Service Manual

FDA12U1CN-EU

SYMBOLS AND MARKS 1-1	TORQUE VALUES (ENGINE) 1-10
GENERAL SAFETY 1-2	TORQUE VALUES (FRAME) 1-11
SERVICE PRECAUTIONS 1-3	TROUBLES DIAGNOSIS 1-12
SPECIFICATIONS 1-9	LUBRICATION POINTS 1-16

SYMBOLS AND MARKS

Symbols and marks are used in this manual to indicate what and where the special service are needed, in case supplemental information is procedures needed for these symbols and marks, explanations will be added to the text instead of using the symbols or marks.

Warning	Means that serious injury or even death may result if procedures are not followed.
Caution	Means that equipment damages may result if procedures are not followed.
Engine oil	Limits to use SAE 10W-30 API SH/CD class oil. Warranty will not cover the damage that caused by not apply with the limited engine oil.
Gear oil	Limits to use SAE 85W-140 class oil. Warranty will not cover the damage that caused by not apply with the limited gear oil.
Grease	King Mate G-3 is recommended.
Locking sealant	Apply sealant, medium strength sealant should be used unless otherwise specified.
Oil seal	Apply with lubricant.
Renew	Replace with a new part before installation.
Brake fluid	Use recommended brake fluid DOT3 or WELLRUN brake fluid.
Special tools	Special service tools.
Correct	Meaning correct installation.
Wrong	Meaning wrong installation.
Indication	Indication of components.
Directions	Indicates position and operation directions.
	Components assembly directions each other.
	Indicates where the bolt installation direction, --- means that bolt cross through the component (invisibility).

GENERAL SAFETY

Carbon monoxide

If you must run your engine, ensure the place is well ventilated. Never run your engine in a closed area. Run your engine in an open area, if you have to run your engine in a closed area, be sure to use an extractor.

⚠ Caution

Exhaust contains toxic gas which may cause one to lose consciousness and even result in death.

Gasoline

Gasoline is a low ignition point and explosive material. Work in a well-ventilated place, no flame or spark should be allowed in the work place or where gasoline is being stored.

⚠ Caution

Gasoline is highly flammable, and may explode under some conditions, keep it away from children.

Used engine oil

⚠ Caution

Prolonged contact with used engine oil (or transmission oil) may cause skin cancer although it might not be verdict.

Hot components

⚠ Caution

Components of the engine and exhaust system can become extremely hot after engine running. They remain very hot even after the engine has been stopped for some time. When performing service work on these parts, wear insulated gloves and wait until cooling off.

Battery

⚠ Caution

- Battery emits explosive gases; flame is strictly prohibited. Keep the place well ventilated when charging the battery.
- Battery contains sulfuric acid (electrolyte) which can cause serious burns so be careful do not be spray on your eyes or skin. If you get battery acid on your skin, flush it off immediately with water. If you get battery acid in your eyes, flush it off immediately with water, then go to hospital to see an ophthalmologist.
- If you swallow it by mistake, drink a lot of water or milk, and take some laxative such as castor oil or vegetable oil, and then go to see a doctor.
- Keep electrolyte beyond reach of children.

Brake shoe

Do not use an compressed air or a dry brush to clean components of the brake system, use a vacuum cleaner or the equivalent to avoid asbestos dust flying.

⚠ Caution

Inhaling asbestos dust may cause disorders and cancer of the breathing system.

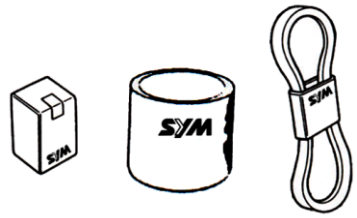
Brake fluid

⚠ Caution

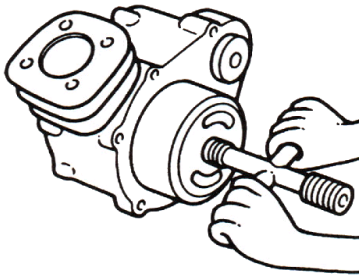
Spilling brake fluid on painted, plastic, or rubber parts may cause damage to the parts. Place a clean towel on the above-mentioned parts for protection when servicing the brake system. Keep brake fluid beyond reach of children.

SERVICE PRECAUTIONS

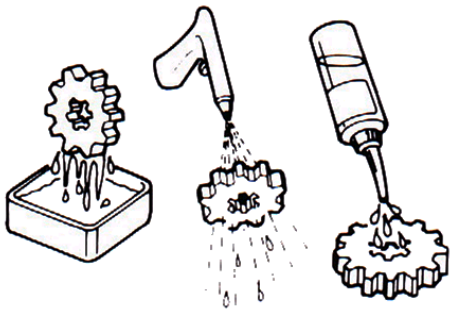
- Always use with SANYANG genuine parts and recommended oils. Using non-designed parts for SANYANG motorcycle may damage the motorcycle.



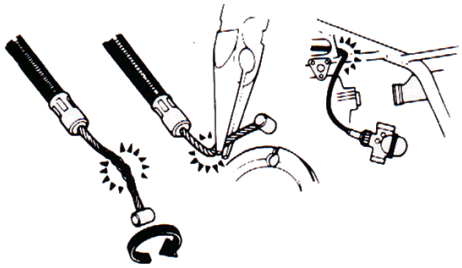
- Special tools are designed for remove and install of components without damaging the parts being worked on. Using wrong tools may result in parts damaged.



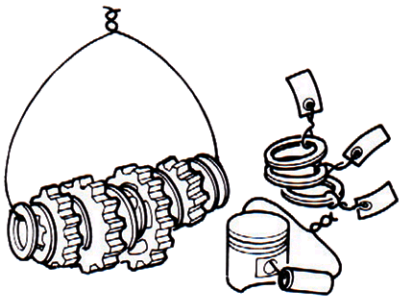
- When servicing this motorcycle, use only metric tools. Metric bolts, nuts, and screws are not interchangeable with the English system, using wrong tools and fasteners may damage this vehicle.
- Clean the outside of the parts or the cover before removing it from the motorcycle. Otherwise, dirt and deposit accumulated on the part's surface may fall into the engine, chassis, or brake system to cause a damage.
- Wash and clean parts with high ignition point solvent, and blow dry with compressed air. Pay special attention to O-rings or oil seals because most cleaning agents have an adverse effect on them.



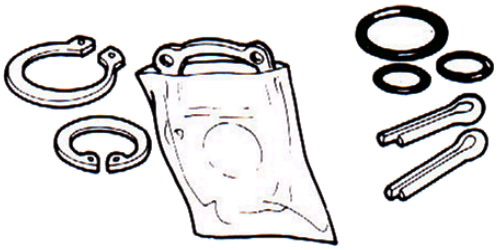
- Never bend or twist a control cable to prevent stiff control and premature worn out.



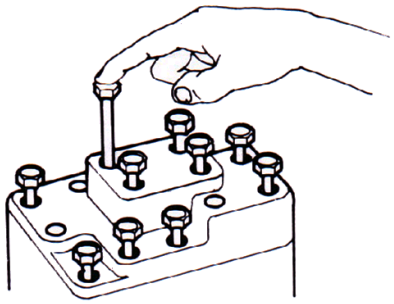
- Rubber parts may become deteriorated when old, and prone to be damaged by solvent and oil. Check these parts before installation to make sure that they are in good condition, replace if necessary.
- When loosening a component which has different sized fasteners, operate with a diagonal pattern and work from inside out. Loosen the small fasteners first. If the bigger ones are loosen first, small fasteners may receive too much stress.
- Store complex components such as transmission parts in the proper assemble order and tie them together with a wire for ease of installation later.



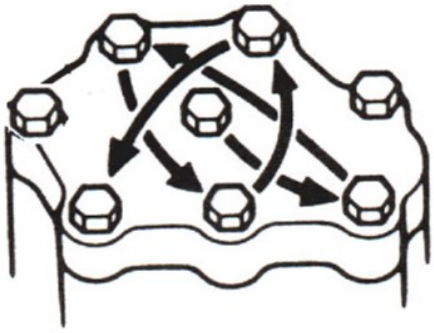
- Note the reassemble position of the important components before disassembling them to ensure they will be reassembled in correct dimensions (depth, distance or position).
- Components not to be reused should be replaced when disassembled including gaskets metal seal rings, O-rings, oil seals, snap rings, and split pins.



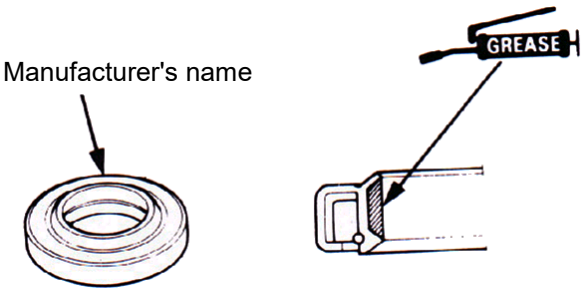
- The length of bolts and screws for assemblies, cover plates or boxes is different from one another, be sure they are correctly installed. In case of confusion, Insert the bolt into the hole to compare its length with other bolts, if its length out side the hole is the same with other bolts, it is a correct bolt. Bolts for the same assembly should have the same length.



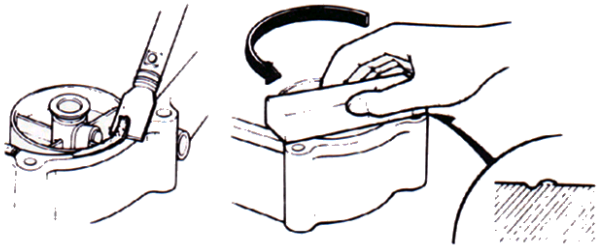
- Tighten assemblies with different dimension fasteners as follows:
- Tighten all the fasteners with fingers, then tighten the big ones with special tool first diagonally from inside toward outside, important components should be tightened 2 to 3 times with appropriate increments to avoid warp unless otherwise indicated. Bolts and fasteners should be kept clean and dry. Do not apply oil to the threads.



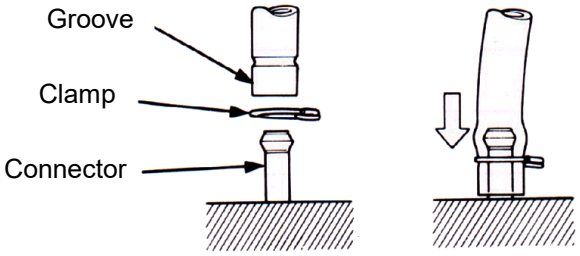
- When oil seal is installed, fill the groove with grease, install the oil seal with the name of the manufacturer facing outside, check the shaft on which the oil seal is to be installed for smoothness and for burrs that may damage the oil seal.



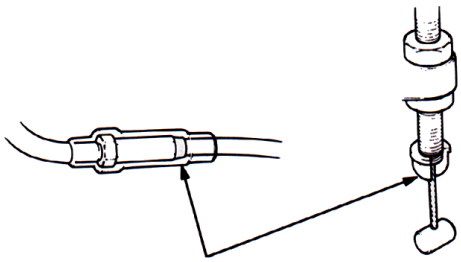
- Remove residues of the old gasket or sealant before reinstallation, grind with a grindstone if the contact surface has any damage.



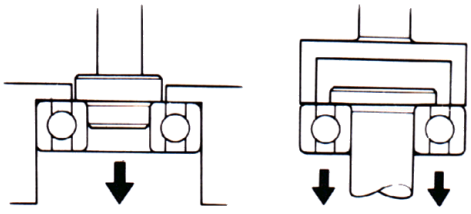
- The ends of rubber hoses (for fuel, vacuum, or coolant) should be pushed as far as they can go to their connections so that there is enough room below the enlarged ends for tightening the clamps.



- Rubber and plastic boots should be properly reinstalled to the original correct positions as designed.

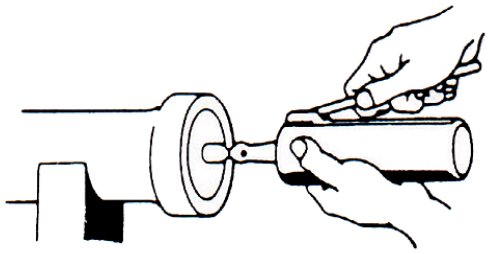


- The tool should be pressed against two (inner and outer) bearing races when removing a ball bearing. Damage may result if the tool is pressed against only one race (either inner race or outer race). In this case, the bearing should be replaced. To avoid damaging the bearing, use equal force on both races.

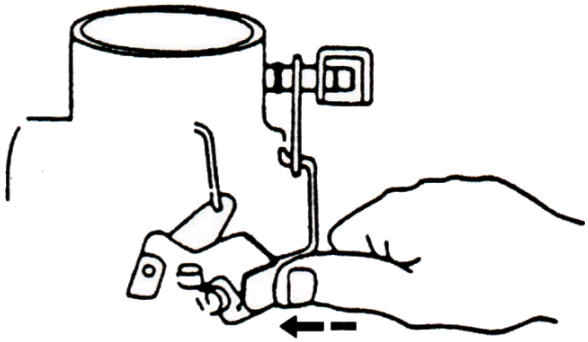


Both of these examples can result in bearing damage.

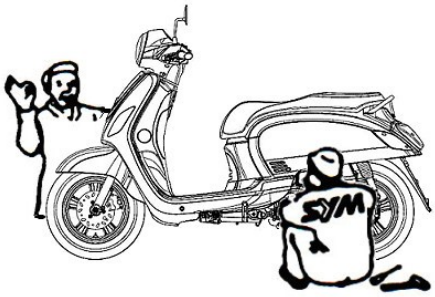
- Lubricate the rotation face with specified lubricant on the lubrication points before assembling.



- Check if positions and operation for installed parts is in correct and properly.

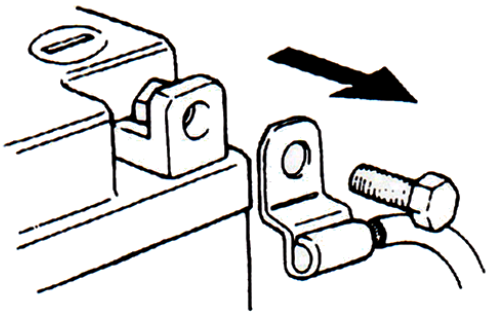


- Make sure service safety each other when conducting by two persons.

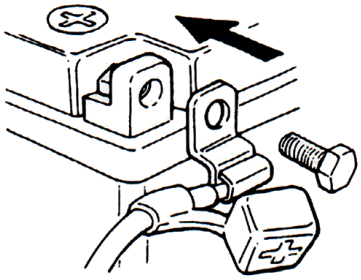


- Note that do not let parts fall down

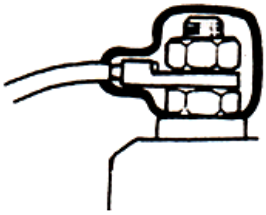
- Before battery removal operation, it has to remove the battery negative (-) cable firstly. Notre tools like open-end wrench do not contact with body to prevent from circuit short and create spark.



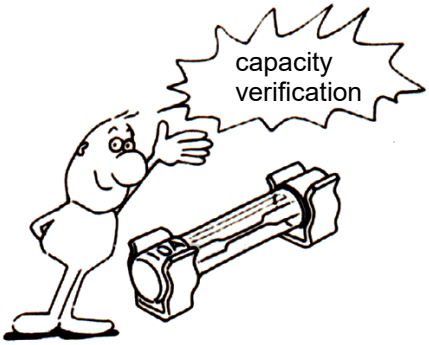
- After service completed, make sure all connection points is secured. Battery positive (+) cable should be connected firstly. And the two posts of battery have to be greased after connected the cables.



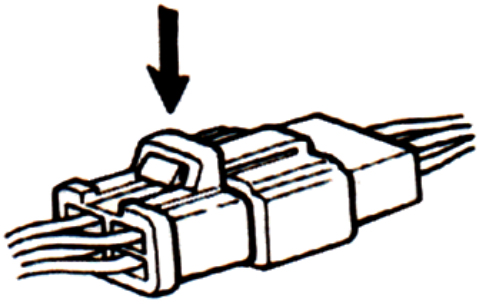
- Make sure that the battery post caps are located in properly after the battery posts had been serviced.



- If fuse burned, it has to find out the cause and solved it. And then replace with specified capacity fuse.

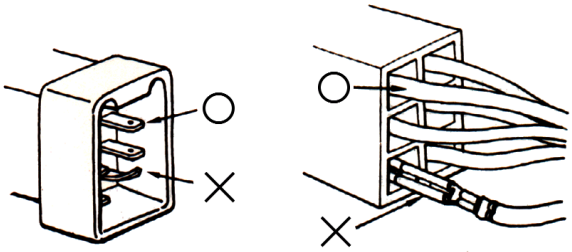


- When separating a connector, it locker has to be unlocked firstly. Then, conduct the service operation.

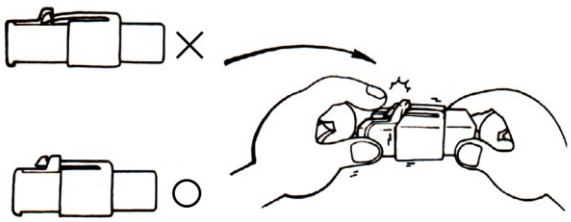


- Do not pull the wires as removing a connector or wires. Hold the connector body.

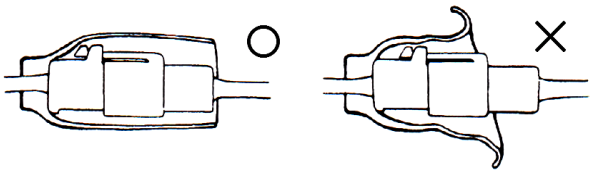
- Make sure if the connector pins are bent, extruded or loosen.



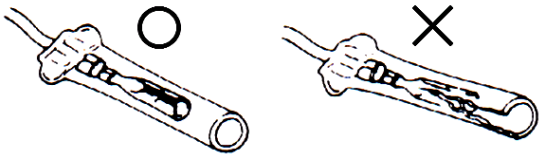
- Insert the connector completely. If there are two lockers on two connector sides, make sure the lockers are locked in properly. Check if any wire loose.



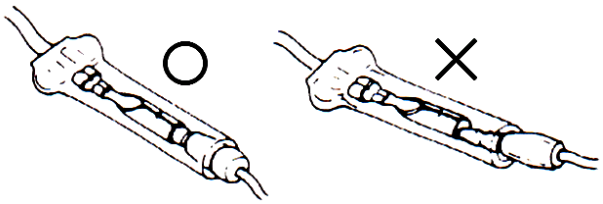
- Check if the connector is covered by the twin connector boot completely and secured properly.



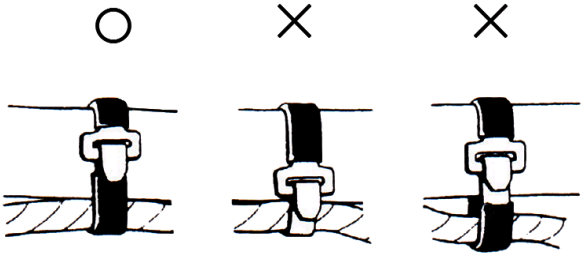
- Before terminal connection, check if the boot is crack or the terminal is loose.



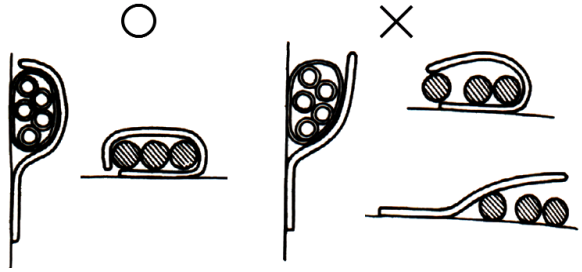
- Insert the terminal completely. Check if the terminal is covered by the boot. Do not let boot open facing up.



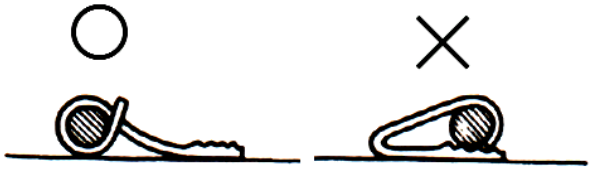
- Secure wires and wire harnesses to the frame with respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.



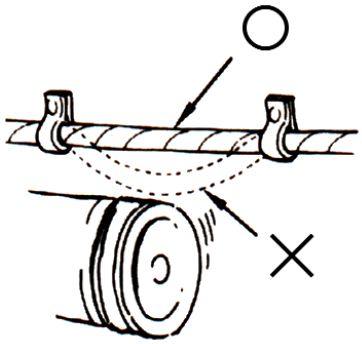
- Wire band and wire harness have to be clamped secured properly.



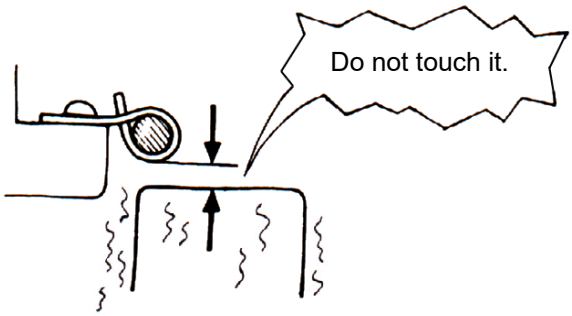
- Do not squeeze wires against the weld or its clamp.



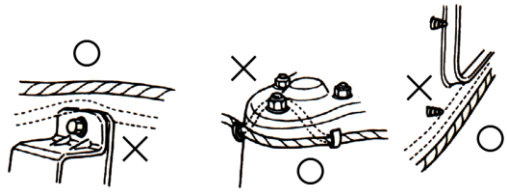
- Do not let the wire harness contact with rotating, moving or vibrating components as routing the harness.



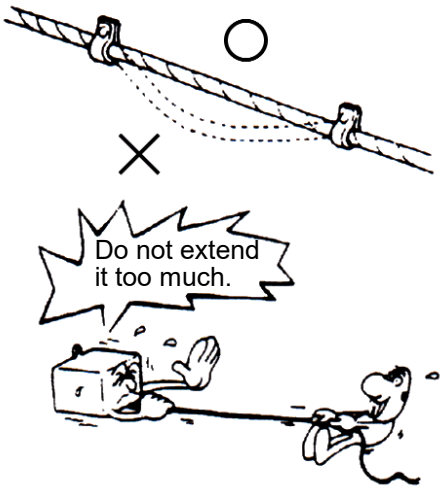
- Keep wire harnesses far away from the hot parts.



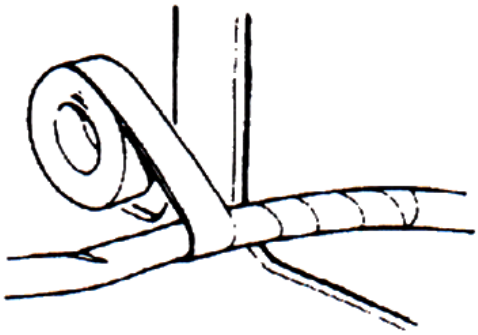
- Route wire harness to avoid sharp edges or corners and also avoid the projected ends of bolts and screws.



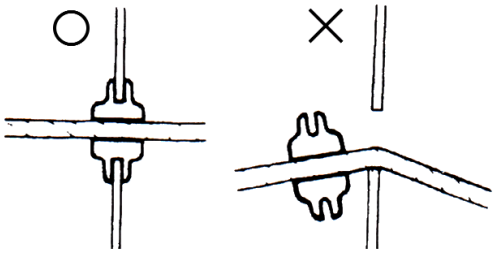
- Route harnesses so that they neither pull too tight nor have excessive slack.



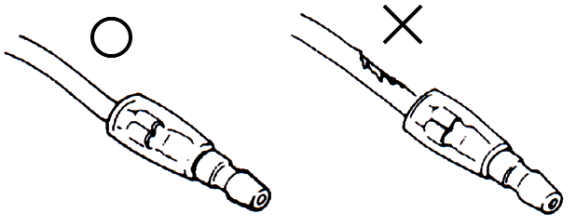
- Protect wires or wire harnesses with electrical tape or tube if they contact a sharp edge or corner. Thoroughly clean the surface where tape is to be applied.



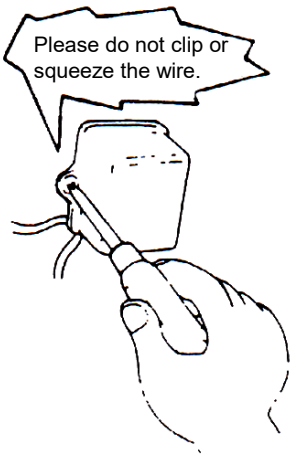
- Secure the rubber boot firmly as applying it on wire harness.



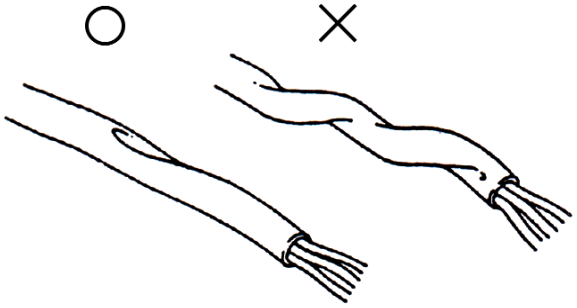
- Never use wires or harnesses which insulation has been broken. Wrap electrical tape around the damaged parts or replace them.



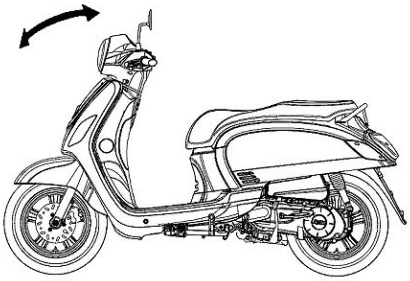
- Never clamp or squeeze the wire harness as installing other components.



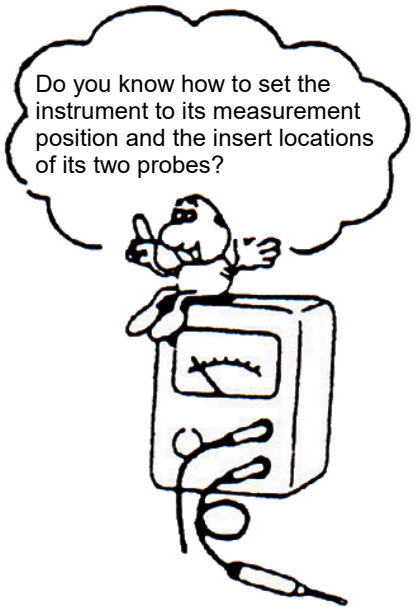
- Do not let the wire harness been twisted as installation.



- Wire harnesses routed along the handlebar should not be pulled too tight or have excessive slack, be rubbed against or interfere with adjacent or surrounding parts in all steering positions.



- Before operating a test instrument, operator should read the operation manual of the instrument. And then, conduct test in accordance with the instruction.



- With sand paper to clean rust on connector pins/terminals if found. And then conduct connection operation later.

SPECIFICATIONS

MAKER			SANYANG	MODEL			FDA12U1CN-EU FDA12D1CN-EU
DIMENSION	Overall Length		1915±20 mm	Suspension System	Front		Telescopic fork
	Overall Width		690±10 mm		Rear		unit swing
	Overall Height		1085±20 mm	Tire Specifications	Front		90/90-12
	Wheel Base		1255±20 mm		Rear		100/90-10
WEIGHT	Curb Weight	Front	47±2 kg	Brake System	Front		Disk (ø 260 mm)
		Rear	65±3 kg				
		Total	112±5 kg		Rear		Durn(ø 130mm)
	Passengers/ Weight		Two men/150 kg	Performance	Climb Ability		32.5° Below
	Total Weight	Front	78±2 kg				
		Rear	187±3 kg	Deceleration equipment	Primary Reduction		C.V.T.
		Total	265±5 kg		Secondary Reduction		GEAR
ENGINE	Type		4-STROKE ENGINE		Clutch		Centrifugal, dry type
	Installation and arrangement		Vertical, below center, incline 80°		Transmission		V-belt
	Fuel Used		Unleaded	Speedometer			0 ~ 199 km/hr
	Cycle/Cooling		4-stroke/forced water cooled	Horn			87~112 dB/A
	Cylinder	Bore	52.4 mm	Muffler			Expansion & Pulse Type
		Stroke	57.9 mm	Exhaust Pipe Position and Direction			Right side, and Backward
		Number/Arrangement	Single Cylinder	Lubrication System			Separated-lubrication
	Displacement		125 cc	Exhaust Emission (IDLE)	CO g/km		<1.0
	Compression Ratio		10.8±0.2 : 1		HC g/km		<0.1
	Idle speed		1500±100 rpm	Fuel tank capacity			6.8 $^{0}_{-1}$ L
	Max. HP		7.1 KW/ 7000 rpm	Air Filtration			Paper filter
	Max. Torque		10.4N.m /5500 rpm	License Light			13.5V 4.66W（LED）
	Ignition		Transistorized coil ignition	Headlight deep/main beam			13.5V 27.7W/17W（LED）
	Starting System		Electrical	Position Lamps			13.5V 8.8W X1(LED)
	FUSE		ZF2:20A*2+15A*2+10A*3 ZF2:20A*2+15A*2+10A*2	Taillight / Stoplight			13.5V 4.66W /6.3W (LED)
	Noise Emission		< 74dB(A)	Turn Signal Light			F/R 12V 10W X4

TORQUE VALUES (ENGINE)

ITEM	Q'TY	THREAD DIA (mm)	TORQUE VALUE(Kg-m)	REMARKS
A.C. generator flange bolt	2	6	0.8~1.2	
L side cover plate pan screw	7	5	0.5~0.7	
RR. brake shoe anchor fixing nut	1	8	1.5~2.0	
Rear brake arm flange bolt	1	6	0.7~1.1	
Engine oil filter screen cover	1	30	1.0~2.0	
Crankcase bolts	2	6	0.8~1.2	
Oil pump flat screw	2	6	0.8~1.2	
Cylinder/cylinder head two-ends bolts	4	8	0.7~1.1	Tighten to crankcase
Cylinder head left side bolts	2	6	0.7~1.1	
Camshaft sprocket bolt	2	6	1.0~1.5	
Valve adjustment fixing nuts	2	5	0.7~1.1	Apply oil to thread
Camshaft chain tensioner pivot bolts	1	6	0.8~1.2	
Camshaft chain adjuster bolts	2	6	0.8~1.2	
A/I fixing flange bolt	4	6	0.8~1.2	
Oil pump separator bolt	2	6	0.8~1.2	
One-way clutch lock nut	1	22	9.0~10.0	Apply oil to thread
Right crankcase cover bolts	10	6	0.7~1.1	
Pulse generator bolts	2	5	0.4~0.6	
A.C. generator flange bolt	2	5	0.8~1.2	
Flywheel nut	1	12	5.0~6.0	
Cooling fan flange bolt	4	6	0.8~1.2	
Shroud A/B	2	6	0.7~1.1	
Engine oil draining plug bolt	1	12	3.5~4.5	
Transmission bolts	7	8	2.6~3.0	
Gear oil draining plug	1	8	1.0~1.5	
Gear oil filling bolt	1	8	1.0~1.5	
Driven pulley nut	1	12	5.5~6.0	
Driving face nut	1	12	5.0~6.0	
Left crankcase cover bolts	8	6	0.8~1.2	
Cylinder head holder nuts	4	8	1.8~2.2	
Cylinder head cover bolts	4	6	0.8~1.2	
Spark plug	1	10	1.0~1.2	
Carburetor heat protector connecting nuts	2	6	0.7~1.1	
Exhaust pipe bolts	2	8	3.0~3.6	
Exhaust pipe connecting nuts	2	6	1.0~1.4	

TORQUE VALUES (FRAME)

ITEM	Q'TY	THREAD DIA (mm)	TORQUE VALUE(Kg-m)	REMARKS
Mounting Hex socket bolt for steering handlebar	4	10	4.0~5.0	
Mounting nut for steering rod	1	25.4	1.0~2.0	
Cone seat for steering rod	1	25.4	0.2~0.3	
Front wheel shaft nut	1	12	5.0~7.0	
Rear wheel shaft nut	1	16	11.0~13.0	
Wheel hub/rim mounting nuts	8	8	2.8~3.2	
Speedometer cable locking screw	1	5	0.15~0.3	
Front shock absorber mounting bolts	4	8	2.4~3.0	
Rear shock absorber upper connection bolt	1	10	3.5~4.5	
Rear shock absorber lower connection bolt	1	8	2.4~3.0	
Brake lever bolts	2	6	0.8~1.2	
Front brake hose bolts	2	10	3.3~3.7	
Front brake air-bleeding valve	1	6	0.8~1.0	
Front brake disc mounting bolts	4	10	4.0~4.5	
Front brake clipper mounting bolts	2	10	3.1~3.5	
Drum brake arm bolts (front/rear)	2	6	0.8~1.2	
Engine suspension bracket bolts	2	10	4.5~5.5	On frame side
Engine connection bolt	1	10	4.5~5.5	On engine side
Main standard nut	1	10	3.5~4.5	
Air cleaner bolts	2	6	1.0~1.4	

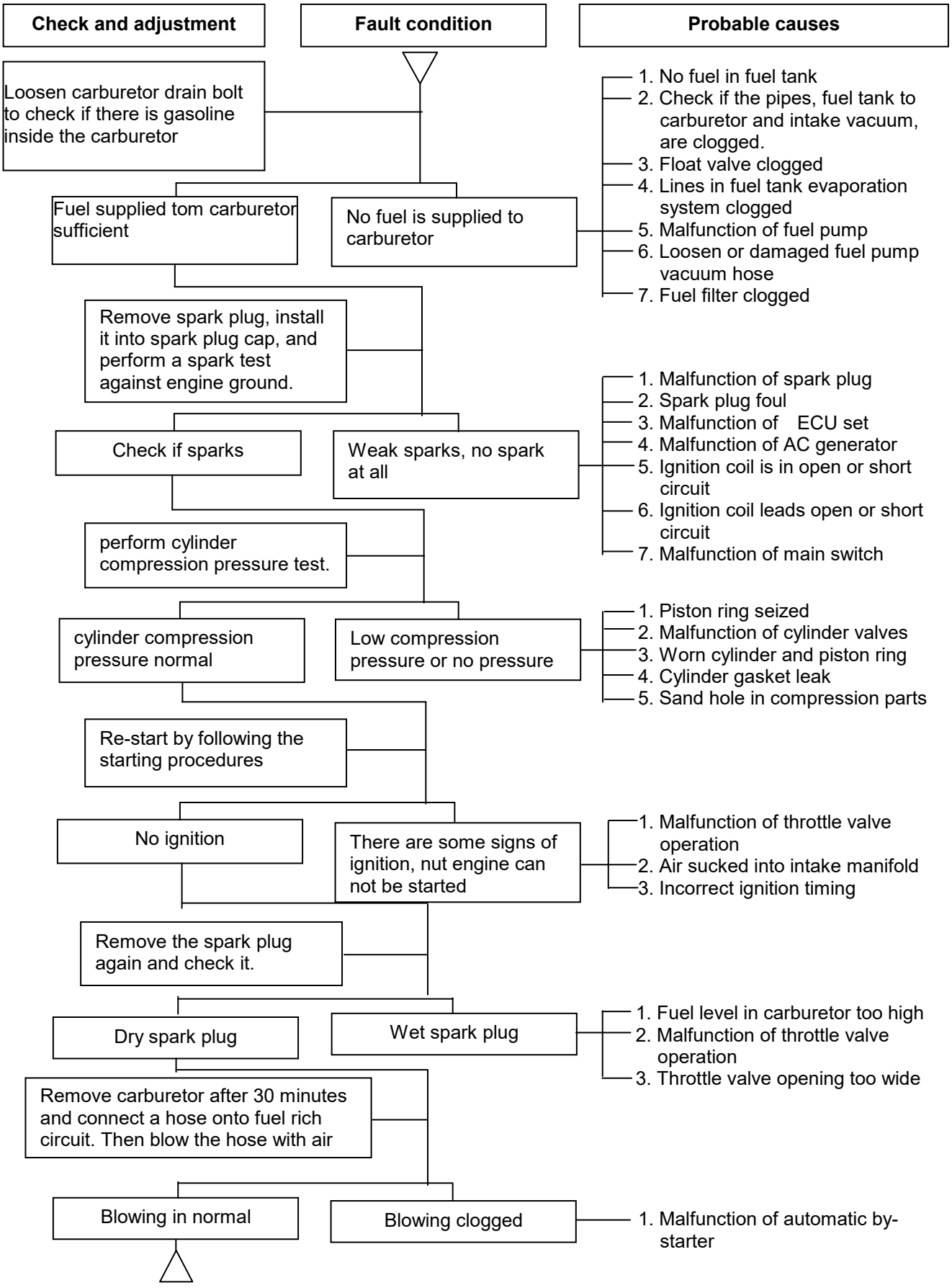
The torque values listed in above table are for more important tighten torque values. Please see standard values for not listed in the table.

Standard Torque Values for Reference

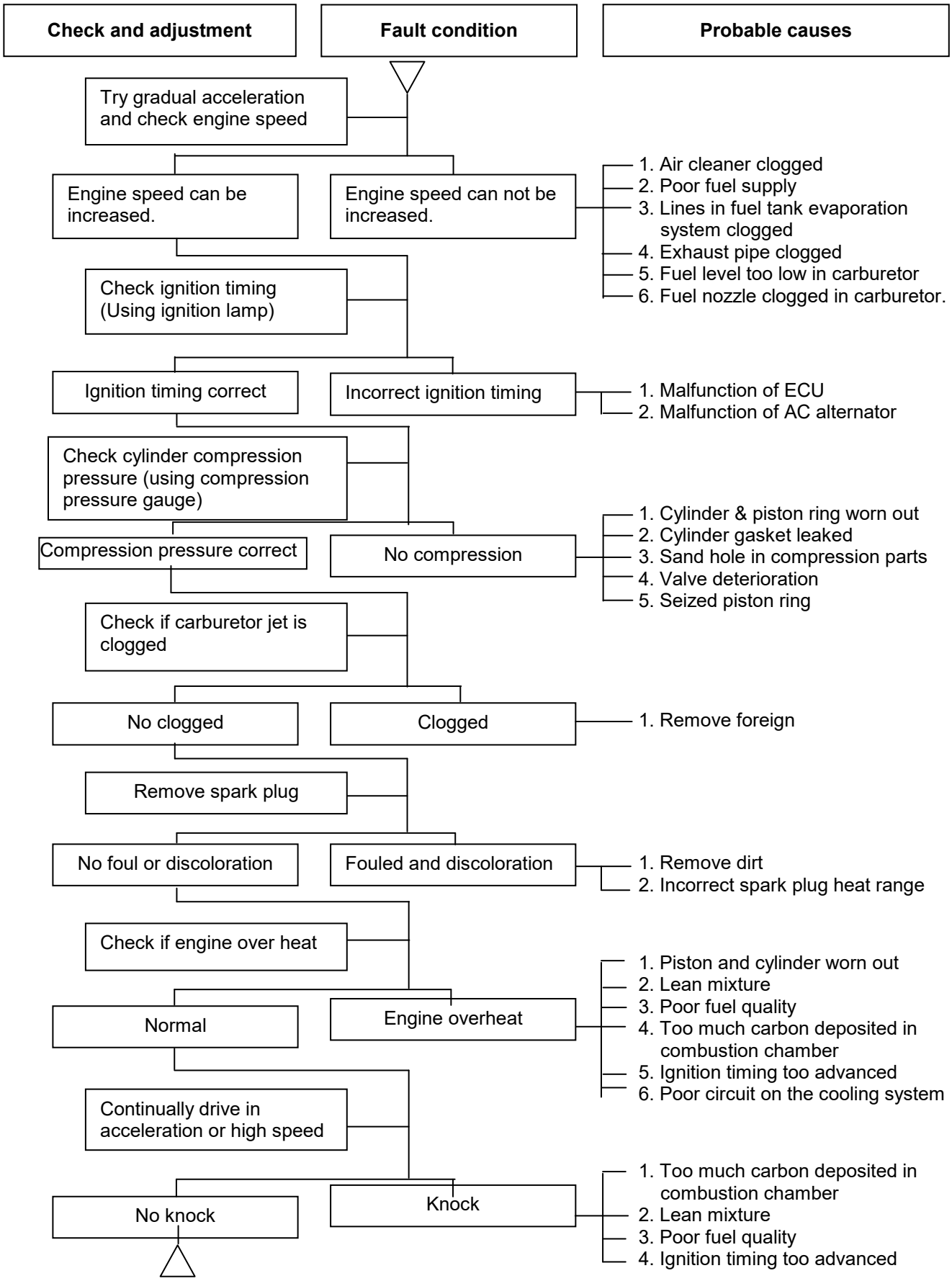
TYPE	TIGHTEN TORQUE	TYPE	TIGHTEN TORQUE
5mm bolt、nut	0.45~0.60kgf-m	3mm screw	0.05~0.08kgf-m
6mm bolt、nut	0.80~1.20kgf-m	4mm screw	0.10~0.15kgf-m
8mm bolt、nut	1.80~2.50kgf-m	5mm screw	0.35~0.50kgf-m
10mm bolt、nut	3.00~4.00kgf-m	6mm screw、SH nut	0.70~1.10kgf-m
12mm bolt、nut	5.00~6.00kgf-m	6mm bolt、nut	1.00~1.40kgf-m
		8mm bolt、nut	2.40~3.00kgf-m
		10mm bolt、nut	3.50~4.50kgf-m

TROUBLES DIAGNOSIS

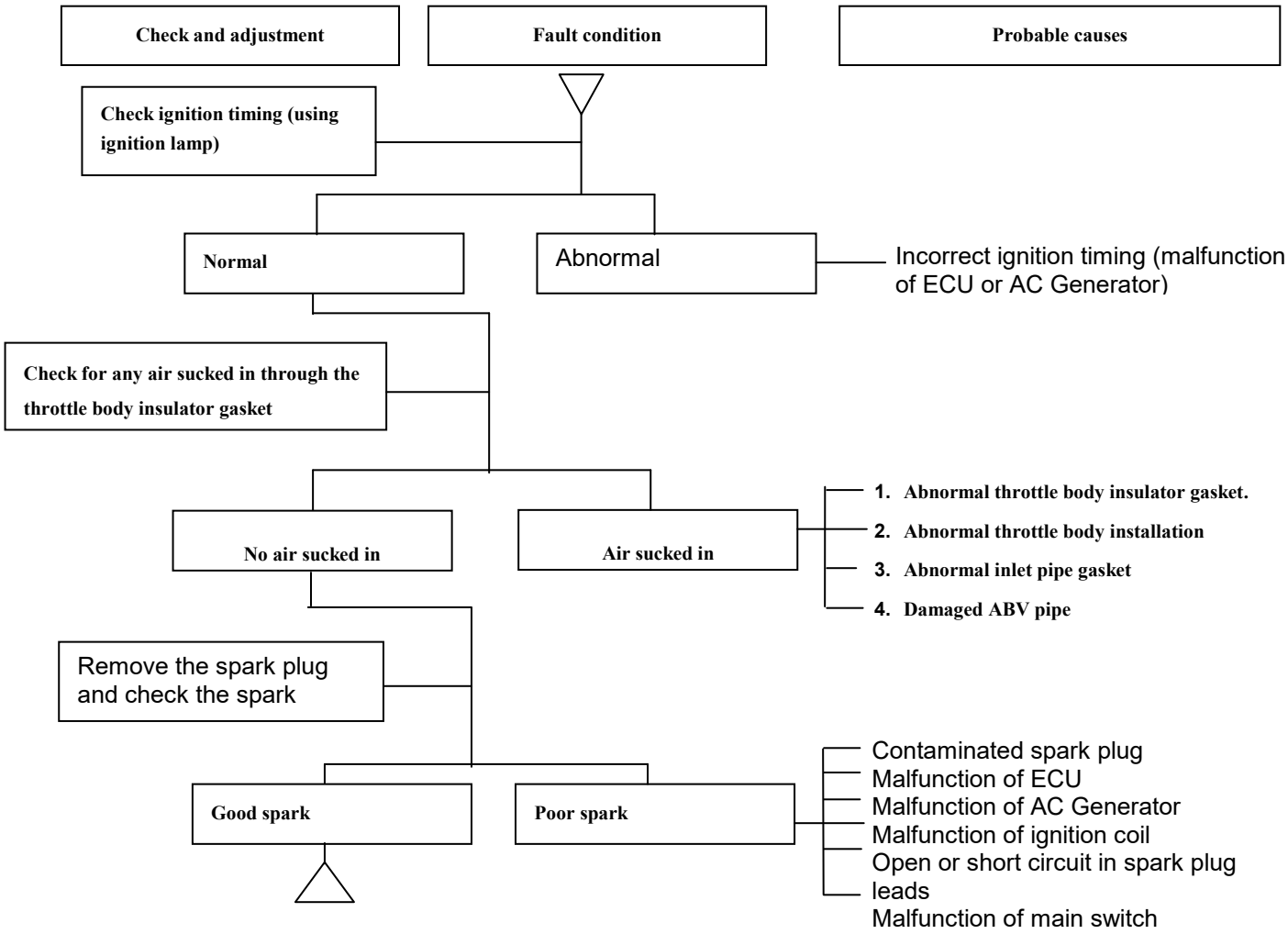
A. Engine hard to start or can not be started



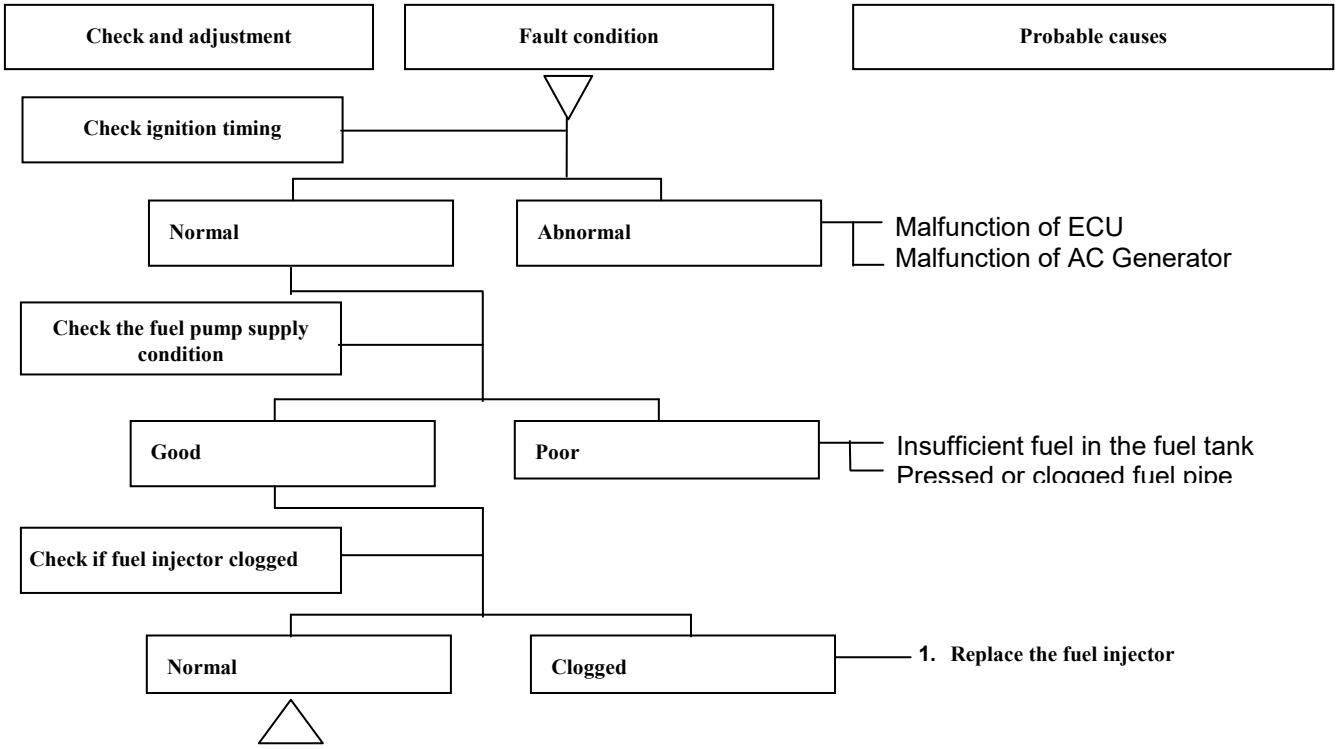
B. Engine run sluggish (Speed does not pick up, lack of power)



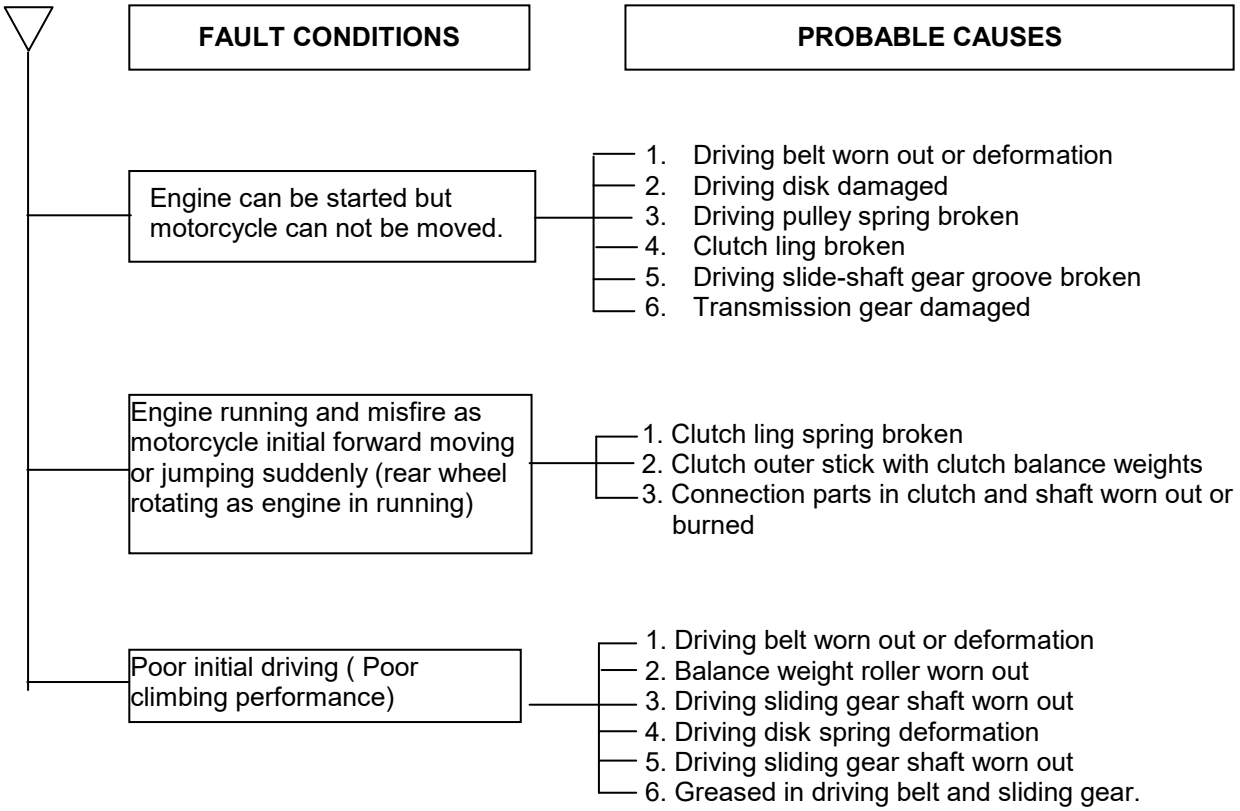
C. Engine runs sluggish (especially in low speed and idling)



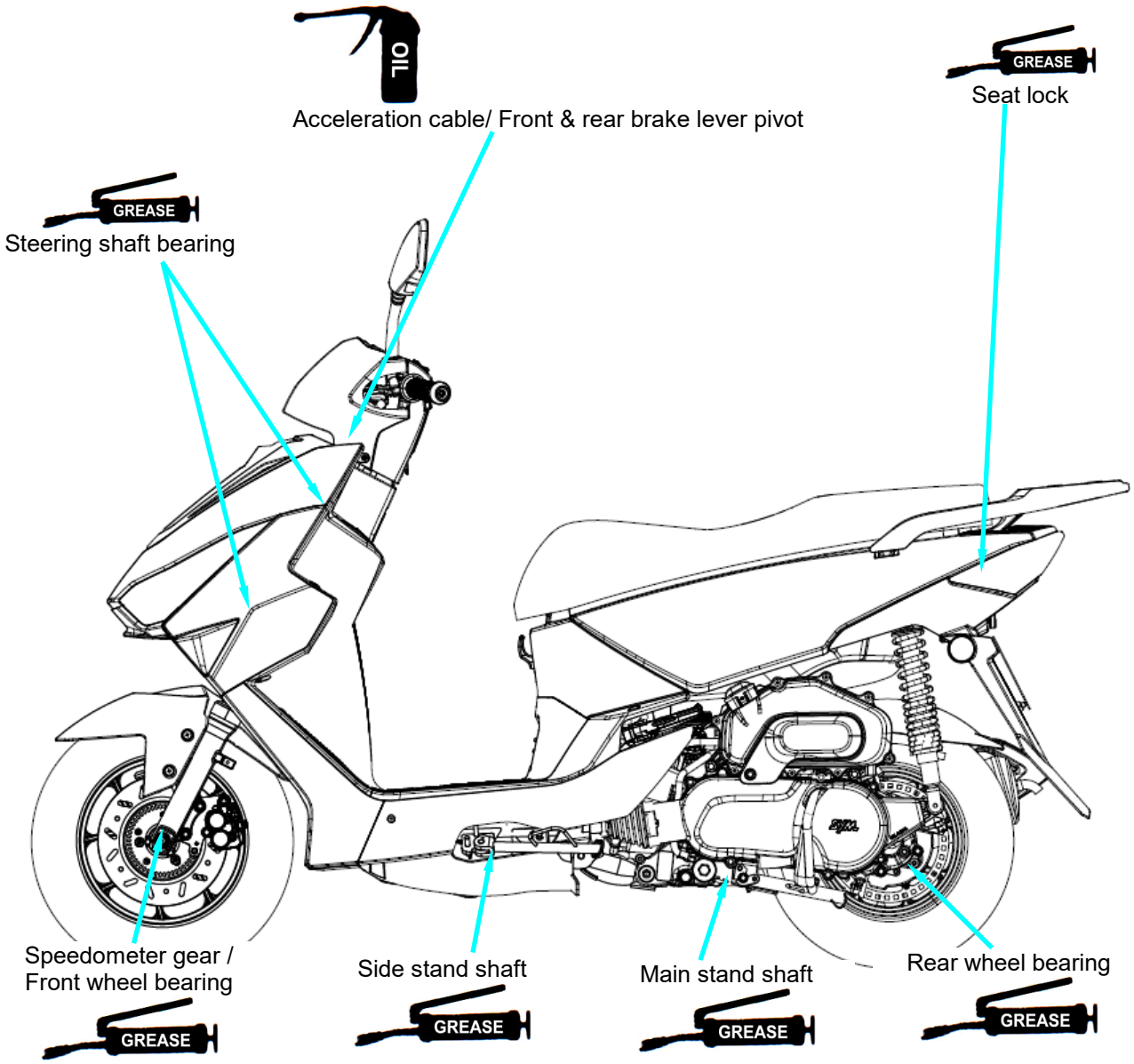
D. Engine runs sluggish (High speed)



E. CLUTCH, DRIVING AND DRIVING PULLEY



LUBRICATION POINTS



PRECAUTIONS IN OPERATION 2-1
PERIODICAL MAINTENANCE SCHEDULE 2-2
LUBRICATION SYSTEM 2-3
GEAR OIL 2-4
AIR CLEANER 2-5
THROTTLE VALVE OPERATION2-5
CRANKCASE BLOW-BY SYSTEM 2-6
VALVE CLEARANCE INSPECTION & ADJUSTMENT 2-6
CARBURETOR IDLING SPEED ADJUSTMENT 2-7
SPARK PLUG 2-8
CYLINDER COPMRESSION PRESSURE 2-9
DRIVING SYSTEM 2-9
STEERING SYSTEM.....2-10
SUSPENSION SYSTEM.....2-10
FRONT DISK BRAKE SYSTEM 2-11
ADDED BRAKE FLUID.....2-12
WHEEL/TIRE.....2-13
BATTERY 2-14
HEADLIGHT ADJUSTMENT 2-14
NUTS、BOLTS TIGHTEN 2-14

PRECAUTIONS IN OPERATION

Specification

Fuel Tank Capacity	$6.8\ ^{0}_{-1}$ L	
Engine Oil	capacity	950 c.c.
	change	800 c.c.
Transmission Gear oil	capacity	110 c.c.
	change	100 c.c.
Clearance of throttle valve		2~6 mm
Spark plug		LR7D Gap: 0.6~0.7 mm
“F” Mark in idling speed		Before TDC 0 / 1750 rpm
Idling speed		**1500±100 rpm**
Cylinder compression pressure		12 kgf/cm² 以上
Valve clearance: IN/EX		0.12±0.02 mm/0.12±0.02) mm
Tire dimension	front / rear	90/90-12 44L 100/90-10 56L
Tire pressure (cold)	single	Front: 1.75 kg/cm² rear: 2.3 kg/cm²
battery		12V8Ah
Play of drum brake lever		10~20 mm

PERIODICAL MAINTENANCE SCHEDULE

Item	Check Items / Maintenance kilometer / Maintenance Interval	Every 1000KM	Every 3000KM	Every 6000KM	Every 12000KM
		1 Month	3 Months	6 Months	1 Year
1	Air cleaner element*	I	C	R	
2	Oil filter (mesh filter)	I	Clean every 10,000km		
3	Engine oil (air-cooling model)	(initial at 1,000km, second at 4,000km and then replace every 3,000km thereafter)			
4	Tire, pressure	I	I		
5	Battery	I	I		
6	Spark plug	I	I		R
7	Carbon Deposit cleaning on Throttle valve	I		I	
8	Steering bearing and handles	I	I		
9	Check Transmission for leakage	I	I		
10	Check crankcase for leakage	I	I		
11	Transmission Oil	(initial replace at 1,000km, and then replace every 6,000km thereafter)			
12	Brake Fluid	I	Replace every 30,000km		
13	Drive Belt/roller/Drive Pulley			C	R
14	Fuel tank tubes and Fuel filter	I	I		
15	Throttle valve operation and cable	I	I		
16	Bolts and nuts	I	I		
17	Guide/Tensioner/Tensioner Lifter/Cam chain	Inspection every 20,000km			
18	Valve clearance	I		I	
19	Shock absorbers	I		I	
20	Front/rear suspension	I		I	
21	Main/side stand	I/L		I/L	
22	Crankcase Blow-by system (PCV)	I		C	
23	Clutch, Clutch outer, Driven pulley			C	
24	Brake mechanism/brake lining (pads) **	I	I		
25	Light, Switches and Electrical system	I	I		

★The above maintenance schedule is established by taking the monthly 1000 kilometers as a reference which ever comes first.

Code: I ~ Inspection, cleaning, and adjustment R ~ Replacement

C ~ Cleaning (replaced if necessary) L ~ Lubrication

Remark: 1.Clean or replace the air cleaner element more often when the motorcycle is operated on dusty roads or in the Heavily- polluted environment.

2. Maintenance should be performed more often if the motorcycle is frequently operated in high speed and after the motorcycle has accumulated a higher mileage.

【【Notes in the remarks are used to indicate the applicable models.】

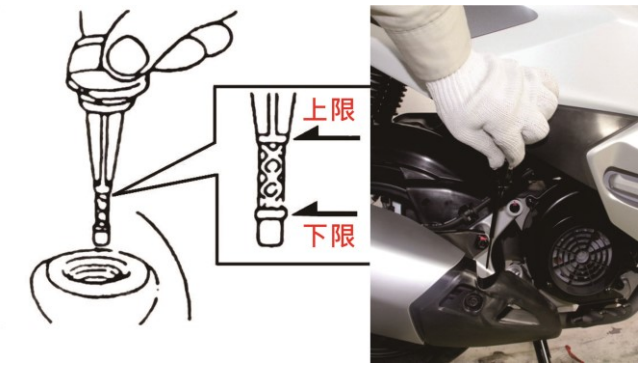
LUBRICATION SYSTEM

Engine Oil Capacity

⚠ Caution

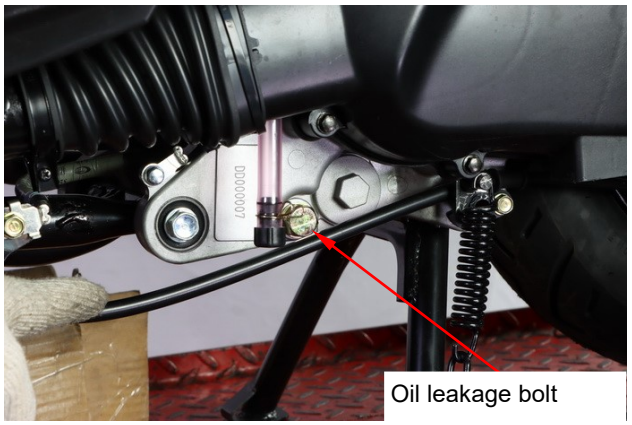
- The vehicle must be parked on a level ground when checking oil capacity.
- Run the engine for 2-3 minutes then stop, wait about 2-3 more minutes allowing engine oil to settle before checking the oil level.

Remove dipstick to check the oil level. If oil level is below the lower limit mark, add oil to the specified upper limit mark.



Oil change

Shut off the engine and remove dipstick.
Remove the oil drain plug on the bottom-left of crankcase to drain oil.
After draining out oil, clean oil plug and its gasket and reinstall. Replace the gasket if it is damaged.
Torque value: 3.5~4.5 kgf-m



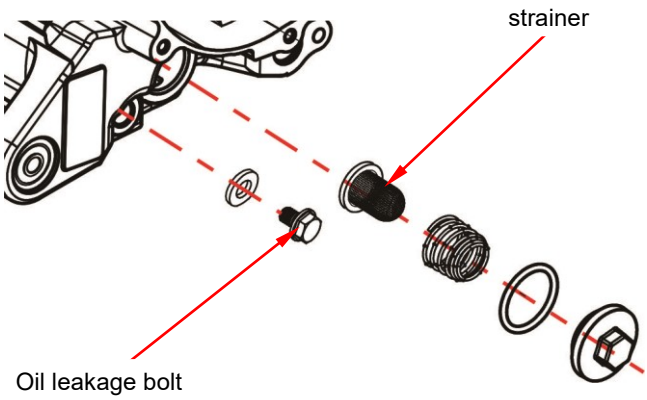
⚠ **Caution**

Warm up the engine. This will make the oil flow out easily.

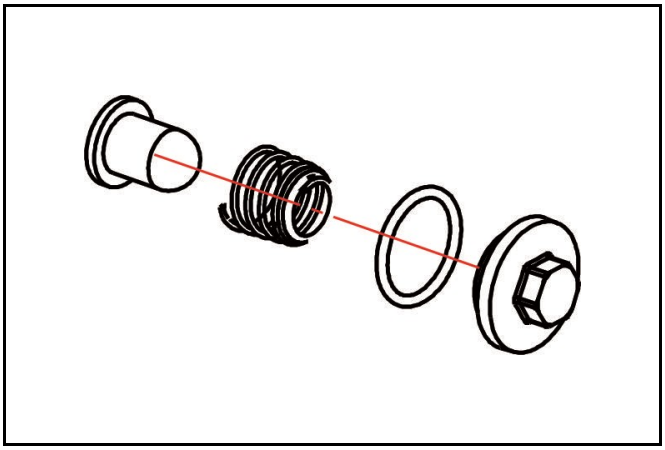
Add oil to the specified capacity.
Oil Viscosity: SAE 10W-40, recommended using King-Mate serial oil.（especially suggest USE SM 10W-50）

Engine oil capacity:
Disassembly: 950cc
Change: 800cc

When checking for oil leak, run the engine at idle speed for a few minutes, then check oil capacity with dipstick.



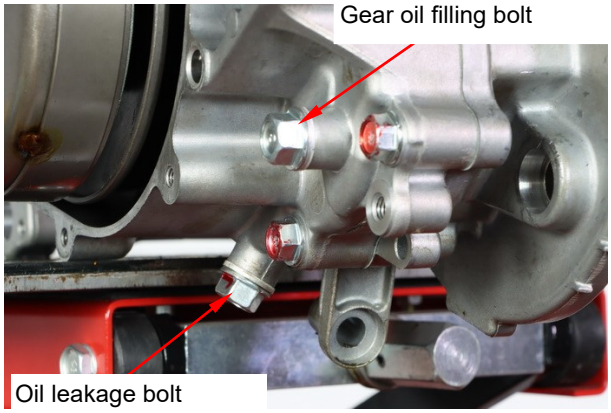
Cleaning the oil strainer
Drain oil from engine, remove the strainer cover, spring and strainer.
If there is an accumulation on the screen, wash it off with suitable solvent (recommended using compressed air).
Check O-ring for damage, replace if necessary.
Reinstall strainer, spring, O-ring and strainer cover.
Torque value: 1.0~2.0 kgf-m



Transmission gear oil

Check

Check if the transmission gearbox is leaking oil.
Jack up the vehicle on a flat surface with the main jack.
Turn off the engine and remove the gear oil filler bolt.
Place a measuring cup under the oil drain hole.
Remove the drain hole bolt and drain the gear oil into the measuring cup.
Check if the oil quantity is sufficient.



Replace

First, remove the oil-filling bolt, then remove the oil-drain bolt to drain the oil. After the gear oil has been drained completely, reinstall the oil-drain bolt.

Torque value：1.0~1.4kgf-m

⚠ Caution

- Check whether the sealing gasket is in good condition. If it is deformed or damaged, a new one should be replaced.

Inject a predetermined amount of gear oil through the gear oil injection hole.
Install the oil injection bolt.

Torque value：1.0~1.4kgf-m

Transmission oil capacity: 110 c.c.(100 c.c. for change)

The engine oil viscosity should be SAE 10W - 30 / SAE 10W - 40. Please use the recommended series of oil from San Yang.

Fuel system

Fuel lines

Remove the luggage compartment, center cover, body cover and foot pedals.

Inspect all fuel lines and replace any deteriorated, damaged or leaking parts.

Attention

⚠ Caution

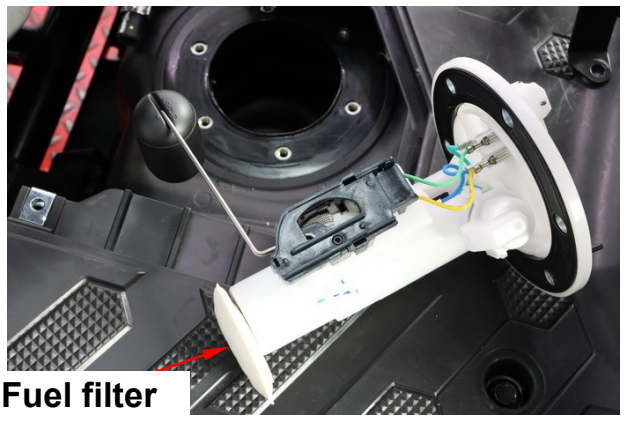
- Gasoline is a low-temperature flammable and explosive substance. Please strictly prohibit the use of open flames during handling

Fuel filter

Remove the luggage compartment and the central cover.

Remove the protective frame and the fixing bolts (6 bolts) of the fuel pump assembly.

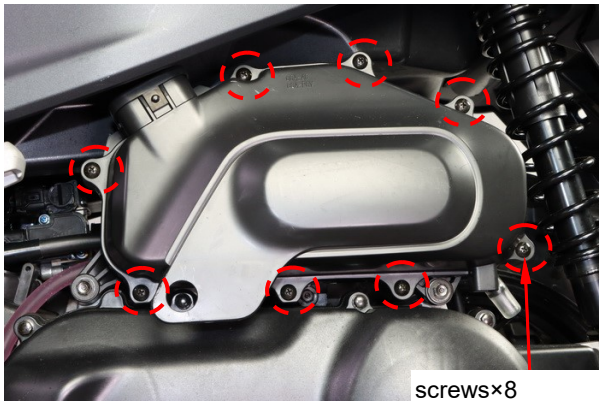
Check whether the fuel filter is clogged or damaged. If so, replace it with a new one.



Air filter Filter

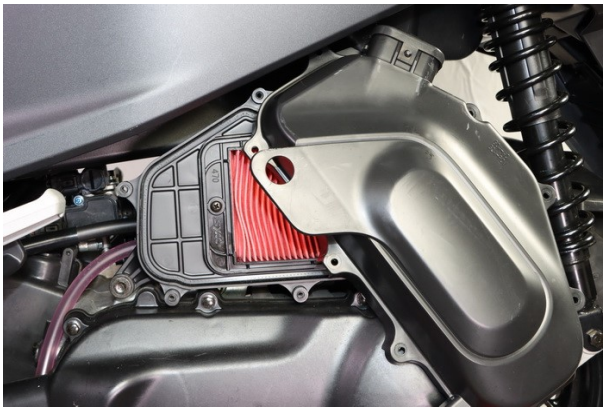
Element

Remove the air filter box cover (8 screws).

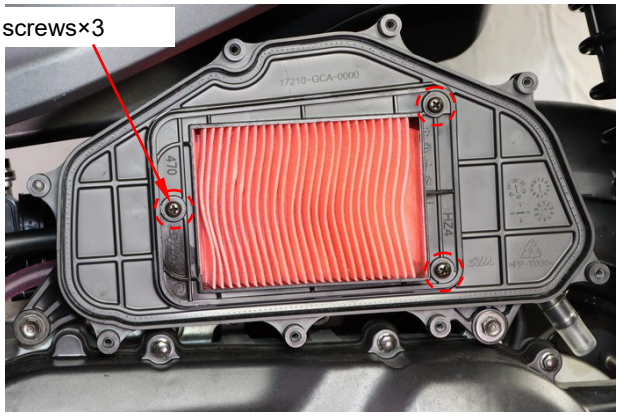


Turn the air filter cover clockwise until the ventilation holes are exposed.

Remove the air filter cover

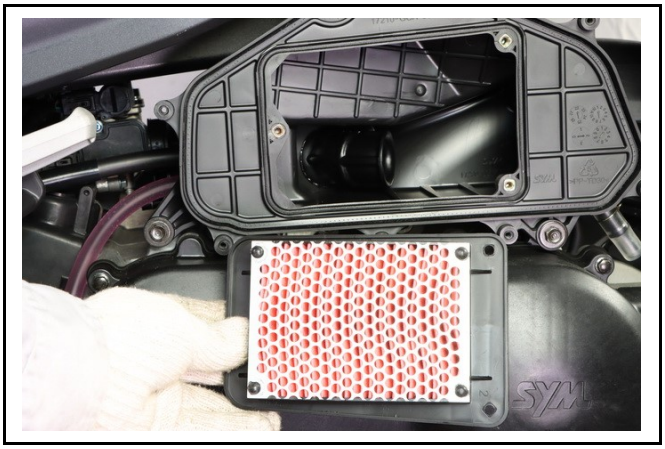


Remove the air filter element (3 screws) that has been detached.



Check whether the filter element is dirty or damaged.

If it is overly dirty and cannot be cleaned or if it is damaged, a new one should be replaced.



⚠ Caution

- The air filter is made of paper. It must not be soaked or cleaned; otherwise, it will affect the performance of the engine.
- If not installed completely, dust will directly be sucked into the cylinder, causing engine wear and a decrease in horsepower, and shortening the engine's lifespan.

Throttle control operation

When the steering handle is at any position, fully open the throttle handle and then release it to allow it to automatically return to the fully closed position.

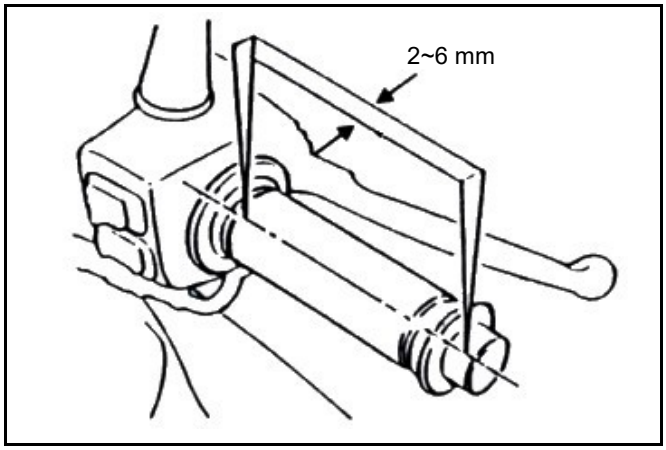
Check if the handle operates smoothly.

Check the throttle line. If there is any deterioration, distortion or damage, replace it.

If the throttle operation is not smooth, lubricate the throttle line.

Measure the free travel of the throttle handle protrusion.

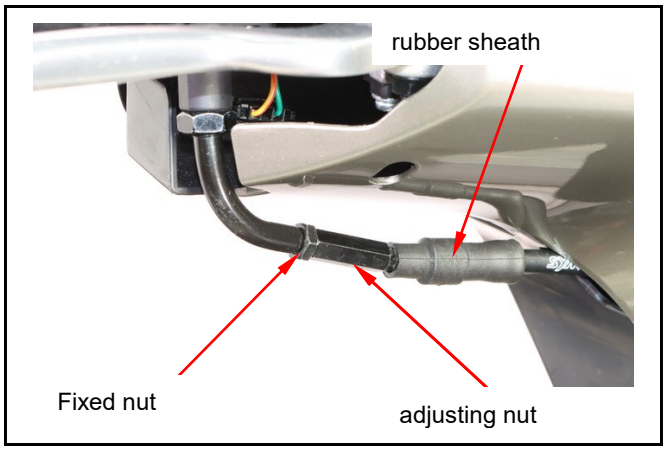
Free travel: 2 - 6 mm.



The adjustment can be made at either end of the throttle wire.

For minor adjustments, please proceed from the upper end of the wire.

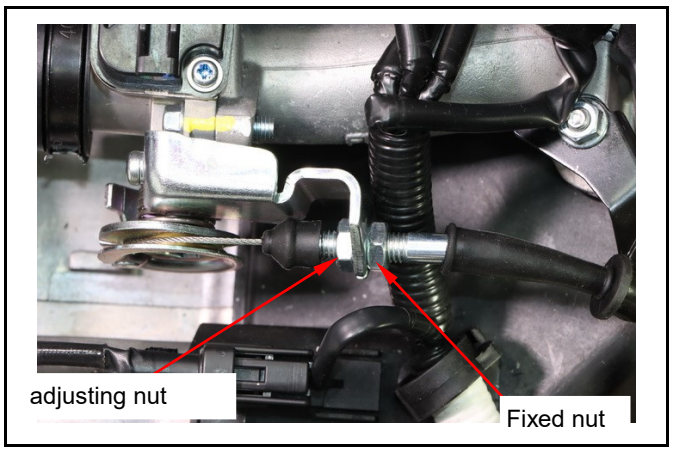
Remove the rubber sleeve, loosen the fixing nut, and rotate the adjustment nut to make the adjustment.



The main adjustment should be made at the lower end of the throttle cable.

Loosen the fixing nut, rotate the adjustment nut to make the adjustment.

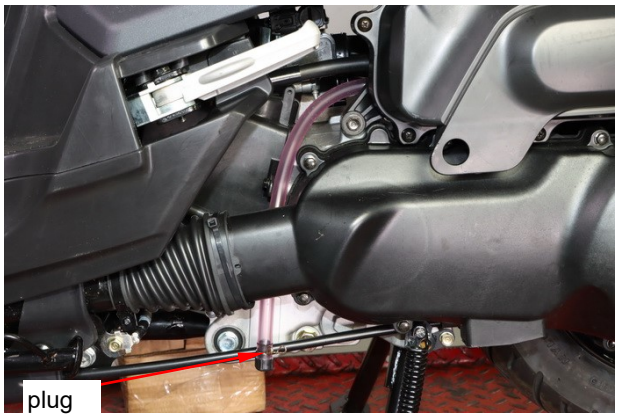
Lock the fixing nut and check the operation of the throttle.



Crankcase blow-off air system

Remove the plug from the lower end of the leak pipe to drain the internal deposits.

Drain the oil once every 2000 kilometers.



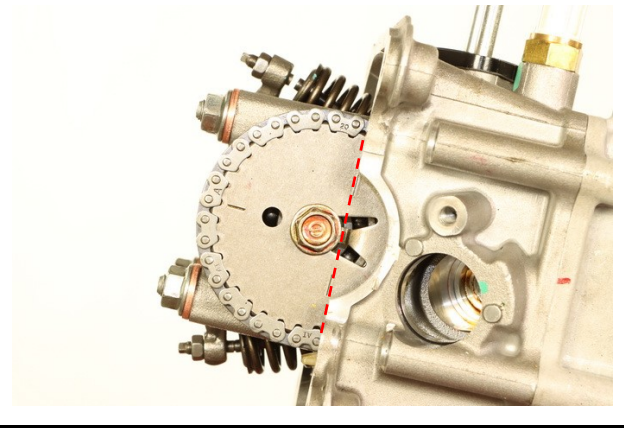
⚠ Caution

- When riding in rainy conditions or with the accelerator fully engaged, shorten the maintenance schedule. Any deposits can be seen on the transparent section of the leaky pipe.

Valve clearance adjustment

⚠ Caution

- When the engine has cooled down (below 35°C), inspect and adjust the valve clearance.



Remove the luggage compartment.

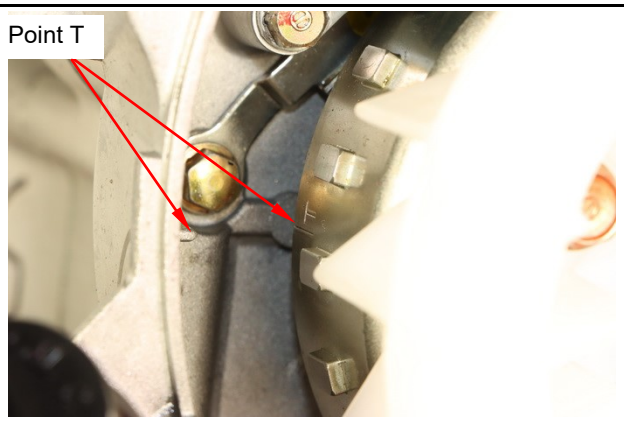
Remove the central cover.

Remove the cylinder head side cover.

Remove the valve adjustment hole cover.

Remove the cooling fan.

Turn the crankshaft clockwise with a T-shaped wrench so that the "T" mark on the generator flywheel aligns with the mark on the crankcase, and the dead point mark on the cam sprocket, the timing gear line, and the edge of the cylinder head are parallel (the piston is at the top dead center of the compression stroke).



⚠ Caution

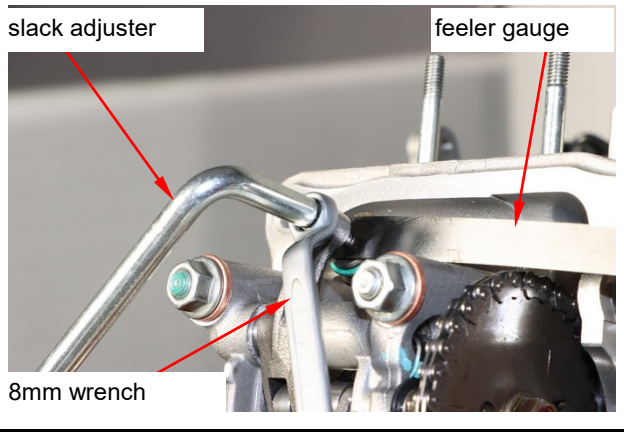
- Do not rotate in the reverse clockwise direction.

Use an 8mm wrench to loosen the valve fixing nut.

Use the gap adjuster to adjust the adjusting bolt.

Use a thickness gauge to measure the adjustment gap.

Valve gap reference: 0.12 ± 0.02mm (for intake/exhaust)



⚠ Caution

- When adjusting the valve rocker arm clearance, it is necessary to ensure that all have been adjusted to the reference value. After the fixing nuts are tightened, the valve clearance should be checked again.

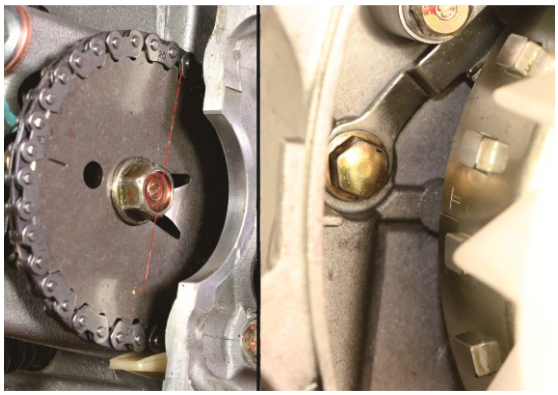
Ignition system

Ignition timing

⚠ Caution

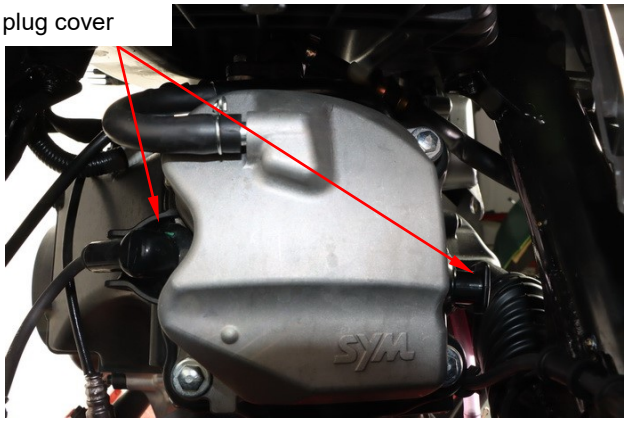
- The ignition timing is set at the factory and cannot be adjusted.
- The ignition timing inspection procedure; is to confirm whether the function of the ECU is normal.

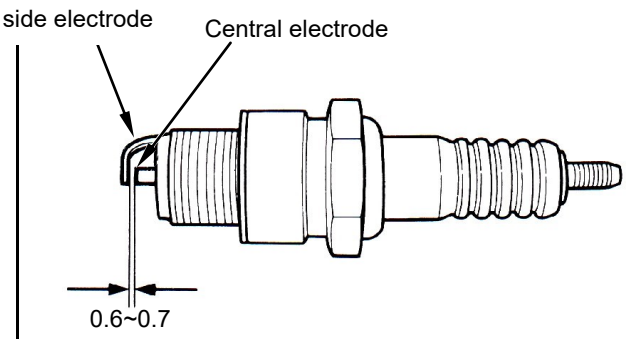
Light the ignition and remove the cooling fan cover.
Mark the teeth on the timing gear, with the top line facing upwards. The upper and lower lines must be parallel to the edge of the cylinder head. The "T" mark on the generator flywheel must align with the "T" mark on the engine cover.。



Mars plug

Specified Mars plug: 2 LR7D
Remove the luggage compartment.
Remove the central cover.
Open the Mars plug cover.
Clean the area around the Mars plug hole.
Remove the Mars plug.
Measure the gap of the Mars plug.
Mars plug gap: 0.6 - 0.7 mm
When adjustment is needed, carefully move the side electrode to change the gap.
First, rotate the Mars plug into the Mars plug hole by hand, then lock it with a wrench to avoid damaging the screw thread.
Torque value: 1.0 - 1.4 kgf-m





Cylinder compression pressure

After warming up the engine, turn off the engine.

Remove the central cover.

Remove the spark plug cover and the spark plug.

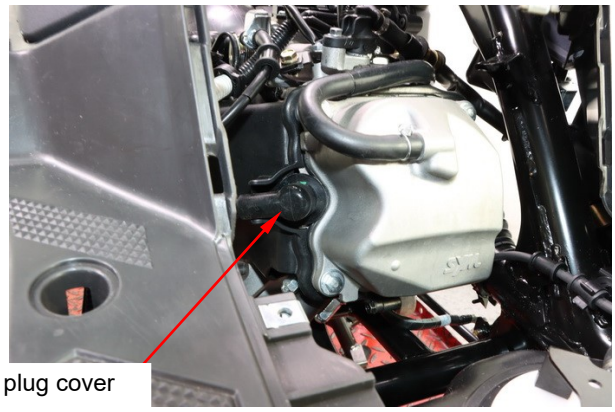
Insert the cylinder pressure gauge into the spark plug hole.

Fully open the throttle and step on the foot pedal to start the engine.

⚠ Caution

Turn the engine until the pressure gauge reading stops rising.

- The maximum pressure is usually reached within 4 to 7 seconds.



Compression pressure: above12 Kgf/cm²
Tool name: Cylinder pressure gauge

If the compression pressure is too low, check the following items:

- The valve clearance is incorrect.
- The valve is leaking.

The cylinder head is leaking, the piston, piston rings, and the cylinder are worn.

If the compression pressure is too high, it indicates that there is excessive carbon buildup in the combustion chamber or on the top of the piston.

Drive system

Drive belt

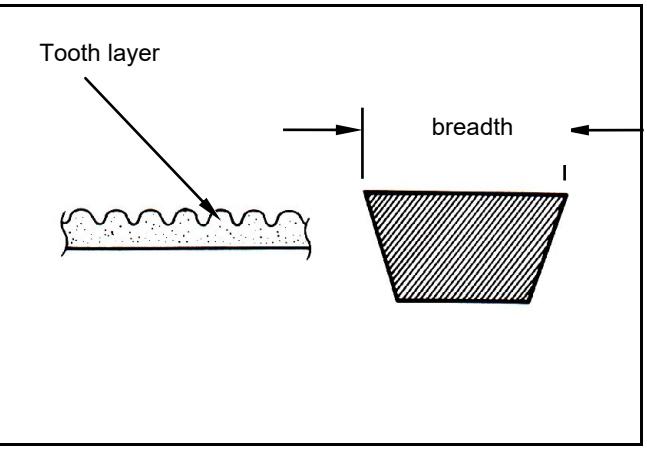
Remove the left cover.

Remove the fixing bolts below the air filter.

Remove the bolts and cover of the left side of the engine.

Check if the belt is cracked, worn unevenly or excessively worn.

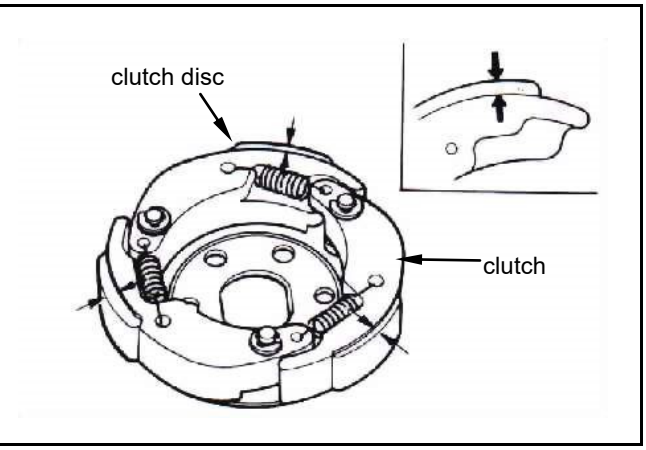
If necessary or if it is time for maintenance according to the regular inspection schedule, replace it with a new one.



Clutch plate

Start the vehicle and gradually increase the throttle opening to check the operation of the clutch.

If the vehicle shakes forward, check the wear condition of the clutch plate. If necessary, replace it.



Knuckle mechanic

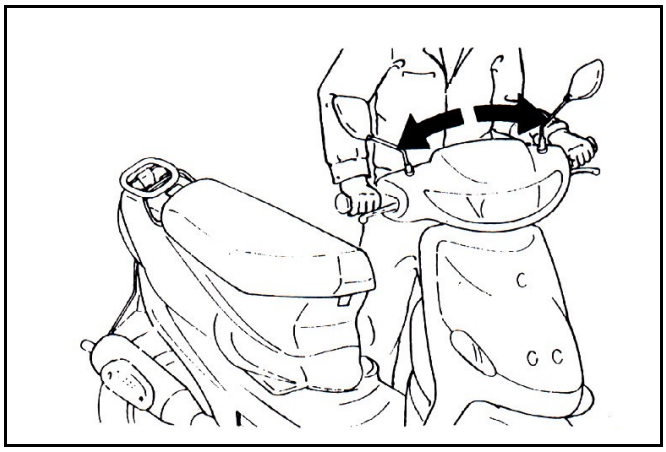
⚠ Caution

- Check each pipeline to ensure there is no interference with the handle rotation.

Make the front wheels lift off the ground.

Rotate the steering handle left and right to check if it moves smoothly.

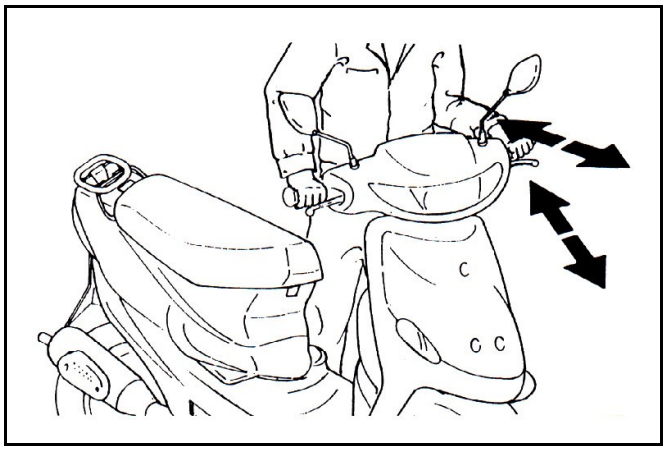
If the steering handle operates unevenly, is bent or can be moved vertically, then adjust the bearing at the head of the steering rod.



Suspension system

⚠ Caution

- Do not ride a motorcycle with faulty shock absorbers.
- Lax, worn-out or damaged shock absorbers will cause poor stability and handling of the motorcycle.



Front shock absorber

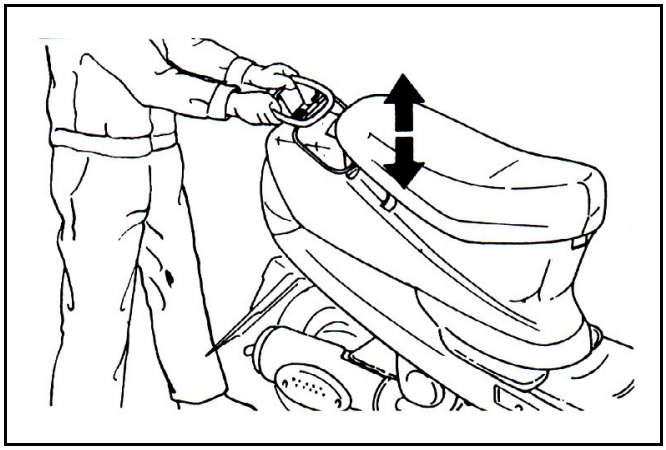
Grab the front brake lever and press down on the shock absorber several times to check the operation condition of the front shock absorber.

Grab the front brake lever and push the shock absorber forward several times to check the locking condition of the front shock absorber.

Check if the shock absorber is damaged or leaking oil.

Replace the damaged parts that cannot be repaired.

Lock all nuts and bolts.



Rear shock

Press down several times to check the operation of the shock absorber.

Check if the shock absorber is damaged or leaking oil.

Replace the damaged parts that cannot be repaired.

Set up the main outrigger of the aircraft.

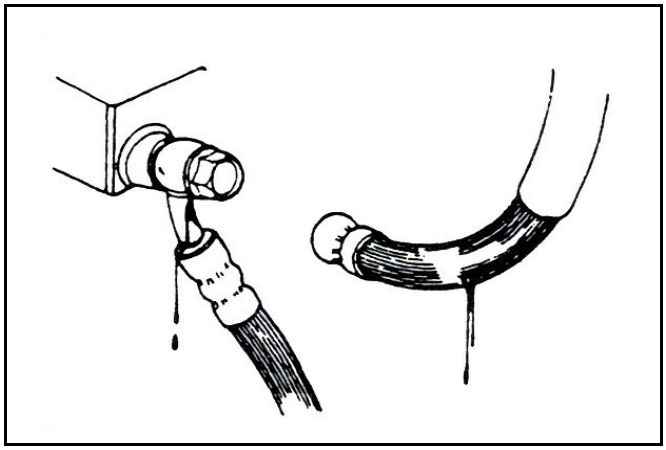
Start the engine and gradually increase the engine speed to make the rear wheels rotate. Observe if there is any looseness or shaking in the engine. If the suspension frame bushings are worn, replace them.

Lock all the shock absorber nuts and bolts.

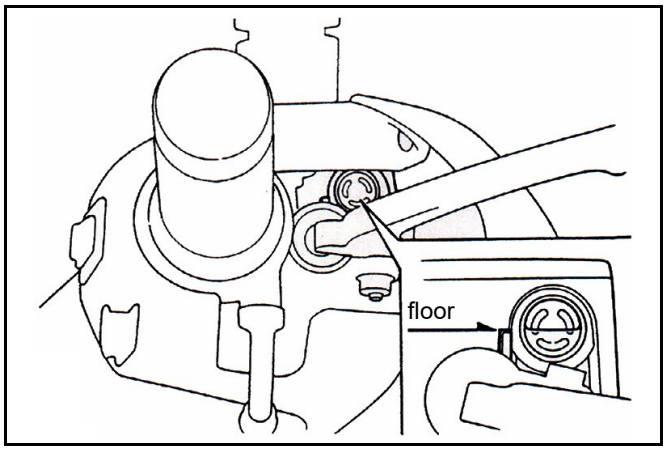
Brake system

Disc brake system hose

Check for corrosion and damage on the brake hose and also inspect the brake system for any leakage.



Check the brake fluid level in the brake fluid reservoir. If the fluid level is close to the minimum mark, add brake fluid to the maximum mark. If the fluid level is low, check the brake system for any leaks.



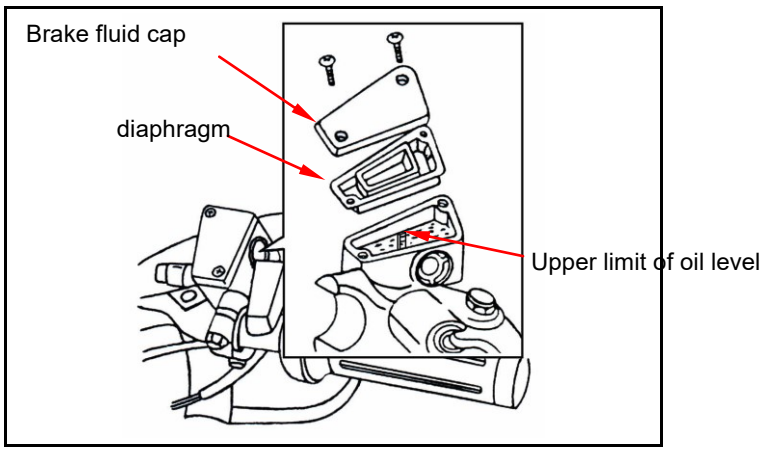
⚠ Caution

- To keep the liquid level of the brake fluid reservoir at a constant level, do not remove the brake fluid cap until the steering wheel is securely positioned.
- Do not operate the brake lever after removing the cap. If you pull the brake lever, the fluid will spill out.
- Do not mix incompatible oils.

Disc brake air release operation

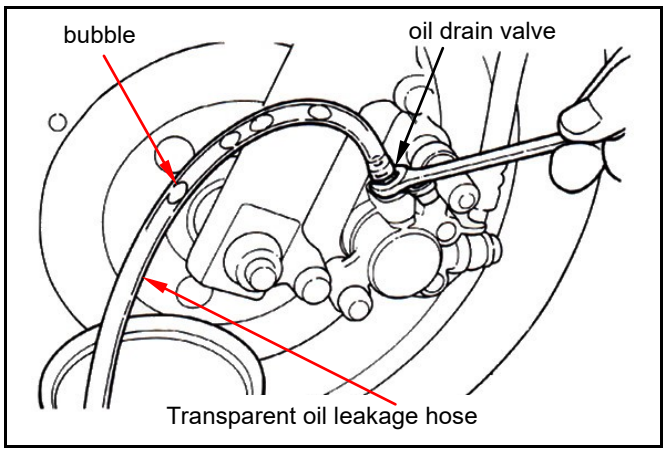
Lock the deflation valve, remove the brake oil cap, fill it with brake fluid, and add brake fluid up to the maximum level.

Operate the brake lever to fill the brake oil circuit with brake fluid.The deflation valve is connected to a transparent hose. Continue operating the brake lever, then pull the lever tight, then open the deflation valve, and repeat this operation until there are no air bubbles in the brake oil system.



⚠ Caution

Do not release the brake lever until the vent valve is closed.



Refilling of disc-type brake fluid

Refill the brake fluid until it reaches the upper limit.

It is recommended to add DOT3 or DOT4 brake fluid.

⚠ Caution

Never use mixed or contaminated brake fluid to avoid damaging the braking system or reducing the braking efficiency.

Brake pad inspection

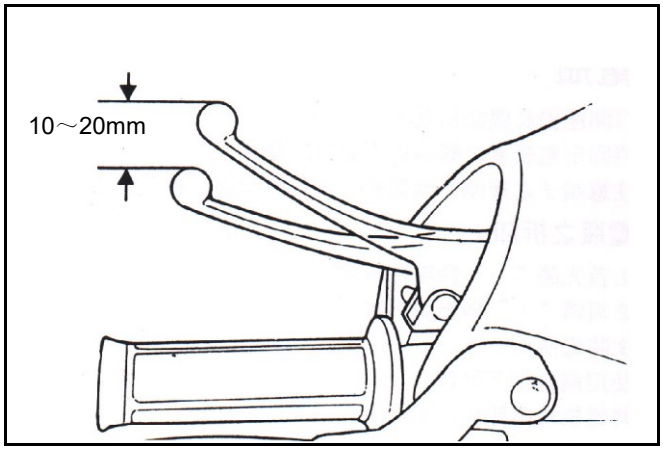
Disc brake

The notches on the brake pad assembly serve as the wear limit marks.

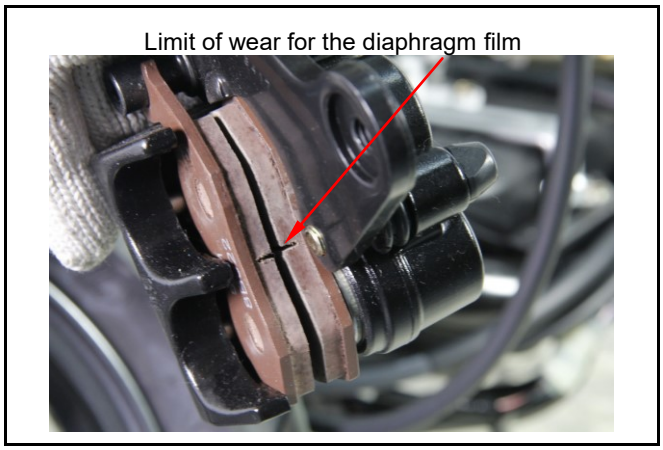
When the worn edge reaches the edge of the brake disc, the brake pad must be replaced.

⚠ Caution

- The brake pad replacement does not require the disassembly of the brake hose.



Confirm the gap standard for the brake pull rod: 10 to 20 mm.

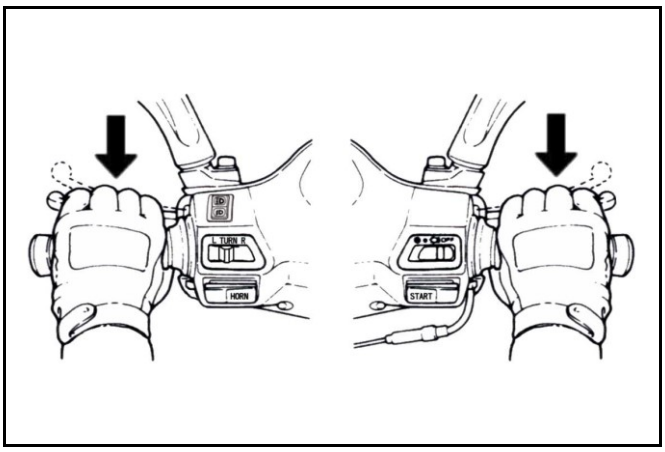


UNIVERSAL STEERINGUPPER CONE RACESOCKET

Brake confirmation

⚠ Caution

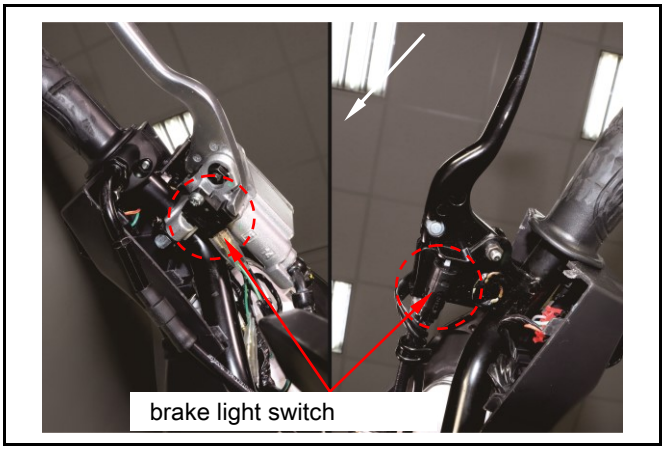
- After replacing the brake pads and brake fluid, it is necessary to check the brake operation status and confirm whether the front and rear wheels can be braked tightly.



brake light switch

When the brakes start to function, the brake lights will illuminate.

Confirm the electric starter. It can only be activated when the brakes are locked.

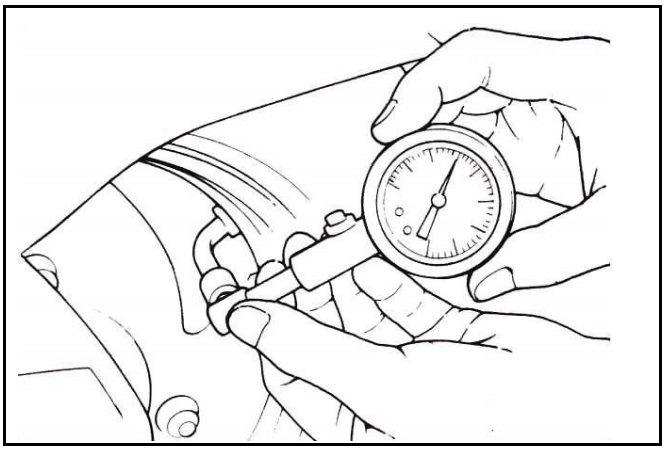


Wheels/Tires

Check whether the pressure of the front and rear tires is correct.

⚠ Caution

- Wheel / The tire pressure check should be conducted when the tire is cold.



Specified tire pressure

Tire pressure		
Low tire pressure (Kg/cm²)	front wheel	1.75
	rear-wheel	2.3

Specified tires:

Front/rear wheels: 90/90-12 / 100-90-10

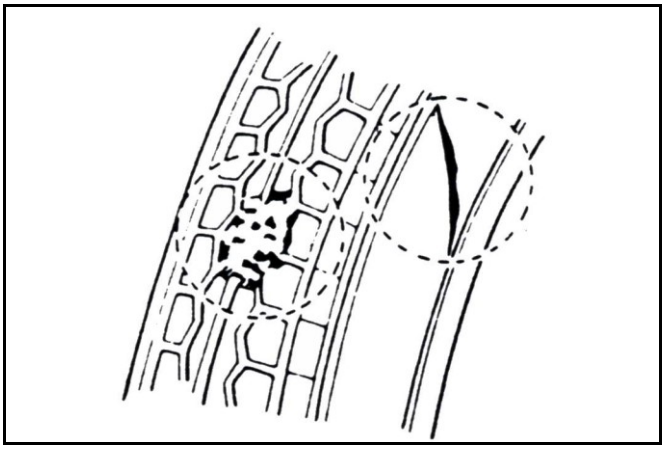
Check if there are any foreign objects such as iron nails, gravel or sharp objects attached to the surface of the tires.

Inspect for any cracks or damages on the tire tread and sidewall. If necessary, replace the tire.

The depth of the tire tread depression can be directly visually inspected or checked using a depth gauge.

If the tire tread depression is too deep or there is uneven wear, replace the tire.

If the wear limit pointer indicated by the "△" mark is visible, replace the tire immediately.



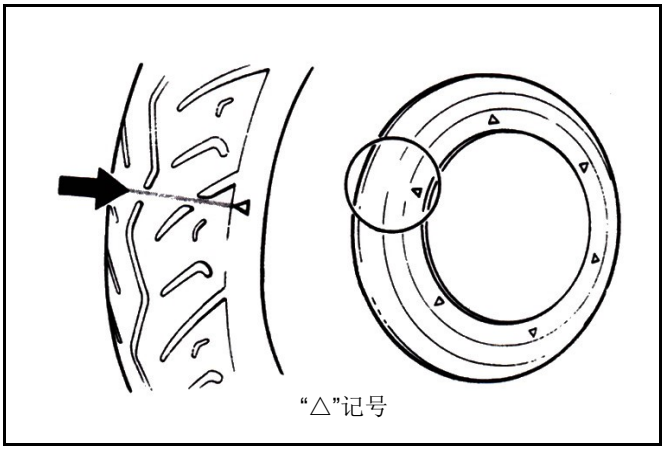
Measure the depth of the tire tread from the center of the tire tread.

If the tire tread depth does not meet the following standards, replace the tires.

Minimum tire tread depth:

Front wheels: 1.5 mm

Rear wheels: 2.3 mm



⚠ Caution

- The worn-out pointer "△" is evenly distributed along the tire sidewall for easy inspection.

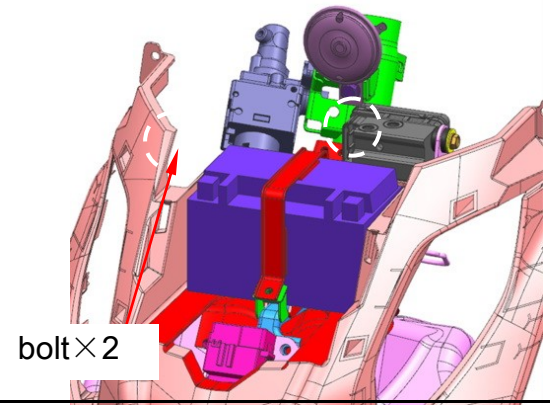
Battery

Battery removal

Remove the front cover (4 screws).

Battery

Remove the battery and detach the battery fixing straps.



Disassembly of battery wires:

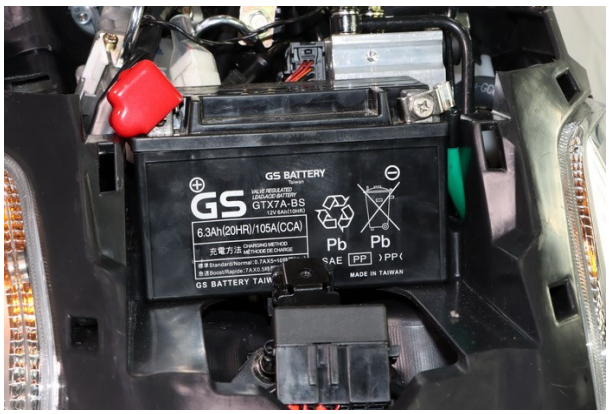
First, remove the "—" terminal wire.

Then, remove the "+" terminal wire.

Remove the battery.

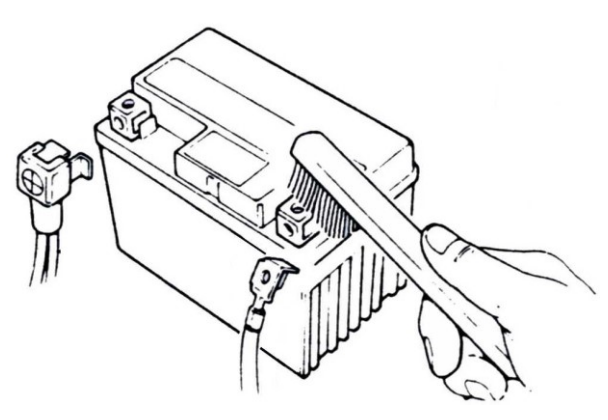
Installation

Install in the reverse order of disassembly.



If the battery terminals are rusty, they can be cleaned with a wire brush.

Install the battery in the reverse order of disassembly.



⚠ Caution

- If the rust on the battery terminal is too severe, it can be first soaked in hot water and then scrubbed off with a wire brush. This will make it easier to remove the rust.
- After removing the rust, apply grease to the terminal to prevent it from rusting again.

Locking of nuts and bolts

Carry out regular inspections according to the mileage on the inspection schedule.

Check whether all bolts and nuts of the frame are securely locked within the specified torque range.

Check all fixed rods, safety retaining rings, oil pipe bundles and lamp fixing heads for adjustment.

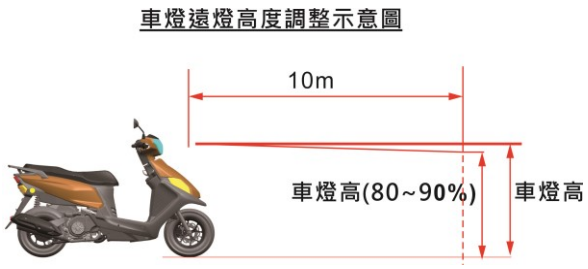
Turn on the main switch.

Use a cross wrench to rotate the lamp adjustment screw to adjust the height of the lamp. Rotate clockwise to raise, and counterclockwise to lower.

⚠ Caution

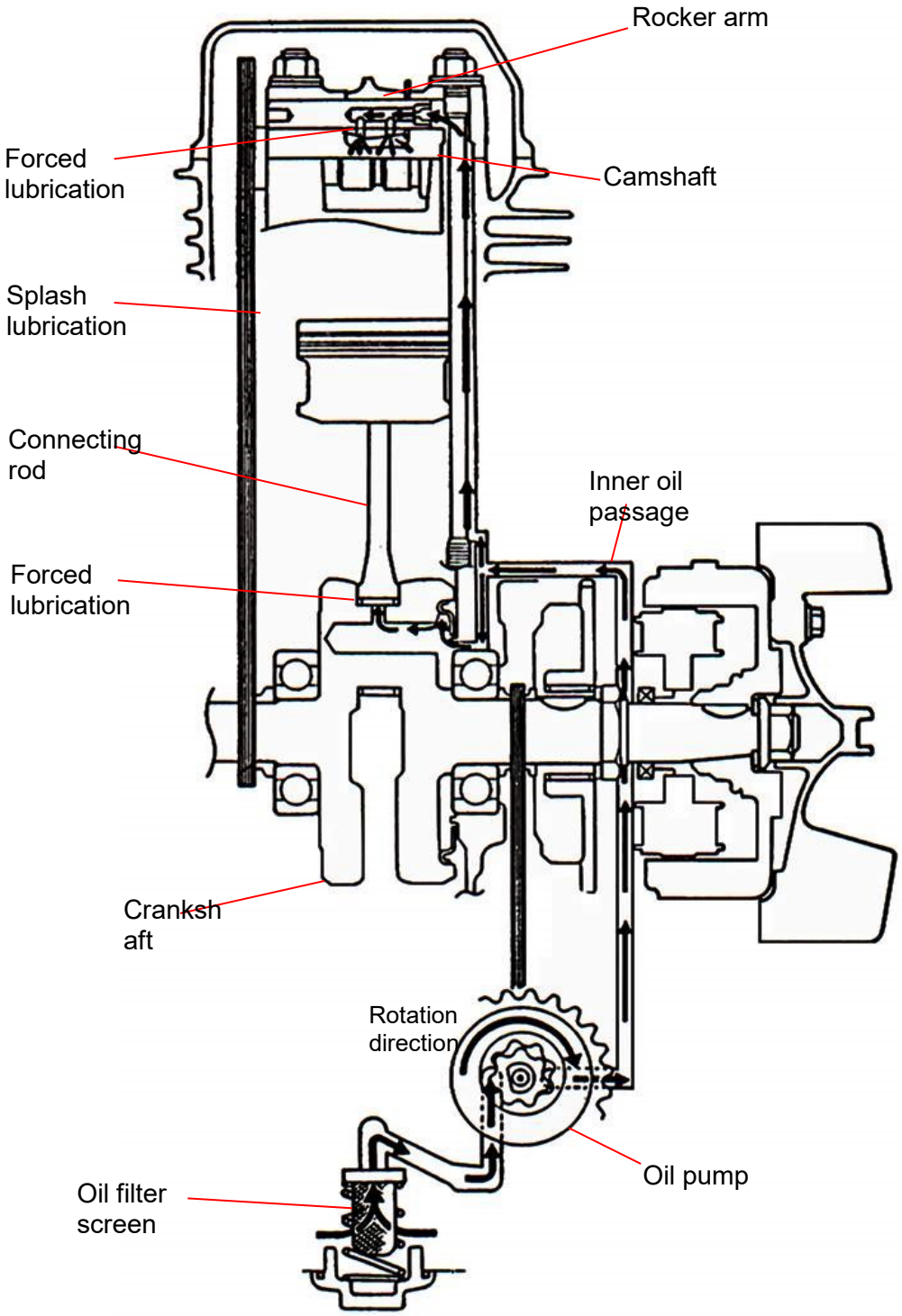
- The distance of the headlight beam has been adjusted in accordance with regulations. Unnecessary adjustments should not be made at will.
- Improper adjustment of the headlight can cause dazzlement for oncoming drivers or result in insufficient safety lighting distance.

Headlight adjustment bolt



Institutional Configuration ····· 3-1	Oil filter cleaning ····· 3-3
Notes on the assignment ····· 3-2	Oil pump ····· 3-4
Fault Diagnosis ····· 3-2	Gear oil ····· 3-9
Engine oil ····· 3-4	

Mechanism configuration



Precautions for operation

General Notes

This section covers the maintenance operations of the oil pump, engine oil and gear oil.

Specifications

Add 950 c.c when the engine oil capacity breaks down.

Add 800 c.c when changing.

Use engine oil viscosity SAE 10W-30 or 10W-40 equivalent

(Sanyo original engine oil is recommended)

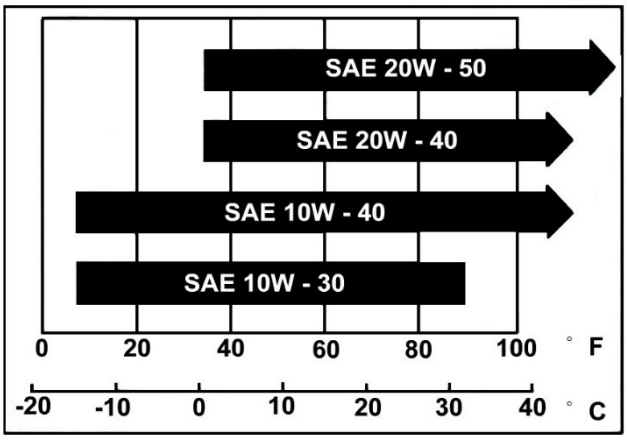
Add 110 c.c when decomposing .

Add 100 c.c when replacing .

Use gear oil viscosity SAE 10W-30 or 10W-40, and exchange oil SAE 5W-30 or 20W-50 equivalent.

(**SYM Hypoid gear oil from Sanyo is recommended**)

Engine oil viscosity



Unit: mm

Project		Standard values	Available limits
Oil pump	Gap between the inner	**0.15**	**0.20**
	Clearance between the	**0.15 ~ 0.20**	**0.25**
	Clearance between the	**0.04 ~ 0.09**	**0.12**

Torque value

Oil filter cover	1.0 to 1.2kgf-m(9.8 to 19.6 N-m)
Engine oil drain bolt	3.5 to 4.5kgf-m(34.3 to 44.1 N-m)
Gear oil drain bolts	1.0 to 1.4kgf-m(10.0 to 14.0 N-m)
Gear oil filling bolts	1.0 to 1.4kgf-m(10.0 to 14.0 N-m)
Oil pump mating screw	0.1 to 0.29kgf-m(1.0 to 2.9 N-m)

Fault diagnosis

The oil level is too low

Oil leakage.

Valve guide sleeve or oil seal wear.

Piston ring wear.

Insufficient engine oil pressure

The oil level is too low.

Clogging of oil filters, oil lines, and oil pipes.

The oil pump is damaged.

Dirty oil

Failure to change the oil on time.

The cylinder head gasket is damaged.

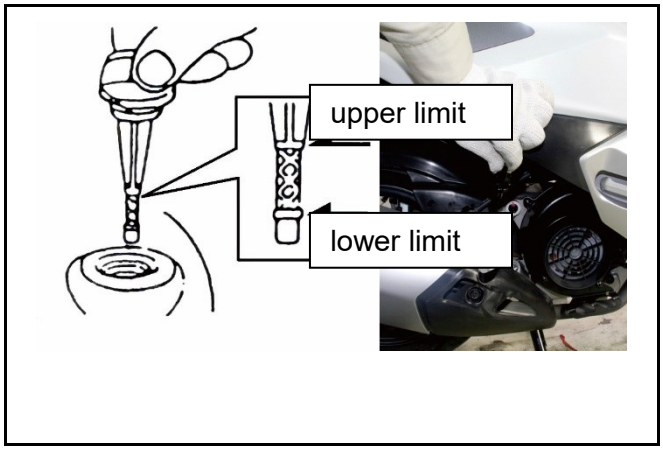
Piston ring wear.

Engine oil

Turn off the engine, stand the locomotive vertically on a flat ground for 3 to 5 minutes, and then check the oil level with a dipstick.

Do not screw in the dipstick when checking.

If the oil level is close to the lower limit, add the recommended oil to the upper limit.



Oil change

⚠ Note

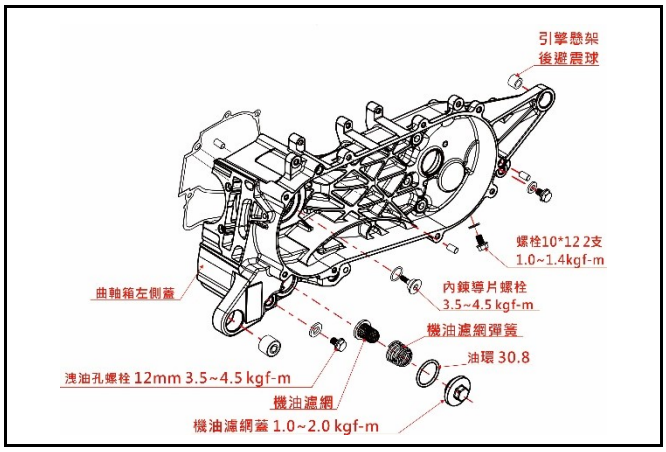
Drain the oil when the engine is warm to ensure it drains smoothly and completely.

Place an oil pan under the engine, remove the oil drain bolt, and drain the oil completely.

Check if the aluminum gasket of the oil drain bolt is damaged and replace it with a new one.

Return oil drain bolt.

Torque value: 3.5 to 4.5kgf-m(34.3 to 44.1 N-m).



The oil filter is clean

Remove the oil filter cap.

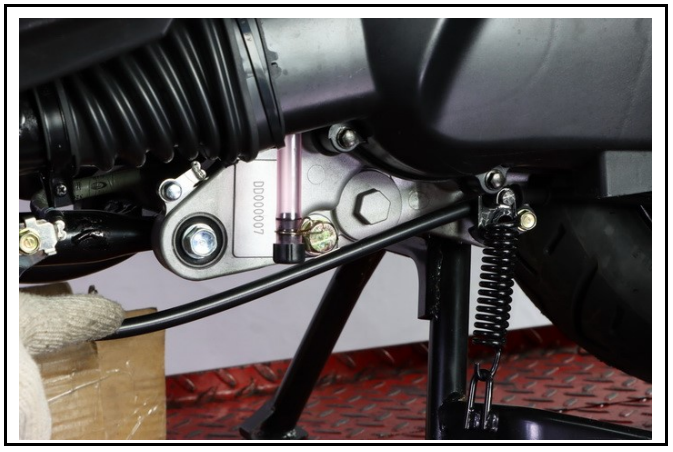
Remove the oil filter and spring.

Clean the oil filter (it is recommended to use a high-pressure air jet to remove foreign objects).

Check the O-ring of the oil filter cap and the condition of the filter screen. If there is any damage, replace it with a new one.Reinstall the oil filter and spring.

Lock back the filter cover.

Torque value: 1.0 to 2.0kgf-m(9.8 to 19.6 N-m).



Use engine oil (SAE 10W-30 or 10W-40 equivalent

Pour into the filler hole (Sanyang original engine oil is recommended).

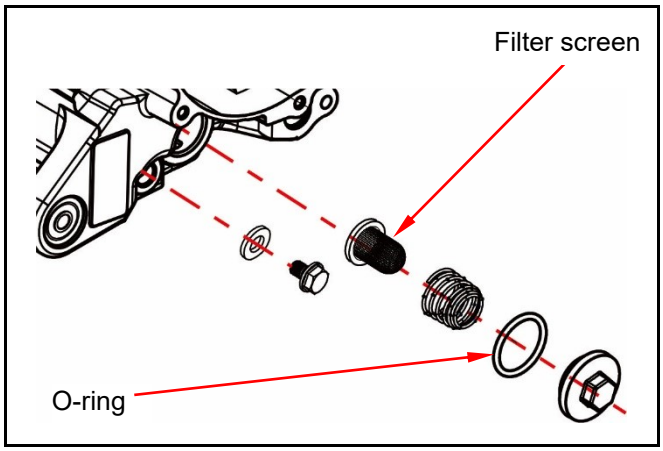
Engine oil level: 800 c.c when changing.

Press the reset button on top of the dashboard, the indicator light will go off and reset the oil change mileage to zero.

Attach the dipstick and start the engine idling for a few minutes.

Turn off the engine and wait for 3 to 5 minutes before checking the oil level again to see if it meets the reference value.

Check the engine's exterior for any oil leakage.

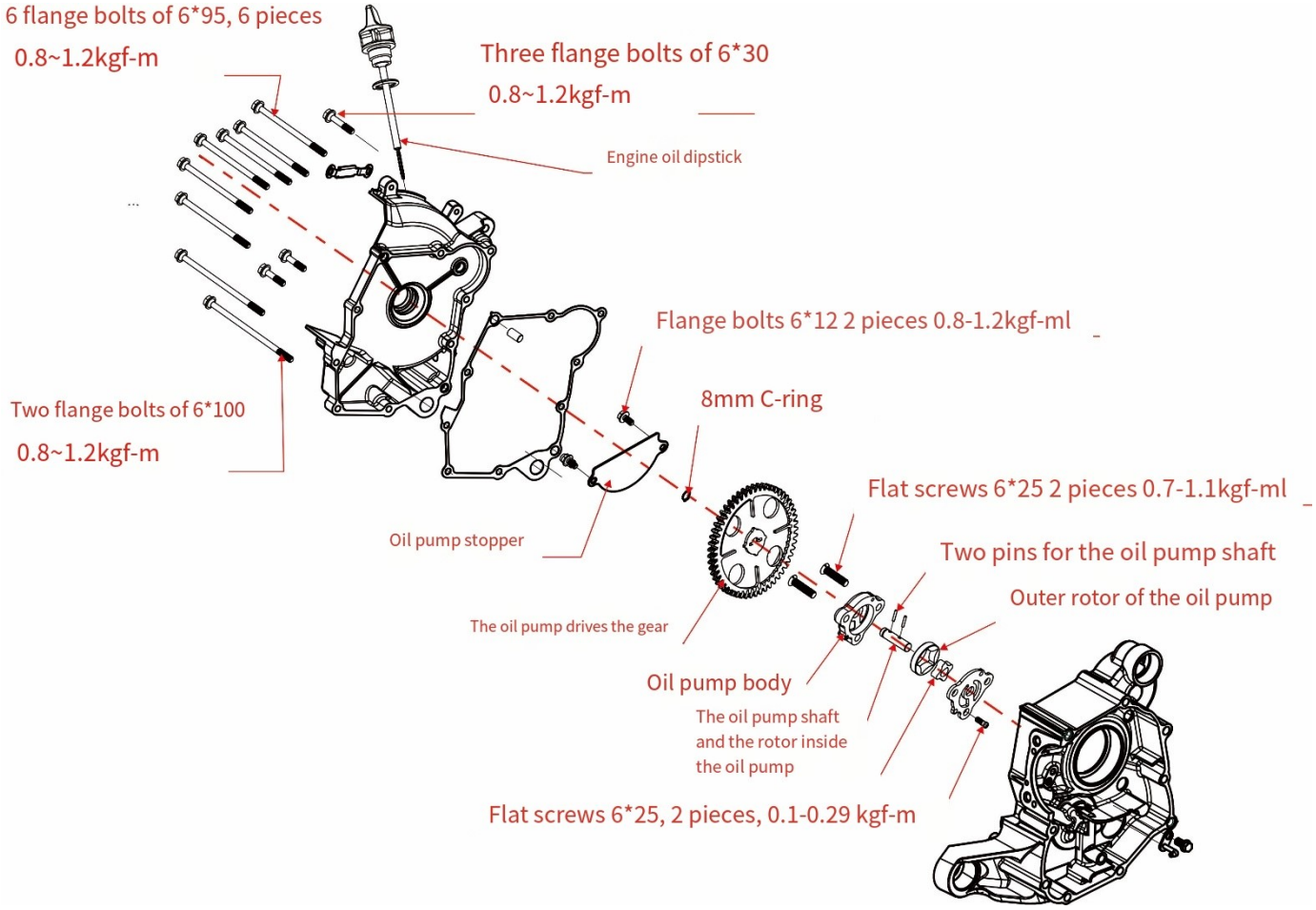


⚠ Notice

The filter screen and O-ring must not be damaged or under-installed.

Oil pump

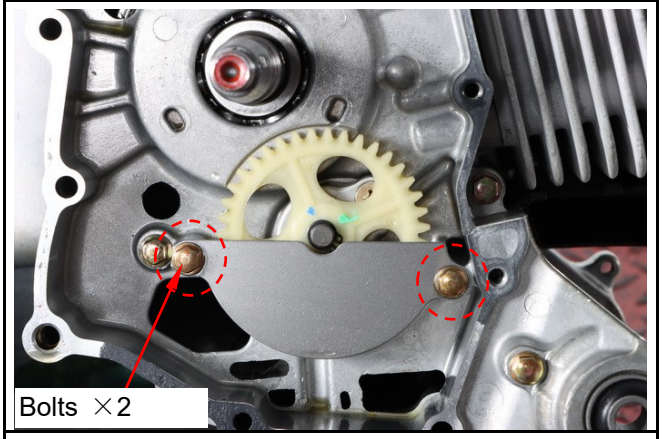
Oil pump structure diagram:



Oil pump disassembly

Remove the oil pump cover (bolts ×2).

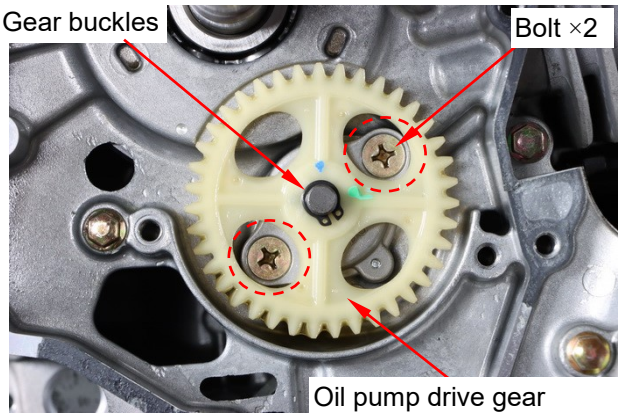
Confirm that the pump shaft can rotate freely.



With an external clamp, remove the oil pump gear loop and then take off the oil pump drive gear.

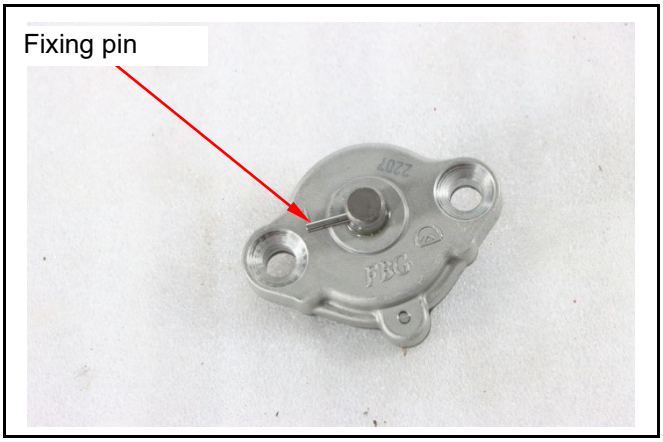
Remove the oil pump locking screw (screw ×2).

Alternatively, align the oil pump gear with the screw first, then remove the oil pump and then the oil pump gear.

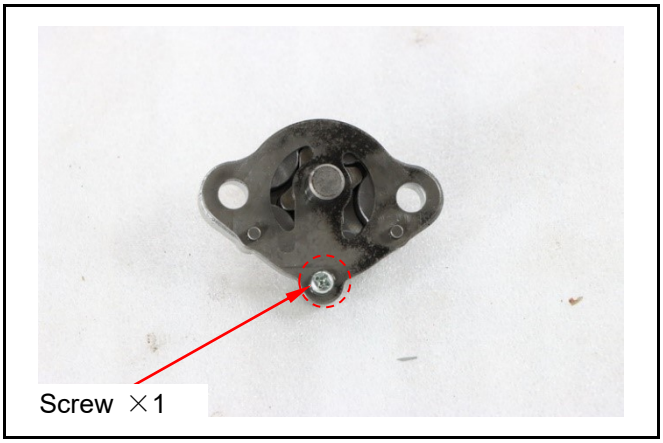


Remove the oil pump.

Remove the gear fixing pin of the oil pump.



Remove the oil pump cover fixing screw (screw × 1).



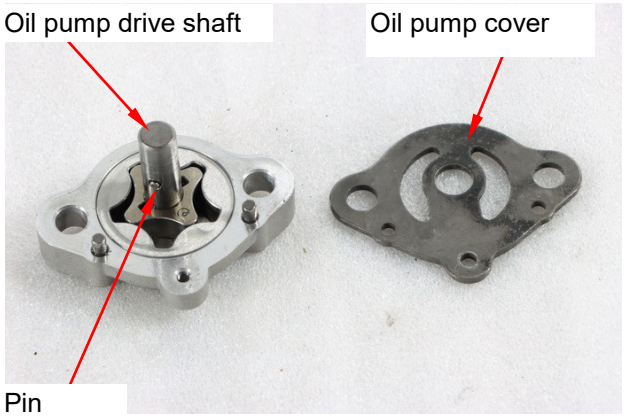
Oil pump disassembly

Remove the oil pump cap.

Remove the drive shaft of the oil pump.

⚠ Note

The pin on the oil pump drive shaft must not be missing or under-installed.



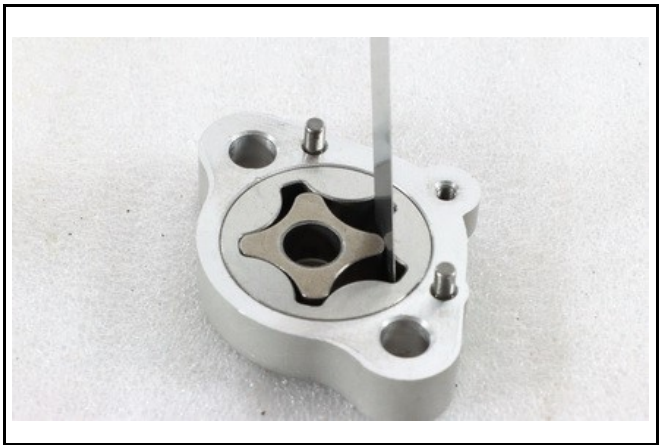
Oil pump inspection

Check the clearance between the oil pump body and the outer rotor.

Available limit: 0.25mm.

Check the clearance between the inner rotor and the outer rotor.

Available limit: 0.20mm



Check the clearance between the rotor end face and the pump body.

Available limit: 0.12mm

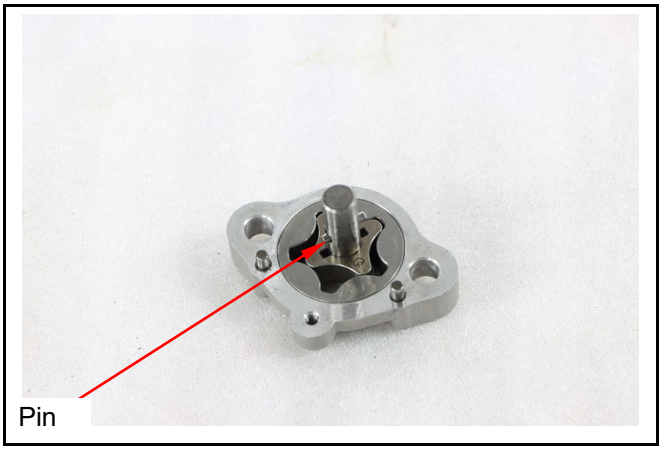
Oil pump assembly

Insert the inner and outer rotors into the body.

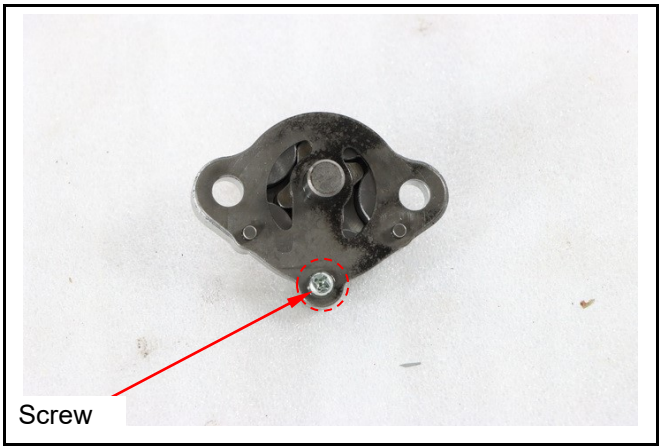
After aligning the shaft hole of the drive shaft with the shaft hole of the inner rotor, install the drive shaft and the pin.

⚠ Note

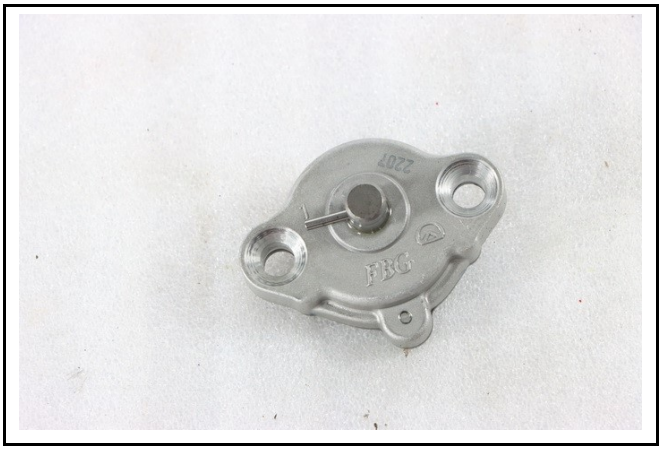
The pin on the oil pump drive shaft must not be missing or under-installed.



The pump cover is securely fastened to the pump cover fixing pins.
Lock the screws.
Locking torque: 0.1 to 0.29kgf-m(1.0 to 2.9 N-m).



Turn the motor oil pump drive shaft and confirm that the oil pump can rotate freely.

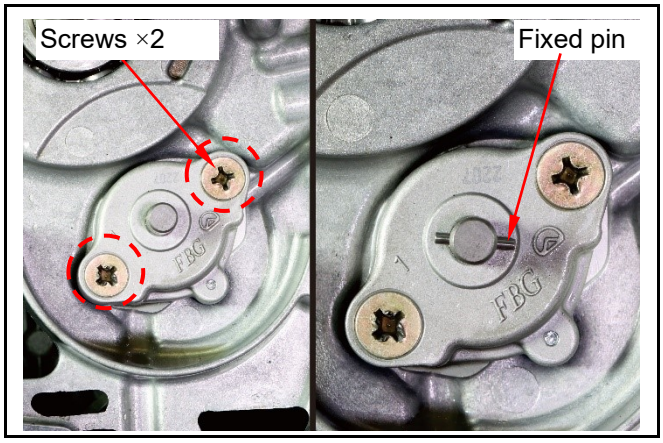


Oil pump installation

Assemble the oil pump into the crankcase and tighten the fixing screws.

Torque value: 0.7 to 1.1kgf-m.

Install the drive gear fixing pin.

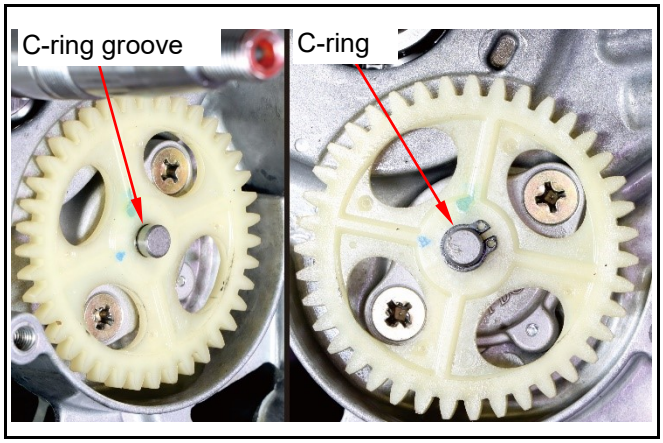


Install the oil pump drive gear and secure it to the oil pump shaft with a C-ring.

⚠ Note

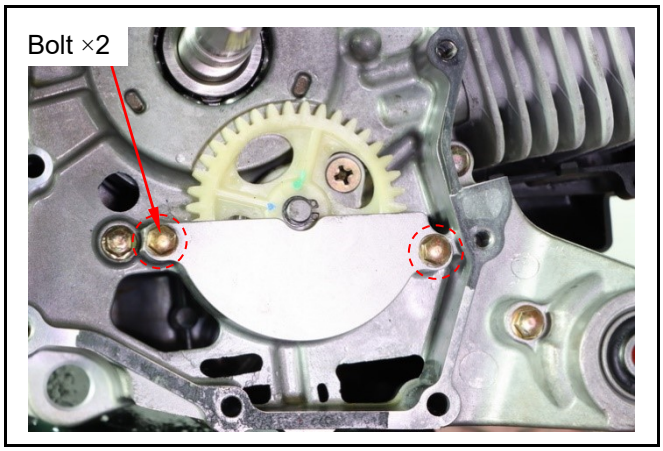
- The gear must be able to be pressed down to the bottom to confirm that the gear is securely engaged with the pin.
- After the C-ring is removed, it must be reassembled with a new one.

Turn the oil pump shaft and make sure the oil pump shaft can rotate freely



Install the oil pump guard cover (bolts ×2).

Torque value: 0.7 to 1.1kgf-m.



Gear oil

Gear oil level check

Set up the locomotive with the main tripod on flat ground.

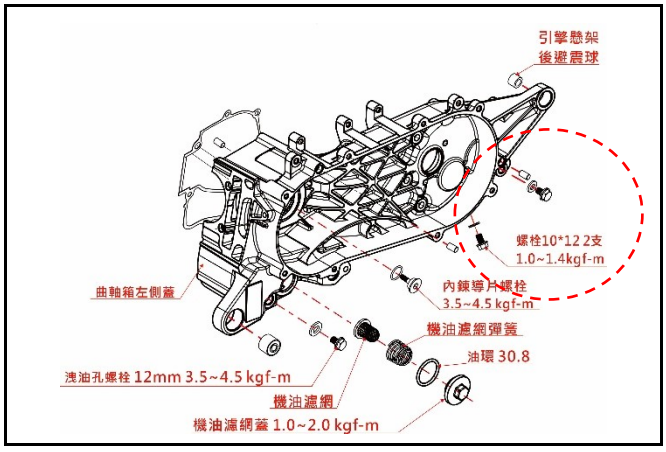
Shut down the engine and remove the oil filler bolts and drain bolts.

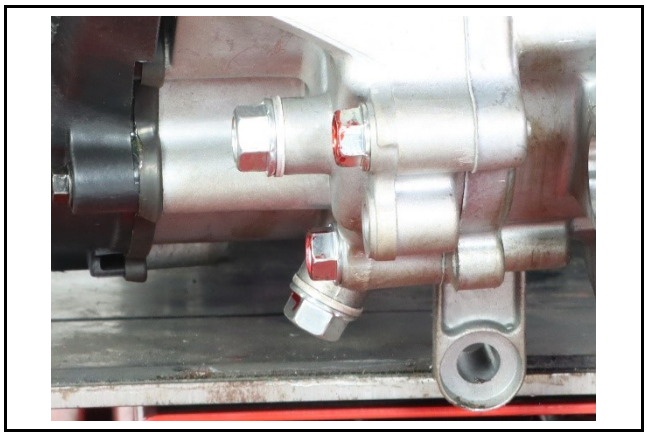
Remove the gear oil injection port bolt and place a measuring cup under the drain bolt, remove the gear oil drain bolt, pour the gear oil into the measuring cup, and check if the gearbox oil meets the standard value?

If the oil level is too low, add the specified gear oil.

Standard oil level: 110 c.c.

For general replacement: 100 c.c.





Gear oil change

Remove the gear oil injection hole bolt and the gear oil drain bolt, and

Drain the oil completely.

Install and lock the gear oil drain bolt (confirm the sealing gasket of the bolt and replace it with a new one if it is damaged).

Pour the new gear oil (100 c.c.) into the gear oil injection hole. After replenishment, install the gear oil injection hole bolt and lock it.

*** It is recommended to use Sanyo original SYM HYPOID GEAR OIL (SAE 10W-30 or 10W-40, exchange oil SAE 5W-30 or 20W-50) equivalent engine oil.**

Torque value

Gear oil drain bolt 1.0 to 1.4 kgf-m

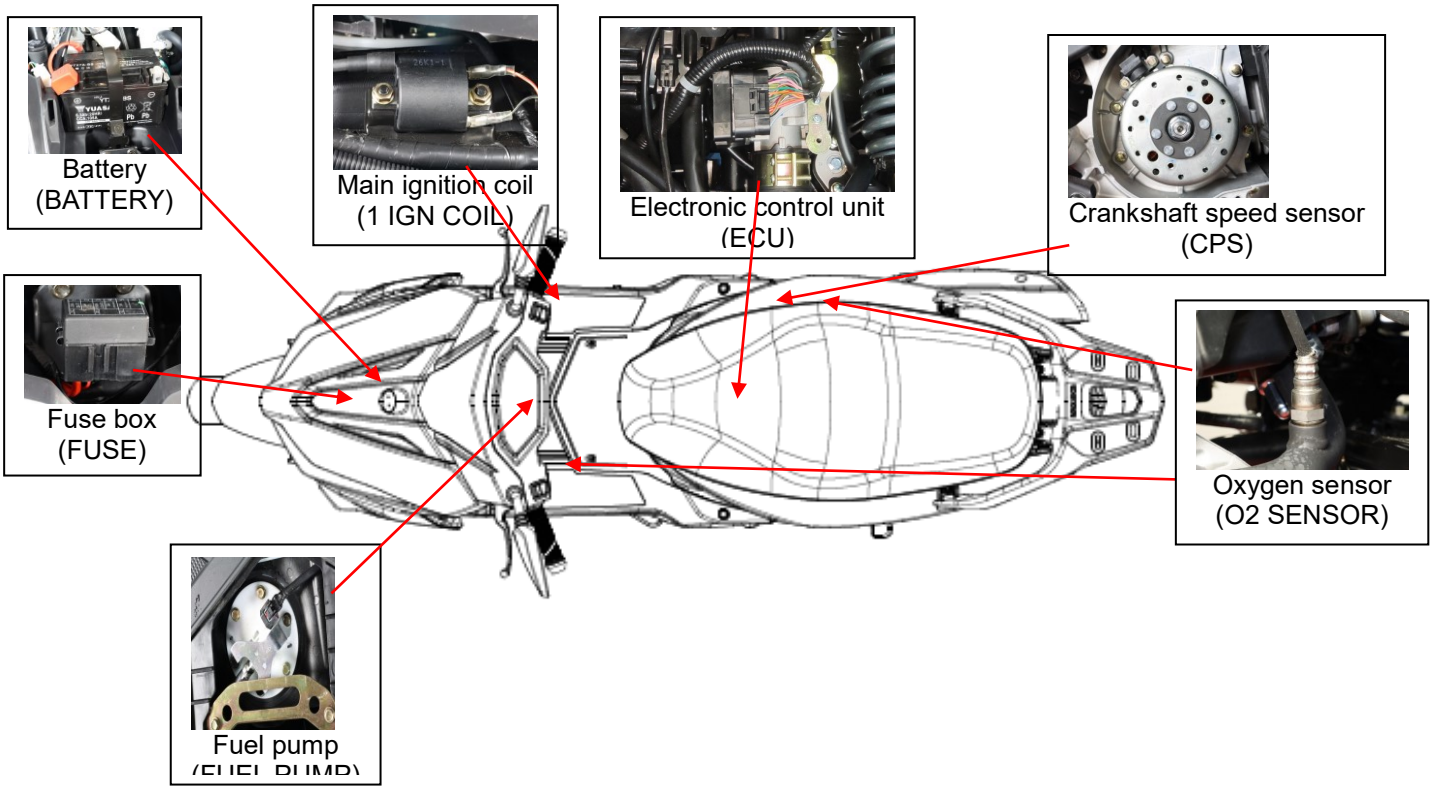
Gear oil injection hole bolt 1.0 to 1.4 kgf-m

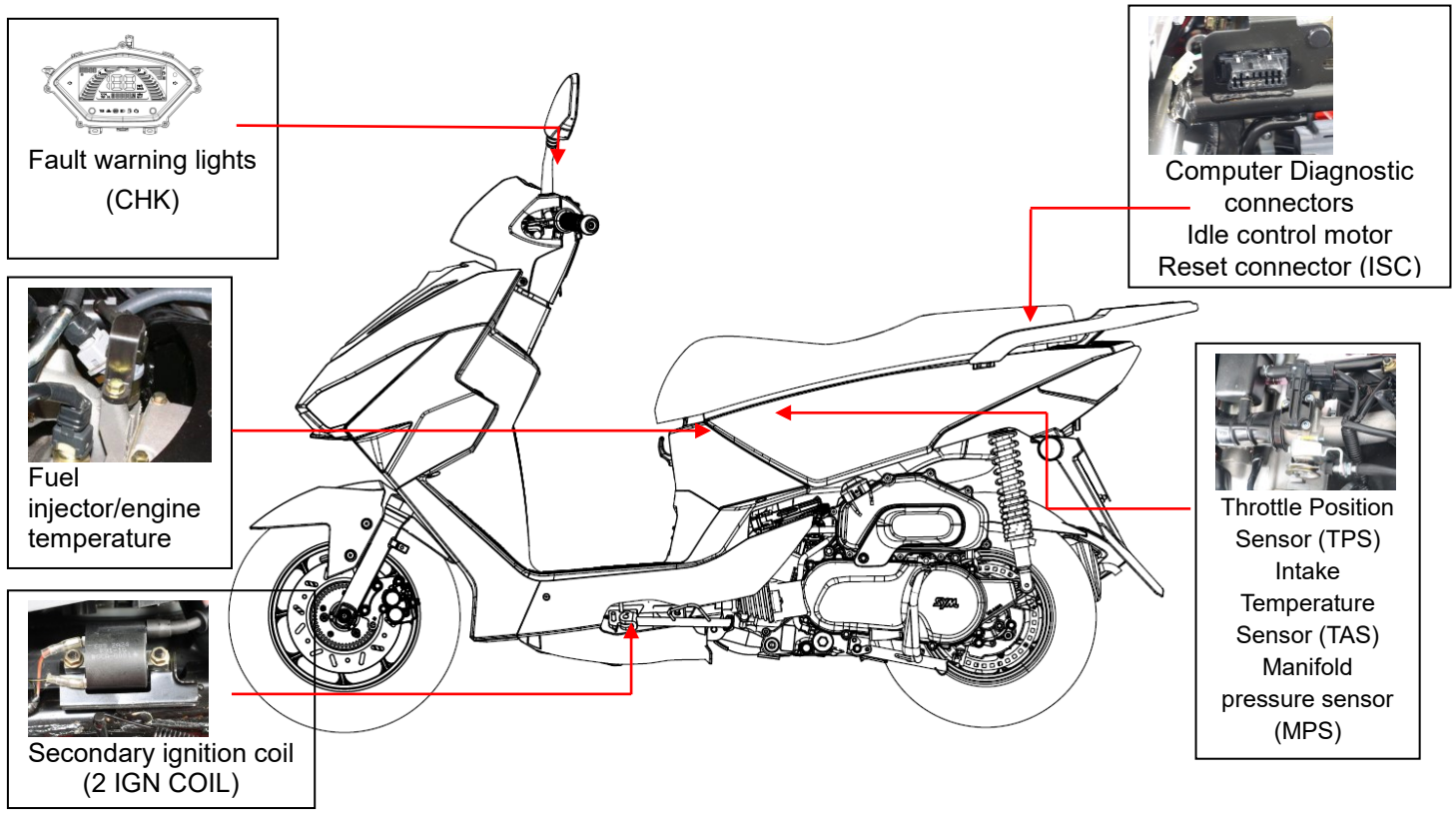
Start the engine and test ride for 2 to 3 minutes.

Turn off the engine and check for any oil leakage.

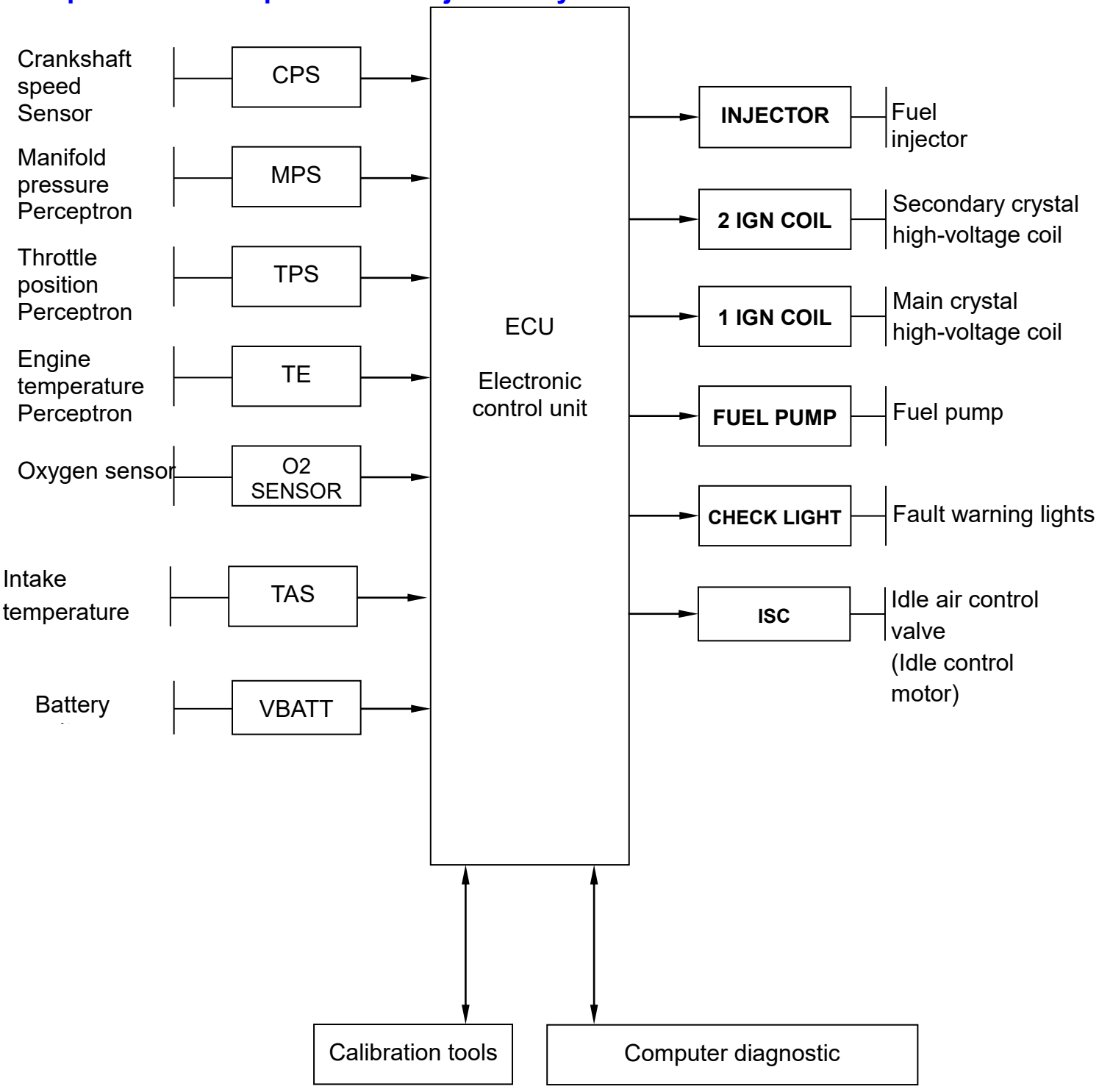
EFi Injection System Actual vehicle Configuration 4-2
Instructions for operating the injection System 4-3
Introduction to the composition/working principle of Electronic Fuel Injection ..... systems 4-4
Overview of Fuel ..... lines 4-5
Ignition system Overview 4-6
Sensor and Driver Overview 4-7
Precautions on ..... the job 4-12 Engine Temperature Sensor 4-13
Oxygen sensor 4-14
Fuel pump 4-15
Fuel nozzle 4-17
Transistor ignition coil 4-21
Crankshaft speed sensor 4-22
ECU connector configuration 4-23 .....
Fault Diagnosis 4-24
Comprehensive Fault Diagnosis Procedure 4-28
Fuel pump disassembly 4-30
Check the oil level gauge ..... at 4-32
Disassemble the fuel tank 4-33
Air filter 4-34
Troubleshooting instructions 4-38
Comprehensive Maintenance Checklist 4-40
Comprehensive Maintenance Checklist 4-40
fault code 4-43

EFi injection system in-vehicle configuration





Operation description of the injection system



Introduction to the composition/working principle of electronic fuel injection devices

A four-stroke electronically controlled fuel injection and ignition engine is basic; The fuel evaporation gas is adsorbed by activated carbon canisters, the crankcase gas is guided to the combustion chamber for combustion purification by the gas separation device, and the closed-loop control of the oxygen sensor can accurately inject fuel to improve the efficiency of the three-way catalyst.

Electronic fuel injection device:

It is composed of fuel supply devices such as the fuel tank, electric fuel pump, fuel filter, oil pressure regulating valve, etc., and fuel control devices such as fuel injectors and ECU.

The fuel is pumped from the fuel tank to the fuel injector on the intake manifold by the electric fuel pump. The fuel pressure is maintained at approximately 294±6kpr(about 3kg/cm^2) through the fuel pressure regulating valve. The fuel injection signal from the ECU causes the crankshaft to rotate twice, injecting fuel into the cylinder once. The remaining fuel flows back to the fuel tank through the regulating valve. The fuel pump is installed inside the fuel tank. It can reduce the noise of the fuel pump and simplify the fuel piping, and the electronically controlled ignition and fuel injection system can effectively control fuel consumption and pollution emissions, achieving the purpose of purifying the environment.

The fuel injection method detects the intake air volume and temperature, and then determines the fuel volume based on the default air-fuel ratio in the computer, and then forces the fuel to be injected by the fuel injector; Unlike carburetors, these three functions are independent, which can easily improve the accuracy of each function and thus control the fuel supply more precisely.

This engine uses computer process control for fuel injection, and its main features are as follows:

1. Determine the necessary fuel injection volume in accordance with the operating conditions of the engine, using a responsive and accurate throttle valve method (determining the fuel injection volume and timing based on the engine speed and throttle valve opening).

2 The determination of fuel injection volume and injection timing is controlled by a 32-bit high-precision microcomputer.

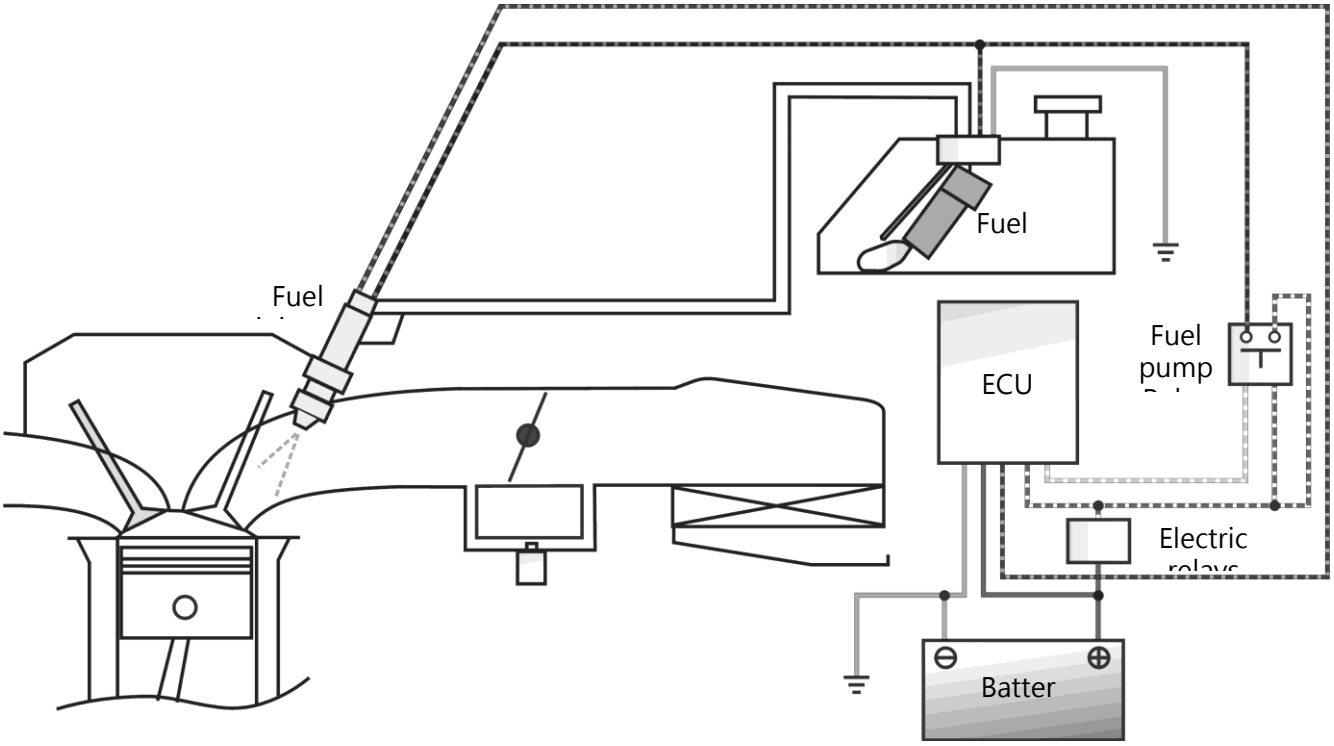
3. The pressure regulating valve keeps the difference between the intake manifold pressure and the fuel pressure at a constant value of 294±6kpr(about 3kg/cm^2), maintaining an appropriate fuel injection volume in response to changes in the intake manifold pressure.

4 Measure the manifold pressure to compensate for changes in high air pressure and expand the driving area.

5. The idle control system supplies bypass air in a timely manner, which enhances idle stability and starting performance.

6. The closed-loop fuel supply control of the oxygen sensor can make the exhaust emissions more stable.

Overview of fuel lines



1. System Instructions

1. When the electric fuel pump in the fuel tank is Key-on, the sensor signals are first sent to the ECU, which controls the fuel relay to start the fuel pump. If the engine is not started, the fuel pump will shut down after 5 seconds to save power. The pressure regulating valve keeps the fuel pressure on the fuel line at **294±6kpa(about 3kg/cm²)**, and the nozzle sprays the appropriate amount of fuel according to the operating conditions and environmental compensation factor. The fuel pump stops operating when Key-off or the engine stops running.
2. The fuel filter, which removes impurities from the fuel, should be replaced regularly.
3. When the engine fails to start smoothly, do not keep the starter motor running, which causes the battery to be undercharged (below 10V), and the electric fuel pump will not work. The correct way is to connect a new battery.

Fuel injector

The injector provides the intake valve with the most appropriate amount of fuel to increase atomization and reduce HC emissions. The fixed cap can easily fix the injector and receive fuel from the fuel pump, and fix the injector to prevent rotation. The amount of fuel sprayed by the nozzle is controlled by the signal from the ECU, using the fuel injection time width to control the amount of fuel sprayed.

Fuel pump

The in-box electric fuel pump, powered by the battery, is controlled by the ECU to open and close. The Regulator uses diaphragms and springs to maintain the fuel pressure at 294±6kpa(about 3kg/cm²), allowing the fuel injector to maintain a certain fuel pressure under different engine load conditions.

Overview of Ignition System

2. How it works:

1. When the main power switch is turned on, the 5V power supply of the start/charge controller begins to supply power. According to the start procedure, press the brake switch and the start button. The ECU provides a signal to the controller. Rotate the start/charge mechanism to rotate the crankshaft at approximately 800 to 1000 RPM. The ignition system ignites and starts the vehicle. The start is more precise and faster, so it is called a zero-delay start system
2. Ignition still uses computer-programmed ignition timing control, signals from the TDC/ crankshaft Angle sensor, throttle sensor TPS, oxygen sensor, intake pressure sensor, intake temperature sensor, and engine water temperature sensor. In coordination with the engine speed, the appropriate ignition timing is determined by the 16-bit microcomputer, and the transistor controls the discontinuity of the primary current to generate a secondary high voltage of 25,000-30,000 volts, triggering the spark plug to trip. This method not only maximizes the engine's output power but also helps to increase fuel consumption.

3 • **Specifications**

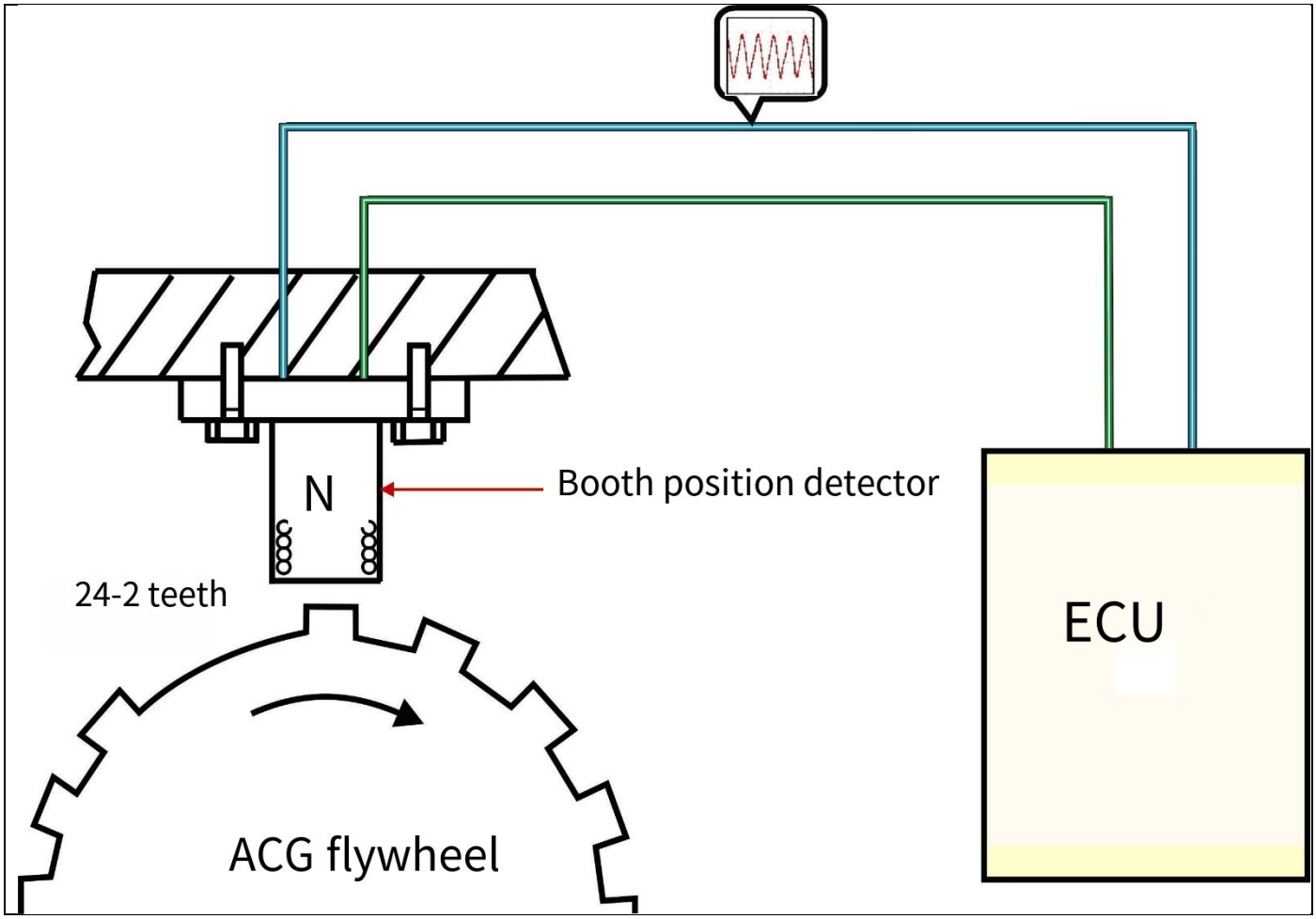
Starting ignition Angle: 0° BTDC / 1500±200RPM
Engine speed dual ignition: 1500±150RPM
Engine speed single ignition: 1400±300RPM
Spark plug :NGK LR7Dx2 clearance :0.6 to 0.7mm
A.C.G coil impedance: 0.6 Ω ±20% (yellow-yellow)
Crankshaft position sensor coil impedance: 120 Ω ±20% (green/white - blue/yellow)
Primary/secondary ignition coil circuit: 2.8Ω±10% (20°C) (red/yellow - black/yellow)
Primary/secondary ignition coil: 14.8KΩ±20% (20°C) (with spark plug cap)
Battery type/capacity: YTZ10S 12V 8.0Ah

Sensor and driver overview

Crankshaft speed sensor (CPS)

Function

The tooth sequence on the induction flywheel transmits the voltage signal to the ECU, enabling the ECU to function properly.

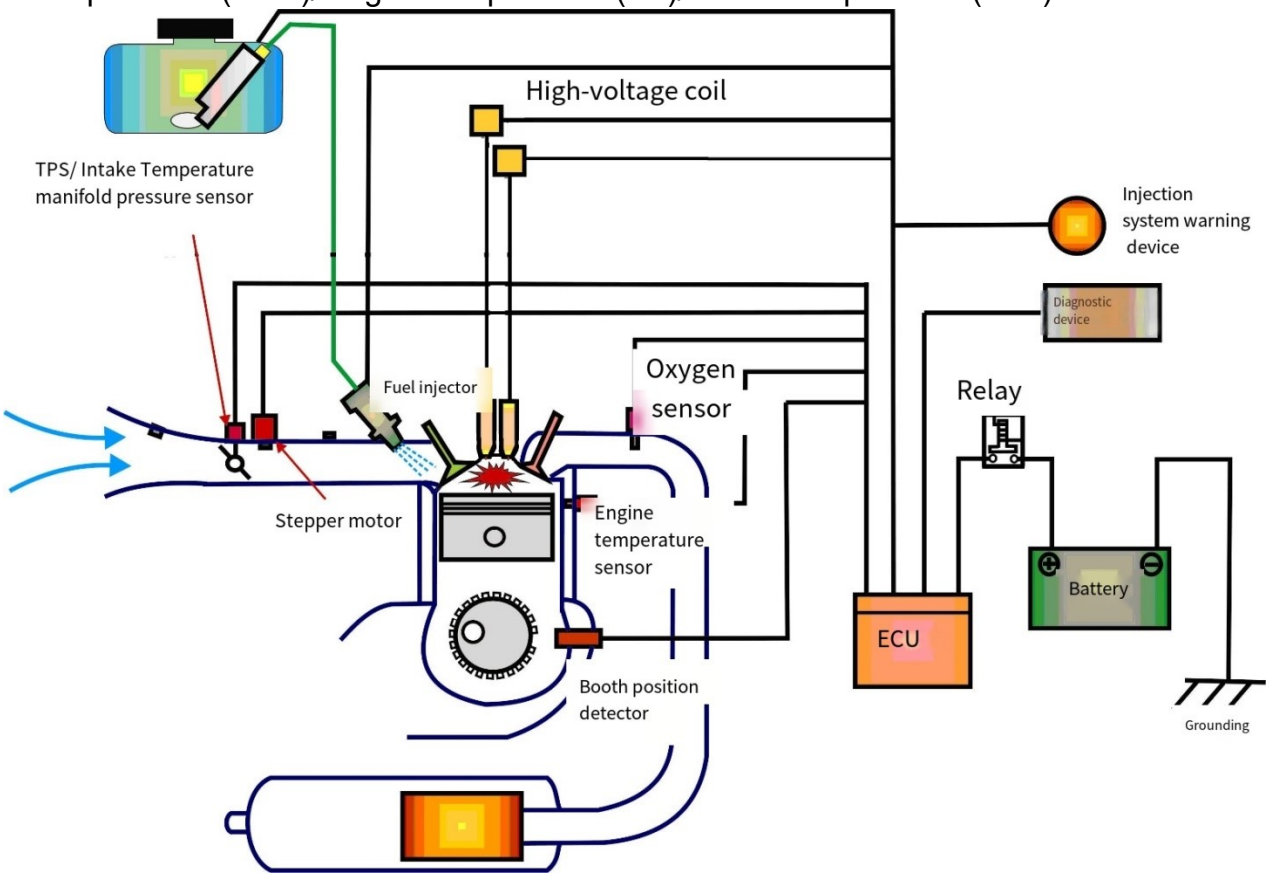


Note:

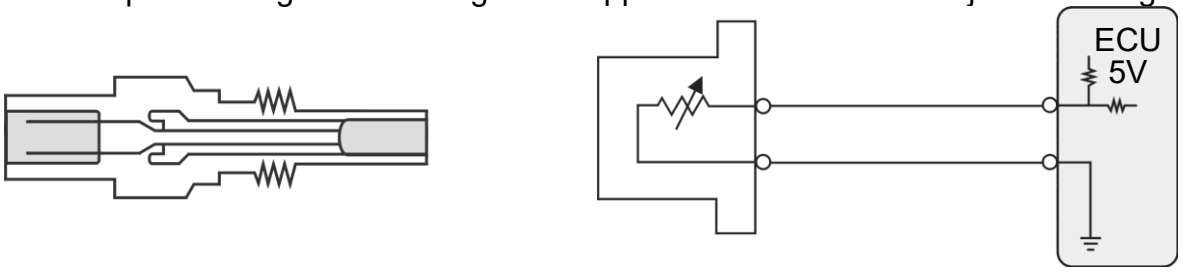
The ECU, which receives signals from various sensors, outputs the speed Angle to control the opening of the idle air control valve, and adjusts the amount of air to the intake manifold through the idle control valve (ISC stepping motor) to correct the idle speed and bring the engine operation closer to normal.

When starting, since the position of the top dead center is not yet known, the crankshaft sensor detects a missing tooth on the flywheel and calculates the time to locate the top dead center position, igniting at a fixed ignition Angle, and switching to software ignition when the engine speed reaches the software-set speed.

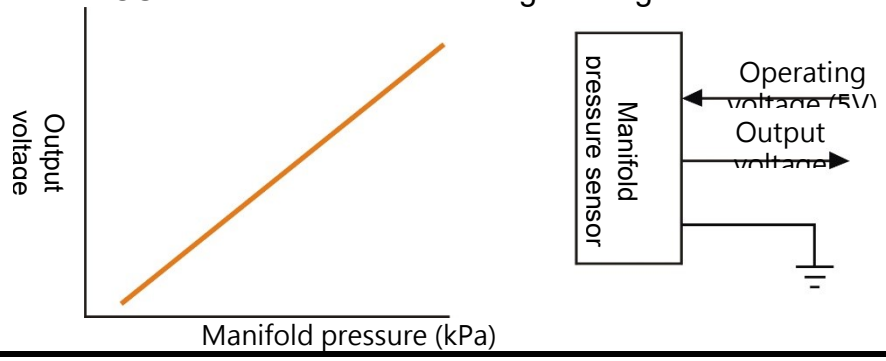
Manifold pressure (MPS)/ engine temperature (TE)/ intake temperature (TAS) sensor



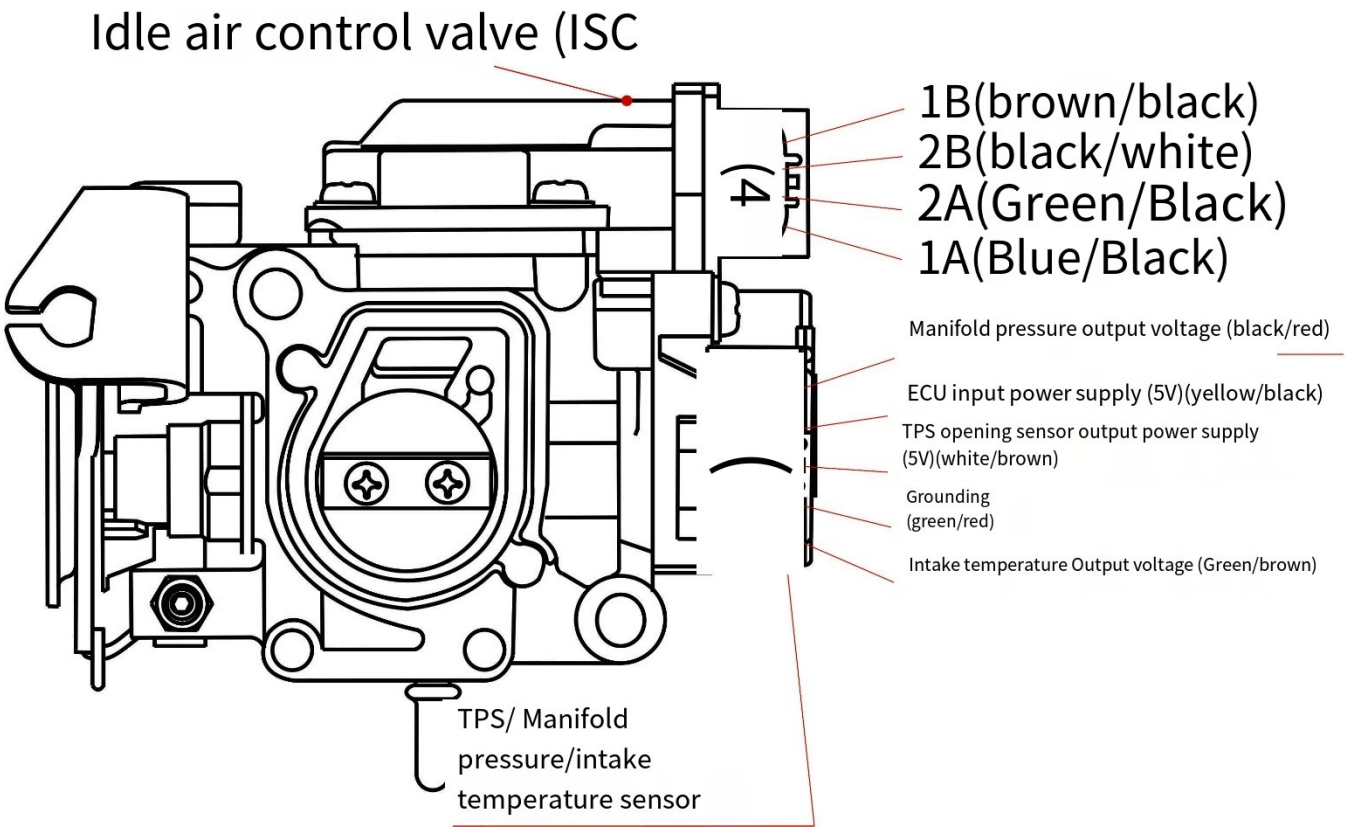
Engine water temperature/intake temperature sensor: It uses a variable resistor (thermistor) with a negative temperature coefficient to sense the outside temperature. The resistance value decreases when the temperature is high and increases when the temperature is low, providing the ECU with a temperature signal of the engine for applications such as fuel injection and ignition.

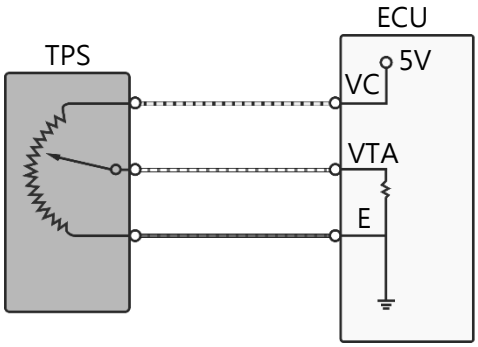


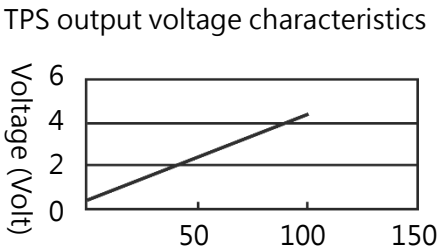
Manifold pressure sensor: The manifold absolute pressure sensor (MPS) is a Wheatstone bridge circuit made of silicon chip thin-film pressure-sensitive resistors that senses atmospheric pressure and intake manifold pressure and forces the feedback to the ECU as the basis for controlling the engine.



Throttle Position sensor (TPS)



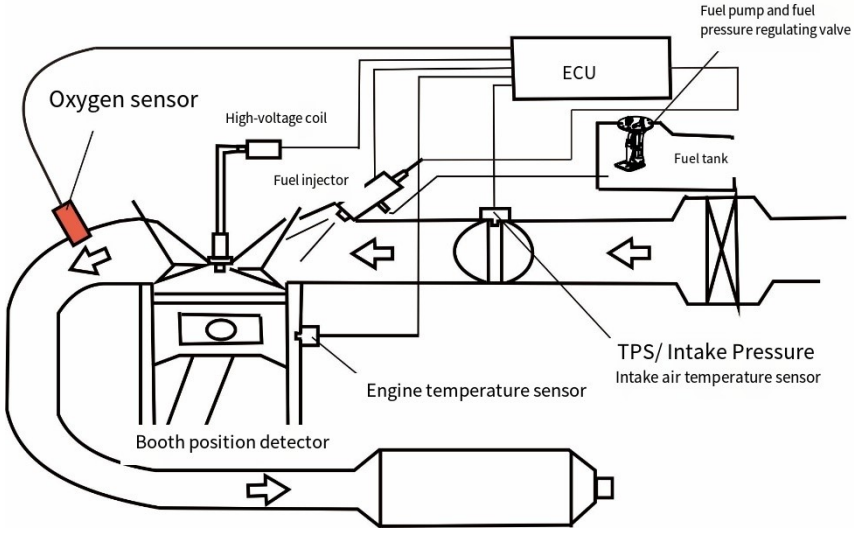


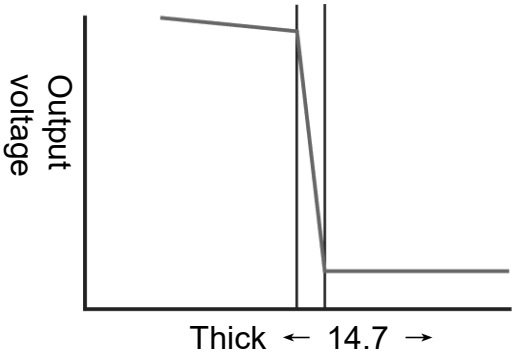


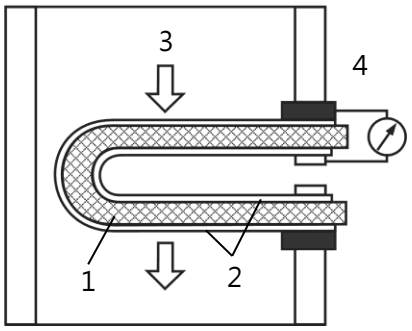
Basic principle: A TPS is a rotating variable resistor. When it is turned, the resistance value changes, and so does the voltage value, which can be used to reflect the position of the throttle valve.

Function: Measure the position of the throttle valve and feed it back to the ECU as a basis for controlling the engine.

O2 Sensor







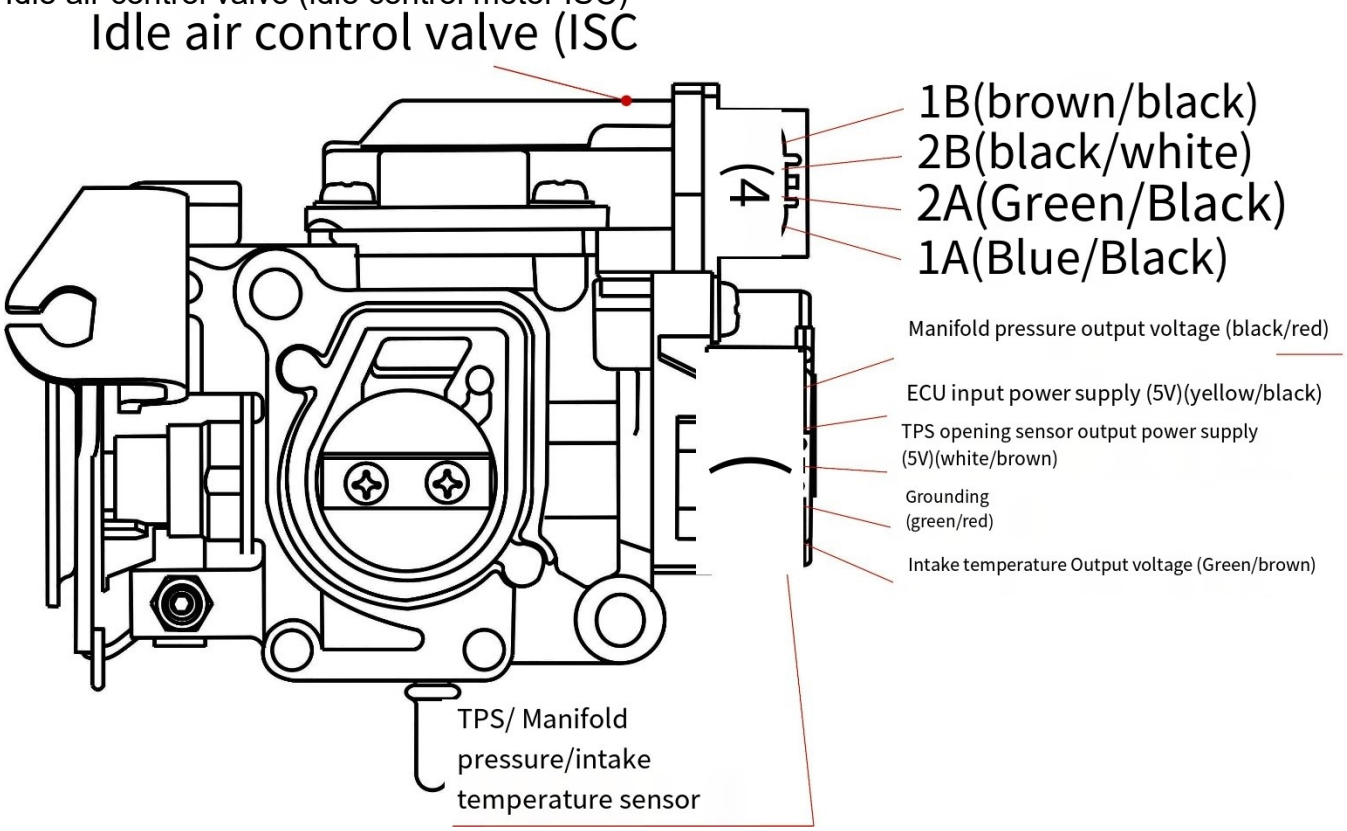
1. Ceramic tube
2. Electrode
3. Waste

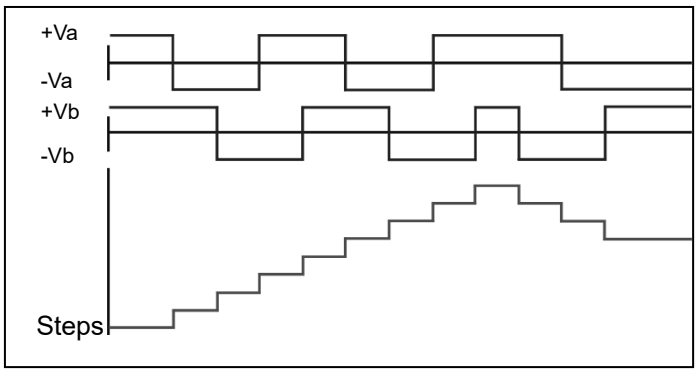
Function:

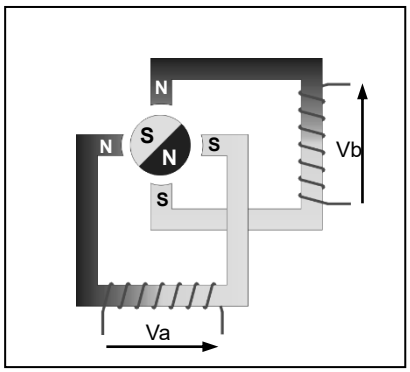
Measure the oxygen (O2) concentration < oxygen content > in the exhaust gas from the cylinder and send the signal back to the computer to change the fuel injection time of the fuel injector and adjust the mixture ratio. If the oxygen content is too low, it indicates that the mixture is too rich and the concentrations of HC and CO in the exhaust gas will increase; If the oxygen content is too high, it means the mixture is too thin. A thinner mixture ratio will raise the combustion temperature and increase the concentration of NOx in the exhaust gas.

1. The oxygen sensor outputs a feedback signal to the ECU to keep the fuel ratio around 14.6 to form a fuel closed-loop control.
2. When the air-fuel ratio is controlled near the equivalent point,CO/HC/Nox has the highest conversion efficiency.
3. The O_2 Sensor correction voltage value fluctuates between **100 and 900 mV**.

Idle air control valve (idle control motor ISC)







Function: Control the idle control motor to move forward and backward to maintain the amount of air required for the engine to run (Figure 1). When current is applied to the rotor of the idle control motor, a rotational torque is generated by cutting the magnetic field lines produced by the stator, causing the motor rotor to rotate (Figure 2).

Precautions for operation

General Notes

⚠ Warnings

- Gasoline is a low flash point explosive. Work in a well-ventilated area and do not open fire or smoke.
- When disassembling the fuel line, first release the fuel pressure in the fuel system or clamp the fuel line with a fuel pipe clamp to prevent fuel from splashing.

⚠ Attention

- Do not bend or twist the throttling wire. Damaging the throttling wire causes unstable handling.
- When disassembling the fuel system parts, pay attention to the position of the O-ring and replace it with a new one when assembling.

The way to relieve the fuel pressure in the fuel system:

After removing the fuel pump relay, turn ON the main switch (ON), press the start switch, start the engine until it is turned off to consume the fuel in the pipeline and reduce its pressure.

Specifications

Project	Specifications
Throttle handle free travel	2~6 mm
Fuel pressure	294±6kpa (about 3.0kg/cm²)

Torque value

Engine temperature sensor: 1.22±0.2kgf-m / 12±2 n-m

Oxygen sensor: 2.55±0.51kgf-m / 25±5 n-m

Specialized tools

Gasoline pressure gauge

Fuel pipe clamp

EFI vehicle line inspector

Vehicle line measurement line group

Injection system diagnosticator

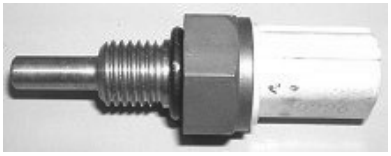
The throttle output signal can also be confirmed by the diagnostic device.

1. Connect the "Diagnostic", turn on the main switch, but do not start the engine.
2. Switch the Diagnostic screen to the Data Analysis screen.
3. Turn the throttle and check the voltage value.

Abnormal phenomena and how to handle them:

- Damage to the throttle position sensor, or poor contact at the connector.
- Check for abnormalities in the main wiring.

Engine Temperature sensor:



Working voltage measurement

Function description

- Use the DC 5V power supply provided by the ECU, socket with 2 pins, 1 voltage output pin (green/blue); 1 is a ground pin (green/red).
- The main component is a thermistor with a negative temperature coefficient (the resistance decreases as the temperature rises).
- The resistor in the engine temperature sensor converts the sensed temperature into a voltage signal and sends it to the ECU to calculate the engine temperature at that time. The ECU then corrects the fuel injection timing and ignition Angle according to the engine warm-up status.

Resistance measurement

Feedback voltage measurement

Detection steps:

Resistance measurement:

- Remove the engine temperature sensor.
- Check the sensor resistance using the Ohm range of the "multimeter".

Detection determination:

The relationship between resistance values and temperature is as shown below

Temperature	Resistance value
- 20 ℃	18.8 KΩ± 2.6%
40 ℃	1.136 KΩ± 8.8%
100 ℃	0.1553 KΩ± 4.5%

Anomalous phenomena and ways of handling:

- Engine temperature sensor damage, or poor contact at the connector.
- Check for abnormalities in the main wiring.
- If the engine temperature sensor is likely to malfunction, it is recommended to replace it with a new one.

Oxygen sensor:

Function description:

- Use body grounding; 1 is an O2 signal pin that activates the sensor using exhaust heat.
- The oxygen sensor outputs a feedback signal to the ECU to control the fuel ratio around 14.5 to 14.7 to form a fuel closed-loop control.
- When the air-fuel ratio is controlled near the equivalent point, CO/HC/Nox can have the highest conversion efficiency.

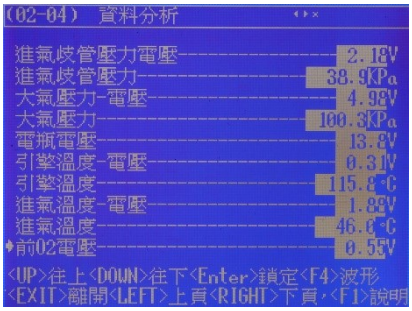
Detection steps:

1. Working voltage confirmation

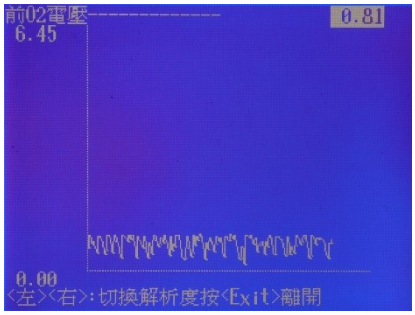
   Use a diagnostic instrument to measure and interpret voltage values.

   Use the diagnostic device to confirm the functioning of the oxygen sensor:

- Connect the "Diagnostic device", turn on the main switch, and start the engine.
- The engine must be fully warmed up (idle for more than "**5 minutes "**).
- Switch the diagnostic screen to "O2 Voltage" under "Waveform Analysis" and observe how the O_2 Sensor operates while the vehicle is idling.
- Observe how the oxygen sensor corrects voltage values.
- The oxygen sensor correction voltage fluctuates between 100 and 900 mV; It indicates that the pollution closed-loop control system is functioning properly; otherwise, if it remains at a fixed value, it is abnormal.



Operating voltage confirmation



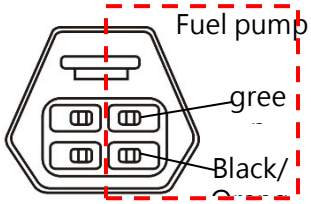
Correct for variations in voltage values

Abnormal phenomena and ways to handle them:

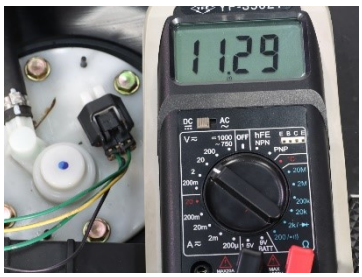
- Damaged oxygen sensor, or poor contact at the connector.
- Check for abnormalities in the main wiring.

If the oxygen sensor may be abnormal, it is recommended to replace it with a new one and measure again.

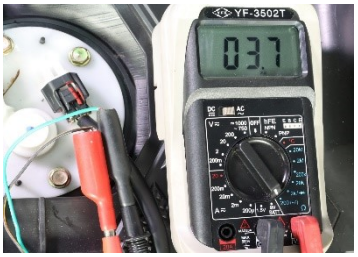
Fuel pump



Front view of the wire harness end connector



Measurement of fuel pump operating voltage



Measurement of fuel pump resistance value

Fuel pressure force measurement disassembly point - fuel injector

Function description:

- Use a DC 8-16V power supply with a 2-pin socket.
- The sockets with two pins are power (black/orange) and ground (green). The ECU controls and manages the operation of the fuel pump through the power.
- It mainly uses a low-power DC motor to drive the vane pump, which supplies 12V and maintains a pressure of 294±6kpa(about 3kg/cm^2) in the fuel supply line.
- The fuel pump is installed in the fuel tank and has a fuel filter at the suction end to prevent foreign objects from being sucked in and damaging the fuel pump and the fuel injector.

Inspection steps 1:

Fuel pump operating voltage confirmation:

- Connect the fuel pump connector properly (using a probe tool) or remove the connector to measure the working voltage (measure directly).
- Turn on the main switch but do not start the engine.
- Use the DC setting (DCV) of the multimeter to check the voltage of the fuel pump.
- Confirm the working voltage:

Connect the negative terminal of the meter to the second pin (green) of the fuel pump.

Connect the positive terminal of the electricity meter to the first pin (black/orange) of the fuel pump.

⚠ Note

- When measuring the fuel pump operating voltage, if the engine is not started within 5 seconds after the main switch is turned on, the ECU will automatically cut off the fuel pump operating voltage.

Test Determination 1:

1. Operating voltage: **above 10V**
2. Resistance value: **3.5±0.5Ω**
3. Fuel pressure: **294±6kPa(about 3kg/cm^2)**

Test Step 2:

Fuel pressure force test:

- Use a fuel pressure gauge connected in series between the fuel tank and the fuel injector.

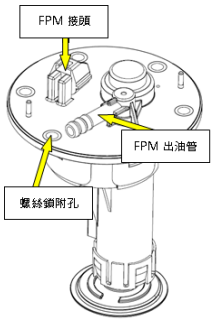
⚠ Note

- When conducting the fuel pressure force measurement, you will disassemble the fuel tubing, such as the **injector side** or the fuel **pump end**. After measuring the fuel pressure, make sure there is no fuel leakage to avoid danger.

Test determination 2:

Fuel pressure: 294±6kPa(approximately 3kg/cm ^{2})

Fuel pressure force gauge disassembly point - fuel pump



Abnormal phenomena and ways to handle:

1. Check for leaks/damages in the tubing.
2. Use an oil pressure gauge connected in series between the fuel pump outlet pipe and the pipe to check if the fuel pump is operating/if the oil pressure is normal and to record the oil pressure value.
3. Unplug the wire plug above the fuel pump and use the ammeter DC voltage file position to turn on the main switch to measure whether the wire harness terminal is powered and record the voltage value.
4. Use the resistance range of the meter to measure the resistance at the fuel pump connection and record the resistance
5. If the fuel pump malfunctions, it is recommended to replace the fuel pump.
6. If the fuel gauge is abnormal, it is recommended to update the fuel gauge.

Fuel gauge resistance measurement (empty)

Model indication: F8L

Oil level gauge resistance measurement (full)

Check Step 3:

Oil gauge resistance measurement:

Check the fuel gauge resistance value (yellow/white & green) using the Ohm range of the "multimeter".

Test Determination 3:

When the float arm is in full (F) and empty (E) positions, the resistance values are as follows:

Float arm position	Resistance value
E (empty)	90 + 10 Ω
F (full)	10 + 0 Ω

Fuel nozzle

Measurement of injector resistance values

Good injection condition

Abnormal jetting condition

Function description:

- Use a DC 8-16V power supply with a 2-pin socket.
- The main component is a high-impedance voltage-driven electromagnetic needle valve.
- The sockets with two pins are for power and ground. The timing of fuel injection and the duration of the fuel nozzle opening are determined by the control of the ECU.

Inspection steps:

1. Resistance measurement

   Check the resistance value of the fuel injector using the Ohm range of the multimeter.
2. Fuel injection status check:
   - Remove the fuel injector cap fixing screw, but do not unplug the wiring harness connector.
   - Hold the fuel injector and the nozzle cap tightly by hand without any leakage.
   - Key-on start the engine and observe how the fuel injector sprays.

Test determination:

1. Resistance between two pins: **12.0±0.6Ω**
2. Spray status:
   - Good atomization and distinct scattering Angle → judged as normal.
   - The fuel injection is in a droplet shape with no obvious scattering Angle → judged as abnormal.

Abnormal phenomena and ways to handle them:

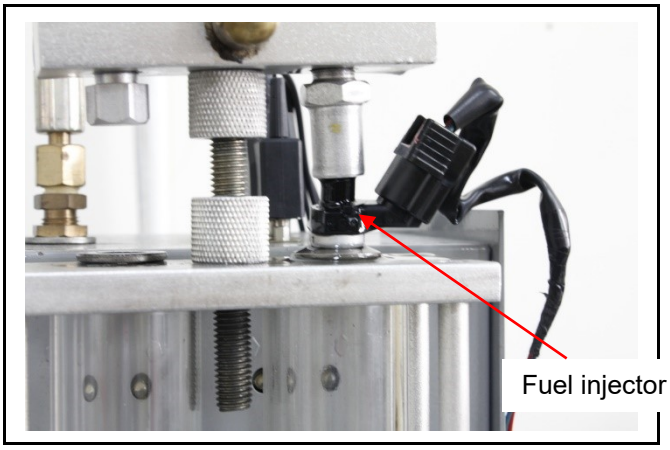
1. Resistance value NG→ Abnormal fuel injector. It is recommended to replace the fuel injector.
2. Abnormal fuel injection status for the following reasons:
   - Clogged fuel injector → Abnormal fuel injector, it is recommended to use a fuel injector cleaner or

     Replace with new fuel injectors.
   - Insufficient fuel pressure → Confirm the fuel pressure. It is recommended to replace the fuel pump and confirm again.

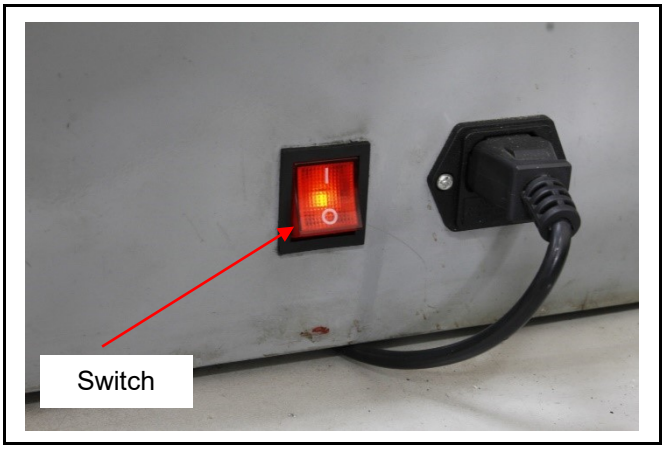
⚠ Warnings

- Gasoline is a low flash point explosive. Work in a well-ventilated area and do not open fire or smoke.
- When checking the fuel injection status of the fuel injector, the gasoline that flows out of the injector should be collected in an appropriate container to avoid danger.

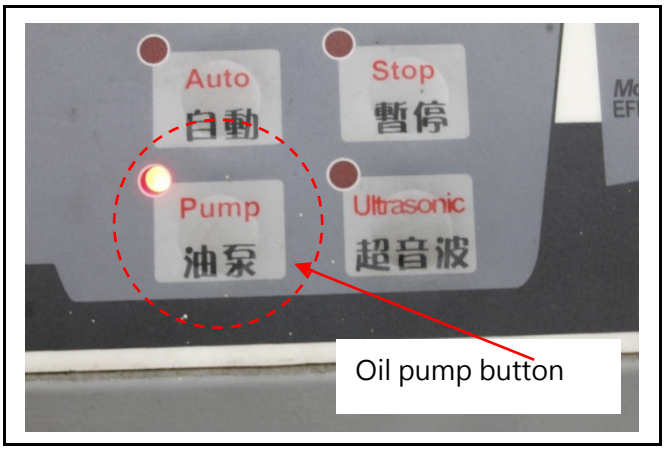
Fuel nozzle flow test
Attach the fuel injector to the test tube.



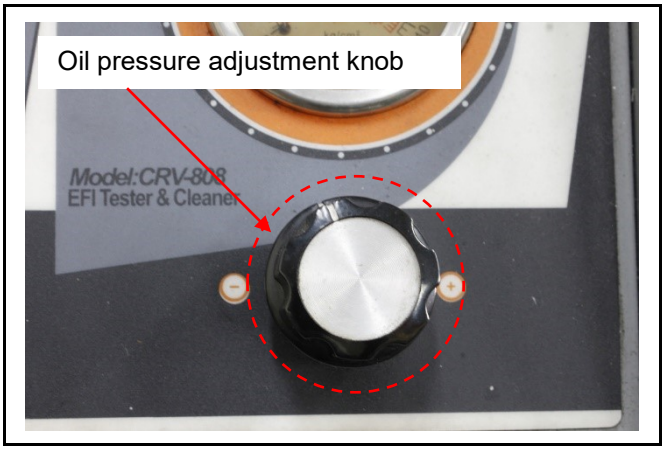
Turn on the main switch.



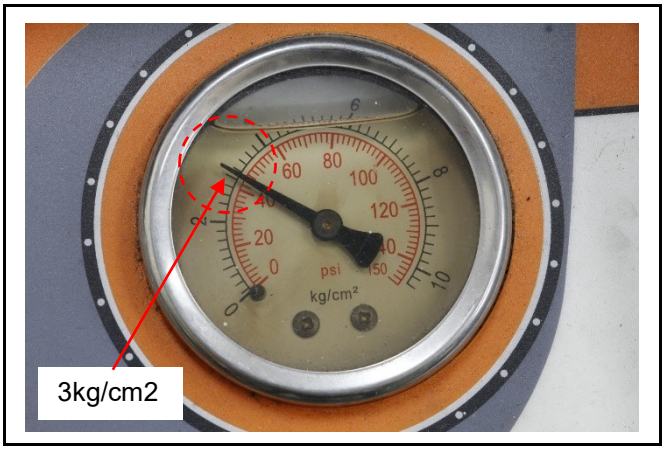
Press the oil pump button to start the oil pump.



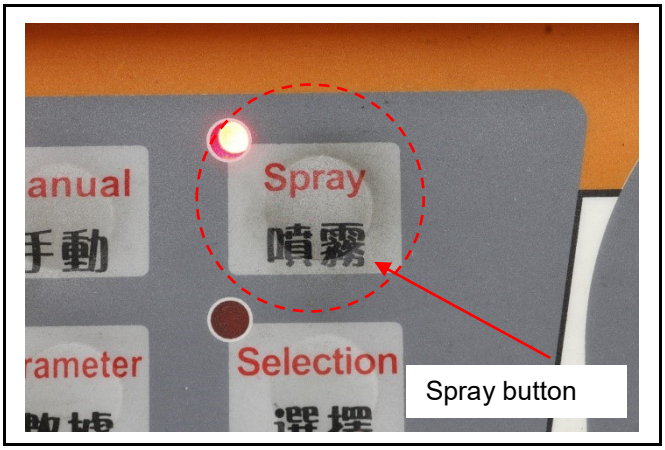
Turn the oil pressure adjustment knob.



Adjust the oil pressure to 3kg/cm ².

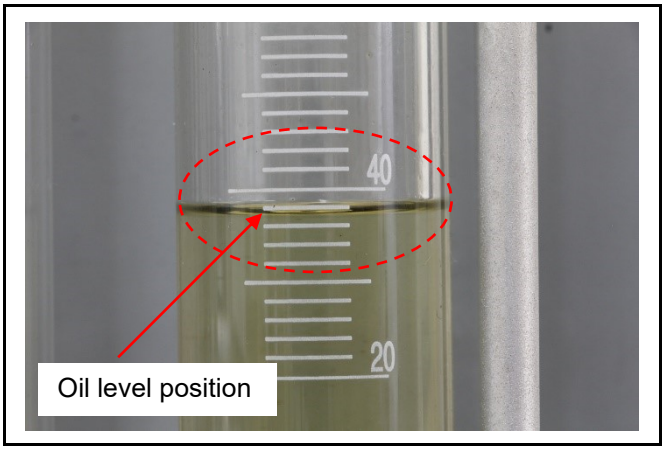


Press the spray button.

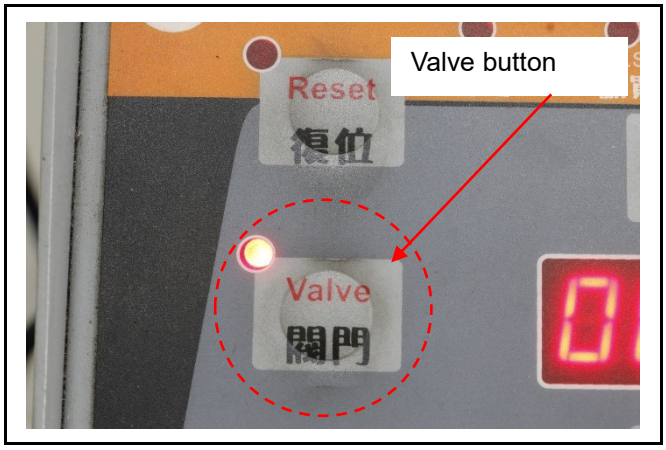


Spray for 20 seconds.
Also observe whether the atomization of the fuel injectors is normal.

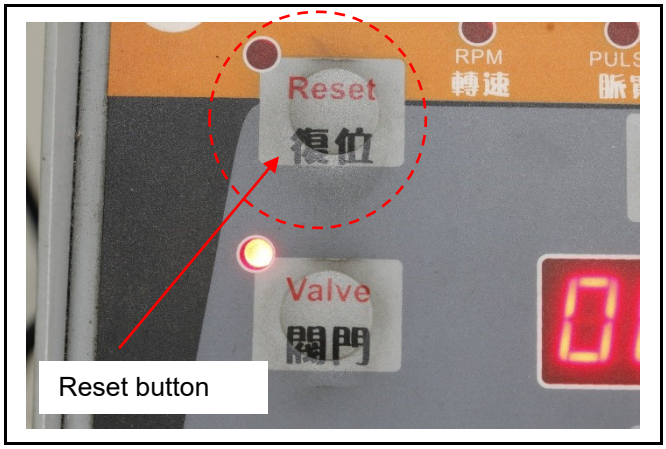
When the action is completed and the air bubbles in the tube to be tested disappear, observe the oil level in a level eye position.



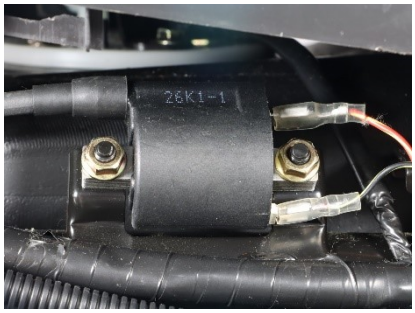
Press the valve button to clear the test fluid in the test tube.



Press the reset button to restore all Settings of the injector cleaner.
Press the fuel pump button again to start the fuel pump item and repeat the test 2 to 3 times.
If the fuel injector atomizes poorly or the fuel injection volume is abnormal after the test, perform the fuel injector cleaning procedure.



Transistor ignition coil



Master transistor ignition coil


Secondary transistor ignition coil

Measurement of the resistance value of the primary coil terminal

Measurement of the resistance value of the secondary coil terminal

Function description:

- Use a DC 8-16V power supply with a 2-pin socket.
- The sockets have two pins for power and ground. The main component is a high conversion ratio transformer.
- Through computer-programmed ignition timing control, signals from the ignition timing (TDC)/ crankshaft speed sensor, throttle position sensor, engine temperature sensor, manifold pressure sensor, and oxygen sensor, in conjunction with the engine speed, are used by the ECU to determine the appropriate ignition timing, and crystals control the discontinuity of the primary current A secondary high voltage of 25,000 to 30,000 volts is generated to trigger the spark plug to trip, which not only maximizes the engine's output but also helps improve fuel efficiency and pollution.

Inspection steps:

Resistance measurement:

- Remove the primary coil connector from the ignition coil (red/yellow & black/yellow).
- Use the Ohm range of the "multimeter" to check the ignition coil resistance value.

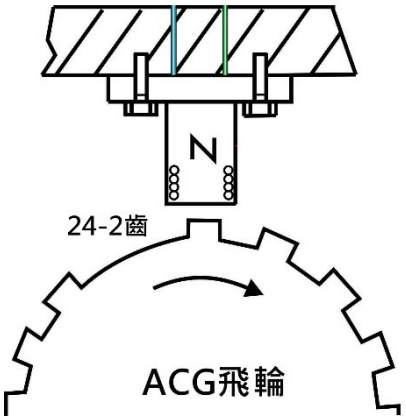
Detection and determination

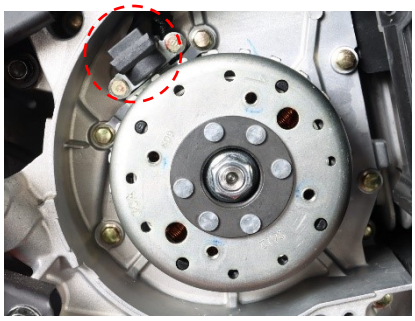
- Ignition coil primary circuit: **2.8 Ω ± 10% (20 ° C)**
- Ignition coil secondary circuit (with cover) : **14.8K Ω ± 20% (20 ° C)**
-

Anomalous phenomena and ways of handling:

1. The internal coil of the ignition coil is broken or damaged, or there is poor contact at the connector.
2. If the ignition coil is abnormal and does not ignite, it is recommended to replace the ignition coil.

Crankshaft speed sensor





Resistance value measurement

Function description:

- No external power supply is required. There are two plugs with separate signal pins.
- It is mainly composed of a variable magnetoresistance induction coil.
- The distance between the sensor and the flywheel should be 0.7 to 1.1mm.
- The magnetic sensor uses the changes in the magnetic field of the rotating disc (24-2 teeth) on the flywheel cutting the induction coil and the induced voltage signal generated by the sensor for the ECU to determine and calculate the engine speed and crankshaft position at that time, and to produce the most appropriate fuel injection and ignition timing control.

Detection steps:

Resistance measurement:

- Remove the joint of the crankshaft speed sensor (blue/yellow & green/white).
- Use the Ohm range of the "multimeter" to check the resistance value of the crankshaft speed sensor.

Detection determination:

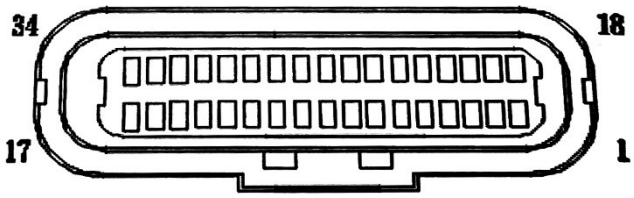
- **Resistance value: 120Ω ±20%(20°C)**

Anomalous phenomena and ways of handling:

1. The sensor's internal coil is broken or damaged, or the connector has poor contact.
2. Check for abnormalities in the main wiring.
3. If the sensor coil is abnormal, it is recommended to replace it with a new coil group.

ECU connector configuration

ECU pin diagram (ECU side)



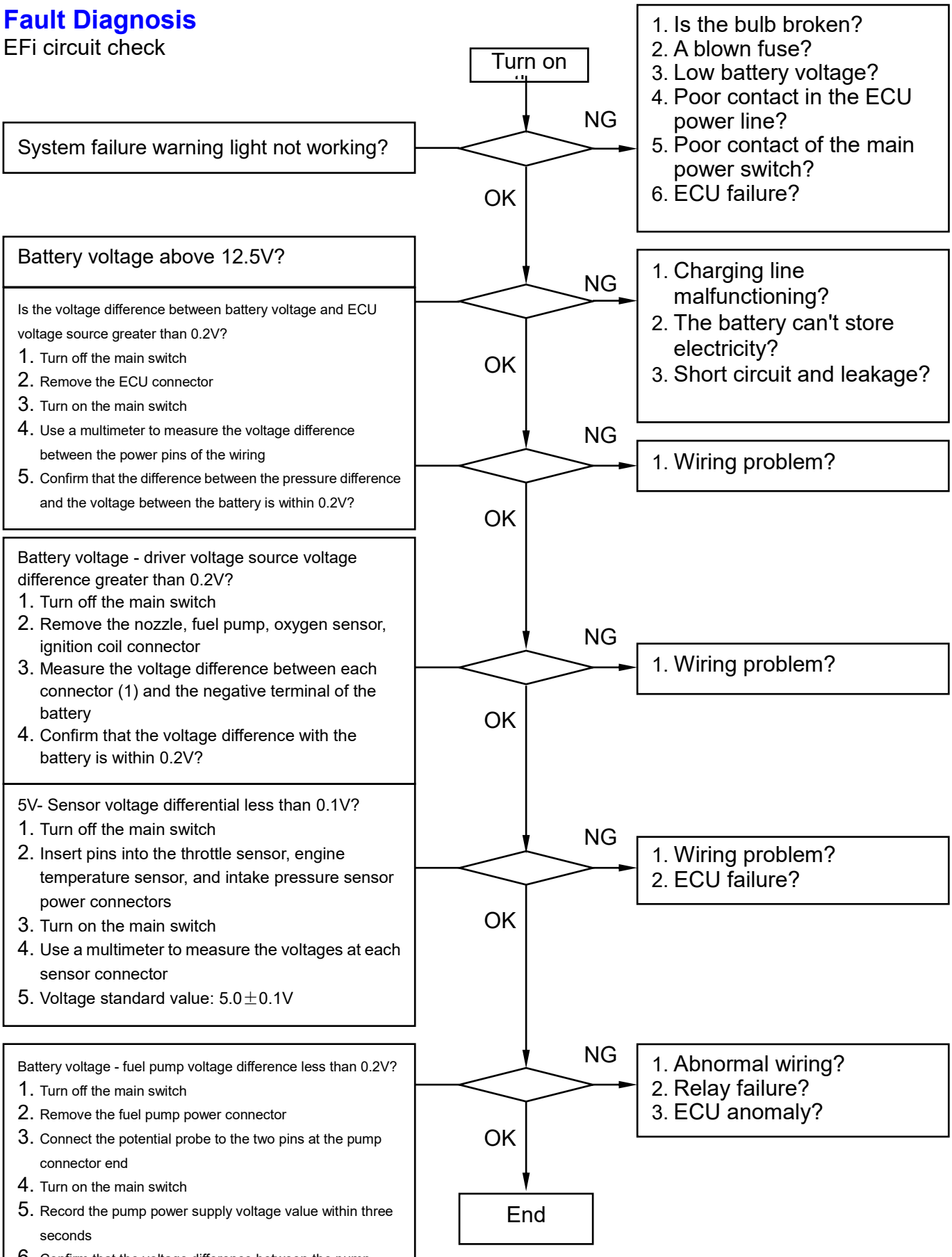
Power supplies	6
Sensors inputs	6
Logic inputs	4
Differential inputs	2
Power outputs	12
Communication	2
cConfigurable IO	2

X34	X33	X32	X31	X30	X29	X28	X27	X26
Vehicle Speed	-	SENSOR supply	Kill Sw	VBD	CAN_L	SAV	(H)EGO SENS_UP	SENSOR GROUND
FAN relay	-	RPM OUT	-	FSU/FP relay	CAN_H	VBK	(H)EGO SENS_DN	-
X17	X16	X15	X14	X13	X12	X11	X10	X9

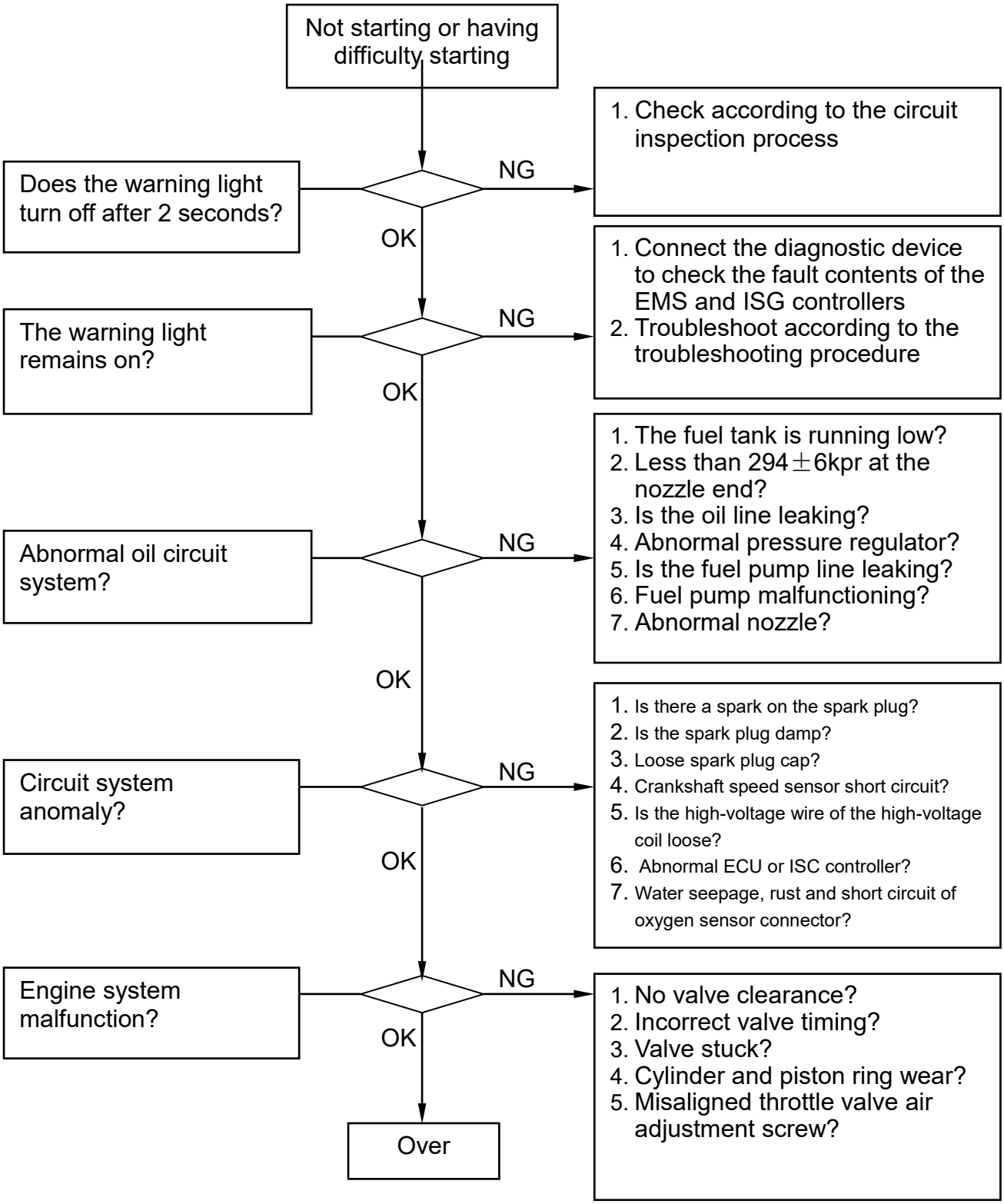
X25	X24	X23	X22	X21	X20	X19	X18
VR-	start relay	CHTS	CPV	SSW	IGNITION COIL	MIL	PGND2
VR+	head lamp relay	START SW	Injector PI	-	HEGO HEAT_UP	-	PGND1
X8	X7	X6	X5	X4	X3	X2	X1

Fault Diagnosis

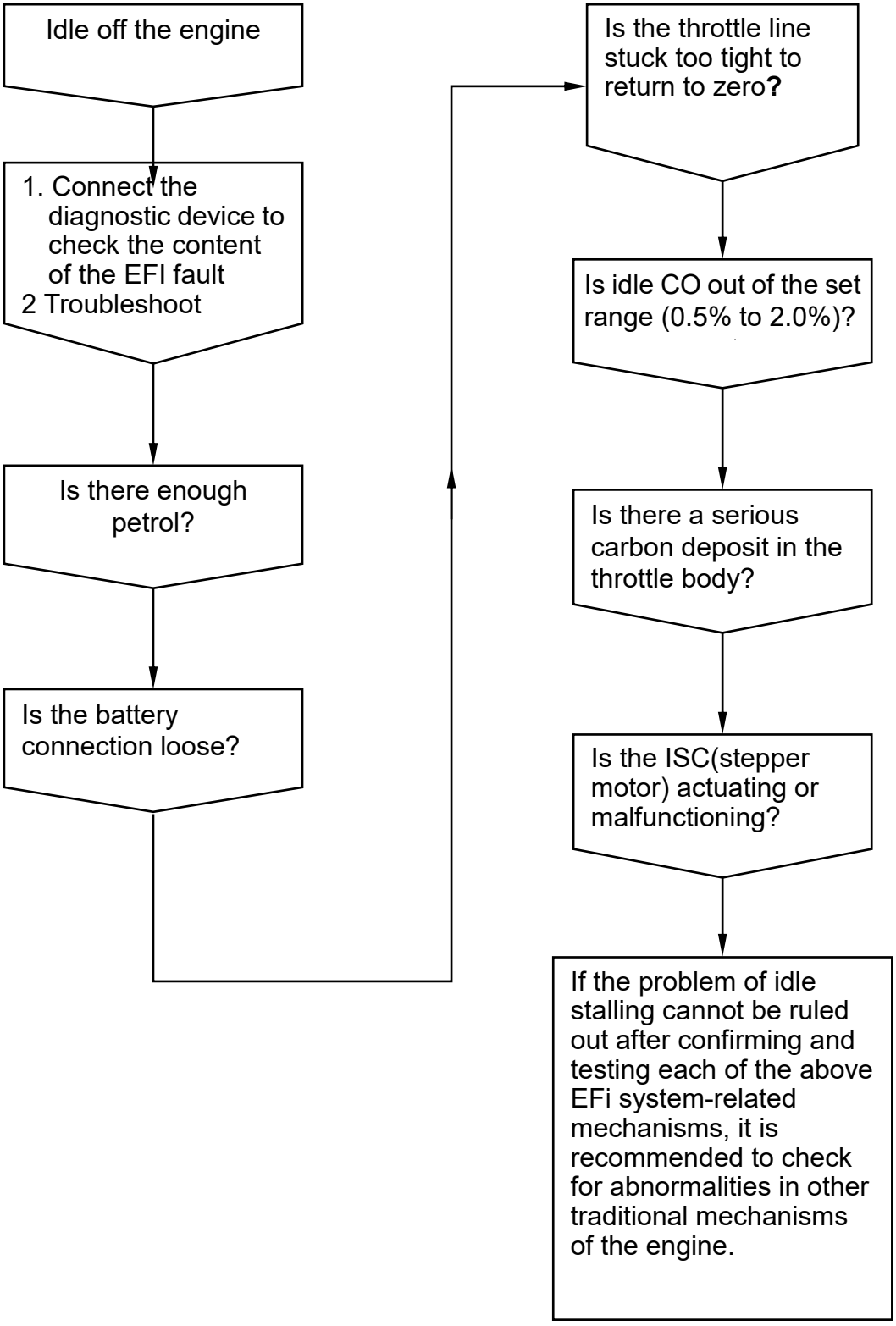
EFi circuit check



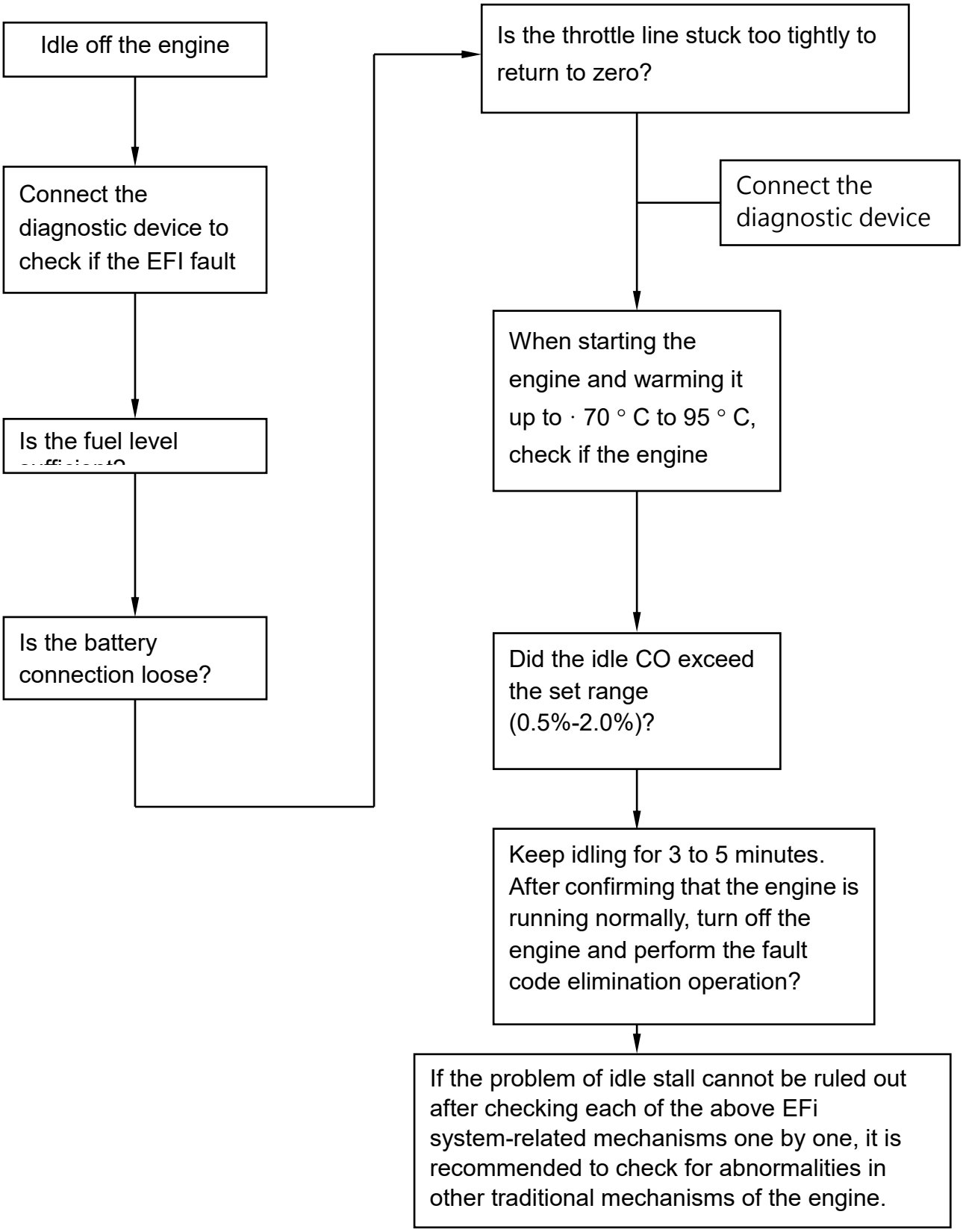
Check for engine not starting or difficulty starting



Idle stall diagnosis

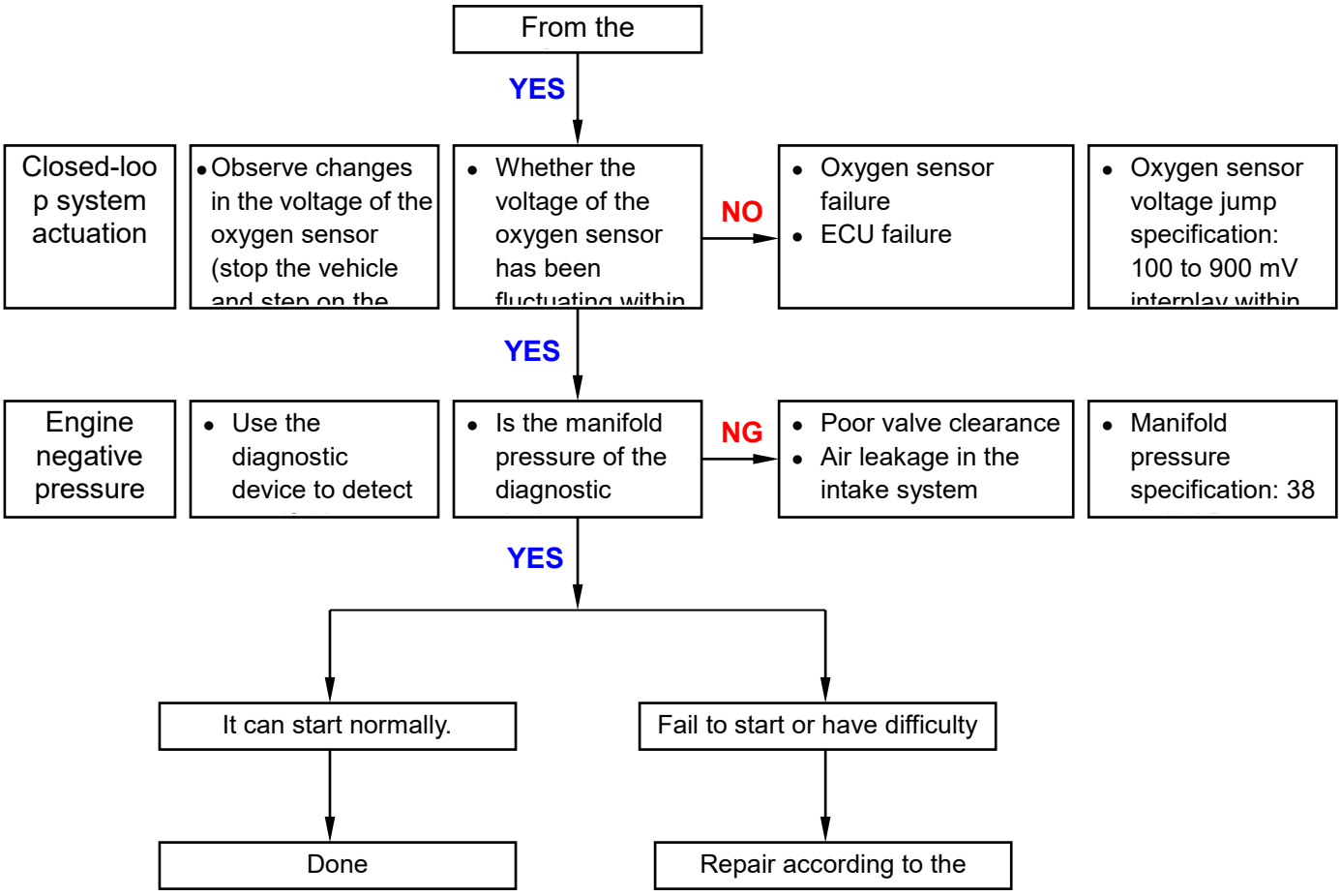


The CO correction is abnormal
For systems equipped with oxygen sensors, in principle, the CO value may not need to be adjusted. If the CO value deviates from the normal range, please first confirm whether the oxygen sensor and other mechanisms are abnormal.



Comprehensive fault diagnosis procedure

Check, adjust Project	Check the repair items and steps	Fault Condition determination		Cause of failure	System parts Specification Requirements
Battery voltage	• Measure the battery voltage directly using a multimeter • Use a diagnostic	• Is the battery voltage above 10V? • Does the diagnostic	NO	• The battery is dead • The battery connector is loose • Wiring harness open circuit	• The diagnostic device indicates that the voltage must be above 10V
		YES			
Diagnostic Device Fault code check	• Use the diagnostic device to detect existing fault codes • Eliminate the fault code before starting the	• Does the diagnostic device show a fault code? • Does the fault code show up again after being cleared?	YES	• Throttle position sensor failure • Engine temperature sensor failure • Crankshaft position sensor failure • Manifold pressure sensor failure	• For the detection methods and specifications of each sensor, please refer to the repair manual
		NO			
Fuel level and fuel pressure	• Remove the injector fixing bolts but do not remove the tubing (the nozzle and nozzle cap must be held tightly by hand and there must be no oil leakage). • Start the engine • Check if the fuel	• Is the fuel injector spraying fuel? • Is the spray Angle normal? • Is the fuel pressure sufficient?	NO	• The fuel tank is running low. • Fuel injector malfunction • Fuel relay failure • Fuel pump failure • ECU failure • The fuel pump filter screen is clogged	• Fuel pressure specification: 3 seconds after the main switch is turned on but the engine is not started → more than 250kPa At idle → 294±6kPa • Injector resistance specification:
		YES			
Ignition status	• Remove the spark plug from the cylinder head, but the high-voltage coil	• Check if the spark plug ignites? • Check if the spark intensity of	NO	• Spark plug failure • Toppling sensor failure • ECU failure • Ignition coil failure	• Spark plug specification: NGK-LR7Dx2
		YES			
		Next page			


From the
YES
Closed-loop system actuation
• Observe changes in the voltage of the oxygen sensor (stop the vehicle and step on the
• Whether the voltage of the oxygen sensor has been fluctuating within
NO
• Oxygen sensor failure
• ECU failure
• Oxygen sensor voltage jump specification: 100 to 900 mV interplay within
YES
Engine negative pressure
• Use the diagnostic device to detect
• Is the manifold pressure of the diagnostic
NG
• Poor valve clearance
• Air leakage in the intake system
• Manifold pressure specification: 38
YES
It can start normally.
Fail to start or have difficulty
Done
Repair according to the

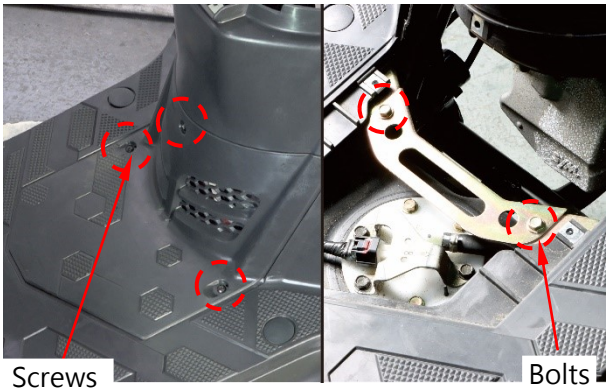
Disassemble the fuel pump

Fuel pump disassembly

Disassembly:

Remove the lower central guard cover (screw ×3).

Remove the foot pedal guard plate (bolt ×2).



Remove the fuel pump power cord connector.

Specialized tools: EFI pipe wrench set

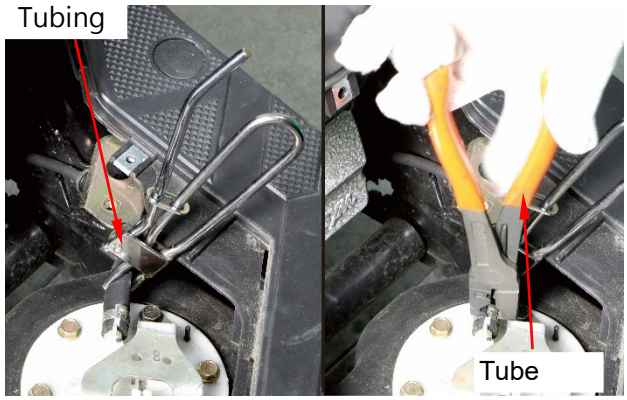
Use tubing clamps to hold the tubing to prevent gasoline leakage.

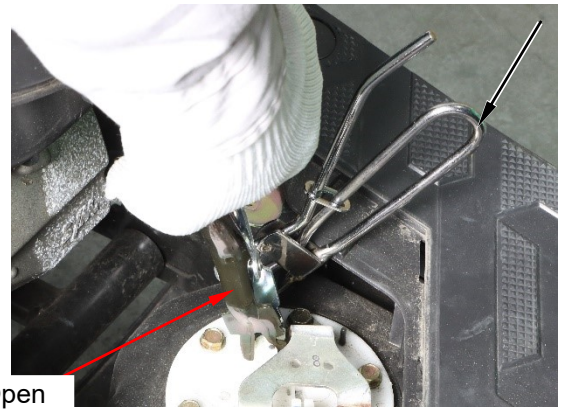
Use the tube bundle clamp to loosen the tubing bundle.

⚠ Note

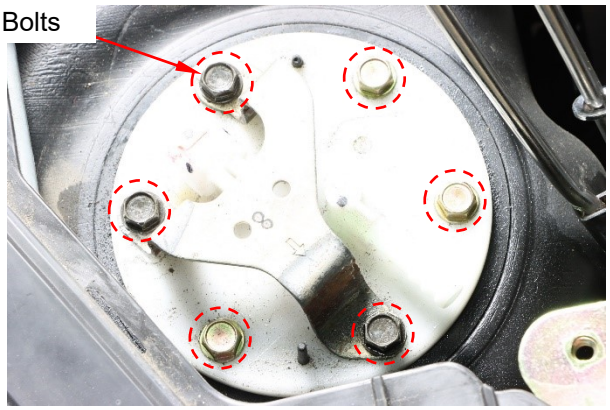
- The tubing tube bundle must be replaced with a new one after disassembly.

Use tubing splitters to remove the tubing.

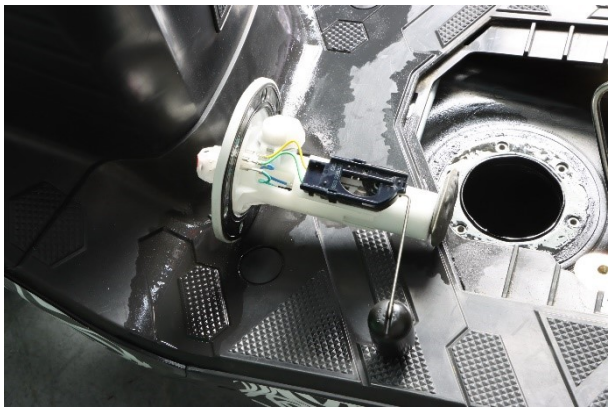




Remove the fuel pump fixing bolts (bolts ×6).



Remove the fuel pump.



Installation:
Install in the reverse order of disassembly.
After assembly, connect the fuel pressure gauge and measure whether the fuel pressure is at the reference value of 294±6kPa.

How to use the tube bundle clamp
Loosen

⚠ Note

- The tubing tube bundle must be replaced with a new one after disassembly.

Install

Check the oil level gauge

Remove the fuel pump.

⚠ Note

- Do not damage or bend the float arm when removing it.

Connect the fuel gauge wiring connector to the main wiring.

Turn the main switch to the "ON" position.

Move the float arm up and down to check if the stopwatch fuel gauge pointer is in the correct position.

Float arm position	Instrument pointer position
Up (full)	F(full)
Down (empty)	E(blank)

Use a multimeter and set it to the "Ω" range.

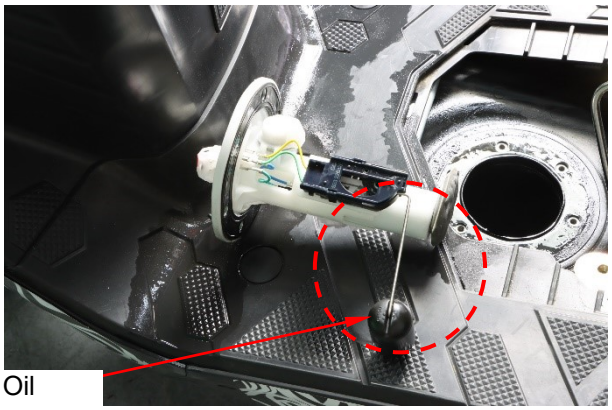
When the float arm is in full (F) and empty (E) positions, the resistance values are as follows:

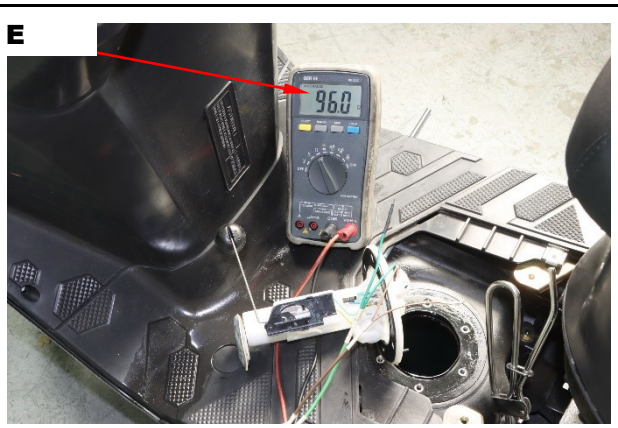
Measure the resistance value.

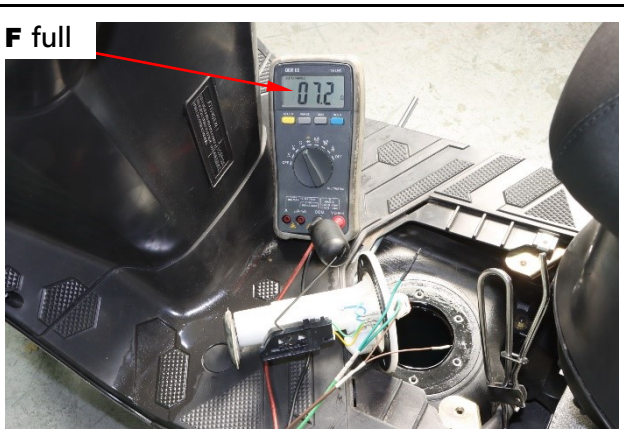
Floating arm position	Resistance value
E (empty)	90 + 10 Ω 0 Ω
F (full)	10 + 0 6.0 Ω

Installation

Install in the reverse order of disassembly.





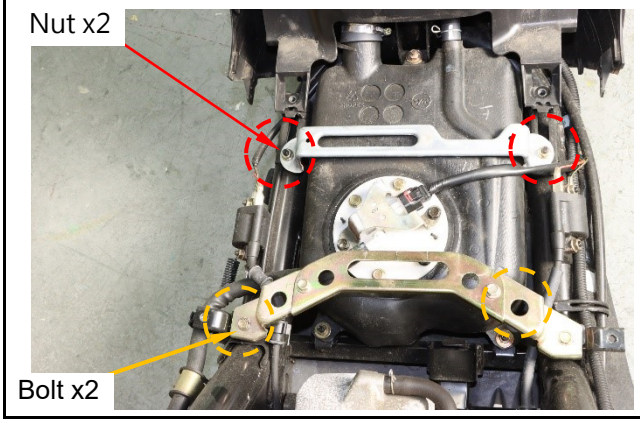


Disassembly of the fuel tank

Remove the front baffle, left/right cover, front spoiler, seat cushion, trunk, rear frame, body cover, footrest.

Remove the footrest front/rear panel mounting bolts and nuts (2 bolts and 2 nuts each).

Unplug the fuel pump power plug, start the vehicle until it is turned off, and release the fuel pressure.

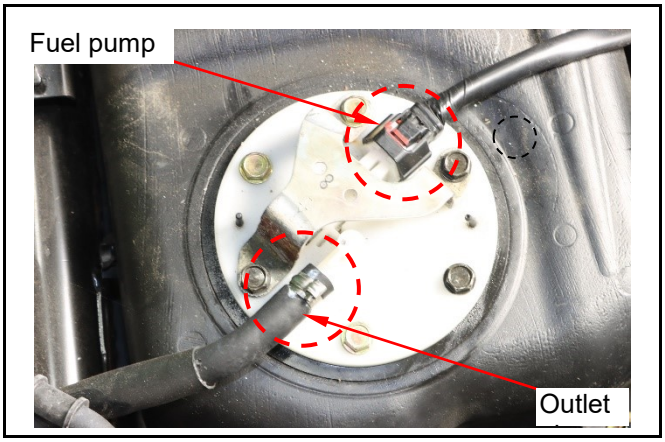


Remove the fuel pump socket.

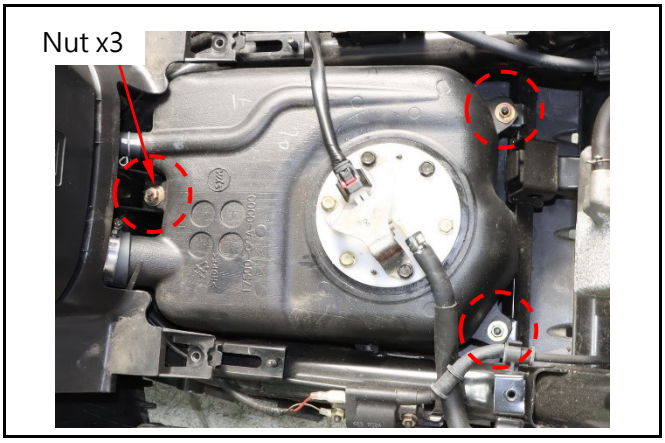
Loosen the fuel tube bundle.

Use a tubing splitter to remove the tubing.

Specialized tool: EFI pipe wrench set



Remove the rear fixing nut (nut x3) from the fuel tank.



Remove the fuel tube bundle ring and the vent tube bundle clamp.

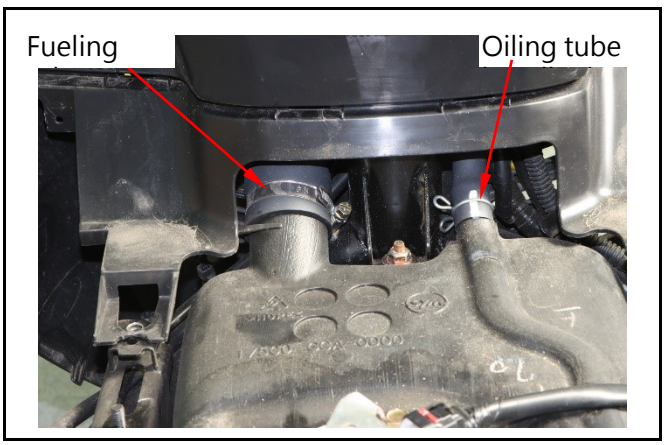
Remove the fuel tank.

Installation

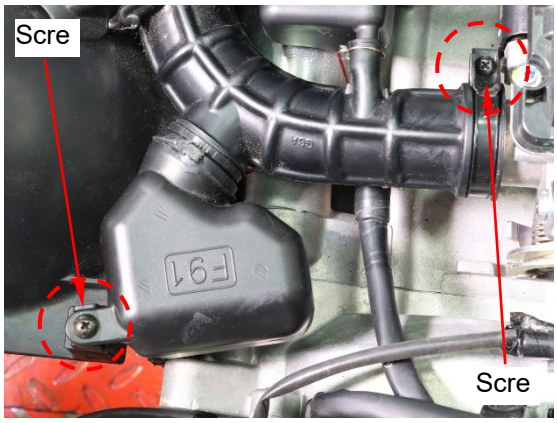
Install in the reverse order of disassembly.

⚠ Attention

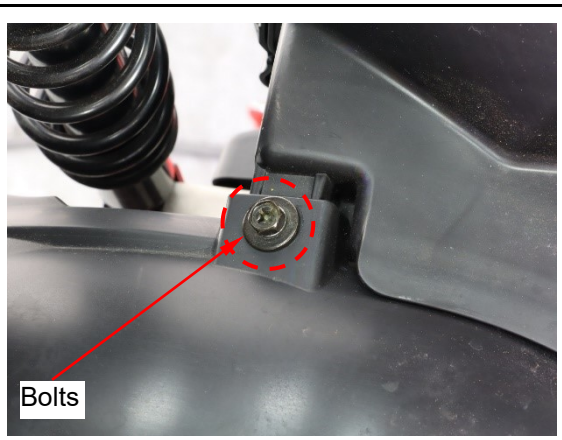
- After assembly is complete, connect the fuel pressure gauge to measure if the fuel pressure is at the reference value of 294 ±6kPa.



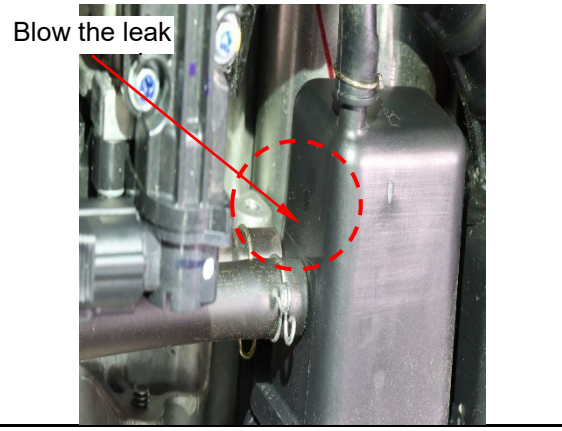
Disassembly
Remove the seat cushion and suitcase assembly.
Loosen the intake tube bundle screws.
Remove the air chamber screw (screw ×1).



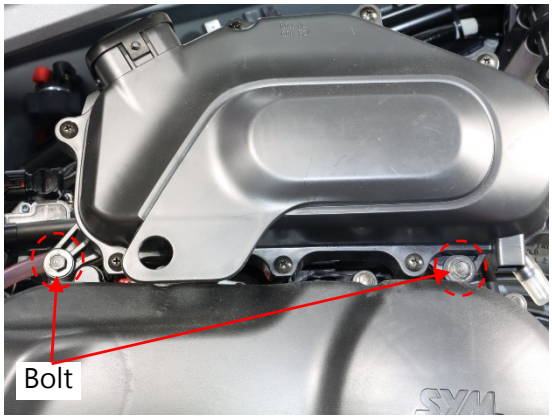
Remove the air filter and rear soil drain fixing bolts (bolt ×1).



Remove the oil vapor recovery pipe.



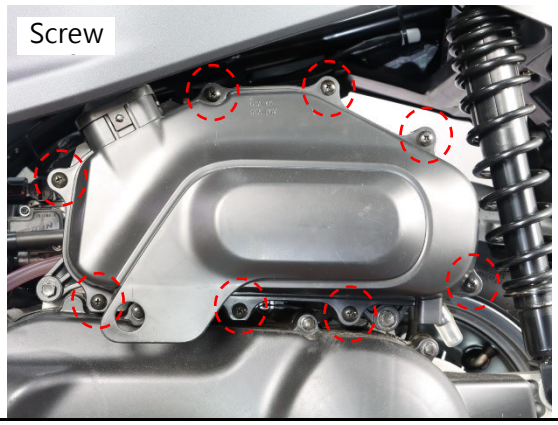
Remove the air filter body fixing bolts (bolts ×2).
Remove the air filter assembly.



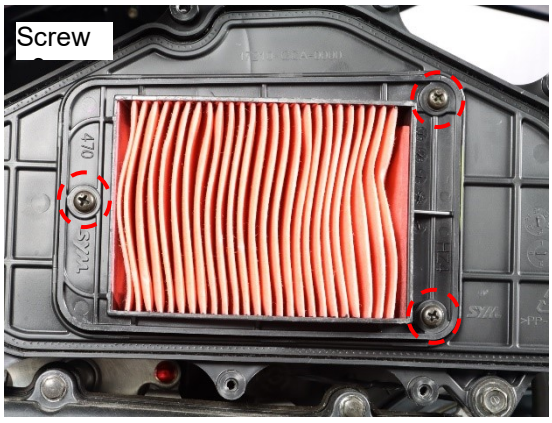
Installation

Install in the reverse order of disassembly.

Air filter check
Remove the air filter box cover (screw ×8).



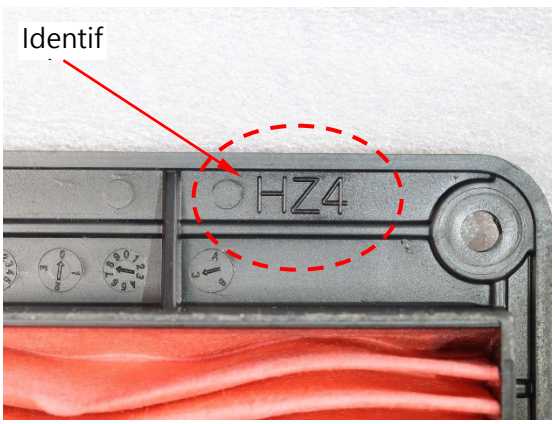
Remove the air filter cartridge (screw ×3).



Check if the filter element is dirty or damaged. Replace the filter with a new one if it is overly dirty or damaged.

⚠ Note

- The air filter is made of paper and must not be wet or cleaned, otherwise it will affect engine performance.
- If not fully loaded, dust will be directly sucked into the cylinder, causing wear and reduced horsepower and affecting engine life.



⚠ Note

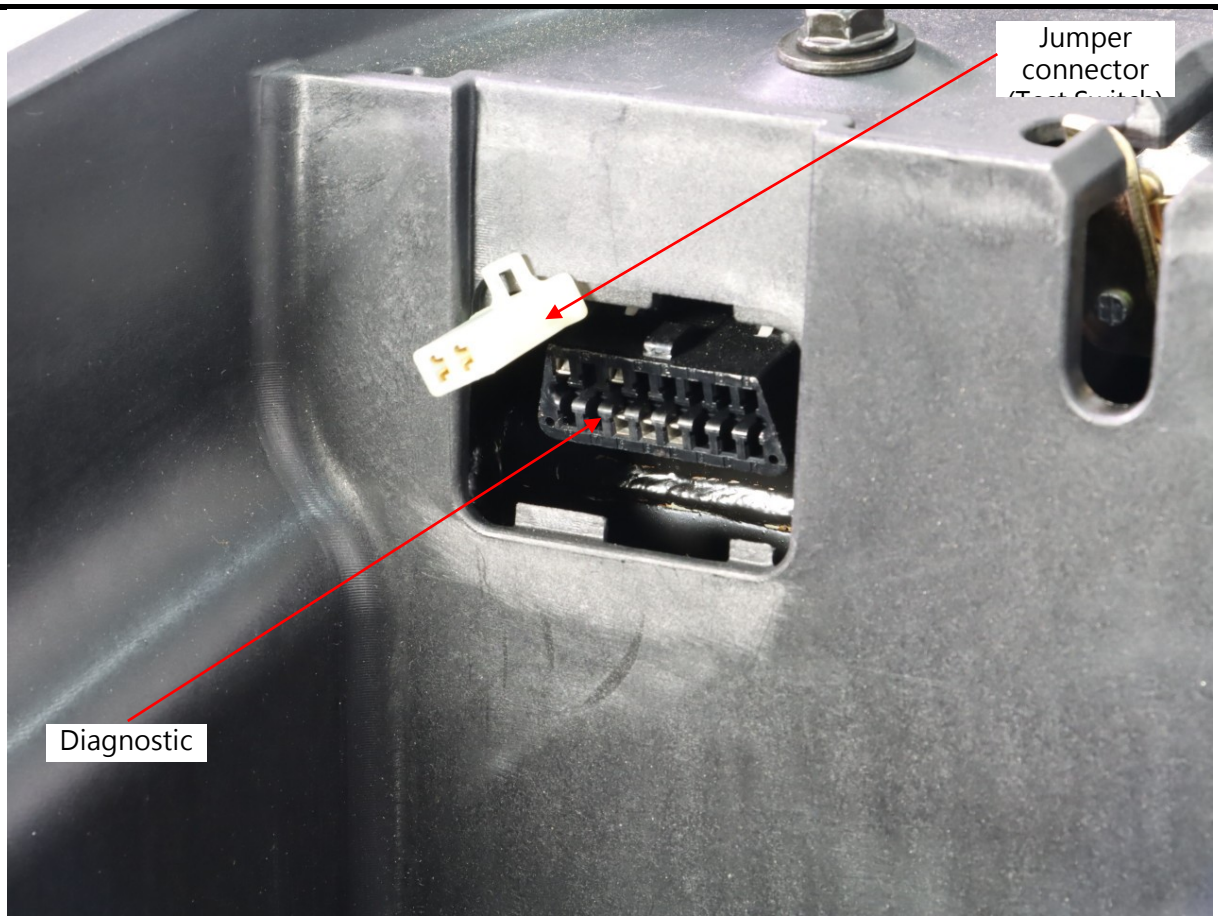
- When replacing the air filter cartridge, make sure the new parts are correct.

Description of troubleshooting methods

The fault check light on the dashboard lights up to inform the driver that a repair check is required when an error signal occurs in the vehicle's injection system, causing the engine to run abnormally or fail to start.
During maintenance, a diagnostic tool can be used for fault diagnosis (see how to use the diagnostic tool) for repair.
If the fault has been eliminated or the repair is completed, the inspection light will go out, but the ECU will record the fault code, so the fault code needs to be cleared. If there is a fault, this system has two ways to eliminate the fault, namely diagnostic clearing and manual clearing.

Diagnostic maintenance:
Connect the diagnostic device to the diagnostic device connector on the vehicle and test it according to the diagnostic device usage method. If it is a fault in the injection system or injection parts and components, check and test the components and replace the parts and repair them according to the fault code message displayed on the diagnostic device. After the repair is completed, the fault code must be cleared (for detailed steps, please refer to the diagnostic operation instructions), otherwise the fault code will be permanently stored in the ECU.

Manual inspection:
Use a jumper (wire or paper clip, etc.) to ground the jumper joint Test Switch. At this point, the inspection light on the dashboard will flash, indicating an abnormality in the injection system or part, but when there is no diagnostic tool available for inspection, The cause of the fault can be indicated by whether the inspection light flashes for a long time or a short time (for fault information, see the flashing light fault code comparison table).

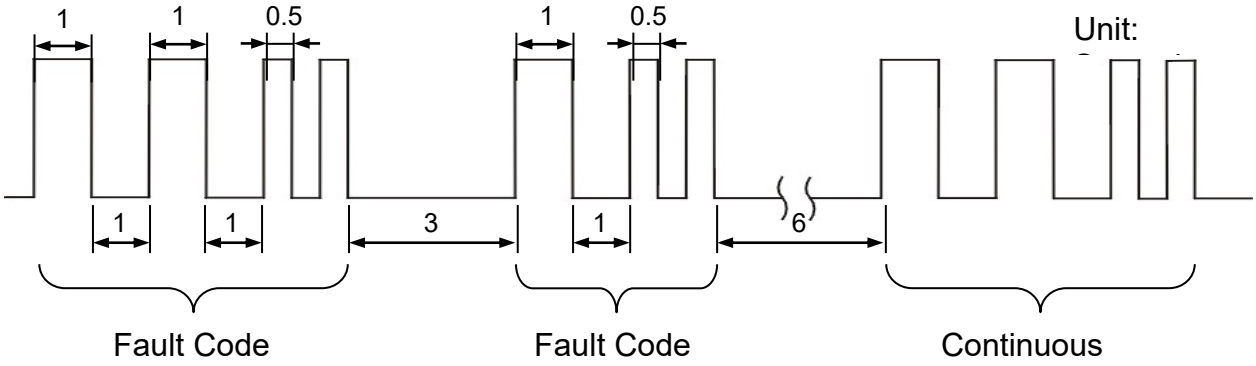


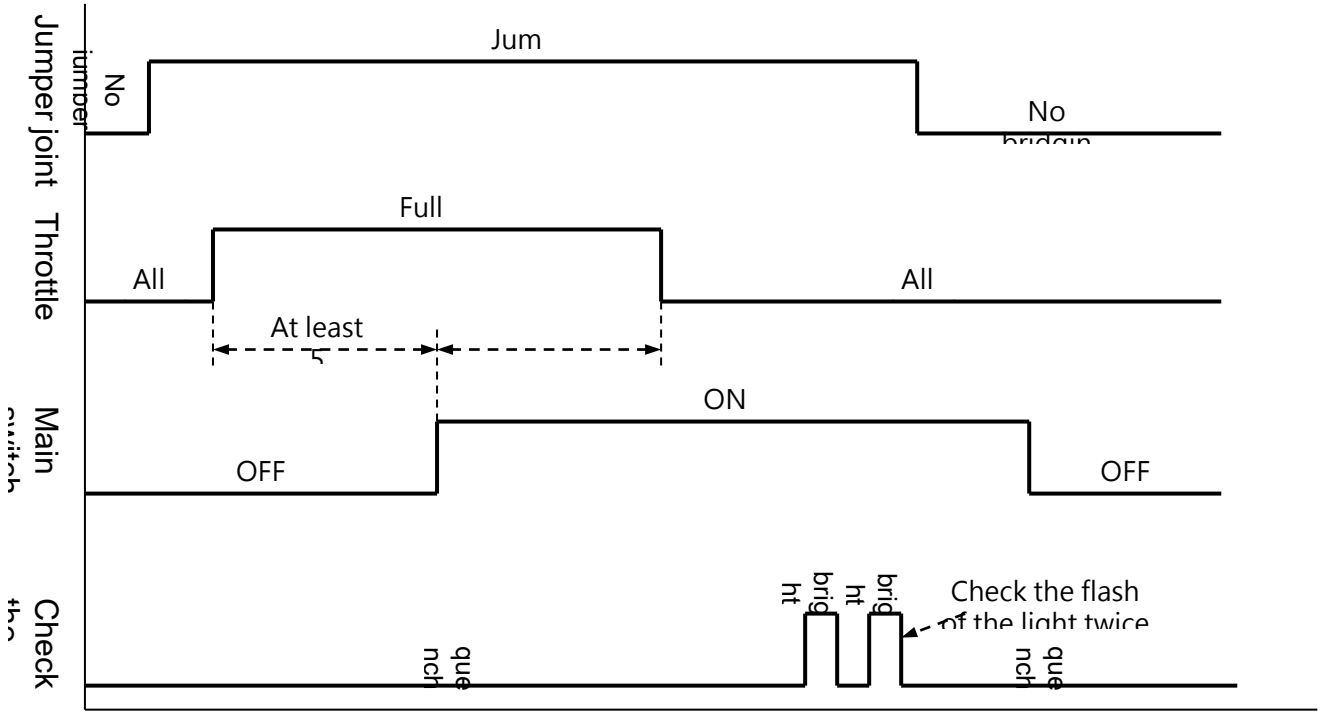
Diagnostic connector and jumper connector location diagram

Check the lamp fault code discrimination method

Check the flashing pattern of the faulty light:

If there is a problem and there is no diagnostic device to detect it, you can connect the jumper connector, read the CHK light flashing signal from the on-board speedometer, and then use the processing priority light on the diagnostic device action information comparison table to alert you that the vehicle has some warning signs, or use the FLASH CODE to determine what kind of fault it is and eliminate it.





Vehicle fault checklist

Inspection items / Undesirable phenomena		Comprehensive vehicle testing project							Individual parts		
		Power supply Voltage	Fuel Pressure	Ignition Status	Engine Negative pressure	Fuel injection volume	Contaminate the closed-loop control system	Diagnostic fault code detection	Electronic Control Unit (ECU)	Throttle valve open Degree sensor	Engine temperature Perceptron
Primability	Unable to start	○	○	○	○	○		○	○		
	Hard to start	○	○		○			○		○	○
Idle	No idle			○	○	○		○		○	○
	Unstable idle					○	○	○	○	○	
	RPM NG							○	○		
	Pollution (CO) NG		○			○	○	○	○		
Acceleration	Slow acceleration		○	○	○	○		○	○	○	○
	Slow and weak acceleration		○	○	○	○		○	○	○	○
Stalling	Turn off the engine at idle				○			○			
	Accelerate off							○	○		

Related parts						
	Fuel pump	High pressure Coil	Intake air Manifold	Fuel injector	Oxygen-containing Perceptron	
Power relay	Fuel Pressure regulating valve	Spark plug	Cylinder head	Fuel pump		
	Fuel Relay		Intake pressure sensor	Fuel Pressure regulating valve		
Main switch	Gasoline Filter screen					
Battery						

Note: 1. Comprehensive vehicle test items shall be carried out in accordance with the "Comprehensive Maintenance List".

2. For individual parts, follow the instructions for inspection of major parts.

Comprehensive Maintenance Checklist

NO	Maintenance project	Inspection steps	Test items	Criteria for judgment	Cause of failure
1	Power supply and voltage	• Measure the battery voltage directly using a multimeter • Use a diagnostic device to detect the battery voltage	• Battery voltage	• Battery voltage = 10V or more	• The battery is dead • The battery connector is loose • Wiring harness open circuit • The ECU connector is not properly connected
2	Fuel pressure	• Install the fuel pressure gauge between the pressure regulator and the nozzle • Turn on the main switch but do not start the engine • Check the fuel pressure • Start the engine (idle) • Check for changes in fuel pressure • Turn the throttle several times • Check again for changes in fuel pressure	• The fuel pressure when the main switch is turned on but the engine is not running • Oil pressure at idle • The change in oil pressure when the throttle is turned	• Open the main switch but do not start: Oil pressure = 250kPa (stable value) • At idle speed Oil pressure = 294±6kPa(up and down runout condition) • The moment the throttle is turned: Oil pressure = 294±6kPa(slight jolts)	• Insufficient fuel in the tank • Fuel relay failure • Fuel pump failure • Fuel injector malfunction • ECU failure
3	Ignition status	• Remove the spark plug from the cylinder head, but the high-voltage coil remains attached • Start the engine or use the diagnostic output detection function to check the spark plug ignition status	• Spark plug specifications • Whether the spark plug ignites • Check if the spark intensity of the spark plug is normal	• Specification: NGK-LR7Dx2 • Ignition condition: The same as the traditional engine determination method	• Spark plug failure • ECU pins 32 and 48 are faulty • Ignition coil failure • Crankshaft position sensor failure
4	Engine negative pressure	• Use the diagnostic device to detect manifold pressure	• The manifold pressure of the diagnostic device	• Manifold pressure: =38 to 40kPa	• Poor valve clearance • Air leakage in the intake system
5	Fuel injection volume	• Remove the fuel injector cap fixing bolt, but do not remove the wiring harness plug and tubing • Turn on the main switch but do not start the engine • Check if the fuel injectors are leaking gasoline • Start the engine again or use the detection output function of the diagnostic device	• When the main switch is turned on but the engine is not running, the nozzle leaks fuel • The state of fuel injection when starting	• The fuel injector must not leak gasoline when the engine is not running • When starting, the fuel injection state must be fan-shaped	• Fuel relay failure • Fuel pump failure • Fuel injector malfunction • ECU failure

		• Check whether the fuel injector is spraying fuel and the condition of the fuel spraying			
6	Contamination of closed-loop control systems	• Use the diagnostic device to observe changes in the voltage of the oxygen sensor	• The changes in sensor voltage in a stable state (measure again after idling for 5 minutes)	• At stable idle speed: Oxygen-containing sensor voltage = 100-900 mV (showing up and down jumps)	• Oxygen sensor failure • ECU failure
7	Diagnostic fault code detection	• Use a diagnostic device to detect current fault codes or historical fault codes • Perform an elimination fault code to confirm if it can be eliminated • Start the engine again • Check if the fault code appears again	• Check if the diagnostic fault code can be eliminated • Whether the fault code will reappear after restarting	• There must be no remaining fault codes • If there are any remaining fault codes, follow the "Fault Code Checklist" for troubleshooting	• Throttle position sensor failure • Engine temperature sensor failure • Air temperature sensor failure • Manifold pressure sensor failure • Oxygen sensor failure • Crankshaft Angle sensor failure • ECU failure

Note: 1. After connecting the oil pressure gauge in series between the fuel tank and the fuel injector, turn the main switch on and off several times to stabilize the oil pressure in the fuel system.

2. The fuel injector and nozzle cap must be held tightly by hand to ensure there is no oil leakage.

fault code

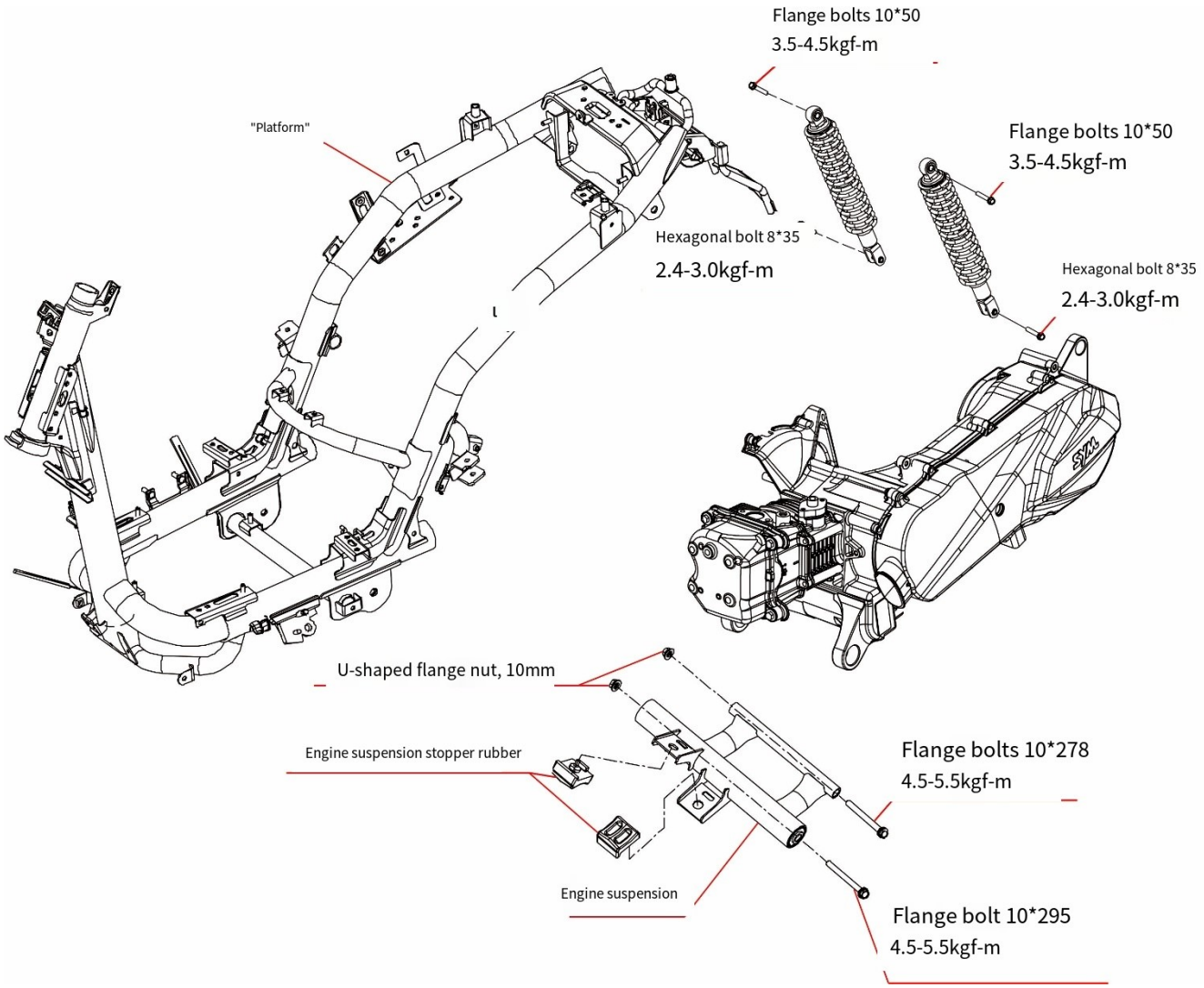
	Component	DTC	DTC Description	Monitoring Strategy
1	Engine Coolant Temperature sensor	P0117	Engine Coolant Temperature Circuit Low Input	Signal shorted to ground
		P0118	Engine Coolant Temperature Circuit High Input	Signal shorted to Battery or circuit open
		P0116	Engine coolant temperature sensor range problem	Tco out of range
		P0116	Engine coolant temperature sensor stuck problem	Stuck Tco Signal
2	Intake Air Temperature sensor	P0112	Intake Air Temperature Circuit Low Input	Signal shorted to ground
		P0113	Intake Air Temperature Circuit High Input	Signal shorted to Battery or circuit open
		P0111	Intake air temperature sensor range problem	TIA out of range
		P0111	Intake air temperature sensor performance problem	Stuck TIA Signal
3	Manifold Absolute Pressure sensor	P0107	Manifold absolute pressure sensor Circuit Low Input	Signal shorted to ground
		P0108	Manifold absolute pressure sensor High Input	Signal shorted to Battery or ope
		P0106	Manifold absolute pressure sensor range problem	MAP Signal out of range
		P0106	Manifold absolute pressure sensor stuck problem	Stuck MAP Signal
4	O2 Sensor Signals (Upstream) (in front of metal catalyst)	P0131	O2 Sensor Signals circuit low Voltage	Signal shorted to ground
		P0132	O2 Sensor Signals circuit High Voltage	Signal shorted to Battery
		P0134	O2 Sensor Signals circuit open	Signal open circuit
		P2A00	O2 Sensor Signals out problem	Signal out of range

		P0133	02 Sensor Circuit Slow Response	Signal Plausibility
5	02 Sensor Heater System (Upstream) (in front of metal catalyst)	P0031	02 sensor heater circuit lower	Signal shorted to ground
		P0032	02 sensor heater circuit high	Signal shorted to Battery
		P0131	02 sensor heater circuit open	Signal open circuit
		P0135	02 Sensor Heater Circuit Malfunction	02 sensor heater Plausibility
6	Throttle Position Sensor	P0122	Throrrle position sensor circuit low or circuit open	Signal shorted to ground/ circuit open
		P0123	Throrrle position sensor circuit high	Signal shorted to Battery
7	Fuel Injector	P0261	Fuel Injector circuit low	Signal shorted to battery or open
		P0262	Fuel Injector circuit High	Signal shorted to ground
8	Idle Air Control system	P0508	Step motor circuit lower or circuit open	Signal shorted to ground or open
		P0509	Step motor circuit high	Signal shorted to Battery
		P0519	Step motor circuit Plausibility problem	Signal Plausibility
9	Ignition Coil Control System	P2300	Primary coil low/ no current	Signal shorted to ground or open
		P2301	Primary coil overcurrent	Signal shorted to Battery
10	CrankShaft Position Sensor	P0335	CrankShaft Position Sensorr circuit open	Present crank error
11	Fuel Pump	P0231	Ssignal shorted to groung or open	Signal shorted to ground or open
		P0232	Steep motor circuit high	Signal shorted to Battery
12	Engine Over Temperature	P0217	Engine Overtemp Condition	None
13	Battery	P0562	System voltage low	None

		P0563	System voltage high	None
14	Mis Fire A diagnosis	P0314	Cylinder Misfire Detected	Mis fire detected
15	Mis Fire B diagnosis	P0314	Single cylinder misfire	Mis fire detected
16	Vehicle Speed Sensor	P0501	Vehicle Speed Sensor signal Plausibility problem	Signal Plausibility
17	O2 Sensor Signals (Downstream) (behind metal catalyst)	P0143	O2 Sensor Signals circuit low Voltage	Signal shorted to ground
		P0144	O2 Sensor Signals circuit High Voltage	Signal shorted to Battery
		P0172	O2 Sensor Signals out problem	Signal out of range
		P0171		
		P0145	O2 Sensor Circuit Slow Response	Signal Plausibility
18	O2 Sensor Heater System (Downstream) (behind metal catalyst)	P0043	O2 sensor heater circuit lower	Signal shorted to ground
		P0044	O2 sensor heater circuit high	Signal shorted to Battery
		P0043	O2 sensor heater circuit open	Signal open circuit
		P0141	O2 Sensor Heater Circuit Malfunction	O2 sensor heater Plausibility
19	Cata monitor diagnosis	P0420	Cata efficiency diagnosis	Cata detected by Downstream O2 Sensor

Institutional Illustration ..... 5-1 Notes on Work..... 5-2	Engine disassembly..... 5-3

Diagram of the mechanism



Notes on the assignment

General Notes

This driver's footrests are placed under the engine. Before removing the engine, a bracket or other height-adjustable fixture is required to support the frame.

The following parts can be maintained and repaired while the engine is mounted on the frame.

- Parts related to fuel injection.
- Generator and starter clutch.
- Drive discs, drive belts, clutches, drive disc assemblies.
- Final reduction mechanism.

Torque value

Engine suspension nuts (frame side) 4.5 to 5.5kgf-m

Engine suspension nuts (engine side) 4.5 to 5.5kgf-m

Rear shock absorber top joint bolt 3.5 to 4.5kgf-m

The lower end mating bolt of the rear shock absorber is 2.4 to 3.0kgf-m

Exhaust pipe front end nut 2.4 to 3.0kgf-m

The rear end bolts of the exhaust pipe are 3.2 to 3.8kgf-m

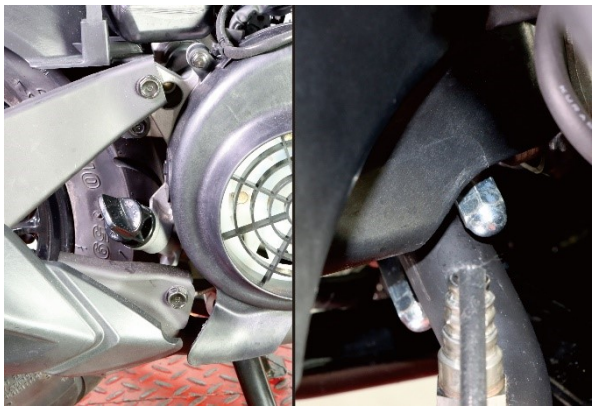
Rear brake fixture bolts 2.4 to 3.0kgf-m

Engine disassembly

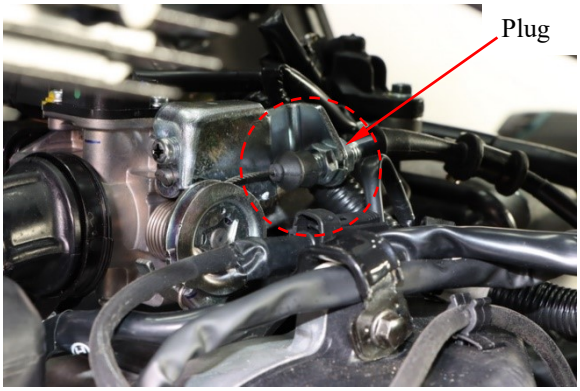
Remove the left and right covers and the central guard cover.
Remove the trunk and seat cushion, the rear frame, and the body cover.
Remove the exhaust pipe fixing nuts and bolts (nuts ×2, bolts ×2).

Torque value

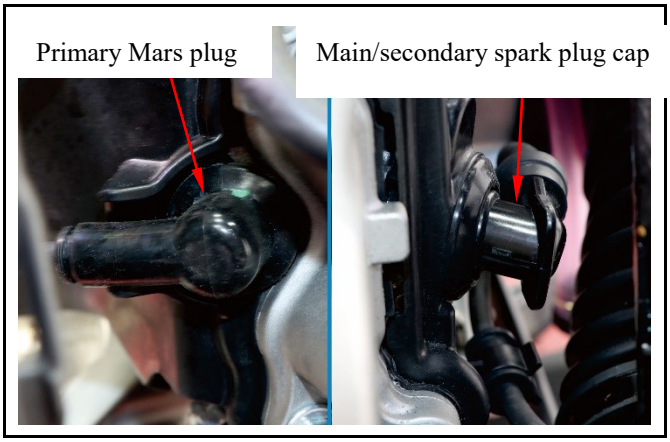
Exhaust pipe front end nut 2.4 to 3.0kgf-m



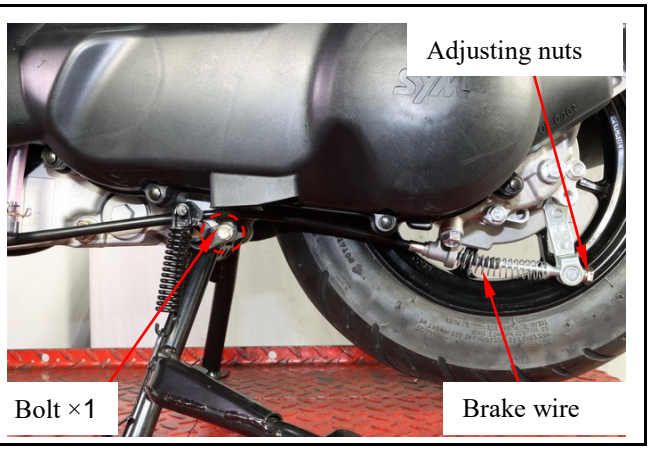
Remove the oxygen sensor plug.
Disengage the oxygen sensor wire clamp.



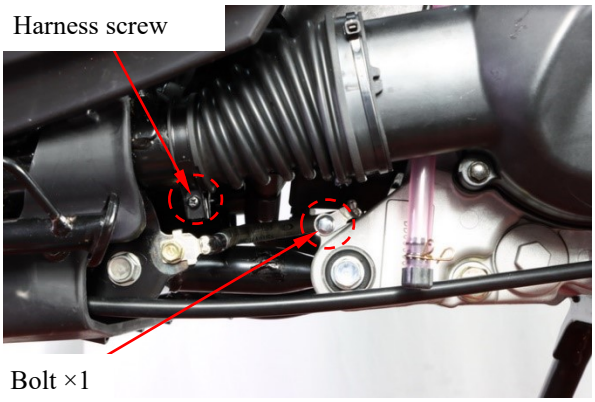
Remove the main/secondary spark plug cap.



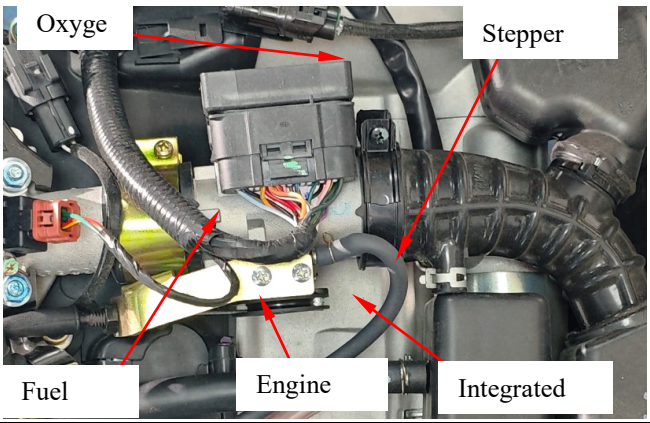
Remove the brake wire fixator fixing bolt (bolt ×1) at the main tripod.
Remove the brake wire adjustment nut and pull out the brake wire.



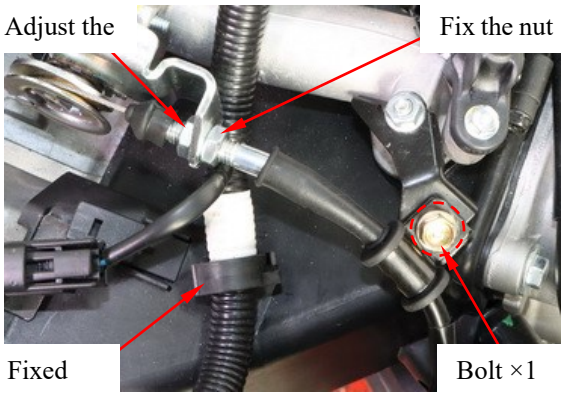
Remove the grounding wire fixing bolt (bolt x1).
Loosen the screws of the ventilation tube bundle on the left cover of the engine crankcase.



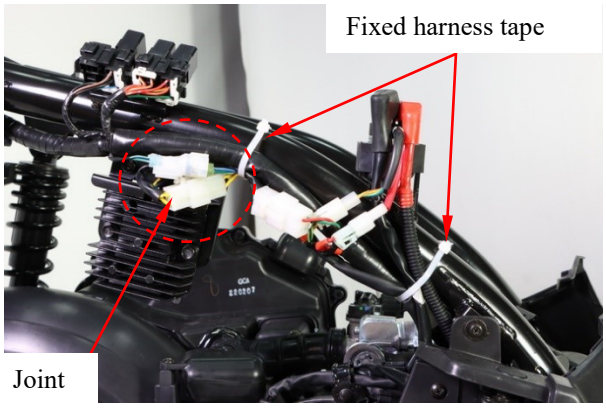
Remove the plug of the stepper motor and the integrated sensor on the throttle body.
Remove the plugs for the fuel injectors and the engine temperature sensor.
Remove the oxygen sensor socket.



Remove the fixing bolts of the oil gate line (bolt x1).
Loosen the gate line fixing and adjusting nuts.
Remove the throttle line.
Remove the axis fixing ring.

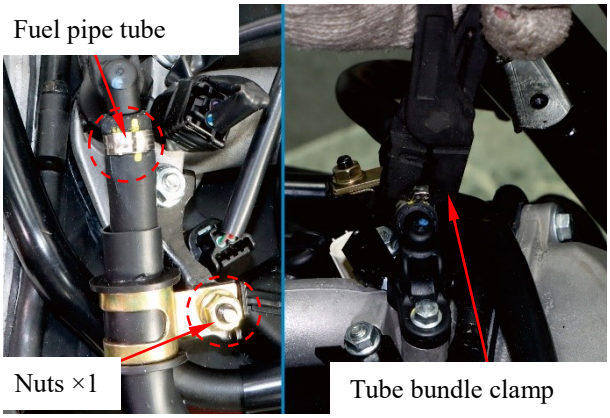


Cut off the fixed harness (harness x2).
Remove the crankshaft position sensor and generator charging cable connector.

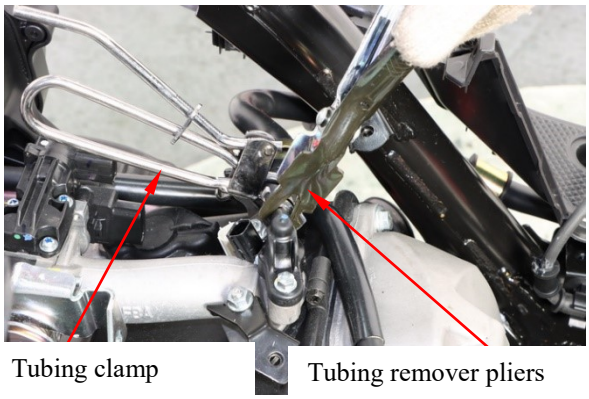


Remove the black terminal fixing nut (nut x1) of the starting relay.

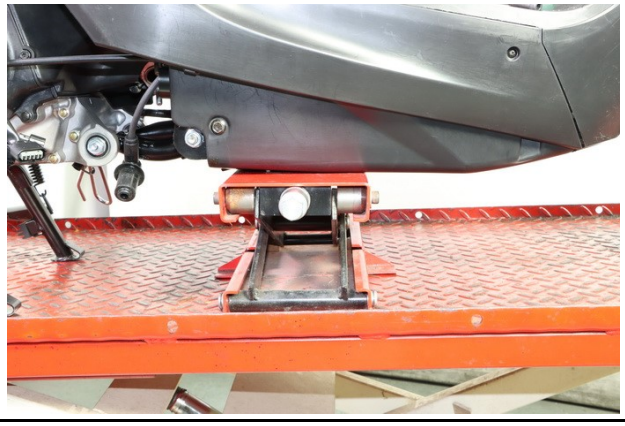
Remove the fuel pipe reholder nut (nut ×1).
Use the tube bundle clamp to remove the fuel tube bundle.
Tool Name :EFI pipe clamp kit
Tool Number :SYM-1768100



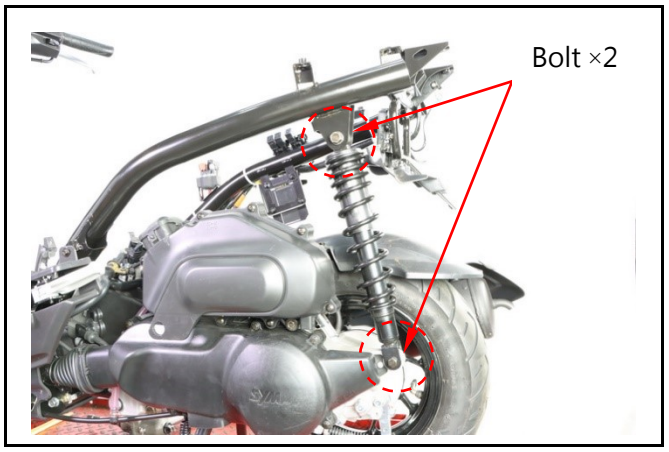
Use a tubing clamp and a tubing opener to remove the fuel line.
Specialized tools:
Tool Name :EFI pipe wrench set
Tool Number :SYM-1768100



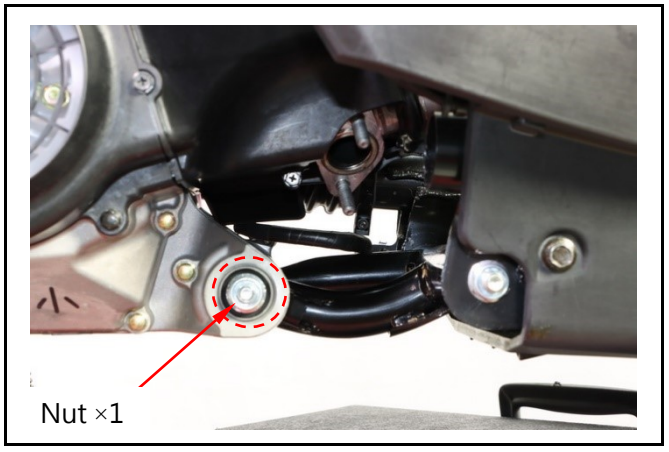
Place the engine bracket under the frame to secure the frame.



Remove the shock absorber fixing bolts (bolts ×2)
Remove the shock absorbers.
Bolt lock return torque:
Shock absorber lower end bolt: 2.4 to 3.0 kgf-m(24 to 29 N-m)
Upper shock absorber bolts: 3.5 to 4.5 kgf-m(34 to 44 N-m)



Remove the engine end engine suspension fixing nut (nut ×1)
Pull out the engine end suspension bolt.
Remove the engine backward.
Locking torque:
Engine suspension fixing nuts (engine end):
Newley standard :4.5 to 5.5kgf-m(44 to 54 N-m).



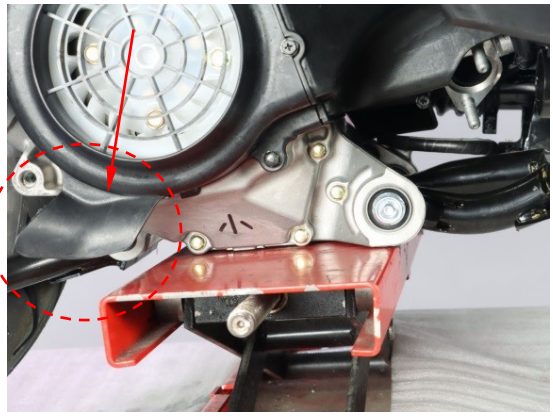
Installation

Install in the reverse order of disassembly.

⚠ Note

- When installing, pay attention to the safety of your hands and feet to avoid crushing.
- Do not bend or press the lines.
- Wires and wiring should be placed in the correct position according to the pipeline layout diagram.

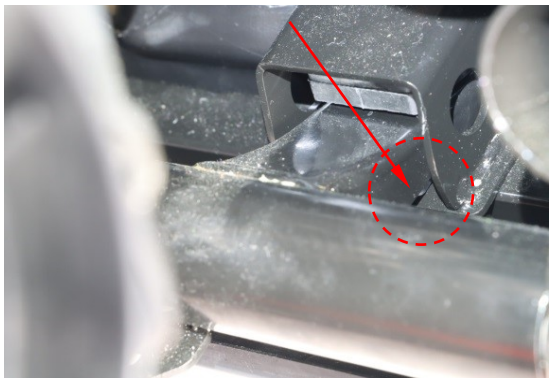
Engine suspension assembly notes:
Engine suspension assembly (single person):



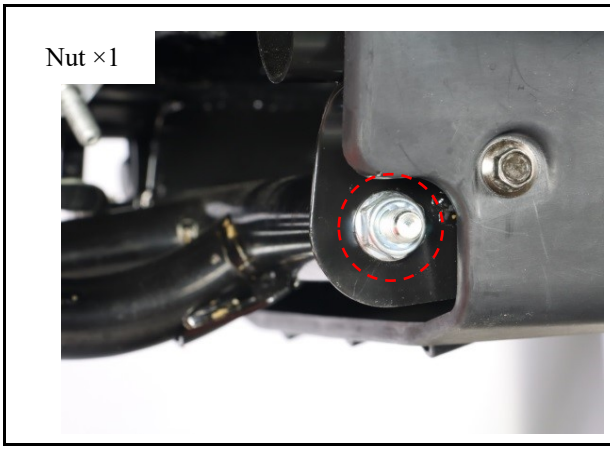
Lower the main tripod, lift the engine using the engine bracket, and lift the rear wheels slightly off the ground

Make contact with the frame under the front shock absorber rubber of the suspension.

The shock-absorbing rubber is in contact with the frame below

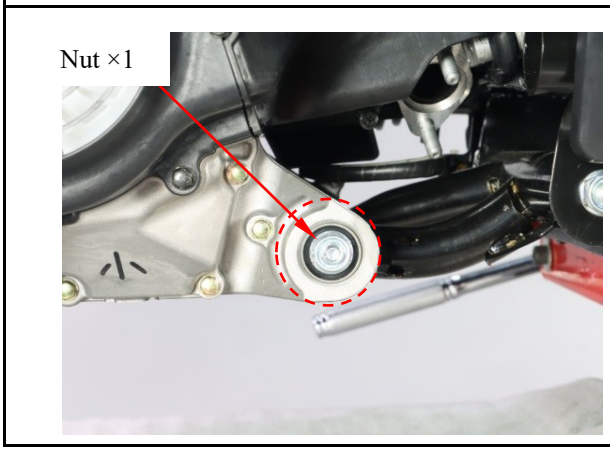


Lock the suspension and frame nut.
The torque value is 4.5 to 5.5kgf-m



Align the engine bracket under the fuel tank to lift the frame, with the rear wheels slightly off the ground.

Lock the suspension to the engine nut
Torque value 4.5 to 5.5kgf-m



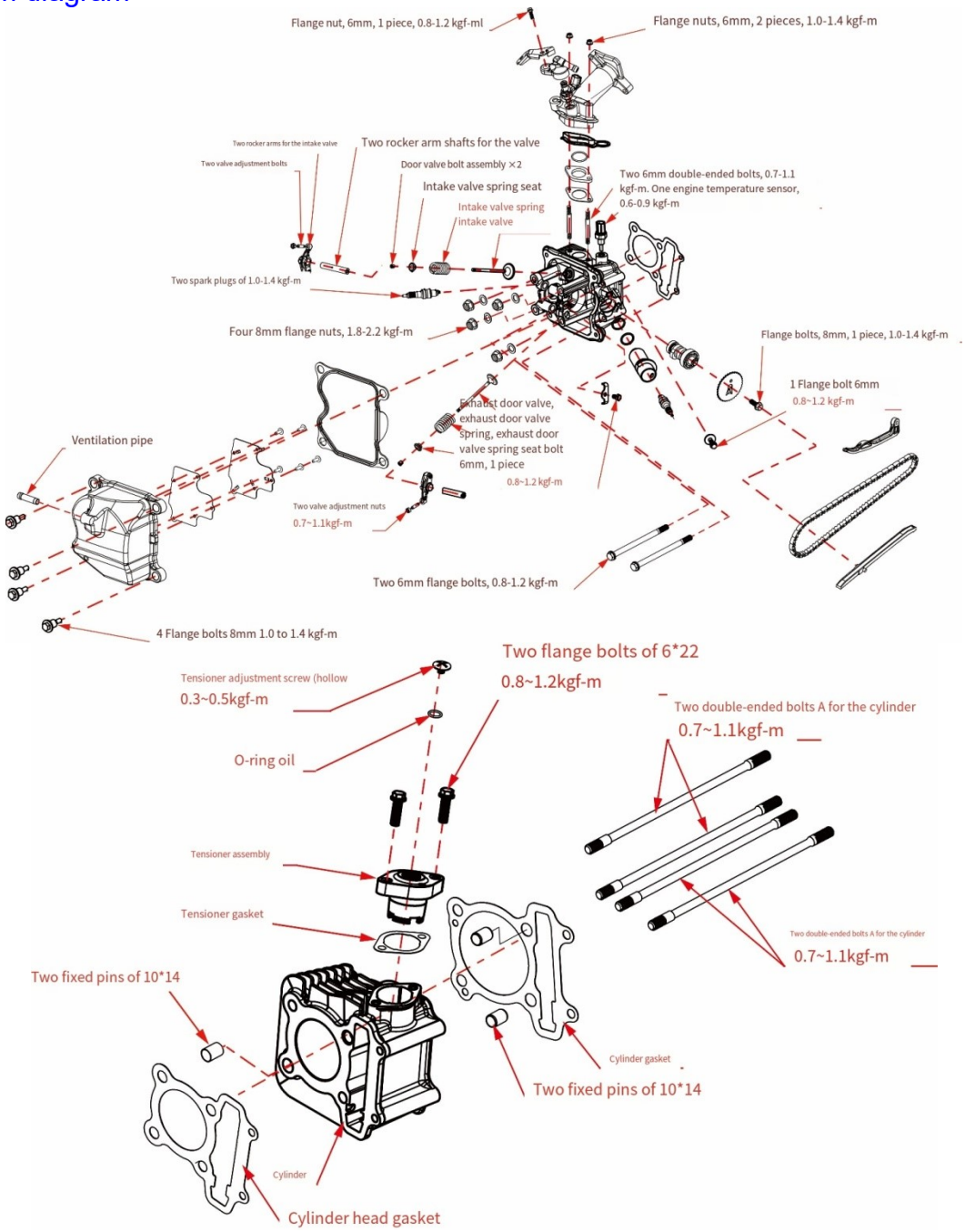
Engine suspension assembly (for two)

Engine suspension assembly tips:

When relocking the engine suspension, pay attention to the sequence of relocking the engine suspension. First, loosen the nuts that connect the engine suspension to the frame and the engine. Then, press the real vehicle down and lock the nuts that connect the engine suspension to the frame at the same time. Finally, lift the real vehicle up and lock the nuts that connect the engine suspension to the engine at the same time.

Institutional Diagram 6-1	Valve replacement..... 6-10
Notes on Work..... 6-2	Cylinder head assembly 6-13
Fault Diagnosis..... 6-3	Cylinder head assembly 6-15
Cylinder head disassembly 6-4	Valve clearance adjustment..... 6-18
Cylinder head disassembly/assembly 6-6	

Mechanism diagram



Notes on the assignment

General Notes

- This section covers the maintenance of cylinder heads, valves, camshafts and rocker arms.
- Cylinder head maintenance should not be carried out while the engine is still mounted on the frame.

Specification unit :mm

Project			Standard	Available limits
Valve clearance (intake/exhaust when cold)			0.12±0.02	—
Compression pressure			More than 12 kgf/cm² (570 rpm)	—
Camshaft	CAM height	Intake	30.76 ~ 30.84	30.61
		Exhaust	30.54 ~ 30.62	30.39
Arm swing	Inner diameter of the swing arm		12.98 ~ 13.00	13.100
	Outer diameter of the rocker shaft		9.972 ~ 9.987	9.960
Steam valve	Outer diameter of the steam	Intake	4.480 ~ 4.470	4.400
		Exhaust	4.470 ~ 4.455	4.400
	Guide sleeve		4.500 ~ 4.512	4.520
	Clearance between the valve stem	Intake	0.010 ~ 0.037	0.080
		Exhaust	0.030 ~ 0.057	0.100
	Valve seat width		1.000	1.600
Flatness of the cylinder head mating surface			—	0.050

Torque value

Cylinder head cover bolts 1.0-1.4kgf-m
Cylinder head left bolt 1.0 to 1.4kgf-m
Cylinder head nuts 1.8 to 2.2kgf-m
Timing chain automatic tensioner seal bolt 0.8 to 1.2kgf-m
Timing chain tensioner bolts 1.0 to 1.4kgf-m
Valve adjustment fixing nut 0.7 to 1.1kgf-m (threaded part, seat surface coated with engine oil)
Spark plugs 1.1 to 1.4kgf-m

Tools

Specialized tools
Valve guide rod reamer 4.5mm
Valve guide driver 4.5mm

Fault diagnosis

Problems at the top of the engine, which usually affect engine performance, can be identified by measuring compression pressure or tracing the source of the noise.

Poor idling

Too low compression pressure.

Too low compression pressure

1. Valve
The valve clearance is poorly adjusted
The valve is burned out or bent
Valve timing is incorrect
Valve spring damage
Valve carbon deposits
Poor valve seat airtightness
The spark plug is poorly installed

2. Cylinder head
Cylinder head gasket deflated or damaged
The cylinder face is crooked or cracked

3. Piston
Piston ring wear
Excessive compression pressure
Excessive carbon deposits in the combustion chamber or on top of the piston

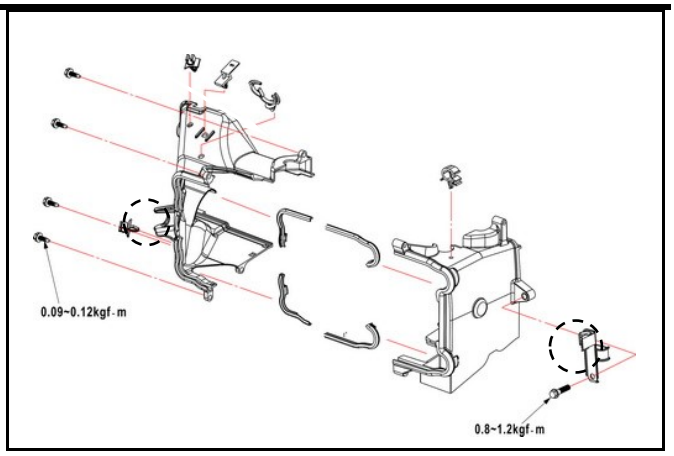
Abnormal sound
Poorly adjusted valve clearance
Valve burnout or valve spring damage
Camshaft wear or damage
CAM chain wear or looseness
Wear or damage to the CAM chain tensioner
Camshaft chain gear wear
Wear on the rocker arm or rocker shaft

White smoke comes out of the exhaust pipe
Wear on the valve guide or valve guide rod
Wear of the valve guide rod oil seal

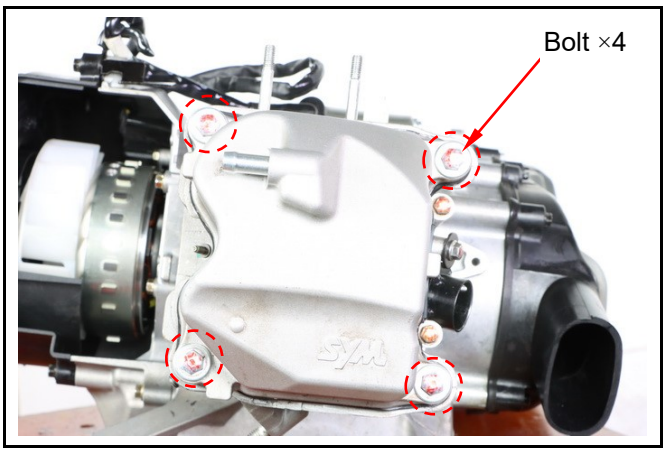
Cylinder head disassembly

Remove the engine before doing the work (refer to Chapter 6).

Remove the cooling cover on the right side of the engine body cover (screws ×4, bolts ×1).



Remove the cylinder head cover bolts (bolts × 4).

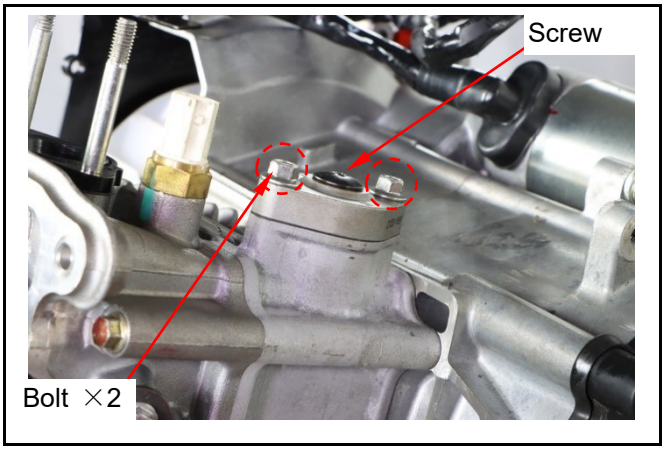


Remove the inner chain adjuster

Remove the tension adjustment screw (screw ×1).

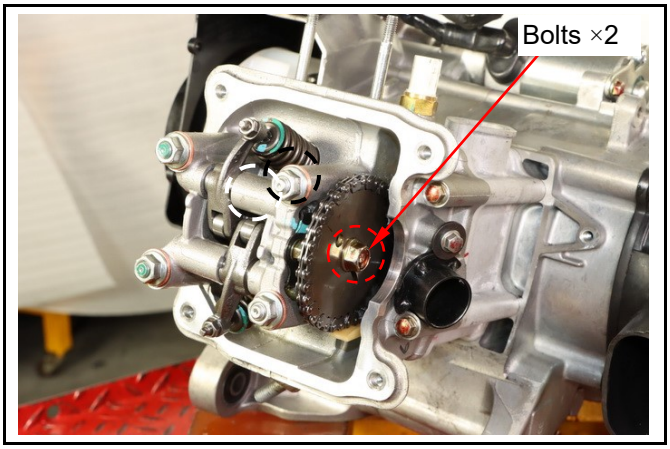
Remove the inner chain adjuster fixing bolts (bolts ×2).

Remove the internal adjuster.

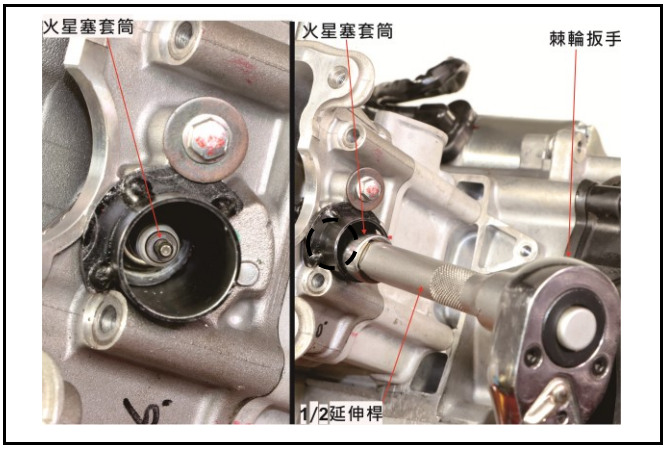


Remove the timing gear fixing bolt (bolt ×1).

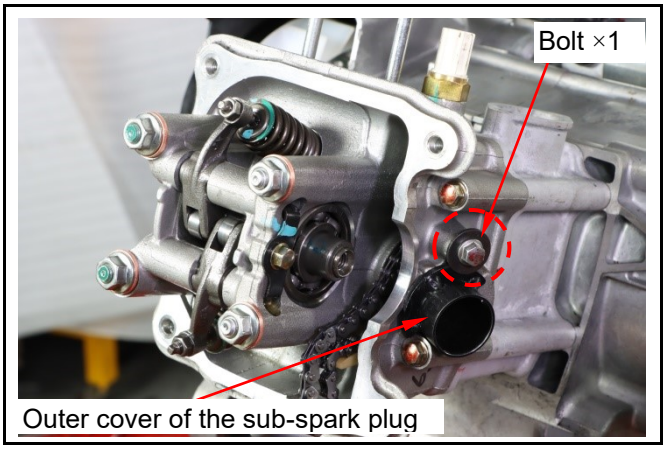
Remove the timing gear.



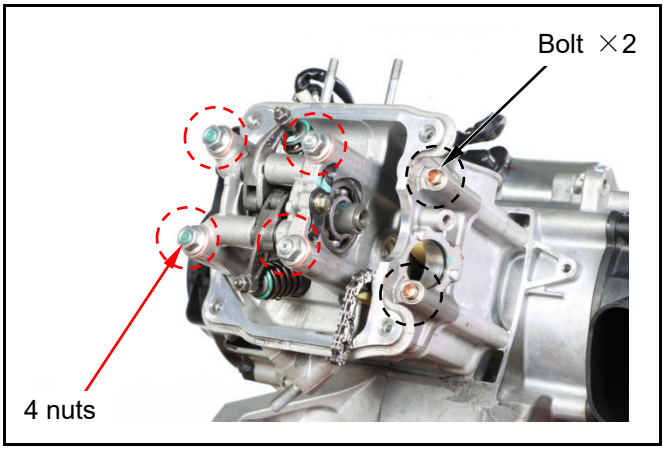
Use a spark plug socket to connect the extension rod and the ratchet wrench.
Remove the spark plug.



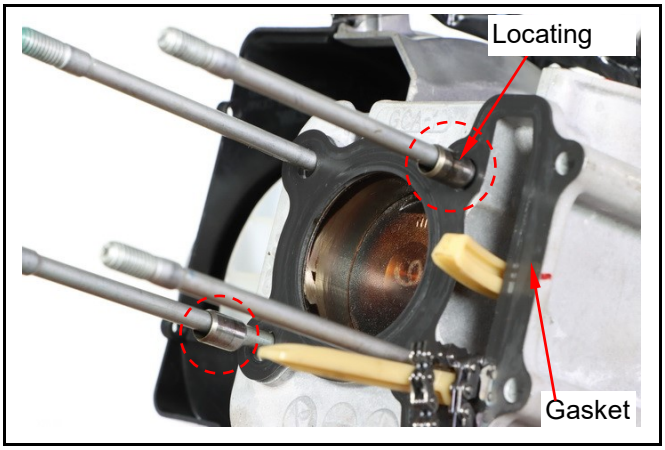
Remove the secondary spark plug outer cover fixing bolts (bolt ×1).
Remove the outer sleeve of the secondary spark plug.



Remove the left side bolt of the cylinder head (bolt ×2).
Remove the cylinder head fixing nut (nut ×4).
Remove the cylinder head.

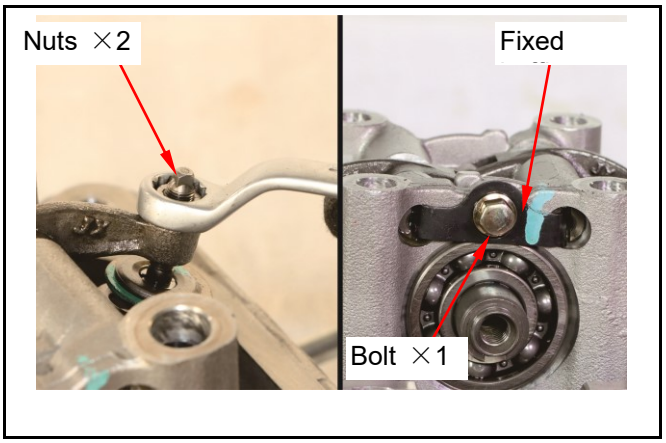


Remove the locating pin (locating pin ×2).
Remove the cylinder head gasket.

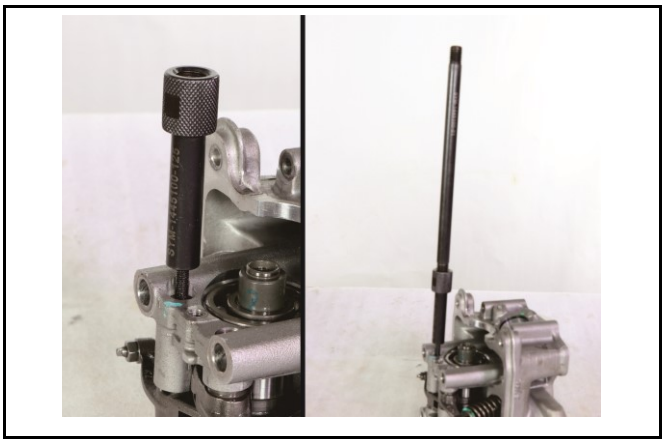


Cylinder head disassembly/assembly

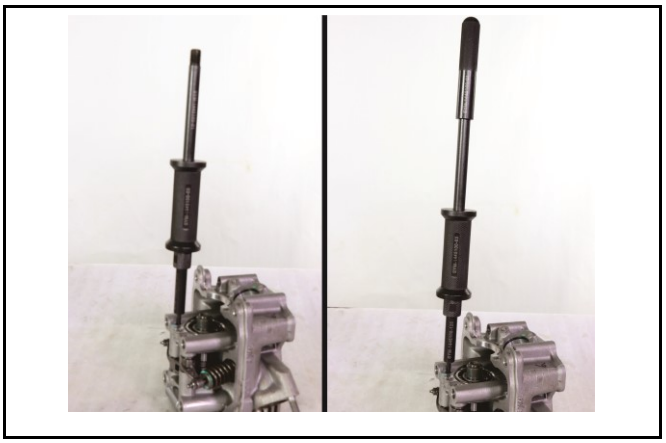
Loosen the valve adjustment nuts (nuts ×2) before disassembling.
Remove the camshaft fixing plate (bolt ×1) first.



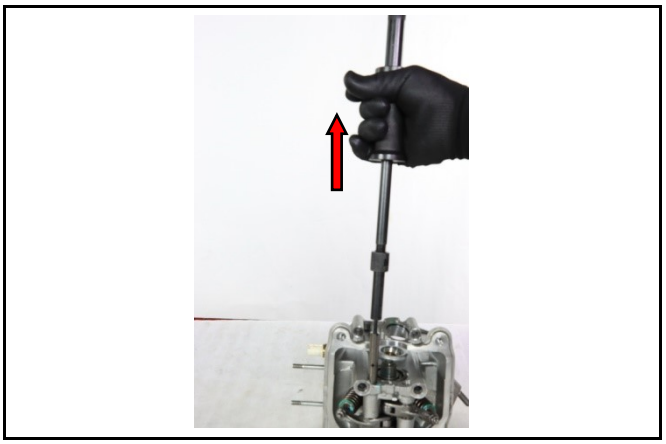
Select the appropriate disassembler and lock the rocker shaft clockwise.
Lock the tool spindle clockwise into the combined disassembler.
Special tools:
Tool Name: Rocker tip disassembly and Assembly tool
Tool Number: SYM-1445100-ALL



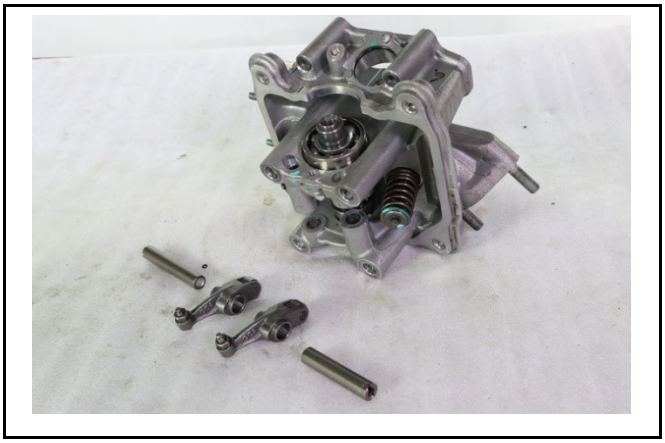
Load the hammer.
Lock the tool handle clockwise.
Specialized tools
Tool Name: Rocker tip disassembly and Assembly tool
Tool Number: SYM-1445100-ALL



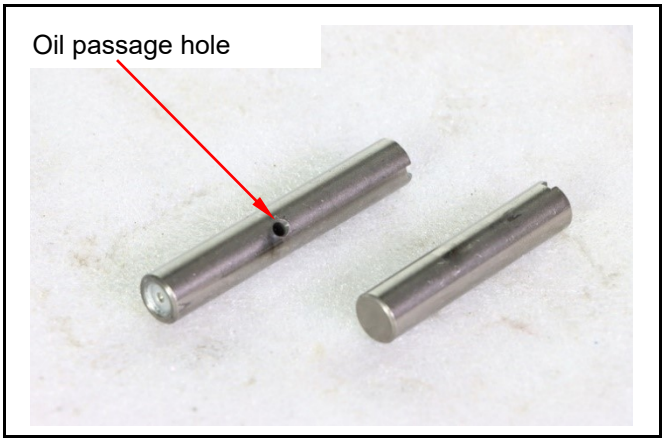
Strike the handle upwards with the hammer to remove the rocker shaft.



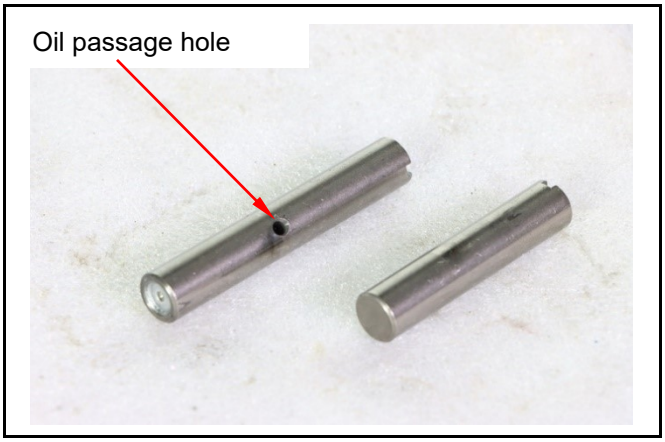
Remove the rocker arm and rocker shaft.



The rocker shaft distinguishes between intake and exhaust. The rocker shaft with oil passage must be installed at the intake end.

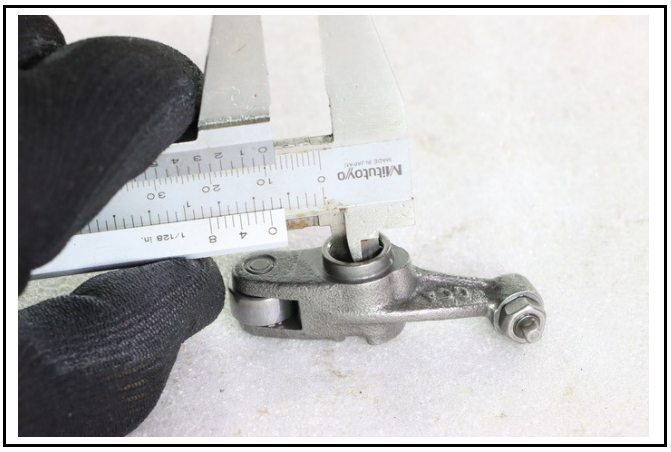


The oil passage must be unobstructed and not blocked.

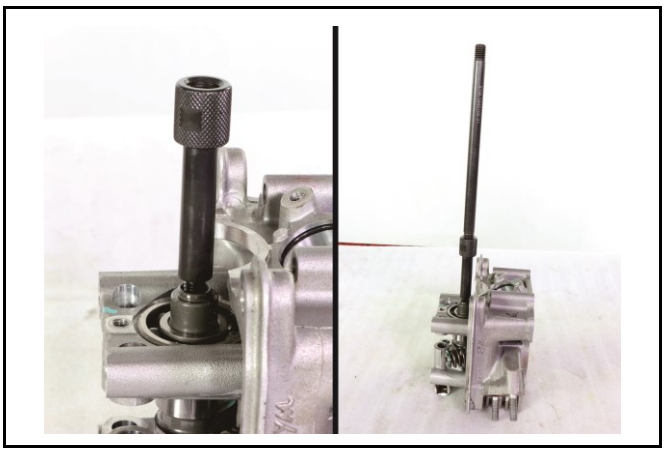


Check
Measurement of the outer diameter of the valve rocker shaft and the movable part of the valve rocker.
Available limit: 9.96mm

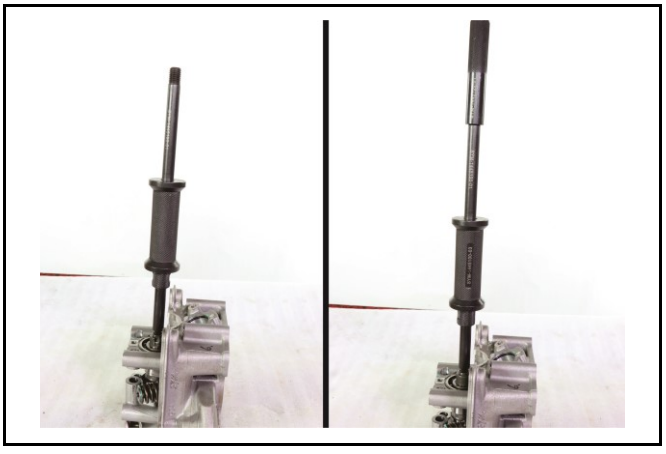
Measurement of valve rocker arm inner diameter.
Available limit: 13.1mm
Calculate the gap between the valve rocker shaft and the valve rocker.
Available limit: less than 0.05



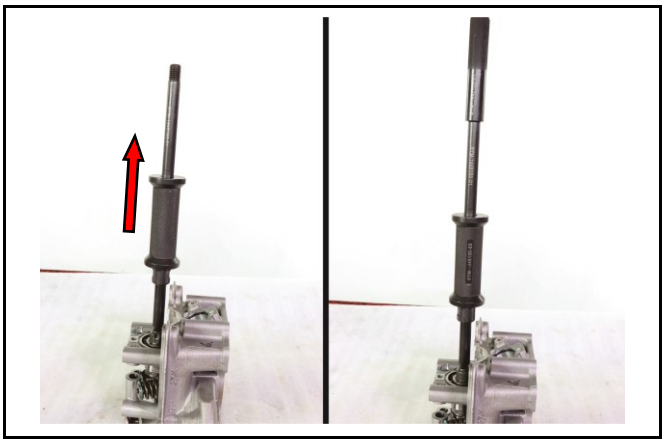
Camshaft disassembly:
Select the appropriate disassembler and lock the camshaft clockwise.
Lock the tool spindle clockwise into the combined disassembler.



Insert the hammer.
Lock the tool handle clockwise.

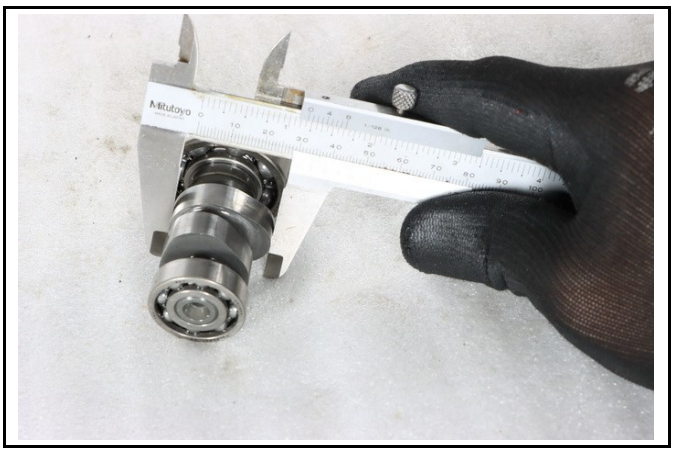


Use the hammer to strike the tool handle upwards.
Pull out the camshaft.



Check:
Inspect the surface of the CAM to ensure that it is not blackened or burned.

Check if the height is damaged.
Available limits:
Intake 30.61mm
Exhaust 30.39mm

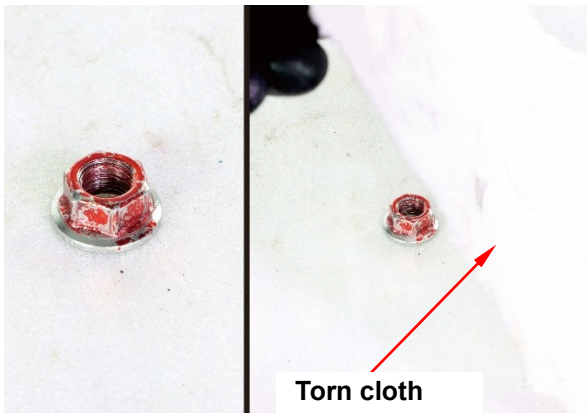


Check that the rotating bearings must be smooth without interference or abnormal noise, not loose or worn, and if any, replace the entire camshaft assembly.

Valve replacement

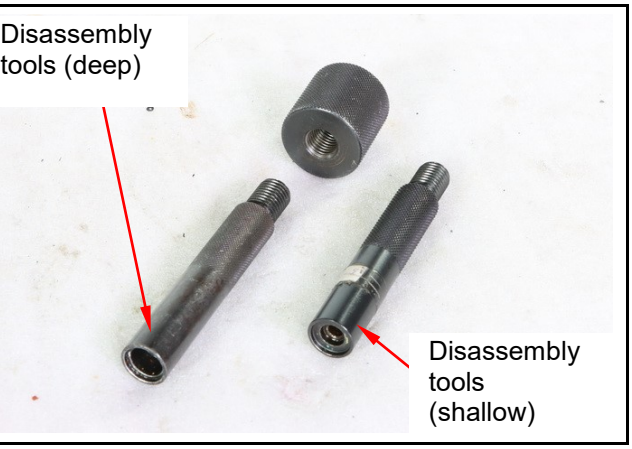
Place the nuts first.

Cover the nut with rags to prevent the valve stem from bending and deforming.



Remove the valve.

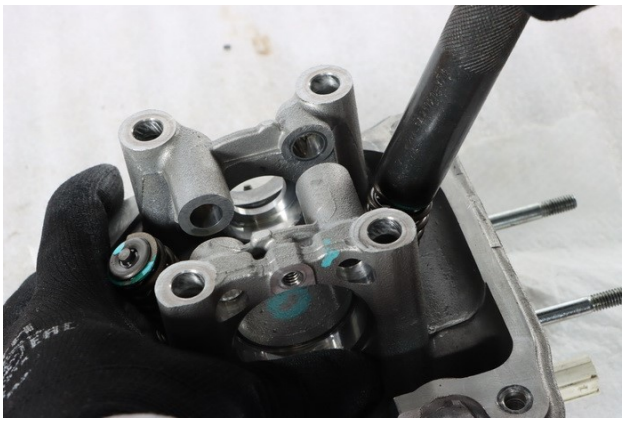
Use a dedicated tool to remove the valve, with the tool front end disassembled (deep) and the tool front end assembled (shallow).



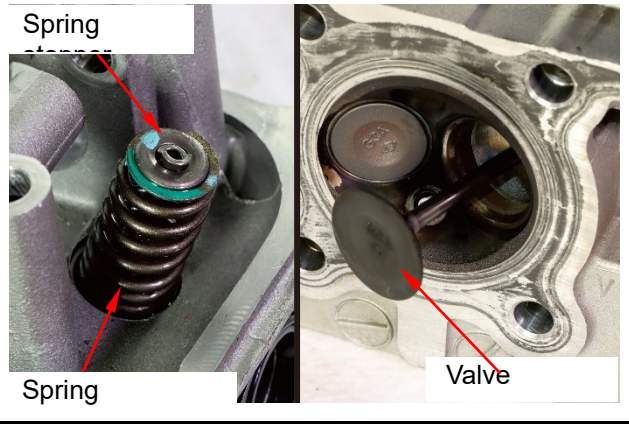
Touch the bottom of the valve to the nut and use the tool to press the valve spring seat down with an instant force.

⚠ Note

- The front end of the tool must be tightly wrapped around the valve spring seat.
- The bottom of the valve must be in close contact with the nut.



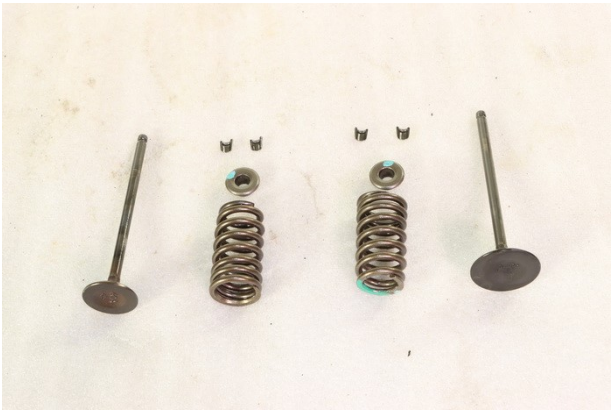
Remove the spring stopper, the spring and the valve.



Remove carbon deposits from the combustion chamber.
Remove gasket debris and impurities from the gasket surface of the cylinder head.

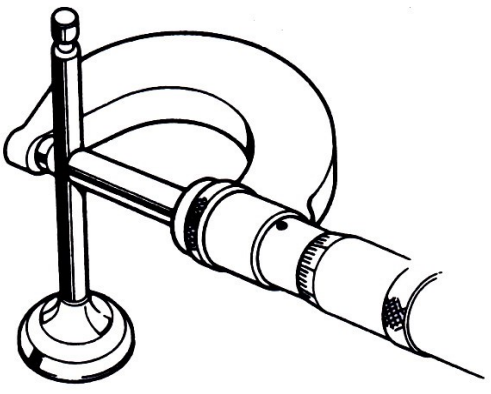
Note

- Do not damage the cylinder head mating surfaces.



"Check
Confirm whether the valve oil seal is burned, cracked or damaged.
Check if the valve guide rod is loose, burned or deformed.

Valve stem
Check each valve stem for any bending, burning damage or abnormal wear.
Check the operation of each valve stem in the conduit, measure and record the outer diameter of the valve stem.
Available limit: 4.4mm

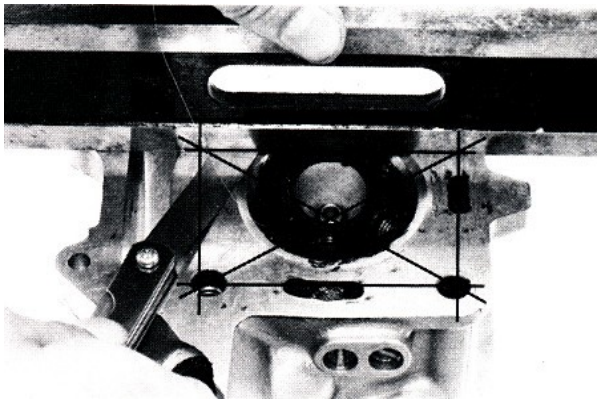


Cylinder head

Check the spark plug holes and valve holes for cracks.

Measure the flatness of the cylinder head with a straight ruler and a thickness gauge.

Available limit: 0.5mm



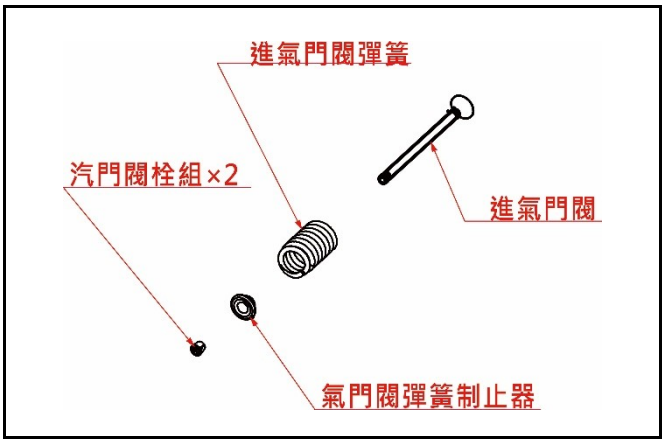
Valve spring

Measure the free length of the intake and exhaust valve springs.

Available limit: 36.8mm

Cylinder head assembly

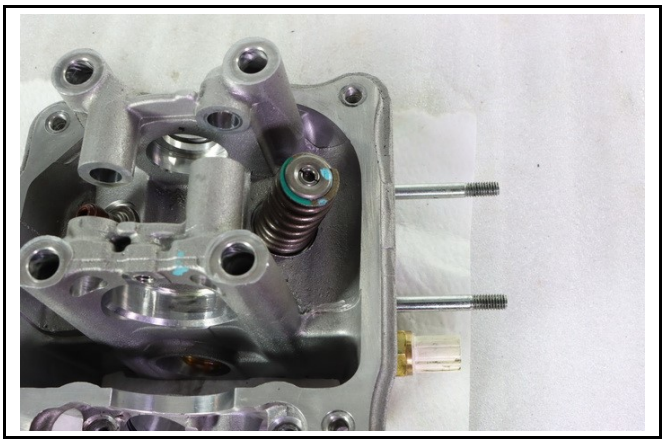
Lubricate the valve stem with engine oil and then insert the valve into the guide.
Install a new oil seal on the valve stem.



Install the valve spring and spring stopper.

⚠ Note

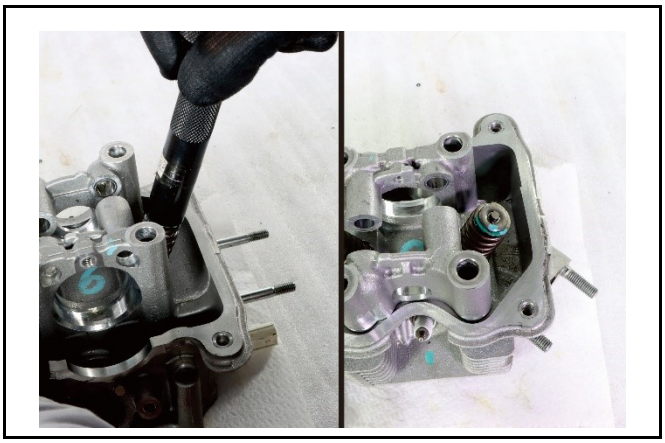
- The end with a denser number of coils should face towards the combustion chamber.



Install the valve with a valve disassembly assembler.

⚠ Note

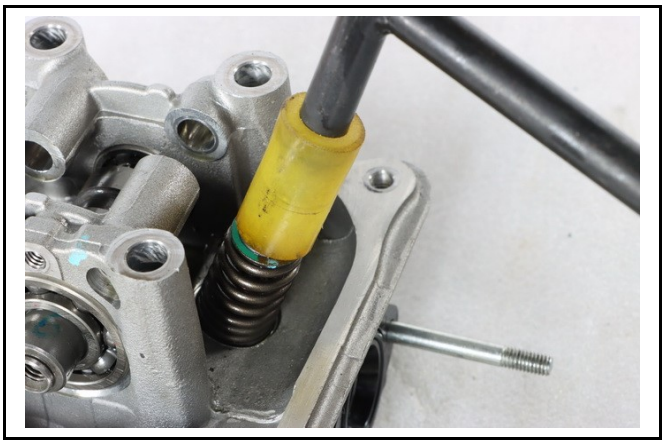
- When disassembling, place rags under the combustion chamber to prevent the valve stem from bending and deforming.



Tap the valve stem lightly with a rubber hammer to ensure a good fit between the valve bolt and the valve stem.

⚠ Note

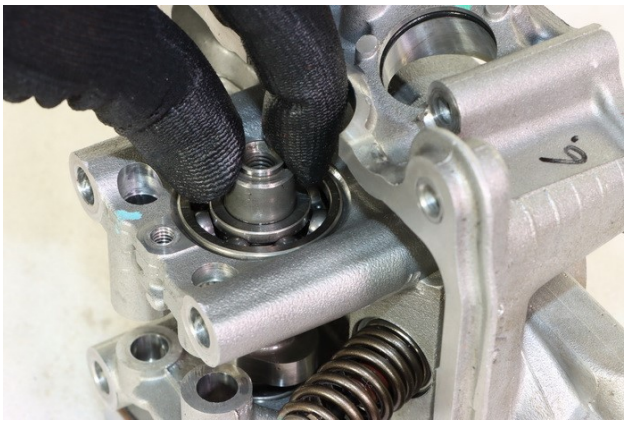
- Support the cylinder head on the workbench to avoid damaging the valve.



Camshaft assembly
Insert the camshaft vertically into the assembly position.
Gently press down to fit the camshaft into position.

Note

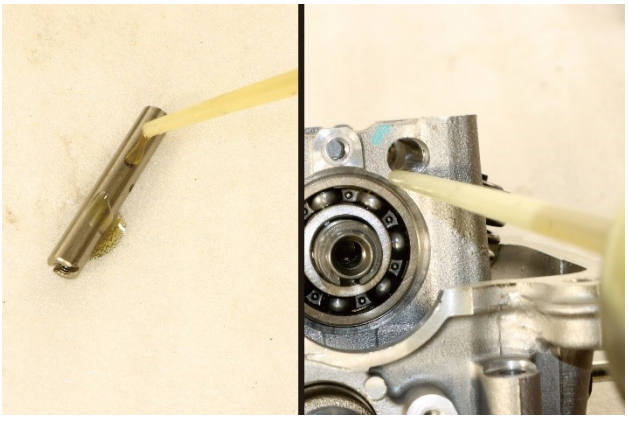
- Oil can be applied to the outer edge of the bearing and the assembly hole before assembly to facilitate assembly.



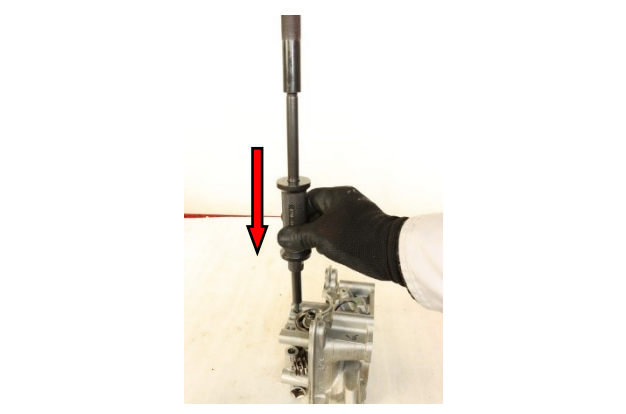
Valve rocker arm assembly.
Before assembly, apply engine oil to the rocker arm shaft and assembly holes first.

Note

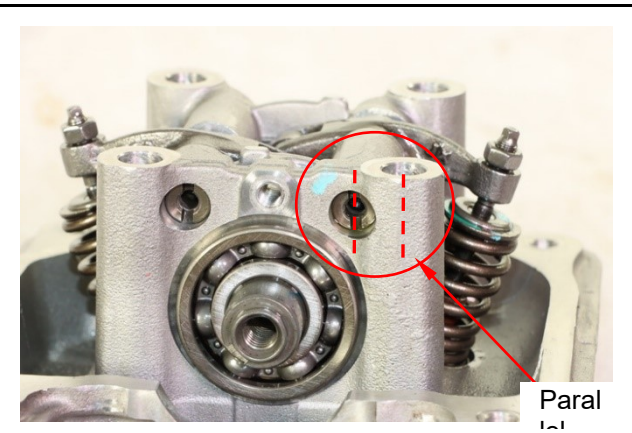
- The rocker shaft with oil passage is the intake valve



Assemble the rocker shaft and rocker arm.
Use a dedicated tool to tap the rocker shaft to position.

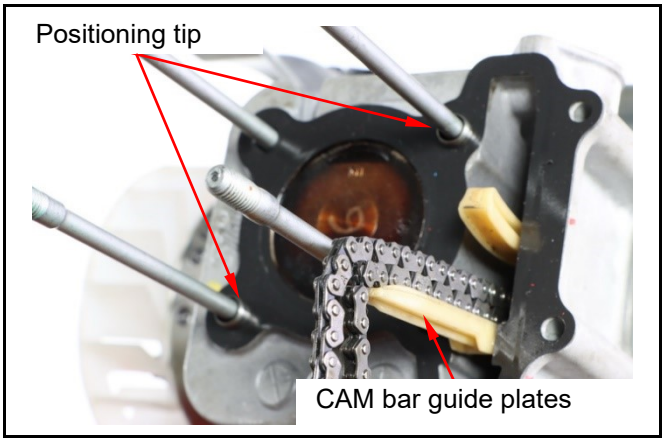


When installing the rocker shaft, the notch should be adjusted to be parallel to the bolt column.

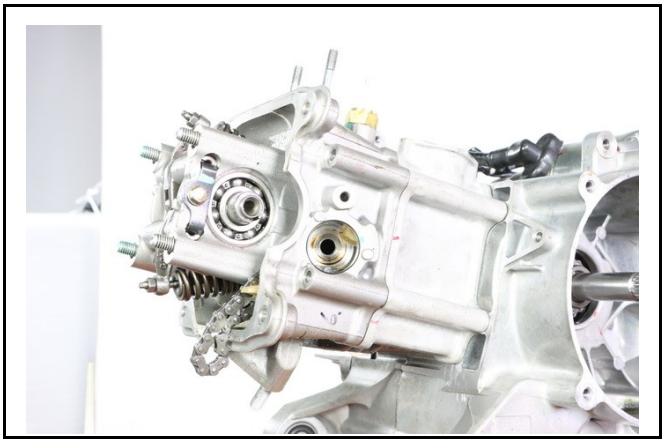


Cylinder head assembly

Place the locating pin and the new cylinder head gasket onto the cylinder.
Install the CAM bar guide plate.



Install the cylinder head

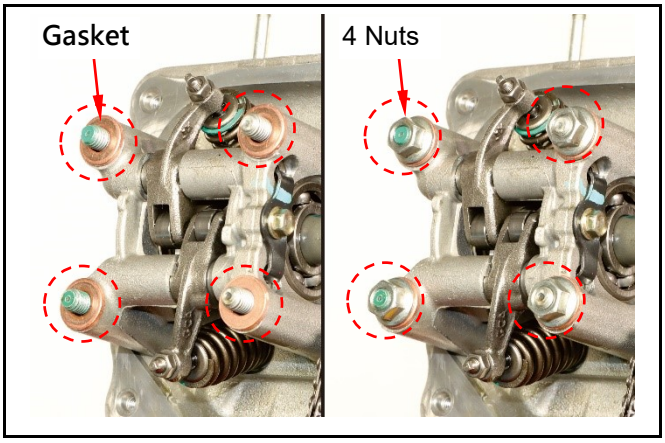


Insert the cylinder head gasket (**gasket** ×4).

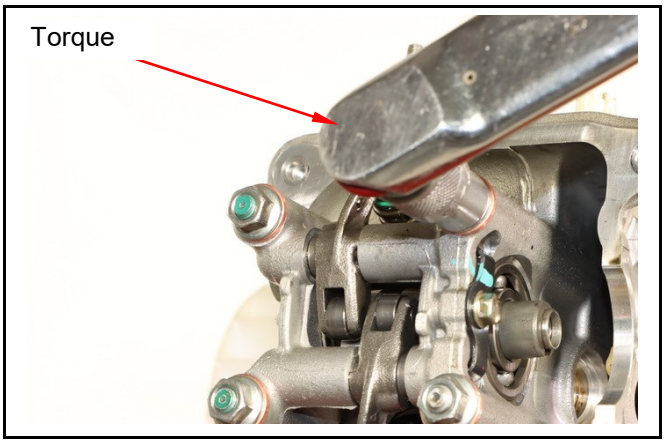
⚠ Attention

- **The gasket should be placed directionally, with the machined surface facing up**

Insert the cylinder head locking nut (**nut** ×4) by hand.



Use a torque wrench to lock the four nuts above the cylinder head.
Torque standard :1.8 to 2.2 kgf-m(17.7 to 21.6 N-m).



Timing gear assembly
Turn the alternator flywheel and align the top dead center "T" point with the crankcase cover timing mark.

Timing gear assembly

Turn the alternator flywheel and align the top dead center "T" point with the crankcase cover timing mark.

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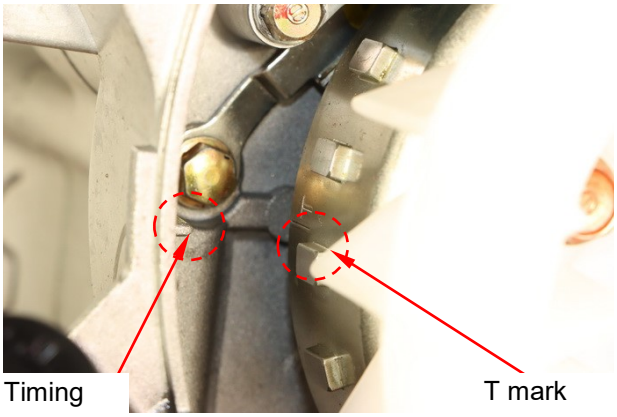
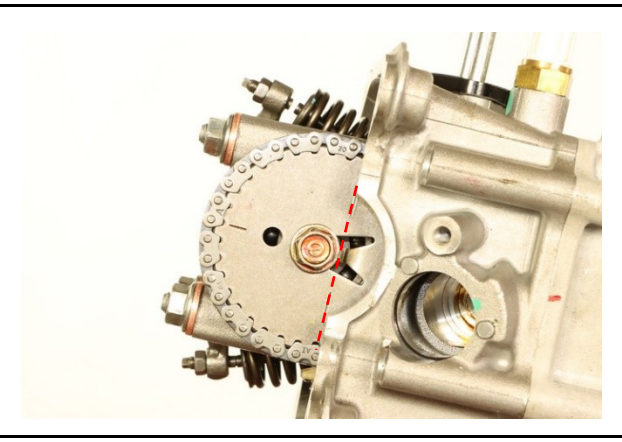


Align the camshaft timing mark with the contact between the cylinder head and the cylinder head cover.



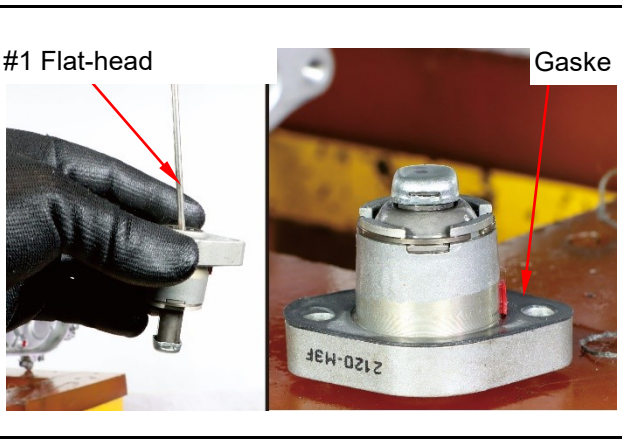
Install the timing gear and align the timing marks.

Torque standard : 1.0~1.4 kgf-m(9.8~13.7 N-m)

Internal adjuster assembly.

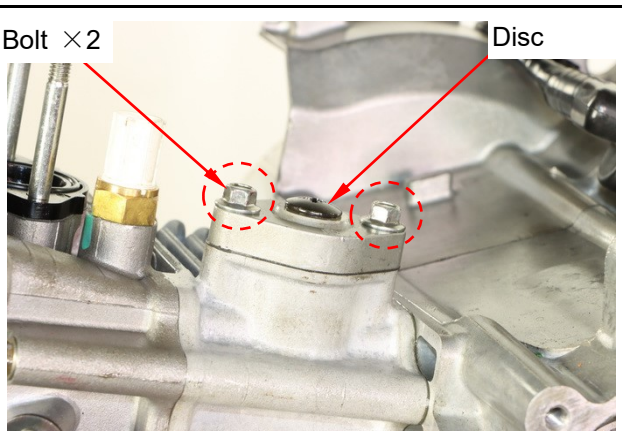
Use the #1 flat-head screwdriver to turn the tension adjustment screw clockwise to secure the tensioner to the lowest point.

Check that the adjuster gasket is not damaged or deformed and must be replaced with a new one after removal.

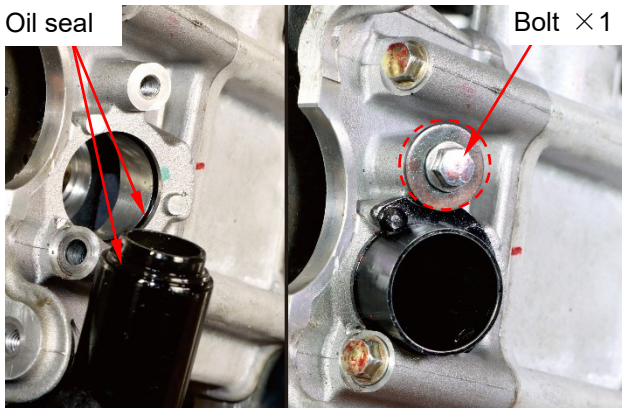


Lock in the inner chain adjuster fixing bolts (bolts ×2).

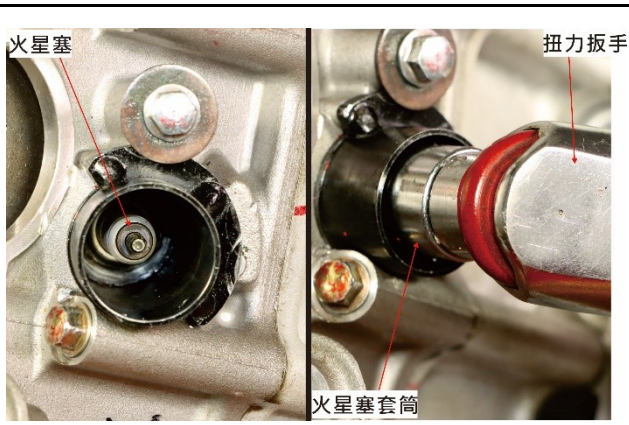
Lock in the disc screw of the inner chain adjuster.



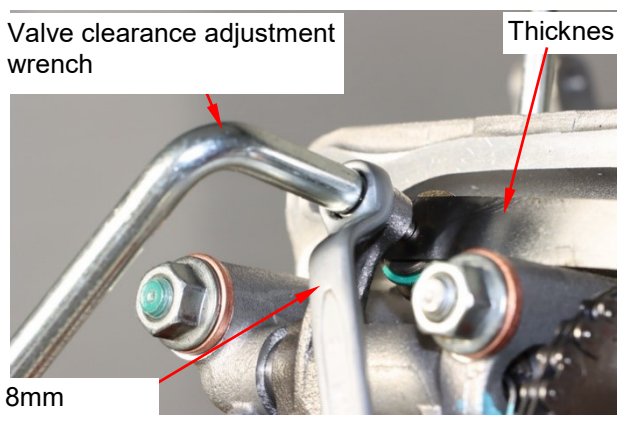
Pair spark plug assembly
Confirm that the two oil seals are not missing or damaged (oil seal ×2).
Assemble the spark plug outer sleeve of the pair, lock the blocking gasket and bolts (bolts ×1).



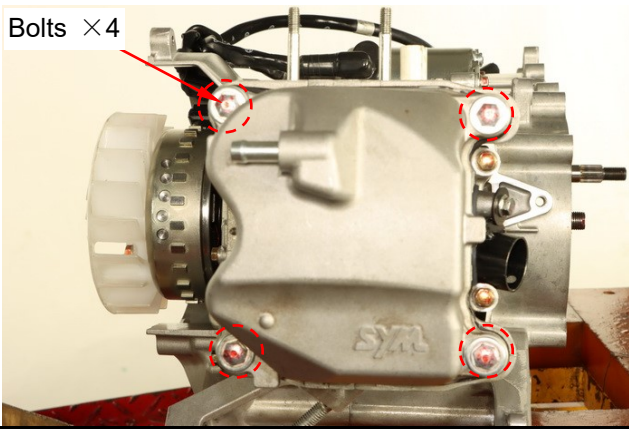
Use the spark plug sleeve and insert the spark plug.
Use a torque wrench to lock the spark plug.
Torque standard :1.0 to 1.4 kgf-m(9.8 to 13.7 N-m).



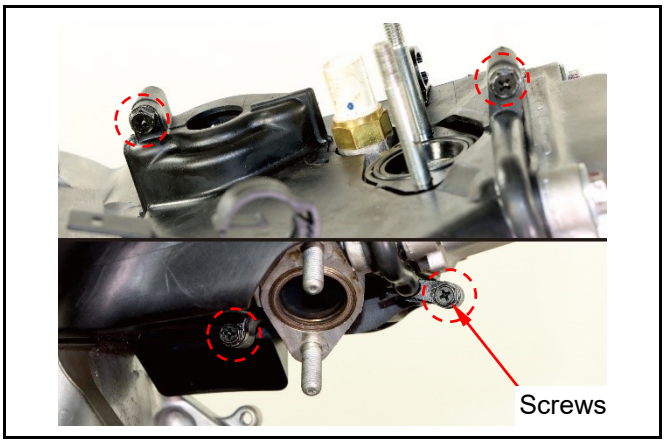
Valve clearance adjustment
Loosen the clearance adjustment nuts and bolts on the valve rocker arm.
Measure and adjust the clearances of each valve with a thickness gauge.
After adjusting to the standard value, fix the adjusting bolt and tighten the adjusting nut.
Standard value: 0.12 ± 0.02mm
Lock the chain adjustment hole cover.
Specialized tools:
Tool Name: Valve clearance adjustment wrench
Tool Number: SYM-9001200



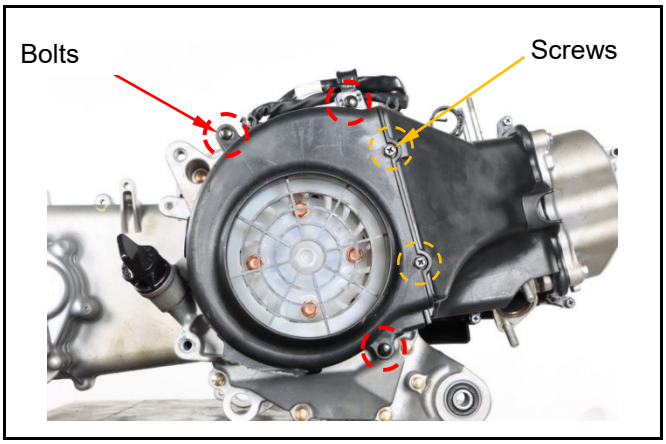
Assemble the cylinder head cover
Lock in the cylinder head head fixing bolts (bolts ×4).
Torque standard :1.0 to 1.4 kgf-m(9.8 to 13.7 N-m).



Assemble the cylinder guard head and lock in the fixing screws (screw ×4).

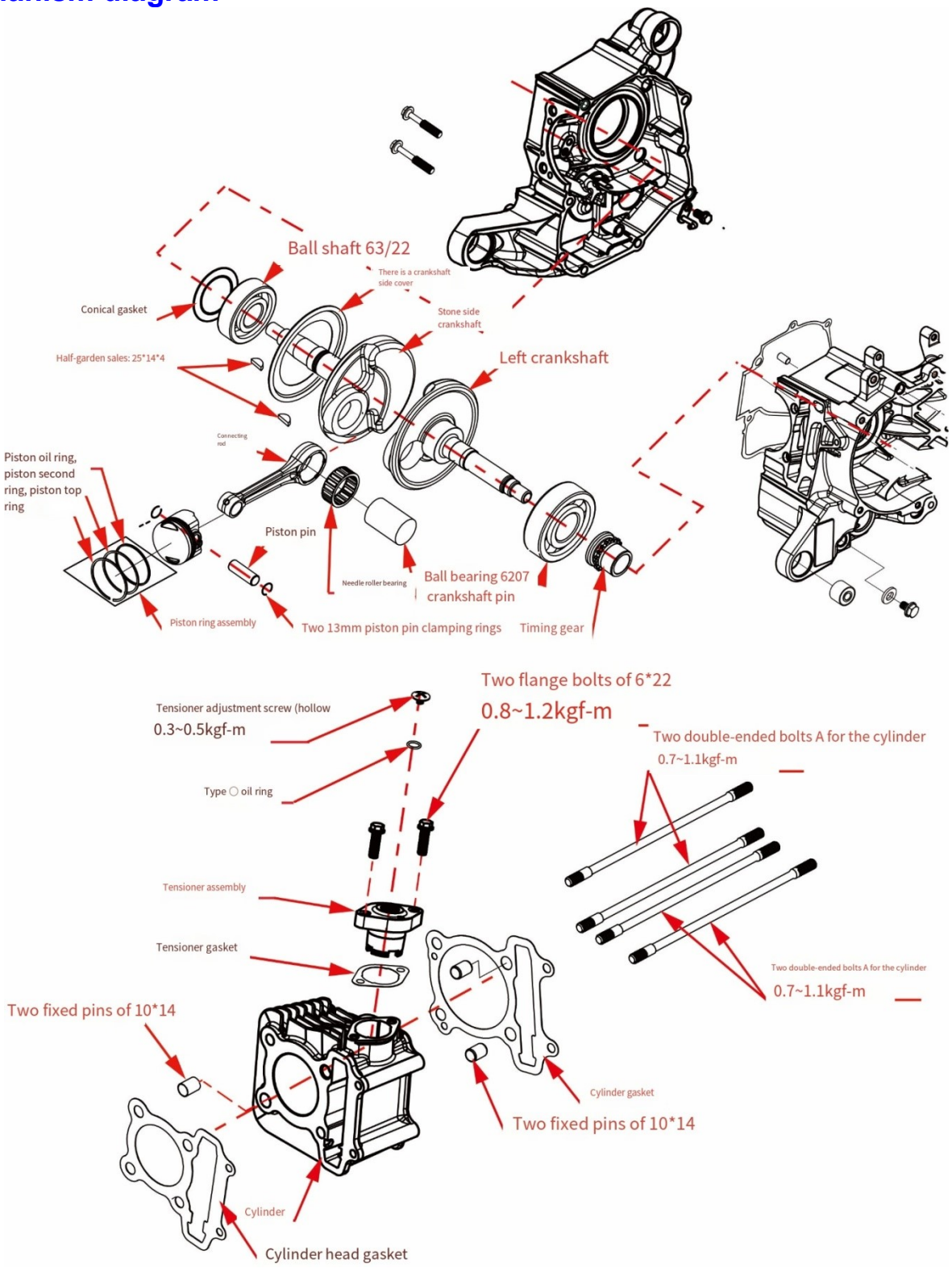


Remove the cooling fan cover (tap screws × 2, bolts ×3).



Institutional Diagram ····· 7-1	Piston disassembly/inspection 7-5
Notes on Work····· 7-2	Plug ring installation ····· 7-7
Fault Diagnosis····· 7-2	Piston mounting ····· 7-8
Cylinder disassembly/inspection 7-3	

Mechanism diagram



Notes on the assignment

General Notes

- Cylinder and piston repairs should not be carried out while the engine is mounted on the frame.

Specification **unit: mm**

Project			Standard values	Available limits
Cylinder	Inner diameter		52.385 ~ 52.405	52.500
	Top parallelism		—	0.050
	Cylinder degree		—	0.050
	True roundness		—	0.050
Piston/piston ring	The gap between the piston ring	Top ring	0.015 ~ 0.050	0.090
		Two rings	0.015 ~ 0.050	0.090
	Piston ring fit clearance	Top ring	0.100 ~ 0.250	0.500
		Two rings	0.100 ~ 0.250	0.500
		Oil scraper ring	0.300 ~ 0.900	—
	Outer diameter of the piston		52.10 ~ 52.15	52.00
	Piston outer diameter determination position		About 7 mm at the lower end of the skirt	—
	Piston and cylinder clearance		0.005 ~ 0.015	0.100
	Inner diameter of the piston tip hole		13.002 ~ 13.008	13.040
Outer diameter of the piston tip			13.000 ~ 13.006	12.960
Piston and piston tip clearance			0.002 ~ 0.014	0.020
Inner diameter of the small end of the connecting rod			13.016 ~ 13.034	13.060

Fault diagnosis

Too low or unstable compression pressure

Cylinder or piston ring wear.

Excessive compression pressure

Piston, carbon deposits in the combustion chamber.

Knocking or abnormal noises

Cylinder and piston wear.

There is too much carbon on the piston head.

Piston tip hole and piston tip wear.

Smoke coming from the exhaust pipe

Cylinder piston or piston ring wear.

The piston rings are poorly installed.

Damage to the cylinder or piston.

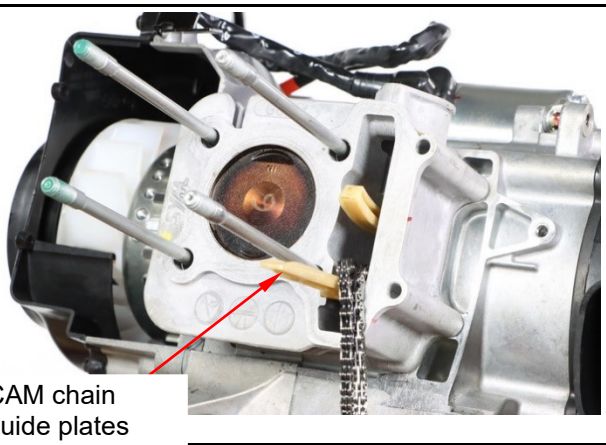
Engine overheating

Excessive carbon deposits on the top of the piston.

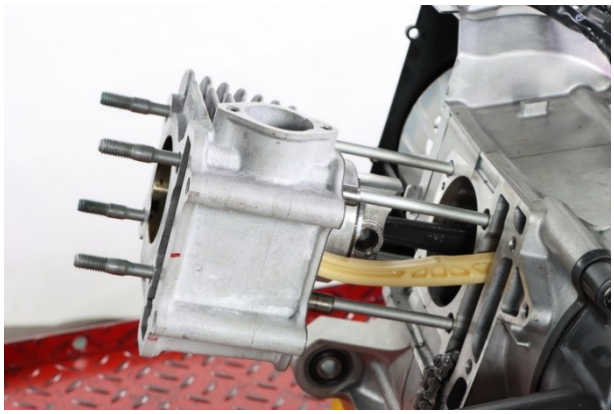
Cylinder disassembly/inspection

Remove the cylinder head (refer to Chapter 7).

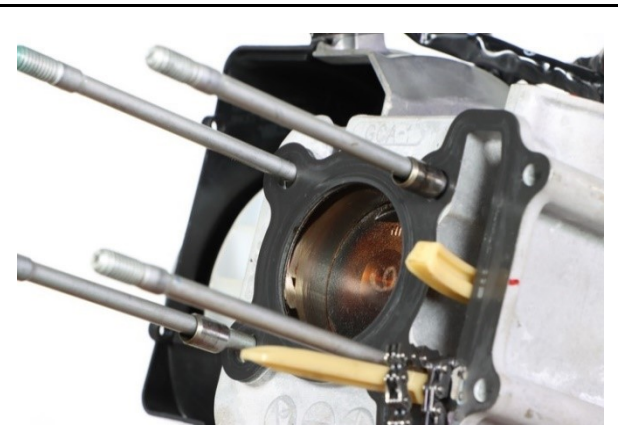
Remove the CAM chain guide plates.



Remove the cylinder.



Remove cylinder gaskets and fixing pins.

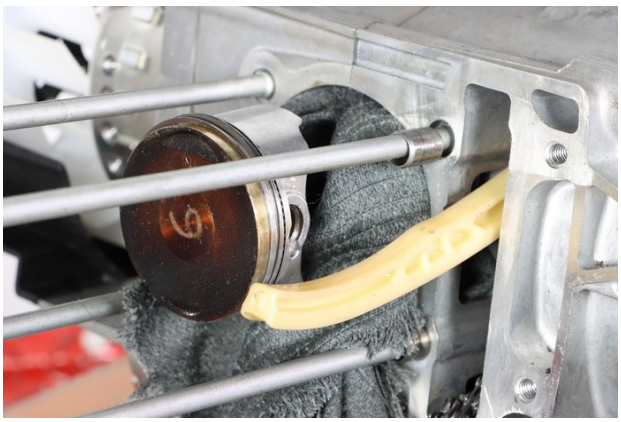


Plug the crankcase holes and CAM chain holes with clean cloths.

Scrape off the gasket debris attached to the cylinder and crankcase mating surfaces.

Note

- The gasket debris can be moistened with a solution, which makes it easier to remove.



Check

Check the inner diameter of the cylinder for wear or damage.

Measure and record the values of the cylinder inner diameter in the X and Y axes at the upper, middle and lower positions in the cylinder respectively.

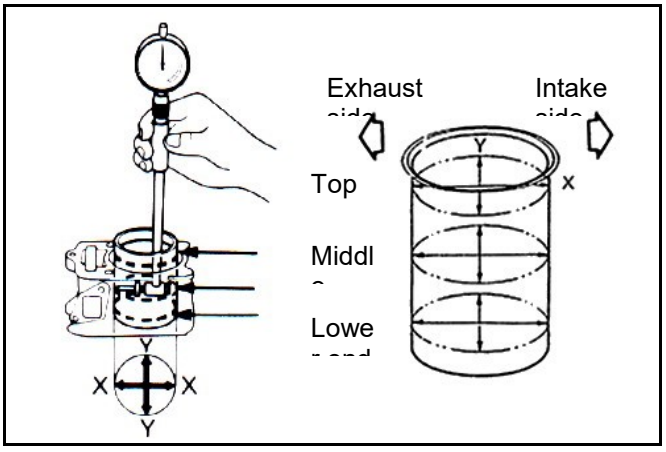
Available limit: 52.50mm

Calculate the true roundness (the difference between the X and Y directions) and the roundness (the difference between the inner diameters at the upper, middle, and lower positions in the X or Y direction), whichever is the maximum.

Available limits:

True roundness: Correction or replacement for 0.05mm and above

Roundness: Correction or replacement for roundness above 0.05mm



Check cylinder flatness.

Available limit: 0.05mm or more correction or replacement

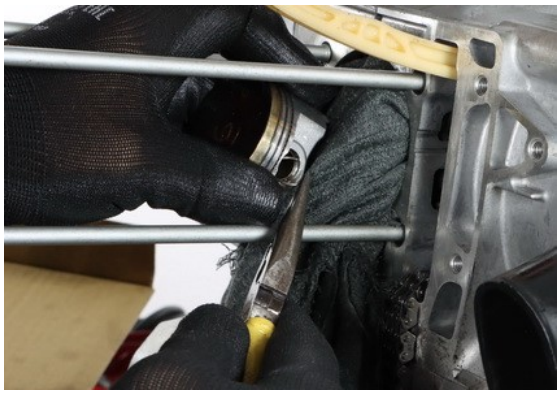
Piston disassembly/inspection

Plug the crankcase opening and CAM chain hole with a clean cloth strip to prevent piston snap rings or other parts from falling into the crankcase during disassembly.

Use a pair of pointed-nose pliers to remove the ring on one side of the piston tip.

Push out the piston tip from the end where the buckle is removed.

Remove the piston rings.

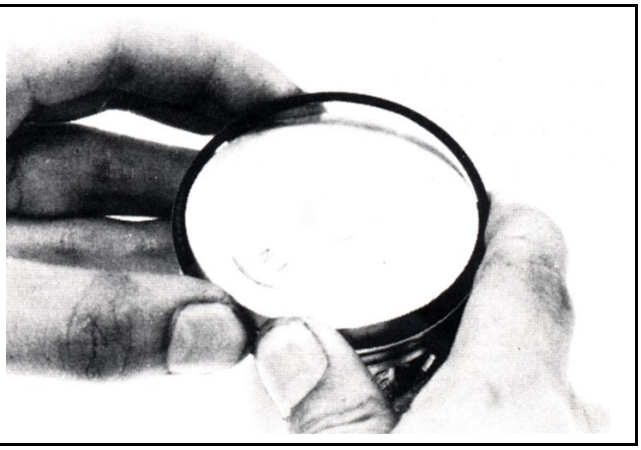


Note

- Piston rings are prone to breakage, so be careful when removing them.

Check if the piston rings are damaged and if the ring grooves are worn.

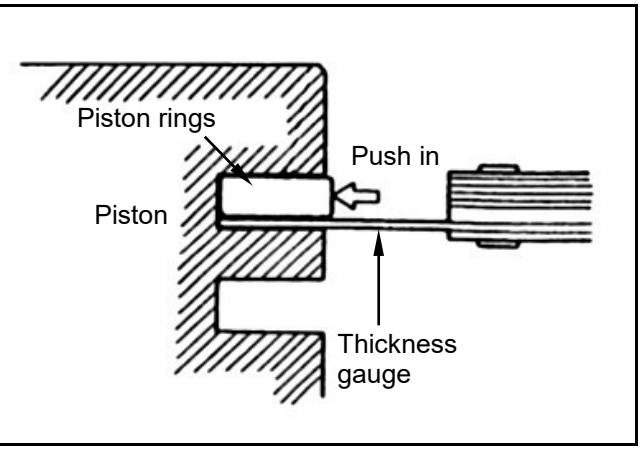
Remove the carbon deposits attached to the piston ring grooves.



Install the piston rings and measure the gap between the piston ring grooves.

Available limits: Top ring: Replace above 0.09mm

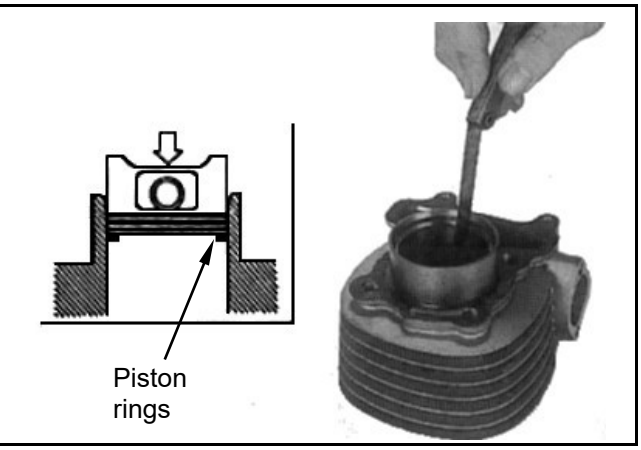
Second ring: Replace above 0.09mm



Remove the piston rings, install each of them at the bottom of the cylinder, and then push the piston rings into 20mm from the top of the cylinder to measure the fit clearance of each piston ring.

Note

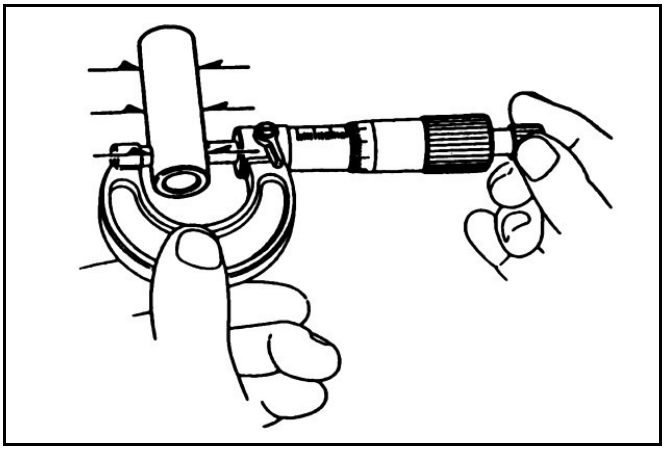
- Push the piston rings parallel into the cylinder using the top of the piston.



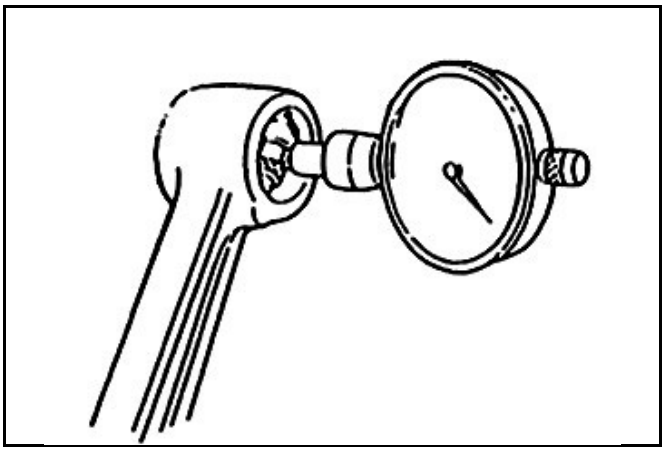
Available limit: Top ring: Replace more than 0.5mm

Second ring: Replace above 0.5mm

Measure the outer diameter of the piston tip.
Available limit: 12.96mm

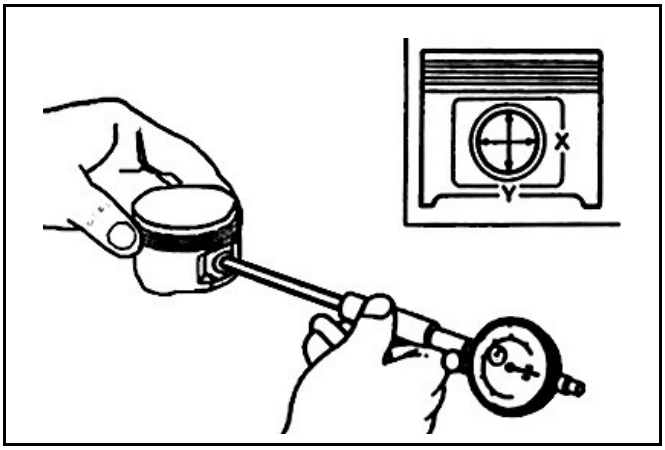


Measure the inner diameter of the small end of the connecting rod.
Available limit: 13.06mm



Measure the inner diameter of the piston tip hole.
Available limit: 13.04mm

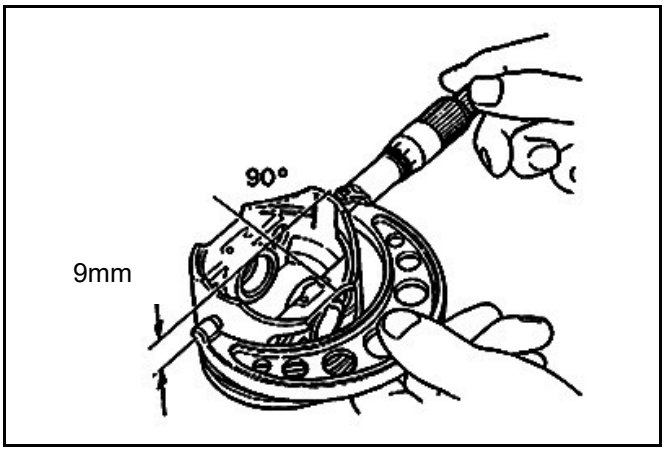
Calculate the clearance between the piston tip and the piston tip hole.
Available limit: 0.02mm



Measure the outer diameter of the piston.
Available limit: 52.00mm

⚠ Note

- The measurement position is 90° to the piston tip hole according to Section 2 of this chapter, for each model specification.



Compare this measurement with the available limits and calculate the piston and cylinder clearance.

Plug ring mounting

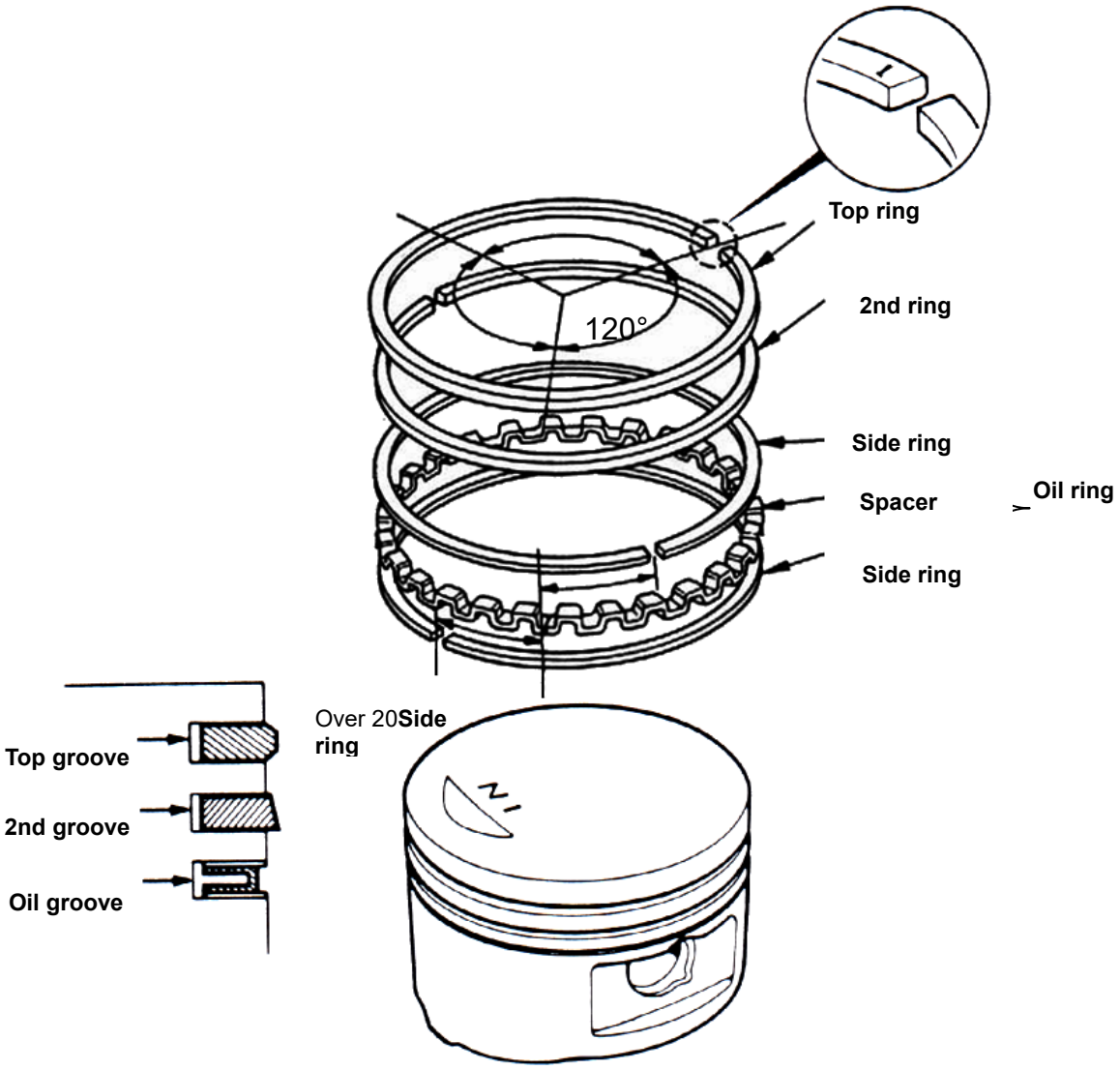
Clean the piston head, ring groove and piston skirt.

Carefully push the piston rings open and insert them into the piston.

Align each ring according to the ICONS below.

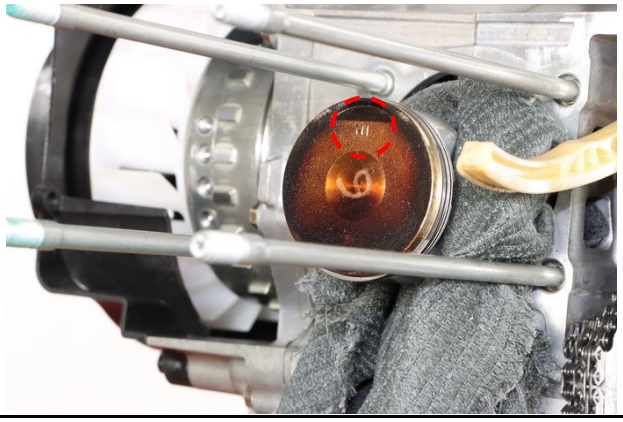
⚠ Note

- Do not damage the piston and piston rings during installation.
- All marks on the piston rings should be installed upwards.
- After installation is completed, make sure that all the piston rings can rotate freely without any jamming.



Piston mounting

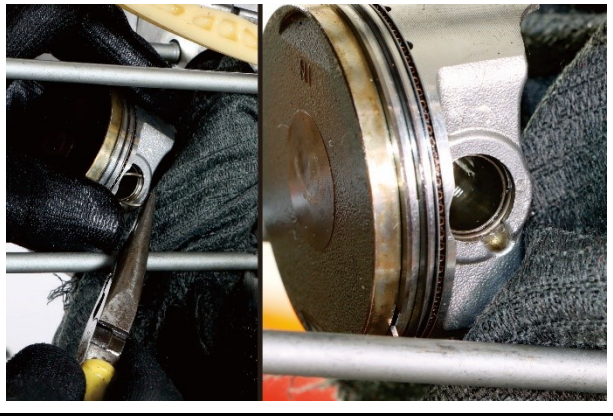
Install the piston and the piston tip, and place the IN mark on the top surface of the piston on the intake valve side.



Install the new piston pin buckle.
The clasp must be fully inserted into the groove.

Note

- Do not make a notch in the piston tip buckle ring. Align the notch used for assembling the upper piston buckle ring.
- When working, a piece of cloth should be placed between the piston skirt and the crankcase to prevent the buckle from falling into the crankcase.

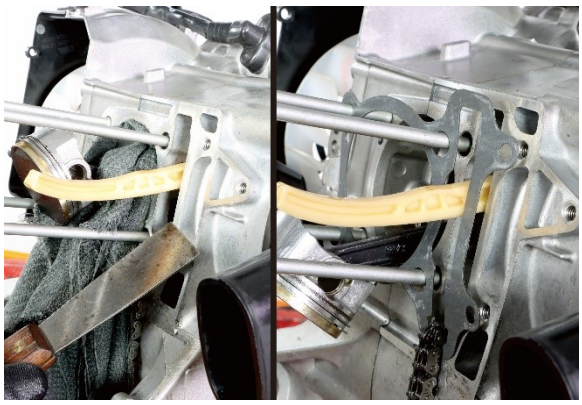


Cylinder mounting

Confirm that all gasket debris and foreign objects on the crankcase mating surfaces have been removed.

Note

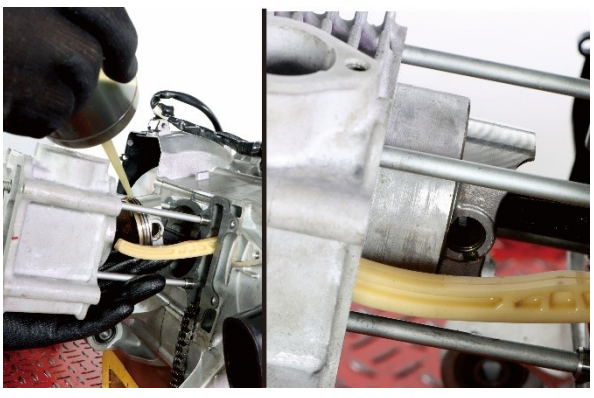
- The gasket debris can be moistened with a solution, which makes it easier to remove.



Install the new gasket.
Insert the new locating pins (locating pins ×2).
Apply new engine oil to the inner side of the cylinder, the piston and the piston rings.
Carefully insert the cylinder into the piston.
When inserting, hold down the piston ring and insert one ring at a time.

Note

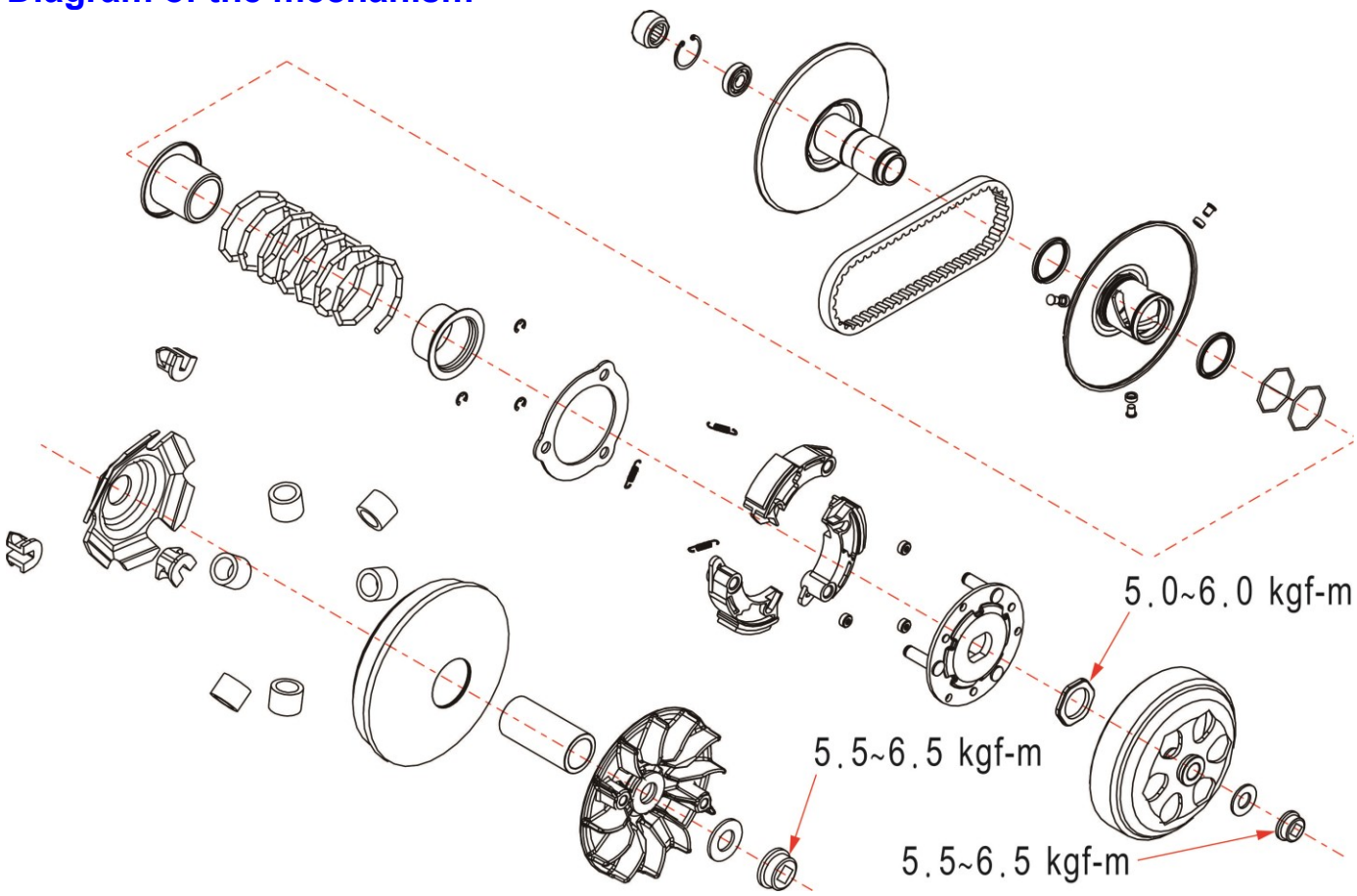
- Do not forcefully insert the cylinder into the piston, as that can easily damage the piston and the piston rings.



Install CAM chain guide plates, cylinder head gaskets and locating pins.
Install the cylinder head (see Chapter 7).
Install the CAM chain auto-adjuster (bolt ×2).

Institutional Diagram 8-1	Drive belt..... 8-3
Maintenance Instructions 8-2	Slide the drive disc..... 8-6
Fault Diagnosis 8-3	Clutch/drive pulley..... 8-9
Left crankcase cover 8-3	Transmission system maintenance..... 8-18

Diagram of the mechanism



Maintenance Instructions

Precautions for work

General Notes

Drive discs, clutches, and transmission discs can be repaired on the vehicle.

There must be no grease on the surface of the drive belt and drive disc.

Specification unit: mm

Project	Standard value	Available limits
Drive belt width	19.3 ~ 20.1	19.100
Slide the inner diameter	23.989 ~ 24.052	24.060
Slide the outer diameter	23.960 ~ 23.974	23.940
Outer diameter of the	17.920 ~ 18.080	17.400
Clutch jacket inner	112.000 ~ 122.200	112.500
Clutch to make the plate	2.000	1.500
Drive pulley spring length	98.100	-
Outer diameter of the	33.965 ~ 33.985	33.940
The inner diameter of the	34.000 ~ 34.025	34.060

Torque values

Sliding drive nut 5.5 to 6.5 kgf-m

Clutch jacket nut 5.5 to 6.5 kgf-m

Clutch drive plate nuts 5.0 to 6.0 kgf-m

Fault diagnosis

The engine starts, but the wheels don't turn

The drive belt is broken.

Wear on the inclined plate.

The clutch causes the plates to be damaged and worn.

Drive disc spring breakage.

Stalling or shaking while the vehicle is in motion

The clutch counterweight spring is broken.

The clutch causes the plates to wear out.

Poor high-speed performance or insufficient horsepower

The drive belt is worn out.

The drive disc spring is not strong enough.

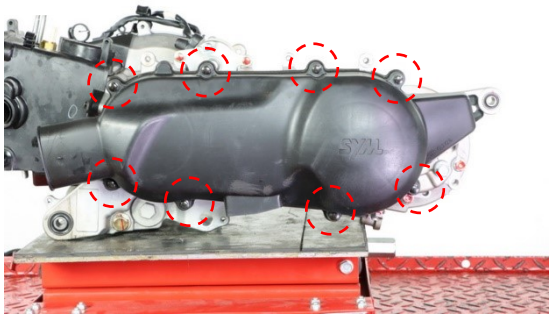
The counterweight rollers are worn out.

The drive disc doesn't work smoothly.

Left crankcase cover

Remove the left crankcase cover
Remove the engine left cover fixing bolts (bolts ×8).

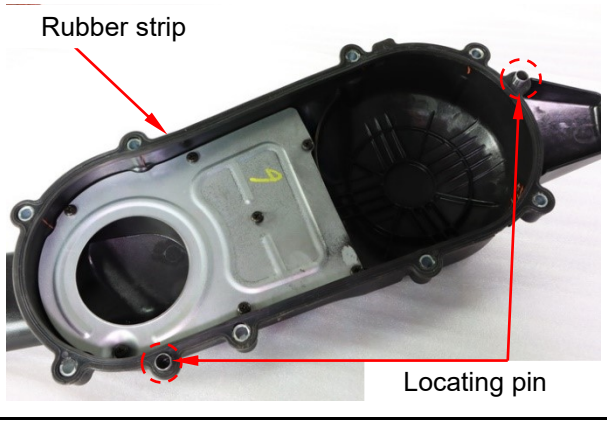
Bolt ×8



Remove the left engine cover.

Note

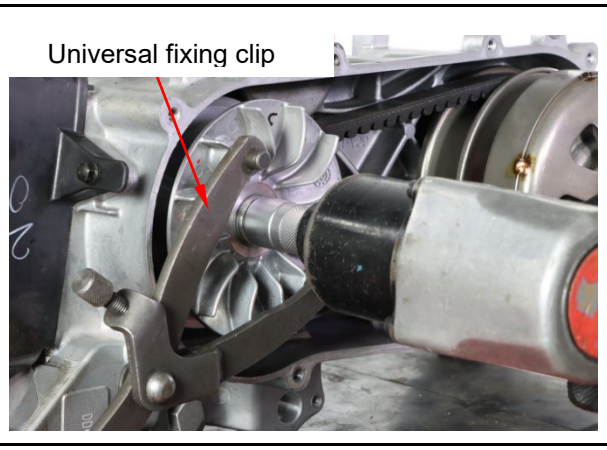
- Please replace the tape with a new one if it is not damaged, cracked or poorly broken.
- The locating pins must not be missing or omitted.



Installation
Install in the reverse order of disassembly.

Drive belt

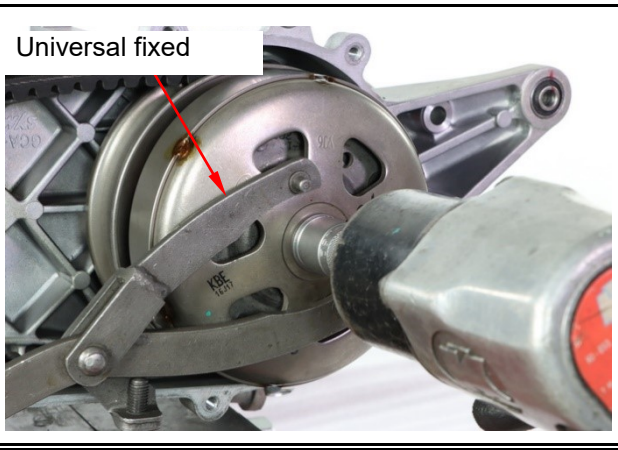
Disassemble
Remove the left crankcase cover.
Use the universal clamps to secure the drive disk and remove the nuts and the drive disk.
Special tools:
Tool Name: Universal Clamp



Use the universal clamp to secure the clutch jacket and remove the nut.

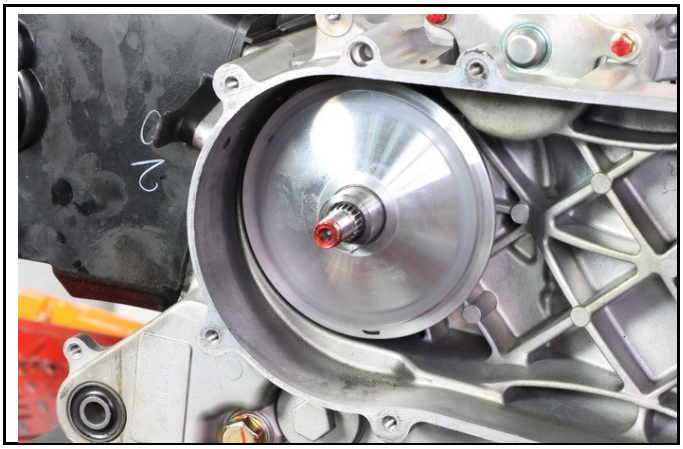
Note

- When loosening the lock nut, use a special tool. If only the rear wheel or rear brake is fixed, the reduction gear system will be damaged.

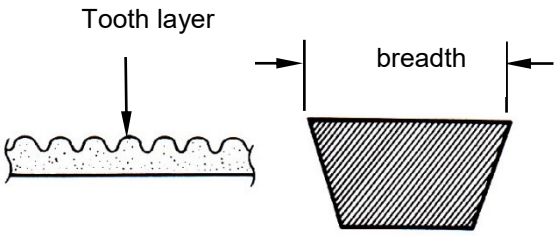


Remove the clutch jacket.
Then remove the belt and clutch at the same time.
Remove the drive belt from the clutch drive pulley groove.

Remove the sliding drive disc and hub.



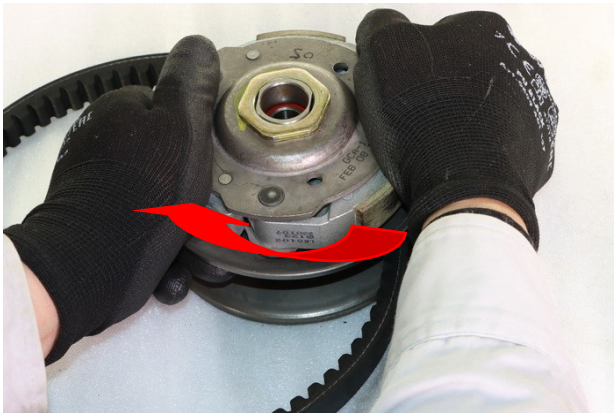
Check
Check for cracks and wear on the drive belt and replace it if necessary.
Measure the width of the drive belt as shown in the figure. If it exceeds the maintenance limit, replace the drive belt.
Available limit: 19.10mm



⚠ Note

- Please replace with genuine parts.
- There must be no grease on the surface of the drive belt or pulley.
- Grease and dirt should be removed before installation.

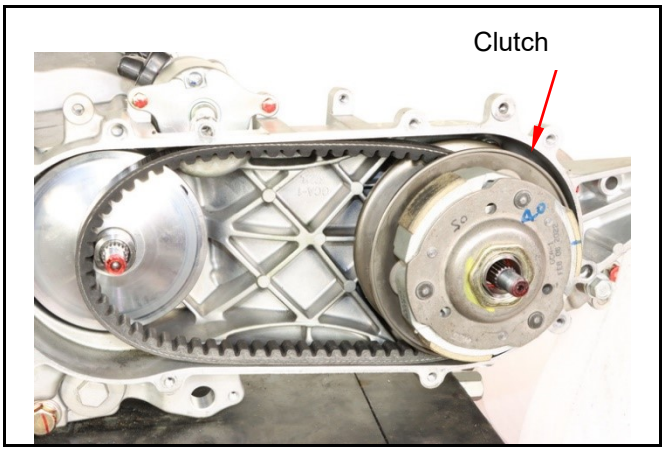
Installation
First rotate the drive belt pulley clockwise, then insert the drive belt into the drive pulley.



⚠ Attention

- Pull the drive pulley to position and then insert the drive belt into the drive pulley, which makes it easier to assemble the belt onto the sliding pulley.

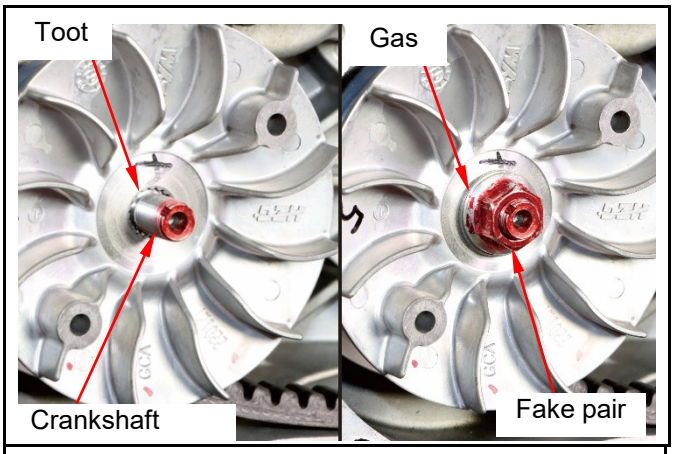
Assemble the clutch that has been loaded into the drive belt onto the drive shaft.
Put on the clutch jacket.
Put the sliding pulley on the other end of the belt.



Install the drive disc.
Place the gasket and lock the nut (fake pair)

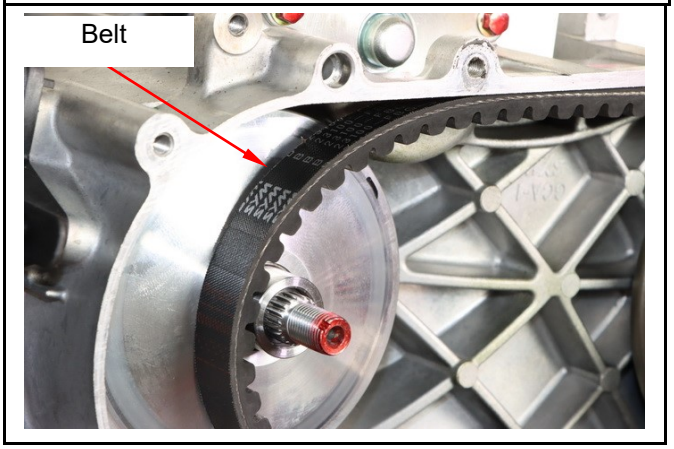
⚠ Note

- Drive disk slots must fit tightly with crankshaft slots.

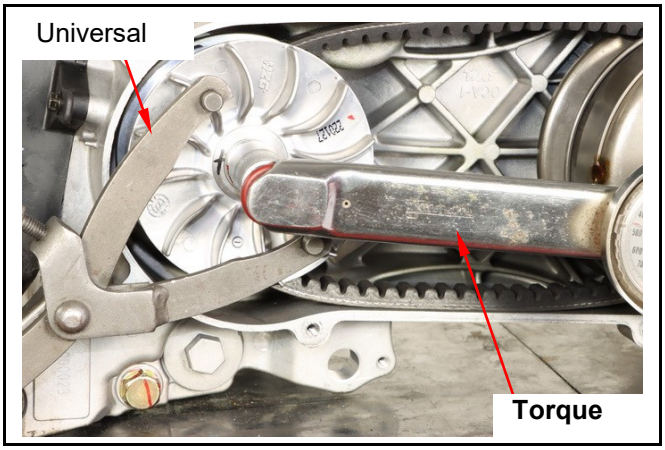


⚠ Note

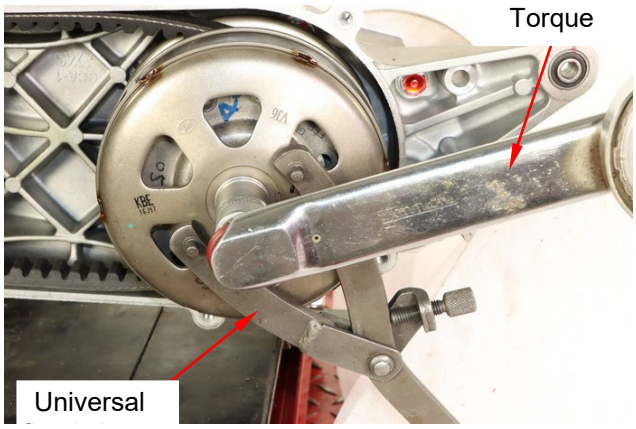
- When assembling the drive belt, if there is an arrow marking, it should face the direction of rotation; if there is no arrow marking, the direction of the text on the belt should also face the assembly direction.



Hold the drive disc in place with a universal clamp.
Tighten the nut to the specified torque.
Torque value: 5.5 to 6.5 kgf-m

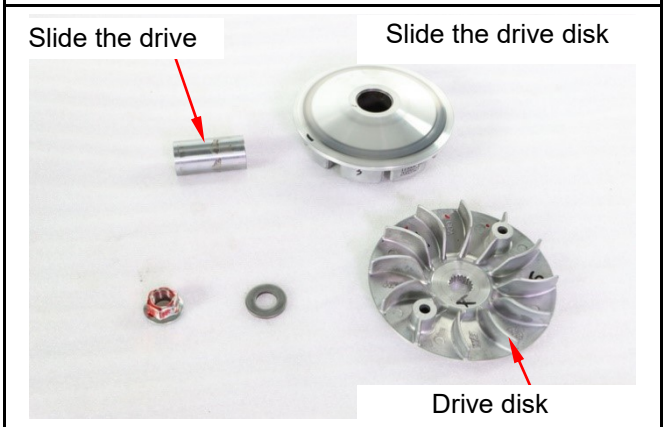


Secure the clutch jacket with the universal clamp and tighten the nut to the specified torque value.
Torque value: 5.5 to 6.5 kgf-m

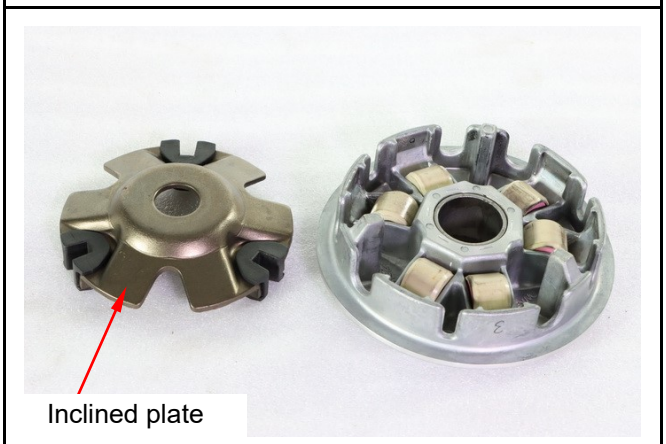


Slide drive disk

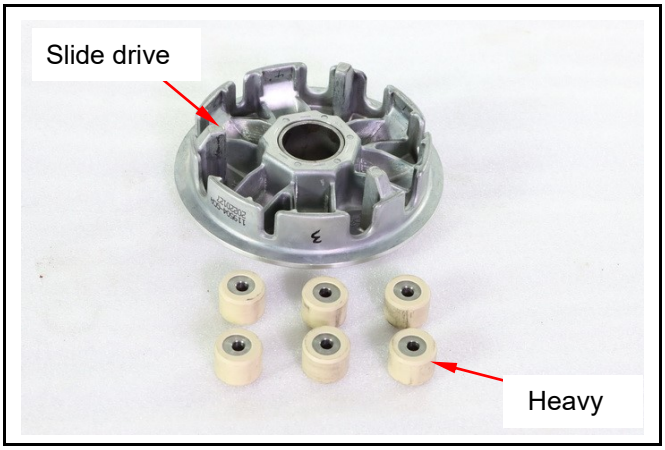
Disassemble
Remove the left crankcase cover.
Secure the drive disk with a universal clamp, remove the fixing nut of the drive disk, remove the drive disk.
Remove the sliding drive disk assembly and drive disk hub from the crankshaft.



Remove the ramps.



Remove the heavy hammer roller from the sliding drive disc.



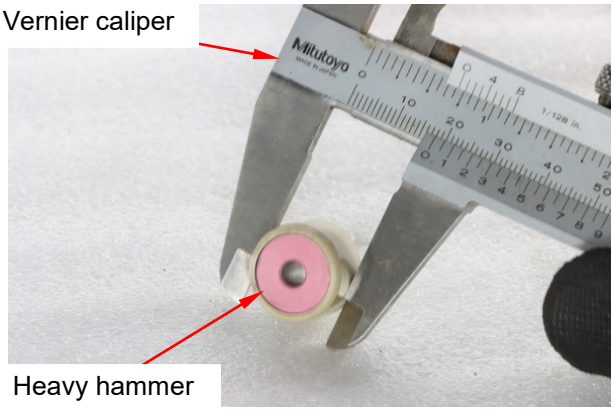
Check

The function of the sliding drive plate is to use the centrifugal force of the hammer roller to roll at the Angle of the inclined plate to push the sliding drive plate to achieve the function of changing speed; So if the hammer rollers are worn or damaged, it will affect the effect of this centrifugal force.

Check if the rollers are worn or damaged and replace them if necessary.

Measure the outer diameter of each roller and replace it with a new one if it exceeds the specified limit for use.

Available limit: 17.40mm



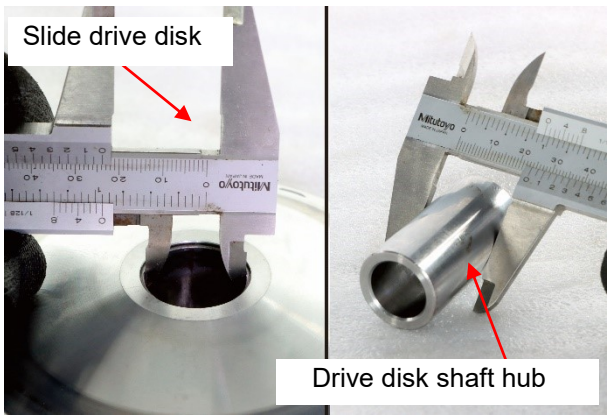
Check for wear or damage to the drive disk shaft hub and replace it if necessary.

Measure the outer diameter of the drive disk hub and replace it if it exceeds the specified limit for use.

Available limit: 23.94 mm

Measure the inner diameter of the sliding drive plate and replace it if it exceeds the specified limit for use.

Available limit: 24.06mm



Assembly/Installation

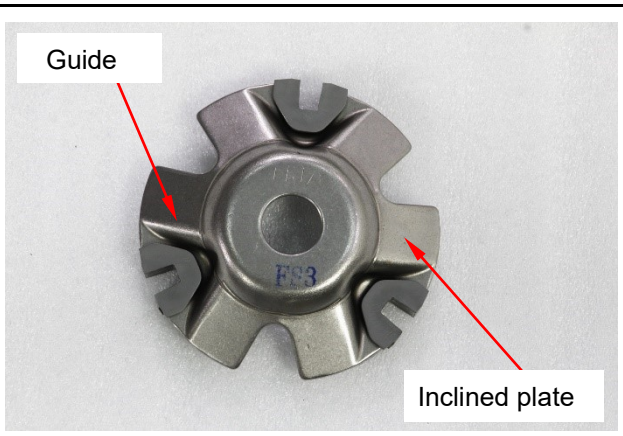
Install the heavy hammer roller.

⚠ Note

- The two end faces of the hammer roller are not the same. To extend the life of the roller and prevent abnormal wear, assemble the sliding drive disk on the open end face in a clockwise direction.

Install the inclined plate guide rubber sleeve (3 pieces) onto the inclined plate.

Install the inclined plate.



Apply a little butter to the inside of the drive disk shaft hole.
Install the drive disk shaft hub.

Note

- There should be no grease on the pulley surface. Use a degreaser to remove unnecessary grease.

Install the sliding drive disk assembly onto the crankshaft.

Install the drive disc
Insert the drive belt onto the sliding drive disk and press down the upper and lower ends of the drive belt to separate the belt from the drive disk hub.

Note

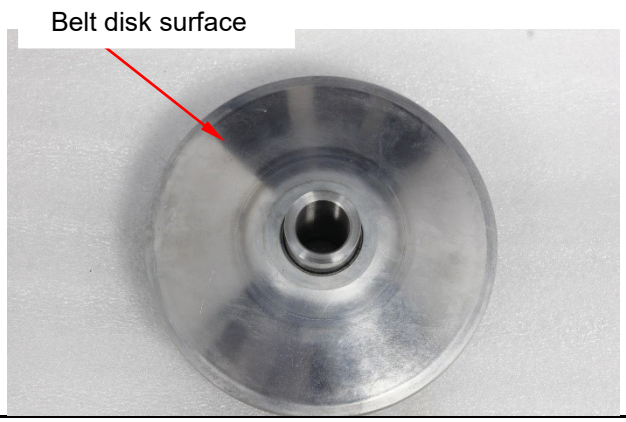
- Press down the upper and lower ends of the drive belt to avoid damaging the belt when assembling the drive disc and to ensure that the drive disc is securely locked.

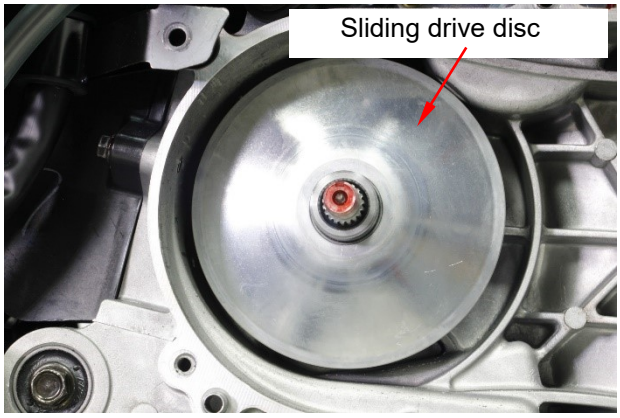
Install the drive disc, washers and nuts.

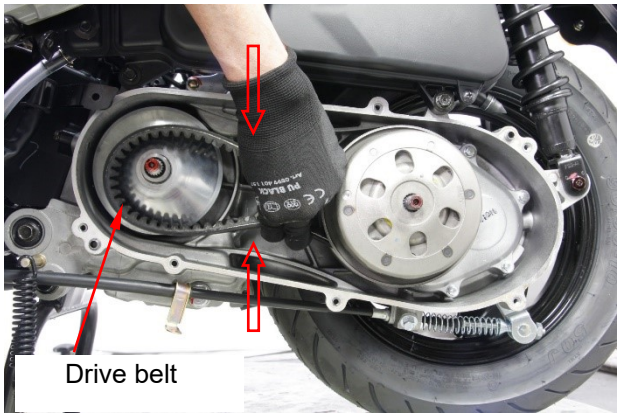
Note

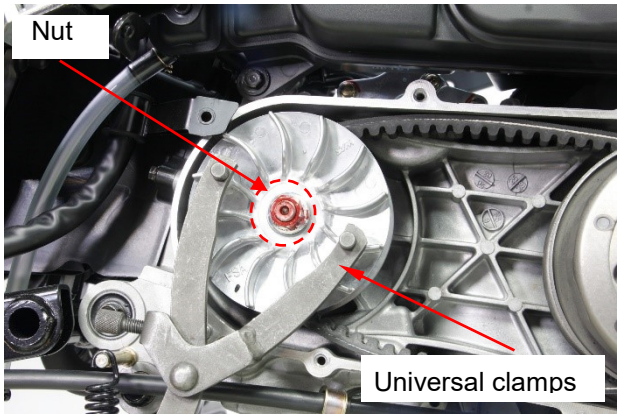
- Make sure there is no grease on either side of the pulley and use a degreaser to remove any unnecessary grease.

Secure the drive disc with a universal clamp.
Tighten the nut to the specified torque.
Torque value: 5.5 to 6.5 kgf-m
Install the left crankcase cover.
Special tools:
Tool Name: Universal Clamp







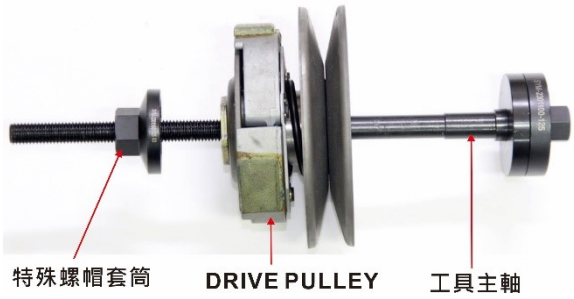


Clutch/drive pulley

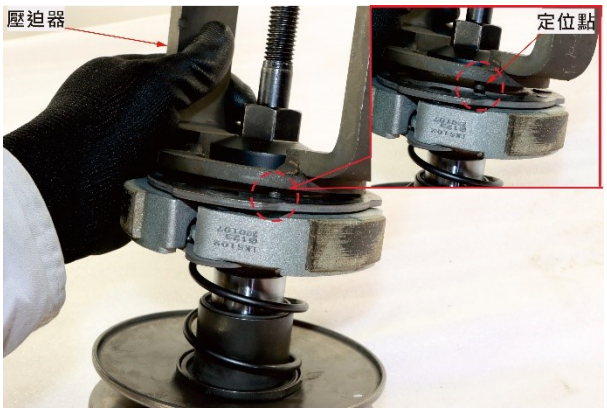
Disassemble

Use special tools to disassemble the clutch/drive pulley.

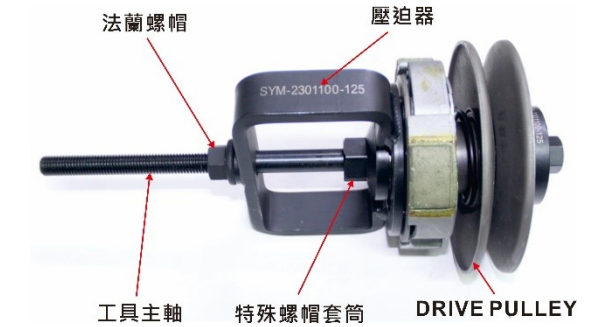
Insert the tool spindle into the clutch/drive pulley and insert the special nut sleeve.



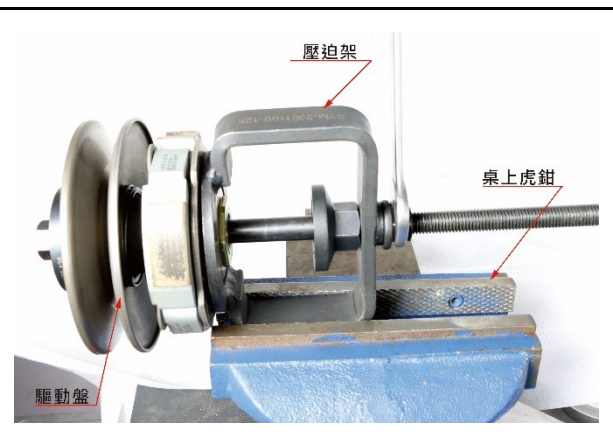
Insert the tool presser, and the tool positioning point must be securely engaged with the clutch/drive pulley positioning hole.



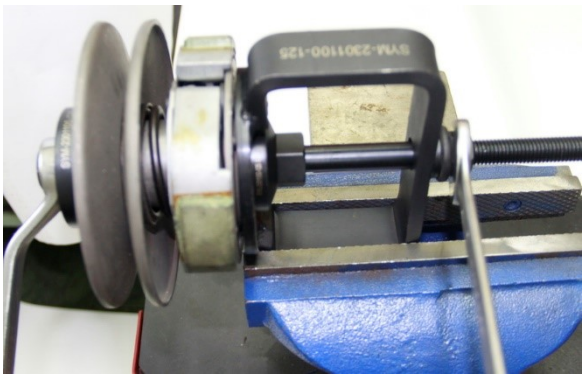
Lock the 21mm flange nut of the tool all the way in.



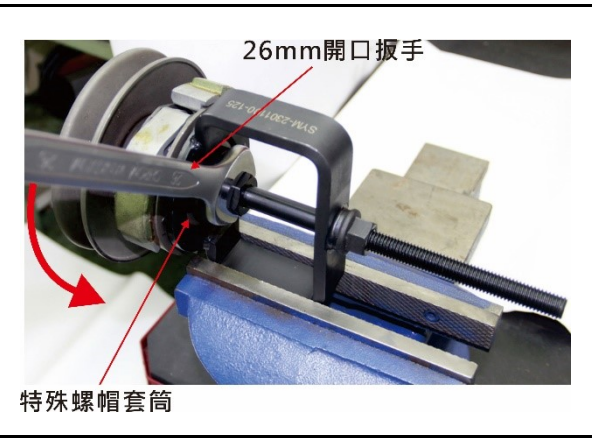
After engaging the tool with the clutch/drive pulley, use a table vise to securely clamp the tool press.



Use a 21mm plum wrench to lock the flange nut in the presser.

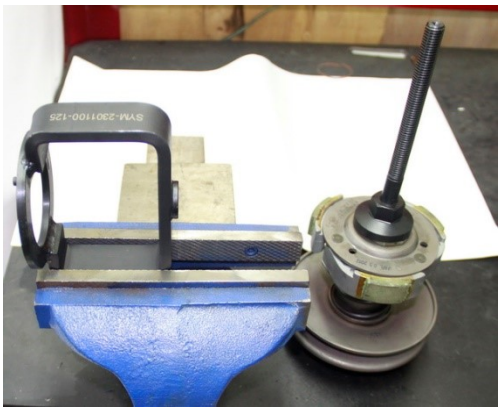


The special nut socket is engaged with the clutch/drive pulley special nut. Use a 26mm plum wrench to loosen the special nut counterclockwise.

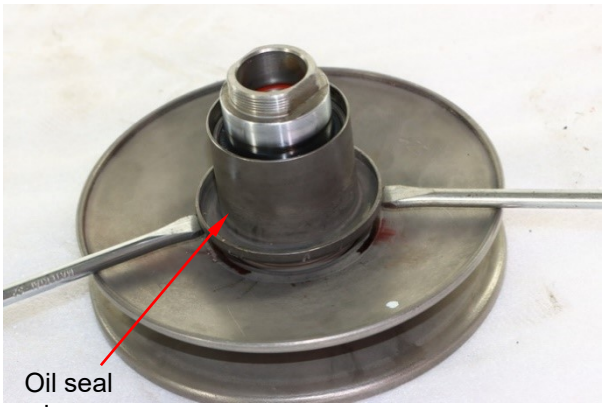


Use a 21mm ratchet wrench to counterclockwise loosen the flange nut until the spring is no longer elastic.

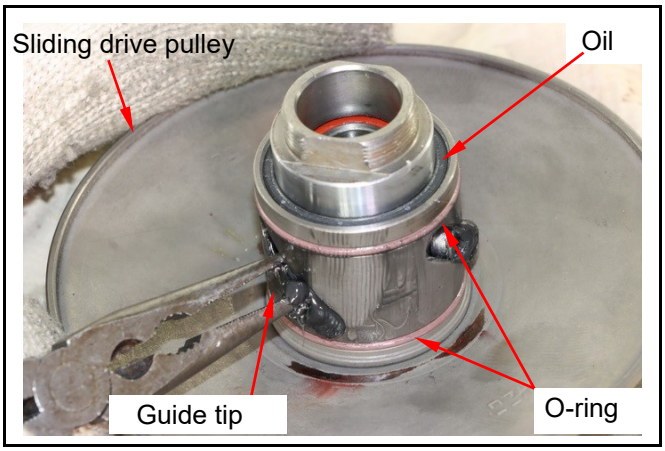
Remove the flange nuts and the main shaft, and then take off the clutch/drive belt pulley body



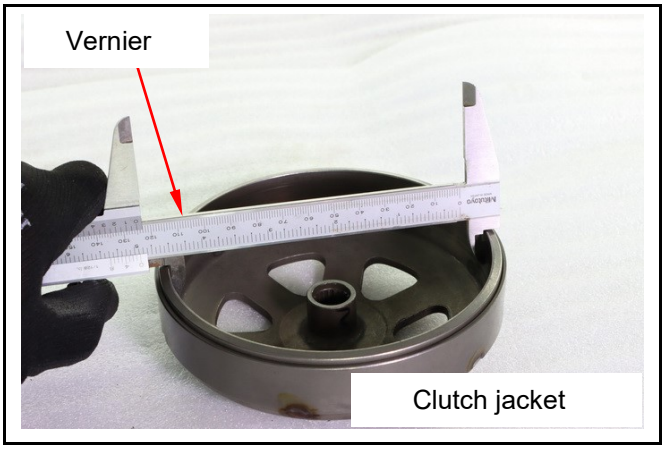
Clutch/drive pulley inspection:
Use a flat-head screwdriver to remove the oil seal sleeve from the drive pulley.



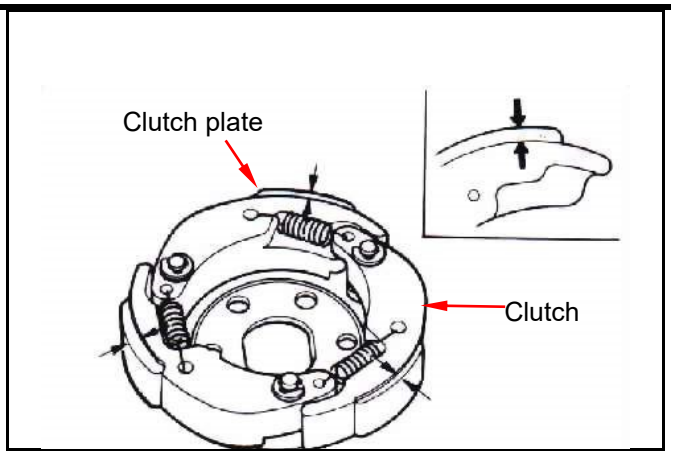
Remove the guide pins, slide the drive pulley, and remove the O-ring and the oil seal gasket from the sliding disc.



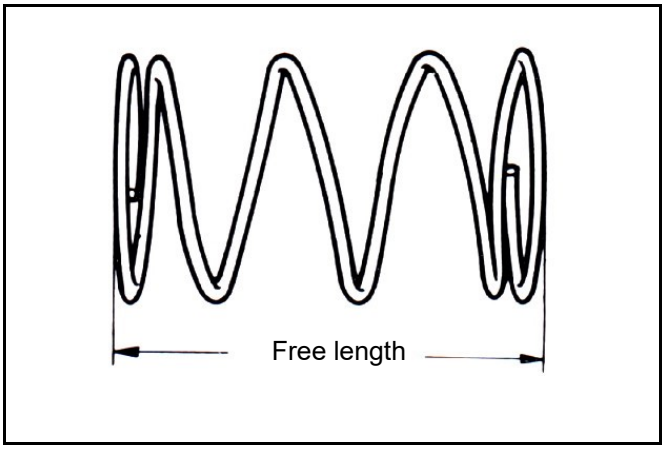
Clutch jacket
Measure the inner diameter of the friction surface of the clutch jacket and replace it if the maintenance limit is exceeded.
Available limit: 112.500mm



Clutch plate
Measure the thickness of each plate and replace it if it exceeds the limit specified for maintenance.
Available limit: 2.0mm

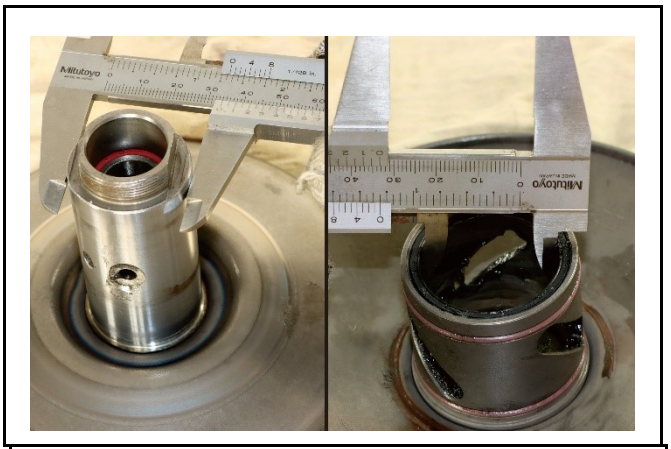


Drive pulley spring
Measure the length of the drive pulley spring and replace it if it exceeds the limit specified for maintenance.
Available limit: 98.1mm

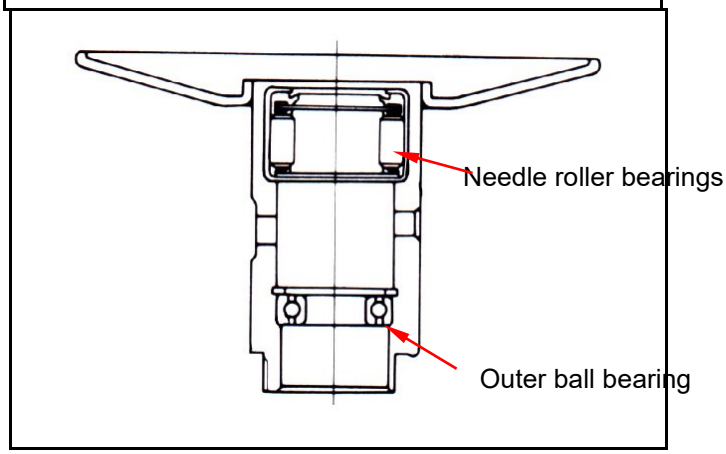


Drive belt pan
Check the following items:
1. Check for damage or excessive wear on both dials.
2. Check if the guide groove is damaged or deformed.

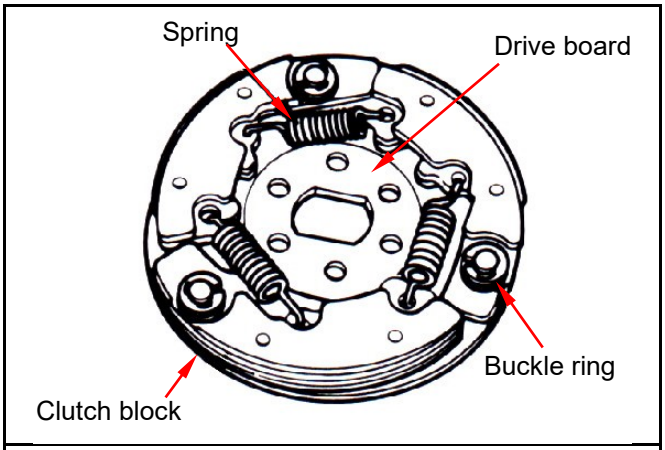
Replace damaged or overworn parts.
Measure the outer diameter of the transmission disc shaft and the inner diameter of the sliding transmission disc shaft hole. If they exceed the maintenance limit specified, replace them immediately.
Available limits:
Drive belt pulley block outer diameter 33.940 mm
Sliding drive pulley inner diameter 34.060mm



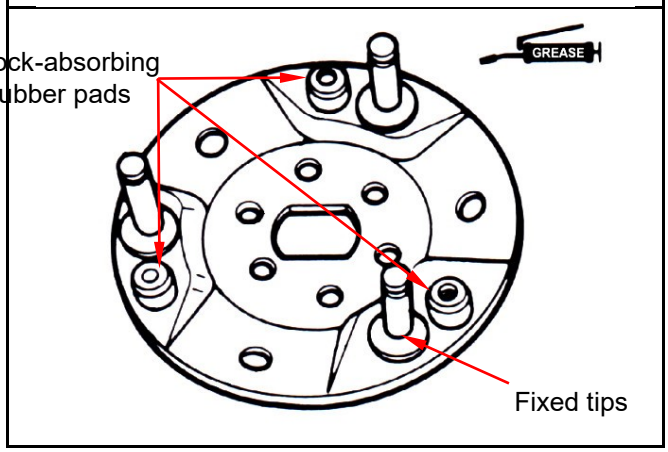
Inspection of the bearings of the drive pulley
Check for damage to the inner bearing oil seal. Replace the oil seal if necessary.
Check needle roller bearings for damage or excessive clearance and replace them if necessary.
Rotate the inner side of the outer bearing with your finger to check if the bearing can rotate smoothly and silently, and if the outer side fits and is fixed, replace the bearing if necessary.



Replace the clutch block
Remove the retaining ring and washer, then remove the clutch block and spring from the drive plate.
Check the springs for damage or insufficient tension.



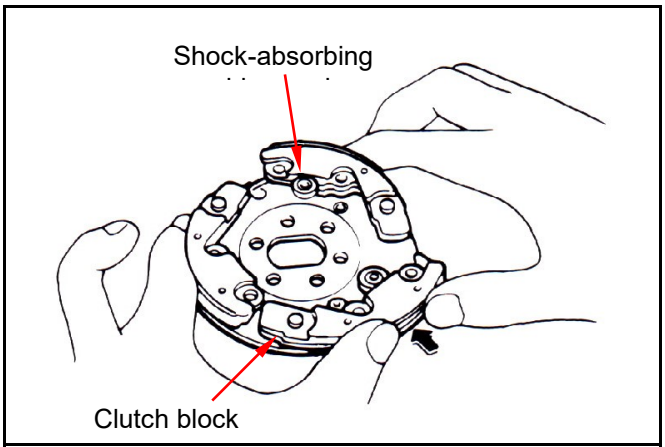
Check if the shock-absorbing rubber is damaged or deformed. Replace it if necessary.
Apply a little butter to the fixed tip.



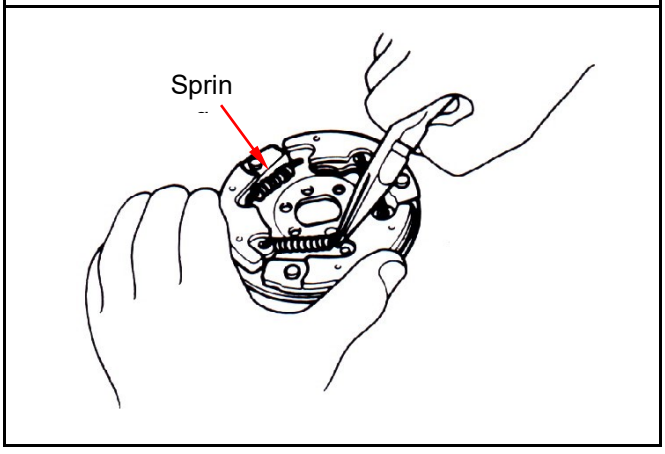
Apply a little grease to the fasteners, but there should be no grease on the clutch block. If there is grease on the clutch block, replace it immediately.
Insert the new clutch block onto the fixing pin and push it into position.

⚠ Note

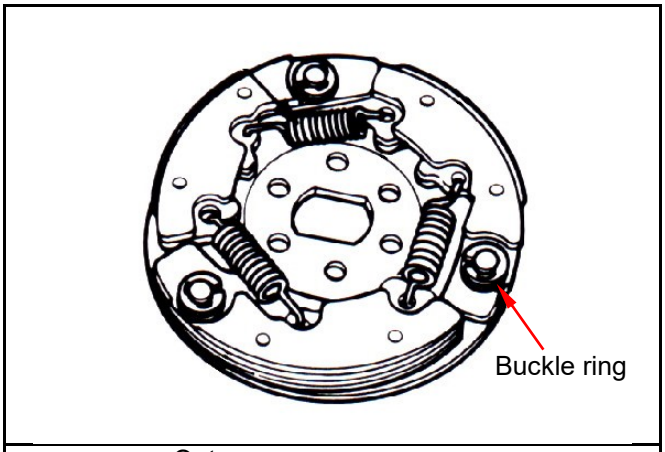
- Grease or lubricating oil can damage the friction plates on the clutch block and cause them to lose engagement.



Use pliers to insert the spring into the groove.



Attach the clasp and the support plate to the fixed tip.

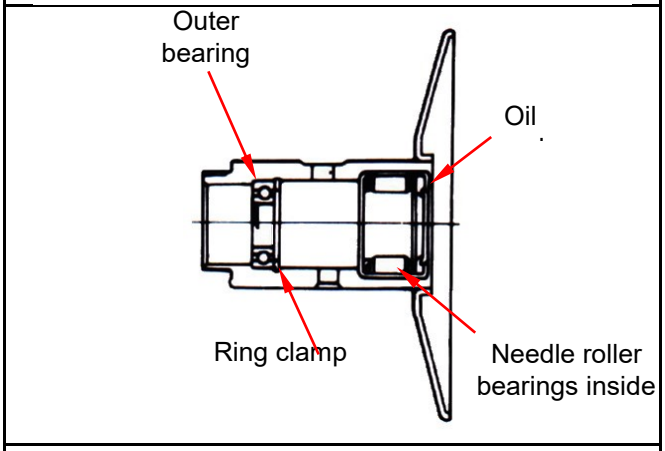


Replace the bearings of the drive belt pulley
Remove the internal bearings.

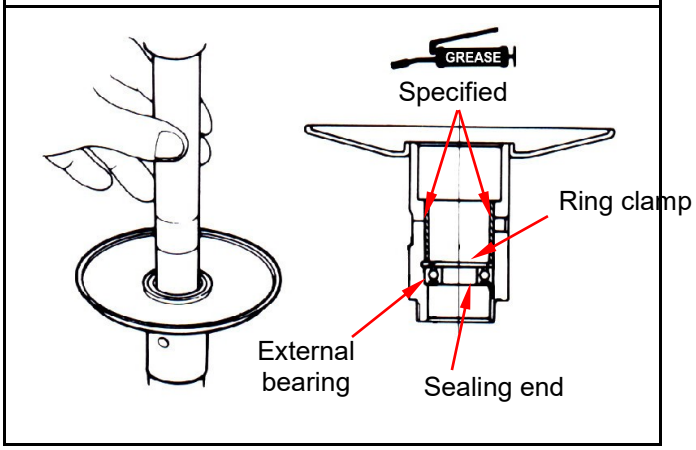
Note

- The drive pulley is equipped with an oil seal on one side of the internal bearing. The oil seal should be removed first.
- For the internal ball bearing, the ring clamp must be removed before the bearing is removed.

Remove the ring of the outer bearing and then push the bearing out towards the inner bearing.



Push the new bearing into position, with one end of the seal facing outward.
Apply the specified grease, and SYM brand butter is recommended.
Attach the ring clamp to secure the bearing.

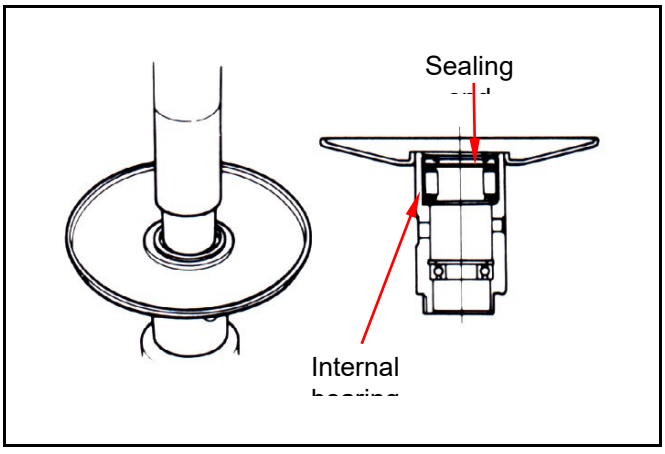


Install the new inner bearing.

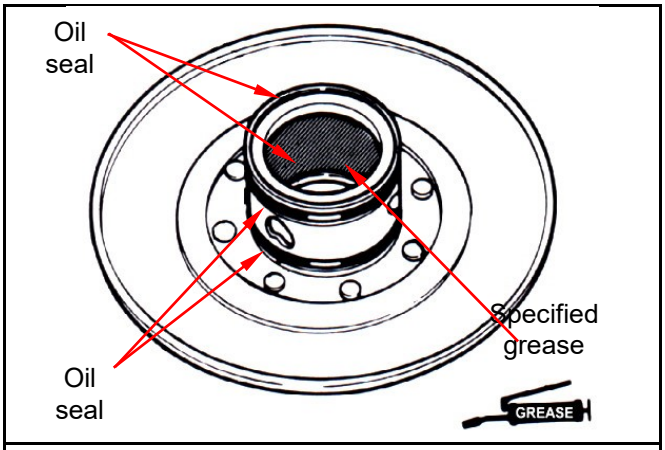
Note

- Note that when installing the bearing, one end of the seal should face outward.
- Use a hydraulic press or a drive to install the bearing.

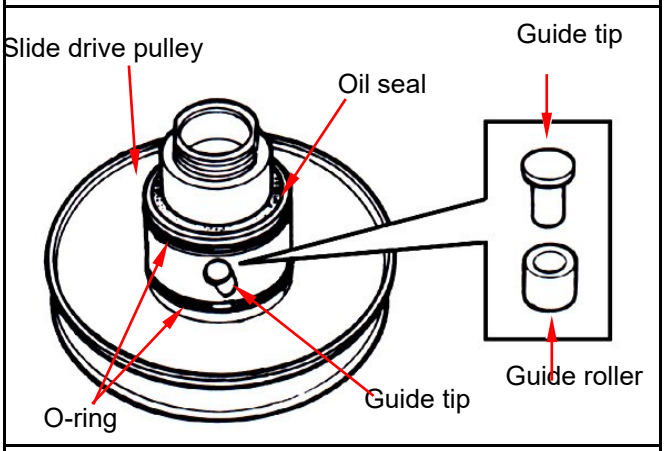
Align the lip of the oil seal with the bearing and install the new oil seal (if necessary).



Install the clutch/drive pulley assembly
On the sliding drive disc, install the new oil seal and O-ring. Lubricate the inside of the sliding plate with the specified grease.



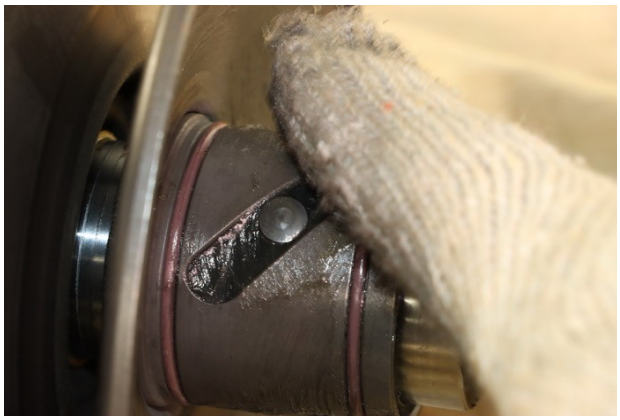
Install the sliding drive disc onto the drive belt disc.
Install the guide pins and guide pin rollers.



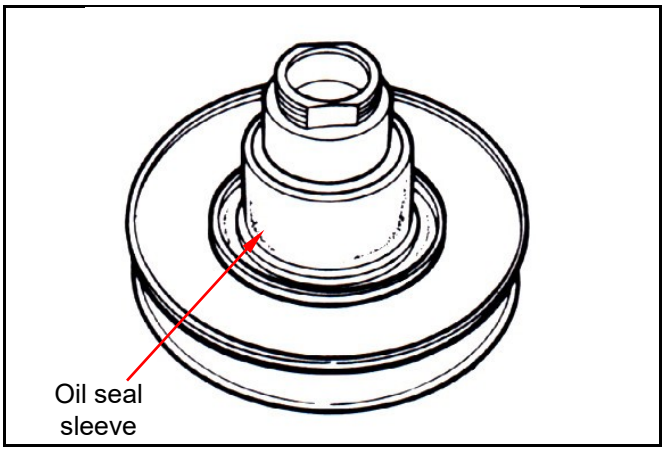
High-temperature resistant grease must be applied to the guide pin grooves

Note

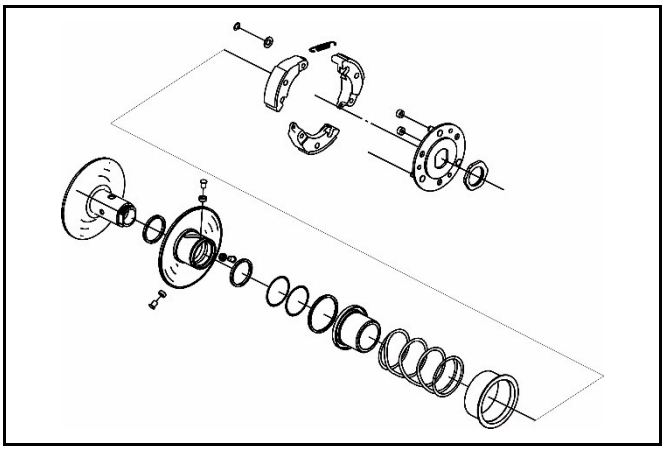
- Except for the hiking grease inside the pin groove, the rest must be wiped clean and free of grease stains.



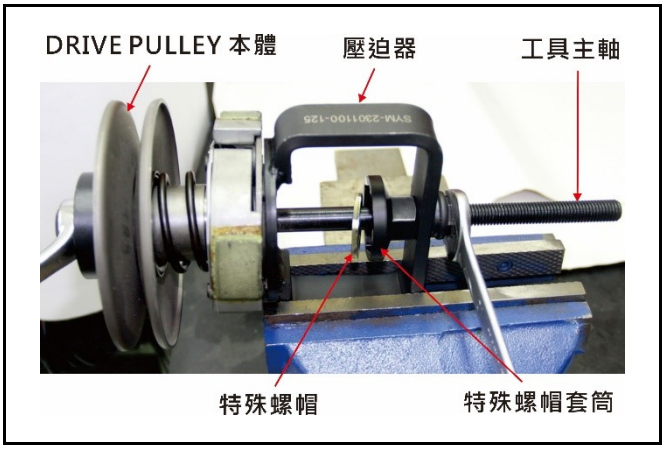
Install the oil seal sleeve.



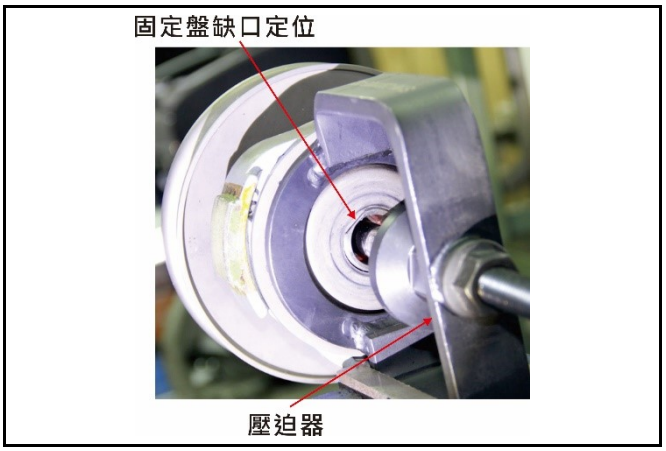
Combine the belt pulley parts in sequence.



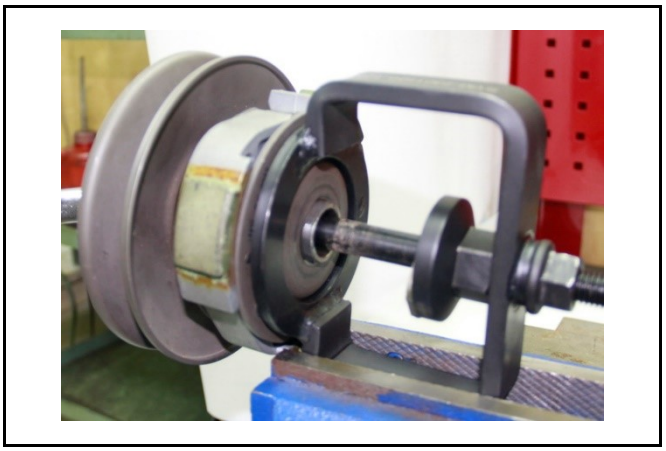
Use a 21mm open-end wrench to lock the flange nuts clockwise, push the presser, and press the clutch/drive pulley main body.



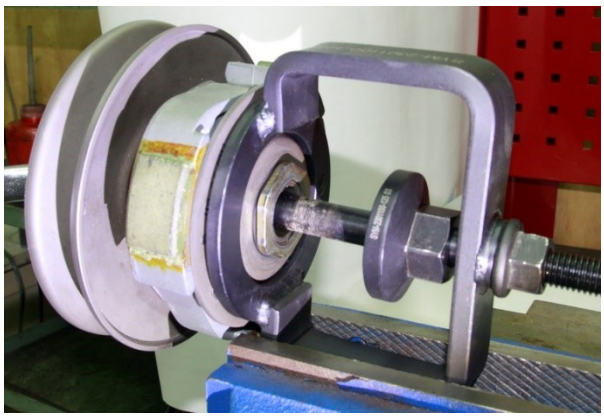
Turn the presser to position the notches on the fixed disc.
Using a 21mm open-end wrench, lock the flange nut clockwise and push the press to make the drive disk thread part pass through the fixed disk



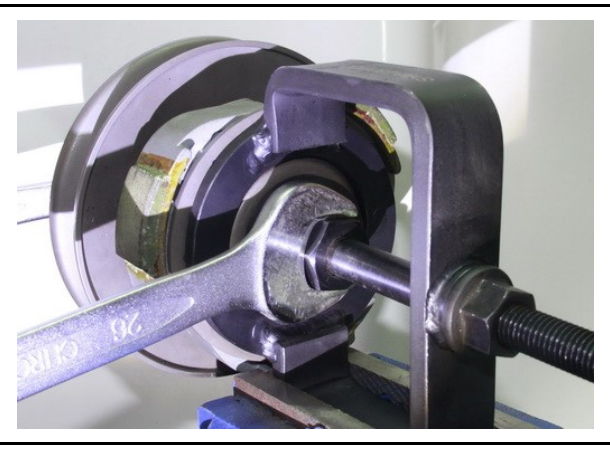
Use a 21mm open-end wrench and lock clockwise
Tighten the flange nut and push the press to drive the disc screw
The tooth section passes through the fixed plate to the full bottom.



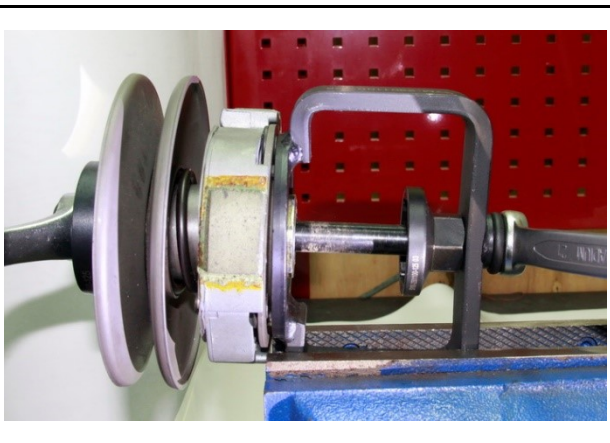
Insert the 39mm special nut, fake and lock in.



Attach the special nut sleeve to the nut.
Use a 26mm open-end wrench to lock the special nut socket clockwise to the bottom.

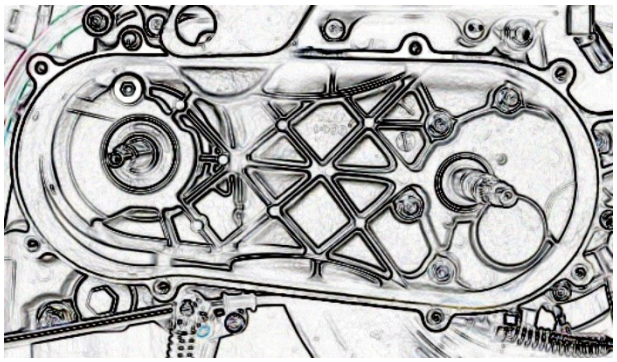


Using a 21mm open-end wrench, loosen the flange nut counterclockwise to separate the tool from the drive pulley body.



Powertrain maintenance

Clean with a vacuum cleaner and brush. Dust from the drive compartment and the left crankcase cover.



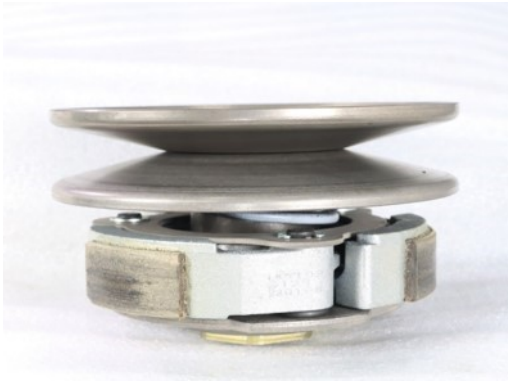
Spray the cleaner onto the surface of the drive disc and the sliding drive disc, then wipe it clean with a clean rags. There must be no oil stains on the surface.

Remove the balls and clean them with a vacuum cleaner and brush. Check if the balls are worn and pay attention to the direction of the balls when assembling.

Use a vacuum cleaner and brush to clean. Spray the cleaner onto the clutch jacket and wipe it clean with a clean rag. There should be no oil stains on the surface.

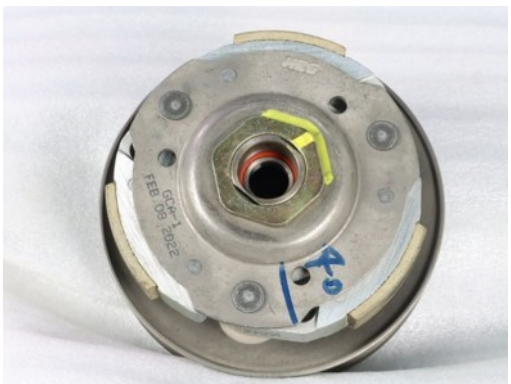
Use a rag to wipe the oil stains off the drive disc assembly.

Spray the cleaner on the drive disc and the belt groove between the sliding drive discs and wipe them clean with a clean rag. There should be no oil stains on the surface.



Use a rag to wipe the oil stains off the sliding drive discs.

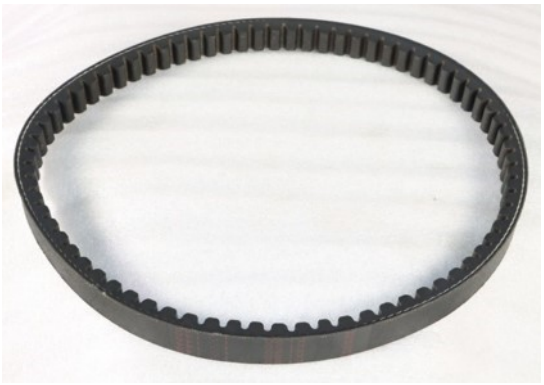
Use a vacuum cleaner and brush to clean the clutch assembly dust, then spray the cleaner onto the friction plates. There should be no oil stains on the surface of the friction plates.



Spray the machine cleaner onto the belt and then clean the surface of the belt with a rag. The surface of the belt must not have oil stains

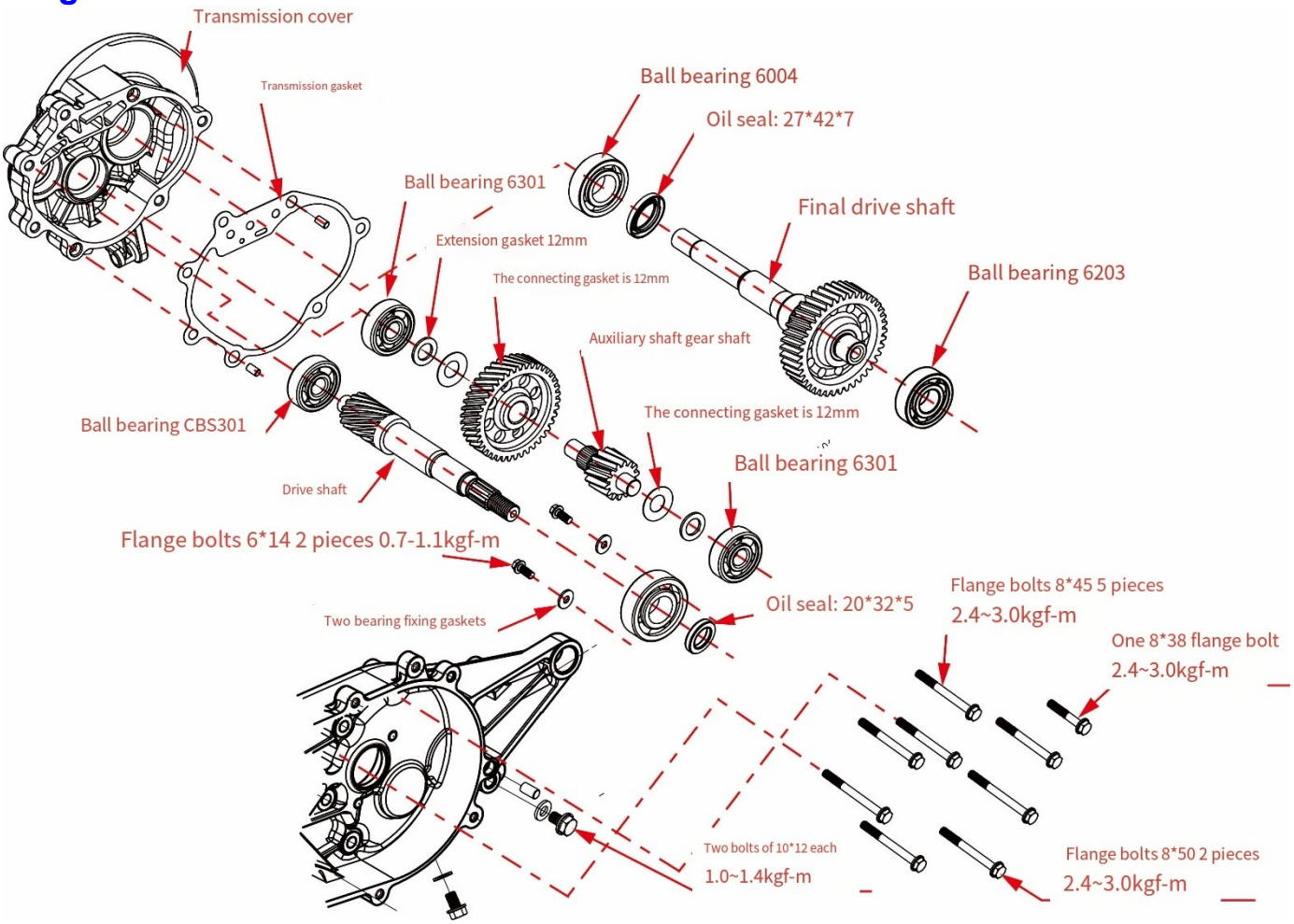
⚠

Do not spray the cleaner onto the bearing section to avoid contaminating the lubricating oil.



Institutional Diagram ..... 9-1 Maintenance Instructions ..... 9-2 Fault Diagnosis 9-3	Final deceleration mechanism disassembles..... 9-3 Check the final deceleration mechanism ..... 9-5 Replace the bearings 9-9

Diagram of the mechanism



Maintenance Instructions

Precautions for work

General Notes

Use gear oil: SAE 10W-40.

Use gear oil recommended by SYM.

Specifications

Gear oil quantity: 110 c.c. (100 c.c. when changing)

Torque value

Gearbox cover	1.0 to 1.4 kgf-m
Gearbox oil drain bolt	1.0-1.4 kgf-m
Gearbox oil filling bolts	1.0 to 1.4 kgf-m

Fault diagnosis

The car couldn't move after the engine started

- The transmission gear set is damaged
- Transmission gear set burnout
- Drive belt breakage

Abnormal sound

- Gear wear, burn, or damage to the tooth surface
- Bearing wear

The gear oil is leaking

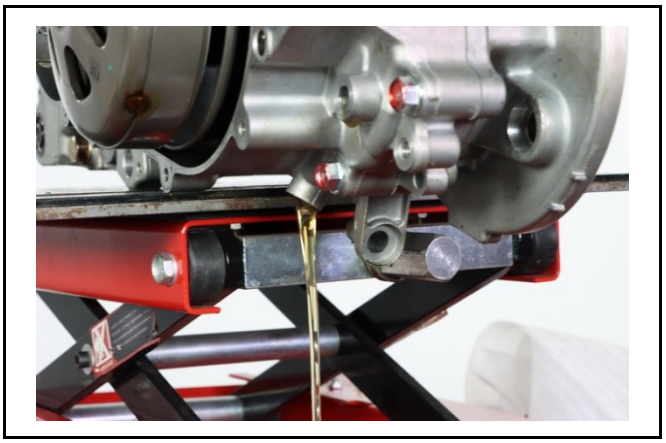
- Too high oil level
- Wear or damage to the oil seal

Eventually, the deceleration mechanism breaks down

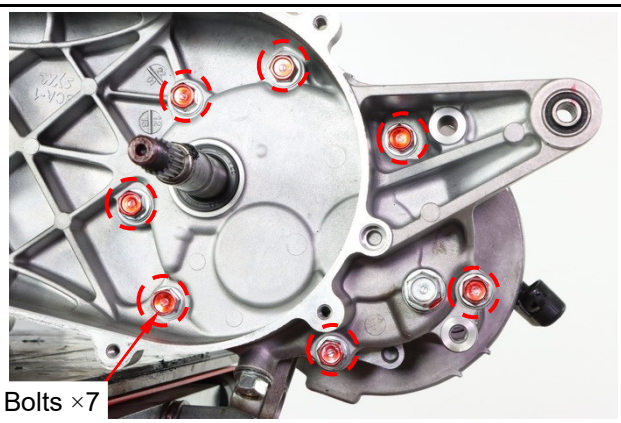
Remove the rear wheel (see Chapter 15).

Remove the left crankcase cover.

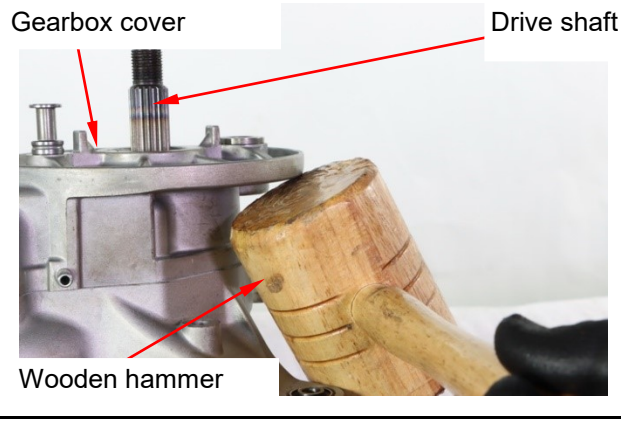
Drain the gearbox oil.



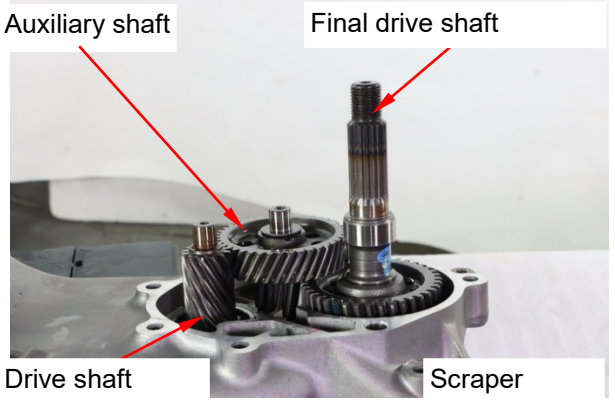
Remove the transmission system.
Remove the gearbox cover and take off the gearbox cover (bolt ×7) and the drive shaft.



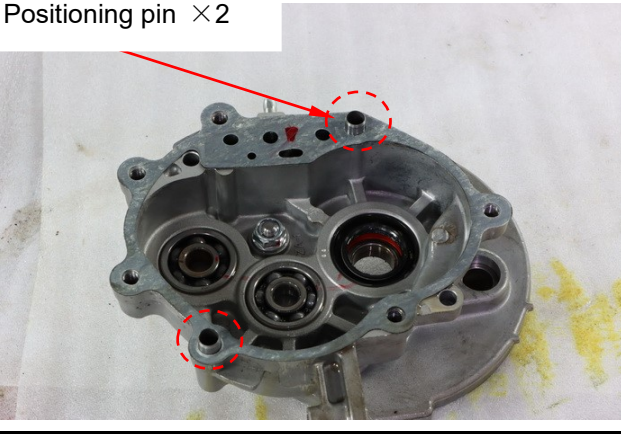
Use a wooden hammer to knock open the gearbox cover.



Remove the sub-shaft and gears.
Remove the final drive gear and the final drive shaft.
Remove the gearbox cover gasket and locating pins.



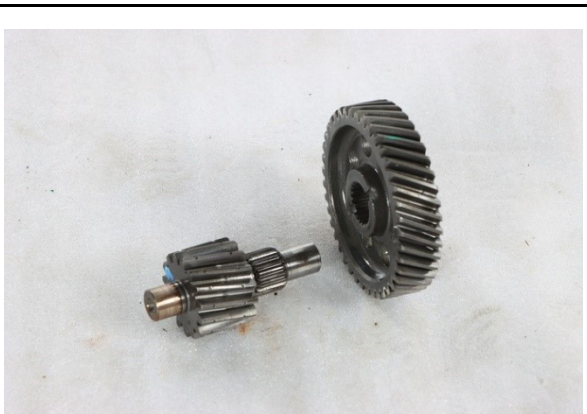
Remove the gearbox cover locating pins.



Final deceleration mechanism inspection

When disassembling, pay attention to the assembly direction of each part and gasket, and arrange them in order.

Check for wear or damage to the sub-shaft and the sub-shaft gear.



Check the final drive shaft and the final drive gear for wear or damage.

Check for wear or damage on the drive shaft and gears.

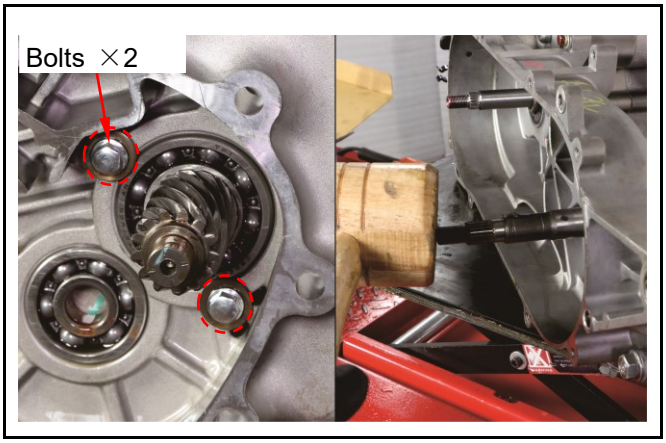
⚠ Attention

- Do not remove the drive shaft from the gearbox or gearbox cover unless necessary.
- If the drive shaft is removed from the gearbox, its bearings will need to be replaced with new ones.

Remove the drive shaft fixing gasket (bolts × 2).

Knock the drive shaft out of the gearbox.

Remove the drive shaft oil seal.



Note

- When pushing the drive shaft out of the gearbox, use a bushing or nut to lock it flat with the top surface of the shaft during operation
- Use a wooden mallet or rubber mallet to strike.

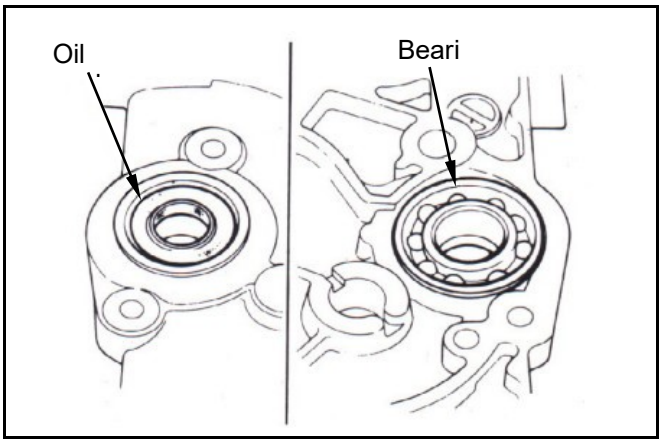
Check the gearbox and the bearings on the box cover.

Turn the inner rings of each bearing with your fingers.

The bearings should rotate smoothly and quietly, and check the outer rings of the bearings to see if they are securely attached to the gearbox and the cover.

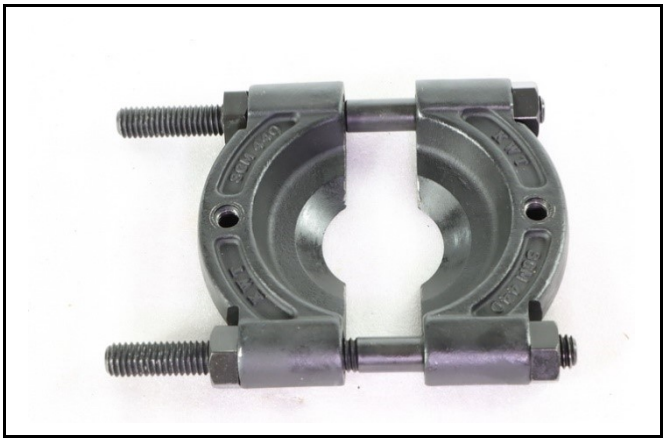
If the bearing does not turn smoothly, makes abnormal noises or is loosely attached to the gearbox or cover, it should be pulled out and replaced with a new one.

Check if the oil seal is worn or damaged and replace it with a new one if necessary.



Use of the bearing extractor - Remove the drive shaft bearing

Use a dedicated tool to remove the drive shaft bearing.

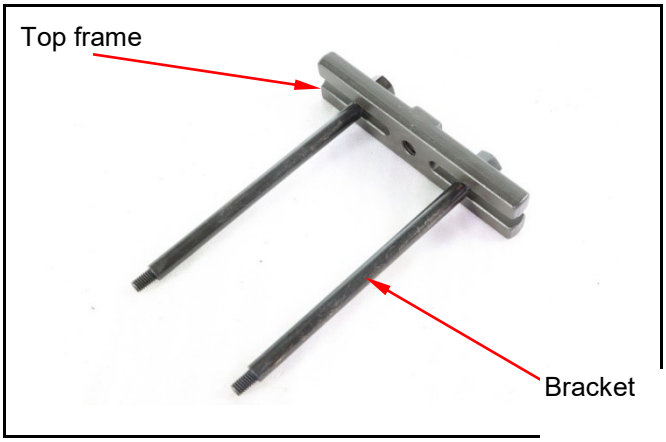


Combine the fixture and the fixture bolts.

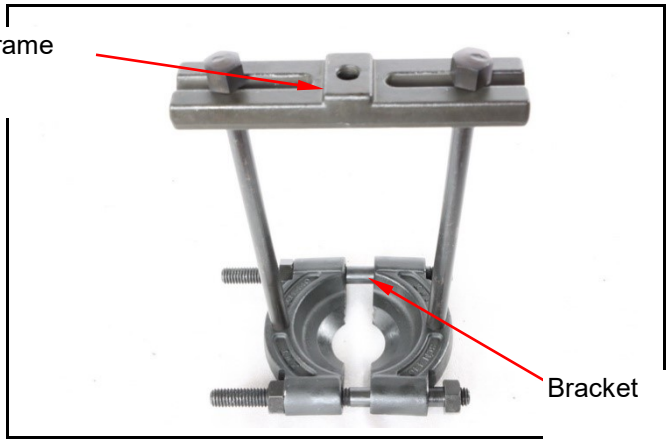
Insert the brackets on both sides into the top frame grooves.

Note

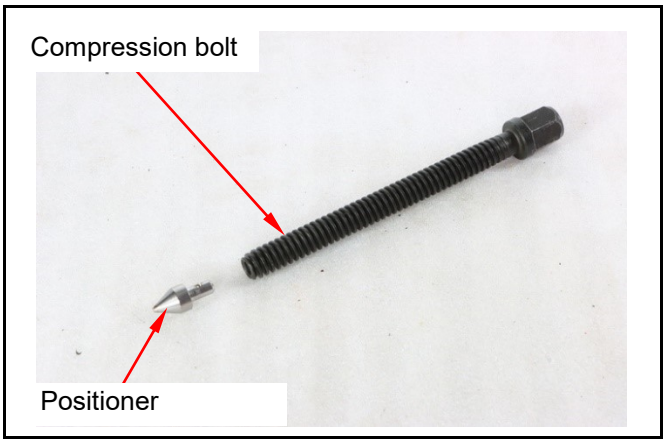
- There are two sizes of brackets, long and short, and you need to choose according to your job requirements



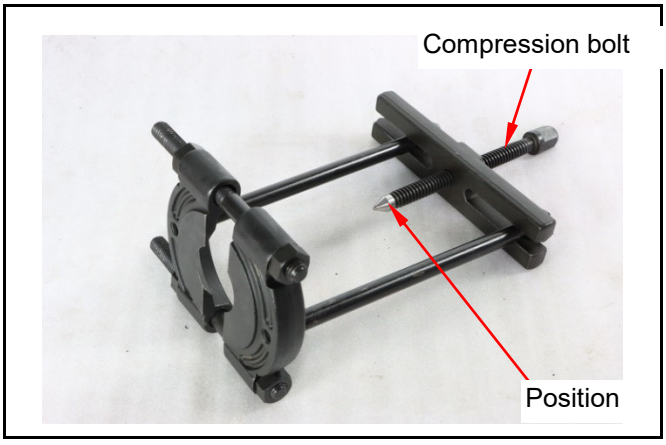
Lock the threaded part of the bracket with both hands simultaneously into the fixture locking holes on both sides.



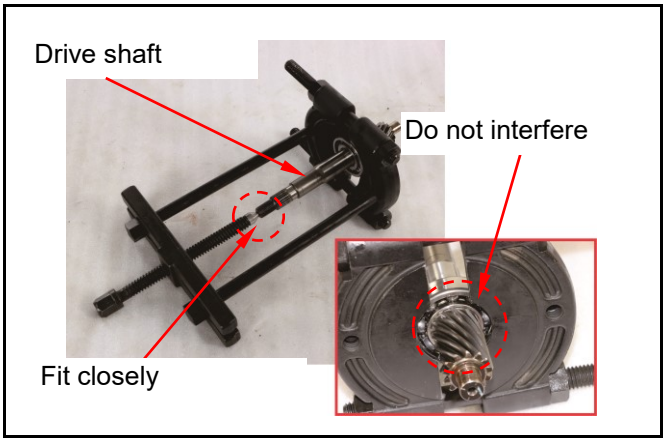
Separate the compression bolts from the positioner.



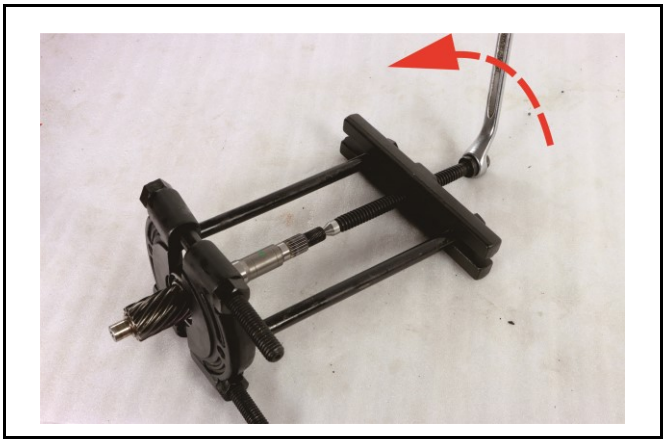
Lock the compression bolts into the top frame and insert the positioner.



Adjust the width of the fixture. The inner edge of the fixture must not interfere with the body of the drive shaft.
The tip of the positioner must be closely attached to the drive shaft.



Use the wrench to rotate clockwise



Disengage the bearing and the drive shaft.

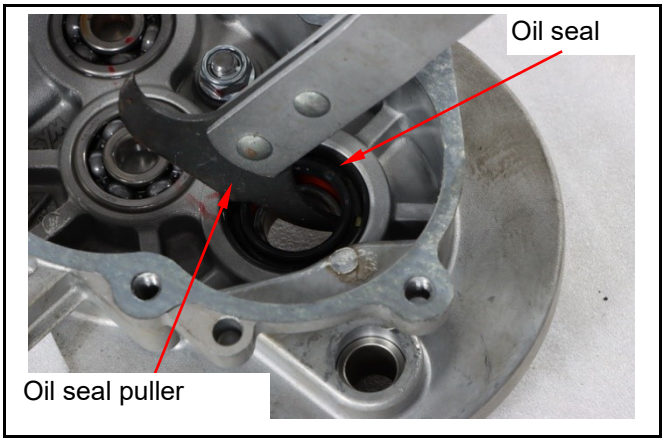
Bearing replacement

Use a special tool to remove the bearing.

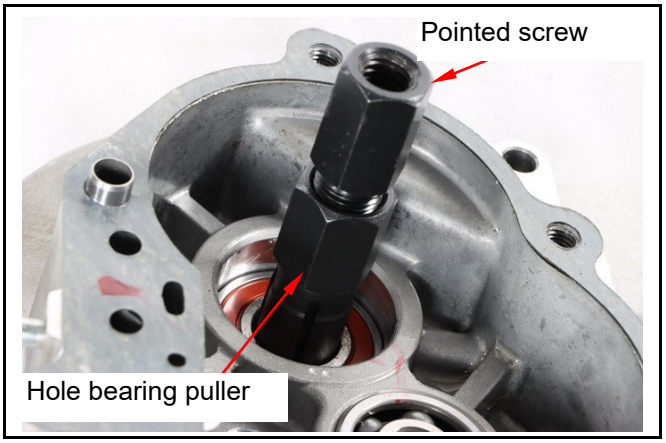
Special tool: Inward-pulling bearing extractor

Tool Number: SYM-6204025

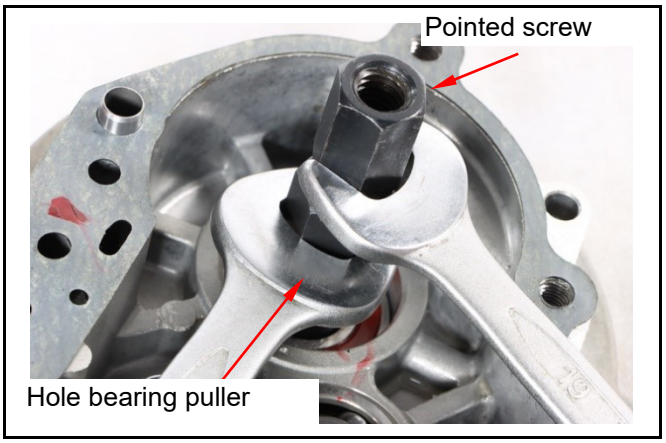
Use the oil seal puller to remove the oil seal.



When removing the gearbox bearing or the bearing on the box cover, use the following special tools to remove the bearing.
Use the hammer type to pull out the bearing.
Select the appropriate hole bearing puller to insert into the inner hole of the bearing so that it passes through the bearing.
Lock the appropriate disassembler tip screw into the end of the disassembler



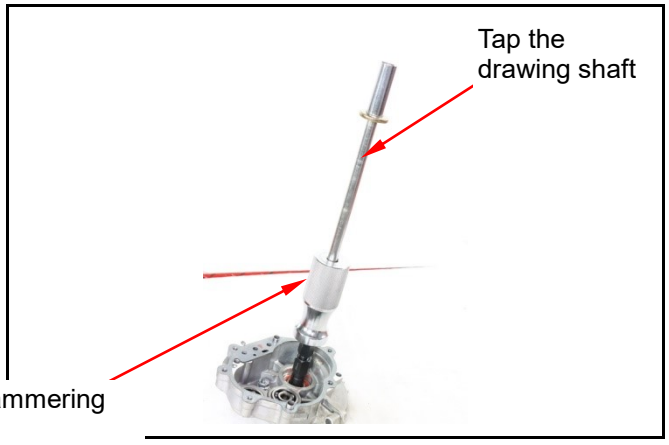
Use an open-end wrench to tighten the pointed screws to the maximum.



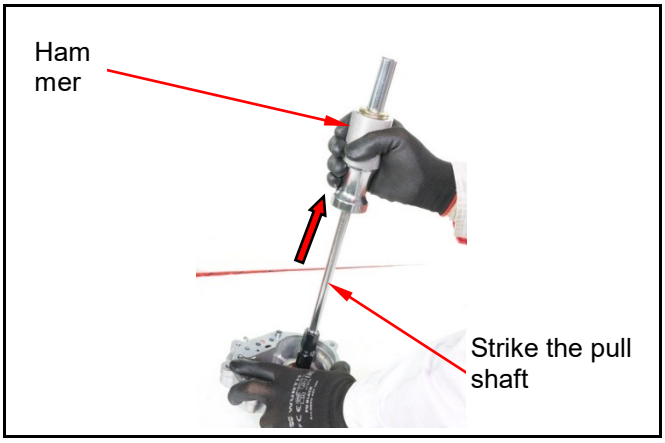
Note

- Check that the puller is securely attached to the bearing and that the lip is tightly attached to the lower end of the bearing.

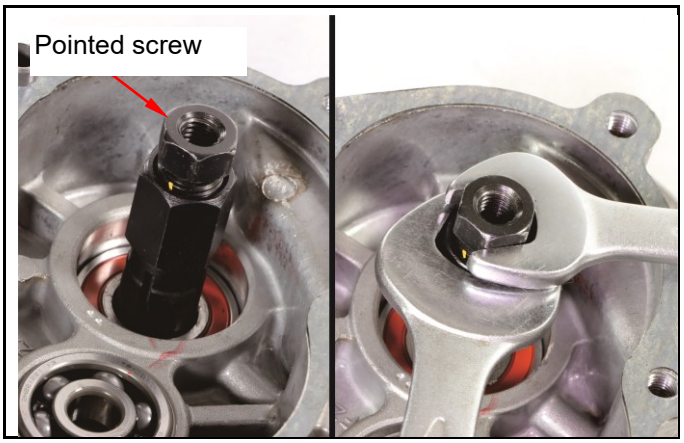
After the pull-out shaft is combined with the hammer, lock the pointed screw by hand until it reaches the bottom.



Hold the hammer and strike upwards to pull out the bearing.



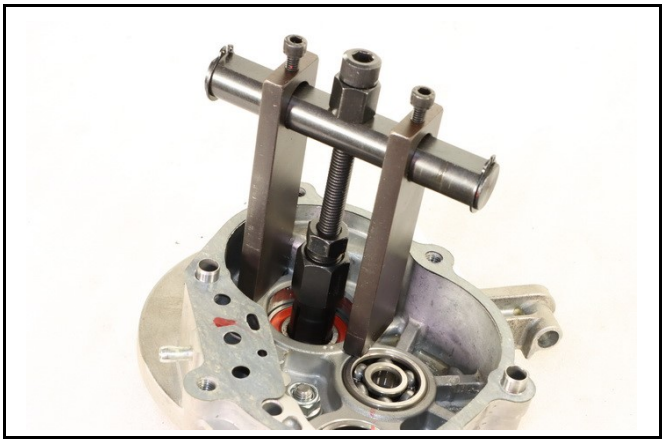
Select the appropriate hole bearing puller to insert into the inner hole of the bearing so that it passes through the bearing.
Lock the appropriate remover bridge-type pointed screw into the tail end of the remover.
Use an open-end wrench to tighten the pointed screws to the maximum.



Note

- Check that the puller is securely attached to the bearing and that the lip is tightly attached to the lower end of the bearing.

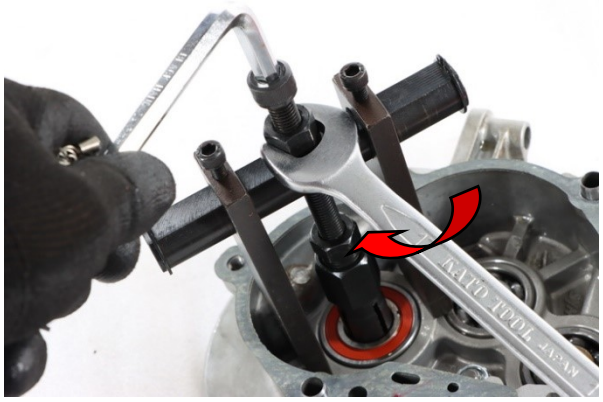
Attach the top frame to the pointed bolts, with the top frame posts standing upright in the plane parts on both sides of the bearing.
Lock the pull-out nuts to secure the top frame.



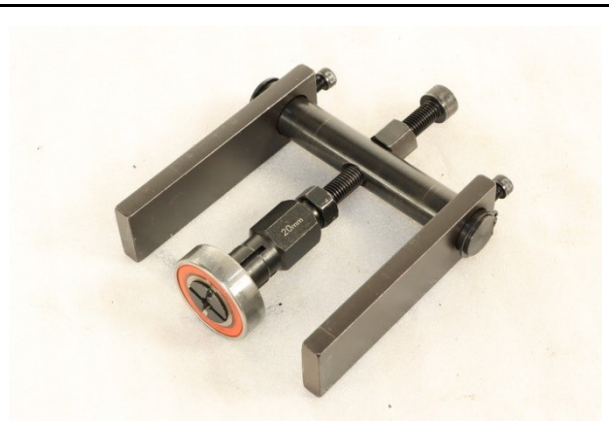
Note

- The top support posts must not interfere with the bearings.

Use an Allen wrench to secure the bolt, use a 17mm wrench to lock the pull-out nut, and pull out the bearing.



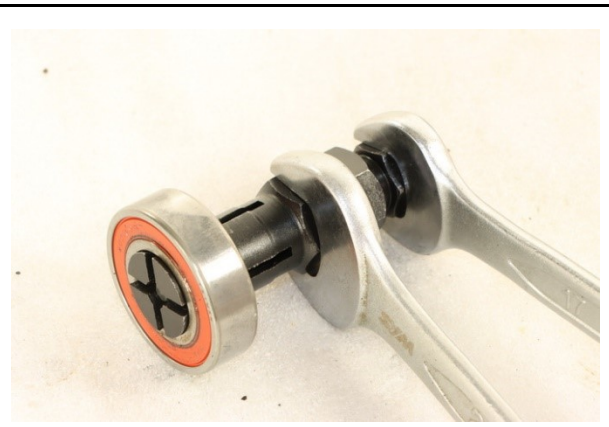
Remove the top frame and the bearing.



Use a wrench to loosen the pointed bolts and remove the puller and bearings.

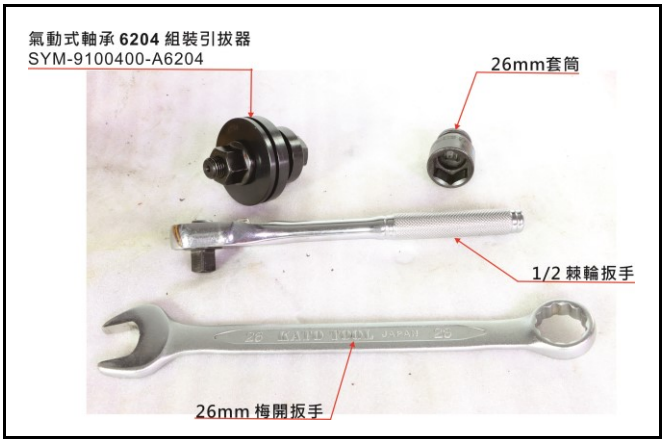
⚠ Note

- The bearing must be replaced with a new one after being pulled out.



Drive shaft oil seal 20*32*5 disassembly.
After selecting the appropriate striking disc and striking device, knock out the 20*32*5 drive shaft oil seal.
Special tool: Bearing striking device
Tool Number: SYM-6204024

Drive shaft assembly
Drive shaft bearing assembly
Drive shaft bearing assembly tools.

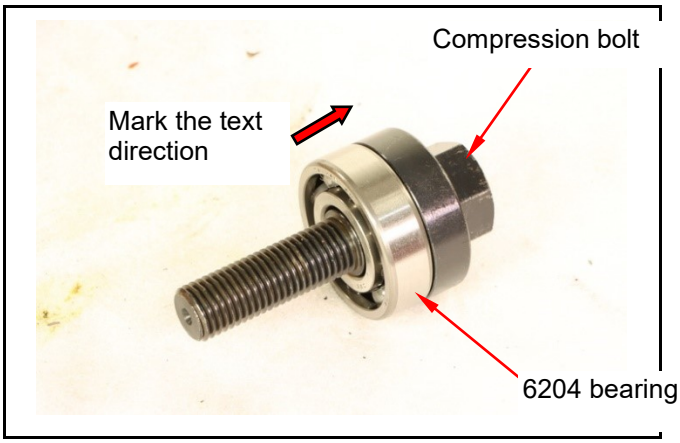


Combine the new 6204 bearing with the tool compression bolt.

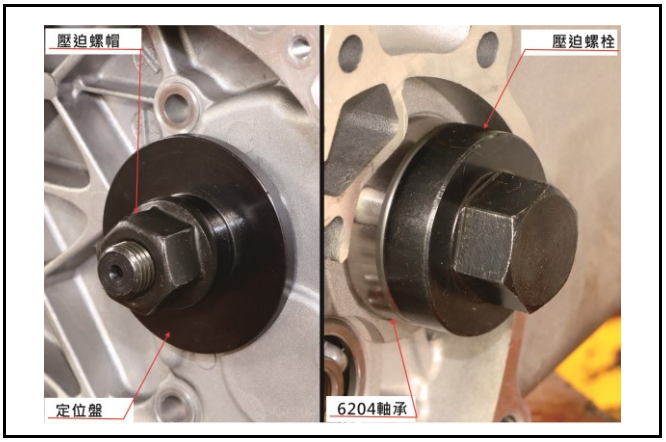
Note

- Bearing part marking text must face the pressure plate.

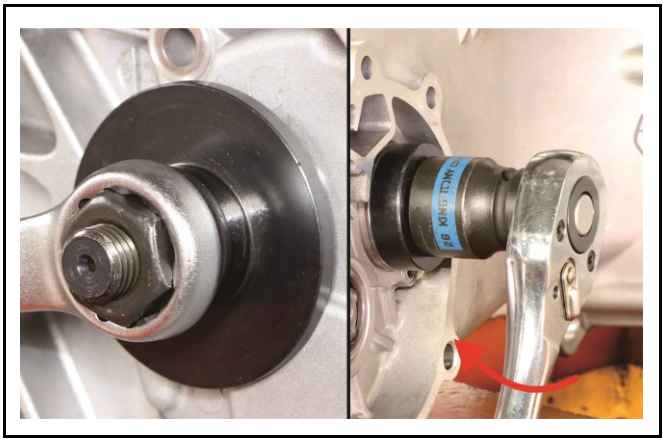
Special tool: Pneumatic bearing 6204 assembly puller
Tool Number: SYM-9100400-A6204



Place the tool and the bearing through the crankcase in the assembly position.
Place the positioning plate opposite the crankcase and lock the compression nut to secure the tool.
Special tool: Pneumatic bearing 6204 assembly puller
Tool Number: SYM-9100400-A6204



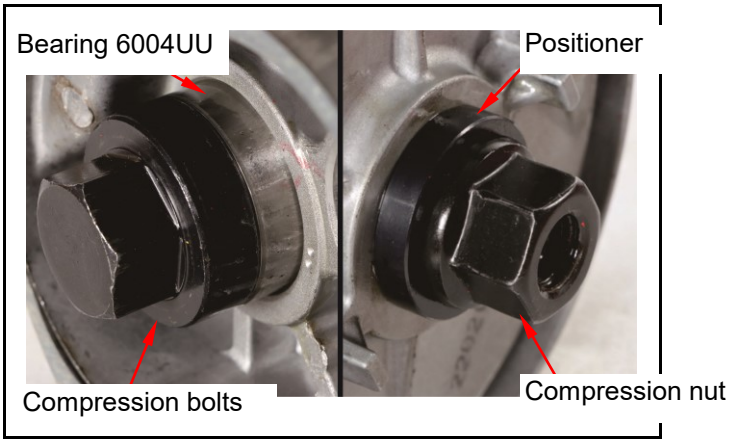
Use a 26mm plum wrench to secure the compression nut.
Use a ratchet wrench with a 26mm socket to lock in the compression bolt and push the bearing into position.



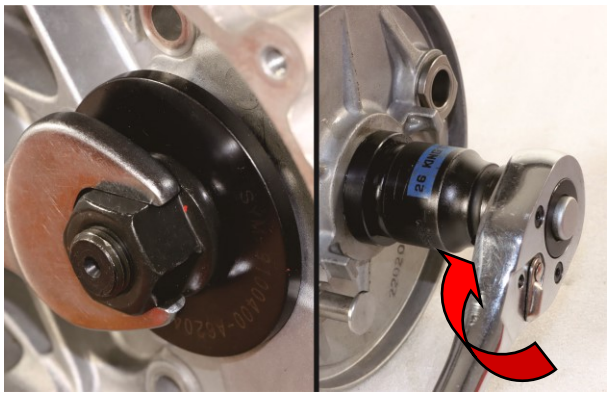
Final drive shaft bearing assembly tools:
Specialized tools for bearing assembly.

Attach the tool compression bolt to the 6004UU.

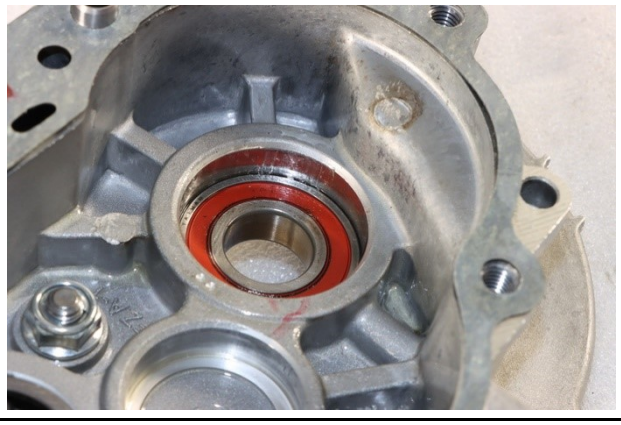
Pass the bearing and the tool through the gearbox cover.
Insert the positioner and press the nut in the opposite direction.



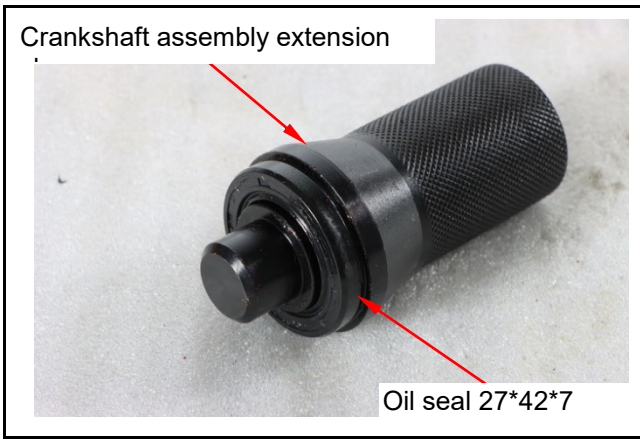
Use a plum wrench to secure the compression nut
Lock the ratchet wrench clockwise into the compression bolt all the way
Press the bearing all the way in.



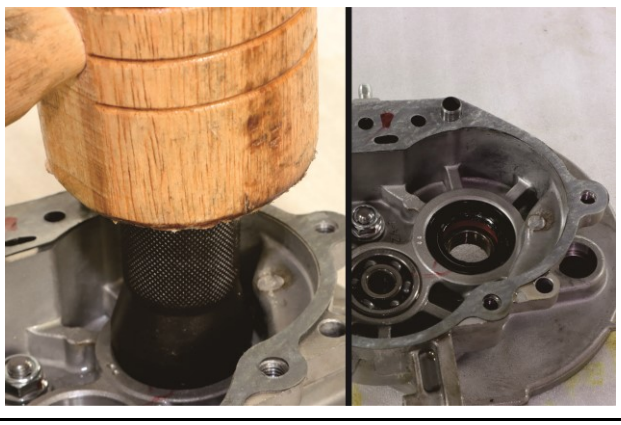
Check that the bearings are properly assembled and positioned.



Finally, the drive shaft oil seal 27*42*7 is assembled.
Place the concave side of the oil seal facing the tool and fit it closely with the tool.
Special tool: Oil seal 27*42*7 knock-in tool
Tool Number: SYM-9125500

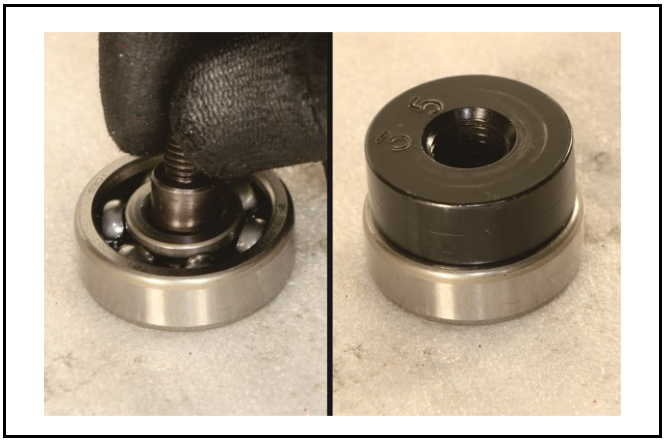


Place the oil seal in the assembly position and hammer the oil seal in position.



Blind hole bearing assembly
Use a special tool to assemble the bearing.
Special tool: Bearing hammer
Tool Number: SYM-6204024

Select the appropriate striking disk and positioner.



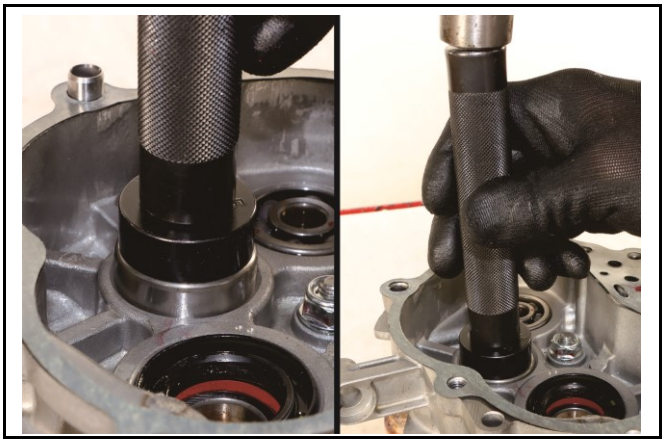
Lock the appropriate tap into the tap and then into the locator.

Check the bearing and striking tool specification labels towards the striking tool to confirm that the selected tool is properly available.

⚠ Note

- The outer diameter of the striking plate must be greater than the inner diameter of the outer ring of the bearing.

Place the bearing in the assembly position. Tap the tool tap the bearing all the way in. Check that the bearing is indeed in place.

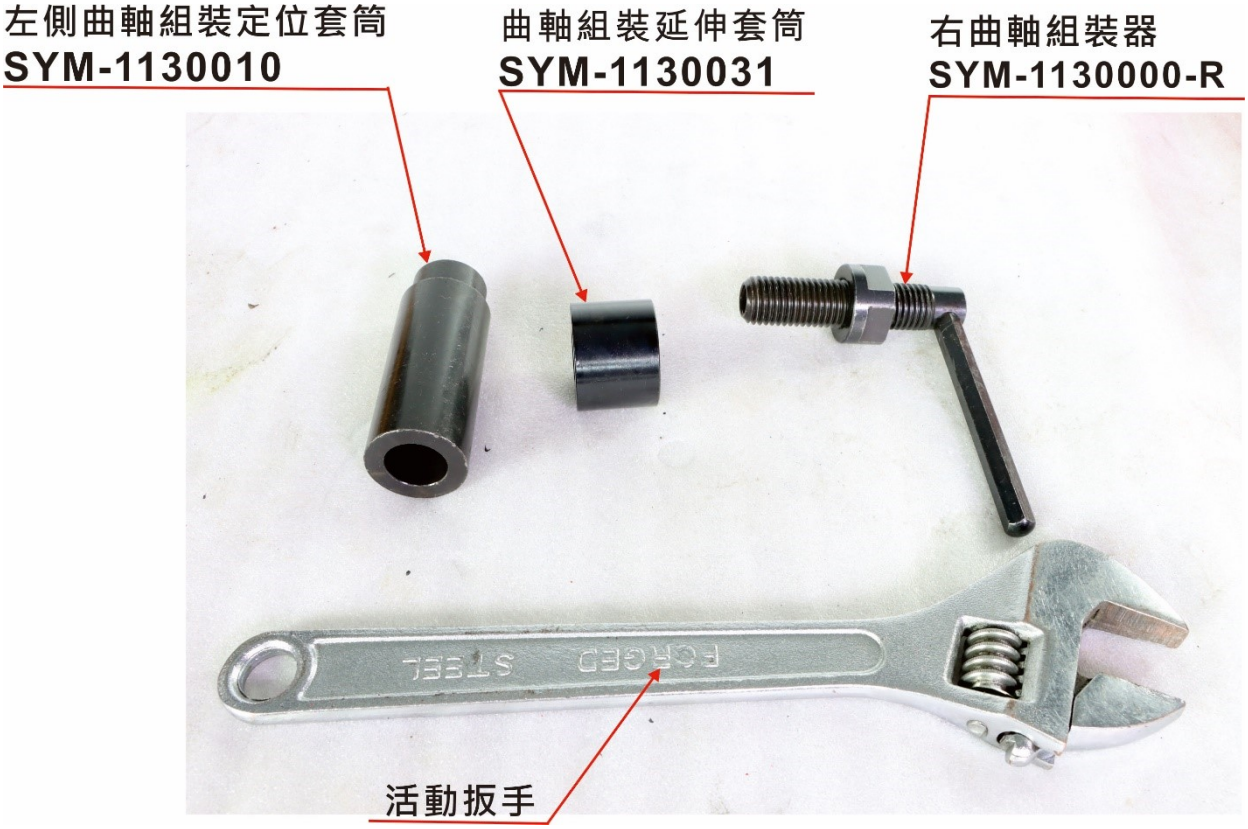


Drive shaft assembly:

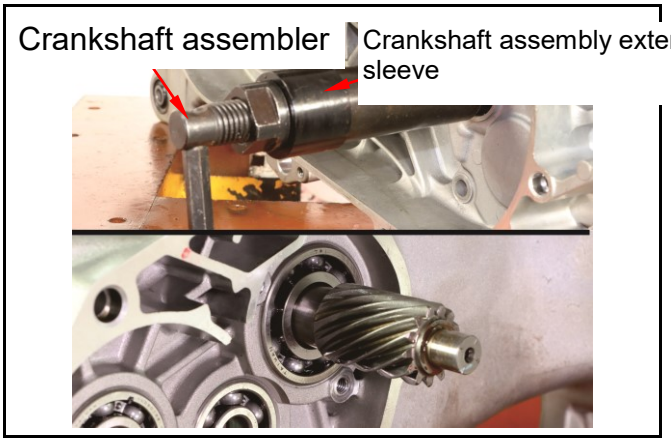
Use a special tool for the drive shaft.

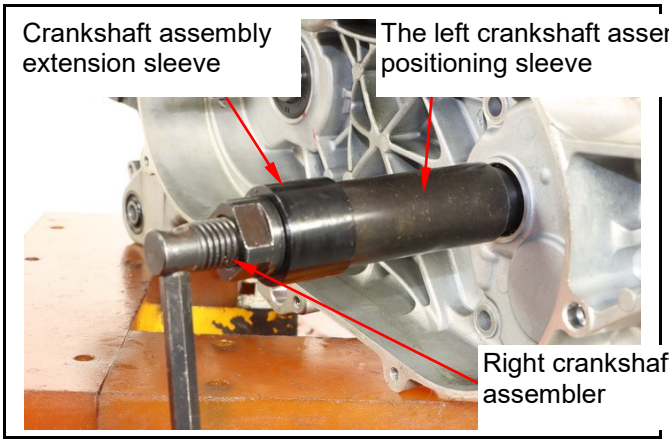
Special tools: As shown in the picture below

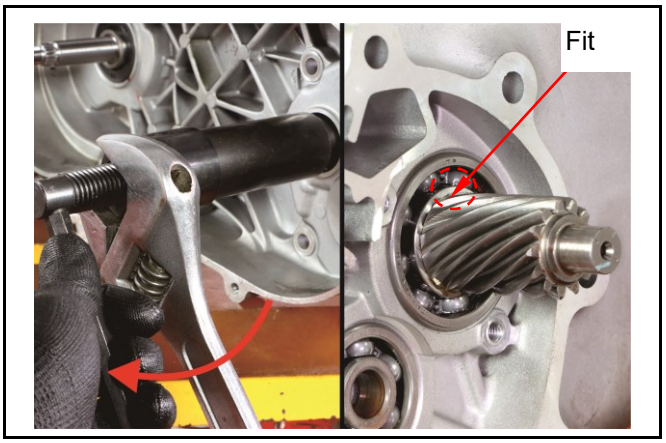
Tool number: As shown below



Drive shaft assembly
Drive shaft assembly tools.
Specialized tools: Left crankshaft assembly positioning sleeve
Tool Number: SYM-1130010
Special tool: Crankshaft assembly extension sleeve
Tool Number: SYM-1130031
Special tool: Right crankshaft assembler
Tool Number: SYM-1130000-R
Pass the drive shaft through bearing 6204.
On the opposite end, insert the small end of the left crankshaft assembly positioning sleeve into the drive shaft.
Then put on the crankshaft assembly extension sleeve.
Lock the crankshaft assembler into the front thread of the drive shaft and make sure the drive shaft is in the correct assembly position.







Secure the right crankshaft assembler handle by hand.
Use the adjustable wrench to rotate clockwise to pull the drive shaft to the bottom.
Use the appropriate wrench to lock in the crankshaft assembler pressing nut clockwise.
Pull the drive shaft until the drive shaft gear is tightly against the bearing.
Check the fit between the drive shaft gear and the inner ring of the bearing.
Turn the drive shaft to make sure it is smooth and does not produce any abnormal sounds.
After completion, loosen the crankshaft assembler pressing nut and remove all tools.

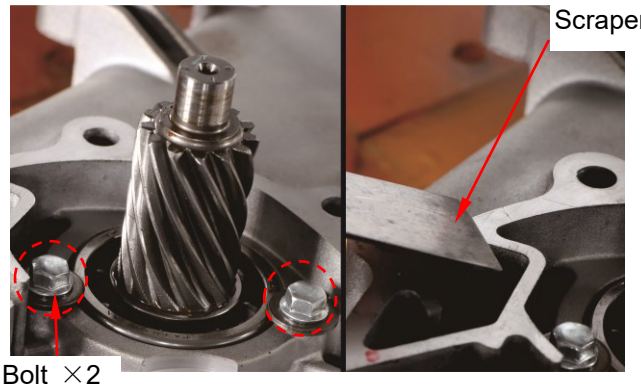
Crankcase cover assembly

The tools used are as shown in the following figure

Specialized tools: Oil seal 20*32*6 knock-in tool

Tool Number: SYM-9120200

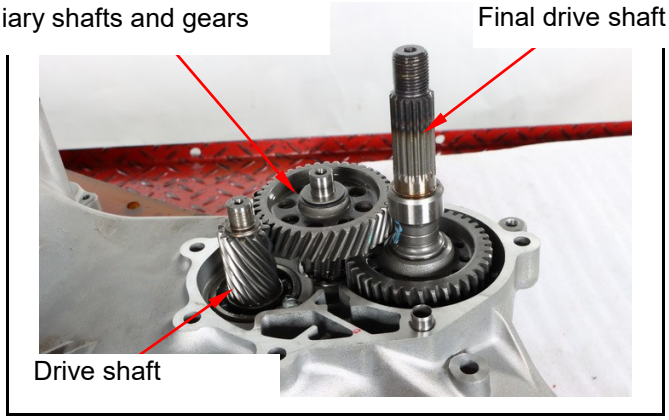
Gearbox gear assembly
Lock in the drive shaft bearing fixing bolts and washers (bolts ×2).
Use a scraper to scrape off any remaining gaskets in the gearbox.



Assemble the final drive shaft, pair shaft and gears.

Note

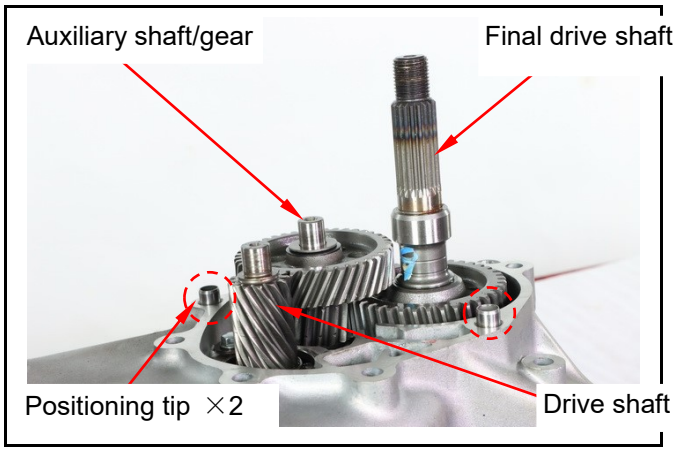
- All thrust gaskets and flat gaskets must not be missing or omitted.



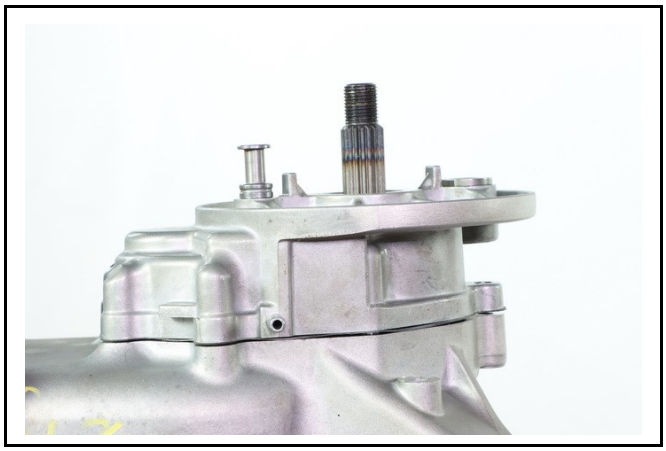
Install two locating pins.

Note

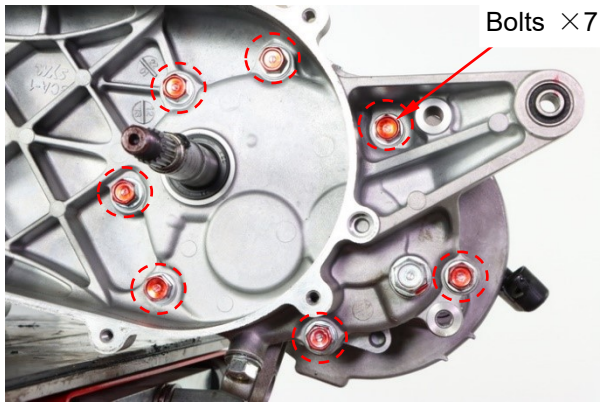
- The locating pins must not be lost or omitted.



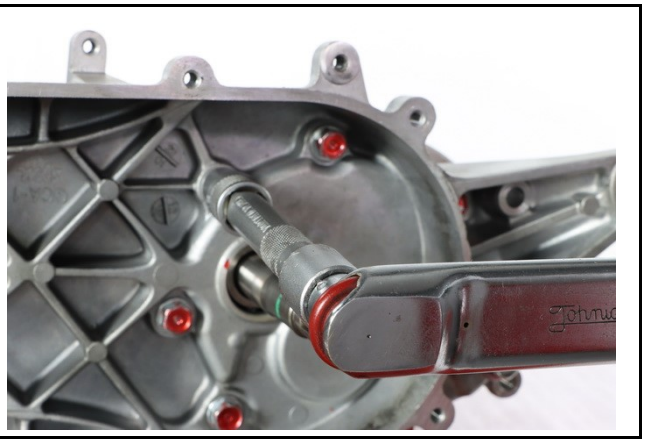
Install the gearbox cover.



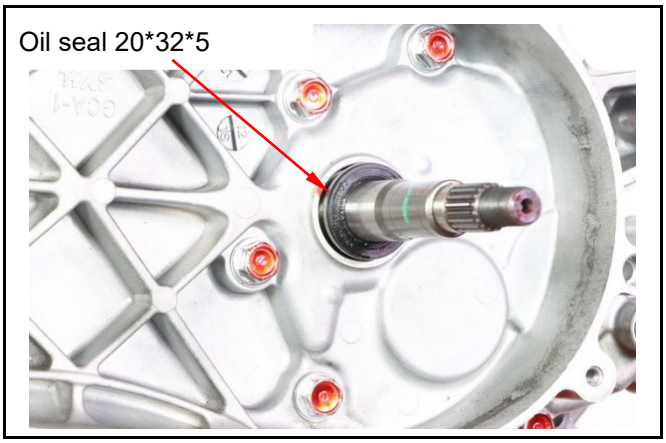
Use T-row connecting rods and 12mm sleeves to lock (false pair) the gearbox fixing bolts (bolts ×7).



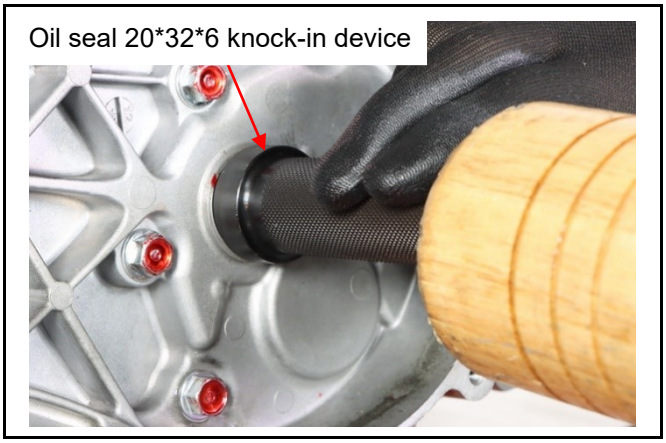
Use a torque wrench to tighten the bolts diagonally.
Torque standard :2.4 to 3.0 kgf-m(24 to 29 N-m)



Insert the oil seal 20*32*5 into the drive shaft.

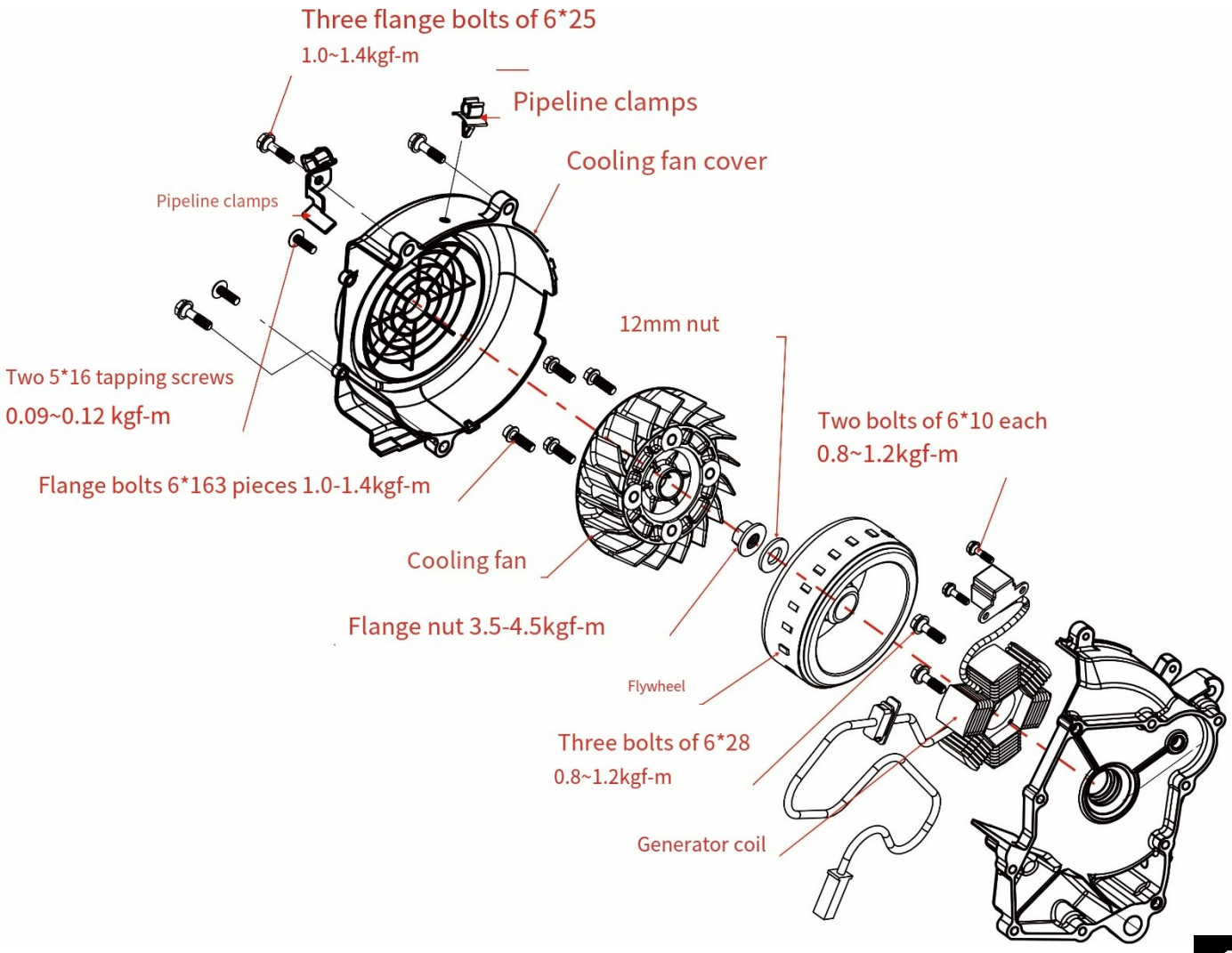


Use a special tool to knock in the drive shaft oil seal (20*32*5).
Special tool: Oil seal 20*32*6 knock-in device
Tool Number: SYM-9120200
Refill the gearbox oil.
※ It is recommended to use SYM HYPOID GEAR OIL SAE 10W-30 or SAE 10W-40 or equivalent.



Institutional Illustration ····· 10-1	Generator coil assembly ····· 10-5
Notes on Work ····· 10-2	Flywheel installation ····· 10-5
Alternator disassembly ····· 10-3	

Mechanism illustration



10

Notes on the assignment

General Notes

- For engine disassembly and installation, see Chapter 6.
- For engine fault diagnosis and inspection, see Chapter 1.
- For starter motor repair procedures and precautions, see Chapter 17.

Specification **unit: mm**

Project	Availability Limits
Start passive gear inner diameter	32.060
Clutch cover outer diameter	27.940

Torque value

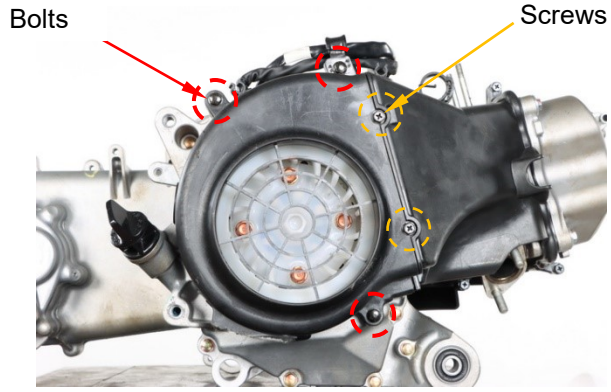
Flywheel nuts 3.5 to 4.5kgf-m

Start clutch hexagon socket bolts 1.0 to 1.4kgf-m with adhesive

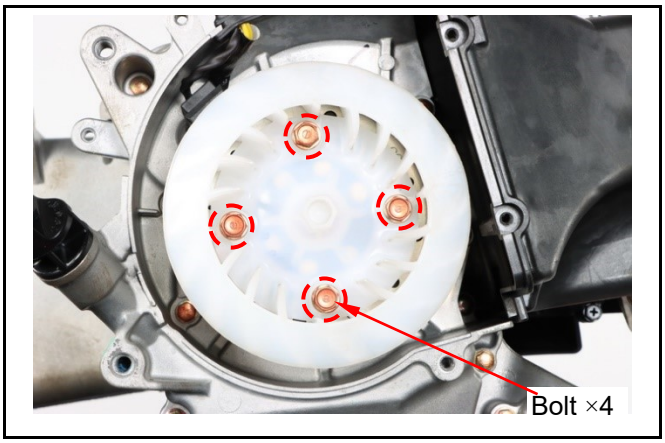
See the structure diagram

Alternator disassembly

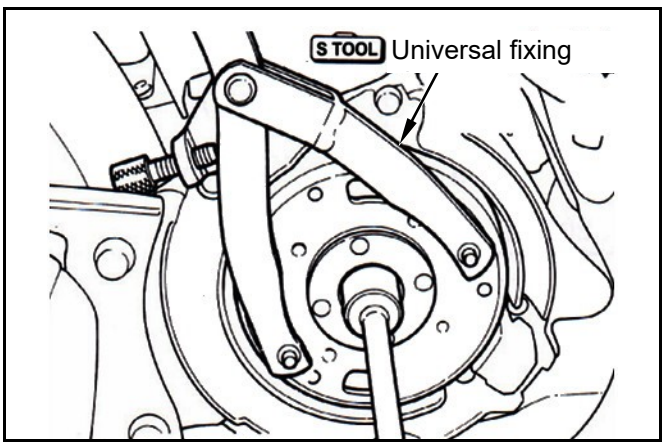
Remove the right cover (see Chapter 12)
Remove the cooling fan cover (2 tap screws, 3 bolts).



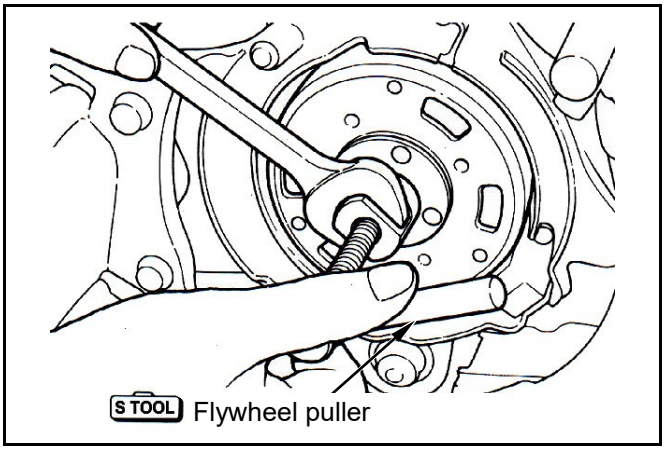
Remove the cooling fan (bolts ×4).



Use the universal clamps to secure the flywheel.
Remove the 10mm nut from the flywheel.
Special tools: Universal clamps
Tool Number: SYM-2210100



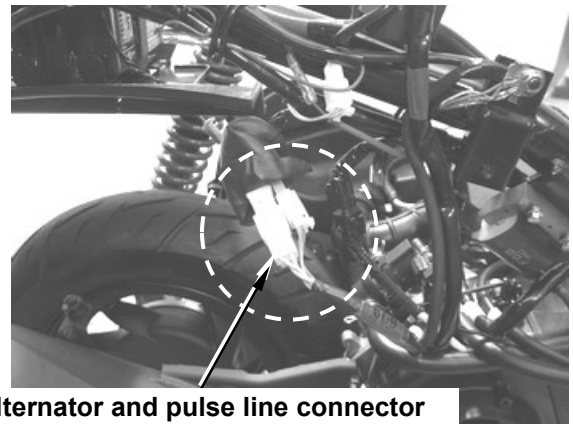
Use the flywheel puller to remove the flywheel.
Special tool: Alternator flywheel puller
Tool Number: SYM-3110000-125



⚠ Attention

- Before installing the flywheel puller, a shaft guard should be placed at the end of the right crankshaft to prevent damage to the crankshaft.

Remove the AC generator wire connector and the pulse connector.

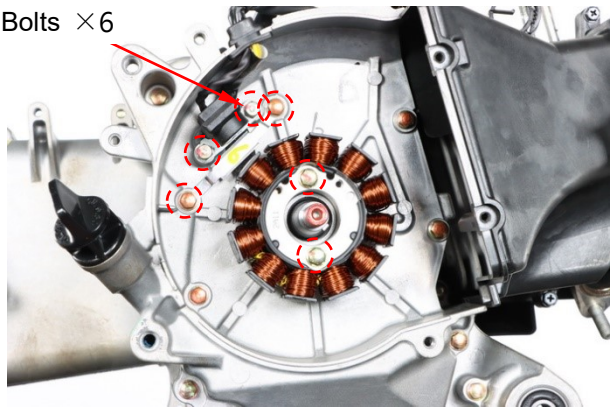


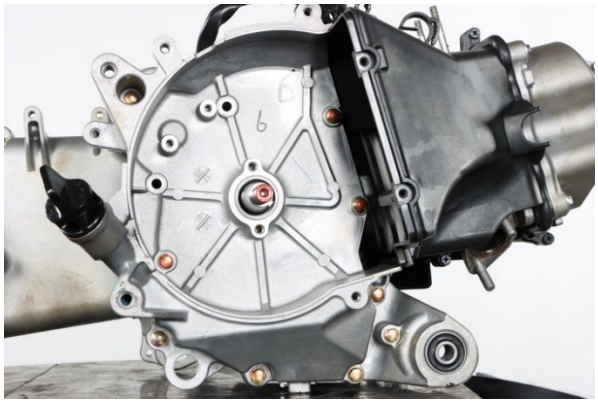
Alternator and pulse line connector

Remove the six bolts of the pulse, generator coil and wire fixing plate, and take out the alternator coil assembly.

Note

- Please avoid damaging the generator coils.



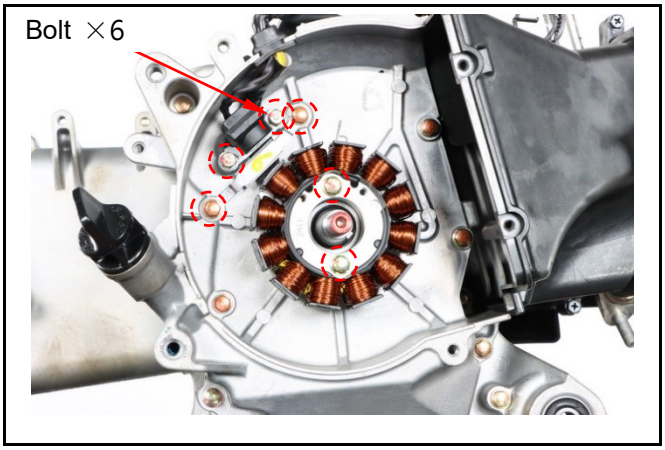


Generator coil assembly installation

Lock the coil group onto the right crankcase cover (bolt ×3)
Torque value: 1.0 to 1.4 kgf-m
Lock the pulse (bolts ×2).
Torque value: 0.8 to 1.2 kgf-m
Lock the wire fixing plate (bolts ×2).
Torque value: 1.0 to 1.4 kgf-m
Attach the wire harness adhesive to the fixed notch on the crankcase cover.

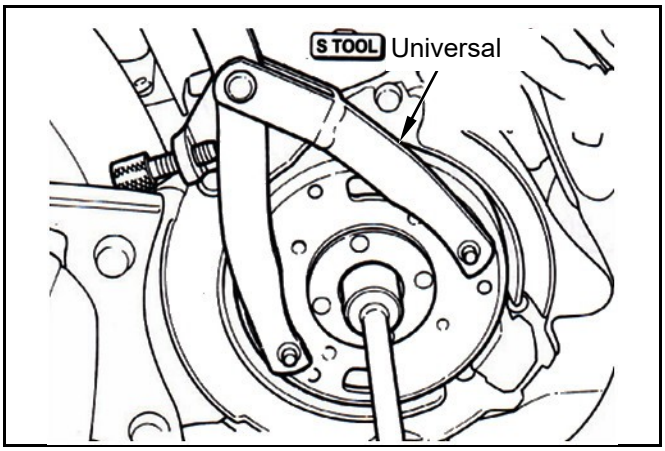
⚠ Note

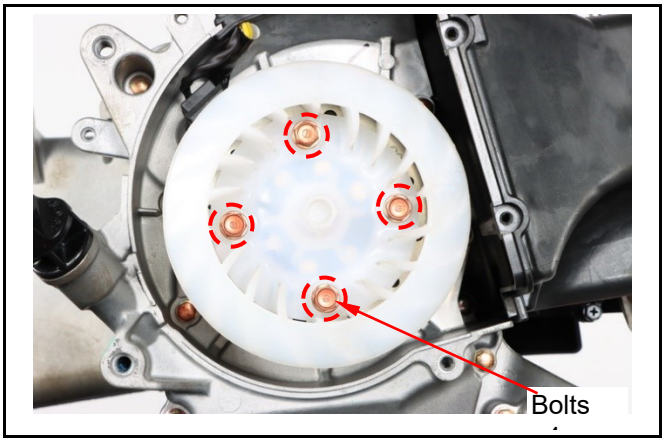
Please avoid damaging the generator coils.



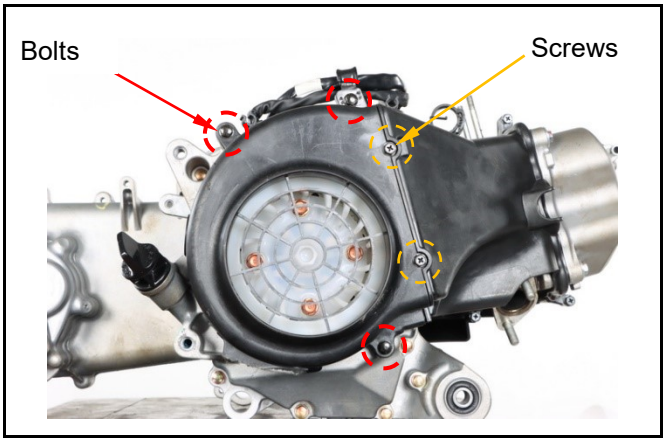
Flywheel installation

Install the alternator wire connector and the pulse connector.
Make sure there are no iron filings adhering to the flywheel. If there are, remove them thoroughly.
Align the keys on the crankshaft with the key grooves inside the flywheel and install the flywheel.
Secure the crankshaft with a universal clamp to fix the flywheel and then lock the nut.
Torque value: 3.5 to 4.5 kgf-m
Special tools: Universal fixator
Tool Number: SYM-2210100
Install the cooling fan (bolts ×4).
Torque value: 1.0 to 1.4 kgf-m.





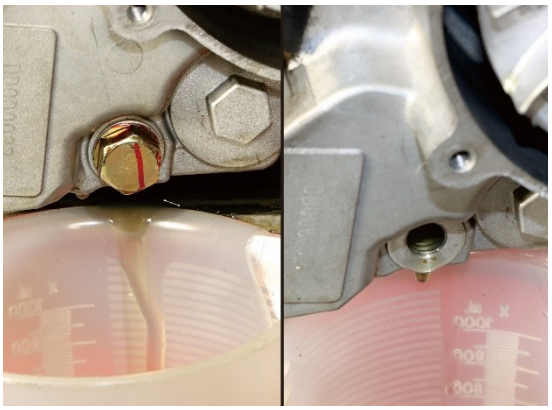
Install the cooling fan cover (screw ×2, bolt ×2).
Screw torque: 0.09 to 0.12kgf-m.
Bolt torque: 1.0 to 1.4 kgf-m.



Start the clutch

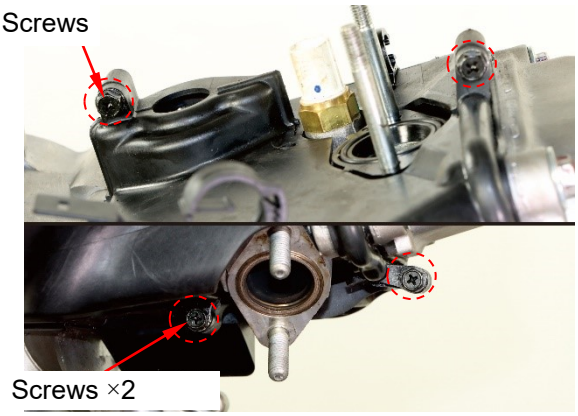
Remove the drain bolt.

Leak engine oil.

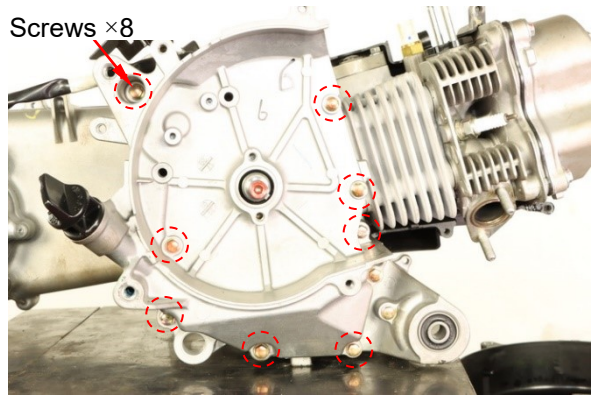


Remove the upper/lower engine cylinder guard head tapping screws (2 at the bottom)

Remove the upper/lower engine cylinder guards

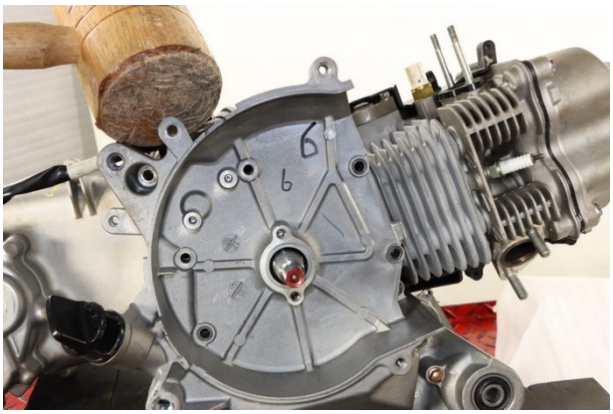


Remove the crankcase right cover bolt (bolt × 8)



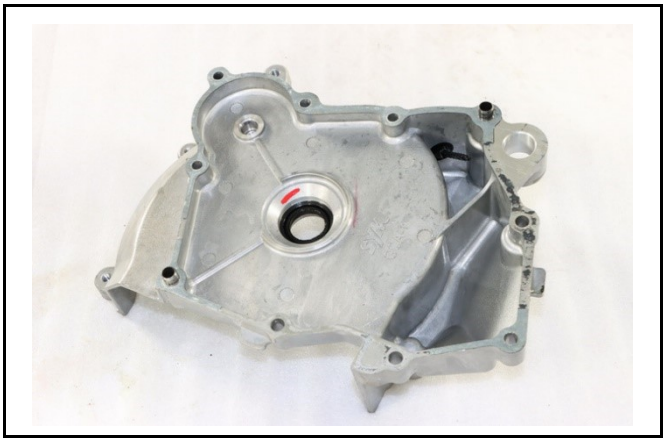
Use a wooden (rubber) hammer to tap the hood lightly to make it come off.

Remove the crankcase cover on the right side.



Start clutch disassembly/assembly

Remove the right crankcase cover.



Remove the starter clutch anti-disengagement nut and gasket.

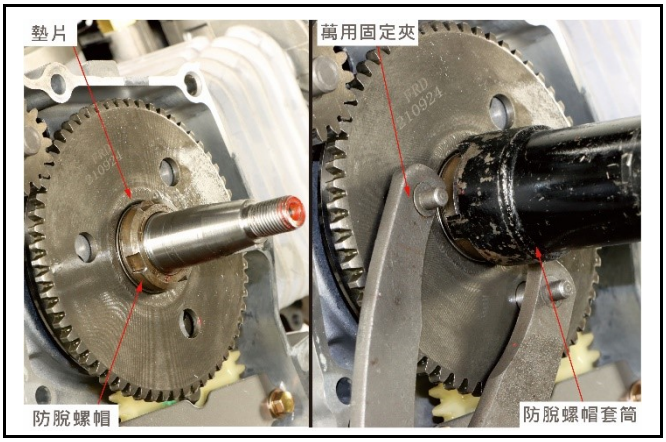
Remove the starter clutch assembly

Special tools: Universal clamps

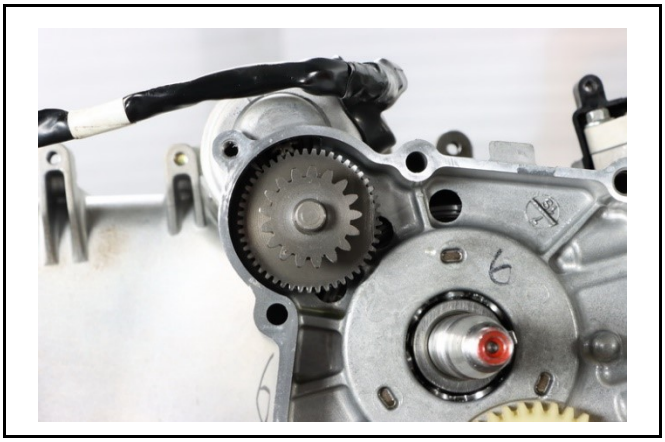
Tool Number: SYM-2210100

Special tool: Anti-disengagement nut sleeve

Tool Number: SYM-9020100



Remove the starting idler gear.

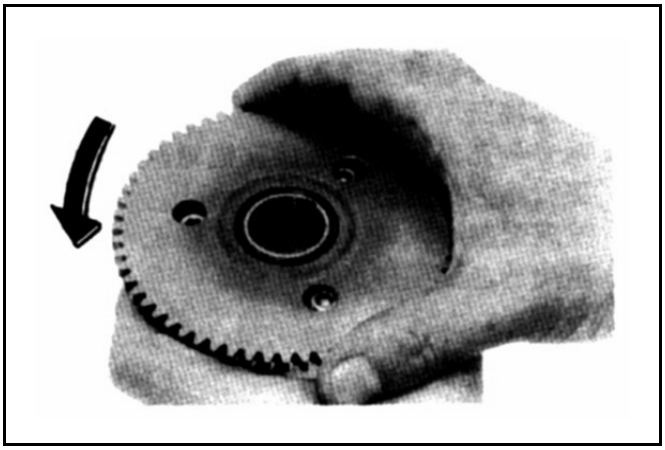


Start clutch check

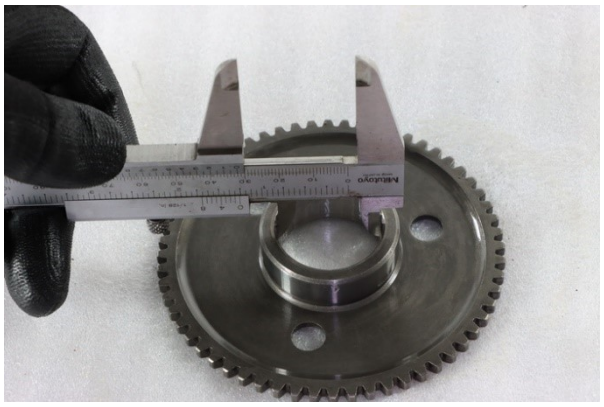
Install the starting passive gear onto the starting clutch.

Secure the starter clutch and turn the starter passive gear.

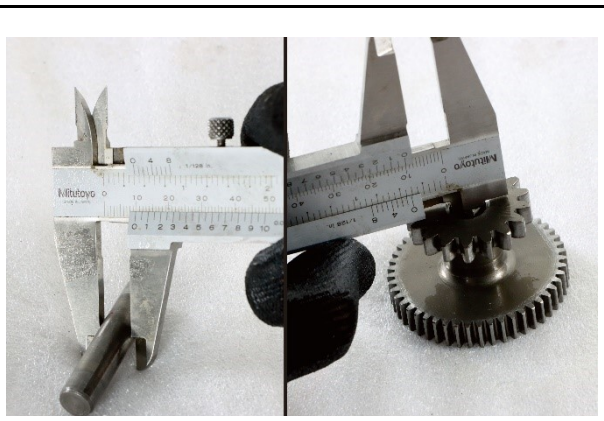
The starter passive gear should be able to turn counterclockwise and not clockwise.



Check whether the starting passive gear is worn or damaged.
Measure the inner diameter of the starter passive gear.
Available limits:
Inner diameter: less than 32.06mm

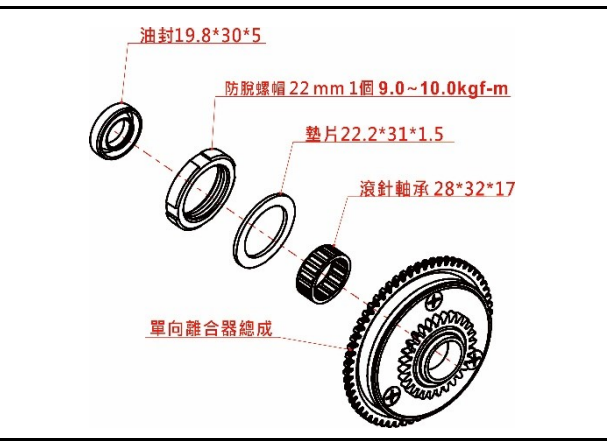


Check for wear or damage to the starting idler and shaft.
Measure the inner diameter of the starting idler gear.
Available limits:
Inner diameter: less than 10.05mm

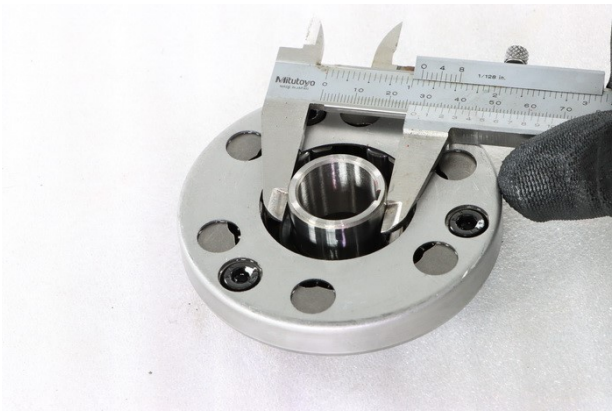


Measure the outer diameter of the starting idler gear shaft.
Available limits:
Inner diameter: more than 9.94mm

Disassembled
Remove the starter clutch hexagon socket bolt (bolt ×3).
Separate the clutch body from the clutch cover.
Remove the clutch rollers, plungers and springs from the one-way clutch.
Check each roller and plunger for wear or damage.
Install the rollers, plungers and springs.

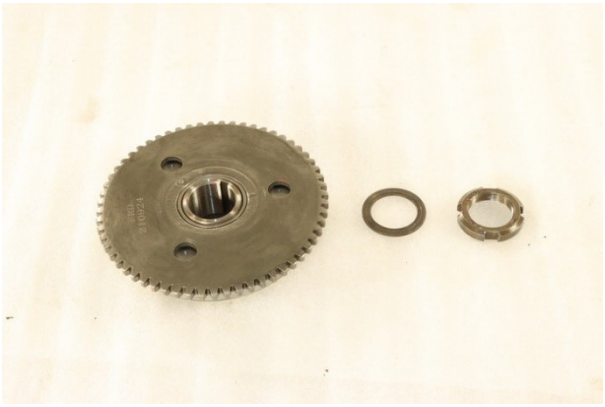


Measure the outer diameter of the starter clutch cover.
Available limits:
Inner diameter: 27.94 mm or more



Start clutch assembly

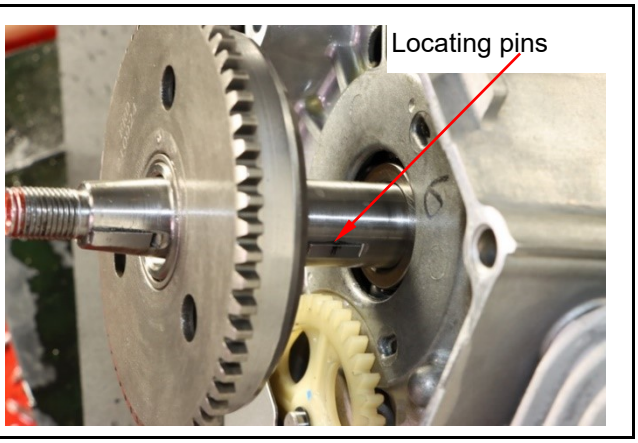
Engage the one-way clutch with the starting gear.



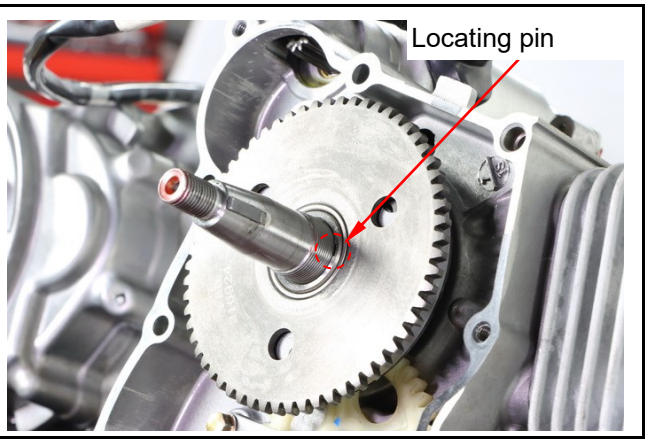
Assemble the starter clutch assembly.

Note

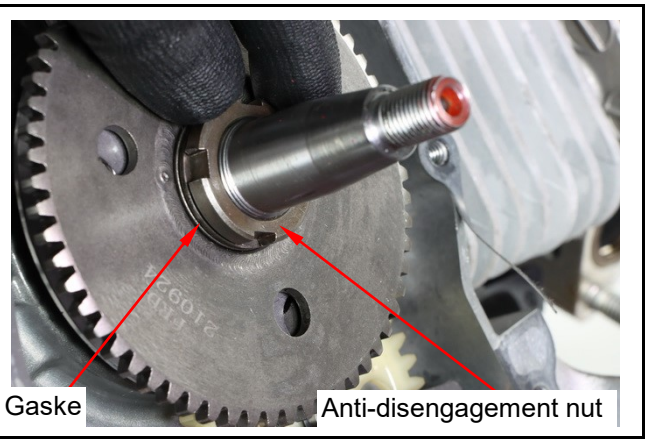
The inner diameter notch of the one-way clutch must be aligned with the locating pin on the crankshaft.



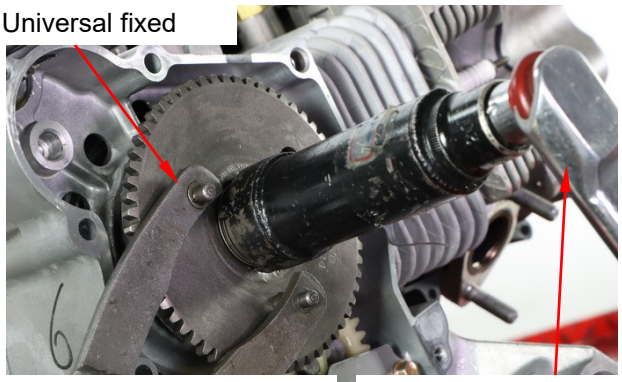
Start the clutch and assemble it properly.



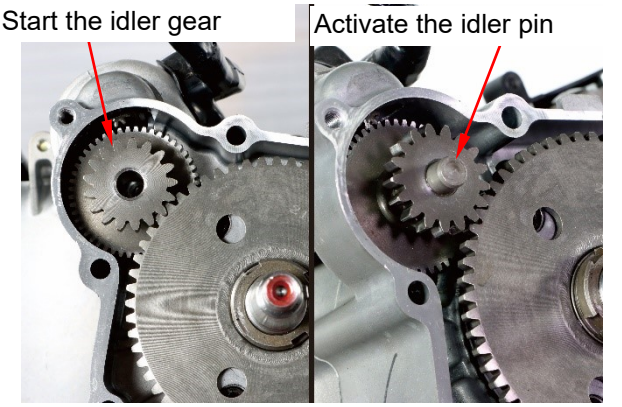
Assemble the gasket and anti-disengagement nut by hand



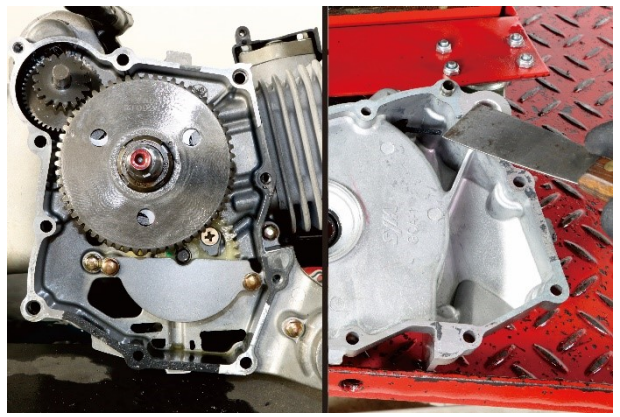
Use a universal clamp to secure the starter clutch.
Use a torque wrench to lock the anti-disengagement socket.
Special tool: Universal fixing clamp
Tool Number: SYM-2210100
Special tool: Anti-disengagement nut sleeve
Tool Number: SYM-9020100



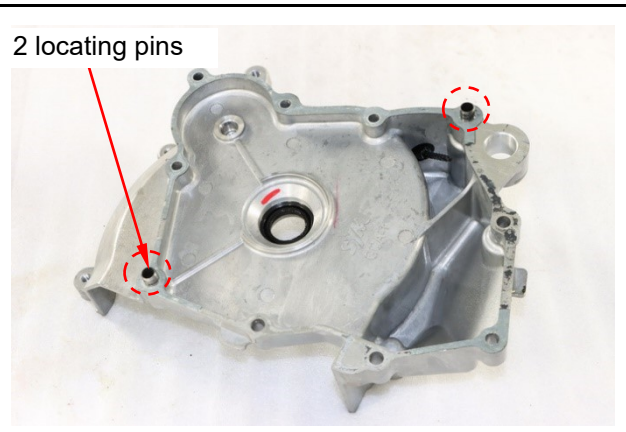
Assemble the starting idler gear.
Assemble the starter idler pin.



Use a scraper to scrape off the remaining gasket.
Replace with a new gasket.



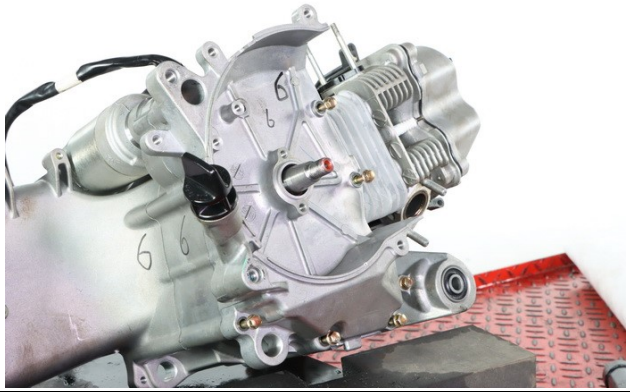
Replace the new locating pins.



Install the crankshaft phase right cover and insert the bolts.

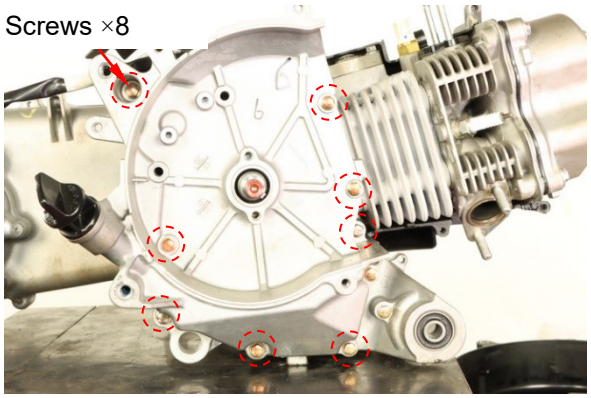
⚠ Note

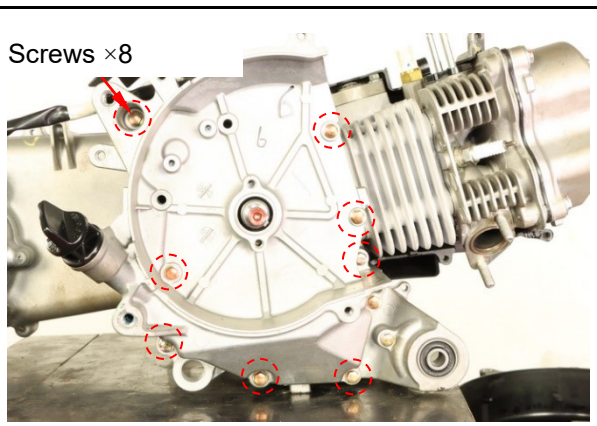
Special attention is needed to the height of the bolts.



Lock the bolts diagonally (screw ×8).

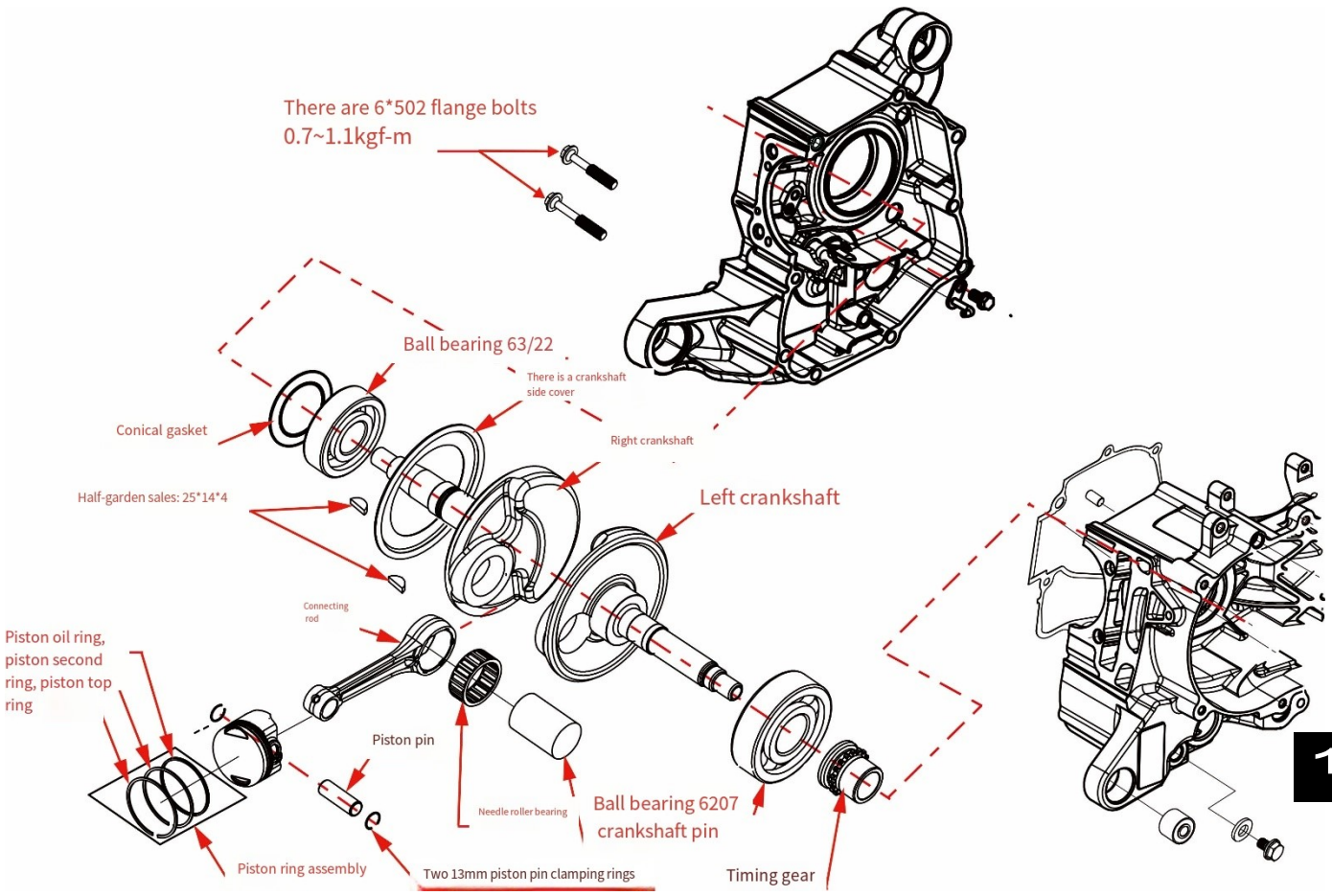
Bolt locking torque:





Institutional Illustration ····· 11-1	Disassemble the crankshaft ·· 11-4
Notes on Work ····· 11-2	Crankshaft inspection ····· 11-5
Fault Diagnosis ····· 11-3	Crankshaft assembly ····· 11-8
Crankcase separation ····· 11-3	Crankshaft assembly ····· 11-10

Diagram of the mechanism



Notes on the assignment

General Notes

- This section is about disassembling the crankcase to repair the crankshaft.
- The following parts need to be disassembled before disassembling the crankcase:

Engine	Chapter 6
Cylinder head	Chapter 7
Cylinder/Piston	Chapter 8
Chapter 9	of V-Belt Drive Mechanism
Generator/Starter clutch	Chapter 11

- If crankshaft bearings or timing sprockets need to be replaced, the entire set of crankshafts must be replaced.

Specification **unit: mm**

Project	Standard values	Available limits
Big end clearance of the connecting rod	0.100 ~ 0.350	0.550
Radial clearance at the big end of the connecting rod	0.000 ~ 0.008	0.050
Crankshaft swing	—	0.100

Torque value

Crankcase bolts	1.0 to 1.4 kgf-m
Engine drain bolts	3.5 to 4.5 kgf-m
CAM chain tensioner bolts	0.8 to 1.2 kgf-m

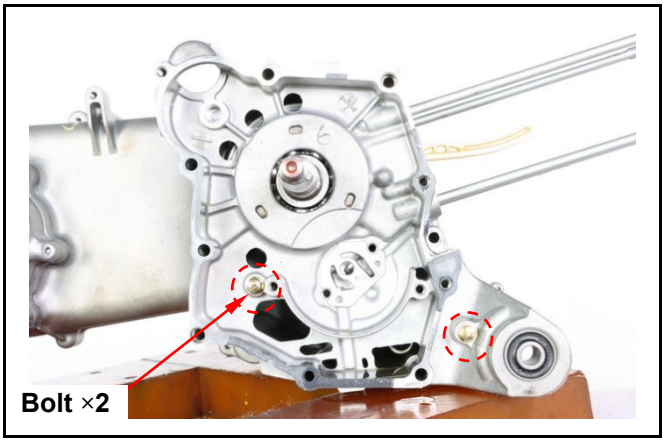
Fault diagnosis

Excessive engine noise

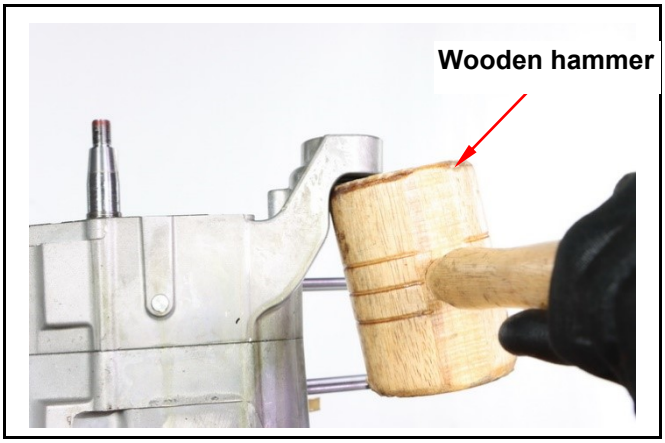
- Excessive bearing clearance
- Excessive clearance at the crankshaft end bearings
- Wear on the piston pins or piston pin holes

Crankcase separation

Remove the crankcase coupling bolts (bolts ×2).



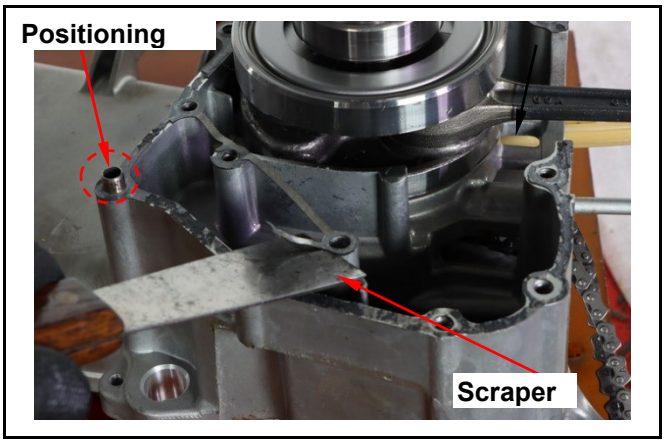
Use a wooden hammer to tap the right crankcase lightly.



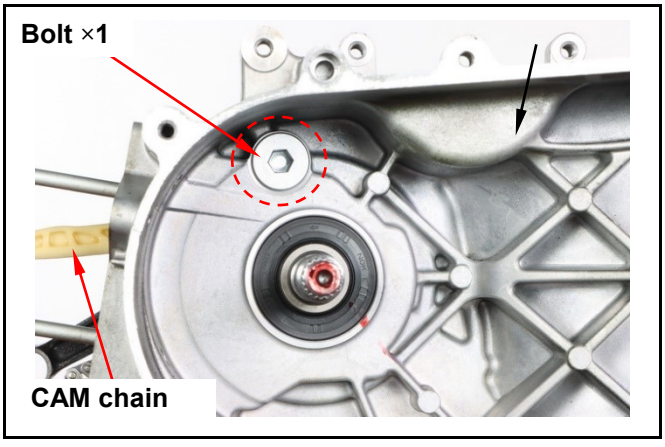
Remove the right crankcase.

Remove 2 locating pins.

Use a scraper to remove the gasket residue.

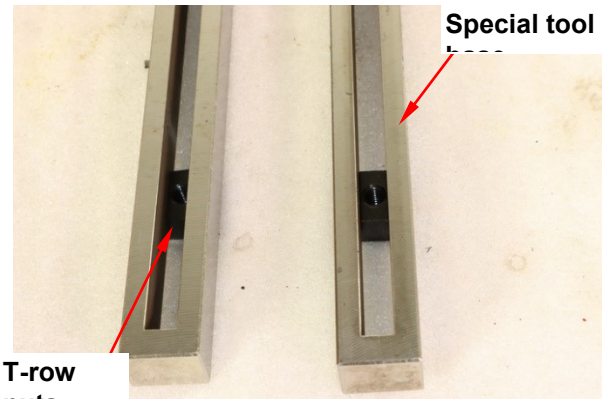


Remove the CAM chain tensioner bolt (bolt × 1).



Crankshaft disassembly

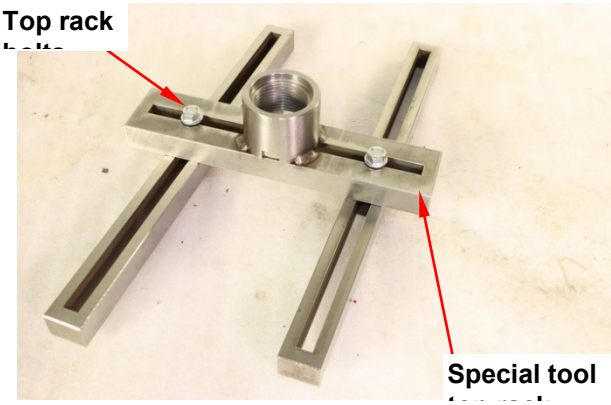
Specialized tools for assembly and use.



Place the tool jacks on the underframe and pass the jacks bolts through the underframe and jacks and insert them.

⚠ Note

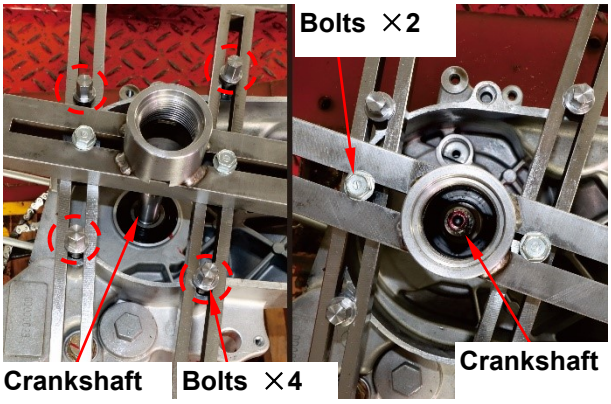
- Bolts must not be locked and the top frame must be sliding.



Place the combined top frame and underframe on the left crankcase.
Place the shaft between the two underframes.
Lock the underframe fixing bolts (bolts ×4) and secure the underframe to the left crankcase.
Move the top frame to the top frame removal hole and place the crankshaft in the center of the shaft remover hole.
Lock the top frame fixing bolts (bolts ×2).

⚠ Note

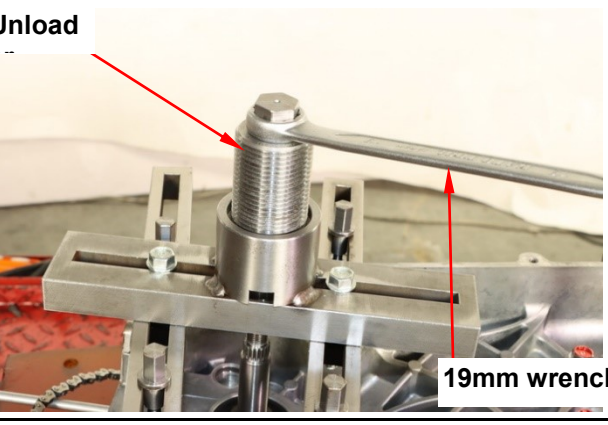
- All bolts must be tightened.



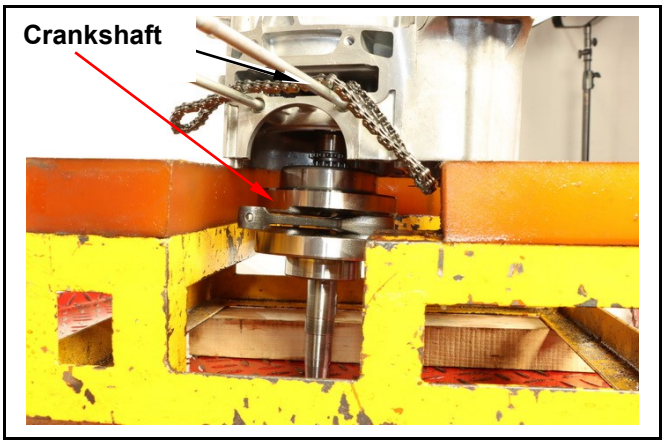
Lock the axle remover into the removal hole until it presses against the crankshaft.
Use a 19mm wrench to rotate clockwise to press out the crankshaft.

⚠ Note

- Always be aware that the inner chain does not interfere with the crankshaft timing gear.

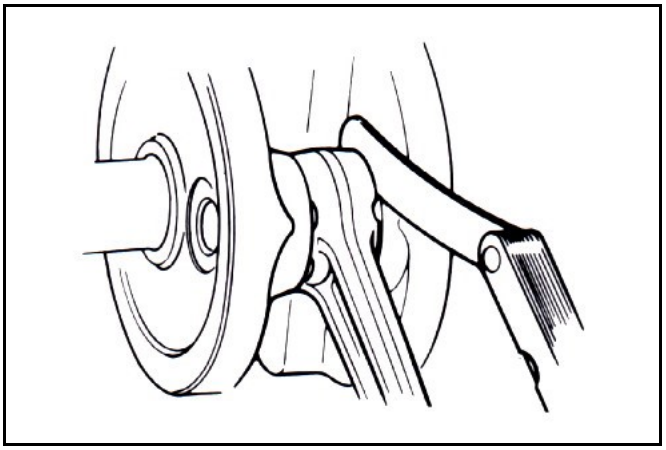


Push out the crankshaft.

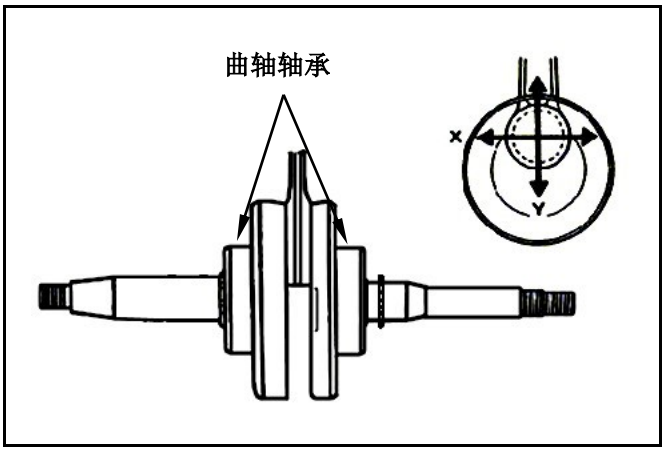


Crankshaft inspection

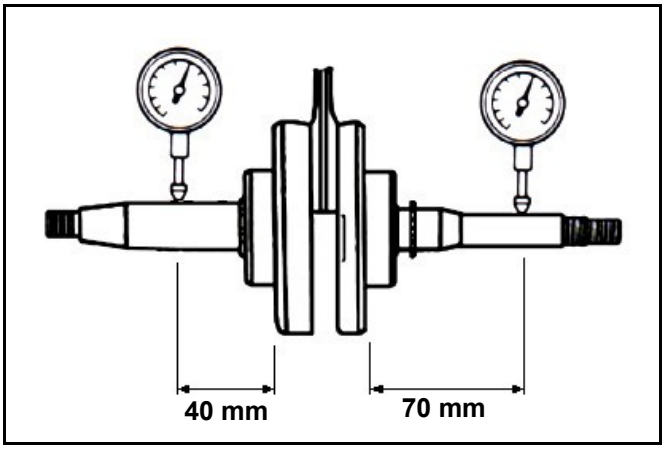
Measure the axial clearance at the big end of the connecting rod with a thickness gauge.
Available limit: Replace with a new one above 0.55mm



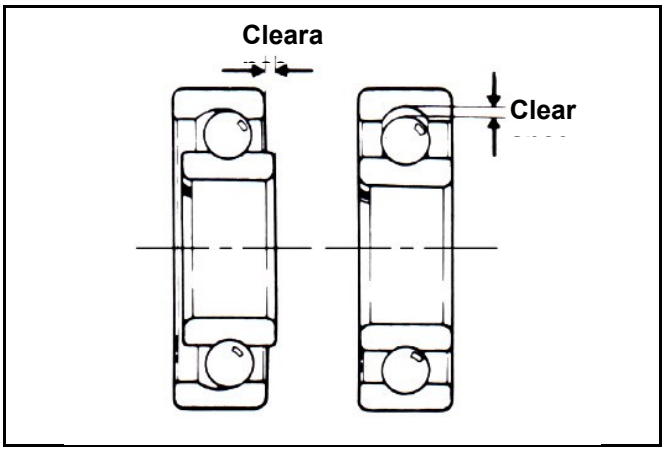
Measure the radial clearance at the large end of the connecting rod in the vertical direction of the crankshaft.
Available limit: 0.05mm



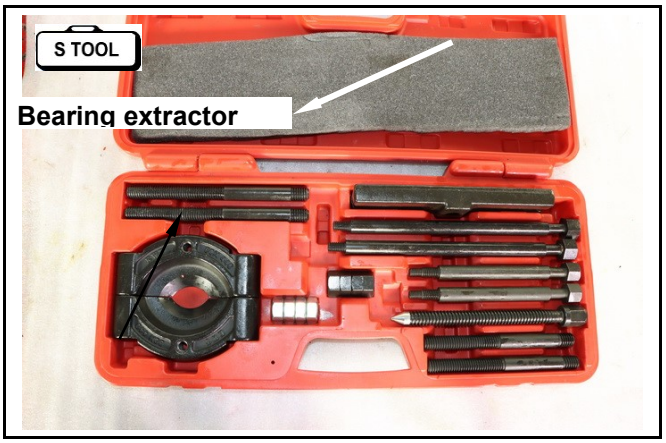
Place the crankshaft on the V-slot block and measure the crankshaft deflection at the two points shown in the diagram with a pin disk gauge.
Available limit: 0.10mm



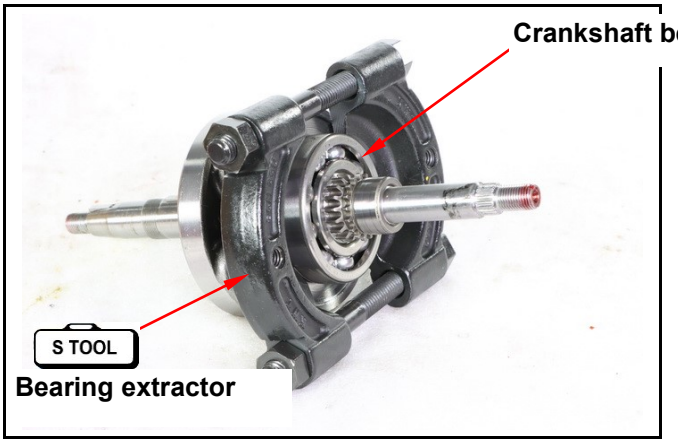
Bearing inspection
Turn the bearing with your finger. The bearing should turn freely, smoothly and quietly.
And check if the inner ring is securely attached to the crankshaft.
Replace the entire set of crankshafts if there is any unevenness, abnormal noise or loose engagement.



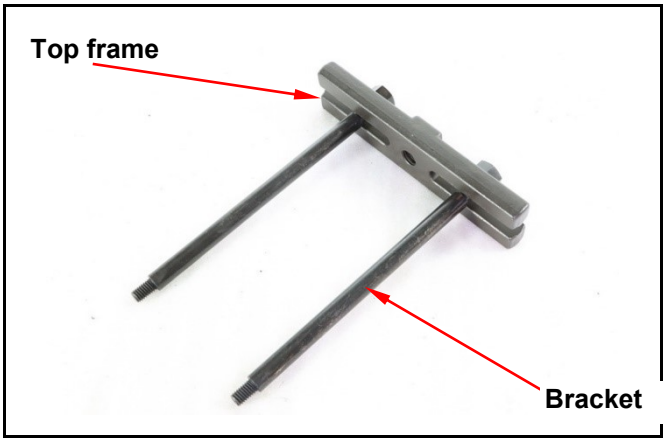
Remove the left bearing of the crankshaft
Use a special tool to disassemble the crankshaft bearing.



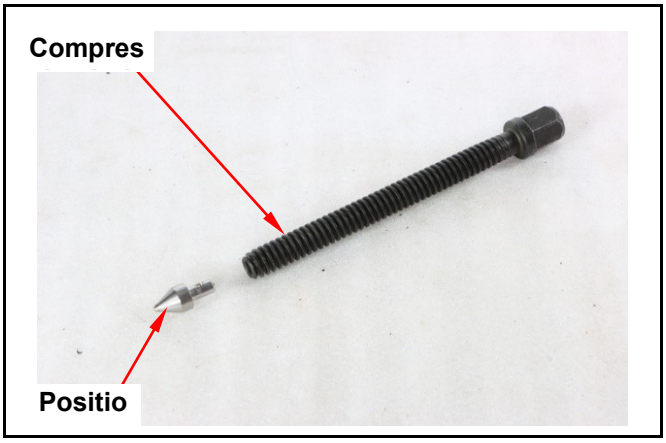
Use a special tool fixture to lock the pressing nuts clockwise from both sides of the bearing so that the inner edge of the fixture is inserted under the bearing.



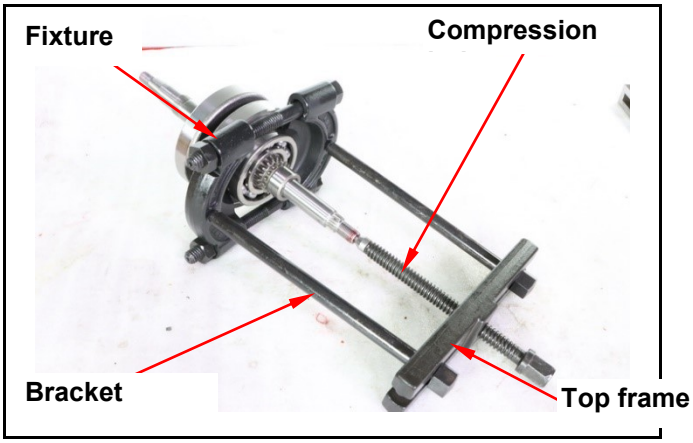
Insert the side brackets into the top bracket grooves.



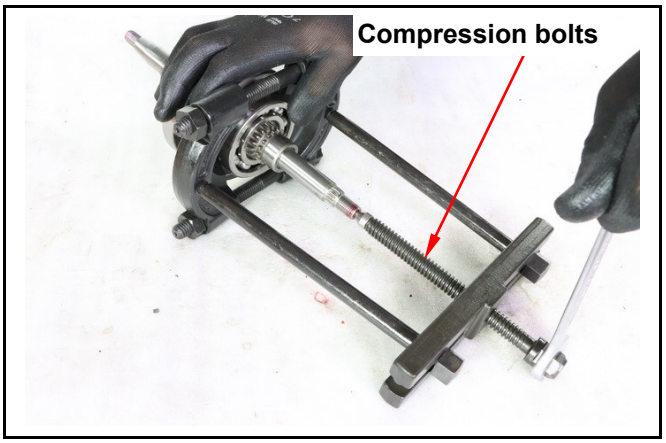
Separate the compression bolts from the positioner.



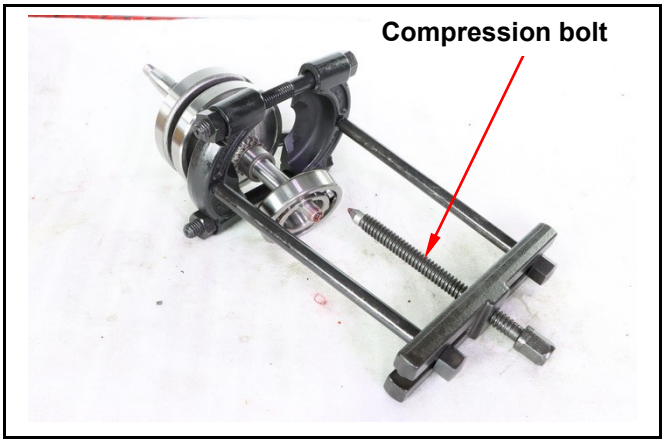
Lock the threaded part of the bracket with both hands simultaneously into the locking holes of the fixtures on both sides.
Lock the compression bolts into the top frame and insert the positioner.
The compression bolt positioner needs to be in close contact with the top of the crankshaft.



Secure the bearings and crankshaft, and use a 17mm wrench to lock in the compression bolts clockwise.



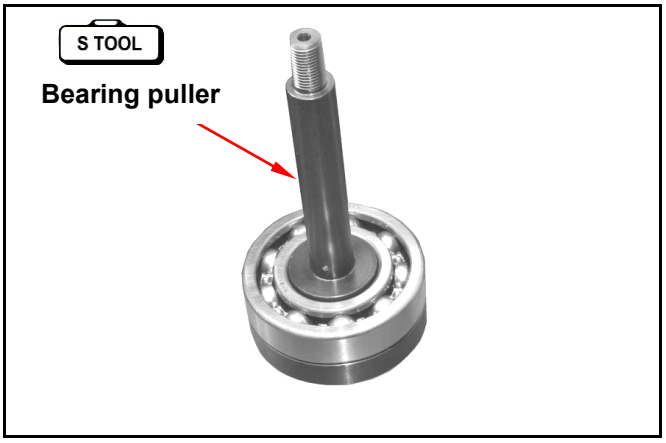
Push the crankshaft out of the bearing.



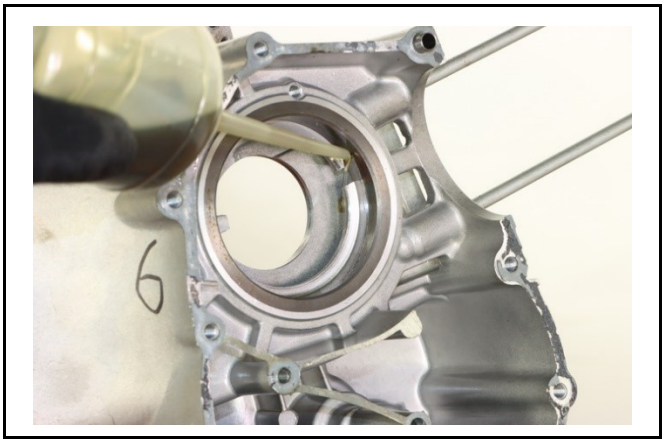
Crankshaft assembly

Crankshaft bearing assembly

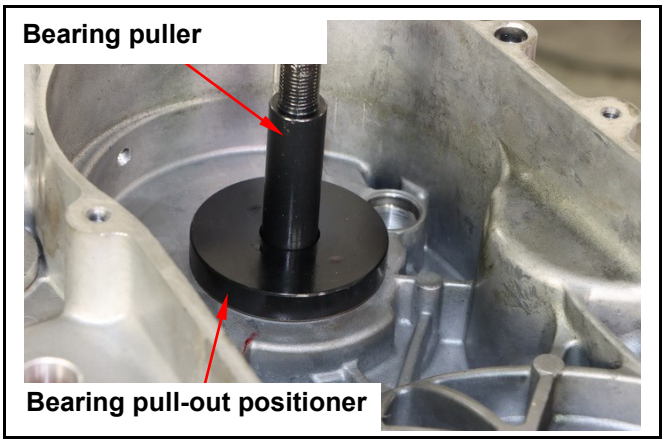
Insert the left crankshaft bearing into the bearing puller.



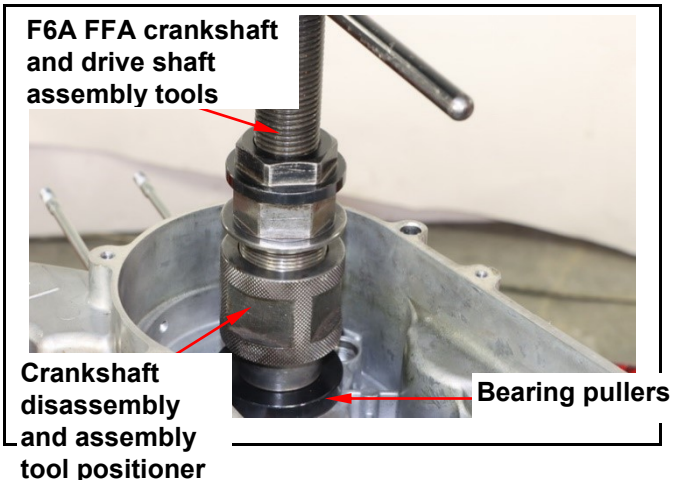
Apply engine oil to the bearing assembly position.



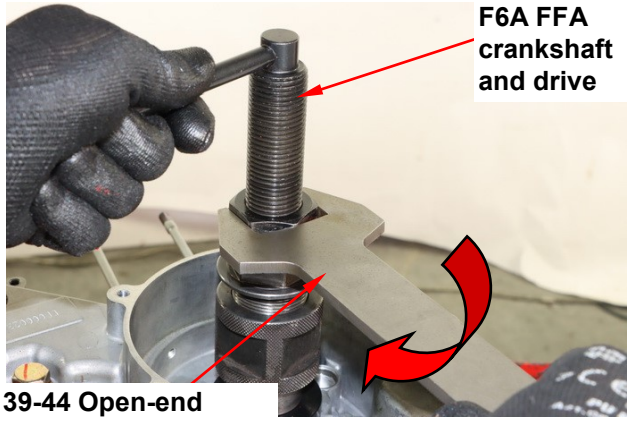
Place the bearing puller and the bearing at the assembly position.
Insert the positioner in the opposite direction.



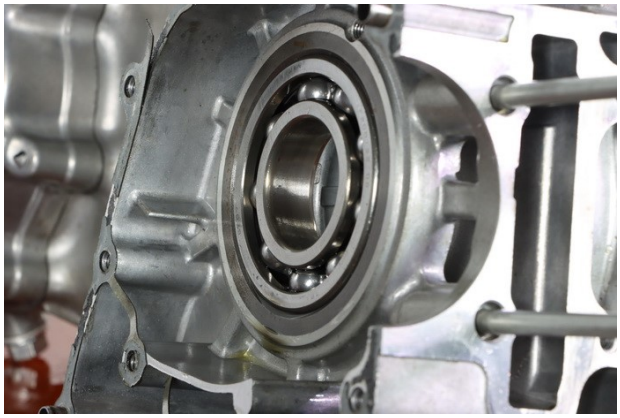
Insert the crankshaft disassembly and assembly tool positioner.
Insert the crankshaft installation puller and lock it with the bearing puller.



Hold the assembly tool handle by hand. Using a 39-44 open-end wrench, turn the 39mm nut of the assembly tool clockwise to position the bearing in place.



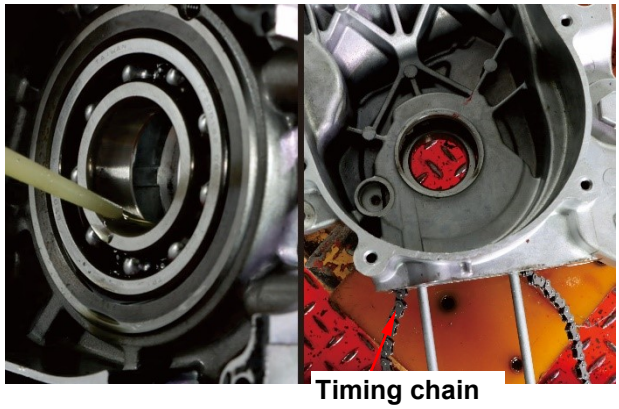
Check that the bearing is indeed assembled and positioned.



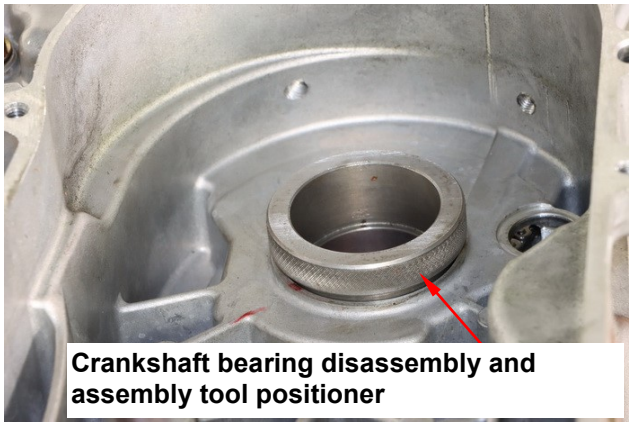
Crankshaft assembly

Apply engine oil to the inner ring of the crankshaft bearing.

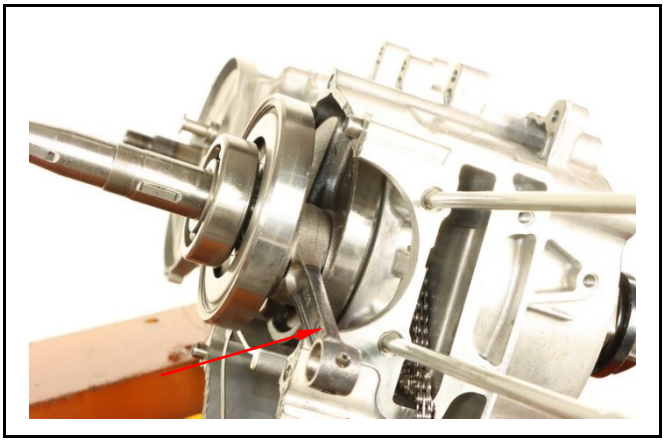
Insert the timing chain.



Install the crankshaft bearing disassembly and assembly tool positioner.

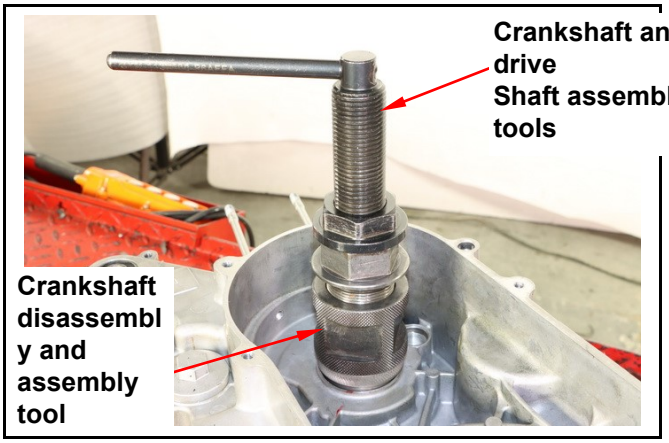


Place the crankshaft in the assembly position.

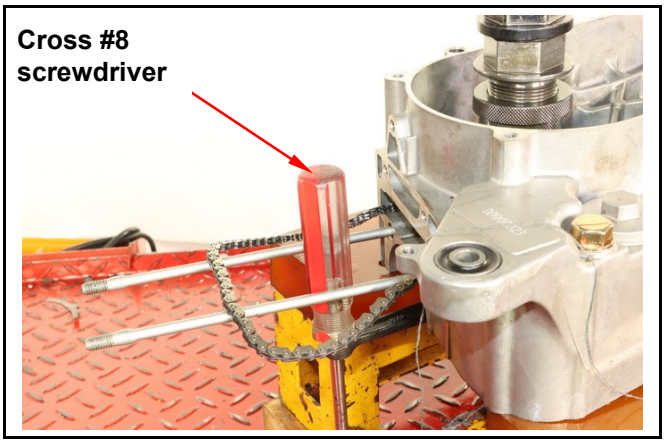


Install the crankshaft disassembly tool positioner B and insert the crankshaft and drive Shaft assembly tools.
Rotate the crankshaft and drive shaft assembly tool clockwise to lock the crankshaft and the tool together.

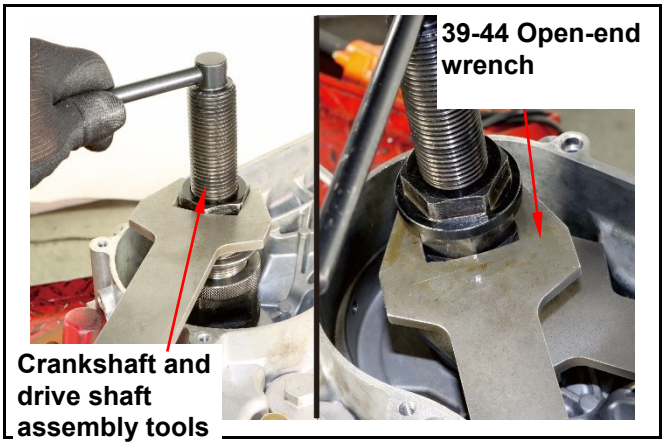
◦



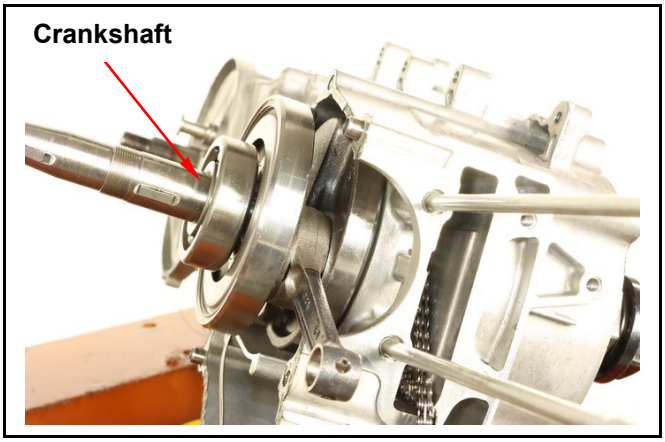
Insert the small end of the connecting rod into the screwdriver to avoid interference between the connecting rod and the crankcase.



Using a 39-44 open-end wrench, turn the assembly tool clockwise and the 39mm nut to pull the crankshaft into position.
Remove the assembly tool to check that the crankshaft is properly positioned.



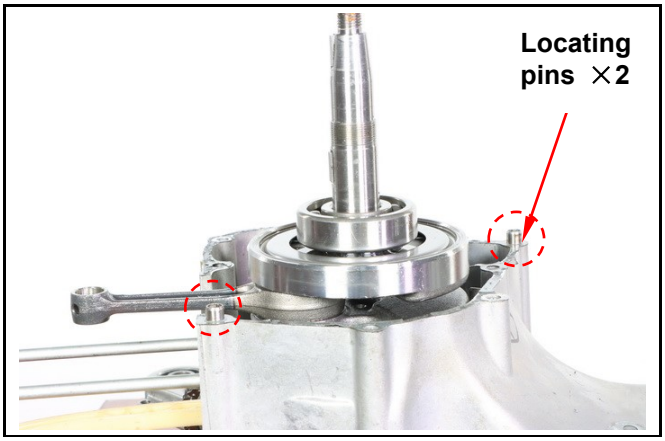
Remove the assembly tool to check that the crankshaft is properly positioned.



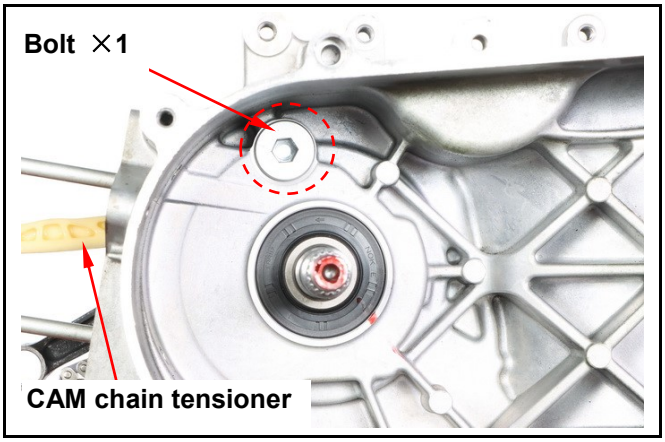
Insert the locating pins (locating pins ×2). Place the new gasket crankcase mating surface.

Note

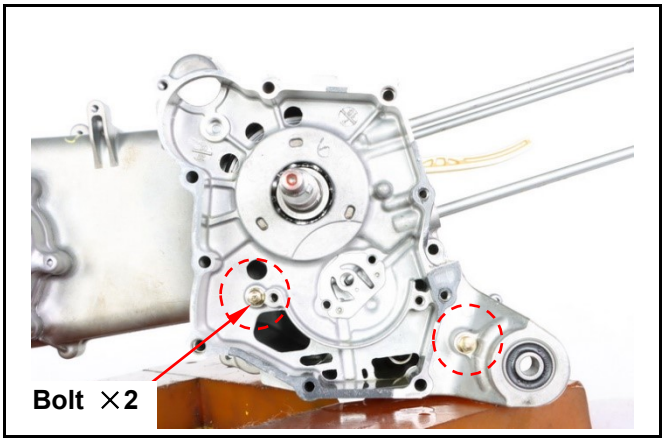
- The gasket must not be broken or missing.



Remove the bolts of the CAM chain tensioner (bolt ×1).

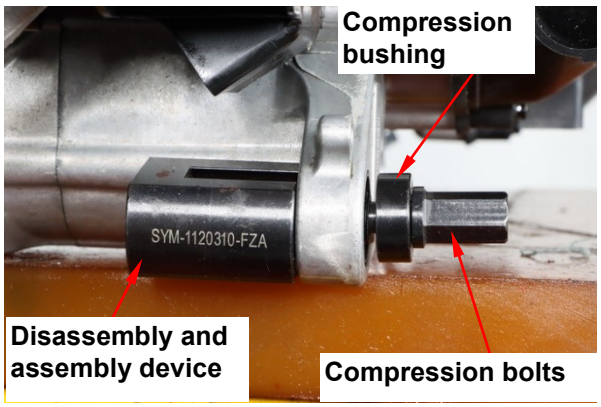


Lock in the crankcase engagement bolt (bolt ×2).

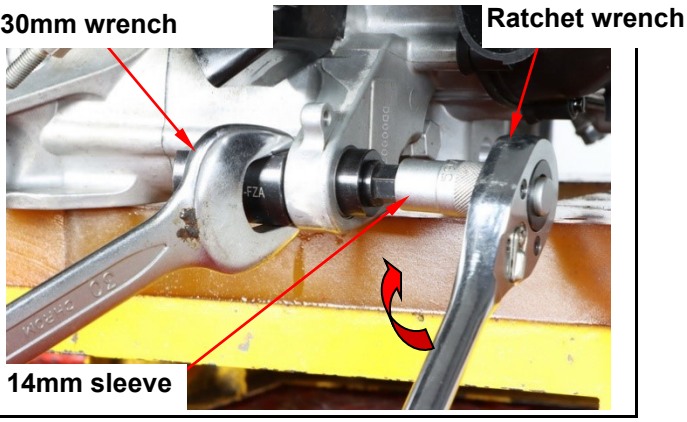


Engine rack suspension bushing disassembly and assembly

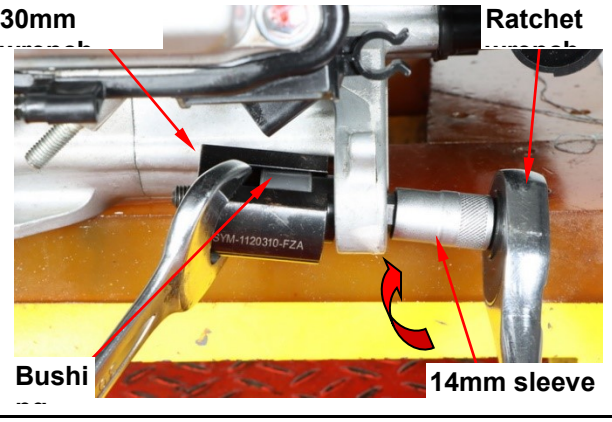
Engine rack suspension bushing disassembly
After the tool compression bushing is fitted into the compression bolt, the bolt passes through the engine suspension bushing.
The disassembler is recessed towards the bushing, and the compression bolt is locked into the disassembler.



Use a 30mm wrench to fix the disassembly and assembly groove towards the crankcase.
After the ratchet wrench is combined with the 14mm socket, insert the compression bolt.
The ratchet wrench locks the compression bolt clockwise.

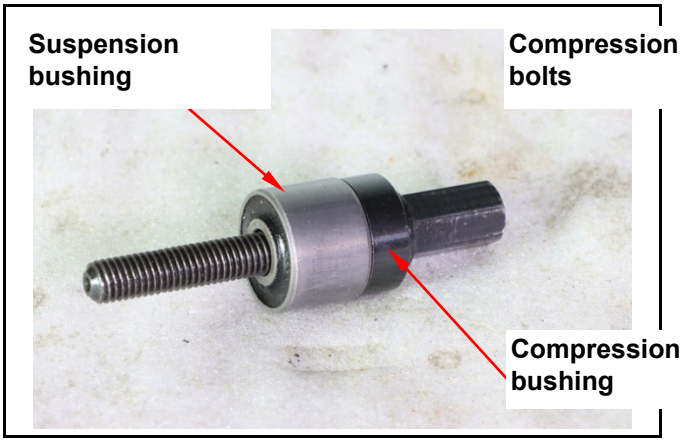


Keep locking the compression bolts until the bushing is separated from the crankcase and fully enters the disassembler.

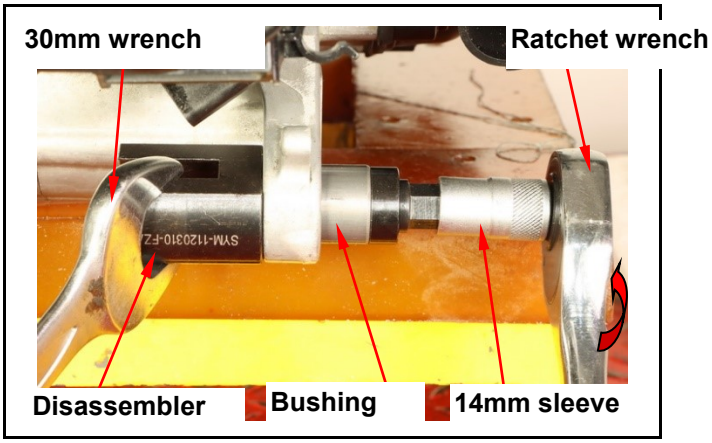


Remove the tools and bushings.
Rotate counterclockwise to exit the compression bolt and remove the bushing.

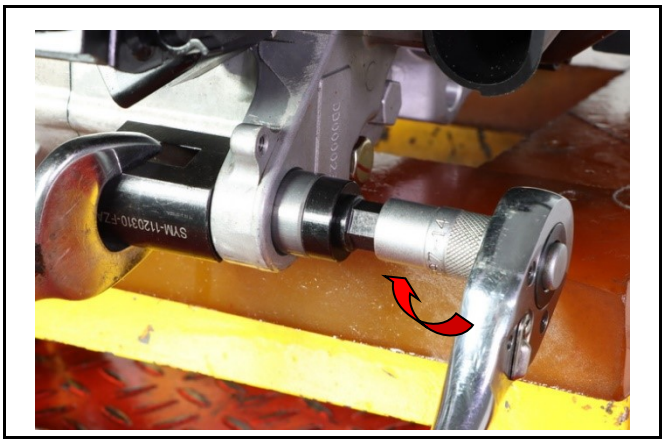
Engine rack suspension bushing assembly
The compression bolts pass through the compression bushing and the new suspension bushing.



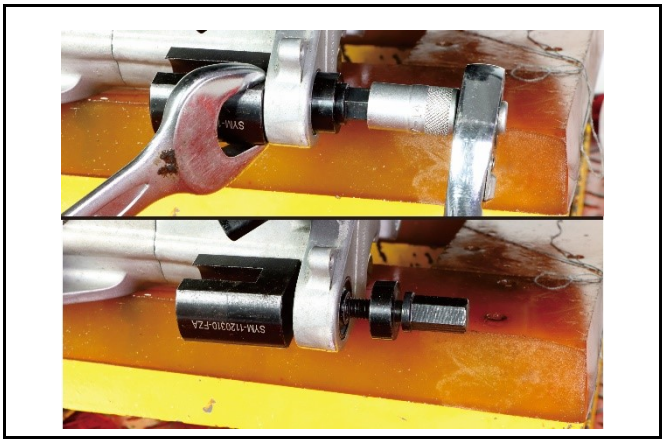
Position the disassembler plane part towards the assembly surface and place the compression bolts and bushings in the assembly position.
Turn the bolt clockwise to lock it into the thread of the disassembler's flat part.



Use a 30mm wrench to secure the disassembler, and the ratchet wrench with a 14mm socket rotates clockwise to press the bolt.
Press the suspension bushing into the engine crankcase assembly position.

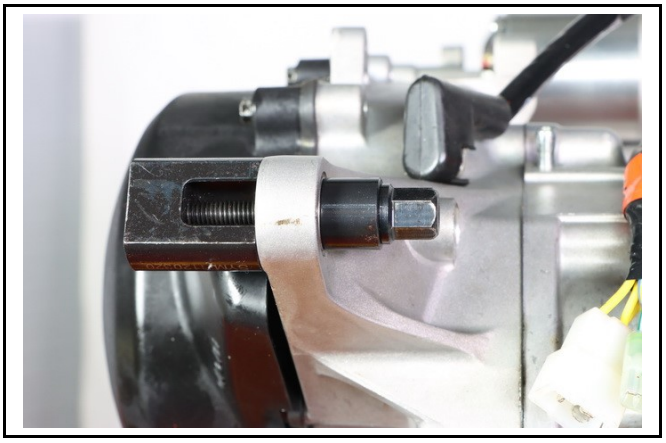


Press the suspension bushing all the way down, withdraw the compression bolts and remove the disassembly and assembly tools.
Confirm the bushing assembly positioning.

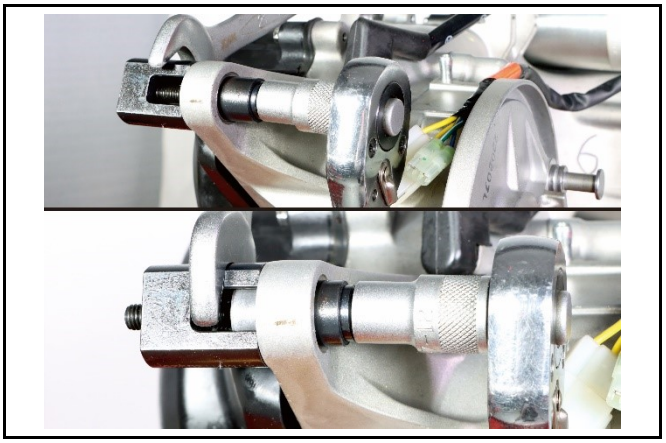


Shock absorber bushing disassembly and assembly

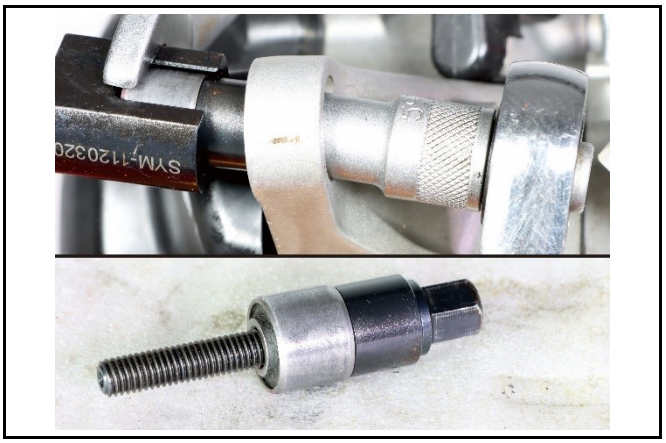
Disassembly of shock absorber bushings
After the tool compression bushing is fitted into the compression bolt, the bolt passes through the shock absorber bushing.
The disassembler is recessed towards the bushing, and the compression bolt is locked into the disassembler.



Use a 21mm wrench to secure the disassembler groove towards the crankcase.
After the ratchet wrench is combined with the 12mm socket, insert the compression bolt.
The ratchet wrench locks the compression bolt clockwise.

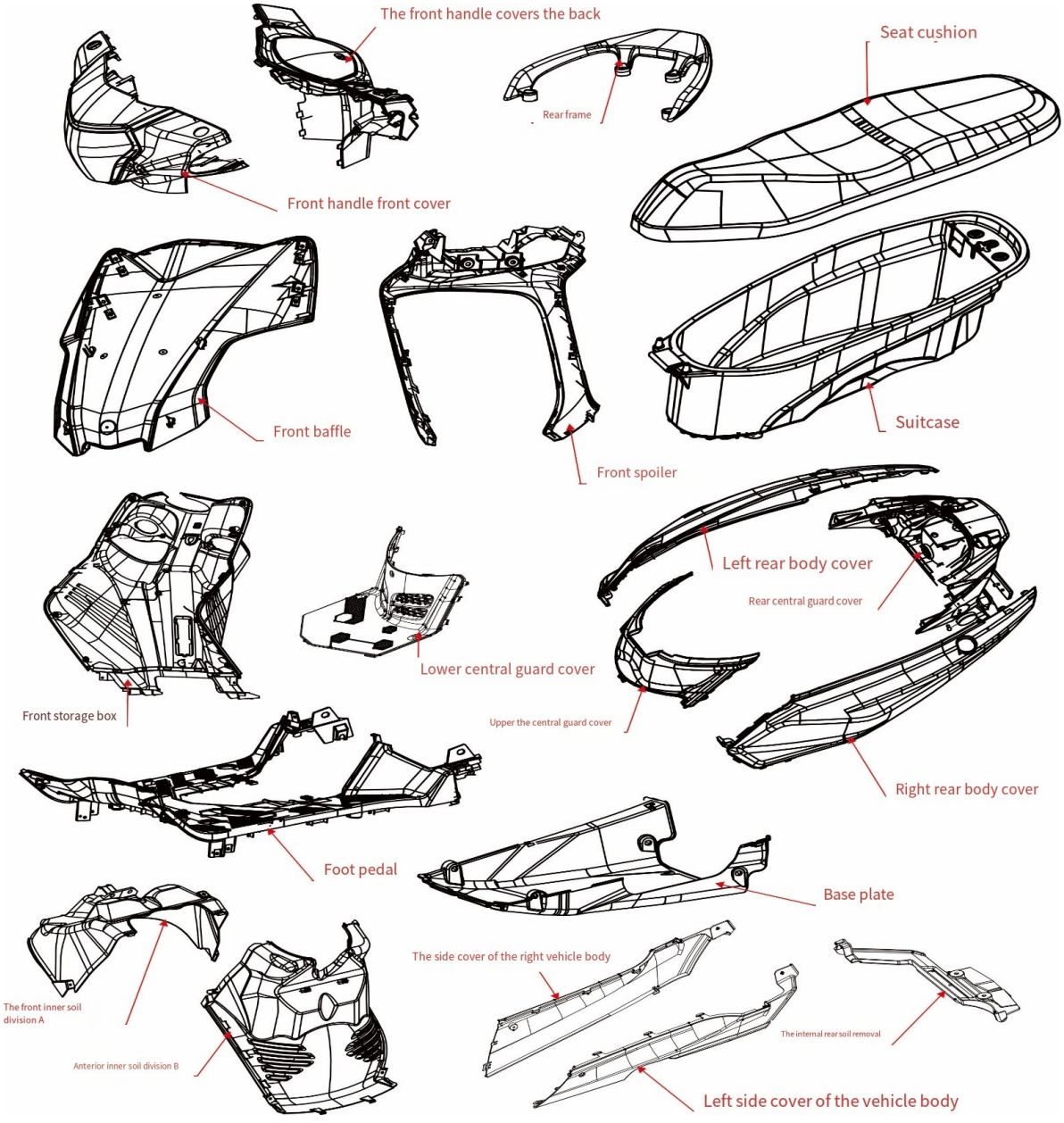


Keep locking the compression bolts until the bushing is separated from the crankcase and fully enters the disassembler.
Remove the tools and bushings.
Rotate counterclockwise to exit the compression bolt and remove the bushing.



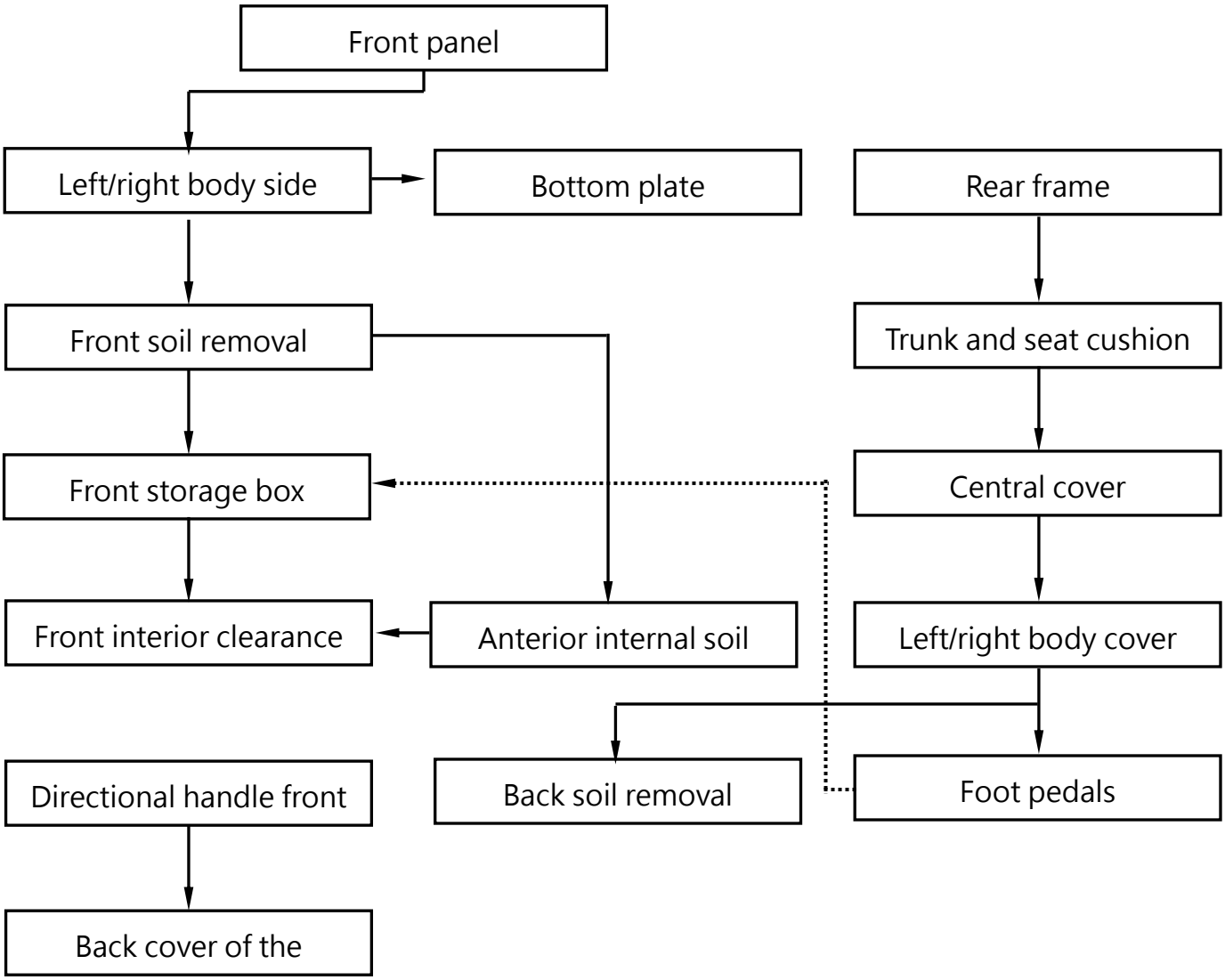
Institutional Illustration ····· 12-1	Central cover ····· 12-8
Maintenance Instructions ····· 12-2	Body cover/license plate frame ····· 12-8
Front panel ····· 12-3	Foot pedals ····· 12-10
Directional handle front cover ····· 12-4	Front cargo box ····· 12-11
Body side cover ····· 12-6	Bottom cover ····· 12-12
Front lower spoiler ····· 12-6	Front soil removal ····· 12-12
Trunk ····· 12-7	Inner rear division ····· 12-14
Rear rack ····· 12-7	

Diagram of the structure



Maintenance Instructions

The sequence for removing the body cover

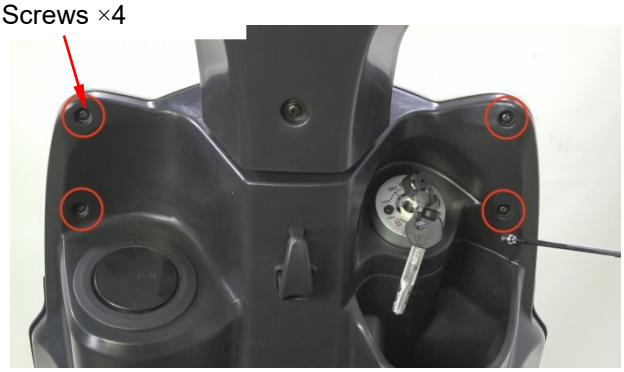


- When disassembling and assembling, do not damage any of the body covers.
- When disassembling and assembling the hook claws on the body cover, no damage is allowed.
- Align the panels and covers on the body guard with their respective grooves.
- When assembling, make sure the hooks of each part are securely installed without damage.
- When installing the cover, do not apply pressure or strike it.

Front baffle

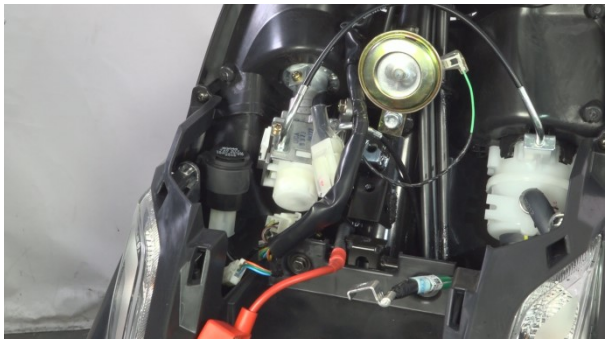
Front baffle removal

Remove the front baffle fixing screws (screws ×4) from above the front inner baffle.



Pull open the upper end latch of the front baffle, pull the lower end outward and pull down to remove the front baffle

Remove the front panel.



Directional handle front cover

Remove

Remove the rearview mirror.

Remove the fixing screws (screw ×4) behind the front cover of the steering handle.

Remove the fixing screws (screws ×2) at the back of the front cover of the directional handle.

Remove the front cover of the steering handle.

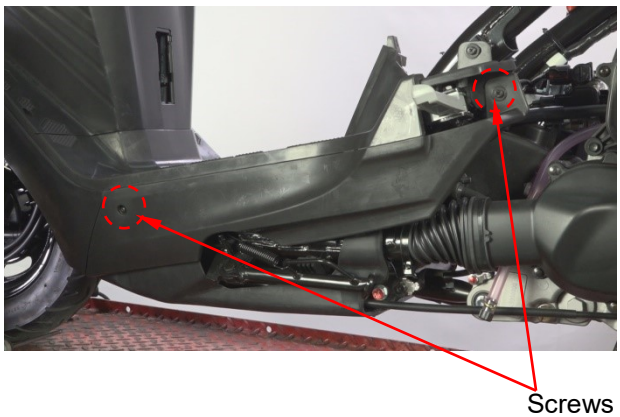
Installation

Install in the reverse order of disassembly.

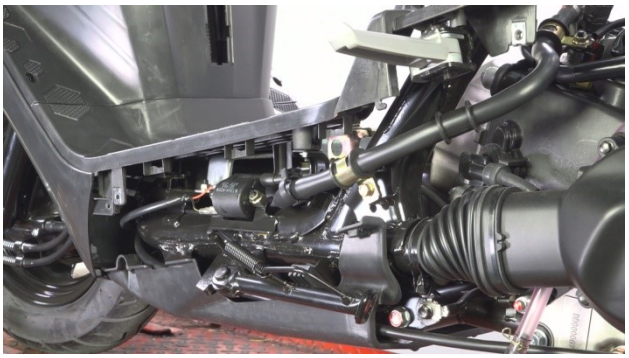
Body side cover

Disassemble

Remove the screws (2 screws each on the left and right sides) from the front bottom of the body side cover.



Remove the left and right side covers.



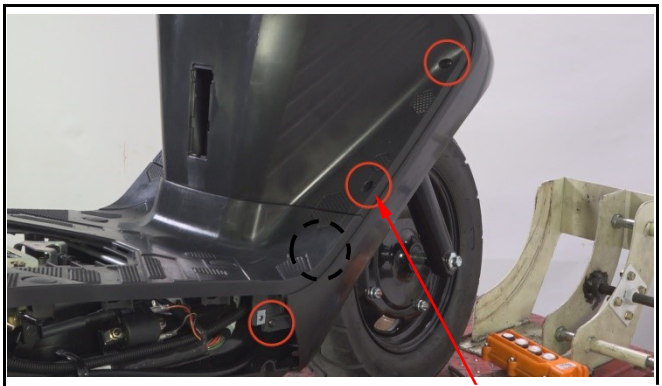
Installation

Install in the reverse order of disassembly.

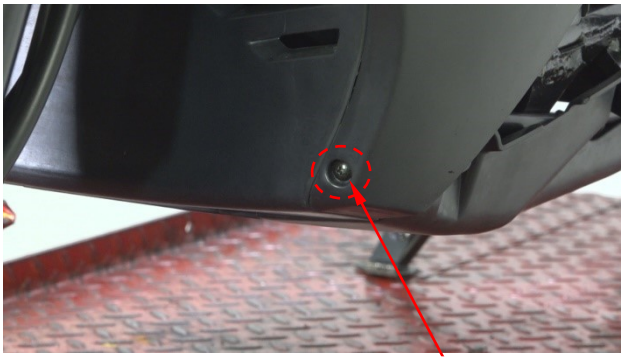
Front lower spoiler

Disassemble

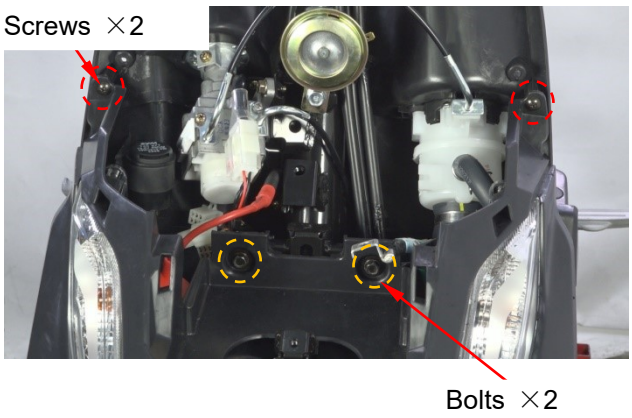
Remove the front panel and the left/right cover of the body.
Remove the spoiler side fixing screws (screws ×3).



Remove the front lower end fixing screws of the spoiler (left and right screws ×1).



Remove the front spoiler.



Installation

Install in the reverse order of disassembly.

Suitcase

Disassembling

Open the cushion.

Remove the luggage compartment fastening bolts (bolts ×4).

Remove the suitcase.

Rear rack

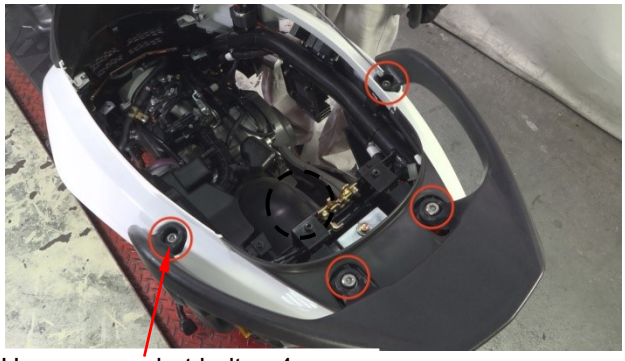
Disassemble

Remove the rear frame fixing bolts (hexagon socket bolts ×4).

Remove the rear frame.

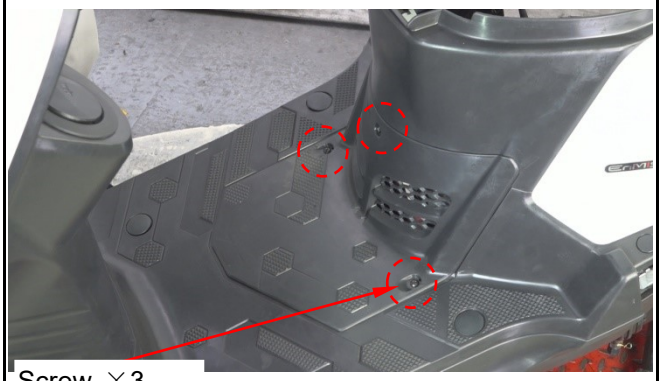
Installation

Install in the reverse order of disassembly.

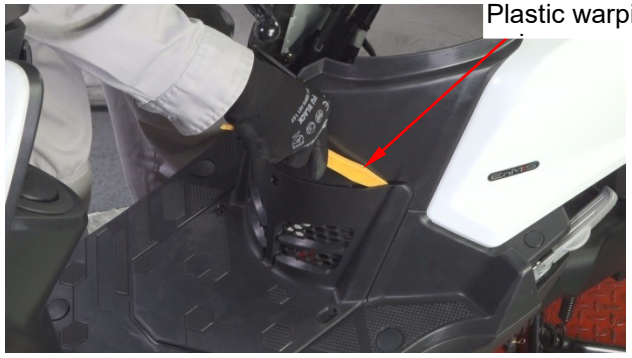


Central guard cover

Remove the central cover screws (screws ×3).



Use a plastic wrench to pry open the latch.
Remove the plastic warps.



Installation

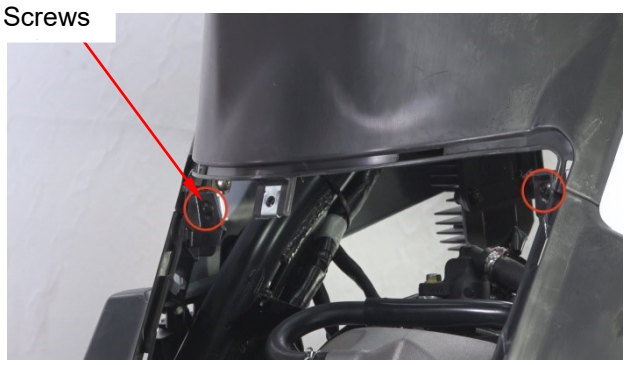
Install in the reverse order of disassembly.

Body cover/license plate frame

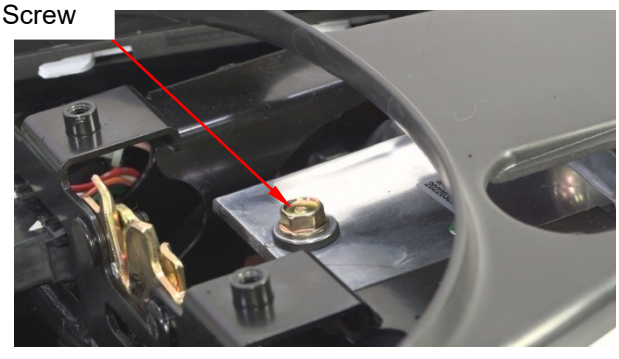
Disassemble

Body cover

Open the seat cushion.
Remove the suitcase.
Remove the rear rack.
Remove the central guard cover
Remove the front end fixing screws (screws ×2)

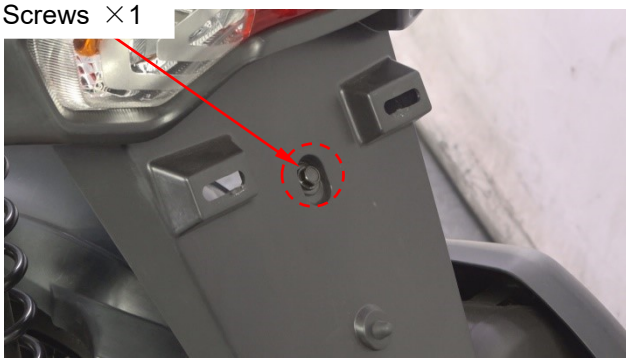


Remove the rear top fixing bolts (bolt ×1)



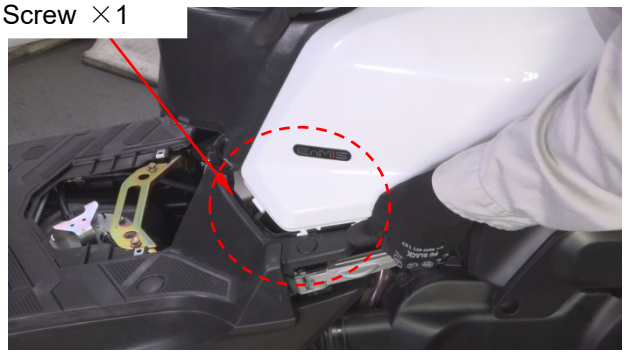
Remove the rear license plate frame fixing bolts (bolt ×1)

Screws ×1



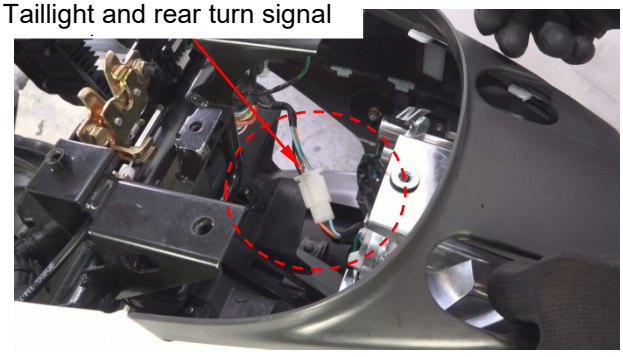
Disengage the front lower latch of the body cover.

Screw ×1



Pull the body back.
Remove the wire connectors for the taillights and turn signals.

Taillight and rear turn signal

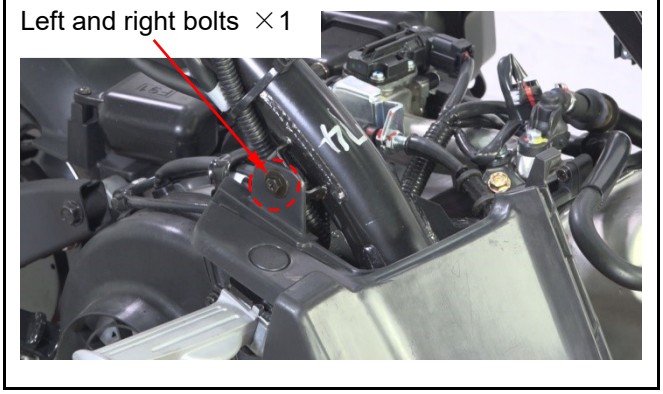


Remove the rear body cover assembly.

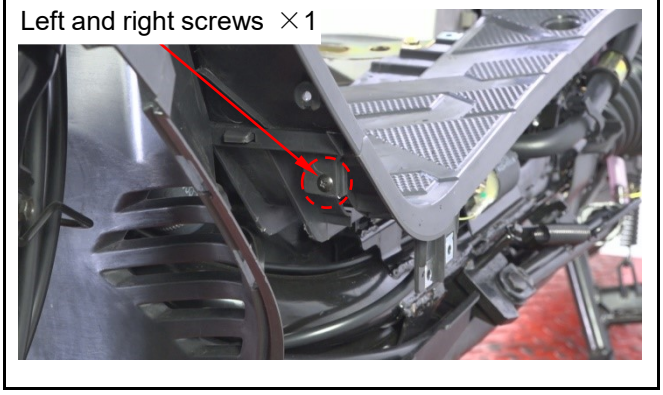
Foot pedals

Disassemble

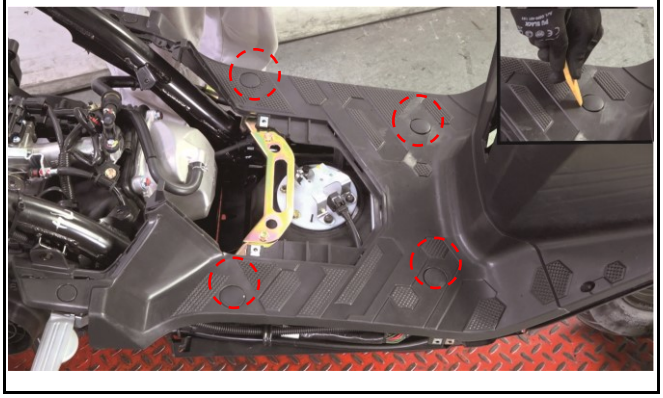
Remove the left/right side cover of the body, the central guard cover, and the trunk.
Remove the upper fixing bolts (left/right bolts ×1) after the left/right side of the footrest.



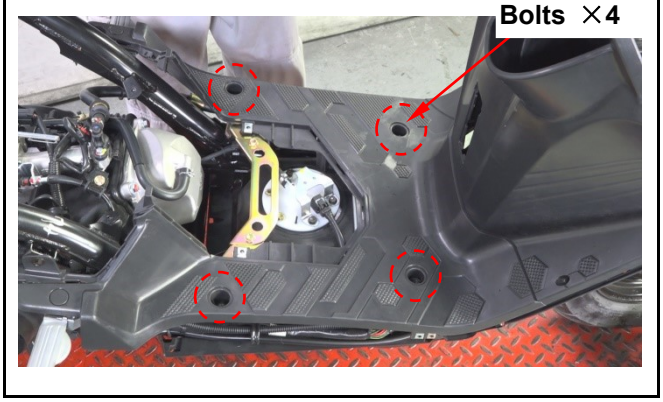
Remove the front fixing screws on the left/right side of the foot pedal (left and right screws × 1).



Use a plastic wrench to pry open the bolt cap.



Remove the foot pedal fixing bolts (bolts × 4).
Remove the foot pedal.



Installation

Install in the reverse order of disassembly.

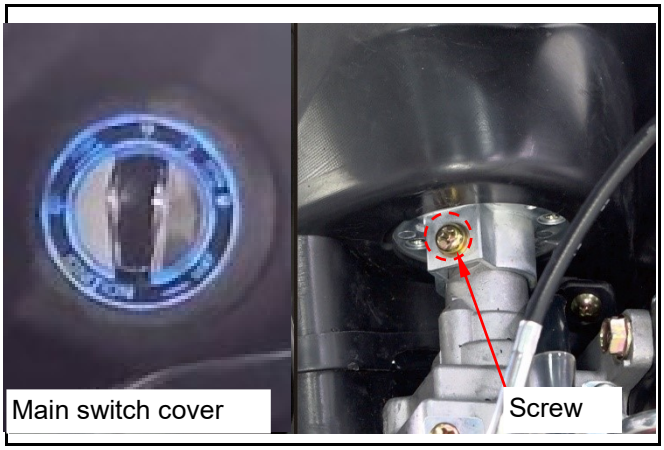
Front cargo box

Disassemble

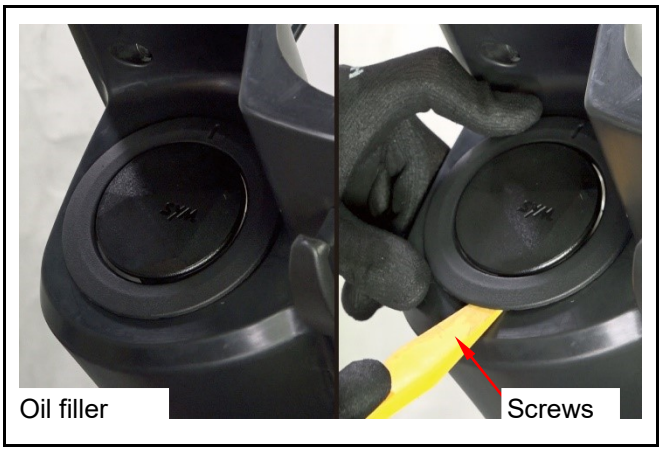
Remove the front bumper, the left/right cover of the body and the front lower spoiler and footrests.

Remove the main switch cover fixing screws (screw ×1).

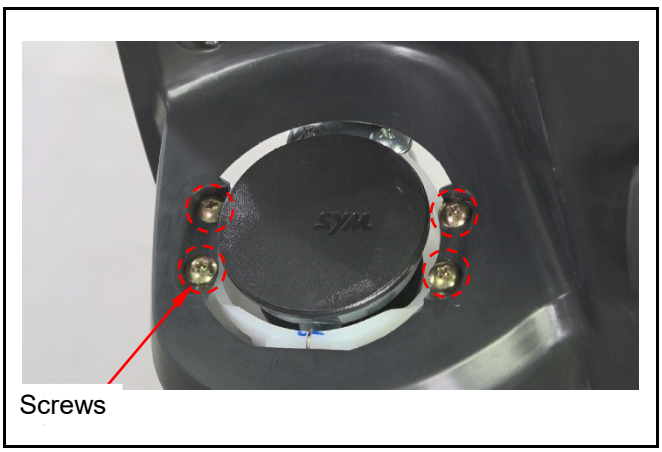
Remove the main switch cover.



Use the plastic rocker to remove the oil filler cap panel.

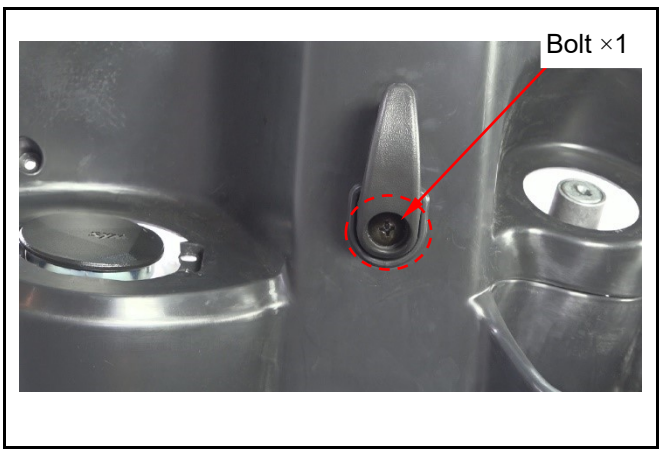


Remove the filler cap fixing screw (screw ×4).



Remove the container hook (bolt ×1).

Remove the front storage box.

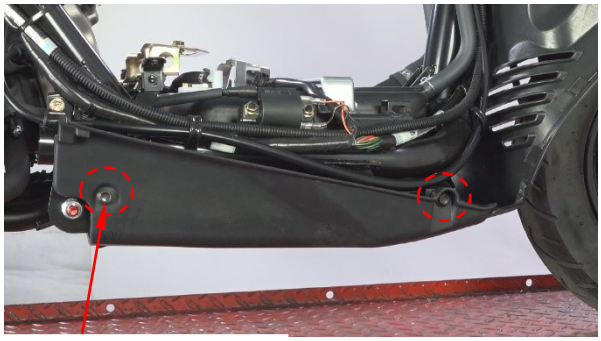


Installation

Install in the reverse order of disassembly.

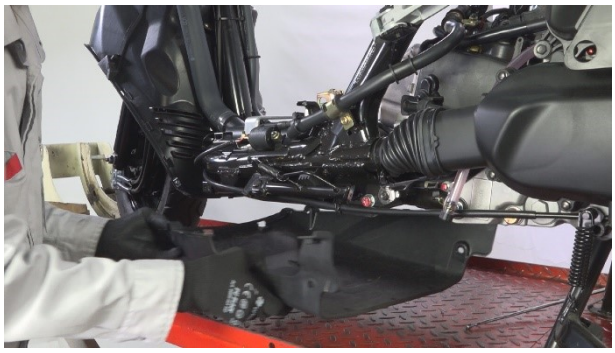
Bottom cover

Remove the bottom cover fixing bolts (left/right bolts ×2).



Left/right bolt ×2

Remove the bottom cover.



Installation

Install in the reverse order of disassembly.

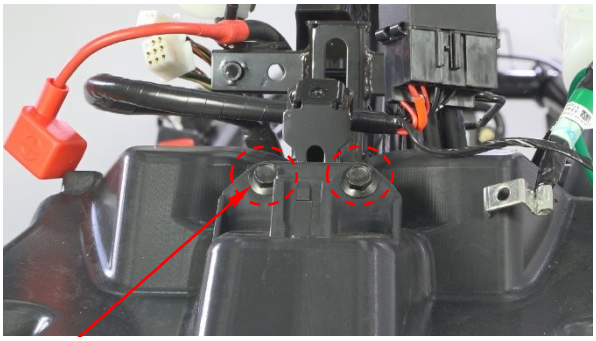
Front soil removal

A

Remove the two fixing screws (screws ×2) on both sides of front soil divider A.

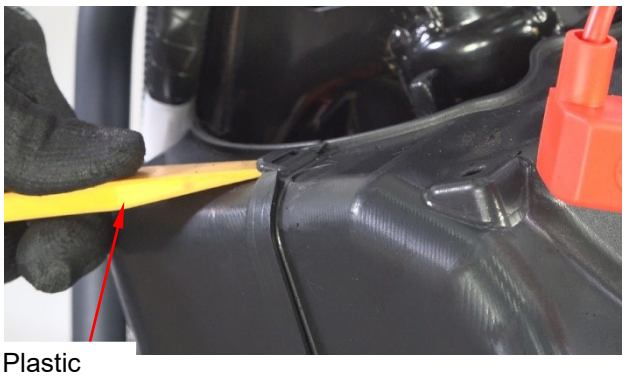
Screws ×2

Remove the front fixing bolts (bolts ×2).



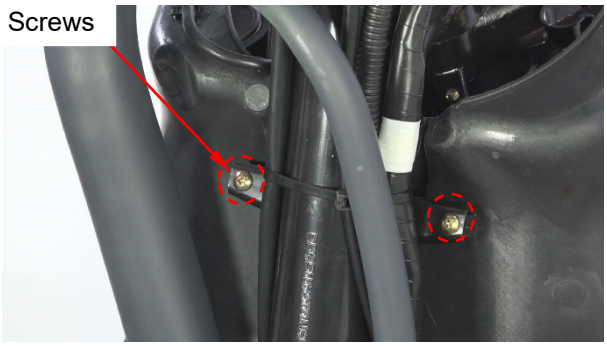
Bolts ×2

Use a plastic wrench to pry open the latch.
Remove the front soil from the front A.

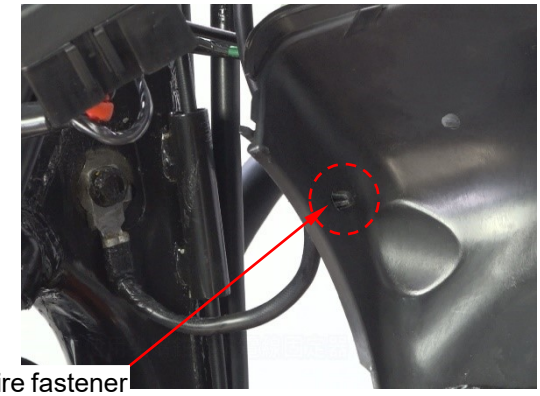

Plastic

Front soil remove B

Remove the fixing screws (screw ×2) in front of front soil removal B.


Screws

Remove the wire retainer.


Wire fastener

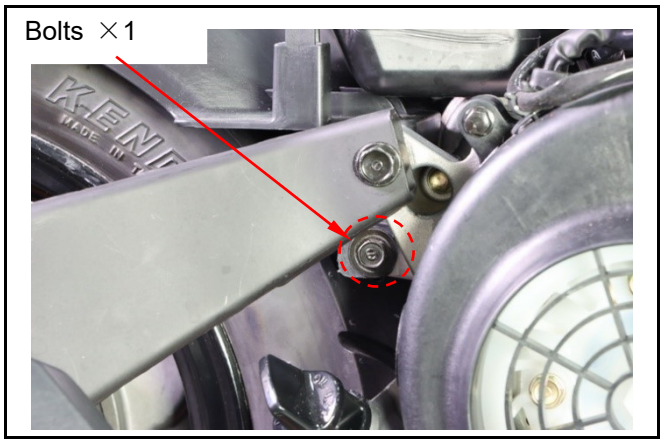
Remove the front soil remover B.

Installation

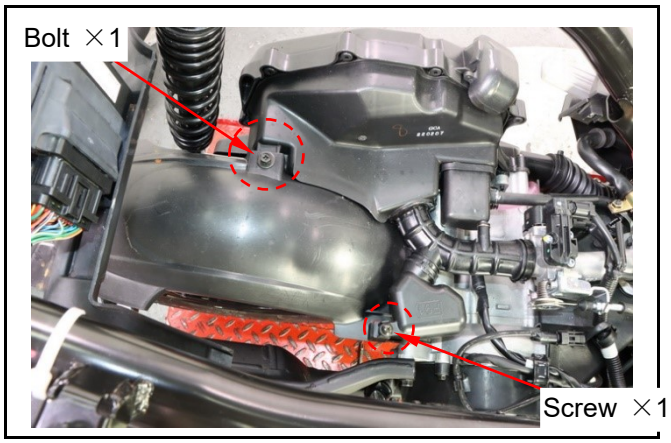
Install in the reverse order of disassembly.

Inside back soil remover

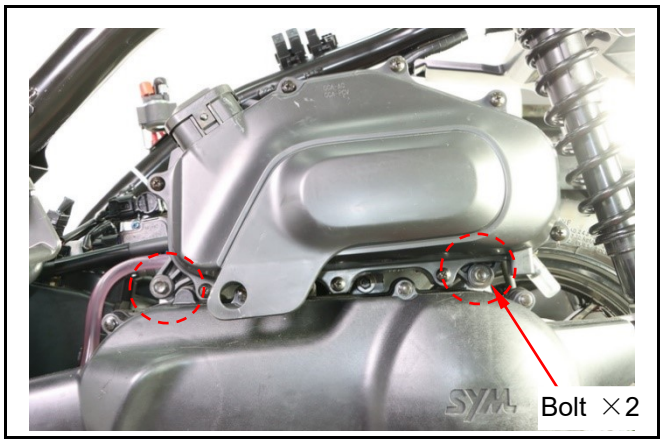
Remove the right lower fixing bolt (bolt ×1) in front of the inner rear soil removal.



Remove the upper fixing bolt and the upper front screw (1 bolt and 1 screw).



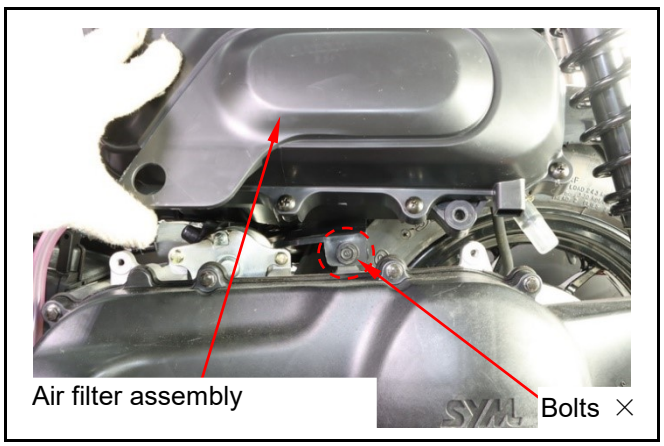
Remove the fixing bolts (bolts ×2) below the air filter assembly.



Remove the left side fixing bolt (bolt ×1).
Remove the inner rear drain.

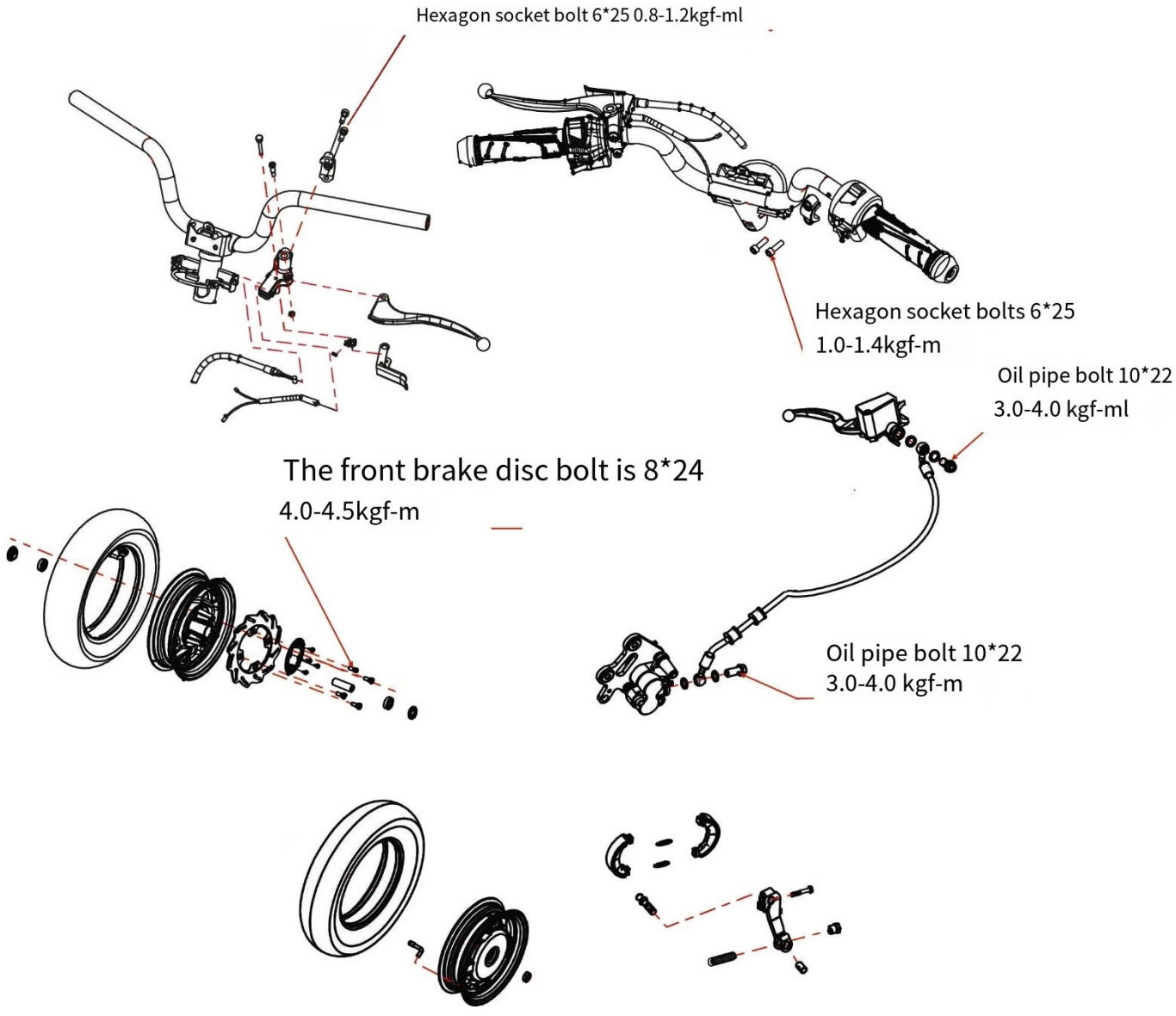
Installation

Install in the reverse order of disassembly.

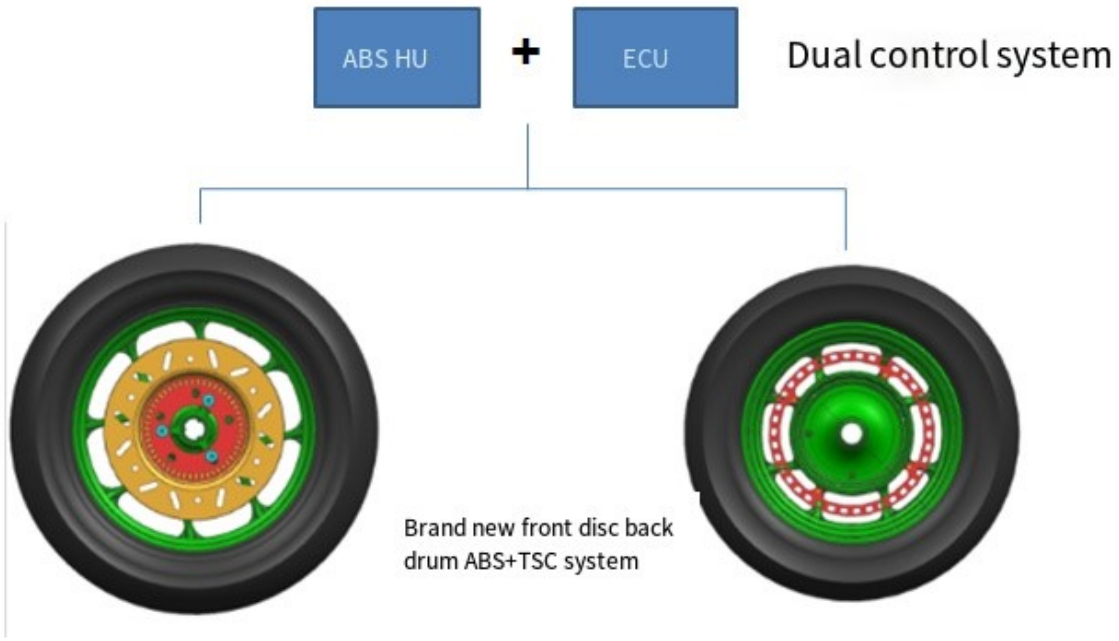


Institutional Illustration 13-1	Front brake calipers 13-9
Notes on Work 13-3	Replace the front brake tubing 13-14
Torque value 13-3	Replace the main brake cylinder .... with 13-16
Fault Diagnosis 13-4	
Hydraulic brake system inspection ···· 13-5	Brake discs 13-18
	Replace the rear brake wire 13-19
Brake fluid refill 13-6	Replace the rear brake come ..... pad 13-21
Brake fluid change/Drain air 13-7	
	Rear wheel stopper 13-26

Mechanism illustration



Introduction to Brake Systems



■ The ABS+TCS system, rarely seen in its class, prevents skidding caused by misoperation of the accelerator and brakes, creating the highest level of rider protection system.

Precautions for homework

⚠ Note

Inhaling dust can affect respiratory function or even cause cancer, so never clean brake assemblies with compressed air or a dry brush. Use a vacuum cleaner or other alternative methods to minimize dust contamination.

- You can remove the brake calipers without having to remove the hydraulic system.
- When removing the oil pressure system or feeling that the brakes are soft, air should be drained from the oil pressure system.
- When refilling the brake fluid, be careful not to let any foreign objects into the system.
- Avoid dripping brake fluid onto painted surfaces or rubber to prevent damage.
- Check the brakes before riding the vehicle.

Specification

unit: mm

Project	Standard values	Available limits
Front brake disc thickness	4.000	3.500
Brake disc eccentricity	Less than 0.100	0.300
Front brake disc diameter	205.000	
The inner diameter of the rear brake drum	130.000	132.000
The front brake is used to make the thickness of	4.800	
Apply the rear brake to make the thickness	4.000	

Torque value

Brake tubing bolts	3.0 to 4.0kgf-m
Brake caliper fixing bolts	2.9 to 3.5kgf-m

Fault diagnosis

The brake lever is loose

- There is air in the hydraulic system
- The oil pressure system is leaking
- The main cylinder piston seal is worn out
- Poor calipers
- To wear out the disc
- Insufficient brake fluid
- The brake tubing is clogged
- Brake discs are deformed and bent
- The brake lever is bent

The brake lever is difficult to operate

- The brake system is clogged or blocked
- Poor calipers
- Brake fluid lines are clogged or blocked
- Master cylinder piston seizure/wear
- Brake lever bent

Uneven braking force

- Brake to contaminate the disc/disc
- The wheels are poorly aligned
- Brake tubing is clogged or blocked
- Brake discs are deformed or bent
- Brake tubing/couplings are clogged or blocked

Brake too tight

- Brake to contaminate the disc/disc
- The wheels are poorly aligned
- The brake disc is deformed and bent

Brake noise

- To stain the pads
- Brake disc eccentricity
- The brake calipers are poorly installed
- Brake discs or wheels are not parallel

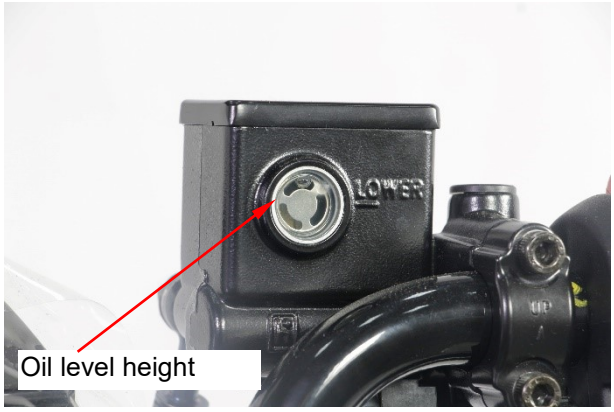
Check the hydraulic brake system

Check

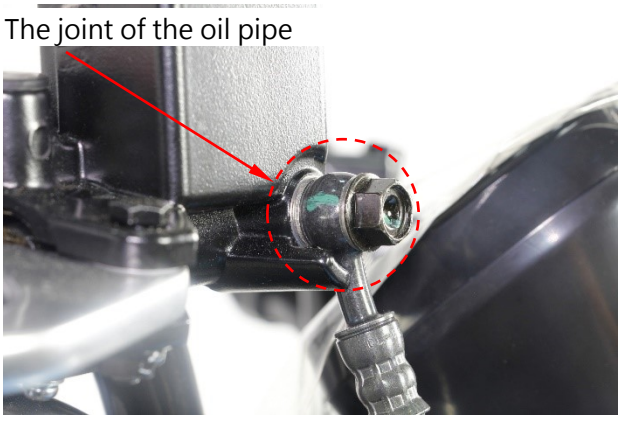
Stand the vehicle up on a flat ground and check the height of the oil level in the right brake driver's cylinder.

⚠ Note

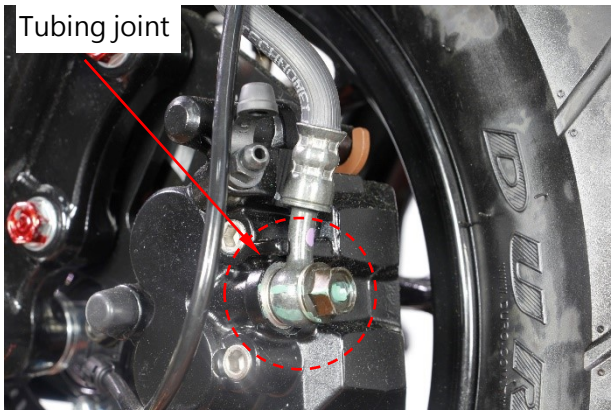
- If the vehicle is tilted or has just stopped, the measurement of the oil level will not be accurate. Let it stand for 3 to 5 minutes.



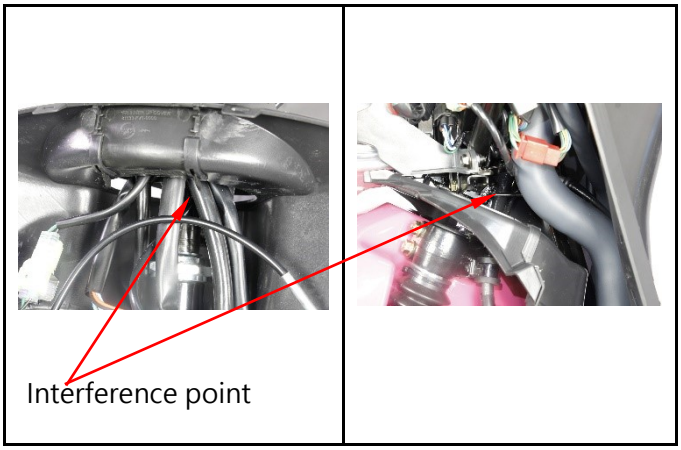
Visually check for leaks or damage and use a wrench to check for loose tubing joints.



Check for leaks or damage visually and use a wrench to check for loose tubing joints.

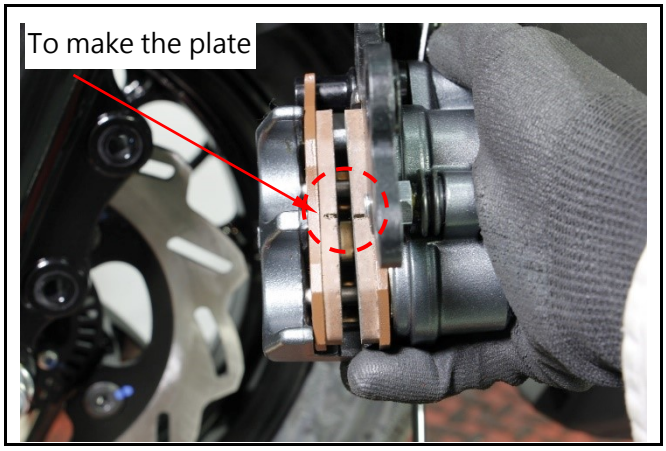


Turn the steering handle left and right or press the shock absorber up and down to check if there is any risk of interference or contact with other parts except the pipe protection.



Check the brakes to wear out the pads. Check the thickness of the brake pads at the junction of the front brake caliper and brake disc pads. When the brake pads wear down to the baseline, new brake pads must be replaced.

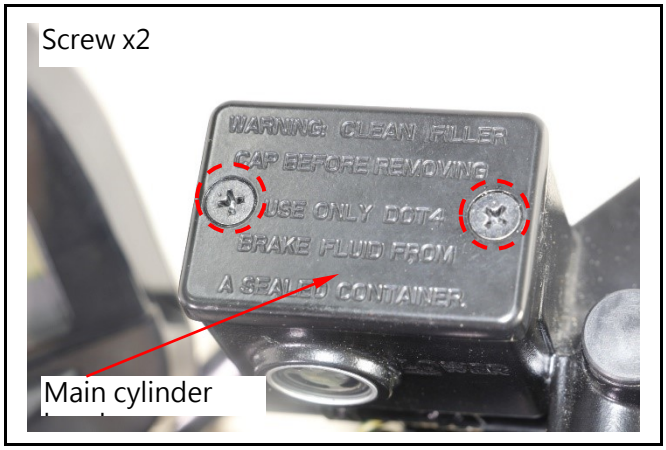
Brake pad thickness: 4.800mm



Brake fluid refill

Turn the steering handle to level the brake cylinder.

Remove the brake cylinder head screw (screw x2).

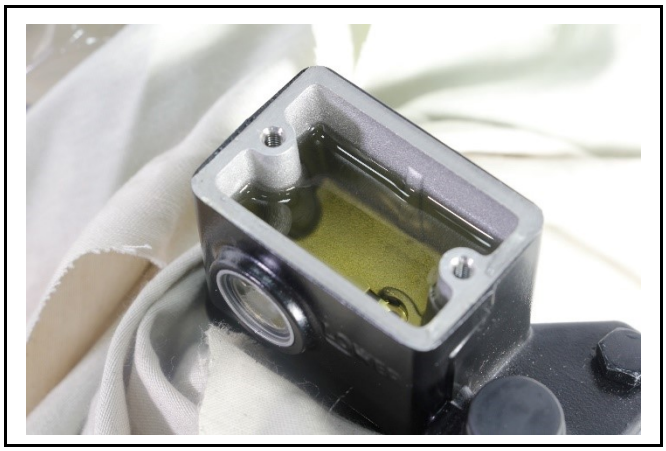


Note

- When maintaining the brake system, cover the paint surface, plastic or rubber parts with a cloth.

Remove the main cylinder head and diaphragm.

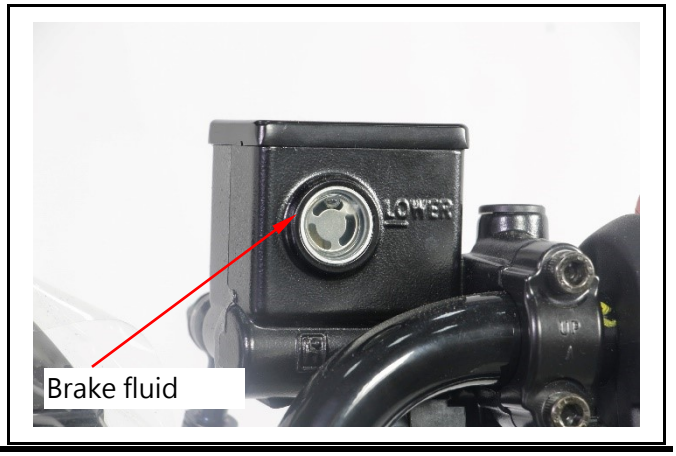
Recommended use: Add Sanyang "DOT4" brake fluid to the master cylinder.



Add new brake fluid to the upper limit.

Note

- Contaminated brake discs or brake pads can reduce braking performance.
- Incompatible brake fluids mixed together can affect brake efficiency.
- Foreign objects can clog the system, resulting in reduced or complete loss of braking ability.



Note

Do not exceed the limit when refilling brake fluid and avoid dripping brake fluid onto paint, plastic or rubber parts to prevent damage to components.

Brake fluid change/Drain air

Brake fluid replacement

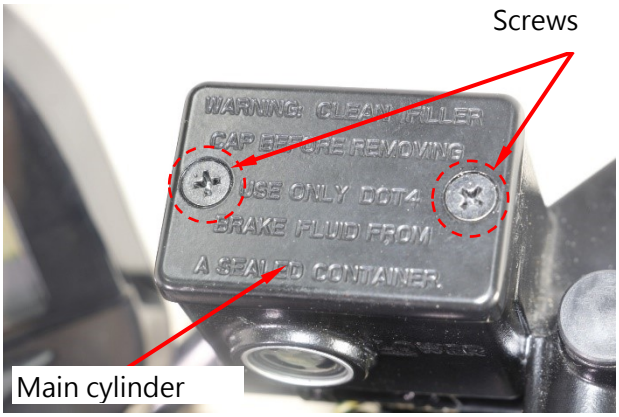
Tools used: Container cup, transparent tube, 8-gauge box wrench

Line the front baffle with rags.

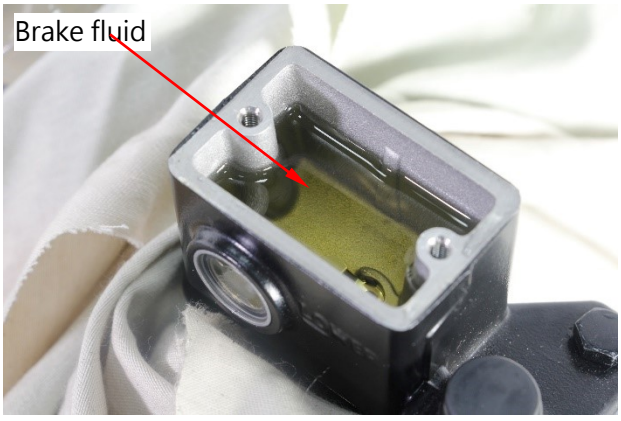
⚠ Note

Do not let brake fluid come into contact with the surface of the paint.

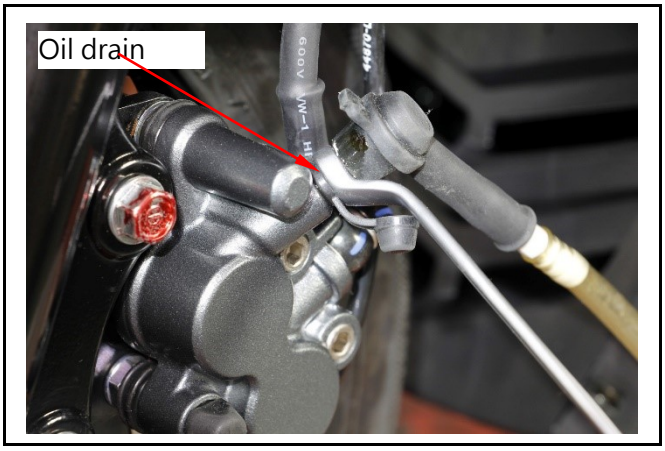
Remove the brake owner cylinder head screw (screw x2).
Remove the brake master cylinder head.



Use an oil pump to drain the old brake fluid.
Add new brake fluid up to the limit.
Recommended use: Sanyang "DOT4" brake fluid.



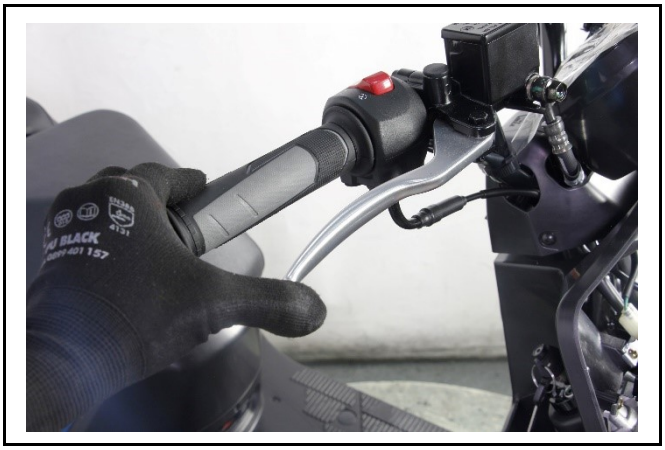
Connect the transparent tube to the oil drain valve and place the other end of the oil pipe in a container.



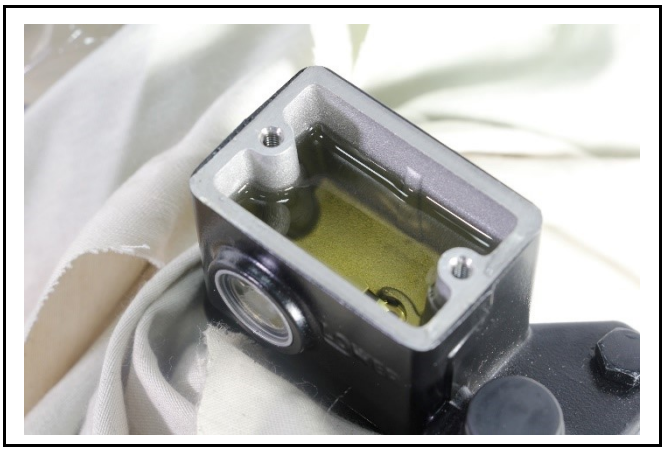
Press the brake lever 3 to 5 times and hold it down.
Release the drain valve about 1/4 turn to allow the old brake fluid to flow out and lock the drain valve.

⚠ Note

- Do not release the pull rod until the drain valve is closed.
- Check the brake fluid level frequently and replenish the brake fluid to prevent air from entering the system.



Repeat the above actions until new brake fluid flows out of the transparent tube.
When there is resistance when you press the lever about 1/3 again, it indicates that the air release is complete.
If there is still sinking when you press the lever, repeat the above brake fluid change action.
Add the new brake fluid to the upper limit.



Cover the main cylinder head.
Lock the screws (screw x2).

Release air
Do it this way

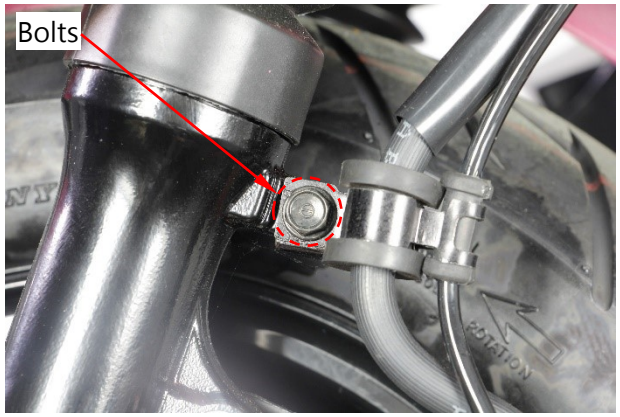
⚠ Note

- Brake fluid can be changed using a brake fluid changer; It takes longer and the bubbles are less likely to remain.

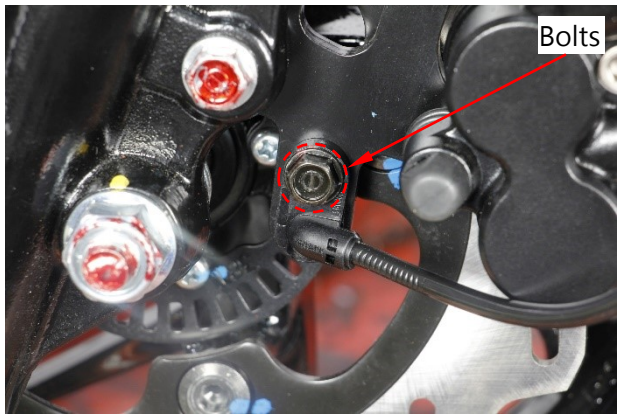
Front brake calipers

Disassemble

Remove the front brake oil pipe and speed sensor fixing clamp bolts (bolt x1).



Speed sensor fixing bolt (bolt x1).

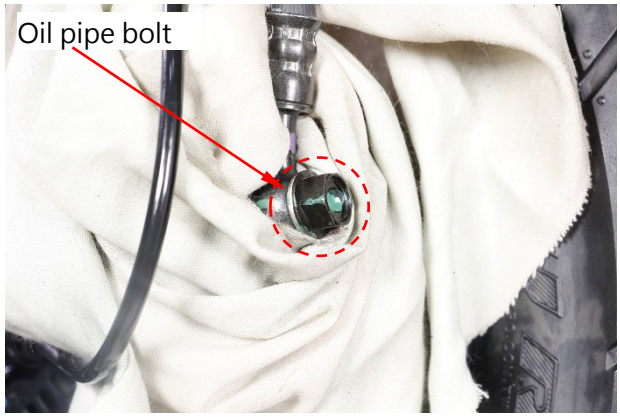


Use rags to cover the front brake calipers and tubing bolts.

Remove the bolts and cover the tubing completely with the rags.

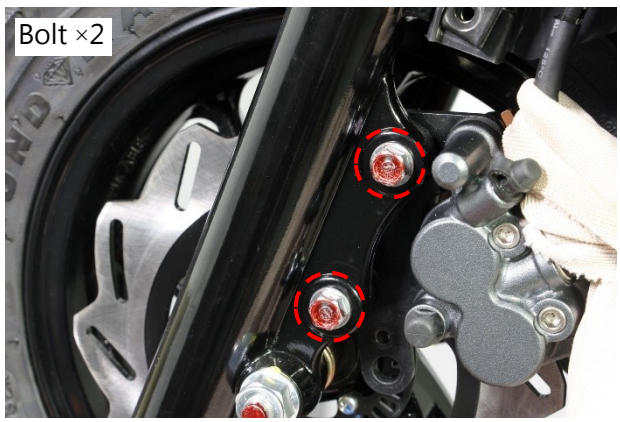
⚠ **Note**

Do not let brake fluid come into contact with the surface of the paint.



Remove the front brake caliper bolts (bolts ×2).

Remove the front brake calipers.



Installation

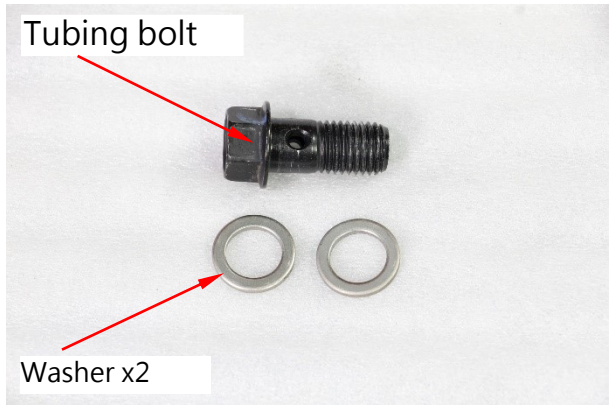
Install the front brake caliper and lock the fixing bolts (bolts ×2).

Torque value: 2.9 to 3.5kgf-m

⚠ Note

- M8 x 35 mm bolts should be used.
- Bolts that are too long will impede the operation of the brake discs.

Tubing bolts and washers (washer x2).



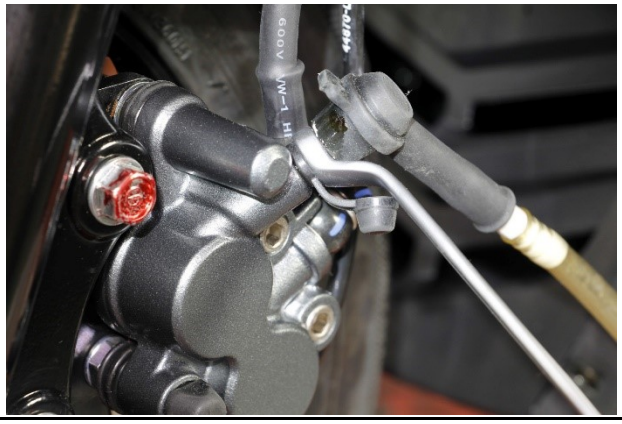
⚠ Note

The gasket must be replaced with a new one after being removed.

Torque value

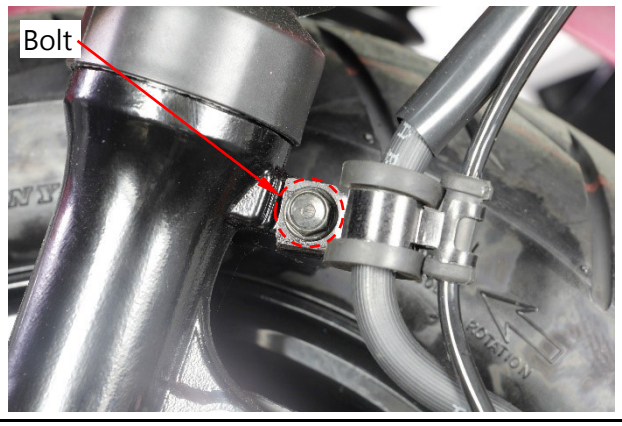
Brake tubing bolts 3.0 to 4.0kgf-m

Remove the main cylinder head and add brake fluid to the front brake main cylinder, and drain the air from the brake system.

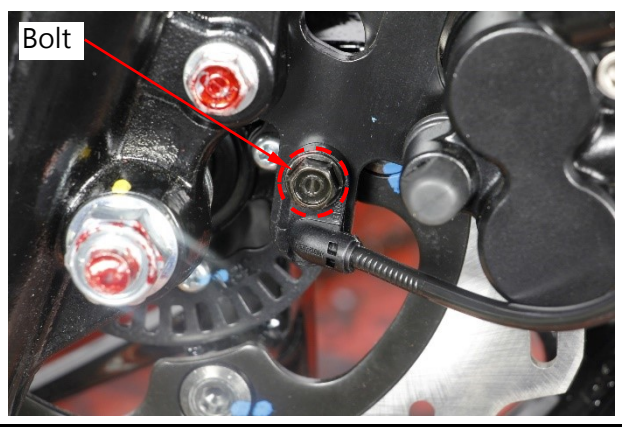


Replace the brake pads on the front brake

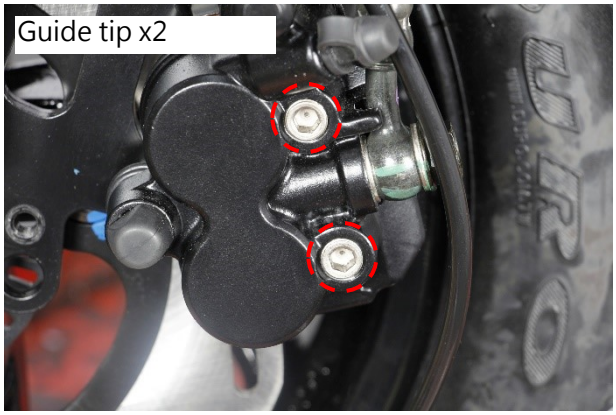
Remove the front brake tubing and speed sensor fixing clamp bolts (bolt x1).



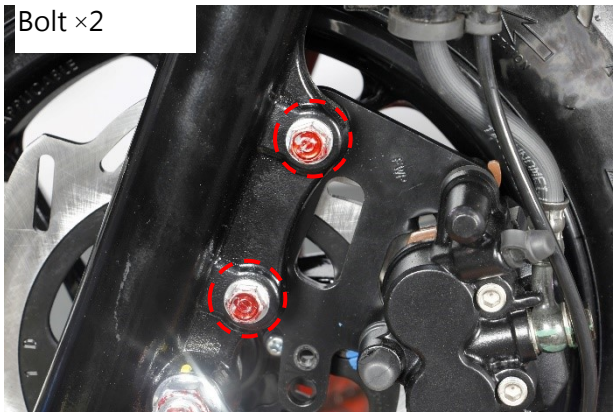
Speed sensor fixing bolt (bolt x1).



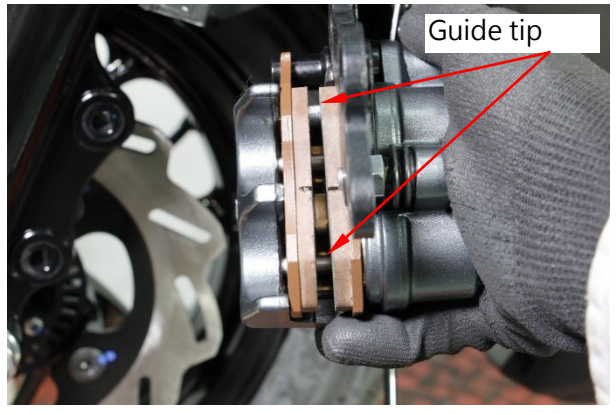
Loosen to allow the guide pin (guide pin x2).



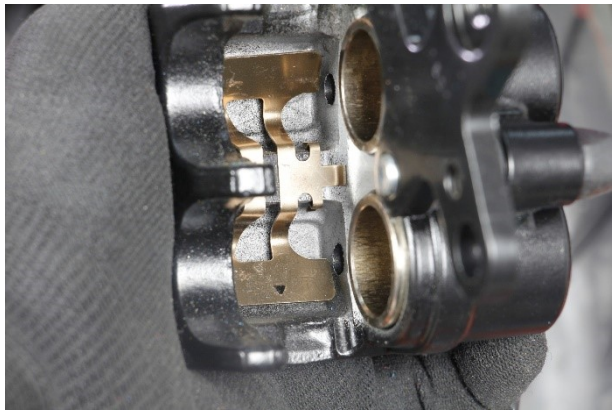
Remove the front brake caliper bolt (bolt ×2).



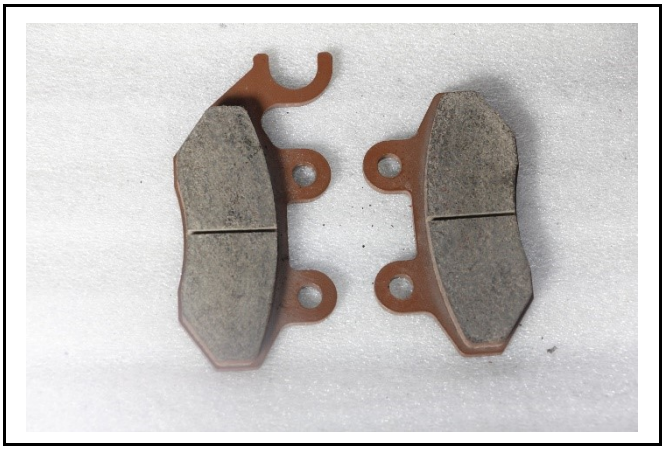
Pull out the guide pin.



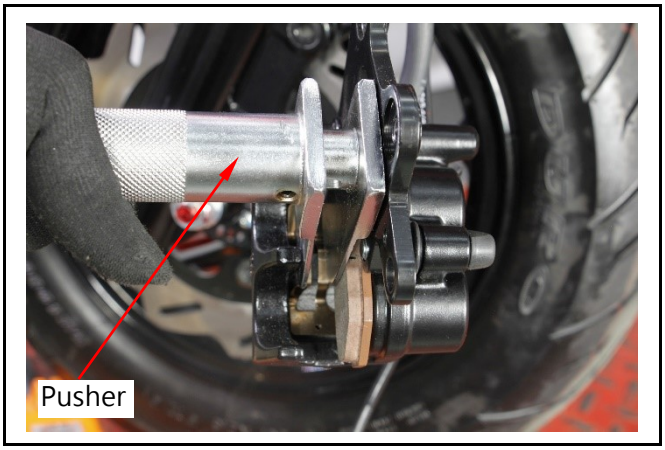
Remove the token.



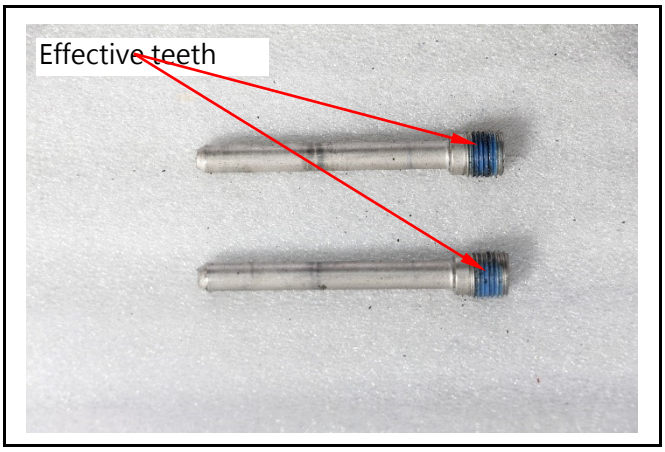
Replace the new insert.



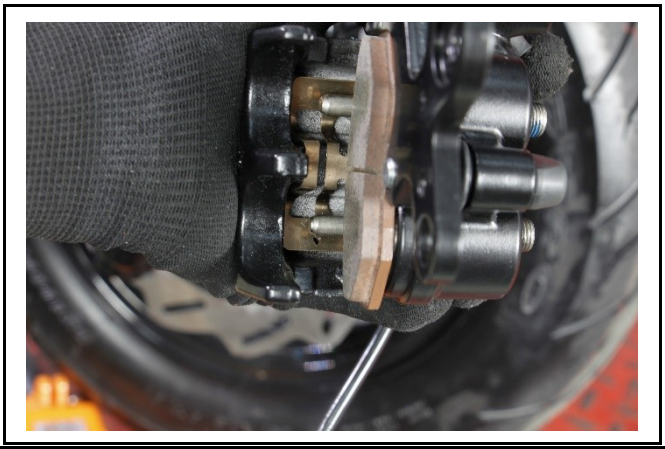
First insert the insert piece and use the insert piece spreader to push the caliper piston to the maximum open.



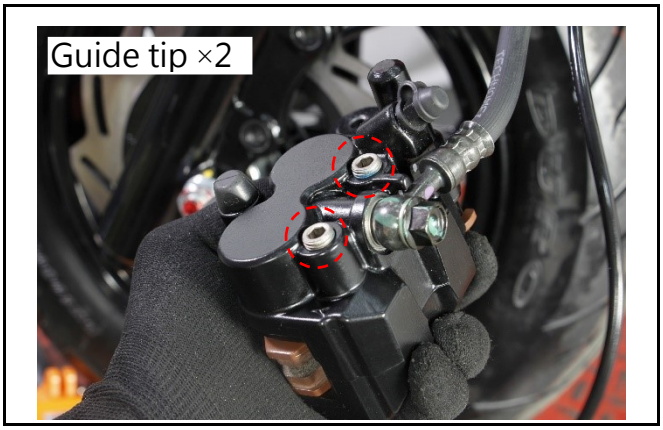
Apply anti-disengagement agent to the effective teeth of the guide bolt.



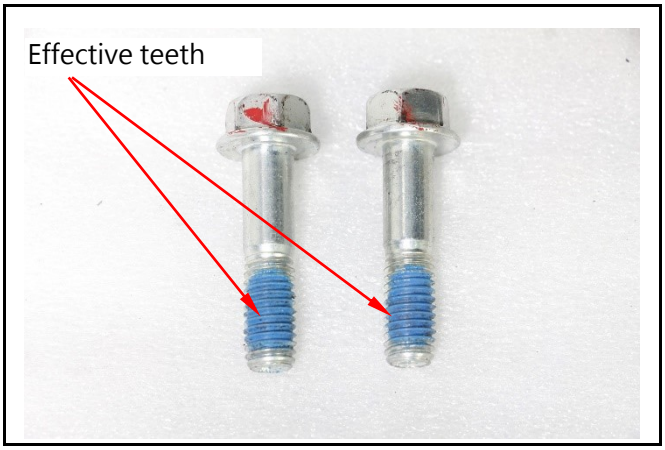
Insert a new guide strip and position the guide tip.



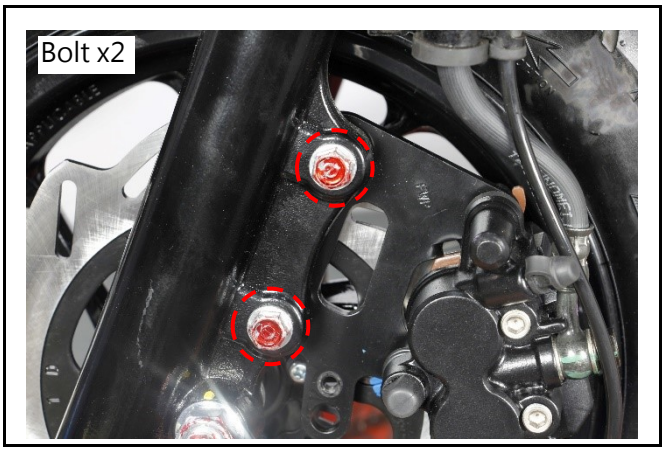
The guide tip is inserted without locking.



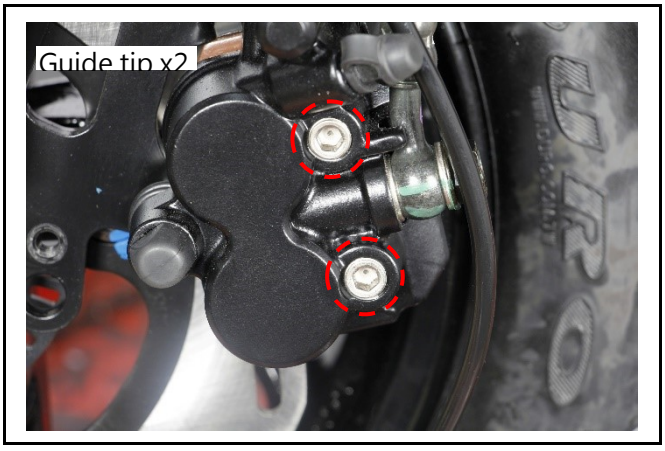
Apply anti-disengagement agent to the effective thread of the bolt.



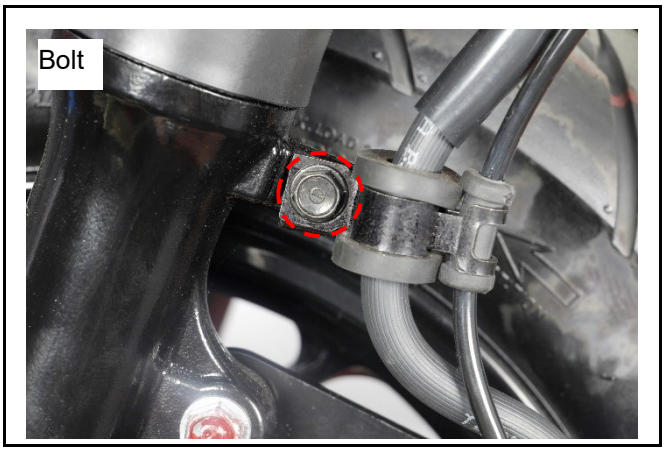
Install the front brake caliper fixture and lock the fixing bolts (bolt x2).



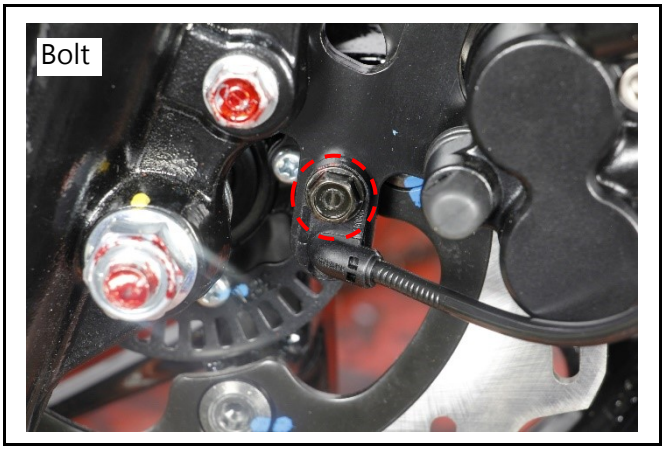
Lock the guide pin (guide pin x2).



Lock the fixing clamp bolt (bolt x1).

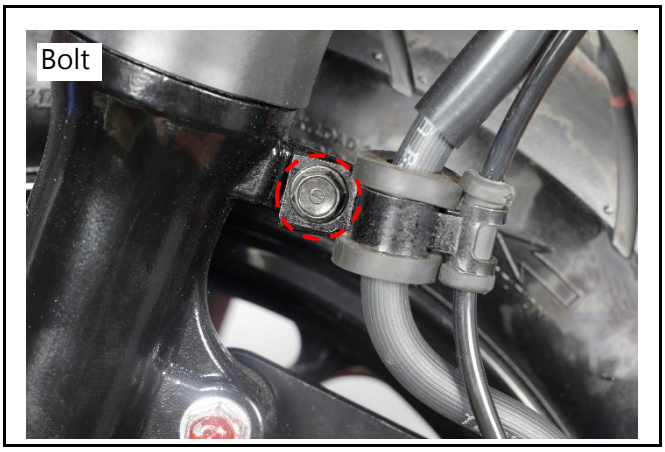


Lock the speed sensor bolt (bolt x1).
Press the brake lever to confirm that the brake actuation is normal.

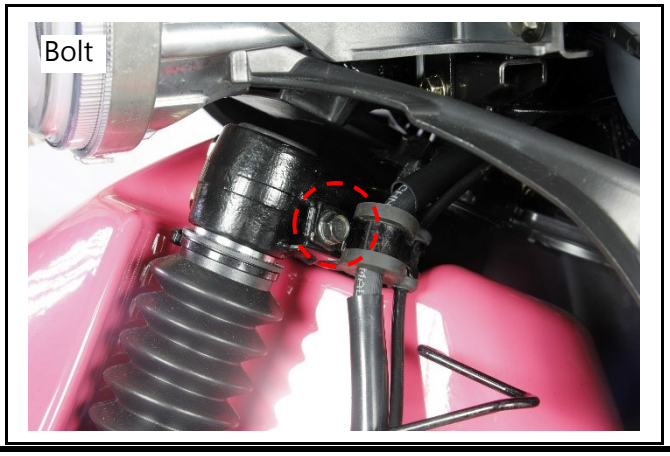


Replace the front brake tubing

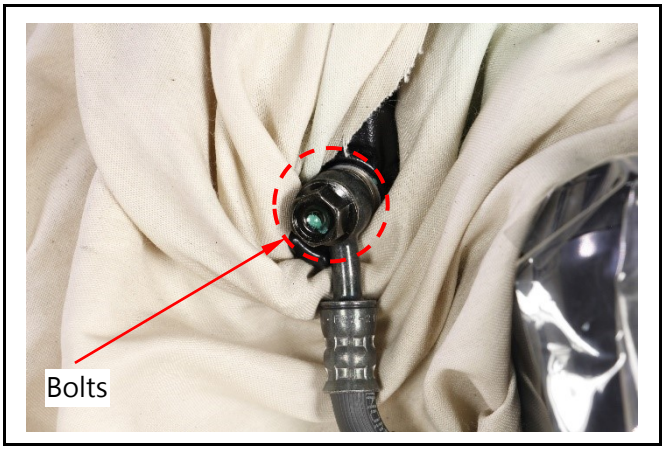
Remove the shock absorber front brake oil pipe and the speed sensor fixing clamp bolt (bolt x1).



Remove the steering trunk front brake oil pipe and speed sensor fixing clamp bolts (bolt x1).

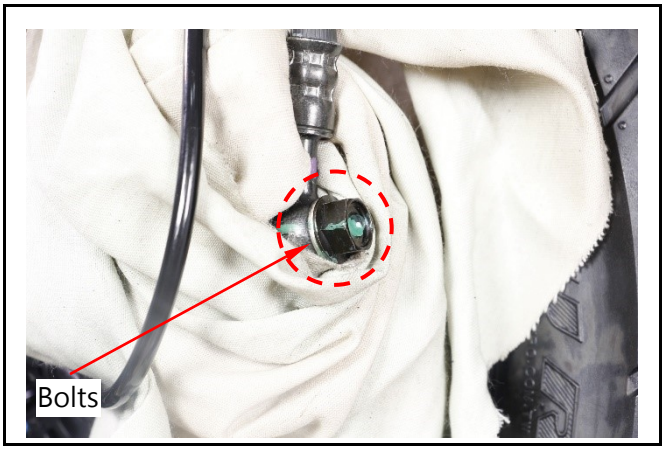


Use rags to cover the main cylinder and tubing of the brake.
Remove the tubing bolts.



Use rags to cover the front brake calipers with the tubing bolts.

Remove the bolts and cover the tubing completely with the rags.



⚠ Note

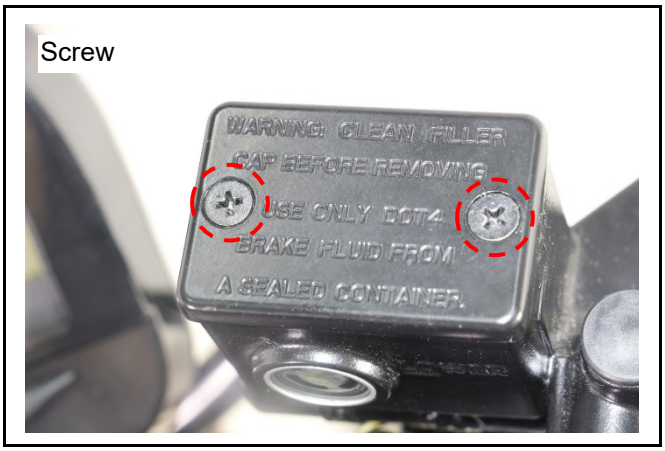
Do not let brake fluid come into contact with the surface of the paint.

Remove the front brake tubing.
Install in the reverse order of disassembly.

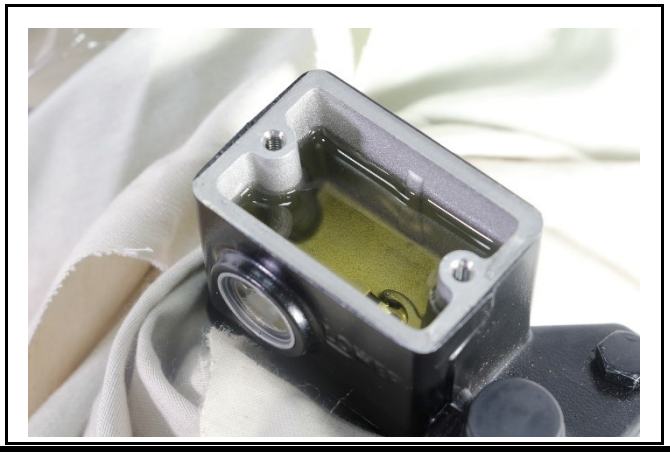
Torque value

Brake oil pipe bolts 3.0-4.0kgf-m

Remove the main cylinder head screw (screw x2).
Open the main cylinder head.



Add the recommended brake fluid to the brake cylinder.
Add to the upper limit position.

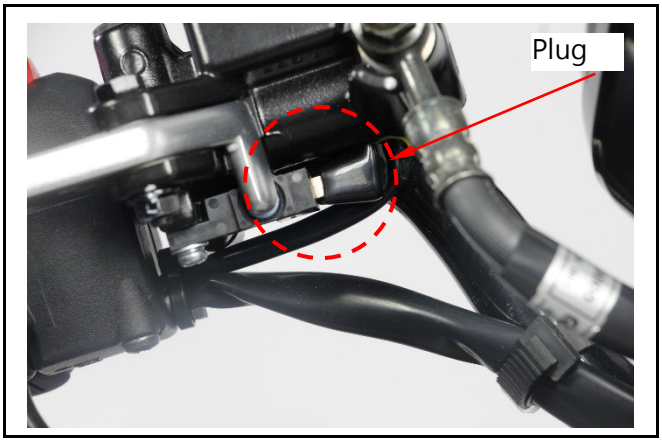


Drain the air from the brake system.

Brake cylinder replacement

Disassemble

Remove the brake light switch plug.

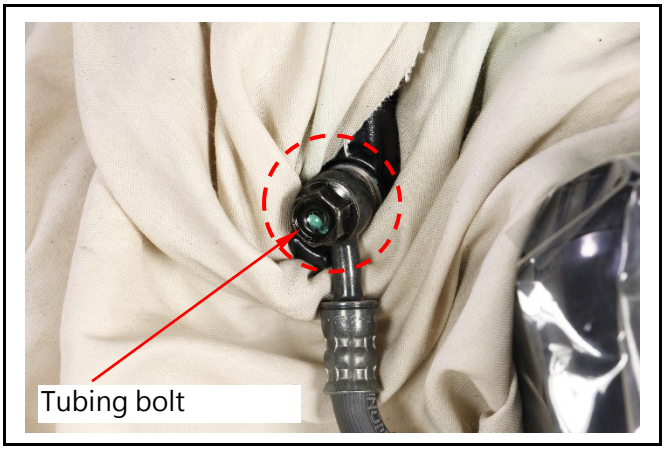


Cover the front panel with rags.

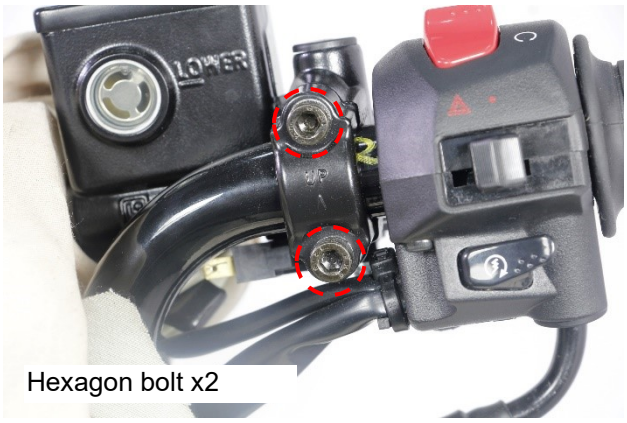
⚠ Attention

Do not let brake fluid come into contact with the surface of the paint.

Cover the brake cylinder and tubing with a rag.
Remove the tubing bolts.



Remove the master cylinder hexagon socket bolt (bolt x2).
Remove the master cylinder.

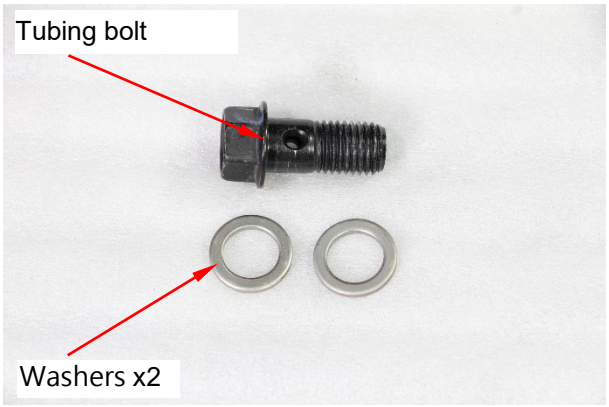


Installation
Install the new master cylinder in the reverse order of disassembly.

Tubing bolts and washers (washer x2).

⚠ Note

The gasket must be replaced with a new one after being removed.

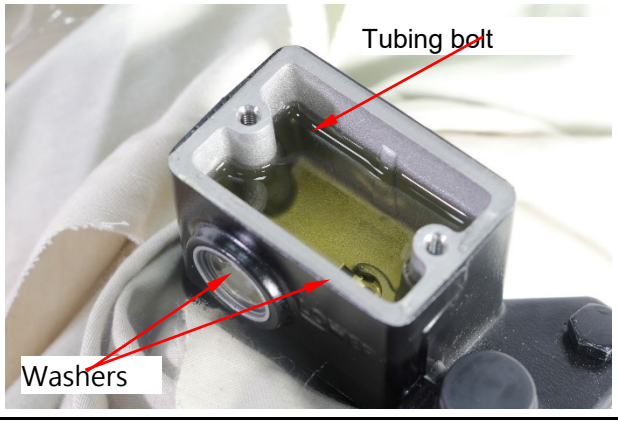


Torque value

Brake oil pipe bolts 3.0-4.0kgf-m

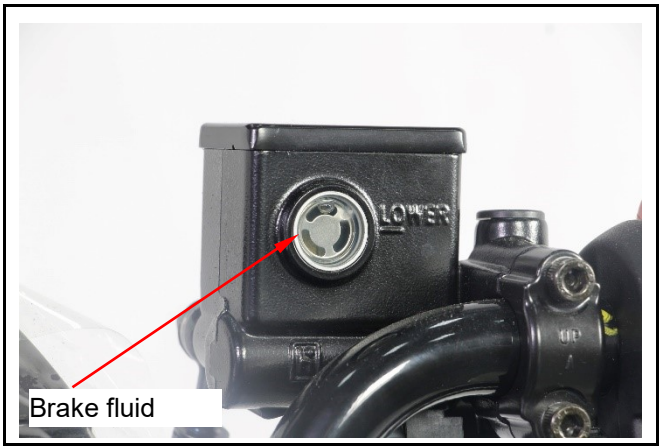
Remove the main cylinder head screw (screw x2).

Apply the recommended brake fluid to the main cylinder of the brake.
Add to the upper limit position.



And carry out the air release operation of the system.

Add brake fluid to the limit.
Cover the main cylinder head.
Lock the screws (screw x2).



Brake discs

Check

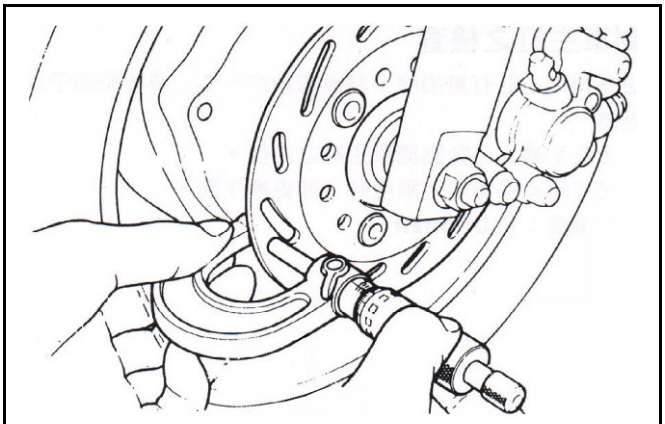
Visually inspect the brake discs for wear and breakage.

Measure the thickness of the brake discs at several locations and replace them if they are found to be less than the limit specified for maintenance.

Front brake discs

Standard value: 4. 0mm

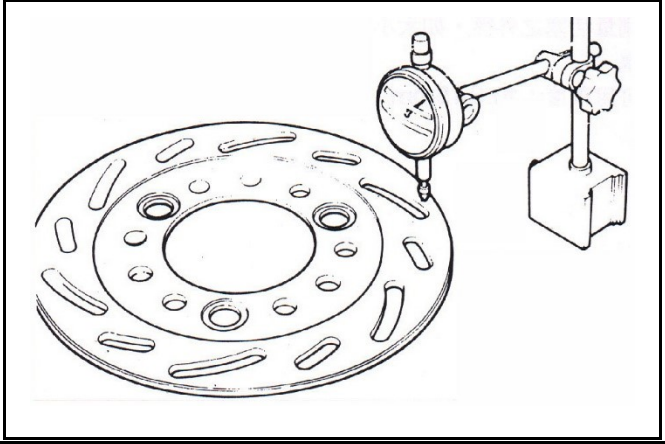
Available limit: 3.5mm



Remove the brake discs from the wheels.
Check if the brake discs are deformed or bent.

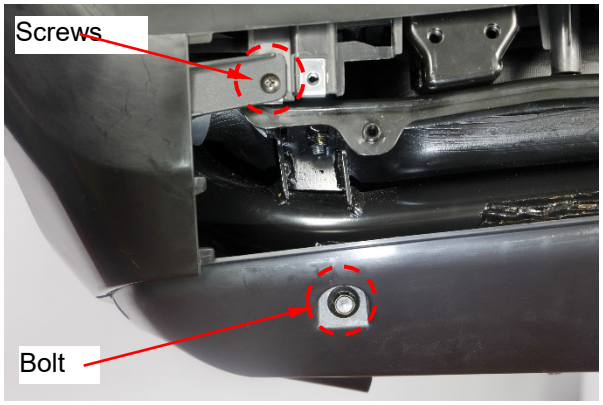
⚠ Note

- Do not contaminate the discs with oil. A contaminated disc will reduce its braking force.
- Do not use an air gun to clean the disc to prevent inhalation of dust. The operator should wear a mask and gloves and use a vacuum cleaner.

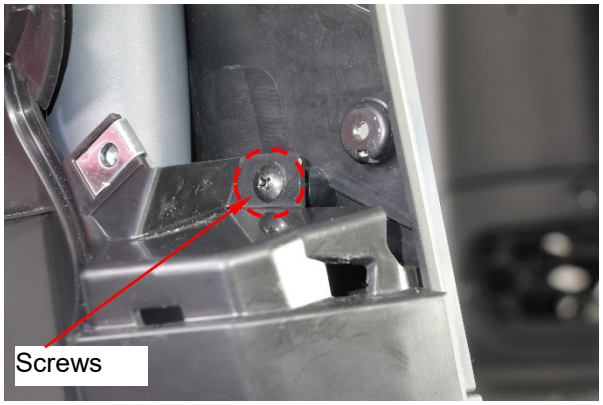


Rear brake wire replacement

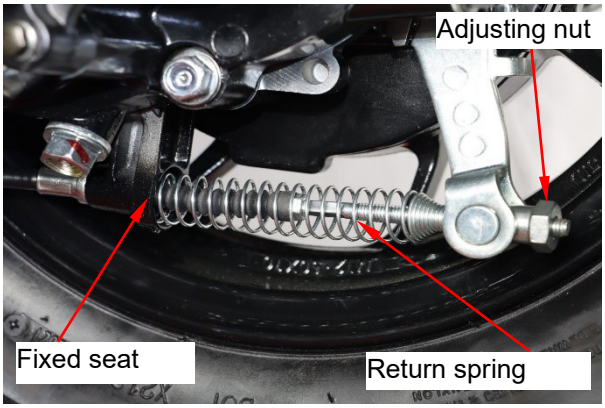
Remove the front panel and the left cover.
Remove the bottom plate left front bolt (bolt x1) and the front spoiler left screw (screw x1).



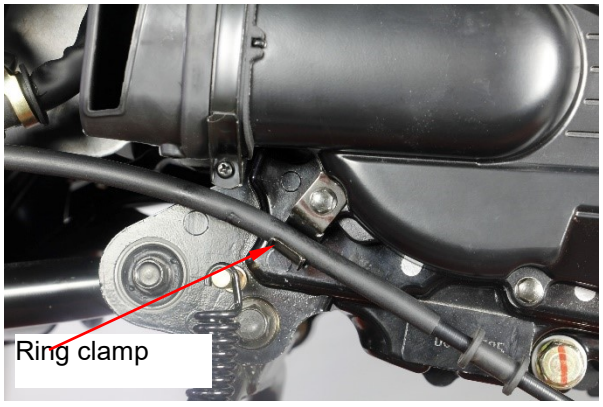
Remove the left front screw (screw x1) of the front spoiler.



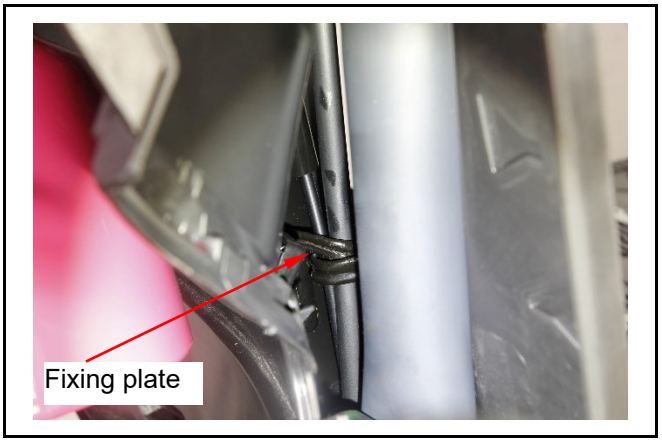
Remove the brake adjustment nut and the rear brake return spring.
Pull out the brake wire from the mounting seat.



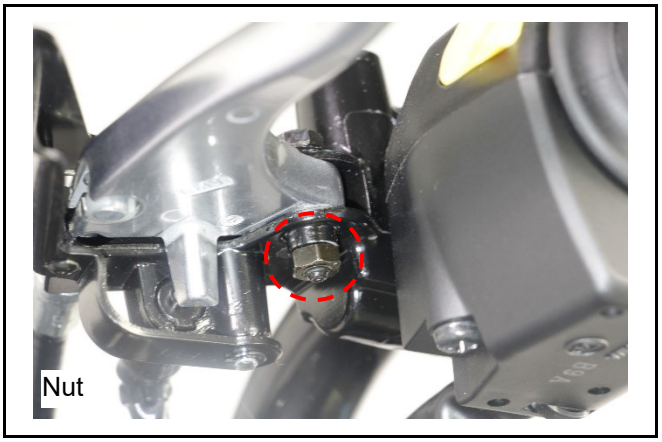
The brake wire disengages from the ring clamp.



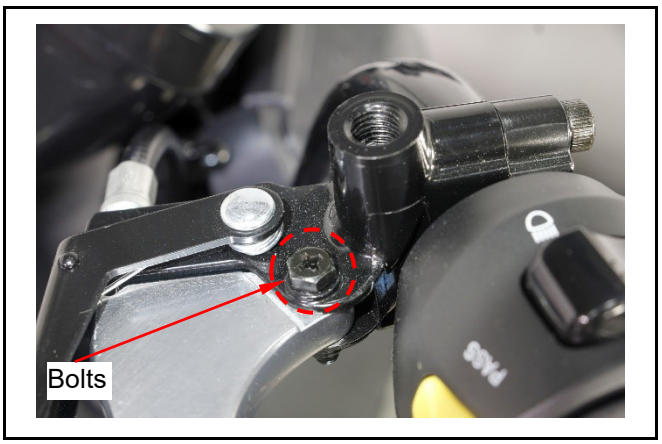
Remove the front fixing plate.



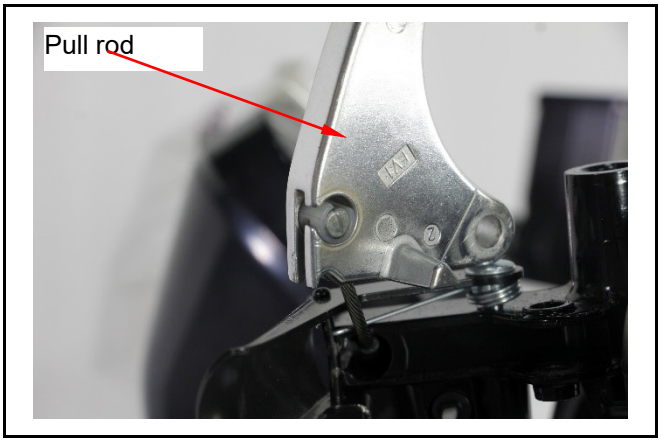
Remove the nut (nut x1) under the left brake lever.



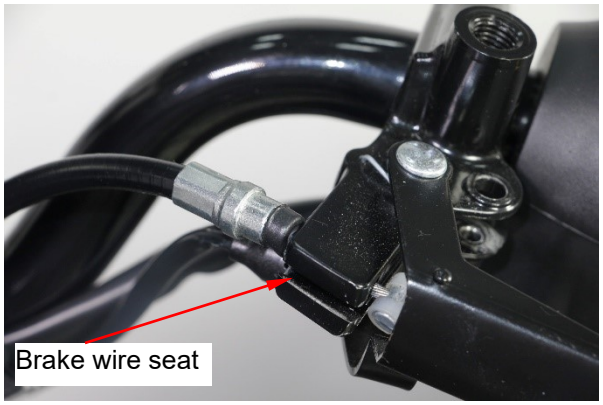
Remove the left brake tie rod bolt (bolt x1).



Remove the left brake tie rod.



Remove the brake wire from the left brake wire seat.



Pull out the brake wires from below.

Installation

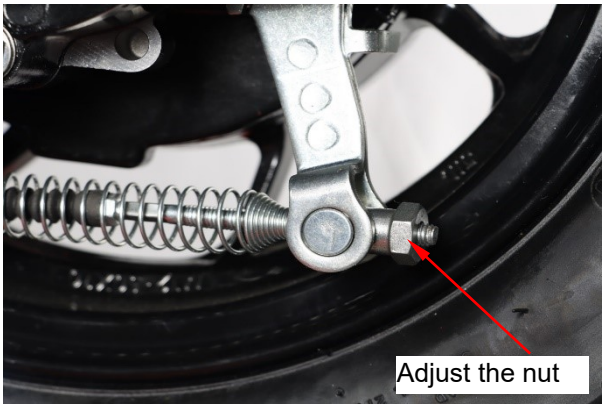
Replace the new brake wires.

Install in the reverse order of disassembly.

Adjust the brake adjustment nut to a brake pull rod clearance of 10 to 20mm.

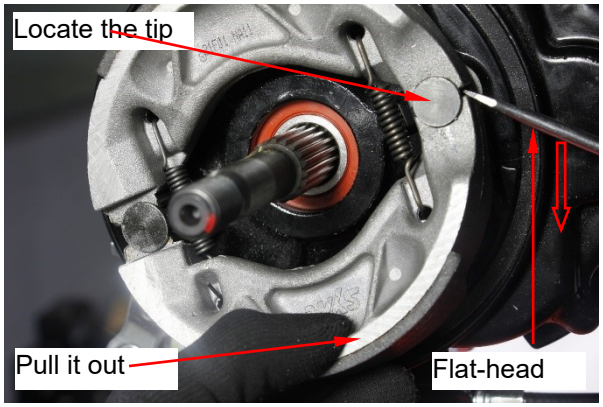
Brake the rear brake to replace the brake pads

Remove the rear brake adjustment nut.



Remove the exhaust pipe, the rear rocker arm, and the rear wheel.

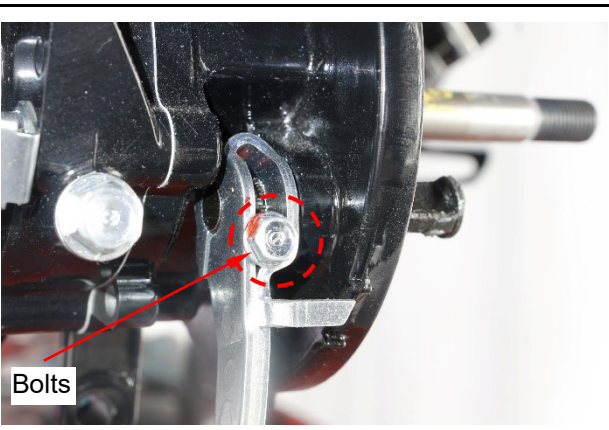
Use a flat-head screwdriver to dig open the brake pads from the brake pad positioning tip. Pull the brake pads outward with the other hand.



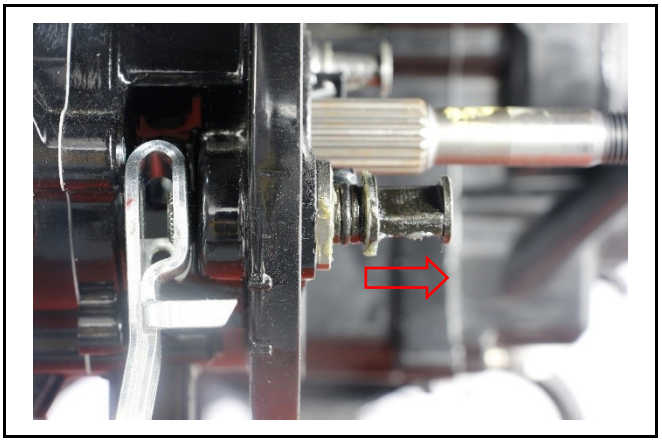
Release the brake pads from the brake CAM and the end pin.

Remove the brake pads.

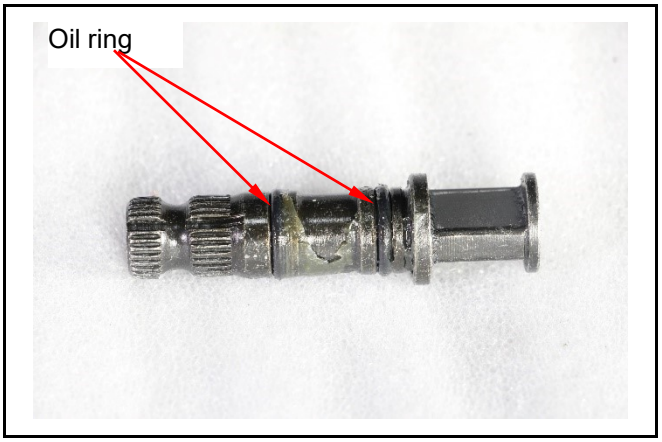
Shake the brake arm up and down to check if the brake CAM operates smoothly.
Remove the brake arm bolt (bolt x1).



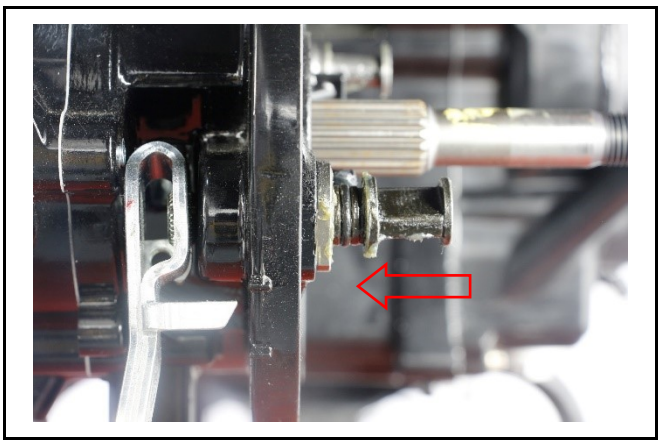
Pull out the brake CAM.



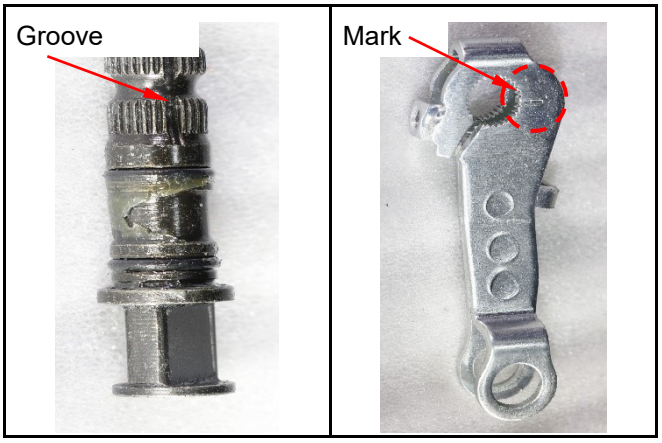
Check if the brake CAM oil ring is damaged or broken.
Apply grease between the two oil rings.



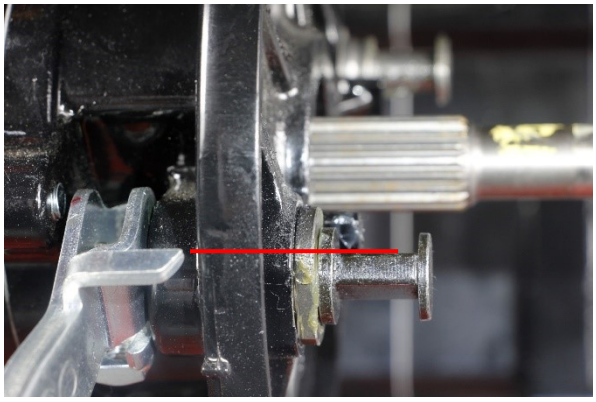
Insert the brake CAM and brake arm.



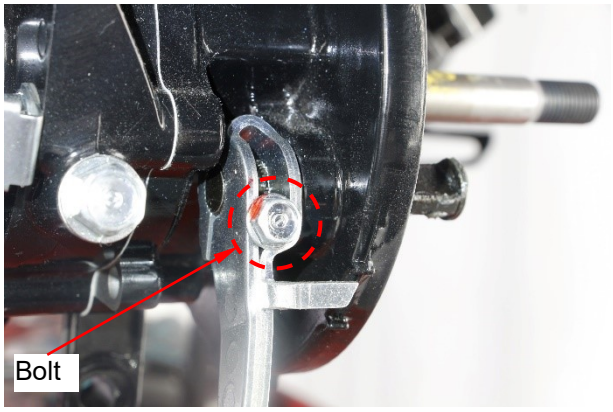
When installing, the brake CAM grooves and brake arm markings must be aligned.



The brake CAM groove and the brake arm mark are aligned in a straight line.



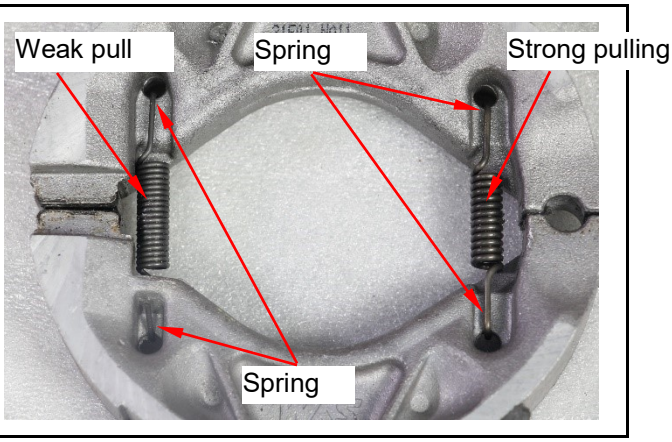
Lock the brake arm bolt (bolt x1).



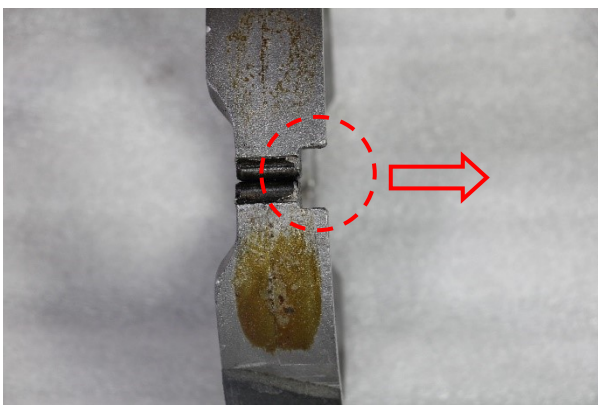
Note

- To make the leaf springs different on the left and right and not together.

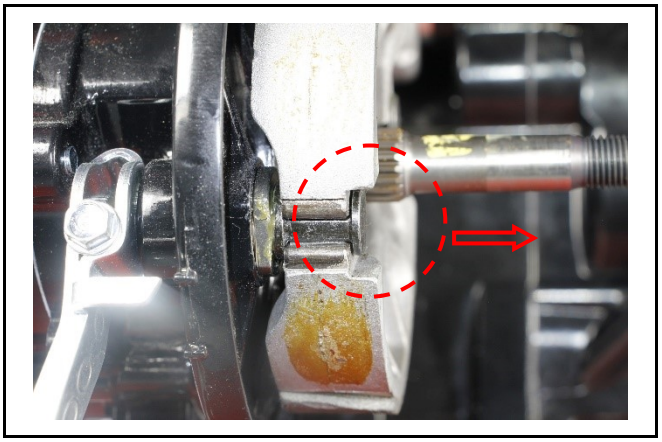
The left spring has a weaker pull.
The top of the spring hook is hooked from outside to inside, and the bottom is hooked from inside to outside.
The right side of the spring has a stronger pull.
Both the top and bottom of the spring hook claws are hooked from the outside to the inside.



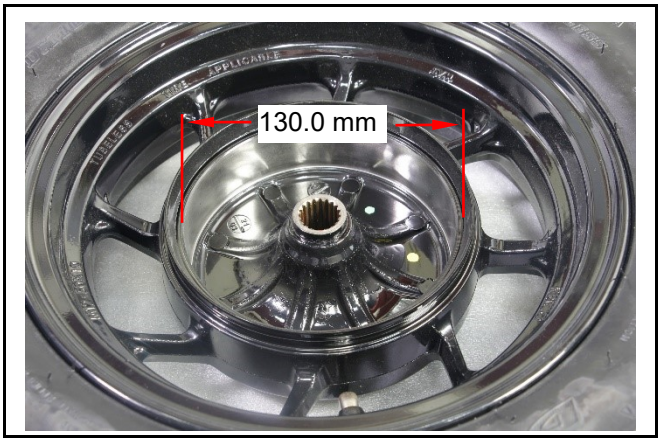
To make the groove at the brake CAM face outward.



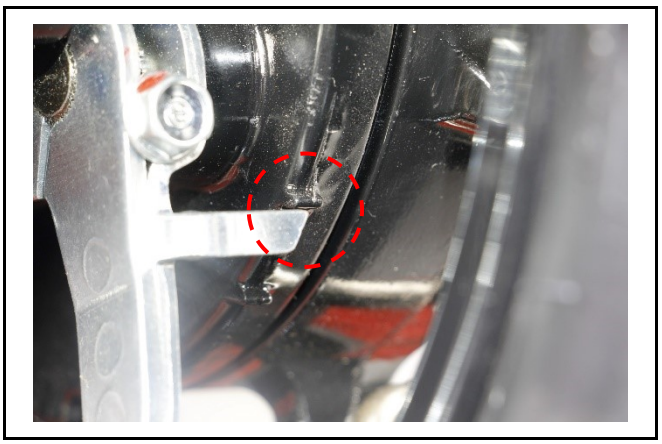
The correct way to assemble.



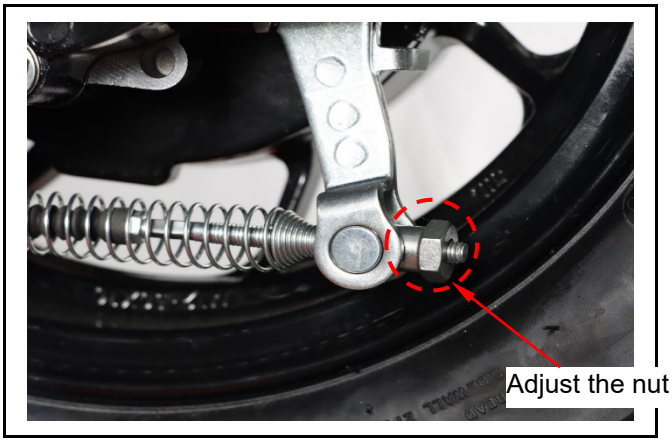
Check if the inner diameter of the rim is worn.
Standard value: 130.000mm
Available limit: 132.000mm



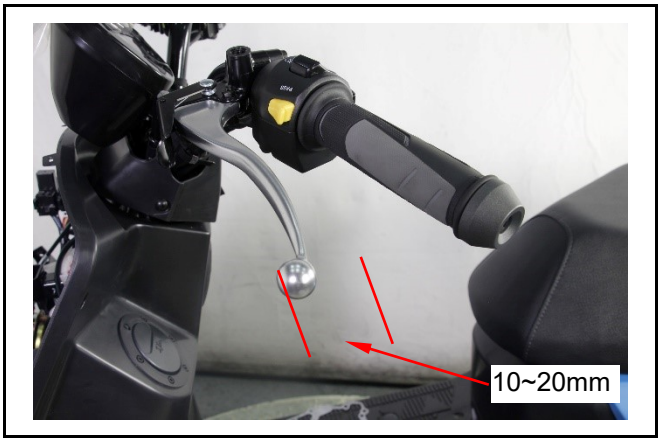
The wear indicator of the brake arm should be installed at the marked upper limit position.



Lock in the brake adjustment nut.

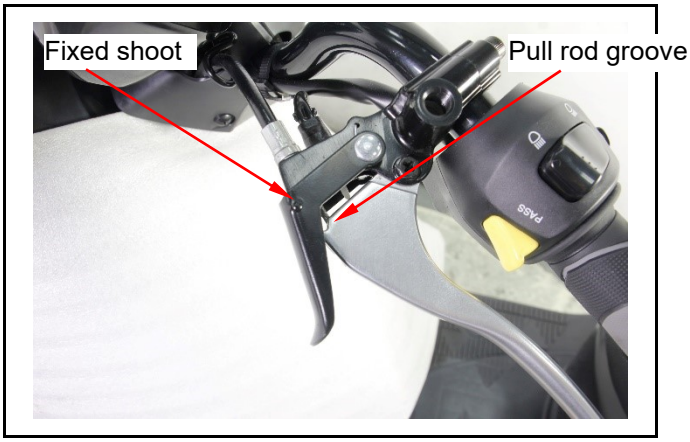


Adjust the brake adjust the nut to a brake pull rod clearance of 10 to 20mm.

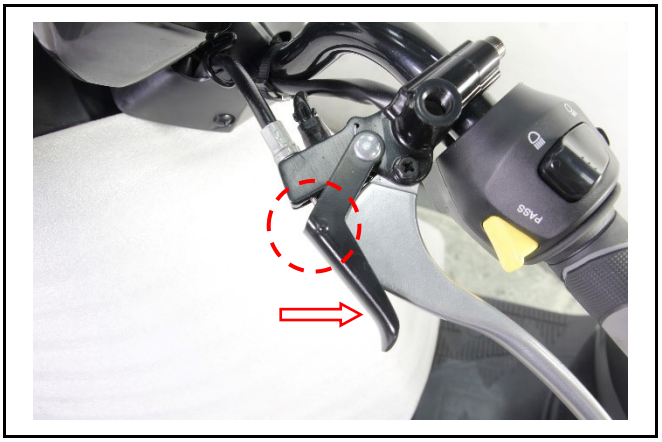


Rear wheel stopper

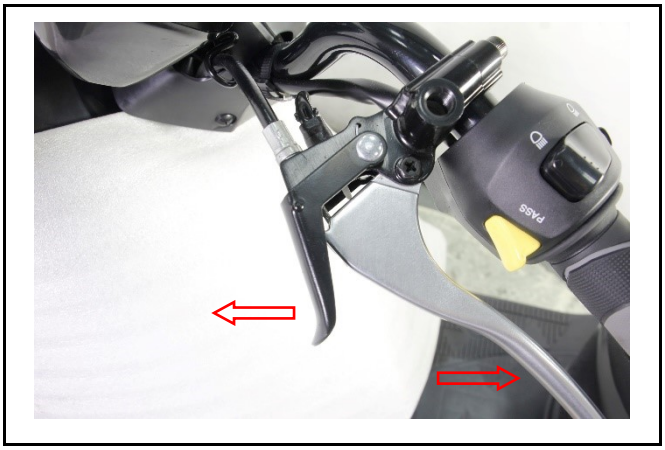
Application timing: When both wheels are on the ground and the road surface is uneven with a slope.
Pull up the rear brake lever without releasing it.



Press the stopper with the other hand until the fixed end meets the brake lever groove, then release the brake lever.
The rear brake actuates the vehicle without sliding.

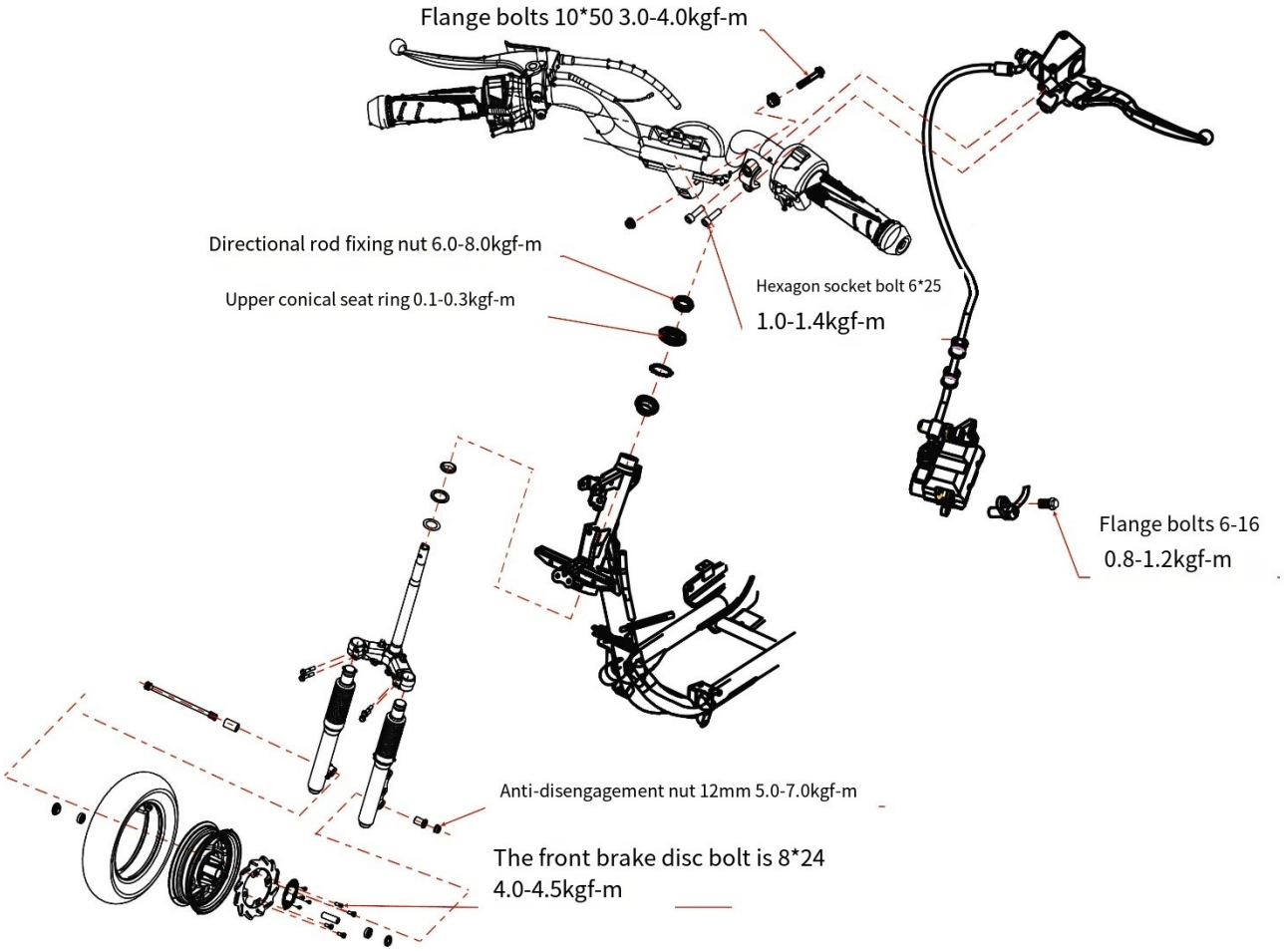


When released, pull down the rear brake lever, the stopper automatically retracts to position, and the stopper braking function is released.



Institutional Diagram 14-1	Front wheel 14-6
Maintenance Instructions 14-2	Front shock absorber 14-17
Fault Diagnosis 14-2	Turn the main trunk 14-17
Direction handle 14-3	Steering shaft ball disc disassembly/assembly 14-20

Mechanism diagram



Maintenance Instructions

Precautions for work

General Matters

- Remove the front wheels, use brackets to support the bottom of the vehicle body, and do not overturn the vehicle after the front wheels are lifted to the ground.
- When working, be careful that there is no grease attached to the brake pads.

Torque value

Front axle nuts 5.0 to	7.0kgf-m
Steering handle nut	3.0-4.0kgf-m
The cone seat ring on the steering main rod	is 0.1 to 0.3kgf-m
Steering main rod fixing nut	6.0 to 8.0kgf-m
Front shock absorber: Upper joint bolt	2.4 to 3.0kgf-m
Front brake caliper fixing bolts	2.4 to 3.0kgf-m
Front brake disc bolts	4.0 to 5.0kgf-m

• Specification

Type	FYJ12D1CN-IRC
Front fork oil capacity	92±1cc

Fault diagnosis

Difficulty in steering

- The steering shaft nut is too tight
- Damage to the steering shaft ball and crown socket
- Insufficient tire pressure

The steering handle is crooked

- The front shock absorbers are uneven
- Front fork bent
- Front axle bend

The front wheel wobbles

- Rims bent
- The axle nut is not locked
- Bad tyres or uneven wear
- Excessive tire bearing clearance

The shock absorber is too soft

- Front shock absorber springs are worn out
- The shock absorber oil seal is leaking

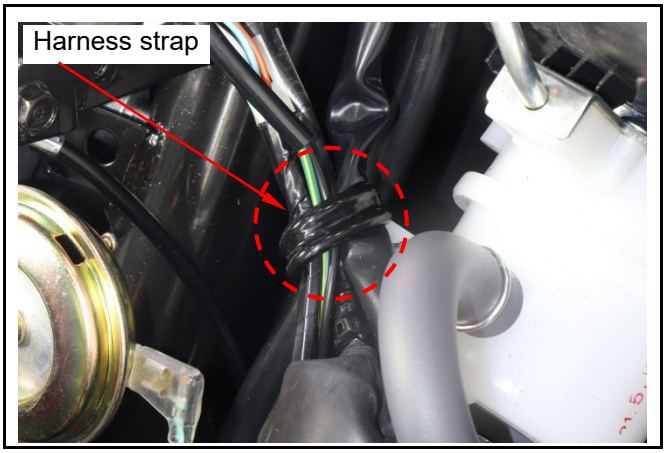
The front shock absorber makes a noise

- The shock absorber connecting rod is bent
- The shock absorber lock is loose

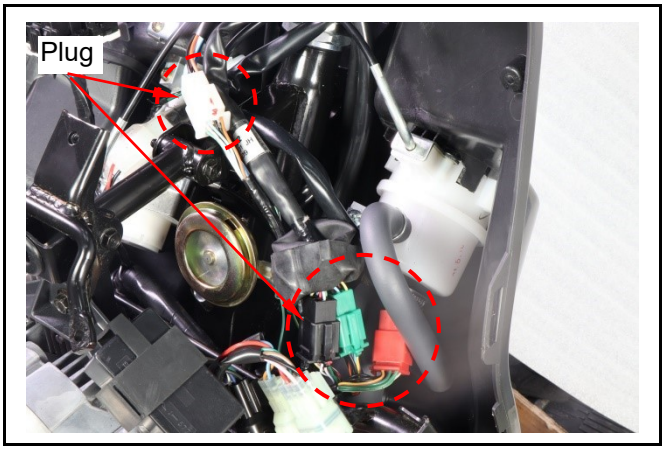
Direction handle

Remove the front guard, the front cover of the handle, the instrument assembly, and the rear cover of the handle.

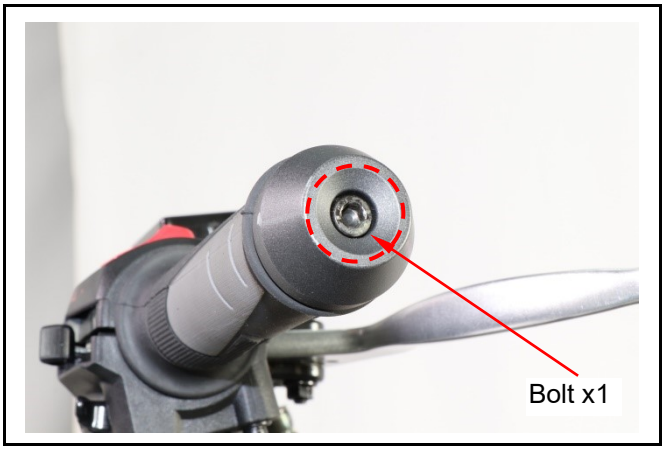
Remove the instrument assembly, left/right handle switch wiring harness tape.



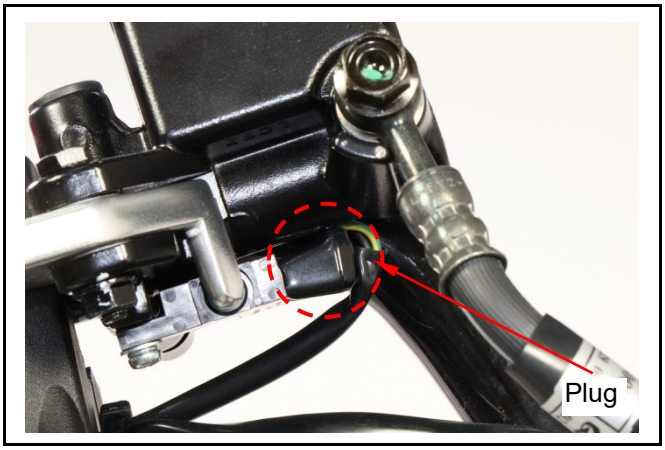
Remove the instrument assembly and the plug of the left/right handle switch.
Remove the instrument assembly.



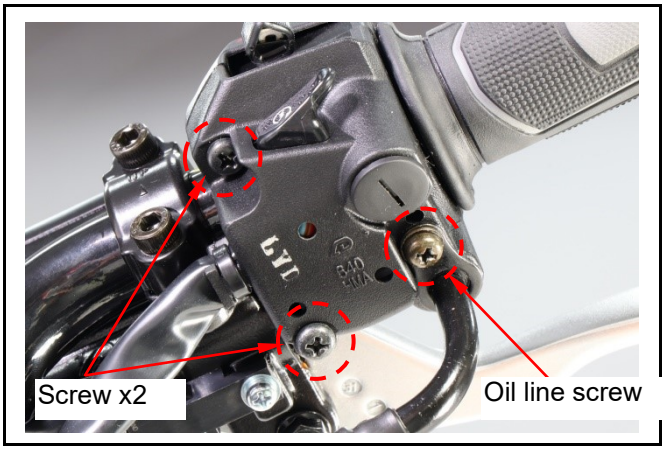
Remove the right handle counterweight terminal hexagon socket bolt (bolt x1).
Remove the right handle counterweight terminal.



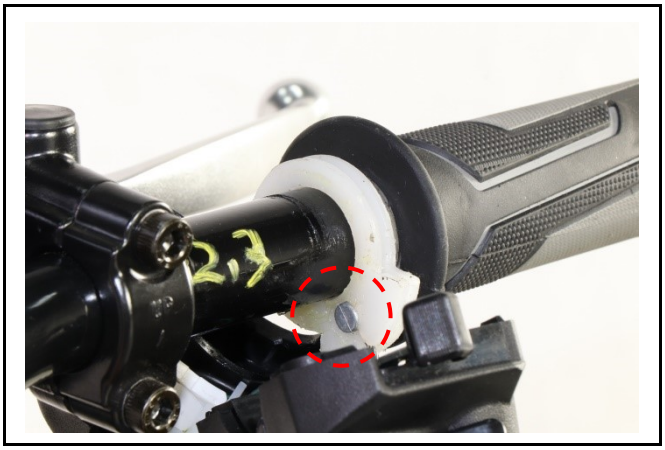
Remove the right brake switch plug.



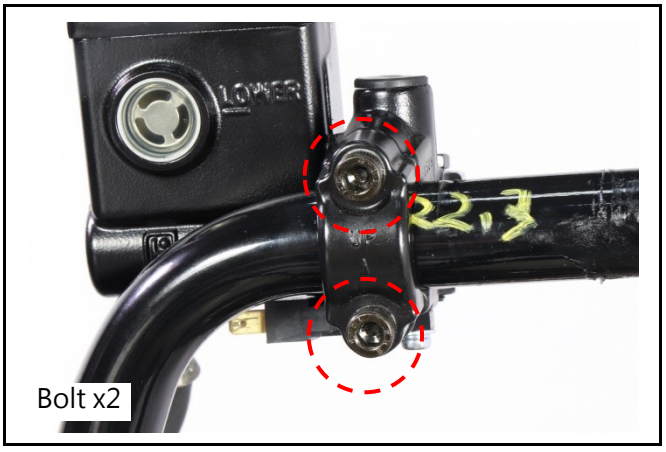
Remove the fuel line fixing screw (screw x1).
Remove the right handle switch screw (screw x2).



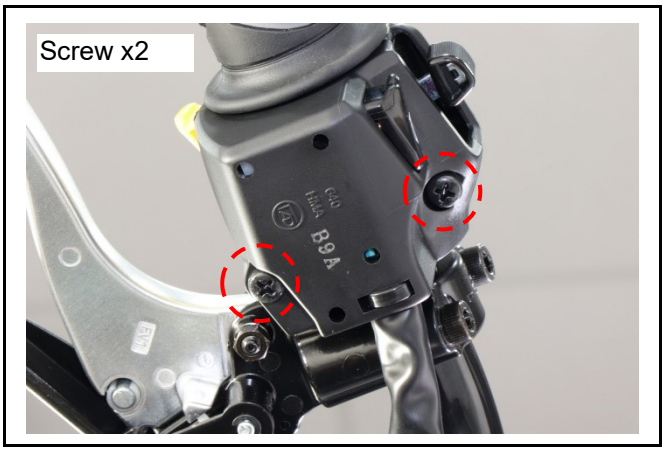
Remove the throttle tube and the oil line.



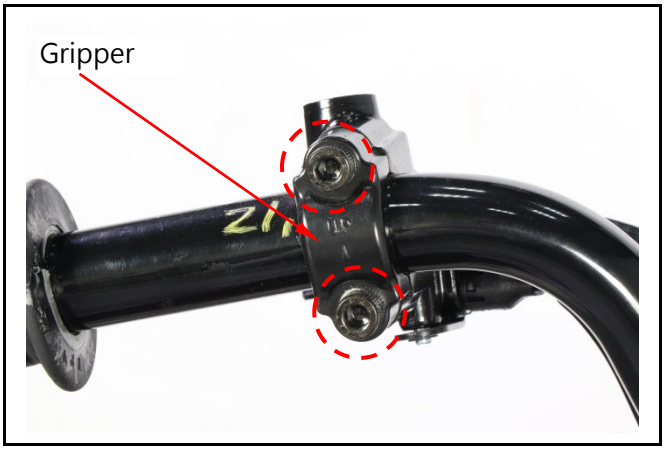
Remove the hexagon socket bolt (bolt x2) of the right brake master cylinder holder.
Remove the right brake master cylinder.



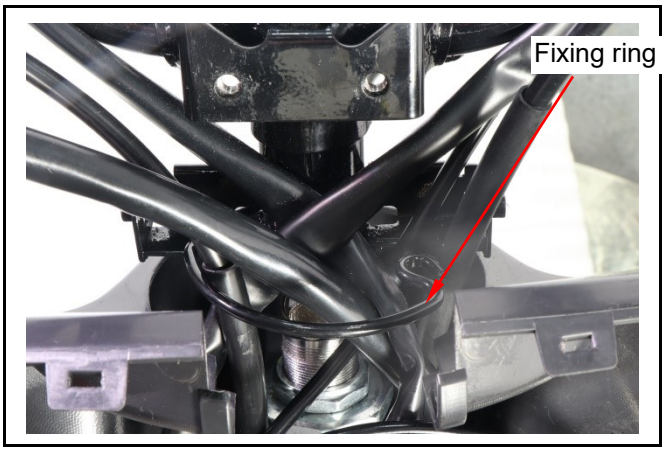
Remove the left handle switch screw (screw x2).



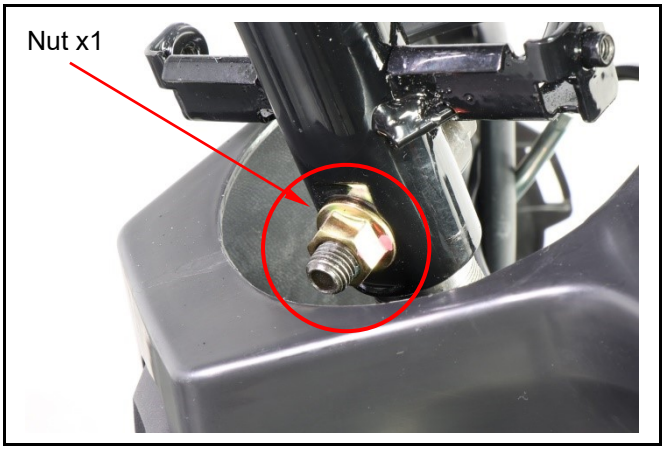
Remove the hexagon socket bolt (bolt x2) of the left brake seat clamping fixture.



Remove the left/right brake oil pipe wire, left/right switch wiring, and fuel line from the steering handle fixing ring.



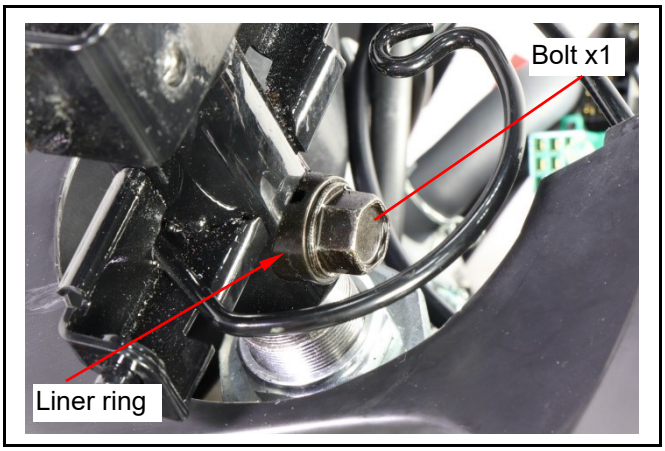
Remove the direction handle nut (nut x1).



Remove the bolts and the handrail ring.

Note

- The handle frame ring must not be lost.

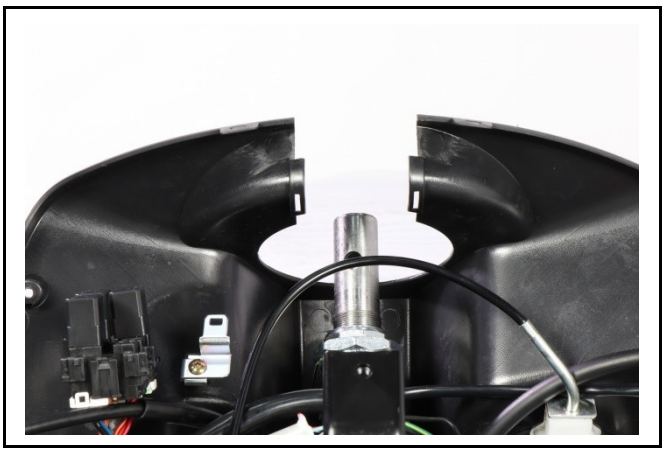


Remove the steering handle.

Installation

Install in reverse order.

Torque value: 3.0 to 4.0kgf-m



Front wheels

Place the engine bracket under the floor.

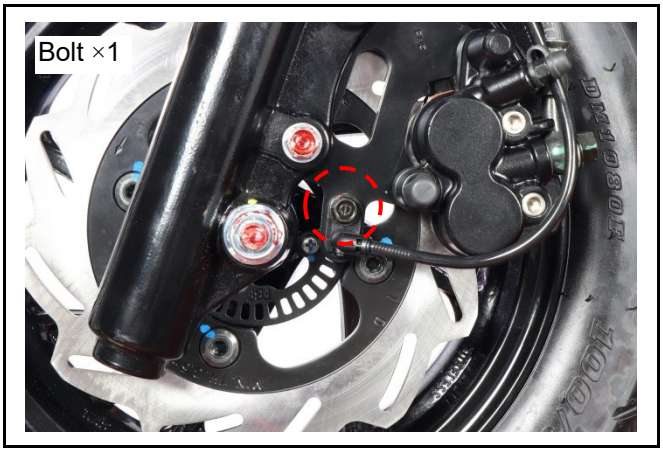
Special tool: Engine bracket.

Tool Number: SYM-HM17110

Adjust the front wheels to an appropriate height off the ground.

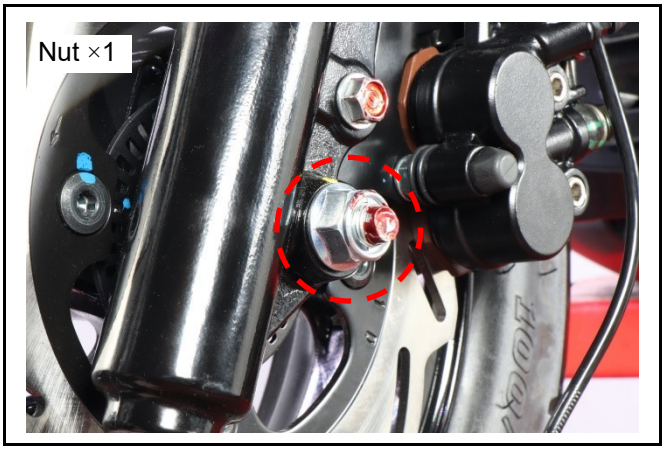
(The steering handle can freely turn left and right)

Remove the speed sensor wire fixing clamp bolt (bolt ×1).



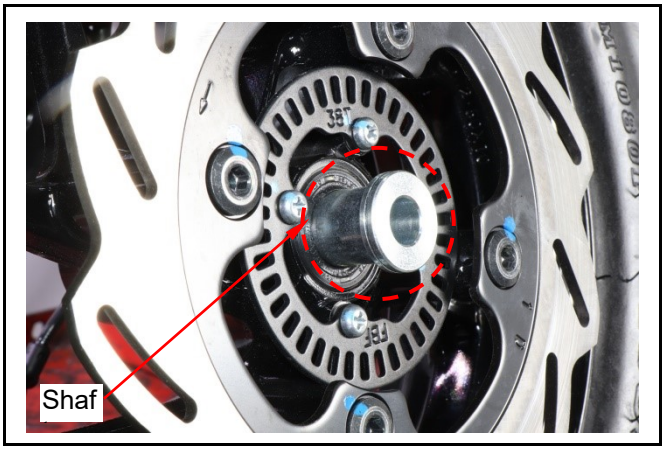
Remove the front axle nut (nut ×1).

Torque value: 5.0-7.0kgf-m



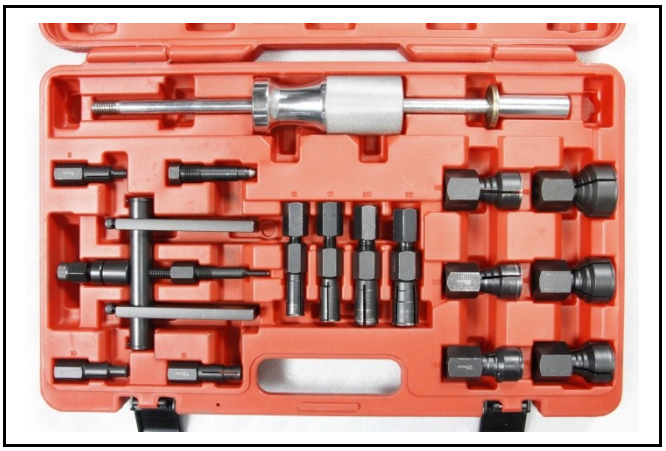
Remove the front axle bolt (bolt ×1).
Remove the front wheels.

Disassemble
Remove the left axle ring of the front wheel.

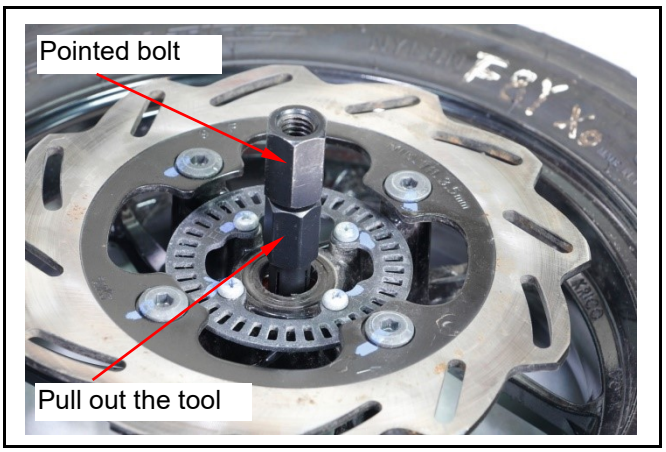


Bearing oil seal disassembly and assembly

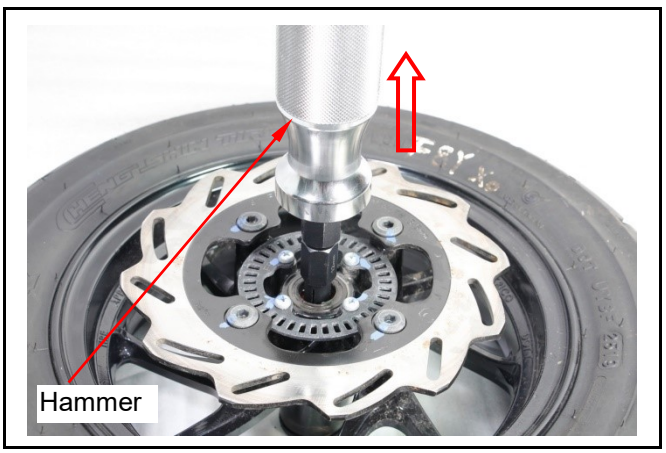
Special tools:
Tool Name: Inward-pulling bearing Extractor
Tool Number: SYM-6204025



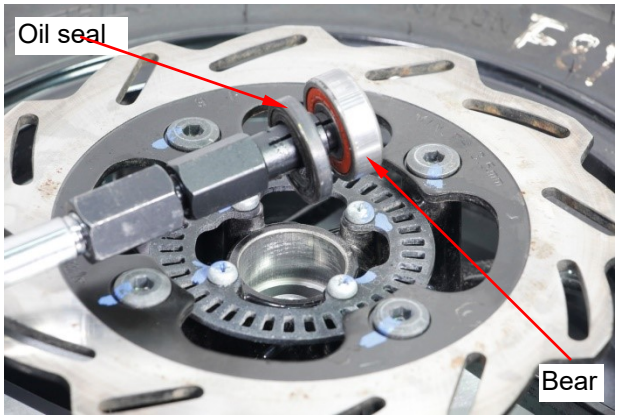
Select the appropriate bearing extraction tool and the pointed screw combination.



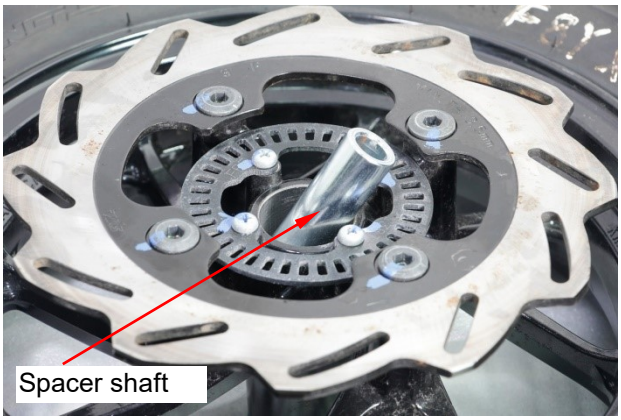
Install the hammer, strike the pull-out shaft. Strike the hammer upwards.



Remove the bearing and the oil seal together.

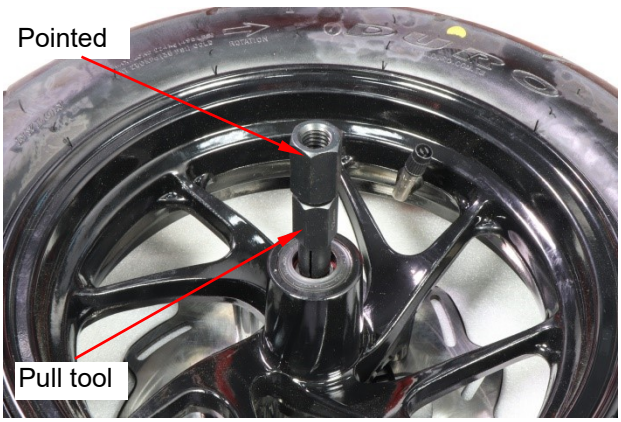


Remove the bearing spacer shaft.

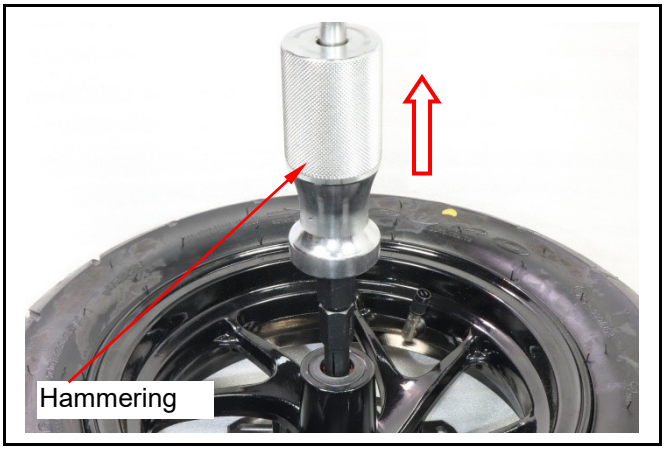


Turn the front wheel over to the other side.

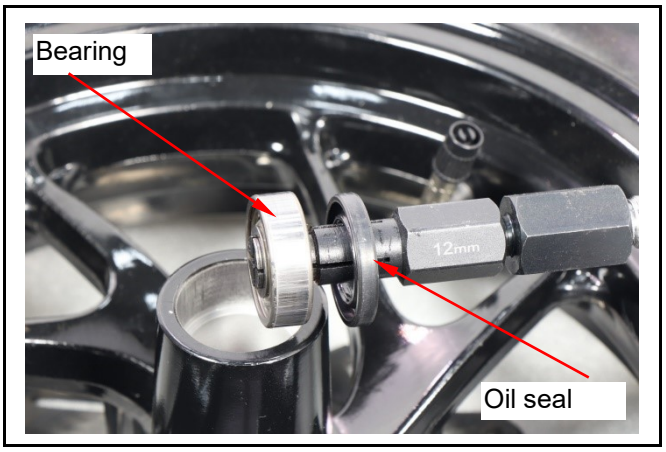
Select the appropriate bearing pull-out tool and the pointed screw combination.



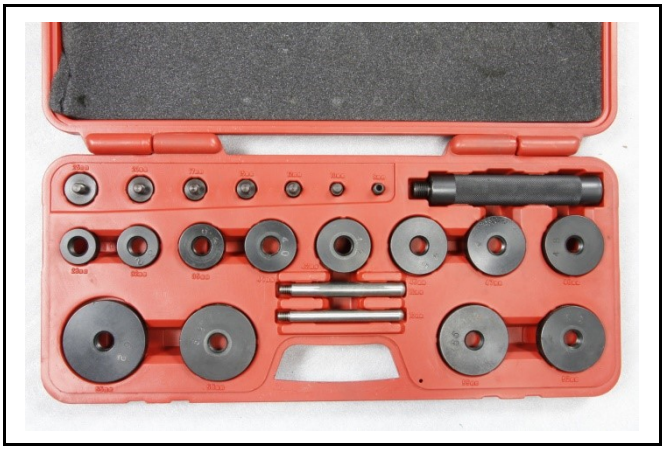
Attach the hammer, strike the pull shaft.
Strike the hammer upwards.



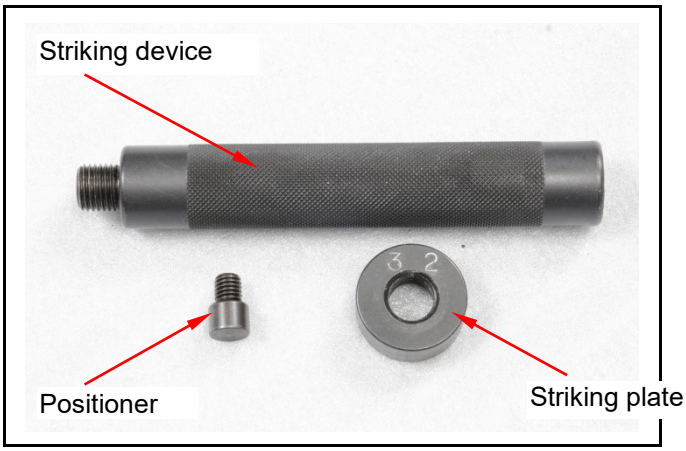
Remove the bearing and the oil seal together.



Assemble the bearings and oil seals
Specialized tools:
Tool Name: Bearing Assembly hammer
Tool Number: SYM-6204024



Select the appropriate positioner, striking disk and striking device.

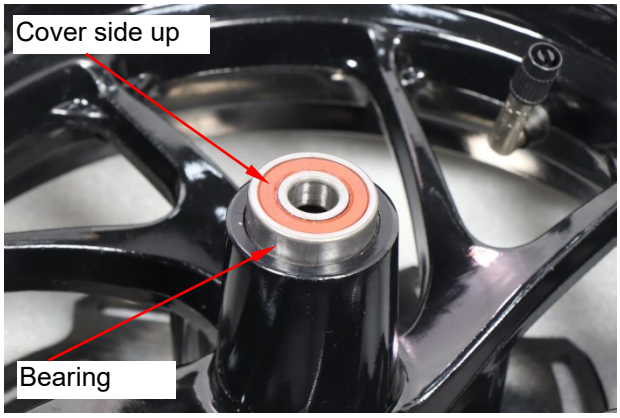


Place the bearing at the hole position.

Note

- The bearing cover face up.

Do not use old bearings. Once a bearing is removed, it must be replaced with a new one and in pairs.

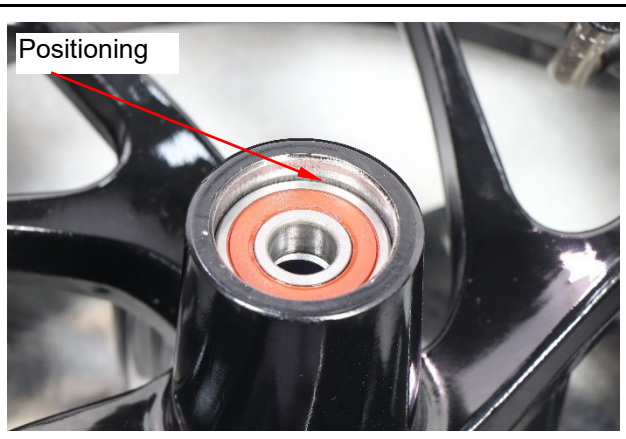


Use a striking tool to strike the bearing in.

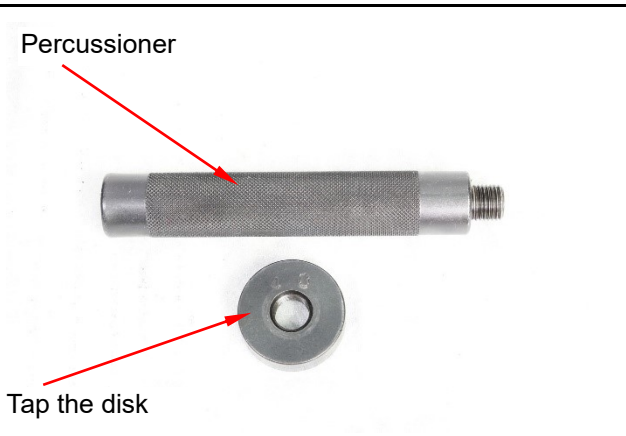
Note

- Do not tilt the bearing during the loading process.

Make sure the bearings are positioned.



Select the appropriate striking plate (the striking plate must be larger than the oil seal) and the striking device.
The strike plate plane should face the oil seal.



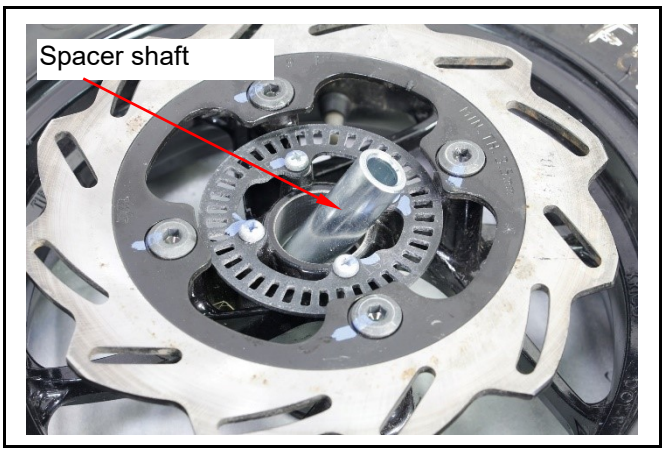
Place the oil seal at the hole position.

Use a hammer to tap the percussioner lightly.
Make sure the oil seal is in place.

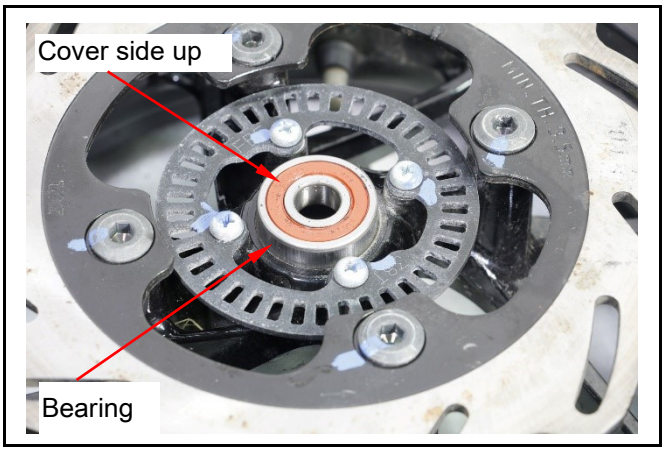
Note

- Make sure the dust-proof oil seal is not deformed.

Turn the front wheel over to the other side.
Insert the bearing spacer shaft.



Place the bearing at the hole position.



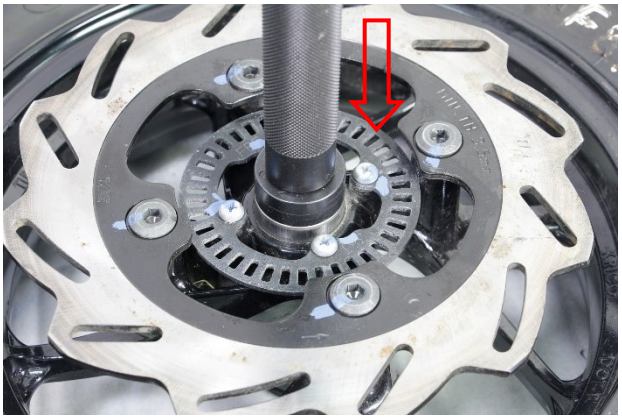
Note

- The bearing cover face up.

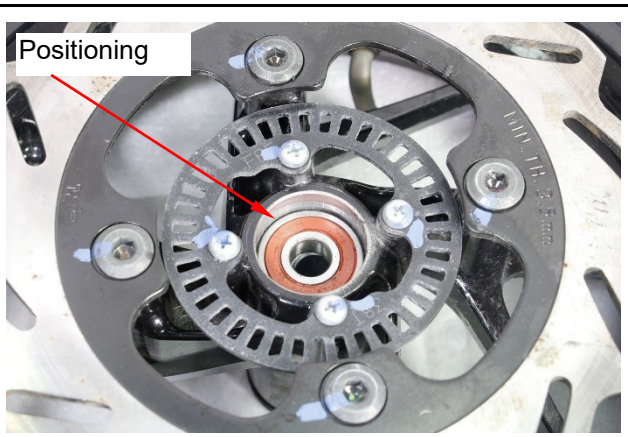
Use a striking tool to strike the bearing in.

Note

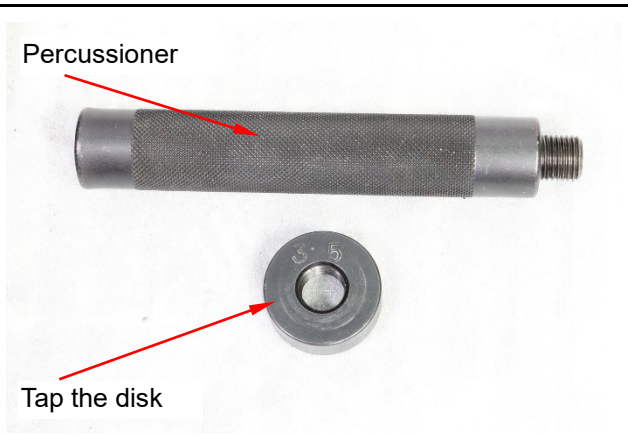
- When striking, the hammer should be struck perpendicularly to the bearing.



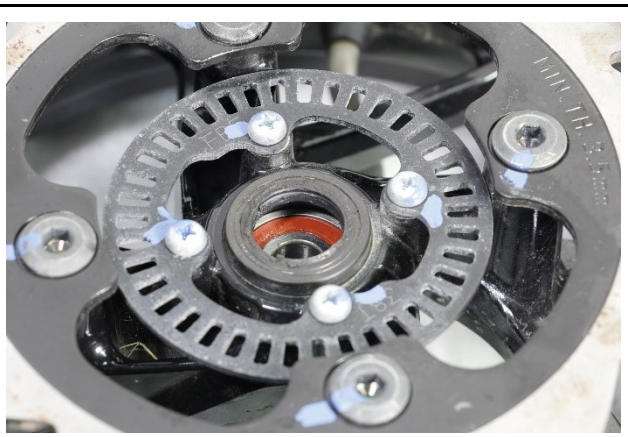
Make sure the bearing is positioned.



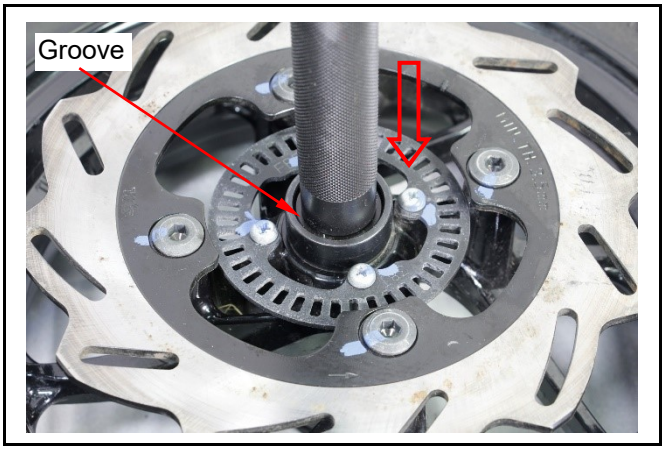
Select the appropriate striking plate (the striking plate must be larger than the oil seal) and the striking device.
The strike plate plane should face the oil seal.



Place the oil seal at the hole position.



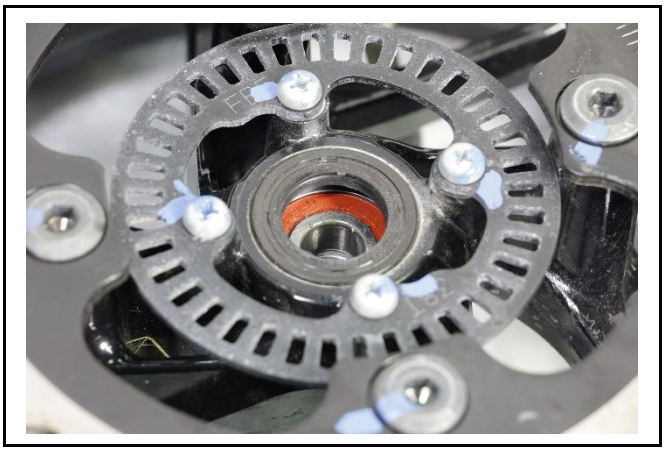
Use a hammer to tap the hammer lightly.



Make sure the oil seal is in place.

Note

- Confirm that the oil seal must not deform.

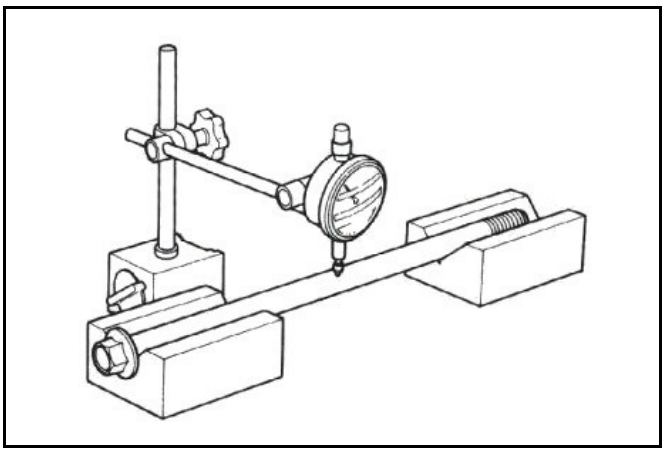


Check

Axle

Place the axle on the V-shaped block and measure its wobble.

Available limit: 0.2mm



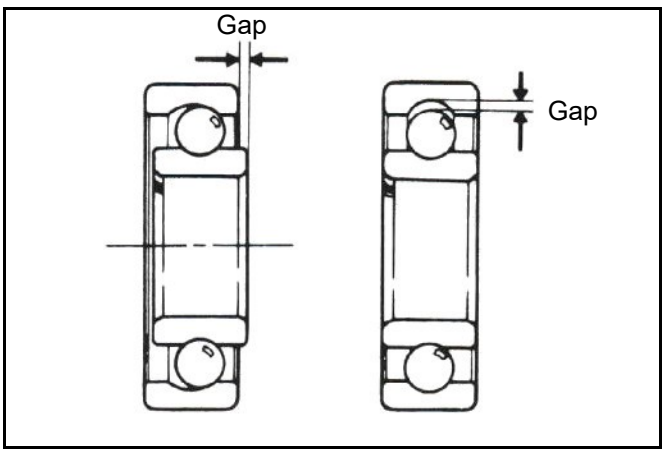
Bearing

Turn each inner ring of the bearing with your fingers smoothly and quietly. Check at the same time whether the outer ring is tightly attached to the hub.

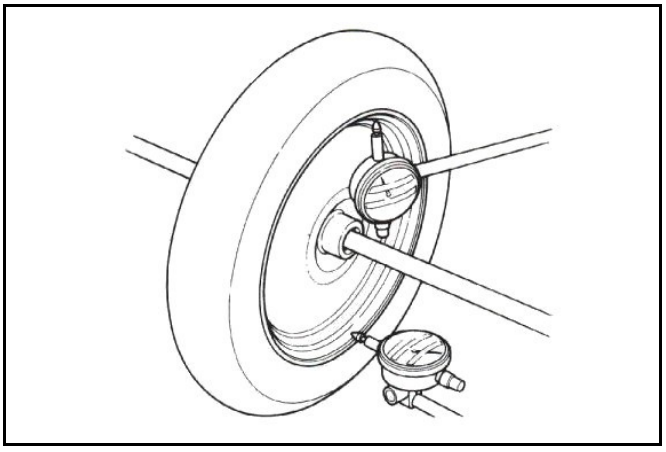
If the bearing does not turn smoothly, makes abnormal noises or is loose, remove it and replace it with a new one.

Note

- Bearings must be replaced in pairs.



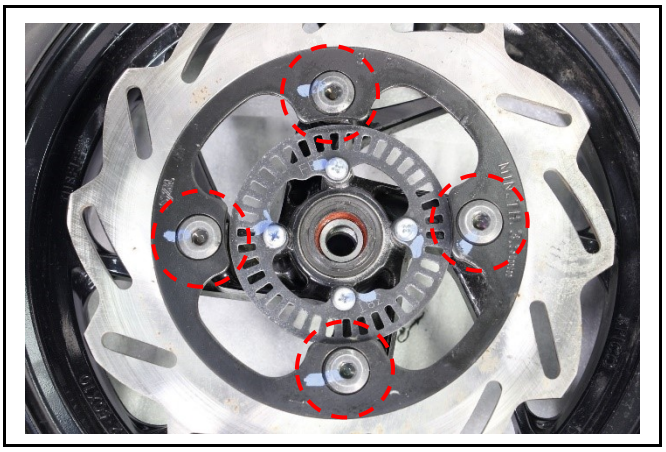
Wheel rim
Place the rims on a rotatable rack.
Turn the rim by hand and measure its wobble with a dial indicator.
Available limit: 2.0mm radial
Axial 2.0mm



Front brake discs

Disassemble

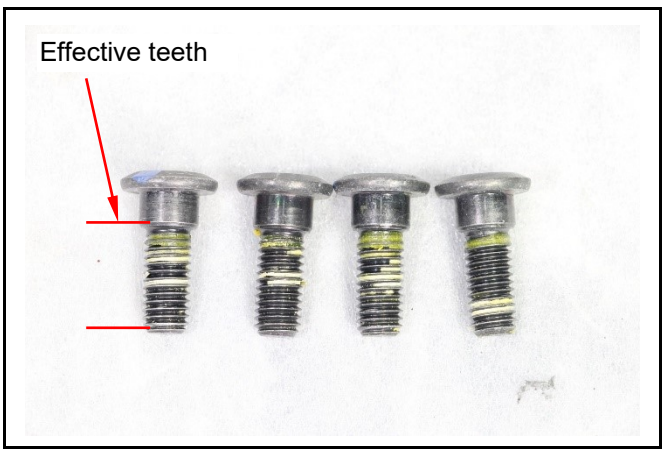
Remove the brake disc hex socket bolt (bolt ×4).



Remove the brake disc.

Check the front brake discs.
The front brake discs are 4.00mm thick
Available limit 3.50mm
Eccentricity 0.1mm
Available limit 0.30mm

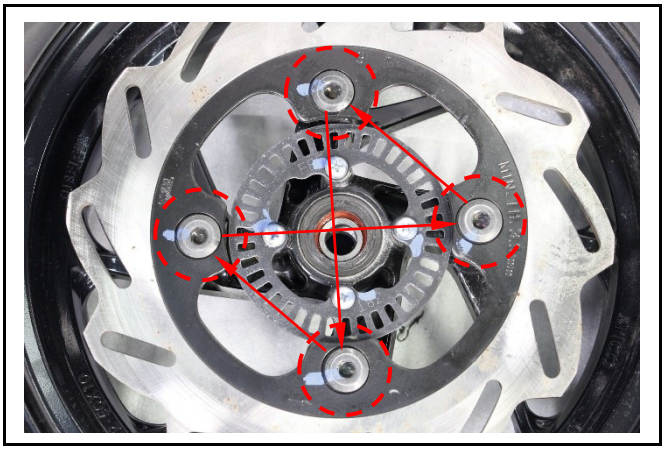
Assembly
Hexagon socket bolts (bolt x4).



⚠ Attention

- Apply anti-disengagement agent to the effective thread part of the bolt.

Lock the bolts by hand first to position the disc brake.
Then lock the bolts diagonally in sequence.
Torque value: 4.0 to 4.5kgf-m



Note

- The torque is locked multiple times according to the torque value.

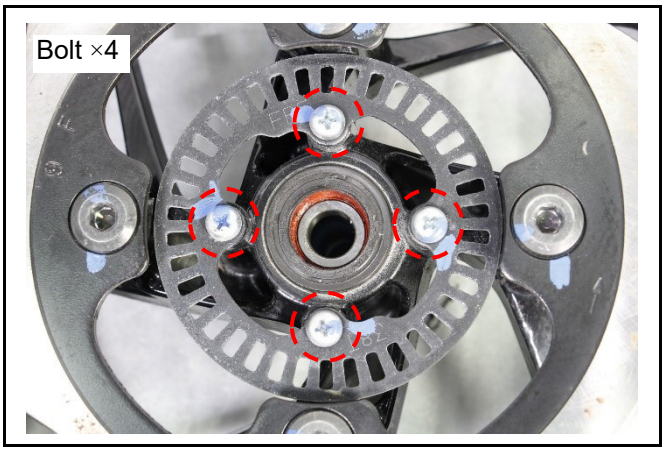
Installation

Install in reverse order.

Front wheel speed reading disk

Disassemble

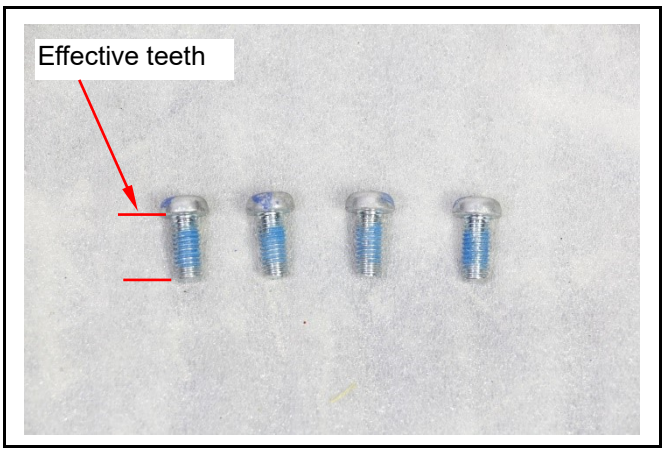
Remove the read disk cross bolt (bolt ×4).
Remove the reading disk.



Assembly

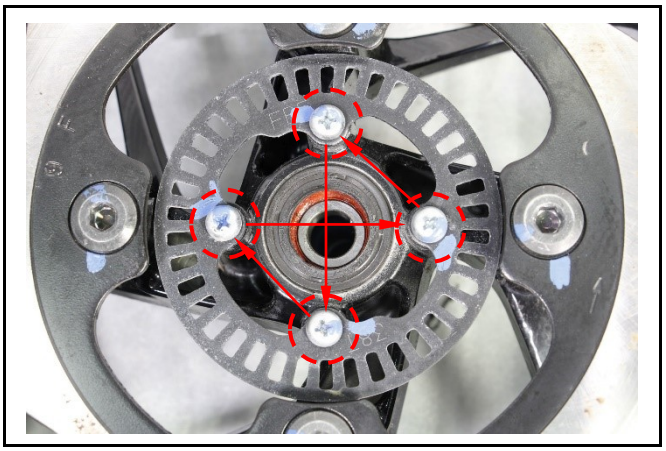
Attention

- Apply anti-disengagement agent to the effective thread part of the bolt.



Lock the bolt by hand first to position the reading disk.
Then lock the bolts diagonally in sequence.

Torque value: 0.3 to 0.5kgf-m

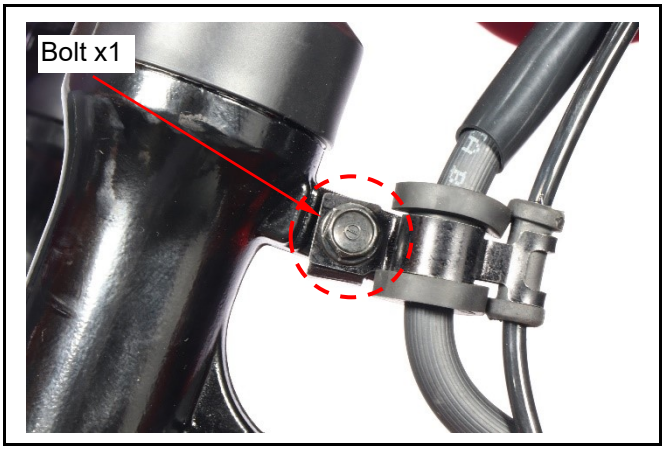


Note

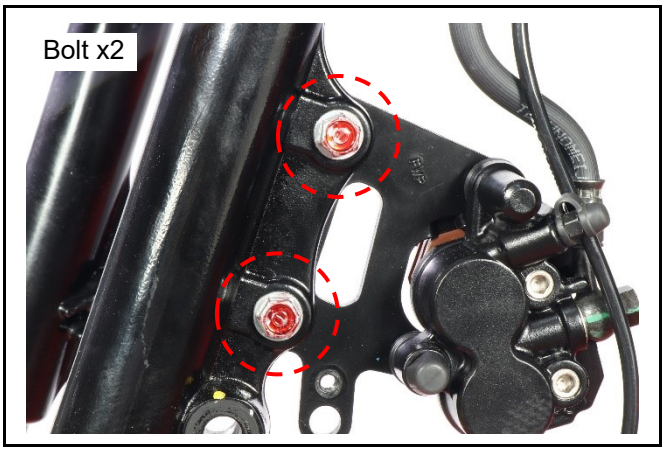
- The torque is locked in stages according to the torque value.

Front shock absorbers

Remove the brake tubing, stopwatch wire clamp bolts (bolt x1).



Remove the front brake fixture bolt (bolt x2).



Remove the front shock absorber bolts (bolt x4).
Remove 2 front shock absorbers.

Installation

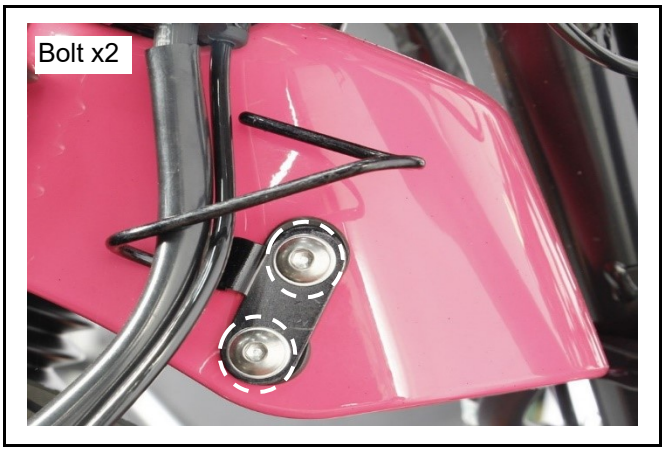
Install in reverse order.

Torque value: 2.4 to 3.0kgf-m

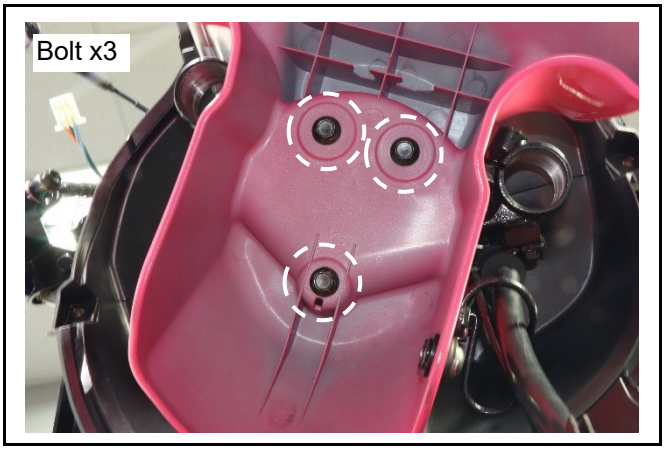
Turn to the main trunk

Disassemble

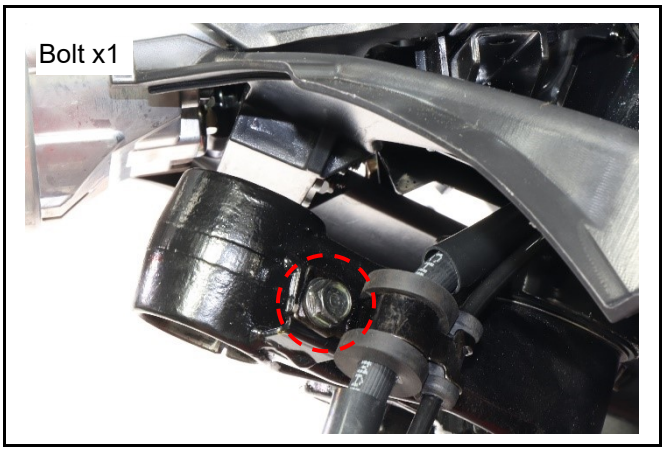
Remove the brake oil pipe, stopwatch wire fixing ring clamp hexagon socket bolt (bolt x2).



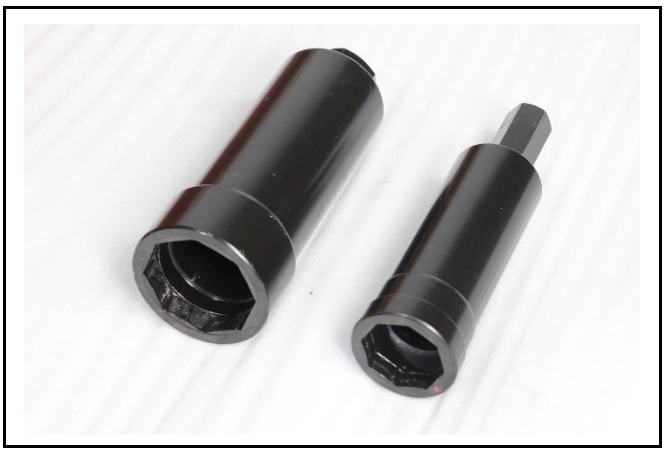
Remove the front soil removal bolt (bolt x3).

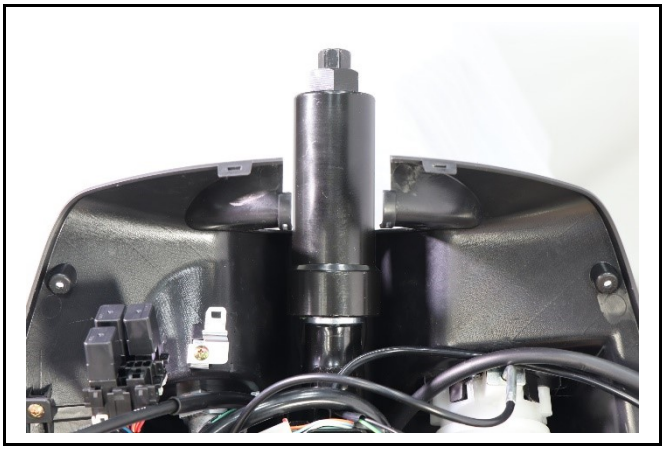


Remove the brake oil pipe, stopwatch wire fixing ring clamp bolt (bolt x1).

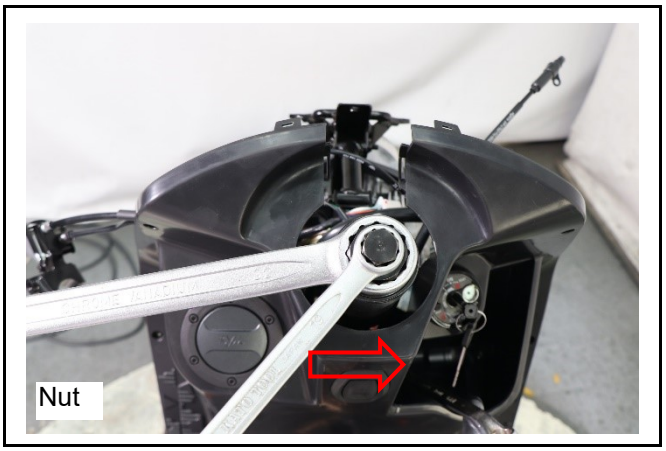


Special tools:
Tool Name: Disassembly and assembly tool for turning the upper cone seat ring nut on the main trunk
Tool Name: Steering Main Trunk Fixing Nut Disassembly and Assembly Tool

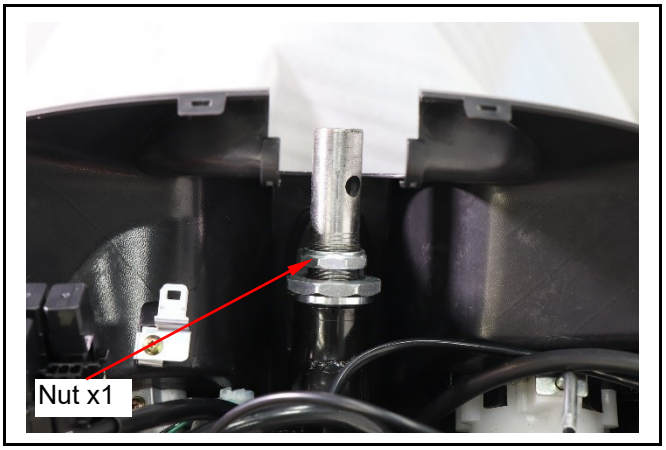




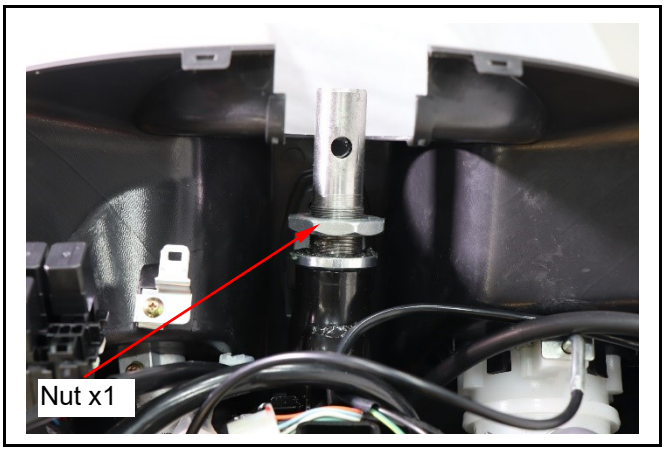
Loosen the steering trunk fixing nut.



Remove the steering trunk fixing nut.



Remove the upper cone seat ring nut.



Pull out the steering main rod.
Remove the upper bead bowl turning steel ball.

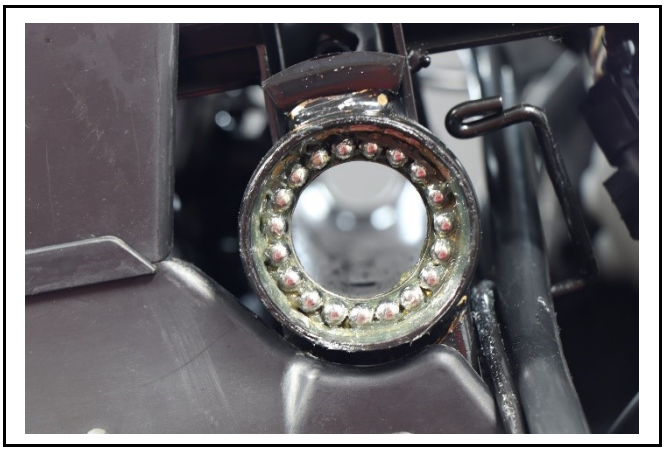
Attention

- The steering ball must not be lost.

Remove the lower bead bowl and turn the ball.

Note

- The steering ball must not be lost.



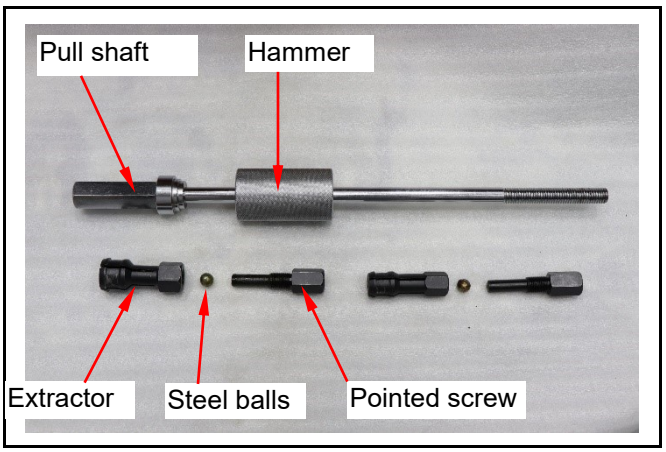
Steering shaft ball disc disassembly/assembly

Special tools:

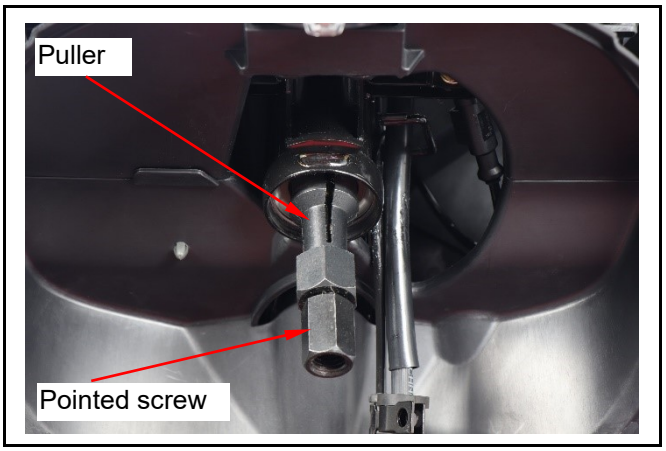
Tool Name: Steering shaft ball disc disassembly and assembly tool

Note

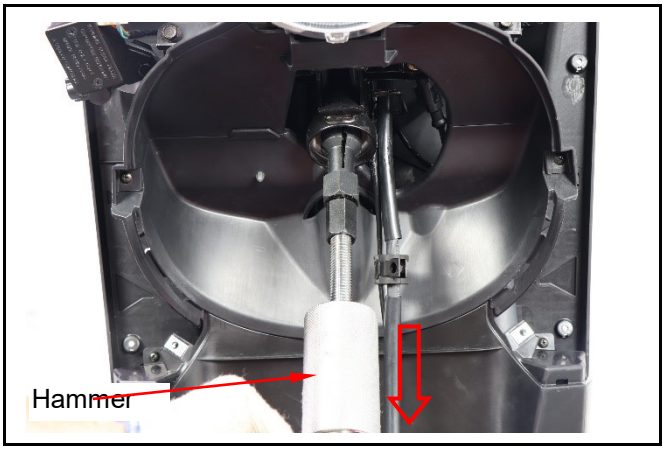
- The steel ball must not be lost.



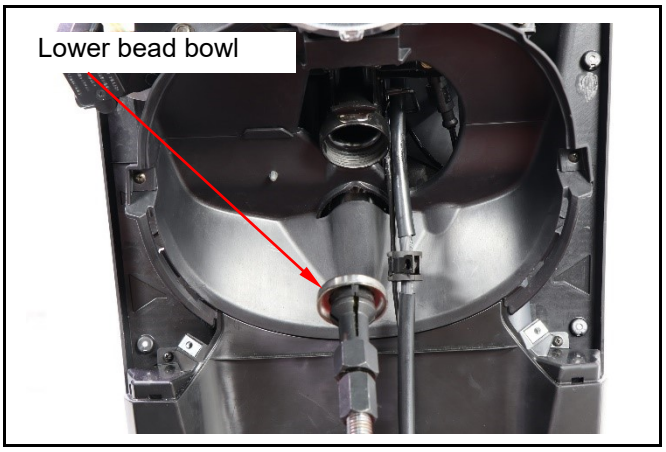
Select the appropriate bearing pull-out tool and the pointed screw combination.



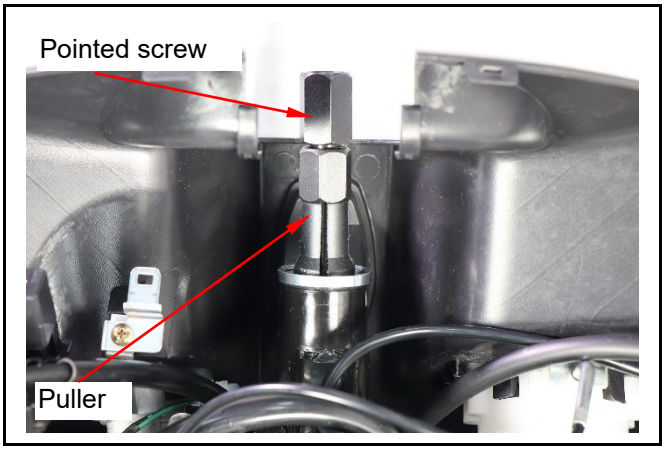
Attach the hammer and strike the pull-out shaft.
Strike the hammer down.



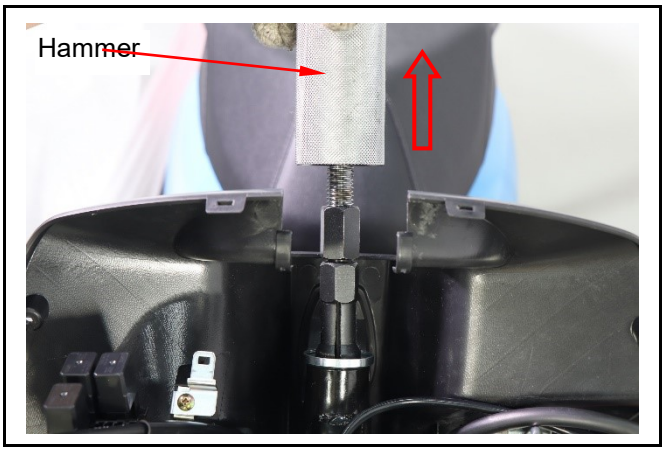
Remove the lower bead bowl.



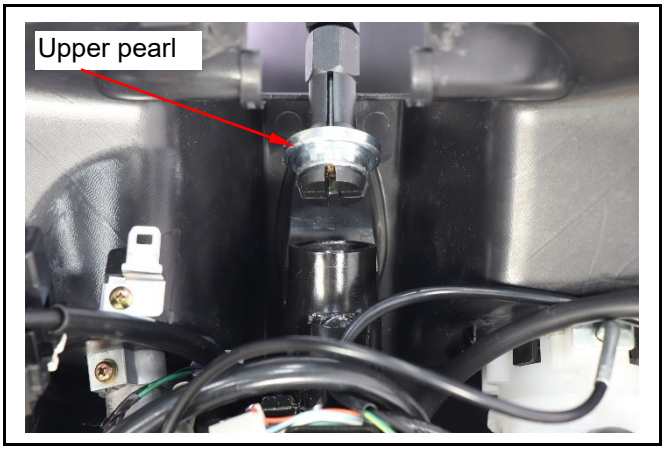
Select the appropriate bearing extraction tool and the pointed screw combination.



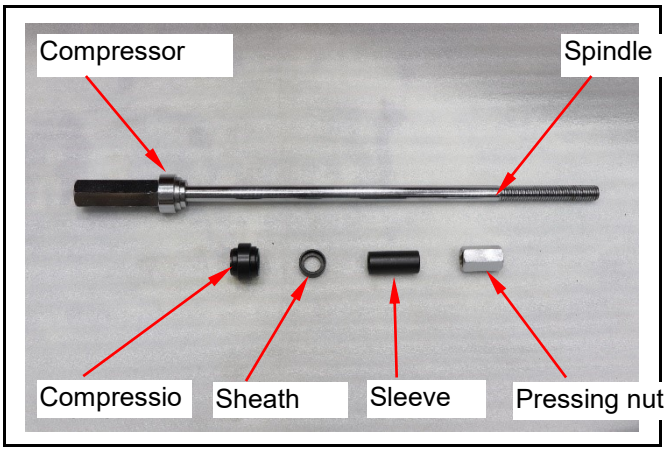
Install the hammer, strike the pull-out shaft.
Strike the hammer upwards.



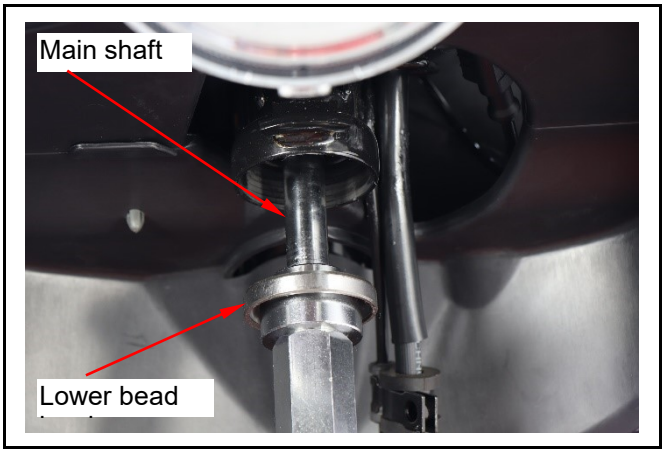
Remove the upper bead bowl.



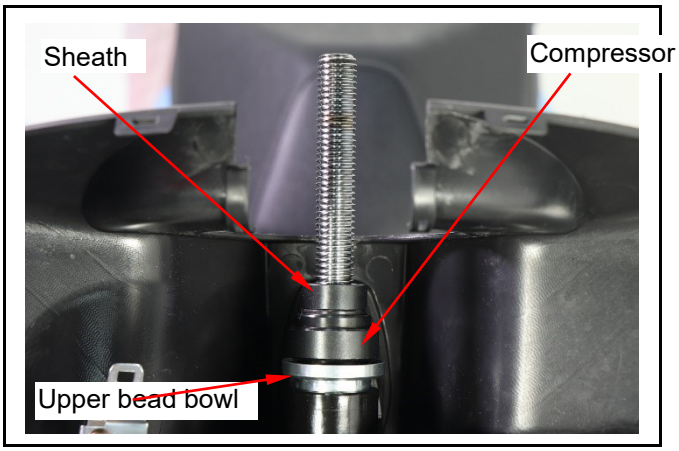
Assembly
Specialized tools:
Tool Name: Steering shaft ball disc disassembly and assembly tool



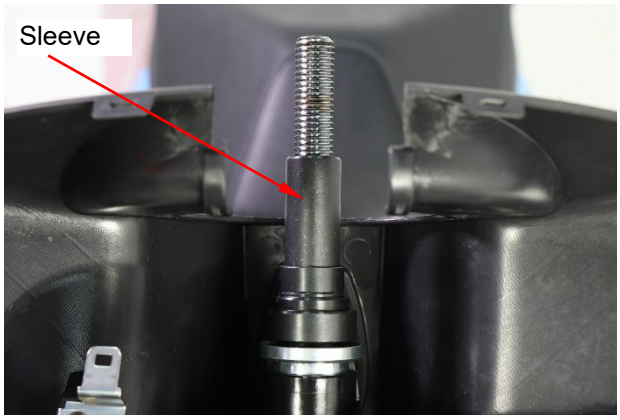
Insert the lower ball bowl into the main shaft. The main shaft is inserted under the steering main rod hole.



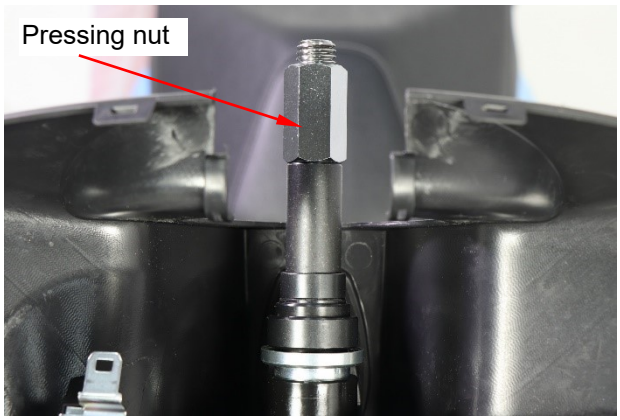
Insert the upper bead bowl, the presser, and the sheath.



Insert the sleeve.



Lock in the emergency nut.

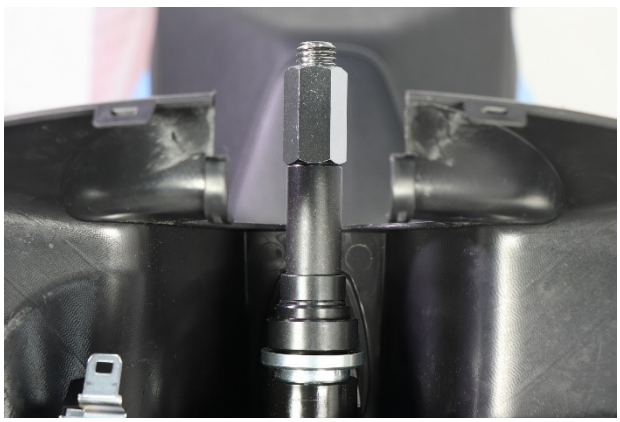


First, lock the adjusting nut by hand to position the upper/lower bead bowl.

Note

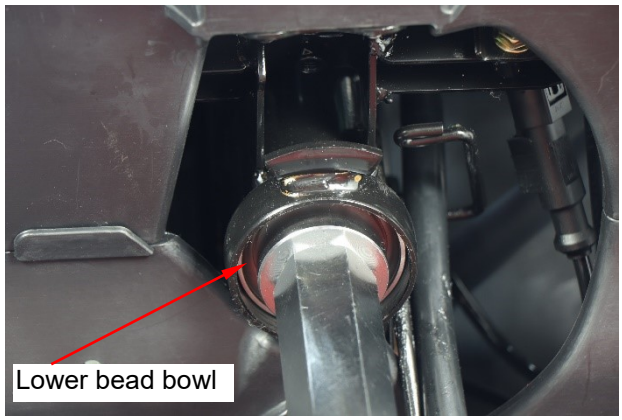
- Do not tilt the ball bearing during installation.

Use a wrench to secure the nut under the main shaft.
Use the wrench to lock the upper pressing nut.



Lock the top bead bowl into position.

The lower bead bowl is in position.
Confirm whether the upper/lower bead bowl has reached positioning.



Apply lubricating grease to the upper/lower bead bowls.
Install the steering ball.

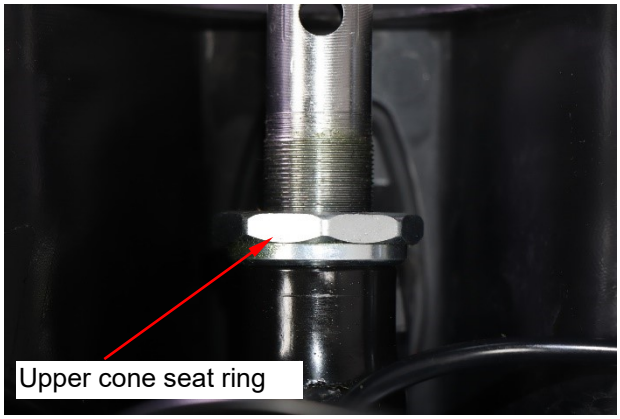
⚠ Note

- The steering ball must not be missing.

Apply lubricating grease to the upper cone seat ring nut and the steering main rod.

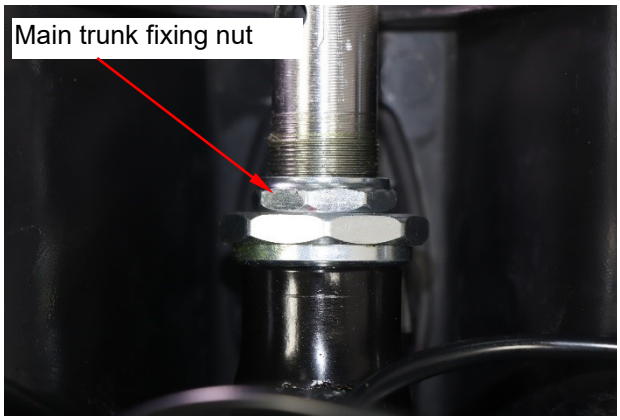
Turn the main rod and insert it from below the hole.
Lock in the upper conical seat ring nut.
(Lock by hand until it fits the upper ball bearing without any gap)

Torque value: 0.1 to 0.3 kgf-m

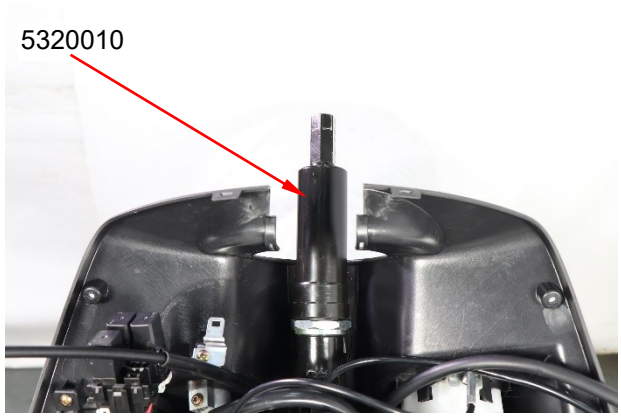


Lock in the steering trunk fixing nut.

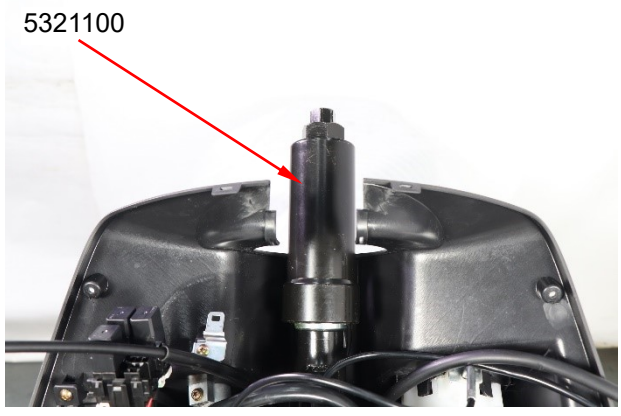
Torque value: 6.0 to 8.0kgf-m



Fitted with **special tools:** SYM-5320010.



Put on the **specialized tools again**:
SYM-5321100.



Screw the upper cone seat ring into the steering trunk until it fits the upper ball bearing without any gap, then roll back 1/2 turn and lock the upper cone seat ring with the specified torque (approximately another 1/4 to 3/8 turn).
Torque value: 0.1 to 0.3kgf-m

Install the steering trunk fixing nut and secure the upper cone seat ring, then tighten the nut.
Torque value: 6.0 to 8.0kgf-m

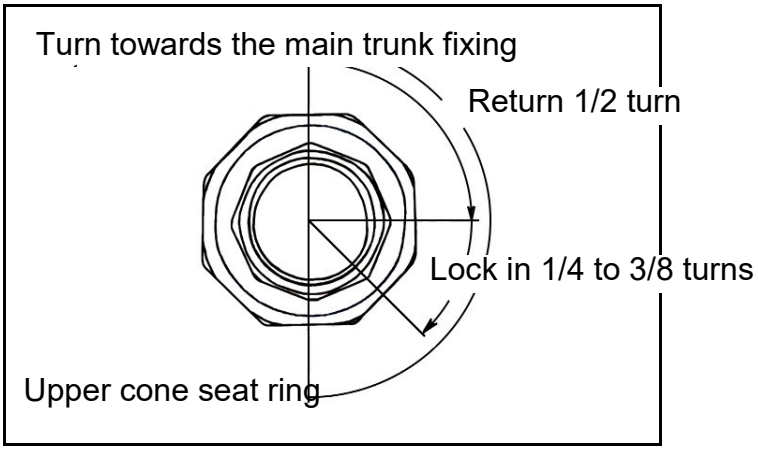
⚠ Note

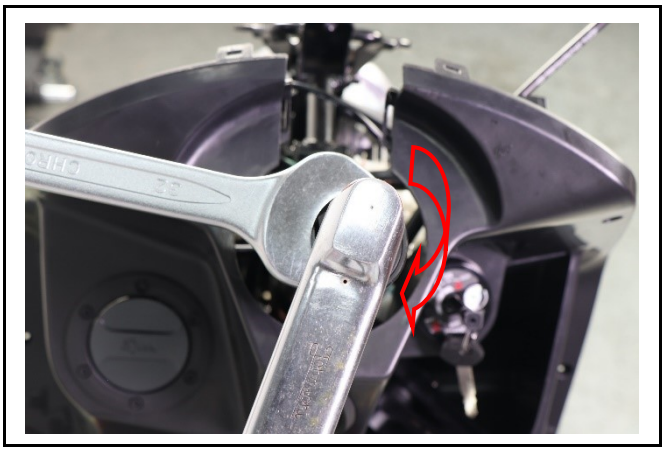
- When the upper conical seat ring is screwed in, it should not be tightened too much to avoid damaging the ball bearing plate.

⚠ Note

- Once the assembly is complete, check that the steering main rod is free to rotate and has no vertical clearance.

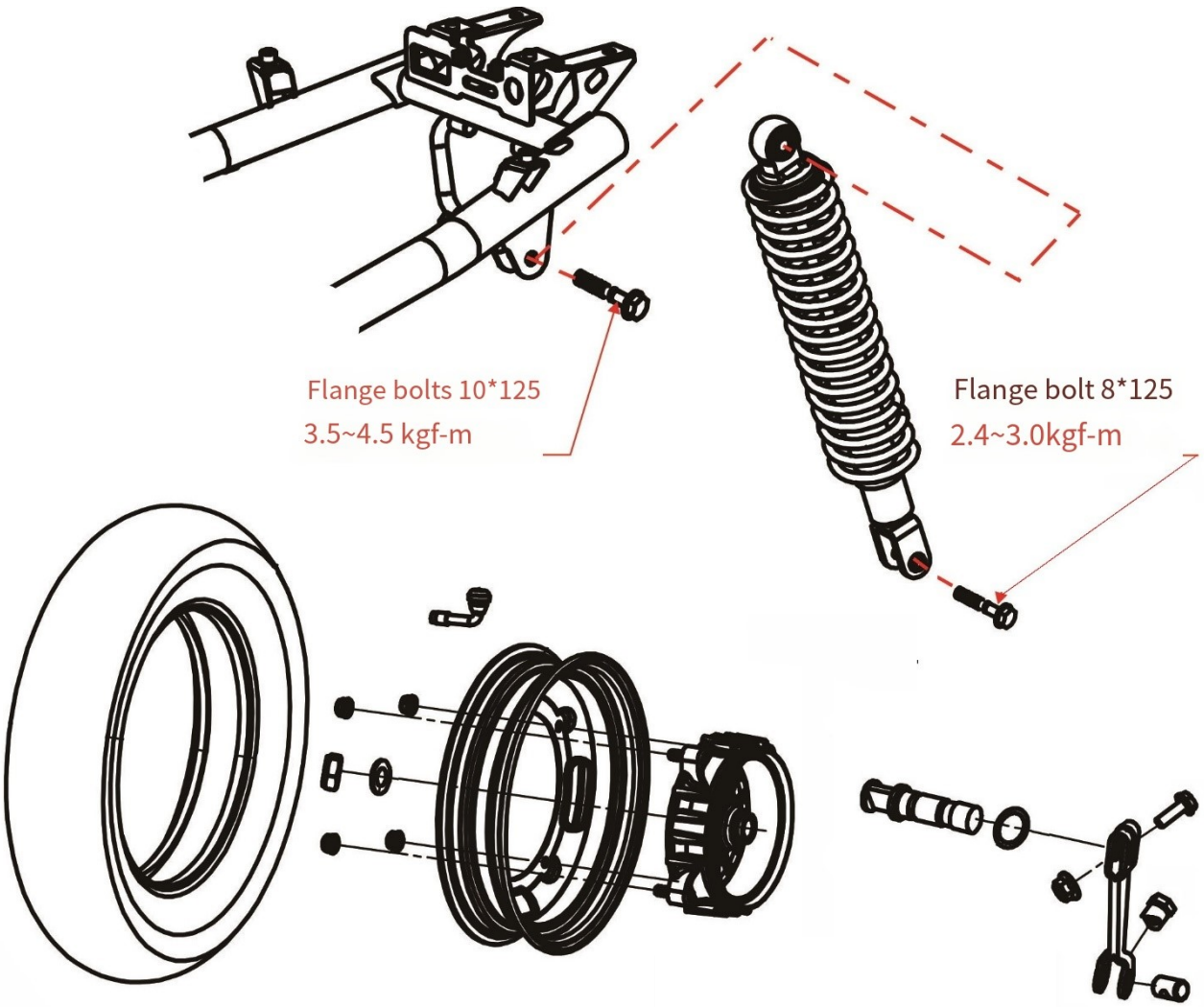
Tools to use: Torque wrench
Upper cone seat ring nut
Torque value: 0.1 to 0.3kgf-m
Turn the main trunk fixing nut
Torque value: 6.0 to 8.0kgf-m





Institutional Illustration 15-1	Exhaust pipe..... 15-3
Notes on Work..... 15-2	Rear wheels 15-6
Fault Diagnosis 15-2	Rear shock absorber 15-8

Mechanism illustration



Notes on the assignment

General Notes

For the disassembly, repair and assembly procedures of tires, please refer to the maintenance manual for high-speed tires.

Specification **unit: mm**

Project		Standard values
Rear wheel wobble	Radial	Less than 0.5
	Axial	Less than 0.5
Brake drum	Inner diameter	Youdaoplaceholder0 130 +0.2
Apply the rear brake for thickness		4.3 +0.3

Torque value

Rear axle nut 11.0 to 13.0kgf-m
Rear shock absorber upper bolt 3.5 to 4.5kgf-m
Rear shock absorber lower bolts 2.4 to 3.0kgf-m
Exhaust pipe joint nuts 3.2 to 3.8kgf-m
Exhaust pipe mating bolts 3.2 to 3.8kgf-m
Brake drum coupling bolts 1.5 to 2.0kgf-m

Fault diagnosis

Rear wheel wobbling

- The rim is bent and deformed.
- Bad tyres.
- The axle is not locked.

The shock absorbers are too soft

- Shock absorber springs are fatigued.

Brake noise

- Brake to wear out the pads.
- Brake drum eccentric deformation.
- The brake disc is poorly installed.
- Brake drums or wheels are not parallel.

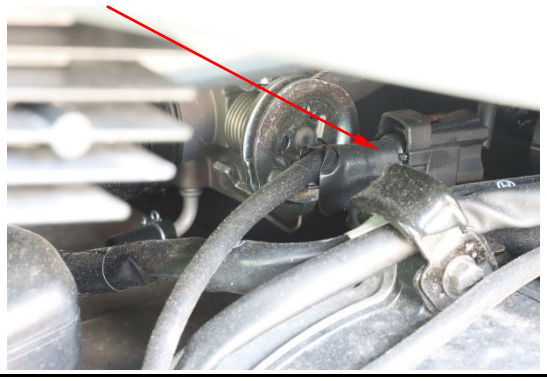
Poor brake performance

- Poor brake alignment.
- Brake to get the pads dirty.
- The brakes wear out the plates.
- Brake drum oil stains.
- Brake wires are soiled and stuck.
- The brake wires are not installed properly.

Exhaust pipe

Disassemble

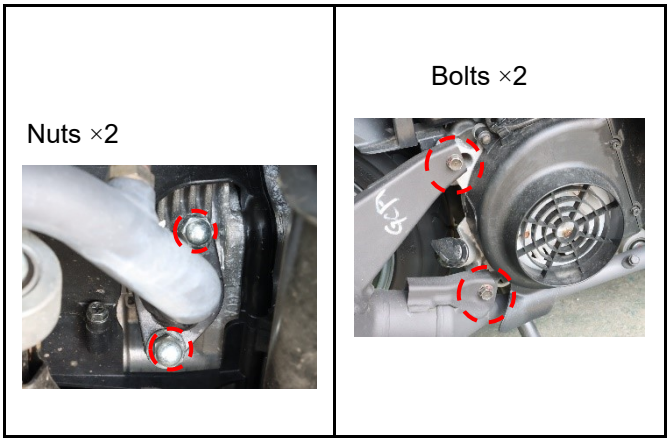
Remove the oxygen sensor connector and hook.



Remove the front nut of the exhaust pipe (nut ×2).

Remove the bolts (bolts ×2).

Remove the exhaust pipe.



Installation

Proceed in the reverse direction of the disassembly procedure.

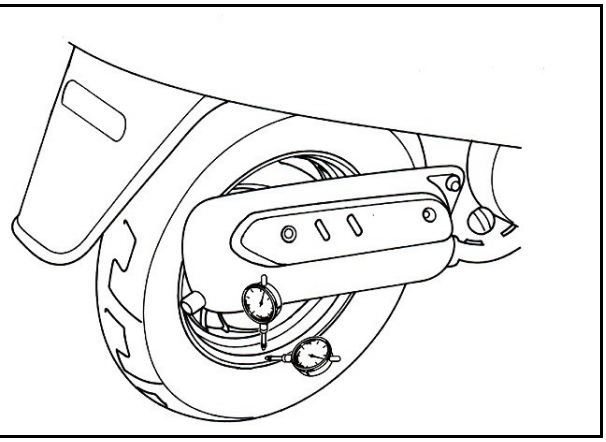
Note

- Replace the vent gasket with a new one if it is damaged or deformed.
- Before removing the exhaust pipe, remove the wire connector and hook of the oxygen sensor first.

Torque value:

Exhaust pipe bolts: 3.2 to 3.8kgf-m

Exhaust pipe nuts: 3.2 to 3.8kgf-m



Check

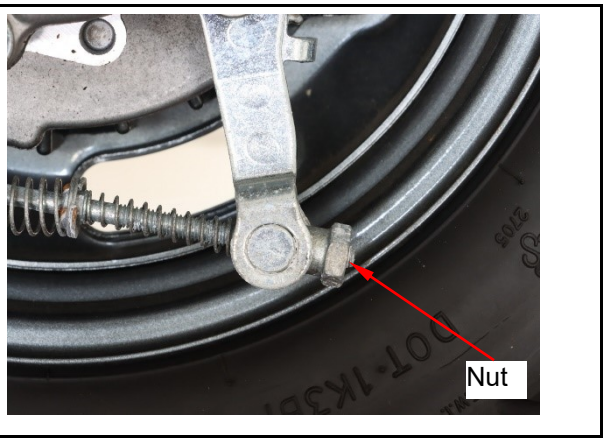
Check the rear wheel wobble.

Available limits

Radial: 2.0 mm

Axial: 2.0 mm

When the rear wheel deflection exceeds the available limit, in addition to the deformation of the wheel rim itself, it is also possible that the final drive shaft bearing is loose or worn, or the drive shaft is bent or deformed.



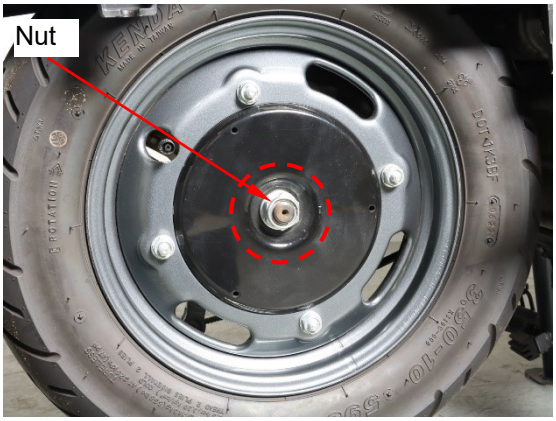
Loosen the rear brake adjustment nut.

Disassemble

Remove the exhaust pipe (2 bolts, 2 nuts).

Remove the rear axle nut (nut ×1).

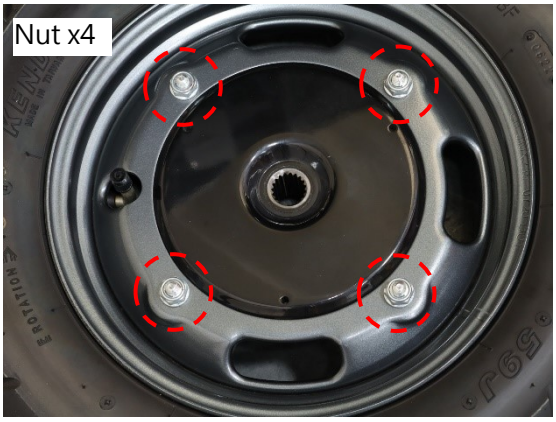
Torque value at assembly: 11.0 to 13.0kgf-m



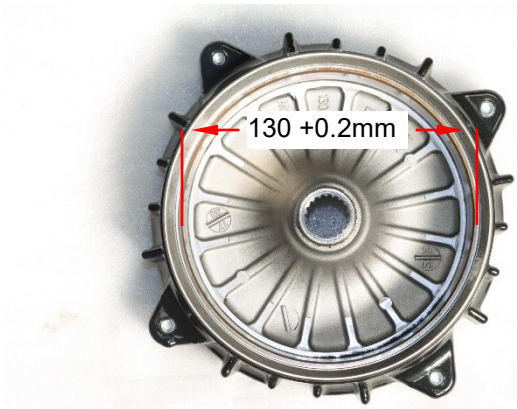
Remove the nut.

Remove the rear wheel.

Remove the brake drum nut (nut x4).



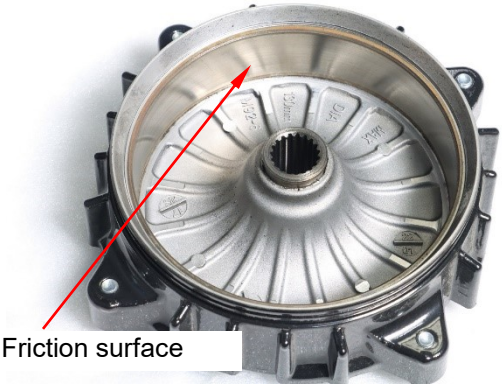
Measure the inner diameter of the brake drum.
Standard value: ǿ130 +0.2mm



Check for uneven wear on the brake drum friction surface, with severe grooves on the wear surface.

Note

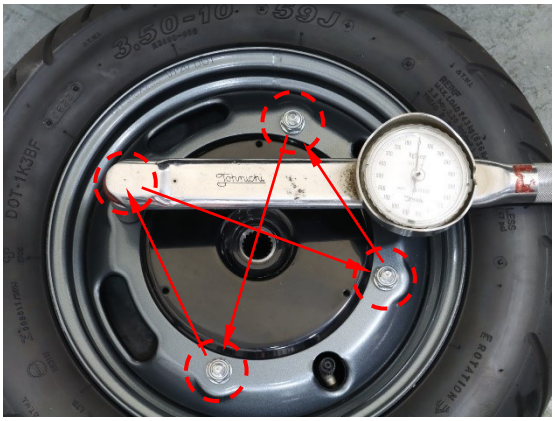
- Replace with a new one if there is any defect.



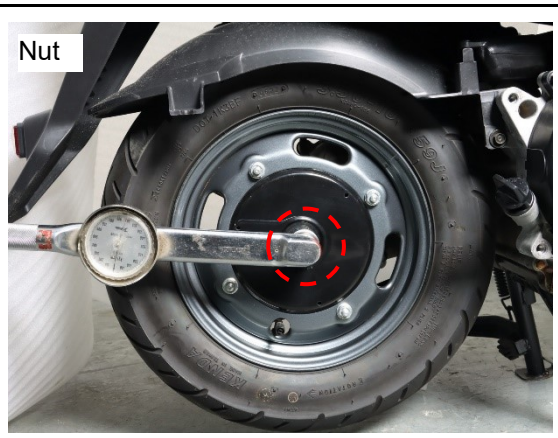
Lock the nut (nut x4).
Torque value: 1.5 to 2.0kgf-m

Attention

- Lock the nuts diagonally in several steps.

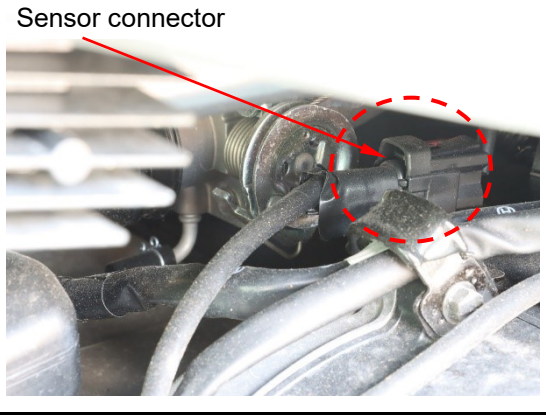


Insert the rear wheel locking nut (nut x1).
Torque value: 11.0 to 13.0kgf-m

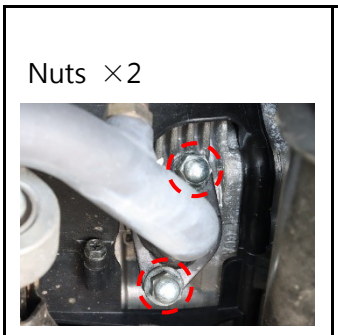


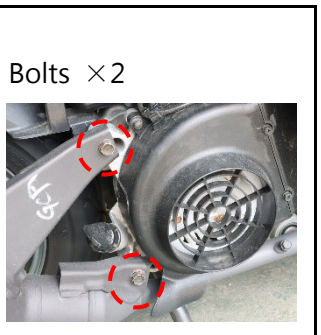
Rear wheel

Remove the oxygen sensor connector and hook.



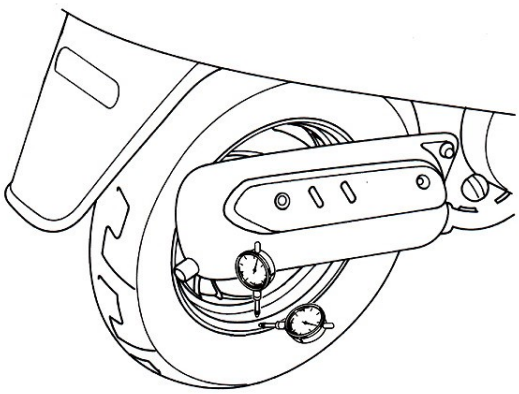
Remove the front nut of the exhaust pipe (nut ×2).
Remove the bolts (bolts ×2).
Remove the exhaust pipe.





Note

- If the exhaust port gasket is damaged or deformed, replace it with a new one.
- Before removing the exhaust pipe, remove the wire connector and hook of the oxygen sensor first.



Check

Check the rear wheel wobble.

Available limits

Radial: 2.0 mm

Axial: 2.0 mm

When the rear wheel deflection exceeds the available limit, in addition to the deformation of the wheel rim itself, it is also possible that the final drive shaft bearing is loose or worn, or the drive shaft is bent or deformed.

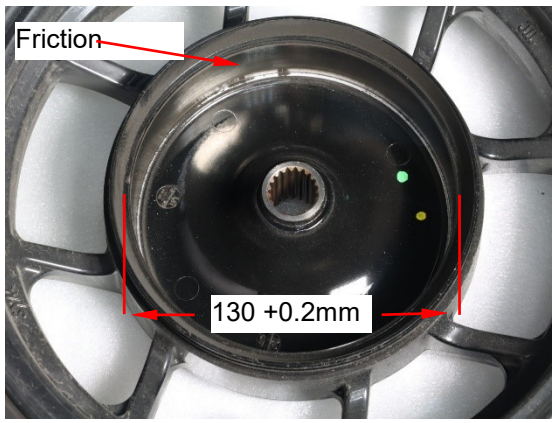
Disassemble

Remove the rear brake adjustment nut.

Remove the rear axle nut (nut ×1).

Remove the rear wheel set

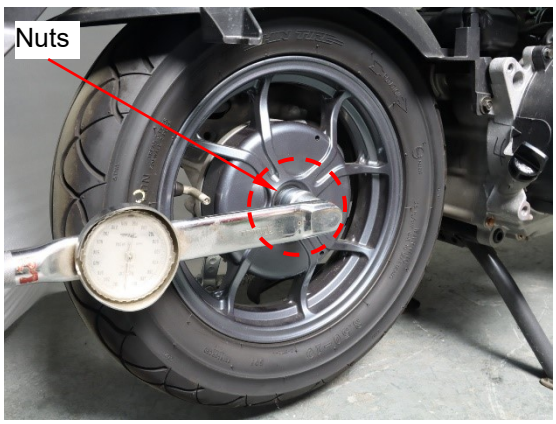
Measure the inner diameter of the brake drum.
Standard value: ø130 +0.2mm
Check for uneven wear on the brake drum friction surface, with severe grooves on the wear surface.



Note

- Replace with a new one if there is any defect.

Install the rear wheel lock nut (nut x1).
Torque value: 11.0 to 13.0kgf-m



Rear shock absorber

Disassembly

Use tools: A 12, 14mm wrench.

Remove the top bolt of the shock absorber (bolt ×1).

Remove the lower end bolt of the shock absorber (bolt ×1).
Remove the rear shock absorber.

Installation

Install and lock in the reverse order of disassembly.

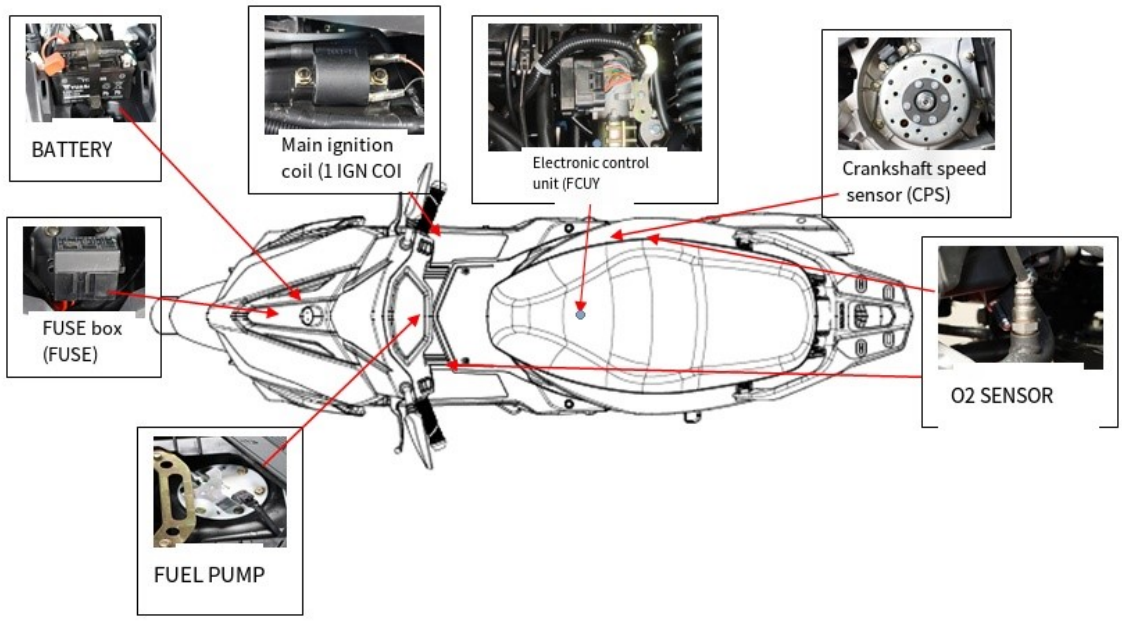
Note

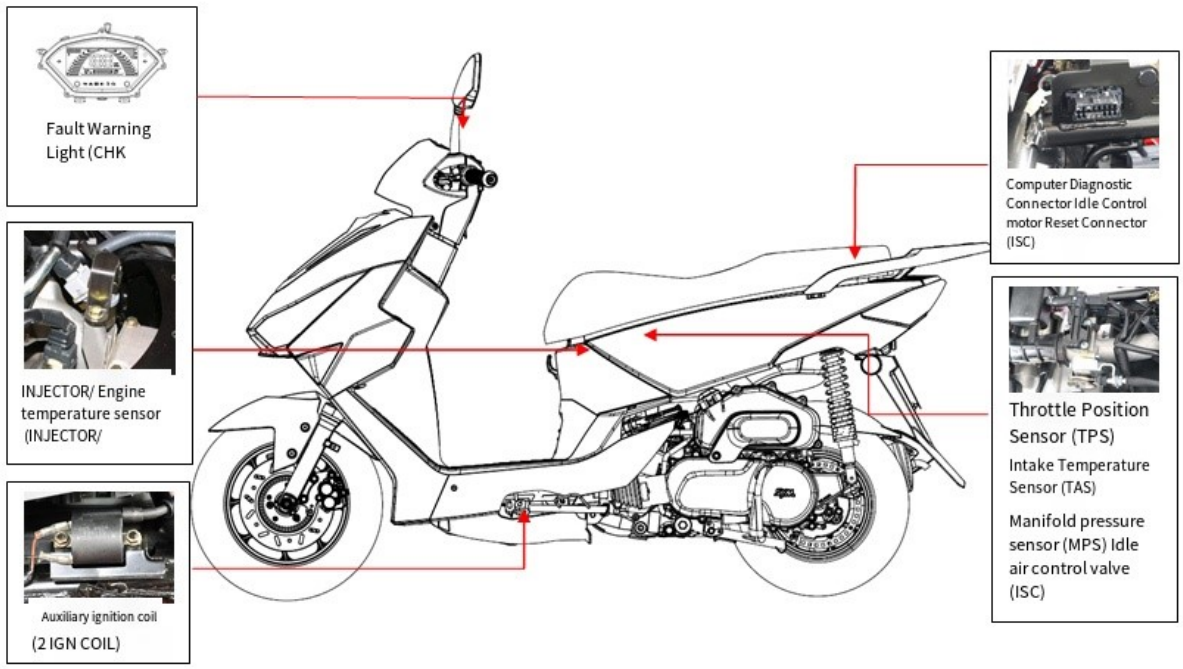
- The rear shock absorber must be replaced as a whole. Do not disassemble it yourself, otherwise the rubber bushing and structure will be damaged.

Torque value
Top bolt of shock absorber: 3.5 to 4.5 kgf-m
Lower shock absorber bolts: 2.4 to 3.0 kgf-m

Institutional Diagram 16-1	Ignition high-voltage coil check ... 16-8
Notes on Homework 16-2	Start the system 16-16
Circuit system specifications 16-3	Instrument 16-17
Fault Diagnosis 16-4	Direction handle switch 16-18
Charging system 16-6	Fuel gauge 16-21

Mechanism diagram





Notes on homework

Charging system

- Disassembling and assembling the positive and negative terminals of the battery (disassemble the negative terminal first and then the positive terminal).
- MF maintenance-free batteries do not require checking the electrolyte level or replenishing distilled water.
- When charging the battery, the battery must be removed from the frame, but do not remove the liquid cap.
- Do not perform rapid charging unless it is urgently necessary.
- The charging voltage check must be done using a voltmeter.
- Batteries can be recharged and discharged. If a battery is left unused after being discharged, it will cause damage, shorten its lifespan or reduce its performance. Typically, after about 1 to 2 years of use, the performance of the battery will decline. A battery with reduced capacity will have its voltage restored when replenished, and when an additional load is applied, the voltage will drop sharply and then rise again.
- The general overcharging symptoms of a battery can be seen from the appearance of the battery itself; If there is a short circuit inside the battery, the voltage cannot be measured at the battery terminals; If the voltage regulator rectifier doesn't work, the charging voltage of the battery will be too high and the battery life will be shortened.
- If the battery is left unused for a long time, it will discharge itself and its capacity will decrease. It will need to be recharged approximately every two months.
- When a new battery is filled with battery fluid, it needs to be recharged before use to extend its lifespan.
- Check the charging system in the order indicated on the fault diagnosis sheet.
- When there is current flowing through the electrical equipment, do not remove and reconnect the connectors, which will cause the voltage to be too high and damage the voltage regulator rectifier. The main switch must be turned OFF before operation.
- Do not use a traditional battery when replacing the battery.
- Disassemble the alternator and pulse according to the disassembly instructions.

Ignition system

- Check the ignition system in the order of fault diagnosis.
- This vehicle uses the E.C.U. transistor ignition system, which is an electrical automatic Angle device, so the ignition timing does not need to be adjusted. In case the ignition timing is inaccurate, check the E.C.U. Transistor ignition system and generator set; In case of faulty replacement, the ignition timing must be confirmed using the ignition timing lamp.
- If the E.C.U. assembly sags off or is subjected to a strong impact, it is often the main cause of its failure. Special attention should be paid when disassembling.
- The fault of the ignition system is often due to poor contact at the joints and sockets. Check for poor contact at all parts of the joints before preparation.
- Check if the spark plug model and the heat value used are appropriate. An inappropriate spark plug can cause the engine to run poorly or burn out. Also, pay attention to the locking torque of the spark plugs.
- This manual mainly explains the inspection based on the maximum voltage. The key points for

checking the impedance value of the ignition coil are also recorded, as well as the determination when it is good or bad.

- Check the main switch according to the conduction table.

Start the system

- Check the ignition system in the order of fault diagnosis.
- Disassembly of the starter motor can be carried out on the engine.
- For the disassembly of the starter clutch, refer to Chapter 11.

Circuit system Specifications

Charging system

Project			Fuel injection pattern
Battery	Capacity/Type		12V 8 Ah / YTX7A/GTX7A-BS
	Charging rate		Standard: 0.8A / 5 to 10hr Fast charging: 8A / 1hr
	When fully charged	Voltage (20 ° C)	From 13.0 V to 13.2 V
	When charging is		12.3 V
Alternator	Output characteristics		6.2 A / 12 v
	Charging coil impedance value (20° C)		0.2 to 1.0Ω(yellow/yellow)
Leakage current			Less than 1mA
Engine speed at which charging begins			2000 rpm
The voltage regulator controls the voltage			14.5V ± 0.5v
Fuse			20A*2+15A*2+10A*3

Ignition system

Project		Fuel injection pattern
Spark plug	Standard model	NGK LR7D (Recommended)
	Gap	0.6 to 0.7 mm
Ignition coil resistance value	Primary coil	2.8 Ω ±10% (20 ° C)
Ignition timing	When marked "T"	0° /1500pm before the top dead center
Impedance value of crankshaft position sensor (20 ° C)		120 Ω±20%

Start the system

Project		Specifications
Starter motor	Style	Direct current
	Output characteristics	0.5 KW

Fault diagnosis

Charging system
- No power supply
- The battery connection is loose
- The battery is over-discharged
- The fuse is blown.
- Poor main switch
- Controller Malfunctioning

Low voltage
- Poor battery charging
- Poor contact
- Poor charging system
- Controller Malfunctioning

Intermittent power supply
- The wire connector of the charging system is loose
- Poor contact of the battery wires
- Poor contact or short circuit in the discharge system
- Poor contact or short circuit in the power generation system
- Poor controller

Charging system malfunctioning
- Blown fuse
- Poor contact, open circuit or short circuit of the joint or socket
- Poor controller
- Generator malfunctioning

Start the system
The starter motor doesn't turn
- The fuse is blown
- The battery is undercharged
- Poor main switch
- The starting switch is malfunctioning.
- Malfunctioning front or rear brake switches
- The controller power relay is faulty
- Poor contact, open circuit or short circuit on the power line
- Controller malfunctioning

Ignition system
- The spark plug doesn't ignite
- Faulty spark plug
- Poor wire contact, open circuit or short circuit
  ~ Between the generator and the ECU
  ~ Between the ECU and the ignition coil
  ~ Between the ECU and the main switch
- The main switch and relays are faulty
- The ECU group is faulty
- Generator malfunctioning

Not turning smoothly
- Ignition primary circuit
  ~ Poor ignition coil
  ~ Poor wire or contact
  ~ Poor contact of the main switch
- Ignition circuit
  ~ The ignition coil is faulty
  ~ Faulty spark plug
  ~ Bad high-voltage wire
  ~ The spark plug cap is leaking
- Improper ignition timing
  ~ Generator malfunctioning
  ~ The pulse sensor is poorly installed
  ~ The ECU is faulty

Weak starter motor
- Poor charging system
- Low battery power
- Poor contact on the power cord
- Foreign objects are stuck in the motor or gear

The starter motor rotates but the engine doesn't
- The starter motor drive gear is faulty

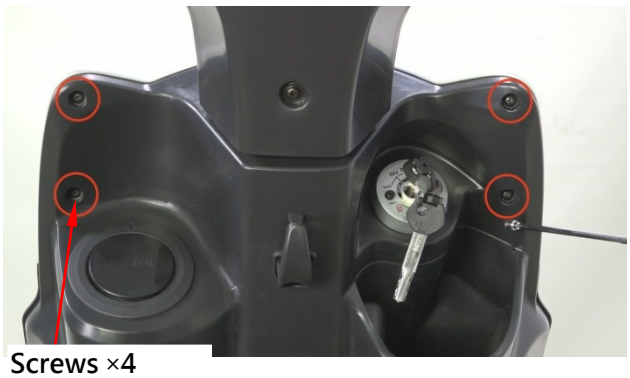
- Poor starter clutch
- Starter motor reverse
- Low battery power

Charging system

Battery

Disassemble

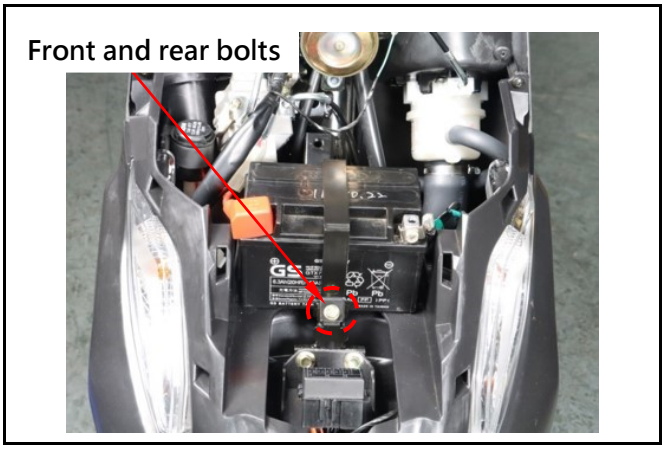
Remove the front panel (screw ×4).



Remove the battery fixing iron sheet (front and rear bolts ×1).

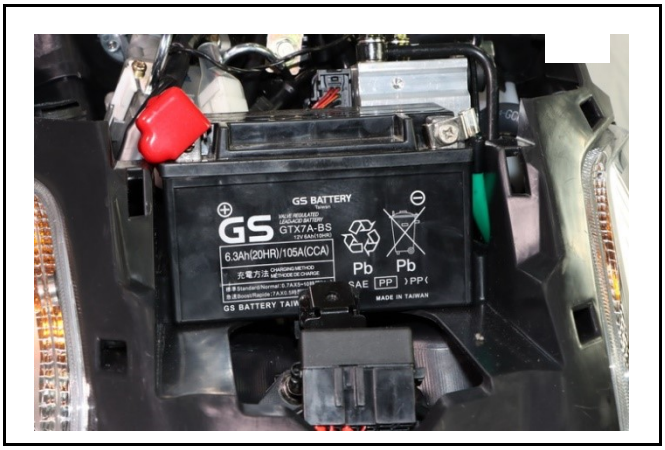
⚠Note

- The electrolyte is a highly toxic acid. If it accidentally comes into contact with clothes, skin or eyes, it can cause burns or blindness. In case of contact, rinse thoroughly with plenty of water and seek medical attention.
- When the electrolyte comes into contact with the skin, remove the clothing immediately and rinse with plenty of water.



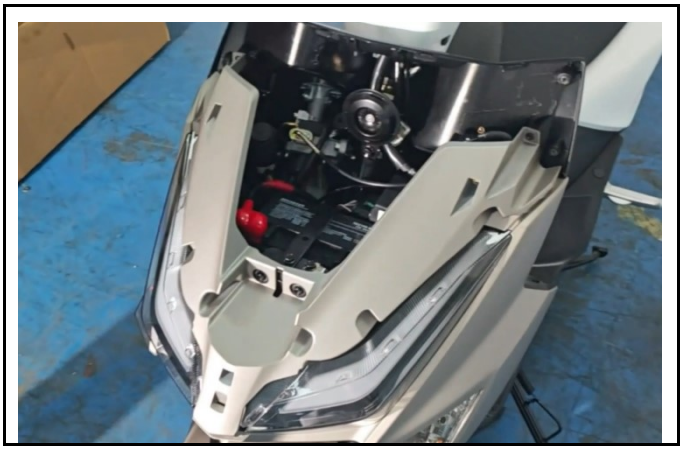
Remove the power cord fastening bolts, first disconnect the negative **(-)** and then the positive (+).

Remove the battery.



Installation

Install in the reverse order of disassembly.



Leakage check

Turn the main switch to the off position and remove the ground (-) wire from the battery.

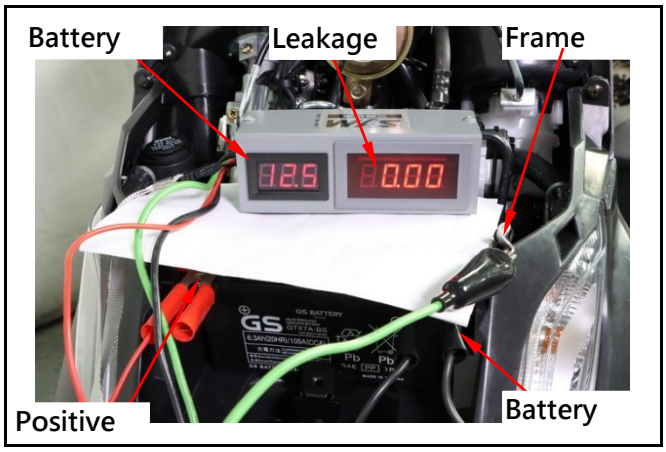
Connect the voltmeter, the black wire to the battery's negative terminal (-), the green wire to the ground, and the red wire to the battery's positive terminal (+).

Read the ammeter.

If the leakage current exceeds the standard value, it indicates a short circuit.

Leakage current: **less than** 10mA

While measuring the leakage current, disassemble each wire connection point one by one to locate the short-circuit position.



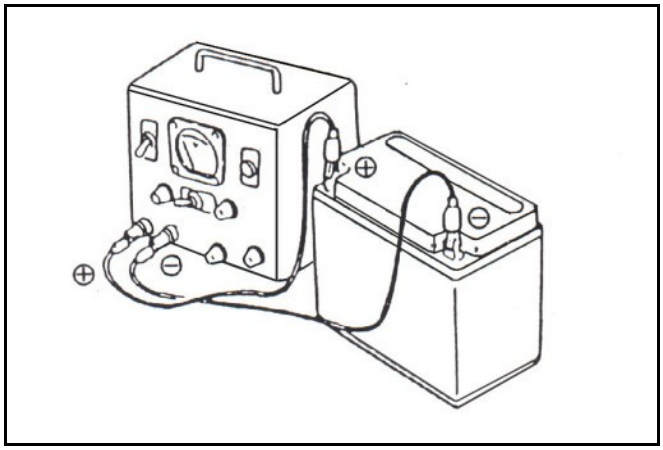
Voltage check

Measure the battery voltage using a digital voltmeter or multimeter and voltmeter and ammeter.

Voltage value

When fully charged: 14.0 to 15.0V (at 20°C).

Undercharged: Below 12.3V (at 20°C).



Charge

Connect the charger's positive terminal (+) to the battery's positive terminal (+) connector.

Connect the charger negative (-) to the battery negative (-) connector.

Warnings

- No fire or smoke near the battery while charging.
- The ON/OFF of charging is controlled by the charger switch, not by the battery wiring.
- When charging begins or ends, the charger switch must be turned off first to prevent the risk of explosion caused by sparks at the connection.
- Charging must be based on the current and time indicated on the battery.

After the battery is installed, apply grease to the terminals to prevent them from oxidizing.

Note

- Do not charge rapidly unless necessary; charge slowly.
- Confirm to charge using the above-mentioned current and time.
- Charging with too much current or too fast time can damage the battery.
- After charging is complete, wait 30 minutes before measuring the voltage again.

Charge voltage/current check
Use a voltmeter/ammeter.
Turn the main switch to the off position and remove the ground (-) wire from the battery.
Connect the voltmeter, the black wire to the battery's negative terminal (-), the green wire to the ground, and the red wire to the battery's positive terminal +).
Turn the main switch to the on position and start the engine to read the charging voltage and current.

Note

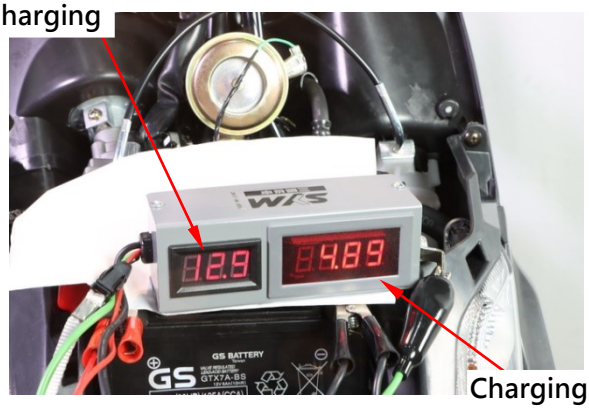
- Do not use any short-circuited wires.
- The vehicle is connected to a voltmeter and ammeter. While the engine can be started directly, frequent starts can damage the ammeter. Do not perform continuous starting actions.
- When connecting the meter, turn the main switch to the OFF position.

Connect an engine tachometer.
Turn the headlights to the high beam position and start the engine.
Gradually increase the engine speed and measure the charging voltage/current at the specified speed per minute.

Charging control voltage: 14.0±0.5V/2000rpm
Charging control current: 6A

Note

- When replacing a new battery, make sure that both the charging current and voltage are normal.



For the following situations, most of the problems are related to the charging system, follow the steps of the fault checklist.
①The charging voltage cannot be increased and exceeds the voltage at the battery connection, and the charging current is in the direction of discharge.
②The charging voltage and current are much higher than the standard values.
For cases other than the above, most are not related to the charging system. Please perform the following checks and follow the steps of the fault checklist.
①The standard charging voltage/current is only reached when the engine speed exceeds the specified revolutions per minute:

- Excessive electrical load is caused by using bulbs that exceed the specified power.
- The replaced battery is old or has insufficient capacity.

②The charging voltage is normal but the charging current is abnormal:

- Replace an old or under-capacity battery.
- The battery used is either undercharged or overcharged.
- The voltmeter and ammeter are damaged

③The charging current is normal, but the charging voltage is abnormal:

- The voltmeter and ammeter are damaged.

Ignition high-voltage coil inspection

Remove the right cover.
Remove the crystal high-voltage coil terminal.
Measure the resistance between the terminals of the primary circuit of the high-voltage coil.
Primary circuit: 2.8 Ω ± 15%

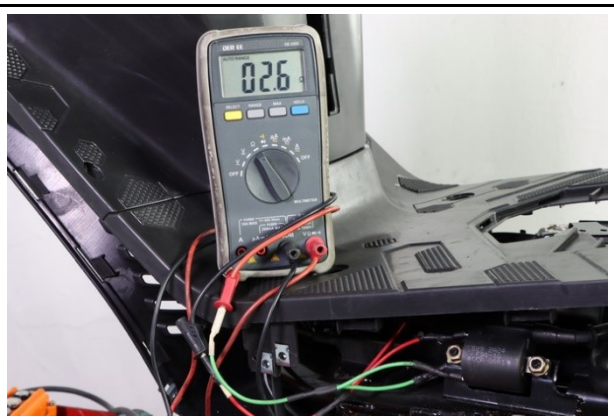
Crankshaft Angle sensor inspection

Remove the wire harness from inside the right upper cover.
Remove the 2P connection of the crankshaft Angle sensor and measure the resistance between the (green/white) to (blue/yellow) wire connection terminals.
Standard value: 120 Ω ±20%

⚠ Note

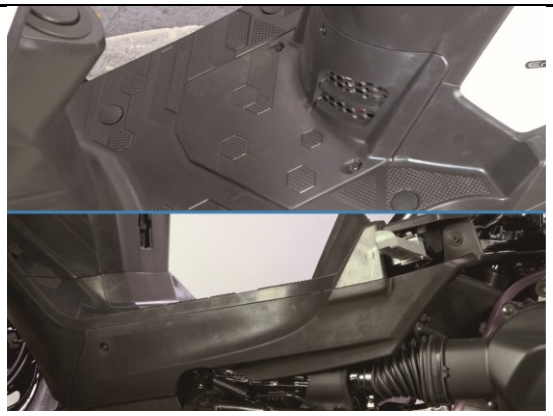
- This test does not require the coil to be removed from the engine.

If you need to replace the coil group, see Chapter 11.



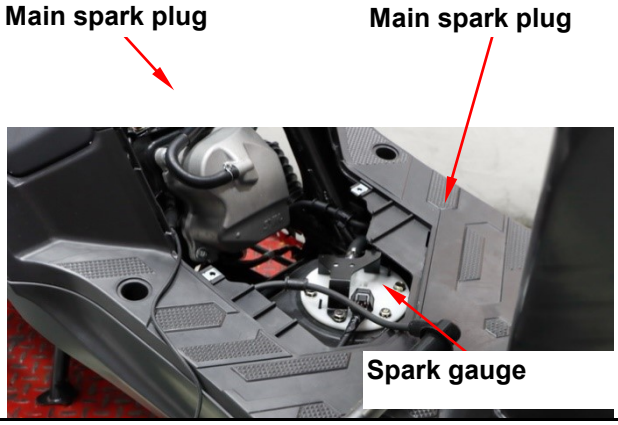
High-voltage coil tripping inspection

Remove the lower central cover and the left and right side covers.



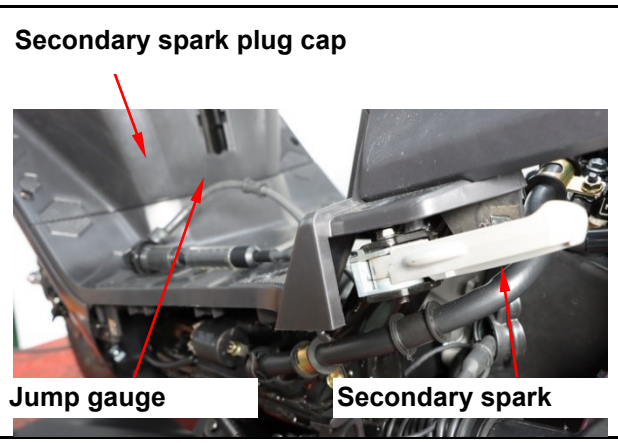
Remove the spark plug cap.

Use the spark gauge to insert one end into the spark plug cap and clamp the spark plug ultimate nut with one end of the fixture.



Turn on the main switch.

Pull and press the brake lever, press the start switch, and observe the spark.



⚠ Note

- Do not touch the flameout gauge or part with bare hands during testing to avoid

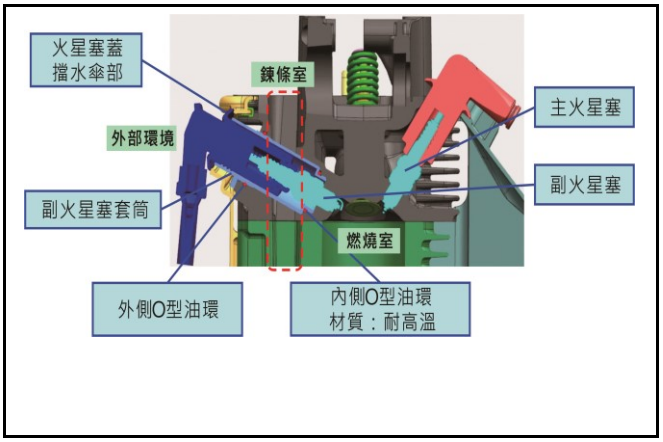
If there is no spark or the spark is not in good condition, check the circuit for leakage or short circuit. If the circuit is fine, replace the high-voltage coil

Double spark plug instructions and maintenance

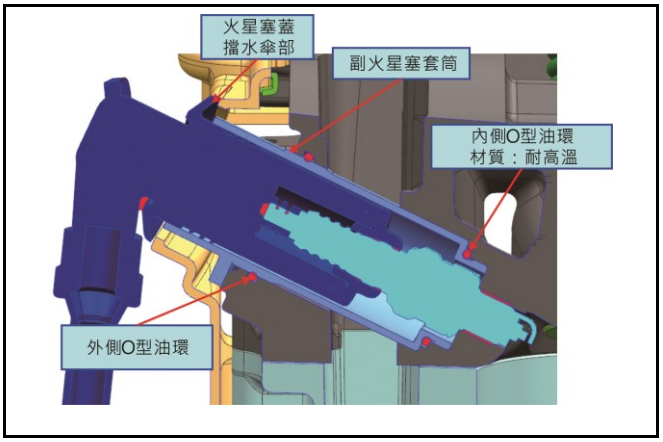
Features:

Single spark plug ignition has a longer residual flame time, while double spark plug ignition has a shorter residual flame time, thus **improving thermal efficiency and reducing pollution**

Double spark plug structure as shown on the right:



Detailed installation of the secondary spark plug sleeve



Diagnostic Device diagnoses

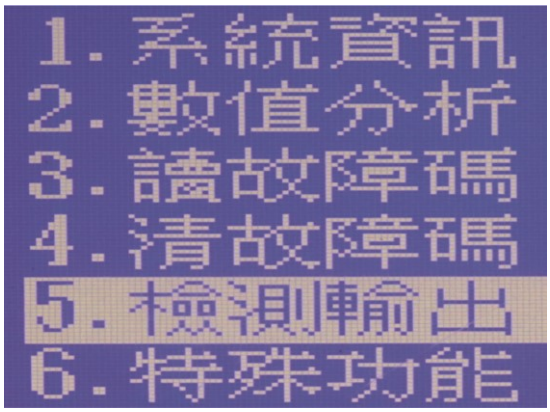
⚠ Note

- It is necessary to confirm that the diagnostic version is the latest version and use the diagnostic to check if the main and auxiliary spark plugs are functioning properly.

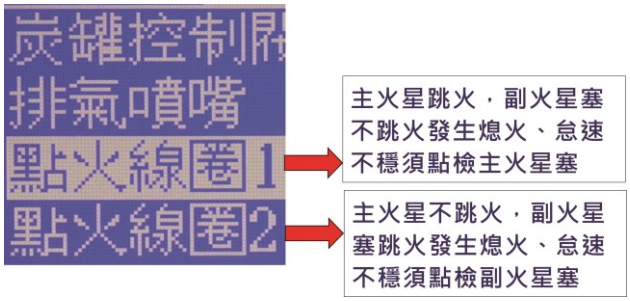
Enter the diagnostic screen and select the manufacturer (Sanyang).

Select "CAN" engine in the main menu.

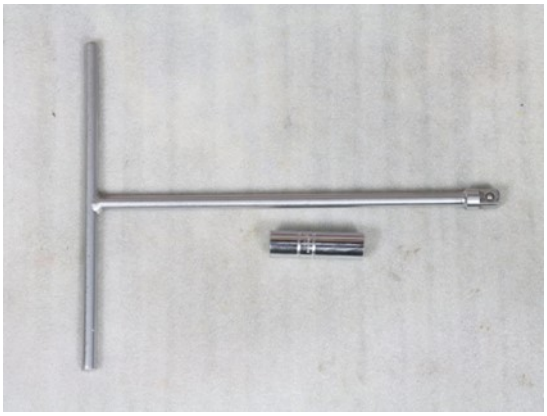
Select the "Detect Output" feature from the menu item.



The self-diagnostic device reads whether the ignition of the main and secondary spark plugs is normal to check the spark plugs



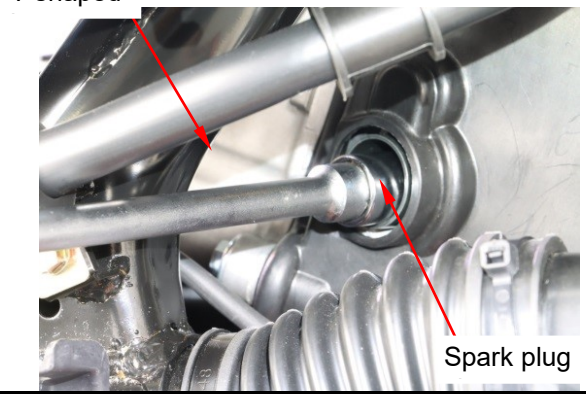
Remove the secondary spark plugs
Secondary spark plug removal tools
T-shaped lever, spark plug sleeve



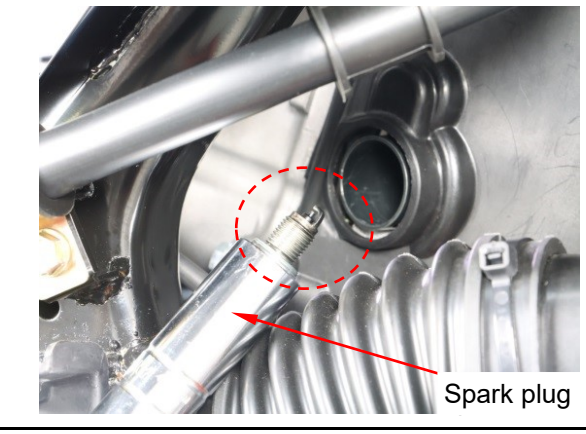
Remove the central guard cover and the left cover

Insert your left hand through the central cover.
Hold the spark plug cap butterfly piece with your fingers to remove the spark plug cap.

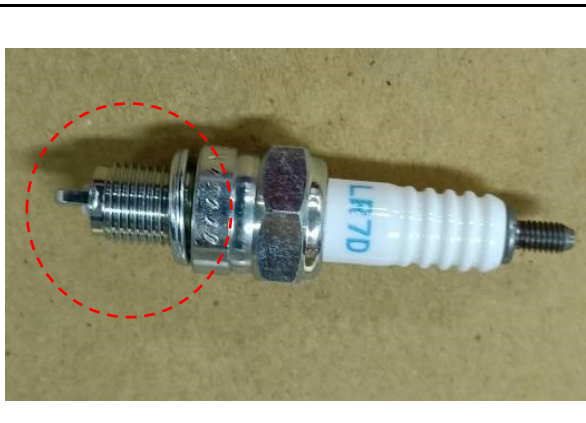
Use a T-shaped lever and a spark plug sleeve



Remove the spark plug and check for oil stains and carbon deposits.



Remove the secondary spark plug to check for oil stains/carbon deposits on the head, and replace the spark plug sleeve O-ring if there are any issues



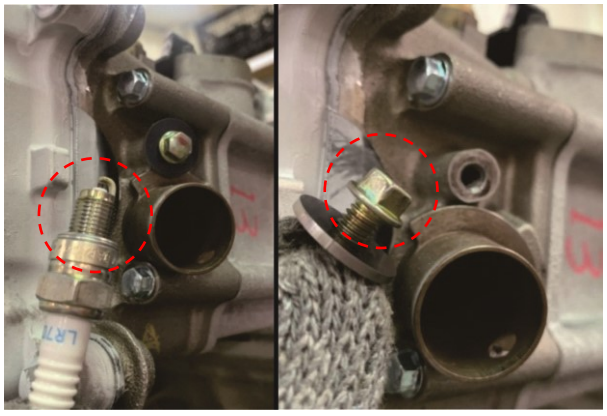
Disassembly and assembly of the secondary spark plug sleeve

Secondary spark plug sleeve repair manual

Remove the engine and the left cylinder guard.

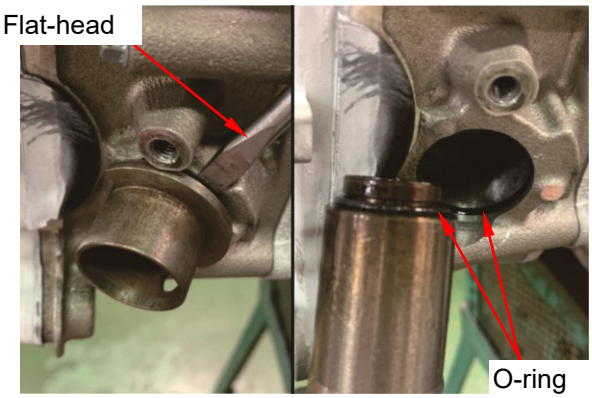
Remove the secondary spark plug and check for oil stains/carbon deposits on the head.

Secondary spark plug sleeve fixing screws.



Dig open the secondary spark plug sleeve with a flat-head screwdriver and remove the O-ring.

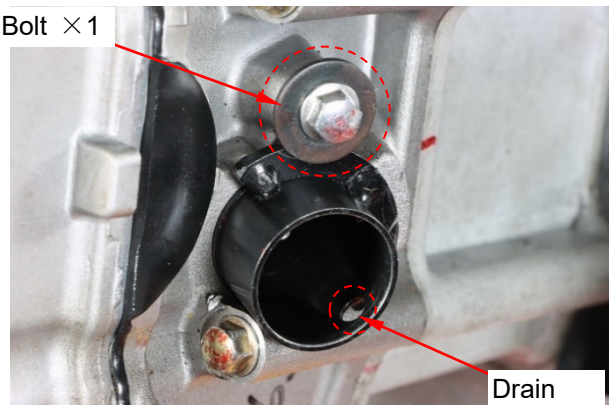
Replace with a new O-ring.

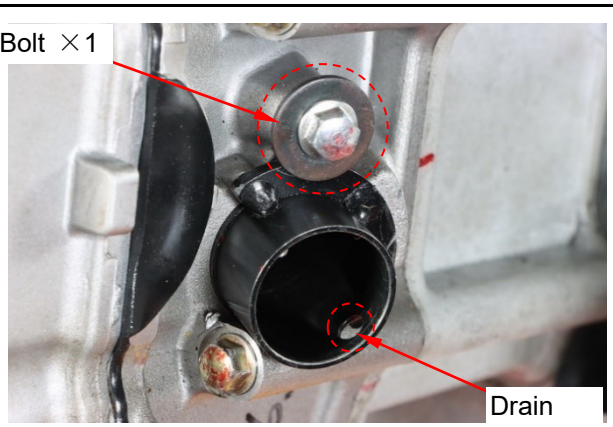


Assemble the pair spark plug sleeve and lock the fixing bolts and gaskets.

⚠ Note

- The drain hole of the secondary spark plug sleeve must face down.

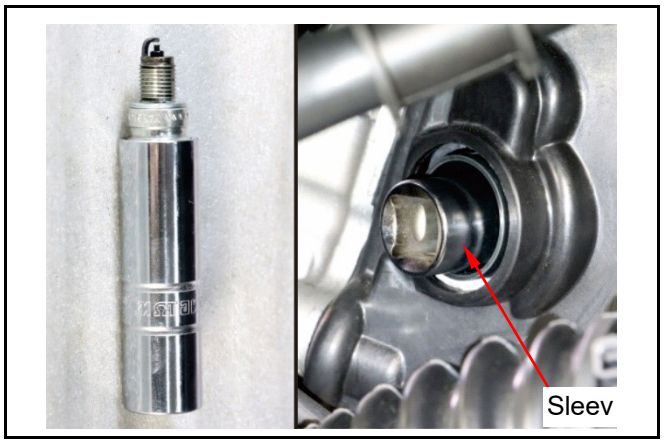




Spark plug assembly

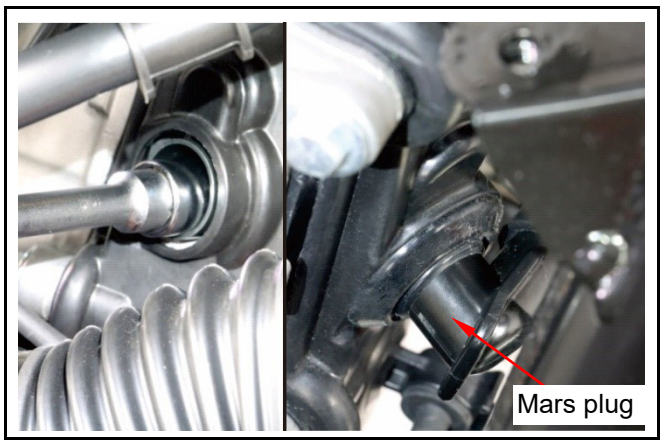
Combine the spark plug with a dedicated set for the spark plug.

Assemble the spark plug and first lock in the fake pair by hand.



Use the T-shaped lever to lock the spark plug.

Push the spark plug cap all the way in so that the spark plug umbrella part fits tightly with the secondary spark plug sleeve



Start system

Start relay check

Turn on the main switch.

Pull the brake lever and press the start switch.

If you hear a click, it indicates that the relay is functioning properly.

Start the relay coil to check.

Use a line inspector to check the coil.

The black measuring wire of the inspector is connected to the negative terminal of the battery, and the red wire is connected to the black wire at the motor end of the relay.

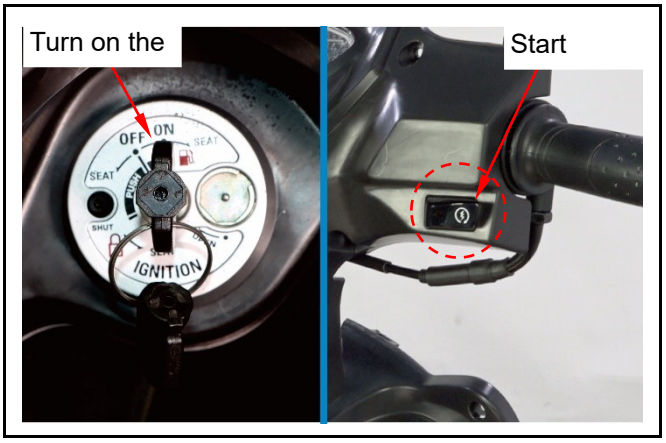
Set the inspector selector switch to the DVC position.

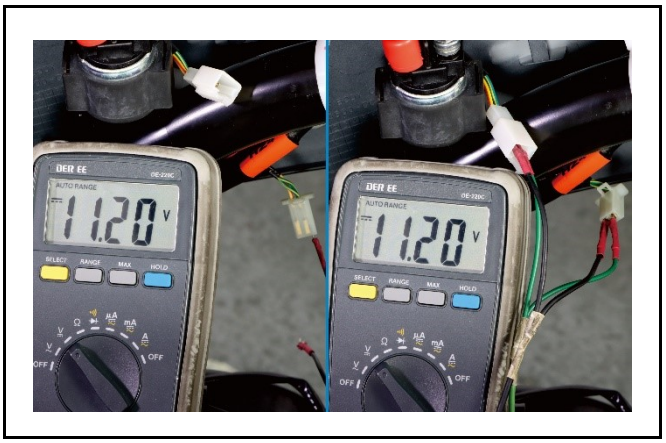
Turn on the main switch, pull the brake and press the start switch to measure the battery voltage, then it can be determined that the start relay coil is normal.

Check the small end of the start relay coil

Connect the black wire of the electricity meter (negative terminal) to the negative terminal of the battery, the red wire of the electricity meter (positive terminal), start the green/red wire of the relay coil, pull the brake switch, and the battery voltage can be measured.

The battery voltage can be measured by pulling the brake switch and pressing the start switch on the red line (positive terminal) of the electricity meter.





Start motor disassemble

Remove the left cover (screw ×3).

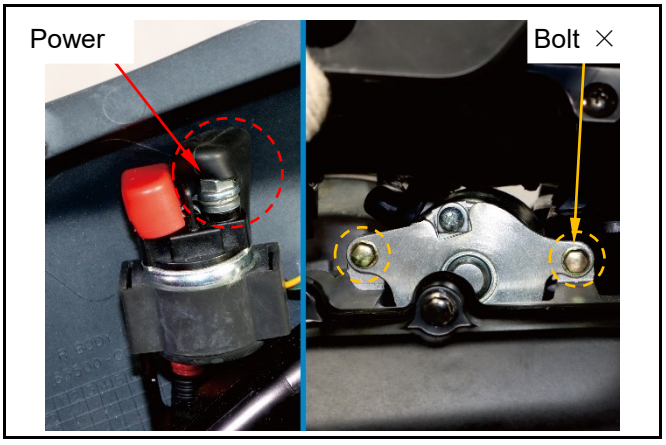
Remove the air filter fixing bolts (bolts ×2).

First, disconnect the negative terminal (-) of the battery, and then disconnect the positive terminal (+) for wiring.

Remove the suitcase.

Remove the starter motor power cord from the starter relay.

Remove the starter motor connection bolt and the motor ground wire (bolt ×2).



Starter motor installation

Install the starter motor and its components in the reverse order of disassembly.

Instrument

Disassembly

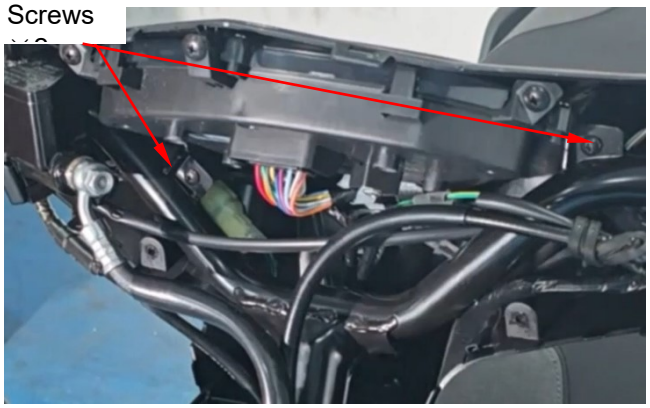
Remove the front cover of the steering handle (refer to Chapter 12).

Remove the front baffle (see Chapter 12).

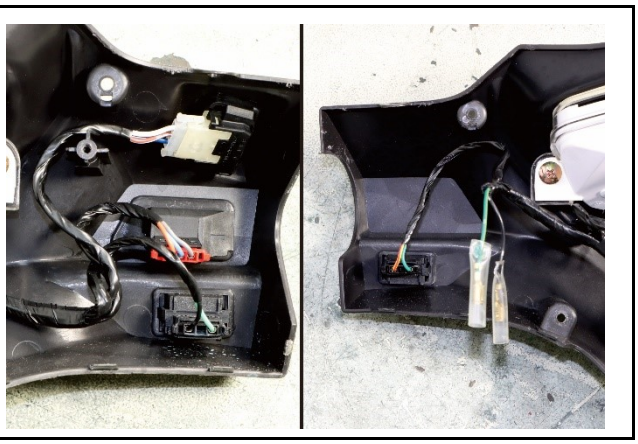
Remove the instrument power cord

Remove the switch connectors on both sides.

Remove the rear cover of the direction handle (see Chapter 12).

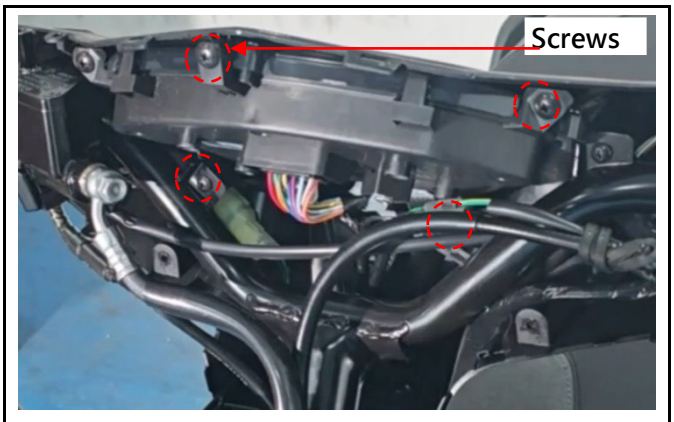


Remove the left and right switch plugs of the handle.



Remove the dashboard fixing screws (screws ×4)

Remove the instrument panel.



Installation

Install in the reverse order of disassembly.

Switch/Horn

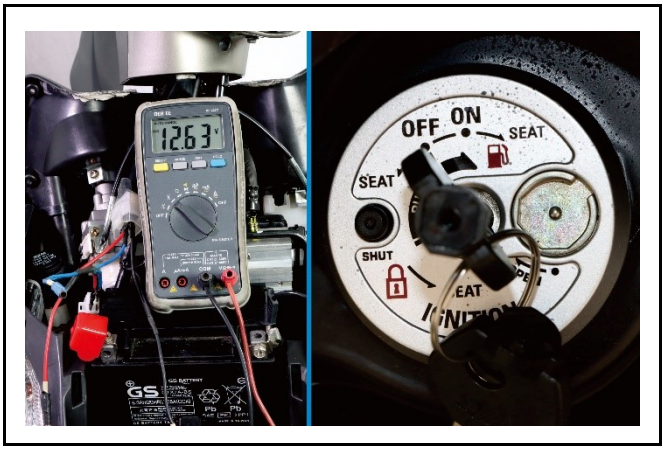
Main switch

"Check

Remove the front panel (see Chapter 12 for details).

Check the path of the inter-table connection terminals below.

	BAT3	BAT2	BAT1
LOCK			
OFF			
ON	●	●	●
線色	黑	黑	紅



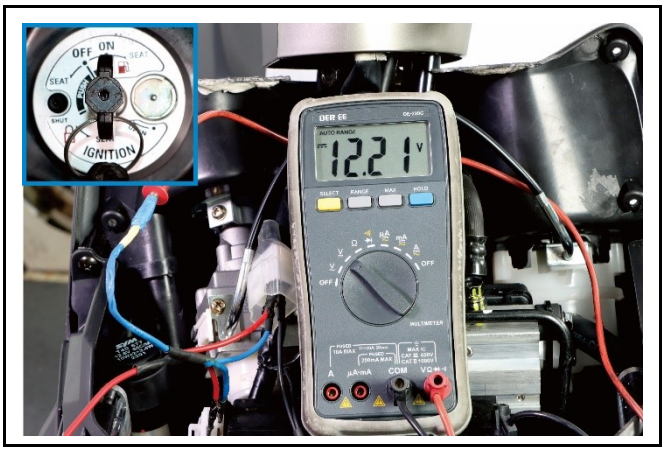
Unplug the main switch power supply connector and measure the red wire to confirm that there is battery voltage.

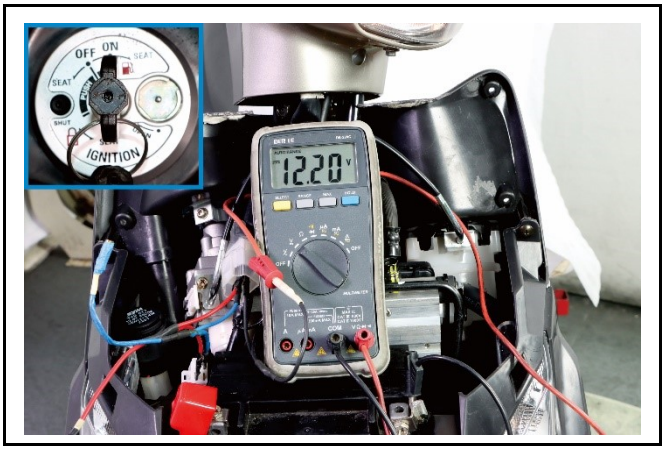
Connect the red wire to conduct it.

Connect the red wire (positive terminal) of the meter to the black wire of the main switch.

The black wire (negative) of the electricity meter is connected to ground.

Set the meter to DCV, turn on the main switch, and you should be able to measure the battery voltage.



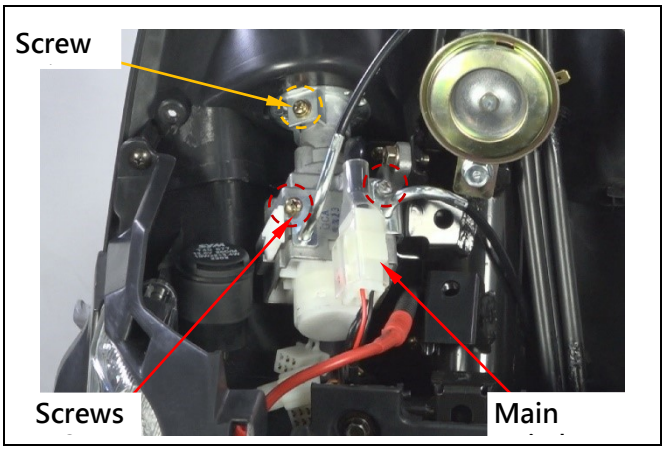


Replace:

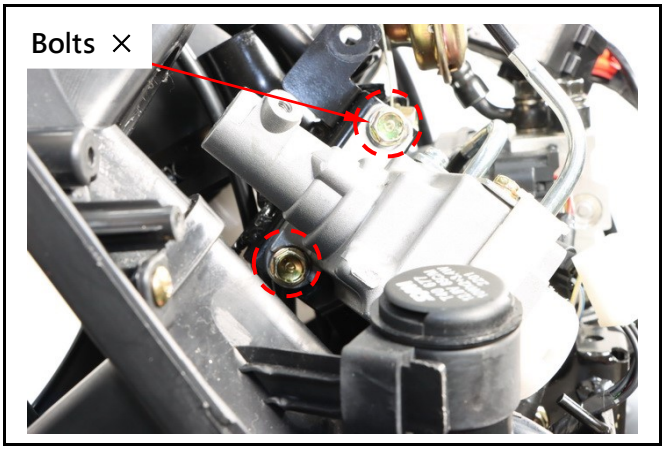
Remove the main switch cover fixing screws (screws ×2)

Remove the open tank wire and seat lock wire fixing screws (screw ×2)

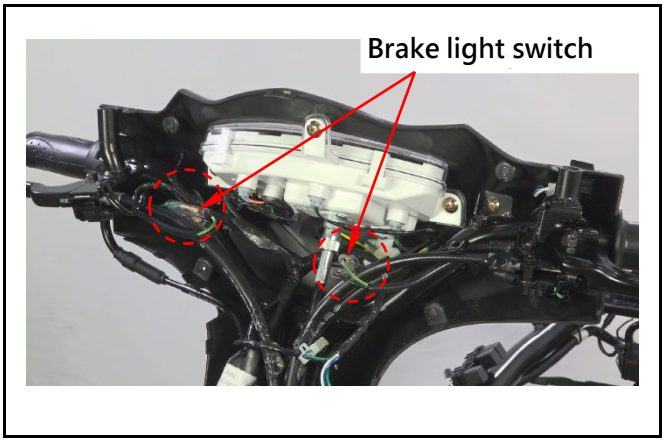
Remove the main switch connector.



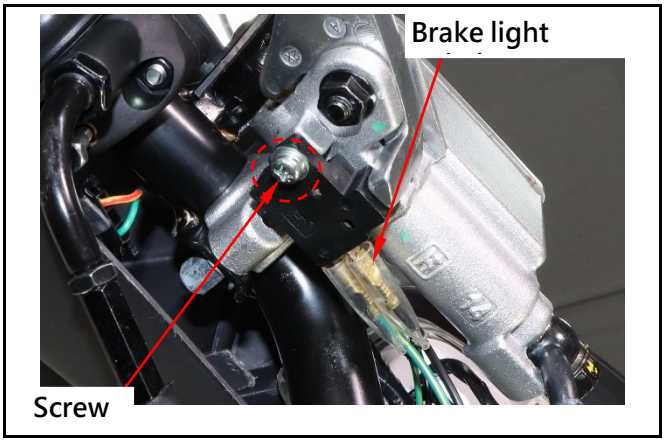
Remove the main switch line connectors and fixing bolts (bolts ×2).
Remove the wire cover and wires, and take off the cushion switch.
Replace the main switch.
Installation
Install in the reverse order of disassembly.



Brake light switch
When the front brake is held, it is normal for the black wire of the brake light switch to be in the path with the green/yellow wire.
Replace the switch with a new one if it is damaged.

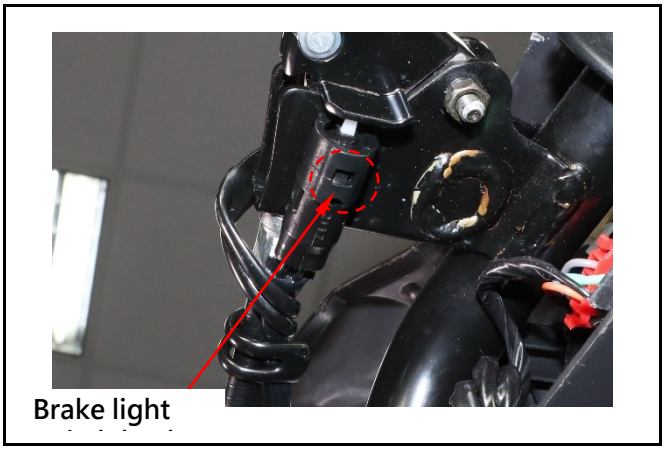


Replace the brake light switch
Front brake disc brake:
Remove the switch power cord.
Remove the locking screw of the front brake switch (screw ×1).
Remove the front brake switch



Front and rear brake drum brakes
Use a screwdriver to press the brake light switch latch.
Remove the brake light switch.

Installation
Install in the reverse order of disassembly.
After installation, confirm whether the switch operates normally?



Direction handle switch

Check the path of the inter-meter connection terminals below.

High and low beam switches

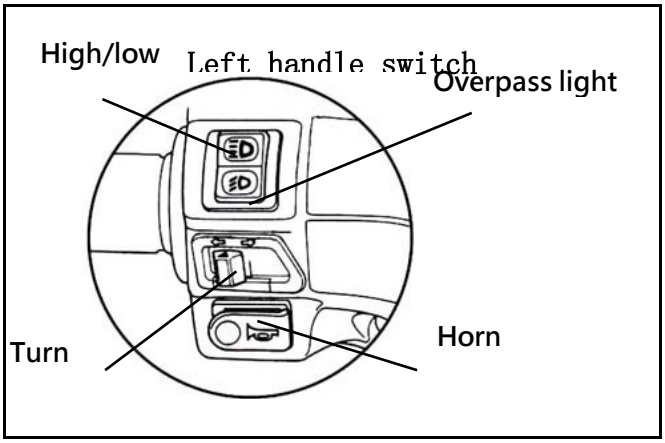
	HI	LO	HL
		●	●
	●		●
線色	藍	白	棕/白

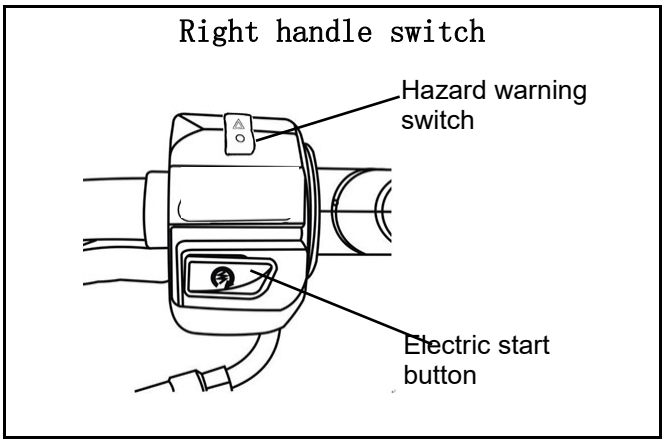
Turn signal switch

		R	WR	L
		●	●	
N	FROM R	●	●	
	PUSH OFF			
	FROM		●	●
			●	●
線色		淺藍	灰	橘

Horn switch

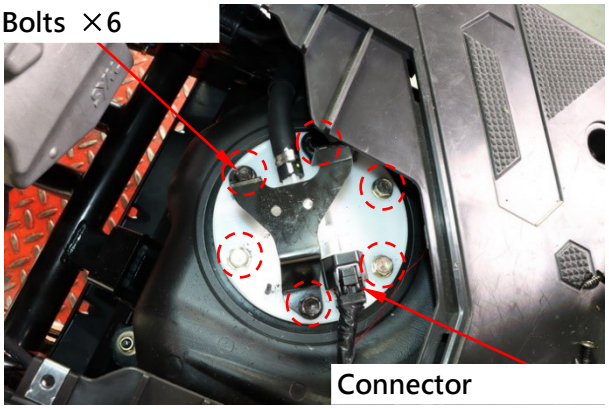
	BAT	HO
FREE		
	●	●
線色	黑	淺綠





Fuel gauge

Fuel tank disassembly (see Chapter 4)
Remove the body cover, the front cargo box, the central guard cover and the footrests.
Disassemble the fuel pump and fuel gauge wiring connectors.
Remove the fuel pump (bolt ×6).



⚠ Note Note

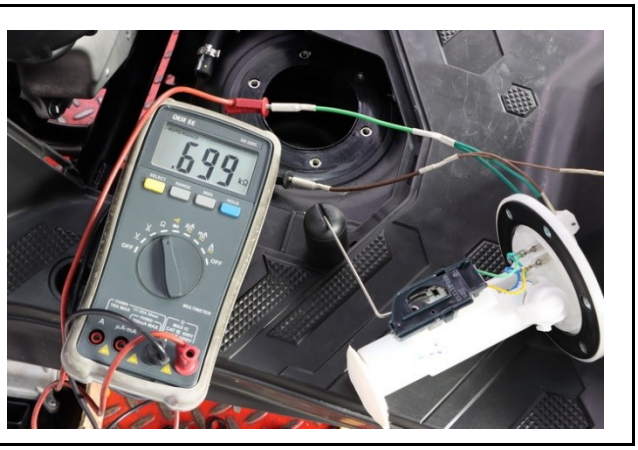
- Do not damage or bend the float arm when removing it.

Connect the fuel gauge wiring connector to the main wiring.
Turn the main switch to the "ON" position.
Move the float arm up and down to check if the stopwatch fuel gauge pointer is in the correct position.

Float arm position	Pointer position
Up (full)	F(Full
Down (empty)	E(blank)

⚠ Note Note

- Before conducting the test, turn on the turn signal first to make sure the battery is functioning properly.



When the float arm is in full (F) and empty (E) positions, the resistance values are as follows:

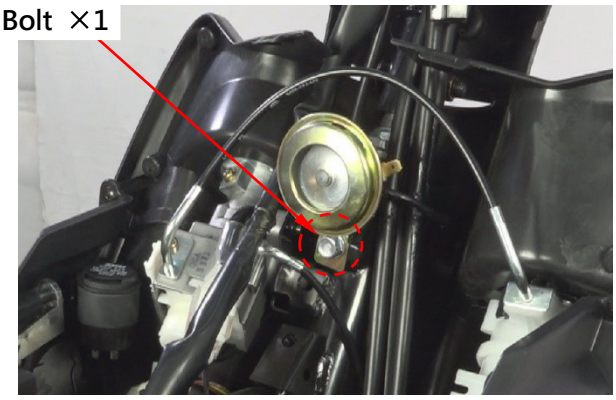
Float arm position	Resistance value
E (empty)	Ω 788 ~ 818
F (full)	Ω 95 ~ 105

The flame residue time of single spark plug ignition combustion is longer, while that of double spark plug ignition combustion is shorter. Therefore, it can improve thermal efficiency and reduce pollution

Horn

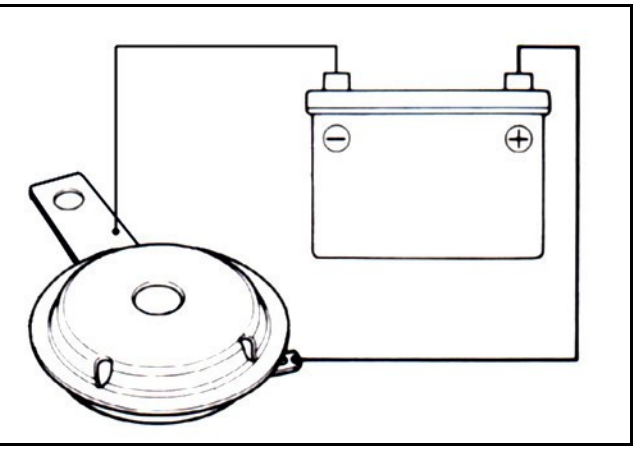
Remove the front hood.

Disassemble the horn power connector and remove the horn (bolt ×1).

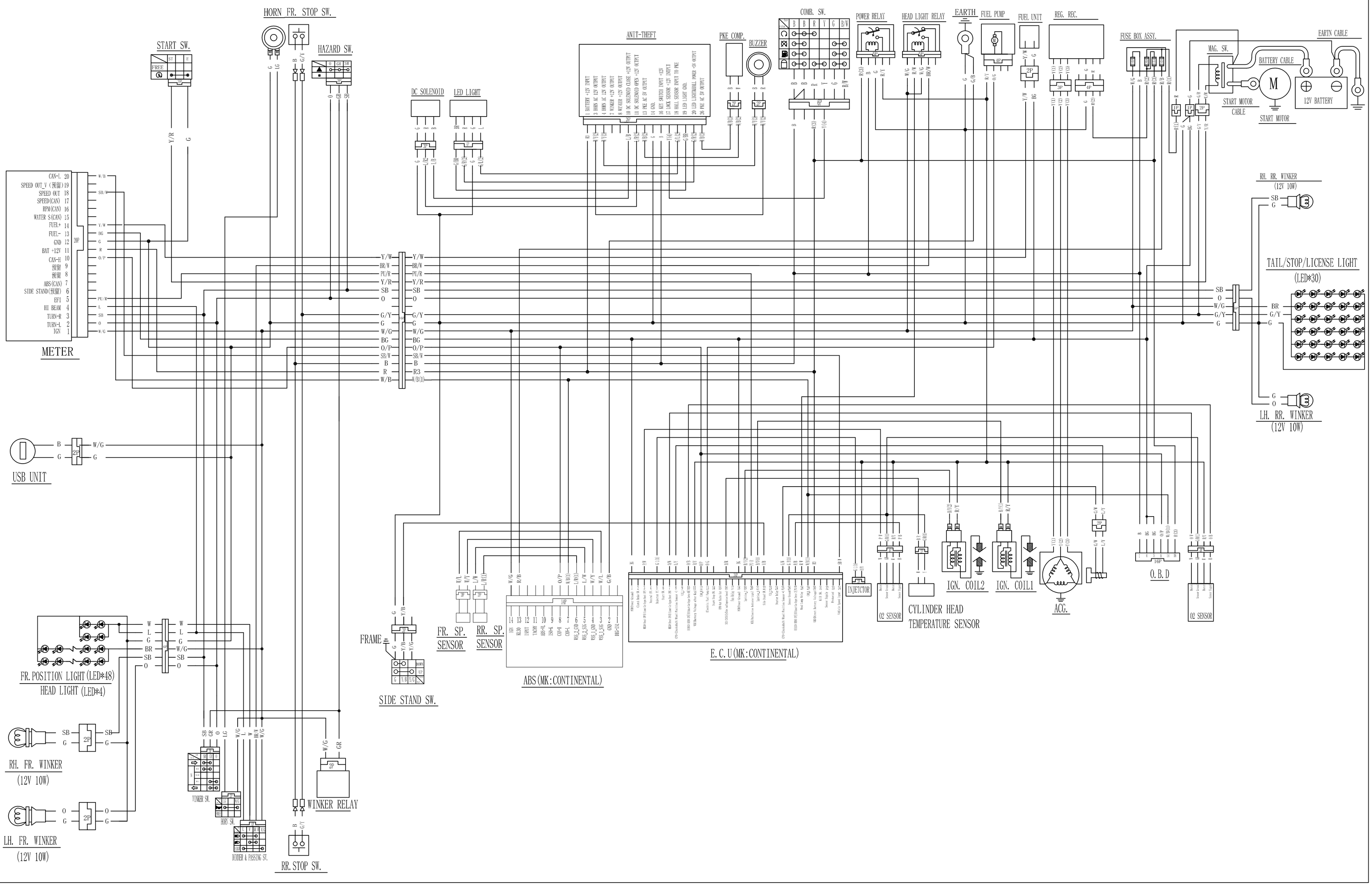


Connect the positive terminal (+) of the 12V DC power supply to the horn terminal and the negative terminal (-) of the battery to the horn ground, and the horn will sound.

Replace with a new one if necessary.



FDA12U1CN-EU(ZF2) ELEC. DISTRIBUTION



KEYLESS DESCRIPTION ..... 18-1 | KEYLESS MACTHING 18-5

KEYLESS DESCRIPTION

1. Set security ： When motorcycle ignition lock is off

Sound and light warning ：Press the remote control once, the horn will sound a warning tone, the direction light will flash once, and the lock will be locked. After 3 seconds, it will enter the sound and light warning state.

Silent alert：Press the mute key of the remote control once, the horn will sound, the direction light will flash once, the lock will be locked, and it will enter the silent alert state after 3 seconds

2. Remove anti-theft and automatic recovery alert

Press the release key of the remote control, the horn will sound twice, the direction light will flash twice, the lock will be unlocked, and the alert will be released. (Normal unlocking)
If the main switch is not turned on or the vehicle does not sense vibration within 20 seconds, the alarm system will be regarded as false release and will automatically return to the original anti-theft alert state。(silent alert or sound and light waning) (If you press the unlock key by mistake, it will be locked automatically)

careful ：Press the release key twice in 2 seconds to completely release the alarm, and it will not automatically return to the alert state.

3. Alert not set

In the released state: stop and turn off the engine (turn off the main switch). 20 seconds automatic locking and enter silent alert. (If you forget to lock the engine, you will give an alarm)

4. Main switch emergency alarm

In the anti-theft alert state: When the switch lock (main switch on) is forced to turn without unlocking, the direction light will flash synchronously. You can press the remote control release key or turn off the switch lock to stop the alarm. (This operation is regarded as prying lock, so alarm is given)

Careful: When leaving the vehicle, make sure that the main switch is turned to "lock" and lock the direction handle

5. Automatic lock

When the main switch is off ：When the main switch is turned from off to lock, the lock will be locked automatically after one second, and then it will enter the sound and light warning state after three seconds. (The handle locks automatically)

In lock state：Press the release key of the remote control once, and if it does not exit lock within 15 seconds, it will automatically return to the alert state.(If you press the unlock key by mistake, it will lock automatically) .In lock state , Press the release key twice in 2 seconds. If it cannot be removed completely, it will automatically return to the original anti-theft alert state

(sound and light warning state or silent alert state)

In the released state, When the main switch is turned from off to lock，and it will lock automatically after 15 seconds ,and enter the silent alert state，Press the release key twice in 2 seconds to completely release the alarm, and it will not automatically return to the alert state.

6.Malicious operation of solenoid valve protection

In 10 seconds, if the solenoid valve is operated continuously for 10 times（The 10th forced lock and silent alert），it is judged as malicious operation, and the system will automatically protect it.

In the protection state, press the remote control host to respond normally, but the lock solenoid valve does not respond (does not act). After 15 seconds, it will automatically exit the solenoid valve protection and return to normal.

7. Alarm pause

When the vehicle is in the vibration alarm state: the alarm can be suspended by short pressing the fortification key, release key or mute key, and the original fortification state remains unchanged. (Press any key to remove the alarm without changing the alarm state)

8. Alarm mode（for first level smart lock）

trigger / Alert state	First vibration trigger	Vibrate again in 15 seconds
sound and light warning state	alarm three times	Acousto-optic alarm for 15 seconds (after 8 consecutive cycles, enter the sound and light warning state)
silent alert state	No alarm	No alarm

state	LED status
Fortification	Flash 4 times every 1.5 seconds, and turn off after 5 seconds
relieve	Flash once every 1 second and turn off after 5 seconds
Main switch ON	Normally on for 5 seconds and then off
alarm	Flashing with alarm

10：SPECIFICATION

Working voltage: 12V　2.Static current: average≤ 3.5ma　3.Working current: ≤ 600mA　4. Modulation mode: ASK
Working voltage of remote control: 3V　6. Horn sound level: 90-115db　7. Working frequency: 433.92mhz

11. PKE UNLOCK

On alert: When the main switch is turned from off to lock，Press the PKE wake-up key of the lock handle (or when the body vibration is detected) to wake up PKE, When the remote control is within 1m-3m, the lock is unlocked and the alert is released. Press the PKE wake-up key of the lock handle (or when body vibration is detected) at off gear. If ACC is not opened within 20 seconds after PKE unlocking, it will automatically return to the original anti-theft alert state (sound light alert or silent alert).Press the PKE wake-up key of the lock handle in lock gear (or detect the vibration of the car body). If the PKE does not exit the lock gear within 15 seconds after unlocking, it will automatically return to the original anti-theft alert state (sound light alert or silent alert)。After lock is pressed and PKE wake-up key (or when body vibration is detected), PKE will turn to off after unlocking, and lock automatically for 15 seconds, enter silent warning, and press release key twice in 2 seconds in 2 seconds to completely release.

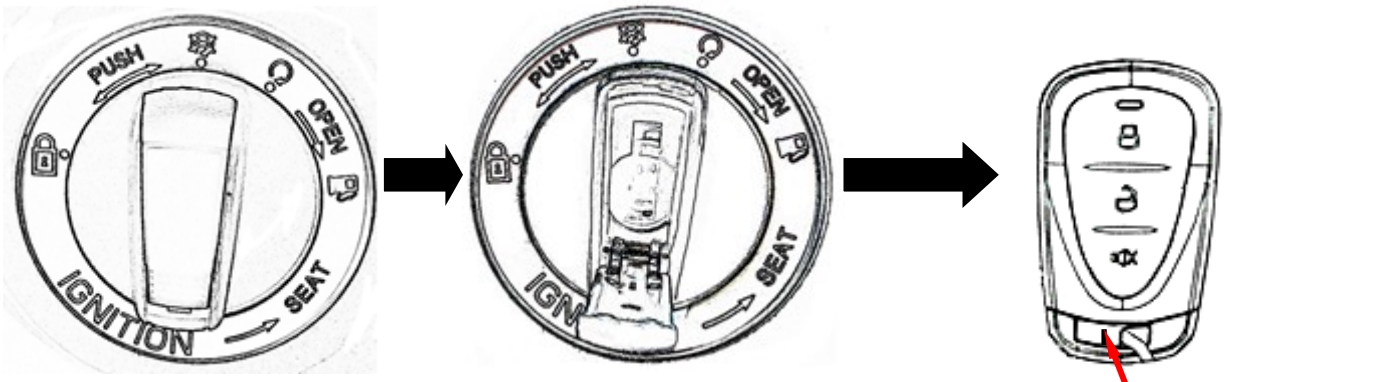
12. IMMO Induction unlocking

On alert: When the main switch is turned from off to lock, After pressing the PKE wake-up key of the lock handle, the back of the remote control will be within 1cm of the sensing area of the IMMO antenna within 10 seconds to automatically unlock. IMMO. If the sensor is still in lock or off after unlocking, it will automatically return to the original anti-theft alert state（sound light alert or silent alert）（When the remote control battery is too low to use, you can use this function to unlock）

13. Malicious operation of PKE protection

After continuously pressing the PKE wake-up key for 10 times within 15 seconds (the 10th time of forced locking and entering，the silent alert), it is determined as malicious operation, and the system automatically enters the PKE protection state for 15seconds. In the protection state, press the remote control host to respond normally, but the lock operation and PKE function are invalid. After 15 seconds, it will automatically exit the protection and return to normal.

14.If the intelligent lock cannot be released under abnormal conditions, please turn on the switch and release it with the key.



Smart key(remove the key after pressing the switch)

18. KEYLESS

CAUTION：

1. When using the spare key, insert and remove the key in the same gear。
2. When leaving the vehicle, make sure that the main switch is turned to "lock"
3. Please keep the spare key "key code" aluminum plate properly. If the key is lost, you can order a new spare key from the dealer with the "key code". If the key is not available, it may cause your car to fail to start.
4. Ensure the battery capacity≥ 8ah.
5. If the vehicle is not riding for a long time, the battery must be disconnected and the battery should be charged and maintained every month.
6. The effective distance of the remote control button must be more than or equal to 20 meters. Please avoid touching the remote controller within the effective distance to unlock the vehicle.
7. When the operating distance of the remote control is less than 10 meters, pay attention to replace the built-in battery of the remote control, and the battery specification must be consistent with sym factory specification.
8. Pay attention not to install other electronic components not approved by SCN, so as to avoid frequent abnormal power loss of vehicle battery.
9. Please do not directly expose the remote controller to the sun and rain.
10. In noisy and vibration environment, it is necessary to consider whether fortification is necessary to prevent battery power loss caused by long-time alarm.
11. The remote control battery is not in the three packs.
12. If the user disassembles the machine by himself or is damaged artificially, it is not covered by the warranty.

KEYLESS MACTHING

Second generation KEYLESS

1. After parking and turning off the engine in the released state, turn the ACC switch from ON to OFF. Within 10 seconds, turn the ACC from 0FF to 0N for 8 times continuously, and the last time it stops in the ON position, the horn will makes a sound of start to pairing, and the indicator light will remain on, it indicates that it has entered the pairing state.

2. After entering the pairing state, press the remote control unlock button briefly, the horn will make a sound once and the indicator light flashes a time every second, it indicates the first remote control is paired successful. Press the second remote control unlock button briefly, and the horn will makes a sound twice, and the indicator light flashes twice every second, it indicates the second remote control is paired successful. After both remote controls are paired successfully, turn off ACC to save and exit. When both remote controls are paired successfully, it will save and exit after 5 seconds automatically.

★Note: Each host is allowed to pair remote controls up to two at the same time. In the armed state, pairing is allowed by inserting a mechanical key, as described above.