remove the fuel injector and check the fuel injector for leakage or blockage using a special fuel injector cleaning analyzer.	Yes	Replace it in case of failure
		No	Next step

S/N	Operational procedures	Testing result	Subsequent procedures
7	Check the fuel condition to see if the fault phenomenon happens just after refueling.	Yes	Change fuel
		No	Next step
8	Check whether the ignition sequence and ignition timing of the engine meet the specifications.	Yes	Next step
		No	Maintain the ignition timing
9	Check whether the exhaust pipe exhausts smoothly	Yes	Next step
		No	Repair or replace exhaust pipe
10	Connect the EFI system adapter, power on the ignition switch (ON), and check if the power supply to the L4# pin is normal; check if the ground connection of the M3# pin is normal.	Yes	Diagnostic help
		No	Maintain corresponding lines

### (3) Slow response when accelerating.

Common fault location: 1. water in fuel; 2. air intake pressure sensor and throttle position sensor; 3. spark plug; 4. throttle body and idle bypass air passage; 5. air intake duct; 7. fuel injector; 8. ignition timing; 9. exhaust pipe.

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the air filter is clogged.	Yes	Maintain the air intake system
		No	Next step
2	Connect the fuel pressure gauge (the connection point is at the front end of the fuel injector inlet pipe), start the engine, and check that the fuel pressure is around 330 kPa at idle.	Yes	Next step
		No	Maintain the fuel supply system
3	Check the spark plug of the cylinder to see whether its model and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
4	Remove the throttle body and check for carbon deposition on the throttle body and idle bypass air passage.	Yes	Adjust or replace
		No	Next step
5	Check whether the intake pressure sensor, throttle position sensor and their lines are normal.	Yes	Next step
		No	Maintain the line or replace the sensor
6	Remove the fuel injector and check the fuel injector for leakage or blockage using a special fuel injector cleaning analyzer.	Yes	Replace it in case of failure
		No	Next step
7	Check the fuel condition to see if the fault phenomenon happens just after refueling.	Yes	Change fuel
		No	Next step
8	Check whether the ignition sequence and ignition timing of the engine meet the specifications.	Yes	Next step
		No	Maintain the ignition timing
9	Check whether the exhaust pipe exhausts smoothly	Yes	Next step
		No	Repair or replace exhaust pipe
10	Connect the EFI system adapter, power on the ignition switch (ON), and check if the power supply to the L4# pin is normal; check if the ground connection of the M3# pin is normal.	Yes	Diagnostic help
		No	Maintain corresponding lines

#### (4) Weak acceleration and poor performance.

Common fault location: 1. Water in fuel; 2. Air intake pressure sensor and throttle position sensor; 3. Spark plug; 4. Ignition coil; 5. Throttle body and idle bypass air passage; 6. Air intake channel; 7. Idle speed controller; 8. Fuel injector; 9. Ignition timing; 10. Exhaust pipe.

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check for clutch slippage, low tire pressure, brake drag, and incorrect tire size.	Yes	Repair
		No	Next step
2	Check whether the air filter is clogged.	Yes	Maintain the air intake system
		No	Next step
3	Connect the fuel pressure gauge (the connection point is at the front end of the fuel injector inlet pipe), start the engine, and check that the fuel pressure is around 330 kPa at idle.	Yes	Next step
		No	Maintain the fuel supply system
4	Remove the ignition high-voltage wire, connect a spark plug, and place the spark plug electrode about 5 mm from the engine body. Start the engine and check if the spark plug ignition intensity is normal.	Yes	Next step
		No	Maintain the ignition system
5	Check the spark plug of the cylinder to see whether its model and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
6	Remove the throttle body and check for carbon deposition on the throttle body and idle bypass air passage.	Yes	Clean related parts
		No	Next step
7	Check whether the intake pressure sensor, throttle position sensor and their lines are normal.	Yes	Next step
		No	Maintain the line or replace the sensor
8	Remove the fuel injector and check the fuel injector for leakage or blockage using a special fuel injector cleaning analyzer.	Yes	Replace it in case of failure
		No	Next step
9	Check the fuel condition to see if the fault phenomenon happens just after refueling.	Yes	Change fuel
		No	Next step
10	Check whether the mechanical ignition timing of the engine meets the specifications.	Yes	Maintain the ignition timing
		No	Next step
11	Check whether the exhaust pipe exhausts smoothly	Yes	Next step
		No	Repair or replace exhaust pipe
12	Connect the EFI system adapter, power on the ignition switch (ON), and check if the power supply to the L4# pin is normal; check if the ground connection of the M3# pin is normal.	Yes	Diagnostic help
		No	Maintain corresponding lines

**Appendix:**

## 1) List of fault codes (PCODE)

S/N	Fault code	Description (UAES)
1	P0105	Intake pressure sensor voltage (signal) fault
2	P0106	Intake pressure sensor signal abnormal
3	P0107	Intake pressure sensor circuit voltage too low
4	P0108	Intake pressure sensor circuit voltage too high
5	P0112	Intake temperature sensor signal voltage too low
6	P0113	Intake temperature sensor signal voltage too high
7	P0117	Engine coolant temperature sensor circuit voltage too low
8	P0118	Engine coolant temperature sensor circuit voltage too high
9	P0122	Throttle position sensor circuit voltage too low
10	P0123	Throttle position sensor circuit voltage too high
11	P0627	Oil pump relay control circuit malfunction
12	P0629	Oil pump relay control circuit voltage too high.
13	P2300	Ignition coil for cylinder 1 short to ground
14	P0827	Quick shifter sensor circuit short to ground
15	P0828	Quick shifter sensor control circuit short to ground

**Fuel System**

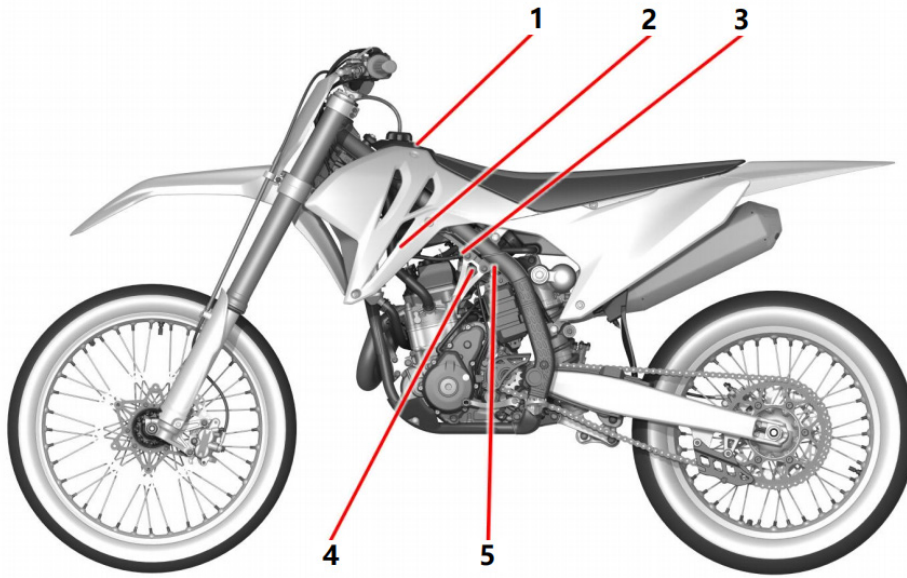
Section 1 Maintenance Instructions .....	178
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### Maintenance Instructions

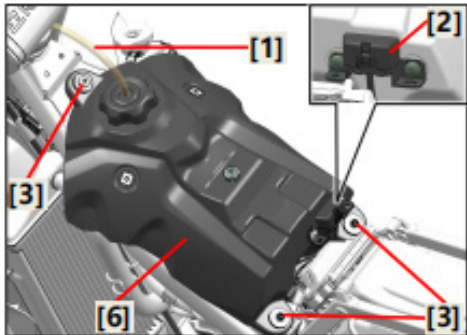
#### Overview:

- Bending or kinking the control cable can affect the operation and may cause the cable to tangle, resulting in loss of vehicle control.
- Please work in a well-ventilated area. Smoking in a place where gasoline is stored can cause a fire or explosion.
- Release the fuel pressure in the system before disconnecting the fuel supply hose.
- Do not turn the throttle flap from fully open to fully close after removing the throttle, as this may cause erratic idle speed.
- Seal the intake port with tape or a clean cloth to prevent dirt and foreign matters from entering the engine after the throttle body is removed.
- Keep dust and debris out of the throttle bore and air passages after the throttle body is removed. Clean them using compressed air, if necessary.
- Do not loosen or tighten any nuts or screws on the throttle body painted with torque markers, as this may cause throttle valve and idle speed control malfunctions.
- Do not apply commercial carburetor detergent on the inside of the throttle bore.

**Position of Components**



S/N	Component Name
1	Fuel tank assembly
2	Fuel pump assembly
3	Fuel injector
4	Throttle valve body assembly
5	Three-in-one sensor



※ **Fuel tank assembly**

1. Use the pump to remove the remaining gasoline from the fuel tank.

**Notes**

· Although the gasoline in the fuel has been removed, residual gasoline may still exist, so be careful when removing fuel hoses.

· Do not use tools to remove or install the fuel supply hose, connectors, and fuel pipes to avoid damage.

**Note**

· Clamp the fuel tank vent hose with a pipe clamp.

2. Disassemble

- Seat cushion assembly;

- Front fuel tank trims - left and right;

See "Frame, body trim, exhaust system" on page 39 for details.

3. Disassemble

- Fuel tank vent pipe [1];

- OBD detection interface [2];

- Bolt [3];

- Disconnect the fuel pump harness connector [4];

- Disconnect the fuel hose quick connector [5];

- Fuel tank assembly [6].

**Notes**

· Do not hang the fuel tank from the fuel supply hose

· If the quick connector and its surroundings are dirty, please clean them.

4. Inspection

Gasoline pipeline

Check the fuel hose/quick connector/single ear stepless clamp for any looseness, damage or leakage.

- Check if there are any of the following situations

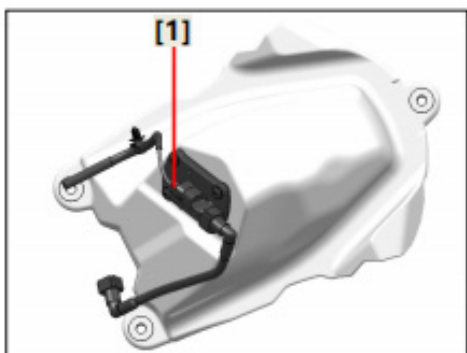
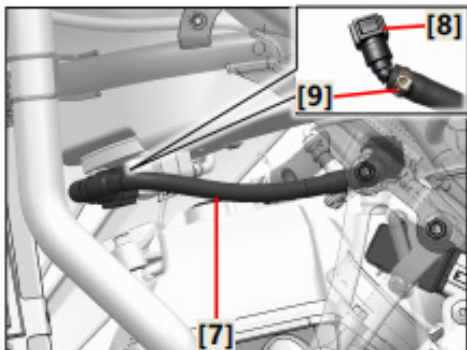
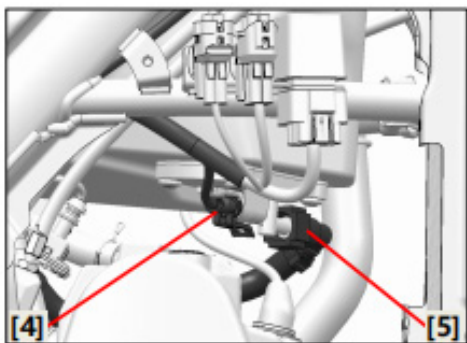
Squeeze/loosen → Connect correctly.

Crack/damage/leak → Replace.

Torque:

**Front and rear mounting points of fuel tank**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)



※ **Fuel pressure release**

**Notes**

· Before disconnecting the fuel hose, release the system pressure as follows.

· Disconnect the power supply harness connection plug [1] of the fuel pump unit.

· Start the engine and let it idle until it stops to release the fuel pressure in the fuel hose.

※ **Brake fluid addition**

•Front brake pump

1.Disassembly

- Screw [1]
- Reservoir cover [2];
- Gasket plate [3];
- Gasket [4].

2.Add

Fill the reservoir with the recommended brake fluid to the upper level line [a].

Use the recommended brake fluid:DOT4 brake fluid

3.Installation

The installation sequence is reversed from the removal sequence.

4.Inspection

Check the front brake hydraulic system for leaks.

Torque:

**Fastening screw for front brake fluid reservoir cap**

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

•Rear brake pump

1.Disassembly

- Screw [1]
- Oil reservoir cover [2];
- Gasket plate [3];
- Gasket [4].

2.Add

Fill the reservoir with the recommended brake fluid to the upper level line [a].

Use the recommended brake fluid:DOT4 brake fluid

3.Installation

The installation sequence is reversed from the removal sequence.

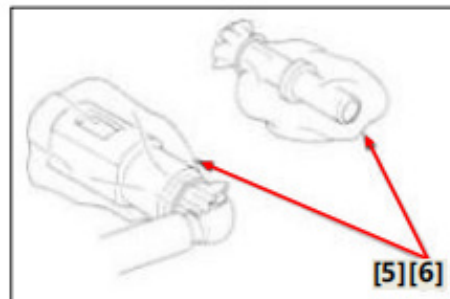
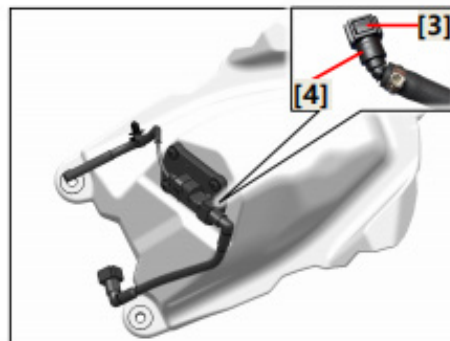
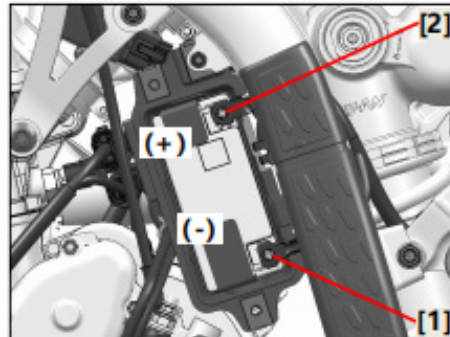
4.Inspection

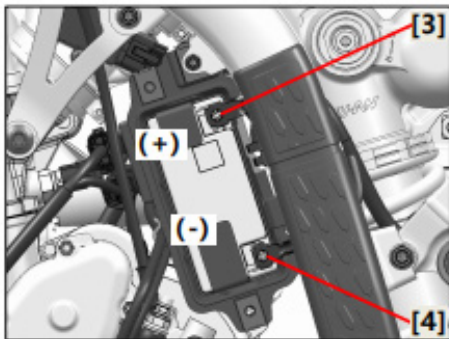
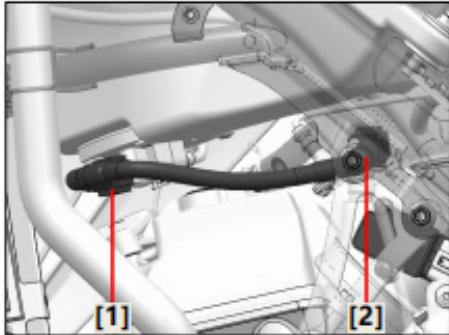
Check the rear brake hydraulic system for leaks.

Torque:

**Fastening screw for rear brake fluid reservoir cap**

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)





※ **Front brake caliper (left and right)**

**Notes**

• Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.

Disassembly/installation  
Disassemble the following parts:

- Front wheel speed sensor [1];
- Oil passing bolt and shim [2];
- Front brake hose harness [3];
- Brake caliper fixing bolt [4];
- Front brake caliper - left/right [5];

The installation sequence is reversed from the removal sequence.

**Note**

- Replace the brake caliper oil pipe washer after disassembly and assembly of the brake caliper each time.
- When tightening the brake pipe locking bolt, make sure to place the eyelet stop pin against the brake caliper body.
- Apply thread locker (Huitian 7262) to the caliper mounting bolts

Torque:

**Front wheel speed sensor**

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

**Front brake hose and front brake calipers left/right**

32 N·m (3.2 kgf·m, 23.6 lbf·ft)

**Front brake caliper-left and right and front shock absorber**

35 N·m (3.5 kgf·m, 25 lbf·ft)

※ **Rear brake caliper**

**Notes**

• Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.

**Disassembly/installation**

Disassemble the following parts:

- Rear wheel assembly [1];  
See "Rear Wheel, Suspension" on page 283 for details

- Rear wheel speed sensor [2];  
- Oil passing bolt and gasket [3];  
- Rear brake hose [4];  
- Rear brake caliper assembly [5].

The installation sequence is reversed from the removal sequence.

**Note**

• When installing the rear wheel, be careful not to let the brake caliper fall out of the rear swing arm boss or damage the brake pad.

• Replace the brake caliper oil pipe washer after disassembly and assembly of the brake caliper each time.

• When tightening the brake hose locking bolt, make sure to press the connector tightly against the limiting protrusion [a] of the brake caliper body.

• The sliding area of the bare shaft of the up-down sliding axle of the rear brake caliper and the contact area of the bare shaft of the guide pin of the rear brake caliper need to be applied with multi - purpose grease.

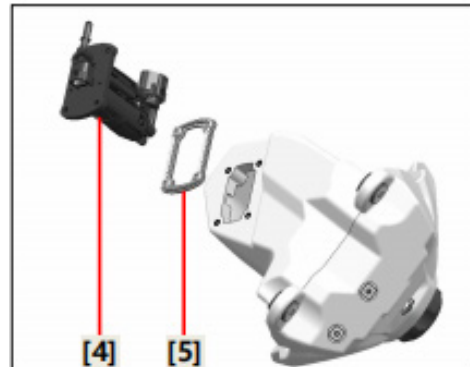
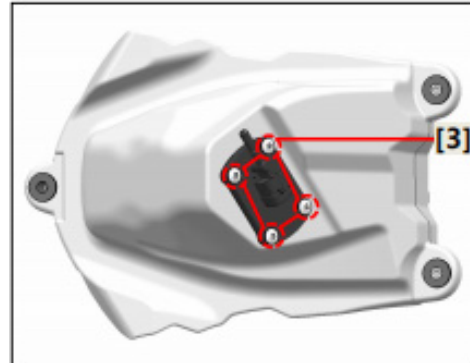
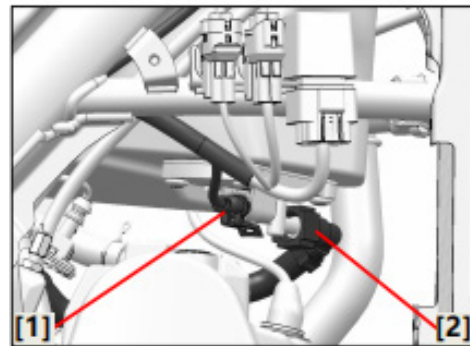
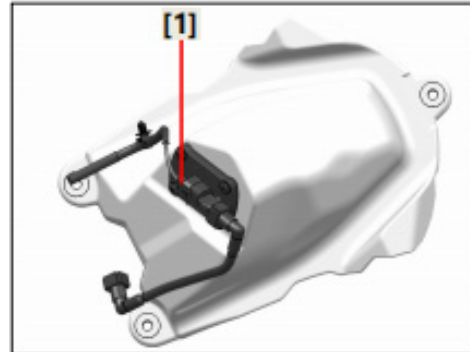
**Torque:**

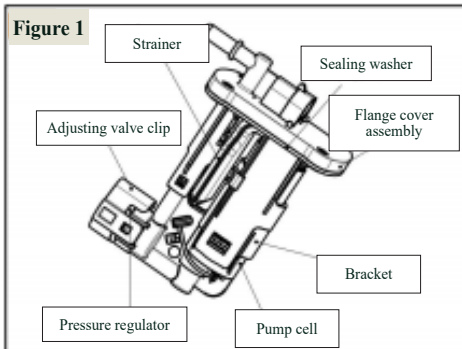
**Rear wheel speed sensor and rear brake caliper assembly**

8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

**Rear brake hose and rear brake caliper**

32 N·m (3.2 kgf·m, 23.6 lbf·ft)





· Fuel pump unit assembly

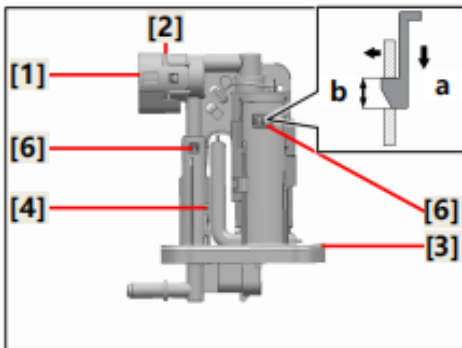
As shown in Figure 1: Diagram of the fuel pump unit assembly.

1. Disassemble

- Regulating valve clip [1];
- Pressure regulator [2];
- Gasket [3].

**Notes**

- Avoid using tools when disassembling to prevent damage to the fuel pump unit.



2. Inspection

- Check if the fuel filter (strainer) is stuck, damaged, or aged, and replace if necessary.
- Check if the fuel pump rubber gasket is damaged or aged, and replace if necessary.

**Note**

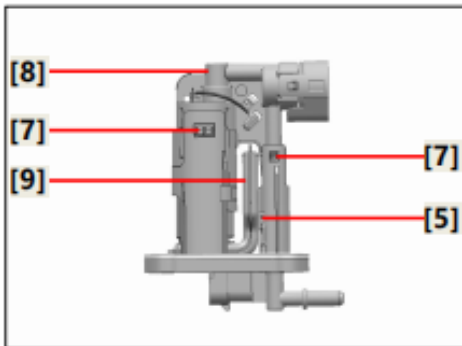
- Release the hook [a] of the pressure regulator base bracket from the groove [b] in the fuel pump base bracket, and simultaneously push the fuel pump base bracket out of the lugs on the pressure regulator bracket.

3. Disassemble

- Disconnect harnesses [4] and [5];
- Release the clips [6] and [7];
- Pump core [8] and strainer [9].

**Note**

- After replacing the strainer component, please correctly lay out the harness with black and red wires.



※ **Fuel tank installation**

1. Fuel pump

- Install the following components:
- Fuel pump [1];
- Rubber gasket [2];
- Bolt [3].

**Notes**

- When installing the fuel pump rubber gasket, ensure there are no foreign objects between the gasket and the fuel tank mounting surface
- Position the fuel pump outlet (interface) toward the left side of the vehicle.

**Note**

- Rubber seals require a small amount of engine oil.
- As shown in the right figure, tighten the fuel pump bolts in the correct sequence indicated by the arrows.

Torque:

**Fuel pump mounting bolts**

4.0 N·m(0.4 kgf·m, 3.0 lbf·ft)

2. Fuel tank

Connect the quick connector [4]

- Connect the power supply connector [5] of the fuel pump;
- Install the front connecting bolt [6] of the fuel tank;
- Install the rear connecting bolt [7] of the fuel tank
- Install the OBD interface [8]
- Remove the clamp [9] of the fuel tank vent hose.

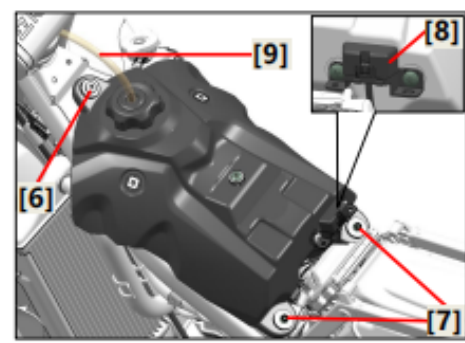
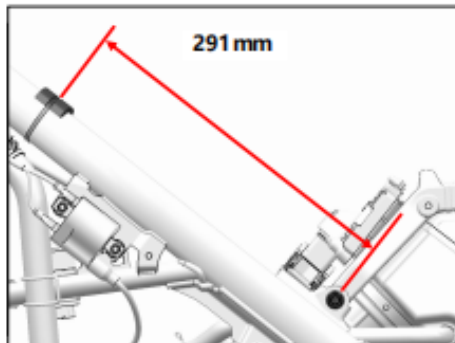
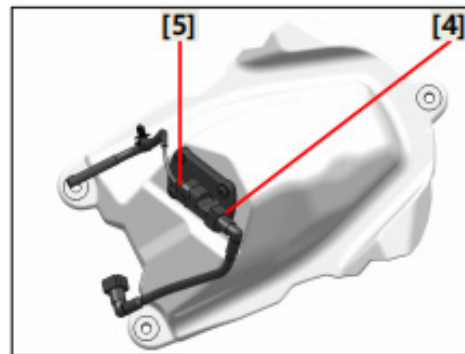
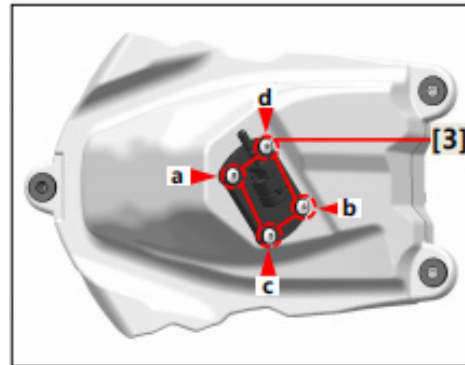
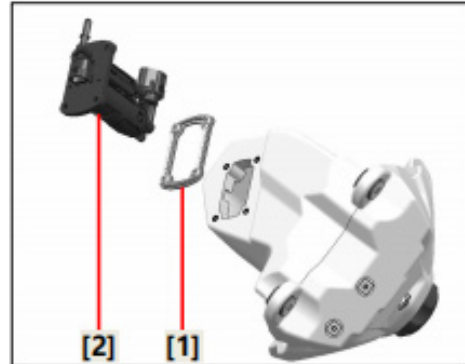
Torque:

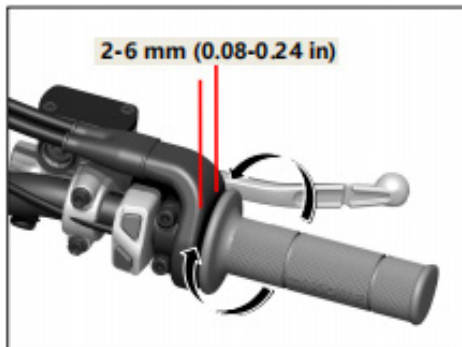
**Front and rear mounting points of fuel tank**

10 N·m (1.0 kgf·m, 7.0 lbf·ft)

**Notes**

- Be careful not to twist or bend the fuel hose.
- Check whether the quick connector of the fuel hose is correctly installed.
- The installation positions of the fuel tank buffer rubber are shown in the figure below.





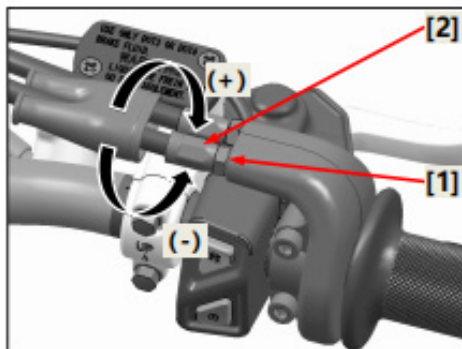
※ **Inspection and adjustment of accelerator free stroke**

Check whether the throttle cable is aged, damaged or kinked. Turn the accelerator handle and check that the throttle opens smoothly and closes automatically in any steering position.

If the accelerator handle does not rotate well, check that the cables are wired correctly, the accelerator is clean with recommended lubricant (engine oil or proper cable lubricant), and the accelerator drum rotates normally.

If Ok, but the throttle does not rotate well, replace the accelerator cable (oil inlet and oil return).

Measure the free play at the accelerator handle flange. Free play: 2-6mm (0.08-0.24 in)



**1. Fine-tune on the accelerator side**

Loosen the lock nut [1] and turn the adjuster [2].

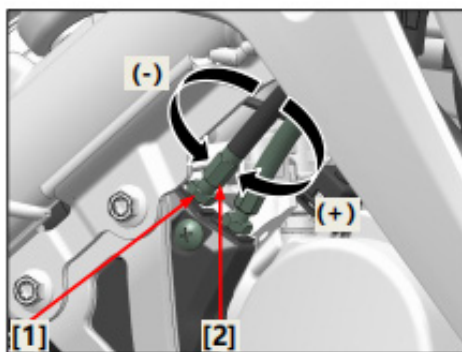
Turning the adjuster in the (-) direction will reduce the free play, and turning the adjuster in the (+) direction will increase the free play.

After adjustment, hold the adjuster and tighten the locking nut.

If the correct free play cannot be obtained despite turning the regulator to the end, turn it back in the (+) direction until it lightly touches the end, make one turn in the (-) direction, and then make more adjustments on the throttle side.

Nut [1] torque:

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



**2. Adequately adjust on the throttle body side**

Loosen the accelerator cable adjuster lock nut [1] and turn the adjuster [2] in the (-) direction to reduce the free clearance and in the (+) direction to increase the free clearance. After the adjustment, hold the adjuster and tighten the locking nut of the inlet accelerator cable adjuster to the specified torque.

Torque:

4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)

(The oil inlet and oil return cables are subjected to the same adjustment).

**Notes**

- Re-check whether the accelerator rotates smoothly or not.

※ **Air filter assembly**

1. Stand the vehicle on a flat surface.

**Warning**

· The vehicle shall be supported firmly without the danger of overturning.

2. Disassemble

- Seat cushion assembly;
- Fuel tank front trim;
- Regulating rectifier.

See "Frame, body trim, exhaust system" on page 39 for details.

3. Disassemble

- Clamp [1];
- Exhaust pipe [2];
- Subframe upper bolts [3],[4];
- Subframe upper bolts [5],[6];
- Electronic control unit (ECU);

See "Frame, body trim, exhaust system" on page 39 for details.

- Subframe and air filter assembly [7];

- Screw [8];
- Air filter assembly [9].

4. Inspection

As shown in Figures 2 and 3:

- Check if the mounting bolts and clamps of the air filter tank are loose.

Loose → Tighten.

Replace the air filter element according to the maintenance schedule or whenever

Too dirty or damaged → Replace.

**Note**

- If you frequently ride in wet or dusty areas, maintain the air filter more frequently.

5. Installation

The installation sequence is reversed from the removal sequence.

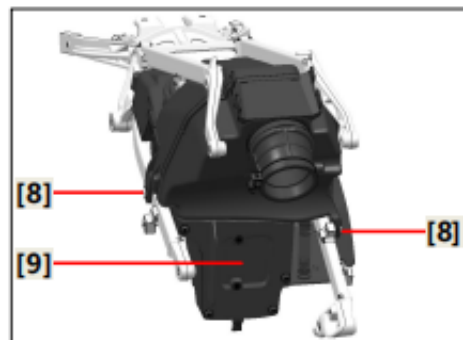
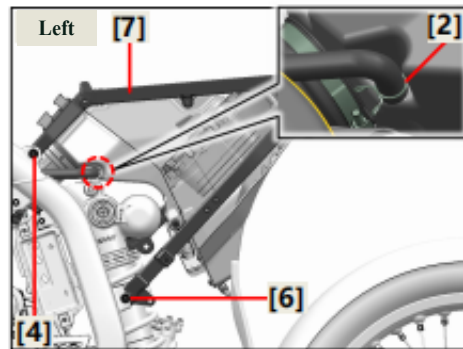
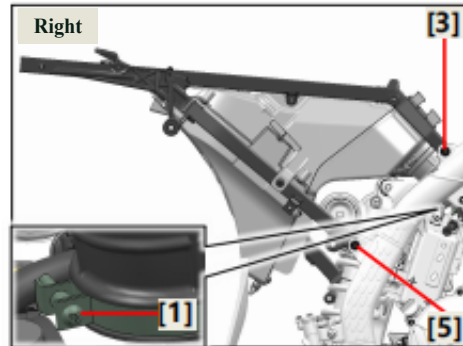
Torque:

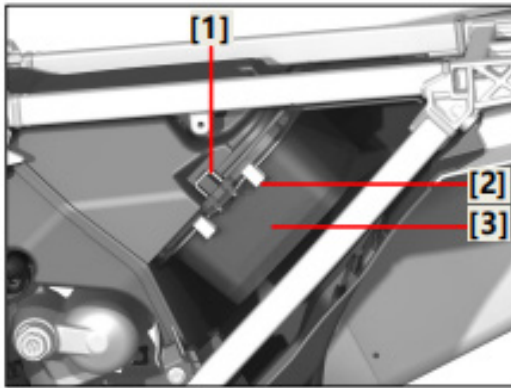
**Air filter and subframe mounting bolt**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Connecting bolt between subframe and main frame**

34 N·m (3.4 kgf·m, 18 lbf·ft)





※ **Cleaning and replacement of air filter sponge element**

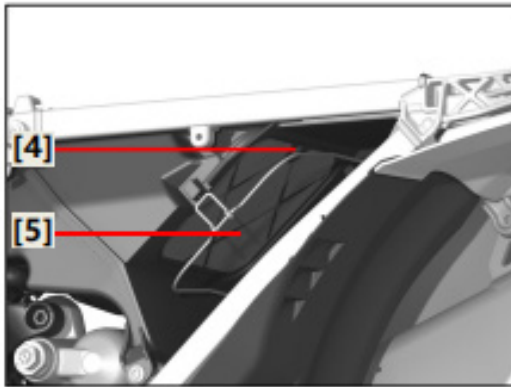
① . Sponge filter element and filter element bracket

**Disassembly/installation**

Disassemble the following parts:

- Release the retaining spring [1] of the sponge filter element;
- Sponge filter element [2] and element bracket [3];
- Remove the screws [4] for fixing the metal strainer;
- Take out the metal strainer [5].

The installation sequence is reversed from the removal sequence.



**Note**

- Remove the sponge filter element [7] from the filter element bracket [6].

**Notes**

- Be careful not to damage the sponge filter element [8].

Thoroughly clean the sponge filter element [1] in a cleaning solvent, and then clean it in hot water with detergent or soap solution.

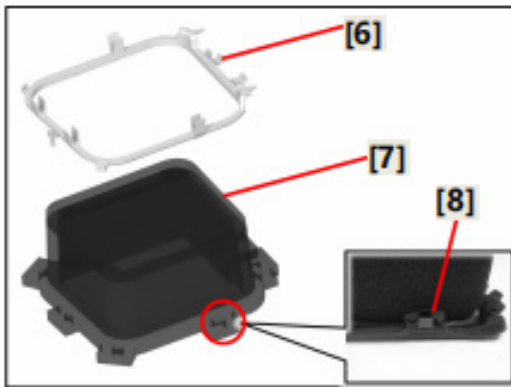
Ensure that there is no dirt or dust in the air filter element. Clean it again if necessary. After cleaning, squeeze out the moisture from the air filter element and let it dry thoroughly.

**Notes**

- Since gasoline or low-flash-point solvents are highly flammable, it is prohibited to use them to clean the air filter sponge filter element.

Apply 50cm<sup>3</sup> of KOVE foam air filter oil or equivalents to the inner side of the sponge filter element.

Put the air filter sponge filter element into a plastic bag and evenly apply the air filter oil with both hands.



**Warning**

- Do not use engine oil on the sponge filter element.

※ **Throttle body assembly and intake pipe**

1. Disassemble

As shown in Figure 1

- Fuel injector connection plug [1];
- Three-in-one sensor connection plug [2].

2. Disassemble

As shown in Figures 2 and 3

- Nut [1];
- Screw [2];
- Cover [3];
- Accelerator cable [4];
- Clamp [5];
- Throttle body assembly [6].

3. Disassemble

As shown in Figure 4

- Bolt [1];
- Intake pipe assembly [2].

4. Inspection

- Check if the installation position of the hoop [6] is correct

Incorrect position → adjustment → correct installation.

- Check the throttle intake pipe  
Crack/damage → Replace.

5. Installation

The installation sequence is reversed from the removal sequence.

Torque:

**Accelerator cable A/B (throttle end)**

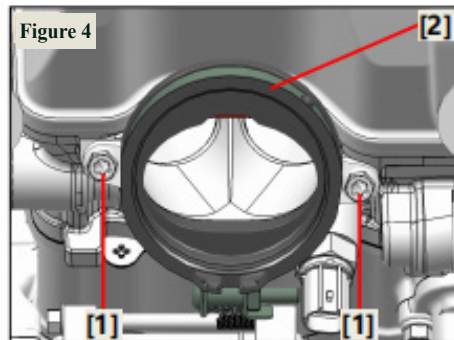
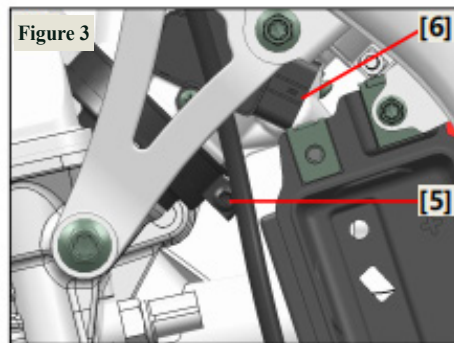
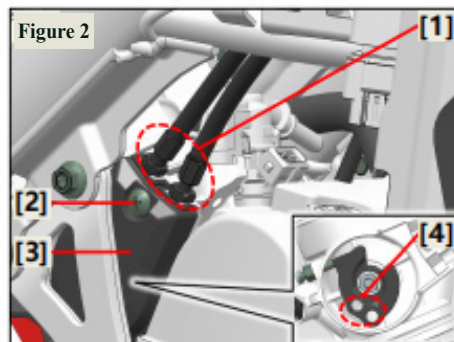
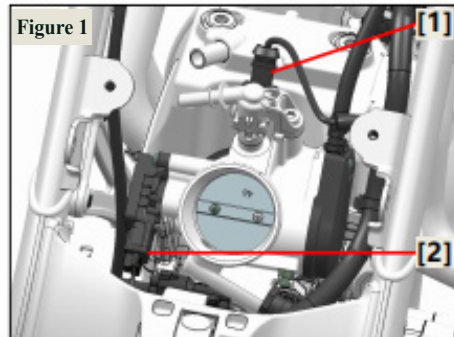
6 N·m (0.6 kgf·m, 4.4 lb·ft)

**Intake pipe clamp locking bolt**

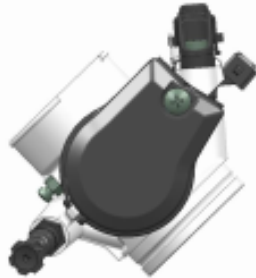
4.0 N·m (0.4 kgf·m, 3.0 lb·ft)

**Eccentric wheel cover and throttle valve**

2.0 N·m (0.2 kgf·m, 1.5 lb·ft)



Drawing of throttle assembly



No disassembly unless for maintenance

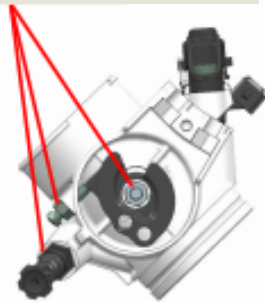


Figure 1

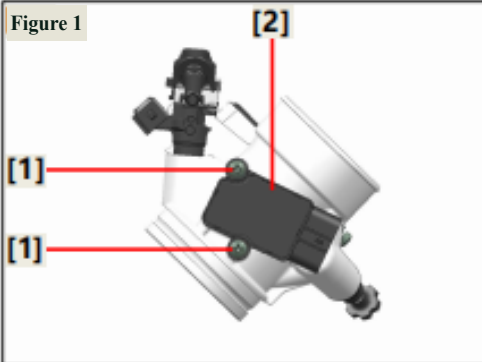
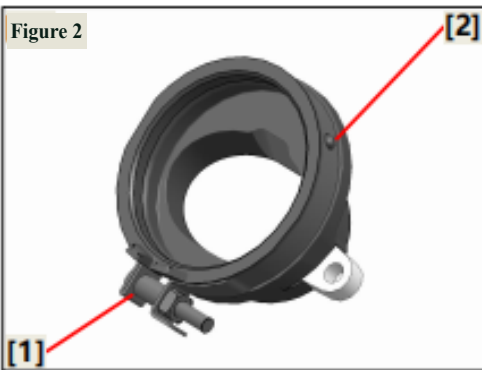


Figure 2



※ Throttle valve body assembly

**Warning**

- The throttle body is pre-assembled at the factory and must not be disassembled in any manner other than as specified in this manual.
- Do not loosen or tighten the nuts and screws marked with torque values, as loosening or tightening them may cause malfunctions of the throttle body.

**Three-in-one sensor**

1. Disassemble

As shown in Figure 1

- Screw [1]
- Three-in-one sensor[2];

2. Inspection

Check the O-ring on the three-in-one position sensor for deterioration or damage.

**Notes**

- Do not use a wire brush or other tools to remove carbon deposits, otherwise the inside of throttle body will be damaged.
- Do not allow carbon deposits or other foreign matters to enter the throttle body passage or the gap between the throttle valve shaft and the throttle valve body.
- Replace the seal/ring with a new one.

3. Cleaning

- Throttle Valve Body

**Notes**

- Clean the throttle body with special carburetor solvent.
- Do not use corrosive cleaning fluid.
- Do not spray cleaning solvent directly on plastic parts, sensors or seals.
- Do not directly push open the throttle flap.

4. Installation

The installation sequence is reversed from the removal sequence.

**Note**

- As shown in Figure 2, install the pipe clamp on the intake pipe with the screw head [1] facing the left side of the vehicle, and align the groove [2] with the lug.

Torque:

**Three-in-one sensor mounting screw**

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

※ **Fuel rail and injector**

**Warning**

- Check the fuel injector in an area without flammable materials and ensure good ventilation. Ensure no smoking or use of electric tools near the fuel injector.
- Be cautious when disconnecting the fuel hose. Any residual pressure in the fuel hose may cause fuel to spray out. Place a container or rag under the hose to catch any spilled fuel. Always clean up any spilled fuel immediately.
- Before removing the fuel injector, ensure the engine is off and disconnect the positive and negative battery cables.

1. Disassemble

- Screw [1]
- Fuel rail [2].
- Fuel injector clamp [3];
- Fuel injector [4];
- Fuel injector O-rings [5], [6].

2. Inspection

- Fuel injector

Stuck → Replace and check the fuel pump/fuel system.

Accumulation → Replace.

Damage → Replace.

3. Inspection

- Fuel injector resistance

See "Electrical Components" on page 229 for details.

4. Installation

The installation sequence is reversed from the removal sequence.

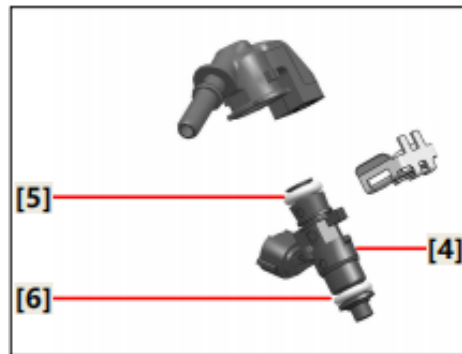
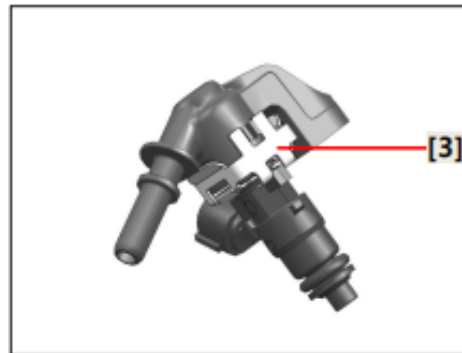
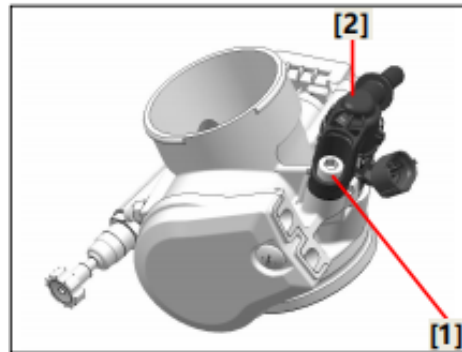
Torque:

**Fuel rail mounting bolt**

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

**Notes**

- Always use a new O-ring.
- When checking the fuel injector, do not allow any foreign matter to enter or adhere to the fuel injector, fuel rail or O-ring.
- Be careful not to twist or squeeze the O-ring when installing the fuel injector.





**Front Wheel, Suspension, Steering**

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### Maintenance Instructions

#### Overview:

- In maintenance of front wheel, front shock absorber and steering stem, dedicated work bench or equivalent means shall be used to support the motorcycle.
- Do not operate the brake handle after the front and rear wheels are removed.
- After installing the front wheel, check the braking operation with the brake handle.

### Troubleshooting

#### Inflexible steering

- Insufficient tire pressure
- Faulty tire
- Over-tight adjusting nut on steering stem
- Wear or damage of bump steering retainer
- Steering stem bending

#### Turning to one side or not going straight

- Axle bending
- Incorrect installation of wheel
- Wear or damage of wheel bearing
- Damaged or loose steering bearing
- Frame deformation and damage
- Failure of wheel bearing

#### Front wheel shaving

- Bending and deformation of rim edge
- Faulty tire
- Wear or damage of wheel bearing
- Axle slack
- Unbalanced tires and wheels

#### Wheels are difficult to turn

- Damaged wheel bearing
- Axle deformation
- Brake failure

#### Soft suspension

- Low tire pressure
- Metal fatigue of absorber spring
- Low liquid level in shock absorber
- Incorrect specification of absorber oil (low viscosity)

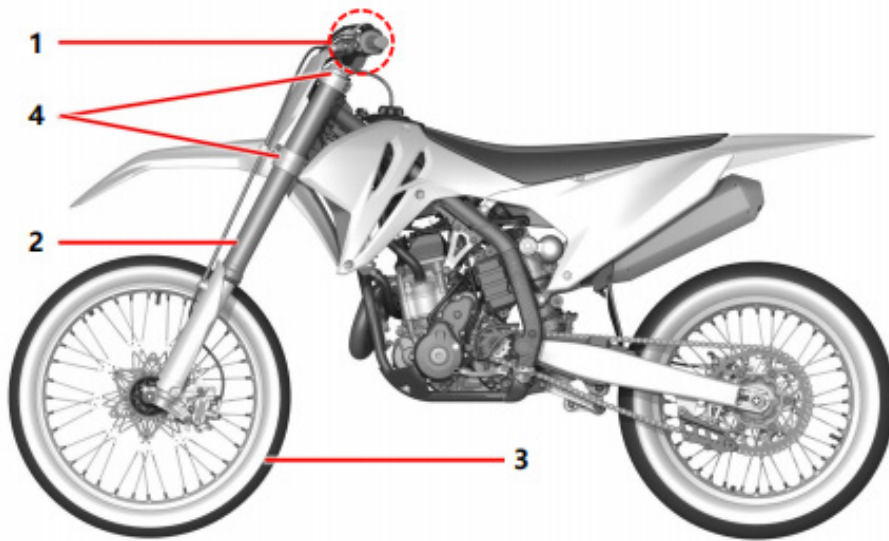
#### Hard suspension

- High tire pressure
- Deformation of absorber components
- High liquid level in shock absorber
- Incorrect specification of absorber oil (high viscosity)
- Blockage in absorber oil passage

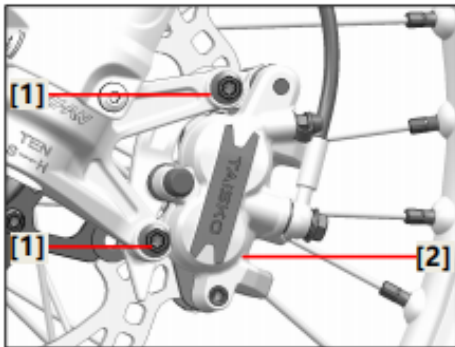
#### Abnormal noise from front suspension

- Loose absorber fastener
- Incorrect specification of absorber oil (low viscosity)
- Wear of slider on front absorber bushing

**Position of Components**



S/N	Component Name
1	Steering handle and components
2	Front shock absorber
3	Front wheel assembly
4	Lower connecting plate and steering stem assembly



※ **Front wheel assembly**

1. Stand the vehicle on a flat surface.

**Warning**

· The vehicle shall be supported firmly without the danger of overturning.

2. Disassemble

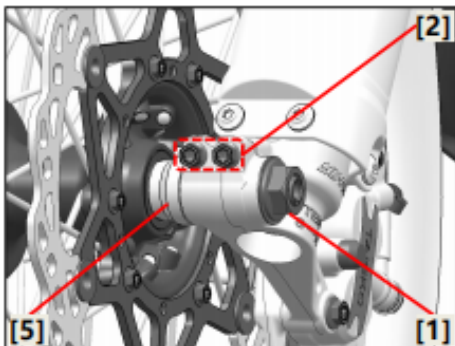
- Bolt [1];
- Front brake caliper [2].

**Notes**

- Do not hang the front brake caliper on the brake hose.
- Do not operate the hand brake lever after removing the brake caliper.

3. Disassemble

- Remove the front wheel axle locking nut [1];
- Loosen the left and right shock absorber bottom cylinder locking bolts [2] and [3];
- Lift the front wheels off the ground;
- Pull out the front wheel axle [4] and remove the front wheel assembly along with the bushings [5] and [6].



4. Inspection

- O-ring [7]
- Damage → Replace.

5. Installation

The installation sequence is reversed from the removal sequence.

**Note**

- Place the wheel between the front shock absorbers, carefully align the axle holes and insert the front wheel axle from the left side. Pre-tighten the shock absorber bottom cylinder shaft locking bolt to a torque of 5N·m.
- Tighten the front wheel axle locking nut to the specified torque.

Torque:

- With the front brake engaged, move the front shock absorber up and down several times to seat the axle and check the operation of the brake.
- Tighten the left and right shock absorber bottom cylinder bolts to the specified torque.

Torque:

**Front wheel axle locking (nut)**

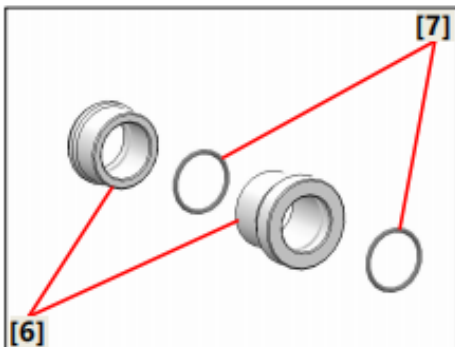
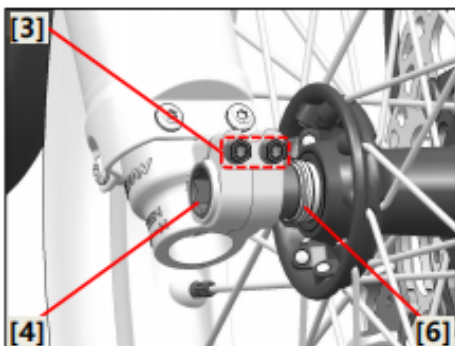
88 N·m (8.8 kgf·m, 65 lbf·ft)

**Front shock absorber bottom cylinder locking bolt**

22 N·m (2.2 kgf·m, 16 lbf·ft)

**Notes**

- During installation, apply silicone grease to the groove between the main and auxiliary lips of the wheel hub bearing seal and to the O-ring inside the bushing.



※ **Front shock absorber**

1. Stand the vehicle on a flat surface.

**Warning**

• The vehicle shall be supported firmly without the danger of overturning.

2. Disassemble the front shock absorber

- Front brake caliper [1]

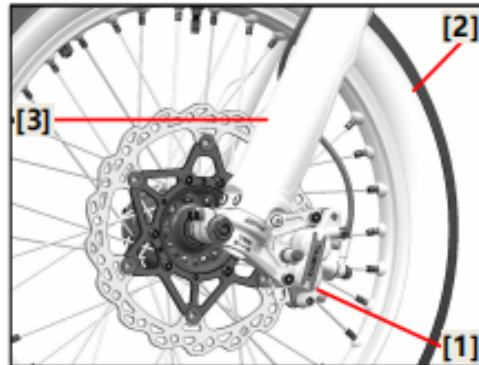
See "Hydraulic Braking System" on page 217 for details.

- Front wheel assembly [2]

See "Front Wheels, Suspension, Steering" on page 193 for details.

- Front shock absorber trim [3]

See "Frame, body trim, exhaust system" on page 39 for details.



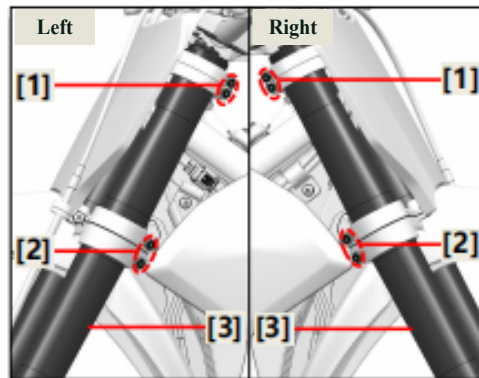
**Notes**

• Do not hang the brake caliper on the brake hose.

• Do not operate the hand brake lever after removing the brake caliper.

**Warning**

• Support the front shock absorber first before loosening the mounting bolts connecting the upper and lower plates.



3. Disassemble

Loosen the upper connecting plate locking bolt [1], firmly support the shock absorber, loosen the lower connecting plate mounting bolt [2], and pull the shock absorber outer cylinder [3]. Then rotate it downward to remove it from the bores of the upper and lower connecting plates until it is fully extracted.

4. Installation

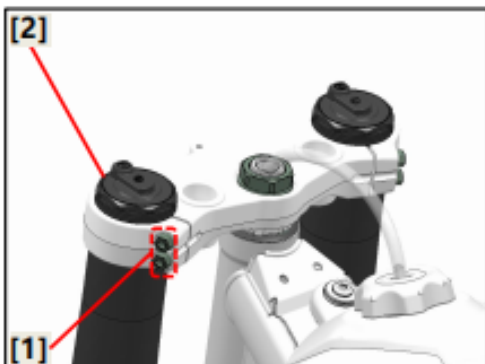
The installation sequence is reversed from the removal sequence.

Torque:

**Mounting bolt of the upper connecting plate**

**Mounting bolt of the lower connecting plate**

22 N·m (2.2 kgf·m, 16 lbf·ft)



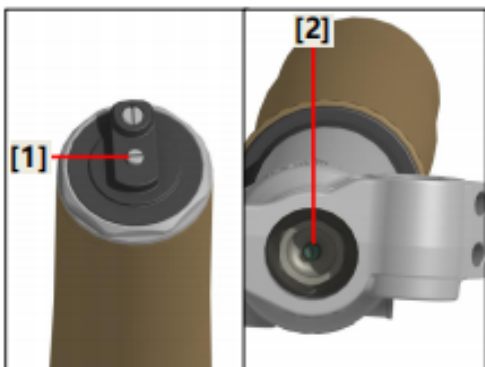
※ **Replacement of front shock absorber oil**

The following procedure for removal of the front shock absorber applies to both left and right.

1. Disassemble

- Steering handle and components;  
See "Front Wheels, Suspension, Steering" on page 193 for details.
- Number plate (front panel);  
See "Frame, body trim and exhaust system" on page for details.

- Loosen the locking bolt [1] of the upper bracket;
- Loosen the upper cover assembly [2] of the shock absorber adjustment inner chamber.



**Notes**

- If you plan to replace the front shock absorber oil, loosen the shock absorber adjustment inner chamber cover assembly.
- Do not remove the upper adjustment cover assembly of the front shock absorber inner chamber.

Use a special tool to loosen the upper cover assembly of the front shock absorber inner chamber.

**Tools:**

**Locking nut wrench, 50mm**

**Notes**

- Remove the inner chamber cover of the reducer.

2. Disassemble

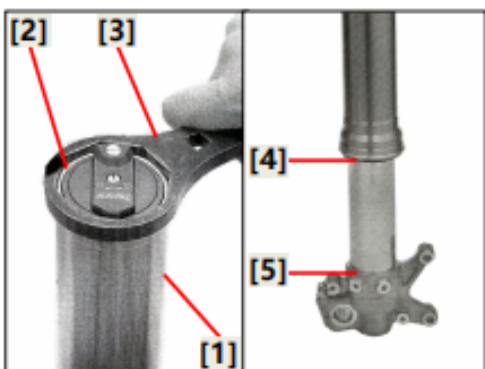
- Front shock absorber;  
See "Front Wheels, Suspension, Steering" on page 193 for details.

**Notes**

- Record the current positions of the compression damping adjuster [1] and the rebound damping adjuster [2].

Turn the compression and rebound damping adjusters counterclockwise and set them to the softest positions.

- Hold the outer hose [1] and use a special tool [3] to remove the upper cover [2] of the front shock absorber from the outer hose
- Slowly slide the outer hose down until the dustproof seal [4] is on the bottom cylinder [5].



**Tools:**

Locking nut wrench, 50mm [3]

- Compress the outer hose [1] several times to drain the shock absorber oil from it, and then remove the O-ring [2] from the shock absorber.

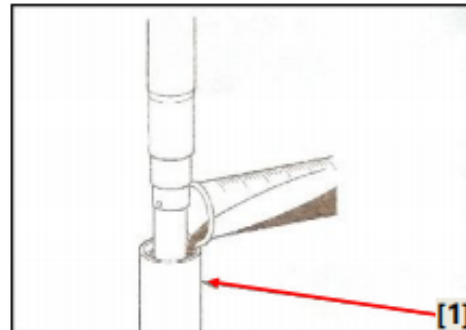


### 3. Add

Pour the recommended shock absorber oil into the fork tube [1].

Recommended shock absorber oil: AMSOIL  
Thunder High-Performance Shock Absorber Oil  
Shock absorber oil (viscosity: 10W)

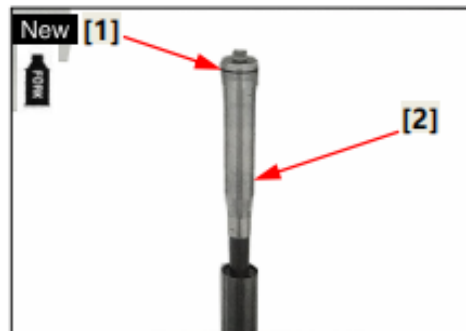
Standard shock absorber oil total capacity: 510±3ml  
Shock absorber inner chamber (damper): 260±3 mL  
Shock absorber outer chamber (spring chamber)  
350±3ml



### Notes

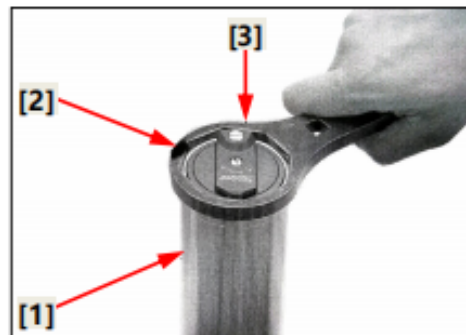
· Pump the fork tube slowly several times to remove the trapped air at the lower part of the fork hose.

- Apply the recommended shock absorber oil to the new O-ring [1] and install the O-ring on the front shock absorber [2].



- Slowly pull up the outer hose [1].

Use a special tool to temporarily tighten the upper adjustment cover [2] of the shock absorber into the front fork tube.



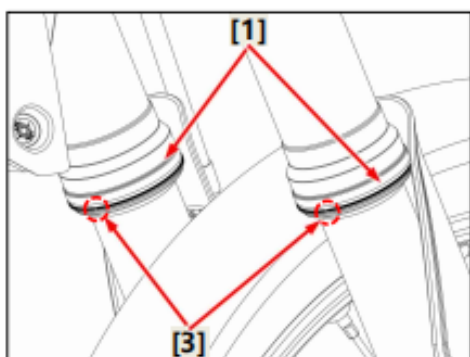
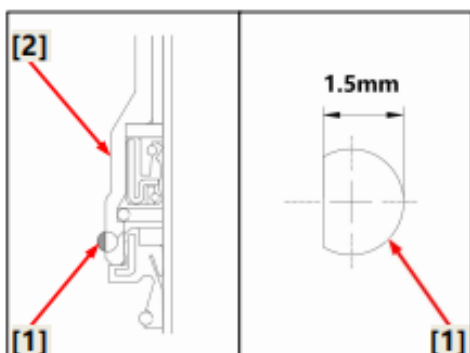
### Tools:

Locking nut wrench, 50mm [3]

### Torque

**Front shock absorber spring chamber upper adjustment cap**

30 N·m (3.0 kgf·m, 22 lbf·ft)



※ **Inspection of front shock absorber wear ring**

Check the operation of the front shock absorber by operating the front brake and compressing the front shock absorber several times.

Check the entire front shock absorber assembly for signs of leakage, damage, or loose fasteners. Check if the decorative protector and the dustproof seal ring of the front shock absorber are clean, free of dirt or dust. Remove the dirt or dust accumulated at the bottom of the front shock absorber seal.

Check the wear ring [1] for wear or damage.

If the wear ring is less than 1.5 mm or flush with the front fork tube [2], replace the wear ring.

Ensure that the end clearance [3] of the wear ring faces backward.

※ **Steering handlebar and components (left and right)**

1. Stand the vehicle on a flat surface.

**Warning**

• Support the vehicle firmly so as not to turn over.

2. Disassemble

- Impact-resistant cable sheath (chest protector) [1].

3. Disassemble

Left steering handlebar assembly

- Screw [2];

- Handlebar grip [3];

- Steering handlebar left switch [4];

See "Frame, body trim, exhaust system" on page 39 for details.

- Screw [5];

- Handle fixing bracket [6];

- Clutch handle [7].

4. Installation

The installation sequence is reversed from the removal sequence.

**Note**

• Install the clutch handle fixing socket by aligning its mating surface with the marking point [a] on the left side of the handlebar.

• Install the marking point [a] on the left side of the handle.

Torque:

**Hydraulic clutch handle mounting bolt**

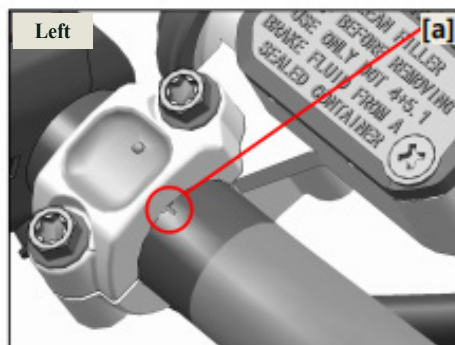
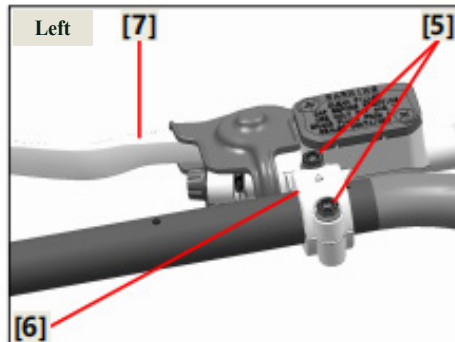
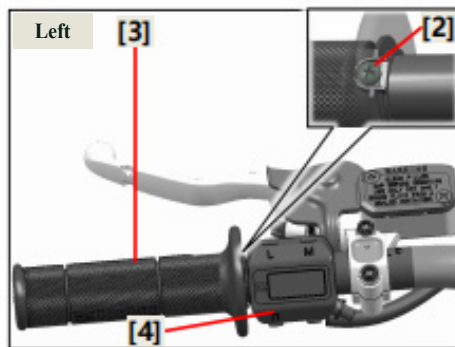
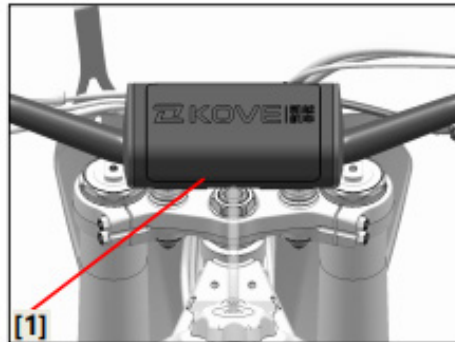
8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

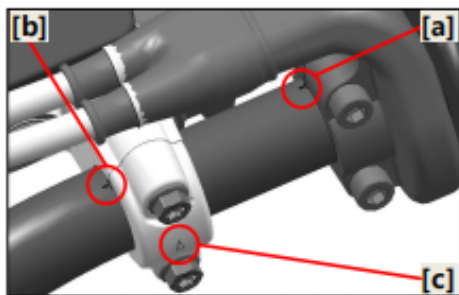
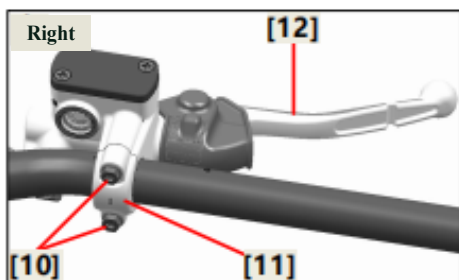
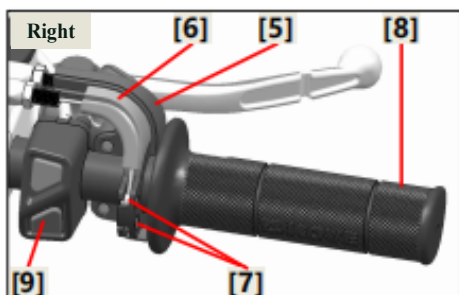
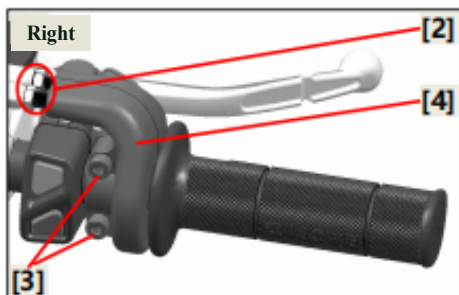
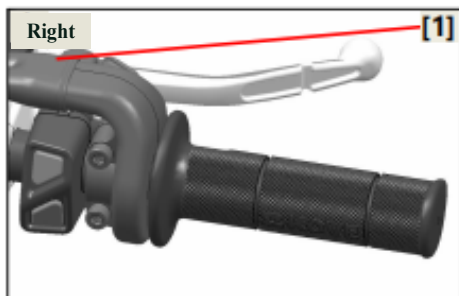
**Steering handlebar - left switch mounting screw**

3.0 N·m (0.3 kgf·m, 2.2 lbf·ft)

**Handlebar grip mounting screw**

7.0 N·m (0.7 kgf·m, 5.2 lbf·ft)





5. Disassemble

Right steering handlebar assembly

- Rubber grommet [1];
- Adjustable cable assembly bolt [2];
- Bolt [3];
- Front cover [4];
- Rear cover [5];
- Guide block [6];
- Throttle cable [7];
- Handlebar grip assembly [8];
- Right steering handlebar switch [9];

See "Frame, body trim, exhaust system" on page 39 for details.

- Bolt [10];
- Socket [11];
- Front hand brake lever [12].

6. Installation

The installation sequence is reversed from the removal sequence.

Notes

- Align the joint surface of the refueling socket with the marking point [a] on the right side of the steering handlebar for installation.
- Align the joint surface of the front brake handlebar fixing socket with the marking point [b] on the right side of the handlebar for installation.
- Install the front brake handlebar fixing socket with the arrow [c] facing upward.

Torque:

**Front brake pump mounting bolts**

8.0 N·m (0.8 kgf·m, 6.0 lbf.ft)

**Oiler mounting screw**

8.0 N·m (8.0 kgf·m, 6.0 lbf.ft)

**Steering handlebar - right switch mounting screw**

4.0 N·m (0.4 kgf·m, 3.0 lbf.ft)

※ **Steering handlebar and upper/lower connecting plates, steering stem assembly**

1. Place the vehicle on the workbench.

**Warning**

- Support the vehicle firmly so as not to turn over.

2. Disassembly:

- Steering handle
- 4 bolts [1]
- Steering handlebar clamp [2]
- Steering handlebar [3]

3. Disassembly:

- Nut and flat gasket [4]
- Steering handlebar lower socket [5]
- Buffer rubber [6]

**Notes**

- The handlebar buffer rubbers are rubber products. If they are deformed or damaged, please replace them in time.

4. Disassembly:

- Upper connecting plate
- Steering stem locking nut and flat gasket [7]
- Bolt [8]
- Upper connecting plate [9]

5. Disassembly:

- Upper connecting plate and steering stem assembly
- Remove the 4-slot nut [10]
- Upper dustproof washer [11]
- Lower connecting plate and steering stem assembly [12]

6. Installation:

The installation sequence is reversed from the removal sequence.

Torque:

**Upper and lower sockets on the steering handlebar**

**Lower end of double-ended thread bolt to upper connecting plate**

22 N·m (2.2 kgf·m, 16 lbf·ft)

**Upper end of double-ended threaded bolt to lower socket of steering handlebar**

30 N·m (3.0 kgf·m, 22 lbf·ft)

**Fastening nut between upper bracket and steering stem**

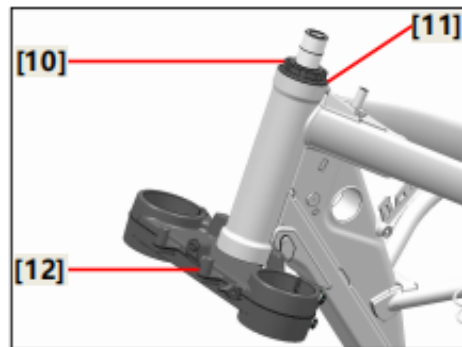
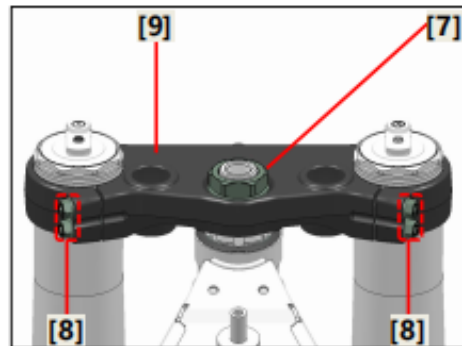
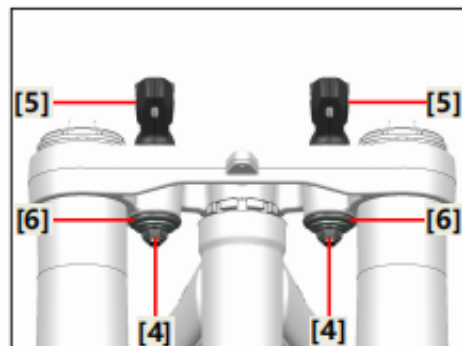
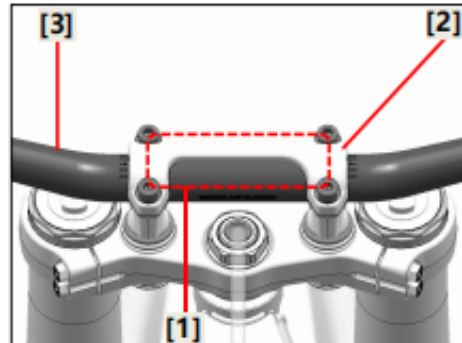
108 N·m (10.8 kgf·m, 80 lbf·ft)

**Steering stem locking 4-slot nut**

First torque to 40N·m, then loosen and torque to 10N·m, and finally back off by 1/4 turn

**Notes**

- Head tube pressure bearing: (tapered roller bearing)  
Model: Upper 32005 Lower 32006  
Brand: (C&U Bearing).





**Rear Wheel/Suspension**

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## Maintenance Instructions

### Overview:

- In maintenance of rear wheel, suspension and relevant components, dedicated work bench or equivalent means shall be used to support the motorcycle.
- Do not operate the brake pedal after the rear wheel is dismantled.
- After installing the rear wheel, step on the brake pedal to check the brake operation.
- All suspension pivots and mounting points can only be replaced with original KOVE bolts and nuts.

## Troubleshooting

### Turning to one side or not going straight

- Non-uniform adjustment of drive chain adjuster
- Axle bending
- Wear of swingarm axle
- Wheel vibration
- Tire deformation
- Wear or damage of wheel bearing
- Improper tightening of axle
- Damage to rear swingarm pivot bearing
- Improper tightening of suspension assembly bolts
- Unbalanced tires and rims

### Wheels are difficult to turn

- Damaged wheel bearing
- Curved axle
- Over-tight drive chain
- Brake resistance

### Soft suspension

- Low tire pressure
- Improper adjustment of suspension
- Metal fatigue of absorber spring
- Oil leakage from shock absorber

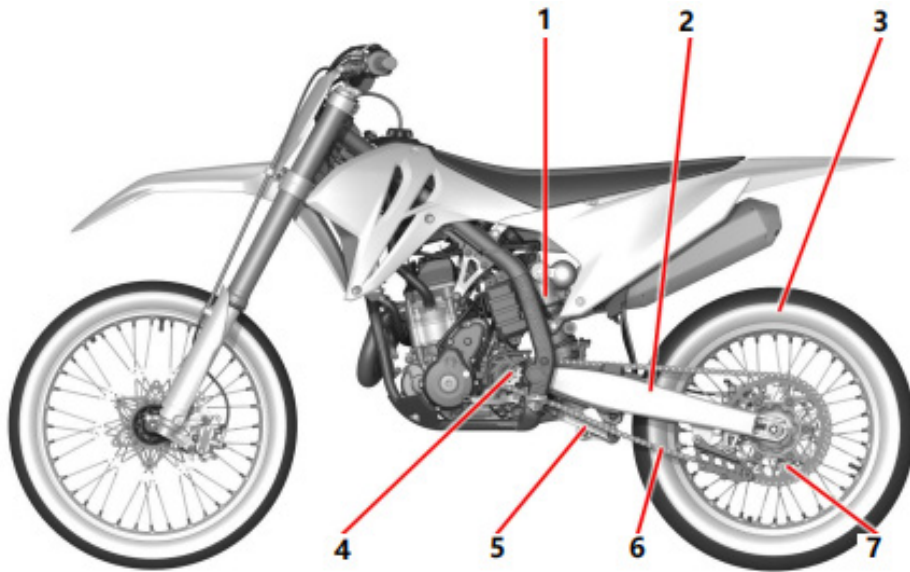
### Hard suspension

- High tire pressure
- Improper adjustment of suspension
- Bending of shock absorber rod
- Damage to suspension or slewing pivot bearing
- Improper tightening of slewing pivot

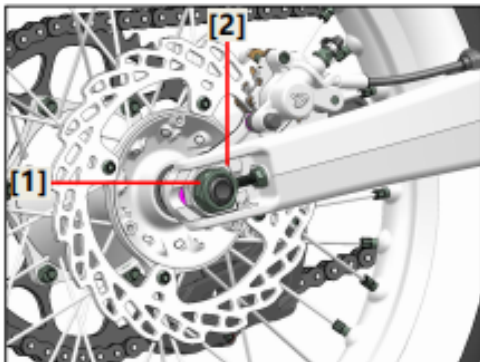
### Noise from rear suspension

- Loose suspension fasteners.
- Wear or damage of suspension pivot bearing
- Shock absorber failure

**Position of Components**



S/N	Component Name
1	Rear shock absorber assembly
2	Rear swingarm
3	Rear wheel assembly
4	Driving sprocket
5	Rear suspension components
6	Drive chain
7	Driven sprocket



※ **Rear wheel assembly**

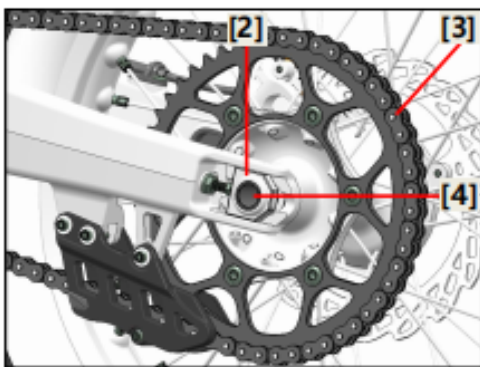
1. Stand the vehicle on a flat surface.

**Warning**

- Support the vehicle firmly so as not to turn over.

2. Disassemble

- Rear wheel locking nut [1];
- Withdraw the chain adjusters on both the left and right sides [2] so that the wheel can move forward continuously.
- Push the rear wheel forward to disengage the drive chain [3] from the large sprocket;
- Hold the rear wheel and remove the rear wheel axle [4];
- Rear wheel assembly.



3. Disassemble

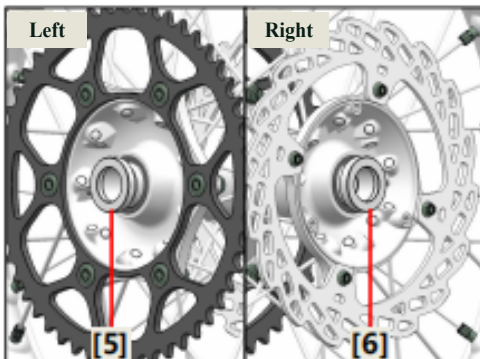
- Rear wheel T-shaped bushing - Left side [5];
- Rear wheel bushing - Right side [6].

5. Inspection

- O-ring seal ring [7] inside the T-type bushing.
- Damage → Replace

**Notes**

- Do not operate the brake pedal after the wheel is disassembled.



6. Installation

The installation sequence is reversed from the removal sequence.

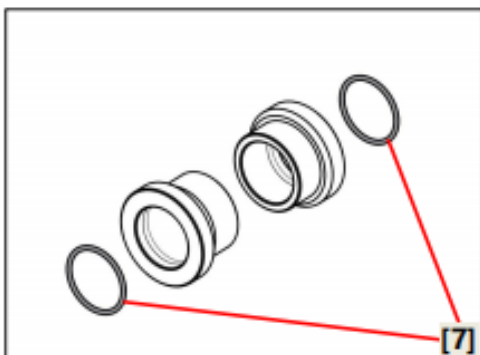
Torque:

**Rear wheel axle locking nut**

128 N·m (12.8 kgf·m, 94 lbf·ft)

**Notes**

- When installing the rear wheel, don't let the brake caliper fall out of the rear swing arm boss or damage the brake pad.
- During installation, apply grease to the seal ring in the T-shaped bushing located in the groove between the main and auxiliary lips of the wheel hub bearing seal.
- Apply grease for lubrication.



※ **Inspection of wheels and tires**

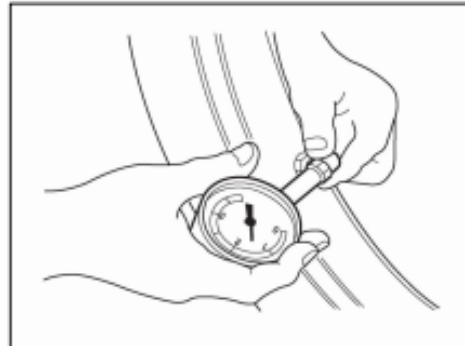
Check tires for cuts, embedded nails, or any other signs of damage. Check that the front and rear wheels are properly installed. Ensure the tire is in a cold state, then use a tire pressure gauge to check the tire pressure.

**Tire pressure:**

Front: 100 kPa (1.0 kgf/cm<sup>2</sup>, 15 psi)

Rear: 100 kPa (1.0 kgf/cm<sup>2</sup>, 15 psi)

☆ Adjust the tire pressure appropriately based on the specific usage requirements.



※ **Inspection of rim damage and runout**

1. Inspection

Check the wheel rim [1] and spokes [2] for damage. Use a spoke wrench [3] to tighten any loose spokes to the specified torque. Tighten the rim tire clip nuts [4] to the specified torque.

Tools

Front wheel: Spoke wrench, 6.0mm

Rear wheel: Spoke wrench, 7.0mm

Torque:

**Front/rear wheel spokes**

6 N·m (0.6 kgf·m, 4.4 lb·ft)

**Front/rear tire clamp locking nut**

12 N·m (1.2 kgf·m, 9.0 lb·ft)

2. Measurement

- Radial wheel rim runout [1]

- Axial wheel rim runout [2]

If the specified limit is exceeded → replace.

Wheel rim runout:

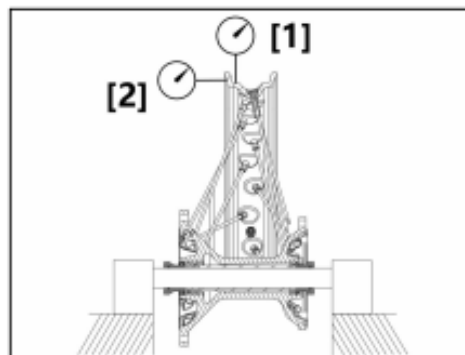
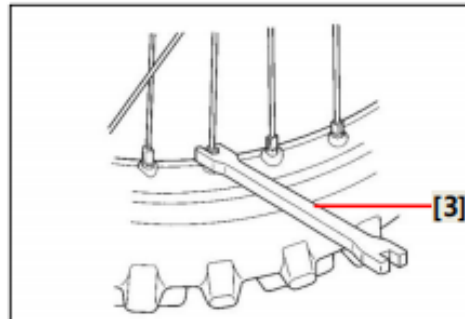
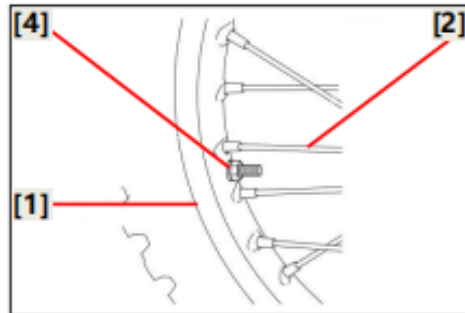
Limit value:

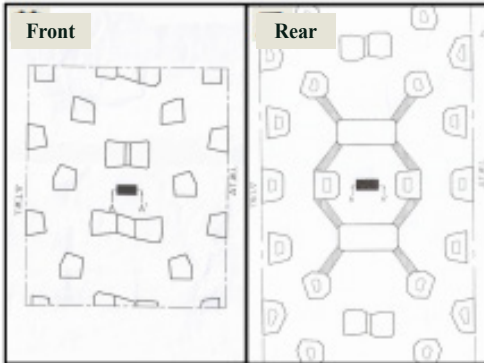
Front wheel: Radial: 1.0 mm

Axial: 1.0 mm

Rear wheel: Radial: 1.0 mm

Axial: 1.0 mm





※ **Replacement of tires**

KOVE's tires provide outstanding handling, braking, durability, and comfort in various riding conditions.

**Warning**

- Installing improper tires on your motorcycle can affect handling and stability, This may cause danger, severe injured or even death.
- Make sure to use the sizes and types of tires recommended in this manual.

**Tire specifications:**

Front wheel	80/100-21 M/C 51M	
	Chengxin/CST	CM736
Rear wheel	110/90-19 M/C 57M	
	Chengxin/CST	CM739
Type	Ordinary inner tube (butyl rubber)	

- When replacing tires, use original tires or equivalent tires of the same specifications.
- When changing tires, ensure that the pattern, rated speed and load range of the new tires match those of the original tires.

**Notes**

- Indicate the tire wear limit by marking the  $\Delta$ TWI mark on both the sidewall and center position of the tire.

※ **Rear shock absorber, suspension components and swingarm**

1. Stand the vehicle on a flat surface.

**Warning**

- Support the vehicle firmly so as not to turn over.

2. Disassemble

- Drive chain [1];
- See "Rear wheels, suspension" on page 205 for details
- Frame trim - left and right [2];
- See "Frame, body trim, exhaust system" on page 39 for details.
- Rear wheel assembly [3].
- See "Rear wheels, suspension" on page 205 for details

3. Disassemble

- Rear brake caliper [4];
- Brake hose clip [5].

**Note**

- When removing or installing the rear swingarm, be careful with the rear brake hose to avoid bending or damage.

4. Disassemble

Suspension components

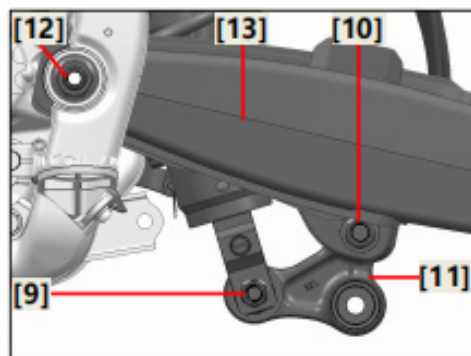
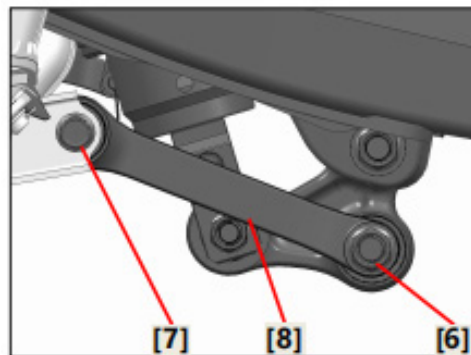
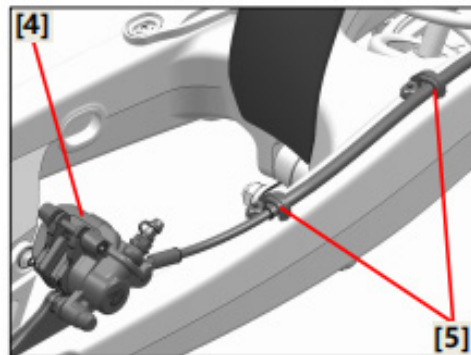
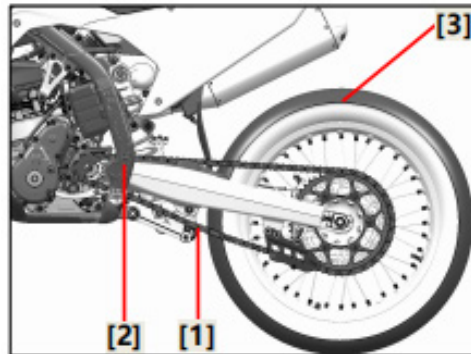
- Bolt [6].
- Nut/bolt [7];
- U swingarm [8].

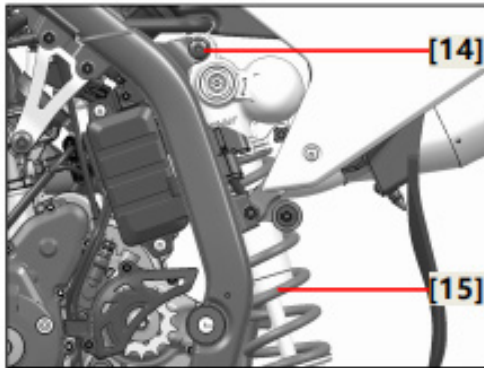
5. Disassemble

- Bolt [9];
- Bolt [10];
- Triangular cradle [11];
- Swingarm axle (nut) [12];
- Rear swingarm [13];
- Bolt [14];
- Rear shock absorber [15].

6. Installation

The installation sequence is reversed from the removal sequence.



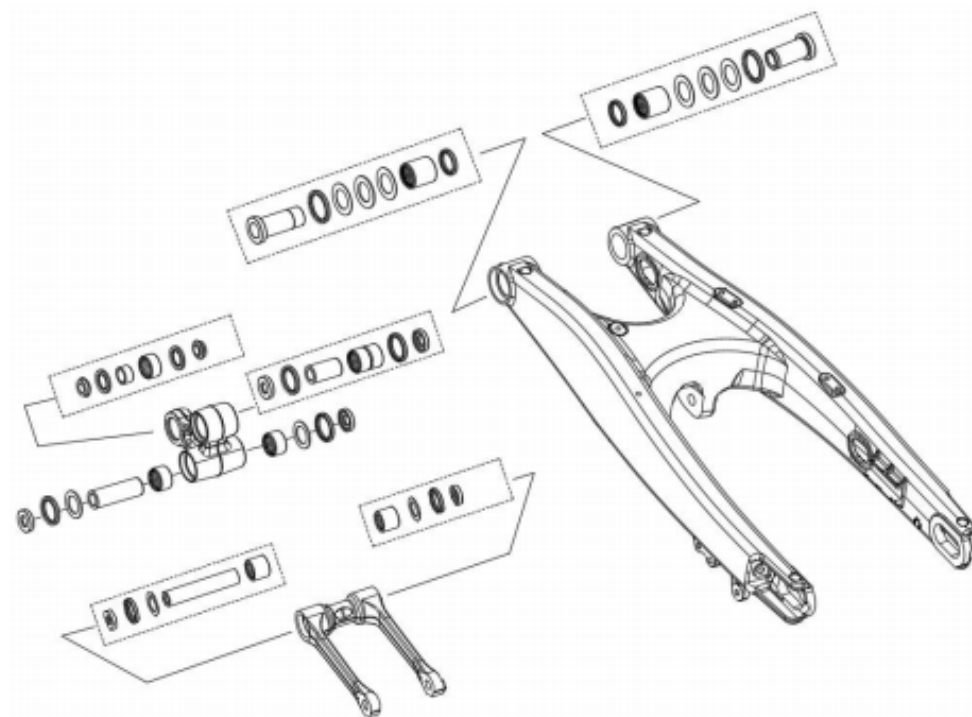


- Torque:
- U swingarm and frame**
  - Swingarm and triangular cradle**
  - U swingarm and triangular cradle**
  - 60 N·m (6.0 kgf·m, 44 lbf·ft)
  - Rear shock absorber upper section and frame**
  - Rear shock absorber lower section and triangular cradle**
  - 44 N·m (4.4 kgf·m, 33 lbf·ft)
  - Swingarm axle locking nut**
  - 88 N·m (8.8 kgf·m, 65 lbf·ft)
  - Mounting bolt of the oil pipe clip**
  - 5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Notes**

- Apply a very small amount of grease to the groove between the main and auxiliary lips of the swingarm bearing seal during installation.
- Lubricate the swingarm with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent).
- The decomposed diagram of the suspension pivot assembly and swingarm pivot is shown in the figure below.

The following is the decomposed diagram of the pivot and swingarm axle assembly.



※ **Rear shock absorber assembly**

**Disposal of rear shock absorber**

Before discarding the shock absorber, the gas pressure must be released. To release the gas pressure, drill a 2-3mm diameter bore in the flat part of the gas cylinder [1] as shown in the figure.

**Warning**

- Wear goggles to prevent eye injury caused by released gas or metal debris.

Disassemble the rear shock absorber assembly

1. Stand the vehicle on a flat surface

**Warning**

- Support the vehicle firmly so as not to turn over.

**Note**

- Support the vehicle with the maintenance bracket so that the rear wheel is lifted
- When removing the bolt, fix the swingarm to prevent it from falling down.

2. Disassembly:

Rear shock absorber

See “Rear wheel/suspension” on Page 253 for details.

Check the rear shock absorber assembly

3. Check:

- Rear shock absorber inner rod  
Bent/damage → Replace the rear shock absorber assembly.

- Rear shock absorber assembly (built-in airbag)  
Bent/damage → Replace the rear shock absorber assembly.

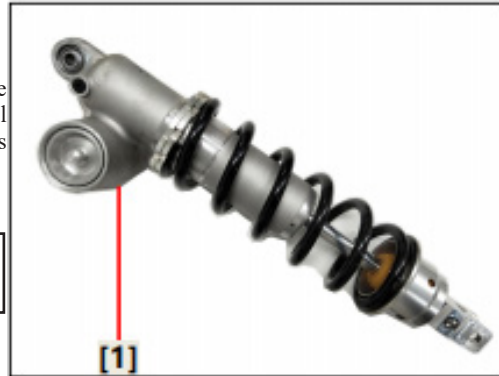
- Bushing

- Spring

Damage/wear → Replace the rear shock absorber assembly.

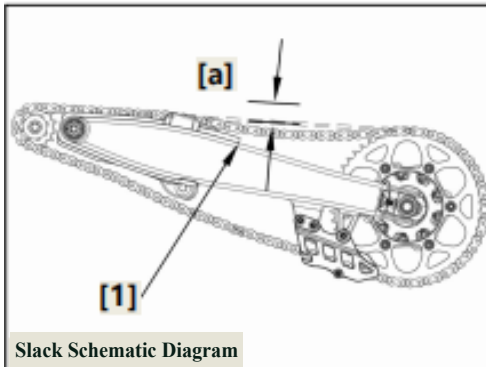
- Size of Bolts

Bent/damage/wear → replace.



**Warning**

- This rear shock absorber contains nitrogen compressed under high pressure. Before handling the rear shock absorber, please read and understand the following information. The manufacturer is not liable for any property or personal injury that may be caused by improper handling of the rear shock absorber.
- Do not modify or attempt to remove the rear shock absorber.
- Do not place the rear shock absorber around an open flame or any other high-temperature heat source, since the high temperature may cause excessive gas pressure and lead to an explosion.
- Do not use a rear shock absorber that is deformed or damaged. A damaged shock absorber will result in a decline in performance.



Slack Schematic Diagram

※ **Inspection and adjustment of slack of drive chain**

1. Place the motorcycle on the workbench.



Warning

• Support the vehicle firmly so as not to turn over.

**Notes**

• An overly tight drive chain can overload the engine and other major components, and an overly loose drive chain can cause slippage and damage the rear flat swingarms or cause an accident. It is therefore necessary to ensure that the drive chain slack is within the specified limits.

2. Put the vehicle in neutral.

3. Rotate the rear wheel backward and keep the drive chain taut.

4. Inspection:

- Looseness of transmission chain

Off-specification → Adjust.

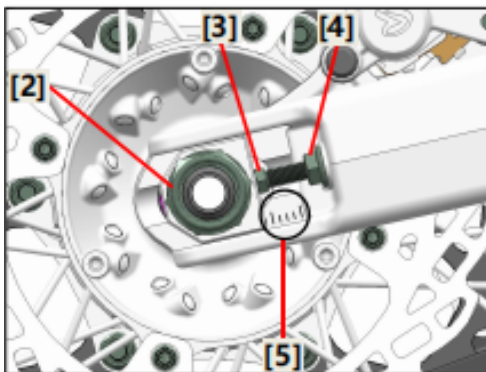
**Note**

• Start from the position [1] indicated by the arrow, and measure the distance [a] between the drive chain centers.

**Standard: 35-45 mm**

**Notes**

• Improper slack in the drive chain can overload the engine and other critical components of the motorcycle, leading to chain slippage or breakage. If the drive chain slack exceeds the specified limit, it may damage the frame, swingarm, and other parts. To prevent this, maintain the drive chain slack within the specified limit.



4. Release:

- Rear wheel axle nut [2]

See "Rear Wheel, Suspension" on Page 205 for details.

5. Adjustment:

- Looseness of transmission chain

a. Loosen the drive chain adjusting block locking nuts on the both sides [2].

b. Turn the two drive chain adjusting block bolts [4] until the specified range of drive chain slack is obtained.

**Note**

• To maintain correct wheel alignment, make sure to align the adjusting blocks on both sides with the scale marking line [5].

• There shall be no clearance between the adjusting blocks and the head of the adjustment bolt.

c. Tighten the rear axle nut to the specified torque.

**Rear wheel axle nut**

128 N·m (12.8 kgf·m, 94 lbf·ft)

d. Tighten the adjusting block locking nuts to the specified torque.

**Drive chain adjusting block locking nut**

16 N·m (1.6 kgf·m, 12 lb·ft)

※ Inspection, cleaning and lubrication of drive chain

**Warning**

• To ensure the service life and strength of the chain, please use the original manufacturer's specification for the drive chain.

**Notes**

• For optimal service life, it is highly recommended to clean and lubricate the drive chain after every drive.

1. Disassemble

Remove the chain baffle of the front sprocket decorative cover, the master link clip [1], the link plate [2], and the master link [3], then disconnect the drive chain.

Check if the master link clip is in good condition. Replace if necessary.

2. Inspection:

Inspect whether the chain gear is bent or damaged, please replace it if necessary.

3. Measurement:

Measure the distance [a] between 17 pins (16 pitches) from the center of one pin to the center of the next, while ensuring the chain remains tight and any bent joints are straightened.

**Service limits:**

**257mm**

If the measured value exceeds the maintenance limit, please replace the drive chain.

4. Clean:

Clean the drive chain [1] with a non-flammable or high-flash-point solvent and dry it.

Ensure the chain is completely dry before lubrication.

Check the drive chain for damage or wear.

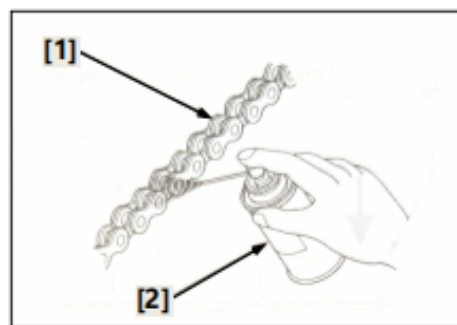
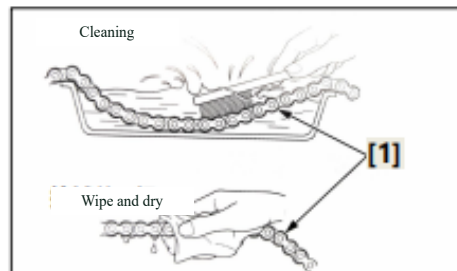
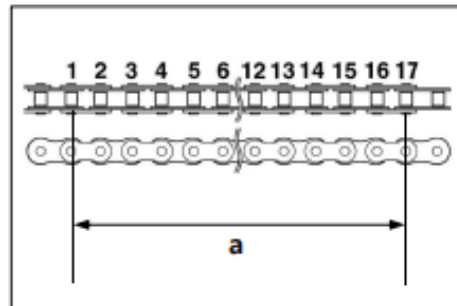
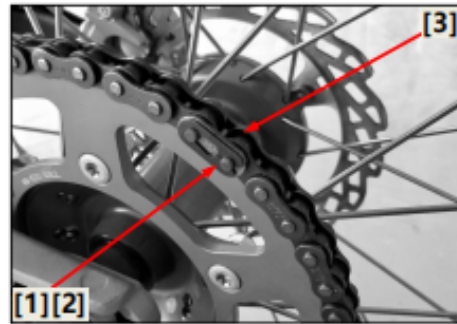
Replace any damaged rollers, loosely assembled links, or an unusable drive chain.

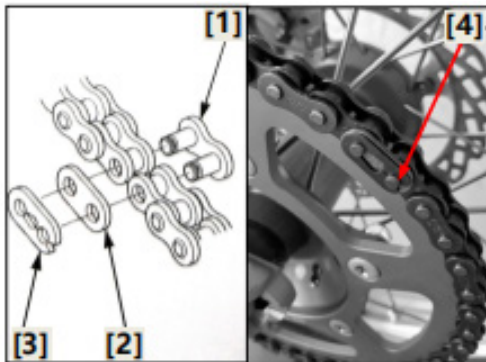
5. Lubrication

Apply drive chain lubricant [2] to properly lubricate the drive chain [1].

Recommended lubricants:

Use chain lubricant or SAE #80-90 gear oil to wipe off any excess oil or lubricant.





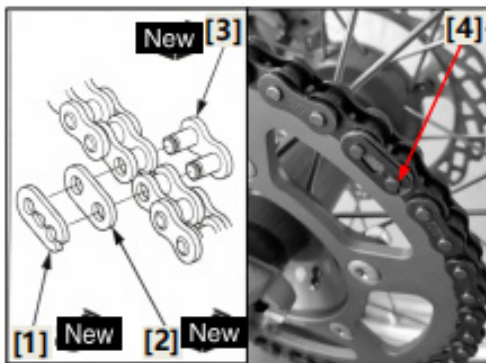
7. Installation:  
 Install the drive chain on the sprockets.  
 Install the master link [1] and the link plate [2].  
 Install the master link clip [3] with its open end [4] always facing rearward when the drive chain is on the upper side of the swingarm.  
 Install the chain baffle and front sprocket decorative cover.  
 Adjust the looseness of drive chain.

※ **Replacement of drive chain**

Remove the drive sprocket cover, baffle, and master link clip [1].

Note: Be careful not to damage the master link clip.  
 Remove the link plate [2] and the master link [3] to disconnect the drive chain.

Remove the drive chain.



**Standard link: 116 links**

**Replaced chain: DID 520 DMA 4K SDH**

**Notes**

• Never use new drive chains on worn sprockets. Both the chain and sprocket must be in good condition; otherwise, the newly replaced drive chain will wear out quickly.  
 When replacing the drive chain, inspect the sprocket as well.

Install the drive chain on the sprockets.

Install the new master link [3] and the link plate [2].

Install the new master link clip [1] with its open end [4] always facing rearward when the drive chain is on the upper side of the swingarm.

Install the baffle and front sprocket decorative cover.

**Note**

• After replacing the chain, adjust the drive chain slack to the specified range again.

※ **Drive/driven sprockets**

Remove the drive sprocket cover.

Check the drive sprocket gear teeth and driven sprocket gear teeth for wear or damage, replace them if necessary.

Consult your dealer to replace the drive sprocket and driven sprocket.

Never use new drive chains on worn sprockets. Both the drive chain and sprocket must be in good condition; otherwise, the newly replaced drive chain will wear out quickly.

Check the bolts and nuts on the drive sprocket and driven sprocket. If there is any looseness, tighten to the specified torque value.

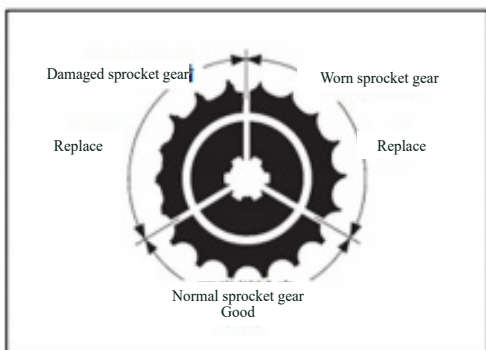
Torque:

**Drive sprocket bolt**

45 N·m (4.5 kgf·m, 33 lbf·ft)

**Bolts connecting driven sprocket to wheel hub**

38 N·m (3.8 kgf·m, 28 lbf·ft)



**Notes**

• Install the driving sprocket on the engine counter shaft and apply thread adhesive (Huitian 7272).

**Hydraulic Brake**

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## Maintenance Instructions

### Overview:

- This section describes the maintenance of conventional brake components of the brake system.
- This section describes how to perform the brake fluid replacement procedure and the exhaust process.
- Contaminated brake discs or brake pads will reduce braking efficiency.
- Discard contaminated brake pads and clean contaminated brake discs with high-quality brake degreaser.
- In maintenance of the system, be sure to use fresh DOT 4 brake fluid in a sealed container and do not mix different types of fluids which may not be compatible.
- Prevent any contaminants (dirt, water, etc.) from entering the unclosed reservoir.
- Once the hydraulic system is turned on, or if the braking force is insufficient, the brake system must be emptied, and the brake operation must be checked.
- Spilled brake fluid will seriously damage the instrument surface, painted surface and rubber parts; be careful when removing the reservoir lid, first make sure that the front reservoir is horizontal.

## Troubleshooting

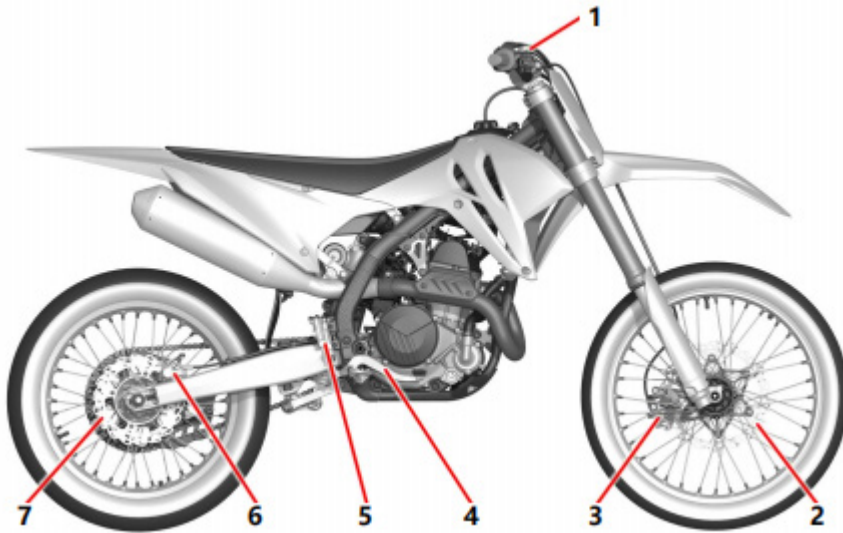
### Insufficient braking force of brake handle/pedal

- Air in hydraulic system
- Leakage in hydraulic system
- Contaminated brake pads/discs
- Wear of brake caliper piston seal
- Wear of main piston cup
- Contaminated brake pads/discs
- Contaminated brake caliper
- Contaminated brake pump
- Abnormal sliding of brake caliper shaft
- Low brake fluid level
- Oil passage blockage
- Distortion/deformation of brake disc
- Brake caliper piston stuck/worn
- Main piston stuck/worn
- Brake handlebar/pedal bend

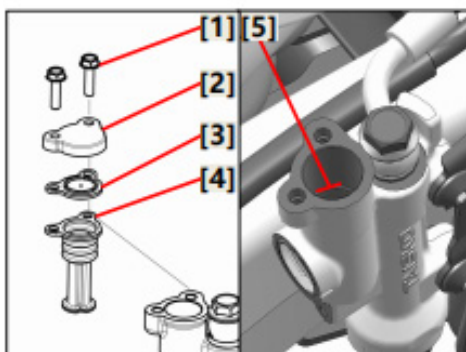
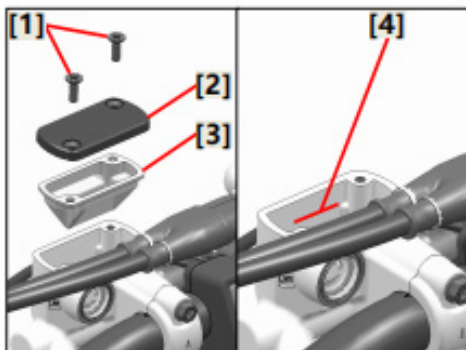
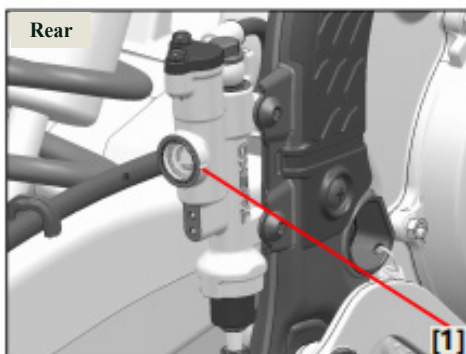
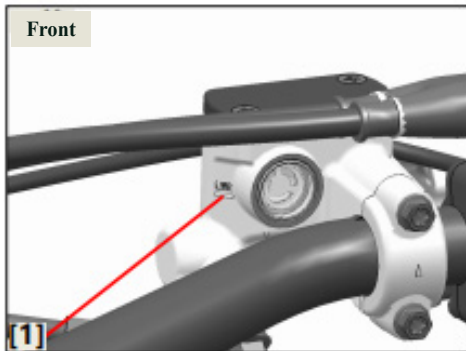
### Brake handlebar/pedal requires force

- Blocked/restricted oil passage
- Brake caliper piston stuck/worn
- Abnormal sliding of brake caliper
- Wear of brake caliper piston seal
- Main piston stuck/worn
- Brake handlebar/pedal bend
- Brake resistance
- Contaminated brake pads/discs
- Misaligned wheels
- Severe wear of brake pads/discs
- Distortion/deformation of brake disc
- Abnormal sliding of brake caliper
- Blocked/restricted oil passage
- Caliper piston stuck

**Position of Components**



S/N	Component Name
1	Front brake pump
2	Front Brake Disc
3	Front brake caliper
4	Rear brake pedal assembly
5	Rear brake pump
6	Rear brake caliper
7	Rear Brake Disc



※ **Inspection and replenishment of brake fluid level**

**Warning**

- Spilled brake fluid can damage paint, plastic or rubber parts.

**Notes**

- Ensure not to mix incompatible types of brake fluids together.
- When adding brake fluid, do not allow foreign matter to enter the reservoir.

※ **Level inspection**

Check the brake fluid level in both the front and rear brake pump liquid reservoirs.

If the level is close to the lower level line [1], check the brake pads for wear. If the brake pads are not worn and the level is low, check the entire system for leaks and proceed to fill the reservoir with brake fluid.

**Brake fluid addition**

- **Front brake pump:**

Remove the front brake pump reservoir cover screw [1], reservoir cover [2], and lining [3].

Fill the reservoir with the recommended brake fluid to the upper level line [4]. Use the recommended brake fluid: DOT4 brake fluid

Install the lining and reservoir cover.

Install and tighten the front brake reservoir cap screws to the specified torque.

**Torque:**

1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Check the front brake hydraulic system for leaks.

- **Rear brake pump:**

Remove the rear brake pump reservoir cover screw [1], reservoir cover [2], gasket [3], and lining [4].

Fill the reservoir to the upper level line using the recommended brake fluid [5]. Recommended brake fluid: DOT4 brake fluid

Install the lining [4], gasket [3], and cover [2].

Install and tighten the rear brake pump reservoir cover screw [1] to the specified torque.

**Torque:**

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Check the front brake hydraulic system for leaks.

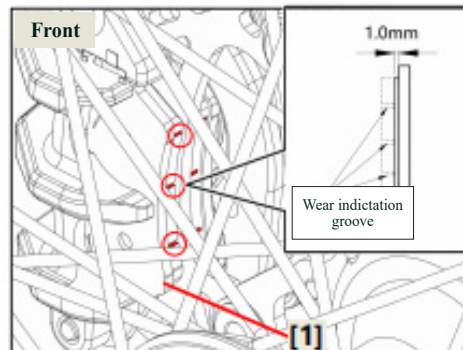
### Inspection and replacement of brake pads

#### - Front brake pad:

By inspecting the front wheel brake pads, the wear condition can be determined. If the wear thickness of any brake pad reaches **1.0mm**, the entire set of brake pads must be replaced.

#### - Rear brake pad:

Check the brake pad from the rear side of the brake caliper to determine the wear of the brake pad. If the wear thickness of any brake pad reaches **1.0mm**, the entire set of brake pads must be replaced.



#### Notes

- When replacing the brake pads, it is not needed to disassemble the brake hose.

Replace front/rear brake pads

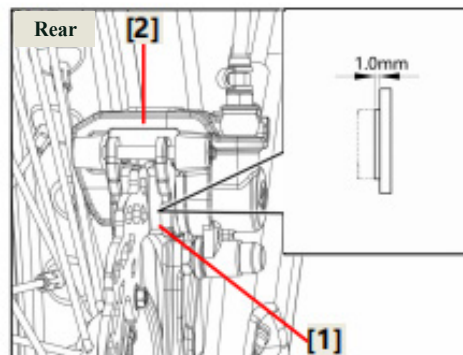
The following steps apply to the front/rear brake pad piece.

#### 1. Disassembly: **Front brake pad**

- Bolt [1];
- Caliper [2];
- Brake pad guide pin bolt [3];
- Brake pad and spring [4].

#### 2. Disassembly: **Rear brake pad**

- Brake pad guide pin bolt [5];
- Brake pad, heat shield, spring [6].



#### Note

- When replacing brake pads, please replace them as a complete set.

The steps are as follows:

- Connect the transparent hose to the bleed screw and place the other end into an empty container.
- Loosen the bleed screw and use an appropriate tool to push the caliper piston into the brake caliper bore.
- Tighten the bleed screw.
- Install the brake pad and brake pad spring.

#### 3. Installation:

- Brake pad guide pin bolt;
- Brake caliper. (Front brake caliper)

#### 4. Inspection:

- Brake fluid level

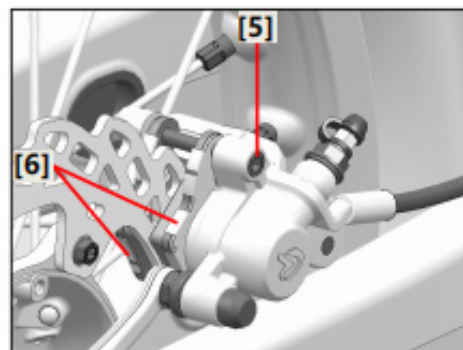
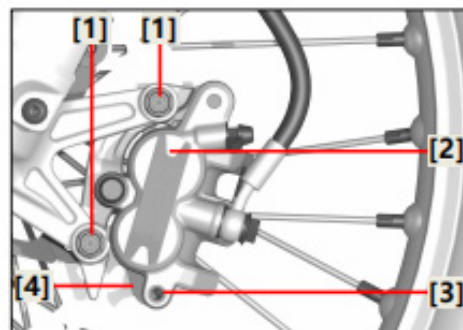
Below minimum level → Add brake fluid.

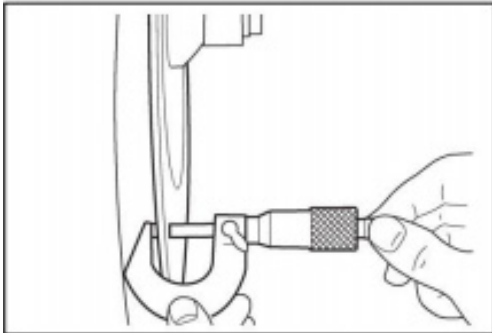
See "Brake fluid addition" on page 220 for details.

- Hand brake lever operation

Soft → Bleed the brake system

See "Hydraulic brake system bleeding" on Page 223 for details.





※ **Inspection and replacement of brake discs**

**Inspection**

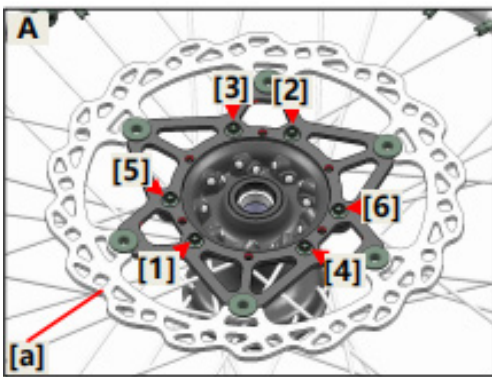
· Visually check the brake disc for damage or cracks.

Measure the wear limit of brake disc:

Front brake disc: **2.5 mm**

Rear brake disc: **2.5 mm**

Damage/deformation/off specification → Replace.



**Replace brake discs**

The following steps apply to the front/rear brake discs.

1. Disassemble

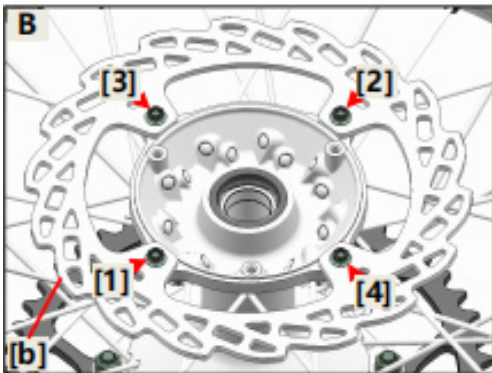
A: Front

- Front wheel assembly;

See "Front Wheels, Suspension, Steering" on page 193 for details.

- Remove 6 mounting bolts of the brake disc;

- Remove the disc brake disc [a].



2. Disassemble

B: Rear

- Rear wheel assembly;

See "Rear Wheel, Suspension" on Page 205 for details.

- Remove 4 mounting bolts of the brake disc;

- Remove the disc brake disc [b];

Torque:

**Front brake disc mounting bolts**

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

**Rear brake disc mounting bolt**

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

**Note**

· Tighten the bolts in the order indicated by the arrow numbers.

**Notes**

· When installing, coat thread locker (Huitian 7272) to the threads of the front/rear brake discs.

※ **Hydraulic brake system bleeding**

**Warning**

- After removing the brake-related parts, ensure to bleed the brake system.

**Note:**

- Exhaust the brake system in the following sequence.
- Step 1: Front brake caliper.
- Step 2: Rear brake caliper.

**Warning**

**State of releasing brake system air:**

- Brake pump is disassembled.
- Brake hose is loose, removed or replaced.
- Brake fluid level is below the minimum mark.
- There is a malfunction in the brake operation.

**Note**

- Take care to avoid spilling brake fluid or allowing the brake master cylinder reservoir or brake caliper reservoir to overflow.
- When releasing the air from the hydraulic brake system, ensure that the brake fluid level is sufficient before running the brake. Skipping this step will allow air to enter the hydraulic brake system, resulting in a significant increase in the time required for the bleeding procedure.
- If releasing is difficult, it may be necessary to allow the brake fluid to settle for several hours. Once the small bubbles in the hose have disappeared, repeat the release procedure.

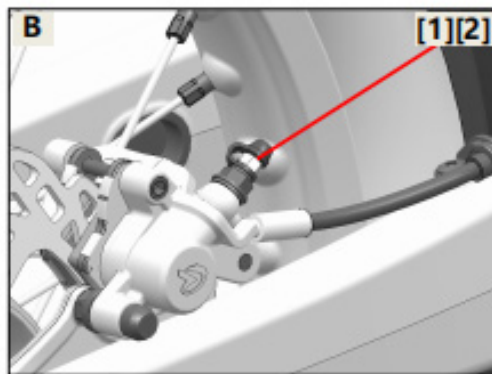
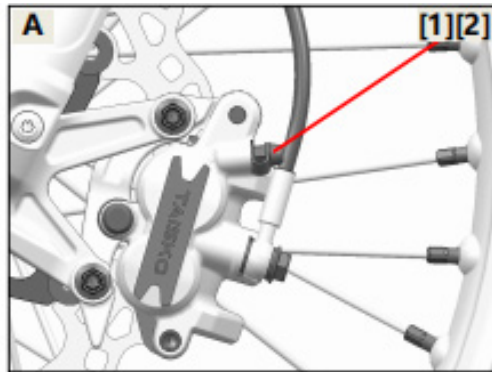
**1.Exhaust:**

- Fill the brake fluid reservoir to the appropriate level using the specified brake fluid.
- Install gasket (brake master cylinder reservoir or brake fluid reservoir).
- Connect the clear plastic hose [1] tightly to the bleed bolt [2].

**A. Front**

**B. Rear**

- Place the other end of the hose in the container.
- Run the brake slowly/several times.
- Pull up the brake handle completely, or press the brake pedal all the way down until it is fully engaged.
- Loosen the bleed screw.



**Note**

- Loosen the bleed screw to release air and ensure that the brake handle makes full contact with the throttle grip or brake pedal.
- h. Tighten the bleed screw and release the brake handle or brake pedal.
- i. Repeat steps (e) to (h) no bubbles are visible in the brake fluid within the plastic hose.
- j. After operating the brake system, repeat steps (e) to (i) and fill the brake master cylinder reservoir or brake fluid reservoir to the appropriate level using the specified brake fluid.
- k. Tighten the bleed screw to the specified torque.

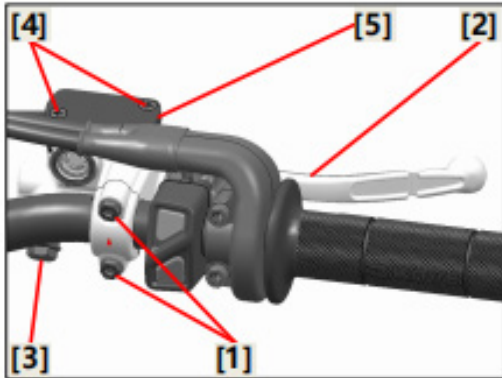
**Brake caliper bleed screw [1]**

9.0 N·m (0.9 kgf·m, 6.6 lb·ft)

- Fill the brake master cylinder or brake fluid reservoir to the appropriate level using the specified brake fluid.
- See "Add brake fluid" on page 220 for details.

**Warning**

- After air is completely removed from the hydraulic brake system, check the operation of the brakes.



※ **Front brake pump**

**Note**

· Before removal of the front brake pump, bleed the brake fluid of the entire brake system.

1. Disassemble

- Brake pump mounting screw [1];
- Front brake pump [2];
- Oil passing bolt and gasket [3];
- Reservoir cover screw [4];
- Reservoir cover and lining [5].

2. Inspection

**Brake pump**

- Brake master cylinder

Damage/scratch /wear → Replace.

- Brake fluid passage

(Brake master cylinder body)

Blocked → Blow through with compressed air.

- Brake master cylinder assembly

Damage/scratch /wear → Replace.

- Brake master cylinder reservoir

- Master cylinder reservoir cover/lining

Crack/damage → Replace.

- Brake hose

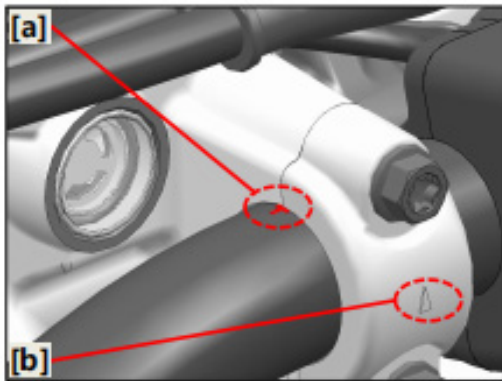
Crack/damage /wear → Replace.

3. Installation

The installation sequence is reversed from the removal sequence.

**Notes**

· Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.



**Warning**

- Only use the specified brake fluid. Other brake fluids may cause aging of the rubber oil seal, resulting in leakage and poor braking performance.
- Please add the same kind of brake fluid as used in the system. Mixed brake fluid may cause adverse chemical reactions, resulting in degradation of braking performance.
- When adding, be careful not to allow water to enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and cause vapor lock.

**Note**

- Replace the new (oil passing bolt) sealing washer.
- Align the joint surface of the front brake pump fixing socket with the marking point [a] on the right side of the steering handlebar for installation.
- Install the front brake pump fixing socket with arrow [b] facing upwards.

**Torque:**

**Front brake pump**

8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

**Brake oil pipe locking bolt**

32 N·m (3.2 kgf·m, 24 lbf·ft)

※ **Rear brake pump**

**Note**

· Before removal of the rear brake pump, bleed the brake fluid of the entire brake system.

1. Disassemble

- Oil passing bolt and gasket [1];
- Pin [2];
- Bolt [3];
- Rear brake pump [4].

2. Inspection

**Brake pump**

- Brake master cylinder

Damage/scratch /wear → Replace.

- Brake fluid passage

(Brake master cylinder body)

Blocked → Blow through with compressed air.

- Brake master cylinder assembly

Damage/scratch /wear → Replace.

- Brake master cylinder reservoir

- Brake master cylinder reservoir cover/gasket/lining

- Rear brake push rod seal rubber grommet

Crack/damage → Replace.

- Brake hose

Crack/damage /wear → Replace.

3. Installation

The installation sequence is reversed from the removal sequence.

**Note:**

· Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.

**Note**

· When installing the connection between the rear brake pump and the frame, apply thread locker (Huitian 7272) to the threaded parts.

· When tightening the brake hose locking bolt, make sure that the oil pipe joint is against the limit protrusion.

· Replace the new (oil passing bolt) sealing washer.

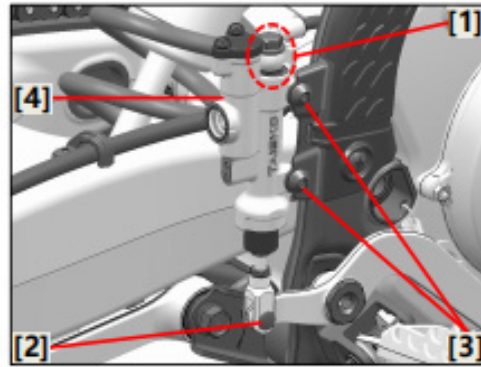
Torque:

**Rear brake pump and frame**

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

**Brake hose bolt**

32 N.m(3.2 kgf·m,24 lbf·ft)

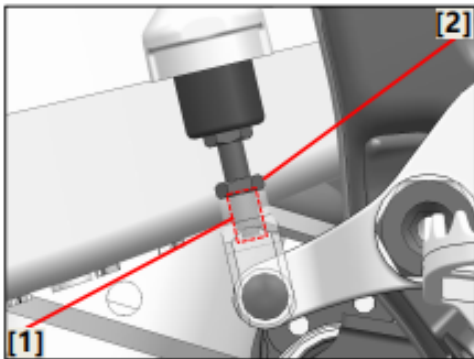


**Warning**

· Only use the specified brake fluid. Other brake fluids may cause aging of the rubber oil seal, resulting in leakage and poor braking performance.

· Please add the same kind of brake fluid as used in the system. Mixed brake fluid may cause adverse chemical reactions, resulting in degradation of braking performance.

· When adding, be careful not to allow water to enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and cause vapor lock.

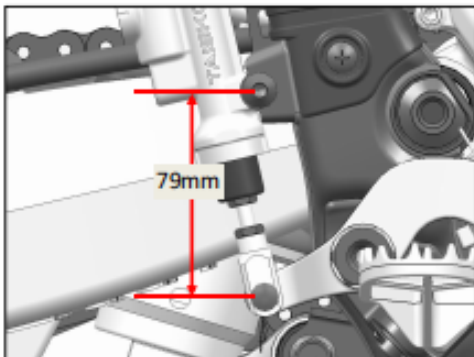


※ **Adjustment of brake pedal**

After removing the push rod, adjust its length so that the distance from the center of the lower mounting bolt hole of the brake pump to the center of the connecting pin hole is the standard length of **79mm**. If the length is adjusted to a longer position, make sure that the lower end of the push rod thread [1] is 5 mm in the connector, and tighten the locking nut [2] to the specified torque after adjustment.

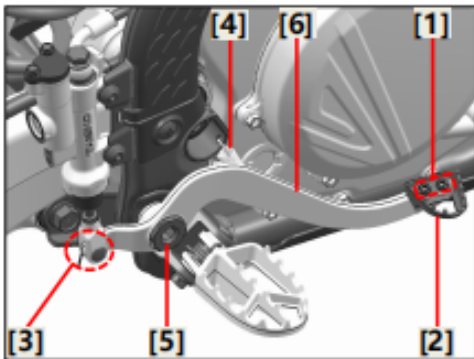
**Rear brake pump push rod adjustment locking nut:**

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



※ **Rear brake pedal assembly**

1. Disassemble
  - Bolt [1];
  - Rear brake pedal [2];
  - Cotter pin, flat gasket, and pin [3];
  - Rebound tension spring [4];
  - Rocker arm mounting bolt [5];
  - Rear brake rocker arm [6].
2. Inspection
  - Rear brake rocker arm pivot oil seal [a]
 Damage → Replace.



3. Installation
 

The installation sequence is reversed from the removal sequence.

**Notes**

- During installation, apply grease to the groove between the main and auxiliary lips of the brake arm pivot oil seal [a].
- Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent).
- When installing the rear brake pedal, apply thread adhesive (Huitian) 7262.
- When installing the rear brake rocker arm bolt [b], apply thread adhesive (Huitian) 7272 on the thread.

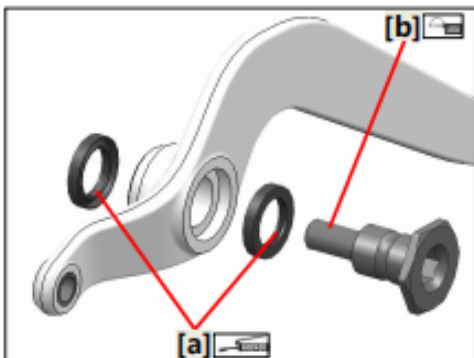
**Torque:**

**Rear brake rocker arm mounting bolt**

22 N.m (2.2 kgf·m, 16 lbf·ft)

**Rear brake pedal mounting bolt**

8.0 N.m (0.8 kgf·m, 6.0 lbf·ft)



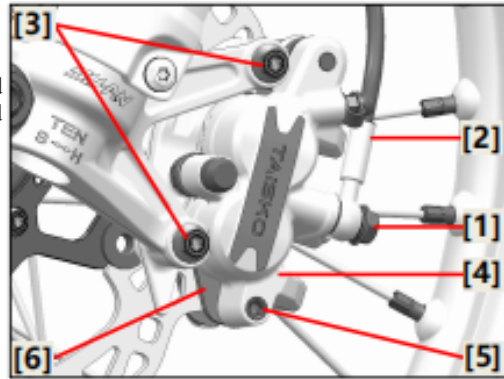
※ **Front brake caliper**

**Notes**

• Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.

1. Disassemble

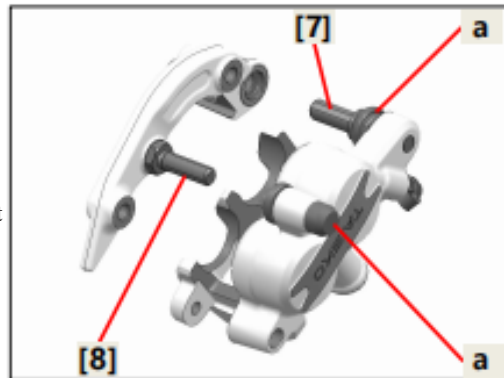
- Oil passing bolt and shim [1];
- Brake hose [2]
- Bolt [3];
- Front brake caliper and caliper bracket [4];
- Brake pad guide pin bolt [5];
- Front brake pad [6].



2. Inspection

**Brake Caliper**

- Brake wheel cylinder  
Damage/scratch /wear → Replace.
- Brake fluid passage  
(Brake wheel cylinder body)  
Blocked → Blow through with compressed air.
- Brake wheel cylinder assembly  
Damage/scratch /wear → Replace.
- Front brake caliper upper and lower sliding shaft  
rubber grommet [a]
- Crack/damage → Replace.
- Brake hose  
Crack/damage /wear → Replace.



3. Installation

The installation sequence is reversed from the removal sequence.

**Note**

- During installation, the sliding areas [7] and [8] of the upper and lower smooth portions of the rods need to be coated with silicone grease for lubrication.
- During installation, apply thread locker (Huitian 7272) to the threads of both the sliding shaft bolt and the brake pad guide pins.
- When tightening the brake hose locking bolt, always ensure the hose connector rests against the limit protrusion on the brake caliper body.
- Replace with the new gasket (oil passing bolt).

Torque:

**Front brake caliper mounting bolt**

32 N·m (3.2 kgf·m, 24 lbf·ft)

**Brake hose bolt**

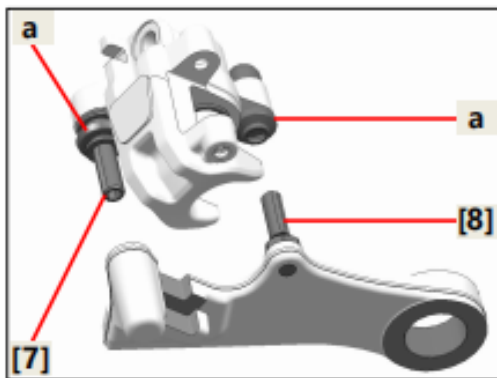
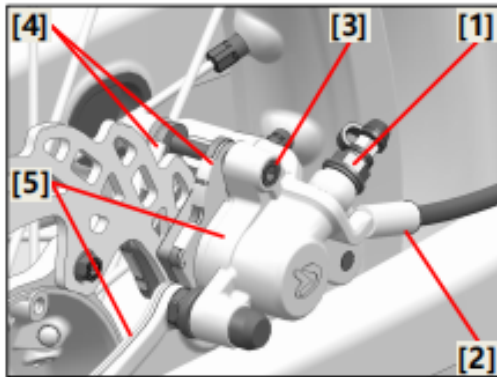
32 N·m (3.2 kgf·m, 24 lbf·ft)

**Brake pad guide pin bolt**

15 N·m (1.5 kgf·m, 11 lbf·ft)

**Upper and lower sliding shaft bolts**

20 N·m (2.0 kgf·m, 15 lbf·ft)



※ **Rear brake caliper**

**Notes**

· Brake fluid may damage the painted surface and plastic parts. Be sure to clean up any spill of brake fluid immediately.

1. Disassemble

- Oil passing bolt and shim [1];
- Brake hose [2]
- Brake pad guide pin bolt [3];
- Rear brake pad, heat shield and spring [4];
- Rear wheel assembly;

See “Rear Wheel, Suspension” on Page 205 for details.

- Rear brake caliper and caliper bracket [5].

2. Inspection

**Brake Caliper**

- Brake wheel cylinder  
Damage/scratch /wear → Replace.
- Brake fluid passage  
(Brake wheel cylinder body)  
Blocked → Blow through with compressed air.
- Brake wheel cylinder assembly  
Damage/scratch /wear → Replace.
- Rear brake caliper upper and lower sliding shaft  
rubber grommet [a]  
Crack/damage → Replace.
- Brake hose  
Crack/damage /wear → Replace.

3. Installation

The installation sequence is reversed from the removal sequence.

**Note**

- During installation, the sliding areas [7] and [8] of the upper and lower smooth portions of the rods need to be coated with silicone grease for lubrication.
- During installation, apply thread locker (Huitian 7272) to the threads of both the sliding shaft bolt and the brake pad guide pins.
- When tightening the brake hose locking bolt, always ensure the hose connector rests against the limit protrusion on the brake caliper body.
- Replace with the new gasket (oil passing bolt).

Torque:

**Brake hose bolt**

32 N·m (3.2 kgf·m, 24 lbf·ft)

**Brake pad guide pin bolt**

15 N·m (1.5 kgf·m, 11 lbf·ft)

**Upper and lower sliding shaft bolts**

20 N·m (2.0 kgf·m, 15 lbf·ft)

**Electrical Components**

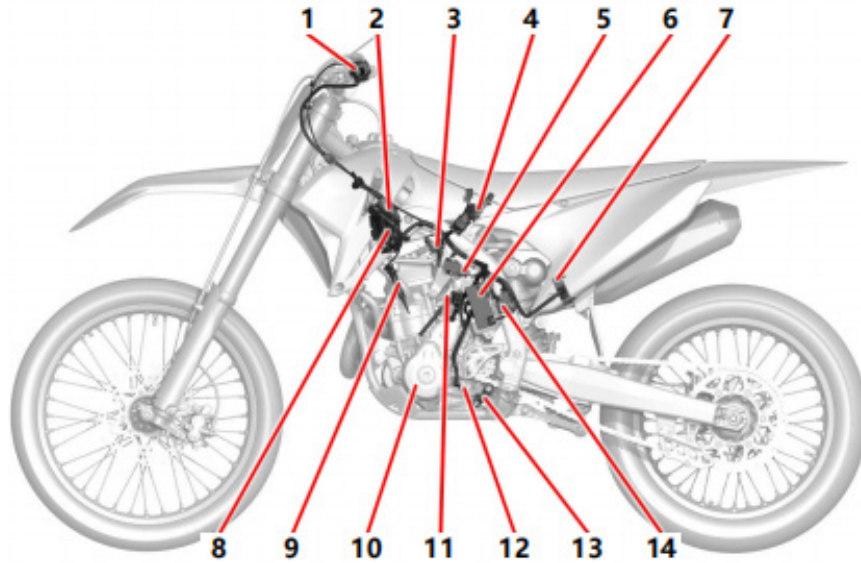
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### Maintenance Instructions

Precautions:

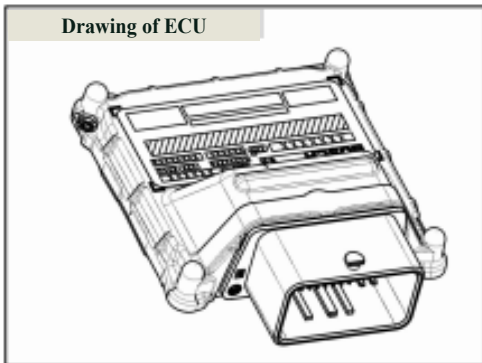
- During maintenance, it is forbidden to disassemble the parts of EFI system.
- During maintenance, extreme care shall be exercised on work with electronic components (ECUs, sensors, etc.) to prevent missing. Furthermore, do not touch the pins of electrical components at will to avoid damage caused by electrostatic breakdown.
- Do not remove the connectors of any components of the EFI system from their installation positions without authorization, to avoid accidental damage or foreign matters such as water and oil entering the connectors, which may affect the normal operation of the EFI system.
- When disconnecting and connecting the connector, be sure to put the ignition switch in the off position, otherwise the electrical components will be damaged.

**Position of Components**

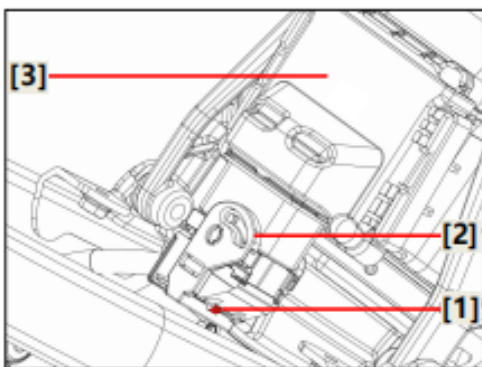
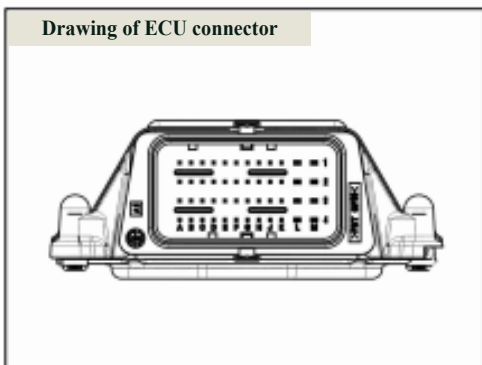


S/N	Component Name
1	Handlebar switch assembly (left and right)
2	Split-type ignition coil
3	Fuel injector
4	ECU control unit
5	Three-in-one sensor
6	Battery
7	Rectifier regulator
8	Fuel pump assembly
9	Spark plug cap
10	Magneto/trigger
11	Water temperature sensor
12	Gear sensor
13	Quick-shifting sensor
14	Starting relay

Drawing of ECU



Drawing of ECU connector



※ **Electronic control unit (ECU)**

The electronic control unit is the brain of the whole EFI system and electrical appliances. It analyzes and processes all kinds of information provided by sensors, and sends the conclusion to the actuator in the form of command, so that the engine can run in the optimum state.

**Warning**

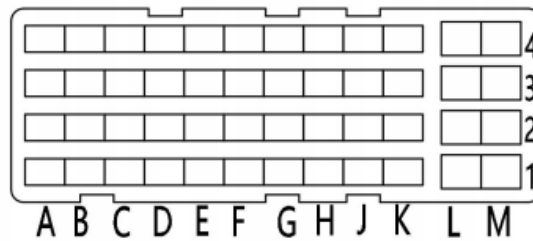
- Do not use tools when disassembling the ECU to avoid damaging the connector clip.
- It is not allowed to increase the load on the housing or cover plate; when disassembling, handle with care and prevent falling to the ground.
- When disconnecting and connecting the ECU connector assembly, be sure to set the ignition switch to OFF position, or the electrical components will be damaged.

**Note**

- While pressing position [1], turn position [2] clockwise, then the connection between the ECU and the cable can be disconnected.
- Remove the ECU control unit and rubber grommet from the clip.

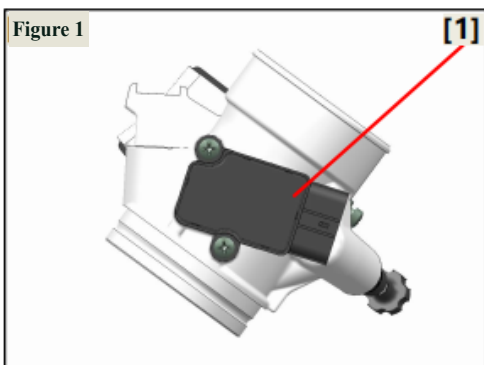
Quantity Value					
		Minimum	Standard	Maximum	Unit
Vehicle voltage	Normal operation	9.0	12.8	15.0	V
Limit and time to withstand vehicle over-voltage	15V	Some functions are maintained and fault diagnosis can be performed.		120	min
Operating temperature		-30		+70	°C
Storage temperature		-30		+85	°C

※ Schematic Diagram of Outgoing Direction of ECU Connector



Function definitions of ECU pins:

PIN-NO	FUNCTION	Wire harness color	PIN-NO	FUNCTION	Wire harness color
1(A1)	-	-	25(A3)	-	-
2(B1)	-	-	26(B3)	-	-
3(C1)	CAN communication line - high	G/L	27(C3)	-	-
4(D1)	CAN communication line - low	R/Y	28(D3)	Launch switch signal input	Y/G
5(E1)	-	-	29(E3)	Diagnostic K-line	W/G
6(F1)	Water temperature sensor signal	Gr/G	30(F3)	Continuous power supply (12V)	R
7(G1)	Throttle position	P/W	31(G3)	Ignition signal	B/W
8(H1)	Intake air temperature sensor	P/B	32(H3)	-	-
9(J1)	Sensor GND	G/B	33(J3)	5V power supply	P
10(K1)	Intake pressure sensor	P/G	34(K3)	-	-
11(L1)	-	-	35(L3)	-	-
12(M1)	-	-	36(M3)	ECU ground	G
13(A2)	-	-	37(A4)	Fuel injector	O/B
14(B2)	-	-	38(B4)	-	-
15(C2)	-	-	39(C4)	Oil pump relay	Br/B
16(D2)	Neutral gear signal input	W/Y	40(D4)	-	-
17(E2)	-	-	41(E4)	-	-
18(F2)	-	-	42(F4)	Trigger A-end	L/W
19(G2)	Quick-shifting sensor	LB	43(G4)	Trigger B-end	G/W
20(H2)	-	-	44(H4)	-	-
21(J2)	-	-	45(J4)	-	-
22(K2)	-	-	46(K4)	Mode switch signal input	Gr/L
23(L2)	-	-	47(L4)	Main relay input: 12V	V
24(M2)	Ignition Coil	B/Y	48(M4)	-	-



※ **Throttle body assembly**

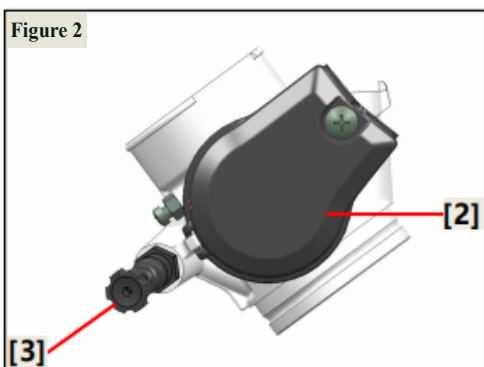
Connect the air filter and engine, control the angle of the throttle plate through the accelerator cable, and the throttle position sensor will send the angle signal to ECU.

**As shown in Figure 1 and 2:** Sensor and component positions:

1. Three-in-one sensor [1];
2. Eccentric wheel [2];
3. Choke knob [3]

Precautions in sensor installation:

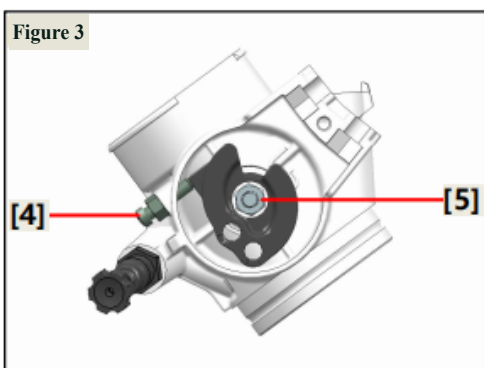
1. The terminals shall not be stained with water, oil and other liquids;
2. Do not contact harmful gases (Cl, SO<sub>3</sub>, etc.);
3. Do not exert external force to cause deformation or damage of parts;
4. Direct contact with terminals is not allowed (to prevent static electricity);
5. It is necessary to block the pressure channel when cleaning the throttle.



**As shown in Figure 3,** the idle limit screw [3] and eccentric wheel nut [4] must not be adjusted.

**Warning**

- The engine idle speed is completely adjusted by EFI system, and manual adjustment of the idle limit bolts is not allowed.
- It is not allowed to increase the load on the shell or cover plate.
- When dismantling, handle with care to avoid falling.



**As shown in the Figure 1:**

Three-in-one sensor mounting screw  
Torque: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

**As shown in the Figure 2:**

Eccentric wheel mounting screw  
Torque: 2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Throttle valve body inspection:

1. The throttle plate moves flexibly and is not stuck;
2. There is no foreign matter in throttle body and oil/gas passages (foreign particle size < 0.34 mm);
3. There is no missing assembly and incorrect assembly of parts or missing parts, and the internal parts are installed firmly without falling off;
4. The throttle screw is tightened reliably without loosening.

※ **Three-in-one sensor**

**Intake air temperature sensor**

It is installed on the right side of the air filter box bottom and used to detect the real-time temperature of air before it is drawn into the engine cylinder and feeds back the signal to the ECU to adjust the fuel injection quantity of the engine, thereby enhancing engine combustion efficiency.

**Intake pressure sensor**

Monitor the intake pipe pressure and provide the engine load information for ECU.

**Throttle position sensor**

The throttle position sensor is generally equipped with a throttle coupling shaft. By turning the accelerator handle, the driver drives the throttle flap to rotate, and then transmits the rotation information to the throttle position sensor through the throttle shaft and the throttle coupling shaft, so as to monitor the opening of the throttle and transmit the position signal to the ECU, measure the intake air volume, control the fuel injection volume of the engine, and realize the real-time control of the engine speed.

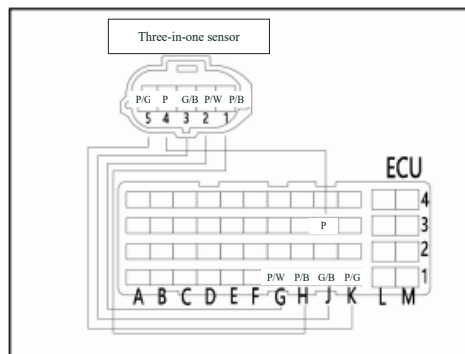
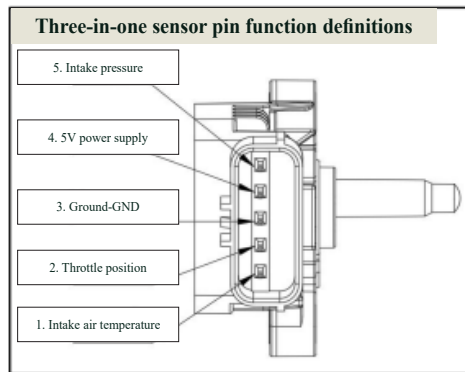
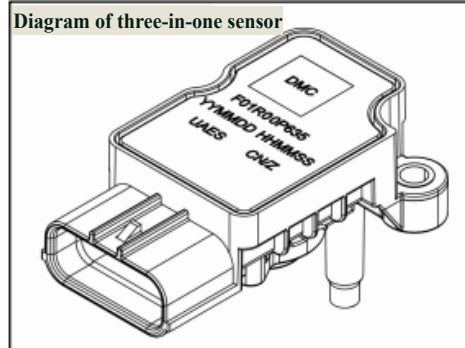
**Function definitions of pins:**

1. Intake air temperature (IAT) to ECU (H1) P/B;
2. Throttle position (TP) to ECU (G1) P/W;
3. Ground - (GND) to ECU (J1) G/B.
4. Power supply 5V+ (Vin) to ECU (J3) P;
5. Intake pressure (MAP) to ECU (K1) P/G;

**Install:**

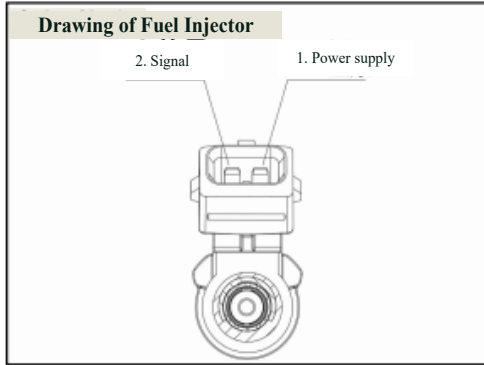
It shall be installed within a permissible range, making sure that no condensate water will be generated in the sensor, because condensate water will damage the sensing elements inside the sensor.

**The figure on the right is** a wiring diagram for connection between different sensors and ECU.



**Sensor voltage/resistance parameters**

- Throttle position sensor voltage: 0.45 - 0.85V at 11°, 3.7-4.2V at 90°.
- Intake pressure voltage: 1.365-1.459V at 35 kPa, 3.793-3.887V at 95 kPa.
- Intake air temperature sensor resistance: 1.990-2.123 kΩ at 25°C.



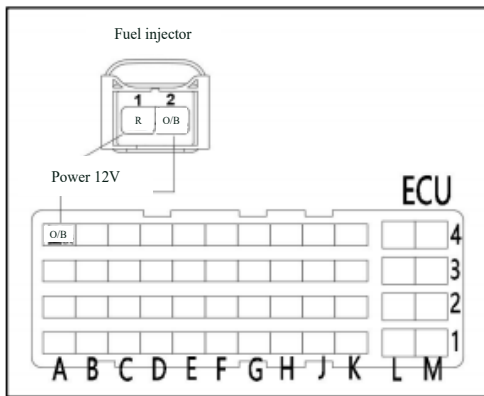
※ **Fuel injector**

One end of the injector is installed on the injector seat, and the other end is connected to the oil pipe through the injector cap. It injects fuel within the specified time according to the command of ECU, thus providing fuel to the engine and atomizing it. The fuel injector adopts 10-hole duel-beam injection, and cannot rotate after the circlip is fixed.

**Function definitions of pins:**

**Fuel injector**

1. Connected to power supply 12V + (R)
2. Signal connected to (A4) pin of ECU37 (O/B)



The figure on the left is a wiring diagram for connection between injector and ECU.

**Note:**

1. In order to avoid contamination to the injecting area, the fuel inlet end of the injector shall always be above the fuel outlet end (at the injector mounting position on the entire vehicle);
2. To achieve the best assembly of fuel injector, it is necessary to lubricate the upper and lower O-ring with clean silicone-free engine oil; Lubricating oil shall not contaminate the inside and orifice of the injector;
3. The O-ring must be replaced when removing and reassembling the injector, and the sealing surface must not be damaged during such operation.

**Inspection of fuel injector**

1. Inspection:

- Fuel injector

Stuck → Replace and check the fuel pump/fuel system.

Accumulation → Replace.

Damage → Replace.

2. Inspection:

- Fuel injector resistance

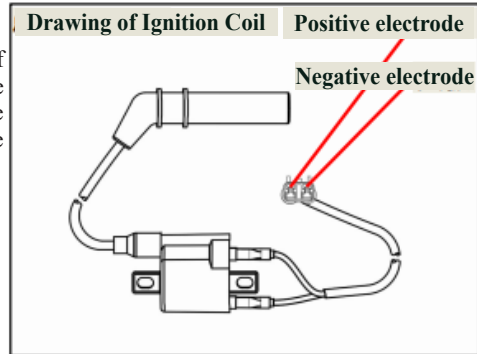
Injector resistance: 12 Ω

**Installation of fuel injector:**

The fuel injector shall be installed by hand and the use of tools such as hammers to strike is prohibited. The O-ring must be replaced when removing and installing the fuel injector; Before disassembling the fuel injector, relieve pressure if necessary; after installation of the injector, check the sealing performance to ensure no leakage.

※ **Ignition Coil**

The ignition coil converts low voltage electricity of the primary winding into high voltage electricity of the secondary winding, and generates sparks through the discharge of spark plugs to ignite the fuel mixture in the cylinder.



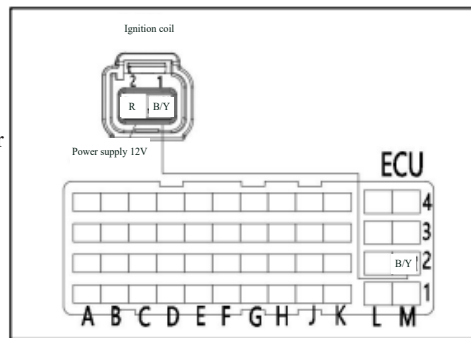
**Function definitions of pins:**

Ignition Coil

Ignition signal to ECU (M2) B/Y;

Connected to power supply 12V+ (R);

**As shown in the right figure:** Wiring diagram for ignition coil and ECU.



**Inspection:**

- Primary high voltage coil resistance

Off-specification → Replace.

a. Remove the ignition coil plug.

b. As shown in the right figure: Diagram for connecting the multimeter to the high-voltage coil.

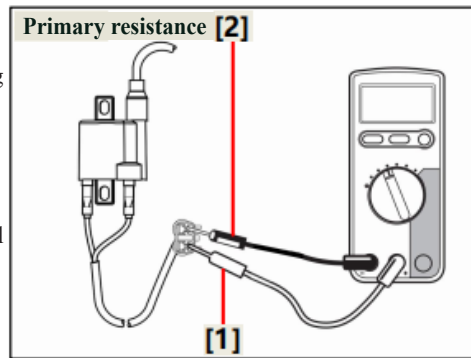
- Positive electrode test probe →

[1]

- Negative electrode test probe →

[2]

c. Measure the resistance of the primary ignition coil winding.



**Ignition coil parameters**

1. Static parameters

Primary resistance: 1.98–2.42 Ω

Secondary resistance: 9.45–11.55kΩ

Primary inductance: 4.25–5.75 mH

Secondary inductance: 9.775–13.225mH

2. Dynamic parameters:

Rated voltage: 13.5–14.5V

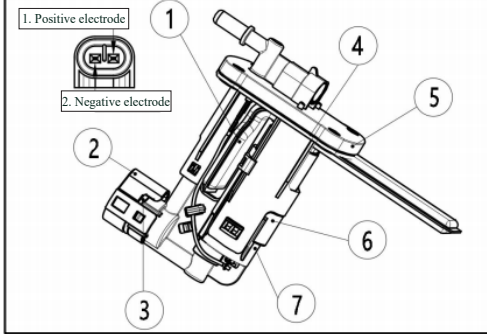
Primary current: 4.1–5.9A

Ignition pulse width: 7.5 - 0.5 msec

Secondary high voltage: MIN 25kV at 50pF Load

Ignition energy: no less than 25 mJ

**Diagram of fuel pump and pin function definition**



※ **Fuel pump assembly**

The fuel pump assembly integrates the fuel pump, plastic bracket, full-flow filter, fine filter and pressure regulating valve. The working process is to use the certain oil pressure and flow to pump the fuel from the fuel tank to the engine.

Function definitions of pins:

- 1: Connect to the output terminal of oil pump relay (V);
- 2: Connect to the negative battery electrode (G).

**Performance parameters:**

Pressure regulating valve: at a flow rate of 40L/h, the corresponding rated pressure is  $300 \pm 10$  kPa

S/N	Component Name
1	Strainer
2	Adjusting valve clip
3	Pressure regulator
4	Sealing washer
5	Flange cover assembly
6	Bracket
7	Pump cell

**Notes**

- This fuel pump is installed at the bottom of the vehicle's fuel tank. Do not operate the fuel pump in a no-load or fuel-free state to prevent damage;
- Handle with care during installation or disassembly, and do not drop it to the ground.

**Measure oil pressure**

Connect the oil pressure gauge to the fuel outlet of the fuel pump assembly, and lock it with a clamp to ensure that there is no leakage at the junction. Press the stop switch, and the fuel pump will stop running after an operation of 5 seconds. Now measure to check that the oil pressure reaches the specified pressure value (300 kpa). If so, it indicates that the fuel pump is in good condition, on the contrary, it indicates that the fuel pump is in abnormal condition and needs to be replaced.

**Fuel Pump Basic Parameters Table**

Name	Voltage (V)	Test Pressure (kPa)	Flow (L/h)	Current (A)
Fuel pump assembly	DC12	$250 \pm 10$	$\geq 30$	$\leq 2.5$
Pump cell	DC12	$300 \pm 10$	$\geq 30$	$\leq 2.5$
Shut-off pressure	DC8	100kPa		

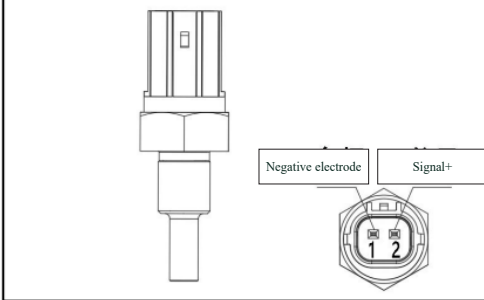
**Pressure relief of fuel line**

The fuel supply pressure of the electronic fuel injection system is high. All fuel pipes are made of high-pressure resistant hoses. Even when the engine is not running, there is still a relatively high pressure in the oil circuit. Therefore, note during maintenance: do not disassemble the fuel pipes easily; when maintaining the fuel system that needs repair, relieve the pressure of the fuel system before disassembling the fuel pipes and the methods are as follows: remove the fuel pump relay or the 2P (black) wire harness connector of the fuel pump, start the vehicle and let it idle until the engine shuts off on its own.

※ **Water temperature sensor (engine)**

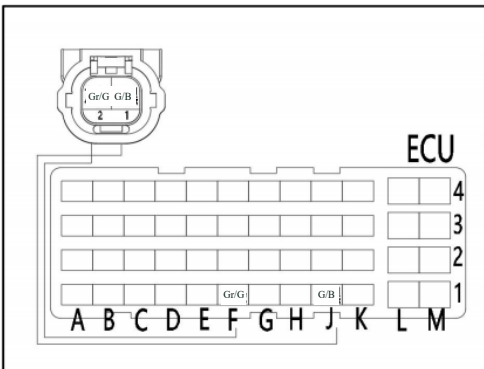
The working principle of this sensor is based on a negative temperature coefficient thermistor (NTC). The sensor is installed on the water jacket of the engine block or cylinder head, in direct contact with the cooling water, so as to measure the temperature of the engine cooling water. The electronic control unit (ECU) measures the temperature of the engine cooling water according to this change and sends it to the instrument via CAN signal for displaying the current water temperature and water temperature alarm.

**Water temperature sensor appearance and pin function definitions**



**Function definitions of pins:**

- 1: Negative - connected to ECU 9 (J1) pin (G/B)
- 2: Sensor signal + connected to ECU 6 (F1) pin (Gr/G)



**As shown in the right figure:** Wiring diagram for water temperature and ECU.

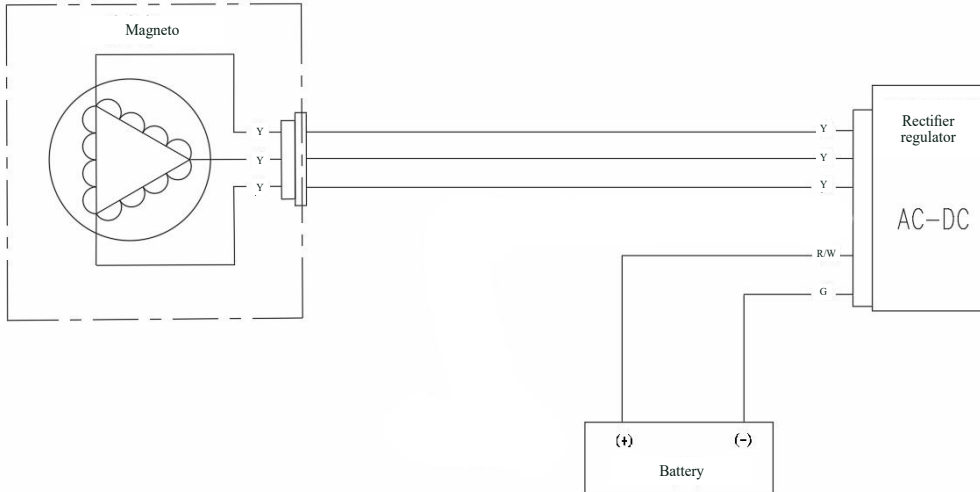
**As shown in the water temperature sensor characteristic table on the right,** different temperatures correspond to different resistance signals.

Resistance of water temperature sensor:  
 Below 20°C: 2318-2550Ω  
 Below 100°C: 178-187Ω

Temperature range (°C)	Resistance value (kΩ)		
	Minimum value	Standard value	Maximum value
-20	13.820	14.770	15.790
20	2.3180	2.4320	2.5500
80	0.3084	0.3170	0.328
100	0.1789	0.1830	0.1870

※ Power supply system

Charging Circuit Diagram



※ Magneto

Magneto coil resistance

Measure the resistance between magneto stator coils, if within the specified range, it indicates that the magneto is in good condition; On the contrary, it indicates an abnormality and an immediate replacement is required;

Normal resistance range of magneto coil:

$0.2\Omega \pm 20\%$  (Y/Y):

Insulation resistance  $\infty \Omega$  (Y-grounding):

When checking, turn the multimeter to the gear 200 $\Omega$ .

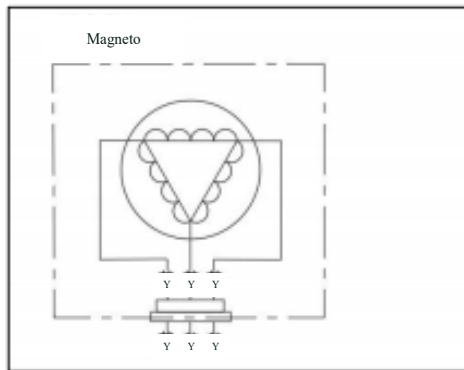
Performance of magneto under load

Start the engine, use a multimeter to measure and check for consistent voltage among the three output lines of the magneto stator coil, if consistent, it indicates that the magneto is in good condition; if not, it indicates an abnormality and a replacement is required;

Charging performance

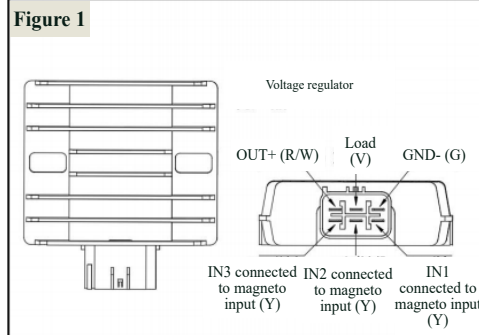
Speed (rpm) 8000

Output current (A)  $\leq 8.5$



※ **Regulating rectifier**

The engine generally runs at 5,000r/min, in a fully charged state of battery, use a multimeter to measure the voltage at positive and negative ends of battery, which is 13.8V-14.8V.

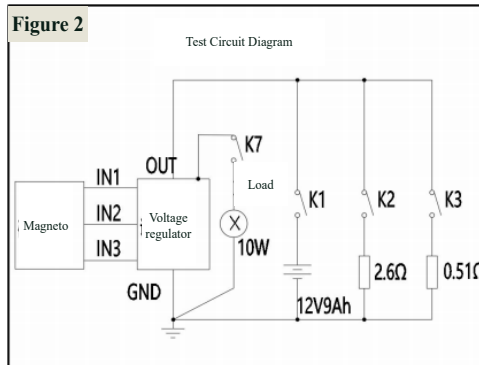


**Figure 1:** Drawing of regulating rectifier and definition of pins

**Figure 2:** Test wiring diagram of regulating rectifier.

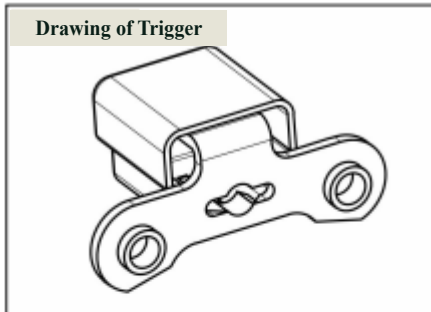
**Function definitions of pins:**

- 1: IN1 connected to magneto input (Y)
- 2: IN2 connected to magneto input (Y)
- 3: IN3 connected to magneto input (Y)
- 4: GND connected to battery: negative terminal (G)
- 5: Load (V)
- 6: OUT connected to battery positive terminal (R/W)



**Specification parameters:**

- 1. Operating voltage: 12V;
- 2. Operating mode: three-phase full-wave;
- 3. Voltage regulation method: Short circuit grounding type (MOSFET);
- 4. Maximum adjustable current: 20A.



※ **Trigger**

It provides engine speed signal to ECU, and the ECU determines the ignition angle and fuel injection phase, etc. based on the signal.

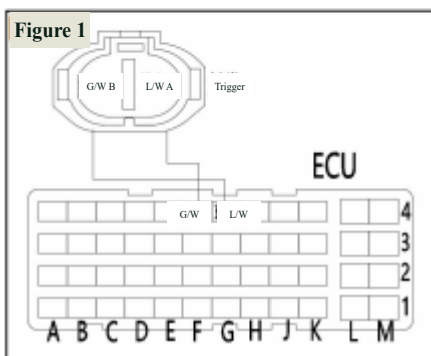
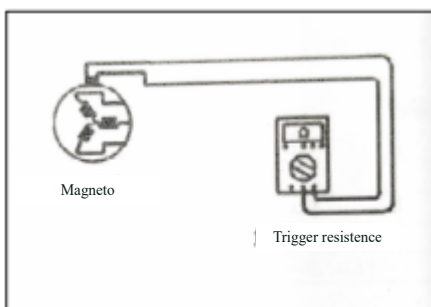


Figure 1: Wiring diagram between trigger and ECU.



**Measure the resistance value of trigger unit:**

Set the multimeter to the 2K $\Omega$  range:

Trigger coil resistance: 260  $\Omega$  (20°C)

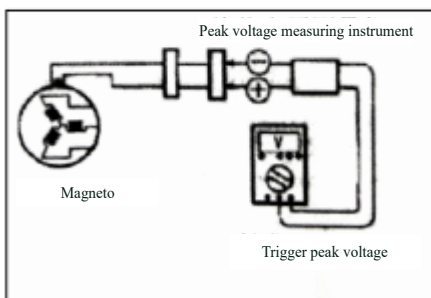
If the resistance value of trigger unit is not within the above range, replace the trigger unit.

Measure the peak voltage of trigger unit

Connect the multimeter to the peak voltage adapter as shown in the figure:

+ Probe: L/W (A) lead

- Probe:G/W (B) lead



Multimeter voltage is set to the AC gear:

Set the engine in neutral, press and hold the start button to make the engine running for a few seconds, and then measure the trigger coil voltage:

Repeat the measurement several times, and the measured highest output voltage of trigger coil is >2V (200r/min)

※ Starting relay

Apply DC12V to the contacts at both ends of the control circuit coil of starting relay, and measure with a multimeter to check for interconnection between the contacts (B and M) :

If the relay contacts make a tick sound and the multimeter makes a continuous beep sound, it indicates that the two contacts are interconnected, if not, it indicates that they are not interconnected. if there is no DC12V voltage applied to two ends of the coil, the two contacts are not interconnected:

The above two items can be used to confirm whether the relay is in good condition, and the multimeter shall be set to the on-off gear during the measurement:

**Warning**

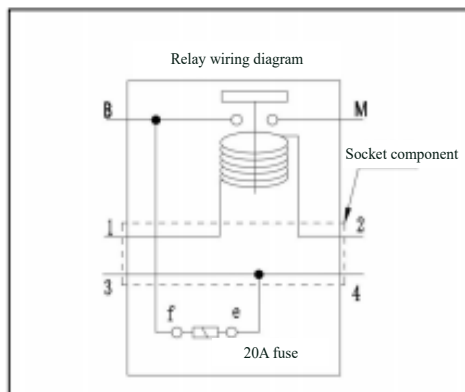
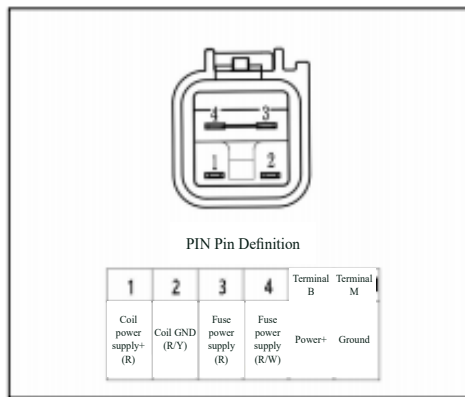
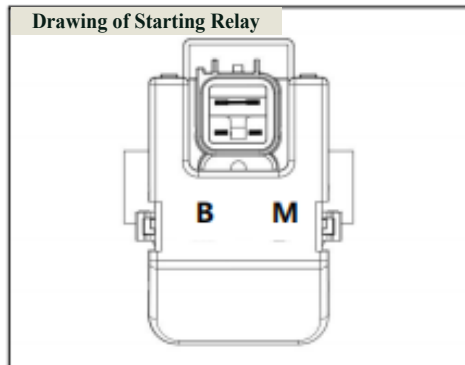
· The time for applying voltage to the relay coil shall not exceed 1 minute, otherwise it may cause overheating and even burnout of the coil.

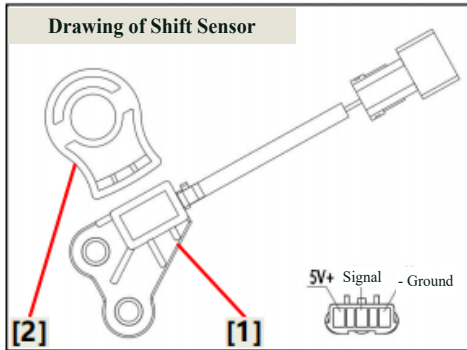
**As shown in the right figure: Wiring diagram of starting relay.**

When measuring the resistance between relay coils using a multimeter, if the resistance is not within the specified range of 3Ω-5Ω, replacement with new parts is need.

Measure with the multimeter set to the 200Ω range.

**As shown in the right figure: Circuit diagram of starting relay.**





※ Quick shifter sensor component

Quickly upshift without operating the clutch, as the clutch lever does not need to be engaged, allowing for uninterrupted continuous shifting.

**Notes**

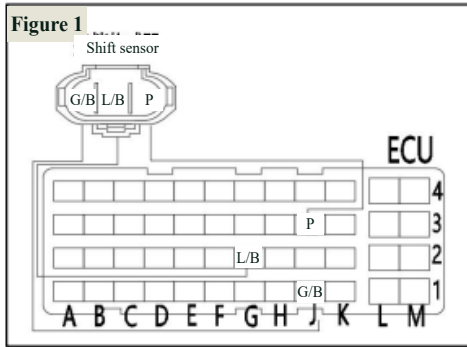
1. This function will not operate when upshifting with the throttle off.
2. When operating the clutch lever, this function will not operate.

**Notes**

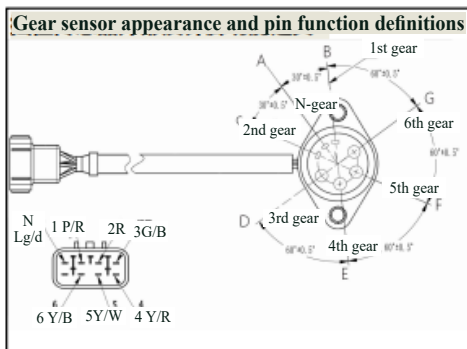
- If there is a malfunction in the quick shifting system.

**Inspection**

1. Check if the quick shifting sensor[1] and magnet seat [2] sensing area are contaminated with foreign matter;
2. Check if the sensor is installed in the correct position, ensuring it is centered between the sensor and the magnet seat.
3. Sensor connection wiring.
4. If the above inspections are completed and it still does not work properly, please replace the quick shifting component.



As shown in Figure 1: Quick shifting sensor wiring diagram.



※ Gear sensor

1. Inspection

- Check the gear sensor wiring for open circuit or short circuit.
- Connection of gear sensor connector.
- Check the fixing condition of the harness connector.
- Remove the connector and check each pin inside the join (Check for any bent or damaged terminals, and verify the security of each pin).
- Sensor mounting bolt M4, with a torque of 4-6 N•m.

2. Inspection

When measuring, the multimeter should be set to the continuity mode to check whether the contacts and wires are connected.

Multimeter positive + probe

Y/R [4]

Multimeter negative - probe

Contact [E]

- Gear sensor

If out of specification → Replace the gear sensor.

※ **Main relay inspection**

Check if each switch is conducting with a digital multimeter.

1. Remove the relay from the harness plug.
2. As shown in the figure, connect the multimeter and the battery (12V) to the relay terminals.

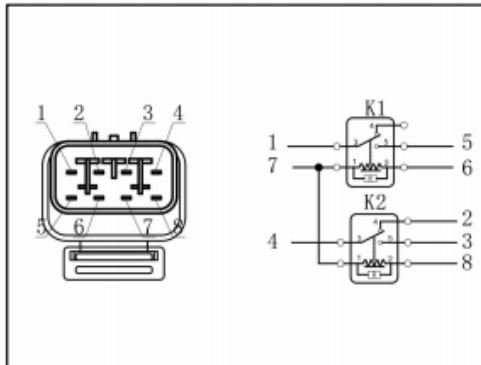
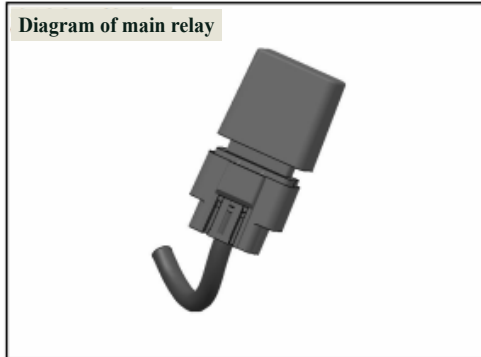
Check the relay operation.

When measuring, set the multimeter to the continuity test mode to check for continuity between the terminals.

- [7] Connect the battery's positive terminal
- [6] Connect the battery's negative terminal
- [1] Multimeter positive probe
- [5] Multimeter negative probe

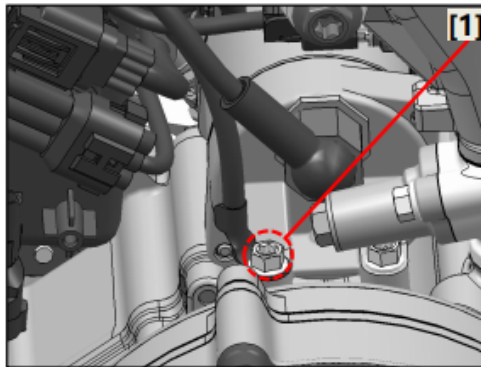
No continuity between terminals → replace the main relay.

Diagram of main relay



※ **Inspection of vehicle ground wire harness**

Check the ground wire harness for any malfunctions  
 Check if the bolt has looseness or has fallen off.  
 Each grounding bolt must be tightened to the required torque



※ Battery

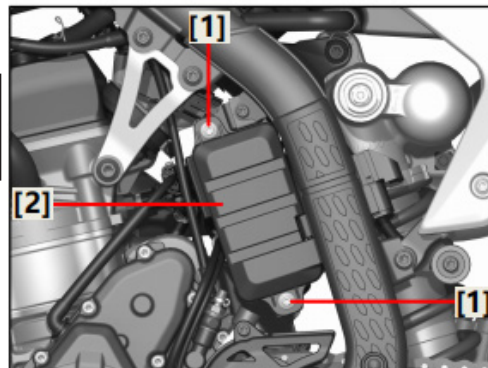
**Warning**

· The negative wire must be disconnected before disassembling the battery, otherwise the battery will be short-circuited.

Disassembly/installation

Disassemble the following parts:

- After the vehicle get stall;
- Step screw [1];
- Battery box cover[2];
- Disconnect the negative battery electrode (-) cable with screw [3].
- Disconnects the positive (+) cable with screw [4];
- Remove the battery rubber grommet [5].



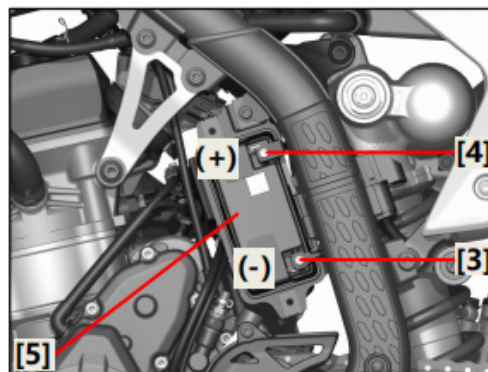
**Note**

· Battery is designed with over-charge protection, and the voltage for over-charge protection is  $\geq 15.3V \pm 0.3V$ .

**Charging**

- a. Turn off the vehicle and disconnect the positive and negative electrodes of the battery from the battery terminals.
- b. Remove battery;
- c. Connect the charger to the battery, turn on the charger.

When the charging is completed, turn off the charger, and unplug it from the battery;



**Notes**

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

**Check charging voltage**

The battery must function properly and be fully charged.

Start the vehicle for a voltage test; Measuring point positive (+), measuring point grounding (-).

**Notes**

· When measuring the battery voltage after charging, it shall be maintained for at least 30 minutes, otherwise accurate results cannot be obtained due to battery voltage fluctuations after charging.

Torque:

**Battery box cover mounting bolts**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Battery terminal mounting screw**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

**Battery specification:**

Battery model: HJ12-FPZ (lithium battery)

Full charging voltage: > 13.2V

Required charging voltage: < 12.8V

Charging current: standard 1.2A, max. 12.0A

Operating temperature: -20°C - 60°C

Battery capacity: 12V/2.3Ah

Overall dimension: Length × Width × Height:

112×49×85(±1mm)

Charging voltage	
5000rpm	14.4±0.5V

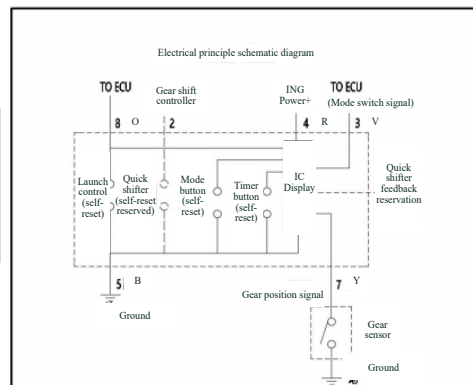
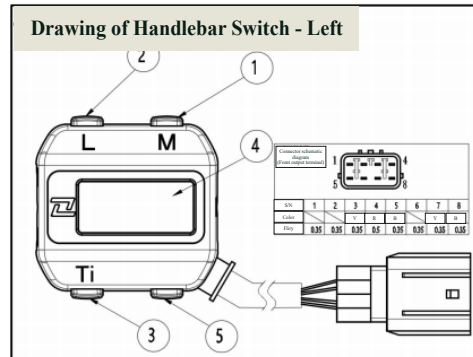
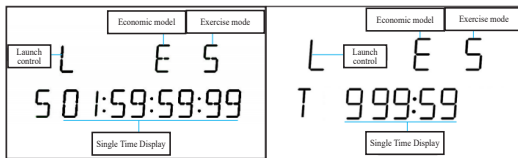
※ **Handlebar switch-left**

Disconnect the plug connector linking the left handlebar switch harness to the main cable, and check the ON/OFF status of each switch action.

- Engine mode **M** button [2]; (self-reset)
- Launch control **L** button [1]; (self-resetting)
- Timer **Ti** button [3]; (self-reset)
- Functional display screen component [4];
- Reserved button with no functionality [5]. (self-reset)

Check for any connector malfunctions such as: pin retraction, crooked pins, improper plugging, etc.

**Left figure:** Function and wire color correspondence table of handlebar switch (left).



**Display logic for the screen:**

The vehicle powers on, and the screen starts working to display.

**1. Engine mode (M)**

1.1 Press the switch once, and the switch continuously outputs a ground signal to the ECU. At this time, it is in SPORT mode, and the display continuously shows the "S" icon.

1.2 Press again to disconnect the output signal, entering ECO mode, where the display continuously shows the "E" icon;

1.3 This function retains memory of the last operating condition before power-off.

**2. Launch control (L)**

2.1 When no low-level gear signal is received, long press the button for 2 seconds. During this time, the "L" icon on the display will flash once per second until the 2-second press ends, then the "L" icon will light up, indicating the launch control function is activated;

2.2 Upon receiving the low-level gear signal, the "L" icon extinguishes. When the low-level gear signal remains active, long press the launch button, and the "L" icon will flash at a frequency of 2 times per second, indicating that the "L" icon cannot be activated.

2.3 During launch control activation, if the low-level gear signal is not detected, pressing the button again will not deactivate the "L" icon. Do no reminder.

**3. Timer button (Ti)**

3.1 The default display upon power on is the single-timer interface;

3.2 Click the timer button: On the single-timer display interface, click the timer button to start the timer, and click again to pause at the current time

Pause for reading; click again to resume timing from the current time.

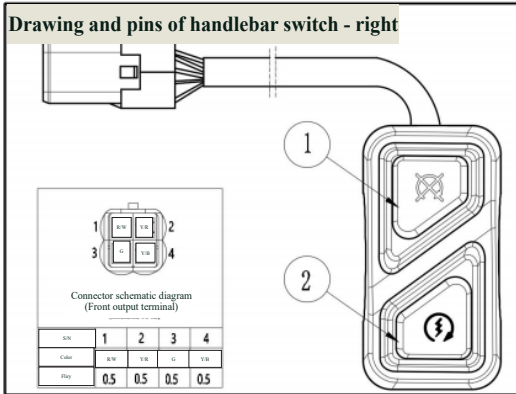
Long press (1s): Used to toggle between the single timer and total timer interfaces;

Long press (3s): Resets the single timer. Long pressing on the total time interface will return to the single timer interface and reset it;

3.4 Total time: The cumulative upper limit is 999 hours and 59 minutes, and it stops at 999:59;

3.5 The total time and individual timing are independent of each other. The total timing starts counting when the screen is powered on and records every minute, retaining the count when powered off.

Powering off for less than one minute is ignored and not counted in the total minutes.



※ **Handle switch-right**

Disconnect the plug connector linking the right handlebar switch harness to the main cable, and check the ON/OFF status of each switch action.

1. Stop button[1]: (self-reset)  
When this button is pressed, the engine will stall.
1. Start button[2]: (self-reset)  
With the engine in neutral or the clutch engaged, press this button to start the engine.
3. Buttons [1] and [2] are initially in the open state and close when pressed.

Inspection:  
Check for any connector malfunctions such as: pin retraction, crooked pins, improper plugging, etc.

As shown in the left figure: ON/OFF schematic diagram of handlebar switch (right)

**Functional On/Off Diagram**

Wire gauge	FRYL 0.5		FRYL 0.35		Icon color
Wire color	Y/R	G	Y/G	G	
Function	[Stop icon]		[Start icon]		W
Function definition	TO starting relay coil	Power supply	TO 8-pin relay coil	Ground	W

**Abbreviation letters corresponding to wire colors:**

B	Black
Br	Brown
G	Green
Gr	Grey
L	Blue
O	Orange
P	Pink
R	Red
Lb	Light Blue
W	White
Y	Yellow
V	Purple
Lg	Light Green
Lg/R	Light Green/Red
V/B	Purple/Black
V/Y	Purple/Yellow
V/G	Purple/Green
B/L	Black/Blue
B/W	Black/White
B/Y	Black/Yellow
Br/R	Brown/Red
Br/B	Brown/Black
Br/L	Brown/Blue
G/L	Green/Blue
G/W	Green/White
G/Gr	Green/Grey
Gr/G	Grey/Green
Gr/Y	Grey/Yellow
Gr/W	Grey/White
Gr/L	Grey/Blue
L/B	Blue/Black
L/W	Blue/White
P/B	Pink/Black
P/L	Pink/Blue
P/R	Pink/Red
P/W	Pink/White
P/G	Pink/Green
R/B	Red/Black
R/Y	Red/Yellow
R/V	Red/Purple
W/P	White/Pink
W/G	White/Green
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/W	Yellow/White
Y/Br	Yellow/Brown
Y/Gr	Yellow/Grey
O/B	Orange/Black
O/W	Orange/White
O/L	Orange/Blue
W/Br	White/Brown