

Foreword



- This Service Manual describes the guidelines relating to the maintenance of CV3 injection engine manufactured by KYMCO.
- The contents, types and vehicles shown in the Service Manual are for illustration purpose only and may differ from the actual vehicles. The correct specifications are subject to change based on the actual model.
- KYMCO will not provide further notice in the event the photos, the pictures or the instructions provided in the manual are inconsistent with the vehicle being purchased due to the change of vehicle model or structure as will be required to meet actual demand.
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KWANG YANG MOTOR CO., LTD.

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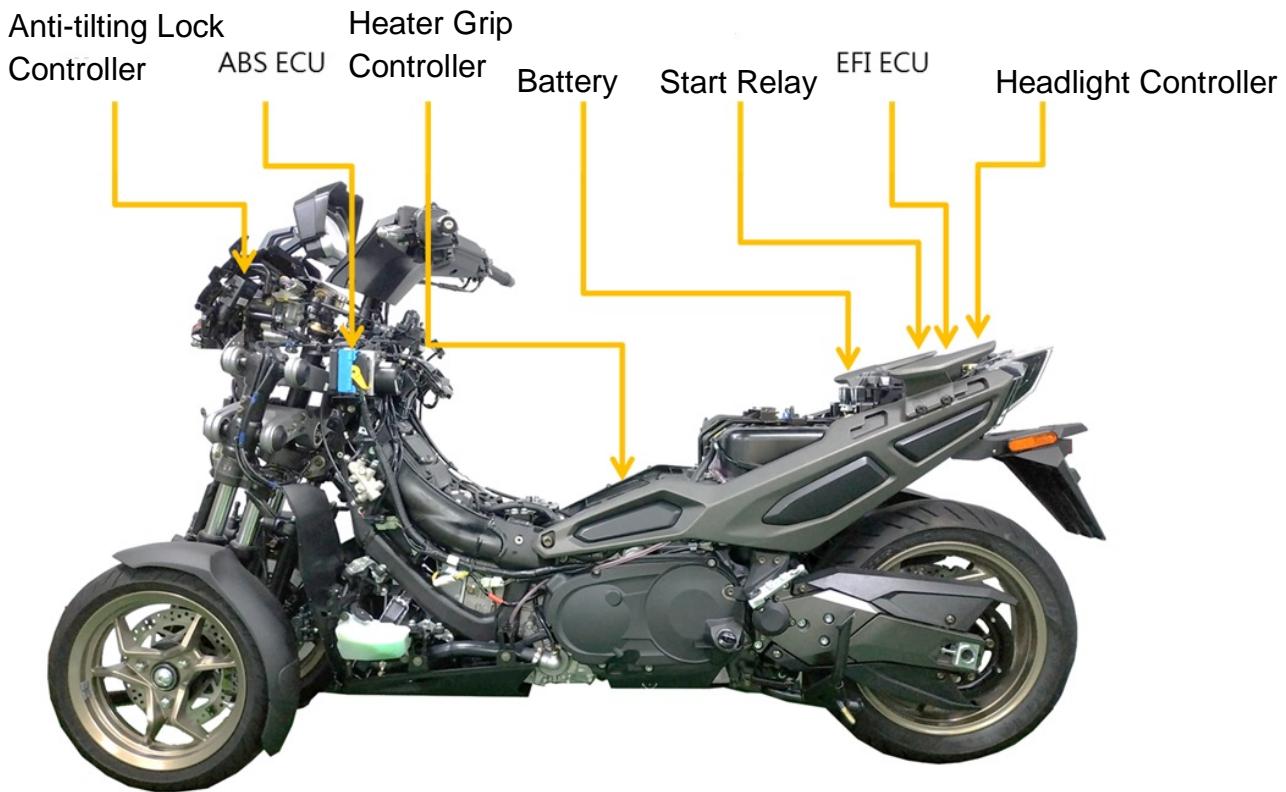
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1. Quick Service Manual

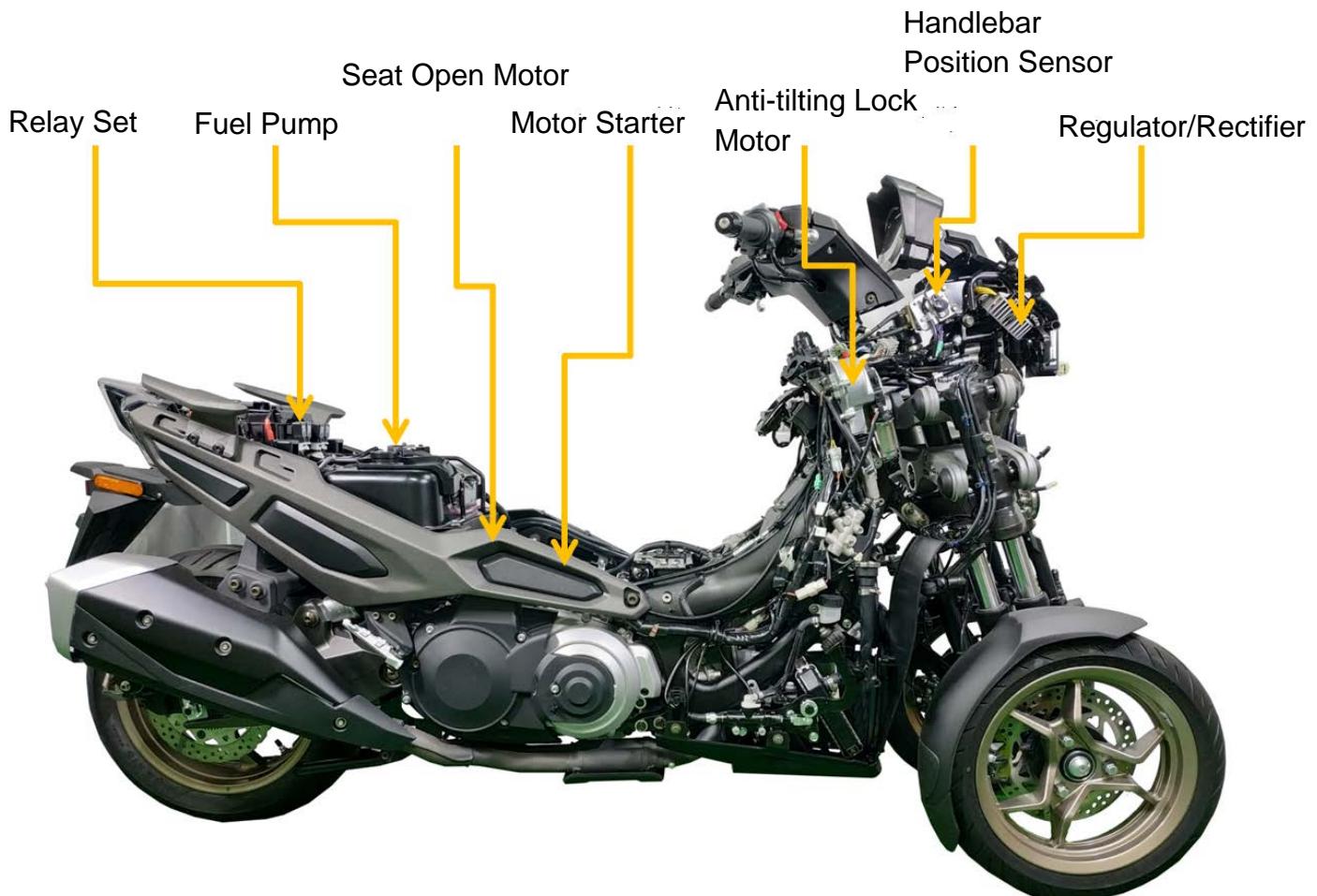
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Electrical System Component Location Diagram

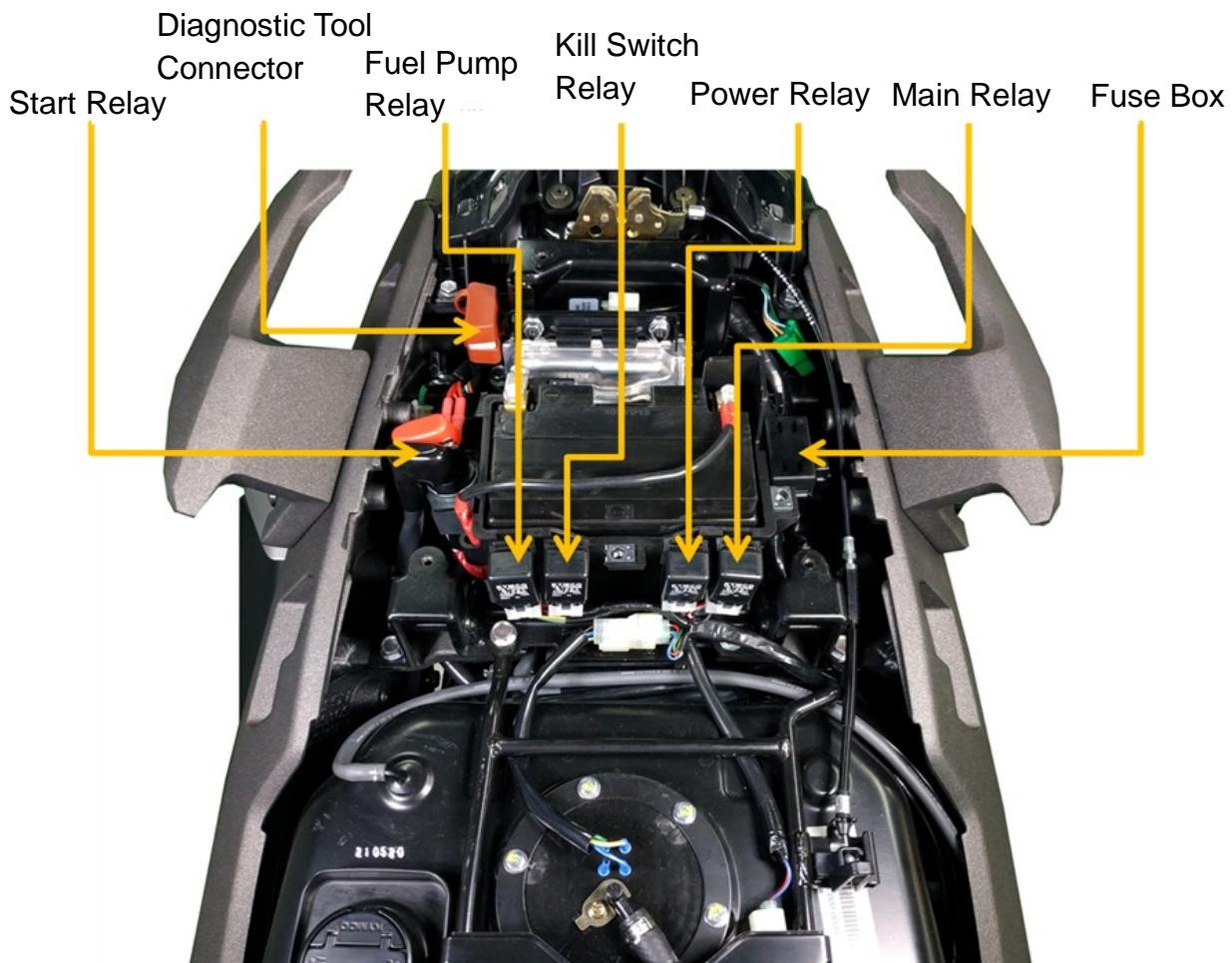
Left View



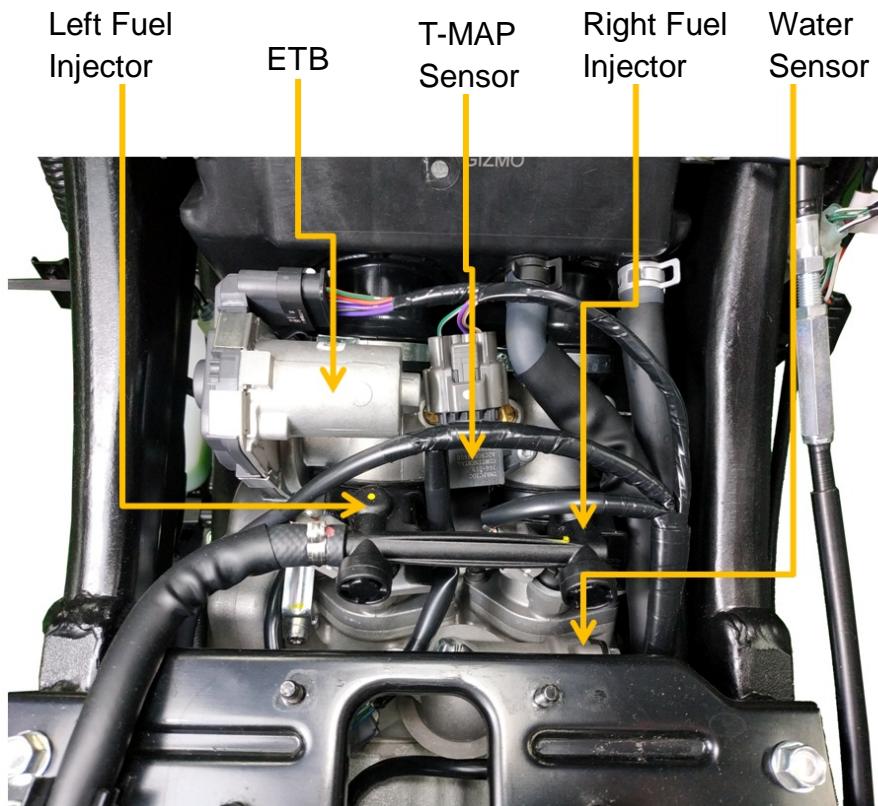
Right View



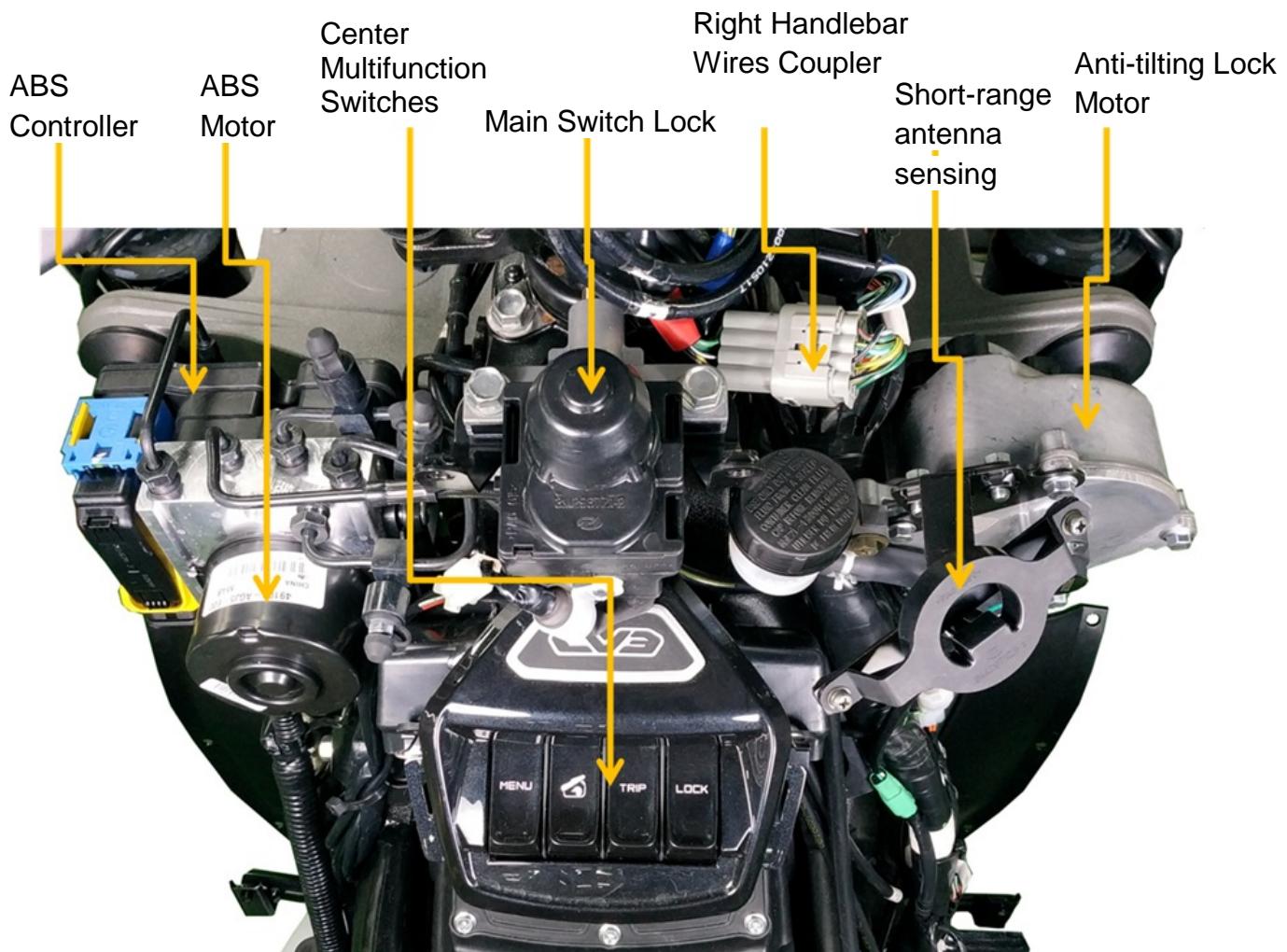
Rear Seat Top View



Injection Component Top View



Middle-mounting Switch Top View



Special Tool

NO.	KYMCO Tool Number	KYMCO Special Tool Number	Image
E039	A120	E00039	Compression Pressure Gauge
E048	A120	E00048	Fuel Pressure Gauge
E098	A120	E00098	Clutch Spring Compressor (E053+E028)
E017	A120	E00017	Y-Shape Fastener
E021	A120	E00021	Flywheel Retaining Belt
E014	A120	E00014	Oil Seal Bearing Installation Tool
E084	A120	E00084	Flywheel puller
E093	A120	E00093	Bearing remover

1. Quick Service Manual



A02K	0000	11	Bridge RH/LH Strg Nut Wrench	
A02K	0000	12	Front Fork Assy Fixing Nut Wrench	
A02K	0000	13	Front Fork Assy Steering Nut Socket (32mm)	
F023	A120	F00023	Steering Stem Top Nut socket (square socket type)	
F030	A120	F00030	High-pressure Ring Clamp	
F031	A120	F00031	Oil Pipe Clip	
F033	A120	F00033	Clamp meter	
F038	A120	F00038	Rear Wheel Axle Hub and Disc Removing Tool	

1. Quick Service Manual



Specifications

Maker	Kymco	Company Name	KWANG YANG MOTOR CO., LTD.	
Model Name / no.	CV3_SBA1CA			
Is "idle stop" function provided?	No	Transmission Device	Gear Shifting Method	CVT
Frame	Pipe Under Bone		Number of Gear shift	N.A
Dimensions	Total Length		Clutch type	Dry centrifugal
	Total Width		Primary Speed Reduction Ratio	0.8~2.4
	Total Height		Final Speed Reduction Ratio	2.659
	Axle Base		1st-shift Gear Ratio	N/A
Weight	Dry Weight		2nd-shift Gear Ratio	N/A
	Total Weight		3rd-shift Gear Ratio	N/A
	Number of passenger/load capacity		4th-shift Gear Ratio	N/A
Performance	Maximum Speed		5th-shift Gear Ratio	N/A
	Oil Consumption		6th-shift Gear Ratio	N/A
	Gradeability		7th-shift Gear Ratio	N/A
Power Output Method			Reverse-shift Gear Ratio	N/A
Engine	Type	Brake	Front Brake	DISK BRAKE
	Total Displacement		Rear Brake	DISK BRAKE
	Inner diameter	Fuel System	Air Filter	Dry-type
	Stroke		Oil Supply Method	Indirect Injection
	Number of Cylinder		Fuel type	92 and above Unleaded Gasoline
	Compression Ratio		Fuel Tank Capacity	15.5 L
	Cooling	Lights	Headlight (high beam)	LED
	Installation Position		Headlight (low beam)	LED
	Cylinder Array Method		Turn Signal Light	LED
	Maximum Horse Power		Tail light	LED
	Maximum Torque		License Plate Lamp	LED
	Ignition Method		Brake Light	LED
	Starting Method		Gear shift supplementary description when testing the oil consumption under fixed cruising speed	
	Idle Scope		Gear shift recommended by the manufacturer	
Speedometer			N/A	
Suspension	Front Suspension Method	Muffler	SINGLE HORN	
	Rear Suspension Method		MANIFOLD&MUFFLER	
Tire Specifications	Front Tire Specifications	Exhaustion Control System Device	Behind right side	
	Rear Tire Specifications		EEC System	Yes
	Front Tire Pressure		PCV System	Yes
	2.00 kgf/cm ²		Catalytic Converter	Yes
	2.70 kgf/cm ²	Power Source		Inner Burner
Remarks				

Repair & Maintenance Information

Engine

Engine	
Throttle Free Play	2 ~ 6 mm
Spark Plug Specifications	NGK : CR7E
Spark plug gap	0.7 mm ~ 0.8 mm
Valve Clearance	IN: 0.175 mm EX: 0.225 mm
Idle Speed	1200 ± 100 rpm
Compression pressure	11 ± 2 kg/cm ²
Ignition Time	ECU PC Control
Cooling	Water-cooling
Engine Oil Level:	
Disassembly	3.0 L
Regular replenishment	2.6L / 2.7–2.8 (including Engine Oil Filter)

Cooling System

Full Capacity of Coolant	
Capacity of Radiator + Water Pipeline	1200 cc
Prepare the water tank	300 cc

Pressure when opening the Radiator Cap	0.9 ± 0.15 kg/cm ² (12.8 ± 2.1 psi)
Initial temperature of temperature regulation	Total Start Temperature
	Fully opened
	Total Openness

Coolant Mixing Table (preventing rusting and frozen functions)

Minimum temperature of operating area	Mixing Ratio	Antifreeze specially manufactured by KYMCO	Distilled Water
- 9°C	20%		
- 15°C	30%	360c.c	720c.c
- 25°C	40%		
- 37°C	50%		
- 44.5°C	55%		

Coolant Specific Gravity Table

Temperature of Coolant (0°C)	0	5	10	15	20	25	30	35	40	45	50
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.051	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.056	1.063	1.062	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

Injection System

Item	Specifications	
Fuel Injector (at 20°C constant)	10.6~15.9Ω	
Fuel Pump (at 20°C constant)	Upper (full)	About 1100Ω
	Lower (low)	About 100Ω
Fuel Pump Standard Pressure	300±10 kPa (3 Bar)	
Water temperature sensor	60°C	703.8±40.9 Ω
	90°C	260.7±15.1 Ω
	120°C	111.1±7.8 Ω
Intake Air Temperature Pressure Sensor (20°C)	1613~2544Ω (1.2 pin)	
Throttle Position Sensor (TPS) (20°C)	3000~7000Ω	
Crankshaft Position Sensor	96~144Ω	

Electrical System

Item		Standard Value
Battery	Capacity	11.2Ah
	Voltage (20°C)	Fully charged 13.2V
		Charging required < 12.3V
	Charging Time	
Item		
Spark Plug Specifications		NGK CR7E
Spark plug gap		0.7 - 0.8 mm
Inductive Ignition Coil	Voltage rated	14v
	Resistance Primary side	740±20 mΩ
	Current Primary side	7A Max.
TPS		3000 - 7000 Ω
Fuel Pump		About 2.2Ω
Fuel Injector		10.6~15.9 Ω(20°C)
Water Temperature Sensor		28.6KΩ (20°C)
O2 Sensor		12 Ω - 18 Ω(20°C)
Crankshaft Position Sensor		96~144 Ω(20°C)

Water Temperature Sensor	60°C	703.8±40.9 Ω
	90°C	260.7±15.1 Ω
	120°C	111.1±7.8 Ω

Vehicle body tightening torque value

Vehicle body relation

ITEM	kgf.m	N.m
5mm BOLT AND NUT	0.45~0.6	4.5~6
6mm BOLT AND NUT	0.8~1.2	8~12
8mm BOLT AND NUT	1.8~2.5	18~25
10mm BOLT AND NUT	3.0~4.0	30~40
12mm BOLT AND NUT	5.0~6.0	50~60
4mm SCREW (ditch)	0.05~0.15	0.51.5
4mm SCREW (sharp)	0.20~0.40	2~4
5mm SCREW (ditch)	0.10~0.30	1~3
5mm SCREW (sharp)	0.35~0.5	3.5~5
6mm SCREW AND FLANGE BOLT(SH TYPE)	0.7~1.1	7~11
6mm FLANGE BOLT AND NUT	1.0~1.4	10~14
8mm FLANGE BOLT AND NUT	2.4~3.0	24~30
10mm FLANGE BOLT AND NUT	3.5~4.5	35~45

Steering

ITEM	THREAD SIZE AND TYPE	Kgf.m	N.m
Handlebar NUT	M14* 1.5	6.0~7.0	60~70
Handlebar HOLDER BOLT	M8* 1.25	2.0~2.6	20~26
Handlebar LINK NUT	M10* 1.25	4.0~5.0	40~50
Handlebar ROD NUT	M8* 1.25	24~30	24~30
STEM LOCK	BC1	6.0~6.5	60~65
RACE NUT(HEAD)	BC1	0.8~1.2	8~12
RACE NUT R/L	BC1	0.8~1.2	8~12
R/L STRG ARM	M8* 1.25	2.4~3.0	24~30
Steering ARM NUT	M8* 1.25	2.4~3.0	24~30
Steering JOINT BOLT	M8* 1.25	2.4~3.0	24~30
Steering ROD NUT	M10* 1.25	3.0~4.0	30~40

Wheel

ITEM	THREAD SIZE AND TYPE	Kgf.m	N.m
FR. AXLE NUT	M16* 1.5	8.0~10.0	80~100
RR. AXLE NUT	M20* 1.5	12~14	120~140
FR WHEEL CAST NUT	M10* 1.25	5.0~6.0	50~60

Suspension

ITEM	THREAD SIZE AND TYPE	Kgf.m	N.m
FR FORK / STEM	M10* 1.25	4.5~5.5	45~55
FR FORK / FR FORK A	M10* 1.25	3.5~4.5	35~45
RR CUSH UP / LWR	M10* 1.25	3.5~4.5	35~45

Anti-tilting Lock

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
FR FORK / STPR	M8* 1.25	2.0~2.6	20~26
STOPPER ARM	M10* 1.25	2.4~3.0	24~30
CALIPER NUT	M10* 1.25	3.0~4.0	30~40
DISK BOLT	M8* 1.25	3.2~3.8	32~38

Brake

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
FR CALIPER	M8* 1.25	2.4~3.0	24~30
RR CALIPER	M10* 1.25	3.0~4.0	30~40
BRK OIL BOLT	M10* 1.0	3.0~4.0	30~40
BRK OIL BOLT (C/P)	M10* 1.0	2.3~2.6	23~26
BRK PRESSURE-BANJO	M10* 1.25	1.9~2.1	19~21
M/C HOLDER	M6* 1.0	1.0~1.4	10~14
M/C CAP SCREW	M4* 1.0	0.12~0.2	12~20
C / P BLEEDER	M8* 1.25	0.4~0.7	4.0~7.0
DISK BOLT	M8* 1.25	3.2~3.8	32~38
MODULATOR/HOSE JOINT	M10* 1.0	1.6~2.0	16~20
MODULATOR/HOSE JOINT	M12* 1.0	2.0~2.4	20~24
MODULATOR BOLT	M6* 1.0	0.77~0.83	7.7~8.3

Body Frame

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
HEAD PIPE TOP	M14* 1.5	8.6~9.1	86~91
HEAD PIPE LOW	M10* 1.25	5.4~6.0	54~60
FRAME FRONT	M10* 1.25	5.4~6.0	54~60
FRAME SIDE	M12* 1.25	8.6~9.1	86~91
ENG SIDE UP	M12* 1.25	8.6~9.1	86~91
ENG SIDE DOWN (R)	M10* 1.25	4.3~4.8	43~48
ENG SIDE DOWN (L)	M10* 1.25	4.3~4.8	43~48
ENG SIDE REAR	M12* 1.5	8.6~9.1	86~91

Muffler

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
EXH. PIPE	M8* 1.25	1.8~2.2	18~22
MUFF. BRKT / FRAME	M10* 1.25	2.7~3.2	27~32

Rear Fork

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
RR FORK R / L	M10* 1.25	3.0~3.5	30~35
RR FORK R / L (UP)	M10* 1.25	3.0~3.5	30~35
F / S HOLDER	M10* 1.25	3.0~3.5	30~35
SWING AXLE R	M22* 1.5	0.6~1.0	6~10
SWING AXLE L	M22* 1.5	0.6~1.0	6~10
Front Belt SPROKECT	M16* 1.5	11.5~12.5	115~125

Front Suspension

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
TILTING ARM BOLT	M12* 1.25	8.6~9.1	86~91
UPR TILTING ARM BOLT	M12* 1.25	1.8~2.2	18~22
UPR TILTING ARM NUT	M12* 1.25	5.0~6.0	50~60
LWR TILTING ARM NUT	M10* 1.25	3.0~4.0	30~40

Front Fork

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
C / P BOLTA	M6 * 1.0	1.0~1.4	10~14
C / P BOLT B	M6 * 1.0	1.0~1.4	10~14

Other

ITEM	THREAD SIZE AND TYPE	kgf.m	N.m
SPDMT SENSOR CABLE	M6 * 1.0	1.0~1.4	10~14
IGN COIL	M6 * 1.0	1.0~1.4	10~14
START RELAY	M6 * 1.0	0.25~0.35	2.5~3.5
O2 SENSOR	M12* 1.25	2.0~3.0	20~30
MAIN STAND	M10* 1.25	3.0~4.0	30~40
MAIN STAND STAY	M10* 1.25	3.0~4.0	30~40
MAIN STAND APRON	M8* 1.25	2.0~2.8	20~28
RR CARRIER	M8* 1.25	1.8~2.5	18~25

Engine tightening torque value

Standard Tightening Torque

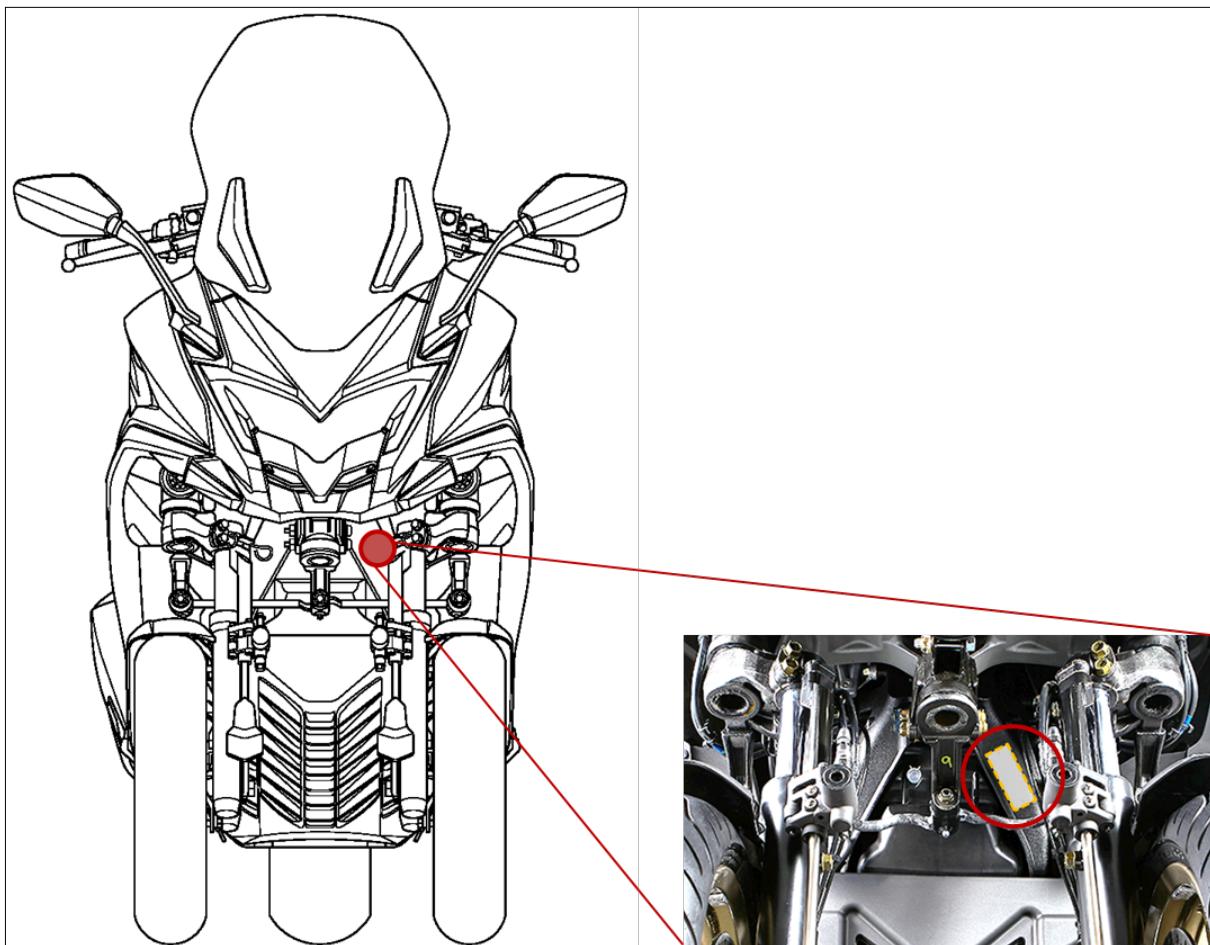
Type	Tightening torque (kg-m)	Type	Tightening torque (kg-m)
5mm bolt and nut	0.5	5mm bolt and nut	0.4
6mm bolt and nut	1.0	6mm bolt and nut	0.9
8mm bolt and nut	2.2	6mm bolt and nut	1.2
10mm bolt and nut	3.5	8mm bolt and nut	2.7
12mm bolt and nut	5.5	10mm bolt and nut	4.0

Engine

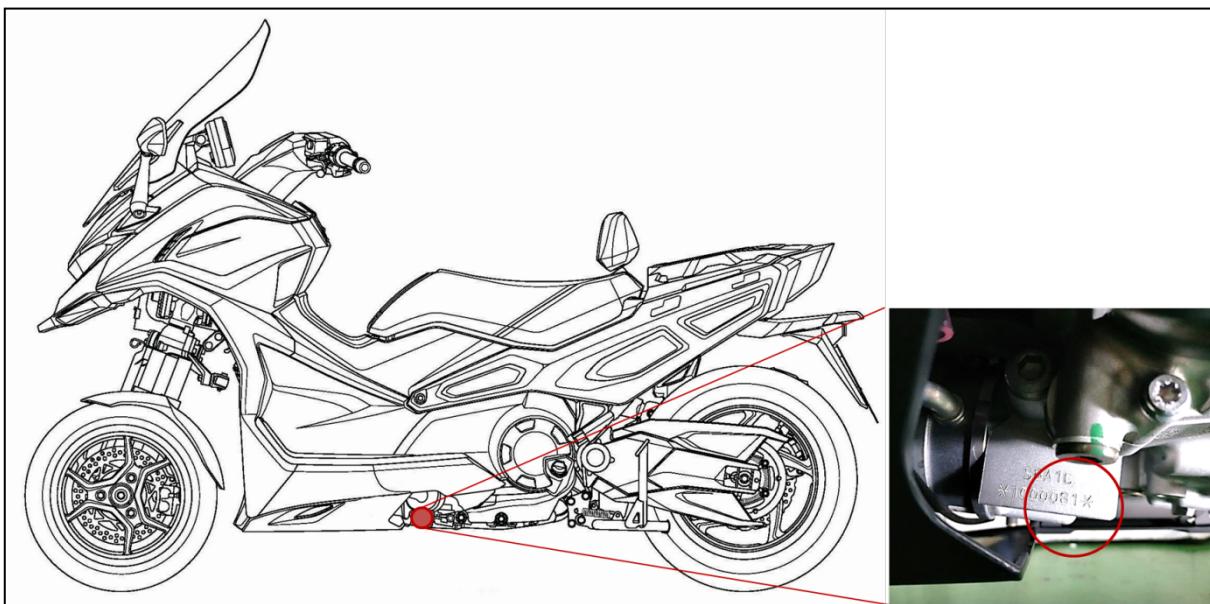
Tightening part	Number	Pitch (mm)	Tightening torque (kgf-m)	Remarks
Cylinder head		6	1.0~1.2	
Cylinder head		18	3.2~3.9	
Spark Plug	2	10	1.0~1.4	
Camshaft holder		6	0.9~1.1	Apply engine oil
Cylinder head cover		6	1.0~1.4	
Bottom Crankcase		8	1.8~2.5	Apply engine oil
Bottom Crankcase		6	1.0~1.4	Apply engine oil
ACG Flywheel		14	5.5~6.5	
Clutch Case R/L		10	3.0~4.0	Apply engine oil
Wet-type Clutch		16	5.9~7.3	Apply engine oil
CVT Transmission Box		8	1.8~2.2	
Front CTV Pulley		18	7.6~9.3	
Drive Pulley		18	8.3~10	
CVT Cover		8	1.8~2.2	
CVT Cover		6	1.0~1.4	
Engine Oil Cooler		20	3.2~3.9	

Engine and frame number/engraving position

Frame Number



Engine Number



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Preparations

General

※ Warning:

- Before starting the engine, check if the environment is well ventilated. Do not attempt to start the engine in an enclosed location because the waste gas contains CO that may lead to the loss of consciousness or even death.
- Under certain circumstances, gasoline is easily evaporated as to cause the explosion. Before starting the work, ventilate the working location and shut down the engine. Do not use fire in the working location or around the oil storage area.

Engine Specifications

Item		Specifications	
Throttle Free Play		2-6 mm	
Spark Plug	NGK	CR7E	
Spark plug gap		0.7~0.8 mm	
Valve gap	Air Intake Valve	0.175 mm	
	Exhaust Valve	0.225mm	
Engine Oil	Air exchange capacity	2.6L, 2.7~2.8 (including Engine Oil Filter)	
	Full capacity	3.0L	
Engine oil brand		KYMCO 4-stroke engine oil API: SL and greater (MA) SAE: 10W40	
Idle rpm		1200±100 rpm	
Gear Oil	Air exchange capacity	Such type not available	
	Full capacity	Such type not available	
Brake Fluid		DOT 4	
Tire	Front	110/70-13	
	Rear	160/60-R15	
Tire pressure	1 person	Front	2.0 kgf/cm ²
		Rear	2.7 kgf/cm ²
	2 person	Front	2.0 kgf/cm ²
		Rear	2.7 kgf/cm ²

Tightening Torque

Spark Plug thread 1.0~1.4 kgf.m

Engine oil Strainer nut 1.2~1.8 kgf.m

Engine Oil Filter 0.8~1.2 kgf.m

2. Inspection and adjustment



Periodic Maintenance Chart

Execute time-based periodic maintenance according to the schedule plan in order to maintain the motorcycle at the optimal operating status at all times. The first round of maintenance is very important and it should be executed with extreme caution.

I: Inspection; clean, lubricate, replenish, remedy or replace as required. A: Adjustment. C: Cleaning. R: Replace. T: Tightening. M: Maintenance. D: Diagnosis

Maintenance mileage Items		1000 km 600 mile	5000 km 300mile	10000 km 600 mile	15000 km 900 mile	20000 km 12000 mile	25000 km 15000 mile	30000 km 18000 mile	Remarks
Lubrication System	Engine Oil	R	R	R	R	R	R	R	I: Inspection A: Adjustment C: Cleaning R: Replace T: Tightening M: Maintenance D: Diagnosis
	Engine Oil Screen	C	C/R	C/R	C/R	C/R	C/R	C/R	
	Engine Oil Filter	R	R	R	R	R	R	R	
	Fuel Pump and Fuel Pump Filter		I/C	I/C	I/C	I/C	I/C	I/C	
Supply	Throttle Free Play		I	I	I	I	I	I	
	Air Filter			I		R		I	
	Canister		I	I	I	I	I	I	
	CVT System Filter Wool			R		R		R	
Air Supply System	P.C.V Evaporative Emission Control Valve		I	I	I	I	I	I	
	O2 Sensor		I	I	I	I	I	I	
	Catalytic Converter		I	I	I	I	I	I	
	Cam Chain		I	I	I	I	I	I	
Drivetrain	Transmission outer belt					R			
	CVT Driving Belt	I	I	I	I	I	I	I	
	Valve Clearance	Check and Adjust at every 40000 km (24000 mile)							
	Spark Plug			I		R		I	
Ignition System	Ignition Circuit and ECU			I		I		I	
	Throttle Body					M/I		M/I	
	Fuel Injector Diagnostic Tool			I/D		I/D		I/D	
	Idle Air Bypass Valve			D/M		D/M		D/M	
Engine Management	Engine Water Temperature Sensor		D	D	D	D	D	D	
	Air Intake Temperature and Pressure Sensor		D	D	D	D	D	D	
	Ignition Coil		D	D	D	D	D	D	
	Battery		D	D	D	D	D	D	
Oth ers	Important Body Bolts	T	T	T	T	T	T	T	
	Brake System (Disc)	I	I	I	I	I	I	I	
	Brake cable (oil pipe)	I	I	I	I	I	I	I	
	Brake Fluid		I	R	I	R	I	R	
	Coolant		I	R	I	R	I	R	

Random maintenance items

Item	Situation and Handling
Ignition System	If the ignition failure, engine overheating or engine stalling problems are noticeable and occur constantly, perform maintenance and inspection.
Remove Carbon Deposits	If horsepower decreases considerably between 10000 and 15000 km, remove the carbon deposits in the exhaust system, cylinder head and piston head.
Drivetrain	If the top speed drops considerably between 10000 and 15000 km, perform CVT System maintenance and inspection.
Piston	If you use the vehicle intensely before 1000 km, the pistons, piston rings and cylinder block can be worn down or cause of a seized engine. In this case, clean or bore the engine or replace it with a new one.
Fuel Injector	Please remove the carbon deposits or gummy residues inside the fuel injector every 1000 km or when the vehicle has not been operated for a long time.
Water tank heat sink and water tank front protection net.	Execute the inspection and cleaning for every 1000km of journey. Earlier cleaning and maintenance will be required if the running area is dusty and rainy.
ABS wheel speed sensor / reading disc	Execute the maintenance and inspection for every 5000km. If required, make new parts replacement.

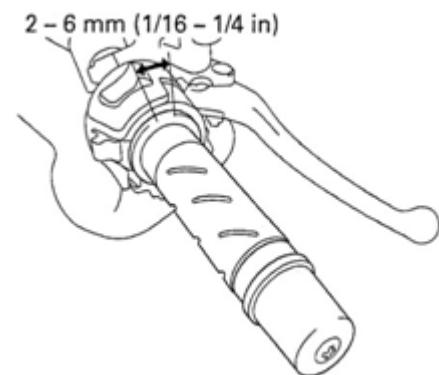
Fuel Pump Strainer

Remove the middle cover and remove the Fuel Pump and then check if the gasoline pipe is deteriorated or damaged and if the Fuel Pump Filter is dirty or clogged. If clogged, clean with a high-pressure spray gun. Notice: Release the pressure before removing the Fuel Pump.



Throttle Operation

Check if the Throttle Valve is operating smoothly. Check the play of Throttle Valve and the play should fall within 2–6mm.



The fine tuning should be executed at the Throttle Stem. During the adjustment, remove the dust cover and loosen the lock nut and then rotate the adjusting nut. The Throttle Valve lead wire should be adjusted at the other side of the Throttle Valve. During the adjustment, loosen the lock nut and then rotate the adjusting nut.



Air Filter

Air Filter

The accumulation of dust is mainly due to the lower horsepower and less oil consumption.

<Disassembly Method>

1. Remove 4 plastic screws from the center cover.
2. Remove the center cover.
3. Remove the filtering core securing screws from the Air Filter.
4. Replace the filter core of the Air Filter.

“Installation Method”: The installation shall be performed in reverse order of removal.

Check if the filter core is dirty or damaged. If seriously contaminated or damaged, make new parts replacement.

Replacing time: Make the replacement before using the motorcycle under rough road surface or raining conditions.

Crankcase Ventilation Pipe

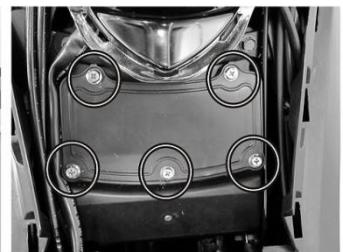
Remove the ventilation pipe clip from the Crankcase.

Remove the ventilation cover.

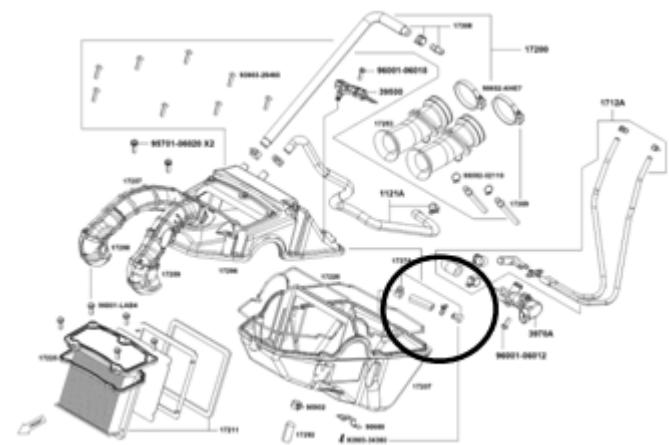
Plastic screws



Screws from the Air Filter



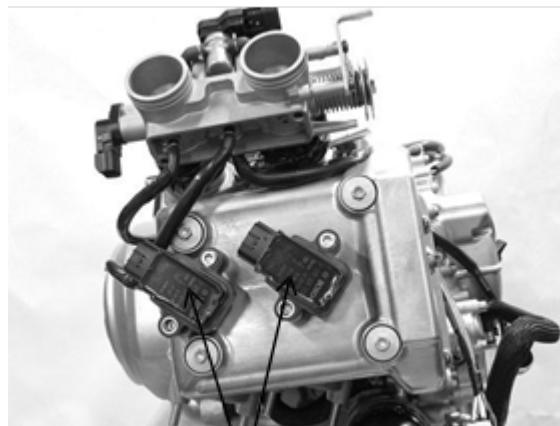
Filter core of the Air Filter



Inspection of Spark Plug

Spark Plug

Remove the ignition coil. Dismantle the Spark Plug.



Ignition Coil

Remove the Spark Plug.

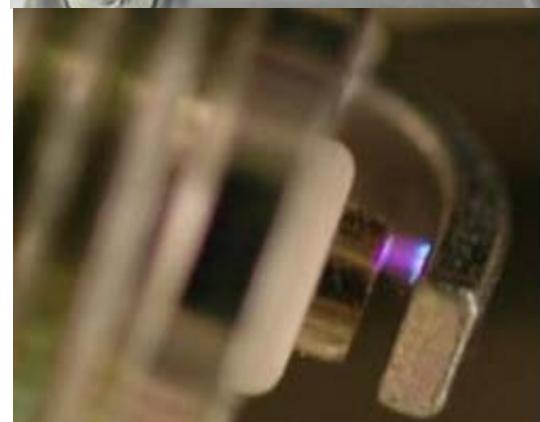
The installation shall be performed in reverse order of removal.



Inspection of Spark Plug.

After removing the Spark Plug, check if it is presenting any dirty, residual carbon or burning damage sign. If dirty or residual carbon signs are present, clean with the Spark Plug cleaner or a steel wire brush.

Designated spark plug: NGK: CR7E



Inspection of Spark Plug gap:

Gap: 0.7-0.8 mm

Torque value: 0.8~1.2kgf.m



Valve gap adjustment

Valve gap adjustment

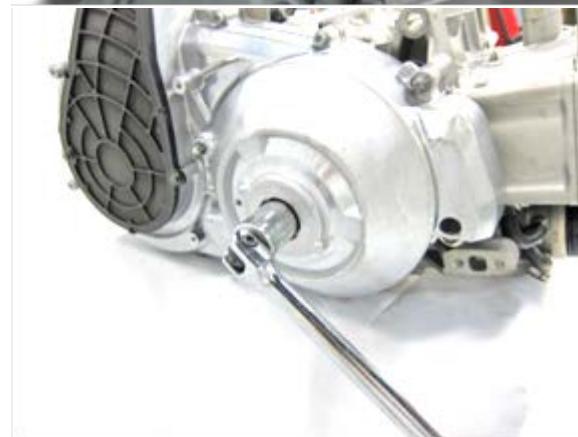
The inspection and adjustment shall be executed when the engine temperature is below 35°C and the engine should be removed.

Remove the Cylinder Head cover.

Remove the timing peep hole cover from the Engine Electric Panel cover, and then turn the front pulley lock nut of the CVT till reaching the timing position.

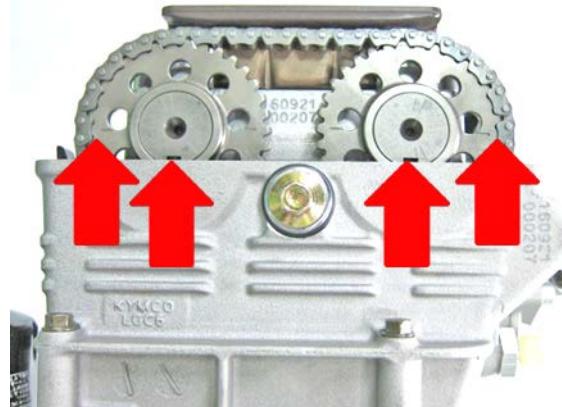
Turn the front pulley lock nut of the CVT till reaching the timing position and the Cam Axle gear timing position.

(Please refer to the figure below.)



Correct timing position:

1. The ACG Flywheel "T" position should be flush with the mark on the timing peep hole cover.
2. The timing position mark of the CAM Axle gear should be flush with the Cylinder Head surface horizontally, and a linear denting mark is indicated at the middle section.



2. Inspection and adjustment



Valve gas inspection and adjustment:

Valve gas inspection and adjustment:

Check the valve gap with a Thickness Gauge. If the inspection result fails to meet the aforesaid standard, replace it with a new gasket.

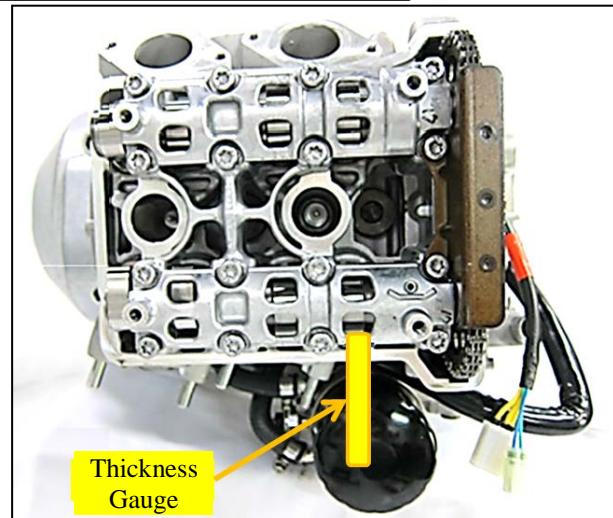
Valve gap: IN.: 0.175mm EX.: 0.225mm

Gasket specifications: 1.5~2.0mm

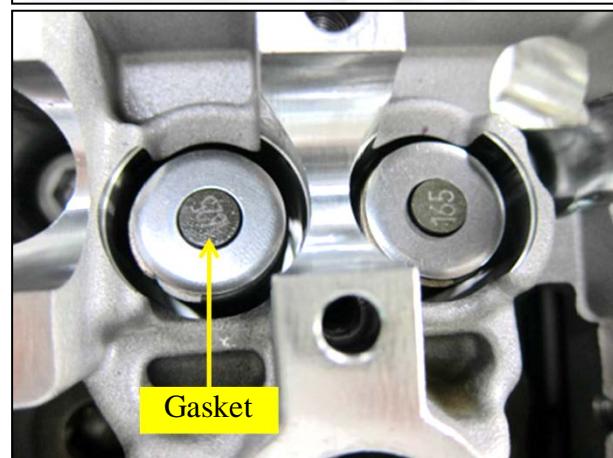
NO.	"T" thickness	Lever code
01	1.50	1.50
02	1.55	1.55
03	1.575	1.575
04	1.60	1.60
05	1.625	1.625
06	1.65	1.65
07	1.675	1.675
08	1.70	1.70
09	1.725	1.725
10	1.75	1.75
11	1.775	1.775
12	1.80	1.80 ←
13	1.825	1.825
14	1.85	1.85
15	1.875	1.875
16	1.90	1.90
17	1.925	1.925
18	1.95	1.95
19	2.00	2.00



Level code



Thickness Gauge



Gasket

Cylinder pressure inspection

Cylinder Pressure

When warming up the engine, remove the middle storage box and the middle cover.

Dismantle the Spark Plug.

Install the cylinder compression pressure gauge.

Run the engine with the starter motor to measure the cylinder pressure at full throttle.

Compression pressure: Check following items if the engine is under 19 ± 2 kg/cm² low compression pressure.

- Valve
- Valve gap is too narrow.
- Cylinder Head gasket is damaged.
- Piston Ring is worn.
- Piston and cylinder are worn. If the compression pressure is too high, check if excessive carbon is accumulated in the Combustion Chamber and the piston top area.



Engine oil inspection/replacement

Engine Oil

Before checking the engine oil volume, shut down the engine and then park the vehicle at a flat surface in upright manner. After elapsing for 2–3 minutes, check the engine oil dipstick.

Change Oil

After completing the engine warm-up, drain the engine oil. Remove the engine oil drain bolt and drain off the engine oil. Install the aluminum washer and then install the engine oil drain bolt.

Torque value: 1.5 kgf.m.

Notice: If the aluminum washer is presenting deforming or uneven sign, replace it with a new one. Inject the fresh engine oil.



2. Inspection and adjustment



Oil Capacity

Disassembly: 3.0L. General replacement:
2.6L/2.7–2.8 (replace the Engine Oil Filter).

Recommended engine oil brand:
KYMCO 4-stroke engine oil (API- SL
synthetic engine oil).
SAE: 10W40 (MA-Class)

Start the engine and then check if the engine oil is leaking. Shut down the engine and then check the engine oil volume.

Remove the engine oil dipstick. Drain off the engine oil. Remove the Strainer. Check if the Strainer is clogged or damaged. If yes, replace it with a new one. Check the Strainer and the O-ring. If damaged, make new parts replacement.

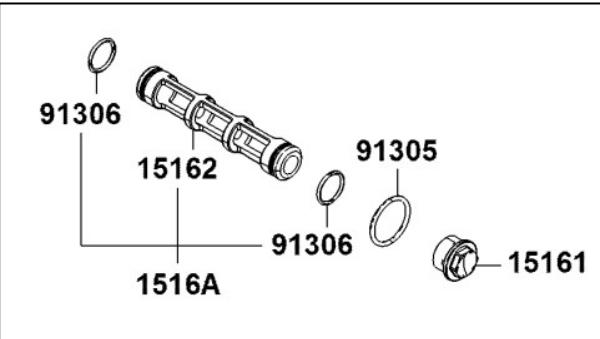
Clean the Strainer.

Before pouring the engine oil, mount the spring O-ring and then tighten the Strainer bolt.

Strainer bolt torque value: 1.5kgf.m



After that, pour the engine oil into the engine. Start the engine and then check if the oil is leaking. Shut down the engine and then check the engine oil volume. After pouring the engine oil, tighten the engine oil dipstick.



Engine Oil Filter

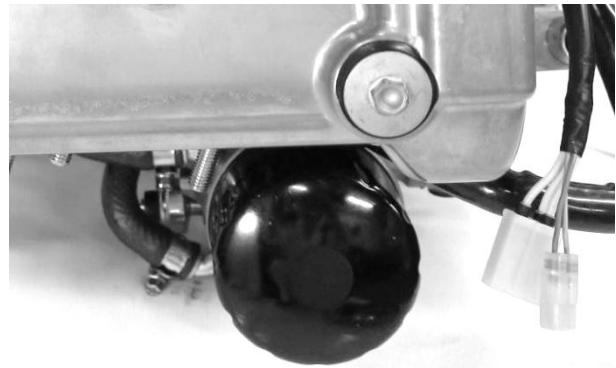
Draining the engine oil.

Remove the bottom plate.

Remove the Engine Oil Filter.

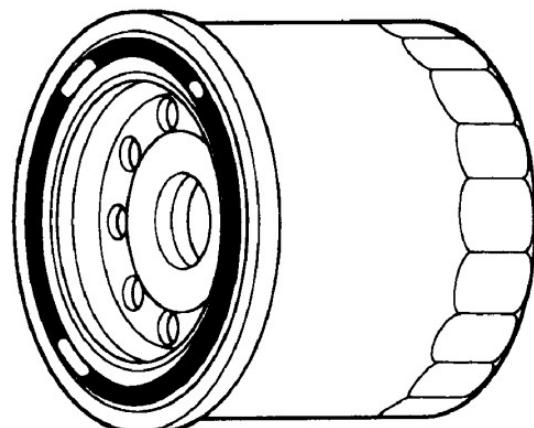
Replace it with a new Engine Oil Filter.

Before starting the installation, apply engine oil on the O-ring.



Tightening torque: 0.8 - 1.2kgf.m

Check if the O-ring is damaged. If damaged, replace it with a new one.



Cooling Device inspection/adjustment

Cooling Device

Check the water level of the Spare Radiator.

Erect the main support frame upright.

Check if the liquid in the Spare Radiator is between the upper limit and lower limit. If low, replenish the Coolant till to “F” (upper limit) and “L” (lower limit).

Recommended radiator additives: Designated radiator additives (with standard concentration rated at 30% 1:3). When replenishing the Coolant, remove the rubber gasket and then remove the screws from the cover plate.

Open the Radiator cap and then replenish the Coolant.



Coolant replenishing

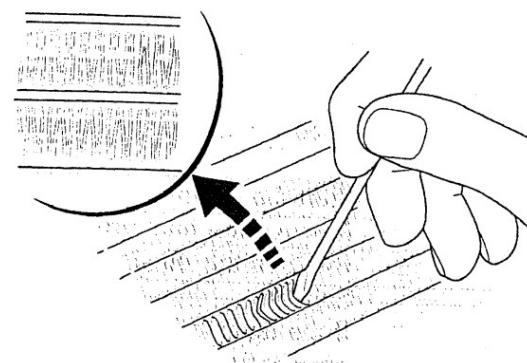
Remove the footrest. Remove the Radiator cap.

Remove the drain bolt until the Coolant is totally drained and then tilt the motorcycle to right side, allowing the Coolant to flow out more easily. Tighten the drain bolt. Pour the Coolant into the Spare Radiator.

After replenishing the Coolant, start the engine in order to check if air bubbles are presented at the inlet of Spare Radiator and if the water level is safe. If yes, install the Spare Radiator cap. If air bubbles are presented, release the air from the pipe. Pour the Coolant into the Spare Radiator till reaching the upper limit.



Note: If any heat sink is dented or sticking together, separate the heat sink row one by one.



Brake oil inspection/adjustment/replacement

Brake Fluid

Before returning the handlebar, check if the Rear Brake Hydraulic Cylinder and the brake oil are above the “L” lower limit. If low, replenish the oil till reaching the upper limit. Designated brake oil brand: DOT4

※ If the brake lining pad is worn, the brake oil will drop.



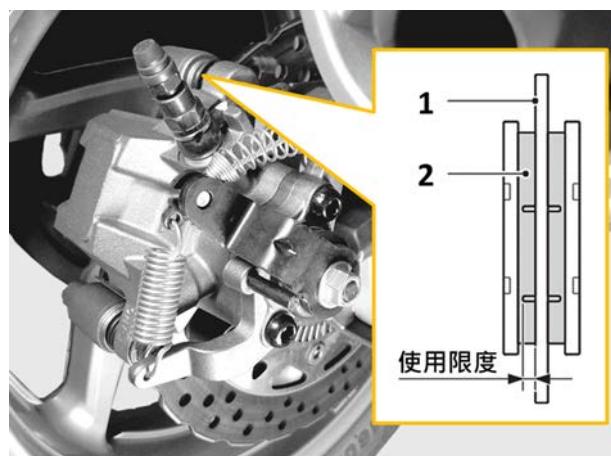
Brake Disc/Brake Lining Pad

Check if the surface of Brake Disc is presenting any cutting, uneven or abnormal abrasion sign. Check if the offsetting of the Brake Disc exceeds its service limit. Check if the Brake Lining Pad is exceeding the abrasion marking line. Lining Pad thickness: 3.8–4.2/4.8–5.2mm (front/rear). Service limit: 3.0/4.0mm (front/rear)

※ The Brake Disc shall not present any grease attaching sign.

Before checking and adjusting the Brake Lever/Rear Brake Lever play. Play: The disc shall not present any play sign.

1. Adjust the Brake Lever distance with the Brake Adjust button (containing 4 adjusting steps).
2. During the adjustment, push the Brake Lever forward and rotate the Adjust button (default value: 3)
3. After the adjustment, pull the Brake Lever (1) to the position easier for finger feeling and then check if the front-end distance of the lever is within the specified dimensional range.



2. Inspection and adjustment



Replace the brake oil.

Remove the Reservoir cover and the spacer.

Remove the Release Valve from the Lower Brake Caliper.

Connect a transparent plastic tube to the Release Valve, with and the other end of the tube remaining in the container.

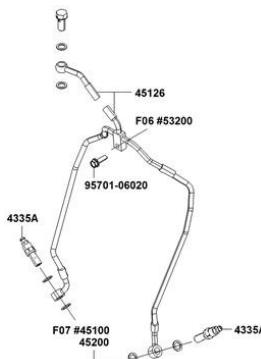
Pour the fresh brake oil into the Reservoir.

Repeat this step until the fresh brake oil is flowing out of the plastic tube (without air bubbles in the brake oil) or when the brake oil color changes.

1. Open the Release Valve.
2. Hold the Brake Lever and secure it in position.
3. Close the Release Valve.
4. Loosen the Brake Lever.

When replacing the brake oil, check the oil level frequently and then replenish the fresh brake oil if required.

When releasing the gas, if the fluid is totally drained from the Reservoir at any given time that the gas is invading into the pipeline, then repeat the gas releasing step once again.



Hand Brake inspection

Erect the main support frame and then push the Hand Brake Lever towards left side to keep the rear wheel from moving. Push the Hand Brake Lever towards right side and the brake can be released.



Before adjusting the Hand Brake, loosen the nut and then tighten the nut.

After that, test the Rear Wheel rotating status. In this case, it should remain still without turning.



Front Lamp adjustment/suspension/steering inspection.

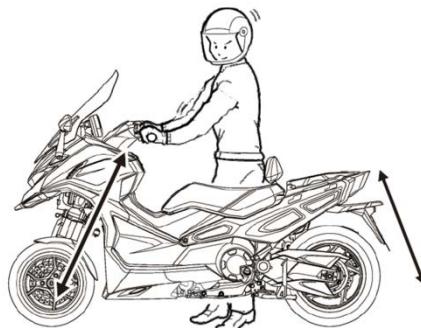
Headlight Beam

Remove the headlight. Turn the upper and lower adjusting screws of the surface and then adjust the optical axis.

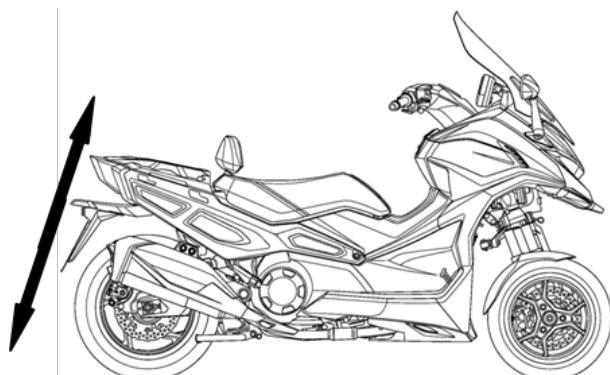


Suspension

Compress the front and rear Cushions up and down to check its action status. Check if oil is leaking from the front and rear Cushions and if each component is damaged or loosening.



Suspend the rear wheel and then compress the rear wheel up and down to see if the engine suspension bushing is loosening.



Rim/tire inspection

Rim/tire inspection

If the tire tread patterns are excessively worn, the tire will be vulnerable to puncturing damage and failure. The acceptable estimate value should be 90% of the entire tire failure, and it shall occur during 10% of tire tread service life (90% of abrasion). It will be the false saving and unsafe method by using the tire until it is completely worn.

Remove the stones or other foreign matters that are embedded into the tread pattern. Check if the tire is presenting any cracks or notches. If damaged, it should be replaced with a new one. The bulging or protruding sign means the internal side is damaged. In this case, it should be replaced with a new one.

Take a thickness gauge and measure the depth of tire pattern at the center of tire tread pattern. Because the tire may present uneven abrasion damage, it is required to measure several position points.

※ Replace the tire if the measured value is less than the service limit. Tire tread pattern depth service limit.

Front wheel: 0.8mm

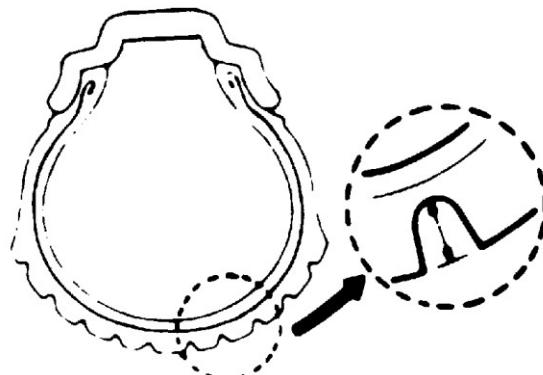
Rear wheel: 0.8mm

※ To ensure stabilized installation, operation and riding, it is recommended to use the standard tire and then inflate till reaching the standard tire pressure.

Tire specifications:

Specified tire pressure: Unit: kgf/cm²

	Single passenger riding	2 People
Front wheel	2.0	2.0
Rear wheel	2.7	2.7

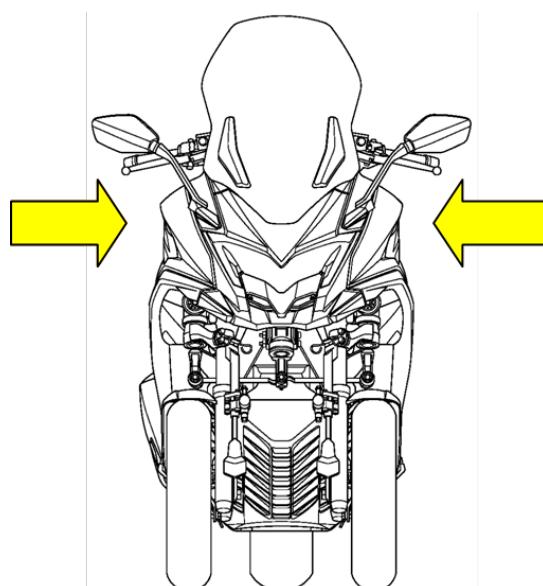


Tire specifications:

	Front wheel	Rear wheel
Specifications	110/70-13	160/60-R15

Steering Stem

Suspend the front wheel and then check if the left and right moving of the Steering Stem is impeded and if it is operating smoothly. Hold the front Cushion with both hands and then shake it forward and backward to see if the bearing of the steering Stem is loosening.



3. Vehicle appearance components/ Exhaustion Pipe



3. Vehicle appearance components/ Exhaustion Pipe

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3. Vehicle appearance components/ Exhaustion Pipe

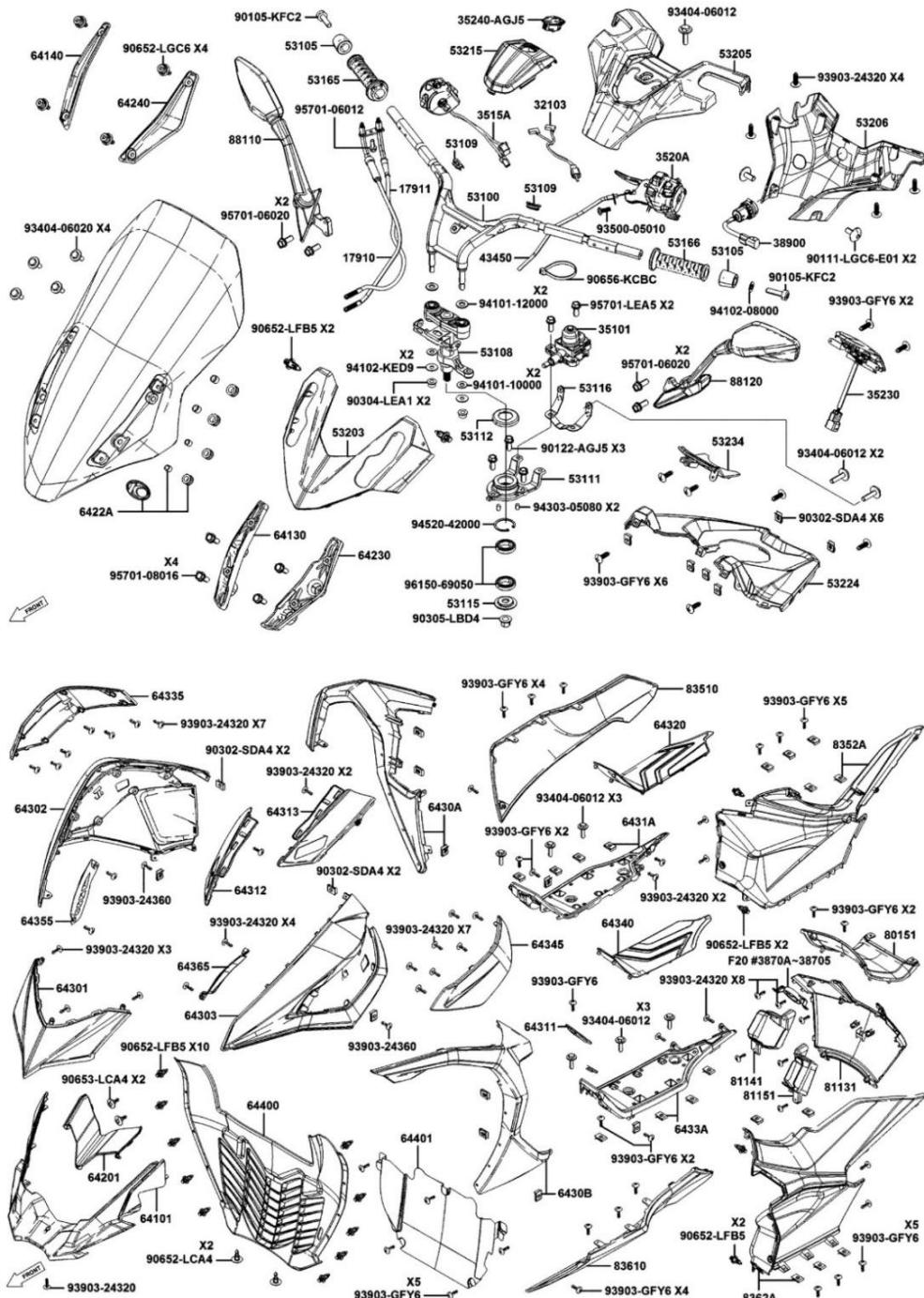


Preparations

Operational Precautions

- When removing the outer cover from the vehicle body, do not attempt to drag the cover by force. The forceful dragging will cause damage to the claws at the cover jointing area. Therefore, special care shall be used during the operation process.
- When routing cables or wiring, follow the wiring diagram.

Exploded View



3. Vehicle appearance components/ Exhaustion Pipe

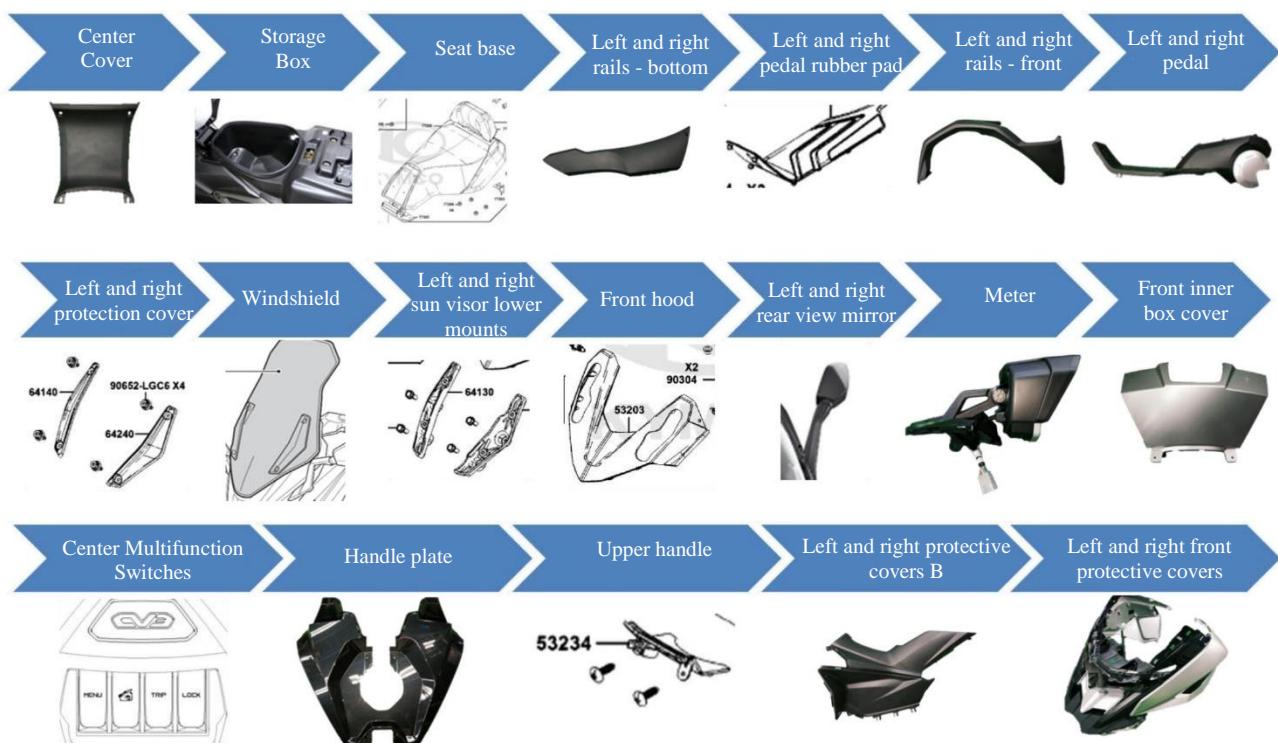


Appearance Parts Disassembly Sequence Schematic

Please refer to the removal sequence indicated in the figure below. The installation shall be performed in reverse order of the removal.

⚠ Caution

The disassembly sequence of exterior parts is a recommended order for removal. In some cases, certain exterior parts can be removed in a different order according to the operator's needs, but the condition is that no exterior parts should be damaged.



3. Vehicle appearance components/ Exhaustion Pipe



Center cover removal.

Remove 2 screw.



The center cover can be dismantled by removing 2 plastic screws from the upper side.



Remove the storage box

Remove the storage box

Remove 8 screws and then remove the storage box.



Before removing the storage box, it is required to remove the connected LED wire and the power socket connector



3. Vehicle appearance components/ Exhaustion Pipe



Seat base removal.

After removing 4 nuts, take out the seat and the base.

⚠ Caution

When removing the seat and the base, do not bump the base screws thread.



Remove 1 screw from the side strip underneath the lower-left pedal.



Remove the rubber cushion of the left and right pedals.



Remove the left and right pedals.

Remove 8 screws and then remove the bottom strip of the lower-left pedal.



3. Vehicle appearance components/ Exhaustion Pipe



Remove the front inner box cover.

Remove the “inner box cover” first.



⚠Caution

- When removing the “front internal box cover”, dismantle it outward gradually without using brute force.



Remove 1 screw from the side strip underneath the lower-right pedal.



Remove the **right** pedals.

Remove 8 screws and then remove the side strip underneath the lower-left pedal.



3. Vehicle appearance components/ Exhaustion Pipe



Remove B screws from the pedal and the left protection cover.



Remove the front-left side rail.

Remove the left side rail – front

Remove the plastic fixing screw from its underside.



Remove 5 plastic mounting screws.



Remove B screws from the pedal and the right protection cover.



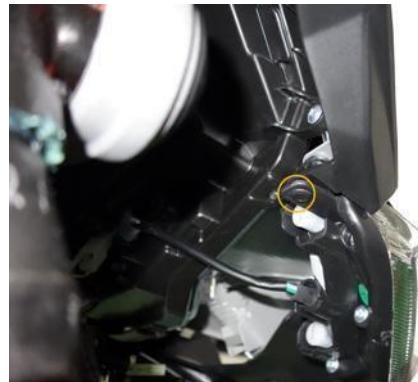
3. Vehicle appearance components/ Exhaustion Pipe



Remove the front-right side rail.

Remove the front-right side rail.

Remove the plastic fixing screw from its underside.



Remove 5 plastic mounting screws.



Remove 2 plastic fixing screws hidden underneath the front protection cover.



Remove 1 screw from the left and right pedals respectively.



3. Vehicle appearance components/ Exhaustion Pipe



Windshield protection plate removal

Remove 4 fixing bolts from the windshield protection plate and then remove the windshield protection plate.



Remove the windshield.

Remove 4 fixing bolts from the windshield and then remove the windshield.



Remove the windshield fixing base.

Remove 4 fixing bolts and then remove the windshield fixing base.



Remove the front shield cover.

Remove 2 plastic screws from both sides and then remove the front shield cover.



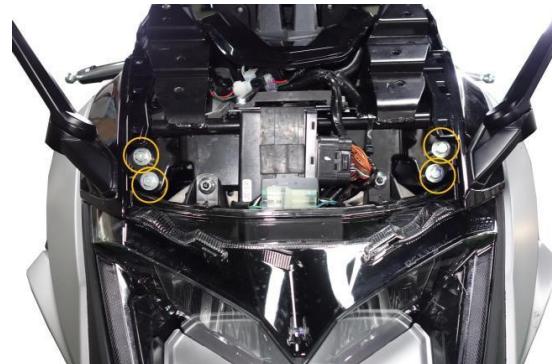
3. Vehicle appearance components/ Exhaustion Pipe



Remove the rear view mirror

Remove 4 screws from the left and right rear view mirror.

Remove the rear view mirror.



Remove the metering assembly.

Remove the left screw from the metering assembly.

⚠ Caution

- Before removing the metering assembly, ensure that the power has been disconnected.
- When removing the screw, it should be performed with the magnetic tool to avoid falling.



Remove the right screw from the metering assembly.

⚠ Caution

When removing the screw, it should be performed with the magnetic tool to avoid falling.



Insert the joint area with a screwdriver and you can pry open the fixing plate easily. Take out the fixing plate and the metering assembly can be removed easily.

After taking out the metering assembly, disconnect and separate the main wires and the metering assembly connector.

⚠ Caution

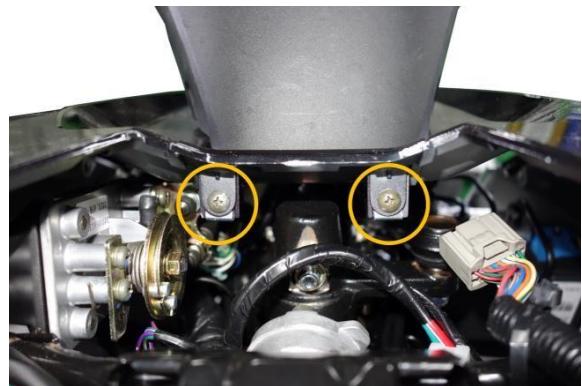
When removing the metering assembly connector, it should be dismantled according to the latch carefully. Do not attempt to drag with brute force to avoid the wire breaking.



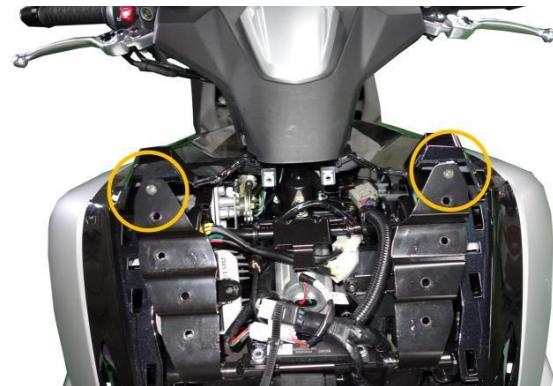
3. Vehicle appearance components/ Exhaustion Pipe



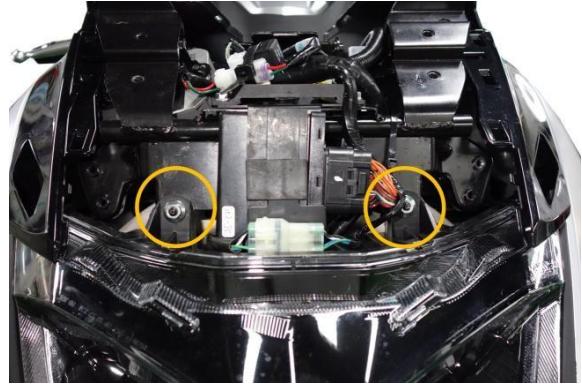
Remove 2 screws from upper lever and then remove the upper lever plate.



Remove 2 screws from the front end of upper lever.



Loosen 2 fixing screws of the head lamp.



Remove 2 fixing screws from the middle-mounting multi-function switch.

Remove the middle-mounting multi-function switch.



3. Vehicle appearance components/ Exhaustion Pipe



Remove 2 screws from upper lever and 2 screws from the front protection cover respectively.



Remove the head lamp connector wire.



Remove the left and right indicator lamp connector wire underneath the hand lamp.



Dismantle the section connecting with the upper lever plate and then lift open the front-left and front-right protection covers. After that, remove the entire unit, lamp and front cover assembly.



3. Vehicle appearance components/ Exhaustion Pipe



Finally, remove the lower and upper lever plate. When removing, move the angle gently until the upper lever plate is detached from the handlebar front cover assembly.



Remove the wind-guide shield assembly

Remove 2 plastic screws from under the wind-guide shield assembly and then remove the wind-guide shield assembly



Remove 2 screws from both sides respectively and then remove Fender-A.



The installation shall be performed in reverse order of the removal.

3. Vehicle appearance components/ Exhaustion Pipe



Remove the front wheel fender

Remove 3 screws from the front fender that are fixed at the front fork tube.



Remove the front fender unit.



Remove the upper and lower steering handlebar covers.

Remove 3 screws underneath the right steering handlebar cover.



Remove 3 screws underneath the left steering handlebar cover.



3. Vehicle appearance components/ Exhaustion Pipe



The removal shall be executed with plastic removing tool to prevent from hurting the plastic surface.



After remove the center screw, remove the upper steering handlebar cover.



Remove the lower steering handlebar cover.

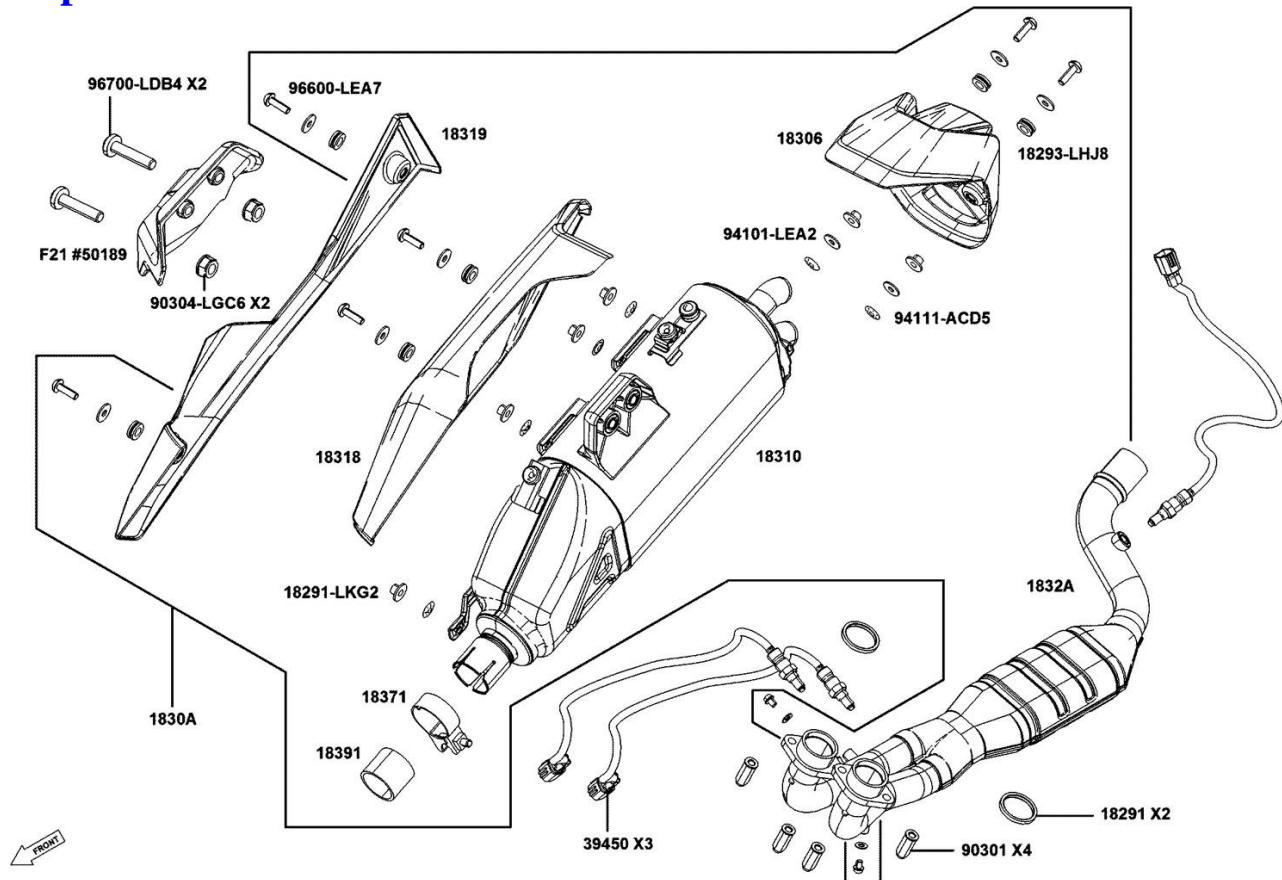


3. Vehicle appearance components/ Exhaustion Pipe



Exhaust Pipe

Exploded View



Operational Precautions

⚠ Warning

Before starting the operation, wait till the temperature of the exhaust pipe is dropped and then execute the removing work so as to avoid scorching injury.

⚠ Caution

During the removal process, the appearance component shall be properly protected to prevent hurting the appearance if any tool is being improperly used.

When the oxygen sensor is operating, do not hit the sensor because such kind of action will lead to damage to the oxygen sensor.

When using the oxygen sensor, do not drag the connecting wire with too much force and prevent the wire clipping or fraying event from occurring.

3. Vehicle appearance components/ Exhaustion Pipe



Remove the cover of the exhaust pipe

The exhaust pipe is composed of a rear cover, upper cover and lower cover. Please remove them according to the sequential order. When assembling, please install the outer cover in the reverse procedure.

⚠Caution

After removing the outer cover, the appearance should be properly protected to avoid scratching defect.

First, remove the 2 hex socket screws of the exhaust pipe rear cover.



Remove the exhaust pipe rear cover.



Next, remove the 2 hex socket screws of the exhaust pipe upper cover.

Remove the exhaust pipe upper cover.



3. Vehicle appearance components/ Exhaustion Pipe



Finally, remove the 2 hex socket screws of the exhaust pipe lower cover.

Remove the exhaust pipe lower cover.



3. Vehicle appearance components/ Exhaustion Pipe



Remove the exhaust tailpipe

First, loosen the screws connecting the exhaust tailpipe to the front section, then slide the clamp forward to detach it.

Next, loosen the two screws securing the exhaust tailpipe.

When loosening, the rear mounting nut may rotate, so please hold them with a box (ring) or open-end wrench to prevent slipping.

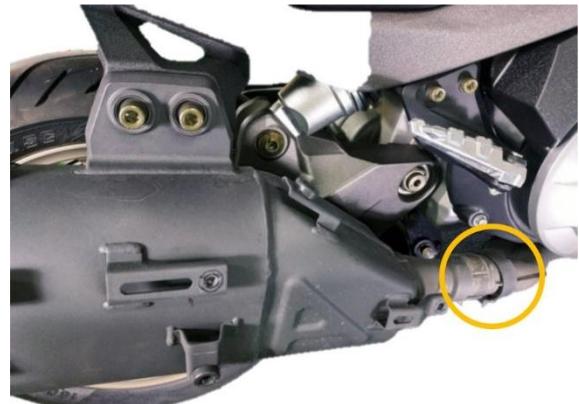
Torque: 200–400Kgf-cm.

Set value: 300Kgf-cm (excessive torque and insufficient torque not allowed).

When removing both screws, hold the tail tube of the exhaust pipe with your hand and then separate the tail tube of the exhaust pipe from the front tube slowly and carefully.

⚠Caution

When installing, check if the airtight gasket of the exhaust pipe connection compartment is normal. If required, make new parts replacements.



3. Vehicle appearance components/ Exhaustion Pipe



Remove the exhaust front pipe

Before removing the front tube of the exhaust pipe, remove the oxygen sensor connector from the main wiring assembly and then untie the strap. Such strap is designed in reusable type. It is convenient for use by the operators.

⚠Caution

When removing the oxygen sensor, indicate its position by means of photo-taking, tape or mark to avoid the error when executing the installation.



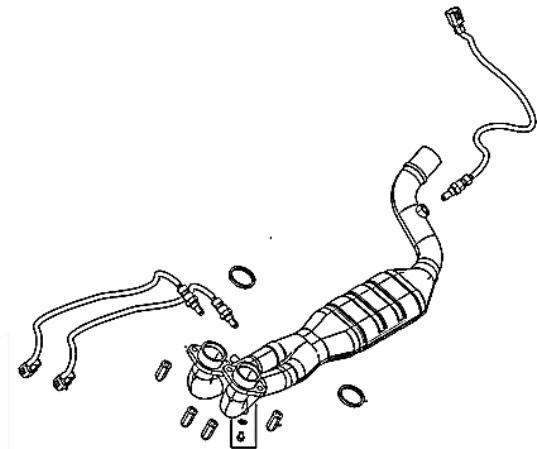
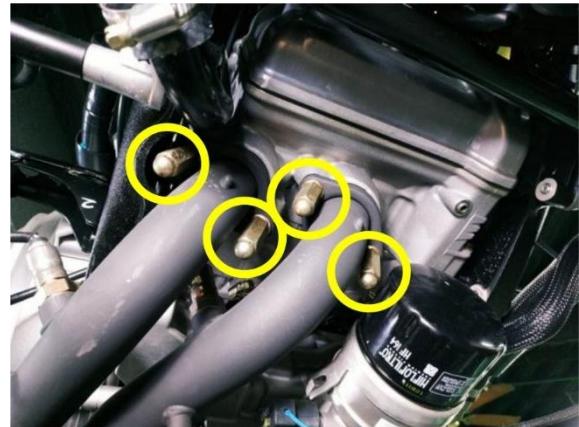
Locate the position of the exhaust front pipe below the cylinder, and remove the mounting screws securing the exhaust pipe head.

Torque: 100–300Kgf-cm.
Set value: 200Kgf-cm (excessive torque and insufficient torque not allowed).

⚠Caution

When installing the exhaust pipe front tube assembly, check if the gasket in the exhaust pipe head is normal. If required, make new parts replacements.

The oxygen sensor wires should be carefully handled when removing the exhaust front tube. Do not drag the wires with too much force to avoid wire breaking events.



3. Vehicle appearance components/ Exhaustion Pipe



Remove O2 sensor

When removing, it should be removed at the bolt position.

Avoid the thread slipping so as to not hurt the main body.



▲Caution

When installing, apply the anti-seize agent on the threads of the oxygen sensor to prevent it from getting seized under high temperatures so that it cannot be removed.

Torque: 200–300kgf-cm
Set value: 250Kgf-cm



When removing the third oxygen sensor, use a suitable No. 17 socket, like the one used for spark plug removal.

Torque: 200–300kgf-cm
Set value: 250Kgf-cm



4.Engine

This chapter covers the location and servicing of the engine components for the KYMCO CV3 model.

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Troubleshooting	4-2
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Cylinder Head Cover	4-7
Camshaft	4-11
Cylinder Head	4-16
Cylinder	4-19
Piston	4-20
CVT	4-21
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Fly Wheel	4-38
Mission Box	4-42
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Crankcase	4-53
Crankshaft/Balancer Gear/Plane Bearing	4-56
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GENERAL INSTRUCTIONS

Lubrication System

The maintenance of lubrication system can be performed with the engine installed in the frame. Use care when removing and installing the oil pump not to allow dust and foreign matters to enter the engine and oil line.

Do not attempt to disassemble the oil pump.

After the oil pump is installed, check each part for oil leaks.

TROUBLESHOOTING**Oil level too low**

1. Natural oil consumption
2. Oil leaks
3. Worn or poorly installed piston rings
4. Worn valve guide or seal

Poor lubrication pressure

1. Oil level too low
2. Clogged filter or oil passages
3. No use the specified oil

Cylinder Head Camshaft and Valves

- The cylinder head can be serviced with the engine installed in the frame. Coolant in the radiator and water hoses must be drained.
- When assembling, apply molybdenum disulfide grease or engine oil to the valve guide movable parts and valve arm sliding surfaces for initial lubrication.
- The valve rocker arms are lubricated by engine oil through the engine oil passages. Clean and unclog the oil passages before assembling the cylinder head.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal.

TROUBLESHOOTING

- The poor cylinder head operation can be diagnosed by a compression test or by tracing engine top-end noises.

Poor performance at idle speed

- Compression too low

Compression too low

- Incorrect valve clearance adjustment
- Burned or bent valves
- Incorrect valve timing
- Broken valve spring
- Poor valve and seat contact
- Leaking cylinder head gasket
- Warped or cracked cylinder head
- Poorly installed spark plug

Compression too high

- Excessive carbon build-up in combustion chamber

Abnormal noise

- Incorrect valve clearance adjustment
- Sticking valve or broken valve spring
- Damaged or worn camshaft
- Worn cam chain tensioner
- Worn camshaft and rocker arm

White smoke from exhaust muffler

- Worn valve stem or valve guide
- Damaged valve stem oil seal

Cylinder and Piston

- The cylinder and piston cannot be serviced with the engine installed in the frame.
- After disassembly, clean the removed parts and dry them with compressed air before inspection.
- If replacing the piston or cylinder, they must be changed as a pair.

TROUBLESHOOTING

Compression too low or uneven compression

- Worn, stuck or broken piston rings
- Worn or damaged cylinder and piston

Compression too high

- Excessive carbon build-up in combustion chamber or on piston head.

Excessive smoke from exhaust muffler

- Worn or damaged piston rings
- Worn or damaged cylinder and piston

Abnormal noisy piston

- Worn cylinder, piston and piston rings
- Worn piston pin hole and piston pin

General Torque Specifications

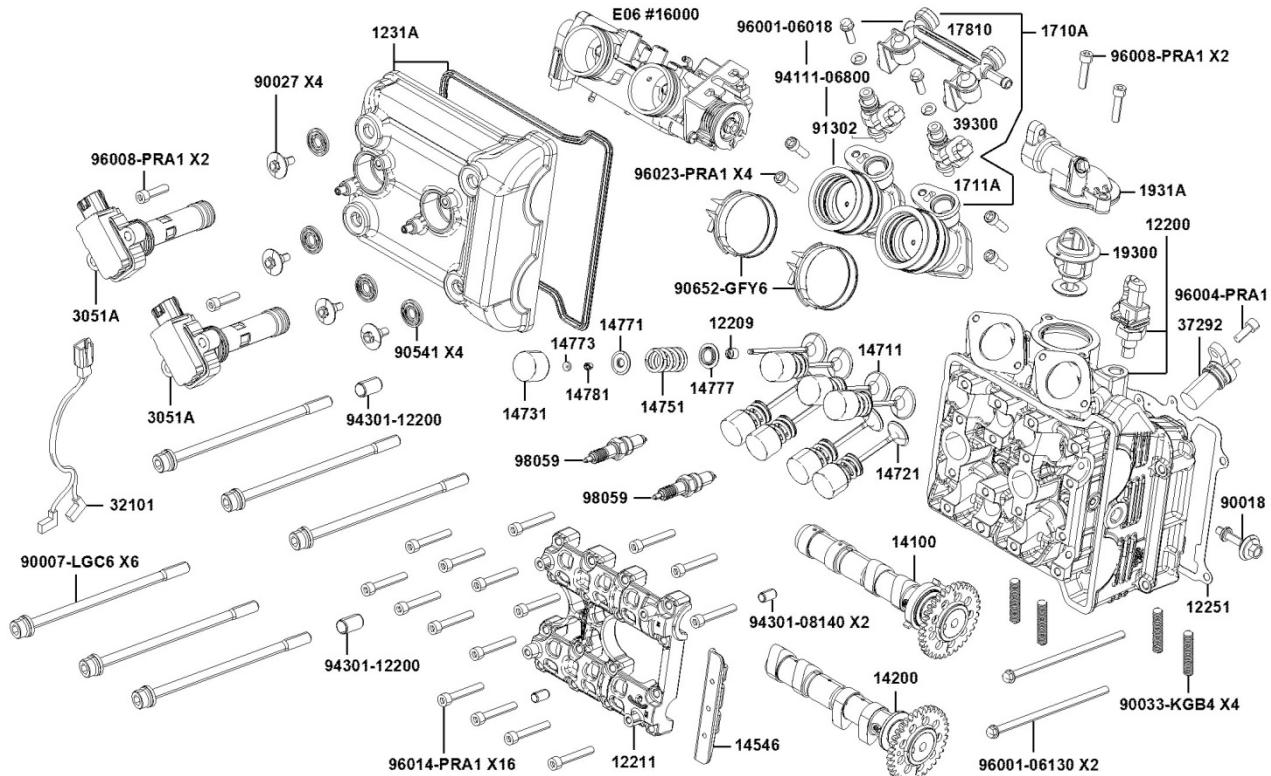
TORQUE(GENERAL)		
ITEM	N·m	kgf·m
5mm bolt and nut	4.4~6	0.45~0.6
6mm bolt and nut	8~12	0.8~1.2
8mm bolt and nut	18~25	1.8~2.5
10mm bolt and nut	29~39	3.0~4.0
12mm bolt and nut	49~59	5.0~6.0
5mm screw	3.4~5	0.35~0.5
6mm screw and flange bolt(SH TYPE)	7~11	0.7~1.1
6mm flange bolt and nut	10~14	1.0~1.4
8mm flange bolt and nut	24~29	2.4~3.0
10mm flange bolt and nut	34~44	3.5~4.5

Engine Torque Specifications

Part name	Q'ty	Spec.(mm)	kgf-m	Note
Cylinder Head		6	1.0~1.2	
Cylinder Head		18	3.2~3.9	
Spark Plug	2	10	1.0~1.4	
Camshaft Hold		6	0.9~1.1	With oil
Cylinder Head Cover		6	1.0~1.4	
Crankshaft Case Lower		8	1.8~2.5	With oil
Crankshaft Case Lower		6	1.0~1.4	With oil
ACG Flywheel		14	5.5~6.5	
Clutch Case R/L		10	3.0~4.0	With oil
Wet Clutch		16	5.9~7.3	With oil
CVT case		8	1.8~2.2	
Front Drive Pulley		18	7.6~9.3	
Roller weight		18	8.3~10	
CVT cover		8	1.8~2.2	
CVT cover		6	1.0~1.4	
Oil Cooler		20	3.2~3.9	

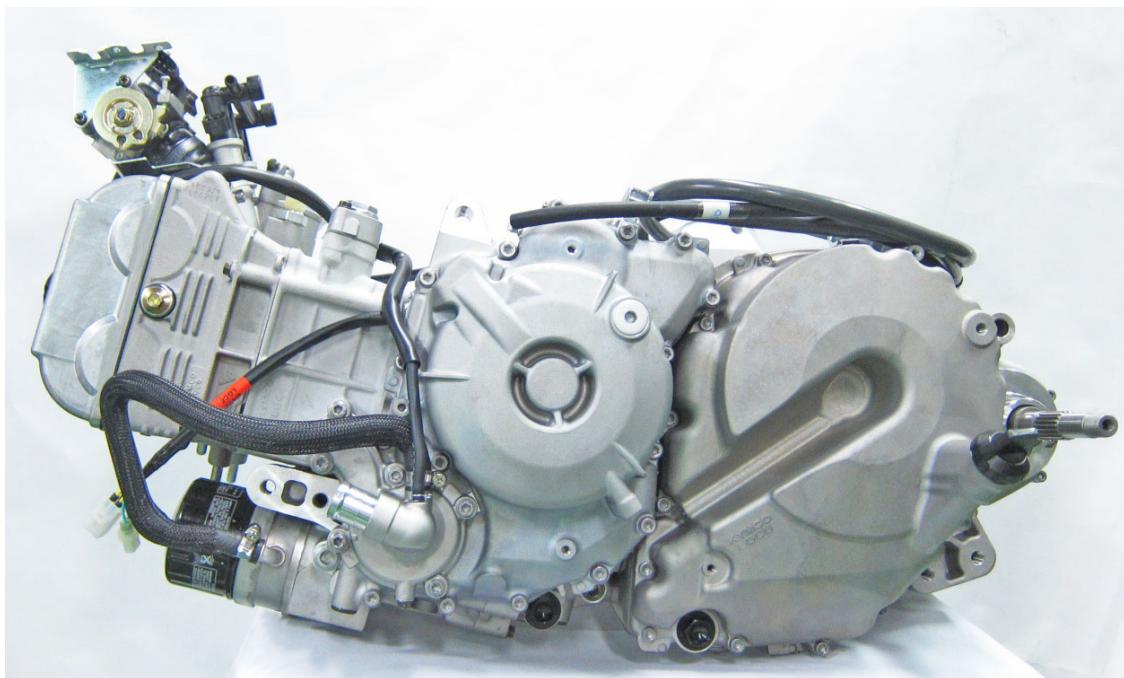
CYLINDER HEAD/VALVES

SCHEMATIC DRAWING



Cylinder Head Cover Removal

Cylinder head cover can be removed when engine is installed on the vehicle.



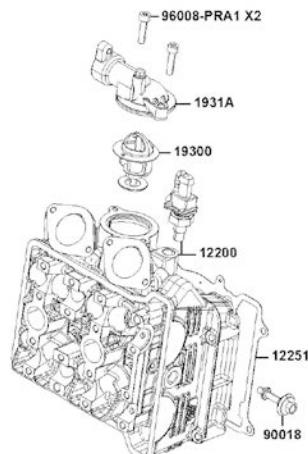
Remove the bolts and remove the thermostat cover.

The seal need to be replace when remove the thermostat cover.



Note: Replace a new seal when installing.

Remove the thermostat.

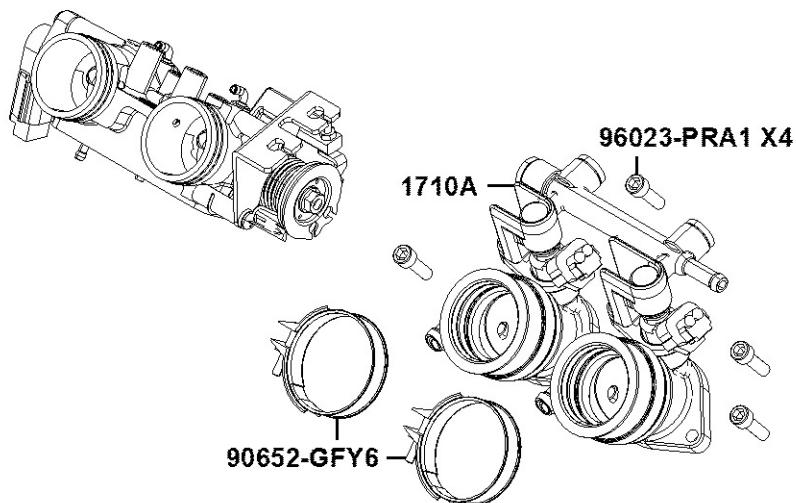


Remove four bolts and the fuel supply rail.



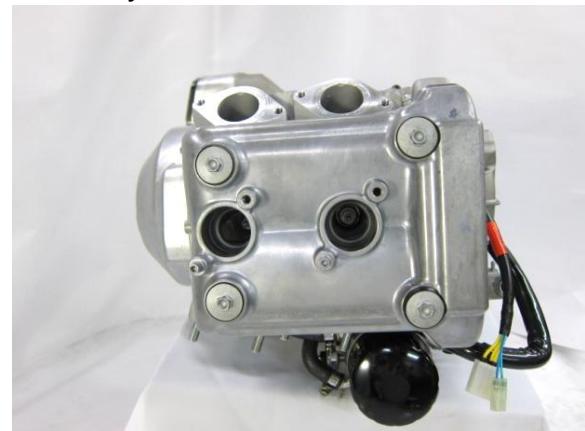
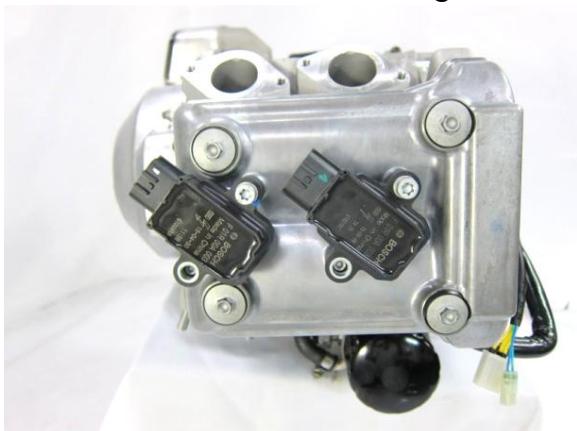
Remove injectors.

Remove 4 bolts and inlet pipes.

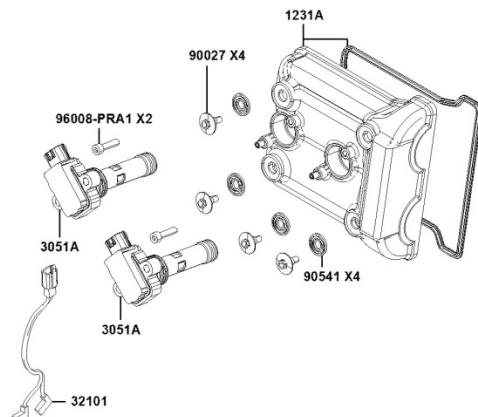


Remove two bolts and two ignition coils.

Remove bolts and mounting rubbers of the cylinder head cover.



Remove the cylinder head cover. Replace the rubbers when installation.

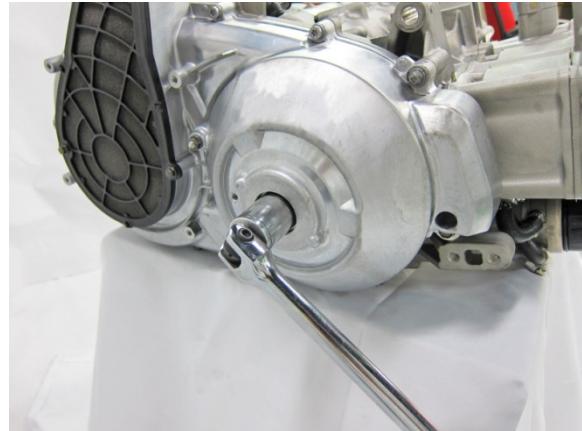
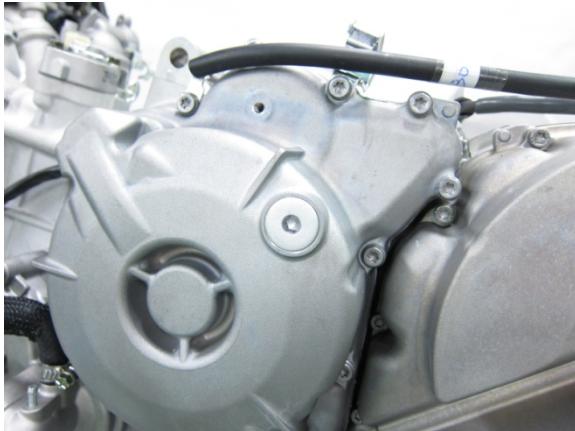


Installation torque: 1~1.4 kgf-m (9.8~13.7 N·m)

Camshaft Removal

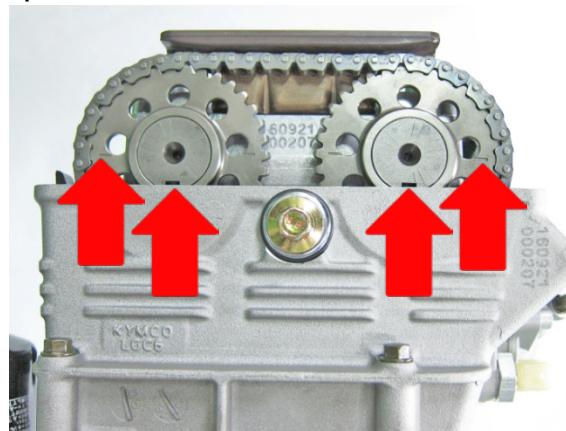
Remove the timing inspection cap from the left side of the engine. And rotate the crankshaft from the right side of the engine.

When installation, inspect the O-ring on the cap and replace it as needed.



Rotate the crankshaft to TDC mark.

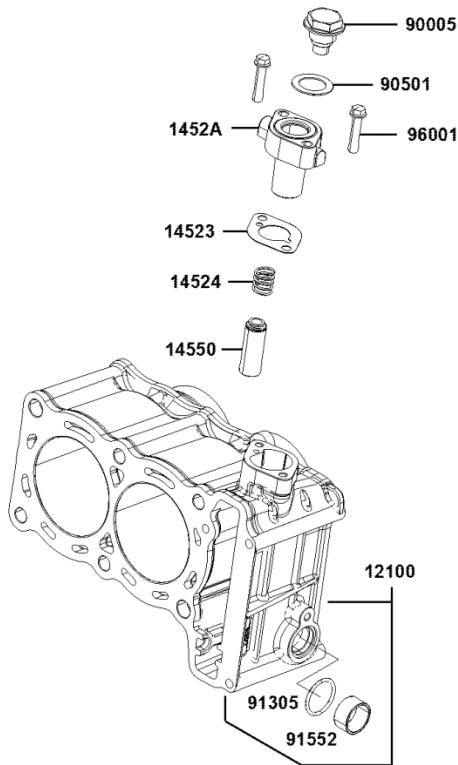
And align the TDC mark at camshaft sprocket.



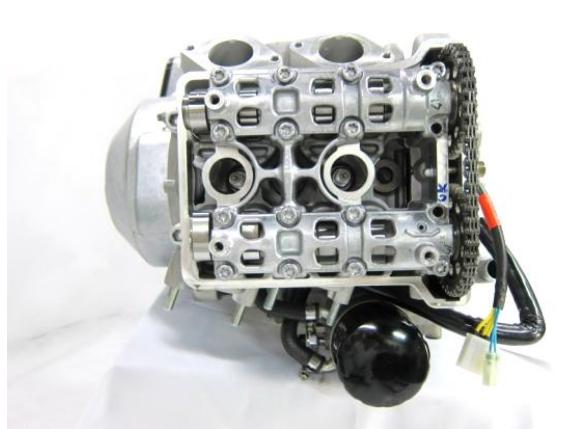
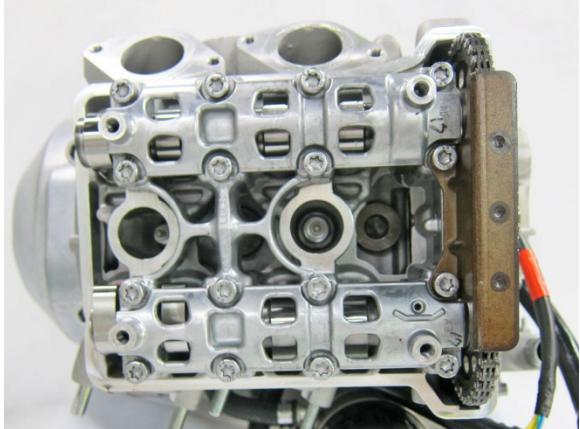
For correct engine timing the marks on the camshaft sprocket must be even with the cylinder head mating surface at the same time the "T" mark is lined up with the with the index notch in the timing inspection hole.

If this is not the case, rotate the crankshaft 360° clockwise until the "T" mark is once again aligned with the notch on the case cover.

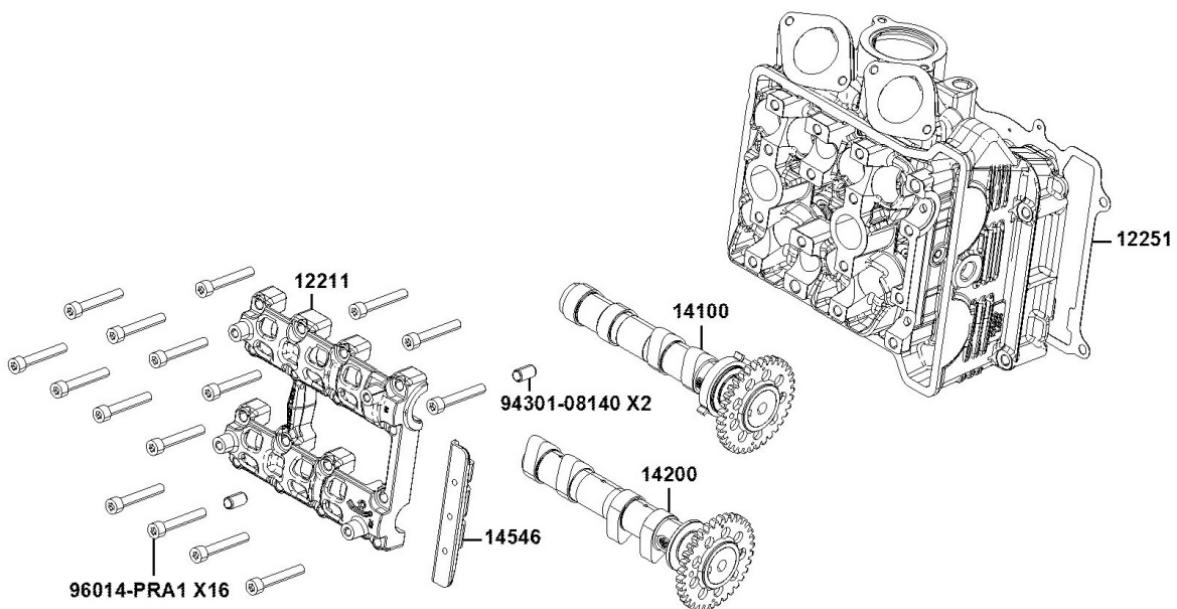
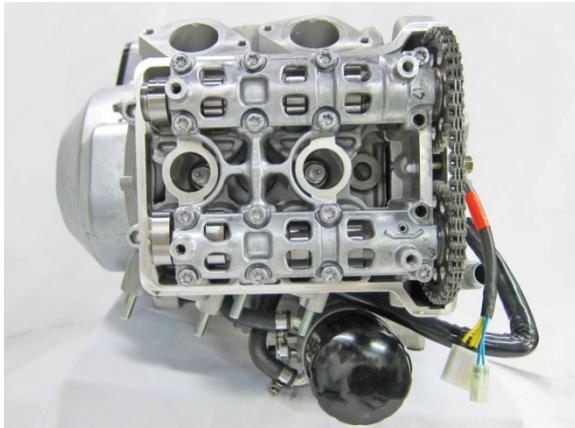
Remove the cam chain tensioner cap bolt. Loosen the cam chain tensioner mounting bolts evenly with an 8 mm socket. Lift the cam chain tensioner out of the cylinder. Remove the cam chain tensioner gasket.



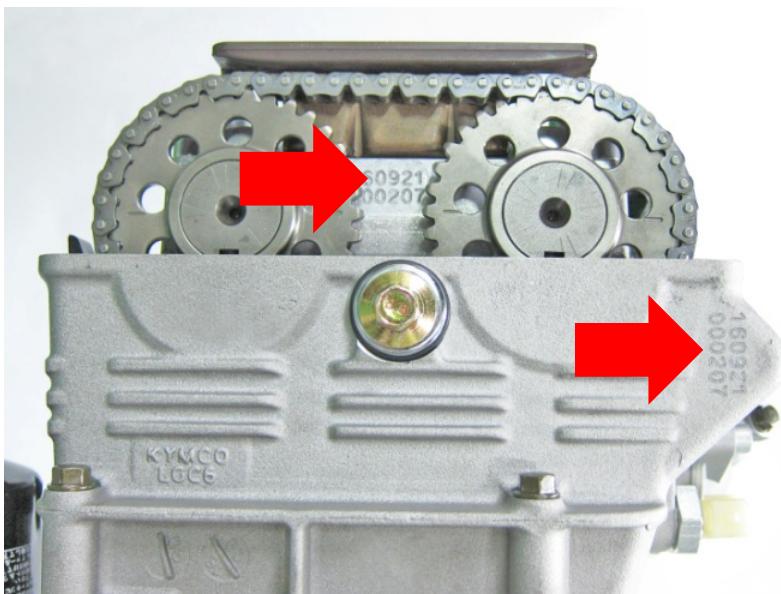
Remove two bolts and remove the upper train guide.



Loosen and remove the camshaft holder bolts in a crisscross pattern in several steps, then remove the camshaft holder. And remove camshafts.

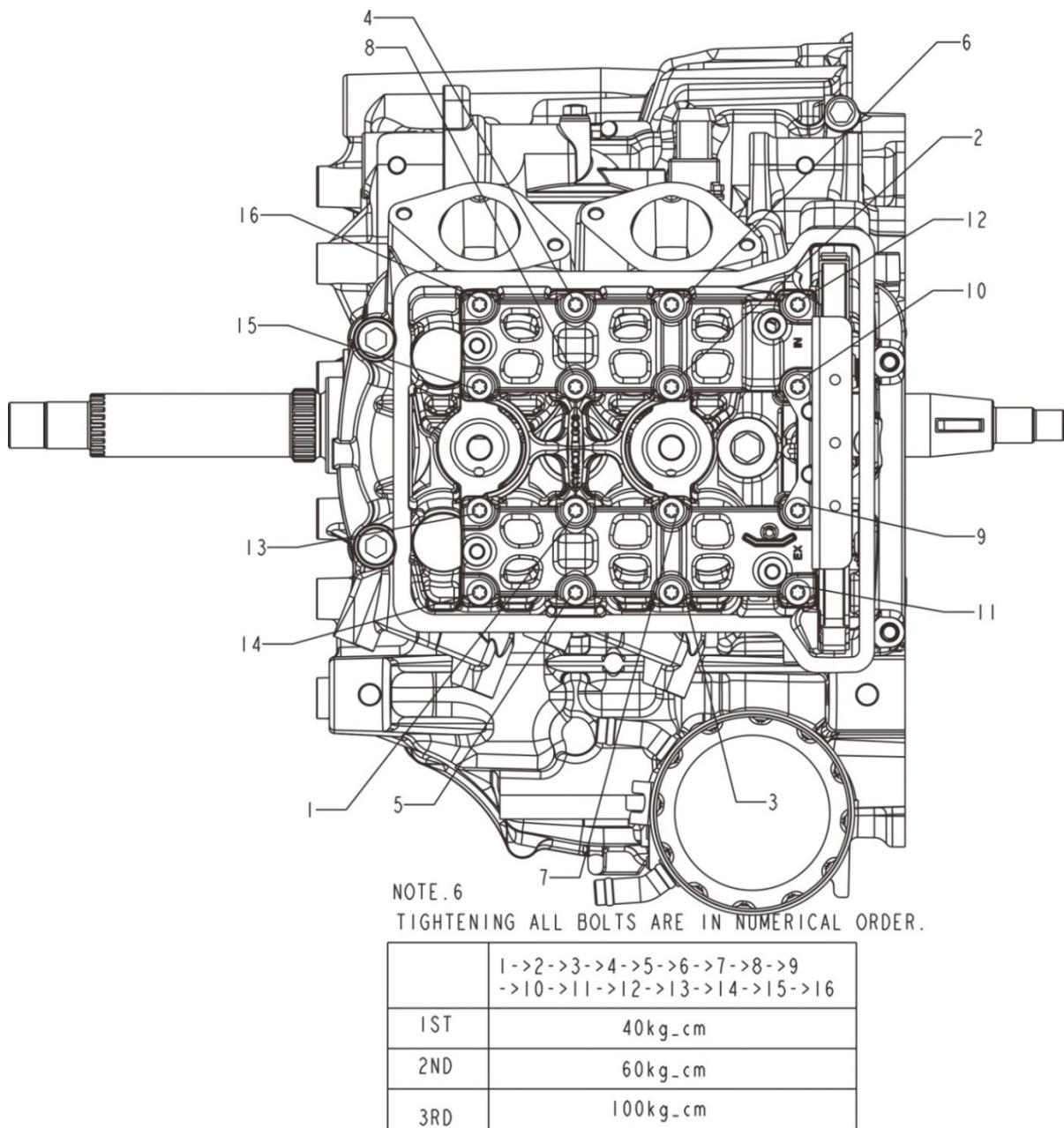


The camshaft holder and cylinder need with the same number mark.



Install the cam holder.

The bolts mounting order and torque should follow the below rule.



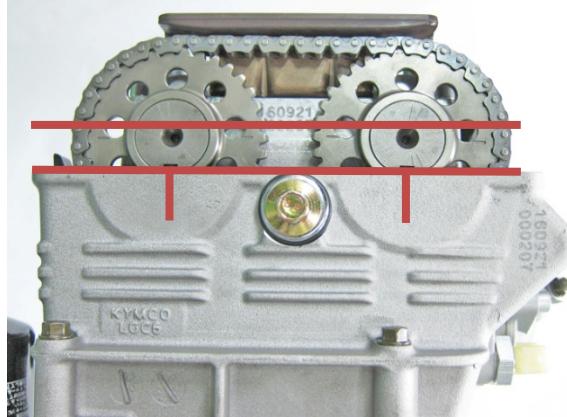
Install the upper train guide.



Cam Holder Installation

Rotate (clockwise) the crankshaft until the piston is at top dead center (TDC) on the compression stroke.

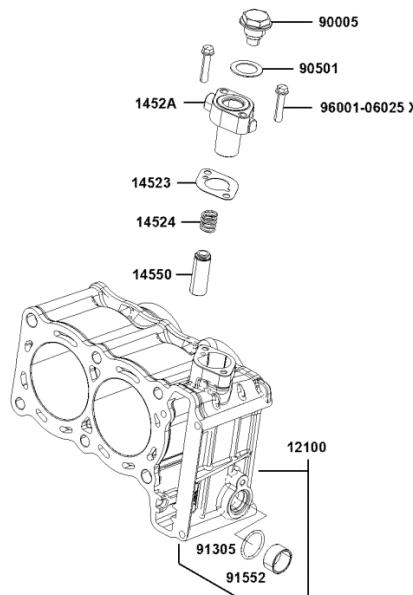
And align the TDC mark at camshaft sprocket.



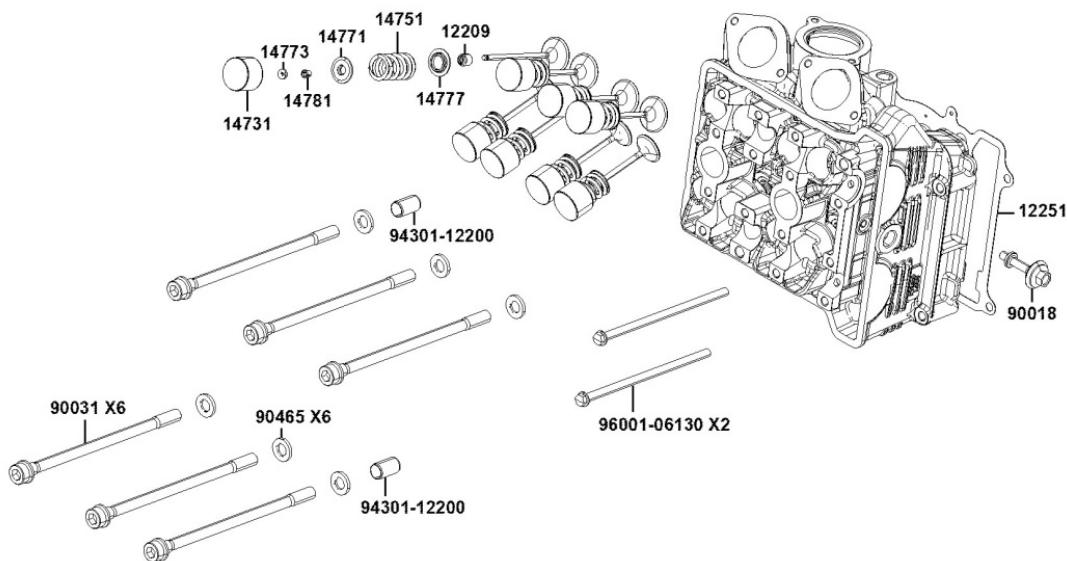
Install the tensioner.

Note: Replace a new gasket when installing.

Tensioner cap bolt installation torque: 1.8~2.2 kgf-m (17.7~21.6 N·m)

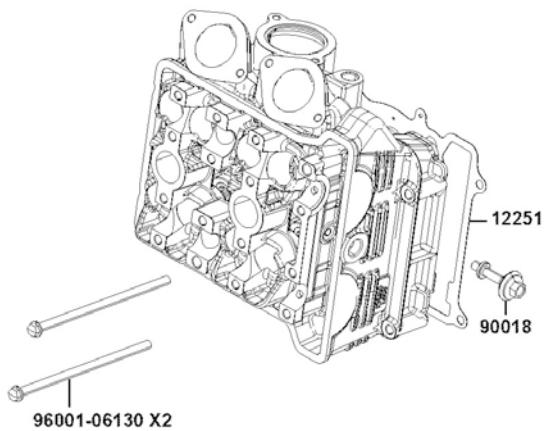


Cylinder Head Removal

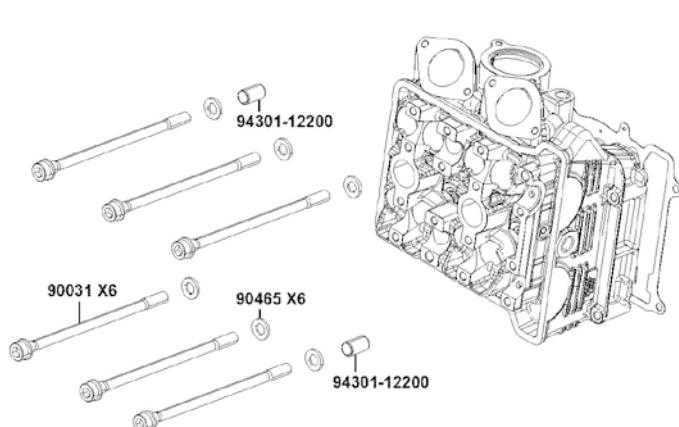
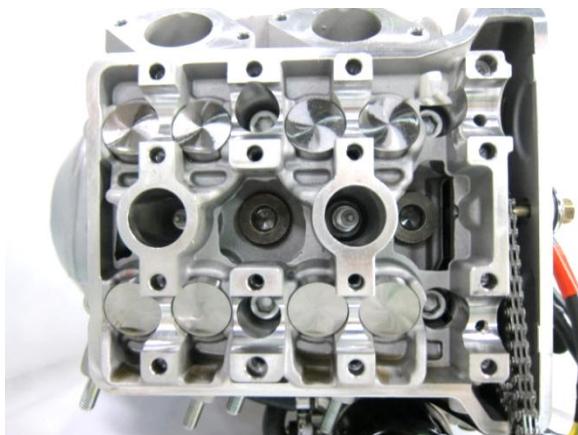


Remove bolts of cylinder head.

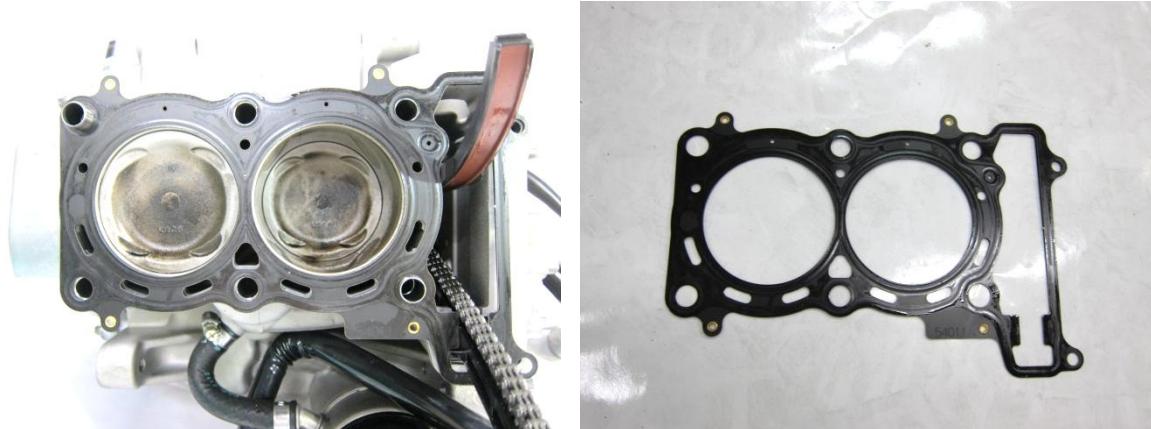
Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



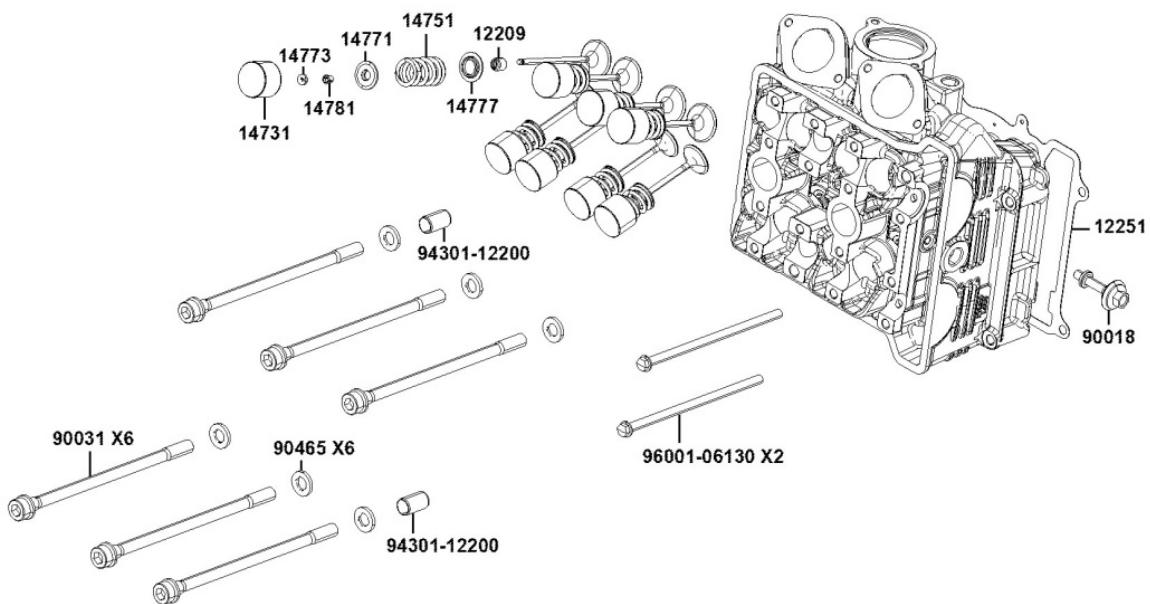
Loosen and remove the cylinder head bolts in a crisscross pattern in several steps, then remove the cylinder head.



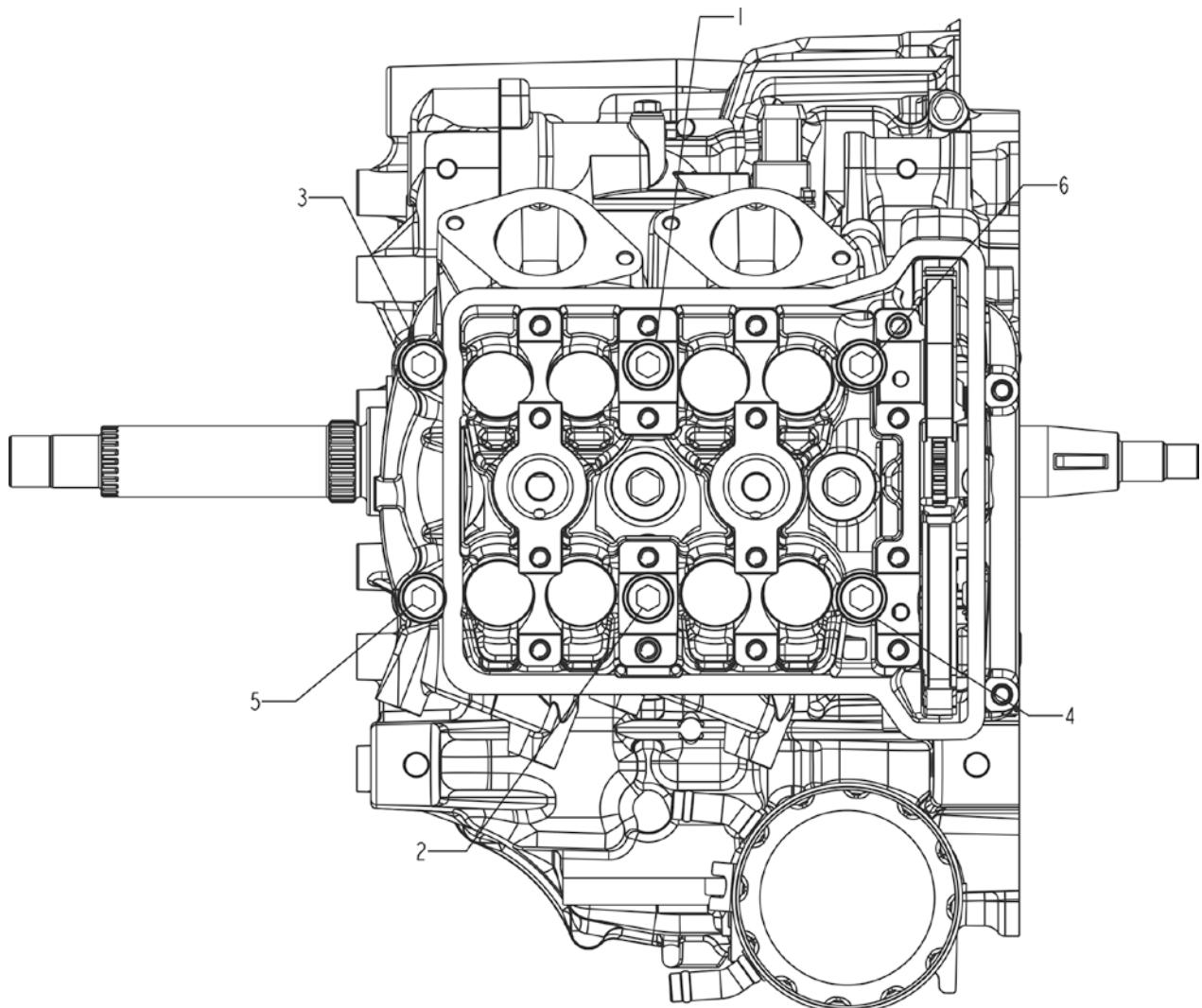
Remove the cylinder head gasket and dowel pins.
Replace a new gasket when installation.



After removal, mark and arrange the removed parts in order. When assembling, install them in the reverse order of removal.
Place this cylinder head carefully, do not fall out the lifter and shim.



Installation: The bolts mounting order and torque at 3 stages follow the below rule.



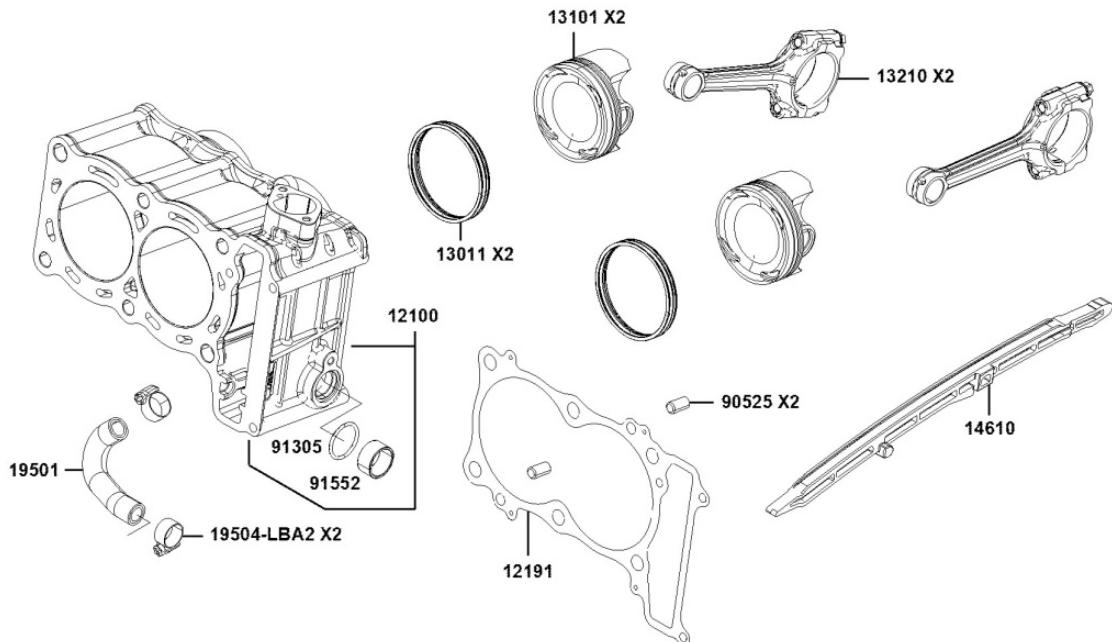
NOTE.3 TIGHTENING SEQUENCE:

1st: $10 \pm 1 \text{ N}\cdot\text{m}$

2nd: $20 \pm 2 \text{ N}\cdot\text{m}$

3rd: $105^\circ \pm 5^\circ$

Cylinder Removal



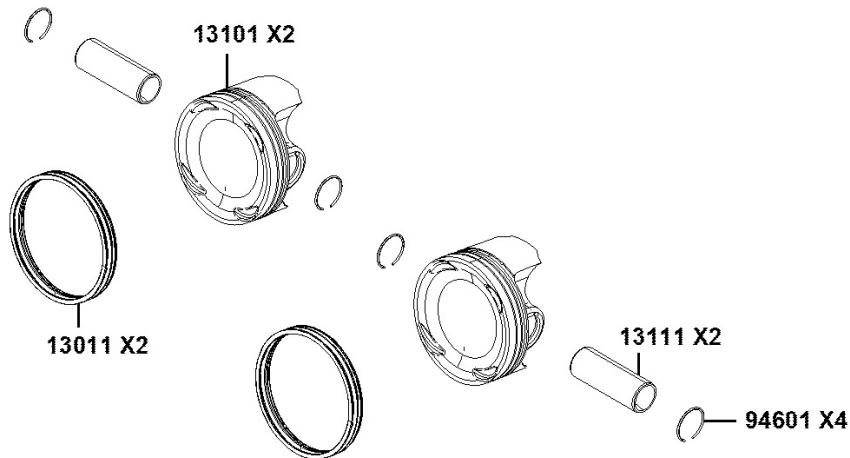
Remove the cylinder head gasket and dowel pins.
Replace a new gasket when installation.



Remove the cylinder, gasket and dowel pins.
Replace a new gasket when installation.



Pistons Removal

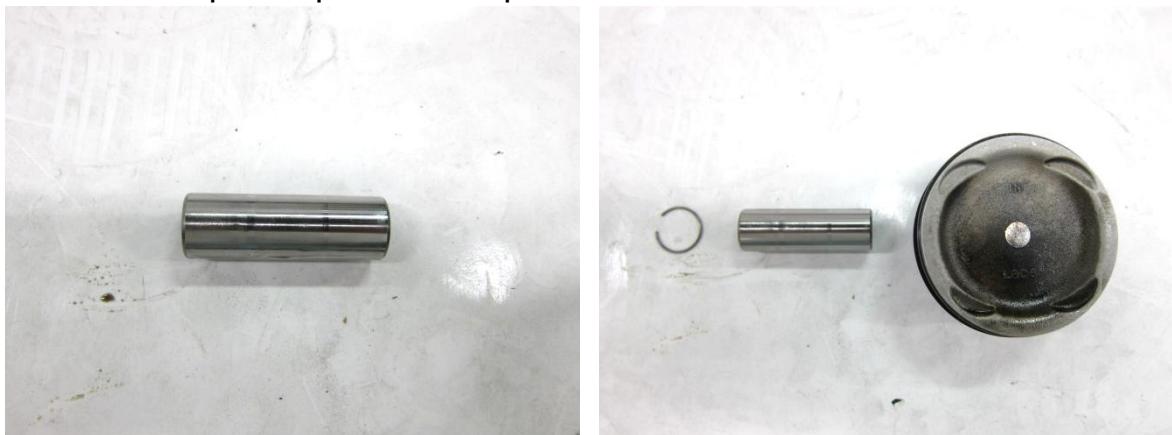


Place a clean shop towel under and around the base of the piston to prevent any parts or debris falling into the crankcase.

Remove the piston pin clips with a pick or needle nose pliers. Discard the piston pin clips.

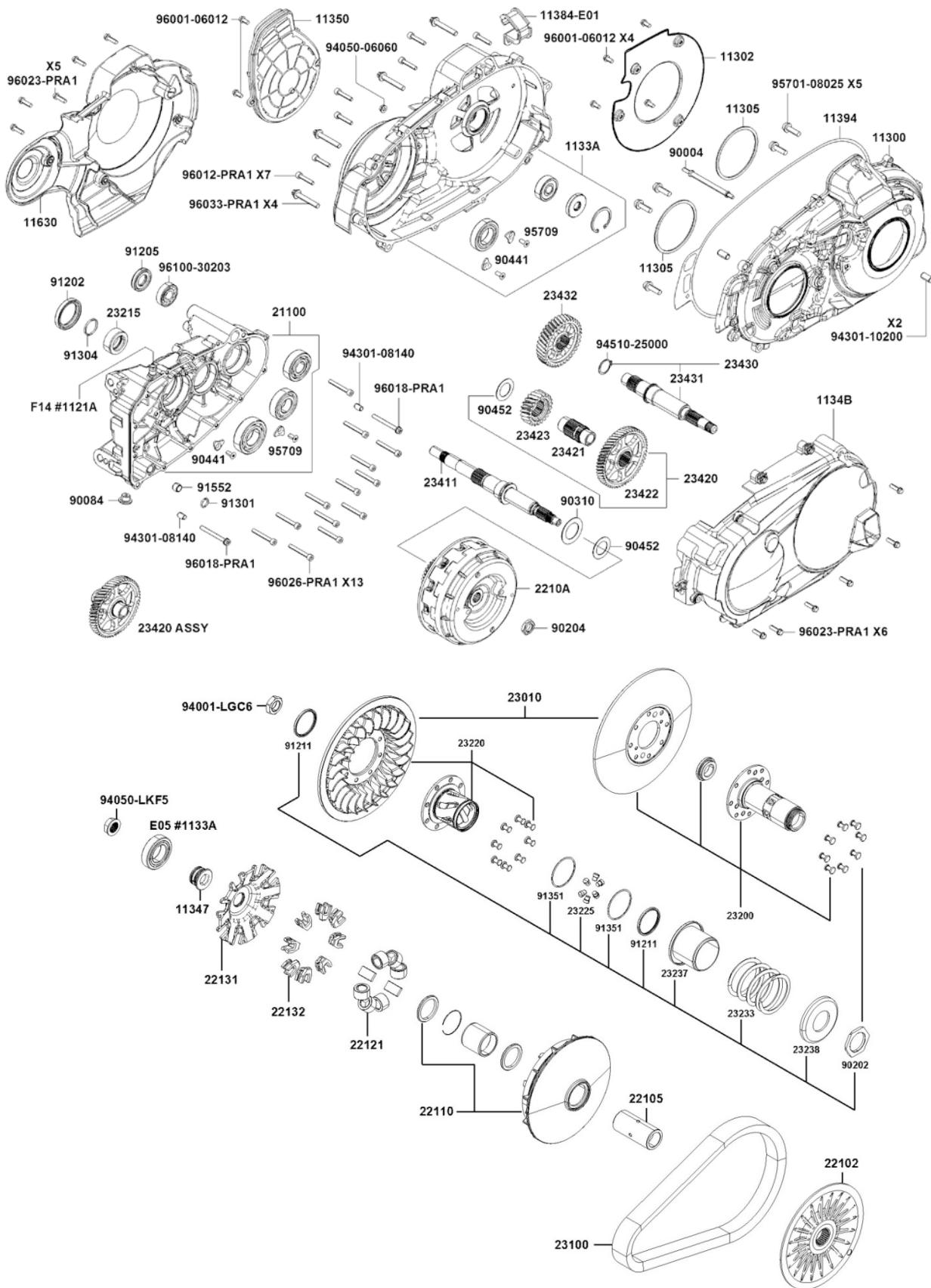


Remove the piston pin and the piston.



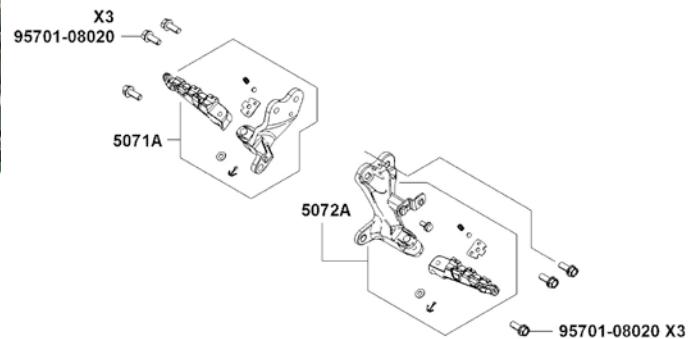
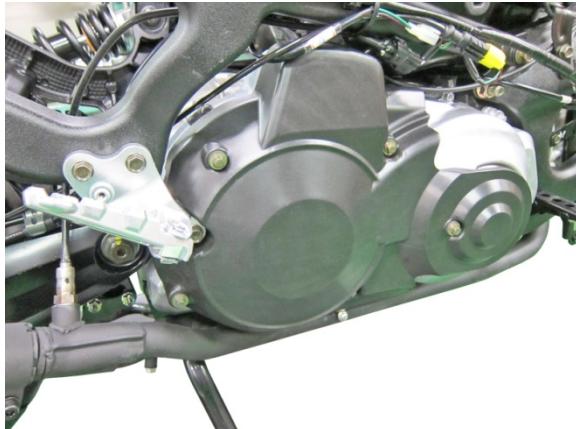
CVT Removal

SCHEMATIC DRAWING

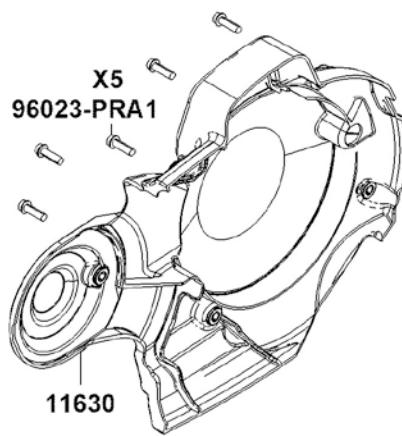


Belt Case Removal

Remove three bolts. And remove the pillion step set.

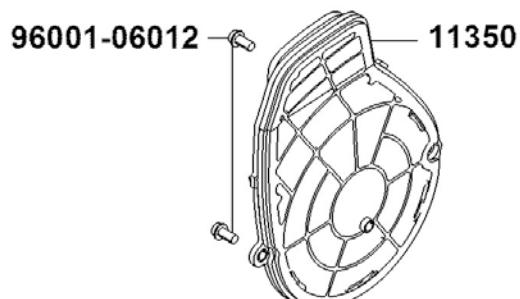


Remove five bolts and remove the CVT right cover.



Remove two bolts and remove the CVT cover element.

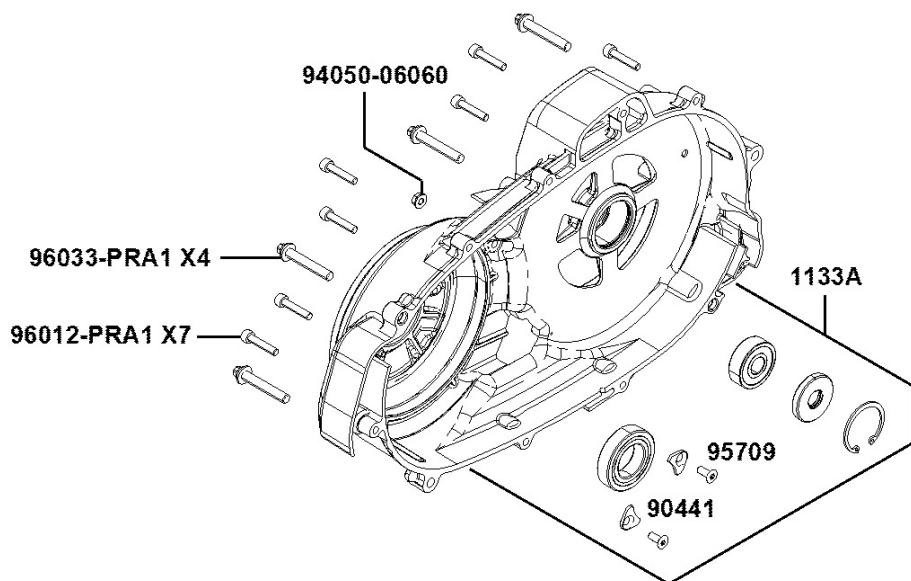
Clean the cover element if necessary.



Remove the bolts, nut and remove the CVT cover.



Remove the gasket and two dowel pins.

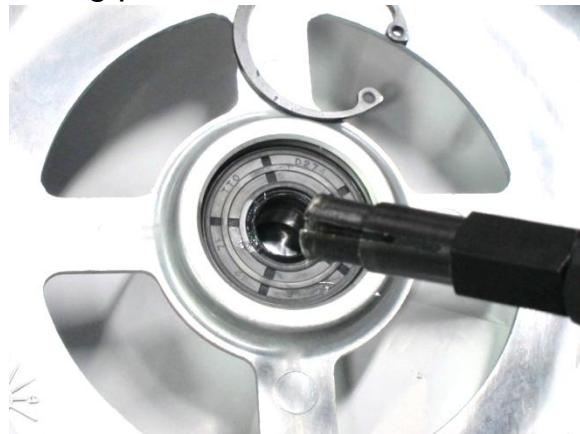


Inspect the belt case bearing by turning it with a finger. Replace the bearing if it is rough or noisy.



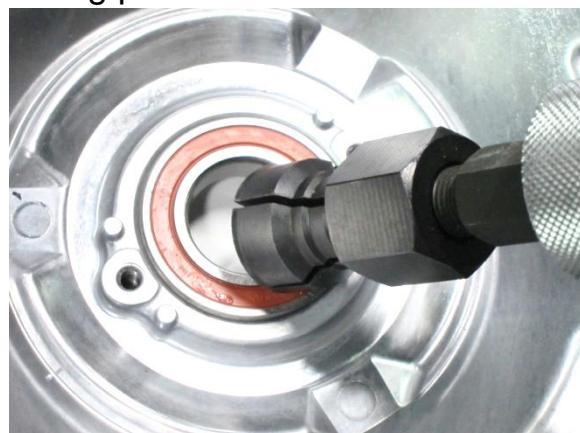
Remove the bearing snap ring with snap ring pliers.

Remove the bearing with a suitable bearing puller.



Remove two screws and plates.

Remove the bearing with a suitable bearing puller.



Drive in a new bearing with a suitable bearing driver that has the same outside diameter as the bearing.

Install a new snap ring with snap ring pliers.

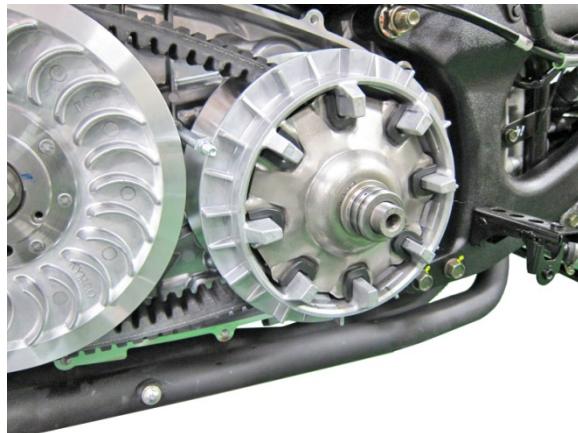
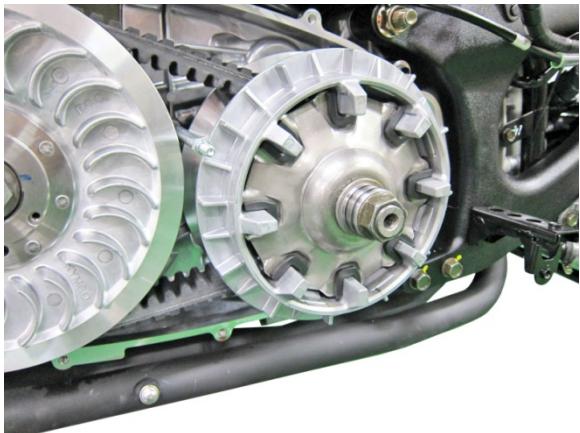


CVT Removal

Remove the nut and boss of drive pulley.

Installation torque: 7.6~9.3 kgf-m (75~91.3 N-m)

Lubricate the threads of the nut before installation.



Remove the movable face set.



Drive Pulley Disassembly

94050-LKF5

E05 #1133A



11347



22131



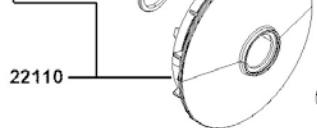
22132



22121



22110

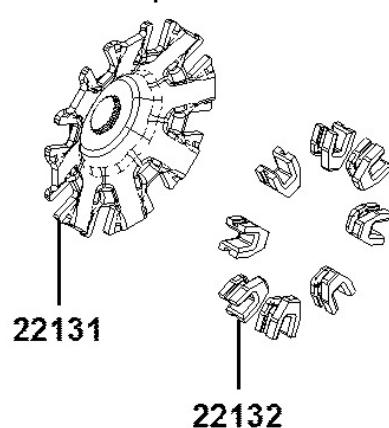


22105

Inspect the faces of the drive pulley. Clean away any grease from the faces. Lift the ramp plate out of the back of the movable drive pulley face.



Remove the rubber damper pieces from the ramp.



There are eight weight rollers in the back of the movable face of the drive pulley.



Remove the rollers and check them for excessive or uneven wear. Replace the weight rollers as needed.

Installation: Install the rollers into the back of the movable drive face of the driven pulley. Position the rollers so that their colored sides are clockwise.

Fit the ramp into the back of the movable drive face of the drive pulley. Make sure the rubber dampers fit onto the ridges as shown.

Inspect the movable drive face and bushing for wear and damage. Replace the parts as needed.



Hold the drive pulley with a universal holder tool.

Remove the nut of driven pulley.



Lubricate the threads of the nut before installation.

Installation torque: 8.3~10 kgf-m (81~99 N-m)

When installation, make sure the drive face are clean and grease free where they will contact the belt.

Screw in the bolts and loosen the belt.



Remove the belt from the driven pulley.

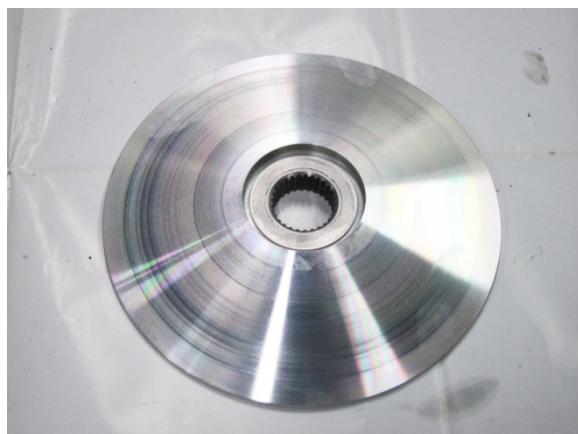
Inspect the drive belt for cracks or excessive wear. Replace it if needed.



Remove the driven pulley.



Remove the drive face.



When installation, make sure the drive face are clean and grease free where they will contact the belt.

Remove the three bolts.

Remove the air intake plate.

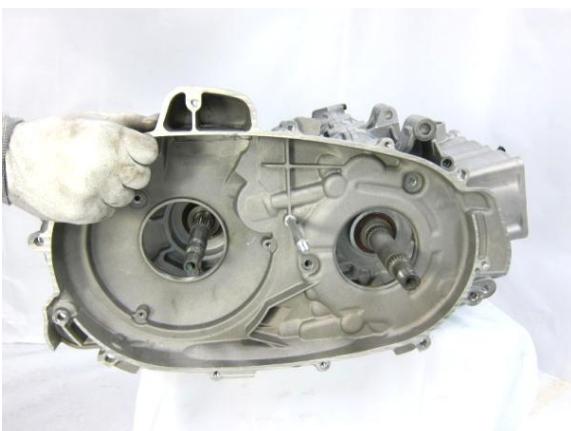


Remove the five bolts of the CVT case.

Installation torque: 1.8~2.2 kgf-m (17.7~21.6 N·m)

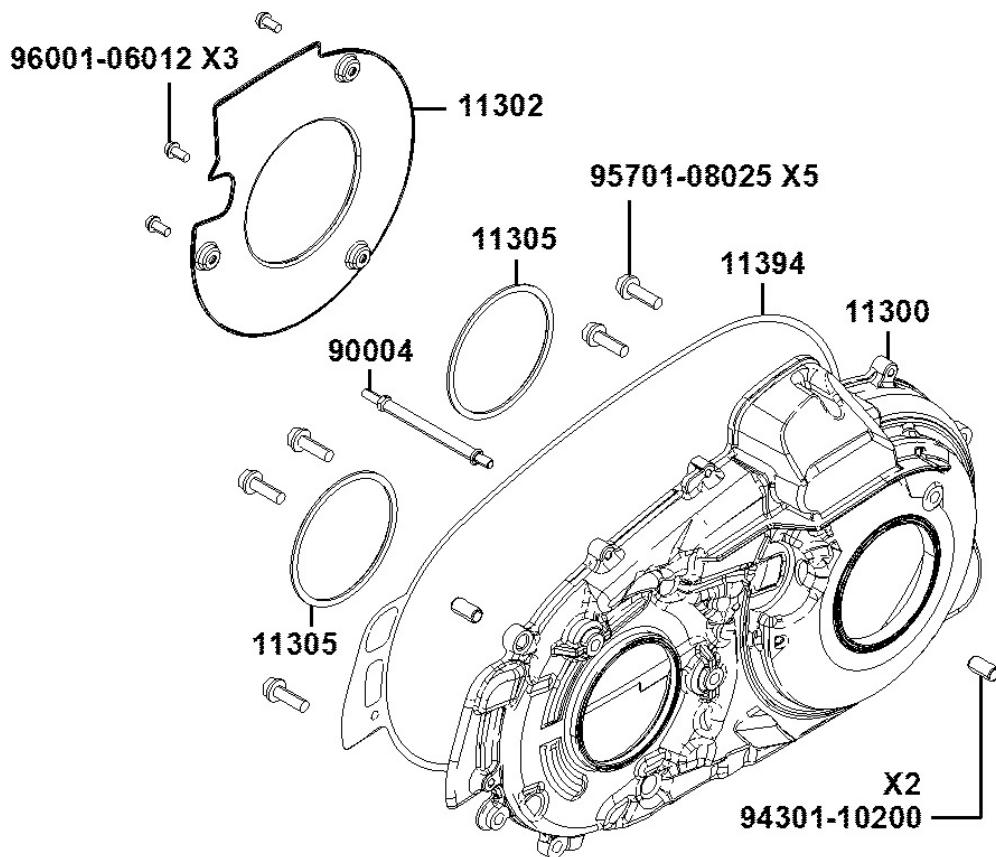


Remove the CVT case.

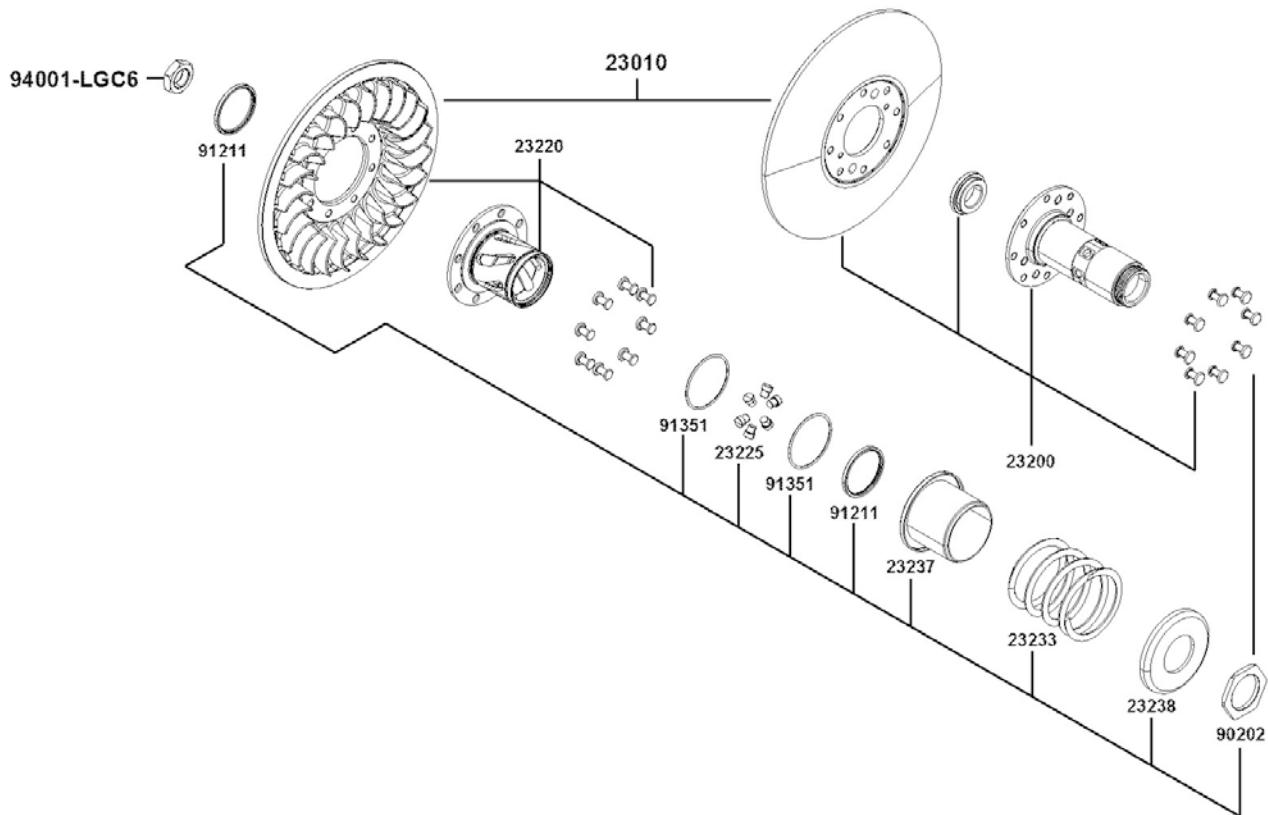


Remove the gaskets of CVT case.

Replace with new gaskets when installation.



Driven Pulley Disassembly



Set the compressor tool to disassemble the driven pulley.

ITEM	TOOL NO.	DESCRIPTION
Compressor Tool	A120E00053	Driven Pulley disassembly



Tighten the bolt of the fitting tool to compress the spring.



Secure the spring compressor tool in a vise. Loosen the plate nut with the socket. And remove the plate nut of driven pulley set.



Loosen and remove the spring compressor tool.

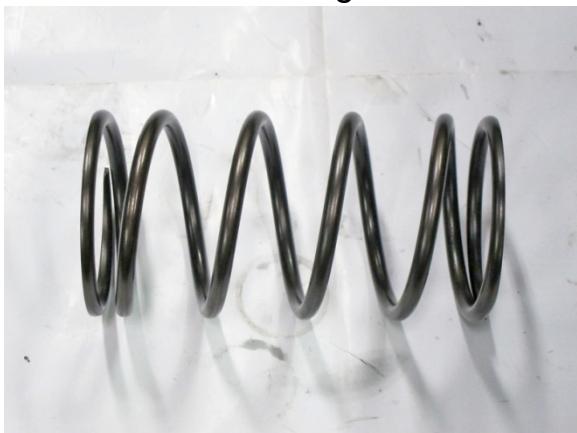
Remove the collar of spring.



Remove the spring.



Measure the free length of the clutch spring. Replace the spring if needed.



Remove the seal collar.



Remove the six guide rollers with guide roller pins.

Note: When installation, lubricate the guide pins and rollers with grease.



Separate the left and right faces of the driven pulley.

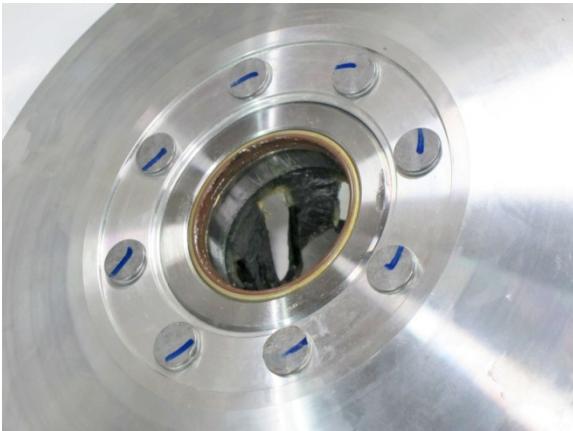


When installation, wipe away any grease that gets on the faces where the belt will ride.

Inspect the faces of the driven pulley. Clean away any grease from the faces where the belt rides.



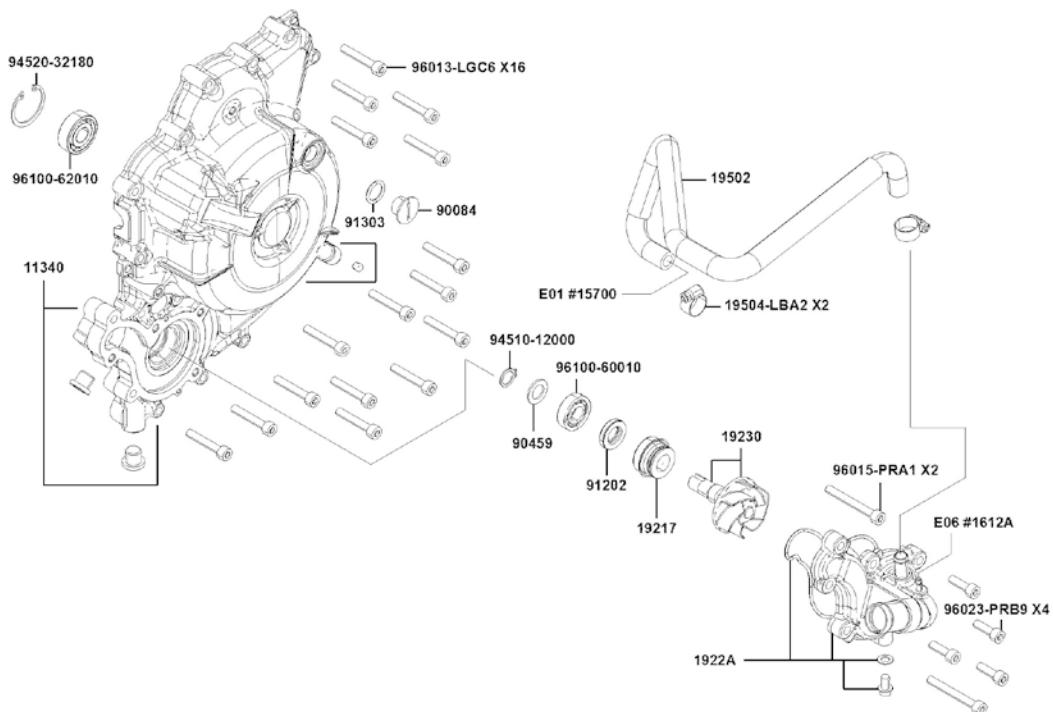
Replace the seals from the driven pulley.



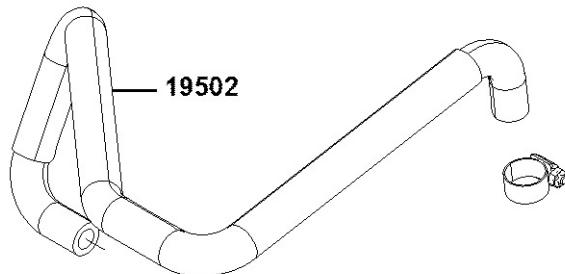
Replace the O-rings of the driven pulley.



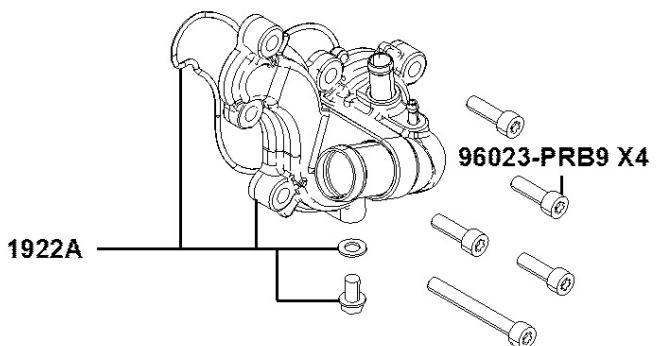
Left Side Cover Removal



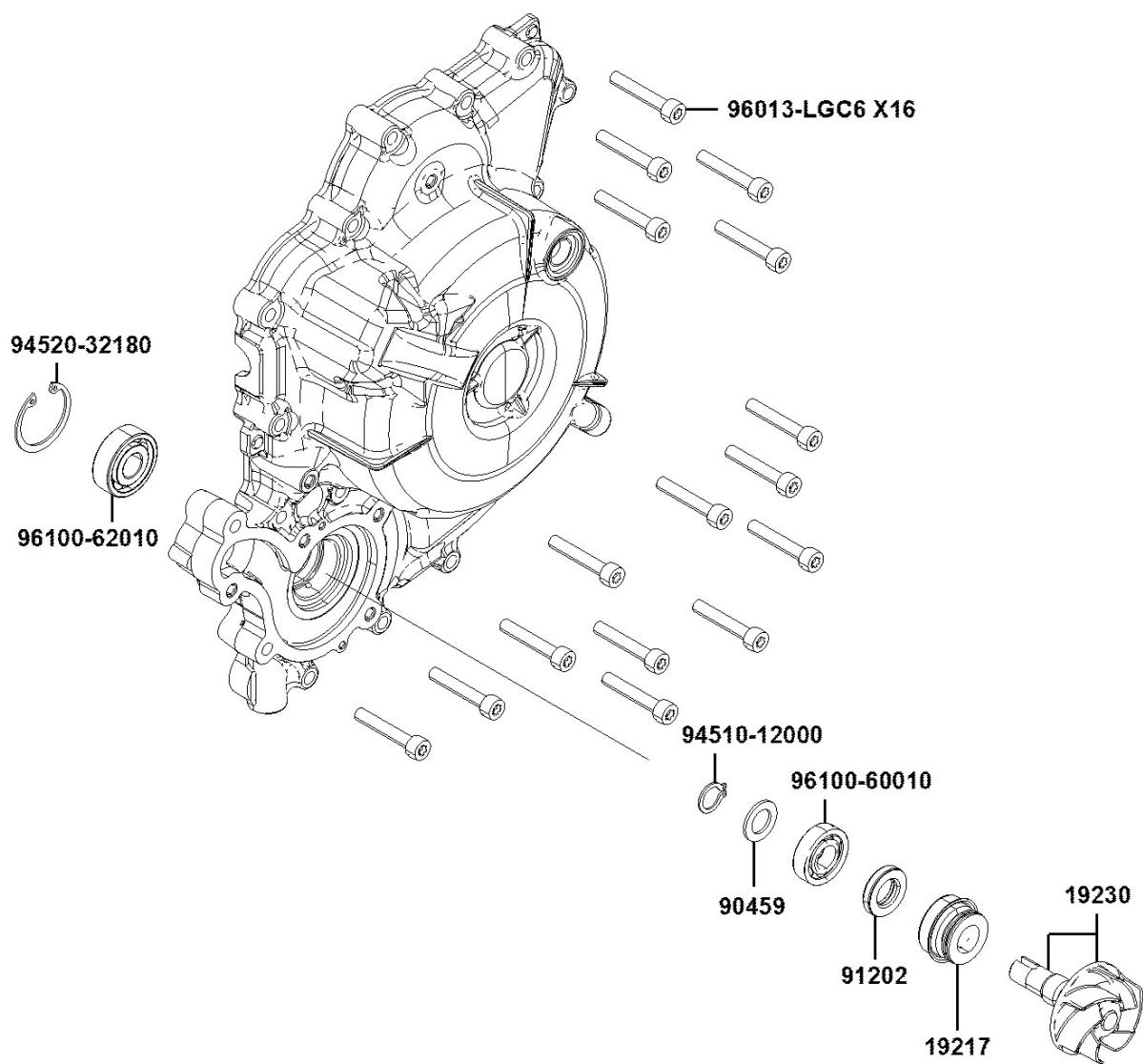
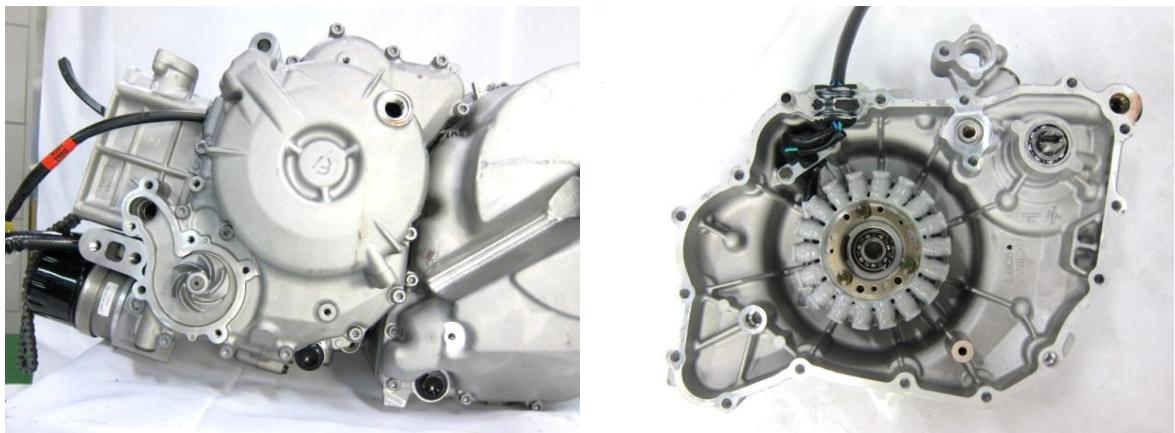
Remove the clamp and water hose.



Remove the bolts, water pump cover.



Remove the bolts and left side cover.



Installation torque: 1~1.4 kgf-m (9.8~13.7 N·m)

Flywheel Removal

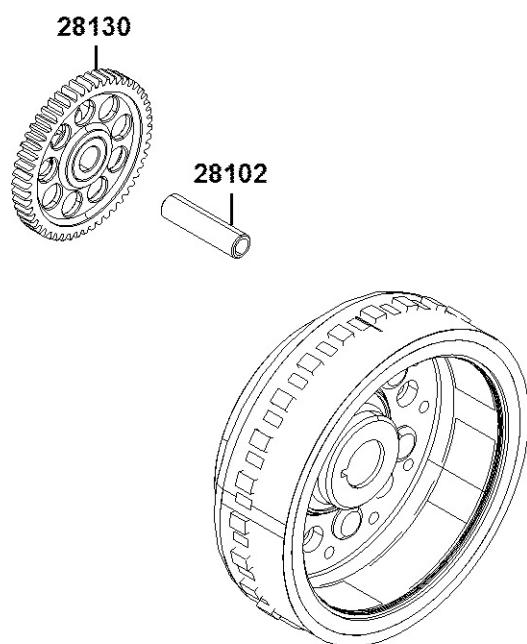
Remove the starter reduction gear and shaft.



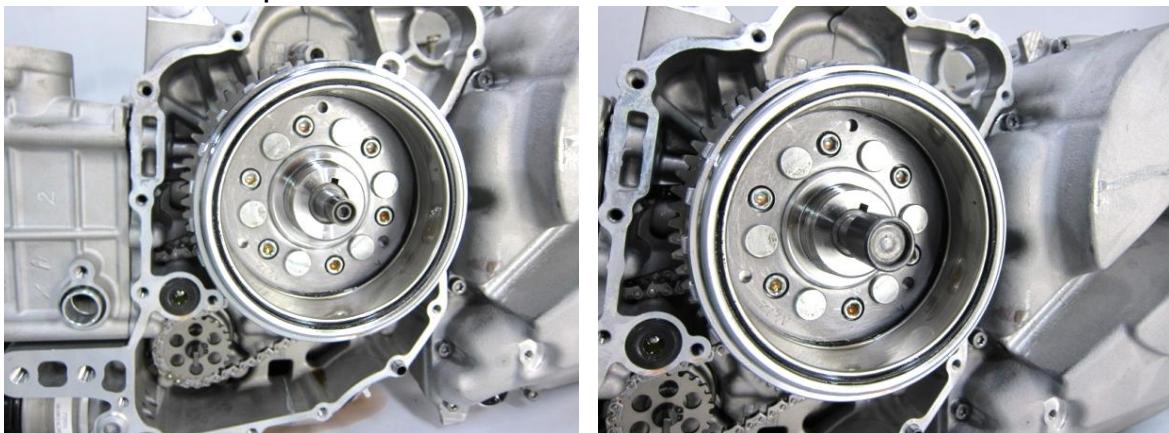
Remove the nut of flywheel and remove the washer.



Installation torque: 5.5~6.5 kgf-m (53.9~63.7 N·m)

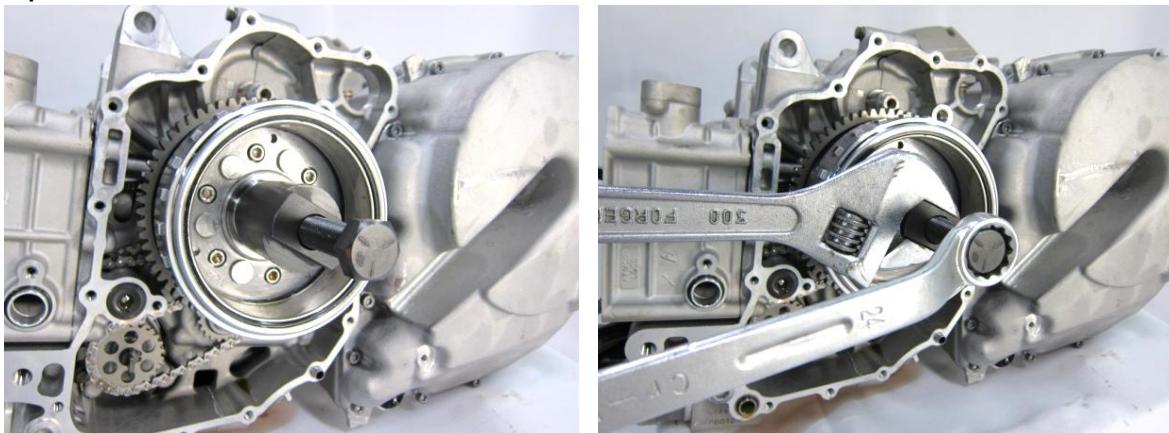


Mount the shaft protector.



Use the special tool and remove the flywheel.

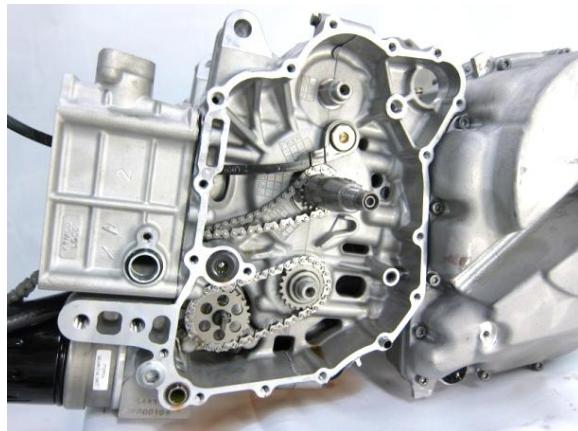
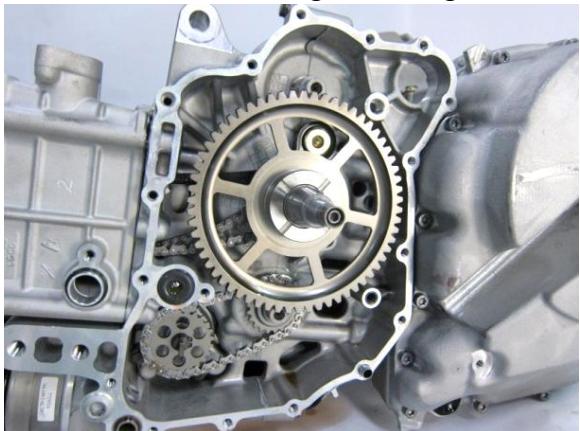
Special tool: A120 E00084



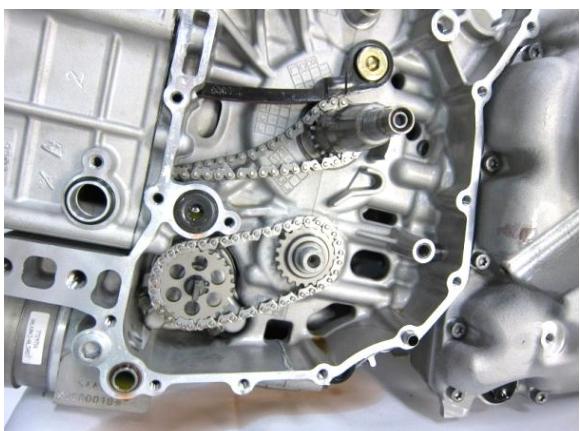
Inspect the one way bearing, replace if necessary.



Remove the starting clutch gear.



Remove the cam chain.



Remove the c-clip of the sprocket.

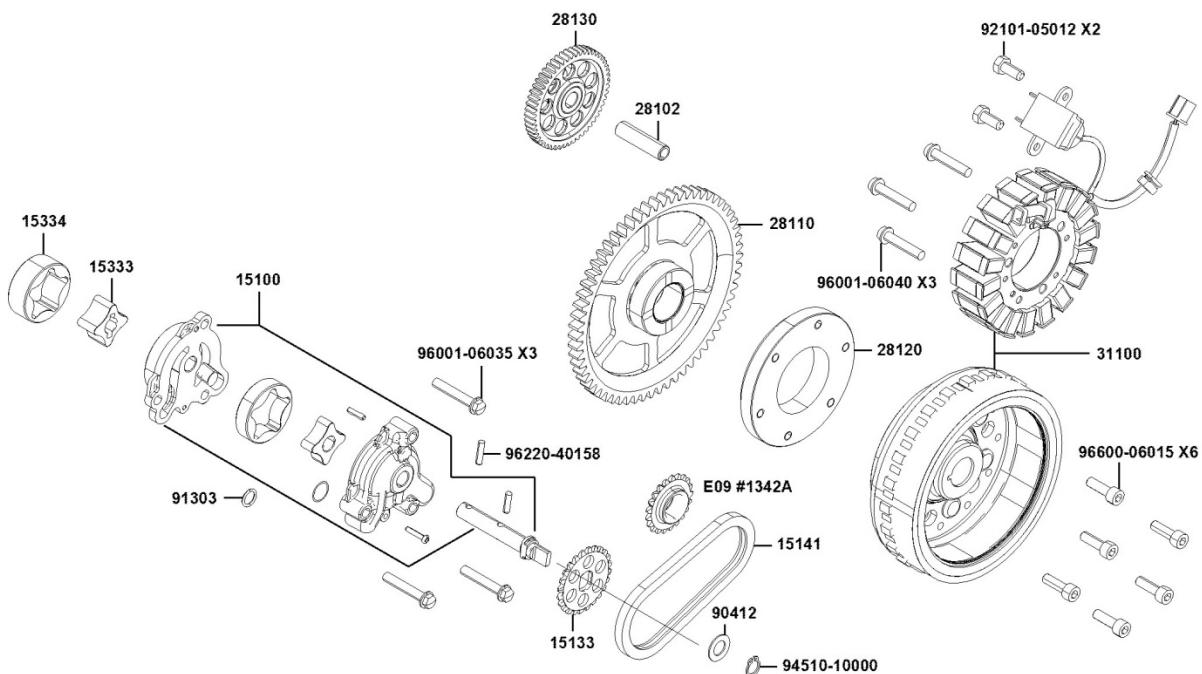
Remove the chain of the oil pump and remove the sprocket.



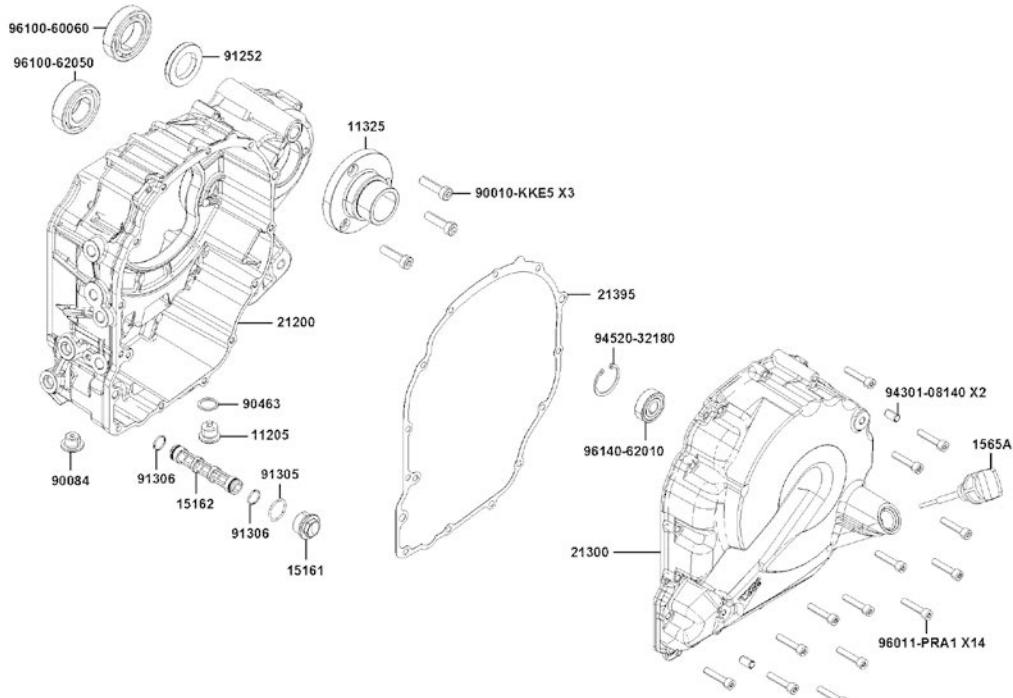
Remove the three bolts and remove the oil pump.



Installation torque: 0.8~1.2 kgf-m (7.8~11.8 N·m)

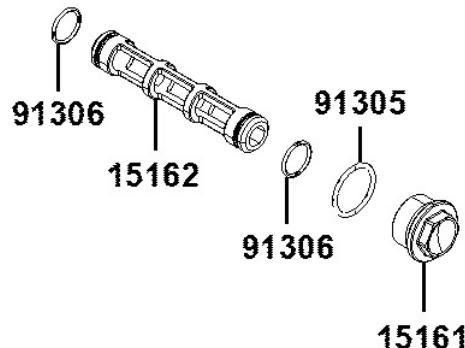


Mission Box Removal



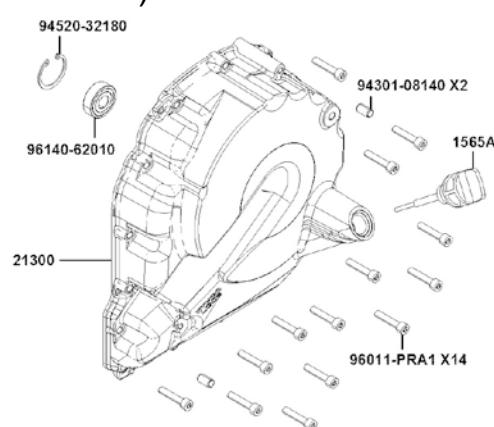
Remove the filter plug bolt and remove the filter.

Replace with new filter when installation.

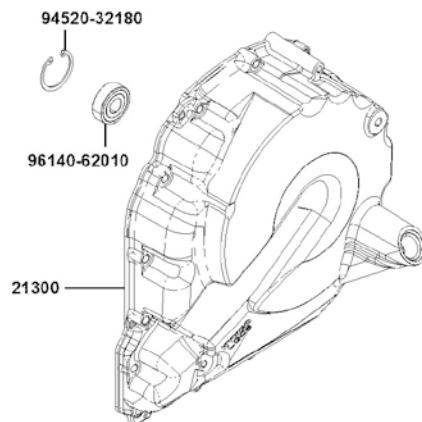


Remove the bolts and remove the mission cover.

Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



Remove the clip and check the bearing for wear or damage.
Replace a new bearing if needed.



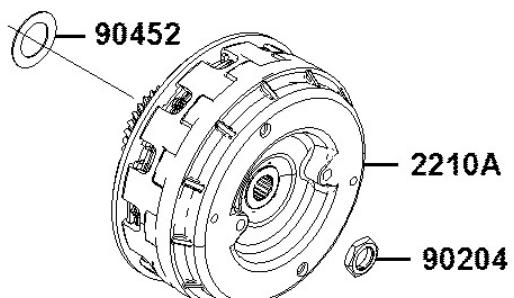
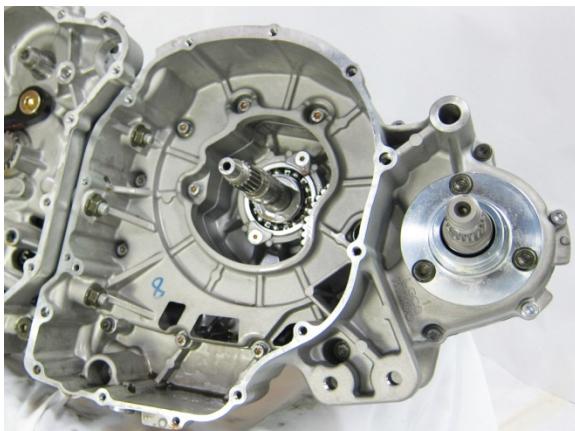
Remove the gasket of the mission case.
Replace a new gasket when installation.



Remove the nut and remove the wet clutch.
Installation torque: 5.9~7.3 kgf-m (58.5~71.5 N-m)



Remove the washer.



Wet Clutch Disassembly



Remove the C-clip.



Remove the C-clip.



Remove the retainer and spring.

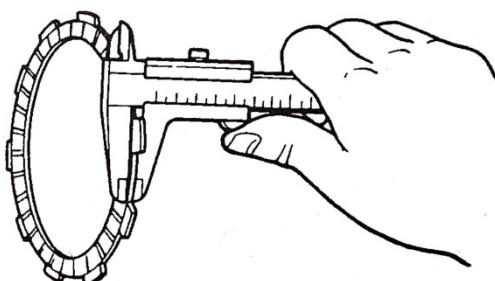


Remove the retainer and friction plates set.

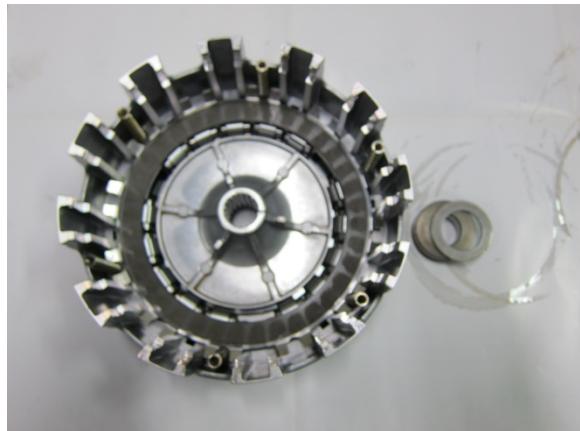


CHECKING THE FRICTION PLATES

Friction plate thickness	Wear limit
$3 \pm 0.08 \text{ mm}$ (0.115-0.121 in)	2.82 mm (0.111 in)



Remove the washer and collar.



Remove the spring and lower retainer set.



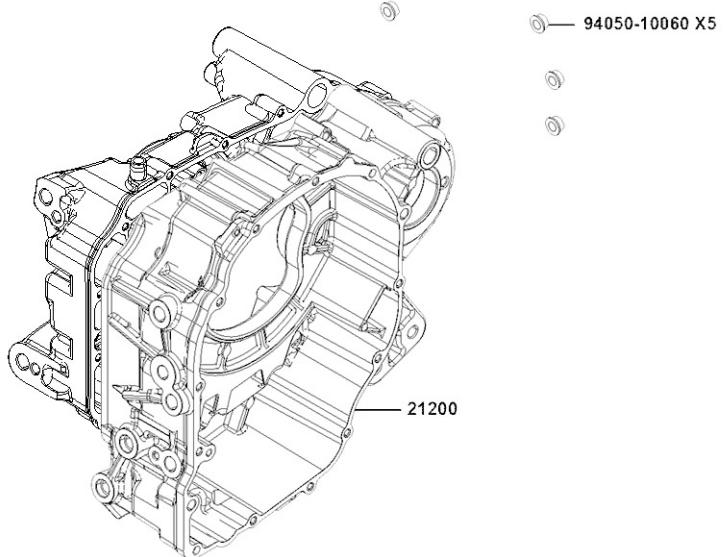
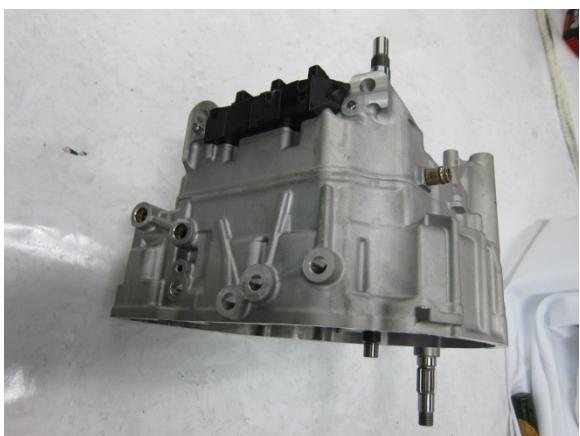
Remove the rollers.



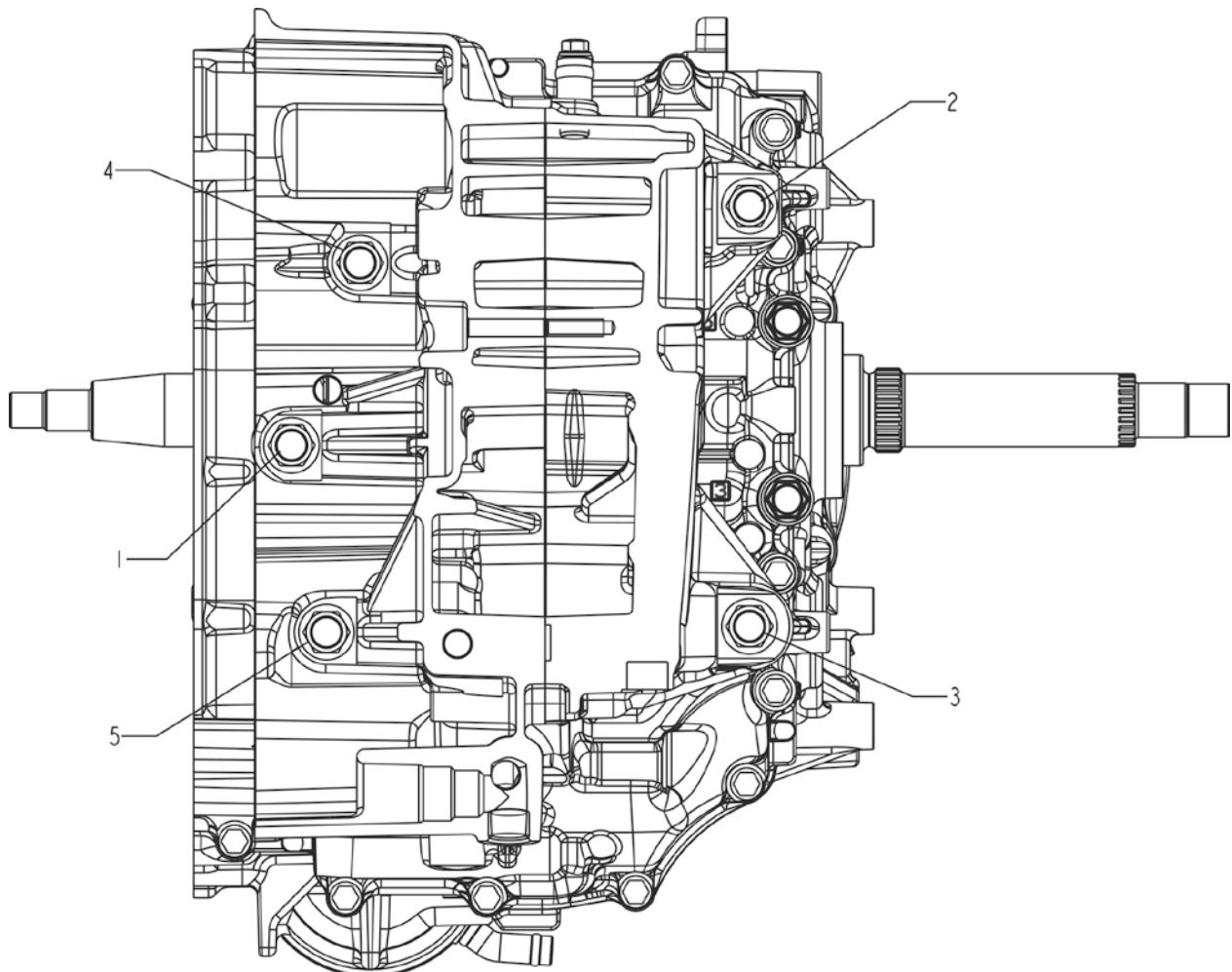
Remove the left side three nuts and right side two nuts.
Remove the mission case set.



Remove the mission box.



Installation: The nuts tighten order and torque should follow the below rule.

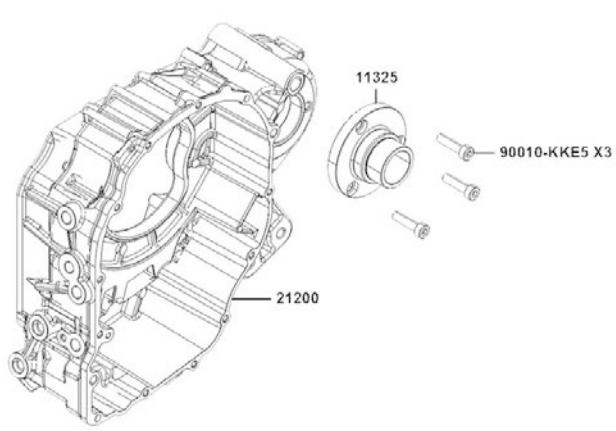


NO.4 NUT TIGHTENING SPECIFICATION

SEQUENCE	1	2	3	4	5	1
TORQUE kgf·m						
1ST TIGHTENING	1.2	3.4	3.4	3.4	3.4	3.4

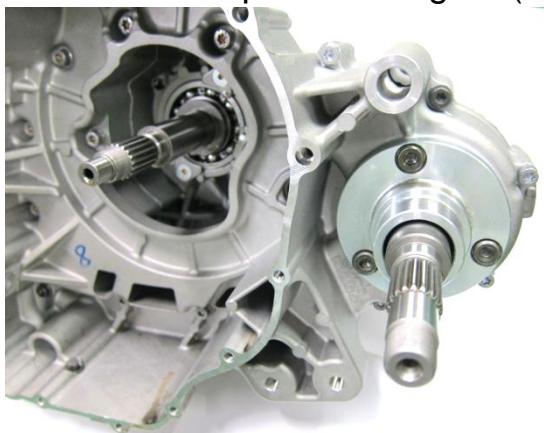
Mission Box Disassembly

Remove the 3 bolts and remove the swim arm pivot.



The bolts are all with blue Loctite (non-permanent) to the threads. Using this type of bolts when installation.

Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)

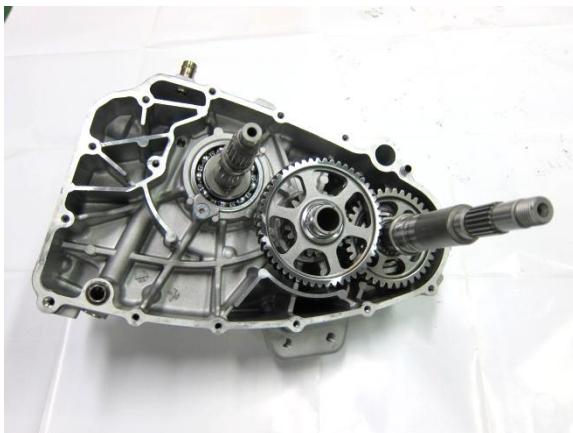


Remove the bolts and remove the left mission case.

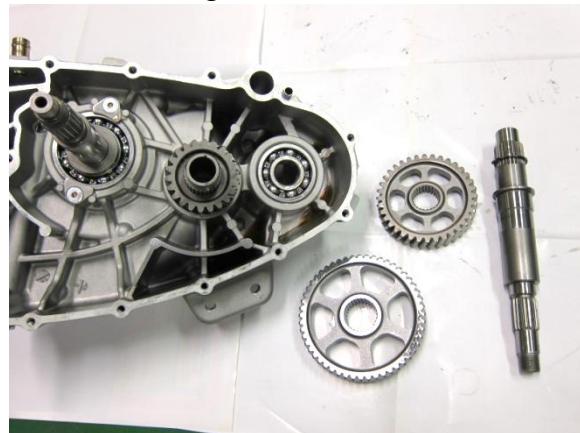
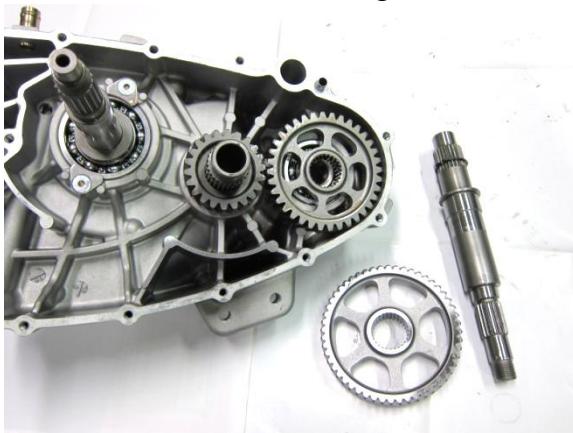
Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



Remove the final shaft.



Remove the counter A gear and remove the final gear.



Remove the counter B gear and remove the counter gear.



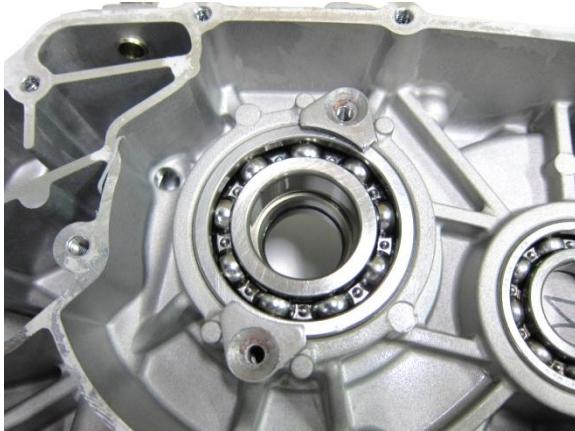
Remove the washer and remove the drive shaft.



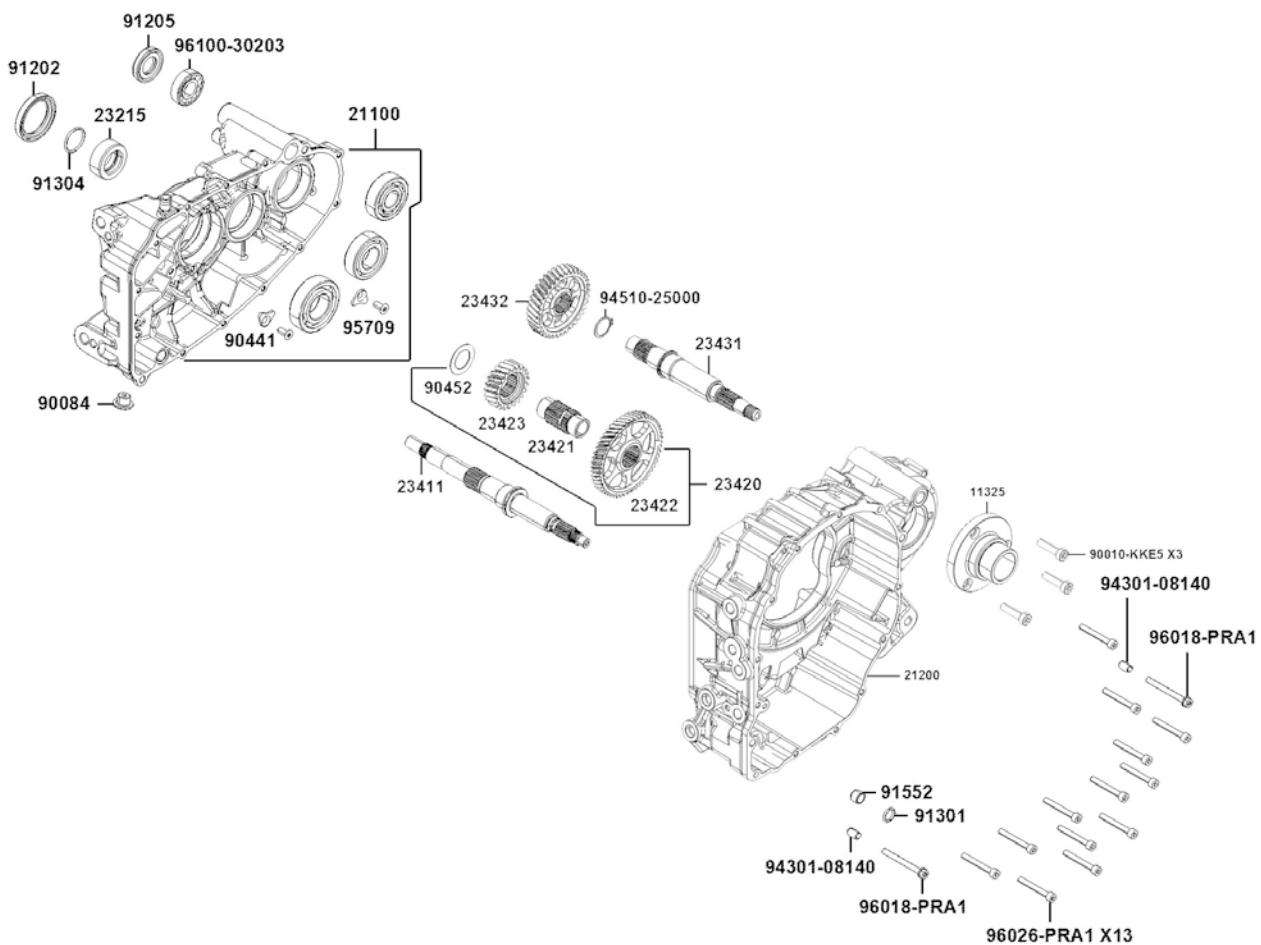
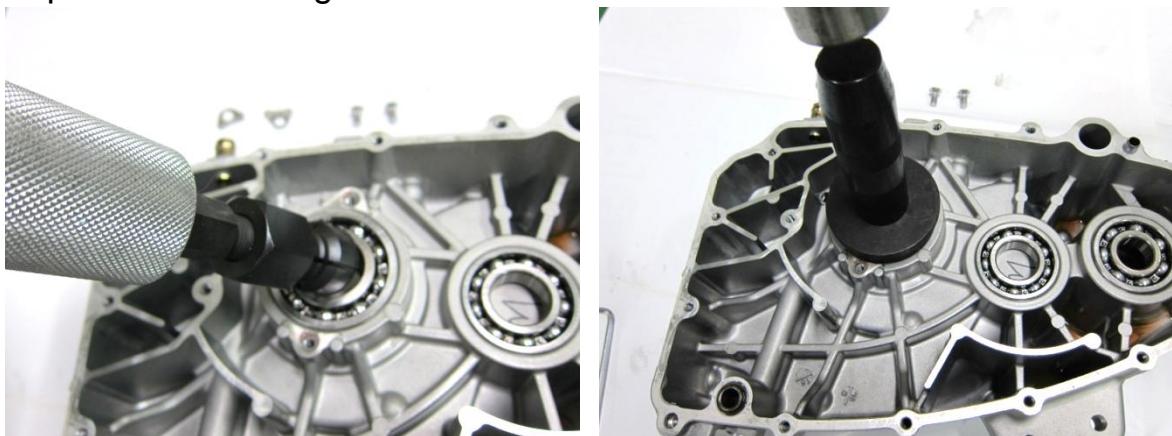
Remove the two screws of the bearing fixed plate.



Remove the two bearing fixed plate.



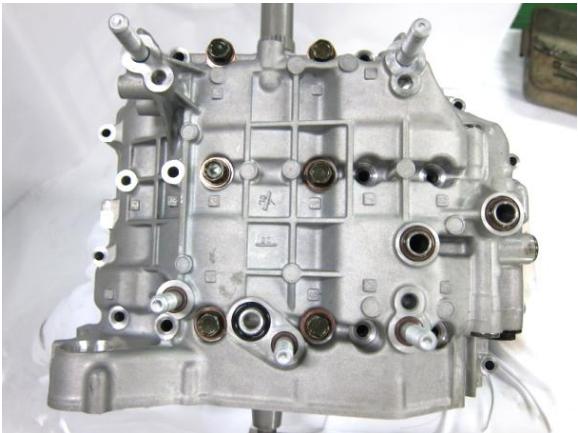
Remove the bearing by bearing puller tool.
Tap the new bearing in when installation.



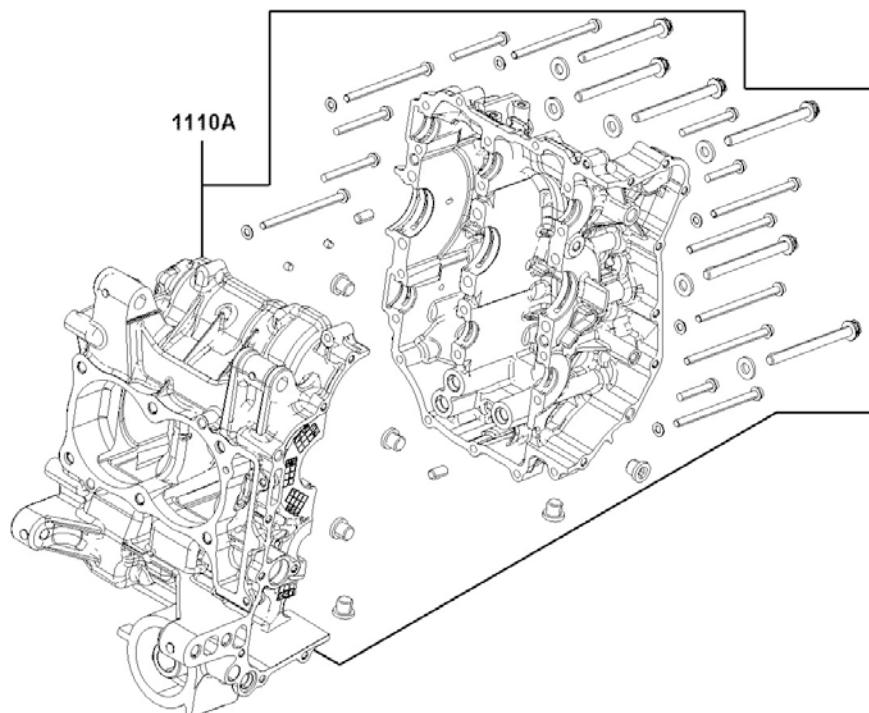
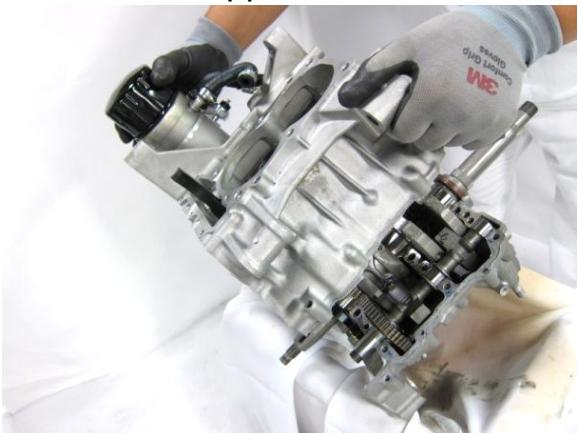
Crankcase Removal

Remove the bolts, washers and rubber seals.

Replace the washers and rubber seals when installation.

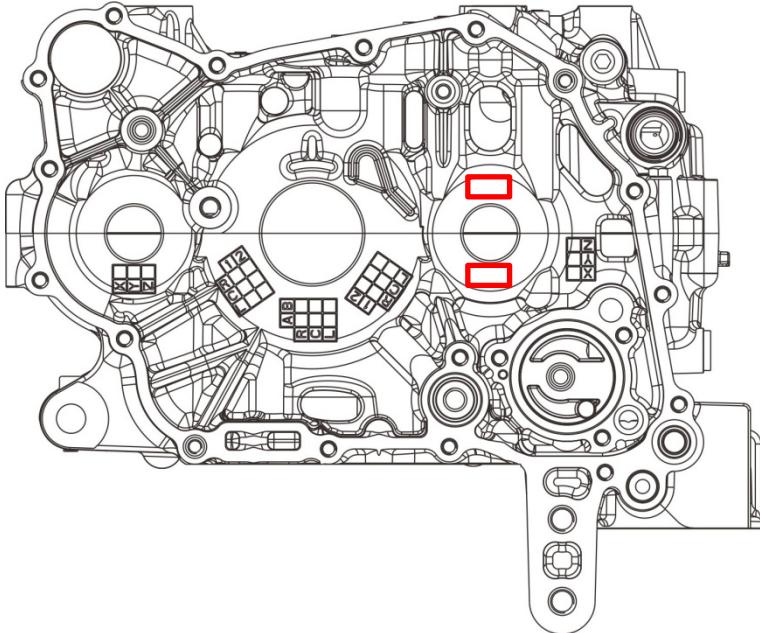


Remove the upper crankcase.



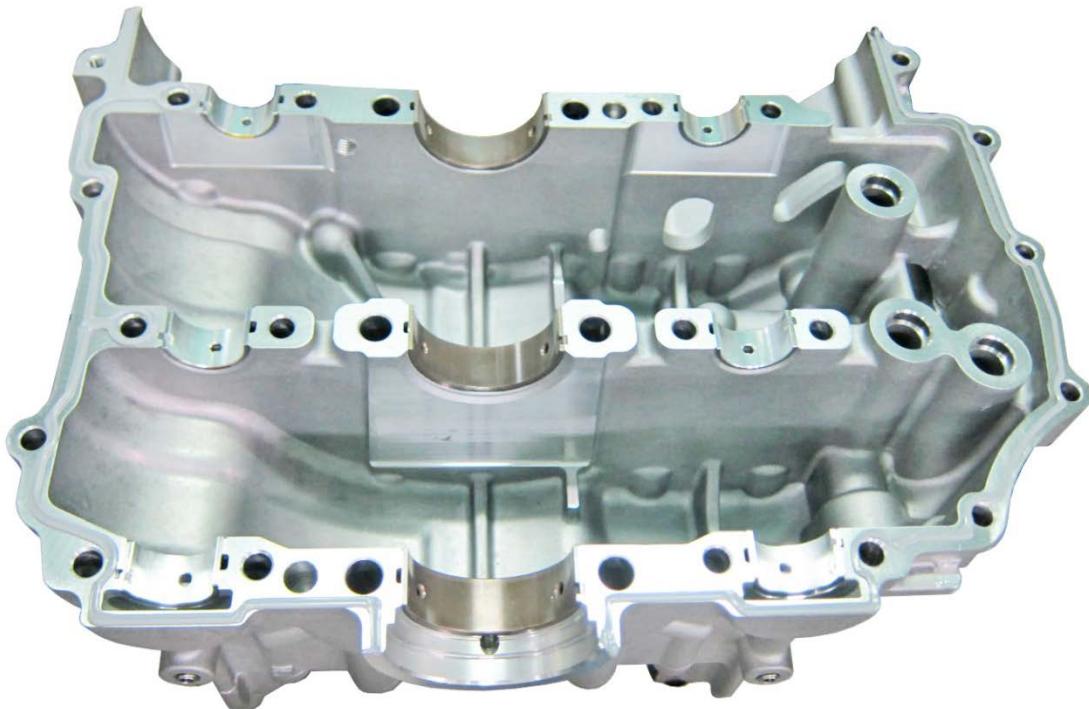
CRANKCASE INSTALLATION

Note: Make sure the Upper/Lower crankcases are with the same number mark. Both are pairing of parts, assembly machining.



Thoroughly clean the crankcase mating surface.

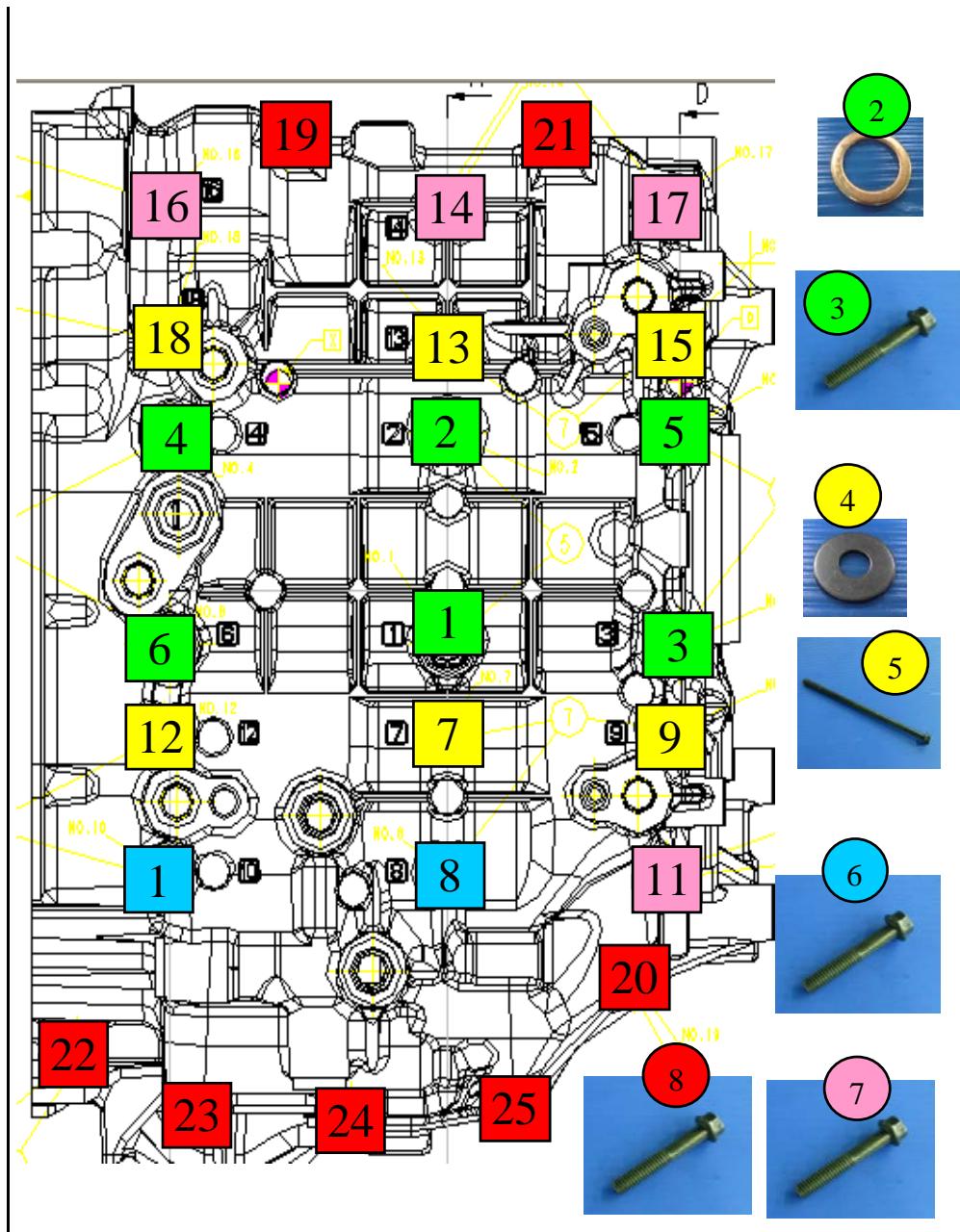
Apply sealant uniformly to the crankcase mating surface as indicated. Do not allow sealant to enter oil passages or get in bearings.



And set the upper crank case half down on top of the lower case.

CRANKCASE INSTALLATION

The bolts mounting order and torque follow the below rule.



NOTE.5
BOLT TIGHTENING SPECIFICATION BEFORE MACHINING

SEQUENCE TORQUE kgf-m	1	2	3	4	5	6
1ST TIGHTENING	1.2	1.2	1.2	1.2	1.2	1.2
2ND TIGHTENING	1.8	1.8	1.8	1.8	1.8	1.8
3RD TIGHTENING	2.3	2.3	2.3	2.3	2.3	2.3

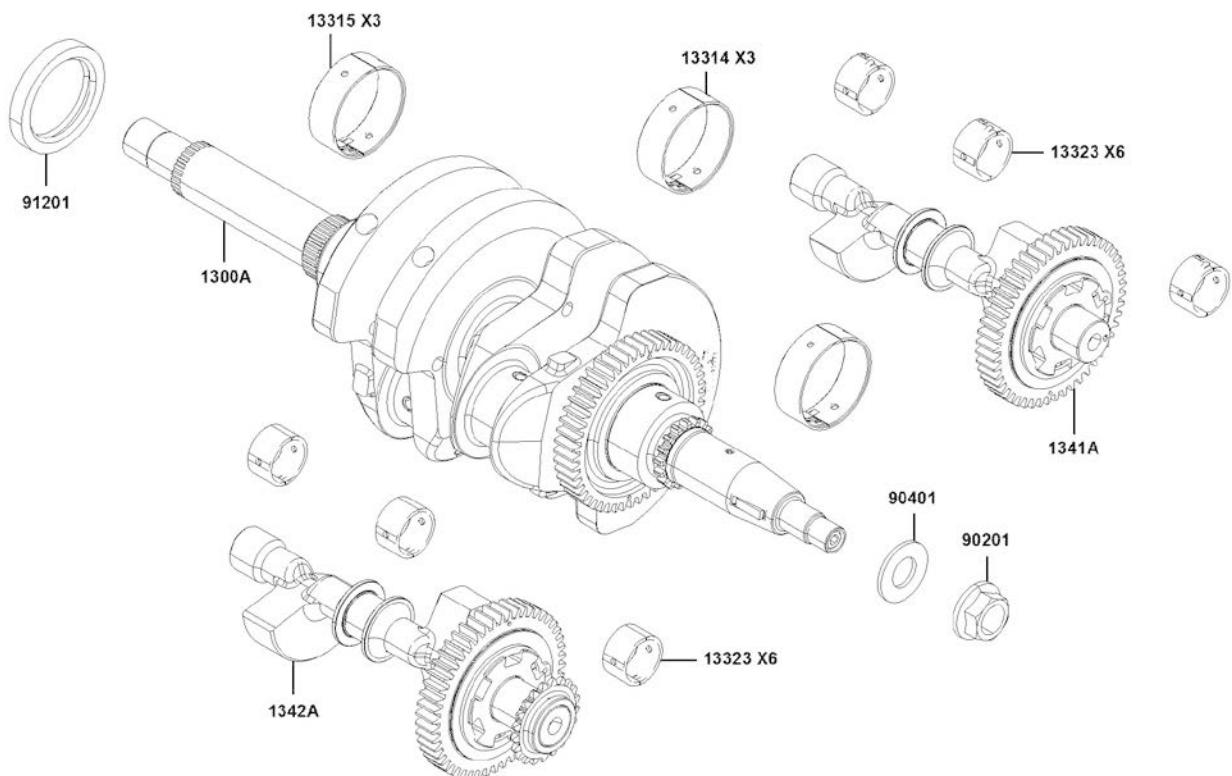
SEQUENCE TORQUE kgf-m	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4TH TIGHTENING	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

No. 21 - 25: 1.2 kgf-m

Crankshaft/Balancer Gear/Plane Bearing Removal

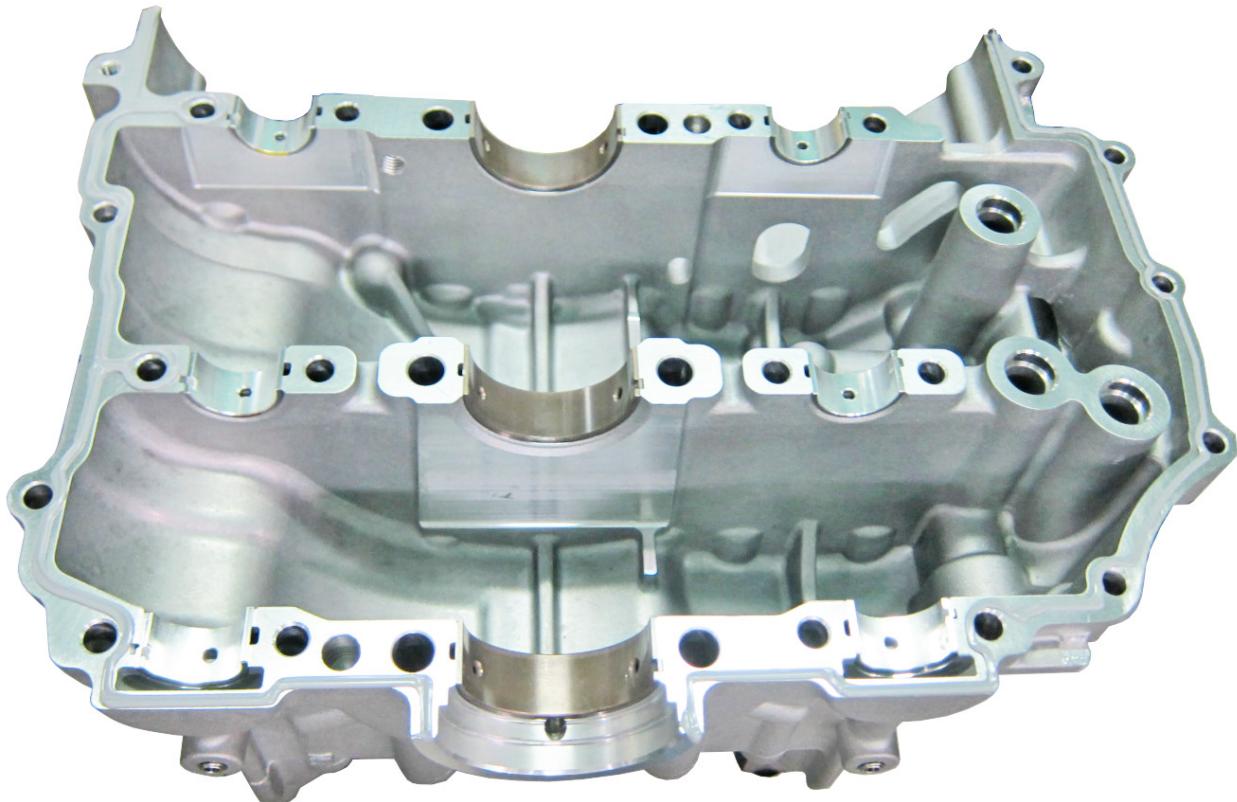
Remove the crankshaft, balancer gears and plane bearing.

Check the balancers for worn or damage, replace if necessary.



Plane Bearing Selection

Inspect the bearings for signs of damage and wear. Replace the bearings if they show any kind of imperfection.

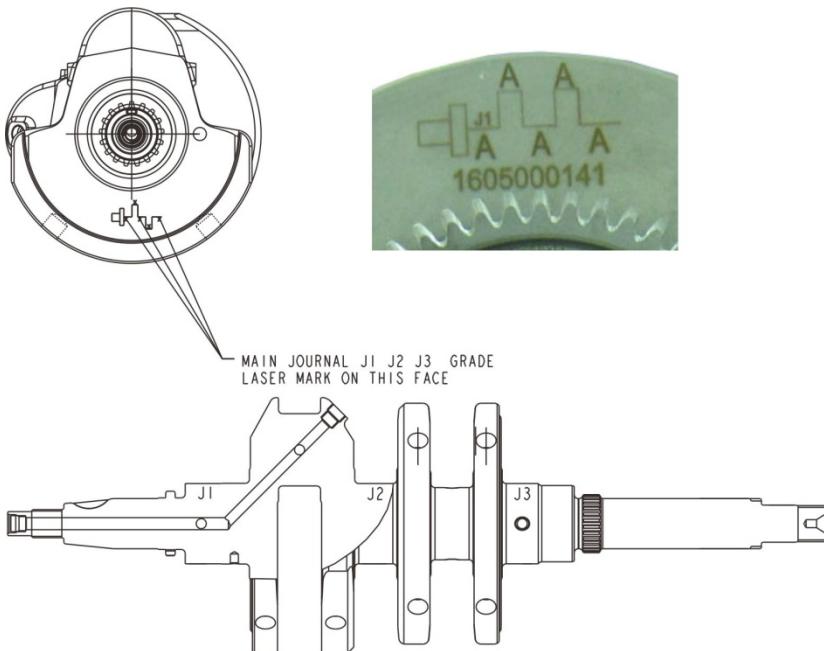


Plane bearing color: For example: Red.

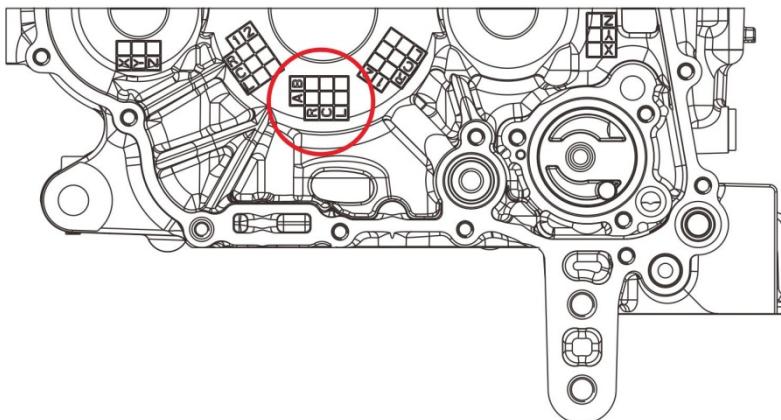


Crankshaft And Crankcase Plane Bearing Selection

Crankshaft main journal grade marks (A or B).



Crankcase grade marks (A or B).



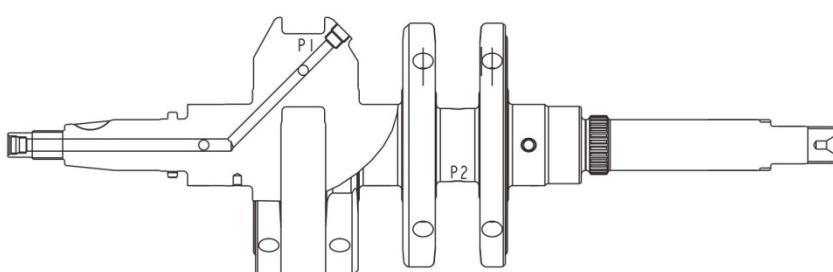
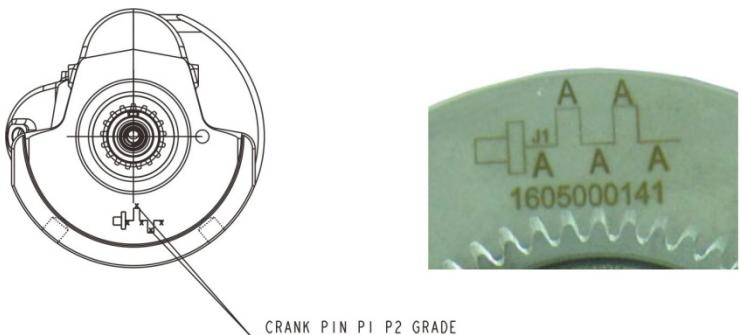
Crankshaft plane bearing color selection follows the below charts.

TABLE FOR ASSEMBLING BRG. AND CRANK CASE AND CRANKSHAFT

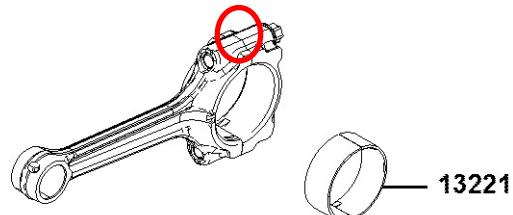
		CRANK CASE TOLERANCE	
		MARK	
CRANK SHAFT TOLERANCE		A	B
$\phi 40.015$ (0~-0.008)	MARK	$\phi 43$ (0 ~ +0.008)	$\phi 43$ (+0.008 ~ +0.016)
	A	BLACK 1.5(-0.010 ~ -0.014)	GREEN 1.5(-0.006 ~ -0.010)
$\phi 40.015$ (-0.008~ -0.016)	B	GREEN 1.5(-0.006 ~ -0.010)	RED 1.5(-0.002 ~ -0.006)

Crankshaft & Connecting Rod Plane Bearing Selection

Crankshaft grade marks (A or B).



Connecting rod grade marks (1 or 2).



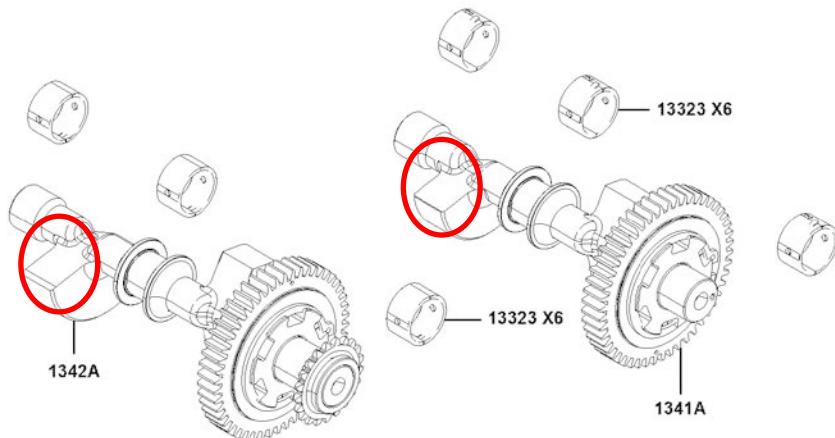
Connecting rod plane bearing color selection follows the below charts.

TABLE FOR ASSEMBLING BRG. AND CON-ROD AND CRANK PIN

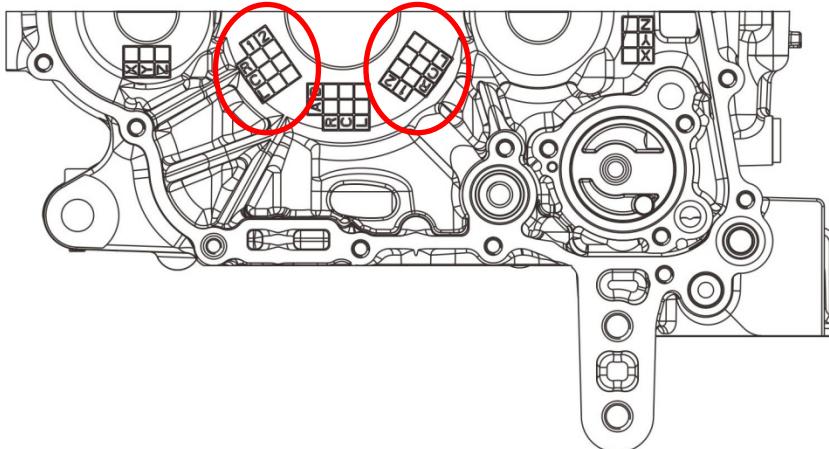
		HOUSING TOLERANCE	
		MARK	
PIN TOLERANCE		1	2
$\phi 36.015$ (0~-0.008)	MARK	$\phi 39$ (+0.008 ~0)	$\phi 39$ (+0.016 ~+0.008)
		BLACK 1.5(-0.010 ~-0.014)	GREEN 1.5(-0.006 ~ -0.010)
$\phi 36.015$ (-0.008~ -0.016)	B	GREEN 1.5(-0.006 ~ -0.010)	RED 1.5(-0.002 ~ -0.006)

Balancer Gear Shaft And Crankcase Plane Bearing Selection

Balancer gear shaft grade marks (A or B).



Crankcase grade journal marks (1 or 2).



Balancer gear shaft and crankcase plane bearing color selection follows the below charts.

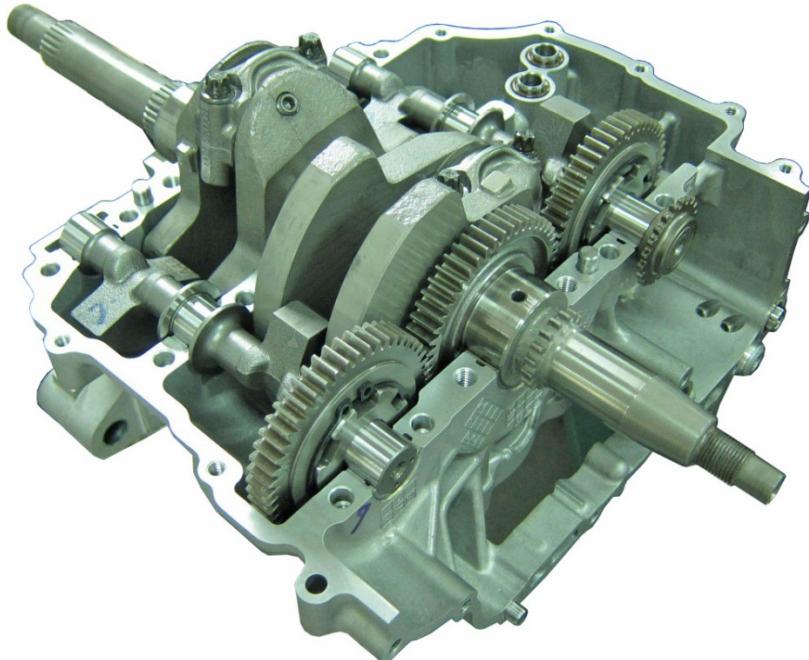
TABLE FOR ASSEMBLING BRG. AND UP/DOWN CASE AND BALANCER SHAFT

UPPER/LOWER		CRANK CASE TOLERANCE	
		MARK	
BALANCER SHAFT TOLERANCE		1	2
$\phi 20$ (-0.001 ~ -0.010)	MARK A	$\phi 23.25$ (-0.01 ~ -0.02)	$\phi 23.25$ (0 ~ -0.01)
		YELLOW/BROWN 3.25(-0.02 ~ -0.032)	BROWN/BROWN 3.25(-0.01 ~ -0.022)
$\phi 20$ (+0.008 ~ -0.001)	B	YELLOW/YELLOW 3.25(-0.03 ~ -0.042)	BROWN/YELLOW 3.25(-0.02 ~ -0.032)

Crankshaft/Balancer Gear Installation

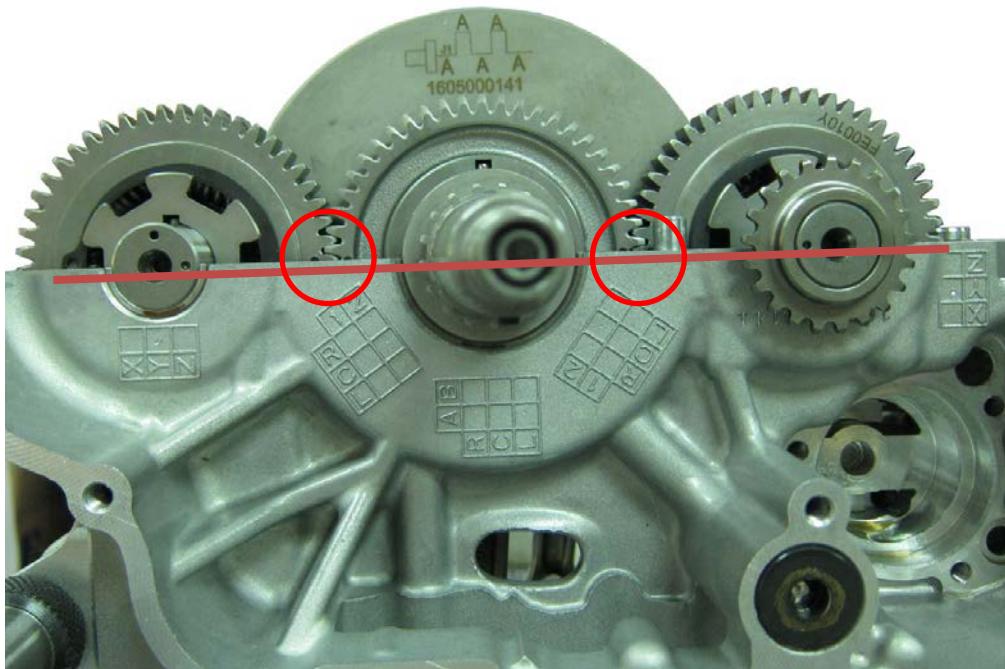
Install the crankshaft, balancer gears in the correct timing.

Check the balancers for worn or damage, replace if necessary.



Install the crankshaft, balancer gears in the correct timing.

Align the timing mark as below illustrator.



Engine Removal

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

- A floor jack or other adjustable support is required to support and maneuver the engine. Be careful not to damage the scooter body, cables and wires during engine removal.
- Use shop towels to protect the scooter body during engine removal.

Place the scooter on the center stand.

Drain the coolant. Drain the engine oil.

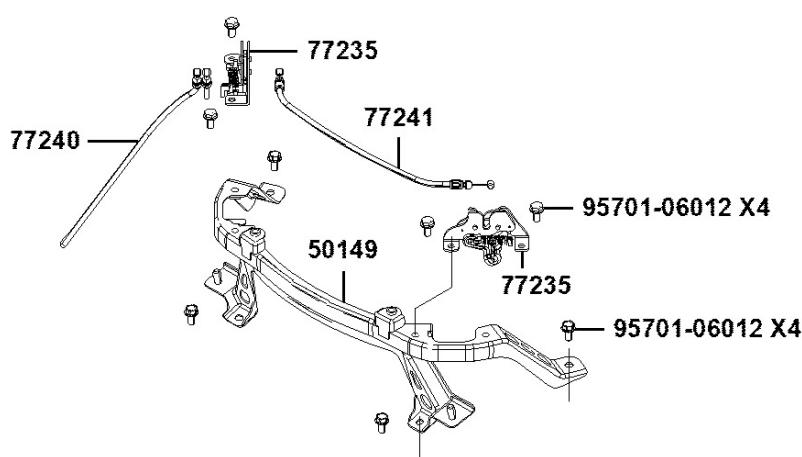
Remove the external components: See the external topic for more information.

Remove the rear brake caliper, rear suspension and the rear wheel. See those topic for more information.

Remove the exhaust system. See the Exhaust System topic for more information.

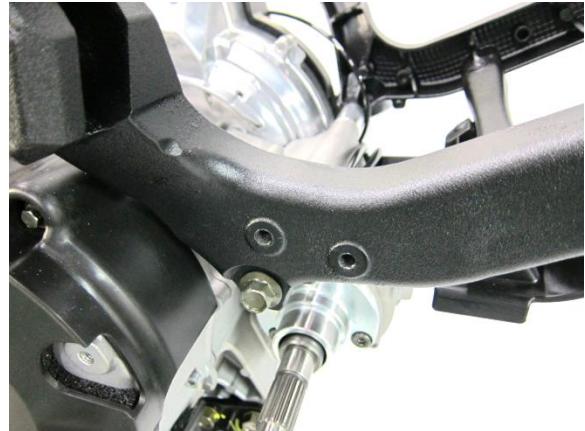
Remove the throttle body, cables and wires and fuel tank.

Remove the seat catch wire and remove the seat catch wire stay.



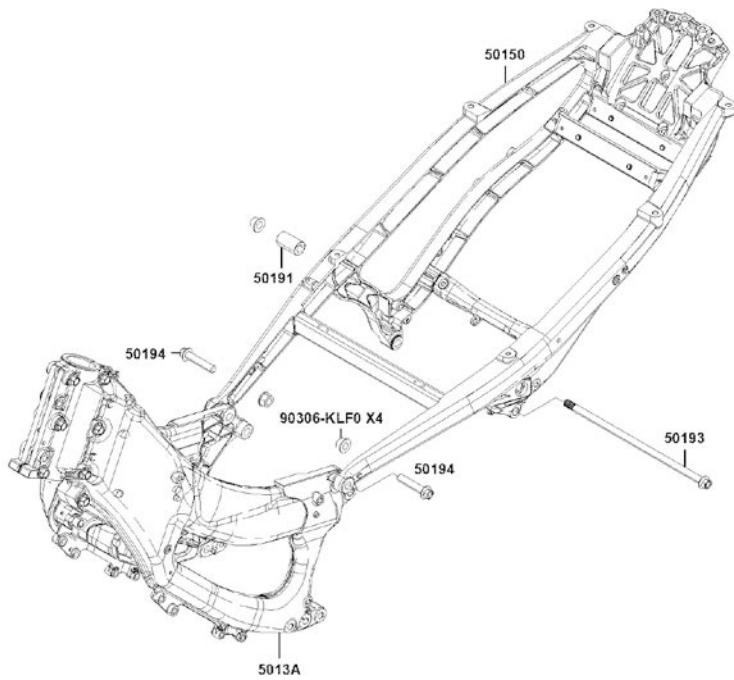
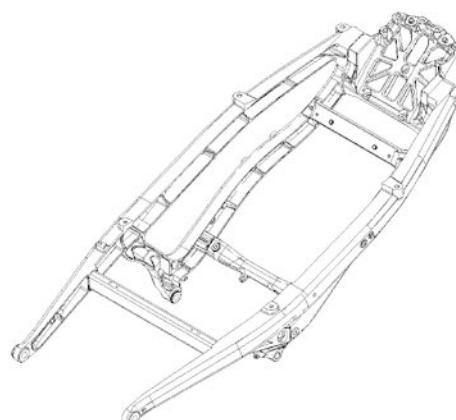
Remove the bolt, nut and collar of rear frame body.

Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



Remove the bolts and nuts and remove the rear frame body.

Installation torque: 8.6~9.1 kgf-m (86~91 N-m)



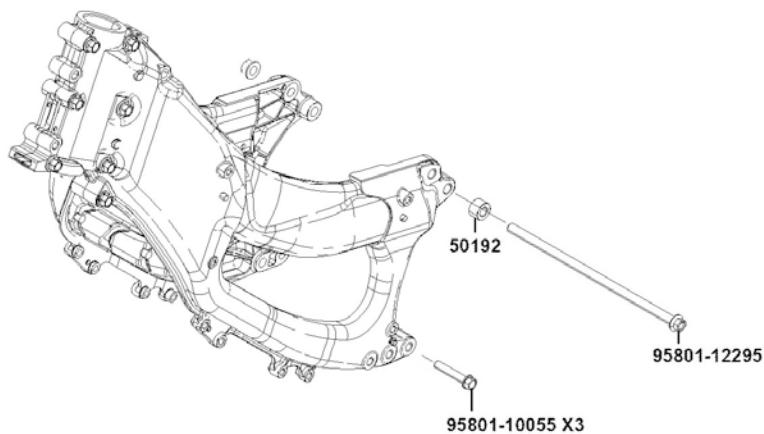
Support the engine with a suitable jack or stand.
Remove the bolt, collar and nut.



Remove the four bolts.



Carefully move the front frame forward and separate it from the engine.
Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



CONTENTS

Preparations	1
Troubleshooting.....	2
Cooling System	3
Replenishing the Coolant	5
Cautions for using the Coolant:	5
Pressuring test of the Cooling System.....	7
Remove the Radiator	8
Auxiliary Radiator	11

Preparations

Operation instructions

- The Water Pump can be removed from the engine of the vehicle for carrying out maintenance. The maintenance activities of the cooling system can be performed on the vehicle.
- Start the maintenance work after the engine cools down.
If the temperature of the Coolant is still higher than 100°C, do not attempt to reduce the pressure by opening the Radiator because the pressure remaining inside the Radiator may climb abruptly and then boil causing danger.
- Keep the Coolant from spraying onto the coating surface as it may cause corrosion damage of the coating surface. If the coating surface is contaminated by the Coolant, flush with fresh water immediately.
- After completing the inspection and maintenance, use the Coolant pressure tester to test each connector and watertight area to see if water is leaking.

Troubleshooting

Excessive rising of water temperature

- Water Temperature Gauge and Water Temperature Sensor defective.
- Radiator Cap defective.
- Temperature Regulator defective.
- Radiator water volume low.
- Water pipe (and) water jacket clogged.
- Radiator heat sink clogged.
- Radiator internal side clogged.
- Water Pump defective.

Water Temperature Gauge needle fails to rise but water temperature is rising.

- Water Temperature Gauge and Water Temperature Sensor defective.
- Temperature Regulator defective.

Water leakage.

- Mechanical sealing (water seal) defective.
- O-ring aging. Cohesion defective.
- Water pipe damaged or deteriorated.

Cooling System

Remove the right-side screws from Radiator cap.

After the engine cools down, remove the Radiator cap.



Remove the drain bolt.



Drawing the coolant

Warning:

Allow the engine sufficient time to cool before handling or working on the cooling system components.



5. Cooling System



Remove the pedal rubber pad.



Remove the protection cover screws and then remove the protection cover and the Auxiliary Radiator cap.



Check if the hose of the Auxiliary Radiator is damaged or hardened. If yes, replace it with a new one.



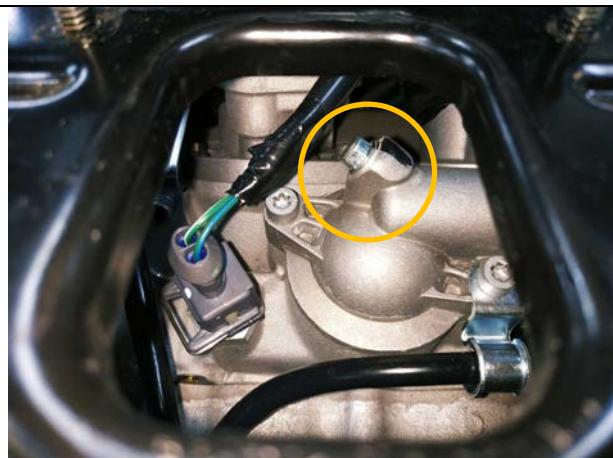
Replenishing the Coolant

- Prepare the radiator additives designated by KYMCO and the distilled water into 30% coolant. When the engine cools down, open the Radiator cap and then pour the coolant directly from the Radiator inlet.
- Start the engine and then loosen the air-bleeding bolt. After the Coolant flows from the air-bleeding bolt does not present any bubbles, tighten the air-bleeding bolt again. If the Coolant poured into the Radiator inlet is too little, then replenish the required coolant and then tighten the Radiator cap.

Pour the coolant into the Radiator directly from the inlet



Release the air-bleeding bolt.



Coolant capacity	1200cc	Auxiliary Radiator: 300 cc
------------------	--------	----------------------------

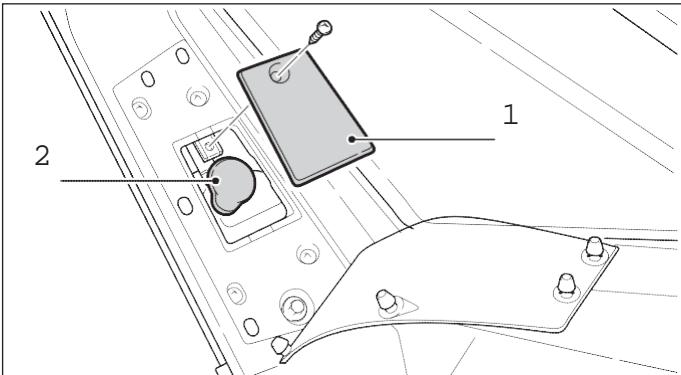
Cautions for using the Coolant:

- Use the Coolant prepared in the designated mixing ratio. (The mixing ratio shall be 30% of coolant additives designated by KYMCO.)
- Do not mix the Coolant with other brand.
- The radiator additives and the coolant are toxic. Do not attempt to drink.
- The mixing ratio of the coolant should be 5°C lower than the minimum air temperature of the operation area.

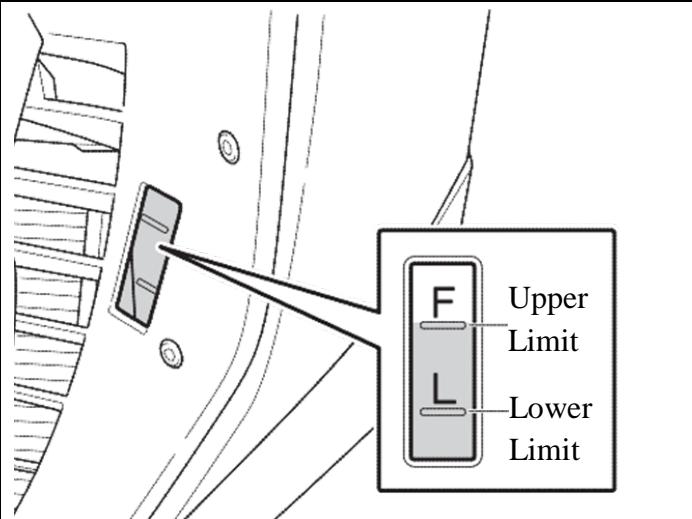
Replenish the radiator additives till reaching the "F" position marked on the Auxiliary Radiator.

Lift open the pedal rubber pad.

Remove 1 screw from Auxiliary Radiator outer cover. Open the Auxiliary Radiator outer cover and then the Auxiliary Radiator rubber cover can be removed.



Replenish the radiator additives till reaching the upper limit position marked on the Auxiliary Radiator.

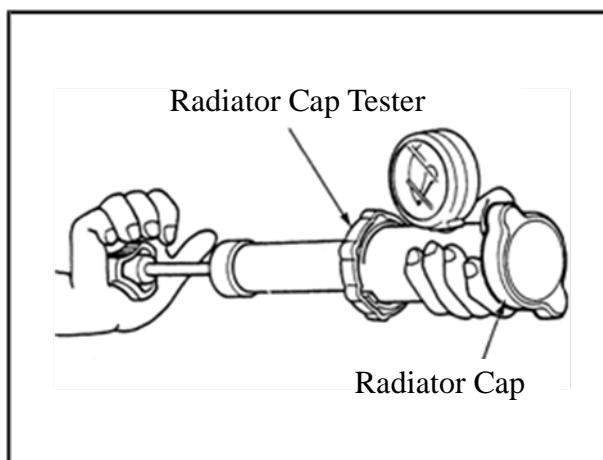


Check the water level of the Auxiliary Radiator several days after replenishing the radiator additives for the first time. If low, replenish the coolant again.

Pressuring test of the Cooling System



- Remove the Radiator cap for inspection.
- Mount the Radiator cap onto the Radiator Cap Tester and then increase the pressure till reaching the specified pressure range and then stop the pressurizing for 6 seconds to confirm the pressure holding status.
- Pressure when opening the Radiator cap: 1.1 kg/cm^2 , and the testing pressure shall not be higher than 1.4 kg/cm^2 . If the pressure is too high, it may damage the connector between the radiator cap and the respective component.
- Check if the water pipe between Radiator and engine is leaking. Mount the Radiator Tester onto the Radiator and then increase the pressure till reaching the specified pressure range and then stop the pressurizing for 6 seconds to confirm the pressure holding status.
- Check if the water pipe and the connector are leaking.

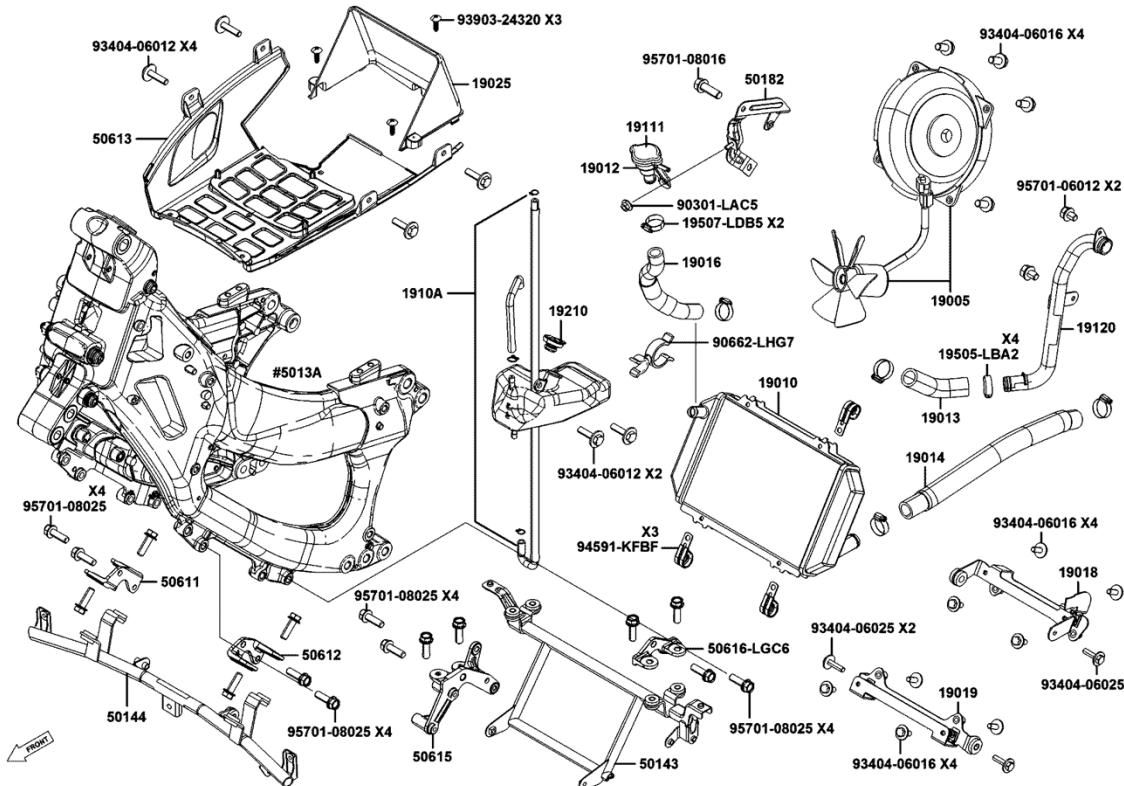


Before mounting the Radiator cap, spray slight amount of water on the airtight surface and then install the Radiator cap.

Radiator cap testing pressure.	$0.9 \pm 0.15 \text{ kg/cm}^2 (12.8 \pm 2.1 \text{ psi})$
--------------------------------	---

5. Cooling System

Remove the Radiator.



Drain off the coolant and then remove the Fan Motor lead wire connector.



5. Cooling System



Remove the Radiator water pipe securing clip.

Take out the Radiator upper water pipe.



Remove the Radiator lower water pipe securing clip.



Take out the water temperature regulator water pipe from the Radiator.



5. Cooling System



Remove the Radiator lower water pipe securing clip and then remove the Radiator lower water pipe.



Remove the Radiator lock bolt.



Move the Radiator pipeline and the rest of other lock bolts.



Remove the Radiator from the frame.

Auxiliary Radiator



Remove 2 bolts from the Auxiliary Radiator.
Take out the Auxiliary Radiator from the frame.



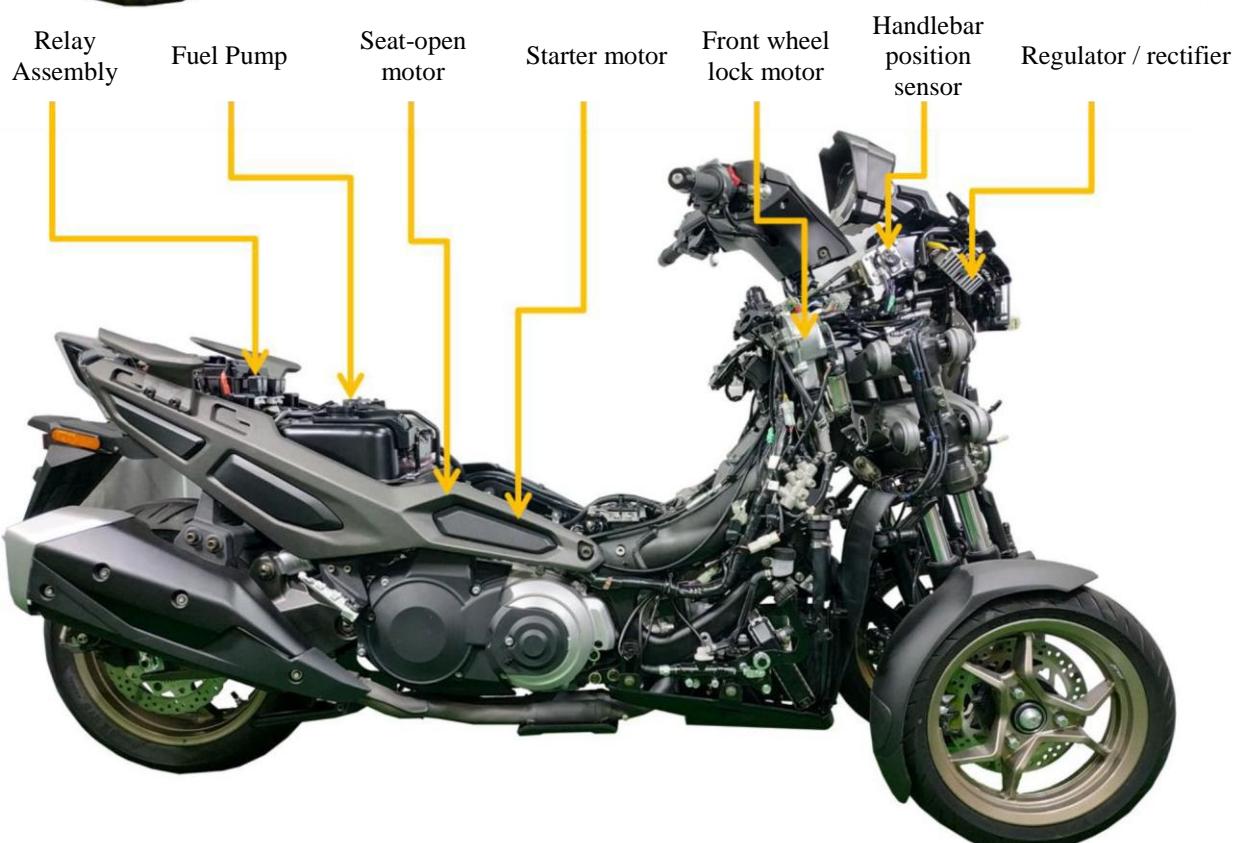
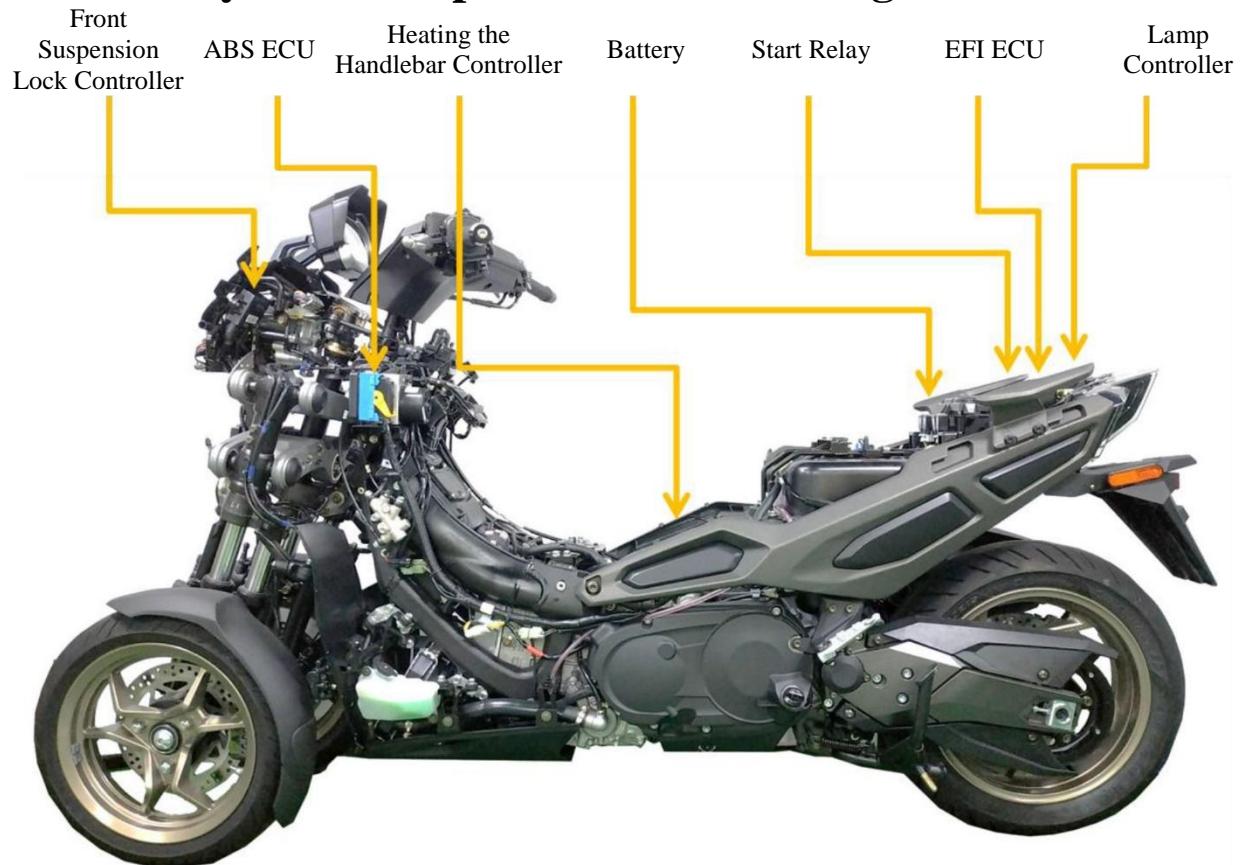
6. Fuel Injection System

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6. Fuel Injection System



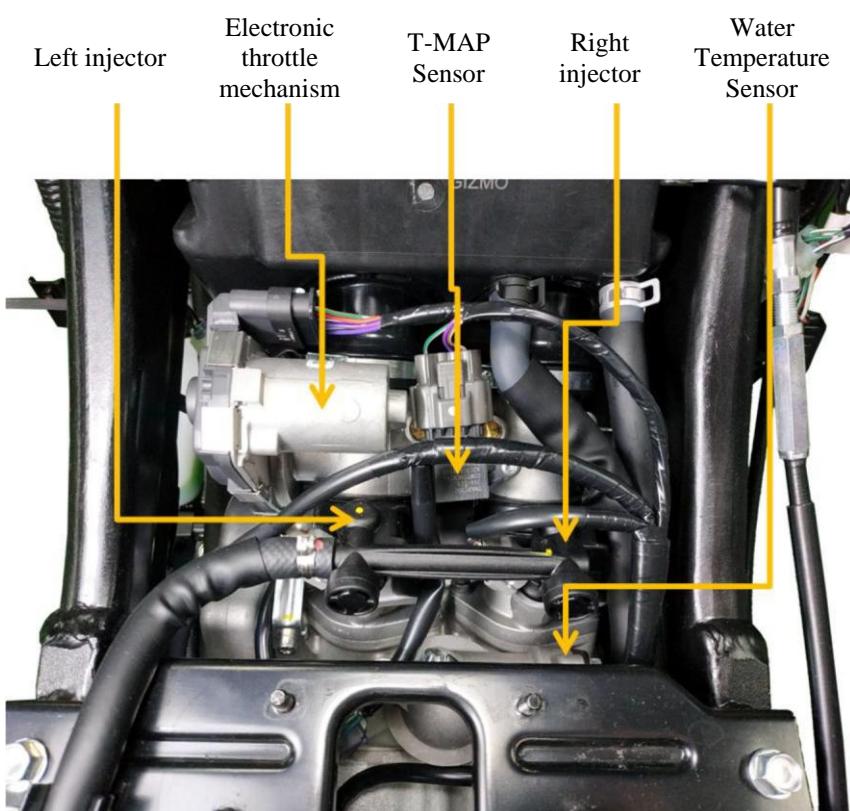
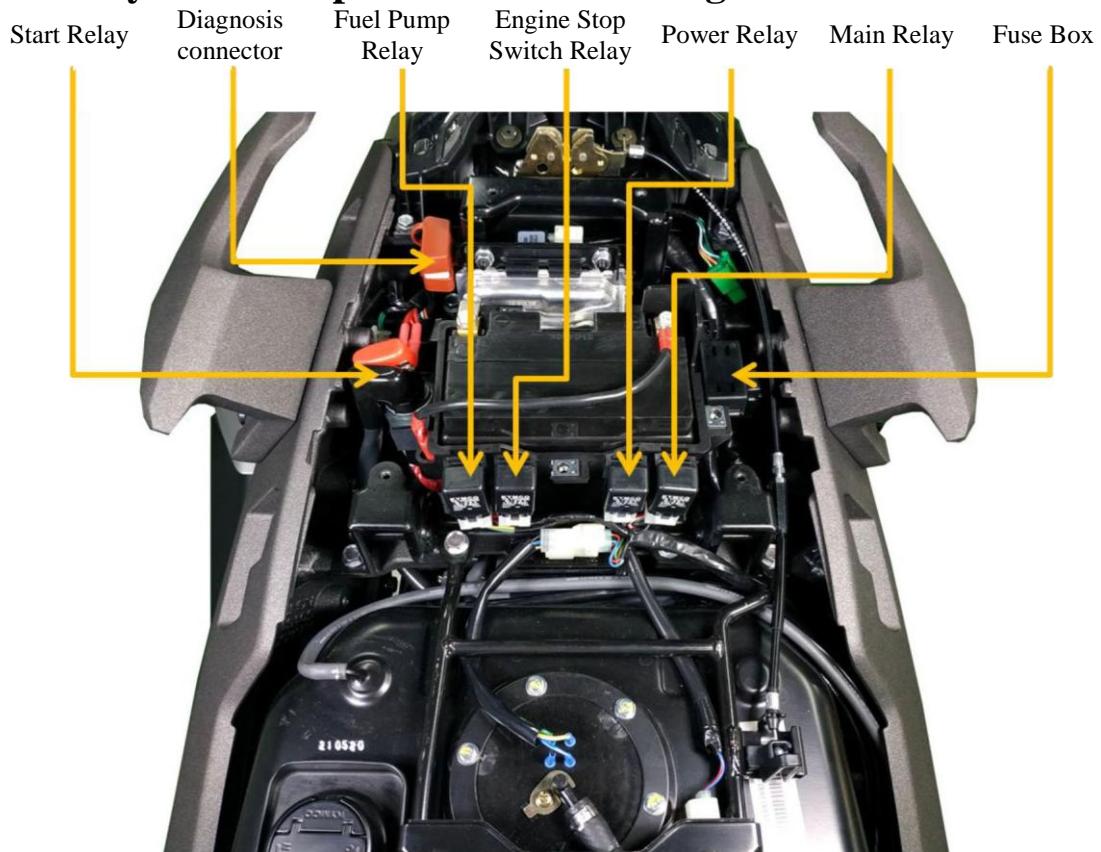
Electrical System Component Location Diagram



6. Fuel Injection System



Electrical System Component Location Diagram



6. Fuel Injection System



ECU

Remove rear seat assembly

Remove rear seat assembly.

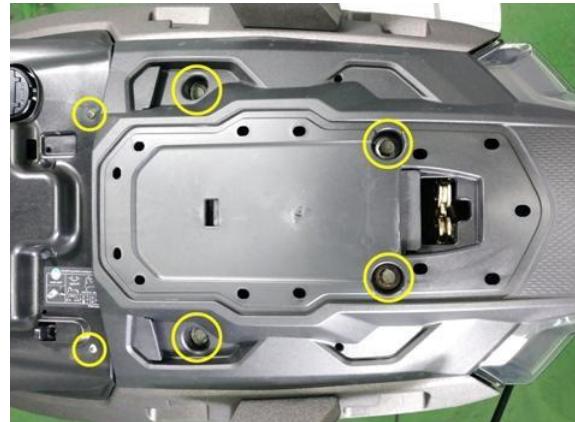
Per the figure, pull the seat locking switch. When the rear seat assembly is opened, remove the rear seat.



Remove the rear seat rubber covering.



Remove 6 screws and then remove the seat cushion protective cover.



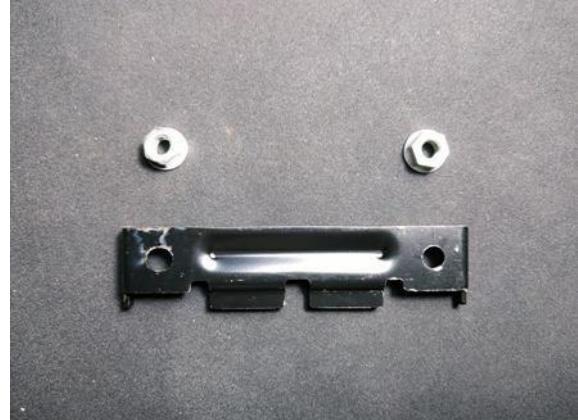
Remove 2 fixing screws from ECU.



6. Fuel Injection System



Remove the ECU fixing damper.



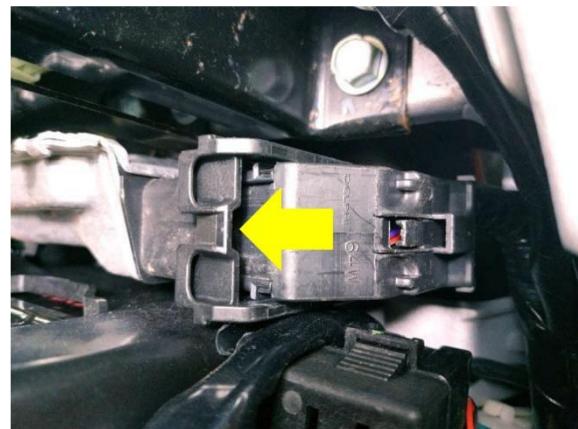
Press the ECU connector latch and then lift the lever upward.

⚠ Caution

Before removing the ECU connector, confirm that the main switch power is disconnected to avoid the ECU damage when the switch is carrying the current.



After that, push it straight to the bottom. On hearing the “click” sound, it means the ECU has been opened to the intended position.



The ECU shall be restored in reverse order of the removal.

⚠ Caution

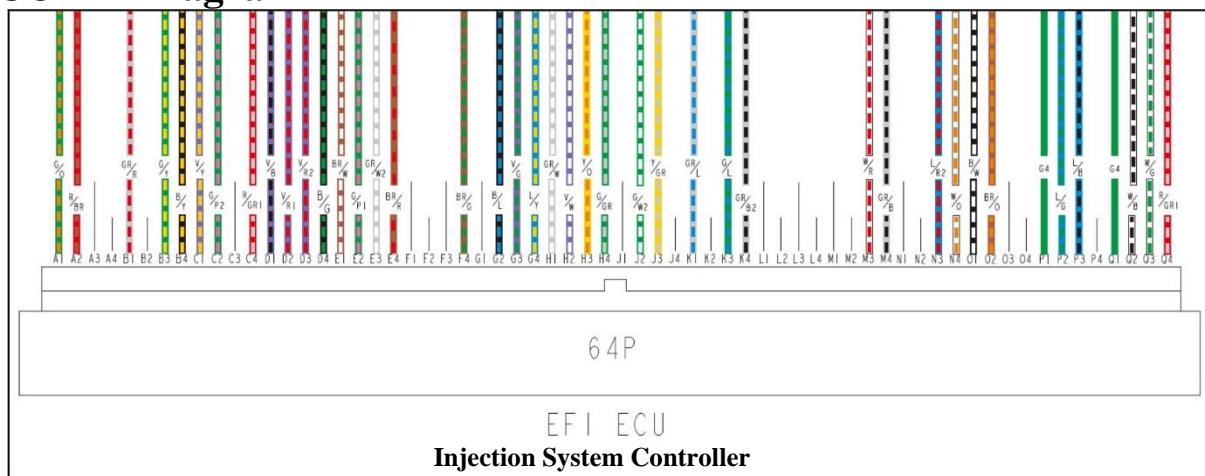
- When restoring the ECU fixing damper, the ECU body shall be secured into the damper groove.
- When restoring the ECU connector, it shall be executed carefully until the latch is correctly positioned.



6. Fuel Injection System



ECU Pin Diagram



6. Fuel Injection System



ECU Pin Function Table

B-A1	ETC(-)	Electronic throttle mechanism (-)	B-D1	PPS-1 SIGNAL	Handlebar throttle position sensor 1
B-A2	ETC (+)	Electronic throttle mechanism (+)	B-D2	VSENS(PPS-1, TPS)	Sensor power
B-A3			B-D3	VSENS(PPS-2, MAP, TILT)	Sensor power
B-A4			B-D4	VBK	Main Switch Power
B-B1	CRUISE CTRL ON/OFF	Cruise control on/off	B-E1	MANIFOLD AIR PRESSURE	Manifold pressure
B-B2	SIDE STAND SW	Side stand switch	B-E2	SGNDI (PPS-1, TPS)	Sensor ground
B-B3	BRAKE SWI	Brake Switch 1	B-E3	O2 SIGNAL 2(LEFT)	O2 Signal (left)
B-B4	MAIN RELAY	Main Relay	B-E4	CAN-HIGH(+)	CAN signal (+)
B-C1	PPS-2 SIGNAL	Handlebar throttle position sensor	B-F1		
B-C2	SGND2(PPS-2, MAP)	Sensor ground	B-F2		
B-C3	STARTER SW	Start-up switch	B-F3		
B-C4	VBR	Battery voltage supply	B-F4	CAN-LOW(-)	CAN signal (-)
PIN	FUNCTION		PIN	FUNCTION	

B-G1			B-K1	TIA	Air intake temperature
B-G2	MODE SW	Riding mode switch	B-K2		
B-G3	TPS-1 SIGNAL	Throttle Position Sensor Signal 1	B-K3	THERMO	Engine temperature
B-G4	CPS (+)	Crankshaft position sensor (+)	B-K4	O2 HEAT 2(LEFT)	O2 Heat (left)
B-H1	O2 SIGNAL I(RIGHT)	O2 Signal (right)	B-L1		
B-H2	TPS-2 SIGNAL	Throttle Position Sensor Signal 2	B-L2		
B-H3	CRUISE CTRL RESUME (+)	Cruise control resume (+)	B-L3		
B-H4	CPS (-)	Crankshaft position sensor (-)	B-L4	Electronic water pump	Electronic water pump
B-J1	SGND4(TILT)	S grounding 4 (tilt signal)	B-M1		
B-J2	SGND3(THERMO, TIA, O2*2)	S grounding 3 (temperature, O2)	B-M2		
B-J3	CRUISE CTRL SET (-)	Cruise control setting (-)	B-M3	INJ-2(LEFT)	Injector (left)
B-J4	HEAD LIGHT RELAY	Headlight Relay	B-M4	O2 HEAT (RIGHT)	O2 Heat (right)
PIN	FUNCTION		PIN	FUNCTION	

B-N1			B-Q1	PGND I	P grounding 1
B-N2			B-Q2	IGNITION COIL#2(LEFT)	Ignition Coil No. 2 (left)
B-N3	MIL	Engine failure indicator	B-Q3	IGNITION COIL#I(RIGHT)	Ignition Coil No. 2 (right)
B-N4	INJ-I (RIGHT)	Injector (right)	B-Q4	VBR	Battery voltage supply R
B-O1	KILL SW	Engine Stop Switch	PIN	FUNCTION	
B-O2	BRAKE SW2	Handbrake Switch 2			
B-O3					
B-O4					
B-P1	PGND 2	P grounding 2			
B-P2	FAN RELAY	Fan Relay			
B-P3	FUEL PUMP RELAY	Fuel Pump Relay			
B-P4	STARTER RELAY	Start Relay			
PIN	FUNCTION				

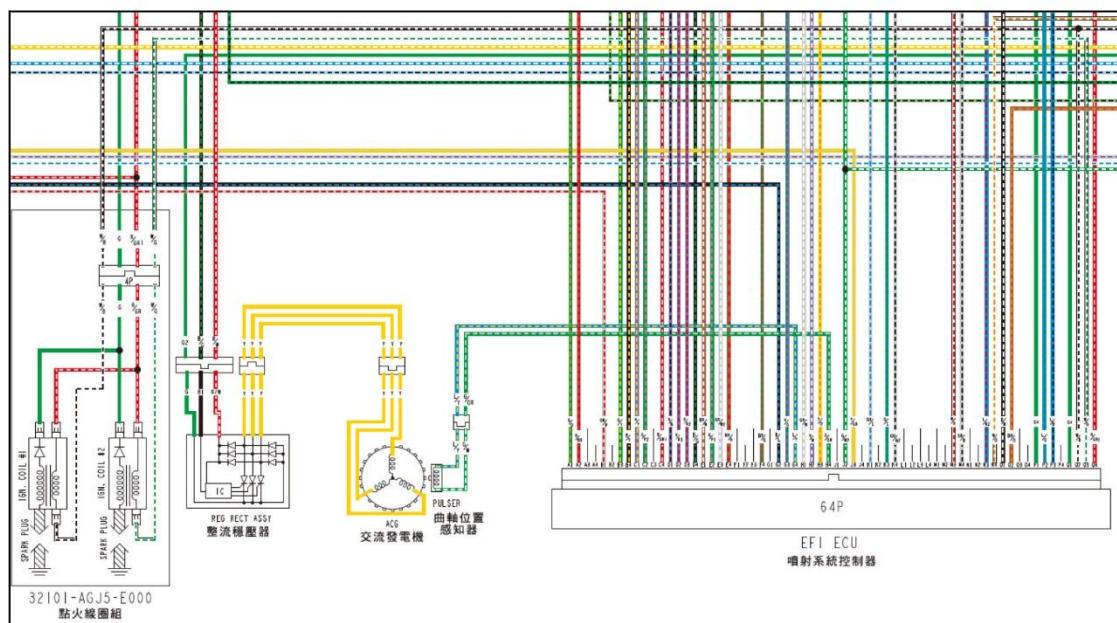
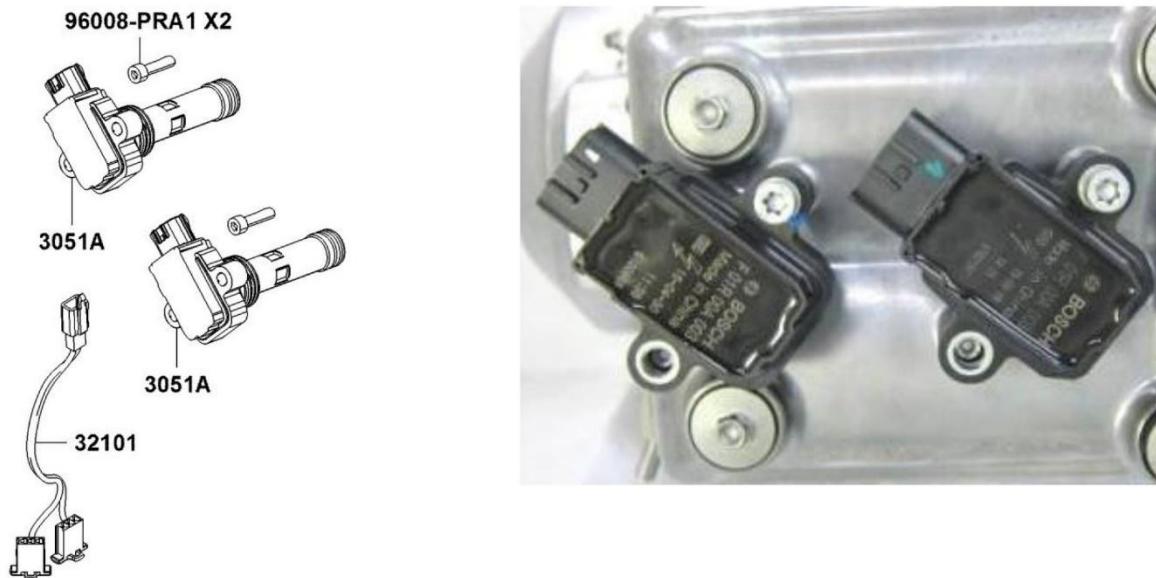
Ignition System

The ignition timing is adjusted by ECU automatically. Do not use the plug-in PC or ECU (other brand) to change the ignition timing setting as it may lead to vehicle damage.

Ignition Coil

Remove the Ignition Coil connector.

Remove 2 bolts from the Ignition Coil and then take out the Ignition Coil.



Spark Plug

After taking out the Ignition Coil, remove the Spark Plug with a linear spark plug socket.



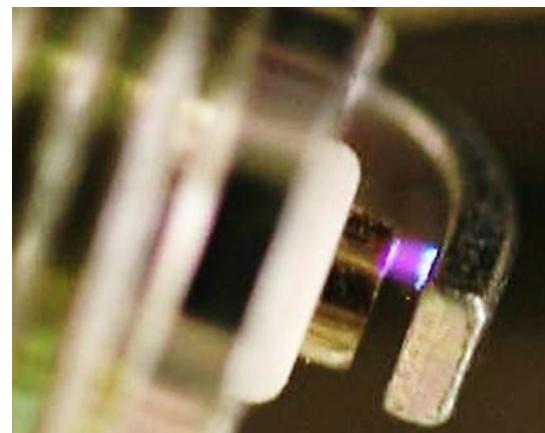
Measure the gap of the Spark Plug with the Spark Plug gap gauge. If not within the specified value, please make adjustment.

Spark Plug Specifications	NGKCR7E
Spark plug gap	0.8~0.9 mm

Check if any dirt remains in the Spark Plug. If required, replace it with a new one.

Spark Plug Spark Test: Check if the igniting status and the spark color are normal.

If required, replace it with a new one. (During the spark plug spark test, keep the Spark Plug away from the oil path and take necessary safety precautions).



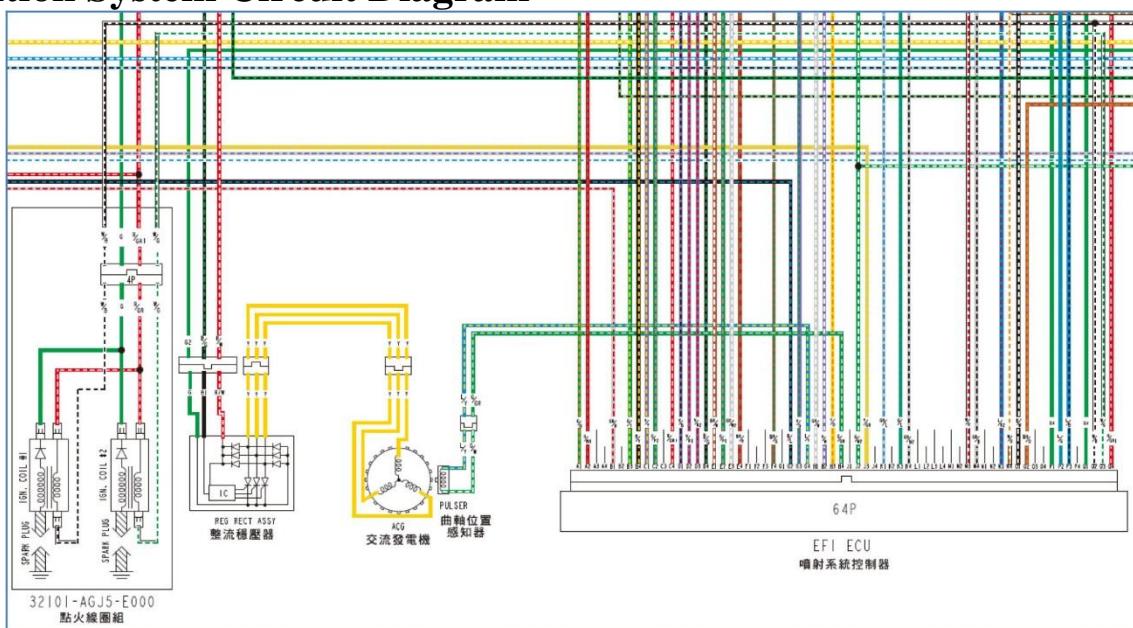
Do not secure the Spark Plug too tight as it may lead to thread slipping of the Cylinder Head.

Item	Tightening Torque
Spark Plug	8~12 N·m (0.8 – 1.2 kgf·m)

6. Fuel Injection System



Ignition System Circuit Diagram



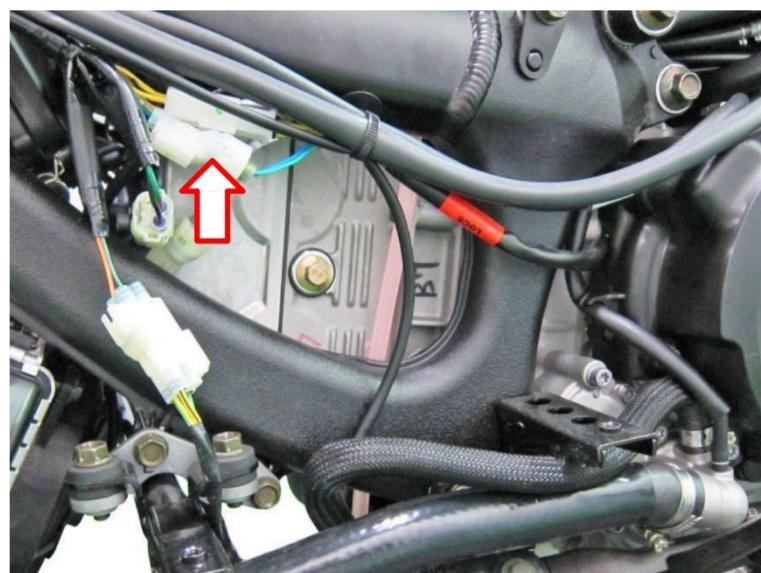
AC Generator inspection

Crank position

Sensor (CPS) inspection

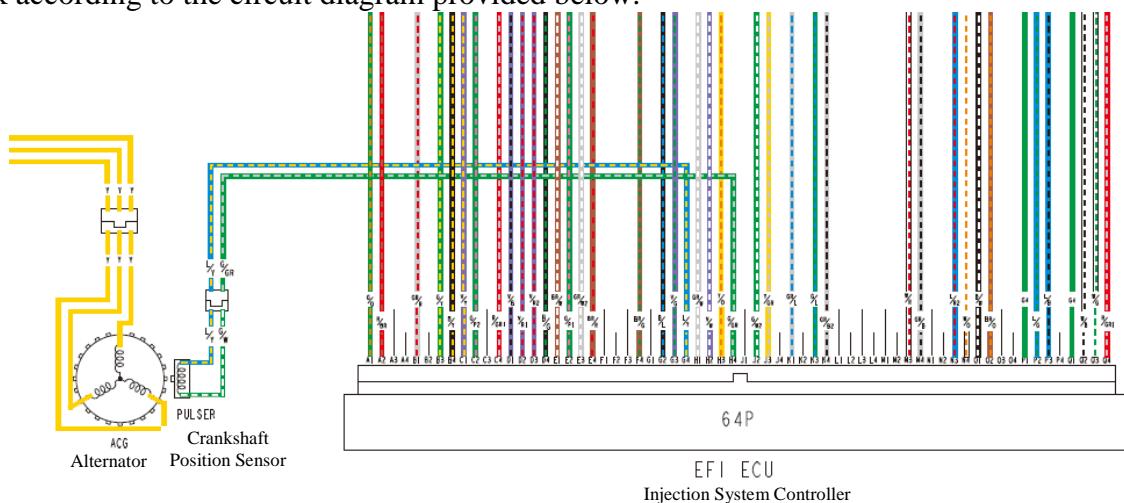
Remove the lead wire connector used for separating the crank position sensor.

Measure the resistance value between blue/yellow and green/gray lead wires with a multimeter.



Resistance	
blue/yellow and green/gray lead wires	96–144 Ω

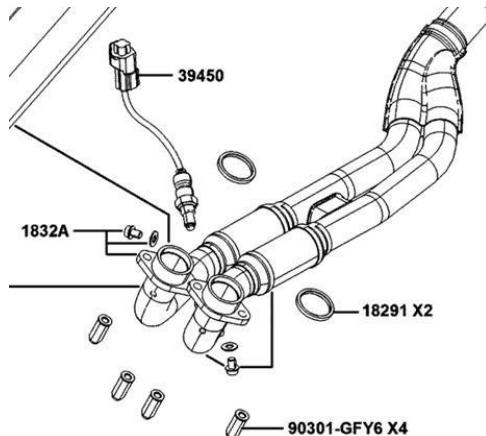
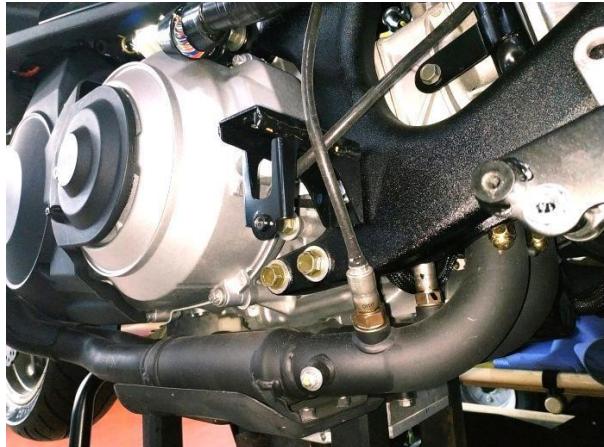
Check according to the circuit diagram provided below.



Including the removal of Oxygen Sensor.

Remove the Oxygen Sensor from the front tube of Exhaustion Pipe.

Do not twist the cable when connecting and disconnecting the O2 sensor cable.



Installation and tightening torque value: 2–3 kgf·m (20–30 N·m). During the installation process, apply anti-seize agent around the thread and then tighten the torque. The Oxygen Sensor shall be active until its working temperature is higher than 300°C.

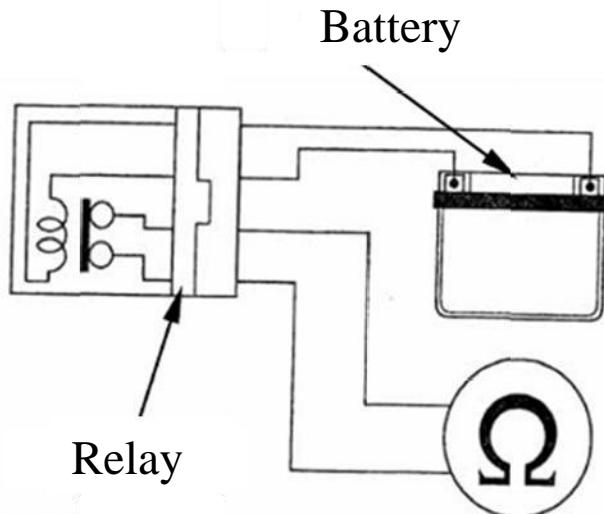
Measure the resistance of the O2 sensor body heater:

Set the multimeter to the 200Ω position. Connect the positive terminal with the O2 sensor body power pin and the negative terminal with the heater pin. The standard value is $12\text{--}18\Omega$ (20°C).

Relay

Relay inspection

Check the Relay with a multimeter.



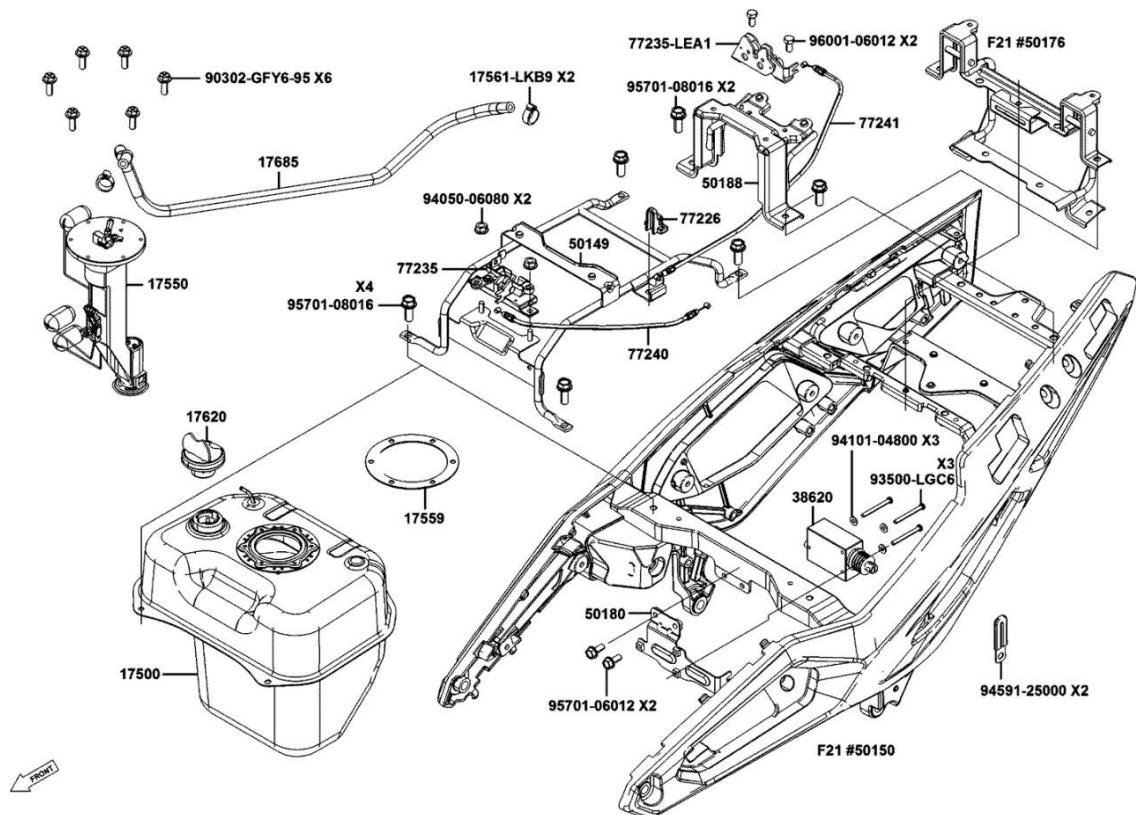
Measure the platinum contact and the result shall be identical with the battery voltage. After elapsing for several seconds, the disconnect voltage shall be less than 0.2V. Measure the resistance of the Coil-type Relay to see if it is within the standard value range (60–90Ω). Measure the resistance of the IC-type Relay to see if it is within the standard value range (about 180Ω).

6. Fuel Injection System



Fuel Tank

Warning: Gasoline is a highly evaporative and flammable substance. Therefore, the operation should be executed by keeping away from the ignition source to avoid danger.



Remove the fuel pump

Before the removal, release the fuel pipe pressure. After pulling up the fuel pump connector, start the engine till it is stalled.

Check if pressure is remained in the fuel pipe. If negative, turn off the main switch.

Before the removal, dismantle the front/rear seat locking switch and the connecting steel wires on the oil tank support.



Remove 4 screws from the oil tank support and then remove the oil tank support.



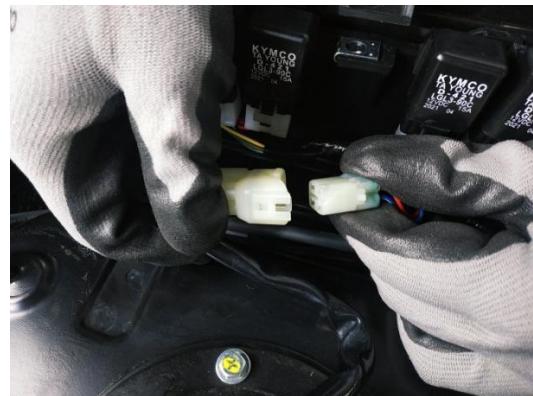
Remove and detach the fuel pump connector.



6. Fuel Injection System



When removing the connector, push the damper away and then detach the connector.



Clamp the fuel pipe with the pipe clip.



Loosen the fuel pipe clamp with high-pressure retaining clip.



Then take out the fuel pipe with the pipe-loosening clip.

▲Caution

- When the fuel pipe is detached, it may discharge the residual pressure and gasoline. In this case, block the outlet with a rag and then wipe the pipe to prevent splashing.
- When taking out the fuel pipe with pipe-loosening clip, it should be carefully performed to avoid damaging the fuel pipe.
- When installing the fuel pipe, the newly made fuel pipe high-pressure retainer should be used to protect safety.



6. Fuel Injection System



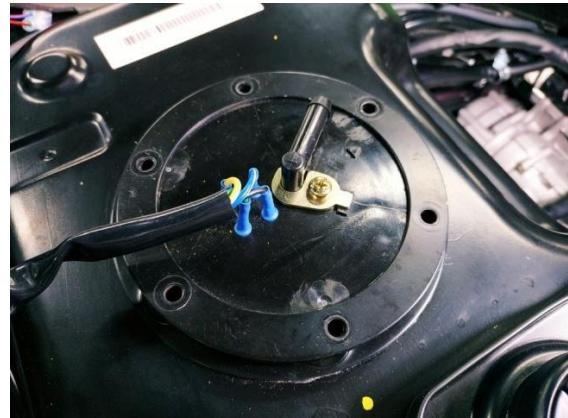
Remove 6 fixing screws from the fuel pump.



6. Fuel Injection System



Remove the securing gasket.



Remove the fuel pump. When taking out the buoy, it should be adjusted to the appropriate angle in order to remove it smoothly.



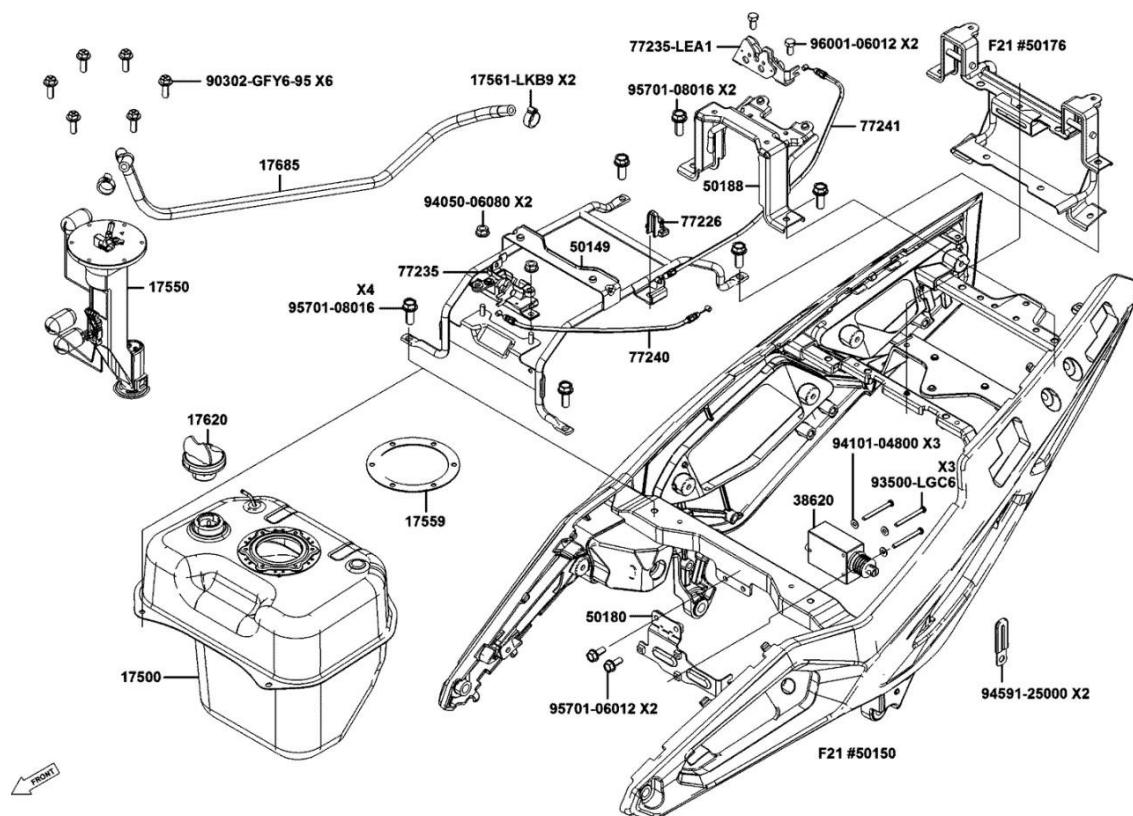
Remove the oil gas recovery pipe and then remove the oil tank.

⚠ Caution

- The gasoline remaining in the oil tank shall be pumped out and then stored securely.
- Such work shall be executed in a well-ventilated location to prevent causing physical unfitness and hazard.



6. Fuel Injection System



Fuel Pump

Warning

Gasoline is a highly evaporative and flammable substance. Therefore, the operation should be executed by keeping away from the ignition source to avoid danger.

Input voltage inspection

Set the Engine Stop Switch to “ON” position and then turn on the Main Switch Disc.

Take a probe from the Toolkit and then measure the voltage of the Fuel Pump connector.

Turn on the Main Switch Disc. The voltage measuring time will last several seconds only.

If failed, turn off the Main Switch Disc and then turn it on and then measure again. The voltage thus measured should be identical with the battery voltage.

If the voltage cannot be measured, maybe either of the following components is abnormal:

- Fuse
- Fuel Pump Relay
- ECU

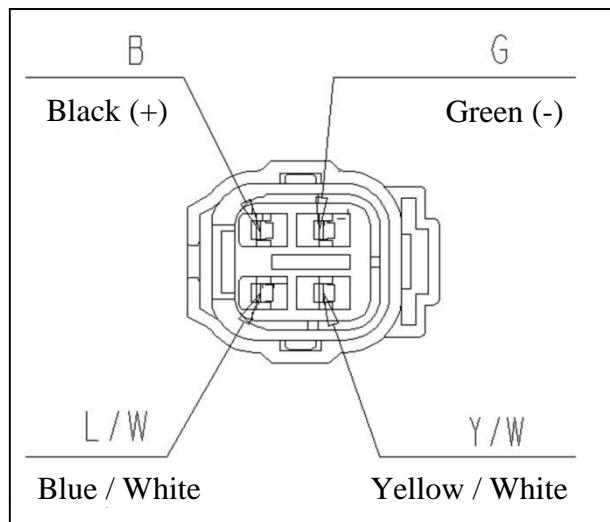
Remove the fuel pump

Take out the Fuel Pump by lifting it upward and then remove the O-ring. If a new O-ring should be replaced, then apply a slight amount of engine oil for the convenience of erection and installation.



Oil Level Gauge inspection

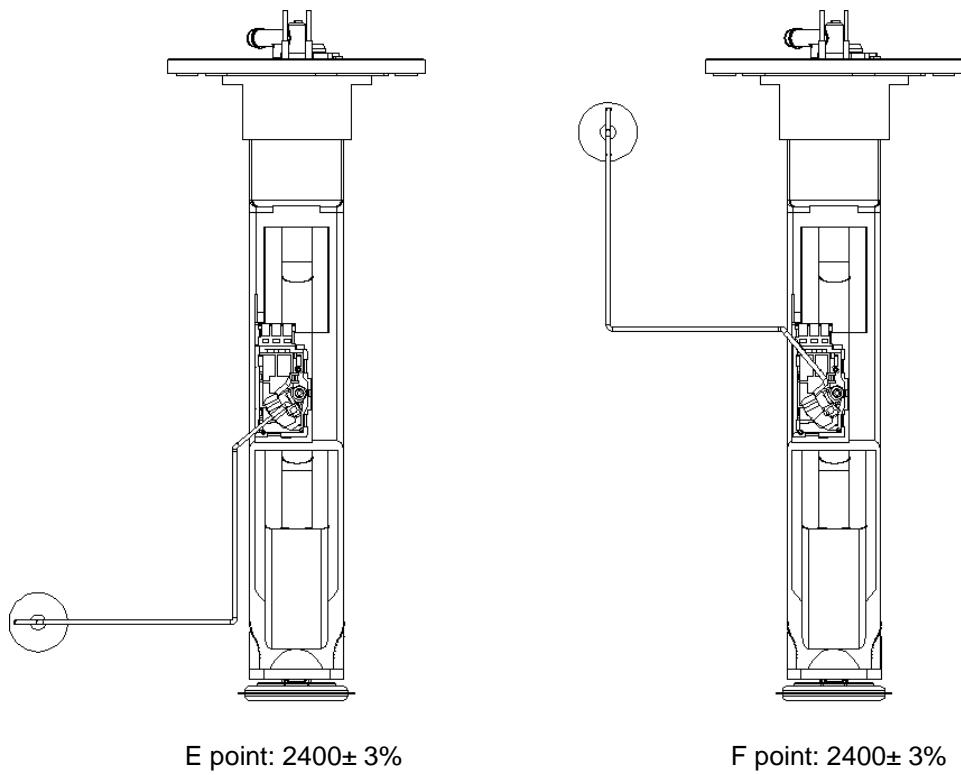
Take a multimeter and then measure if the resistance between L/W (blue/white) and Y/W (yellow/white) pins of the Fuel Pump connector is normal.



Pump Connector Pin Diagram

⚠ Caution

Different color will be marked for the fuel pump connector and the wiring terminal and it should be checked during the measuring process.



Oil Level Gauge buoy position	Resistance
F (full)	$100\Omega \pm 3\%$
E (low)	$2400\Omega \pm 3\%$

If the measured value is infinite or higher and lower than the standard value, then the entire Fuel Pump should be replaced.

Fuel Pump oil pressure

Clamp the fuel pipe with the pipe clip.



Loosen the fuel pipe clamp with high-pressure retaining clip.



Then take out the fuel pipe with the pipe-loosening clip.

⚠ Caution

- When the fuel pipe is detached, it may discharge the residual pressure and gasoline. In this case, block the outlet with a rag and then wipe the pipe to prevent splashing.
- When taking out the fuel pipe with pipe-loosening clip, it should be carefully performed to avoid damaging the fuel pipe.
- When installing the fuel pipe, the newly made fuel pipe high-pressure retainer should be used to protect safety.



Connect the Oil Pressure Gauge and then start the Fuel Pump test. If failing to meet the specifications, replace it with a new one.

Rating: 3.0 bar

If the test result indicates that the oil pressure is less than 3.0 bar, then it may be impossible to start the engine or result in uncomfortable vehicle riding.

If a slight amount of gasoline is leaking after completing the oil pressure test and after removing the oil pressure gauge, clean the engine and then connect the pipeline between the oil tank and the injector.

Fuel Injector removal

Warning

Gasoline is a highly evaporative and flammable substance. Therefore, the operation should be executed by keeping away from the ignition source to avoid danger.

Release the pressure first.

Turn off the Main Switch and then clamp the fuel line with a clip.
After that, loosen the fuel line bundle with a high-pressure circlip.



If the fuel line is damage, replace it with a new one.



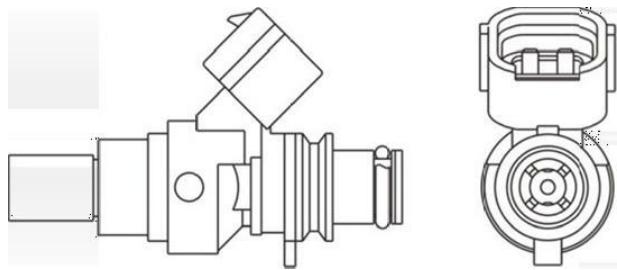
6. Fuel Injection System



Remove the bolt from the Fuel Injector.



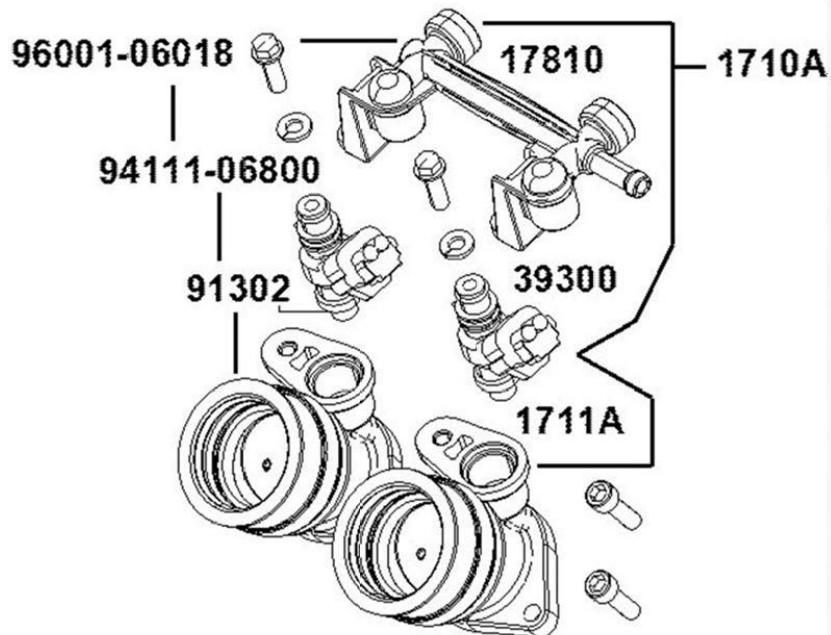
Remove 2 washers from the bolt and then lift the Fuel Injector upward from the intake manifold.



Inspection

Measure the resistance between any of two pins of the Fuel Injector with a multimeter.

Item	Specified value
Resistance value (at 20°C/68°F)	10.6 – 15.9 Ω



▲Caution

Install the fuel injection pipe on the injector and then check if it is secured in position.

Cleaning

Check if the oil is injected from the Fuel Injector.

Remove the injector and then install it on the prepared air intake manifold. After that, put it into a transparent PET bottle and then press the START button to see if any oil injecting and atomizing sign is presented.

Remove the outer head from the injector. Turn on the power and then visually check if the oil is injected for about 1 meter long.

⚠ Caution

(Collect the sprayed gasoline with the tray and the cleaning rag to avoid danger.)

⚠ Warning

During the entire operation process, do not use fire in the surrounding area to prevent producing sparks.

If required, take the protective measures such as wearing goggles to prevent the sparks entering the eyes.

Injector Cleaning Instructions

After confirming the injector is clogged, remove the injector from the injector cover together with the connecting wire. After that, soak the removed injector in the injector cleaning agent for 30 minutes (use the metallic container as the cleaning agent will decompose plastic material).

After being soaked for 30 minutes, use a dedicated wire for executing the power conducting process in order to check if the injector is operating (emitting “da, da” sound).



Throttle Valve removal

Remove the seat and the storage box. Remove 2 bolts from the Throttle Valve lead wire locating plate.

Remove the seat and the storage box. Remove 2 bolts from the Throttle Valve lead wire locating plate.



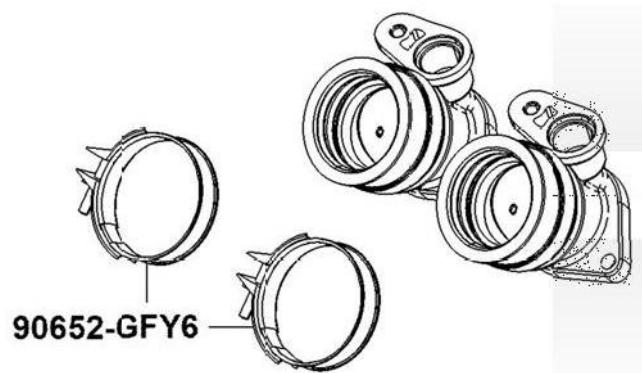
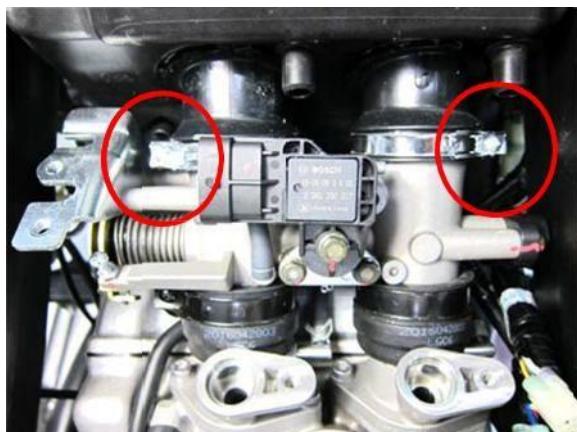
Loosen the Throttle Valve lead wire from the throttle wire securing position of the Throttle Valve.



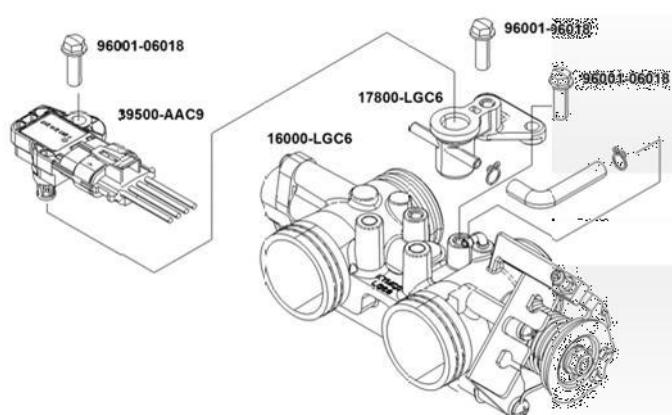
6. Fuel Injection System



Loosen the screws of air intake manifold and air filter circlip.



Remove T-MAP bolt and then remove T-MAP.



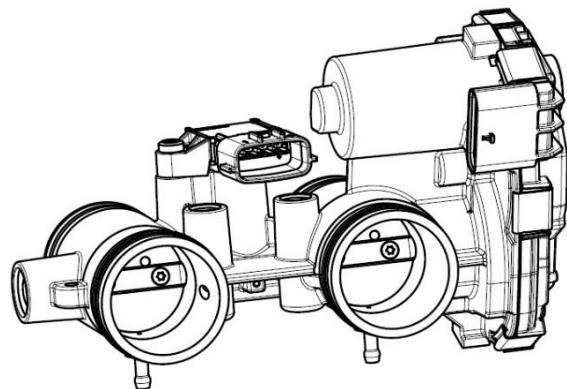
Remove 4 blots from the air intake manifold.



6. Fuel Injection System



Remove the throttle valve.



Air intake temperature/pressure sensor removal

Remove the lead wire connector of the air intake temperature/pressure sensor and 1 bolt.

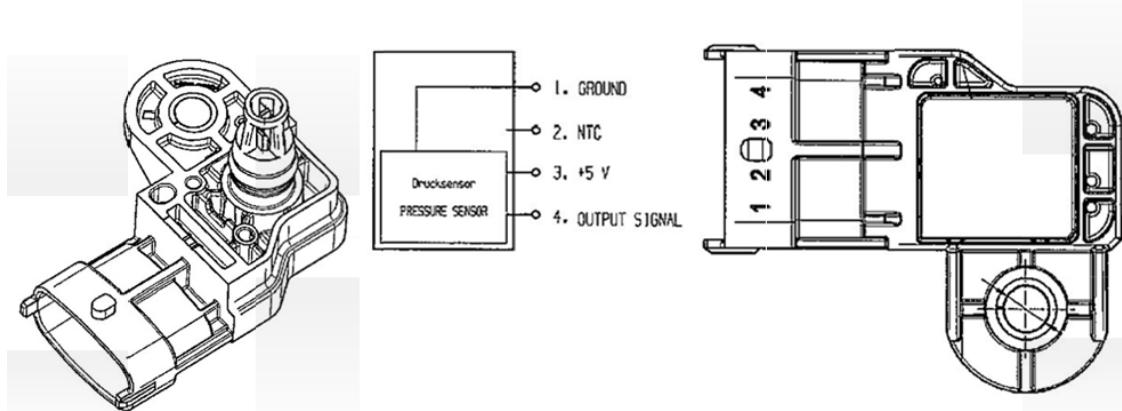


Multimeter Inspection

Turn off the Main Switch and then remove the main wire and the lead wire connector connecting the air intake temperature/pressure sensor.

Turn on the Main Switch and then measure the input voltage between ECU and air intake temperature/pressure sensor with a multimeter that has been set to 20VDC position.

Connect positive terminal to violet/red wire and negative terminal to green/pink wire. Normal voltage value shall be rated within 5 ± 0.25 VDC.



Air intake temperature/pressure sensor inspection

Take a multimeter and measure the resistance value between air intake temperature/pressure sensor pin1 and pin2.

Standard value: $1620\text{--}2544\Omega$ ($20\text{--}30^\circ\text{C}$)

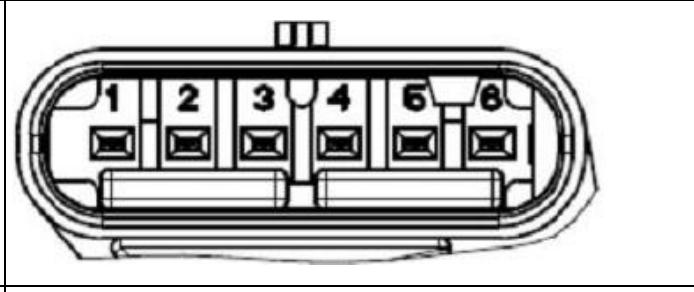
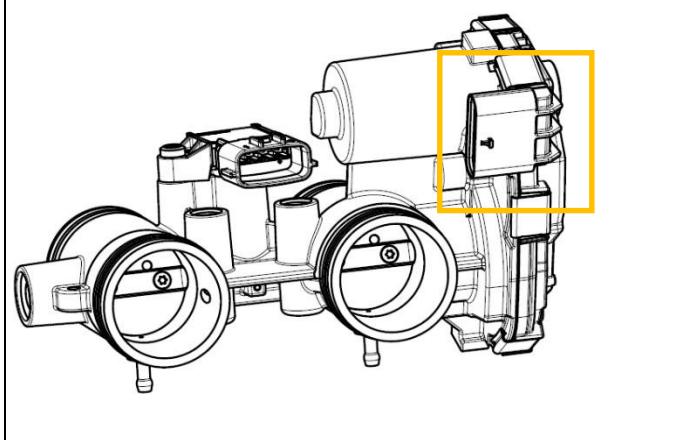
Replace the part with a new one if it's out of the standard range.

T.P.S (Throttle Position Sensor) Inspection

Find the lead wire connector of the throttle valve position sensor. Start the measuring work after confirming that all pins are properly functioning.

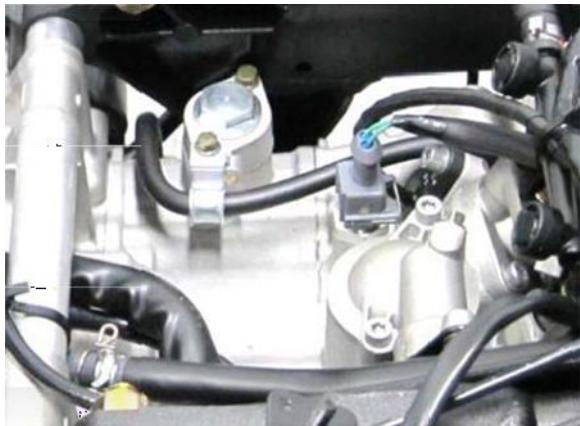
Set the multimeter to 20VDC position and then insert the probe rod into pin3 and pin5 as well as pin6 and pin5 to see if they meet the specifications indicated in the table below.

Inspection standard:

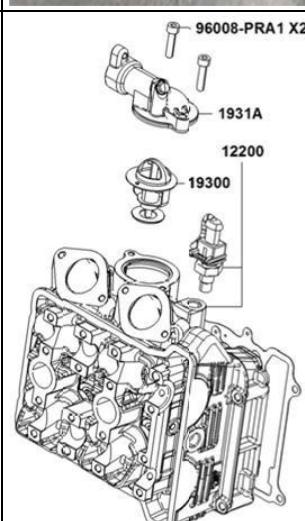
<p>When the throttle valve is closed. IS1 = 0.5 ± 0.05V IS2 = 4.5 ± 0.05V</p> <p>When the throttle valve is fully open. IS1 : $>4.5 \pm 0.05$V IS2 : 0.4 ± 0.15V</p>	<table border="1" data-bbox="737 579 1431 961"> <thead> <tr> <th>PIN</th><th></th><th>Fonction</th></tr> </thead> <tbody> <tr> <td>1</td><td>M-</td><td>Motor -</td></tr> <tr> <td>2</td><td>M+</td><td>Motor +</td></tr> <tr> <td>3</td><td>IS2</td><td>Sensor Out 2</td></tr> <tr> <td>4</td><td>5V DC</td><td>Sensor supply voltage</td></tr> <tr> <td>5</td><td>GND</td><td>Sensor ground</td></tr> <tr> <td>6</td><td>IS1</td><td>Sensor Out 1</td></tr> </tbody> </table>	PIN		Fonction	1	M-	Motor -	2	M+	Motor +	3	IS2	Sensor Out 2	4	5V DC	Sensor supply voltage	5	GND	Sensor ground	6	IS1	Sensor Out 1
PIN		Fonction																				
1	M-	Motor -																				
2	M+	Motor +																				
3	IS2	Sensor Out 2																				
4	5V DC	Sensor supply voltage																				
5	GND	Sensor ground																				
6	IS1	Sensor Out 1																				
<p>Corresponding pin diagram.</p>																						
<p>Caution</p> <p>When setting the opening/closing position of the throttle valve, please use the “Adjust Reset” function designed in the diagnosis software in order to adjust the opening/closing position of the throttle so that the measuring work will be performed easily. Do not move the throttle valve position manually to prevent it from damage and deformation.</p>																						

WTS (Water Temperature Sensor)

Remove the WTS connector.



Remove the WTS with 17mm socket.



Installation and tightening torque value: 1.8-2.2 kgf-m (18-22 N·m)

Troubleshooting

Engine inspection indicator: After “KEY ON,” the engine inspection indicator will illuminate and then extinguish by itself after starting the engine. In this case, it means the vehicle is under normal conditions.

If the lamp keeps illuminating, it means the vehicle system is in a normal state.



⚠ Caution

To diagnose the failure of the injection system, connect the diagnostic tool and then observe in order to carry out troubleshooting.

KDS diagnosis system

Description of KDS diagnostic instrument system

(A). System description

1. The KDS Tools diagnostic instrument is developed by KYMCO R&D Center. Do not attempt to use the KDS Tools; they are for professional technicians appointed by KYMCO.
2. The KDS Tools diagnostic instrument can be used with the controllers of all vehicle models manufactured by KWANG YANG MOTOR CO., LTD. When performing the maintenance, it allows the user to check part of the parameters designed for the controller.
3. As the firmware of the KDS Tools is designed with automatic updating function, it saves the trouble of replacing the diagnostic instrument when the new model cannot be connected to carry out the diagnosis.

(B). Hardware connection

When performing the diagnosis, please connect the Thin Client (PC end) diagnosis wire to the USB LINKER and then connect to the CAN LINKER. After connecting to the on-board diagnosis connector (next to the battery box), turn on the main switch and you can start the diagnosis.

The LINKER comprises the following two types:

1. General type (USB LINKER and CAN LINKER – separated)
2. Integrated type (USB LINKER and CAN LINKER – integrated)

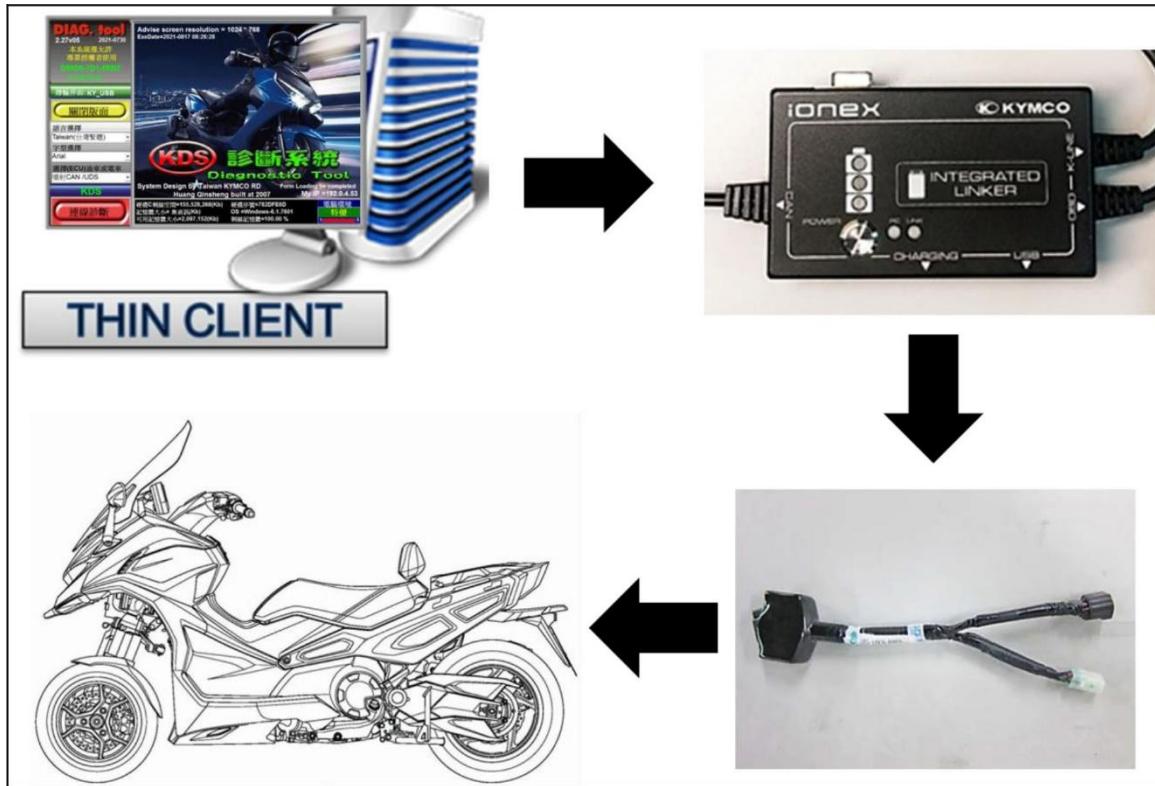
General connection schematic



6. Fuel Injection System



Integrated connection schematic



Regarding further details of the aforesaid two types of LINKER, please refer to the description of KYMCO USB Linker provided on the official website.

⚠ Caution

When updating the software and firmware of the respective system, such work shall be executed by using the integrated connector to solve the compatibility problem.

PC-version (KDS) diagnosis picture

- Access the initial picture by starting the PC-version (KDS) diagnosis software.



- Next, select “Injection CAN/UDS” option.



6. Fuel Injection System



- After confirming that the wire is properly connected, open the main switch power of the vehicle and then click “Read Data” in order to complete the system linking.
- After completing the system linking, it will be displayed in the upper-side information column.
- At this time, you will be allowed to check the ECU information and the data analysis result.



⚠ Caution

- If the wires are not correctly connected, it may lead to the online failure continuously. In this case, check the hint message indicated in the status bar in order to correct the status of the connection wire.
- When clicking the desired function, the system will shut down the previous status. To restore, click “Read Data” in order to load the status again.

Adjust reset item

When clicking the “Adjust Reset” item, it can be used according to the adjustment, resetting, zero-setting and part action test.



ECU firmware updating

Click the lower-right icon and you may access the “Firmware Update” item. At this time, the picture will display the ECU version being connected; whereas, the right-side flip page will display the latest version of model code.



6. Fuel Injection System



After selecting the model suitable for updating, input the “Authorized Model” password.



After inputting the “Authorized Model” password, you may start the updating procedure.

⚠ Caution

Do not update the code not belonging to such model to avoid unexpected adverse consequences.

When updating the integrated connector, it is required to maintain two frames of power capacity to ensure a stabilized update.

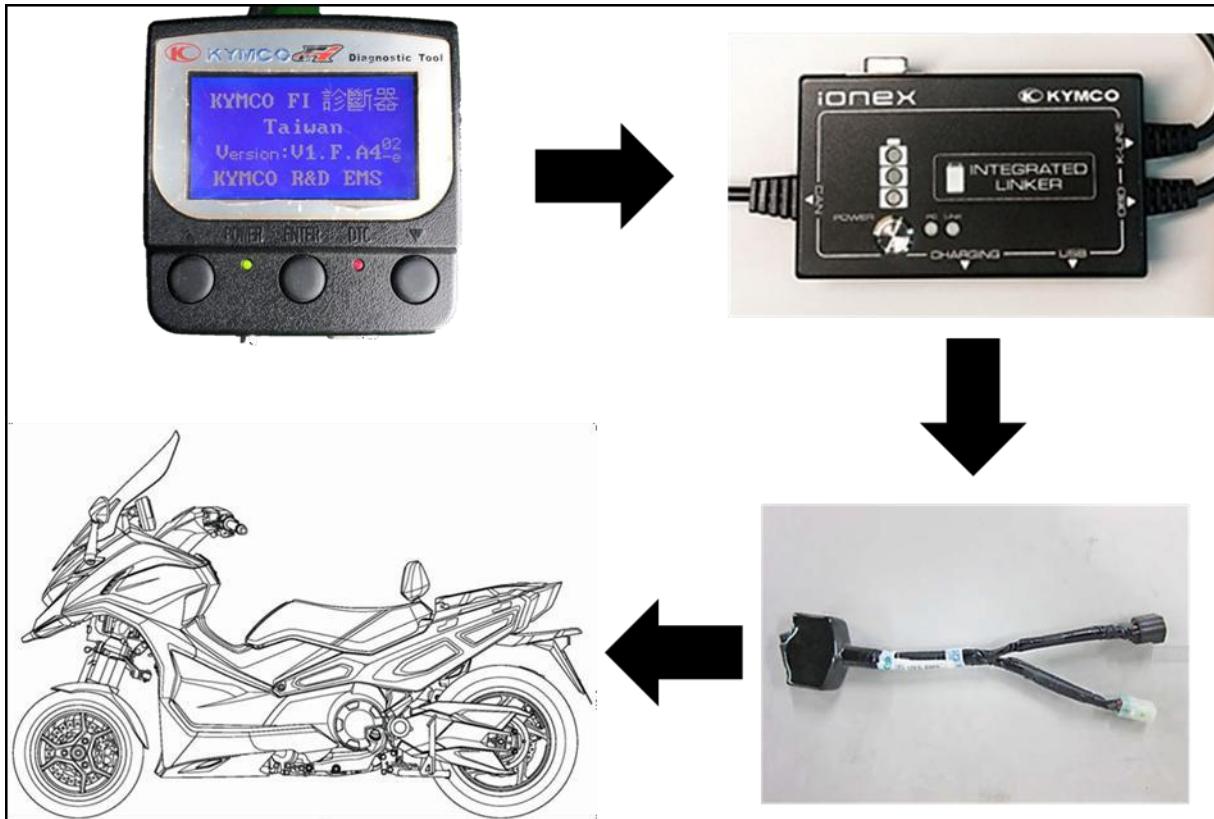
Failure diagnosis item

If the failure information is displayed, click “Read Failure” and it will be displayed under such column. In the meantime, the troubleshooting column also provides the maintenance instructions.



Hand-held Diagnostic Tool

How to connect the diagnostic instrument?



6. Fuel Injection System



Find the vehicle diagnostic instrument connector (OBD orange connector)



1. Connect the OBD connector of the adaptor wire assembly with the vehicle end.



Connect the 4-pin CAN connector to the CAN jack of the connector.



Connect the hand-held wire to the OBD of the connector.



Page connection information and functional options

After being connected, read the model and the ECU related information.

⚠Caution

In the current CV3 model, the hand-held diagnostic instrument is not designed to support the Front Suspension Control System (FLC). If connection will be required, please connect to the PC diagnosis system.

Read Trouble Code



Clear Trouble Code

6. Fuel Injection System



Trouble Code Table

No	Sys	Diagnostic tool serial number	Type	Pcode and Chinese description
1	Vitesco	D1	OBD	B0099 Tilt sensor circuit voltage too high
2	Vitesco	F0	OBD	C0064 Tilt sensor circuit error
3	Vitesco	A1	OBD	P0030 O2 Sensor heater faulty
4	Vitesco	A2	OBD	P0131 O2 Sensor voltage too low
5	Vitesco	A3	OBD	P0032 O2 Sensor heater voltage too high
6	Vitesco	A4	OBD	P0105 Air intake pressure sensor voltage faulty
7	Vitesco	A5	OBD	P0107 Air intake pressure sensor voltage too low
8	Vitesco	A6	OBD	P0108 Air intake pressure sensor voltage too high
9	Vitesco	A7	OBD	P0110 Air intake temperature sensor abnormal or voltage too high
10	Vitesco	A8	OBD	P0111 Air intake temperature sensor wire faulty
11	Vitesco	A9	OBD	P0112 Air intake temperature sensor abnormal or voltage too low
12	Vitesco	D6	OBD	P0113 Air intake temperature sensor abnormal or voltage too high

6. Fuel Injection System



13	Vitesco	AA	OBD	P0114 Air intake temperature sensor periodic faulty
14	Vitesco	AB	OBD	P0115 Engine temperature sensor voltage faulty or too high
15	Vitesco	AC	OBD	P0117 Engine temperature sensor voltage too low
16	Vitesco	AD	OBD	P0118 Engine temperature sensor voltage too high P0118 Engine temperature sensor voltage too avoid
17	Vitesco	AE	OBD	P0119 Engine temperature sensor periodic faulty
18	Vitesco	AF	OBD	P0120 Throttle valve position sensor voltage abnormal or too low
19	Vitesco	B0	OBD	P0121 Throttle valve position sensor function faulty or exceeds the specified range.
20	Vitesco	B1	OBD	P0122 Throttle valve position sensor voltage too low
21	Vitesco	B2	OBD	P0123 Throttle valve position sensor voltage too high
22	Vitesco	B3	OBD	P0124 Throttle valve position highest or lowest point exceeds the specified range.
23	Vitesco	B4	OBD	P0130 O2 Sensor voltage faulty
24	Vitesco	B5	OBD	P0031 O2 Sensor heater voltage too low
25	Vitesco	B6	OBD	P0132 O2 Sensor voltage too high
26	Vitesco	D7	OBD	P0171 Closed circuit faulty (Too Lean)
27	Vitesco	D8	OBD	P0172 Closed circuit faulty (Too Rich)
28	Vitesco	B7	OBD	P0200 Fuel injector faulty
29	Vitesco	DA	OBD	P0201 Fuel injector faulty
30	Vitesco	B8	OBD	P0217 Engine temperature too high

6. Fuel Injection System



31	Vitesco	B9	OBD	P0219 Engine speed exceeds upper limit
32	Vitesco	BA	OBD	P0230 Fuel pump faulty
33	Vitesco	BB	OBD	P0231 Fuel pump voltage too low
34	Vitesco	BC	OBD	P0232 Fuel pump voltage too high
35	Vitesco	BD	OBD	P0260 Fuel injector faulty
36	Vitesco	BE	OBD	P0261 Fuel injector (INJ) voltage too low
37	Vitesco	BF	OBD	P0262 Fuel injector (INJ) voltage too high
38	Vitesco	BE	OBD	P0264 Fuel injector (INJ) voltage too low
39	Vitesco	BF	OBD	P0265 Fuel injector (INJ) voltage too high
40	Vitesco	C0	OBD	P0335 Crank position sensor or circuit faulty
41	Vitesco	C1	OBD	P0350 Ignition coil faulty or voltage too low
42	Vitesco	C2	OBD	P0351 Ignition coil voltage too high
43	Vitesco	DB	OBD	P0412 Secondary air injection system faulty
44	Vitesco	C3	OBD	P0480 Fan control relay faulty
45	Vitesco	F1	OBD	P0484 Fan Relay Overvoltage
46	Vitesco	F2	OBD	P0485 Fan Relay Undervoltage
47	Vitesco	DE	OBD	P0500 Vehicle speed diagnosis faulty
48	Vitesco	D9	OBD	P0501 Vehicle speed diagnosis faulty
49	Vitesco	C4	OBD	P0505 Idle air bypass valve (IAC) motor faulty

6. Fuel Injection System



50	Vitesco	C5	OBD	P0508 Idle air bypass valve (IAC) voltage too low
51	Vitesco	C6	OBD	P0509 Idle air bypass valve (IAC) voltage too high
52	Vitesco	DF	OBD	P0511 ISC motor faulty
53	Vitesco	F3	OBD	P0560 Battery voltage error
54	Vitesco	F4	OBD	P0561 Battery voltage error
55	Vitesco	C7	OBD	P0562 Battery voltage too low
56	Vitesco	C8	OBD	P0563 Battery voltage too high
57	Vitesco	DC	OBD	P0603 Control memory faulty
58	Vitesco	F7	OBD	P0615 Starter motor relay anomaly
59	Vitesco	F8	OBD	P0616 Starter motor relay undervoltage
60	Vitesco	F9	OBD	P0617 Starter motor relay overvoltage
61	Vitesco	C9	OBD	P0650 Failure indicator voltage too high
62	Vitesco	CA	OBD	P0700 Engine speed too high
63	Vitesco	CB	OBD	P1110 Tilt sensor circuit voltage too high
64	Vitesco	CC	OBD	P1111 Tilt sensor circuit fault or voltage too low
65	Vitesco	DD	OBD	P1205 Air intake pressure sensor voltage faulty
66	Vitesco	CD	OBD	P1410 Secondary air (AISV) electromagnetic valve faulty
67	Vitesco	E0	OBD	P1505 ISC system faulty
68	Vitesco	E1	OBD	P1521 Variable air intake valve circuit faulty

6. Fuel Injection System



69	Vitesco	CE	OBD	P1630 Tilt sensor voltage faulty
70	Vitesco	CF	OBD	P2187 O2 sensor control voltage too low
71	Vitesco	D0	OBD	P2188 O2 sensor control voltage too high
72	Vitesco	D4	OBD	P2300 Ignition coil faulty or voltage too low
73	Vitesco	D5	OBD	P2301 Ignition coil faulty or voltage too high
74	Vitesco	D4	OBD	P2303 Ignition coil faulty or voltage too low
75	Vitesco	D5	OBD	P2304 Ignition coil faulty or voltage too high
76	Vitesco	D3	OBD	P263A Failure indicator voltage faulty or too low
77	Vitesco	D2	OBD	P263B Failure indicator voltage too high
78	Vitesco		ETC	P0051 O2 sensor heater undervoltage (second cylinder, left cylinder)
79	Vitesco		ETC	P0052 O2 sensor heater overvoltage (second cylinder, left cylinder)
80	Vitesco		ETC	P0139 O2 sensor circuit slow response (second cylinder, left cylinder)
81	Vitesco		ETC	P0141 O2 sensor heater Performance anomaly (second cylinder, left cylinder)
82	Vitesco		ETC	P0151 O2 sensor circuit undervoltage (second cylinder, left cylinder)
83	Vitesco		ETC	P0152 O2 sensor circuit overvoltage (second cylinder, left cylinder)
84	Vitesco		ETC	P0174 The system (air-fuel ratio) is too low (second cylinder, left cylinder)

6. Fuel Injection System



85	Vitesco		ETC	P0175 The system (air-fuel ratio) is too high (second cylinder, left cylinder)
86	Vitesco		ETC	P0221 Throttle position sensor circuit range/performance (No. 2)
87	Vitesco		ETC	P0222 Throttle Position Sensor Voltage Too Low (No. 2)
88	Vitesco		ETC	P0223 Throttle Position Sensor Voltage Too High (No. 2)
89	Vitesco		ETC	P2140 Throttle handlebar position sensor voltage ratio error
90	Vitesco		ETC	P0301 Misfire detected in cylinder 1 and the right cylinder.
91	Vitesco		ETC	P0302 Misfire detected in cylinder 2 and the left cylinder.
92	Vitesco		ETC	P1008 Engine stops due to excessively high battery voltage.
93	Vitesco		ETC	P2100 Throttle control motor circuit/open circuit.
94	Vitesco		ETC	P2101 Short circuit between throttle control motor terminals.
95	Vitesco		ETC	P2102 Throttle control motor voltage too low
96	Vitesco		ETC	P2103 Throttle control motor voltage too high
97	Vitesco		ETC	P2105 Throttle control motor position deviation exceeds threshold.
98	Vitesco		ETC	P2107 Throttle control motor overheating.
99	Vitesco		ETC	P2126 Throttle handlebar position sensor circuit range/performance.
100	Vitesco		ETC	P2127 Throttle handlebar position sensor voltage too low (No. 1).
101	Vitesco		ETC	P2128 Throttle handlebar position sensor voltage too high (No. 1).

6. Fuel Injection System



102	Vitesco		ETC	P2131 Throttle handlebar position sensor circuit range/performance.
103	Vitesco		ETC	P2132 Throttle handlebar position sensor voltage too low (No. 2).
104	Vitesco		ETC	P2133 Throttle handlebar position sensor voltage too high (No. 2).
105	Vitesco		ETC	P2135 Throttle position sensor voltage ratio error
106	Vitesco		ETC	P2136 Electric throttle position sensor voltage ratio error
107	Vitesco		ETC	P2158 Front vehicle speed sensor malfunction
108	Vitesco		ETC	P2669 Main relay voltage open circuit.
109	Vitesco		ETC	P2670 Main relay voltage too low
110	Vitesco		ETC	P2671 Main relay voltage too high
111	Vitesco		ETC	P2A01 O2 sensor circuit range/performance (cylinder 2, left cylinder)
112	Vitesco		ETC	U0028 Vehicle CAN communication fault.
113	Vitesco		ETC	P0609 Reference voltage B abnormal voltage.
114	Vitesco		ETC	P0642 Reference voltage A voltage too low/open circuit.
115	Vitesco		ETC	P0653 Reference voltage B voltage too high
116	Vitesco		ETC	P0652 Reference voltage B voltage too low/open circuit.

6. Fuel Injection System



Maintenance Diagnosis Record Sheet

(2025/04/23)- v1

AGJ5-M4C Vitesco Injection System Maintenance Diagnosis Record Sheet

Maintenance SF:	Owner name:			Engine No.:
License issue date:	Event date:			Mileage: xxxx KM
Purpose of service: <input type="checkbox"/> General Maintenance <input type="checkbox"/> Fault Repair (Detailed Description of Problems)				
Items	Specified value	Pre-maintenance	Post-maintenance	Remarks
Version Verification	Model	AGJ5		
	Software version	KYCA1B40		
	Revised version	E5AGJ5EUBA		
	CVN	5D 53 42 E4		
Error Code	Fill in the error code		Error Code/Name	Check if the failure indicator is extinguished and confirm the cause of error (post-maintenance failure description; Yes/No).
	Current error code			Starting. Faulty item is detected.
	Previous error code			When the faulty item is detected and is not under "KEY OFF" status.
	Freeze error code			Faulty item being detected but not removed.
Diagnostic items (engine not running)	Idle target value	—		To be set per the current cylinder head temperature (value reading allowed only when the engine is active).
	Throttle handlebar opening angle PV (%)	0.0% / 98% or more		Closed / full throttle
	Handlebar voltage	Over 0.18–0.20 V / 1.85V		Closed / full throttle
	Electronic throttle mechanism aperture TPS(°)	1.2±0.05°		Initial value with KEY ON, engine not started
	Electronic throttle voltage (V)	0.56±0.06		Initial value with KEY ON, engine not started
	Atmospheric pressure	101.3±3kpa		The atmospheric pressure drops for about 12kPa when the altitude rises for every 1,000m.
	Engine temperature	Meeting environmental temperature±2°C		
	Air temperature	Meeting environmental temperature±2°C		
	ECU operating time	—		
Diagnostic items (engine running after warm-up)	Engine speed (when idling)	1200 ± 100 rpm		
	Battery voltage	>13V / >12V		Fan not operating/Fan operating range
	Engine temperature	90–95°C		
	Air temperature	Per actual value		In the lab (25°C) the cooling fan operates 5 times by around 35°C
	Air intake pressure	25–45kpa		The larger the valve clearance, the lower the intake pressure.
	Injection timing	1.4–2.1 ms		
	Ignition angle (°)	-2–7 BTDC		
	Electronic throttle mechanism aperture TPS(°)	3–5°		ISC replacement item (Green vehicle 3.6–4.4; Run-in vehicle 3.1–3.9). If the aperture of TPS is larger than 5°, then the throttle valve should be cleaned.
	O2 voltage (left cylinder)_1	0–1.2 V		
	O2 voltage (right cylinder)_0	0–1.2 V		
	O2 correction value (left cylinder)_1	-14% – +10%		
	O2 correction value (right cylinder)_0	-14% – +10%		
	IDLE CO (%) before catalyst	0.15–1.3%		Such value is measured before the catalyst (the warm-up shall be allowed when the engine temperature is between 90–95°C).
Ignition charging time		1.8–2.6 ms		
Description of maintenance services: (part replacement or repairs/adjustment, etc.)			Maintenance history: (previous maintenance record, date, mileage and treatment result, etc.)	

7. CVT Transmission System

This chapter describes the information and the position relating to the CVT Transmission System components and the maintenance services.

7. CVT Transmission System.....	0
Preparations	1
Troubleshooting	1
Exploded View.....	2
CTV Transmission Case removal.....	3
Remove the CVT	6
Passive Drive Disc Disassembly Diagram	10

Preparations

- The preparation of the Drive Disc and the Passive Drive Disc of the clutch can be performed on the engine.
- Wipe the grease from the surface of the drive belt and the drive. If oil is present, remove it to minimize slipping of the driving belt and driving pulley.

Troubleshooting

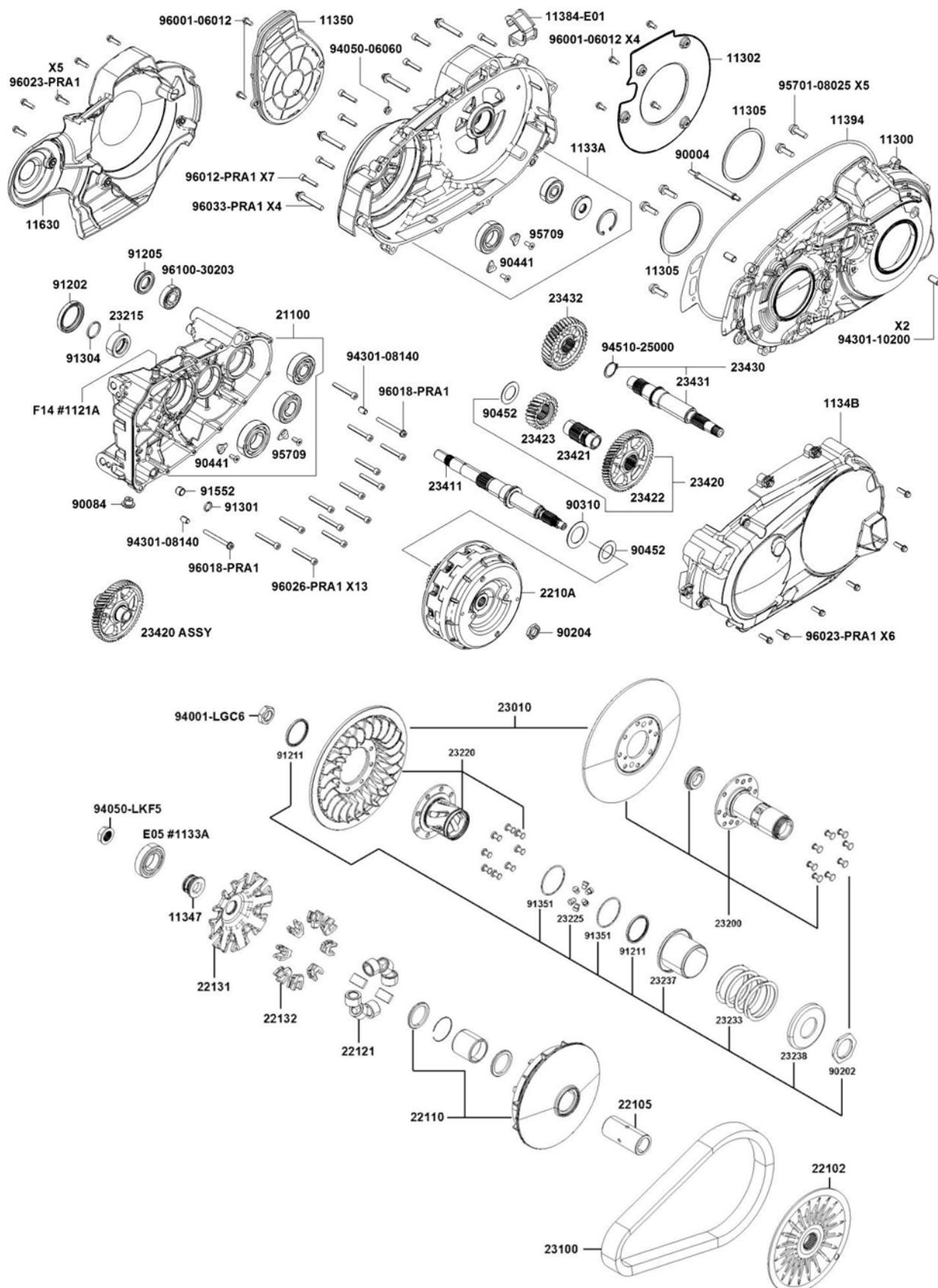
Vehicle doesn't move after engine started

- Drive belt worn.
- Drive plate damaged.
- Passive Drive Disc spring damaged.

Insufficient horsepower

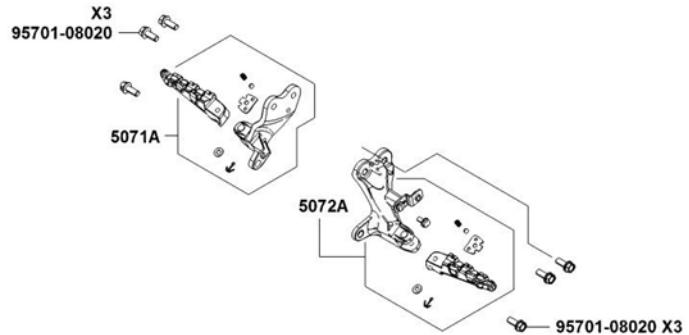
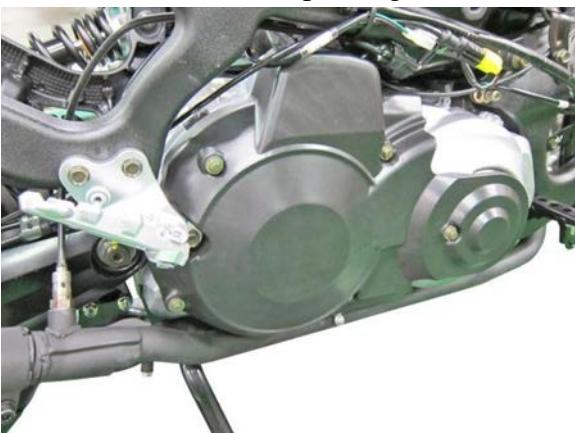
- Drive belt worn.
- Passive drive belt spring deformed.
- Hammer roller worn.
- Drive surface dirty.

Exploded View

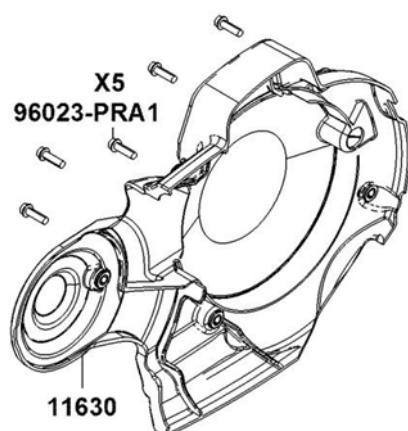


CTV Transmission Case removal

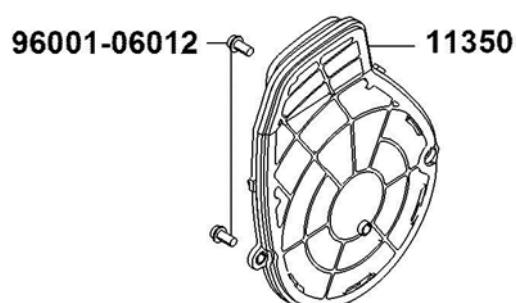
Remove the screws from the passenger footrest and then remove the passenger footrest.



Remove 5 bolts from the CVT outer protection cover of the CVT and then remove the CVT outer protection cover.



Remove the bolts from the CVT Air Filter core and then remove the filter core.



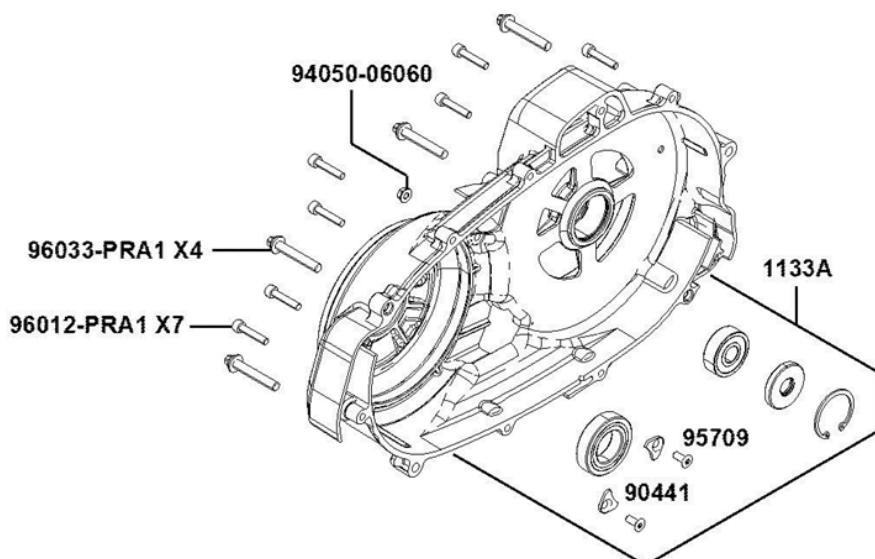
7. CVT Transmission System



Remove the bolts and the nuts from the CVT transmission cover and the remove the CVT transmission cover.



Remove the gasket and 2 pins.



Check the operating status of the bearing at the internal side of CVT transmission cover. If abnormal abrasion sound is heard, replace it with a new one.



Remove the C-shape clip from the bearing with an external caliper and then remove the bearing with the bearing puller.



Remove the bolts from the bearing fixing plate and then remove the bearing with the bearing puller.



Install new bearing with the bearing installer and then install new C-shape clip with the external caliper.

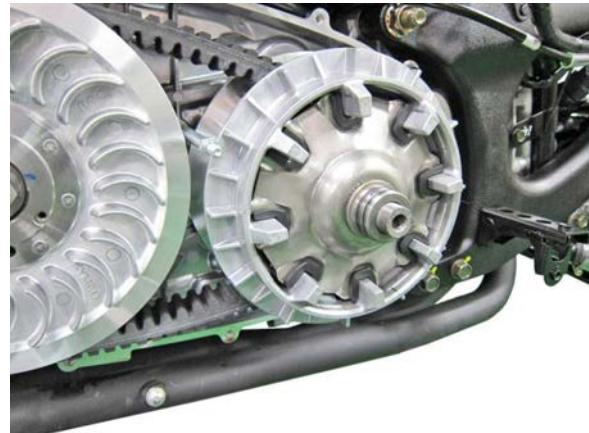
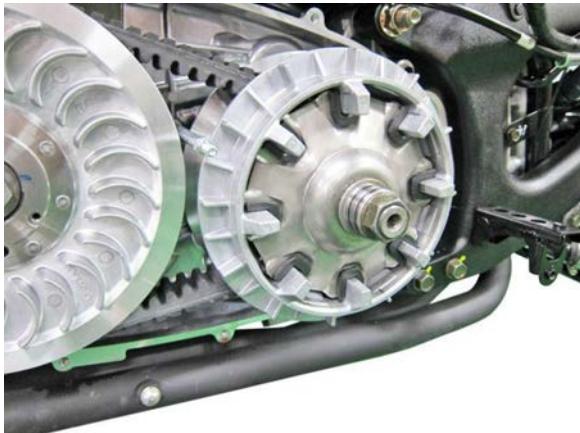


Remove the CVT

Remove the nuts and the socket from the slide Drive Disc.

Installation tightening torque value: 7.6-9.3 kgf-m (75-91.3 N·m)

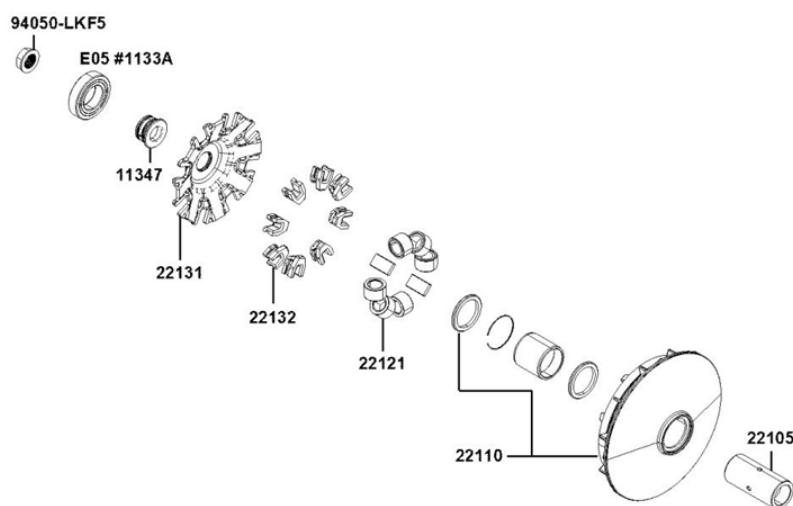
When installing the nut, apply slight amount of lubricant on the nut.



Remove the slide Drive Disc unit.



Slide Drive Disc Disassembly Diagram



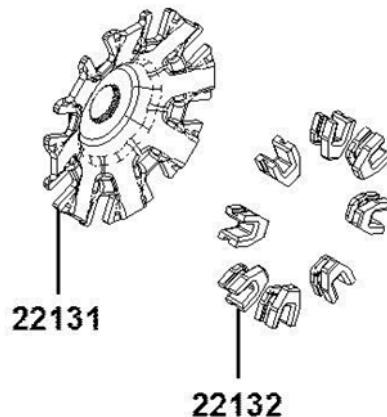
7. CVT Transmission System



Check the slide Drive Disc and then remove the grease attached to the disc. Next, remove the bevel plate.



Remove 8 sliding keys.



The slide Drive Disc comprises 8 weight rollers.



Check if the weight rollers are presenting any wearing or abrasion sign. If required, replace it with a new one.

Check if the bushing of the slide Drive Disc is presenting any wearing or abrasion sign. If required, replace it with a new one.



Secure the Passive Drive Disc with the universal retainer and then remove the nut from the Passive Drive Disc.



- When installing the nut, apply slight amount of lubricant on the net.
- Installation tightening torque value: 8.3-10 kgf-m (81-99 N·m)
- Before starting the installation, wipe the grease attached to its surface.
- Tighten 2 smaller bolts into the Passive Drive Disc and then loosen the CVT belt.

Remove the CVT belt from the Passive Drive Disc.

Check if the CVT belt is excessively worn. If required, replace it with a new one.



Remove the Passive Drive Disc with two-claw clamp (the claws shall be used carefully to avoid the pinching injury).

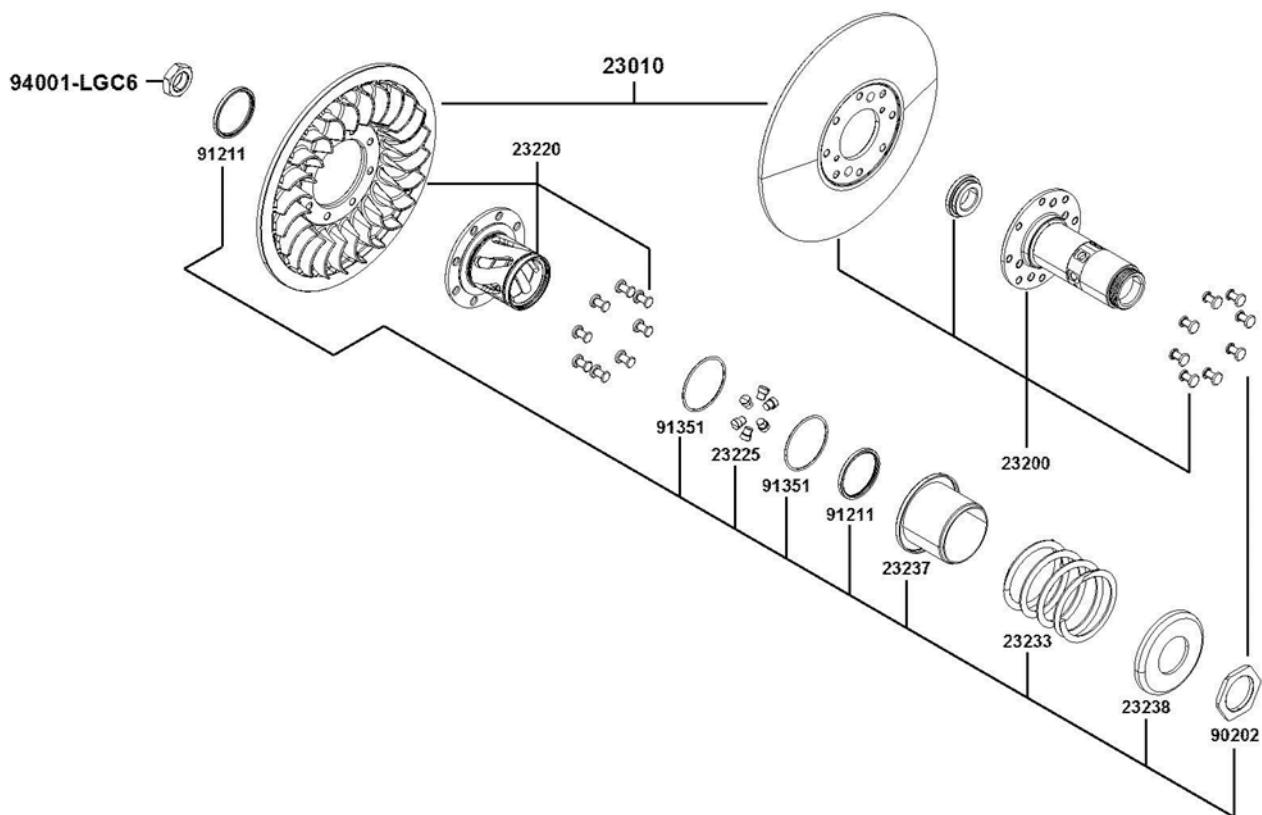


Remove the hold-down plate.



Before starting the installation, wipe the grease attached to its surface.

Passive Drive Disc Disassembly Diagram



Passive Drive Disc Spring Compressor Tool – A120E00053+E00028



7. CVT Transmission System



Tighten the spring compressor bolts of Passive Drive Disc.



Remove the nuts from the spring compressor of Passive Drive Disc with pliers. Release the spring compressor and then disassemble the Passive Drive Disc.



Disassemble the Passive Drive Disc Unit.



Take out the spring and the securing plate.



Check if the spring of Passive Drive Disc is abnormally worn. If required, replace it with a new one.



Remove the collar sleeve.



Remove the pilot roller pin and then remove the pilot roller. Before starting the installation, wipe the grease attached to its surface.



Remove the drive plate from Passive Drive Disc.

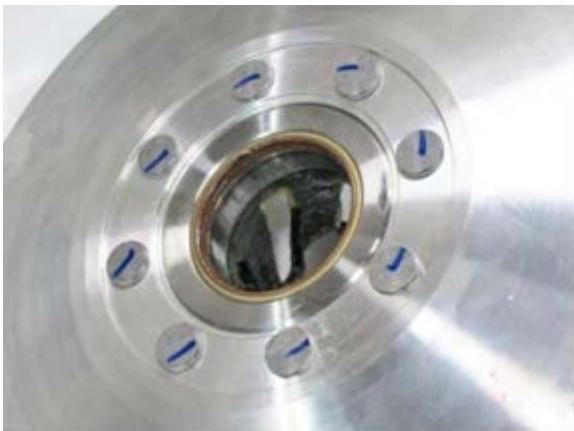


Before starting the installation, wipe the grease attached to its surface.

Before starting the installation, wipe the grease attached to its surface.



Replace the lower-side oil seal of Passive Drive Disc.



Replace the upper-side oil seal of Passive Drive Disc.

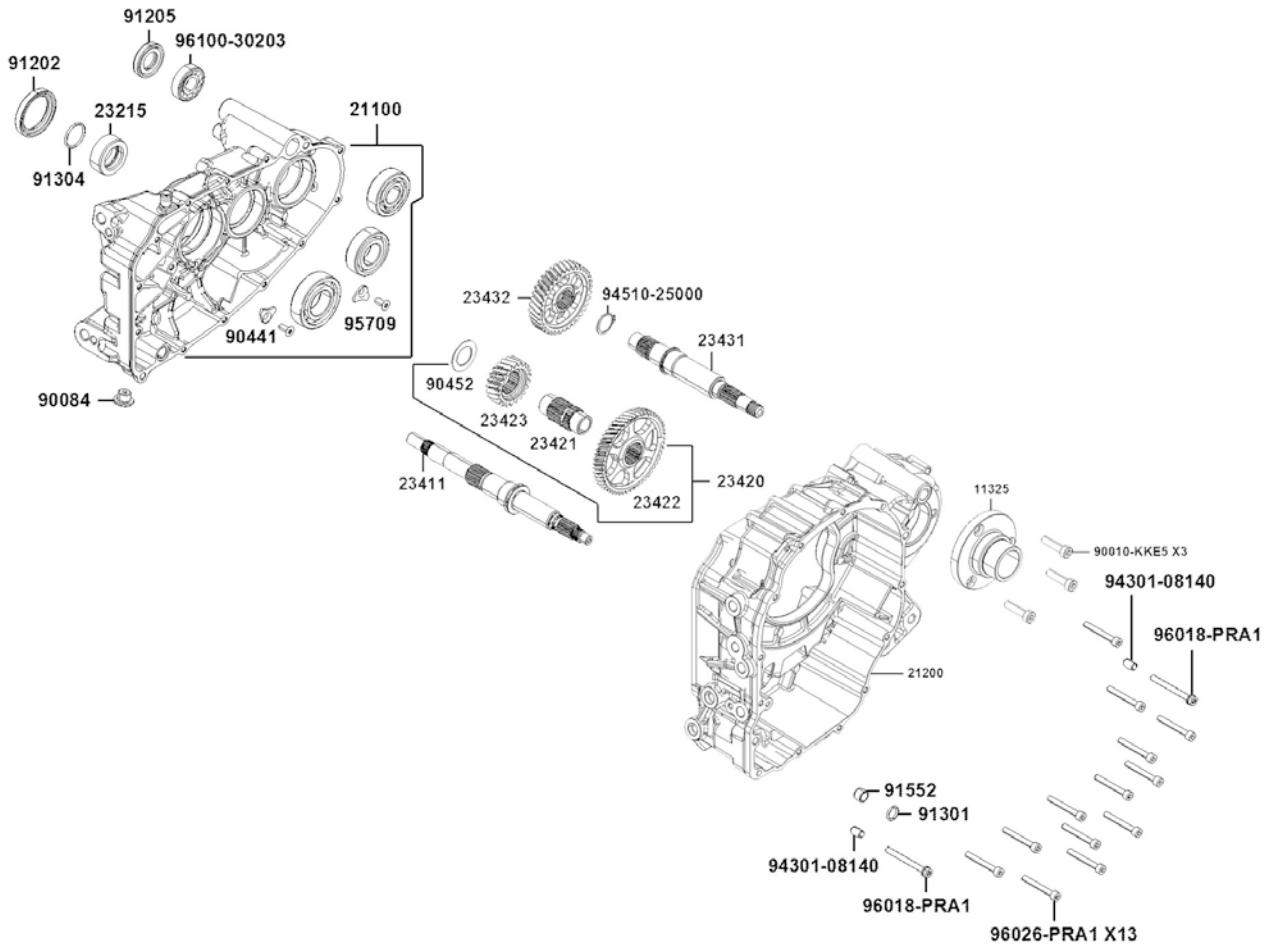


8.Final Drive

This chapter covers the location and servicing of the final drive components for the KYMCO CV3 model.

SCHEMATIC DRAWING	8-1
TROUBLESHOOTING	8-2
FINAL REDUCTION	8-3

SCHEMATIC DRAWING



TROUBLESHOOTING

Engine starts but motorcycle won't move

- Damaged transmission
- Seized or burnt transmission

Abnormal noise

- Worn, seized or chipped gears
- Worn bearing

Oil leaks

- Oil level too high
- Worn or damaged oil seal

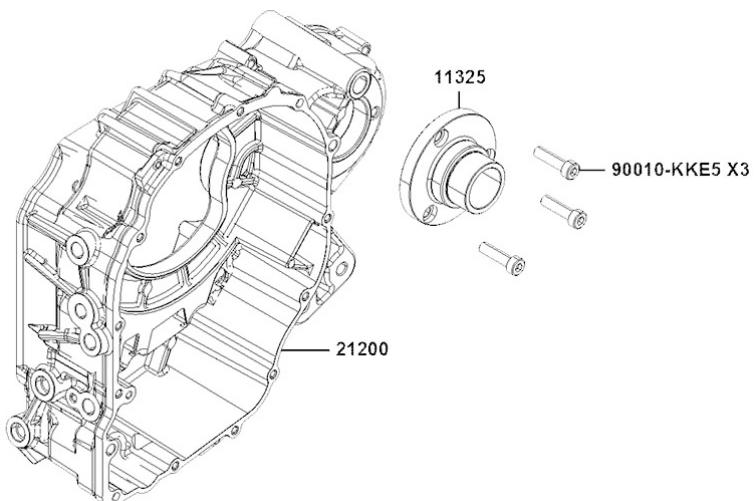
Final Reduction

SAFETY FIRST: Protective gloves and eyewear are recommended at this point.

Disassembly

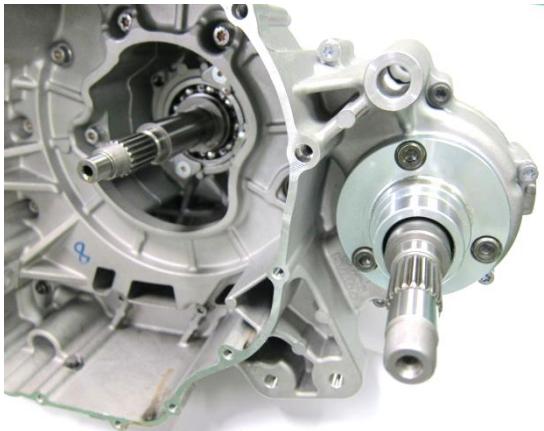
Note: Do not remove the transmission case cover except for necessary part replacement. If the drive shaft is replaced, make sure to also replace the bearing and oil seal.

Remove the 3 bolts and remove the swim arm pivot.



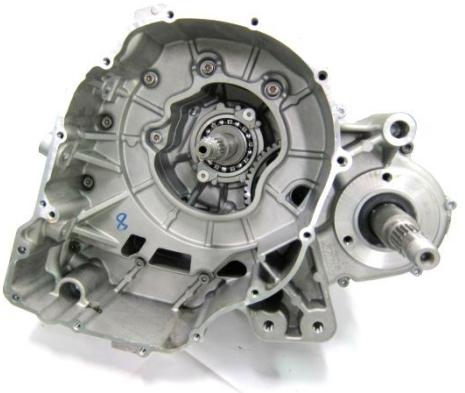
The bolts are all with blue Loctite (non-permanent) to the threads. Using this type of bolts when installation.

Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



Remove the bolts and remove the left mission case.

Installation torque: 1~1.4 kgf-m (9.8~13.7 N-m)



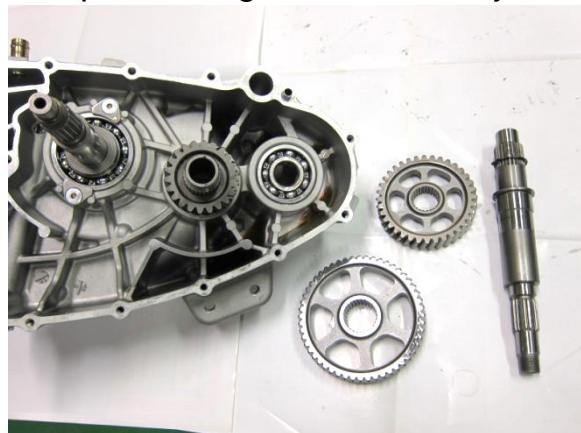
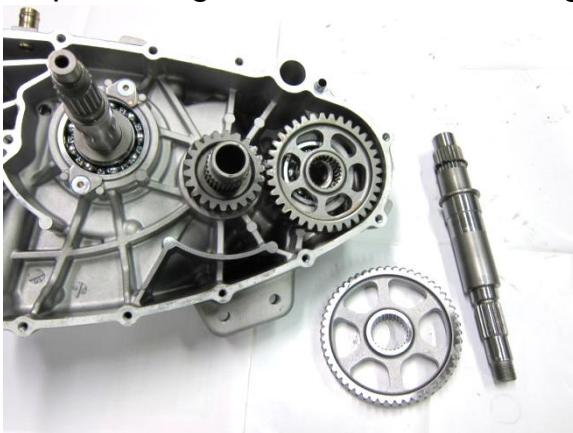
Remove the final shaft.

Inspect the final shaft for wear or damage. Replace it if necessary.



Remove the counter A gear and remove the final gear.

Inspect the gears for wear or damage. Replace the gear if necessary.



Remove the counter B gear and remove the counter gear.

Inspect the gears for wear or damage. Replace the gear if necessary.



Remove the washer and remove the drive shaft.

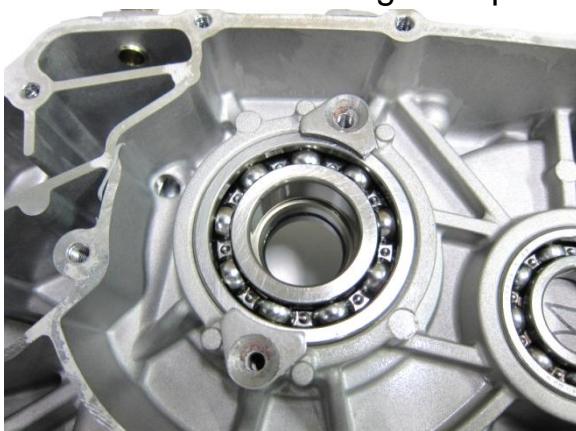
Inspect the drive shaft for wear or damage. Replace it if necessary.



Remove the two screws of the bearing fixed plate.



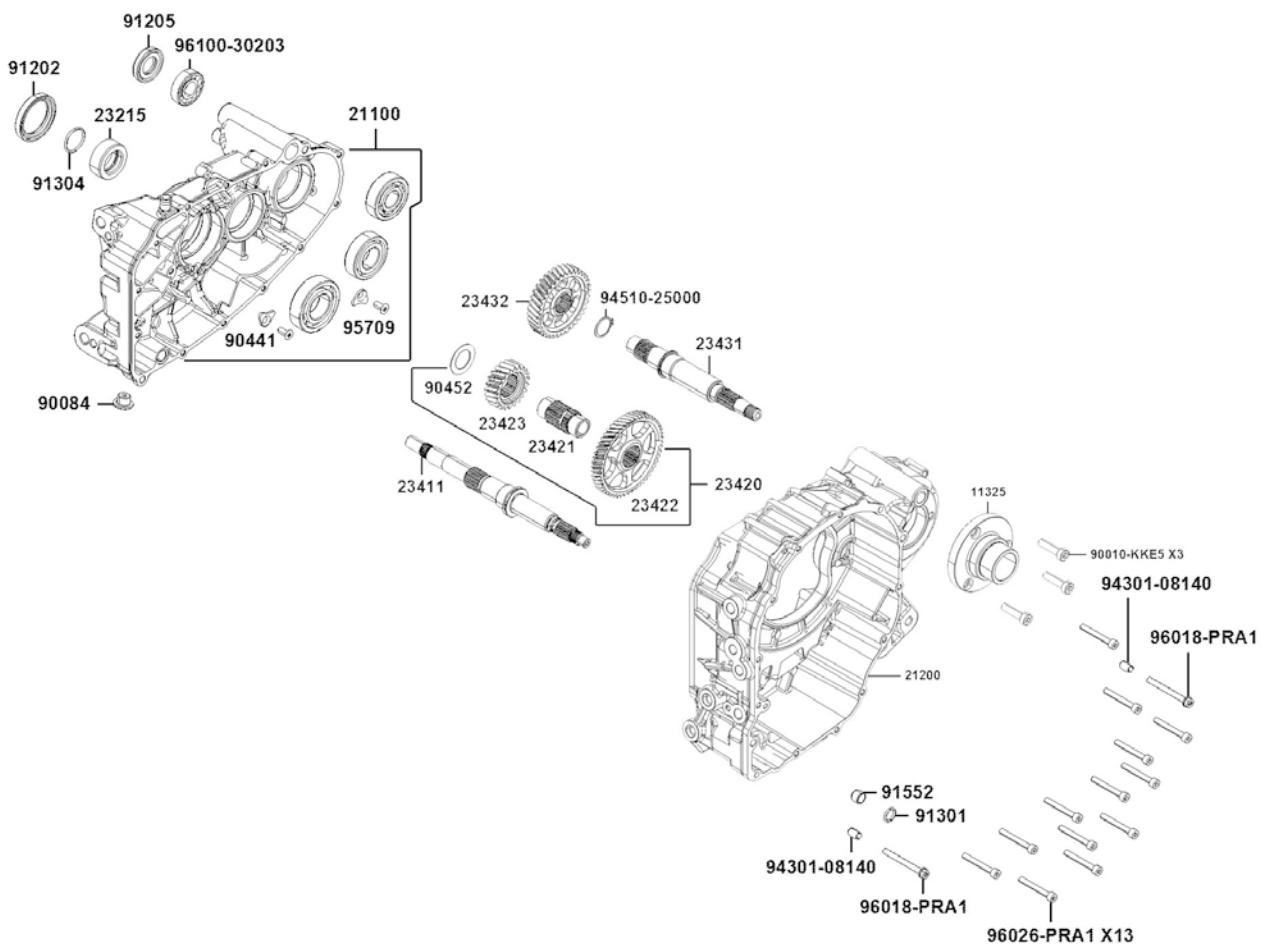
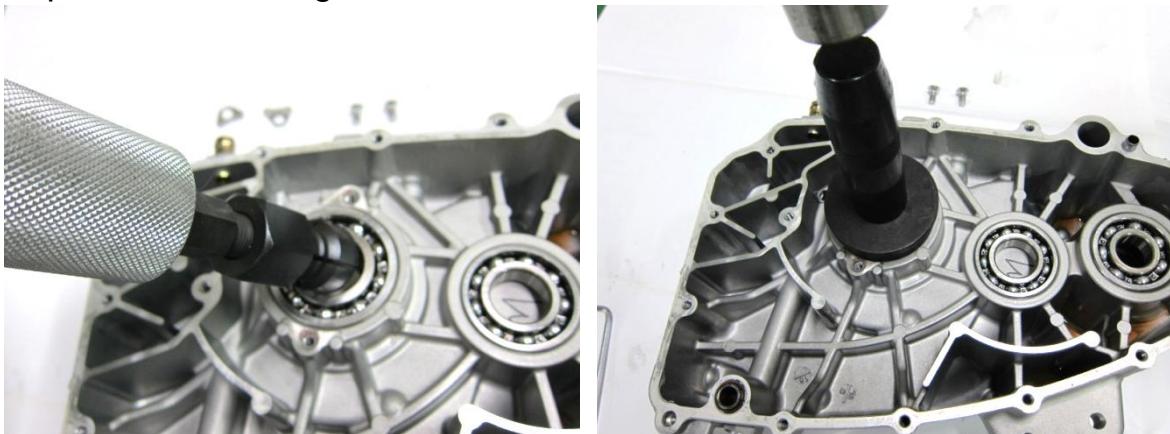
Remove the two bearing fixed plate.



Remove the bearing by bearing puller tool.

Inspect the bearing for wear or damage. Replace it if necessary.

Tap the new bearing in when installation.



9. Electrical System

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Preparations (Charging System)

- The battery can be recharged and discharged repeatedly. If a discharged battery is left unattended, it may be damaged, its service life may be shortened, or its performance may be reduced. The performance of the battery will usually decrease after approximately two to three years of use. The battery with reduced performance (lower capacity) can restore its voltage after recharging. When a load is applied, the voltage will drop rapidly and rise again.
- When the battery is overcharged, the battery's body will display relevant symptoms. If an internal short circuit occurs, the terminals of the battery will display the symptom of no voltage. If the regulator/rectifier becomes inoperative, the battery will generate an overvoltage, which shortens the service life of the battery.
- When the battery is not used for a long time, it will discharge by itself, and the power level will decrease. Recharging is required every 3 months.
- When a new battery is filled with electrolyte, voltage will be generated in a certain amount of time. When the power level is low, recharge it. The service life of new batteries can be extended by recharging.
- For the inspection of the charging system, refer to the sequence specified in the Troubleshooting Guide.
- Do not disconnect and connect the connector of any energized electrical parts. Otherwise, an overvoltage will be generated and cause damage to the electronic parts of the regulator / rectifier. Make sure to turn the main switch to OFF before working.
- Electrolyte inspection and refilling distilled water are necessary for the MF battery.
- Do not use the boost charge unless it's an emergency.
- When charging the battery, make sure to remove the battery from the vehicle before charging.
- When replacing the battery, do not replace it with a conventional water-added lead-acid battery
- When inspecting the battery charging state, a voltmeter must be used.

Troubleshooting

No power

- Battery over-discharged
- Battery wiring not connected
- Fuse burnt
- Faulty main switch

Intermittent current

- Poor contact of battery wiring
- Poor contact of the charging system
- Poor contact and short circuit of lighting system

Low voltage

- Poor battery charging
- Poor contact
- Faulty charging system
- Faulty regulator / rectifier

Faulty charging system

- Poor contact, disconnection, or short circuit of the cable
- Faulty regulator / rectifier
- Faulty A.C generator

Ignition System

Preparations

- For inspection of the ignition system, refer to the Troubleshooting Guide for the inspections.
- The ignition system is an injection system, so ignition timing does not need adjustment.
- The full-transistor ignition control unit of the ignition system must not become loose or hang down, nor be subjected to strong impacts, as these are major causes of malfunction. Special care must be taken during removal.
- The faults for the ignition system can be attributed to the poor contact with the connector socket in most cases. Before carrying out preparations, check all parts of the connector for poor contact.
- Make sure the heat range of the spark plug is appropriate. A spark plug with inappropriate heat range is the primary cause for poor engine running or the engine to be burned.
- The inspection described in this manual is based on the maximum voltage. For the determination of the resistance of the ignition coil, refer to the inspection guidelines.

Troubleshooting

Spark plug no spark

- Faulty spark plug
- Poor contact of the lead wire, such as breaking or a short circuit
- Faulty fuse or main switch
- Faulty ignition coil
- Faulty ECU.
- Faulty alternator
- Faulty battery

Ignition Timing

- Faulty alternator (coil assembly, flywheel with encoder teeth)
- Crank position sensor poorly installed.
- Faulty ECU.

The engine runs rough

Faulty ignition primary circuit

- Faulty ignition coil (primary coil)
- Wiring or connector has poor contact
- Poor contact of main switch

Faulty ignition secondary circuit

- Faulty ignition coil (secondary coil)
- Faulty spark plug
- Faulty high-voltage wire
- Spark plug leakage

Ignition voltage is normal, but the spark plug does not spark

- An incorrect spark plug or a secondary coil of the ignition coil with leakage
- Faulty spark plug

Preparations (Starter System)

Operational Precautions

- The removal of the starter motor can be done on the engine.
- Remove the starter one-way clutch.
- After installing the starter one-way clutch, make sure to inject engine oil and coolant, and release the air from the cooling system.
- Remove the starter one-way clutch.

Troubleshooting

Engine will not start

- Fuse burnt
- Battery low power
- Faulty main switch
- Faulty starter one-way clutch
- Faulty brake light switch
- Faulty starter relay
- Poor contact of cable
- Faulty starter motor

Starter motor torque too weak

- Battery low power
- Poor contact of cable
- Starter motor gear jammed by foreign objects

Starter motor running but engine not running

- Faulty starter one-way clutch
- Starter motor running in reverse
- Battery low power

Preparations (lights/switches)

- Operational Precautions
- When checking and measuring electrical parts, make sure to use a multimeter.
- Make sure to use fuses and bulbs according to the specifications to prevent electrical parts from being burnt or performance error.
- Switches can be removed from the vehicle for continuity test.

Troubleshooting

Turn signal light, brake light and horn inoperative when main switch is ON.

- Faulty main switch
- Faulty fuse
- Battery depleted (low power)
- Faulty bulb
- Faulty switch
- Faulty horn
- Poor contact of connector or open circuit

Fuel meter inoperative

- Faulty fuel meter
- Faulty fuel pump float
- Poor contact of cable connector or open circuit

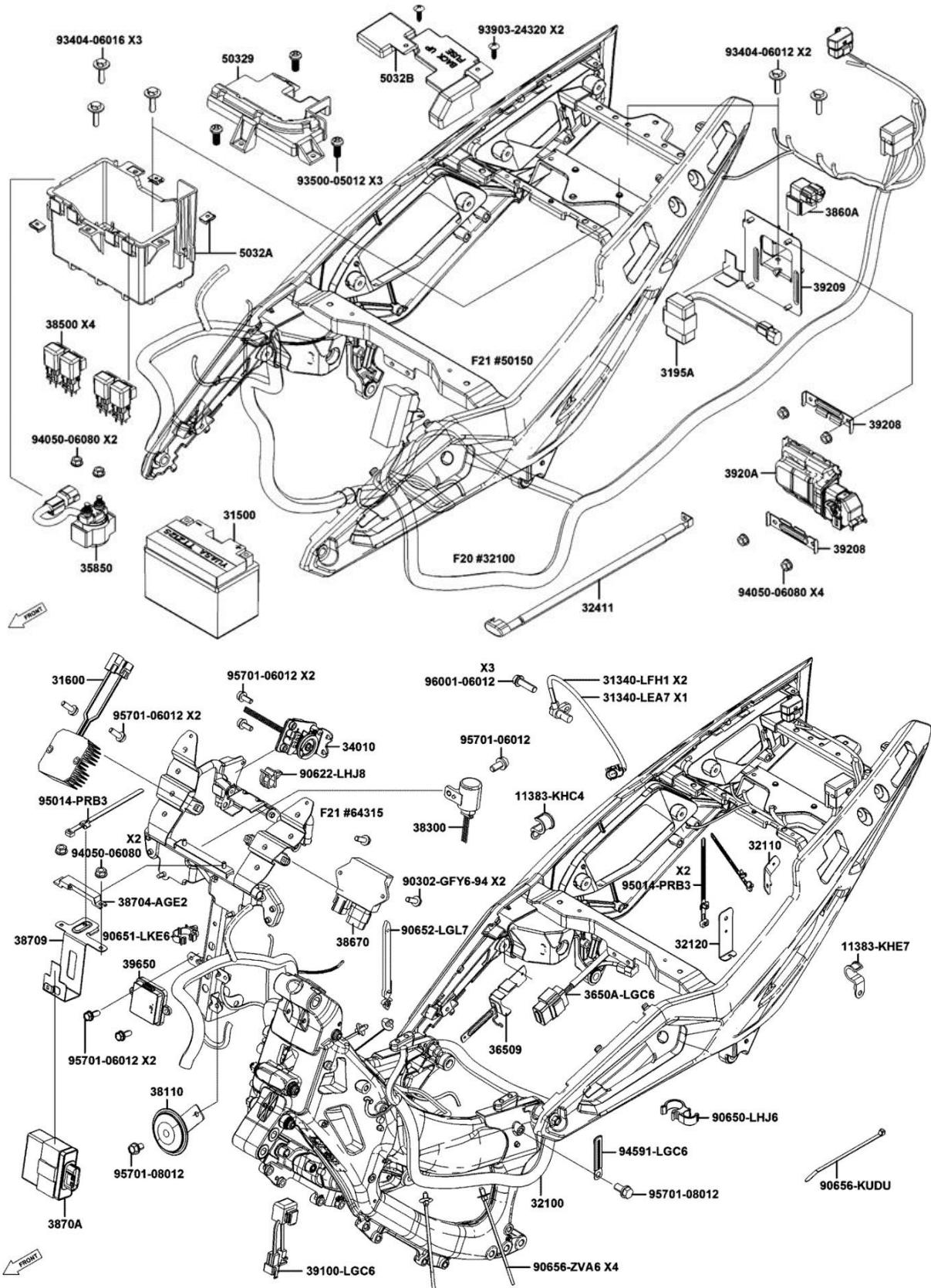
Inaccurate fuel meter operation

- Faulty fuel meter
- Faulty fuel pump float

9. Electrical System



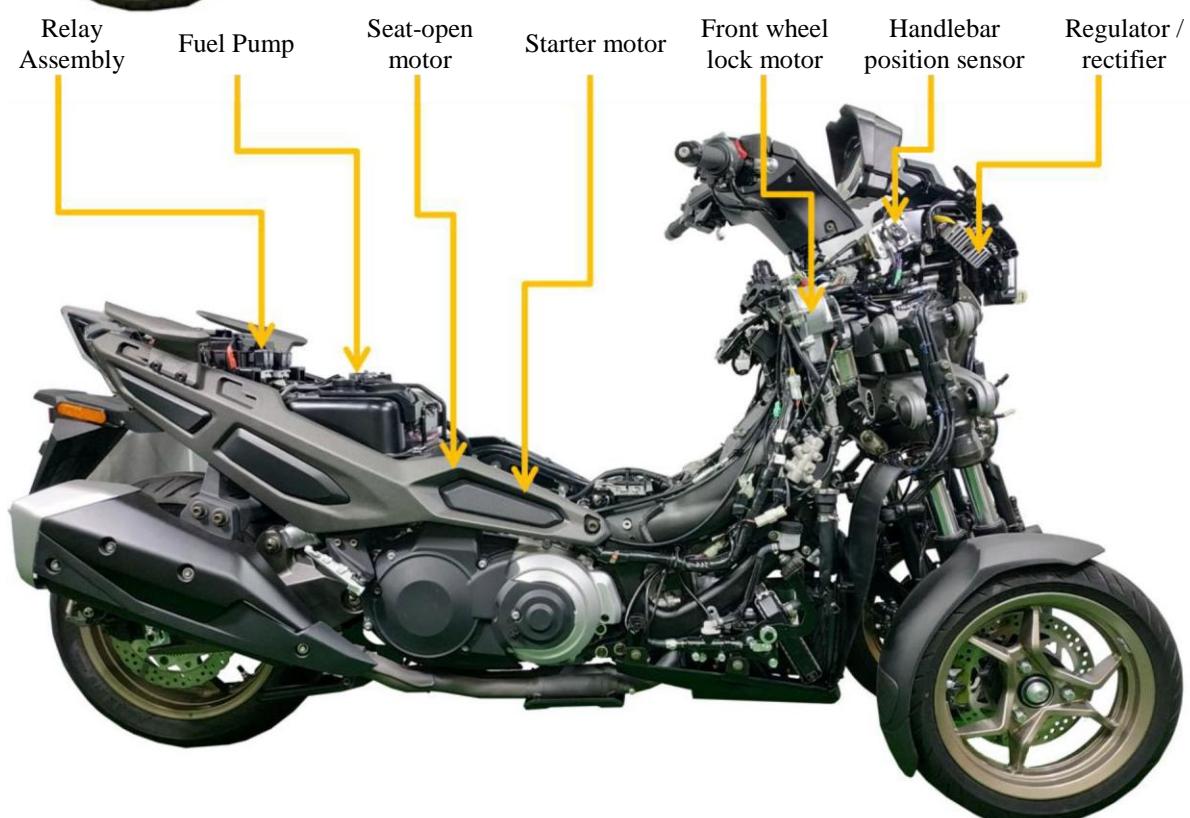
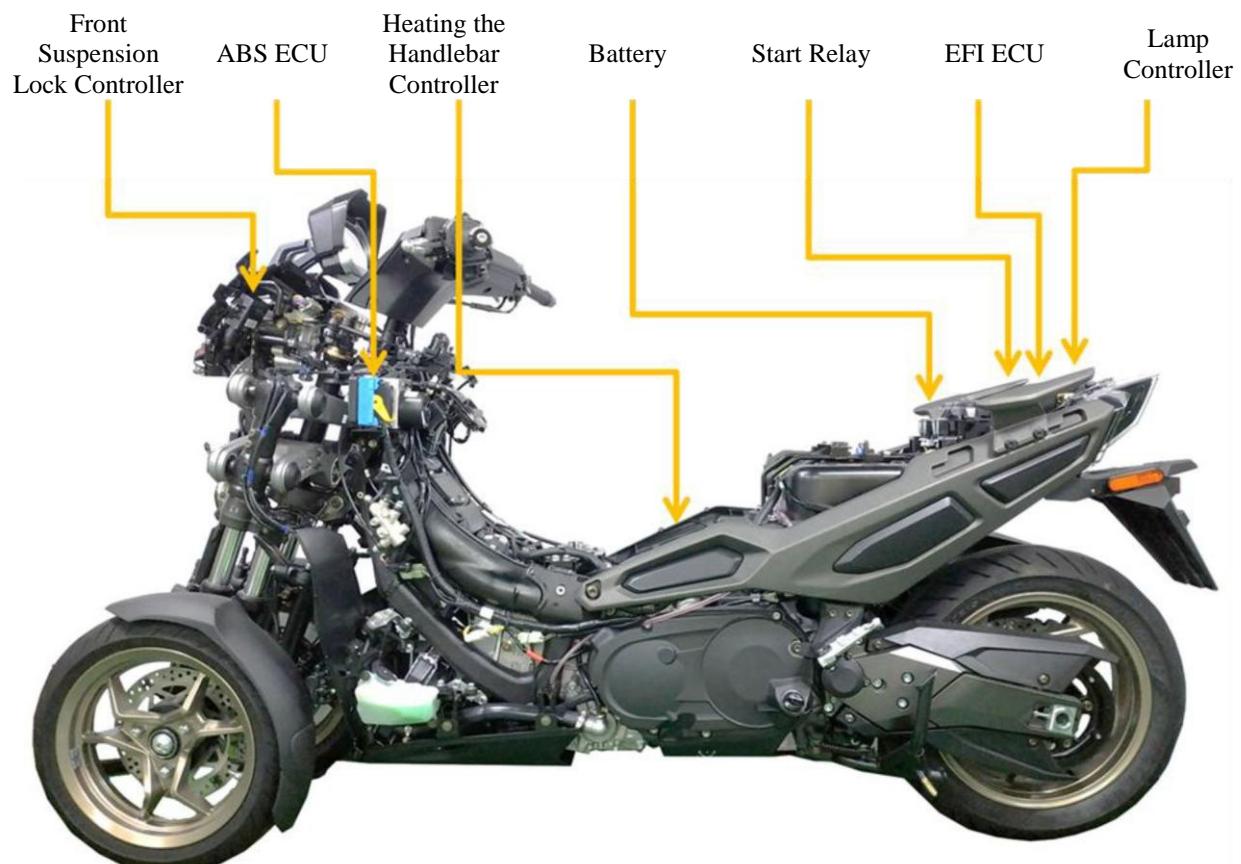
Electrical System Component Diagram



9. Electrical System



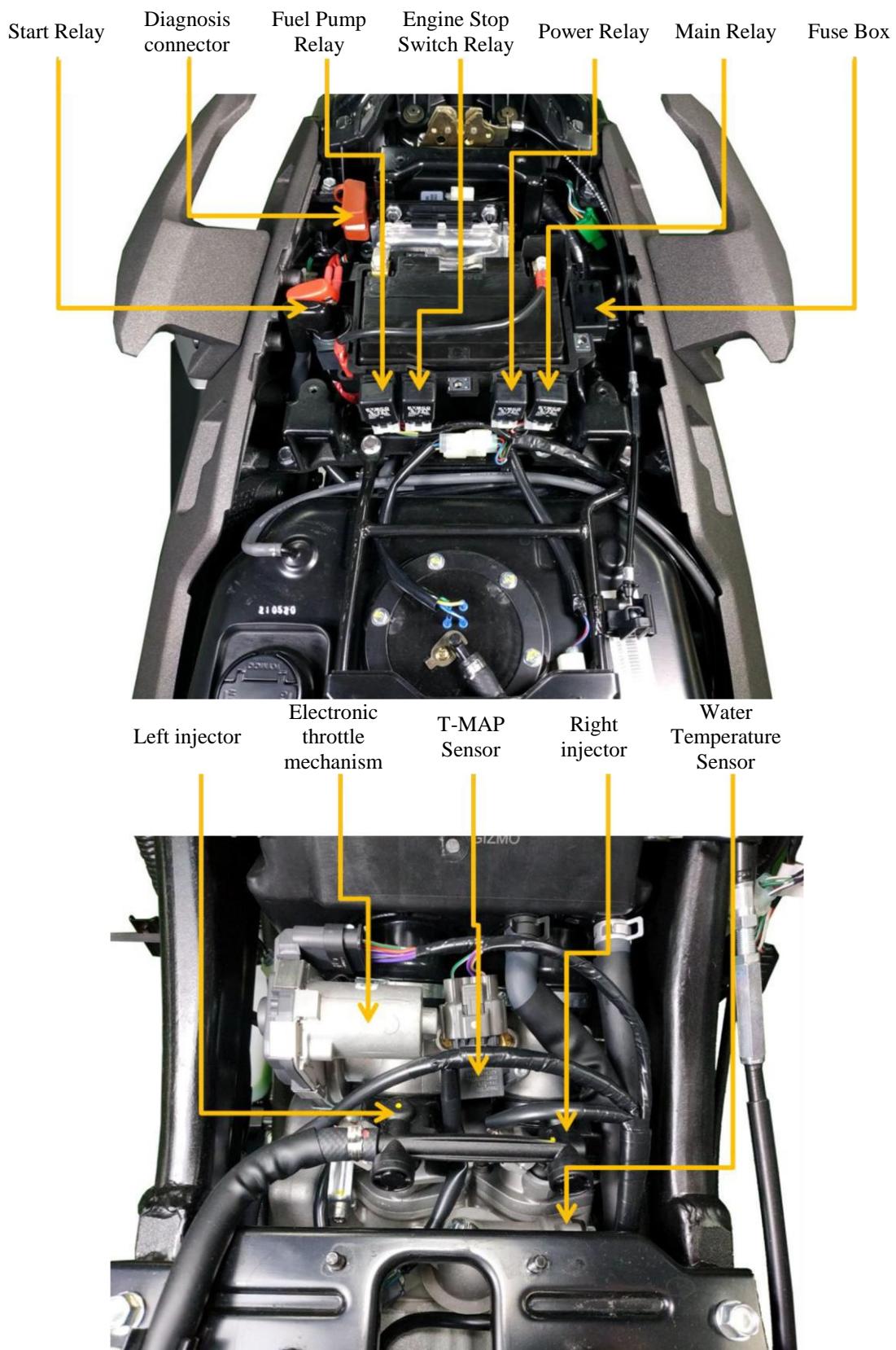
Electrical System Component Location Diagram



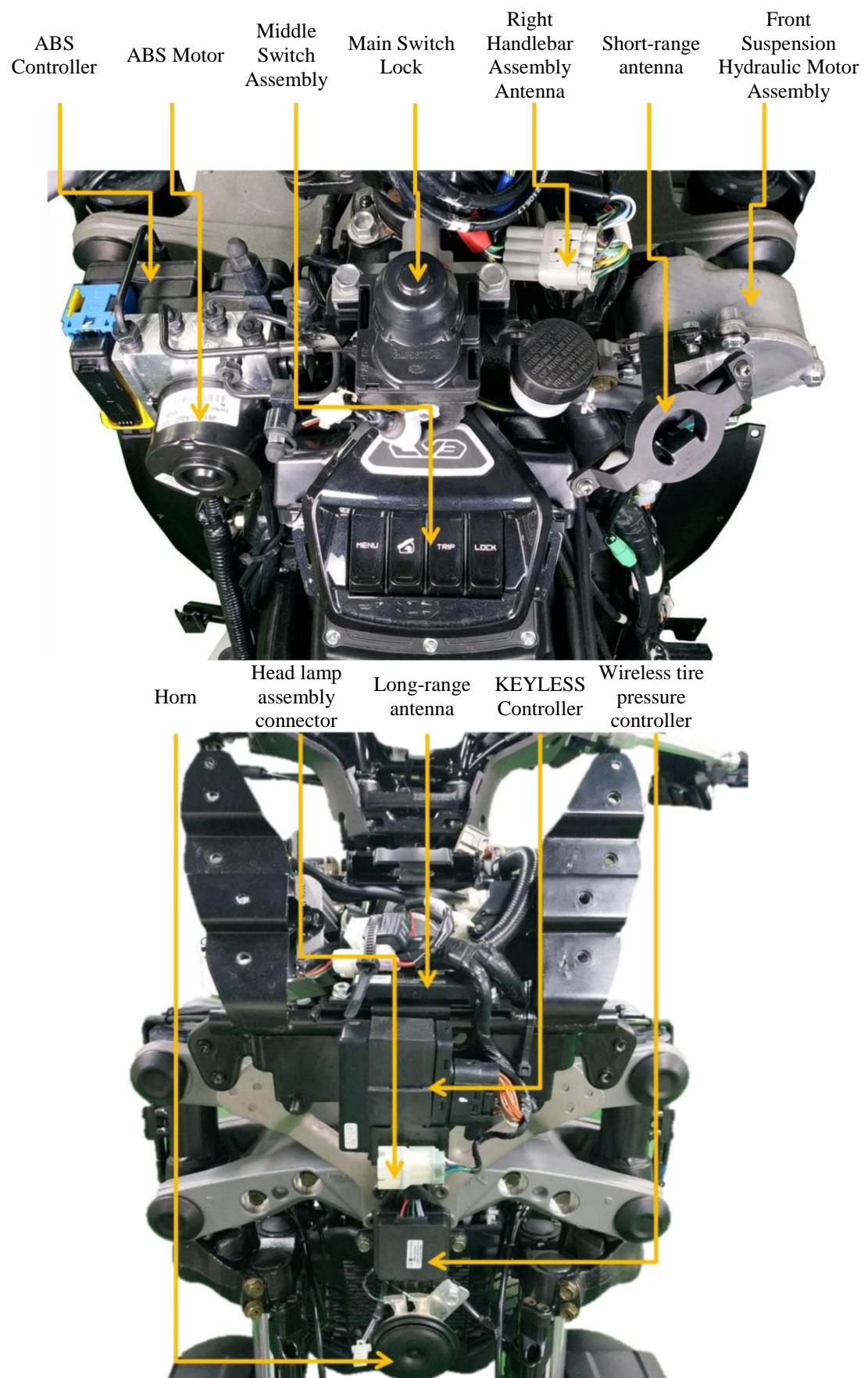
9. Electrical System



Electrical System Component Location Diagram



9. Electrical System

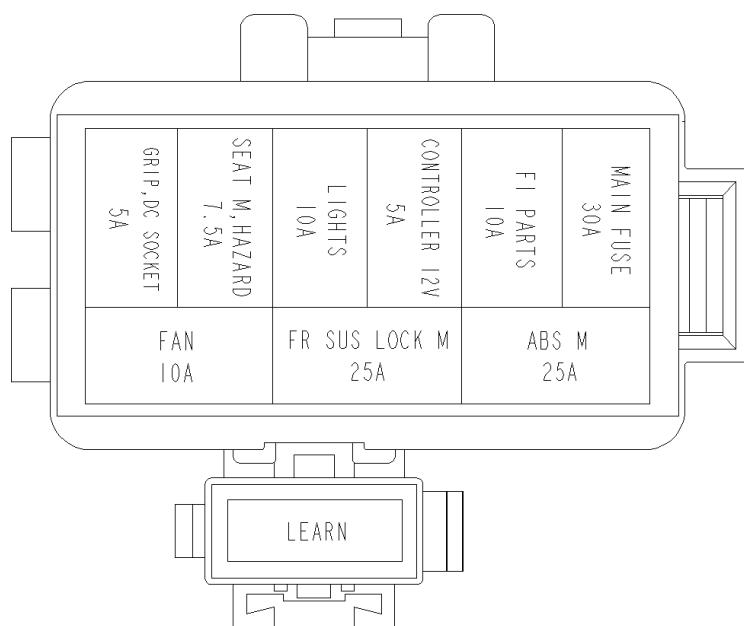


9. Electrical System



Fuse

The fuse box is located next to the battery. Open the fuse box to replace or check the fuses.



Fuse Specification:

MAIN FUSE: Main Fuse	FI PARTS: Injection Part	CONTROLLER 12V: Controller 12V
30A	10A	5A
LIGHTS: Lights	SEAT M, HAZARD: Seat motor, warning indicator	GRIP, DC SOCKET: Heating the Handlebar, DC Socket 12V
10A	7.5A	5A
FAN: Cooling fan	FR SUS LOCK M: Front suspension lock motor	ABS M: ABS Motor
10A	25A	25A

Fuse Replacement

The fuse is located to the left of the battery. Open the fuse cover to get to the fuse.

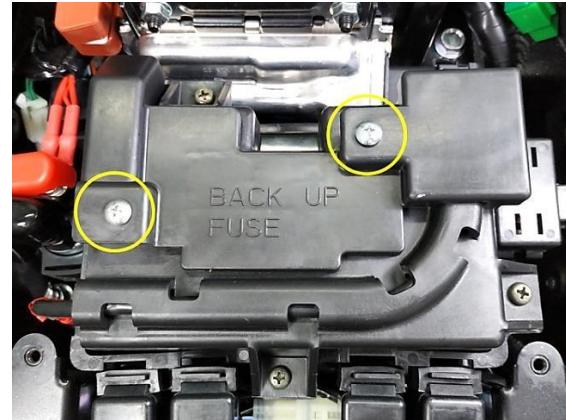
- ◆ Turn KEYLESS Main Switch off, check for blown Fuse.
- ◆ Only replace it with a fuse of specified capacity.
- ◆ Identify the cause of a blown fuse before replacing it.

Backup fuse

When the replacement of fuse is required, the backup fuse is located to the top of the battery cover.

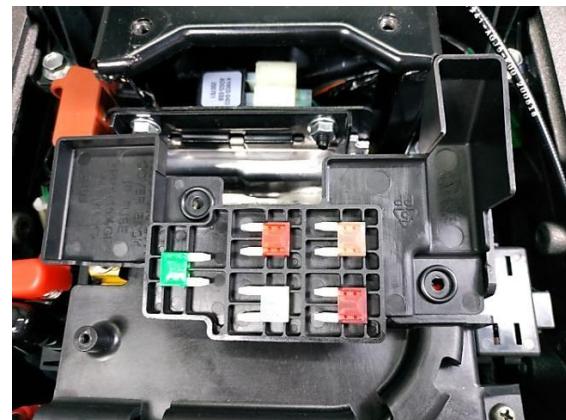
Remove 2 screws from the top side of the protective cover.

Remove 2 screws from the top side of the protective cover.

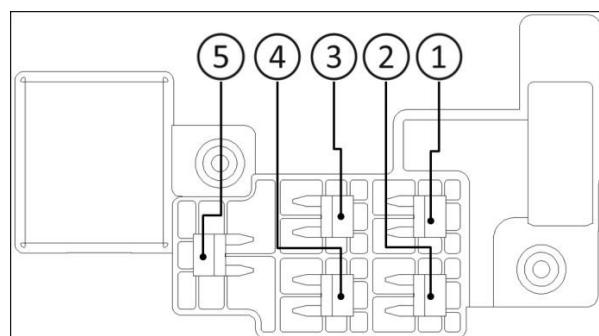


Remove the spare fuse protective cover.

Flip to its back to obtain the backup fuse.



- | | | |
|--------|---------|--------|
| 1. 5A | 2. 7.5A | 3. 10A |
| 4. 25A | 5. 30A | |



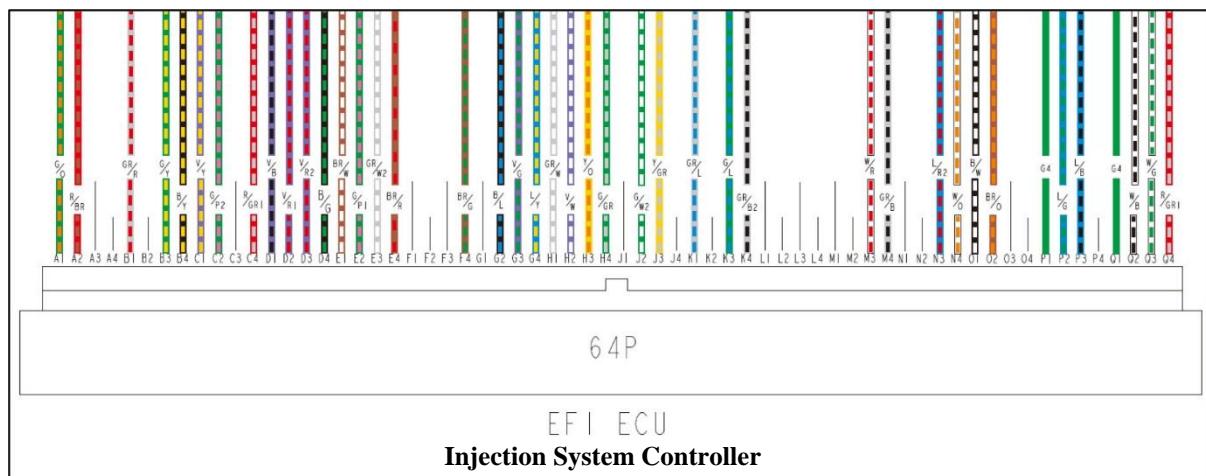
ECU

⚠ Caution

When the main switch is ON (KEY ON), never disconnect the ECU connector, as this may cause ECU damage.

Always disconnect the ECU connector only when the main switch is OFF (KEY OFF).

ECU Pin Diagram



9. Electrical System



ECU Pin Function Table

B-AI	ETC(-)	Electronic throttle mechanism (-)	B-DI	PPS-1 SIGNAL	Handlebar throttle position sensor 1
B-A2	ETC (+)	Electronic throttle mechanism (+)	B-D2	VSENS(PPS-1, TPS)	Sensor power
B-A3			B-D3	VSENS(PPS-2, MAP, TILT)	Sensor power
B-A4			B-D4	VBK	Main Switch Power
B-B1	CRUISE CTRL ON/OFF	Cruise control on/off	B-EI	MANIFOLD AIR PRESSURE	Manifold pressure
B-B2	SIDE STAND SW	Side stand switch	B-E2	SGNDI (PPS-1, TPS)	Sensor ground
B-B3	BRAKE SWI	Brake Switch 1	B-E3	O2 SIGNAL 2(LEFT)	O2 Signal (left)
B-B4	MAIN RELAY	Main Relay	B-E4	CAN-HIGH(+)	CAN signal (+)
B-C1	PPS-2 SIGNAL	Handlebar throttle position sensor	B-FI		
B-C2	SGND2(PPS-2, MAP)	Sensor ground	B-F2		
B-C3	STARTER SW	Start-up switch	B-F3		
B-C4	VBR	Battery voltage supply	B-F4	CAN-LOW(-)	CAN signal (-)
PIN	FUNCTION		PIN	FUNCTION	

B-GI			B-K1	TIA	Air intake temperature
B-G2	MODE SW	Riding mode switch	B-K2		
B-G3	TPS-1 SIGNAL	Throttle Position Sensor Signal 1	B-K3	THERMO	Engine temperature
B-G4	CPS (+)	Crankshaft position sensor (+)	B-K4	O2 HEAT 2(LEFT)	O2 Heat (left)
B-H1	O2 SIGNAL I(RIGHT)	O2 Signal (right)	B-L1		
B-H2	TPS-2 SIGNAL	Throttle Position Sensor Signal 2	B-L2		
B-H3	CRUISE CTRL RESUME (+)	Cruise control resume (+)	B-L3		
B-H4	CPS (-)	Crankshaft position sensor (-)	B-L4	Electronic water pump	Electronic water pump
B-J1	SGND4(TILT)	S grounding 4 (tilt signal)	B-M1		
B-J2	SGND3(THERMO, TIA, O2*2)	S grounding 3 (temperature, O2)	B-M2		
B-J3	CRUISE CTRL SET (-)	Cruise control setting (-)	B-M3	INJ-2(LEFT)	Injector (left)
B-J4	HEAD LIGHT RELAY	Headlight Relay	B-M4	O2 HEAT (RIGHT)	O2 Heat (right)
PIN	FUNCTION		PIN	FUNCTION	

B-NI			B-Q1	PGND I	P grounding 1
B-N2			B-Q2	IGNITION COIL#2(LEFT)	Ignition Coil No. 2 (left)
B-N3	MIL	Engine failure indicator	B-Q3	IGNITION COIL#I(RIGHT)	Ignition Coil No. 2 (right)
B-N4	INJ-I (RIGHT)	Injector (right)	B-Q4	VBR	Battery voltage supply R
B-O1	KILL SW	Engine Stop Switch	PIN	FUNCTION	
B-O2	BRAKE SW2	Handbrake Switch 2			
B-O3					
B-O4					
B-P1	PGND 2	P grounding 2			
B-P2	FAN RELAY	Fan Relay			
B-P3	FUEL PUMP RELAY	Fuel Pump Relay			
B-P4	STARTER RELAY	Start Relay			
PIN	FUNCTION				

Remove rear seat assembly

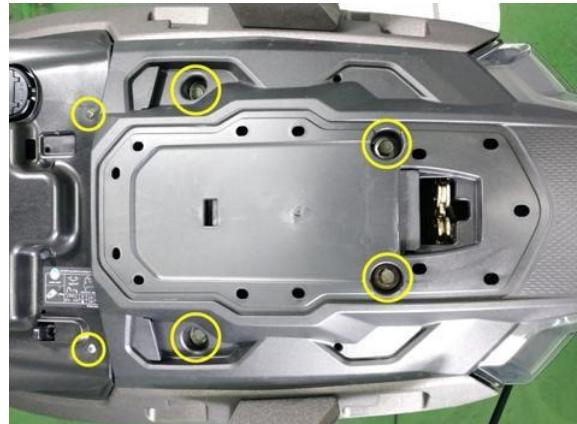
Per the figure, pull the seat locking switch. When the rear seat assembly is opened, remove the rear seat.



Remove the rear seat rubber covering.



Remove 6 screws and then remove the seat cushion protective cover.



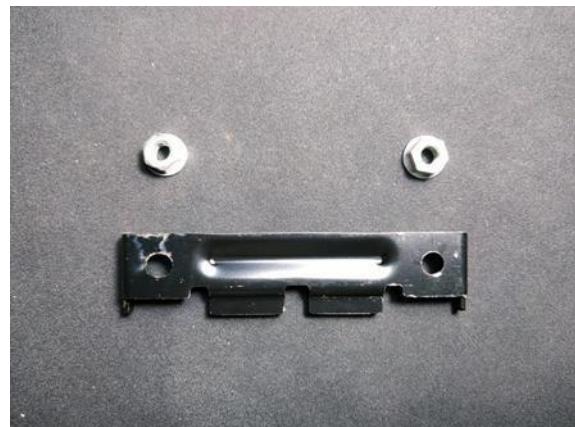
Remove 2 fixing screws from ECU.



ECU Connector Installation and Removal Method and Steps

1. Before assembly, first confirm whether the lever is at the lower locking position. If not, be sure to return it to that position; otherwise, it cannot be inserted.
2. After confirming the lever is at the lower locking position, insert the ECU connector socket (pay attention to direction). After insertion, the protrusion on the socket should be inside the lever track.
3. Hold the connector cover with your index finger, and push the lever upward with your thumb. You will hear a clicking sound as you push the lever up, causing the connector to engage with the socket.
4. Push the lever up until it reaches the top. There will be a stopper that springs back, indicating the installation is complete.

Remove the ECU fixing damper.



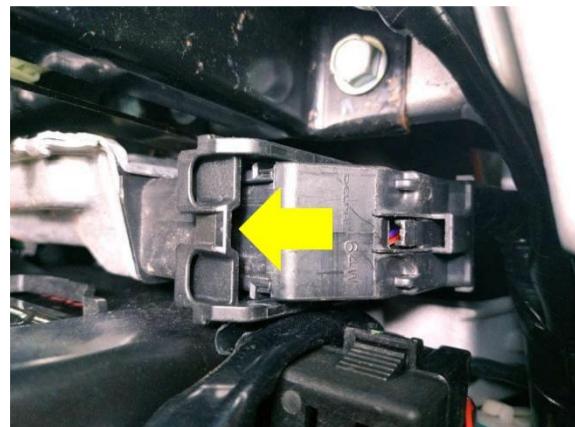
Press the ECU connector latch and then lift the lever upward.

⚠ Caution

Before removing the ECU connector, confirm that the main switch power is disconnected to avoid the ECU damage when the switch is carrying the current.



After that, push it straight to the bottom. On hearing the “click” sound, it means the ECU has been opened to the intended position.



9. Electrical System



The ECU shall be restored in reverse order of the removal.

▲Caution

- When restoring the ECU fixing damper, the ECU body shall be secured into the damper groove.
- When restoring the ECU connector, it shall be executed carefully until the latch is correctly positioned.



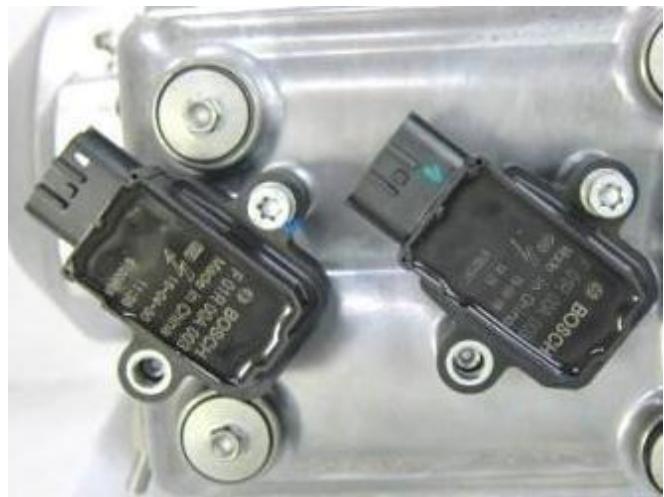
Ignition System

The ignition timing is adjusted by ECU automatically. Do not use the plug-in PC or ECU (other brand) to change the ignition timing setting as it may lead to vehicle damage.

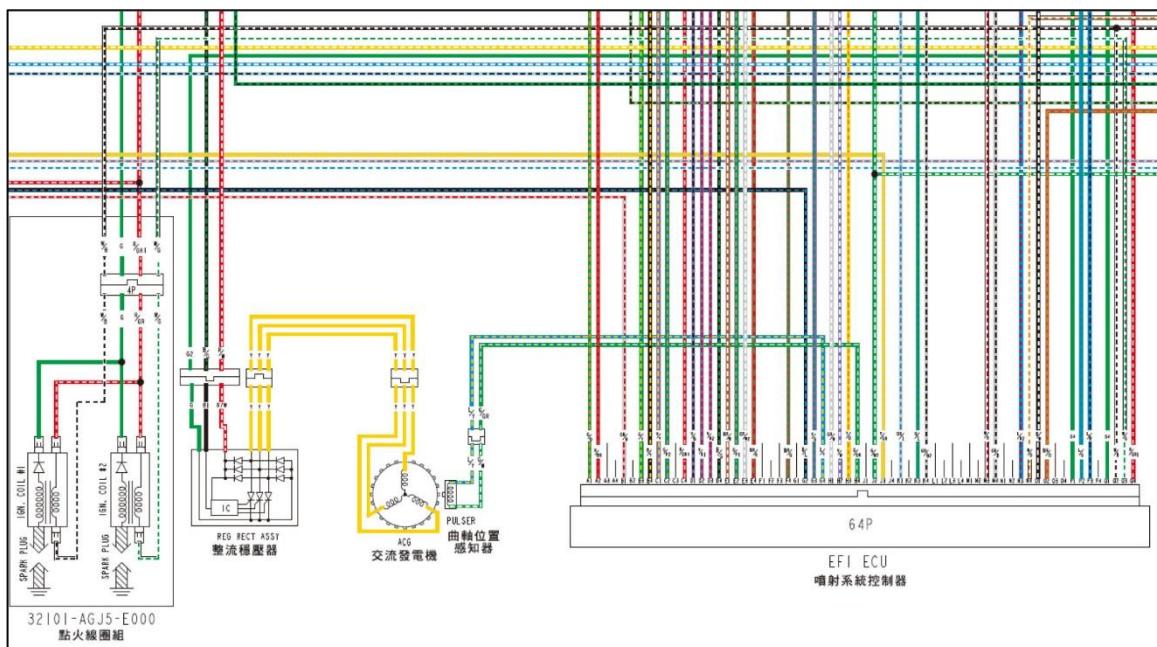
Ignition Coil

Remove the Ignition Coil connector.

Remove 2 bolts from the Ignition Coil and then take out the Ignition Coil.

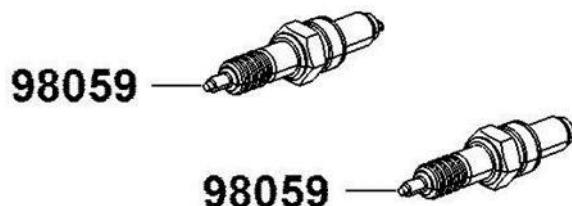


Ignition System Circuit Diagram



Spark Plug

After taking out the Ignition Coil, remove the Spark Plug with a linear spark plug socket.



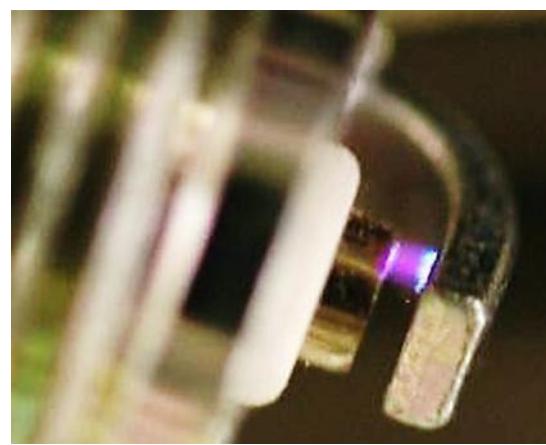
Measure the gap of the Spark Plug with the Spark Plug gap gauge. If not within the specified value, please make adjustment.

Spark Plug Specifications	NGKCR7E
Spark plug gap	0.8~0.9 mm

Check if any dirt remains in the Spark Plug. If required, replace it with a new one.

Spark Plug Spark Test: Check if the igniting status and the spark color are normal.

If required, replace it with a new one. (During the spark plug spark test, keep the Spark Plug away from the oil path and take necessary safety precautions).



Do not secure the Spark Plug too tight as it may lead to thread slipping of the Cylinder Head.

Item	Tightening Torque
Spark Plug	8–12 N·m (0.8 – 1.2 kgf·m)

AC Generator inspection

Crank position sensor (CPS) inspection

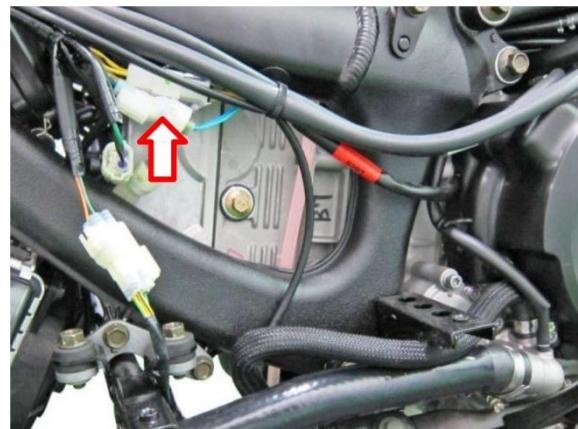
- Remove the lead wire connector used for separating the crank position sensor.
- Use a multimeter to measure the resistance value between Blue/Yellow (L/Y) and Green/Gray (G/GY).

Resistance:

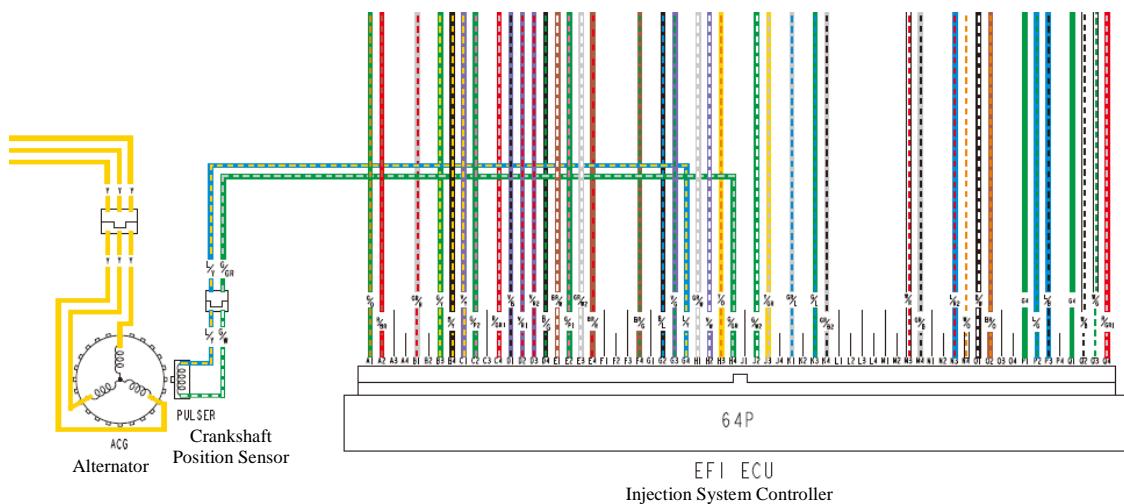
Blue/yellow and green/gray lead wires: 96–144 Ω

Caution

The wire colors between the main harness connector and the component connector may sometimes differ slightly, but the connectors and wiring assemblies are correct.



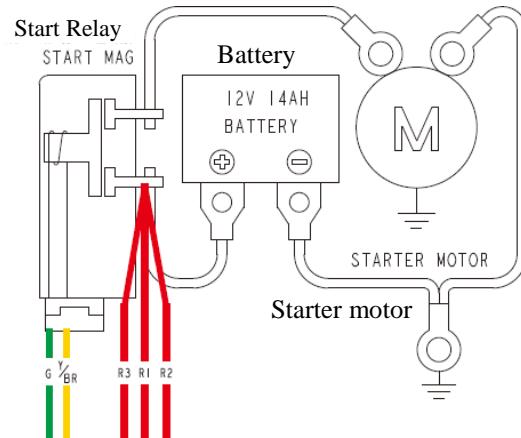
Check according to the circuit diagram provided below.



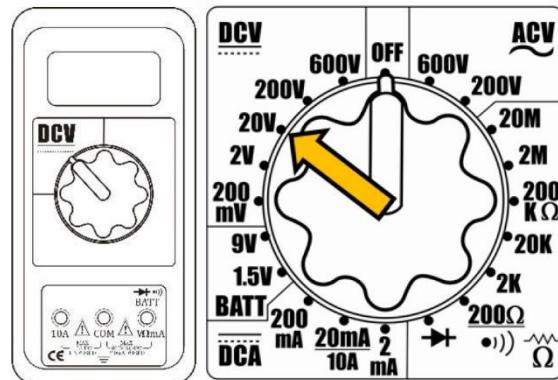
Charging System

Charging Voltage Check-up

1. When the engine is warmed up, connect the fully-charged battery.
2. Use a multimeter set to the DC voltage (DCV) range (do not select a range lower than the expected voltage).
3. Connect the red probe to the positive terminal of the battery and the black probe to the negative terminal.



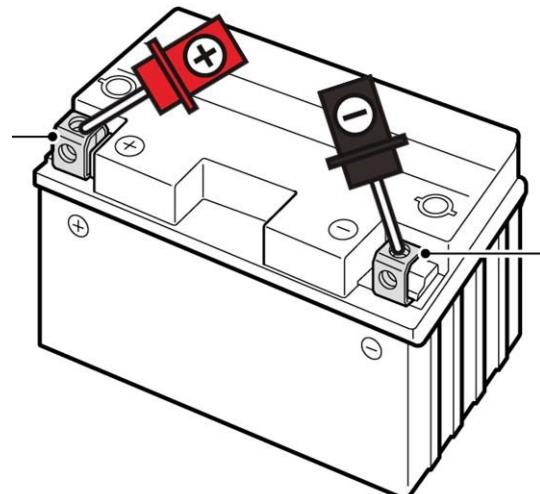
4. Start the engine, gradually increase the throttle so the engine speed rises slowly, and measure the limit voltage and charging voltage.



5. Accelerate gently until the engine speed reaches around 5000 RPM, then use the multimeter to measure the DC voltage.

Battery voltage measurement: 13.8V or higher

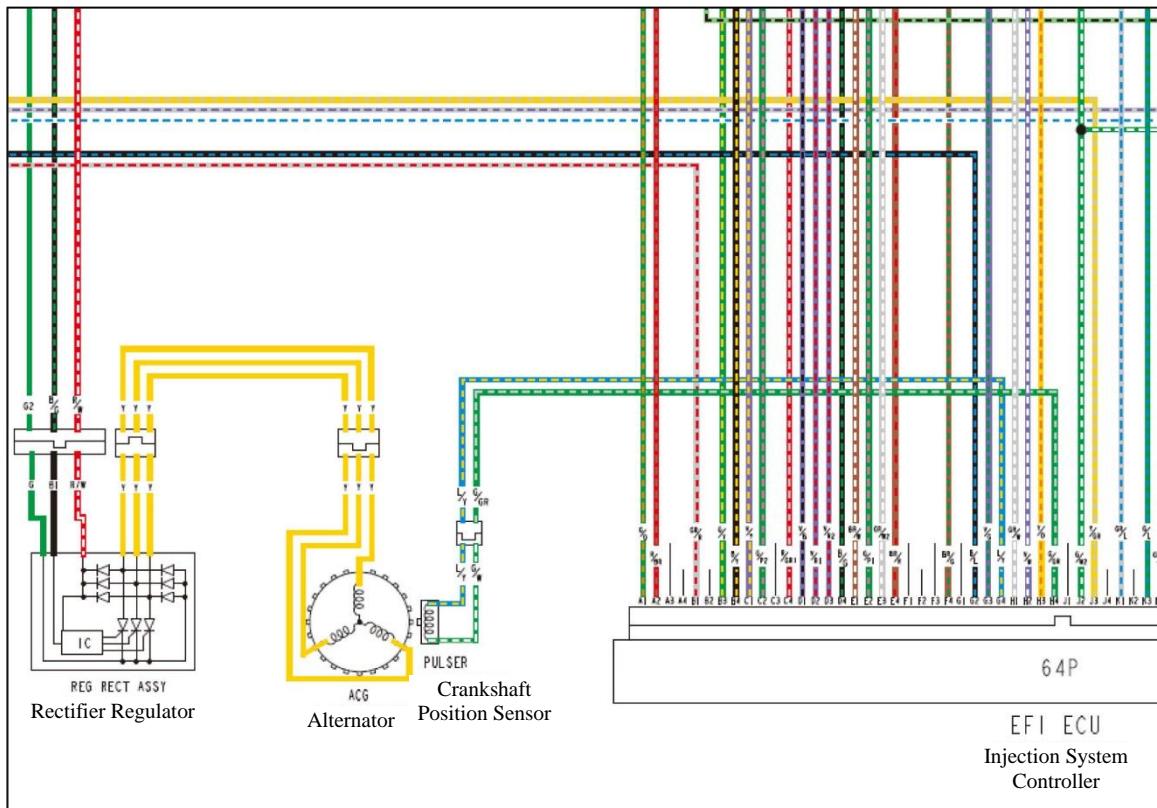
Charging voltage measurement: $14.5 \pm 0.5V$



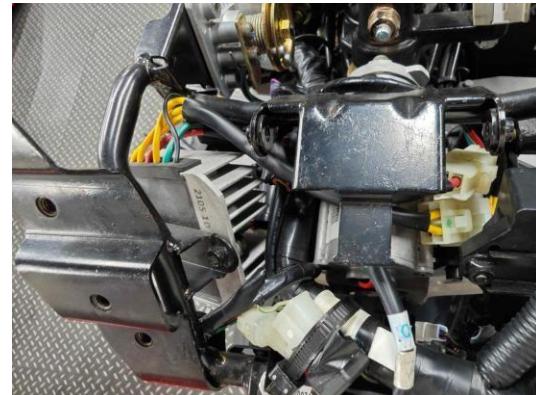
9. Electrical System



Regulator / rectifier

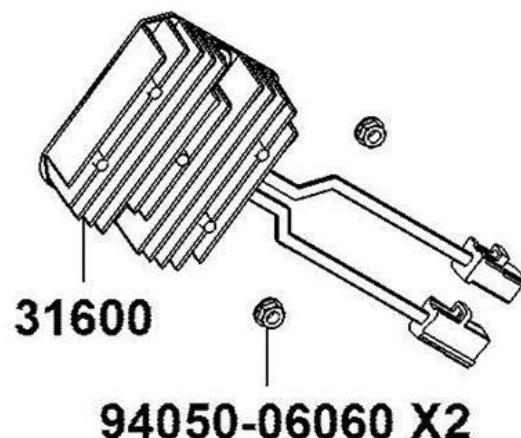


Remove the fastening nut and disconnect the regulator connector.



Remove the regulator and the rectifier

Disconnect the wire connector of the separator regulator/rectifier, and check whether the wire connector is loose or if there is corrosion on the connector.

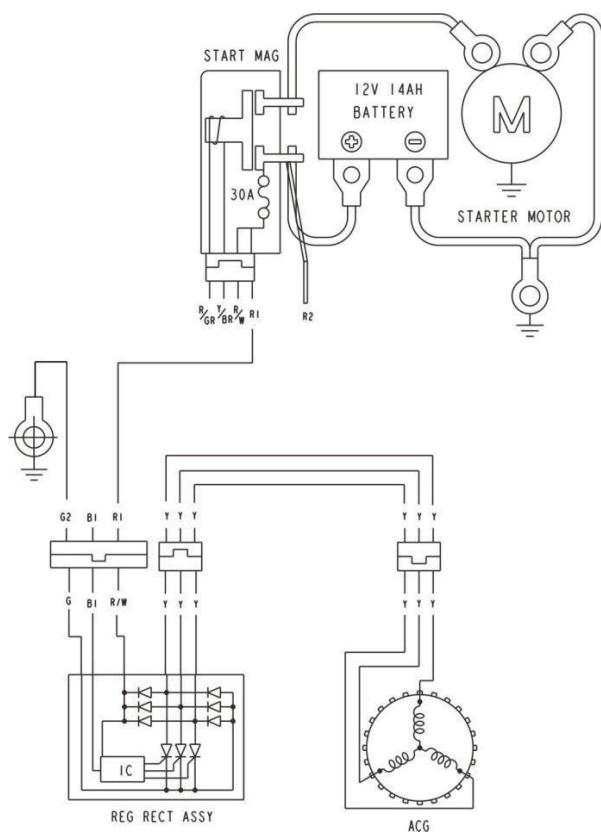


Battery lead wire

Set the multimeter to the DCV-20V range. Connect the multimeter's \oplus lead to the red/green wire, and the lead to the chassis. When the main switch is ON, the reading will be approximately the battery voltage.

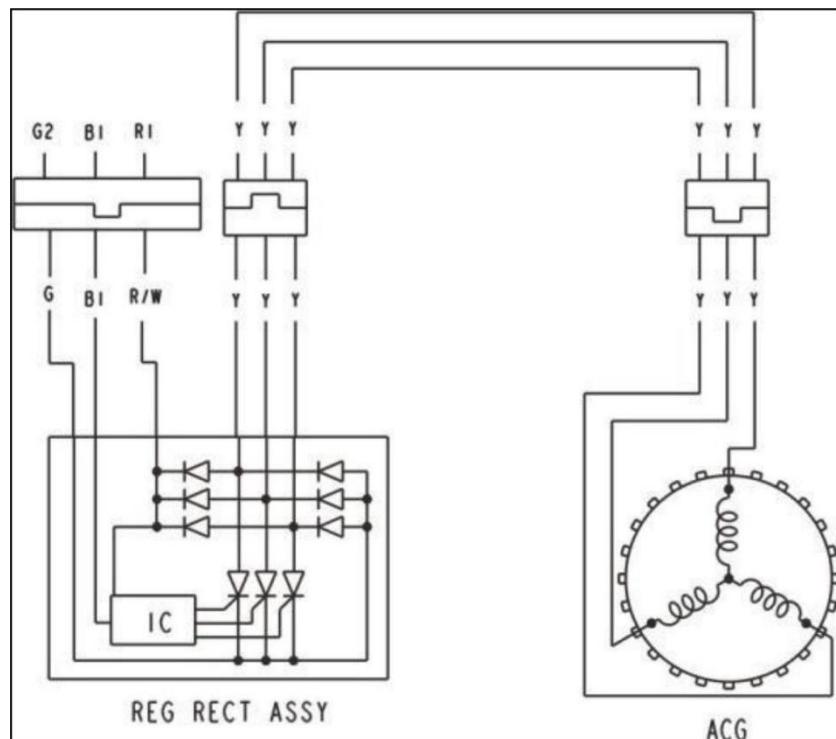
Earthing wire

Use the multimeter in the Ω range to check continuity between the green wire and the ground wire. It should conduct, and the smaller the resistance, the better.



Charging Coil Inspection

Disconnect the wire connector of the separated charging coil, and check whether the wire connector is loose or if there is corrosion on the connector.



Measure the impedance between every two yellow wires. Check the continuity between each yellow wire and the ground wire.

There should be no continuity; if there is, it means the charging coil is grounded.

Battery

▲Caution

- Operational Precautions: The electrolyte (dilute sulfuric acid) is highly toxic, which may pose the risk of burn or blindness when it comes into contact with your clothes, skin or eyes. In the event of electrolyte contact, wash the contacted part with plenty of clean water and seek medical treatment from a doctor. When your clothes come into contact with the electrolyte, your skin may also contact it. In this case, take off your clothes and wash the contacted part with plenty of water.
- Currently used lead-acid batteries are all sealed, maintenance-free types. Although there are no issues as mentioned above, when installing a new battery, the electrolyte (dilute sulfuric acid) injection process must be handled carefully.

Removal

The battery is located at the rear of the vehicle and must be removed according to the following steps.

Remove rear seat assembly.

Per the figure, pull the seat locking switch. When the rear seat assembly is opened, remove the rear seat.



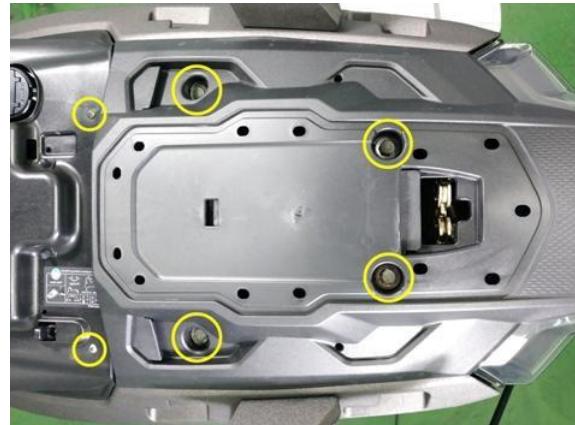
Remove the rear seat rubber covering.



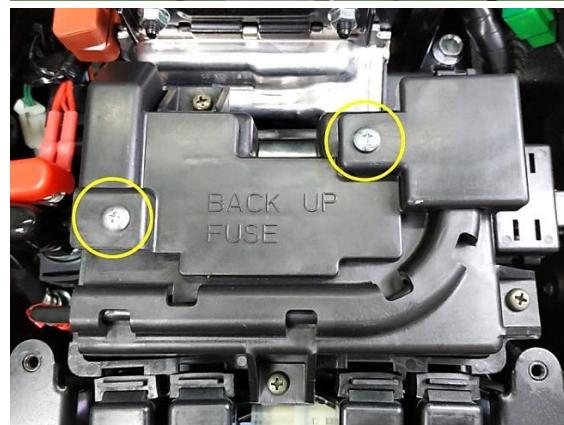
9. Electrical System



Remove 6 screws and then remove the seat cushion protective cover.



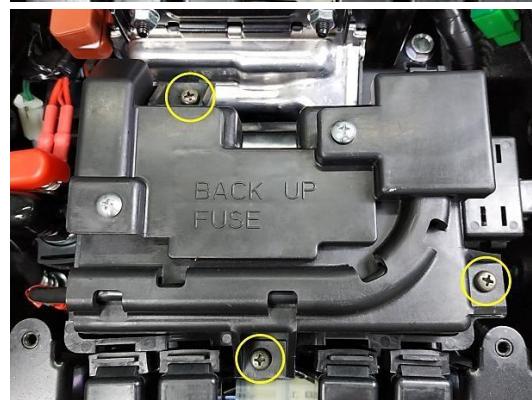
If only measuring the battery terminals, you can remove the spare fuse cover by unscrewing 2 screws.



Remove the spare fuse cover.



Alternatively, if you want to remove the battery, first remove the battery cover by unscrewing 3 screws.



9. Electrical System



Then disconnect the battery terminals and carefully remove the battery.

⚠ Caution

- Remove the negative lead wire first and then the positive lead wire.
- When using metal tools, be careful not to cause a short circuit.



⚠ Caution

- Before installing the battery cover, penetrate the positive electrode wire through the protective cover securing groove. After restoring the protective cover, adjust the wire hole and then tighten the terminals of the positive and negative electrodes.



Check Battery Voltage

Remove the battery positive and negative cables.

Measure the voltage between battery poles.

Fully charged: 13.2 V Undercharged: below 12.3 V

Battery Charging

Connection method:

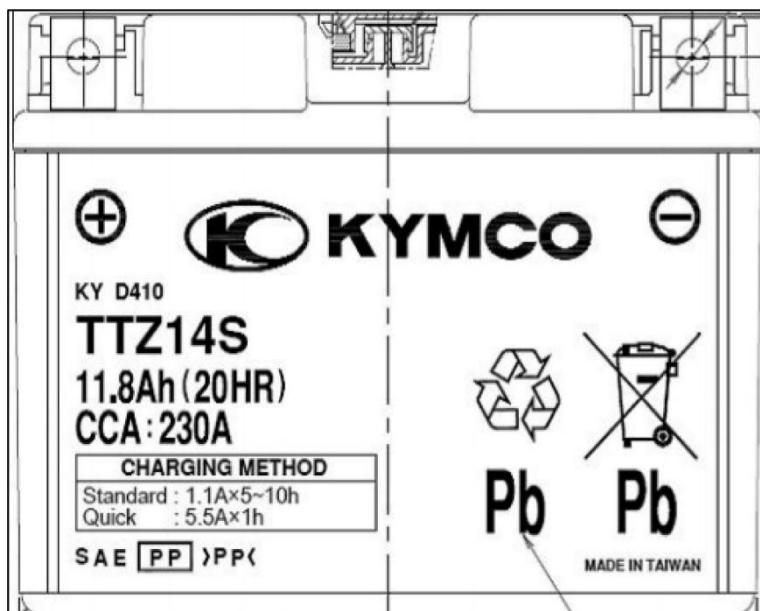
Connect the battery positive (+) terminal to the + battery cable, and the negative (-) terminal to the - battery cable.

Connect the negative end of the charger to the negative end of the battery.

▲Caution

- When charging the battery, make sure to remove the battery from the vehicle before charging.
- Never use any open flame in the vicinity of the battery.
- When charging starts or finishes, make sure the charger is turned off first to prevent the connected part from generating sparks. Otherwise, the risk of explosion may exist.
- When charging the battery, follow the current and time information indicated on battery label.
- During battery charging, the temperature must not exceed 45°C.
- Do not use boost charge for the battery unless it's an emergency.
- After charging is finished, wait 30 minutes before measuring the voltage.

Charging current: Standard: 1.1 A / 5 to 10 hours; Fast charge: 5.5 A / 60 minutes



Starting System

Starter Relay

Contact side impedance check

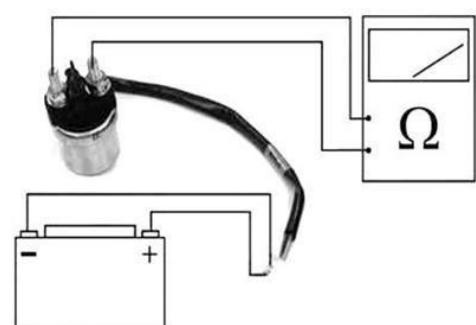
With the ignition OFF (KEY OFF), remove the motor-side fixing nut on the starter relay and disconnect the motor wiring to open the circuit.

Nut tightening torque: 40–60 kgf.cm

1. Set the multimeter to the ohm (Ω) range.
2. First, touch the red and black probes to both ends of the contact points.
3. Press the start switch and confirm the reading on the ohm scale.
4. After measurement, the component must be properly installed and secured in position.

Specification: should be less than 1–0.8 ohms.

This is a connection diagram for measuring a single component that has been removed separately.



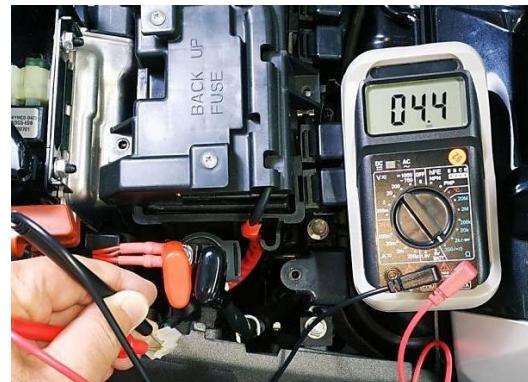
Coil side impedance check.

With the ignition OFF (KEY OFF), locate the **coil side connector** on the starter relay, and disconnect the **connector** wires to open the circuit.



1. Set the multimeter to the ohm (Ω) range.
2. First, use the red and black multimeter probes to measure across both terminals.
3. After measurement, remember to restore the wiring to its original condition.

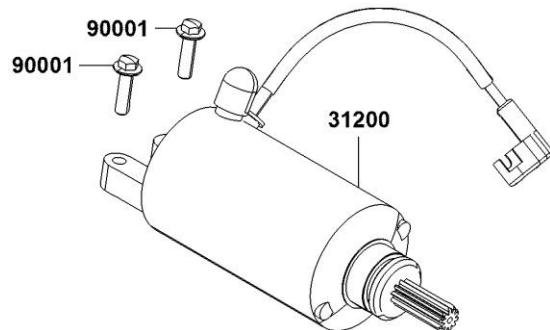
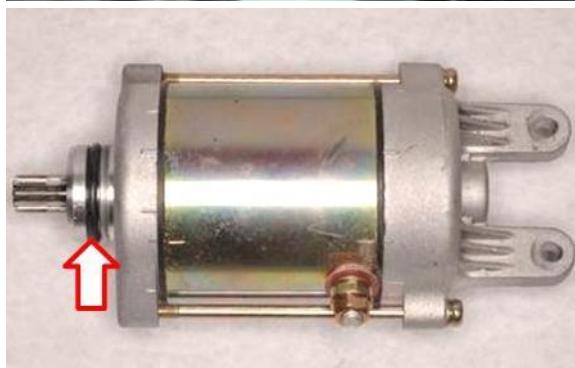
Specifications: Should be between 3.5–5.5 ohms



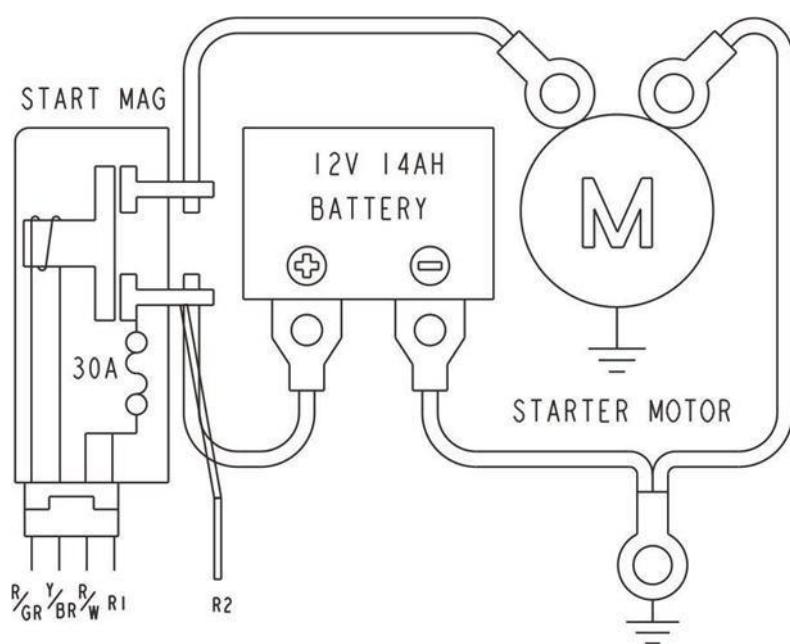
Starter motor

First, remove the seat storage box. Roll up the rubber waterproof cover and then disconnect the starter motor power wire.

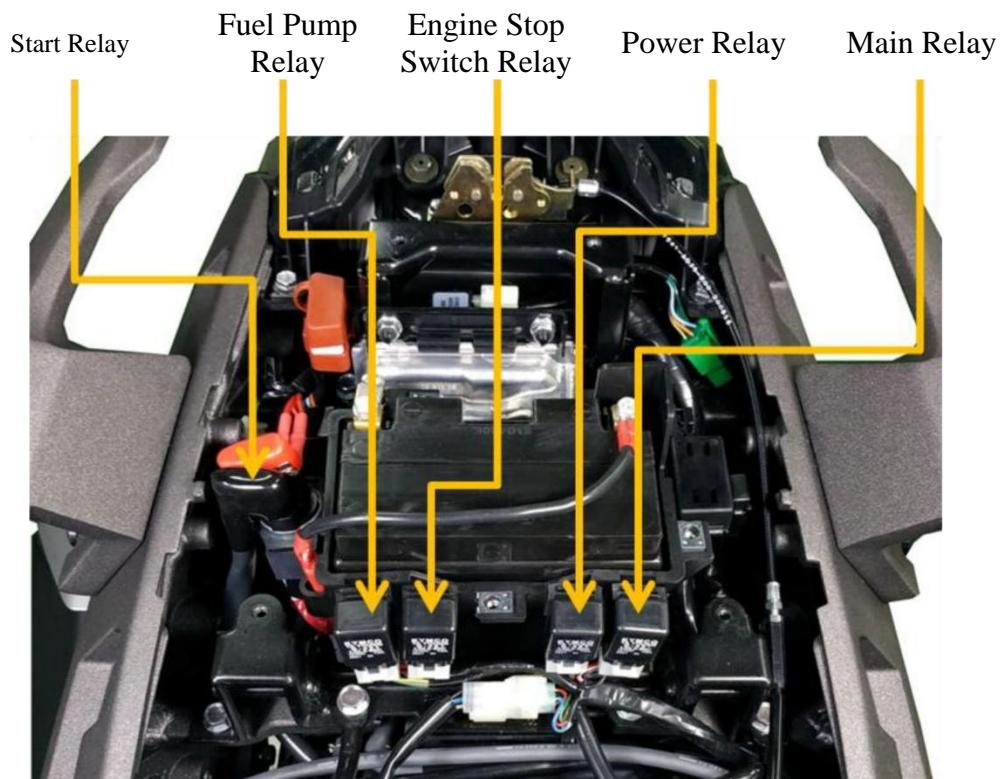
Remove 2 mounting bolts from the starter motor and then remove the starter motor.



Check if the O-ring is damaged. Replace it with a new one when any error occurs.

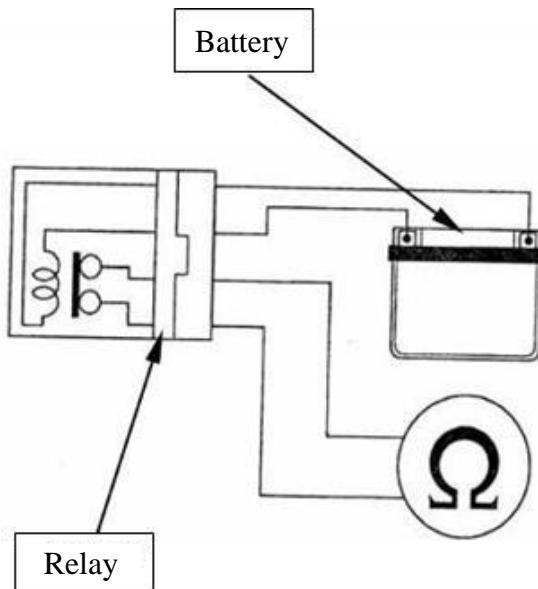


Relay



Relay inspection

Check the Relay with a multimeter.



Measure the platinum contacts to have the same voltage as the battery voltage; after a few seconds, the voltage should drop to below 0.2V when cut off.

Measure the resistance of coil-type relays to see if it is within the standard range (about 60 to 90 ohms).

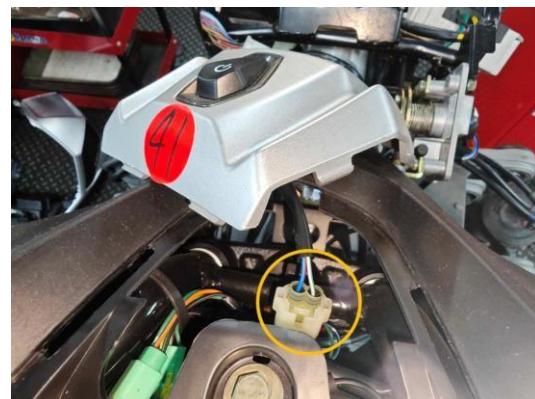
Measure the resistance of IC-type relays to see if it is within the standard value (about 180 ohms).

Main Switch

Use a plastic pry tool to remove the cover at the marked spot on the main switch cover.



Find and remove the connector.

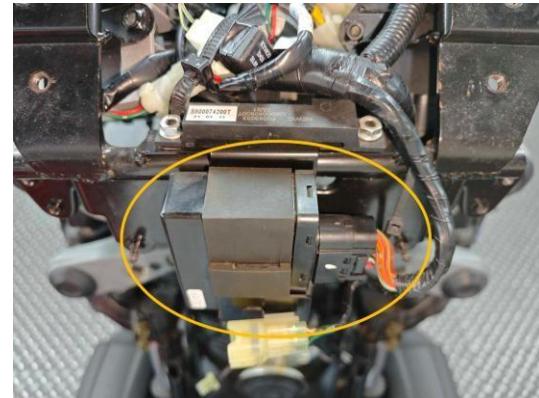


Remove the main switch cover.



Keyless and seat opening controllers

Remove the wire connector of the keyless controller and remove the keyless controller.



When installing, pay attention to the direction of the rubber seal



Remove the storage box. Unscrew the fixing screws of the seat opening controller and remove its wires and connectors. Remove the seat opening controller.



Storage box illumination switch:

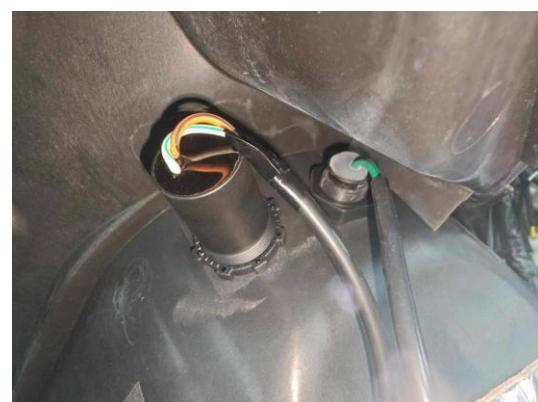
Unscrew the fixing bolts of the storage box and lift it upward.



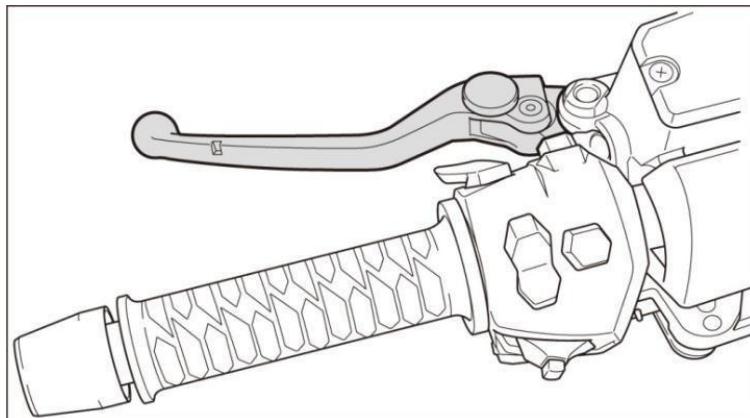
Remove the light sensor switch and the storage box light connector.



Remove the luggage cabinet switch and storage box light,



Left Handlebar Switch



Use a multimeter to check the continuity of the handlebar switch according to the circuit diagram.

Left Handlebar Switch
SW ASS'Y, LH, HANDLE COMP.

MODE	Mode key	
FREE		
PUSH		
CORD SIZE	AVSS0.5f	AVSS0.5f
CORD COLOR	Y/P	G/W

HEATING	Heating the Handlebar	
FREE		
PUSH		
CORD SIZE	AVSS0.5f	AVSS0.5f
CORD COLOR	Y/L	G

WINKER	Blinker switch		
(N)			
CORD SIZE	AVSS0.5f	AVSS0.5f	AVSS0.5f
CORD COLOR	GR	O	SB

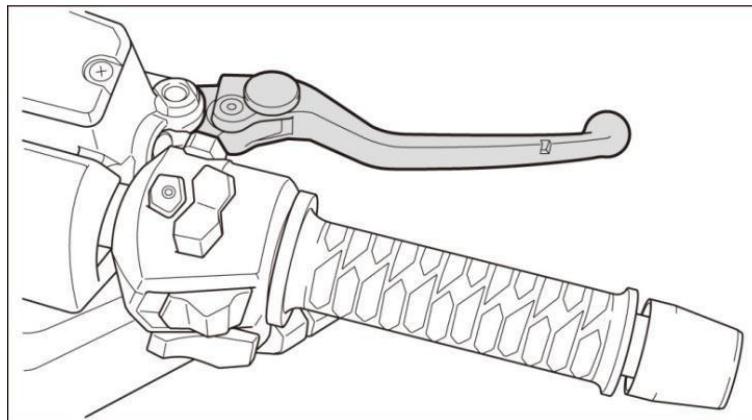
Over-pass Light Switch

PASSING		
FREE		
PUSH		
CORD SIZE	AVSS0.75f	AVSS0.75f
CORD COLOR	BR/L	L

HORN	Horn switch	
FREE		
CORD SIZE	AVSS0.75f	AVSS0.75f
CORD COLOR	BR/L	LG

DIMMER	High/Low beam switch		
CORD SIZE	AVSS0.75f	AVSS0.75f	AVSS0.75f
CORD COLOR	L	W	L/W

Right Handlebar Switch



Use a multimeter to check the continuity of the handlebar switch, following the circuit diagram instructions to inspect.

Right Handlebar Switch

SW ASS'Y, RH, HANDLE COMP.

START		Start-up key
FREE		
	<input type="circle"/>	<input type="circle"/>
CORD SIZE	AVSS0.5f	AVSS0.5f
CORD COLOR	Y/R	G1

HAZARD		Warning indicator key
FREE		
	<input type="circle"/>	<input type="circle"/>
CORD SIZE	AVSS0.75f	AVSS0.75f
CORD COLOR	B/L	Y/B

KILLER		Engine stop key
FREE	<input type="circle"/>	<input type="circle"/>
CORD SIZE	AVSS0.75f	AVSS0.75f
CORD COLOR	B/W	B/G

DOWN		Down key
FREE		
	<input type="circle"/>	<input type="circle"/>
CORD SIZE	AVSS0.5f	AVSS0.5f
CORD COLOR	G/V	G2

UP		Up key
FREE		
	<input type="circle"/>	<input type="circle"/>
CORD SIZE	AVSS0.5f	AVSS0.5f
CORD COLOR	Y/V	G2

DEFINE		Confirm key
FREE		
	<input type="circle"/>	<input type="circle"/>
CORD SIZE	AVSS0.5f	AVSS0.5f
CORD COLOR	G/BR	G2

**NOODEE smart
dashboard key**

NOODEE		
FREE		
●	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	0/BR	G2

Cruise control key

CRUISE		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	GR/R

Reset key (-)

RESET(-)		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	Y/GR

Car key switch key

KEYLESS		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	W/P	R/Y

Resume key (+)

RESUME(+)		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	Y/O

Close/Lock key

OFF/LOCK		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	GR/O

Seat key

SEAT		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	SB/B

**Three-wheel
unlock button**

3W UNLOCK		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	SB/Y

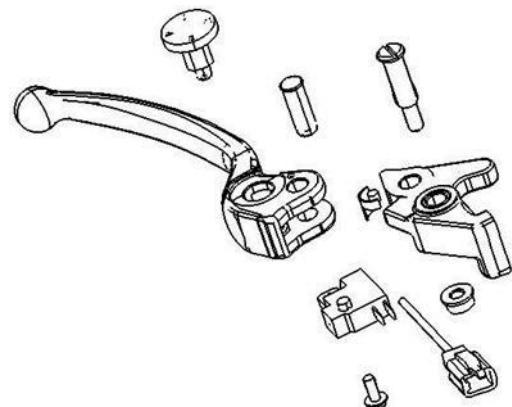
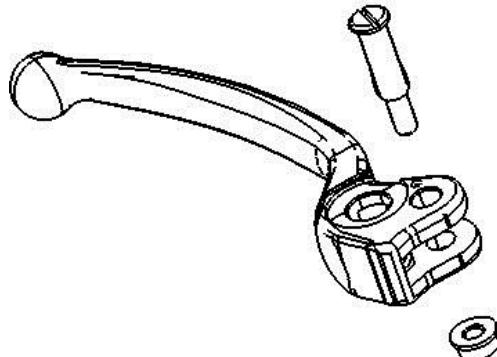
Three-wheel lock button

3W LOCK		
FREE		
○	○	○
CORD SIZE	AVSS0.5f	AVSS0.5f

CORD COLOR	G	SB/G

Brake Light Switch

Remove the front and rear brake light wire connectors, and check for continuity at both ends of the wire connectors. After removing the brake lever nut, take off the brake lever.



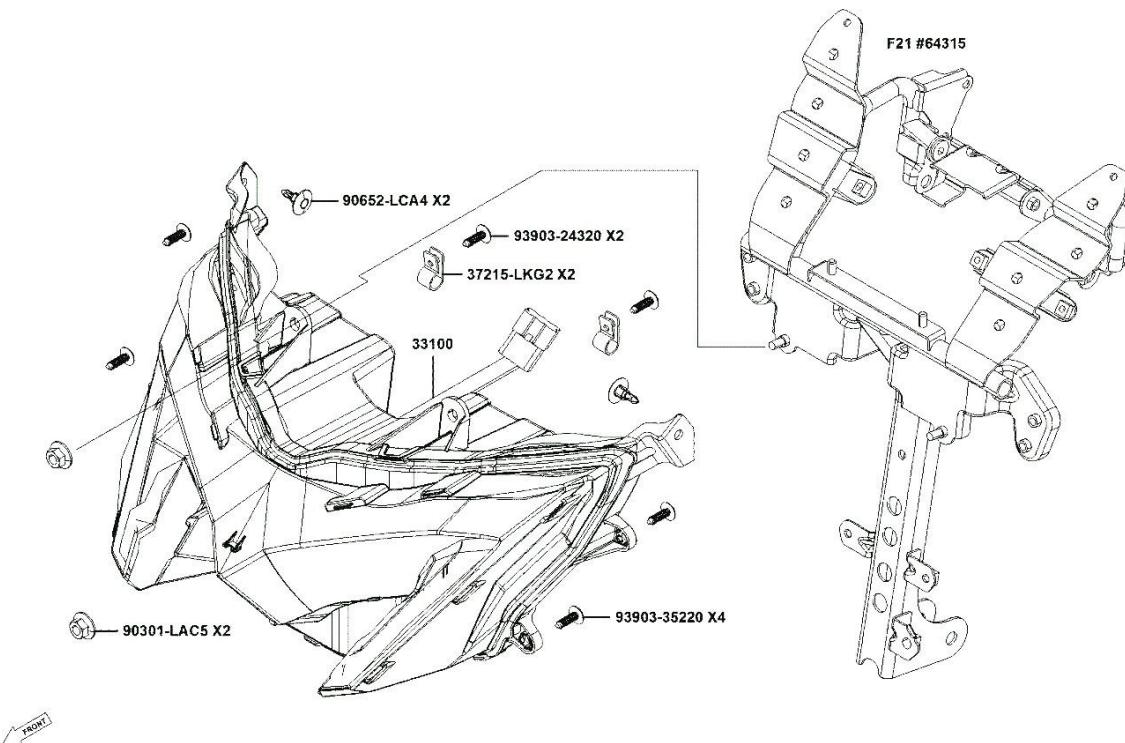
When the front or rear brake light switch is pressed, there should be continuity. When the brake light switch is released, there should not be continuity.

STOP SW



Lighting components

Headlight Assembly



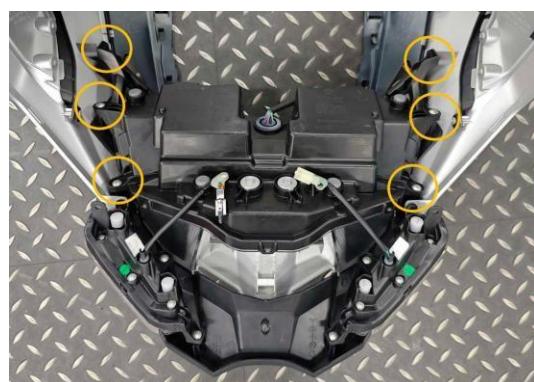
9. Electrical System



Remove the front panel. After taking out the screws/plastic screws, separate the front panel and the front light assembly.



Remove the mounting screws/plastic screws of the front light assembly.



After removing the plastic screws at the front end of the light assembly, take off the assembly.

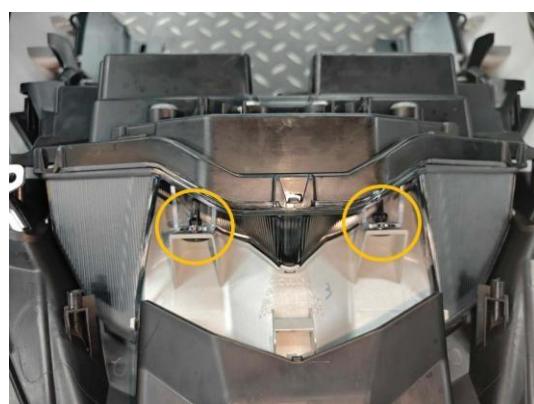
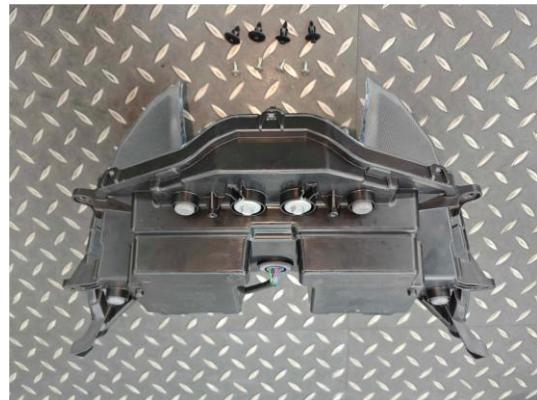


Photo of the front of the light assembly
If the front light assembly is damaged, the entire set needs to be replaced.



Back side of the light assembly and adjustment mechanism



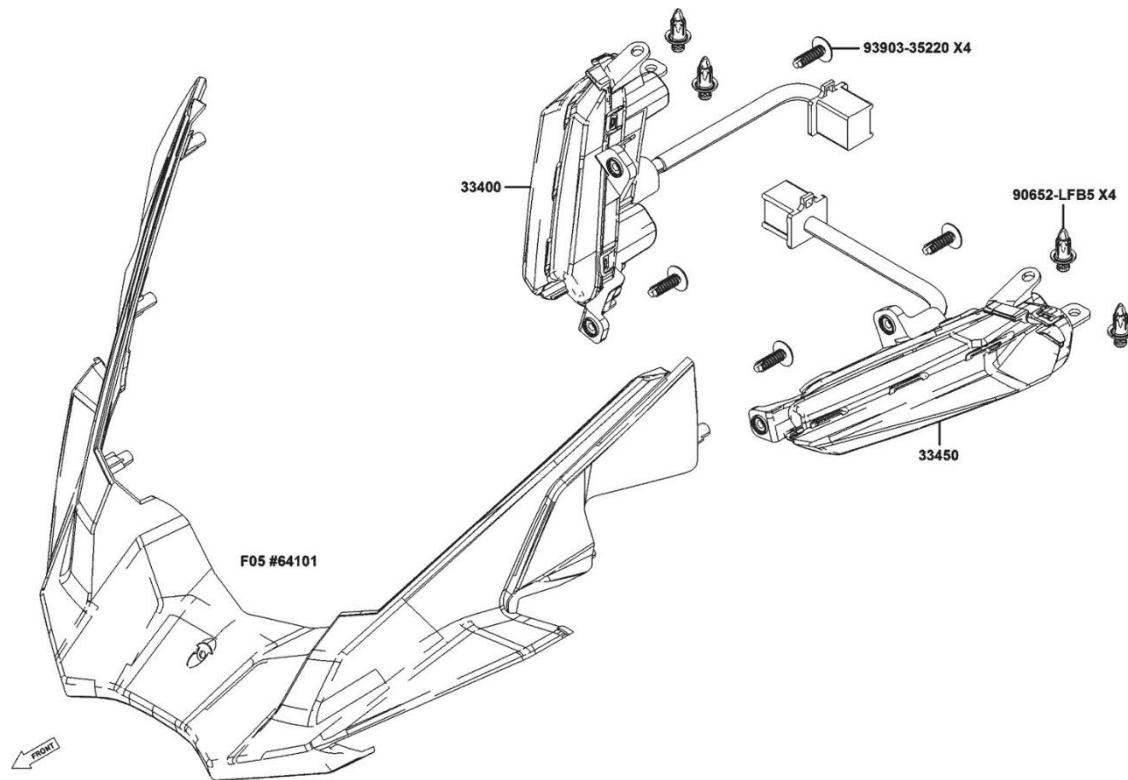
There are axis adjustment screws marked at the back of the light adjustment mechanism, which can be adjusted up or down after the entire vehicle is assembled.



Check Winker

Remove the front cover. Remove the screws of the front turn signal. If damaged, replace with a new complete LED assembly.

9. Electrical System



Remove the front panel. After taking out the screws/plastic screws, separate the front panel and the front light assembly.



Remove the mounting screws/plastic screws of the right/left light assembly.



9. Electrical System



Remove the right/left winker unit.

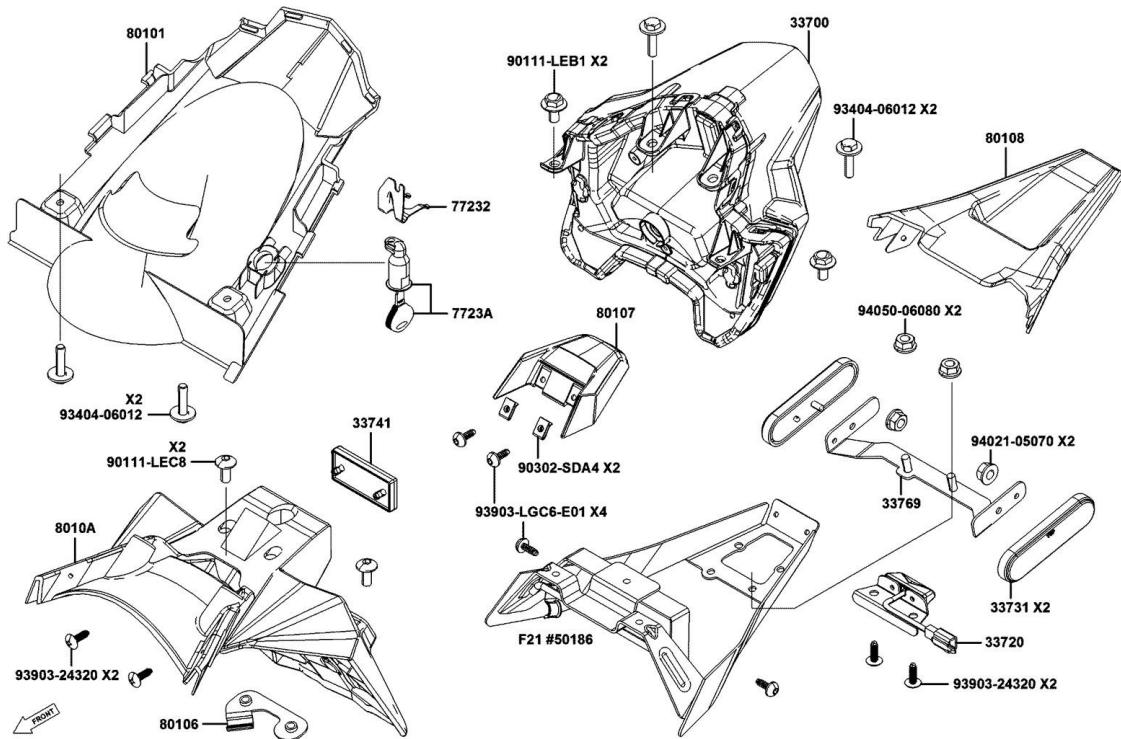
During assembly, reassemble in the reverse order.



9. Electrical System



Tail Light / Brake Light / Rear Turn Signal Light



Remove the rear body cover assembly. After removing the screws/plastic screws, separate the rear body cover panel and the rear light assembly.



Use a flathead screwdriver to pry up the mounting bracket slightly.



9. Electrical System



Remove the rear light assembly.



Remove the rear light assembly connector.



Remove the rear light assembly.

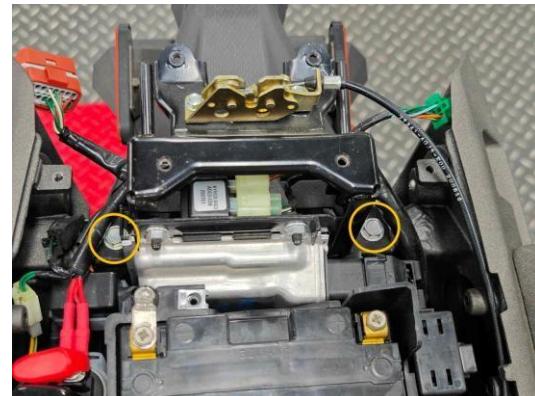


The rear light assembly includes the taillight, brake light, and left and right turn signals. If damaged, the entire rear light assembly must be replaced.



License Plate Lamp

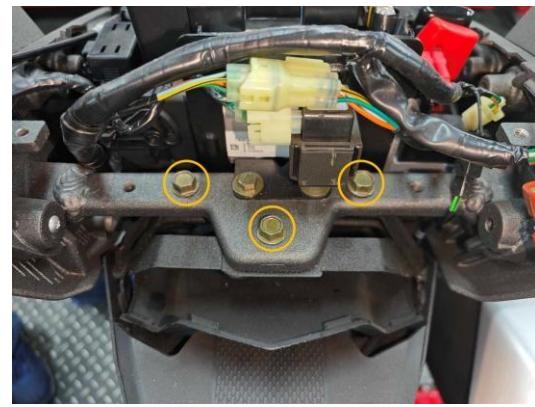
Remove 2 mounting screws.



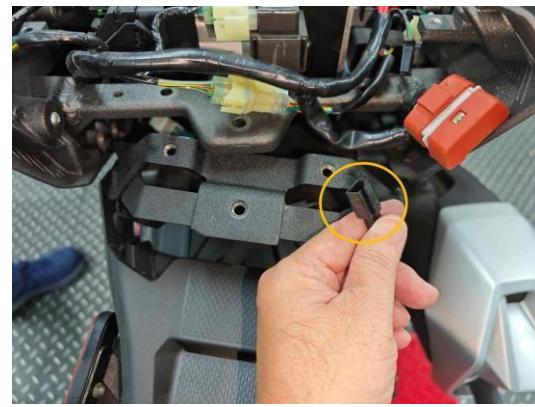
Remove the seat hook assembly.



Remove 3 mounting bolts from the rear fender.



Remove the license plate light assembly connector.



9. Electrical System



Remove the license plate light assembly



Unscrew the two hex socket screws on both sides.



Remove the cover.



Remove 2 pieces of hexagon socket bolts.



9. Electrical System



Remove the license plate light assembly



Heating the Handlebar

Locate the heated handlebar controller on the right side under the seat.



Remove the rubber cover of the right heated handlebar controller.



Remove the heated handlebar controller.



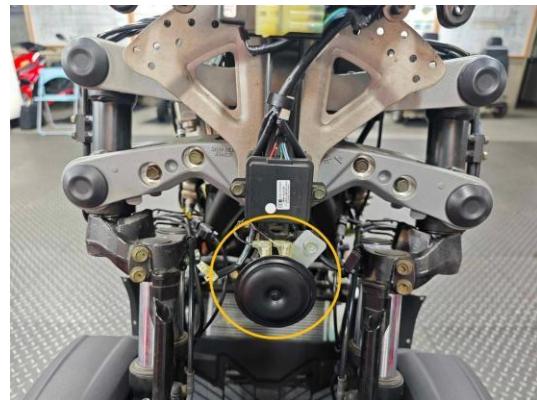
Check the fuse on the wiring harness of the heated handlebar controller.

Fuse Specification: 4A



Horn

Remove the front panel. Remove the horn connector.



Remove the nut and horn.

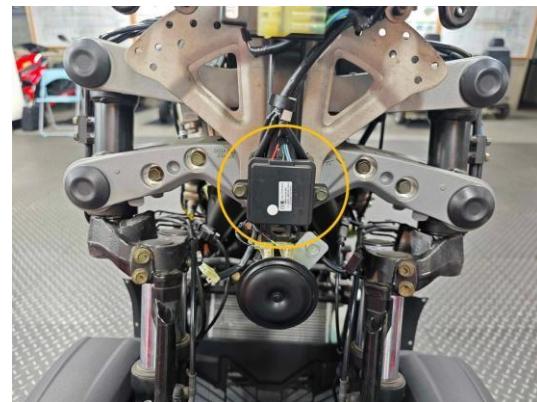
Connect the horn directly to a 12V battery. If it sounds normal, it is in good condition.



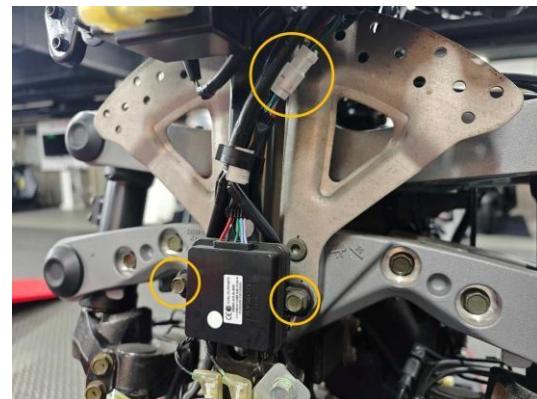
Tire Pressure Monitoring Controller

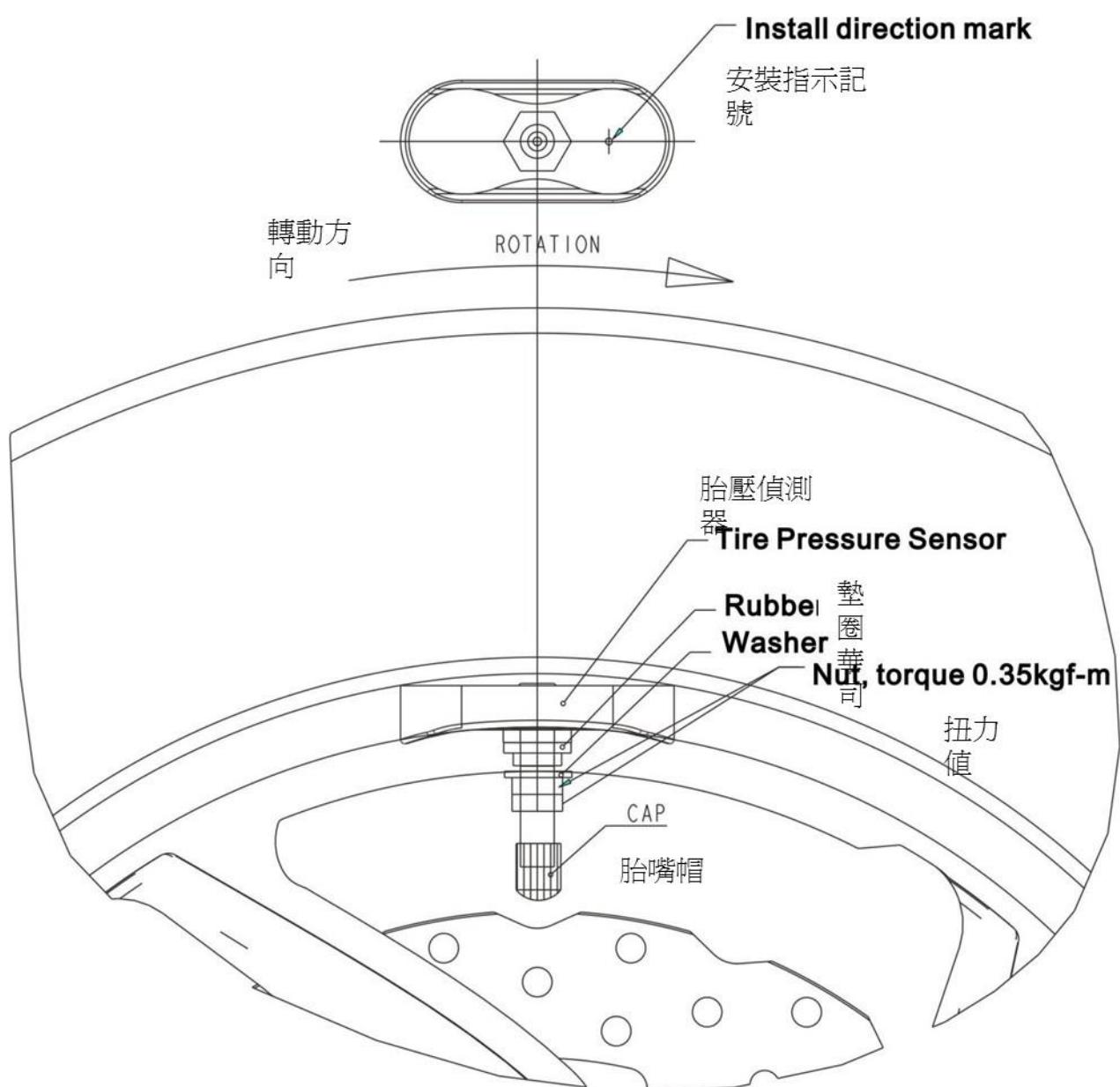
Remove the fixing nut of the tire pressure monitoring controller. Remove the tire pressure monitoring controller.

Remove the tire pressure monitoring controller fixing nut.



Remove the tire pressure monitoring controller connector and remove the controller.





10. Brake System

10. Brake System	0
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Preparations

General Operation Instructions

- Dirty brake lining pad or brake pedal will degrade (reduce) the braking force.
- Discard the dirty parts and then clean the dirty brake lining pad with high-quality brake parts cleanser.
- During the cleaning process, do not bend or twist the brake oil pipe.
- Use the authentic brake system screws and nuts manufactured by KYMCO.

Troubleshooting

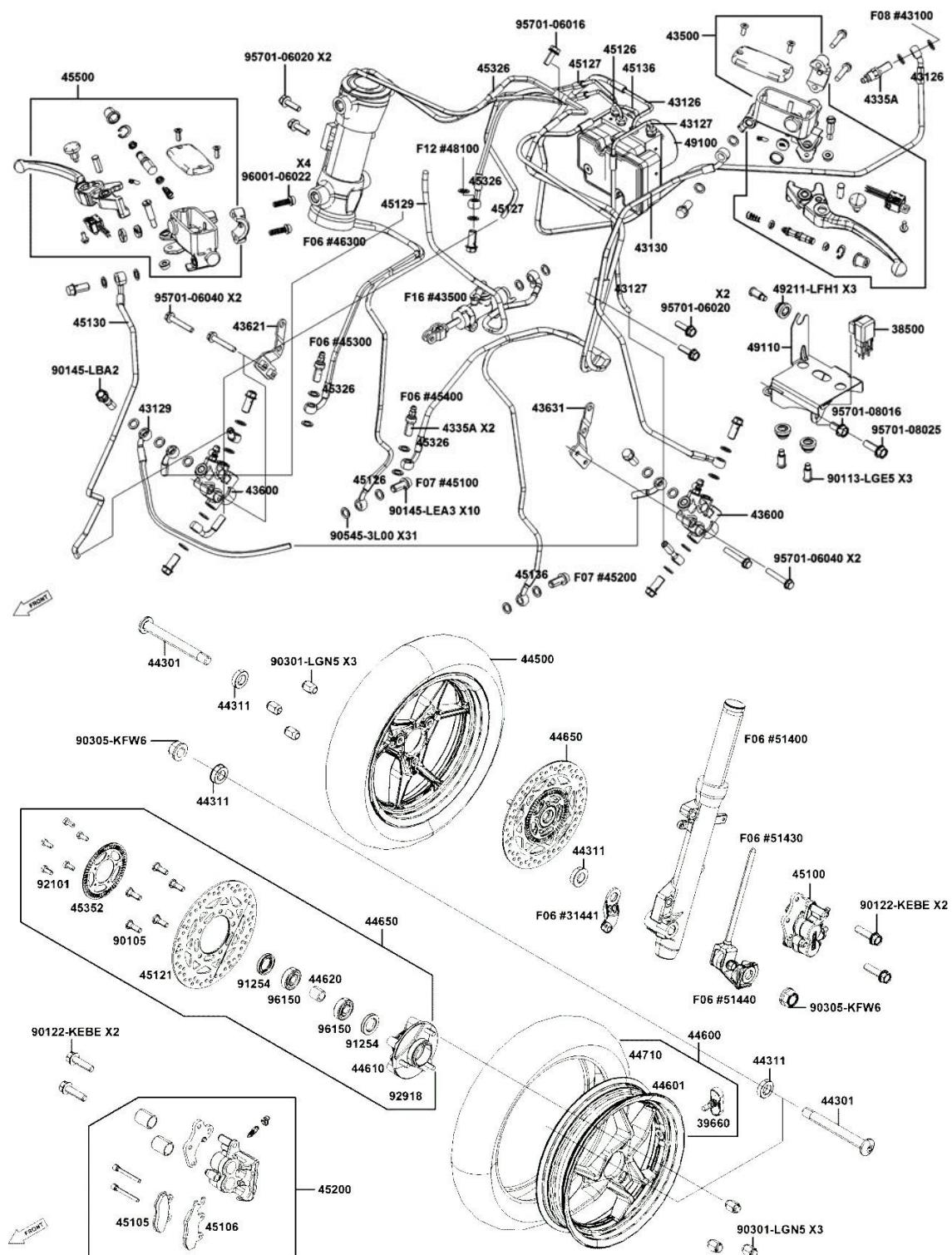
Brake effect poor.

- Brake pad lining worn
- Brake pad lining surface dirty
- Brake disc deformed
- Air inside brake system
- Brake fluid deteriorated
- Oil seal of brake master cylinder piston worn
- Brake fluid passage clogged
- One side of brake caliper worn

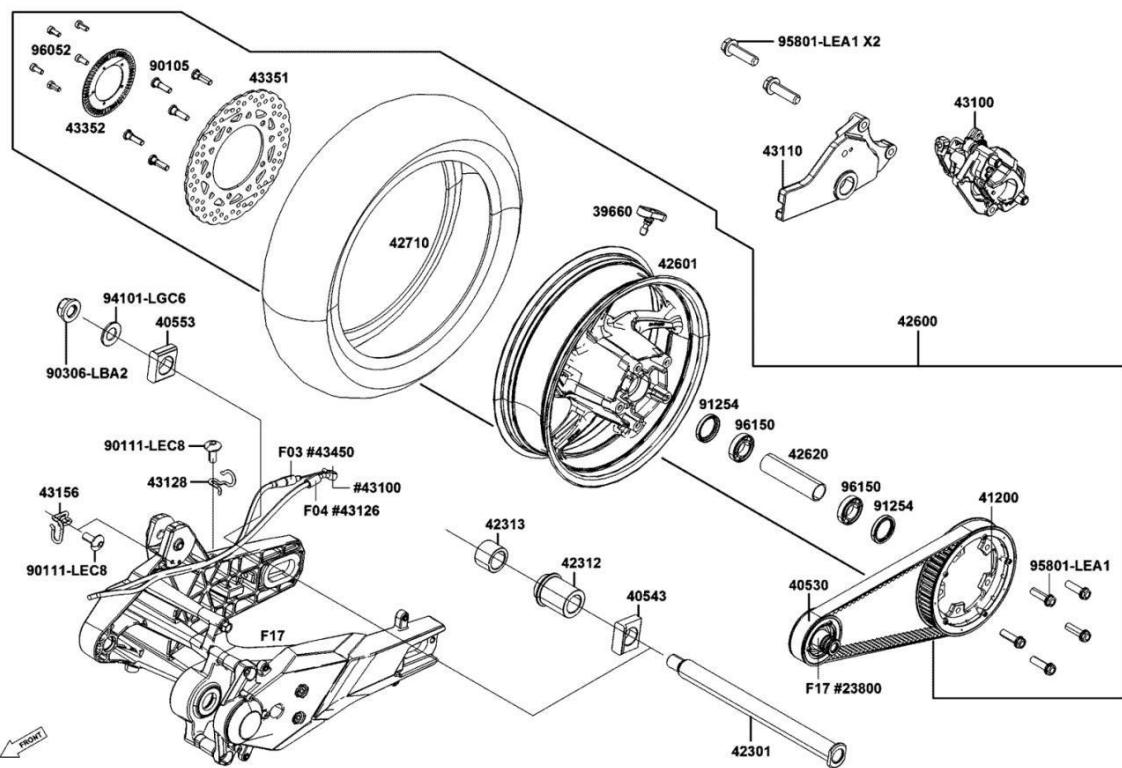
10. Brake System



Exploded View



10. Brake System



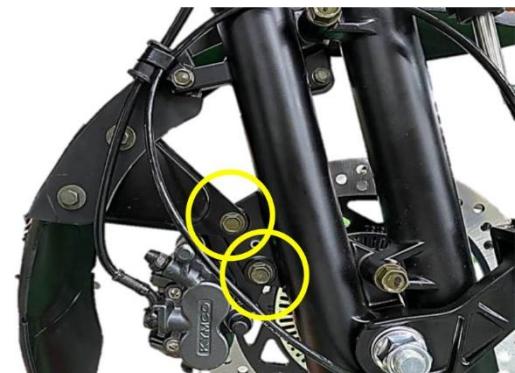
Replace brake pad lining

When replacing the brake lining pad, be sure to replace the entire unit with a new one in order to protect the riding safety. Remove the front wheel speed sensor and then remove the front wheel speed sensor.

Remove 3 nuts from the front wheel and then remove the front wheel.



Remove 2 screws from the caliper and then remove the caliper.



Remove 3 bolts from the fender cover and then remove the fender cover.



Remove the screws from the wheel speed sensor and the securing hook and then remove the wheel speed sensor.

Cautions for the brake caliper installation:

- a. Insert the upper and lower screws into the front-left fender.
Front Fork. Caliper: 2–3 threads.
- c. Tighten the screws sequentially. Loosening shall not be allowed.
- d. Torque: 240–300kgf-cm

Remove the caliper and then remove 2 hexagonal socket screws from the dowel pin of both brake lining pads.

Remove the lining pad. After being replaced, install the pad in reverse order.



Remove the rear brake lining pad

Loosen the rear wheel speed sensor and the brake lead wire.



Remove the bolt from the lining pad of rear brake caliper.



Remove the bolt from rear brake caliper.



Apply blue Loctite agent on the bolts. If required, make new bolt replacement.

Installation tightening torque value: 3-4 kgf-m (30-40 N-m)



10. Brake System



Remove the rear-left/rear-right brake lining pads.



Make new parts replacement if excessively worn or jammed or partially worn.



During the installation, turn the hand brake piston in clockwise direction.



Brake Master Cylinder

Remove the upper and lower steering handlebar covers

Remove 3 screws underneath the right steering handlebar cover.



Remove 3 screws underneath the left steering handlebar cover.



The removal shall be executed with plastic removing tool to prevent from hurting the plastic surface.



After remove the center screw, remove the upper steering handlebar cover.



Remove the lower steering handlebar cover.



Remove 2 bolts from the brake main cylinder cover with a screwdriver and then remove the cylinder cover. Next, take out the dust cover and the rubber cover.



Note: When removing the screws from the vehicle oil pipeline, be sure to plug the end of the oil pipeline to avoid contaminating other components. The oil pipeline should be secure in position to prevent the brake oil from leaking from the oil pipeline.

Draining the brake oil

Drain the brake oil from the hydraulic system. Remove brake lead wire and then remove the bolts and the washers from the oil pipeline.

First, drain the brake fluid from the hydraulic system.

Remove the brake lead wire and then remove the bolts and the washers from the oil pipeline.



Remove the bolts from the oil pipeline. If required, replace the oil pipeline bolts and washers with new ones.



10. Brake System



Remove the brake handle nut and the brake lamp switch.



Remove the lead wire connector from the brake indicator switch. Remove the right brake handle and the brake indicator switch.



During the installation, confirm that the fixing hole of the mounting base is inserted into the fixing hole of the steering handlebar.

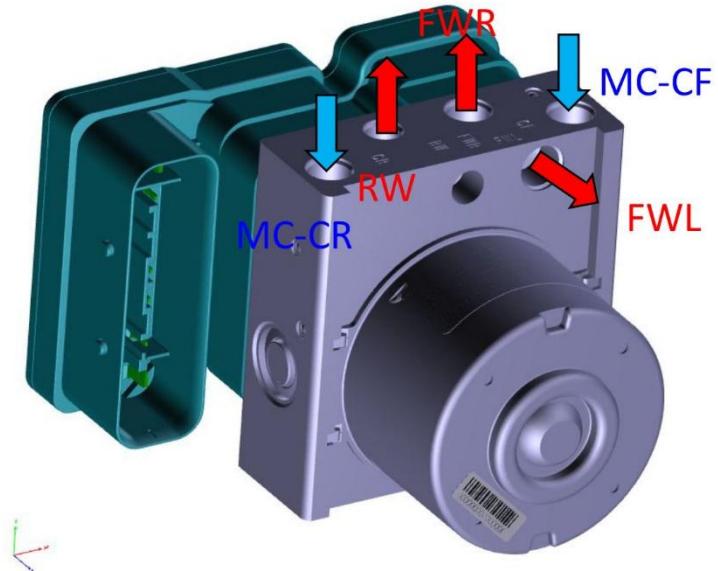


Install the brake master cylinder to the mount. Install the front and rear brake cables and adjust them to their appropriate free play. Install the dust boot.

Install the fluid pipe using the bolt and 2 sealing washers. Refill brake fluid to the upper level line of the reservoir and bleed air.

ABS Brake System

The CV3 uses an ABS braking system supplied by Continental.



Output / Input Oil Pipe Circuit Names

Input:

MC-CF: Main Cylinder - Front Circuit

MC-CR: Main Cylinder - Rear Circuit

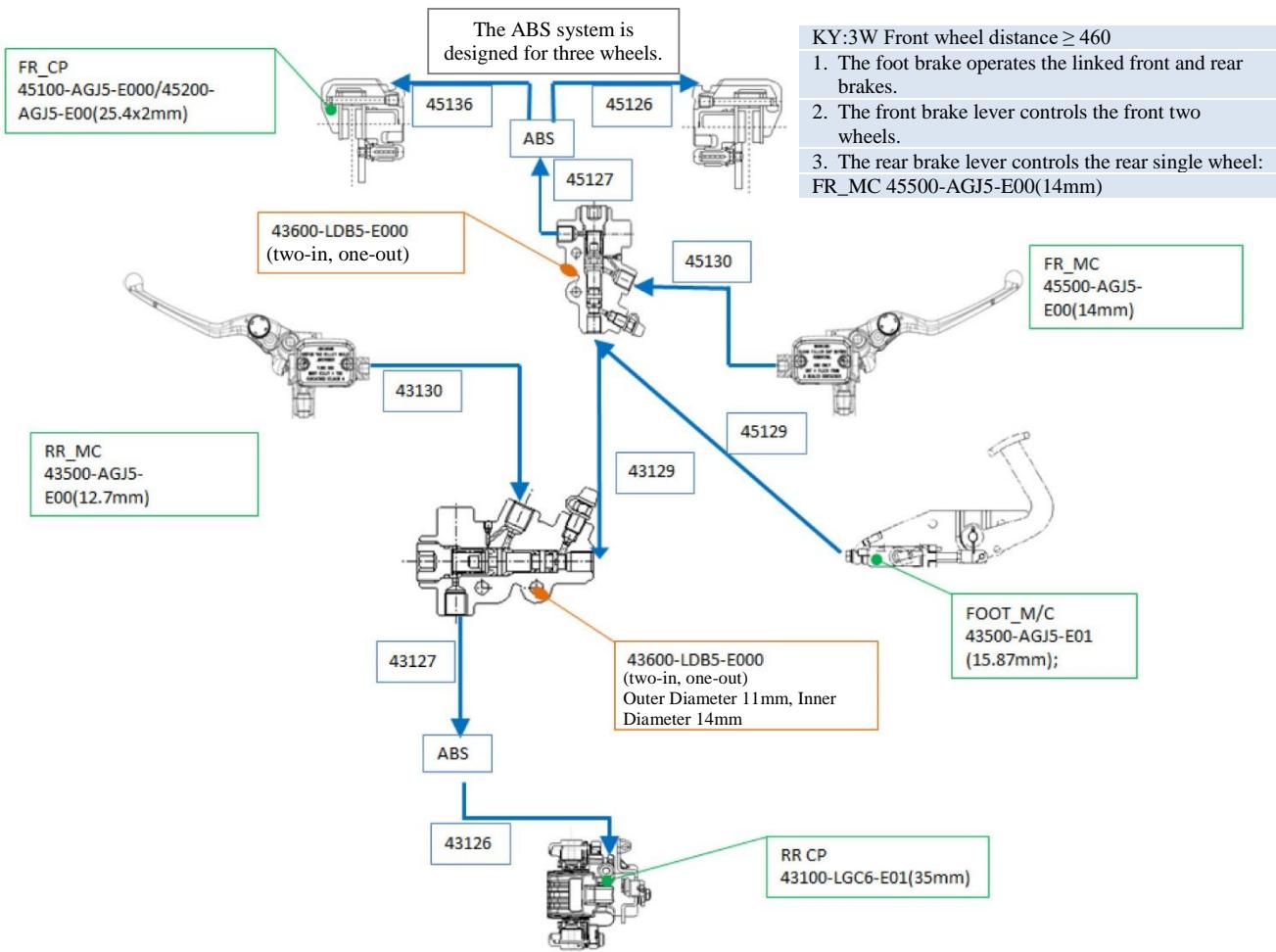
Output:

FWR: Right front wheel

FWL: Left front wheel

RW: Rear wheel

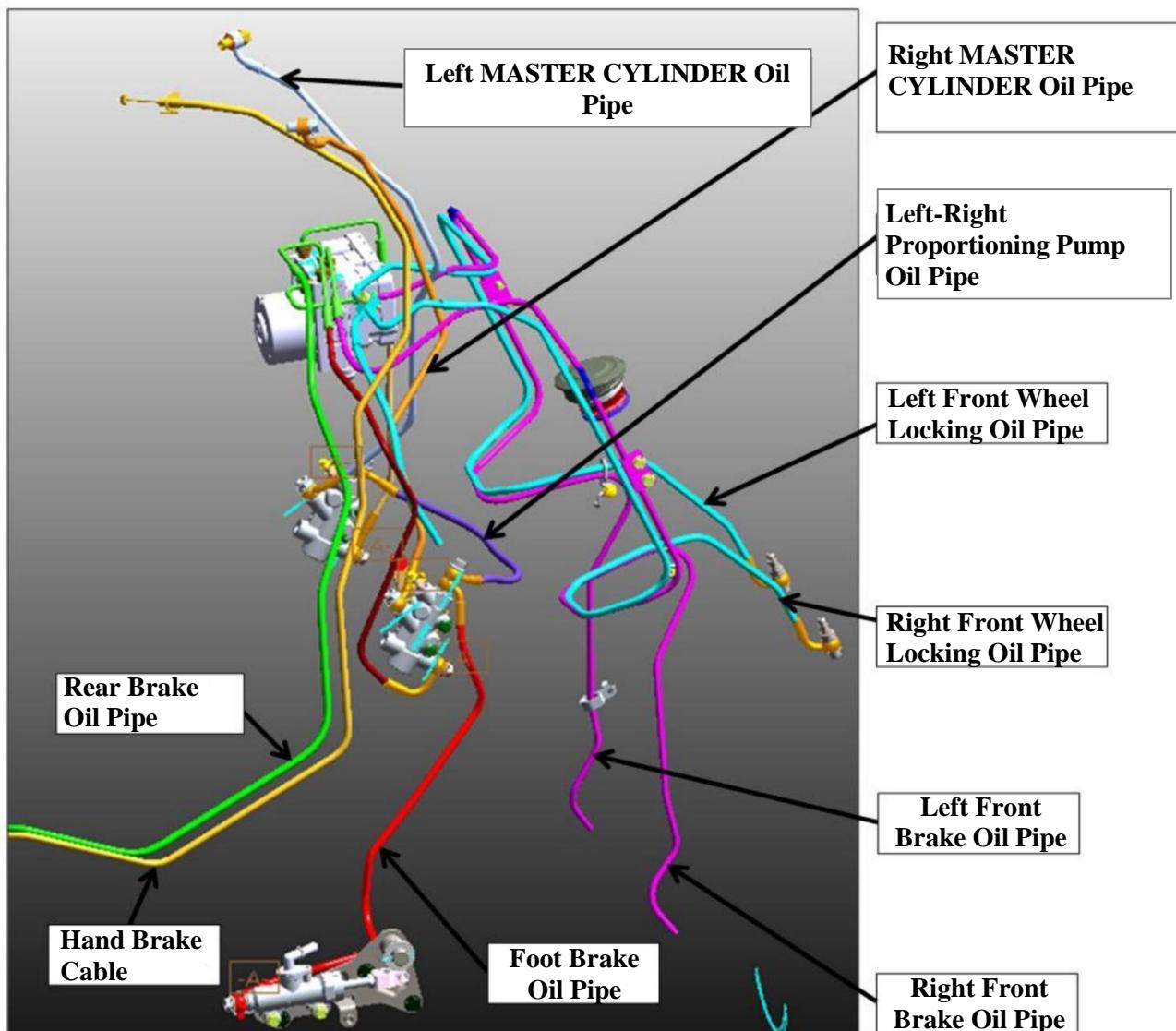
Hydraulic Pipe Circuit Diagram



10. Brake System

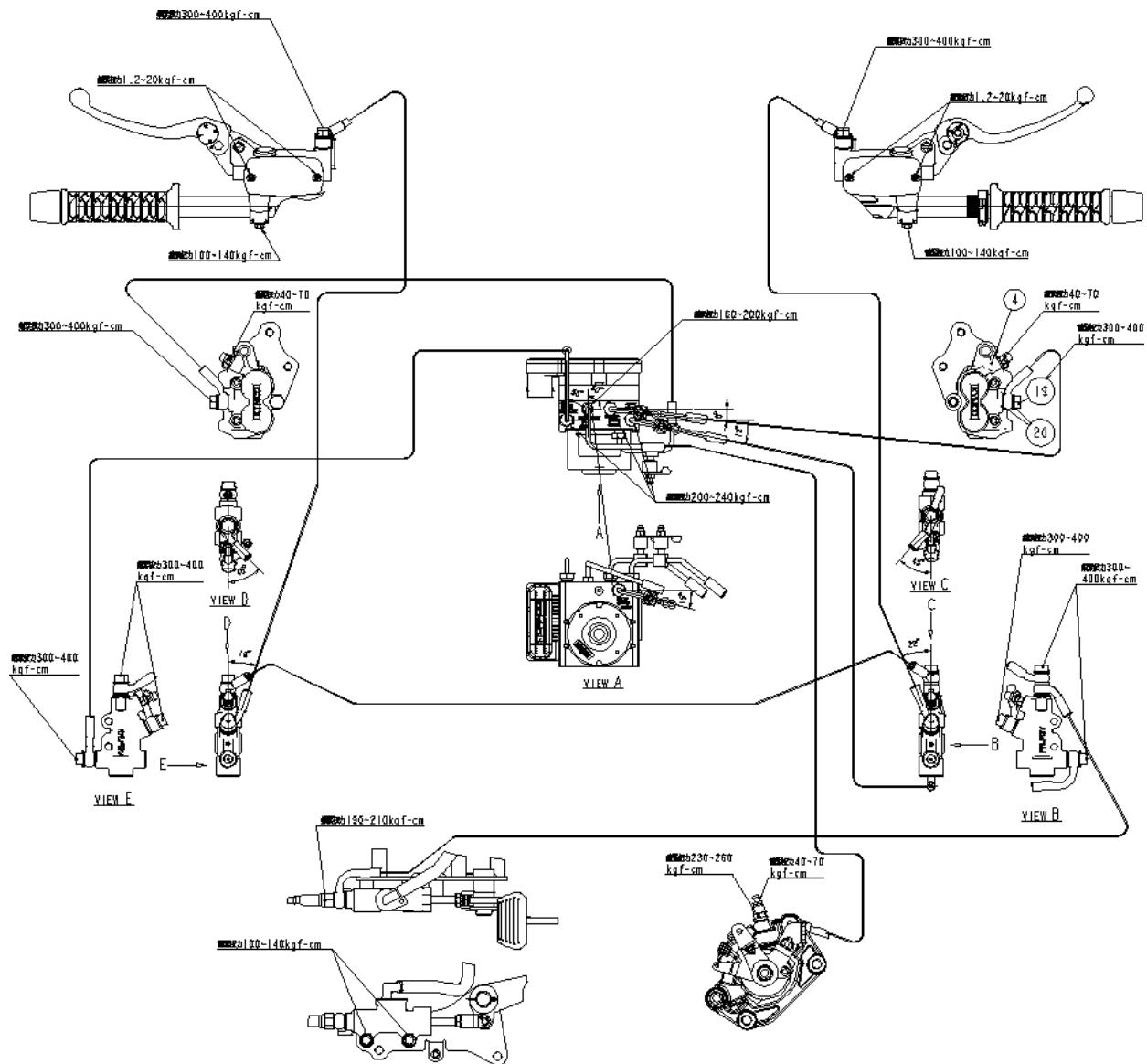


3D Hydraulic Pipe Layout Diagram



10. Brake System

Brake Circuit Torque Diagram



ABS System Fault Codes

ABS DTC Code (Communication Codes and SAE J2012 Codes) Correspondence Table

Handheld Diagnostic Display Numbers	DTC Code		Fault Description	
	掌-V1.0.9D 前 PC-2.22V09 前	掌-V1.0.A 後 PC-2.23V00 後	(PC)AfiDiag	Hand-held Diagnostic Tool
	DTC Code	SAE J2012		
Conti ABS MK70				
01	5D90	C1D90	Wheel speed sensor – el. Fault front left	Front Left wheel speed sensor malfunction
02	5D91	C1D91	Wheel speed sensor – Extrapolation Fault front left	Front Left wheel speed sensor malfunction
03	5D92	C1D92	Wheel speed sensor – Periodic Fault front left	Front Left wheel speed sensor malfunction
04	5D93	C1D93	Wheel speed sensor – Start Recognition Fault front left	Front Left wheel speed sensor malfunction
05	5D94	C1D94	Wheel speed sensor – Phase- Length-Supervision Fault front left	Front Left wheel speed sensor malfunction
06	5D95	C1D95	Wheel speed sensor – Double Frequency Check front left	Front Left wheel speed sensor malfunction
07	5DD3	C1DD3	OSEK Fatal Error	Fatal Error
08	5DF0	C1DF0	Pump defective	Pump Motor Malfunction
09	5DF1	C1DF1	Pump-connection	Pump Motor Disconnection
10	5DF2	C1DF2	Hardware Fault	Circuit malfunction
13	5DF5	C1DF5	Internal Hardware Fault (main driver, valves, ...)	Circuit malfunction(Driver,Valves..)
11	5DF3	C1DF3	Voltage low-long term detection	Voltage low-long term detection
12	5DF4	C1DF4	Voltage Low	Voltage low
14	5DF7	C1DF7	Voltage high	Voltage high
16	5E59	C1E59	Vehicle variant coding Error	Vehicle variant coding Error
18	5DA0	C1DA0	Wheel speed sensor-el. Fault rear	Rear wheel speed sensor malfunction
19	5DA1	C1DA1	Wheel speed sensor- Extrapolation Fault rear	Rear wheel speed sensor malfunction
20	5DA2	C1DA2	Wheel speed sensor-Periodic Fault rear	Rear wheel speed sensor malfunction
21	5DA3	C1DA3	Wheel speed sensor-Start Recognition Fault rear	Rear wheel speed sensor malfunction

10. Brake System

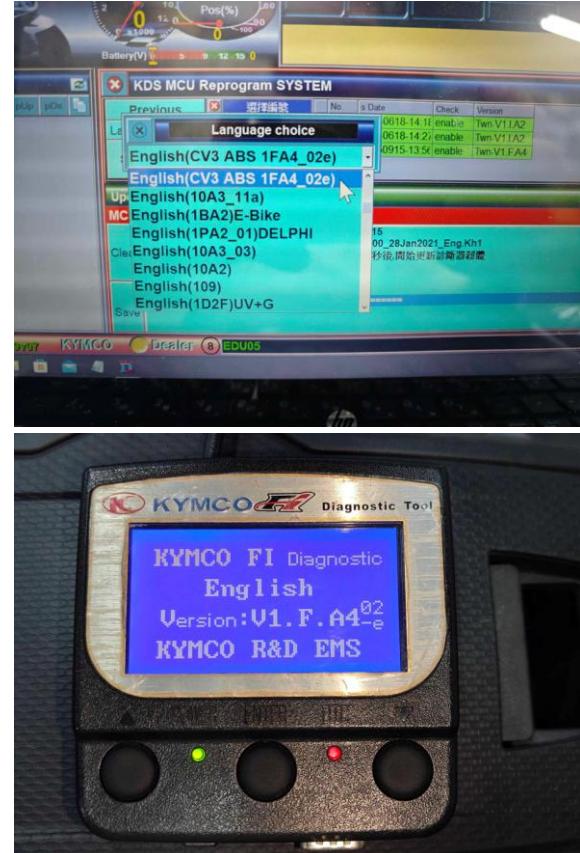


22	5DA4	C1DA4	Wheel speed sensor-Phase-Length-Supervision Fault rear	Rear wheel speed sensor malfunction
23	5DA5	C1DA5	Wheel speed sensor-Double Frequency Check rear	Rear wheel speed sensor malfunction
17	5E5A	C1E5A	ABS Switch Failure	ABS switch failure
32	5DC0	C1DC0	Wheel speed sensor – el. Fault front right	Front Right wheel speed sensor malfunction
33	5DC1	C1DC1	Wheel speed sensor – Extrapolation Fault front right	Front Right wheel speed sensor malfunction
34	5DC2	C1DC2	Wheel speed sensor – Periodic Fault front right	Front Right wheel speed sensor malfunction
35	5DC3	C1DC3	Wheel speed sensor – Start Recognition Fault front right	Front Right wheel speed sensor malfunction
36	5DC4	C1DC4	Wheel speed sensor – Phase-Length-Supervision Fault front right	Front Right wheel speed sensor malfunction
37	5DC5	C1DC5	Wheel speed sensor – Double Frequency Check front right	Front Right wheel speed sensor malfunction

Hand-held Diagnostic Tool and Repair Method: Dedicated Firmware Update

Because the CV3 ABS is a specialized system, you must first download and install the dedicated firmware via the PC diagnostic system before use.

1. Please go to the KDS system, select Firmware Update, and locate the CV3 ABS dedicated version.
2. Follow the standard firmware update procedure to perform the update.



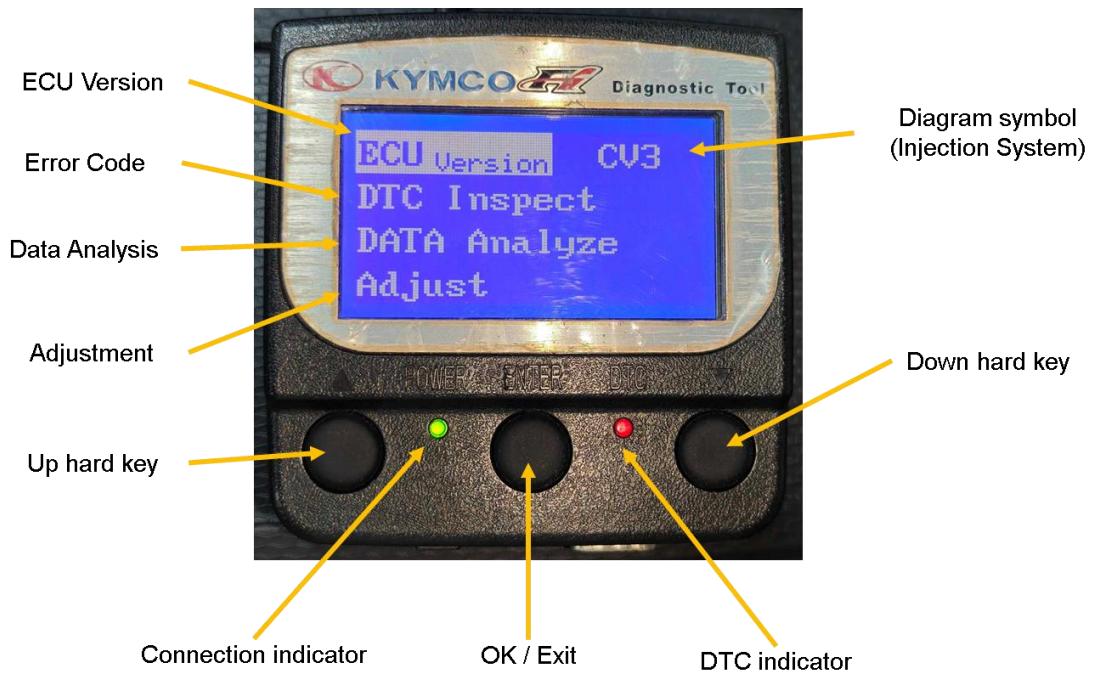
1. After updating, the diagnostic tool will display the version information during startup.
2. The current latest version in use is:
V1FA4_02e CV3 Dedicated Version

⚠Caution

Because firmware versions may be updated over time, please refer to the latest version announced in the KDS system.

Diagnostic Tool Interface Description

1. This diagnostic tool can be used for the injection-type engine ECU and ABS ECU. The factory default is an injection-type engine ECU.
2. If the injection type engine ECU option is selected, the diagnostic tool will prioritize the diagnosis of injection ECUs.
3. If you want to diagnose ABS ECUs, use the up/down hard keys to highlight the ABS ECU.



Diagnosis item selection

Tap ECU Version key once and then press the down hard key twice to go to the Set Priority screen.



Select ABS and return to the previous page. Press the middle key ENTER again to go to the Diagnose ABS screen.



Display of Software/Hardware Version and Calibration Code



Fault Code Inquiry

The ABS reads DTCs and erases trouble codes

Press the key to select the fault code.

Press ENTER to enter.

Press the key to select the fault code.

Press "Read Fault Code" to enter.

Once inside, there are three options: "Current," "Past," and "History." Please select the appropriate option to read the fault codes.

If fault codes are generated, please troubleshoot according to the fault symptoms and then clear the fault codes.

After returning to the previous page, enter the "Clear Fault Code" option.



10. Brake System



After clearing the fault codes, please verify whether the original faults recur. If so, it means the faults have not been resolved; please perform the related inspection and repairs again.



Data Analysis

When parking the vehicle and before operating, the rear wheel (turn the front wheel or the rear wheel 360 degrees several rounds). If the speed data is displayed on the diagnostor, it means the front wheel and rear speed sensors and the reading panel are presenting normal sensing function.

Press the key to select “Data Analysis” and enter.

You will access KYMCO Diagnostic Tool Page 01, which displays:
Left front wheel speed, right front wheel speed, and rear wheel speed.

Press the key to enter KYMCO Diagnostic Tool Page 02, which shows:
Battery voltage status.



Adjustment

Time of Use

- Brake system replacement of brake-related components or replacement
- After replacing brake-related components or replacing the ABS ECU and hydraulic parts, it is necessary to exhaust the brake lines to remove any trapped air. Use the Adjustment function to check if air inside the ABS unit is fully expelled, and test if the hydraulic components are operating properly.

After returning to the previous page,
Press the key to select "Adjustment" and enter.

Inside the Adjustment menu, you will see three options: Left front exhausting, rear wheel exhausting and right front exhausting.

Note:

We use the "Rear Wheel Exhausting" item as an example. The other two items follow the same procedure.

Press the key to select "Rear Wheel Exhausting" and enter.



Select “Rear Wheel Exhausting,” the ABS will start the exhausting process for the rear wheel hydraulic lines.

▲Caution

The exhausting action of the ABS removes air from inside the ABS unit itself. Any remaining air in the remaining hydraulic lines must still be exhausted manually by other methods.



Inspection

If the lead wire connector of the front wheel sensor/front wheel speed reading panel/sensor is defective.



It should be ranged within 0.3–1.2mm standard scope.

The gap should be less than 0.8mm. (After installing and securing the lead wire of front wheel speed sensor in position, check if it is impeding or rubbing the front wheel or other components when making the up and down action on the front wheel. If yes, please readjust the lead wire position until the impeding phenomenon no longer exists.)

11. Steering System

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Troubleshooting	2
Remove the upper and lower steering handlebar covers	3
Steering Handlebar	4
Handlebar Switch and Throttle Valve lead wire	5
Handlebar Cover	10
Steering Stem Removal	10

11. Steering System

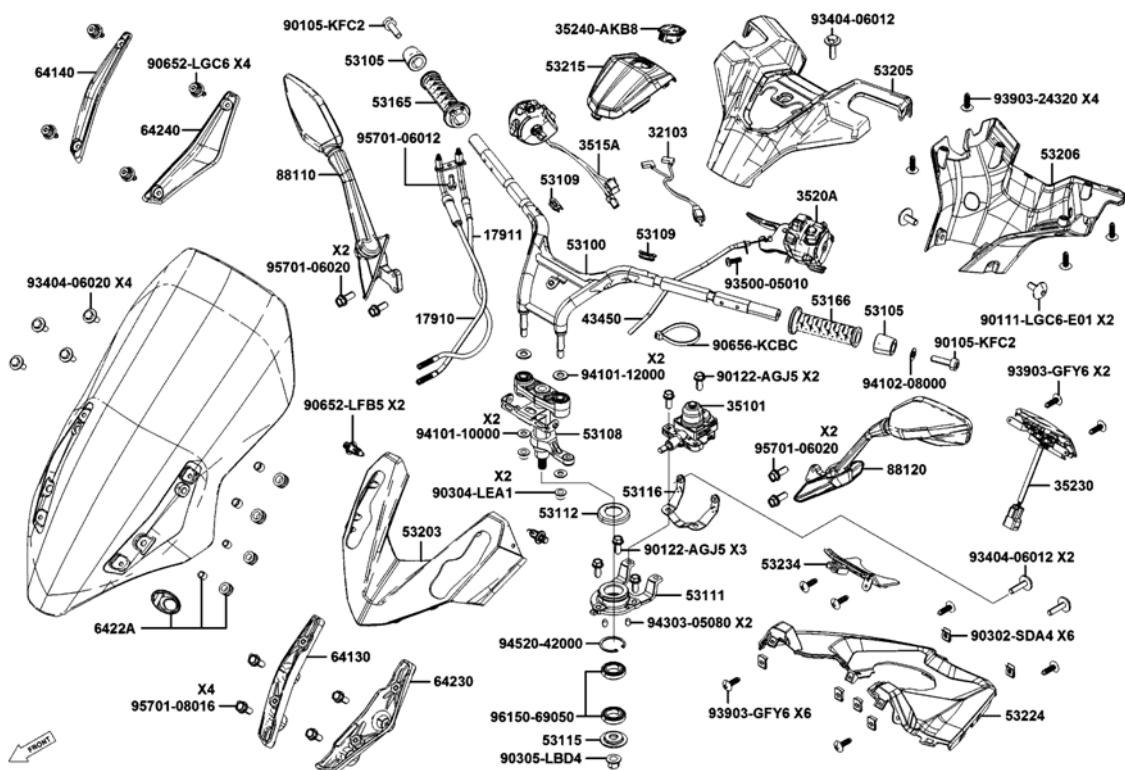
Troubleshooting

Steering handlebar tight (heavy)

- Steering stem top race tightened excessively
 - Steering stem mechanism ball cracked
 - Tire pressure low

Steering handlebar skewed

- Left and right damper uneven
 - Steering stem bent
 - Front axle bent or tire drifts



Remove the upper and lower steering handlebar covers

Remove 3 screws underneath the right steering handlebar cover.



Remove 3 screws underneath the left steering handlebar cover.



The removal shall be executed with plastic removing tool to prevent from hurting the plastic surface.



After remove the center screw, remove the upper steering handlebar cover.



11. Steering System



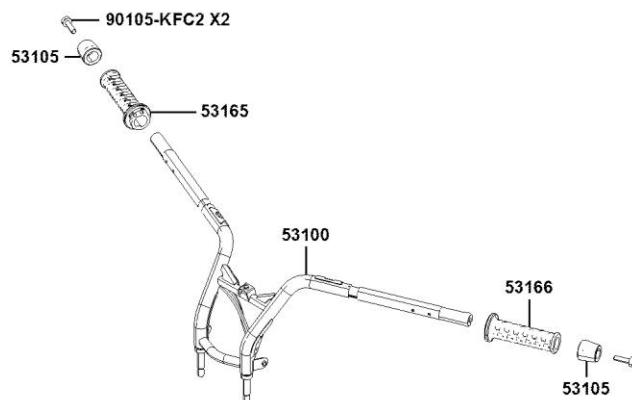
Remove the lower steering handlebar cover.



Steering Handlebar

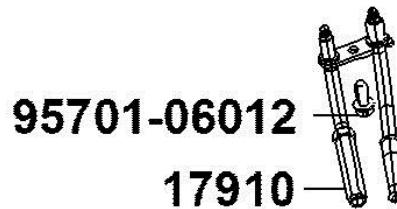
Remove the balance terminal.

Remove the bolts from left/right balance terminals with 6mm hexagonal wrench.

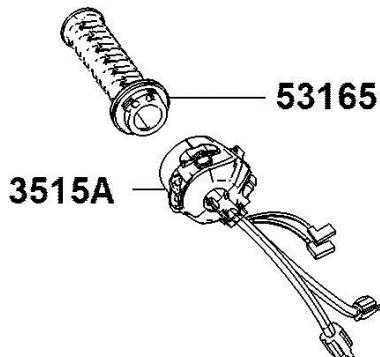


Handlebar Switch and Throttle Valve lead wire

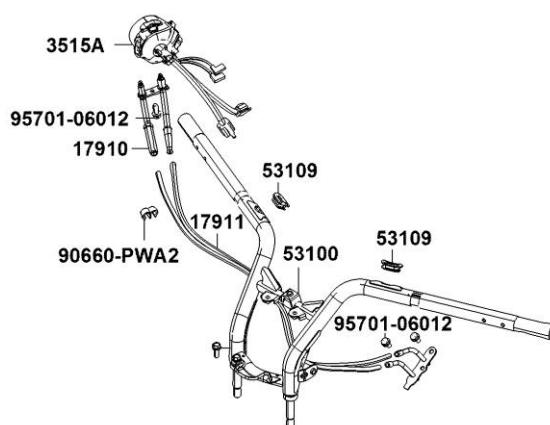
Remove the bolts from the lead wire holder of Right-side Handlebar Switch and Throttle Valve.



Remove the screws from Right-side Handlebar Switch and then separate the Right-side Handlebar Switch.



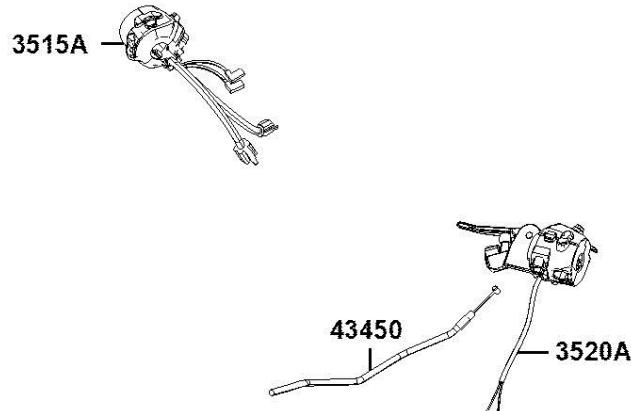
Remove the Right-side Handlebar Switch and the heating handle connector.



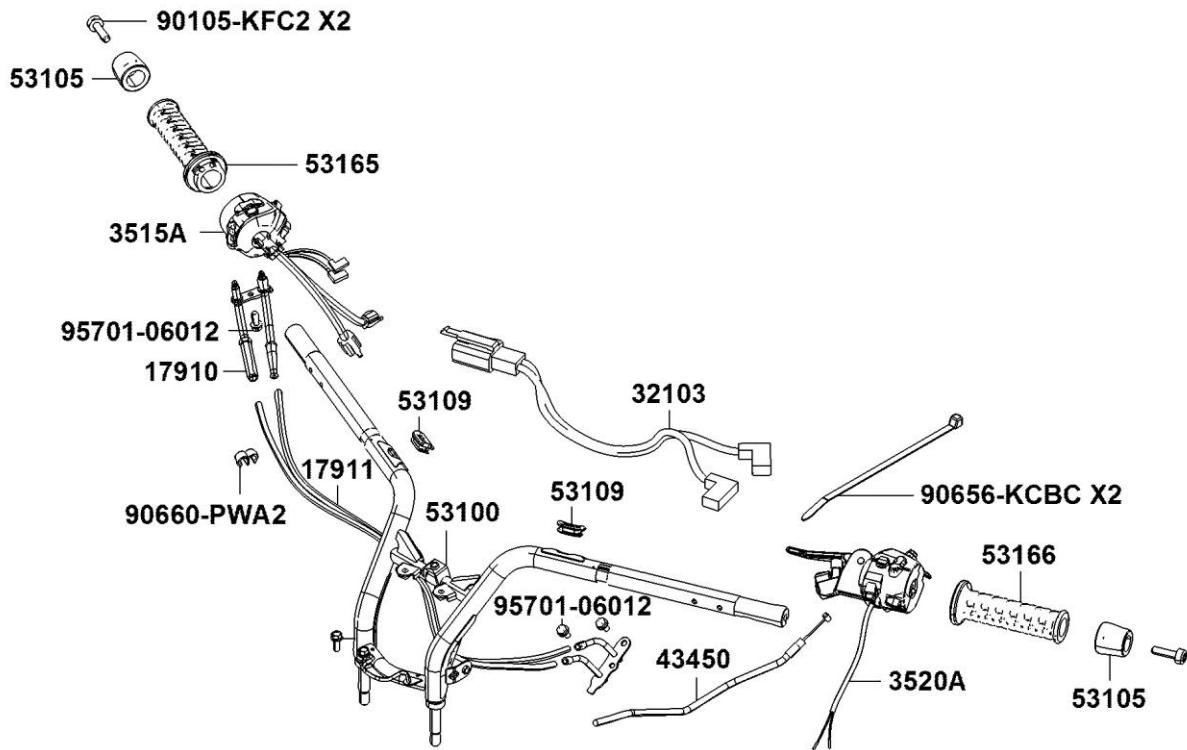
11. Steering System



Separate the Throttle Valve lead wire from the Handlebar Power Switch and the Throttle Valve Stem.



Remove the Hand Brake lead wire. Remove the Left-side Handlebar Switch with the same removal method.

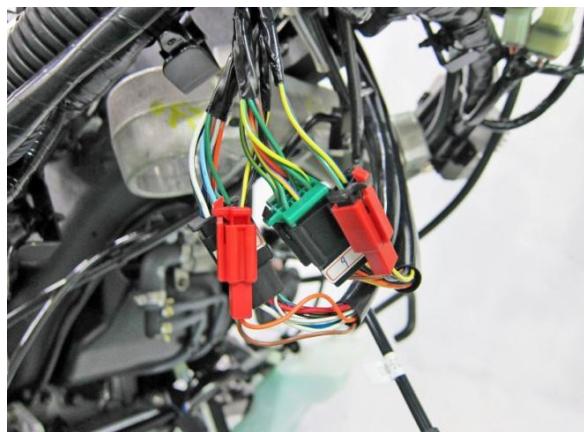
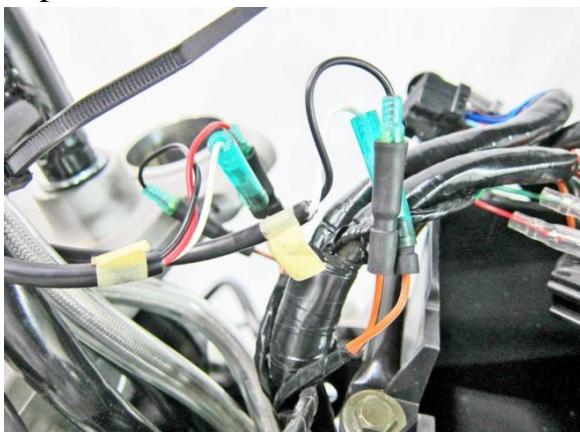


Remove the Steering Handlebar

Loosen the lead wire clip clamping spot.



Separate the lead wire connector of each switch.



Remove the nuts from the triangular stand with 29mm socket.

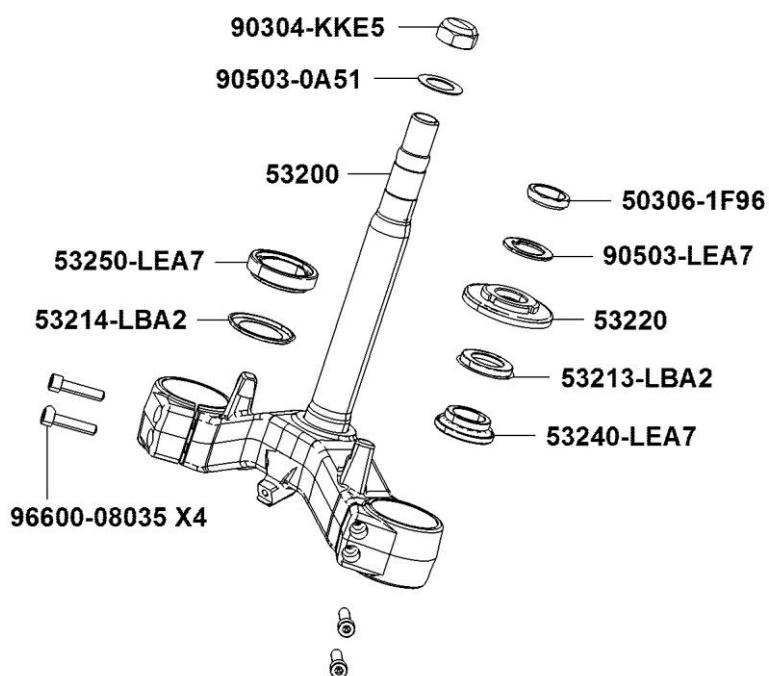
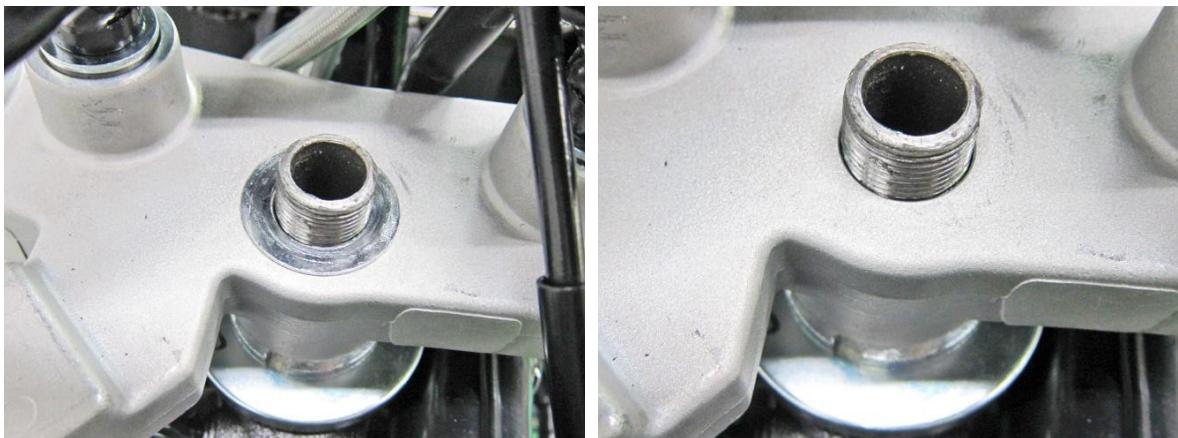
Installation tightening torque value: 6-6.5 kgf-m (60-65 N·m)



11. Steering System



Remove the washer.



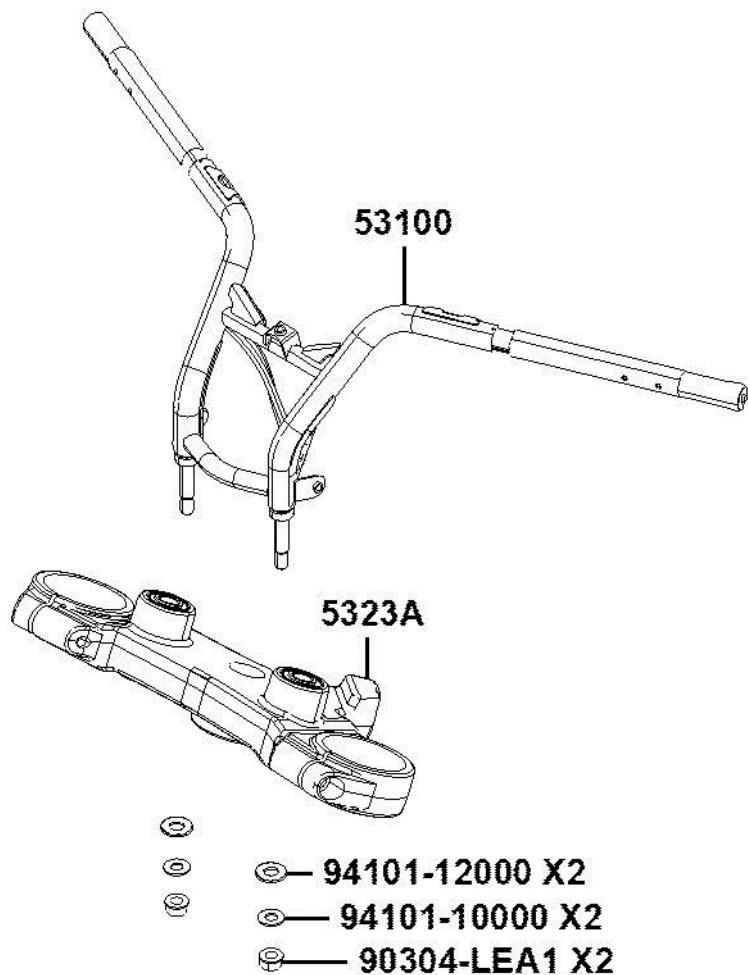
11. Steering System



Remove the Steering Handlebar Unit.



Remove the octagonal nut and the washer in order to separate the Steering Handlebar Unit. Tightening torque value during the installation: 3-4 kgf-m (30-40 N-m)

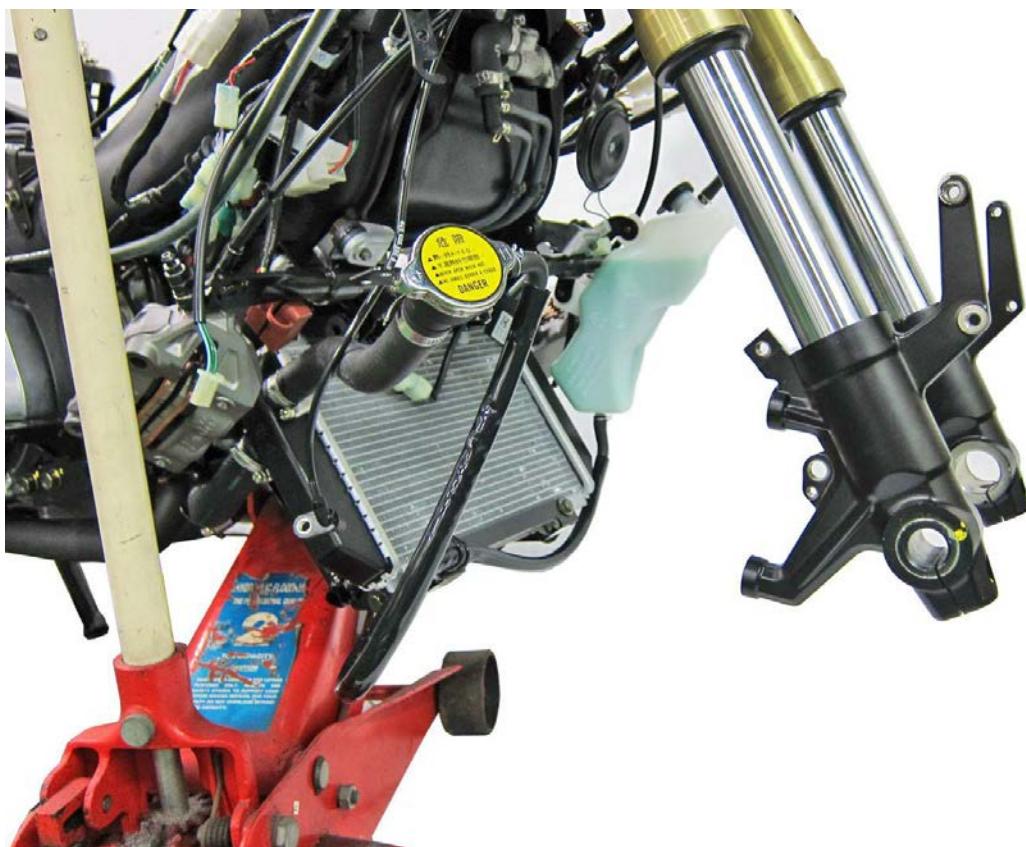


Handlebar Cover



Remove the Handlebar Cover with an air gun. When installing new Handlebar Cover, clean the installation area (removing the residual glue). Apply slight amount of superglue and then install the handlebar cover. Use the vehicle after the glue is dried through.

Steering Stem Removal



Lift the front wheel with a forklift or the alternative fixtures.

11. Steering System

Remove the octagonal nut with a special tool.

Steering Stem socket: A120F00002

Remove the octagonal nut.

Installation tightening torque value: 5-6 kgf-m (50-60 N-m)



Pull out the washer.



Remove the open-end nut (square nut) from the Top Seat ring with a special tool.

Top Seat ring open-end nut removing tool:
A120 F00023. Remove the square nut.

Installation tightening torque value: 1.8-2.2 kgf-m (18-22 N-m)

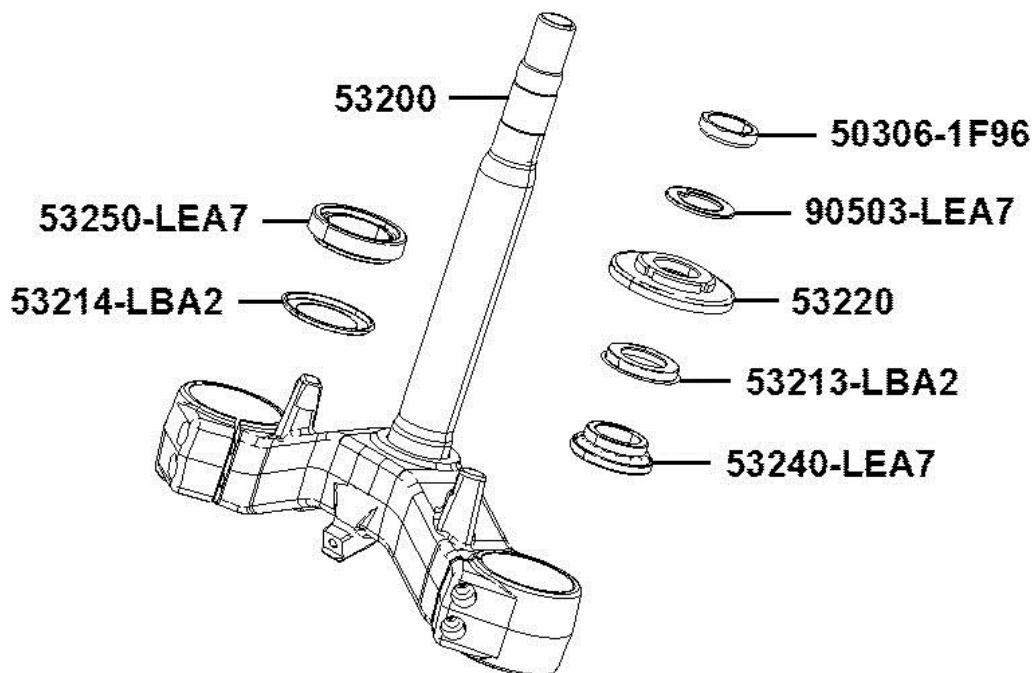


11. Steering System

Remove the dust cover.



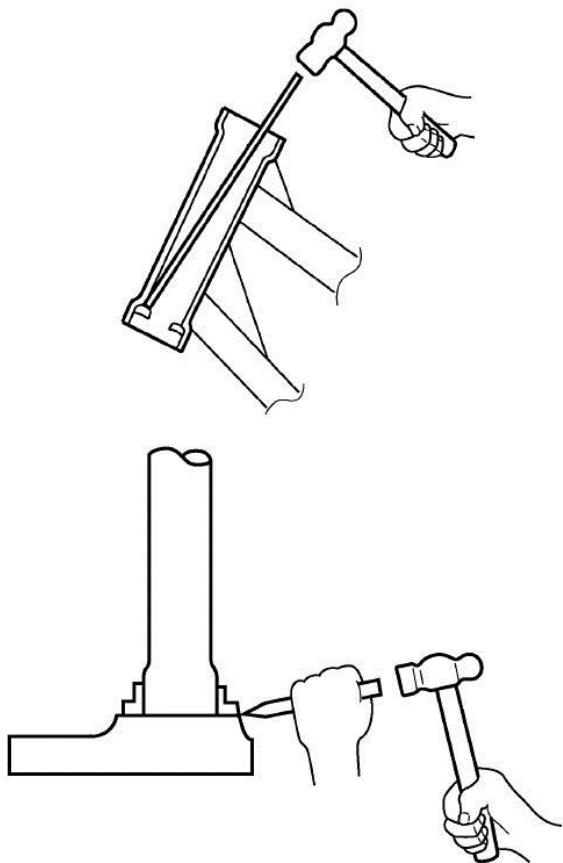
Remove the upper bowl and the socket.



11. Steering System



Remove the upper/lower bowl holder with the Upper/Lower Bowl Disassembly Device and do not hurt the steering stem and frame connecting tube. When installing, use the Upper/Lower Bowl Installation Device. Before the installation, apply a slight amount of grease on the steering stem and frame connecting tube and then install the upper/lower bowl holder with the installation device.



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Preparations

Operational Precautions

- Make sure if the tighten torque within the standard specification range when the parts removed or replaced.
- Please follow the standard torque specification when the front fork installed.

Specification

Item	standard	Service limit
Wheel axle bent	-	0.2
Brake Disk thickness	4.0±0.2	3.0

unit : mm

Standard Torque

Handlebar LINK NUT-----	4.0~5.0 kgf·m	C/P BLEEDER-----	0.4~0.7kgf·m
Handlebar NUT -----	6.0~7.0 kgf·m	FR CALIPER-----	2.4~3.0 kgf·m
RACE NUT(HEAD) -----	0.8~1.2 kgf·m	RR CALIPER -----	3.0~4.0 kgf·m
FR FORK / STEM -----	4.5~5.5 kgf·m	BRK OIL BOLT -----	3.0~4.0 kgf·m
FR. AXLE NUT-----	8.0~10.0 kgf·m	M/C HOLDER-----	1.0~1.4 kgf·m

Special Tool

Bearing remover-----A120E00093

Oil Seal Bearing Installation Tool--A120E00014

Troubleshooting

Steering operation is stiff (heavy)

- Steering stem upper cone unit ring too tight.
- Steering stem mechanism ball cracked
- Tire pressure low

Steering stem is skewed

- Left and right damper uneven
- Front fork bent
- Front axle bent or tire drifts

Poor braking performance

- Brake not properly adjusted
- Brake pad lining worn
- Brake pad lining surface dirty
- Brake lining camshaft worn
- Brake drum arm not properly assembled

Poor braking performance (disc)

- Air inside brake system
- Brake fluid deteriorated
- Brake disc pad or brake disc smudged
- Brake lining worn.
- Oil seal of brake master cylinder piston worn
- Brake fluid passage clogged
- Brake disc deformed.
- One side of brake caliper worn

Abnormal sound in front damper

- Sliding part bent
- Front fork mounting bolt loosened
- Front fork oil not enough
- Front fork oil leaking

Soft front damper

- Buffer spring fatigue
- Damper oil level not enough

Front wheel wobbles

- Rim distorted
- Front wheel bearing loosened
- Spoke plate distorted
- Poor tire
- Axle connection not tightened during installation

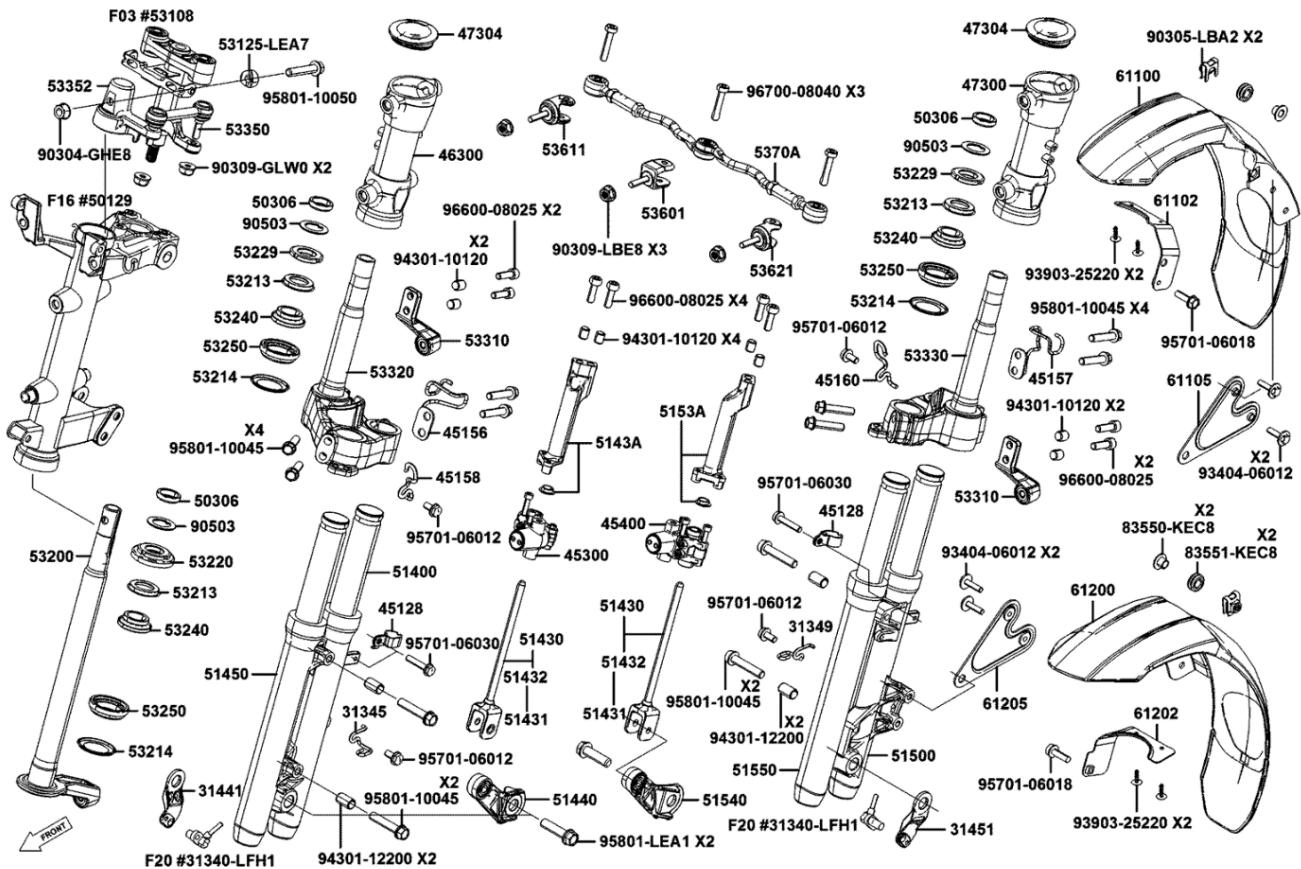
Front fork oil leaking

- Oil seal worn
- Oil seal leaking
- Front fork pipe bent
- Front fork pipe scratch

12. Front Fork

 **KYMCO**

Parts Drawing



Front Fork Removal

Remove 3 nuts from the front wheel and then remove the front wheel.



Remove 2 screws from the caliper and then remove the caliper.



Remove 3 bolts from the fender cover and then remove the fender cover.



Remove the screws from the wheel speed sensor and the securing hook and then remove the wheel speed sensor.



Cautions for the brake caliper installation:

- a. Insert the upper and lower screws into the front-left fender.
Front Fork. Caliper: 2–3 threads.
- c. Tighten the screws sequentially. Loosening shall not be allowed.
- d. Torque 240-300 kgf-cm

Remove the front wheel Fender cover

Remove the front wheel Fender cover.



Remove the screws from the upper oil pipeline of Front Fork and then remove the hook.



Remove the screws from lower side of Front Fork Locking Rod Unit.

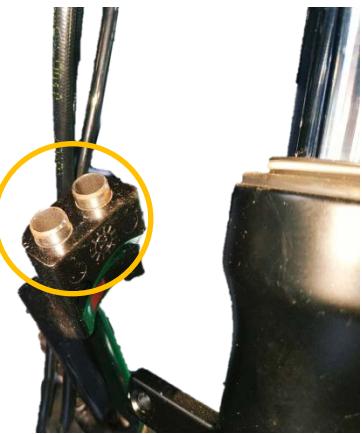


Remove 2 hexagonal socket screws from the upper side of Front Fork Locking Rod Unit.

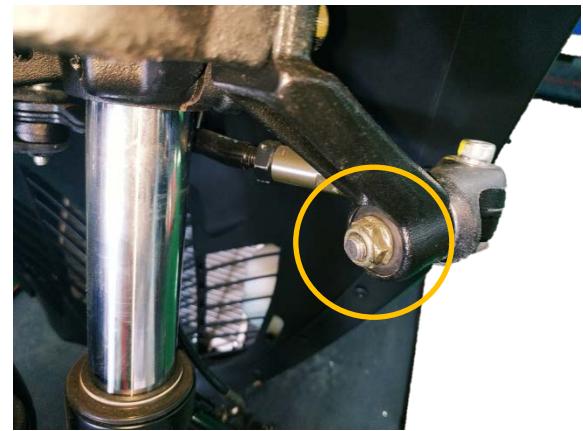


When removing the Front Fork Locking Rod Unit, put both bushings aside for use again.

If any bushing is deformed, replace it with a new one when performing the installation.

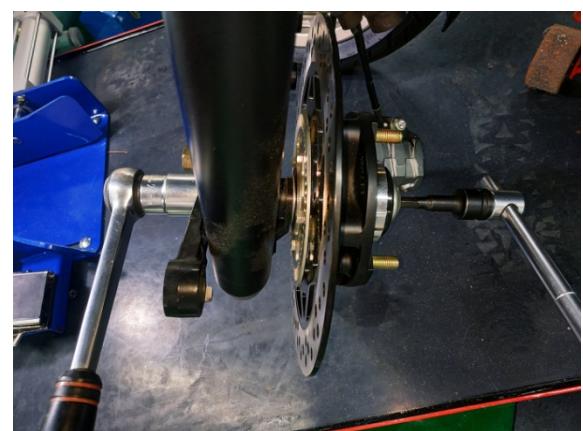


Remove the rear connecting rod and then separate the connecting rod connector.



Remove the disc unit

Remove the disc nut and then remove the disc unit.



When removing the disc, wrap the wheel speed fixing plates together to prevent from missing.



Remove the Front Fork locking plate

Remove the Front Fork locking plate.

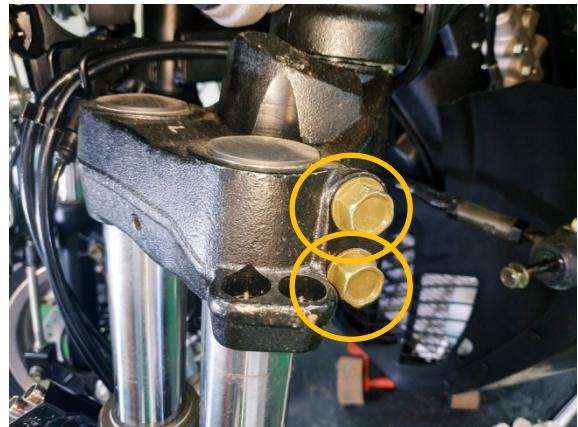


During the installation, restore the Front Fork back to the positioning point and then insert the disc screws.

Loosen 2 screws of the Shock Absorber.



Remove 4 screws from the front and rear sides of Front Fork.



Remove the Front Fork Unit. Remove the connecting screw and then it will be separated easily.



12. Front Fork



During the installation, start the erection after confirming that the marks are identical on the same side.

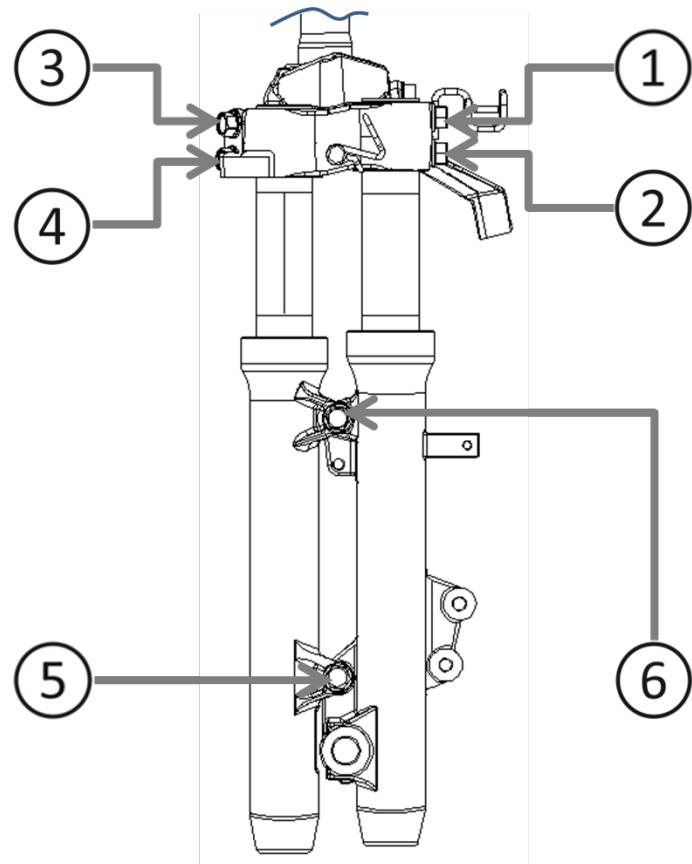


Repeat the same installation steps for the tire of the other side.

Front fork install

Tighten order and standard torque

TORQUE (kgf-m)	No.1 Tighten	No.2 Tighten
Tighten Order		
1	2.0	5.0
2	2.0	5.0
3	2.0	5.0
4	2.0	4.0
5	2.0	4.0



Remove the left and right Front Fork head tubes

Remove 2 screws from the oil pipe of the left and right head tubes.



Move the oil pipe of the left and right head tubes to one side and then remove the dust-resistant rubber cover from the head tube.



Remove the nut and then pull out the Front Fork head tube unit and then it will be separated easily.

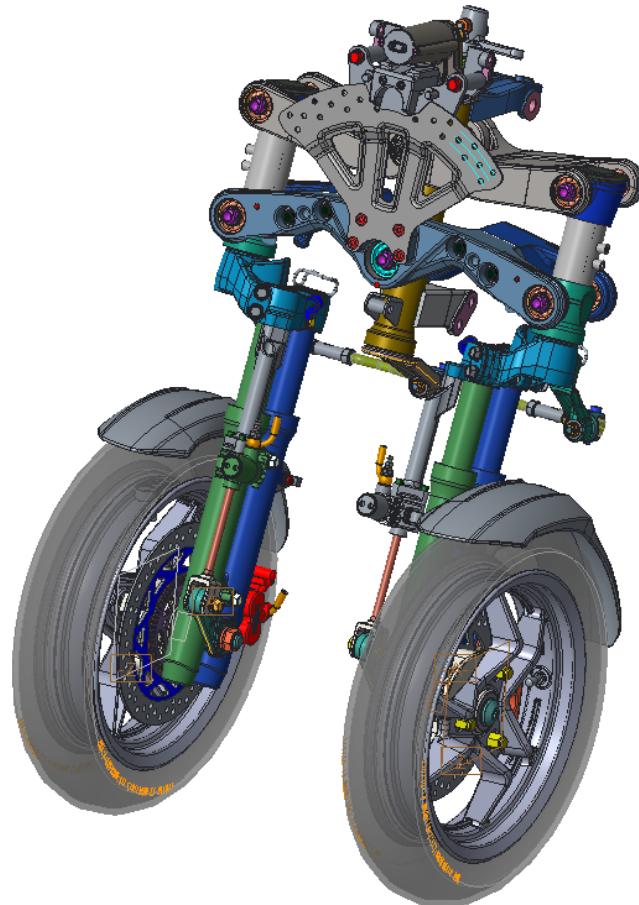
During the installation, the assembly shall be performed in reverse order according to the screw torque actually needed.



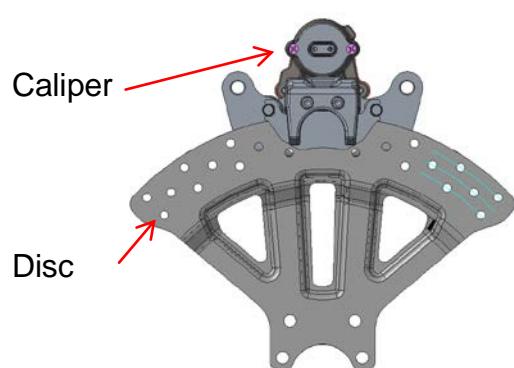
Front suspension anti-tilt locking mechanism

Part composition

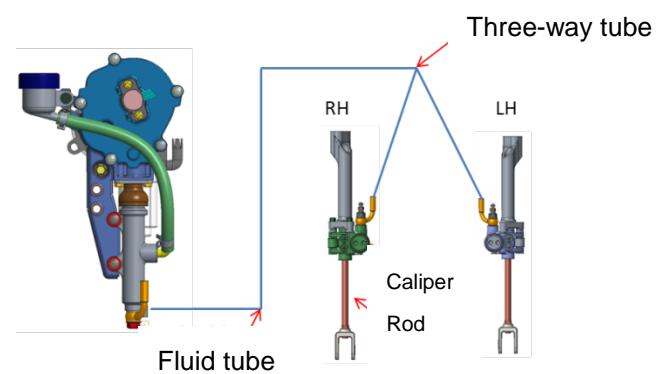
1. Anti-tilt locking device: Caliper - Disc
2. Anti-tilt locking device



(1) . Anti-tilt locking device



(2). Suspension Lock device

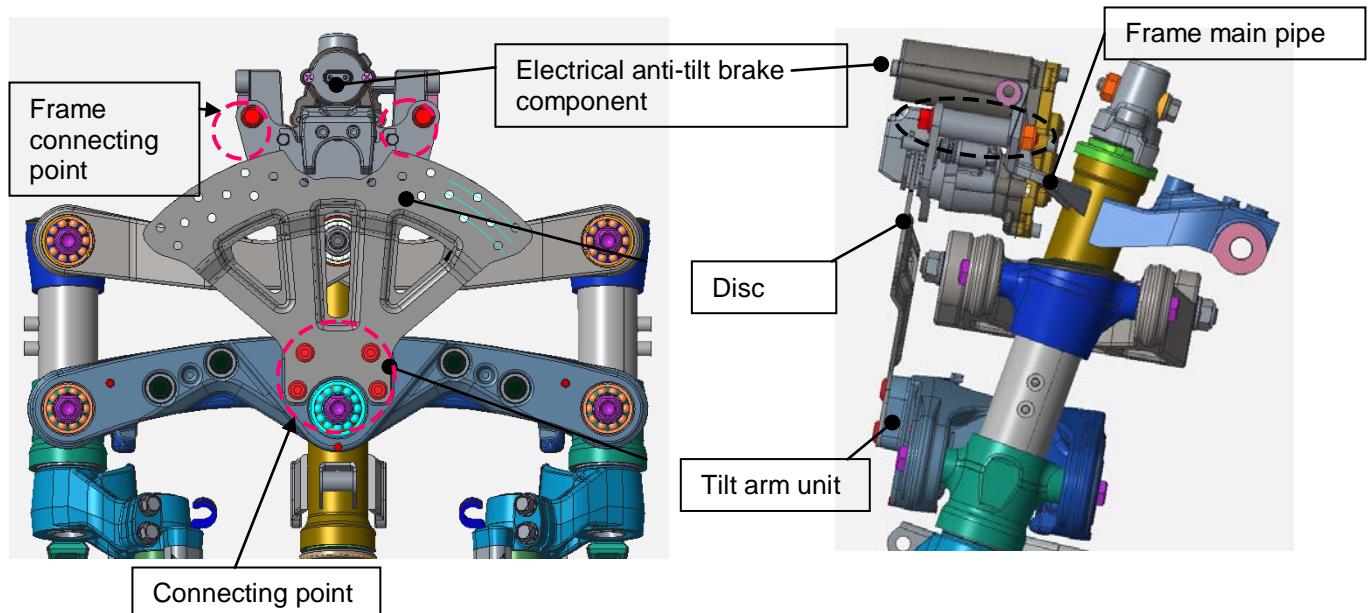


Anti-tilt locking device- (Caliper - Disc)

(1) Disc and bottom cross-bar erection

(2) Caliper and frame head pipe

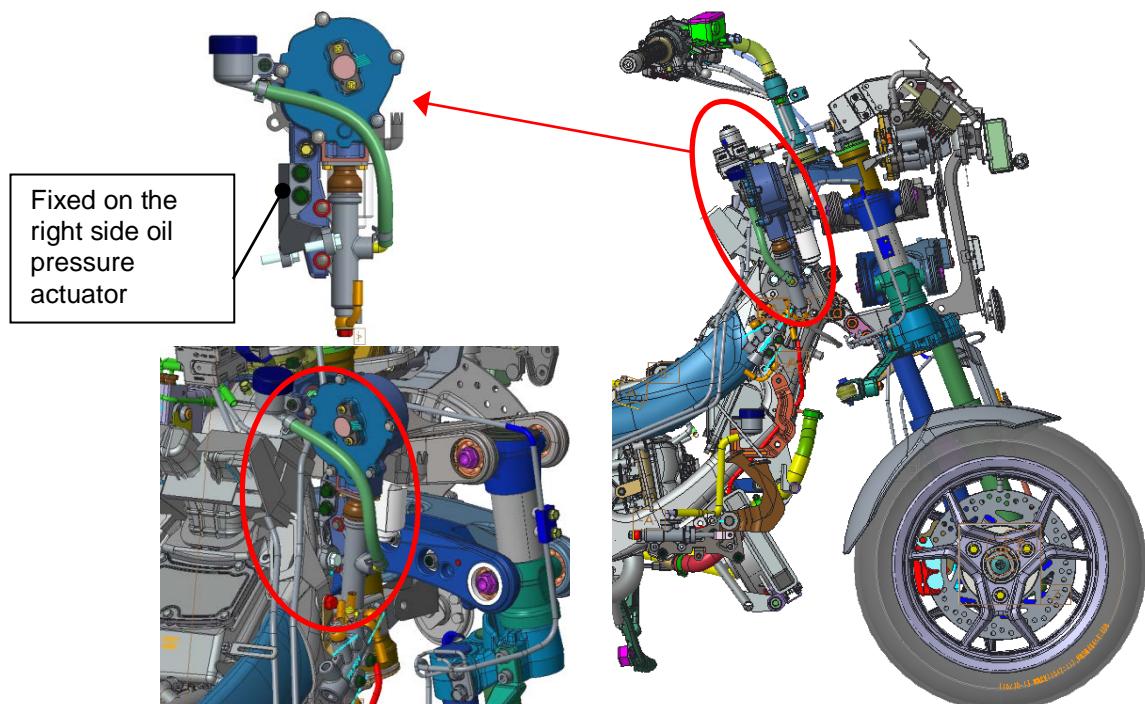
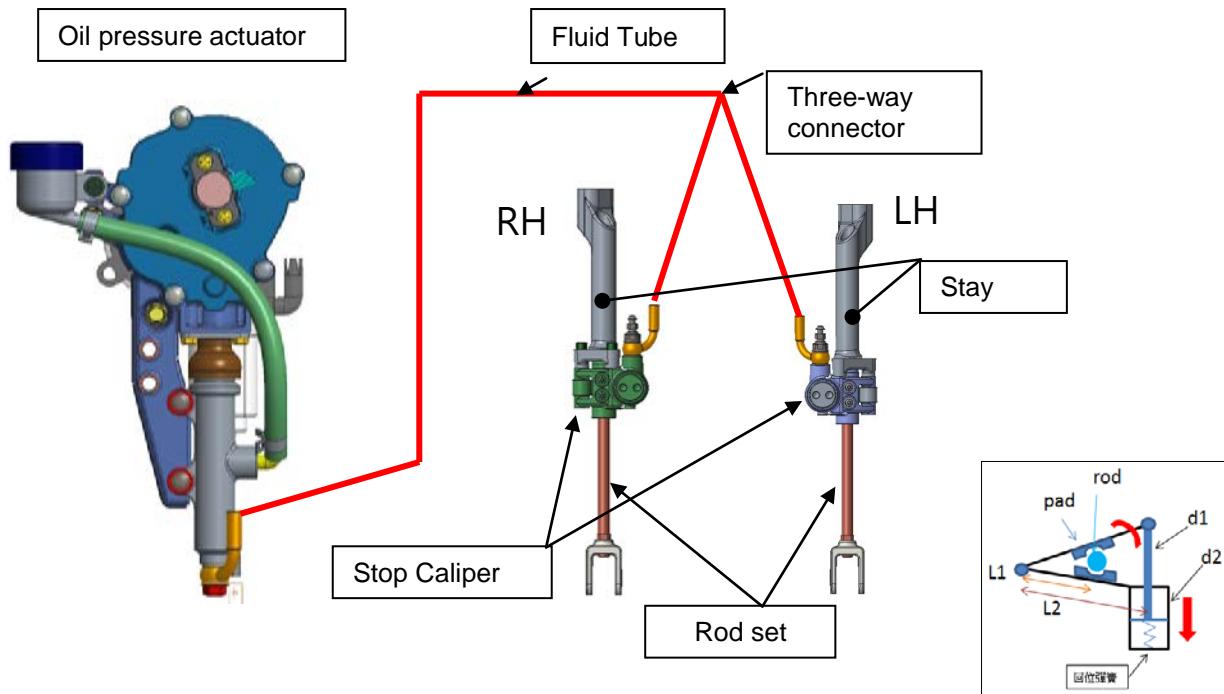
The caliper clamping action is activated by the motor through the enlarged torque of the reducing gear unit.



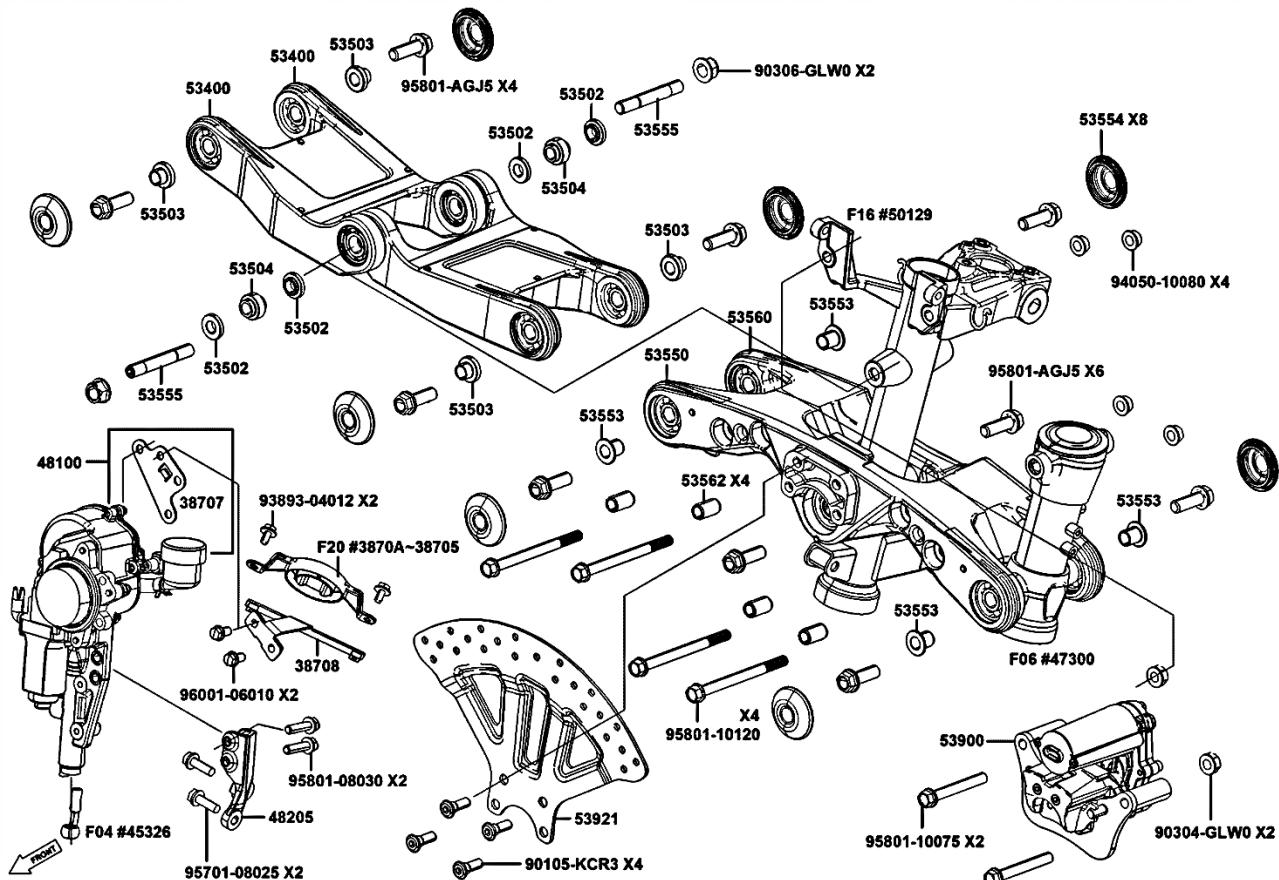
12. Front Fork

Suspension Lock is designed with caliper and rod set.

- (1). The rod set is installed with stay, front fork and wheel axle.
- (2). The caliper is stalled on the stay left and right side of wheel.



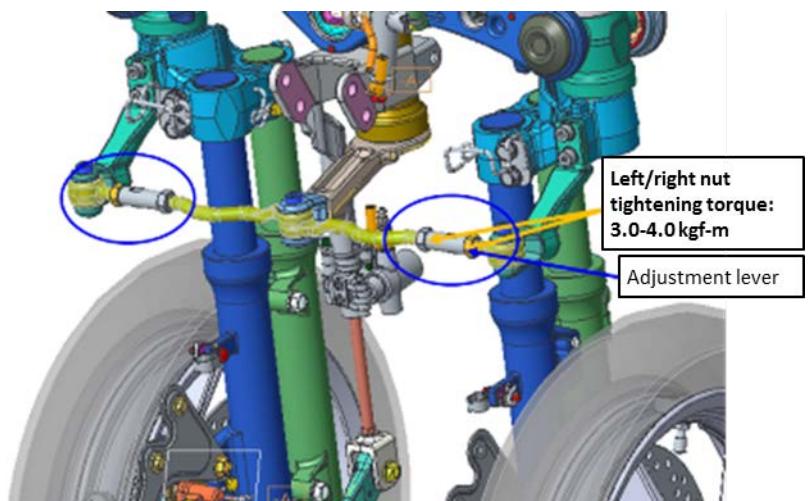
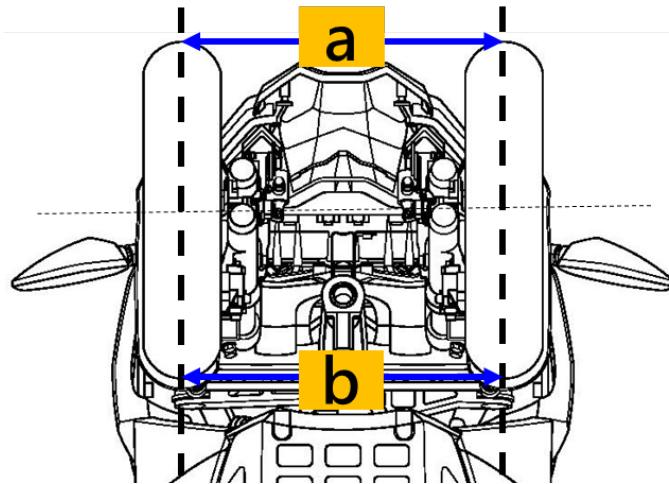
Parts Drawing



Toe angle adjustment

Steps:

1. Erect the main leg frame when making the adjustment.
2. Move the handle towards the front direction till square.
3. Mark the centerline front edge position of the front disc or the tire and then measure width "a".
4. Mark the centerline rear edge position of the front disc or the tire and then measure width "b".
5. Toe angle position = "a" minus "b"
6. Toe angle specifications:
 -8 to -12mm (tire)
 -4 to -6 mm (Brake Disc)



Removal

Remove two bolts attaching caliper.
The other wheel is same step.

Remove the bolts and confirm if it is free loose condition.

To keep the caliper with hand.

NOTE:

The caliper is fixed with a tighten tape is recommended to make it is easy to operate.

Fixed the disc with the distance measure meter, adjust measure point to set on the center of disc.

NOTE:

If the laser light point is not onto the disc position, the tire could be moved to make the laser light point on the disc.



Distance measure tool type:

BOSCH GLM-40

Use the subtract function of Distance measure tool, it means the front side subtract rear side.

front side



rear side



=



Toe angle specifications:

-8 to - 12 mm (tire)

-4 to - 6 mm (Brake Disc)

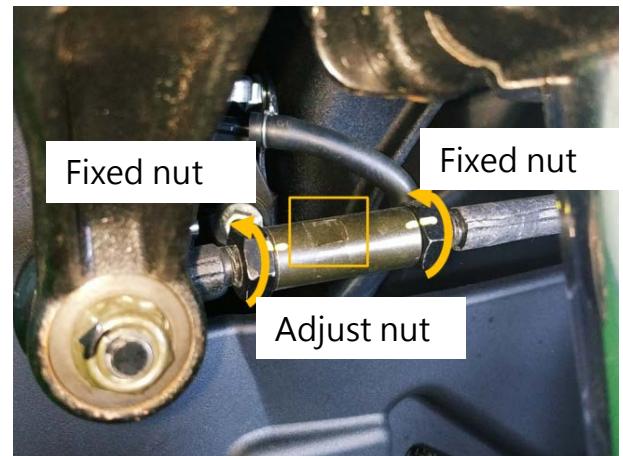
If the toe angle is adjusted, the adjust rod can be loosed if necessary.

NOTE:

1. Make sure the tire pressure and size should be standard before operation.
2. Unlock the front suspension state.

Adjust Steps

1. Loose two fixed nuts 17mm
2. Rotate the adjust nut upward, the distance of connect rod is getting shorter. Rotate the adjust nut downward, the distance of connect rod is getting longer.
3. To do the toe angle adjustment.
4. To tighten the two fixed nuts 17mm after completed.



Standard Torque: 3.0~4.0 kgf.m

NOTE:

The distance of connect rod is about 3mm when the adjust rod rotated one turn.

13. Rear Fork and Rear Shock Absorber



13. Rear Fork and Rear Shock Absorber

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Adjustment screw and loosen mounting nut	6
Remove the top / bottom cover of the belt.	7
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13. Rear Fork and Rear Shock Absorber



Troubleshooting

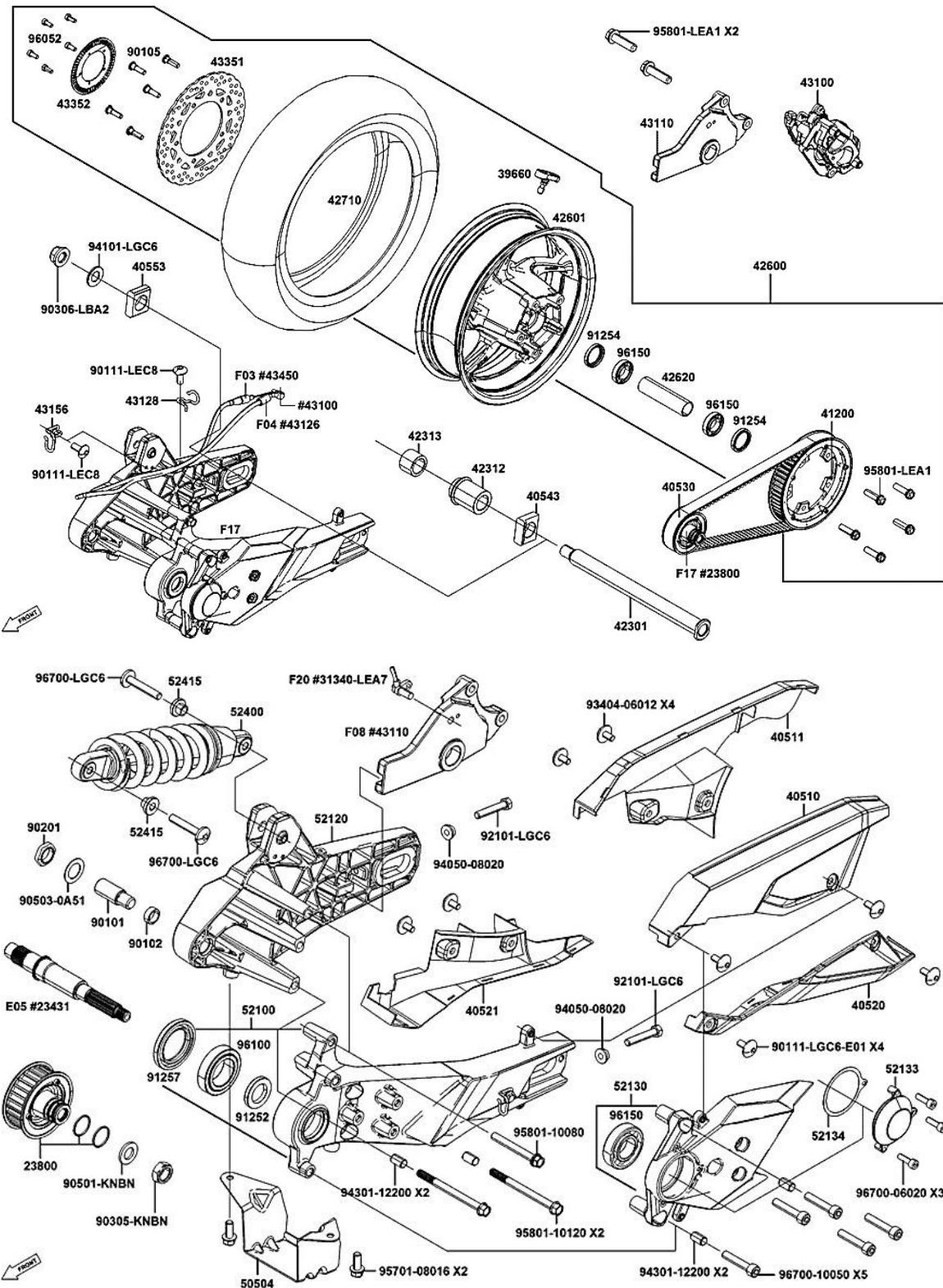
Soft rear damper

- Spring elastic fatigue.
- Faulty damper

13. Rear Fork and Rear Shock Absorber

 **KYMCO**

Exploded View



13. Rear Fork and Rear Shock Absorber



Rear Shock Absorber

Remove Exhaust Pipe Screw x 2

Installation tightening torque value:
2.7–3.2 kgf.m (27–32 N.m)



Remove 1 screw under the exhaust pipe

Installation tightening torque value:
1.8–2.2 kgf.m (18–22 N.m)



Remove the rear section of the exhaust pipe.



Remove 1 screw under the shock absorber



13. Rear Fork and Rear Shock Absorber



Remove the screws and carefully set down the rear swingarm.



Next, remove the single upper shock absorber bolt.



Carefully take off the shock absorber and the bolt.

Rear shock absorber bolt torque value:
3.5–4.5 Kgf.m(35–45 N.m)



13. Rear Fork and Rear Shock Absorber



Rear axle removal

Safety comes first: Use the protective gloves and the goggles.

- When removing the rear wheel, the engine and the exhaustion pipe should be under cool-down condition in order to avoid the scalding injury when removing the rear wheel.
- Keep the grease from contaminating the brake linking pad to prevent brake failure.

Removal Caliper

Removal Caliper Screw x 2

Installation tightening torque value:

300–400 kgf.cm (30–40N·m)



Caliper Protection

After removing the caliper, please wrap it with bubble wrap or similar protective material to prevent damage.



13. Rear Fork and Rear Shock Absorber

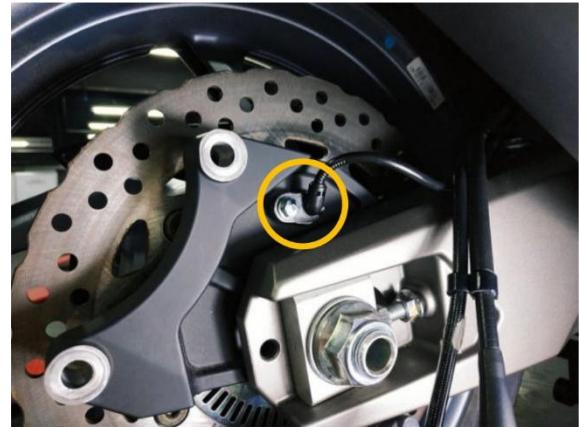


Remove the rear wheel speed sensor

Remove the rear wheel speed sensor

Distance between the encoder disc during installation:

0.3mm–1.2mm



Adjustment screw and loosen mounting nut

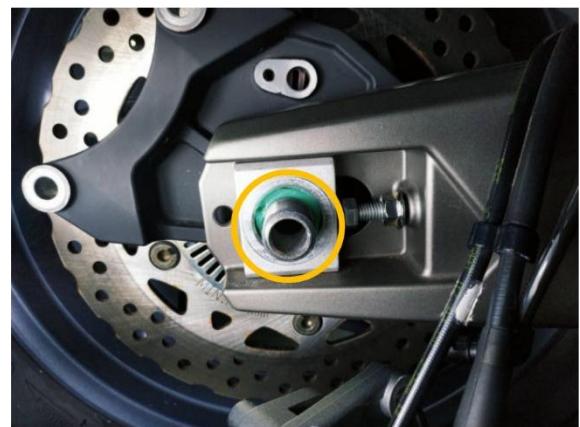
Loosen the adjustment screw and mounting nut, and move them to the right.



Remove the rear axle mounting nut.

Installation tightening torque value:

12–14 kgf.m (120–140 N·m)



13. Rear Fork and Rear Shock Absorber



Remove the top / bottom cover of the belt.

Remove 4 screws on the top / bottom cover of the belt



Remove the top / bottom cover of the belt



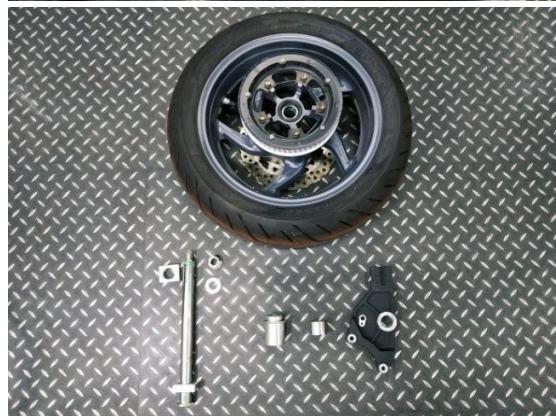
13. Rear Fork and Rear Shock Absorber



Remove the belt from the wheel.



Remove the rear wheel axle screw, and remove the related adjustment components.



Remove the belt pulley

⚠Caution

When assembling the belt pulley, please tighten in sequence.



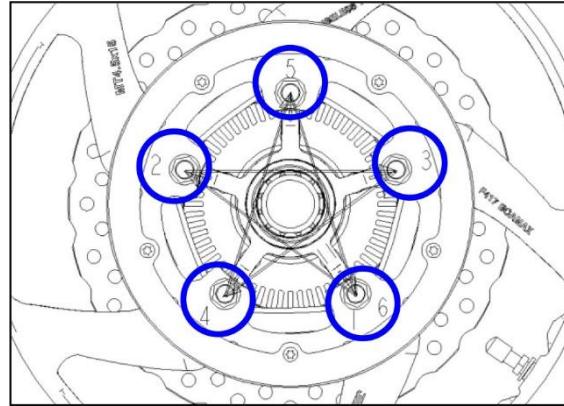
13. Rear Fork and Rear Shock Absorber



When assembling the belt pulley, follow the star-shaped tightening order (1-2-3-4-5), and use two stages to apply torque.

⚠Caution

First time
<350 kgf.cm
Second time
500–600 kgf.cm



Remove disc

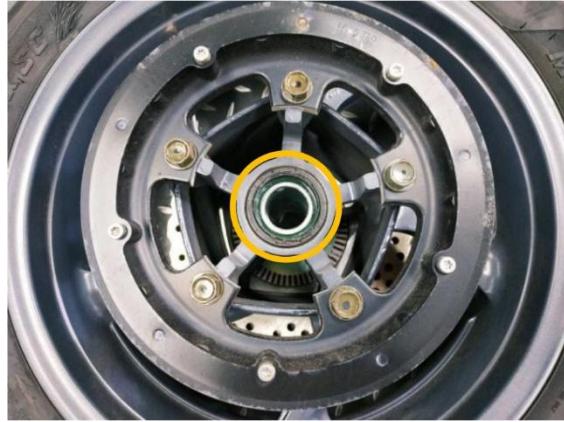
⚠Caution

When assembling the disc, follow the star-shaped tightening order and use two stages to apply torque.

First time
<150 kgf.cm
Second time
320–380 kgf.cm



Remove the oil seal and bearing



13. Rear Fork and Rear Shock Absorber



Remove the encoder disc

⚠ Caution

When installing, follow the star-shaped tightening order and use two stages to apply torque.

Tightening torque: **45–60 kgf.cm**



13. Rear Fork and Rear Shock Absorber



Remove Rear Fork

Remove the rear brake hose clamp



Remove the shock absorber lower screw



Installation tightening torque value:
350–450 kgf.cm (35–45 N·m)

Remove the rear fork swingarm nut



Tightening torque: 900–1100kgf.m
Set value: 1000kgf-cm
(excessive torque and insufficient torque not allowed).

Remove the 3 screws on the front belt pulley cover



13. Rear Fork and Rear Shock Absorber



Remove the front belt pulley cover

⚠ Caution

When installing,

- a. The outer cover gasket for the belt drive assembly must not be left out.
- b. Temporarily tighten the screws 2-3 turns in sequence; do not leave them loose.



Remove the front belt pulley axle nut.

Installation tightening torque value:

1200–1400 kgf.cm (120–140 N·m)



Remove the 2 screws securing the left footrest.



Remove the belt along with the front belt pulley outer cover

⚠ Caution

When installing the belt, make sure the belt's arrow points in the correct direction and is not reversed.

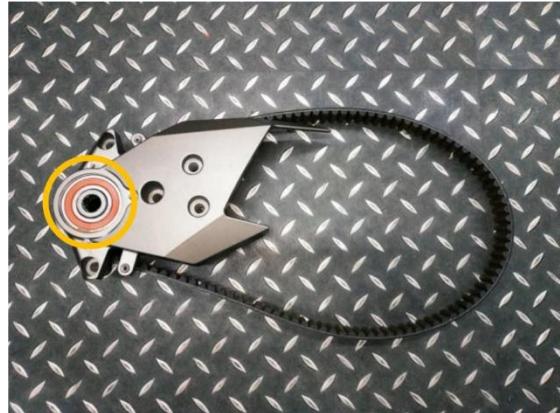


13. Rear Fork and Rear Shock Absorber



Remove the front belt pulley.

Since the pulley is tightly fitted with the bearing, use a bearing puller tool for removal.



Remove the four screws securing the upper and lower bases of the pulley cover.



Remove the 3 screws on the front belt pulley cover



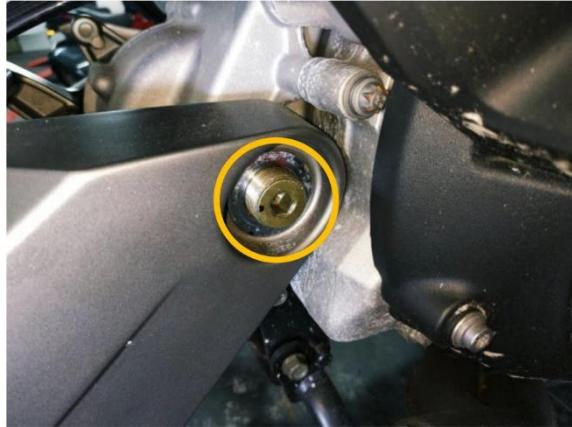
Remove the lower guard of the rear fork swingarm.



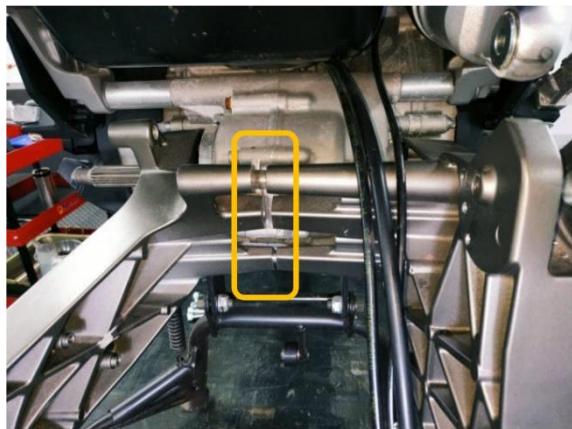
13. Rear Fork and Rear Shock Absorber



Remove the rear fork swingarm bolt.



Separate the left and right rear fork assemblies.



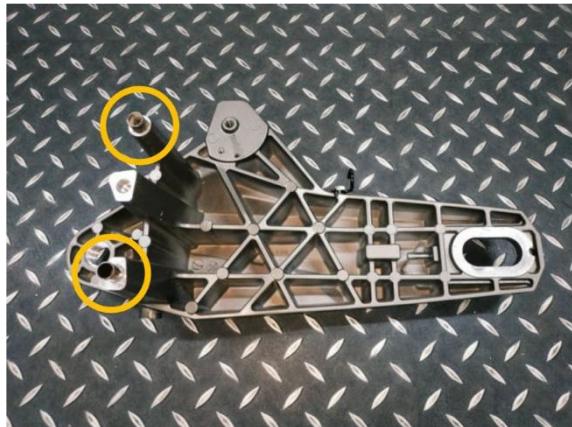
When separating, because the parts fit together tightly, gently tap with a rubber mallet. Make sure the fastening bolts have been removed first.

Take out the 2 bushings.

▲Caution

When installing, make sure the bushings are fully pressed into the rear fork's locating points.

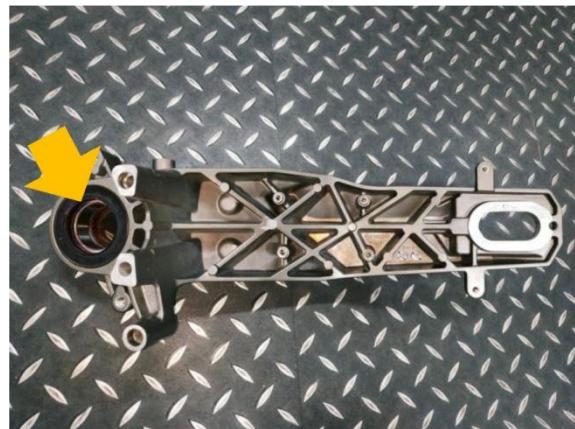
Remove the outer oil seal and bearing.



13. Rear Fork and Rear Shock Absorber



Remove the inner oil seal and bearing.



14. Front Wheel and Rear Wheel

14. Front Wheel and Rear Wheel.....	0
Troubleshooting.....	1
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Removal Caliper	9
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Adjustment screw and loosen mounting nut.....	10
Remove the top / bottom cover of the belt.....	10
Adjust the outer drive belt.....	21
Tire Pressure Sensor	28
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Rear Wheel inspection	34

Troubleshooting

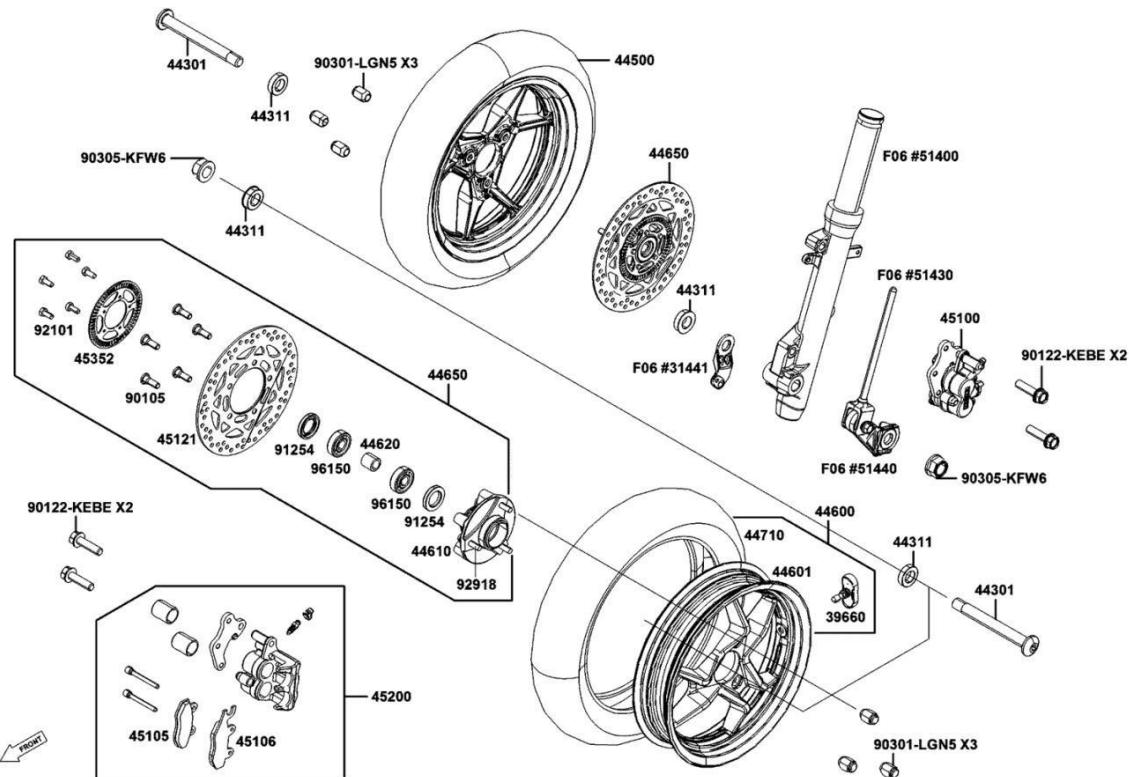
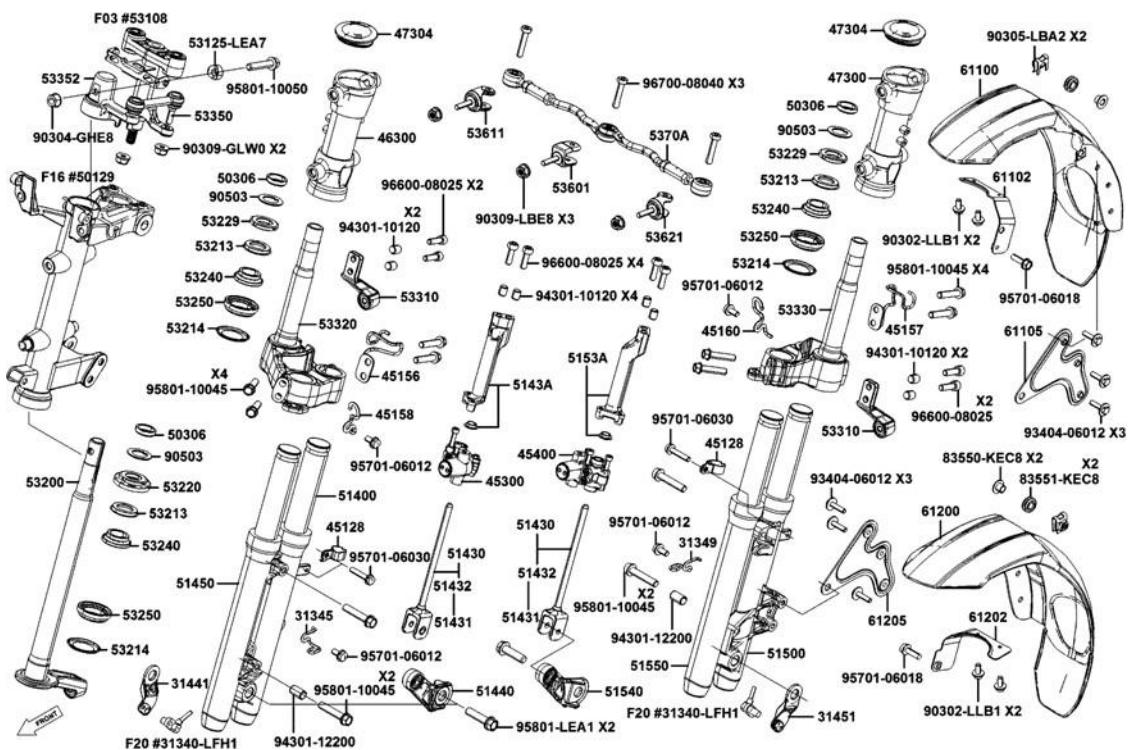
Front wheel wobbles

- Rim distorted
- Front wheel bearing loosened
- Faulty rim
- Poor tire
- Axle connection not tightened during installation

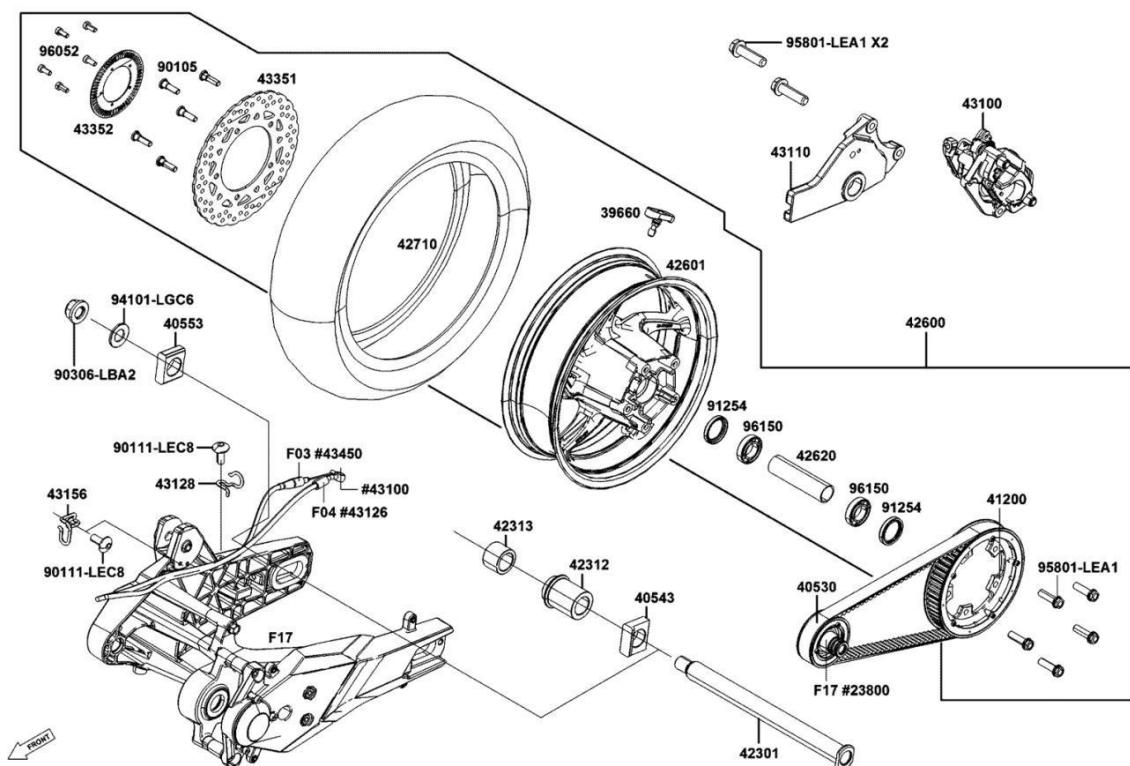
Rear wheel wobbles

- Rim distorted
- Poor tire
- Axle connection not tightened during installation

14. Front Wheel and Rear Wheel



14. Front Wheel and Rear Wheel



Front Wheel Removal

Safety comes first: Use the protective gloves and the goggles.

Front Fender Unit Removal

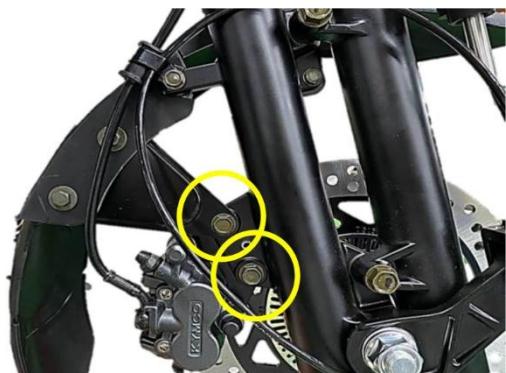
Remove the locating plate bolts and the reflector. Remove the bolts from Front Fender and then remove the Front Fender Unit.

Remove 3 nuts from the front wheel and then remove the front wheel.

Tightening torque:
550 kgf.cm



Remove 2 screws from the caliper and then remove the caliper.



Remove 3 bolts from the fender cover and then remove the fender cover.



14. Front Wheel and Rear Wheel



Remove the screws from the wheel speed sensor and the securing hook and then remove the wheel speed sensor.

Cautions for the brake caliper installation:

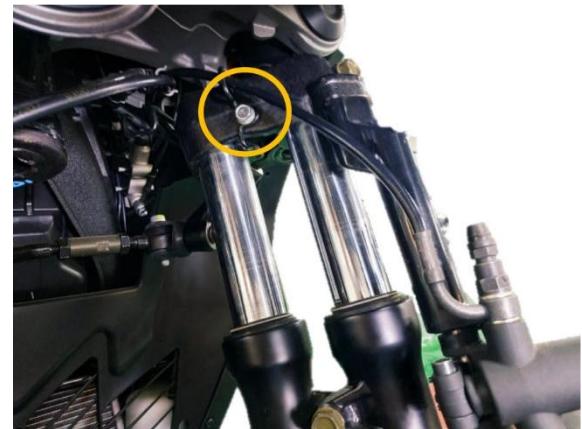
- a. Insert the upper and lower screws into the front-left fender.
Front Fork. Caliper: 2–3 threads.
- c. Tighten the screws sequentially. Loosening shall not be allowed.
- d. Torque: 240–300kgf-cm



Remove the front wheel Fender cover.



Remove the screws from the upper oil pipeline of Front Fork and then remove the hook.



Remove the screws from lower side of Front Fork Locking Rod Unit.



Tightening torque:
270 kgf.cm

14. Front Wheel and Rear Wheel



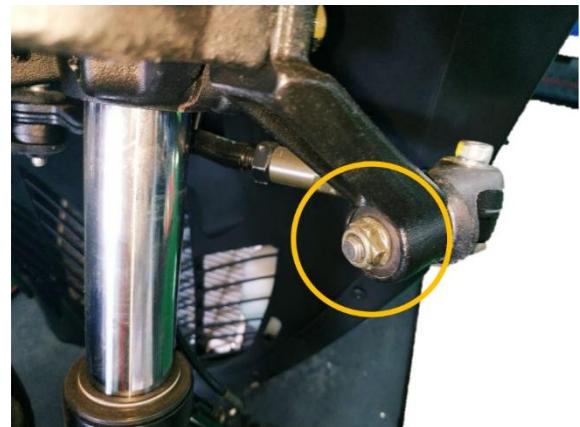
Remove 2 hexagonal socket screws from the upper side of Front Fork Locking Rod Unit.

Tightening torque:
230 kgf.cm

When removing the Front Fork Locking Rod Unit, put both bushings aside for use again.

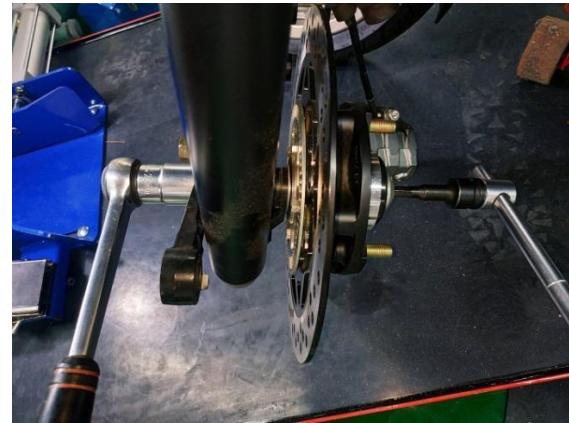
If any bushing is deformed, replace it with a new one when performing the installation.

Remove the rear connecting rod and then separate the connecting rod connector.



Remove the disc unit.

Remove the disc nut and then remove the disc unit.



When removing the disc, wrap the wheel speed fixing plates together to prevent from missing.

Front axle nut tightening torque:
900 kgf.cm



Remove the Front Wheel Hub Assembly. Remove 5 screws from the disc and then remove the wheel speed reading panel.



When installing the encoder disc, follow the star-shaped order.

Torque:
240–60 kgf.cm

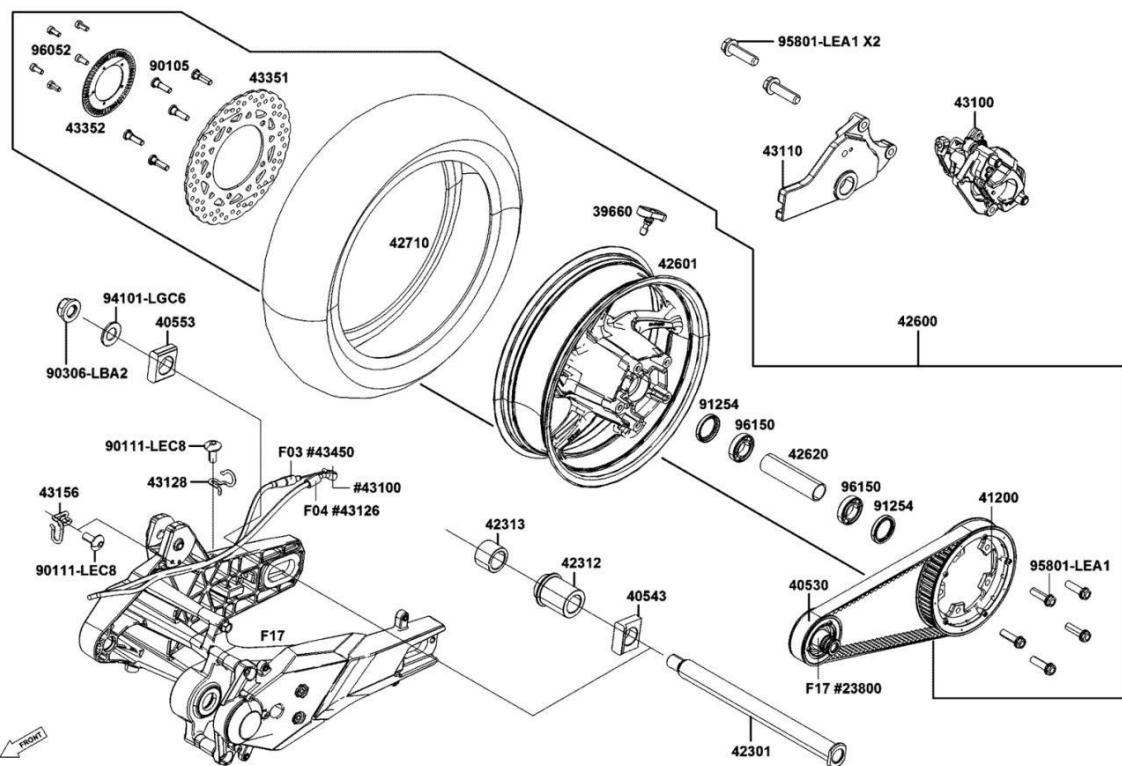


Rear Wheel Removal

Safety comes first:

Use the protective gloves and the goggles.

- When removing the rear wheel, the engine and the exhaustion pipe should be under cool-down condition in order to avoid the scalding injury when removing the rear wheel.
 - Keep the grease from contaminating the brake linking pad to prevent brake failure.



Removal Caliper

Removal Caliper Screw x 2

Installation tightening torque value:
300–400 kgf.cm (30–40N·m)



Caliper Protection

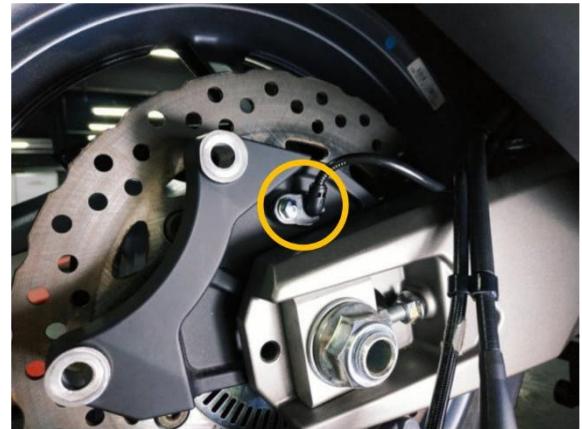
After removing the caliper, please wrap it with bubble wrap or similar protective material to prevent damage.



Remove the rear wheel speed sensor

Remove the rear wheel speed sensor

Distance between the encoder disc during installation:
0.3mm–1.2mm



Adjustment screw and loosen mounting nut

Loosen the adjustment screw and mounting nut, and move them to the right.



Remove the rear axle mounting nut.

Installation tightening torque value:
12–14 kgf.m (120–140 N·m)



Remove the top / bottom cover of the belt.

14. Front Wheel and Rear Wheel



Remove 4 screws on the top / bottom cover of the belt



Remove the top / bottom cover of the belt



14. Front Wheel and Rear Wheel



Remove the belt from the wheel.



Remove the rear wheel axle screw, and remove the related adjustment components.



Remove the belt pulley

⚠ Caution

When assembling the belt pulley, please tighten in sequence.



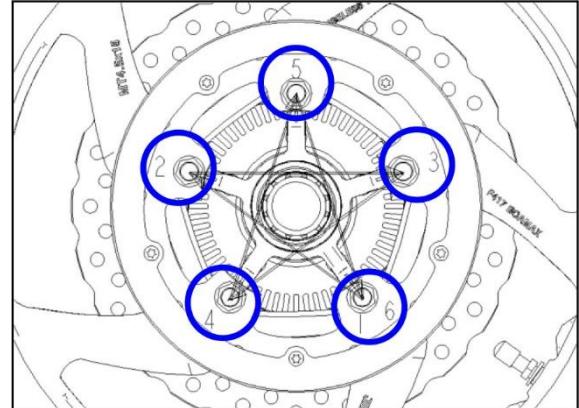
14. Front Wheel and Rear Wheel



When assembling the belt pulley, follow the star-shaped tightening order (1-2-3-4-5), and use two stages to apply torque.

⚠ Caution

First time
<350 kgf.cm
Second time
500–600 kgf.cm



Remove disc

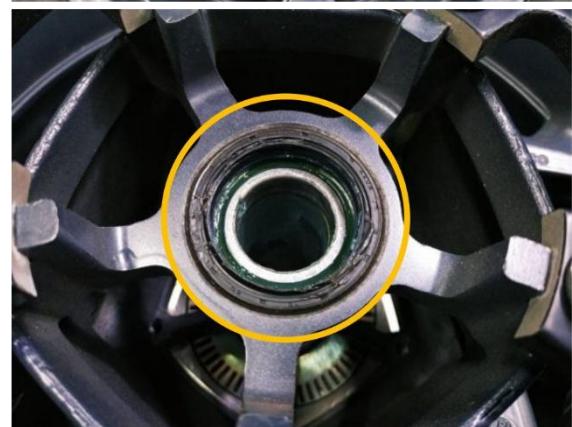
⚠ Caution

When assembling the disc, follow the star-shaped tightening order and use two stages to apply torque.

First time
<150 kgf.cm
Second time
320–380 kgf.cm



Remove the oil seal and bearing



14. Front Wheel and Rear Wheel



Remove the encoder disc

⚠ Caution

When installing, follow the star-shaped tightening order and use two stages to apply torque.

Tightening torque: 45–60 kgf.cm



14. Front Wheel and Rear Wheel



Remove the rear brake hose clamp



Remove the shock absorber lower screw



Remove the rear fork swingarm nut



Tightening torque: 900–1100kgf.m

Set value: 1000kgf-cm

(excessive torque and insufficient torque not allowed).

Remove the 3 screws on the front belt pulley cover



14. Front Wheel and Rear Wheel



Remove the front belt pulley cover

⚠Caution

When installing,

- a. The outer cover gasket for the belt drive assembly must not be left out.
- b. Temporarily tighten the screws 2-3 turns in sequence; do not leave them loose.



14. Front Wheel and Rear Wheel



Remove the front belt pulley axle nut.

Installation tightening torque value:

1200–1400 kgf.cm (120–140 N·m)



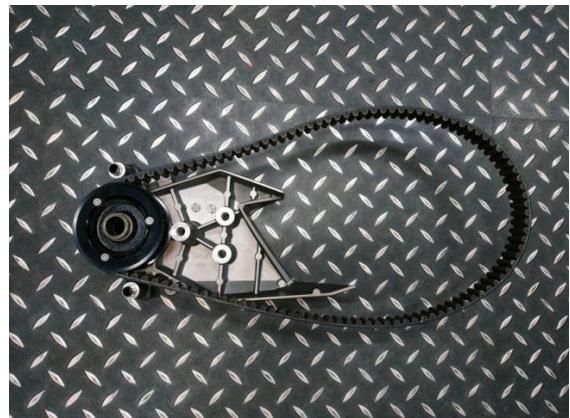
Remove the 2 screws securing the left footrest.



Remove the belt along with the front belt pulley outer cover

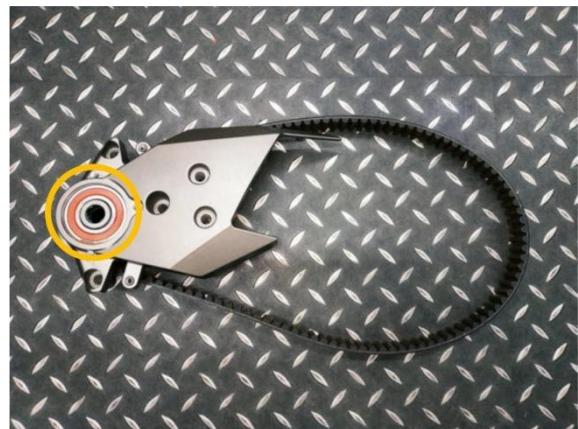
⚠ Caution

When installing the belt, make sure the belt's arrow points in the correct direction and is not reversed.



Remove the front belt pulley.

Since the pulley is tightly fitted with the bearing, use a bearing puller tool for removal.



14. Front Wheel and Rear Wheel



Remove the four screws securing the upper and lower bases of the pulley cover.



Remove the 3 screws on the front belt pulley cover



Remove the lower guard of the rear fork swingarm.

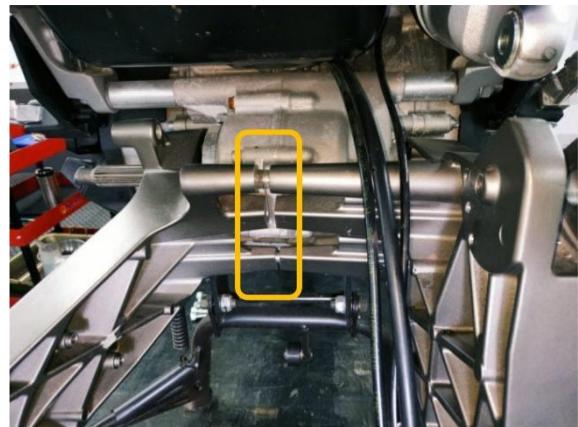


Remove the rear fork swingarm bolt.



Separate the left and right rear fork assemblies.

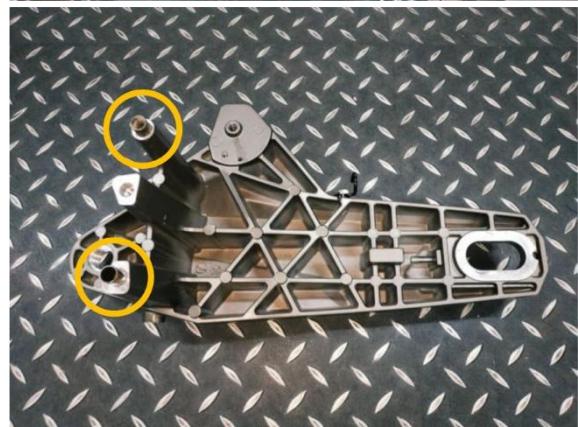
When separating, because the parts fit together tightly, gently tap with a rubber mallet. Make sure the fastening bolts have been removed first.



Take out the 2 bushings.

▲Caution

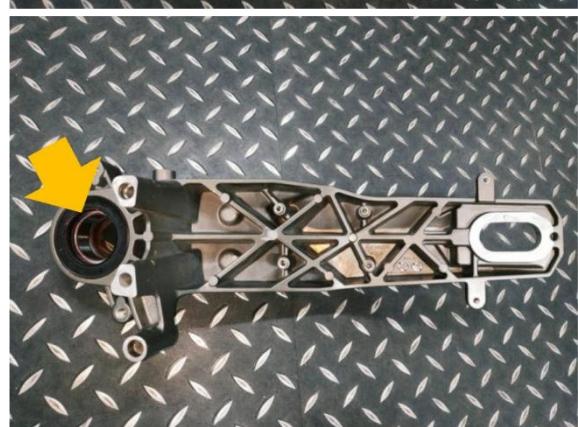
When installing, make sure the bushings are fully pressed into the rear fork's locating points.

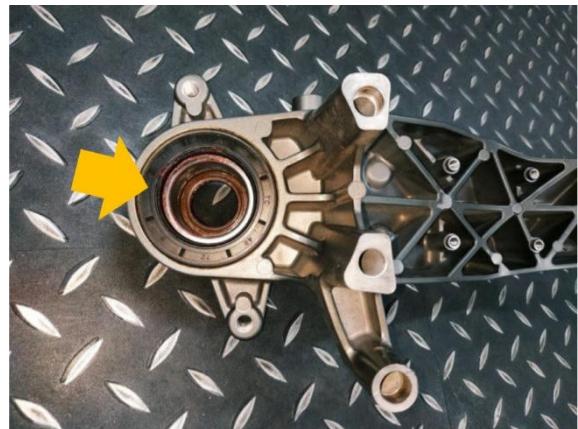


Remove the outer oil seal and bearing.



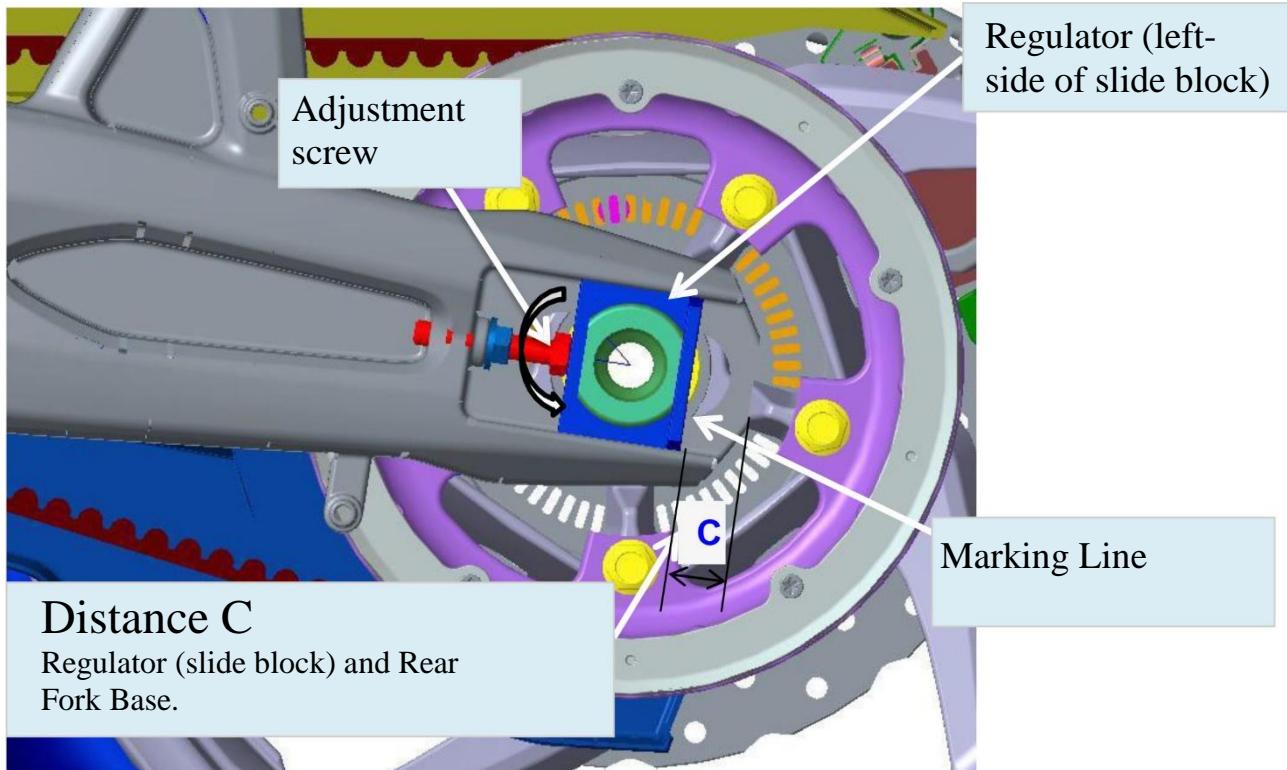
Remove the inner oil seal and bearing.





Adjust the outer drive belt.

Step 1: Adjust the Belt Regulator.



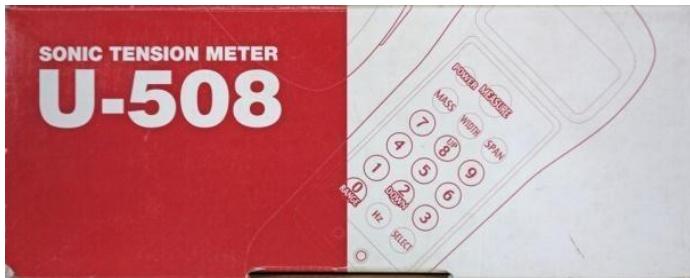
- ~1. Turn the left-side adjusting screw counter clockwise until the Belt Slide Block reaches the marking line.
- ~2. Turn the right-side adjusting screw clockwise until the Belt Slide Block is aligned with the left side.
- ~3. Adjust the slide blocks of both sides and the dimensions indicated in Fig. C is **$17\pm0.5\text{mm}$** .

14. Front Wheel and Rear Wheel



Step 2-1: Audio Tensioner Setting

sample model (English version): ~ Gates Unitta, U-508



~1. Input Belt mass constant, width and belt wheelbase.

M (Mass) 008.5 g/m W (Width) 027.0 mm/R S (Belt wheelbase) 0377 mm

- ~2. Align the Tensioner microphone with the belt and then press "Measure (measuring)" key.
- ~3. Tap the belt and then read the tension value.

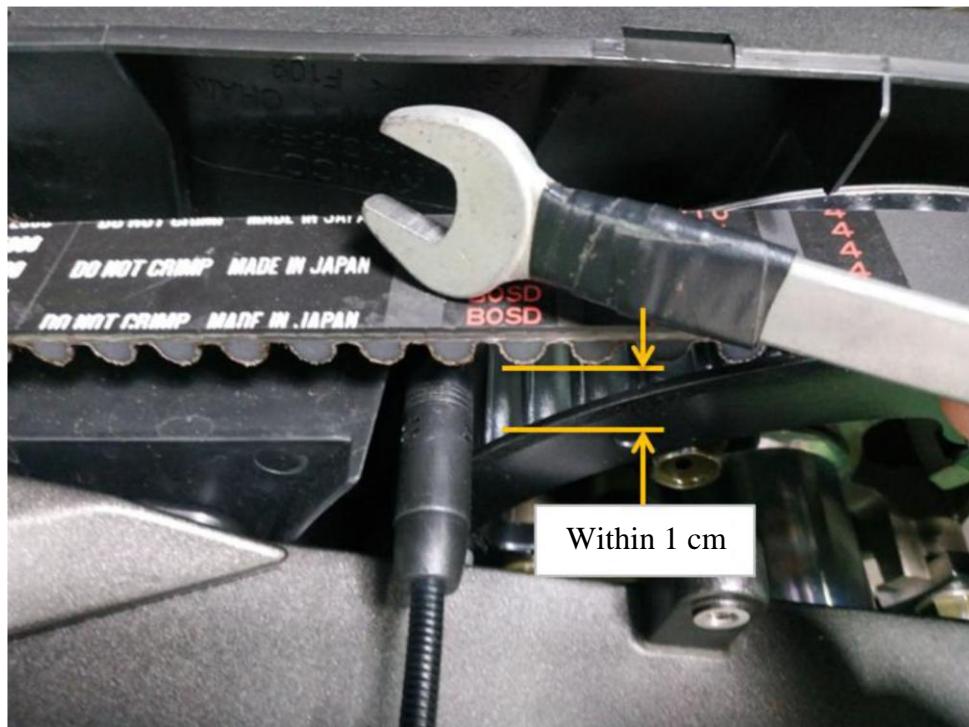


Step 2-2: Measure the belt tension with Belt Audio Tensioner.

P.S. Marking distance. Slide Block C and Rear Fork Base Plan

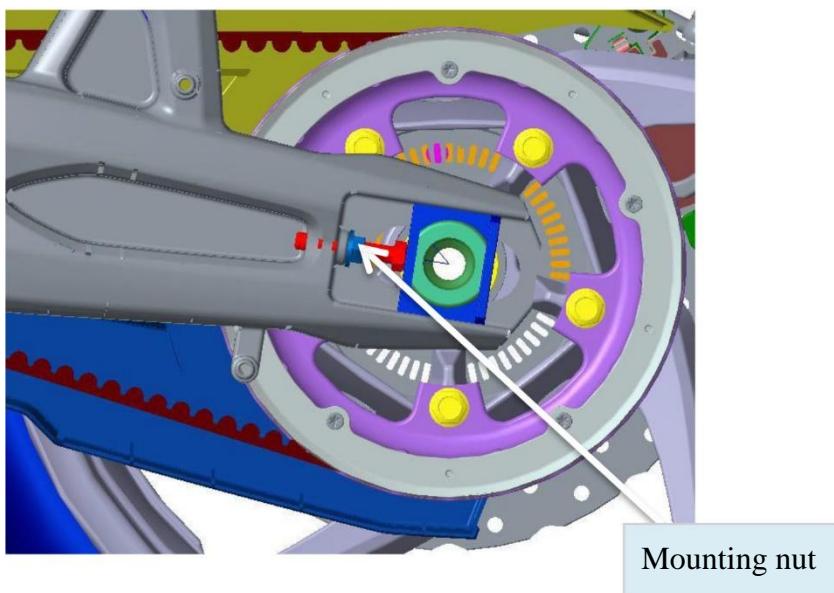
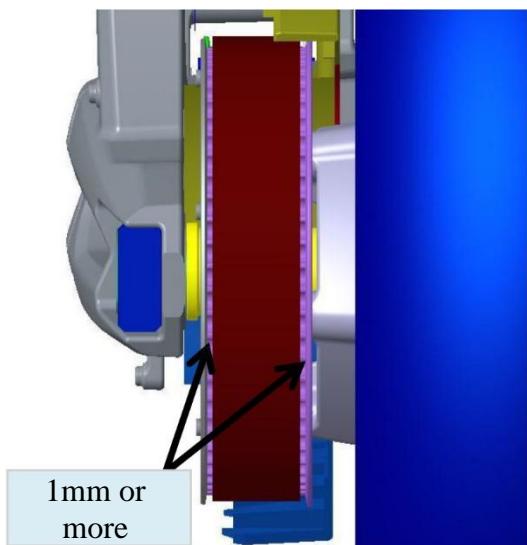
Marking Distance and Tension Reference

17mm --- (900–1200N)



1. When measuring with the Belt Audio Tensioner, it should align with the belt horizontally.
2. Place the Reading Head within 1cm of the belt, with its front and rear ends located behind the Rear Rocker Shock Absorber (per the figure).
3. Tap the belt with a metallic tool with appropriate hitting force.
4. Read the value of the tension, and it should be ranged between **800–1100 N**

Step 3: Ensure the belt gap

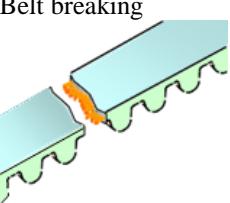
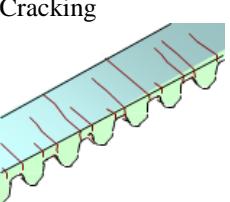
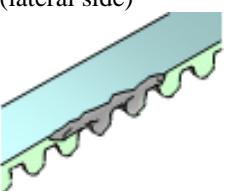
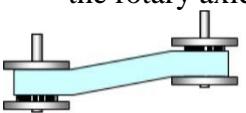
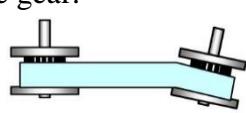
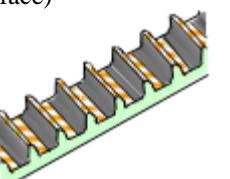
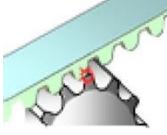
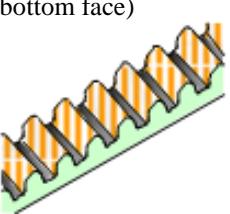


- ~1. Let the Rear Wheel rotate several rounds and then watch if the belt is located at the Belt Pulley center (with belt edge gap over 1mm). If offset too much, turn the Right-side Belt Adjusting Slide Block but the left/right slide block Dimension-C must be within $17\pm0.5\text{mm}$.
- ~2. After confirming that the belt is located at the center, lock the Rear Wheel and then tighten the lock nut of the bolt.

Issues of the outer drive belt and solutions

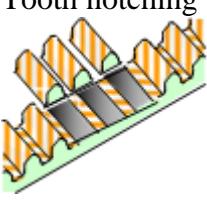
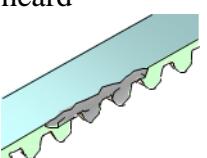
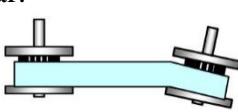
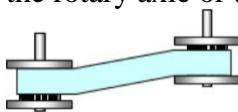
The problems encountered during the mechanical operation process are usually tough challenges.

If any problem occurs to the belt, it cannot be solved simply by making new parts replacement; instead, it is imperative to ascertain the cause in order resolve it effectively. When used correctly, the belt may demonstrate the intended functions in achieving longer service life.

Abnormal sign	Possible causes (inspection item) and solutions	
	<p>1) Core elasticity degrading or corrosion ⇒ Check the belt storage condition. 2) Belt is moistened by water ⇒ Prevent the belt from getting moistened.</p> <p>Store the belt in room temperature and avoid direct sunshine. Do not wrap and compress the belt. Store the belt away from the oil and steam.</p>	<p>Do not bundle, heavily compress, or sharply bend the belt, as this may damage the core wires.</p>  
	<p>1) Environmental temperature is too high ⇒ Use high-quality (higher heat resistance) belt. Standard Quality (CR) : below 90°C High Quality (H-NBR) : below 120°C</p>	
	<p>1) The rotary axle is unbalanced or the gear offsetting is too big ⇒ Adjust the rotary axle or the gear.</p>  	
	<p>1) The belt tension is too tight or too loose ⇒ Adjust the belt initial tension 2) Gear surface is coarse ⇒ Select the gear treated with smooth surface finish.</p>	 <div data-bbox="637 1372 1352 1500" style="border: 1px solid black; padding: 5px;"> <p>If the belt tension is too tight or too loose, it means the biting effect between the belt and the gear is poor.</p> </div>
	<p>1) Belt tension is too tight ⇒ Adjust the belt initial tension 2) Gear shape is irregular ⇒ Select the gear treated with standard tooth dimensions.</p>	

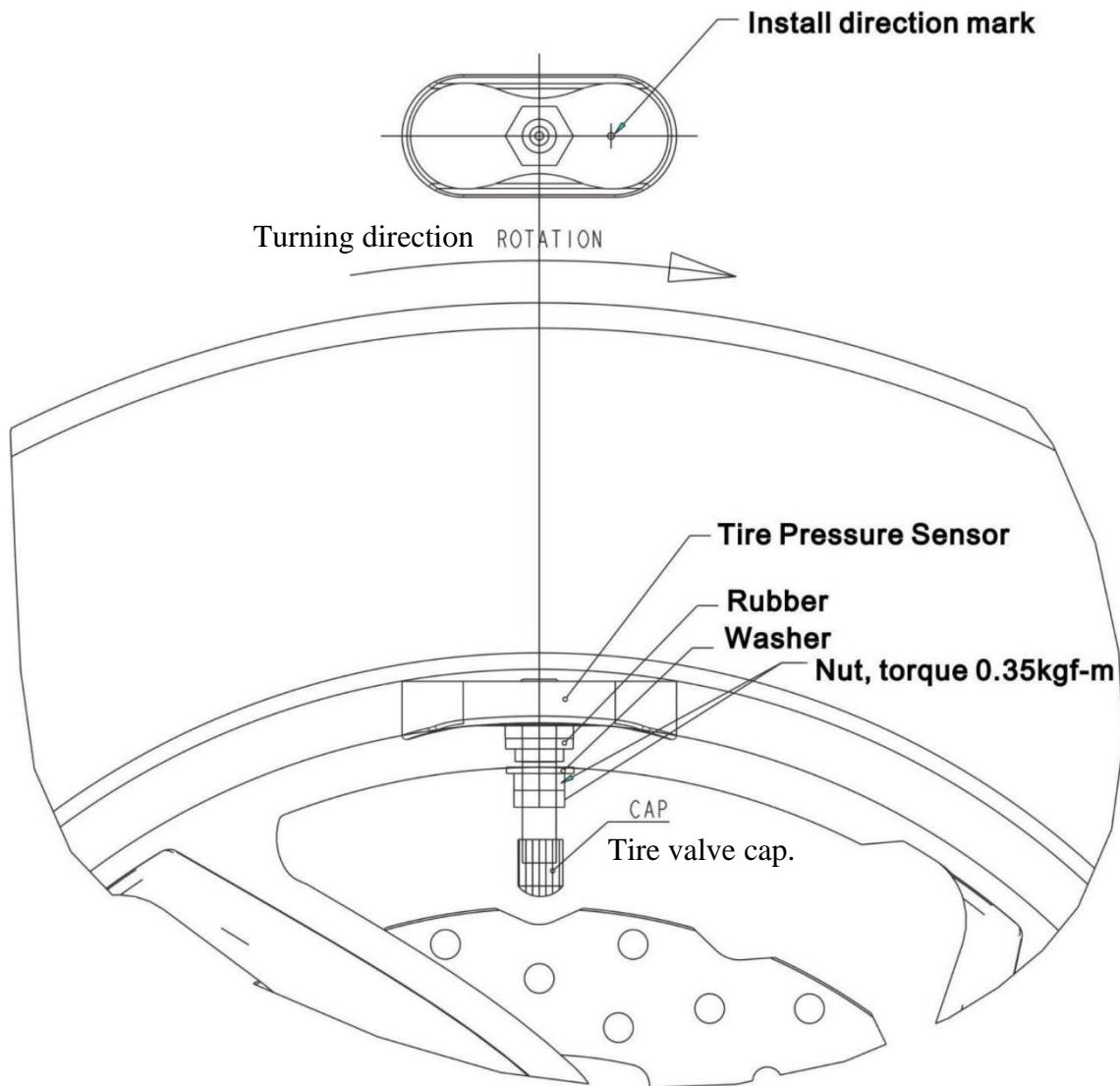
14. Front Wheel and Rear Wheel



<p>Tooth notching</p> 	<ol style="list-style-type: none">1) Impact load is presented ⇒ Prevent the belt from being subjected to impact.2) Oil attached ⇒ Prevent the belt from oil contamination.3) Belt tension is too tight ⇒ Adjust the belt initial tension4) Environmental temperature is too high ⇒ Use high-quality (higher heat resistance) belt.
<p>Abnormal sound is heard</p> 	<ol style="list-style-type: none">1) The rotary axle is unbalanced or the gear offsetting is too big ⇒ Adjust the rotary axle or the gear.2) Belt tension is too tight ⇒ Adjust the belt initial tension3) Gear shape is irregular ⇒ Select the gear treated with standard tooth dimensions.

Tire Pressure Sensor

Remove the tire. Loosen the lock nut and then remove the tire pressure detector. The installation shall be performed according to the torque and the sequence indicated in the table below.



Rear Wheel Unit inspection and installation

Remove the Rear Wheel Axle and socket.



Remove the bolts from the rear drive pulley of outer drive belt. Tightening torque value required for the installation: 3–4 kgf.m (30–40 N·m)



Remove the rear drive pulley of the outer drive belt.



Remove the oil seal and replace it with a new one and then apply a slight amount of grease on the soil seal.



Check if the bearing is rotating smoothly and if any abnormal sound is heard. If abnormal, replace it with a new bearing.

Pull out the bearing with the Bearing Puller.

Special tool: Bearing Puller A120E00037



Install the new bearing with the Bearing Installation Device. After being installed, the bearing shall be flush with the rim face without any protrusion.

Special tool - Bearing Installation Device: A120E00014

14. Front Wheel and Rear Wheel



After being installed, apply a slight amount of grease on the bearing and the oil seal.

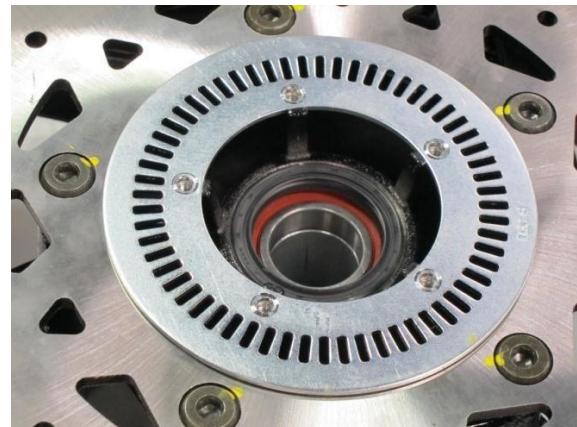
14. Front Wheel and Rear Wheel



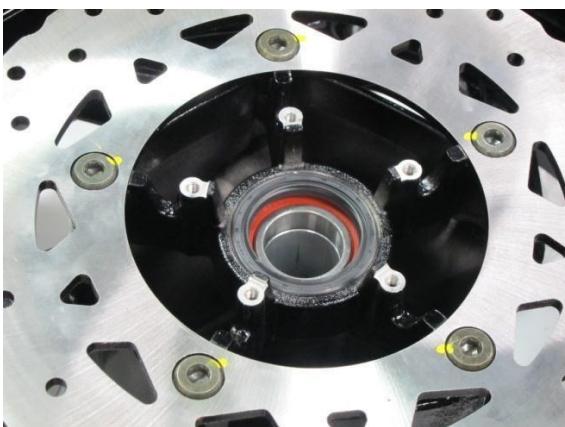
Check the conditions of the right-side Rear Wheel.



Remove the Rear Wheel socket and then remove the bolt from the Reading Panel.



Take out the Reading Panel and then check if the Reading Panel is showing any deformation sign or foreign matter. If foreign matters are found, execute cleaning. If seriously damaged or deformed, replace it with a new one.



14. Front Wheel and Rear Wheel



Remove the bolts from the disc.



Check if the Disc is showing any deformation or notching and damage. If seriously damaged or deformed, replace it with a new one.

Remove the Rear Disc.

Installation tightening torque value: 3.2–3.8 kgf.m (32–38 N·m)

Apply blue Loctite agent on the lock bolt. If required, replace it with a new bolt.



Check if the bearing is rotating smoothly and if any abnormal sound is heard. If abnormal, replace it with a new bearing.

Pull out the bearing with the Bearing Puller.

Special tool: Bearing Puller A120E00037



Install the new bearing with the Bearing Installation Device. After being installed, the bearing shall be flush with the rim face without any protrusion.

Special tool: Bearing Installation Device A120E00014

After being installed, apply a slight amount of grease on the bearing and the oil seal.



Rear Wheel inspection

Check if the bearing is rotating smoothly and if any abnormal sound is heard. If abnormal, replace it with a new bearing.