

ZF800GY Touring Edition Motorcycle Maintenance
Manual

First Edition (October 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 ZF800GY 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

English version editor: October 2024

Contents

Chapter I Overview	1
Chapter II Basic Information	3
Chapter III Regular Maintenance And Adjustment	23
Chapter IV Frame, Body Trim, Exhaust System	65
Chapter V Electronic Fuel Injection (EFI) System	101
Chapter VI Fuel System	123
Chapter VII Cooling System	141
Chapter VIII Engine	153
Chapter IX Front Wheel, Suspension, Steering	263
Chapter X Rear Wheel, Suspension	283
Chapter XI Hydraulic Braking System	301
Chapter XII Anti-Lock Brake System (ABS)	317
Chapter XIII Vehicle Electrics	335
Circuit Schematic Diagram	Appendix

Overview

How to use this manual

This manual describes the maintenance procedures of ZF800GY Touring Edition.

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

Section 1 Maintenance Instructions 4

Section 2 Model Identification..... 5

Section 3 Basic Information..... 6

Section 4 Vehicle Body Bolt Torque Value..... 12

Section 5 Vehicle Body Lubrication And Sealing Positions 19

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 ZF800GY Touring Edition



Basic Information

	Item	Parameter
Size	Length × width × height	2230mm×930mm×1395mm
	Shaft distance	1520mm
	Seat height	835mm
	Ground clearance	230mm
	Curb weight	215kg (with triple cases) /195kg (without triple cases)
	Carrying capacity	2 person
	Payload	175kg ((with triple cases) /150kg (without triple cases)
Frame	Frame type	High-strength steel twin-spar cradle frame
	Front shock absorber	Fully adjustable inverted hydraulic damping type
	Front shock absorber stroke	209.6mm
	Rear shock absorber	Fully adjustable external airbag oil-gas separation type
	Rear shock absorber stroke	86.5mm
	Front tire size/model	110/80 R19 59V TL / CST AMBRO A3
	Rear tire size/model	150/70 R17 69V TL/CST AMBRO A3
	Front wheel rim	MT2.5 × 19/ 6082-T6
	Rear wheel rim	MT4.25 × 17 / 6082-T6
	Front brake/disc	Dual one-way double-piston hydraulic brake / dual discs 298mm
	Rear brake/disc	Single-piston hydraulic brake/single disc 240mm
	Lead angle	27.15°
	Steering angle	35°
Engine	Model	Z288MW
	Displacement	799ml
	Type	Twin-cylinder, four-stroke, water-cooled, DOHC, 8-valve
	Cylinder diameter × stroke	88mm×65.7mm
	Combustion-chamber type and compression ratio	Basin-shaped combustion chamber, 13:1
	Maximum power (kW/r/min)	71.0/9000 (kW/rpm)
	Maximum torque (N·m/rpm)	80.0/7500 (N·m/r/min)
	Valve mechanism	DOHC/chain-driven
	Cooling System	Closed coolant circulation cooling
	Lubrication system	Forced pressure lubrication + splash lubrication
	Net engine mass	52kg

Item		Parameter
Drivetrain	Clutch	Manual wet multi-plate
	Transmission	Six-speed constant-mesh stepped transmission
	Primary transmission ratio	1.923
	Final transmission ratio	3.000
	Gear transmission ratio	1st gear: 2.846; 2nd gear: 2.056; 3rd gear: 1.632; 4th gear: 1.273; 5th gear: 1.083; 6th gear: 0.957
	Shift mode/sequence	Mechanical reciprocating type / 1-N-2-3-4-5-6-5-4-3-2-N-1
Electric system	Ignition mode	ECU-controlled digital ignition
	Starting mode	Electric starting
	Spark plug model/ electrode gap	LMAR9AI-10 (NGK) / 0.9 mm-1 mm
		BN9RSI (Weichai Torch) /0.95mm-1.05mm
	Regulating rectifier	Three-phase full-wave rectification
	Stator coil (resistance)	0.2 Ω ±20 %
	Trigger (resistance)	100 Ω ±20%

Cooling System Specification

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	

Specification of EFI System

Item	Specification
Engine idle speed (minimum no-load stable speed)	1400rpm±100rpm
Water temperature sensor (output resistance at 20 °C)	2.4320k Ω
Fuel injector resistance (20°C/68°F)	12 Ω
Electronic throttle rated operating voltage	12V
Intake air temperature sensor resistance: at 20°C	2290-2551 Ω

Lubrication System Specifications

Item		Standard value	Ultimate state
Oil capacity	Oil level (new or disassembled)	3.2L	-
	Clean the oil full-flow filter	2.8L	-
	Clean or replace the oil fine filter	3.0L	-
Recommended oil	Brand	Shell dedicated oil	-
	Model	SN 10W/50	-
	Grade	API quality grade: SN or above specification (do not use the oil listed at the circular API service label mark as "Energy-efficient") / (JASO T903 standard) : MA/GB 11121-2006	-
Engine oil filter type		Full flow paper filter element	-
Oil pump rotor	Clearance between inner and outer rotors	0.08mm~0.15mm	0.2mm
	Clearance between the outer rotor and the pump body	0.14mm~0.23mm	0.3mm
	Clearance between the inner and outer rotor and the pump body	0.02mm~0.09mm	0.17mm

Fuel System Specification

Item		Specification
Throttle valve body identification number		S101
Fuel pressure at idle speed		330 Kpa±10kPa
Fuel pump flow (at 12V and 280 ± 10 kPa)		≥30L/h
Fuel supply system	Type	BOSCH EFI
	Throttle orifice	46mm
Carben canister solenoid valve resistance		17Ω
Fuel type	Gasoline	95 octane, GB17930 - 2016
Fuel tank capacity		20 Litre

Battery/Charging System Specifications

Item			Specification
Battery	Model		HJ13L-FPZ
	Capacity		6.0AH
	Leakage value	It can be stored for more than one year between -20℃~40℃, and the higher the temperature, the shorter the storage time.	
	Voltage (28 ℃, 68°F)	Fully charged	≥13.2V
		Need to be charged	≤12.8V
	Charging current	Normal	3.0A
		Fast	24A
Magneto	Charging capacity		5000r/min>26A

Front Wheel/Suspension/Steering System Specifications Unit: mm

Item		Standard	Ultimate state
Tire tread depth		5.3mm	Tire wear limit marks at Δ TW1 mark on sidewall and center of tire
Cycling on paved roads		230 kPa (2.30 kgf/cm ² , 33 psi)	-
Cycling on unpaved roads		200 kPa (2.00 kgf/cm ² , 29 psi)	-
Shaft runout		0.05	0.1
Wheel rim runout	Radial	≤1.0	≥2.0
	Axial	≤1.0	≥2.0
Front Shock Absorber	Free length of spring	570	558.6
	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: 415 ml±2 ml	Injection volume of right shock absorber: 415 ml±2 ml

Rear Wheel/Suspension/System Specifications Unit: mm

Item		Standard	Ultimate state
Tire tread depth		6.3mm	Tire wear limit marks at Δ TWL mark on sidewall and center of tire
Cycling on paved roads		250 kPa (2.50 kgf/cm ² , 36 psi)	-
Cycling on unpaved roads		200 kPa (2.00 kgf/cm ² , 29 psi)	
Shaft runout		0.05	0.1
Wheel rim runout	Radial	≤ 1.0	≥ 2.0
	Axial	≤ 1.0	≥ 2.0
Drive chain	Size/link	Choho 520 SX2 (X-type sealed, closed) / 120 links	-
	Slack	30 - 45	45
Rear shock absorber		Free length of spring	277
		Recommended specifications of shock absorber oil	Special shock absorber oil provided by the manufacturer
		Shock absorber oil adding volume	181ml
		Airbag nitrogen quantity (standard)	1.0Mpa

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	4.0	3.5
	Brake disc runout	0.15	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	3.5
	Brake disc runout	0.08	0.15
	Inner diameter of master cylinder	12.700	-
	Inner diameter of brake caliper piston cylinder	34.000	-

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	LED
	Indicator/warning lamp	
	TCS Indicator	LED
	Electronic injection malfunction indicator light	LED
	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
	Light/Headlight startup	7.5A
	ING/Ignition	5.0A
	Bat/Constant power	7.5A
	Switch/OFF switch	15A
	FAN/Water tank fan motor	15.0A
	EFi + PUMP/Fuel injection + fuel pump	15.0A
	Spare	15A,10.0A,7.5A

Vehicle Body Bolt Torque Value

Installment position	Specification status	Torque force value N·m	Notes
ABS bracket and ABS	M6	10	
ABS bracket and frame	M6	10	
BCM bracket and frame	M6	10	
ECU and ECU bracket	M6	8	
ECU bracket and rear fender front section	M5	3	
OBD interface and rear fender front section	ST4.2	1	
U swingarm and frame	M12	60	
Bumper mounting bracket and frame (left and right)	M8	22	
Bumper upper and bumper bracket (left and right)	M10	45	
Bumper lower and frame (left and right)	M8	22	
Side case bracket mounting bolt (left and right)	M8	22	
Side case bracket-guard connector	M8	22	
Gear shift lever rod end bearing and shift pedal connecting rod	M6	10	
Gear shift lever rod end bearing and shift rockerarm	M6	10	
Adjusting and tightening nut of the shift rod	M6	6	
Shift pedal connecting rod and frame	M8	22	
Shift rockerarm and engine	M6	10	
Side cover (L/F) and frame	M5	5	
Side tilt sensor and side tilt sensor bracket	M5	4	
Side tilt sensor bracket and carbon canister	M5	4	
Side stand OFF switch and frame	M5	4	
Vehicle body (left and right) and rear fender front section	ST4.8	1	
Vehicle body inner lining (left and right) and frame	M6	8	
Vehicle body inner lining (left and right) and vehicle body (left and right)	ST4.2	1	
Water reservoir and radiator	M6	8	
Magneto plug bracket and fuel tank	M6	6	
Driven sprocket connected to buffer	M8	35	
Ground wire to frame (left front)	M6	10	
Headlight bracket pressure plate and headlight bracket	M5	5	

Installment position	Specification status	Torque force value N·m	Notes
Headlight bracket and headlight assembly	M5	5	
Headlight trim (left and right) and fuel tank side protector inner lining (left and right)	M5	5	
Headlight trim and instrument housing	M5	5	
Headlight trim and instrument bracket	M5	5	
Ignition lock and upper connection plate	M8	22	
Battery box cover and battery box	M5	5	
Battery box and frame	M6	10	
Electronic accelerator handle and handlebar tube	M4	3	
Regulating rectifier and fuel tank	M6	6	
Engine heat shield and engine	M6	10	
Engine fuel drain bolt	M20	20	
Engine rear suspension	M10	54	
Engine reinforcement bracket - right with engine (M10)	M10	44	
Engine reinforcement bracket - left with engine (M10)	M10	44	
Engine front suspension (upper)	M10	54	
Engine front suspension (lower)	M10	54	
Engine upper suspension (right)	M10	54	
Engine upper suspension (left)	M10	54	
Engine lower protector (lower) rear mounting point	M6	12	
Engine lower protector side mounting point	M6	8	
Engine lower protector left/right-front bracket	M8	22	
Engine lower reinforcement bracket-right with frame	M8	22	
Engine lower reinforcement bracket-right with engine	M8	22	
Engine lower reinforcement bracket-left with frame	M8	22	
Engine sprocket cover and engine	M6	10	
Steering handlebar counterweight mounting bolt	M6	15	
Upper clamp and lower socket of the steering handlebar	M8	22	
Steering stem locking	M24	108	
Steering damper and frame	M8	22	
Steering damper and lower bracket	M8	22	
Rear ABS ring gear and rear wheel hub	M5	4	

Installment position	Specification status	Torque force value N·m	Notes
Rear fender rear section and rear fender rear bracket	ST4.2	1	
Rear fender rear section and license plate lamp pressure plate	ST4.2	1	
Rear fender inner panel and rear fender rear section	M5	5	
Rear fender inner panel and rear fender rear bracket	M5	5	
Rear fender inner panel and rear fender rear bracket with frame	M6	10	
Rear fender front section and frame	M6	8	
Rear fender front section trim and frame	M6	8	
Rear fender front section trim and rear fender front section	M6	8	
Rear disc brake and rear wheel hub	M8	30	
Rear reflector mounting nut	M6	5	
Rear grab handle mounting point and frame	M8	22	
Rear grab handle front mounting point and frame	M8	22	
Rear shock absorber locking nut	M6	12	
Rear shock absorber upper mount to frame	M10	54	
Rear footpeg (left and right) and frame	M8	22	
Rear wheel speed sensor and rear brake caliper assembly	M6	8	
Rear wheel small fender and rear fender front section trim	M5	5	
Front wheel axle locking	M22	128	
Rear tailgate and rear fender front section	M5	5	
Rear tailgate, rear tailgate trim, and frame	M6	8	
Rear tailgate trim, vehicle body inner lining (left and right) and frame	M6	8	
Rear brake pump push rod adjusting and tightening nut	M5	6	
Rear brake pump and frame	M6	8	
Rear brake switch installation	M10	32	
Rear brake pedal and brake rockerarm	M5	3	
Fastening screw for rear brake fluid reservoir cap	M4	2	
Rear brake hose clip and swingarm	M5	5	
Rear brake hose and rear brake caliper	M10	32	
Shift sensor and engine	M5	5	
Spark plug installation	M10	12	
Fine filter cover mounting bolt	M5	6	

Installment position	Specification status	Torque force value N·m	Notes
Oil pressure sensor	M10	10	
Throttle locking pipe clamp	M5	3	
Thermostat cover mounting bolt	M6	6	
Intake pipe assembly and engine	M6	10	
Intake pressure sensor mounting screw	M5	2	
Air filter element bracket and air filter tank	M5	2	
Air filter locking pipe clamp	M5	3	
Air filter and frame	M6	10	
Horn and frame	M6	10	
Cooling pump cover mounting bolt	M6	10	
Clutch handle assembly mounting bolt	M6	10	
Chain guard and swingarm	M6	8	
Chain adjuster locking nut	M8	16	
Chain clip pressure plate and swingarm	M6	6	
License plate lamp pressure plate and rear fender rear bracket	ST3.5	1	
Swingarm shaft locking	M16	88	
Swingarm axle trim	M6	8	
Front windshield and front windshield bracket	M5	5	
Front windshield bracket and instrument bracket	M6	8	
Front fender and front shock absorber	M6	8	
Front disc brake, front ABS ring gear, and front wheel hub	M8	30	
Front shock absorber adjuster end cover bolt	M8	22	
Front shock absorber and front wheel axle locking	M8	22	
Front wheel speed sensor and front shock absorber	M6	8	
Front wheel axle	M16	70	
Front upper fender mounting bolt	M5	5	
Front brake pump mounting bolts	M6	10	
Front brake caliper-left and right and front shock absorber	M8	35	
Fastening screw for front brake fluid reservoir cap	M4	2	
Front brake hose and front brake pump	M10	32	
Fuel pump and fuel tank	M5	3	

Installment position	Specification status	Torque force value N·m	Notes
Fuel rail mounting bolt	M6	8	
Triangular cradle and U swingarm	M12	60	
Triangular cradle and rear shock absorber	M10	44	
Triangular cradle and swingarm	M12	60	
Radiator fan and radiator	M6	8	
Radiator upper mounting point and frame	M6	10	
Radiator lower mounting point and frame	M6	10	
Brake rockerarm and frame	M8	22	
Brake rockerarm and rear brake rod end bearing	M6	10	
Upper bracket wire hook	M5	6	
Upper bracket and front shock absorber (locking)	M8	22	
Handlebar grip - left and handlebar tube	M4	3	
Handlebar switch - right mounting screw	M4	2	
Handlebar switch - upper right cover and electronic accelerator handle	ST4.2	1	
Handlebar switch - left mounting screw	M4	2	
Upper right mounting bolt for hand windshield	M6	6	
Hand-operated windshield left and right cover cap nuts	M6	4	
Double-threaded stud to lower socket of steering handlebar	M10	30	
Double-threaded stud and upper bracket locking nut	M8	22	
Water pump drain bolt	M6	10	
Water pump impeller fastening bolt	M6	10	
Water tank air guide cover - left and right and fuel tank side protector - left and right	ST4.2	1	
Carbon canister and frame	M6	10	
Taillight assembly and rear tailgate	M5	5	
Top/side case gourd bracket mounting bolt	M6	10	
Top case rubber ring mounting bolt	M5	4	
Top case latch mounting bolt	M6	10	
Top case bracket mounting bolt	M8	22	
OFF switch wire bracket & engine lower reinforcement bracket - left to engine	M8	22	
Lower bracket and front shock absorber (locking)	M8	22	
Muffler pipe clamp	M8	22	

Installment position	Specification status	Torque force value N·m	Notes
Muffler heat shield and muffler	M6	8	
Muffler rear section and rear footpeg assembly - right	M8	22	
Muffler shield and muffler	M6	8	
Muffler front section and frame	M8	22	
Muffler front section and engine	M8	18	
Battery positive and negative terminal connecting screw	M5	2	
Oxygen sensor connected to muffler front section	M18	50	
Instrument housing rear section (left and right) and fuel tank	M5	5	
Instrument bracket and bracket	M6	12	
Instrument bracket and instrument trim	M5	5	
Instrument bracket and instrument assembly	M5	5	
Oil pipe clamp and swingarm	M5	5	
Fuel level sensor mounting bracket and fuel tank	M5	3	
Fuel level sensor and fuel tank	M5	3	
Fuel tank side protector (left and right) and instrument housing	M5	5	
Fuel tank side protector (left and right) and fuel tank	M5	5	
Fuel tank side protector (left and right) and fuel tank side protector bracket (left and right)	M6	8	
Fuel tank side protector inner lining (left and right) and side protector (left and right)	ST4.2	1	
Fuel tank side protector bracket-right and frame	M6	10	
Fuel tank side protector bracket-left and frame	M6	10	
Fuel tank side trim (left and right) and side protector (left and right)	ST4.2	1	
Fuel tank drain pipe pressure plate and fuel tank	M5	4	
Fuel tank front protector bracket and fuel tank	M5	5	
Fuel tank front shield and instrument housing rear section (left and right)	M5	5	
Fuel tank front shield and fuel tank	M5	4	
Fuel tank lock base and fuel tank	M5	4	
Fuel tank lower protector (left and right) and fuel tank	M5	5	
Fuel tank and frame (front and rear) mounting points	M8	22	
Fuel tank seat cushion stopper	M6	5	

Installment position	Specification status	Torque force value N·m	Notes
Brake caliper bleed screw	M5	6	
Brake hose 2 and front brake caliper (left)	M10	32	
Brake hose 2 and brake hose 3 to front brake caliper (right)	M10	32	
Brake hose 3 and frame	M6	10	
Brake hose and ABS	M10	25	
Drive sprocket locking bolt	M20	100	
Main harness ground wire	M6	10	
Steering damper and frame mounting bolt	M8	22	
Steering damper and lower connecting plate mounting bolt	M8	22	
Damper inner rod and regulator end cap tightening nut	M6	15	
Seat cushion mounting bracket and fuel tank	M6	6	
Seat cushion lock and frame	M6	5	
4-slot adjusting nut	M25	First stage: 40N·m, second stage: loosen the adjusting nut by two turns and then tighten it to 10N·m, third stage: keep the direction fixed and loosen by 1/4 turn	
Special mounting bolts for side stand	M10	Fasten the bolt to 10 N·m and loosen by 1/3 turn, then hold the bolt head steady and tighten the locking nut to a torque of 22 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 stem 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	
	Clutch control lever sliding area	
	Sliding area of side stand pivot	
	Rear brake arm pivot rotation area	
	Sliding area of shift arm pivot	
	Front footpeg left and right sliding area with the frame rotating shaft	
	Rear footpeg left and right sliding area with the rear footpeg bracket rotating shaft	
	Swingarm pivot oil 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	
	Rear shock absorber spherical needle roller bearing	
	Contact area of oil seal lip of front wheel hub bearing	
	Contact area of the front wheel hub and front wheel bushing-left (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	
	Triangular cradle rotation area and needle roller bearing	
	Contact area of oil seal lip of triangular cradle	
	U swingarm rotation area and needle roller bearing	
	Contact area of oil seal lip of U swingarm	

Material	Position	Notes
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 rockerarm	
	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 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	
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	

Material	Position	Notes
Special chain lubricant or equivalent	Entire surface of chain	
Engine lubricant	Fuel pump unit rubber seal ring	
Cable lubricant	Clutch cable	
	Seat lock cable	
Thread locker (Huitian 7272)	Seat lock cable	
	Front and rear brake disc mounting bolts	
	Mounting bolts of front and rear ABS gear rings	
	Engine front suspension (upper and lower) and frame	
	Engine upper suspension (left and right) and frame	
	Engine rear suspension and frame	
	Engine lower reinforcement bracket (left and right) and engine	
Thread locker (Huitian 7262)	Connecting bolt between bumper mounting bracket and frame	
	Connecting bolt between shift pedal connecting rod and frame	
	Gear shift lever rod end bearing and shift rockerarm	
	Gear shift lever rod end bearing and shift pedal connecting rod	
	Special mounting bolts for side stand	
	Left and right rear footpeg connecting bolts to frame	
	Connecting bolt between rear brake arm and frame	
	Connecting bolt between rear brake pedal and rear brake arm	
	Rear brake pump push rod end bearing and brake rockerarm	
	Locking bolts of front shock absorber and lower connecting plate	
	Connecting bolt between front brake caliper -left/right and front shock absorber	
	Steering handlebar lower socket and double-threaded stud	
	Drive sprocket locking bolt	
	Top case bracket mounting bolt	
	Side case bracket and guard bar mounting bolts	

Regular Maintenance And Adjustment

Section 1 Care Instructions	25
Section 2 Exhaust Gas Control System Maintenance Schedule	26
Section 3 General Periodic Maintenance/Lubrication Table	27
Section 4 Inspection Of Fuel Tank Line	29
Section 5 Crankcase Vent Pipe Maintenance.....	30
Section 6 Inspection And Adjustment Of Spark Plug.....	31
Section 7 Inspection And Adjustment Of Valve Clearance.....	32
Section 8 Inspection Of The Engine Intake Pipe	36
Section 9 Engine Oil Inspection And Replacement.....	37
Section 10 Engine Oil Filter Replacement.....	39
Section 11 Engine Idle Speed	39
Section 12 Inspection Of Engine Oil Pressure.....	40
Section 13 Inspectionf Of Exhaust System.....	42
Section 14 Inspection And Adjustment Of Clutch Free Play.....	44
Section 15 Inspection And Adjustment Of Front Hand Brake Lever	45
Section 16 Inspectionf Of Evaporation System	45
Section 17 Replacement Of Air Filter Element/Inspection Of Hose Cleanliness.....	46
Section 18 Inspection Of Brake Operation	47
Section 19 Inspection Of Brake Pads.....	47
Section 20 Inspection And Replacement Of Disc Brake	47
Section 21 Inspection Of Front Brake Hose	48
Section 22 Inspection Of Rear Brake Hose	48
Section 23 Adjustment Of Headlight Beam.....	49
Section 24 Inspection Of Steering Damper	49

Section 25 Inspection Of Side Stand	50
Section 26 Lubrication Of Side Stand	50
Section 27 Inspection Of Side Stand Off Switch	50
Section 28 Inspection Of Coolant Level	51
Section 29 Inspection Of Cooling System	52
Section 30 Lubrication Of Front Brake Handle	53
Section 31 Lubrication Of Rear Brake Rockerarm	53
Section 32 Lubrication Of Clutch Handle	53
Section 33 Inspection And Lubrication Of Pedal	53
Section 34 Inspection And Adjustment Of Steering Head	54
Section 35 Inspection And Lubrication Of Front And Rear Wheel Seals	55
Section 36 Inspection And Lubrication Of Steering Head Bearing	55
Section 37 Inspection And Lubrication Of Triangular Cradle	56
Section 38 Inspection And Lubrication Of U-Cradle	56
Section 39 Inspection And Lubrication Of Swingarm Bearing	56
Section 40 Inspection Of Front Shock Absorber	57
Section 41 Inspection Of Rear Shock Absorber	57
Section 42 Front Shock Absorber Settings And Adjustments	58
Section 43 Rear Shock Absorber Adjustment	60
Section 44 Inspection Of Brake Light Switch	61
Section 45 Inspection Of Switches, Lights And Signals	61
Section 46 Inspection Of Vehicle Locking Torque	61
Section 47 Battery Inspection And Charging	62
Section 48 Inspection And Lubrication Of Steel Cable	63

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		•		•		
		• Check the burning condition. • Adjust clearance and clean. • Replace if necessary.			•		•	
3	☆	Valve clearance	Every 40,000 km					
4	☆	Fuel injection	•	•	•	•	•	•
		• Check the engine idle rotation speed. • Check and make synchronization adjustments.		•	•	•	•	•
5	☆	Exhaust system	•	•	•	•	•	
6	☆	Evaporative emission control system			•		•	
7	☆	Engine exhaust gas reflux device		•	•	•	•	•

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 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 together with engine oil; replace fine filter / clean coarse filter						
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

- Disconnect the electrical component wiring harness connector [1];
- Fuel tank overflow hose [2];
- Bolt [3];
- Regulating rectifier [4];
- Bolt and T-bushing [5];
- Lift the fuel tank [6] upwards;

3. Check the fuel pipeline

Notes

- When lifting the fuel tank, be careful not to pull the fuel tank drain hose/overflow hose.
- If the quick connector and its surroundings are dirty, please clean them.

- Check the fuel hose [7], quick connector [8], fuel filter and rubber grommet [9], and single ear stepless clamp for any looseness, damage or leakage.

- Check if there are any of the following situations
 Squeeze/loosen → Connect correctly.
 Crack/damage/leak → Replace.

Note

- Ensure that the fuel tank drain hose/overflow hose and drain pipe are routed correctly.

4. Installation

The installation sequence is reversed from the removal sequence.

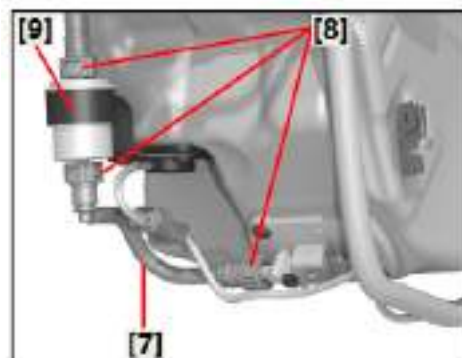
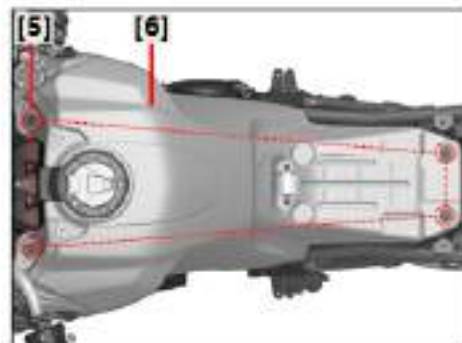
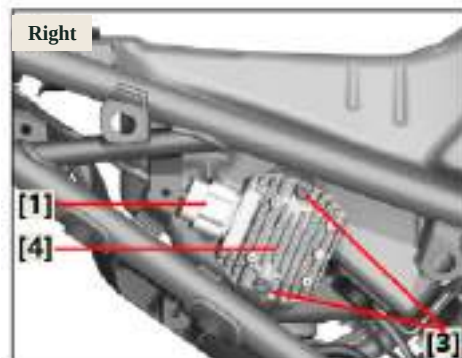
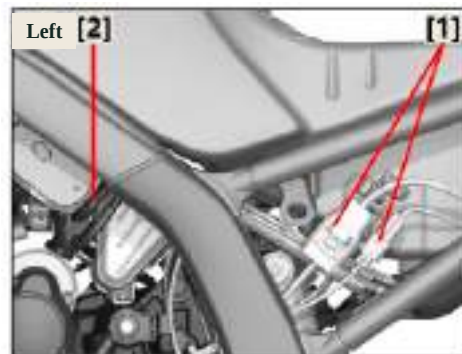
Torque:

Regulating rectifier and fuel tank

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Fuel tank and frame (front and rear) mounting points

22 N·m (2.2 kgf·m, 16 lbf·ft)





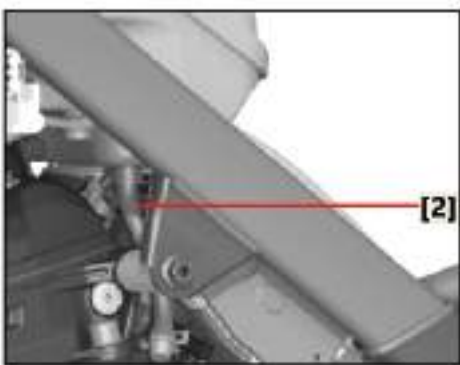
※ Crankcase vent pipe maintenance

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

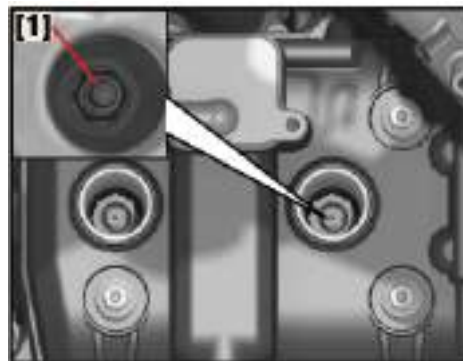
- Maintenance should be performed more frequently when riding in the rain or at full speed, as well as after rinsing the motorcycle or when it is inverted.
- Regularly check if sediment is visible in the transparent section of the air filter cleaning pipe [2]. If so, remove the air filter cleaning pipe,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

TORCH / BN9RSI

2.Inspection

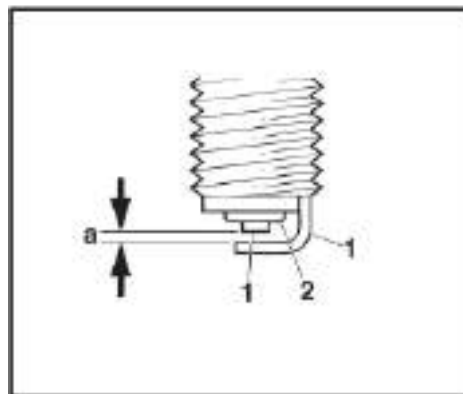
-Electrode [1]

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

LMAR9AI-10 (NGK) : 0.90–1.00 mm

BN9RSI (Weichai Torch) : 0.95–1.05 mm

6.Install

-Spark plug

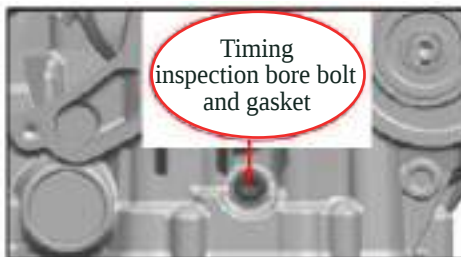
Torque :

Spark plug installation

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

Note

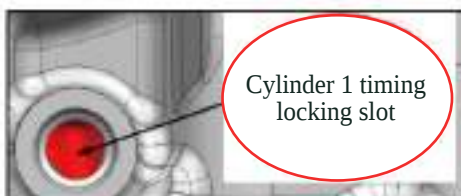
•Before installing the spark plug, clean the surfaces of the spark plug and the gasket first.



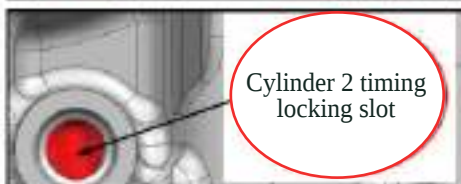
Timing inspection bore bolt and gasket



Locking bolt



Cylinder 1 timing locking slot



Cylinder 2 timing locking slot

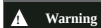


Stop clip



Feeler gauge

※ 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.

Inspection steps:

- Remove all the vehicle accessories that block the engine cylinder head, generally including the body panels, fuel tank, air filter, and water tank;
- Remove the engine cylinder head cover assembly, adjusting bore cap, and timing inspection bore bolt and gasket;
- Use a 15mm socket wrench on the magneto bolt assembly and turn the engine crankshaft a few turns.

-Turn the crankshaft counterclockwise to position it at the ignition top dead center (TDC) of cylinder 1 (the left cylinder) . Insert the locking bolt from the timing inspection bore into the locking slot on the crank end face to secure the crankshaft and prevent any deviation. At this point, the linear markings on the intake and exhaust camshaft sprockets must align flush with the cylinder head cover sealing surface.

-Use a feeler gauge to check the valve clearance between the intake and exhaust rockerarms of cylinder 1 and the cam.

-Turn the crankshaft counterclockwise to position it at the ignition top dead center (TDC) of cylinder 2 (the right cylinder) . Insert the locking bolt from the timing inspection bore into the locking slot on the crank end face to secure the crankshaft and prevent any deviation. At this point, the dot markings on the intake and exhaust camshaft sprockets must align flush with the cylinder head cover sealing surface.

-Then remove the exhaust stop clip and use a feeler gauge to check the valve clearance between the cam and the curved surfaces of the intake and exhaust rockerarms of cylinder 2.

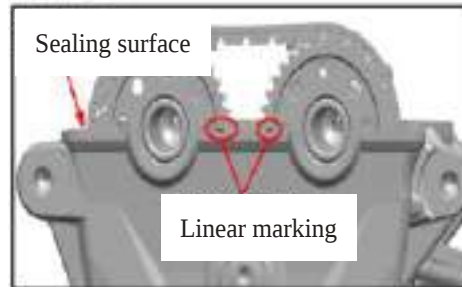
•Check that there is no abnormality in the valve clearance, then reassemble the components in reverse order. If any abnormality is found, it is necessary to adjust the valve clearance (see the following content) and reassemble the components in reverse order after passing the inspection.

Instruction:

Cylinder 1 ignition top dead center:

Turn the crankshaft counterclockwise to position it at the ignition top dead center of cylinder 1 (the left cylinder) . The linear markings on the intake camshaft "IN" and exhaust camshaft "EX" sprockets must be flush with the cylinder head cover sealing surface.

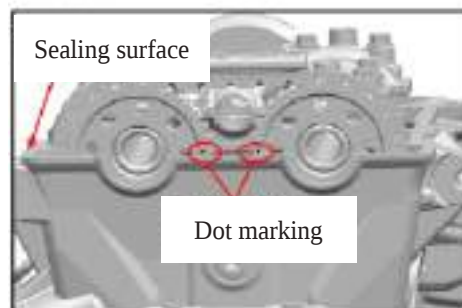
Lock the timing inspection bore using the locking bolt.



Cylinder 2 ignition top dead center:

Turn the crankshaft counterclockwise to position it at the ignition top dead center of cylinder 2 (the right cylinder) . The dot markings on the intake camshaft "IN" and exhaust camshaft "EX" sprockets must be flush with the cylinder head cover sealing surface.

Lock the timing inspection bore using the locking bolt.

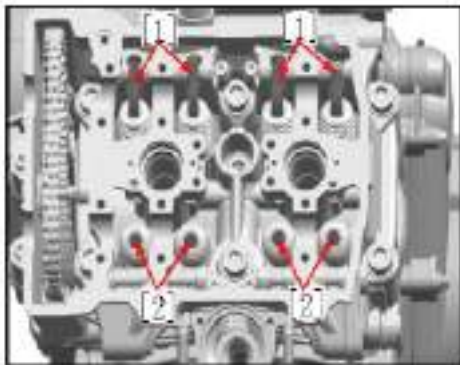
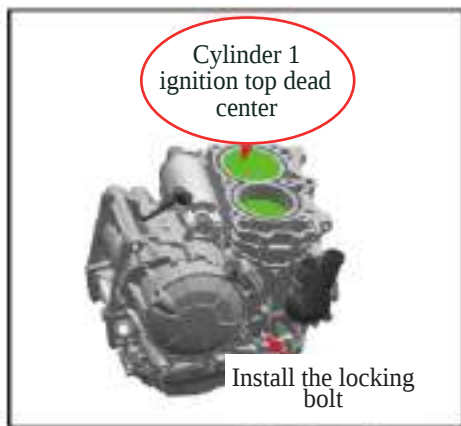


Valve clearance (cold: 20 °C)

Intake valve (IN) : 0.10–0.15 mm.

Exhaust valve (EX) : 0.15mm - 0.21mm

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



Adjust the valve clearance

Adjustment procedures:

To adjust the valve clearance of cylinders 1 and 2, the following components need to be disassembled:

Note

• Before disassembling, ensure that cylinder 1 is in the ignition TDC installation position (see above) .

- Remove the cylinder head cover
- Remove the camshaft cover assembly
- Remove the intake and exhaust camshaft assembly
- Remove the tensioner

Adjustment method:

- Lift the rockerarm [1].
- Remove the valve gaskets [2] and place them in order, remembering their respective installation positions.
- Measure and record the thickness of the valve gasket [2], then select the appropriate gasket based on the valve gasket specifications and methods provided below.
- Place the appropriate valve gasket in the marked order.
- Install the intake and exhaust camshaft assembly and the camshaft cover assembly, then fasten the tensioner. Continue to rotate the crankshaft counterclockwise for several turns, then return to the timing position and use a feeler gauge to recheck whether the intake and exhaust valve clearances are within the specified range.
- If it fails, continue adjusting (method as mentioned above) until it falls within the specified range, then reassemble the components in reverse order.

Detailed disassembly and assembly instructions (See "Valve train system" on page 180 for cylinder head disassembly) .

Note

• Cover the timing chain opening with a cloth to prevent the valve clearance adjusting gasket from falling into the crankcase.

The exhaust valve clearance adjustment of cylinder 2 does not require disassembling the camshaft.

Adjustment method:

First, adjust the engine to the cylinder 2 ignition TDC installation position (see above) . Remove the rockerarm stop clip, use tweezers to move the rockerarm to one side, and extract the valve adjusting gasket with tweezers. Select the appropriate valve adjusting gasket and install it into place with tweezers. Then, use tweezers to position the rockerarm above the valve adjusting gasket (note: prevent the gasket from falling off) , and finally reinstall the rockerarm stop clip.



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 adjusting gasket: $A = (B - C) + D$. Select the valve adjusting gasket group closest to the calculated result;

A: Thickness of the new gasket;

B: Recorded valve clearance value;

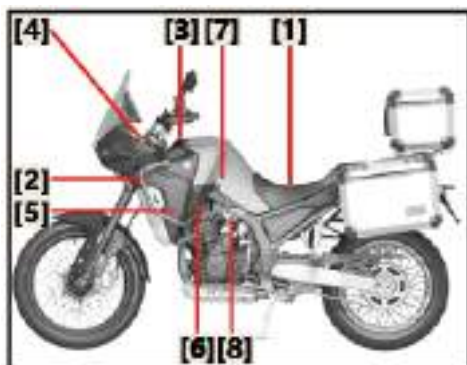
C: Specified valve clearance value;

D: Thickness of the removed gasket.

Notes

- The removed gasket must be measured for thickness using the micrometer shown in Figure [1];

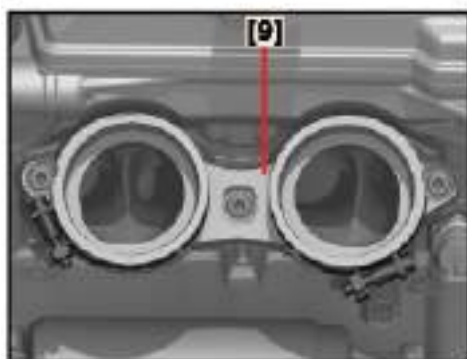
- There are 22 groups of valve adjusting gaskets available for adjusting the valve clearance. The thickness difference between adjacent groups is 0.04mm, and the thickness range is 1.72mm - 2.60mm. The washer markings are 1720 = 1.72mm, 1760 = 1.76mm... 2600 = 2.60mm.



※ **Inspection of the engine intake pipe:**

1. Disassembly

- Seat cushion assembly [1];
 - Bumper (left and right) [2];
 - Front shield of fuel tank [3];
 - Rear section of the instrument housing (left and right) [4];
 - Fuel tank side protector assembly (left and right) [5];
 - Fuel tank lower protector (left and right) [6];
- See "Frame, Body Trim, Exhaust System" on page 65 for details.



- Fuel tank assembly and air filter assembly [7];
 - Throttle body assembly [8];
- See "Fuel System" on page 123 for details

2. Inspection

- Engine intake pipe [9];
- Crack/damage → Replace.

3. Install

The installation sequence is reversed from the removal sequence.

Torque:

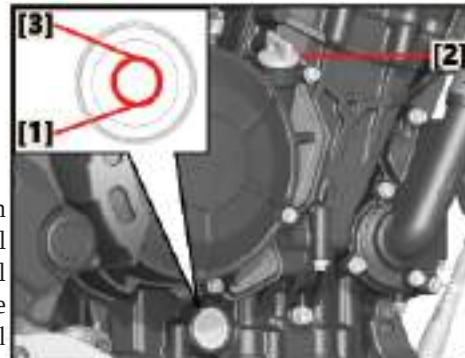
Intake pipe assembly and engine

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ 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 fuel level mark within the red-circled area [1], remove the oil plug [2] and fill the specified engine oil into the crankcase until it reaches the upper mark within the red-circled area [3].



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

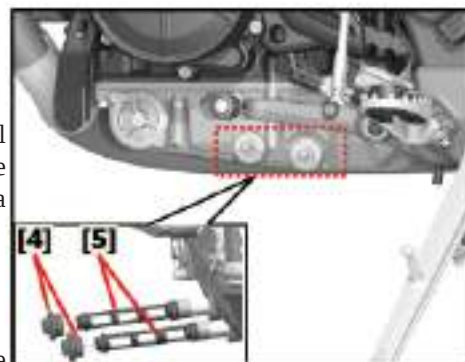
Start the engine, warm the motorcycle for several minutes and then turn off the engine. Support the motorcycle upright on a flat surface and place a container under the engine oil bleed bolt.

Disassemble the following parts:

- Engine lower protector;

See "Frame, Body Trim, Exhaust System" on page 65 for details.

- Engine oil plug [2];
- Oil drain bolt and O-ring [4];
- Coarse filter [5];
- Drain the engine oil.

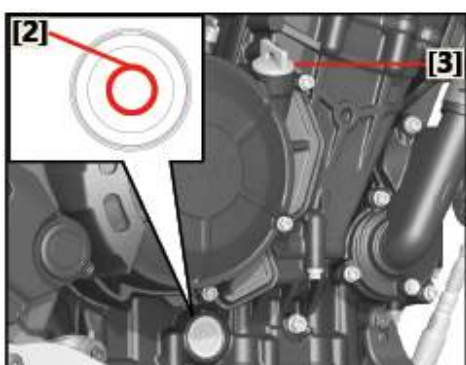
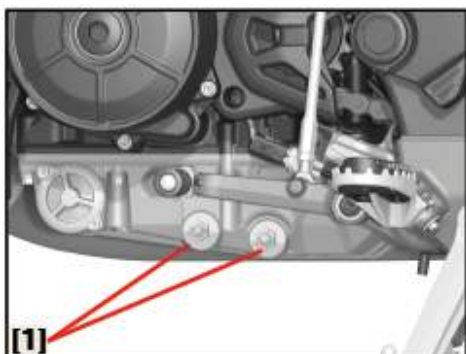


Inspection

- Oil full-flow filter

Damage → Replace

Undamaged → Clean.



After completely draining the engine oil

- First, clean the oil drain bolt and coarse filter, then coat engine oil to the thread and seat surface of the oil drain bolt.
- Install a new seal ring on the engine oil drain bolt and coat engine oil.
- Install the oil drain bolt along with the coarse filter assembly [1] in the bore on the left side of the oil pan and tighten to the specified torque.
- Add engine oil to the upper fuel level mark within the red-circled area [2].
- 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 [3]
- Damage → Replace.

Torque:

Engine fuel drain bolt

20 N·m (2.0 kgf·m, 15 lbf·ft)

Requirements for oil filling volume

Only after draining from the oil drain bolt: **2.8L**;

After replacing the oil fine filter: **3.0L**;

After disassembly and reassembly: **3.2L**.

※ 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

- Install the engine oil filter with the oil seal facing inward.
- Check the O-ring 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

6.0 N·m (0.6 kgf·m, 4.4 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;
- Accelerator switch and accelerator handle.

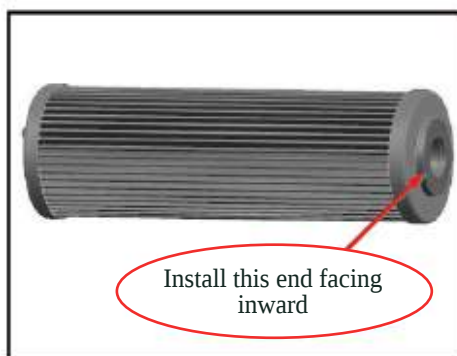
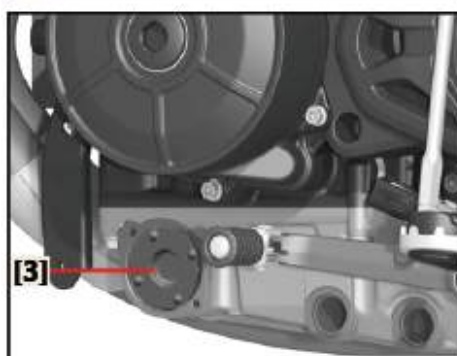
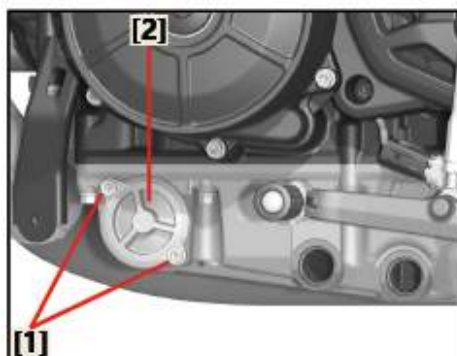
2. Start the engine, heat up to normal operating temperature, and let it idle run;
3. Check idle speed.

Notes

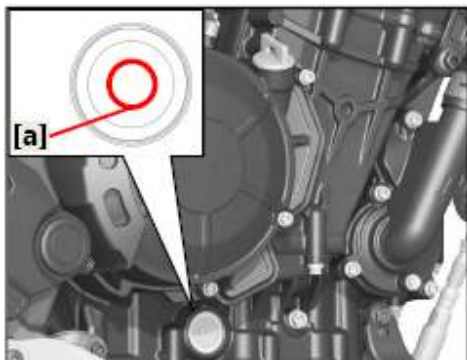
- Check the idle speed after completing all maintenance items of the engine and confirming that it is within the specified limit;
- The engine must be warmed up before checking and adjusting the idle speed accurately. Idle speed range:

(1400 ± 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.



※ Inspection of engine oil pressure

1. Park the vehicle on a level surface.

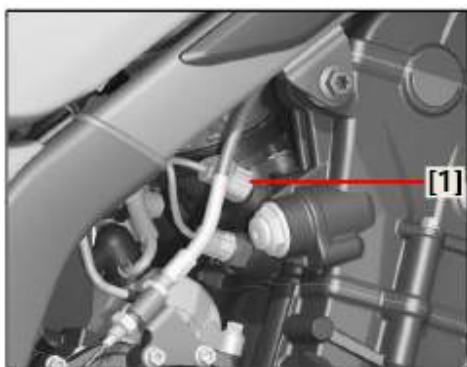
Note

- 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.

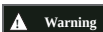
4. Disassembly

- Fuel tank assembly;

See "Fuel System" on page 65 for details.

5. Disassembly

- Oil pressure sensor[1];



Warning

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

6. Installation

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

7. Park the vehicle on a level surface.

Note

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

8. Measurement

- Engine oil pressure (under the following conditions)

190.0 kPa/5000 r/min
1.90 kgf/cm² / 5000 r/min,
27.5 psi/5000 rpm

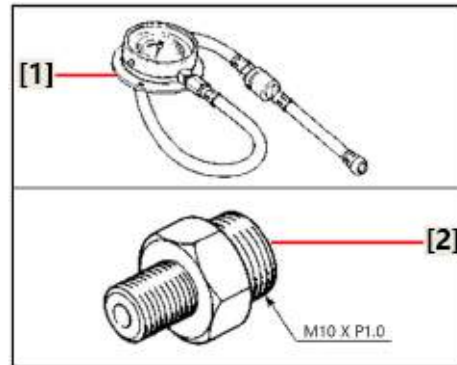
9. Installation

- Oil pressure sensor;
- Engine lower protector assembly.

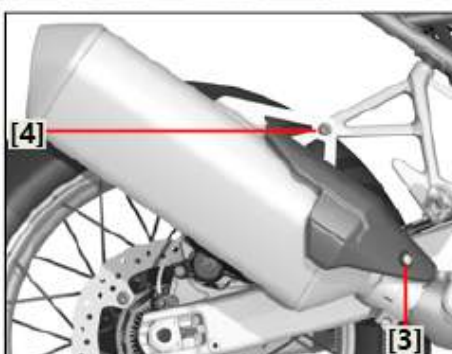
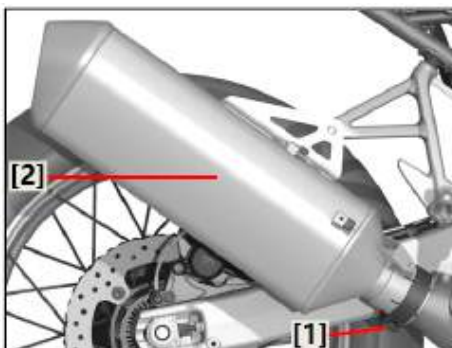
Torque:

Oil pressure sensor

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



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



※ Inspection of exhaust system

1. Rear muffler section

⚠ Warning

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

Inspection

- Muffler pipe clamp [1];
Break/damage → Replace. Loose → Properly connect.
- Muffler rear section [2];
Crack/damage/leak → Replace.

Locking torque inspection

- Muffler shield mounting bolt [3];
- Connecting bolt [4] between muffler rear section and right rear footpeg.

Torque:

Muffler shield mounting bolt

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Muffler pipe clamp

Muffler rear section and rear footpeg assembly

- right

22 N·m (2.2 kgf·m, 16 lbf·ft)

2. Muffler front assembly

Warning

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

Inspection

- Muffler gasket [1];
Exhaust leakage → Replace
- Muffler front section [2];
Crack/damage/leak → Replace.

Locking torque inspection

- Exhaust port connecting nut [3];
- Oxygen sensor [4].
- Connecting bolt [5] between muffler front section and frame

Torque:

Muffler front section and engine

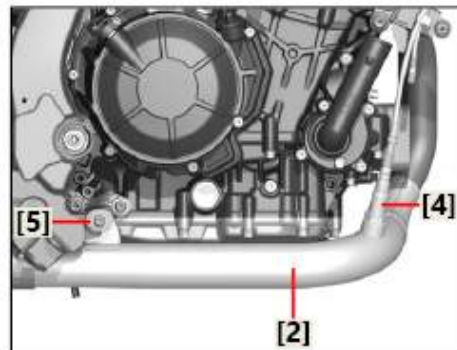
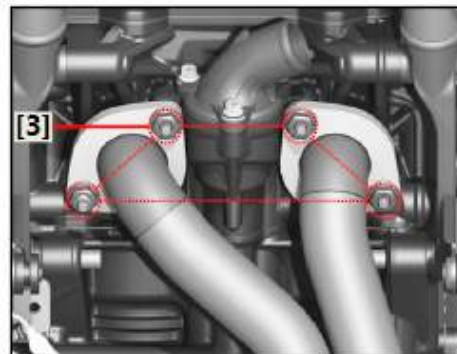
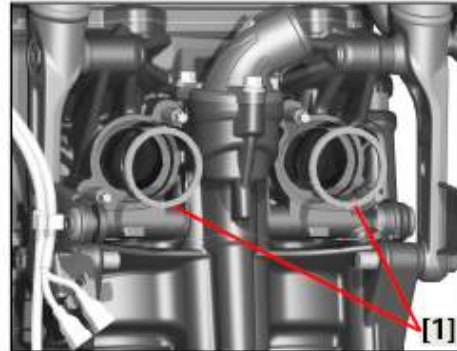
18 N·m (1.8 kgf·m, 13 lbf·ft)

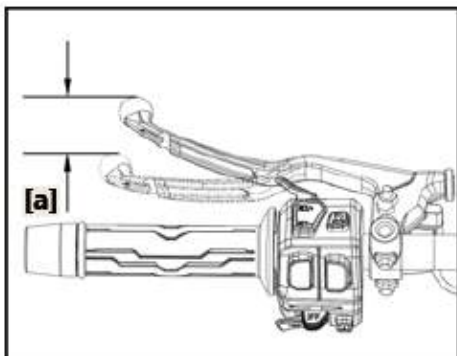
Connecting bolt between muffler front section and frame

22 N·m (2.2 kgf·m, 16 lbf·ft)

Oxygen sensor connected to muffler front section

50 N·m (5.0 kgf·m, 37 lbf·ft)

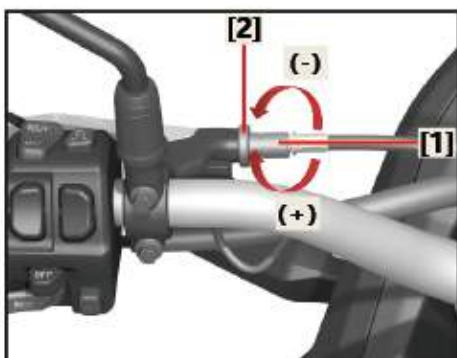




※ Inspection and adjustment of clutch free play

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].

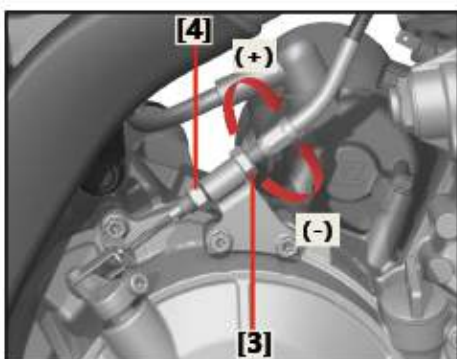
Free play: 3-6mm



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]) .

- Push the hand brake lever forward.
- Rotate the adjustment knob [1] until the hand brake lever is in the desired position.
- 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 evaporation system

1.Disassembly

- Fuel tank assembly
- See "Fuel System" on page 123 for details.

2.Inspection

- Evaporative emission carbon canister box [1]
- Evaporative emission carbon canister box connecting hose [2]
- Overflow hose connecting fuel tank to tipping valve [3]
- Cracked/broken → Replace.
- Loose connection → Correct connection.

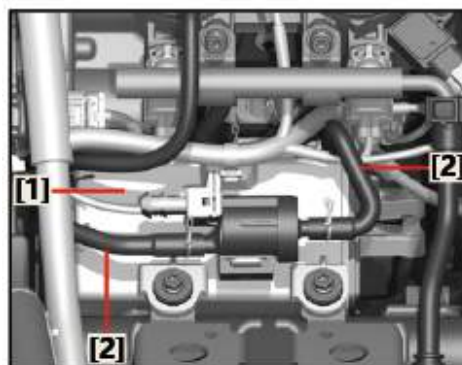
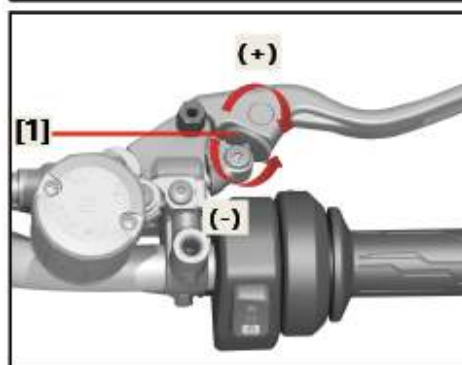
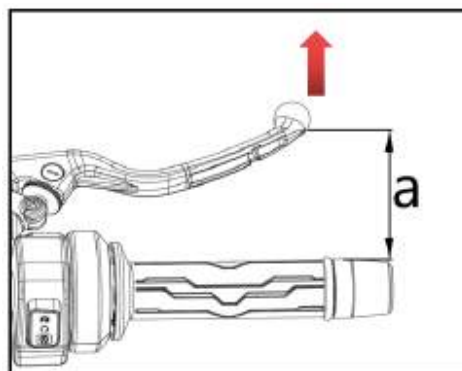
3.Install

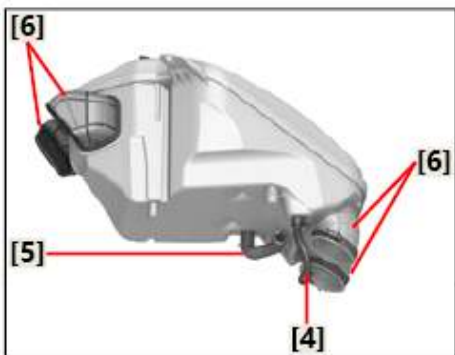
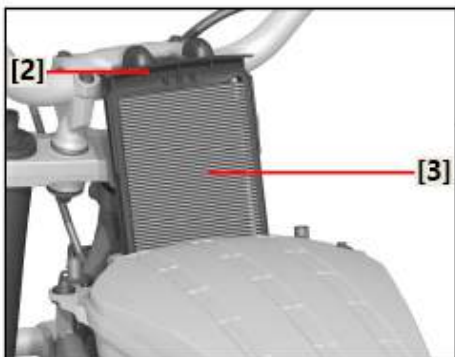
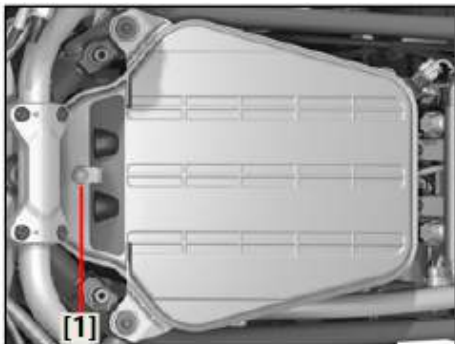
- Fuel tank assembly
- See "Fuel System" on page 123 for details.

Torque:

Carbon canister and frame

10 N·m (1.0 kgf·m, 7.4 lbf·ft)





※ Replacement of air filter element/inspection of hose cleanliness

Disassembly/installation

Disassemble the following parts:

- Bolt and pressure plate[1];
- Lift up the air filter element bracket [2];
- Air filter element [3];

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 [4]

Cracked/broken → Replace.

Loose connection → Correct connection.

-Clean the accumulated water in the drain pipe.

-Check whether the engine exhaust pipe [5] and the air filter inlet/outlet hose [6] are in good condition;

Cracked/broken → Replace.

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 element bracket and air filter tank

2.0 N·m(0.2 kgf·m, 1.5 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

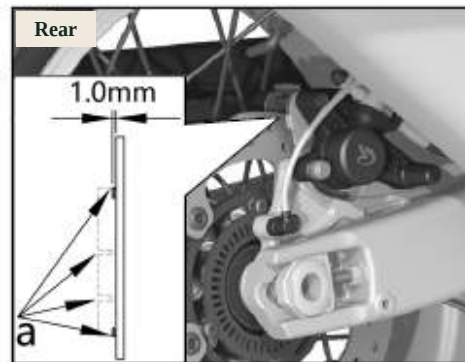
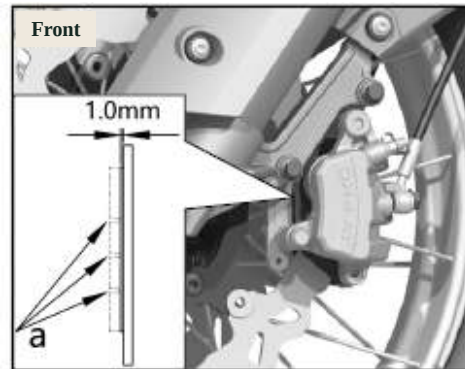
1. Inspection

- Brake operation

Brake is not functioning properly → Check brake system. See "Hydraulic Braking System" on page 301 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 301 for details.

※ Inspection and replacement of disc brake

Inspection

- Visually check the brake disc for damage or cracks.

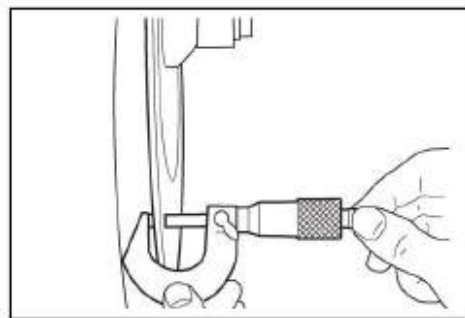
Measure the wear limit of brake disc:

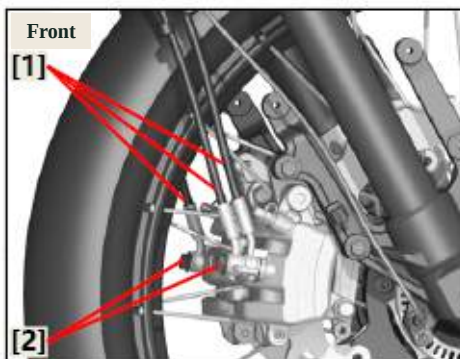
Front brake disc: **3.5 mm**

Rear brake disc: **3.5 mm**

Damage/deformation/off specification → Replace.

See "Hydraulic Braking System" on page 301 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.

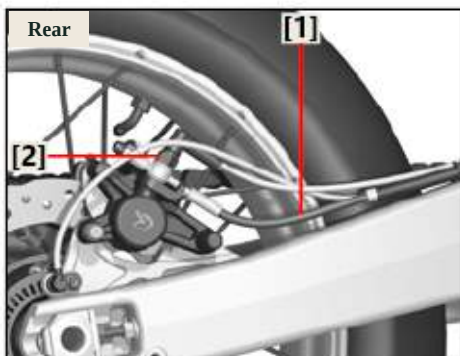
3. Keep the vehicle upright and run the brakes several times.

4. Inspection

-Brake hose [1]

Brake fluid leaks → Replace damaged brake hose.

See "Hydraulic Braking System" on page 301 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];

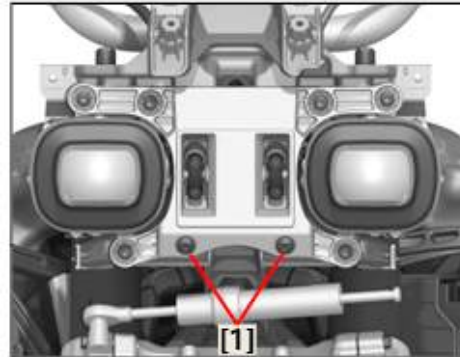
Brake fluid leaks → Replace damaged hose.

See "Hydraulic Braking System" on page 301 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 angle of the headlight beam by rotating the adjusting screw [1], and the clockwise rotation is the overall decline of the headlight beam; The counterclockwise rotation is the overall rise of the headlight beam.



※ Inspection of steering damper

1. Stand the vehicle on a flat ground.

Notes

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

2. Inspection

- Grip the left and right handlebars and turn the head dampers [1] to see if they are working properly;

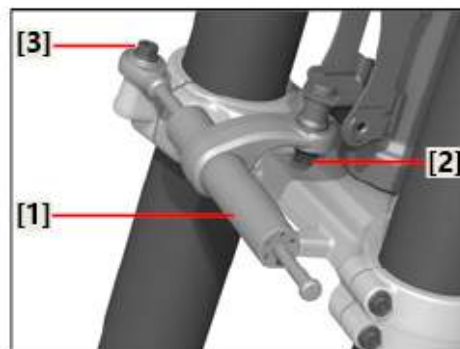
- Oil leakage in the steering damper

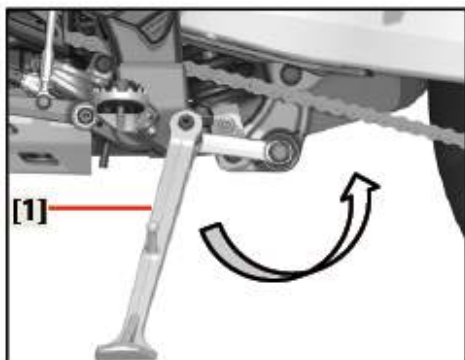
Damping invalidation → Repair.

- Steering damper and bracket mounting (bolt) [2], [3];

Loosen → Lock bolt.

See "Front Wheel, Suspension, Steering" on page 263 for details.



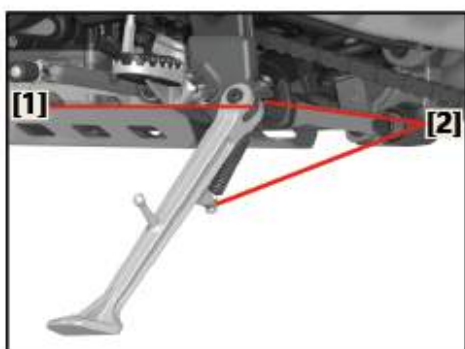


※ Inspection of side stand

Inspection

Inspect whether the side bracket [1] moves smoothly or not

Unsmooth movement → Maintenance.



※ 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.

※ Inspection of side stand OFF switch

See "Vehicle Electrics" on page 335 for details.

※ **Inspection of coolant level**

1. Stand the vehicle on a flat ground.

Note

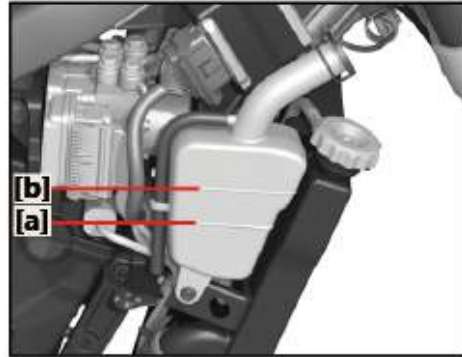
- Place the motorcycle on the appropriate bracket.
- Make sure the motorcycle stays upright.

2. Inspection

- Coolant volume

The coolant level shall be maintained between the lowest level mark "a" and the highest level mark "b".

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.

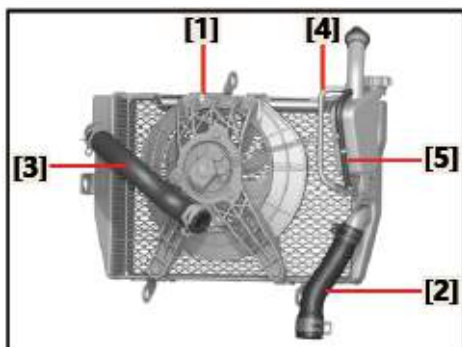
3. Start the engine, warm the motorcycle for several minutes and then turn off the engine.

4. Inspection

- Coolant volume

Note

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



※ Inspection of cooling system

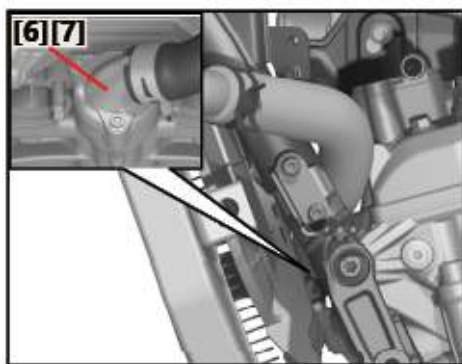
1. Inspection

- Radiator [1]
- Engine water inlet hose [2];
- Engine water outlet hose [3];
- Water reservoir return hose [4];
- Water reservoir overflow hose [5];
- Thermostat cover [6]
- Thermostat [7].

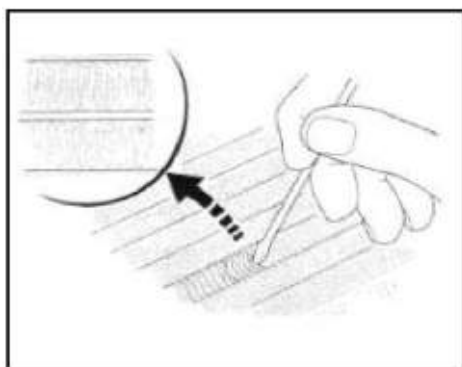
Crack/damage → Replace.

See "Cooling System" on page 141 for details.
Thermostat

See "Cooling System" on page 141 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**

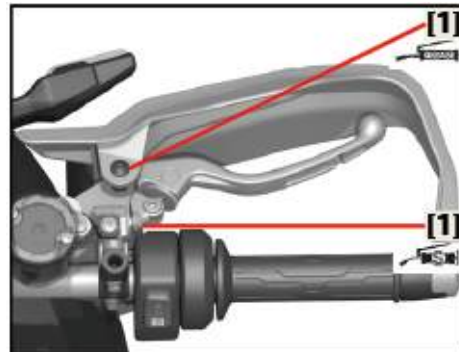
Apply lubrication to the pivot point of the handle and the contact areas of the metal parts [1].



Recommended lubricating oil
Use silicone grease



Recommended lubricating oil
Use silicone grease

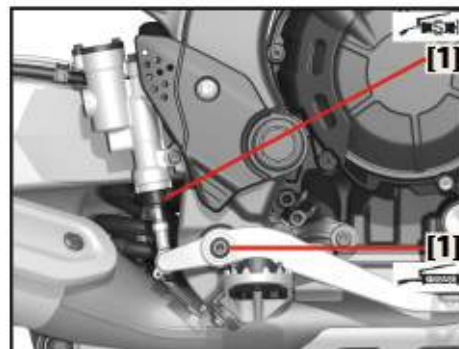


※ **Lubrication of rear brake rocker arm**

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

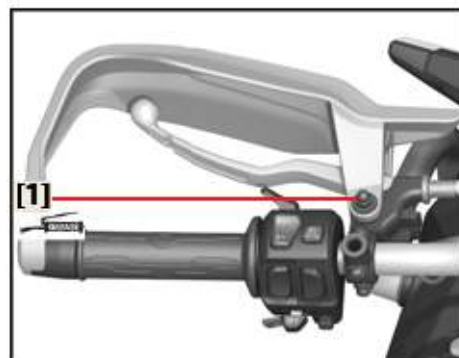


※ **Lubrication of clutch handle**

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

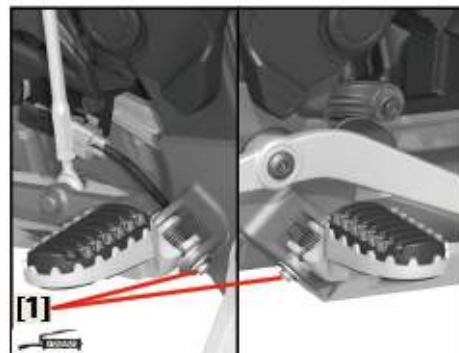


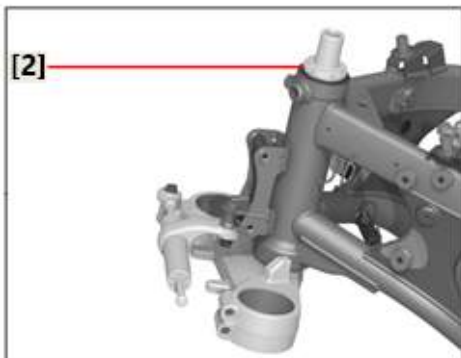
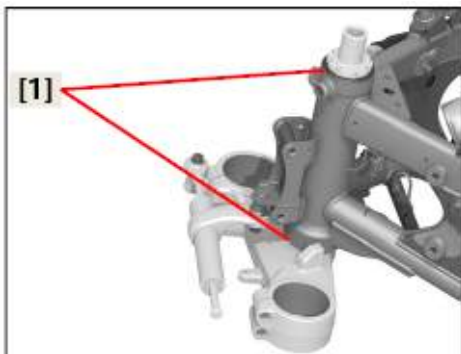
※ **Inspection and lubrication of pedal**

The anti-slip teeth of the pedal can be repaired by filing the grooves between the teeth with a triangular file. However, be aware that filing too much will reduce the lifespan of the sole. Only file the tips of the anti-slip teeth. Filing the grooves too deep will weaken the pedal. Make sure that the bolts can rotate freely and keep the cotter pins of the pivot pins in good condition.



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: 40N·m, second stage: loosen the adjusting nut by two turns and then tighten it to 10N·m, third stage: keep the direction fixed and loosen by 1/4 turn.

⚠ 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.

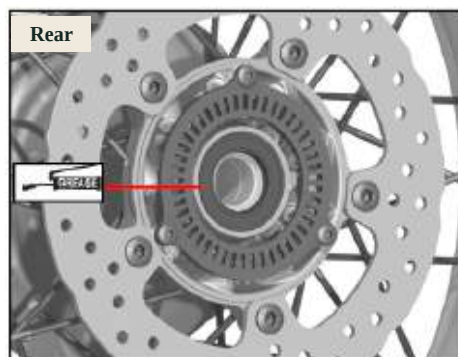
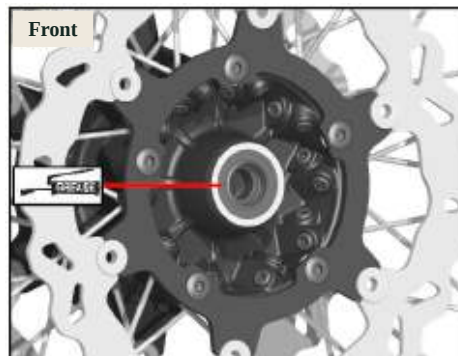
※ **Inspection and lubrication of front and rear wheel seals**

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



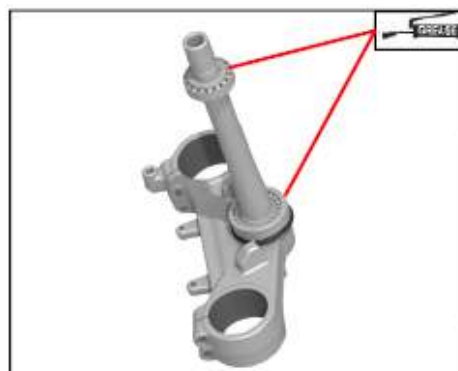
※ **Inspection and lubrication of steering head Bearing**

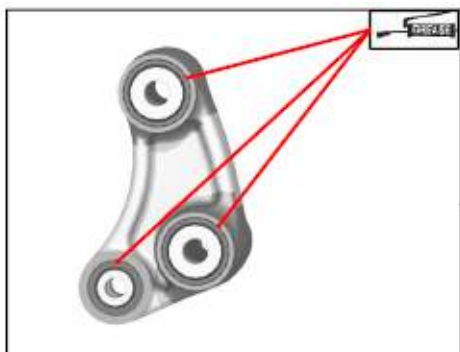
Regularly clean, inspect and lubricate steering head bearings, particularly when riding on wet, muddy, or dusty roads.

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



Recommended lubricating oil
Lithium-based multipurpose grease



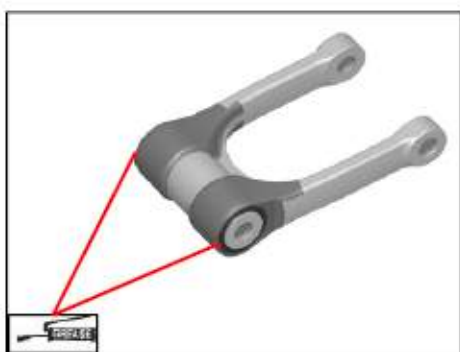


※ Inspection and Lubrication of triangular cradle

Clean, inspect and lubricate the triangular cradle bearing regularly. Make sure all dustproof seals are in good condition. During installation, apply a small amount of grease in the groove between the main and auxiliary lips of the oil seal. Lubricate with high-temperature extreme pressure composite lithium grease (UNIVERSAL SU-T330Y or equivalent) .



Recommended lubricating oil
Lithium-based multipurpose grease

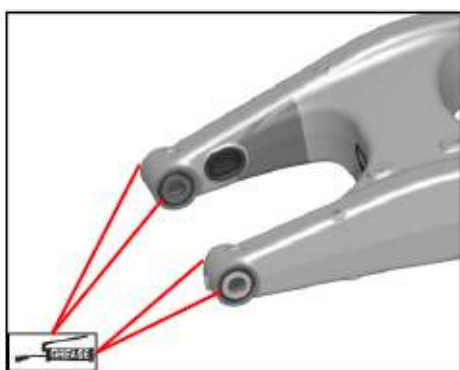


※ Inspection and Lubrication of U-cradle

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) .



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.

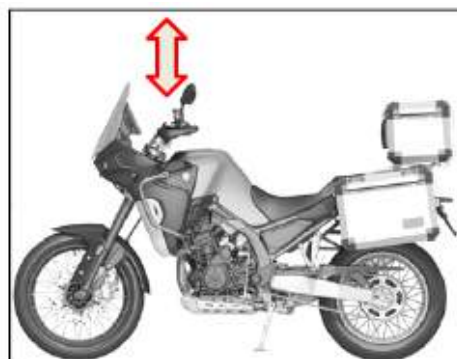
4. Inspection

- 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 263 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

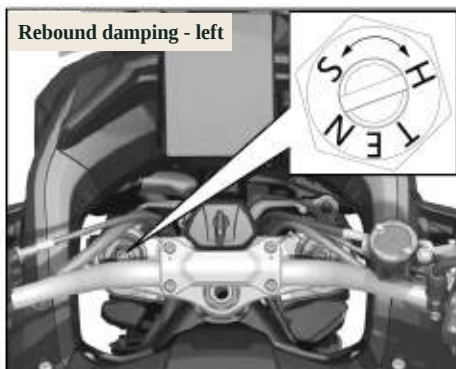
- Rear shock absorber actuation

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 283 for details





※ Front shock absorber settings and adjustments

The following are the settings and adjustments for front shock absorber damping and spring preload.

Notes

- The left-side shock absorber is adjusted for rebound damping.
- The right shock absorber is adjusted for compression damping.

Left side: rebound damping adjustment

The adjustment of rebound damping will affect the rebound speed of the front shock absorber. The rebound damping of the front shock absorber is **marked "TEN"** on the left side of the front shock absorber. Adjust the center slotted alignment of the adjusting stud.

Notes

- Gently rotate the adjusting bolt to prevent damage to the shock absorber.
- When adjusting compression damping or rebound damping, always use a properly sized tool to avoid damaging the adjustment device.
- Make sure that the adjusting bolt is firmly in the fixed position during each adjustment.
- The adjusting torque shall not exceed 0.5N·m.

The front shock absorber has **24 ± 2** rebound damping clicks. Rotating the adjusting bolt clockwise (H) increases rebound damping, while rotating it counterclockwise (S) decreases rebound damping.

Set the standard rebound damping:

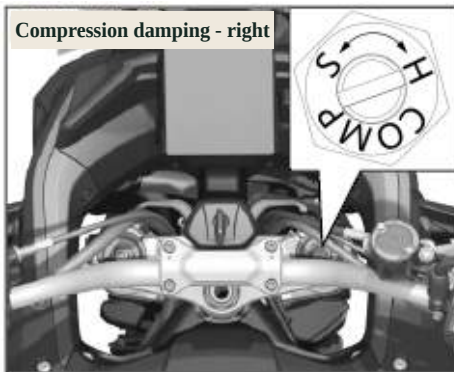
- 1.Rotate the adjuster clockwise (H) until it cannot be rotated.
- 2.Rotate the adjusting bolt in a counterclockwise(S) direction. Rotate **18 segments** from the hardest position to the position where a click sound is heard.

Right side: Compression damping adjustment

The adjustment of the compression damping affects the speed at which the front shock absorber compresses. The front shock absorber's compression damping is located on the left side of the shock absorber and is marked with (COMP) . Adjust the center slotted alignment of the adjusting stud.

Notes

- Gently rotate the adjusting bolt to prevent damage to the shock absorber.
 - When adjusting compression damping or rebound damping, always use a properly sized tool to avoid damaging the adjustment device.
 - Make sure that the adjusting bolt is firmly in the fixed position during each adjustment.
 - The adjusting torque shall not exceed 0.5N·m.
- The front shock absorber has 24 ± 2 compression damping clicks. Rotating the adjusting bolt clockwise (H) increases compression damping, while rotating it counterclockwise (S) decreases compression damping.



Set standard compression damping:

- 1.Rotate the adjuster clockwise (H) until it cannot be rotated.
- 2.Rotate the adjusting bolt in a counterclockwise(S) direction. Rotate **18 segments** from the hardest position to the position where a click sound is heard.

Spring pre-compression adjustment

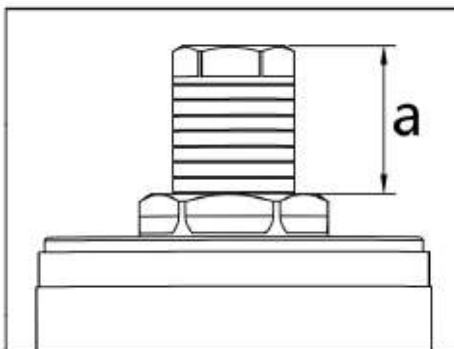
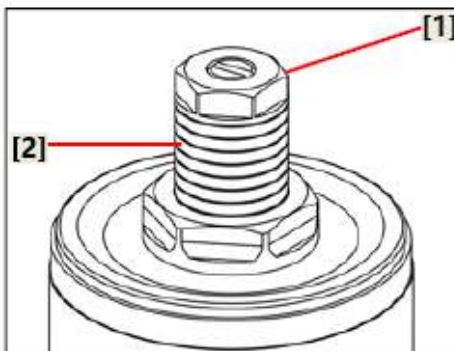
Spring pre-compression adjustment affects the force required to compress the spring. The higher the pre-compression, the greater the force required for the spring to compress the same distance; the lower the pre-compression, the less force the spring needs to compress the same distance. Adjust the hexagonal part of the front shock absorber stud [1].

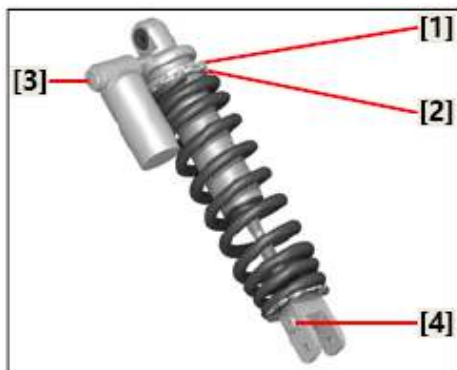
Rotate the adjusting bolt clockwise (H) to increase spring preload, and rotate it counterclockwise (S) to decrease spring preload.

When adjusting the spring pre-compression, ensure the scale marks [2] on both the left and right sides of the shock absorber are equal, with one mark representing 2mm.

Notes

- The spring preset is determined by the measured distance [a]. The shorter distance [a] is, the higher the spring preload will be; the longer distance [a] is, the lower the spring preload will be.
- The adjustment range for spring preload distance [a] is **4-19 mm**.





Rebound damping adjustment

The rebound damping adjusting bolt [4] is located at the lower end of the rear shock absorber, with 20 ± 2 clicks of rebound damping.

Rotating the adjusting bolt clockwise (H) increases rebound damping, while rotating it counterclockwise (S) decreases rebound damping.

Set the standard rebound damping:

1. Rotate the adjusting bolt clockwise (H) until it cannot be rotated.
2. Rotate the adjusting bolt in a counterclockwise (S) direction. Rotate **10 segments** from the hardest position to the position where a click sound is heard.

Notes

- Gently rotate the adjusting bolt to prevent damage to the shock absorber.
- When adjusting compression damping or rebound damping, always use a properly sized tool to avoid damaging the device.
- Make sure that the adjusting bolt is firmly in the fixed position during each adjustment.
- The adjusting torque shall not exceed $0.5\text{N}\cdot\text{m}$.

Torque:

Rear shock absorber locking nut

$12\text{ N}\cdot\text{m}$ ($1.2\text{ kgf}\cdot\text{m}$, $9.0\text{ lbf}\cdot\text{ft}$)

※ 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.

Rotate the preload adjusting nut clockwise to increase the spring preload and shorten the spring length; rotate the preload adjusting nut counterclockwise to reduce the spring preload and increase the spring length.

The preloaded and compressed spring (standard) should have a length of $267 \pm 1.5\text{ mm}$.

Compression Damping Adjustment

The compression damping adjuster [3] is located at the upper end of the rear shock absorber, with 23 ± 2 clicks of compression damping.

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

Set standard compression damping:

1. Rotate the adjuster clockwise (H) until it cannot be rotated.
2. Rotate the adjusting bolt in a counterclockwise (S) direction by **10 clicks** from the hardest position

※ Inspection of brake light switch

Inspection of brake light switch [1]

1. Inspection

- Front brake light switch operation

- Rear brake light switch operation

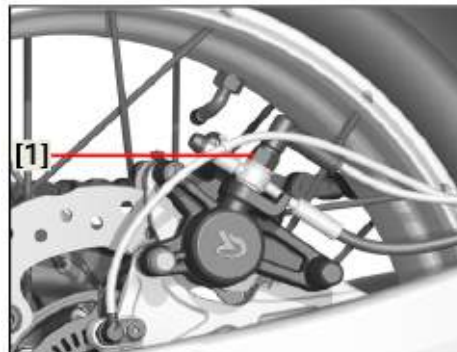
2. Inspection

- 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.

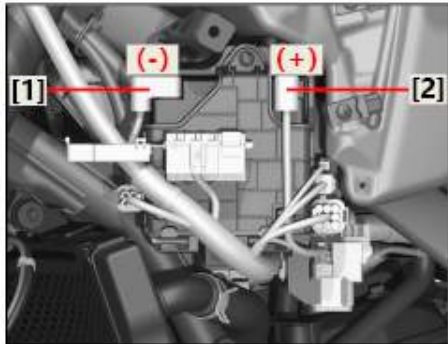
※ Inspection of switches, lights and signals

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 12 for details.



8. Inspection

-Battery terminal fouling → clean with wire brush.

Connection unsecured → tighten.

9. Installation

-Fuel tank side protector assembly - left

-Instrument housing rear section-left

-Fuel tank front cover

-Bumper - left

See "Frame, Body Trim, Exhaust System" on page 65 for details.

※ Battery inspection and charging

1.Disassembly

-Fuel tank front cover

-Instrument housing rear section-left

-Bumper - left

-Fuel tank side protector assembly - left

See "Frame, Body Trim, Exhaust System" on page 65 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 65 for details.

4.Inspection

-Battery voltage

5.Charging

-Battery

6.Install

-Battery

See "Frame, Body Trim, Exhaust System" on page 65 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].

※ Inspection and lubrication of steel cable

The following procedures apply to all steel cables.

1. Inspection

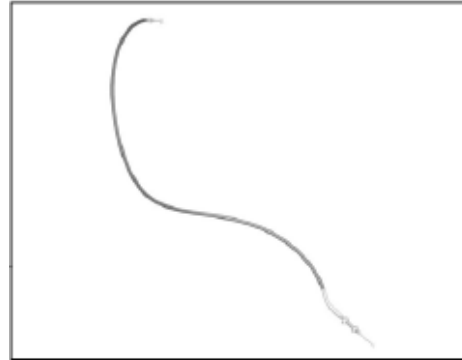
-Outer cable (rubber covering)

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

Section 1 Maintenance Instructions	67
Section 2 Body Trim Position/Disassembly Drawing	68
Section 3 Top Case Assembly And Side Case Assemblies (Left And Right) ..	69
Section 4 Top Case Bracket	70
Section 5 Side Case Bracket (Left And Right) And Guard Bar	71
Section 6 Bumper (Left And Right)	72
Section 7 Front Windshield And Front Windshield Bracket.....	72
Section 8 Rear Mirror Assembly (Left And Right)	73
Section 9 Hand Windshield (Left And Right) And Steering Handlebar Counterweight.....	73
Section 10 Fuel Tank Front Cover	74
Section 11 Rear Section Of The Instrument Housing (Left And Right)	74
Section 12 Fuel Tank Side Protector (Left And Right)	75
Section 13 Fuel Tank Side Protector Assembly Disassembly.....	76
Section 14 Fuel Tank Lower Protector (Left And Right)	77
Section 15 Headlight Trim, Instrument Housing	77
Section 16 Instrument Assembly, Instrument Trims	78
Section 17 Front Upper Fender	78
Section 18 Headlight Assembly (Left And Right) , Headlight Bracket.....	79
Section 19 Instrument Bracket.....	80
Section 20 Seat Cushion Assembly.....	80
Section 21 Rear Armrest	81
Section 22 Frame Trim (Left And Right)	81
Section 23 Side Cover (Left And Right)	81
Section 24 Vehicle Body And Inner Lining (Left And Right)	82
Section 25 Taillight Assembly, Rear Tailgate And Trims	83
Section 26 Rear Fender Liner Panel	84
Section 27 Rear Turn Signal (Left And Right) , Rear Reflector	84

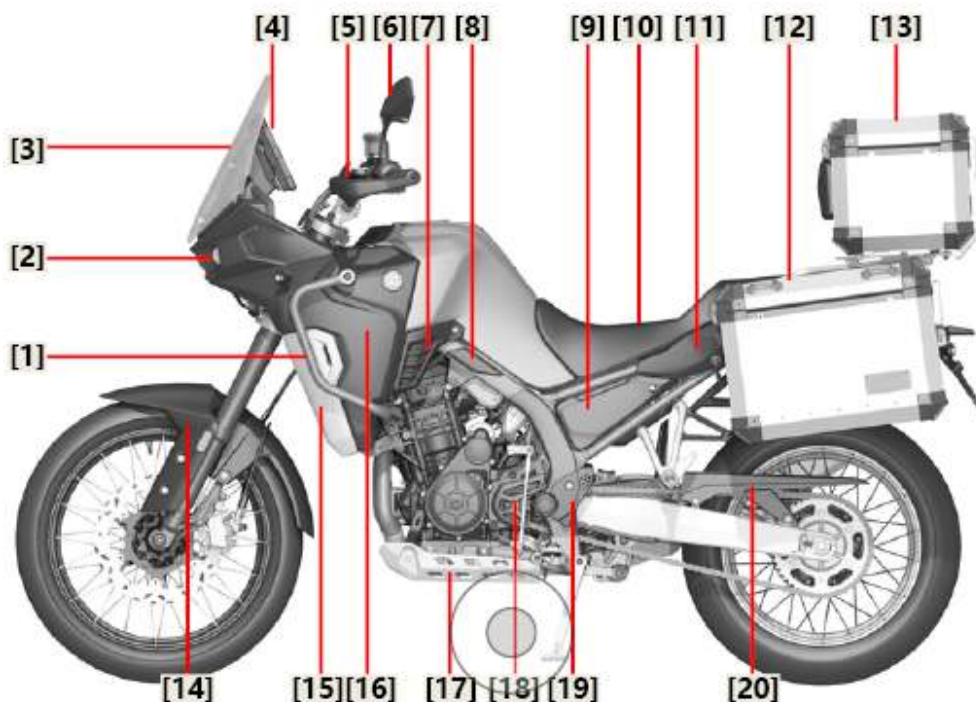
Section 28 License Plate Lamp, Rear Fender Rear Section And Bracket	85
Section 29 Rear Wheel Small Fender	85
Section 30 Rear Fender Front Section And Trims	86
Section 31 Full Vehicle Lock Set.....	87
Section 32 Front Fender.....	88
Section 33 Swingarm Axle Trim (Left And Right)	88
Section 34 Gear Shift Assembly	89
Section 35 Engine Front Sprocket Cover.....	90
Section 36 Engine Heat Shield	90
Section 37 Battery And Battery Box.....	91
Section 38 Bumper Mounting Bracket (Left And Right)	92
Section 39 Chain Box	92
Section 40 Engine Lower Protector	93
Section 41 Engine Lower Protector Bracket.....	93
Section 42 Front Footpeg Assembly (Left And Right)	94
Section 43 Rear Footpeg Assembly (Left And Right)	94
Section 44 Side Stand And Side Stand Off Switch	95
Section 45 Horn	95
Section 46 Brake Pedal Assembly	96
Section 47 Muffler Rear Section Assembly, Muffler Shield	97
Section 48 Muffler Front Assembly	98
Section 49 Frame Sn, Engine Number And Vehicle Nameplate Information...	99

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) Bumper	(2) Headlight assembly	(3) Front windshield	(4) Instrument assembly
(5) Hand windshield	(6) Rear mirror assembly	(7) Fuel tank lower protector	(8) Frame trim
(9) Side cover	(10) Seat cushion assembly	(11) Vehicle body	(12) Side case assembly
(13) Top case assembly	(14) Front fender	(15) Water tank trim	(16) Fuel tank side protector
(17) Engine lower protector	(18) Engine front sprocket cover	(19) Swingarm axle trim	(20) Chain box

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

Triple case assembly → Bumper → Full vehicle exterior trim → Instrument assembly → Water reservoir → Radiator cooler → Oxygen sensor → Exhaust pipe assembly → Fuel tank assembly → Air filter assembly → Throttle valve → 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:

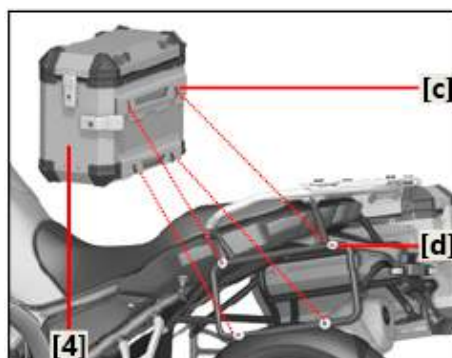
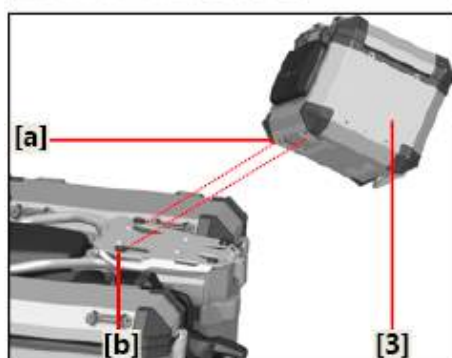
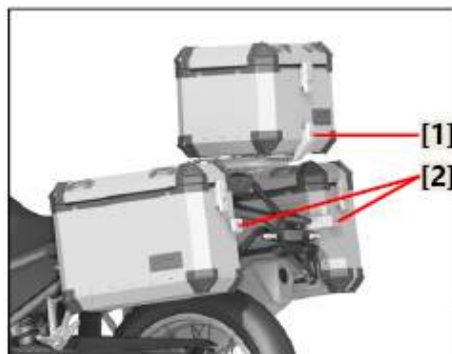
- Insert the key to unlock the top case latch [1] and the side case latch [2];
- Top case assembly [3];
- Side case assembly - left [4];

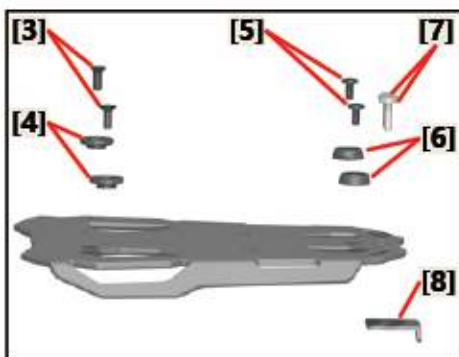
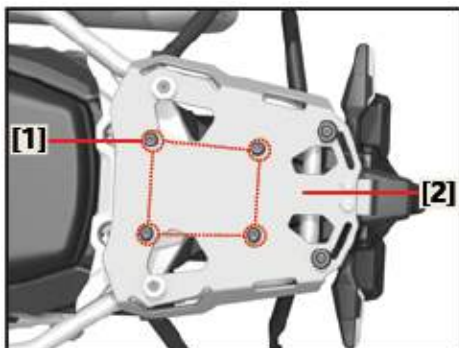
-The disassembly method of the right side case is the same as the left side.

The installation sequence is reversed from the removal sequence.

Notes

- When removing, pull the top case toward the rear of the motorcycle to disengage the mounting plate back-slot [a] from the top case mushroom [b]. Lift the side case upward to disengage the slot [c] from the side case mushroom [d].
- When installing the top case and side case, align the mounting plate back-slot with the top case mushroom [b] and side case mushroom [d], ensuring the back-slot is fully engaged with the triple case mushroom.





※ Top case bracket

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Top case bracket and bushing [2];
- Bolt [3];
- Top case mushroom [4];
- Bolt [5];
- Top case rubber ring [6];
- Bolt [7];
- Top case latch [8];

The installation sequence is reversed from the removal sequence.

Notes

- Apply (Huitian 7262) thread locker on the top case bracket mounting bolt.

Torque:

Top case rubber ring mounting bolt

4.0 N·m(0.4 kgf·m, 3.0 lbf·ft)

Top case mushroom mounting bolt

Top case latch mounting bolt

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Top case bracket mounting bolt

22 N·m (2.2 kgf·m, 16 lbf·ft)

※ **Side case bracket (left and right) and guard bar**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Side case bracket guard bar [2];
- Bolt [3];
- Bolt [4];
- Side case bracket - left [5];
- Bolt [6].
- Side case mushroom [7];
- The right-side case bracket 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 side case bracket and guard bar.

Torque:

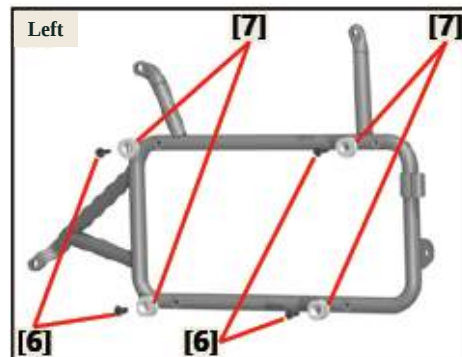
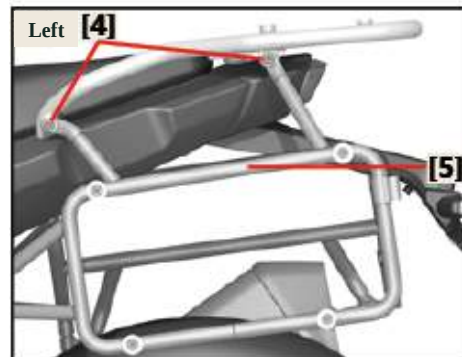
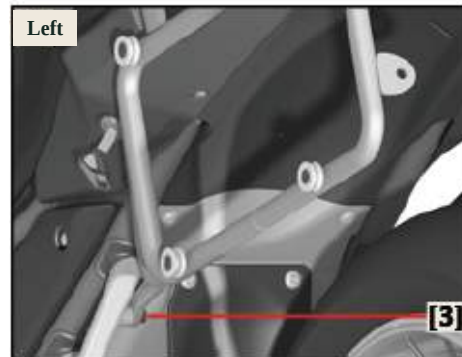
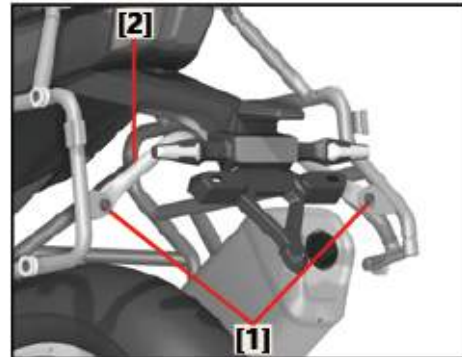
Side case mushroom mounting bolt

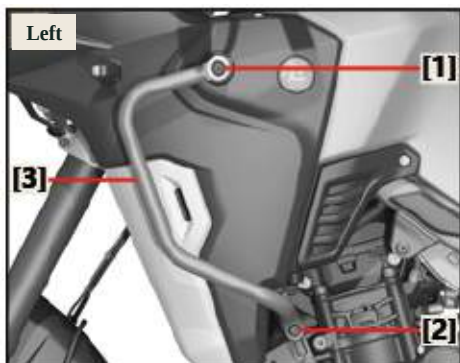
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Side case bracket guard bar mounting bolt

Side case bracket mounting bolt

22 N·m (2.2 kgf·m, 16 lbf·ft)





※ **Bumper (left and right)**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bolt [2];
- Bumper - left [3];
- The right-side bumper removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.

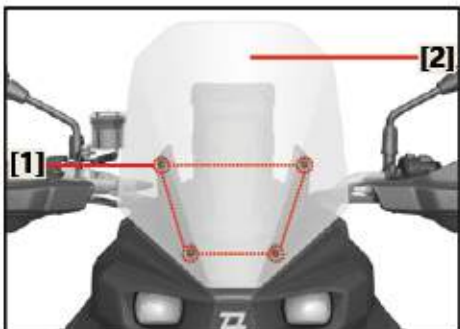
Torque:

Bumper lower and frame (left and right)

22 N·m (2.2 kgf·m, 16 lbf·ft)

Bumper upper and bumper bracket (left and right)

45 N·m (4.5 kgf·m, 33 lbf·ft)



※ **Front windshield and front windshield bracket**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Front windshield[2];
- Bolt [3];
- Front windshield bracket [4];

The installation sequence is reversed from the removal sequence.

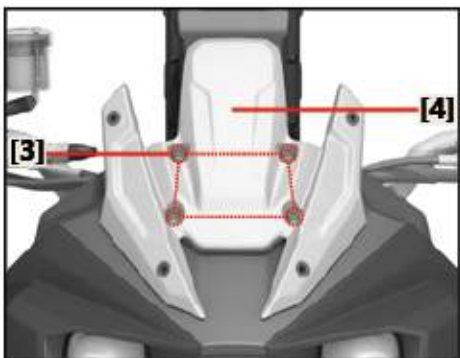
Torque:

Front windshield and front windshield bracket

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

Front windshield bracket and instrument bracket

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

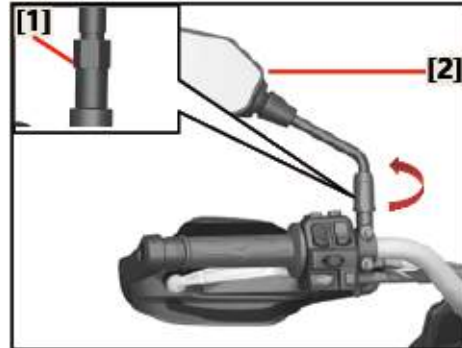


※ Rear mirror assembly (left and right)

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.



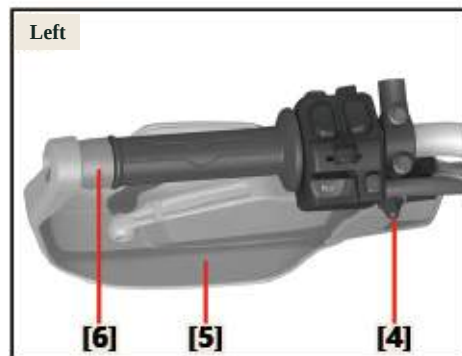
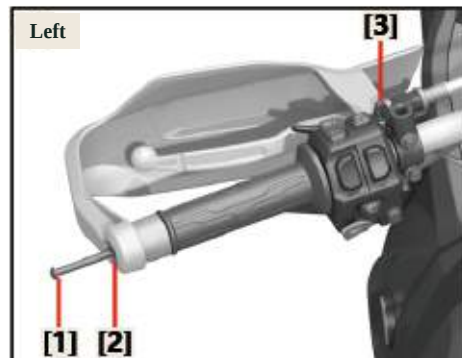
The installation sequence is reversed from the removal sequence.

※ Hand windshield (left and right) and steering handlebar counterweight

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Flat gasket [2];
- Cap nut and flat gaskets [3], [4];
- Hand windshield - left [5];
- Steering handlebar counterweight [6];
- The right-hand windshield removal position is the same as the left side.



Note

•Hand windshield upper right mounting point [7] is a hexalobular bolt. The installation sequence is reversed from the removal sequence.

Torque:

Hand-operated windshield left and right cover cap nuts

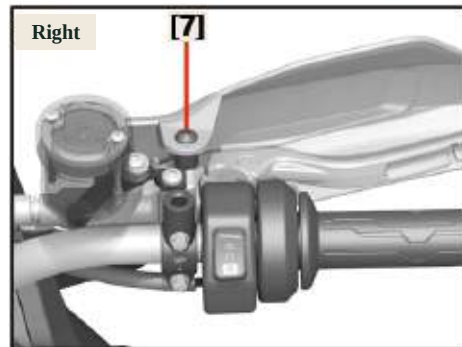
4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)

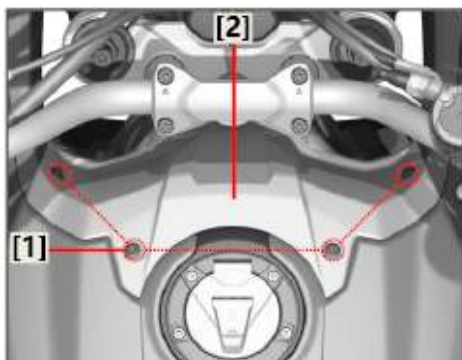
Hand windshield - right upper mounting bolt

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Steering handlebar counterweight mounting bolt

15 N·m (1.5 kgf·m, 11.0 lbf·ft)





※ **Fuel tank front cover**

Disassembly/installation

Disassemble the following parts:

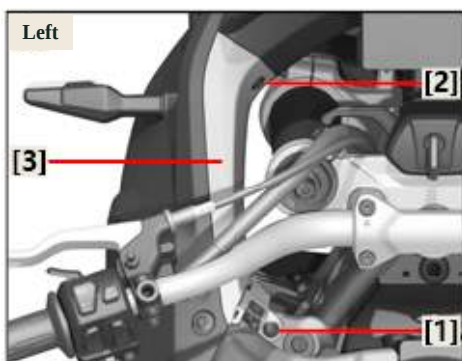
- Bolt [1];
- Front shield of fuel tank [2];

The installation sequence is reversed from the removal sequence.

Torque:

Fuel tank front shield and fuel tank

4.0 N·m(0.4 kgf·m, 3.0 lbf.ft)



※ **Rear section of the instrument housing (left and right)**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Expansion screw [2];
- Instrument housing rear section - left [3];
- The right-side instrument housing rear section removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.

Torque:

Instrument housing rear section (left and right) and fuel tank

5.0 N·m (0.5 kgf·m, 3.7 lbf.ft)

※ **Fuel tank side protector (left and right)**

Disassembly/installation

Disassemble the following parts:

- Bolt and flat gasket [1];
- Bolt [2];
- Bolt and flanged bushing [3];
- Bolt [4];
- Fuel tank side protector assembly - left [5];
- The right-side protector assembly's removal position of the fuel tank is the same as the left side.

The installation sequence is reversed from the removal sequence.

Notes

- When disassembling, carefully back off the front turn signal from the limit bore [a] on the fuel tank side protector to avoid damaging or causing breakage to the harness.
- 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 water tank limit bore [c] to avoid damage from forced disassembly.

Torque:

Fuel tank side protector (left and right) and fuel tank [1]

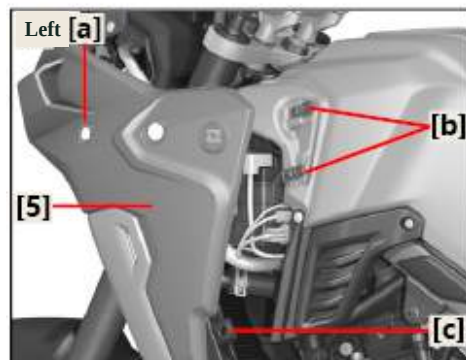
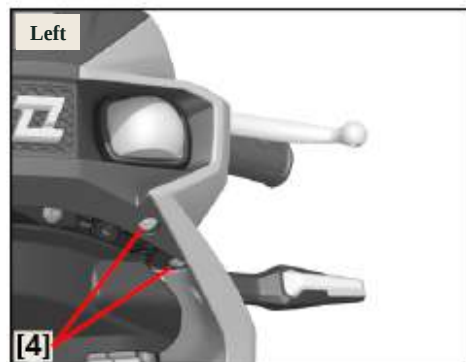
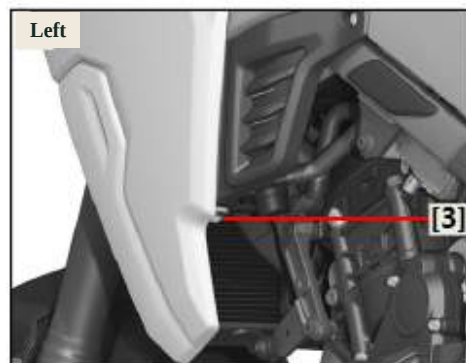
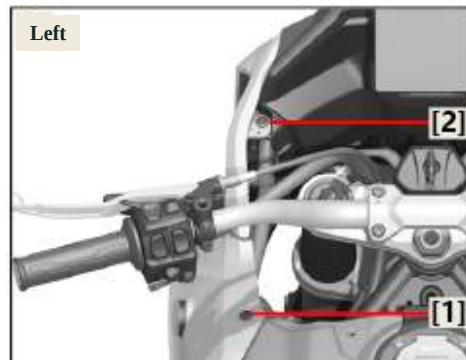
Fuel tank side protector (left and right) and instrument housing [2]

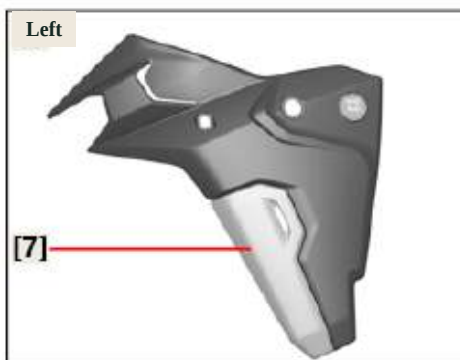
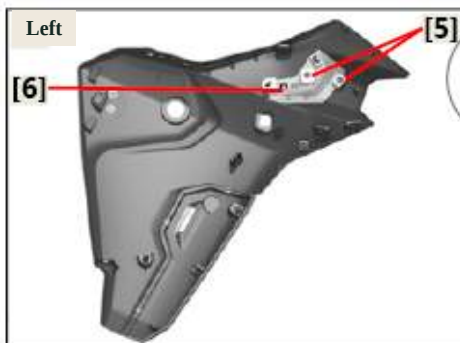
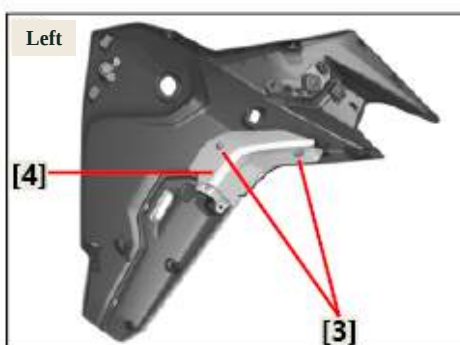
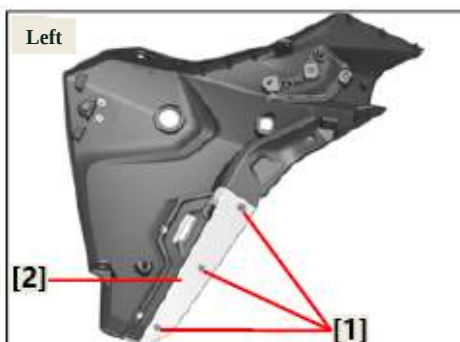
Headlight trim (left/right) and fuel tank side protector inner lining (left/right) [4]

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

Fuel tank side protector (left/right) and fuel tank side protector bracket (left/right) [3]

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





※ Fuel tank side protector assembly disassembly

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Water tank air guide cover - left [2];
- Bolt [3];
- Fuel tank side protector inner lining - left [4];
- Bolt [5];
- Fuel tank side trim - left [6];
- The right-side removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.

Torque:

Water tank air guide cover - left and right and fuel tank side protector - left and right

Fuel tank side protector inner lining (left and right) and side protector (left and right)

Fuel tank side trim (left and right) and side protector (left and right)

1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Note

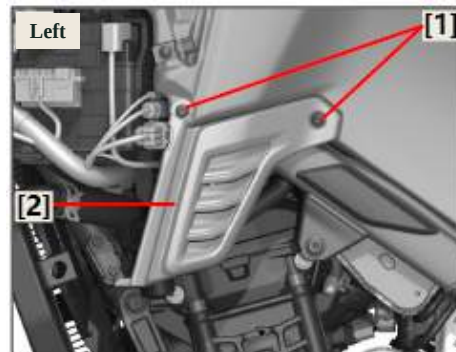
- The water tank trim [7] is bonded to the fuel tank side protector with double-sided tape. Do not disassemble unless necessary.

※ **Fuel tank lower protector (left and right)**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
 - Fuel tank lower protector - left [2];
 - The removal position of the right-side fuel tank lower protector is the same as the left side.
- The installation sequence is reversed from the removal sequence.



Torque:

Fuel tank lower protector (left and right) and fuel tank

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

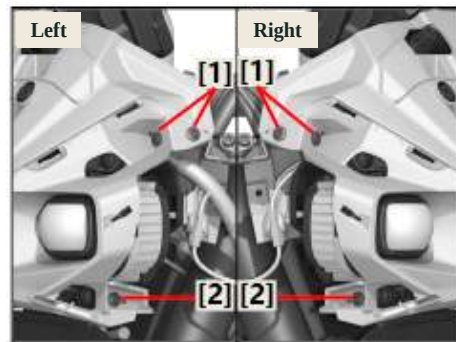
※ **Headlight trim, instrument housing**

Disassembly/installation

Disassemble the following parts:

- Bolts [1], [2];
- Expansion screw [3];
- Headlight trim [4];
- USB harness connector [5];
- Instrument housing [6];

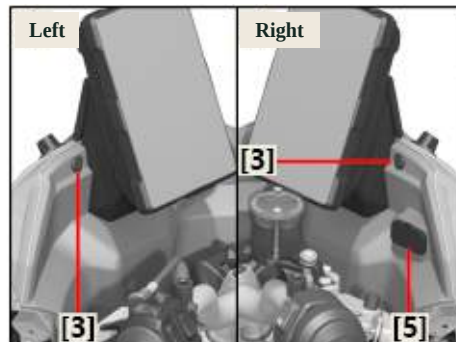
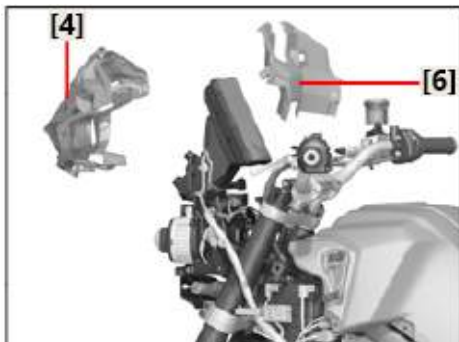
The installation sequence is reversed from the removal sequence.

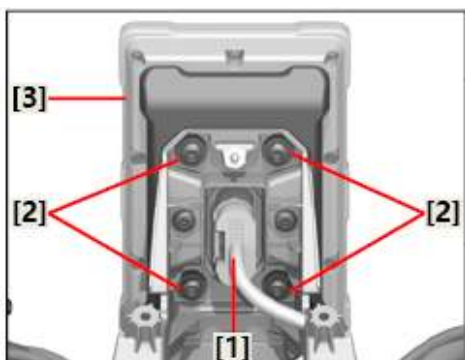


Torque:

**Headlight trim and instrument housing
Headlight trim and instrument housing
bracket**

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



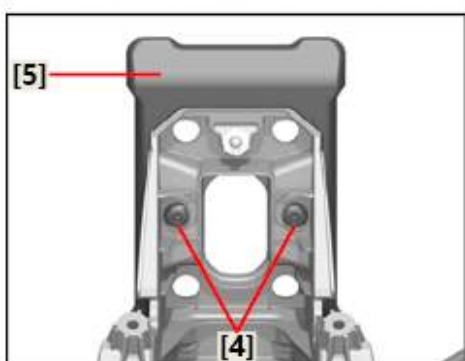


※ **Instrument assembly, instrument trims**

Disassembly/installation

Disassemble the following parts:

- Disconnect the instrument wiring harness plug [1];
- Bolt and flat gasket [2];
- Instrument assembly [3];
- Bolt [4];
- Instrument trim [5];



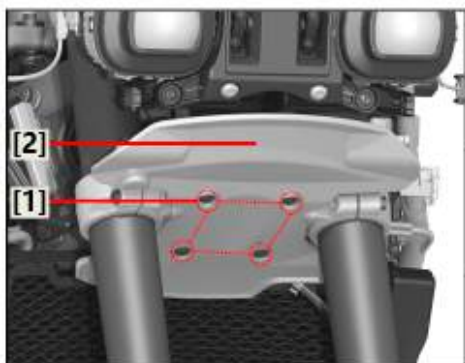
The installation sequence is reversed from the removal sequence.

Torque:

Instrument bracket and instrument assembly

Instrument bracket and instrument trim

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



※ **Front upper fender**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Front fender [2];

The installation sequence is reversed from the removal sequence.

Torque:

Front upper fender mounting bolt

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

※ **Headlight assembly (left and right) , headlight bracket**

Disassembly/installation

Disassemble the following parts:

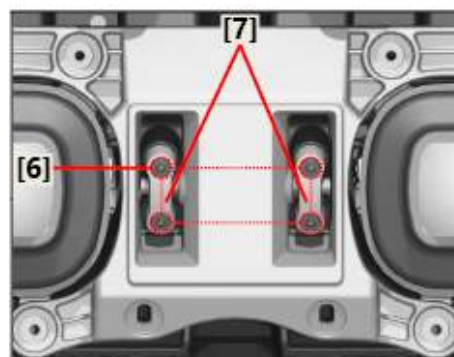
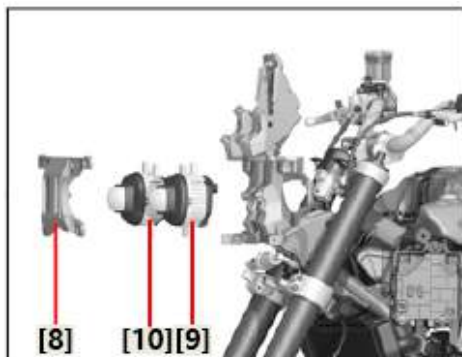
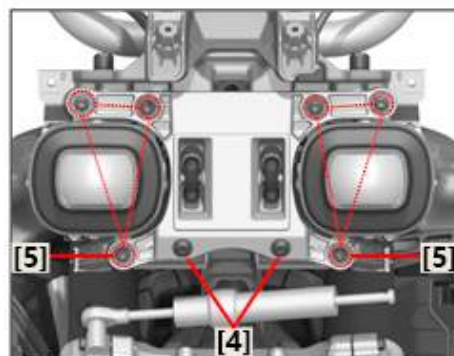
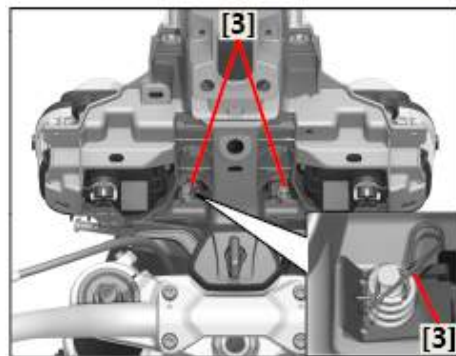
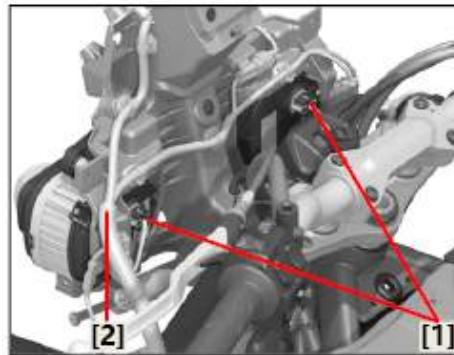
- Disconnect the headlight assembly harness connector [1];
- Disconnect the main cable [2];
- Cotter pin [3];
- Headlight adjusting screw [5];
- Bolt and flat gasket [5];
- Bolt [6].
- Headlight bracket pressure plate [7];
- Headlight bracket [8];
- Headlight assembly - left [9];
- Headlight assembly - right [10];

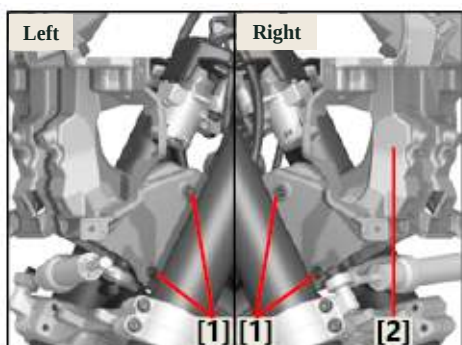
The installation sequence is reversed from the removal sequence.

Torque:

Headlight bracket pressure plate and headlight bracket

Headlight bracket and headlight assembly
5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)





※ Instrument bracket

Disassembly/installation

Disassemble the following parts:

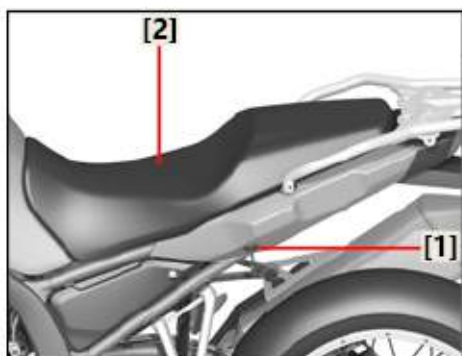
- Bolt [1];
- Instrument bracket [2];

The installation sequence is reversed from the removal sequence.

Torque:

Instrument bracket and bracket

12 N·m (1.2 kgf·m, 9.0 lbf·ft)



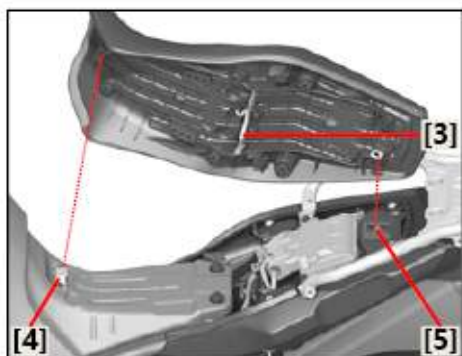
※ Seat cushion assembly

Disassembly/installation

Disassemble the following parts:

- Insert the key to unlock the seat cushion [1];
- Seat cushion assembly [2];
- Disconnect the heating seat cushion harness connector [3];

The installation sequence is reversed from the removal sequence.



Notes

- During installation, the front limit hanging point of the seat cushion must be secured into the seat cushion mounting bracket [4], while the rear end should align with the seat cushion locking pin and bore [5] to ensure the pin is inserted into the bore and automatically locked by the latch.

※ **Rear armrest**

Disassembly/installation
Disassemble the following parts:

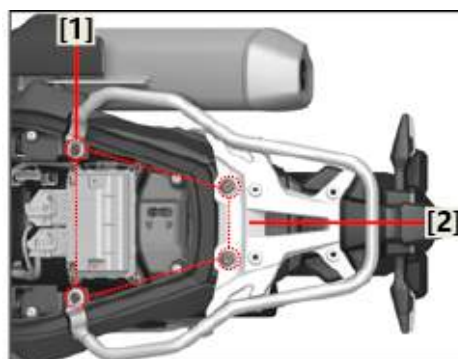
- Bolt [1];
- Rear grab handle [2];

The installation sequence is reversed from the removal sequence.

Torque:

Rear grab handle and frame

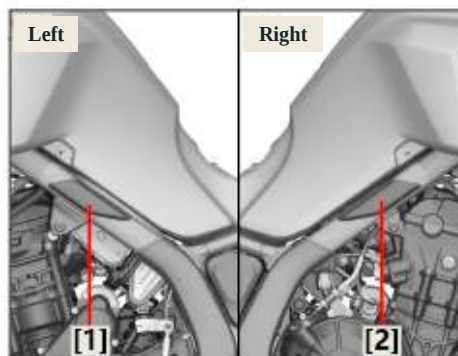
22 N·m (2.2 kgf·m, 16 lbf·ft)



※ **Frame trim (left and right)**

Note

- The left and right frame trim [1], [2] is bonded with double-sided tape. Do not disassemble unless necessary.
- The final appearance of the left and right frame trim parts is subject to the actual vehicle.



※ **Side cover (left and right)**

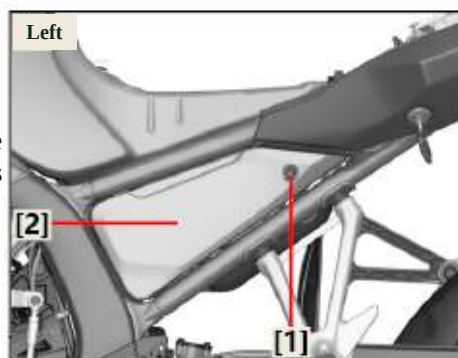
Disassembly/installation
Disassemble the following parts:

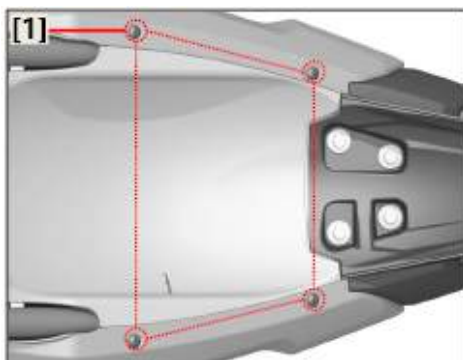
- Bolt [1];
- Side cover - left [2];
- The right-side cover removal position is the same as the left side. The installation sequence is reversed from the removal sequence.

Torque:

Side cover (left and right) and frame

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

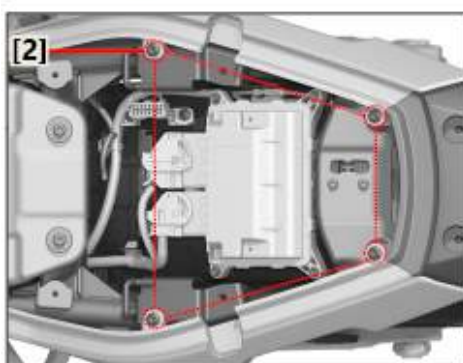




※ **Vehicle body and inner lining (left and right)**

Disassembly/installation
Disassemble the following parts:

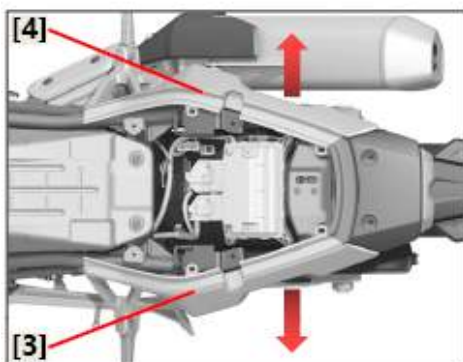
- Bolt [1];
- Bolt [2];
- Vehicle body and inner lining - left [3];
- Vehicle body and inner lining - right [4];
- Bolt [5];
- Vehicle body inner lining - left [6];
- Vehicle body - left [7];
- The right-side vehicle body and inner lining removal position is the same as the left side.



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.



Torque:

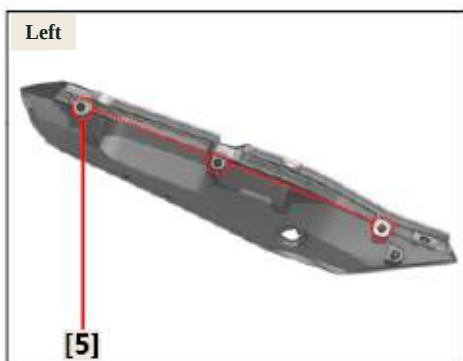
Vehicle body (left and right) and front section of rear fender [1]

Vehicle body inner lining (left and right) and vehicle body (left and right) [5]

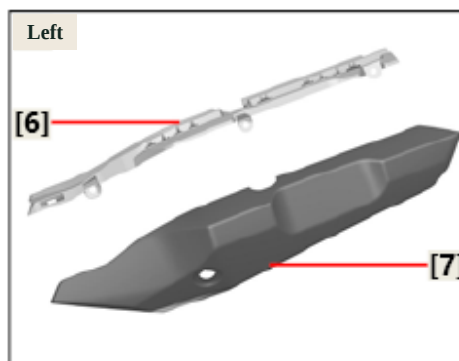
1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Vehicle body inner lining (left and right) and frame [2]

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



Left



Left

※ **Taillight assembly, rear tailgate and trims**

Disassembly/installation

Disassemble the following parts:

- For vehicle body-left/right, see page 82 for details.
- Bolt [1];
- Bolt [2];
- Disconnect the taillight's wiring harness connector [1];
- Taillight assembly and rear tailgate [4];
- Rear tailgate trim [5];
- Bolt [6].
- Rear tailgate [7];
- Taillight assembly [8];

The installation sequence is reversed from the removal sequence.

Torque:

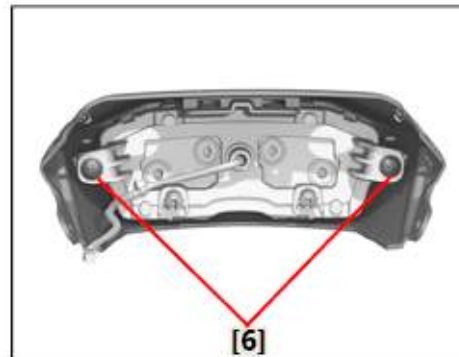
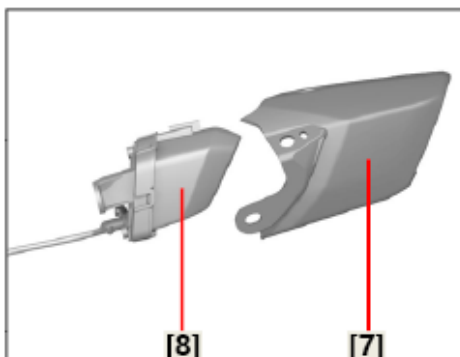
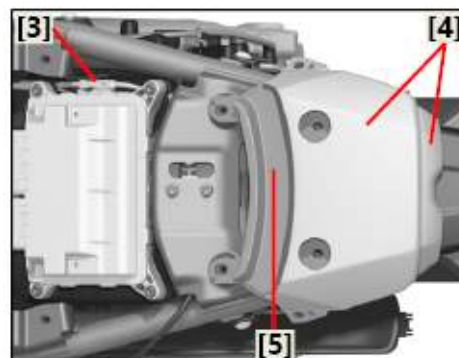
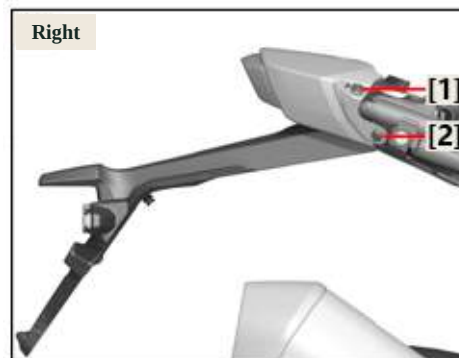
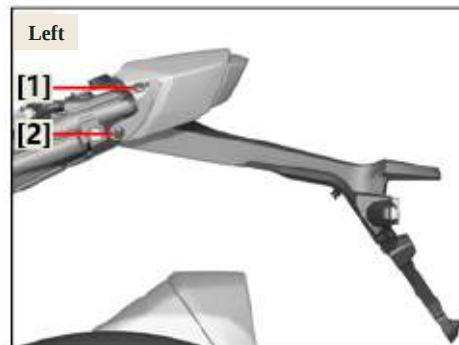
Rear tailgate and rear fender front section [2]

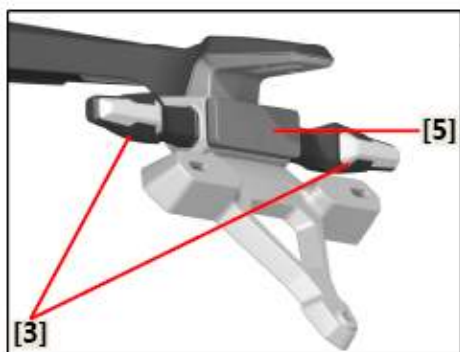
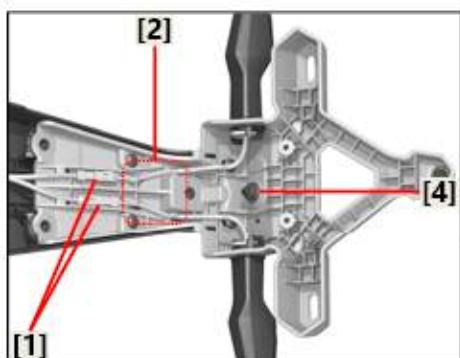
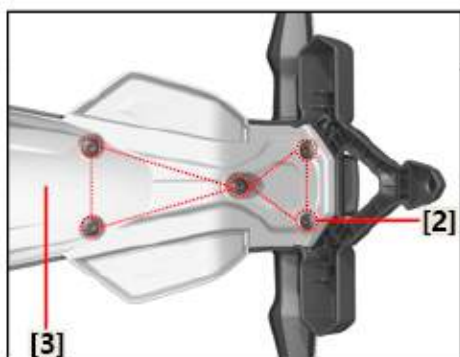
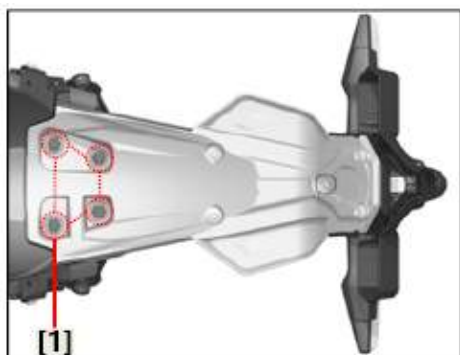
Taillight assembly and rear tailgate [6]

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

Rear tailgate, rear tailgate trim, and frame [1]

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)





※ Rear fender liner panel

Disassembly/installation

Disassemble the following parts:

- Disconnect the lamp harness connector;
- Bolt and flat gasket [1];
- Bolt [2];
- Rear fender liner panel [3];

The installation sequence is reversed from the removal sequence.

Torque:

Rear fender inner panel and rear fender rear bracket with frame [1]

10 N·m (1.0 kgf·m, 7.0 lbf·ft)

Rear fender inner panel, rear fender rear section, and rear fender rear bracket [2]

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

※ Rear turn signal (left and right) , rear reflector

Disassembly/installation

Disassemble the following parts:

- Disconnect the rear turn signal harness connector [1];
- Remove the wiring harness from the wire slot [2];
- Rear turn signal left and right [3];
- Nut [4];
- Rear reflector [5];

The installation sequence is reversed from the removal sequence.

Note

- When disassembling the rear turn signal, press the clip and pull the turn signal outward to release it.

Torque:

Rear reflector mounting nut

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)

※ **License plate lamp, rear fender rear section and bracket**

Disassembly/installation

Disassemble the following parts:

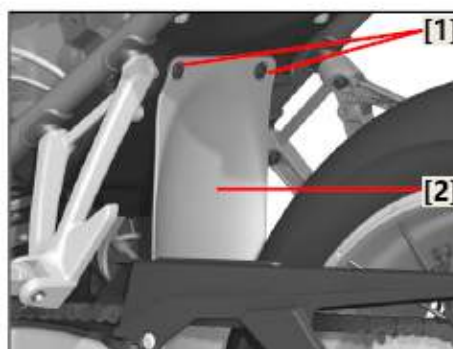
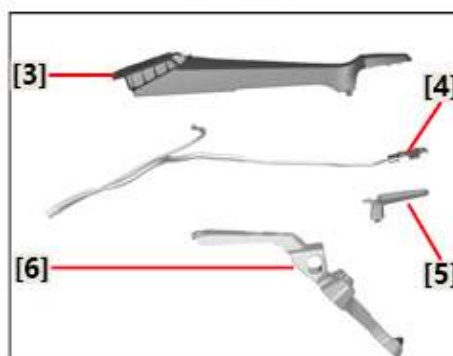
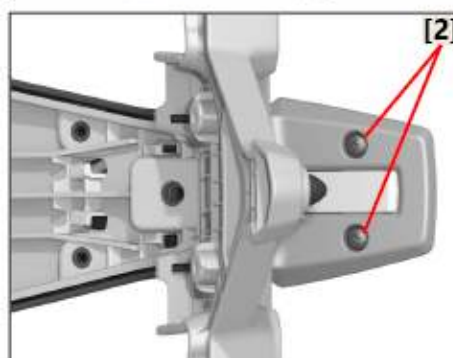
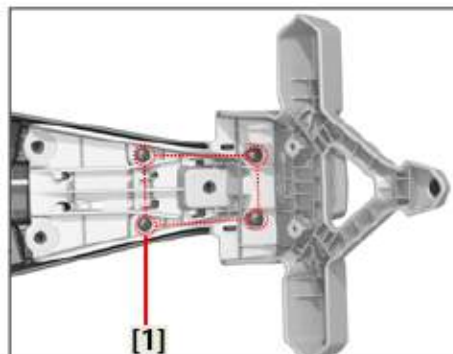
- Bolt [1];
- Bolt [2];
- Rear fender rear bracket [3];
- License plate lamp [4];
- License plate lamp pressure plate [5];
- Rear fender rear section [6];

The installation sequence is reversed from the removal sequence.

Torque:

**Rear fender rear section, rear fender rear bracket and license plate lamp pressure plate
License plate lamp pressure plate and rear fender rear bracket [2]**

1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)



※ **Rear wheel small fender**

Disassembly/installation

Disassemble the following parts:

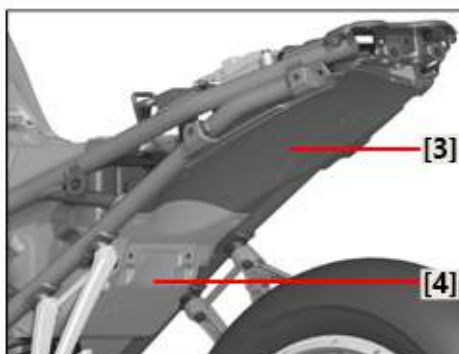
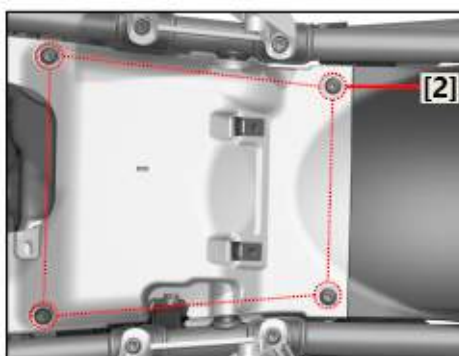
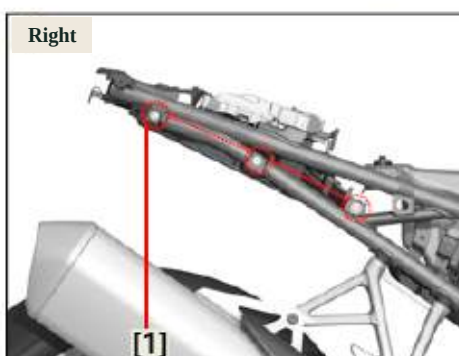
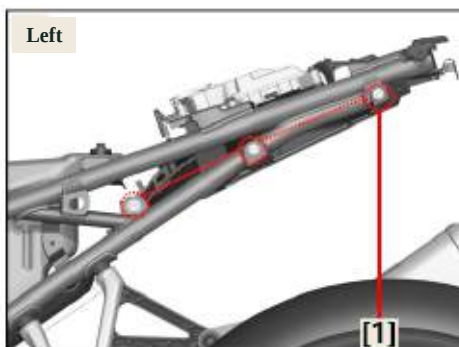
- Bolt [1];
- Rear wheel small fender [2];

The installation sequence is reversed from the removal sequence.

Torque:

Rear wheel small fender and rear fender front section trim

5.0 N·m (0.5 kgf·m, 3.7 lbf·ft)



※ Rear fender front section and trims

Note

•Electrical components and cables are installed and routed on the front section of the rear fender and the trim. If disassembly is required, the electrical component harness connector should be disconnected first.

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bolt [2];
- Rear fender front section [3];
- Rear fender trim [4];

The installation sequence is reversed from the removal sequence.

Torque:

Rear fender front section and frame

Rear fender front trim, frame and rear fender trim

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Notes

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

※ **Full vehicle lock set**

Disassembly/installation

Disassemble the following parts:

- Disconnect the ignition lock harness connector;
- Bolt [1];
- Ignition lock cover [2];
- Upper triple clamp wire hook [3];
- Bolt [4];
- Ignition lock [5];
- Bolt [6].
- Open the fuel tank cap with the key;
- Bolt [7];
- Fuel tank lock [8];
- Bolt [9];
- Seat cushion lock [10];

The installation sequence is reversed from the removal sequence.

Torque:

Fuel tank lock base and fuel tank

4.0 N·m(0.4 kgf·m, 3.0 lbf.ft)

Seat cushion lock and frame

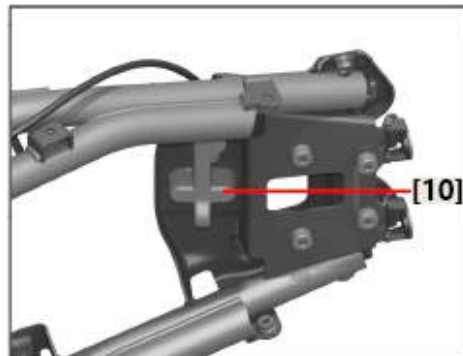
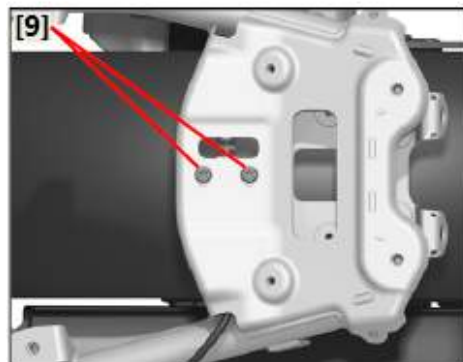
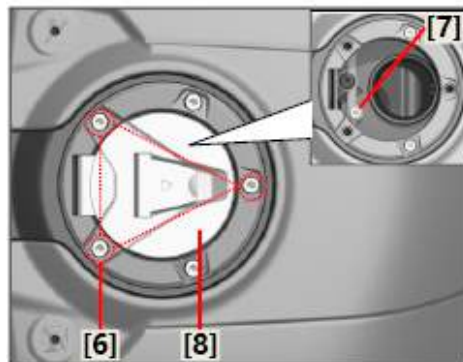
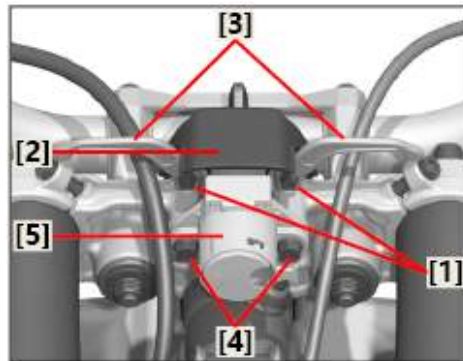
5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

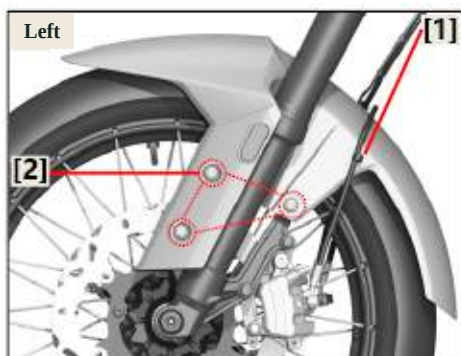
Upper bracket wire hook

6.0 N·m (0.6 kgf·m, 4.4 lbf.ft)

Ignition lock and upper connection plate

22 N·m (2.2 kgf·m, 16 lbf.ft)





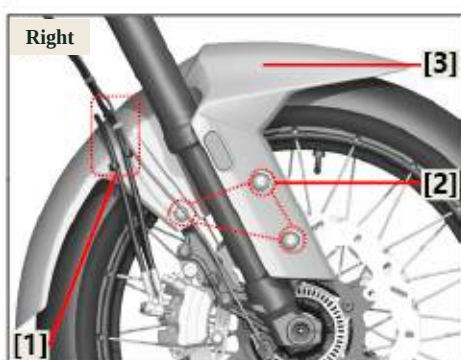
※ Front fender

Disassembly/installation

Disassemble the following parts:

- Brake hose retaining clip [1];
- Bolt and flanged bushing [2];
- Front fender [3];

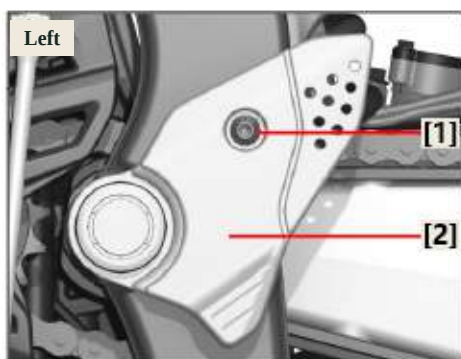
The installation sequence is reversed from the removal sequence.



Torque:

Front fender and front shock absorber

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



※ Swingarm axle trim (left and right)

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Swingarm axle trim - left [2];
- The \removal position of the right-side swingarm axle trim is the same as the left side.

The installation sequence is reversed from the removal sequence.

Torque:

Swingarm axle trim

8.0 N·m(0.8 kgf·m, 6.0 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 236mm. 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]

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

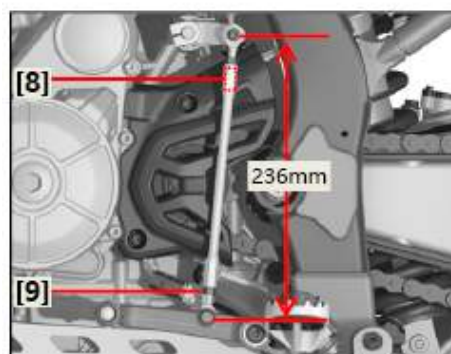
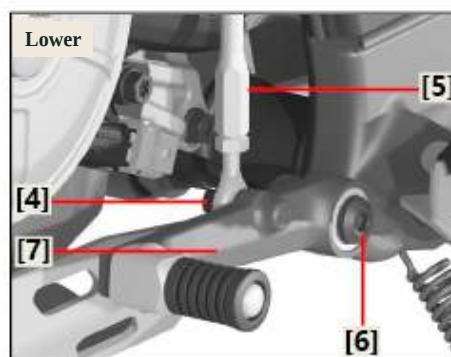
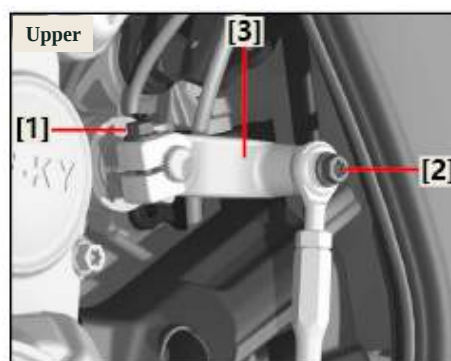
Gear shift rockerarm and engine shift rod [1]

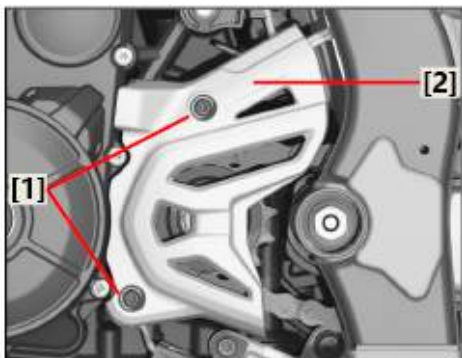
Gear shift lever mounting bolts [2], [4]

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Shift pedal connecting rod and frame [6]

22 N·m (2.2 kgf·m, 16 lbf·ft)





※ **Engine front sprocket cover**

Disassembly/installation

Disassemble the following parts:

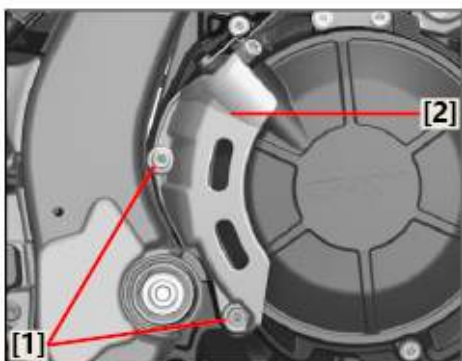
- Gear shift lever assembly;
See page 89 for details.
- Bolt [1];
- Engine front sprocket cover[2];

The installation sequence is reversed from the removal sequence.

Torque:

Engine sprocket cover and engine

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



※ **Engine heat shield**

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Engine heat shield [2];

The installation sequence is reversed from the removal sequence.

Note

- After disassembling the engine heat shield, promptly reinstall the bolts to the engine.

Torque:

Engine heat shield and engine

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ Battery and battery box

⚠ 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];
- Connection plugs and harness clamps at various points along the main cable [3];
- Fuse box [4];
- Starting Relay [5];
- Bolt [6].
- Battery box cover [7];
- Battery and rubber pad [8];
- Bolt [9];
- Battery box [10];

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 connecting screw

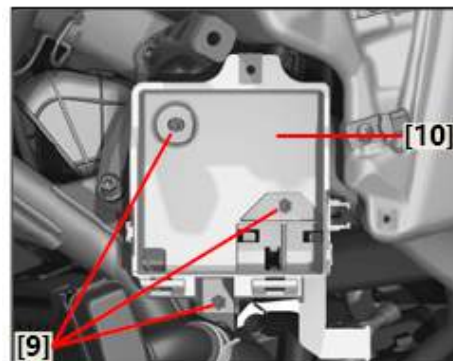
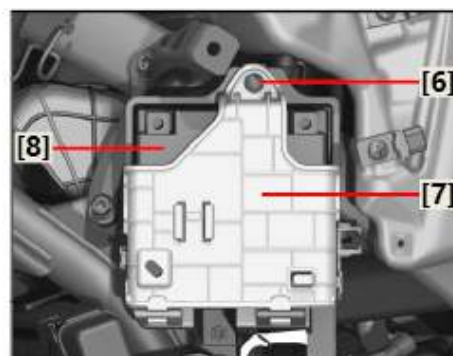
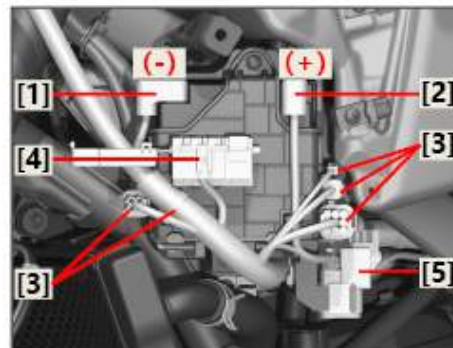
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

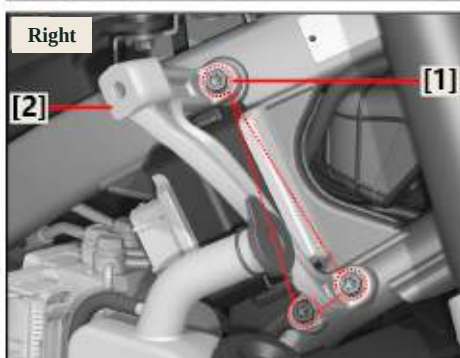
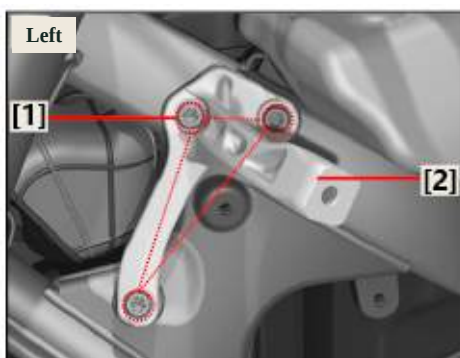
Battery box cover and battery box

5.0 N·m(0.5 kgf·m, 4.0 lbf.ft)

Battery box and frame

10 N·m (1.0 kgf·m, 7.4 lbf·ft)





※ Bumper mounting bracket (left and right)

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bumper mounting bracket - left and right [2];

The installation sequence is reversed from the removal sequence.

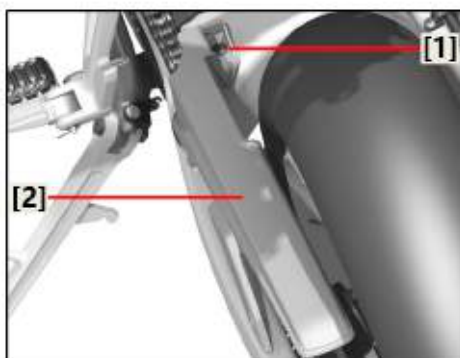
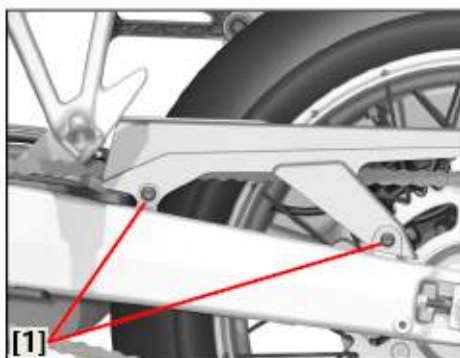
Note:

- The connection between the bumper mounting bracket and the frame requires the application of (Huitian 7262) thread locker.

Torque:

Bumper mounting bracket and frame (left and right)

22 N·m (2.2 kgf·m, 16 lbf·ft)



※ Chain box

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Chain guard [2];

The installation sequence is reversed from the removal sequence.

Torque:

Chain guard and swingarm

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

※ Engine lower protector

Disassembly/installation

Disassemble the following parts:

- Bolt and flanged bushing [1];
- Bolt and flanged bushing [2];
- Engine lower protector [3];

The installation sequence is reversed from the removal sequence.

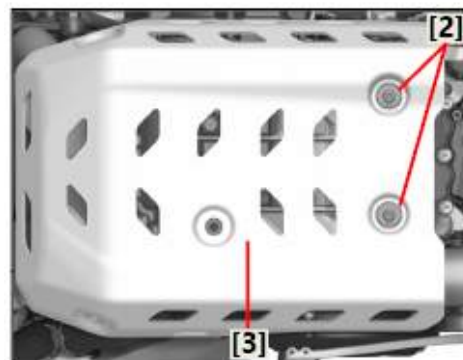
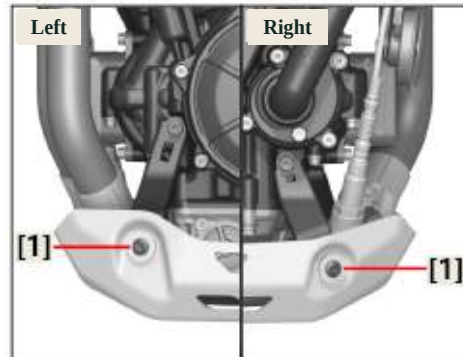
Torque:

Engine lower protector side mounting point

8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

Engine lower protector (lower) rear mounting point

12 N·m (1.2 kgf·m, 9.0 lbf·ft)



※ Engine lower protector bracket

Disassembly/installation

Disassemble the following parts:

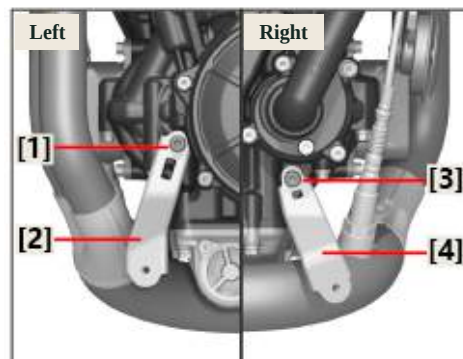
- Bolt [1];
- Engine lower protector left front bracket [2];
- Bolt [3];
- Engine lower protector right front bracket [4];

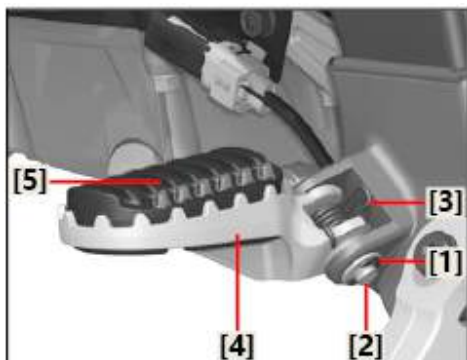
The installation sequence is reversed from the removal sequence.

Torque:

Engine lower protector left/right-front bracket

22 N·m (2.2 kgf·m, 16 lbf·ft)





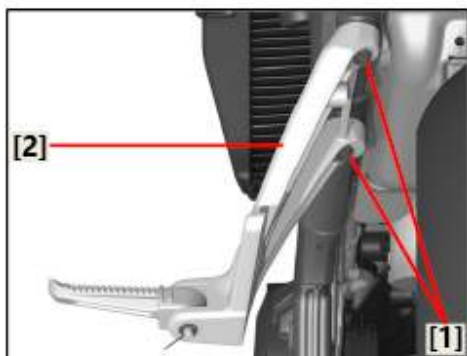
※ **Front footpeg assembly (left and right)**

Disassembly/installation

Disassemble the following parts:

- C-type circlip and flat gasket [1];
- Footpeg main pivot bolt [2];
- Footpeg torsion spring - left [3];
- Front footpeg - left [4];
- Front footpeg rubber - left [5];
- The right-side front footpeg removal position is the same as the left side.

The installation sequence is reversed from the removal sequence.



※ **Rear footpeg assembly (left and right)**

Disassembly/installation

Disassemble the following parts:

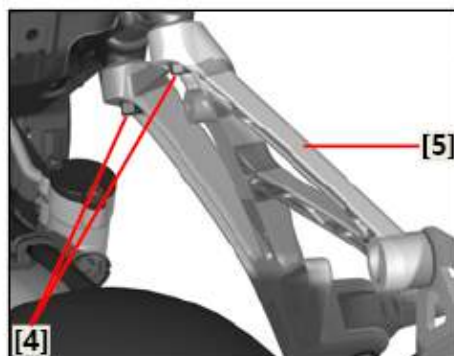
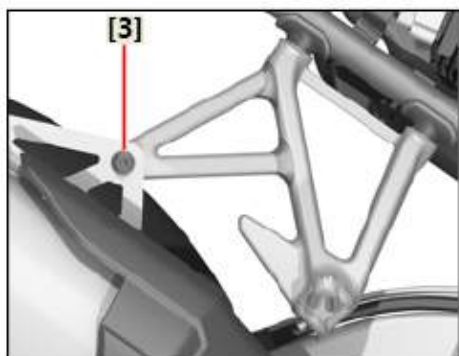
- Bolt [1];
- Rear footpeg assembly - left [2];
- Bolt [3];
- Bolt [4];
- Rear footpeg assembly - right [5];

The installation sequence is reversed from the removal sequence.

Torque:

**Rear footpeg (left and right) and frame
Muffler rear section and rear footpeg assembly
- right**

22 N·m (2.2 kgf·m, 16 lbf·ft)

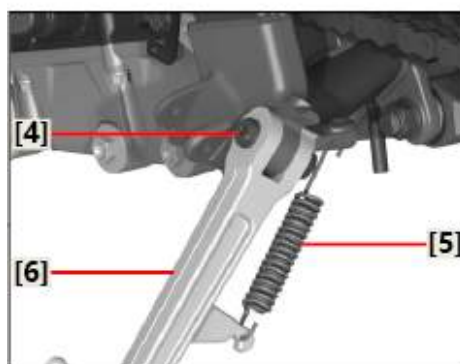
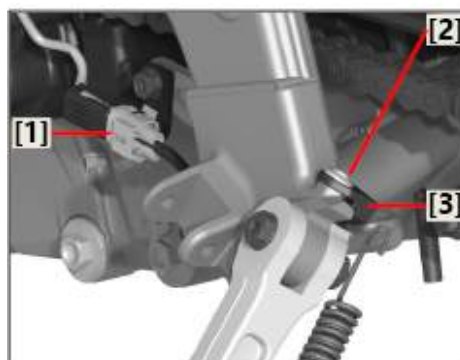


※ Side stand and side stand OFF switch

Disassembly/installation

Disassemble the following parts:

- Disconnect the side stand OFF switch harness connector [1];
- Remove the wire clip;
- Bolt [2];
- Side stand OFF switch [3];
- Special bolts for side stand [4];
- Stand spring [5];
- Side stand [6];



The installation sequence is reversed from the removal sequence.

Notes

- Apply thread locker (Huitian 7262) to the side stand special bolts

Torque:

Side stand OFF switch and frame

4.0 N·m(0.4 kgf·m, 3.0 lbf·ft)

Special mounting bolts for side stand

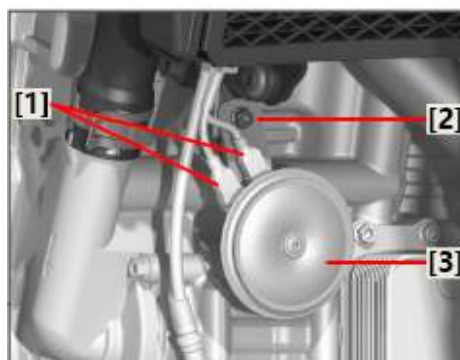
Fasten the bolt to 10 N·m and loosen by 1/3 turn, then hold the bolt head steady and tighten the locking nut to a torque of 22 N·m.

※ Horn

Disassembly/installation

Disassemble the following parts:

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

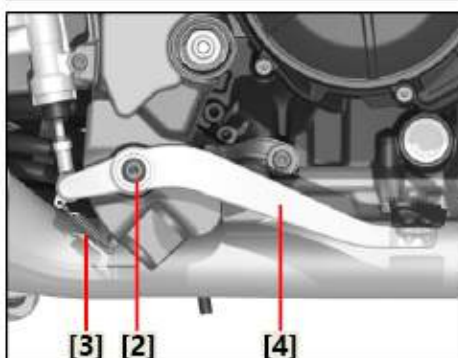
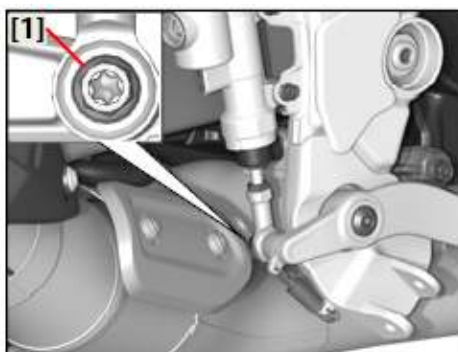


The installation sequence is reversed from the removal sequence.

Torque:

Horn connected to the frame

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



※ Brake pedal assembly

Disassembly/installation
Disassemble the following parts:

- Bolt [1];
- Brake rockerarm bolt [2];
- Return spring [3];
- Brake pedal assembly [4];
- Bolt [5];
- Brake rockerarm [6];
- Rear brake pedal [7];

The installation sequence is reversed from the removal sequence.

Notes

- The brake rockerarm, frame, rear brake pedal, and rear brake rod end bearing need to be coated with (Huitian 7262) thread locker.

Torque:

Rear brake pedal and brake rockerarm

3.0 N·m(0.3 kgf·m, 2.0 lbf·ft)

Brake rockerarm and rear brake rod end bearing

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Brake rockerarm and frame

22 N·m (2.2 kgf·m, 16 lbf·ft)

※ **Muffler rear section assembly, muffler shield**

Warning

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

Disassembly/installation
Disassemble the following parts:

- Bolt and flanged bushing [1];
- Muffler shield [2];
- Bolt [3];
- Muffler pipe clamp [4];
- Muffler rear section [5];
- Muffler graphite ring [6].

Inspection

- Muffler pipe clamp
Break/damage → Replace. Loose → Properly connect.
- Muffler rear section
Crack/damage/leak → Replace.
- Muffler graphite ring
Broken/damaged → Replace.

The installation sequence is reversed from the removal sequence.

Torque:

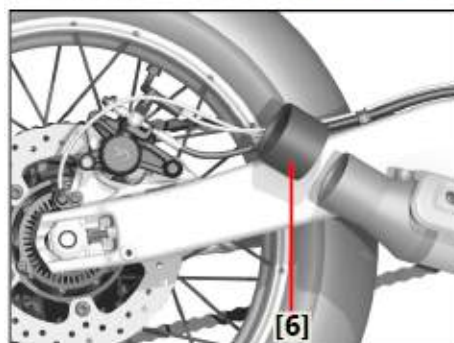
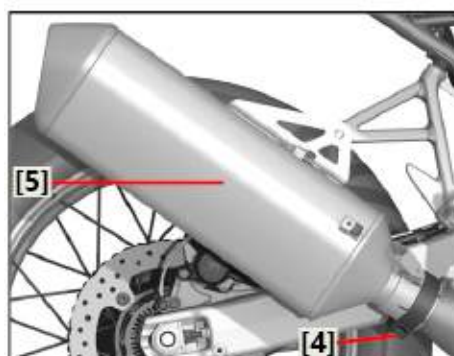
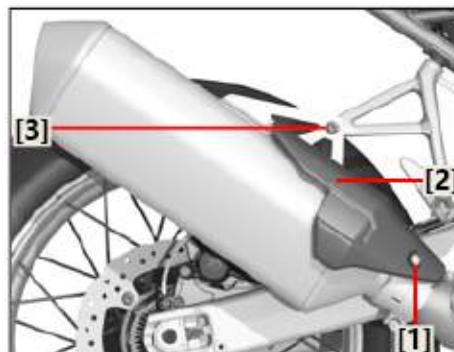
Muffler shield mounting bolt

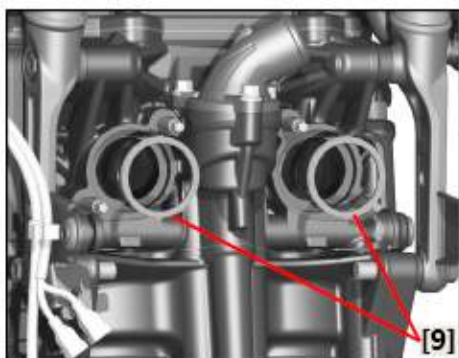
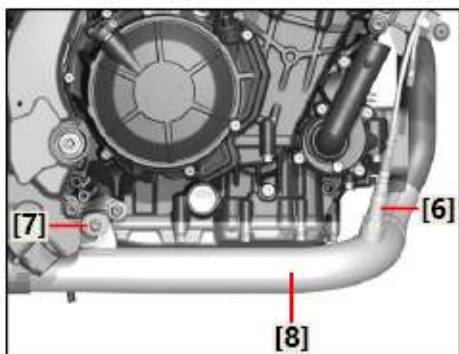
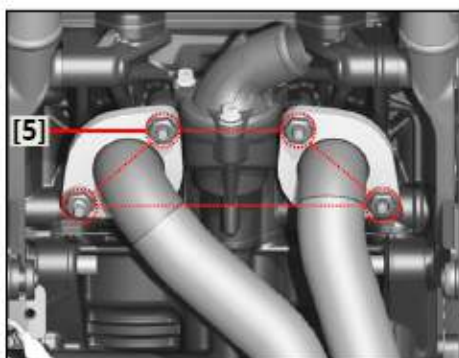
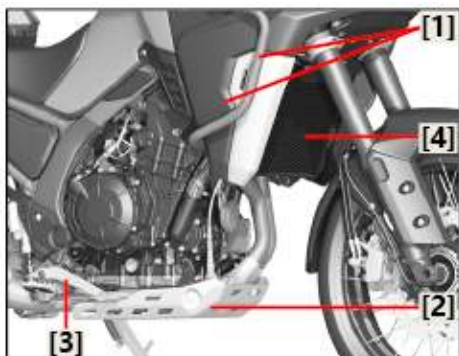
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Muffler pipe clamp

**Muffler rear section and rear footpeg assembly
- right**

22 N·m (2.2 kgf·m, 16 lbf·ft)





※ Muffler front assembly

⚠ Warning

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

1.Disassembly

- Bumper and fuel tank side protector assembly (left and right) [1];
 - Engine lower protector [2];
 - Brake pedal assembly [3]; see pages 72-96 for details.
 - Radiator assembly [4];
- See "Cooling System" on page 141 for details

2.Disassembly

- Nut [5];
- Oxygen sensor [6];
- Bolt and flanged bushing [7];
- Muffler front section 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 front section assembly and then take out the muffler gasket inside the exhaust port [9].

Inspection

- Check the muffler gasket for its exhausting Exhaust leakage → Replace.
- Muffler front section Crack/damage/leak → Replace.

The installation sequence is reversed from the removal sequence.

Torque:

Muffler front section and engine

18 N·m (1.8 kgf·m, 13 lbf·ft)

Connecting bolt between muffler front section and frame

22 N·m (2.2 kgf·m, 16 lbf·ft)

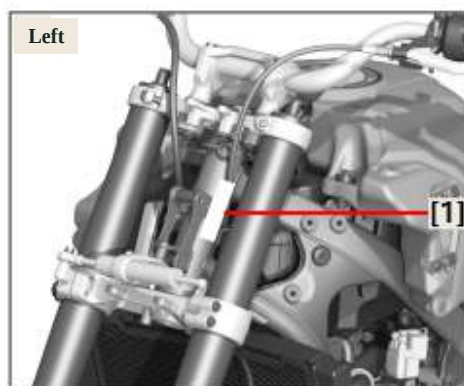
Oxygen sensor connected to muffler front section

50 N·m (5.0 kgf·m, 37 lbf·ft)

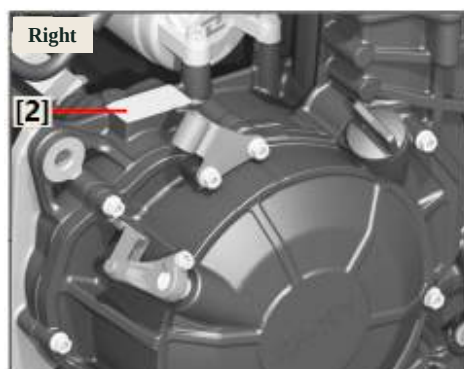
※ **Frame SN, engine number and vehicle nameplate information**

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.

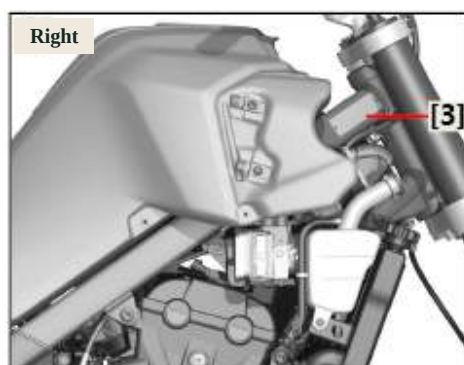
The VIN [1] is engraved on the right side of the frame upright tube.



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



The vehicle nameplate information [3] is riveting on the right side of the main frame beam.



Electronic Fuel Injection (EFI) System

Section 1 Maintenance Instructions	102
Section 2 Position Of Components	103
Section 3 Introduction Of System Troubleshooting.....	104
Section 4 Introduction Of OBD Interface.....	105
Section 5 Maintenance Tools	106
Section 6 Maintenance And Troubleshooting Process.....	108
Section 7 Troubleshoot According To Fault Codes	109
Section 8 Troubleshoot According To Fault Phenomena.....	118
Section 9 Attachment/Fault Code List	121

Maintenance Instructions

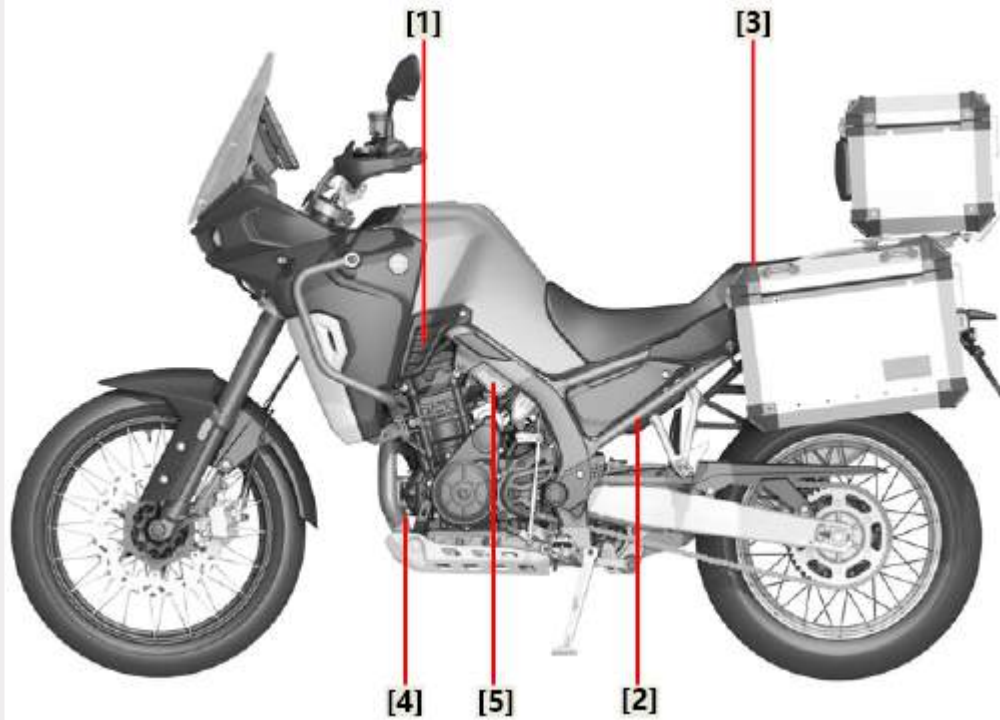
Overview:

- This section introduces UMC's UP6.0 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 **36-2 teeth** trigger signal to identify the speed.

Position of Components



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

Introduction of System Troubleshooting

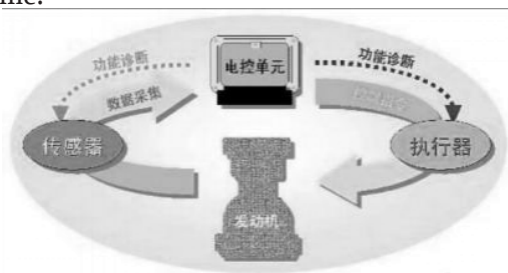
On-board diagnosis system (OBD system) refers to the diagnosis system integrated in the engine control system, which can monitor the components that affect exhaust emissions and the main functional states of the engine. It has the function of identifying and storing EFI faults. When repairing vehicles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

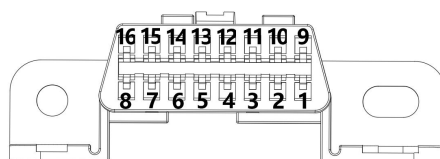
Turn on the ignition switch, turn on the stop switch, and the ECU will be initialized immediately. From initialization, the MIL lamp is on. The MIL lamp goes out immediately after the engine starts.

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, 6, 14 and 16 on the OBD diagnostic interface. Pin 4 of the standard diagnostic connector is connected to the battery negative terminal. Pins 6, 14 are connected to pins 1, 17 of ECU, that is, the "CAN" 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 "CAN" line and can read the following information:

•Version information display

ECU hardware number, ECU software number.

•Fault code display

Intake pressure sensor, intake air temperature sensor, engine temperature sensor, throttle position sensor, oxygen sensor, oxygen sensor heating circuit, fuel injector, fuel pump relay, speed sensor, canister control valve, speed signal, system voltage, ECU, throttle valve signal, electronic accelerator signal, 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, 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, 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

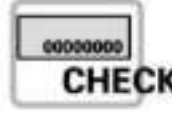
Function:

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 UP 6.0 system, the corresponding diagnosis strategy, possible fault causes and fault treatment strategy, which can be used as a reference in the process of vehicle maintenance.

1. Fault code: P0322 No signal from crankshaft speed sensor

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: Check the followings
--	--

2. Fault code: P0107 Intake pressure sensor 1 circuit voltage too low

3. Fault code: P2A0C Intake pressure sensor 2 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.
--	---

4. Fault code: P0108 Intake pressure sensor 1 circuit voltage too high

5. Fault code: P2A0D Intake pressure sensor 2 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 air temperature sensor circuit 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 circuit voltage too high

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 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: P0650 MIL control circuit open

Maintenance tips: The fault has been confirmed and may have the following problems 1) MIL lamp drive 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 drive circuit connected to the ECU.
--	--

11. Fault code: P0480 Fan control circuit voltage open (low speed)

12. Fault code: P0691 Fan control circuit voltage too low (low speed)

13. Fault code: P0692 - Fan control circuit voltage too high (low speed)

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.
--	---

14. Fault code: P0627 Fuel pump relay control circuit open

15. Fault code: P0628 Oil pump relay control circuit voltage too low

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

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.
--	---

17. Fault code: P0444 canister control valve circuit open

Maintenance tips: The fault has been confirmed and may have the following problems 1) Open circuit between the circuit connected to ECU and pin 2 of canister control valve. 2) Open circuit for pin 1 of canister control valve connected to main relay; 3) Open circuit of solenoid between pin 1 and pin 2 of canister control valve	Maintenance tips:
--	--------------------------

18. Fault code: P0458 canister control valve circuit voltage too low

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

19. Fault code: P0459 Canister control valve circuit voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1) Open circuit between the circuit connected to ECU and pin 2 of canister control valve.	Maintenance tips: Check the followings 1) Measure whether the voltage of ECU pin is normal. 2) Measure between ECU pin and pin 1 circuit of canister control valve.
---	---

20. Fault code: P0915 Gear sensor voltage out of range

21. Fault code: P0916 Gear sensor voltage too low

22. Fault code: P0917 Gear sensor voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1) Poor contact between the circuit connected to ECU with the gear sensor; 2) Gear sensor short to ground; 3) Gear sensor short to power;	Maintenance tips: Check the followings 1) Check whether the harness has looseness; 2) Check whether the sensors are damaged;
---	--

23. Fault code: P1001 Neutral shift sensor position self-learning value unreasonable after power-on

24. Fault code: P082B Neutral shift sensor position self-learning value unreasonable after power-on

25. Fault code: P082C Shift shaft signal voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1) Poor contact between the circuit connected to ECU with the shift shaft signal; 2) Shift shaft sensor short to ground; 3) Shift shaft sensor short to power;	Maintenance tips: Check the followings 1) Check whether the harness has looseness; 2) Check whether the sensors are damaged;
--	--

26.Fault code: P0568 Cruise control circuit malfunction

Maintenance tips: The fault has been confirmed and may have the following problems 1) Poor contact between the circuit connected to the ECU and the cruise switch; 2) Cruise switch short to ground; 3) Cruise switch short to power;	Maintenance tips: Check the followings 1) Check whether the harness has looseness; 2) Check whether the cruise switch is damaged;
--	---

27.Fault code: P0201 Injector control circuit of cylinder 1 open

28.Fault code: P0202 Injector control circuit of cylinder 2 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 1) Check if the fuel injector harness is loose;
--	---

29.Fault code: P0261 Cylinder 1 fuel injector control circuit voltage too low

30.Fault code: P0264 Cylinder 2 fuel injector control circuit voltage too low

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.
--	--

31.Fault code: P0262 Cylinder 1 fuel injector control circuit voltage too high

32.Fault code: P0265 Cylinder 2 fuel injector control circuit voltage too high

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 .
---	--

33.Fault code: P0501 Vehicle speed signal malfunction

Fault cause description: When the vehicle is coasting with the accelerator released, the ECU simultaneously monitors both engine speed and vehicle speed. If the engine is maintained at a high speed but the vehicle speed is displayed as 0 or significantly too low, the system will determine that there is a speed signal fault.

Maintenance tips: The fault has been confirmed and may have the following problems 1) The signal circuit between the ECU and the vehicle speed sensor is shorted to ground or open.	Maintenance tips: Check the followings 1) Check the circuit resistance of the ECU connector connected to the vehicle speed signal sensor. 2) Check the resistance to ground of the ECU pin circuit.
--	---

34.Fault code: P0641 5V supply voltage 1 IC fault

35.Fault code: P0651 5V supply voltage 2 IC fault

Maintenance tips: The fault has been confirmed and may have the following problems 1) The ECU power supply IC is damaged.	Maintenance tips: Check the followings 1) Replace the ECU.
---	--

36.Fault code: P0121 Electronic throttle position sensor 1 signal unreasonable

37.Fault code: P0221 Electronic throttle position sensor 2 signal unreasonable

Maintenance tips: The fault has been confirmed and may have the following problems 1) The harness has looseness.	Maintenance tips: Check the followings 1) Check if there is any looseness in the harness.
--	---

38.Fault code: P0122 Electronic throttle position sensor 1 signal voltage too low

39.Fault code: P0222 Electronic throttle position sensor 2 signal voltage too low

Maintenance tips: The fault has been confirmed and may have the following problems 1) The sensor is shorted to ground.	Maintenance tips: Check the followings 1) Check the harness for any issues; 2) Check if the sensor pin is breakdown;
--	---

40.Fault code: P0123 Electronic throttle position sensor 1 signal voltage too high

41.Fault code: P0223 Electronic throttle position sensor 2 signal voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1) The sensor is short-circuited to the 5V power supply.	Maintenance tips: Check the followings 1) Check the harness for any issues; 2) Check if the sensor pin is breakdown;
---	---

42.Fault code: P2106 Electronic throttle actuator control system malfunction

Maintenance tips: The fault has been confirmed and may have the following problems 1) Drive motor duty cycle fault.	Maintenance tips: Check the followings 1) The drive motor is damaged; 2) The motor wire harness has looseness;
---	---

43. Fault code: P1568 Return spring maximum fault check

Maintenance tips: The fault has been confirmed and may have the following problems 1) The valve body is stuck.	Maintenance tips: Check the followings 1) Whether the valve body has severe carbon deposition.
---	---

44. Fault code: P1545 DVE position deviation error

Maintenance tips: The fault has been confirmed and may have the following problems 1) The valve body is stuck. 2) Self-learning failure.	Maintenance tips: Check the followings 1) Whether the valve body has severe carbon deposition. 2) Power on and relearn.
--	---

45. Fault code: P1565 Electronic throttle lower limit position initialization self-learning failure

Maintenance tips: The fault has been confirmed and may have the following problems 1) The battery voltage is below 9V; 2) Intake air temperature or minimum temperature failure;	Maintenance tips: Check the followings 1) Whether the battery voltage greater than 10V; 2) Whether there is a minimum fault in the intake air temperature or water temperature;
--	---

46. Fault code: P2138 Electronic accelerator pedal position sensor signal unreasonable

Maintenance tips: The fault has been confirmed and may have the following problems 1) The harness has looseness.	Maintenance tips: Check the followings 1) Check if there is any looseness in the harness.
---	--

47. Fault code: P2122 Electronic accelerator pedal position sensor 1 signal voltage too low

48. Fault code: P2127 Electronic accelerator pedal position sensor 2 signal voltage too low

Maintenance tips: The fault has been confirmed and may have the following problems 1) The sensor is shorted to ground.	Maintenance tips: Check the followings 1) Check the harness for any issues; 2) Check if the sensor pin is breakdown;
---	--

49. Fault code: P2123 Electronic accelerator pedal position sensor 1 signal voltage too high

50. Fault code: P2128 Electronic accelerator pedal position sensor 2 signal voltage too high

Maintenance tips: The fault has been confirmed and may have the following problems 1) The sensor is short-circuited to 5V.	Maintenance tips: Check the followings 1) Check the harness for any issues; 2) Check if the sensor pin is breakdown;
---	--

51. Fault code: P0606 Electronic throttle safety monitoring function malfunction

Maintenance tips: The fault has been confirmed and may have the following problems 1) Calculate the torque exceeding the monitoring layer torque;	Maintenance tips: Check the followings 1) Whether there has been any modification to the intake or exhaust system; 2) Whether the engine operating quality changes;
--	---

52. Fault code: P2106 Load monitoring failure

Maintenance tips: The fault has been confirmed and may have the following problems 1) Load monitoring exceeds limit;	Maintenance tips: Check the followings 1) Whether there has been any modification to the intake or exhaust system; 2) Whether the engine operating quality changes;
---	---

53. Fault code: P0053 Front oxygen sensor heater resistance unreasonable

Oxygen sensor heater diagnostics: The system determines if the heating output is correct by measuring the oxygen sensor's heating resistance value. Heated sensors can be damaged by condensation under certain unfavorable conditions, especially during the cold start stage.

Maintenance tips: The fault has been confirmed and may have the following problems 1) The heating function of the upstream oxygen sensor has failed; replace the oxygen sensor.	Maintenance tips:
--	--------------------------

54. Fault code: P0030 The oxygen sensor heating control circuit 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. 3) Measure the resistance between pin 1 and pin 2 of the upstream oxygen sensor to assess its performance
--	--

55. Fault code: P0030 Oxygen sensor heating control circuit voltage too low

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.
---	--

56. Fault code: P0030 Oxygen sensor heating control circuit voltage too high

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.
---	--

57. 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:
--	--------------------------

58. Fault code: P0131 Oxygen sensor signal circuit 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.
--	---

59. Fault code: P0132 Oxygen sensor signal circuit 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.
---	--

60. Fault code: P0134 Oxygen sensor circuit signal malfunction

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.
--	--

61. Fault code: U0073 CAN bus off failure

Maintenance tips: The fault has been confirmed and may have the following problems 1) The CAN bus is disconnected.	Maintenance tips: Check the followings 1) Whether the CAN bus voltage is normal.
---	---

62. Fault code: U0140 Communication loss or signal malfunction between ECU and BCM

Maintenance tips: The fault has been confirmed and may have the following problems 1) Whether the BCM and ECU CAN matrix are functioning properly; 2) Whether the BCM communication resistance is reasonable	Maintenance tips: Check the followings 1) Check the Software version; 2) Check the CAN bus voltage;
--	---

63. Fault code: U0121 Communication loss between ECU and ABS control module

Maintenance tips: The fault has been confirmed and may have the following problems 1) Check if the ABS and ECU CAN matrix are functioning normally; 2) Check if the ABS resistance is normal.	Maintenance tips: Check the followings 1) Check the Software version; 2) Check the CAN bus voltage;
---	---

64. Fault code: U0155 Abnormal communication between ECU and IPC (instrument panel control module)

Maintenance tips: The fault has been confirmed and may have the following problems 1) Whether the IPC and ECU CAN matrix are normal; 2) Whether the IPC resistance is functioning properly;	Maintenance tips: Check the followings 1) Check the Software version; 2) Check the CAN bus voltage;
---	---

Troubleshoot according to Fault Phenomena

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

(1) Start normally but idle at high speed.

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

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the electronic accelerator 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	Check the throttle body 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 EFI system, turn on the ignition switch, and check whether the power supply of 20lb, 35lb pin is normal; check whether the 63lb, 64lb 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. fuel injector; 7. ignition timing; 8. exhaust pipe.

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the air filter is clogged.	Yes	Maintain the air intake system
		No	Next step
2	Connect the fuel pressure gauge (the connection point is at the front end of the fuel injector inlet pipe), start the engine, and check that the fuel pressure is around 330 kPa at idle.	Yes	Next step
		No	Maintain the fuel supply system
3	Check the spark plug of the cylinder to see whether its model and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
4	Check the throttle body 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 EFI system, turn on the ignition switch, and check whether the power supply of 20lb, 35lb pin is normal; check whether the 63lb, 64lb 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. fuel injector; 7. ignition timing; 8. exhaust pipe.

General diagnostic process:

S/N	Operational procedures	Testing result	Subsequent procedures
1	Check whether the air filter is clogged.	Yes	Maintain the air intake system
		No	Next step
2	Connect the fuel pressure gauge (the connection point is at the front end of the fuel injector inlet pipe) , start the engine, and check that the fuel pressure is around 330 kPa at idle.	Yes	Next step
		No	Maintain the fuel supply system
3	Check the spark plug of the cylinder to see whether its model and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
4	Check the throttle body 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 EFI system, turn on the ignition switch, and check whether the power supply of 20lb, 35lb pin is normal; check whether the 63lb, 64lb 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. Fuel injector; 8. Ignition timing; 9. 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 330 kPa at idle.	Yes	Next step
		No	Maintain the fuel supply system
4	Remove the ignition high-voltage wire, connect a spark plug, and place the spark plug electrode about 5 mm from the engine body. Start the engine and check if the spark plug ignition intensity is normal.	Yes	Next step
		No	Maintain the ignition system
5	Check the spark plug of the cylinder to see whether its model and clearance meet the specifications.	Yes	Next step
		No	Adjust or replace
6	Check the throttle body 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 EFI system, turn on the ignition switch, and check whether the power supply of 20lb, 35lb pin is normal; check whether the 63lb, 64lb 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	P0322	No signal from crankshaft speed sensor
2	P0107	Intake pressure sensor 1 circuit voltage too low
3	P2A0C	Intake pressure sensor 2 circuit voltage too low
4	P0108	Intake pressure sensor 1 circuit voltage too high
5	P2A0D	Intake pressure sensor 2 circuit voltage too high
6	P0112	Intake air temperature sensor signal voltage too low
7	P0113	Intake air 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	P0650	MIL control circuit open
11	P0480	Fan control circuit voltage open (low speed)
12	P0691	Fan control circuit voltage too low (low speed)
13	P0692	Fan control circuit voltage too high (low speed)
14	P0627	Oil pump relay control circuit open
15	P0628	Oil pump relay control circuit voltage too low
16	P0629	Oil pump relay control circuit voltage too high.
17	P0444	Carbon canister control valve circuit open
18	P0458	Carbon canister control valve circuit voltage too low
19	P0459	Carbon canister control valve circuit voltage too high
20	P0915	Gear sensor voltage unreasonable
21	P0916	Gear sensor voltage too low
22	P0917	Gear sensor voltage too high
23	P1001	Neutral shift sensor position self-learning value unreasonable after power-on
24	P082B	Shift shaft signal voltage too low
25	P082C	Shift shaft signal voltage too high
26	P0568	Cruise control circuit malfunction
27	P0201	Open circuit for fuel injector control circuit of cylinder 1
28	P0202	Open circuit for fuel injector control circuit of cylinder 2
29	P0261	Cylinder 1 fuel injector control circuit voltage too low
30	P0264	Cylinder 2 fuel injector control circuit voltage too low
31	P0262	Cylinder 1 fuel injector control circuit voltage too high
32	P0265	Cylinder 2 fuel injector control circuit voltage too high
33	P0501	Vehicle speed signal malfunction
34	P0641	5V supply voltage 1 IC fault
35	P0651	5V supply voltage 2 IC fault
36	P0121	Electronic throttle position sensor 1 signal unreasonable
37	P0221	Electronic throttle position sensor 2 signal unreasonable
38	P0122	Electronic throttle position sensor 1 signal voltage too low
39	P0222	Electronic throttle position sensor 2 signal voltage too low
40	P0123	Electronic throttle position sensor 1 signal voltage too high
41	P0223	Electronic throttle position sensor 2 signal voltage too high
42	P2106	Electronic throttle actuator control system malfunction
43	P1568	Return spring maximum fault check
44	P1545	DVE position deviation error
45	P1565	Electronic throttle lower limit position initialization self-learning failure
46	P2138	Electronic accelerator pedal position sensor signal unreasonable
47	P2122	Electronic accelerator pedal position sensor 1 signal voltage too low

S/N	Fault code	Description (UAES)
48	P2127	Electronic accelerator pedal position sensor 2 signal voltage too low
49	P2123	Electronic accelerator pedal position sensor 1 signal voltage too high
50	P2128	Electronic accelerator pedal position sensor 2 signal voltage too high
51	P0606	Electronic throttle safety monitoring function malfunction
52	P2106	Load monitoring failure
53	P0053	Front oxygen sensor heater resistance unreasonable
54	P0030	Oxygen sensor heating control circuit fault
55	P0031	Oxygen sensor heating control circuit voltage too low
56	P0032	Oxygen sensor heating control circuit voltage too high
57	P0130	Oxygen sensor signal unreasonable
58	P0131	Oxygen sensor circuit voltage too low
59	P0132	Oxygen sensor circuit voltage too high
60	P0134	Oxygen sensor circuit signal malfunction
61	U0073	CAN bus-off malfunction
62	U0140	Communication loss or signal malfunction between ECU and BCM
63	U0121	Communication loss between ECU and ABS control module
64	U0155	Abnormal communication between ECU and IPC (instrument panel control module)

Fuel System

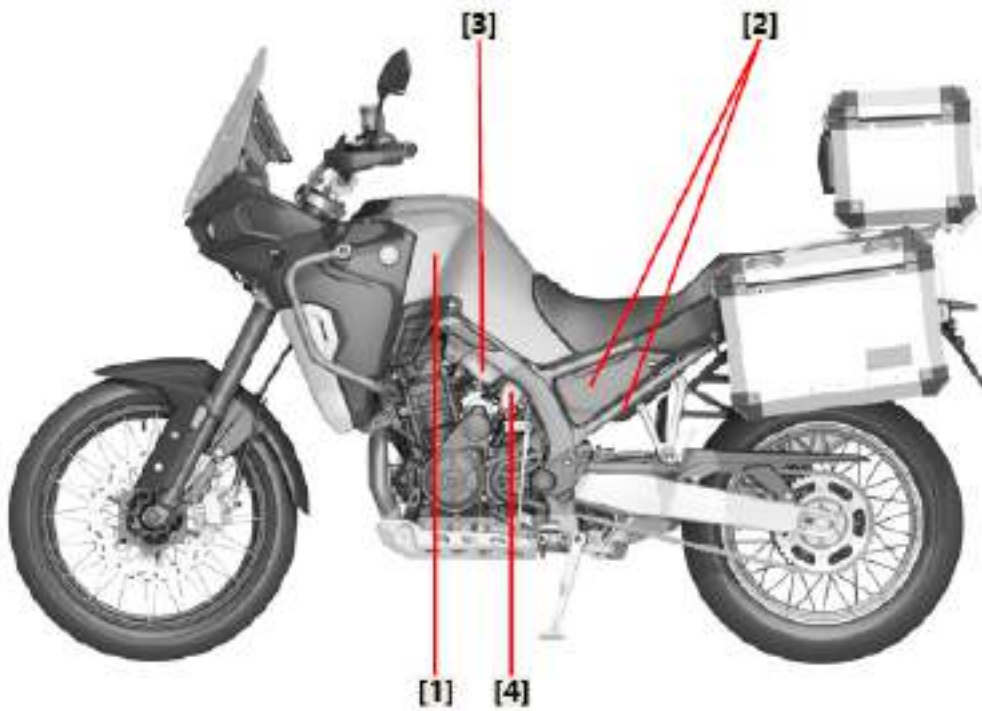
Section 1 Maintenance Instructions	124
Section 2 Position Of Components	125
Section 3 Fuel Tank Assembly.....	126
Section 4 Fuel Pressure Release	128
Section 5 Fuel Pressure Addition.....	128
Section 6 Quick Connector	129
Section 7 Fuel Pump Unit	131
Section 8 Fuel Pump Unit Assembly	132
Section 9 Air Filter Assembly	133
Section 10 Air Filter Element Replacement And Maintenance	134
Section 11 Throttle Body Assembly And Intake Pipe.....	135
Section 12 Electronic Throttle Body.....	136
Section 13 Fuel Rail Assembly	138
Section 14 Fuel Evaporation System	139

Maintenance Instructions

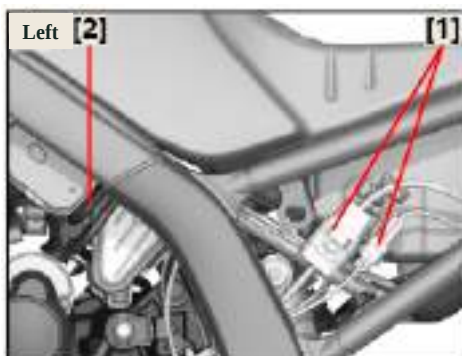
Overview:

- 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) Electronic throttle valve/sensor	(4) Fuel evaporation system
---------------	---------------------------------	--------------------------------------	-----------------------------



※ Fuel tank assembly

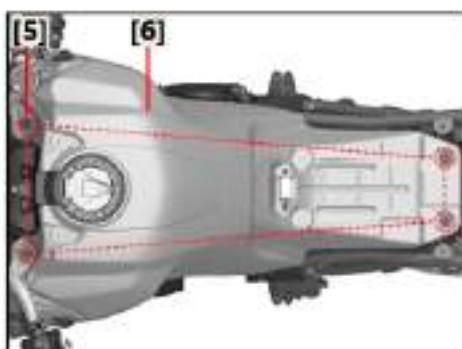
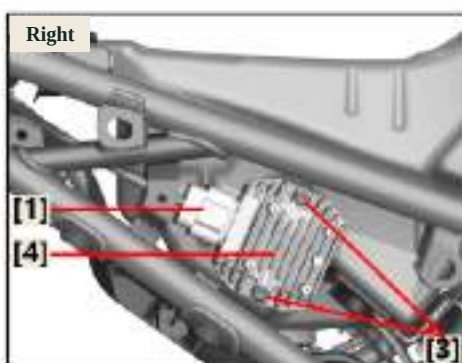
1. Use a pump to extract gasoline from the fuel tank.

Notes

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

2. Disassembly

- Disconnect the electrical component wiring harness connector [1];
- Fuel tank overflow hose [2];
- Bolt [3];
- Regulating rectifier [4];
- Bolt and T-bushing [5];
- Lift the fuel tank [6] upwards;
- Fuel hose quick connector [7];
- Fuel filter [8];
- Fuel pump harness connector [9];
- Fuel level sensor harness plug [10];
- Fuel tank [6];



The installation sequence is reversed from the removal sequence.

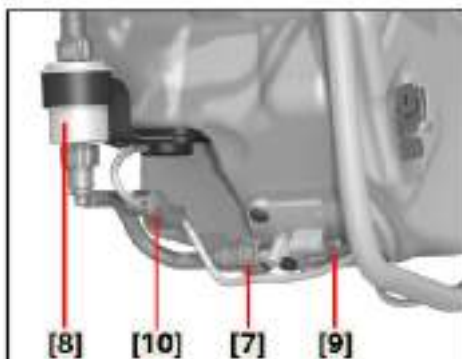
Torque:

Regulating rectifier and fuel tank

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Fuel tank and frame (front and rear) mounting points

22 N·m (2.2 kgf·m, 16 lbf·ft)



3. Disassembly

- Screw and drain pipe pressure plate[1];
- Fuel tank drain hose [2];
- Fuel tank overflow hose[3];
- Bolts [4], [5];
- Fuel filter bracket [6];
- Fuel level sensor [7];
- Fuel level sensor mounting bracket [8];

The installation sequence is reversed from the removal sequence.

Notes

- During installation, the limit rubber at the rod end of the fuel level sensor should be fitted onto the fixing point on the fuel level sensor bracket [a].

Torque:

Fuel level sensor mounting bracket and fuel tank

Fuel level sensor and fuel tank

3.0 N·m(0.3 kgf·m, 2.0 lbf·ft)

Fuel tank drain pipe pressure plate and fuel tank

4.0 N·m(0.4 kgf·m, 3.0 lbf·ft)

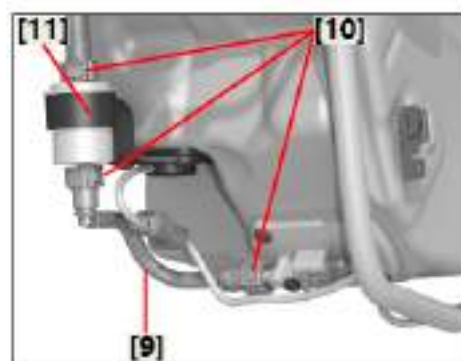
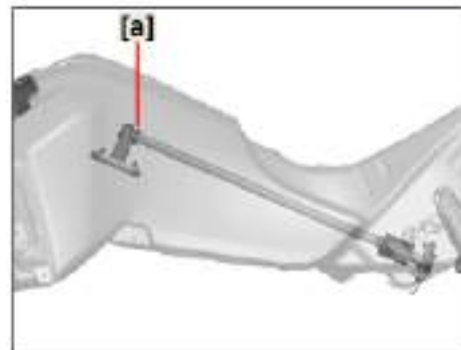
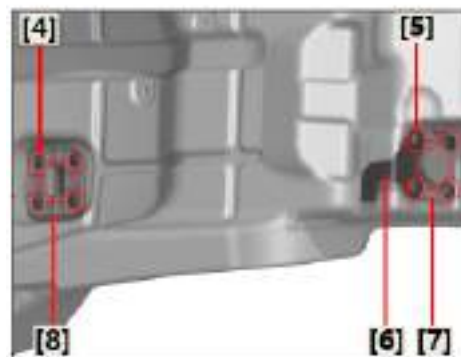
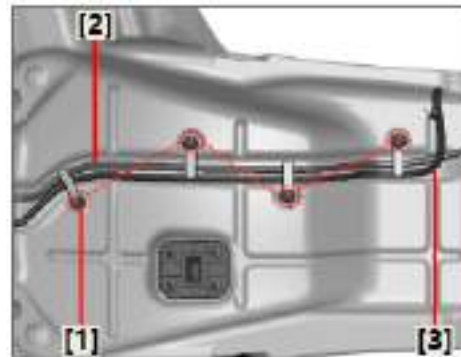
4. Check the fuel pipeline

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 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

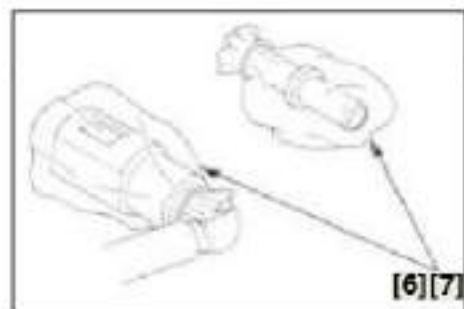
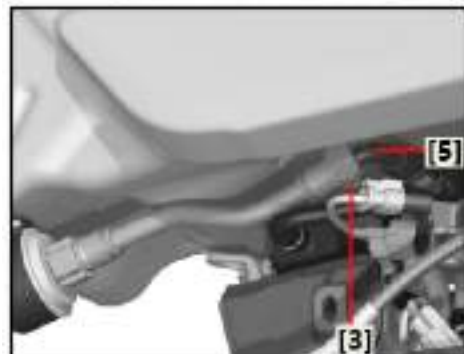
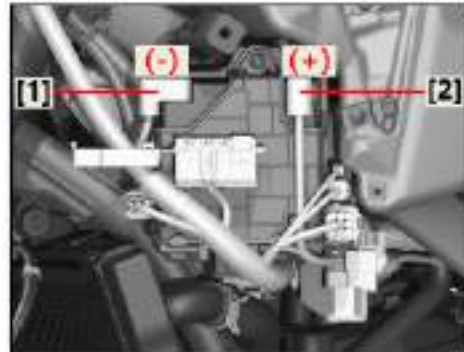
- Release the fuel pressure;
- First, disconnect the negative battery terminal (-) bolt [1], then disconnect the positive battery terminal (+) bolt [2];
- Place a cloth at the fuel line quick connector.
- Press the release button [3] on the fuel hose connector and disconnect the quick connectors from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

Notes

- Do not reuse kinked or damaged fuel supply hoses, as this could cause a fuel leak.
- 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.



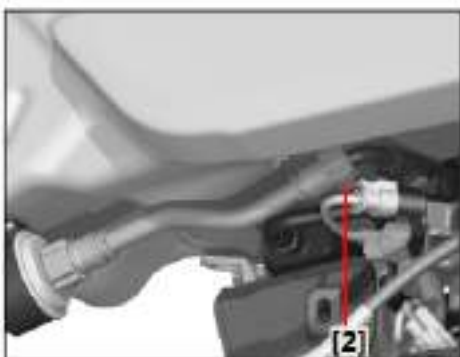


2.Installation

-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.



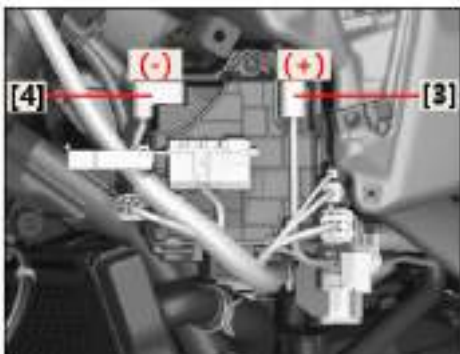
Torque:

Battery positive and negative terminal connecting screw

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 126 for details) ;
- Bolt [1];
- Fuel pump [2];
- Rubber seal [3];

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.

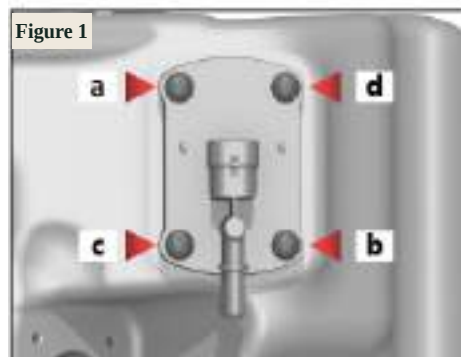
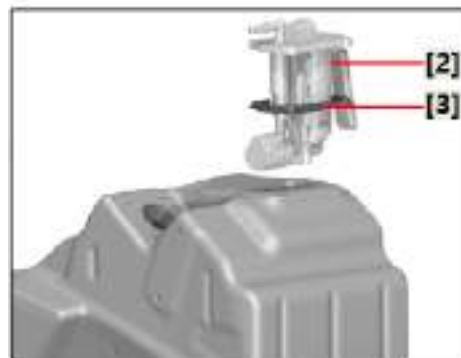
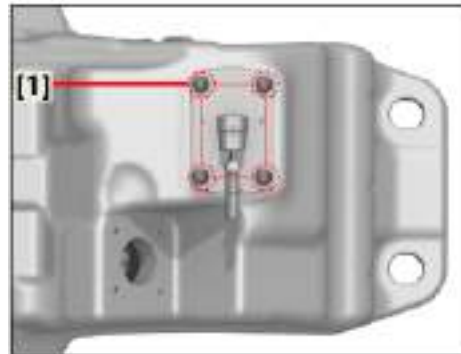
Notes

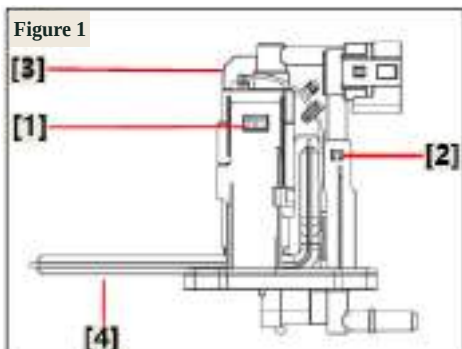
- Be careful not to damage the fuel pump. Drain the remaining fuel from the fuel pump into a suitable container, immediately wipe away any spilled fuel, and replace with a new rubber seal.
- When removing/installing the fuel pump rubber seal ring, ensure there is no dust around the seal and the tank mounting surface, and prevent dust from entering the fuel system.
- Position the fuel pump outlet (interface) towards the right side of the fuel tank when installing

Torque:

Fuel pump and fuel tank

3.0 N·m(0.3 kgf·m, 2.0 lbf·ft)





※ Fuel pump unit assembly

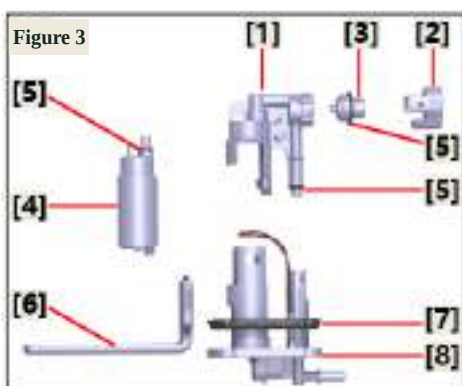
1. Disassembly

Fuel pump unit strainer (Figure 1)

- Disassemble the clips [1], [2] on the left and right sides of the fuel pump bracket;
- Fuel pump core and bracket [3];
- Strainer [4].

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 pump assembly (Figure 2)

- Fuel pump unit bracket [1];
- Regulating valve clip [2];
- Fuel pressure regulator [3];
- Fuel pump core [4];
- O-ring [5];
- Fuel filter (strainer) [6];
- Rubber seal [7];
- Fuel pump base [8];

The installation sequence is reversed from the removal sequence.

Notes

- Correctly lay the black wire [9] and red wire [10] of the harness, aligning the rubber seal with the groove on the fuel pump base.
- Avoid using tools when disassembling to prevent damage to the fuel pump unit.



※ Air filter assembly

1. Disassembly

- Bolt and flanged bushing [1];
- Air filter pipe clamp screw [2];
- Intake air temperature sensor [3];
- Lift up the air filter assembly [4];
- Engine exhaust gas pipe [5];
- Air filter assembly [4].

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

3.0 N·m (0.3 kgf·m, 2.2 lbf·ft)

Air filter and frame

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

2. Inspection

- Check if the air filter tank mounting bolts are loose

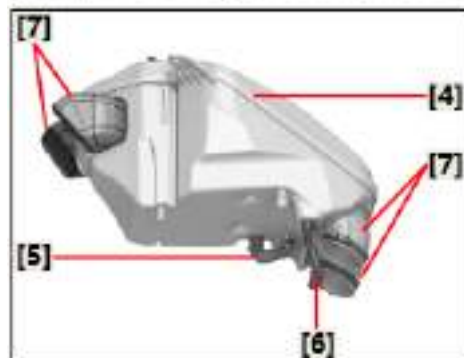
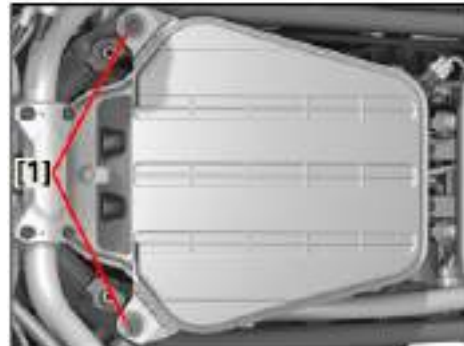
Loose → Tighten.

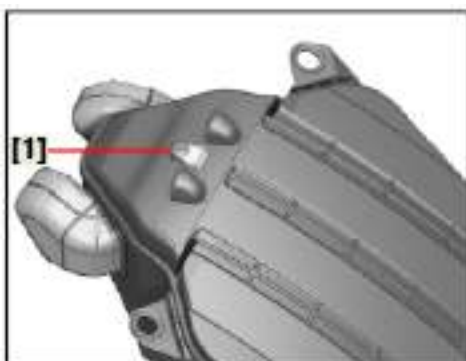
- Check whether the engine exhaust pipe [5], air filter tank drain pipe [6], and air filter intake/exhaust pipe [7] are in good condition; Cracked/broken → Replace.

- Clean the accumulated water in the drain pipe [7].

- Inspect whether the installation position of the pipe clamp [2] is correct and if it is loose
Incorrect position → adjustment → correct installation.

The convex point [a] on the intake pipe must be aligned with the bore.





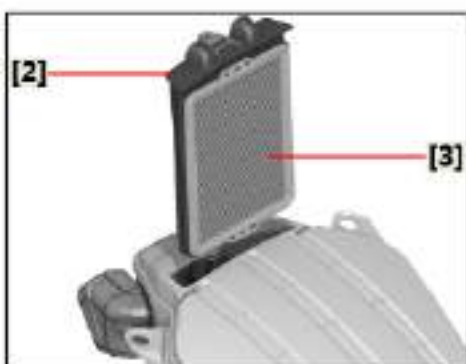
※ **Air filter element replacement and maintenance**

1. Disassembly

- Bolt and pressure plate [1];
- Lift up the air filter element bracket [2];
- Air filter element [3];

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 element bracket and air filter tank
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

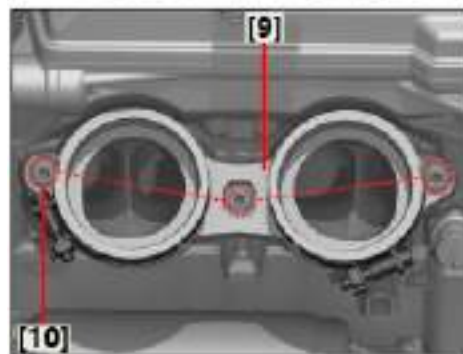
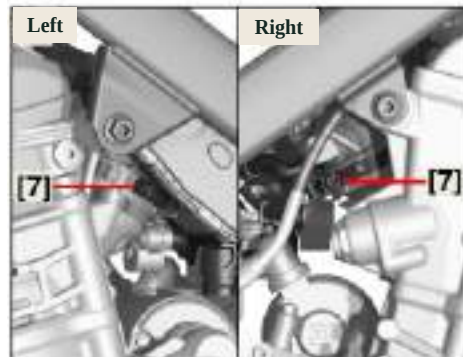
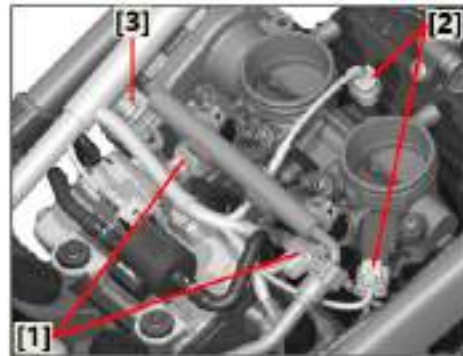
Notes

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];
- Intake pressure sensor harness connector [2];
- Throttle body connector harness plug [3];
- Fuel pipe [4];
- Canister connecting 5 [5];
- Canister connecting 6 [6];
- Pipe clamp screw [7];
- Throttle body assembly [8];
- Bolt [9];
- Intake pipe assembly [10];



Notes

- The throttle valve pipe clamp screw does not need to be fully removed to prevent the nut from falling off.

The installation sequence is reversed from the removal sequence.

Torque:

Throttle valve locking pipe clamp screw

3.0 N·m (0.3 kgf·m, 2.2 lbf·ft)

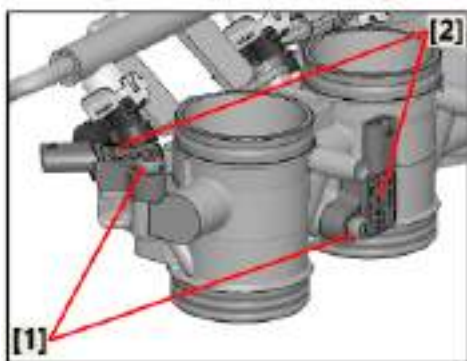
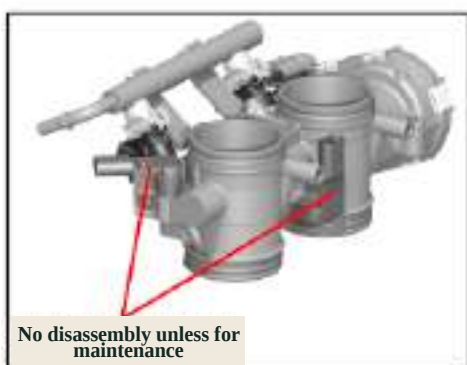
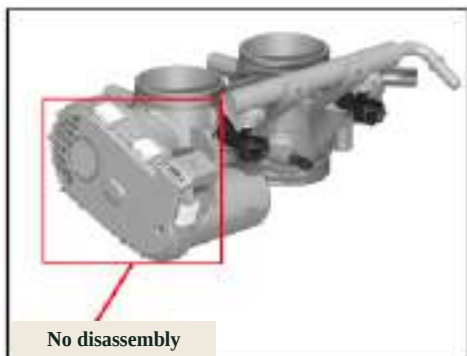
Intake pipe assembly and engine

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

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.



※ Electronic throttle body

⚠ Warning

- The electronic throttle body is a safety-critical component and must be handled with extreme care during operation. The throttle body must not be deformed or damaged during installation or disassembly. Any dropped parts must be scrapped, as damage to these parts may lead to invalidation even after a short period of use.
- 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 installation position requirements

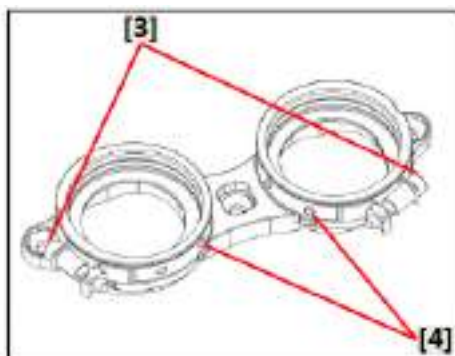
- The electronic throttle body should be kept clean to avoid contamination.
- Tilt the throttle body air passage to ensure that no liquid accumulates in the area between the air passage and the throttle plate.
- Prevent condensation from entering the throttle shaft bore from anywhere in the vehicle's system (e.g., from the intake side, such as the crankcase exhaust system...).

Intake pressure sensor

1. Disassembly
 - Screw [1]
 - Intake pressure sensor [2];

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

-Electronic throttle 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.

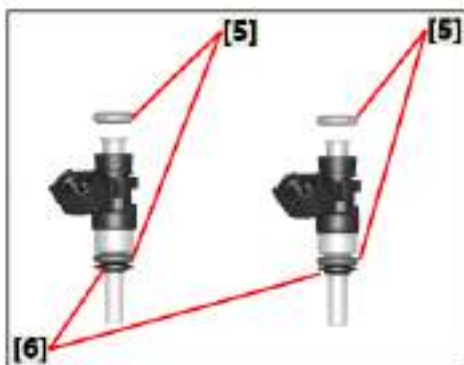
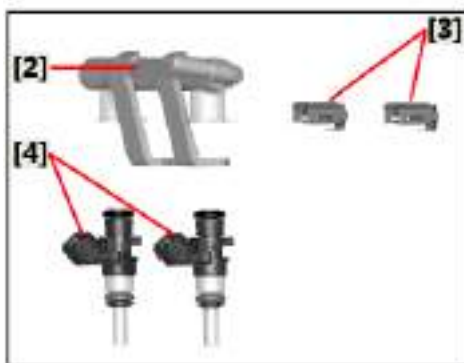
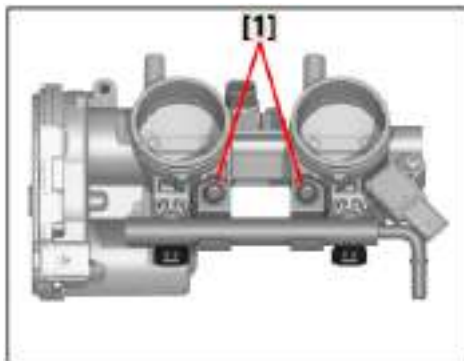
Note

- Install the clamp on the intake pipe with the screw head [3] facing outward, and align the groove [4] with the lug.

Torque:

Intake pressure sensor mounting screw

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)



※ Fuel rail assembly

⚠ 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

- Bolt and gasket [1];
- Fuel rail [2];
- Fuel injector clamp [3];
- Fuel injector [4];
- Fuel injector O-ring [5];
- Fuel injector washer [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 335 for details.

4. Installation

The installation sequence is reversed from the removal sequence.

Torque:

Fuel rail mounting bolt

8.0 N·m (0.8 kgf·m, 6.0 lbf.ft)

Notes

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

※ **Fuel evaporation system**

1. Disassembly

- Side tilt sensor harness connector [1];
- Canister solenoid valve harness connector [2];
- Main cable and harness clamp [3];
- Bolt and flanged bushing [4];
- Bolt [5];
- Side tilt sensor [6];
- Bolt [7];
- Side tilt sensor mounting bracket [8];
- Canister connecting 2 [9];
- Tilt valve [10];
- Canister connecting 3 [11];
- T-type adapter [12];
- Canister solenoid valve [13];
- Carbon canister box [14];

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:

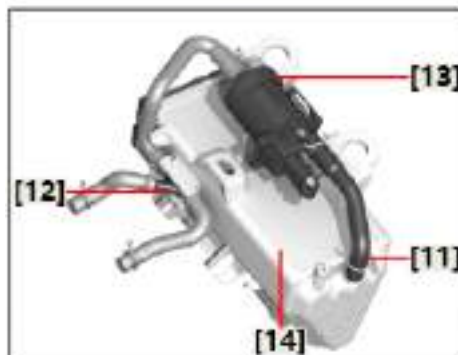
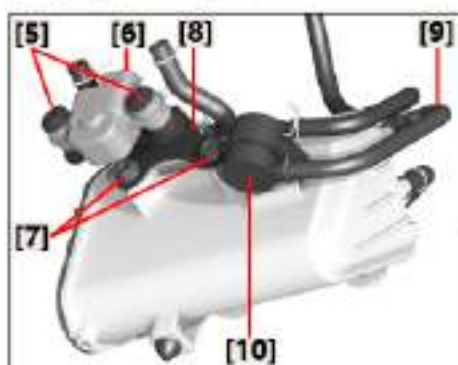
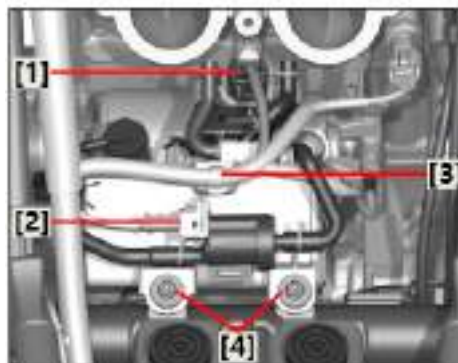
Side tilt sensor and side tilt sensor bracket [5]

Side tilt sensor bracket and carbon canister [7]

4.0 N·m (0.4 kgf·m, 3.0 lbf·ft)

Carbon canister and frame [4]

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



Cooling System

Section 1 Maintenance Instructions	142
Section 2 Position Of Components	143
Section 3 Troubleshooting	144
Section 4 Flow Chart Of Cooling System.....	145
Section 5 Cooling System Test	146
Section 6 Coolant Replacement/Exhausting	147
Section 7 Water Reservoir.....	148
Section 8 Engine Inlet And Outlet Pipes.....	148
Section 9 Radiator And Fan	149
Section 10 Thermostat	150
Section 11 Cooling Pump	152

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

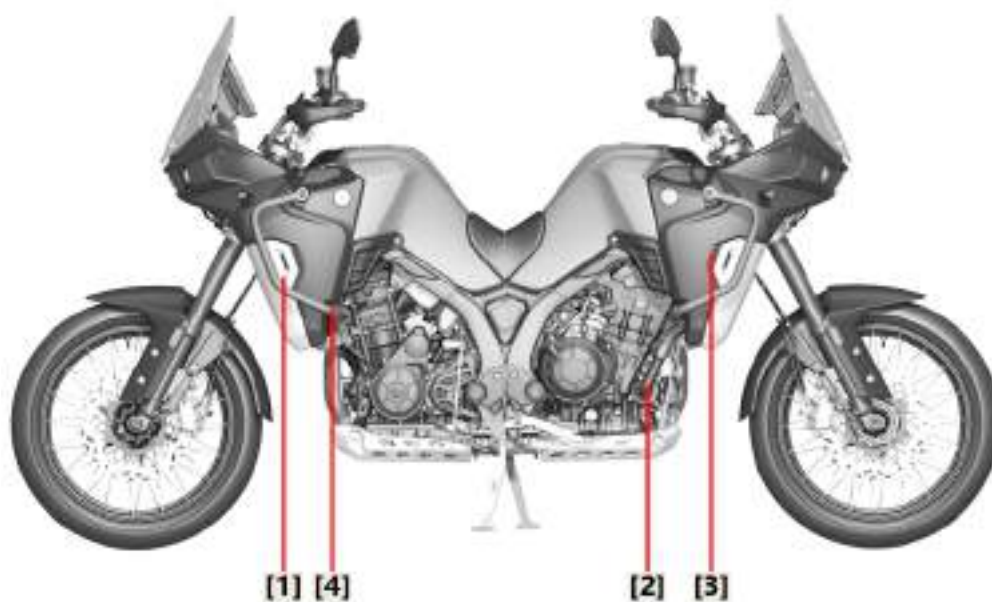
Using coolant with added silicate corrosion inhibitor can cause premature wear of water pump seal rings or blockage of radiator passages. Using tap water will cause engine damage.

- 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)	1.6 Litre
	Water reservoir (up to upper limit level marks)	0.18 Litre
Radiator cap relief pressure		130-155kPa(1.3bar)
Thermostat	Initial opening temperature	75°C
	Full opening temperature	87°C
	Fully open valve lift	≥8mm
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

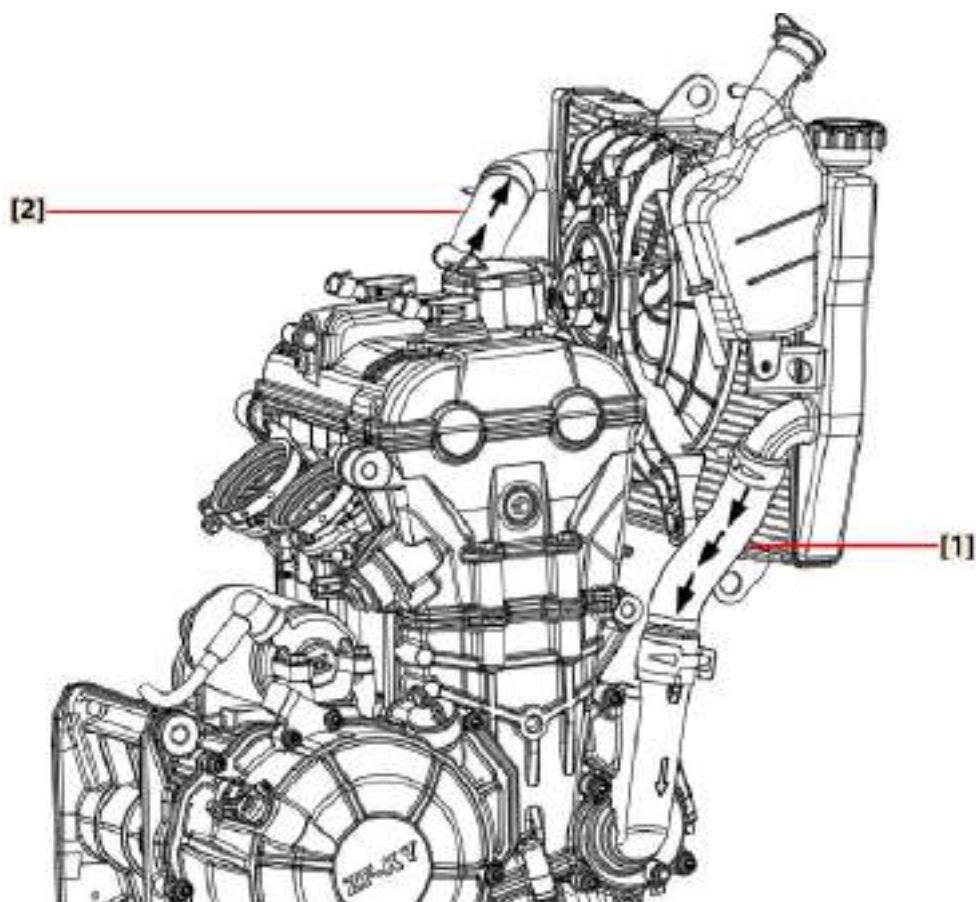
Engine temperature too low

- 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].

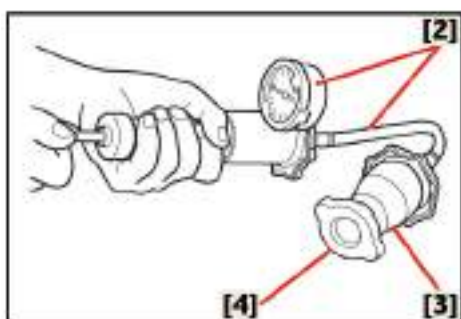
Install the radiator cap tester [2] and radiator cap tester adapter [3] to the radiator cap [4].

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)

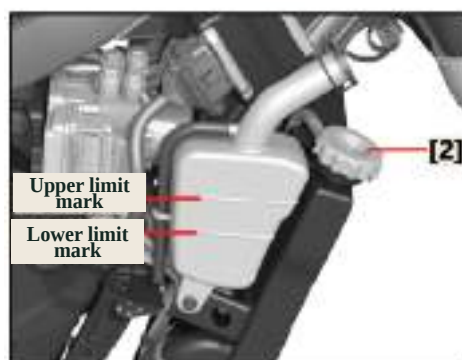
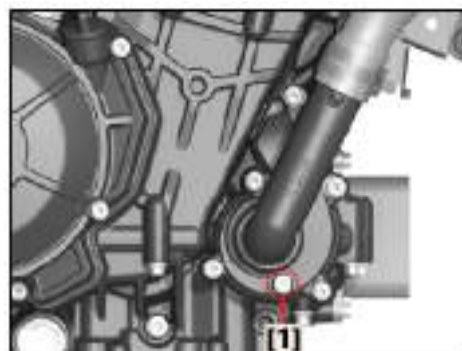
1.6 Litre

Coolant reservoir (up to the upper limit level mark)

0.18 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.



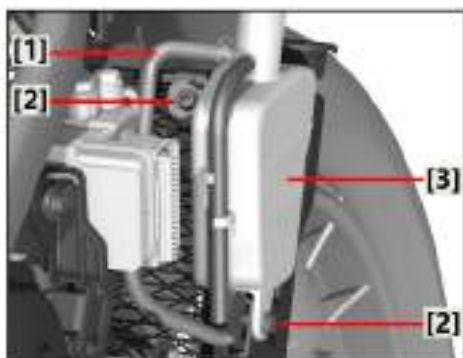
Warning

- 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:

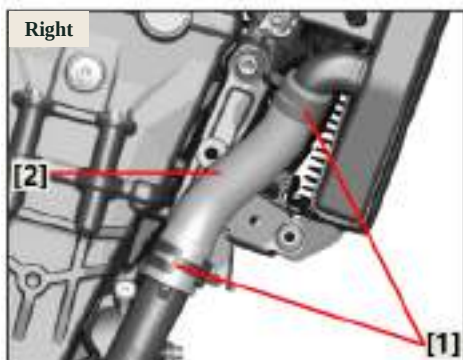
- Water reservoir return hose [1];
- Bolt [2];
- Water reservoir [3];

The installation sequence is reversed from the removal sequence.

Torque:

Water reservoir and radiator

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



Right

※ Engine water outlet and inlet pipes

Disassembly/installation
Disassemble the following parts:

Note

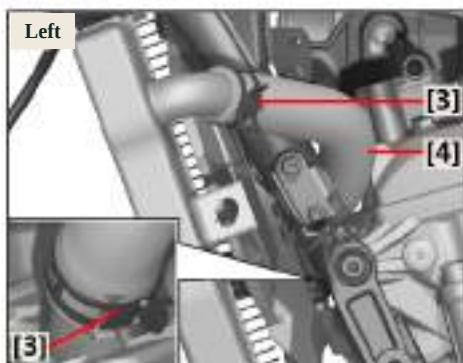
- Use special water pipe clamps and similar tools for disassembly and assembly.

Engine inlet pipe

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

Engine outlet pipe

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



Left

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.

※ 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 147-148 for details) .

- Water reservoir [1];
- See page 148 for details.
- Bolt and flanged 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 12V, the motor runs at full speed, and the ammeter current does not exceed 4A. 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.

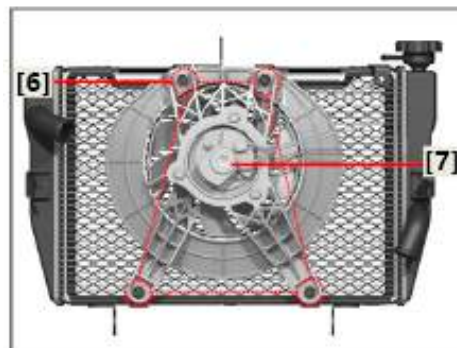
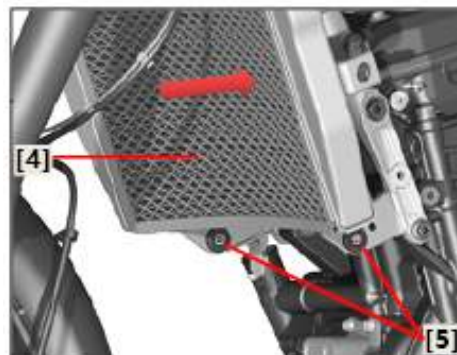
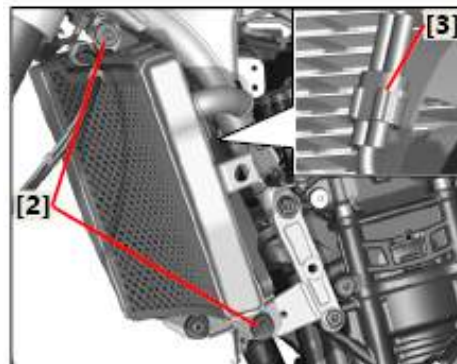
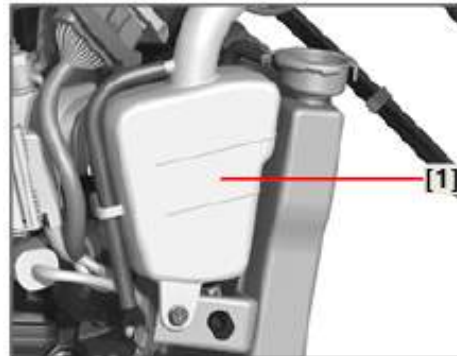
Torque:

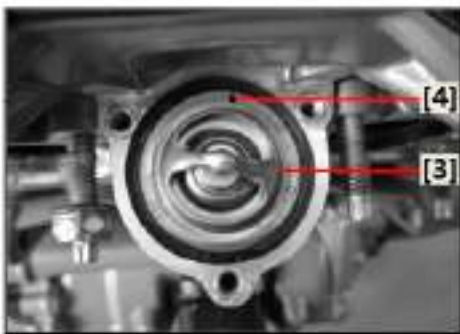
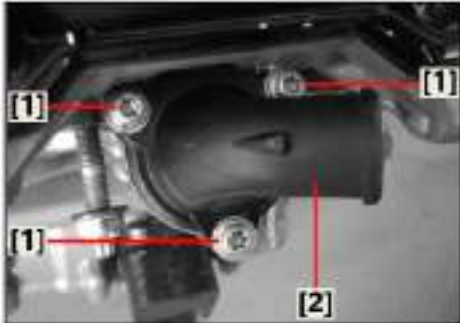
Radiator fan and radiator mounting bolts

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Connecting bolts between radiator and frame

10 N·m (1.0 kgf·m, 7.4 lbf.ft)





※ Thermostat

Disassembly/installation

Disassemble the following parts:

Note

•Before disassembling, drain the coolant and then remove the radiator (see page 149 for details) .

- Bolt [1];
- Thermostat valve cover [2];
- Thermostat [3].

The installation sequence is reversed from the removal sequence.

Notes

- When installing the thermostat, ensure the thermostat seal ring is properly installed and secured into the circular groove of the middle cylinder's water channel.
- The thermostat small circulation bore [4] must be placed upward, i.e., facing the intake direction.
- The thermostat cover mounting bolts require thread locker application.

Torque:

Thermostat cover mounting bolt

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

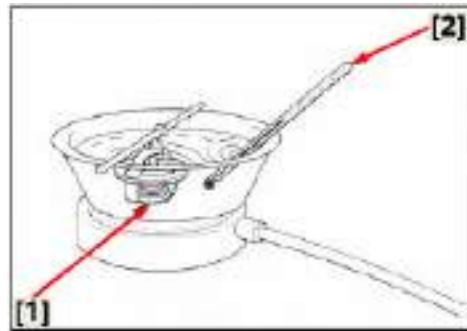
Inspection

- Check whether the exterior of the thermostat [5] is damaged.
- If the thermostat valve is in an open state at room temperature, replace it.
- Check whether the seal ring [6] 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 [1] 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 [2] to touch the chassis, or you will get an incorrect reading.

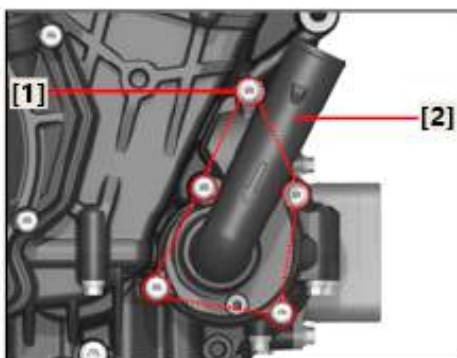


Thermostat opening start temperature: $75 \pm 2^{\circ}\text{C}$

Fully open temperature: $87 \pm 2^{\circ}\text{C}$

Valve lift: $\geq 8 \text{ mm}$

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



※ Cooling pump

Disassembly/installation
Disassemble the following parts:

Note

•Before disassembling, drain the coolant and then remove the engine inlet pipe (see pages 147-148 for details) .

- Bolt [1];
- Cooling pump cover [2];
- Dowel pin [3];
- Water pump impeller fastening bolt [4];
- water pump impeller assembly [5] and flat gasket [6];
- Water pump cover gasket [7];

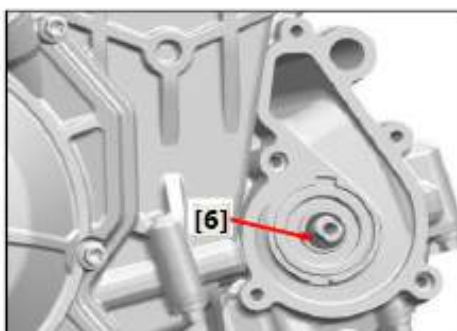
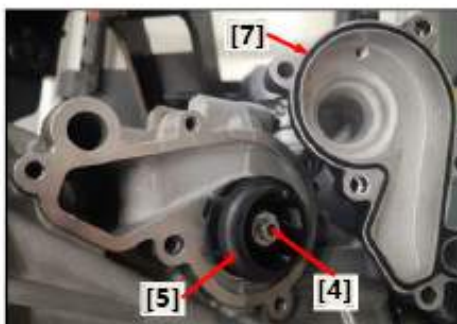
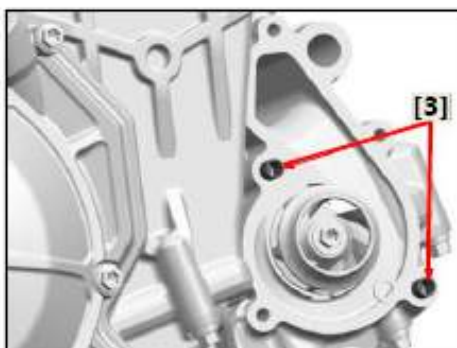
The installation sequence is reversed from the removal sequence.

Torque:

Cooling pump cover mounting bolt
Water pump impeller fastening bolt
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Inspection

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



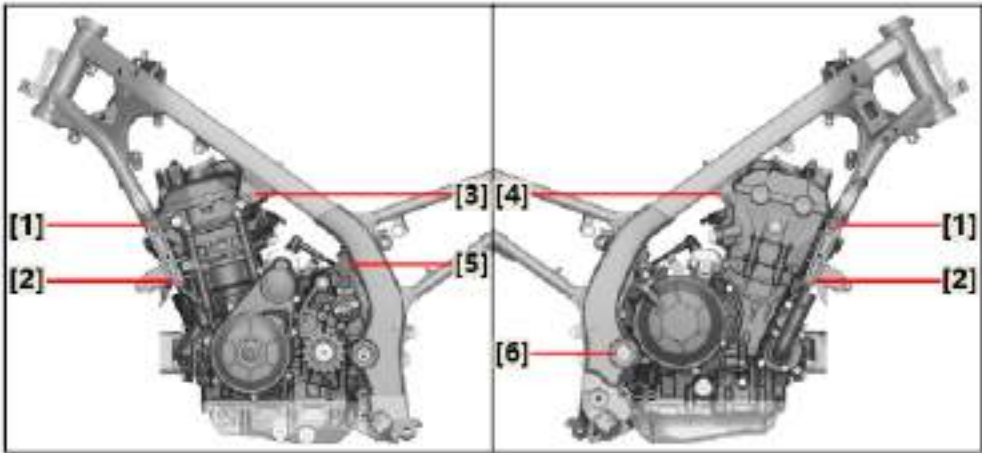
Engine

Section 1 Maintenance Instructions	154
Section 2 Position Of Components	155
Section 3 Engine Main Parameters	156
Section 4 Maintenance Parameter Table	157
Section 5 Auxiliary Materials For Engine Operation And Installation.....	161
Section 6 Engine Bolt Torque Value	162
Section 7 Bolt Tightening Methods For Key Parts	164
Section 8 Common Engine Faults.....	171
Section 9 Engine Inspection.....	174
Section 10 Removing And Installing Of Engine 1.....	176
Section 11 Removing And Installing Of Engine 2.....	178
Section 12 Removing And Installing Of Engine 3.....	179
Section 13 Valve Train System	180
Section 14 Crank Connecting Rod Mechanism	199
Section 15 Case Section.....	213
Section 16 Clutch Operating Mechanism	221
Section 17 Drive And Shifting Mechanism	233
Section 18 Cooling And Lubrication Mechanism.....	244
Section 19 Starting System	253

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. 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 front suspension (upper)	2	M10	54
2	Engine front suspension (lower)	2	M10	54
3	Engine upper suspension (left)	1	M10	54
4	Engine upper suspension (right)	1	M10	54
5	Engine rear suspension	1	M10	54
6	Swingarm shaft locking	1	M16	88

Engine Main Parameters

Item			Type/Specification		
			Z288MW		
Type			Twin-cylinder, four-stroke, water-cooled, DOHC, 8-valve		
Bore × stroke			88mm×65.7mm		
Combustion chamber volume			25.6ml		
Total displacement			799cm3		
Compression ratio			13:1		
Minimum no-load steady speed (Idle speed)			1400rpm±100rpm		
Starting mode			Electric starting		
Power			71 kW/9000 rpm		
Electric system	Ignition mode		ECU-controlled digital ignition		
	Spark plug model/electrode gap		LMAR9AI-10 (NGK) / 0.9 mm–1 mm		
	Magneto type		BN9RSI (Weichai Torch) /0.95mm-1.05mm		
	Combustion chamber type		Permanent magnet three-phase AC generator with outer rotor flywheel type		
Combustion system	Air filter		Dish-type combustion chamber		
	Gasoline		Paper filter element type		
	Valve mechanism		95 octane, GB17930 - 2016		
Valve train system	Lubrication method		DOHC/chain-driven		
Lubrication system	Oil pump type		Forced pressure lubrication + splash lubrication		
	Engine oil filter type		Rotary type		
	Engine oil grade		Full flow paper filter element		
	Cooling method		SN 10W/50 GB 11121-2006		
Cooling System	Coolant types		Closed coolant circulation cooling		
	Clutch type		-40°C Ethylene glycol organic light-load engine antifreeze		
Drivetrain	Shift mode		Wet multi-piece manual clutch		
	Reducer gear		Six-speed constant-mesh stepped transmission		
	Shift mode/sequence		6		
	Primary transmission ratio		Mechanical reciprocating type / 1-N-2-3-4-5-6-5-4-3-2-N-1		
	Transmission gear ratio	Primary transmission ratio		1.923	
		Final transmission ratio		3.000	
		Secondary transmission ratio	1st gear		2.846
			2nd gear		2.000
			3rd gear		1.550
			4th gear		1.273
			5th gear		1.083
6th gear			0.957		
Dimensions			L × W × H: 423mm × 357mm × 516mm		
Net mass			52.0kg		
Output type			Sprocket output		
Engine output rotation direction			Facing the output shaft, rotate counterclockwise		

Maintenance Parameter Table

Cooling System

Item		Specification	Maintenance limit value
Coolant capacity	Radiator (including all water channels)	1.6L	-
	Auxiliary reservoir (above maximum level)	0.18L	-
Radiator cap relief pressure		130kpa~155kpa	-
Thermostat	Opening start temperature	75°C	-
	Fully open temperature	87°C	-
	Valve lift	≥8mm	-

Lubrication System

Item		Standard value	Maintenance limit value
Oil capacity	Oil level (new or disassembled)	3.2L	/
	Clean the oil full-flow filter	2.8L	/
	Clean or replace the oil fine filter	3.0L	/
Recommended oil	Brand	Shell dedicated oil	/
	Model	SN 10W/50 GB 11121-2006	/
	Grade	API quality grade: SN or above (do not use the oil listed at the circular API service label mark as "Energy-efficient"), JASO T903 standard: MA/GB 11121-2006	/
Oil pressure sensor pressure		The upper limit for engine oil alarm pressure is 0.13-0.33 bar.	/
Oil pump rotor	Clearance between inner and outer rotors	0.08-0.15	0.2
	Clearance between the outer rotor and the pump body	0.14-0.23	0.3
	Clearance between the inner and outer rotor and the pump body	0.02-0.09	0.17

Crank Connecting Rod Mechanism

Item			Standard value	Maintenance limit value
Electric starting cylinder pressure			14.5-17.5 bar/360-460 rpm	/
Valve clearance		Intake valve	0.10-0.15	/
		Exhaust valve	0.15-0.20	/
Rockerarm and shaft	Rockerarm bore diameter	7.505-7.518		/
	Rockerarm shaft diameter	7.486-7.495		/
Camshaft	Cam protrusion height	Intake	21.26-21.32	21.16
		Exhaust	21.27-21.33	21.17
	Clearance between journal and bracket		0.02-0.06	/
	Runout		0.04	0.05
Valve Valve guide	Valve rod diameter	Intake	4.976-4.99	4.946
		Exhaust	4.956-4.97	4.926
	Inner diameter of valve guide	Intake/exhaust	5.004-5.016	5.046
	Clearance between valve rod and valve guide	Intake	0.014-0.04	0.08
		Exhaust	0.034-0.06	0.10
	Valve seat width	Intake/exhaust	0.95-1.05	/
Free length of valve spring		Intake/exhaust	43.9	41.9
Installation length of valve spring		Intake/exhaust	35	/
Flatness of cylinder head		0.03		0.05

Specifications of Magneto and Starting Clutch

Item	Standard value	Maintenance limit value
Outer diameter of starting disc gear shaft sleeve	51.69-51.703	51.67
Inner diameter of starting clutch housing	53-53.046	53.066

Specification of Housing and Transmission

Item			Standard value	Maintenance limit value
Transmission mechanism	Gear bore inner diameter	Main 5th gear	28.007-28.02	28.22
		Main 6th gear	28.007-28.02	28.22
		Counter 3rd & 4th gear	30.007-30.02	30.22
		Counter 1st gear	28.007-28.02	28.22
	Outer diameter of bushing			
	Inner diameter of bushing			
	Main/counter shaft journal	Fit with the main 5th gear shaft bearing	23.991-24	23.971
		Fit with the main 6th gear bushing	23.991-24	23.971
		Counter 3rd & 4th gear	25.991-26	25.971
		Counter 1st gear	23.991-24	23.971
Shift fork and shift fork shaft	Shift fork shaft journal		11.77-11.78	11.37
	Shift fork inner diameter		11.8-11.818	11.838
	Thickness of shift fork tip		4.81-4.89	4.51

Specification of Clutch and Shift Mechanism

Item		Specification	Maintenance limit value
Free stroke of clutch handle		3.0-6.0	/
Clutch	Free length of spring	47.2	45
	Thickness of friction plate	2.95-3.05	2.8
	Flatness of driven plate	/	0.1
Clutch bushing	Inner diameter	/	
	Outer diameter	/	
Clutch bushing main shaft outer diameter		/	

Specifications of Crankshaft, Piston and Cylinder Block

Item			Standard value	Maintenance limit value
Crankshaft	Connecting rod big end side clearance		0.15-0.3	0.35
	Crankshaft side clearance		0.15-0.35	0.37
Cylinder block	Cylinder diameter		87.995-88.011	88.061
Piston, piston pin, piston ring	Diameter of piston base circle		87.951-87.969	87.900
	Pin hole diameter		20.004-20.01	20.02
	Piston pin diameter		19.992-20	19.982
	Closed clearance of piston ring	First ring	0.20-0.35	0.55
		Second ring	0.2-0.4	0.6
		Wiper ring	0.25-0.50	0.8
	Clearance between piston ring and ring groove	Clearance between the first ring and the groove	0.015-0.06	0.10
		Clearance between the second ring and groove	0.020-0.06	0.08
Cylinder clearance			0.026-0.06	0.1
Inner diameter of connecting rod small end			20.007-20.013	20.035
Fit clearance betwee connecting rod and pin			0.007-0.021	0.041

Auxiliary materials for engine operation and installation

Material	Specification and brand	Application position	Notes
Grease	Lithium-based grease No.2 GB/T5671 - 2014	Lip of oil seal, O-ring seal, sealing surface of other rubber sealing materials, sealed bearing	
Plane sealant	Loctite 5910	Joint surfaces of the case, the left and right crankcase covers, the water pump cover, and the semi-circular corners of the top cover gasket.	
Engine oil	SN 10W/50 SN grade or above	Rotating parts and sliding areas inside the cylinder Rotating and sliding areas inside the crankcase Rotating and sliding areas inside the cylinder head	New engine oil adding volume: 3.2L
Lubricating oil/ engine oil	SN 10W/50 GB 11121-2006	Piston outer surface, piston pin bore, piston pin surface, entire piston ring surface, valve rod, valve oil seal, camshaft assembly, cylinder bore inner surface, idler mandrel, gear shaft, shift fork shaft working surface, connecting rod piston pin hole, each bearing rotation areas.	
Thread locker	Loctite 243	Some of threads	
Degreaser		All joint surfaces	
Coolant	-40°C Ethylene glycol organic light-load engine antifreeze	Cooling system, water seal installation	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
5mm bolt and nut	5.2	5mm Screw	4.2
6mm bolt and nut	10	6mm Screw	9.0
8mm bolt and nut	22	6mm Flange Bolt and Nut	10
10mm bolt and nut	34	8mm Flange Bolt and Nut	27
12mm bolt and nut	54	10mm Flange Bolt and Nut	39

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

Engine Torque Value

S/N	Item	Thread outer diameter	Torque value N·m	Whether the threads are sealed
1	Star wheel bolt	M6	10±2	Yes
2	Combination bolt for limit plate	M6	10±2	Yes
3	Shift shaft baffle	M6	10±2	Yes
4	Magneto bolt combination	M12	90±5	No
5	Spark plug	M10	12±2	No
6	Cylinder head fastening bolt	M10	See the following instructions	
7	Valve rockerarm shaft plug	M10	10±2	No
8	Tensioner plug	M10	10±2	No
9	Tensioner base assembly	M24	25±2	No
10	Oil drain bolt	M20	20±2	No
11	Upper and lower case assembly bolt	M8	25±2	No
12	Upper and lower case assembly bolt	M6	12±1.2	No
13	Top dead center bolt	M8	20±2	No
14	Oil pump idler mounting bolt	M8	15±2	Yes
15	Counter shaft sprocket fasteningspecial-shaped nut	M20	100±5	Yes

S/N	Item	Thread outer diameter	Torque value N·m	Whether the threads are sealed
16	Clutch fastening hex nut	M20	90±5	Yes
17	Thermostat cover bolt	M5	6±1	Yes
18	Water pump impeller bolt	M6	10±2	Yes
19	Vent pipe connector bolt	M6	8±1.5	Yes
20	Oil-gas separation cover bolt	M6	12±1.2	Yes
21	Connecting rod bolt	M8	See the following instructions	
22	Magneto rotor bolt	M6	10±2	Yes
23	Tensioner bolt	M8	15±2	Yes
24	Transmission drum bearing baffle screw	M5	6±1	Yes
25	Oil separator screw	M5	3±0.3	Yes
26	Main shaft fixed bearing seat	M6	10±2	Yes
27	Intake seat screw	M6	10±2	Yes
28	Oil pressure sensor component	M10	10±2	No
29	Water temperature sensor component	M10	10±2	No
30	Gear sensor bolt	M5	6±1	No
31	Camshaft cover combination bolt	M6	See the following instructions	Yes
32	Magneto trigger bolt	M5	6±1	Yes
33	Engine oil fine filter cover bolt	M5	6±1	No
34	Chain pressure plate bolt	M6	10±2	Yes
35	One-way clutch assembly bolt	M6	10±2	Yes
36	Balance weight shaft limit screw	M5	6±1	Yes
37	Rockerarm positioning screw	M5	6±1	Yes
38	Adjusting bore cap	M24	11±1	No
39	Main shaft oil passage plug	M8	10±2	Yes
40	Fuel injector	M5	2±0.2	Yes
41	Exhaust through stud	M8	15±2	Yes
42	Remaining M6 bolts	M6	10±2	No

Bolt Tightening Methods for Key Parts

1.Connecting rod bolt

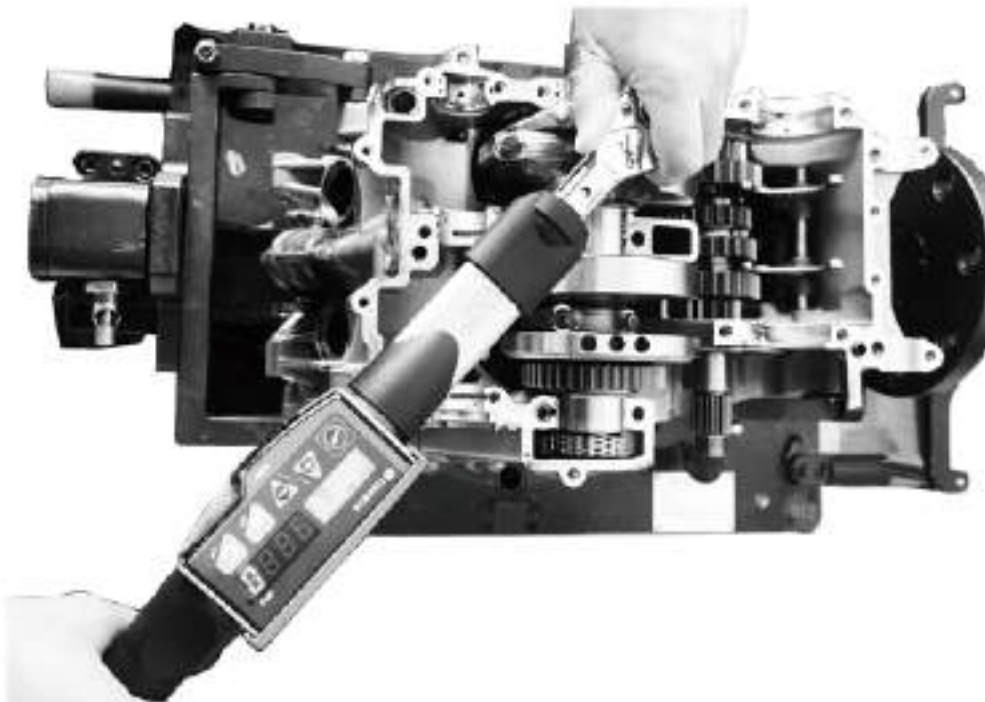
Lubricate the inner surface of the bearing liner with engine oil, ensuring there is no engine oil or grease on the connecting rod joint surface. Install the other part of the connecting rod onto the connecting rod body. First, coat the thread portion and supporting surface of the M8 connecting rod bolt with engine oil, then fasten it in sequence using a special tool for connecting rod bolts. The first stage is 5 N·m; the second stage is 15 N·m; and the third stage is 90°.

Notes

- The numerical markings on the sides of the connecting rod must be identical and clearly visible.
- After disassembling the connecting rod, new bolts need to be replaced.
- Do not twist the connecting rod during fastening.

Special tools

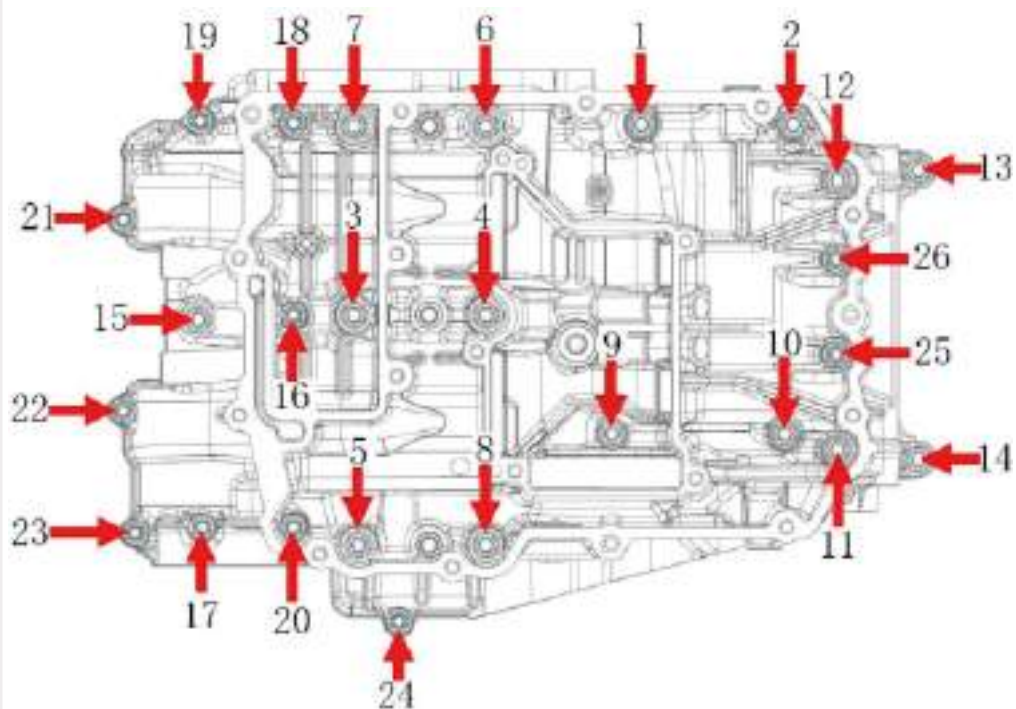
Multi-tooth socket, electronic angle torque wrench.



2.Crankcase bolt

The tightening steps are as follows (apply sealant to the joint surface, coat the supporting surfaces of all M8 bolts with a proper amount of engine oil, replace bolts 1–15 with new ones after disassembly, and replace new washers for bolts 3–8) :

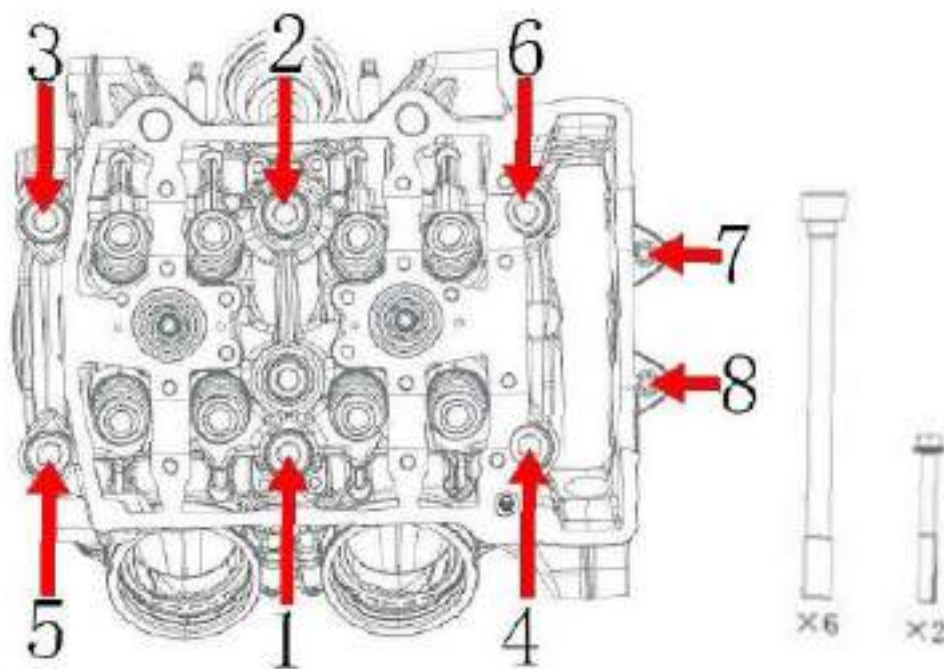
1. Tighten in the order of marks 1–15 as shown in the figure below; the bolt tightening torque is 25N.m;
2. Tighten in the order of marks 16–26 as shown in the figure below; the bolt tightening torque is N.m;



3. Cylinder head bolt

The bolt tightening sequence is as follows:

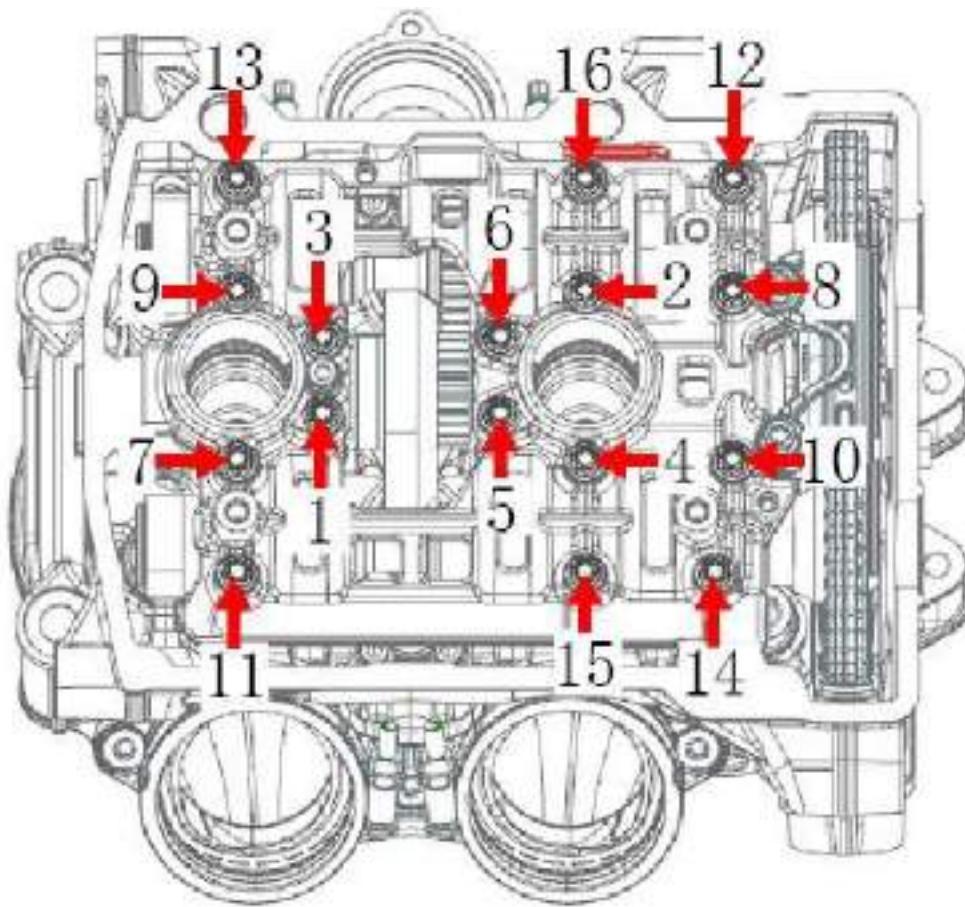
1. Apply engine oil to the threads and supporting surfaces of bolts 1–6, as well as both ends of the washers; after removing the cylinder head bolts and washers, new bolts and washers must be replaced.
2. Pre-tighten bolts 1–6 in the order shown in the figure below: Stage 1: 5N·m; Stage 2: 15N·m; Stage 3: 90°; Stage 4: 90°; and record the bolt torque values.
3. Tighten bolts 7–8 to 10N·m in the order shown in the figure below.

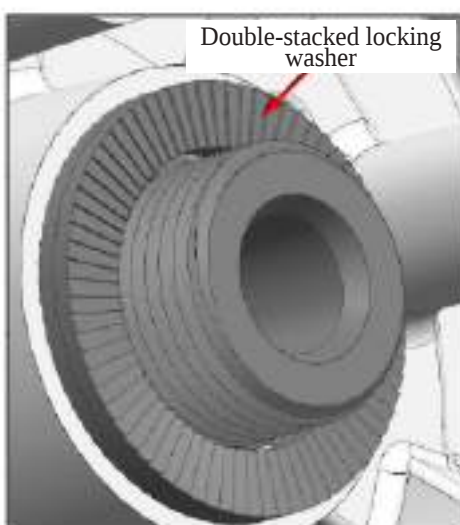
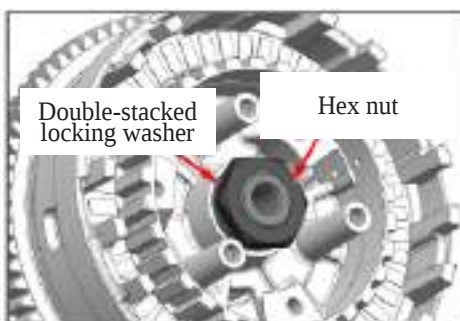


4. Camshaft gland bolt

The bolt tightening sequence is as follows:

1. Apply thread locker to the threads of all camshaft cover combination bolts.
2. Tighten bolts 1–16 to 12N·m in the order shown in the figure below.





5. Clutch nut / Magneto bolt / One-way bolt

Clutch nut fastening methods:

1. After installing the clutch center bushing, mount two sets of clutch plates.
2. Install the double-stacked locking washer as shown in the right 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 (anti-rotation wrench) into the clutch center bushing to fix the clutch center assembly. Note that the tool must be placed flat; otherwise, the clutch center bushing will be damaged;
4. Use a torque wrench with the special tool and tighten clockwise to the specified torque.

Notes

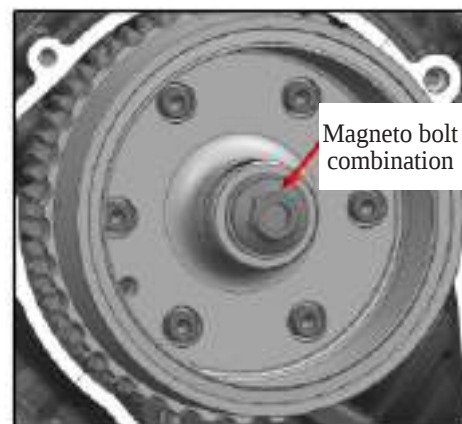
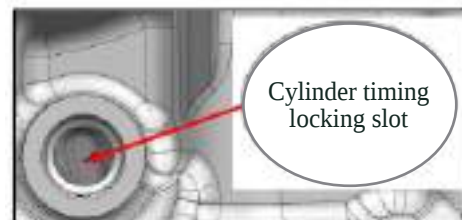
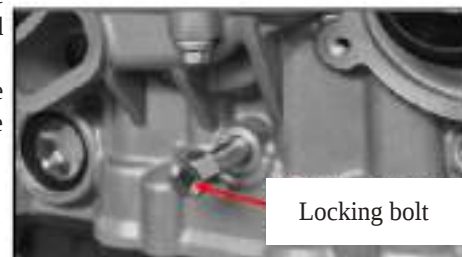
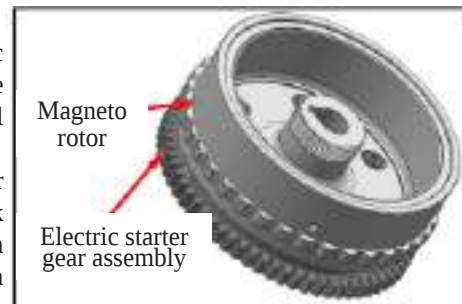
- Coat thread locker to the threads of the clutch fastening nut.
- Hex nut tightening torque: 90 N·m.

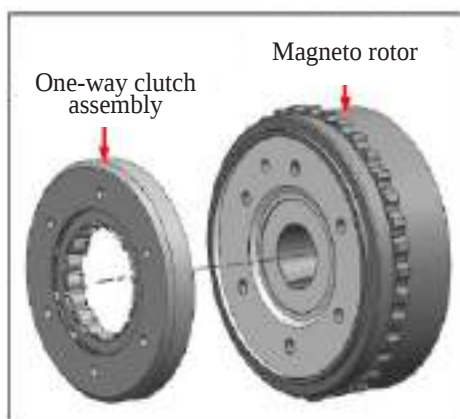
Magneto bolt fastening method:

1. Apply engine oil to the inner bore of the electric starter gear assembly for lubrication, then rotate the electric starter gear counterclockwise to install it on the magneto rotor;
2. Rotate the crankshaft to the TDC of cylinder 1, then use a special tool (locking bolt) to lock the crankshaft through the timing inspection positioning bore to prevent the crankshaft from rotating when tightening the magneto bolts.
3. Assemble the magneto rotor and the electric starter gear assembly onto the crankshaft and install them in place;
4. Lubricate the magneto bolt threads with engine oil and fasten the bolts to the specified torque using a torque wrench.

Bolt torque value:

90 N·m (9.0 kgf·m, 66.3 lbf·ft)



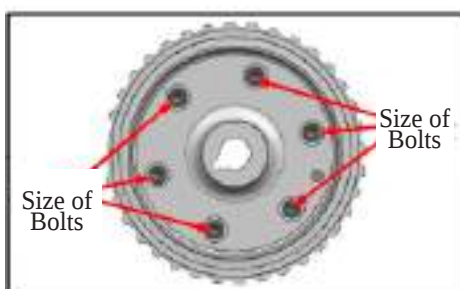


One-way clutch bolt fastening methods:

Apply clean engine oil to the contact surface of the one-way clutch assembly.

1. Install the one-way assembly onto the magneto rotor.

2. Secure the magneto rotor using the rotor fixing tooling, coat the threadlocker to the threads of the one-way clutch fastening bolt, and then fasten it sequentially to 10 N·m.

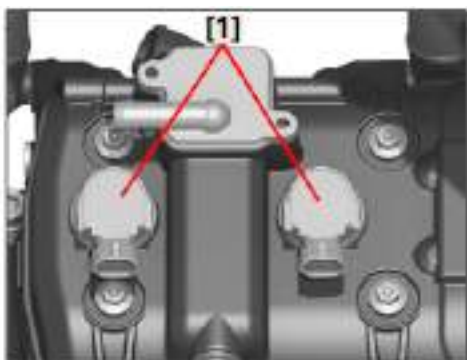


Common Engine Faults

Fault phenomenon	Fault cause	Treatment measures
The engine cannot start or has difficulty starting	The cylinder pressure is too low. 1.Cylinder, piston and piston ring got wear 2.Leaky or damaged cylinder head gasket 3.Worn valve guide or improperly fitted valve seat 4.Loose spark plug 5.Starting motor rotating too slowly 6.Improper valve timing Improper valve clearance adjustment	Replace Replace Replace Repair or replace Tighten Check the electrical part Adjustment Adjustment
	No ignition or weak ignition on spark plug 1.Incorrect spark plug gap 2.The spark plug is wet or dirty 3.Faulty ignition coil 4.Trigger circuit open or short Magneto failure	Adjust or replace Clean, dry or replace Replace Replace Replace
	The throttle valve body lacks fuel 1.The fuel tank vent hole is blocked 2.Fuel injector blockage or malfunction 3.High-pressure fuel pump out of work 4.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	1.Improper valve clearance adjustment 2.Poor sealing or damage of valve seat retainer 3.Defective valve guide 4.Worn rockerarm or rockerarm shaft 5.Dirty spark plug 6.Incorrect spark plug gap 7.Ignition coil fault 8.Idle valve inlet and exhaust pipe blockage Magneto failure	Adjustment Replace or repair Replace Replace Replace Replace or repair Replace Replace or repair Replace

Fault phenomenon	Fault cause	Treatment measures
The engine exhaust emits blue or black smoke	1.Excessive lubricating oil 2.Piston ring wear 3.Valve guide wear 4.Cylinder wall wear or scratches 5.Valve rod wear Valve rod seal damaged	Check the oil level and drain the excessive oil Replace Replace Replace Replace Replace
Unstable engine operation at medium and high speeds	1.The engine lacks power 2.Camshaft wear 3.Dirty spark plug 4.The spark plug gap is too small 5.Incorrect valve timing 6.Ignition coil fault 7.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
The engine lacks power	1.Valve clearance too small 2.The engine lacks power 3.Incorrect valve timing 4.Cylinder wear 5.Piston ring wear 6.Improper valve seat 7.Dirty spark plug 8.Improper spark plug gap 9.The fuel injector nozzle is blocked 10.Insufficient oil supply pressure of the high-pressure fuel pump 11.The air filter is too dirty 12.The rockerarm or camshaft is worn 13.Air leakage in the intake pipe Too much lubricating 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 Check the fuel level and change the oil
Engine overheating	1.Excessive carbon deposits on the piston top or inside the combustion chamber 2.Too little or too much lubricating oil 3.Oil pump fault 4.Oil passage blockage 5.Air leakage in the intake pipe 6.Inappropriate lubricating oil Cooling system fault	Clean Check and then add or reduce Replace Clean Fasten or replace Change the oil Repair

Fault phenomenon	Fault cause	Treatment measures
Abnormal noise of engine	Valve abnormal knocking 1.The valve clearance is too large 2.The valve spring is worn or broken The rockerarm or camshaft is worn	Adjustment Replace Replace
	Abnormal knocking in the piston section 1.Piston wear 2.Cylinder wear 3.Combustion chamber in combustion chamber 4.Wear of piston pin or piston pin hole Wear of piston ring or ring groove	Replace Replace Clean Replace Replace
	Abnormal knocking from the timing chain section 1.Chain elongation or damage 2.Sprocket wear or damage Tensioner assembly operation malfunction	Replace the chain and sprocket Replace the chain and sprocket Repair or replace
	Clutch abnormal knocking 1.Wear, excessive fitting clearance, or damage of the clutch gear and main drive gear 2.Aging and damage of the clutch buffer rubber Wear, excessive fitting clearance, or damage of the main drive gear and clutch gear	Replace the clutch gear Replace the clutch gear Replace the main drive gear
	Crankshaft abnormal knocking 1.Bearing liner wear and damage 2.Crank pin bearing liner wear or sintering Excessive fit clearance	Replace the bearing liner or crankshaft Replace the bearing liner or crankshaft Replace bearing liner
	Drive transmission system abnormal knocking 1.Gear wear or gear damage 2.Main shaft or counter shaft wear 3.Bearing wear Bushing wear	 Replace Replace Replace Replace
The clutch slips	1.The clutch driving piece is worn or damaged 2.The clutch driven piece is worn or damaged The spring force of the clutch spring becomes weaker	Replace Replace Replace
No spark or spark too weak	1.Faulty igniter 2.Spark plug ablation 3.The spark plug gap is too small 4.The spark plug gap is too large or too small 5.Magneto fault 6.Insufficient voltage or invalidation of battery 7.Faulty ignition coil 8.Faulty ignition coil 9.The trigger plug gap is too small Other pipeline faults	Replace Replace Adjustment Clean Replace Charge or replace Replace Replace Adjustment Inspection



※ 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.

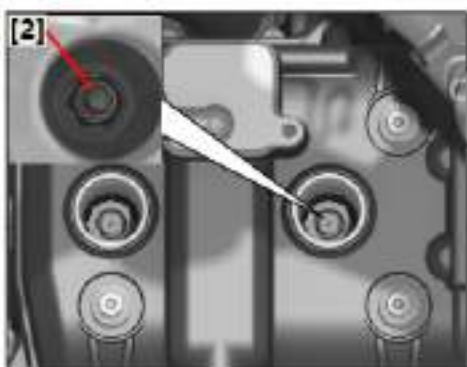
See "Inspection and adjustment of valve clearance" on page 32 for details

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

3.Disassembly

-Ignition coil [1];

-Spark plug [2].



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 [3];

-Cylinder pressure gauge [4].



5.Measurement

-Cylinder pressure

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

Compression pressure value:

14.5 Bar ~ 17.5 Bar at 360~460 rpm

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.

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.

6.Installation

-Spark plug

-Ignition Coil

Torque:

Spark plug installation

12 N·m (1.2 kgf·m, 9.0 lbf·ft)

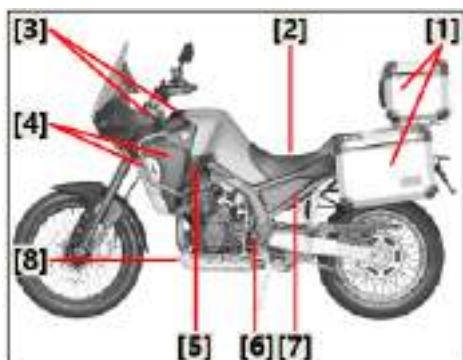
Note

- 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

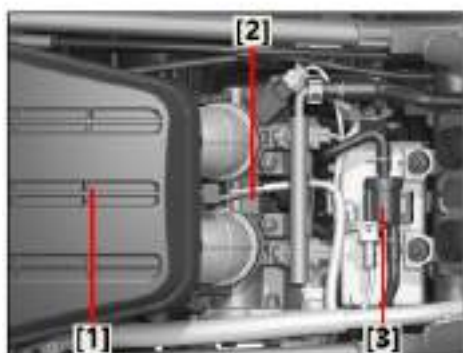
- Triple case assembly [1];
- Seat cushion assembly [2];
- Fuel tank front shield and instrument housing rear section (left and right) [3];
- Bumper (left and right), fuel tank side protector assembly (left and right) [4];
- Disconnect the battery negative terminal;
- Fuel tank lower protector (left and right) [5];
- Swingarm axle trim (left and right) [6];
- Side cover (left and right) [7];
- Engine lower protector [8];

See "Frame, Body Trim, Exhaust System" on page 65 for details.



3. Disassembly

- Fuel tank assembly [1];
- See "Fuel System" on page 123 for details.

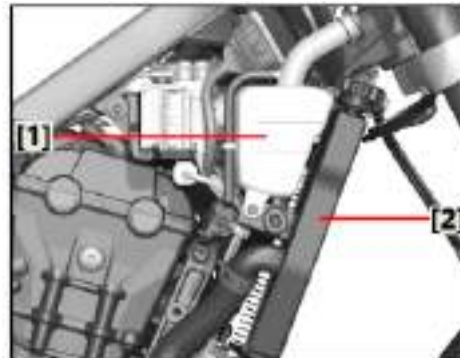


4. Disassembly

- Air filter assembly [1];
 - Throttle body assembly [2];
 - Fuel evaporation system [3];
- See "Fuel System" on page 123 for details.

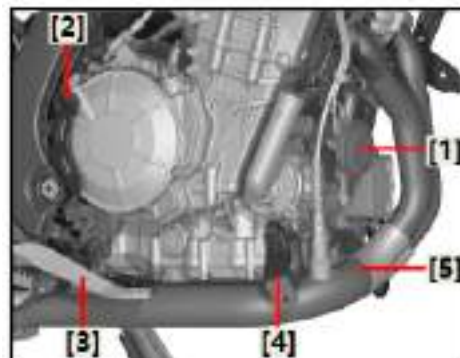
5. Disassembly

- Water reservoir [1];
 - Radiator [2];
- See "Cooling System" on page 141 for details.



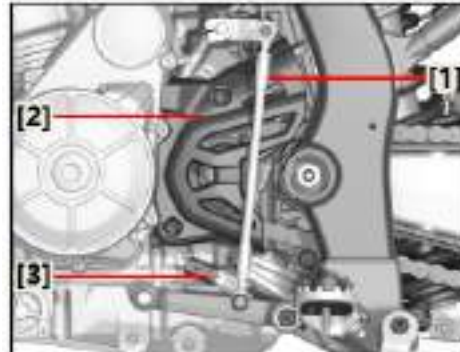
6. Disassembly

- Horn [1];
 - Engine heat shield [2];
 - Brake pedal assembly [3];
 - Engine lower protector bracket [4];
 - Muffler front/rear section assembly [5];
- See "Frame, Body Trim, Exhaust System" on page 65 for details.

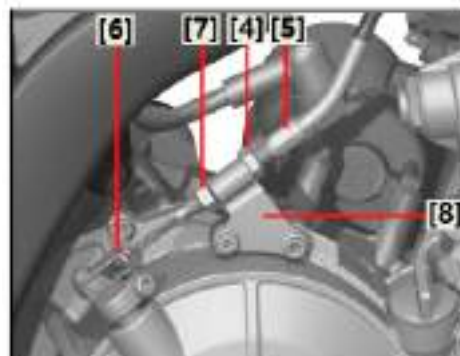


7. Disassembly

- Gear shift assembly [1];
 - Engine front sprocket cover [2];
 - Side stand OFF switch [3];
- See "Frame, Body Trim, Exhaust System" on page 65 for details.

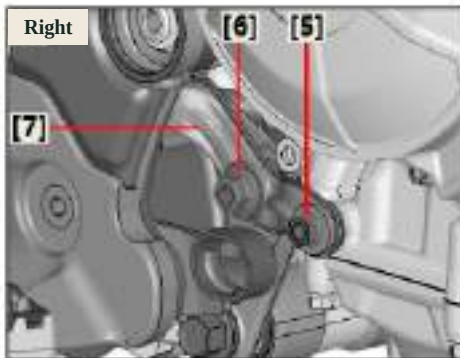
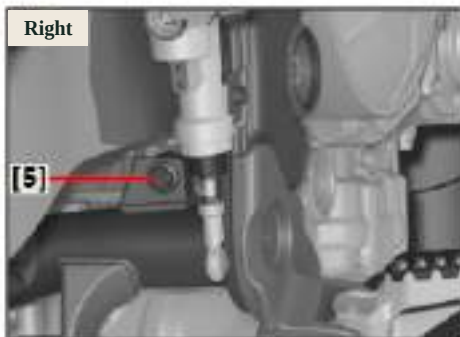
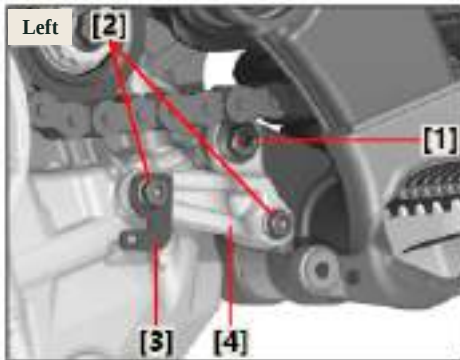


- Loosen the adjusting nut [4] to release the clutch lock [5] from the clutch control arm [6].
- Remove the locking nut [7] and take out the clutch lock [5] from the clutch lever positioning panel [8];



Notes

Check and disconnect all harness connectors and hoses connected to the engine, such as the vehicle ground wire harness, water temperature sensor, etc.



※ Removing and installing of engine 2

Engine lower reinforcement bracket (left and right)

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bolt [2];
- OFF switch bracket [3];
- Engine lower reinforcement bracket-left [4];
- Bolt [5];
- Bolt [6];
- Engine lower reinforcement bracket-right [7];

The installation sequence is reversed from the removal sequence.

Notes

- The mounting bolt of the engine lower reinforcement bracket needs to be coated with (Huitian 7272) thread locker.

Torque:

Engine lower reinforcement bracket - left with frame [2]

OFF switch wire bracket & engine lower reinforcement bracket - left to engine [2]

Engine lower reinforcement bracket - right with engine [5]

Engine lower reinforcement bracket - right with frame [5]

22 N·m (2.2 kgf·m, 16 lbf·ft)

Engine reinforcement bracket - left with engine (M10) [1]

Engine reinforcement bracket - right with engine (M10) [6]

44 N·m (4.4 kgf·m, 32.4 lbf·ft)

※ 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 283 for details

3. Disassembly

- Engine front suspension (lower) mounting bolts [3];

- Engine front suspension (upper) mounting bolts [4];

- Engine upper suspensions (right) mounting bolts [5];

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

- Engine rear suspension [7];

- Swingarm axle [8];

The installation sequence is reversed from the removal sequence.

Torque:

Engine front suspension (upper and lower) and frame [3], [4]

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

Engine rear suspension and frame [7]

54 N·m (5.4 kgf·m, 40 lbf·ft)

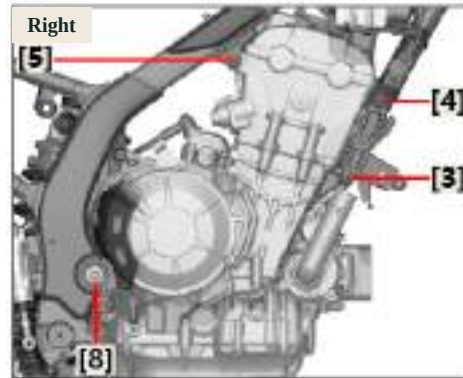
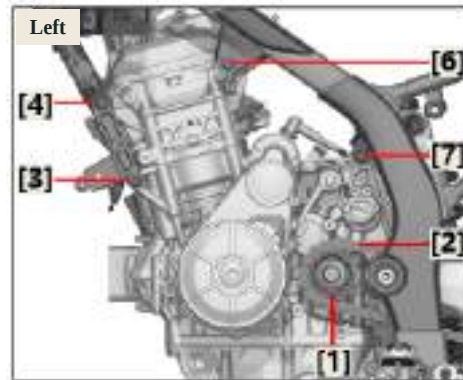
Swingarm axle locking [8]

88 N·m (8.8 kgf·m, 65 lbf·ft)

Driving sprocket locking bolt [1]

100 N·m (10 kgf·m, 74 lbf·ft)

Notes



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

Left and right mounting bolts [3], [4] for the engine front suspension

Left and right mounting bolts [5], [6] for the engine upper suspension

Engine rear suspension [7]

Precautions

• Place the engine on a jack or other adjustable bracket under the frame;

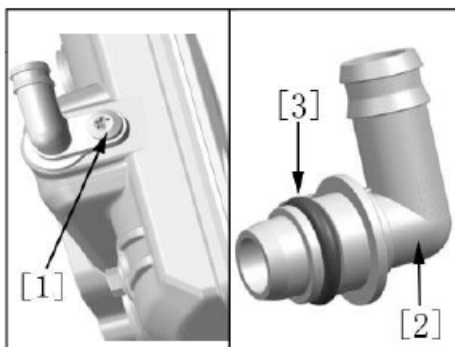
• The height of the jack must be adjusted continuously to reduce the pressure and facilitate the installation of the bolt;

• Carefully align the engine mounting points with the frame to prevent damage to the engine and frame;

• Align the engine upper suspension bolt bore with the mounting bore on the frame, then install the left bushing and bolt first;

• 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.



※ Valve train system

Disassemble the cylinder head cover/camshaft assembly/ignition coil/cylinder head cover

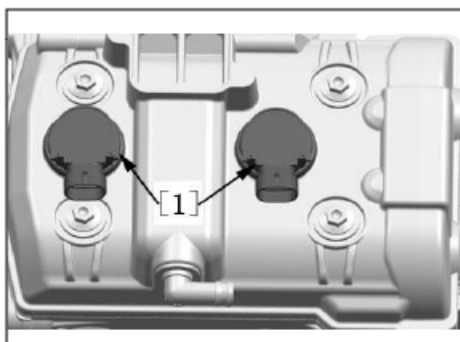
1. Remove the bolt [1], vent pipe connector [2], O-ring [3], and bushing.

The installation sequence is reversed from the removal sequence.

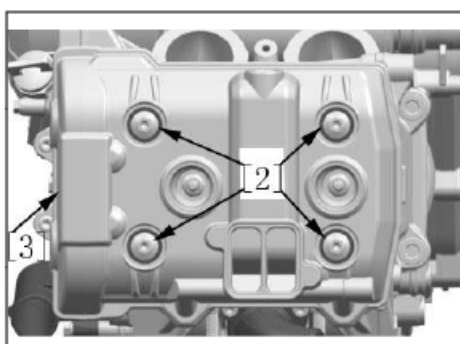
Notes

- Apply thread locker to the bolt threads.
- If the O-ring is damaged, inelastic or deformed, it needs to be replaced with a new O-ring.

Bolt torque value:
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



2. Remove the ignition coil [1].



3. Remove the cylinder head cover bolt [2] and rubber gasket.

Remove the cylinder head cover [3] and the gasket from the cylinder head.

The installation sequence is reversed from the removal sequence.

Cylinder head cover bolt:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Notes

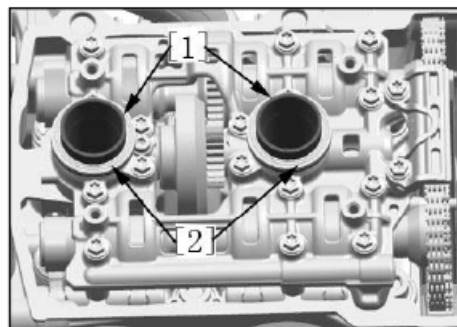
- Clean the cylinder head cover and remove oil during installation.

4. Remove the spark plug shaft sleeve [1] and the washer [2].

Notes

- When reinstalling, it is necessary to replace the spark plug shaft sleeve washer with a new one;
- The spark plug shaft sleeve must not be damaged; replace if necessary.

The installation sequence is reversed from the removal sequence.

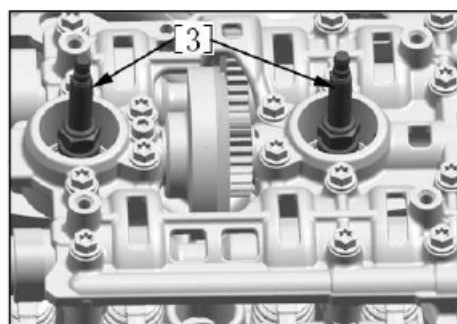


5. Use a special tool (spark plug socket) to remove the spark plug [3].

Notes

- Clean the area around the spark plug base with an air gun before removing the spark plug.
 - Check the spark plug for any malfunction (see "Common engine faults" on page 171 for details).
- If any are found, replace the spark plug with a new one.

The installation sequence is reversed from the removal sequence.



Torque:

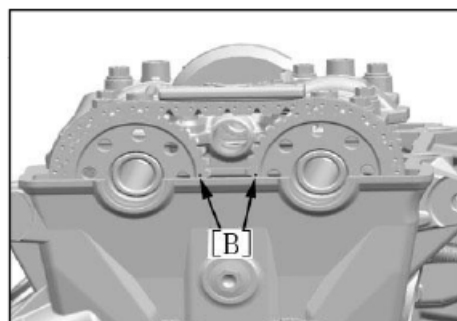
12 N·m (1.2 kgf·m, 9.0 lbf·ft)

Camshaft / rockerarm

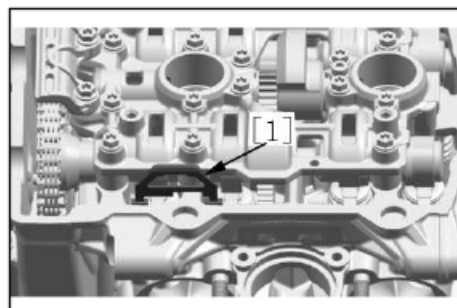
6. Turn the crankshaft counterclockwise and position cylinder 2 at the ignition TDC. Ensure that the timing mark [B] of the cylinder 2 is aligned with the sealing surface.

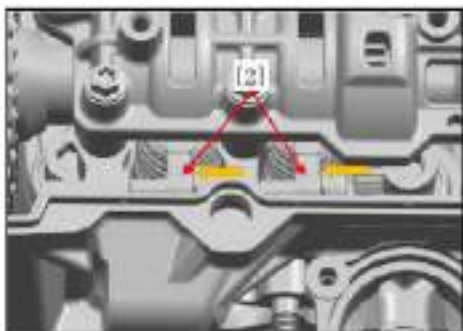
Notes

- The timing mark for the cylinder 2 is a dotted mark.

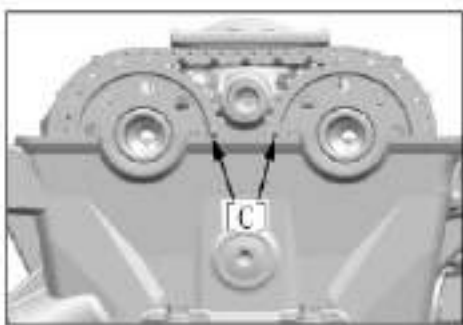


7. Remove the rockerarm stop clip [1].





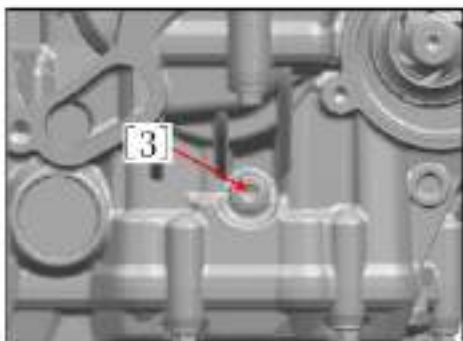
8. Push the cylinder 2 exhaust rockerarm [2] aside.



9. Turn the crankshaft counterclockwise to position cylinder 1 at the ignition TDC. Ensure that the timing mark [C] of cylinder 1 is aligned with the sealing plane.

Notes

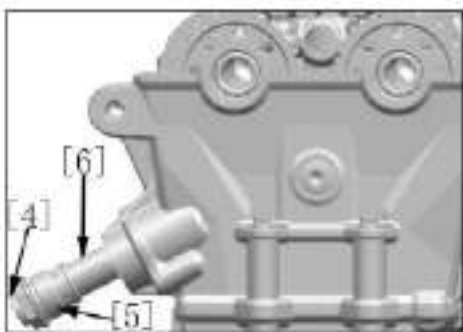
- The timing mark for the cylinder 1 is a line indicator.



10. Remove the bolt [3] and copper washer.

Notes

- Check through the timing inspection bore to see if the crankshaft's positioning mark groove is visible.
- Install special tools (locking bolt) .



11. Remove the screw plug [4] and the O-ring. Remove the tensioner base [5], tensioner rod [6] and O-ring.

Notes

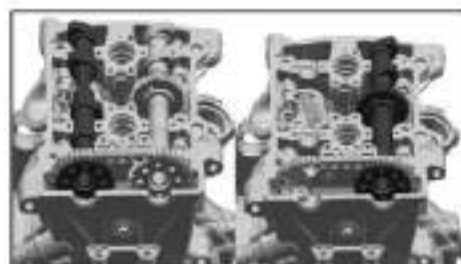
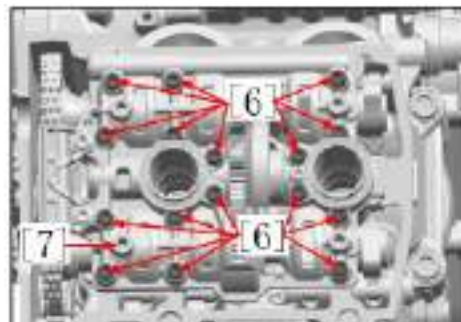
- During installation, the O-ring on the screw plug, the O-ring on the tensioner base, and the O-ring on the lower part of the tensioner base must all be replaced with new O-rings.

12. Remove the camshaft cover assembly fastening bolts [6]. The bolt removal sequence shall follow the reverse order 16 to 1 as specified in "Bolt tightening methods for key parts" on page 164. Remove the camshaft cover assembly [7] from the cylinder head.

Notes

- From the outside to the inside, loosen the camshaft cover assembly bolts in several staggered steps to avoid damaging the camshaft cover.
- Do not force the dowel pin to be removed from the cylinder head or camshaft cover.

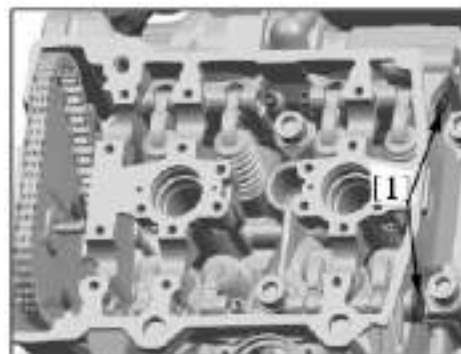
Lift the camshaft cover assembly from the rear and remove the timing chain from the sprocket. Remove the camshaft assembly.



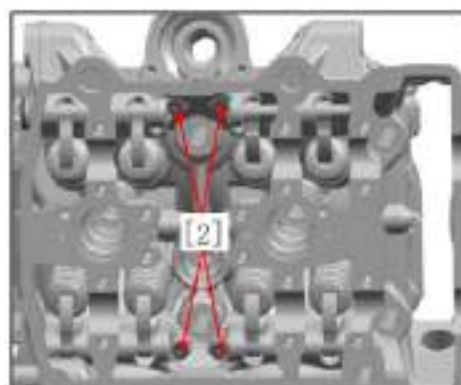
13. Remove the screw plug [1] and the O-ring.

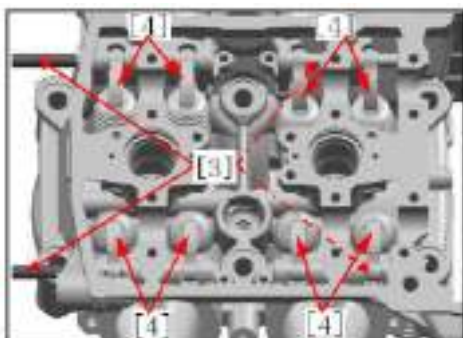
Notes

- Replace the O-ring with a brand new one when reinstalling.



14. Remove the bolt [2].

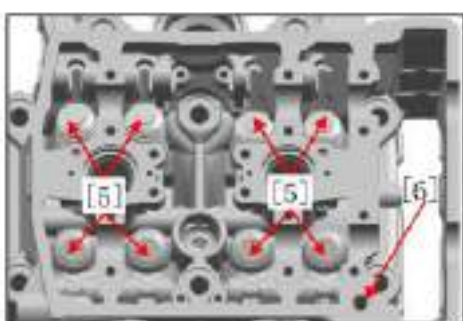




15. Use the M4 disassembly tool to remove the rockerarm shaft [3] and rockerarm [4].

Notes

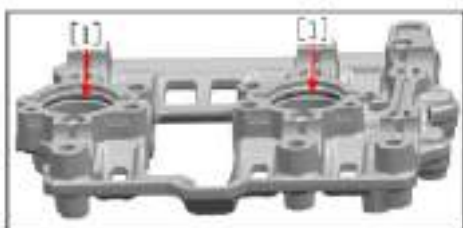
- Make corresponding marks on where rockerarms and rockerarm shaft locates to ensure they are installed in the original positions.



16. Remove the valve adjusting gasket [5] and cylinder head oil filter [6].

Notes

- Be careful to prevent the valve adjusting gasket from falling into the engine.
- Mark the location of the gasket to ensure it is reinstalled in the original position.
- The adjustment gasket is easier to remove with tweezers or a magnet piece.

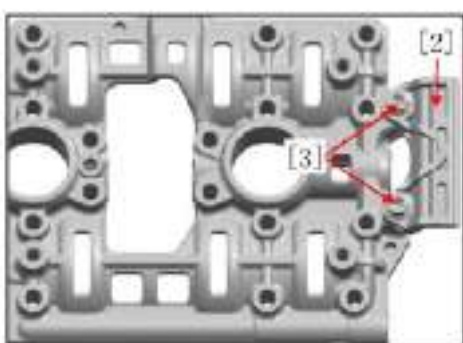


17. Decompose the cam balance weight section

- Remove the O-ring [1].
- And check for any damage.

Notes

- Replace the O-ring with a brand new one when reinstalling.
- Remove the bolt [3].
- Remove the chain pressure plate [2].



Notes

- Apply thread adhesive to the M6 bolt threads during reinstallation.
- Check the contact surface with the chain for wear or damage, and replace the chain pressure plate if necessary.

Torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

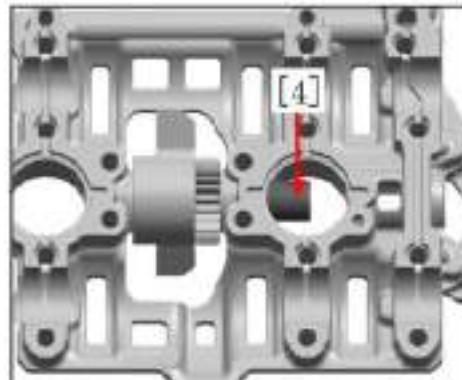
-Remove the hexalobular socket cap head limit bolt of the balance shaft, and use a suitable M10×1.25 bolt to pull out the balance shaft component [4].

Notes

- Check the balance shaft for wear or strain, and replace it if necessary.

Torque:

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



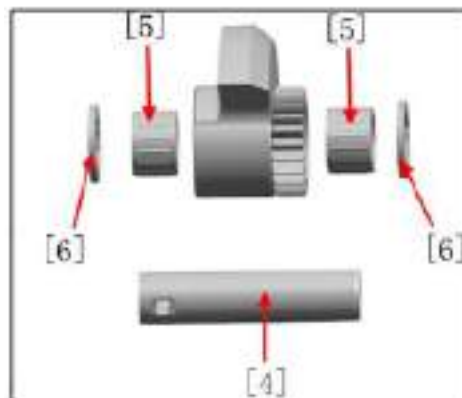
-Remove the balance weight shaft [4], needle roller bearing [5], and washer [6].

-Check if the needle roller has fallen off and ensure there is no stuck during rotating. If necessary, replace the needle roller bearing.

The installation phase of the cam counterweight section is the reverse of the disassemble phase.

Notes

- Replace the bearing and turn with new ones and lubrication them with engine oil.
- Apply thread locker to M5 and M6 bolts.





Camshaft/Cylinder Head Cover Inspection and Assembly Check

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

- Camshaft sprocket/camshaft
- Camshaft cover assembly/dowel pin
- Valve rockerarm/valve adjusting gasket

Camshaft runout

Fix both ends of the camshaft with a V-block and measure its runout with a dial indicator. Maintenance limit: 0.05 mm. If it exceeds the maintenance limit, replace it with a new part.

Tensioner release inspection

Place two auxiliary devices (similar to those shown in the illustration) beside the tensioner piston. When pressing down the tensioner, the piston will not fully retract.

Reference: Thickness 2 mm–2.5 mm

Release the tensioner. The pawl system works to prevent the piston from moving. Please note that this step is necessary.

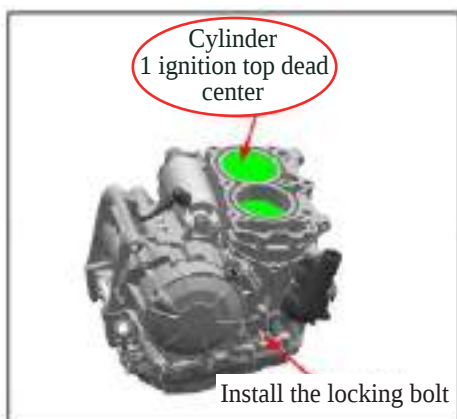
(The first notch is 5mm-6mm, and the remaining notches are 2mm-2.5mm) . When the tensioner continues to be compressed (during installation) , the piston will automatically extend to each gear position. At this point, the pawl system engages, preventing further compression of the tensioner. This feature is necessary to ensure sufficient tension is maintained even at low oil pressure.

Installation steps

1. Ensure that cylinder 1 is positioned at the ignition TDC (left cylinder) , and the crankshaft's timing mark groove is locked by installing a special tool (locking bolt) through the timing inspection bore.

Notes

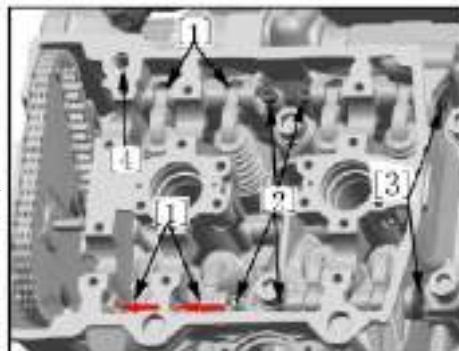
- Before installing the tensioner, the tensioner rod must be compressed to the lowest position. When the camshaft is not installed and the tensioner pops up, the chain must be tightened to prevent the chain from being stuck in the rotating crankshaft.



2. Install the rockerarm and rockerarm shaft [1] sequentially back to their original positions on the cylinder head, then push the rockerarm shaft to the cylinder 2.

Push the exhaust rockerarm to the side (in the direction of the red arrow) .

Install and fasten the bolt [2] and plug [3] with a new O-ring, then install the cleaned cylinder head engine oil filter [4].



Notes

- Apply engine oil to the rockerarm shaft, rockerarm bore, and working surface for lubrication and installation.

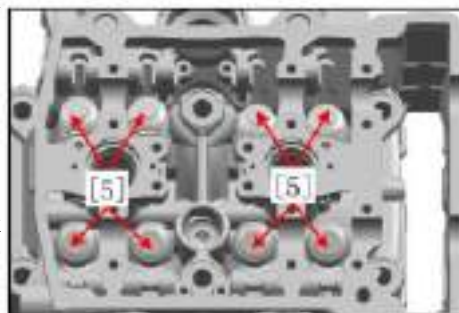
- Apply thread locker to the threads of bolt [2] and screw plug [3].

Bolt torque value:

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Screw plug torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



3. Reinstall the valve adjusting gaskets [5] back in sequence to its original position on the valve spring cover.

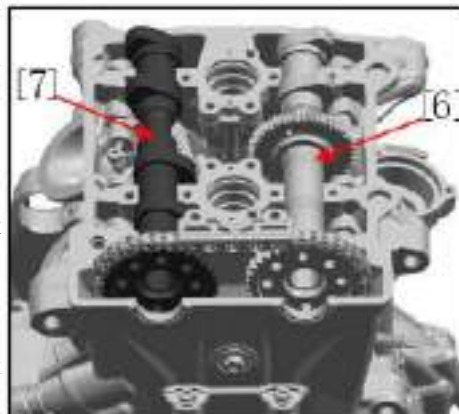
Notes

- Shaft with balance gear [6] or sprocket marked "EX": Exhaust camshaft.

- Shaft without balance gear [7] or sprocket marked "IN": Intake camshaft.

4. Apply engine oil to the camshaft cam, journal, and load-bearing surfaces. Apply engine oil to the entire surface of the cam chain.

Pull up the timing chain and place it on the exhaust camshaft assembly [6], then place the intake camshaft assembly [7].

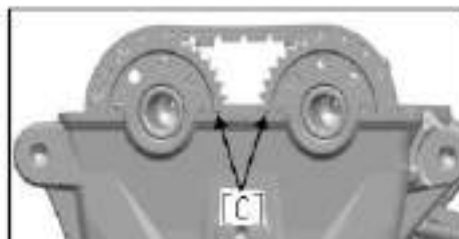


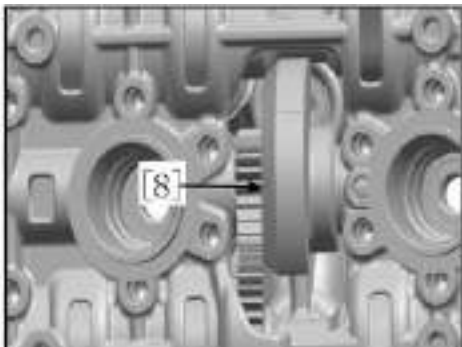
Notes

- The balance shaft drive gear is on the exhaust camshaft.

- Place the timing chain on the exhaust camshaft sprocket.

- The mark for cylinder 1 [C] is flush with the sealing surface of the cylinder head cover. Note that the mark for cylinder 1 is a linear mark.





Install the balance weight assembly [8] to mesh with the gear on the exhaust camshaft.

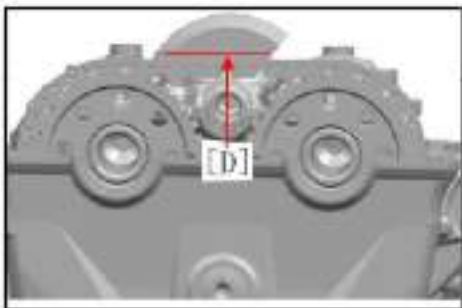
Notes

- The balance weight marking line [D] must be flush with the sealing plane during installation.

6. Ensure that the pin hole of the camshaft cover assembly [10] is aligned with the dowel pin on the cylinder head during installation. Then fasten with bolts [9].

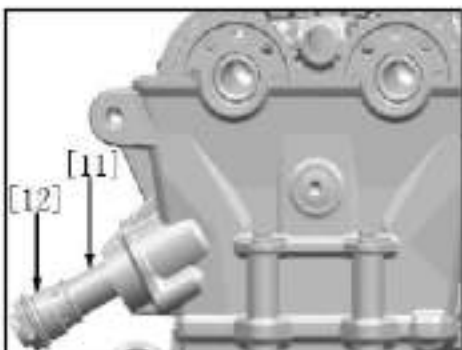
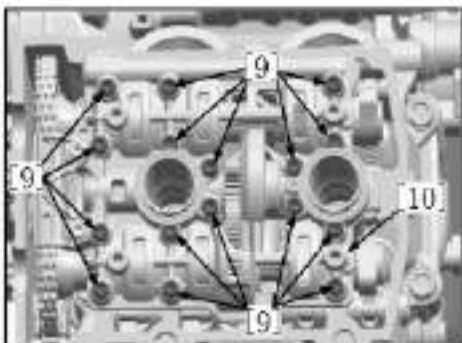
Notes

- Apply thread locker to the bolt threads. The bolts are fastened from the inside to the outside to the specified torque value. For details on the fastening method and torque value, see "Bolt tightening methods for key parts" on page 164 for details.
- The camshaft cover assembly must be replaced at the same time as the cylinder head as a set.
- The camshaft cover assembly code and cylinder head code must match.



7. Remove the tensioning rod piston to the bottom. After aligning the installation position, insert the tensioner rod [11] with the new O-ring. Replace the tensioner base assembly [12] with a new O-ring, then install and fasten it.

Tensioner base assembly torque:
25 N·m (2.5 kgf·m, 18.4 lbf·ft)

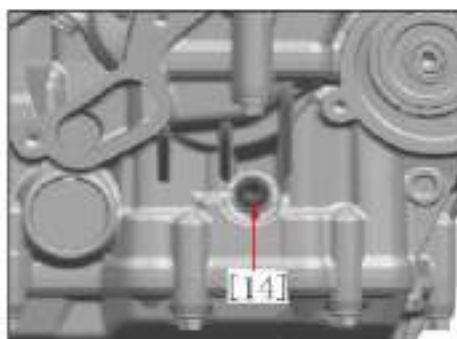
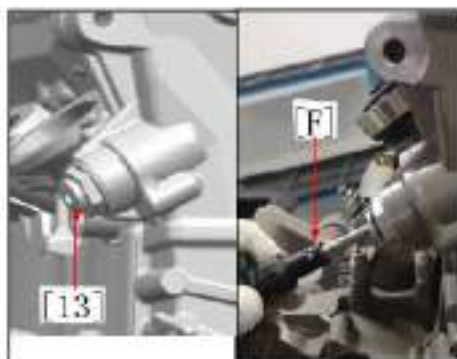


8. Use a special tool (tensioner release tool [F]) to push the tensioner toward the timing chain, placing the tensioner in a tensioned working state. Then install and fasten using the plug [13] with a new O-ring.

Screw plug torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

9. Remove the special tool (locking bolt), install and fasten bolt [14] along with the gasket.

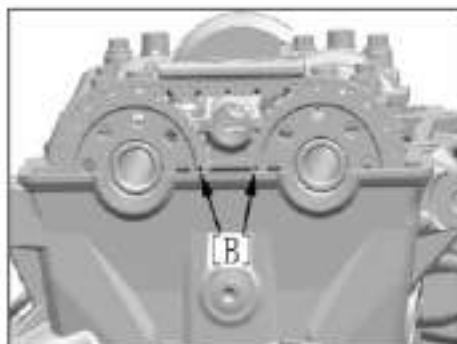
Bolt torque value:
15 N·m (1.5 kgf·m, 11.0 lbf·ft)



10. Turn the crankshaft counterclockwise to position cylinder 2 at the ignition TDC. Align the timing mark [B] of the cylinder 2 with the cylinder head cover sealing surface.

Notes

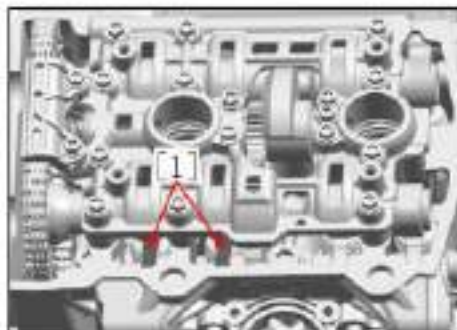
•The timing mark for the cylinder 2 is a dotted mark.



11. Use tweezers to place the exhaust valve rockerarm [1] to the left (in the direction of the arrow) on the cylinder 2 exhaust valve adjusting gasket.

Notes

Prevent the valve adjusting gasket from falling.

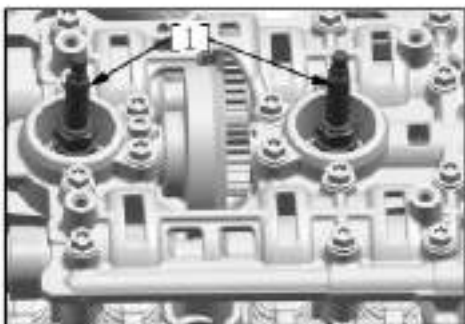




12. Install the rockerarm stop clip [15].

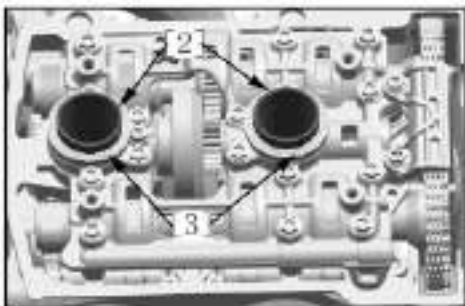
Notes

- Rotate the crankshaft several turns, then readjust cylinder 1 and cylinder 2 to the installed position respectively to recheck the valve timing.
- Check and adjust the valve clearance (see "Inspection and adjustment of valve clearance" on page 32 for details) .

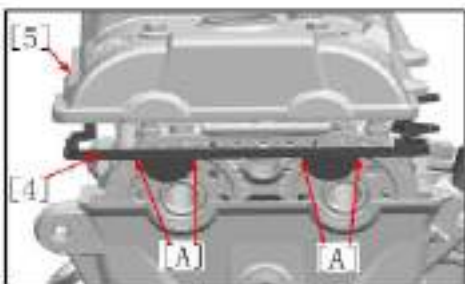


13. Use a special tool (spark plug socket) to install and fasten the spark plug.

Spark plug torque:
12 N·m (1.2 kgf·m, 9.0 lbf·ft)



14. Install the spark plug shaft sleeve [2] and the new spark plug shaft sleeve washer [3].



15. Clean the cylinder head cover and remove oil, then apply a layer of sealant to the area of the top cover gasket [A].

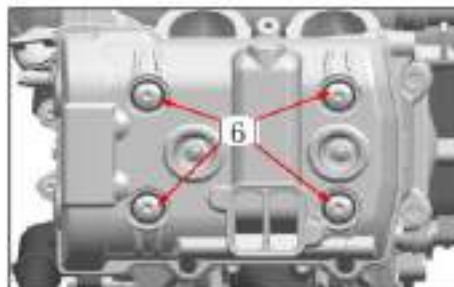
Install the cylinder head cover [5] and the new top cover gasket [4].

Notes

- Install the top cover gasket into the groove of the cylinder head cover.

16. Install the cylinder head cover bolts [6] and new rubber gaskets.

Bolt torque value:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

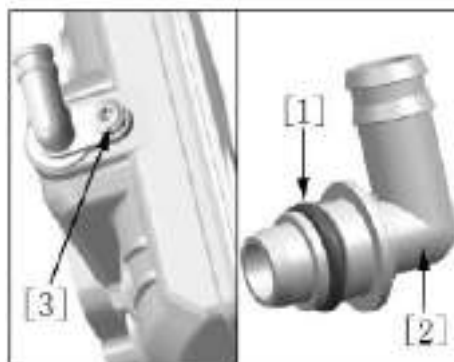


17. Lubricate the new O-ring [1].
Place the vent pipe connector [2] and bushing on the cylinder head cover.
Install and fasten bolt [3].

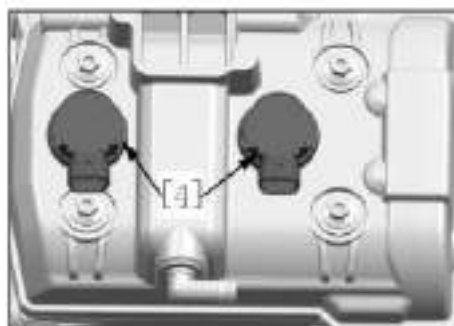
Notes

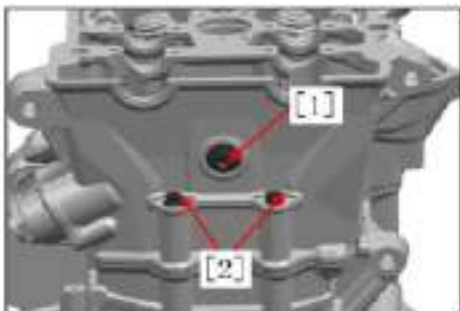
- Apply thread adhesive to the bolt threads.

Torque:
8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)



18. Install the ignition coil [4].

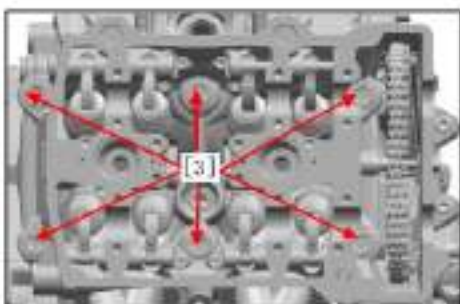




Disassemble the cylinder head

Remove the ignition coil, cylinder head cover, tensioner, camshaft, spark plug, rockerarm, and valve adjusting gasket according to the method in the last section.

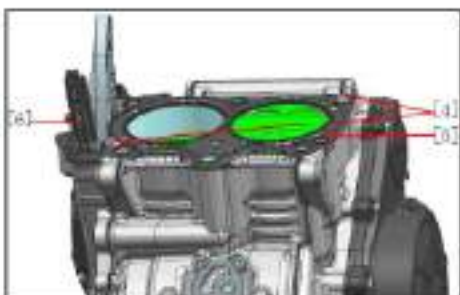
Remove the shock absorber bolt [1] and the gasket. Remove bolt [2] and the seal ring inside the spark plug bore of the cylinder head.



2. Loosen bolt [3] in a crisscross pattern for 2-3 times, then remove the bolt and gasket. Remove the cylinder head.

Notes

- Do not tap the cylinder head excessively, and do not use any tool as a lever to damage the joint surface.



3. Remove the dowel pin [4] and the gasket [5].

4. Remove the chain guide panel [6].

5. Decompose the cylinder head assembly:

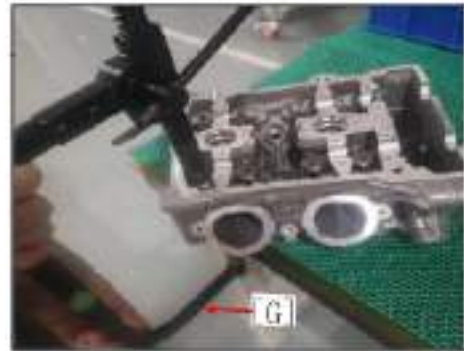
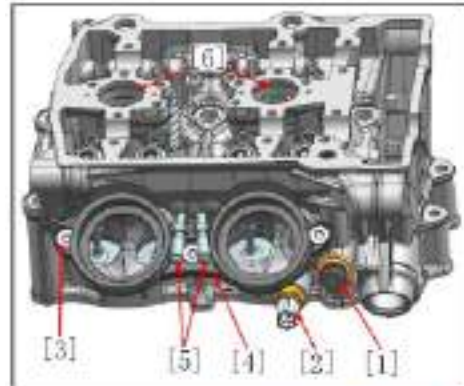
Disassemble the following parts:

- Engine oil pressure sensor [1] and O-ring;
- Water temperature sensor assembly and O-ring [2];
- Hexalobular countersunk screw [3];
- Intake seat [4];
- Clamp [5] and O-ring [6].

Use a special tool to remove the valve lock clip.

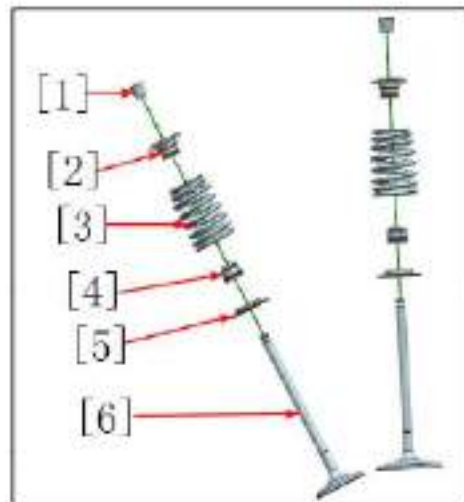
Tools:

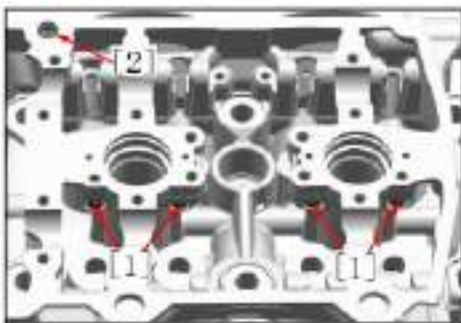
Valve spring compression tool [G] compresses the valve spring to release and remove the valve lock clip.



Remove the valve spring compression tool and the following components:

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

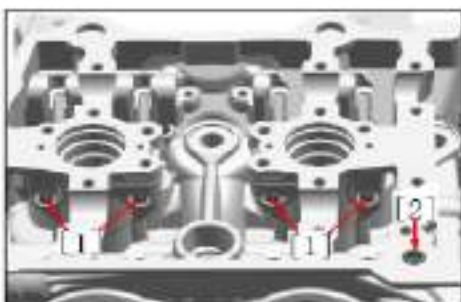




6. Remove the left and right fuel injectors [1]. Remove the cylinder head engine oil filter [2] and clean it.

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.



Clean carbon deposition from the combustion chamber and cylinder head gasket surfaces.

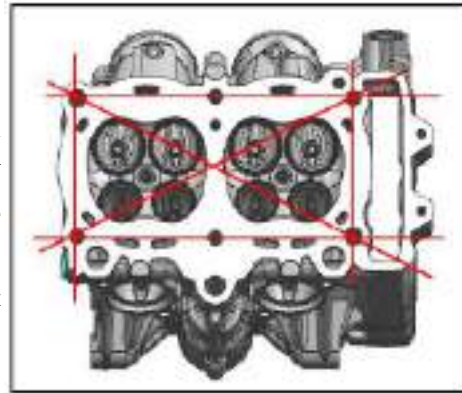
Cylinder head inspection and installation

Cylinder head flatness inspection

Measure the flatness of the cylinder head and cylinder joint surface using a straightedge and feeler gauge to check for wear.

The service limit for the cylinder head joint surface is ≤ 0.05 mm.

If the measured data exceeds the service limit, repair and replace the cylinder head and camshaft cover assembly.

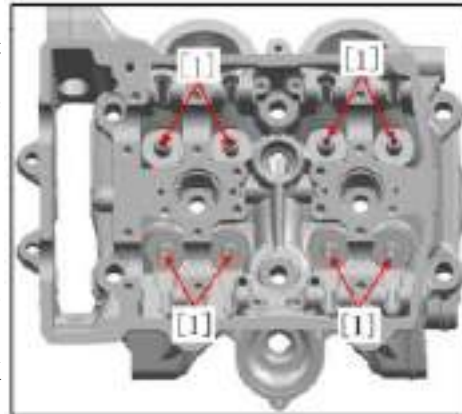


Inspection of valve guide

Valve guide: Use a three-jaw internal micrometer to inspect the valve guide bore [1].

If the measured value is between $\phi 5$ and $\phi 5.02$, it is acceptable.

If the value exceeds the specified limit, replace the cylinder head assembly.



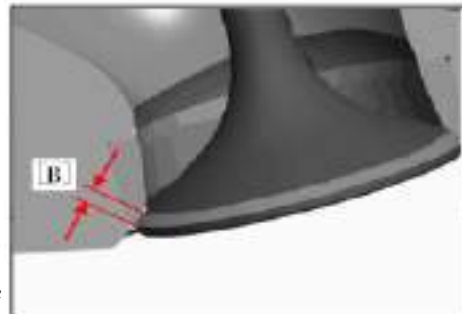
Valve seal seat width [B]:

Valve seal seat width, intake: (1–1.1) mm;

Valve seal seat width, exhaust (1–1.1) mm;

If the measured value exceeds the limit, replace the cylinder head.

Blow the oil passages and fuel injectors with compressed air, and check if they are thoroughly cleaned.



Valve mating parts inspection

Valve [2]: Valve runout:

At valve disc ≤ 0.03 mm;

At valve rod ≤ 0.05 mm;

Valve rod diameter:

Exhaust: 4.956 mm - 4.97 mm;

Intake: 4.976 mm - 4.99 mm;

If the measured value exceeds the limit, replace the valve or repair it.

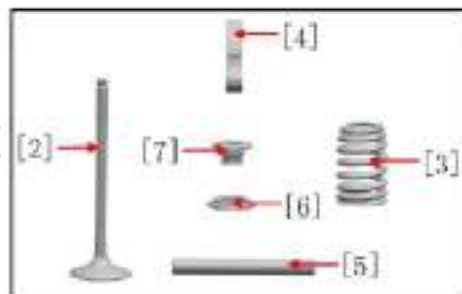
Valve spring [3]: Measure the minimum length of the valve spring (without the valve spring seat) as 43.9 mm;

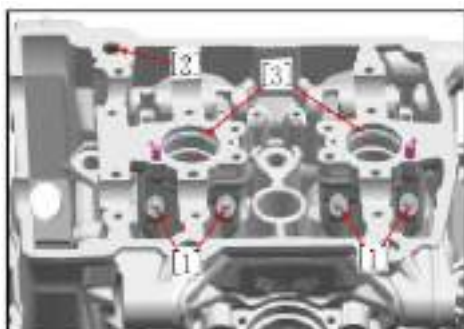
If the measured value exceeds the limit, replace the valve spring.

If the rockerarm [4], rockerarm shaft [5], valve spring seat [6], and valve spring cover (7) are damaged or abnormally, deformed or burning, please replace with a new one.

Check the working surface of the chain guide panel for damage or wear.

If any, please replace it with a new part.

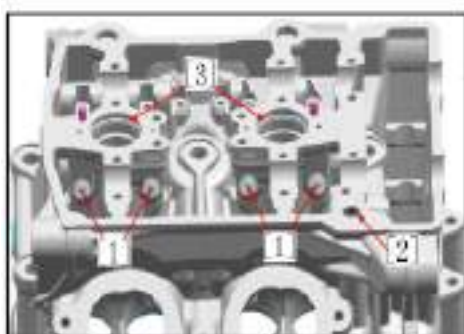




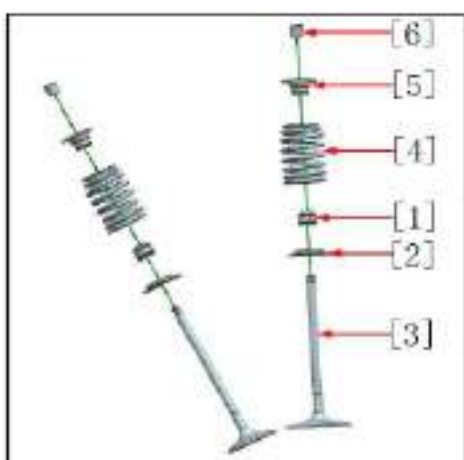
Assembly steps

Clean the cylinder head assembly with a degreaser and blow to wash all oil passages with compressed air.

1. Install the cleaned cylinder head engine oil filter [2];
Install the fuel injectors [1] (with thread locker applied) on both left and right sides using special tools;
Lubricate the new O-ring [3] with engine oil and install it in place.



Fuel injector torque:
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)



2. Lubricate the new valve rod seal with engine oil [1].
Install the lower valve spring seat [2] and the valve rod seal.
Lubricate the sliding surfaces and rod ends of each valve rod with engine oil.
Insert the valve [3] into the valve guide, rotating the valve slowly during insertion to prevent damage to the valve rod seal.
Install the valve spring [4] with the larger coil end facing the combustion chamber.
Install the valve spring cover [5].

3. Install the valve lock clip [6] with special tools.

Tools:

After compressing the valve spring with the valve spring compressor tool [G], place the valve lock clip [6] inside the valve spring cover. Once the lock clip is installed, release the special tool [G].

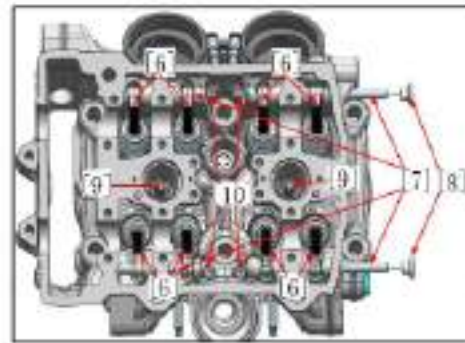
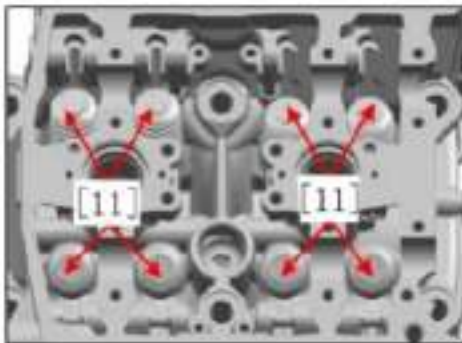
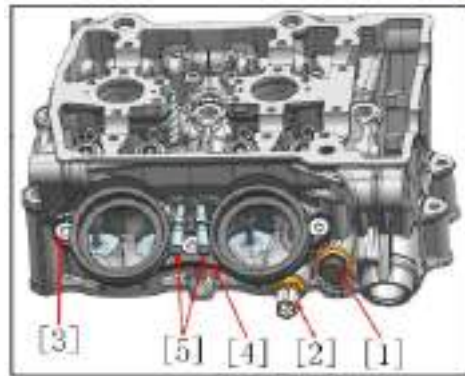
Notes

•When installing the valve lock clip, check that it is properly seated, and it's best to use a small amount of grease to assist with installation.



4. Install the following components:

- Engine oil pressure sensor [1] and new O-ring
- Water temperature sensor assembly and O-ring [2]
- Hexalobular countersunk screw [3]
- Intake seat [4]
- Clamp [5]
- Rockerarm [6]
- Rockerarm shaft [7]
- Screw plug and new O-ring [8]
- Spark plug [9]
- Hexalobular socket cap head screw [10]
- Adjusting gasket [11]

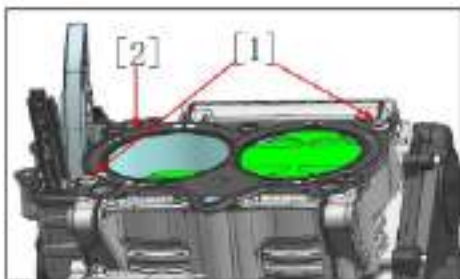




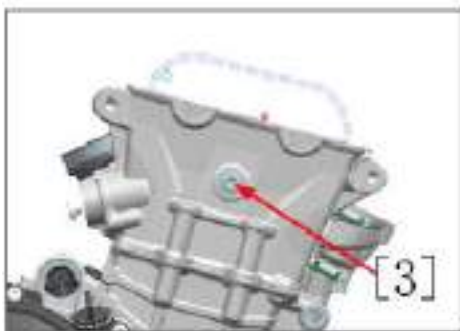
Remove the gasket material from the cylinder joint surface.

Notes

- Do not allow dust and residue to enter the cylinder.
5. Pull up the chain, install the chain guide panel [1], and align its protruding part with the groove on the cylinder.



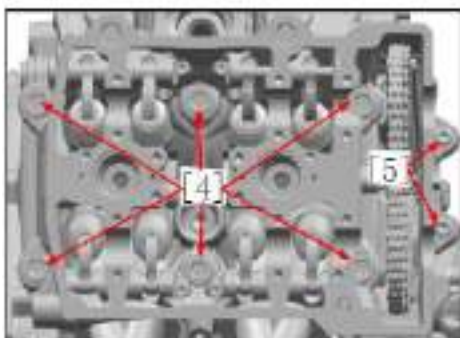
6. Install the dowel pin [1] and the new gasket [2].



7. Pass the timing chain through the cylinder head and install the cylinder head onto the cylinder block. Install the cylinder head shock absorber bolt [3] and gasket in place.

Torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



8. Place the cylinder head component. Install the cylinder head bolt [4], bolt [5], and washers, then tighten to the specified torque.

Notes

- Cylinder head bolts and washers must be replaced with new parts during installation. Coat a proper amount of lubricating oil to both sides of the washers, bolt threads, and supporting surfaces.

Tightening method and torque value: See "Bolt tightening methods for key parts" on page 164 for details.

Install camshaft/cylinder head cover: see "Camshaft/Cylinder Head Cover Inspection and Assembly" on page 186 for details.

※ Crank connecting rod mechanism

Disassemble the crank connecting rod/piston

The crankcase must be separated when disassembling the crankshaft, balance shaft, and piston/connecting rod.

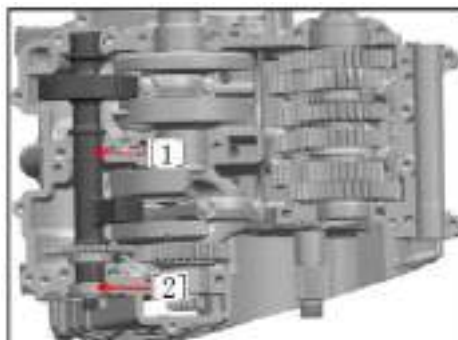
The method for separating the upper and lower crankcases is described on page 213, "Case Section."

Mark and store the connecting rod, connecting rod bearing cap, and bearing liner to ensure these components are in the correct position during reassembly.

Crankshaft bearing liners and connecting rod bearing liners are selected and be paired with by color.

Select the bearing liner by pairing the color of the bearing liner to the letter on the crank end face.

Incorrect bearing liner clearance can cause severe engine wear.



1. Remove the balance shaft assembly

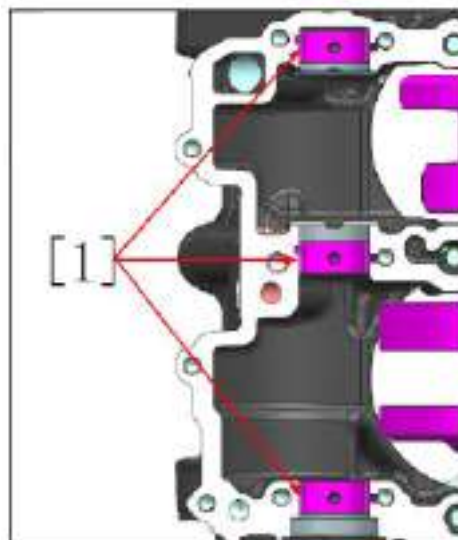
- Separate the upper and lower case sections.
- Remove the balance shaft [1], oil-water seal [2], bushing, and O-ring.
- Check the balance shaft journal, oil-water seal, bushing, and O-ring for any damage.

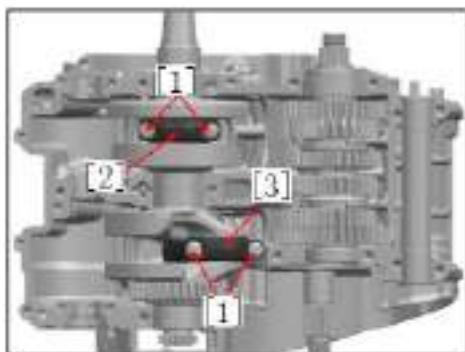
2. Remove the balance shaft bearing liner

- Remove the balance shaft bearing liner [1] from the upper and lower cases and ensure proper assembly, otherwise the correct oil film clearance will be compromised, leading to engine damage.
- If the main shaft bearing liner is damaged, it is necessary to clean the bearing liner base and select a new bearing liner for replacement.

Notes

- There should be no engine oil or impurities on the back of the bearing liner or the base.
- Do not change the bearing liner position. The bearing liner must be installed in the original position. Otherwise, it will damage the correct oil film clearance and cause engine damage.

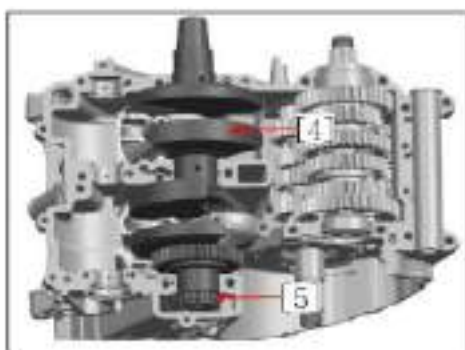




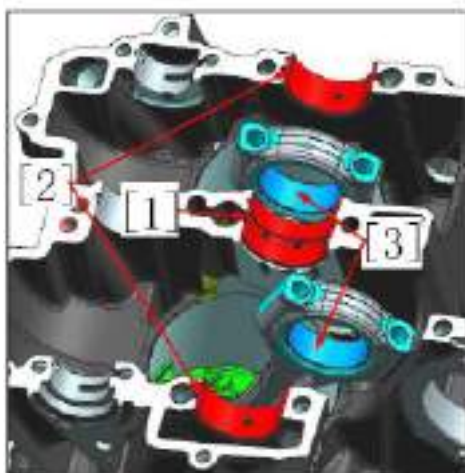
3. Remove the connecting rod cap bolt [1], connecting rod bearing liner caps [2], and [3].

Notes

- Remove the connecting rod bearing cap and bearing liner after marking them to ensure they are matched and used together. Do not mix them up. This is to assembly easily and correctly.
- Do not change the bearing liner position. The bearing liner must be installed in the original position. Otherwise, it will damage the correct oil film clearance and cause engine damage.



4. Remove the crankshaft [4] and the timing chain [5].



5. Remove the crankshaft bearing liners [1] and [2] from the upper and lower crankcase halves. Remove the connecting rod bearing liner [3] from the connecting rod body and the bearing cap.

Notes

- Do not change the bearing liner position. The bearing liner must be installed in the original position. Otherwise, it will damage the correct oil film clearance and cause engine damage.

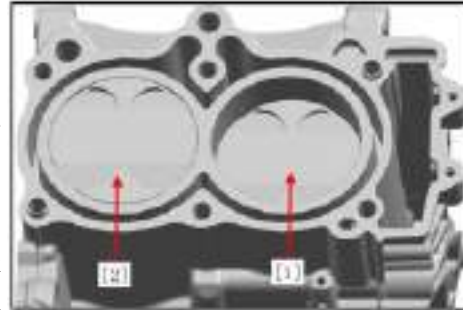
6. Remove the piston

Remove piston/connecting rod

- Before removing the piston, tangle a clean, lint-free cloth around the connecting rod's big end to prevent damage to the cylinder liner.
- Do not change the bearing liner position.

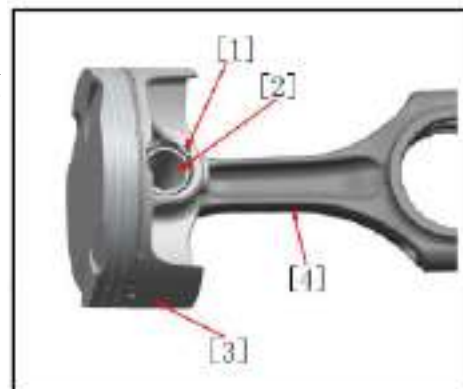
-Shake the engine upper case upward and mark pistons [1] and [2].

-Remove the piston/connecting rod from the top of the cylinder.



7. Remove the piston

- Use tweezers to remove the piston pin retainer [1].
- Push the piston pin [2] out of the piston [3] and the connecting rod small end [4], then remove the piston.



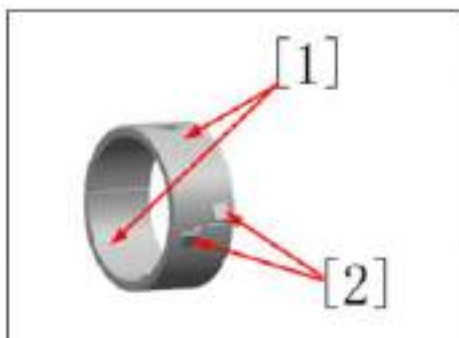
8. Remove the piston ring

-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.





Crank connecting rod/piston inspection and installation

Balance shaft bearing liner inspection

- Check the bearing liner [1] for abnormal wear or peeling.
- Check the bearing liner boss [2] for any damage.

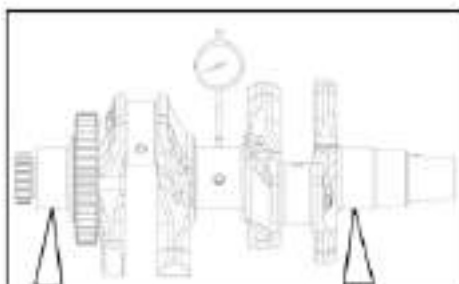


Crankshaft connecting rod side clearance inspection

- Separate the upper and lower crankcase.
- Measure the connecting rod side clearance.

Maintenance limit: 0.35mm.

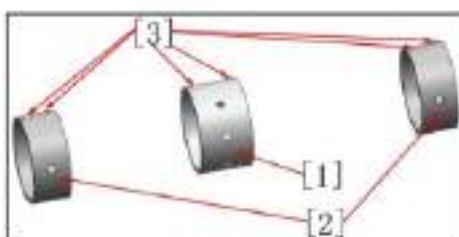
If the clearance exceeds the maintenance limit, replace the connecting rod. Re-confirm the side clearance. If it still exceeds the limit value, then replace the crankshaft.



Crankshaft runout

- Support the journal at both ends of the crankshaft using the V-block.
- Place a dial indicator above the middle main shaft journal. When placing, avoid the oil groove and oil hole.
- Rotate the crankshaft two turns (720°), then read the runout value.

Maintenance limit: 0.03 mm



Main journal bearing liner inspection

- Inspect the main journal bearing liner and [2] for abnormal wear or peeling.
- Check the bearing liner boss [3] for any damage.
- If the main journal bearing liner is damaged, select a bearing liner for replacement.

Crankshaft main journal bearing liner clearance

- Check the radial clearance of the crankshaft main bearing liner
- Place the crankshaft on the upper crankcase.
- Insert the plastigage [C] vertically into the journal.
- Install the lower case.
- Install mounting bolts [1] to [6] and fasten them in sequence to the specified torque.

Torque:

25 N·m (2.5 kgf·m, 18.4 lbf·ft)

Notes

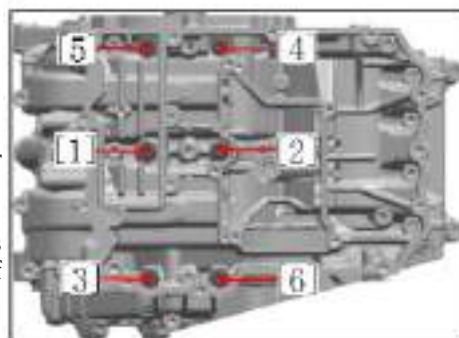
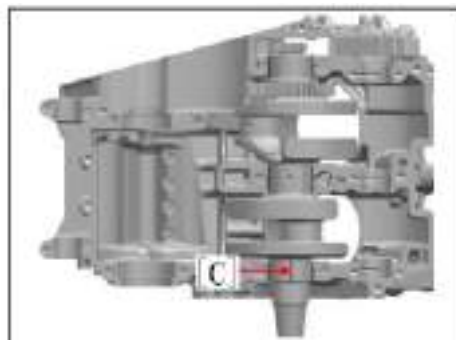
- Do not twist the crankshaft.

- Disassemble the lower case again.
- Check whether the clearance value of the feeler gauge is reasonable during case closing.

The fit clearance for new crankshaft bearing liners is 0.030 mm to 0.060 mm, with a service limit of 0.080 mm.

Notes

- The plastigage measures the bearing liner clearance.
- Clean all components.





Selection of main journal bearing liners

-Number the bearing liners in the crankshaft journal bores of the case from left to right to facilitate the sequential installation of the selected bearing liners.

-The letters [1] on the right crank end face represent the matching code for the crankshaft main journal bearing liner, while the letters [2] below represent the matching code for the connecting rod bearing liner.

Notes

- Main journal groups are identified sequentially from the tapered end of the crankshaft to the sprocket end.

- The connecting rod journals are identified in groups, sequentially from the crankshaft taper end to the sprocket end.

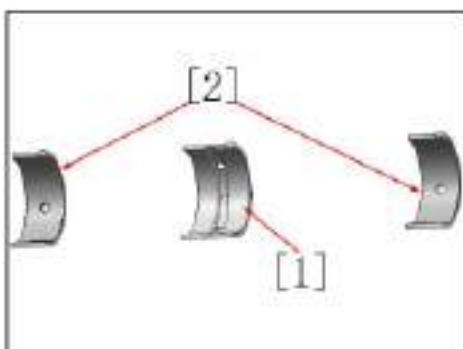
- Main shaft journal diameter grouping:

A ($\phi 37.994 \text{ mm} \sim \phi 38 \text{ mm}$) ;

- Main shaft journal diameter grouping:

B ($\phi 37.988 \text{ mm} \sim \phi 37.994 \text{ mm}$) .

-Select the replaceable bearing liner colors [1] and [2] according to the letter markings [1] on the right crank end face.



Main journal bearing liner thickness:

a: Blue Thick



b: Red Thin

Blue: $1.984 \text{ mm} \sim 1.988 \text{ mm}$;

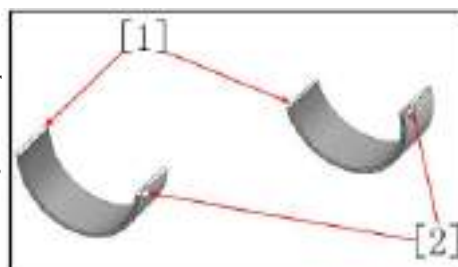
Red: $1.981 \sim 1.985 \text{ mm}$.

Main Journal Bearing Matching Table:

Crankshaft main journal	A	B
Main journal bearing liner	R	L

Connecting rod bearing liner

- Check the connecting rod bearing liner [1] for abnormal wear or peeling.
- Inspect the bearing liner boss [2] for damage.
- If the connecting rod bearing liner is damaged, select a bearing liner for replacement.



Select the connecting rod bearing liner

- If the crankshaft needs to be replaced, record the corresponding number [2] located on the crank end face (the letters A or B on the crank end face represent the crank pin outer diameter number sequence from left to right) , then select the matching bearing liner color according to the connecting rod bearing pairing table.
- If the crankshaft is reused, measure the crank pin outer diameter with a micrometer.
- Select the connecting rod bearing liner color according to the measured values using the connecting rod bearing liner matching table.



Notes

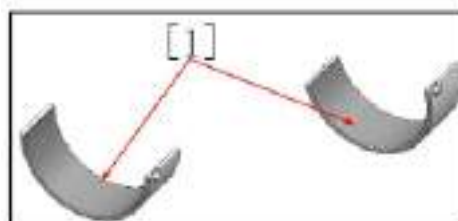
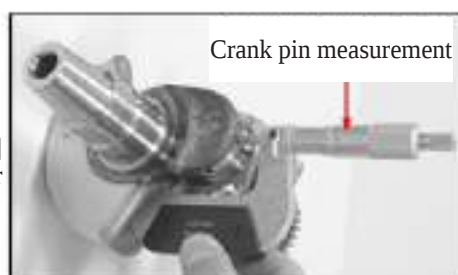
- Connecting rod journal diameter grouping:
A ($\phi 37.994 \text{ mm} \sim \phi 38 \text{ mm}$) ;
- Connecting rod journal diameter grouping:
B ($\phi 37.988 \text{ mm} \sim \phi 37.994 \text{ mm}$) .

- Select the replaceable bearing liner color [1] according to the connecting rod journal diameter code on the crank end face.

Thickness of connecting rod bearing liner:
a: Blue Thick

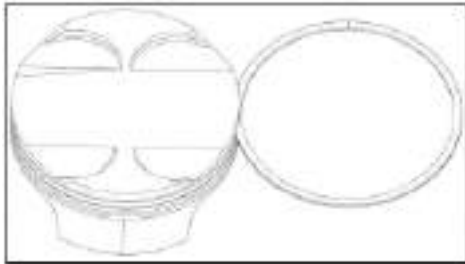


b: Red Thin
Blue: $1.984 \text{ mm} \sim 1.988 \text{ mm}$;
Red: $1.981 \sim 1.985 \text{ mm}$.



Main Journal Bearing Matching Table:

Connecting rod journal	A	B
Connecting rod bearing liner	R	L

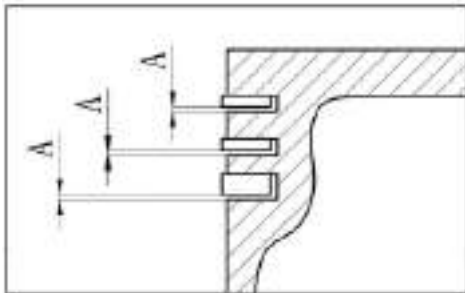


Piston inspection and measurement

- Check the piston surface for any damage.
- If any damage, please replace with a new part. If necessary, replace the cylinder (upper and lower cases) as well.
- Check if the piston ring can move freely within the piston ring groove.
- If any stuck, clean the piston ring groove.
- Use piston rings that are ready to be discarded to remove carbon deposition from the piston ring groove.
- Check the piston ring for damage.
- If any, please replace it with a new part.

Notes

- Do not use a steel brush to avoid scratching the piston and piston ring.



Use a feeler gauge to measure the clearance between the piston ring and the groove (A)

Piston ring groove clearance:

First ring (rectangular ring) ≤ 0.06 mm;

Second ring (lower compression ring) ≤ 0.06 mm;

Oil ring ≤ 0.06 mm.

If the clearance (A) exceeds the maximum value:
Replace the piston and piston rings, then inspect and measure the piston.



Check the piston pin coating for discoloration, wear, or peeling. If there is any malfunction, please replace it with a new one.

Place the piston pin at the connecting rod to check for movement.

If the play between the piston pin and the connecting rod is too large: replace the connecting rod and piston pin.

Measure the piston diameter at the gauge point on the printed surface as shown in the figure.

Piston: 87.951 mm~87.969 mm.

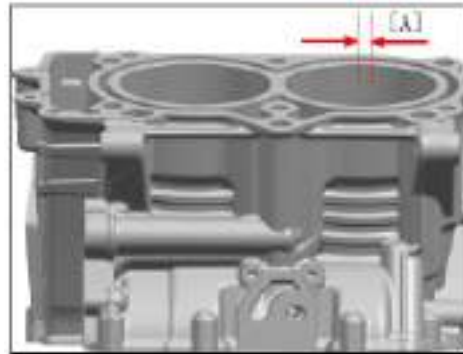
Check the piston ring opening clearance

- Remove the piston ring from the piston.
- Place the piston ring at the cylinder, aligning it with the piston. Position it 10 mm from the top edge of the cylinder and measure the end gap (A) with a feeler gauge.

Piston ring opening clearance:

Compression ring: ≤ 0.60 mm; oil ring: ≤ 0.8 mm

- If the opening clearance exceeds the limit value: check and measure the cylinder.
- If the cylinder is within the service limit: replace the piston ring.
- Install the piston ring with the marked side facing upward into the piston.



Piston and cylinder fit clearance

- Inspect and measure the cylinder.
- Inspect and measure the piston.

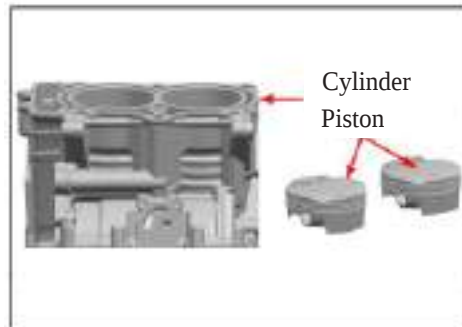
The minimum fit clearance is the difference between the minimum cylinder inner diameter and the maximum piston diameter.

The maximum fit clearance is the difference between the maximum cylinder inner diameter and the minimum piston diameter.

Piston/cylinder fit clearance

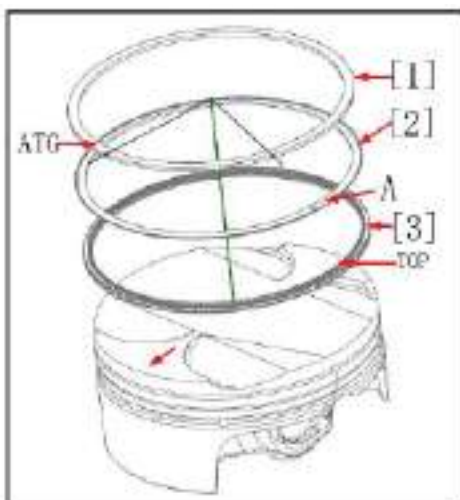
New part: 0.026mm~0.060mm

Service limit: 0.10mm



Timing chain inspection

- Check whether the working surface of the timing chain is damaged or worn (such as the link plate being gnawed, etc.) .
- If any, please replace it with a new part.
- Inspect the timing chain for smooth link movement. Allow the chain to hang naturally. If the chain is no longer straight or has been stretched (compare with a new chain) , replace the timing chain.



Installation steps

1. Piston ring installation

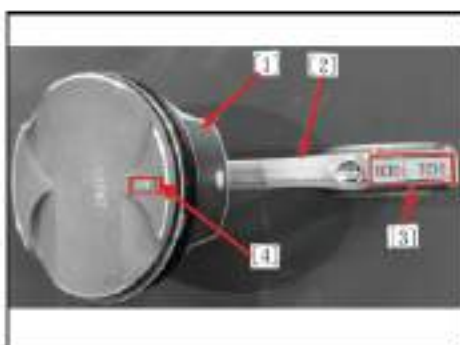
- Thoroughly clean the piston ring groove and install the piston ring.
- Apply engine oil to the entire surface of the piston ring and the piston ring groove.
- Prevent damage to the piston and piston ring during installation.
- When installing, the marked side of the piston ring shall face up;

"ATG": 1st ring [1].

"A": 2nd ring [2].

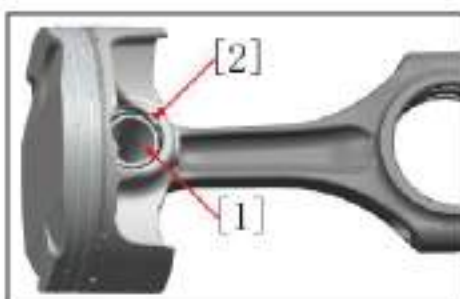
"TOP": oil ring assembly [3].

- Cross the piston ring openings 120° apart from each other.
- Install the expander spring and the side rails together as a unit.



2. Piston connecting rod installation

- Install the connecting rod bearing liner in its original position. Apply engine oil to the surface of the piston pin bore.
- Apply engine oil to the inner surface of the connecting rod small end.
- When assembling the piston [1] and connecting rod [2], align the connecting rod weight-class identification mark [3] with the piston "➡" mark [4].



3. Coat engine oil to the outer surface of the piston pin.

Install the piston pin [1] and secure it with a new piston pin retainer [2].

Notes

- Ensure the piston pin snap ring is properly installed.
- Do not align the opening of the piston pin retainer with the notch on the piston.

4. Apply engine oil on the cylinder wall and piston thrust surface.
Position the piston ring openings at 120° intervals.
Place the piston in the installation tool (Piston Ring Installation Tool B).
Use the tool to lock the piston ring.



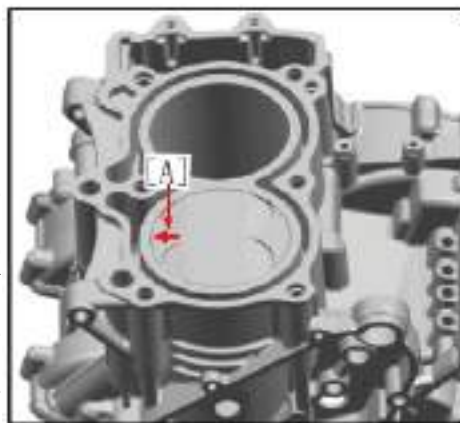
5. Use special tools to place the piston in the cylinder.
Use the rubber mallet to gently tap the head of the piston ring press tool to align it flush with the cylinder.

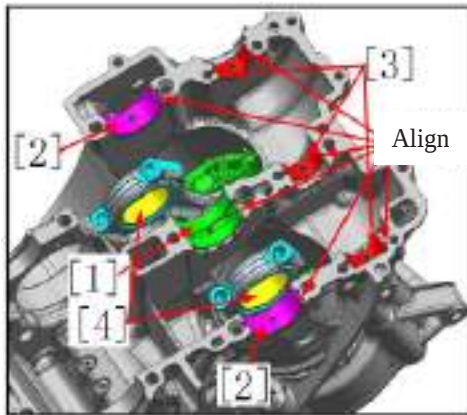


6. Ensure the piston "➡" mark [A] faces the exhaust side.

Notes

- The special tool must compress all piston rings evenly and keep them flush with the cylinder. Carefully tap the piston with the hammer handle, Insert the piston into the cylinder.
- Do not hit the piston ring, as it can easily be damaged.
- When installing the piston, be careful not to damage the upper surface of the piston, especially the part that fits with the cylinder bore;
- Be careful not to let the cylinder liner and the crank pin be damaged by the connecting rod;
- Make sure that the connecting rod weight-class identification marks are the same for both cylinders.





7. Crankshaft and balance shaft bearing liner assembly

-Clean the outer surface of the bearing liner, the crankcase, and the connecting rod bearing liner bore.

-Install the main journal bearing liners [1] and [2], balance shaft bushings [3], and connecting rod bearing liners [4] in their original positions.

-In the mounting bores, align each boss and groove of the bearing liner.

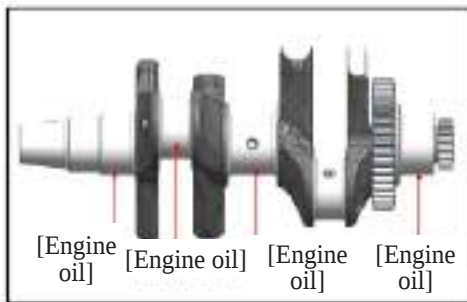
Notes

- The back surface of the bearing liner and the bearing liner mounting bore must be wiped clean and free of engine oil or impurities.

- During installation, first align the bearing liner boss with the notch on the bearing liner bore, then press the bearing liner down from the other side until it is properly seated.

- Do not change the bearing liner position. The bearing liner must be installed in the original position. Otherwise, it will damage the correct oil film clearance and cause engine damage.

- After matching the bearings, ensure the installation order follows the letter sequence on the right crankcase from left to right, corresponding to the bearing liner bores on the crankcase.

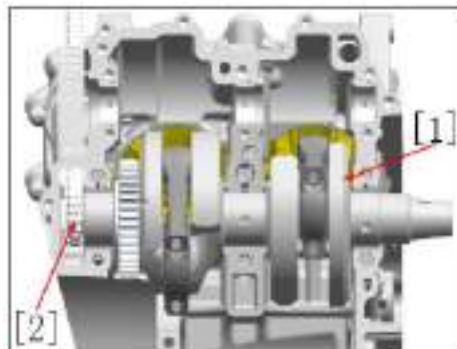


-Apply engine oil to the inner surface of the main journal bearing liners in the upper crankcase and the connecting rod bearing liners in the big end of the connecting rod.

8. Place the crankshaft [1] above the crankcase, and then insert the crank pin into the connecting rod.
At the same time, place the timing chain [2].

Notes

- Do not damage the crank pin, main journal, and bearing liner.
- Install the crankshaft into the upper crankcase.



9. Clean the joint surface of the connecting rod and the connecting rod bearing liner, then dry it with compressed air.
Apply engine oil to the inner surface of the connecting rod bearing cap.
Ensure that the numbers on the connecting rod bearing caps and the connecting rod are the same and clearly visible, then pair and install the connecting rod bearing caps.

Notes

- Ensure each part is installed in its original position, as marked when removed.



10. Replace the bolts and apply engine oil to the threaded part of the bolts and the supporting surface.

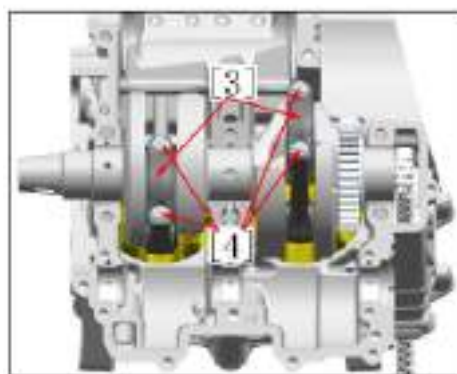
Install the connecting rod bearing caps [3] on the connecting rod, and install the connecting rod bolts [4] and tighten them securely.

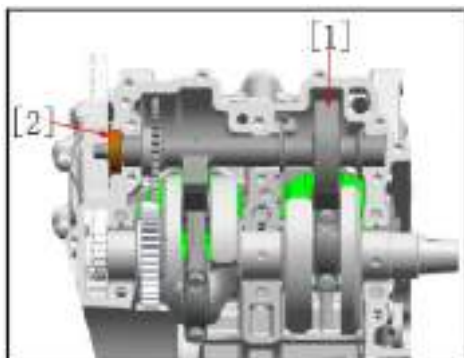
For details on fastening methods, see "Bolt tightening methods for key parts" on page 164 .

Torque:
15 N·m + 90°.

Notes

If the connecting rod bolts are disassembled during maintenance, they must be replaced with new bolts during installation and fastened strictly according to the angle control method.

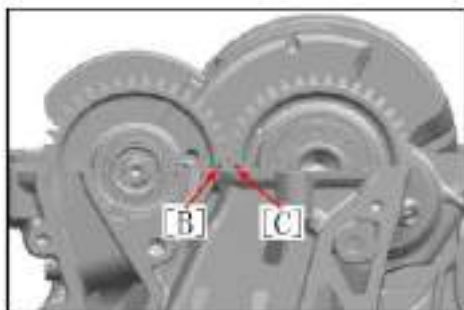




11. Coat engine oil to the journal of the balance shaft and the inner surface of the bearing liner. Then place the balance shaft assembly [1] along with the newly lubricated oil-water seal [2], bushing, and new O-ring.

Notes

- Marks (B) and (C) must be aligned during installation.
 - The two marks are dot marks.
- Assemble the lower crankcase (see "Case section" on page 213 for details) .



※ Case section

Notes

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

1. Valve train system related components
2. Crankshaft connecting rod assembly components
3. Clutch and clutch control mechanism related components
4. Transmission shift mechanism related components
5. Cooling and lubrication system related components
6. Components related to the starting system

• Be careful not to damage the right/left crankcase covers or case joint surface.

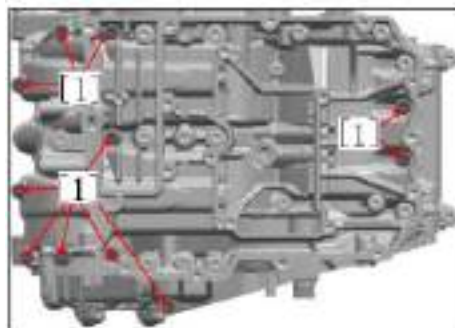
• Clean the joint surface and oil passage before case assembly;

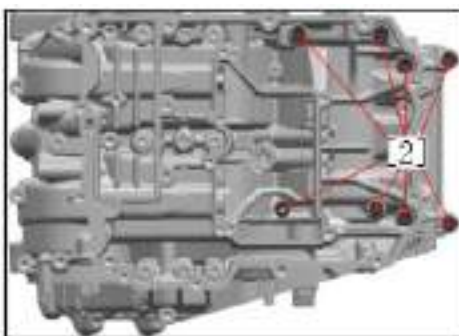
• Before closing the case, evenly apply the end sealant on the closing surface, and clean up the excess sealant.

• 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.

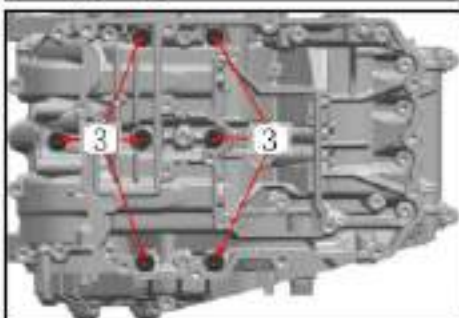
Disassemble the upper and lower cases

1. Disassemble the case closing bolts [1].





2. Disassemble the case closing bolts [2].



3. Loosen and remove the bolts [3] in a crisscross pattern.

Notes

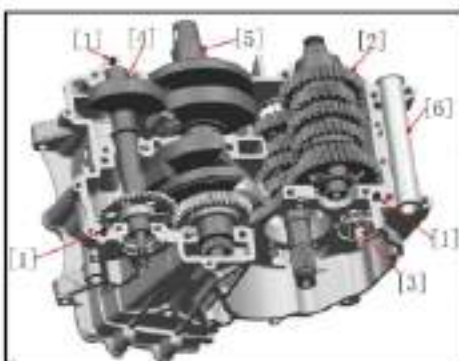
- The bolts are fitted with washers, which typically remain attached to the crankcase during removal.



4. Remove the lower crankcase [1] 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.
- Ensure the bearing liner remains in place.



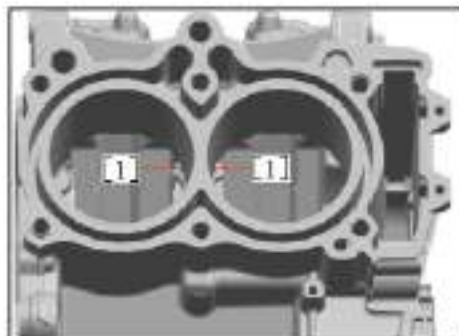
5. Remove the dowel pin [1].

Remove the main/counter shaft and counter shaft kit [2], transmission drum [3], and shift fork (see "Drive and shifting mechanism" on page 233 for disassembly and assembly details) .

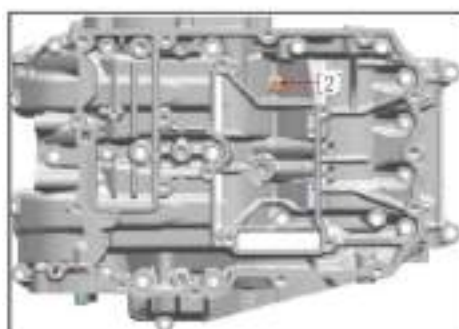
Remove the balance shaft [4] and crankshaft [5] (see "Crank connecting rod mechanism" on page 199 for disassembly and assembly details) .

Remove the swingarm bushing [6].

6. Use special tools to remove the fuel injectors [1] and [2] from the upper and lower crankcase bores. Do not damage the fuel injectors, and thoroughly clean them with solution.



7. Remove the screw plug [4]. Since the fuel injector [3] is press-fitted into the upper case with an interference fit, there is no need to disassemble it unless there is blockage or damage.



Notes

- Check if the fuel injector has a blockage and replace it if necessary. If there are no malfunctions, use compressed air to blow out the oil passages in the upper crankcase and the fuel injector; then install them in place in the reverse order of disassembly.

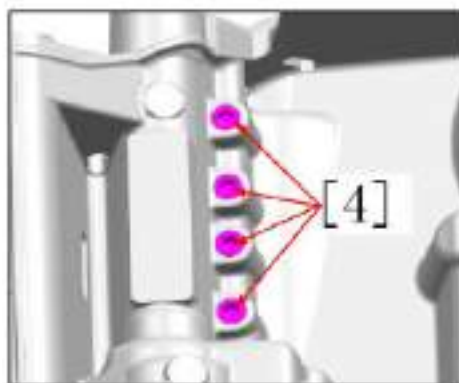
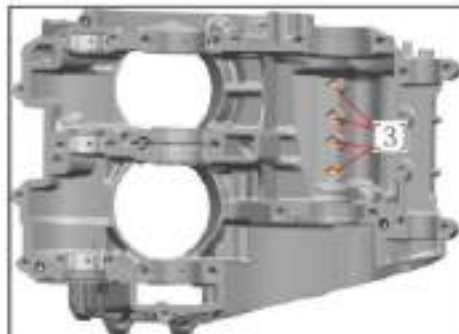
Apply thread locker to fuel injectors [1] and [2] before installation. Install the threaded plug [4] with thread locker.

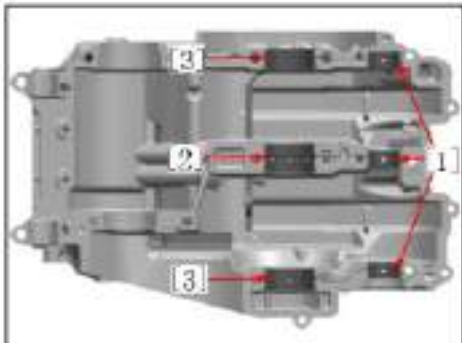
Fuel injector mounting torque:

2.0N·m(0.2kgf·m,1.5lbf·ft)

Screw plug mounting torque

12 N·m (1.2 kgf·m, 9.0 lbf·ft)



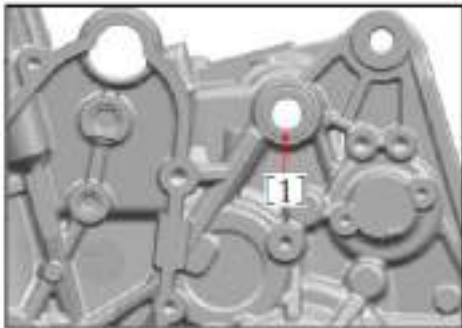


8. Clean the bearing liner and bearing liner base

- Remove the balance shaft bearing liner [1] from the lower case.
- Remove the crankshaft bearing liners [2] and [3] from the lower case.
- Clean the bearing liner base.

Notes

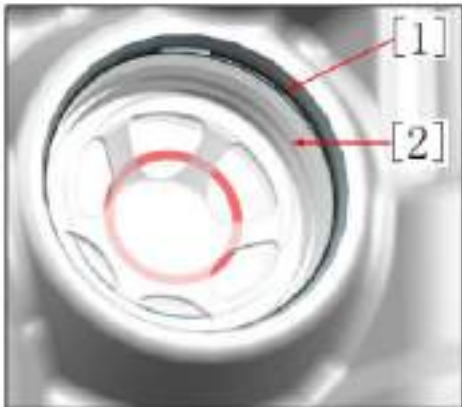
- Ensure the bearing liner remains in place.
- To replace and install a new bearing liner, select the appropriate bearing liner according to the matching table for the "Crank connecting rod mechanism" on page 199.



9. Remove the shift shaft oil seal [1] and press-fit a new shift shaft oil seal.

Notes

- During press-fitting, the shift shaft oil seal is pressed inward with its opening facing, and the end face of the oil seal is 0.5 mm lower than the end face of the oil seal bore.



10. Disassemble the lower snap ring [1] and the oil level inspection window [2], press-fit a new oil level inspection window, and install the snap ring into the turn groove.

Notes

- The newly press-fitted oil level inspection window must not exhibit any cut edge.

11. Disassemble the upper case bearing.

- Heat the upper engine case appropriately.
Reference: At around 130 °C, tap both sides of the engine crankcase with a wooden block to allow the bearings to drop out of their bearing bores.

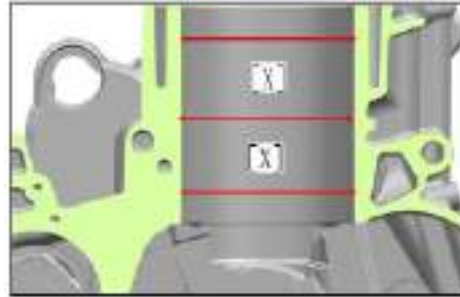
Notes

- Any bearings remaining in the engine crankcase must be removed using the appropriate special tools.
- There is a gasket behind the main shaft bearing; make sure that the gasket is not damaged.

Case section inspection and installation

Inspect and measure the cylinder

- Check the cylinder surface for any damage.
- If any damage, please replace the cylinder (upper and lower case) and piston.
- Use a micrometer to measure the inner diameter of the cylinder along the X-axis and Y-axis at different positions to determine if there is any wear.



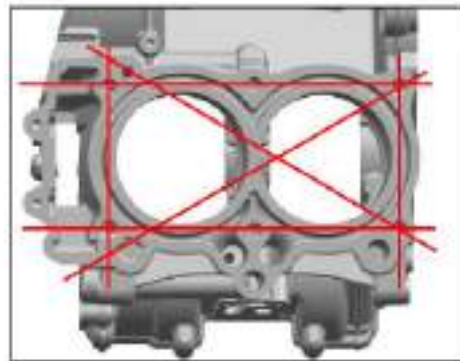
Cylinder - Inner Diameter
Size: 87.995mm to 88.011mm

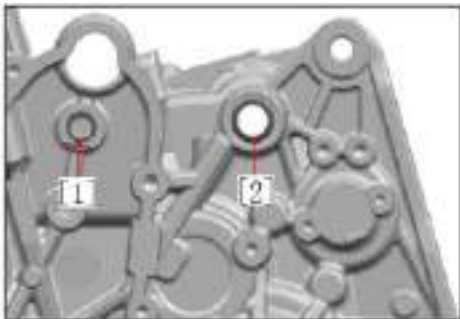
Cylinder flatness inspection

- Use a straightedge and feeler gauge to measure the flatness of the cylinder and cylinder head joint surface, and check for wear.

The service limit for the upper case joint surface is ≤ 0.05 mm.

- If the measured data exceeds the service limit, please repair or replace the upper and lower cases.



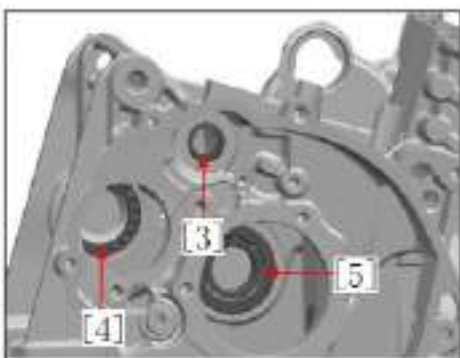


Upper and lower case assembly steps

1. Clean the left and right crankcase body joint surface, and do not damage the joint surface;
2. Heat the engine upper case appropriately.
Reference: At around 130 °C, install the new cold needle roller bearings [1] and [2] into the bearing bore located on the left side of the heated case.
If possible, use a suitable press-fit tool to install the bearing into the seat.

Notes

- During press fitting, ensure that the engine case is level to avoid damage.
- Apply pressure only to the outer turn of the bearing during press fitting. Otherwise, bearing damage may occur during the press-fitting process.



3. Install the cold new needle roller bearing [3], bearings [4] and [5] into the bearing bore located on the right side of the heated upper case.
If possible, use a suitable press-fit tool to install the bearing into the bore.
Be careful not to miss the gasket behind bearing [5].
During press fitting, ensure that the engine case is level to avoid damage.
After the case has cooled, confirm whether the bearings are properly press-fitted in place.

Notes

- If the bearing is not pressed into place after cooling down, it may rotate while the engine is operating. If this occurs, replace the case with a new one.

Case closing assembly

-Install the main/counter shaft components, crankshaft, balance shaft, transmission drum assembly, shift fork, shift fork shaft, and swingar sleeve to the upper crankcase (refer to "Crank connecting rod mechanism" on page 199 for the transmission shift mechanism) .

As shown in the figure, evenly coat end sealant to the joint surface of the lower case.

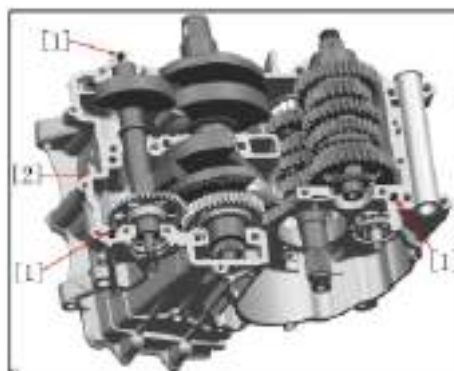


Notes

- Do not apply an excessive amount of end sealant.
- Do not apply end sealant to the oil passage bore.

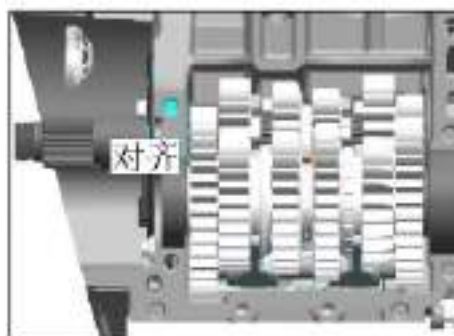
-Install the dowel pin [1] onto the upper crankcase [2].

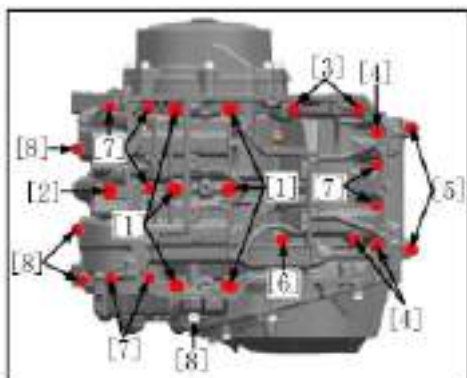
-Align the main/counter shaft gear teeth one by one to ensure they are in neutral position, then recheck that all parts on the case are properly and correctly installed.



Notes

- Align the shift forks one by one with the shift fork grooves of the transmission drum.





-Install the lower crankcase onto the upper crankcase.

Notes

- The main journal bolts should be pre-coated with engine oil before installation to enhance their axial tensile stability. Do not wipe the engine oil off the bolt surface during installation.
- If necessary, gently tap with a rubber mallet.
- Bolts [1] and [2] require washers to be installed, with engine oil coated on both end faces.
- Install bolts M8×90 for [1] and [3]; install bolts M8×65 for [2] and [4]; install bolts M8×55 for [5]; install bolts M8×45 for [6]; install bolts M6×60 for [7]; install bolts M6×30 for [8].

-Verify that the upper and lower crankcase are securely installed.

-Replace the washer and the case closing bolts with new ones, and tighten the case closing bolts to the specified torque.

Torque:

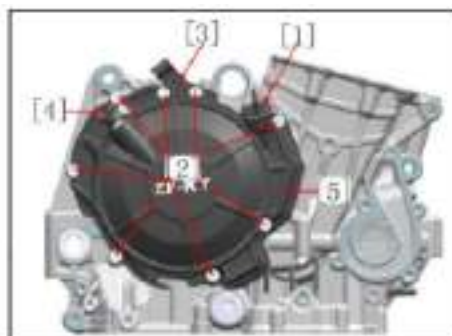
For details on torque and fastening methods, see "Bolt tightening methods for key parts" on page 164

※ **Clutch operating mechanism**

Disassemble the right crankcase cover/clutch

1. Disassemble the right crankcase cover

- Remove the fuel filler cap [1] and the O-ring.
- Loosen and remove bolts [2] and pull brackets [3] in 2~3 staggered steps.
- Turn the clutch operating shaft [4] counterclockwise and remove the right crankcase cover [5] along with the right crankcase cover gasket.
- When disassembling, pay attention to the installation position of the bolts and number them to prevent incorrect installation.



- Remove the dowel pin [1].

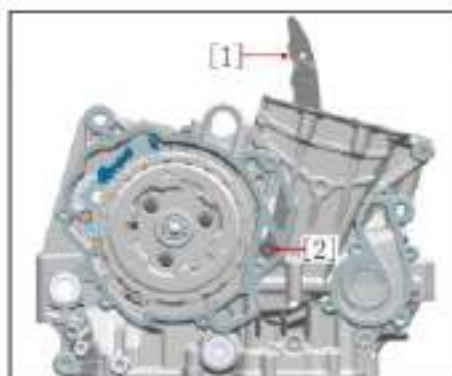


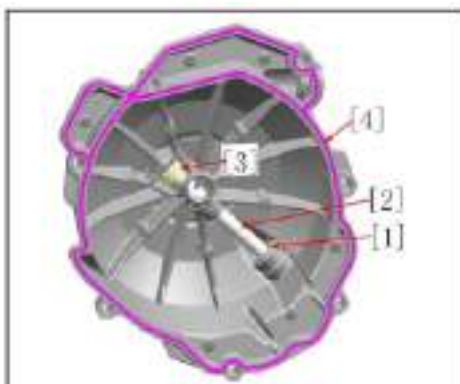
2. Remove the bolt and shaft sleeve [2].

3. Remove the chain tensioning panel [1] upward.

Notes

- To remove the tensioning panel, the cylinder head must be disassembled.





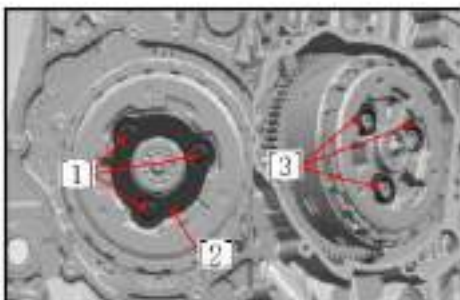
4. Control shaft disassembly/assembly

- Disassemble the snap ring [1];
- Remove the control shaft [2];
- Remove the control torsion spring [3];
- Remove the right crankcase cover gasket [4];
- Remove the crankshaft oil seal from the right crankcase cover.

Notes

- This snap ring must be replaced with a new one after disassembly.
- Replace the right crankcase cover gasket with a new one.
- Replace the oil seal with a new one.

The assembly sequence is the reverse of the disassembly order.



Note

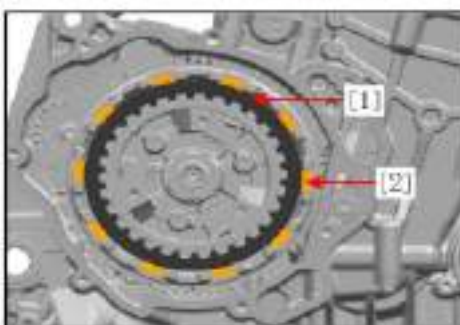
- Coat engine oil to the sliding surfaces of the control shaft and push rod.

5. Disassemble the clutch

- Loosen and remove the clutch lifting plate bolts [1] in 2-3 staggered steps, then remove the lifting plate [2] and compression spring [3].



- Remove the clutch pressure plate [1], clutch push rod [2], and snap ring [3].

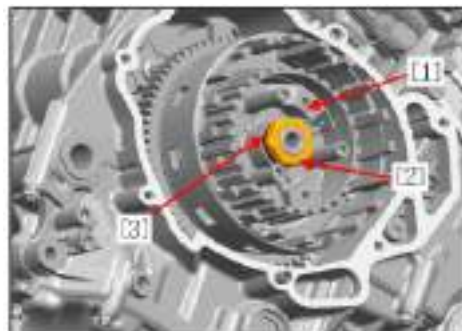


- Remove the clutch rod [1] and the friction plate [2].

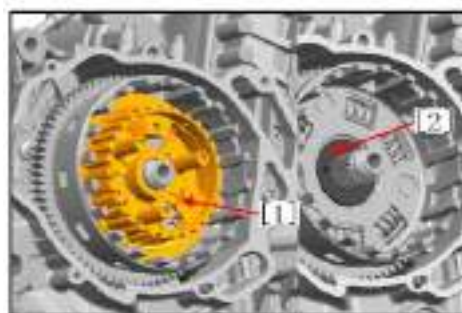
6. Use a special tool (anti-rotation wrench) to secure the clutch center bushing [1].
-Remove the hex nut [2] and the double-stacked locking washer [3].

Notes

•The gasket is usually attached to the clutch center bushing.



Remove the clutch center bushing [1] and spline washer [2].



8. Remove the needle roller bearing [1].

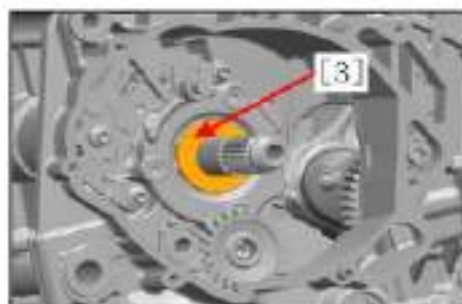
Notes

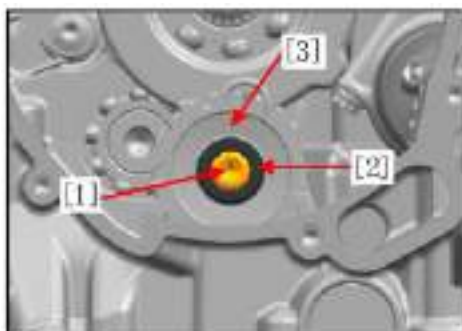
•Using a magnetic rod makes it easier to disassemble. Do not use pliers, otherwise the needle roller bearing will be damaged.

9. Remove the clutch housing assembly [2].



10. Remove the washer [3].

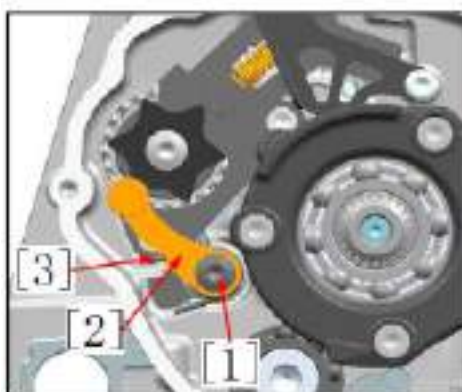




11. Remove the bolt [1]. Remove the oil pump idler shaft sleeve [2] and the oil pump idler gear assembly [3].

Notes

•Check the oil pump idler assembly for damage and deformation. If any, replace it.

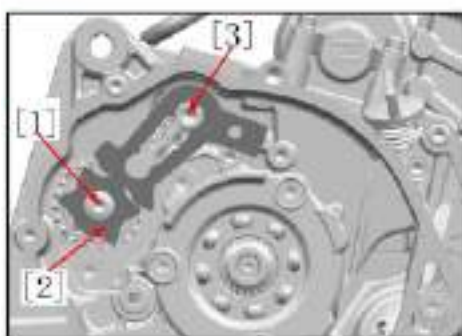


12. Disassemble the limit plate

-Remove the bolt [1];
-Remove the limit plate [2], along with the bushing and limit plate torsion spring [3].



13. Remove the bolt [1] and the shift shaft baffle [2]



14. Remove the bolt [1] and the star wheel [2]. Remove the shift shaft assembly [3] and the gasket.

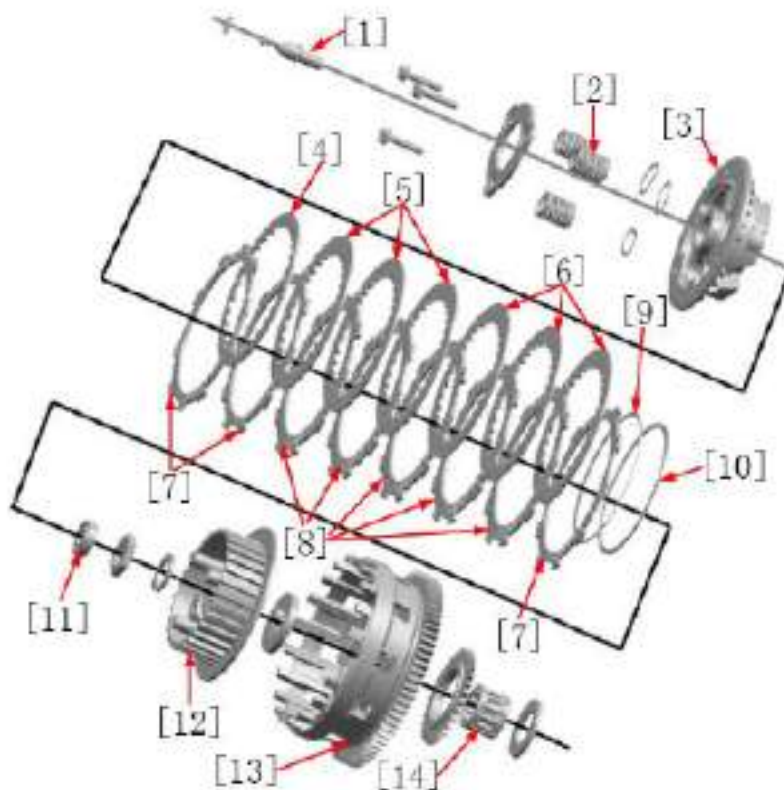
Notes

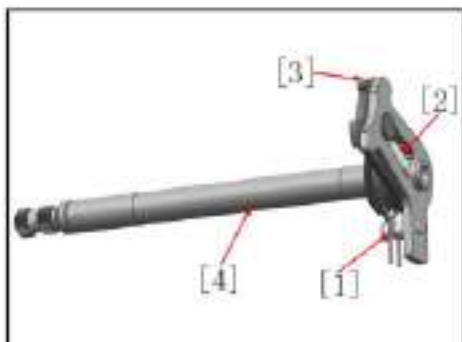
•The gasket is usually attached inside the engine.

Clutch/shift shaft Inspection and Installation

Clutch assembly inspection

- Check the clutch push rod [1] for damage or wear. If any, please replace it with a new part.
- Check the length of the clutch compression spring [2]. Clutch compression spring length ≥ 47.2 mm. If the measured value is less than the minimum, replace all clutch compression springs.
- Inspect the clutch pressure plate [3] for damage or wear. If any, please replace it with a new part.
- Check clutch steel pieces [4], [5], and [6] for damage or wear. If there is any abnormality, replace the steel piece.
- Check the clutch friction plates [7] and [8] for discoloration or wear. If there is any abnormality, replace the friction plate.
- Check the thickness of the clutch plate combination. Clutch plate set - thickness, new: 36.1 mm~36.7 mm; service limit: 35.3 mm. If the thickness of the clutch plate set exceeds the service limit, replace the entire set of steel plates and friction plates.
- Check if the disc spring [9] and disc spring washer [10] are damaged or worn. If any, please replace it with a new part.
- Check ball bearing [11] for any stuck or not smooth rolling. If there is stuck or rolling is not smooth, please replace it with a new one.
- Check the center bushing [12] for damage or wear. If any, please replace it with a new part.
- Check whether the common normal W5 of the driven gear in the clutch housing [13] is less than 27.61 mm. If any, replace the clutch housing assembly.
- Check if the needle roller bearing [14] is stuck or not rolling smoothly. If there is stuck or rolling is not smooth, please replace it with a new one.



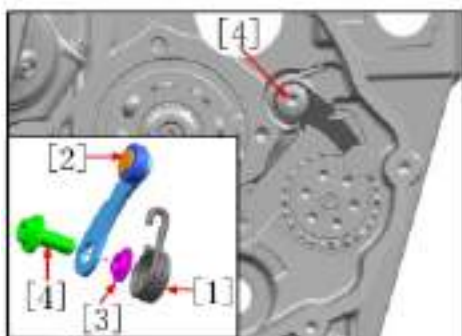


Shift shaft assembly inspection

Inspect the following components for damage, abnormal wear or deformation. Replace if necessary.

- Star wheel
- Limit plate assembly
- Limit torsion spring

Check the shift return torsion spring [1] and compression spring [2] for fatigue or wear; Check the shift slide plate [3] for wear or bend; Check the shift shaft [4] for wear, damage or deformation; if replacement is required, replace the shift shaft components as a set.



Assembly steps

1. Place the limit plate spring [1], limit plate assembly [2] and stepped bushing [3]. Install and fasten the bolt [4].

Notes

- Coat thread locker to the bolts.

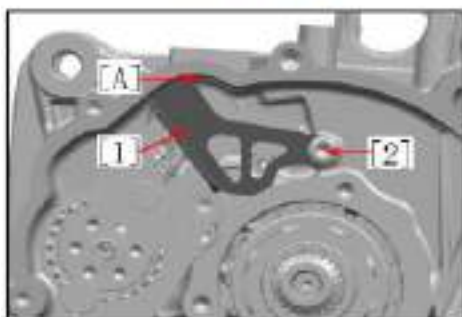
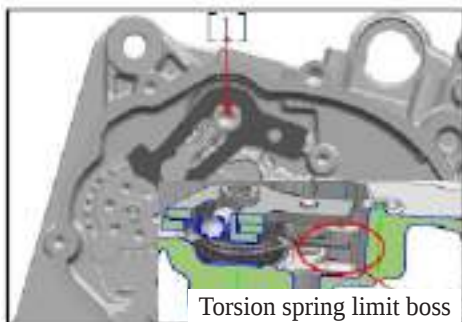
Torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

2. Insert the shift shaft component [1] and the gasket into the needle roller bearing bore, and align the shift return torsion spring with the torsion spring limit boss on the case to install it in place.

Notes

- Coat lubricating oil to the contact surface between the shift shaft and the needle roller.



- Place the shift shaft baffle [1] into groove [A]. Install and fasten the bolt [2]. Coat thread locker to the bolts.

Torque:

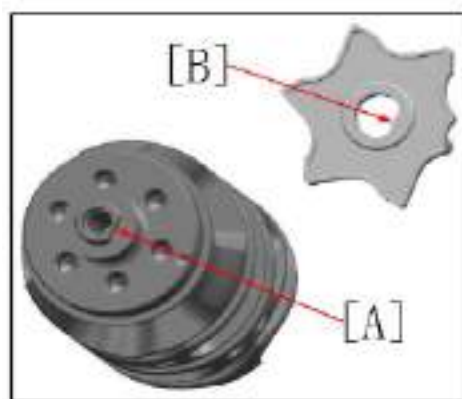
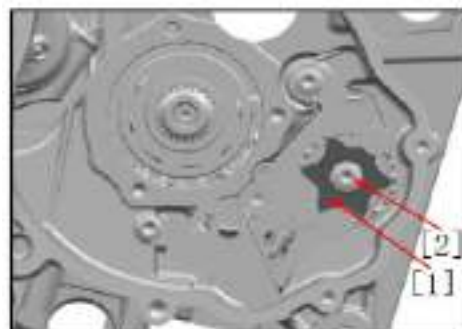
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

3. Place the star wheel [1].
Install and fasten the bolt [2] (Coat thread locker to the bolt) .

Notes

- Align the star wheel notch [A] with the transmission drum notch [B] for installation.

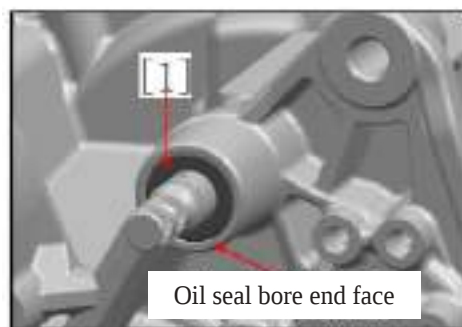
Torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

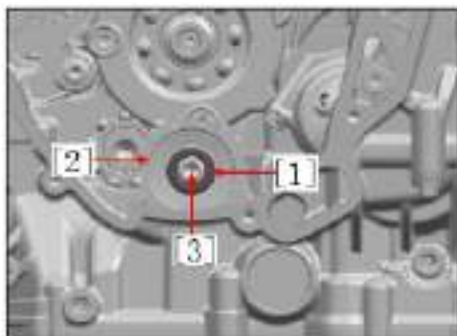


4. Install the shift shaft oil seal [1] onto the upper crankcase.
During press-fitting, the shift shaft oil seal is pressed inward with its opening facing, and the end face of the shift shaft oil seal is 0.5 mm lower than the end face of the oil seal bore.

Notes

- Replace the shift shaft oil seal with a new one after disassembly.





5. Fully lubricate the oil pump idler shaft sleeve [1]. Place the oil pump idler shaft sleeve [1] and the oil pump idler assembly [2]. Install and fasten the new bolt [3].

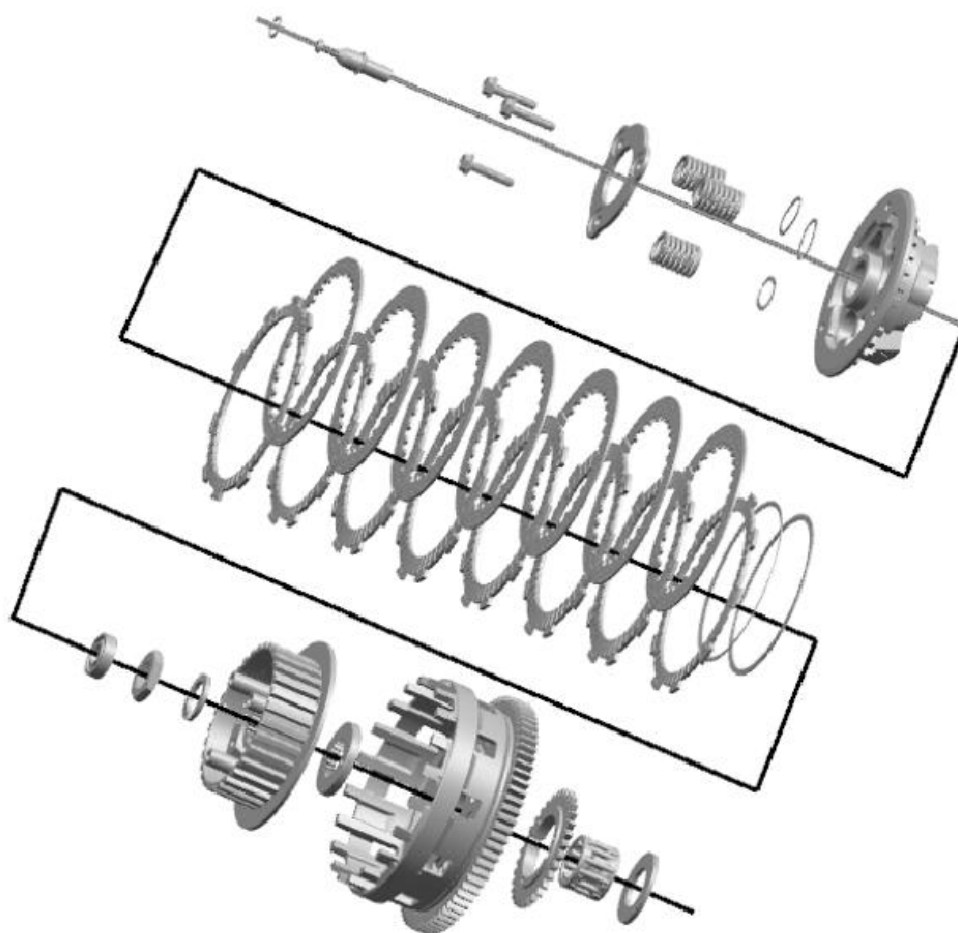
Notes

- Coat the thread with thread coating, and bolt [3] must be replaced.

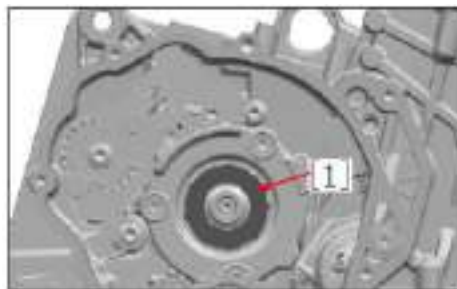
Torque:

15 N·m (1.5 kgf·m, 11.0 lbf·ft)

Clutch Installation Diagram:



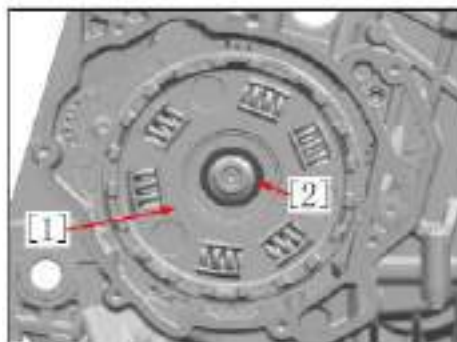
6. Install the washer [1].



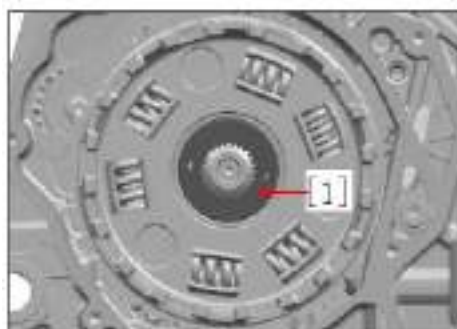
7. Place the housing assembly [1], gently rotate the housing assembly and the oil pump idler assembly back and forth to ensure smooth gear meshing, then install the needle roller bearing [2].

Notes

- Ensure the housing is properly installed, and the clutch housing driven gear is correctly meshing with the primary driving gear on the crankshaft and the oil pump idler assembly.

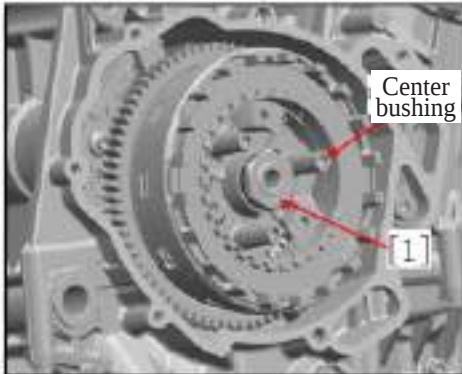


8. Install the spline washer [1].



9. Install the center bushing [1].





10. Install the hex nut [1] and double-stacked locking washer.

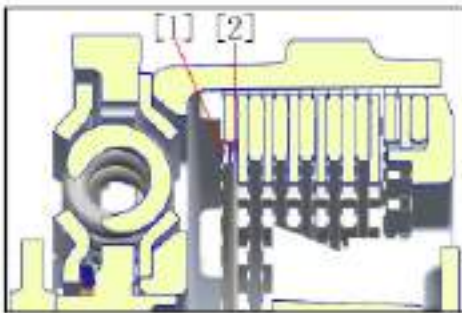
Using a special tool (anti-rotation wrench) to lock the central bushing, and tighten the hex nut [1] to the specified torque.

Notes

- Coat thread adhesive to the hex nut threads.

Torque:

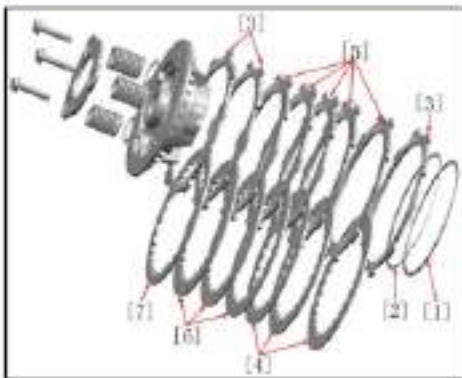
90 N·m (9.0 kgf·m, 66.3 lbf·ft)



11. Install the disc spring washer [1] and the disc spring [2].

Note: The conical surface of the disc spring [2] should face the disc spring washer [1] on the small end, and the large end should face the steel plate end.

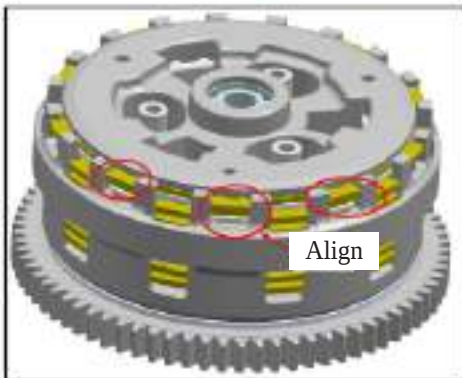
As shown in the figure.



12. First, install the narrow friction plates [3], then install the 1.6mm thick steel plates [4] for 3 pieces, alternating with the wide friction plates [5] for 3 pieces. Next, install the 2mm thick steel plates [6] for 3 pieces, alternating with the remaining 2 wide friction plates [5]. Finally, alternate the narrow friction plates [3] with the 2mm thick narrow steel plates [7], with the last friction plate [3] positioned closer to the pressure plate and displaced from the other friction plates.

The pressure plate is properly assembled and closely fitted to the friction plate.

As shown in the figure, the friction plates and steel plates are assembled alternately.



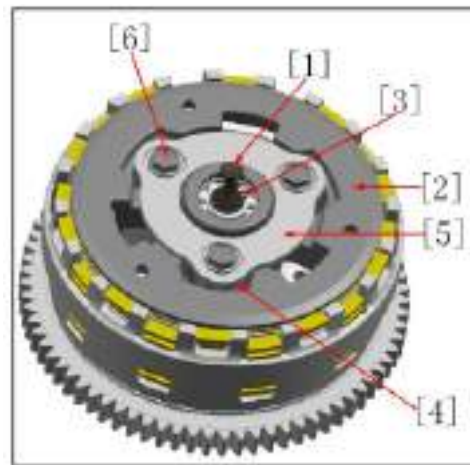
Notes

- Align the teeth of the friction plate with the gear grooves on the housing one by one.

- The top narrow friction plate aligns with the short gear groove of the clutch housing.

13. Install the clutch push rod [1] through the bearing bore of the pressure plate [2] and secure it in place with the snap ring [3]. Install the compression spring [4], the lifting plate [5], and the fastening bolt [6]. Tighten the pressure plate bolts gradually in several passes in a crisscross pattern, and torque them to the specified value.

Torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

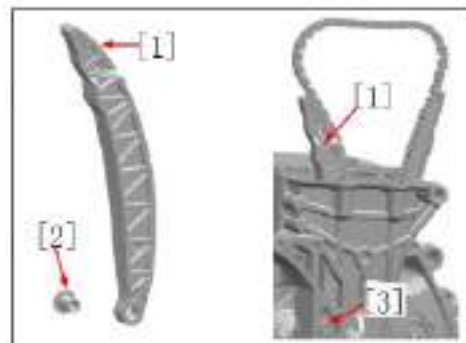


14. Install the chain tensioning panel [1] and the shaft sleeve [2]. Coat fastening agent to the thread of bolt [3] and fasten it securely.

Torque:
15 N·m (1.5 kgf·m, 11.0 lbf·ft)

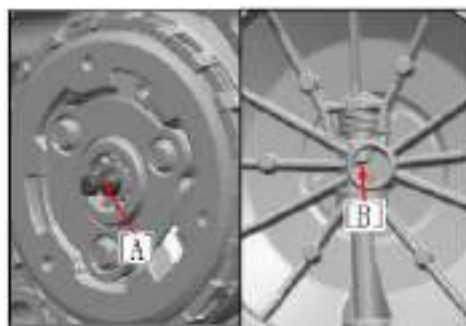
Notes

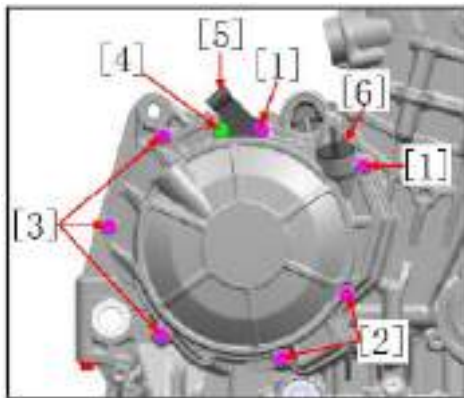
- Ensure there is no thread locker on the rod, otherwise, the tensioning panel may get stuck and cause damage.



15. Install the dowel pin on the upper and lower cases.

Align the clutch push rod (A) with the groove (B), then install the right crankcase cover and right crankcase gasket.

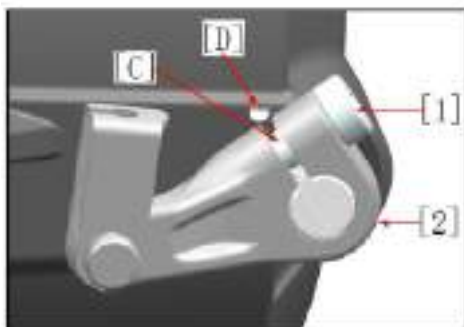




16. Install bolt [1] M6×35, bolt [2] M6×30, bolt [3] M6×25, bolt [4] M6×12, and the stay bracket [5], and pre-tighten them. Then tighten all bolts in a diagonal sequence.

Tighten the fuel filler cap [6] and the new O-ring.

Bolt torque value:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)



17. Remove the bolt [1] again. Remove the control arm assembly [2], adjust the angle, and reassemble it. Use a slotted screwdriver to rotate the control shaft clockwise to the end, then align the opening position (C) of the control arm assembly with the right cover marking point (D) .

Bolt torque value:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ Transmission shift mechanism

Disassemble the main shaft/counter shaft/transmission drum

Notes

• Before disassembling the transmission shift mechanism, the following components must be removed:

1. Right crankcase cover
2. Clutch assembly
3. Left crankcase cover
4. Starting system
5. Oil pan section
6. Oil pump assembly
7. Case section
8. Cooling System

• Pay attention not to damage the joint surface of the case during maintenance.

• Clean the joint surface before assemble the case cover.

• Before closing the case, evenly apply the end sealant on the closing surface, and clean up the excess sealant.

• Each bearing liner should be kept in place and not moved, otherwise it may cause major damage to the engine.

Disassemble the sprocket

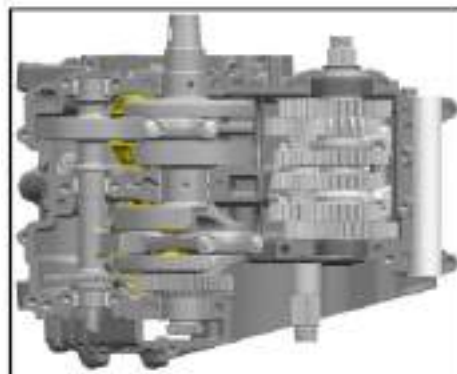
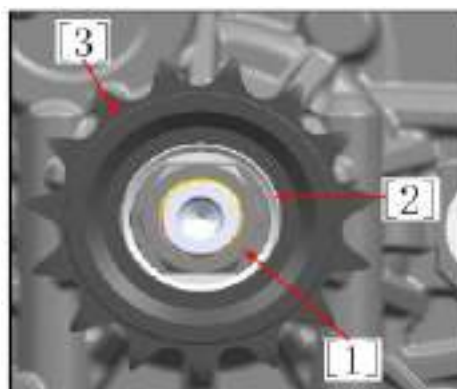
1. Remove the locking gasket, flatten the piece where the locking gasket is in close contact with the edge of the special-shaped nut using a tool, then shift to the gear position, and use a tool to disassemble the special-shaped nut [1], locking gasket [2], and sprocket [3].

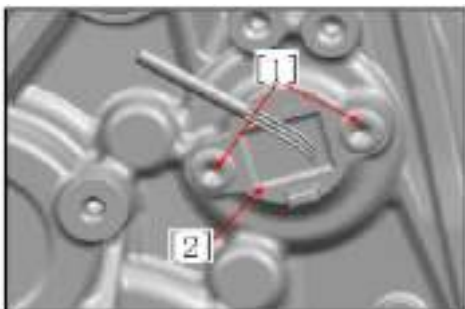
The installation process is the reverse of the removal process.

When installing, ensure that the locking gasket horn opening faces outward.

Tightening torque:
100 N·m (10.0 kgf·m, 73.7 lbf·ft)

Disassemble and separate the upper and lower crankcase.

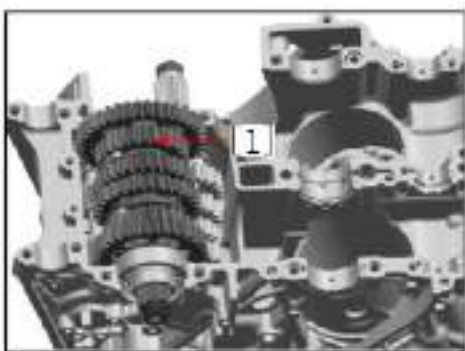




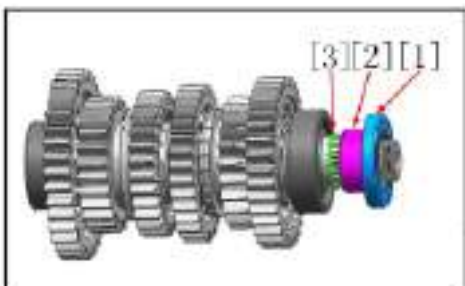
2. Remove the bolt [1] and the gear sensor [2].

The installation process is the reverse of the removal process.

Tightening torque:
6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



3. Remove the counter shaft [1].

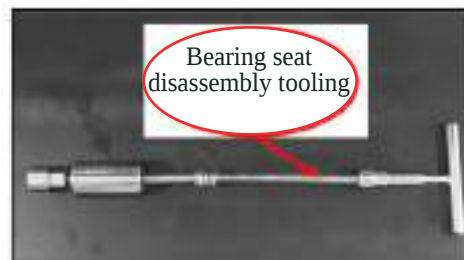
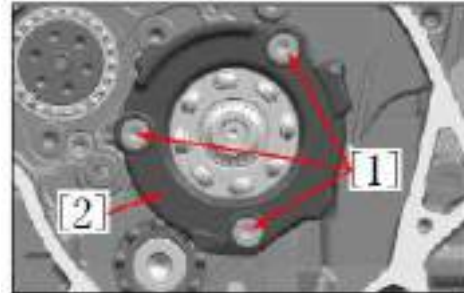


4. Remove the counter shaft oil seal [1], bushing [2], and O-ring [3].

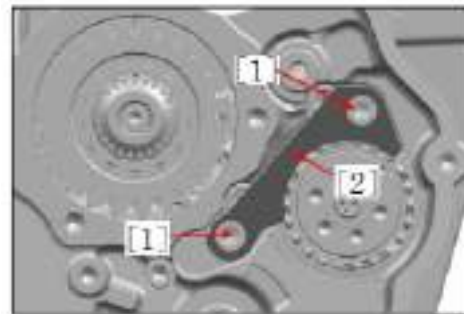
Notes

- Check the bearing and bushing for wear; replace if any is found.

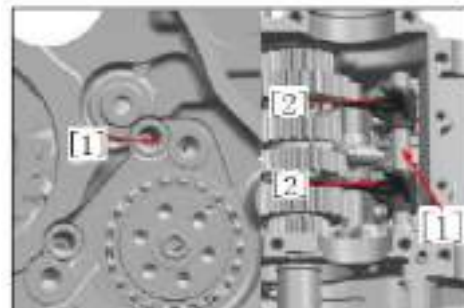
5. Remove the hexalobular countersunk screw [1], then use the dedicated tooling to remove the bearing seat [2].

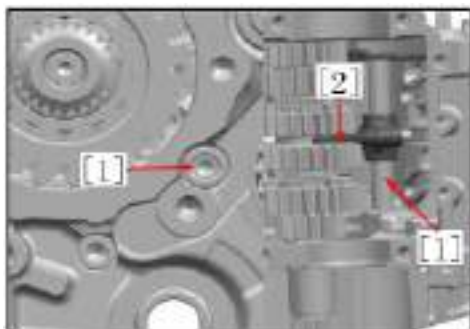


6. Remove the screw [1].
Remove the bearing baffle [2].

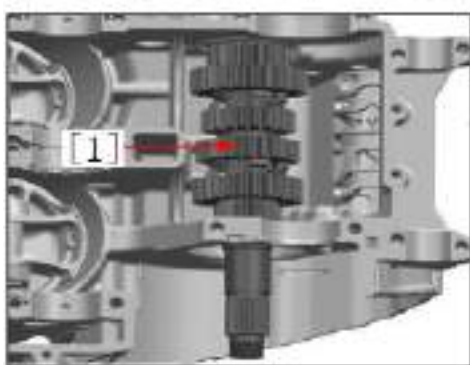


7. Install the appropriate M8 bolt on the countershaft shift fork shaft [1].
Remove the countershaft shift fork shaft [1] and the countershaft shift fork [2].

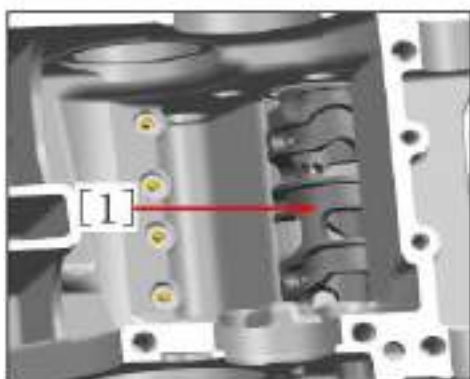




8. Install the appropriate M8 bolt on the main shaft shift fork shaft [1]. Remove the main shaft shift fork shaft [1] and main shaft shift fork [2]



9. Remove the main shaft [1].

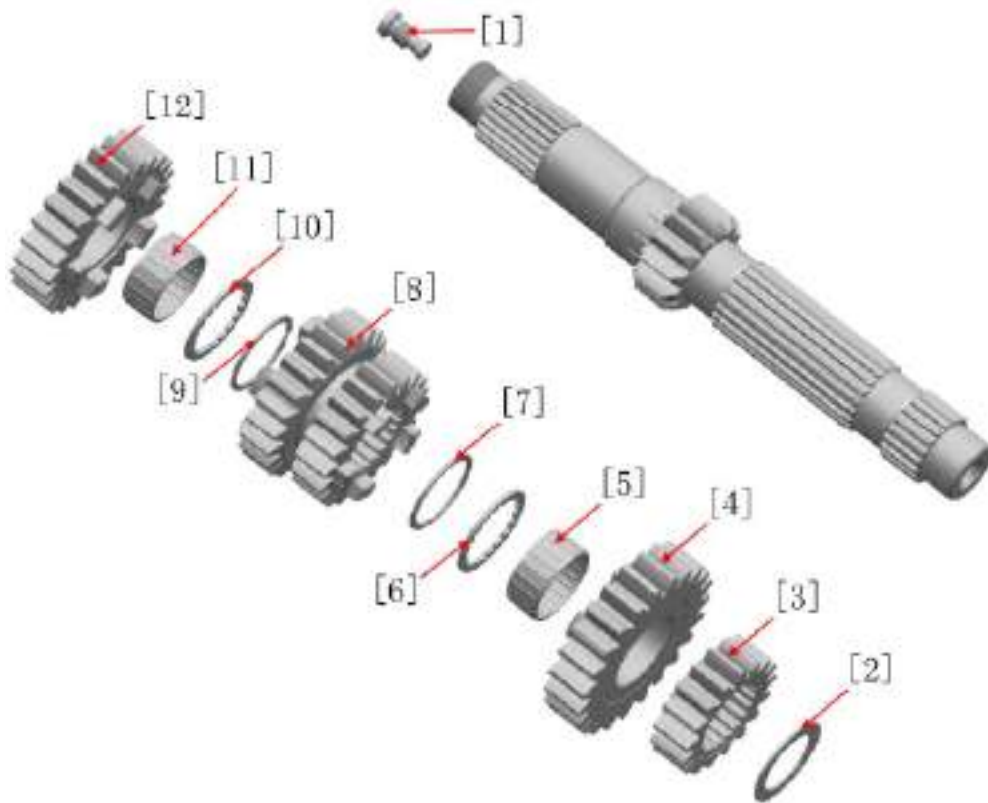


10. Remove the transmission drum [1] and the upper bearing section.



11. Remove the ball bearing [1].

12. Exploded View of Main Shaft



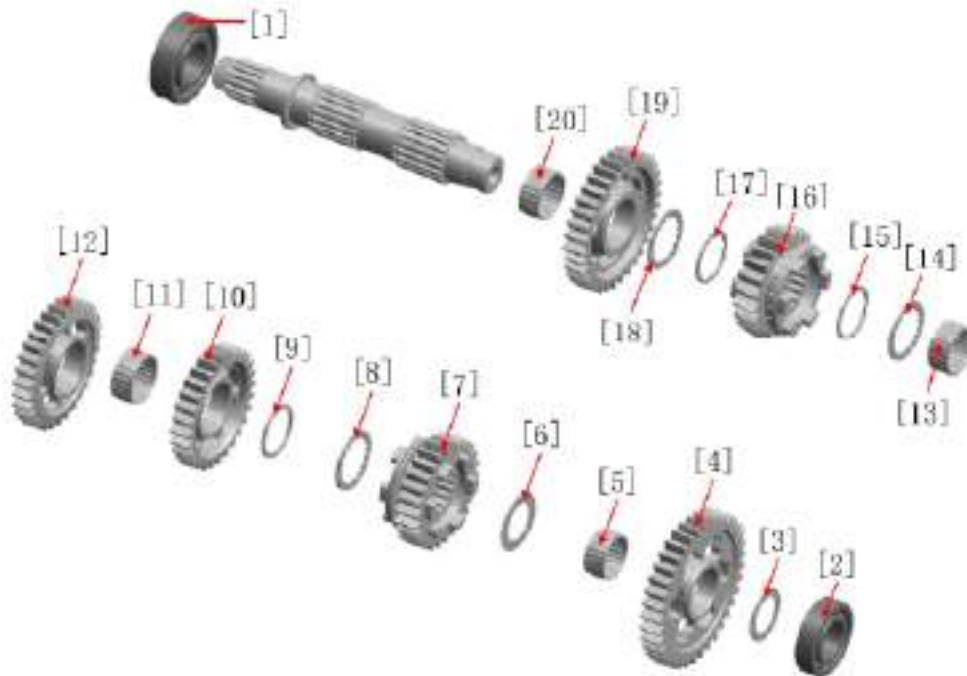
Fix Main Shaft

- Remove the oil passage plug [1].
- Remove the thrust washer [2] and main second gear [3].
- Remove the main sixth gear [4].
- Remove the needle roller bearing [5] and spline washer [6].
- Remove the spring washer [7].
- Remove the main third and fourth gears [8].
- Remove the spring washer [9].
- Remove the spline washer [10] and main fifth gear [12].
- Remove the needle roller bearing [11].

Notes

- Place the disassembled gear, bushing, washer and snap ring in a special container or in a straight line; Do not expand the circlip beyond its limit. When disassembling the circlip, first expand it, and then use the gear behind the circlip to push the circlip out;

13. Exploded View of Counter shaft



Fix Counter Shaft

- Remove the bearing [1].
- Remove the bearing [2].
- Remove the thrust washer [3] and counter first gear [4].
- Remove the needle roller bearing [5] and thrust washer [6].
- Remove the counter fifth gear [7] and splined washer [8].
- Remove the spring washer [9] and counter fourth gear [10].
- Remove the needle roller bearing [11] and counter third gear [12].
- Remove the needle roller bearing [13] and spline washer [14].
- Remove the spring washer [15] and counter sixth gear [16].
- Remove the spring washer [17] and spline washer [18].
- Remove the counter second gear [19] and needle roller bearing [20].

Notes

- Place the disassembled gear, bushing, washer and snap ring in a special container or in a straight line; Do not expand the circlip beyond its limit. When disassembling the circlip, first expand it, and then use the gear behind the circlip to push the circlip out;

14. Main and counter shaft assembly

Clean all parts with solvent 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 process is the reverse of the removal process.

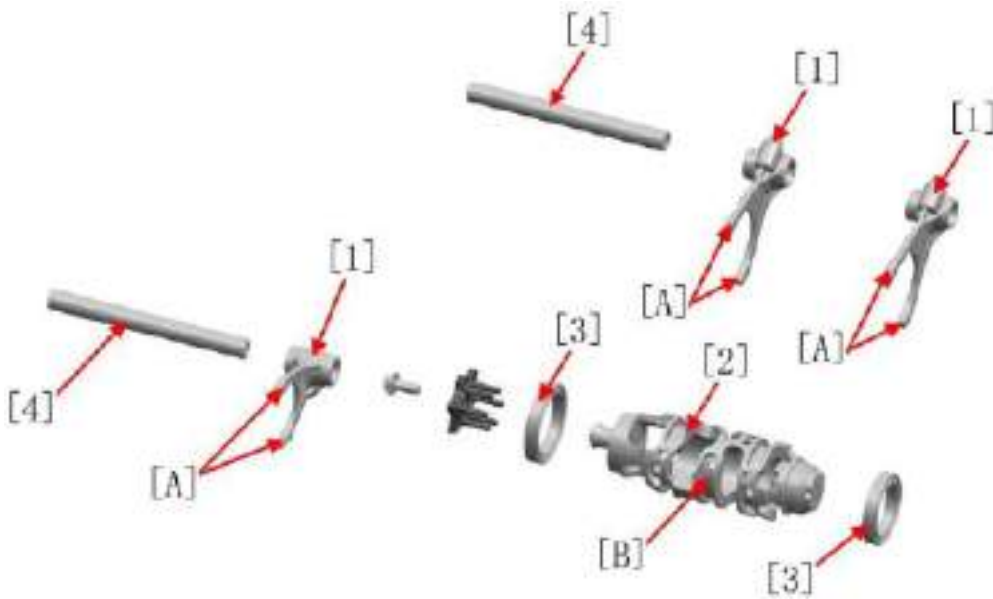
Notes

- Apply engine oil to each gear and check whether it rotates smoothly.
- Align the internal spline of the spline washer with the keyway.
- Use a new spring washer for each service.
- Ensure the spring washer is fully seated in the shaft groove after installation.

Transmission shift mechanism inspection and installation

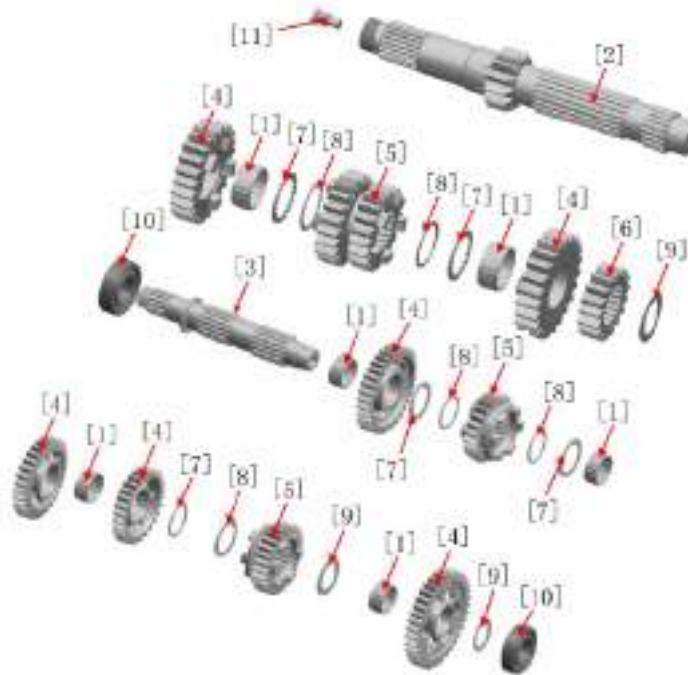
Check the shift mechanism

- Inspect the claw [A] of the main/counter shaft shift fork [1] for damage or wear (visually) , and replace it with a new one if any is found.
- Check the transmission drum [2] groove [B] for wear. If any, please replace it with a new part.
- Check the transmission drum bearing [3] for any stuck or not smooth rotation. Replace the bearing if it is stuck or rolling is not smooth.
- Check the shift fork shaft [4] for wear. If any, please replace it with a new part.
- Check if the main/counter shaft shift fork moves smoothly on the shift fork shaft. If any abnormal, please replace it with a new part.



Check the drive transmission system

- Check if the needle roller bearing [1] is stuck or not rolling smoothly. Replace the bearing if it is stuck or rolling is not smooth.
- Inspect the main shaft [2] and counter shaft [3] bearing mounting shaft diameters for damage or wear. If any, please replace it with a new part.
- Inspect the main shaft [2] and counter shaft [3] for any damage or wear on the gear surfaces. If any, please replace it with a new part.
- Check the idler gear [4] for damage or wear on the gear surfaces. If any, please replace it with a new part.
- Check the idler gear [4] and sliding gear [5] shift positions for damage or wear. If any, please replace it with a new part.
- Inspect the idler gear [4], sliding gear [5], and fixed gear [6] for damage or wear on the gear surfaces. Please replace the gear set if any.
- Check the gear surface of the sliding gear [5] for damage or wear. Please replace the gear set if any.
- Check if the sliding gear [5] moves freely on the main shaft [2]. If the gear is stuck, replace the sliding gear or Main shaft.
- Check if the sliding gear [5] moves freely on the counter shaft [3]. If the gear is stuck, replace the sliding gear or counter shaft.
- Check the spline washer [7] for damage or wear. If any, please replace it with a new part.
- Use new spring washers [8] and thrust washers after each service.
- Check bearing [10] for damage or wear. If any, please replace it with a new part.
- Check if the oil passage plug [11] is clear. If the oil plug has a blockage, clean the oil passage plug and replace it with a new part if any.

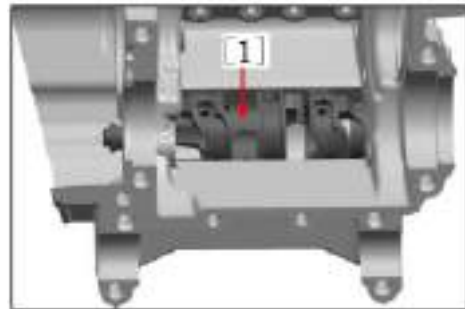


Assembly steps

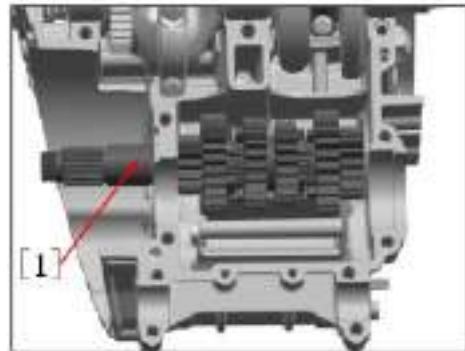
1. Secure the transmission drum and install the ball bearing [1]

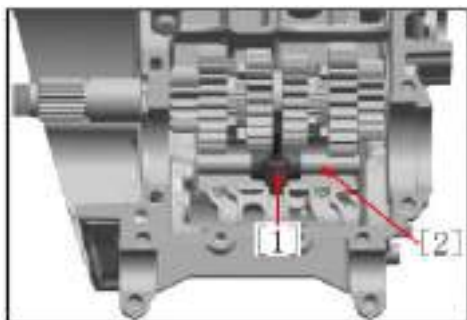


2. Install the transmission drum [1] and lubricate the ball bearings with engine oil.



3. Install the main shaft [1]

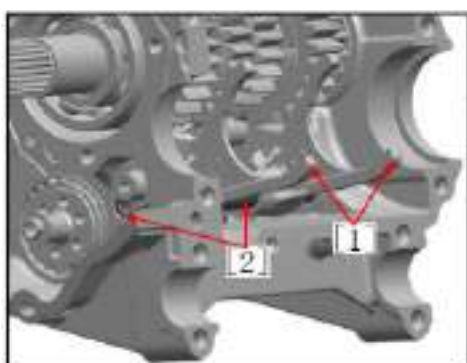




4. Place the main shaft shift fork [1].
Install the shift fork shaft [2].

Notes

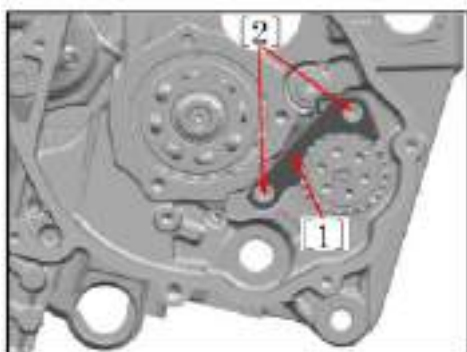
- The main shaft shift fork marked "EBSC" faces toward the sprocket.
- Coat engine oil to the working surface of the shift fork shaft for lubrication.



5. Place the countershaft shift fork [1].
Install the shift fork shaft [2].

Notes

- The countershaft shift fork labeled "EBSC R/L" faces the clutch.
- Coat engine oil to the working surface of the shift fork shaft for lubrication.



6. Place the bearing baffle [1]. Install and
fasten the bolt [2]

Notes

- Coat thread locker to the bolts.

Torque:

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

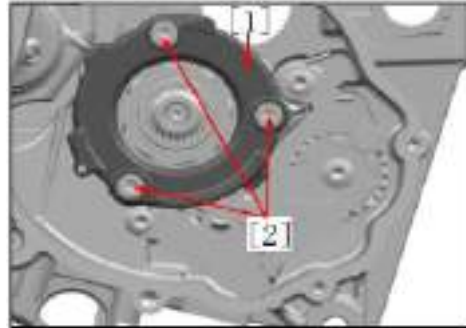
7. Place the bearing seat [1] and bearing. Install and fasten the bolt [2].

Notes

- Coat thread locker to the bolts.

Torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



8. Place the counter shaft [1]. Roller bearing [2], ball bearing [3], counter shaft oil seal, bushing [4] and O-ring.

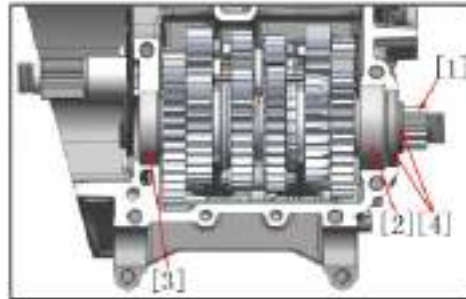
Notes

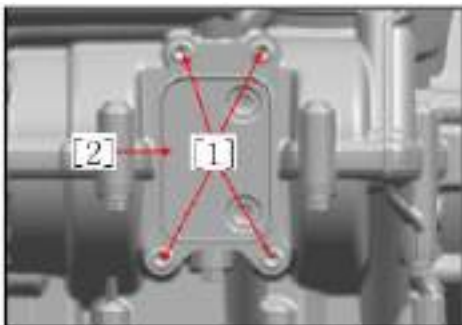
- After disassembling, it is necessary to replace the counter shaft oil seal and O-ring with new ones.

Install the lower case and fasten it securely.

Torque:

For details on torque and fastening methods, see "Bolt tightening methods for key parts" on page 164





※ **Cooling and lubrication mechanism**

Disassemble cooling and lubrication mechanism

1.Oil cooler

Disassembly/installation

-Remove bolt [1] and engine oil cooler [2].

-Remove the oil cooler sealing gasket [1].

The installation sequence is reversed from the removal sequence.



Notes

•Ensure the “Outer Side” marking on the oil cooler sealing gasket faces outward.

Bolt tightening torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

2.Oil full-flow filter

Disassembly/installation

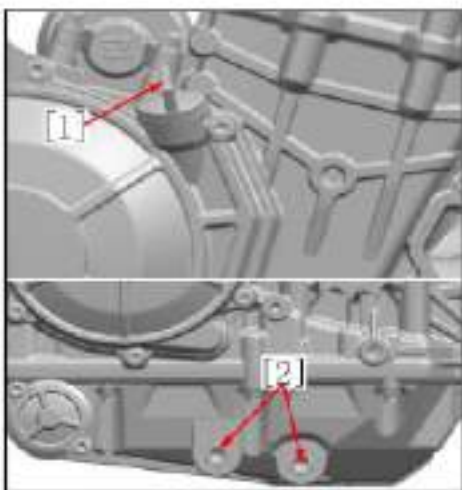
-Engine oil replacement: Stop the engine and remove the fuel filler cap [1].

-Remove the drain bolt [2] along with the O-ring. Check the O-ring. Remove the oil full-flow filter and drain the oil.

-After draining the engine oil, install the oil full-flow filter and drain bolt [2] along with the O-ring.

-Tighten the oil drain bolt to the specified torque.

-Add engine oil up to the upper scale line on the turn.



Torque:

20 N·m (2.0 kgf·m, 14.7 lbf·ft)

Engine oil adding volume (see "Engine oil inspection and replacement" on page 37 for details) .

3. Oil fine filter assembly

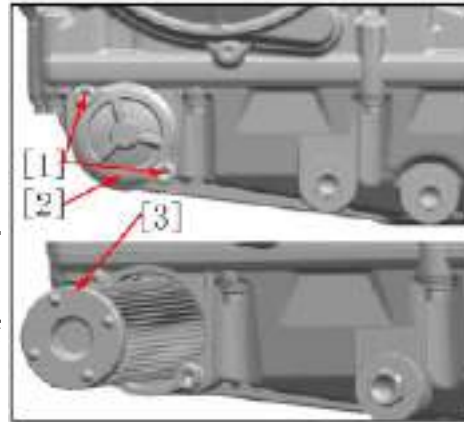
Disassembly/installation

- Drain the engine oil and remove bolt [1].
- Remove the engine oil fine filter cover [2] and the O-ring.
- Remove the engine oil fine filter assembly [3].

The installation process is the reverse of the removal process.

Bolt tightening torque:
6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

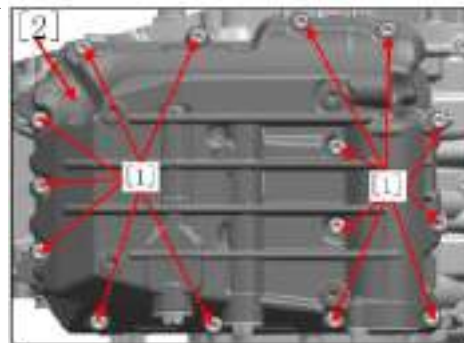
For the engine oil fine filter assembly, please refer to "Regular maintenance and adjustment" on page 23.



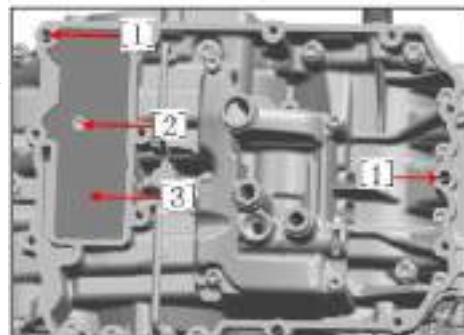
4. Oil pan

Disassembly/installation

- Remove the oil pan bolts diagonally [1].
- Remove the oil pan assembly [2].

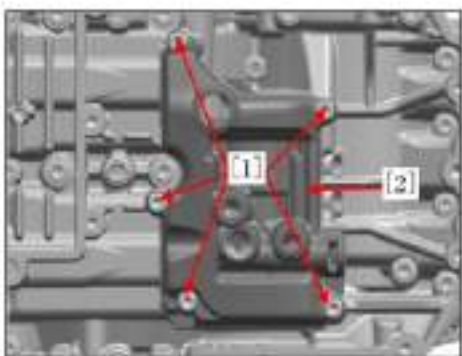


- Remove the dowel pin [1] and oil pan gasket.
- Remove the screw [2];
- Remove the oil separator [3].





-Remove the oil passage connecting pipe assembly [1].

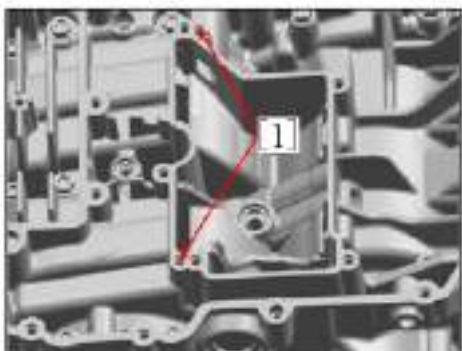


5.Oil pump assembly

Disassembly/installation

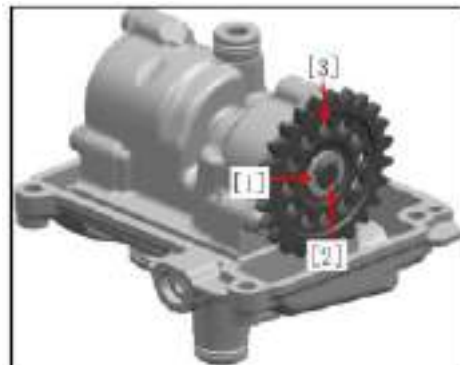
-Remove the bolt [1];
-Remove the engine oil pump assembly [2].

-Remove the dowel pin [1].

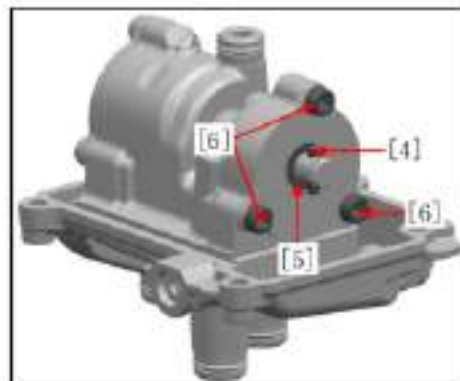


Disassemble/Assemble

- Remove the snap ring [1] and gasket [2].
- Remove the oil pump gear [3]



- Remove the needle roller [4] and the gasket [5]. Remove the screw [6];
- Remove the oil pump cover.

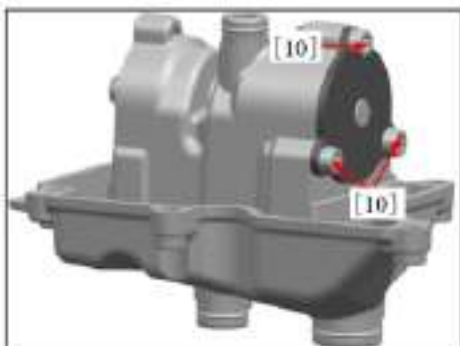


- Remove the outer rotor [7].
- Remove the inner rotor [8].

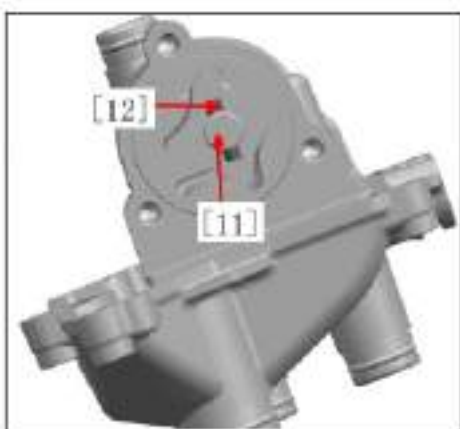


- Remove the needle roller [9]

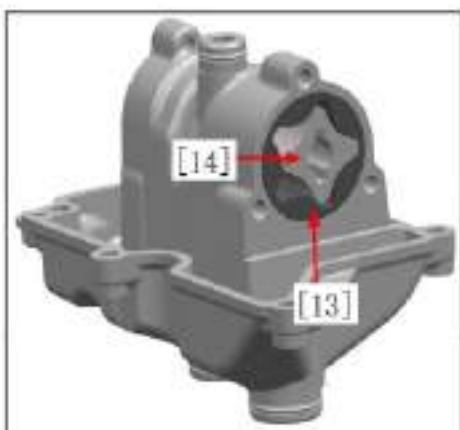




- Remove the bolt [10].
- Remove the oil pump cover.



- Remove the oil pump shaft [11] and needle roller [12].



- Remove the outer rotor [13] and inner rotor [14].

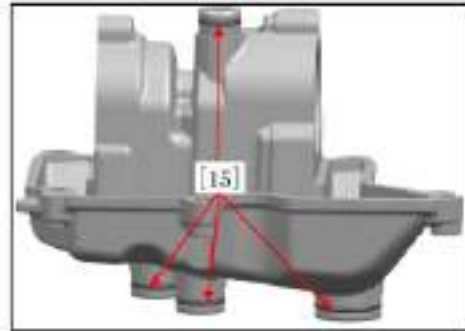
-Remove the O-ring [15].

The installation process is the reverse of the removal process.

Notes

- After disassembly, replace the O-ring with a new one and coat engine oil.
- Apply thread locker to the bolt.
- After assembly, rotate the oil pump gear by hand for more than 2 turns to ensure there is no stuck.

Bolt tightening torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)



Inspection and installation of oil pump/oil pan

Check the oil pump

Use a feeler gauge to measure the clearance between the outer rotor and the oil pump housing, as well as between the inner and outer rotors.

The clearance between the inner and outer rotors tips is ≤ 0.2 mm;

Clearance between outer rotor outer diameter and housing: 0.14–0.23 mm



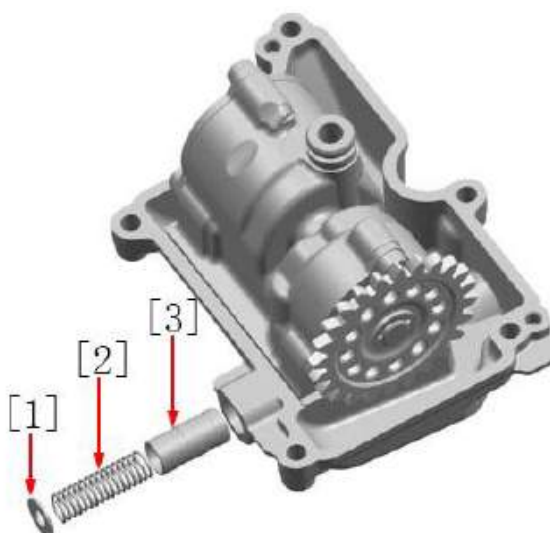
Inner and outer rotors and oil pump shaft inspection

- Check the oil pump inner and outer rotors [1] for damage or wear. Replace the oil pump if any damage or wear is found.
- Check the oil pump shaft [2] for damage or wear. Replace the oil pump shaft if necessary.
- Check the oil pump cover for damage or wear. Replace the oil pump cover if necessary.



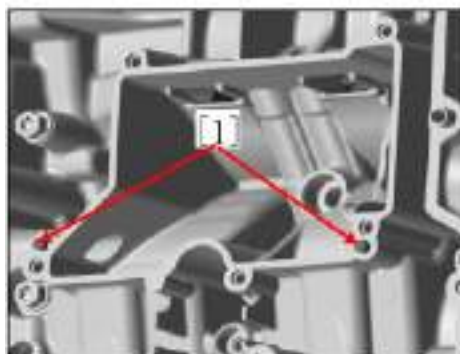
Oil pressure relief valve inspection

- Remove the washer [1].
- Remove the spring [2] and measure its free length. Minimum free length of oil pressure relief valve spring: 40 mm. If the length is less than the limit, replace the spring.
- Check the valve [3] for damage or wear. Replace if necessary.
- Ensure the valve [3] moves smoothly within the oil pump housing. If sticking occurs, replace the valve [3] or the oil pump housing. Thoroughly lubricate the valve [3] and spring [2], then install them. Install the gasket [1].



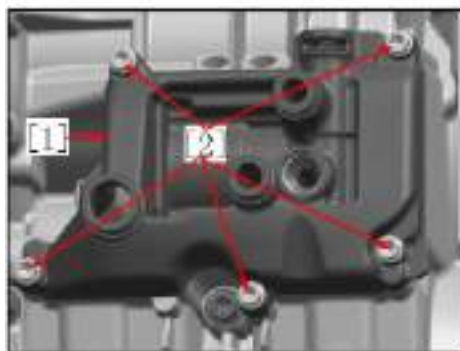
Assembly steps

1. Install the dowel pin [1].

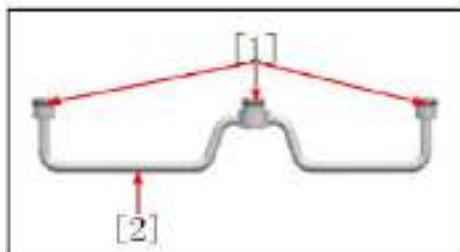


2. Lubricate the O-ring of the oil pump. Install the oil pump assembly [1]. Tighten the mounting bolts [2] to the specified torque.

Torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)



3. Apply lubrication to the new O-ring [1] and install it on the oil passage connecting pipe assembly [2].

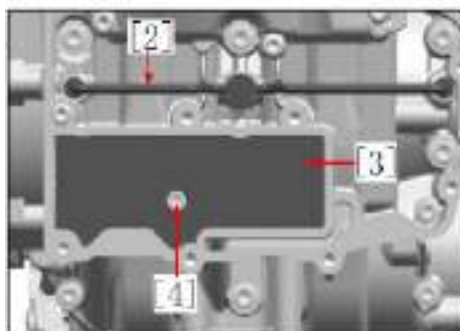


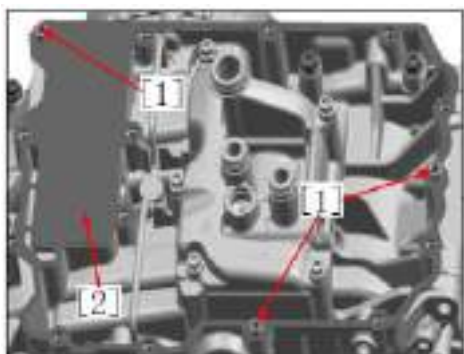
4. Place the oil separator [3]. Install and fasten the bolt [4].

Notes

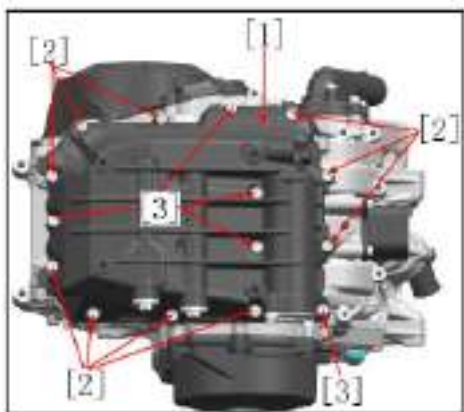
- Coat thread locker to the bolts.

Torque:
3.0 N·m (0.3 kgf·m, 2.0 lbf·ft)





5. Install the dowel pin [1] and oil pan gasket [2].



6. Install the oil pan assembly [1], install 10 bolts M6×30 [2], install 5 bolts M6×35 [3], and fasten the bolts diagonally to the specified torque.

Torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

※ Starting system

**Disassemble left crankcase cover/
double-idler gear assembly**

1.Remove the left crankcase cover

-Remove the adjusting bore cap [1] and the O-ring.

Adjusting bore cap torque:
10 N·m (1.0 kgf·m, 7.4 lbf·ft)

-Loosen the crankcase cover bolts diagonally in several steps [2].

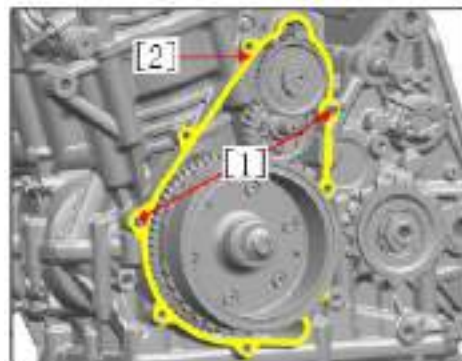
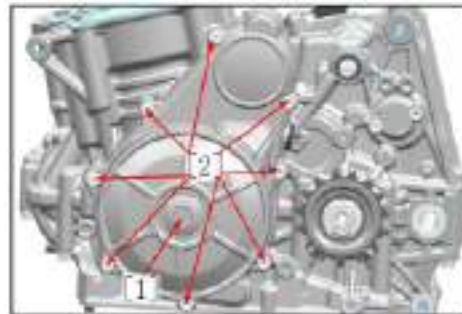
Notes

- The left crankcase cover (rotor housing) is subject to the rotor's magnetic attraction, so be careful when disassembling and installing.
- Replace the adjusting bore cap O-ring with a new one.

2. Remove the dowel pin [1] and the left crankcase cover gasket [2].

Notes

- Replace the left crankcase cover gasket with a new one.



3. Magneto rotor and trigger

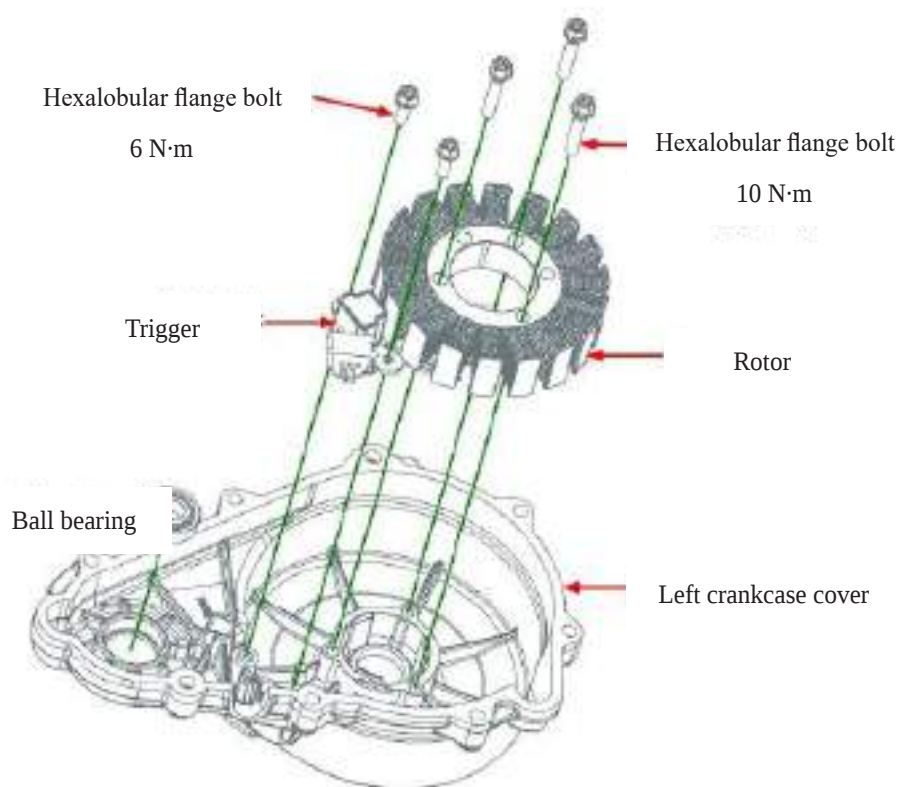
Disassembly/installation

-Remove the left crankshaft cover.

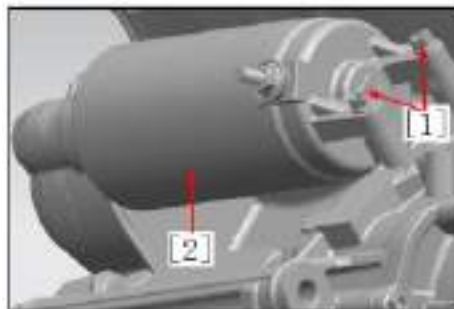
Disassemble and install the ball bearing/rotor/trigger as shown in the figure below.

- Coat thread adhesive to the thread of the rotor and trigger bolt.
- Use a special tool (inner bearing puller) to remove the bearing.
- Use a dedicated tool to press-fit the new bearing (secure the left crankcase cover during press-fitting).

The installation sequence is reversed from the removal sequence.



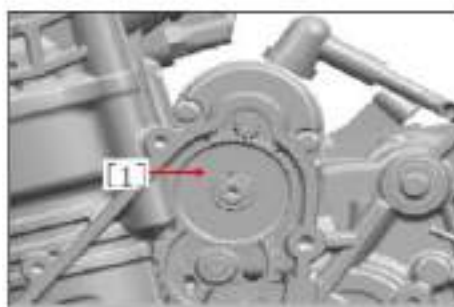
4. Remove the bolt [1] and the starting motor assembly [2].



5. Remove the double-idler gear assembly [1] and the gasket.

Notes

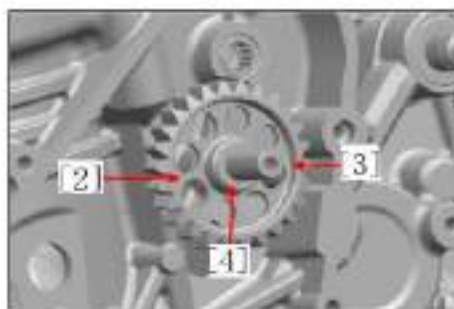
- The gasket is usually attached inside the engine.

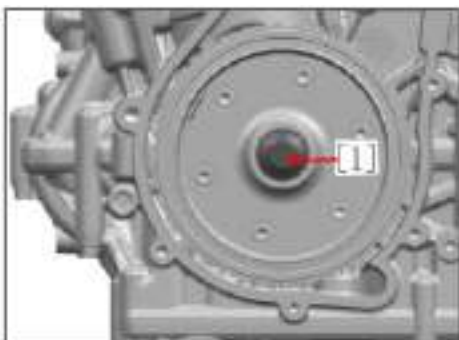


6. Remove the idler mandrel [2], idler [3], as well as the needle roller bearing and gasket [4].

Notes

- The gasket is usually attached inside the engine.





7. Remove the magneto bolt assembly [1]. Install special tools (press-fit tools) . Mount the special puller tool onto the magneto rotor. Secure the special tool and, by tightening the bolt, remove the magneto rotor together with the electric starter gear assembly.

Notes

- To prevent damage to the crankshaft taper-end threads during removal, do not allow the tool to press directly against the crankshaft; instead, position the tool against the head of the bolt.

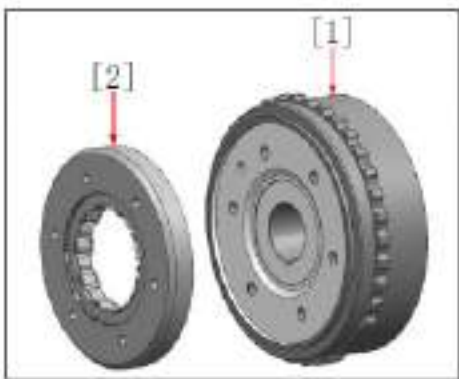


8. Disassemble the one-way clutch assembly.

- Remove the rotor.
- Rotate the electric starter gear assembly counterclockwise and remove it [1].



Secure the magneto rotor [1] with the rotor fixing tooling, and remove the one-way clutch assembly fastening bolt [2].

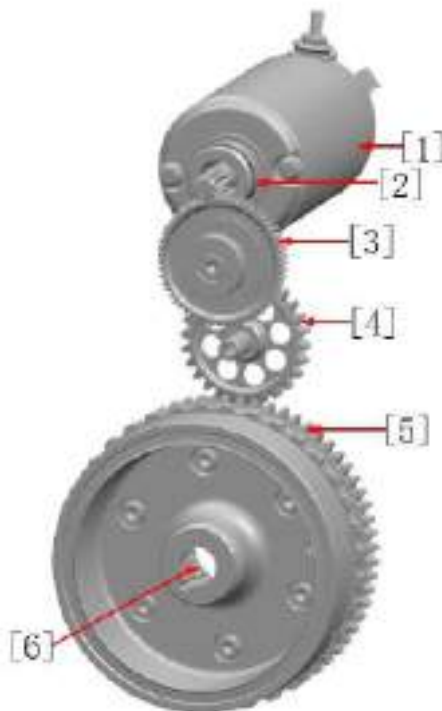


Remove the one-way clutch assembly [2] from the magneto rotor [1].

Starting system inspection and installation

Check the starting system

- Inspect the starting motor [1] gear for damage or wear. If any, replace the starting motor. Replace the starting motor and also replace the O-ring [2].
- Connect the negative wire of the 12V power supply to the housing of the starting motor and the positive wire to the interface of the starting motor. When the circuit is closed and the starting motor does not rotate, replace the motor.
- Inspect the double-idler gear assembly assembly [3] and bearings for damage or wear. Please replace the double-idler gear assembly assembly and bearings if any.
- Check the idler [4] and bearings for damage or wear. Replace the idler pulley and bearing if any.
- Check the electric starter gear [5] for damage or wear. Please replace it assembly if any.
- Check the gear meshing and the electric starter gear bearing [6] for any stuck or smooth issues. If there is stuck or not smooth rolling, replace the electric starter gear assembly.



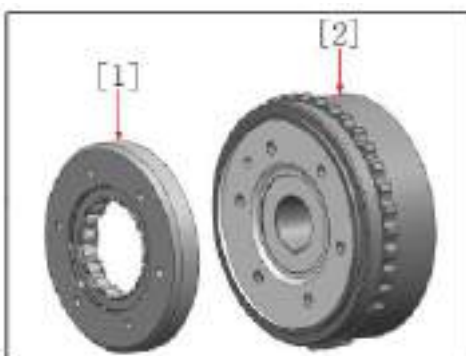
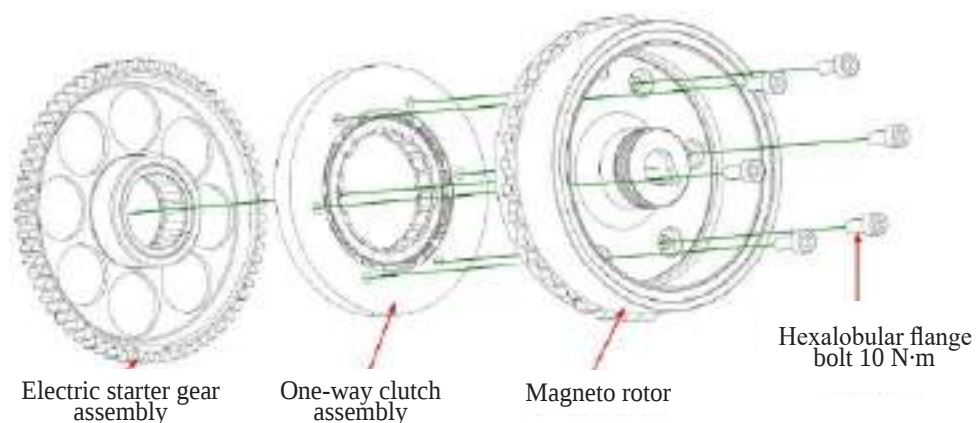


One-way clutch operation inspection

Check the operability of the one-way clutch assembly by rotating the electric starter gear assembly [1].

Check if the electric starter gear assembly rotates smoothly counterclockwise; clockwise rotation is not allowed. If it can rotate clockwise, the one-way assembly must be replaced.

Assembly steps



1. Apply clean engine oil to the contact surface of the one-way clutch assembly. Install the one-way clutch assembly [1] onto the rotor [2].

2. Secure the magneto rotor [1] using the rotor fixing tooling.
Install and tighten the fastening bolts [2] to the specified torque.

Notes

- Apply thread locker to the threads of the one-way clutch fixing bolt.

Torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

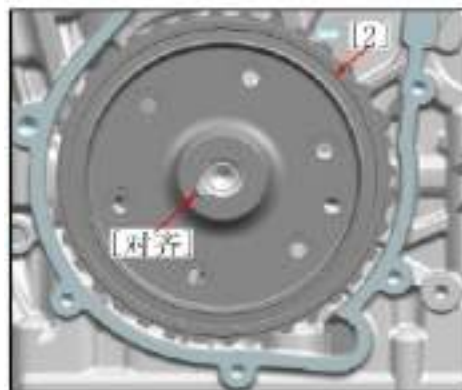
3. Rotate the electric starter gear assembly counterclockwise and install it onto the magneto rotor [2].

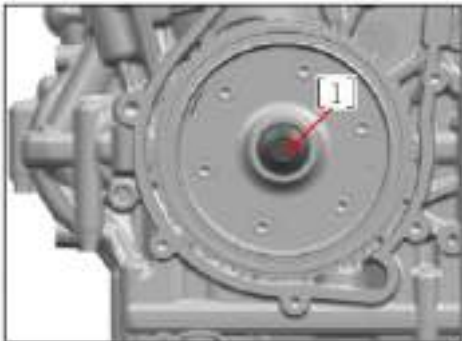
4. Check if the semi-circular key [1] is damaged.
Thoroughly clean the engine oil and impurities from the crankshaft cone and the rotor bore.

5. Install the magneto rotor [2].

Notes

- Align the semi-circular key on the crankshaft with the keyway on the rotor.





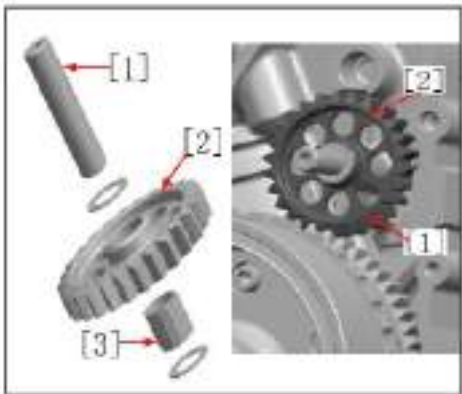
6. Coat the threaded surfaces and mounting surfaces of the rotor bolts with clean engine oil.

Install the magneto bolt [1].

Secure the crankshaft with a locking bolt (see "Bolt tightening methods for key parts" on page 164 for details on magneto bolt tightening) and tighten the bolt to the specified torque.

Torque:

90 N·m (9.0 kgf·m, 66.3 lbf·ft)



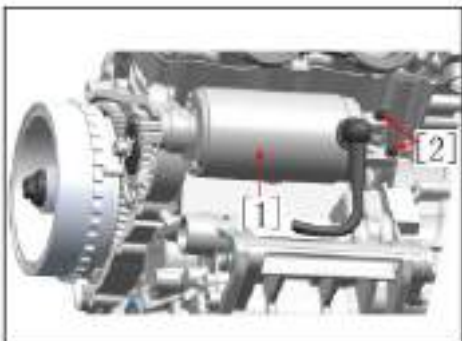
7. Idler mandrel [1], idler [2], needle roller bearing [3], and gasket.



8. Double-idler gear assembly [1] and gasket.

Notes

- The gasket is installed on the lower shaft hole end face of the double-idler gear assembly, while there is no gasket on the upper shaft hole end face.



9. Starting motor assembly [1], fasten with bolts [2] to the specified torque.

Notes

- Coat engine oil for lubrication of the O-rings on the starting motor assembly.

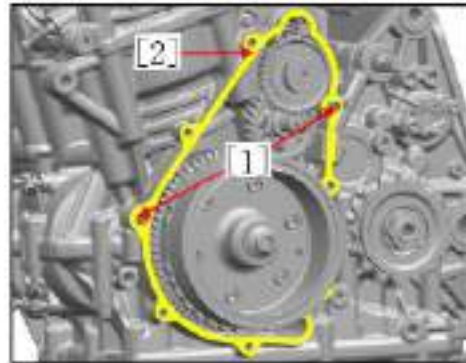
Torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

10. Install the dowel pin [1] and the left crankcase cover gasket [2].

Notes

- Replace the left crankcase cover gasket with a new one.



11. Install the left crankcase cover

-Install bolts [1] M6×35 and bolts [2] M6×30, then tighten the left crankcase cover bolts in a diagonal sequence.

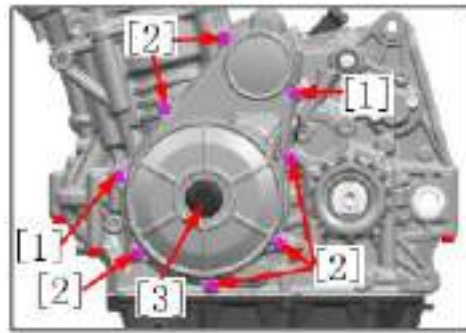
-Install and adjust the bore cap [3] and the O-ring.

Bolt:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Adjusting bore cap torque:

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



Notes

- Replace the adjusting bore cap O-ring with a new one.

Front Wheel, Suspension, Steering

Section 1 Maintenance Instructions	264
Section 2 Troubleshooting	264
Section 3 Position Of Components	265
Section 4 Front Wheel Assembly.....	266
Section 5 Front Shock Absorber	268
Section 6 Front Shock Absorber Disassembly	269
Section 7 Inspection Of Front Shock Absorber Assembly.....	271
Section 8 Front Shock Absorber Assembly	272
Section 9 Handlebars (Left And Right) And Components.....	276
Section 10 Steering Handlebar, Handlebar Upper Clamp	279
Section 11 Upper Bracket, Steering Handlebar Lower Socket	280
Section 12 Steering Damper	281
Section 13 Steering Stem Assembly	281

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)

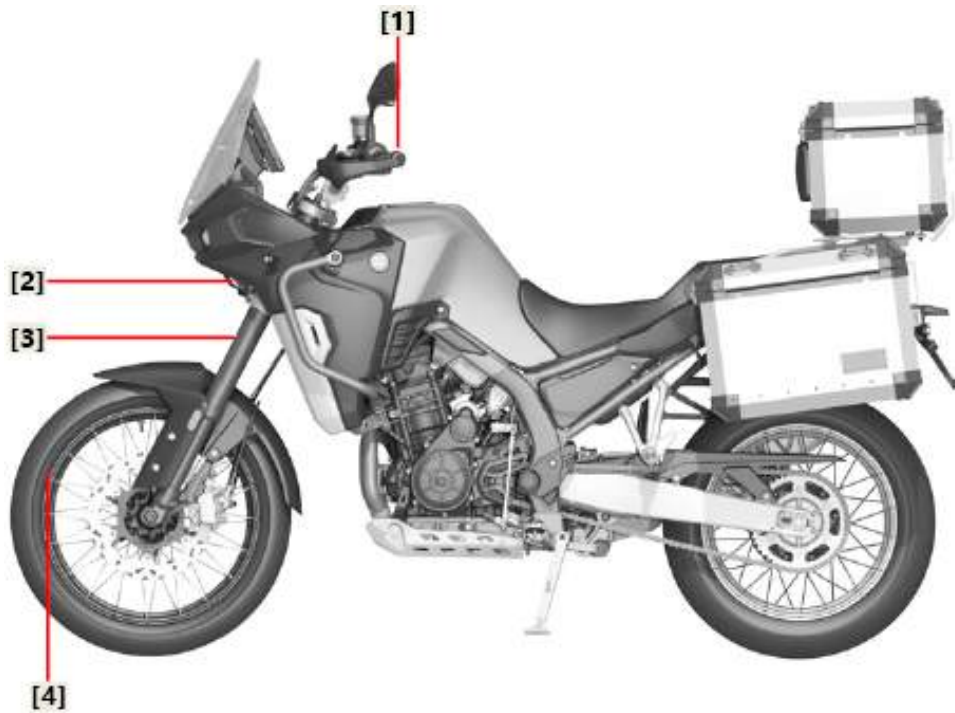
Hard suspension

- 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

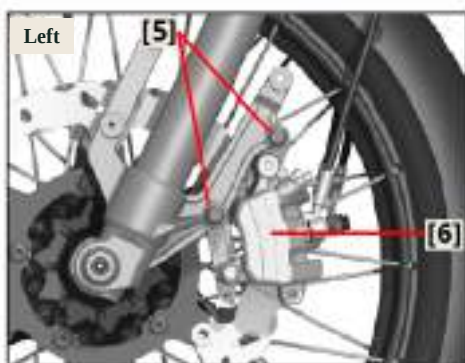
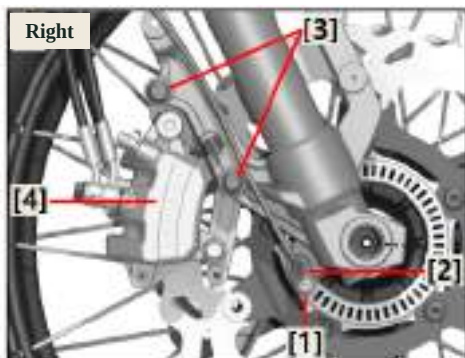
Abnormal noise from front suspension

- 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) Steering damper	(3) Front shock absorber	(4) 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 65 for details.

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

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 [5] 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 and front shock absorber

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Front shock absorber tightened to front wheel axle

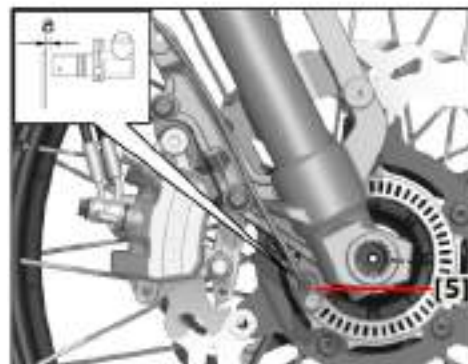
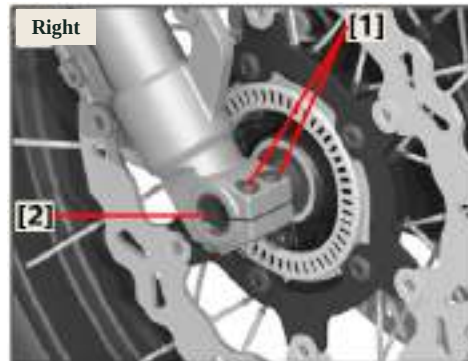
22 N·m (2.2 kgf·m, 16 lbf·ft)

Front brake caliper-left and right 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 266 for details

Notes

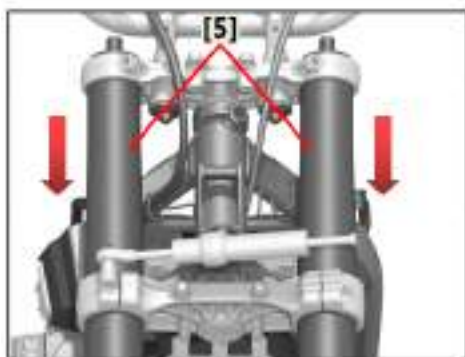
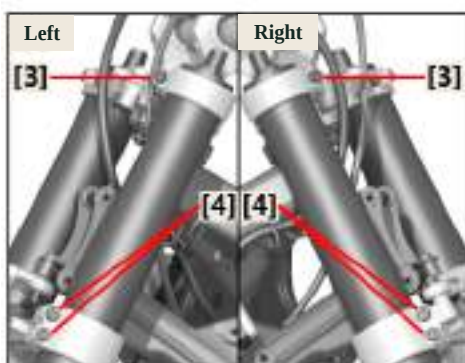
• Do not hang the brake caliper on the brake hose.
• Do not operate the brake handle after removing the brake caliper.

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 lower bracket locking bolt.

• 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 268 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 [4].

a. Press the spring bushing [3] with the spring compression tool;

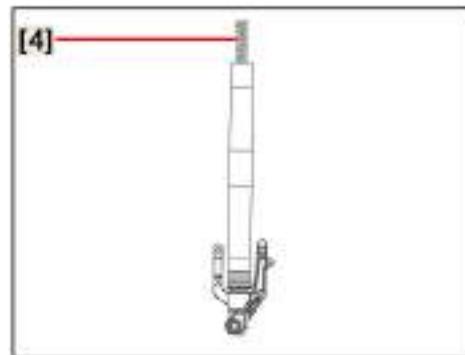
b. Use a double-ended wrench to support the upper end of the bushing;

c. Use a double-ended wrench to hold the nut [2] in place while removing the adjusting end cap bolt [1];

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

e. Remove the shock absorber spring bushing and locking nut;

f. Remove the front shock absorber spring.

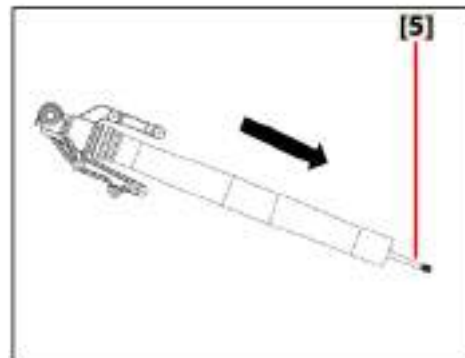


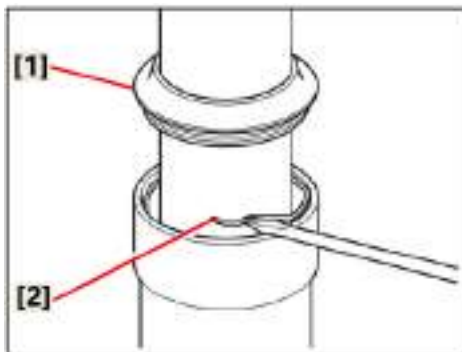
3. Emissions

-Front shock absorber oil

Note

•When draining the shock absorber oil, move the shock absorber damping rod [5] up and down several times.





4. Remove the dustproof seal ring and oil seal circlip

- Dustproof seal ring [1];
 - Oil seal circlip [2].
- (Use a slotted screwdriver)

Notes

- Do not scratch the shock absorber fork tube.

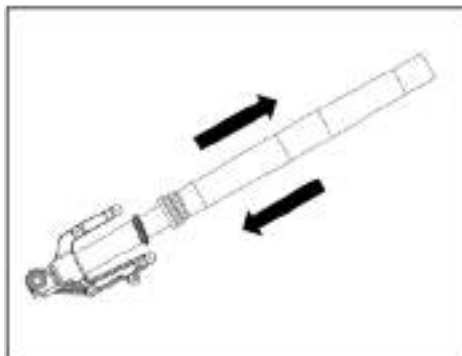
5. Disassemble outer tube and fork tube

-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.

※ **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

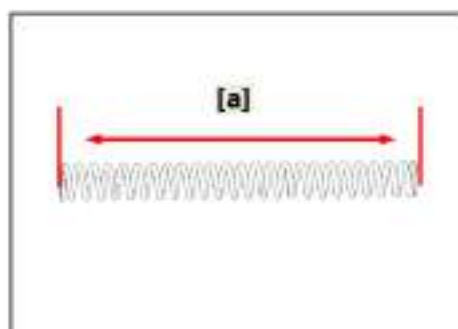
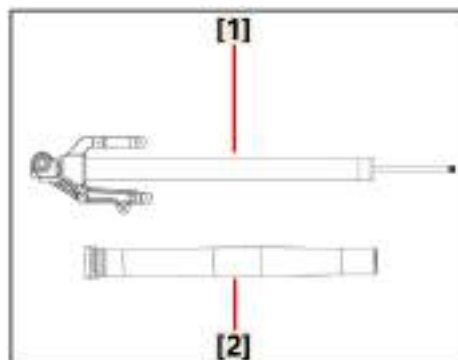
- Do not try to repair bent fork tubes as it may lead to danger.

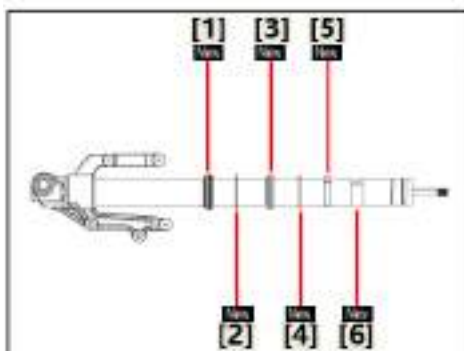
2.Measurement

- Free length of spring [a]
- Off-specification → Replace.
- Standard/Limit: 570mm/558.6mm

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.Lubrication

- The outer surface of the cross pipe.

Recommended oil/KOVE dedicated damping oil

2.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

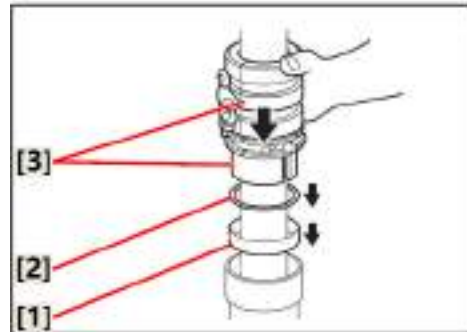
- Make sure that the side of the oil seal with the number is facing the bottom of the inner tube.
- Before installing the oil seal, lubricate the lip of the oil seal with lithium soap base grease.
- Before installing the oil seal, cover the top of the fork tube with a plastic bag to protect the oil seal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

3.Installation

- Outer tube;
(to fork tube)

4.Install

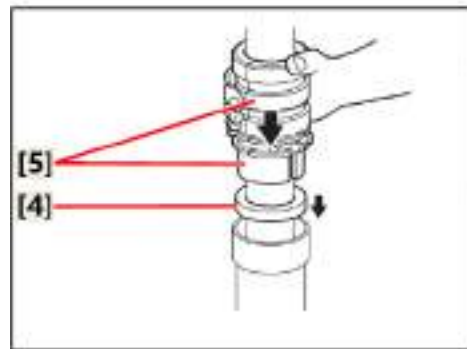
- Outer tube bushing [1];
- Washer [2].
(Use the front shock absorber oil seal hammer [3])
- Adjustable front shock oil seal hammer (36–46 mm)



5.Install

- Oil seal[4].
(Use shock absorber oil seal hammer [5])

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

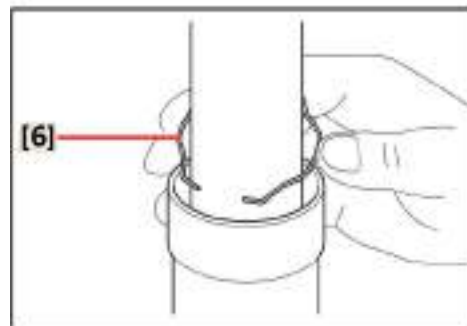


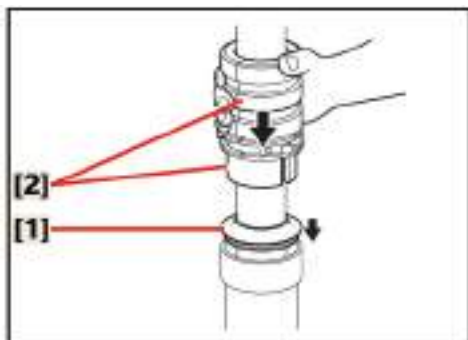
6.Install

- Oil seal circlip [6].

Note

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





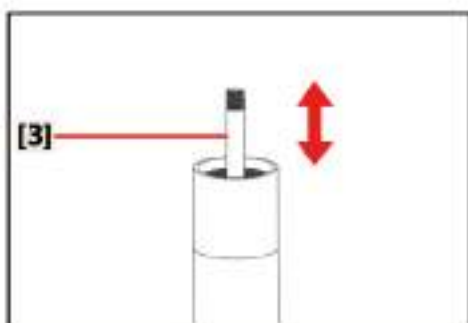
7.Install

- Dustproof seal ring[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.Add

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



The manufacturer provides specialized shock absorber oil (OILNO-00M01) .

The oil filling amount of the left and right shock absorbers is 415 ± 2 ml

Notes

- Always use the recommended damping 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.

9.After the front shock absorber is filled with oil, slowly pump up and down the rod [3] 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.

10. 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.

11. 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. Fix the nut [6] with a double-end wrench and tighten the bolt [5] of the adjuster end cap;
- 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 seal after each disassembly and assembly.

12. Installation

- Regulator end cap [8] (to Outer tube [9])

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)

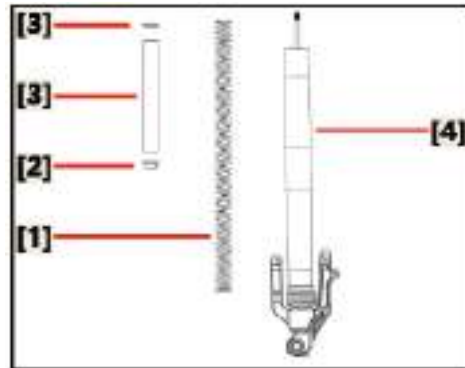
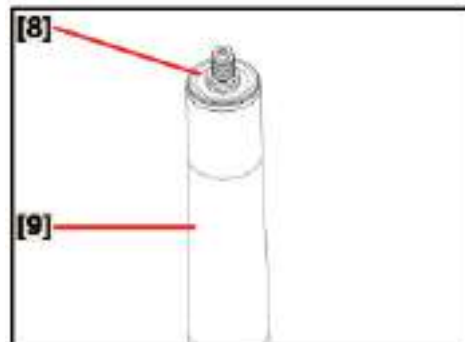
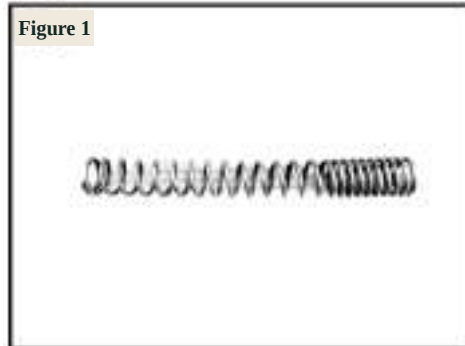


Figure 1





※ **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.

- Hand windshield (left and right) and steering handlebar counterweight [1];

See "Frame, Body Trim, Exhaust System" on page 65 for details.

- Bolt [2];

- Handlebar grip - left [3];

- Clutch switch harness plug [4];

- Bolt [5];

- Clutch lever assembly [6];

- Locking screws for the upper and lower covers at handlebar switch [7];

- Open the handlebar switch - left upper cover [8];

- Screw [9]

- Handlebar switch - left [10].

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 screws [4], [6]

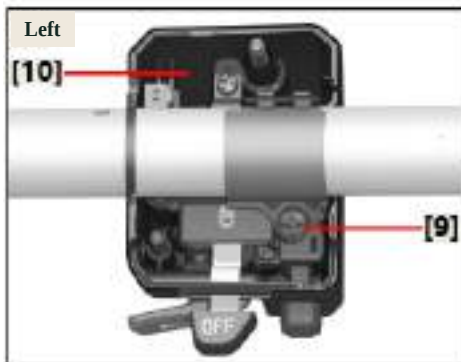
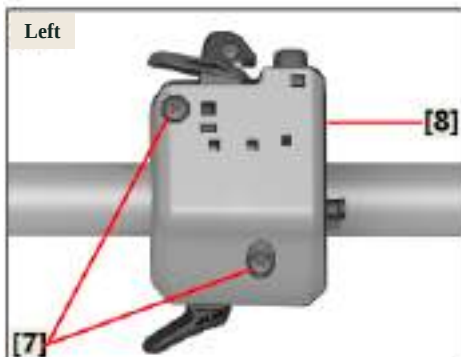
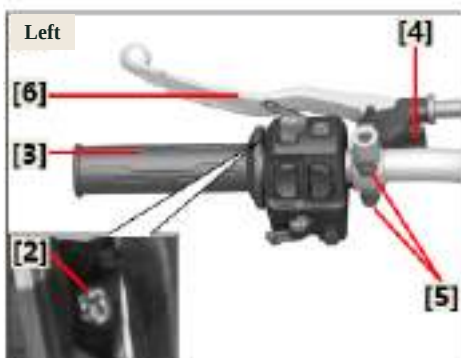
2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Handlebar grip - left and handlebar tube [2]

3.0 N·m (0.3 kgf·m, 2.0 lbf·ft)

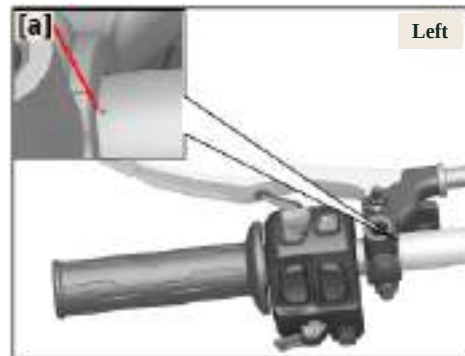
Clutch handle assembly mounting bolt [5]

10 N·m (1.0 kgf·m, 7.4 lbf·ft)



Note

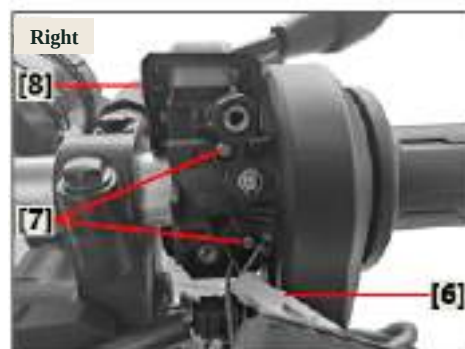
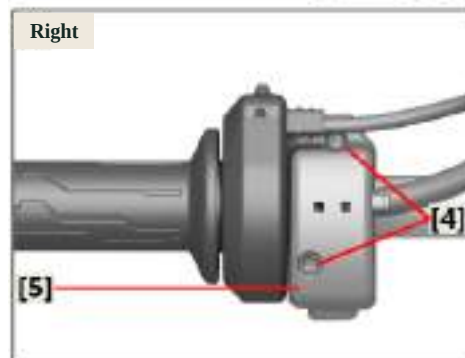
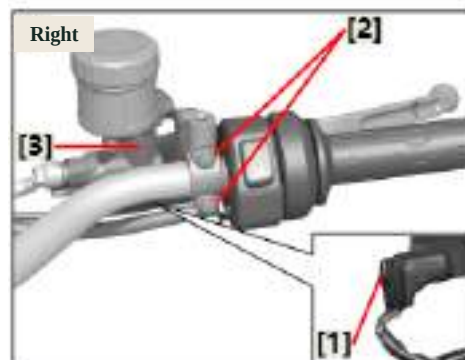
•When installing the clutch lever assembly, align the joint surface of the clutch lever retaining socket with the engraving point [a] on the left of the steering handlebar.

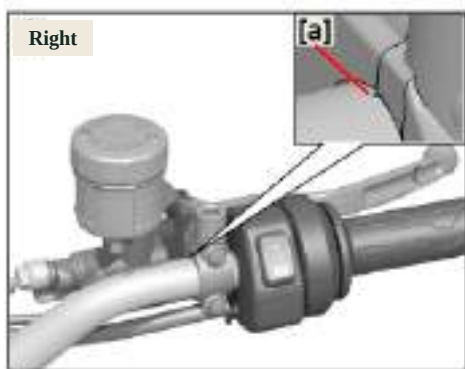
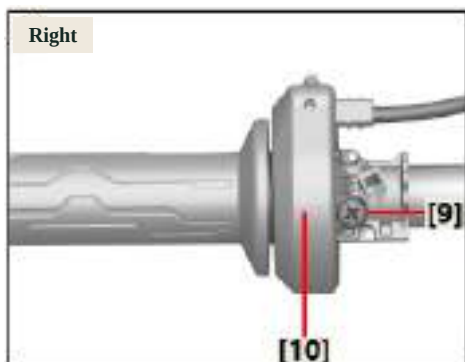


3.Disassembly

Front brake pump/handlebar switch - right/
electronic accelerator handle

- Brake light switch harness plug [1];
- Bolt [2];
- Front brake pump assembly [3];
- Screw [4];
- Open the handlebar switch - lower right cover [5];
- Disconnect the electronic accelerator handle harness connector [6];
- Screw [7]
- Handlebar switch - right [8];





- Screw [9]
- Electronic accelerator handle [10].

The installation sequence is reversed from the removal sequence.

Notes

- When installing the electronic accelerator handle, the lower shell bracket of the accelerator handle must be aligned with the positioning bore on the steering handlebar.

Torque:

Handlebar switch - upper right cover and electronic accelerator handle [7]

1.0 N·m (0.1 kgf·m, 0.7 lbf·ft)

Handlebar switch - right mounting screw [4]

2.0 N·m(0.2 kgf·m, 1.5 lbf·ft)

Electronic accelerator handle and handlebar tube [9]

3.0 N·m(0.3 kgf·m, 2.0 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 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.

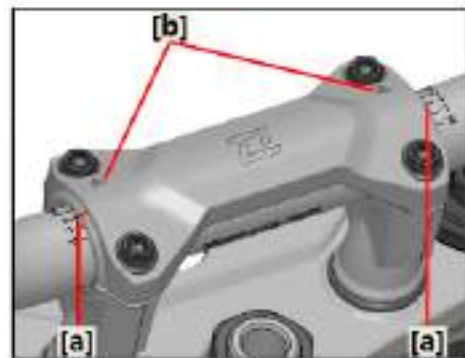
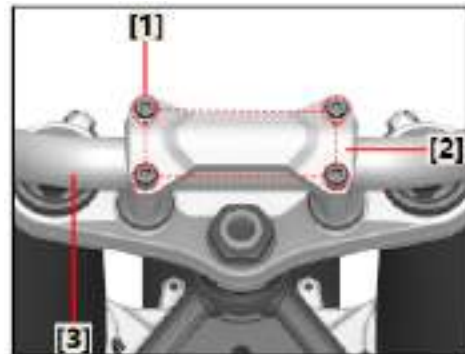
Notes

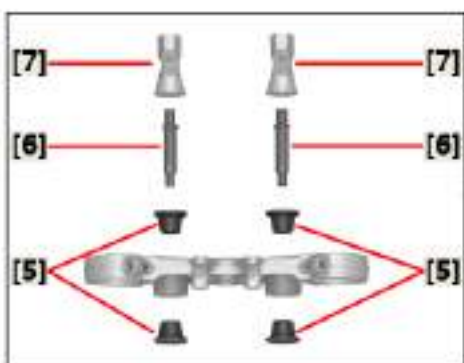
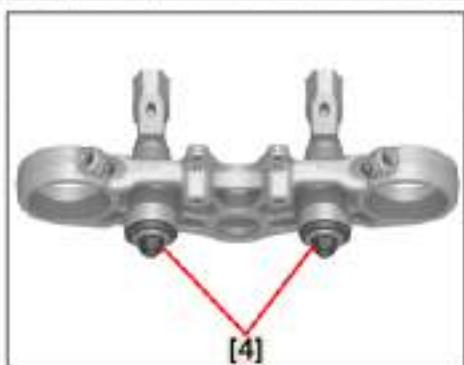
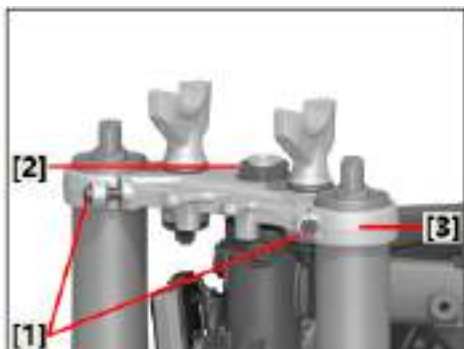
- When installing the steering handlebar, the left and right limit values are set to "0" by default, flush with the limit marks on both sides of the handlebar clamp, or adjusted appropriately within the scale range according to the rider's preference.
- The triangular mark [b] on the steering handlebar clamp should face the headlight direction.

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:

- Upper bracket locking bolt [1];
- Steering stem locking nut and flat gasket [2]
- Upper connecting plate [3];
- Nut and flat gasket [4];
- Steering handlebar buffer rubber [5];
- Double-ended threaded stud [6];
- Steering handlebar lower socket [7].

The installation sequence is reversed from the removal sequence.

Notes

- 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 stem locking nut

108 N·m (10.8 kgf·m, 80 lbf·ft)

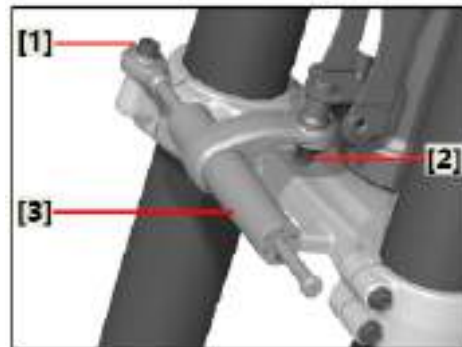
※ Steering damper

Disassembly/installation

Disassemble the following parts:

- Bolt [1];
- Bolt [2];
- Steering damper [3];

The installation sequence is reversed from the removal sequence.



Torque:

Steering damper and frame mounting bolt

Steering damper and lower connecting plate mounting bolt

22 N·m (2.2 kgf·m, 16 lbf·ft)

※ Steering stem assembly

Disassembly/installation

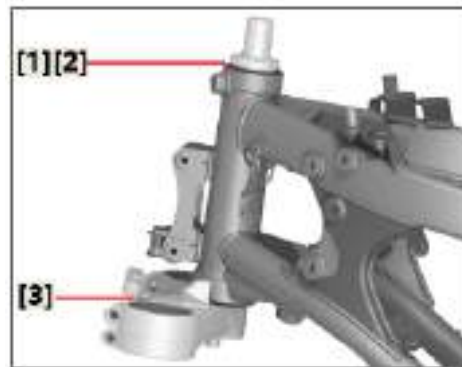
Disassemble the following parts:

- 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

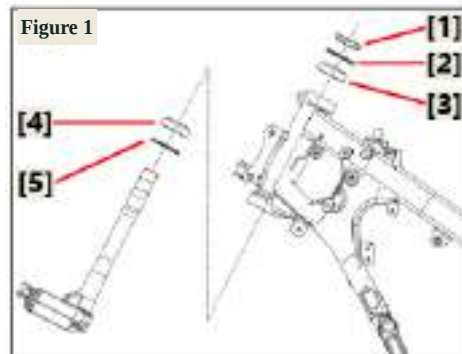
First stage: 40N·m, second stage: loosen the adjusting nut by two turns and then tighten it to 10N·m, third stage: keep the direction fixed and loosen by 1/4 turn

Upright tube bearing model:

Upper - 32005

Lower-32006X

Grade: P5



The installation and disassembly of the steering stem assembly are as shown in Figure 1:

- 4-slot adjusting nut [1]
- Steering stem upper dust cover [2]
- Steering stem upper bearing [3]
- Steering stem lower bearing [4]
- Steering stem lower dust cover [5]

Rear Wheel, Suspension

Section 1 Maintenance Instructions	284
Section 2 Troubleshooting	284
Section 3 Position Of Components	285
Section 4 Rear Wheel Assembly	286
Section 5 Buffer Assembly.....	288
Section 6 Inspection Of Wheels And Tires	288
Section 7 Inspection Of Rim Damage And Runout	289
Section 8 Replacement Of Tires	290
Section 9 Rear Shock Absorber, Suspension Components	291
Section 10 Swingarm, Chain Clip.....	292
Section 11 Exploded View Of Suspension Pivot Assembly And Swingarm Axle Assembly.....	294
Section 12 Rear Shock Absorber Assembly.....	295
Section 13 Inspection And Adjustment Of Drive Chain Tension	296
Section 14 Inspection, Cleaning And Lubrication Of Drive Chain	298
Section 15 Replacement Of Drive Chain	299
Section 16 Replacement And Inspection Of Drive/Driven Sprockets	300

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

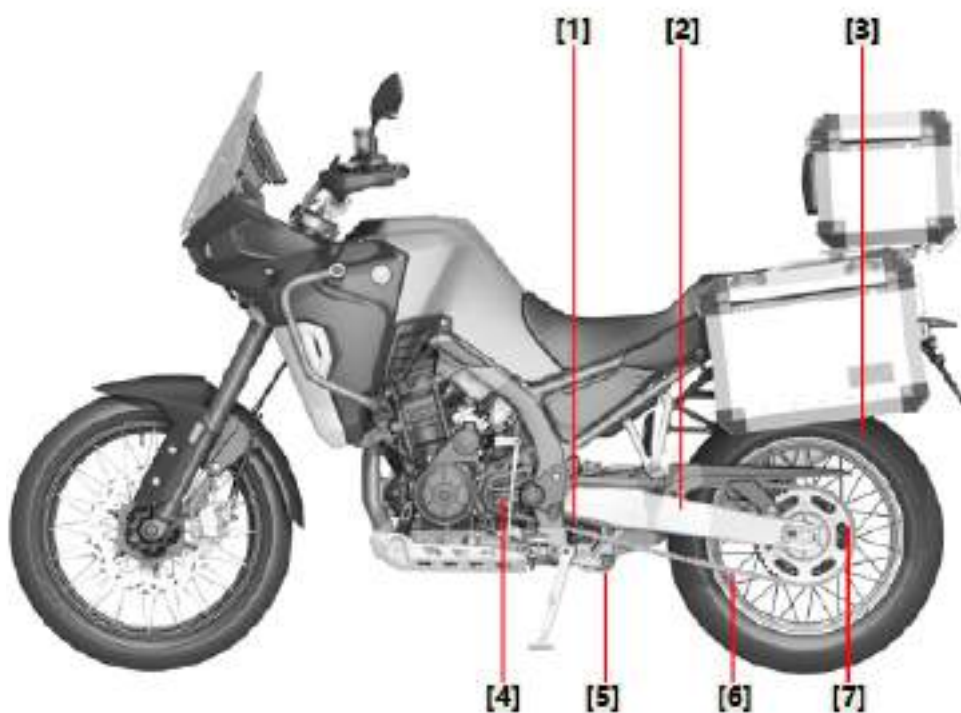
Hard suspension

- High tire pressure
- Improper adjustment of suspension
- Bending of shock absorber rod
- Damage to suspension or slewing pivot bearing
- Improper tightening of slewing pivot

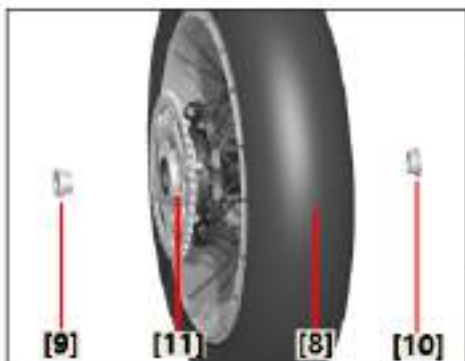
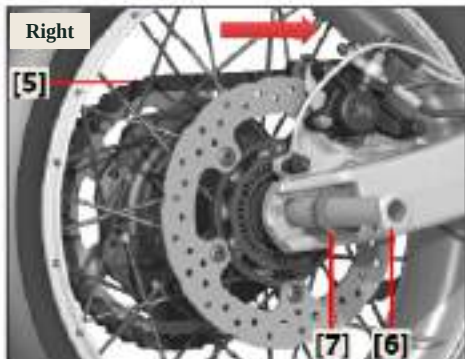
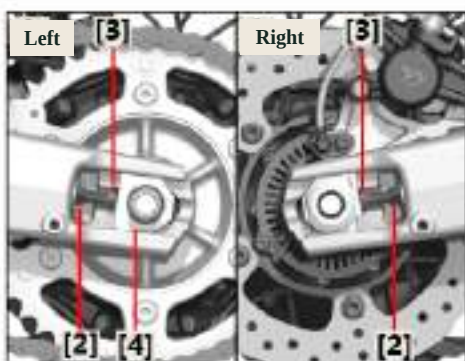
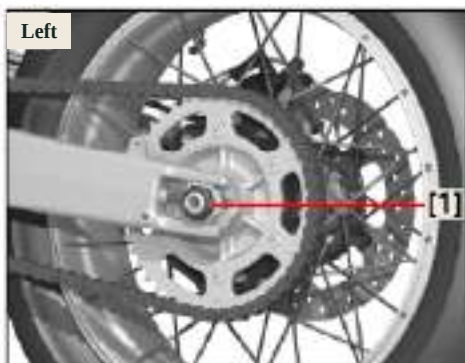
Noise from rear suspension

- 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) Rear suspension components	(6) Drive chain	(7) 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 chain adjuster locking nuts [2] on the left and right sides;

- Rotate the chain adjuster adjusting bolts on the left and right sides [3];

- Chain adjuster - left [4];

- Push the rear wheel forward to disengage the drive chain [5] from the large sprocket;

- Rear wheel axle [6];

- Chain adjuster - right [7];

- Rear wheel assembly [8];

- Rear wheel bushing - left [9];

- Rear wheel bushing - right [10];

- Buffer assembly [11].

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.

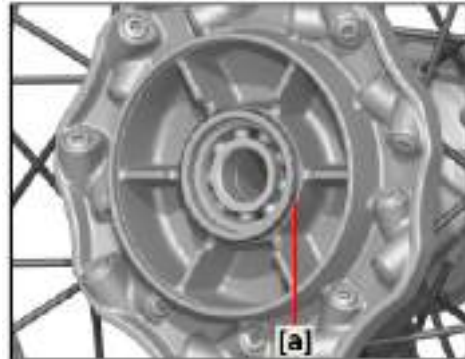
Torque:

Chain adjuster locking nut

16 N·m (1.6 kgf·m, 12 lbf·ft)

Rear wheel axle locking nut

128 N·m (12.8 kgf·m, 95 lbf·ft)



Notes

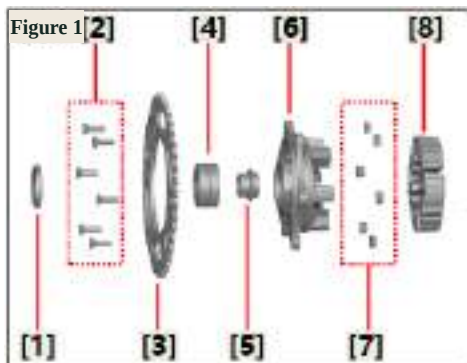
- When installing the rear wheel, be careful not to let the brake caliper fall out of the rear swing arm boss or damage the brake pad.
 - After installation, the drive chain slack must be readjusted.
- See "Inspection and adjustment of slack of drive chain" on page 296 for details.
- Apply a very small 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:

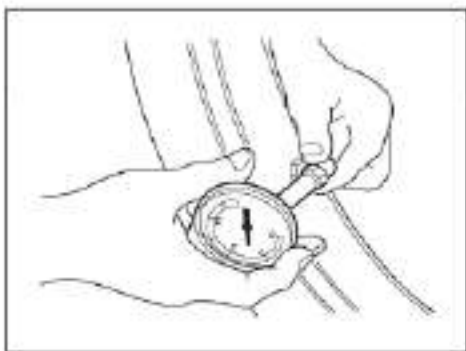
- Oil seal [1];
- Bolt [2];
- Drive sprocket [3];
- Buffer bearing [4];
- T-bushing [5];
- Buffer [6];
- Nut [7];
- Buffer rubber [8];

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)

Cycling on unpaved roads

Front wheels: 200 kPa (2.00 kgf/cm², 29 psi)

Rear wheels: 200 kPa (2.00 kgf/cm², 29 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:

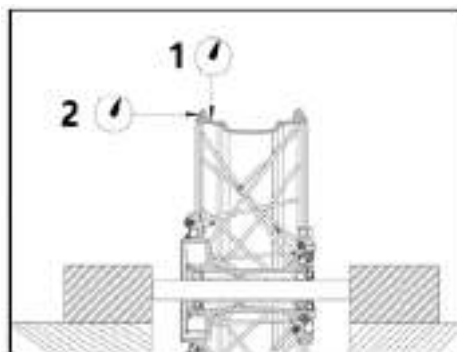
Front wheel: Radial: 2.0 mm

Axial: 2.0 mm

Rear wheel: Radial: 2.0 mm

Axial: 2.0 mm

Exceed the specified value → Replace.



2.Inspection

- Wheel bearing

If the wheel rotates unevenly or too tightly → Replace the wheel bearing.

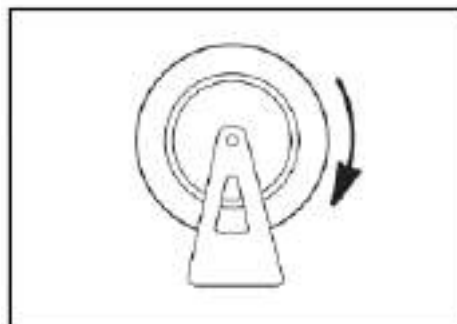
- Oil seal

Damage/wear → Replace.

- Rims [1] and spokes [2]

Loosen → Tighten the spoke nipples [3].

Damage/wear → Replace.



Torque:

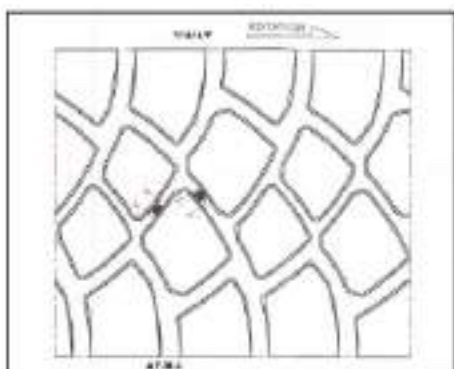
Front/rear wheel spokes

6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)



Tire specifications:

Front wheel	110/80 R19 59V TL	
	CST/CHENG-SHIN-TIRE	AMBRO A3
Rear wheel	150/70 R17 69V TL	
	CST/CHENG-SHIN-TIRE	AMBRO A3
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, suspension components**

Note

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

1. Disassembly

- Seat cushion assembly [1];
- Fuel tank assembly [2];
- Side cover (left and right) [3];

For details, see "Frame, Body Trim, Exhaust System" on page 65 and "Fuel System" on page 123.

2. Disassembly

- Connecting bolt between U-cradle and frame [4];
- Connecting bolt between U-cradle and triangular cradle [5];
- U swingarm [6];

3. Disassembly

- Triangular cradle and swingarm connecting bolt [7];
- Triangular cradle and rear shock absorber connecting bolt [8];
- Triangular cradle [9];

4. Disassembly

- Bolt [10];
- Rear shock absorber [11].

The installation sequence is reversed from the removal sequence.

Torque:

Triangular cradle connected to rear shock absorber

44 N·m (4.4 kgf·m, 33 lbf·ft)

Rear shock absorber upper section connected to frame

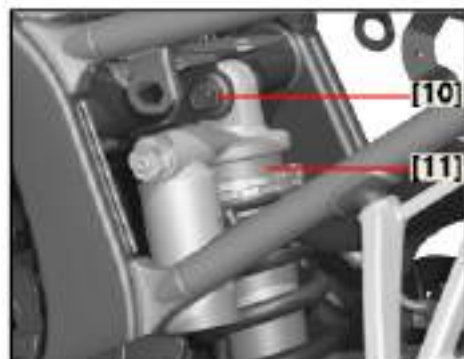
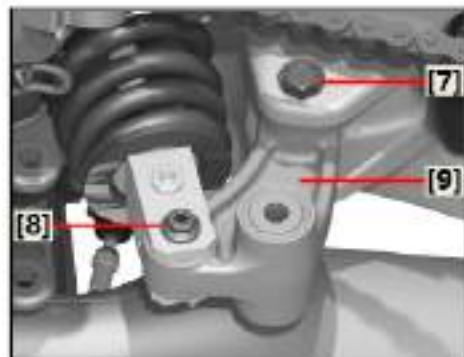
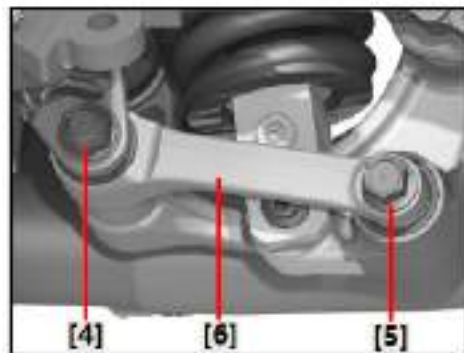
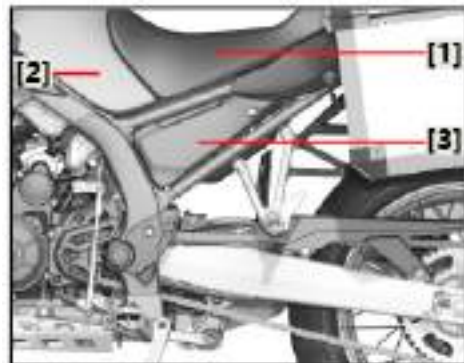
54 N·m (5.4 kgf·m, 40 lbf·ft)

Triangular cradle connected to swingarm

U swingarm and triangular cradle

U swingarm to frame connection

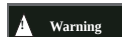
60 N·m (6.0 kgf·m, 44 lbf·ft)



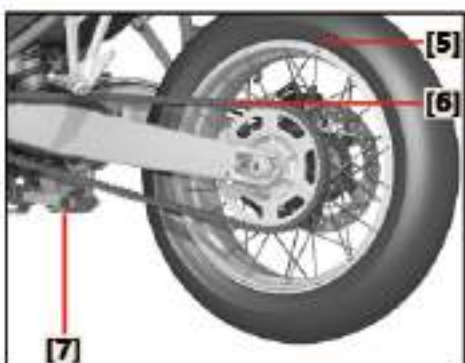


※ Swingarm, chain clip

1. Stand the vehicle on a flat ground.



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

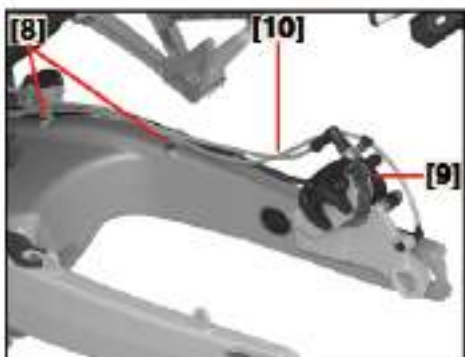


2. Disassembly

- Triple case assembly and side case bracket [1];
- Rear wheel small fender and chain guard [2];
- Swingarm axle trim (left and right) [3];
- Muffler front/rear section assembly [4];
- See "Frame, Body Trim, Exhaust System" on page 65 for details. Support the vehicle firmly so as not to turn over.

3. Disassembly

- Rear wheel assembly [5];
See page 286 for details.
- Drive chain [6];
See page 299 for details.
- Suspension assembly [7];
See page 291 for details.

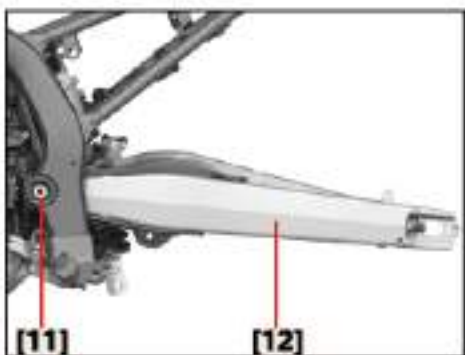


4. Disassembly

- Brake hose clip mounting screw [8];
- Rear brake caliper assembly [9];
- Brake hose, brake switch, and wheel speed sensor harness [10];
- Swingarm axle [11];
- Swingarm [12];

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. Disassembly

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

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.

The installation sequence is reversed from the removal sequence.

Torque:

Rear brake hose clip mounting screw

5.0 N·m (0.5 kgf·m, 4.0 lbf·ft)

Chain clip pressure plate and swingarm

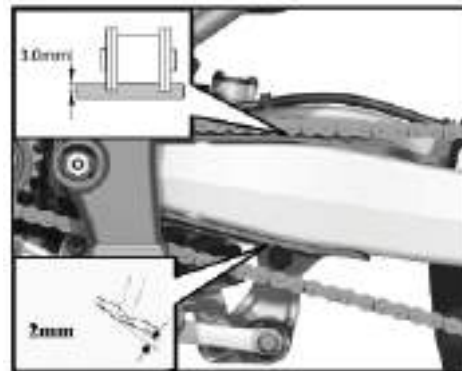
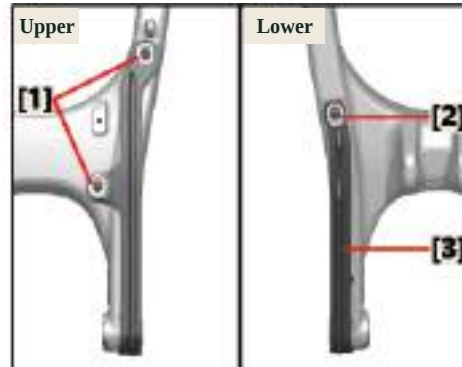
6.0 N·m (0.6 kgf·m, 4.4 lbf·ft)

Swingarm shaft locking nut

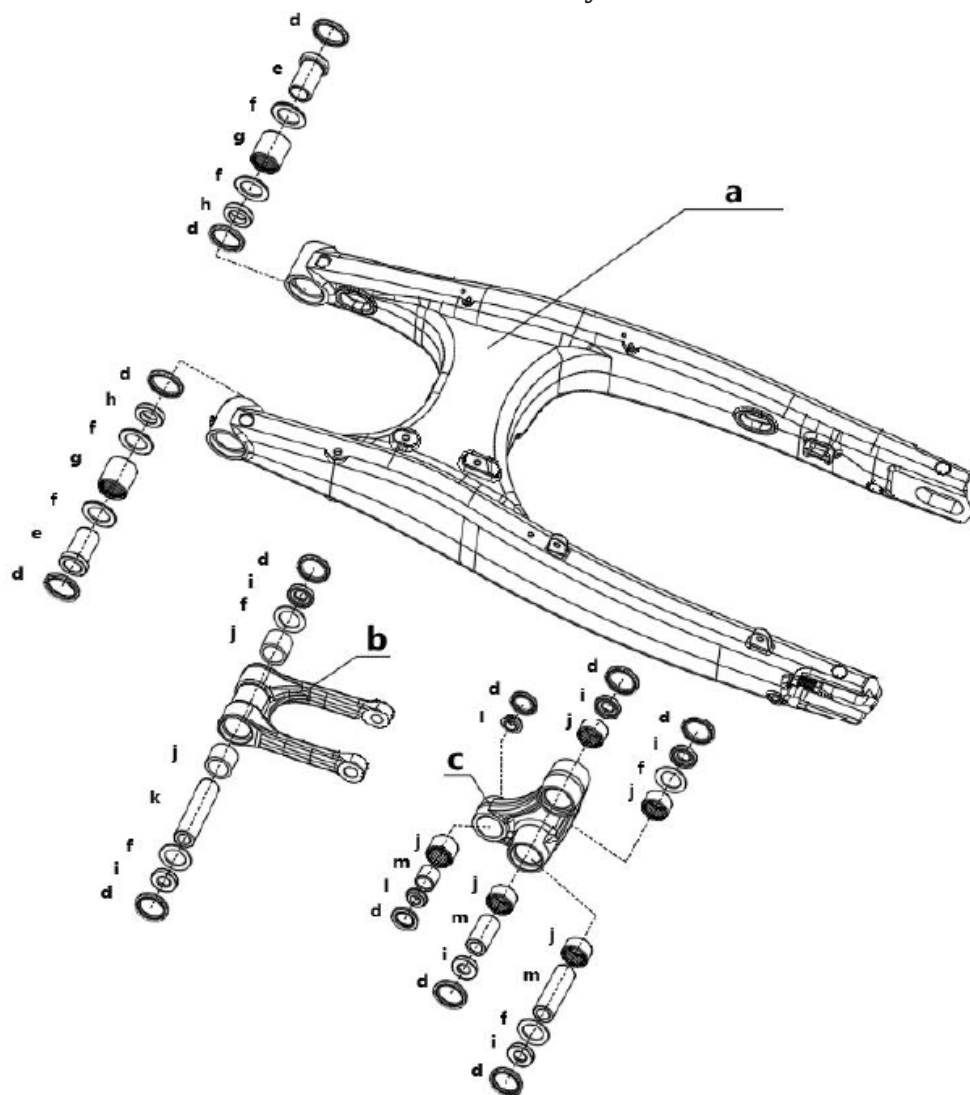
88 N·m (8.8 kgf·m, 65 lbf·ft)

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).



Exploded View of Suspension Pivot Assembly and Swingarm Axle Assembly



a	Swingarm	b	U swingarm	c	Triangular cradle	d	Oil seal	e	Swingarm T-shaped bushing
f	Flat gasket	g	Needle roller bearing	h	Bushing	i	Flanged bushing	j	Flat full complement needle roller bearing
k	U swingarm bearing sleeve	l	Flanged bearing sleeve	m	Triangular cradle bearing sleeve				

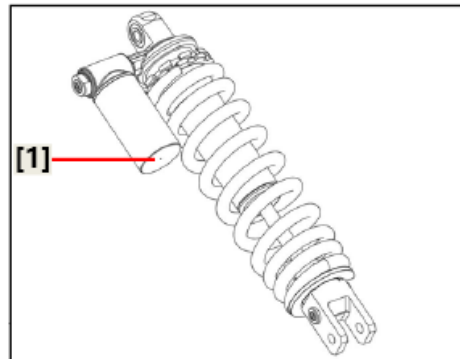
※ Rear shock absorber assembly

⚠ 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.



⚠ Warning

•Wear goggles to prevent eye injury caused by released gas or metal debris.

1.Park the vehicle on a level surface.

⚠ Warning

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

2.Disassemble the rear shock absorber assembly
See page 291 for details.

3.Check the rear shock absorber assembly

-Rear shock absorber inner rod

Bent/damage → Replace the rear shock absorber assembly.

-Rear shock absorber assembly (external airbag)

Air leakage → Replace the rear shock absorber assembly.

-Spring

Damage/wear → Replace the rear shock absorber assembly.

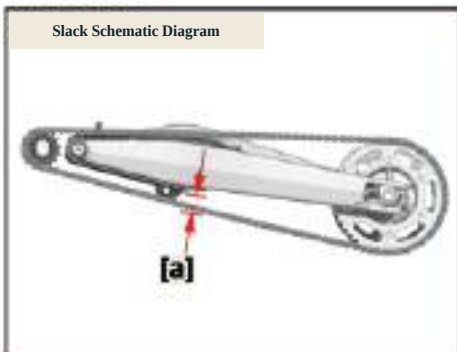
-Size of Bolts

Bent/damage/wear → replace.

4.Disposal of rear shock absorber

The air pressure must be released before disposing of the rear shock absorber. Please release the gas from the shock absorber's gas cylinder through the valve bore [1].

Slack Schematic Diagram



※ 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: 30-45 mm

Limit: 45 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. Release

-Rear wheel axle nut [1]

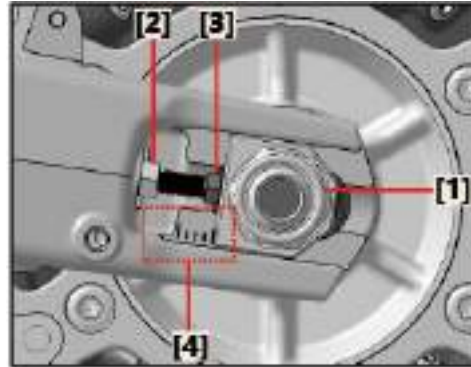
See "Rear wheel assembly" on page 286 for details.

5. Adjustment

-Looseness of transmission chain

a. Loosen the drive chain adjusting block locking nuts on the both sides [2].

b. Rotate the adjusting bolt [3] on both sides of the drive chain adjusting block 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 adjusting blocks on both sides with the scale marking line [4].
- There shall be no clearance between the adjusting blocks and the head of the adjustment bolt.

c. Tighten the rear axle nut to the specified torque.

d. Tighten the adjusting block locking nuts to the specified torque.

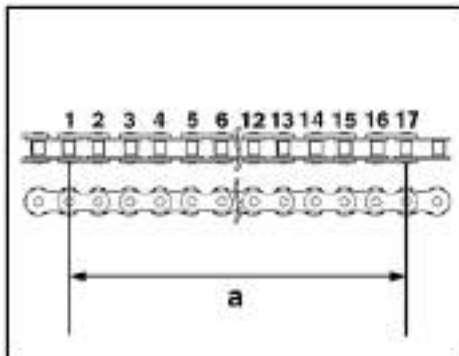
Torque:

Chain adjuster locking nut

16 N·m (1.6 kgf·m, 12 lbf·ft)

Rear wheel axle locking nut

128 N·m (12.8 kgf·m, 94 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**

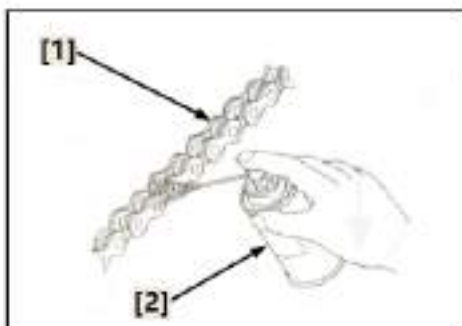
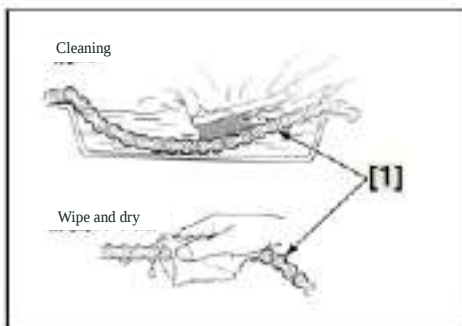
If the measured value exceeds the maintenance limit, please replace the drive chain.

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 65 for details.

3. Disassembly

- Drive chain [4].

Note

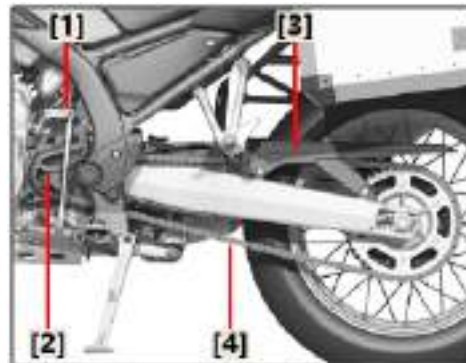
- Replace the drive chain using the drive chain cutting and riveting tool.
- The installation sequence is reversed from the removal sequence.

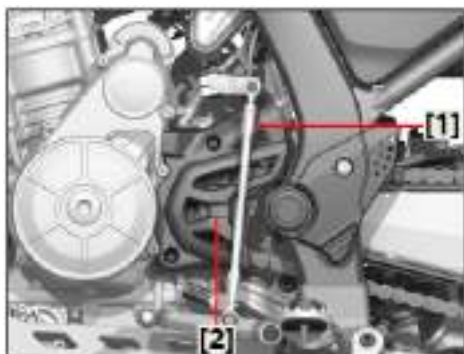
Note

- After replacing the chain, adjust the drive chain slack to the specified range again.
- Standard link: **120 links (Choho)**
Replacement of chain: **520 SX2 (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

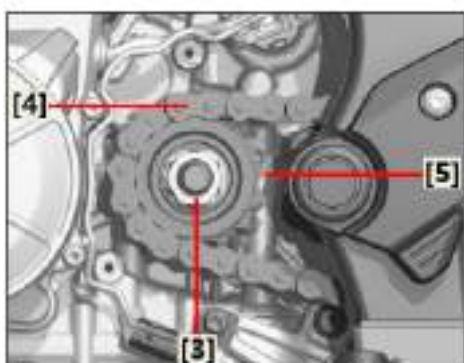
1. Driving sprocket

Disassembly/installation

Disassemble the following parts:

- Gear shift assembly [1];
- Small sprocket cover [2];

See "Frame, Body Trim, Exhaust System" on page 65 for details.



- Driving sprocket locking bolt [3];
- Drive chain [4];
- Driving sprocket [5].

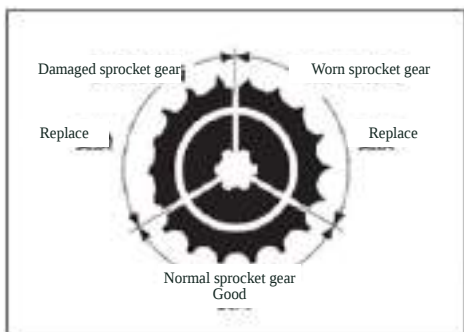
2. Driven sprocket

See "Rear wheel assembly" and "Buffer body assembly" on pages 286–288 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

100 N·m (10 kgf·m, 74 lbf·ft)

Hydraulic Braking System

Section 1 Maintenance Instructions	302
Section 2 Troubleshooting	302
Section 3 Position Of Components	303
Section 4 Inspection Of Brake Fluid Level.....	304
Section 5 Brake Fluid Addition	305
Section 6 Front Brake Caliper (Left And Right)	306
Section 7 Rear Brake Caliper.....	307
Section 8 Inspection And Replacement Of Brake Pads	308
Section 9 Inspection And Replacement Of Disc Brake	310
Section 10 Hydraulic Brake System Bleeding.....	311
Section 11 Bleed Operating Procedure (ABS)	312
Section 12 Inspection Of ABS Gear Ring Clearance.....	313
Section 13 Front Brake Pump	314
Section 14 Rear Brake Pump Assembly	315
Section 15 Adjustment Of Brake Pedal	316

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

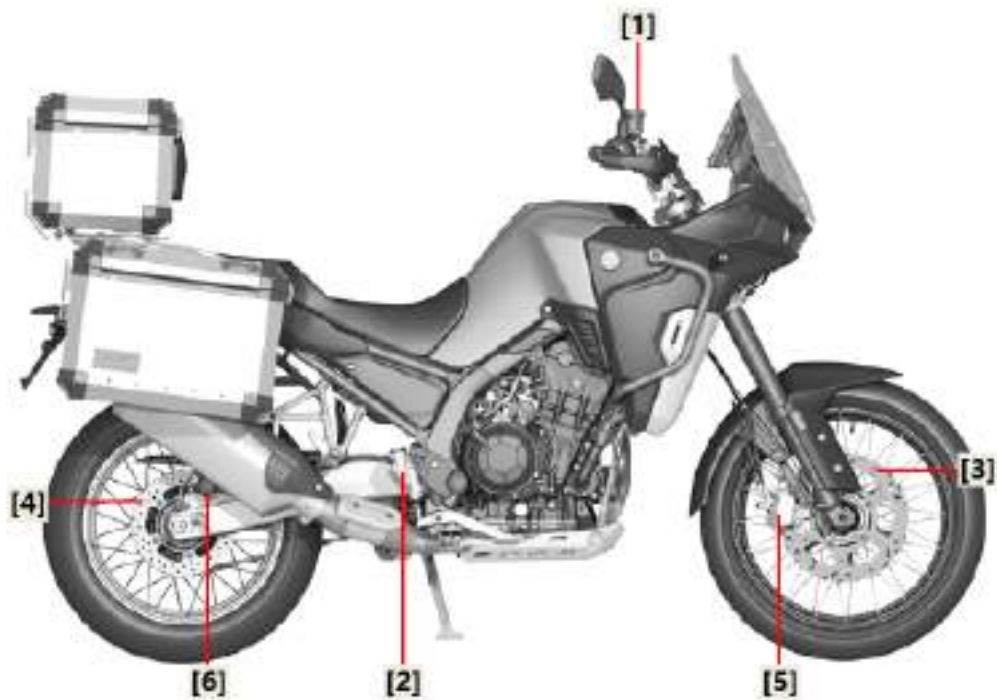
Insufficient braking force of brake handle/ Brake handle/pedal unsmooth operation/ pedal stuck

- | | |
|--|-------------------------------------|
| • Air in hydraulic system | • Blocked/restricted oil passage |
| • Leakage in hydraulic system | • Brake caliper piston stuck/worn |
| • Contaminated brake pads/discs | • Abnormal sliding of brake caliper |
| • Wear of brake caliper piston seal | • Wear of brake caliper piston seal |
| • Wear of main piston cup | • Main piston stuck/worn |
| • Contaminated brake pads/discs | • Bent brake bar/pedal |
| • 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 | |

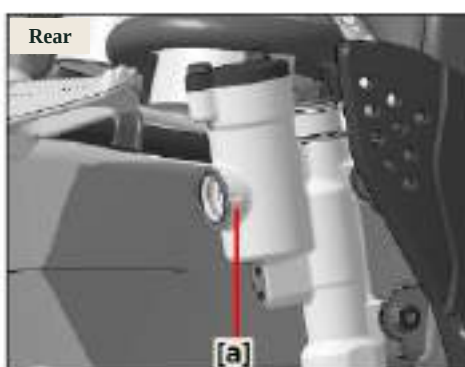
Brake resistance

- 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].

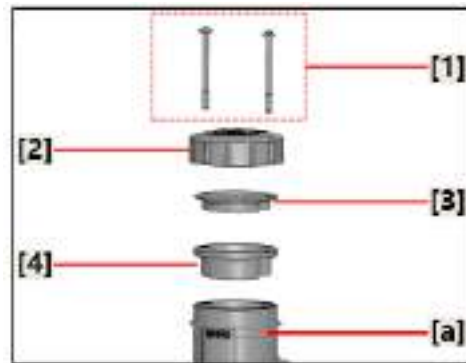
Use the recommended brake fluid:DOT4 brake fluid

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].

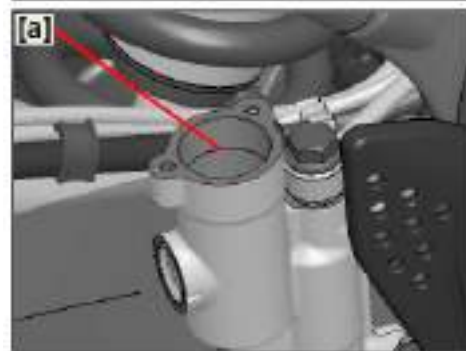
Use the recommended brake fluid:DOT4 brake fluid

3. **Installation**

The installation sequence is reversed from the removal sequence.

4. **Inspection**

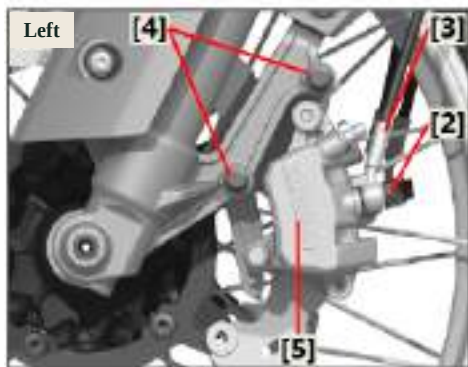
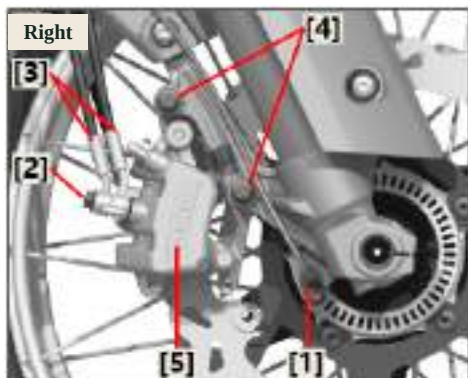
Check the rear brake hydraulic system for leaks.



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.
- When tightening the brake pipe locking bolt, make sure to place the eyelet stop pin against the brake caliper body.
- Apply thread locker (Huitian 7262) to the caliper mounting bolts

Torque:

Front wheel speed sensor

8.0 N·m (0.8 kgf·m, 6.0 lbf·ft)

Front brake hose and front brake calipers left/right

32 N·m (3.2 kgf·m, 23.6 lbf·ft)

Front brake caliper-left and right and front shock absorber

35 N·m (3.5 kgf·m, 25 lbf·ft)

※ **Rear brake caliper**

Notes

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

Disassembly/installation

Disassemble the following parts:

-Rear wheel assembly [1];

See "Rear Wheel, Suspension" on page 283 for details

-Rear wheel speed sensor [2];

-Oil passing bolt and gasket [3];

-Rear brake hose [4];

-Rear brake caliper assembly [5].

The installation sequence is reversed from the removal sequence.

Note

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

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

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

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

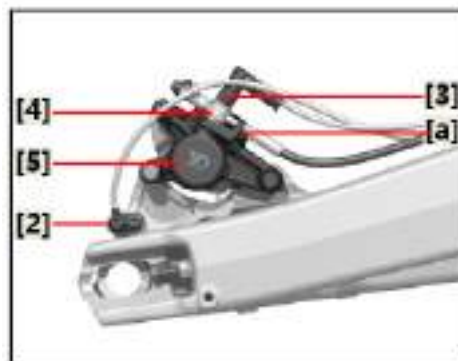
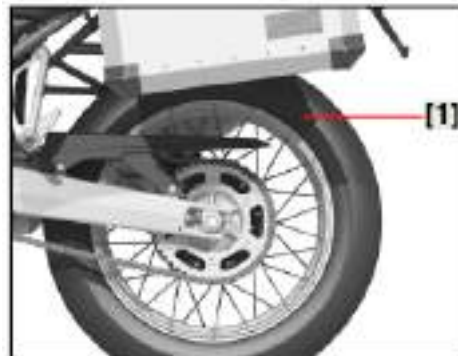
Torque:

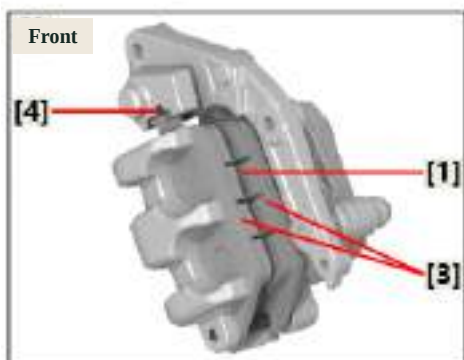
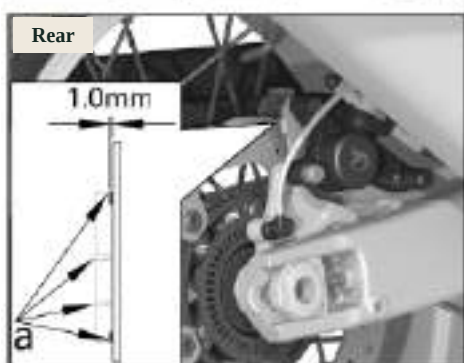
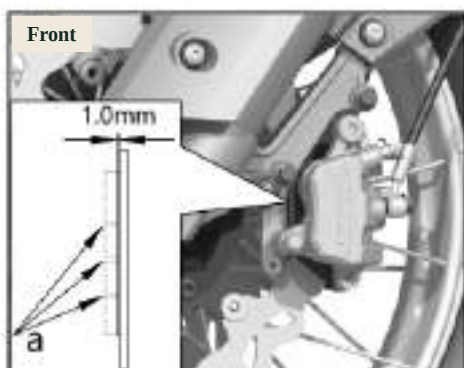
Rear wheel speed sensor and rear brake caliper assembly

8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

Rear brake hose and rear brake caliper

32 N·m (3.2 kgf·m, 23.6 lbf·ft)





※ 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 306 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;
- Dowel pin bolt [2];
- Front brake pad [3] and spring plate [4].

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

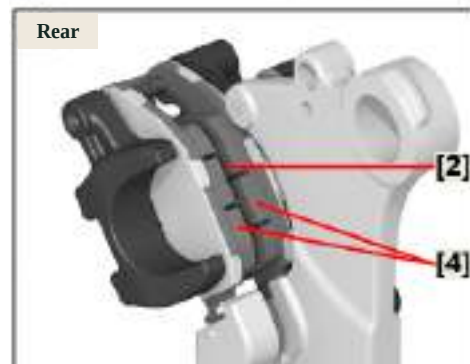
Disassemble the following parts:

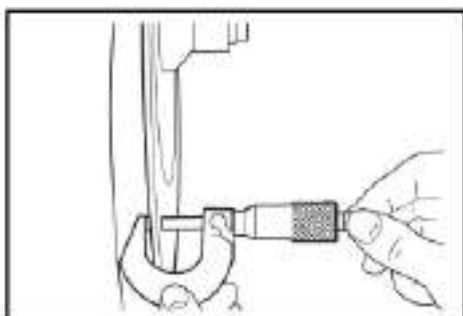
- Rear brake caliper;
See "Rear brake caliper" on page 307 for details
- Slotted screw [1];
- Place the tool between the brake pads [2], and pry left and right to allow the piston to retract for installation of a new brake pad;
- Dowel pin bolt [3];
- Rear brake pad [4] and spring plate [5].

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

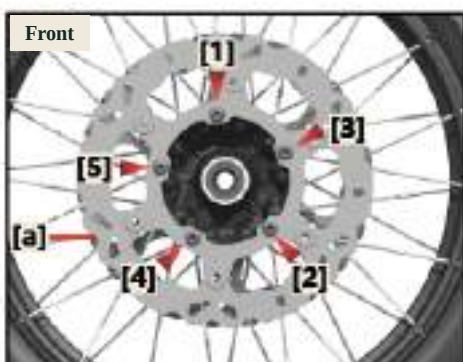
- Visually check the brake disc for damage or cracks.

Measure the wear limit of brake disc:

Front disc brake: 3.5 mm

Rear disc brake: 3.5 mm

Damage/deformation/off specification → Replace.



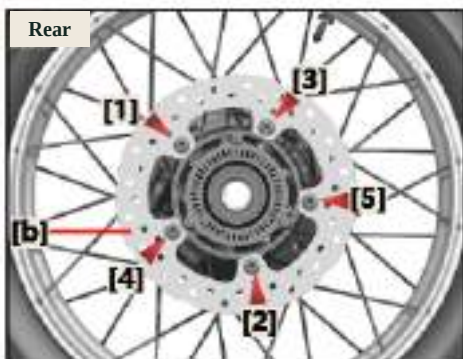
Replace
Front disc brake

Disassembly/installation
Disassemble the following parts:

- Front wheel assembly;
- Bolts [1]- [5];
- 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]- [5];
- 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

Rear disc brake and rear wheel hub

30 N·m (3.0 kgf·m, 22 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.

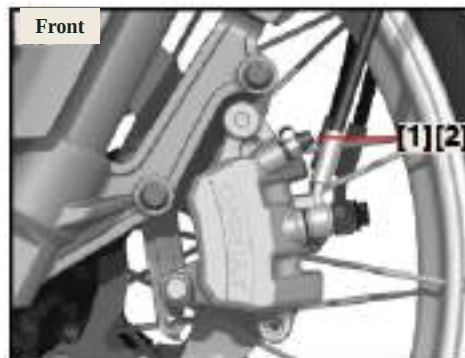
Note

- 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.

- Tighten the bleed screw and release the brake handle or brake pedal.

- Repeat steps (e) to (h) no bubbles are visible in the brake fluid within the plastic hose.

- 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.

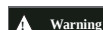
- Tighten the bleed screw to the specified torque.

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 lowe 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

- Screw [1]
- Front disc brake (right) [2];
- Front ABS ring gear [3];
- Screw [4];
- Rear ABS ring gear [5];

The installation sequence is reversed from the removal sequence.

Torque:

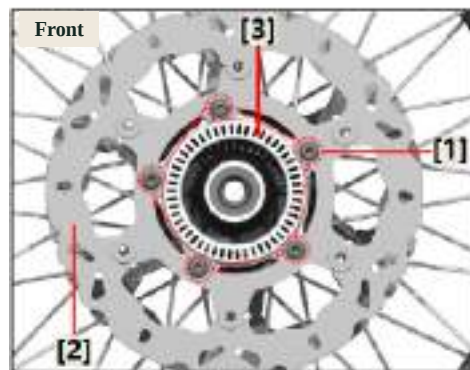
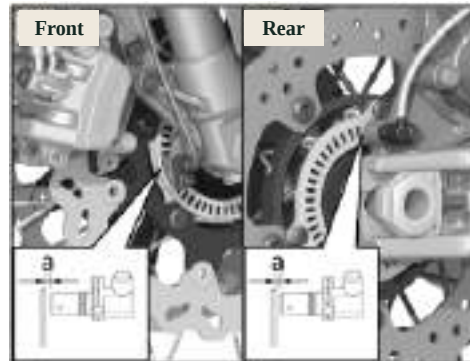
Front disc brake (right) , front ABS ring gear and front wheel hub

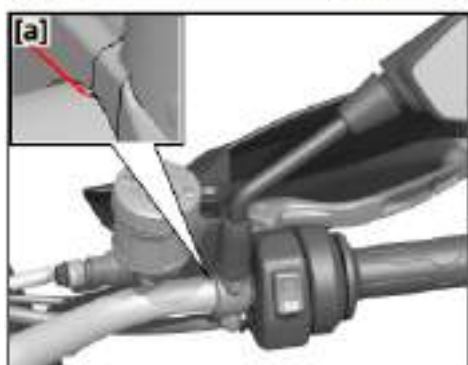
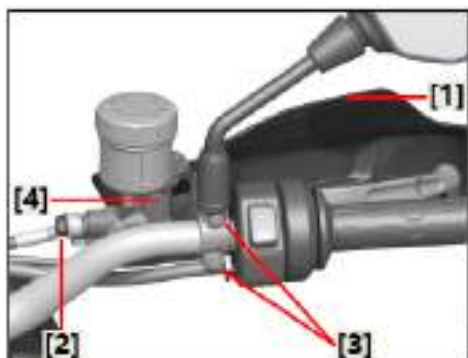
30 N·m (3.0 kgf·m, 22 lbf·ft)

Rear ABS ring gear and rear wheel hub

4.0 N·m (0.4 kgf·m, 3.0 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:

-Hand windshield - right [1];
See "Frame, Body Trim, Exhaust System" on page 65 for details.

- Oil passing bolt and gasket [2];
- Brake pump mounting screw [3];
- Front brake pump [4].

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:

-Swingarm trim - right [1];

See "Frame, Body Trim, Exhaust System" on page 65 for details.

-Oil passing bolt and shim [2];

-Bolt [3];

-Bolt [4];

-Rear brake pump assembly [5].

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

- 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 and frame

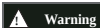
8.0 N·m(0.8 kgf·m, 6.0 lbf·ft)

Brake rockerarm and rear brake rod end bearing

10 N·m (1.0 kgf·m, 7.4 lbf·ft)

Brake hose and rear brake cylinder

32 N·m (3.2 kgf·m, 23.6 lbf·ft)

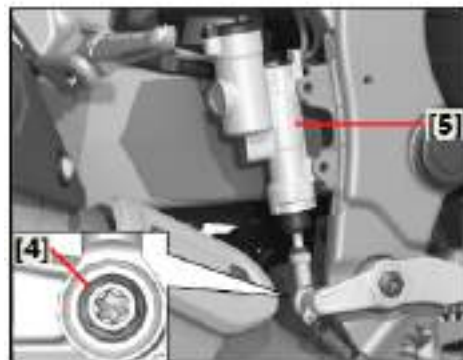
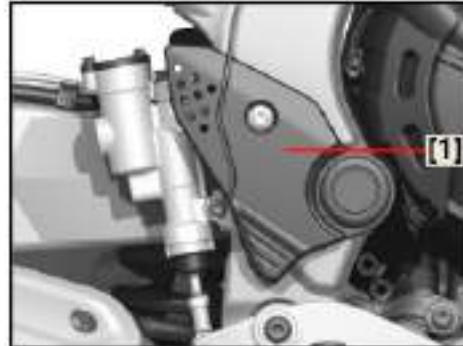


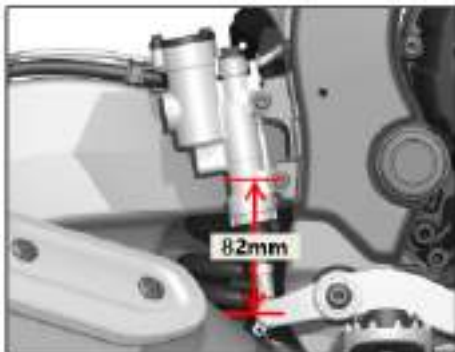
Warning

- 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 82 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

Section 1 Maintenance Instructions	318
Section 2 Function Introduction Of ABS System	319
Section 3 Mechanical Schematic Diagram	320
Section 4 Electrical Schematic Diagram.....	321
Section 5 System Location.....	322
Section 6 ABS Hydraulic Unit Assembly	323
Section 7 Inspection Of Hydraulic Unit.....	324
Section 8 Wheel Speed Sensor And ABS Ring Gear.....	326
Section 9 Maintenance Diagnosis Process And Troubleshooting.....	329
Section 10 Fault Code Information Table.....	330
Section 11 Fault Code Corresponding Treatment Measures.....	332

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:

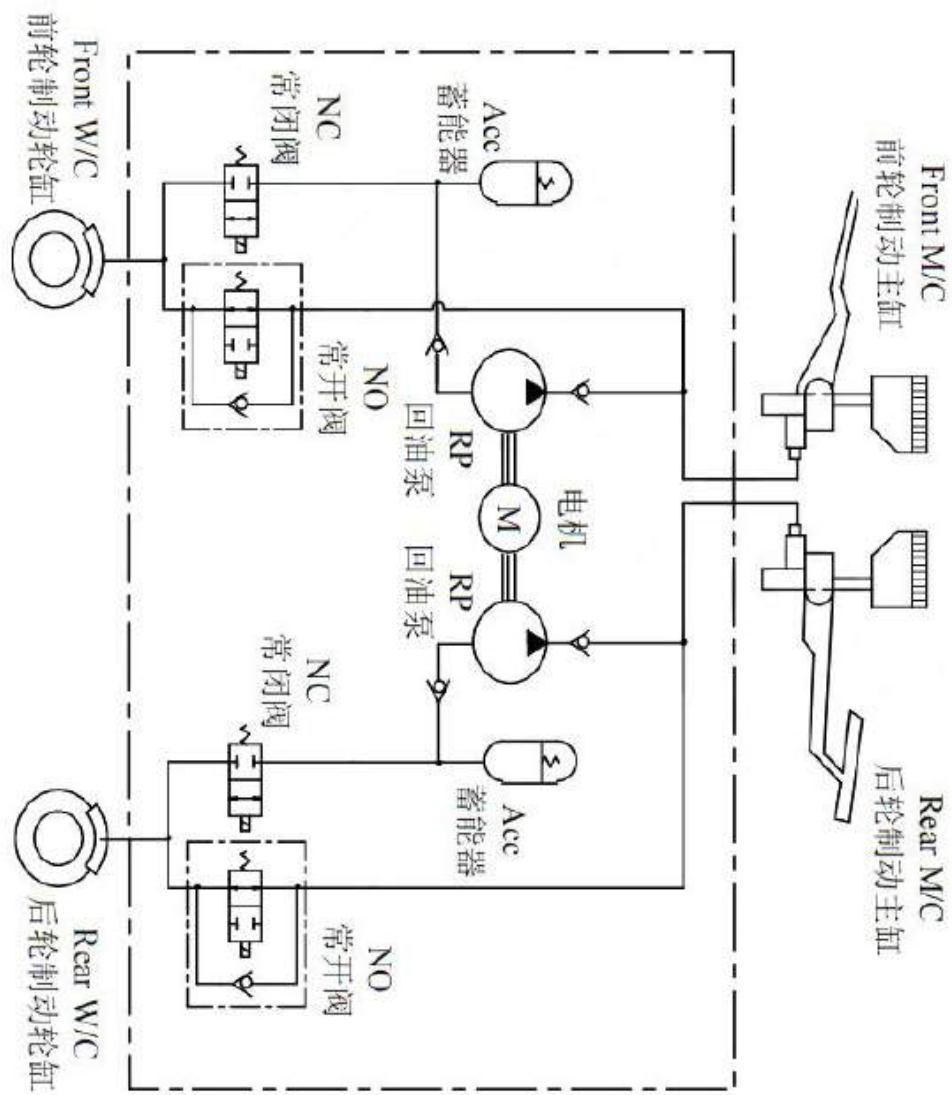
ABS function to be impaired:

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.

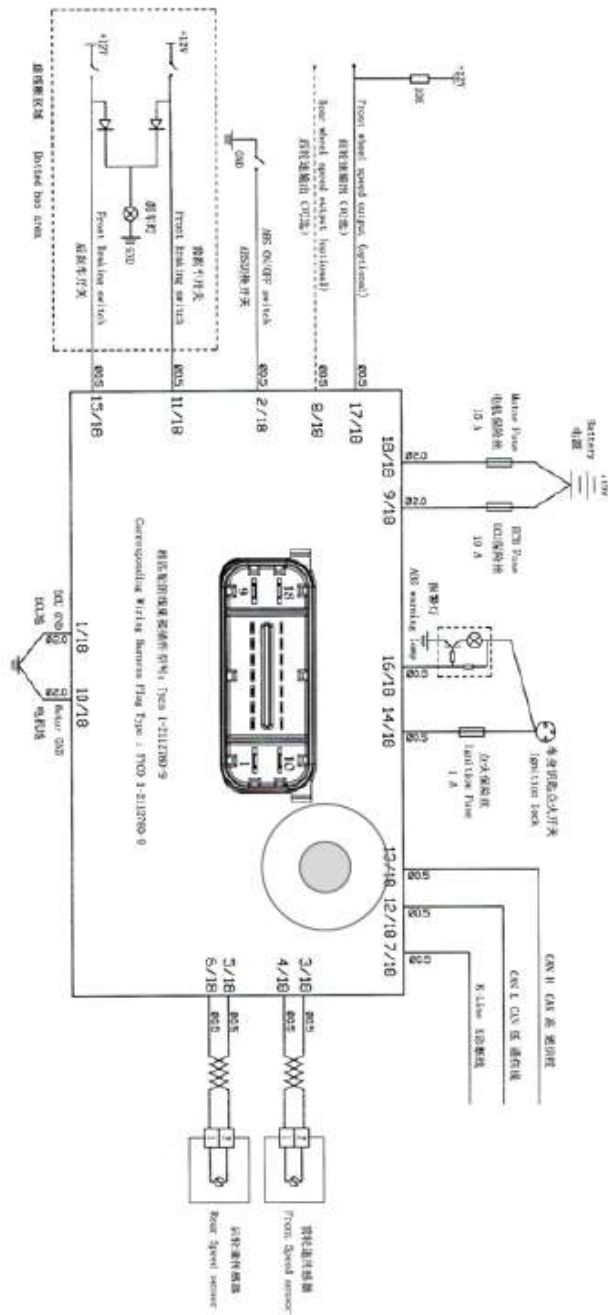
ABS brake system recommendations:

- 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.

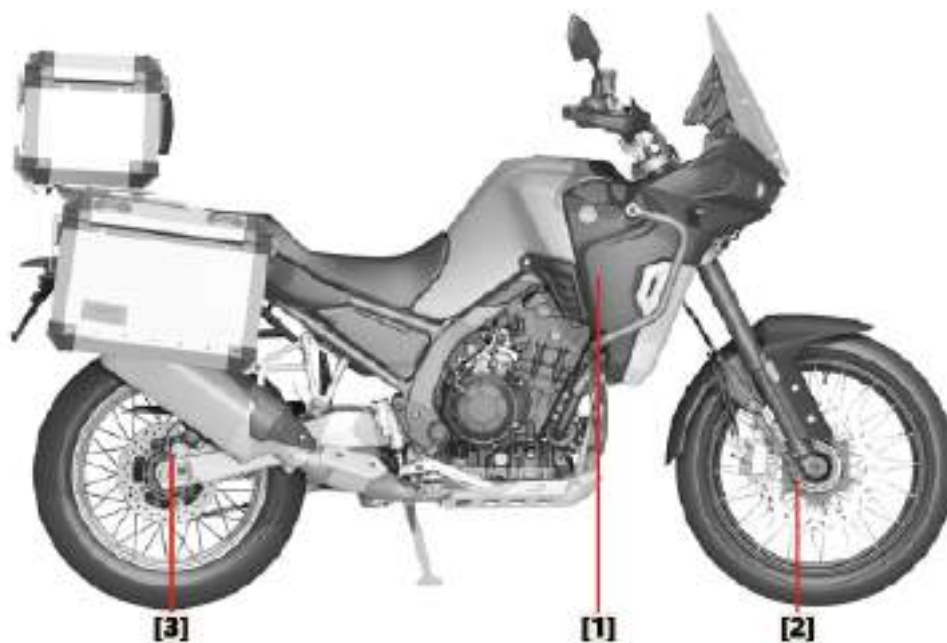
Mechanical Schematic Diagram



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

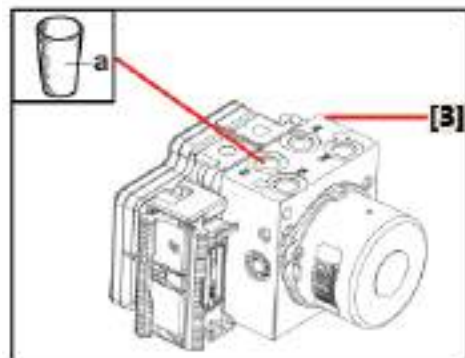
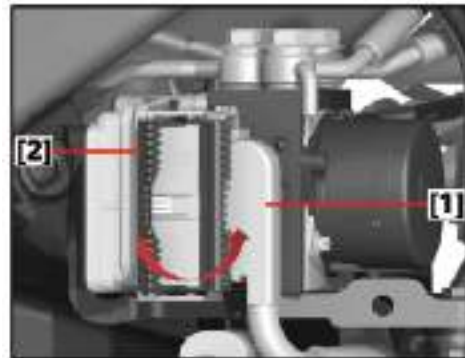
- Brake hose

Note

- Do not operate the brake handle and pedal when dismantling the brake hose.

Notes

- Dissemble 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.

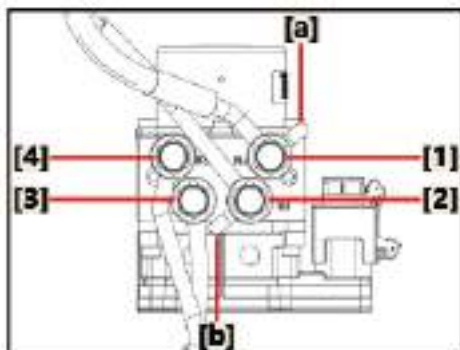


3.Disassembly

- 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 (M10x1.0)
- 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 rear 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 and ABS bracket

ABS bracket and frame

10 N·m (1.0 kgf·m, 7.4 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

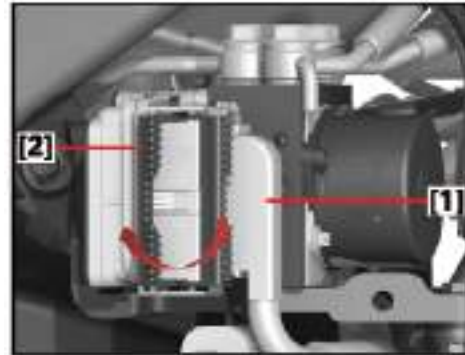
- If the brake hose connecting bolt cannot be turned easily, replace the entire hydraulic unit assembly, brake hose and relevant parts.

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

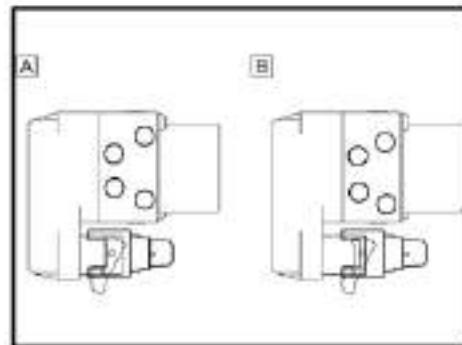
-Front brake master cylinder reservoir

-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 311 for details.

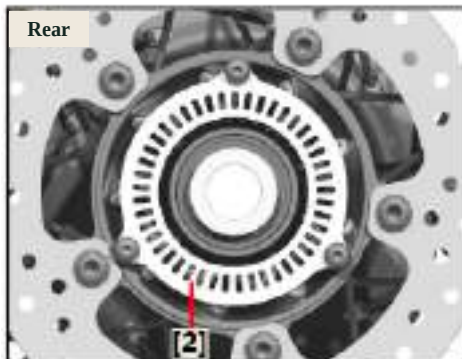
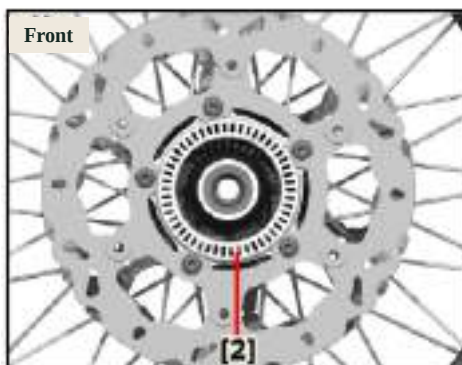
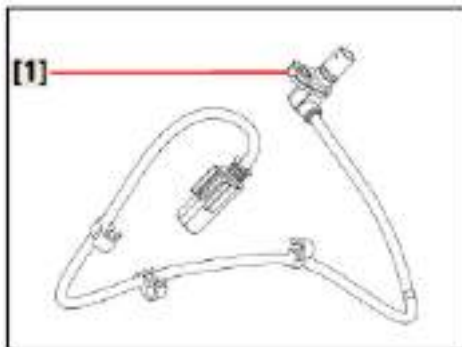
8.Inspection

-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

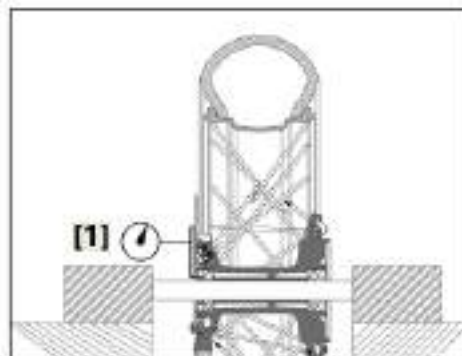
-ABS ring gear deflection

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:

Front disc brake, front ABS ring gear, and front wheel hub

30 N·m (3.0 kgf·m, 22 lbf·ft)

Rear ABS ring gear and rear wheel hub

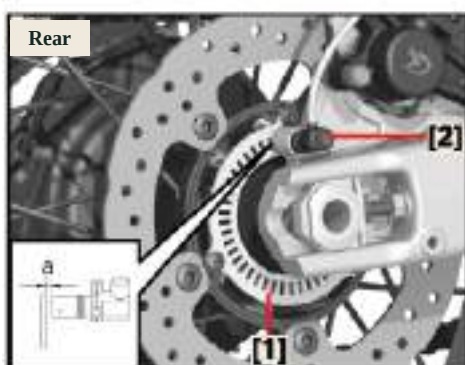
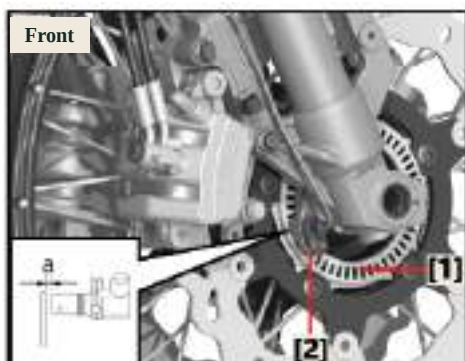
4.0 N·m(0.4 kgf·m, 3.0 lbf.ft)

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:

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 微控制器时钟检测错误
C0032	MCU_MC_ROM_Failed 微控制器ROM错误
C0033	MCU_MC_RAM_Failed 微控制器RAM错误
C0040	MCU RAM Stack Overflow Fault 微控制器RAM堆栈错误
C0041	MCU Hardware Reset 微控制器硬件复位
C0044	Solid State Relay_Relay over current 固态继电器_过流
C0045	Solid State Relay_Relay shorted (Stuck on) 固态继电器继电器短路(卡死)
C0046	Solid State Relay_shorted to ground 固态继电器_与地短接
C0051	Battery Voltage Battery under-voltage 1 (7V<Voltage <9V) 电池电压过低1, (大于7伏小于9伏)
C0052	Battery Voltage Battery under-voltage 2 (Voltage <-71) 电池电压过低2, (小于等于7伏)
C0053	Battery Voltage _Battery over-voltage 电池电压过高
C0060	Brake Pedal Not Applied with Decel 不踩刹车有减速度
C0061	Brake Pedal Always Applied Without Decel Fault 踩下刹车时没有减速度
C0062	Brake Diode Breakdown 刹车二极管击穿
C0070	Pump Motor control Bad connection or Pump supply open or low voltage 泵电机连接差或供电端开路或电压过低
C0071	Pump Motor control _ Pump ground open or Motor open 泵电机开路或地线开路
C0072	PumpMotor control _ Pump FET shorted 泵电机开关管短路
C0073	Pump Motor control _ Pump FET open 泵电机的开关管开路
C0074	Pump Motor controlL_Pump over current 泵电机过流
C0075	Pump Motor contro1_Pump motor blocked 泵电机堵转
C0080	Front_wss_HSs _ Short_To_Battery 前轮轮速传感器高端与电源短接
C0081	Fromt_Wss_LSS_Short_To_Battery 前轮轮速传感器低端与电源短接
C0082	Front WSS HSS_Short To Ground or WSS short circuited 前轮轮速传感器高端接地或短路
C0083	Front WSS LSS Short To Ground or WSS open 前轮轮速传感器低端接地或开路

DTC	Failure Description
C0084	Front_wSs_Plausibility01 前轮轮速传感器信号失真等级01
C0085	Front_wss_Plausibility02 前轮轮速传感器信号失真等级02
C0086	Front_wss_Plausibility03 前轮轮速传感器信号失真等级03
C0087	Front_wss_Plausibility04 前轮轮速传感器信号失真等级04
C0088	Front_Wss_Plausibility05 前轮轮速传感器信号失真等级05
C0100	Rear_wss_HSs_Short_To_Battery 后轮轮速传感器高端与电源短接
C0101	Rear_ss_ILsS_Short_To_Battery 后轮轮速传感器低端与电源短接
C0102	Rear WSS HSS Short To_Ground or WSS short circuited 后轮轮速传感器高端接地或短路
C0103	Rear WSS LSS_Short To Ground or WSS open 后轮轮速传感器低端接地或开路
C0104	Rear_wss_Plausibility01 后轮轮速传感器信号失真等级01
C0105	Rear_wss_Plausibility02 后轮轮速传感器信号失真等级02
C0106	Rear_wss_Plausibility03 后轮轮速传感器信号失真等级03
C0107	Rear_wss_Plausibility04 后轮轮速传感器信号失真等级04
C0108	Rear_wss_Plausibility05 后轮轮速传感器信号失真等级05
C0120	Front_No Coils Short to battery 前轮常开线圈接电源
C0121	Front_No Coils Short to ground or Open solenoid 前轮常开线圈接地或开路
C0130	Front_NC Coils Short to battery 前轮常闭线圈接电源
C0131	Front_NC Coils Short to ground or Open solenoid 前轮常闭线圈接地或开路
C0160	Rear_NO Coils Short to battery 后轮常开线圈接电源
C0161	Rear_NO Coils Short to ground or Open solenoid 后轮常开线圈接地或开路
C0170	Rear_NC Coils Short to battery 后轮常闭线圈接电源
C0171	Rear_NC Coils Short to ground or Open solenoid 后轮常闭线圈接地或开路
C0210	Warning Lamp output_Short to battery 报警灯输出与电源短路
C0213	Warning Lamp output_Short to ground or open 报警灯输出与地短路或开路
C0230	Vehicle speed output_Short to ground 车速输出与地短路
C0231	Vehicle speed output_Short to battery 车速输出与电源短路

(4) .Fault code corresponding treatment measures

故障类型(failure type)	DTC	采取措施(Handling)
微控制器故障 (MCU Failure)	C0024-C0041	ABS故障 , 请咨询供应商后, 更换新ABS. ABS failure, please replace new ABS after consulting supplier.
固态继电器故障 (Solid State Relay Failure)	C0044-C0046	ABS故障 , 请咨询供应商后, 更换新ABS. ABS failure, please replace new ABS after consulting supplier.
电池电压故障 (The battery voltage Failure)	C0051-C0052	主要是外围电路故障! Mainly peripheral circuit failure! 检查车辆供电系统(线束连接、保险丝、电瓶、整流器) Check the vehicle power supply system(The fuse, battery, rectifier)
刹车信号故障 (The brake signal failure)	C0060-C0062	主要是外围电路故障! Mainly peripheral circuit failure! 2.检查刹车信号线和ABS连接情况。 Check the connection between brake line and ABS
电机故障 (Pump motor fault)	C0070, C0071	主要是外围电路故障! Mainly peripheral circuit failure! 检查电机供电线 Check the motor power supply line
电机故障 (Pump motor fault)	C0072-C0075	ABS故障 , 请咨询供应商后, 更换新ABS. ABS failure, please replace new ABS after consulting supplier.
轮速传感器接线故障 (Wheel speed sensor wiring fault)	C0080-C0083 C0100-C0103	主要是外围电路故障! Mainly peripheral circuit failure! 1.检查传感器线束与ABS连接通断情况, 若问题未解决, 进行下一步: Check the connection between sensor wire and ABS 2.尝试更换轮速传感器。 Try to change the wheel speed sensor .
轮速信号质量故障 (Wheel speed signal quality failure)	C0084-C0088 C0104-C0108	主要是外围故障! Mainly peripheral failure! 1.检查前后轮速传感器安装是否规范(传感器头部与齿圈的间隙 $\leq 1.2\text{mm}$): Check the installation of wheel speed sensor(The gap between sensor head and the tone wheel is 1.2 mm or less) 2.检查齿圈是否有变形以或损坏。 Check if there is a deformation, or a damage with the tone wheel
线圈故障 (coil failure)	C0120-C0171	ABS故障 , 请咨询供应商后, 更换新ABS. ABS failure, please replace new ABS after consulting supplier.

故障类型(failure type)	DTC	采取措施(Handling)
报警灯输出故障 (warning lamp output failure)	C0210, C0213	主要是外围电路故障! Mainly peripheral circuit failure! 检查仪表盘与ABS连接处线束, 若问题未解决, 请更换仪表, 若问题仍未解决, 请咨询供应商 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.
轮速输出故障 (WSS output failure)	C0230, C0231	主要是外围电路故障! Mainly peripheral circuit failure! 检查外围电路和仪表, 若问题未解决, 请咨询供应商后, 更换新 ABS 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

Section 1 Maintenance Instructions	337
Section 2 System Location.....	338
Section 3 Electronic Control Unit (ECU)	339
Section 4 Bcm Assembly	343
Section 5 Electronic Throttle Body.....	345
Section 6 Throttle Body Connector	346
Section 7 Intake Pressure Sensor	347
Section 8 Intake Air Temperature Sensor	348
Section 9 Electronic Accelerator.....	349
Section 10 Shift Sensor (Quick Shifter)	350
Section 11 Ignition Coil	351
Section 12 Fuel Injector	352
Section 13 Fuel Pump Assembly	353
Section 14 Oxygen Sensor	354
Section 15 Side Tilt Sensor	355
Section 16 Battery.....	356
Section 17 Power Supply System	357
Section 18 Magneto	357
Section 19 Oil Pressure Sensor	358
Section 20 Regulating Rectifier	359
Section 21 Trigger.....	360
Section 22 Starting Relay.....	361
Section 23 Oil Pump, Headlight Relay	362
Section 24 Fan, Main Relay.....	363
Section 25 Usb Charging Port.....	363
Section 26 Fuse Box/Wire	364
Section 27 Gear Sensor.....	365
Section 28 Engine Water Temperature Sensor.....	366
Section 29 Ignition Lock.....	367

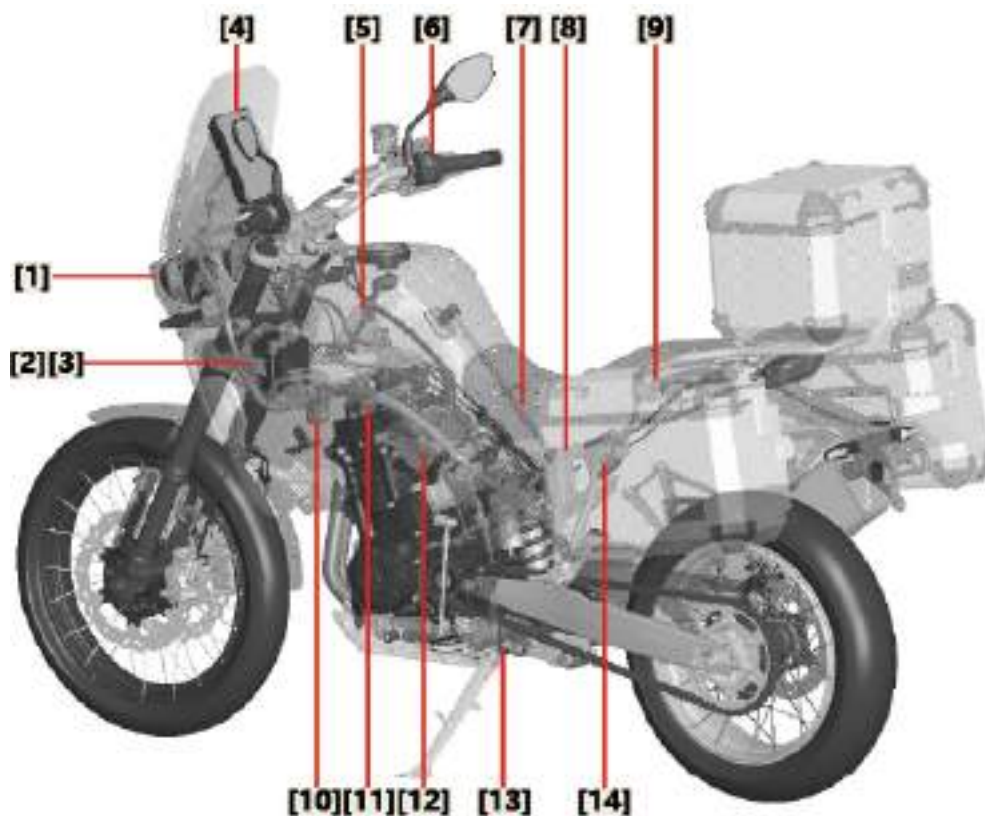
Section 30 Horn	368
Section 31 Clutch Switch.....	368
Section 32 Handlebar Switch-Left	369
Section 33 Handle Switch-Right	370
Section 34 Instruments.....	371
Section 35 Fuel Level Sensor	372
Section 36 Brake Switch.....	373
Section 37 Inspection Of Vehicle Ground Wire Harness	373
Section 38 Side Stand Off Switch.....	374
Section 39 Headlight Assembly (Left And Right)	375
Section 40 Front And Rear Turn Signals	375
Section 41 Tail Light Assembly	376
Section 42 License Plate Lamp.....	376

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) Fuse box	(3) Battery	(4) Instrument assembly
(5) BCM assembly	(6) Electronic accelerator handle	(7) Oil level sensor	(8) Fuel Pump
(9) ECU	(10) Starting relay	(11) Ignition Coil	(12) Electronic throttle body
(13) Side stand OFF switch	(14) Regulating rectifier		

※ 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

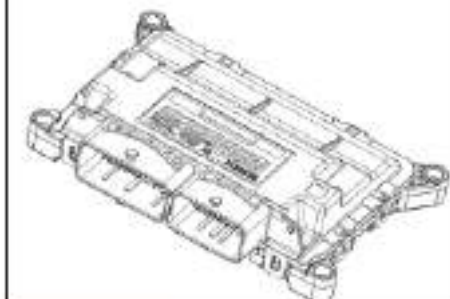
- ECU mounting screw [1];
- While pressing position [2], turn position [3] clockwise, then the connection between the ECU and the cable can be disconnected.

Torque:

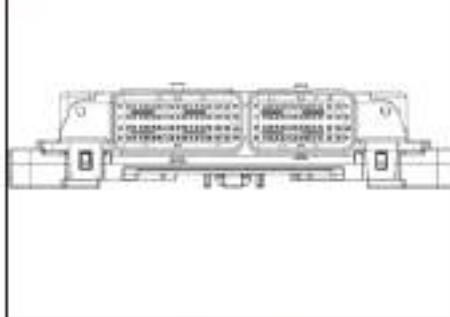
ECU and ECU bracket

8.0 N·m(0.8 kgf·m, 6.0 lbf.ft)

Drawing of ECU



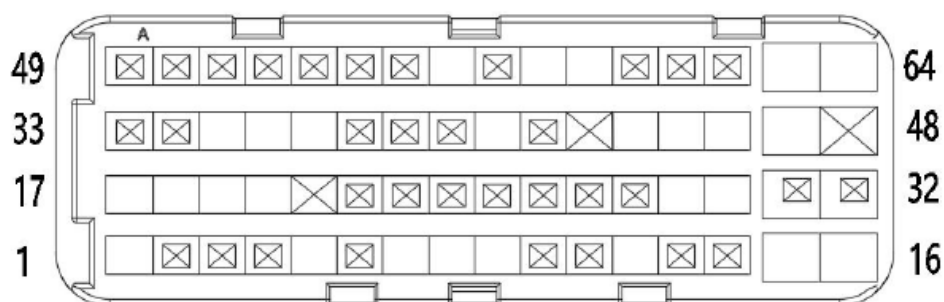
Drawing of ECU connector



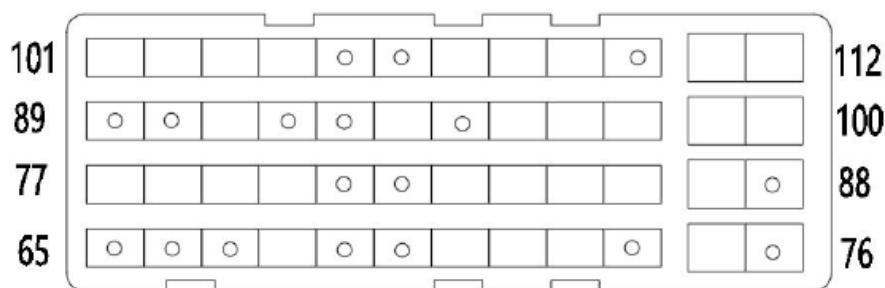
Quantity Value					
		Minimum	Standard	Maximum	Unit
Vehicle voltage	Normal operation	9.0	12.8	16.0	V
	Limited function	6.0-9.0		12.8-16.0	V
Limit and time to withstand vehicle over-voltage	16V	Some functions are maintained and fault diagnosis can be performed.		120	min
Operating temperature		-30		+70	°C
Storage temperature		-30		+85	°C

Schematic Diagram of Outgoing Direction of ECU Connector

ECU (64pin)



ECU (48pin)



ECU Pin Function Definitions (64-pin):

PIN-NO	FUNCTION	Wire harness color	PIN-NO	FUNCTION	Wire harness color
1	CANT communication line - high	G/L	8	OFF switch	B/W
2	-	-	9	Cruise control	R/L
3	-	-	10	-	-
4	-	-	11	-	-
5	Main relay	Br/R	12	Intake pressure sensor 2	O/Gr
6	-	-	13	-	-
7	Pedal 1 GND	Y/G	14	-	-

ECU Pin Function Definitions (64-pin):

PIN-NO	FUNCTION	Wire harness color	PIN-NO	FUNCTION	Wire harness color
15	Discontinuous power supply 1	V	40	-	-
16	Discontinuous power supply 2	V	41	Oil pump relay control	Gr/B
17	CANT communication line - low	R/Y	42	-	-
18	Diagnostic K-line	W/G	43	-	-
19	Intake pressure sensor 2 (5V)	O/R	44	Clutch switch	G/R
20	Continuous power supply (12V)	R	45	Accelerator pedal sensor 1	Y/P
21	-	-	46	Tilt signal	G/O
22	-	-	47	Intake pressure 2 GND	O/Y
23	-	-	48	-	-
24	-	-	49	-	-
25	-	-	50	-	-
26	-	-	51	-	-
27	-	-	52	-	-
28	-	-	53	-	-
29	Side stand OFF switch	W/B	54	-	-
30	Accelerator pedal sensor 2	P/Gr	55	-	-
31	-	-	56	Fan relay control	Gr/W
32	-	-	57	-	-
33	-	-	58	Starting relay control	W/V
34	-	-	59	Pedal 2 GND	Y/B
35	IGN	O/V	60	-	-
36	Pedal 2 (5V)	R/Gr	61	-	-
37	Pedal 1 (5V)	R/L	62	-	-
38	-	-	63	ECU GND 2	G
39	-	-	64	ECU GND 1	G

ECU Pin Function Definitions (64-pin):

PIN-NO	FUNCTION	Wire harness color	PIN-NO	FUNCTION	Wire harness color
65	-	-	89	-	-
66	-	-	90	-	-
67	-	-	91	Intake pressure sensor 1	B/Gr
68	Fuel injector 1	O/B	92	-	-
69	-	-	93	-	-
70	-	-	94	Carbon canister control valve	P/L
71	-	-	95	-	-
72	Fuel injector 2	O/W	96	Trigger A-end	L/W
73	Oxygen sensor heating -	O/G	97	Trigger B-end	G/W
74	-	-	98	Shift sensor (5V+)	P/W
75	Throttle actuator A terminal +	R/V	99	Ignition coil 2	B/L
76	-	-	100	Ignition coil 1	B/Y
77	Throttle position sensor 1	Gr/Y	101	Water temperature sensor	Gr/G
78	Throttle position sensor 2	Y/L	102	Air temperature	P/B
79	Gear shift signal	W	103	Gear signal	Gr/O
80	Oxygen sensor GND	W/Gr	104	Oxygen sensor +	Y/Gr
81	-	-	105	-	-
82	-	-	106	-	-
83	Shift sensor GND	G/B	107	Throttle valve (5V)	Y/V
84	Water temperature sensor GND	LB	108	Gear (5V+)	V/R
85	Intake pressure 1 GND	B/O	109	Intake pressure 1 (5V+)	B/R
86	Throttle GND	L/G	110	-	-
87	Throttle actuator B terminal -	G/Br	111	ECU GND 4	G
88	-	-	112	ECU GND 3	G

※ BCM assembly

The BCM (Body Control Module) is used to control and coordinate various electronic devices on a motorcycle. The BCM controls the motorcycle's headlight, turn signal, horn and other equipment by collecting the driver's operation commands and various sensor inputs. It also monitors the status of these devices to ensure the motorcycle operates normally.

Warning

- Do not use tools when disassembling BCM assembly 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 BCM connector assembly, be sure to set the ignition switch to OFF position, or the electrical components will be damaged.

Disassembly

- Pull the fixing rod [1] of the harness connector in the direction of the arrow shown in Figure 1.
- Remove the BCM assembly from the rubber grommet.

As shown in Figure 2: BCM controller application test circuit diagram.

Performance parameters.

Rated working voltage: 13.5V

Normal operating voltage range: DC 6.5~18V, with a minimum startup voltage of at least 6.5V.

Drawing of BCM



Drawing of BCM connector

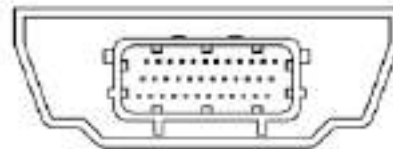
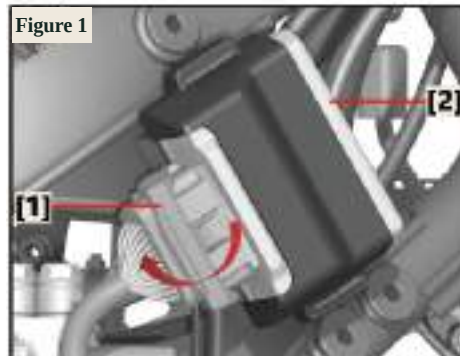
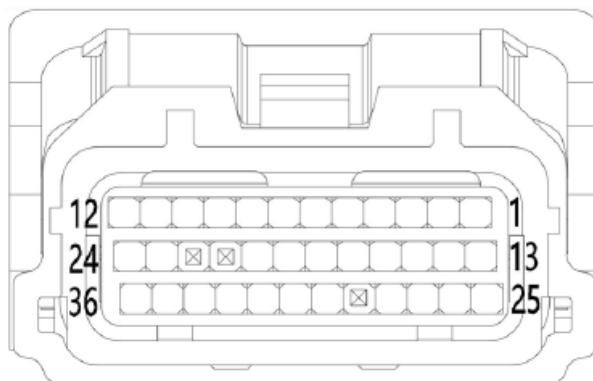


Figure 1



Schematic Diagram of Outgoing Direction of BCM Connector



Function definitions of BCM pins:

PIN-NO	FUNCTION	Wire harness color	PIN-NO	FUNCTION	Wire harness color
1	Starting relay	R/Br	19	Main relay control	Br/G
2	Fan 1	Gr/R	20	Right turn signal switch	Lb
3	Left turn signal	O	21	-	-
4	Right turn signal	Lb	22	-	-
5	Low beam	Br/W	23	Constant power 2	Br/L
6	Seat cushion heating	W/O	24	Constant power 2	Br/L
7	Handlebar heating	Y/O	25	CANT communication line - high	G/L
8	brake light	Y/G	26	CANT communication line - low	R/Y
9	Constant power 1	W/R	27	ON switch	Y/R
10	Oil pump	O/Br	28	Seat cushion temperature	L/V
11	Fi constant power	V	29	-	-
12	Horn	Br/B	30	Fan control	Gr/W
13	Constant power 3	L	31	Fuel pump control	Gr/B
14	Fan 2	Gr/R	32	Left turn signal switch	B/O
15	Rear brake signal	Br/Gr	33	Aarm switch	Gr
16	Front brake signal	Gr/Br	34	IGN	O/V
17	Horn switch	Br/G	35	GND	G
18	Startup auxiliary control	W/V	36	GND	G

※ Electronic throttle body

The electronic throttle body is used to control the air flow of the internal combustion engine and is part of the EGAS system. The motorcycle EGAS system generally consists of parts such as the electronic throttle body, electronic accelerator handle module and electronic control unit. The electronic throttle body is installed in the engine's air intake system, controlling the airflow into the cylinder by adjusting the throttle valve plate angle.

As shown in Figures 1 and 2: Sensor installation locations

1. Throttle body connector [1];
2. Intake pressure sensor [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.

Warning

- The electronic throttle body is a safety-critical component and must be handled with extreme care during operation. The throttle body must not be deformed or damaged during installation or disassembly. Any dropped parts must be scrapped, as damage to these parts may lead to invalidation even after a short period of use.
- It is not allowed to increase the load on the shell or cover plate.

Torque:

Intake pressure sensor mounting screw

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Electronic throttle body inspection

1. The throttle plate moves flexibly and is not stuck:

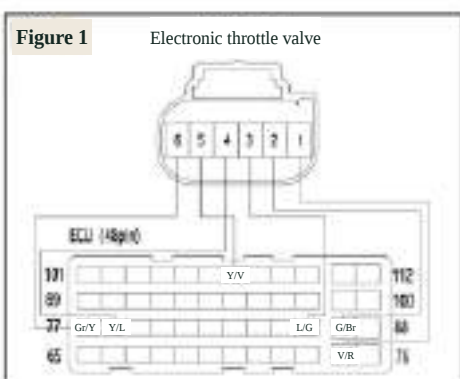
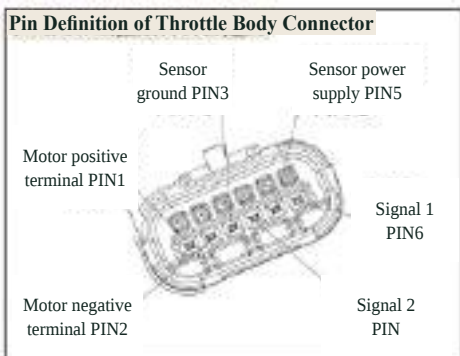
Figure 1



Figure 2



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.



※ Throttle body connector

The function of the electronic throttle body is to regulate the airflow into the engine and create a pressure differential. The throttle position is adjusted by a DC motor. The operating range is from open to closed, i.e., from LMS (Mechanical Lower Dead Center) to UMS (Mechanical Upper Dead Center). The position feedback of the throttle body is achieved through a non-contact position sensor. The measured values of this function include response time, air flow rate, and sensor output signal at specific positions of the valve plate.

Function definitions of pins

1. Throttle actuator A terminal + connects to ECU75 R/V;
2. Throttle actuator B terminal - connects to ECU87 G/Br;
3. Ground- (GND) connects to ECU86 L/G;
4. Throttle position sensor 2 connects to ECU78 Y/L;
5. Power supply 5V+ connects to ECU107 Y/V;
6. Throttle position sensor 1 connects to ECU77 Gr/Y.

Figure 1: Wiring diagram between throttle body connector and ECU

Power voltage

Note

• The supply voltage refers to the voltage output by the ECU. The output voltage of the ECU is the same as the input voltage of the electronic throttle body.

Motor power supply (DVE-SE connector):

Minimum working voltage: 8V

Rated working voltage: 12V

Overload working voltage: 17V

Sensor power supply (DVE-SE connector)

Sensor working voltage (5V power supply):

Sensor rated voltage: $4.75\text{ V} < U < +5.25\text{ V}$

Sensor power supply terminal withstand voltage range: $-12\text{ V} < U \leq +20\text{ V}$; sensor output terminal withstand voltage range: $-0.3\text{ V} < U \leq +18\text{ V}$

※ Intake pressure sensor

Monitor the intake pipe pressure and provide the engine load information for ECU.

Function definitions of pins

Intake pressure sensor 1

- 1.Signal connects to ECU91 B/Gr;
- 2.Ground- (GND) connects to ECU85 B/O;
- 3.Power supply 5V+ connects to ECU109 B/R;

Intake pressure sensor 2

- 1.Signal connects to ECU12 O/Gr;
- 2.Ground- (GND) connects to ECU47 O/Y;
- 3.Power supply 5V+ connects to ECU19 O/R;

Figure 1 and 2: Wiring diagram between IAP sensor and ECU

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°.

Drawing and Pin Definition of Pressure Sensor

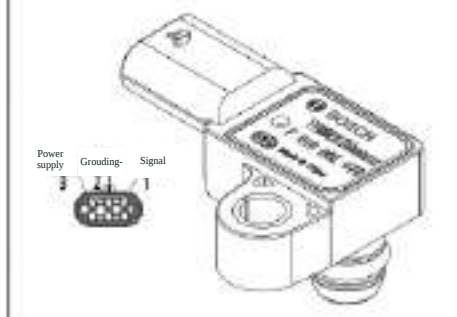


Figure 1

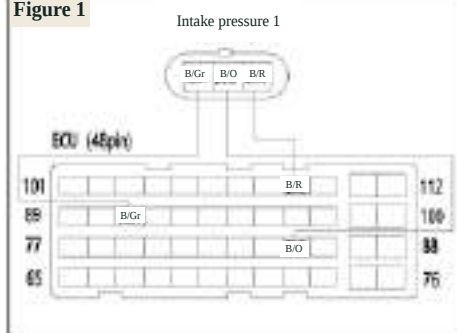
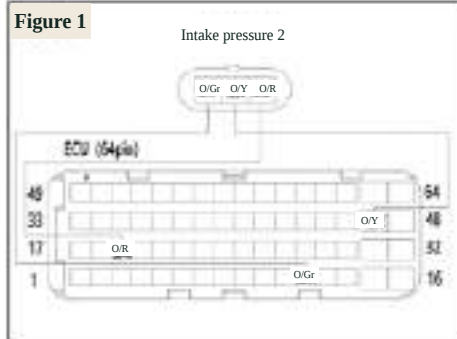


Figure 1



Drawing and Pin Definition of Temperature Sensor

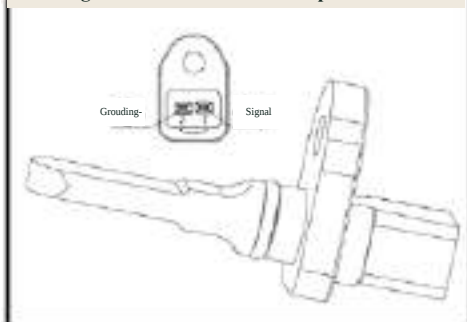
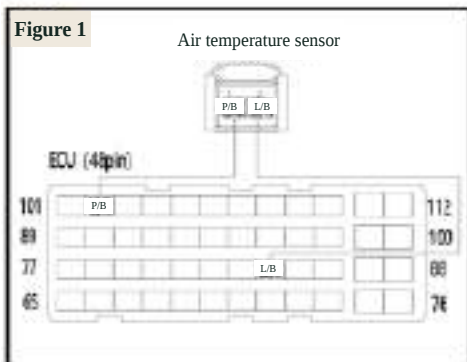


Figure 1



※ Intake air temperature sensor

It is installed on the rear 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 connects to ECU102 P/B;
2. Ground- (GND) connects to ECU84 L/B;

Figure 1: Wiring diagram between IAT sensor and ECU

Sensor resistance parameters

-IAT sensor resistance
2290–2551 Ω at 20°C.

※ Electronic accelerator

The electronic accelerator transmits the output voltage from the accelerator handle position sensor to the ECU, which then controls the motor to achieve closed-loop control of the electronic throttle opening.

Function definitions of pins

Electronic accelerator

1. Pedal 1 power supply 5V+ connects to ECU37 R/L;
2. Accelerator pedal sensor 1 connects to ECU45 Y/P;
3. Pedal 1 ground (GND) connects to ECU7 Y/G;
4. Accelerator pedal sensor 2 connects to ECU30 P/Gr;
5. Pedal 2 ground (GND) connects to ECU59 Y/B;
6. Pedal 2 power supply 5V+ connects to ECU36 R/Gr

Figure 1: Wiring diagram between electronic accelerator and ECU.

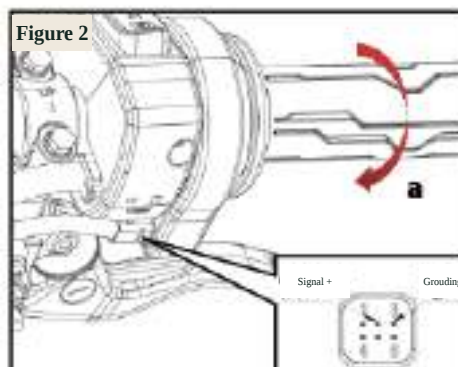
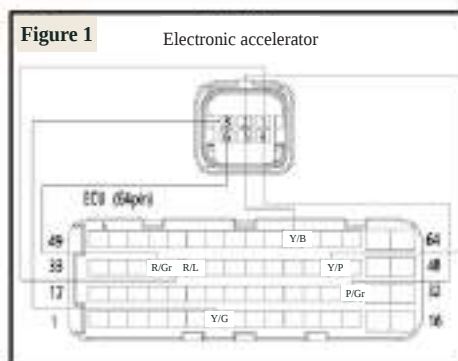
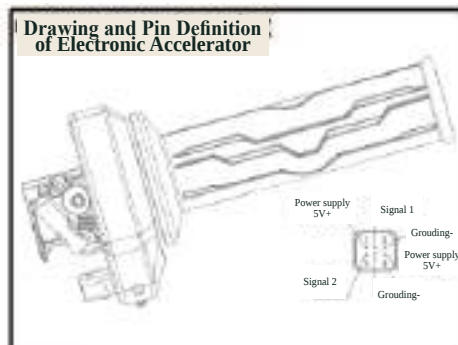
Angle sensor parameters

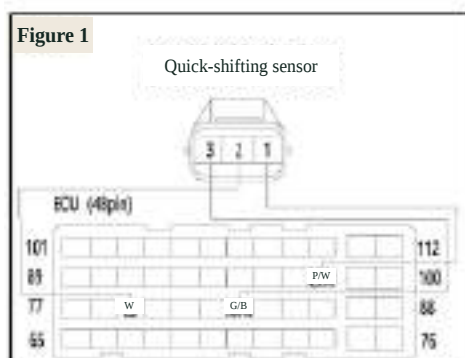
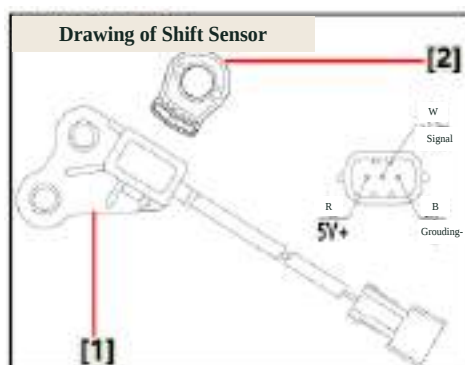
Input voltage: 5 ± 0.25 V;

Maximum current consumption: 30 mA

Testing:

1. Connect the multimeter to the position sensor harness terminal as shown in Figure 2.
 - Positive test probe → sensor signal +
 - Negative electrode test probe → GND-
2. Rotate the electronic accelerator in direction "a" to its fully open position and verify that the output voltage is within the specified value of $4 \text{ V} \pm 0.1 \text{ V}$. When the accelerator is released, verify that the output voltage is within the specified value of $1.0 \text{ V} \pm 0.1 \text{ V}$.





※ Shift sensor (quick shifter)

Quickly upshift without operating the clutch, as the clutch lever does not need to be engaged, allowing for uninterrupted continuous shifting.

Notes

- This function will not operate when upshifting with the throttle off.
- When operating the clutch lever, this function will not operate.

Sensor parameters

Temperature range: -30~125°C

Voltage range: DV 5V ± 0.25V;

Sensor output correlation	
Voltage	Angle
0.63V	-15°
2.56V	0°
4.5V	15°

Notes

- If there is a malfunction in the quick shifting system.

Inspection

1. Check if the quick shifting sensor[1] and magnet seat [2] sensing area are contaminated with foreign matter;
2. Check if the sensor is installed in the correct position, ensuring it is centered between the sensor and the magnet seat.
3. Sensor connection wiring.
4. If the above inspections are completed and it still does not work properly, please replace the quick shifting component.

Function definitions of pins

1. Power supply 5V+ connects to ECU98 P/W;
2. Quick shift sensor signal connects to ECU79 W;
3. Ground- (GND) connects to ECU83 G/B;

As shown in Figure 1: Quick shifting sensor wiring diagram.

※ 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

- 1.Positive electrode + connects to power supply 12V + (V);
- 2.Negative electrode - connects to GND - G/P;
- 3.Ignition signal connects to ECU100 B/Y;

Ignition coil 2

- 1.Positive electrode + connects to power supply 12V + (V);
- 2.Negative electrode - connects to GND - G/P;
- 3.Ignition signal connects to ECU99 B/L;

Figure 1: Wiring diagram between ignition coil and ECU.

Inspection

- Primary ignition coil resistance
- Off-specification → Replace.

- Remove the ignition coil plug.
- As shown in Figure 2: Diagram for connecting multimeter to ignition coil.
 - Positive electrode test probe → [1]
 - Negative electrode test probe → [2]
- Measure the primary ignition coil resistance.

Ignition coil parameters

1.Static parameters

Primary resistance: $0.70 \pm 10\% \Omega$

Primary inductance: $2.13 \pm 15\% \text{ mH}$

2.Dynamic parameters:

Rated voltage: $14 \pm 0.5\text{V}$

Primary current: $7.7 \pm 0.8\text{A}$

Ignition pulse width: $1.6 \pm 0.5 \text{ msec}$

Secondary voltage:

Not lower than 25 KV at 25pF load

Not lower than 20 KV at 25pF/ 1 MΩ load

Ignition energy: not lower than 30mJ

Operating temperature: $-35^{\circ}\text{C} - 125^{\circ}\text{C}$

Drawing and Pin Definition of Ignition Coil

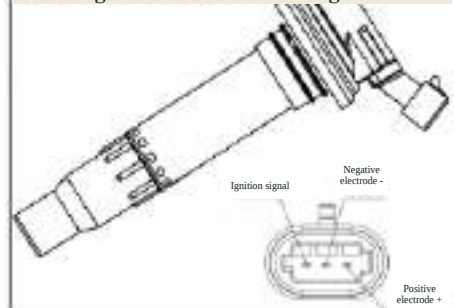


Figure 1

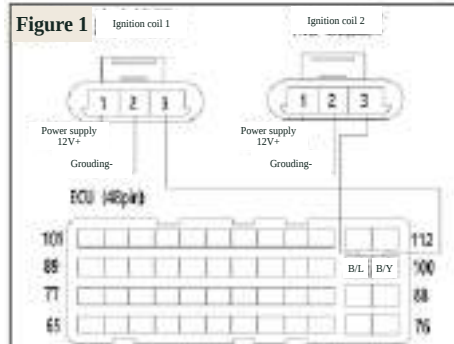
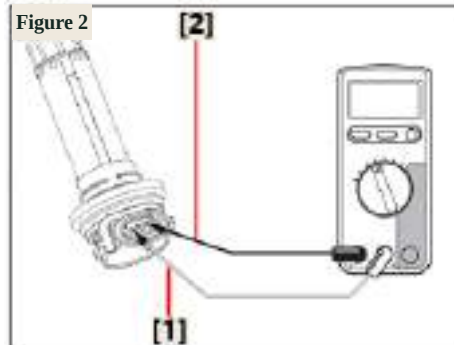
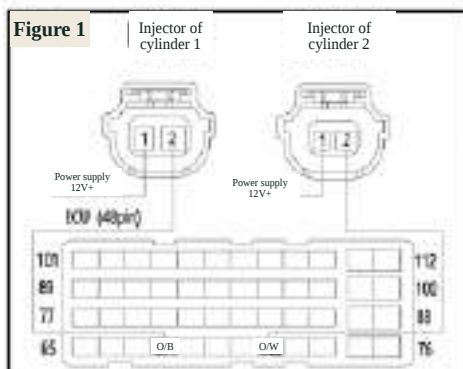
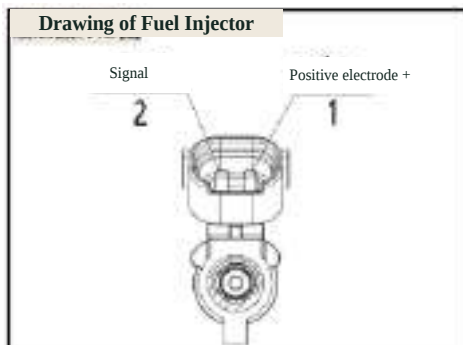


Figure 2





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 8-hole injection, and cannot rotate after the circlip is fixed.

Pin function definition

Fuel injector 1

1. Connects to power supply 12V+, V

2. Signal connects to ECU68 O/B

Fuel injector 2

1. Connects to power supply 12V+, V

2. Signal connects to ECU72 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, 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 BCM, ECU.

Function definitions of pins:

- 1: Connects to BCM assembly (O/Br)
- 2: Connect to the negative battery electrode (G)

Performance parameters:

Opening pressure of pressure regulating valve:
 $330 \pm 10 \text{ kPa}$

At a flow rate of 40L/h, the corresponding rated pressure is $330 \pm 10 \text{ kPa}$

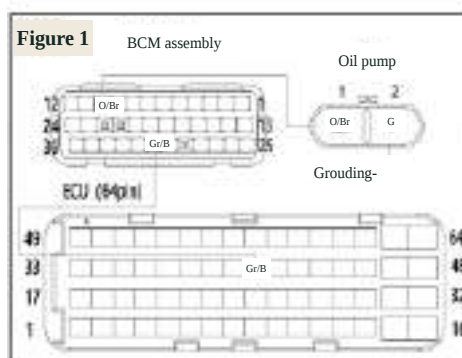
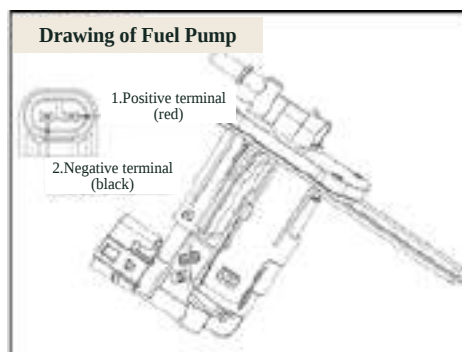
This fuel pump is installed at the bottom of the vehicle's fuel tank. Do not operate the fuel pump in a no-load or fuel-free state to prevent damage; Handle with care during installation or disassembly, and do not drop it to the ground.

Measure oil pressure

Connect the oil pressure gauge to the fuel outlet of the fuel pump assembly, and lock it with a clamp to ensure that there is no leakage at the junction. Press the stop switch, and the fuel pump will stop running after an operation of 5 seconds. Now measure to check that the oil pressure reaches the specified pressure value (330 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-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



Fuel Pump Basic Parameters Table

Name	Voltage (V)	Test Pressure (kPa)	Flow (L/h)	Current (A)
Fuel pump assembly	DC12	280 ± 10	≥ 30	≤ 2.5
Pump cell	DC12	330 ± 10	≥ 30	≤ 2.5
Shut-off pressure	DC8	100kPa		

should be depressurized before disassembling the oil pipe. The procedure is as follows: remove the fuel pump relay or disconnect the 2-pin (black) fuel pump harness connector, then start the engine and let it idle until it stalls on its own.

Drawing of Oxygen Sensor



※ Oxygen Sensor

The sensor detects the oxygen content in the exhaust gas to obtain the rich and lean signals of the air-fuel ratio in the mixture, converts the testing result into a voltage signal, and inputs it into the ECU. Based on the signal from the oxygen sensor, the ECU continuously adjusts the fuel injection pulse width. 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 15 V;
PIN2: Sensor ground - ECU 80 W/Gr;
PIN3: Heating - ECU 73 O/G;
PIN4: Sensor signal + ECU 104 Y/Gr.

Notes

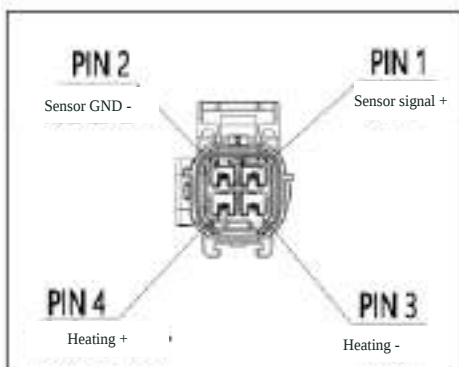
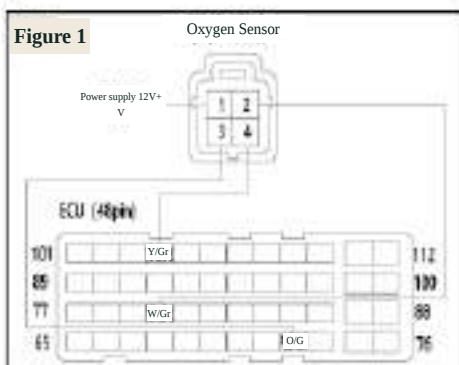
•Apply high temperature resistant grease to the thread area during installation.

Torque:

Oxygen sensor to muffler

50 N·m (5.0 kgf·m, 37 lbf·ft)

Figure 1



※ 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: Connect to side-stand signal, ECU 46 (G/O)

GND: Connect to ground - (G)

Inspection

-Output voltage of tilt sensor

Off-specification → Replace.

Output voltage of tilt sensor

Operating angle: $65^{\circ} \pm 10^{\circ}$

The sensor output voltage before actuation angle is at a high level, ≥ 13.5 V.

The sensor outputs a low-level voltage (≤ 0.2 V) within the operating angle range

As shown in Figure 3: Wiring diagram between side tilt sensor and ECU.

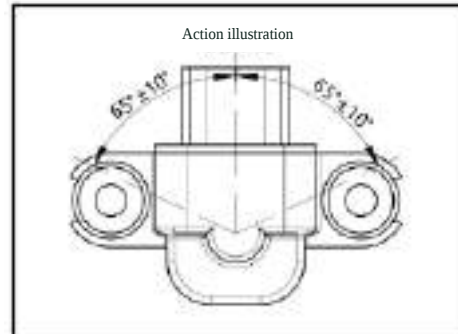


Figure 1

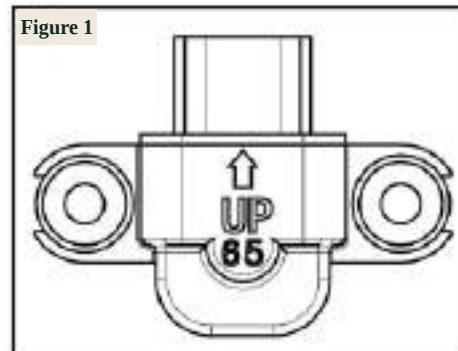


Figure 2

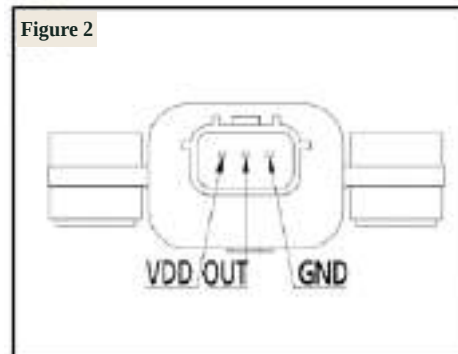
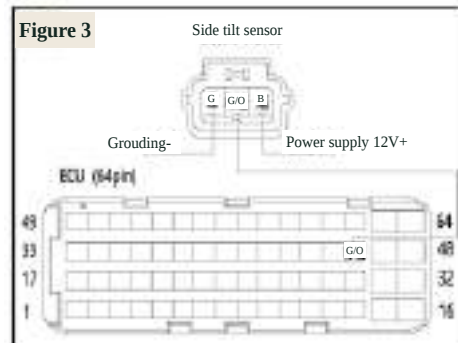
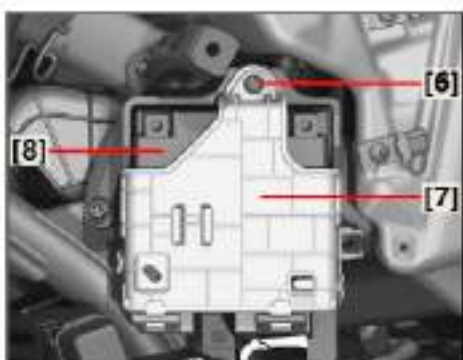
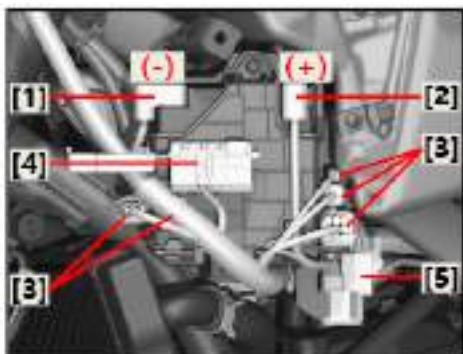


Figure 3





Charging voltage	
5000rpm	14.2V-14.8V

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

Torque:

Battery positive and negative terminal connecting screw

2.0 N·m (0.2 kgf·m, 1.5 lbf·ft)

Battery box cover and battery box

5.0 N·m (0.5 kgf·m, 4.0 lbf·ft)

Battery specification:

Battery model: HJ13L-FPZ

Nominal voltage: 12V

Capacity: 6.0 Ah

Required charging voltage: 14.4V $\pm$ 0.5V

Charging current: standard 3.0A, max. 24A

Operating temperature: -20°C -60°C

Overall dimension: Length x Width x

Height: 112x70x110(2 $\pm$ mm)

※ 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:

- Remove the negative battery terminal screw [1];
- Remove the positive battery terminal screw [2];
- Connection plugs and harness clamps at various points along the main cable [3];
- Fuse box [4];
- Starting Relay [5];
- Bolt [6].
- Battery box cover [7];
- Battery and rubber pad [8];

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;

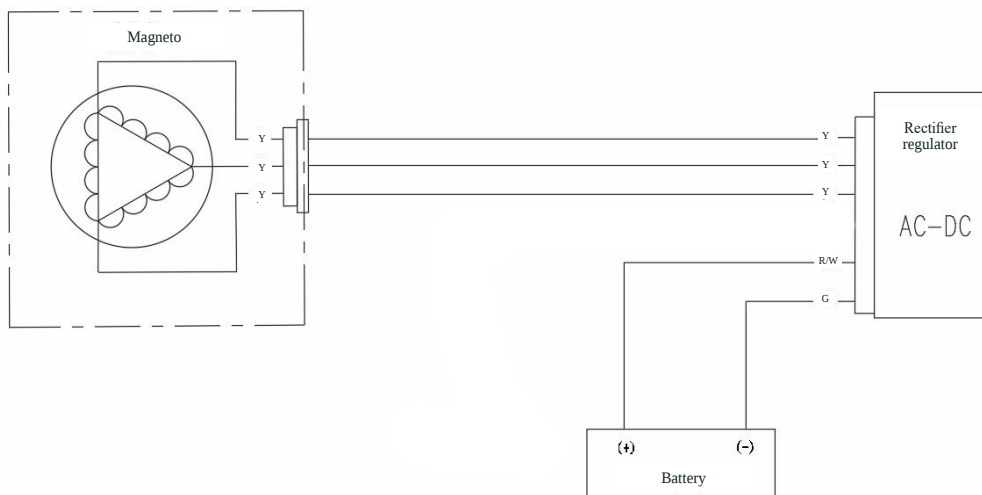
Measuring point positive (+), measuring point grounding (-).

Notes

•When measuring the battery voltage after

※ 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 200Ω .

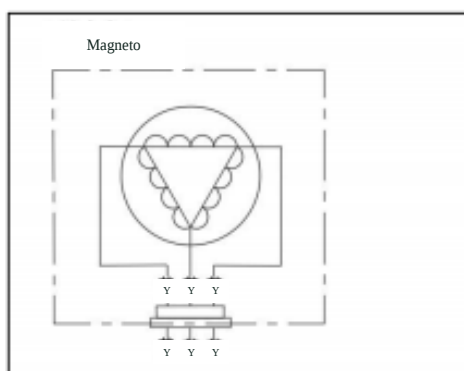
Performance of magneto under load

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

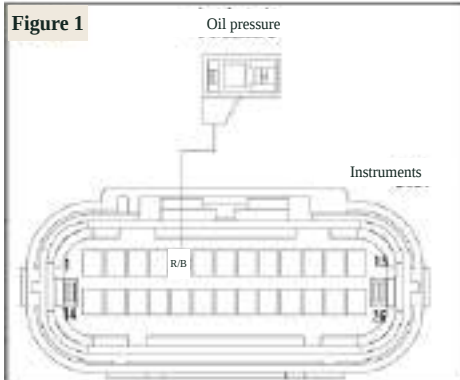
Output current (A) >24



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 40 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

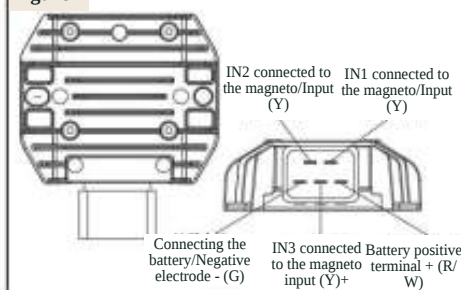


Figure 2

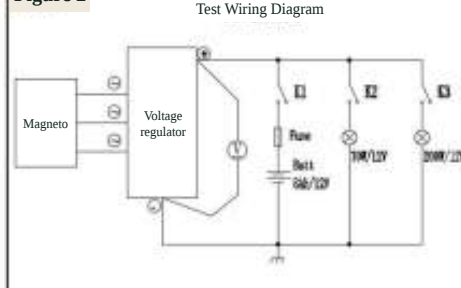
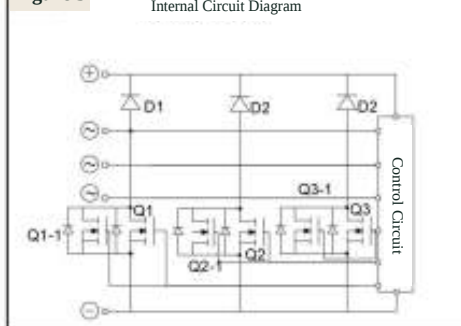


Figure 3



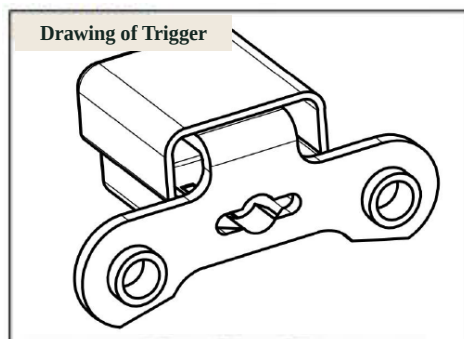


Figure 1

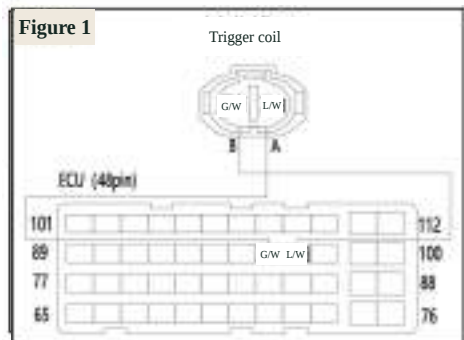


Figure 2

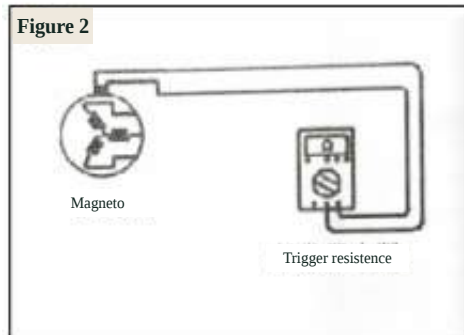
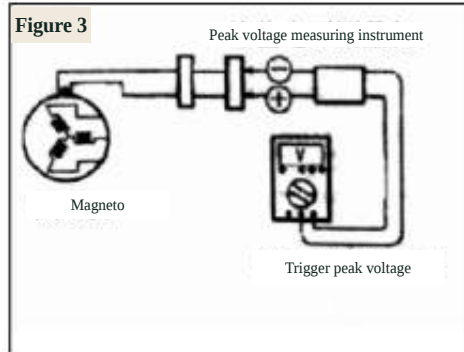


Figure 3



※ 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: $100\Omega \pm 20\%$ (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 $\geq 2V$ (200r/min)

※ Starting relay

Apply DC12V to the contacts at both ends of the control circuit coil of starting relay, and measure with a multimeter to check for interconnection between the contacts (B and M) :

If the relay contacts make a tick sound and the multimeter makes a continuous beep sound, it indicates that the two contacts are interconnected, if not, it indicates that they are not interconnected. if there is no DC12V voltage applied to two ends of the coil, the two contacts are not interconnected.

The above two items can be used to confirm whether the relay is in good condition, and the multimeter shall be set to the on-off gear during the measurement.

⚠ Warning

- The time for applying voltage to the relay coil shall not exceed 1 minute, otherwise it may cause overheating and even burnout of the coil.

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 200Ω range.

As shown in Figure 2: Circuit diagram of starting relay.

Drawing of Starting Relay

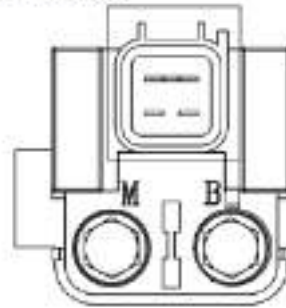


Figure 1

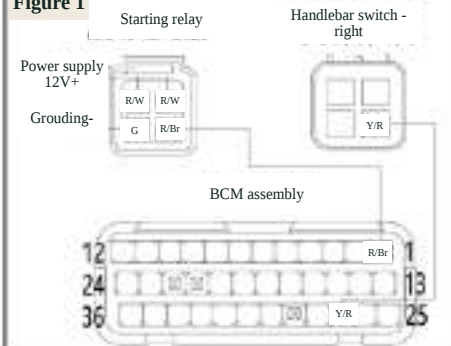
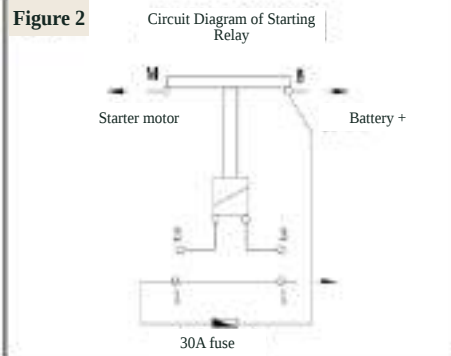
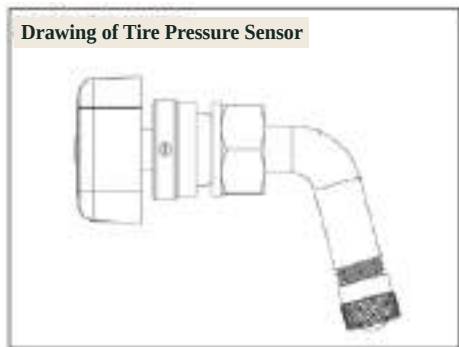


Figure 2





※ Tire pressure sensor

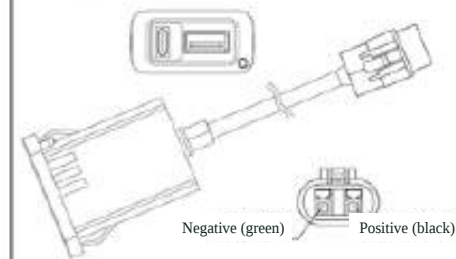
- 1.Working voltage range: 2.1V–3.6V;
- 2.Battery capacity: 220mA;
- 3.Battery service life: ≥5 years (based on 4 hours of driving per day)
- 4.Temperature detection range: -40°C~95°C, accuracy ±1°C;
- 5.Mounting torque: 5 N·m;
- 6.The pressure detection range and error are shown in the following table:

Pressure	Error	Operating temperature
0-400KPa	± 5KPa	0~70°C
	± 10KPa	-40~0°C , 70~95°C
400-800KPa	± 7KPa	0~70°C
	± 15KPa	-40~0°C , 70~95°C

※ USB charging port

1. Working environment temperature: $-30^{\circ}\text{C} \sim +95^{\circ}\text{C}$;
2. Working voltage: $\text{DC}10\text{V} \sim 24\text{V}$;
3. Output voltage range: $\text{DC}3\text{V} \sim 12\text{V}$ (automatically adjusted according to the fast charging protocol);
4. Fast charging protocols: support Qualcomm QC2.0, QC3.0 fast charging protocols, support Huawei fast charging protocol FCP, support Samsung fast charging protocol AFC, etc.;
5. Charging interface: Type-A + Type-C;
6. Maximum output power: $18\text{W} + 18\text{W}$ ($5\text{V}@3\text{A}, 9\text{V}@2\text{A}, 12\text{V}@1.5\text{A}$)
7. In case the fast charging protocol is not recognized, the output is $5\text{V}@3\text{A}$;
8. Insulation resistance: insulation resistance between the housing and the internal

Drawing of USB Charging Port



※ 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

a. Connect the digital multimeter to the fuse wire and check for conduction.

b. If it is not conductive, replace the fuse wire.

2. Replace

-Replace the fuse wire.

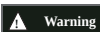
a. Set the main power switch to "OFF".

b. Install new fuse wire with correct ampere value.

c. Turn on the power switch and check for normal operation of the circuit.

d. 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.

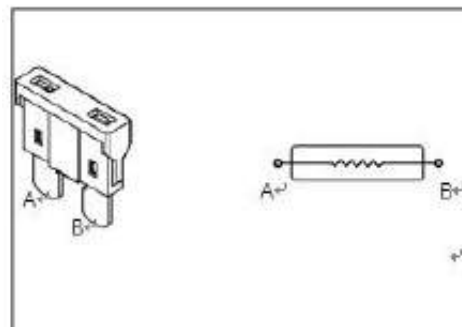
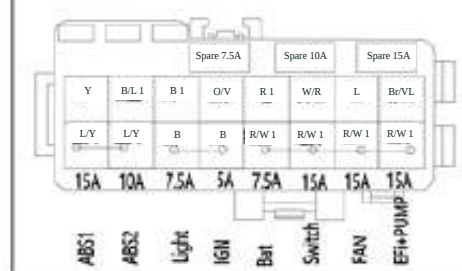
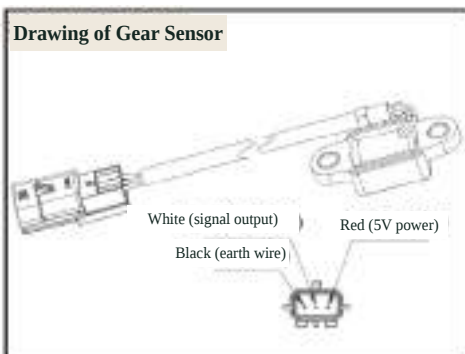


Figure 1

Fuse box



Drawing of Gear Sensor



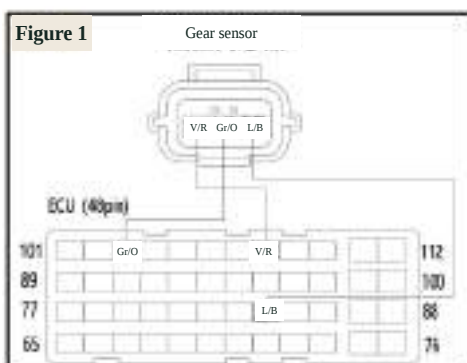
※ Gear sensor

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).
- The sensor mounting bolt is M5x12 with a torque of 6N.m.

As shown in Figure 1: Wiring diagram between gear sensor and ECU.

Figure 1



Function definitions of pins

- 1.Power supply 5V+ connects to ECU108 V/R;
- 2.Gear signal connects to ECU103 Gr/O;
- 3.Ground- (GND) connects to ECU84 L/B;

Parameter

- 1.Service temperature of sensor: -30~125°C;
- 2.Service voltage of sensor: DV 5V $\pm$ 0.25V;

Gear-to-voltage output relationship (at 5.05V input voltage)

	1(0°)	N (30°)	2(60°)	3(120°)	4(180°)	5(240°)	6(300°)
Standard value	4.4V	4.02V	3.64V	2.88V	2.12V	1.36V	0.6V
Minimum value	4.33V	3.98V	3.54V	2.78V	2.02V	1.26V	0.5V
Maximum value	4.5V	4.07V	3.71V	2.98V	2.22V	1.46V	0.7V

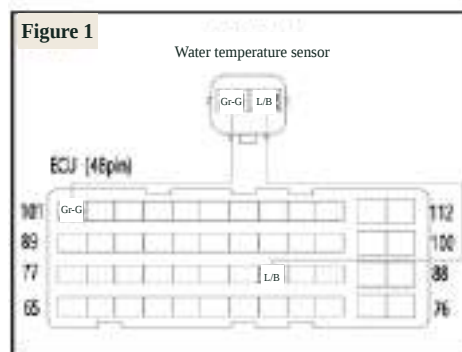
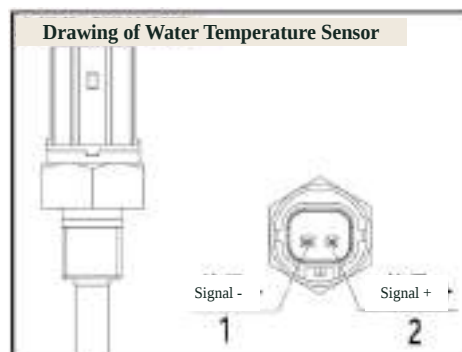
※ Engine water temperature sensor

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

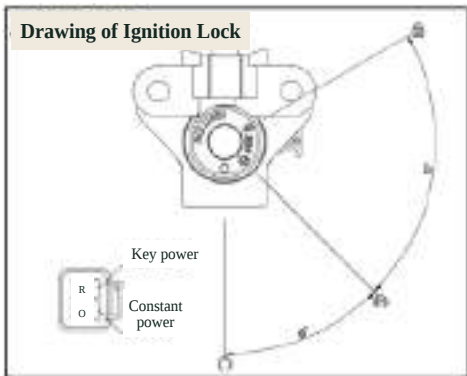
- 1: Signal ground - connected to ECU84 pin (L/B)
- 2: Sensor signal + connected to ECU101 pin (Gr/G)



As shown in the water temperature sensor characteristic table, different temperatures correspond to different resistance signals.

Temperature range (°C)	Resistance value (Ω)		
	Minimum value	Standard value	Maximum value
-20	13820	14770	15790
100	178.9	183.0	187.0

Drawing of Ignition Lock



Electrical Logic Table

Wire color	Red	Orange	Key insertion and extraction
Gear			
			Cannot
			Can
			Can

※ 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.

※ Carben canister solenoid valve

The canister control valve is used to regulate the flow of fuel vapor from the fuel tank through the carben canister. It is triggered by pulses, and the duration of the pulses or the frequency of the electronic controller is adjusted according to the engine's operating conditions.

Figure 1: Circuit connection diagram of canister solenoid valve.

Function definitions of pins

- 1: Signal connected to ECU94 pin (P/L)
- 2: Connected to power supply 12V + (V)

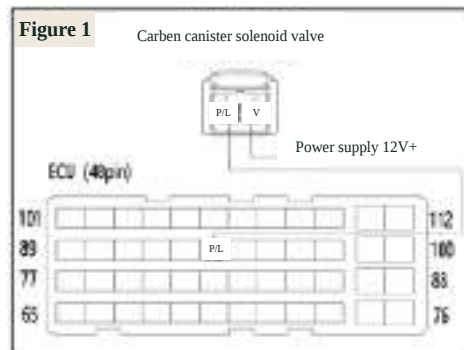
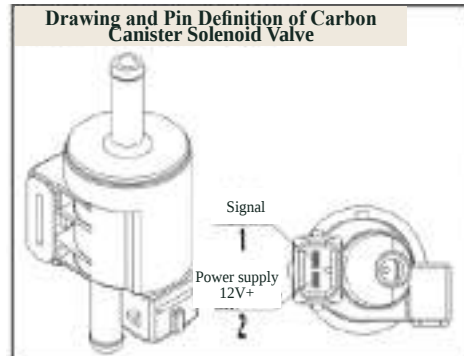
Characteristic parameters

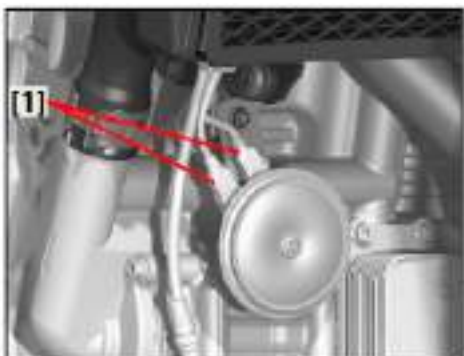
Working voltage: 9V-16V

Trigger frequency: up to 30 Hz

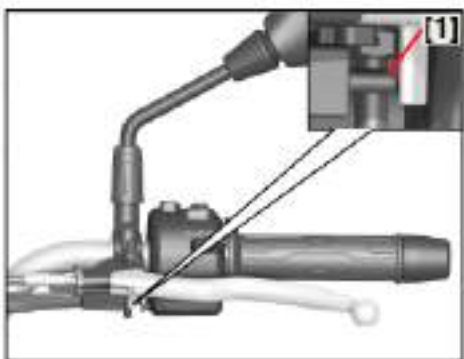
Operating temperature: -40°C~140°C

Resistance: 17Ω (at room temperature)



**※ 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.Instrument confirmation/exit switch; (self-reset)
- 2.Menu selection switch; (self-reset)
- 3.Turn signal switch; (self-reset)
- 4.Horn switch; (self-reset)
- 5.Hazard light switch; (self-locking)
- 6.Dimming switch (self-locking/self-reset)
- 7.Cruise control speed adjustment switch; (self-reset)
- 8.Cruise control NO/OFF switch; (self-reset)

- A.Handlebar switch harness terminal;
B.Function switch harness terminal;
C.Handlebar heater harness terminal;
D.Clutch switch harness terminal.

Figure 1 and 2: Correspondence table for handlebar switch - left function wire color (input terminal).

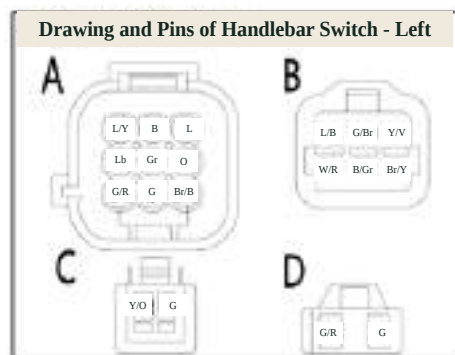
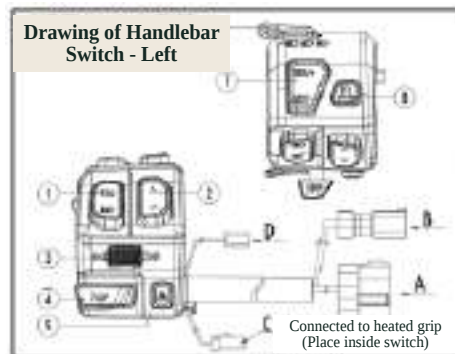
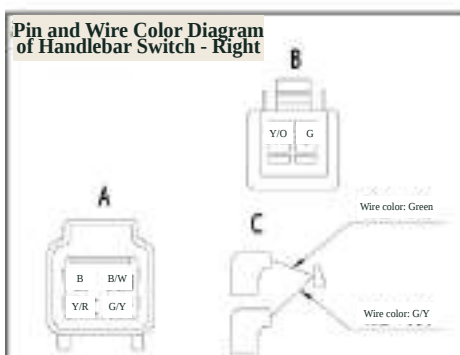
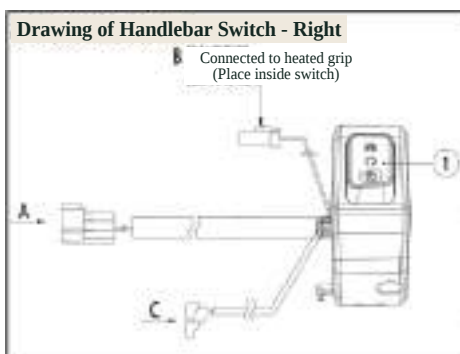


Figure 1

Schematic Diagram of Left Switch On-Off Status												
Symbol	Wire color / diameter	Button status	Br/W	L	B	Lb	Gr	L/O	Br/B	G/B	G	Y/O
Color change		Self-locking 13P	●	●								
		Self-locking										
Overtake		Self-vent 12.1P		●	●							
Turn		Self-vent 17P						●			●	
	OFF	Self-vent 7P									●	
		Self-vent 17P				●					●	
Warning		Self-locking 7P					●				●	
Alarm	Door	Self-vent 10.9P							●		●	
Clutch lock										●	●	
Handlebar heating											●	●

Figure 2

Instrument adjustment switch							
Symbol Function	Wire color diameter	Button status	Y/V	G/Br	Br/Y	B/Gr	G
Upper	▲	Self-reset 10P		●			●
Lower	▼	Self-reset 10P	●				●
Exit	ESC	Self-reset 10P			●		●
Confirm	ENT	Self-reset 10P				●	●



※ 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 electric starter button "⊕"
- The engine can be started.
- 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.

- A.Handlebar switch harness terminal;
- B.Handlebar heater harness terminal;
- C.Brake switch wiring harness terminal

Figure 1: Correspondence table for handlebar switch - right function wire color (input terminal).

Figure 1

CC01 Schematic Diagram of Right Switch On-Off Status							
Symbol	Wire color / diameter	Button status	O/N	B/W	Y/R	Gr/Br	Y/O
Function							
OFF	⊗	Self-locking 20°					
START	○		●	●			
ON	⊕	Self-reset 14°	●	●	●		
Brake switch						●	●
Handlebar heating							●

※ Instruments

Display check

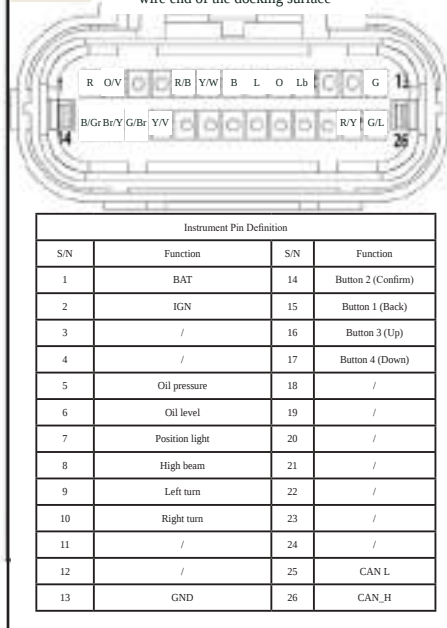
When the ignition key is turned to the "I" (ON) position, the instrument will be powered on and play the boot animation, then run a self-check, and display all functional modules and symbols; if the digital display screen fails to work, check the instrument power/ground wire; in the event of missing 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.



Figure 2 Detection reference plane of the outgoing wire end of the docking surface



Drawing of Trigger

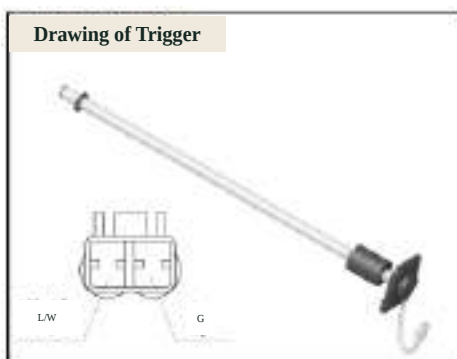


Figure 1

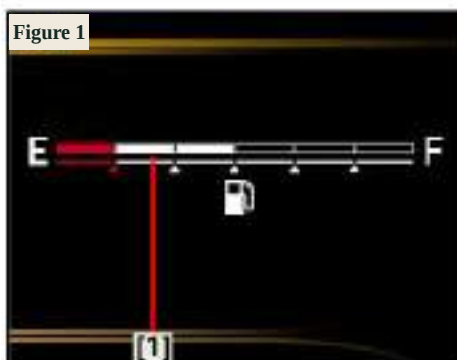
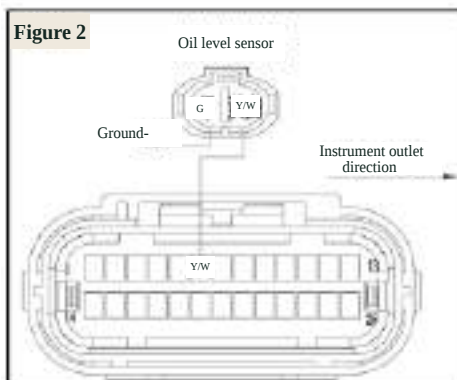


Figure 2



※ 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: 0-6 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 6 bars.

Point parameter table

Point location	15 = F	0 = E
Stroke (mm)	382±3	≤44.5×3
Resistance value (Ω)	10±2Ω	95±3Ω

If the resistance does not meet the specification, replace the oil level sensor.

Figure 2: Wiring diagram of fuel level sensor and TFT instrument.

※ Brake switch

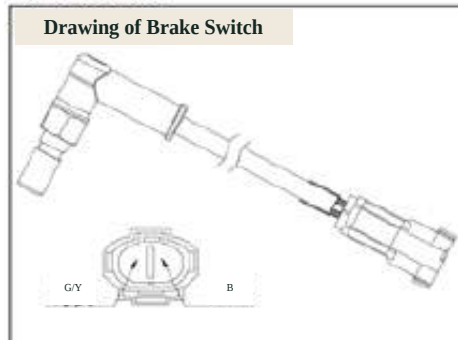
Identify the working state of the brake switch according to the lighting of brake light.

- 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
32 N·m (3.2 kgf·m, 23.6 lbf·ft)

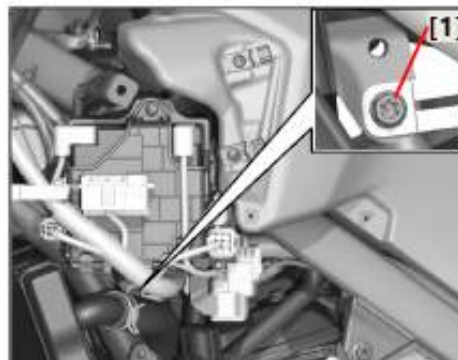
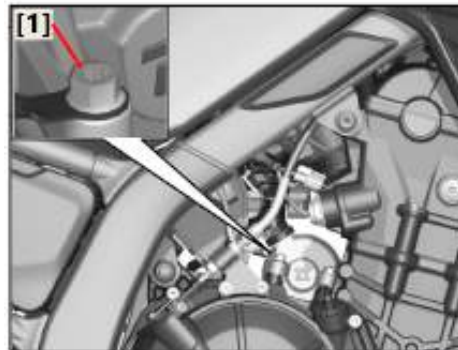


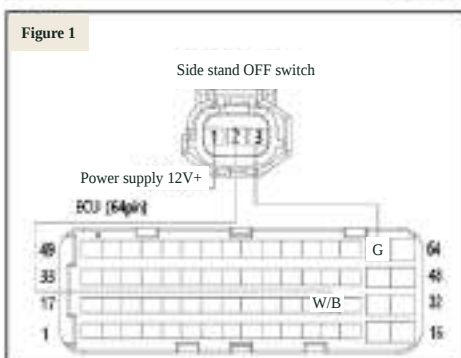
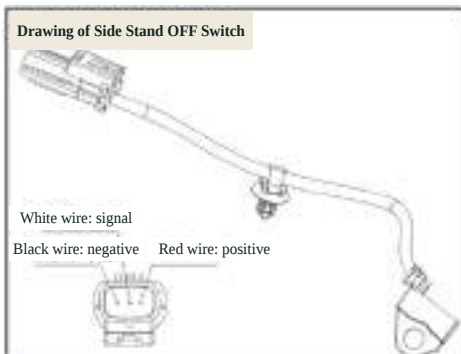
※ Inspection of vehicle ground wire harness

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 harness ground wire
10 N·m (1.0 kgf·m, 7.4 lbf·ft)





※ 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: Connected to power + DC12V (B)
- 1: Signal + connected to ECU 29 (W/B)
- 2: GNG - connected to ECU 63 (G)

Figure 1: Wiring diagram between side stand switch and ECU.

※ Headlight assembly (left and right)

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

- 1.Check if the headlight mode set correctly;
- 2.Switch damage;
- 3.Headlight relay damage;
- 4.Connector abnormality, such as pin retraction, crooked pin, improper plugging, etc.

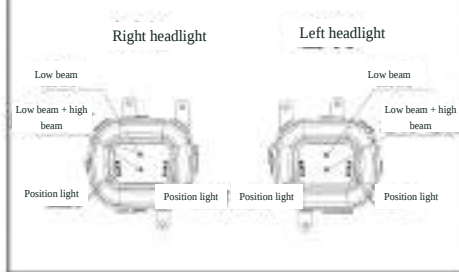
As shown in Figure: Wiring diagram of headlight assembly.

※ Front and rear turn signals

- 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

Front Diagram of Headlight



Rear view of front headlight diagram and pin function definitions

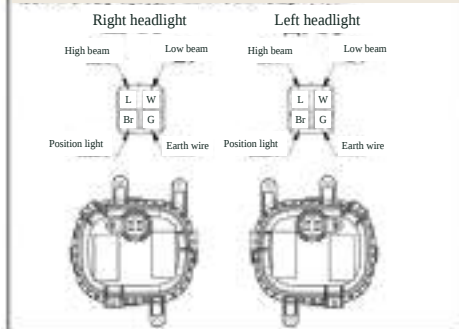


Diagram of Front Turn Signal

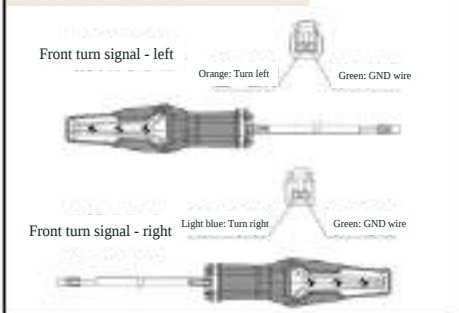


Diagram of rear turn signal

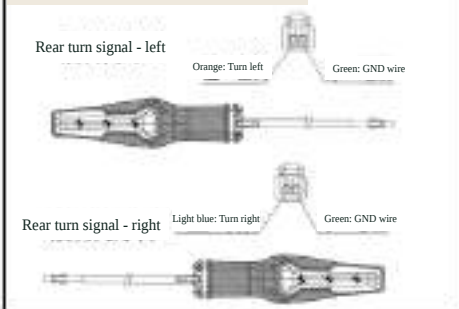
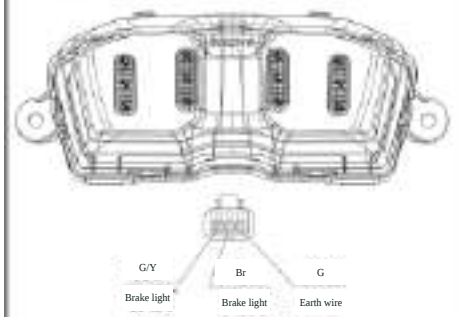


Diagram of taillight assembly



※ 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

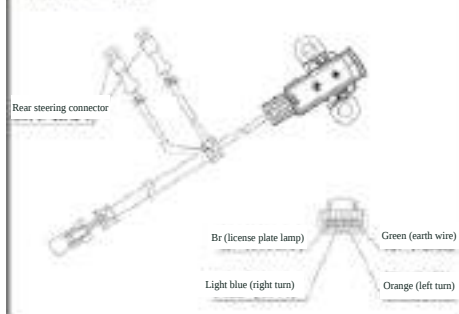
When turning on the ignition lock switch or starting the vehicle:

- 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.

Diagram of License Plate Lamp



※ 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

ZF800GY Touring Edition

Wiring Diagram

