

ZF400-2 Motorcycle Maintenance Manual

Edition 1 (April 2024)

This maintenance manual is a property of TIBET NEW SUMMIT MOTORCYCLE CO., LTD. The contents and pictures in this maintenance manual are for reference only. The actual product shall prevail.

Preface

This motorcycle manual introduces the basic structure, working principle, disassembly and maintenance, fault diagnosis and troubleshooting methods of ZF400-2 motorcycles 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.

TIBET NEW SUMMIT MOTORCYCLE CO., LTD.

Customer service hotline: 400-8818603

For more information, please visit our website at cn.kovemoto.com
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Overview

How to use this manual

This manual describes the maintenance procedures of ZF400-2.

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 XIII 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 III. 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.

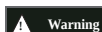
Your safety and the safety of others are very important. To help you make an informed decision, we provide safety information and other information in this manual.

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:



Warning

This symbol indicates a dangerous situation. This dangerous situation will lead to fatality or serious injury if not avoided.

Note

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.

Note

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.
	Use the recommended oil unless otherwise specified.
	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-T330Y)
	Use molybdenum disulfide grease (NLGI #2 or equivalent product containing more than 3% molybdenum disulfide).
	Use molybdenum disulfide paste (NLGI #2 or equivalent product containing over 40% molybdenum disulfide).
	Use silicone grease.
	Coat thread locking adhesive unless otherwise specified.
	Apply sealant.
	Use DOT4 brake fluid. Unless otherwise specified, use the recommended 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
ABS	Anti-lock braking system
DTS	Diagnostic trouble code
ECU	Engine control module
ECT sensor	Engine coolant temperature sensor
EVAP	Evaporative emission
IAP sensor	Intake air temperature sensor
MAP sensor	Intake manifold pressure sensor
MIL	Fault indicator
O ₂ sensor	Oxygen Sensor
OBD Service connector	Maintenance diagnostic interface
TP sensor	Throttle position sensor

Model Identification-Zf400-2



Basic Information

Item		Parameter
Size	Length × width × height	2010mm×830mm×1100mm
	Shaft distance	1385mm
	Seat height	Front: 795mm Rear: 965mm
	Ground clearance	135mm
	Curb weight	164kg
	Carrying capacity	2 person
	Payload	151KG
Frame	Frame type	High-strength steel twin-spar cradle frame
	Front shock absorber	Non-adjustable inverted hydraulic damping type
	Front shock absorber stroke	112mm
	Rear shock absorber	Non-adjustable center-mounted shock absorber
	Rear shock absorber stroke	42mm
	Front tire size/model	120/70 ZR17 58W TL / CST CM-S1
	Rear tire size/model	160/60 ZR17 69W TL / CST CM-S1H
	Front wheel rim	MT3.5 × 17 / A365-T6
	Rear wheel rim	MT4.5 × 17 / A365-T6
	Front brake/disc	Dual one-way double-piston hydraulic brake / dual discs 300mm
	Rear brake/disc	Single-piston hydraulic brake/single disc 220mm
	Lead angle	24.5°
	Steering angle	35°
Engine	Model	Z459MQ-B
	Displacement	443ml
	Type	DOHC, L4-cylinder, water-cooled, 16-valve
	Cylinder diameter × stroke	59mm×40.5mm
	Combustion-chamber type and compression ratio	Irregular combustion chamber, 12.3:1
	Maximum power (kW/r/min)	48.0kW/12000rpm
	Maximum torque (N·m/rpm)	40.0N.m/9000rpm
	Valve mechanism	DOHC/chain-driven
	Cooling System	Closed coolant circulation cooling
	Lubrication system	Forced pressure lubrication + splash lubrication
	Net engine mass	44kg
Drivetrain	Clutch	Manual wet multi-plate
	Transmission	Constant-mesh two-stage transmission with six-gear speed shifting
	Primary transmission ratio	1.949
	Final transmission ratio	3.214
	Gear transmission ratio	1st gear: 2.846; 2nd gear: 2.056; 3rd gear: 1.632; 4th gear:1.381; 5th gear: 1.240; 6th gear: 1.111
	Shift mode/sequence	Mechanical reciprocating type / 1-N-2-3-4-5-6-5-4-3-2-N-1

Item		Parameter
Electric system	Ignition mode	ECU-controlled digital ignition
	Starting mode	Electric starting
	Spark plug manufacturer/model	NGK/LMAR9AI-10
	Spark plug clearance	0.9mm~1mm
	Regulating rectifier	Three-phase full-wave rectification
	Stator coil (resistance)	0.2 Ω ±20 %
	Trigger (resistance)	140-160 Ω
	Maximum magneto output power	375W

Cooling System Specification Unit: mm

Item		Specification	Ultimate state
Coolant capacity	Radiator (including all water channels)	1.8 Litre	
	Auxiliary water tank (up to the upper limit level)	0.24 Litre	
Radiator cap relief pressure		130-155kPa (1.3bar)	
Thermostat	Initial opening temperature	≥85°C	
	Full opening temperature	95 °C±3 °C	
	Fully open valve lift	4.5mm~7.0mm	

Lubrication System Specifications Unit: mm

Item		Standard value	Ultimate state
Oil capacity	Oil level (new or disassembled)	2.8 Litre	-
	Replace the oil filter core	2.6 Litre	-
	Not replace the oil filter core	2.4 Litre	-
Recommended oil	Brand	Shell dedicated oil	-
	Model	SN10W-40	-
	Grade	API quality grade: SN 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 seat	0.14mm~0.22mm	-
	Axial clearance between the inner and outer rotors and the pump body	0.03mm~0.20mm	-

Fuel System Specification Unit: mm

Item		Specification
Throttle valve body identification number		-
Fuel pressure at idle speed		350Kpa±10kpa
Fuel pump flow (at 12V and 250 ± 10 kPa)		≥25L/h
Fuel supply system	Type	BOSCH EFI
	Throttle orifice	36mm
Fuel type	Gasoline	No.95 GB17930 - 2016
Fuel tank capacity		17 Litre

Specification of EFI SystemUnit: mm

Item	Specification
Engine idle speed (minimum no-load stable speed)	1500rpm±100rpm
Water temperature sensor (output resistance at 20 °C)	2.4±0.1kΩ
Fuel injector resistance (20°C/68°F)	12Ω
Throttle position sensor (idle) output voltage	0.5-0.7 V
Intake air temperature sensor resistance: at 20°C	2290-2551Ω

Battery/Charging System SpecificationsUnit: mm

Item			Specification
Battery	Model		HJ15-FPZ
	Capacity		4.0AH
	Leakage value	It can be stored for more than one year between -20°C~40°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	2.0A
		Fast	20A
Magneto	Charging capacity		5000r/min>25A

Front Wheel/Suspension/Steering System SpecificationsUnit: mm

Item		Standard	Ultimate state
Tire tread depth		4.8mm	Tire wear limit marks at ΔTWI mark on sidewall and center of tire
Cycling on paved roads		230 kPa (2.30 kgf/cm², 33 psi)	-
Shaft runout		0.05	0.1
Wheel rim runout	Radial	≤0.5	≥1.0
	Axial	≤0.5	≥1.0
Front Shock Absorber	Free length of spring	238(mm)	228(mm)
	Tube runout	-	0.2
	Recommended specifications of shock absorber oil	Special shock absorber oil provided by the manufacturer	
	Shock absorber fluid adding capacity	Injection volume of left shock absorber: 457 ml±3 ml	Injection volume of right shock absorber: 457ml±3ml

Rear Wheel/Suspension/System SpecificationsUnit: mm

Item		Standard	Ultimate state
Tire tread depth		6.3mm	Tire wear limit marks at ΔTWI mark on sidewall and center of tire
Cycling on paved roads		250 kPa (2.50 kgf/cm², 36 psi)	-
Shaft runout		0.05	0.1
Wheel rim runout	Radial	≤0.5	≥1.0
	Axial	≤0.5	≥1.0
Drive chain	Size/link	Choho 520UX (X-type sealed, closed)/112 links	-
	Slack	20-35	35
Rear shock absorber		Free length of spring (mm)	180
		Recommended specifications of shock absorber oil	Special shock absorber oil provided by the manufacturer
		Shock absorber oil adding volume	75 ml±1 ml
		Airbag nitrogen quantity (standard)	1.2Mpa

Hydraulic Brake Specifications Unit: mm

	Item	Standard	Ultimate state
Front brake	Designated brake fluid	DOT4	-
	Total thickness of brake pads	10.5	To groove
	Brake disc thickness	4.5	4
	Brake disc runout	0.08	0.2
	Inner diameter of master cylinder	14.000	-
	Brake caliper piston inner diameter 1	27.000	-
	Brake caliper piston inner diameter 2	27.000	-
Rear brake	Specified brake fluid	DOT4	-
	Total thickness of brake pads	10.2	To groove
	Brake disc thickness	4.5	4
	Brake disc runout	0.08	0.2
	Inner diameter of master cylinder	12.700	-
	Inner diameter of brake caliper piston cylinder	30.200	-

Lights/Instruments/Switches Specifications

	Item	Standard
Bulbs/indicators/ warning lamps	Bulbs	
	Headlights (high/low beam)	LED
	Front turn signal lamp	LED
	Rear turn signal lamp	LED
	Brakes/taillights	LED
	License plate lamp	LED
	Instrument backlight	LCD
	Indicator/warning lamp	
	Neutral indicator lamp	LED
	Oil pressure warning lamp	LED
	Coolant temperature warning lamp	LED
	Turn indicator light	LED
	Engine fault warning lamp (MIL)	LED
	ABS warning lamp	LED
	Position indicator light	LED
	High beam indicator	LED
Fuse	ABS1 fuse	15.0A
	ABS2 fuse	10.0A
	ABS3 fuse	5.0A
	Light/Headlight startup	10.0A
	ING/Ignition	10.0A
	FI/Fuel injection	10.0A
	FAN/Water tank fan motor	15.0A
	PUMP/Fuel pump	5.0A
	Spare	15A,10.0A,5A

Vehicle Body Bolt Torque Value

Installment position	Specification status	Torque force value N·m	Notes
ABS to ABS bracket	M6	8	
ABS bracket and frame	M6	8	
OBD and vehicle frame	M5	6	
USB charging converter and relay bracket	M5	5	
Shift rod mounting screw	M6	10	
Adjusting and tightening nut of the shift rod	M6	5	
Shift pedal connecting rod and side stand mounting plate	M8	22	(Sealing)
Shift rockerarm and engine gear shift lever	M6	10	(Sealing)
Side cover (left and right) and subframe bolts	M5	5	
Side cover (L/F) and fuel tank	M5	5	
Side tilt sensor and bracket	M5	5	
Side stand mounting panel and engine	M10	54	(Sealing)
Side stand OFF switch and side stand	M6	8	
Side stand and side stand mounting plate (special mounting bolts for side stand)	M10	22	(Apply grease to the smooth portion of the rod and sealing to the threads)
Frame and brake hose 1	M6	10	
Inner lining (L/F) and vehicle body (L/F)	ST4.2×13	2	
Inner lining (L/F) and subframe	M5	5	
Water reservoir and engine upper suspension - right, radiator	M6	8	
Driven sprocket connected to buffer	M8	35	
Headlight bracket pressure plate and headlight	M5	5	
Headlight bracket and headlight rear panel	M5	5	
Headlight bracket and upper bracket	M6	10	(Sealing)
Headlight bracket and instrument	M5	5	
Idle stepper motor mounting screw	M5	4	
ignition lock and frame	M8	22	(Sealing)
Battery positive and negative terminal bolt connection	M5	2	
Electrical appliance mounting bracket and subframe	M5	6	
Electrical appliance box and frame	M5	5	
Regulating rectifier and regulating rectifier bracket	M6	10	

Installment position	Specification status	Torque force value N·m	Notes
Regulating rectifier bracket and frame	M6	10	
Engine fuel drain bolt	M12	30	
Engine rear suspension	M10	60	
Engine upper suspension (left and right) and frame	M10	54	(Sealing)
Engine upper suspension bracket - L/R and frame	M8	26	(Sealing)
Engine upper suspension bracket - L/R and engine (upper)	M10	54	(Sealing)
Engine upper suspension bracket - L/R and engine (lower)	M8	26	(Sealing)
Engine lower protector bracket and engine	M6	10	
Engine lower protector - L/R and engine lower protector	ST4.8-12	2	
Engine lower protector - L/R and engine lower protector bracket	M6	8	
Engine sprocket cover and engine	M6	8	
Upper clamp and lower socket of the steering handlebar	M8	22	
Steering column locking nut	M24	128	
Subframe weld assembly and fuel tank	M6	10	
Subframe welded assembly and seat lock	M6	8	
Ignition coil pack pressure plate mounting bolt	M6	10	
Rear ABS ring gear and wheel hub	M5	5	(Sealing)
Rear fender rear section and license plate lamp	M5	5	
Rear fender rear section and subframe	M6	10	
Rear fender inner panel and rear fender rear section	M5	5	
Rear fender front section and side covers - L/R	M5	5	
Rear fender front section and vehicle body inner lining - L/R	M5	5	
Rear disc brake and wheel hub	M8	35	(Sealing)
Rear reflector	M5	5	
Rear shock absorber locking nut	M6	12	
Rear shock absorber and frame	M10	54	
Rear shock absorber and swingarm	M10	54	
Rear footpeg bracket - L/R and frame	M8	22	(Sealing)
Rear wheel speed sensor	M6	8	
Rear wheel axle locking nut	M16	108	
Rear brake pump push rod adjusting and tightening nut	M5	6	
Rear brake pump assembly and front footpeg - right	M6	12	(Sealing)

Installment position	Specification status	Torque force value N·m	Notes
Spark plug installation	M10	12	
Fine filter cover mounting bolt	M6	10	
Oil pressure sensor	R21/8	12	
Relay and frame	M6	10	
Relay bracket and frame	M6	10	
Oiler mounting screw	ST4.8	2	
Throttle valve locking pipe clamp screw	M5	4	
Throttle cable bracket mounting screw	M5	3.5	
Throttle position sensor mounting screw	M5	2	
Throttle and intake pressure sensor bracket	M6	10	(Sealing)
Thermostat cover mounting bolt	M6	10	
Mounting bolts of intake pipe and engine	M6	10	
Intake air temperature sensor and air filter	M6	10	
Intake pressure sensor and intake pressure sensor bracket	M6	8	(Sealing)
Air filter locking pipe clamp screw	M5	4	
Air filter element mounting screw	M5	3	
Air filter upper cover mounting screw	M5	3	
Air filter and frame	M6	10	
Horn	M6	8	
Cooling pump cover mounting bolt	M6	10	
Clutch handle assembly mounting bolt	M6	10	
Chain guard and swingarm	M5	6	
Chain adjuster adjusting nut	M8	1.5	
Chain adjuster locking nut	M8	16	
Chain clip with swingarm	M6	8	(Sealing)
Swingarm shaft locking nut	M16	88	
Front/rear turn signals	M5	5	
Front ABS ring gear	M5	5	(Sealing)
Headlight rear panel trim cover and headlight bracket	M5	5	
Headlight lower housing-L/R and front panel inner lining	ST4.8-12	2	
Front fender and front shock absorber-L/R	M6	8	
Front disc brake and front wheel hub	M6	12	(Sealing)

Installment position	Specification status	Torque force value N·m	Notes
Front and rear oil reservoir filler cap fastening bolt	M5	2	
Front shock absorber adjuster end cover bolt	M8	22	
Front shock absorber and front wheel shaft locking	M8	22	
Front shock absorber damper bottom bolt	M10	45	
Front footpeg bracket-right-mounted return spring	M6	8	(Sealing)
Front footpeg bracket - right and frame	M8	22	(Sealing)
Front footpeg bracket - left and side stand mounting plate	M8	35	(Sealing)
Front footpeg bracket - left and frame	M8	22	(Sealing)
Front wheel speed sensor	M6	8	
Front wheel axle	M10	70	
Front panel inner lining and headlight bracket	M5	5	
Front panel inner lining and headlight rear panel	M5	5	
Front panel inner lining and front panel	ST4.8-12	2	
Front brake pump mounting bolts	M6	10	
Front brake caliper-L/R and front shock absorber	M8	35	(Sealing)
Front brake hose upper bracket and main frame	M6	8	
Front seat cushion to frame.	M6	8	
Fuel pump and fuel tank	M5	5	(Sealing)
Radiator mounting bracket and engine	M6	8	
Radiator fan and radiator mounting bolts	M5	6	
Radiator and frame	M6	10	
Radiator and radiator mounting bracket	M6	10	
Upper bracket and front shock absorber (locking)	M8	22	(Sealing)
Handlebar switch - left/right mounting screw	ST4.8	2	
Handlebar switch-left and handlebar connecting bolt	M5	5	
Double-threaded stud to lower socket of steering handlebar	M10	30	(Sealing)
Double-threaded stud and upper bracket locking nut	M8	22	
Water pump drain bolt	M6	10	
Water pump impeller fastening bolt	M6	10	
Left and right water tank trim and frame	M6	8	
Left and right water tank trim and radiator	M6	8	
Left and right water tank trim and left and right fuel tank side protector	ST4.2×13	2	

Installment position	Specification status	Torque force value N·m	Notes
Left and right water tank trim and left and right fuel tank side trim	ST4.2×13	2	
Carbon canister mounting bracket and main frame	M6	8	
Taillight assembly and subframe	M6	8	
Lower bracket and front shock absorber (locking)	M8	22	(Sealing)
Muffler mounting bracket and engine	M6	12	
Muffler shield and muffler	M6	8	
Muffler shield and muffler trim cover	ST4.2×13	2	
Muffler front section and engine	M6	8	
Muffler and muffler mounting bracket	M8	22	
Battery box cover mounting bolts	M5	5	
Oxygen sensor connector bracket and engine upper suspension bracket - left	M6	8	
Oxygen sensor harness bracket and engine	M6	10	
Oxygen sensor to muffler	M18	50	
Accelerator cable A/B (steering handlebar end)	M5	4	
Accelerator cable A/B (throttle end)	M5	6	
Accelerator cable and oiler	M5	3	
Fuel tank side trim - L/R and fuel tank	M6	8	
Fuel tank side trim - L/R and fuel tank side protector - L/R	ST4.2×13	2	
Fuel tank front shield and oil frame	M6	8	
Fuel tank front shield and fuel tank	M6	8	
Fuel tank front shield and side protectors - L/R	M6	8	
Front of fuel tank and frame	M6	8	
Fuel tank lock and fuel tank	M5	6	
Bracket and rear fender front section	ST4.8-12	2	
Bracket and main frame	M5	6	
Brake caliper bleed screw	M5	6	
Installation of brake switch	M10	25	
Brake rockerarm and front footpeg bracket-right	M8	22	(Sealing)
Brake hose ABS end	M10	25	
Brake hose and caliper/brake pump end	M10	32	
Main frame and subframe	M10	35	(Sealing)
Drive sprocket locking bolt	M10	55	(Sealing)

Installment position	Specification status	Torque force value N·m	Notes
Main ground wire connected to engine.	M6	10	
Damper inner rod and regulator end cap tightening nut	M6	15	
Seat cushion pull strap and subframe	M6	8	
Steering stem locking 4-slot nut	M25	First stage: 45N·m; Second stage: Retract the adjusting nut by 180° and tighten it to 20N·m; Third stage: Keep the direction fixed and retract by 15° (≈one groove position).	
Fuel rail and throttle valve	M5	Tighten the two center screws to 5 N·m, then tighten the two side screws to 5 N·m. Next, tighten the center screws to 7 N·m, followed by the side screws to 7 N·m	

Vehicle Body Lubrication and Sealing Positions

Material	Position	Notes
Lithium-based multipurpose grease (Universal SU-T330Y or equivalent product)	Contact area of steering column locking bolt, gasket, and upper connecting plate	
	Contact area of upper and lower bearings and steel bowls of steering stem	
	Steering stem upper and lower dustproof cover	
	Throttle cable end (handlebar side)	
	Throttle eccentric wheel cable groove	
	Clutch control lever sliding area	
	Sliding area of side stand pivot	
	Rotation area of brake arm pivot	
	Sliding area of shift arm pivot	
	Front footpeg left and right sliding area with the front footpeg bracket rotating shaft	
	Rear footpeg left and right sliding area with the rear footpeg bracket rotating shaft	
	Swingarm pivot dustproof seal lip contact area	
	Swingarm shaft rod, flat thrust bearing, needle roller bearing	
	Dustproof sealing lip installed on the upper part of the rear shock absorber	
	Contact area of oil seal lip of front wheel hub bearing	
	Contact area of the front wheel hub and front wheel bushing-left and right (tapered)	
	Outer surface of the front wheel axle	
	Contact area of oil seal lip of rear wheel hub bearing	
	Contact area of the rear wheel hub and rear wheel bushing—left and right (tapered)	
	Contact area of oil seal lip of buffer bearing	
	Rear wheel hub left O-ring	
	Outer surface of rear wheel axle	
Use silicone grease	Sliding area of the front hand brake lever pivot bolt	
	Contact area of the front hand brake lever adjusting bolt	
	Front hand brake lever return spring	
	Sliding area of clutch lever pivot bolt	
	Contact area of front brake pump tappet, piston and rocker arm	
	Contact area of front and rear cups and piston of front brake pump	
	Front brake pump push rod rounded surface and rubber cable sheat mounting area	
	Contact area of push rod and piston of rear brake pump	
	Contact area of front and rear cups and piston of rear brake pump	
	Contact area between rear brake pump and brake arm shift fork pin shaft	
	Contact area of dustproof washer, seal ring, and piston of front brake caliper	
	Sliding area of smooth portion of upper and lower sliding shafts of front brake caliper	
	Contact area of smooth portion of guide pin of front brake caliper	
	Contact area of dustproof washer, seal ring, and piston of rear brake caliper	
	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	

Material	Position	Notes
Shock absorber fluid specialized	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	
	Seal lip of front shock absorber oil seal	
	Dust-proof seal lip of front shock absorber	
	O-ring of front shock absorber end cover	
DOT4 brake fluid	Front brake caliper piston seal ring	
	Rear brake caliper piston seal ring	
	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	
Special chain lubricant or equivalent	Entire surface of chain	
Engine lubricant	Fuel pump unit rubber seal ring	
Cable lubricant	Clutch cable	
	Seat lock cable	
	Throttle cable	
Thread locker (Huitian 7272)	Front and rear brake disc mounting bolts	
	Mounting bolts of front and rear ABS gear rings	
	Engine upper suspension (left and right) and frame	
	Engine upper suspension bracket - L/R and frame	
	Engine upper suspension bracket - L/R and engine (upper)	
	Engine upper suspension bracket - L/R and engine (lower)	
Thread locker (Huitian 7262)	Connecting bolts between shift pedal connecting rod and side stand mounting plate	
	Shift rockerarm and engine gear shift lever	
	Side stand mounting panel and engine connecting bolt	
	Special mounting bolts for side stand	
	Headlight bracket connecting bolt to upper bracket	
	Ignition lock connecting bolt to frame	
	Left and right rear footpeg connecting bolts to frame	
	Rear brake pump assembly connecting bolts to front footpeg bracket - right	
	Connecting bolts between rear brake rockerarm and front footpeg	
	Throttle valve connecting bolts to intake pressure sensor bracket	
	Intake pressure sensor connecting bolt to intake pressure sensor bracket	

Material	Position	Notes
Thread locker (Huitian 7262)	Connecting bolt between chain clip and swingarm	
	Front shock absorber and upper/lower bracket locking bolt	
	Front footpeg bracket-right-mounted return spring bolt	
	Connecting bolts between left front footpeg and side stand mounting plate	
	Connecting bolts between left and right front footpegs and frame	
	Connecting bolt between front brake caliper -left/right and front shock absorber	
	Connecting bolt between fuel pump and fuel tank	
	Steering handlebar lower socket and double-threaded stud	
	Connecting bolt between main frame and subframe	
	Drive sprocket locking bolt	

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.

Exhaust Gas Control System Maintenance Schedule

1. Annual inspection must be carried out once a year for items requiring annual inspection.

2. After the odometer reading reaches 50,000 km, additional maintenance shall be carried out in a repeated manner started from 10,000 km of the regular maintenance meter.

3. ☆ : Refers to the items recommended to KOVE Moto Service Network for inspection and maintenance as they have special tools, materials and professional skills.

S/N	Item	Contents of inspection or maintenance	Odometer reading (km)					
			1000	10,000	20,000	30,000	40,000	Annual inspection
1	☆	Gasoline pipeline		•	•	•	•	•
2	☆	Spark plug		•		•		
		• Replace if necessary.			•		•	
3	☆	Valve clearance						Every 40,000 km
4	☆	Fuel injection	•	•	•	•	•	•
		• Check the engine idle rotation speed.		•	•	•	•	•
5	☆	Exhaust system	•	•	•	•	•	
6	☆	Evaporative emission control system			•		•	
7	☆	Engine exhaust gas reflux device		•	•	•	•	•
8	☆	Secondary air supply system		•	•	•	•	•

General Periodic Maintenance/Lubrication Table

Note

1. Annual inspection must be carried out once a year for items requiring annual inspection.
2. After the odometer reading reaches 50,000 km, additional maintenance shall be carried out in a repeated manner started from 10,000 km of the regular maintenance meter.
3. ☆ : Refers to the items recommended to KOVE Moto Service Network for inspection and maintenance as they have special tools, materials and professional skills.

S/N		Item	Contents of inspection or maintenance	Odometer reading (km)					
				1000	10,000	20,000	30,000	40,000	Annual inspection
1	☆	Diagnostic system check	- Use KOVE diagnostic tools for dynamic inspection. - Check the fault code.	•	•	•	•	•	•
2	☆	Air filter element	Replace.		•	•	•	•	
3	☆	Air filter box and hose	Cleaning.	•	•	•	•	•	
4	☆	Fuel filter	Replace.		•	•	•	•	
5		Clutch	- Check the operation. - Adjustment.	•	•	•	•	•	
6	☆	Front brake	- Check the operation, brake fluid level and leakage. - Replace brake pads if necessary.	•	•	•	•	•	•
7	☆	Rear brake	- Check the operation, brake fluid level and leakage. - Replace brake pads if necessary.	•	•	•	•	•	•
8	☆	Brake hose	- Check for cracks or damage. - Replace.		•	•	•	•	•
9	☆	Brake fluid	Replace.	Every 4 years					
				Every 2 years					
10	☆	Rim	- Check the radial and axial runout and whether there is damage. - Replace if necessary.		•	•	•	•	
11	☆	Tire	- Check the depth and damage of wheel tread. - Replace if necessary. - Check the tire pressure. - Correct if necessary.		•	•	•	•	•
12	☆	Wheel bearing	Check whether the bearing is loose or damaged.		•	•	•	•	
13	☆	swingarm pivot bearing	- Check operation and free play. - Lubricate with lithium soap-based grease.		•	•	•	•	
14		Drive chain	- Check the chain for looseness and alignment. - Dedicated chain lubricant to thoroughly adjust and lubricate the chain.	Every 1,000 km and after washing the motorcycle, or after riding in rainy or humid areas.					
15	☆	Steering head bearing	- Check the bearing assembly for tightness. - Apply a proper amount of composite lithium grease for lubrication.	•	•		•		
						•		•	

S/N		Item	Contents of inspection or maintenance	Odometer reading (km)					
				1000	10,000	20,000	30,000	40,000	Annual inspection
16	☆	Complete motorcycle fastener	• Ensure that all nuts, bolts and screws are tightened to the specified torque.		•	•	•	•	•
17		Front brake handle pivot	• Apply composite lithium grease for lubrication.		•	•	•	•	•
18		Brake pedal pivot	• Apply composite lithium grease for lubrication.		•	•	•	•	•
19		Clutch handle pivot	• Apply composite lithium grease for lubrication.		•	•	•	•	•
20		Shift pedal pivot	• Apply composite lithium grease for lubrication.		•	•	•	•	•
21		Side stand	• Check the operation. • Apply composite lithium grease for lubrication.		•	•	•	•	•
22	☆	Side stand switch	• Check the operation and replace if necessary.	•	•	•	•	•	•
23	☆	Front shock absorber	• Check the operation and oil leakage. • Replace if necessary.		•	•	•	•	
24	☆	Rear shock absorber	• Check the operation and oil leakage. • Replace if necessary.		•	•	•	•	
25		Engine oil	• Replace (preheat the engine before draining). • Check the oil level and the motorcycle for oil leakage.	Replace at 500Km, 1500Km, and every 5000Km thereafter					•
26		Engine oil filter element	• Replace.	Replace the oil at the same time.					
27	☆	Cooling System	• Check the amount of coolant and whether it leaks.		•	•	•	•	•
	☆		• Replace.	Every 2 years					
28	☆	Front and rear brake switches	• Check the operation.	•	•	•	•	•	•
29		Moving parts and cables	• Lubrication.		•	•	•	•	•
30	☆	Accelerator handle housing and cable	• Check the operation and free play. • Adjust the free play of the accelerator cable if necessary. • Lubricate the accelerator handle housing and cable.		•	•	•	•	•
31	☆	All lighting, signals and switches	• Check the operation. • Adjust the headlight beam.	•	•	•	•	•	•
32	☆	Battery	• Check whether the battery voltage is normal. • Clean the terminals.		•	•	•	•	•

Note

- Air filter
 - This kind of air filter element is paper type and cannot be cleaned with compressed air to avoid damage.
 - When driving in unusually humid or dusty areas, the air filter element must be replaced frequently.
- Hydraulic brake
 - Regularly check brake fluid and replenish when necessary.
 - Replace the inner parts of brake master cylinder and brake caliper every 2 years, and replace brake fluid at the same time.
 - Replace the brake hose every four years. Replace it immediately if there are cracks or damages.

※ Inspection of fuel tank line

1. Stand the vehicle on a flat ground.

Note

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

2. Disassembly

- Bolt and T-bushing [1];
- Bolt and gasket [2];
- Lift the fuel tank [3] upwards;
- Fuel tank drain hose [4];
- Fuel tank overflow hose [5];
- Fuel hose quick connector [6];
- Fuel filter [7];
- Fuel pump harness connector [8];
- Fuel tank [3].

3. Check the fuel pipeline

Notes

- Do not suspend the fuel tank from the fuel hose. Cover the frame with a cloth to prevent damage to the frame.
- If the quick connector and its surroundings are dirty, please clean them.
- Check the fuel hose [9], quick connector [10], fuel filter and rubber grommet [11], and single ear stepless clamp [12] for any looseness, damage or leakage.
- Check if there are any of the following situations
Squeeze/loosen → Connect correctly.
Crack/damage/leak → Replace.

Note

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

4. Installation

The installation sequence is reversed from the removal sequence.

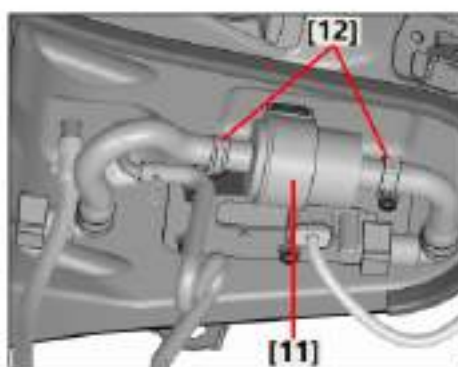
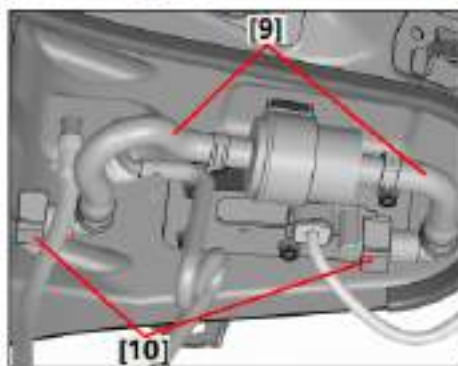
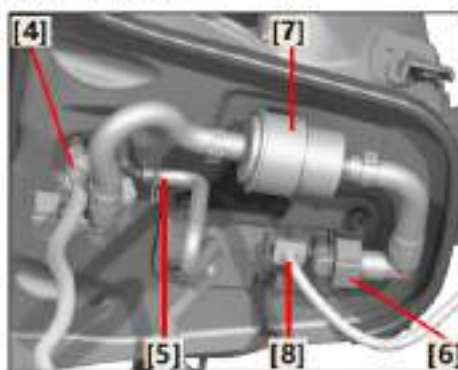
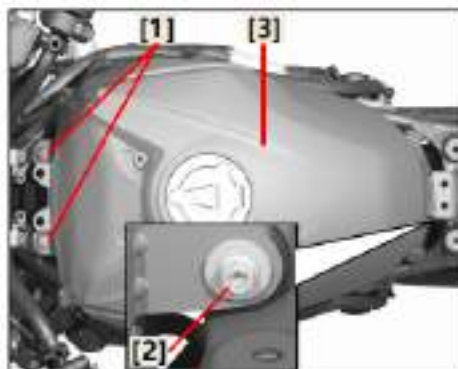
Torque:

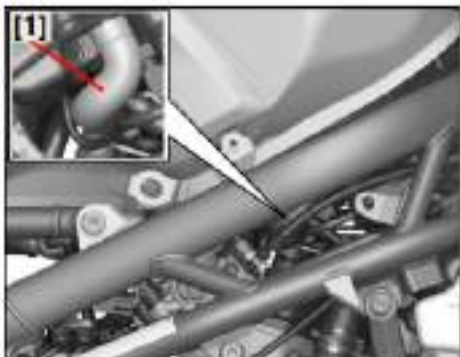
Front of fuel tank and frame

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Subframe weld assembly and fuel tank

10 N·m (1.0 kgf·m, 7.4 lbf·ft)





※ Crankcase vent pipe maintenance

Maintenance steps:

1. Remove the body panels shielding the fuel tank;
2. Check the crankcase exhaust pipe [1] for cracks, aging, damage or looseness;
3. Check and maintain, and replace the exhaust pipe if necessary [1];
4. Reinstall the fuel tank and body panels.

Notes

- Maintenance should be performed more frequently when riding in the rain or at full speed, as well as after rinsing the motorcycle or when it is inverted.
- Regularly check if sediment is visible in the transparent section of the air filter cleaning pipe [2]. If so, remove the air filter cleaning pipe, drain the sediment into a suitable container, and reinstall the pipe plug.

※ Inspection and adjustment of spark plug

Notes

•Before removing the spark plug [1], 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/LMAR9AI-10

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. Inspection

-The resistance value between the connection screw and the center electrode [1] is 5KΩ.

4. Cleaning

-Spark plug

(using spark plug detergent or wire brush)

5. Measurement

-Spark plug gap [a]

(measured with a feeler gauge)

Off-specification → Adjust the gap.

Spark plug clearance

0.90-1.00 mm

6. Install

-Spark plug

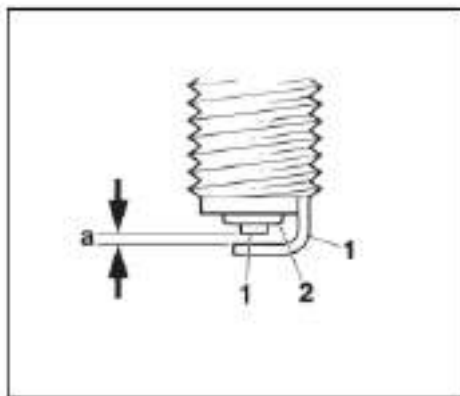
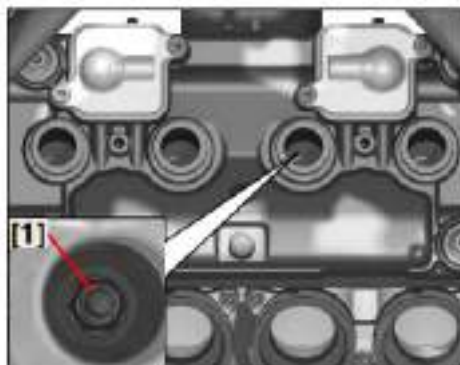
Torque :

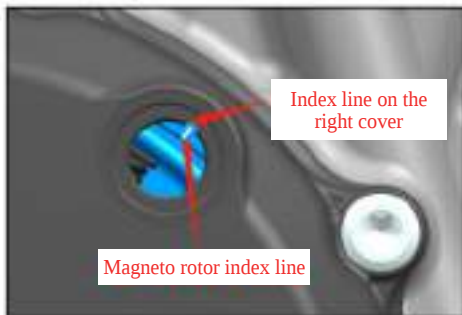
Spark plug installation

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

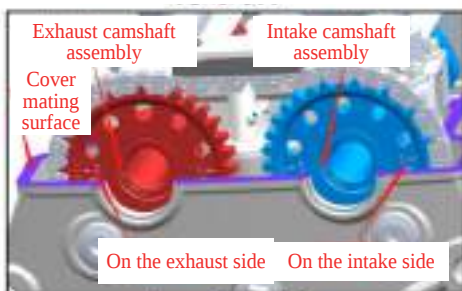
Note

•Before installing the spark plug, clean the surfaces of the spark plug and the gasket first.

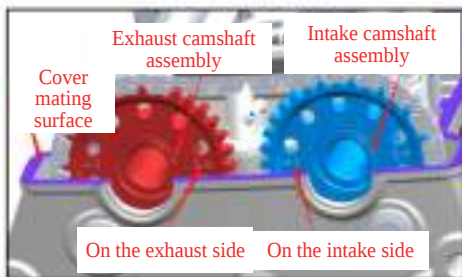




Align the index lines



TDC of compression stroke of Cylinder 1



TDC of compression stroke of Cylinder 4



※ Inspection and adjustment of valve clearance

⚠ Warning

-Please check and adjust the valve clearance when the engine is cold (below 35°C). Avoid getting burned on your hands.

Instruction:

Valve clearance: The gap between the valve rocker arm and the base circle of the camshaft.

TDC of compression stroke of cylinder 1: When the timing index line on the right crankcase cover aligns with the timing index line of the magneto rotor, the “I” mark of the intake camshaft assembly and the “E” mark of the exhaust camshaft assembly are flush with the cover mating surface. At the same time, the “I” mark of the intake camshaft assembly is on the intake side, and the “E” mark of the exhaust camshaft assembly is on the exhaust side;

TDC of compression stroke of cylinder 4: When the timing index line on the right crankcase cover aligns with the timing index line of the magneto rotor, the “I” mark of the intake camshaft and the “E” mark of the exhaust camshaft are flush with the cover mating surface. At the same time, the “I” mark of the intake camshaft is on the exhaust side, and the “E” mark of the exhaust camshaft is on the intake side;

Valve clearance:

Intake (IN): 0.08mm - 0.10mm

Exhaust (EX): 0.10mm - 0.12mm

Notes

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

Inspection steps:

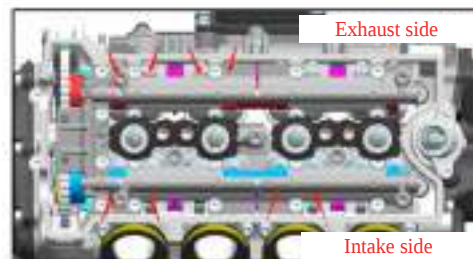
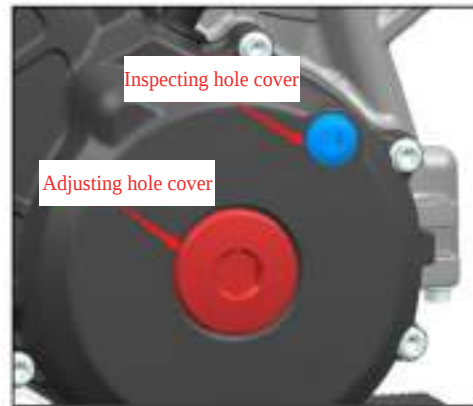
1.Remove all the vehicle accessories that block the engine cylinder head, generally including the body panels, fuel tank, and air filter;

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

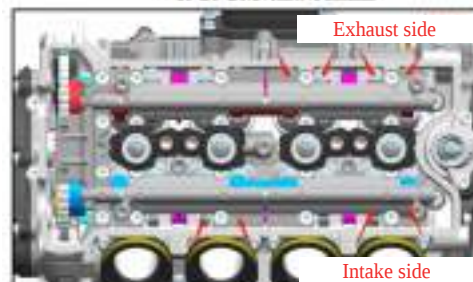
3.Rotate the crankshaft to adjust the engine to the TDC of compression stroke of cylinder 1, and use a feeler gauge to check the valve clearances of intake cylinders 1 and 3, and exhaust cylinders 1 and 2;

4.Rotate the crankshaft to adjust the engine to the TDC of compression stroke of cylinder 4, and use a feeler gauge to check the valve clearances of intake cylinders 2 and 4, and exhaust cylinders 3 and 4;

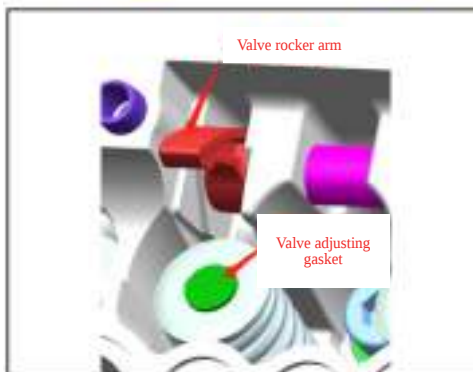
5.Check that there is no abnormality in the valve clearance, then reassemble the components in reverse order. If any abnormality is found, it is necessary to adjust the valve clearance. The adjustment procedures are as follows, and reassemble the components in reverse order after passing the inspection.



**TDC of compression stroke of Cylinder 1
Valve clearance inspection point**



**TDC of compression stroke of Cylinder 4
Valve clearance inspection point**



Adjustment procedures:

1. Rotate the crankshaft to adjust the engine to the top dead center of compression stroke of cylinder 1 (see the instructions on the previous page for details);

2. Disassemble the top bolt of the tensioner, insert a slotted screwdriver into the adjustment hole of the tensioner, and rotate it clockwise until it is locked to keep the tensioner in a compressed state;

3. Disassemble 20 camshaft cover bolts in 2 - 3 times in reverse order of the tightening sequence according to the "Bolt tightening methods for key parts" on page 150. Since some valve springs are in a compressed state, loosening the cover bolts all at once will damage the camshaft cover. Therefore, loosen all the bolts of the camshaft cover in multiple times, 1mm - 2mm each time, to ensure that the clearance between the cover assembly and the cylinder head plane increases evenly until they are separated;

4. Disassemble the camshaft cover and the camshaft. According to the actual values recorded during the inspection, lift the rocker arm of the abnormal valve clearance, remove the corresponding valve gasket, and calculate and replace it with a suitable valve gasket according to the actual clearance;

5. After replacing the valve gasket, lower the rocker arm. 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 intake and exhaust camshafts to the TDC of compression stroke of cylinder 1, install the camshaft cover, tighten the camshaft cover according to the "Bolt tightening methods for key parts" on page 150, and release the tensioner. For the detailed assembly steps, see "Valve train system" on page 165.

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 aluminum gasket and bolts of the tensioner, the engine cylinder head cover assembly (apply an appropriate amount of plane sealant at the position shown in the figure 1), the adjustment hole cover and the inspection hole cover. At this point, the valve clearance adjustment is completed;

Figure 1

Apply an appropriate amount of plane sealant



7. If the valve clearance still exceeds the required range from the standard range, repeat adjustment steps 2 - 6.

Notes

- During the reassembly process, an appropriate amount of engine oil should be applied to each moving friction pair;

- 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

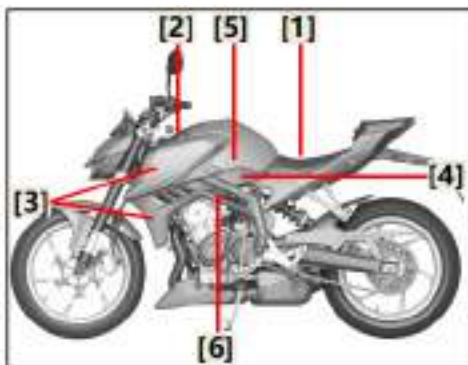
B: Recorded valve clearance value

C: Specified valve clearance value

D: Thickness of the removed gasket

- There are 41 groups of valve gaskets available for adjusting the valve clearance. The thickness range is 1.72mm - 2.60mm. The gasket markings are 1720 = 1.72mm, 1740 = 1.74mm... 2600 = 2.60mm;

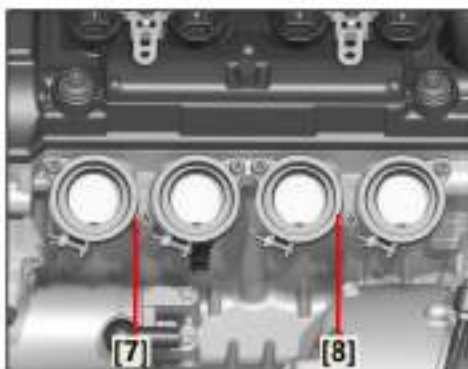
- It is recommended to use a magnetic bar to remove the valve gasket to prevent the valve gasket from falling into the engine.



※ Inspection of the engine intake pipe:

1.Disassembly

- Front seat cushion [1]
- Front shield of fuel tank [2];
- Fuel tank side protector and water tank trim (left and right) [3];
- Side cover (left and right) [4];
- See "Frame, Body Trim, Exhaust System" on page 57 for details.
- Fuel tank assembly and air filter assembly [5];
- Throttle body assembly[6];
- See "Fuel System" on page 107 for details



2.Inspection

- Engine intake pipes [7], [8];
- Crack/damage → Replace.

3.Install

The installation sequence is reversed from the removal sequence.

Torque :

Mounting bolts of intake pipe and engine

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ Engine idle speed

Inspection steps:

1.Before checking idle speed, check the following items:

- Check if the fault indicator flashes;
- Spark plug state;
- State of air filter element;
- Free stroke of accelerator switch and accelerator handle.

2.Start the engine, heat up to normal operating temperature, and let it idle run;

3.Check idle speed.

Notes

- Check the idle speed after completing all maintenance items of the engine and confirming that it is within the specified limit;
- The idle speed can only be accurately checked and adjusted under the engine warm-up state at the idle speed of **(1500±100) rpm**.
- If the idle speed is not within the maintenance limit, check the following components:
 - Intake volume or engine muffler-related Issues
 - Idle speed control valve operation
 - Cable lines and connectors.

※ Engine Oil Inspection and Replacement

Oil Level Check

1. Start the engine and let it idle for 3-5 minutes.
2. Turn off the engine and wait for 2-3 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 minimum mark [1], remove the oil plug [2] and fill the crankcase [3] with the specified engine oil up to the fuel upper level mark.

Specified engine oil specification:

API quality grade: SN or above

(Do not use the oil listed at the circular API service label marked as “Energy-efficient”);; model: SN 10W-40 GB 11121-2006.

- Check that the O-ring of the engine oil plug is in good condition and replace it if necessary.
- Coat engine oil to the O-ring surface.
- Install the engine oil plug.

Engine oil replacement

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:

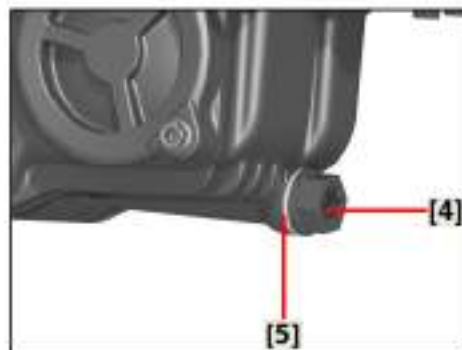
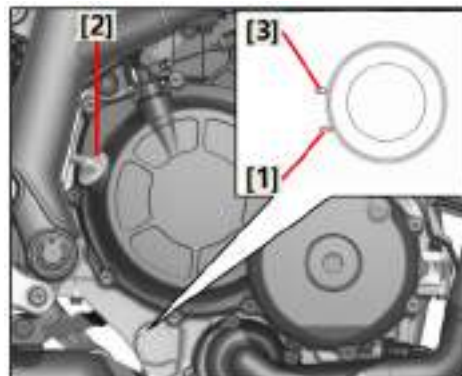
- Engine oil plug [2];
- Oil drain bolt [4] and plain washer [5];
- Drain the engine oil.

After completely draining the engine oil

- Install the oil drain bolt [2] and replace it with a new washer.
- Add engine oil to the upper fuel level mark [3].
- Install the engine oil plug.

Inspection

- Check the fuel level to ensure there are no engine oil leaks.
- Check the O-ring on the engine oil plug [2] for damage → replace if necessary.



Torque:

Engine fuel drain bolt

30 N·m (3.0 kgf·m, 22 lbf·ft)

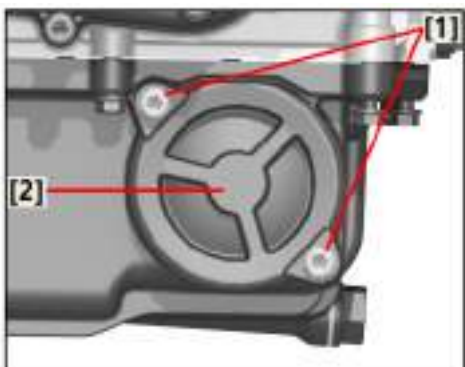
Requirements for oil filling volume

Only after draining from the oil drain bolt:

2.4L;

After disassembling or replacing the oil fine filter: **2.6 L;**

After disassembly and reassembly of the entire machine: **2.8L.**



※ Engine oil filter replacement

Note

- Drain the engine oil before replacement.

Replacement steps:

- Bolt [1];
- Engine oil filter cover [2];
- Remove the engine oil filter with needle-nose pliers or caliper [3];
- Clean the oil filter chamber with cleaning agent, then blow it dry or wipe it clean;
- Install the new engine oil filter, check for the rubber grommet on the filter, and reinstall the engine oil filter cover.

Notes

- Check the O-ring [4] on the filter cover for damage and replace it if necessary. Coat a proper amount of engine oil or grease to the O-ring before assembly.

Torque :

Fine filter cover mounting bolt
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ Inspection of engine oil pressure

1. Park the vehicle on a level surface.

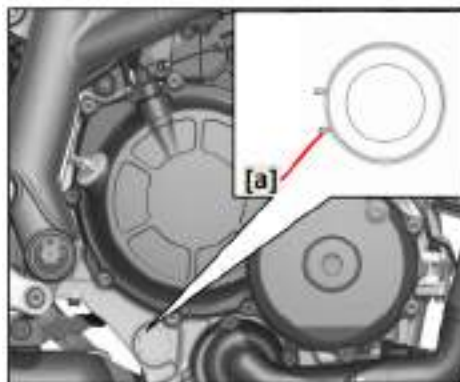
Note

- Place the vehicle on a suitable workbench.
- Make sure it remains upright.

2. Inspection

-Engine oil level

The oil level is below the lowest level mark [a] →
Add the recommended oil to the appropriate level.



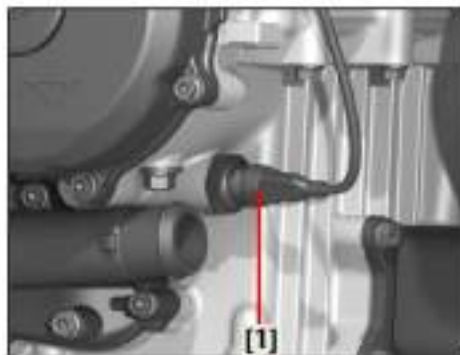
3. Start the engine, let it warm up for a few minutes, and then turn it off.

Notes

- When the engine is cold, the oil has a higher viscosity, which will cause an increase in oil pressure. Therefore, it is necessary to measure the engine oil pressure after warm-up.

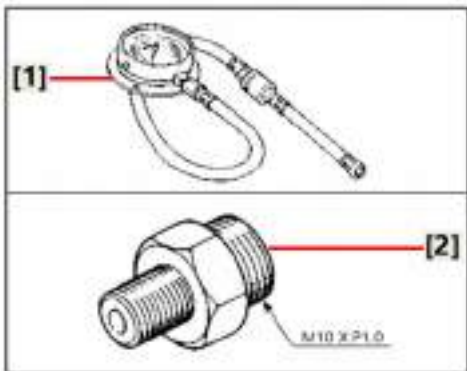
4. Disassembly

-Oil pressure sensor[1];



▲ Warning

- The engine, muffler and engine oil are very hot.



Engine oil pressure	Possible reasons
Lower than the standard pressure	•Oil pump fault •Oil filter blockage •Fuel line leakage •Broken or damaged oil seal
Higher than the standard pressure	•Oil filter failure •Too high oil viscosity

5.Installation

- Oil pressure gauge [1];
- Oil pressure gauge adapter [2];

6.Park the vehicle on a level surface.

Note

- Place the vehicle on a suitable stand.
- Make sure it remains upright.

7.Measurement

- Engine oil pressure (under the following conditions)

300 kPa/8000r/min
3.0 kgf/cm² / 8000 r/min,
43.5 psi/8000 rpm

8.Installation

- Oil pressure sensor;
- Engine lower protector assembly.

Torque:

Oil pressure sensor

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ Inspection of exhaust system

Warning

- Wait for the exhaust pipe to cool down before disassembly to avoid burns.

Inspection

- Muffler gasket;
Exhaust leakage → Replace
- Muffler assembly;
Crack/damage/leak → Replace.

Locking torque inspection

- Exhaust port connecting nut [1];
- Oxygen sensor [2].
- Muffler mounting bolt [3].
- Muffler shield mounting bolt [4];
- Muffler mounting bracket and engine connecting bolt [5];

Torque:

Connecting nut [1] between front section of muffler and engine exhaust port

Muffler shield and muffler [4]

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Muffler mounting bracket and engine [5]

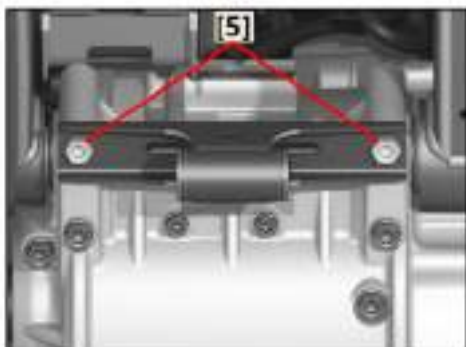
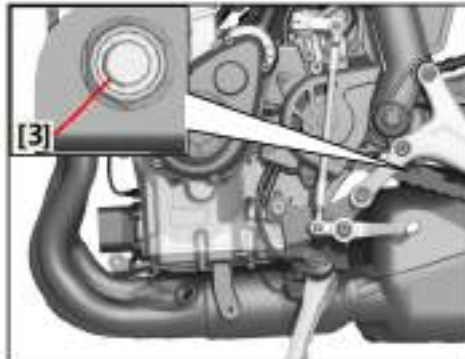
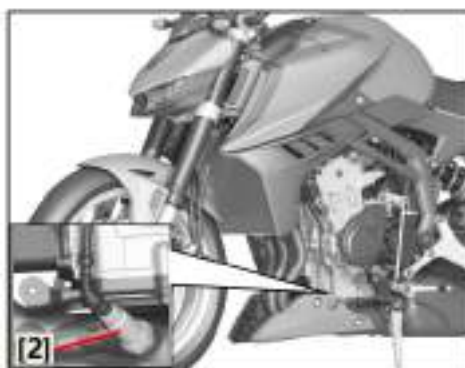
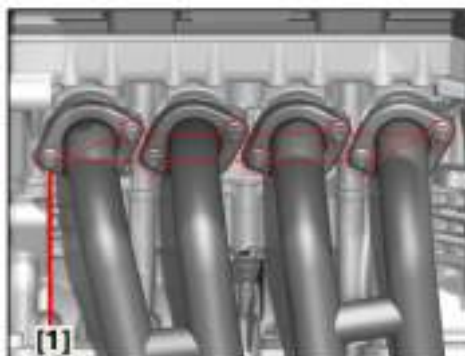
12 N·m (1.2 kgf·m, 9.0 lbf·ft)

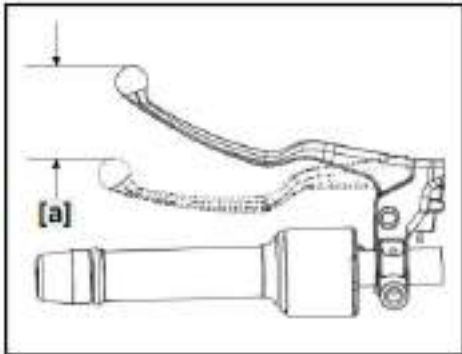
Muffler and muffler mounting bracket [3]

22 N·m (2.2 kgf·m, 16 lbf·ft)

Oxygen sensor connected to the muffler [2]

50 N·m (5.0 kgf·m, 37 lbf·ft)

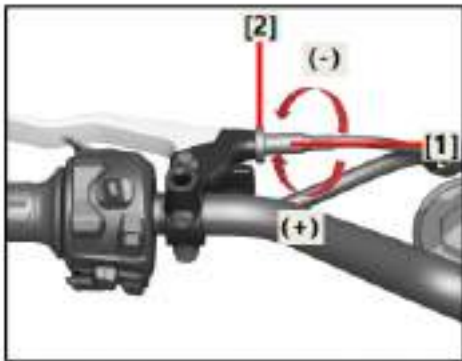




※ Inspection and adjustment of clutch free play

Inspect the clutch cable for twists or damage, and lubricate it if necessary.
Measure the free play of the clutch lever at the end of the lever [a].

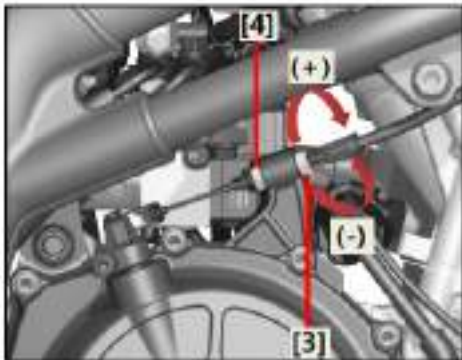
Free play: 10-15mm



The minor adjustment can directly adjust the adjusting bolt on the clutch lever [1].

Loosen the locking nut [2] and rotating the adjusting bolt as needed. Hold the adjusting bolt in place while tightening the locking nut.

When the adjustment limit is exceeded, the free play cannot be accurately achieved. This time you need further adjustments on the clutch lever positioning panel.



The main adjustment is made by adjusting the nut [3] located on the clutch lever positioning panel.

Loosen the locking nut [4] and rotating the adjusting nut as needed to achieve the specified free play. Hold the adjusting nut in place while tightening the locking nut.

Disassemble and inspect the clutch if the correct stroke cannot be obtained or if the clutch slippage occurs during a test ride.

(+) Increase free play;

(-) Decrease free play;

※ Inspection and adjustment of front hand brake lever

Inspection

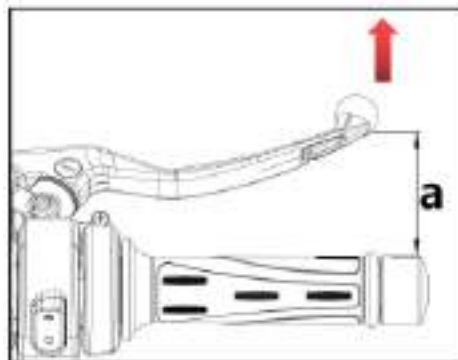
- Hand brake lever liquid reservoir and brake fluid

Too low → Add

Damage/leakage → Replace.

- Brake handle

Weak pressing/excessive looseness → Air release



Adjustment

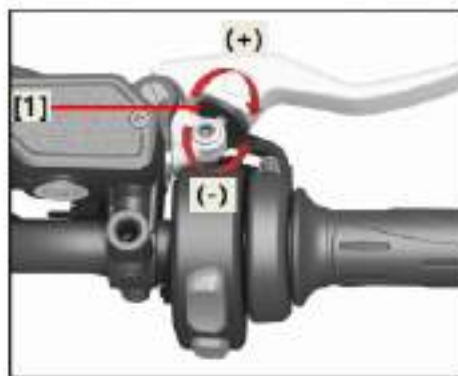
- Front hand brake lever position

(Distance from accelerator handle to hand brake lever [a]).

a. Push the hand brake lever forward.

b. Rotate the adjustment knob [1] until the hand brake lever is in the desired position.

c. Rotate the adjusting knob clockwise to increase the distance, and counterclockwise to decrease the distance.



Notes

- After adjusting the hand brake lever position, ensure the brake does not drag.

※ Inspection of engine intake pipe

1. Disassembly

- Air filter assembly

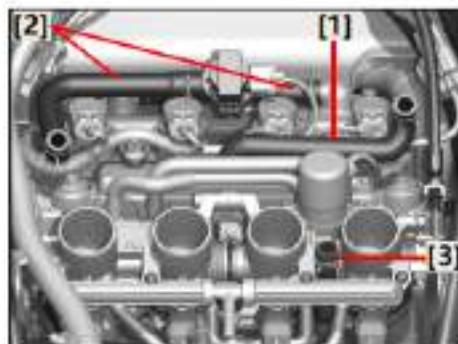
See "Fuel System" on page 107 for details.

2. Inspection

- Inspect whether the exhaust pipe [1]/air supply valve inlet and outlet pipe [2]/stepper motor air intake pipe [3] is in good condition.

Cracked/broken → Replace.

Loose connection → Correct connection.

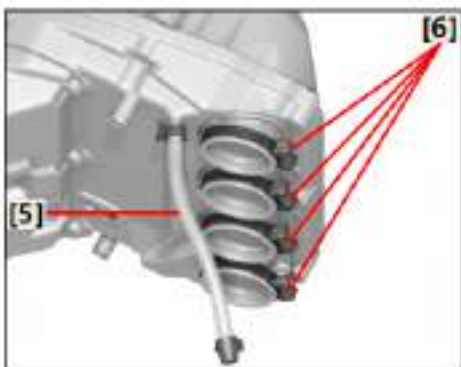
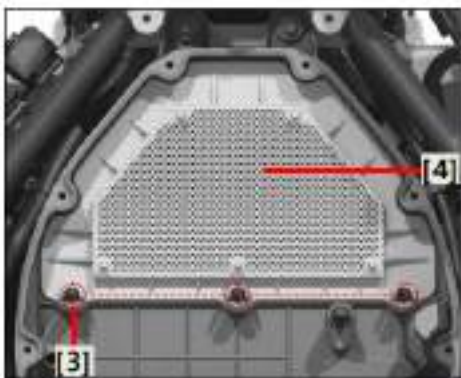
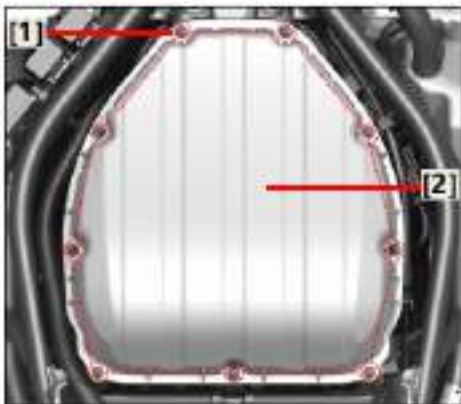


3. Installation

The installation sequence is reversed from the removal sequence.

Notes

- Confirm the correct configuration of each connecting pipe of the engine.



※ Replacement of air filter element/inspection of hose cleanliness

Disassembly/installation

Disassemble the following parts:

- Screw [1]
- Air filter cover [2];
- Air filter element screw [3];
- Air filter element [4].

Inspection

-Check if the air filter tank mounting bolts are loose

Loose → Tighten.

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

Too dirty or damaged → Replace.

As shown in the figure:

-Check the air filter drain pipe [5]

Cracked/broken → Replace.

Loose connection → Correct connection.

-Clean the accumulated water in the drain pipe.

-Inspect whether the installation position of the pipe clamp [6] is correct and if it is loose

Incorrect position → adjustment → correct installation.

Cleaning

-Inside the air filter tank

The installation sequence is reversed from the removal sequence.

Note

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

Torque:

Air filter upper cover mounting screw

Air filter element mounting screw

3.0 N·m (0.3 kgf·m, 2.0 lbf·ft)

Notes

Do not start the engine before installing the air filter element. Unfiltered air will cause rapid wear of engine parts and may damage the engine.

※ Inspection of brake operation

1. Inspection

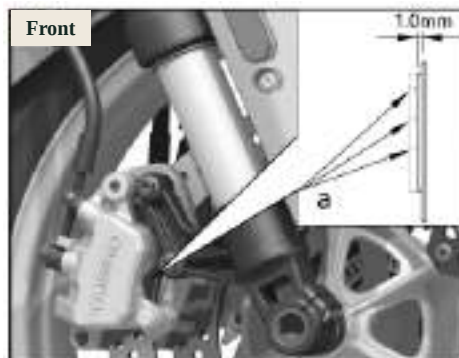
- Brake operation

Brake is not functioning properly → Check brake system.

See "Hydraulic Braking System" on page 269 for details.

Notes

• Drive on a dry road and run both the front and rear brakes separately to check if they are functioning properly.



※ Inspection of brake pads

The following procedure applies to all brake pads.

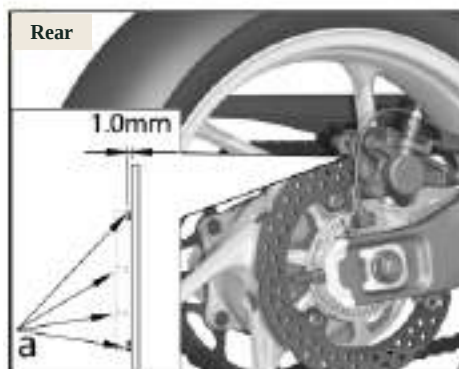
1. Run brake

2. Inspection

- Front and rear brake pads

If any one wears down to the indicated groove [a] → Replace the entire set of brake pads.

See "Hydraulic Braking System" on page 269 for details.



※ Inspection and replacement of disc brake

Inspection

- Visually check the brake disc for damage or cracks.

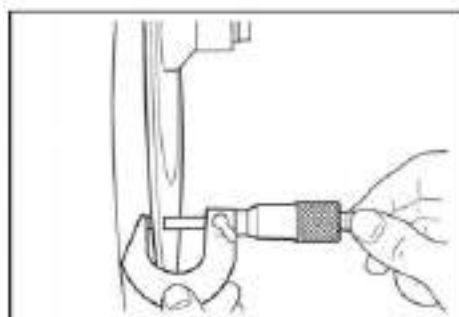
Measure the wear limit of brake disc:

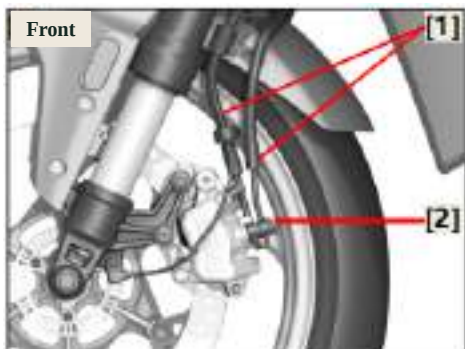
Front brake disc: **4.0 mm**

Rear brake disc: **4.0 mm**

Damage/deformation/off specification → Replace.

See "Hydraulic Braking System" on page 269 for details.





※ Inspection of front brake hose

1. Inspection

-Brake hose [1]

Crack/damage → Replace.

2. Inspection

-Brake hose clip

Loosen → Install correctly.

-Brake hose (bolt) [2]

Loosen → Lock bolt.

3. Keep the vehicle upright and run the brakes several times.

4. Inspection

-Brake hose [1]

Brake fluid leaks → Replace damaged brake hose.

See "Hydraulic Braking System" on page 269 for details.

※ Inspection of rear brake hose

1. Inspection

-Brake hose [1]

Crack/damage → Replace.

2. Inspection

-Brake hose clip

Loosen → Install correctly.

-Brake hose (bolt) [2]

Loosen → Lock bolt.

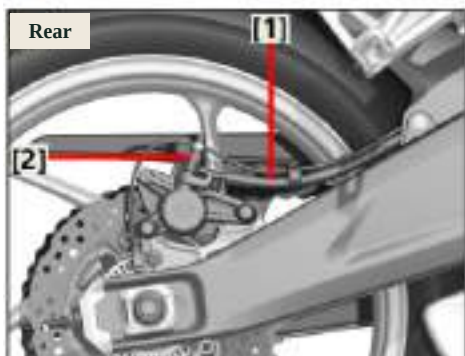
3. Keep the vehicle upright and run the rear brake several times.

4. Inspection

-Brake hose [1];

Brake fluid leaks → Replace damaged hose.

See "Hydraulic Braking System" on page 269 for details.



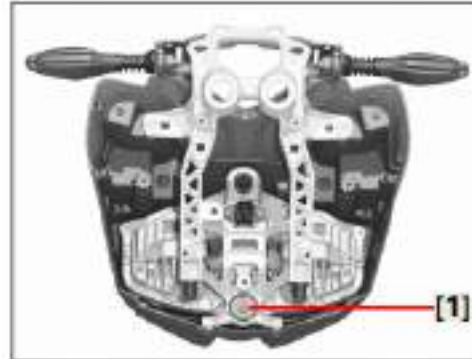
※ Adjustment of headlight beam

- Adjust the headlight alignment according to local laws and regulations.
- Support the motorcycle vertically on a horizontal plane.

Adjust the headlight beam angle by rotating the adjusting screw [1], and use a screwdriver to turn the adjusting screw serration [a] under the headlight.

Rotating clockwise lowers the headlight beam as a whole.

Rotating counterclockwise raises the headlight beam as a whole.





※ Inspection of side stand

Inspection

Check the side stand [1] for smooth movement.
If movement is irregular → Repair or replace.



※ Lubrication of side stand

Apply lubrication to the pivot point of the side stand, the contact areas of the metal parts [1] and the spring contact point [2].

Recommended lubricants:

UNIVERSAL SU-T330Y grease.

※ Recommended lubricants:

UNIVERSAL SU-T330Y grease.

※ Inspection of coolant level

1. Stand the vehicle on a flat ground.

Note

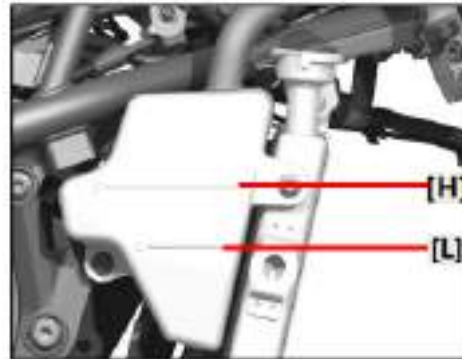
- Place the motorcycle on the appropriate bracket.
- Make sure the motorcycle stays upright.

2. Inspection

-Coolant volume

The coolant level shall be maintained between the lowest level mark "L" and the highest level mark "H".

Below the lowest level mark → Fill the recommended coolant to the appropriate level.



Notes

- Replacing coolant with water will lower the concentration of antifreeze in the coolant. If water is used instead of coolant, check and correct the concentration of antifreeze in the coolant if necessary.
- Use only distilled water for filling the coolant. In the absence of distilled water, soft water can be used as an alternative.

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

4. Inspection

-Coolant volume

Note

- Before checking the coolant level, allow a few minutes for the coolant to settle.



※ Inspection of cooling system

1. Inspection

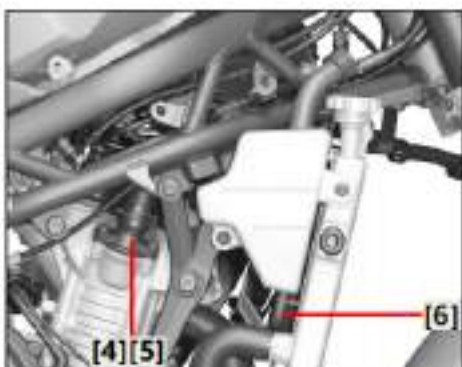
- Radiator [1]
- Engine water inlet hose [2];
- Engine water outlet hose [3];
- Thermostat cover [4]
- Thermostat [5]
- Pressure relief pipe [6].

Crack/damage → Replace.

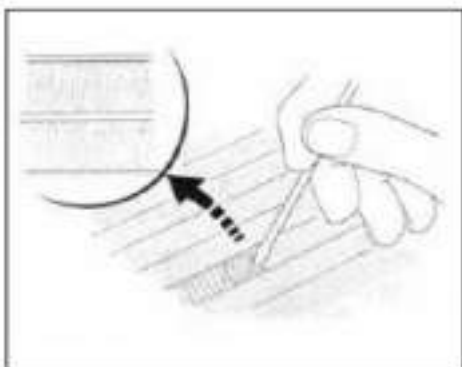
See "Cooling System" on page 115 for details.

Thermostat

See "Cooling System" on page 115 for details.



Check the radiator air channel for blockages or damage, straighten any bent pieces with a flathead screwdriver, and remove insects, dirt or other obstructions using compressed air or low water pressure. If the restricted flow exceeds 20% of the heat dissipation surface, replace the radiator.



※ **Lubrication of front brake handle**

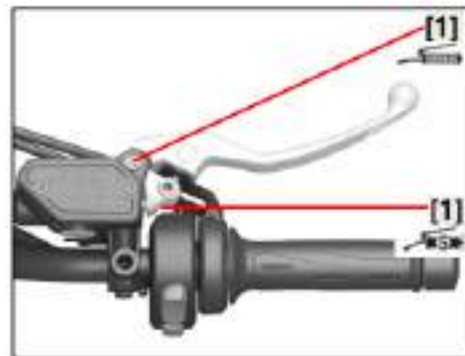
Apply lubrication to the pivot point of the handle and the contact areas of the metal parts [1].



Recommended lubricating oil
Use silicone grease

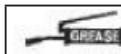


Recommended lubricating oil
Use silicone grease

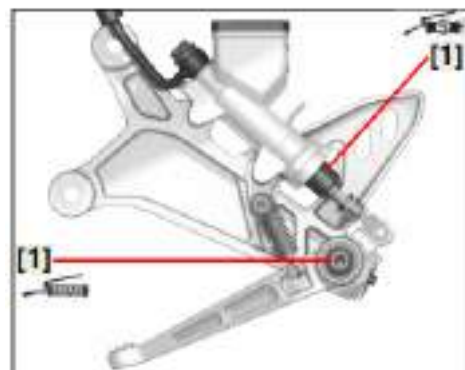


※ **Lubrication of rear brake rocker arm**

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



※ **Lubrication of clutch handle**

Apply lubrication to the pivot point of the handle and the contact areas of the metal parts [1].

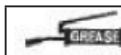


Recommended lubricating oil
Lithium-based multipurpose grease

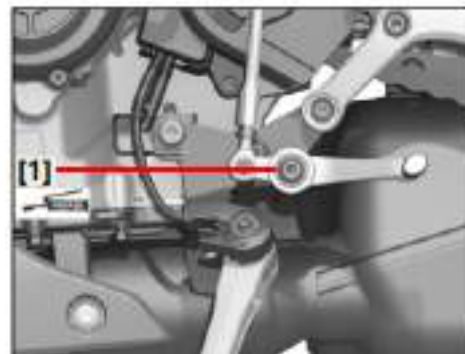


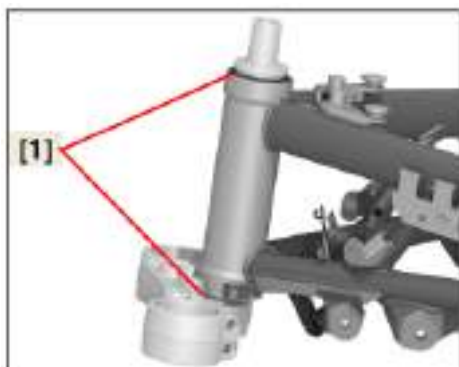
※ **Lubrication of shift pedal connecting rod**

Lubricate the pivot points of the gear shift lever and the contact areas between metals [1].



Recommended lubricating oil
Lithium-based multipurpose grease





※ 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.

Torque:

Steering stem 4-slot nut

First stage: 45N·m; Second stage: Retract the adjusting nut by 180° and tighten it to 20N·m; Third stage: Keep the direction fixed and retract by 15° (≈one groove position).

⚠ Warning

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

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 seals**

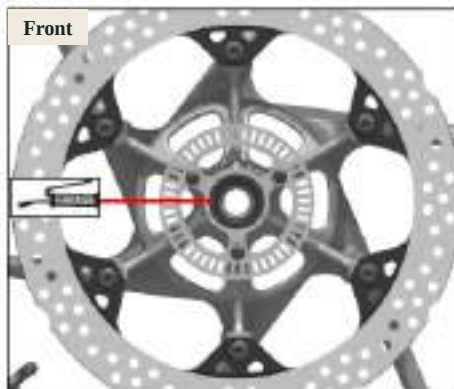
Regularly clean, inspect, and lubricate oil seals, particularly when riding on wet, muddy, or dusty roads, to ensure that all dustproof seals are in good condition. During installation, apply a small amount of grease in the groove between the main and auxiliary lips of the oil seal.

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

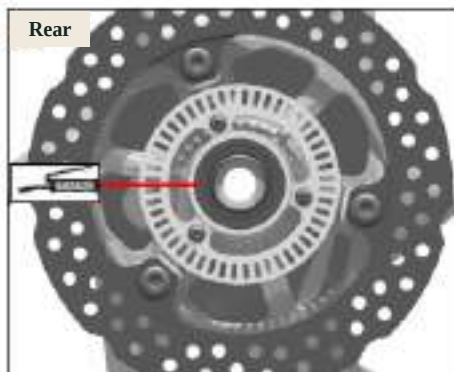


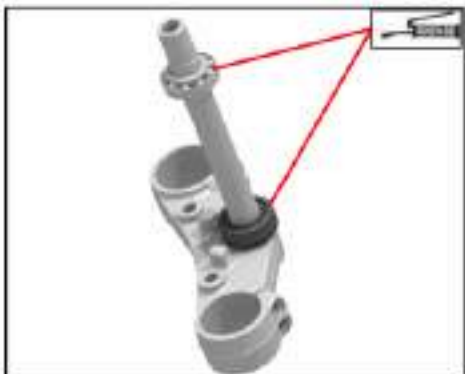
Recommended lubricating oil
Lithium-based multipurpose grease

Front



Rear





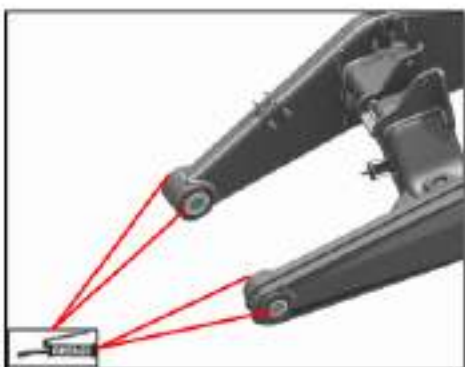
※ Inspection and lubrication of steering head Bearing

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 swingarm bearing

Clean, inspect and lubricate the swingarm bearing regularly. Make sure all dustproof seals are in good condition. 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).

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 of front shock absorber

1. Stand the vehicle on a flat ground.

⚠ Warning

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

2. Inspection

- Front swingarm hose

Damage/scratch → Replace.

- Front shock absorber

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 Wheel, Suspension, Steering" on page 243 for details.



※ Inspection of rear shock absorber

1. Stand the vehicle on a flat ground.

⚠ Warning

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

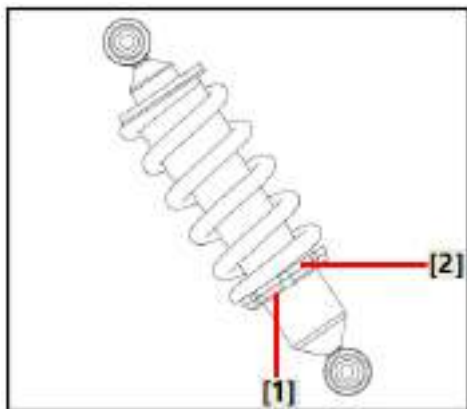
- Rear shock absorber actuation

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

Unsmooth movement → Adjust.

See "Rear wheel, suspension" on page 253 for details





※ Rear shock absorber adjustment

⚠ Warning

- This rear shock absorber contains highly compressed nitrogen gas. Before removing the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for any property loss or personal injury resulting from improper operation of the rear shock absorber.
- Do not modify or attempt to remove the rear shock absorber.
- Avoid exposing the rear shock absorber to open flames or any other high-temperature sources. Due to the high gas pressure, exposure to high temperatures can lead to an explosion.

Spring preload adjustment

Adjust the spring preload after the vehicle has been stationary for some time. Loosen the spring preload adjustment locking nut [1], then rotate the shock absorber spring preload adjusting nut [1] to adjust the spring preload.

Turning the knob clockwise (H) increases the spring preload, shortening the spring length; turning it counterclockwise (S) decreases the spring preload, lengthening the spring. The compressed spring length (standard) after preload adjustment is 174 mm.

Note

- The subsequent compression and recovery of the rear shock absorber are not adjustable.

Notes

- Gently rotate the adjusting bolt to prevent damage to the shock absorber.
- Make sure that the adjusting bolt is firmly in the fixed position during each adjustment.
- The adjusting torque shall not exceed 0.5N·m.

Torque :

Rear shock absorber locking nut

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

※ Inspection of brake light switch

Inspection of brake light switch [1]

1. Inspection

- Front brake light switch operation
- Rear brake light switch operation

2. Inspection

- Brake switch wiring harness

Crack/damage → Replace.

- Brake switch (bolt)

Loosen → Lock bolt.



Note

- Make sure the brake light is on when operating the brake handle and brake pedal.

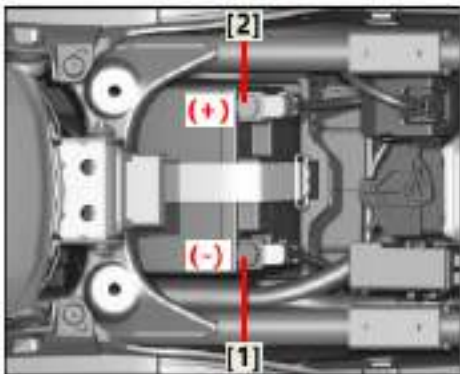
※ Inspection of switches, lights and signals

Check that all switches are operating properly and all lights are on.

※ Inspection of vehicle locking torque

Check that all nuts, bolts and screws are properly locked (every 3 months or 10000km).

For torque values, see "Vehicle Body Bolt Torque Value" on page 10 for details.



※ Battery inspection and charging

1.Disassembly

-Front seat cushion assembly

See "Frame, Body Trim, Exhaust System" on page 57 for details.

2.Disconnection

- Battery conductor

(From battery terminal)

Notes

•First, disconnect the negative battery wire [1], and then disconnect the positive battery wire [2].

3.Disassembly

-Battery

See "Frame, Body Trim, Exhaust System" on page 57 for details.

4.Inspection

-Battery voltage

5.Charging

-Battery

6.Install

-Battery

See "Frame, Body Trim, Exhaust System" on page 57 for details.

7.Connection

- Battery conductor

(To battery terminal)

Notes

•First, connect the battery positive lead [2], and then connect the battery negative lead [1].

8.Inspection

-Battery terminal fouling → clean with wire brush.

Connection unsecured → tighten.

9.Install

-Front seat cushion assembly

See "Frame, Body Trim, Exhaust System" on page 57 for details.

※ Inspection and lubrication of steel cable

The following procedures apply to all steel cables.

1. Inspection

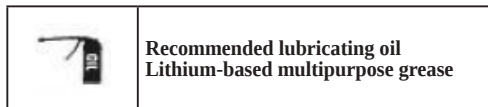
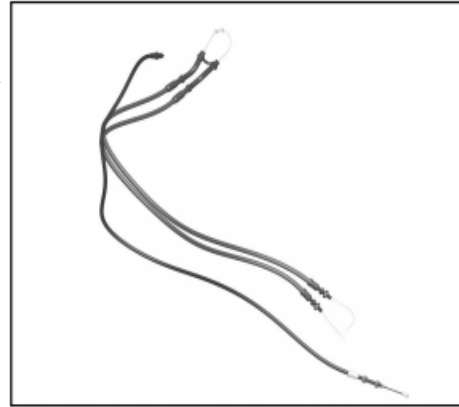
-Outer cable (rubber covering)

Damage → Replace.

2. Inspection

-Cable operation

Unsmooth movement → Lubrication.



Recommended lubricating oil
Lithium-based multipurpose grease

Notes

- Hold the cable end vertically and pour a few drops of lubricant into the cable sheath, or use an appropriate lubrication device.

⚠ Warning

- Damaged cable rubber will cause cable corrosion and affect its operation. Replace damaged cable as soon as possible.

Frame, Body Trim, Exhaust System

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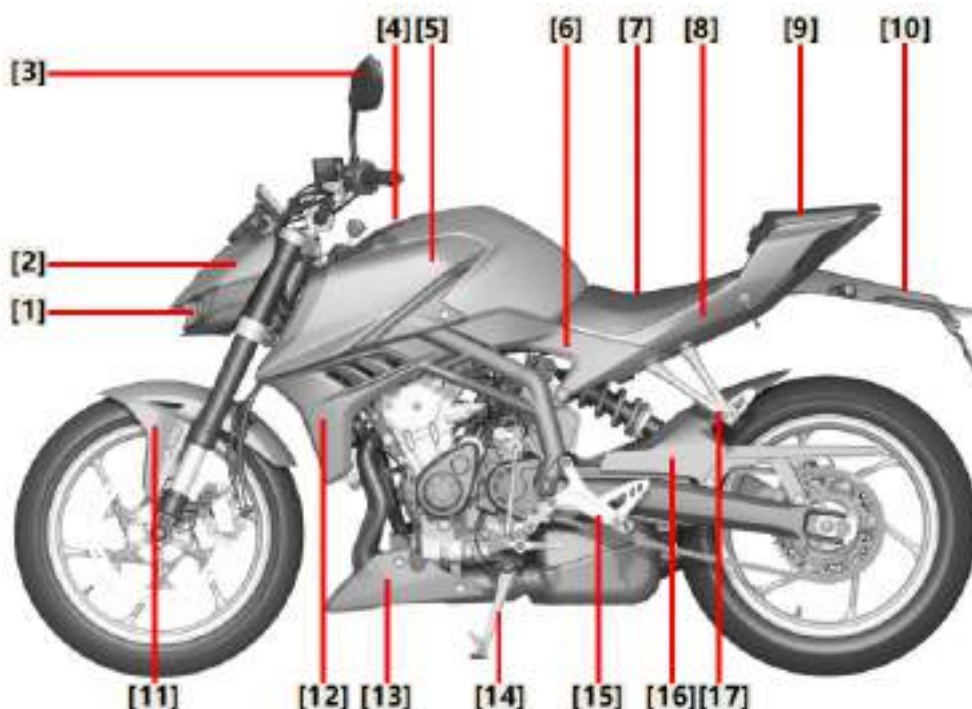
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Maintenance Instructions

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, first loosen all fasteners. Be sure to tighten the exhaust pipe joint nut first, then tighten the mounting bolt;
- After installation, be sure to check for the exhaust system leak, or unacceptable exhaust noise at the time of troubleshooting;
- Exhaust system damage;
- Inadequate exhaust gas leak performance;
- Exhaust system deformation;
- Exhaust gas leak;
- Muffler blockage.

Body Trim Position/Disassembly Drawing



(1)Headlight assembly	(2)Front panel	(3)Rear mirror assembly	(4)Fuel tank front cover
(5)Fuel tank side protector	(6)Side cover	(7)Front seat cushion assembly	(8)Vehicle body
(9)Rear seat cushion assembly	(10)Rear fender rear section	(11)Front fender	(12)Water tank trim
(13)Engine lower protector	(14)Side stand	(15)Front footpeg assembly	(16)Chain box
(17)Rear footpeg assembly			

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

Full vehicle exterior trim → Instrument assembly → Water reservoir → Radiator cooler → Oxygen sensor → Exhaust pipe assembly → Fuel tank assembly → Air filter assembly → Throttle valve assembly → Fuel evaporation system → Full vehicle electrical components → Full vehicle lighting components → Full vehicle wiring harness → Front and rear calipers and master cylinder → Hydraulic brake unit → Front and rear wheel assembly → Front and rear shock absorbers → Handlebars and components → Upper bracket → Lower bracket and steering stem → Drive chain → Swingarm → Front footpeg assembly → Rear footpeg assembly → Side stand → Gear shift lever assembly → Engine components

※ **Seat cushion assembly (front/rear)**

Disassembly/installation

Disassemble the following parts:

-Insert the ignition key to unlock the rear seat cushion [1];

-Rear seat cushion assembly [2];

-Front seat cushion mounting bolt and bushing [3];

-Front seat cushion assembly [4].

The installation sequence is reversed from the removal sequence.



Notes

•When installing the rear seat cushion, ensure it snaps into the cushion pull strap [5]. Align the cushion lock pin [6] with the lock bore [7], making sure the pin is fully inserted into the bore and automatically secured by the lock tongue;

•The mounting bolt for the front seat cushion is located beneath the seat cushion. To disassemble it, lift the rear edge of the front seat cushion.

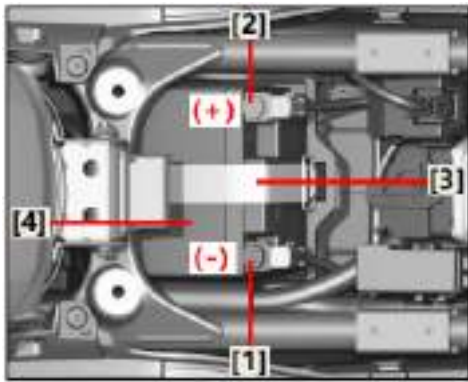


Torque:

Front seat cushion to frame.

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





※ Battery

⚠ Warning

- Please disconnect the positive and negative connections of the battery before disassembly

Disassembly/installation

Disassemble the following parts:

- Remove the negative battery terminal screw [1];
- Remove the positive battery terminal screw [2];
- Battery strap [3];
- Battery [4].

The installation sequence is reversed from the removal sequence.

Notes

- When installing, correctly route the wiring harness and plugs.

Torque:

Battery positive and negative terminal bolt connection

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

※ Fuel tank front cover

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bolt and flanged bushing [2];
- Bolt [3];
- Bolt and flanged bushing [4];
- Expansion screw [5];
- Front shield of fuel tank [6];
- The installation sequence is reversed from the removal sequence.

Note

- To obtain sufficient working space, first disassemble the connecting bolts [1] and [2] of the fuel tank side trim and water tank trim to avoid damage from forceful disassembly.
- Ensure the front shield of the fuel tank is completely detached from all component clips before disassembling to avoid damage caused by forceful removal.

Notes

- When disassembling or assembling, note that the right side [7] of the fuel tank front shield should be embedded in the water reservoir opening.
- Ensure the fuel tank front shield limit pin is engaged into the fuel tank limit bore [a] during installation.

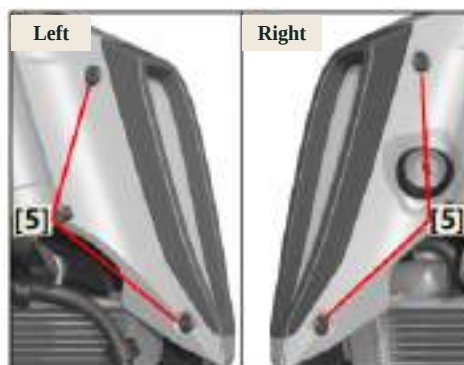
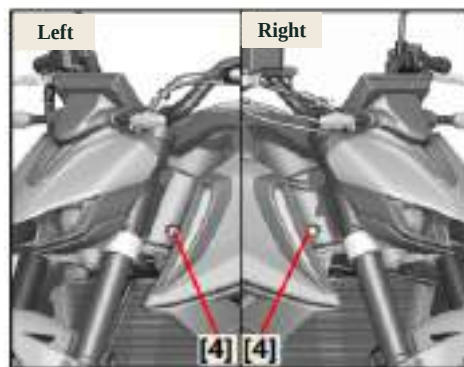
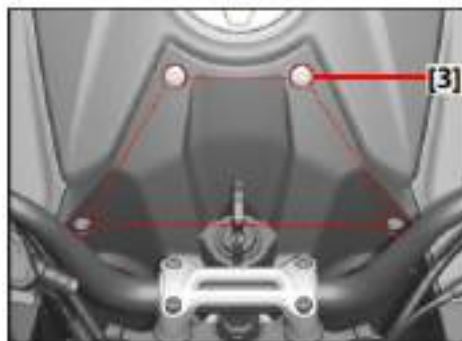
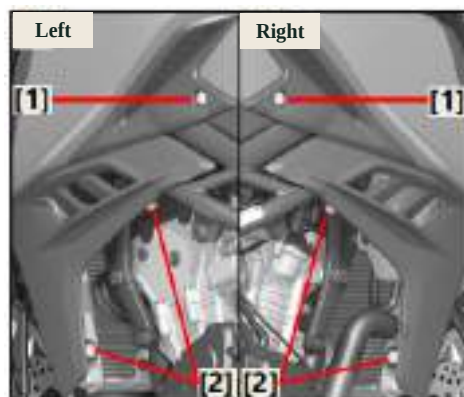
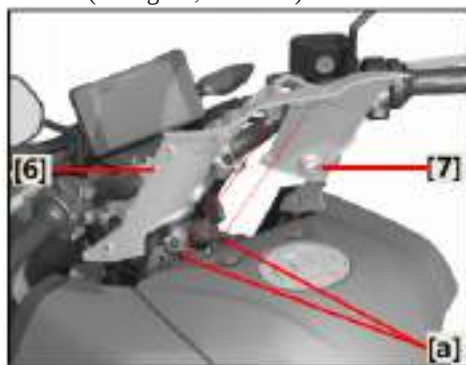
Torque:

Fuel tank side trim connected to the fuel tank [1]

Water tank trim connected to the frame and the radiator assembly [2]. Fuel tank front shield connected to the fuel tank [3]

Fuel tank front shield connected to the frame [4]

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





※ Fuel tank side protector assembly and water tank trim (left and right)

Note

•Remove the front shield of the fuel tank and the bolts (see page 63 for details) before disassembly.
Disassembly/installation

Disassemble the following parts:

-Fuel tank side protector-left [1] and connected components;

Note

•Separate the water tank trim from the radiator positioning bore [a] outward from the vehicle body, then remove it forward to avoid damage from forceful disassembly.

-Fuel tank lower protector trim - left [2];

-Screw [3];

-Water tank trim - left [4];

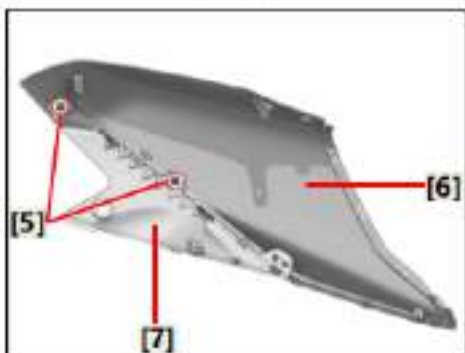
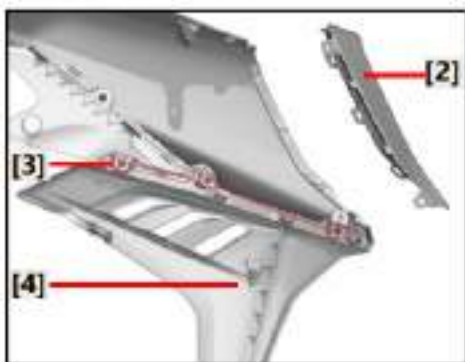
-Screw [5]

-Fuel tank side protector - left [6];

-Fuel tank side trim - left [7];

-The right-side trim removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.



Notes

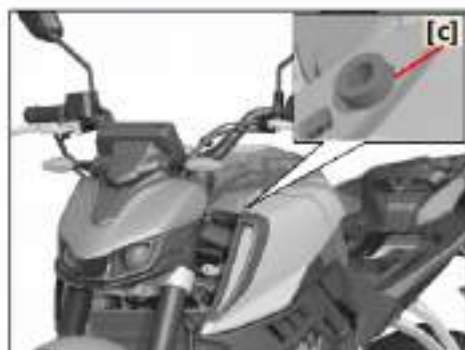
•During installation, ensure that all components are securely fitted to the clips on the vehicle body, and the fuel tank side protector should be engaged with limit brackets [b] and [c] to avoid damage from forced disassembly.

Torque:

Water tank trim connected to the fuel tank side protector and the fuel tank side trim [3]

Fuel tank side protector connected to the fuel tank side trim [5]

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)



※ Rear mirror assembly (left and right)

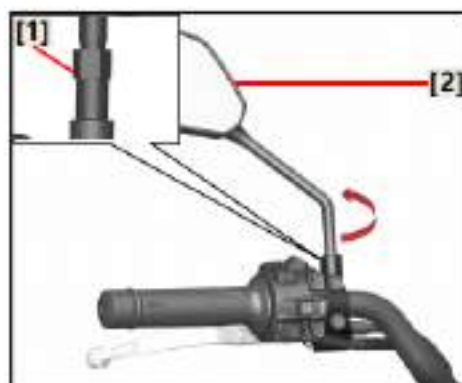
Disassembly/installation

Disassemble the following parts:

- Pull on the rubber grommet;
- Loosen the nut [1];
- Rotate the left rear mirror [2] until it is removed.

-The right-side rear mirror removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.



※ Headlight assembly and instrument

1.Disassembly

- Gently pull outward to remove the headlight housing trim [1];
- Disconnect the instrument plug and electrical harness connector [2];
- Bolt and flanged bushing [3];
- Lift the headlight assembly and instrument, then pull the headlight bracket limit pin out of the bore on the lower bracket [4];

The installation sequence is reversed from the removal sequence.

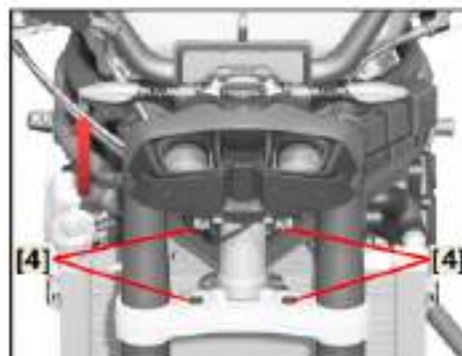
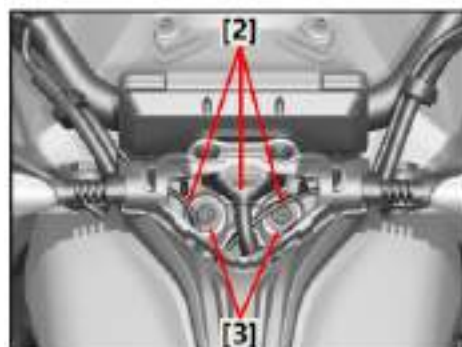
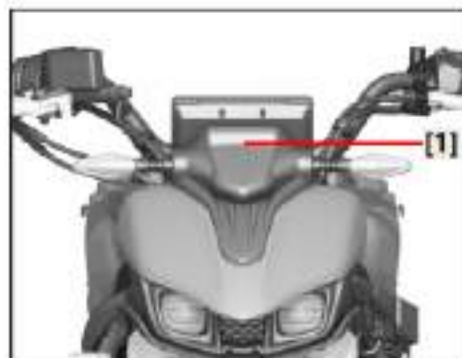
Notes

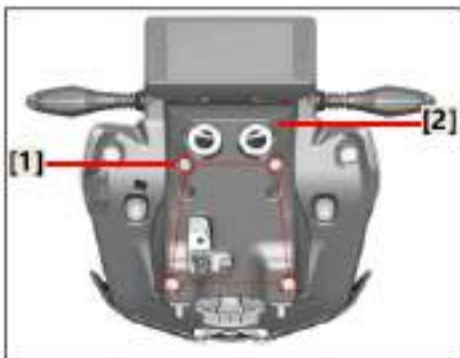
- Apply thread locker (Huitian 7262) to the bolts connecting the headlight bracket to the upper bracket.

Torque:

Headlight bracket connected to the upper bracket

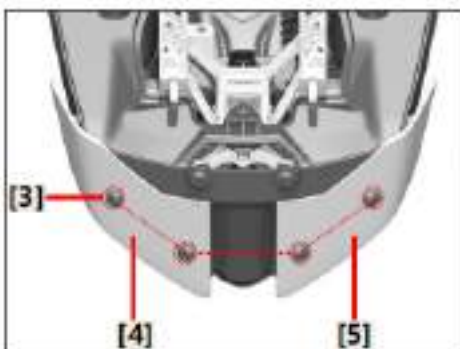
10 N·m (1.0 kgf·m, 7.4 lbf·ft)



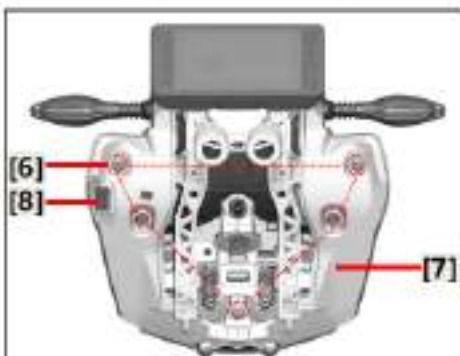


2.Disassembly

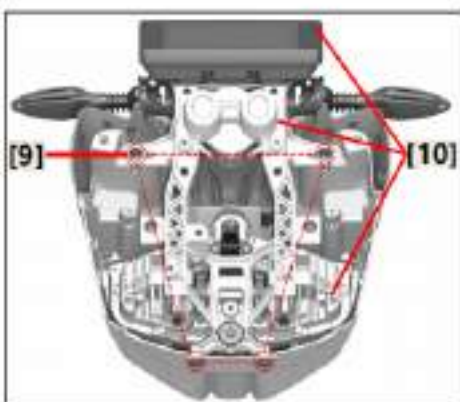
- Bolt [1];
- Headlight rear trim cover [2];



- Screw [3];
- Headlight lower housing - left [4] and right [5];



- Bolt [6].
- Rear panel of headlight [7];
- USB [8];



- Bolt [9];
- Separate the instrument, headlight bracket, and headlight assembly [10] from the front panel inner lining.

The installation sequence is reversed from the removal sequence.

Torque:

Headlight lower housing- L/R to front panel inner lining

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Headlight rear panel trim cover and headlight bracket [1]

Headlight rear panel and front panel inner lining, headlight bracket [6]

Headlight bracket and front panel inner lining [9]

5.0 N·m (0.5 kgf·m, 4.0 lbf·ft)

3.Disassembly

- Bolt and flat gasket [1];
- Instrument assembly [2];
- Bolt [3];
- Headlight bracket pressure plate [4];
- Headlight adjusting screw [5];
- Headlight bracket [6];
- Headlight assembly [7];

The installation sequence is reversed from the removal sequence.

Notes

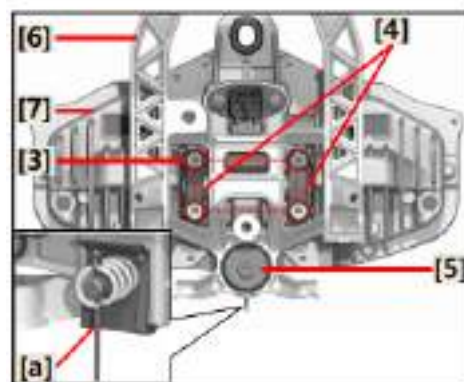
- When disassembling the headlight adjusting screw, first remove the cotter pin [a] and the headlight adjusting spring.
- Adjust the headlight alignment according to local laws and regulations when installing. (See "Adjustment of Headlight Beam" on page 43 for details)

Torque:

Headlight bracket and instrument [1]

Headlight bracket pressure plate and headlight [3]

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)



4.Disassembly

- Nut [1];
- Front turn signal left/right [2];
- Screw [3];
- Front panel [4];
- Front panel inner lining [4].

The installation sequence is reversed from the removal sequence.

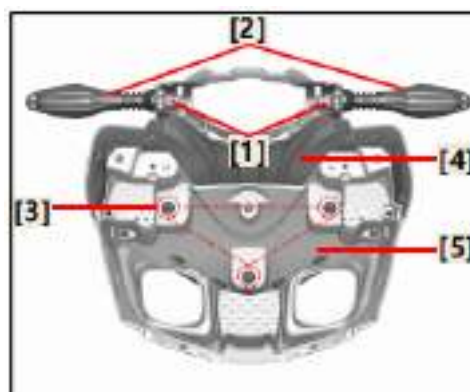
Torque:

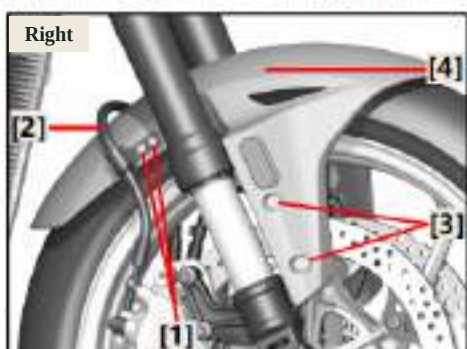
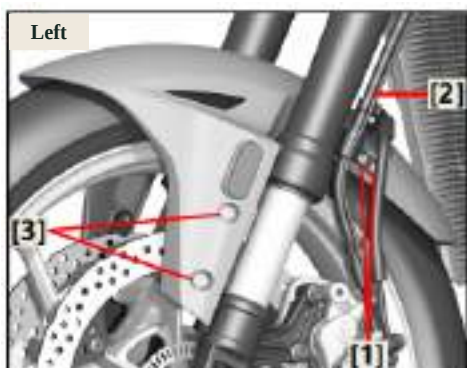
Front panel inner lining and front panel [3]

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Front turn signal [1]

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)





※ Front fender

Disassembly/installation
Disassemble the following parts:

Note

•The left and right front brake hose bracket and front fender are secured with professional rivet gun rivets. Repairs or replacements should be performed by an authorized service center.

- Rivet and gasket [1];
- Remove the brake hose [2];
- Bolt [3];
- Front fender [4].

The installation sequence is reversed from the removal sequence.

Torque:

Front fender and front shock absorber-L/R
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

※ Engine lower protector assembly

Disassembly/installation

Disassemble the following parts:

- Bolt and flanged bushing [1];
- Engine lower protector assembly [2];
- Screw [3];
- Engine lower protector - left [4];
- Engine lower protector [5];
- Engine lower protector - right [6].

The installation sequence is reversed from the removal sequence.

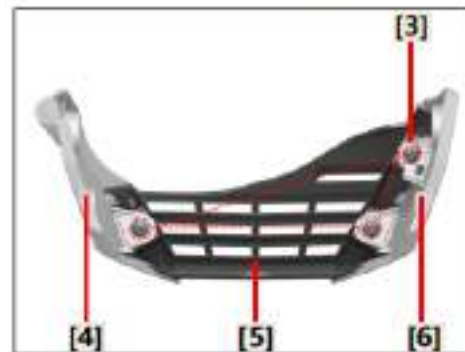
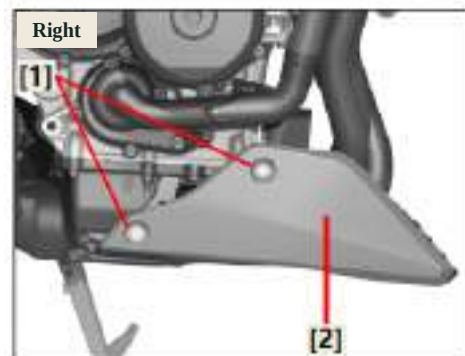
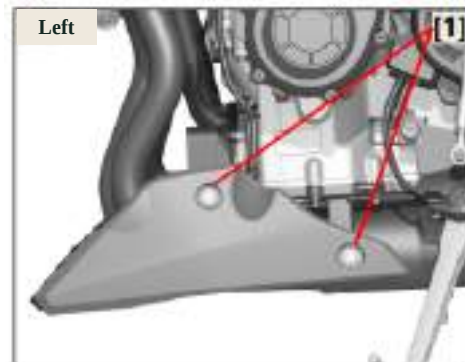
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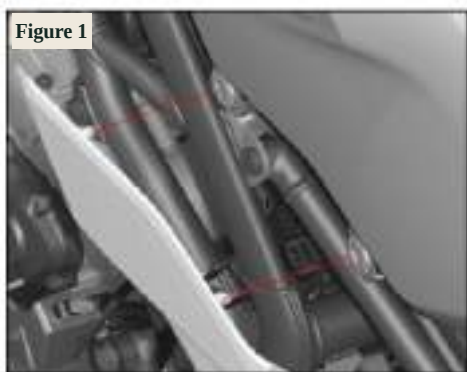
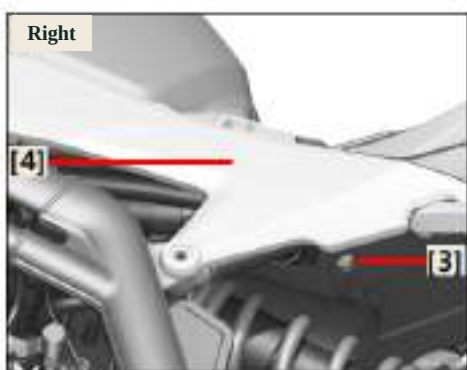
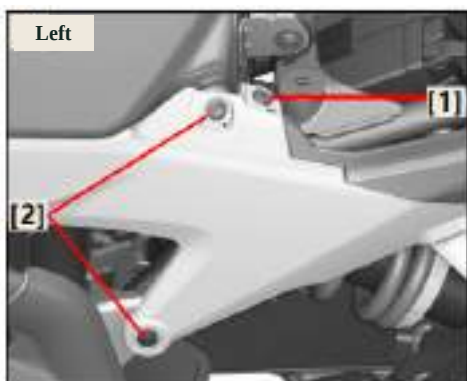
Engine lower protector - L/R and engine lower protector

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Engine lower protector - L/R and engine lower protector bracket

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





※ Side cover (left and right)

Disassembly/installation

Disassemble the following parts:

- Expansion rubber nail [1];
- Bolts [2], [3];
- Side cover - left [4].
- The right-side cover removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.

Notes

- During installation, the front limit pin of the side cover should be inserted into the bore of the fuel tank to ensure a secure clip connection. (As shown in Figure 1)

Torque:

Side cover (L/F) and fuel tank

Side cover (L/F) and subframe

Side cover (L/F) and rear fender front section

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

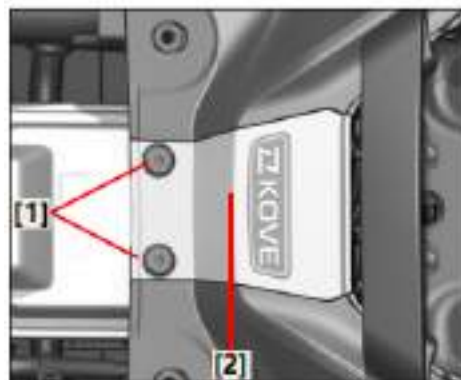
※ Seat cushion trim

Disassembly/installation

Disassemble the following parts:

- Expansion rubber nail [1];
- Seat cushion trim [2].

The installation sequence is reversed from the removal sequence.



※ Rear fender rear section and liner panel

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Disconnect the lamp harness plug;
- Rear fender rear section assembly [2];
- Bolt [3];
- Rear fender liner panel [4];
- Rear fender rear section [5].

The installation sequence is reversed from the removal sequence.

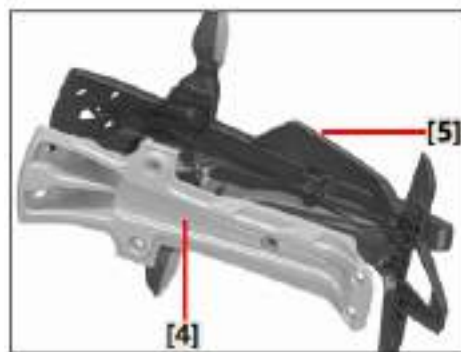
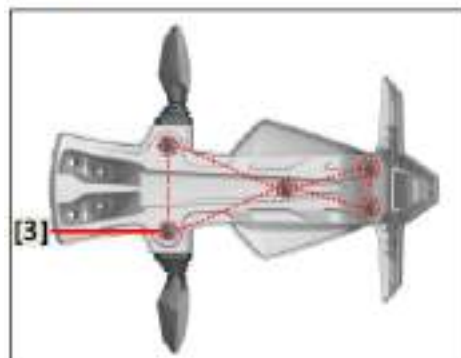
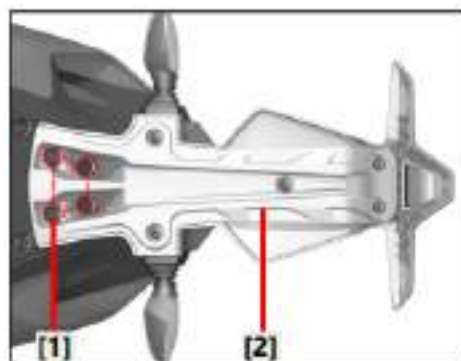
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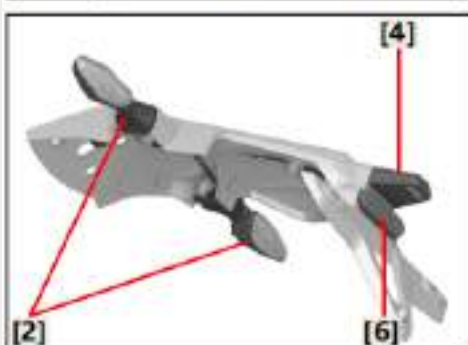
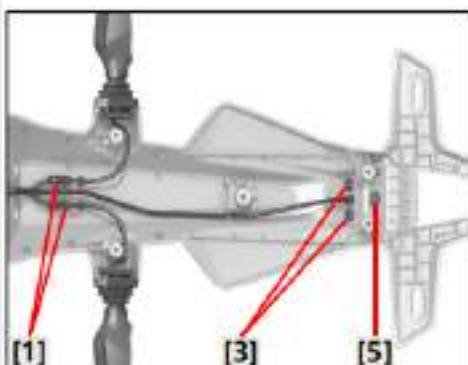
Rear fender inner panel and rear fender rear section

5.0 N·m(0.5 kgf·m, 4.0 lbf·ft)

Rear fender rear section and subframe

10 N·m (1.0 kgf·m, 7.4 lbf·ft)





※ Rear turn signal, license plate lam and rear reflector

Disassembly/installation

Disassemble the following parts:

- Rear fender liner panel (see page 71 for details);
- Wiring harness plug [1];
- Rear turn signal left and right [2];
- Screw [3];
- License plate lamp assembly [4];
- Nut [5];
- Rear reflector [6].

The installation sequence is reversed from the removal sequence.

Torque:

Rear fender rear section and license plate lamp

Rear reflector nut

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

※ **Vehicle body assembly (left and right)**

1. Disassembly

- Front/rear cushion assembly [1];
- Seat cushion trim [2];
- Left/right side cover [3];
- Rear fender assembly [4].

(See pages 61–71 for details.)

2. Disassembly

- Bolt [5];
- Expansion rubber nail [6], [7];
- Bolt [8];
- Vehicle body assembly - left [9];
- Vehicle body assembly - right [10].

The installation sequence is reversed from the removal sequence.

Notes

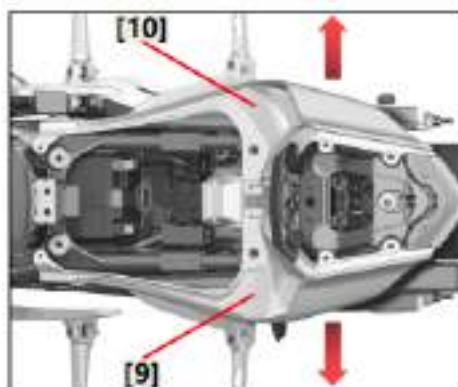
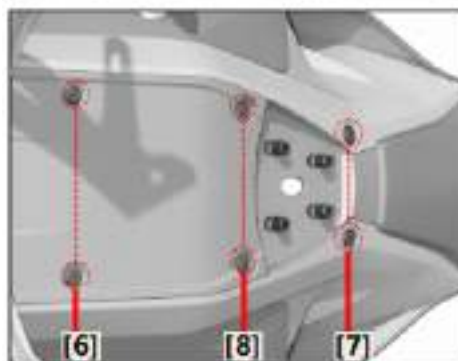
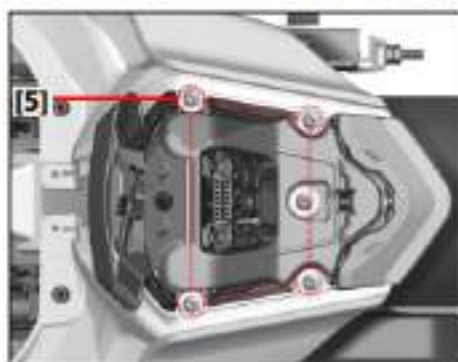
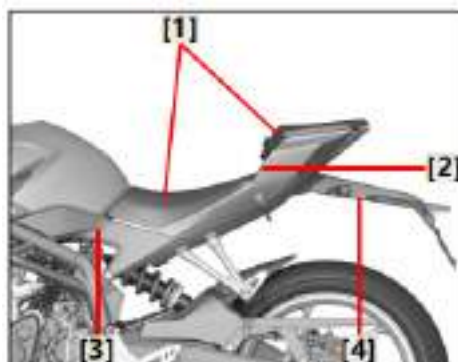
- When separating the left and right sides of the vehicle body, carefully detach them from both sides of the frame to avoid damage from forceful disassembly.
- When removing the vehicle body, the front section of the rear fender will lose its support. Take protective measures promptly to prevent it from falling off.

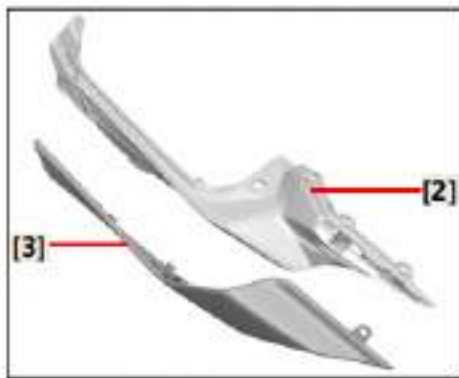
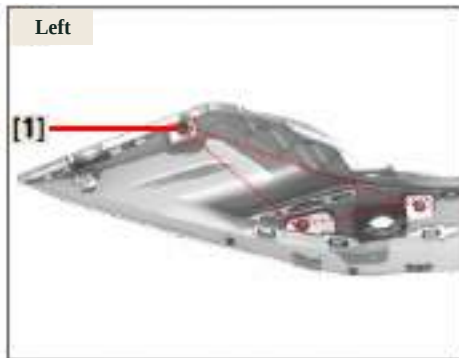
Torque:

Inner lining (L/F) and subframe [5]

Inner lining (L/F) and rear fender front section [8]

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)





※ Vehicle body inner lining (left and right)

Disassembly/installation

Disassemble the following parts:

Note

•Before disassembly, remove the left and right side of the vehicle body from the frame (see for details on page 73).

-Screw [1]

-Vehicle body inner lining - left [2];

-Vehicle body - left [3];

-The right-side vehicle body inner lining removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.

Torque:

Inner lining (L/F) and vehicle body (L/F)

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

※ **Seat cushion pull strap, taillight assembly, and rear fender front section**

Disassembly/installation
Disassemble the following parts:

Note

•After removing the vehicle body assembly, the front section [5] of the rear fender can be detached. Take protective measures promptly and disconnect the electrical harness connectors.

- Bolt and flat gasket [1];
- Seat cushion pull strap [2];
- Bolt and flat gasket [3];
- Taillight assembly [4];
- Rear fender front section [5];

The installation sequence is reversed from the removal sequence.

Notes

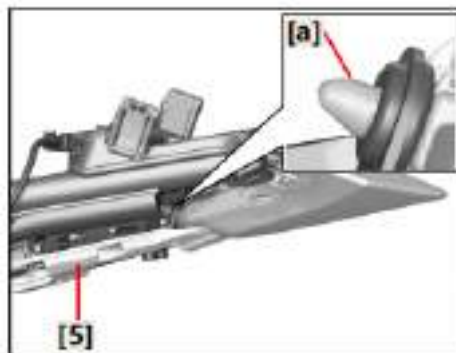
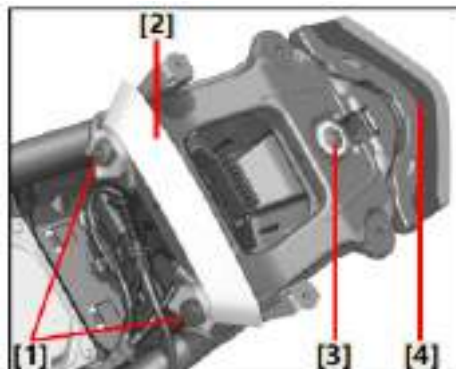
•When installing the taillight assembly, the rear housing pin [a] must be snapped into the subframe limit bore.

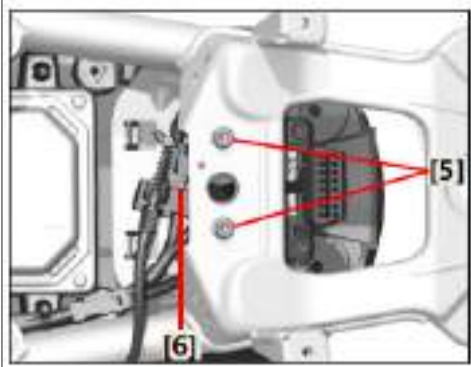
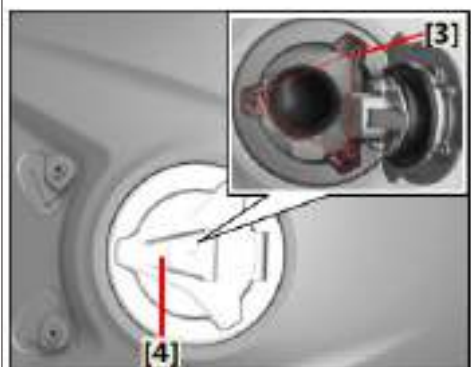
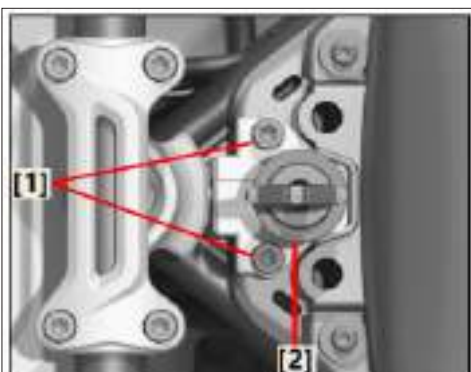
Torque:

Seat cushion pull strap and subframe

Taillight assembly and subframe

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





※ Full vehicle lock set

Disassembly/installation

Disassemble the following parts:

- Disconnect the ignition lock harness connector;
- Bolt [1];
- Ignition lock [2];
- Open the fuel tank cap with the key;
- Bolt [3];
- Fuel tank lock [4];
- Bolt [5];
- Seat cushion lock [6].

The installation sequence is reversed from the removal sequence.

Notes

- Apply thread locker (Huitian 7262) to the ignition lock bolts.

Torque:

Fuel Tank Lock

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Seat Lock

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Ignition lock

22 N·m (2.2 kgf·m, 16 lbf·ft)

※ Horn

Disassembly/installation

Disassemble the following parts:

- Disconnect the wiring harness plug [1];
- Bolt [2];
- Horn [3].

The installation sequence is reversed from the removal sequence.

Torque:

Horn connected to the frame

8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

※ Chain box

Disassembly/installation

Disassemble the following parts:

- Bolts [1], [2];
- Chain guard [3].

The installation sequence is reversed from the removal sequence.

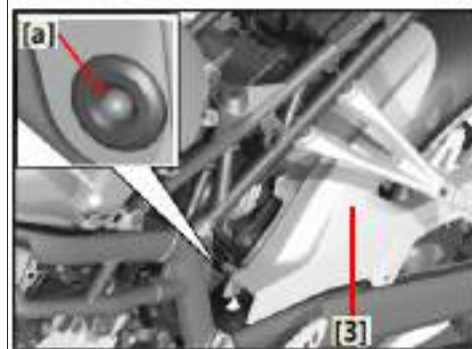
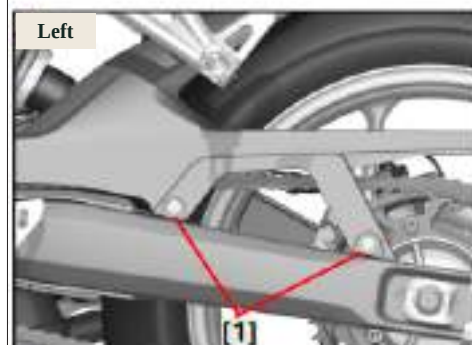
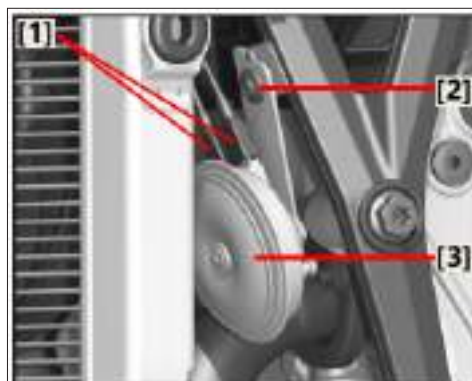
Notes

- When installing, first snap the chain guard into the swingarm limit pin [a].

Torque:

Chain guard connected to swingarm

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



※ Gear shift assembly

Disassembly/installation

Disassemble the following parts:

- Shift rockerarm mounting bolt [1];
- Gear shift lever upper end shaft mounting bolt [2];
- Shift rockerarm [3];
- Gear shift lever lower end shaft mounting bolt [4];
- Gear shift lever [5];
- Special mounting bolt for shift pedal [6];
- Shift pedal connecting rod [7].

The installation sequence is reversed from the removal sequence.

Notes

- Apply thread locker (Huitian 7262) to the gear shift rockerarm mounting bolts and the gear pedal special bolts.

Adjustment of shift rod

After removing the rod, adjust its length so that the distance between the both ends of the mounting holes of the shift rod is the standard length of 223mm. If adjusting to a longer length, ensure the lower end of the push rod thread [8] is within the rod connector by 5mm, then tighten the connecting nut [9] to the specified torque.

Torque:

Gear shift lever adjusting and tightening nut [9]

5.0 N·m(0.5 kgf·m, 4.0 lbf·ft)

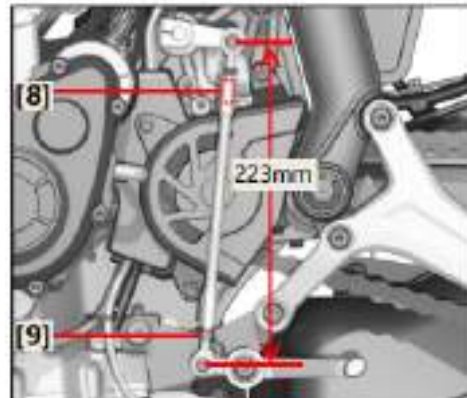
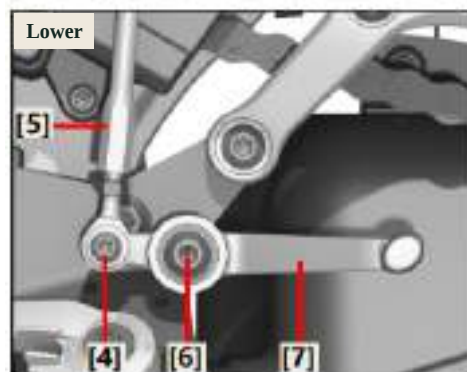
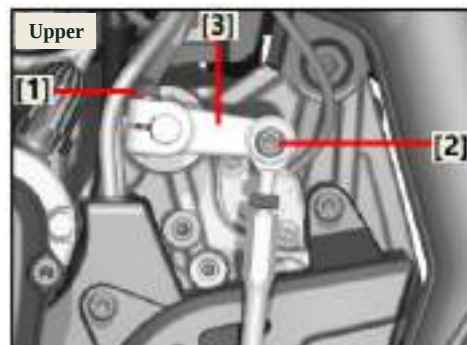
Gear shift rockerarm and engine shift rod [1]

Gear shift lever mounting bolts [2], [4]

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Shift pedal connecting rod and side stand mounting plate [6]

22 N·m (2.2 kgf·m, 16 lbf·ft)



※ Engine front sprocket cover

Disassembly/installation

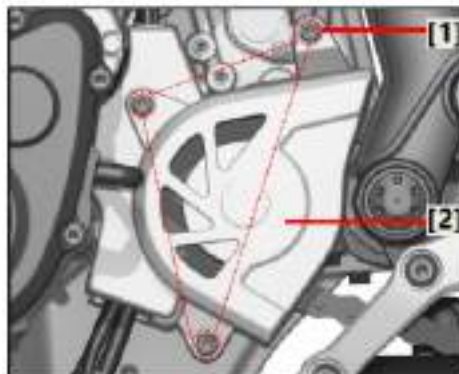
Disassemble the following parts:

-Gear shift lever assembly; see page 78 for details.

-Bolt [1];

-Small sprocket cover[2];

The installation sequence is reversed from the removal sequence.



Torque:

Engine sprocket cover and engine

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

※ Oxygen sensor connector bracket

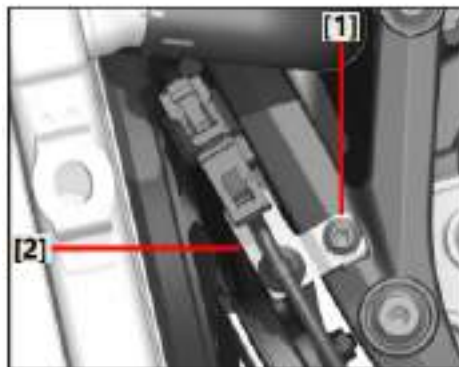
Disassembly/installation

Disassemble the following parts:

-Bolt [1];

-Oxygen sensor connector bracket [2].

The installation sequence is reversed from the removal sequence.



Torque:

Oxygen sensor connector bracket and engine upper suspension bracket - left

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

※ Oxygen sensor harness bracket

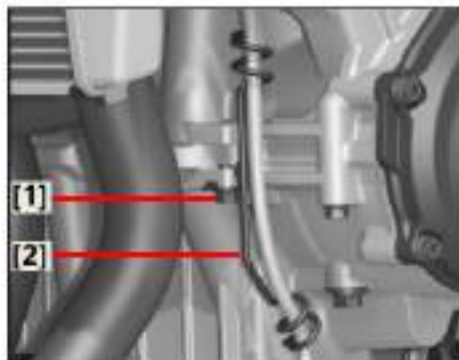
Disassembly/installation

Disassemble the following parts:

-Bolt [1];

-Oxygen sensor harness bracket [2].

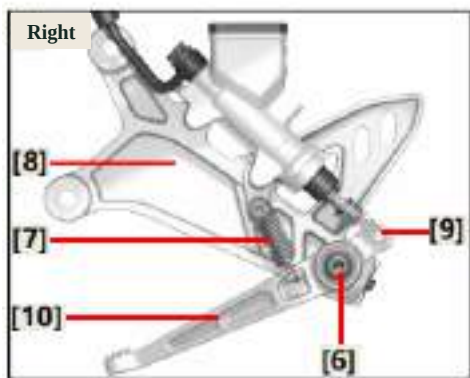
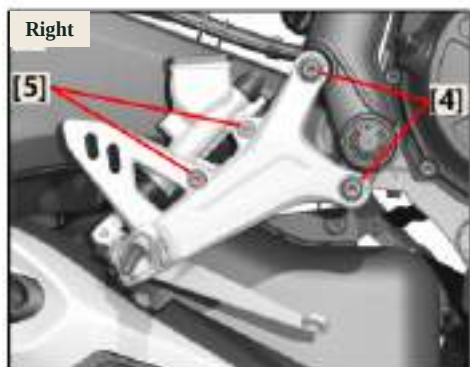
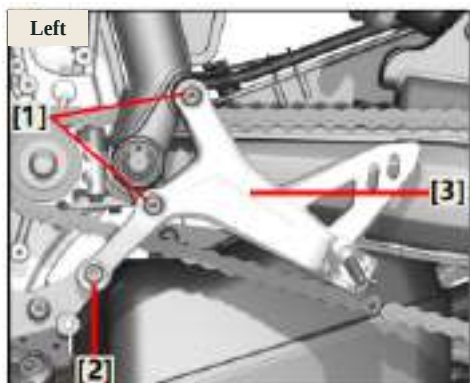
The installation sequence is reversed from the removal sequence.



Torque:

Oxygen sensor harness bracket and engine

10 N·m (1.0 kgf·m, 7.4 lbf.ft)



※ Front footpeg assembly (left and right), brake pedal assembly

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bolt [2];
- Front footpeg assembly - left [3];
- Bolt [4];
- Connecting bolt connecting the right front footpeg bracket to rear brake master cylinder [5];
- Connecting bolt connecting the rear brake arm to front footpeg bracket—right [6];
- Brake return spring [7];
- Front footpeg assembly - right [8];
- Clamp and rear brake pump pin shaft [9];
- Brake pedal assembly [10].

The installation sequence is reversed from the removal sequence.

Notes

- Apply thread locker (Huitian 7262) to the bolts connecting the left/right front footpegs to the frame.
- Apply thread locker (Huitian 7262) to the bolts connecting the left front footpeg to the side stand mounting plate.
- Apply thread locker (Huitian 7262) to the bolts connecting the rear brake pump assembly to the right front footpeg bracket.
- Apply thread locker (Huitian 7262) to the bolts connecting the rear brake arm to the right front footpeg.

Torque:

Rear brake pump assembly and front footpeg bracket - right [5]

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

Left and right front footpeg bracket and frame [1], [4]

Brake rockerarm and front footpeg bracket - right [6]

22 N·m (2.2 kgf·m, 16 lbf·ft)

Front footpeg bracket - Left and side stand mounting plate [2]

35 N·m (3.5 kgf·m, 25 lbf·ft)

※ **Side stand OFF switch, side stand and side stand mounting plate**

Disassembly/installation

Disassemble the following parts:

Note

- To disassemble the side stand mounting plate, first remove the front footpeg assembly - left [1] and the gear shift assembly [2] (see pages 78-80 for details).
- Disconnect the side stand OFF switch harness plug [3];
- Bolt and gasket [4];
- Side stand OFF switch [5];
- Special bolts for side stand [6];
- Stand spring [7];
- Side stand [8];
- Side stand mounting plate bolt [9];
- Wire hook [10];
- Side stand mounting plate [11];
- Side stand mounting plate connecting bushing [12].

The installation sequence is reversed from the removal sequence.

Notes

- Special bolts for side stand and the connecting bolt connecting side stand mounting plate to the engine must be coated with thread locker (Huitian 7262).

Torque:

Side stand OFF switch and side stand [4]

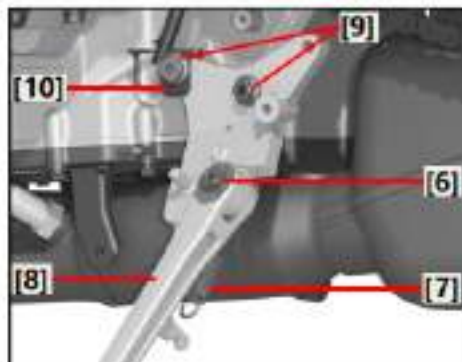
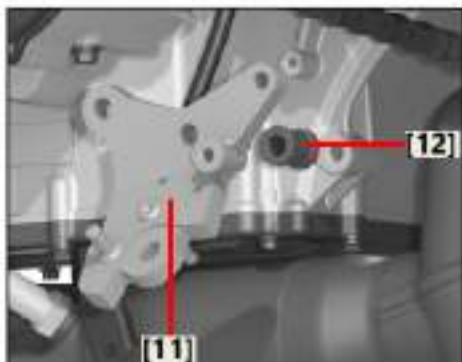
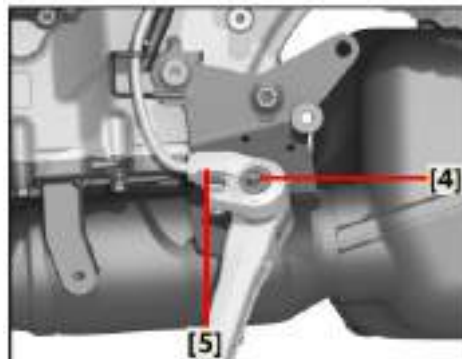
8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

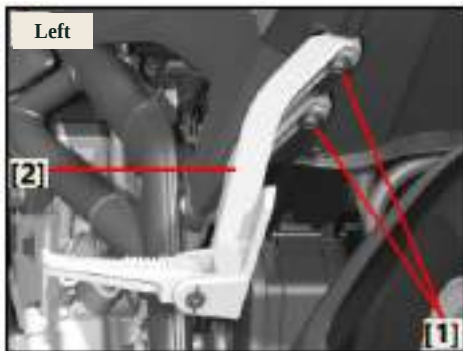
Special bolts for side stand [6]

22 N·m (2.2 kgf·m, 16 lbf·ft)

Side stand mounting panel and engine [9]

54 N·m (5.4 kgf·m, 40 lbf·ft)





※ Rear footpeg assembly (left and right)

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Rear footpeg assembly - left [2];
- The right-side rear footpeg removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.

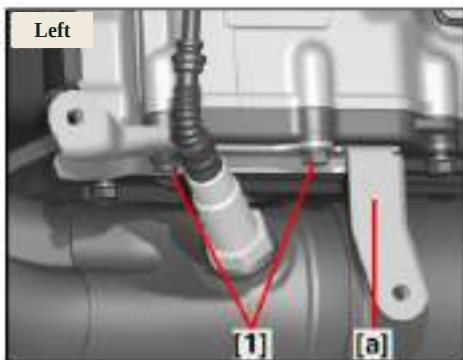
Notes

- Apply thread locker (Huitian 7262) to the bolts connecting the left/right rear footpegs to the frame.

Torque:

Rear footpeg bracket - L/R and frame

22 N·m (2.2 kgf·m, 16 lbf·ft)



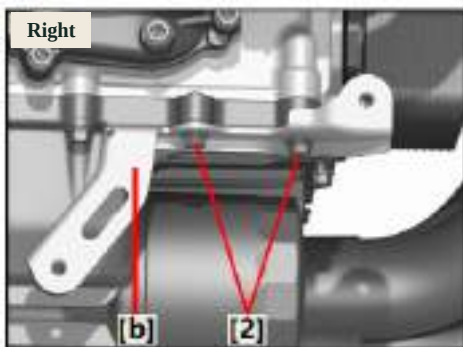
※ Engine lower protector bracket

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Engine lower protector left bracket [a];
- Bolt [2];
- Engine lower protector right bracket [b];

The installation sequence is reversed from the removal sequence.



Note

- After disassembling the engine lower protector bracket, promptly reinstall the bolts to the engine.

Torque:

Engine lower protector bracket connected to engine

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

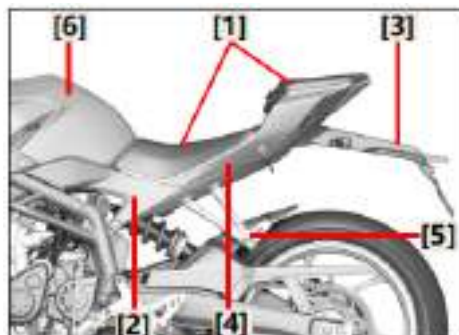
※ Subframe

1.Disassembly

- Front/rear seat cushion assembly [1];
- Side cover - left/right [2];
- Rear fender assembly [3];
- Vehicle body assembly - left/right [4];
- Rear footpeg assembly - left/right [5];

See pages 61–82 for details.

- Fuel tank assembly [6];



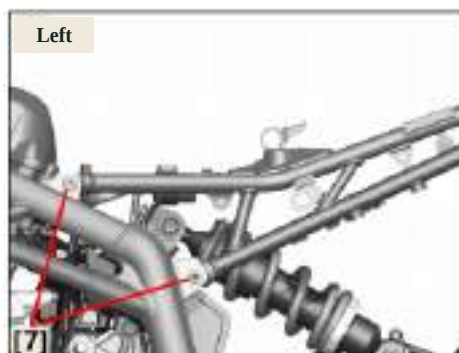
See "Fuel System" on page 107 for details

2.Disassembly

Note

- Before disassembly, disconnect the main wiring harness connector and remove the rear fender front section along with its electrical components.

- Bolts [7], [8];
- Subframe [9].



The installation sequence is reversed from the removal sequence.

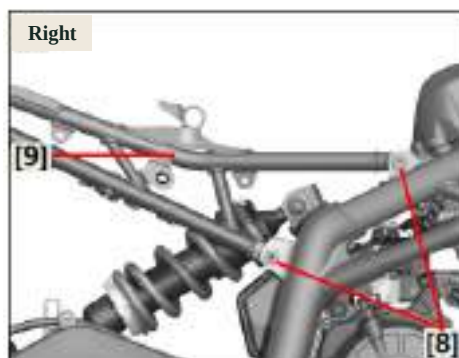
Notes

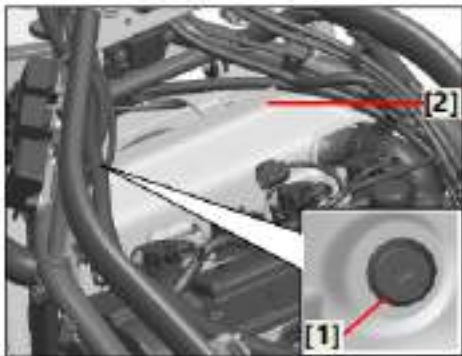
- Apply thread locker (Huitian 7262) to the bolts connecting the frame to the subframe.

Torque:

Main frame and subframe

35 N·m (3.5 kgf·m, 25 lbf·ft)





※ Engine heat shield

Note

•To disassemble the engine heat shield, first remove the fuel tank, air filter and other shielding.

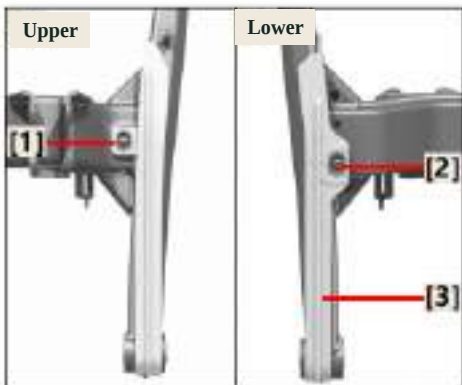
See "Fuel system" on page 107 for details.

Disassembly/installation

Disassemble the following parts:

- Expansion rubber nails connecting the left and right heat shields and frame [1];
- Clip connecting the main cable to the heat shield;
- Engine heat shield [2].

The installation sequence is reversed from the removal sequence.



※ Chain guard clip

Disassembly/installation

Disassemble the following parts:

- Screws [1], [2];
- Chain clip [3].

The installation sequence is reversed from the removal sequence.

Torque:

Chain clip with swingarm

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Inspection

•Check the chain clip for excessive wear.

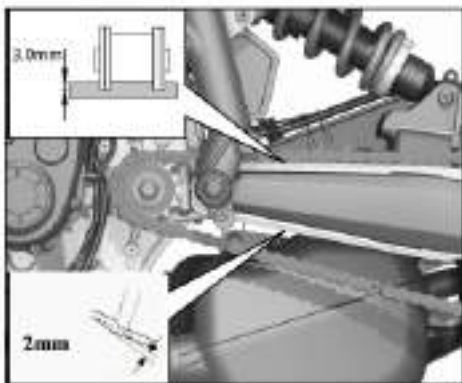
Wear limit not exceed:

Top: 3mm

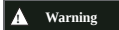
Bottom: 2mm

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.
- Apply thread locker (Huitian 7262) to the bolts connecting the chain clip to the swingarm.



※ Muffler assembly



Warning

- Wait for the exhaust pipe to cool down before disassembly to avoid burns.

1. Disassembly

- Fuel tank front shield [1];
 - Fuel tank side protector and water tank trim (left and right) [2];
 - Engine lower protector assembly [3]; see page 69 for details.
 - Radiator assembly [4];
- See "Cooling System" on page 125 for details

2. Disassembly

- Oxygen sensor [5];
- Nut [6];
- Muffler mounting bolt [7];
- Muffler assembly [8].

Note

- If it is not necessary to separate the oxygen sensor from the muffler, you can directly disconnect the oxygen sensor harness connector.
- Remove the muffler assembly and then take out the muffler gasket inside the exhaust port [9].

3. Inspection

- Check the muffler gasket
Exhaust leakage → Replace
- Muffler assembly
Crack/damage/leak → Replace.

The installation sequence is reversed from the removal sequence.

Torque:

Connecting nut between muffler front section and engine exhaust port [6]

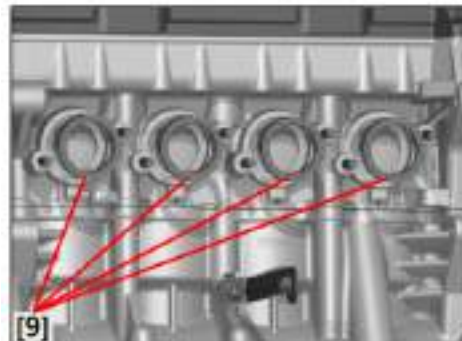
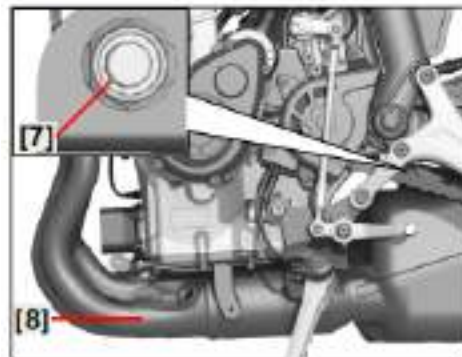
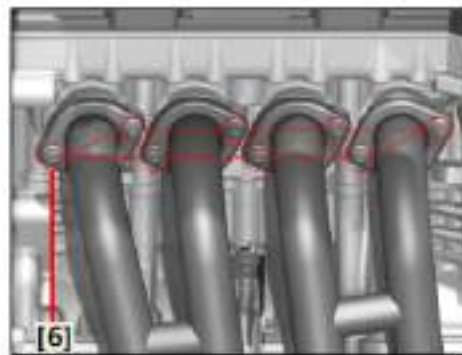
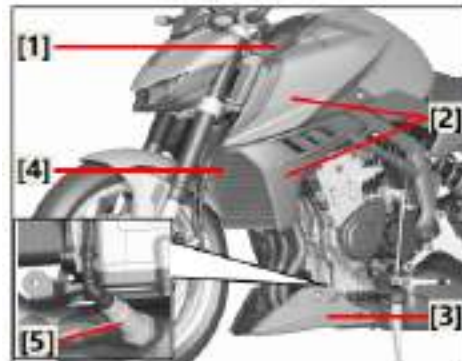
8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

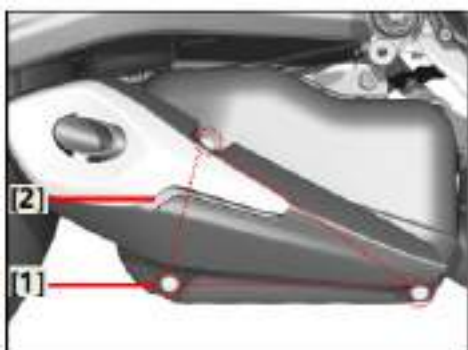
Muffler and muffler mounting bracket [7]

22 N·m (2.2 kgf·m, 16 lbf·ft)

Oxygen sensor connected to the muffler [5]

50 N·m (5.0 kgf·m, 37 lbf·ft)





※ Muffler shield

Disassembly/installation

Disassemble the following parts:

- Bolt and flanged bushing [1];
- Muffler shield assembly [2];
- Screw [3];
- Muffler trim cover [4];
- Muffler shield [5];

The installation sequence is reversed from the removal sequence.

Torque:

Muffler shield and muffler trim cover

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Muffler shield and muffler

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

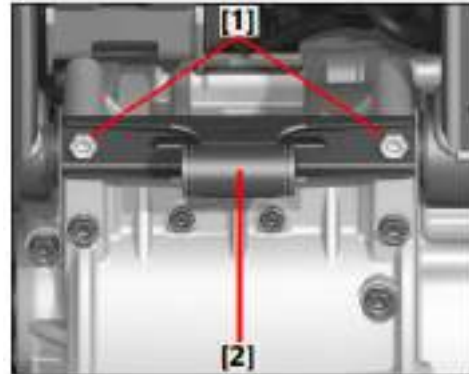
※ Muffler mounting bracket

Disassembly/installation
Disassemble the following parts:

Note

- The muffler mounting bracket is located below the rear of the engine. If disassembly is required, please remove the muffler assembly first.

- Bolt [1];
- Muffler mounting bracket [2].



The installation sequence is reversed from the removal sequence.

Note

- After disassembling the muffler bracket, please reinstall the bolt back into the engine promptly.

Torque:

Muffler mounting bracket and engine

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

※ Radiator mounting bracket

Disassembly/installation
Disassemble the following parts:

Note

- The radiator mounting bracket is located below the engine exhaust port. If disassembly is required, first remove the radiator assembly.

- Bolt [1];
- Radiator mounting bracket [2].

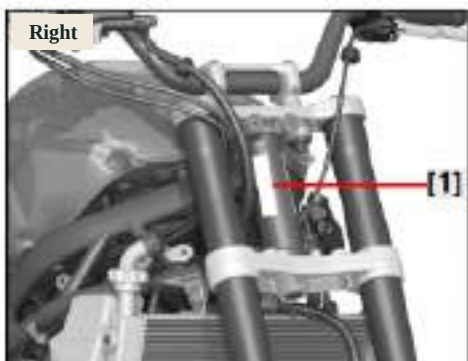


The installation sequence is reversed from the removal sequence.

Torque:

Radiator mounting bracket and engine

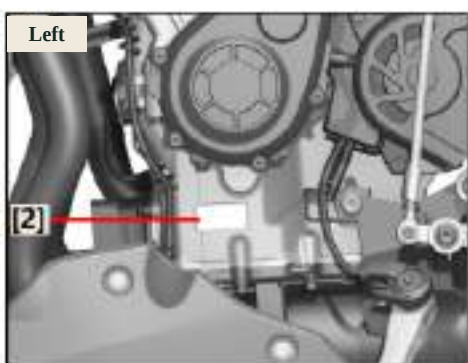
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



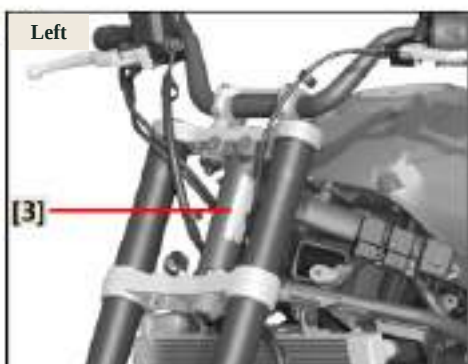
※ **Frame SN, engine number and vehicle nameplate information**

When registering a motorcycle, you need to provide the vehicle identification number(VIN) and engine number. 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 engraved on the right side of the frame upright tube.



The engine identification number [2] is engraved on the lower left side of the engine case.



The vehicle nameplate information [3] is engraved on the right side of the frame upright tube.

Electronic Fuel Injection (Efi) System

Section 1 Maintenance Instructions	90
Section 2 Position Of Components	91
Section 3 Introduction Of System Troubleshooting.....	92
Section 4 Introduction Of Obd Interface	93
Section 5 Maintenance Tools	94
Section 6 Maintenance And Troubleshooting Process.....	96
Section 7 Troubleshoot According To Fault Codes	97
Section 8 Troubleshoot According To Fault Phenomena.....	102
Section 9 Attachment/Fault Code List	105

Maintenance Instructions

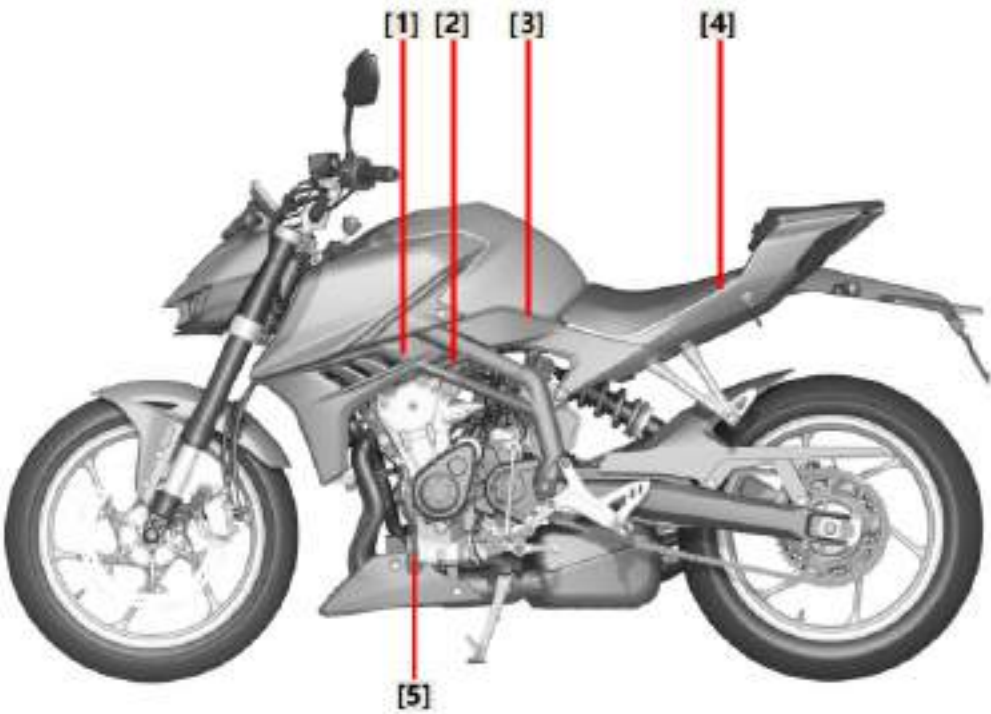
Overview:

- This section introduces UMC's MSE7817 electronic fuel injection system (EFI) 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 (electronic control units, sensors, etc.) to prevent missing or collision. 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.
- 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



(1) Ignition coil and spark plug	(2) Throttle valve body assembly	(3) Fuel Pump
(4) ECU control unit	(5) Oxygen Sensor	

Introduction of System Troubleshooting

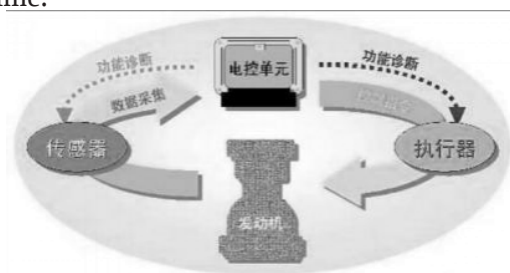
On-board diagnosis system (OBD system) refers to the diagnosis system integrated in the engine control system, which can monitor the components that affect exhaust emissions and the main functional states of the engine. It has the function of identifying and storing EFI faults. When repairing vehicles 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

Description of fault lamp and its control strategy

Fault Indicator (malfunction indicator light, MIL): It is used to indicate the failure of emission-related components or systems. MIL lamps are generally an indicator lamp that can be displayed on the dashboard and shaped to meet the requirements of regulations and standards.

The activation of MIL lamp follows the following principles:

1) In normal mode, and the fault memory is empty

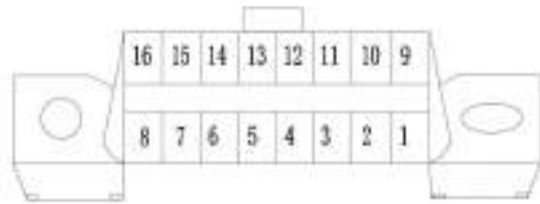
Turn on the ignition switch, turn on the stop switch, and the ECU will be initialized immediately. From initialization, the MIL lamp is on. The MIL lamp goes out immediately after the engine starts.

2) In normal mode, and the failed memory has failed

When the ignition switch is turned on and ECU is initialized, the MIL lamp remains on; If the fault manager requires the MIL to be illuminated in the fault mode, the MIL lamp is illuminated in the subsequent driving cycle; If the fault manager does not require the MIL to light up in fault mode, the MIL lamp goes out after startup.

Introduction of OBD Interface

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 H1 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 temperature sensor, engine temperature sensor, throttle position sensor, oxygen sensor, oxygen sensor heating circuit, air-fuel ratio correction, fuel injector, fuel pump relay, speed sensor, canister control valve, speed signal, idle speed, idle speed regulator, 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 air pressure, intake air volume, stepper motor target position, throttle position sensor signal voltage, throttle opening, relative throttle position, canister control valve duty cycle, charging time, fuel injection pulse width, ignition advance angle, oxygen sensor short-term correction, oxygen sensor voltage, oxygen sensor long-term correction, engine relative load, canister control relative fuel injection, canister purification rate, canister load, idle actuator TEV opening, ambient pressure, altitude correction factor, fuel injection phase and other parameters.

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.

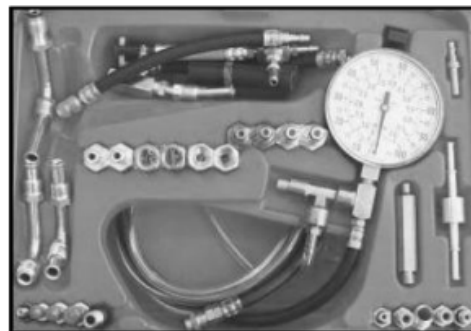


Tool name:

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

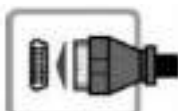
Function:

The fuel injector can be cleaned and analyzed.

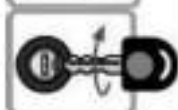


Maintenance and Troubleshooting Process

Usage of diagnostic instrument



1. Connect the diagnostic instrument to the diagnostic interface.



2. Turn on the "ignition switch".



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 7817 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.

1. Fault code: P0030 The oxygen sensor heating control circuit is open

Maintenance tips: The fault has been confirmed and may have the following problems 1) There is an open circuit between the circuit connected to the ECU pin and the upstream oxygen sensor pin 2. 2) Open circuit for upstream oxygen sensor pin 1 to main relay 3 Open circuit between pin 1 and pin 2 of upstream oxygen sensor	Maintenance tips: Check the followings 1) Measure the resistance of the line between ECU connector pin and upstream oxygen sensor pin 2 to assess its performance 2) Measure the resistance between the upstream oxygen sensor pin 1 and the main relay to assess its performance Measure the resistance between pin 1 and pin 2 of the upstream oxygen sensor to assess its performance
--	---

2. Fault code: P0031 Oxygen sensor heating circuit shorted to ground

Maintenance tips: The fault has been confirmed and may have the following problems 1) The circuit connected to the ECU pin is short-circuited to ground	Maintenance tips: Check the followings 1) Measure whether the ECU's resistance to ground pin is normal
--	---

1. Fault code: P0030 The oxygen sensor heating control circuit is open

Maintenance tips: The fault has been confirmed and may have the following problems 1) Short circuit between the circuit connected to the ECU pin and the upstream oxygen sensor pin 1 circuit. 2) Short circuit between circuit connected to ECU pin and other power supply circuit	Maintenance tips: Check the followings 1) Measure whether ECU voltage is normal. 2) Measure the resistance between the ECU pin and the upstream oxygen sensor pin 1 circuit. Measure whether the ECU's resistance to ground pin is normal
---	---

4. Fault code: P0107 Intake pressure sensor circuit voltage too low

Maintenance tips: The fault has been confirmed and may have the following problems 1) The ECU sensor signal circuit is shorted to ground	Maintenance tips: Check the followings 1) Resistance between ECU pin and ground
---	--

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

Maintenance tips: The fault has been confirmed and may have the following problems 1) ECU detects that the sensor signal circuit is short-circuited to the power supply	Maintenance tips: Check the followings 1) Voltage of ECU pin
--	---

6.Fault code: P0112 Intake temperature sensor signal voltage too low

Maintenance tips: The fault has been confirmed and may have the following problems 1) Sensor signal circuit connected to ECU pin is short-circuited to ground	Maintenance tips: Check the followings 1) Measure the resistance between the sensor signal circuit at the ECU pin and ground
---	--

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

Maintenance tips: The fault has been confirmed and may have the following problems 1) Sensor signal circuit connected to ECU pin short circuit to ground	Maintenance tips: Check the followings 1) Measure whether the voltage of the sensor signal circuit of ECU pin is normal
--	---

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

Maintenance tips: The fault has been confirmed and may have the following problems 1) Fault code: P0122 The circuit connected to the ECU pin short-circuited to ground	Maintenance tips: Check the followings 1) Measure the resistance between the ECU pin and ground
--	---

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

Maintenance tips: The fault has been confirmed and may have the following problems 1) Short circuit between circuit connected to ECU pin and other power supply circuit	Maintenance tips: Check the followings 1) Measure whether the voltage connected to the ECU pin is normal
---	--

10.Fault code: P0122 Throttle position sensor circuit voltage too low

Maintenance tips: The fault has been confirmed and may have the following problems 1) ECU pin circuit short to ground	Check the followings 1) Measure the resistance between the ECU pin and ground
---	--

11.Fault code: P0123 Throttle position sensor circuit voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1) Short circuit between circuit connected to ECU pin and other power supply circuit	Maintenance tips: Check the followings 1) Measure whether the voltage connected to the ECU pin is normal
---	--

12.Fault code: P0130 Oxygen sensor signal unreasonable

Fault cause description: When the oxygen sensor signal shows the following conditions, the system judges that the oxygen sensor signal is unreasonable. The oxygen sensor signal circuit is coupled with the heating circuit.

Maintenance tips: The fault has been confirmed and may have the following problems 1) Check whether the oxygen sensor connector is correct and normal 2) Check whether the oxygen sensor signal circuit is coupled to the heating circuit	Maintenance tips:
--	-------------------

13. Fault code: P0131 Oxygen sensor signal voltage too low

Maintenance tips: The fault has been confirmed and may have the following problems 1) The signal circuit connected to the ECU pin is short-circuited to ground	Maintenance tips: Check the followings 1) Measure the resistance between the signal circuit connected to the ECU pin and ground
--	---

14. Fault code: P0132 Oxygen sensor signal voltage too high

Fault cause description: When the engine starts, ECU measures the voltage of oxygen sensor circuit. When the signal voltage is higher than 1.5 volts for a long time, it is assessed that the oxygen sensor signal circuit is short-circuited to the power supply.

Maintenance tips: The fault has been confirmed and may have the following problems 1) Short circuit between signal circuit connected to ECU pin and oxygen sensor pin 1 2) Short circuit between signal circuit connected to ECU pin and other power supply circuit	Maintenance tips: Check the followings 1) Measure the resistance between the signal circuit connected to the ECU pin and the oxygen sensor pin 1 2) Measure the voltage of the signal circuit connected to the ECU pin
--	---

15. Fault code: P0134 Oxygen sensor signal fault

Fault cause description: When the ECU measures the voltage of oxygen sensor circuit after the engine starts, and when the signal voltage always changes between 0.4 ~ 0.6 volts, it is assessed that the oxygen sensor signal circuit suffers open-circuit fault.

Maintenance tips: The fault has been confirmed and may have the following problems 1) Open circuit for oxygen sensor to ECU pin 2) Poor connection of oxygen sensor connector (pin oxidation)	Maintenance tips: Check the followings 1) Measure the resistance of ECU connector to oxygen sensor 4
--	--

16. Fault code: P0322 No speed sensor pulse signal (open circuit or short circuit)

Fault cause: When the engine starts, ECU monitors the speed sensor signal and other signals as well. According to the rationality of the signal, the system assesses that the signal of the speed sensor is lost.

Maintenance tips: The fault has been confirmed and may have the following problems 1) Open circuit for speed sensor connected to ECU 2) The circuit of the speed sensor connected to the ECU is short-circuited 3) Open circuit of speed sensor coil	Maintenance tips:
--	-------------------

17. Fault code: P0508 stepper motor drive pin circuit short to ground

18. Fault code: P0509 stepper motor drive pin circuit short to power

19. Fault code: P0511 Open circuit for stepper motor drive pin

Fault cause description: When the engine starts, the circuit control module in ECU continuously monitors the driving circuit voltage of the idle stepper motor. When any one of the four circuits has short circuit to ground/short circuit to power supply/open circuit, the system assesses that the stepper motor circuit has the fault.

Maintenance tips: The fault has been confirmed and may have the following problems 1) Any one of the driving circuits of the stepper motor connected to the ECU is short circuit to ground and short circuit/open circuit to power supply	Maintenance tips: Check the followings 1) Measure the resistance or voltage between each stepper motor drive circuit connected to the ECU and ground
---	--

- 20.Fault code: P0627 Fuel pump relay control circuit open
 21.Fault code: P0628 Fuel pump relay control circuit short to ground
 22.Fault Code: P0629 Fuel pump relay control circuit short to power

Maintenance tips: The fault has been confirmed and may have the following problems 1) Open circuit/short circuit to ground/short circuit to power supply between pump relay control circuit connected to ECU and pump relay 2) Open circuit between relay and main relay 3) Open circuit of electromagnetic coil of relay	Maintenance tips: Check the followings 1) Measure the resistance or voltage of the fuel pump relay control circuit connected to ECU 2) Resistance between relay and main relay 3) Resistance between relay pins
---	---

- 23.Fault Code: P0650 MIL lamp control circuit fault

Maintenance tips: The fault has been confirmed and may have the following problems 1) MIL lamp control circuit connected to ECU is open/short to ground/short to power supply. 2) Open circuit between MIL and main relay 3) MIL lamp burns out	Maintenance tips: Check the followings 1) Measure the resistance or voltage of the MIL lamp control circuit connected to the ECU
---	--

- 24.Fault code: P0201 Injector control circuit of cylinder 1 open
 25.Fault code: P0202 Injector control circuit of cylinder 2 open
 26.Fault code: P0203 Injector control circuit of cylinder 3 open
 27.Fault code: P0204 Injector control circuit of cylinder 4 open

Maintenance tips: The fault has been confirmed and may have the following problems 1)Check if the injector coil is open- circuited 2)Check if the connection between injector connector pin and ECU pin is secured 3)Check if the connection between injector connector pin and main relay is secured	Maintenance tips: Check the followings
---	---

- 28.Fault code: P0261 Injector control circuit of cylinder 1 short to ground
 29.Fault code: P0264 Injector control circuit of cylinder 2 short to ground
 30.Fault code: P0267 Injector control circuit of cylinder 3 short to ground
 31.Fault code: P0270 Injector control circuit of cylinder 4 short to ground

Maintenance tips: The fault has been confirmed and may have the following problems 1)Each drive circuit connected to the ECU pin is short-circuited to ground	Maintenance tips: Check the followings 1)Measure the resistance of the circuit connected to the ECU pin to ground
---	---

- 32.Fault code: P0262 Injector control circuit of cylinder 1 short to power
 33.Fault code: P0265 Injector control circuit of cylinder 2 short to power
 34.Fault code: P0268 Injector control circuit of cylinder 3 short to power
 35.Fault code: P0271 Injector control circuit of cylinder 4 short to power

Maintenance tips: The fault has been confirmed and may have the following problems 1) The circuit connected to the ECU pin is short-circuited to another power supply	Maintenance tips: Check the followings 1) Measure the voltage of the circuit connected to the ECU pin
---	---

- 36.Fault code: P0489 Fan relay control circuit open
 37.Fault code: P0691 Fan relay control circuit short to ground
 38.Fault Code: P0692 Fanrelay control circuit short to power

Maintenance tips: The fault has been confirmed and may have the following problems 1) The circuit between the fan relay control circuit connected to ECU and fan relay is open/short to ground/short to power supply. 2) Open circuit between relay and main relay 3) Open circuit of electromagnetic coil of relay	Maintenance tips: Check the followings 1) Measure the resistance or voltage of the fan relay control circuit connected to the ECU 2) Resistance between relay and main relay 3) Resistance between relay pins
---	---

- 39.Fault Code: P1098 Tilt sensor control circuit short to ground

Maintenance tips: The fault has been confirmed and may have the following problems 1) Sensor signal circuit connected to ECU pin is short-circuited to ground	Maintenance tips: Check the followings 1) Measure the resistance between the sensor signal circuit at the ECU pin and ground
---	--

- 40.Fault Code: P1099 Tilt sensor short to power

Maintenance tips: The fault has been confirmed and may have the following problems 1) Sensor signal circuit connected to ECU pin short circuit to ground	Maintenance tips: Check the followings 1) Measure whether the voltage of the sensor signal circuit of ECU pin is normal
--	---

- 41.Fault code: P0413 Secondary air injection solenoid valve control circuit open
 42.Fault code: P0414 Secondary air injection solenoid valve control circuit voltage too low
 43.Fault code: P0412 Secondary air injection solenoid valve control circuit voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1)The circuit between the circuit connected to ECU pin and sensor pin is open-circuited. 2)Sensor signal circuit connected to ECU pin is short-circuited to ground 3)Sensor signal circuit connected to ECU pin short circuit to ground	Maintenance tips: Check the followings 1)Measure whether the resistance of the wire between ECU connector pin and sensor pin 2 is normal 2)Measure the resistance between the sensor signal circuit at the ECU pin and ground 3)Measure whether the voltage of the sensor signal circuit of ECU pin is normal
--	---

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. Idle speed controller; 4. Engine temperature sensor;

5. Ignition timing.

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the accelerator cable is stuck or overtightened.	Yes	Adjustment
		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 idle speed controller and check the throttle body, idle speed controller and idle bypass air passage for carbon deposition.	Yes	Clean related parts
		No	Next step
4	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
5	Check whether the mechanical ignition timing of the engine meets the specifications.	Yes	Next step
		No	Maintain the ignition timing
6	Connect the adapter of electronic fuel injection (EFI) system, turn on the ignition switch, and check whether the power supply of P4#,O4# pin is normal; check whether the Q3#,H3#,C3# pin is grounded properly.	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. idle speed controller; 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 350 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 idle speed controller and check the throttle body, idle speed controller and idle bypass air passage for carbon deposition	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 adapter of electronic fuel injection (EFI) system, turn on the ignition switch, and check whether the power supply of P4#,O4# pin is normal; check whether the Q3#,H3#,C3# pin is grounded properly.	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; 6. idle speed controller; 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 350 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 idle speed controller and check the throttle body, idle speed controller and idle bypass air passage for carbon deposition.	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 adapter of electronic fuel injection (EFI) system, turn on the ignition switch, and check whether the power supply of P4#,O4# pin is normal; check whether the Q3#,H3#,C3# pin is grounded properly.	Yes	Diagnostic help
		No	Maintain corresponding lines

(4) Weak acceleration and poor performance.

Common fault location: 1. Water in fuel; 2. Intake pressure sensor and throttle position sensor; 3. Spark plug; 4. Ignition coil; 5. Throttle body and idle bypass air passage; 6. Air intake duct; 7. Idle speed adjuster; 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

S/N	Operational procedures	Testing result	Subsequent procedures
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 350 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 idle speed controller and check the throttle body, idle speed controller and idle bypass air passage for carbon deposition	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 adapter of electronic fuel injection (EFI) system, turn on the ignition switch, and check whether the power supply of P4#,O4# pin is normal; check whether the Q3#,H3#,C3# pin is grounded properly.	Yes	Diagnostic help
		No	Maintain corresponding lines

Appendix:

1) List of fault codes (PCODE)

S/N	Fault code	Description (UAES)
1	P0030	Oxygen sensor heating control circuit fault
2	P0031	Oxygen sensor heating control circuit short to ground
3	P0032	Oxygen sensor heating control circuit short to power
4	P0107	Intake pressure sensor circuit voltage too low
5	P0108	Intake pressure sensor circuit voltage too high
6	P0112	Intake temperature sensor signal voltage too low
7	P0113	Intake temperature sensor signal voltage too high
8	P0117	Engine coolant temperature sensor circuit voltage too low
9	P0118	Engine coolant temperature sensor circuit voltage too high
10	P0122	Throttle position sensor circuit voltage too low
11	P0123	Throttle position sensor circuit voltage too high
12	P0130	Oxygen sensor signal unreasonable
13	P0131	Oxygen sensor circuit voltage too low
14	P0132	Oxygen sensor circuit voltage too high
15	P0134	Oxygen sensor circuit signal malfunction
16	P0322	No speed sensor pulse signal (open circuit or short circuit)
17	P0508	Stepper motor drive pin circuit short to ground
18	P0509	Stepper motor drive pin circuit short to power
19	P0511	Stepper motor drive pin open circuit
20	P0627	Oil pump relay control circuit open
21	P0628	Oil pump relay control circuit short to ground
22	P0629	Oil pump relay control circuit short to power
23	P0650	MIL lamp control circuit fault
24	P0201	Open circuit for fuel injector control circuit of cylinder 1
25	P0202	Open circuit for fuel injector control circuit of cylinder 2
26	P0203	Open circuit for fuel injector control circuit of cylinder 3
27	P0204	Open circuit for fuel injector control circuit of cylinder 4
28	P0261	Short circuit to ground for fuel injector control circuit of cylinder 1
29	P0264	Short circuit to ground for fuel injector control circuit of cylinder 2
30	P0267	Short circuit to ground for fuel injector control circuit of cylinder 3
31	P0270	Short circuit to ground for fuel injector control circuit of cylinder 4
32	P0262	Short circuit to power for fuel injector control circuit of cylinder 1
33	P0265	Short circuit to power for fuel injector control circuit of cylinder 2
34	P0268	Short circuit to power for fuel injector control circuit of cylinder 3
35	P0271	Short circuit to power for fuel injector control circuit of cylinder 4
36	P0480	Fan relay control circuit open
37	P0691	Fan relay control circuit short to ground
38	P0692	Fan relay control circuit short to power
39	P1098	Tilt sensor short to ground
40	P1099	Tilt sensor short to power
41	P0413	Secondary air injection solenoid valve control circuit open
42	P0414	Secondary air injection solenoid valve control circuit voltage too low
43	P0412	Secondary air injection solenoid valve control circuit voltage too high

Fuel System

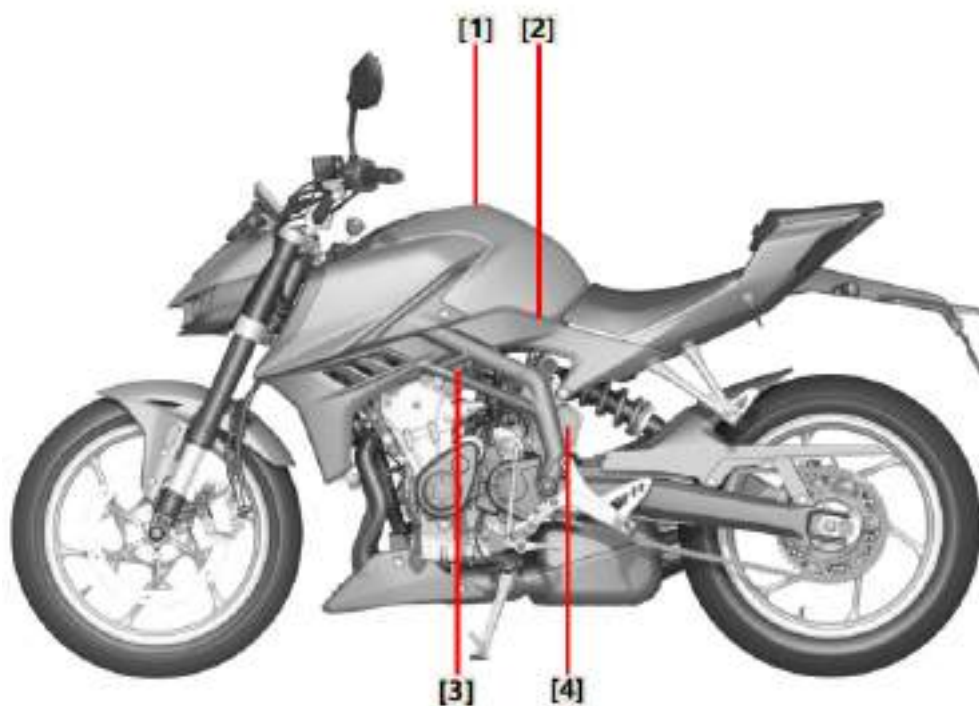
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Maintenance Instructions

Overview:

- Bending or kinking the control cable can affect the operation and may cause the cable to bind or 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

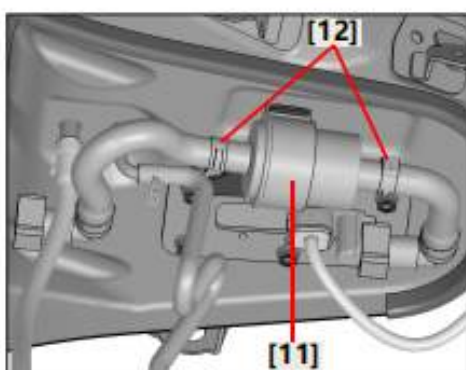
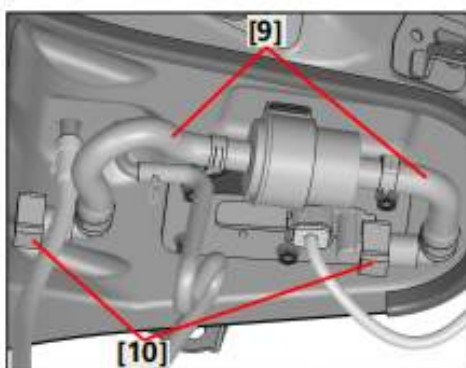
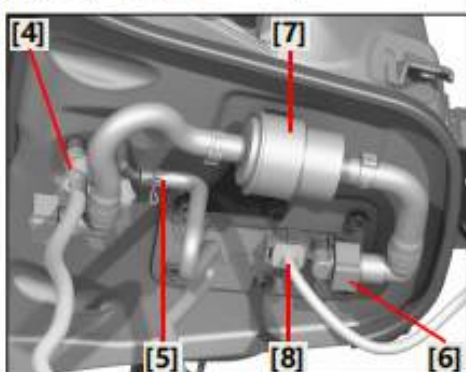
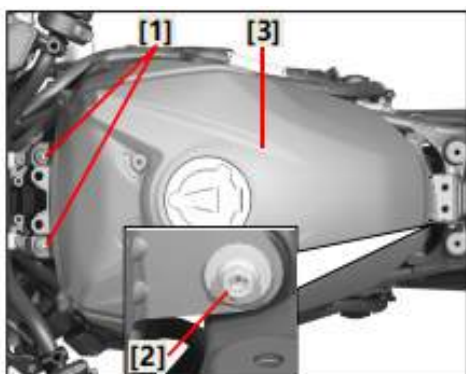


(1)Fuel tank

(2)Fuel pump/fuel level
sensor

(3)Throttle valve body/
sensor

(4)Fuel evaporation system



※ Fuel tank assembly

1. Use a pump to extract 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.

2. Disassembly

- Bolt and T-bushing [1];
- Bolt and gasket [2];
- Lift the fuel tank [3] upwards;
- Fuel tank drain hose [4];
- Fuel tank overflow hose [5];
- Fuel hose quick connector [6];
- Fuel filter [7];
- Fuel pump harness connector [8];
- Fuel tank [3].

The installation sequence is reversed from the removal sequence.

Torque:

Front of fuel tank and frame

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Subframe weld assembly and fuel tank

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

3. Check the fuel pipeline

Notes

- Do not suspend the fuel tank from the fuel hose. Cover the frame with a cloth to prevent damage to the frame.

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

- Check the fuel hose [9], quick connector [10], fuel filter and rubber grommet [11], and single ear stepless clamp [12] for any looseness, damage or leakage.

- Check if there are any of the following situations

Squeeze/loosen → Connect correctly.

Crack/damage/leak → Replace.

Note

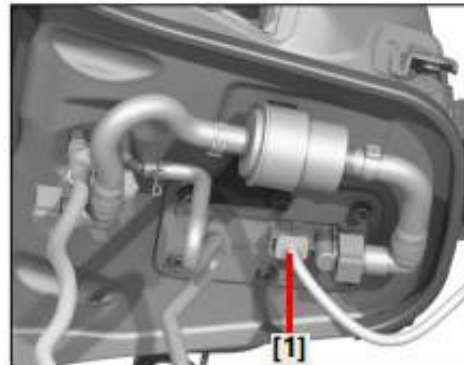
- Do not use tools to remove or install the fuel supply hose, connectors, and fuel pipes to avoid damage.

※ Fuel pressure release

Notes

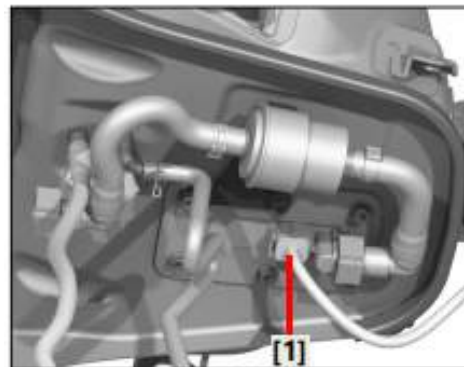
- Before disconnecting the fuel hose, release the system pressure as follows.

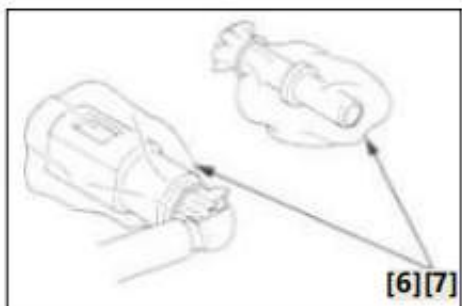
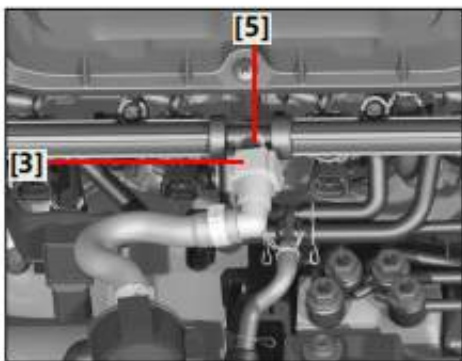
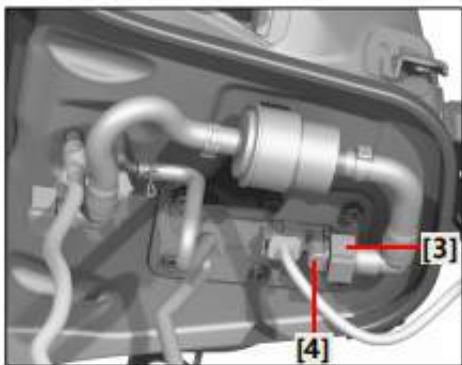
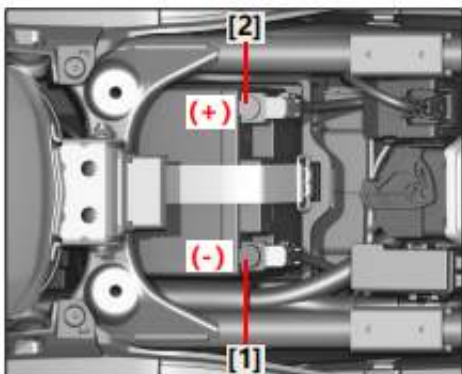
- 1.Disconnect the power supply harness connection plug [1] of the fuel pump unit.
- 2.Start the engine and let it idle until it stops to release the fuel pressure in the fuel hose.



※ Fuel pressure addition

- 1.Connect the power supply harness plug [1] of the fuel pump;
- 2.Temporarily place the fuel tank on the main frame;
- 3.With the throttle valve fully closed, pull the clutch lever all the way to the bottom and press the starter switch. The engine will start by increasing the fuel pressure;
- 4.Turn off the engine and check whether there is any leakage in the fuel pipeline.





※ Quick connector

⚠ Warning

•When disassembling, cover the fuel hose connector with a cloth. When disassembling the hose, residual pressure in the fuel pipeline may cause gasoline to spray out.

1.Disassembly

- Release the fuel pressure;
- First, disconnect the negative battery terminal (-) bolt [1], then disconnect the positive battery terminal (+) bolt [2];
- Place a cloth at the fuel line quick connector.
- Press the release button [3] on the fuel hose connector and disconnect the quick connectors from the fuel pump unit connector [4] and the fuel distribution rail connector [5].

Notes

- Although the gasoline in the fuel has been removed, residual gasoline may still exist, so be careful when removing fuel hoses.
- Clean around the quick connector before disconnecting the fuel hose, ensuring no dust enters the fuel system.

Note

- Cover the disconnected connector [6] and fuel connector end [7] with plastic bags to prevent damage and foreign materials from getting in.

2. Installation

-Connect the quick connectors [1], [2] to the fuel pump unit connector and the injector connector, respectively, while holding the quick connector housing until a "click" sound is heard.

-If it is not easy to connect, apply a small amount of machine oil to the fuel connector end, making sure the connection is secure and the quick connector is firmly locked in place, visually inspect and pull the connector housings.

-First connect the battery positive (+) cable [3], then the the negative (-) cable [4], and tighten the battery terminal bolts to the specified torque.

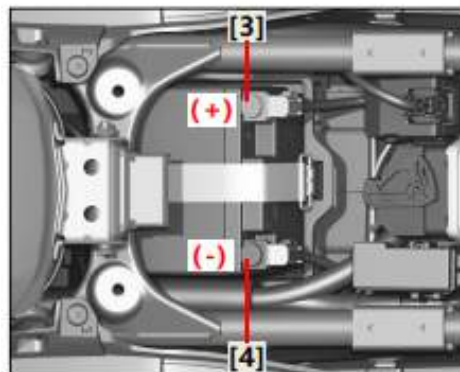
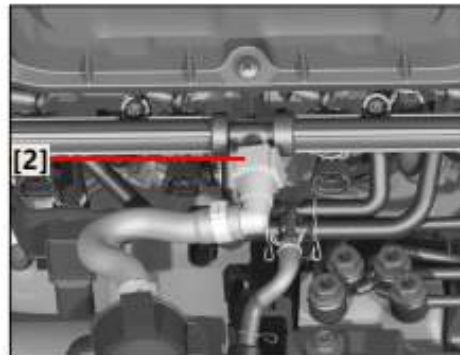
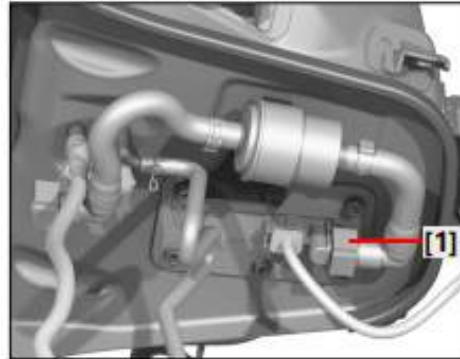
Torque:

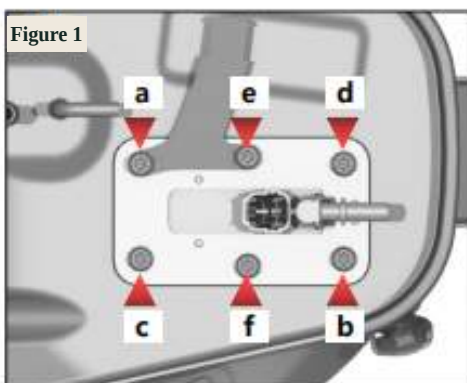
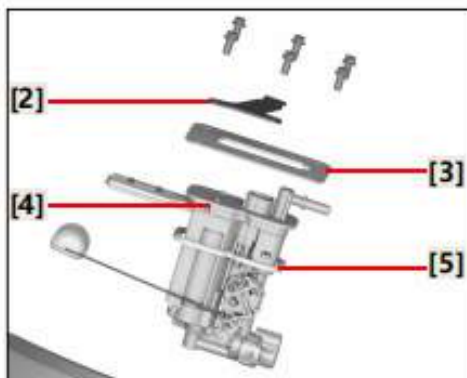
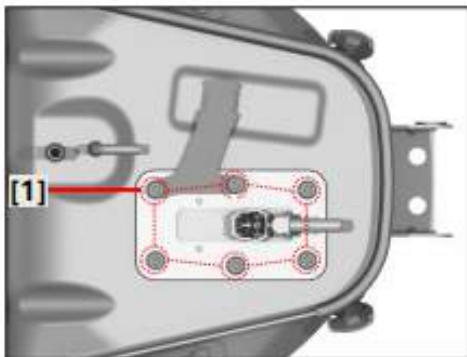
Battery terminal mounting bolts

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Notes

- Do not reuse kinked or damaged fuel supply hoses, as this could cause a fuel leak.
- Clean around the quick connector before installing the fuel hose, ensuring no dust enters the fuel system.





※ Fuel pump unit

⚠ Warning

•Although the gasoline in the fuel tank has been removed, residual gasoline may still exist, so be careful when removing the fuel pump.

Disassembly/installation

Disassemble the following parts:

- Fuel tank assembly (see page 110 for details);
- Bolt [1];
- Fuel filter bracket [2];
- Remove the fuel pump mounting pressure plate [3];
- Fuel pump [4];
- Rubber seal [5].

The installation sequence is reversed from the removal sequence.

Note

•As shown in Figure 1, tighten the fuel pump bolts in the correct sequence indicated by the arrows.

Notes

•Apply thread locker (Huitian 7262) to the bolts connecting the fuel pump to the fuel tank.

•When removing/installing the fuel pump rubber seal ring, ensure there is no dust around the seal and the tank mounting surface, and prevent dust from entering the fuel system.

•Position the fuel pump outlet (interface) towards the rear side of the fuel tank when installing

Torque:

Fuel pump and fuel tank

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

※ Fuel pump unit assembly

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

1	Pressure regulating valve
2	Oil level sensor assembly
3	Pump cell
4	Strainer
5	Sealing washer

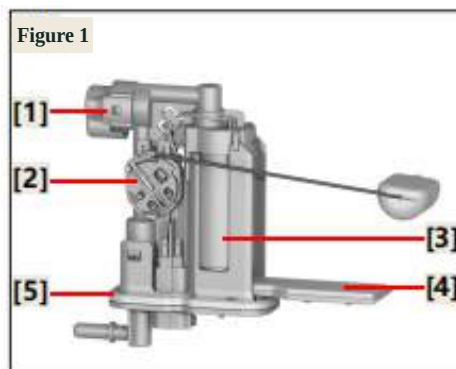
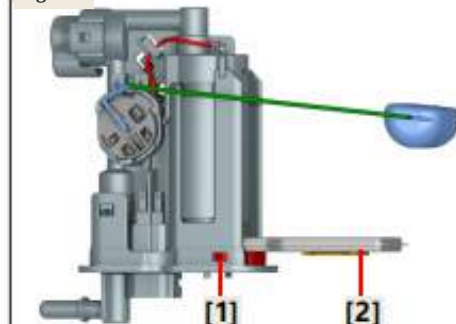


Figure 2



1.Disassembly

- Fuel pump unit strainer;
- Remove the gasket as shown in Figure 2, then pull the clip outward at position [1] to extract the fuel pump strainer [2];

Notes

- 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.

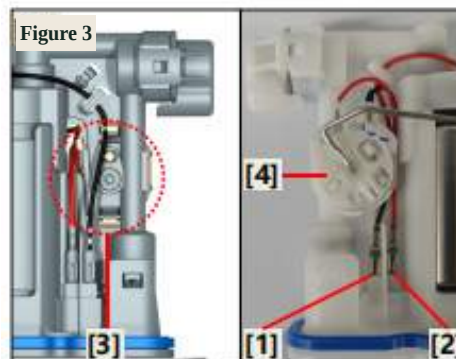
2.Disassembly

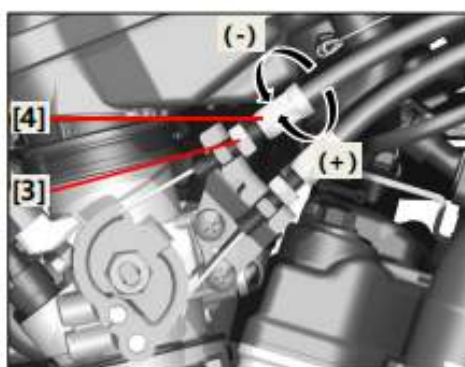
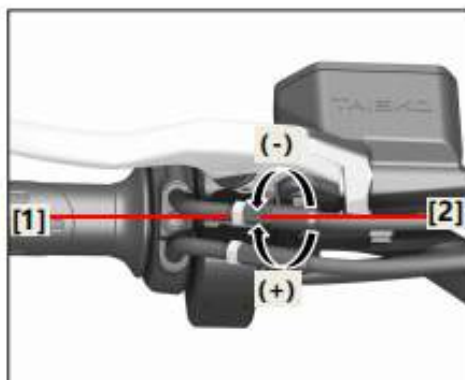
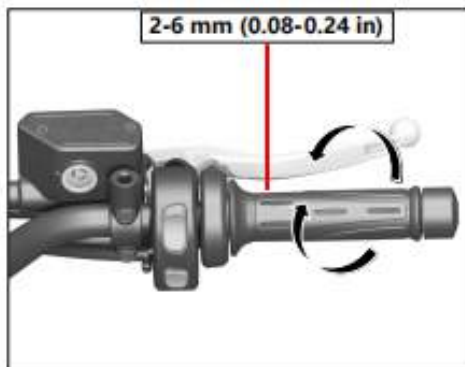
- Fuel level sensor assembly;
- As shown in Figure 3: Disconnect the two wiring harnesses at location [1],[2];
- Release clip [3];
- Remove component [4].

Notes

- After replacing the oil level sensor assembly, please correctly lay out the wiring harness with black and red wires.
- Avoid using tools when disassembling to prevent damage to the fuel pump unit.

Figure 3





※ Accelerator free play

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 handle is clean and greased, 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-tuning on accelerator cable

Loosen the locking 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.

Torque:

Accelerator cable A/B (steering handlebar end)

4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)

2. Adequately adjust on the throttle side

Loosen the accelerator cable adjuster lock nut [3] and turn the adjuster [4] in the (-) direction to reduce the free clearance and in the (+) direction to increase the free clearance.

After adjustment, hold the adjuster and tighten the lock nut of the inlet accelerator cable adjuster to the specified torque.

Torque:

Accelerator cable A/B (throttle end)

6.0 N·m (0.6 kgf·m, 4.0 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.

※ **Carben canister**

1.Disassembly

- Canister fixing strap [1];
- Canister connecting hose [2], [3];
- Canister connecting hose 3 [3];
- Carbon canister box[4];
- Bolt [5];
- Carbon canister box mounting bracket [6].

2.Inspection

Check whether the connecting hose is intact.
Cracked/broken → Replace.

Loose connection → Correct connection.

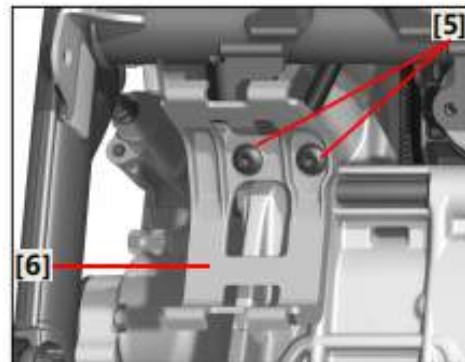
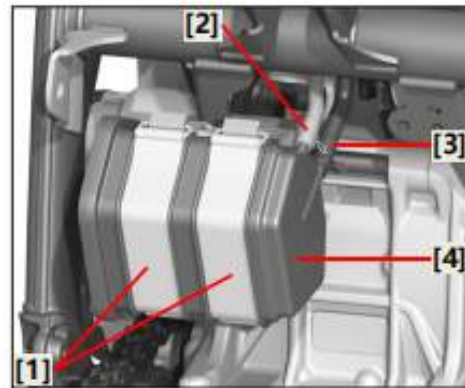
3.Installation

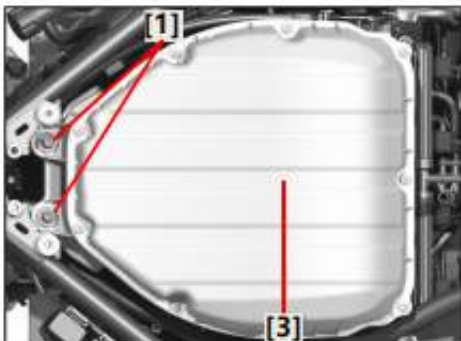
The installation sequence is reversed from the removal sequence.

Torque:

Carbon canister mounting bracket and main frame

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

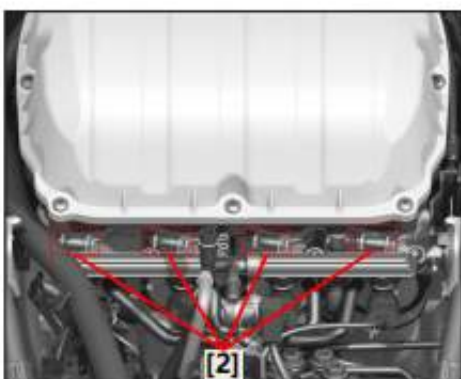




※ Air filter assembly

1.Disassembly

- Bolt and flanged bushing [1];
- Air filter pipe clamp screw [2];
- Lift up the air filter assembly [3];
- Air intake pipe for the air supply valve [4];
- Intake air temperature sensor [5];
- Engine exhaust gas pipe [6];
- Intake pipe of stepper motor [7];
- Air filter assembly [3].



Notes

- The air filter pipe clamp screw does not need to be fully backed off, preventing the nut from falling off.

The installation sequence is reversed from the removal sequence.

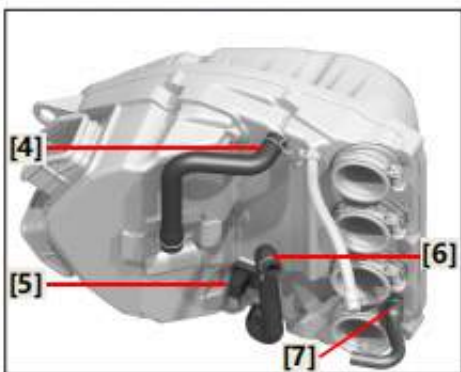
Torque:

Air filter locking pipe clamp screw

4.0 N·m(0.4 kgf·m , 3.0 lbf·ft)

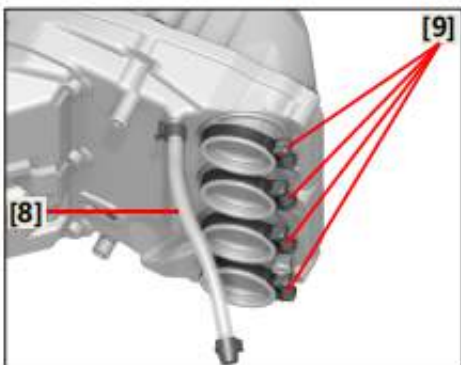
Air filter and frame

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



2.Inspection

- Check if the mounting bolts of the air filter tank are loose → Tighten if necessary.
- Check whether the air supply valve intake pipe [4], engine exhaust pipe [6], stepper motor intake pipe [7], and air filter tank drain pipe [8] are intact.
- Cracked/broken → Replace.
- Clean the accumulated water in the drain pipe [8].
- Check whether the installation position of the clamp [9] is correct. If not, adjust it → Install it correctly.



※ Air filter element replacement and maintenance

1. Disassembly

- Screw [1]
- Air filter cover [2];
- Air filter element screw [3];
- Air filter element [4];

2. Inspection

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

3. Cleaning

- Inside the air filter tank

The installation sequence is reversed from the removal sequence.

Note

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

Torque:

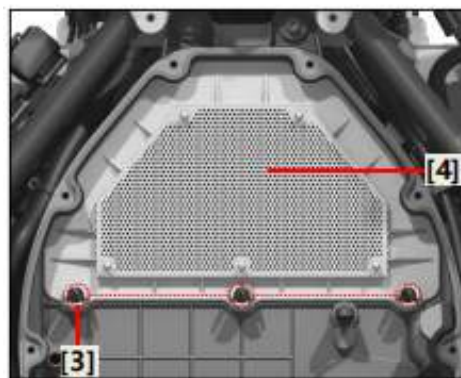
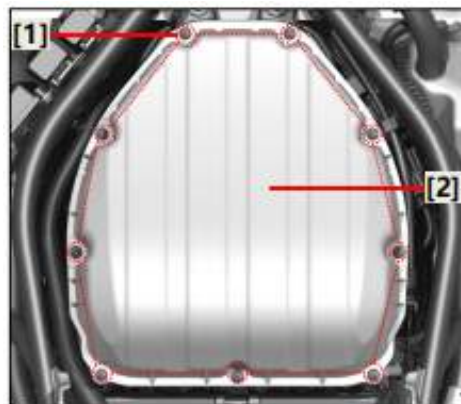
Air filter upper cover mounting screw

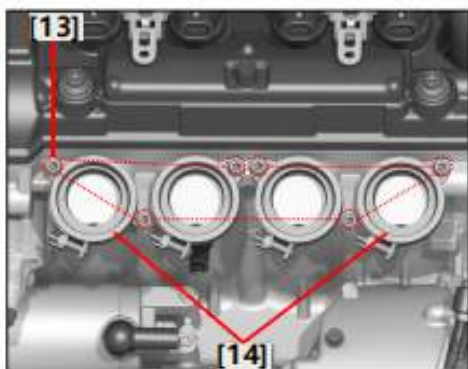
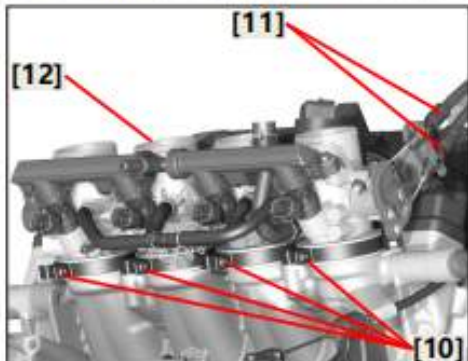
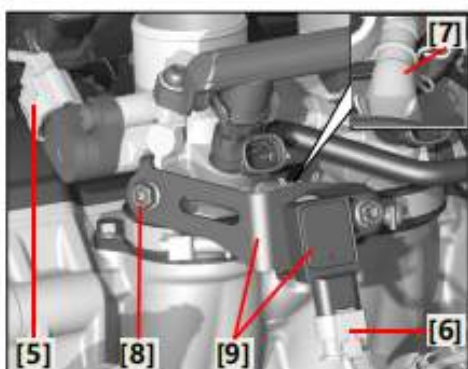
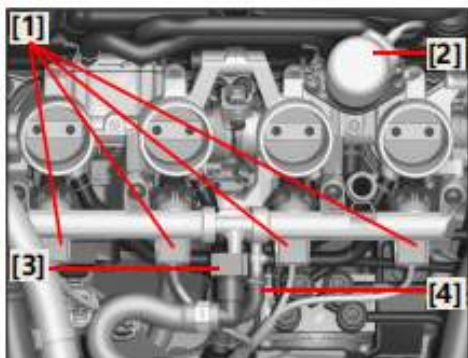
Air filter element mounting screw

3.0 N·m (0.3 kgf·m, 2.0 lbf·ft)

Notes

- Do not start the engine before installing the air filter element. Unfiltered air will cause rapid wear of engine parts and may damage the engine.





※ Throttle body assembly and intake pipe

1.Disassembly

- Fuel injector harness plug [1];
- Idle stepper motor harness plug [2];
- Fuel pipe [3];
- Canister connecting 2 [2];
- Position sensor harness plug [5];
- Intake pressure sensor harness plug [6];
- Intake pressure pipe [7];
- Bolt [8];
- Intake pressure sensor and bracket [9];
- Pipe clamp screw [10];
- Accelerator cable A/B [11];
- Throttle body assembly[12];
- Bolt [13];
- Intake pipe assembly [14];

The installation sequence is reversed from the removal sequence.

Torque:

Throttle valve pipe clamp screw [10]

4.0 N·m(0.4 kgf·m, 3.0 lbf·ft)

Accelerator cable A/B (throttle end) [11]

6 N·m (0.6 kgf·m,4.4 lb·ft)

Throttle valve and intake pressure sensor bracket [8]

Mounting bolts of intake pipe and engine [13]

10 N·m(1.0 kgf·m, 7.4 lbf·ft)

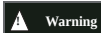
Notes

- The throttle valve pipe clamp screw does not need to be fully removed to prevent the nut from falling off.
- Apply thread locker (Huitian 7262) to the bolts connecting the throttle valve to the intake pressure sensor bracket.

2.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.

※ Throttle valve body



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.

Throttle position sensor/idle stepper motor

1.Disassembly

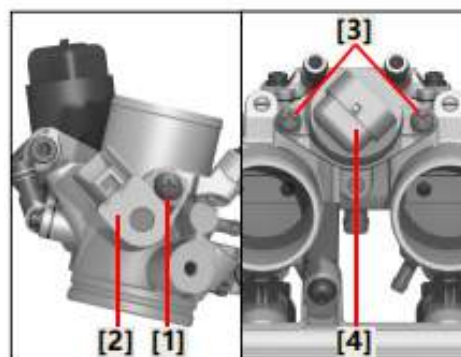
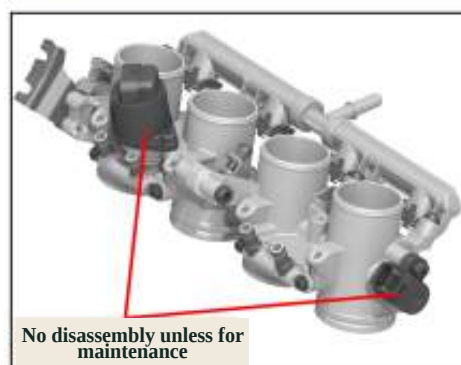
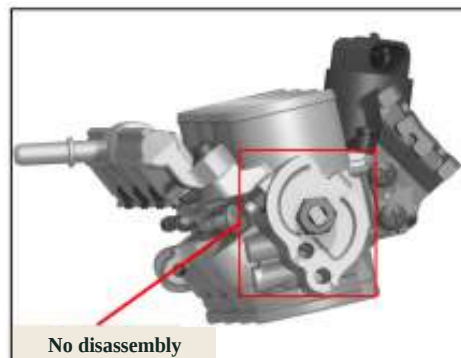
- Screw [1]
- Throttle position sensor [2];
- Screw [3];
- Idle stepper motor connection plug [4];

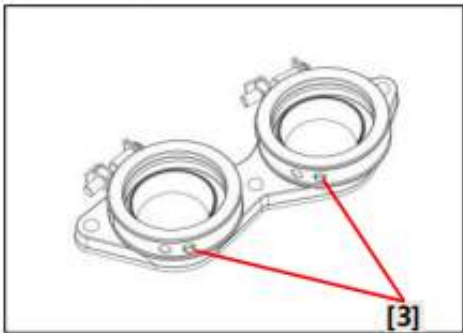
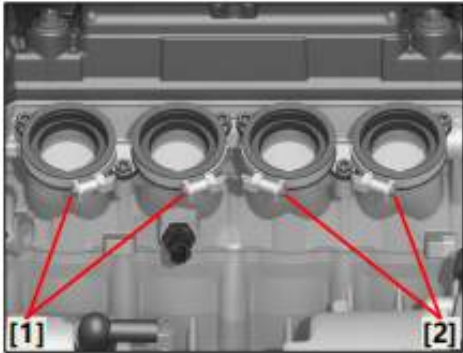
2.Inspection

- Check if there is carbon deposition in the air passage of idle stepper motor in the throttle body.
- Check the O-ring on the idle stepper motor/throttle 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

- Install each clamp on the intake pipe with the screw heads [1] and [2] facing outward, and align the groove [3] with the lug.

Torque:

Throttle position sensor mounting screw

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Idle stepper motor mounting screw

4.0 N·m(0.4 kgf·m, 3.0 lbf.ft)

Throttle cable remainer screw

3.5 N·m (0.3 kgf·m, 2.6 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, turn the main switch to "OFF" and disconnect the negative battery terminal from the battery.

1. Disassembly

- Screw and gasket [1];
- Fuel rail [2];
- Fuel injector clamp [3];
- Fuel injector [4];
- Fuel injector O-ring [5];
- Fuel rail O-ring [6].

2. Inspection

- Fuel injector

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

Accumulation → Replace.

Damage → Replace.

3. Inspection

- Fuel injector resistance

See "Vehicle Electrics" on page 303 for details.

4. Installation

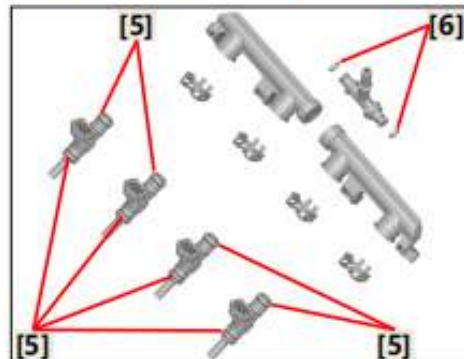
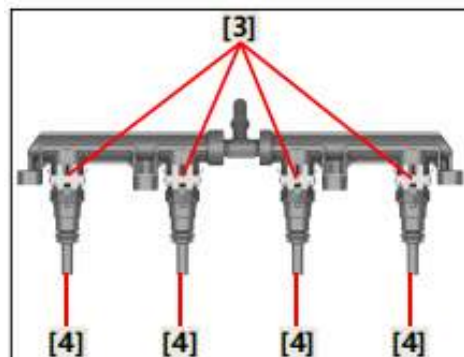
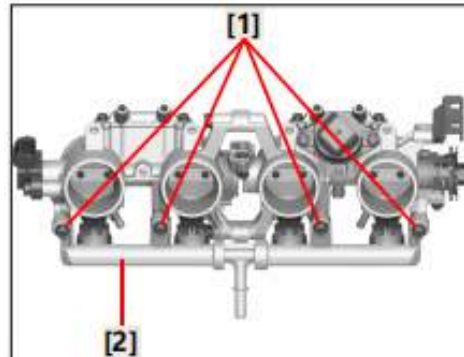
The installation sequence is reversed from the removal sequence.

Torque:

Fuel rail and throttle valve

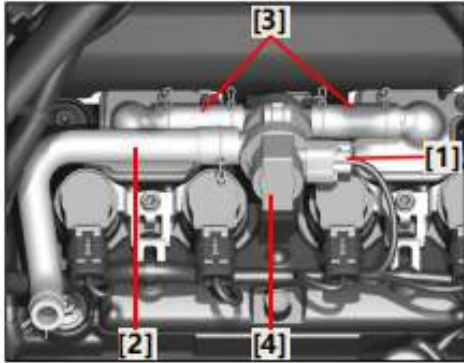
7.0 N·m (0.7 kgf·m, 5.1 lbf·ft)

Tighten the two center screws to 5 N·m, then tighten the two side screws to 5 N·m. Next, tighten the center screws to 7 N·m, followed by the side screws to 7 N·m



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.
- Install the original fuel injector cap and bolt, please use cleaning solvent to remove the white paint mark. Otherwise, paint chips on the screw thread may prevent the bolt from locking to the specified torque.



※ Secondary air supply valve

1. Disassembly

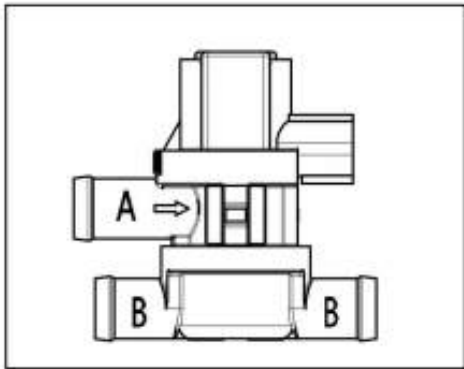
- Secondary air supply valve harness plug [1];
- Air supply valve intake pipe [2];
- Air supply valve exhaust pipe [3];
- Secondary air supply valve [4];

2. Check the hose

Loose connection → Correct connection.
Crack/damage → Replace.

3. Inspection

- Disconnect the hose connecting A-end to the air filter box
 - When the cold vehicle starts, air will flow out from A-end. After tens of seconds, the control valve will cut off the air flow.
- If the air flow is not cut off → Replace the control valve assembly.



4. Installation

The installation sequence is reversed from the removal sequence.

- A. From the air filter box
- B. To the inside of the engine

Cooling System

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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.

Notes

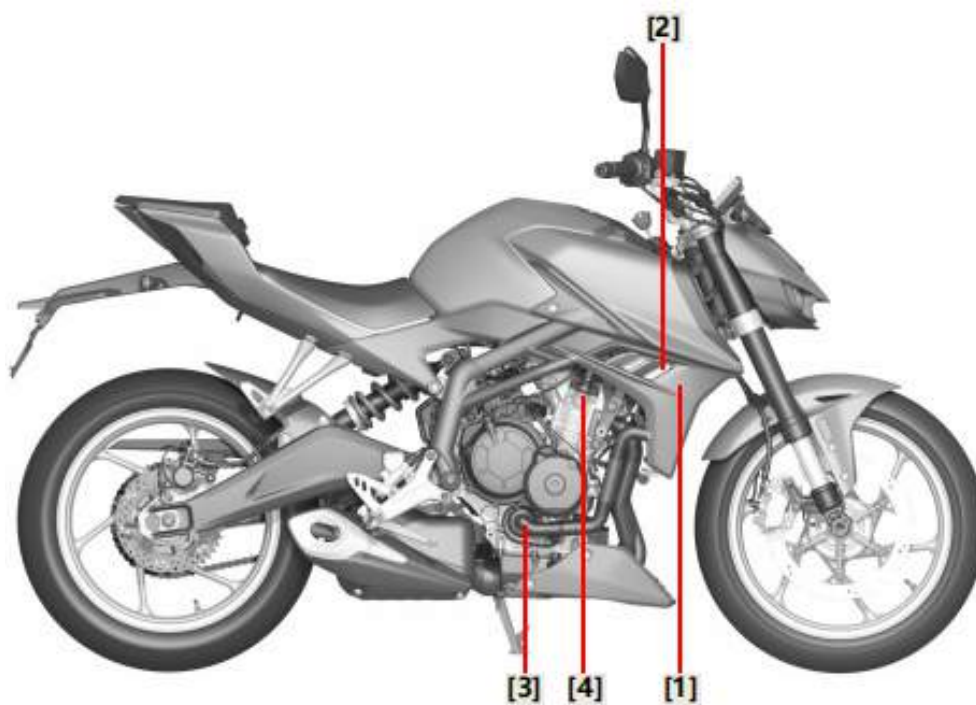
Using coolant with added silicate corrosion inhibitor can cause premature wear of water pump seal rings or blockage of radiator passages. Using tap water will cause engine damage.

- Add coolant to the water reservoir. 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.
- Check the coolant temperature indicator/water temperature sensor.
- Fan control relay inspection.

Cooling System Specification

Item		Specification
Coolant capacity	Radiator (including water channel)	1.8 Litre
	Water reservoir (up to upper limit level marks)	0.24 Litre
Radiator cap relief pressure		130-155kPa(1.3bar)
Thermostat	Initial opening temperature	$\geq 85^{\circ}\text{C}$
	Full opening temperature	$95^{\circ}\text{C} \pm 3^{\circ}\text{C}$
	Fully open valve lift	4.5mm □ 7.0mm
Recommended coolant	-40°C Ethylene glycol organic light-load engine antifreeze	

Position of Components



(1) Radiator and fan

(2) Stock kettle

(3) Engine water pump

(4) Thermostat

Troubleshooting

Engine temperature too high

- Coolant temperature indicator fault/water temperature sensor fault
- Thermostat valve not opened
- Radiator outlet
- Insufficient coolant
- Radiator passages, hoses, water pipes blocked
- Circulatory system intake
- Cooling fan motor malfunction
- Fan control relay failure
- Water pump failure

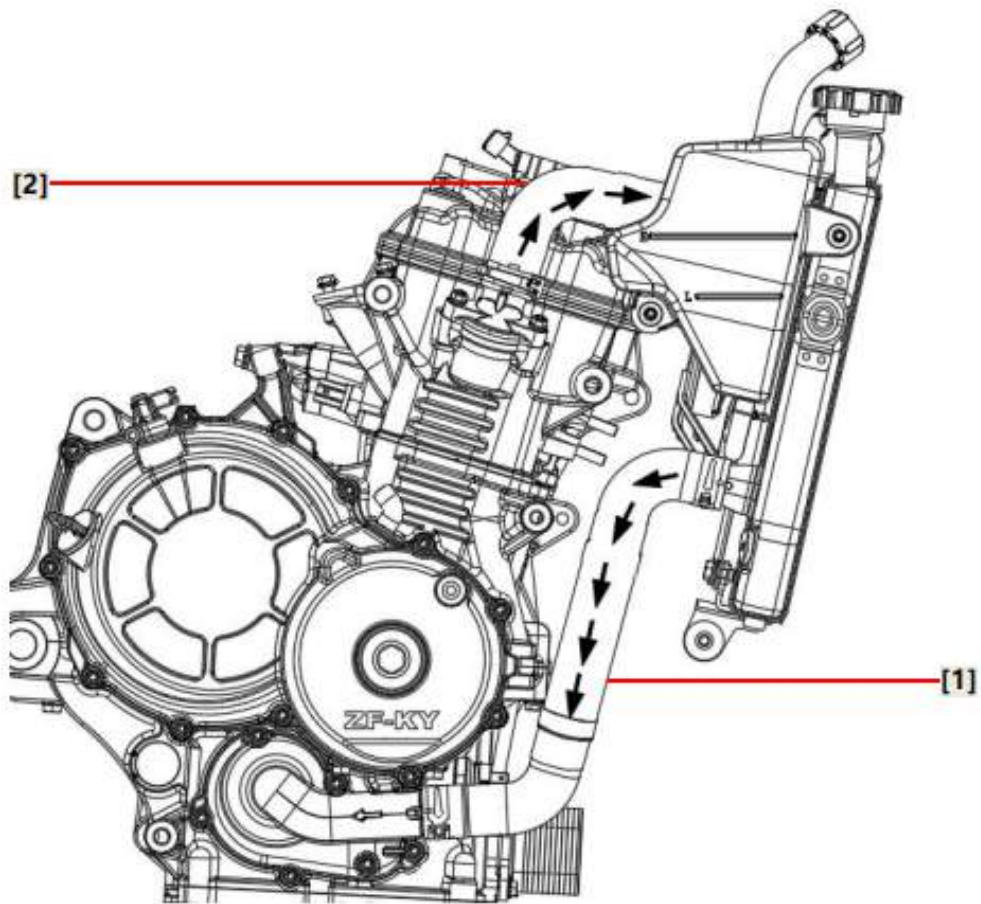
Engine temperature too low

- Coolant temperature indicator fault/water temperature sensor fault
- Thermostat valve opened
- Fan control relay failure

Coolant leakage

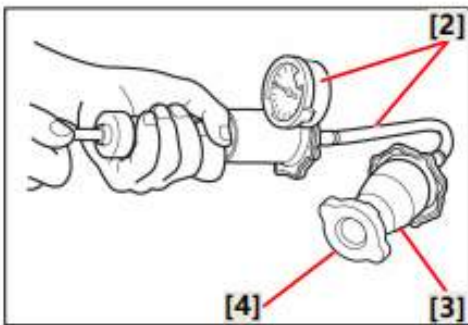
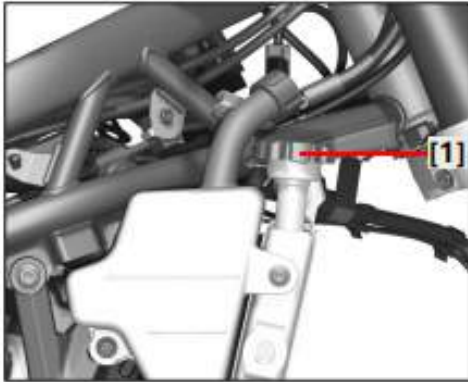
- Defects in water pump mechanical mechanism
- O-ring seal ring aged
- Radiator outlet
- Leakage or damage of cylinder head gasket
- Hose connections loosened or hose clamps not tightened
- Hoses damaged or aged
- Radiator damaged
- Thermostat cover and water pump cover pipe joints loose

Flow Chart of Cooling System



(1)Engine inlet pipe

(2)Engine outlet pipe



※ Cooling system test

Radiator cap/system pressure detection

-Remove the radiator cap [1].
Install the radiator cap tester [2] and radiator cap tester adapter [3] to the radiator cap [4].
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 :
130-155Kpa**

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 155 kPa.
- If the system cannot maintain the specified pressure for at least 6s, repair or replace the component.

※ Coolant replacement/exhausting

1. Stand the vehicle on a flat ground.

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.

1. Disassembly

- Water pump drain bolt and plain washer [1];
- Radiator cap [2];
- Drain the coolant.

Torque:

Water pump drain bolt

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

2. Add:

- Using the water hole, fill the cooling system with the recommended coolant up to the neck [2].

Recommended antifreeze:

-40°C Ethylene glycol organic light-load engine antifreeze

Radiator (including all lines)

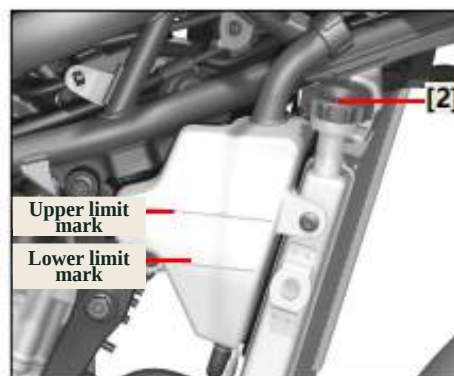
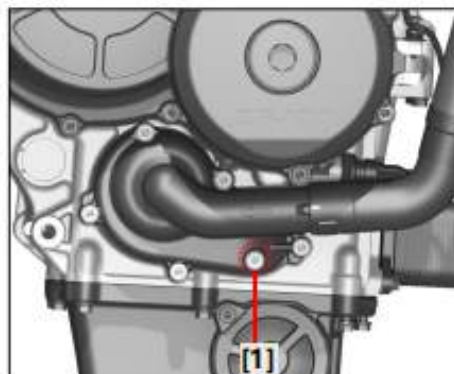
1.8 Litre

Coolant reservoir (up to the upper limit level mark)

0.24 Litre

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.



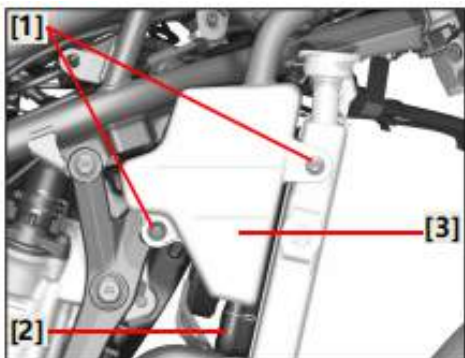
Warning

- 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. Shut down the engine and, if necessary, fill the water reservoir between the upper and lower level marks.
5. Check the coolant for leaks.



※ Stock kettle

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Pressure relief pipe [2];
- Water reservoir [3].

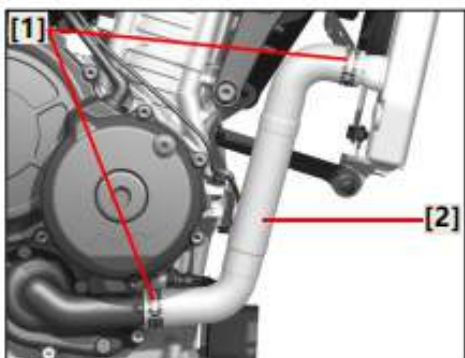
The installation sequence is reversed from the removal sequence.

Torque:

Water reservoir connected to engine upper suspension - right

Water reservoir connected to radiator

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



※ Engine water outlet and inlet pipes

Disassembly/installation

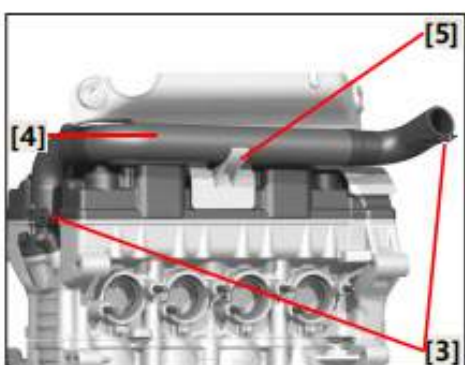
Disassemble the following parts:

Note

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

Engine inlet pipe

- Inlet pipe clamp [1];
- Engine Inlet pipe [2].



Engine outlet pipe

- Outlet pipe clamp [3];
- Engine outlet pipe [4].

The installation sequence is reversed from the removal sequence.

Notes

- Try to thoroughly drain antifreeze in the radiator and water channel in advance when the vehicle is in cold state.
- The engine outlet pipe should be placed at the engine heat shield hook [5].

※ Radiator and fan

Disassembly/installation

Disassemble the following parts:

Note

•Before disassembling, drain the coolant and then remove the engine inlet and outlet pipes (see pages 131-132 for details).

- Connecting bolts between the water reservoir and radiator [1];
- Bolt and T-bushing [2];
- Fan wiring harness plug [3];
- Move the radiator [4] to the left out of the limit bracket [5];
- Bolt [6].
- Radiator fan [7].

Inspection of fan motor

The battery voltage is 14V, the motor runs at full speed, and the ammeter current does not exceed 6.5A. If the motor does not rotate or the current exceeds the specified value, replace the fan motor.

The installation sequence is reversed from the removal sequence.

Torque:

Radiator fan and radiator mounting bolts

6.0 N·m (0.6 kgf·m, 4.0 lbf·ft)

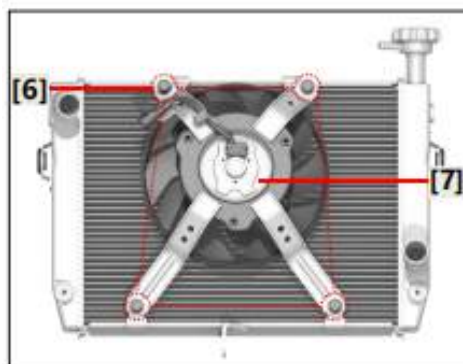
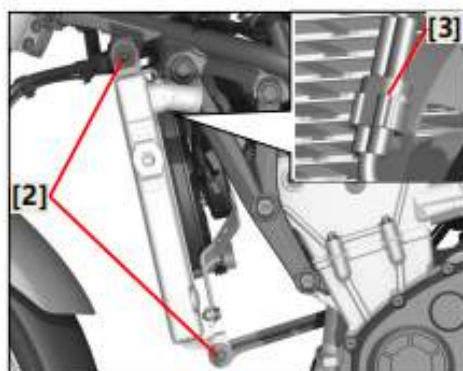
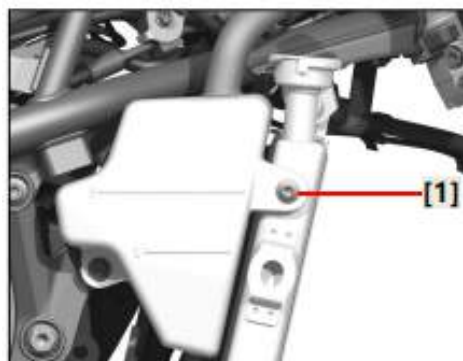
Water reservoir connected to radiator

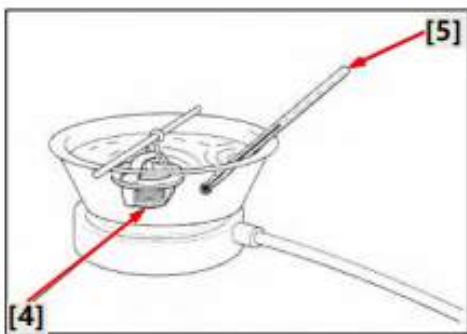
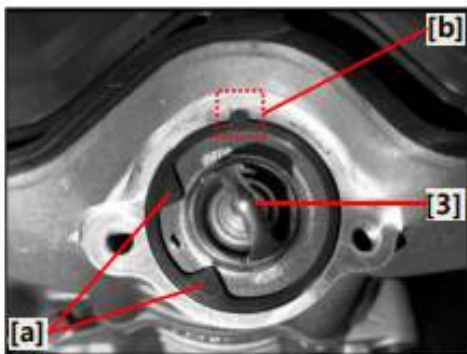
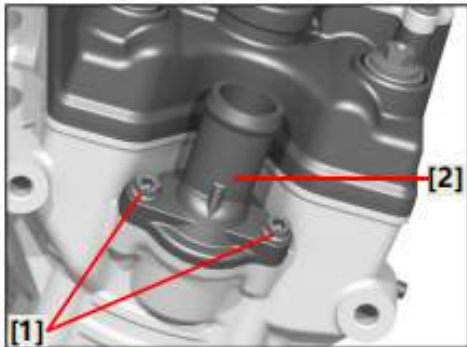
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Radiator connected to frame

Connecting bolts between radiator and frame mounting bracket

10 N·m (1.0 kgf·m, 7.4 lbf·ft)





Thermostat opening start temperature: $\geq 85^{\circ}\text{C}$

Thermostat fully open: $95 \pm 3^{\circ}\text{C}$

Valve fully open height:

4.5mm~7.0mm at 95°C

If the thermostat does not open at the specified temperature, replace it. A faulty thermostat will cause severe overheating or low engine temperature.

※ Thermostat

Disassembly/installation

Disassemble the following parts:

Note

• Before disassembling, drain the coolant and then remove the radiator (see page 133 for details).

- Bolt [1];

- Thermostat valve cover [2];

- Thermostat [3].

The installation sequence is reversed from the removal sequence.

Note

• When installing the thermostat, ensure the upper triangle [a] of the rubber ring is always facing upward.

• Ensure the bulge [b] on the seal ring aligns with the stopper on the cylinder head;

Torque:

Thermostat cover mounting bolt

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Inspection

• Check whether the exterior of the thermostat [3] is damaged.

• If the thermostat valve is in an open state at room temperature, replace it.

• Check whether the seal ring is damaged. If it is deformed or damaged, replace it.

Heat water to the operating temperature using an induction cooker for 5 minutes. Suspend the thermostat [4] in the hot water and check whether its function is abnormal.

Note

• Wear heatproof gloves and take appropriate eye protection measures.

• Keep flammable materials away from electrical components and do not allow the thermostat or thermometer [5] to touch the chassis, or you will get an incorrect reading.

※ Cooling pump

Disassembly/installation

Disassemble the following parts:

Note

- Before disassembling, drain the coolant and then remove the engine inlet pipe (see pages 131-132 for details).

- Bolt [1];
- Cooling pump cover (including seal ring) [2];
- Water pump impeller fastening bolt [3];
- Water pump impeller [4].
- Flat gasket [5];
- Use a slotted screwdriver [6] to remove the oil-water seal [7] through the designated removal position.

The installation sequence is reversed from the removal sequence.

Torque:

Cooling pump cover mounting bolt

Water pump impeller fastening bolt

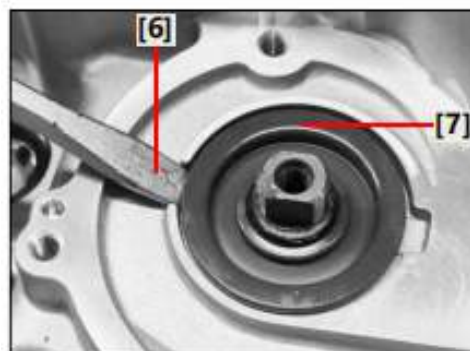
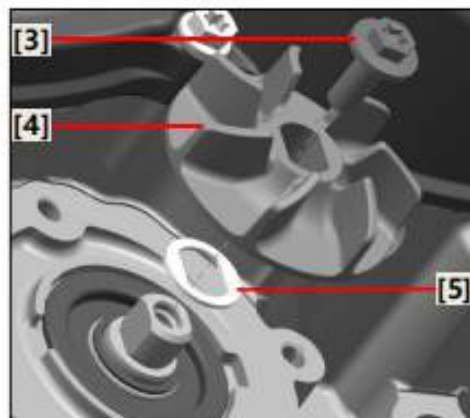
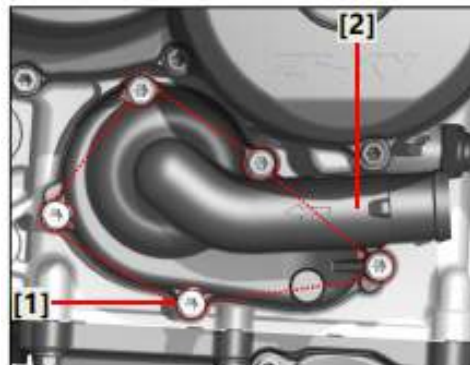
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Notes

- Do not damage the sealing surface of the water pump cover on the case.
- 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.

Inspection

- Cooling pump cover seal ring
Deform/aging → Replace.
- Water pump impeller and water pump shaft gasket
Deform/aging → Replace.



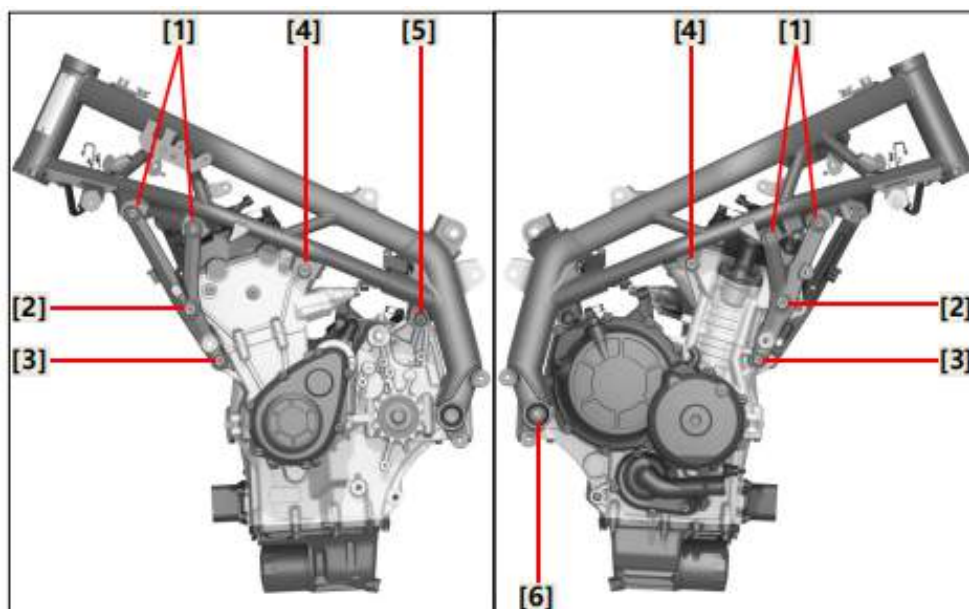
Engine

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Maintenance Instructions

- 1.2. 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.
- 3.1. 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



Position of Components

S/N	Installment position	Quantity	Specification status	Torque force value N·m
1	Engine upper suspension bracket (left and right) and frame	4	M8	26
2	Engine upper suspension bracket (left and right) and engine (upper)	2	M10	54
3	Engine upper suspension bracket (left and right) and engine (lower)	2	M8	26
4	Engine upper suspension (left and right) and frame	2	M10	54
5	Engine rear suspension mounting points	1	M10	60
6	Swingarm shaft locking	1	M16	88

Engine Main Parameters

Item		Type/Specification
		Z459MQ-B
Type		DOHC, L4-cylinder, water-cooled, 16-valve
Bore × stroke		59 mm×40.5 mm
Total displacement		443 ml
Compression ratio		12.3:1
Minimum no-load steady speed (Idle speed)		1500 rpm ± 100 rpm
Starting mode		Electric starting
Power		48 kW/12500 rpm
Electric system	Ignition mode	ECU-controlled digital ignition
	Spark plug model/electrode gap	NGK LMAR9AI-10 / 0.9 mm□1 mm
	Magneto type	Permanent magnet three-phase AC generator with outer rotor flywheel type
	Air filter	Sponge filter element type
	Gasoline	95 octane, GB17930 - 2016
Valve train system	Valve mechanism	DOHC/chain-driven
Lubrication system	Lubrication method	Forced pressure lubrication + splash lubrication
	Oil pump type	Rotary type
	Engine oil filter type	Full flow paper filter element
	Engine oil grade	SN 10W-40 GB 11121-2006
Cooling System	Cooling method	Closed coolant circulation cooling
	Coolant types	-40°C Ethylene glycol organic light-load engine antifreeze
Transmission System	Clutch type	Manual wet multi-plate
	Shift mode	Constant-mesh two-stage transmission with six-gear speed shifting
	Reducer gear	6th gear
	Shift mode/sequence	Mechanical reciprocating type / 1-N-2-3-4-5-6-5-4-3-2-N-1
	Transmission gear ratio	Primary transmission ratio
		Final transmission ratio
		1st gear
		2nd gear
		3rd gear
		4th gear
		5th gear
		6th gear

Item	Type/Specification
	Z459MQ-B
Dimensions	L × W × H: 385mm × 400mm × 526mm
Net mass	44.0kg
Output type	Sprocket output
Engine output rotation direction	Rotate counterclockwise (when facing the output shaft)

Maintenance Parameter Table

Cooling System

Item		Specification	Maintenance limit value
Coolant capacity	Radiator (including all water channels)	1.8L	-
	Water tank (to the upper limit level mark)	0.24L	-
Radiator cap relief pressure		130kpa~155kpa	-
Thermostat	Opening start temperature	$\geq 85^{\circ}\text{C}$	-
	Fully open temperature	$95^{\circ}\text{C} \pm 3^{\circ}\text{C}$	-
	Valve lift	4.5mm~7.0mm	-

Lubrication system

Item		Standard value	Maintenance limit value
Oil capacity	Oil level (Reassembly after complete disassembly)	2.8L	-
	Disassemble/replace the engine oil fine filter	2.6L	-
	Engine oil fine filter not disassembled or replaced	2.4L	-
Recommended oil	Brand	Shell dedicated oil	-
	Model	SN 10W-40 GB 11121-2006	-
Oil pressure sensor pressure	Alarm upper limit value	0.16bar~0.24bar	-
Oil pump rotor	Clearance between the outer rotor and seat	0.14mm~0.22mm	-
	Axial clearance between the inner and outer rotors and the pump body	0.03mm~0.20mm	-

Crank connecting rod mechanism

Item			Standard value	Maintenance limit value
Crankshaft	Fit clearance between connecting rod bearing liner and connecting rod		0.031mm~0.057mm	0.08mm
	Side clearance between connecting rod and crankshaft		0.20mm~0.35mm	0.40mm
	Side clearance between crankshaft and case		0.15mm~0.35mm	0.40mm
	Clearance between crankshaft bearing liner and crankshaft journal		0.02mm~0.049mm	0.07mm
	Crankshaft runout		0.03mm	0.05mm
Cylinder block	Cylinder diameter		Φ59.00mm~Φ59.01mm	Φ59.10mm
Piston, piston pin, piston ring	Diameter of piston base circle		Φ58.97mm~Φ58.98mm	Φ58.95mm
	Bore diameter of piston pin		Φ15.003mm~Φ15.008mm	-
	Outer diameter of piston pin		Φ14.994mm~Φ15mm	-
	Closed clearance of piston ring	First ring	0.15mm~0.30mm	0.50mm
		Second ring	0.30mm~0.45mm	0.60mm
	Side clearance between piston ring and ring groove	Side clearance between the first ring andgroove	0.03mm~0.07mm	0.10mm
		Clearance between the second ring and groove	0.02mm~0.06mm	0.09mm
	Height of piston ring groove	First ring	0.82mm~0.84mm	0.86mm
		Second ring	0.81mm~0.83mm	0.85mm
	Piston ring height	First ring	0.77mm~0.79mm	0.76mm
		Second ring	0.77mm~0.79mm	0.76mm
Cylinder clearance			0.02mm~0.04mm	0.07mm
Inner diameter of connecting rod small end			Φ15.007mm~Φ15.015mm	Φ15.025mm
Fit clearance between connecting rod and pin			0.007mm~0.021mm	0.04mm

Valve train system

Item			Standard value	Maintenance limit value
Cylinder pressure for electric starting (at normal temperature and pressure)			9bar~12bar/380rpm~400rpm	-
Valve clearance (between camshaft and rocker arm, 20°C)		Intake valve	0.08mm~0.10mm	-
		Exhaust valve	0.10mm~0.12mm	-
Camshaft	Cam protrution height	Intake	4.6612mm	4.60mm
		Exhaust	4.0871mm	4.02mm
	Clearance between journal and bracket		0.038mm~0.08mm	0.105mm
	Shaft journal runout		0.02mm	0.025mm
Valve guide	Valve rod diameter	Intake	Φ3.976~Φ3.990	Φ3.95mm
		Exhaust	Φ3.956~Φ3.970	Φ3.93mm
	Inner diameter of valve guide	Intake/exhaust	Φ4.004~Φ4.016	Φ4.03mm
	Valve, valve guide	Intake	0.014mm~0.04mm	0.08mm
		Fit clearance	0.034mm~0.06mm	0.10mm
Free length of valve spring		Intake/exhaust	40.3mm	39.3mm
Installation length of valve spring		Intake/exhaust	32.0mm~30.5mm	-
Flatness of cylinder head			0.05mm	0.08mm

Electric system

Item	Standard value		Maintenance limit value
Spark plug	Model	NGK LMAR9AI-10	-
	Clearance	0.9mm ~1 mm	-
Magneto coil resistance	Trigger	150Ω	-
Maximum magneto output power	375W		-
Regulated voltage	14.5V		-

Drive and shifting mechanism

Item		Standard value	Maintenance limit value
Main/counter shaft journal	Main shaft left journal	Φ16.978mm~Φ16.989mm	16.968mm
	Main shaft right journal	Φ25.002mm~Φ25.015mm	-
	Countershaft left journal	Φ22.002mm~Φ22.015mm	-
	Countershaft right journal	Φ19.976mm~Φ19.989mm	16.966mm
Shift fork and shift fork shaft	Shift fork shaft journal	Φ11.97mm~Φ11.98mm	16.955mm
	Shift fork inner diameter	Φ12.0mm~Φ12.018mm	12.033mm
	Thickness of shift fork tip	4.875mm~4.95mm	4.85mm

Clutch and operating mechanism

Item		Standard value	Maintenance limit value
Free stroke of clutch handle		13mm	-
Clutch	Free length of spring	41.8mm~42.8mm	-
	Number of springs	3	-
	Thickness of friction plate	2.42mm~2.58mm	2.22mm
	Flatness of driven plate	0.12mm	0.3mm
	Number of friction plate I	1	-
	Number of friction plate II	5	-
	Number of friction plate III	1	-
	Number of steel plates	6	-
Clutch bushing	Inner diameter	Φ24.983mm~Φ24.996mm	25.006mm
	Outer diameter	Φ29.991mm~Φ30.0mm	19.981mm
Clutch bushing main shaft outer diameter		Φ24.969mm~Φ24.980mm	24.959mm

Auxiliary Materials for Engine Operation and Installation

Name of auxiliary material	Specification and brand	Usage position	Notes
Plane sealant	Loctite 5910	Crankcase joint surface Magnetorotor outlet port Trigger outlet port Joint between the left and right cover surfaces of cases Semi-circular concave corner of the cylinder head cover seal	
Engine oil	SN 10W-40 GB 11121-2006	Rotating and sliding areas inside the cylinder Rotating and sliding areas inside the crankcase Rotating and sliding areas inside the cylinder head See the lubrication system diagram for details Piston pin, valve stem, valve oil seal, camshaft areas	Capacity: 2.8 L
Multipurpose grease	Lithium-based grease No.2 GB/T5671 - 2014	Oil seal lip O-ring Sealing surface of other rubber sealing materials Sealed bearings	
Thread locker	Loctite 243	Some of threads	
Antifreeze	-40°C Ethylene glycol organic light-load engine antifreeze	Cooling System	The capacity is determined according to the radiator water pipe system

Engine 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

- The torque specifications listed below apply to the specified fasteners.
- Others should be tightened to the specified torque value above.

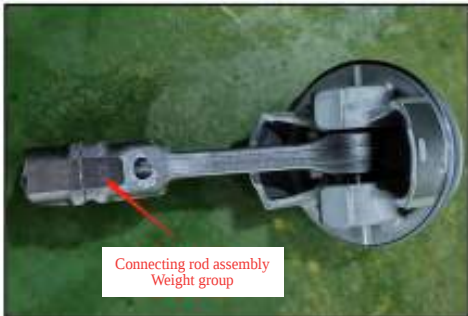
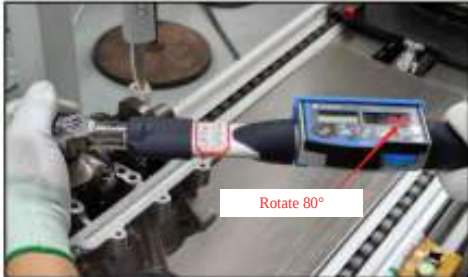
Engine Torque Value

System	Position	Quantity	Thread Specification	Torque Value N·m	Notes
Valve train system	Spark plug	4	M10×1	12±2	
	Camshaft gland bolt	20	M6×1	12±1	
	Rocker arm shaft limit bolt	4	M5×0.8	6±1	Apply an appropriate amount of thread locker
	Tensioner mounting bolt	2	M6×1	10±2	
	Tensioner mounting bolt	1	M6×1	8±2	
	Cylinder head fastening bolt	10	M8×1.25	-	See "Bolt tightening methods for key parts" on page 150 for details
		2	M6×1	10±1	
	Vibration damping bolt	1	M6×1	10±2	
	Camshaft process screw plug	2	M12×1.25	10±2	Apply an appropriate amount of grease to the O-ring
	Guide panel bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Tensioner bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Cylinder head cover bolt	4	M6×1	10±2	
	Secondary air supply cover bolt	4	M6×1	10±2	
	Spark plug gland bolt	2	M6×1	10±2	
	Exhaust through bolt	8	M6	9±1.5	Apply an appropriate amount of thread locker
	Intake seat bolt	6	M6×1	10±2	

System	Position	Quantity	Thread Specification	Torque Value N·m	Notes
Crank connecting rod mechanism	Connecting rod bolt	8	M7×0.45	-	See "Bolt tightening methods for key parts" on page 150 for details
Case section	M6 bolt for case assembly	9	M6×1	12±1.2	
	M8 bolt at the crankshaft position for case assembly	10	M8×1.25	25±2	Apply an appropriate amount of lubricating oil to both ends of the washer and the supporting surface of the bolt
	The rest of M8 bolts for case assembly	8	M8×1.25	25±2	Apply an appropriate amount of lubricating oil to the supporting surface of the bolt
	RC1/4 screw plug	1	-	15±2	Apply an appropriate amount of thread locker
	RC3/8 screw plug	1	-	25±2	Apply an appropriate amount of thread locker
	Left cover bolt	7	M6×1	10±2	
	Right cover bolt	12	M6×1	10±2	
	Main shaft left bearing screw plug	1	M10×1	10±2	
	Adjusting hole cover	1	M30×1.5	12±2	Apply an appropriate amount of grease to the O-ring
	Inspecting hole cover	1	M12×1.25	10±2	Apply an appropriate amount of grease to the O-ring
Clutch and shift mechanism	Clutch nut	1	M20×1.5	130±5	
	Clutch spring rod bolt	3	M6×1	10±2	
	Clutch control arm bolt	1	M6×1	10±2	
	Main shaft right bearing baffle bolt	2	M6×1	10±2	Apply an appropriate amount of thread locker
	Main shaft left bearing baffle bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Transmission drum baffle bolt	2	M6×1	10±2	Apply an appropriate amount of thread locker
	Setbolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Gear shift stud	1	M8×1.25	22±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	55±3	Apply an appropriate amount of thread locker

System	Position	Quantity	Thread Specification	Torque Value N·m	Notes
Lubrication cooling system	Water pump cover mounting bolt	5	M6×1	10±2	
	Water pump cover drain bolt	1	M6×1	10±2	
	Fine filter cover mounting bolt	2	M6×1	10±2	
	Oil pump chain baffle mounting bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Oil cooler mounting bolt	4	M6×1	10±2	
	Oil pump mounting bolt	3	M6×1	10±2	Apply an appropriate amount of thread locker
	Oil pan mounting bolt	11	M6×1	10±2	
	Water pump impeller mounting bolt	1	M6×1	10±2	Apply an appropriate amount of thread locker
	Thermostat cover mounting bolt	2	M6×1	10±2	
	Oil drain bolt	1	M12×1.5	30±2	
	Oil separator mounting bolt	5	M5×0.8	8±1	Apply an appropriate amount of thread locker
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
	One-way clutch mounting bolt	1	M10×1.25	34±3	Apply an appropriate amount of thread locker
	Rotor mounting bolt	1	M10×1.25	78±5	Apply an appropriate amount of thread locker
	Stator mounting bolt	3	M6×1	10±2	Apply an appropriate amount of thread locker

Bolt Tightening Methods for Key Parts



1.Connecting rod bolt

The tightening method of the single set of connecting rod bolts is as follows, and each set shall be fastened in this way (4 sets in total):

- 1.Apply lubricating oil to the bolt supporting surface and threads;
- 2.Tighten each bolt to 5N·m respectively;
- 3.Tighten each bolt to 13N·m respectively;
- 4.Tighten each bolt by an angle of 80° respectively.

Notes

- The connecting rod bolts must be replaced after being used 2 times;
- The connecting rod assemblies of the same weight group shall be installed in cylinders 1, 2, 3 and 4 respectively.

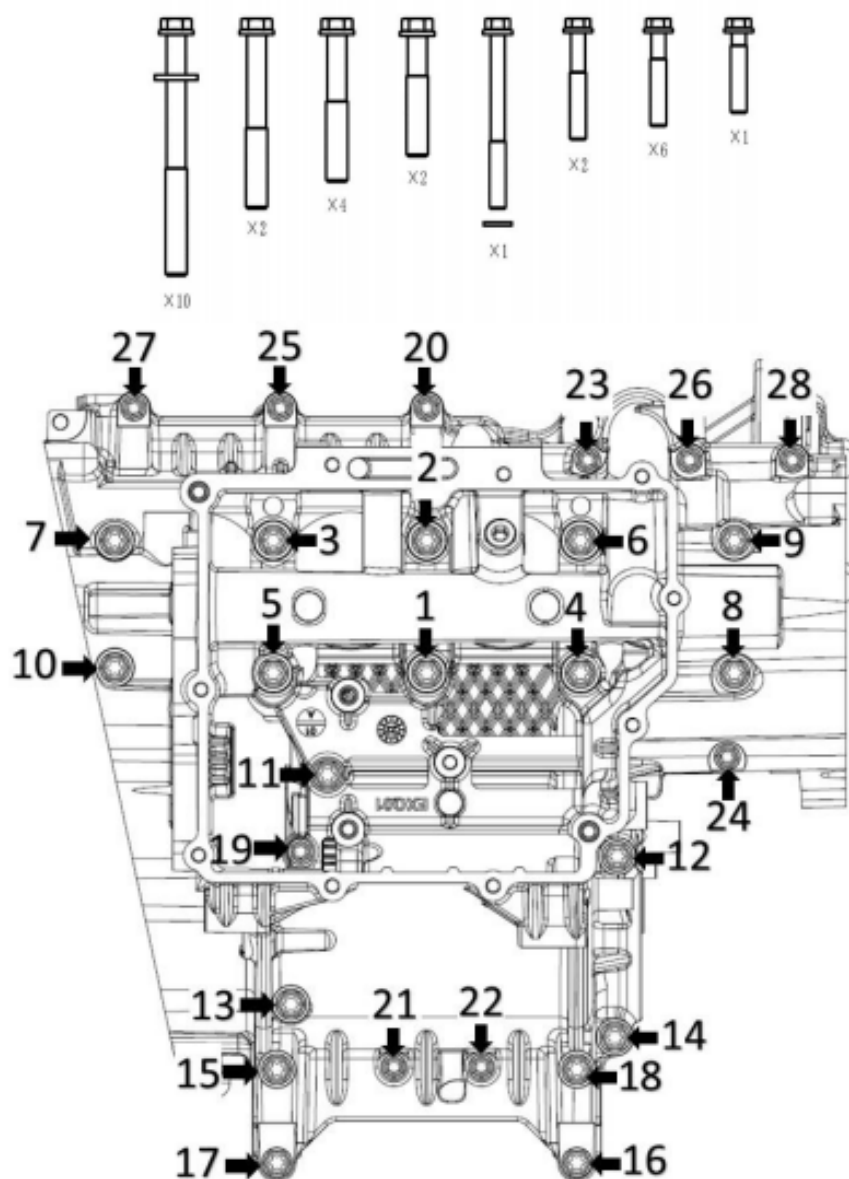
The weight groups of the connecting rod assemblies are: A, B, C, D, E.

- The connecting rod body must be paired with the connecting rod cap (with the same mark);
- When tightening the connecting rod bolts, place the torque wrench flat to prevent the bolt head from slipping.

2.Crankcase bolt

The tightening steps are as follows (apply an appropriate amount of lubricating oil to the contact surfaces of all M8 bolts and gaskets. All bolts and gaskets shall be replaced after disassembly):

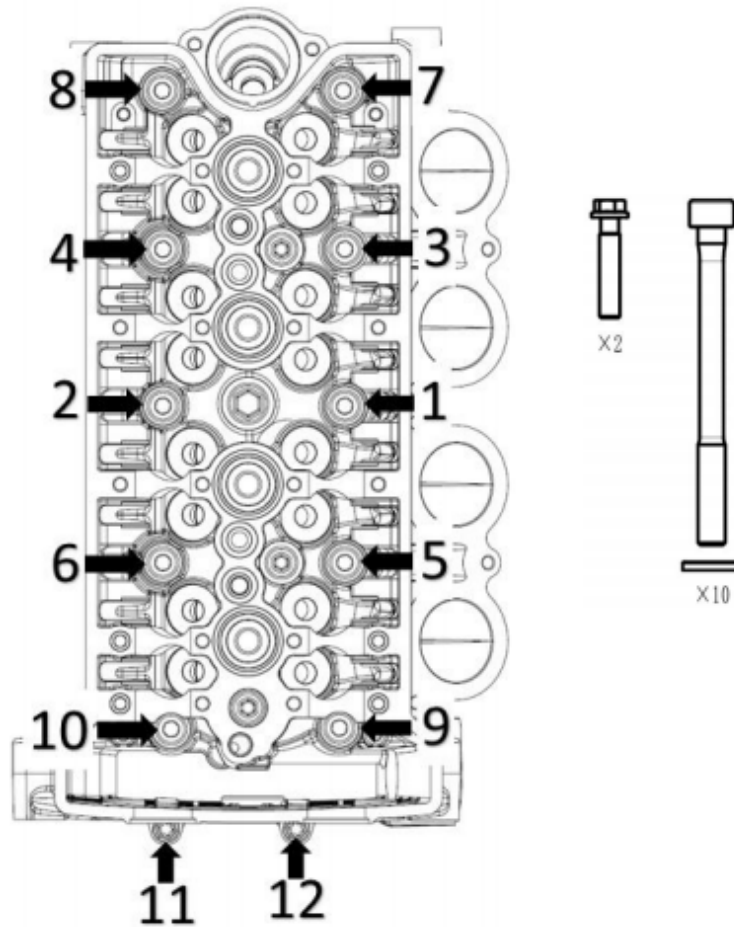
- 1.Tighten in the order of marks 1 - 18, with a tightening torque of $(12 \pm 1.2)\text{N}\cdot\text{m}$;
- 2.Tighten in the order of marks 1 - 18, with a tightening torque of $(25 \pm 2)\text{N}\cdot\text{m}$;
- 3.Tighten in the order of marks 19 - 28, with a tightening torque of $(12 \pm 1.2)\text{N}\cdot\text{m}$.



3.Cylinder head bolt

The bolt tightening sequence is as follows (all bolts must be replaced after disassembly):

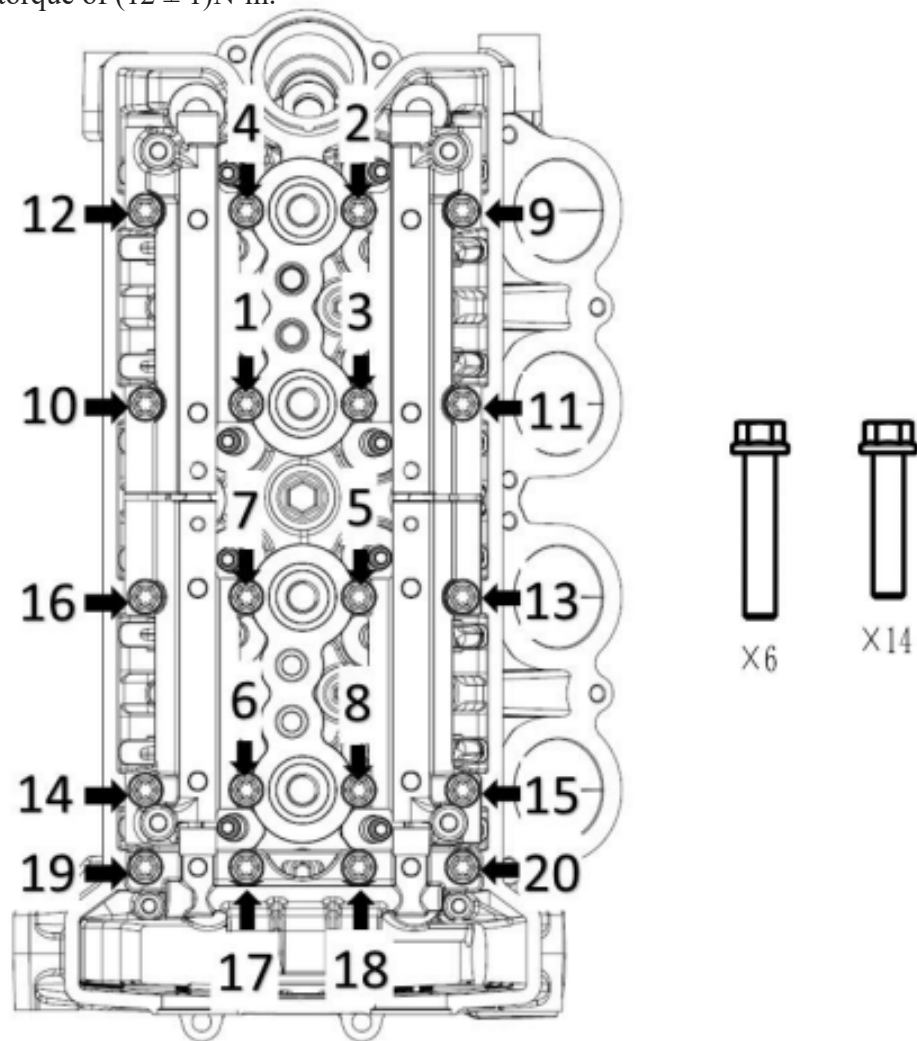
1. Apply an appropriate amount of lubricating oil to the threads and joint surfaces of all M8 bolts;
2. Tighten in the order of marks 1 - 10 in the above figure, with a tightening torque of $(4 \pm 0.5)\text{N}\cdot\text{m}$;
3. Tighten in the order of marks 1 - 10 in the above figure, with a tightening torque of $(12 \pm 1)\text{N}\cdot\text{m}$;
4. Tighten each bolt in the order of marks 1 - 10 in the above figure by an angle of 75° ;
5. Tighten each bolt in the order of marks 1 - 10 in the above figure by an angle of 75° again;
6. Tighten in the order of marks 11 - 12 in the above figure, with a tightening torque of $(10 \pm 1)\text{N}\cdot\text{m}$.

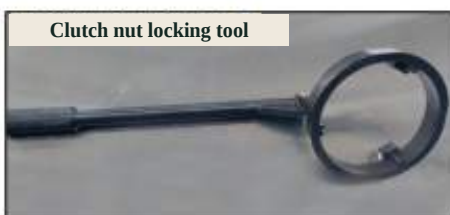


4. Camshaft gland bolt

The bolt tightening sequence is as follows:

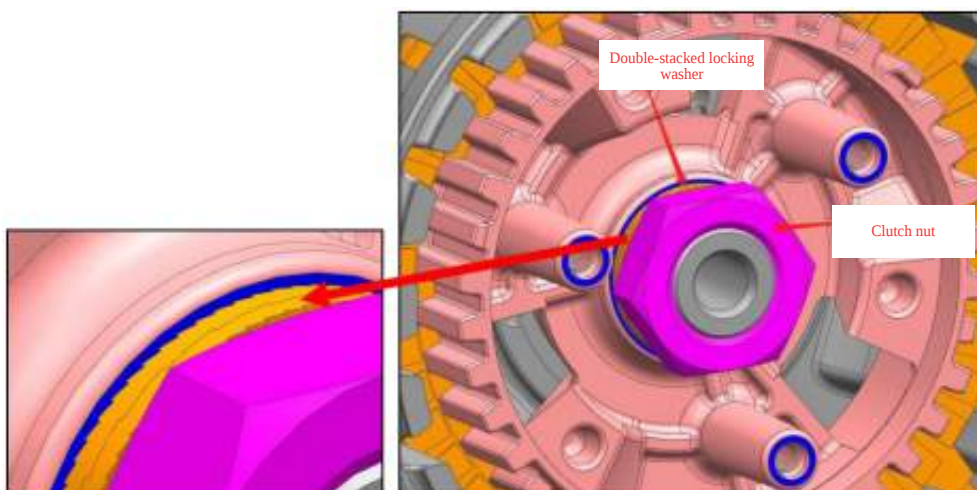
1. Tighten in the order of marks 1 - 20 in the above figure, with a tightening torque of $(6 \pm 0.5)\text{N}\cdot\text{m}$;
2. Tighten in the order of marks 1 - 20 in the above figure, with a tightening torque of $(12 \pm 1)\text{N}\cdot\text{m}$.





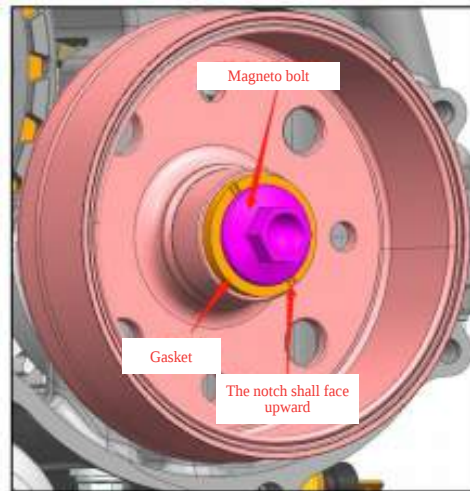
5. Clutch nut fastening methods

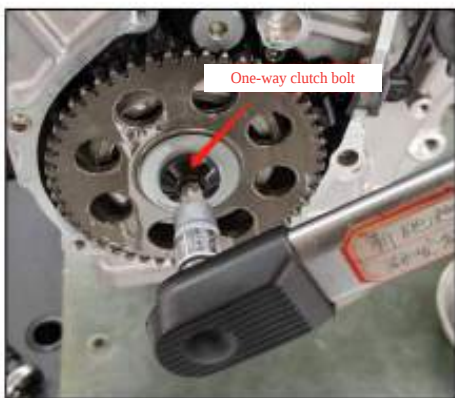
1. Install the clutch gasket and the clutch center assembly;
2. Install the double-stacked locking washer as shown in the following figure, and then screw the clutch nut until it touches the washer. Pay attention to the direction of the washer, otherwise the anti-loosening function will fail;
3. Install 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;
4. Use a torque wrench in conjunction with the special tool to tighten clockwise, with a tightening torque of $(130 \pm 5) \text{N}\cdot\text{m}$.



6. 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 $(78 \pm 5) \text{N} \cdot \text{m}$.





7. One-way clutch bolt fastening methods

1. Install the gasket on the one-way clutch bolt, apply an appropriate amount of thread locker to the 4th - 8th threads of the bolt, and then screw the bolt and the gasket until they touch the crankshaft;

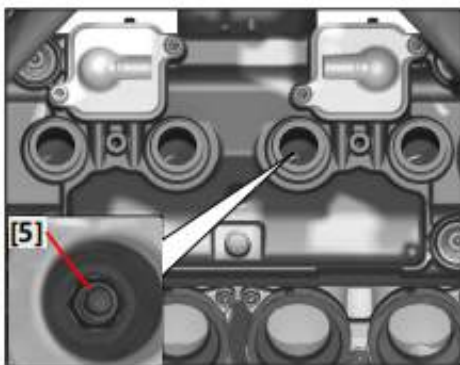
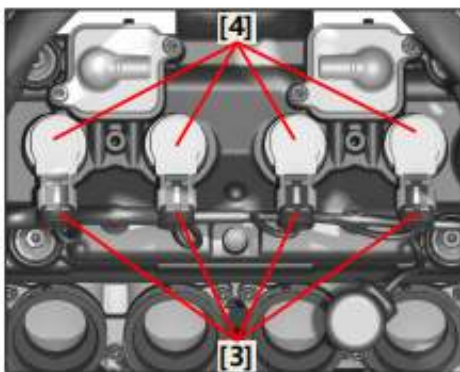
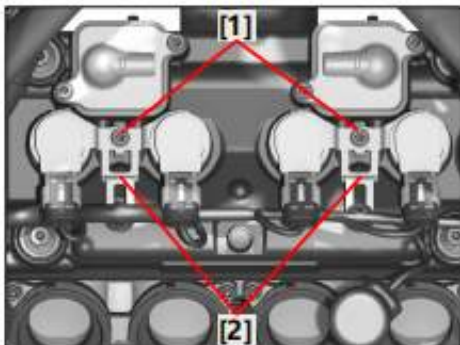
2. Use a wrench to fix the magneto bolt to prevent the crankshaft from rotating. Then, use a torque wrench to tighten the one-way clutch bolt clockwise, with a tightening torque of $(34 \pm 3)\text{N}\cdot\text{m}$.

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 Adjustment Adjustment
	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 Magnetron 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 Magnetron failure	Adjustment 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 Adjustment 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 scratched valve stem wear valve rod seal damage	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 rocker arm or camshaft is worn Air leakage in the intake pipe Too much engine oil	Adjustment Replace Adjustment Replace Replace Replace or repair Clean or replace Clean or replace Clean or replace Adjust or replace Clean or replace Replace Fasten or replace to reduce oil level
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 Adjustment Clean Replace Charge or replace Replace Replace Adjustment 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 Valve tappet or camshaft wear	Adjustment 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
	5. Crankshaft abnormal knocking: Bearing liner wear or damage Crank pin bearing liner wear or sintering Excessive fit clearance	Replace Replace Replace bearing liner
	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



※ 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 "Inspection and adjustment of valve clearance" on page 28 for details

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

3.Disassembly

-Bolt [1];

-Ignition coil pack pressure plate [2];

-Ignition coil harness plug [3];

-Ignition coil [4];

-Spark plug [5].

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.

4. Installation

- Adapter [1];
- Cylinder pressure gauge [2].

5. Measurement

- Cylinder pressure

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

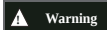
Compression pressure value:

9 Bar ~ 12 Bar at 380 ~ 400 rpm



a. Switch the main switch to "ON".

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.

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.

6. Installation

- Spark plug
- Ignition Coil

Torque:

Ignition coil pack pressure plate mounting bolt

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Spark plug installation

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

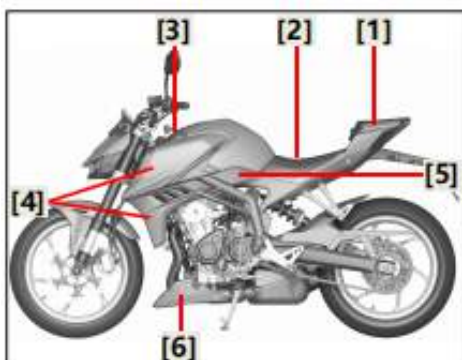
Note

- The compression pressure difference between each cylinder shall not exceed 100 kPa (1 kg/cm², 14 psi).

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 right.



※ Removing and installing of engine 1

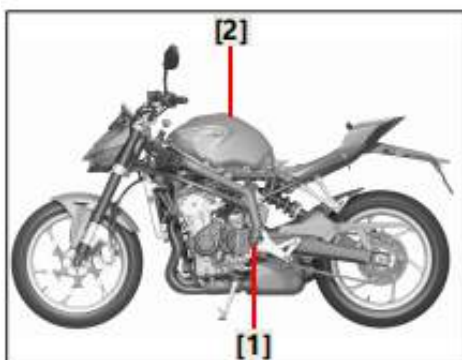
1. Stand the vehicle on a flat ground.

⚠ Warning

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

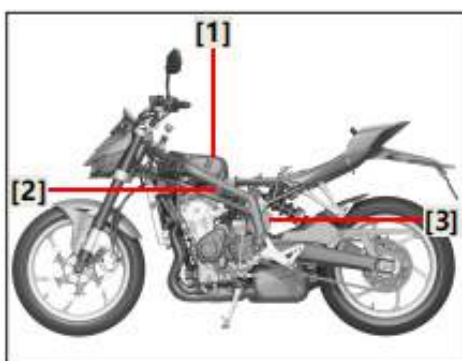
2. Disassembly

- Rear seat cushion assembly [1];
 - Front seat cushion assembly [2];
 - Disconnect the battery negative terminal;
 - Front shield of fuel tank [3];
 - Fuel tank protector assembly and water tank trim (left and right) [4];
 - Side cover (left and right) [5];
 - Engine lower protector assembly [6];
- See "Frame, Body Trim, Exhaust System" on page 57 for details.



3. Disassembly

- left and right frame plugs [1];
 - Fuel tank assembly [2];
- See "Fuel System" on page 107 for details.



4. Disassembly

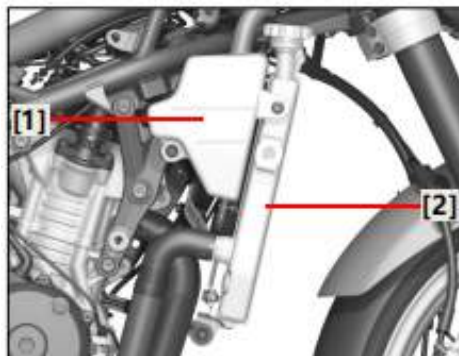
- Air filter assembly [1];
 - Throttle body assembly [2];
 - Carbon canister box [3];
- See "Fuel System" on page 107 for details.

5. Disassembly

-Water reservoir [1];

-Radiator [2];

See "Cooling System" on page 125 for details.



6. Disassembly

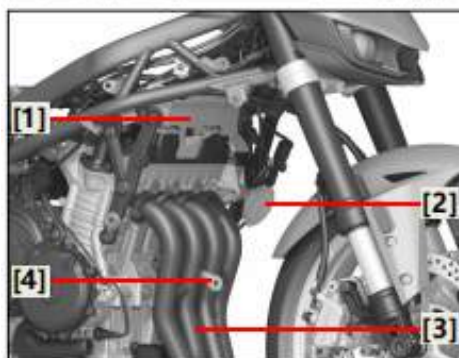
-Engine heat shield [1];

-Horn [2];

-Muffler assembly [3];

-Muffler mounting bracket [4];

See "Frame, Body Trim, Exhaust System" on page 57 for details.



7. Disassembly

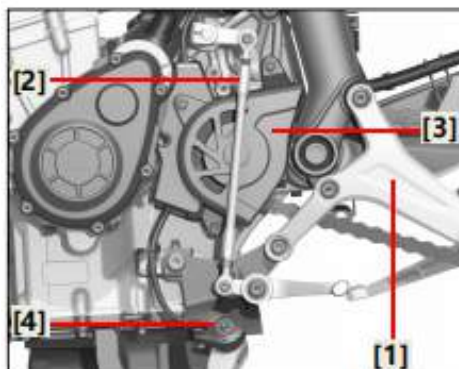
-Front footpeg assembly - left [1];

-Gear shift pedal assembly [2];

-Engine front sprocket cover [3];

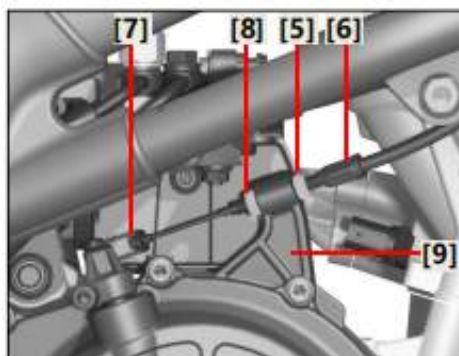
-Side stand OFF switch, side stand, and side stand mounting plate [4];

See "Frame, Body Trim, Exhaust System" on page 57 for details.



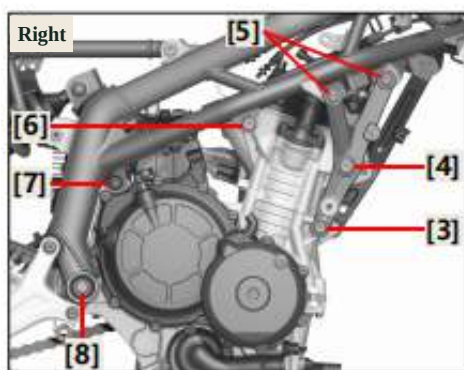
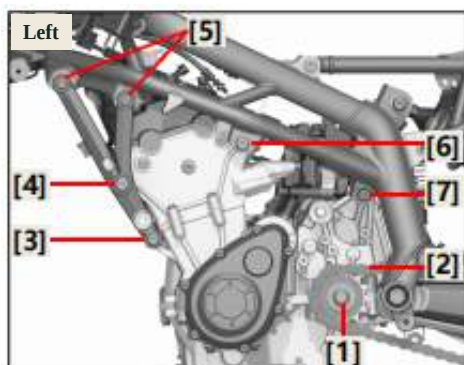
-Loosen the adjusting nut [5] to release the clutch lock [6] from the clutch control arm [7].

-Remove the locking nut [8] and take out the clutch lock [6] from the clutch lever positioning panel [9];



Note

•Disconnect all connectors and hoses connected to the engine.



Notes

- Apply thread locker (Huitian 7272) to the following parts:

Engine upper suspension brackets (left and right) and engine upper/lower mounting bolts [3];

Engine upper suspension brackets (left and right) and frame mounting bolts [5]

Engine upper suspension (left and right) and frame [6]

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;
- Place the engine on a jack or other adjustable bracket under the frame;
- Align the bolt bores of the engine's upper suspension points with the frame mounting seat, and then install the bolts and bushings
- Lift the engine and rotate it upward at the rear to install other bolts and bushings;
- Tighten the bolt and nut to the specified torque.

※ Removing and installing of engine 2

1. Stand the vehicle on a flat ground.

⚠ Warning

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

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;
- When disassembling bolts coated with thread locker, use a heat gun or torch to heat and soften the fastener. Always be cautious during disassembly to avoid damaging the bolts or threads.

2. Disassembly

-Driving sprocket [1];

-Drive chain [2].

See "Rear wheels, suspension" on page 139 for details

3. Disassembly

-Engine upper suspension brackets (left and right) and engine (lower) mounting bolts [3];

-Engine upper suspension brackets (left and right) and engine (upper) mounting bolts [4];

-Engine upper suspension brackets (left and right) and frame mounting bolts [4];

-Engine upper suspensions (left and right) and frame mounting bolts [6];

-Engine rear suspension bolts [7];

-Swingarm axle [8];

The installation sequence is reversed from the removal sequence.

Torque:

Engine upper suspension brackets (left and right) and engine (lower) mounting bolts [3]

Engine upper suspension brackets (left and right) and frame mounting bolts [5]

26 N·m (2.6 kgf·m, 19 lbf·ft)

Engine upper suspension bracket (left and right) and engine (upper) [4];

Engine upper suspension (left and right) and frame [6]

54 N·m (5.4 kgf·m, 40 lbf·ft)

Driving sprocket locking bolt [1]

55 N·m (5.5 kgf·m, 41 lbf·ft)

Engine rear suspension bolt [7]

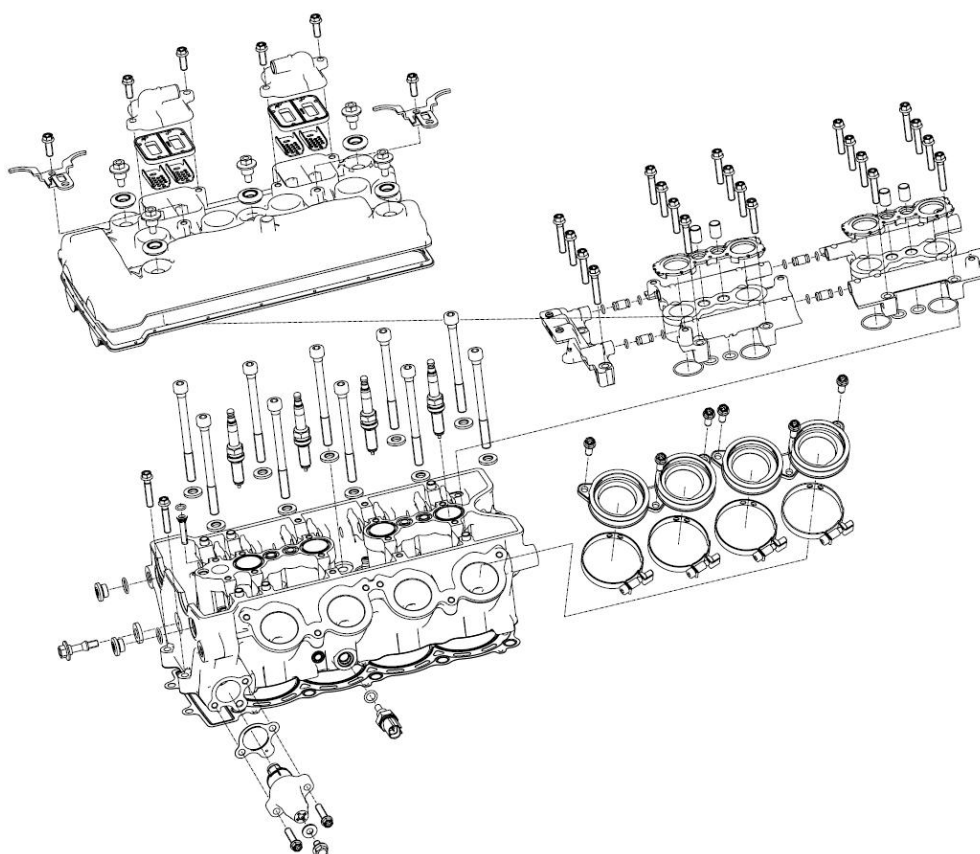
60 N·m (6.0 kgf·m, 44 lbf·ft)

Swingarm axle locking [8]

88 N·m (8.8 kgf·m, 65 lbf·ft)

※ Valve train system

Component arrangement



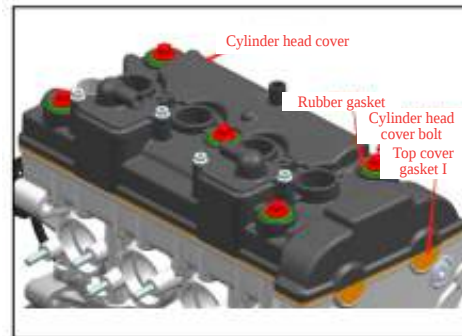
Disassembly

Notes

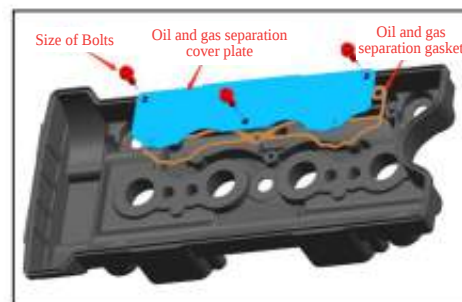
- When repairing the cylinder head cover, camshaft and tensioner, it is necessary to determine whether to remove the engine from the frame according to the model and the shielding; when repairing the cylinder head and valve, the engine must be removed from the frame.
- When disassembling, mark the disassembled parts and put them away to ensure that they are correctly repositioned during reassembly.
- 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.
- When disassembling the cylinder head and cylinder head cover, be careful not to damage the joint surface.
- Before disassembling the cylinder head assembly, a cylinder compression test should be performed for preliminary diagnosis. For detailed test procedures, see "Engine inspection" on page 160 for details.

Disassembly steps:

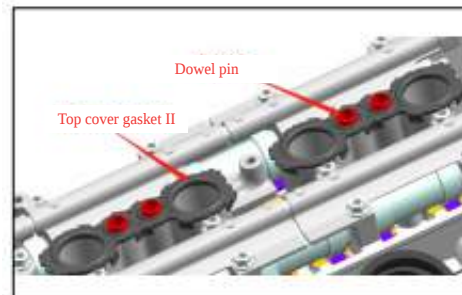
1. Remove 5 cylinder head cover bolts and the rubber gasket, then take off the cylinder head top cover assembly and the top cover gasket I;



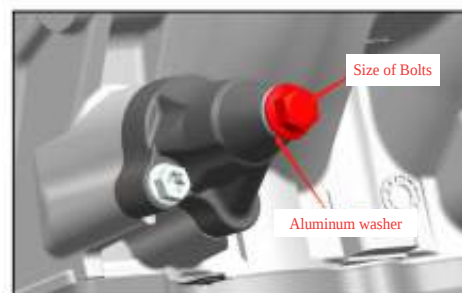
2. Remove the 3 bolts shown in the figure from the cylinder head top cover assembly, and take off the oil and gas separation cover plate and the oil and gas separation cover plate gasket;



3. Remove 2 top cover gaskets II and 4 dowel pins, being careful not to forcibly disassemble the 4 pins;

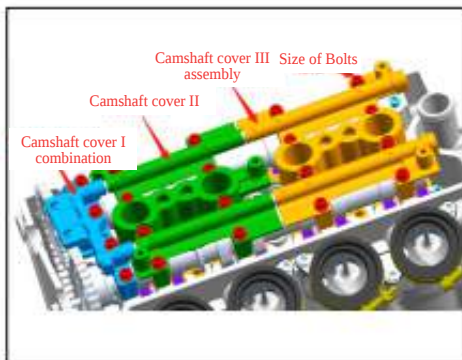


4. See "Inspection and adjustment of valve clearance" on page 28 for details to adjust the engine to the top dead center of cylinder 1; remove the bolts and aluminum washer;





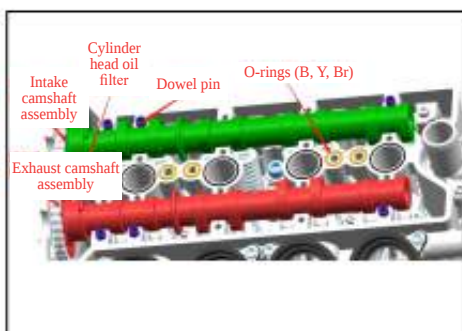
5. Insert a f slotted screwdriver into the tensioner and rotate it clockwise until the tensioner is fully retracted.



6. Loosen the 20 camshaft cover bolts shown in the figure for 2-3 times in reverse order according to the "Bolt tightening methods for key parts" on page 150. Disassemble the Camshaft Cover I combination, Camshaft Cover II, and Camshaft Cover III combination (together), then separate each cap combination (refer to the assembly diagram on page 176).

Notes

- Apply even force when disassembling, protect the camshaft bore and dowel pin hole of the cap, and avoid deforming or damaging the cap.



7. Remove the timing chain from the camshaft, then disassemble the inlet and exhaust camshaft combinations, all O-rings, and the cylinder head engine oil filter shown in the figure.

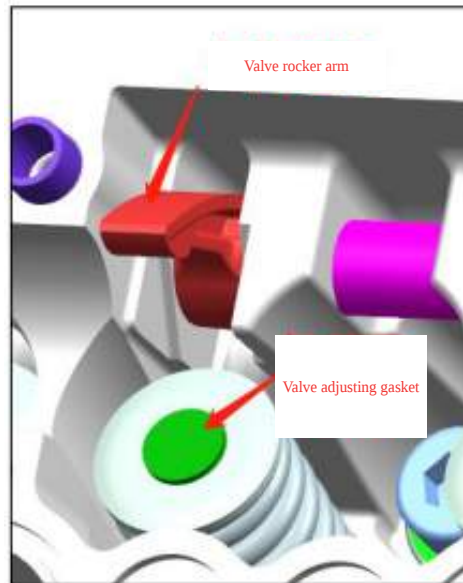
Notes

- Do not forcibly remove the six dowel pins shown in the diagram. Handle the camshaft carefully during disassembly, avoiding any contact or scratches to the camshaft journals.

8. Push aside all the valve rockers and use a magnetic rod to take out 16 valve gaskets.

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.



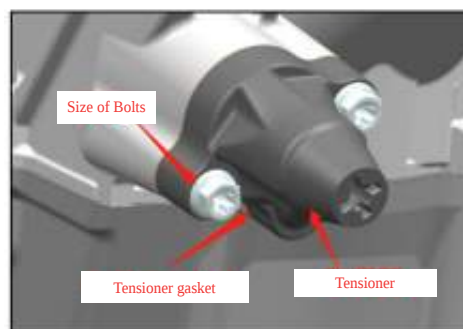
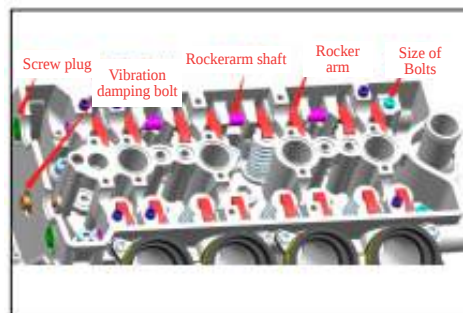
9. Remove 2 screw plugs (including O-rings), vibration damping bolts (including gaskets), and 2 rockerarm shaft limit bolts respectively, and then take out 2 rockerarm shafts and 16 valve rockerarms.

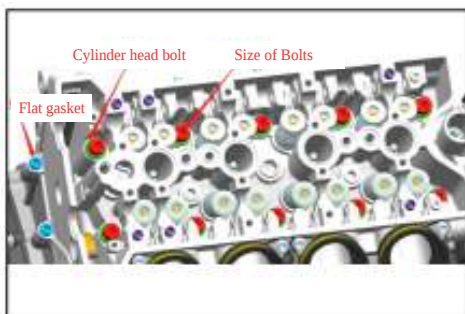
Notes

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

To disassemble the rockerarm shaft, screw an M6 bolt into the rockerarm shaft through the screw plug installation hole and then pulled

10. Dissemble two bolts and take off the tensioner and the tensioner gasket.

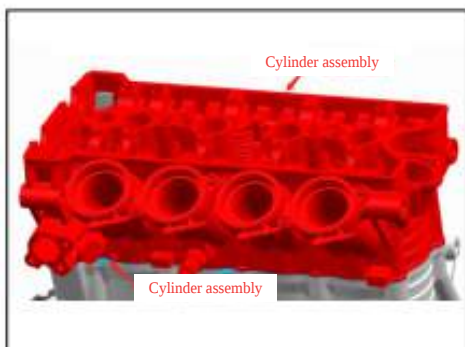




11. Disassemble two M6 bolts, then loosen the cylinder head bolts for 2 to 3 times in reverse order according to the sequence of "Bolt tightening methods for key parts" on page 150, and remove the flat gasket with a magnetic rod or tweezers;

Notes

- Do not let the gaskets fall into the engine.

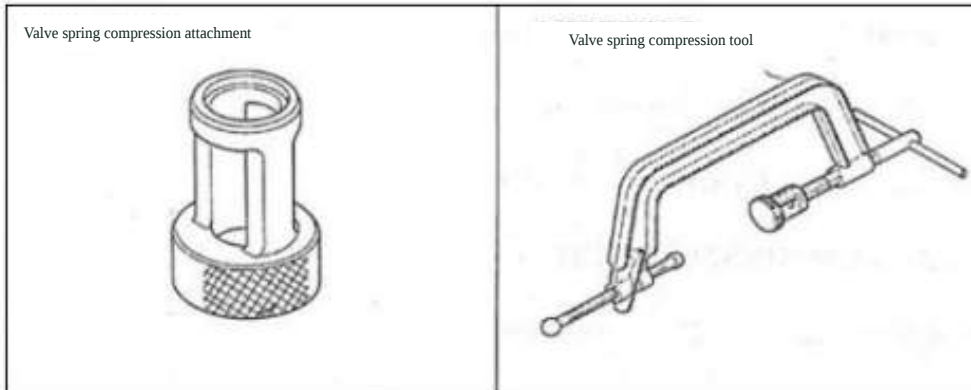


12. Disassemble the cylinder head assembly and the cylinder head gasket assembly.

13. Disassemble the timing chain, guide panel and tensioning panel.
To remove the left side of the starting system, refer to "Starting system" on page 226 for disassembly instructions.

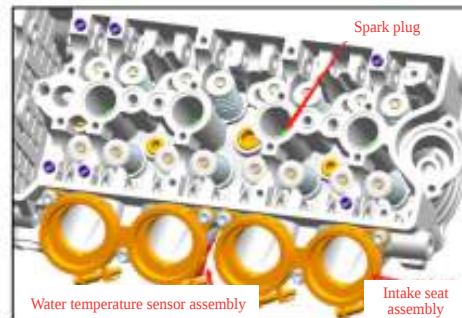
Disassembly steps of the cylinder head assembly

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



Disassembly steps:

1. Disassemble the water temperature sensor assembly, 4 spark plugs and 2 intake seat assemblies;

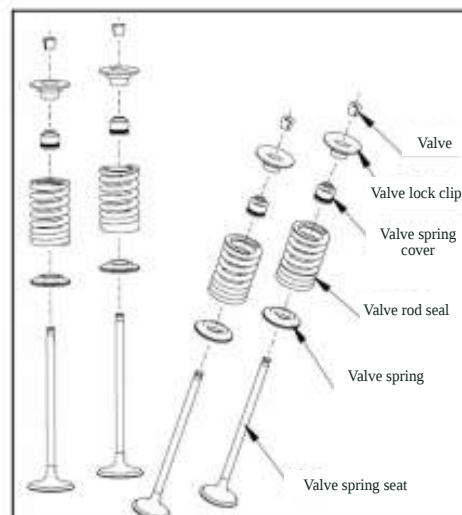


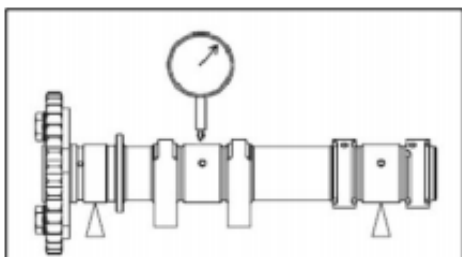
2. Use the valve spring compression tool and its accessories to disassemble the following components:

- Valve lock clip
- Valve spring cover
- Valve rod seal
- Valve spring
- Valve spring seat
- Valve

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:

Cam sprocket	Camshaft
Camshaft bracket	Timing chain
Valve rocker arm	Valve 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 142 and replace the components that exceed the limit values in a timely manner.

2. Check the camshaft runout:

Secure the camshaft journal at both ends with V-blocks,

Rotate the crankshaft two turns (720°), then read the runout value.

Refer to the "Maintenance parameter table" on page 142 and replace the camshaft if the limit is exceeded.

3. Check and adjust the valve clearance; refer to "Inspection and adjustment of valve clearance" on page 28;

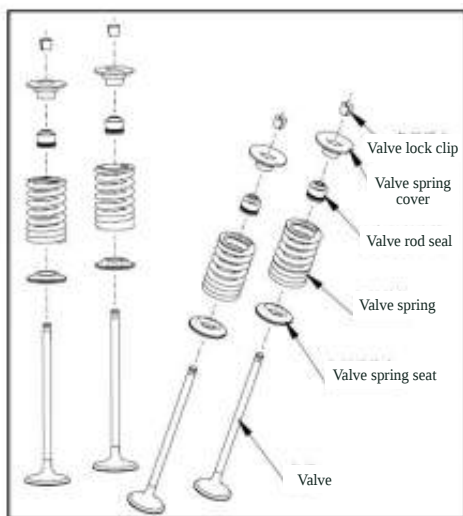
4. Check whether each sealing ring and gasket is deformed or damaged. Replace them if necessary.

Assembly

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.
- When replacing the camshaft bracket, it must be replaced as a set with the cylinder head at the same time. The code of the camshaft gland and the code of the cylinder head must be the same.
- Before assembly, clean the carbon deposits in the combustion chamber and the surface of the cylinder head gasket. 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.
- Once the cylinder head assembly is disassembled, the valve rod seals need to be replaced with new ones.
- 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.
- For bolt tightening methods and torque values not otherwise specified, refer to "Engine bolt torque values" on page 147.
- 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.
- Apply an appropriate amount of lubricating oil between all moving pairs, and apply an appropriate amount of grease to all O-rings.
- During the entire assembly process, prevent dust and debris from entering the cylinder.





Assembly steps:

1. Sub-assemble the cylinder head assembly:

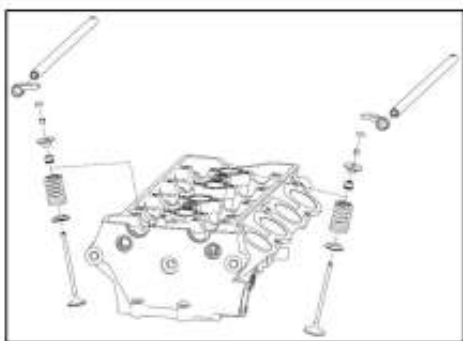
A) : Lubricate the new valve rod oil seal with engine oil first, and then install the valve spring seat and the valve rod oil seal;

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

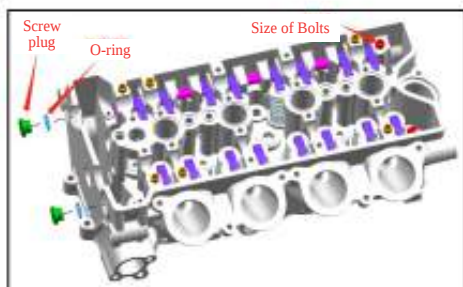
C): Install the valve spring with the seal coils facing down, that is, the colored mark is on the top;

D) : Install the valve spring cover;

E) : Install the valve lock clips with a special tool.



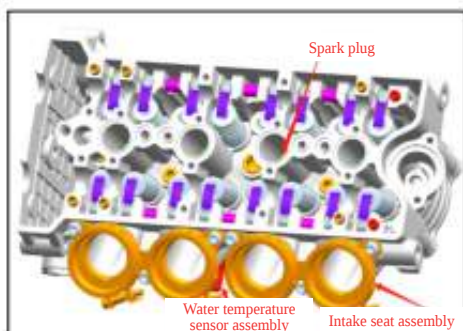
F): Install the camshaft and the valve rocker arm into the cylinder head assembly according to the marks made during disassembly. Then install the valve adjustment gaskets back to their original positions according to the marks. (After reinstalling the cam cover, the valve clearance needs to be checked.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



G): Install 2 rockerarm shaft limit bolts, then install 2 plugs and O-rings;

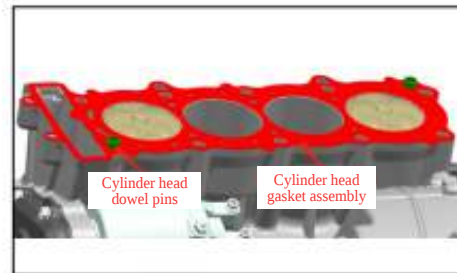
Notes

- O-rings need to be coated with a proper amount of grease.

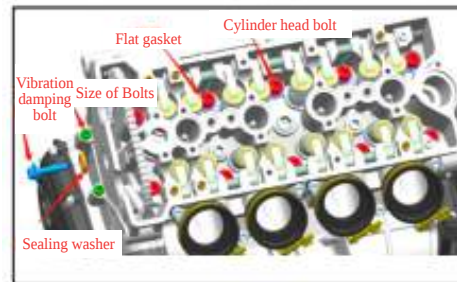


H): Install the water temperature sensor assembly, 4 spark plugs and 2 intake seat assemblies;

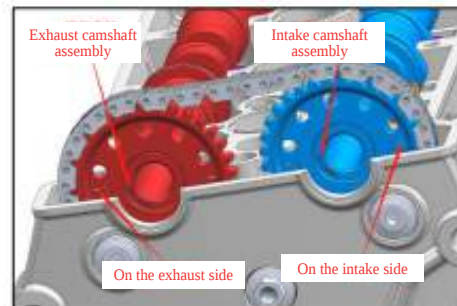
2. Ensure that the timing chain, guide panel and tension panel have been correctly installed on the case part. Install the cylinder head dowel pins and the cylinder head gasket assembly;



3. Assemble the sub-assembled cylinder head assembly onto the upper case, and tighten the cylinder head bolts as required according to "Bolt tightening methods for key parts" on page 150. Pull the timing chain above the installation position of the vibration damping bolt, and install the vibration damping bolt and the gasket;



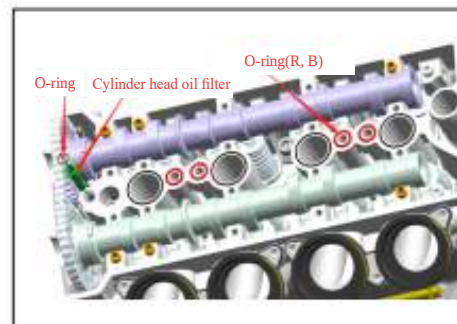
4. Ensure that the engine is at the top dead center of the compression stroke of cylinder 1. Align the timing marks on the right cover and the rotor, then install the intake and exhaust camshaft assemblies. Install the timing chain onto the camshaft assemblies. Hold the camshaft assemblies with one hand and tighten the timing chain from the tensioner position with the other hand. At this time, the marks on the intake and exhaust camshaft assemblies are level with the surface of the cylinder head cover, and the "I" mark referring to the intake camshaft is on the intake side, while the "E" mark referring to the exhaust camshaft is on the exhaust side.



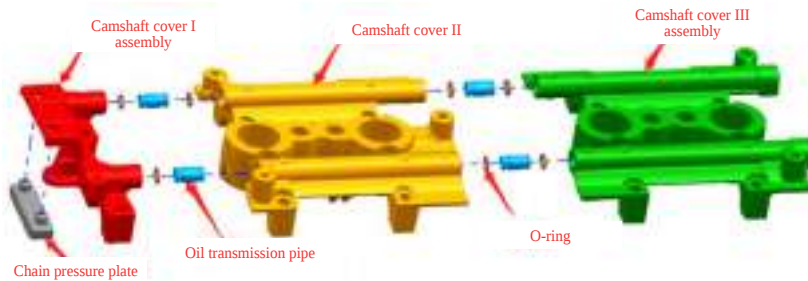
Notes

- Install the intake camshaft assembly first, then install the exhaust camshaft assembly.

5. Assemble the cylinder head oil filter and its O-ring, and assemble the O-rings (red and black) of the cover;

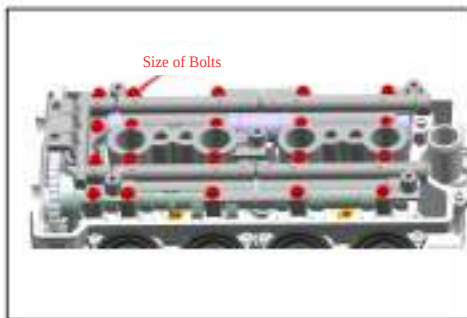


6. Assemble the camshaft cap assembly;
the structure is as shown in the figure:



Notes

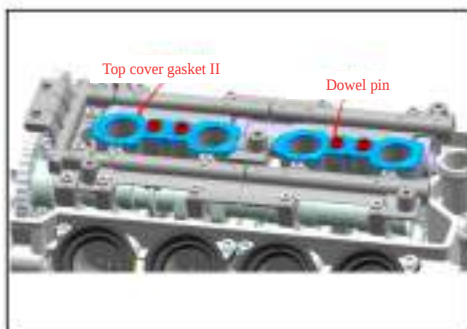
- When assembling the O-ring, coat a proper amount of grease. When installing the oil transmission pipe, gently screw it in to prevent the O-ring from being cut edge.



7. Install the sub-assembled camshaft cap from the step 6 as a whole into the cylinder head. Note that an appropriate amount of lubricating oil shall be applied to the moving parts. Tighten 20 cam gland bolts as required according to "Bolt tightening methods for key parts" on page 150. Then release the tensioner and install the tensioner aluminum washer and bolt;

Notes

- 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) according to "Inspection and adjustment of valve clearance" on page 28;



8. After ensuring that the valve clearance is normal, install 4 dowel pins and the top cover gasket II;

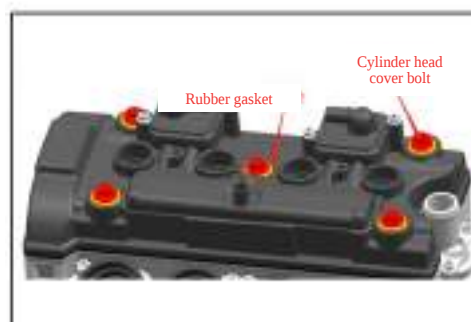
9. Install the top cover gasket I on the cylinder head cover assembly (the assembly sequence of the cylinder head cover assembly is the reverse of the disassembly sequence), and apply an appropriate amount of plane sealant at the corners shown in the figure;



10. After assembling step 9, correctly install it onto the cylinder head, and secure it with 5 cylinder head bolts and rubber gaskets.

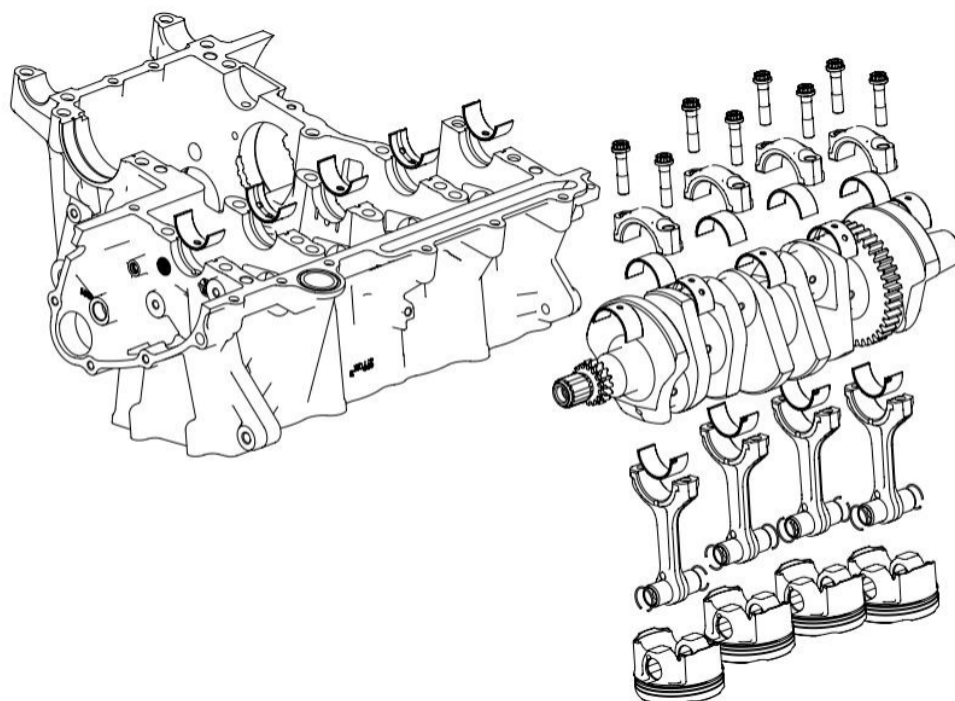
Notes

- Pre-tighten the 5 bolts respectively before applying the final torque.



※ Crank connecting rod

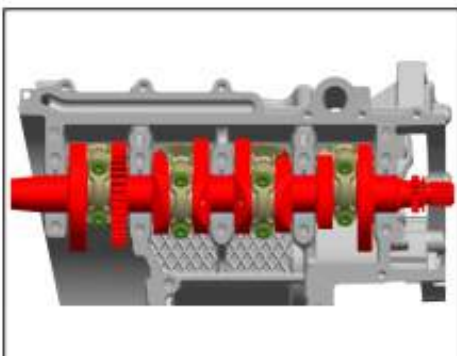
Component arrangement



Disassembly

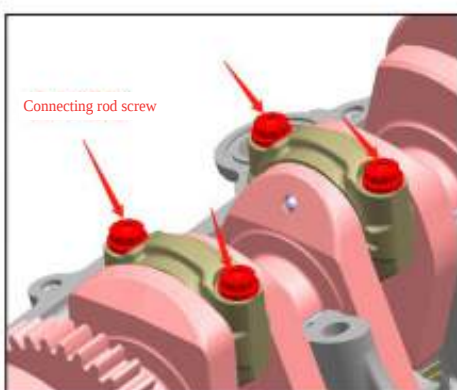
Notes

- When maintaining the crankshaft, connecting rod, piston and piston rings, please separate the upper and lower cases first. For the method of separating the cases, refer to "Case section" on page 92;
- After disassembly, mark and store the crankshaft, connecting rod, piston, piston rings, piston pins and snap rings to ensure that these components are installed in their original positions (except for the replaced components);
- The colors of the main bearing liners and connecting rod bearing liners are determined according to the grouping marks on the crankshaft. Incorrect assembly without following the bearing liner color grouping may cause serious wear of related components such as the engine crankshaft and connecting rod, even damage the engine under severe cases;
- During the disassembly of the main bearing liners and connecting rod bearing liners, do not damage the bearing liners and journals. Make marks of each installation positions one by one during disassembly for easy later inspection and reassembly.

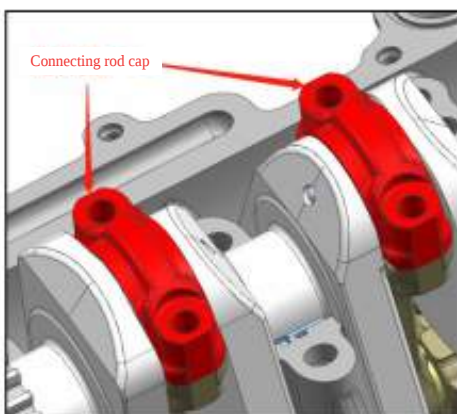


Disassembly steps:

1. Separate the crankcase, seeing "Case section" on page 192 for details. Do not scratch or damage the bearing liners and journals during the disassembly. Then the bearing liners on the lower case can be removed immediately.



2. Rotate the crankshaft to make the connecting rod bolts of cylinder 2 and 3 perpendicular to the case closing surface, and then remove the connecting rod bolts of cylinder 2 and 3;



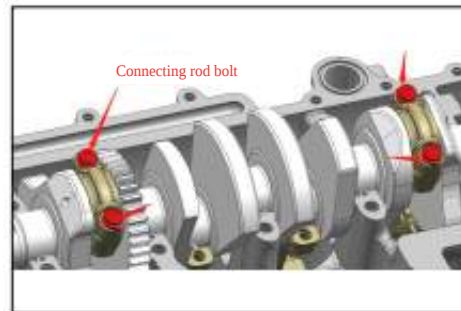
3. Disassemble the connecting rod caps of cylinders 2 and 3;

Notes

- Do not damage the connecting rod bearing liners and connecting rod journals during the disassembly. It is allowed to gently tap the connecting rod caps with a rubber mallet to facilitate disassembly.

Then the bearing liner on the connecting rod cap can be removed immediately;

4. Rotate the crankshaft to make the connecting rod bolts of cylinder 1 and 4 perpendicular to the case closing surface, and then remove the connecting rod bolts of cylinder 1 and 4;

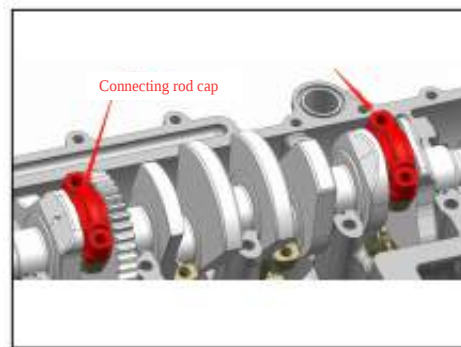


5. Disassemble the connecting rod caps of cylinders 1 and 4;

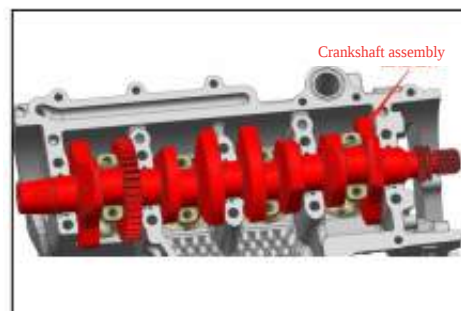
Notes

- Do not damage the connecting rod bearing liners and connecting rod journals during the disassembly. It is allowed to gently tap the connecting rod caps with a rubber mallet to facilitate disassembly.

Then the bearing liner on the connecting rod cap can be removed immediately;



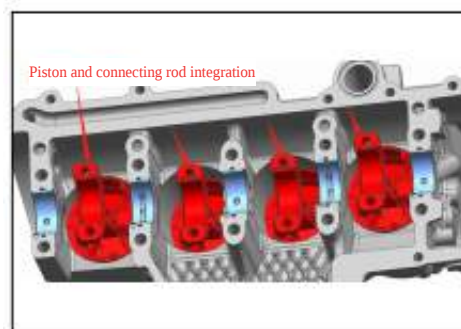
6. Remove the crankshaft assembly;



7. Push the piston and connecting rod integration towards the middle of the cylinder bore. Be careful not to push too hard to prevent the piston from falling into the case and making it impossible to take out completely.

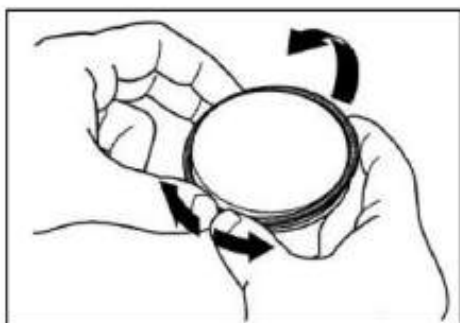
Then clean the carbon deposits in the cylinder bore. After that, wrap a clean dust-free cloth around the big end of the connecting rod to prevent damage to the cylinder liner.

Take out all the pistons and connecting rods from the cylinder bores respectively. Note that before disassembly, mark the intake and exhaust directions of the pistons to facilitate reassembly. Then the crankshaft bearing liners on the upper case can be removed immediately.





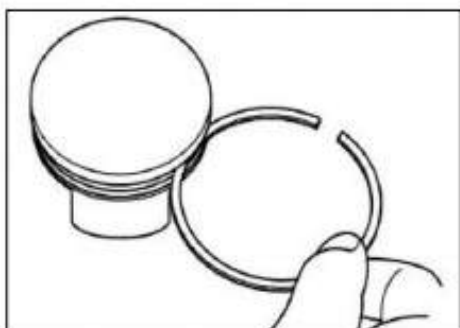
8. Remove the piston pin snap rings respectively, pull out the piston pins, and then the piston ring kits and connecting rod bearing liners can be removed immediately.



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.
- Be careful not to scratch the piston when removing the piston rings.



Inspection

•Crankshaft side clearance

Check the crankshaft side clearance in the way shown in the figure, and refer to "Maintenance parameter table" on page 142. If the clearance exceeds the maintenance limit value, replace the crankshaft and recheck the clearance.



•Connecting rod side clearance

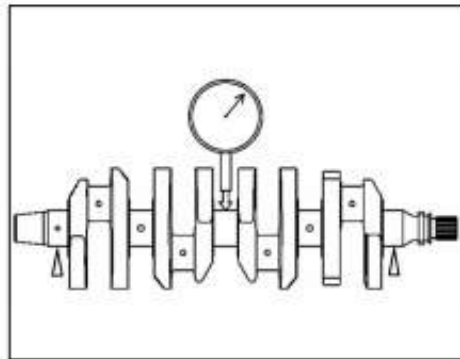
Check the crankshaft side clearance in the way shown in the figure, and refer to "Maintenance parameter table" on page 142. If the clearance exceeds the maintenance limit value, replace the connecting rod.

After replacing the connecting rod, re-confirm the side clearance. If it still exceeds the limit value, then replace the crankshaft.



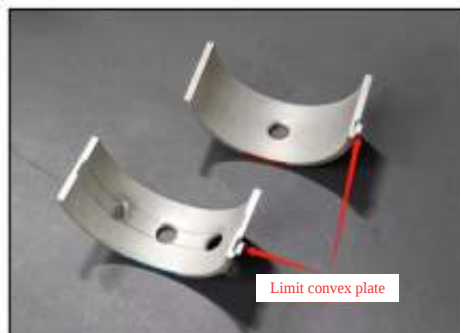
•Crankshaft journal runout

Support the journal at both ends of the crankshaft. Place a dial indicator above the middle main shaft journal. When placing, avoid the oil groove and oil hole. Rotate the crankshaft two full turns (720°) and read the runout value. Refer to "Maintenance parameter table" on page 142. If it exceeds the limit value, replace the crankshaft.



•Crankshaft bearing liners

Check whether there is any abnormal wear or other damage to the overall crankshaft bearing liners and whether the limit convex plates of the bearing liners are damaged. If the crankshaft bearing liners are damaged, select the bearing liners and replace.





Size groups of the crankshaft main journal

•Clearance between crankshaft bearing liner and crankshaft journal

Separate the upper and lower cases, clean the main bearing liner and the main journal. Then assemble the main bearing liner back to the positions of the upper and lower cases. Be careful not to change the positions of the bearing liners. Place the feeler gauge on the main journal, install the upper and lower cases, and tighten them with the specified torque.

Separate the upper and lower cases again, measure the main journal clearance respectively and record it.

Do not rotate the crankshaft when measuring the clearance.

Refer to “Maintenance parameter table” on page 142. When the main journal clearance exceeds the maintenance limit value, replace the main bearing liner. If it still exceeds the maintenance limit value after replacement, replace the crankshaft.

The matching method of the main bearing liners is as follows:

According to the grouping marks of the crankshaft main journals on the side fan plate of the crankshaft conical surface, select the corresponding groups of the crankshaft main bearing liners. As shown in the figure, the letter A and B in the above-mentioned positions represent the size groups of the main journals. From left to right, they represent main journal 1 to 5 starting from the sprocket end.

Refer to the numbers of the crankshaft main journals to select the color of the replaceable main bearing liners.

Instructions for matching the main journal and the main bearing liner:

Main journal mark A is paired with red bearings (Group A, thin bearings); main journal mark B is paired with blue bearings (Group B, thick bearings).

•Connecting rod bearing liner

Check whether there is any abnormal wear or other damage to the overall crankshaft bearing liners and whether the limit convex plates of the bearing liners are damaged. If the crankshaft bearing liners are damaged, select the bearing liners and replace.

•Clearance between connecting rod bearing liner and connecting rod journal

Clean the connecting rod bearing liner and the connecting rod journal. Place the feeler gauge on the connecting rod journal, install the connecting rod cap, and tighten the cap to the connecting rod body with the specified torque (For the tightening method of the connecting rod bolts, see “Bolt tightening methods for key parts” on page 150). Separate the connecting rod cap and the connecting rod body again. Measure and record the clearances between each connecting rod bearing liner and the connecting rod journal in this way.

Do not rotate the crankshaft when measuring the clearance.

Refer to the maintenance parameter table on page 142. When the connecting rod journal clearance exceeds the maintenance limit value, replace the connecting rod liner. If it still exceeds the maintenance limit value after replacement, replace the crankshaft.

The matching method of the connecting bearing liners is as follows:

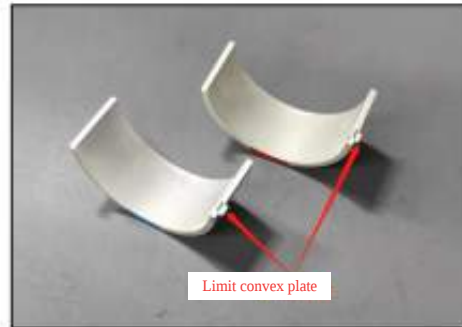
According to the grouping marks of the crankshaft journals on the side fan plate of the crankshaft conical surface, select the corresponding groups of the connecting rod bearing liners. As shown in the figure, the letters A and B in the above-mentioned positions represent the size groups of the connecting rod journals. From left to right, they represent connecting rod journals 1 to 5 starting from the sprocket end.

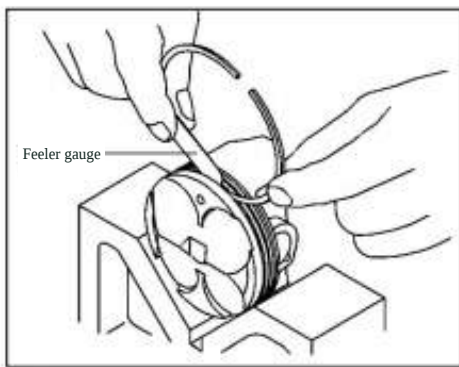
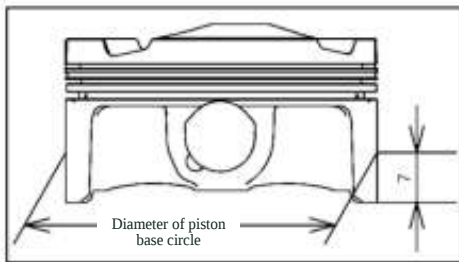
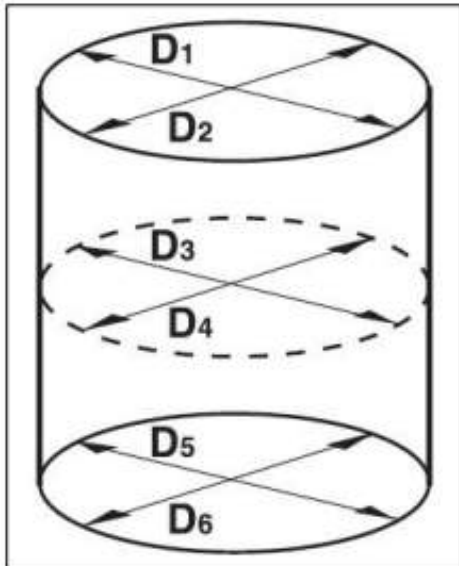
Refer to the numbers of the crankshaft connecting rod journals to select the color of the replaceable connecting rod bearing liners.

Instructions for matching the connecting rod journal and the connecting rod bearing liner:

Connecting rod neck mark A is paired with red bearing (Group A, thin bearing);

Connecting rod neck mark B is paired with blue bearing (Group B, thick bearing).





•Cylinder clearance

Measure the diameters of the cylinder bore and the piston as shown in the figure respectively. Calculate the maximum and minimum clearances between the piston and the cylinder. Refer to the maintenance parameter table on page 142. If the values exceed the limit, replace the piston with a suitable one. If necessary, replace the cylinder block (together with the case assembly);

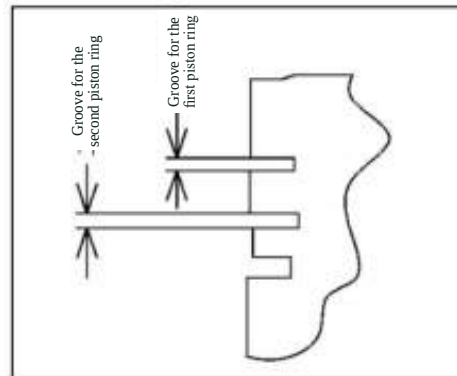
Calculation formula for cylinder clearance =
Cylinder bore diameter - Piston diameter

•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 second piston rings and the piston respectively. Refer to the maintenance parameter table on page 142. If the values exceed the limit, replace the piston ring kit. Replace the piston if necessary.

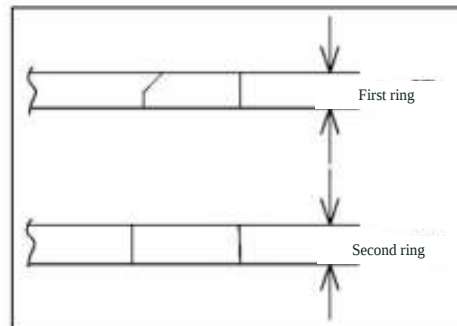
•Ring groove height

As shown in the figure, use a feeler gauge to measure the height values of the ring grooves for the first and second piston rings respectively. Refer to the maintenance parameter table on page 142. If the values exceed the limit, replace the piston.



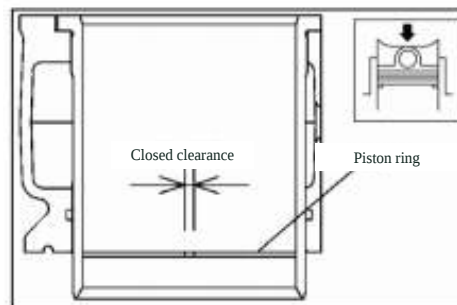
•Piston ring height

As shown in the figure, use a feeler gauge to measure the height values of the first and second piston rings respectively. Refer to the maintenance parameter table on page 142. 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 142. If the values exceed the limit, replace the piston ring kit.



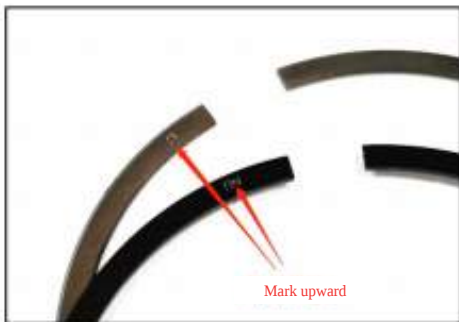
•Piston, connecting rod

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 142, calculate the corresponding clearances and replace any components that exceed the maintenance limit values.



•Piston oil injection hole

Check whether the oil injection holes are blocked. Blow out the oil passages of the upper crankcase and the nozzles with compressed air to ensure cleanliness.



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.

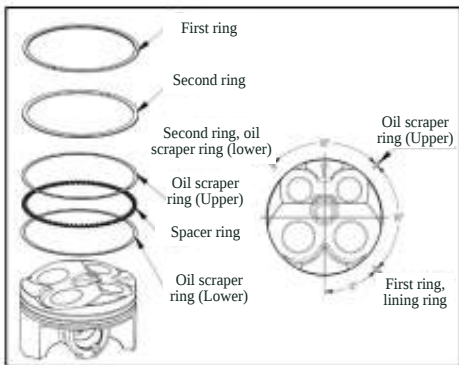
Notes

- 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 The second ring: RN

•As shown in the figure, 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);

•Stagger the piston ring gaps by 90° from each other, as shown in the figure (the arrow indicates the exhaust side direction).

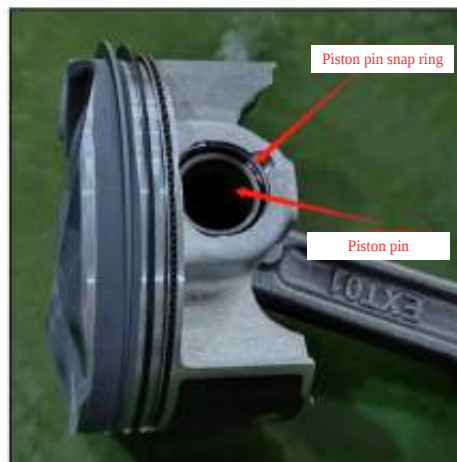


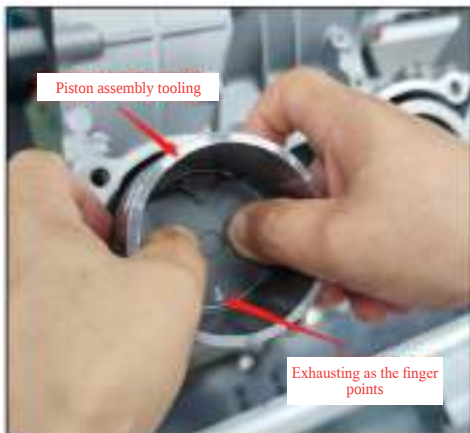
2. Assemble the connecting rod body and the piston pin

Install the connecting rod bearing liner in its original position. Note the corresponding marks made during disassembly. Then install the piston pin and fix it with a new piston pin snap ring.

Notes

- Apply engine oil to the inner surface of the piston pin hole and the inner surface of the small end of the connecting rod;
- When assembling the piston and connecting rod assembly, turn the side with the matching mark of the connecting rod cap towards the direction of the arrow mark (exhaust side);
- Ensure that the wire snap ring is installed in place;
- Do not align the opening of the wire snap ring with the notch on the piston.





3. Assemble the piston connecting rod to the block (cylinder block)

Apply engine oil on the cylinder wall and piston thrust surface.

Install the piston/connecting rod assembly into the cylinder block with the piston ring compression tool available on the market (when installing the piston/connecting rod assembly, the exhaust side of the piston, that is, the side with the arrow mark, faces the exhaust direction).

Notes

- When installing the piston, be careful not to damage the upper surface of the piston, especially the part that fits with the cylinder hole;
- Be careful not to let the cylinder liner and the connecting rod journal be damaged by the connecting rod;
- Ensure that the connecting rod assemblies of the same weight group are installed in cylinder 1 and 2 and cylinder 3 and 4.

The weight groups of the connecting rod assemblies are: A, B, C, D, E.

4. Install the crankshaft assembly

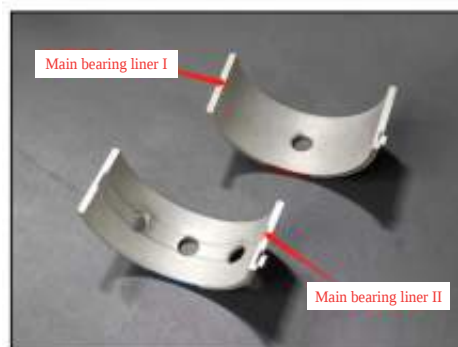
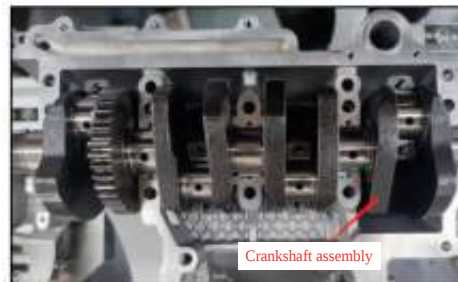
After ensuring that the main bearing liners are installed on the upper case, install the crankshaft on the main bearing liners of the upper case. Then rotate the crankshaft to place the connecting rod journal on the connecting rod bearing liner at the big end of the connecting rod.

Notes

- Do not change the initial installation position of the bearing liner. Otherwise, it will damage the correct oil film clearance and cause engine damage.
- The back of the bearing liner and the bearing liner installation hole must be wiped clean. There shall be no impurities or engine oil remaining.
- Both the crankshaft bearing liner and the crankshaft journal need to be coated with engine oil;
- During the assembly process, the crankshaft journals and bearing liners must not be damaged.
- If the main bearing liners are replaced, install main bearing liner I on main journal 1, 3, and 5, and install main bearing liner II on main journal 2 and 4.

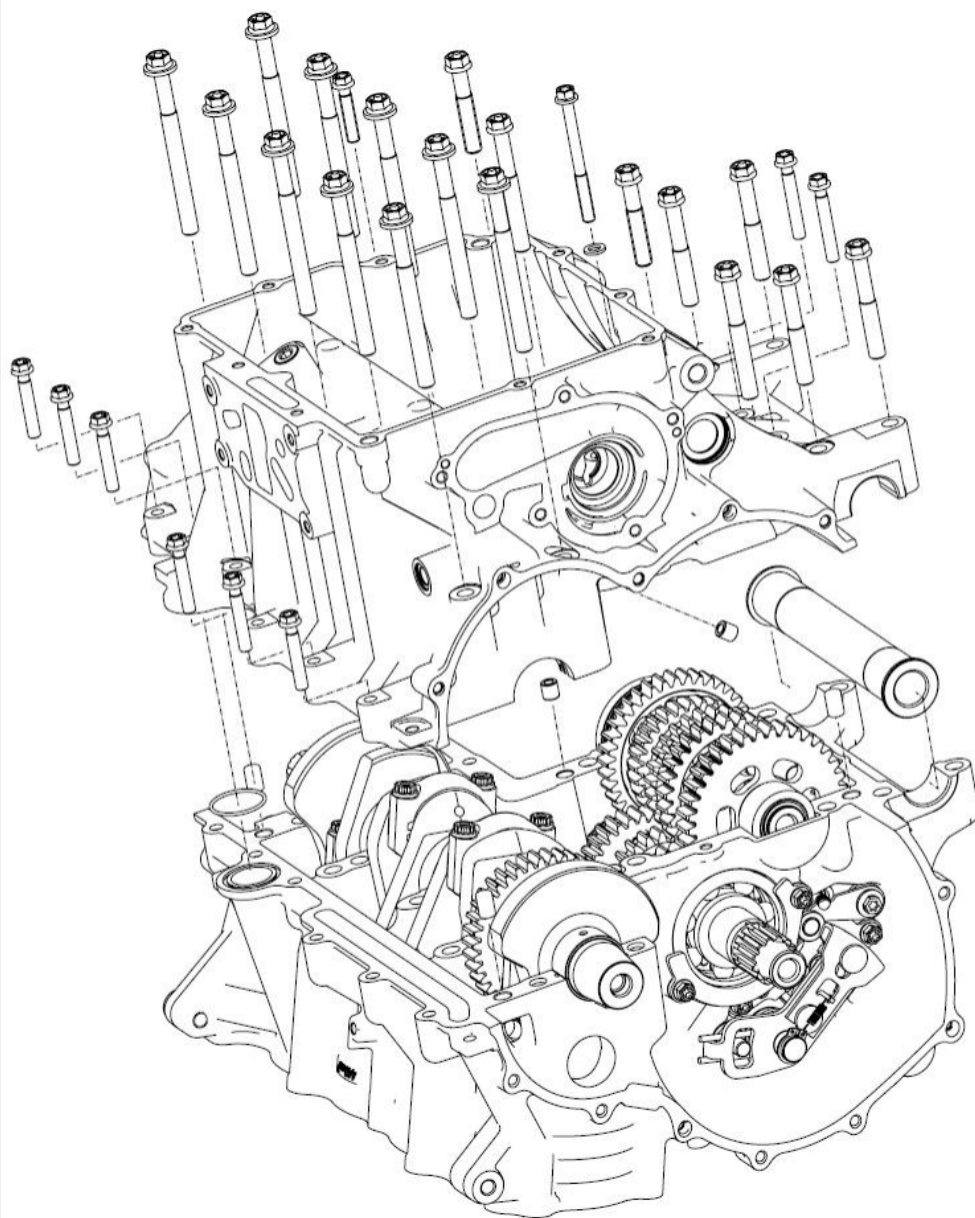
5. Install the connecting rod cap

Install the connecting rod bearing liner in its original position. Align the matching marks of the connecting rod body and the connecting rod cap. After placing the connecting rod cap correctly, replace the old connecting rod bolts with new ones. Apply engine oil to the end face where the connecting rod cap contacts the connecting rod flange bolt and to the connecting rod bol thread. Install and tighten the connecting rod bolts. For the tightening torque and related requirements, see “Bolt tightening methods for key parts” on page 150.



※ Case section

Component arrangement



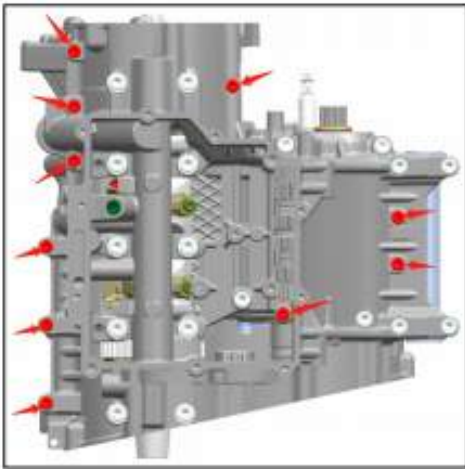
Disassembly

Notes

- Before disassembling the crankcase components, the following components must be removed:

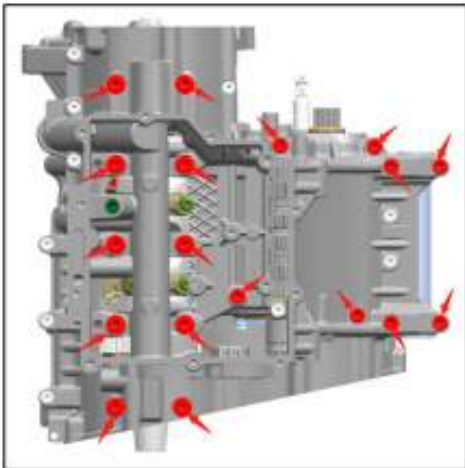
- A) Components related to the valve mechanism
- B) Components related to the clutch operating mechanism
- C) Components related to the cooling and lubrication mechanism
- D) Components related to the starting system

- Pay attention not to damage the joint surface of the case during maintenance;
- Clean the joint surface and oil passage before assembly of the crankcase;
- Before closing the case, evenly apply the end sealant on the closing surface, and clean up the excess sealant;
- Select the bearing liners with appropriate color marks. Choose the bearing liners according to the requirements in the bearing liner matching table. Incorrect bearing liner colors can cause severe damage to the engine.



Disassembly steps:

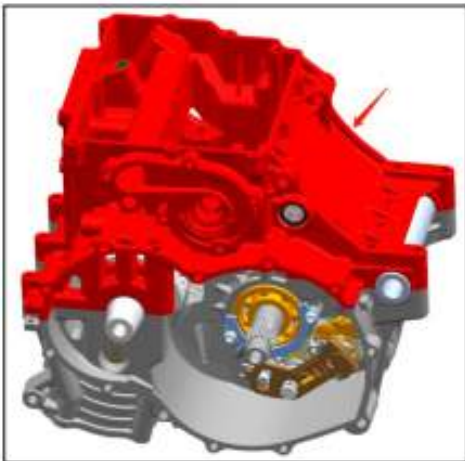
1. Unscrew all the bolts in the figure from the outside to the inside;



2. Use the socket to loosen all M8 bolts from the outside to the inside at first, then use the socket, pneumatic or electric gun to remove all M8 bolts.

Notes

- Do not directly remove the bolts with a pneumatic or electric gun;

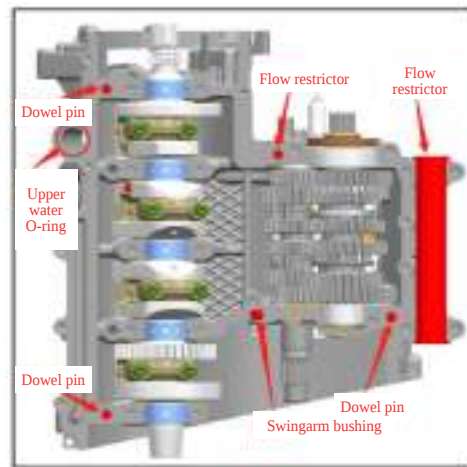


3. Remove the lower crankcase from the upper crankcase;

Notes

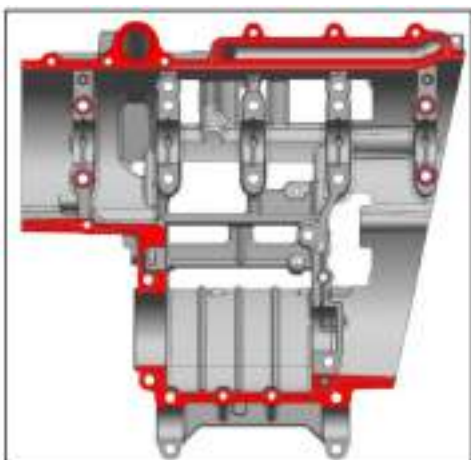
- Do not use tools to pry the crankcase closing surface. You can gently tap the non-machined surface with a rubber mallet to facilitate removal.

4. After opening the case, remove the dowel pins, flow restrictors, upper water O-rings and swingarm bushings. Pay attention to storing in small parts.



Inspection

1. Check whether the cylinder bore 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 passages of the upper and lower cases to ensure that all the passages are clear and free of foreign matters.



Assembly

Notes

- Clean the left and right crankcase body joint surface before assembling, and do not damage the joint surface;
- Do not apply too much case closing sealant, and there shall be no break points at any position when applying the sealant;
- Check whether the oil and water passages of the case are blocked. Clean the passages if necessary;
- Pay attention to the direction when assembling the flow restrictor. Check the case closing bolts before installing them, replace them if necessary.

Assembly steps:

1. Install the components related to the drivetrain and shift mechanism, and the components related to the crank connecting rod (The installation methods are described in the corresponding disassembly and inspection sections) onto the upper case;
2. Evenly apply plane sealant on the joint surface of the lower case in the red area shown in the figure;

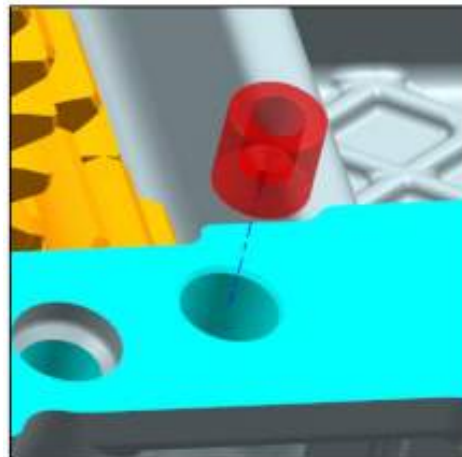
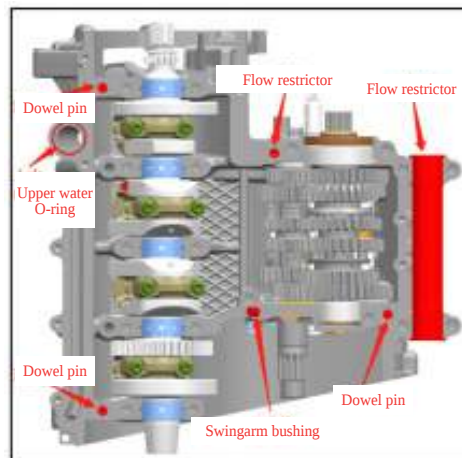
Notes

- The sealant should not have any break points and should not be applied excessively;

3. Install the dowel pin, upper water O-ring, flow restrictors, and swingarm shaft sleeve to the upper case;

Notes

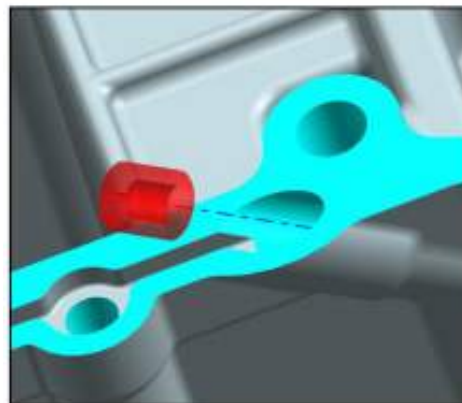
- The small bore of the flow restrictors should face the upper case.



4. Install the oil passage flow restrictors to the lower case (as shown in the figure);

Notes

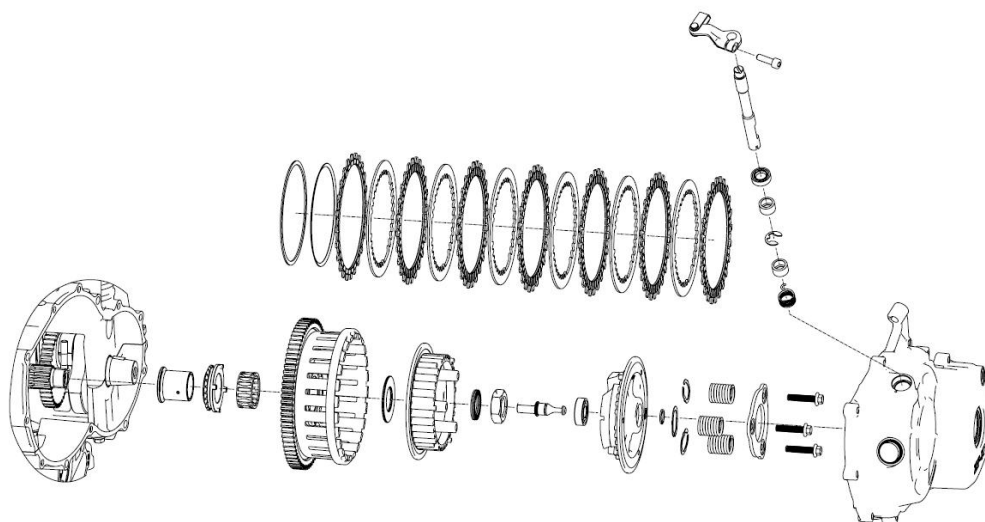
- The large bore should face the lower case.



5. 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 150.

※ Clutch operating mechanism

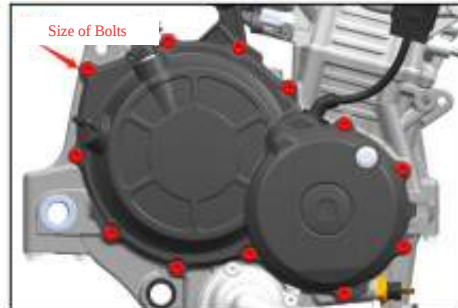
Component arrangement



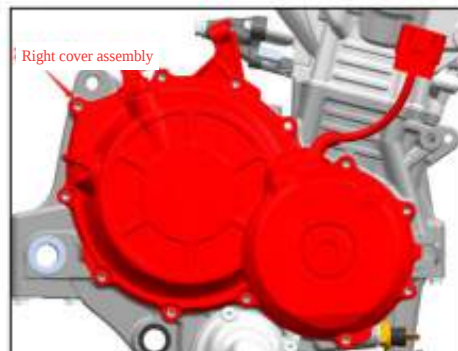
Disassembly

Disassembly steps:

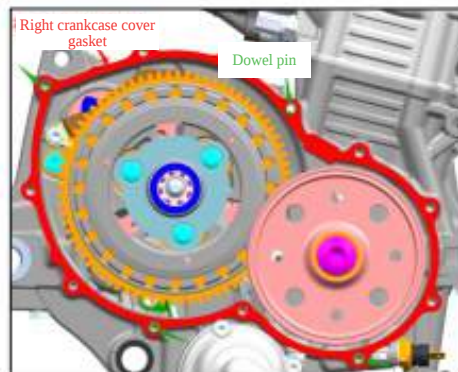
1. Unscrew all M6 bolts in the figure in a diagonal manner;



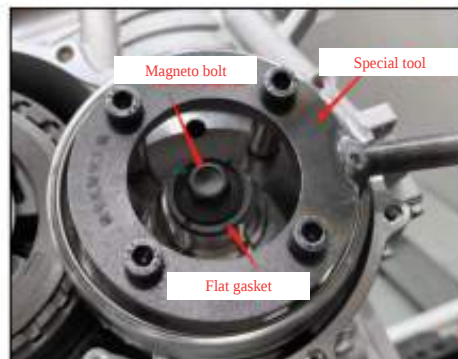
2. Remove the right cover assembly. The right cover has a magneto stator on it. There is a strong magnetic force between the stator and the rotor. Pay attention to safety during disassembly;



3. Remove 4 dowel pins and the right crankcase cover gasket;

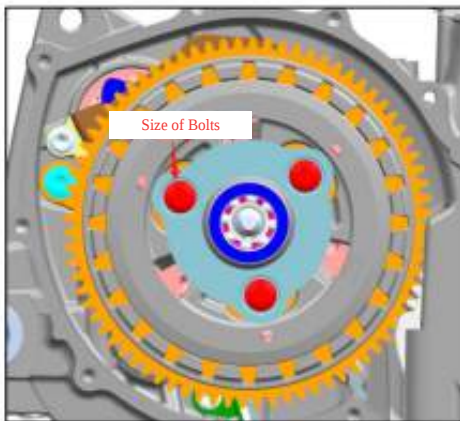


4. Fix the crankshaft with a special tool to prevent it from rotating. Unscrew the magneto bolts and flat gaskets. Pay attention to keeping the special tool flat during disassembly, and electric or pneumatic tools can also be used for removal;

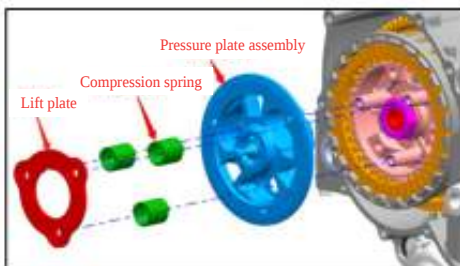




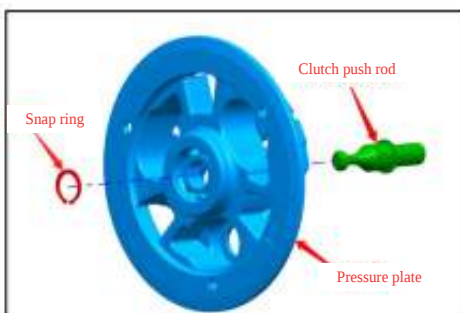
5. Use a magneto disassembly tool to remove the magneto rotor;



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



7. Remove the clutch lift plate, 3 compression springs and the pressure plate assembly;

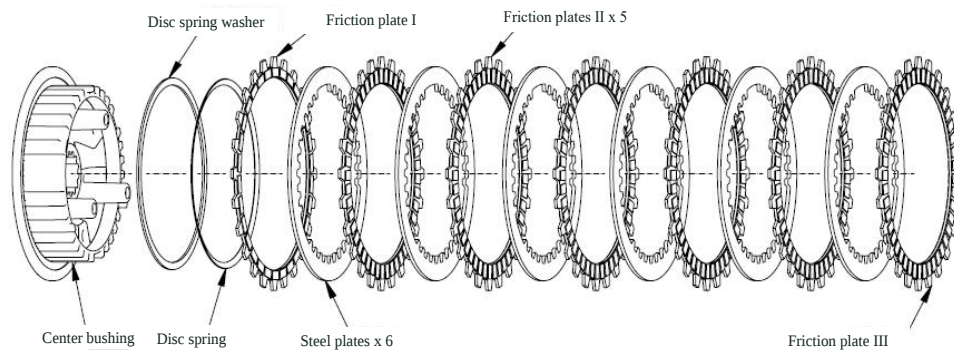


8. Remove the snap ring, then disassemble the clutch push rod and pressure plate;

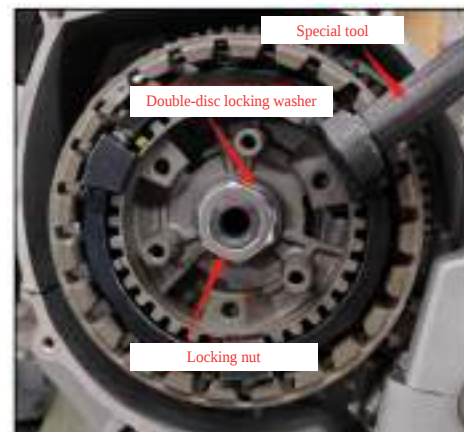
Note

•The snap ring must be replaced with a new one after disassembly.

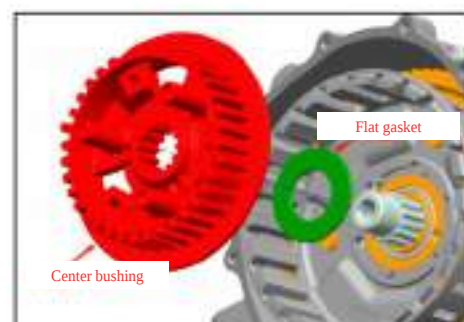
9. Remove the clutch friction plates, steel plates, disc springs and disc spring seats. Pay attention to marking the order when disassembling the friction plates (The top and bottom friction plates are different from the others). The assembly diagram of the clutch friction plates is as follows;

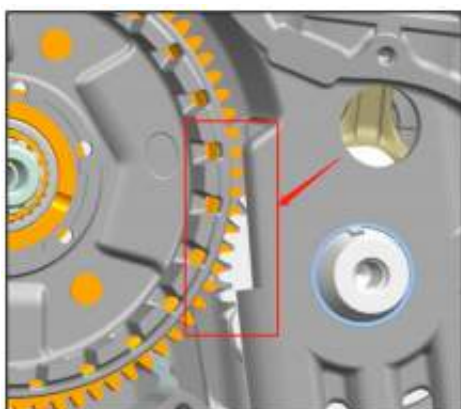


10. Use a special tool to prevent the main shaft from rotating, and then remove the clutch hexagon nut and double-stacked locking washers;

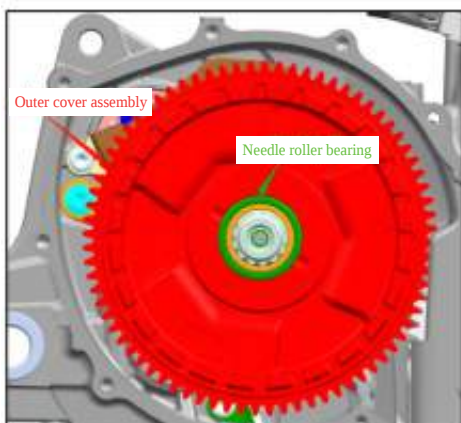


11. Remove the center bushing and the flat gasket below it;

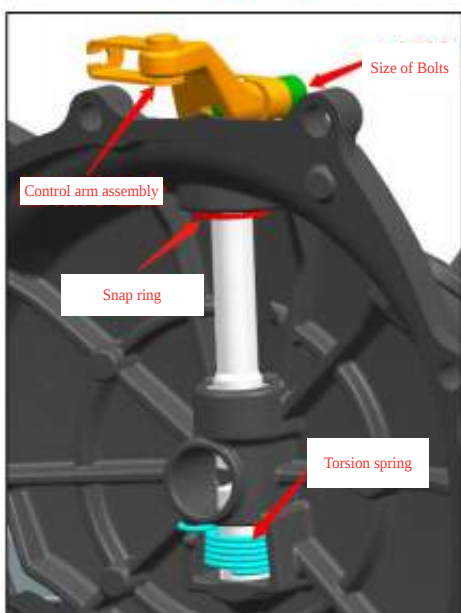




12. Check whether the crankshaft is in the position shown in the figure. If it is not near this position, rotate the crankshaft to the position in the figure;



13. Remove the clutch housing assembly and needle roller bearing After removing the oil pump chain assembly and the oil pump drive sprocket, the T-shaped bushing can be removed. For detailed disassembly, see “Cooling and lubrication system” on page 217 for details;

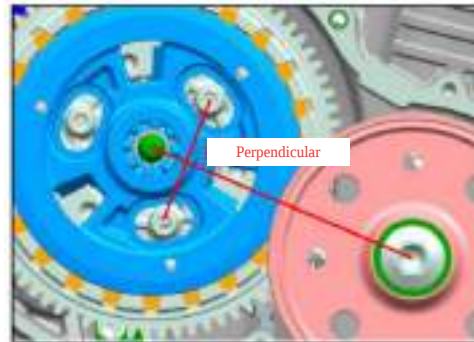


14. After unscrewing the bolts, remove the control arm assembly. Remove the snap ring from the right cover assembly, pull out the control shaft, and then the control shaft oil seal can be removed.

Notes

•If **only the clutch friction plates and steel plates need to be replaced, it is sufficient to perform steps 1, 2, 6, 7, and 9** as listed above to complete the replacement.

•When disassembling the clutch pressure plate assembly, make sure to rotate the pressure plate to the position as shown in the figure (the line connecting the centers of any two lifting plate bolt mounting posts should **be as perpendicular as possible** to the line connecting the crankshaft and the main shaft). Then, pull the clutch push rod by hand and apply outward axial force to remove the clutch pressure plate assembly.



The assembly of the clutch pressure plate assembly is the reverse of the disassembly steps.

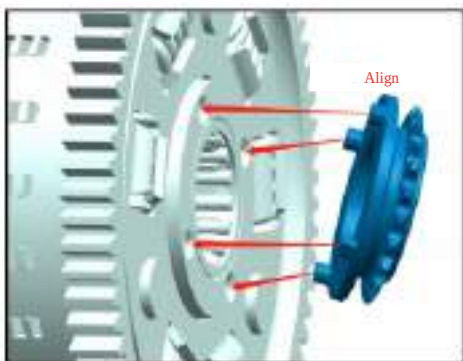
Inspection

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

Clutch lift plate	Compression spring
Center bushing	Flat gasket
Disc spring	Friction plate
Steel plate	Outer cover assembly (gear)
T-shaped bushing	

2. Measure each part according to the specifications of the clutch and shift mechanism. If any part exceeds the maintenance limit, please replace it immediately;

3. Check whether the clutch control shaft, control shaft oil seal, and clutch push rod have abnormal wear. Replace them if necessary.



Assembly

Notes

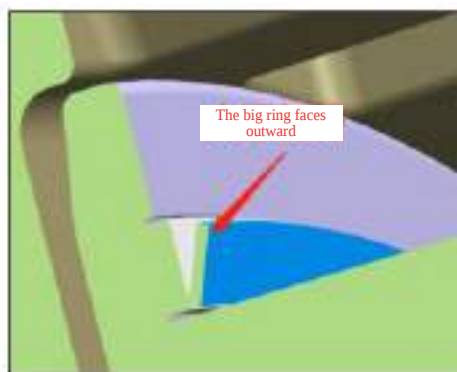
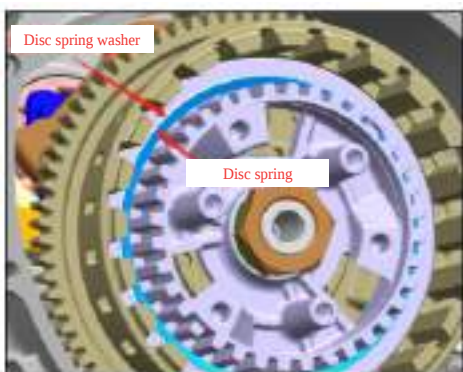
- 1. Lubricate all moving parts. In particular, lubricate between the clutch friction plates and steel plates. Apply an appropriate amount of grease to the lip of the oil seal;
- When assembling the clutch outer cover assembly, move the oil pump chain to align the pin of the oil pump sprocket with the groove of the clutch drive sprocket to ensure proper installation;
- Replace the clutch compression springs and driven friction plates in groups;
- For bolt tightening torque and method not otherwise specified, refer to "Bolt tightening methods for key parts" on page 150.
- The overall assembly sequence of the clutch control shaft mechanism is the reverse of the disassembly method. The assembly methods for special positions are as follows:

Detailed assembly method of the clutch center bushing assembly:

1. After installing the flat gasket and the center bushing, place the double-disc locking gasket and use a special tool to tighten the clutch nut. For tightening torque and method, refer to "Bolt tightening methods for key parts" on page 150;
2. Install the clutch disc spring and disc spring washer;

Notes

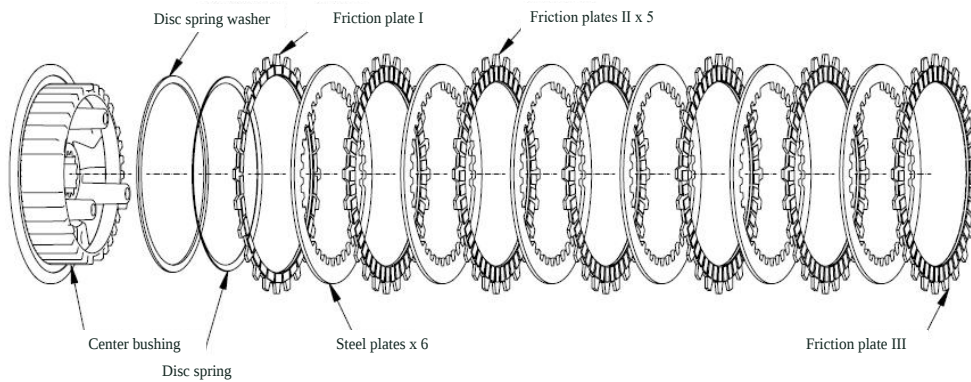
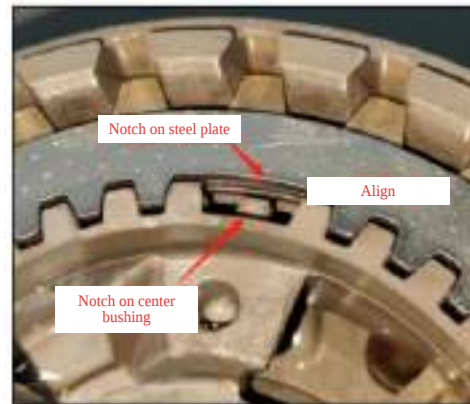
- Disc spring (large ring facing outward).



3. Assemble friction plate I, steel plate, and friction plate II in the order shown in the assembly diagram (friction plate III and one steel plate retained);

Notes

- Align the notch on the steel plate with the mark on the center sleeve.

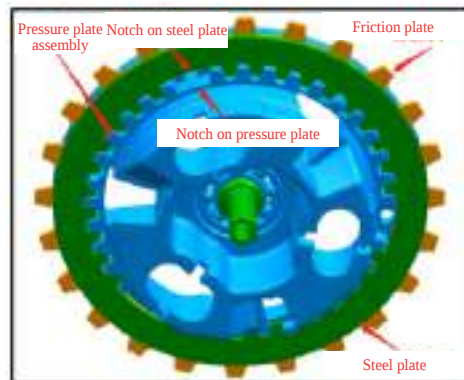


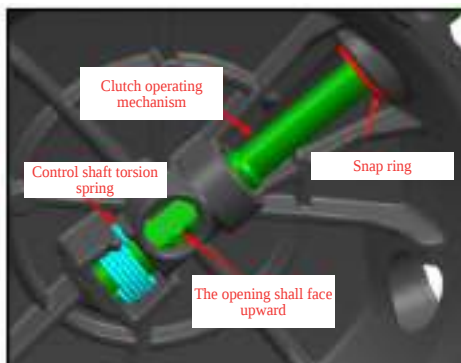
4. Install the remaining friction plates and steel plates into the pressure plate assembly, ensuring the notch on the pressure plate and steel plates are aligned.

This part is then loaded into the center bushing (Step 3).

Notes

- This steel plate must not rotate or misalign, otherwise it will cause clutch invalidation. The subsequent assembly steps are the reverse from the disassemble steps.





Assembly method of the clutch control arm:

1. After correctly installing the needle roller bearing and the control shaft oil seal, insert the control shaft torsion spring, then install the clutch control shaft.

Notes

- The notch of the clutch control shaft should face upward (as shown in the figure);
- Be careful not to scratch the oil seal when the control shaft passes through it.

The snap ring is then installed;

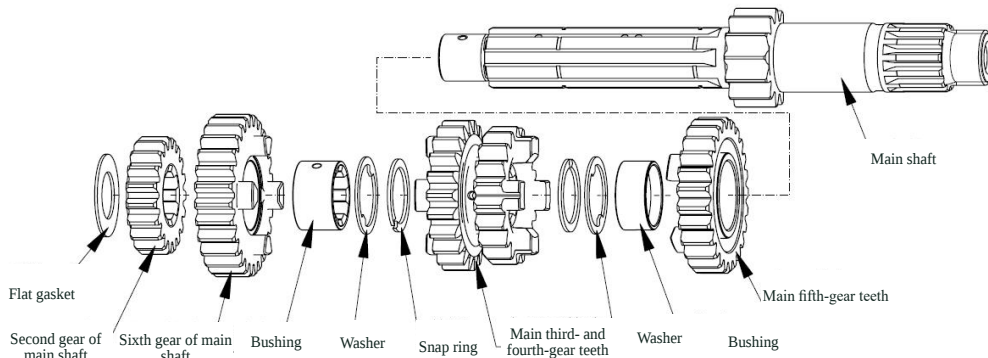


2. After assembling right cover components except for the clutch (refer to "Starting system" on page 226), install it into the engine assembly, then install the clutch control arm assembly onto the clutch control shaft. Insert a slotted screwdriver into the opening slot of the control shaft and rotate it clockwise until it can no longer rotate. Then rotate the control arm assembly so that the groove of the control arm assembly aligns with the dot on the right cover. At the same time, ensure that the bottom surface of the control arm assembly is in contact with the control shaft, and then tighten the bolts.

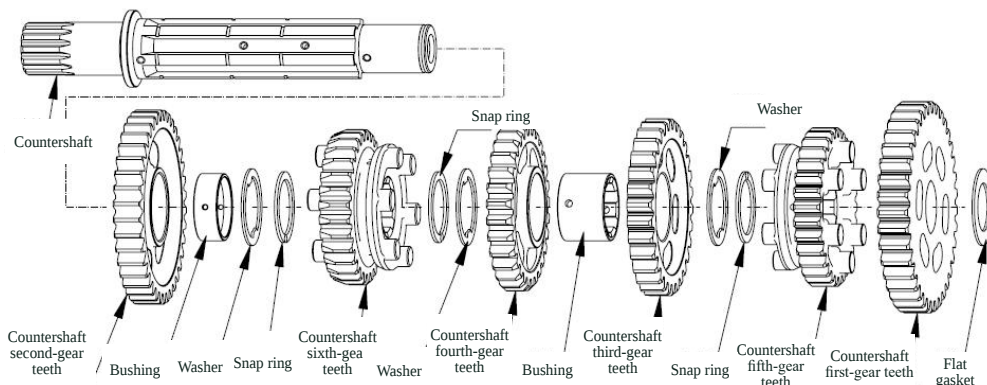
※ Drive and shifting mechanism

Component arrangement

Main shaft assembly:



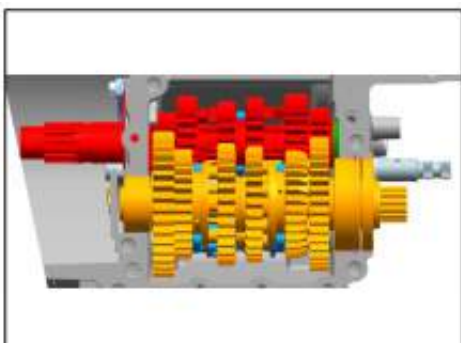
Countershaft assembly:



Disassembly

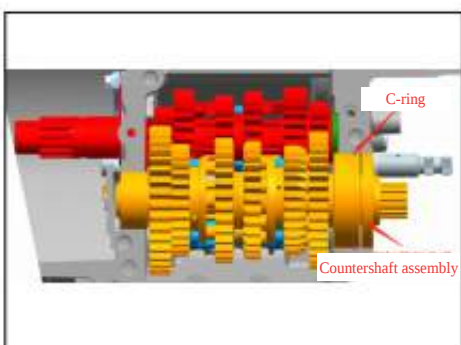
Notes

- 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;
- Once the countershaft assembly is disassembled, the countershaft oil seal must be replaced;
- When reassembling the main and countershaft assemblies after disassembly, pay attention to the alignment of the oil holes on the shafts and the gear teeth;
- During the disassembly process, pay attention to the disassembly and storage of small parts. Take photos for record if necessary.

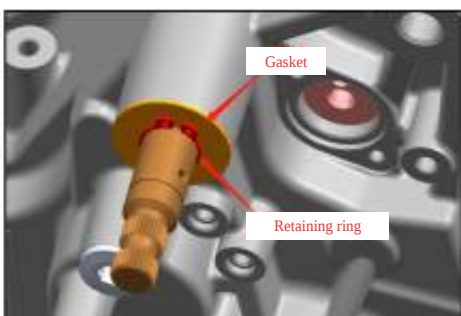


Disassembly steps:

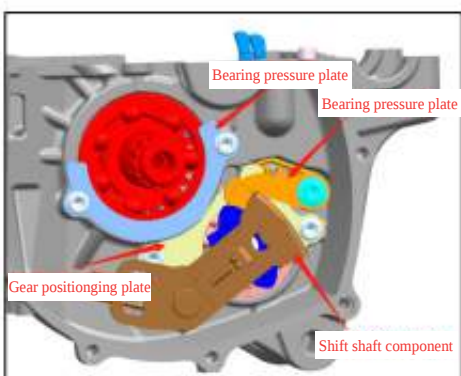
1. Separate the crankcase; refer to "Case section" on page 192.



2. Remove the countershaft assembly and the C-ring;

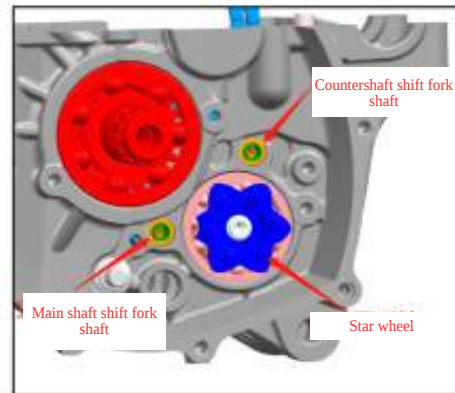


3. Remove the shift shaft snap ring and gasket;

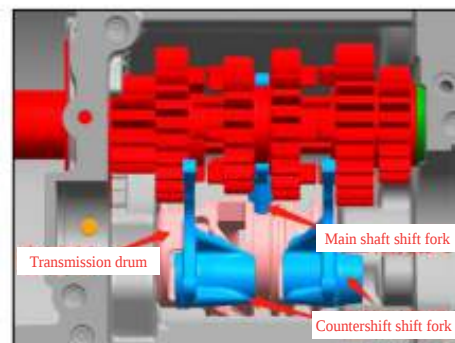


4. Remove the shift shaft components, gear positioning plate and two bearing pressure plates in sequence;

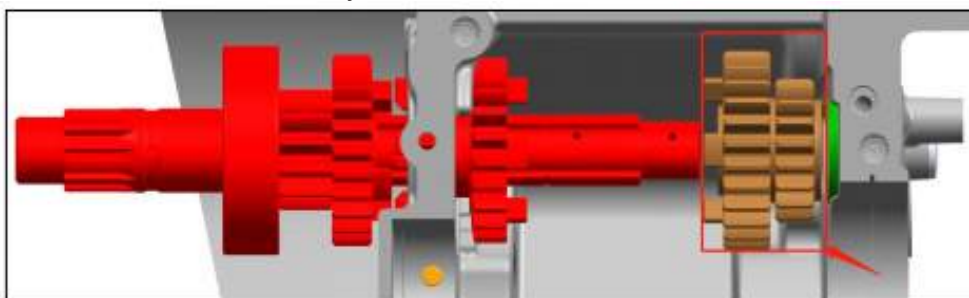
5. Remove the shift fork shafts of the main and countershafts, and the star wheel. Collect the shift fork shaft springs properly;

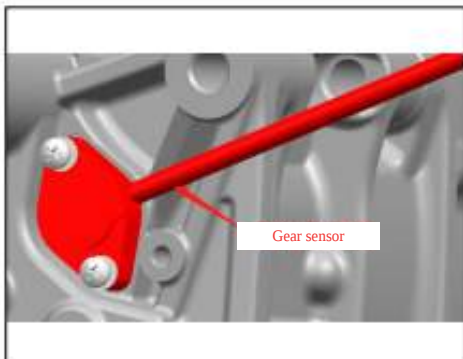


6. Immediately remove the shift forks of the main and countershafts and the transmission drum. Collect the gear display contacts properly;



7. Pull out the main shaft outward, move the main shaft to the position shown in the figure, remove the components related to the second and sixth gear teeth of the main shaft. Pay attention to the gaskets, bushings and bearings, and then remove the main shaft immediately;

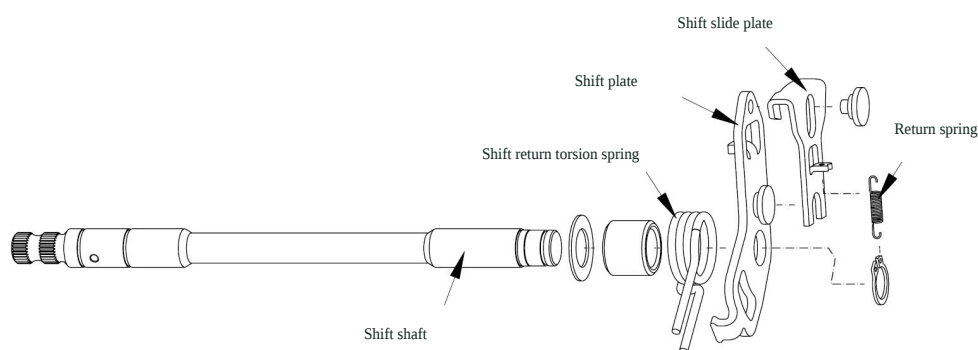




8. Remove the gear sensor and collect the gear display O-ring properly.

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 plate are worn, damaged or deformed. Replace parts if necessary.



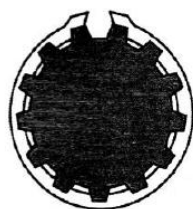
Assembly

Notes

- Clean all parts with solvent before assembly and let them dry thoroughly. Apply engine oil to the gear tooth surface, rotating surface and bearing;
- Apply engine oil to the outer surface of the gear spline sleeve, the entire surface of the gear bushing, the rolling bearing rotation area and the gear transmission groove area;
- The installation method of the main and countershaft assembly is the opposite to the disassembly method;
- Apply engine oil to each gear and check whether it rotates smoothly;
- Always push along the axial thrust surface of the gear when installing the thrust washer;
- When installing the snap ring, align the opening clearance with the spline groove (as shown in the figure below). After installation, ensure that the snap ring is fully installed in the shaft groove;

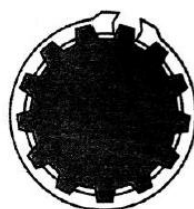
Adjusting hole cover

正确安装



Adjusting hole cover

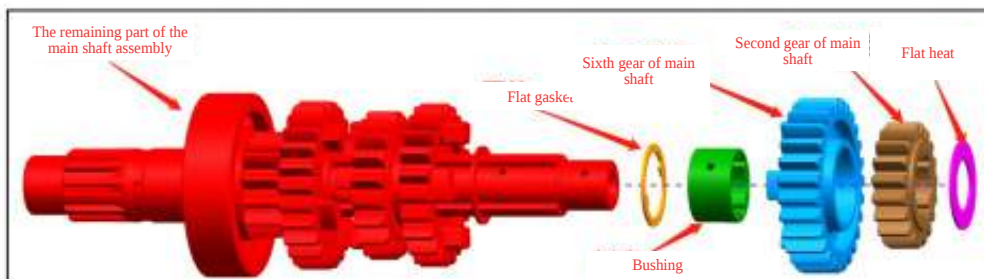
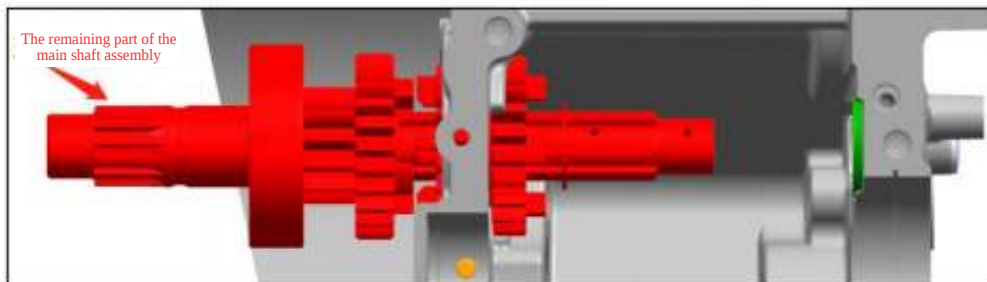
错误安装



- When assembling the main third and fourth gear teeth, the countershaft fifth gear teeth, the countershaft sixth gear teeth and the bushings in the assembly, be careful that the oil holes on them need to be aligned with the oil holes on the shaft;
- All bolts of the transmission shift mechanism require thread locker. Refer to "Engine bolt torque values" on page 147 for tightening torque and method.

Assembly steps:

1. Remove the parts related to the second and sixth gear teeth of the main shaft assembly (including the needle roller bearings). Install the remaining main shaft assembly into the main shaft hole until it reaches the position shown in the figure. Then correctly install the removed parts onto the main shaft assembly. Pay special attention to the orientation of the end face boss of the second gear tooth of the main shaft (as shown in the figure). Immediately install the main shaft assembly in place and install the main shaft pressure plate;

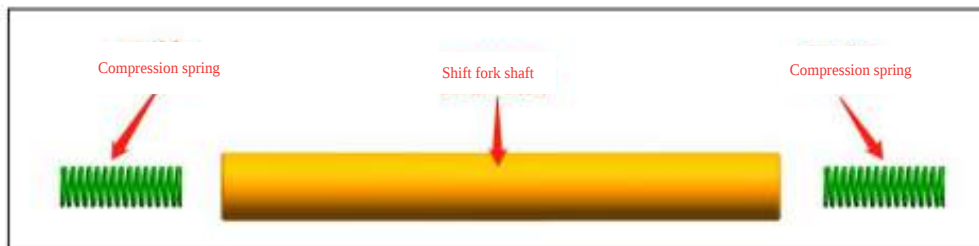
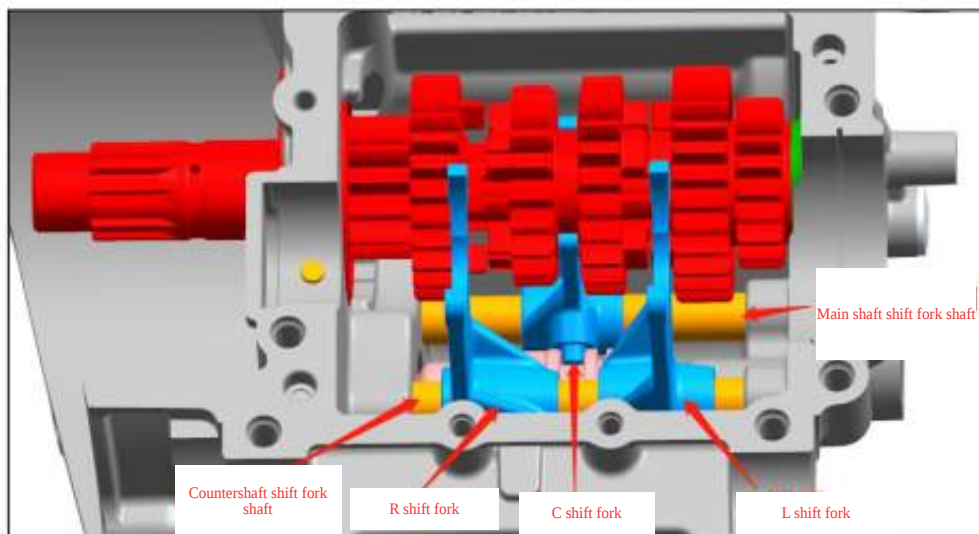


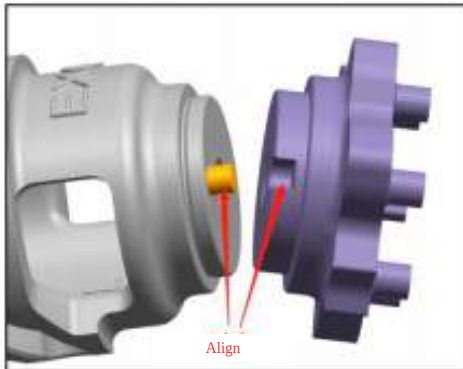
2. Assemble the transmission drum assembly, C shift fork (which needs to be correctly inserted into the profile line of the transmission drum), the shift fork shaft of the main shaft, R shift fork, L shift fork, and the shift fork shaft of the countershaft in sequence. Then install the bearing pressure plate of the transmission drum;

Notes

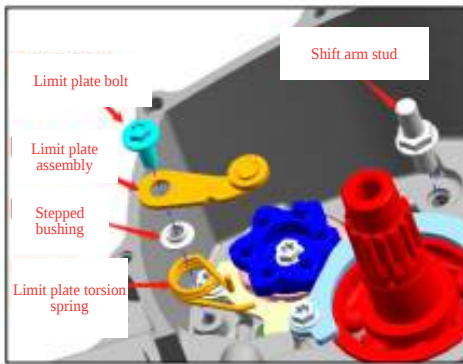
- There are springs at both ends of the shift fork, and engine oil needs to be coated on all moving pairs.

The assembly method is the opposite to the disassembly method.

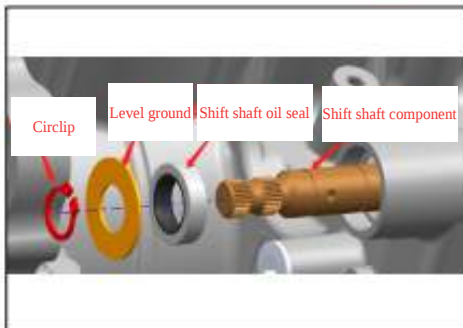




3.Align the limit groove of the star wheel with the limit pin of the transmission drum and then install it in place;

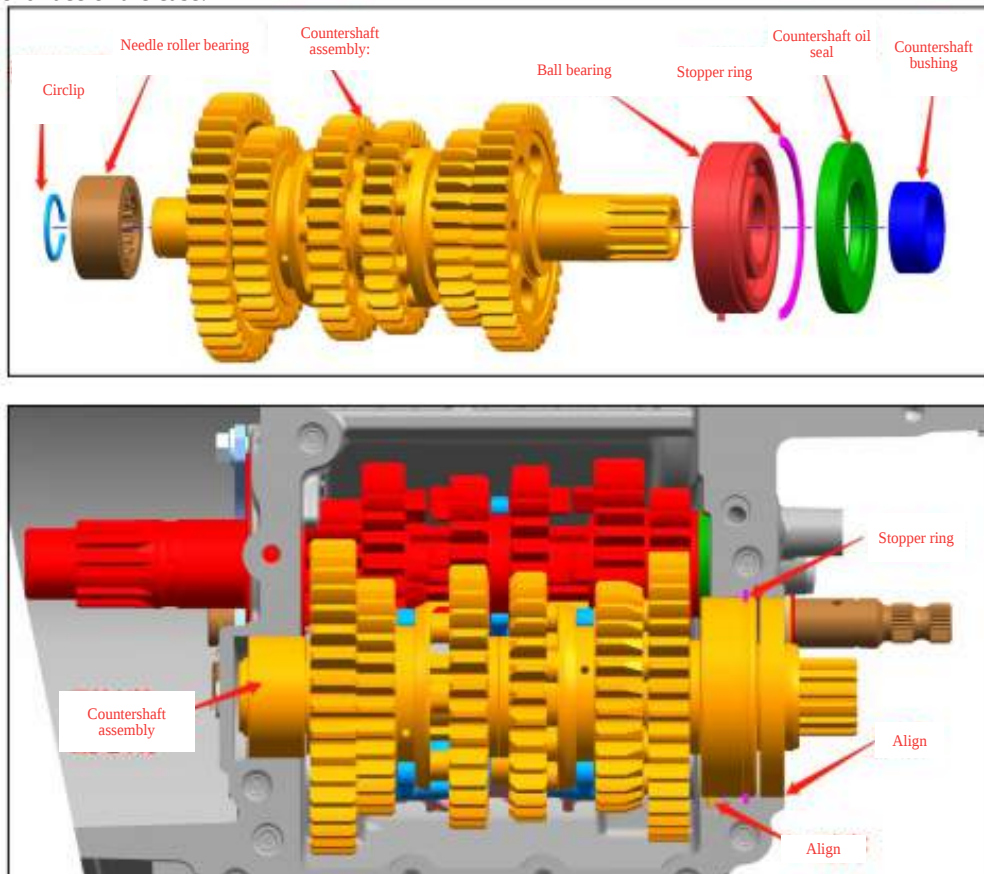


4.Install the shift arm stud, limit plate torsion spring, stepped bushing, limit plate assembly, and limit plate bolt;



5.After correctly installing the shift shaft, immediately install the flat gasket and the circlip, ensuring that the circlip is properly assembled. Check the shift shaft oil seal before assembly. If it is damaged, replace it.

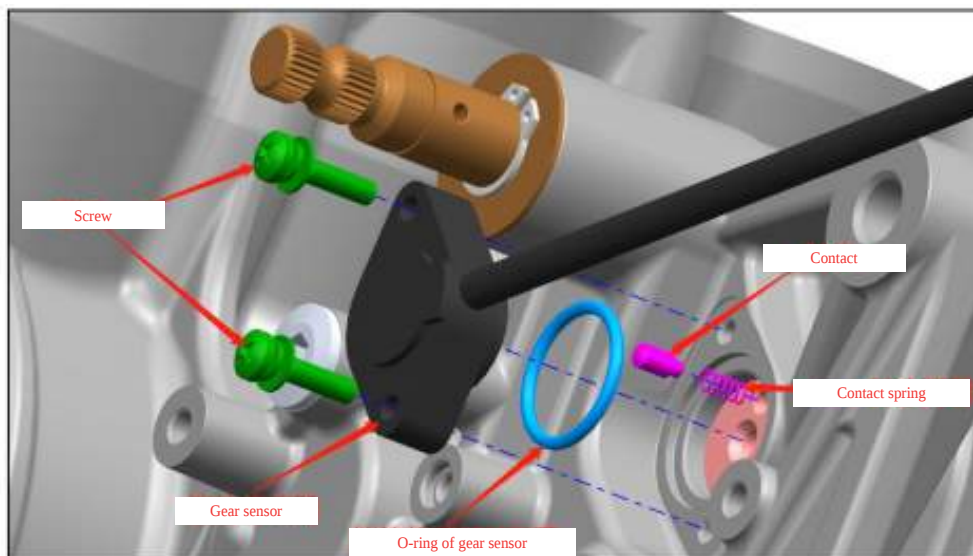
6. After correctly engaging the L shift fork and the R shift fork into the profile groove of the transmission drum, install the countershaft assembly onto the case. Align the outer ring limit pin of the ball bearing with the case, then slightly move it left and right, and install the stopper ring. Before closing the case, confirm that the end face of the countershaft oil seal is aligned with the end face of the case.



8. Close the case.

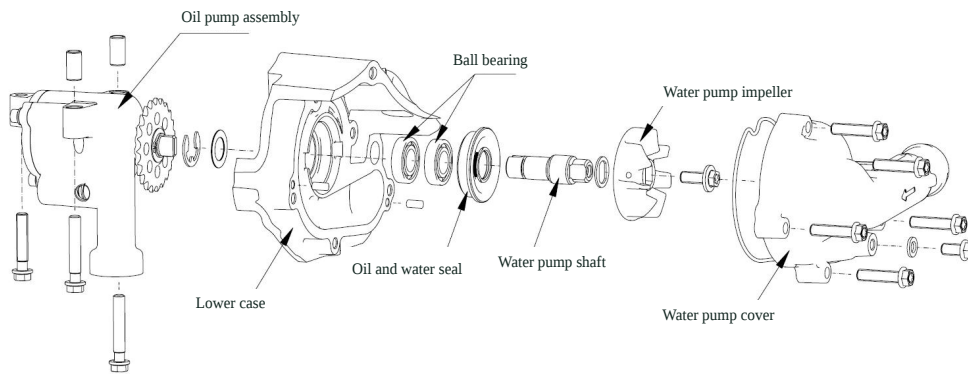
Refer to "Case section" on page 192 for the case-closing part. After closing the case, check whether the shifting is normal and smooth;

9. Assemble the relevant components of the gear position sensor (as shown in the figure). Before assembly, check whether the O - ring of the gear position sensor is damaged. Replace it if necessary.

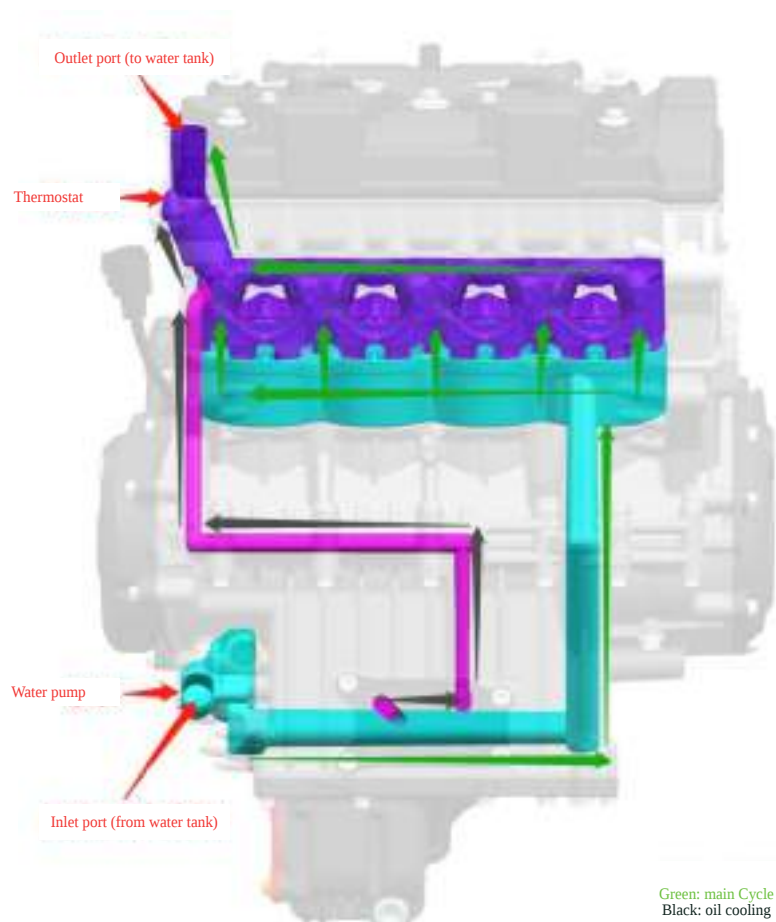


※ Cooling and lubrication mechanism

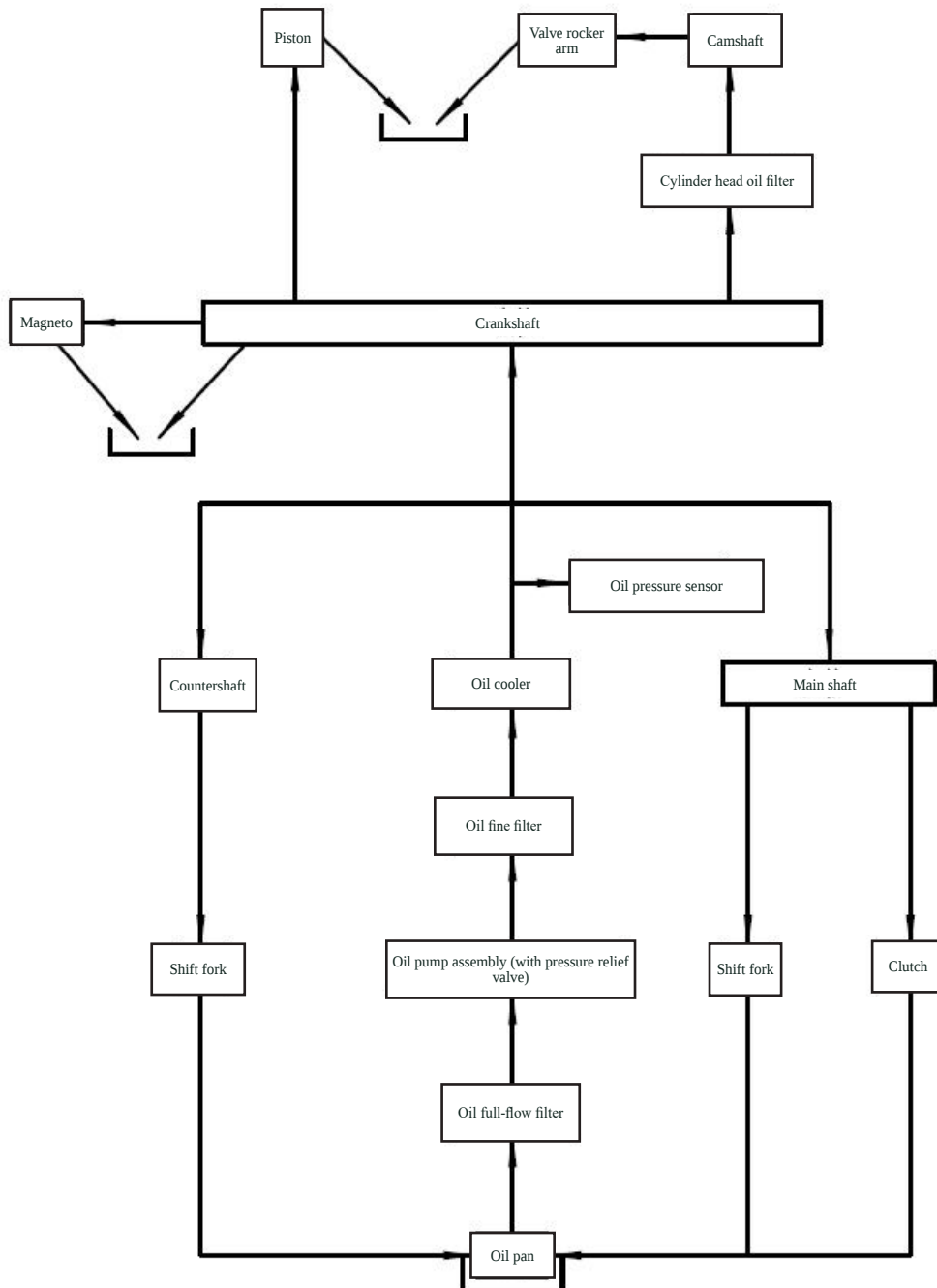
Component arrangement



Flow chart of cooling system



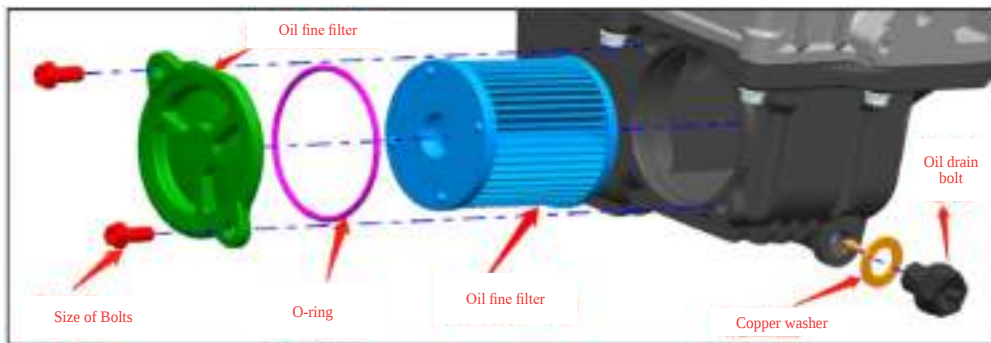
Lubrication system flow chart



Disassembly

Notes

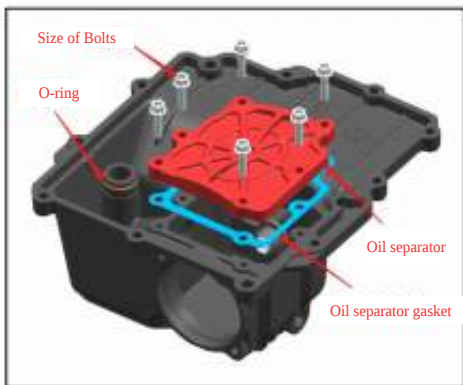
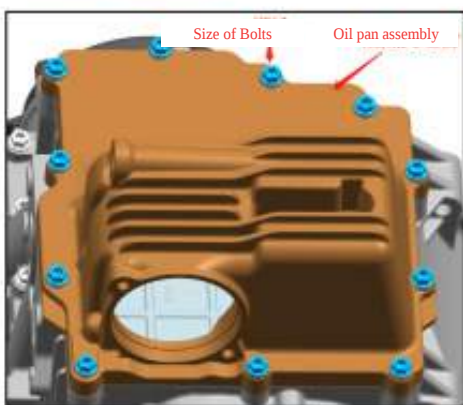
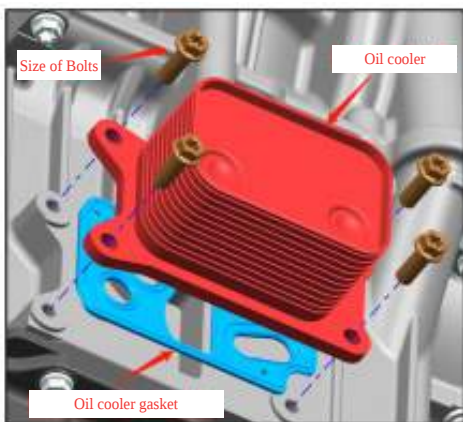
- Before disassembly, wait for the engine to cool down and drain the engine oil and coolant completely. Beware of burns from the hot engine;
- To drain the engine oil, the oil drain bolt and the fine oil filter need to be removed. The structural diagram is as follows. (The fine oil filter can be removed with needle-nose pliers):



- To disassemble the oil pump chain, the clutch assembly needs to be removed. For the removal of the clutch assembly, refer to "Clutch operating mechanism" on page 198.
- When removing the oil pan, place an oil basin or cloth under the engine to prevent engine oil from dripping onto the ground and causing slips and injuries.

Warning!

Repeated and long-term skin contact with used engine oil may cause skin cancer. This is a rare case, unless you are in daily contact with used engine oil. However, we still recommend that you wash your hands thoroughly with soap and water as soon as possible after handling used engine oil.



Disassembly steps:

1. After the engine oil and water have been drained, Remove the thermostat and cooling pump (see "Cooling system" on page 125 for details);

2. Remove 4 fastening bolts of the oil cooler and take off the oil cooler and the oil cooler gasket;

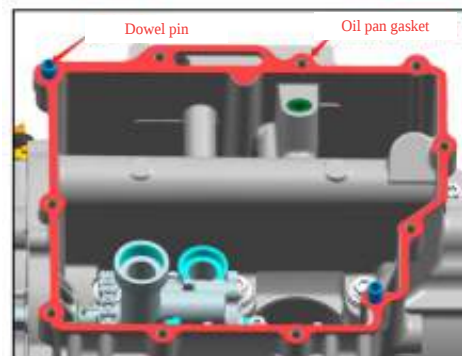
3. Remove 11 oil pan fastening bolts and the oil pan assembly;

Notes

- When disassembling the oil pan assembly, remove the engine oil full-flow filter along with the oil pan.

4. Remove 6 fastening bolts of the oil baffle, take off the oil baffle and the oil baffle gasket, and the O-ring can be removed at the same time;

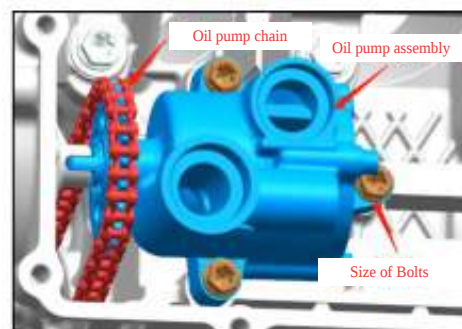
5.Remove 2 dowel pins and the oil pan gasket;



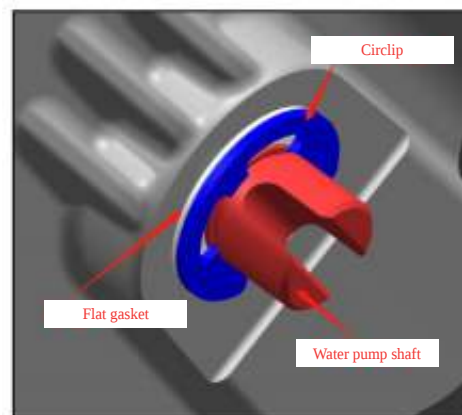
6.Remove 3 fastening bolts of the oil pump, take off the oil pump assembly and 2 dowel pins;

Notes

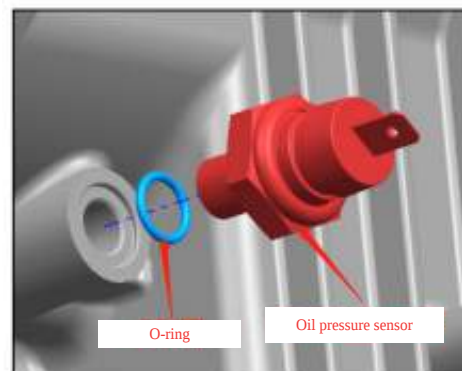
- To disassemble the oil pump chain and oil pump driving sprocket, the clutch assembly needs to be removed. See "Clutch operation mechanism" on page 198 for details.

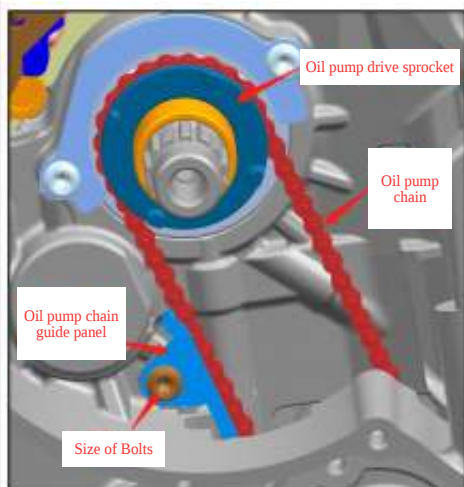


7.After removing the snap ring, take out the flat gasket and the water pump shaft.



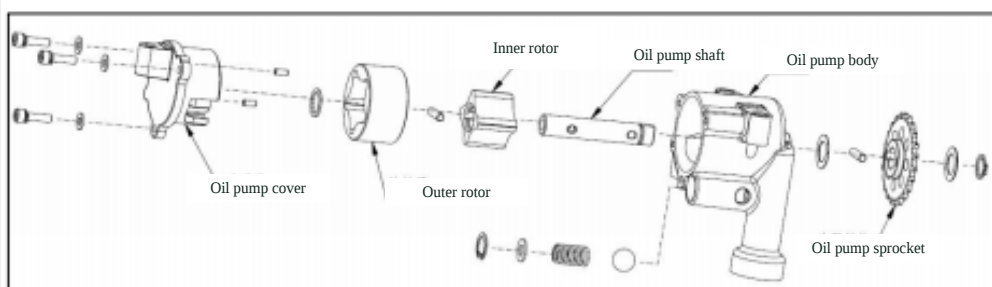
8.Disassemble the oil pressure sensor assembly;



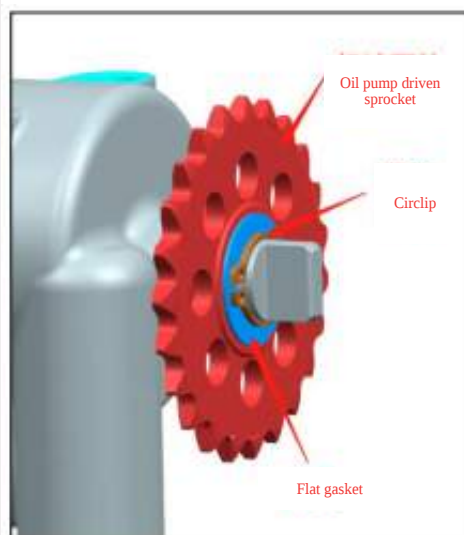


9. After removing the fastening bolts of the oil pump chain guide plate, take off the oil pump chain, the oil pump sprocket and the oil pump chain guide plate.

Arrangement of oil pump components:

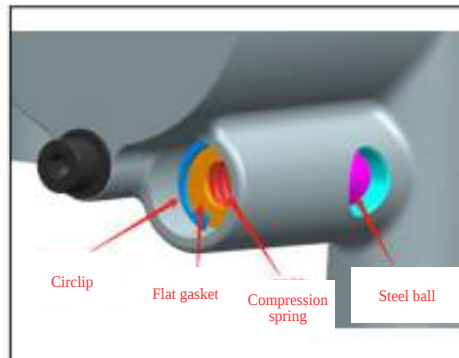


Disassembly steps of oil pump components:

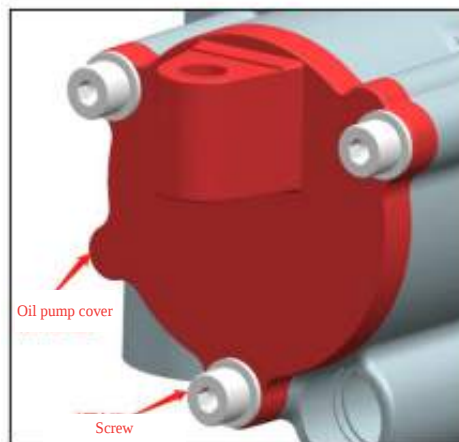


1. Remove the circlip and take off two flat gaskets, the oil pump sprocket and the cylindrical pin (see the component arrangement diagram);

2.Remove the circlip and take out the flat gasket, spring and steel ball;



3.Remove 3 screws and take off the oil pump cover. Then, the remaining components of the oil pump assembly can be removed immediately (see the component arrangement diagram).



Inspection

1.Rotate the oil pump shaft and check for any jamming. If there is jamming, the oil pump assembly needs to be disassembled for inspection and repair. Replace the entire oil pump assembly if necessary;

Notes

- It is normal for the cooling pump gear to have certain resistance when rotating, but it shall be continuous without stuck.
- 2.Check whether the gasket and snap ring of the water pump shaft are abnormally deformed. Replace them if necessary;
- 3.When the engine is running, if the engine oil pressure fault light remains on, check the pressure gauge system first before checking the oil pressure;

Oil pressure check procedure: See "Inspection of engine oil pressure" on page 35 for details.

Oil pump cover	Oil pump body
Oil pump shaft	Inner rotor
Outer rotor	Cylindrical pin

4. Check whether the components of the oil pump are damaged, abnormally worn, deformed, or ablated, and measure the oil pump clearance according to the lubrication system specifications. If any measured value exceeds the specified maintenance limit, replace the entire oil pump assembly.

5. Check whether there are impurities in the oil full-flow filter screen. If there are, clean them in time. If the screen is severely deformed or damaged, replace the oil full-flow filter;

6. Check whether the oil pump drive sprocket and the oil pump sprocket are abnormally worn. Replace them if necessary;

7. Check whether the oil pump chain turns flexibly without jamming and whether it is abnormally worn. Replace it if necessary;

8. Check whether the oil pump chain guide plate is abnormally worn or deformed. Replace it if necessary;

9. Check whether each seal is deformed, has cut edges, is aged, etc. Replace it once such problem appears.

Assembly

Notes

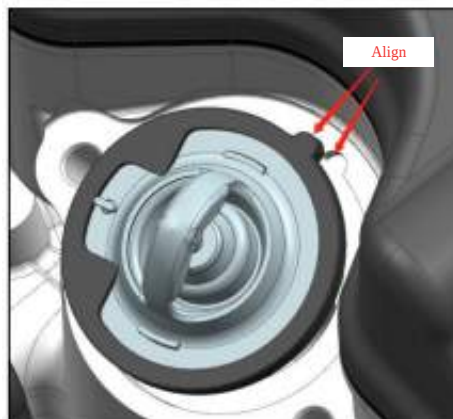
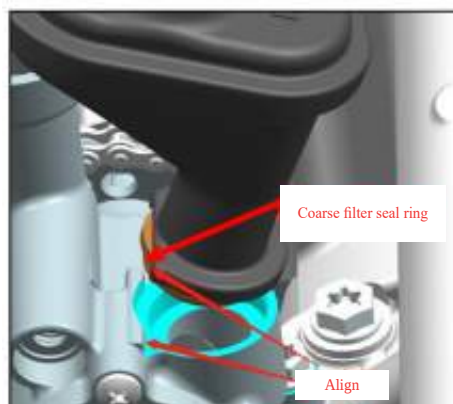
- Before assembly, please clean the oil drain bolt and the cavity of the oil fine filter to ensure no impurities;
- Apply an appropriate amount of thread sealant to all bolts inside the engine;
- Apply an appropriate amount of grease to all O-rings and oil and water seals during assembly;
- Bolt fastening methods and torque values not otherwise specified shall be carried out in accordance with "Engine bolt torque values" on page 147

Assembly steps:

The assembly sequence of the cooling and lubrication system is the reverse from the disassembly sequence.

Precautions during assembly are as follows:

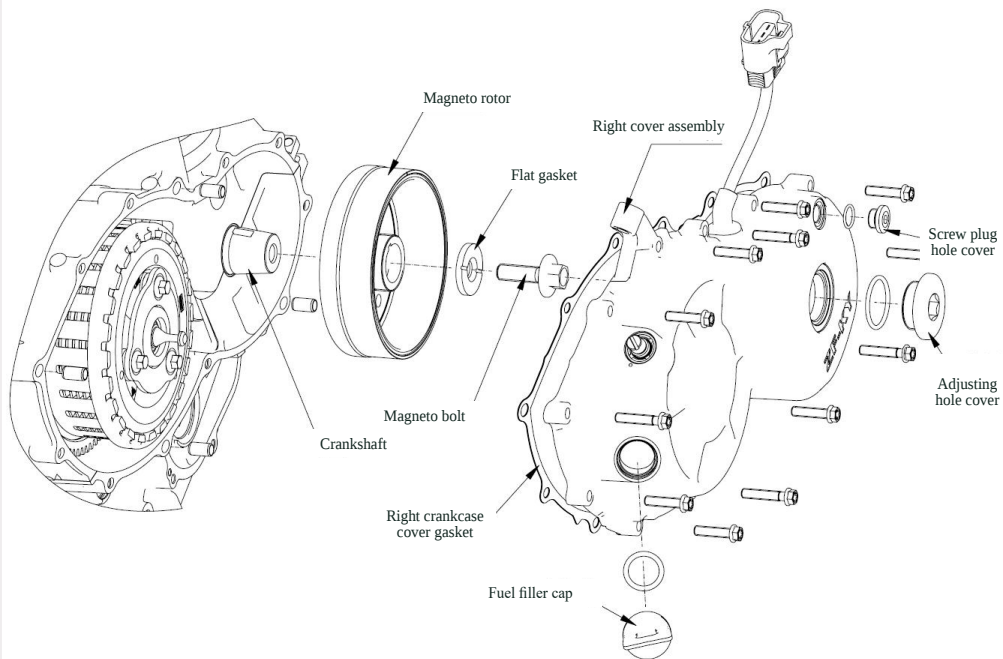
- After assembly of the oil pump chain guide panel, it is necessary to check that the chain is not tight or showing any other malfunction.
- When assembling the oil full-flow filter, pay attention to aligning the upper limit on it with the oil pan assembly. Ensure that the oil full-flow filter is axially installed in place during assembly, and apply an appropriate amount of lubricant to the filter seal.
- When assembling the thermostat, ensure the alignment of the limit stops on both the thermostat and the cylinder head.
- When assembling the fine filter cover, it is necessary to first install the fine filter cover in place before fastening the fine filter cover bolts.



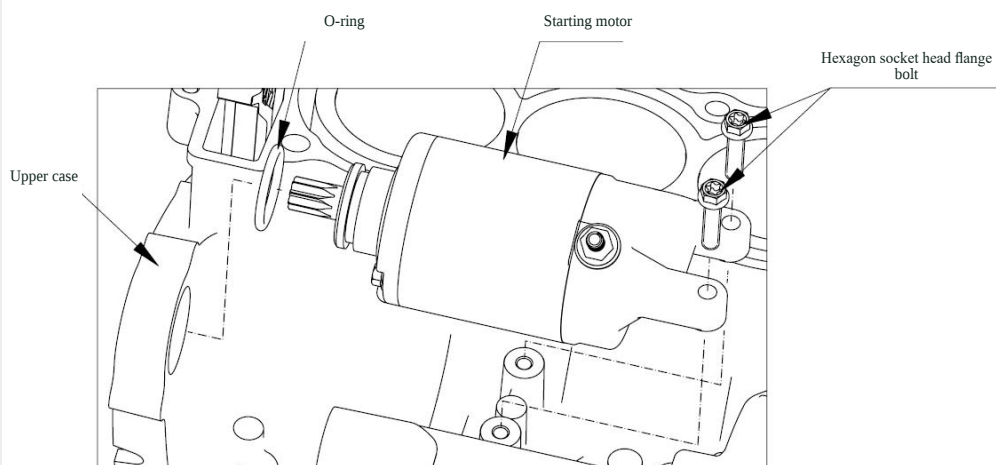
※ Starting system

Component arrangement

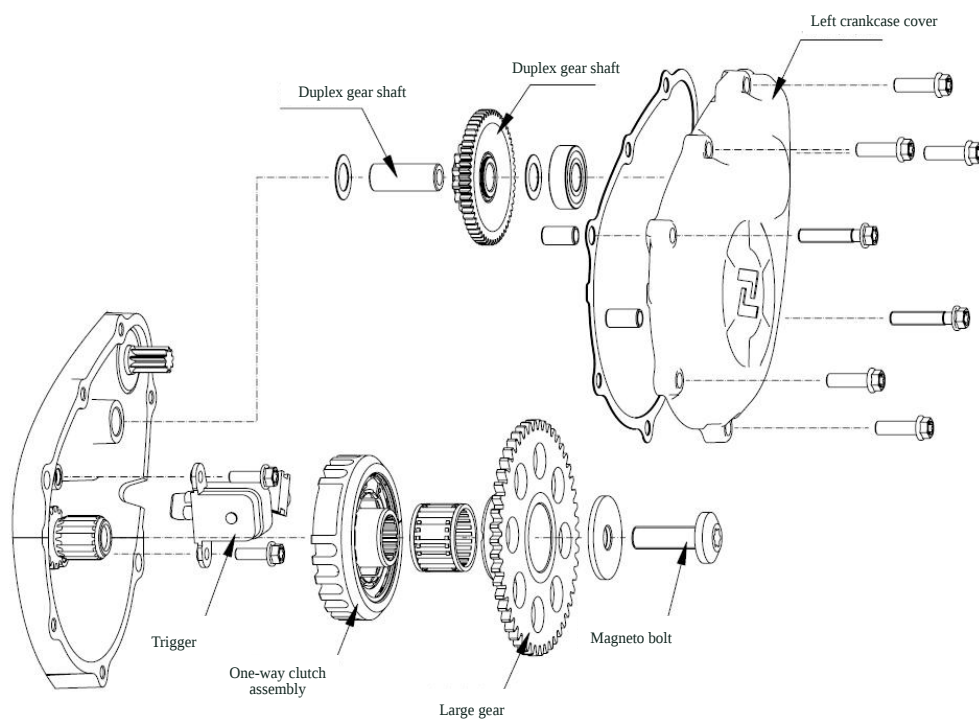
Engine right side

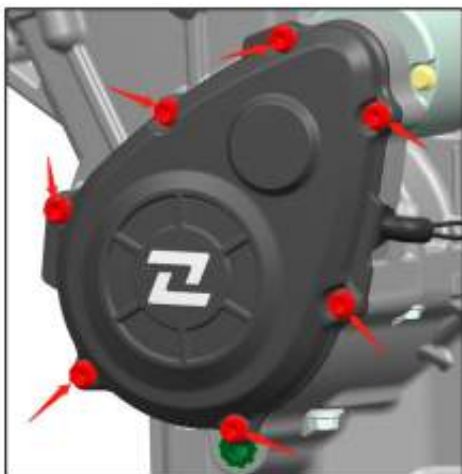


Starting motor



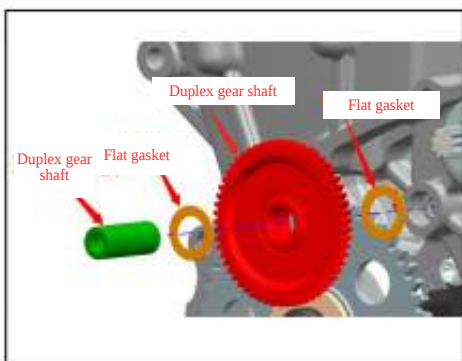
Engine left side



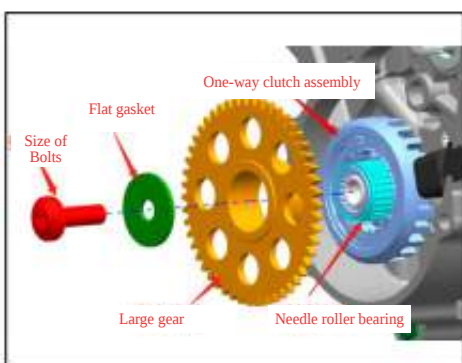


Disassembly

1. Remove the 7 bolts shown in the figure in a diagonal manner. Then remove the left crankcase cover, the dowel pin and the left crankcase cover gasket;



2. Remove the duplex gear shaft, flat gasket and duplex gears;

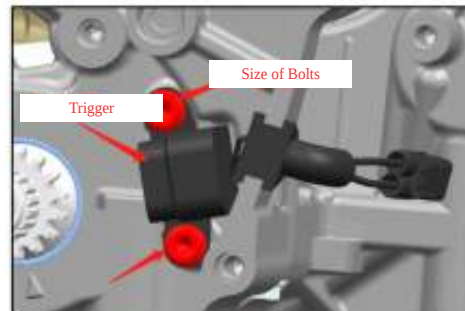


3. Unscrew the one-way clutch bolt, and then remove the flat gasket, the large gear, the bearing and the one-way clutch assembly.

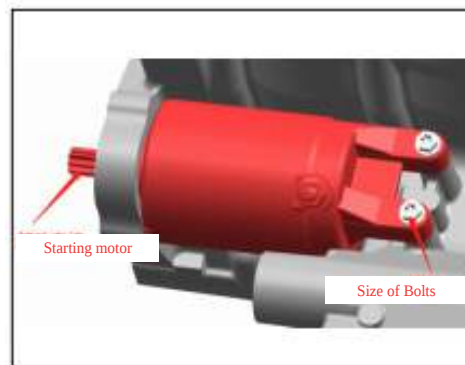
Notes

- When unscrewing the one-way bolt, it is necessary to prevent the crankshaft from rotating. If necessary, reinstall the rotor and use the magneto bolt disassembly tool to fix the crankshaft.

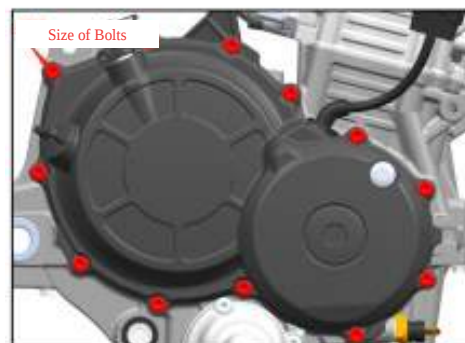
4.Remove 2 fastening bolts of the trigger and take off the trigger;



5.Remove 2 fastening bolts of the starting motor and take off the starting motor;

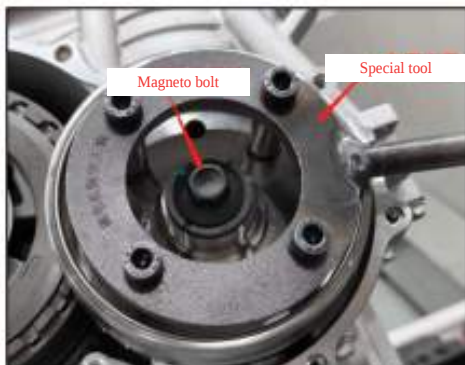


6.Remove 12 fastening bolts of the right cover in a diagonal manner, unplug the wiring harness connector of the magneto, and then remove the right cover assembly, the dowel pin and the right cover gasket.



Notes

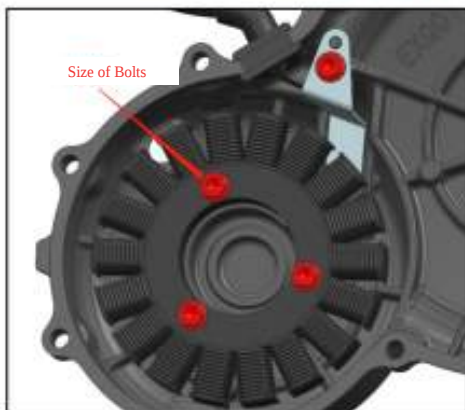
- There is a magneto stator on the right cover with strong magnetic force between the stator and the rotor. Pay attention to safety during disassembly;



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



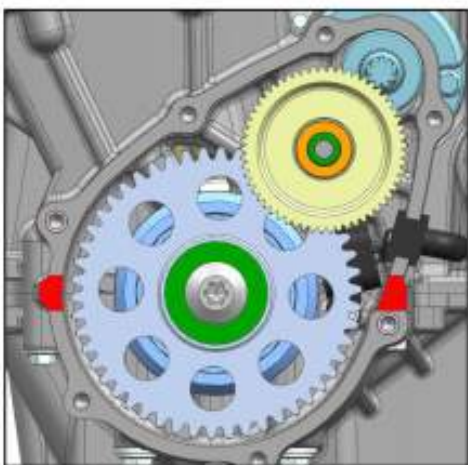
8. Use the magneto disassembly tool to disassemble the magneto;



9. Remove the fastening bolts of the magneto stator and the wiring harness pressure plate bolts, and then take off the magneto stator and the wiring harness pressure plate.

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.

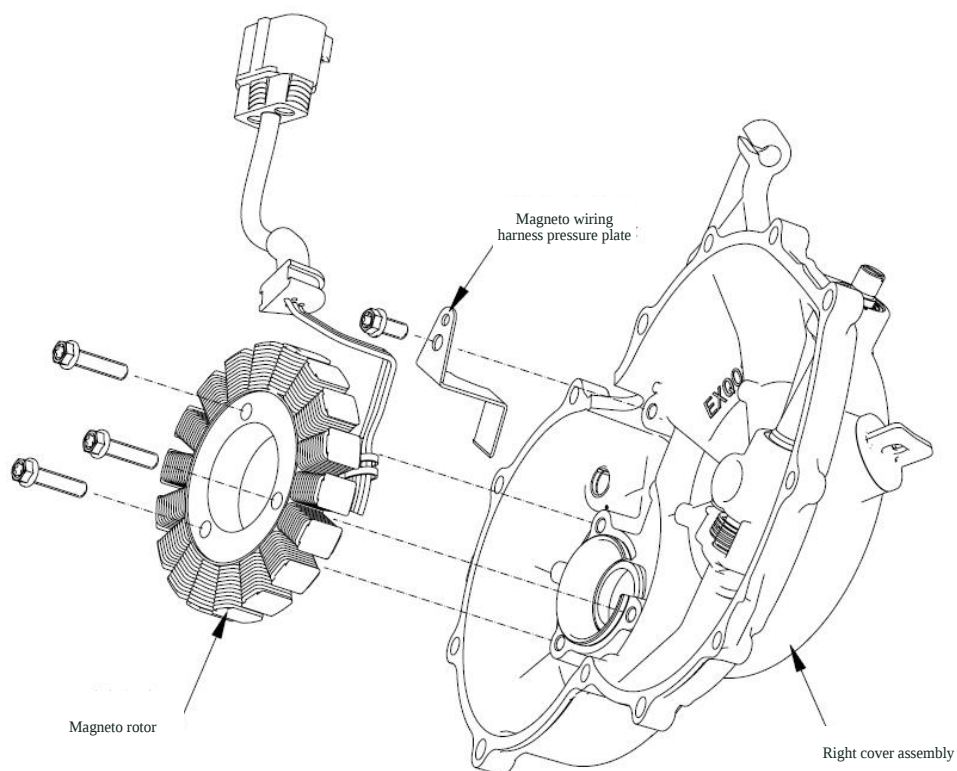


Assembly

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;
- Before installing the left cover gasket, apply an appropriate amount of plane sealant in the red area shown in the figure below;
- Refer "Bolt tightening methods for key parts" on page 150 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 "Engine bolt torque values" on page 147;
- The left cover bolts shall be tightened in a diagonal manner;
- The assembly method and sequence of the left side of the starting system, the starting motor section and the magneto rotor are opposite to the disassembly method. The assembly method of the right cover components is as follows:

Component arrangement diagram of the right cover



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;

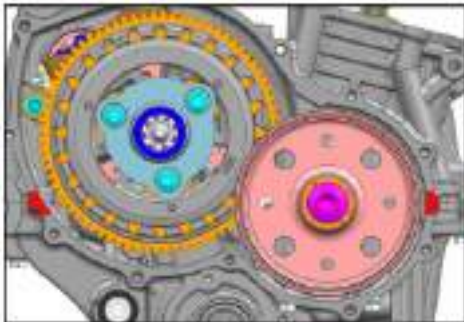




2. Install the pressure plate and the pressure plate fastening bolts on the right cover. Note that the pressure plate shall hold the magneto stator wiring harness in place without any exposure. Otherwise, it will interfere with the magneto rotor, resulting in the wiring harness being worn through and power generation failure;



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



4. Insert 4 right cover dowel pins into the case. Apply an appropriate amount of plane sealant in the red area shown in the figure. Then install the right cover gasket and the right cover assembly.

The assembly method is the opposite to the disassembly method.

Notes

- There is a strong magnetic force between the magneto rotor and the stator when installing the right cover. Pay attention to safety.

Front Wheel, Suspension, Steering

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Section 10 Steering Handlebar, Handlebar Upper Clamp	250
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Section 12 Steering Stem Assembly	252

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.
- After the front wheel is installed, conduct a clearance check. Standard: **0.5-1.2 mm**

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)

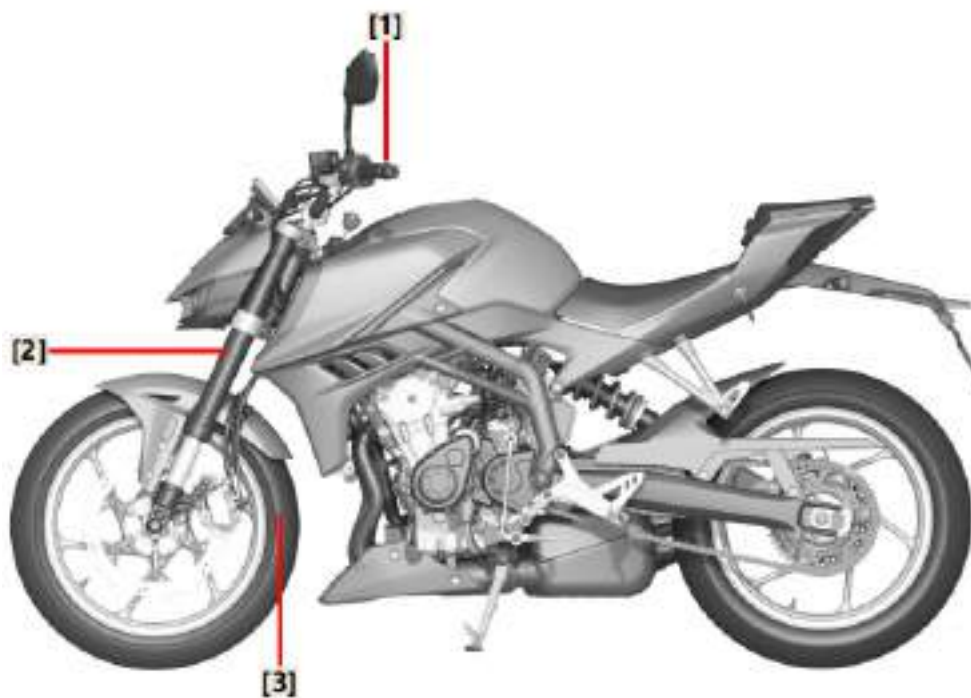
Hard suspension

- 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

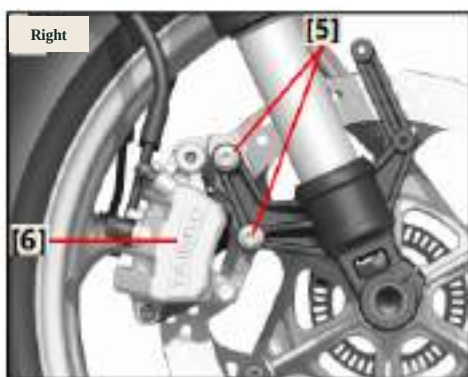
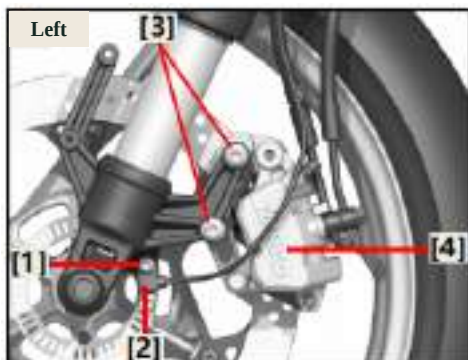
Position of Components



(1) Steering handle and components

(2) Front shock absorber

(3) Front wheel assembly



※ Front wheel assembly

Notes

- Keep the front wheel speed sensor or ABS ring gear away from any type of magnet (including magnetic pickup tools and magnetic screwdrivers); otherwise, the ABS ring gear may be damaged to cause poor performance of ABS
- Do not let the front wheel ABS ring gear fall or be impacted.
- If the front wheel ABS ring gear is stained with solvent, wipe it off immediately.

1. Securely support your motorcycle with a maintenance bracket or a crane and lift the front wheels off the ground.

▲ Warning

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

2. Disassembly

-Front fender;

See "Frame, Body Trim, Exhaust System" on page 57 for details.

- Bolt [1];
- Wheel speed sensor [2];
- Bolt [3];
- Rear brake caliper-left [4];
- Bolt [5];
- Front brake caliper-right [6];

Notes

- Support the brake caliper assembly well and do not hang it on the brake hose. Do not twist the brake hose.
- Avoid getting lubricating oil, engine oil or dirt on the brake disc or brake pad.
- When the brake caliper is removed, do not pull the brake handle.
- Be careful to prevent the brake caliper from scratching the wheel during removal.

3.Disassembly

- Front shock absorber right bottom cylinder locking bolt [1];
- Loosen the front wheel axle [2];
- Lift the front wheels off the ground;
- Front wheel axle [2];
- Front wheel bushing - right [3];
- Front wheel assembly [4];
- Front wheel bushing-left [5];

The installation sequence is reversed from the removal sequence.

Notes

- When tightening the torque bolts for the front shock absorber and front wheel axle, follow the left, right, and left sequence. First, tighten to 5 N·m, then fasten to the specified torque in the second time.
- When reinstalling the wheel and caliper, carefully position the front disc brake between the friction plate to avoid scratches.
- When installing the brake calipers, use new mounting bolts. Coat (Huitian 7262) thread locker to the bolts.
- During installation, apply grease in the groove between the main and auxiliary lips of the wheel hub bearing oil seal.
- Wipe the tip and mounting area of the front wheel speed sensor [6] to remove any foreign matter.

4.Inspection

- After installation, place the front wheel on the ground, operate the hand brake lever several times, and then move the front fork up and down several times. Lift the front wheel off the ground again and check that the wheel is rotating smoothly after you release the hand brake lever.
- Check the gap between the wheel speed sensor and the ring gears [a].

Standard: **0.5-1.2 mm**

Torque:

Front wheel speed sensor mounting bolt

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Front shock absorber tightened to front wheel axle

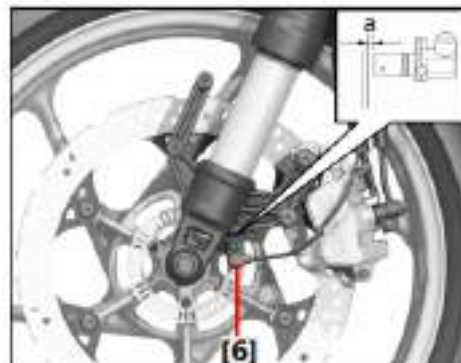
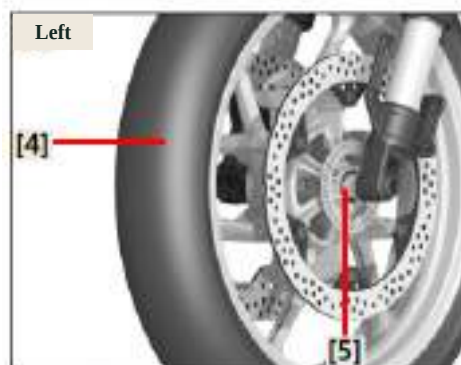
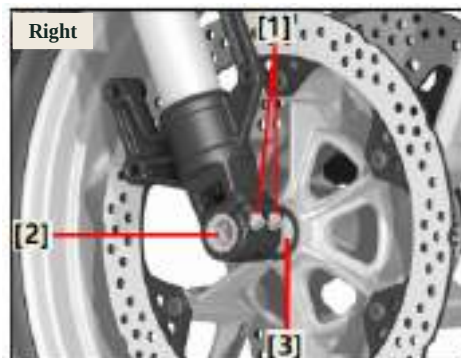
22 N·m (2.2 kgf·m, 16 lbf·ft)

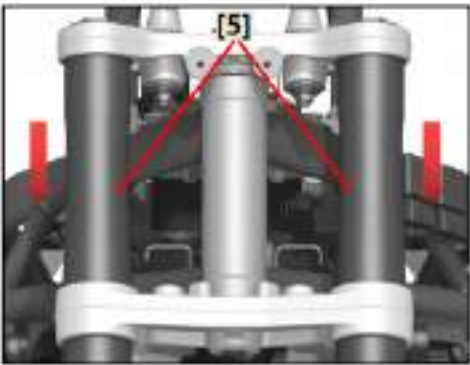
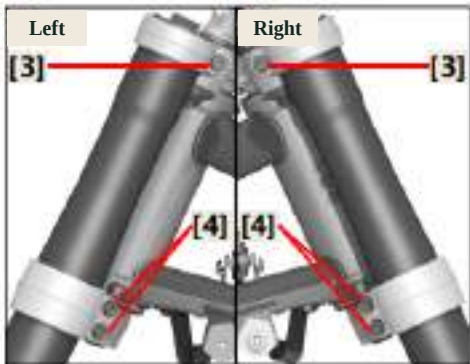
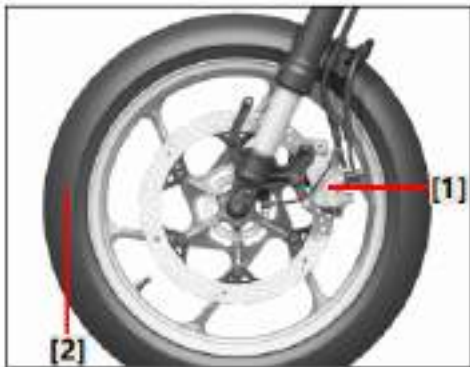
Front brake caliper-L/R and front shock absorber

35 N·m (3.5 kgf·m, 25 lbf·ft)

Front wheel axle

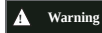
70 N·m (7.0 kgf·m, 52 lbf·ft)





※ Front shock absorber

1. Stand the vehicle on a flat ground.



Warning

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

Note

• Avoid surrounding body panels and interfering components before disassembly, and remove them if necessary to prevent damage.

2. Disassembly

- Front brake caliper-left/right [1];

- Front wheel assembly [2];

See "Front wheel assembly" on page 238 for details

Notes

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

• Do not operate the brake handle after removing the brake caliper.

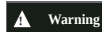
3. Disassembly

- Upper bracket locking bolt [3];

- Upper bracket locking bolt [4];

- Rotate downward to remove the front shock absorber—left and right [5];

The installation sequence is reversed from the removal sequence.



Warning

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

Notes

• Apply (Huitian 7262) thread locker on the upper and lower bracket mounting bolts

• When installing the locking bolt of the Lower bracket, tighten it in an up-down-up sequence. First, tighten it to 5 N·m, then fasten it to the specified torque in the second time.

Torque:

Upper bracket and front shock absorber (locking)

Lower bracket and front shock absorber (locking)

22 N·m (2.2 kgf·m, 16 lbf·ft)

※ Front shock absorber disassembly

1. Disassembly

-Front shock absorber

See "Front shock absorber" on page 240 for details.

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

2. Disassembly

- Adjust the end cap [1];
- Adjust the end cap locking nut [2];
- Spring bushing [3];
- Spring [5].

- a. Use the spring compression tool to press down on the spring bushing;
- b. Use a double-ended wrench to support the upper end of the bushing;
- c. Use a double-ended wrench to secure position [4] and loosen the adjusting end cover locking nut [2];
- d. Remove the adjusting end cover;
- e. Remove the double-ended wrench and the front fork spring compression tool;
- f. Remove the locking nut, spring bushing, and front shock absorber spring.

3. Emissions

-Front shock absorber oil

Note

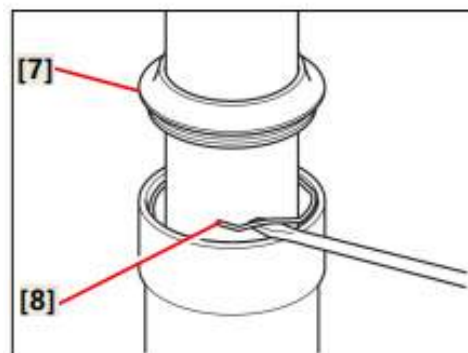
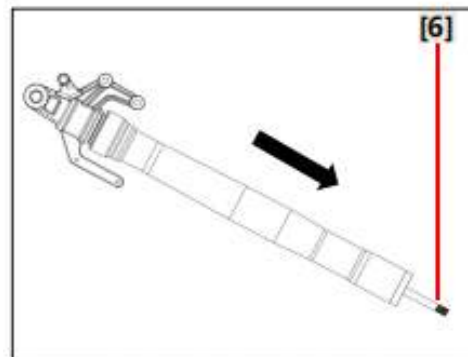
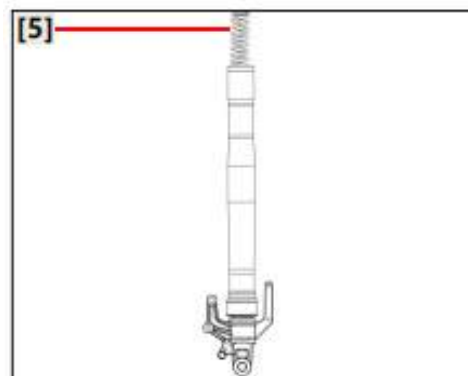
- When draining the shock absorber oil, move the shock absorber damping rod [6] up and down several times.

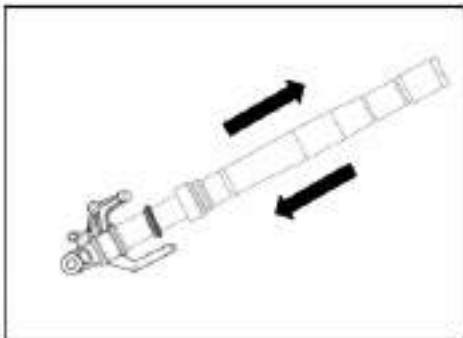
4. Remove the dustproof seal ring and oil seal circlip

- Dustproof seal ring [7];
- Oil seal circlip [8].
(Use a slotted screwdriver)

Notes

- Do not scratch the shock absorber fork tube.



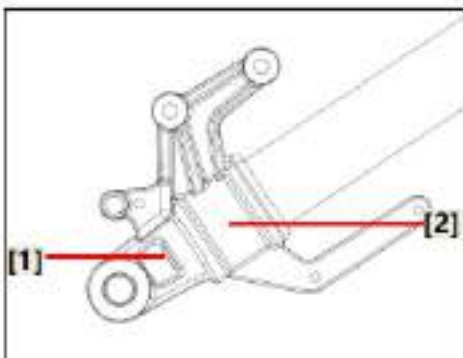


5. Disassemble outer tube and fork tube
-Outer tube.

- a. Keep the front shock absorber bottom tube horizontal.
- b. Clamp the front shock absorber bottom tube with a soft clamp.
- c. Carefully and firmly pull out the outer tube to separate it from the front fork tube.

Notes

- Excessive force will damage the bushing, and if the bushing is damaged, replace it in time.

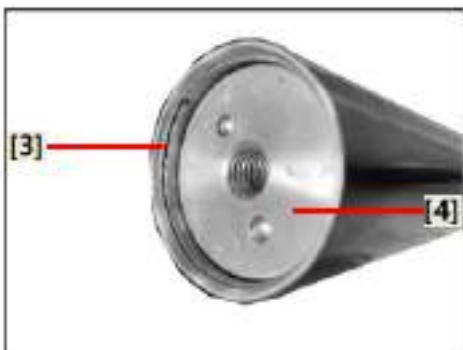


6. Disassemble other components:

- Outer tube bushing;
- Fork tube bushing;
- Washer;
- Oil seal;
- Oil seal circlip;
- Dustproof seal ring.

7. Disassemble the damper assembly

- Damper locking bolt [1];
- Shock absorber bottom tube [2];
- Damper circlip [3];
- Damper assembly [4].



Notes

- The damper assembly shall be removed from the circlip side.

※ **Inspection of front shock absorber assembly**

The following procedures for checking the front shock absorber apply to the left and right.

1. Inspection

-Front fork tube [1]

-Outer tube barrel [2];

Bent/scratched/damaged → Replace.

Warning

• Do not try to repair bent fork tubes as it may lead to danger.

2. Measurement

-Free length of spring [a]

Off-specification → Replace.

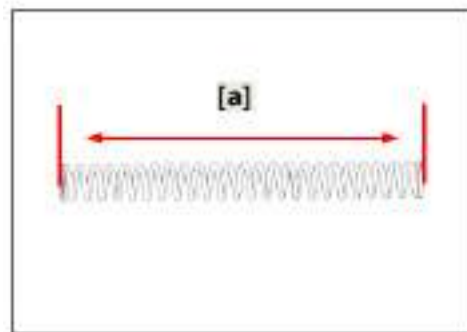
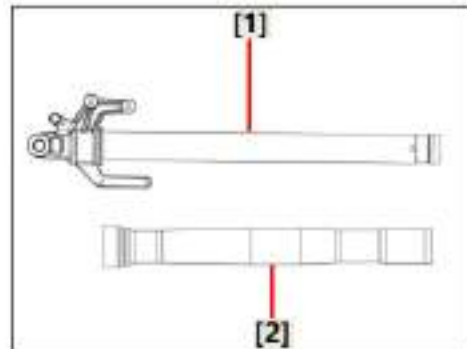
Standard/Limit: 238mm/228mm

3. Inspection:

-Damper assembly

Damage/wear → Replace.

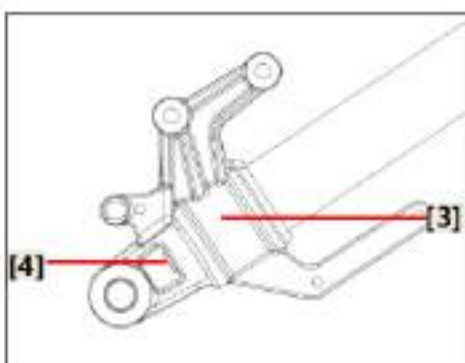
Stuck → Blow all oil passages with compressed air.



Notes

• The internal structure of the front shock absorber is very complex and is particularly sensitive to foreign matter.

• When disassembling and assembling the front shock absorber, do not allow foreign matter to enter the front shock absorber.



※ Front shock absorber assembly

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

⚠ Warning

•If the two front shock absorbers are not filled with the specified amount of damping oil, poor controllability may occur.

Note

•When assembling the front absorber, the following parts must be replaced:

- Fork tube bushing (Replace)
- Outer tube bushing (Replace)
- Oil seal (Replace)
- Dustproof seal ring (Replace)
- Oil seal circlip (Replace)

•Before assembling the front shock absorber, confirm the cleanliness of these components.

1.Installation

- Damper assembly [1];
- Damper circlip [2];

Notes

•Let the damping rod assembly inserted into the fork tube slowly, and be careful not to damage the fork tube.

•After the damper circlip is installed in the fork tube groove, the damper assembly should fit snugly against the circlip.

2.Installation

- Shock absorber bottom tube [3]
- Damper locking bolt [4];

Torque:

Front shock absorber damper bottom bolt

45 N·m (4.5 kgf·m, 33 lbf·ft)

Notes

•Apply a small amount of thread adhesive to the bolt during installation. Thread locker (Huitian 7262)

3. Lubrication

- The outer surface of the cross pipe.

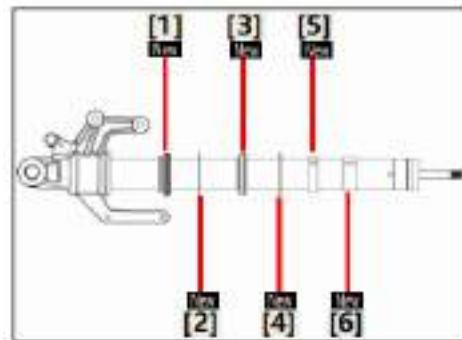
Recommended oil/KOVE dedicated damping oil

4. Installation

- Dustproof seal ring [1];
- Oil seal circlip [2];
- Oil seal [3];
- Washer [4];
- Outer tube bushing [5];
- Fork tube bushing [6]. (to front fork tube)

Notes

- Make sure that the side of the oil seal with the number is facing the bottom of the inner tube.
- Before installing the oil seal, lubricate the lip of the oil seal with lithium soap base grease.
- Before installing the oil seal, cover the top of the fork tube with a plastic bag to protect the oil seal from scratching during installation.

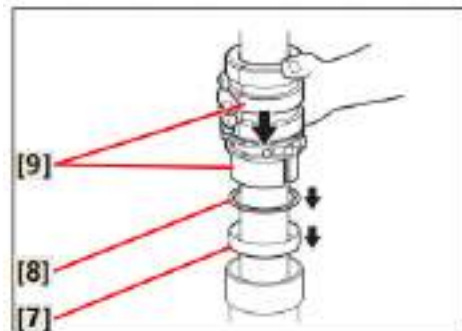


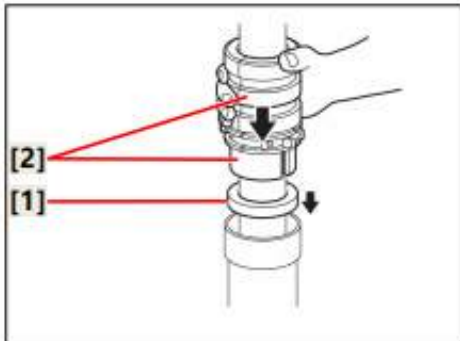
5. Installation

- Outer tube;
(to fork tube)

6. Install

- Outer tube bushing [7];
 - Washer [8].
(Use the front shock absorber oil seal hammer [9])
- Adjustable front shock oil seal hammer (36–46 mm)





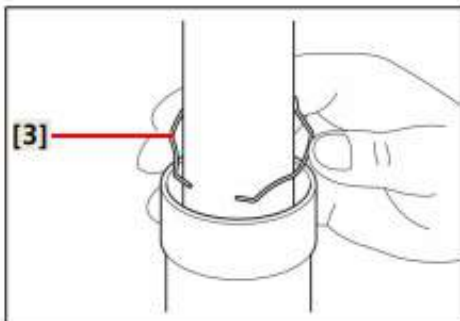
7.Install
-Oil seal[1];
(Use shock absorber oil seal hammer [2])

Front shock absorber oil seal hammer
Adjustable front shock absorber oil seal hammer
(36–46 mm)

8.Install
-Oil seal circlip [3].

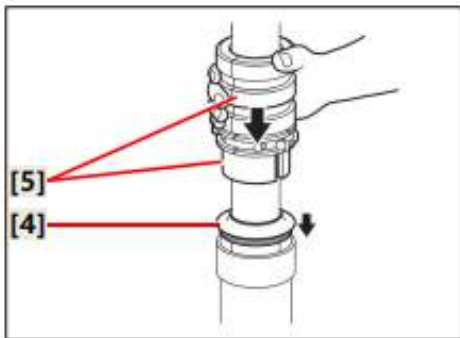
Note

- Adjust the oil seal circlip to fit into the groove of the outer tube.



9.Install
-Dustproof seal ring[4]
(Use shock absorber oil seal hammer [5])
Front shock absorber oil seal hammer
Adjustable front shock absorber oil seal hammer
(36–46 mm)

10.Add
-Front shock absorber oil.
(Add the recommended front shock absorber oil to the specified level)



The manufacturer provides special shock absorber oil
The oil filling amount of the left and right shock absorbers is 457 ± 3 ml

Notes

- Always use the recommended shock absorber oil. Other oils may adversely affect the performance of the front shock absorber.

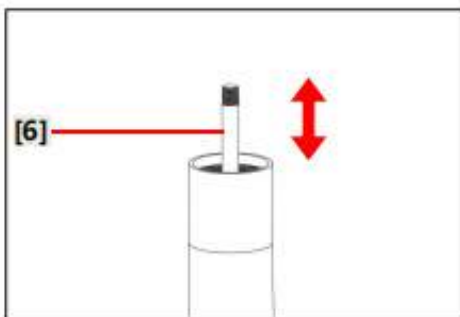
- When disassembling and assembling the front shock absorber, do not allow foreign matter to enter the front shock absorber assembly.

11.After the front shock absorber is filled with oil, slowly pump up and down the rod [6] in the shock absorber (at least 10 times) to make the front shock absorber oil evenly distributed.

Note

- Since the shock-absorbing oil may spray out, always slowly pump the rod in the shock-absorbing damper

- Always drain the residual air from the front shock absorber.



12.Install

-Front damping spring;

-Place the front shock absorber spring [1], spring bushing assembly [2], [3] into the fork tube [4] in order.

Note

•As shown in Figure 1, the end of the shock absorber spring with the larger spacing should face upward during installation.

13.Install the regulator end cap assembly

-Regulator end cap assembly [5];

-Adjuster end cap locking nut [6].

a. Press the front absorber spring bushing [7] with the spring compression tool;

b.Use a double-end wrench to support the upper end face of the spring bushing;

c.Use a double-ended wrench to secure position [8] and tighten the adjuster end cover locking nut [6];

d.Remove the double-ended wrench and the front fork spring compression tool;

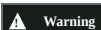
Torque:

Damper inner rod and regulator end cap tightening nut

15 N·m (1.5 kgf·m, 11 lbf·ft)

Notes

•The inner thread of the lower end of the regulator end cap must be rotated to the root of the rod thread in the damper to tighten the lock nut.



Warning

•Use a new O-ring after each disassembly and assembly.

14.Installation

-Regulator end cap [9] (to Outer tube [10])

Notes

•Temporarily lock the regulator end cap.

•After installing the front shock absorber to the motorcycle and locking the fastening bolt of the lower connecting plate, lock the bolt of the regulator end cap to the specified torque.

Torque:

Front shock absorber adjuster end cover bolt

22 N·m (2.2 kgf·m, 16 lbf·ft)

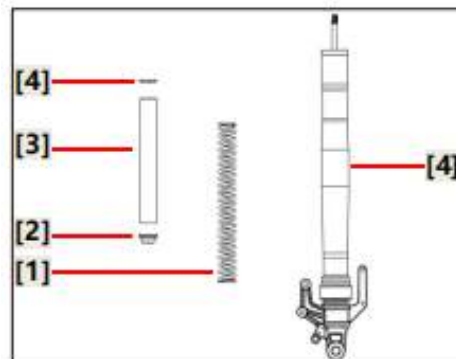
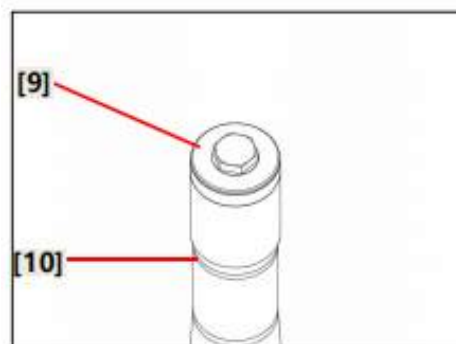
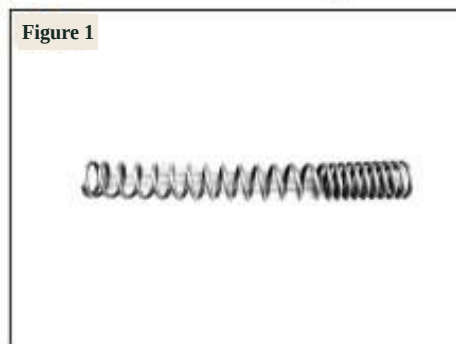
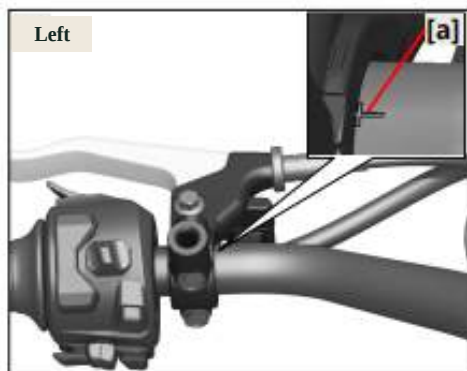
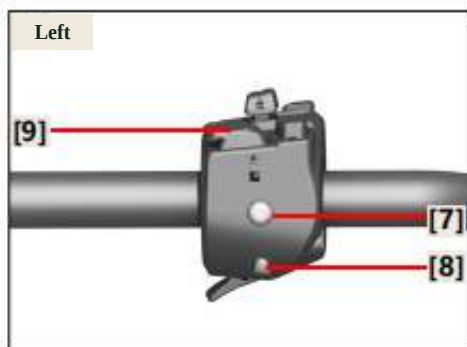
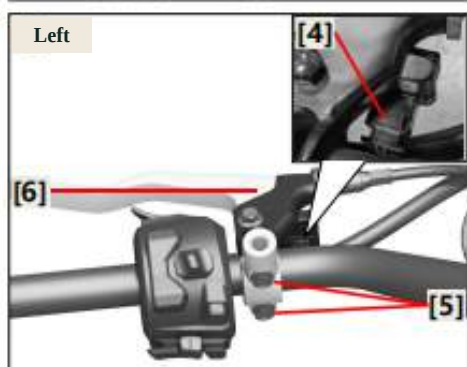
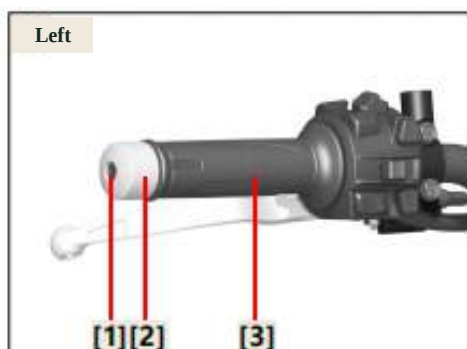


Figure 1





※ Handlebars (left and right) and components

1. Stand the vehicle on a flat ground.



Warning

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

2. Disassembly

Clutch lever assembly/handlebar switch - left

Note

• Disconnect the left and right handlebar switch harness plugs before disassembling.

- Bolt [1];
- Steering handlebar counterweight [2].
- Handlebar grip - left [3];
- Clutch switch harness plug [4];
- Bolt [5];
- Clutch lever assembly [6];
- Bolt [7];
- Handlebar switch - left mounting screw [8];
- Handlebar switch - left [9].

The installation sequence is reversed from the removal sequence.

Notes

• When installing the left handlebar switch, the inner protrusions must be aligned with the pre-drilled positioning holes on the steering handlebar.

Torque:

Handlebar switch - left mounting screw

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Handlebar switch-left and handlebar connecting bolt

5.0 N·m (0.5 kgf·m, 4.0 lbf·ft)

Clutch handle assembly mounting bolt

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Note

• When installing the clutch lever assembly, align the joint surface of the clutch lever retaining socket with the engraving point [a] on the upper left of the steering handlebar.

3.Disassembly

Front brake pump/handlebar switch - right/oiler/
handlebar grip assembly - right

- Steering handlebar counterweight (removal method is the same as that on the left side);
- Brake light switch harness plug [1];
- Bolt [2];
- Front brake pump assembly [3];
- Screw [4];
- Handlebar switch—upper right cover [5];
- Screw [6];
- Handlebar switch - lower right cover [7];
- Throttle cable and oiler connecting screw [8];
- Oiler mounting screws [9], [10];
- Oiler upper cap [11];
- Oiler lower cap [12];
- Accelerator cable AB [13];
- Handlebar grip assembly - right and oiler handle core [14].

The installation sequence is reversed from the removal sequence.

Torque:

Right handlebar swiche mounting screws [4], [6]

Oiler mounting screws [9], [10]

2.0 N·m(0.2 kgf·m; 1.5 lbf·ft)

Throttle cable and oiler connecting screw [8]

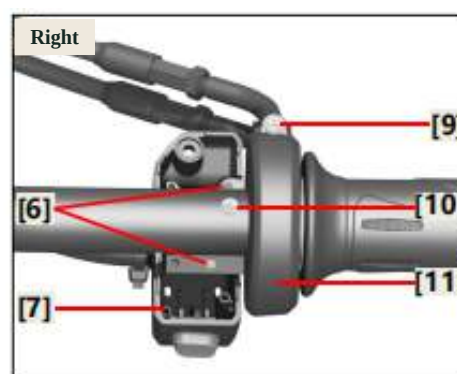
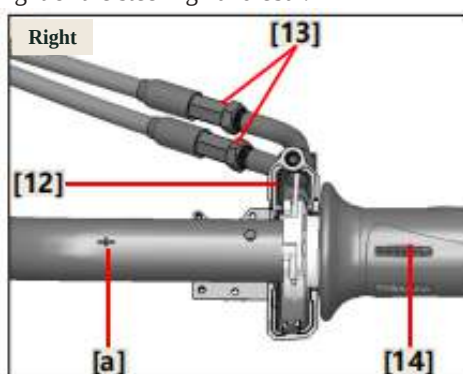
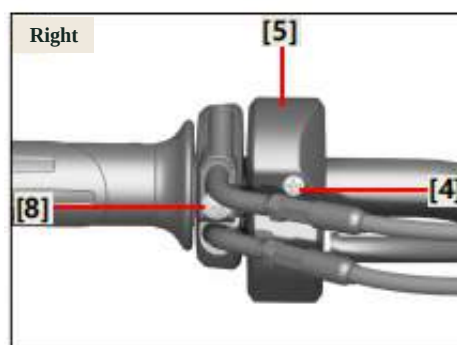
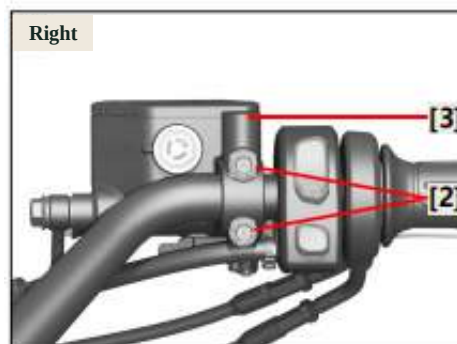
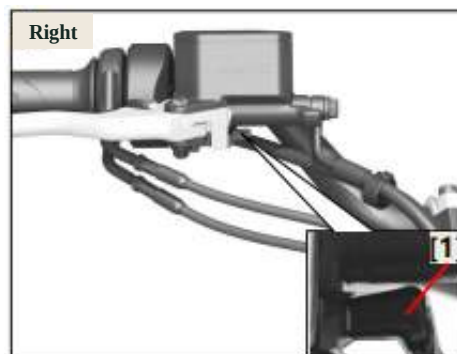
3.0 N·m (0.3 kgf·m, 2.2 lbf·ft)

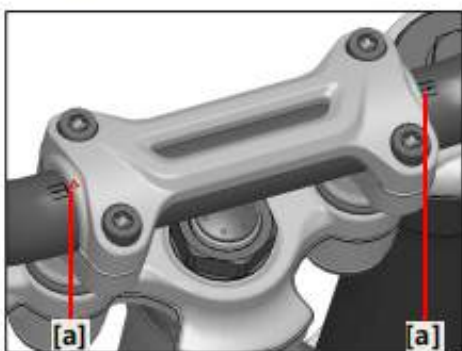
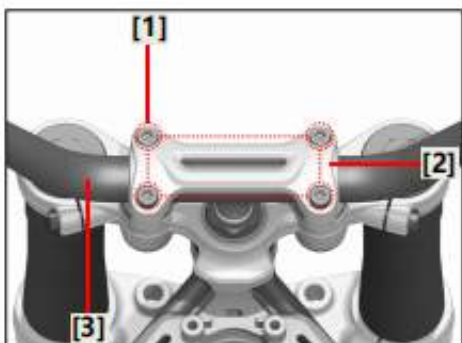
Front brake pump mounting screw [2];

10 N·m(1.0 kgf·m;7.4 lbf·ft)

Note

- When installing the front brake pump, align the joint surface of the front brake pump retaining socket with the engraving mark [a] on the upper right of the steering handlebar.





※ Steering handlebar, handlebar upper clamp

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Steering handlebar clamp[2];
- Steering handlebar [3].

The installation sequence is reversed from the removal sequence.

Notes

- When installing the steering handlebar, the left and right limit values are set to "0" by default, flush with the limit marks on both sides of the handlebar clamp, or adjusted appropriately within the scale range according to the rider's preference.

Torque:

Upper clamp and lower socket of the steering handlebar

22 N·m (2.2 kgf·m, 16 lbf·ft)

※ **Upper bracket, steering handlebar lower socket**

※

Disassembly/installation

Disassemble the following parts:

- Headlight assembly and instrument [1];
- See "Frame, Body Trim, Exhaust System" on page 57 for details.
- Steering handlebar [2]
- Upper bracket locking bolt [3];
- Steering stem plug [4];
- Steering stem locking nut and flat gasket [5]
- Upper connecting plate [6];
- Nut and flat gasket [7];
- Steering handlebar buffer rubber [8];
- Double-ended threaded stud [9];
- Steering handlebar lower socket [10].

The installation sequence is reversed from the removal sequence.

Notes

- Apply (Huitian 7262) thread locker on the upper bracket locking bolt.
- Apply (Huitian 7262) thread locker to the double-ended thread stud when connecting it to the lower socket of the handlebar.

Torque:

Upper bracket and front shock absorber (locking)

Double-threaded stud and upper bracket locking nut (M8)

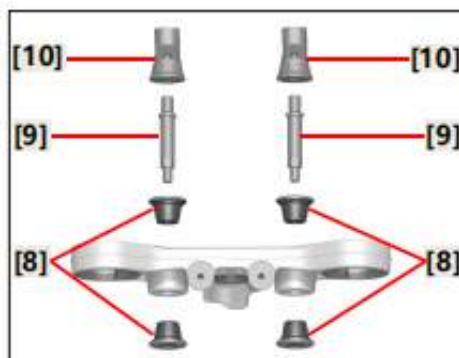
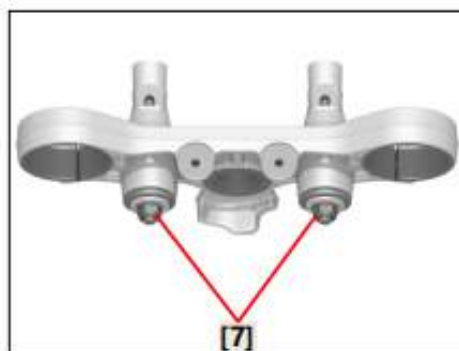
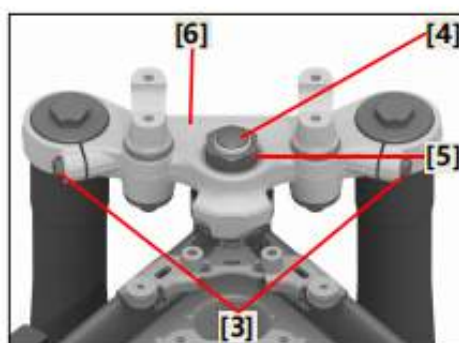
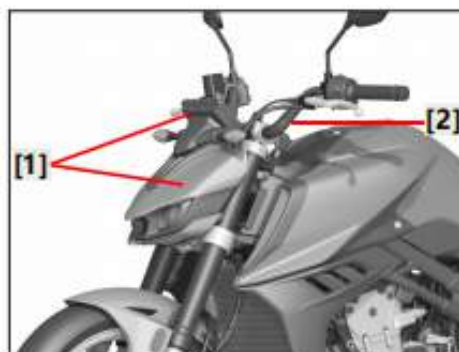
22 N·m (2.2 kgf·m, 16 lbf·ft)

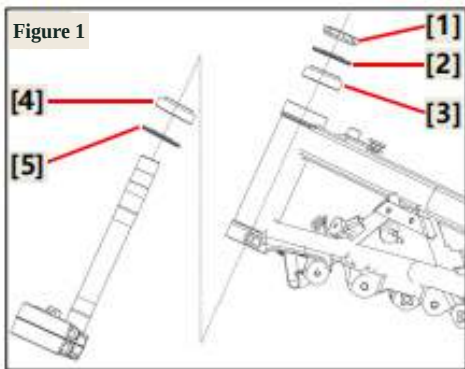
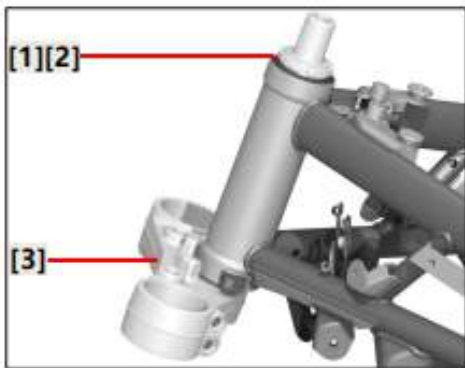
Double-threaded stud to lower socket of steering handlebar (M10)

30 N·m (3.0 kgf·m, 22 lbf·ft)

Steering column locking nut

128 N·m (12.8 kgf·m, 94 lbf·ft)





※ Steering stem assembly

Disassembly/installation

Disassemble the following parts:

- 4-slot nut [1];
- Upper dustproof cover [2];
- Steering stem assembly [3].

The installation sequence is reversed from the removal sequence.

Notes

- Use a special tool to disassemble and assemble the 4-slot adjusting nut.

Torque:

Steering stem locking 4-slot nut

First stage: 45N·m; Second stage: Retract the adjusting nut by 180° and tighten it to 20N·m; Third stage: Keep the direction fixed and retract by 15° (≈one groove position).

Upright tube bearing model:

Upper-561205A1TN1 ($\phi 25 \times \phi 47 \times 15$)

Lower-33005 ($\phi 25 \times \phi 47 \times 17$)

Grade: P5

The installation and disassembly of the steering stem assembly are as shown in Figure 1:

- [1] 4-slot adjusting nut
- [2] Steering stem upper dust cover
- [3] Steering stem upper bearing
- [4] Steering stem lower bearing
- [5] Steering stem lower dust cover

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 dismounted.
- After installing the rear wheel, step on the brake pedal to check the brake operation.
- After the rear wheel is installed, conduct a clearance check. (Standard: 0.5-1.2 mm)
- 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
- Wear or damage of driven flange 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

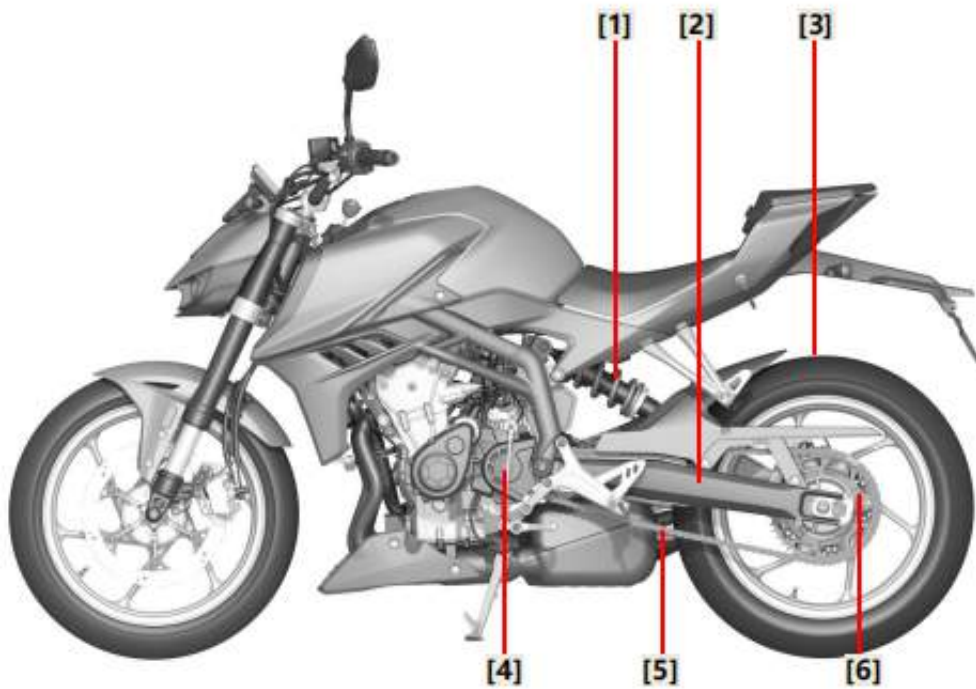
Hard suspension

- High tire pressure
- Improper adjustment of suspension
- Bending of shock absorber rod
- Damage to suspension or slewing pivot bearing
- Improper tightening of slewing pivot

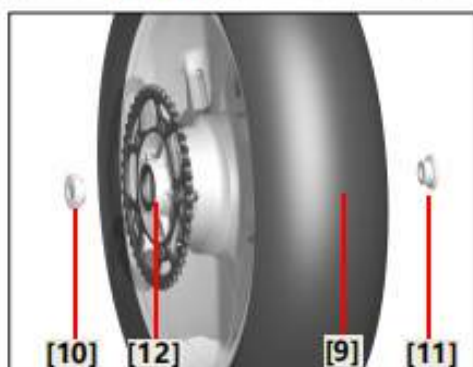
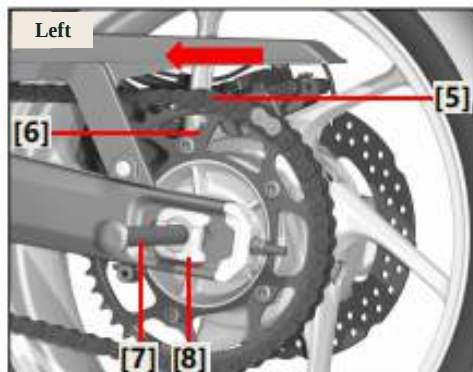
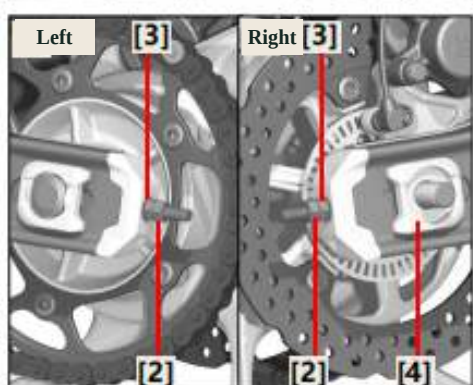
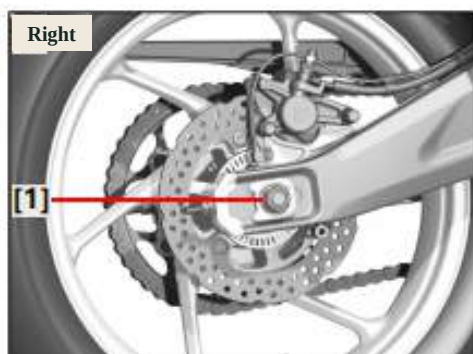
Noise from rear suspension

- Loose suspension fasteners.
- Wear or damage of suspension pivot bearing
- Shock absorber failure

Position of Components

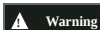


(1) Rear shock absorber	(2) Rear swingarm	(3) Rear wheel assembly
(4) Driving sprocket	(5) Drive chain	(6) Driven sprocket



※ Rear wheel assembly

1. Stand the vehicle on a flat ground.



Warning

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

2. Disassembly

- Rear wheel shaft nut and gasket [1];
- Loosen the locking nuts [2] and adjusting nuts [3] on the left and right sides of the chain adjuster;
- Chain adjuster - right [4];

- Push the rear wheel forward to disengage the drive chain [5] from the drive sprocket [6];
- Rear wheel axle [7];
- Chain adjuster - left [8];

- Rear wheel assembly [9];
- Rear wheel bushing - left [10];
- Rear wheel bushing - right [11];
- Buffer assembly [12].

Notes

- Do not operate the brake pedal after the wheel is disassembled.
- The left side of the rear wheel hub is equipped with an O-ring [a] to prevent it from falling off during disassembly.

Torque:

Chain adjuster adjusting nut

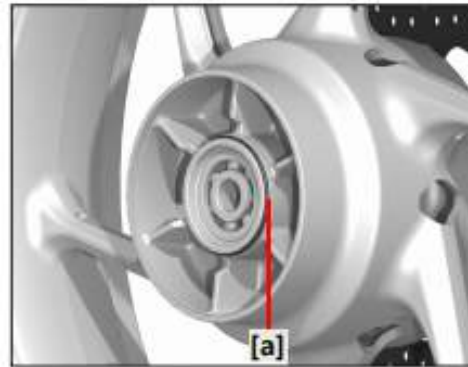
1.5 N·m (0.1 kgf·m, 1.1 lbf·ft)

Chain adjuster locking nut

16 N·m (1.6 kgf·m, 12 lbf·ft)

Rear wheel axle locking nut

108 N·m (10.8 kgf·m, 80 lbf·ft)



Notes

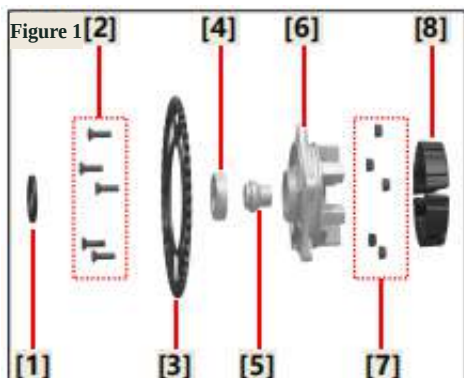
- When installing the rear wheel, be careful not to let the brake caliper fall out of the rear swing arm boss or damage the brake pad.
 - After installation, the drive chain slack must be readjusted.
- See "Inspection and adjustment of slack of drive chain" on page 264 for details.
- Apply a very small amount of grease to the groove between the main and auxiliary lips of the hub bearing seal during installation.
 - Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent).

3. Inspection

- Rotating the inner turn of each bearing with your finger; the bearing should turn smoothly and quietly.
- Check if the bearing outer turn fits snugly with the wheel hub.
- If the bearing does not rotate smoothly, or is not securely installed in the wheel hub, replace the bearing.

4. Installation

The installation sequence is reversed from the removal sequence.



※ Buffer assembly

⚠ Warning

•The buffer body bearing must be press-fitted using a special tool with the outer turn pressing method. Do not disassemble it without authorization.

The installation and disassembly of the buffer assembly are as shown in Figure 1:

- Oil seal [1];
- Bolt [2];
- Drive sprocket [3];
- Buffer bearing [4];
- T-bushing [5];
- Buffer [6];
- Nut [7];
- Buffer rubber [8];

Torque:

Driven sprocket connected to buffer

35 N·m (3.5 kgf·m, 25 lbf·ft)

Inspection

- Buffer [6];
Crack/damage → Replace.
- Buffer rubber [8];
Damage/wear → Replace.

※ 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.

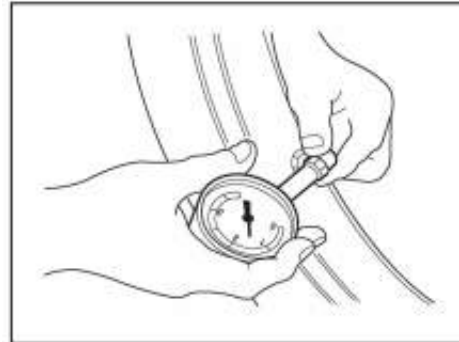
Tire pressure:

Cycling on paved roads

Front wheels: 230 kPa (2.30 kgf/cm², 33 psi)

Rear wheels: 250 kPa (2.50 kgf/cm², 36 psi)

☆ Adjust the tire pressure appropriately based on the specific usage requirements.



※ Inspection of rim damage and runout

1. Measurement

-Radial wheel rim runout [1]

-Axial wheel rim runout [2]

Exceed the specified limit → 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

Exceed the specified value → Replace.

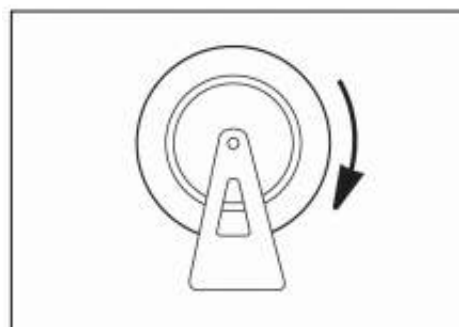
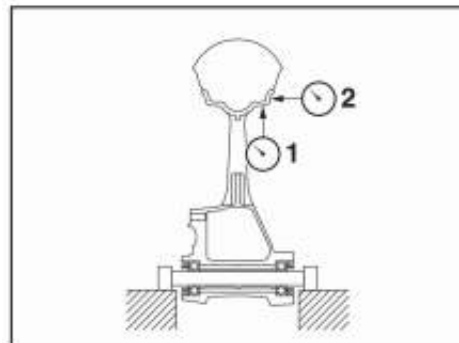
2. Inspection

-Wheel bearing

If the wheel rotates unevenly or too tightly →
Replace the wheel bearing.

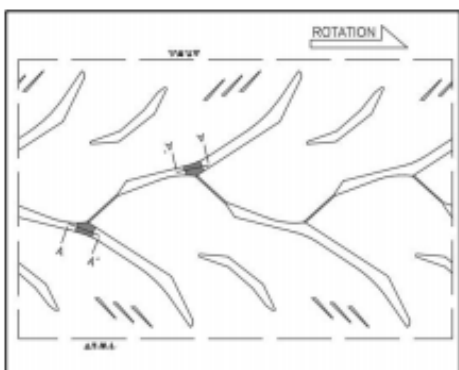
-Oil seal

Damage/wear → Replace.



Tire specifications:

Front wheel	120/70 ZR17 58W TL	
	CST/CHENG-SHIN-TIRE	CM-S1
Rear wheel	160/60 ZR17 69W TL	
	CST/CHENG-SHIN-TIRE	CM-S1H
Type	Semi-sintered/tubeless tire	



※ 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.

- 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

- ROTATON → Mark the tire rolling direction.
- Indicate the tire wear limit by marking the Δ TWL mark on both the sidewall and center position of the tire.

※ Rear shock absorber and swingarm

1. Stand the vehicle on a flat ground.

Warning

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

Note

• Avoid surrounding body panels and interfering components before disassembly, and remove them if necessary to prevent damage.

2. Disassembly

- Front seat cushion assembly [1];
- Side cover - left/right [2];
- Rear footpeg left/right and chain guard [3];
- Muffler assembly [4];

See "Frame, Body Trim, Exhaust System" on page 57 for details.

- Rear shock absorber upper connected to frame [5];

- Rear shock absorber lower connected to swingarm [6];

- Rear shock absorber [7];

3. Disassembly

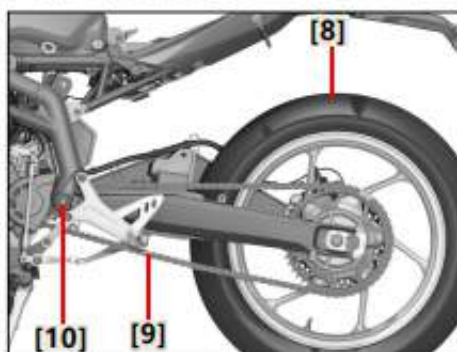
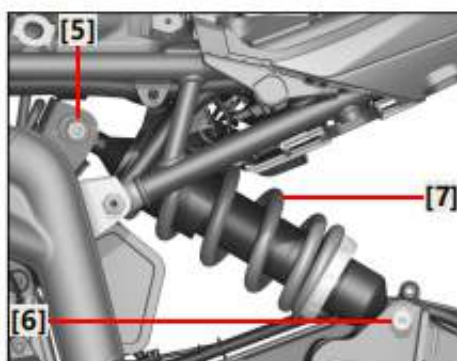
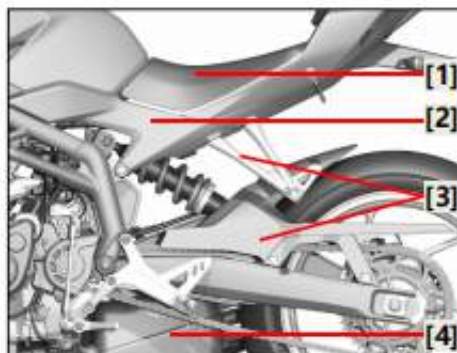
- Rear wheel assembly [8];

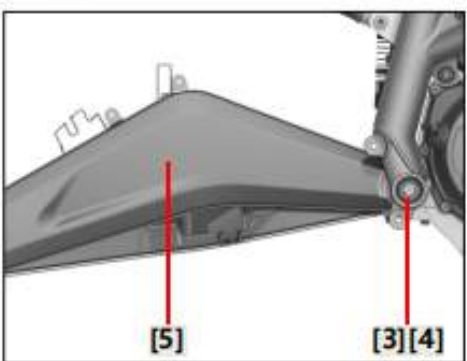
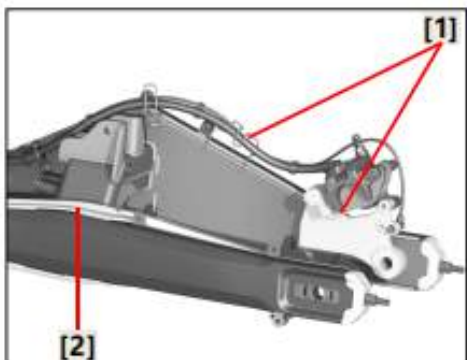
See page 256 for details.

- Drive chain [9];

See "Replacement of drive chain" on page 267 for details.

- Frame left and right swingarm bore caps [10];





4. Disassembly

- Brake caliper assembly and wiring harness oil pipe [1];

- Chain clip [2];

See "Frame, Body Trim, Exhaust System" on page 57 for details.

- Swingarm axle locking nut and gasket [3];

- Swingarm axle [4];

- Rear swingarm [5];

Note

• When disassembling the rear swingarm, carefully remove the brake caliper from the swingarm boss, and detach the rear brake hose and wiring harness from the swingarm wire hook to avoid bending or damage.

5. Installation

The installation sequence is reversed from the removal sequence.

Torque:

Rear shock absorber upper part connected to frame

Rear shock absorber lower part connected to swingarm

54 N·m (5.4 kgf·m, 40 lbf·ft)

Swingarm shaft locking nut

88 N·m (8.8 kgf·m, 65 lbf·ft)

Notes

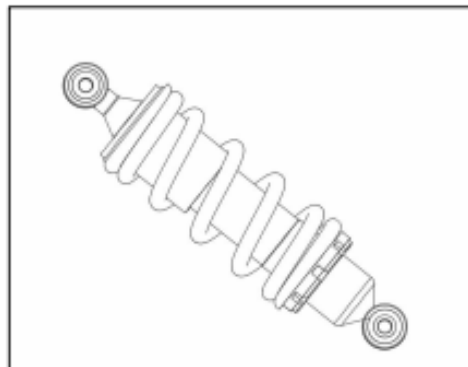
• Apply a very small amount of grease to the groove between the main and auxiliary lips of the swingarm bearing seal during installation.

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

※ Rear shock absorber assembly

Warning

- This rear shock absorber contains highly compressed nitrogen gas. Before removing the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for any property loss or personal injury resulting from improper operation of the rear shock absorber.
- Do not modify or attempt to remove the rear shock absorber.
- Avoid exposing the rear shock absorber to open flames or any other high-temperature sources. Due to the high gas pressure, exposure to high temperatures can lead to an explosion.



1. Park the vehicle on a level surface.

Warning

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

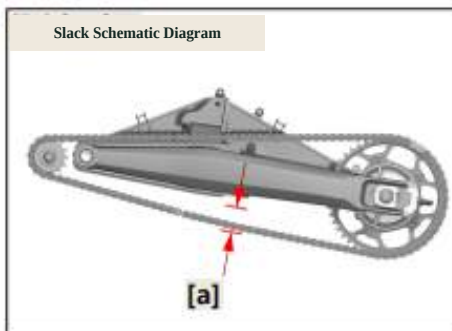
Note

- 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. For details on disassembling the rear shock absorber, see page 261.

3. Check the rear shock absorber assembly

- Rear shock absorber inner rod
Bent/damage → Replace the rear shock absorber assembly.
- Rear shock absorber assembly (built-in airbag)
Air leakage → Replace the rear shock absorber assembly.
- Spring
Damage/wear → Replace the rear shock absorber assembly.
- Size of Bolts
Bent/damage/wear → replace.



※ Inspection and adjustment of slack of drive chain

Notes

•A drive chain that is too tight can overload the engine and other important components, while a drive chain that is too loose can cause gear skip and damage the swingarm or cause an accident. Therefore, the slack of the drive chain should be maintained within the specified range.

1.1.Place the vehicle on the workbench.

⚠ Warning

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

Note

•Use a dedicated motorcycle maintenance workbench to keep the rear wheel in a raised position.

2.Put the vehicle in neutral.

3.Inspection

-Slack drive chain

Off-specification → Adjust.

Note

•Push the drive chain upward from the position indicated by the arrow and measure the distance [a] between the centers of the drive chain.

Standard: 20-35 mm

Limit: 35 mm

Notes

•Improper slackness in the drive chain can overload the engine and other critical components of the motorcycle, potentially leading to chain slippage or breakage. If the drive chain slack exceeds the specified limit, it can damage the frame, rear rockerarm and other components. To prevent this, maintain the drive chain slack within the specified range.

4. Loose

-Rear wheel axle nut [1]

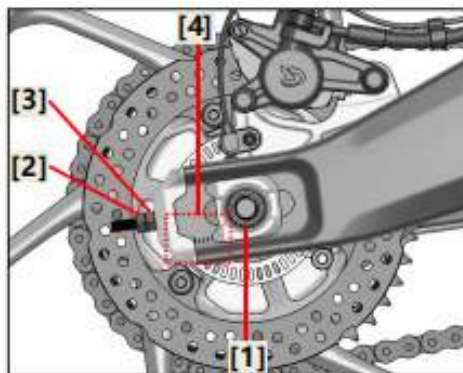
See "Rear wheel assembly" on page 256 for details.

5. Adjustment

-Looseness of transmission chain

a. Loosen the locking nuts on both sides of the adjuster [2].

b. Rotating the adjusting nuts [3] on both sides of the adjuster while adjusting the drive chain adjusting block until the drive chain slack meets the specified range.



Note

- To maintain correct wheel alignment, make sure to align the adjuster on both sides with the scale marking line [4].

- There shall be no clearance between the swingarm end cover and the head of the adjustment bolt.

c. Tighten the rear axle nut to the specified torque.

d. Tighten the adjuster locking nuts to the specified torque.

Torque:

Chain adjuster adjusting nut

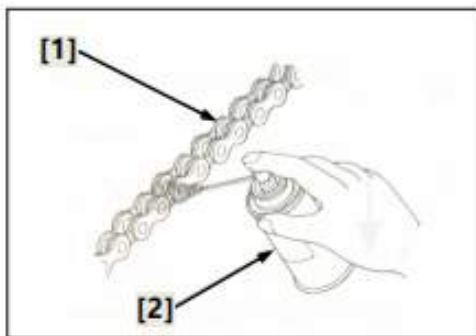
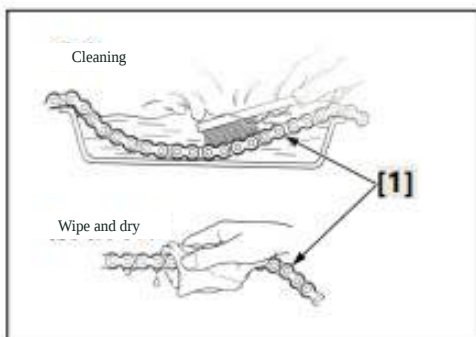
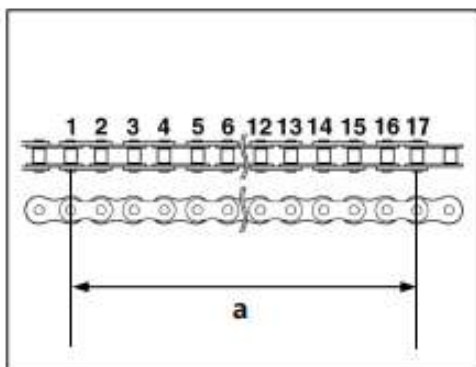
1.5 N·m (0.1 kgf·m, 1.1 lbf·ft)

Chain adjuster locking nut

16 N·m (1.6 kgf·m, 12 lbf·ft)

Rear wheel axle locking nut

108 N·m (10.8 kgf·m, 80 lbf·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.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.

Usage limit: 257 mm

If the measured value exceeds the maintenance limit, please replace the drive chain.

2.Inspection

Inspect whether the chain gear is bent or damaged, please replace it if necessary.

3.Cleaning

This drive chain has small rubber rings between each link plate. Avoid cleaning the drive chain with high-pressure water or air jets, steam, gasoline, certain solvents (such as volatile oil), or abrasive brushes. Using high-pressure methods can result in dirt or water flowing into the inner part of the drive chain, while solvents can cause aging of the X-type oil seal. Abrasive brushes can also cause damage to the X-type oil seal. Therefore, only kerosene is suitable and allowed for cleaning the drive chain.

Notes

•Avoid immersing the drive chain in kerosene for more than 10 minutes, as it can cause damage to the X-type oil seal.

4.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.

※ Replacement of drive chain

1. Place the vehicle on the maintenance workbench.

⚠ Warning

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

Note

- Use a dedicated motorcycle maintenance workbench to keep the rear wheel in a raised position.

2. Disassembly

- Gear shift assembly [1];
- Engine front sprocket cover [2];
- Chain guard [3];

See "Frame, Body Trim, Exhaust System" on page 57 for details.

3. Disassembly

- Drive chain [4].

Note

- Replace the drive chain using the drive chain cutting and riveting tool.

The installation sequence is reversed from the removal sequence.

Note

- After replacing the chain, adjust the drive chain slack to the specified range again.

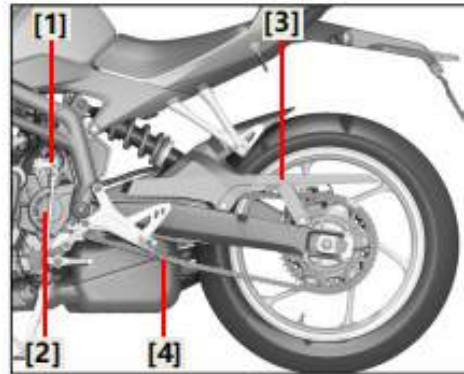
Standard link: **112 links** (Choho)

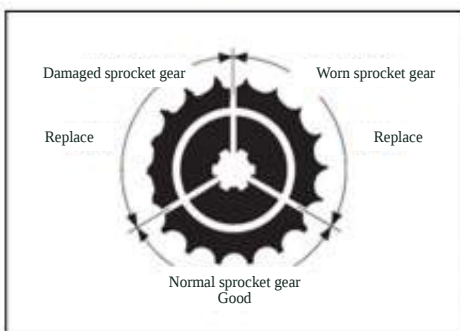
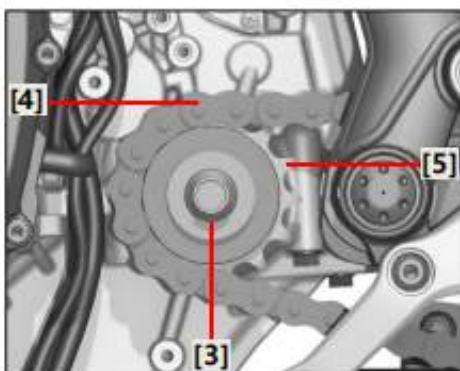
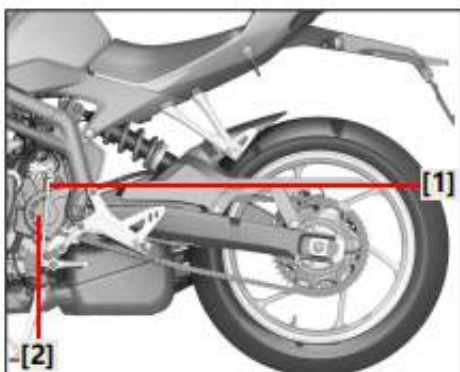
Replacement of chain: **520UX** (X-type oil seal, closed)

Notes

- 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.

When replacing the drive chain, inspect the sprocket as well.





※ Replacement and inspection of drive/driven sprockets

1. Driving sprocket

Disassembly/installation

Disassemble the following parts:

- Gear shift assembly [1];
- Small sprocket cover[2];

See "Frame, Body Trim, Exhaust System" on page 57 for details.

- Driving sprocket locking bolt [3];
- Drive chain [4];
- Driving sprocket [5].

2. Driven sprocket

See "Rear wheel assembly" and "Buffer body assembly" on pages 256–258 for details.

Inspection

Check the drive sprocket teeth and driven sprocket 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 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:

Driven sprocket connected to buffer

35 N·m (3.5 kgf·m, 25 lbf·ft)

Drive sprocket locking bolt

55 N·m (5.5 kgf·m, 41 lbf·ft)

Hydraulic Braking System

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Maintenance Instructions

Overview:

- This section describes the maintenance of conventional brake components of the brake system.
- This model is equipped with an anti-lock braking system (ABS), and provided with the execution method of brake fluid replacement procedure and bleed procedure.
- 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.
- When dismounting the wheel speed sensor, be sure to check the clearance between wheel speed sensor and ring gear after installation.
- 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/ Brake handle/pedal unsmooth operation/ pedal stuck

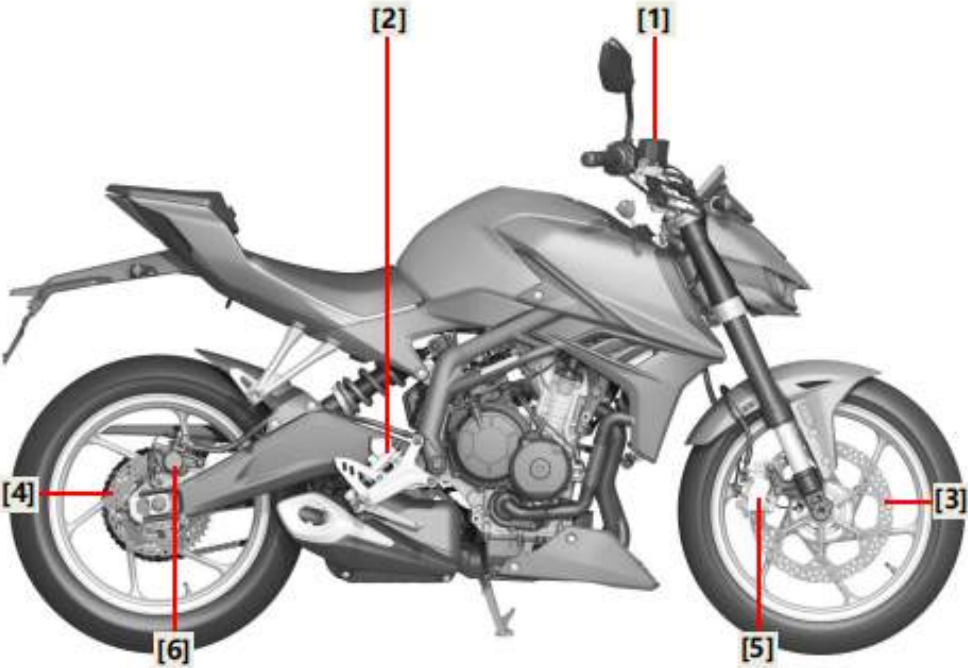
- Air in hydraulic system
- Leakage in hydraulic system
- Contaminated brake pads/discs
- Wear of brake caliper piston seal
- Wear of main piston cup
- Contaminated brake pads/discs
- Contaminated brake caliper
- Contaminated brake pump
- Abnormal sliding of brake caliper
- Low brake fluid level
- Oil passage blockage
- Distortion/deformation of brake disc
- Brake caliper piston stuck/worn
- Main piston stuck/worn
- Bent brake bar/pedal

- Blocked/restricted oil passage
- Brake caliper piston stuck/worn
- Abnormal sliding of brake caliper
- Wear of brake caliper piston seal
- Main piston stuck/worn
- Bent brake bar/pedal

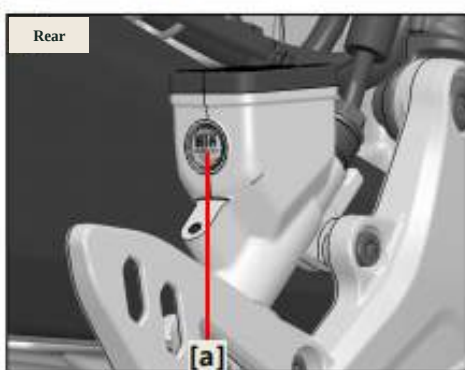
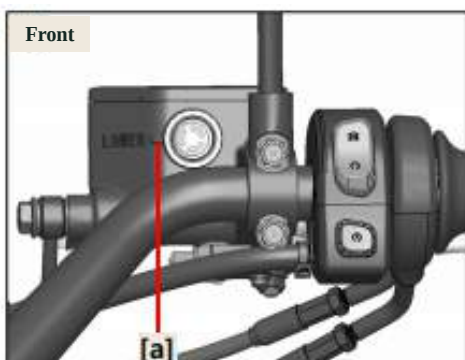
Brake resistance

- 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



(1) Front brake pump	(2) Rear brake pump	(3) Front disc brake
(4) Rear disc brake	(5) Front brake calipers/front brake pads	(6) Rear brake caliper/rear brake pads



※ Inspection 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.
 - During the process of filling the reservoir, take care to prevent any foreign matter from entering.
- Level inspection

Check the brake fluid level in both the front and rear brake master cylinder liquid reservoirs. If the level is close to the lower level line (LOWER) [a], 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

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.

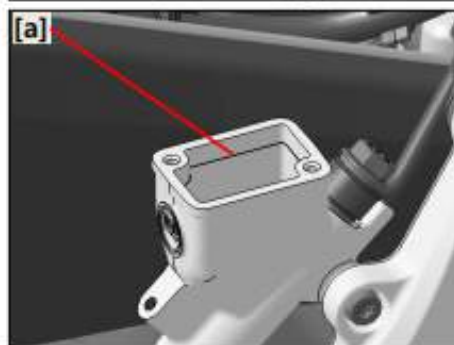
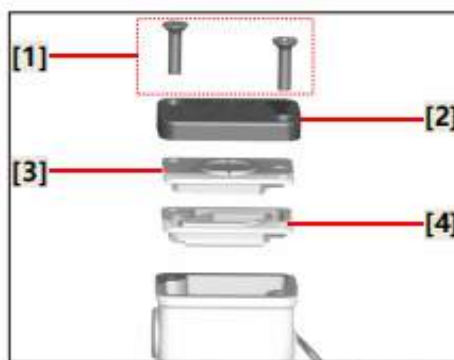
4.Inspection

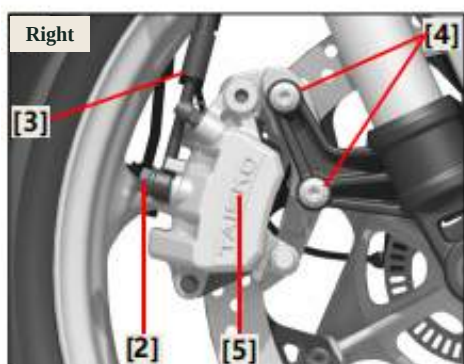
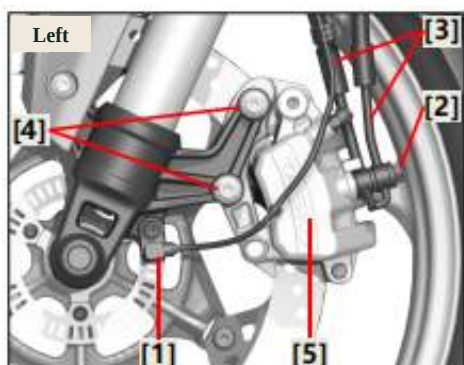
Check the rear brake hydraulic system for leaks.

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.
- 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-L/R 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 253 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.

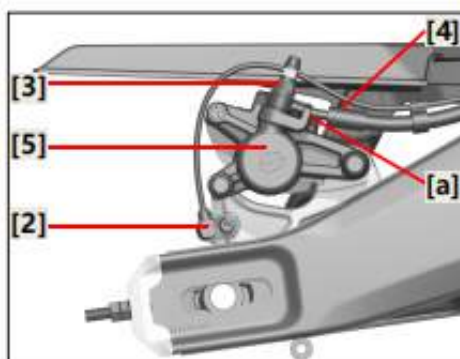
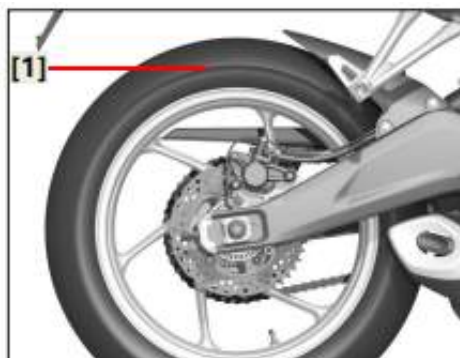
Torque:

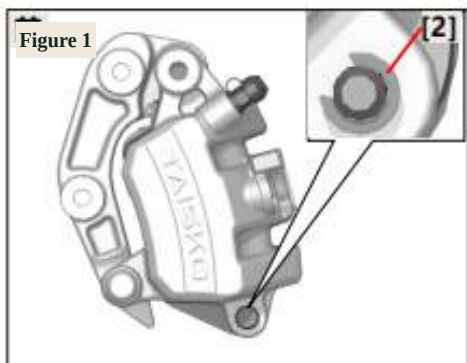
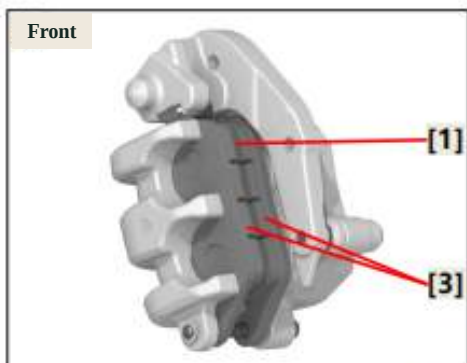
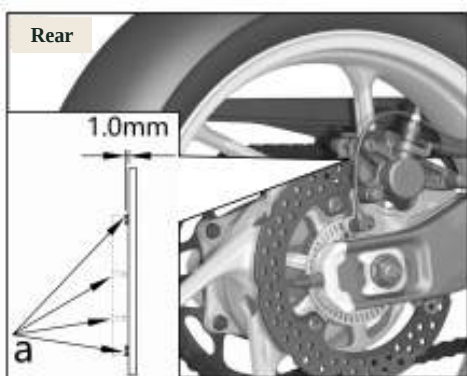
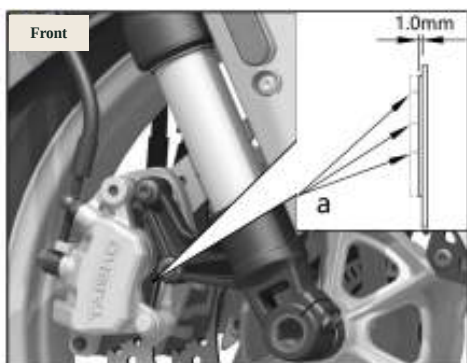
Rear wheel speed sensor

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)





※ Inspection and replacement of brake pads

Inspection

If any brake pad wears down to the indicated groove [a], the entire set of pads must be replaced.

Notes

- The limit wear of thickness of 1.0 mm

If the brake pad is worn to the service limit, consult the dealer to replace the brake pad.

Replace

- Front brake pad

Disassembly/installation

Disassemble the following parts:

- Front brake caliper;
See "Front brake caliper (left and right)" on page 274 for details.
- Place the tool between the brake pads [1], and pry left and right to allow the piston to retract for installation of a new brake pad;
- C-type circlip and dowel pin bolt [2];
- Front brake pad [3].

The installation sequence is reversed from the removal sequence.

Notes

- After removing the brake pad, do not operate the front brake handle.
- When replacing brake pads, please replace them as a complete set.

Replace

- Rear brake pad

Disassembly/installation

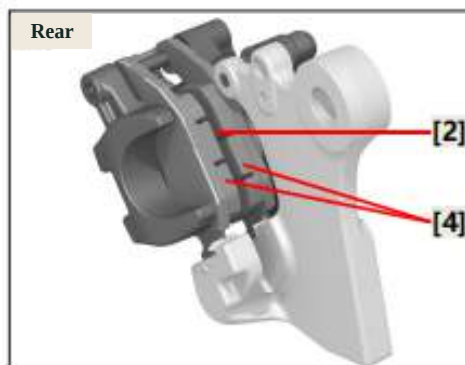
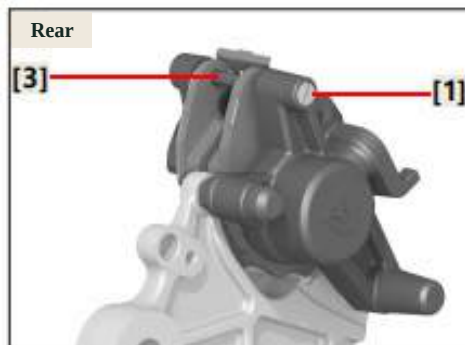
Disassemble the following parts:

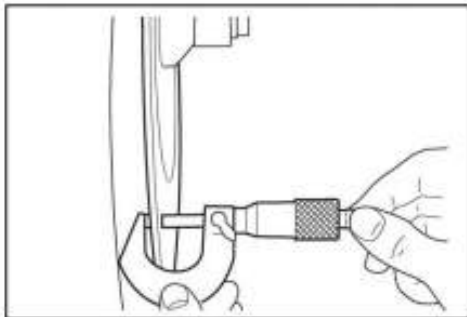
- Rear brake caliper;
See "Rear brake caliper" on page 275 for details
- Slotted screw [1];
- Place the tool between the brake pads [2], and pry left and right to allow the piston to retract for installation of a new brake pad;
- Dowel pin bolt [3];
- Rear brake pad [4].

The installation sequence is reversed from the removal sequence.

Notes

- Do not operate the rear brake pedal after removing the brake pad.
- When replacing brake pads, please replace them as a complete set.





※ Inspection and replacement of disc brake Inspection

- Visually check the brake disc for damage or cracks.

Measure the wear limit of brake disc:

Front disc brake: 4.0 mm

Rear disc brake: 4.0 mm

Damage/deformation/off specification → Replace.

Replace Front disc brake

Disassembly/installation

Disassemble the following parts:

- Front wheel assembly;
- Bolts [1]–[6];
- Front disc brake [a].

Note

- The disassembly and installation methods of the brake discs on the front wheel left and right sides are the same.

Replace Rear disc brake

Disassembly/installation

Disassemble the following parts:

- Rear wheel assembly;
- Bolts [1]–[3];
- Rear disc brake [b].

Notes

- Apply a small amount of thread adhesive to the bolt during installation. (Thread locker Huitian 7272)

Note

- Tighten the bolts in the order indicated by the arrow.

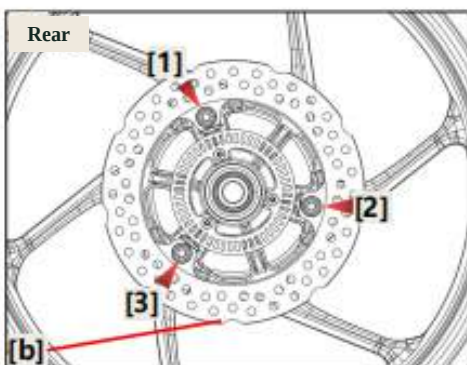
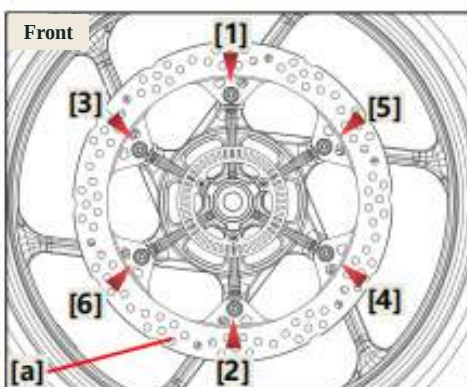
Torque:

Front disc brake and front wheel hub

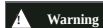
12 N·m (1.2 kgf·m, 9.0 lbf·ft)

Rear disc brake and rear wheel hub

35 N·m (3.5 kgf·m, 25 lbf·ft)



※ 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.

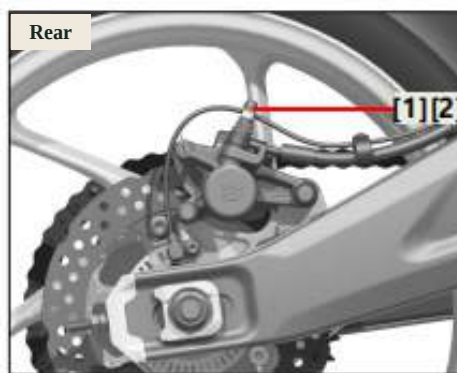
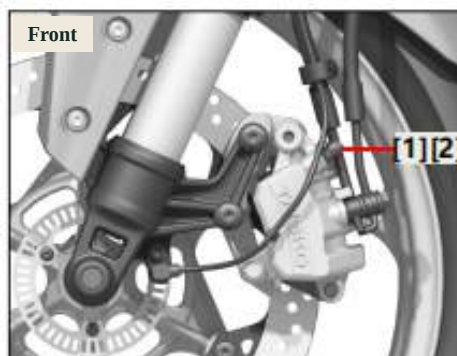
Note

- 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.

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].
- 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

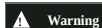


- Loosen the bleed screw to release air and ensure that the brake handle makes full contact with the throttle grip or brake pedal.
- h. Tighten the bleed screw and release the brake handle or brake pedal.
- i. Repeat steps (e) to (h) no bubbles are visible in the brake fluid within the plastic hose.
- 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. Torque:

Brake caliper bleed screw [1]

6.0 N·m (0.6 kgf·m, 4.4 lb·ft)

Fill the brake master cylinder or brake fluid reservoir to the appropriate level using the specified brake fluid.



Warning

- After air is completely removed from the hydraulic brake system, check the operation of the brakes.

※ Bleed operating procedure (ABS)

After the maintenance personnel install ABS, it is essential to remove any air from the lines to ensure proper functioning of ABS. To accomplish this, ABS needs to be bled manually with the assistance of a diagnostic instrument.

Notes

- Please use the brake fluid recommended by the manufacturer and avoid mixing different types of brake fluids.

The following is an example of bleeding the front wheel ABS system:

- 1.Open the brake fluid reservoir cap on the master cylinder, add sufficient brake fluid, and open the drain bolt on the caliper.

- 2.Connect the diagnostic instrument and initiate the front wheel bleeding stage 1 by double-clicking the routine. During this stage, the maintenance personnel shall simultaneously squeeze the brake handle or step on the brake pedal while filling brake fluid. The frequency of actuating the handbrake shall be approximately 1 time per second. This process lasts about 25s.

- 3.After completing front wheel bleeding stage 1, the diagnostic instrument interface will display a prompt indicating the completion of the process. At this point, double-click the routine: front wheel bleeding stage 2. During this stage, the maintenance personnel shall continue to squeeze the brake handle or pedal while filling brake fluid. This process lasts about 90s.

- 4.Once front wheel bleeding stage 2 is completed, hold the brake handle/press the brake pedal and close the low pump bleed bolt. Then, repeatedly squeeze the front brake handle/press the brake pedal several times, and feel the force to judge whether bleeding is finished.

Precautions for bleeding

It is strictly prohibited to repeat the bleeding procedure twice or more in a short period of time. If it is necessary to repeat the bleeding procedure, please wait for 5 minutes to allow the solenoid valve to cool down and prevent overheating damage.

※ Inspection of ABS gear ring clearance

Use a crane or equivalent to firmly support the motorcycle and lift the wheels off the ground.

Turn the wheel slowly and measure the clearance between the sensor and the ring gear at multiple points.

[a] It must be within specifications.

Standard: 0.5-1.2 mm

If the clearance cannot be adjusted or is not within specifications, check each part for deformation, looseness, or damage.

Check whether the wheel speed sensor is damaged, and replace it if necessary.

Check whether the ring gear is deformed or damaged, and replace it if necessary.

Front and rear ring gear

Disassembly/installation

Disassemble the following parts:

-Screw [1]

-ABS ring gear [2].

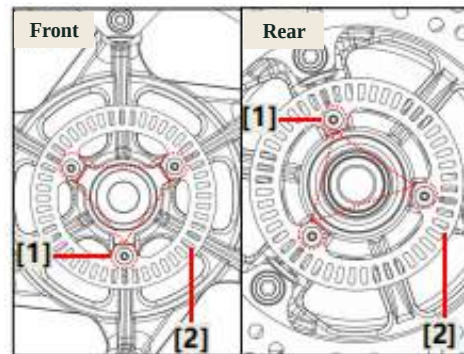
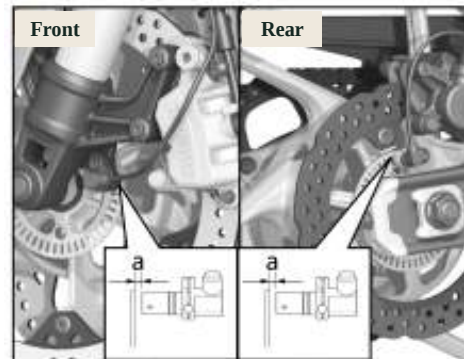
The installation sequence is reversed from the removal sequence.

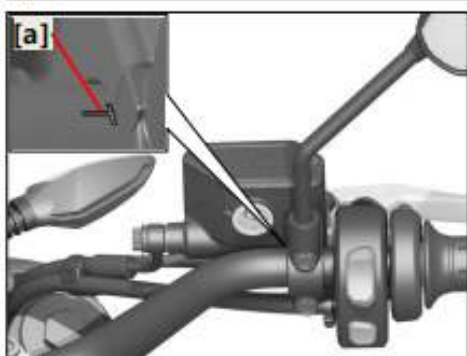
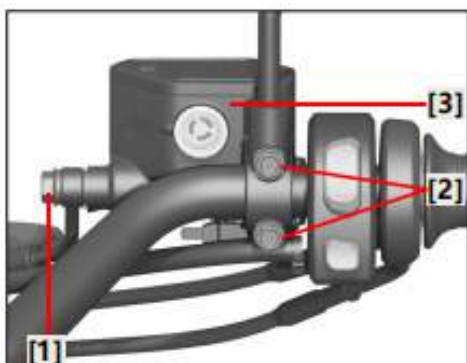
Torque:

Front and rear ABS ring gear screws

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

Apply thread locker (Huitian 7272) to the threads





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.
- Be careful not to allow water to enter the brake oil cup during filling. The internal water will significantly reduce the boiling point of the brake fluid and cause air resistance.

Note

- Replace with a new sealing washer.
- When installing the front brake pump, align the joint surface of the front brake pump retaining socket with the engraving mark [a] on the upper right of the steering handlebar.

Notes

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

※ Front brake pump

Before removal of the front brake pump, bleed the brake fluid of the entire brake system.

Disassembly/installation

Disassemble the following parts:

- Oil passing bolt and gasket [1];
- Brake pump mounting screw [2];
- Front brake pump [3].

Inspection of front brake master cylinder

1. Inspection

- Brake master cylinder
Damage/scratch /wear → Replace.
- Oil reservoir connecting hose (brake master cylinder body)
Blocked → Blow through with compressed air.

2. Inspection

- Brake master cylinder assembly
Damage/scratch /wear → Replace.

3. Inspection

- Brake fluid reservoir groove
- Brake fluid reservoir diaphragm and gasket
- Crack/damage → Replace.

4. Inspection

- Brake hose
Crack/damage /wear → Replace.

5. Installation

The installation sequence is reversed from the removal sequence.

Torque:

Front brake pump mounting bolts

10 N·m (1.0 kgf·m, 7.0 lbf·ft)

Front brake hose connected to front brake pump

32 N·m (3.2 kgf·m, 23.6 lbf·ft)

※ Rear brake pump assembly

Before removal of the rear brake pump, bleed the brake fluid of the entire brake system.

Disassembly/installation

Disassemble the following parts:

- Oil passing bolt and shim [1];
- Bolt [2];
- Clamp and rear brake pump pin shaft [3];
- Rear brake pump assembly [4].

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

Note

- Apply thread locker (Huitian 7262) to the bolts connecting the rear brake pump assembly to the right front footpeg bracket.
- When tightening the brake hose locking bolt, make sure that the oil pipe joint is against the limit protrusion.
- Replace with a new sealing washer.

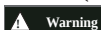
Torque:

Rear brake pump assembly and front footpeg - right

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

Brake hose and rear brake cylinder

32 N·m (3.2 kgf·m, 23.6 lbf·ft)

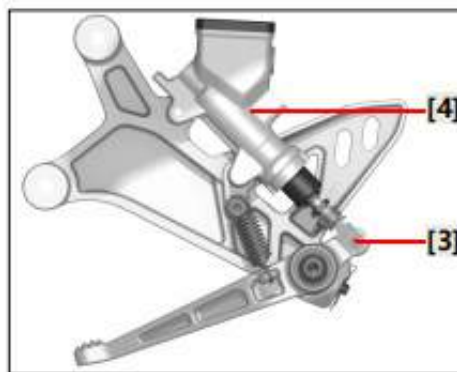
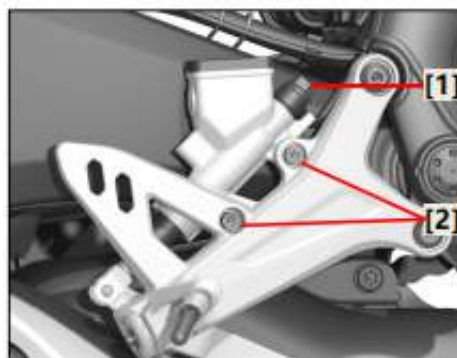


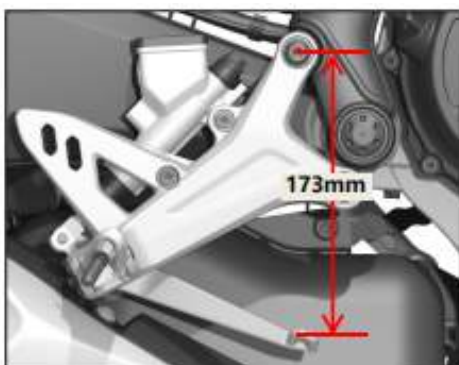
Warning

•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.

•Be careful not to allow water to enter the brake oil cup during filling. The internal water will significantly reduce the boiling point of the brake fluid and cause air resistance.





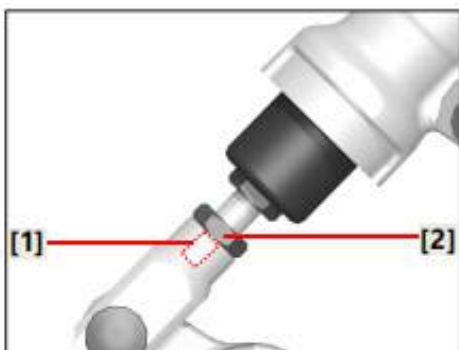
※ Adjustment of brake pedal

After removing the push rod, adjust its length so that the distance from the center of the mounting bolt hole on the right front footpeg assembly to the center of the brake pedal is the standard length of 173 mm. 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 connecting nut [2] to the specified torque after adjustment.

Torque:

Rear brake pump push rod adjusting and tightening nut

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



Anti-Lock Braking System

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Maintenance Instructions

Precautions:

ABS is a safety related component. Therefore, in addition to the general safety and preventive measures, the following diagnostic precautions must be observed when performing maintenance diagnosis:

(1) The ABS system must be maintained by technicians who have received professional training and mastered skills of maintenance, and only original parts can be used for replacement.

(2) Before diagnosis of the ABS system, any fault, if existing in the basic braking system, must be removed, such as:

- Noise from brake system.
- Insufficient force of brake pedal or handle.
- Brake pedal or vehicle vibration during regular braking.

(3) ABS assembly (refers to ABS electronic control unit and hydraulic regulator assembly, excluding brake line, sensor and other attachments) can only be replaced as a whole, and cannot be disassembled for inspection or partially replaced/exchanged. KOVE does not provide separate spare parts, and does not provide warranty for the disassembled ABS assembly, and shall not be responsible for any adverse consequences caused due to disassembly for inspection or partial replacement/exchange of the ABS hydraulic regulator.

(4) The following two situations indicate that the ABS system has detected a fault:

- Turn on the ignition switch. When the vehicle speed exceeds 10 km/h, and the system self-check is completed, the warning lamp remains on.
- The warning lamp remains on during running.

Now the driver can apply regular braking, but shall reduce the applied braking force as much as applicable to prevent wheel lockup. When the warning lamp is turned on, drive carefully and go to the appointed store immediately for maintenance, in order to prevent the occurrence of more failures which may lead to traffic accidents.

(5) When connecting ABS and sensor wiring harness, pay attention to the following:

- Be sure to turn off the ignition switch before unplugging the ABS harness and sensor harness.
- Ensure that the connector assembly is dry and clean, and prevent intrusion of any foreign matters.
- The ABS harness must be connected in place horizontally and vertically, without causing any damage to the connector assembly.

(6) When connecting the ABS brake line, ensure that it is connected correctly. ABS ECU is unable to judge whether the brake line is properly connected. Incorrect connection may lead to a serious accident. When connecting the brake line, be sure to follow the marking on the ABS assembly:

- **FW: Connect the front brake caliper master cylinder pipeline;**
- **FM: Connect the front brake pump master cylinder pipeline;**
- **RW: Connect the rear brake caliper master cylinder pipeline;**
- **RM: Connect the rear brake pump master cylinder pipeline.**

Function Introduction of ABS System

System description:

The ABS assembly consists of a hydraulic control unit (HCU), an electronic control unit (ECU), and a motor. It is installed on the vehicle frame, with a wheel speed sensor mounted on the front and rear wheels respectively.

Function of ABS warning light: Indicates whether the ABS is functioning properly. If the ABS malfunctions, the warning light will illuminate to alert the rider. In the case of significant speed difference between the front and rear wheels under extreme driving conditions, such as performing a Wheelie or in the case of a rear wheel slip, when returning to normal driving, ABS may fail. To ensure the ABS functions properly, stop the vehicle and turn off the ignition switch. When the vehicle is restarted and reaches a speed of 10 km/h, the warning light will automatically turn off and the ABS will be reactivated.

After the ignition switch is turned on, the ABS warning light will come on. When the first riding speed is greater than 10 km, after self-inspection, the warning lamp will go out, and if there is no malfunction warning lamp in the same ignition cycle, it will remain off. If the ABS is always on during driving ($\geq 10\text{km/h}$), it indicates that there is a fault in the ABS. At this point, the ABS cannot be activated. The ABS function is disabled. The braking system itself still functions, but the ABS control system experiences invalidation.

ABS status switch: To disable or enable the ABS function, please ensure that the motorcycle is always in the powered-on state; it is only feasible when the vehicle speed is lower than a certain value. It is recommended to conduct status switching when the vehicle is stationary. ABS modes include: ABS full on, performance mode, ABS full off. The ABS mode can be selected through the instrument setting. No matter whether the ABS function is on or off, after power off, power on again, the ABS will automatically change to the on state.

Precautions for ABS braking:

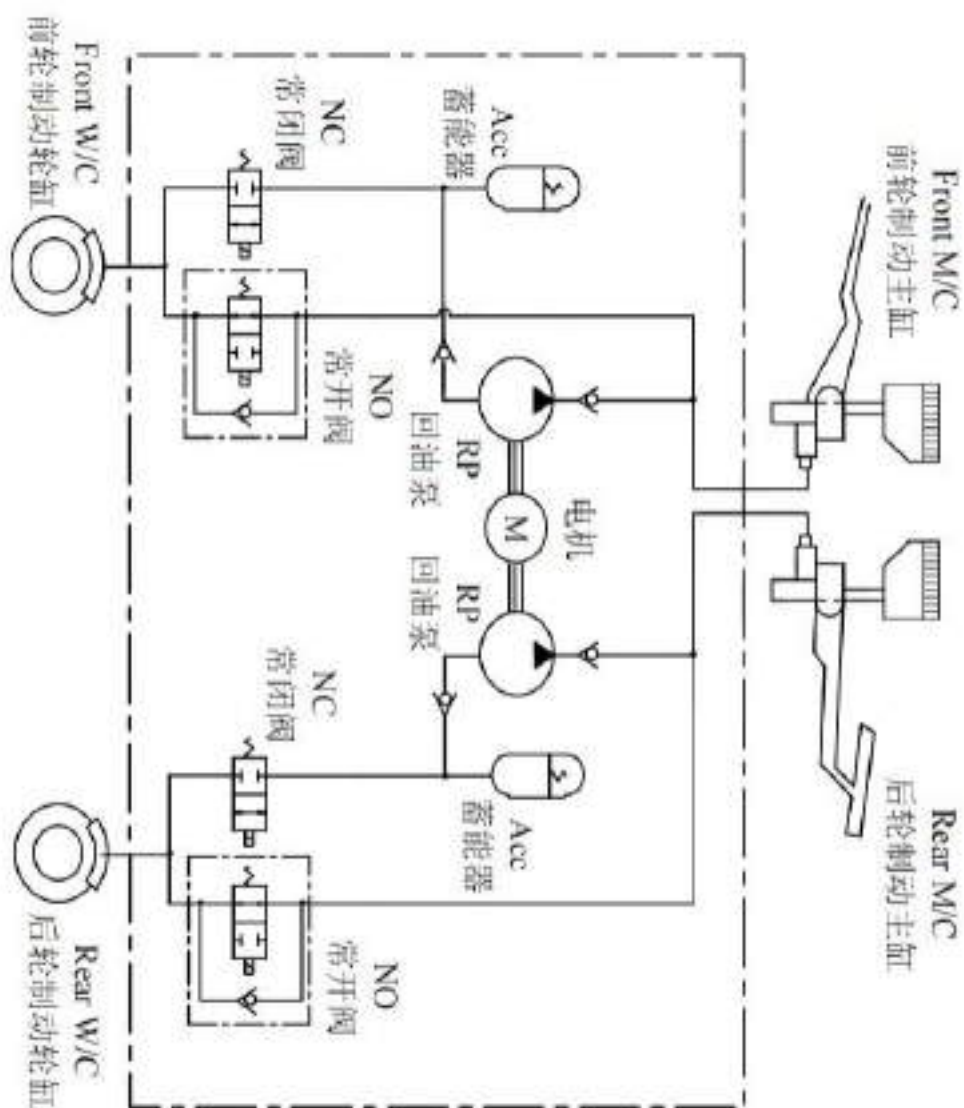
ABS function to be impaired:

Modifications, such as shortening or extending the damping stroke, use of other hub and other tire specifications, improper tire pressure, other brake linings, etc., The ABS may not continue to function optimally, and its best performance can only be guaranteed when using spare parts and tires approved or recommended by the supplier on the braking system.

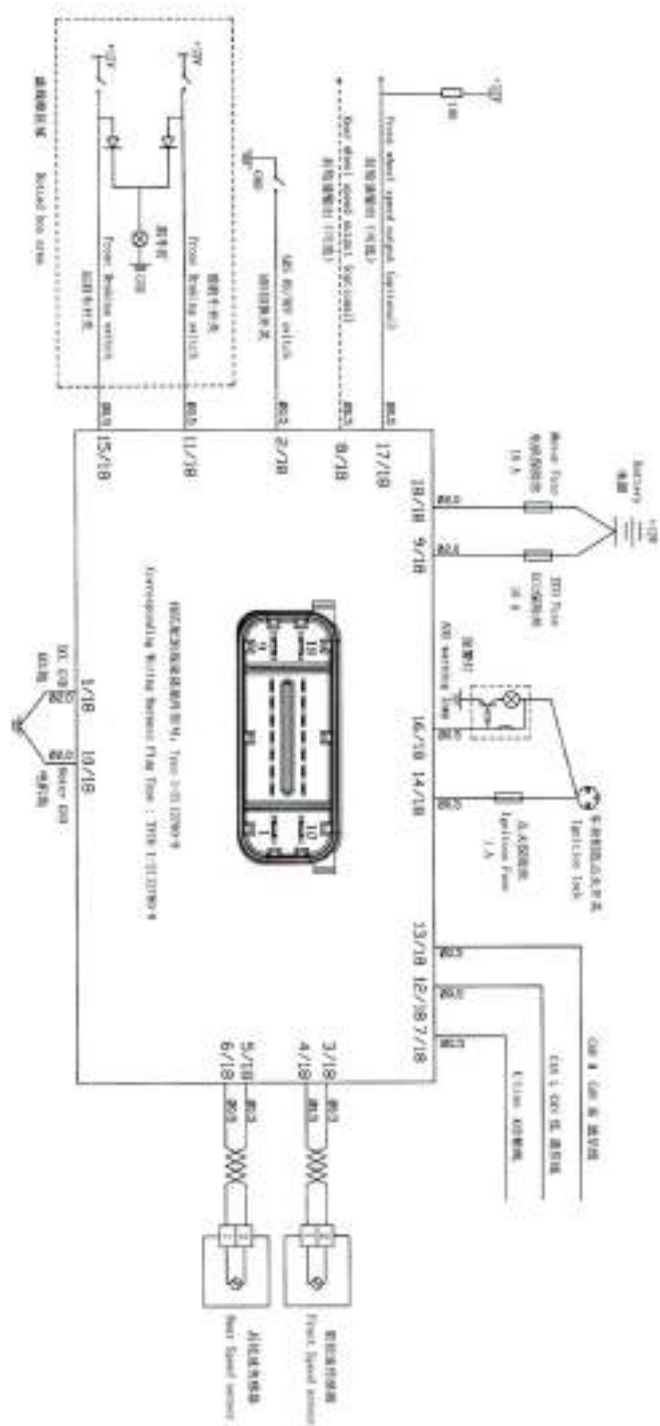
ABS brake system recommendations:

- Basic principle of ABS braking: applying brake as if it is not equipped with ABS;
- When operating the hand brake lever, avoid applying excessive force too quickly; gradually increase the braking pressure only after the brake pad has fully engaged.
- The intervention status of ABS through slight vibrations and brief sounds from the hand brake lever or rear brake pedal can be received.
- Do not perform a full braking operation with the gear engaged;
- Practice braking regularly within the ABS control range, which allows you to fully utilize the ABS system's potential in the event of a serious accident.

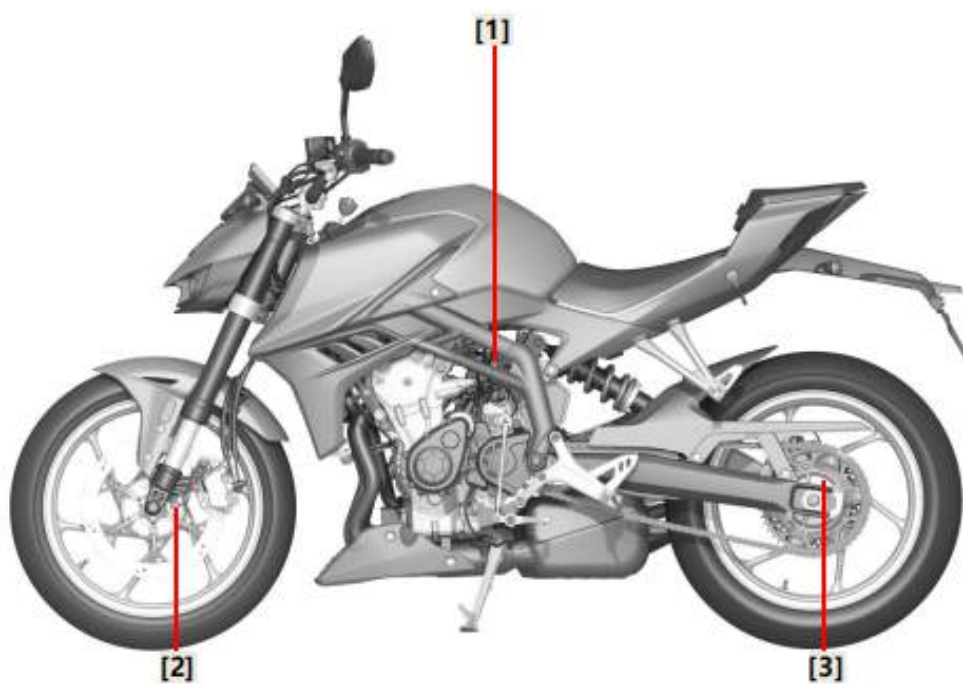
Mechanical Schematic Diagram



Electrical Schematic Diagram



System Location



(1)ABS hydraulic unit	(2)Front ABS ring gear and wheel speed	(3)Rear ABS ring gear and wheel speed
-----------------------	--	---------------------------------------

※ ABS hydraulic unit assembly

Notes

- Unless necessary, do not remove and install the brake hose of the hydraulic unit assembly.

Warning

- 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.

Notes

Always take care with the ABS components for all of them have been accurately adjusted. Do not dirty or subject these components to impacts.

- Do not switch the main switch to "ON" when dismantling the hydraulic unit assembly.
- Never clean with compressed air.
- Do not reuse the brake fluid.
- Brake fluid may damage lacquered surfaces and plastic parts. Please wipe up the splashed brake fluid immediately.
- Never let the brake fluid come into contact with the connectors, since the brake fluid may damage the connectors and result in poor contact.
- If the connecting bolts of the hydraulic unit assembly have been removed, be sure to lock the connected bolts to the specified torque and bleed air from the brake system.

1.Disassembly

-ABS ECU plug [1].

Note

- Pull the fixing rod [2] of the ABS ECU connector in the direction of the arrow shown in the figure, and then disassemble the plug.

2.Disassembly

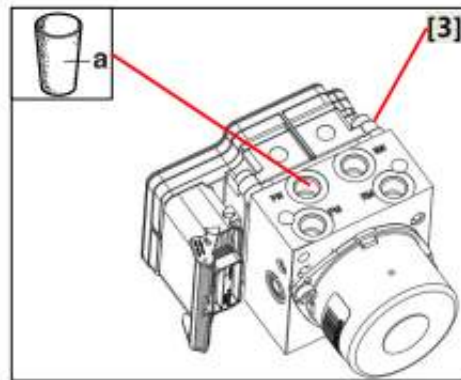
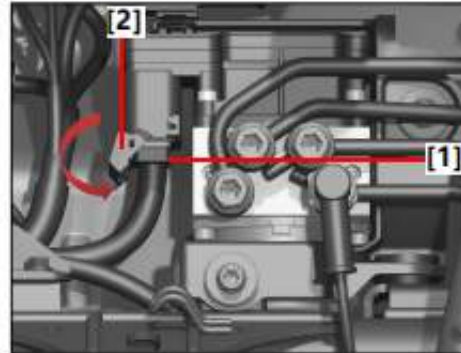
-Brake hose

Note

- Do not operate the brake handle and pedal when dismantling the brake hose.

Notes

- Dismantle the brake hose, cover the area around the hydraulic unit to receive spilled brake fluid. Keep the brake fluid from coming into contact with other parts.

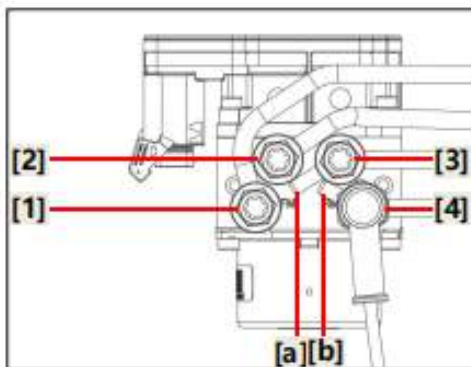


3.Disassembly

-Hydraulic unit assembly [3]

Note

- To prevent brake fluid from overflowing and foreign matters from entering the hydraulic unit assembly, plug each brake hose connecting bolt hole with a rubber plug [a] or a bolt (M10×1.0).
- When using a bolt, do not tighten the bolt before the bolt head comes into contact with the hydraulic unit, otherwise the seat surface of the brake hose connecting bolt may be deformed.



a. Install the brake hose as shown in the above figure.

b. Place the front brake hose (from the hydraulic unit to the front main pump) [1]; make the connector touch the (from the hydraulic unit to the front caliper) [2], and then temporarily tighten the connecting bolt of the brake hose.

c. Place the front brake hose (from the hydraulic unit to the front caliper) [2]; make the connector touch the (from the hydraulic unit to the rear caliper) [3], and then temporarily tighten the connecting bolt of the brake hose.

d. Place the rear brake hose (from the hydraulic unit to the rear caliper) [3], make the protrusion point [a] touch the (from the hydraulic unit to the front caliper) [2], and then temporarily tighten the connecting bolt of the brake hose.

e. Place the rear brake hose (from the hydraulic unit to the rear caliper) [4], make the protrusion point [b] touch the (from the hydraulic unit to the rear caliper) [3], and then temporarily tighten the connecting bolt of the brake hose.

Note

- Make sure that the brake hose is installed in correct position.
- Lock the brake hose connecting bolts in sequence

※ Inspection of hydraulic unit

1. Inspection

-Hydraulic unit assembly

Crack/damage → Replace the entire hydraulic unit assembly and the brake hose connecting the assembly.

Installation of hydraulic unit assembly

2. Installation

-Hydraulic unit assembly

Torque:

ABS to ABS bracket

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Note

- When installing the hydraulic unit assembly, prevent any foreign matters from entering the hydraulic unit assembly or brake hose.

Notes

- Do not remove the rubber plug or bolt (M10×1.0) installed in the brake hose connecting bolt bore before installing the hydraulic unit assembly.

3. Disassembly

-Rubber plug or bolt (M10 × 1.0)

4. Installation

-Front brake hose (hydraulic unit to front main pump) [1]

-Front brake hose (hydraulic unit to front caliper) [2]

-Rear brake hose (hydraulic unit to rear caliper) [3]

-Rear brake hose (hydraulic unit to rear main pump) [4]

Torque:

Bolt connecting brake hose to ABS

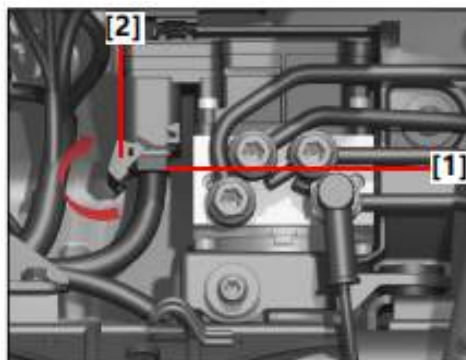
25 N·m (2.5 kgf·m, 18.4 lbf·ft)

Notes

- If the brake hose connecting bolt cannot be turned easily, replace the entire hydraulic unit assembly, brake hose and relevant parts.

5.Connection

- ABS ECU plug [1]
- Connect the ABS ECU plug and push in the plug retaining rod [2] in the direction of the arrow shown in the figure.
- Make sure the ABS ECU plug is connected to the correct position as shown in Figure "A".

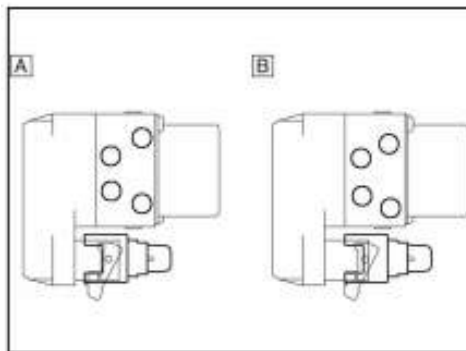


6.Add

- Front brake master cylinder reservoir
 - Rear brake master cylinder reservoir
- (Add the specified brake fluid to the specified level) Brake fluid/DOT4

Warning

- Only use the specified brake fluid. Other brake fluids may cause worsening of the rubber oil seal, resulting in leakage and reducing braking performance.
- Please add the same kind of brake fluid as used in the system. Mixed brake fluid may cause hazardous chemical reactions, resulting in degradation of braking performance.
- Be careful not to allow water to enter the brake fluid reservoir during filling. The water will significantly reduce the boiling point of the brake fluid and cause air resistance.



A: The ABS ECU plug is correctly connected.
B: The ABS ECU plug is not correctly connected.

Notes

- Brake fluid may damage lacquered surfaces and plastic parts. Please wipe up the splashed brake fluid immediately.

7.Emissions

- Brake system

See "Hydraulic brake system bleeding" on page 279 for details.

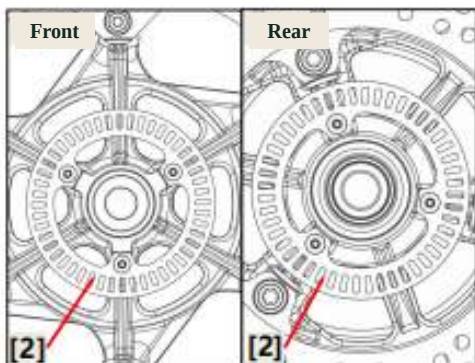
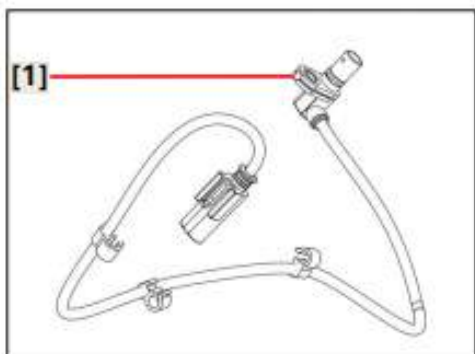
8.Inspection

- Check brake fluid leakage around the hydraulic unit. Brake fluid leakage → Replace the whole set of hydraulic unit, brake hose and relevant parts.

- If the hydraulic unit is operating properly, please delete all fault codes.

Inspection of ABS warning lamp

Upon completion of all inspections and maintenance, run or conduct test run at a speed above 10 km/h (6.0 mph) and make sure the ABS warning lamp is off.



※ Wheel speed sensor and ABS ring gear

1. Stand the vehicle on a flat ground.

⚠ Warning

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

Note

- Place the motorcycle on a proper stand so that the front or rear wheel can be elevated.
- Always take care with the ABS components for all of them have been accurately adjusted. Do not dirty or subject these components to impacts.
- The wheel speed sensor cannot be disassembled, so please do not attempt to disassemble it. If there is a malfunction, please replace it with a new part.
- The wheel speed sensor must be kept away from any kinds of magnet (including magnetic pickup tools, magnetic screwdrivers, etc.).
- Protect the wheel speed sensor from falling or impact.

2. Inspection

- Wheel speed sensor [1]

Crack/Bend/Deformation → Replace.

Iron powder/dust → Clean up.

3. Inspection

- ABS ring gear [2]

Crack/damage/scratch → Replace ABS ring gear.

Iron powder/dust → Clean up.

Note

- The ABS ring gear is mounted on the inside of the hub.
- When cleaning ABS ring gear, please be careful not to damage the surface of the ring gear.

4.Measurement

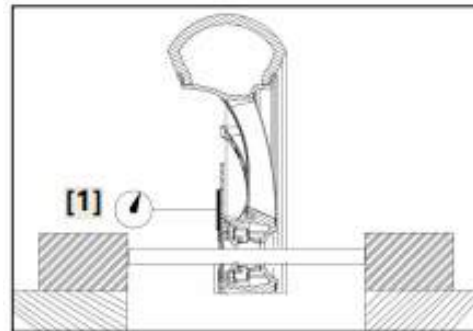
-ABS ring gear deflection

Non-conformance → Clean the mounting surface of ABS ring gear and adjust the ABS ring gear deflection, or replace the ring gear.

ABS ring gear runout limit: 0.25 mm

a. Hold a dial indicator [1] against the ABS ring gear surface at a right angle.

b. Measure the deflection of ABS ring gear.



Note

- Never touch the surface of ABS ring gear with sharp objects.

c. If the deflection exceeds the standard, remove the ABS ring gear from the wheel, turn one or two bolt holes and install.

Torque:

ABS ring gear mounting bolt

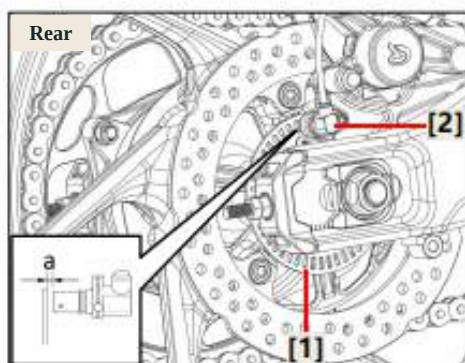
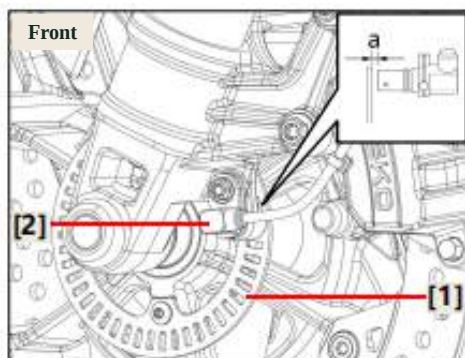
5.0 N·m (0.5 kgf·m, 4.0 lbf.ft)

Apply thread locker (Huitian 7272) to the threads

Notes

- Replace with new ABS ring gear mounting screws.

d. If the deflection exceeds the standard, replace the ABS ring gear.



5. Install
-Wheel speed sensor

Torque:

ABS ring gear mounting bolt

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

Apply thread locker (Huitian 7272) to the threads

Wheel speed sensor mounting bolt

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Notes

- Make sure there is no foreign matter between the wheel speed sensor and the ABS gear ring. The foreign matter can cause damage to the wheel speed sensor and the ABS gear ring.

Note

- When installing the wheel speed sensor, check the sensor wiring harness for twisting.

6.Measurement

-Distance between ABS ring gear [1] and wheel speed sensor [2].

Off-specification → Check whether the wheel bearing is loose, as well as the installation conditions of the wheel speed sensor and the ABS gear ring

(deformation caused by over-tightening, incorrect installation direction, the ABS gear ring being off-center, the installation surface of the ABS gear ring being coated with thread locker, deformation caused by impact during maintenance, and being stuck by foreign matter). If any parts are defective, repair or replace the defective parts.

Distance [a]

(distance between ABS ring gear and wheel speed sensor)

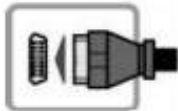
0.50-1.20 mm

Note

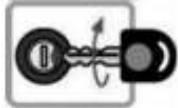
- Measure the distance between ABS ring gear [1] and wheel speed sensor [2] from each position in one revolution of the ring gear. Do not turn the wheel when using a feeler gauge, or the ABS ring gear and wheel speed sensor may be damaged.

Maintenance Diagnosis Process and Troubleshooting

(1).Usage of diagnostic instrument



1.Connect the diagnostic instrument to the diagnostic interface.



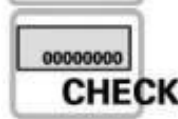
2.Turn on the "ignition switch".



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.

(2).Preliminary check

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

- 1.Confirm that the ABS 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 check the following:

- Check for proper sensor gap;
- Check that the ABS ring gear is flat without deformation;
- Check that the ABS fuse is normal;
- Check that the power wiring harness and grounding area are clean and secure;
- Check the ABS assembly and sensor connector for looseness or 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.

Troubleshooting-Diagnostic Instrument

Fault diagnosis needs to be tested in parking state. Maintenance personnel can read the information of ABS by connecting OBD interface via the diagnostic instrument. See the following table for fault types and handling measures.

(3).Fault code information table

DTC	Failure Description
C0024	MCU_MU_CLK_Monitor_Failed
C0032	MCU_MC_ROM_Failed
C0033	MCU_MC_RAM_Failed
C0040	MCU RAM Stack Overflow Fault
C0041	MCU Hardware Reset
C0044	Solid State Relay_Relay over current
C0045	Solid State Relay_Relay shorted (Stuck on)
C0046	Solid State Relay_shorted to ground
C0051	Battery Voltage Battery under-voltage 1 (7V<Voltage <9V)
C0052	Battery Voltage Battery under-voltage 2 (Voltage <-71)
C0053	Battery Voltage _Battery over-voltage
C0060	Brake Pedal Not Applied with Decel
C0061	Brake Pedal Always Applied Without Decel Fault
C0062	Brake Diode Breakdown
C0070	Pump Motor control Bad connection or Pump supply open or low voltage
C0071	Pump Motor control_ Pump ground open or Motor open
C0072	PumpMotor control _ Pump FET shorted
C0073	Pump Motor control_ Pump FET open
C0074	Pump Motor control L_Pump over current
C0075	Pump Motor contro1_ Pump motor blocked
C0080	Front_wss_HSs _ Short_To_Battery
C0081	Fromt_Wss_LSS_Short_To_Battery
C0082	Front WSS HSS_Short To Ground or WSS short circuited
C0083	Front WSS LSS Short To Ground or WSS open

DTC	Failure Description
C0084	Front_wSs _Plausibility01
C0085	Front_wss_Plausibility02
C0086	Front_wss_Plausibility03
C0087	Front_wss_Plausibility04
C0088	Front_Wss_Plausibility05
C0100	Rear_wss_HSs_Short_To_Battery
C0101	Rear_ss_ILsS_ Short_To_Battery
C0102	Rear WSS HSS Short To_Ground or WSS short circuited
C0103	Rear WSS LSS_Short To Ground or WSS open
C0104	Rear_wss_Plausibility01
C0105	Rear_wss_Plausibility02
C0106	Rear_wss_Plausibility03
C0107	Rear_wss_Plausibility04
C0108	Rear_wss_Plausibilityo5
C0120	Front_No Coils Short to battery
C0121	Front_No Coils Short to ground or Open solenoid
C0130	Front_NC Coils Short to battery
C0131	Front_NC Coils Short to ground or Open solenoid
C0160	Rear_NO Coils Short to battery
C0161	Rear_NO Coils Short to ground or Open solenoid
C0170	Rear_NC Coils Short to battery
C0171	Rear_NC Coils Short to ground or Open solenoid
C0210	Warming Lamp output_Short to battery
C0213	Warning Lamp output_ Short to ground or open
C0230	Vehicle speed output_ Short to ground
C0231	Vehicle speed output_ Short to battery

(4).Fault code corresponding treatment measures

FaWilure type	DTC	Handling
(MCU Failure)	C0024-C0041	ABS failure, please replace new ABS after consulting supplier.
(Solid State Relay Failure)	C0044-C0046	ABS failure, please replace new ABS after consulting supplier.
(The battery voltage Failure)	C0051-C0052	Mainly peripheral circuit failure! Check the vehicle power supply system(The fuse, battery, rectifier)
(The brake signal failure)	C0060-C0062	Mainly peripheral circuit failure! Check the connection between brake line and ABS
(Pump motor fault)	C0070, C0071	Mainly peripheral circuit failure! Check the motor power supply line
(Pump motor fault)	C0072-C0075	ABS failure, please replace new ABS after consulting supplier.
(Wheel speed sensor wiring fault)	C0080-C0083 C0100-C0103	Mainly peripheral circuit failure! Check the connection between sensor wire and ABS Try to change the wheel speed sensor .
(Wheel speed signal quality failure)	C0084-C0088 C0104-C0108	Mainly peripheral failure! Check the installation of wheel speed sensor(The gap between sensor head and the tone wheel is 1.2 mm or less) Check if there is a deformation, or a damage with the tone wheel
(coil failure)	C0120-C0171	ABS failure, please replace new ABS after consulting supplier.

Failure type	DTC	Handling
(warning lamp output failure)	C0210, C0213	Mainly peripheral circuit failure! Check the connection between dash board and ABS, if the problem not solved, please change the dash board. If the problem remains unresolved, please consult the supplier.
(WSS output failure)	C0230, C0231	Mainly peripheral circuit failure! Check the circuit and dash board, if the problem not solved, please replace new ABS after consulting supplier.

Note: For products with software configurations without brake signals, faults C0060, C0061, and C0062 will not occur.

Vehicle Electrics

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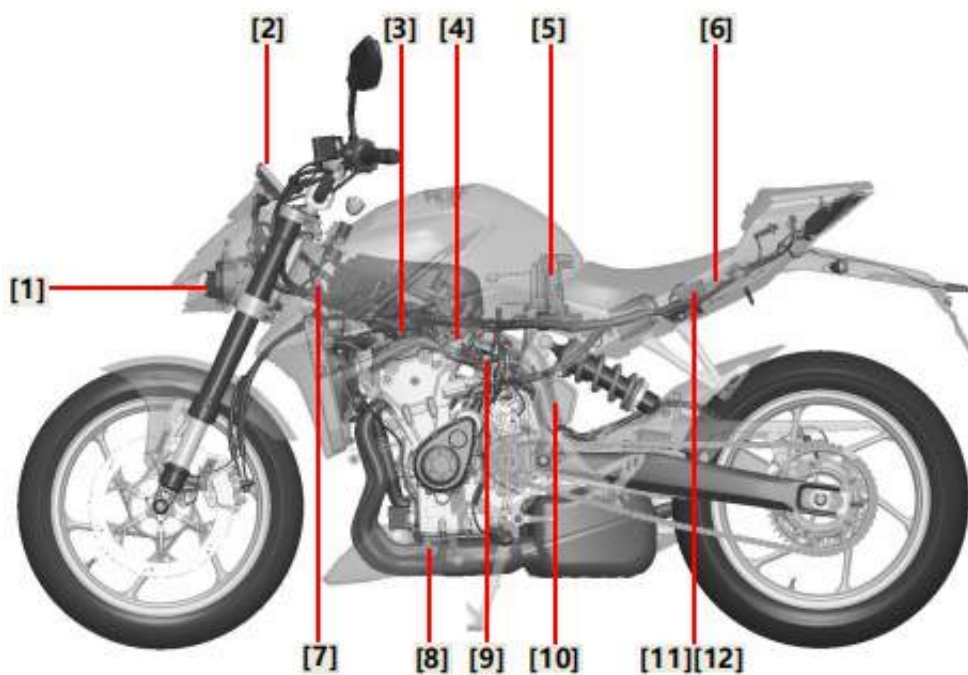
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Maintenance Instructions

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.

System location



(1)Headlight	(2)Instruments	(3)Ignition Coil	(4)Throttle valve
(5)Fuel pump	(6)ECU	(7)Side tilt sensor	(8)Oxygen sensor
(9)Intake pressure sensor	(10)Regulating rectifier	(11)Starting relay	(12)Fuse box

※ 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.

Disassembly

- While pressing position [1], turn position [2] clockwise, then the connection between the ECU and the cable can be disconnected;
- ECU [3].

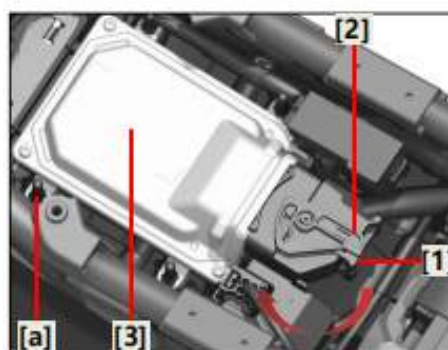
Note

- Pull the fixing rubber pin [a] on the front section of the rear fender upward to retract it, then the ECU can be removed.

Drawing of ECU

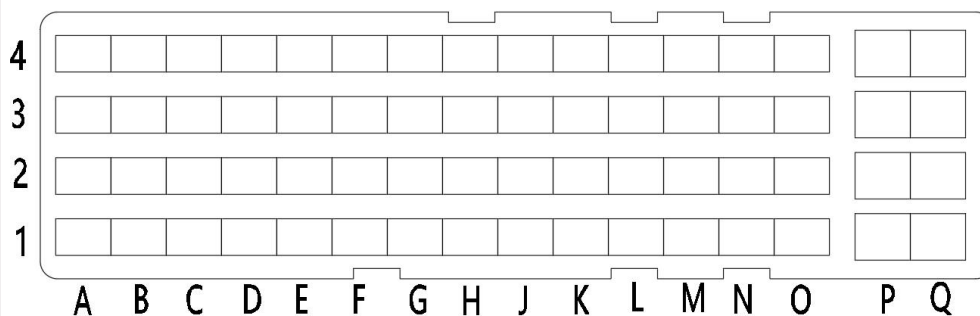


Drawing of ECU connector



Quantity Value					
		Minimum	Standard	Maximum	Unit
Vehicle voltage	Normal operation	9.0	12.8	16.0	V
	Limited function	6.0-9.0		12.8-16.0	V
Limit and time to withstand vehicle over-voltage	16V	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(Q1)	Ignition coil (cylinder 4)	B/Y	18(E1)	5V power supply 2	P
2(P1)	Oxygen sensor heating	O/G	19(D1)	5V power supply 1	P
3(Q2)	Ignition coil (cylinder 1)	B/L	20(C1)	MIL lamp	V/B
4(P2)	Secondary air supply valve	L/Gr	21(B1)	Stepper motor phase B	Y/G
5(Q3)	Ignition GND	G	22(A1)	Stepper motor phase A	Gr/Y
6(P3)	Ignition coil (cylinder 3)	G/B	23(O2)	-	-
7(Q4)	Ignition coil (cylinder 2)	B/R	24(N2)	Launch control switch	Y/Br
8(P4)	Discontinuous power supply	V	25(M2)	Intake air temperature sensor	P/B
9(O1)	-	-	26(L2)	Throttle position sensor	P/W
10(N1)	-	-	27(K2)	-	-
11(M1)	Tilt switch	Y	28(J2)	-	-
12(L1)	Clutch switch	G/R	29(H2)	-	-
13(K1)	-	-	30(G2)	-	-
14(J1)	Neutral switch	Lg/R	31(F2)	-	-
15(H1)	Diagnostic K-line	W/G	32(E2)	Main relay	B/R
16(G1)	Continuous power supply	R	33(D2)	CAN bus interface (HIGH)	G/L
17(F1)	Ignition switch	B/W	34(C2)	CAN bus interface (LOW)	R/Y

Function definitions of ECU pins:

PIN-NO	FUNCTION	Wire harness color	PIN-NO	FUNCTION	Wire harness color
35(B2)	Stepper motor phase C	B-L	50(A3)	Fuel injector (cylinder 1)	O/B
36(A2)	Stepper motor phase D	Gr/L	51(O4)	Discontinuous power supply	V
37(O3)	-	-	52(N4)	-	-
38(N3)	-	-	53(M4)	-	-
39(M3)	Sensor GND 1	G/B	54(L4)	-	-
40(L3)	Sensor GND 2	G/B	55(K4)	-	-
41(K3)	Coolant temperature sensor	Gr/G	56(J4)	-	-
42(J3)	Side stand OFF switch	W/B	57(H4)	-	-
43(H3)	ELECTRONIC GROUND 1 power GND	G	58(G4)	-	-
44(G3)	-	-	59(F4)	Intake pressure sensor	P/G
45(F3)	Upstream oxygen sensor	Y/Gr	60(E4)	Oil pump relay	Br/B
46(E3)	Engine speed sensor B-end	G/W	61(D4)	-	-
47(D3)	Engine speed sensor A-end	L/W	62(C4)	Cooling fan relay	Gr/W
48(C3)	OUTPUTGROUND1 Power GND	G	63(B4)	Fuel injector (cylinder 3)	O/Y
49(B3)	Fuel injector (cylinder 2)	Br/W	64(A4)	Injector (cylinder 4)	O/w

Figure 1

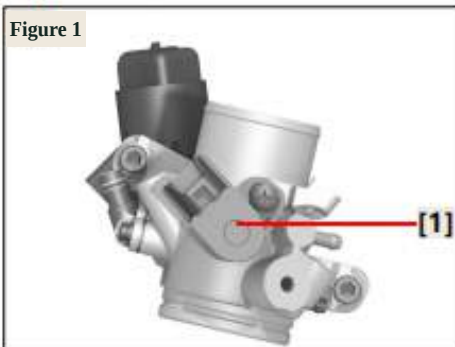


Figure 2

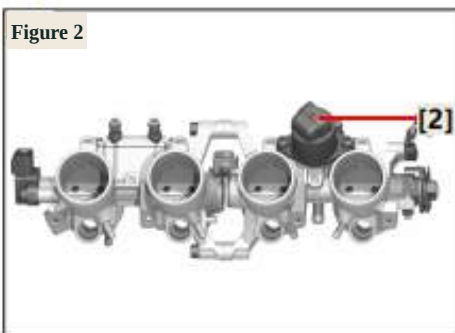
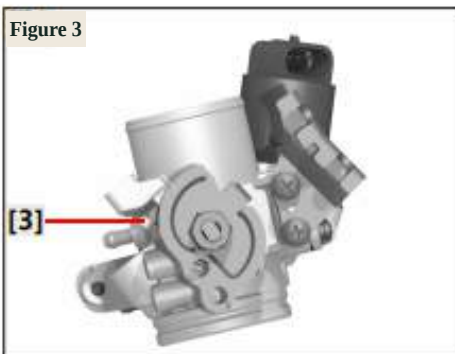


Figure 3



※ 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 Figures 1 and 2: Sensor installation locations

1. Throttle position sensor [1];

2. Idle stepper motor [2]

Precautions in sensor installation

1. The terminals shall not be stained with water, oil and other liquids;

2. Do not contact harmful gases (Cl, SO₃, 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] is not allowed to 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.

Torque:

Throttle position sensor mounting screw

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Throttle cable bracket mounting screw

3.5 N·m (0.3 kgf·m, 2.6 lbf·ft)

Idle stepper motor mounting screw

4.0 N·m (0.4 kgf·m, 3.0 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.

※ 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.

Function definitions of pins

Intake air temperature sensor

1.Signal connected to ECU25 (M2) P/B;

2.Ground connected to ECU39 (M3) G/B;

Figure 1: Wiring diagram between IAT sensor and ECU Sensor resistance parameters

-IAT sensor resistance
2290–2551 Ω at 20°C.

Drawing and pin definition of temperature sensor

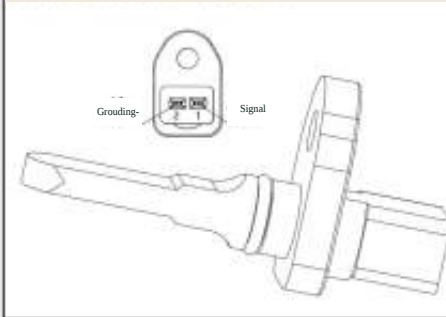
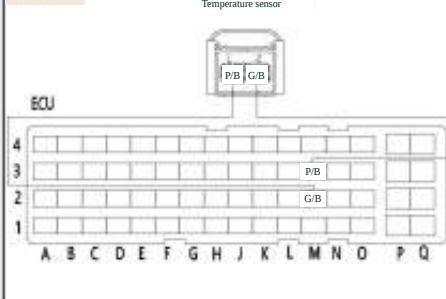


Figure 1



Drawing and pin definition of pressure sensor



※ Intake pressure sensor

Monitor the intake pipe pressure and provide the engine load information for ECU.

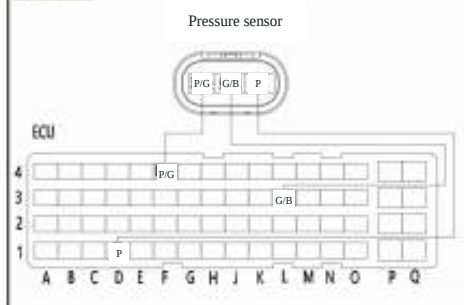
Function definitions of pins

Intake pressure sensor

- 1.Signal connected to ECU59 (F4) P/G;
- 2.GND connected to ECU40 (L3) G/B
- 3.Power supply 5V+ connected to ECU19 (D1) P

Figure 1: Wiring diagram between IAP sensor and ECU

Figure 1

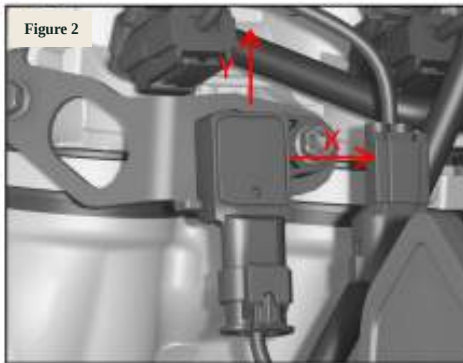


Installation

The allowable value for the bending angle between the sensor outlet and the first cable fixing point (the angle between the harness and the end face) is 0°–90°, with a recommended range of 20°–90°.

As shown in Figure 2: The pressure probe faces downward, with an allowable range of 0°~±6 around the X and Y axes.

Figure 2



※ 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

Throttle position sensor

- 1.Signal connected to ECU26 (L2) pink white;
- 2.Ground connected to ECU39 (M3) G/B;
- 3.Power supply 5V+ connected to ECU18 (E1) P

Figure 1: Wiring diagram between throttle position sensor and ECU

Installation

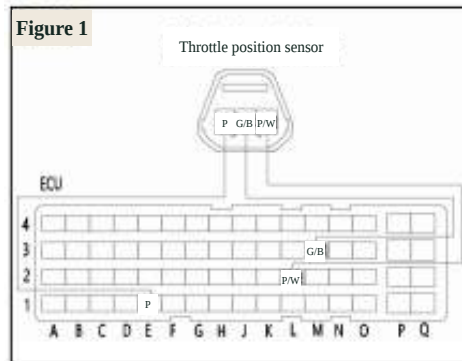
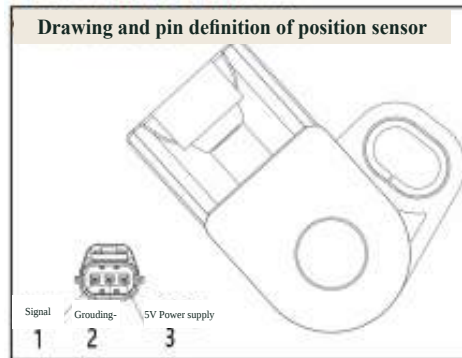
It shall be installed within a permissible range, making sure that no condensate water will be generated in the sensor, because condensate water will damage the sensing elements inside the sensor.

Sensor voltage parameters

-Throttle position sensor output voltage:

Idle position: 0.5-0.7V;

Fully open position: $\geq 3.7V$ (Input voltage: DC5V $\pm 0.1V$).



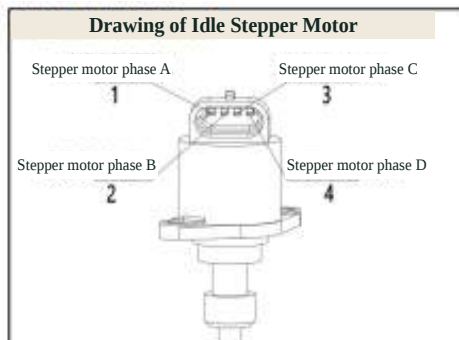


Figure 1

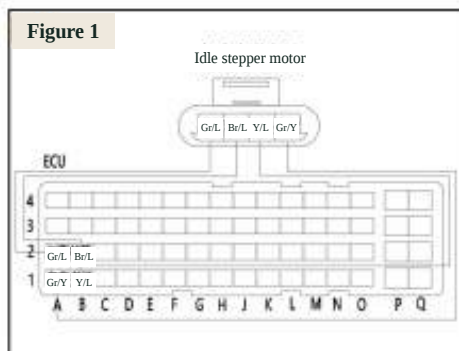
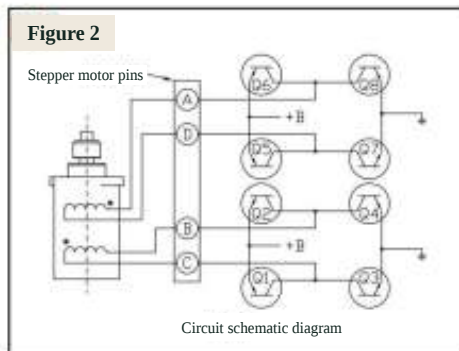


Figure 2



※ Idle stepper motor

It is designed to control the bypass air flow. The stepper motor is controlled by ECU using the engine sensor based on the engine load, and the fuel injection volume is different under different operating conditions, thus it is required to supplement air intake for the motor, and connect in specified method, otherwise it may cause unstable idle speed.

Functions of pins

1. Stepper motor pin A/connected to ECU pin 22 (A1) Gr/Y;
2. Stepper motor pin B/connected to ECU pin 21 (B1) Y/G;
3. Stepper motor pin C/connected to ECU pin 35 (B2) Br/L;
4. Stepper motor pin D/connected to the ECU pin 36 (A2) Gr/L;

Figure 1: wiring diagram between phase pin of idle stepper motor and ECU

Figure 2 is a circuit diagram of idle stepper motor.

The following table shows the characteristic parameters of idle stepper motor.

Characteristic parameters			
NO	Item	Specification	Conditions
1	Rated voltage	12V DC	
2	Min/Max	7.5V-14V	
3	Phase resistance	53±5.3Ω	27°C
4	Operating temperature	-40°C-125°C	

※ 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 1 (cylinder 1):

- 1.Positive electrode + connected to power supply 12V + (V);
- 2.Negative electrode - grounding - (G);
- 3.Ignition signal connected to ECU11 (B/L);

Ignition coil 2 (cylinder 2):

- 1.Positive electrode + connected to power supply 12V + (V);
- 2.Negative electrode - grounding - (G);
- 3.Ignition signal connected to ECU7 (Q4) (B/R);

Ignition coil 3 (cylinder 3):

- 1.Positive electrode + connected to power supply 12V + (V);
- 2.Negative electrode - grounding - (G);
- 3.Ignition signal connected to ECU6 (P3) (B/G);

Ignition coil 4 (cylinder 4):

- 1.Positive electrode + connected to power supply 12V + (V);
- 2.Negative electrode - grounding - (G);
- 3.Ignition signal connected to ECU1 (Q1) (B/Y);

Figure 1: Wiring diagram between ignition coil and ECU.

Inspection

-Primary ignition coil resistance

Off-specification → Replace.

a.Remove the ignition coil plug.

b.As shown in Figure 2: Diagram for connecting multimeter to ignition coil.

-Positive electrode test probe → [1]

-Negative electrode test probe → [2]

c.c. Measure the primary ignition coil resistance.

Ignition coil parameters

1.Static parameters

Primary resistance: $0.60 \pm 10\% \Omega$

Primary inductance: $2.0 \pm 15\% \text{ mH}$

2.Dynamic parameters:

Drawing and Pin Definition of Ignition Coil

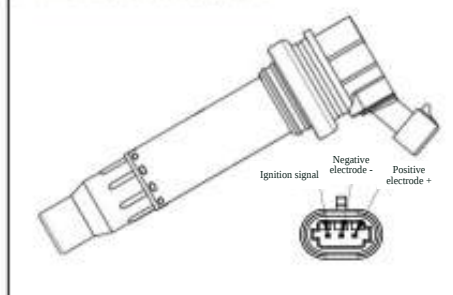


Figure 1

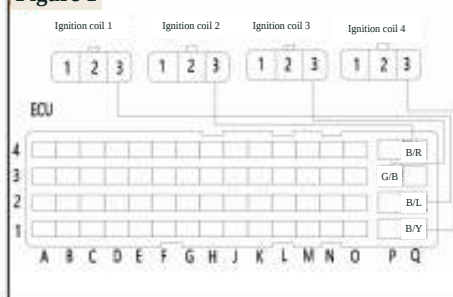
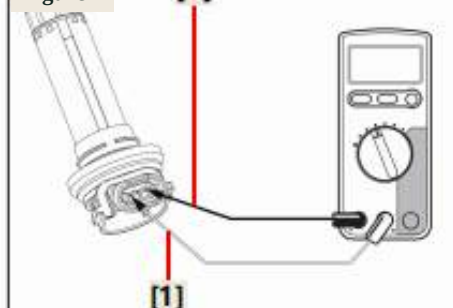


Figure 2



Rated voltage: $14 \pm 0.5\text{V}$

Primary current: $6.6 \pm 0.9\text{A}$

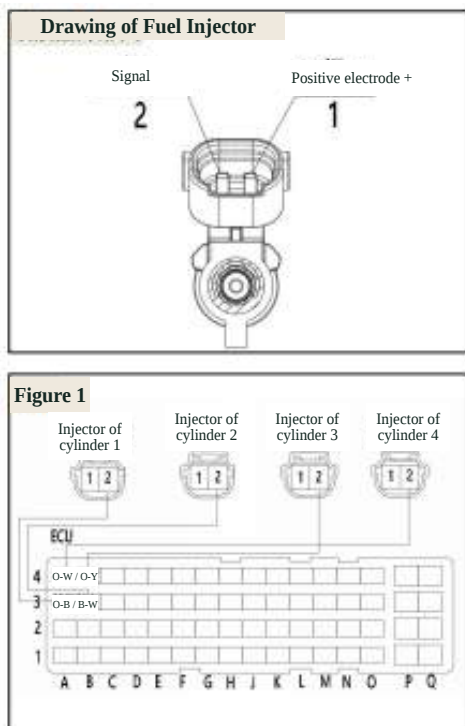
Ignition pulse width: $1.5 \pm 0.5 \text{ msec}$

Secondary voltage:

Not less than 25 kV under 25 pF,

Load Ignition energy: Not less than 26 mJ

Operating temperature: $-35^{\circ}\text{C} - 125^{\circ}\text{C}$



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: $12 \Omega \pm 5\%$

※ 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 six-bore injection, and cannot rotate after the circlip is fixed.

Do not rotating.

Function definitions of pins

Fuel injector 1 (cylinder 1)

1. Connecting power supply 12V + (V)

2. Signal connected to (A3) pin of ECU50 (O/B)

Fuel injector 2 (cylinder 2)

1. Connecting power supply 12V + (V)

2. Signal connected to (B3) pin of ECU49 (Br/W)

Fuel injector 3 (cylinder 3)

1. Connecting power supply 12V + (V)

2. Signal connected to (B4) pin of ECU63 (O/Y)

Injector 4 (cylinder 4)

1. Connecting power supply 12V + (V)

2. Signal connected to (A4) pin of ECU64 (O/w)

Figure 1: Wiring diagram between fuel injector and ECU.

Notes

• 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);

• 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;

• The O-ring must be replaced when removing and reassembling the injector, and the sealing surface must not be damaged during such operation.

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.

※ Fuel pump assembly

The fuel pump assembly integrates the fuel pump, fuel level sensor, 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.

Figure 1: Wiring diagram between fuel pump and ECU.

Function definitions of pins:

- 1: Connecting the instrument oil level signal (Y/W);
- 2: Connecting the fuel pump relay (Br/G);
- 3: Connect to the negative battery electrode (G).
- 4: Connect to the negative battery electrode (G).

Performance parameters:

Pressure regulating valve opening pressure:
 350 ± 10 kPa at a flow of 40 L/h, corresponding to the rated pressure value of 350 ± 10 kPa

The fuel pump assembly is installed at the bottom of the vehicle's fuel tank.

Do not operate the fuel pump assembly under no-load and dry conditions to avoid 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 (350 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.

Pressure relief of fuel line

The fuel supply pressure of the EFI system is high, and all fuel pipes are high-pressure-

Drawing of Fuel Pump

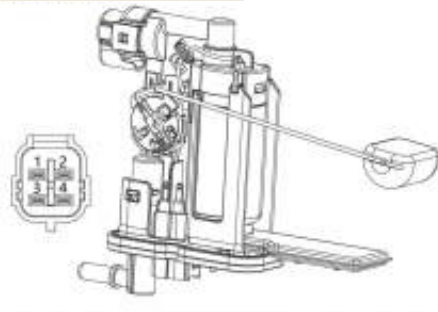
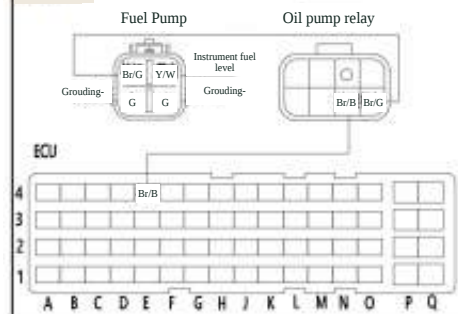
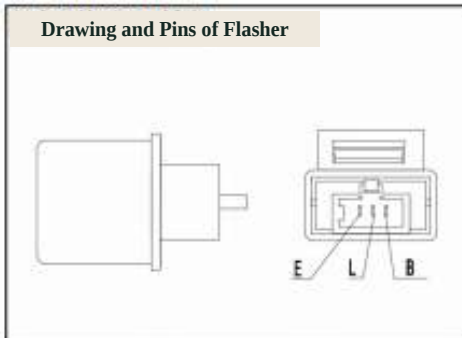


Figure 1



resistant. Even when the engine is not running, the fuel lines maintain high pressure. Therefore, during maintenance, be careful not to disassemble the fuel pipes if unnecessarily. When servicing a fuel system that requires maintenance, the fuel system should be depressurized before disassembling the oil pipe. The procedure is as follows: remove the fuel pump relay or disconnect the 4-pin (black) fuel pump harness connector, then start the engine and let it idle until it stalls on its own.

Drawing and Pins of Flasher



※ Flasher

Notes

•This flasher is designed with the functions of wire break alarm prompt and the overload protection.

As shown in Figure 1: Wiring diagram of flasher.

Relay circuit inspection

Figure 1

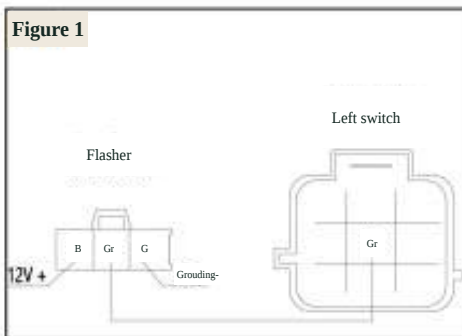
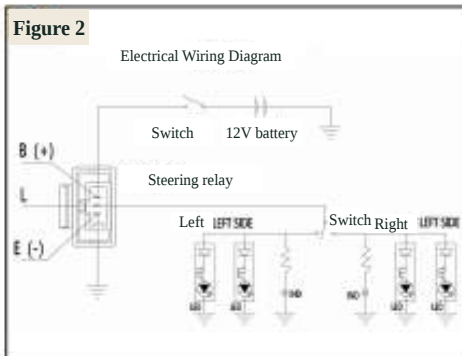


Figure 2



1.Open circuit inspection of power cord
Turn on the ignition switch and measure the voltage between the black line and the green line. Battery voltage is the normal voltage, if not, check the black and green lines for open circuit or fuse failure.

2.Open circuit inspection of output wire
Check the connection between the left switch and the gray wire of the flasher

3.Abnormal flashing frequency or no flashing
Check each turn signal lamp for damage;
Check the signal wire of the turn signal lamp for short to ground, resulting in short circuit protection of flasher.

As shown in Figure 2: Electrical wiring diagram of flasher.

- 1.Rated voltage: DC12.8V;
- 2.Rated power: LED lamp, front and rear turn signal lamps + instrument: 1.5W+1.5W+LED;
- 3.Working voltage range: DC 9 ~ 16V, minimum operating voltage: $\leq 9V$;

※ Oxygen Sensor

This sensor detects the oxygen content in the exhaust gas to obtain the air-fuel ratio signal indicating whether the mixture is rich or lean. Then the testing result is converted into a voltage signal and input to the ECU. The ECU continuously adjusts the fuel injection pulse width based on the signal from the oxygen sensor. Maintain the mixture concentration within the ideal range to achieve feedback control of the air-fuel ratio, also known as closed-loop control.

As shown in Figure 1: Wiring diagram between oxygen sensor and ECU.

Function definitions of pins:

Oxygen Sensor

PIN1: Oxygen heating + ECU 8 (P4) V;
 PIN2: Sensor GND - ECU 39 (M3) G/B;
 PIN3: Heating - ECU 2 (P1) O/G;
 PIN4: Sensor signal + ECU 45 (F3) Y/Gr.

Notes

- Apply high temperature resistant grease to the thread area during installation.

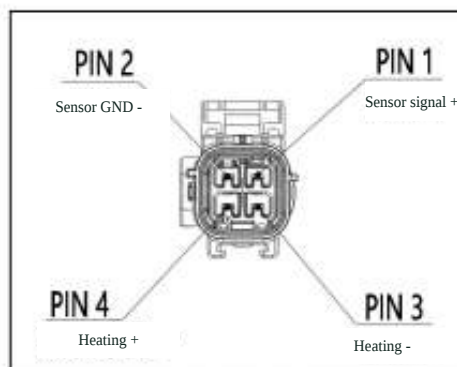
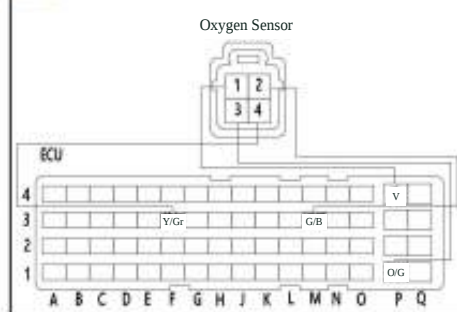
Torque:

Oxygen sensor to muffler
 50 N·m (5.0 kgf·m, 37 lbf·ft)

Drawing of Oxygen Sensor



Figure 1



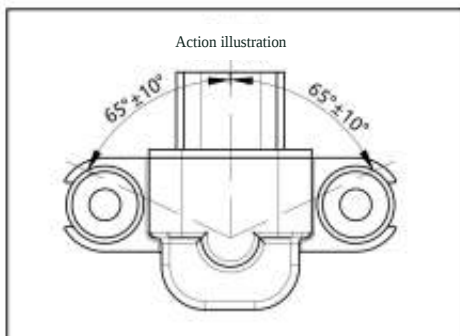


Figure 1

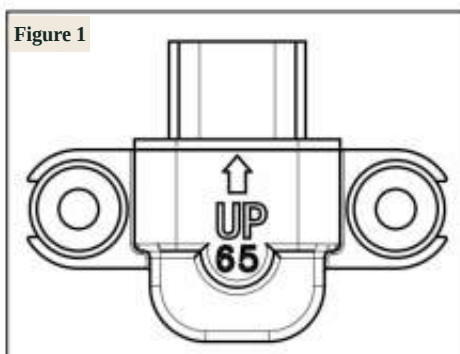


Figure 2

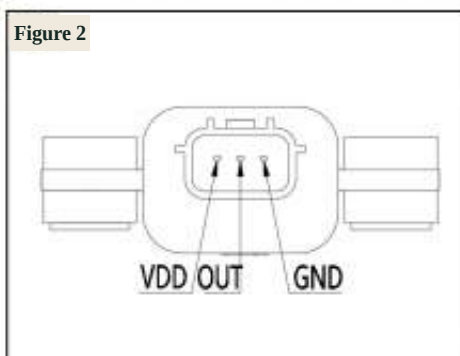


Figure 3

※ Side tilt sensor

The sensor is designed to provide side tilt protection. When the side tilting angle of vehicle exceeds an allowable range ($65^{\circ}\pm 10^{\circ}$), the OUT pin signal is transmitted to ECU, and ECU controls the engine stall, thus providing protection for both the driver and the vehicle.

Figure 1: Install with the “UP” facing up.

Figure 2: Function definition of pins

VDD: Connected to power + DC12V (B)

OUT: Connected to ECU pin 11(M1) (Y)

GND: Ground - connect to ECU pin 5 (Q3) (G)

Inspection

-Output voltage of tilt sensor

Off-specification → Replace.

Output voltage of tilt sensor

Operating angle: $65^{\circ}\pm 10^{\circ}$

The output voltage of the sensor before the actuation angle is at a high level

Voltage $\geq 13.5V$

The sensor outputs a low-level voltage ($\leq 0.2V$) within the operating angle range

As shown in Figure 3: Wiring diagram between side tilt sensor and ECU.

※ 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:

-Front seat cushion assembly;

See "Frame, Body Trim, Exhaust System" on page 57 for details.

-Battery negative mounting screw [1];

-Battery positive mounting screw [2];

-Battery strap [3];

-Battery [4].

The installation sequence is reversed from the removal sequence.

Note

- The battery has overcharge and overdischarge protection.

Over-charge protection voltage $\geq 15.6 \pm 0.3V$;

Over-discharge protection voltage $\leq 8.2 \pm 0.6V$.

Charging

a.Turn the main switch to "OFF" and disconnect the positive and negative electrodes of the battery from the battery terminal;

b.Remove battery;

c.Connect the charger to the battery, turn on the charger. After 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

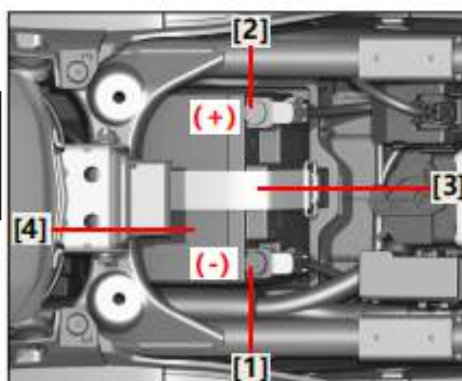
The battery must function properly and be fully charged.

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	14.2V-14.8V

Torque:

Battery box cover mounting bolts

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

Battery terminal bolt

2.0 N·m (0.2 kgf·m, 1.5 lbf.ft)

Battery specification:

Battery model: HJ15-FPZ

Full charging voltage: $> 13.2V$

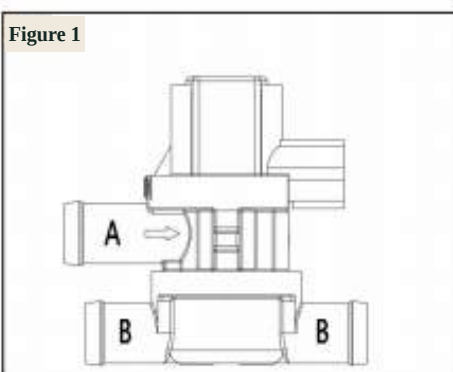
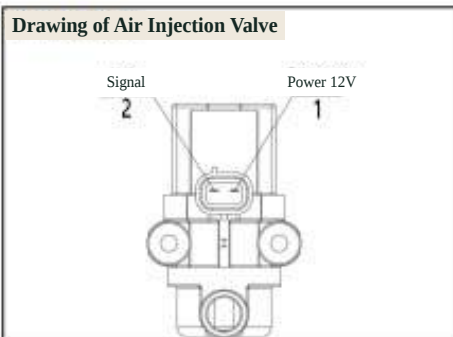
Required charging voltage: $< 12.8V$

Charging current: standard 2.0A, max. 20A

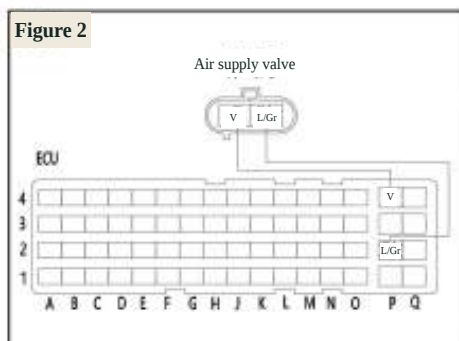
Operating temperature: $-20^{\circ}C$ - $60^{\circ}C$

Battery capacity: 12.0V/4.0Ah

Overall dimension: Length x Width x Height:113x69x110(2±mm)



A. From the air filter box
B. To the inside of the engine



※ Secondary air injection valve (system)

Air injection

The secondary air supply system injects fresh air (secondary air) into the exhaust port to burn the unburned exhaust gas again, reducing the hydrocarbon emissions. When negative pressure occurs at the exhaust port, the secondary air one-way valve will open to allow secondary air to flow into the exhaust port. The temperature required to burn the unburned exhaust gas is approximately 600 - 700°C.

Secondary air injection control valve

The secondary air injection control valve is controlled by the ECU signal according to the combustion condition. Generally speaking, when the vehicle is running, if the secondary air injection control valve is open, air can flow in during idling; when it is closed, the air flow will be cut off. However, if the coolant temperature is lower than the specified value, the secondary air injection control valve will remain open to allow air to flow into the exhaust pipe until the temperature is higher than the specified value.

1. Inspection

-Hose

Loose connection → Correct connection.

Crack/damage → Replace.

2. Inspection (as shown in Figure 1)

-Disconnect the hose connecting A-end to the air filter box

-When the cold vehicle starts, air will flow out from A-end. After tens of seconds, the control valve will cut off the air flow.

If the air flow is not cut off → Replace the control valve assembly.

3. Inspection

-Resistance of the secondary air injection system control valve

Off-specification → Replace.

Resistance of secondary air injection control valve

18–22Ω

Function definitions of pins

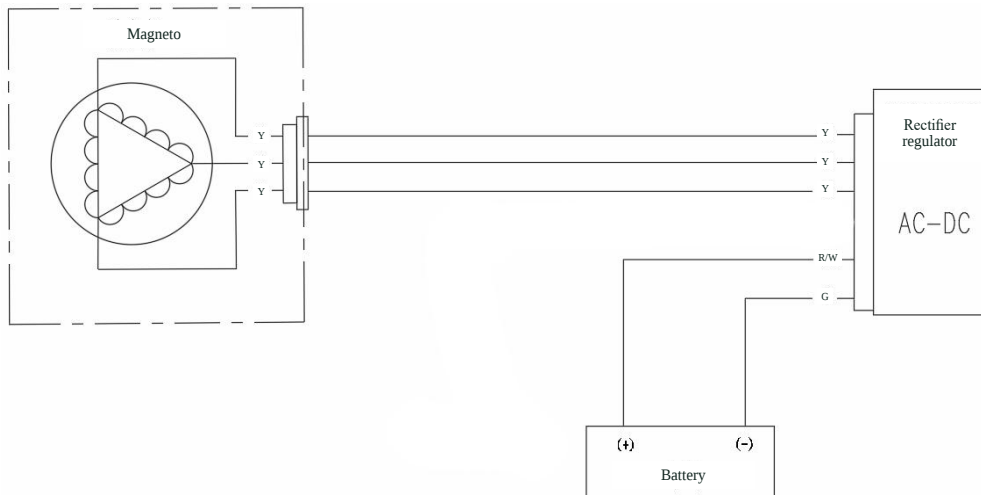
1. Power 12V+ connectde to ECU pin 8 (P4) (V)

2. Signal connected to (P2) pin of ECU4 (O/W)

As shown in Figure 2: Schematic diagram of connection between secondary air supply control valve and ECU pins.

※ 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 Ω .

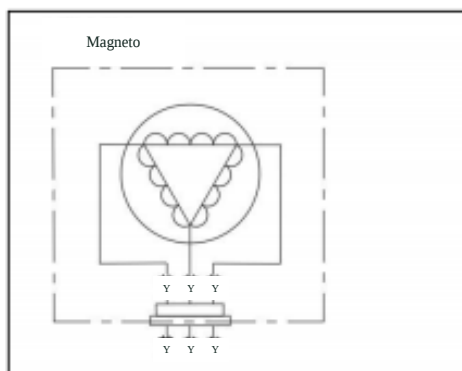
Performance of magneto under load

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) 5000

Output current (A) >25



Drawing of Oil Pressure Sensor

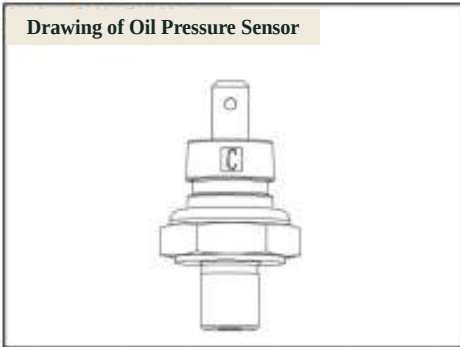
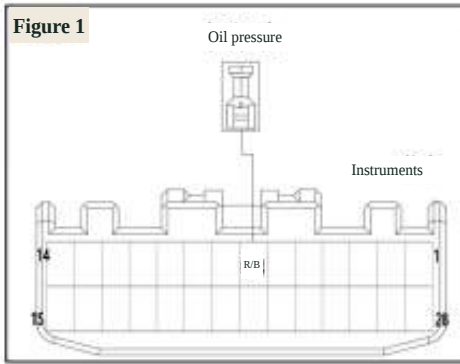


Figure 1



※ Oil pressure sensor

When the ignition switch is set to "ON", the oil pressure warning light on the instrument does not turn on.

1. Check the circuit of the oil pressure sensor.
Damaged → Replace it.

2. Disconnect the wire harness connector from the oil pressure sensor. Then check whether the oil pressure warning light functions when connecting the wire harness to the engine ground,

Not turn on → Replace instrument assembly.

Turns on → Replace oil pressure sensor.

After the engine is started, the oil pressure warning light remains on continuously.

1. Check the circuit of the oil pressure sensor.
Damaged → Replace it.

2. Check the engine oil pressure (see Page 31 for details).

Compliant → Replace the oil pressure sensor

3. If the oil pressure is not within the specified value, continue to check whether the engine oil is leaking, the type of engine oil, the oil seal, the oil filter or the oil pump.

As shown in Figure 1: Wiring diagram of oil pressure sensor and instrument.

※ 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 14.2V-14.8V.

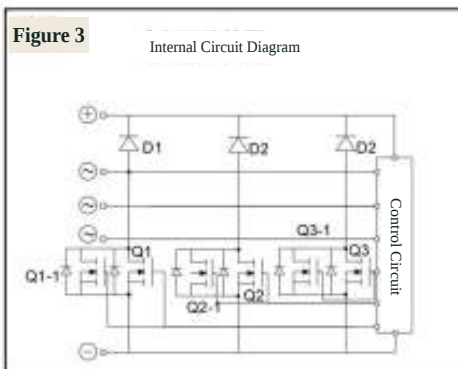
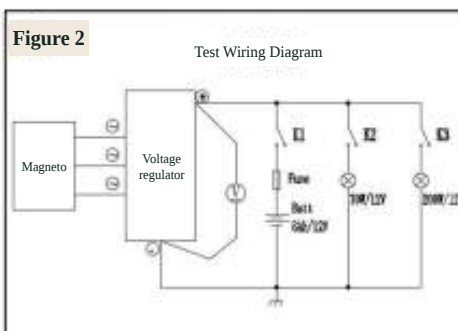
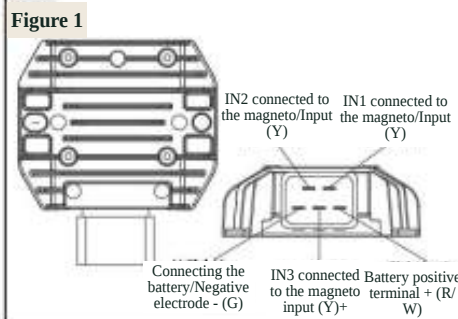
Function definitions of pins:

- 1: IN1 connected to magneto input (Y)
- 2: IN2 connected to magneto input (Y)
- 3: IN3 connected to magneto input (Y)
- 4: GND grounding-(G)
- 5: OUT connected to the positive electrode of battery (R/W)

Figure 1: Drawing of regulating rectifier and definition of pins

Figure 2: Test wiring diagram of regulating rectifier.

Figure 3: Internal circuit diagram of voltage regulating rectifier.



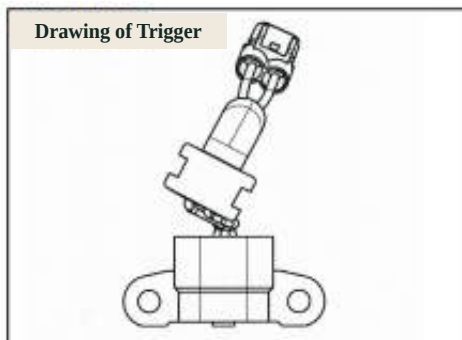


Figure 1

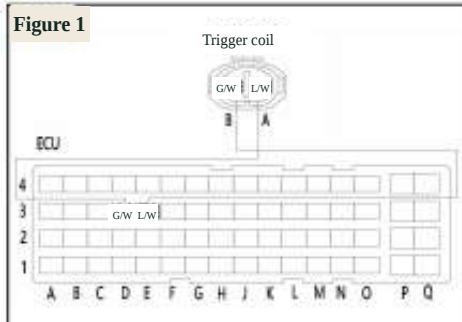


Figure 2

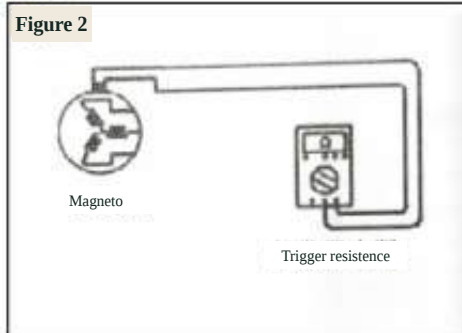
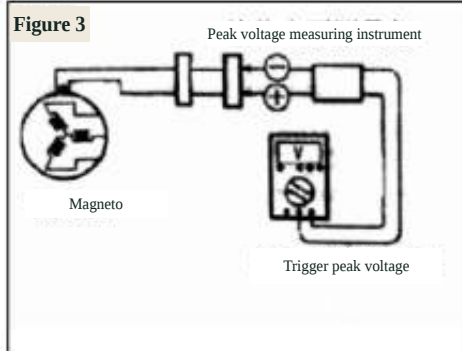


Figure 3



※ 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:

The multimeter is set to gear 200Ω:
Resistance of the trigger coil: 140Ω - 160Ω (20°C). If the resistance value of the trigger is not within the above range, replace the trigger.

As shown in Figure 2: Measure the trigger resistance

Connect the multimeter to the peak voltage adapter as shown in the figure:

+ Probe: L/W (A) lead

- Probe: G/W (B) lead

As shown in Figure 3: Measure the trigger peak voltage

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 $\geq 1.5V$ (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.

Figure 1: 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 200 Ω range.

As shown in Figure 2: Circuit diagram of starting relay.

Drawing of Starting Relay

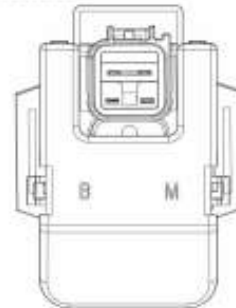


Figure 1

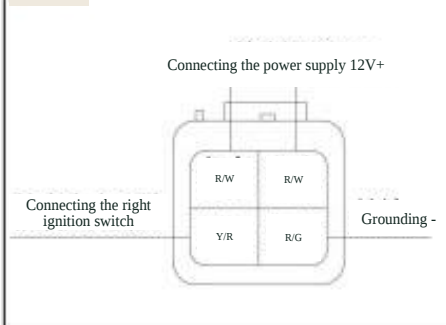


Figure 2

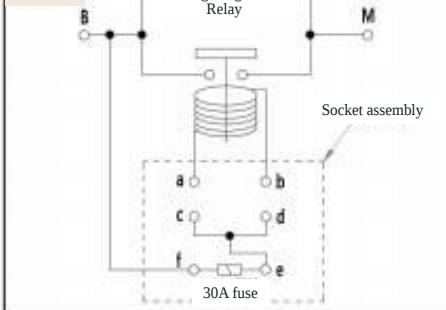


Diagram of relay

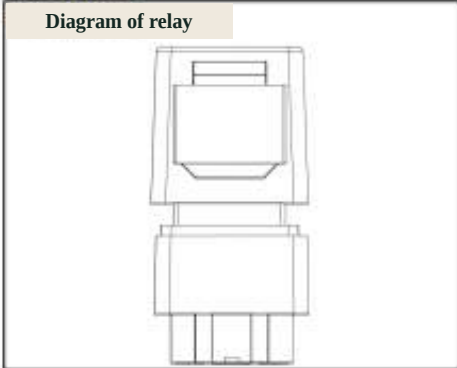
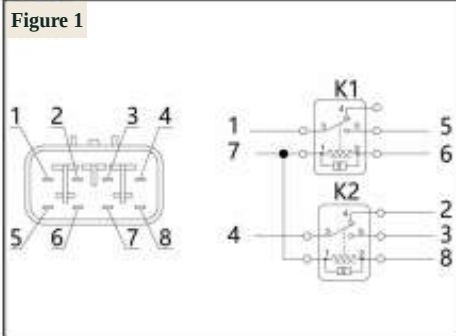


Figure 1



※ Oil pump, headlight relay

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.

Group 1

[7] Connect the battery's positive terminal

[6] Connect the battery's negative terminal

[1] Multimeter positive probe

[5] Multimeter negative probe

Group 2

[7] Connect the battery's positive terminal

[8] Connect the battery's negative terminal

[4] Multimeter positive probe

[5] Multimeter negative probe

No continuity between terminals → Replace the relay.

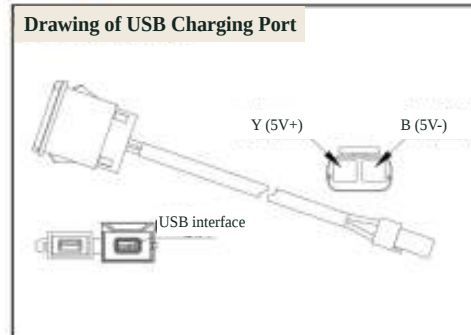
As shown in Figure 1: Wiring diagram of oil pump and headlight relay;

※ Fan, main relay

The inspection method is the same as that for the fuel pump and headlight relays.

※ USB charging port

1. Working environment temperature: $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$;
2. Input voltage: $5 \pm 0.25 \text{ V}$;
3. Input current: $3 \text{ A} \pm 0.15 \text{ A}$
4. Charging interface: Type-A;
5. Insulation resistance: insulation resistance between the housing and the internal $\geq 500 \text{ M}\Omega$



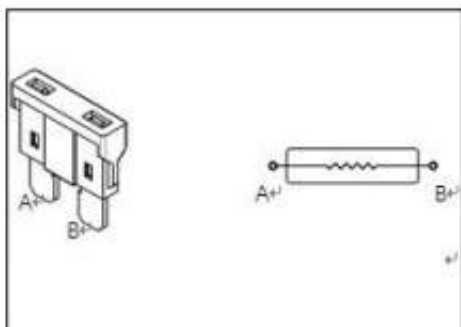
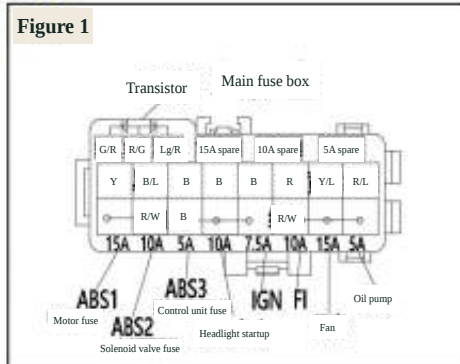


Figure 1



※ Fuse box/wire

To avoid short circuit, be sure to set the main power switch to "OFF" before checking or replacing the fuse wire.

1. Inspection

-Fuse

- Connect the digital multimeter to the fuse wire and check for conduction.
- If it is not conductive, replace the fuse wire.

2. Replace

-Replace the fuse wire.

- Set the main power switch to "OFF".
- Install new fuse wire with correct ampere value.
- Turn on the power switch and check for normal operation of the circuit.
- If the fuse wire burns out again immediately, check the circuit.

As shown in Figure 1: Wiring diagram of main fuse box.

⚠ Warning

- Never use fuses with non-specified ampere valve. Use of inappropriate fuse wire or use of fuse wire with incorrect ampere value may cause extensive damage to electrical components, lead to failure of lighting and ignition systems, and may cause fire.

※ Gear sensor

1.Inspection

- Check the gear sensor wires for open circuit or short circuit.
- Connection of gear sensor connector.
- Check the fixing condition of the harness connector.
- Remove the connector assembly, and check all bolts in the connector (check the terminals for bending or damage, and check the fixing condition of all bolts).
- Sensor mounting bolt M4, with a torque of 4-6 N•m.

2.Inspection

- Whether the contact is conductive to the wire
- Multimeter positive + probe

B/Y [6]

Contact point of the negative probe [6th gear] of the multimeter

- Gear sensor

If out of specification → Replace the gear sensor.

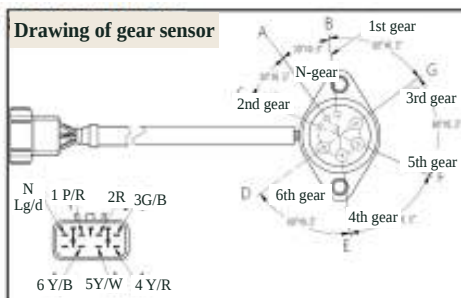
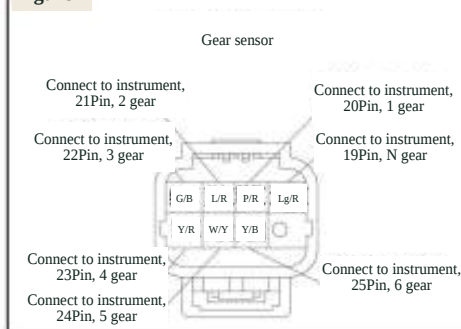


Figure 1

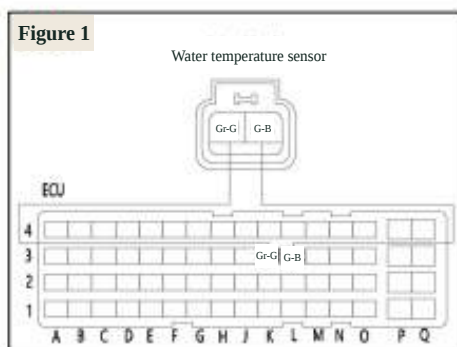
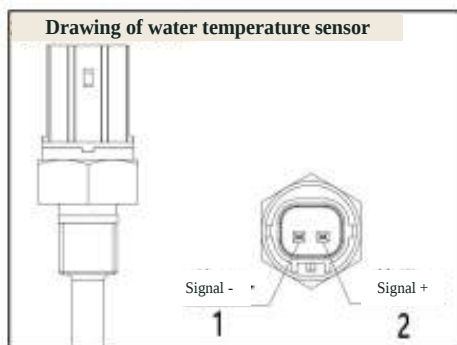


As shown in Figure 1: Wiring diagram of gear sensor

Parameter

- 1.Service temperature of sensor: -30~125°C;
- 2.Service voltage of sensor: DV 5V ± 0.25V;

Contact coding	A	B	C	D	E	F	G
Plug bore position	N	1	2	3	4	5	6
Wire color code	Lg/R	P/R	L/R	G/B	Y/R	Y/W	Y/B
Display gear position	Neutral	1st gear	2nd gear	3rd gear	4th gear	5th gear	6th gear



Temperature range (°C)	Resistance value (Ω)		
	Minimum value	Standard value	Maximum value
-20	13820	14770	15790
100	178.9	183.0	187.0

※ Engine water temperature sensor

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.

Figure 1: Wiring diagram between water temperature sensor and ECU.

Function definitions of pins

- 1: GND signal - connected to ECU 40 (L3) pin (G/B)
- 2: Sensor signal + connected to ECU 41 (K3) pin (Gr/G)

As shown in the water temperature sensor characteristic table, different temperatures correspond to different resistance signals.

※ Ignition lock

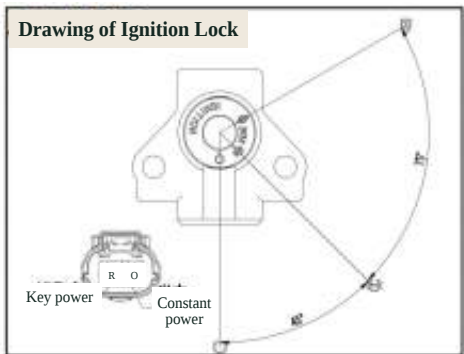
Pull out the connector assembly that connects ignition switch with the main cable, and check the switch connection status of the ignition switch.

When the key is in the "⊗" position, turn the direction handle to the leftmost, press the key, and rotate it counterclockwise to the "🔒" position, and the direction can be locked; if users need to unlock, rotate the key clockwise.

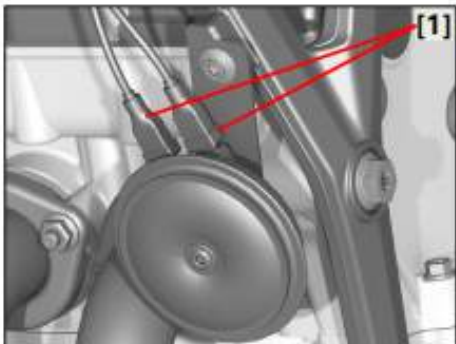
Position	Function
⊗	Used in parking (vehicle is powered off)
↻	Used in starting or driving
🔒	Use when locking the vehicle (the vehicle is powered off and the direction is locked)

During the parking (including parking for a long time), the ignition switch must be in the "⊗" or "🔒" position to ensure the safety of the vehicle and prevent the battery from "losing power".

Do not push the motorcycle while the steering mechanism is locked, otherwise it will be out of balance.

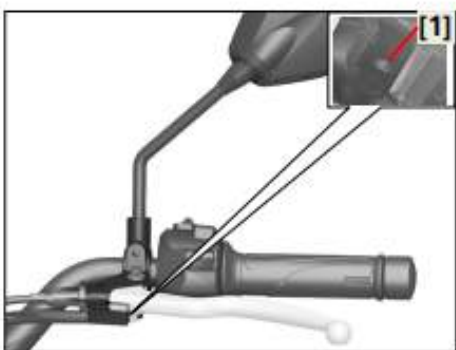


Electrical Logic Table			
Wire color	Red	Orange	Key insertion and extraction
Gear			
↻	↔		Cannot
⊗			Can
🔒			Can



※ Horn

Pull out the harness connector from the horn [1] and connect it with 12V power supply. It indicates a normal state if the horn rings normally, if not, it needs to be replaced.



※ Clutch switch

When it is in gear, clench the clutch lever and enable the clutch switch [1], retract the side stand, and then press the start button to start the vehicle.

※ **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.

- 1.Up and down buttons; (self-reset);
 - 2.High/low beam switch and headlight flasher switch; (self-lock/self-reset)
 - 3.Horn switch button; (self-reset)
 - 4.Turn signal button; (self-reset)
 - 5.Hazard/emergency light button; (self-lock)
 - 6.Confirm button; (self-reset)
 - 7.Return button; (self-reset)
 - 8.Clutch switch harness terminal.
- A.Handlebar switch harness terminal;
B.Function switch harness terminal;

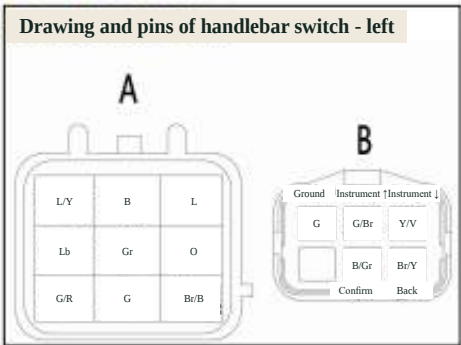
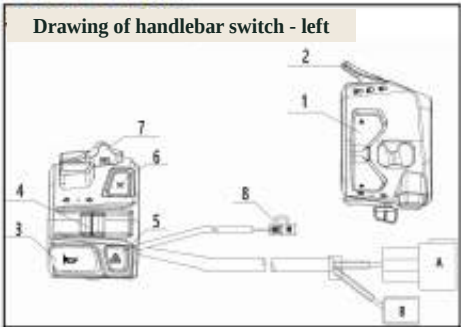


Figure 1: Correspondence table for handlebar switch - left function wire color (input terminal).

Figure 1

Color		L	L/Y		G	Br/B	Gr	O	Lb	B	G/R	Y/V	G/Br	Br/Y	B/Gr
Fiction															
Color change															
Horn															
Clutch															
Turn															
Overtake															
Warning															
Upper															
Lower															
Confirm	BACK														
Back	SET														

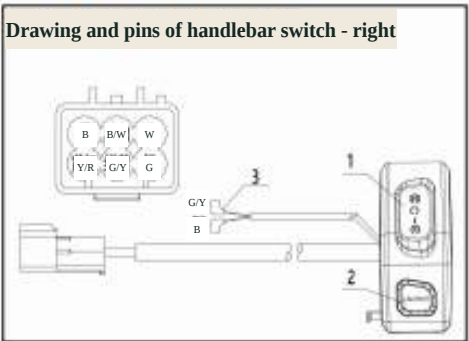


Figure 1

Enable OFF switch			
Color	B	B/W	Y/R
Function			
			
			
			

Brake switch		
Color	G/Y	B
Function		
Brake		

Launch control (LAUNCH)		
Color	G	W
Function		
Press		

※ **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.Start/Stop combined switch
- Only when the switch is in "○"(ON) position, the engine can be started.;
 - When the switch is in "⊗"(OFF) position, the engine cannot be started.
 - If the engine is in neutral, press the start button "⊗" to enable the engine.
 - If the engine is not in neutral gear, ensure the side stand folded up and the clutch lever is pulled to the handlebar. Pressing this start button "⊗" will also start the engine.

- 2.Launch control button
- Start the engine in 1st gear, then long press for three seconds to activate the launch control function.

3.Brake switch wiring harness terminal

Figure 1: Correspondence table for handlebar switch - right function wire color (input terminal).

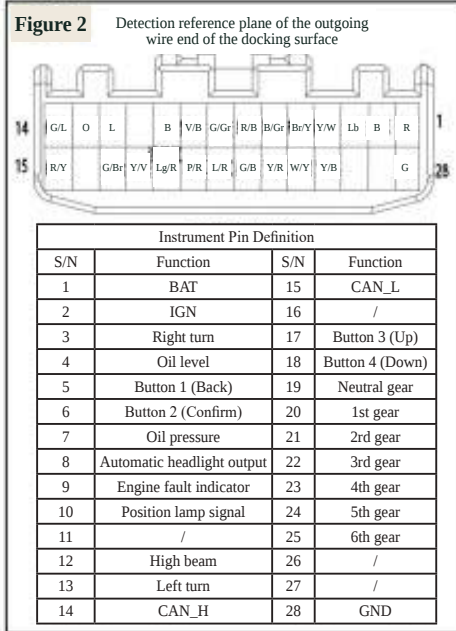
※ Instruments

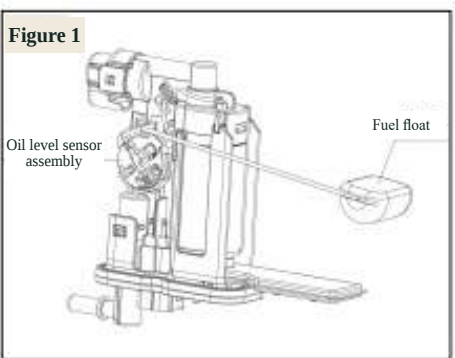
Display check

When the ignition key is turned to the "⌚" (ON) position, the instrument will be powered on and play the boot animation, then run a self-check, and display all functional modules and symbols; if the digital display screen fails to work, check the instrument power/ground wire; in the event of missing display during the self-check, please contact the appointed store of KOVE Moto for repair.

As shown in Figure 1: Drawing of main interface of instrument.

As shown in Figure 2: Definitions of each pin function for the instrument.





※ Oil level sensor

Convert the fuel liquid height signal into standard electric signal and output it to the instrument indicator lamp for display.

- 1.After the instrument starts up and switches to the main interface, the current remaining fuel in the tank shall be displayed;
- 2.Display range: 0-8 bars;
- 3.When the oil volume = 1 bar, the last bar of oil volume will be shown in red;
- 4.When the oil volume is ≤ 1 bar, the last bar of oil volume will turn red and flash;

-In case of fault

When the value of the oil volume sensor is beyond the normal range or no data is received, the dial of the oil gauge flashes in full bars.

As shown in Figure 1, the position [1] indicates the fuel gauge display area on the instrument panel, which shows 8 bars.

Parameter table of resistance value

Float center height (mm)	181.1 $\pm$ 3	62.1 $\pm$ 3
Sensor resistance value (Ω)	10 $\pm$ 2 Ω	110 $\pm$ 3 Ω
Detection point	Full	Empty
Notes	Float upper limit position	Float lower limit position

If the resistance does not meet the specification, replace the oil level sensor.

Figure 2: Fuel level sensor location diagram.

※ Brake switch

Identify the working state of the brake switch according to the lighting of brake light.

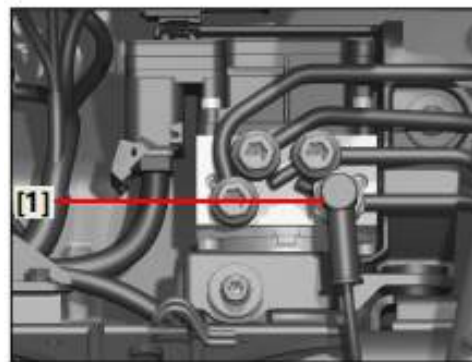
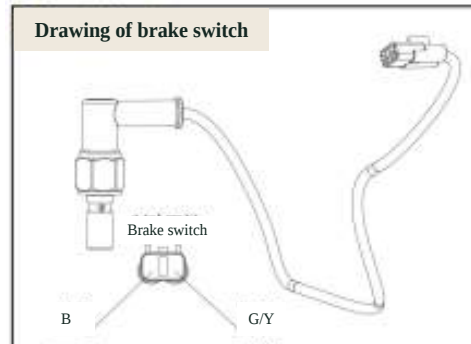
1. Clench the front brake handle: the brake light is on;
2. Release the front brake handle: the brake light is off;
3. Press the rear brake pedal: the brake light is on;
4. Release the rear brake pedal: the brake light is off;

As shown in Figure: Position [1] indicates the installation location of the brake switch on the vehicle.

Torque:

Installation of brake switch

25 N·m (2.5 kgf·m, 18.4 lbf·ft)



※ Inspection of vehicle ground wire harness

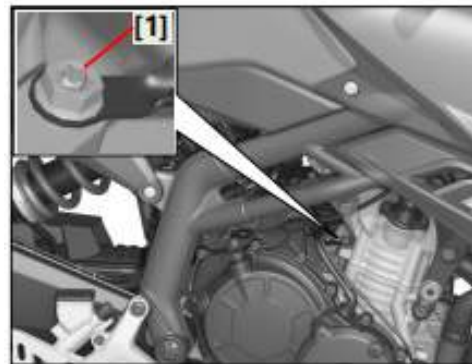
Check the ground wire harness [1] for any malfunctions;
Check if the bolt has looseness;

Each grounding bolt must be tightened to the required torque.

Torque:

Main ground wire connected to engine.

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



Drawing of Side Stand OFF Switch

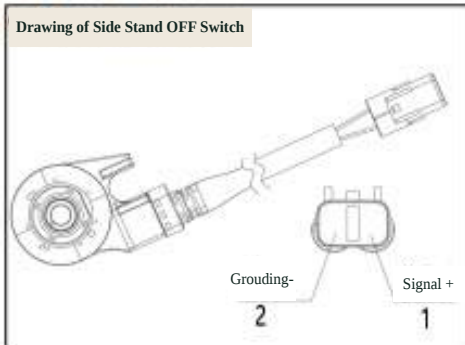
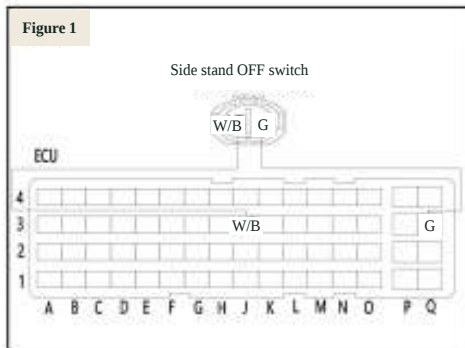


Figure 1



※ Side stand OFF switch

Check the side bracket switch for proper ignition cut-off:

- 1.Straddle the motorcycle and retract the side stand;
- 2.Start the engine when the gearbox is in neutral, and then shift the gearbox into gear while clenching the clutch lever;
- 3.Completely put down the side stand;
- 4.The engine shall stop when the side stand is put down.

If the vehicle fails to stall when the side stand is put down → Replace.

Inspection of wiring connection:

- 1.Check the white-black wire from the side stand switch to ECU for open circuit or short circuit.
- 2.Connection of side stand switch connector.
- 3.Check the fixing condition of the harness connector.
- 4.Remove the connector assembly, and check all bolts in the connector (check the terminals for bending or damage, and check the fixing condition of all bolts).

Function definitions of pins

- 1: Signal + connect to ECU pin 42 (J3) (B/W)
 - 2: GNG - connected to ECU pin 5 (Q3) (G)
- Figure 1: Wiring diagram between side stand switch and ECU.

※ Headlight assembly

In the headlight always-on mode, when turning on the ignition lock switch, the position light of the headlight turns on. When the vehicle is started: The position light and the low beam turn on simultaneously.

Notes

•When starting the vehicle, the headlight switches to the functions high beam: both the high and low beam are lit simultaneously.

When starting the vehicle, the headlight fails to light up, or the high beam and low beam fail to be switched

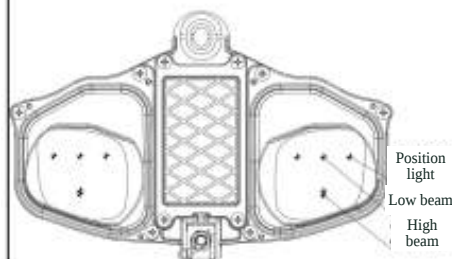
Inspection

Check if the headlight mode set correctly;

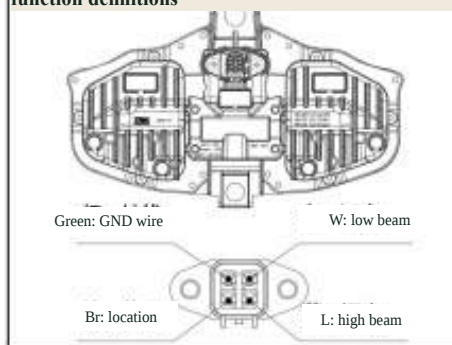
- 1.Switch damage;
- 2.Headlight relay damage;
- 3.Connector abnormality, such as pin retraction, crooked pin, improper plugging, etc.

As shown in Figure: Wiring diagram of headlight assembly.

Front Diagram of Headlight



Rear view of front headlight diagram and pin function definitions



※ Front and rear turn signals

When turning on the ignition lock switch or starting the vehicle:

- 1: Press the left and right turn signal buttons respectively, the lights turn on;
- 2: Press the turn signal center button, the light turns off.

As shown in Figure: Wiring diagram of front and rear turn signals

Diagram of Front Turn Signal

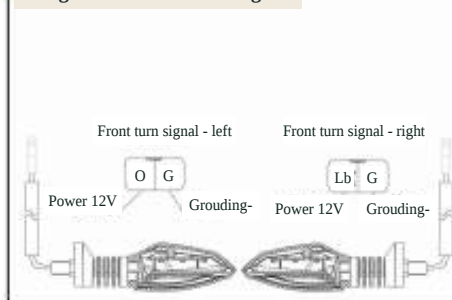
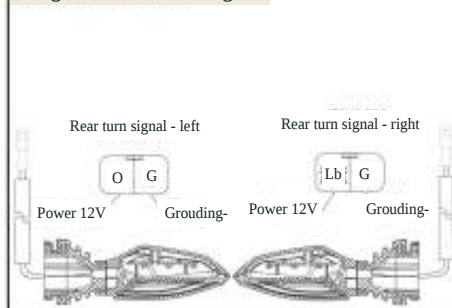
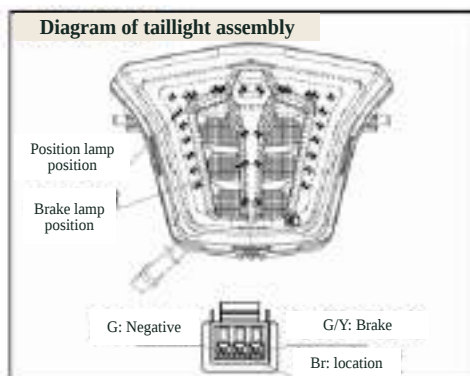


Diagram of rear turn signal





※ Tail light assembly

Position light

- 1: When the ignition lock switch is turned on or the motorcycle is started: the position light is on;
- 2: When the ignition lock switch is turned off after stall: the position light is off.

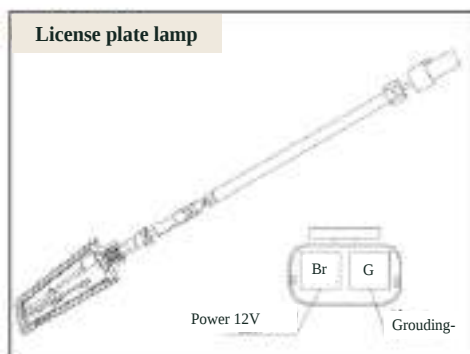
brake light

When turning on the ignition lock switch or starting the vehicle:

- 1: Press the rear brake pedal: the rear brake light is on;
- 2: Release the rear brake pedal: the rear brake light is off.

Rated working voltage: 12V

As shown in Figure: Wiring diagram of position lamps and taillights.



※ License plate lamp

Turn on the ignition lock switch.

- 1: When the vehicle starts, the license plate lamp is on.
- 2: When the ignition lock switch is turned off after stall, the license plate lamp turns off.

As shown in Figure: Wiring diagram of license plate lamp.

Abbreviation letters corresponding to wire colors:

B	Black	Y/G	Yellow/Green
Br	Brown	Y/L	Yellow/Blue
G	Green	Y/W	Yellow/White
Gr	Grey	Y/Br	Yellow/Brown
L	Blue	Y/Gr	Yellow/Grey
O	Orange	O/B	Orange/Black
P	Pink	O/W	Orange/White
R	Red	O/L	Orange/Blue
Lb	Light Blue	W/Br	White/Brown
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		

KOVE 2024

ZF400-2

Route map

