

X-RIDE 125CC

SERVICE MANUAL

PREFACE

This manual covers the description of X-RIDE 125CC motorcycle and the inspection, maintenance and repair procedures of its main parts and components, excluding the other general common senses. The figures in this manual are only used for showing the basic operating principles and working processes and do not refer to any specific motorcycle.

This maintenance manual is meant to instruct the maintenance service personnel with competent knowledge and skills on motorcycle maintenance to inspect, adjust, repair and maintain Qingqi motorcycles.

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This manual contains the latest data, explanation, figures and specifications at the time of publication. Due to improvement or other changes, the description in this manual may be slightly different from the practical situation. The company reserves the right to modify any content at any time.

The product specifications and parameters may be modified at any time without prior notice!

The product configuration and accessories supply may be different at different countries and regions. Please consult the local distributors for details!

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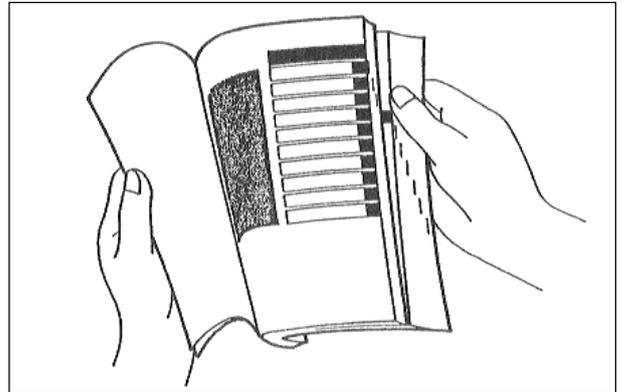
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HOW TO USE THIS MANUAL

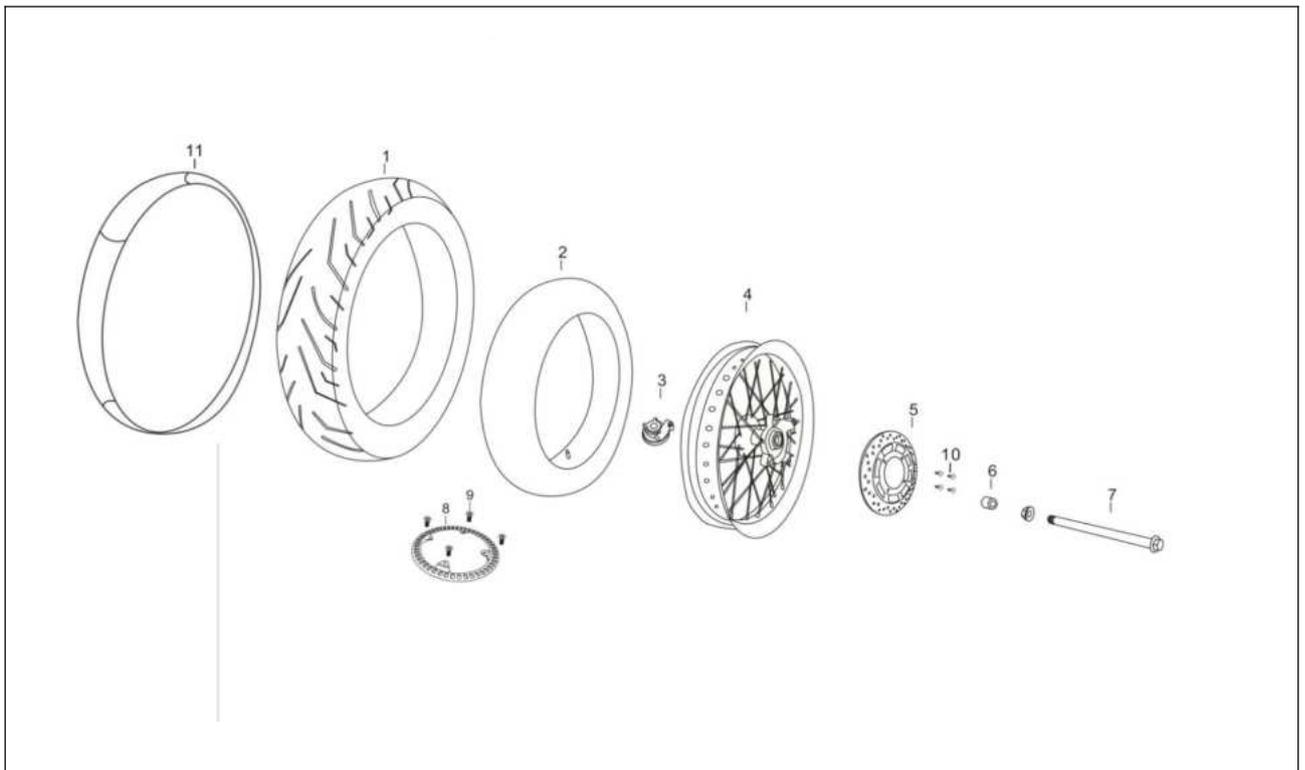
TO LOCATE WHAT YOU ARE LOOKING FOR :

1. The text of this manual is divided into sections.
2. As the title of these sections are listed on the previous page as GROUP INDEX, select the section where you are looking for.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. On the first page of each section, its contents are listed. Find the item and page you need.



COMPONENT PARTS

Example: Front wheel



SYMBOL

Listed in the table below are the symbols indicating instructions and other information necessary for servicing and meaning associated with them respectively.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque		Use fork oil.
	Apply oil. Use engine oil unless otherwise specified.		Apply THREAD LOCK.
	Apply SUPER GREASE "A".		Apply or use brake fluid.
	Apply SUPER GREASE "C".		Measure in voltage range.
	Apply GREASE.		Measure in resistance range.
	Apply SILICONE GREASE.		Measure in current range.
	Apply MOLY PASTE.		Measure in diode test range.
	Apply BOND "1215".		Measure in continuity test range.
	Apply THREAD LOCK "1324".		Use special tool.
	Apply GASKET BOND.		

ABBREVIATIONS USED IN THIS MANUAL

A			L		
	ABDC	: After Bottom Dead Center		LCD	: Liquid Crystal Display
	AC	: Alternating Current		LED	: Light Emitting Diode
	API	: American Petroleum Institute		LH	: Left Hand
	ATDC	: After Top Dead Center	M		
B				MAP&IAT Sensor	: Manifold absolute Pressure Sensor (MAPS)
	BBDC	: Before Bottom Dead Center			: Intake Air Temperature Sensor (IATS)
	BDC	: Bottom Dead Center		Max	: Maximum
	BTDC	: Before Top Dead Center		Min	: Minimum
C			O		
	CLT Sensor	: Coolant temperature sensor (CLTS)		O ₂ Sensor	: Oxygen Sensor (O ₂ S)
D			P		
	DC	: Direct Current		PV	: Purge control Valve
	DOHC	: Double Over Head Camshaft	R		
E				RH	: Right Hand
	ECU	: Engine Control Unit,	S		
		EI Control Unit EI		SAE	: Society of Automotive
	EI	: Electric fuel Injection,			Engineers
		Electric fuel Injector	T		
F				TDC	: Top Dead Center
	FP	: Fuel Pump		TP Sensor	: Throttle Position Sensor (TPS)
G			W		
	GP Switch	: Gear Position Switch		WT switch	: Water Temperature switch
I					
	IG	: Ignition			
	ISC Solenoid	: Idle Speed Control Solenoid			

WIRE COLOR

B	: Black	G	: Green	Pu	: Purple
Bl	: Blue	Gr	: Gray	R	: Red
Br	: Brown	Lg	: Light green	Sb	: Light blue
Db	: Dark brown	O	: Orange	W	: White
Dg	: Dark green	P	: Pink	Y	: Yellow

BBI	Black with Blue tracer	BBr	Black with Brown tracer
BG	Black with Green tracer	BGr	Black with Gray tracer
BO	Black with Orange tracer	BR	Black with Red tracer
BW	Black with White tracer	BY	Black with Yellow tracer
BIB	Blue with Black tracer	BIBr	Blue with Brown tracer
BIG	Blue with Green tracer	BIGr	Blue with Gray tracer
BIO	Blue with Orange tracer	BIR	Blue with Red tracer
BIW	Blue with White tracer	BIY	Blue with Yellow tracer
BrB	Brown with Black tracer	BrBl	Brown with Blue tracer
BrG	Brown with Green tracer	BrR	Brown with Red tracer
BrW	Brown with White tracer	BrY	Brown with Yellow tracer
GB	Green with Black tracer	GBl	Green with Blue tracer
GBr	Green with Brown tracer	GGr	Green with Gray tracer
GO	Green with Orange tracer	GP	Green with Pink tracer
GPu	Green with Purple tracer	GR	Green with Red tracer
GW	Green with White tracer	GY	Green with Yellow tracer
GrB	Gray with Black tracer	GrBl	Gray with Blue tracer
GrBr	Gray with Brown tracer	GrG	Gray with Green tracer
GrO	Gray with Orange tracer	GrR	Gray with Red tracer

LgR	Light green with Red tracer	OB	Orange with Black tracer
OBI	Orange with Blue tracer	OG	Orange with Green tracer
OR	Orange with Red tracer	OW	Orange with White tracer
PBI	Pink with Blue tracer	PG	Pink with Green tracer
PuB	Purple with Black tracer	PuBI	Purple with Blue tracer
PuBr	Purple with Brown tracer	PuG	Purple with Green tracer
PuW	Purple with White tracer	PuY	Purple with Yellow tracer
RB	Red with Black tracer	RG	Green with Black tracer
RW	Red with White tracer	WB	White with Black tracer
WBr	White with Brown tracer	WG	White with Green tracer
YB	Yellow with Black tracer	YBI	Yellow with Blue tracer
YG	Yellow with Green tracer	YGr	Yellow with Gray tracer
YR	Yellow with Red tracer	YW	Yellow with White tracer

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INFORMATION LABELS

WARNING / CAUTION / NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

WARNING

Indicates a potential hazard that could result in death or injury.

CAUTION

Indicates a potential hazard that could result in vehicle damage.

NOTE

Indicates special information to make maintenance easier or instructions cleaner.

Please note, however, that the warning and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the motorcycle. In addition to the WARNING and CAUTION stated, you must use good judgment and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

GENERAL PRECAUTIONS** WARNING**

- Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the vehicle.
- When 2 or more persons work together, pay attention to the safety of each other.
- When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.
- When working with toxic or flammable materials, make sure that the area you work in is well-ventilated and that you follow all of the material manufacturer's instructions.
- Never use gasoline as a cleaning solvent.
- To avoid getting burned, do not touch the engine, engine oil or exhaust system during or for a while after engine operation.
- After servicing fuel, oil, exhaust or brake systems, check all lines and fittings related to the system for leaks.

 CAUTION

- If parts replacement is necessary, replace the parts with Genuine Parts or their equivalent.
- When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
- Be sure to use special tools when instructed.
- Make sure that all parts used in reassembly are clean, and also lubricated when specified.
- When use of a certain type of lubricant, bond, or sealant is specified, be sure to use the specified type.
- When removing the battery, disconnect the negative cable first and then positive cable. When reconnecting the battery, connect the positive cable first and then negative cable, and replace the terminal cover on the positive terminal.
- When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative cable at the battery.
- Tighten cylinder head and case bolts and nuts, beginning with larger diameter and ending with smaller diameter, from inside to outside diagonally, to the specified tightening torque.
- Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, cotter pins, circlips, and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any leftover material from the mating surfaces.
- Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted. Do not use self-locking nuts a few times over.
- Use a torque wrench to tighten fasteners to the torque values when specified. Wipe off grease or oil if a thread is smeared with them.
- After reassembly, check parts for tightness and operation.
- To protect environment, do not unlawfully dispose of used motor oil and other fluids: batteries, and tires.
- To protect Earth's natural resources, properly dispose of used vehicles and parts.

EXTERIOR PHOTOGRAPH



NOTE

Difference between photographs and actual motorcycles depends on the markets.

Section 4 Function Of EI Sensor

★ ECU (Engine Control Unit, EI Control Unit) ECU

ECU decide the fuel injection volume and ignition time to adjust the fuel injector opening and closing rate which is considered the engine speed, intake air pressure, intake air volume, engine temperature, oxygen volume and throttle opening angle, etc.

★ EI (Electric fuel Injector) EI

EI spray the fuel to intake pipe by ECU's injection signal.

Fuel which is needed combustion in the combustion chamber is supplied from the fuel tank.

★ GP Switch (Gear Position Switch)

GP switch is used when start / stop and control ECU as the converted electrical signal of the gear position is supplied ECU.

★ MAP & IAT Sensor (Manifold absolute Pressure & Intake Air Temperature Sensor):

MAP sensor measure the pressure which is generated from the intake pipe and compare with the provided absolute pressure, then analogize the air volume indirectly and help to work the fuel injector properly. :

IAT sensor perceive the atmospheric temperature and is located the throttle body.

★ TP Sensor (Throttle Position Sensor) :

TP sensor detect the throttle opening angle and is located the throttle body.

It decide the fuel injection volume and compensate the ignition time as in middle acceleration · deceleration condition and throttle full opening etc. to ECU.

★ ISC solenoid (Idle Speed Control Solenoid)

ISC solenoid is interlocked with the throttle body, so ECU control the engine idle speed.

★ O₂ Sensor (Oxygen Sensor)

O₂ sensor measure the oxygen volume from the exhaust gas and convert the oxygen volume into voltage value, then communicate the output voltage to ECU.

★ CKP Sensor (Crankshaft Position Sensor)

CP Sensor perceive the front and rear cylinder's engine speed and realtime of piston position.

★ CLT Sensor (Coolant temperature sensor)

CLT Sensor measure the temperature of engine cylinder head, convert the temperature into resistance value, and then transmit the resistance value to ECU.

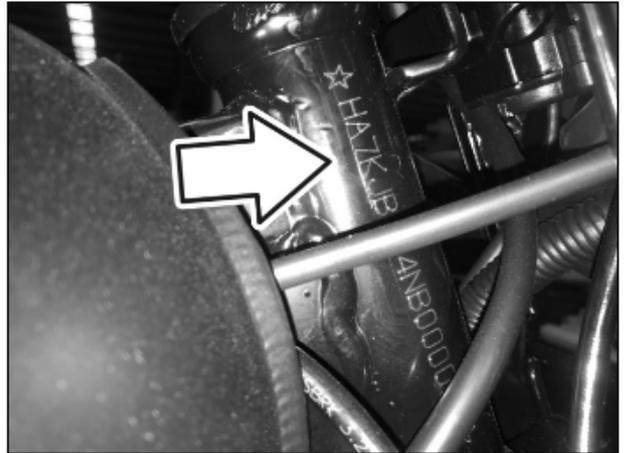
SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) is stamped on the steering head tube.

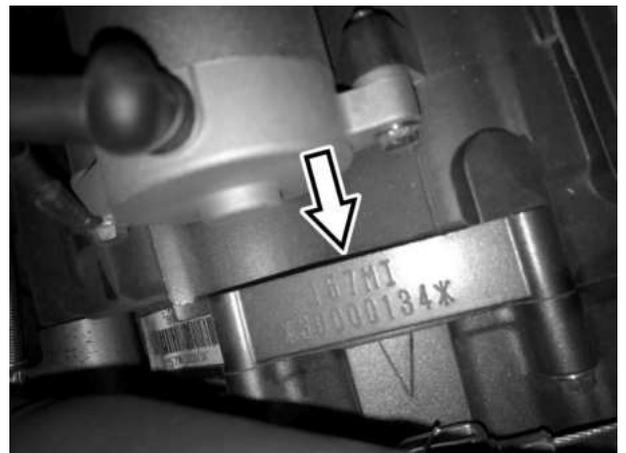
The engine serial number is located on the right up side of crank case assembly.

These numbers are required especially for registering the machine and ordering spare parts.

□ FRAME SERIALNUMBER



□ ENGINE SERIALNUMBER



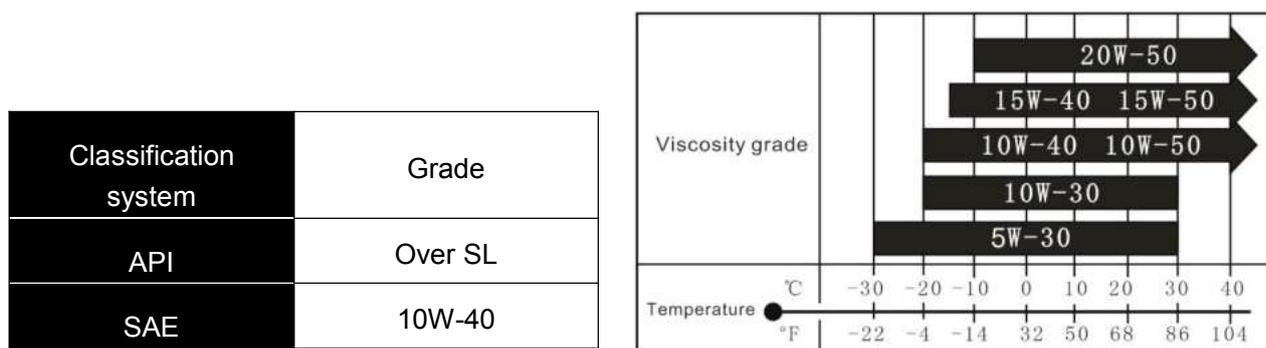
FUEL AND OIL RECOMMENDATIONS

FUEL

If you use ethanol gasoline, ethanol gasoline above E10-E5. Do not use gasoline containing methanol, Even if it contains latent solvents and preservatives, it cannot be used.

ENGINE OIL

ENGINE OIL SPECIFICATION



If an SAE 10W-40 motor oil is not available, select an alternative according to the right chart.

Use a premium quality 4-stroke motor oil to ensure longer service life of your motorcycle.

WARNING

- Don't mix the unrecommended oil. It could damage the engine.
- When refilling the oil tank, don't allow the dust to get inside.
- Mop the oil spill.
- Don't put the patch on the cap. It could disturb the oil to be provided and damage the engine.

BRAKE FLUID

Specification and classification: DOT4

WARNING

Since the brake system of this motorcycle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result. Do not use any brake fluid taken from old or used or unsealed containers. Never re-use brake fluid left over from a previous servicing, which has been stored for a long period.

□ ANTIFREEZE

Antifreeze selection:

1. Antifreeze must not be mixed using.
2. The freezing point of antifreeze is normally lower than the local minimum ambient temperature 5-10 degrees.
3. The boiling point of antifreeze is more than 107 ° C.

WARNING

This motorcycle engine is water cooling system. During motorcycle running, the antifreeze is high temperature and high pressure in the cooling system. So, it is strictly forbidden opening the radiator cap in this state, avoiding burn.

The antifreeze must be added in a timely manner and sufficient amount to prevent damaging the engine.

The antifreeze must be added after the engine is stopped and cooled.

WARNING

Antifreeze belongs to chemicals, which include toxic substances. If the antifreeze gets into your eyes or skin, wash with plenty of water immediately.

BREAK-IN PROCEDURES

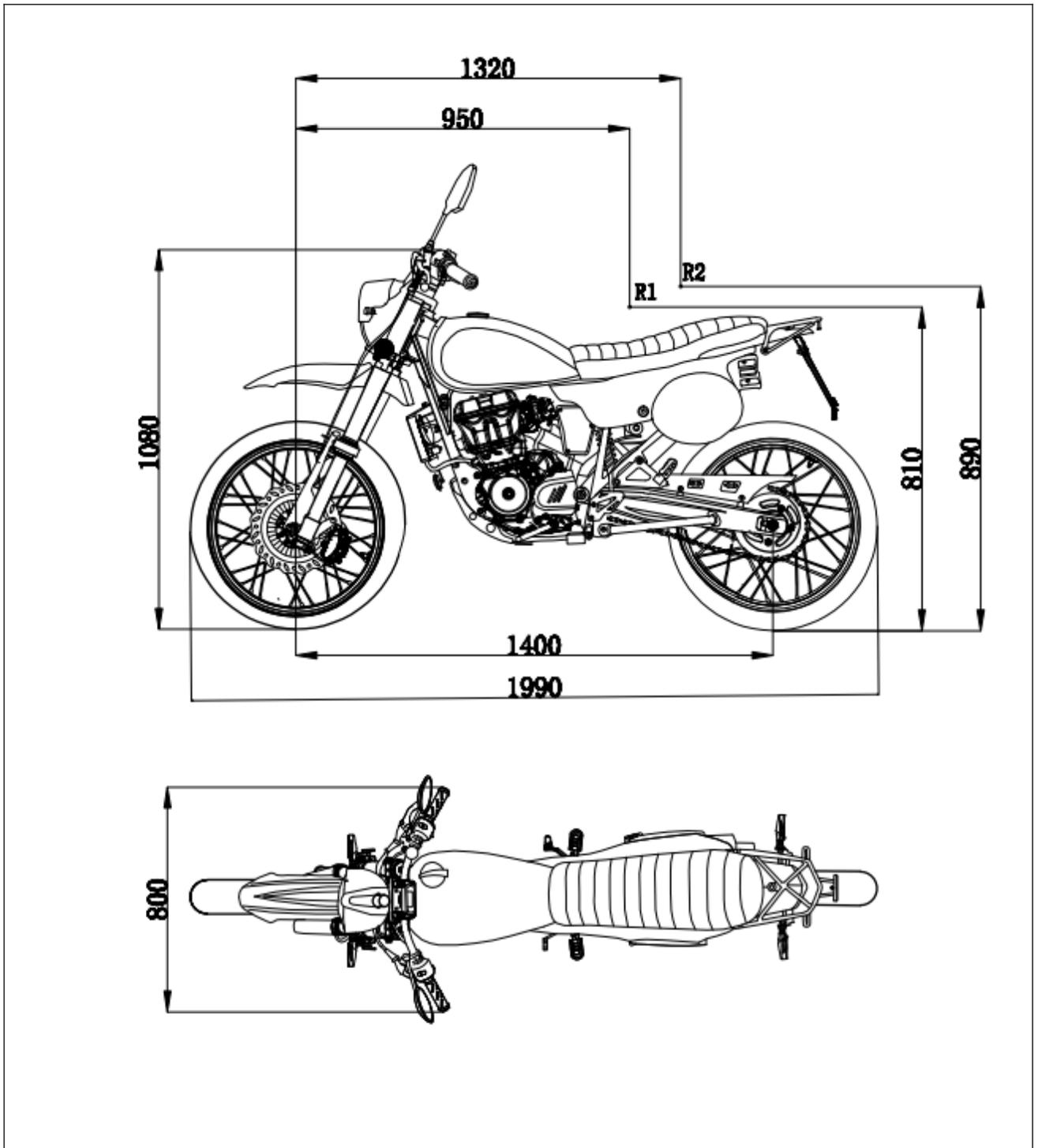
During manufacture only the best possible materials are used and all machined parts are finished to a very high standard but it is still necessary to allow the moving parts to BREAK-IN before subjecting the engine to maximum stresses. The future performance and reliability of the engine depends on the care and restraint exercised during its early life. The general rules are as follows:

- Keep to these break-in procedures:

Initial 800km	Less than 1/2 throttle
Up to 1,600km	Less than 3/4 throttle

- Upon reaching an odometer reading of 1,600km you can subject the motorcycle to full throttle operation.
- Do not maintain constant engine speed for an extended period during any portion of the break-in. Try to vary the throttle position.

EXTERIOR ILLUSTRATION



SPECIFICATIONS

⊙ DIMENSIONS AND MASS

ITEM	QM125-4Y
Overall length	1990 mm
Overall width	800 mm
Overall height	1080mm
Wheelbase	1400 mm
Minimum ground clearance	230 mm
Turning clearance circle diameter	5200mm
Overall mass	131 kg

⊙ ENGINE

ITEM分类	QM125-4Y
Type	Single cylinder,4-stroke,liquid cooling.
Bore	57.0 mm
Stroke	48.8 mm
Total displacement	124
Fuel system	#92 or higher unleaded gasoline
Starter system	Electric starter
Lubrication system	Pressure and splashing

⊙ TRANSMISSION

ITEM	QM125-4Y	
Clutch	Wet type normal pressure multi disc	
Transmission	Foot operated 6-gear transmission	
Primary reduction ratio	3.500	
Final stage reduction ratio	4.000	
Gear ratio	1st	3.000
	2nd	1.857
	3rd	1.368
	4th	1.143
	5th	0.957
	6th	0.840
Drive chain	428UO	

⊙ CHASSIS

ITEM	QM125-4Y
Front suspension	Spring oil damping
Rear suspension	Spring oil damping
Steering angle	39° (right & left)
Caster	29°
Front brake	Disk brake
Rear brake	Disk brake
Front tire size	110/70-17
Rear tire size	130/70-17

⊙ ELECTRICAL

ITEM	QM125-4Y	
Ignition type	Electromagnetic discharge	
Spark plug ^火	CR8E	
Battery		
Fuse	REC. REG/ IGN	15A
	ECU/ M. RELAY	15A
	Head light	15A
	ABS PUMP	25A
	ABS ECU	15A
	ABS IGN	5A
Head light specification	LED 12V 34.2W/24.3W/2.9W	
Turning light	LED 12V 2.2WX4	
Brake light / rear-position light	LED 12V 0.4W/0.1W	
Rear license plate lamp	LED 12V 0.1W	
Meter indicator light	LED 12V 2W	
Horn model	12V 1.5A 105-115dB(A)	

※LED:LightEmittingDiodeLED:

NOTE

The specifications are subject to change without notice.

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PERIODIC MAINTENANCE SCHEDULE

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy.

CAUTION

More frequent servicing should be performed on motorcycles that are used under severe conditions.

PERIODIC MAINTENANCE CHART

□ ENGINE

Item	Interval		
	Initial 1,000 km	Every 4,000 km	Every 8,000 km
Air cleaner element	Clean every 3,000 km Replace every 12,000 km		
Exhaust pipe nuts and muffler mounting bolts	Tighten	Tighten	—
Valve clearance adjust	Inspect	Inspect	—
Spark plug	Clean every 3,000 km Replace every 30000 km		
Fuel hose	Inspect	Inspect	—
	Replace every 4 years		
Engine oil filter	Replace	Replace	—
Engine oil	Replace	Replace	—
Throttle cable	Inspect	Inspect	—
Idle speed	Inspect	Inspect	—
Clutch	Inspect	Inspect	—
Antifreeze	Replace every 2 years		
Radiator hoses	—	Inspect	—
	Replace every 4 years		

▣ CHASSIS

Item \ Interval	Initial 1,000 km	Every 4,000 km	Every 8,000 km
Drive chain	Clean and lubricate every 1,000km		
Brake	Inspect	Inspect	—
Brake hose	Inspect	Inspect	—
	Replace every 4 years		
Brake fluid	Inspect	Inspect	—
	Replace every 2 years		
Tires	Inspect	Inspect	—
Steering	Inspect	Inspect	—
Front forks	—	Inspect	—
Rear suspension	—	Inspect	—
Chassis bolts and nuts	Tighten	Tighten	—

CAUTION

Using poor quality replacement parts can cause your motorcycle to wear more quickly and shorten its useful life.

Use only genuine replacement parts or their equivalent.

LUBRICATION POINTS

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle. Major lubrication points are indicated below.



○- Motor oil, G- Grease

①	Clutch lever holder	②	Passenger footrests pivot
③	Drive chain	④	Side stand pivot and spring hook
⑤	Footrests pivot	⑥	Brake lever holder
⑦	Throttle cable	⑧	Brake pedal pivot

NOTE

Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime. Lubricate exposed parts which are subject to rust, with either motor oil or grease whenever the motorcycle has been operated under wet or rainy condition.

MAINTENANCEPROCEDURES

This section describes the service procedure for each section of the periodic maintenance.

VALVE CLEARANCE

NOTE

Inspect Initial 1,000 km and Every 4,000 km.1,0004,000

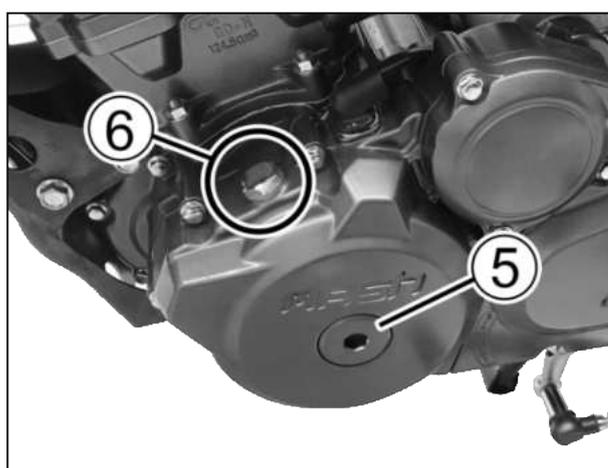
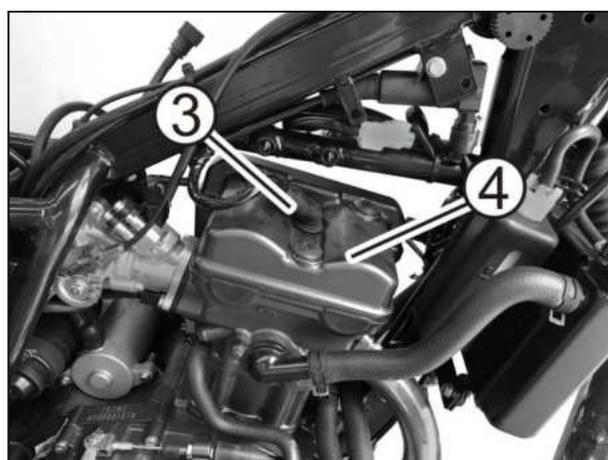
CAUTION

The clearance specification is for COLD state.

The valve clearance specification is different for intake and exhaust valves.

Valve clearance adjustment must be checked and adjusted, 1) at the time of periodic inspection, 2) when the valve mechanism is serviced, and 3) when the camshaft is disturbed by removing it for servicing.:

- ▣ Open the saddle switch lock and remove the saddle ①.,
- ▣ Remove the fuel tank ②. (Refer to page 5-2)
- ▣ Remove the spark plug③. (Refer to page 2-7)
- ▣ Remove the cylinder head cover④.
- ▣ Remove the magneto cover plug ⑤ and the timing inspection plug ⑥

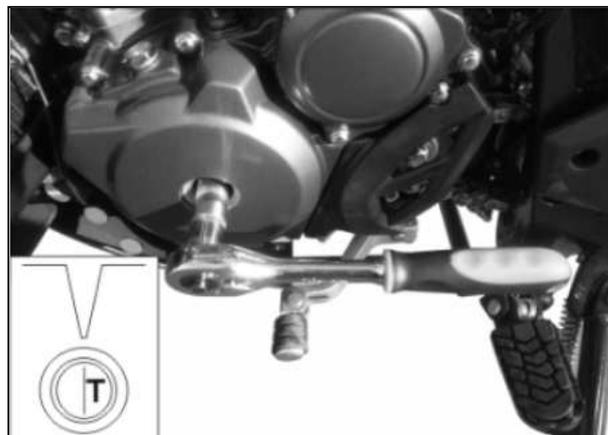


- Rotate the magneto rotor to set the front cylinder's piston at TDC (Top Dead Center) of the compression stroke.

(Rotate the rotor until "T" line on the rotor is aligned with the center of hole on the crankcase.

- To inspect the front cylinder's valve clearance, insert the thickness gauge to the clearance between the camshaft and the tappet.

Valve clearance (when cold)	
IN.	0.1~0.2mm
EX.	0.2~0.3mm



 **Thickness gauge :09900-20806**

 **: 09900-20806**

- If the clearance is out of specification, first remove the cam chain tensioner, camshaft housing, camshaft.

To install the tappet shim at original position, record the shim NO. head as the illustration.

Select the tappet that agree with tappet clearance (vertical line) and shim NO.(horizontal line) as refer to the tappet shim selection chart.

Adjust valve timing, install the camshaft housing and the tensioner.

After the crankshaft rotate about 10 times, measure the valve clearance.

If the clearance be not agree, adjust the standard clearance as the same manner above.



- ▢ In case that valve adjustment which there is no the tappet shim selection chart, please follow instructions of example in the below.

For example, the intake clearance is 0.4 and the shim is 170(1.70mm), select 195(1.95mm) of the shim which 170(1.70mm) of the shim add up the excess clearance 0.25 mm when adjust with the standard 0.15 as the intake standard clearance 0.1-0.2 mm.

 **CAUTION**

- ❖ **Valve clearance should be checked when the engine is cold.**
- ❖ **If you don't rotate the crankshaft about 10 times before measuring the valve clearance, there is no meaning of valve clearance.**

SPARK PLUG

NOTE

Clean Initial 1,000 km and Every 3,000 km,
Replace Every 30, 000 km.

- Disconnect the spark plug caps.
- Remove the spark plugs.

TYPE	SPARK PLUG SPECIFICATION
Hot type	CR7E
Standard type	CR8E
Cold type	CR9E

Remove the carbon deposit with wire or pin and adjust the spark plug gap to 0.7-0.8 mm, measuring with a thickness gauge.

Spark plug gap	0.7-0.8 mm
-----------------------	------------



Thickness gauge :09900-20806



: 09900-20806

Check to see the worn or burnt condition of the electrodes.

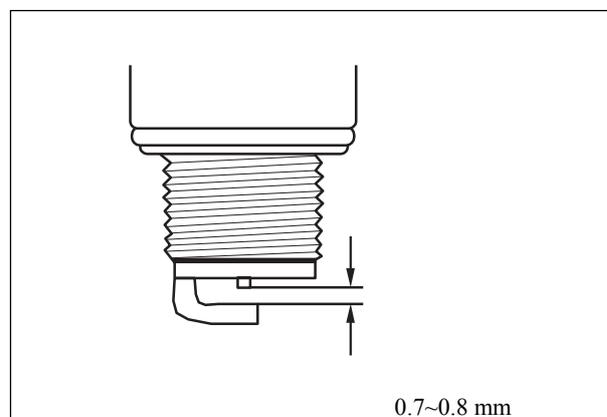
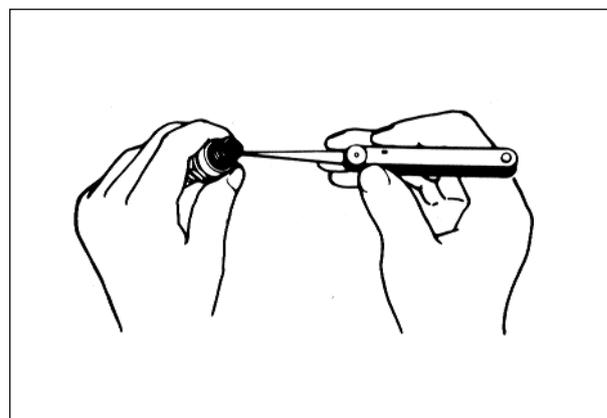
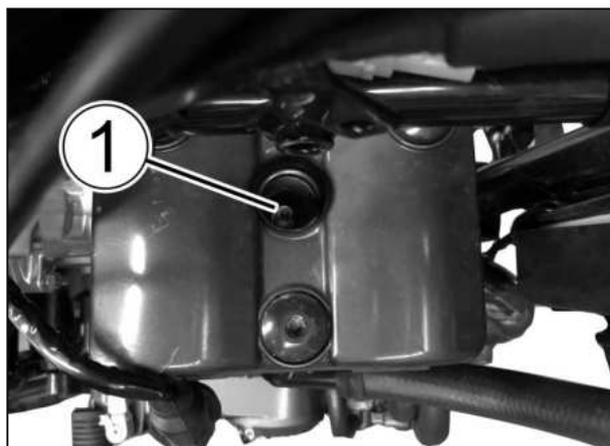
If it is extremely worn or burnt, replace the plug.

And also replace the plug if it has a broken insulator, damaged thread, etc.

- Install the spark plug, and then tighten it to specified torque.

 Spark plug : 15~20 N·m (1.5~2.0 kg·m)

 : 15~20 N·m (1.5~2.0 kg·m)



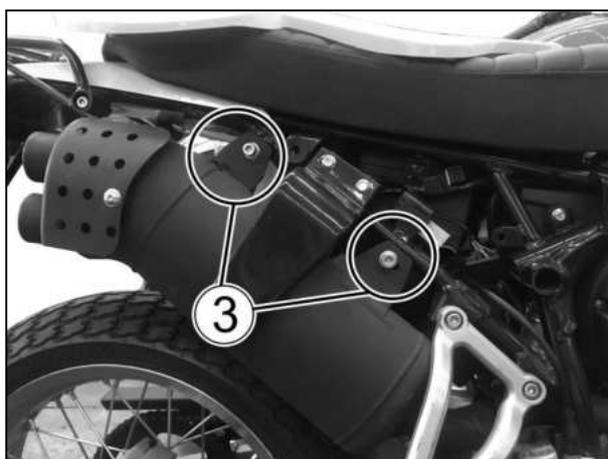
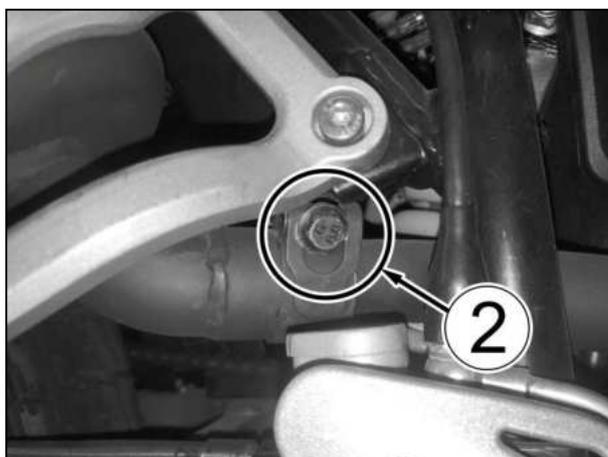
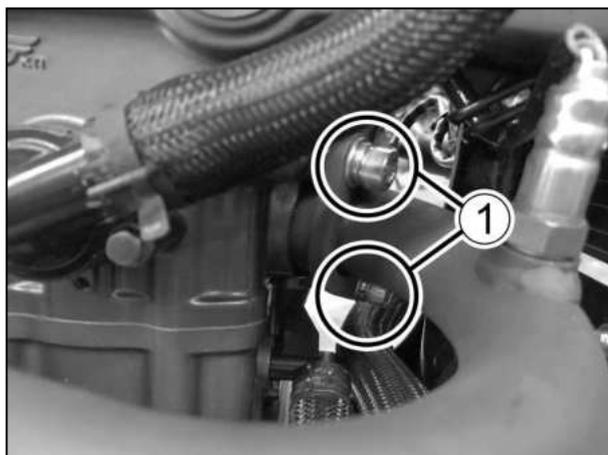
EXHAUST PIPE NUTS AND MUFFLER MOUNTING BOLTS

NOTE

Tighten Initial 1,000 km and Every 4,000 km.

□ Tighten the exhaust pipe nuts ①, and muffler mounting bolts ② to the specified torque.

- Exhaust pipe nut
:11N·m (11kg·m)
- Muffler mounting bolt
:11N·m (11kg·m)



AIR CLEANER

NOTE

Clean Every 3,000 km, Replace Every 12,000 km.

● With the hook ①、②、③ removed, remove the right side cover.

▢ Remove the four air cleaner inlet cap mounting bolts ④, and then remove the air cleaner inlet cap ⑤.

▢ Remove the air cleaner element ⑥.

Clean the air cleaner element for the following:

▢ When the air cleaner element clean with the air gun, necessarily blow at the outside by compressed air.

▢ Carefully examine the air cleaner element for tears during.

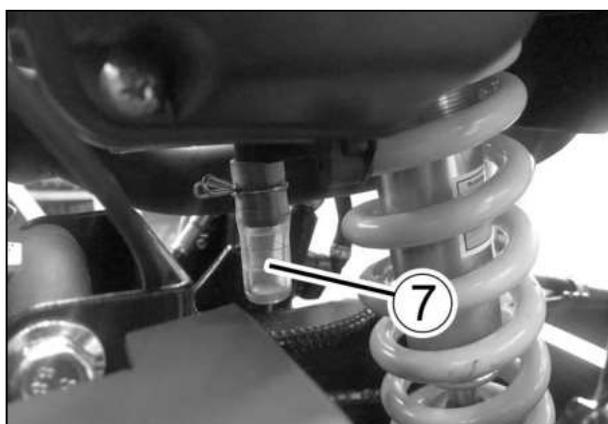
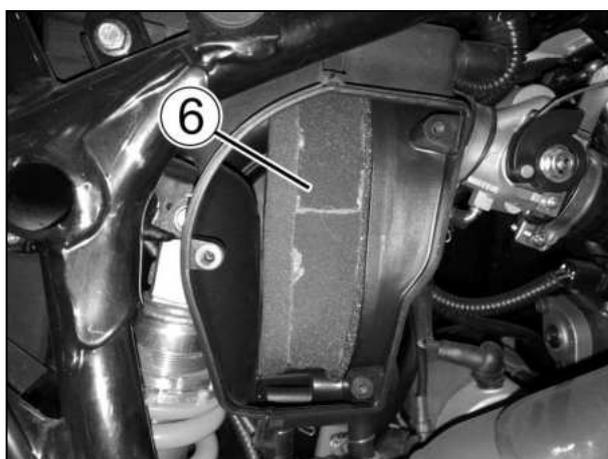
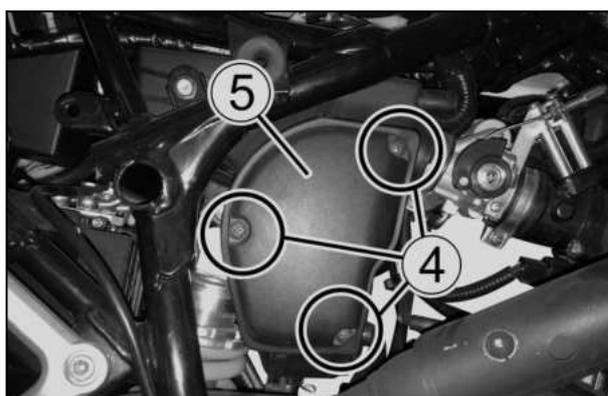
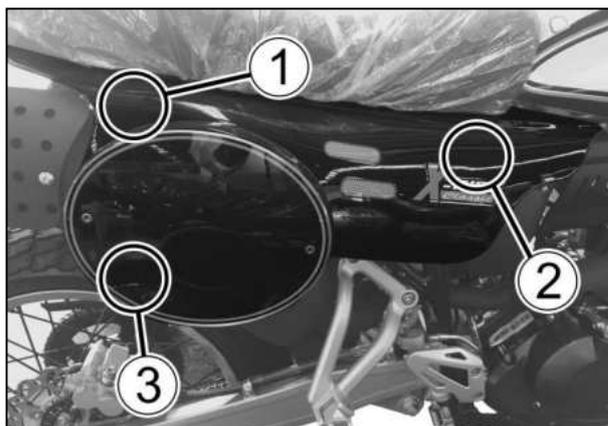
▢ Replace it with a new one if it is torn.

Assemble the element completely or damage severely the engine.

▢ Be careful not to allow water to go inside the air cleaner element.

⚠ CAUTION

More frequent servicing may be performed on motorcycles that are used under severe conditions, also clean the air cleaner element when replacing the oil to prevent damage of the engine. When cleaning the air filter, remove the plug ⑦ and discharge the dirt in the oil accumulation pipe of the air filter.



FUEL HOSE

NOTE

Inspect Initial 1,000 km and Every 4,000 km, Replace every 4 years.

- Remove the left frame cover. (Refer to page 5-2)
- Inspect the fuel hoses for damage and fuel leakage. If any defects are found, the fuel hoses must be replaced.

IDLING ADJUSTMENT

This engine features EFI (electronic fuel injection).

Engine idle speed	1500±100 rpm
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The idle speed is not adjustable.

CAUTION

Do not attempt to make any adjustment to the idle speed as it may permanently damage the EFI system.

THROTTLECABLE PLAY

NOTE

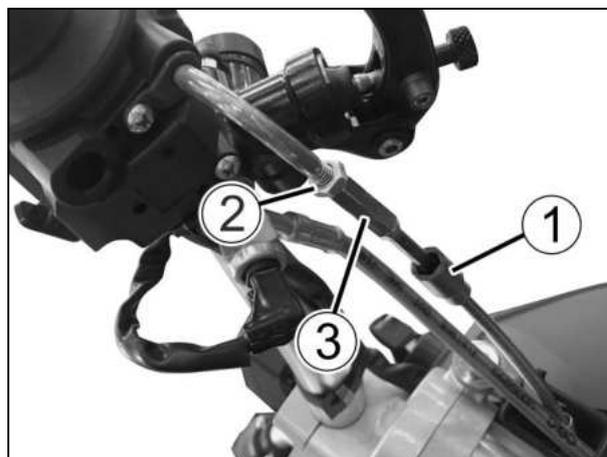
Inspect Initial 1,000 km and Every 4,000 km.

There should be 0.5-1.0mm play on the throttle cable.

To adjust the throttle cable play.

- Prop up the vehicle with a bracket.
- Withdraw the sheath. ①
- Loosen the nut ②.
- Turn the adjusting nut ③ until the throttle clearance is appropriate.
- After completion, tighten the nut ② to confirm the throttle clearance.
- Reinstall the sheath.

Throttle cable play	0.5-1.0 mm
----------------------------	------------



CLUTCH

NOTE

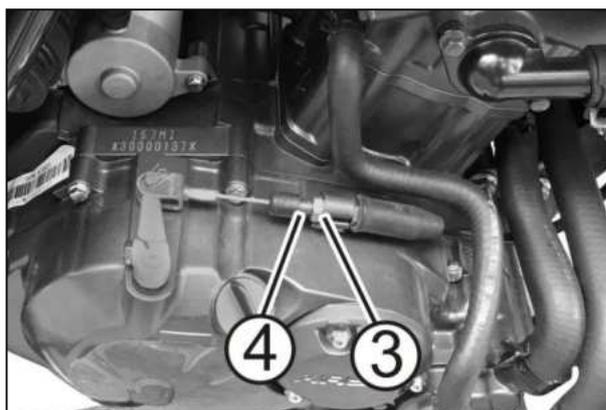
Inspect Initial 1,000 km and Every 4,000 km

Clutch play should be 4 mm as measured at the clutch lever holder before the clutch begins to disengage. If the play in the clutch is incorrect, adjust it in the following way:

- ▣ Loosen the lock nut ① and screw the adjuster ② on the clutch lever holder all the way in.
- ▣ Loosen clutch cable adjuster lock nut ③.
- ▣ Turn the clutch cable adjuster ④ in or out to acquire the specified play.
- ▣ Tighten lock nut while holding the adjuster in position.
- ▣ The clutch cable should be lubricated with a lightweight oil whenever it is adjusted.

Clutch cable play

4 mm



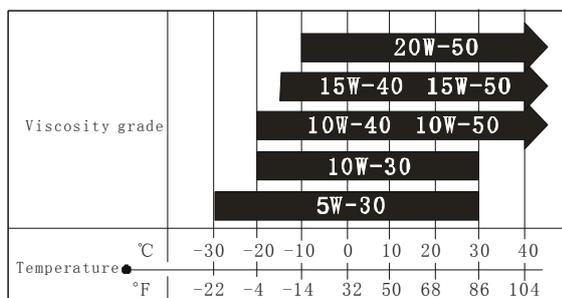
ENGINE OIL

Oil quality is a major contributor to your engine's performance and life. Always select good quality engine oil.

⊙ENGINE OIL SPECIFICATION

Classification system	Grade	Remarks
API	Over SL	
SAE	10W-40	

※If a SAE 10W-40 motor oil is not available, select alternative according to the following chart.



Use the chart to select a viscosity rating based on temperature range in your area.

NOTE

In very cold weather [below -15°C (5°F)], use SAE 5W/30 for good starting and smooth operation.

Using a premium quality four stroke motor oil will increase the service life of your motorcycle.

⚠ WARNING

- Don't mix the unrecommended oil. It could damage the engine.
- When refilling the oil, don't allow the dust to get inside.
- Wipe the spilled oil up immediately.
- Don't put the patch on the filler cap. It could disturb the oil to be provided and damage the engine.

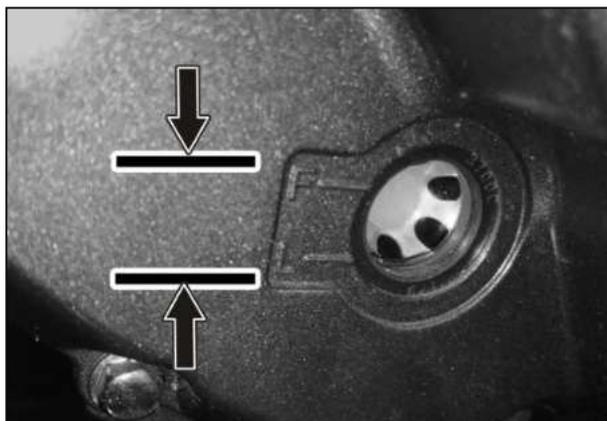
Long engine life depends much on the selection of quality oil and the periodic changing of the oil.

Daily oil level checks and periodic changes are two of the most important maintenances to be performed.

⊙ENGINE OIL LEVEL CHECK

Follow the procedure below to inspect the engine oil level.

- 1.Start up the engine and allow it to run for several minutes at idling speed.
- 2.Turn off the engine and wait about three minutes, then check the oil level through the inspection window. If the level is below mark “L”, add oil to “L” level. If the level is above mark “F”, drain oil to “F” level.



WARNING

The engine and the components of the exhaust system become very hot and remain hot for some time after the engine has been stopped. Before handling these components, wear insulating gloves or wait until the engine and the exhaust system have cooled down.

CAUTION

Never operate the motorcycle if the engine oil level is below the Lower line mark(L) in the engine oil level gauge. Never fill the engine oil above the Up- per line mark(F) .

Engine oil level being most suitable about 1mm under the Upper line mark(F) of the engine oil lens. In case of the engine oil pouring in excessively, the engine output being made insufficient.

Be careful not to pouring in the engine oil excessively.

CAUTION

Necessarily, confirm and clean the oil strainer when replace the Engine oil (specially, when first replacement).

CAUTION

More frequent servicing may be performed on motorcycles that are used under severe conditions.

3. Hold the motorcycle vertically using the stand.

NOTE

Place the motorcycle on firm and flat ground.

4. Inspect the engine oil level through the engine oil level lens on the right side on the engine.

NOTE

Engine oil expands and oil level increases when the engine oil is hot.

Check and adjust engine oil level when the engine oil is not hot.

CAUTION

Be sure to use the engine oil specified in the FUEL AND OIL RECOMMENDATION section.

CAUTION

Operating the motorcycle with an incorrect amount of engine oil can damage your motorcycle.

Too little or too much engine oil can damage your engine.

Place the motorcycle on level ground.

Check the engine oil level with the engine oil level lens before each use of the motorcycle.

CAUTION

Never operate the motorcycle if the engine oil level is below the "Lower line mark (L)" in the engine oil level lens. Never fill the engine oil above the "Upper line mark (F)". Engine oil level being most suitable about 1mm under the "Upper line mark(F)" of the engine oil level lens. In case of the engine oil pouring excessively, the engine output being made insufficient.

Be careful not to pour the engine oil excessively.

⊙ENGINE OIL AND FILT ERCHANGE

CAUTION

More frequent servicing may be performed on motorcycles that are used under severe conditions, inspect

- ①Quantity of Engine oil
- ②Pollution degree of Engine oil before riding the motorcycle and then supplement and replace at any time to prevent damage of the engine.

NOTE

Change the engine oil and filter, after first running 1,000 km and every running 4,000 km.

The engine oil should always be changed when the engine is hot so that the engine oil will be drained thoroughly from the engine.

The procedure is as follows.

CAUTION

In case of the engine oil being over filled, the engine output will be reduced.

Be careful not to over fill the engine oil.

1. Hold the motorcycle vertically using the center stand.

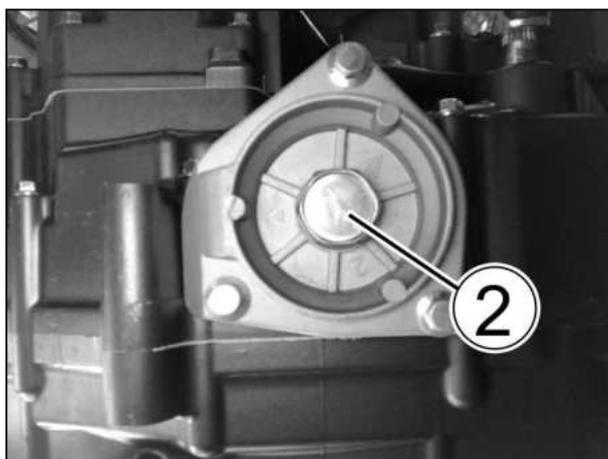
NOTE

Place the motorcycle on firm and flat ground.

2. Place a drain pan under the engine.

3. Remove the engine oil filler plug ①.

4. Drain the engine oil by removing the engine oil drain plug ② located on the bottom of the engine.



⚠ WARNING

New and used oil can be hazardous.

Children and pets may be harmed by swallowing new or used oil.

Continuous contact with used engine oil has been found to cause skin cancer in laboratory animals. Brief contact with used oil may irritate skin.

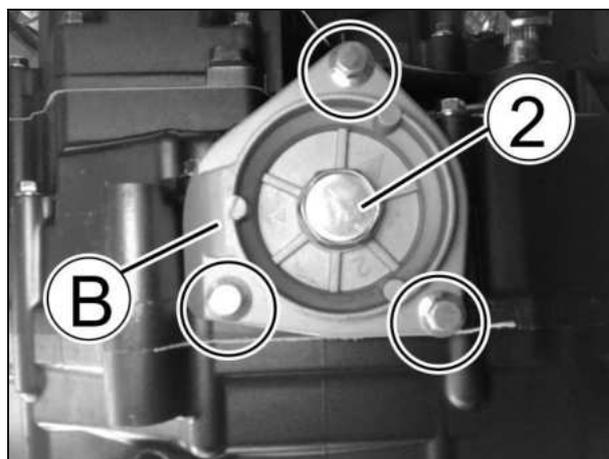
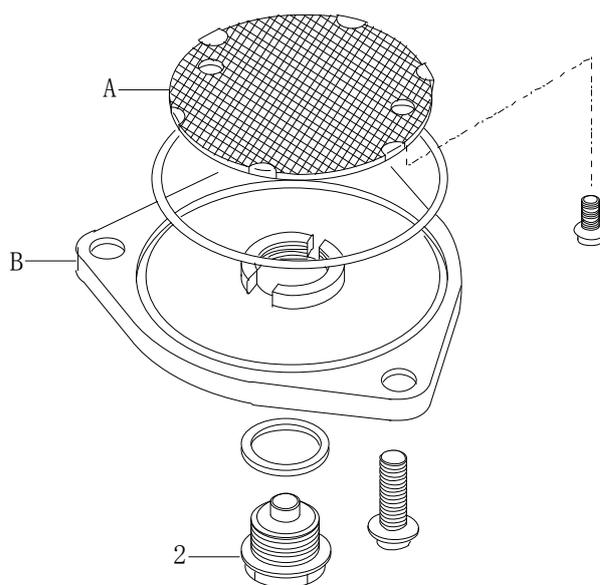
Keep new and used oil and used oil filters away from children and pets. To minimize your exposure to used oil, wear long-sleeve shirt and moisture proof gloves (such as dishwashing gloves) when changing oil. If oil contacts your skin, wash thoroughly with soap and water. Launder any clothing or rags if wet with oil. Recycle or properly dispose of used oil and filters.

⚠ WARNING

- The engine oil temperature may be high enough to burn you when the drain plug is loosened. Wait until the drain plug is cool enough to touch with bare hands before draining oil.
- Do not touch the hot muffler, or the hot muffler can burn you.

⚠ CAUTION

Remove, inspect and clean the oil strainer A by removing the engine oil strainer cap B when replacing the Engine oil (specially, when first replacing).



5. Tighten the drain plug ② to the specified torque.
At this time, insert the gasket necessarily.

-  Oil drain plug: 28N·m (2.8kg·m)
-  : 28N·m (2.8kg·m)

6. Pour a fresh engine oil through the engine oil filler hole.

Use an API classification of SL oil with SAE10W-40 viscosity. At this time, insert the gasket necessarily. Approximately 950 ml of the engine oil will be required. API SAE 10W-40SL, 850

7. Install the engine oil filler plug ①.

8. Start the engine and allow it idle for a few minutes. Check the oil drain plug ② to ensure that there is no oil leakage.

10. Check the engine oil level according to Engine Oil Level Check procedure.

CAUTION

Oil leakage at the oil drain plug indicates a problem with the assembly, possibly due to damage to the O-ring or gasket.

If you find any leaks or are not sure that the engine oil drain plug has been properly installed, have the motorcycle inspected by your dealer or qualified mechanic.

CAUTION

Approximately 850 ml of the engine oil must be required when changing the engine oil only without replacing the engine oil filter.

CAUTION

In case of the engine oil being over filled, the engine output will be reduced.
Be careful not to over fill the engine oil.

CAUTION

Failure to use the correct oil can damage your motorcycle.
Engine damage may occur if you use the engine oil that does not meet Hyosung's specifications.
Be sure to use the engine oil specified in the FUEL AND OIL RECOMMENDATION section.

ANTIFREEZE

WARNING

This motorcycle engine is water cooling system. During motorcycle running, the antifreeze is high temperature and high pressure in the cooling system. So, it is strictly forbidden opening the radiator cap in this state, avoiding burn.

The antifreeze must be added in a timely manner and sufficient amount to prevent damaging the engine.

The antifreeze must be added after the engine is stopped and cooled.

WARNING

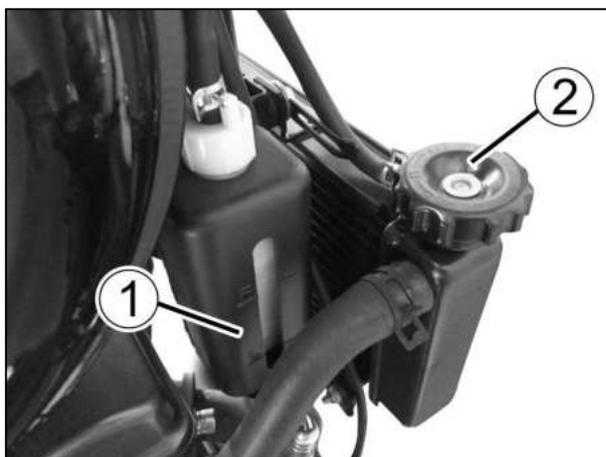
Antifreeze belongs to chemicals, which include toxic substances. If the antifreeze gets into your eyes or skin, wash with plenty of water immediately.

WATER TANK

The left side of the front end of the vehicle fuel tank is provided with a white makeup water tank ① and a radiator cover ②.

The makeup water tank ① is provided with a water level scale line and the antifreeze level in the water tank shall be between the upper and lower scale lines.

When the water level is lower than the lower limit, open the radiator cover ②, add special antifreeze to the water tank and do not add tap water or other liquid at will.



Antifreeze replacement

Carry out this work on about 10000 km running or when using the motorcycle for a year.10000

The operation is following:

1.Please stand the motorcycle on a level ground with stand, take a container and put under the draining bolt③, then remove the bolt③, so antifreeze is outflow.

2.Remove the exhaust bolt ④.

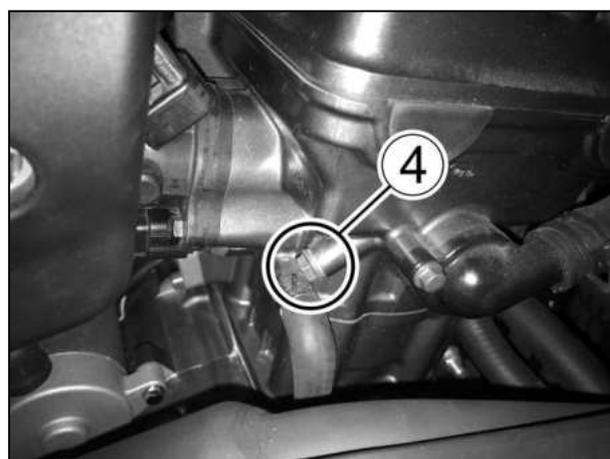
CAUTION

For all antifreeze fully drained off from the system, remove the exhaust bolt ④, which need to use high-pressure air to blow the exhaust bolt connection on the left side of the engine cylinder head.

There is a seal gasket on the draining bolt ③. If the seal gasket is damaged, it must be replaced.

When drain completed, assemble and tighten the drain bolt ③.

3.Open the antifreeze radiator cover ②.Slowly add 0.7L antifreeze into radiator cover using measuring glass, at same time observe the exhaust bolt ④ connection on the engine. When antifreeze outflow from the connection on the engine, plug in the exhaust bolt ④, continue to add liquid until all of 0.7L antifreeze is into the radiator.



4. Tighten the radiator cover, start the engine, repeated acceleration and deceleration of the engine in place until the fan of cooling system turned on (or the needle of water temperature meter point to above the middle of the scale), then turn off the engine.

5. Until engine cool down and water temperature is at 80 degrees (middle scale line) or less, observe the antifreeze from the water tank. If the water level is low, add antifreeze until to the middle of upper and lower scale line. Then tighten the radiator cover.

CAUTION

First add liquid antifreeze is about 0.75L, replacement and maintenance add at about 0.7 L.

Antifreeze level shall not exceed the upper scale line, nor below the lower scale line.

Antifreeze liquid level should be the water tank between two scale marks, if necessary, add or remove.

Antifreeze selection: :

1. Antifreeze must not be mixed using.
2. The freezing point of antifreeze is normally lower than the local minimum ambient temperature 5-10 degrees.
3. The boiling point of antifreeze is more than 107 ° C.

Common fault of cooling system:

Check the makeup water tank, radiator, fan, water pump, rubber water pipe and antifreeze. If antifreeze boiling occurs during vehicle traveling, please find the reason:

1. The boiling point of anti-freezing solution is low and unqualified. Replace anti-freezing solution;
2. The antifreeze is too little. Please add antifreeze to the specified liquid level;
3. There is accumulated gas in cooling system. Please loosen the exhaust bolts on the engine for venting.
4. The cooling system is blocked. The radiator and the rubber water pipe should be checked, and the blockage should be eliminated.
5. The engine water pump is damaged. Please repair or replace it.
6. The fan does not work. It may be that the fan is damaged or the line connection is not good. Please replace the damaged fan or troubleshoot the line connection problem.
7. The radiator is damaged. Please repair or replace it.

DRIVE CHAIN

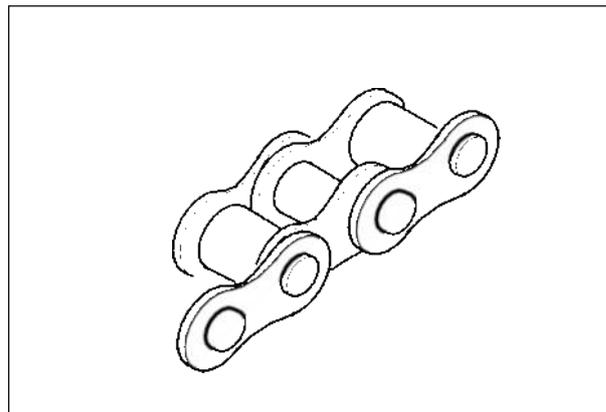
NOTE

Clean and Lubricate Every 1,000 km.

Visually check the drive chain for the possible defects listed below. (Support the motorcycle by the jack or block, turn the rear wheel slowly by hand with the transmission shifted to Neutral.

- Loose pins
- Excessive wear
- Damaged rollers
- Improper chain adjustment
- Dry or rusted links
- Kinked or binding links

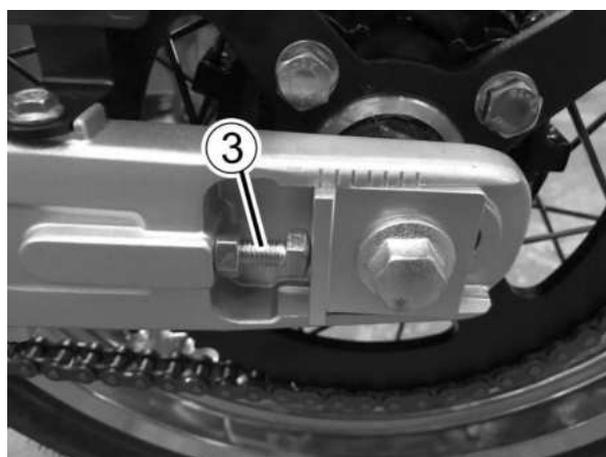
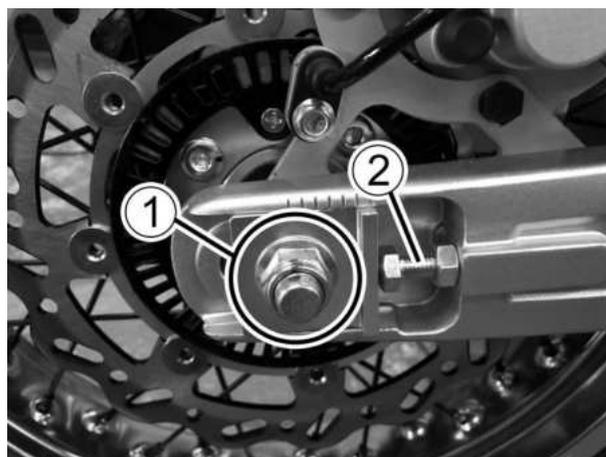
If any defects are found, the drive chain must be replaced.



NOTE

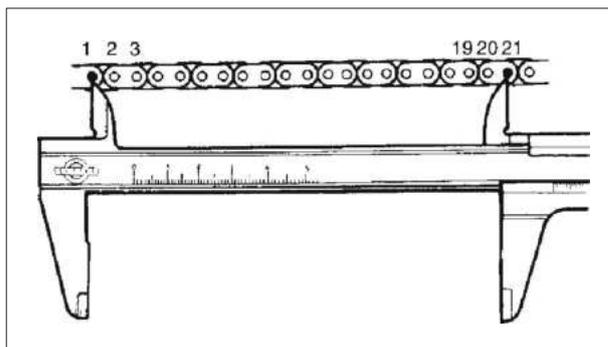
When replacing the drive chain, replace the drive chain and sprocket as a set.

- Loose the axle nut ①.
- Tense the drive chain fully by turning both chain adjusters ②, ③.



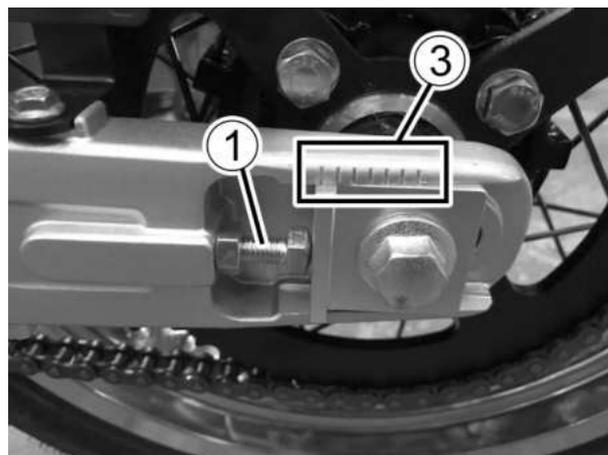
- Count out 21 pins (20 pitches) on the chain and measure the distance between the two points. If the distance exceeds the service limit, the chain must be replaced.

Drive chain 20-pitch length20	Service limit
	259.0 mm



- Loosen or tighten both chain adjusters ①, ② until the chain has 20 - 30 mm of slack in the middle between the engine and rear sprockets. The marks ③, ④ on both chain adjusters must be at the same position on the scale to ensure that the front and rear wheels are correctly aligned.

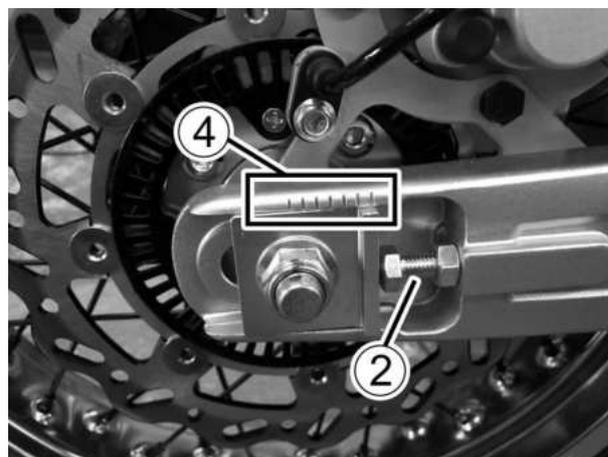
Drive chain slack	20-30 mm
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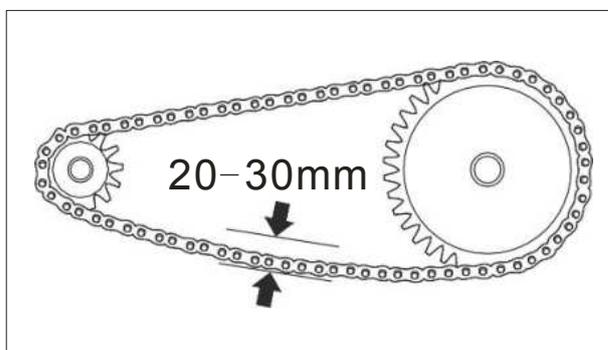
- Place the motorcycle on jack or block for accurate adjustment.
- After adjusting the drive chain, tighten the axle nut to the specified torque.
- Tighten both chain adjusters ①, ② securely.

 Rear axle nut : 78N·m (7.8kg·m)

 : 78N·m (7.8kg·m)



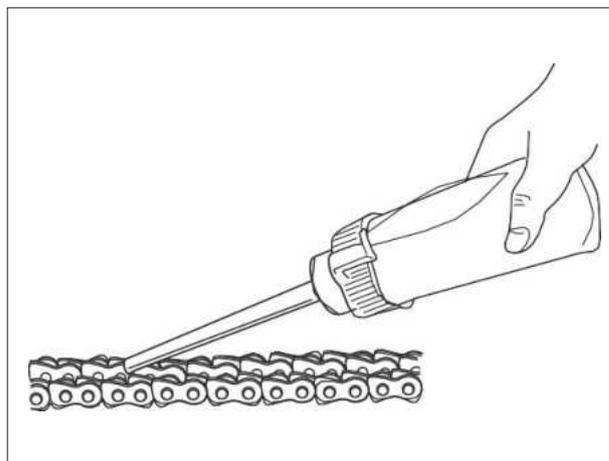
- Recheck the drive chain slack after tightening the axle nut.



- Wash the drive chain with kerosine. If the drive chain tends to rust quickly, the intervals must be shortened.
- After washing and drying the chain, oil it with a engine oil.

 **CAUTION**

The standard drive chain is a 428UO recommends that this standard drive chain should be used for the replacement.



WARNING

Operating the motorcycle in harsh condition can be hazardous if you do not inspect brake wear often.

Operating in mud, water, sand, or other extreme conditions can cause accelerated brake wear. This could lead to an accident.

If you operate your motorcycle under these conditions, the brakes must be inspected more often than recommended in the MAINTENANCESCHEDULE.

BRAKE SYSTEM

NOTE

[BRAKE]

Inspect Initial 1,000 km and Every 4,000 km.

[BRAKE HOSE & BRAKE FLUID]

Inspect Initial 1,000 km and Every 4,000 km.1

Replace the brake hoses Every 4 years,

Replace the brake fluid Every 2 years.

The motorcycle utilizes front and rear disk brakes. Properly operating the brake systems are vital to safe riding. Be sure to perform the brake inspection requirements as schedules.

The brakes should be inspected at periodic inspection by your authorized dealer.

WARNING

Failure to properly inspect and maintain your motorcycle brake systems can be hazardous.

Improper maintenance of the brakes increases your chances of having an accident.

Be sure to inspect the brakes before each use of the motorcycle according to the INSPECTION BEFORE RIDING section.

Always maintain your brakes according to the MAINTENANCE SCHEDULE.

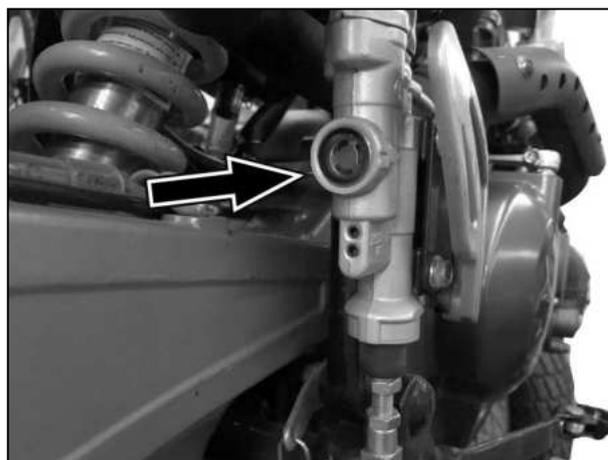
⊖ BRAKE FLUID

Be sure to check the brake fluid level in the master cylinder. If the level was found to be lower than the lower mark holding the motorcycle upright, inspect the brake pad's wear condition.

If the brake pad's wear condition is good, replenish with the proper brake fluid that meets Hyosung's requirements.



Front Brake Cylinder



Rear Brake Cylinder

⚠ CAUTION

Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and oil leakage before riding.

As the brake pads wear, the fluid level will drop to compensate for the new position of brake pads. Replenishing the master cylinder is considered normal periodic maintenance.

⚠ WARNING

Brake fluid may be harmful if swallowed or if it comes in contact with skin or eyes. Contact your doctor immediately if brake fluid is swallowed and induce vomiting. If brake fluid gets into the eyes or in contact with the skin, flush thoroughly with plenty of water.

⚠ CAUTION

This motorcycle uses glycol-based brake fluid.

Do not use or mix different types of brake fluid, otherwise serious damage will result in the brake system.

Use Only DOT4 brake fluid. DOT4

Do not spill any brake fluid on painted or plastic surfaces as it will damage the surface severely.

Never use any brake fluid that has been stored in a used or unsealed container. Never reuse brake fluid left over from the last servicing and stored for long period as it absorbs moisture from the air.

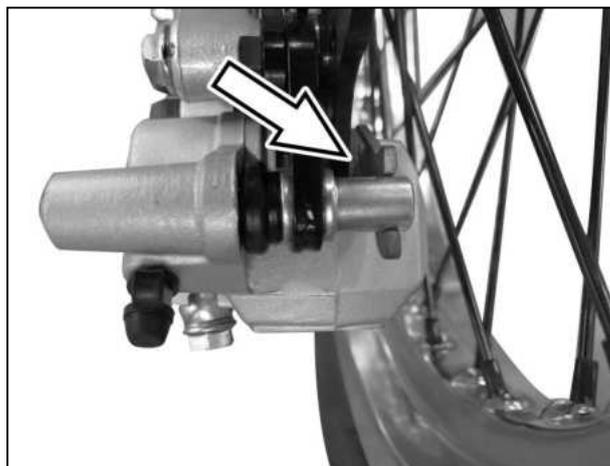
⚠ WARNING

Be careful that water or dust does not enter the brake fluid reservoir when refilling.

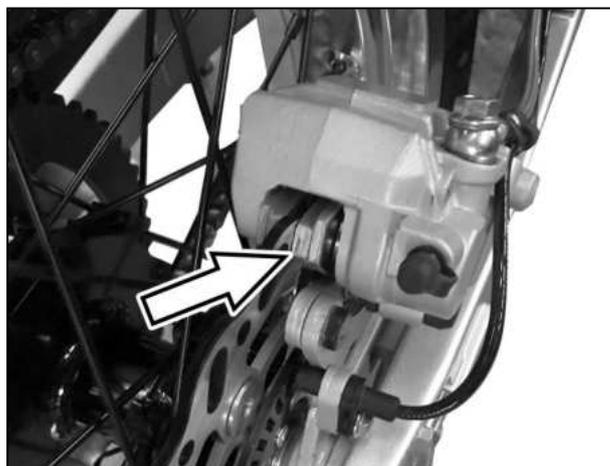
⦿ BRAKE PADS

Inspect the front and rear brake pads to determine whether or not the friction pads are worn down to the grooved limit line. If a pad is worn to the grooved limit line it must be replaced with a new one by your authorized dealer or qualified service mechanic.

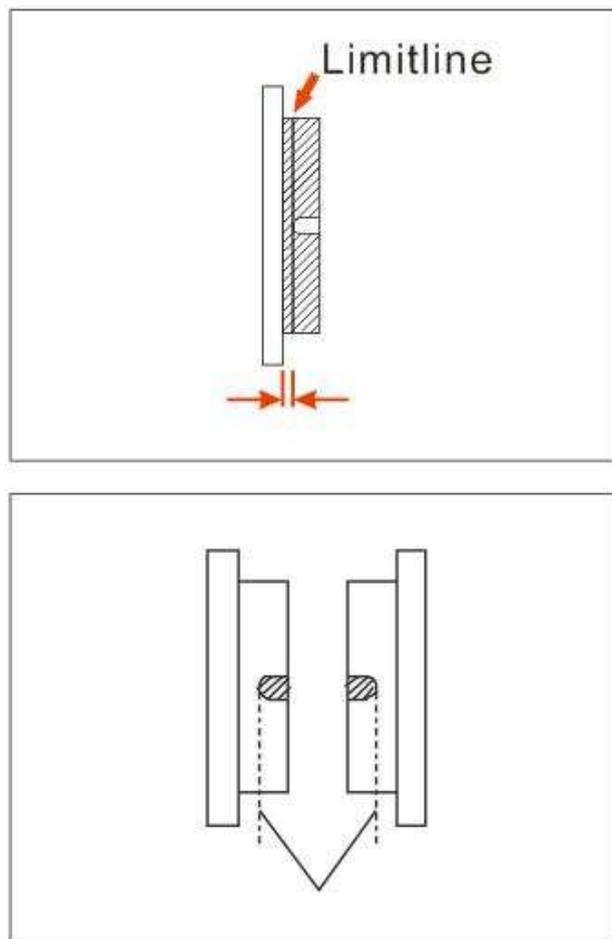
The rate at which brake pads will wear depends on motorcycle usage, riding style and road surface condition.



Front Brake Pads



Rear Brake Pads



The extent of brake pad wear can be checked by observing the grooved limit on the pad. When the wear exceeds the grooved limit, replace the pads with new ones.

CAUTION

Replace the brake pad as a set, otherwise braking performance will be adversely affected.

Inspect every day in the following point at the brake system.

- ① Brake fluid leakage of the front and rear brake system.
- ② Leak or damage of the brake hose.
- ③ Operating of the brake lever and pedal.
- ④ Wear of the front and rear brake pads.

CAUTION

The front and rear brake system requires the brake hose or the brake fluid to be replaced according to periodic inspection chart by your authorized dealer for safety as they operate at high pressure.

WARNING

Riding with worn brake pads will reduce braking performance and will increase your chance of having an accident. Inspect brake pad wear before each use. Ask your dealer or qualified mechanic to replace brake pads if any pad is worn to the limit.

WARNING

If brake pads are allowed to wear down to the metal substrate, metal-to-metal contact with the brake disk would lead to noise and the brake caliper sparking; this would result in loss of braking and brake disk damage, causing a dangerous riding condition.

WARNING

Replacing only one of the two brake pads can be hazardous.

Replacing only one brake pad can result in uneven braking action.

Replace both pads together.

CAUTION

After replacing the front or rear brake pads, squeeze/depress and release several times the brake lever/pedal so that it is settling at the original place.

Then, check that the brakes are operating correctly.

▣ BRAKE DISK INSPECTION

Check the brake disk for damage or cracks.

FRONTBRAKE

▣ BRAKE FLUID LEVELCHECK

- ▣ Keep the motorcycle upright and place the handle bars straight.
- ▣ Check the brake fluid level by observing the lower limit line (LOWER) on the front brake fluid reservoir.
- ▣ When the level is below the lower limit line (LOWER), replenish with brake fluid that meets the following specification.



 Specification and Classification : DOT 4

▣ FRONT BRAKE PADREPLACEMENT

- ▣ Remove the brake caliper.
- ▣ Remove The brake pads.
- ▣ To reassemble, reverse the above sequence.



 Brake caliper mounting bolt
:39N·m (3.9kg·m)



▣ FRONT BRAKE FLUID REPLACEMENT

- ▣ Place the motorcycle on a level surface and keep the handlebars straight.
- ▣ Remove the master cylinder reservoir cap and diaphragm.
- ▣ Suck up the old brake fluid as much as possible.
- ▣ Fill the reservoir with new brake fluid.

Specification and Classification

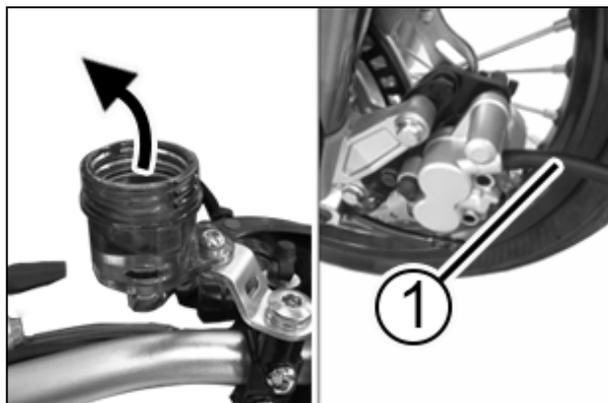
: DOT 4

- ▣ Connect a clear hose① to the air bleeder valve of the front brake caliper and insert the other end of the hose into a receptacle.

- ▣ Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.

- ▣ Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper line.

Front brake caliper air bleeder valve :7.5N·m (7.5kg·m)



REAR BRAKE FLUID REPLACEMENT

- ▣ Place the motorcycle on a level surface and keep the handlebars straight.
- ▣ Remove the master cylinder reservoir cap and diaphragm.
- ▣ Suck up the old brake fluid as much as possible.
- ▣ Fill the reservoir with new brake fluid.

Specification and Classification

: DOT 4

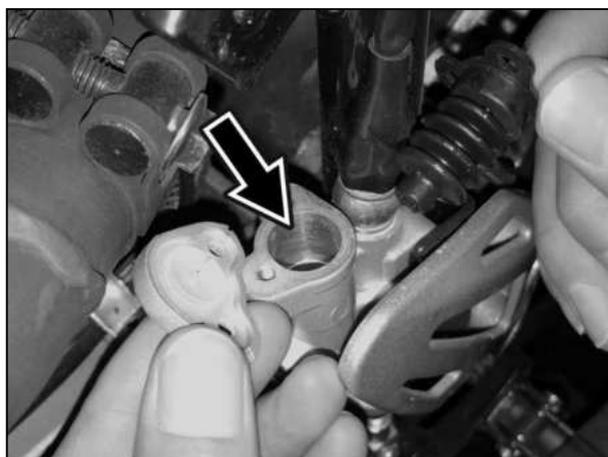
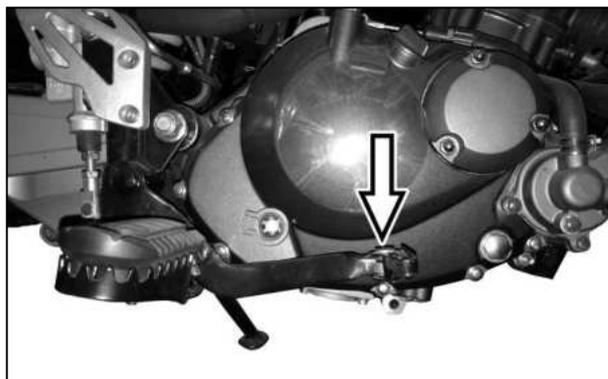
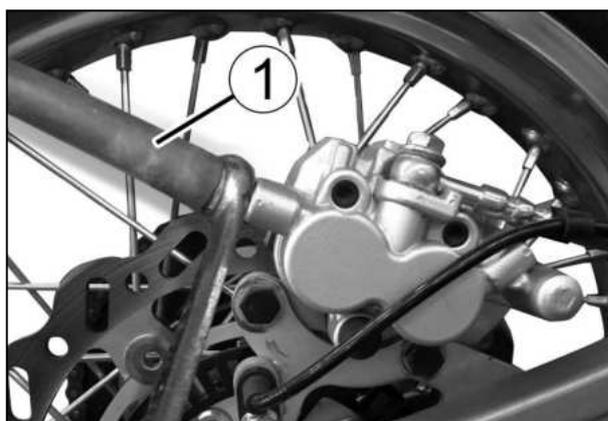
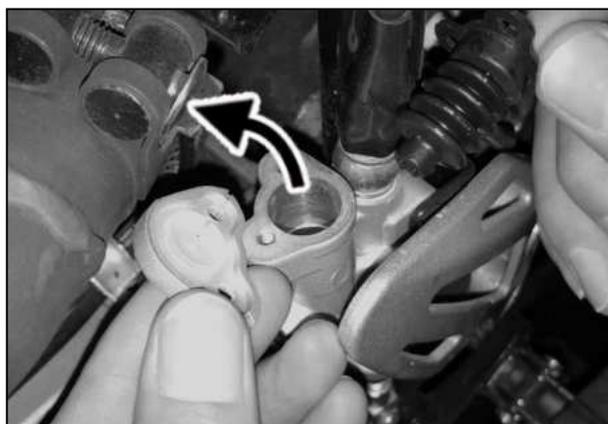
- ▣ Connect a clear hose ① to the air bleeder valve of the rear brake caliper and insert the other end of the hose into a receptacle.

- ▣ Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.

- ▣ Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper line.

Front brake caliper air bleeder valve

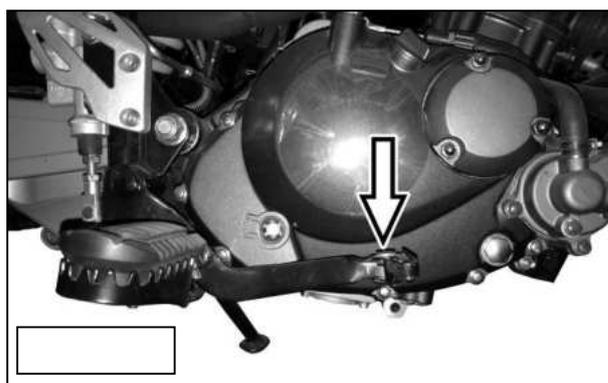
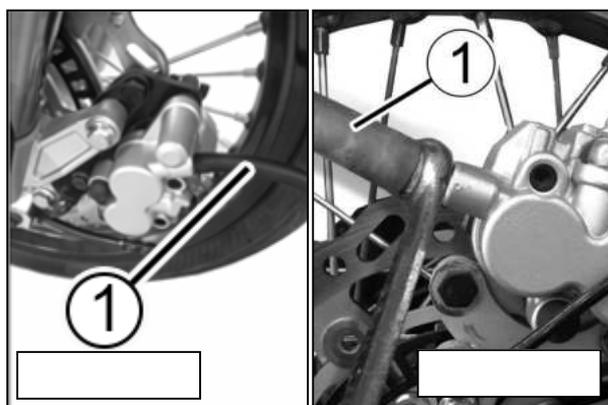
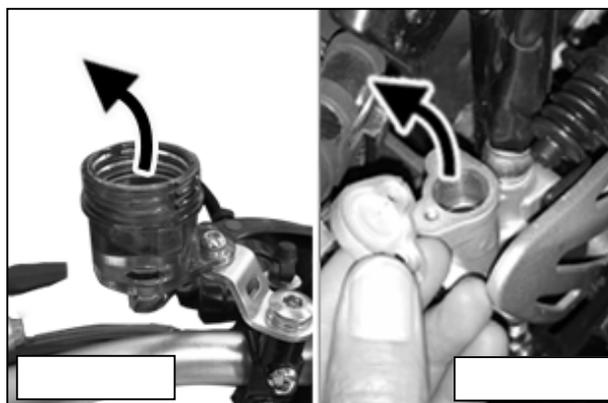
: 7.5N·m (7.5kg·m)



▣ AIR BLEEDING OF THE BRAKE FLUID CIRCUIT

Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by “sponginess” of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that, after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner :

- ▣ Fill the master cylinder reservoir to top of the inspection window. Replace the reservoir cap to prevent dirt from entering it.
- ▣ Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
- ▣ Bleed air from the brake system.
- ▣ Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it. Loosen the bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip. Then, close the air bleeder valve, pump and squeeze the brake lever, and open the valve. Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.



NOTE

While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

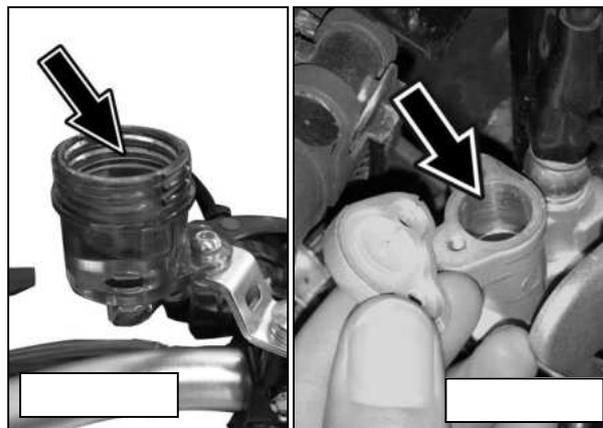
- Close the air bleeder valve, and disconnect the hose. Fill the reservoir with brake fluid to the upper line.

Front brake caliper air

bleedervalue: 7.5N - m (0.75kg - m)

Rear brake caliper air bleedervalue

7.5N - m (0.75kg - m)



CAUTION

Handle brake fluid with care : the fluid reacts chemically with paint, plastics, rubber materials, etc.

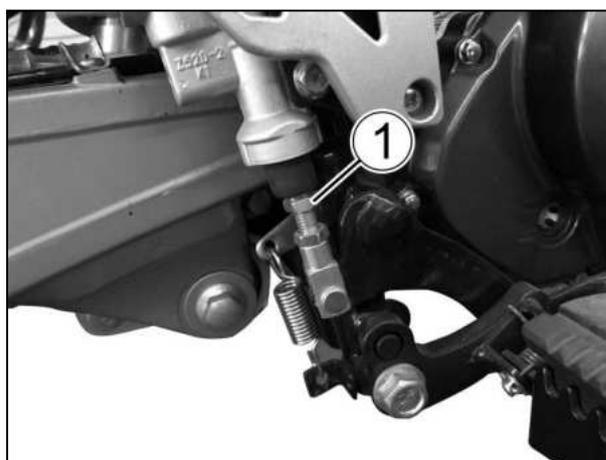
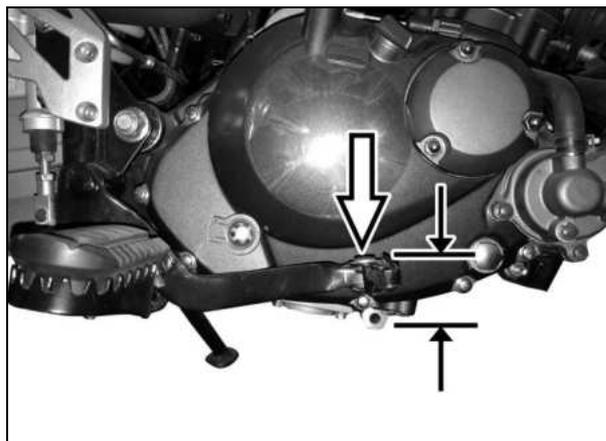
REAR BRAKE

REAR BRAKE ADJUSTING

- Adjust the free travel to 20~30 mm by turning the adjusting nut ①.

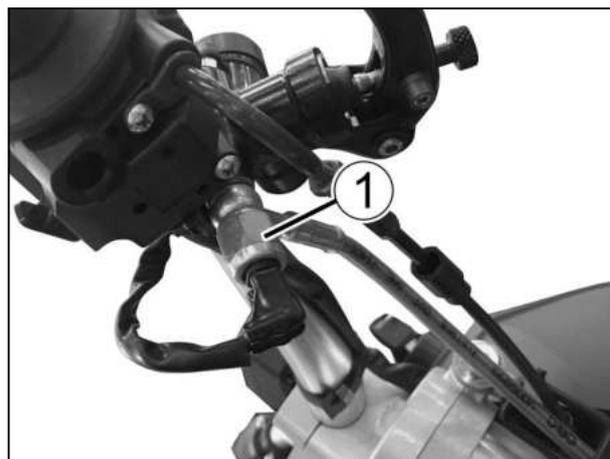
Rear brake pedal free travel

20~30 mm

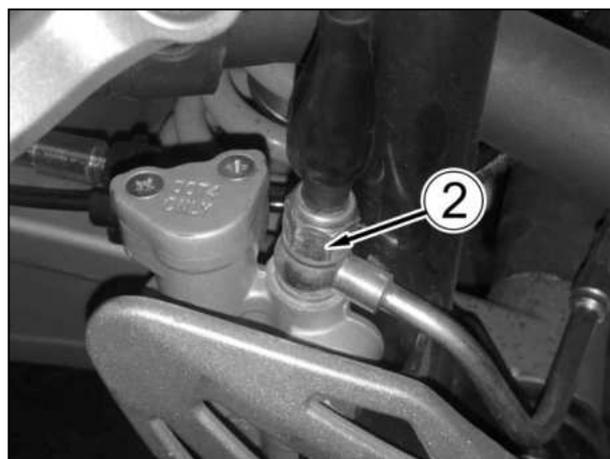


▣ BRAKE LAMP SWITCH

Adjust the front and rear brake light switches so that when the front brake handle is clenched or the brake pedal is pressed, the brake light will light up before the pressure is felt.



Front brake lamp switch



Rear brake lamp switch

STEERING

NOTE

Inspect Initial 1,000 km and Every 4,000 km.

Steering should be adjusted properly for smooth turning of handlebars and safe running. Over tight steering prevents smooth turning of the handlebars and too loose steering will cause poor stability. Check that there is no play in the steering stem while grasping the lower fork tubes by supporting the machine so that the front wheel is off the ground, with the wheel straight ahead, and pull forward. If play is found, perform steering bearing adjustment as described in page 7-39 of this manual.

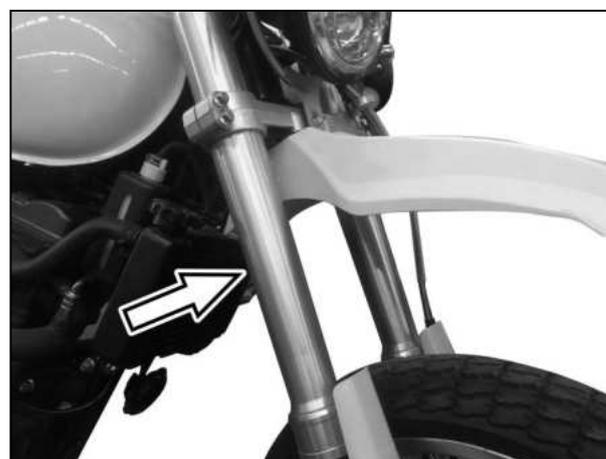


FRONT FORK

NOTE

Inspect Every 4,000 km.

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes. Replace any defective parts, if necessary.

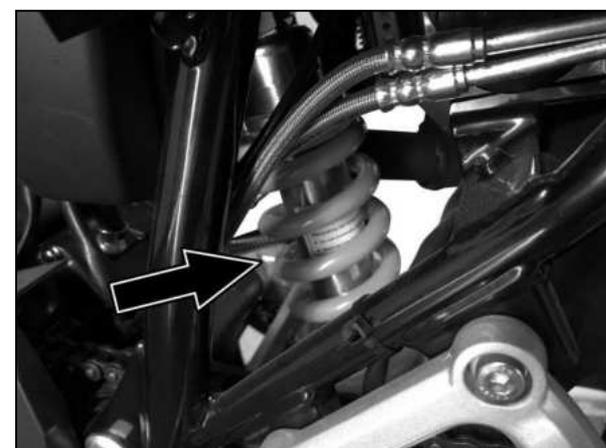


REAR SUSPENSION

NOTE

Inspect Every 4,000 km.4,000

Inspect the rear shock absorber for oil leakage and mounting rubbers including engine mounting for wear and damage. Replace any defective parts, if necessary.



TIRE

NOTE

Inspect Initial 1,000 km and Every 4,000 km.

Inspect the tire pressure and the tire thread depth periodically.

Inspect frequently the tire pressure for the safety and the tire life.

WARNING

Failure to follow these warnings may result in an accident due to tire failure. The tires on your motorcycle form the crucial link between your motorcycle and the road. Follow these instructions

- ▣ Check tire condition and pressure, and adjust pressure before each ride.
- ▣ Avoid overloading your motor cycle.
- ▣ Replace a tire when worn to the specified limit, or if you find damage such as cuts or cracks.

Always use the size and type of tires specified in this owner's manual.

▣ TIRE TREADCONDITION

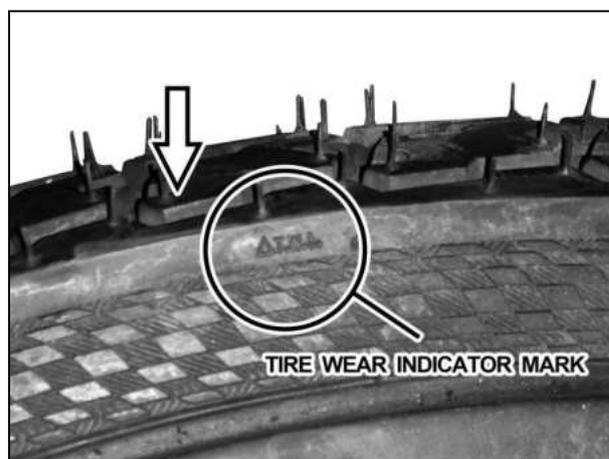
Operating the motorcycle with excessively worn tires will decrease riding stability and can lead to loss of control.

- ▣ Inspect storage of tire thread s depth by the tire wear indicator.
- ▣ Replace the front and rear tires at once when appear the tire wear indicator.

CAUTION

The standard tire on QM125-2X (B7) is 110/70-17or front and 130/70-17 for rear.

The use of tires other than those specified may cause instability. It is highly recommended to use GenuineTire.



▣ TIREFPRESSURE

Insufficient air pressure in the tires not only hasten tire wear but also seriously affects the stability of the motorcycle.

Under-inflated tires make smooth cornering difficult and over-inflated tires decrease the amount of tire in contact with the ground which can lead to skids and loss of control.

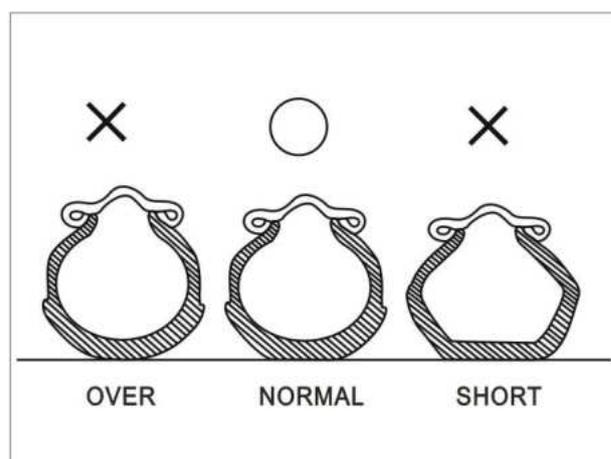
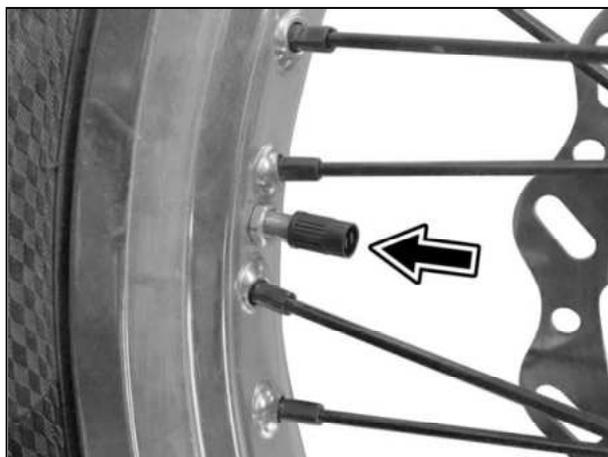
Be sure that the tire pressure is within the specified limits at all times.

Tire pressure should only be adjusted when the tire is cold.

If you see the problem with the tire, adjust the pressure with the pressure gauge.

If the tire pressure is too high or too low, steering will be adversely affected and tire wear increased. Therefore, maintain the correct tire pressure for good roadability or shorter tire life will result. Cold inflation tire pressure is as follows.

TIRE PRESSURE (COLD INFLATION)	NORMAL RIDING	
	SOLORIDING	DUAL RIDING
FRONT	200Kpa(41psi)	225Kpa(41psi)
REAR	225Kpa(41psi)	250Kpa(41psi)



CAUTION

If there are some problem with the tire pressure or cracks and cuts, it will decrease the riding stability and lead to flat tire.

▣ CRACKS AND CUTS

Check if

- 1) There are visible cracks and cuts.
- 2) There are abnormal wears.

CHASSIS BOLTS AND NUTS

NOTE

Tighten Initial 1,000 km and Every 4,000 km. 1,0004,000

Check that all chassis bolts and nuts are tightened to their specified torque.

COMPRESSION PRESSURE

The compression of a cylinder is a good indicator of its internal condition.

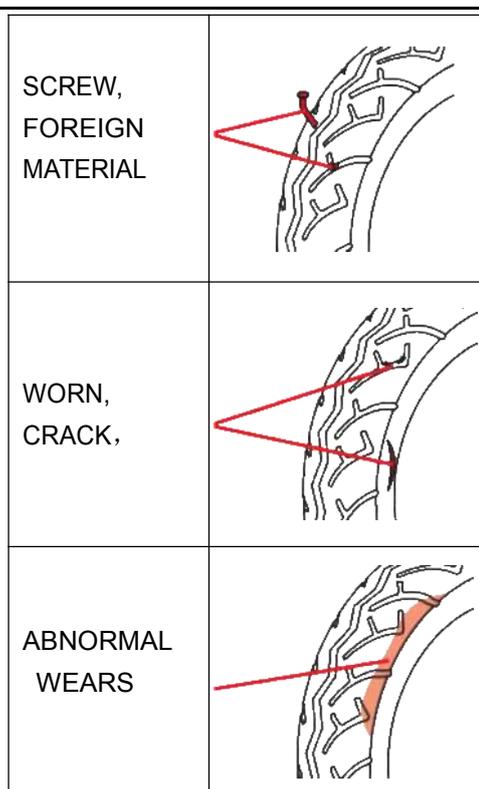
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression reading for each maintenance service.

Compression pressure	
Standard	14~16 kg/cm ² (at 600 rpm)
Service limit	12 kg/cm ² (at 600 rpm)

Low compression pressure can indicate any of the following conditions :

- ▣ Excessively worn cylinder wall
- ▣ Worn-down piston or piston rings
- ▣ Piston rings stuck in grooves
- ▣ Poor seating of valves

Ruptured or otherwise defective cylinder head gasket



◎ COMPRESSION TESTPROCEDURE

NOTE

Before testing the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque values and valves are properly adjusted.

Have the engine warmed up by idling before testing.

Be sure that the battery used is in fully charged condition.

- Remove the parts concerned and test the compression pressure in the following manner.
- Remove the saddle assembly fixing bolts to remove the saddle.
- Remove the fuel tank. (Refer to page 5-2) (5-2)
- Remove the spark plug. (Refer to page 2-4) (2-4)
- Install the pressure gauge in the spark plug socket, and pay attention to the connection firmly.
- Keep the throttle grip in full-open position.
- Crank the engine a few seconds with the starter, and record the maximum gauge reading as the compression of that cylinder.

 **Compression gauge:09915-64510**



OIL PRESSURE

Check the oil pressure periodically. This will give a good indication of the condition of the moving parts.

Oil pressure	Standard
	1.4± 0.2 kg/cm ² (at 60 °C·4,000 rpm)

If the oil pressure is lower or higher than the specification, the following causes may be considered.

● LOW OILPRESSURE

- ▣ Oil leakage from the oilpassage
- ▣ DamagedO-ringO
- ▣ Defective oilpump
- ▣ Combination of aboveitems

● HIGH OILPRESSURE

- ▣ Engine oil viscosity is toohigh
- ▣ Clogged oilpassage
- ▣ Combination of the aboveitems

● OIL PRESSURE TESTPROCEDURE

Check the oil pressure in the following manner.

- ▣ Remove the oil check plug and install the adapter of oil pressure gauge at the removed position.
- ▣ Connect an engine tachometer.
- ▣ Warm up the engine as follows :
Summer 10 min. at 2,000 rpm.2,000 rpm10
Winter 20 min. at 2,000 rpm.
- ▣ After warming up, increase the engine speed to 4,000 rpm. (with the engine tachometer), and read the oil pressure gauge.



Oil pressure gauge : 09915-74510



: 09915-74510



Contents

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ENGINE DISASSEMBLY.....	3-2
INSPECTION AND MAINTENANCE OF ENGINE COMPONENTS.....	3-20

INTRODUCTIO

The engine is separated from the vehicle:

1. Remove the saddle, fuel tank (oil pipe, air pipe, power connector), and remove the guard;
2. Remove the oil and engine coolant, remove the radiator;
3. Disassemble the drive chain, disassemble the battery cable, magneto cable and other connectors, and the gear display switch connector;
4. Remove the shift lever and left front footrest;
5. Remove the throttle cable and throttle body;
6. Remove the clutch line, muffler, right front footrest, and brake lever;
7. Remove the connecting bolts between the engine and the car body, and remove the engine.

Engine decomposition:

1. Remove the cylinder head assembly, cylinder block, and piston assembly;
2. Remove the oil filter and start the motor;
3. Remove the coolant pump;
4. Remove the magneto, balance shaft idler, etc.;
5. Remove the clutch assembly, drive gear, gearshift shaft, etc.;
6. Unpacking

Repair part: :

1. Inspection and repair of cylinder head assembly
2. Check and repair the piston assembly
3. Check and repair the crankshaft assembly
4. Magneto combination inspection and repair
5. Check and repair the electric start system
6. Check and repair the clutch
7. Part of the cabinet is inspected and repaired.

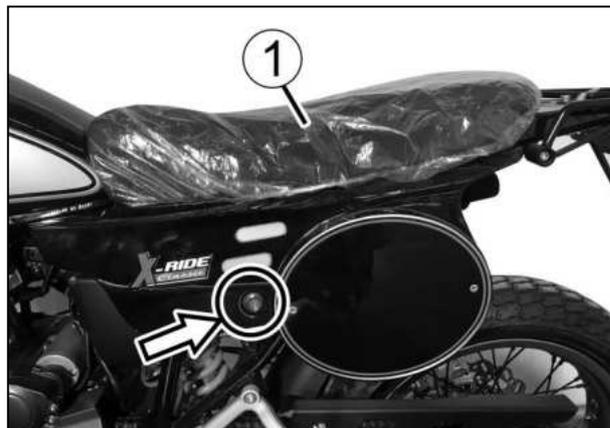
Assembly notes: :

1. Assemble the engine according to the reverse order of disassembly
2. When assembling the left and right boxes, apply the sealant evenly, and do not let the sealant enter the oil channel and water channel;
3. Tighten the bolts of each part according to the assembly torque
4. Add lubricating oil and coolant as required.

ENGINE DISASSEMBLY

□ Remove saddle and fuel tank

- Loosen the rear fixing groove of the saddle and remove the saddle①.

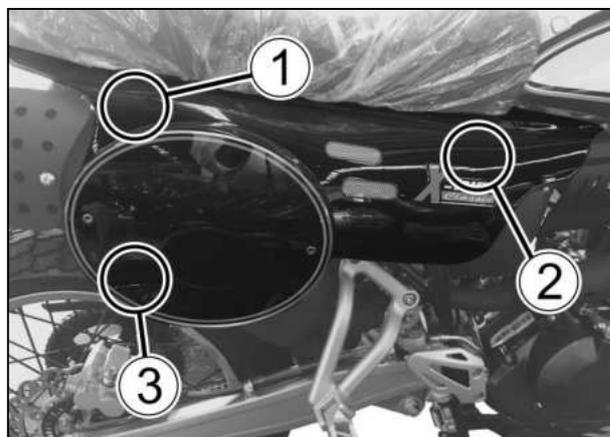


- Remove the fuel tank②. (Refer to page 5-2)

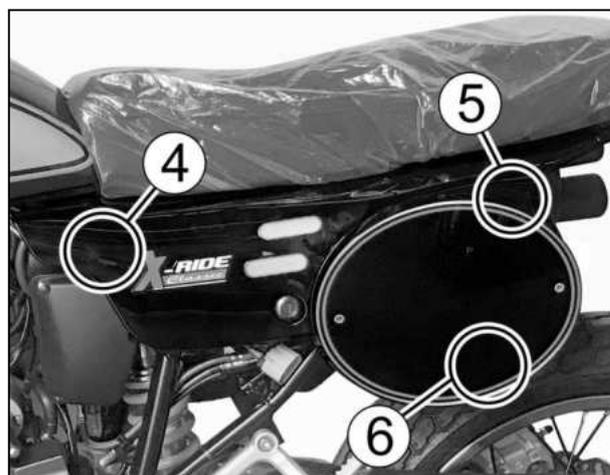


□ Remove the frame cover correctly

- After removing the hooks①、②、③and remove the right cover.



- After removing the hooks ④、⑤、⑥and remove the left cover.



- **Drain the oil and the coolant;**
- Remove the oil drain plug and drain the engine oil.

Engine oil: SAE10W-40

ENGINE OIL CAPACITY	
Oil change	850ml
Oil and filter change	950ml
Engine overhaul	1,400ml

- Remove the exhaust pipe,remove the thermostat water pipe, remove the lower water pipe;
- Drain the antifreeze.

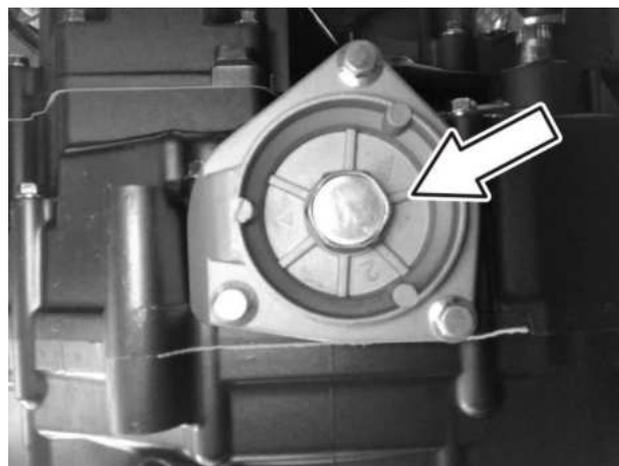
 **CAUTION**

First add liquid antifreeze is about 0.75L, replacement and maintenance add at about 0.7 L.

Antifreeze level shall not exceed the upper scale line, nor below the lower scale line.

Antifreeze liquid level should be the water tank between two scale marks, if necessary, add or remove.

- **Remove the thermostat water tank:**
- Remove the fastening bolts of the radiator and remove the radiator.

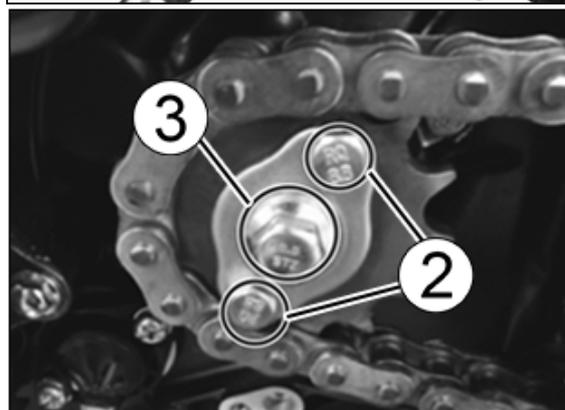


3-4 ENGINE

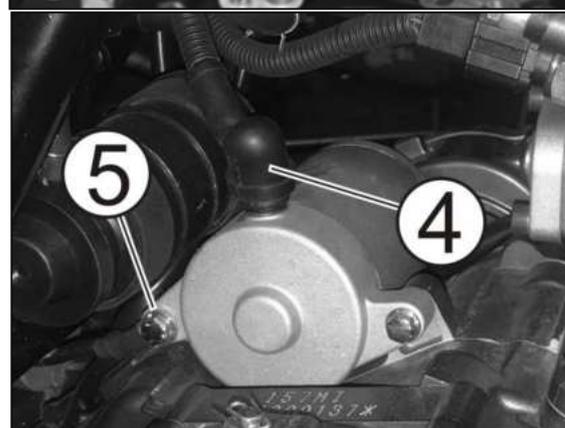
- Remove the small sprocket;
- Remove the two fastening bolts ① and remove the sprocket cover.



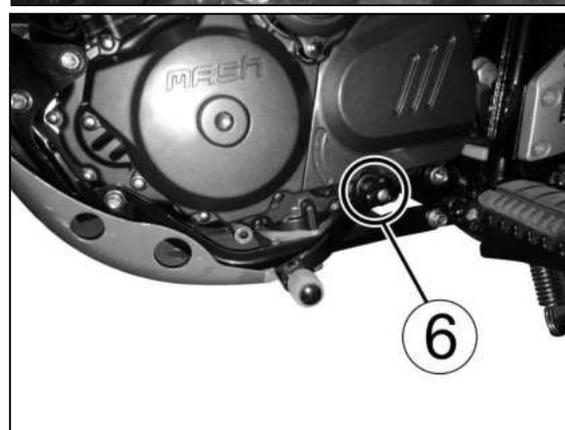
- Remove the two tightening screws and one axle bolt. ②③
- Remove the chain wheel.



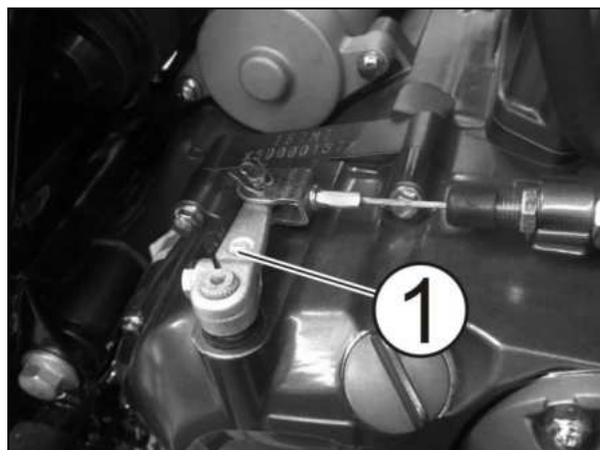
- Remove the idle speed control conducting wire ④.
- Remove the ground conducting wire ⑤.



- Remove the gear display switch ⑥.

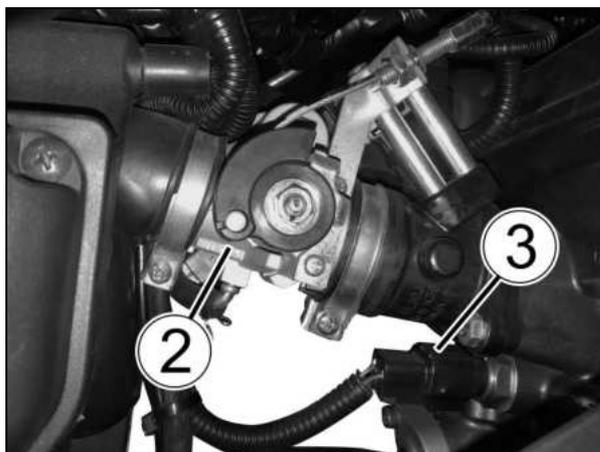


□ Remove the clutch cable①.

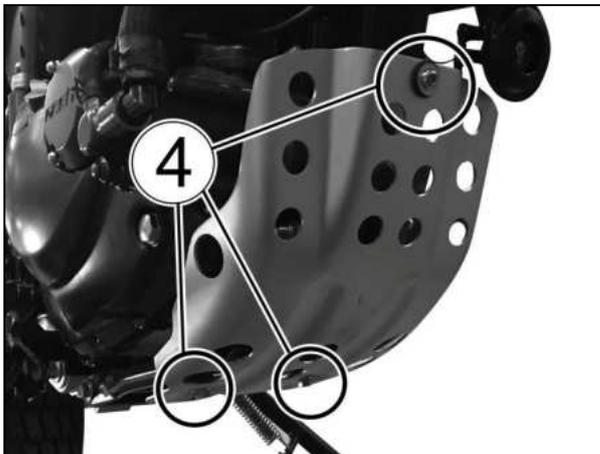


□ Remove the throttle body②.

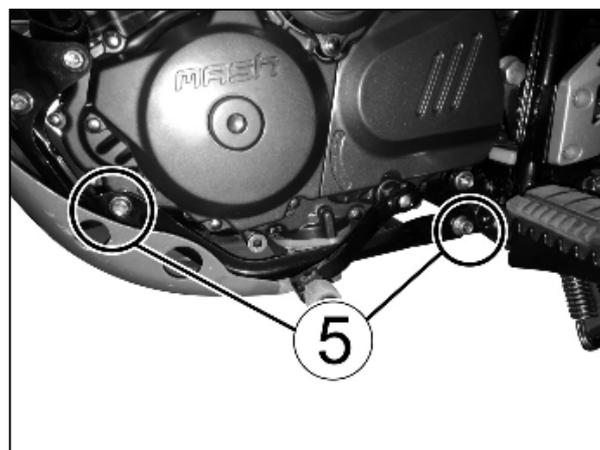
□ Remove the cylinder temperature sensor③



□ Remove the fixing bolts of the engine guard.
④

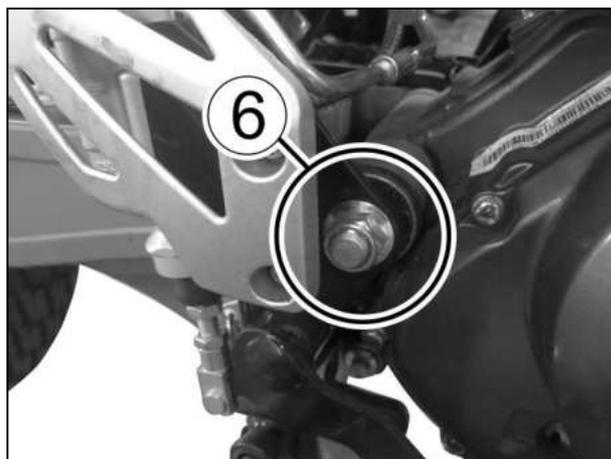


□ Remove the four left and right fixing bolts of the engine guard bracket.⑤

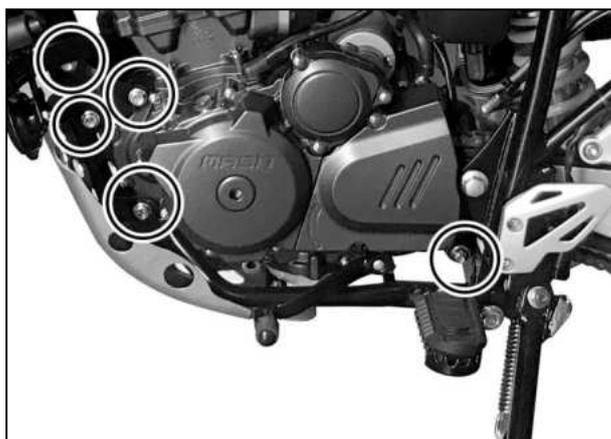


3-6 ENGINE

- Remove the nut of rear fork axle⑥



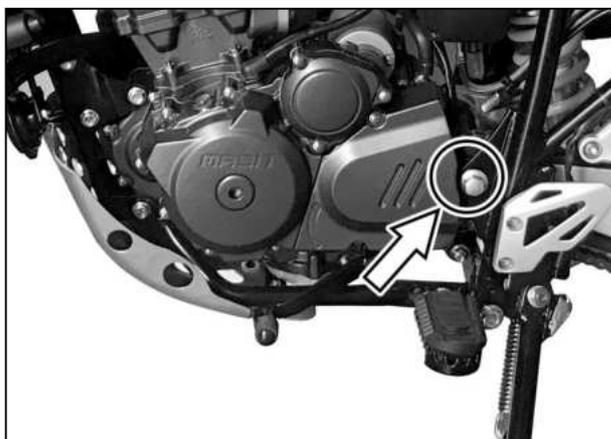
- Remove the tighten bolt of engine



- Pull out part of the rear fork axle so that the engine can be removed.

Note:

Please note do not to pull out the whole rear fork axle



- Take off the engine slowly.



□ Engine decomposition

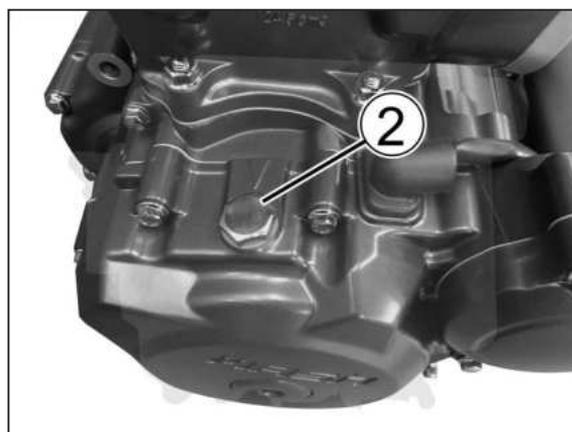
- Take off the bolts of cylinder head cover①.

NOTE

Beat the cylinder head cover with a rubber hammer.



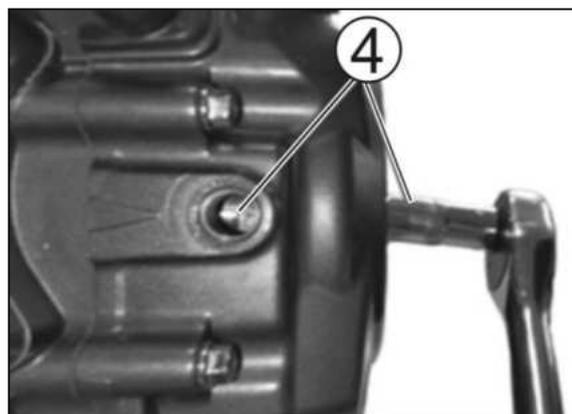
- Remove the plug②.



- Remove the plug③.

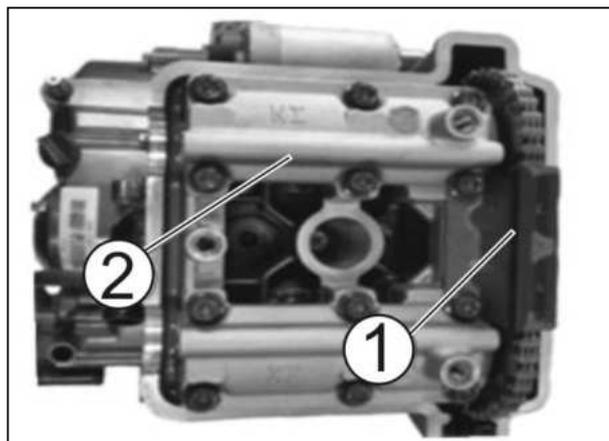


- Rotate the magneto rotor④ to set the front cylinder's piston at TDC (Top Dead Center) of the compression stroke. (Rotate the rotor until "T" line on the rotor is aligned with the center of hole on the crankcase.)

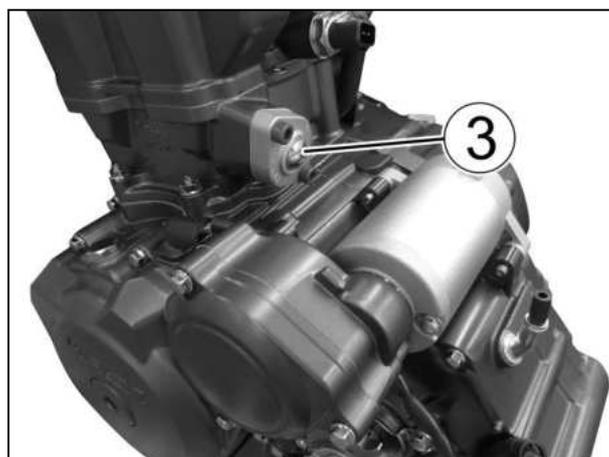


3-8 ENGINE

- ▣ Remove the chain guide II ①.
- ▣ Remove the head ass'y,cylinder②.



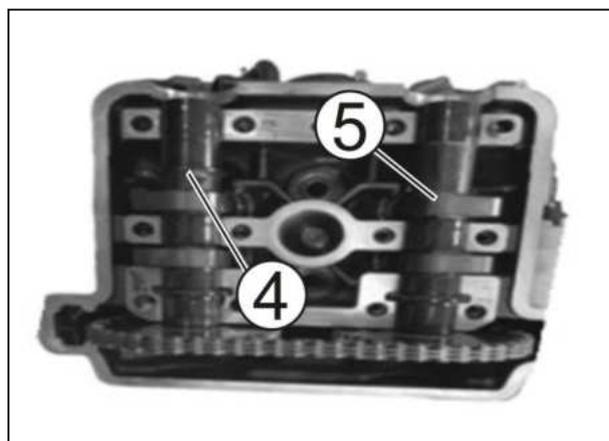
- ▣ Loosen the chain tensioner③.



- ▣ Remove the camshaft comp,intake④ and camshaft comp,exhaust⑤.

NOTE

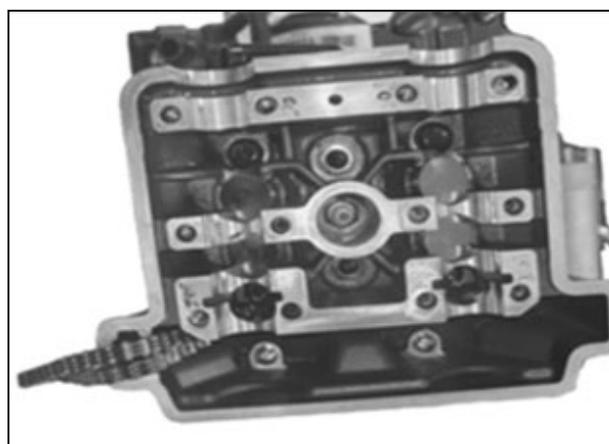
Be careful that the chain falls into the crankcase.



- ▣ Remove the cylinder head.

NOTE

Beat the cylinder with the rubber hammer.



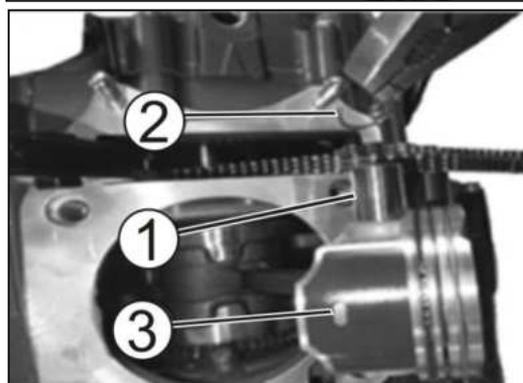
□ Remove the cylinder block.



□ Remove the circlip, piston pin ②.

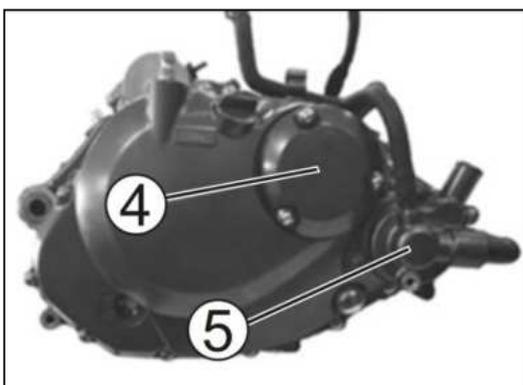
□ Remove the pin, piston ①.

□ Take off the piston ③.



□ Remove the cap ④ and filter comp, engine oil.

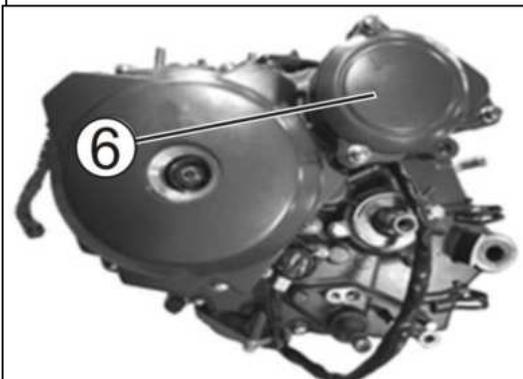
□ Remove the water pump tee ⑤.



□ Remove the cover comp, clutch.

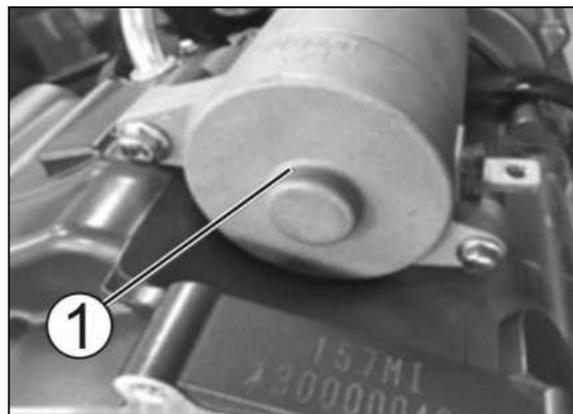


□ Remove the cover, starter idle gear ⑥.

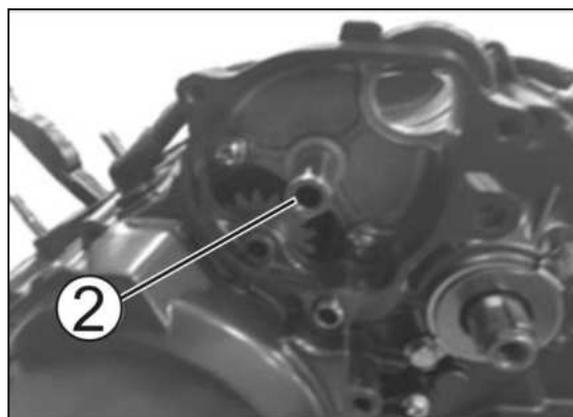


3-10 ENGINE

Remove the motor assy, starting ①.



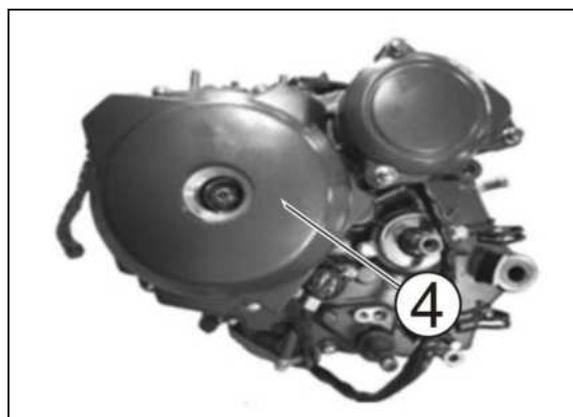
Remove the gear ②.



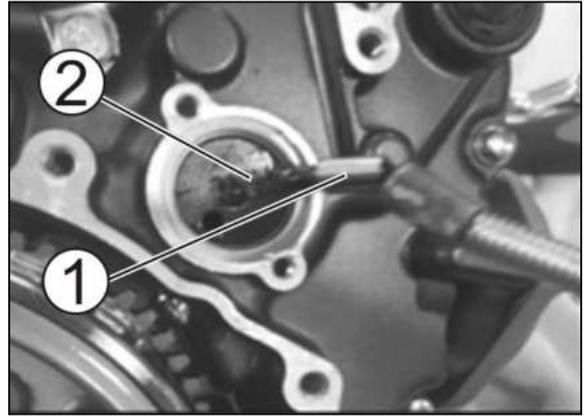
Remove the switch assy, gear shift ③.



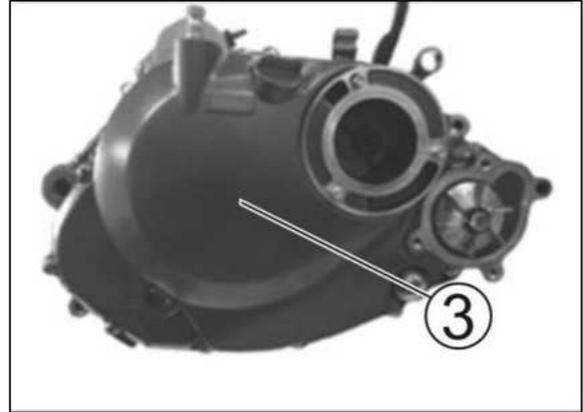
Remove the cover, magneto ④.



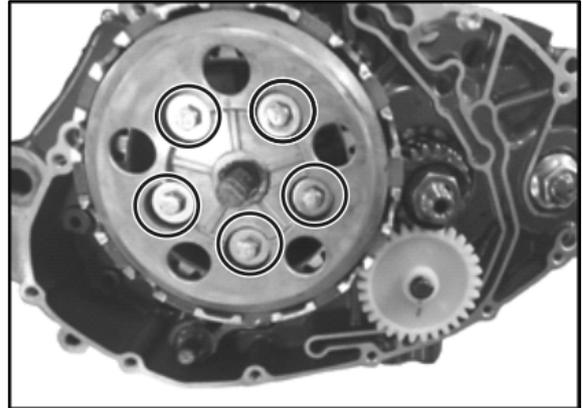
- ▣ Remove the contact, gear shift switch ① and spring, gear shift switch contact ②.



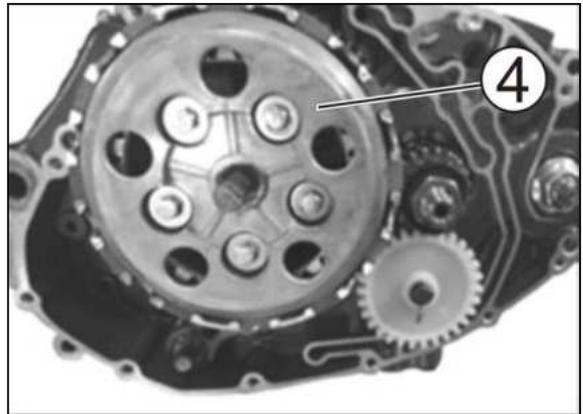
- ▣ Remove the cover comp, clutch ③.



- ▣ Remove the five clutch pressure plate bolts.

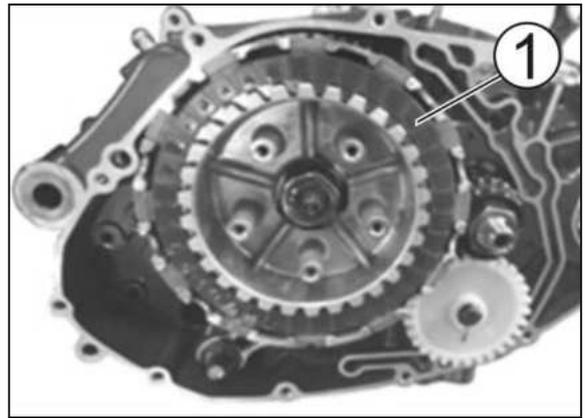


- ▣ Remove the disk, clutch pressure ④.

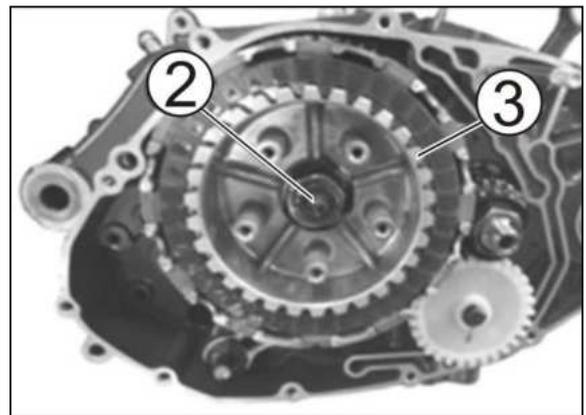


3-12 ENGINE

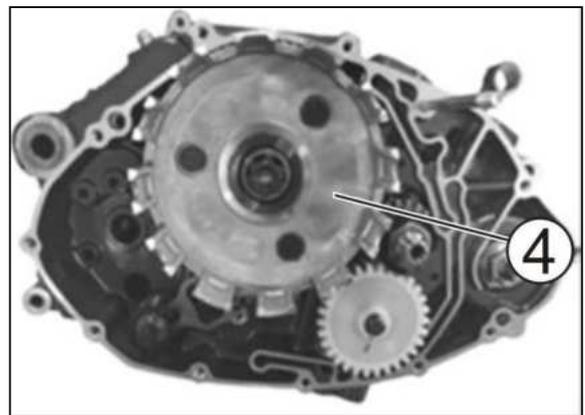
- ▣ Remove the plate,clutch drive and plate, clutch driven①.



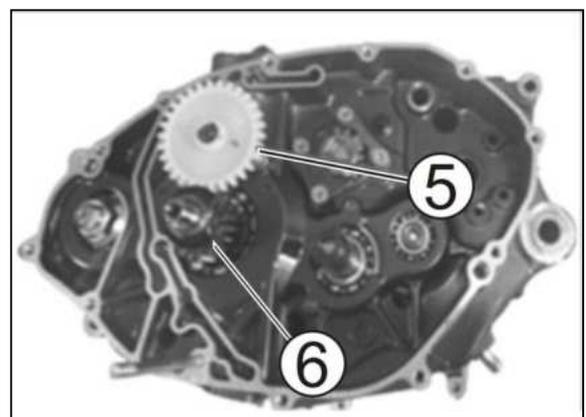
- ▣ Remove the clutch compression nut ②, and remove the clutch spline sleeve ③.



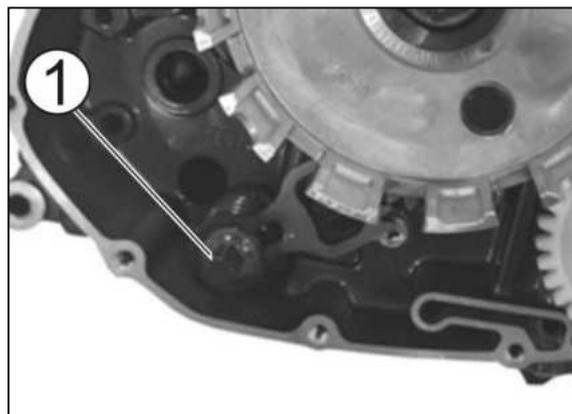
- ▣ Remove the gear assy,primary driven④.



- ▣ Remove the primary driving gear and drive gear of oil pump⑤.
- ▣ Remove the gear of oil pump⑥.



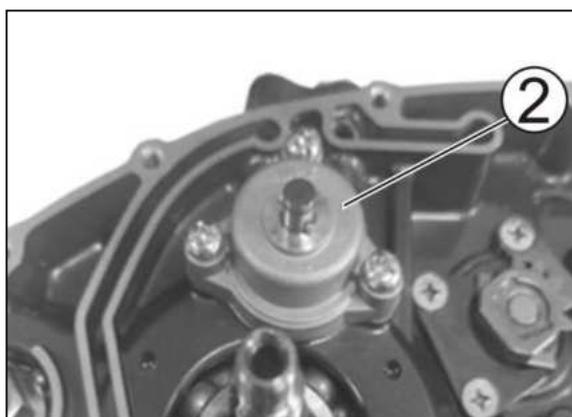
- ▣ Remove the shift shaft assembly ①.



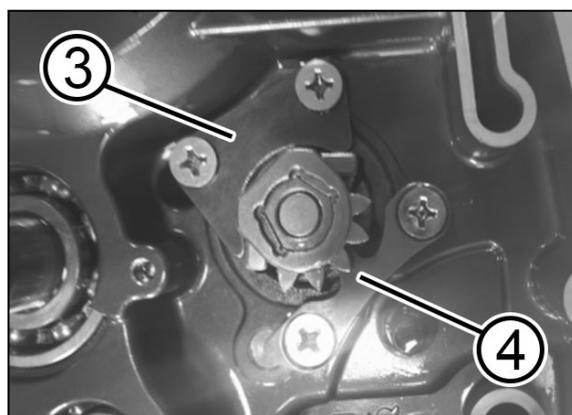
- ▣ Remove the oil pump assembly ②.

NOTE

Be careful that the oil pump couldn't be separated.



- ▣ Remove the two bolts of the cam baffle, and remove the cam baffle ③.
- ▣ Remove the two bolts of the cam holder, and remove the cam holder ④.

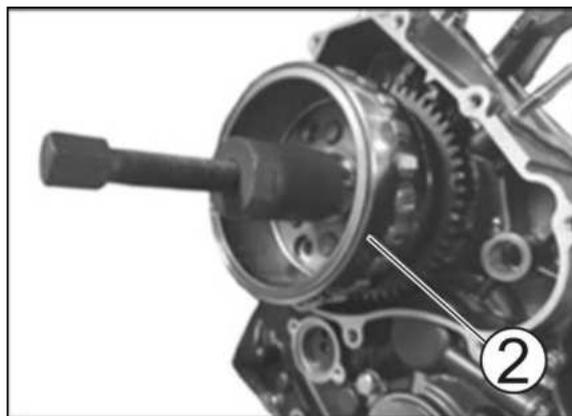


- ▣ Remove the gear shift rocker arm follower gear block.

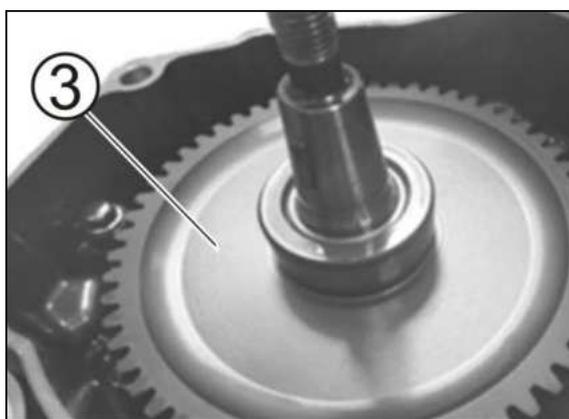


3-14 ENGINE

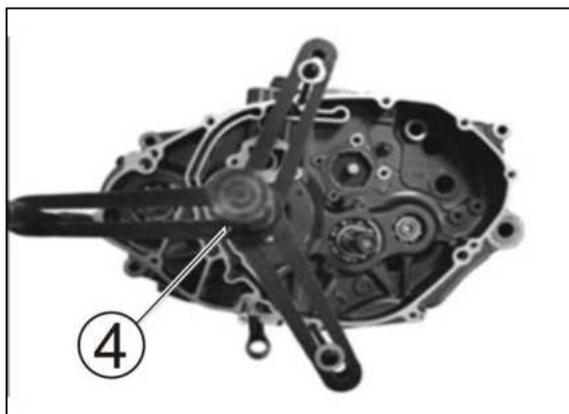
□ Remove the magnet motor rotor ②.



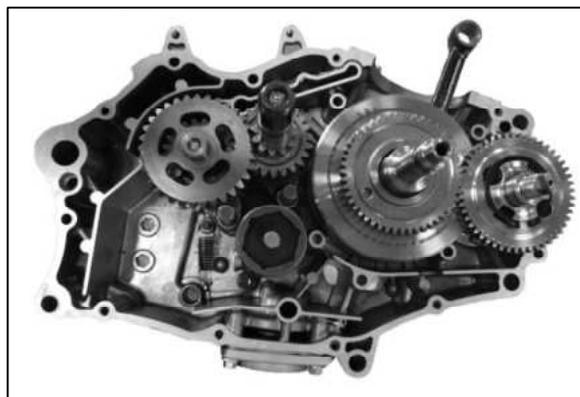
□ Remove the start the driven gear ③.



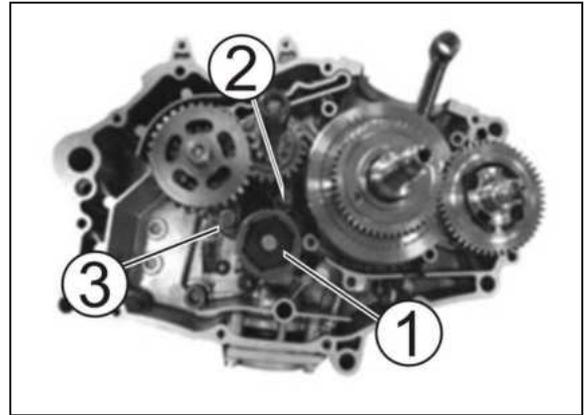
□ Fix the unpacking machine ④ as the picture.



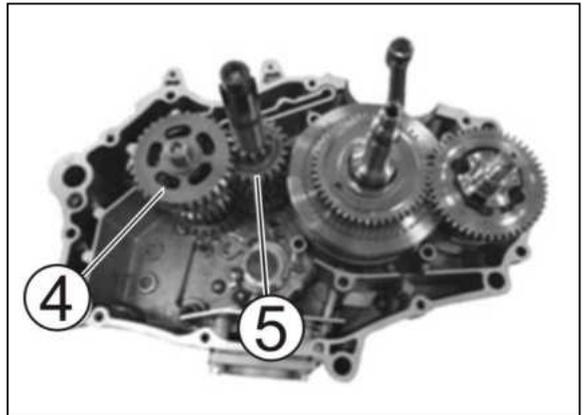
□ Remove the left box.



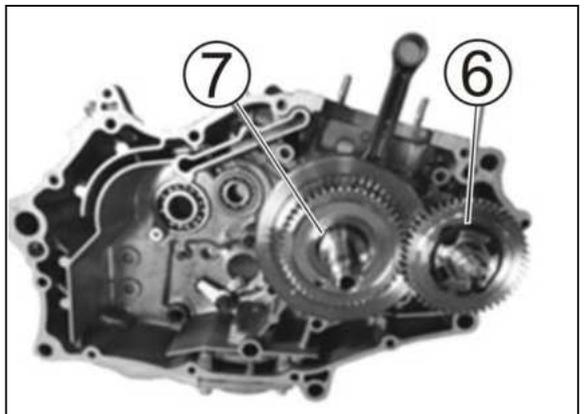
- Remove the cam comp,gear shift①.
- Remove the fork,gear shift NO.1 and shaft,gear shift fork NO.1②.
- Remove the fork,gear shift NO.3 and shaft,gear shift fork NO.2③.



- Remove the shaft comp,drive④.
- Remove the shaft comp,counter⑤.



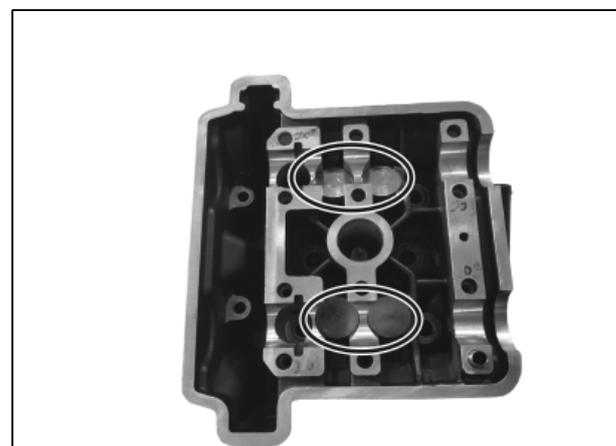
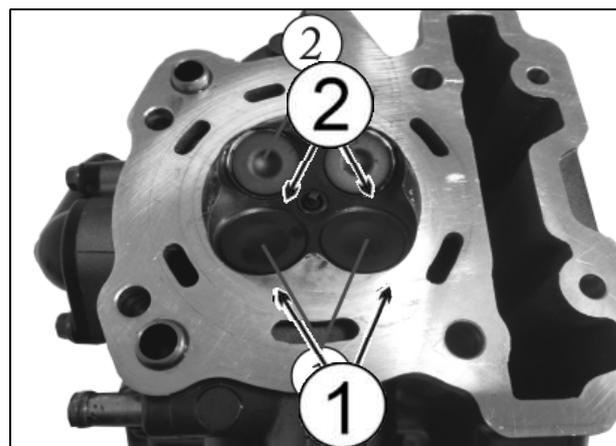
- Remove the shaft comp,crank balancer⑥.
- Remove the crankshaft assy⑦.



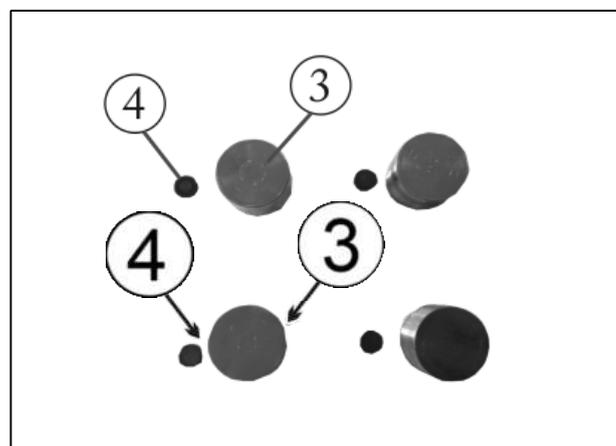
□ **Cylinder head combination decomposition**



□ See if the valve room is carbon-accumulating.
Two intake valve, slightly larger in diameter.
Two exhaust valve, slightly smaller in diameter.

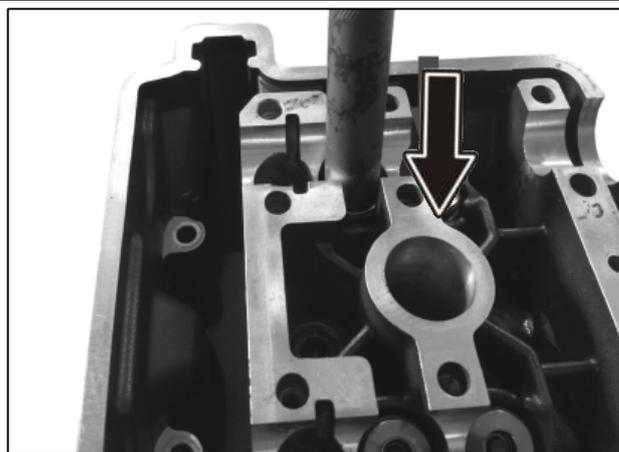


□ Remove the four valve lifters^③ and adjusting shims^④, and pay attention to their installation positions, do not mix them during assembly.



□ Pressurized gas door lock disassembly device, remove the lock plate, remove the valve base, valve oil seal.

The same removal method for the intake and exhaust valves.



Valve lock plate①.

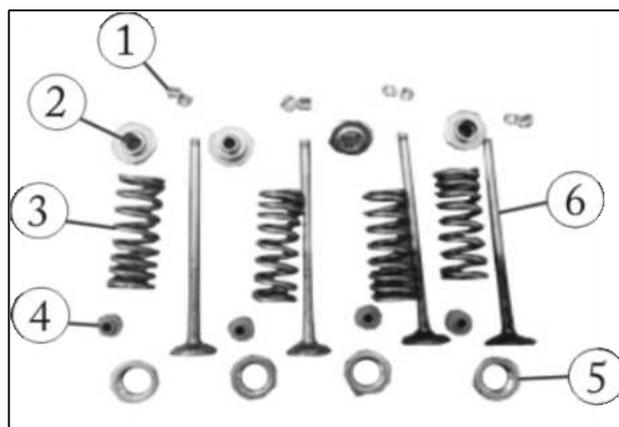
Valve retainer②.

Valve spring ③.

Valve oil seal④.

Valve spring seat⑤.

Valve ⑥.



NOTE

When combining the cylinder heads, use a special tool (valve lock chip installer) to press down the valve spring to install the lock gasket in place.

3-18 ENGINE

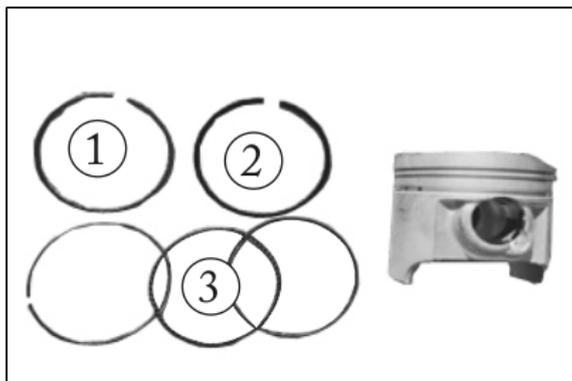
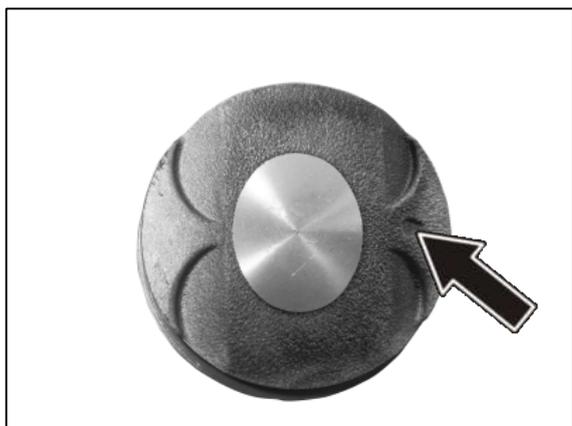
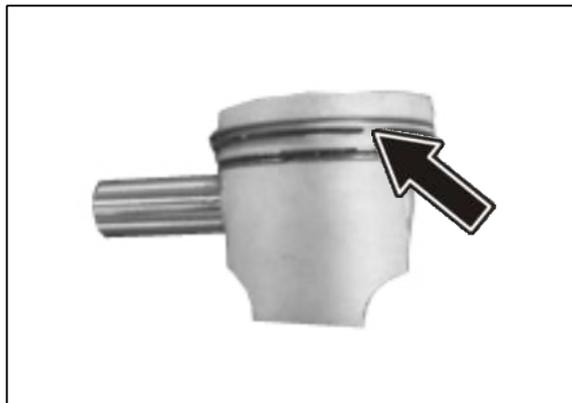
When the piston ring is installed, 3 ring openings are staggered 120° respectively.

NOTE

When installing the piston, the top notch portion corresponds to the valve and the arrow markings on the piston face the exhaust valve.

NOTE

Note When replacing:
A gas ring chrome plating ①.
Two air ring Black ②.
Three oil ring combination up and down a scraper ring, the middle is a spring-like oil storage ring ③.



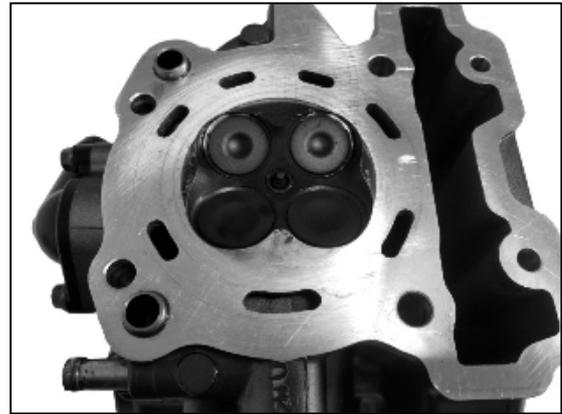
Engine assembly Considerations

1. Reverse operation in the above order.
2. The disassembled engine must be cleaned clean.
3. When the left and right box is merged, apply the sealant evenly and the fixing bolt diagonally according to the torque requirement to lock.
4. When installing the piston, apply lubricating oil.
5. The mounting cylinder head must be aligned with the timing mark, the requirement corresponds to the magnetorotor mark, the fixed bolt diagonally according to the torque requirements locking, the valve clearance must be within the specified value.
6. Clutch large hub, magneto rotor, small sprocket according to the torque requirements of the lock.
7. The engine uses the oil label SAE10W-40 and the oil volume is 1400ml, which is required to be between the upper and lower scales of the oil window;
8. Water tank filling antifreeze 0.1L, required between the upper and lower scales.
9. 0.9L of antifreeze in radiator.

INSPECTION AND MAINTENANCE OF ENGINE COMPONENTS

CAUTION

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as “cylinder”, “Exhaust”, “Intake” so that each will be restored to the original location during assembly.



□ VALVE DISTORTION

Decarbonate in combustion chamber.

Check the gasketed surface of the valve for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the valve.

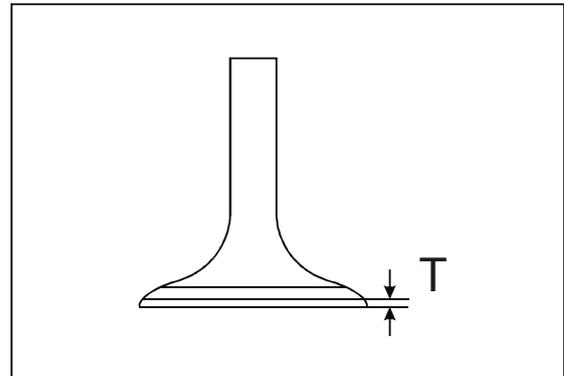
valve distortion	Service limit
	0.05 mm

Thickness gauge: 09900-20806

□ VALVE FACE WEAR

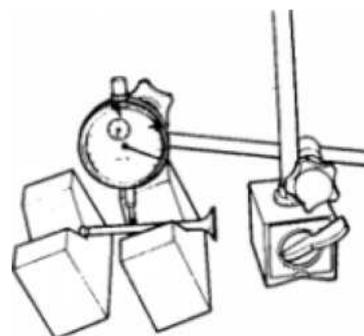
Visually inspect each valve face for wear.

Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head T. If it is out of specification, replace the valve with a new one.



Valve face wear	Service limit
	0.5 mm

Vernier calipers :



□ VALVE STEM RUNOUT

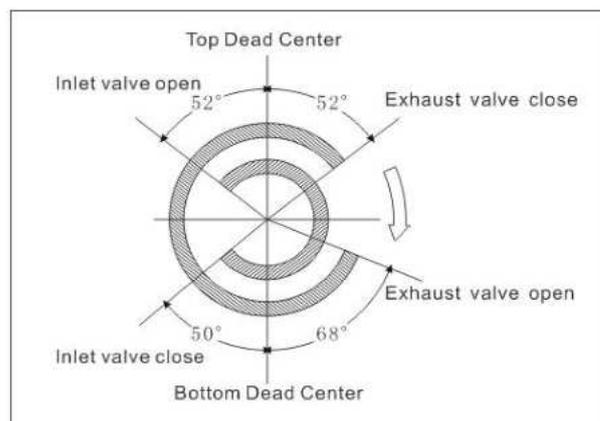
Check the valve stem for abnormal wear or bend. Place the valve on V-blocks and measure runout. If the service limit is exceeded or abnormal condition exists, replace the valve.

Valve stem runout	Service limit
	0.05 mm

Dial gauge :

Magnetic stand :

V-block :



□ CAMSHAFT

The camshaft should be checked for runout and also for wear of cams and journals if the engine has been noted to produce abnormal noise or vibration or a lack of output power. Any of these abnormalities could be caused by a worn camshaft.

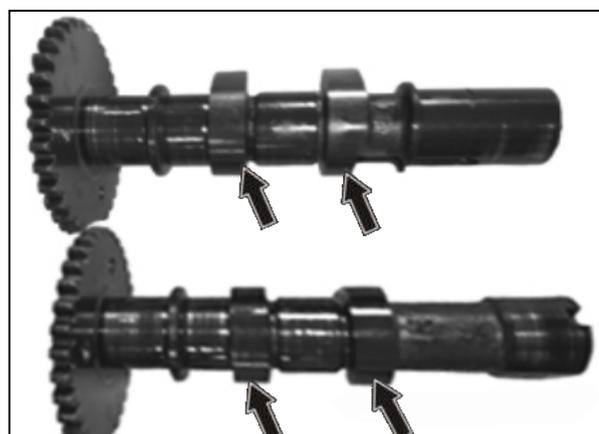
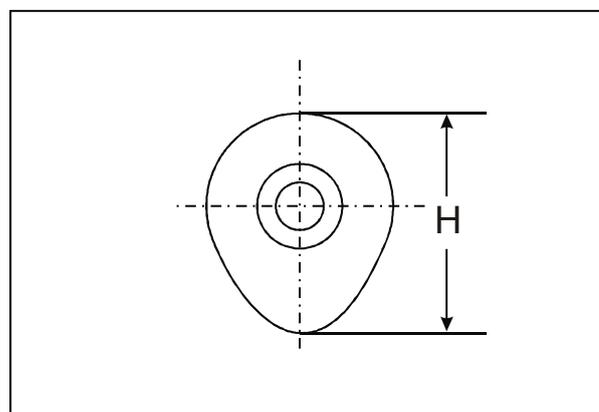
□ CAMSHAFT WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power.

The limit of cam wear is specified for both intake and exhaust cams in terms of cam height H, which is to be measured with a micrometer. Replace camshafts if found worn down to the limit.

Cam height H	Service limit
Intake cam	29.67mm
Exhaust cam	30.04mm

Micrometer(25~50 mm) :09900-20202



3-22 ENGINE

□ VALVE GUIDE-VALVE STEM CLEAR- ANCE

Measure the clearance in the valve guide-valve stem, by rigging up the dial gauge. If the clearance is measured exceeds the limit specified below, then determine whether the valve or the guide should be replaced to reduce the clearance to within the standard range:

Valve guide-valve stem clearance	Standard
IN.	0.010~0.037 mm
EX.	0.030~0.057 mm

Dial gauge : 09900-20606

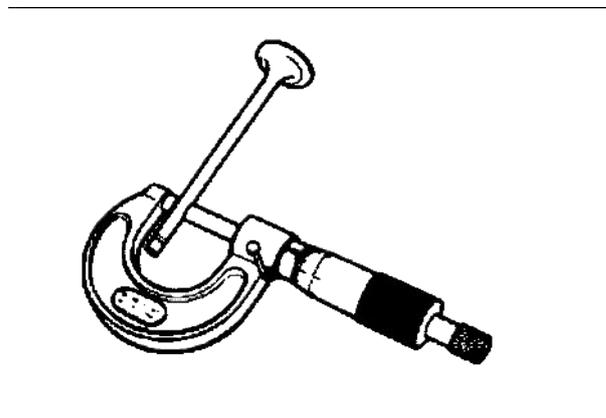
Magnetic stand:09900-20701

□ VALVE STEM DIAMETER

Measure the valve stem outside diameter. If the diameter measured exceeds the standard, replace the valve.

Valve stem diameter	Standard
IN.	4.975~4.990 mm
EX.	4.955~4.970 mm

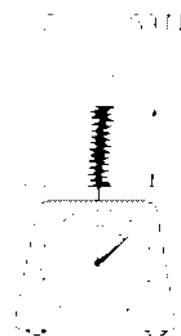
Micrometer(0~25 mm) :09900-20201



□ VALVE SPRING

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace both the inner and outer springs as a set.



Valve spring free length(IN. & EX.)	Service limit
	38.2 mm

Veniercalipers :09900-20101

Valve spring tension (IN. & EX.)	Standard
	19.4~22.4kgf (at length 31.5mm)

□ **CYLINDER DISTORTION**

Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

Cylinder distortion	Service limit
	0.05 mm

Thickness gauge :09900-20806

□ **CYLINDERBORE**

Measure the cylinder bore diameter at six place. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize, or replace the cylinder.

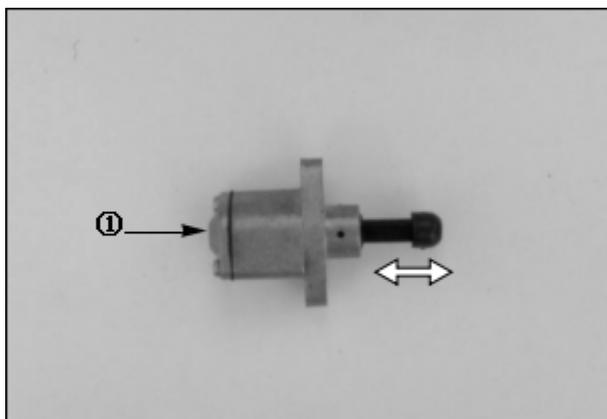
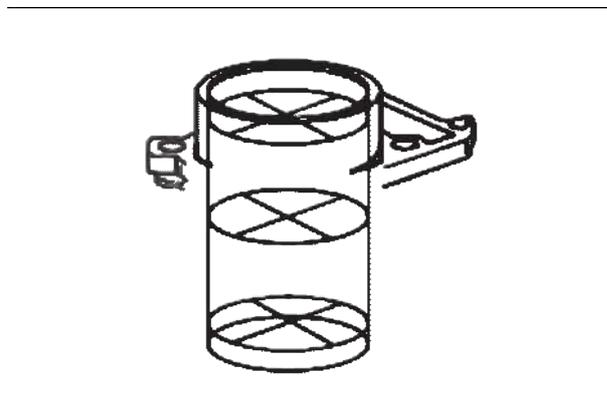
Cylinder bore	Standard	Service limit
	58.000~58.015 mm	58.040 mm

Cylinder gauge set :09900-20508

□ **CAM CHAIN TENSION ADJUSTER**

Check that the push rod slides smoothly with the lock shaft handle ① clockwise (↻).

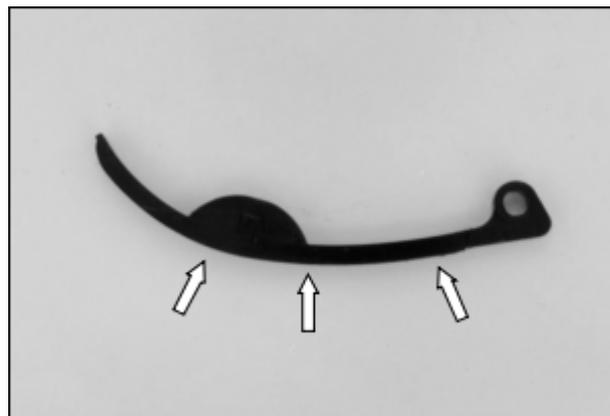
If it does not slide smoothly, replace the cam chain tension adjuster with a new one.



□ CAM CHAIN TENSIONER

Check the contacting surface of the cam chain tensioner.

If it is worn or damaged, replace it with a new one.



□ CAM CHAIN AND CAM CHAIN GUIDE

Check the cam chain for wear, damage and kinked or binding links. If any defects are found, replace it with a new one.

Check the cam chain guide for wear and damage. If it is found to be damaged, replace it with a new one.



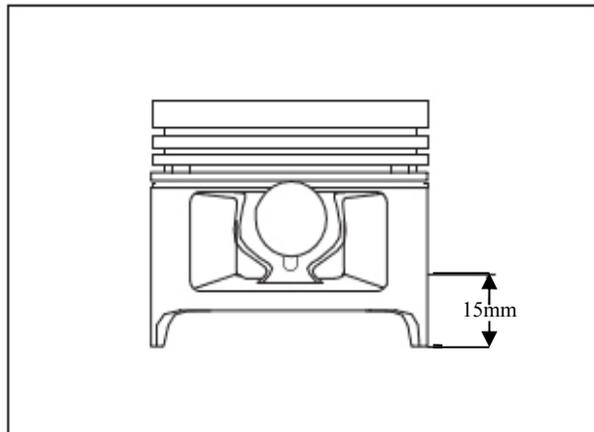
□ PISTON DIAMETER INSPECTION

Measure the outside diameter of piston in the direction perpendicular to the piston pin axis at the height from the skirt as shown in the illustration using a micrometer.

If the measurement is found less than the service limit, replace the piston.

Piston diameter	Service limit
	57.880 mm

Micrometer(50~75 mm) :09900-20203



□ PISTON-TO-CYLINDER CLEARANCE

To determine the piston-to-cylinder clearance, calculate the difference between the cylinder bore and outside diameter of the piston.

Piston-to-cylinder clearance	Standard	Service limit
	0.040~0.070 mm	0.120 mm

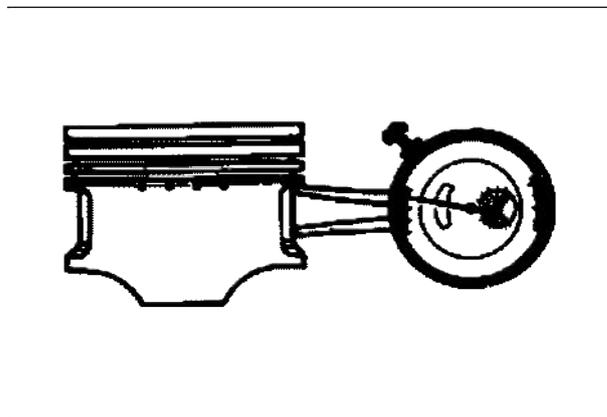
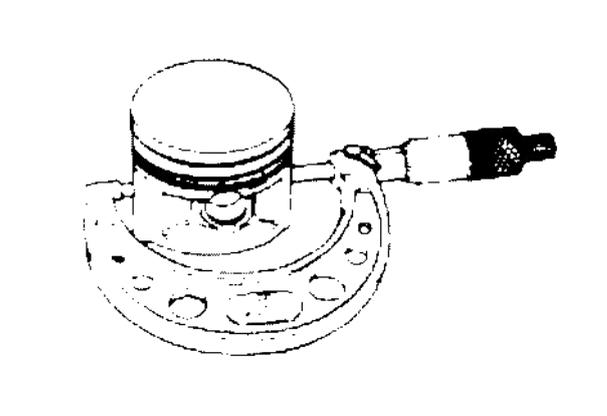
□ PISTON PIN HOLE BORE

Using a dial calipers, measure the piston pin hole bore both in the vertical and horizontal directions.

If the measurement exceeds the service limit, replace the piston.

Piston pin hole bore	Service limit
	15.030 mm

Dial calipers:09900-20605



□ PISTON PIN DIAMETER INSPECTION

Using a micrometer, measure the piston pin outside diameter at three position, both the ends and the center. If any of the measurements is found less than the service limit, replace the pin.

Piston pin diameter	Service limit
	14.980 mm

Micrometer(0~25 mm) :09900-20201

(0~25 mm) :09900-20201

□ PISTON RING FREE END GAP INSPECTION

Before installing piston rings, measure the free end gap of each ring using vernier calipers. If the gap is less than the service limit, replace the ring.

Piston ring free end gap	Standard
1st	5.8mm
2nd	4.9mm

Vernier calipers :09900-20101

:09900-20101

□ PISTON RING END GAP INSPECTION

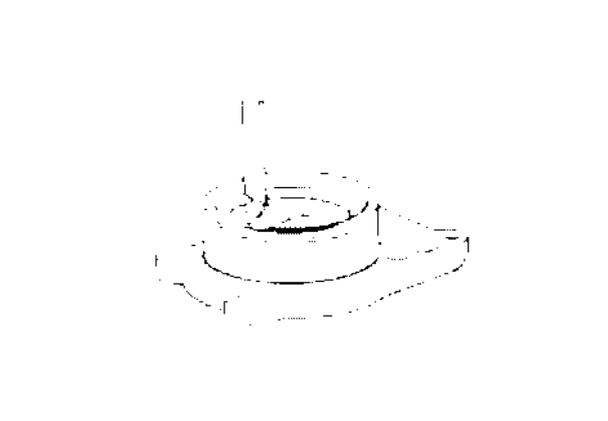
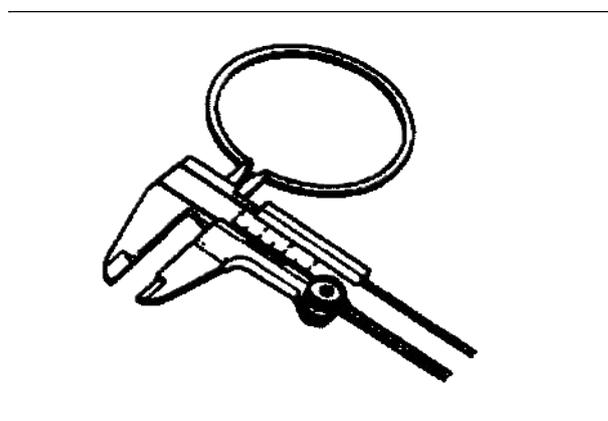
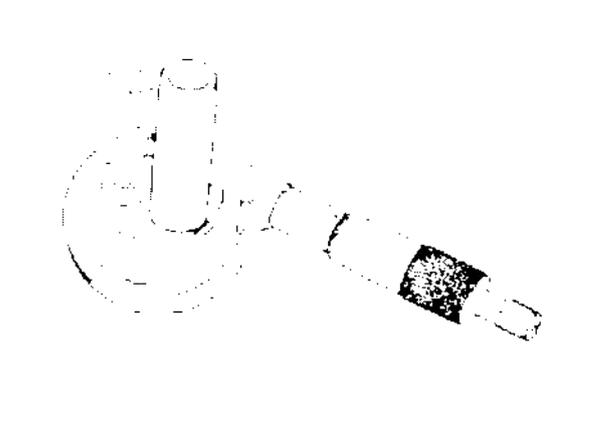
Insert the piston ring squarely into the cylinder using the piston head.

Measure the end gap with a thickness gauge.

If the gap exceeds the service limit, replace the piston ring.

Piston ring end gap(Assembly condition)	Standard	Service limit
1st	0.10~0.25mm	0.5 mm
2nd	0.20~0.35mm	0.7 mm

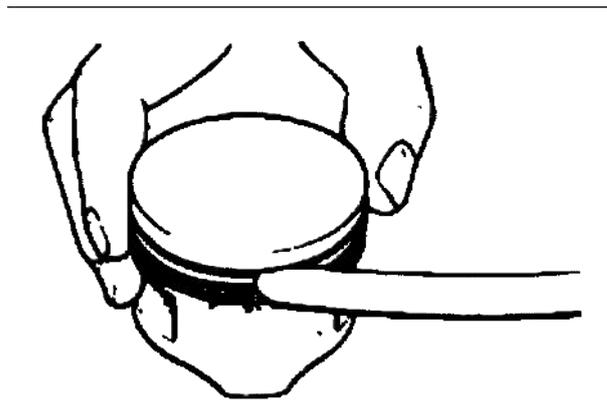
Thickness gauge:09900-20806



PISTON RING-TO-GROOVE CLEARANCE INSPECTION

Remove carbon deposit both from the piston ring and its groove.

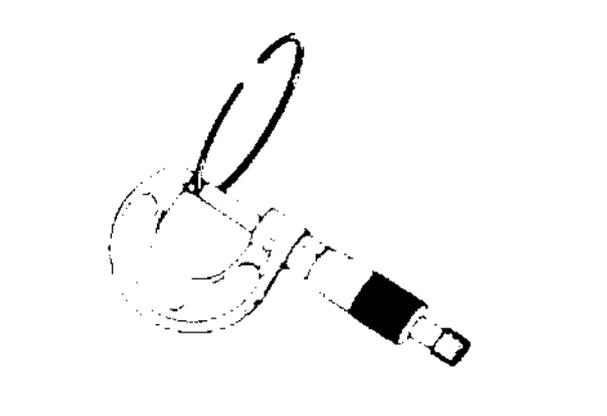
Fit the piston ring into the groove. With the ring compressed and lifted up, measure the clearance on the bottom side of the ring using a thickness gauge.



Piston ring-groove clearance	Service limit
1st	0.180 mm
2nd	0.150 mm

Piston ring-groove width	Standard
1st	1.01~1.03 mm
2nd	1.01~1.03 mm
Oil	2.01~2.03 mm

Piston ring thickness	Standard
1st	0.970~0.990 mm
2nd	0.970~0.990 mm



Thickness gauge: 09900-20806

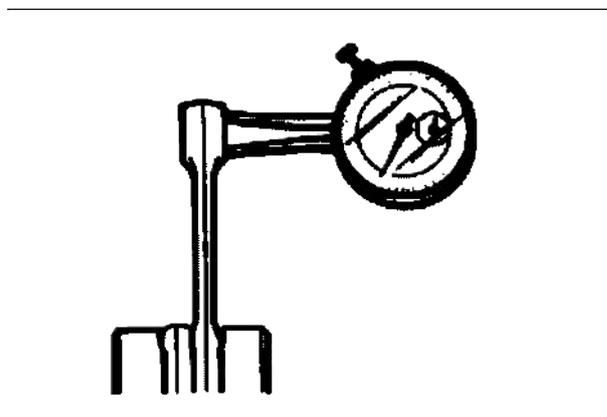
Micrometer(0~25 mm) :09900-20201

Upsize oil ring

The following two types of upsize oil ring are used.

They bear the following identification marks.

Upsize oil ring	Color classification
0.5 mm	Painted red
1.0 mm	Painted yellow

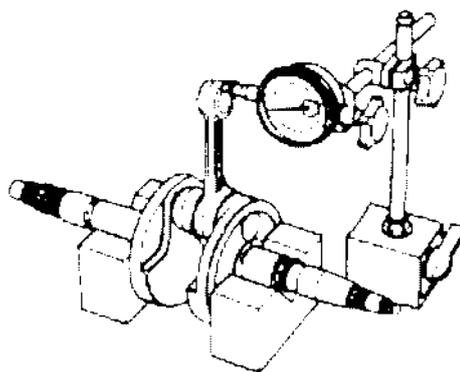


□ CONROD SMALL END INSIDE DIAMETER INSPECTION

Using a dial calipers, measure the conrod small end inside diameter both in vertical and horizontal directions. If any of the measurements exceeds the service limit, replace the conrod.

Conrod small end inside diameter	Standard	Service limit
	13.006~13.014 mm	13.040 mm

Dial calipers :09900-20605

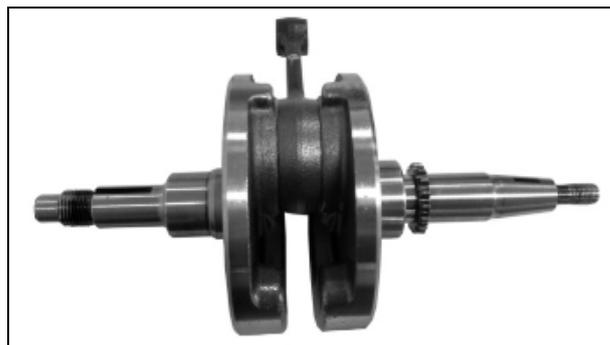


□ CONROD BIG END SIDE CLEARANCE INSPECTION

Using a thickness gauge, measure the side clearance at the conrod big end. If the measurement is out of standard value, measure the conrod big end and the crank pin widths individually to determine which one is to be replaced.

Conrod big end side clearance	Standard	Service limit
	0.40~0.85 mm	1.0 mm

Thickness gauge :09900-20806



□ CRANKSHAFT RUNOUT INSPECTION

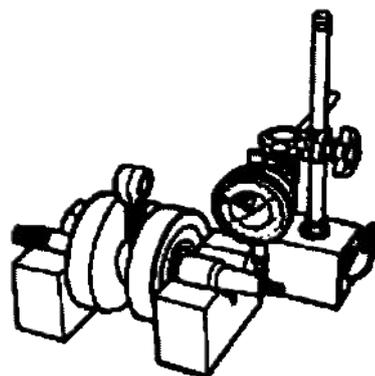
With the right and left crank journals supported with V-block, turn the crankshaft slowly. At this time, measure the crankshaft end runout using a dial gauge. If the runout exceeds the service limit, replace the crankshaft.

Crankshaft runout	Service limit
	0.05 mm

Magnetic stand: 09900-20701

Dial gauge :09900-20606

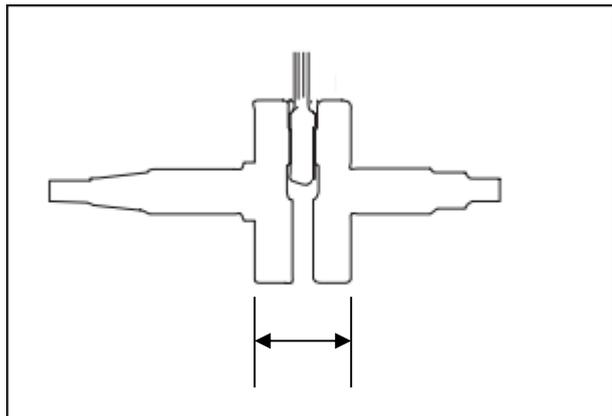
V-block : 09900-21304



□ **CRANKSHAFT REASSEMBLY**

Measure the width between the webs referring to the figure below when rebuilding the crankshaft.

Width between webs	Standard
	72±0.1 mm



MAGNETO ASSY

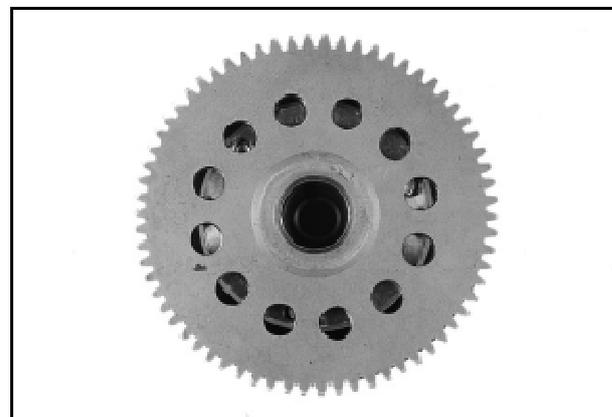
□ **DISASSEMBLY**

Remove the stator.



□ **STARTER CLUTCH**

Install the starter driven gear onto the starter clutch and turn the starter driven gear by hand(the gear turns in only one direction). The starter driven gear should turn smoothly. If excessive resistance is felt while turning the starter driven gear, inspect the starter clutch. Also, inspect the surface of the starter driven gear which contacts the starter clutch, for wear or damage. If any wear or damage is found, replace the defective part(-s).



DISASSEMBLY

Hold the magneto rotor with the rotor holder and remove the starter clutch bolts.

Rotor holder :09930-44510



□ REASSEMBLY

Apply a small quantity of THREAD LOCK“1324”to the starter clutch bolts and tighten them to the specified torque while holding the rotor holder.

 Thread Lock“1324”

Rotor holder:09930-44510

 Starter clutch bolt

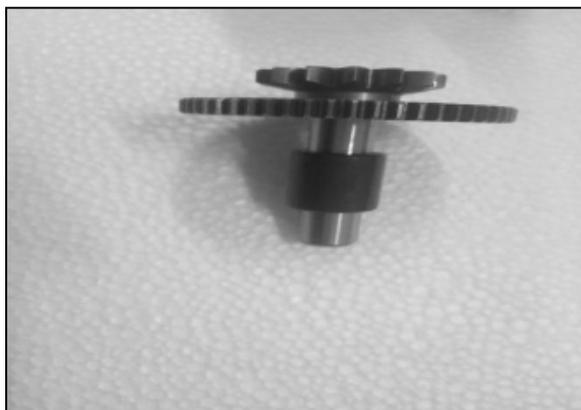
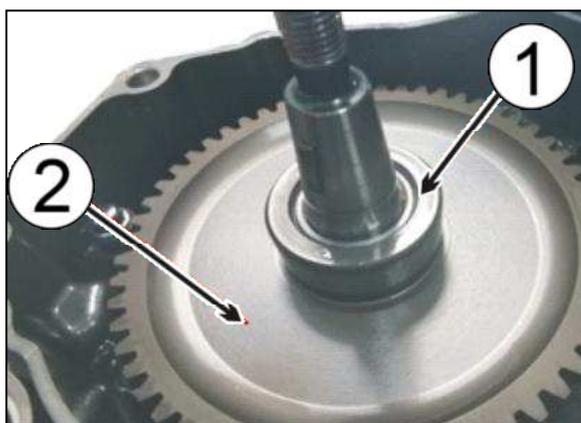
23~28N·m(2.3~2.8kg·m)



STARTER DRIVEN GEAR

□ STARTER DRIVEN GEAR BUSHING

Install the starter driven gear bushing ①and gear ②onto the crankshaft and turn the starter driven gear by hand. Inspect the starter driven gear bushing for smooth rotation and any abnormal noise. If the bushing does not turn smoothly or there is any abnormal noise, replace it.



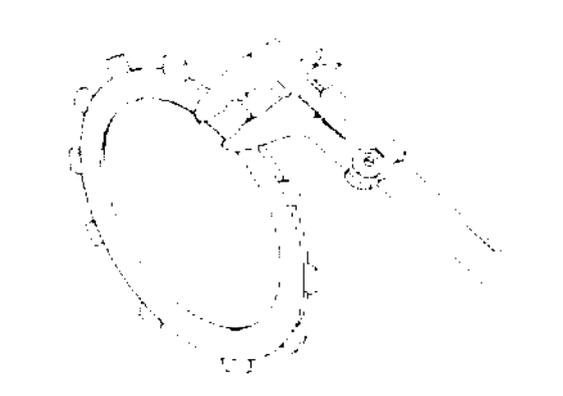
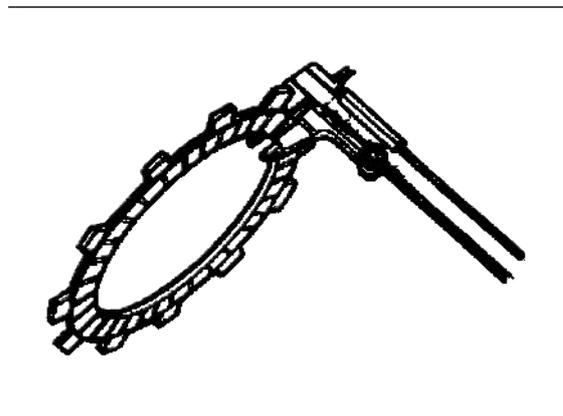
□ CLUTCH DRIVE PLATES

Measure the thickness and claw width of the clutch drive plates using vernier calipers. If a clutch drive plate is not within the service limit, replace the clutch plates as a set.

Clutch drive plate thickness	Standard	Service limit
	2.9~3.1 mm	2.6 mm

Verniercalipers :09900-20101

Clutch drive plate claw width	Standard	Service limit
	11.8~12.0 mm	11.0 mm

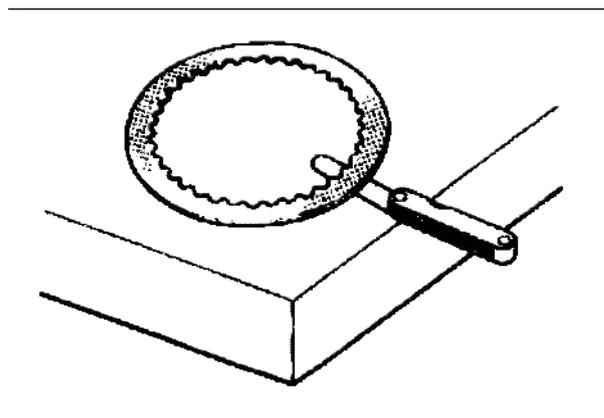


□ CLUTCH DRIVEN PLATES

Measure each clutch driven plates for distortion using the thickness gauge. If a clutch driven plate is not within the service limit, replace the clutch plates as a set.

Clutch driven plate distortion	Service limit
	0.1 mm

Thickness gauge:09900-20806



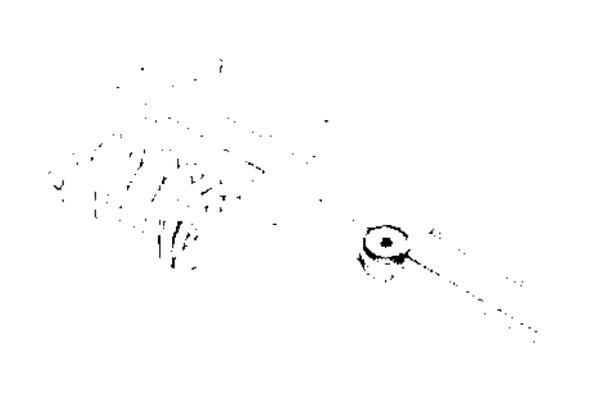
□ CLUTCH SPRING FREE LENGTH

Measure the free length of each clutch spring using vernier calipers. If any spring is not within the service limit, replace all of the spring.

Clutch spring free length	Service limit
	34.3mm

Vernier calipers :09900-20101

:09900-20101



□ CLUTCH RELEASE BEARING

Inspect the clutch release bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.

Smooth engagement and disengagement of the clutch depends on the condition of this bearing.



□ PRIMARY DRIVEN GEAR

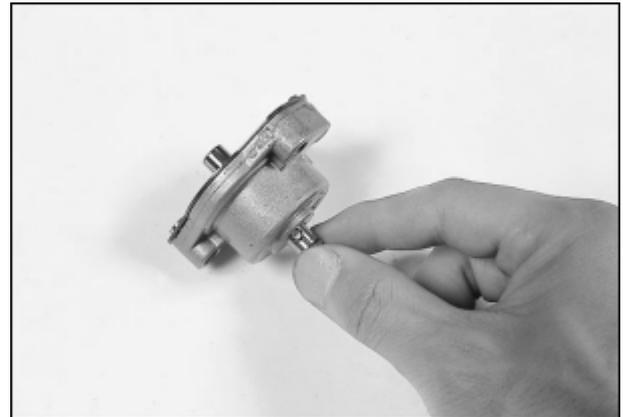
Inspect the primary driven gear bearing for any damage.

If any abnormal condition are found, replace the primary driven gear.



□ **OIL PUMP**

Turn the oil pump shaft and check that rotation is smooth. If any abnormal condition is found, replace the oil pump with new one.



□ **GEARSHIFT SHAFT**

Disassemble and reassemble the gearshift shaft as shown in right picture.



TRANSMISSION

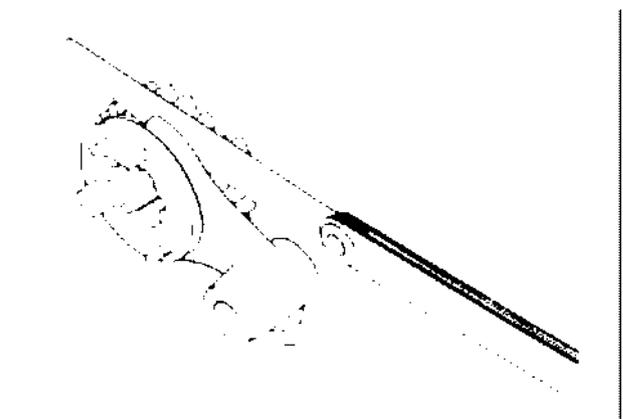
□ **INSPECTION**

Using a thickness gauge, check the clearance between in the groove of its gear and shifting fork.

The clearance for each of the three shifting forks plays an important role in the smoothness and positiveness of shifting action.

If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

Shift fork-groove clearance	Standard	Service limit
	0.10~0.30 mm	0.5 mm

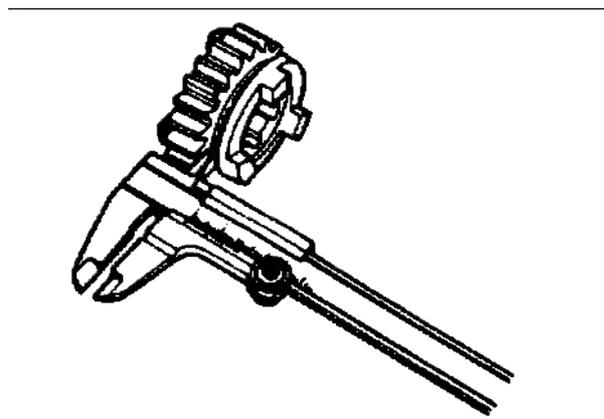


Thickness gauge : 09900-20806

Verniercalipers:09900-20101

Shift fork groove width	Standard
NO.1 & NO.2	5.0~5.1 mm
NO.3	5.0~5.1mm

Shift fork thickness	Standard
NO.1 & NO.2	4.8~4.9 mm
NO.3	4.8~4.9 mm

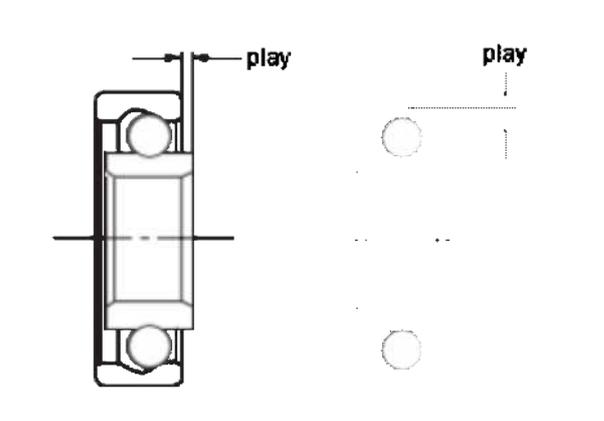


CRANKCASE

□ BEARING INSPECTION

Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.

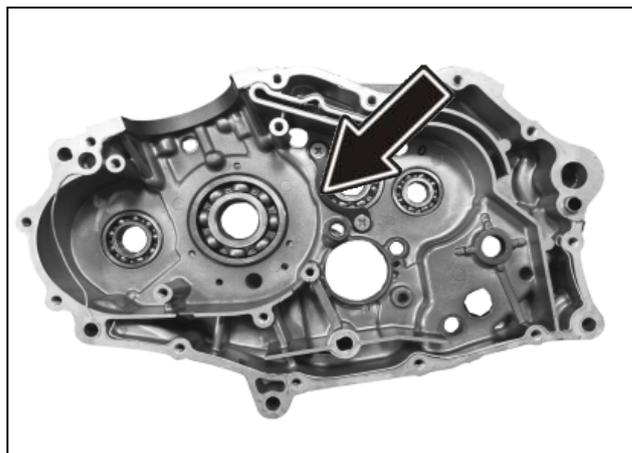
Replace the bearing in the following procedure if there is anything unusual.



□ DISASSEMBLY

□ RIGHT CRANKCASE BEARING

Remove the bearing retainer.

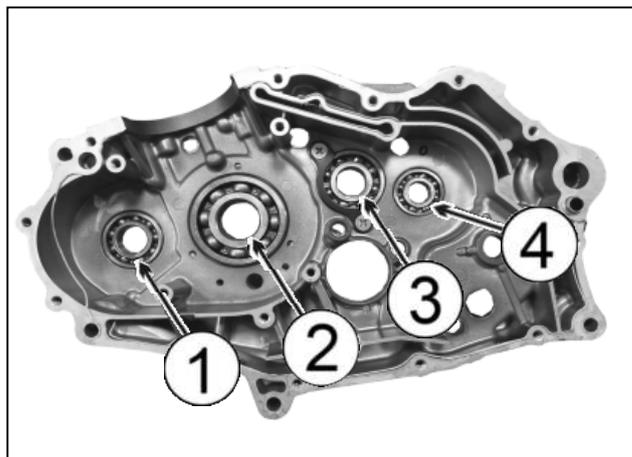


Remove the bearings ①②③and ④.

Bearing remover(17 mm) : 09923-73210

Bearing remover(20~35 mm) :09923-74510

Bearing installer:09913-76010



 CAUTION

The removed bearings should be replaced with a new one.

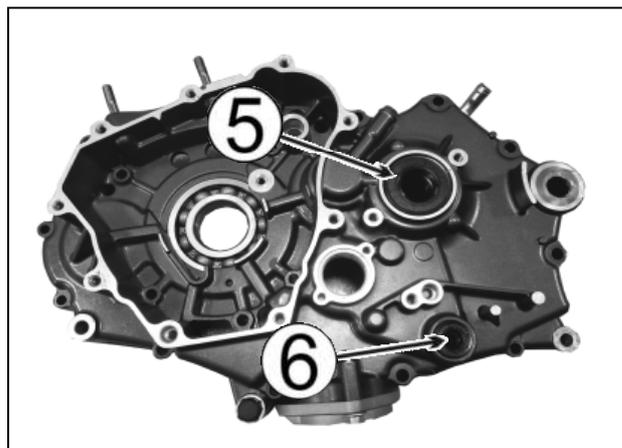
S

□ LEFT CRANKCASE BEARING

Remove the oil seals ⑤ and ⑥.

Oil seal remover :09913-50121

:09913-50121



Remove the bearing retainer.



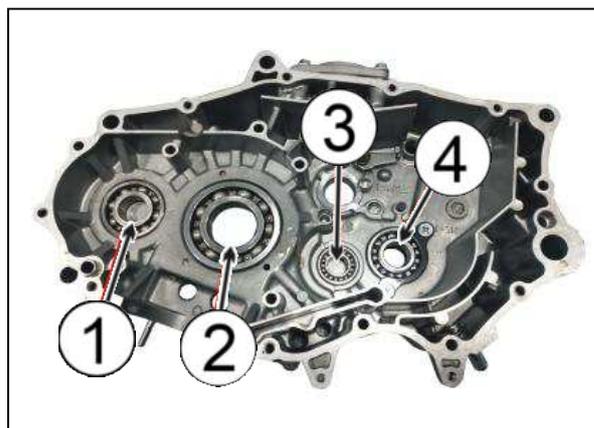
Remove the bearings ①②③and④.

Bearing remover(17 mm) : 09923-73210

(17 mm) : 09923-73210

Bearing remover(20~35 mm) :09923-74510

(20~35 mm) :09923-74510



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PRECAUTIONS IN SERVICING

When handling the component parts or servicing the EI system, observe the following points for the safety of the system.

⊙ ELECTRICAL PARTS

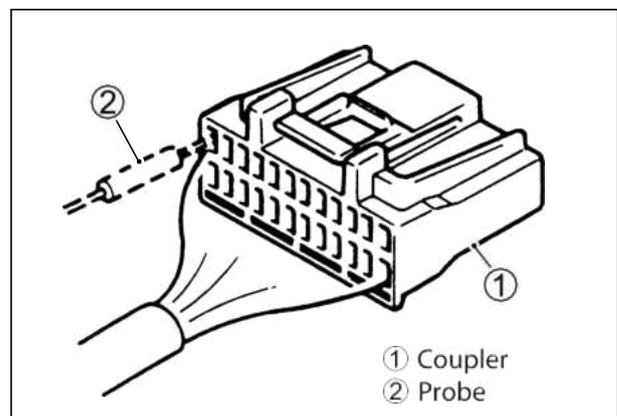
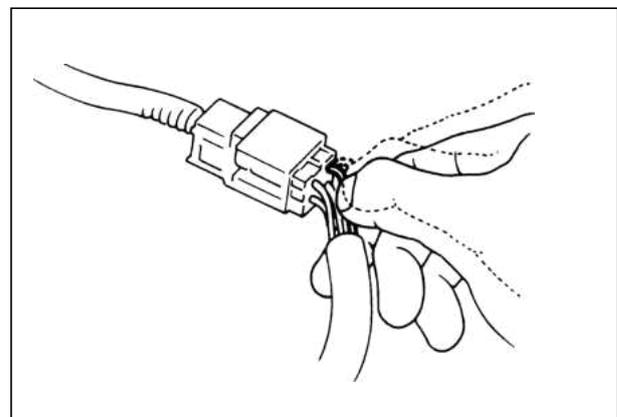
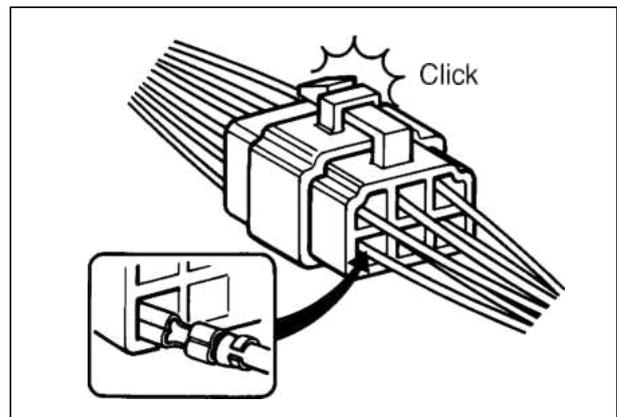
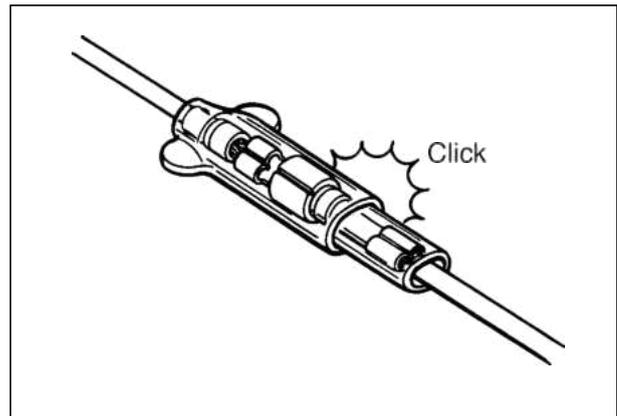
▣ CONNECTOR / COUPLER

- When connecting a connector, be sure to push it in until a click is felt.
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully till the works when connecting it.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector / coupler for looseness or bending.
- Inspect each terminal for corrosion and contamination.

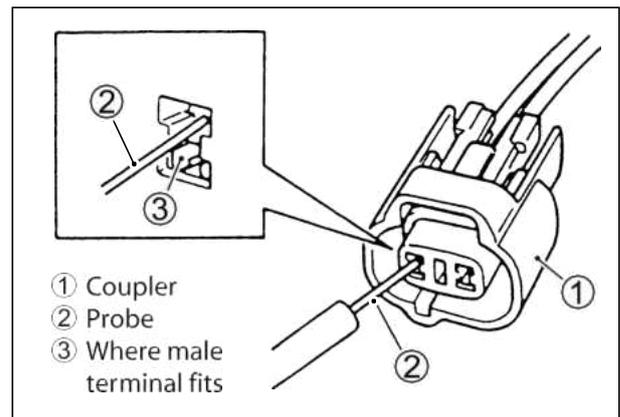
The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.

- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector / coupler.



- When connecting meter probe from the terminal side of the coupler (connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open. Connect the probe as shown to avoid opening of female terminal. Never push in the probe where male terminal is supposed to fit.
- Check the male connector for bend and female connector for excessive opening. Also check the coupler for locking (looseness), corrosion, dust, etc.

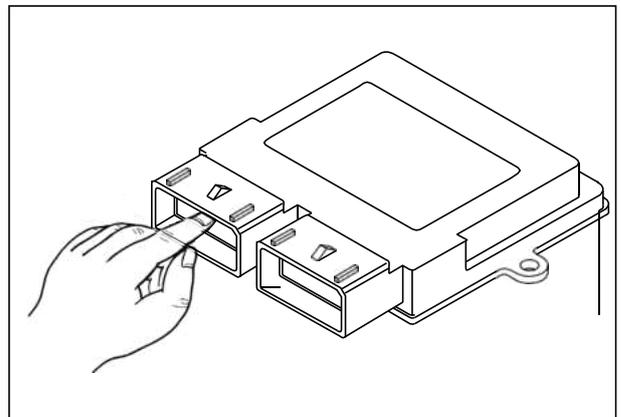
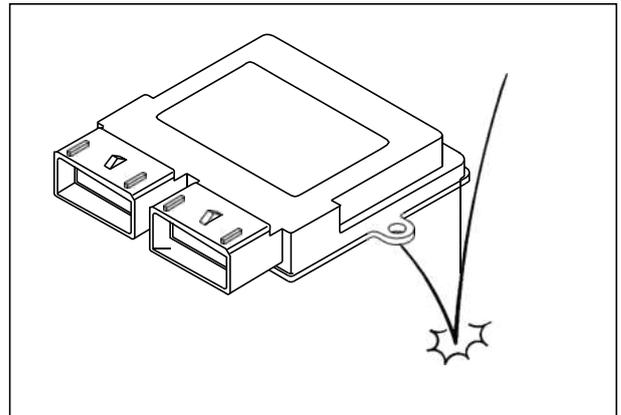


⊙ FUSE

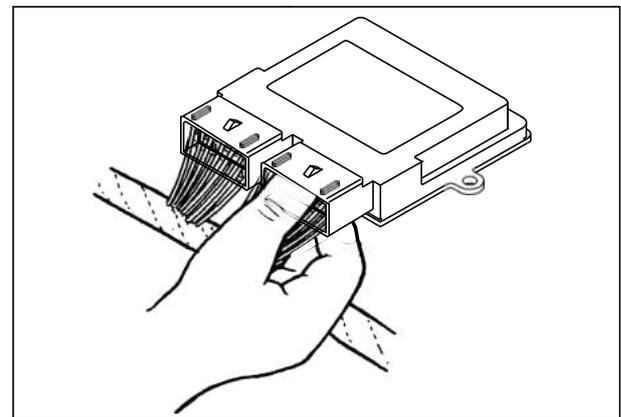
- When a fuse blows, always investigate the cause to correct it and then replace the fuse.
- Do not use a fuse of a different capacity.
- Do not use wire or any other substitute for the fuse.

⊙ ECU / VARIOUS SENSORS

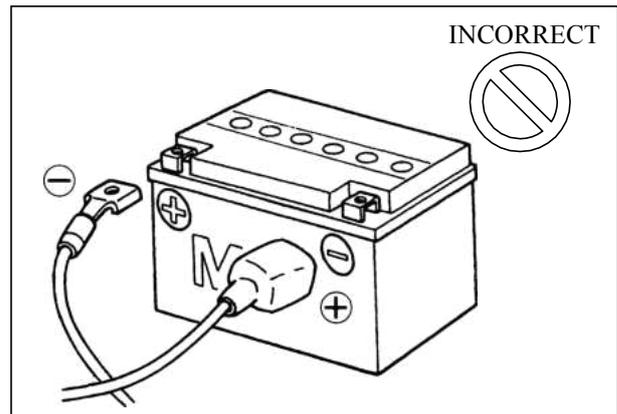
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.
- Be careful not to touch the electrical terminals of the ECU.
The static electricity from your body may damage this part.



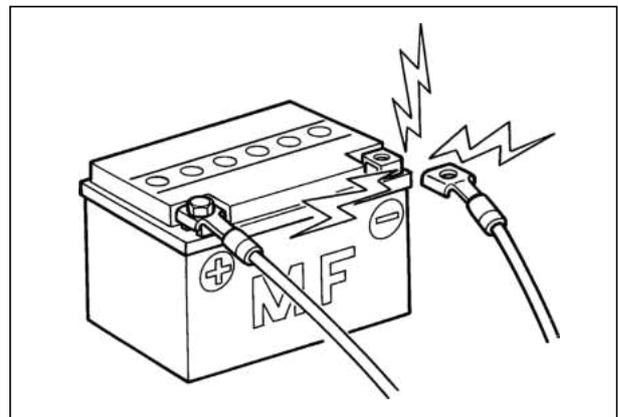
- When disconnecting and connecting the ECU, make sure to turn "OFF" the ignition switch, or electronic parts may get damaged.



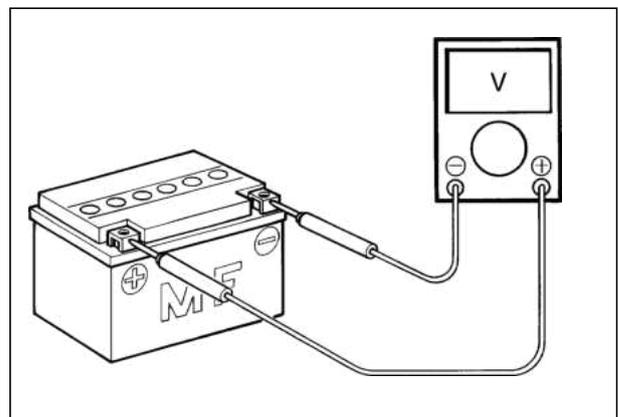
- Battery connection in reverse polarity is strictly prohibited.
Such a wrong connection will damage the components of the EI system instantly when reverse power is applied.



- Removing any battery terminal of a running engine is strictly prohibited.
The moment such removal is made, damaging counter electromotive force will be applied to the ECU which may result in serious damage.



- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher.
Terminal voltage check at low battery voltage will lead to erroneous diagnosis.
- Never connect an ohmmeter to the ECU with its coupler connected. If attempted, damage to ECU or sensors may result.
- Be sure to use a specified voltmeter / ohmmeter.
Otherwise, accurate measurements may not be obtained and personal injury may result.



⊙ USING TESTERS

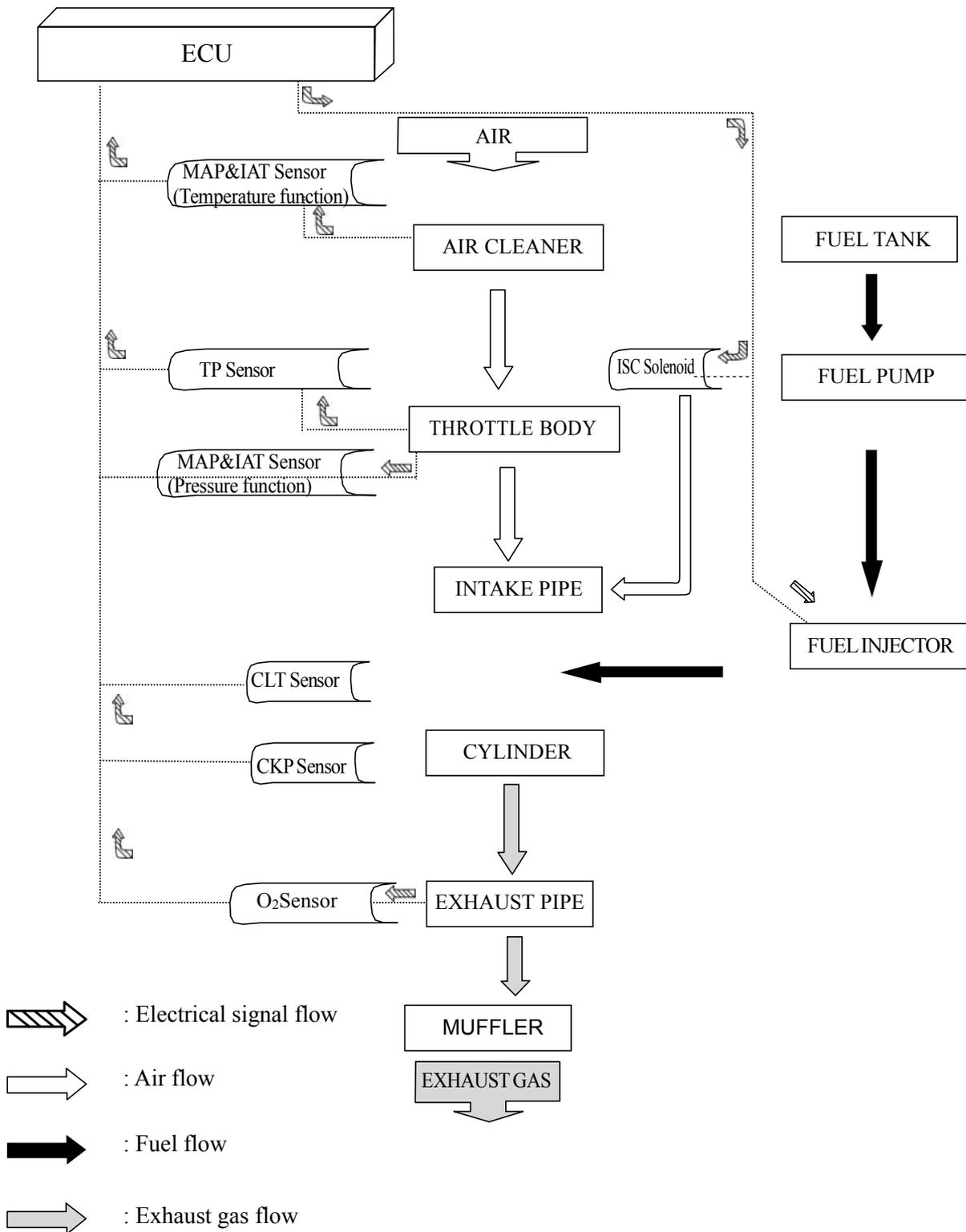
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.

▣ USING THE TESTER

- Incorrectly connecting the ⊕ and ⊖ probes may cause the inside of the tester to burnout.
- If the voltage and current are not known, make measurements using the highest range.
- After using the tester, turn the power off.

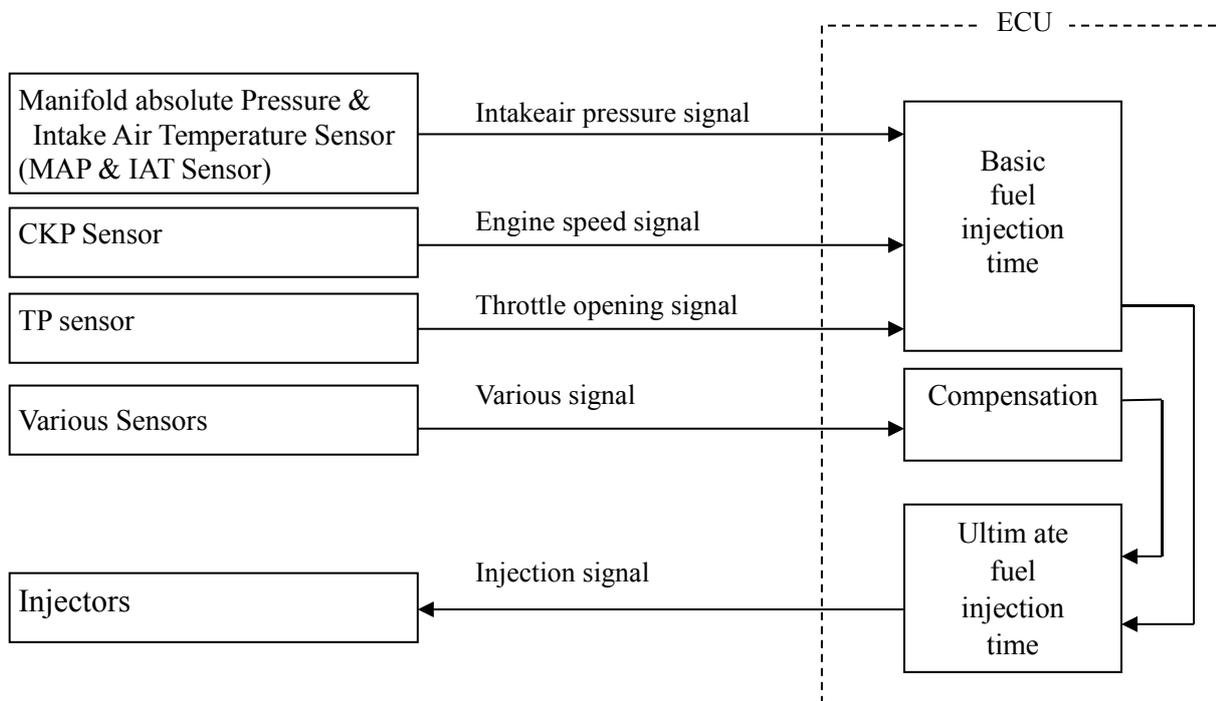
EI SYSTEM TECHNICAL FEATURES

EI SYSTEM'S CONTROL DIAGRAM



⊙ INJECTION TIME (INJECTION VOLUME)

The factors to determine the injection time include the basic fuel injection time, which is calculated on the basis of intake air pressure, engine speed and throttle opening angle, and various compensations. These compensations are determined according to the signals from various sensors that detect the engine and driving conditions.



⊙ COMPENSATION OF INJECTION TIME (VOLUME)

The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

SIGNAL	DESCRIPTION
WATER COOLANT TEMPERATURE SENSOR SIGNAL	When engine temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
BATTERY VOLTAGE SIGNAL	ECU operates on the battery voltage and at the same time, it monitors the voltage signal for compensation of the fuel injection time (volume). A longer injection time is needed to adjust injection volume in the case of low voltage.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL / DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

⊙ INJECTION STOP CONTROL

SIGNAL	DESCRIPTION
OVER-REV. LIMITER SIGNAL	The fuel injectors stop operation when engine rpm reaches rev. limit rpm.

⊙ EI SYSTEM PARTS LOCATION



- ① Speedometer
- ② Fuel injector
- ③ TP sensor
- ④ CKP SENSOR
- ⑤ WTS switch
- ⑥ GP sensor
- ⑦ CLT sensor
- ⑧ ISC solenoid
- ⑨ MAP & IAT Sensor
- ⑩ Regulator



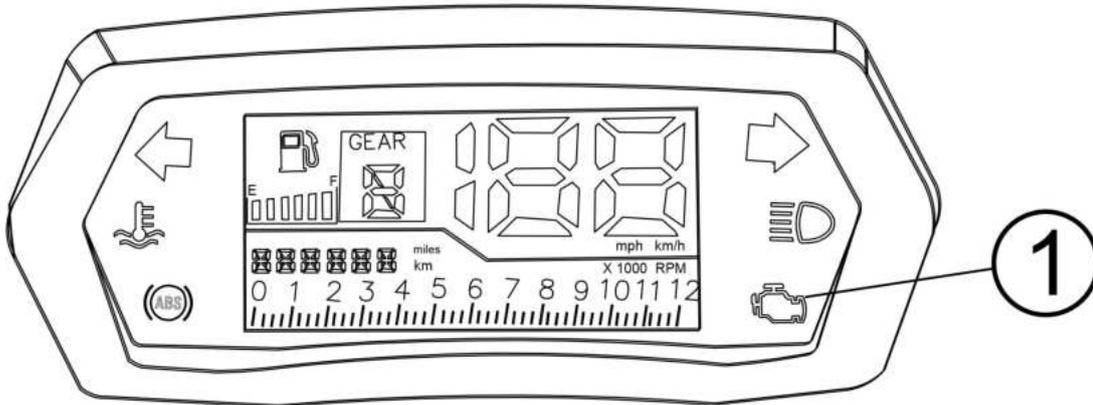
⑪ Oxygen sensor

⑫ Fuel pump relay

SELF-DIAGNOSIS FUNCTION

The self-diagnosis function is incorporated in the ECU.

The user can only be notified by the engine warning lamp “” .



The engine warning lamp “” comes on when the ignition switch is set to “ON” position with the engine is stopped.

As soon as the engine starts, warning lamp “” should go off.

If the fuel injection system fails, The yellow engine warning lamp  should come on continually.

The defective function is memorized in the ECU.

CLASSIFICATION	MAFLUNCTION	ENGINE WARNING LAMP INDICATION	REMARKS
ignition switch is set to “ON” position	“NO	“FI” check lamp comes on continually	
	“YES”	“FI” check lamp comes on continually	
Engine running	“NO”	“FI” check lamp goes off	
	“YES”	“FI” check lamp comes on continually.	

EI SYSTEM TROUBLE SHOOTING

CUSTOMER COMPLAINT ANALYSIS

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of such an inspection form will facilitate collecting information to the point required for proper analysis and diagnosis.

▣ EXAMPLE : CUSTOMER PROBLEM INSPECTION FORM

User name :	Model :	VIN :	
Date of issue :	Date Reg. :	Date of problem :	Mileage :

Engine warning lamp	<input type="checkbox"/> Always ON <input type="checkbox"/> Sometimes ON <input type="checkbox"/> Always OFF <input type="checkbox"/> Good condition
Malfunction display / code (odometer screen) or Blinks signal (Engine warning lamp)	<input type="checkbox"/> No code <input type="checkbox"/> Malfunction code ()

PROBLEM SYMPTOMS

<p>Difficult Starting</p> <p>No cranking No initial No combustion</p> <p>Poor starting at (<input type="checkbox"/> cold <input type="checkbox"/> warm <input type="checkbox"/> always) Other</p>	<p>Poor Driveability</p> <p>Hesitation on acceleration Back fire / Afterfire Lack of power Surging Abnormal knocking Engine rpm jumps briefly Other _____</p>
<p>Poor Idling</p> <p>Poor fast idle Abnormal idling speed (<input type="checkbox"/> High <input type="checkbox"/> Low)(rpm) Unstable Hunting(rpm.Torpm) Other.</p>	<p>Engine Stall when</p> <p>Immediately after start Throttle valve is opened Throttle valve is closed Load is applied Other _____</p>
OTHERS :	

MOTORCYCLE / ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather Temperature Frequency	<input type="checkbox"/> Fair <input type="checkbox"/> Cloudy <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> Always <input type="checkbox"/> Other <input type="checkbox"/> Hot <input type="checkbox"/> Warm <input type="checkbox"/> Cool <input type="checkbox"/> Cold (°F / °C) <input type="checkbox"/> Always <input type="checkbox"/> Always <input type="checkbox"/> Sometimes (times / day, month) <input type="checkbox"/> Only
Road	<input type="checkbox"/> Under certain condition <input type="checkbox"/> Urban <input type="checkbox"/> Suburb <input type="checkbox"/> Highway <input type="checkbox"/> Mountainous (<input type="checkbox"/> Uphill <input type="checkbox"/> Downhill) <input type="checkbox"/> Tarmacadam <input type="checkbox"/> Gravel <input type="checkbox"/> Other
Motorcycle condition	
Engine condition	<input type="checkbox"/> Cold <input type="checkbox"/> Warming up phase <input type="checkbox"/> Warmed up <input type="checkbox"/> Always <input type="checkbox"/> Other at starting <input type="checkbox"/> Immediately after start <input type="checkbox"/> Racing without load <input type="checkbox"/> Engine speed (rpm)
Motorcycle condition	During driving : <input type="checkbox"/> Constant speed <input type="checkbox"/> Accelerating <input type="checkbox"/> Decelerating <input type="checkbox"/> Right hand corner <input type="checkbox"/> Left hand corner <input type="checkbox"/> At stop <input type="checkbox"/> Motorcycle speed when problem occurs (km/h, Mile/h) <input type="checkbox"/> Other _____

NOTE

The above form is a standard sample.

If should be modified according to conditions characteristic of each market.

SELF-DIAGNOSTIC PROCEDURES

Don't disconnect couplers from ECU, battery cable from battery, ECU ground wire harness from engine or main fuse before confirming malfunction code (self-diagnostic trouble code) stored in memory.

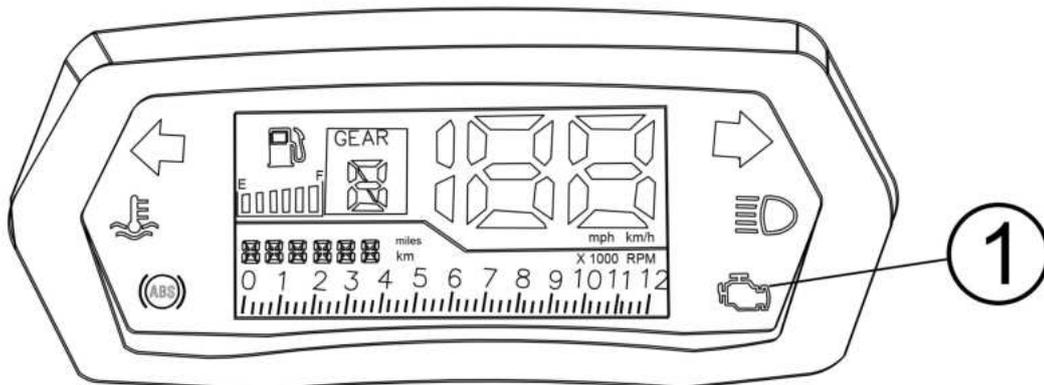
To check malfunction code, read SELF-DIAGNOSIS FUNCTION carefully to have good understanding as to how to use it.

Be sure to read "PRECAUTIONS for Electrical Circuit Service" before inspection and observe what is written there.

SELF-DIAGNOSIS RESET PROCEDURE

ENGINE WARNING LAMP①

- Repair the trouble.
 - Start engine and wait for 20 seconds, and then ignition switch to the off and wait for 15 seconds.
 - Repeat the above procedure 3times.
- In this case, engine warning lamp"  " goes off.



MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0031	O ₂ Sheater Circuit	Low Voltage	After engine running,if oxygen sensor heater signal open or is happened the ground short fault for 1second by10 times in12 times test cycle,the code P0031 is indicated.
			Oxygen sensor, lead wire / coupler connection.
High Voltage		After engine running, if oxygen sensor heater signal is happened the high short fault for 1 second by 10 times in 12 times test cycle, the code P0032 is indicated.	
		Oxygen sensor, lead wire / coupler connection.	
P00D1		Performance	If the engine running time is larger than 180S, and ECU calculated oxygen sensor element resistance is larger than 1400Ω, Over 100 samples have been collected, the code P00D1 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0107	MAP & IAT Sensor Circuit	Low Voltage or Open	The sensor should produce following voltage.0.15 V≤Sensor output voltage. Without the above range for 2.2sec.andmore, P0107 is indicated.
			Intake air pressure sensor, lead wire / coupler connection.
High Voltage		The sensor should produce following voltage. Sensor output voltage≤5 VWithout the above range for 10.0sec.andmore, P0108 is indicated.	
		Intake air pressure sensor, lead wire / coupler connection.	
P3106		Performance	After engine is running in steady state, MAP < 30kpa and running for 50S, P3106 is indicated
			Intake air pressure sensor, lead wire / coupler connection.
P0105	Stuck	Vehicle soak time > 3min, during the process of engine start and running, if the MAP is lower than 15kpa in 50 seconds, P0105 is indicated.	
		Intake air pressure sensor, lead wire / coupler connection.	
P0112	MAP & IAT Sensor Circuit	Low Voltage	The sensor voltage should be the following. 0.1 V ≤Sensor output voltage Without the above range for 6.25sec.andmore, P0112 is indicated.
			Intake air temperature sensor, lead wire / coupler connection.
High Voltage or Open		The sensor voltage should be the following. Sensor output voltage ≤4.9VWithout the above range for 6.25sec.andmore, P0113 is indicated.	
		Intake air temperature sensor, lead wire / coupler connection.	

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0111	MAP & IAT Sensor Circuit	Stuck	Vehicle soak time > 240min, engine is running, during the period of the accumulated air mass is more than 2000g, if the IAT is lower than 2 °C, P0111 is indicated.
			Intake air temperature sensor, lead wire / coupler connection.
P0114		Performance	After key on or engine is running, if the IAT erratic rate is bigger than 5 °C in every 60S of test cycle, P0114 is indicated.
			Intake air temperature sensor, lead wire / coupler connection.
P0117	CLT Sensor Circuit	Low Voltage	The sensor voltage should be the following. 0.1 V ≤ Sensor output voltage Without the above range for 6.25sec.andmore, P0117 is indicated.
			Coolant temperature sensor, lead wire / coupler connection.
P0118		High Voltage or Open	The sensor voltage should be the following. Sensor output voltage ≤5V Without the above range for 6.25sec.andmore, P0118 is indicated.
			Coolant temperature sensor, lead wire / coupler connection.
P0116	CLT Sensor Circuit	Performance	Vehicle soak time > 240 Min, Engine is running, and the accumulated fuel mass is more than 300g, during the process, If the engine temperature change value is lower than 3 °C, P0116 is indicated.
			Coolant temperature sensor, lead wire / coupler connection.
P1116		Out of Range	Vehicle soak time > 240 Min, during the process of engine start, If the coolant temp is 50°C amount higher than the intake air temperature, P1116 is indicated.
			Coolant temperature sensor, lead wire / coupler connection.
P0122	TP Sensor Circuit	Low Voltage or Open	The sensor should produce following voltage. 0.2 V ≤ Sensor output voltage Without the above range for 7.8sec.andmore, P0122 is indicated.
			Throttle position sensor, lead wire / couplmer connection.
P0123		High Voltage	The sensor should produce following voltage. Sensor output voltage ≤4.9 V Without the above range for 7.8sec.andmore, P0123 is indicated.
			Throttle position sensor, lead wire / coupler connection.

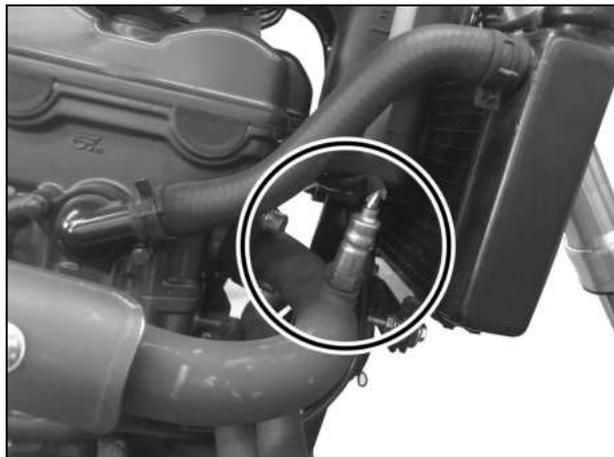
MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0131	O ₂ S Circuit	Low Voltage	After engine running,the oxygen sensor signal is in putted in ECU since then 300sec. In this case,the sensor voltage should be the following. 30mV≤Sensor output voltage Without the above range for 28.1sec.andmore,P0131 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0132	O ₂ S Circuit	High Voltage	After engine running,the oxygen sensor signal is in putted in ECU since then 300sec. Inthiscase,The sensor voltage should be the following. Sensor output voltage ≤1.0V Without the above range for 29.4 sec.and more,P0132 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P2195	O ₂ S Circuit	Out of Range	When engine is running in PE mode, target AFR ≤ 13.5, and the O ₂ voltage is lower than 400mv, for more than 180S, P2195 is indicated
Oxygen sensor, lead wire / coupler connection.			
P014C		Performance	Engine is running in fuel close loop control mode, and the engine temperature > 50°C. In every 90S of test cycle, if the average value of calculated Rich to Lean time is bigger than 600ms, P014C is indicated.
Oxygen sensor, lead wire / coupler connection.			
P014D	Performance	Engine is running in fuel close loop control mode, and the engine temperature > 50°C. In every 90S of test cycle, if the average value of calculated Lean to Rich time is bigger than 600ms, P014D is indicated.	
Oxygen sensor, lead wire / coupler connection.			
P0261	Fuel Injector Circuit Open/Short Low		After engine running, if fuel injector signal open or is happened the ground short fault for 1second by 5 times in10 times test cycle,the code P0261 is indicated.
			Injector,wiring/coupler connection,power supply to the injector.
P0262	Fuel Injector Circuit Short High		After engine running, if fuel injector signal is happened the high short fault for 1second by 5 times in10 times test cycle, the code P0262 is indicated.
			Injector,wiring/coupler connection,power supply to the injector.
P0231	Fuel pump Circuit	Low Voltage or Open	After engine running, if fuel pump relay signal open or is happened the ground short fault for 1 second by 10 times in 20 times test cycle,the code P0231 is indicated.
			Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.
P0232	Fuel pump Circuit	High Voltage	After engine running,if fuel pump relay signal is happened the high short fault for 1 second by 10 times in 20 times test cycle, the code P0232 is indicated.
			Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0336	CKP	Noisy Signal	After engine running, if the magneto rotor tooth's error is happened continuously by 10 times in 100 times test cycle,the code P0336 is indicated.
			CKP Sensor wiring and mechanical parts.(CKP Sensor leadwire coupler connection)
P0335	CKP	No Signal	After engine running, if the CKP Sensor signal does not reach ECU for more than 0.5 sec., the code P0335 is indicated.
			CKP Sensor wiring and mechanical parts.
P2301	IG coil Circuit Short High		After engine running, if ignition coil signal open or is happened the high/ground short fault for 1 second by 5 times in 10 times test cycle,the code P2301 is indicated.
			Ignition coil,wiring/coupler connection,power supply from the battery.
P2300	IG coil Circuit Open/Short Low		After engine running, if ignition coil signal open or is happened the ground short fault for 1 second by 5 times in10 times test cycle, the code P2300 is indicated.
			Ignitioncoil,wiring/couplerconnection,powersupplyfromthe battery.
P1693	Engine speed outCircuit Short Low		After engine running, if Engine speed out Circuits happened the ground short fault for 1 second by 5 times in 10 times test cycle, the code P1693 is indicated
			lead wire / coupler connection.
P1694	Engine speed outCircuit Short High		After engine running, if Engine speed out Circuitis happened the High short fault for 1 second by 5 times in 10 times test cycle, the code P1694 is indicated
			lead wire / coupler connection.
P0500	Speed sensor Malfunction		Motorcycle speed < 10km/h Water temperature < 20℃ MAP&IAT pressure > 40kpa 20% < TPSopen angle < 100% 2,000rpm < Engine speed < 6,000rpm If the above conditions are maintained for 32.5sec.and more, The code P0500 is indicated
			Speedo sensor,wiring/coupler connection to ECU
P0505	ISC Error		After engine running, if idle speed is different to 500 rpmfrom the specified range in 25 seconds test cycle,the code P0505 indicated.
			Idle speed control solenoid, wiring / coupler connection.
P0562	Batterie Voltage	Low	The battery voltage should be the following 9V ≤Battery voltage Without the above range for 3.125 sec. And more,P0562 is indicated.
			Battery,wiring / couplerconnection to ECU.
P0563	Batterie Voltage	High	The battery voltage should be the following. Battery voltage ≤16V Without the above range for 3.125 sec.and more,P0563 indicated.
			Battery, wiring / couplerconnection to ECU.

MALFUNCTION CODE	DETECTED ITEM	DETECTED FAILURE CONDITION
		CHECK FOR
0300	Random/Multiple Cylinder Misfire Detected	After engine running, if the misfire incident is larger than emission damage set threshold detected at the current test cycle of 400 engine cycles, the misfire incident count will be increase 1, after 20 count of total misfire incident, P0300 is indicated.
		EMS components Check.
P0301	Random/Multiple Cylinder Misfire Detected	After engine running, if the sum cylinder misfire incident is larger than emission damage set threshold detected at the current test cycle of 400 engine cycles, the misfire incident count will be increase 1, after 20 count of total misfire incident, and also the percentage point of cylinder misfire incident is larger than 20%, P0301 is indicated.
		EMS components Check.
P0601	ECU Fault	When ML on The ECU will check malfunction code, if there's ECU error the code P0601 is indicated. The fuel injection will be cut off Accordingly
		ECU
P0650	Engine warning lamp Circuit Malfunction	After engine running, if "FI" check lamp signal open or is happened the high / ground short fault for 1 second by 40 times in 80 times test cycle, the code P0650 is indicated.
		"FI" check lamp, wiring / coupler connection.
P0850	GP or Clutch lever Switch Circuit Malfunction	If gear position or clutch lever switch signal feedback is not active in continuous by 20 times in fully power down cycles, the code P0850 is indicated. (Fully power down cycle : Ignition switch "ON"—"OFF" position)
		Gear position or clutch lever switch, wiring/coupler connection, gear shift cam etc.

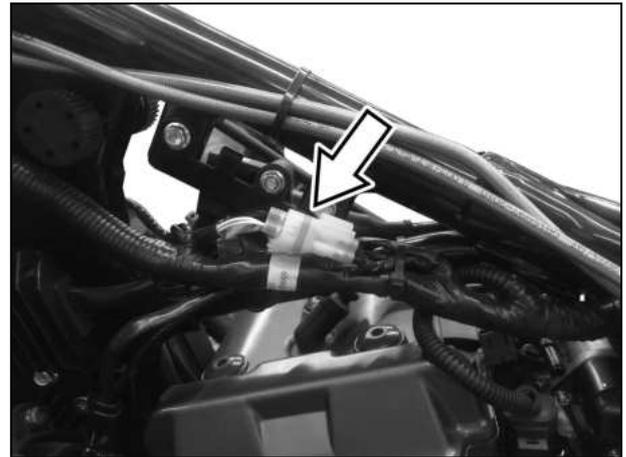
**“P0031”,“P0032” OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION
& “P0131”,“P0132” OXYGEN SENSOR CIRCUIT MALFUNCTION**

● DETECTED CONDITION	POSSIBLE CAUSE
To read the flash code,with the EFI diagnostic instrument	<ul style="list-style-type: none">● Oxygen sensor, Oxygen sensor heater circuit open or short.● Oxygen sensor, Oxygen sensor heater malfunction.● ECU malfunction.

※:O₂S

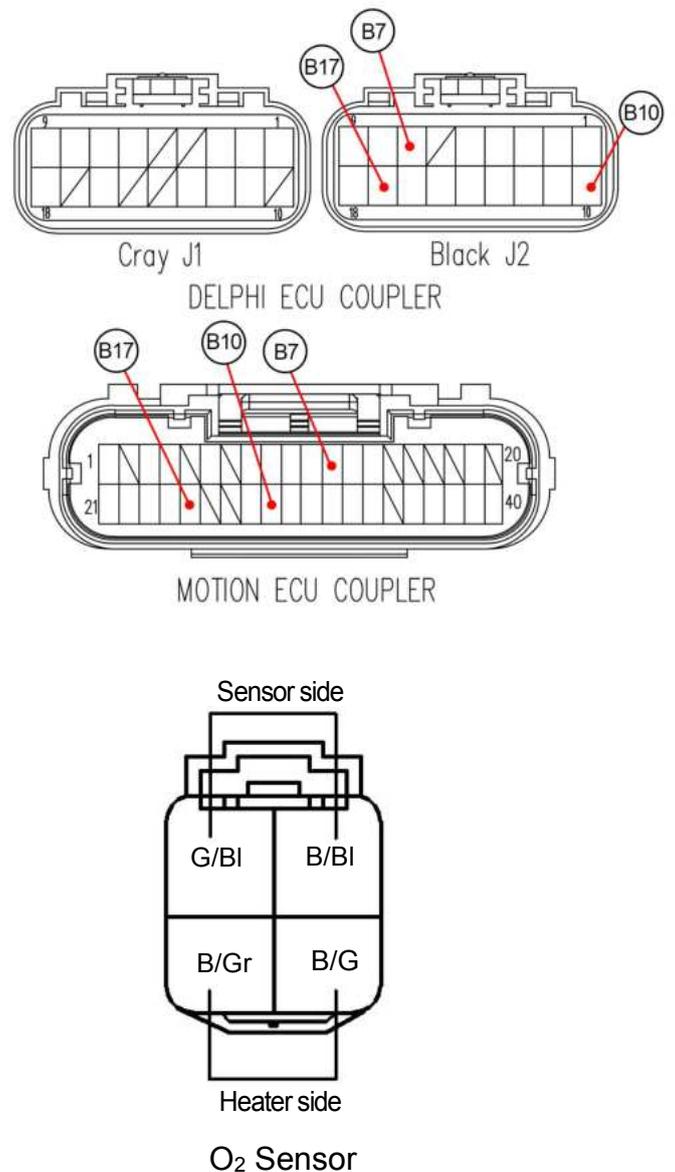
INSPECTION

- 1) The connectors of oxygen sensor is located under the fuel tank,
Turn the ignition switch to the "OFF" position.
- 2) Check the Oxygen sensor coupler for loose or poor contacts.



Is OK?

YES	<ul style="list-style-type: none"> ● B/BI , G/BI (O₂ Sensor)wire open or shorted to ground, or poor B17(J2-17) or B10(J2-10) connection of ECU coupler. [Sensor side] B/Gr (O₂S heater)wire open or shorted to ground, or poor B7(J2-7)(O₂S heater) connection of ECU coupler. B/G coupler open or shorted to the wiring harness (main relay output side). [Heater side] ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the Oxygen sensor with a new one.



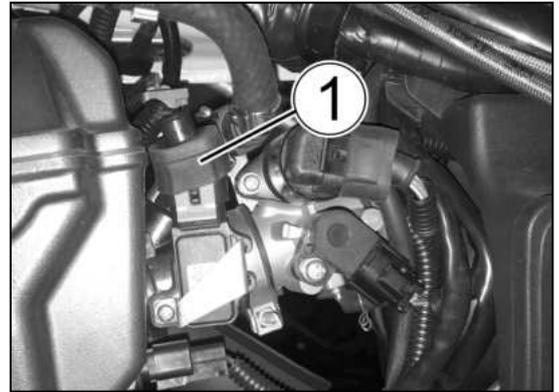
“P0107” or “P0108” MAP & IAT (Pressure function) SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code, with the EFI diagnostic instrument</p> <p>NOTE : <i>Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage</i></p>	<ul style="list-style-type: none"> ● Clogged vacuum passage between throttle body And MAP & IAT Sensor. ● Air being drawn from vacuum passage between throttle body and MAP & IAT Sensor. ● MAP & IAT Sensor circuit open or shorted to ground. ● MAP & IAT sensor malfunction. ● ECU malfunction.

▣ INSPECTION

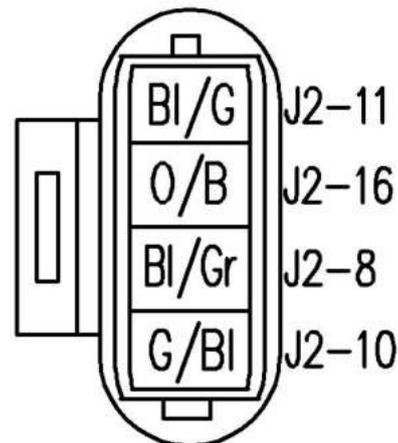
◇ Step 1

- 1) Turn the ignition switch to the “OFF” position.
- 2) Check the MAP & IAT Sensor coupler ① for loose or poor contacts.
If OK, then measure the MAP & IAT Sensor input voltage.
- 3) Disconnect the MAP & IAT Sensor coupler ①.
- 4) Turn the ignition switch to the “ON” position.
- 5) Measure the input voltage at the O/B wire and ground.
If OK, then measure the input voltage at the O/B wire and G/BI wire.



MAP & IAT Sensor input voltage	4.9 ~ 5.1 V
	(⊕O/B - ⊖Ground) (⊕O/B - ⊖G/BI)

 Tester knob indication: Voltage (---)

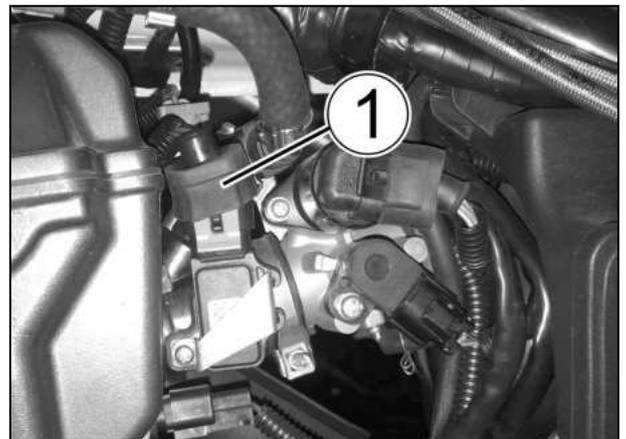


Is the input voltage OK?

YES	Go to Step 2.
NO	<ul style="list-style-type: none"> Loose or poor contacts on the ECU coupler. Open or short circuit in the O/B wire or G/BI wire.

◆ Step 2

- 1) Connect the MAP & IAT sensor coupler①.
- 2) Insert the needle pointed probes to the lead wire coupler.
- 3) Turn the ignition switch to the “ON” position.
- 4) Measure the MAP & IAT sensor output voltage at the wire side coupler(between BI/G and G/BI wires).

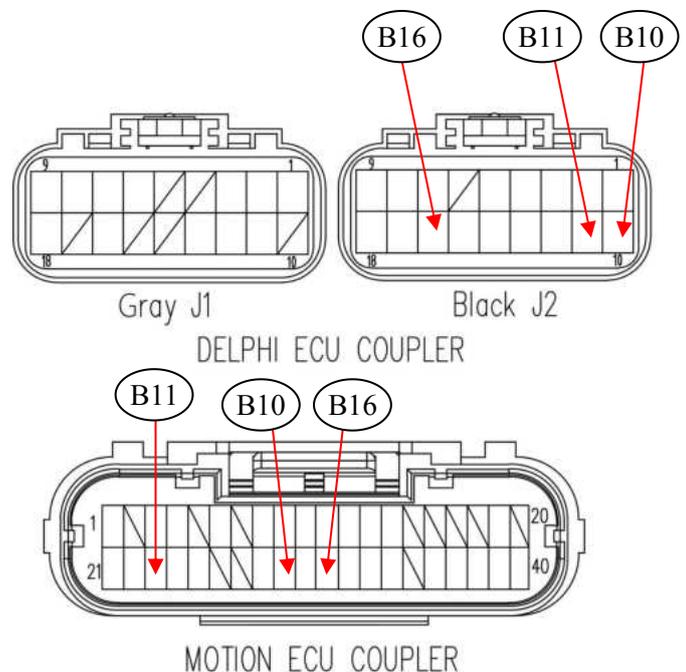


MP & IAT Sensor out put voltage	Approx. 1.5V at idle speed $(\oplus \text{BI/G} - \ominus \text{G/BI})$
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Tester knob indication: Voltage (---)

Is the output voltage OK?

YES	<ul style="list-style-type: none"> O/B, BI/G or G/BI wire open or shorted to ground, or poor B16 (J2-16), B11(J2-11) or B10(J2-10) connection of ECU coupler. If wire and connection are OK, intermittent trouble or faulty ECU. Recheck each terminal and wire harness for open circuit and poor connection.
NO	If check result is not satisfactory, replace the MAP & IAT sensor with a new one.

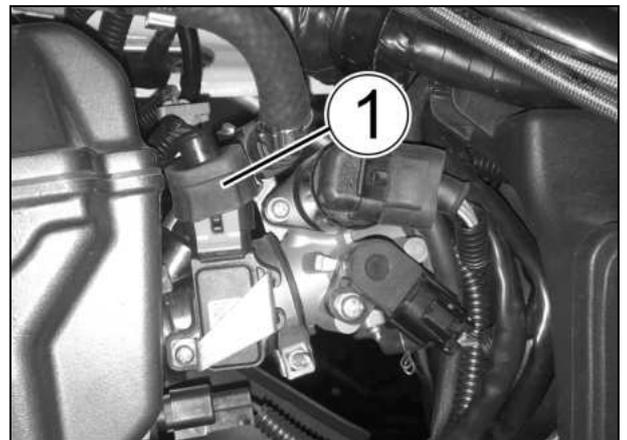


“P0112”or“P0113”MAP&IAT (Temperature function) SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● MAP & IAT sensor circuit open or short. ● MAP & IAT sensor malfunction. ● ECU malfunction.

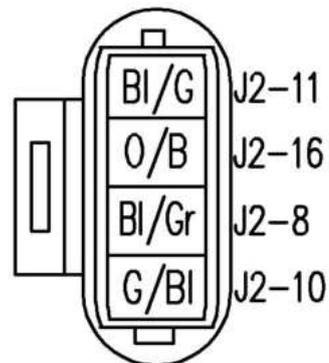
▣ INSPECTION

- 1) Turn the ignition switch to the “OFF” position.
- 2) Check the MAP & IAT sensor coupler① for loose or poor contacts.
- 3) If OK, then measure the MAP & IAT sensor resistance.
- 4) Disconnect the MAP & IAT sensor coupler.
- 5) Measure the resistance between the terminals ②and③.

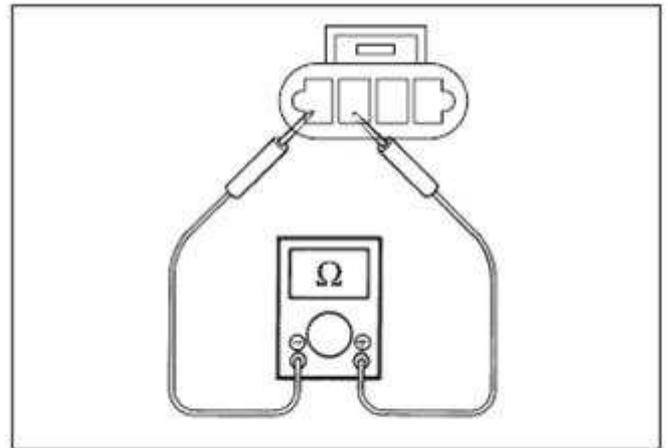


<p>MAP & IAT Sensor resistance</p>	<p>0.075 ~ 14.541 kΩ [When Intake air temperature is -20°C ~ 120°C (-40°F ~ 248°F)]</p>
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 Tester knob indication : Resistance (kΩ)



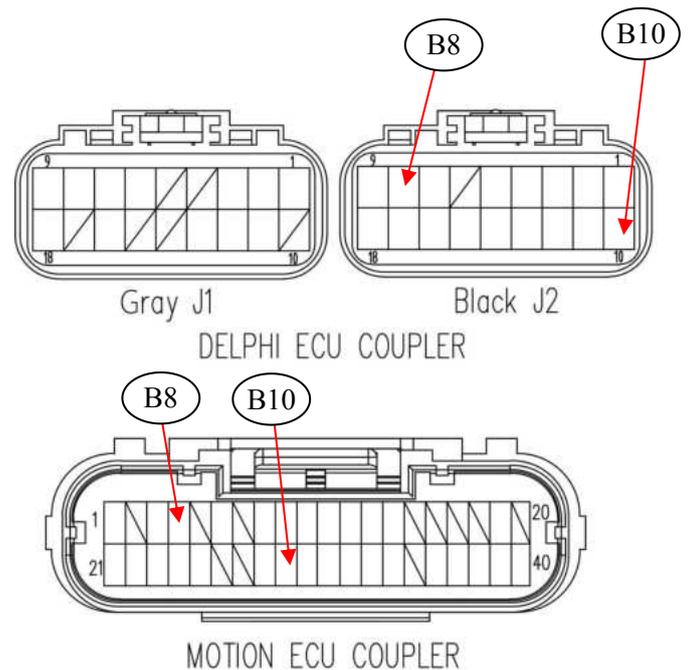
IAP(Temperature function) Sensor resistance	
Intake Air Temp.	Intake Air Temp.
-20 °C (-40°F)	-20 °C (-40°F)
-0 °C (32°F)	-0 °C (32°F)
20 °C (68 °F)	20 °C (68 °F)
40 °C (104 °F)	40 °C (104 °F)
60 °C (140 °F)	60 °C (140 °F)
80 °C (176 °F)	80 °C (176 °F)
120 °C (248°F)	120 °C (248°F)
140 °C (284°F)	140 °C (284°F)



 Tester knob indication : Resistance (kΩ)

Is the resistance OK?

YES	<ul style="list-style-type: none"> ● BI/Gr or G/BI wire open or shorted to ground, or poor B8 (J2-8) or B10(J2-10) connection of ECU coupler. ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the MAP & IAT sensor with a new one.

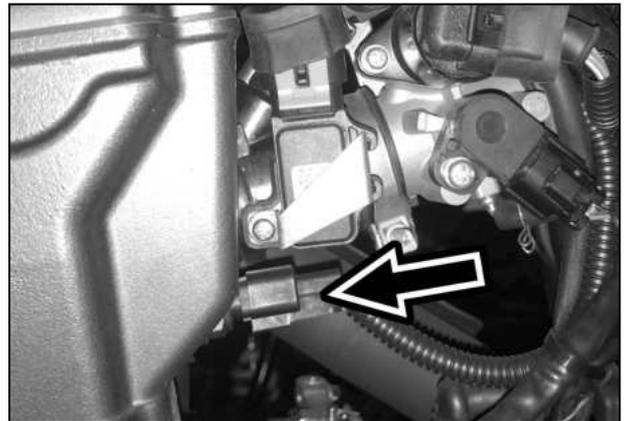


“P0117”or“P0118” CLT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● CLT sensor circuit open or short. ● CLT sensor malfunction. ● ECU malfunction.

▣ INSPECTION

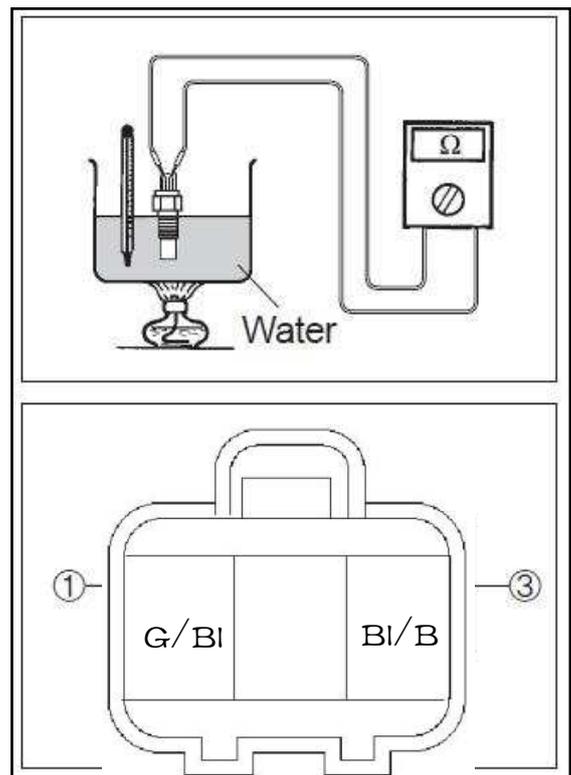
- 1) Turn the ignition switch to the “OFF” position.
- 2) Check the CLT sensor coupler for loose or poor contacts.
If OK, then measure the CLT sensor resistance.



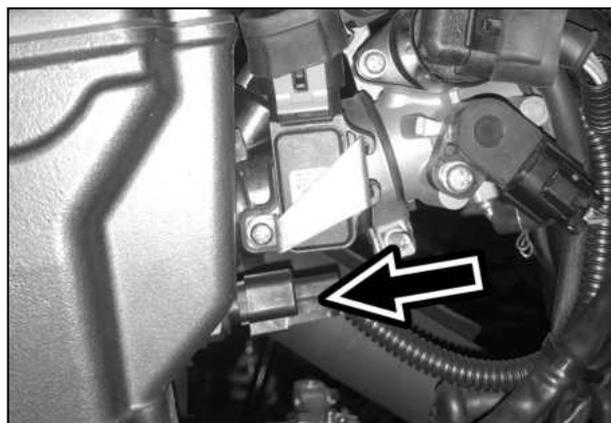
- 3) Disconnect the CLT sensor coupler.
- 4) Measure the resistance between the terminals① and ③ of the CLT sensor.

CLT sensor resistance	<p>0.1163 ~ 48.1400kΩ [When Water temperature is -40°C ~ 120°C (-40°F ~ 248°F)]</p>
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 Tester knob indication : Resistance (kΩ)



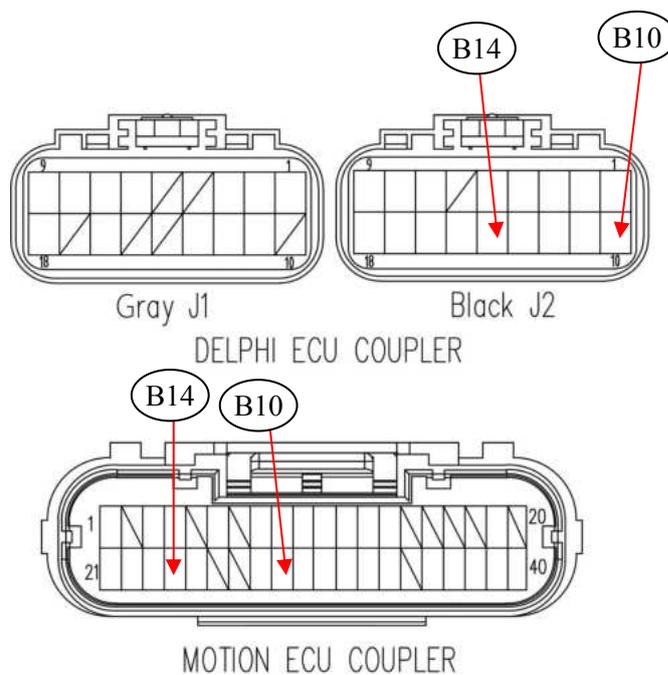
CLT sensor resistance	
Engine Coolant Temp.	Resistance (To ECU)
-40 °C (-40 °F)	Approx. 48.140kΩ
0 °C (32 °F)	Approx. 5.790kΩ
20 °C (68 °F)	Approx. 2.450kΩ
40 °C (104 °F)	Approx. 1.148kΩ
60 °C (140 °F)	Approx. 0.586kΩ
80 °C (176 °F)	Approx. 0.322kΩ
120 °C (248 °F)	Approx. 0.1163kΩ



 Tester knob indication : Resistance (kΩ)

Is the resistance OK?

YES	<ul style="list-style-type: none"> ● BI/Br or G/BI wire open or shorted to ground, or poor B14 (J2-14) or B10 (J2-10) connection of ECU coupler. ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the CLT sensor with a new one.



“P0122”or“P0123” TPS CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● TP sensor circuit open or short. ● TP sensor malfunction. ● ECU malfunction.

▣ INSPECTION

◇ Step 1

- 1) Turn the ignition switch to the “OFF” position.
- 2) Check the TP sensor coupler for loose or poor contacts.
If OK, then measure the TP sensor input voltage.



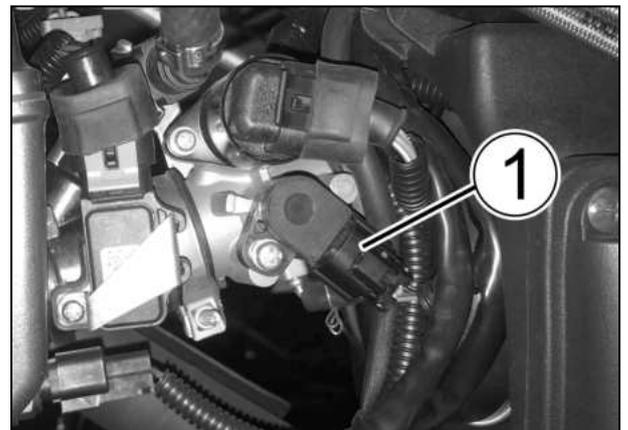
- 3) Disconnect the TP sensor coupler①.
- 4) Turn the ignition switch to the “ON” position.
- 5) Measure the voltage at the O/B wire and ground.
- 6) If OK, then measure the voltage at the O/B wire and G/Bl wire.

TP sensor input voltage	4.9 ~ 5.1 V (⊕O/B – ⊖Ground) (⊕O/B – ⊖G/Bl)
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Tester knob indication: Voltage (---)

Is the input voltage OK?

YES	Go to Step 2.
NO	<ul style="list-style-type: none"> ● Loose or poor contacts on the ECU coupler. ● Open or short circuit in the O/B wire or G/Bl wire.



◆ Step 2

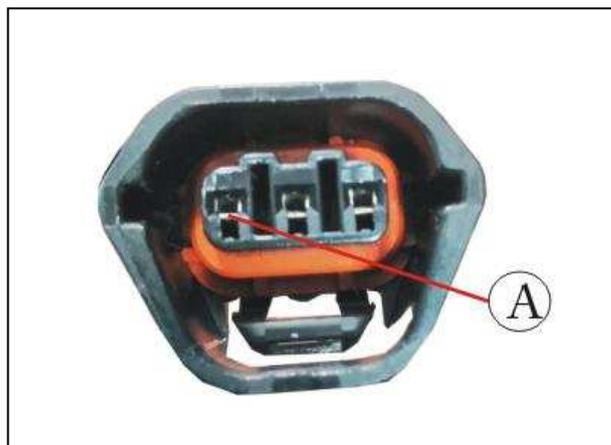
- 1) Turn the ignition switch to the "OFF" position.
- 2) Disconnect the TP sensor coupler.
- 3) Check the continuity between Ⓐ (Gr/BI) and ground.

TP sensor continuity	$\infty \Omega$ (Infinity) (A- Ground)
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Tester knob indication : Resistance (k Ω)

Is the continuity OK?

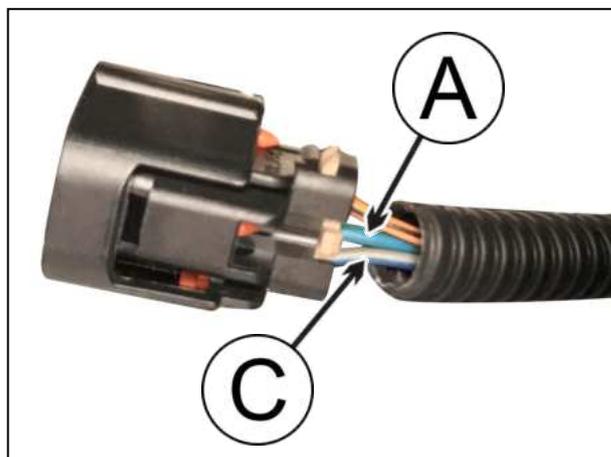
YES	Go to Step3
NO	Replace the TP sensor with a new one.



◆ Step 3

- 1) Connect the TP sensor coupler.
- 2) Insert the needle pointed probes to the lead wire coupler.
- 3) Turn the ignition switch to the "ON" position.

Measure the TP sensor output voltage at the coupler-between Ⓐ (⊕:Gr/BI) and Ⓒ (⊖:G/BI) by turning the throttle grip.

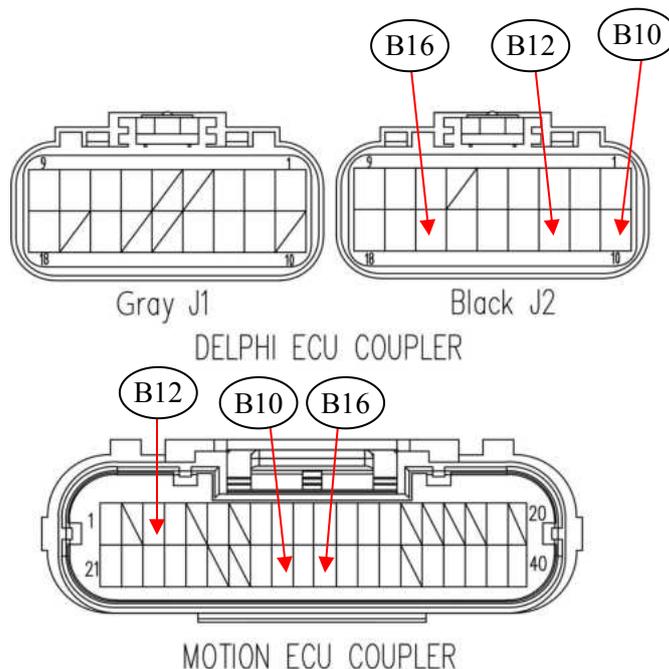


TP sensor output voltage	
Throttle valve is closed	Approx.0.60~1.00V
Throttle valve is opened	Approx.4.00~4.60V

Tester knob indication: Voltage (---)

Is the voltage OK?

YES	<ul style="list-style-type: none"> ● O/B, Gr/BI or G/BI wire open or shorted to ground, or poor B16(J2-16) ,B12(J2-12) or B10(J2-10) connection of ECU coupler. ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	If check result is not satisfactory, replace the TP sensor with a new one.



“P0201” “P0262” FUEL INJECTOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>👉 To read the flash code, with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● Injector circuit open or short. ● Injector malfunction. ● ECU malfunction.

▣ INSPECTION

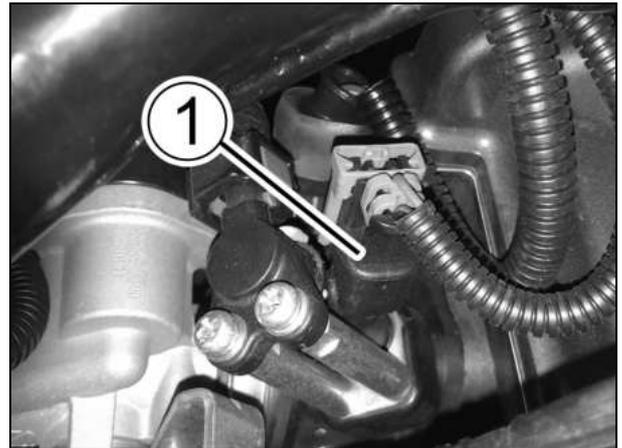
◆ Step 1

- 1) Remove the fuel tank.
- 2) Turn the ignition switch to the “OFF” position.
- 3) Check the injector coupler ① for loose or poor contacts.

If OK, then measure the injector resistance.

※ FUEL INJECTOR

- 4) Disconnect the injector coupler ① and measure the resistance between terminal B/G and Pu.



Injector resistance	11.4 ~ 12.6 Ω at 20°C (68°F)
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🔧 Tester knob indication: Resistance (Ω)

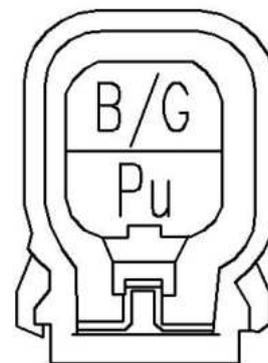
- 5) If OK, then check the continuity between injector terminals and ground.

Injector continuity	∞Ω (Infinity)
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🔧 Tester knob indication: Resistance (Ω)

Are the resistance and continuity OK?

YES	Go to Step 2
NO	Replace the Injector with a new one.



◇ Step 2

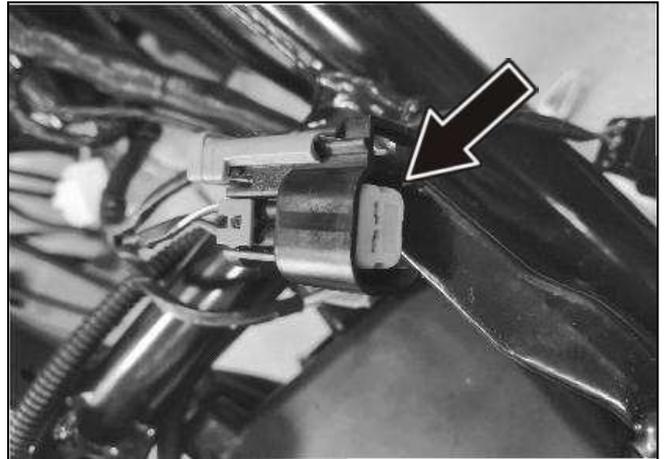
- 1) Turn the ignition switch to the "ON" position.
- 2) Measure the injector voltage between B/G wire and ground.

Injector voltage	Battery voltage ⊕B/G-⊖Ground,
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 Tester knob indication: Voltage (---)

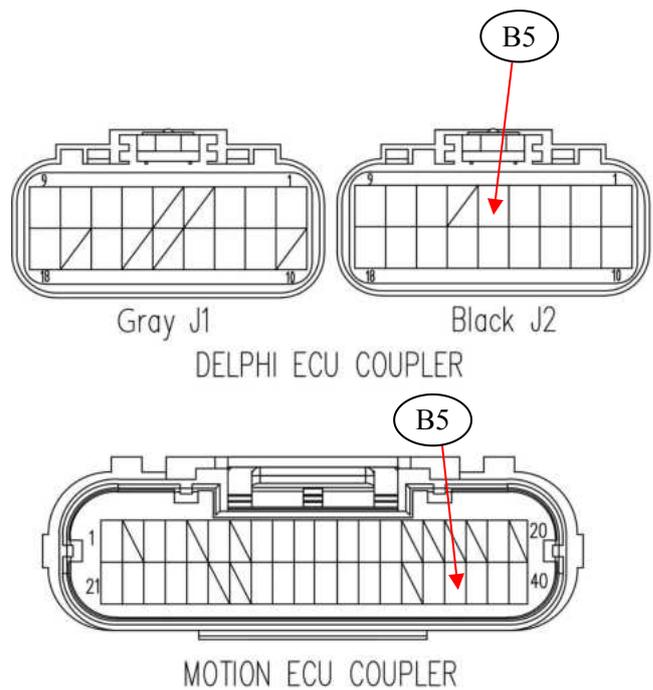
NOTE

Injector voltage can be detected only 3 seconds after ignition switch is turned "ON" position.



Is the voltage OK?

YES	<ul style="list-style-type: none"> ● Pu wire open or shorted to ground, or poor B5 (J2-5) connection of ECU coupler. If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Inspect the fuel pump or fuel pump relay.



“P0231”or“P0232”FUEL PUMP RELAY CIRCUIT MALFUNCTION

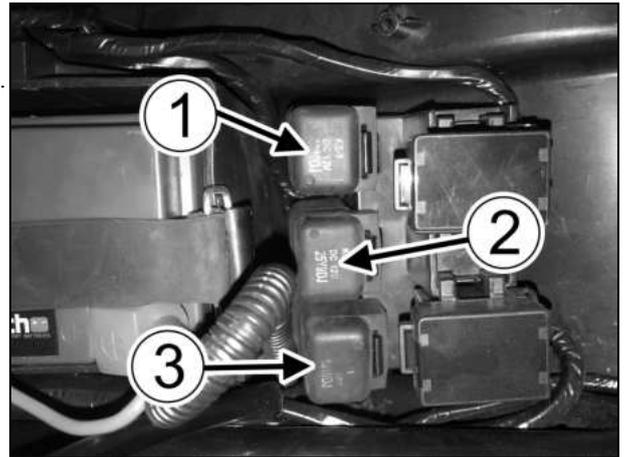
DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● Fuel pump relay circuit open or short. ● Fuel pump relay malfunction. ● ECU malfunction.

▣ INSPECTION

- 1) Remove the seat set
- 2) Turn the ignition switch to the “OFF” position.
- 3) Check the fuel pump relay coupler for loose or poor contacts.

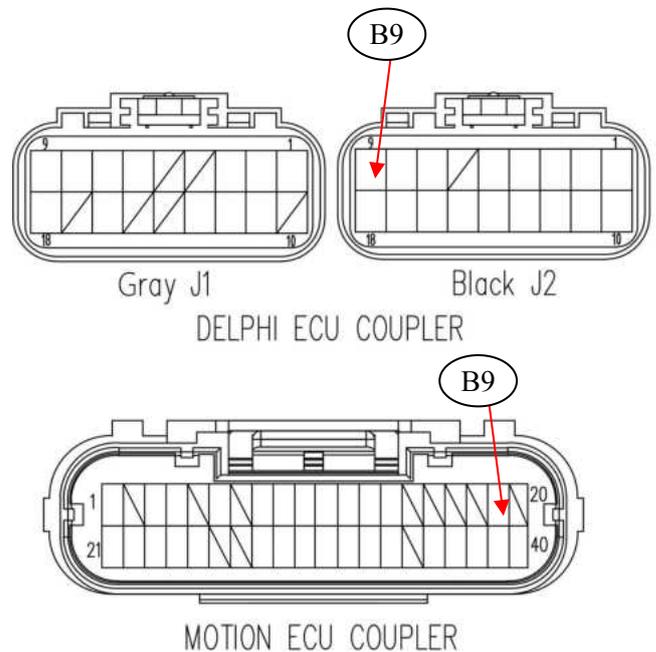
If OK, then check the insulation and continuity. for details.

- ①: Main relay
- ②: Fuel pump relay
- ③: Lamp relay



Is the Fuel pump relay OK?

YES	<ul style="list-style-type: none"> ● Br/R wire open or shorted to ground, or poor B9(J2-9) connection of ECU coupler. ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection. ● Inspect the fuel injectors.
NO	Replace the fuel pump relay with a new one.

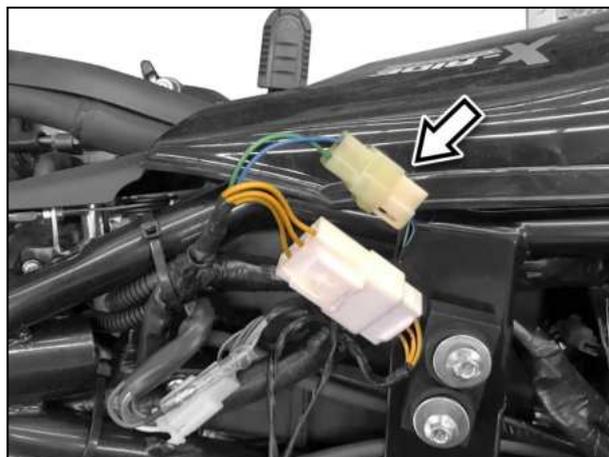


“P0336”or“P0337” , “P1693”or“P1694”CKP Sensor CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● Metal particles or foreign materiel being attached on the CKP and rotortip. ● CKP circuit open orshort. ● CKP malfunction. ● ECU malfunction.

▣ INSPECTION

- 1) Remove the fuel tank.
- 2) Turn the ignition switch to the “OFF” position.
- 3) Check the CKP coupler for loose or poor contacts.
If OK, then measure the CKP resistance.
- 4) Disconnect the CKP coupler and measure the resistance.



CKP resistance	Approx. 85 ~ 105 Ω (B1/W- Grou nd) (G/W-Grou
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Tester knob indication : Resistance (Ω)

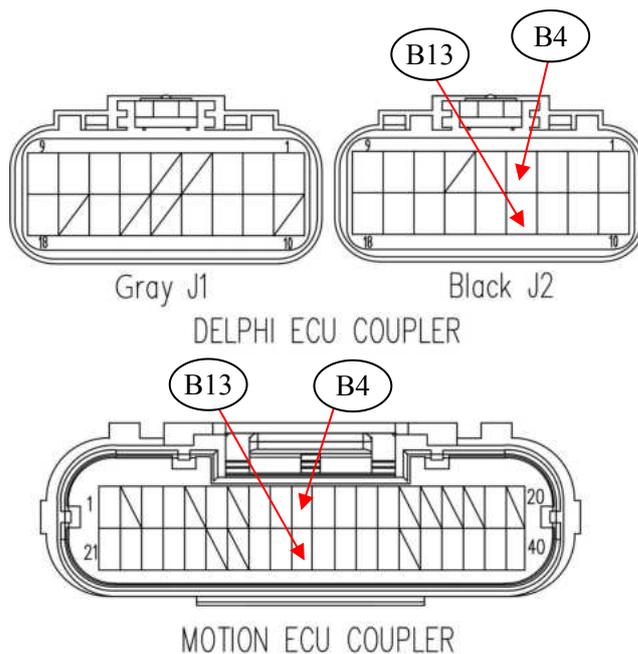
- 5) If OK, then check the continuity between each terminal and ground.

CKP continuity	$\infty\Omega$ (Infinity) (B1/W-Grou nd) (G/W-Grou
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Tester knob indication: Resistance (Ω)

Are the resistance and continuity OK?

YES	<ul style="list-style-type: none"> ● B1/W or G/W wire open or shorted to ground, or poor B4(J2-4) or B13(J2-13) connection of ECU coupler. ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	<ul style="list-style-type: none"> ● Loose or poor contacts on the pick-up coil coupler or ECU coupler. ● Replace the CKP with a new one.

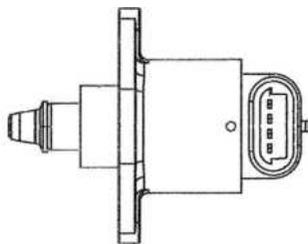


“P0505” ISC SOLENOID RANGE ABNORMAL

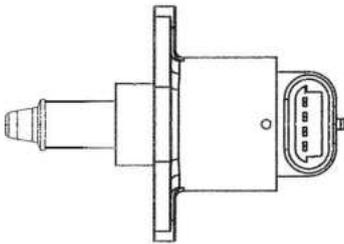
DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● ISC solenoid malfunction. ● ISC solenoid’s step is out of the specified range. ● ECU malfunction.

▣ INSPECTION

- 1) Remove the fuel tank.
- 2) Turn the ignition switch to the “OFF” position.
- 3) Check the ISC solenoid coupler for loose or poor contacts.
- 4) Turn the ignition switch “ON” position to check the ISC solenoid operation.



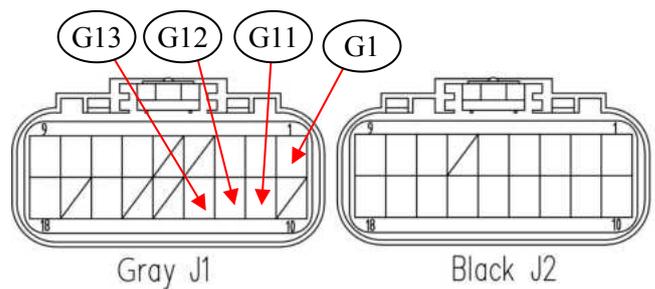
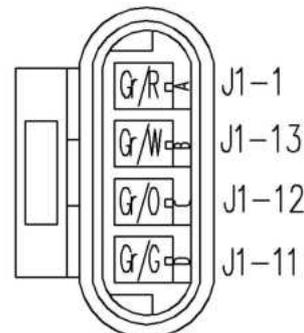
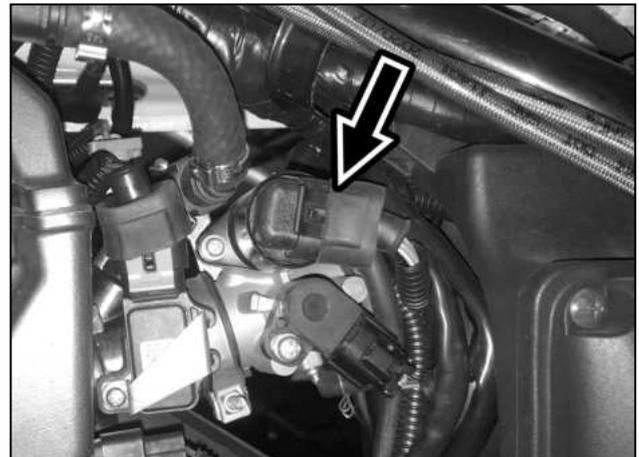
KEY OFF AI
[When Ignition switch “OFF”]



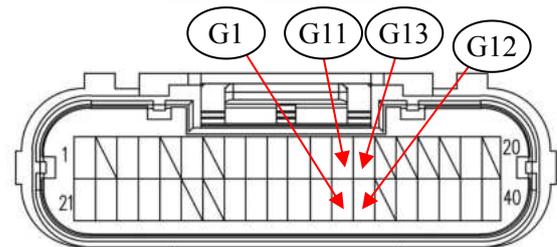
KEY ON AI
[When Ignition switch “ON”]

Is OK?

YES	<ul style="list-style-type: none"> ● Gr/W, Gr/O, Gr/G or Gr/R wire loose or poor contacts on the ISC solenoid coupler, or poor G13 (J1-13), G12(J1-12) , G11(J1-11) or G1(J1-1) connection of ECU coupler. ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the ISC solenoid with a new one.



DELPHI ECU COUPLER



MOTION ECU COUPLER

“P0562” or “P0563” BATTERY VOLTAGE MALFUNCTION

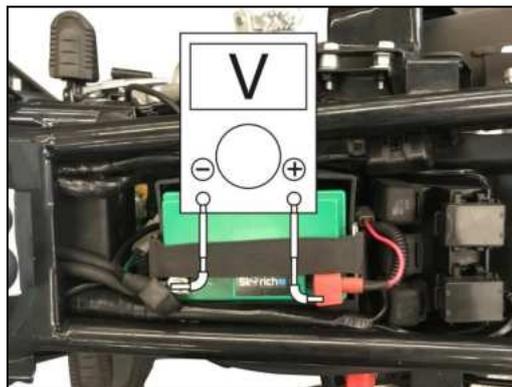
DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code, with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● Battery voltage circuit open and short. ● Battery malfunction. ● ECU malfunction.

INSPECTION

- 1) Remove the seat.
- 2) Turn the ignition switch to the “OFF” position.
- 3) Using the pocket tester, measure the DC voltage between the battery ⊕ and ⊖

Battery voltage	11 ~ 16 V
------------------------	-----------

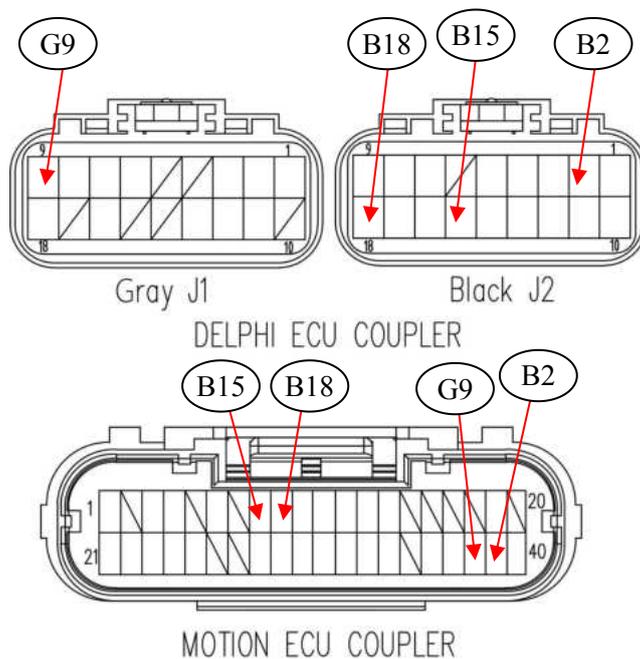
terminal.



Tester knob indication: Voltage (V)

Is the battery voltage OK?

YES	<ul style="list-style-type: none"> ● O/W, G, G or R/O wire open or shorted to ground, or poor B15(J2-15), G9(J1-9), B2(J2-2) or B18(J2-18) connection of ECU coupler. ● If wire and connection are OK, Intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the battery with a new one.



“P0601” ECU FAULT MALFUNCTION

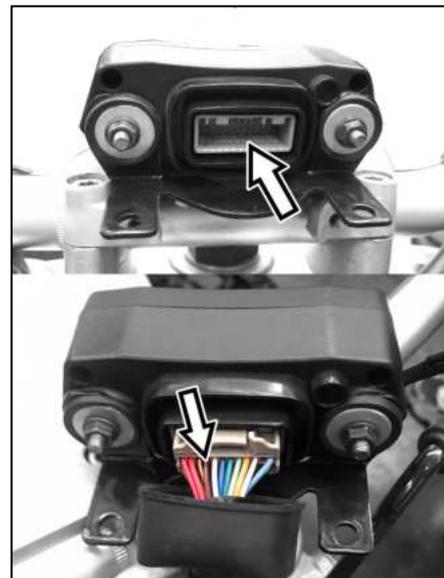
DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code, with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> • ECU error

“P0650”ENGINE WARNING LAMP CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code, with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> • engine warning lamp circuit open and short. • engine warning lamp malfunction. • ECU malfunction.

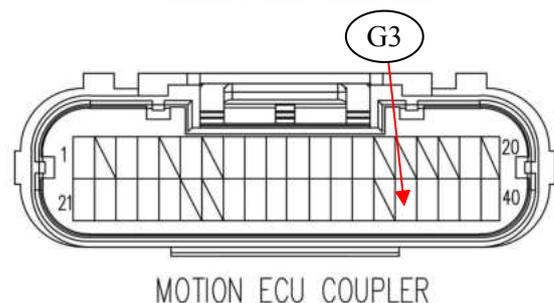
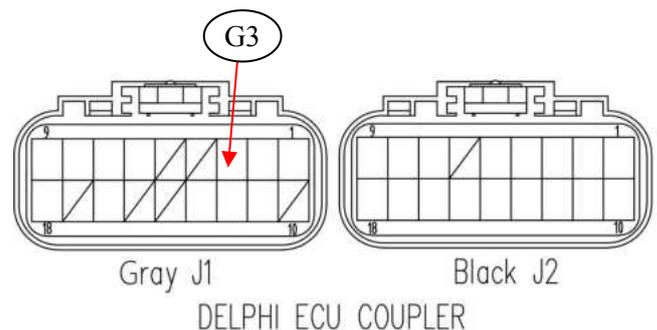
▣ INSPECTION

- 1) Turn the ignition switch to the “OFF” position.
- 2) Disconnect the instrument panel lead wires.
- 3) Connect the battery ⊕ terminal to the R wire pin and B wire pin of the instrument panel and the battery ⊖ terminal to the G wire pin of the instrument panel.
And then connect the B/R wire pin of the instrument panel to the battery ⊖ terminal directly



Is the engine warning lamp lit?

YES	<ul style="list-style-type: none"> • B/R or B wire open or shorted to ground or poor G3(J1-3) connection of ECU coupler. • If wire and connection are OK, intermittent trouble or faulty ECU. • Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the instrument panel with a new one.



“P0850”GP or CLUTCH LEVER SWITCH CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p>☞ To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● GP switch circuit open or short. ● GP switch malfunction. ● Clutch lever switch circuit open or short. ● Clutch lever switch malfunction. ● ECU malfunction.

▣ INSPECTION

- 1) Remove the left side cover.
- 2) Turn the ignition switch to the “OFF” position.
- 3) Check the GP switch and clutch lever switch coupler for loose or poor contacts. If OK, then measure the GP switch and the clutch lever switch resistance.
- 4) Park the motorcycle on a firm, flat surface vertically.
- 5) Disconnect the GP switch coupler and then check the continuity between Lg/R wire and ground when gearshift lever is shifted from the neutral state.

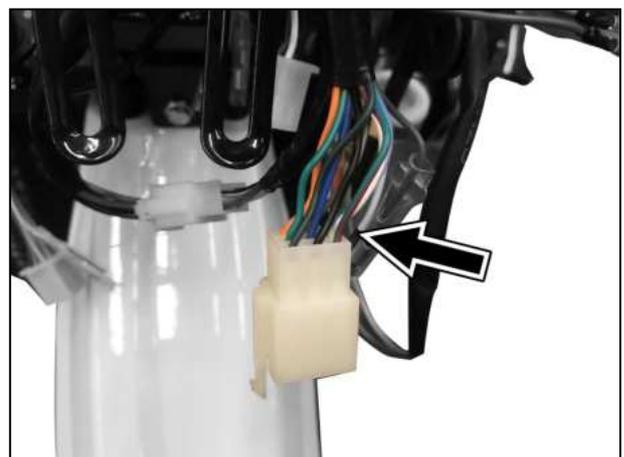
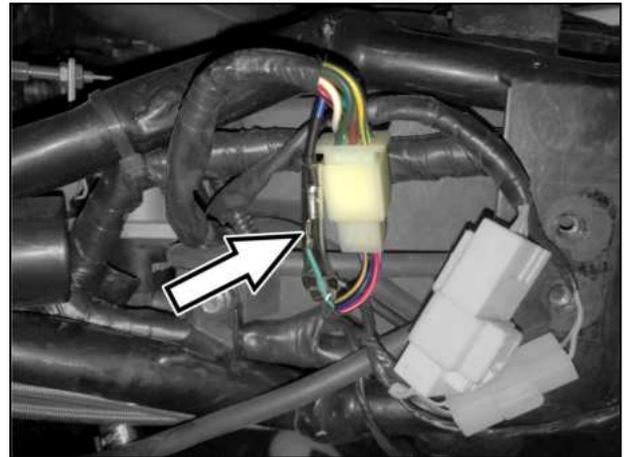
GP switch continuity
 0Ω
 (Lg/R- Ground)

☞ Tester knob indication: Resistance (Ω)

- 6) Disconnect the clutch lever switch coupler and then check the continuity between G/R wire and Gwire when the squeezing the clutch lever.

Clutch lever switch continuity
 0Ω
 (G/R- G)

☞ Tester knob indication: Resistance(Ω)



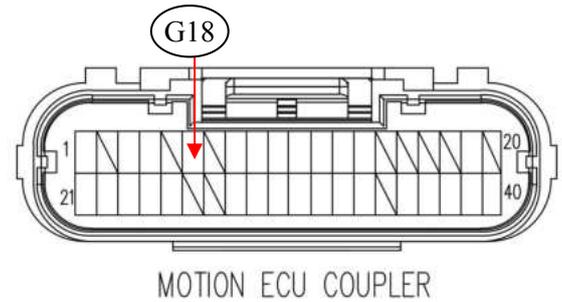
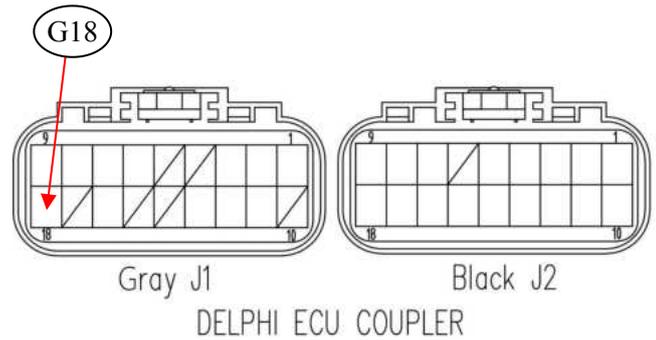
7) Measure the voltage between G18 of the ECU and the G/R wire of the wiring harness' clutch lever switch coupler.

If the measurement is out of 0.4 ~ 0.7 V, replace the DIODE with a new one

 **Tester knob indication: Diode test(↔)**

Is OK?

YES	<ul style="list-style-type: none"> ● If wire and connection are OK, intermittent trouble or faulty ECU. ● Recheck each terminal and wire harness for open circuit and poor connection.
NO	Replace the GP switch or Clutch lever switch with a new one.



“P2300”or“P2301” IGNITION COIL MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
<p> To read the flash code,with the EFI diagnostic instrument</p>	<ul style="list-style-type: none"> ● IGNITIONCOIL malfunction

 Refer to the IGNITION COIL for details

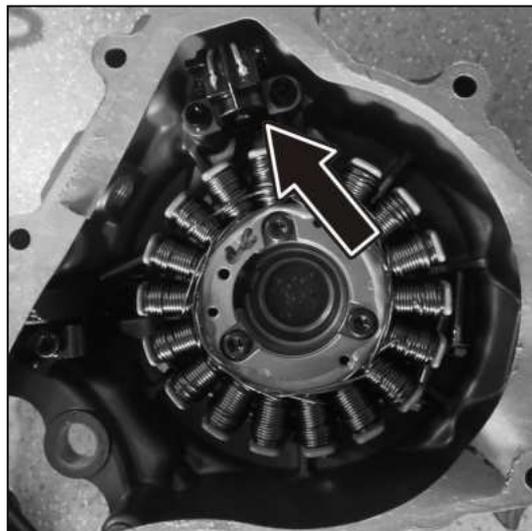
SENSORS

⊙ CKP INSPECTION

- The CKP is installed in the magneto cover.

⊙ CKP REMOVAL AND INSTALLATION

- Remove the magneto cover.
- Install the magneto cover in the reverse order of removal.



⊙ MAP&IAT (MAP) SENSOR INSPECTION

- The MAP sensor is installed at the throttle body.

⊙ MAP&IAT (IAT) SENSOR REMOVAL AND INSTALLATION

- Remove the fuel tank.
- Remove the MAP sensor from the intake pipe.
- Install the MAP sensor in the reverse order of removal.

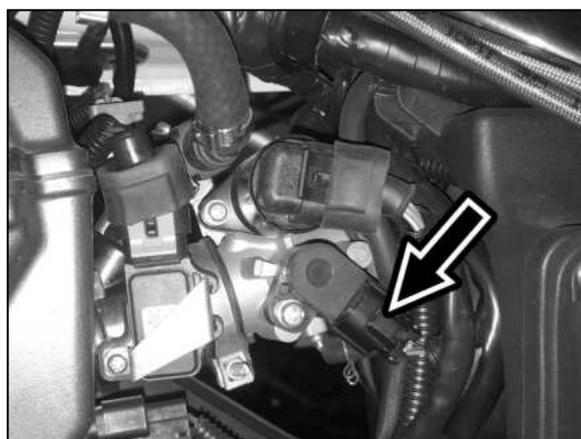


⊙ TP SENSOR INSPECTION

- The throttle position (TP) sensor is installed at the throttle body.

⊙ TP SENSOR REMOVAL AND INSTALLATION

 CAUTION
Never remove or adjust the TP sensor.



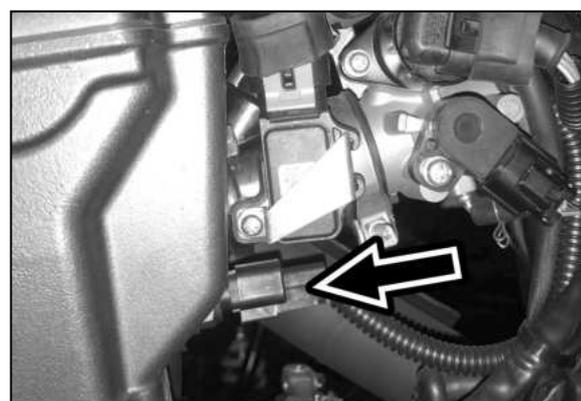
⊙ CLT SENSOR INSPECTION

- The engine temperature (CLT) sensor is installed at the cylinder.

⊙ CLT SENSOR REMOVAL AND INSTALLATION

- Remove the CLT sensor.
- Install the CLT sensor in the reverse order of removal.

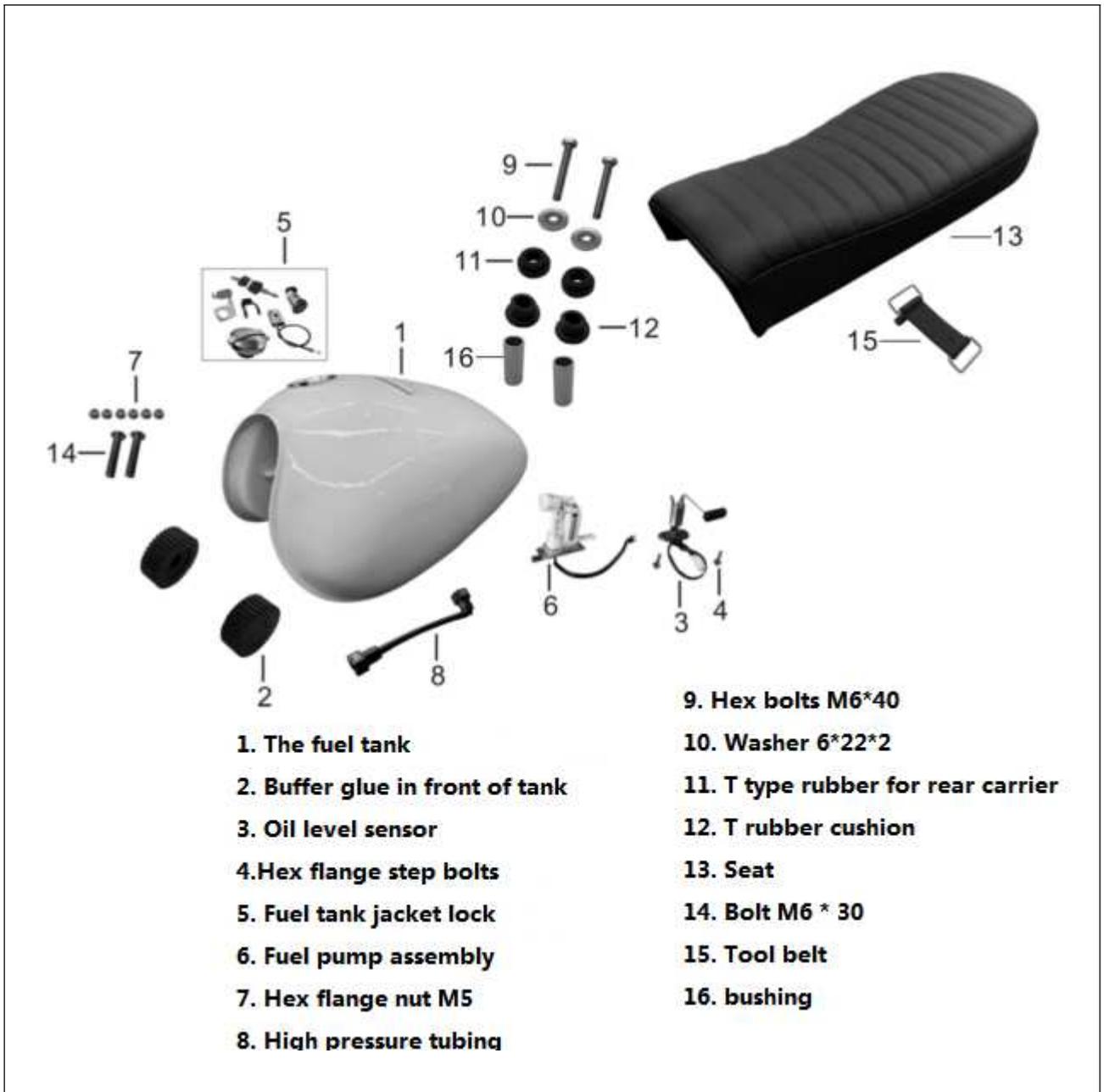
 CLT sensor: 5~8N·m (0.5~0.8kgf·m)



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REASSEMBLY AND INSTALLATION	5-3
FUEL PRESSURE INSPECTION	5-4
FUEL PUMP RELAY INSPECTION	5-5
FUEL MESH FILTER INSPECTION AND CLEANING	5-6
FUEL GAUGE INSPECTION	5-6
THROTTLE BODY	5-7
REMOVAL	5-8
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INSPECTION	5-10
INSTALLATION	5-10

FUEL SYSTEM



CAUTION

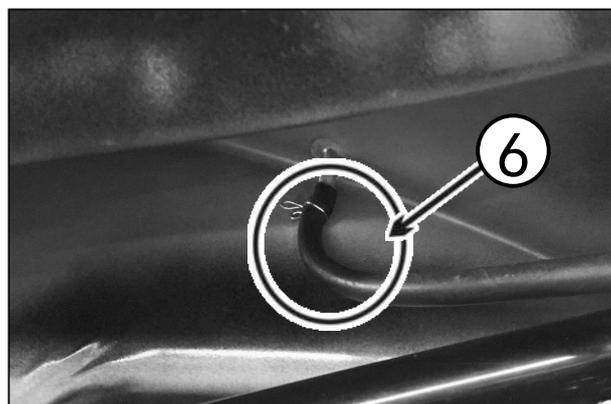
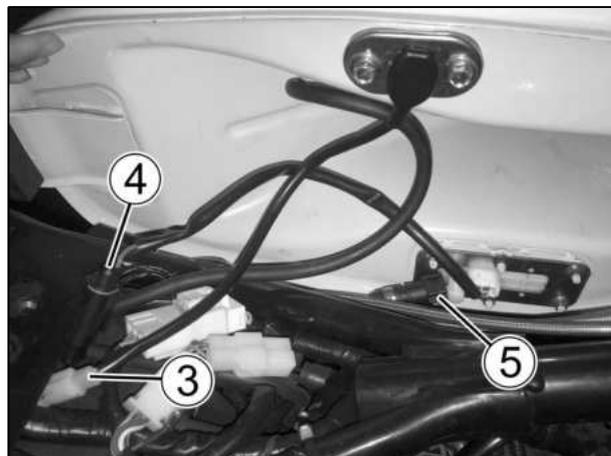
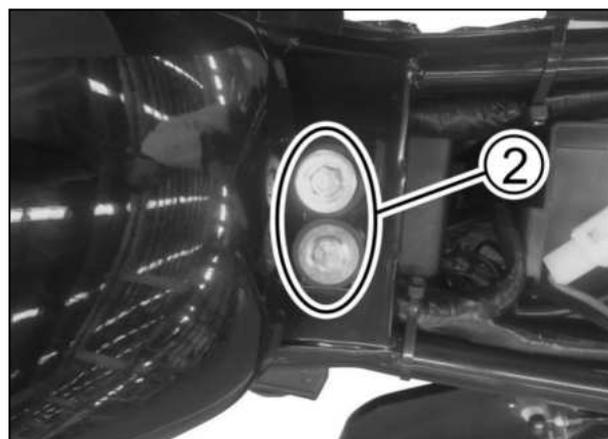
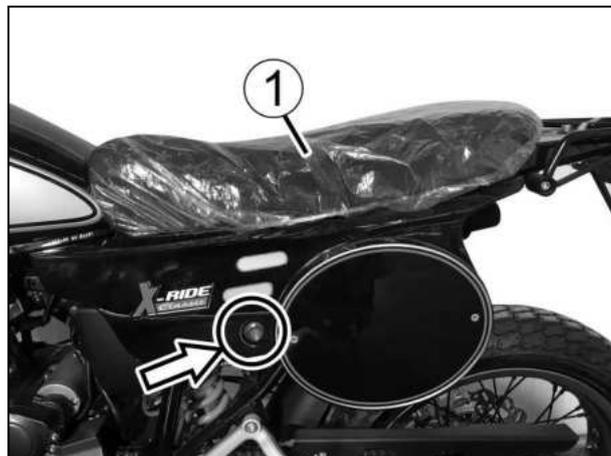
Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

REMOVAL AND DISASSEMBLY

 **WARNING**

Gasoline is very explosive. Extreme care must be taken.

- Drain the fuel.
- Open the saddle switch lock and remove the saddle ①.
- Remove the fuel tank mounting bolts ②.
- Disconnect the fuel sensor connector ③, the fuel pump wire connector ④ and fuel injection pipe ⑤ .
- Disconnect the double-layer coated oil pipe of the oil tank ⑥.



- Remove the fuel tank.

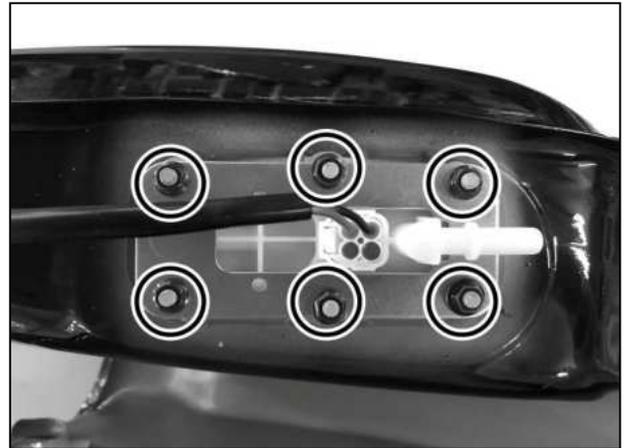
⚠ CAUTION

As gasoline leakage may occur in this operation, keep away from fire and sparks.

- Remove the fuel pump mounting nuts.
- Remove the fuel pump.

⚠ WARNING

- ❖ Gasoline is highly flammable and explosive.
- ❖ Keep heat, spark and flame away.



REASSEMBLY AND INSTALLATION

Reassembly and installation the fuel tank in the reverse order of removal and disassembly.

When installing the fuel pump assembly, first tighten all the fuel pump assembly mounting nuts slightly in diagonal stages, and then tighten them in the tightening order.

NOTE

Apply a small quantity of the **THREAD LOCK** to the thread portion of the fuel pump mounting bolt.

 **THREAD LOCK**

5-4 FUEL SYSTEM AND THROTTLE BODY

FUEL PRESSURE INSPECTION

- Place a rag under the fuel injector hose.
- Disconnect the fuel injector hose from the fuel hose joint.
 - Install the special tool between the fuel tank and fuel hose joint.

TOOL Fuel pump pressuregauge
: 09915-54510

Turn the ignition switch to the "ON" position and check the fuel pressure.

Fuel pressure of fuel pump	Approx. 3.46 ~ 3.67kgf/cm ² 340 ~ 360kPa, 49.31 ~ 52.21 psi)
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If the fuel pressure is lower than the specification, inspect the following item:

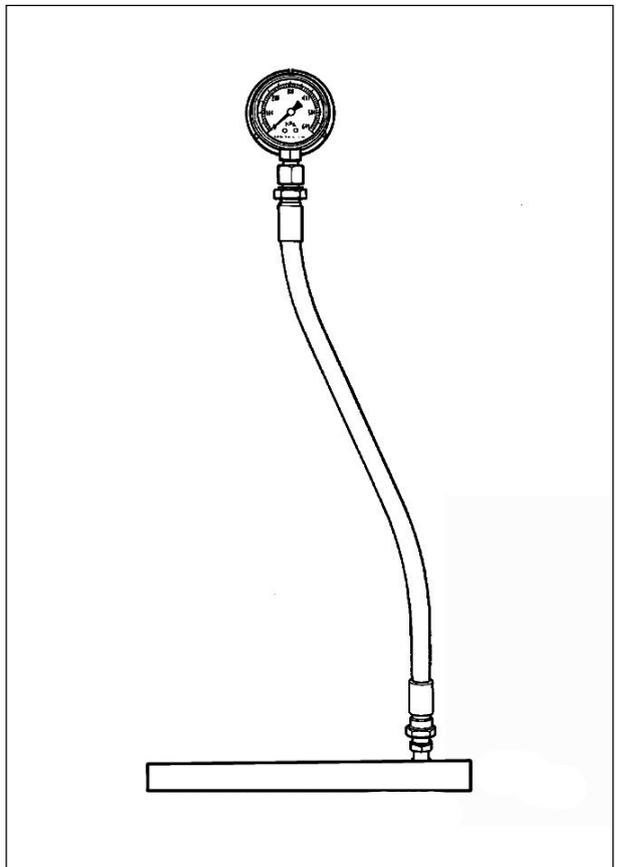
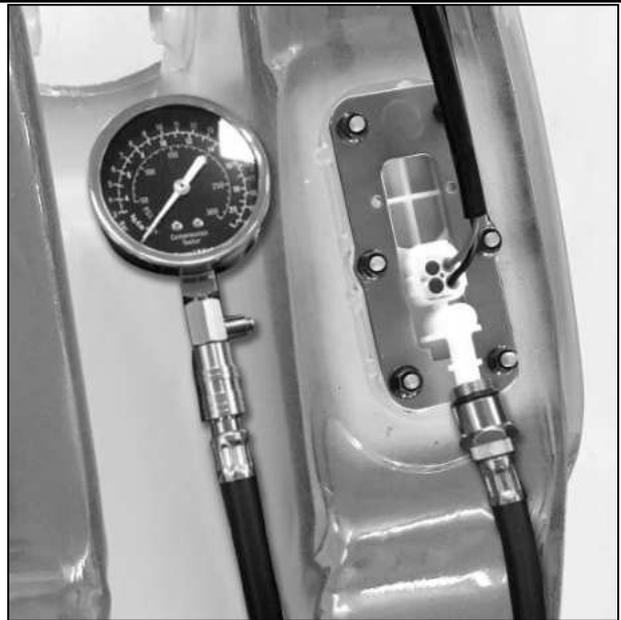
- * Fuel hose leakage
- * Clogged fuel filter
- * Pressure regulator
- * Fuel pump

If the fuel pressure is higher than the specification, inspect the following items :

- * Fuel pump check valve
- * Pressure regulator

WARNING

- ❖ Before removing the special tool, turn the ignition switch to the "OFF" position and release the fuel pressure slowly.
- ❖ Gasoline is highly flammable and explosive. Keep heat, sparks and flame away.

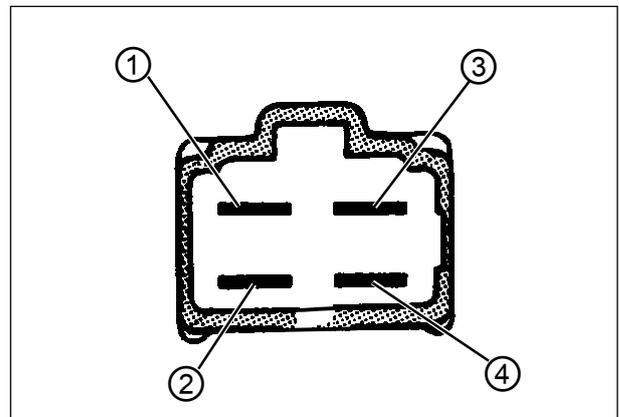
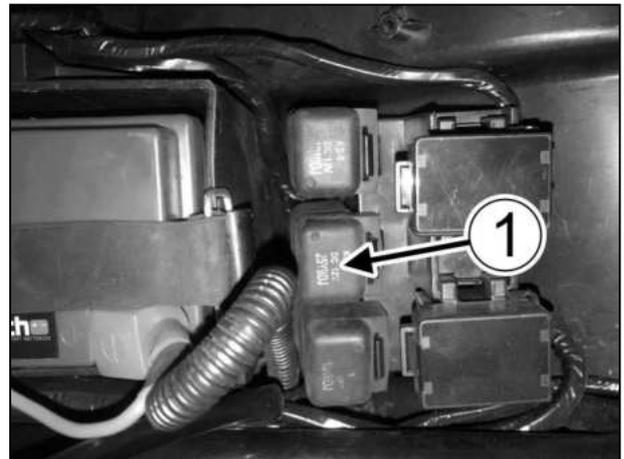


FUEL PUMP RELAY INSPECTION

- X-RIDE's fuel pump relay is located in the rear right cover of the frame.
- Remove the rear right cover of the frame.
- Remove the fuel pump relay ①.

First, check the insulation between ① and ② terminals with the pocket tester. Then apply 12 volts to ③ and ④ terminals, +to ③ and -to ④, and check the continuity between ① and ②.

If there is no continuity, replace it with a new one.



FUEL MESH FILTER INSPECTION AND CLEANING

- If the fuel mesh filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result.
- Blow the fuel mesh filter with compressed air.

NOTE

If the fuel mesh filter is clogged with many sediment or rust, replace the fuel filter cartridge with a new one.



FUEL GAUGE INSPECTION

- Measure resistance between the terminals when float is at the position instead below.

Fuel float position	Resistance between terminals
F	X-RIDE Approx. 90 ~ 100Ω
1/2	X-RIDE Approx. 65Ω
E	X-RIDE Approx. 4 ~ 10 Ω

- If the resistance measured is out of the specification, replace the fuel gauge with a new one.
- Inspect the instrument panel (fuel level meter).

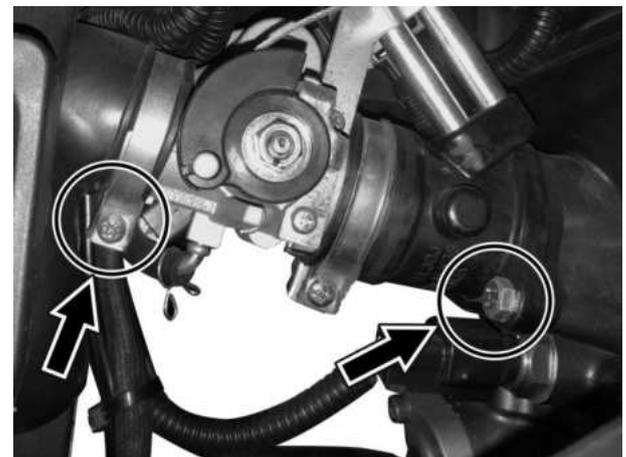
THROTTLE BODY



REMOVAL

- ▣ Remove the fuel tank.
- ▣ Disconnect the fuel hoses.
- ▣ Remove the all couplers connected to the throttle body.

- ▣ Loosen the throttle body clamp and intake pipe screws.
- ▣ Disconnect the throttle cables from their drum.
- ▣ Dismount the throttle body assembly.



CAUTION

- ❖ Be careful not to damage the throttle cable bracket when dismantling or remounting the throttle body assembly.
- ❖ After disconnecting the throttle cables, do not snap the throttle valve from full open to full close. It may cause damage to the throttle valve and throttle body.

CLEANING

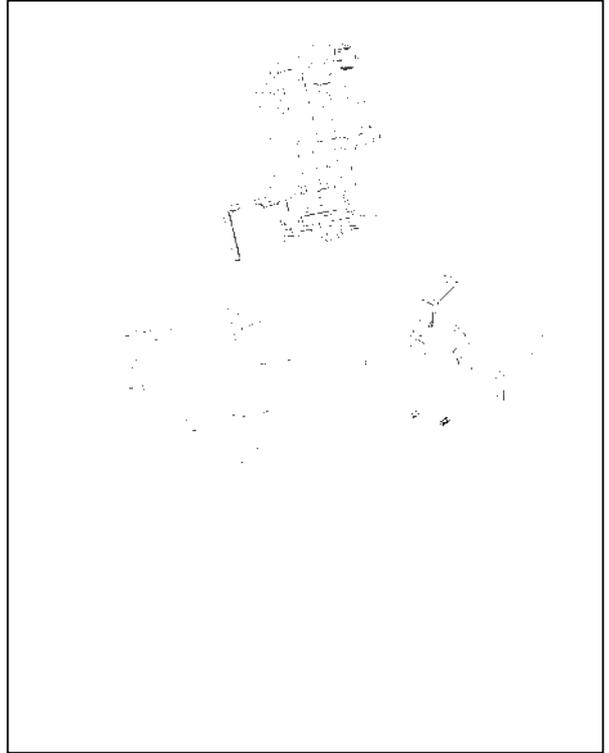
- Clean all passageways with a spray-type throttle body cleaner and blow dry with compressed air.

WARNING

Some throttle body cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.

CAUTION

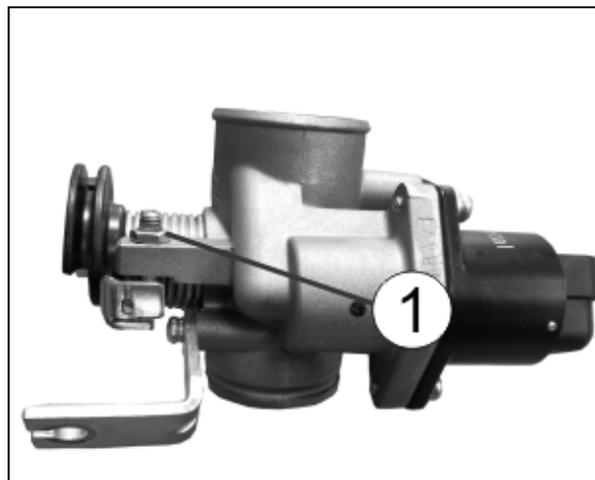
Do not use wire to clean passageways. Wire can damage passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the throttle body components. Do not apply throttle body cleaning chemicals to the rubber and plastic materials.



INSPECTION

- ▣ Check following items for any damage or clogging.
- * O-ring
- * Throttle shaft bushing and seal
- * Injector cushion seal
- * Fuel injector
- * Throttle body
- * Intake pipe
- * Throttle valve
- * Vacuum hose

Check fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel lines and fuel tank.

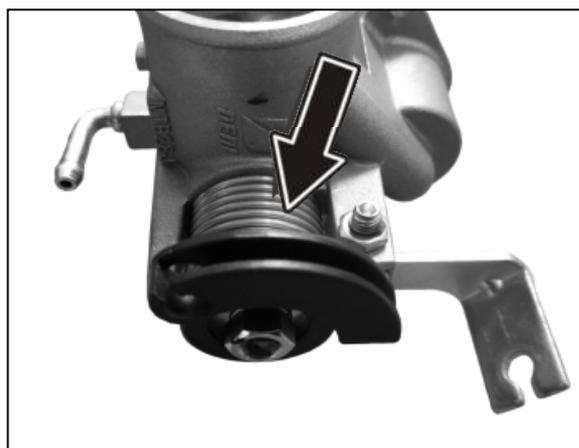
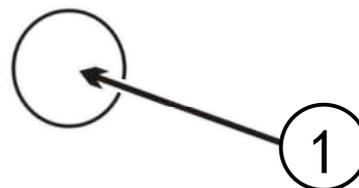


INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points :

⚠ CAUTION
Never operate the idle nuts ① to avoid variations of the ECU setting.

- ▣ Connect the throttle cable to the throttle cable drum.
- ▣ Adjust the throttle cable play with the cable adjuster.



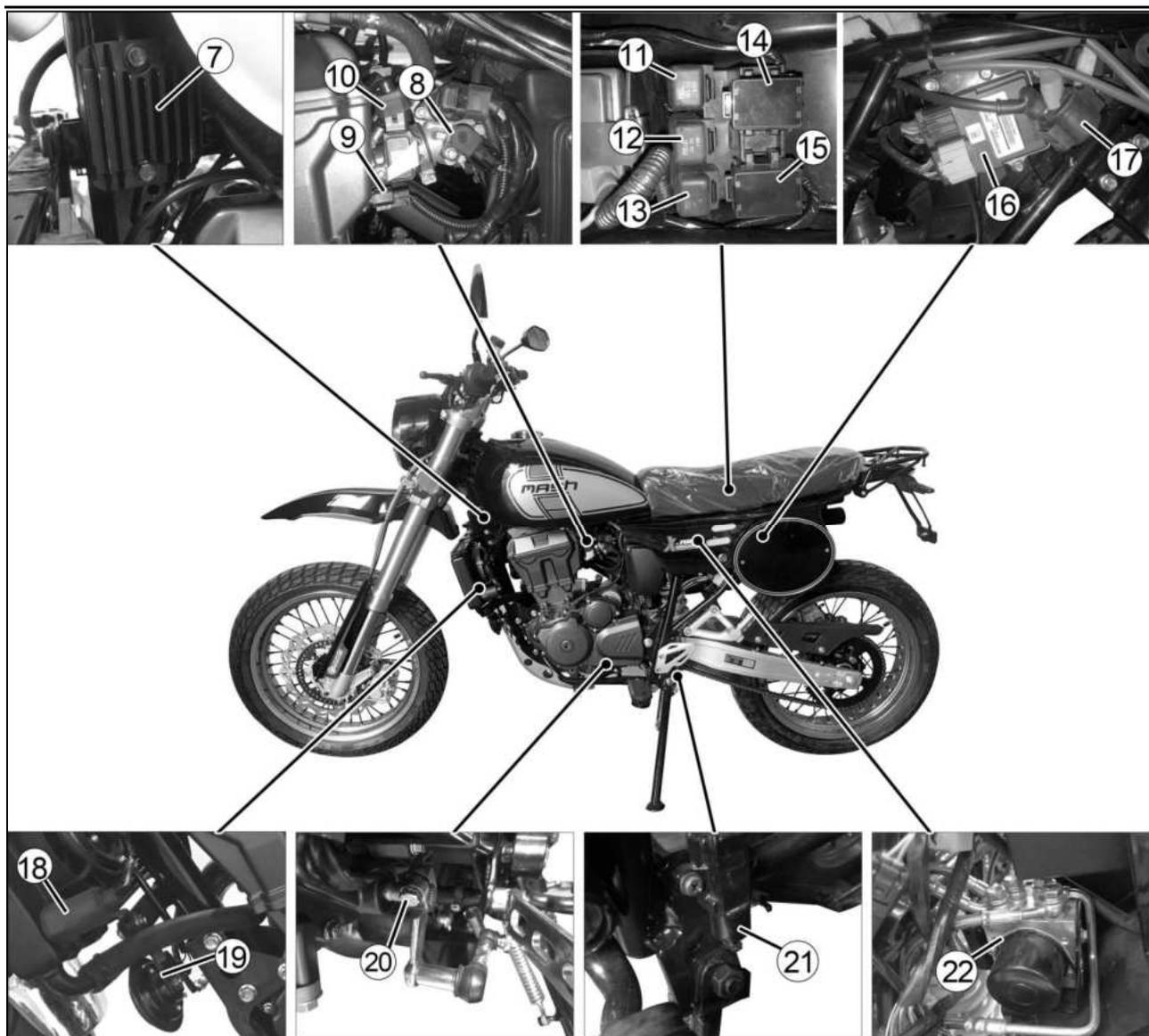
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LOCATION OF ELECTRICAL COMPONENTS



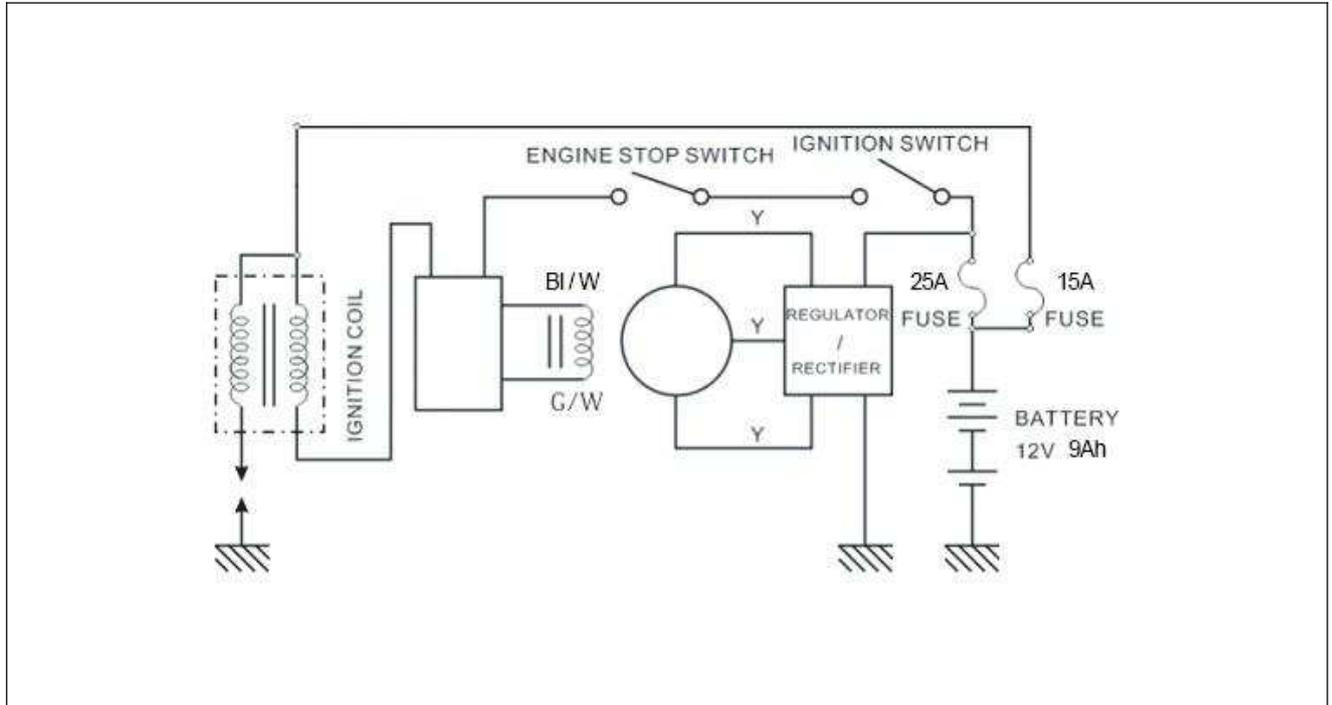
1	Flasher	2	Ignition coil	3	Front brake lamp switch
4	Rear brake lamp switch	5	Starter motor	6	Oxygen sensor



7	Rectifier	8	Throttle body position sensor	9	Cylinder temperature sensor
10	Air intake pressure temperature sensor	11	EFI relay	12	Oil pump relay
13	Headlight relay	14	ECU Fuse	15	ABS Fuse
16	ECU	17	Starting relay	18	Water Temperature switch
19	Horn	20	Gear position switch	21	Side stand switch
22	ABS module				

CAUTION

Be sure not to misassemble the position of battery plus & minus terminal.

IGNITIONSYSTEM

INSPECTION

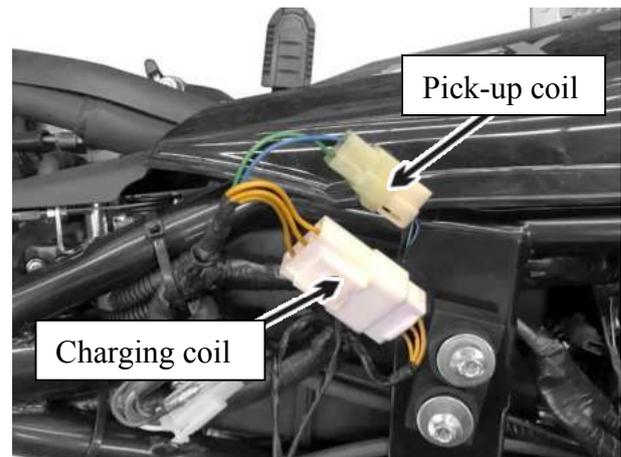
MAGNETO

Using the pocket tester, measure the resistance between the lead wires in the following table. If the resistance is not within the specified value, replace the stator coil, with a new one.

Stator coil resistance	Standard
Pick-up coil	G-L Approx.95~125Ω
Charging coil	Y-Y Approx.0.3~0.6Ω

 Pocket Tester: 09900-25002

 Tester knob indication : Resistance (Ω)



NOTE

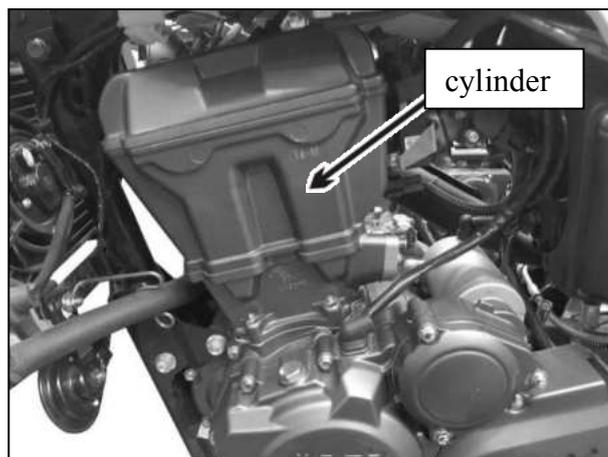
When making above test, it is not necessary to remove the magneto.

IGNITION COIL PRIMARY PEAK VOLTAGE INSPECTION

- Remove the frame cover and fuel tank.
- Disconnect the spark plug caps.
- With the spark plug cap connected, place a new spark plug on the engine to ground it.

NOTE

- ❖ Check that all the couplers are connected.
- ❖ Check that the battery is fully charged.



Measure the No.1 and No.2 ignition coil primary peak voltage using the tester in the following procedure.

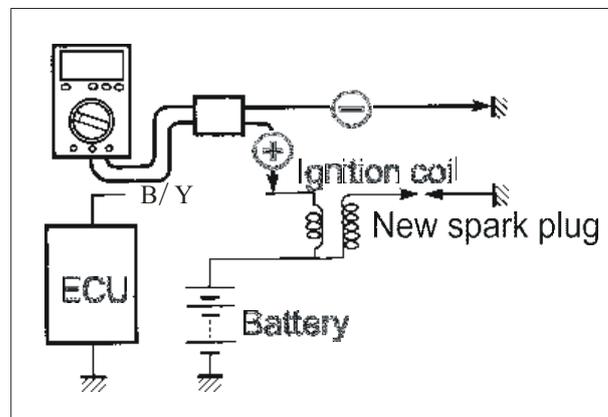
Connect the tester as follows.

Ignition coil	
⇒	⊕ Probe : B/Y lead wire terminal
	⊖ Probe : Ground

NOTE

Do not disconnect the ignition coil / plug cap lead wire couplers.

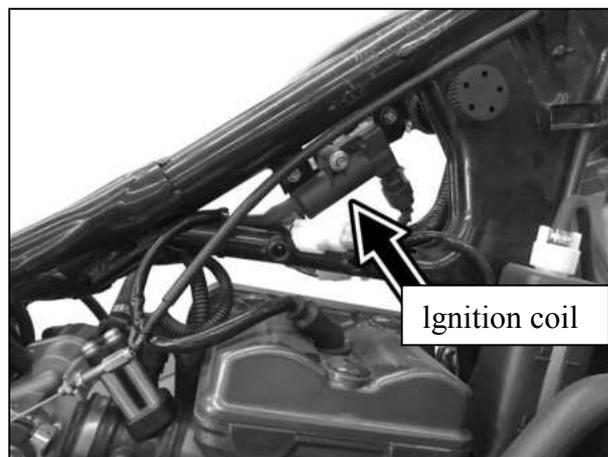
- Shift the transmission into the neutral and then turn the ignition switch to the “ON” position.
- Squeeze the clutch lever.
- Press the starter switch and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.



Ignition coil primary peak voltage	400V and more
---	---------------

 **TOOL** Pocket tester : 09900-25002

 **Tester knob indication : Voltage (---)**



⚠ WARNING

While testing, do not touch the tester probes and spark plugs to prevent receiving an electric shock.

If the peak voltage is lower than the specified values, inspect the ignition coil.

□ IGNITION COIL RESISTANCE INSPECTION

- Remove the fuel tank.
- Disconnect the ignition coil read wire.

Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.

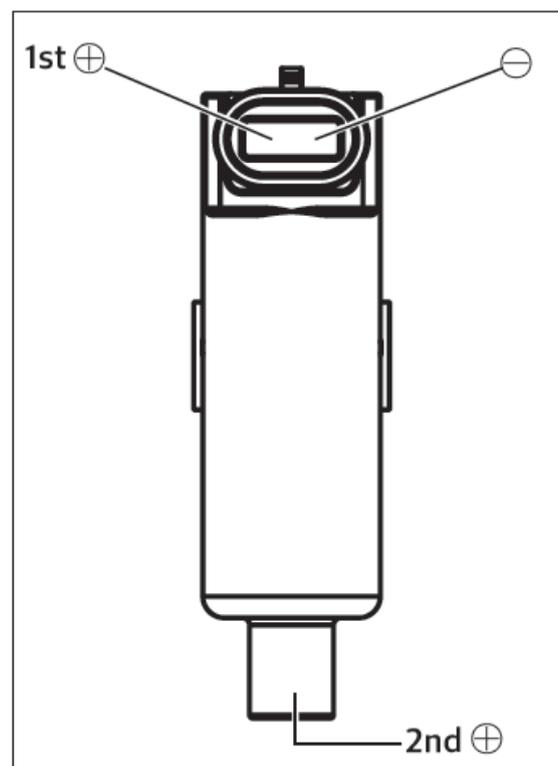
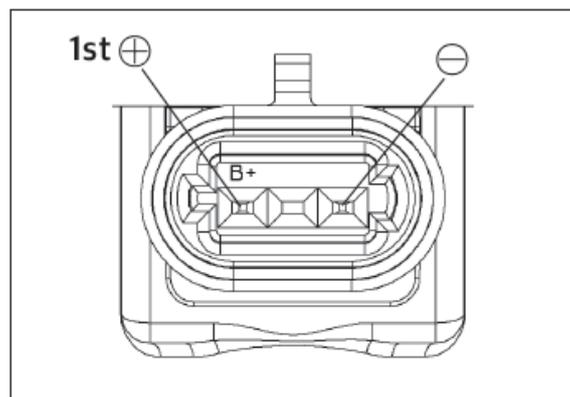
IGNITION COIL RESISTANCE	
primary	0.52~0.64 Ω 第一个 ⊕ — ⊖
Secondary	6.4~7.8KΩ 第二个 ⊕ — ⊖

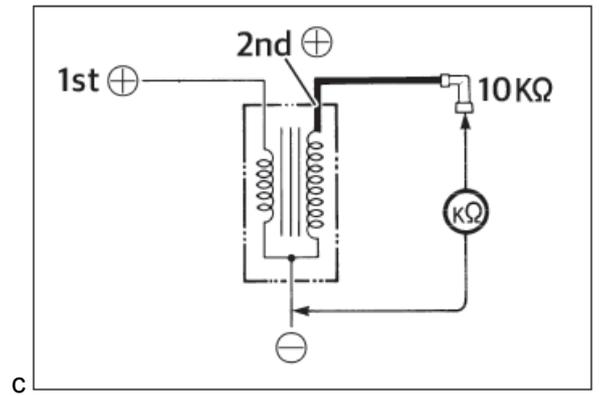
 Pocket Tester :09900-25002

 : 09900-25002

SPARK PLUG CAP RESISTANCE	10K Ω
---------------------------	-------

Ignition coil secondary/ spark plug cap resistance (spark plug cap ~ ⊖ terminal)	16.4~17.8K Ω
--	--------------





■ SPARK PLUG

▷ CARBON DEPOSITS

Check to see if there are carbon deposits on the spark plug.

If carbon is deposited, remove it with a spark plug cleaner machine or carefully use a tool with a pointed end.

▷ SPARK PLUG GAP

Measure the spark plug gap with a thickness gauge.

If the spark plug gap is out of specification, adjust the gap.

Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.032 in)
-----------------------	--

 Thickness gauge : 09900-20806

▷ ELECTRODE'S CONDITION

Check to see the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the spark plug. Replace the spark plug if it has a broken insulator, damaged thread, etc.

CAUTION

Use recommended spark plug only.
A spark plug of the wrong rating may shorten engine life and cause loss of performance.

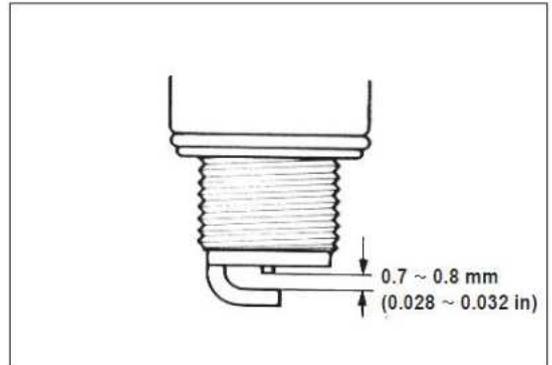
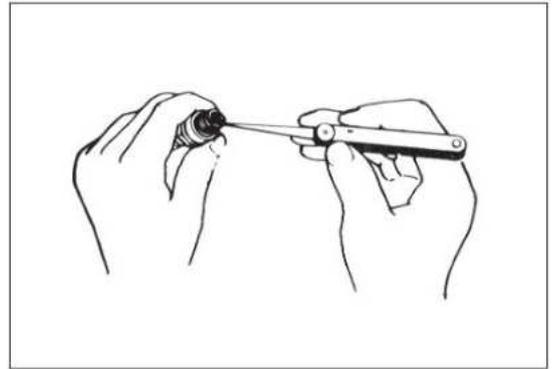
▷ SPARK PLUG INSTALLATION

CAUTION

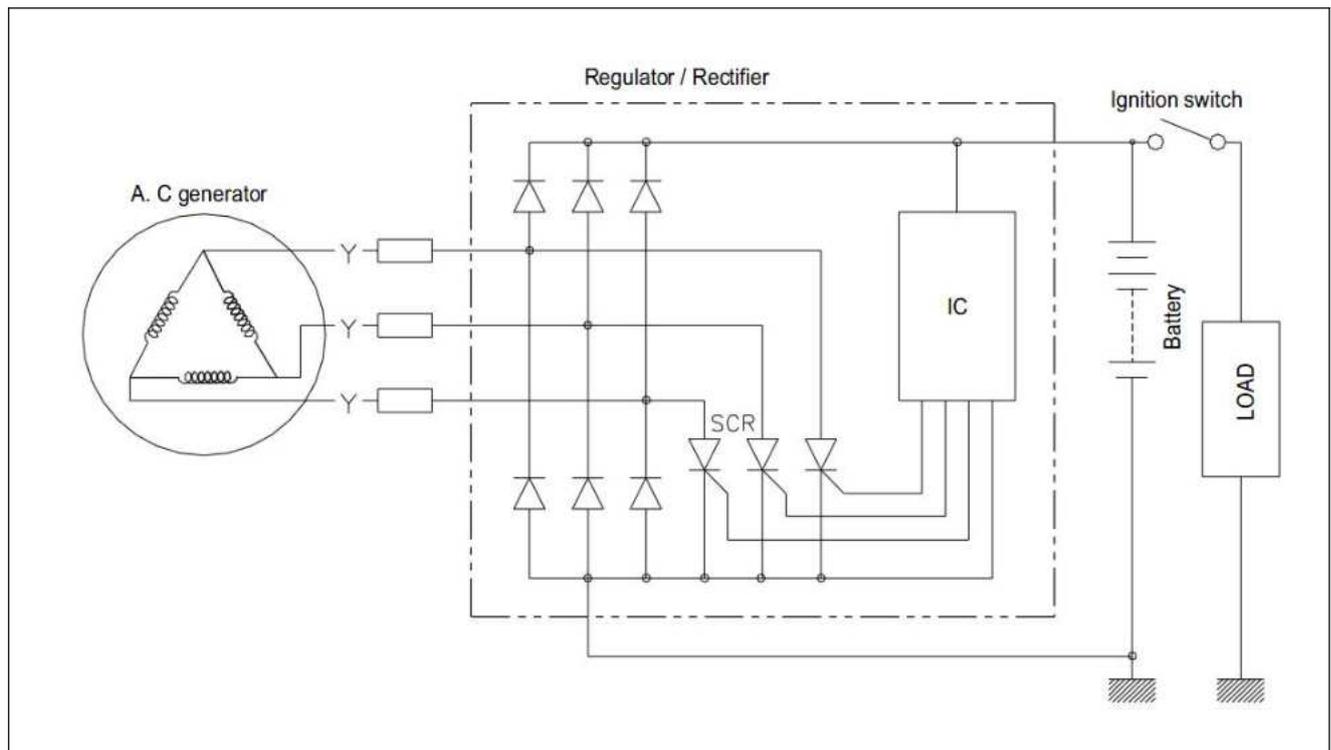
Before tightening the spark plug to the specified torque, carefully turn the spark plug by finger into the threads of the cylinder head to prevent damage the aluminum threads.

- First, finger tighten the spark plug, and then tighten them to the specified torque.

 Spark plug: 23N·m (2.3kgf·m)



CHARGING SYSTEM

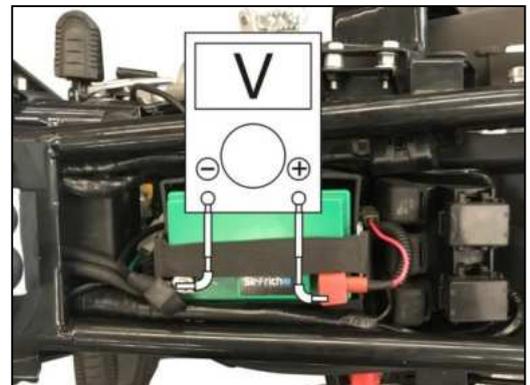


■ INSPECTION

▷ CHARGING OUTPUT CHECK

Start the engine and keep it running at 5,000 rpm.
Using the pocket tester, measure the DC voltage between the battery terminal \oplus and \ominus .

If the voltage is not within the specified value, check the magneto no-load performance and regulator / rectifier.



⚠ CAUTION

When making this test, be sure that the battery is full-charged condition.

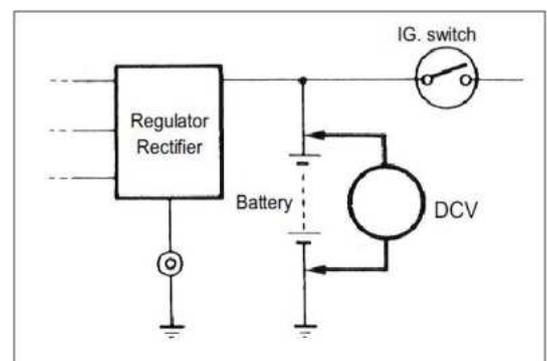
Standard charge

13.5 ~ 15.0 V
(at 5,000 rpm)

 **TOOL** Pocket tester : 09900-25002

 **Tester knob indication : Voltage (---)**

 **TOOL** : 09900-25002



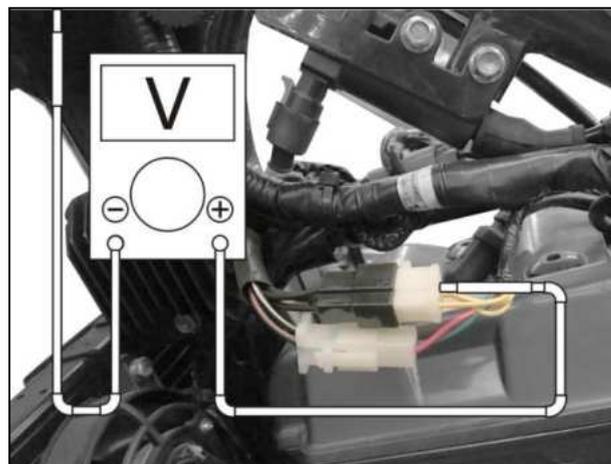
▷ **MAGNETO NO-LOAD**

PERFORMANCE

Disconnect the three lead wires from the magneto terminal.

Start the engine and keep it running at 5,000 rpm. Using the pocket tester, measure the AC voltage between the three lead wires.

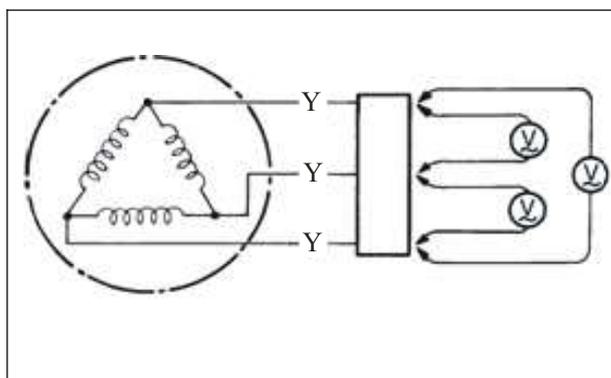
If the voltage is under the specified value, replace the magneto with a new one.



Standard no-load performance of magneto	Over60V (at5,000rpm)
--	-------------------------

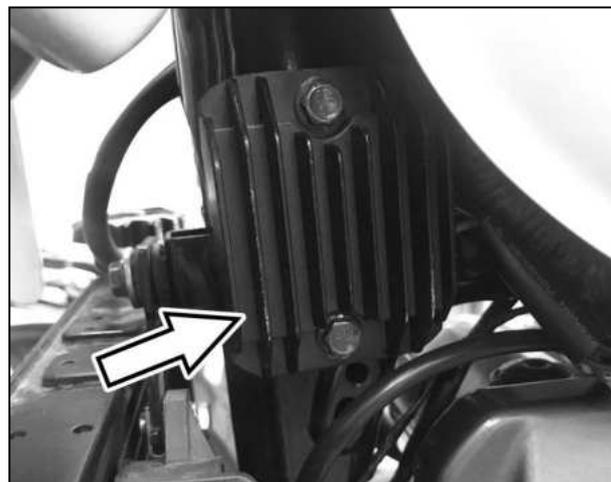
 **Pocket tester : 09900-25002**

 **Tester knob indication : Voltage (~)**



▷ **REGULATOR / RECTIFIER**

Disconnect the regulator / rectifier couplers. Measure the voltage between the terminals using the pocket tester as indicated in the table below. If the voltage is not within the specified value, replace the regulator / rectifier with a new one.

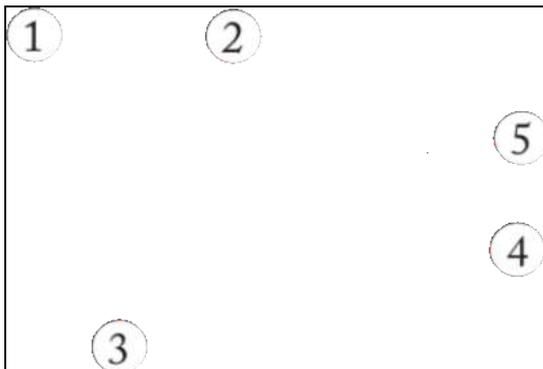


Unit : V

		+Tester probe				
		①	②	③	④	⑤
-Tester probe	①	0	0	0	0	0.4~0.7
	②	0	0	0	0	0.4~0.7
	③	0	0	0	0	0.4~0.7
	④	0	0	0	0	1.8 ~ 2.1
	⑤	0	0	0	0	0

 **Pocket tester : 09900-25002**

 **Tester knob indication: Diode test (⚡)**

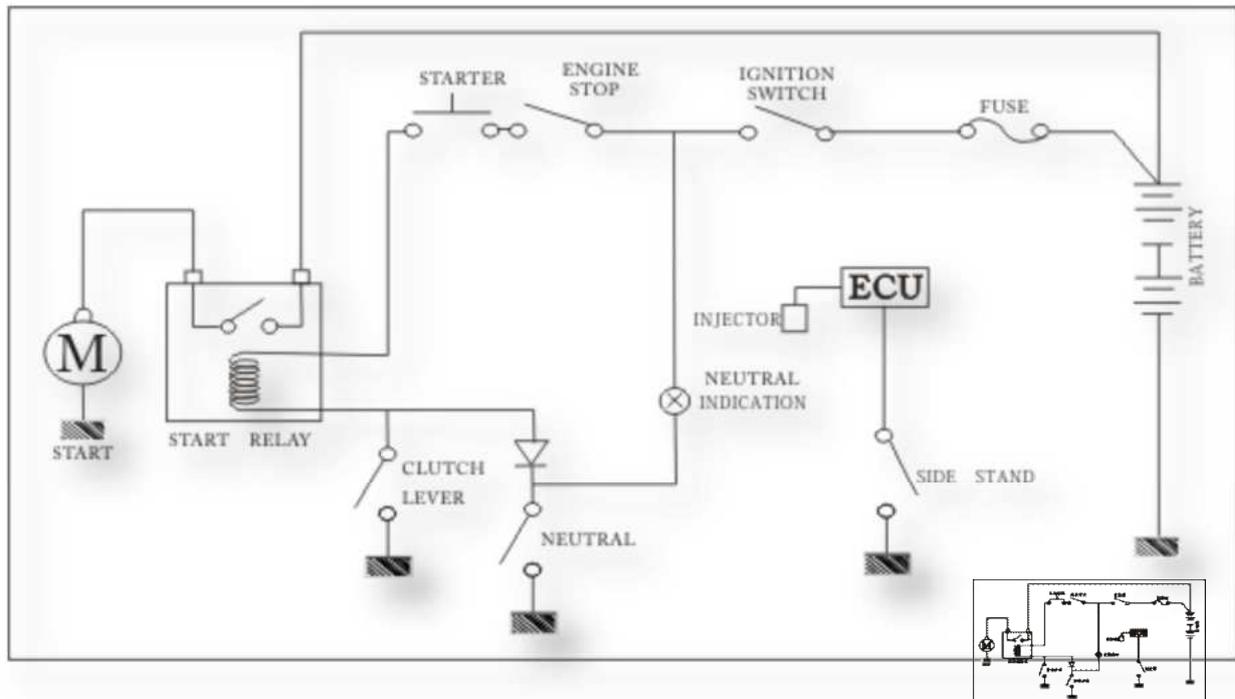


STARTER SYSTEM AND SIDE STAND

□ STARTER SYSTEM DESCRIPTION

The starter system consists of the following components : the starter motor, starter relay, clutch lever switch, side stand switch, GP switch, starter switch, engine stop switch, ignition switch and battery.

Pressing the starter switch (on the right handlebar switch) energizes the starter relay, causing the contact points to close, thus completing the circuit from the starter motor to the battery.



■ SIDE STAND / IGNITION INTERLOCK SYSTEM DESCRIPTION

This side stand / ignition interlock system prevents the motorcycle from being started with side stand down.

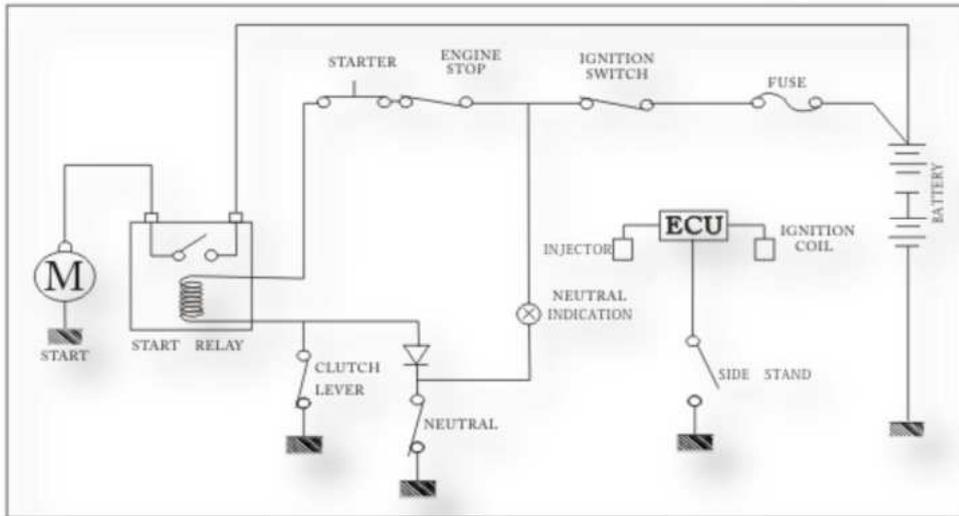
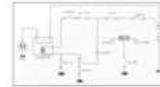
The system is operated by an electric circuit provided between the battery and starter.

The circuit consists of the neutral indicator light and switches.

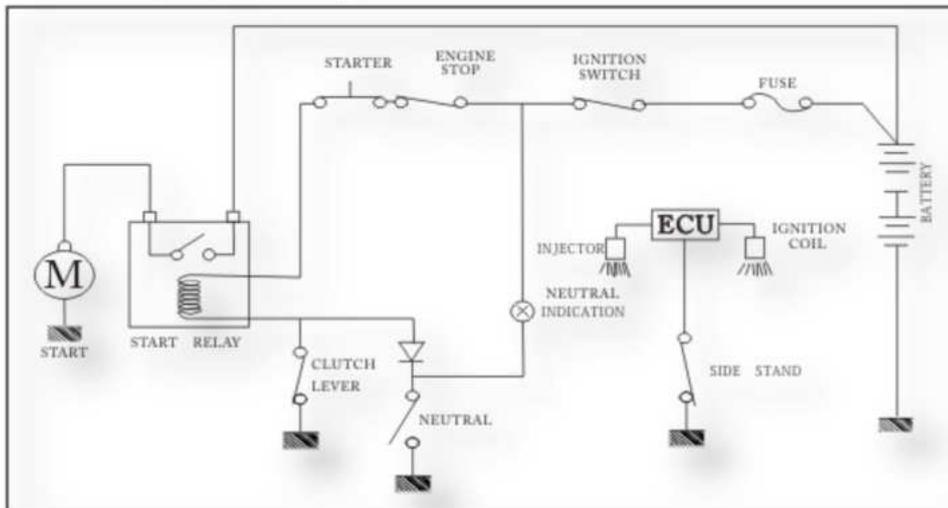
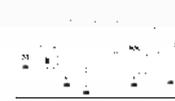
The starter will work depends on the condition of clutch lever switch, GP switch, starter switch, engine stop switch, ignition switch.

ECU will control the injector depends on the condition of side stand switch.

TRANSMISSION: Neutral –“ON”
Side stand - Down
Clutch lever - Squeeze



TRANSMISSION: Neutral –“OFF”
Side stand - Up
Clutch lever - Squeeze



X-RIDE are equipped with the side stand ignition interlock system.

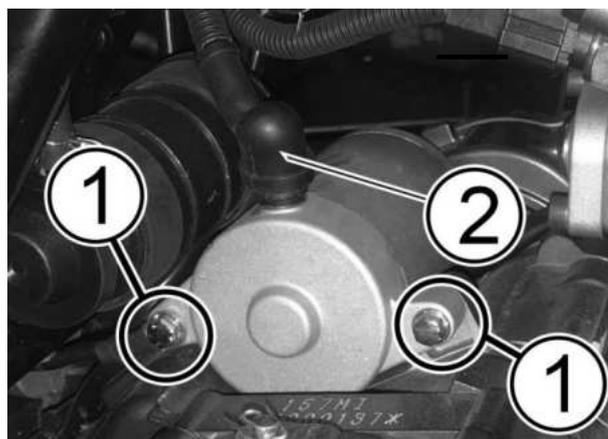
Fuel injector is controlled by ecu depends on the condition of side stand switch.

NO	Neutral switch	Clutch lever	Side stand	Engine Start
1			△	Possible
2	△			Possible
3		△	△	Impossible
4	△		△	Impossible
5	△	△		Impossible

NOTE	
	On or Up
△	Off or Down

STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire ②.
- With loosen the bolt ①, remove the starter motor.
- Disassemble the starter motor.



STARTER MOTOR INSPECTION CARBON BRUSH

Inspect the brushes for abnormal wear, crack or smoothness in the brush holder.

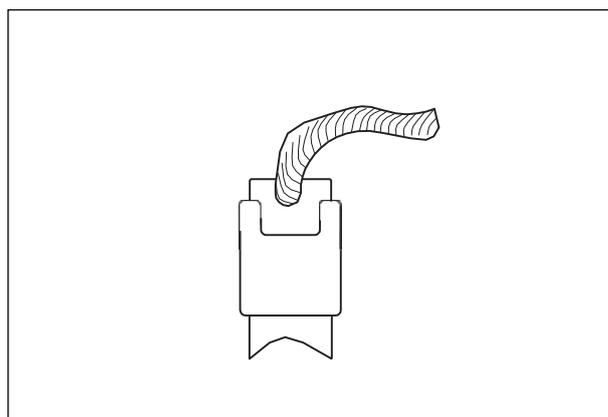
If the brush has failed, replace the brush sub assy.

COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut ③.

If the commutator is abnormally worn, replace the armature.

When surface is discolored, polish it with #400 sand paper and clean it with dry cloth.



ARMATURE COIL INSPECTION

Check for continuity between each segment.

Check for continuity between each segment and the armature shaft.

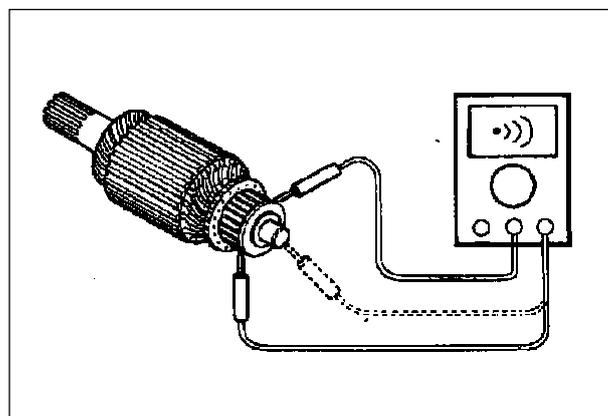
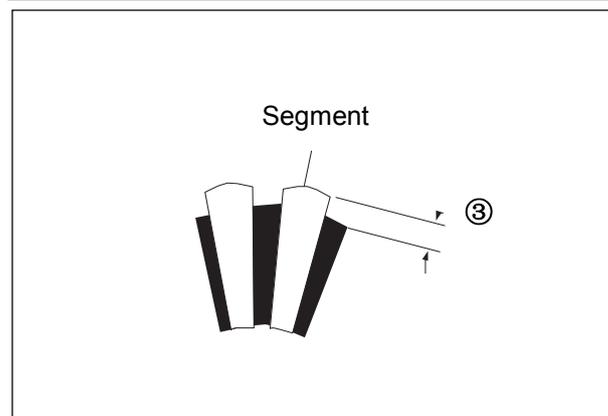
If there is no continuity between the segments or there is continuity between the segment and shaft, replace the starter motor with a new one.

 **Pocket tester : 09900-25002**

 **: 09900-25002**

 **Tester knob indication**

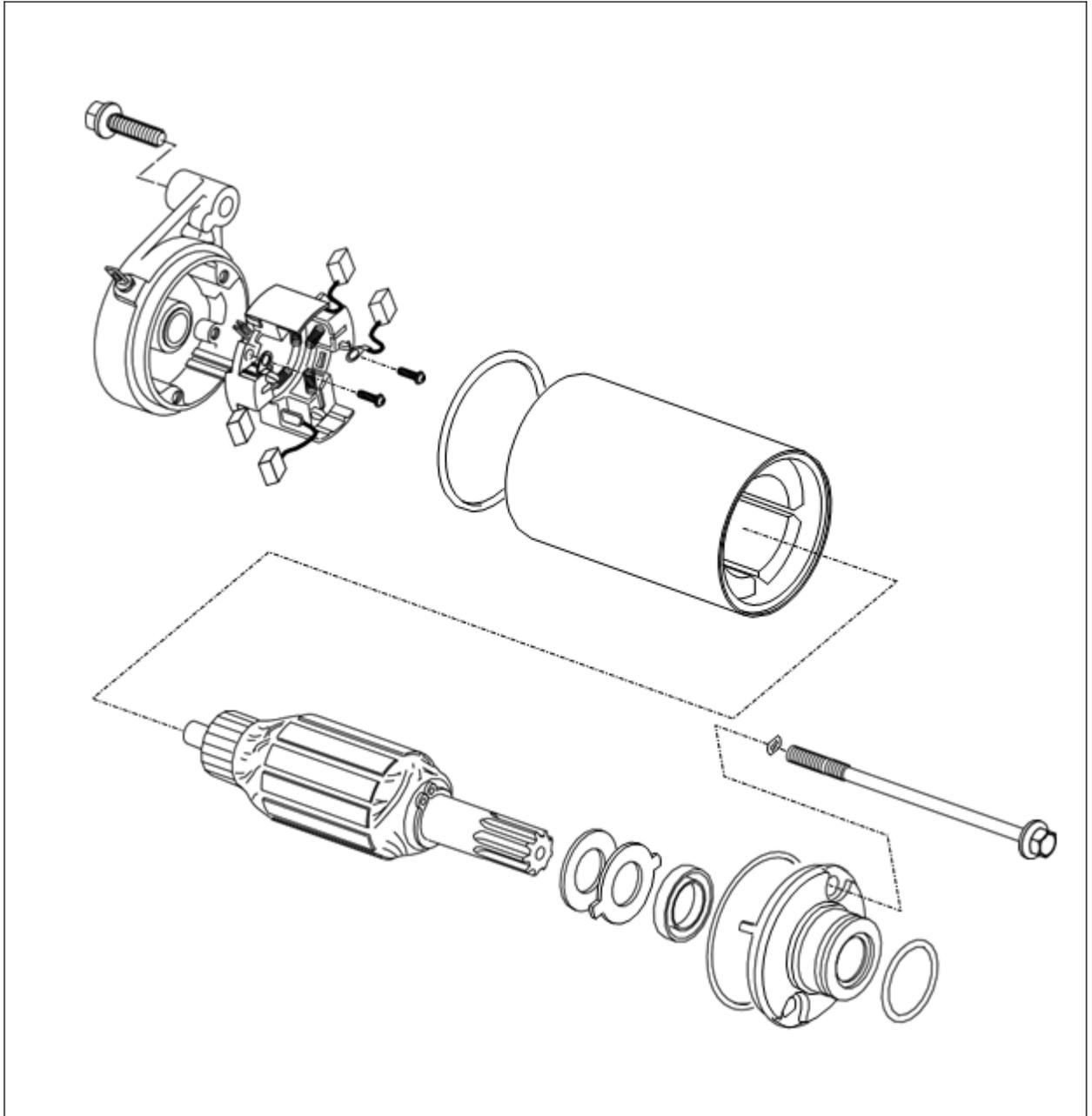
: Continuity test (•••)



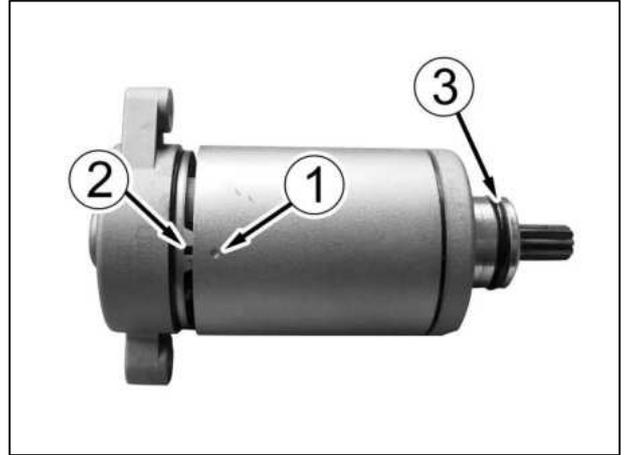
▣ STARTER MOTOR REASSEMBLY

Reassembly the starter motor. Pay attention to the following points :

- Reassembly the starter motor as shown in the illustration.



- Align the mark ① on the housing with the line ② on the housing end.
- Apply GREASE to the O-ring ③ and remount the starter motor.



SWITCHES

Measure each switch for continuity using a tester. If any abnormality is found, replace the respective switch assemblies with new ones.

 Pocket tester :09900-25002: 09900-25002

IGNITION SWITCH				
	R	B	Br	Br/W
				
	○ — ○		○ — ○	

DIMMER				
	Y/W	B	W	B1
	○ — ○ — ○ — ○			
	○ — ○		○ — ○	
PASSING		○ — ○		○ — ○

TURN SIGNAL			
	Sb	0	Gr
		○ — ○	
•			
	○ — ○		○ — ○

HORN		
	G	Lg
		
PUSH	○ — ○	

CLUTCH SWITCH		
	G	G/R
PUSH	○ — ○	

ENGINE STOP		
	B	O/W
	○ — ○	
		

STARTER		
	Y/R	O/W
•		
	○ — ○	

WARNING SWITCH			
	Sb	0	Gr
	○ — ○ — ○		
•			

INFO SWITCH		
	B/O	G
INFO	○ — ○	

FRONT BRAKE SWITCH		
	B	G/Y
PUSH	○ — ○	

RR BRAKE SWITCH		
	B	G/Y
PUSH	○ — ○	

SIDE STAND SWITCH		
	B/W	G
	○ — ○	
		

LAMP

▣ HEADLAMP



▣ TURN SIGNALLAMP



□ TAIL / BRAKELAMP



□ COMBINATION METER

Remove the combination meter.

Disassemble the combination meter as shown in the illustration.

INSPECTION 检查

Using the pocket tester, check the continuity between lead wires in the following illustration.

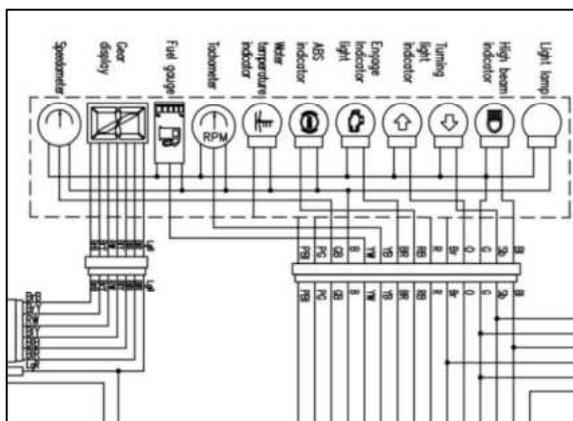
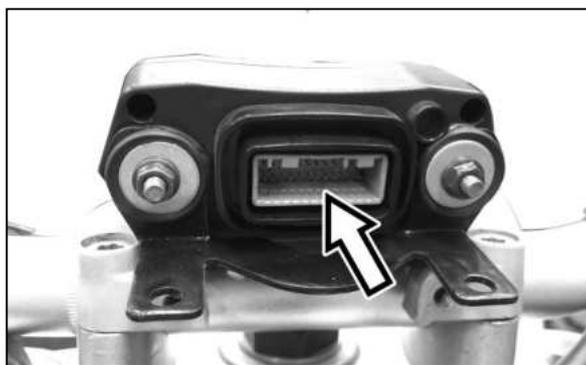
If the continuity measured incorrect, replace the respective part.

 **Pocket tester :09900-25002**

 : 09900-25002

 **CAUTION**

When making this test, it is not necessary to remove the combination meter.



BATTERY

CAUTION

Use only the genuine battery on X-RIDE.

□ CAUTION OF BATTERY TREATMENT

The battery needs attention generally as it occurs flammability gas.

If you don't follow the instruction in the below, there may be an explosion and severe accident.

Therefore, please pay attention to the following points.

- Positively prohibit battery from contacting to short, spark or firearms.
- The recharge of battery should be done in the wide place where the wind is well ventilated.

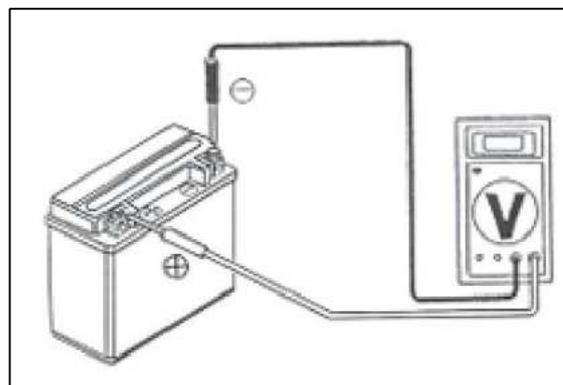
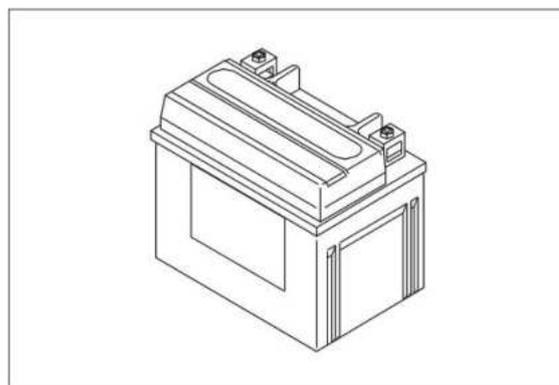
□ RECHARGING OPERATION

Using the pocket tester, check the battery voltage. If the voltage reading is less than the 12.0V(DC), recharge the battery with a battery charger.

How to charge	
Standard	1.5A×2.5hour
Fast	5.0A×1hour

CAUTION

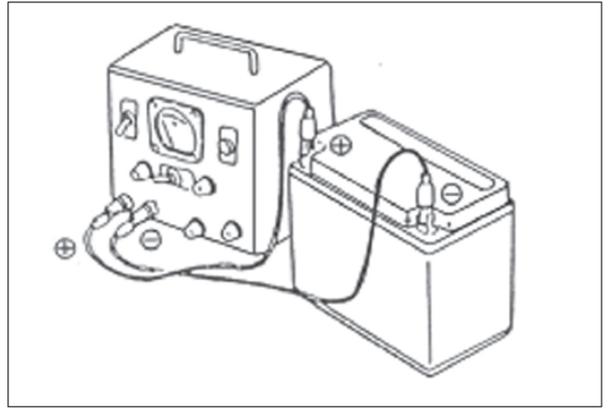
When recharging the battery, remove the battery from the vehicle.



⚠ CAUTION

Be careful not to permit the charging current to exceed 5 A at any time.

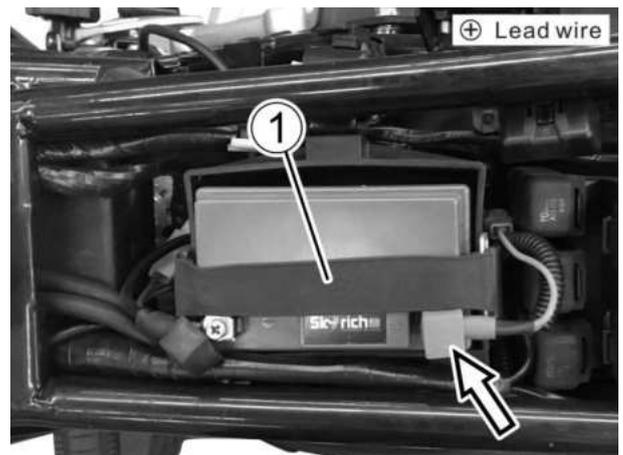
- After recharging, wait for more than 30 minutes and check the battery voltage with a pocket tester.
- If the battery voltage is less than the 12.5 V, recharge the battery again.
- If battery voltage is still less than 12.5 V, after recharging, replace the battery with a new one.
- When the vehicle is not used for a long period, check the battery every 1 month to prevent the battery discharge.



□ BATTERY INSTALLATION

X-RIDE battery installation order pay attention to following points :

- ① Remove the seat, OBD bracket comp.
- ② Orient the battery's positive terminal toward the right side of the battery case.
- ③ Install (+) positive lead wire at the battery terminal.
- ④ Put on the rubber cap at the (+) positive terminal of the battery.
- ⑤ Install (-) negative lead wire at the battery terminal.
- ⑥ Install the OBD bracket comp and seat.



ABS

▣ BRAKES

The X-RIDE utilizes front and rear disk brakes.

Properly operating the brake systems is vital to safe riding. Be sure to perform the brake inspection requirements as scheduled.

The brakes should be inspected at periodic inspection by your authorized dealer.

WARNING

Failure to properly inspect and maintain your motorcycle brake systems can be hazardous.

Improper maintenance of the brakes increases your chances of having an accident.

Be sure to inspect the brakes before each use of the motorcycle according to the INSPECTION BEFORE RIDING section.

Always maintain your brakes according to the MAINTENANCE SCHEDULE.

WARNING

Operating the motorcycle in harsh conditions can be hazardous if you do not inspect brake wear often.

Operating in mud, water, sand, or other extreme conditions can cause accelerated brake wear. This could lead to an accident.

If you operate your motorcycle under these conditions, the brakes must be inspected more often than recommended in the MAINTENANCE SCHEDULE.

▣ ABS (Anti-lock Brake System) ABS

The ABS unit, which consists of a hydraulic unit, ABS control unit, and return pump, is installed inside the left decoration cover.

A wheel speed sensor is located at the front and rear wheels.

WARNING

ABS cannot function properly if certain modifications have been made such as shorter or longer suspension travel, other rim diameters, other tires, an incorrect tire air pressure, other brake pads, etc.

ABS will only function correctly if the spare parts used in the brake system and the tires have been approved and/or recommended.

Maintenance work and repairs must be carried out professionally. (Your authorized workshop will be glad to help.)

ABS is a safety system that prevents locking of the wheels when driving straight ahead without the influence of lateral forces. ABS operates with two independent brake circuits (front and rear brakes).

During normal operation, the brake system operates like a conventional brake system without ABS.

When the ABS control unit detects a locking tendency in a wheel, ABS begins regulating the brake

pressure. The regulating process causes a slight pulsing of the front brake lever and rear brake pedal. ABS warning lamp will light up after the ignition switch is set to “” position and the vehicle has traveled until a speed of 5 km/h (3 mph) for a self-diagnosis test, and will go out after the vehicle has traveled over a speed of 5 km/h (3 mph). If it does not go out after the vehicle has traveled over a speed of 5 km/h (3 mph) or if it lights up while riding, this indicates a fault in ABS system. In this case, ABS is no longer enabled and the wheels may lock during braking. The brake system itself stays functional; only ABS control is not available.

The ABS warning lamp may also light up if the rotating speeds of the front and rear wheels differ greatly under extreme riding conditions, for example when making wheelies or if the rear wheel spins.

This causes ABS to switch off.

To reenables ABS, the vehicle must be stopped and the ignition switch is set to “” position. ABS is reenables when the vehicle is switched on again. The ABS warning lamp goes out when you start off.

□ ABS

ABS (Anti-lock Brake System) features a dual electronic control system, which acts on the front and rear brakes independently.

Operate the brakes with ABS as you would conventional brakes. If the ABS is activated, a pulsating sensation may be felt at the brake lever or brake pedal.

In this situation, continue to apply the brakes and let the ABS work; do not “pump” the brakes as this will reduce braking effectiveness.

WARNING

Always keep a sufficient distance from the vehicle ahead to match the riding speed even with ABS.

- **ABS performs best with long braking distances.**
- **On certain surfaces, such as rough or gravel roads, the braking distance may be longer with the ABS than without.**

ABS is monitored by an ECU, which will revert the system to conventional braking if a malfunction occurs.

CAUTION

ABS performs a self-diagnosis test each time the vehicle first starts off after the key is turned to “” and the vehicle has traveled until a speed of 5 km/h (3 mph) or higher.

During this test, a “clicking” noise can be heard, and if the brake lever or brake pedal is even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.

NOTE

Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front and rear wheel's tone wheels, otherwise the front and rear wheel's tone wheel may become magnetized, resulting in improper performance of ABS system.



Fault types	Fault description	Maintenance rule out	Fault code	ABS	ABS/W/L light
ECU	ABS ECU Internal fault	Replace the ABS Module	C5055	X	(●)
VR relay	ABS ECU Relay failure	Replace the ABS Module	C5019	X	
Inlet valve EV	ABS Application of electromagnetic circuit open circuit or high resistance	Replace the ABS Module	F: C5017 R: C5013	X	
Outlet valve AV	ABS releases electromagnetic circuit open or high resistance	Replace the ABS Module	F: C5018 R: C5014	X	
UZ(Battery voltage)	ABS High voltage	Start the vehicle, check the battery voltage, voltage \geq 15V, replace the rectifier regulator	C5053	X	
	ABS Low voltage	Start the vehicle, check the battery voltage, the voltage is 13~15V is normal, voltage \leq 13V replace the rectifier regulator or battery	C5052	X	
RFP/RFP_HW	ABS pump/motor failure	Replace the ABS Module	C5035	nnc	
WSS_ohmic	ABS wheel speed circuit is open or short	1. Check whether the wires connecting the ABS sensors on the front and rear wheels are open or short 2. THE ABS sensor fault, replace the new sensor	F: C5043 R: C5045	X	
WSS_plausibility	Intermittent WSS of ABS wheel speed is not installed or installed firmly, and the gap is too large	1. Check the installation of ABS sensors on the front and rear wheels to ensure that the sensors are firmly installed 2. Rotate the wheel and check the clearance between the ABS sensor and the gear ring to ensure that it is normal within 3mm 3. Check whether the ABS sensor absorbs iron powder	F: C5042 R: C5044	X	
WSS_GENERIC	The speed difference	The front and rear wheels	C5025	X	

	between front and rear ABS wheels is too high, the number of teeth is incorrect, and the signal is poor	should rotate synchronously, and the clearance between ABS sensor and gear ring every tooth should be guaranteed to be normal within 3mm			
--	---	--	--	--	--

model	instructions
×	Immediately stop
nnc	No new control (cut off after control)
	Immediately open
(●)	Unknown

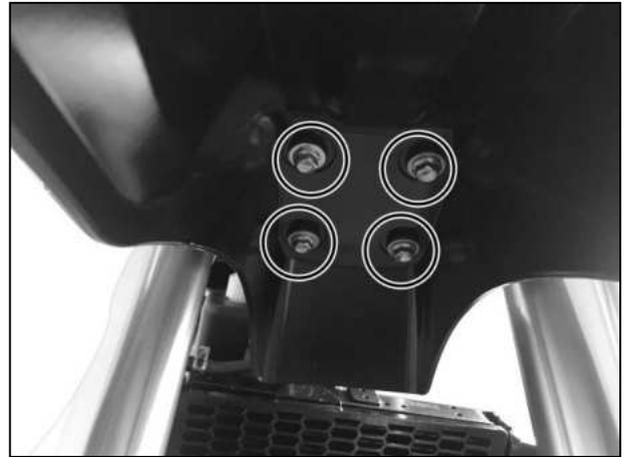
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EXTERIOR PARTS

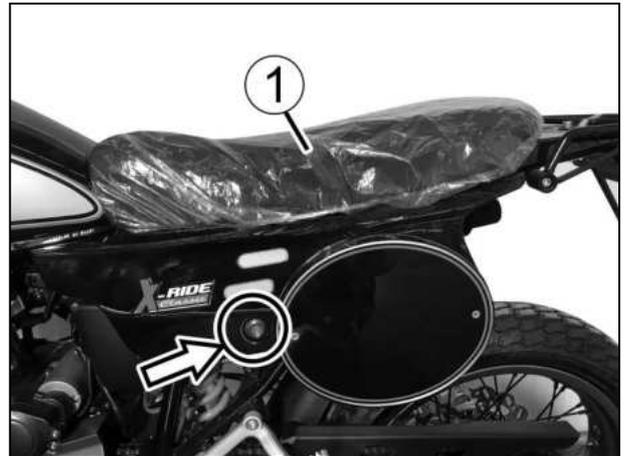
□ FRONT FENDER

- With the bolts removed, remove the front fender

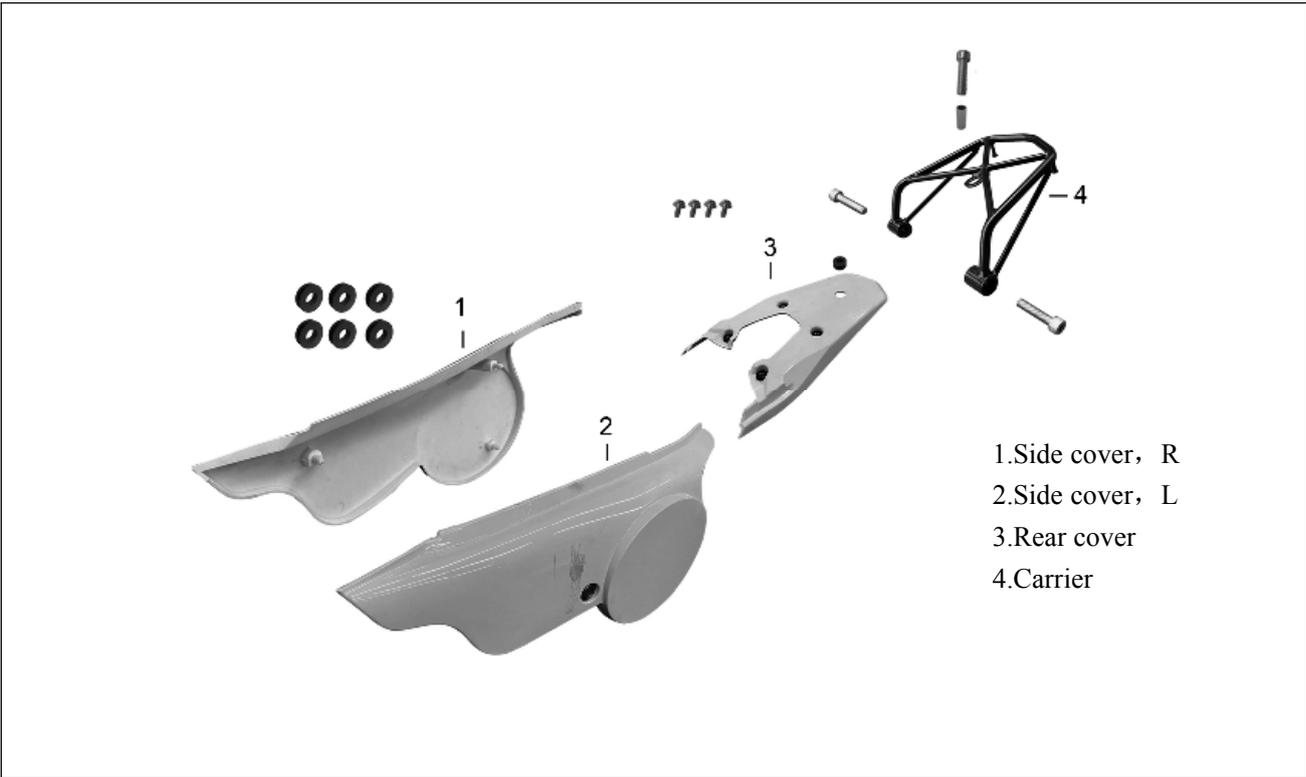


□ SEAT

- Open the saddle switch lock and remove the saddle ①.

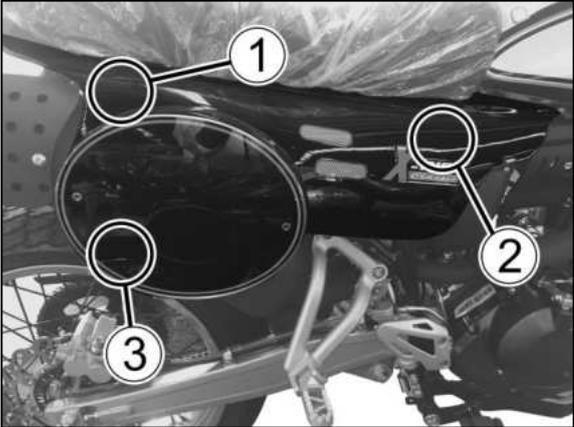


FRAME COVER



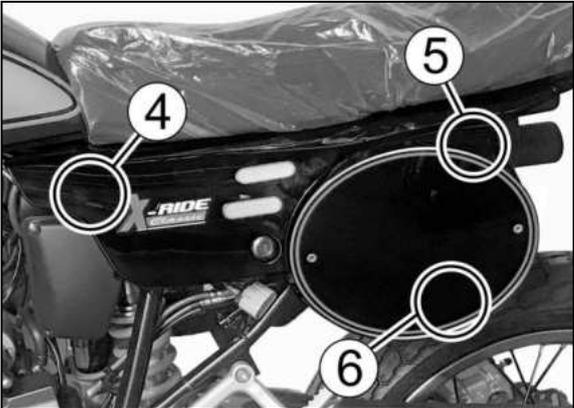
□ RIGHT SIDE COVER

□ With the hook ①、②、③ removed, remove the right side cover.



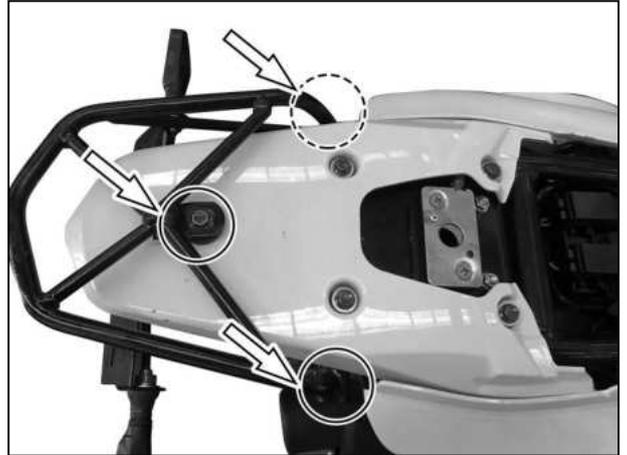
□ LEFT SIDE COVER

□ With the hook ④、⑤、⑥ removed, remove the left side cover.

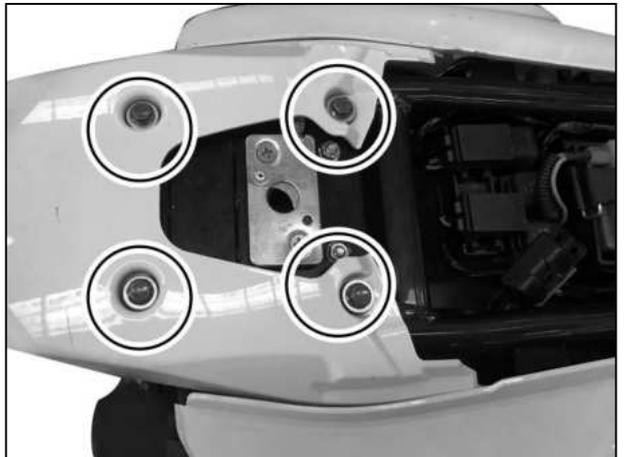


□ **FRAME REAR AND REAR CENTER COVER**

- Remove the mounting screws on the left and right sides.

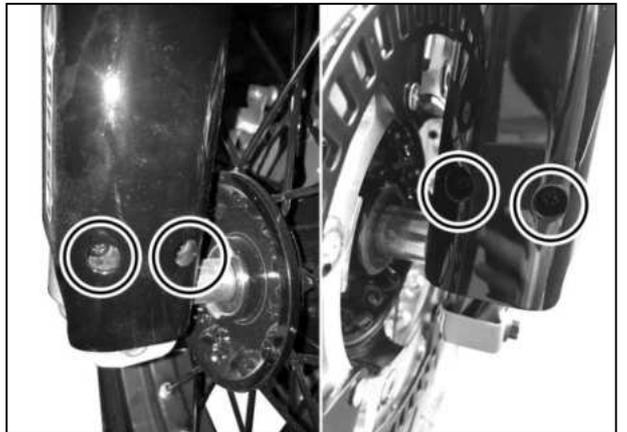


- Remove the six mounting screws on the left and right.
- Remove the rear cover and center cover of the frame.

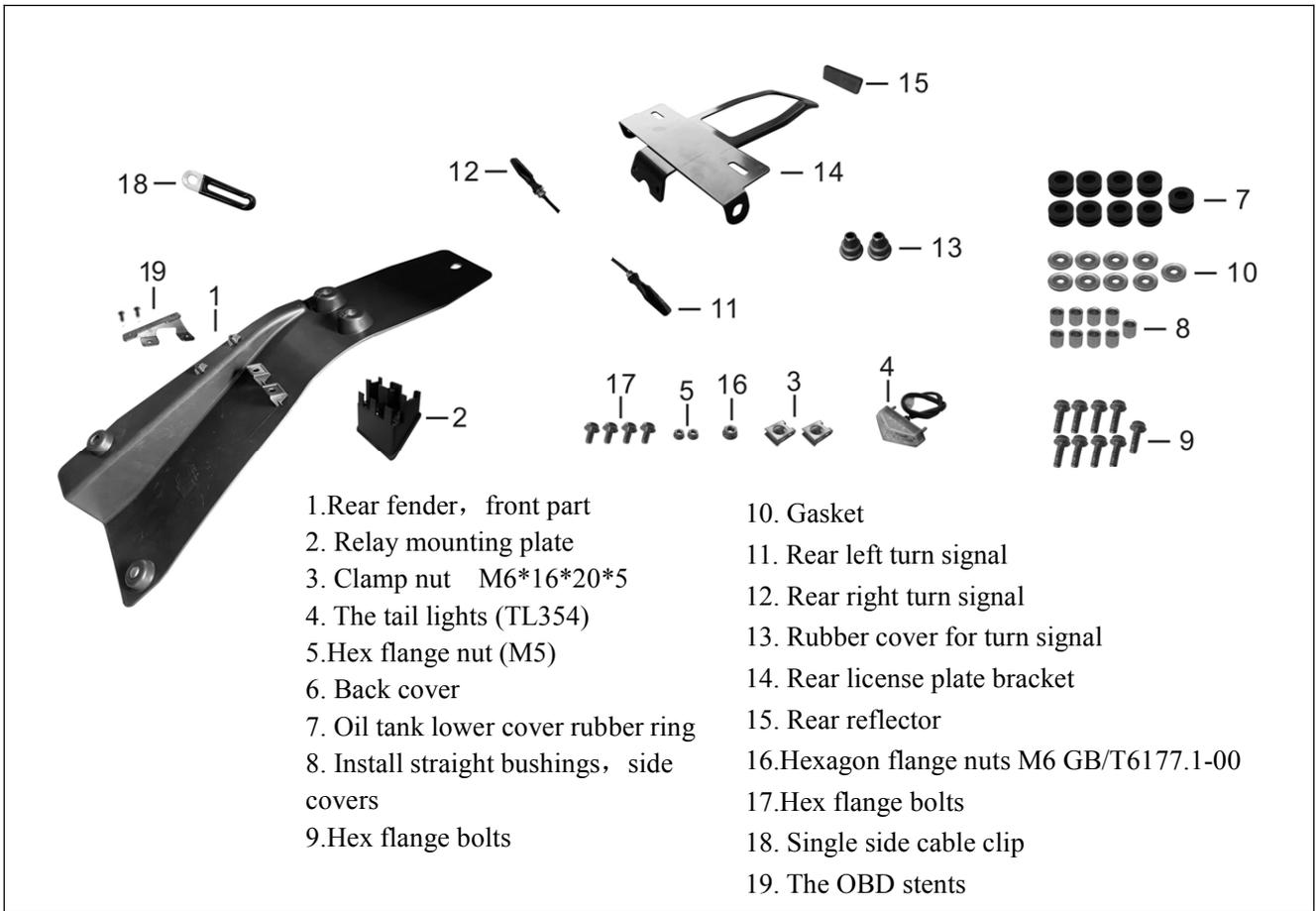


□ **FRONT FORK COVER**

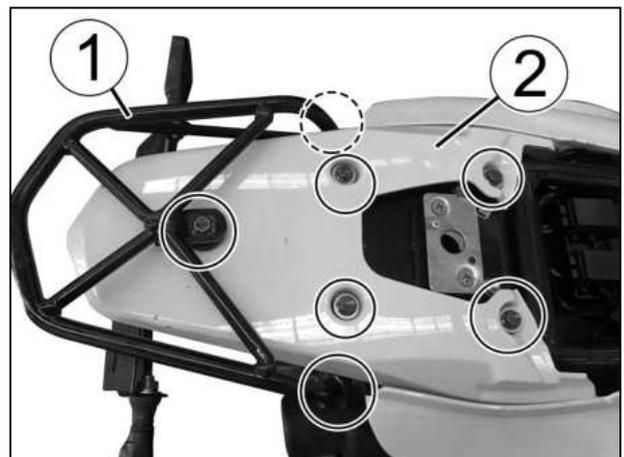
- Remove the four mounting screws.
- Remove the left and right front fork guards.



REAR FRAME COVER

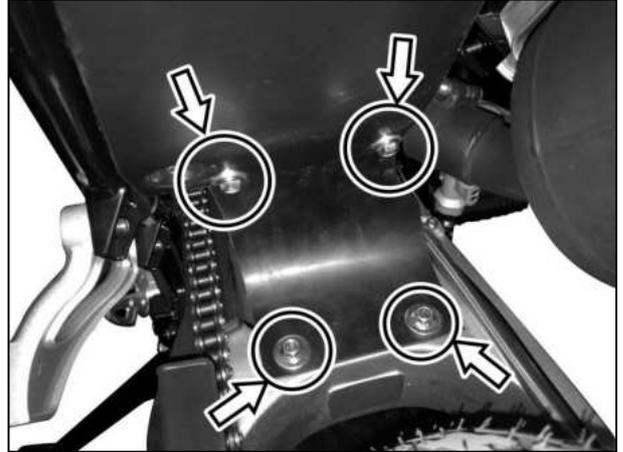


- Remove the seats.
- Remove the carrier① frame covers rear②.



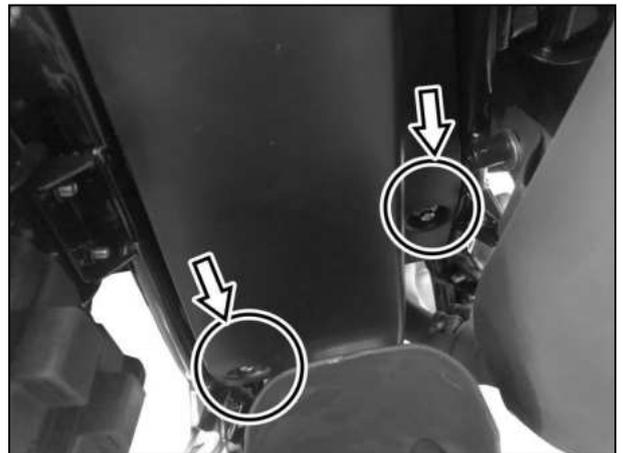
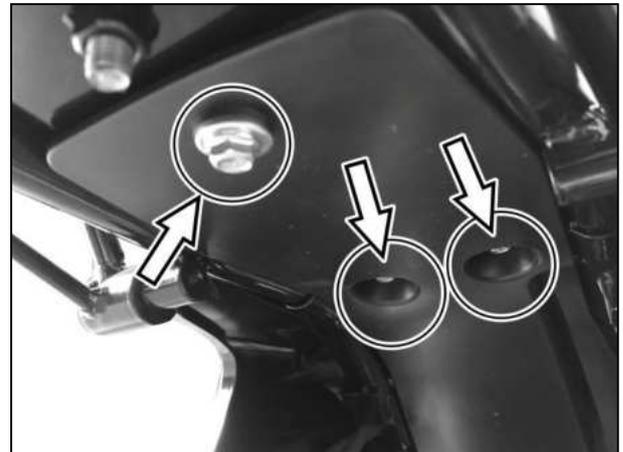
□ **MUD GUARD, REAR UNIT**

- Remove the four mounting screws.
- Remove the water retaining skin.



□ **REAR FENDER FRONT**

- Remove one nut and four mounting bolts.
- Remove the rear fender.

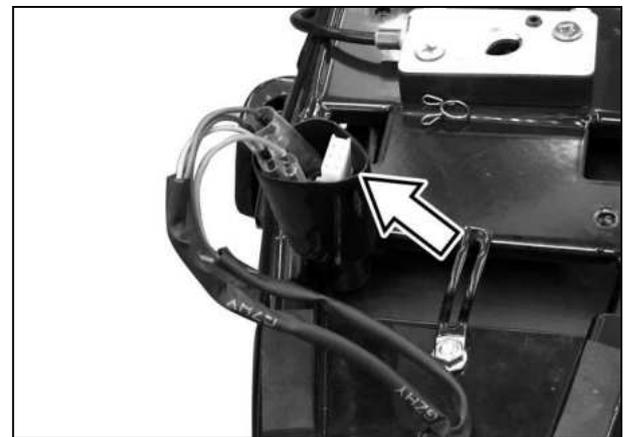


□ SUB ASSY

- Remove the two mounting screws.

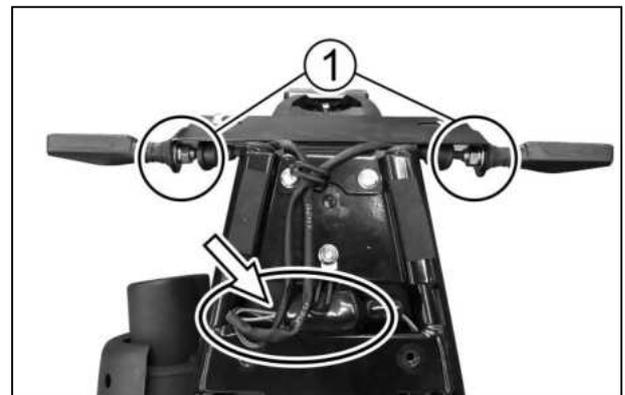


- Disconnect the circuit cable.
- Remove the rear tail lamp assembly.



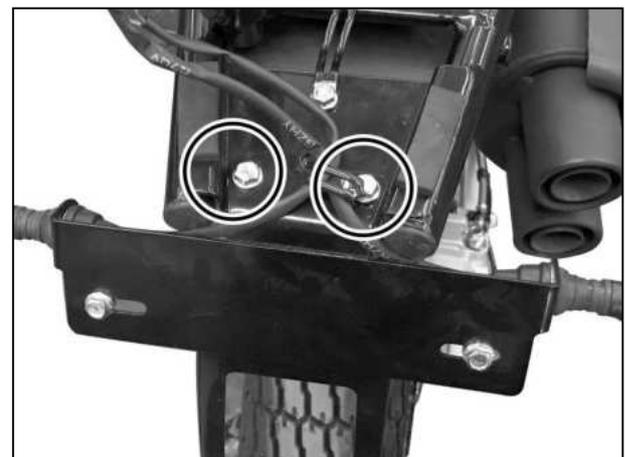
□ TURN SIGNALLAMP ASSY

- Remove the two mounting screws. ①
- Disconnect the turn signal line connection.
- Remove the turn signal combination.

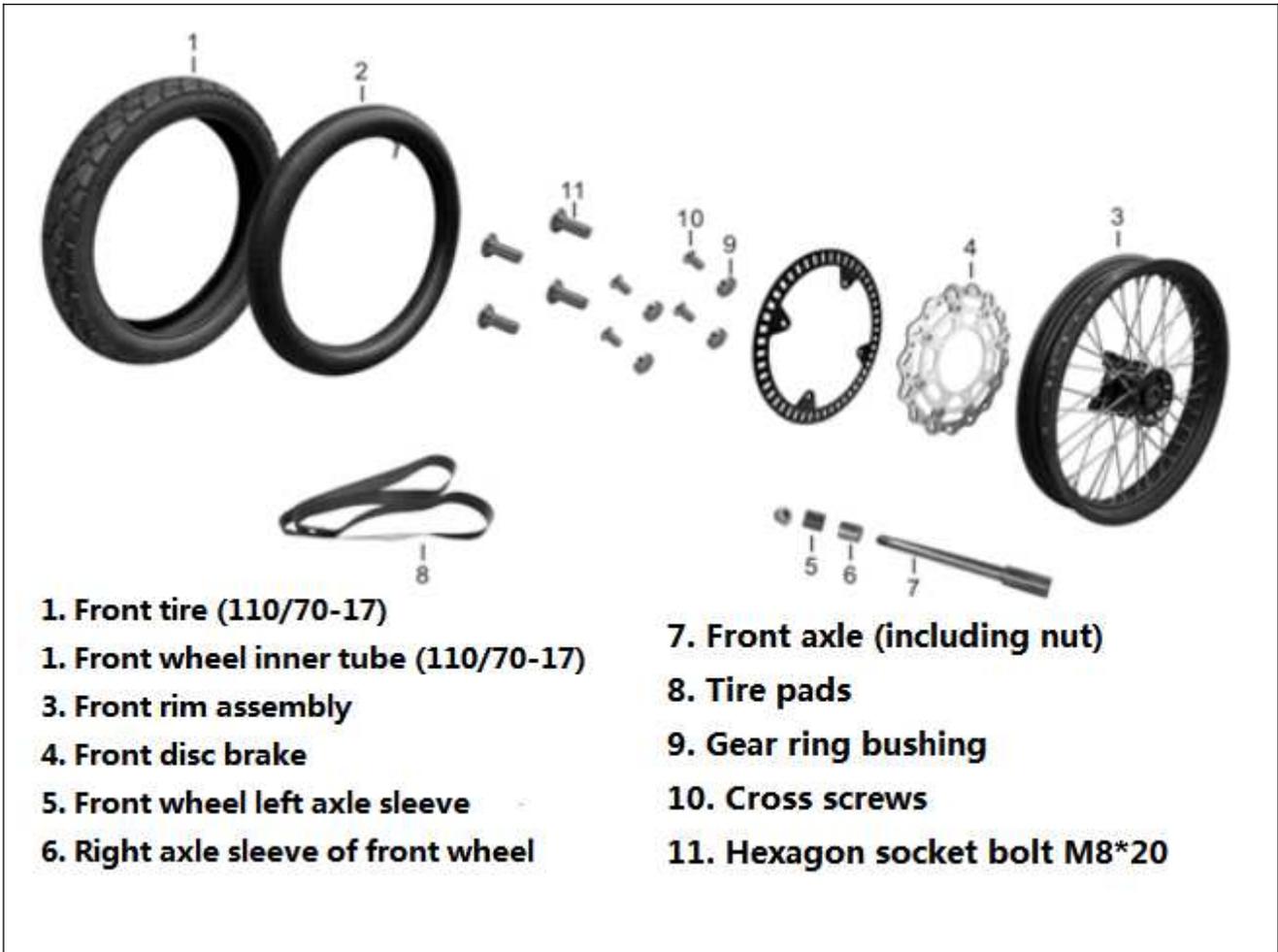


□ TAIL LAMP

- Remove the two mounting screws.
- Remove the rear license plate lamp subassembly



FRONT WHEEL

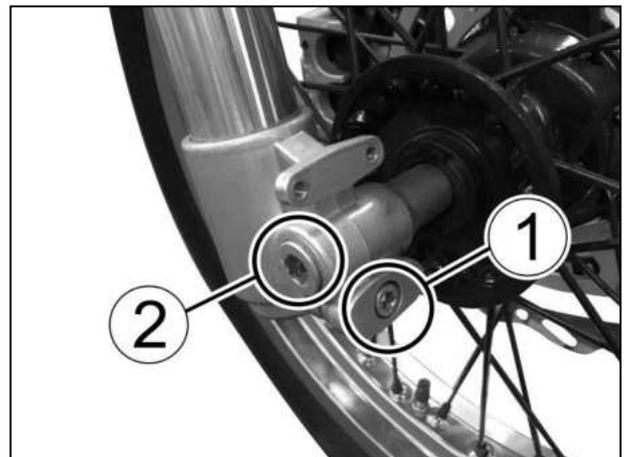


□ REMOVAL

- Loosen the axle pinch bolt ①.
- Loosen the front axle ②.
- Raise the front wheel off the ground with a blockor jack.

⚠ CAUTION

When using a jack, take care not to cause scratches on the chassis.



- Remove the front wheel by removing the front axle ②.

INSPECTION AND DISASSEMBLY

For inspection of the tire : Refer to page 2-36.

FRONT AXLE

Measure the front axle runout using the dial gauge. If the runout exceeds the limit, replace the front axle.

Axle shaft runout	Service limit 0.25 mm
--------------------------	--------------------------

 **Dial gauge : 09900-20606**

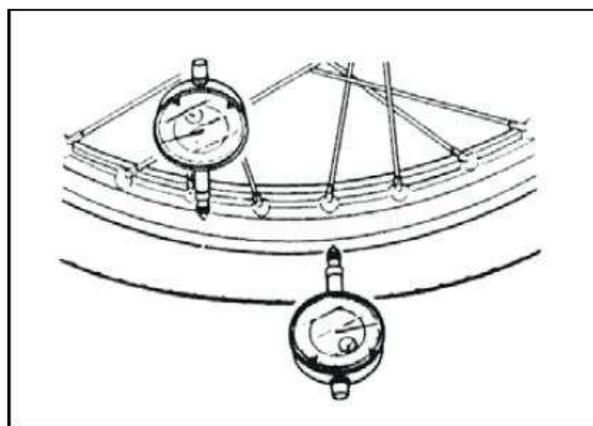
Magnetic stand : 09900-20701

V-block :09900-21304

WHEEL

Make sure that the wheel run out (axial and radial) does not exceed the service limit when checked as shown.

An excessive amount of run out is usually due to worn or loose wheel bearings and can be corrected by replacing the bearings. If bearing replacement fails to reduce the wheel, check the rim.



Wheel runout (axial and radial)	Service limit 2.0 mm
--	-------------------------

SPOKE CAP

Check whether all the caps of the spokes are tight, and re-tighten them with a wrench if necessary, as shown in the figure.

Tools used: spoke cap wrench

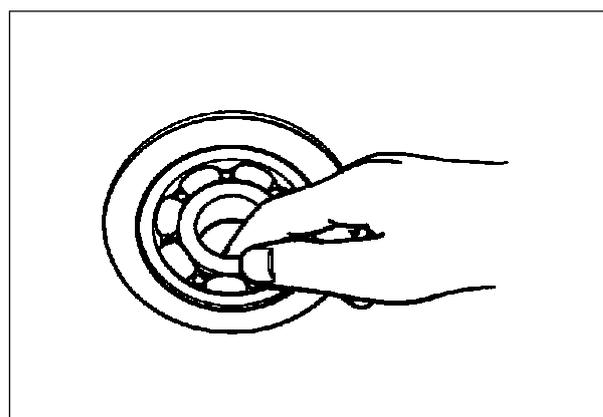
Spoke cap: 4.5N•M(0.45KG•M)



WHEEL BEARING

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation.

Replace the bearing in the following procedure if there is anything unusual.



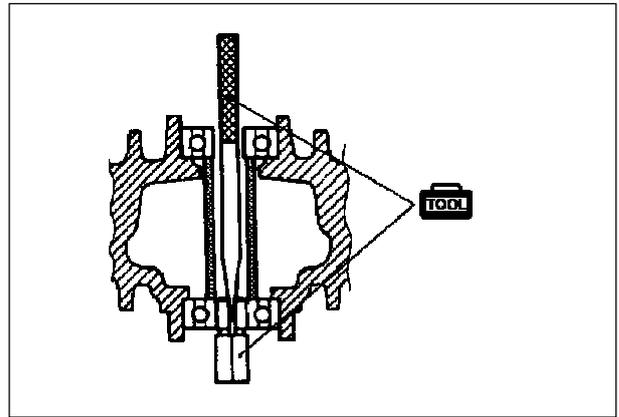
WHEEL BEARINGREMOVAL

□ Remove the wheel bearing by using the special tool.

 Wheel bearing remover :09941-50111

CAUTION

The removed bearing should be replaced with new ones.



REASSEMBLY

□ Reassemble the front wheel in the reverse order of removal and disassembly.

Pay attention to the following points :

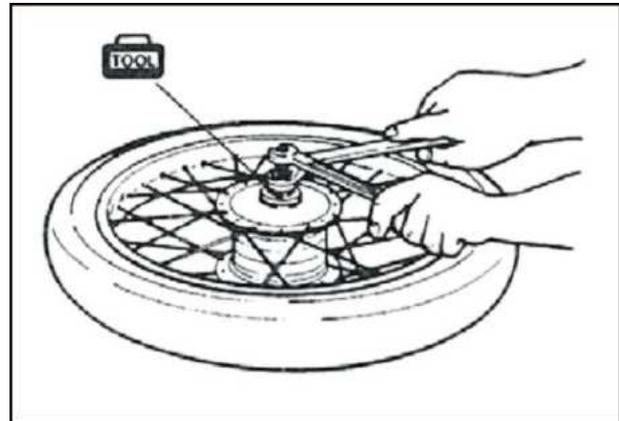
WHEEL BEARING

Install the wheel bearings as follows by using the special tools.

 Steering race installer :09941-34513

CAUTION

First install the right wheel bearing, then install the left wheel bearing.



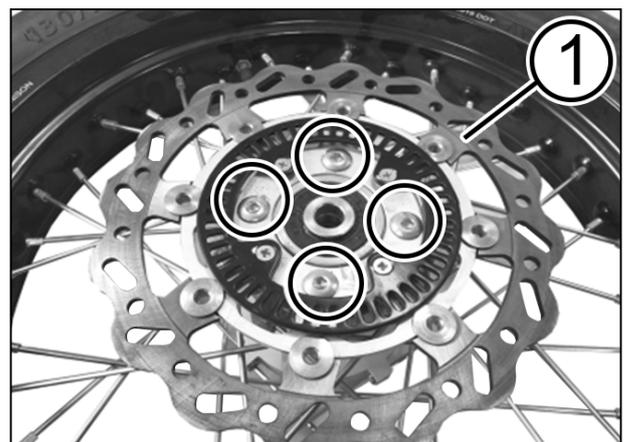
BRAKEDISC

Make sure that the brake disc① is clean and free of any greasy matter.

□ Apply THREAD LOCK“1324”to the disc mounting bolts and tighten them to the specified torque.

 Brake disc bolt : 23N·m(2.3kg·m)

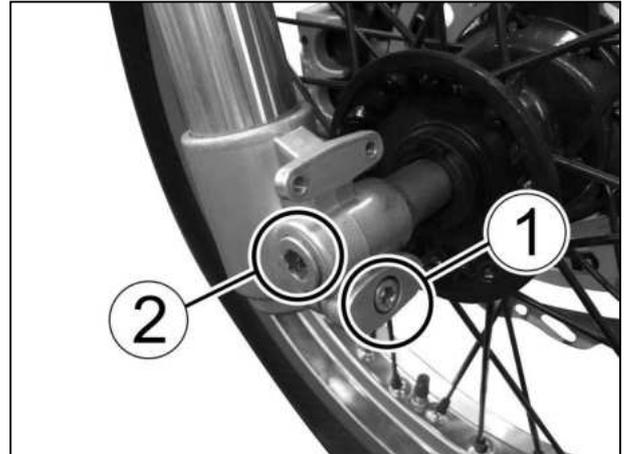
 THREAD LOCK“1324”



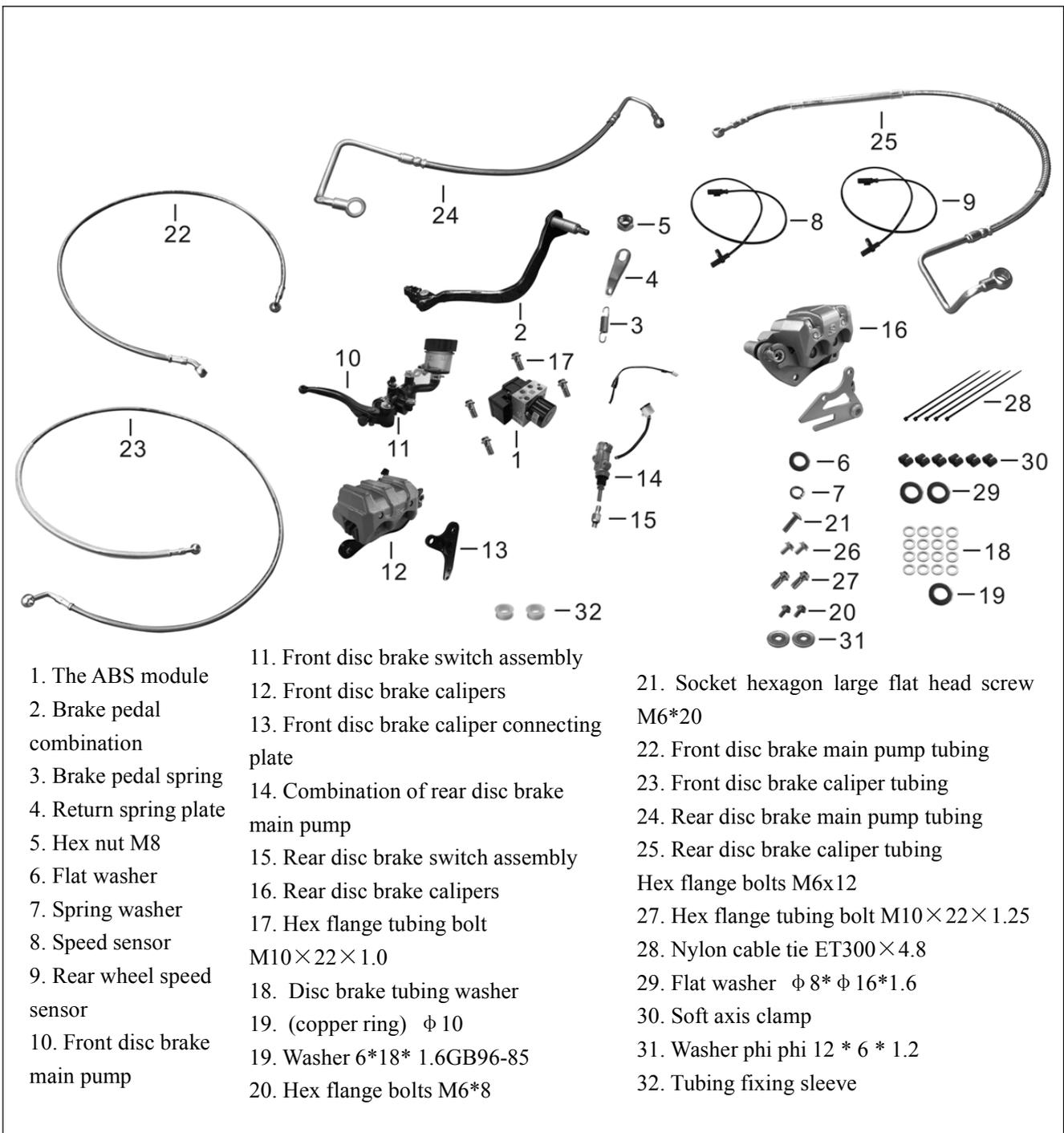
□ Tighten the front axle ① and axle pinch bolt ② to the specified torque.

🔧 **Front axle:65N·m (6.5kg·m)**

Front axle pinch bolt :
23N·m (2.3kg·m)



FRONT BRAKE AND REAR BRAKE


 **WARNING**

- ❖ Do not mix with brake fluid of different brand.
- ❖ Do not use a brake fluid kept in an open container or stored for long period of time.
- ❖ To store brake fluid, make sure to seal the container and keep it in a safe place to be out of reach of children.
- ❖ When filling brake fluid, take care not to allow water or dirt to enter the system.
- ❖ To wash the brake system parts, use brake fluid and not any other material.
- ❖ Do not allow dirt and fluid to contact the brake disc or pad.

 **CAUTION**

Do not allow brake fluid to contact the paint surface, plastic or rubber parts, or its chemical reaction can cause discoloration or crack.

□ BRAKE FLUID REPLACEMENT

□ For replacing procedure of brake fluid :
Refer to page 2-31

□ BRAKE PAD REPLACEMENT

□ For replacing procedure of brake pad :
Refer to page 2-30

□ CALIPER DISASSEMBLY

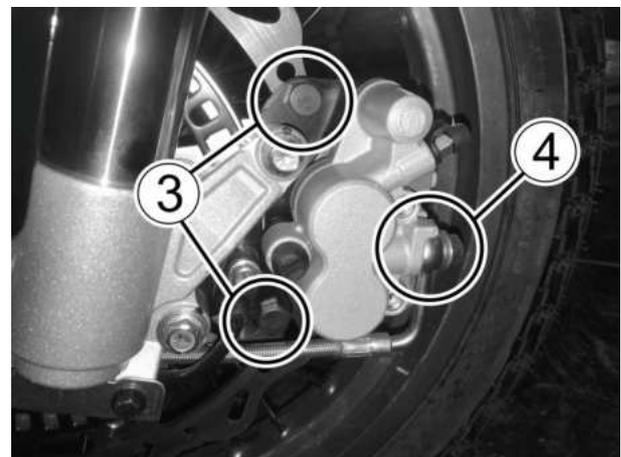
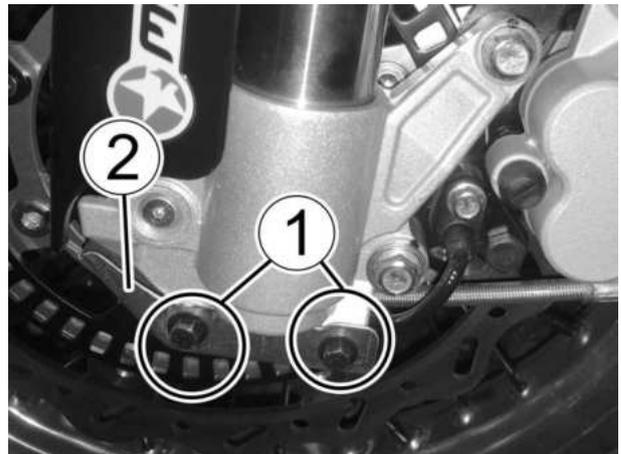
□ Drain brake fluid.

CAUTION

To prevent brake fluid from splashing on the parts nearby, cover the parts with cloth.

CALIPER FRONT BRAKE DISASSEMBLY

- Remove the front brake hose guard bolt ①, and remove the front brake hose guard ②.



- Remove the front brake caliper combination bolt ① to drain the brake fluid, and remove the two mounting bolts ②.

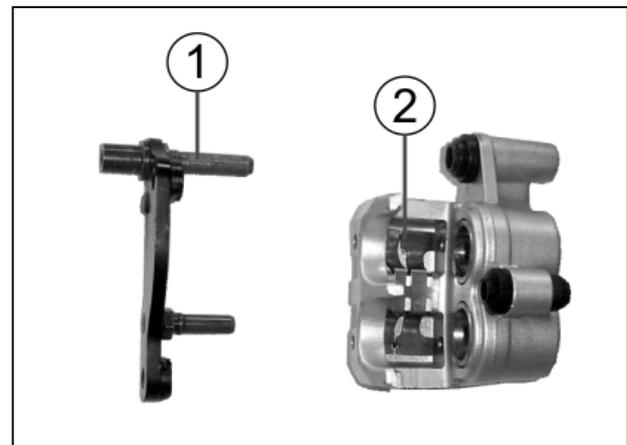


Remove the front brakecaliper pad comp.

▣ Remove the friction plate.

Remove the brake caliper holder ①.

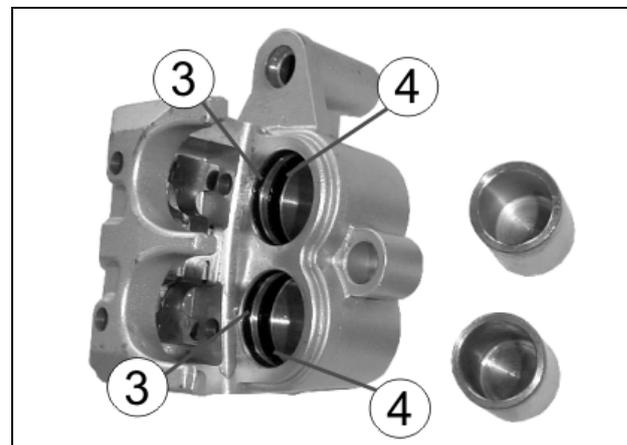
▣ Remove the spring ②.



▣ Put a rag on the brake caliper piston to prevent it from jumping out suddenly. Then compressed air is used to force the piston out.

⚠ WARNING

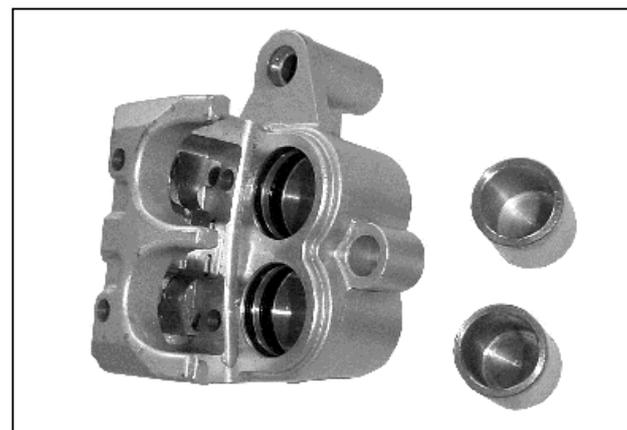
- ❖ Place a rag over the piston to prevent it from popping out and flying and keeping hand offthe piston.
- ❖ Be careful of brake fluid which can possibly splash.
- ❖ Do not use high pressure air but increase thepressure gradually.



Remove the dust seal ③ and piston seal ④.

⚠ CAUTION

- ❖ Care not to cause scratch on the cylinder bore.
- ❖ Do not reuse the piston seal and dust seal thathave been removed.



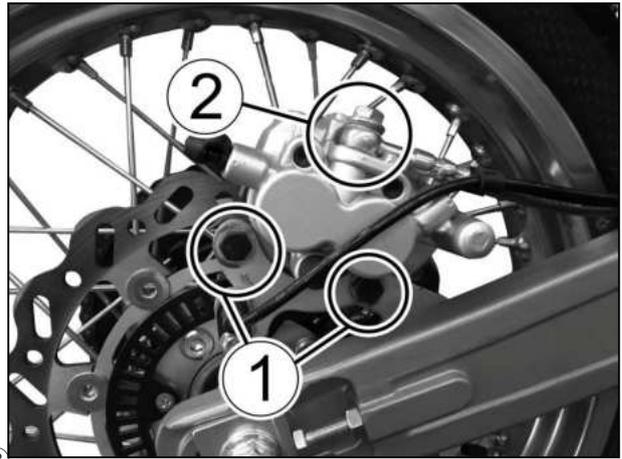
▣ **BRAKE INSPECTION**

▣ Check the brake cylinder wall for defects, cylinder pulling or other damage.

Check the piston for scratches and damag.

CALIPER REAR BRAKE DISASSEMBLY

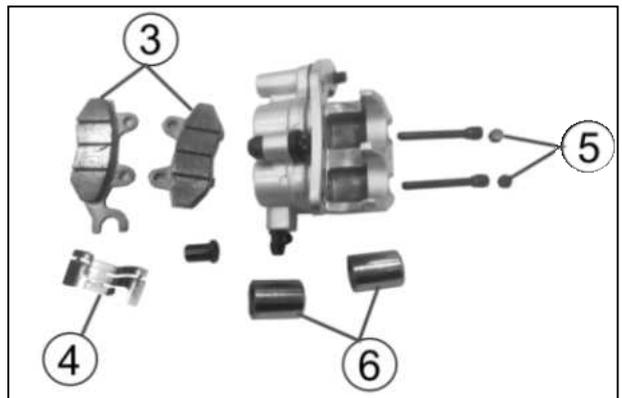
- Remove the rear brake caliper mounting bolts① and brakehouse bolts②.



- Remove the fixing screw ⑤ and the friction plate ③.
- Remove the spring slice ④.
- Using an air gun, push out the caliper piston.

WARNING

- ❖ Place a rag over the piston to prevent it from popping out and flying and keeping hand off the piston.
- ❖ Be careful of brake fluid which can possibly splash.
- ❖ Do not use high pressure air but increase the pressure gradually.



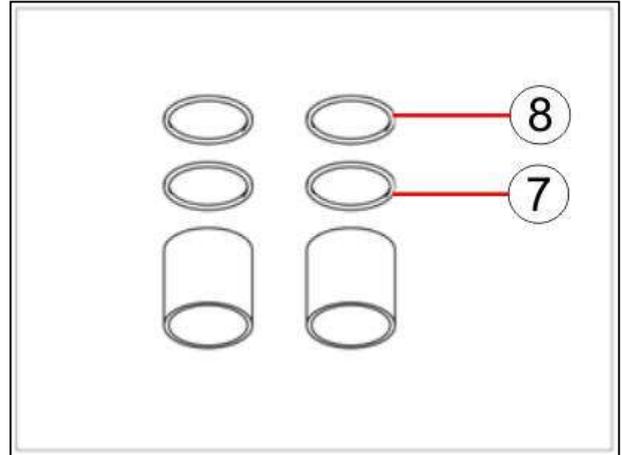
CAUTION

The car is equipped with aABS system. When clenching the front brake handle, because the oil channel ① is connected to the position of the front brake tubing, the piston at both ends work, clamping friction sheet.

- Remove the dust seal ⑦ and piston seal ⑧.

⚠ CAUTION

- ❖ Care not to cause scratch on the cylinder bore.
- ❖ Do not reuse the piston seal and dust seal that have been removed.

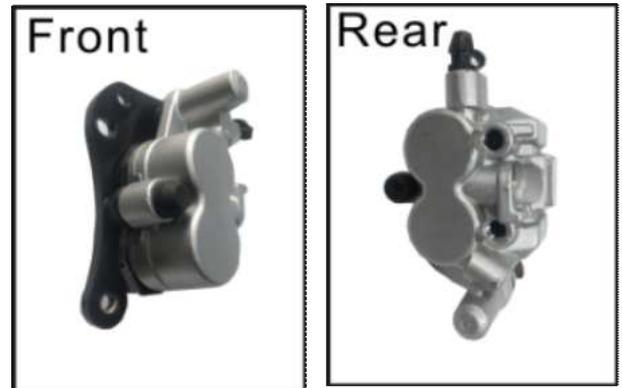


□ CALIPER INSPECTION

Inspect the front and rear caliper cylinder wall and piston surface for scratch, corrosion or other damages. If any abnormal condition is noted, replace the caliper.

□ CALIPER REASSEMBLY

Reassemble the caliper in the reverse order of disassembly procedures and observe the following points.



⚠ CAUTION

- ❖ Wash the caliper components with fresh brake fluid before reassembly. Do not wipe off brake fluid after washing the components.
- ❖ Replace the piston seal and dust seal with new ones with brake fluid applied.

🔧 Brake fluid specification and classification: DOT 4

- Install the brake pad spring.
- Apply SILICONE GREASE to the brake caliper holder.
- Install the brake pads.

- Tighten the front caliper mounting bolts①and rear caliper mounting bolts③.
- With the hose end seated to the stopper, tighten the union bolt ② and ④.

🔧 Front brake caliper mounting bolts

:39N·m (3.9kg·m)

Front brake hose union bolts

:23N·m (2.3kg·m)

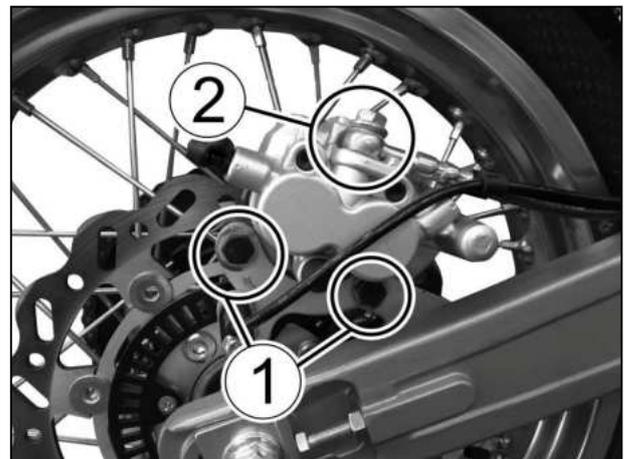
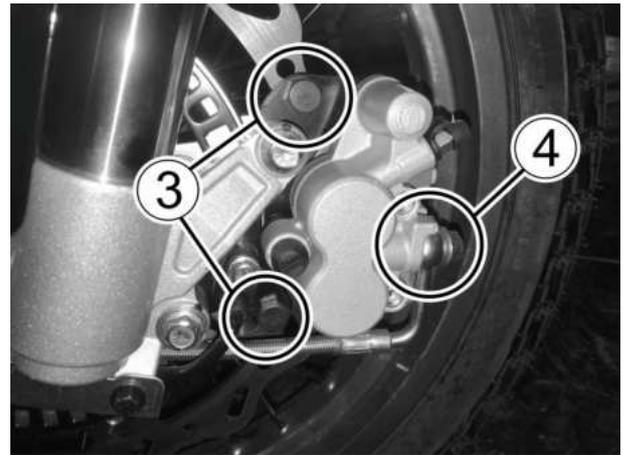
🔧 Rear brake caliper mounting bolts

:39N·m (3.9kg·m)

Rear brake hose union bolts

:23N·m (2.3kg·m)

- Fill the system with brake fluid and bleed air.



Inspection after reassembly : Refer to page 2-30

□ BRAKE DISC INSPECTION

Check the brake disc for damage or cracks.
Measure the thickness using the micrometer.
Replace the brake disc if the thickness is less than the service limit or if damage is found.

Brake disc thickness	Service limit	
	Front	4.0 mm
Rear	4.0 mm	

🔧 Micrometer (0-25 mm) :09900-20201

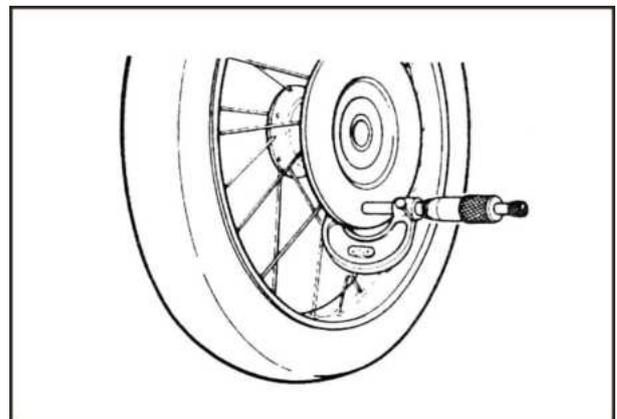
Measure the runout using the dial gauge.
Replace the brake disc if the runout exceeds the service limit.

Brake disc runout	Service limit
	0.3 mm

🔧 Dial gauge : 09900-20606

Magnetic stand :09900-20701

- If either measurement exceeds the service limit, replace the brake disc.



□ **MASTER CYLINDER DISASSEMBLY**

- Drain brake fluid the master cylinder.
- Disconnect the brake lamp switch lead wire coupler.
- Remove the switch assembly①
- Remove the union bolt②.

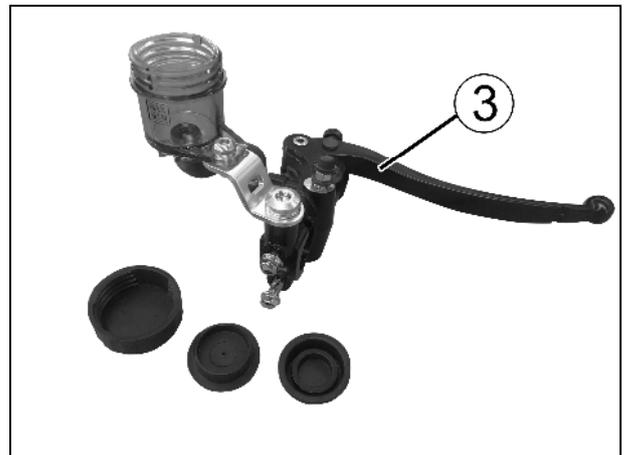
 **CAUTION**

Place a rag under the union bolt so that brake fluid can not contact the parts.

- Remove the master cylinder.



- Remove brake lever ③.
- Remove the master cylinder cap.



- Remove the dust seal cover ① and remove the piston thread circlip ②.
- Pull out the main pump piston③and spring④.

□ MASTER CYLINDER INSPECTION

- Inspect the master cylinder bore for any scratches or other damage.
- Inspect the piston surface for any scratches or other damage.

□ MASTER CYLINDER REASSEMBLY

Reassemble the master cylinder in the reverse order of disassembly.

Pay attention to the following points :

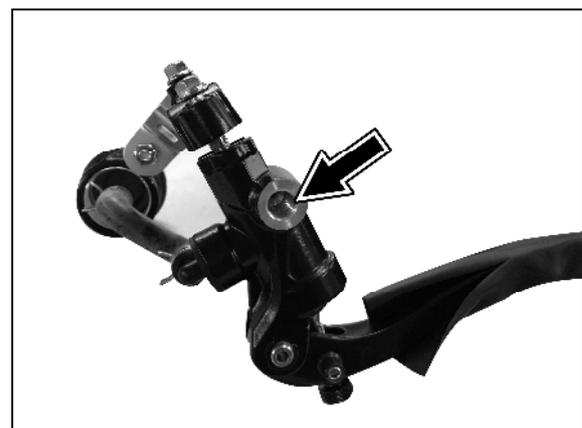
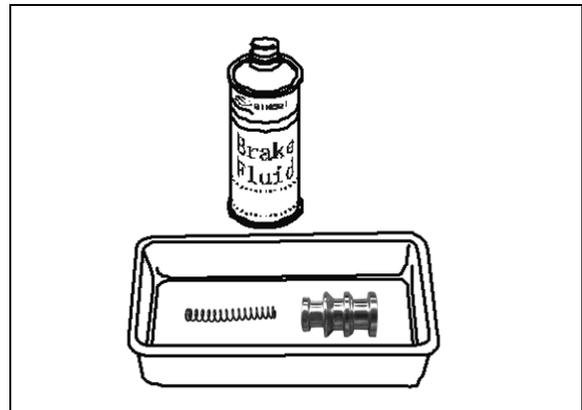
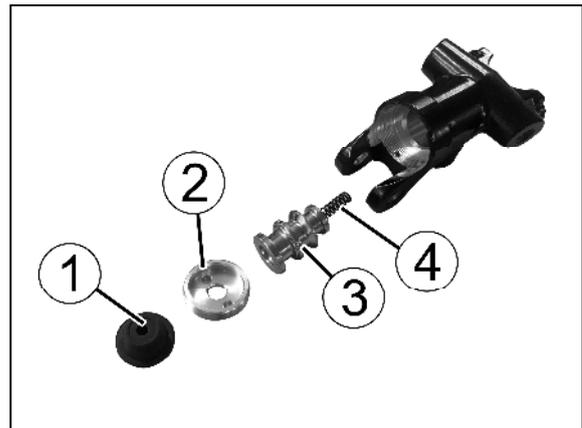
CAUTION

- ❖ Wash the master cylinder components with new brake fluid before reassembly.
- ❖ When washing the components, use the specified brake fluid.
- ❖ Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.

Specification and Classification: DOT 4

When installing the circlip, make sure that the sharp edge of the circlip faces outside.

- When reinstalling the brake lamp switch, align the projection on the switch with the hole in the master cylinder.



- Apply SUPER GREASE“A”to the brake lever pivot①.



- When remounting the master cylinder onto the handlebars, align the master cylinder holder's mating surface with punch mark on the handlebar and tighten the upper clamp bolt first.

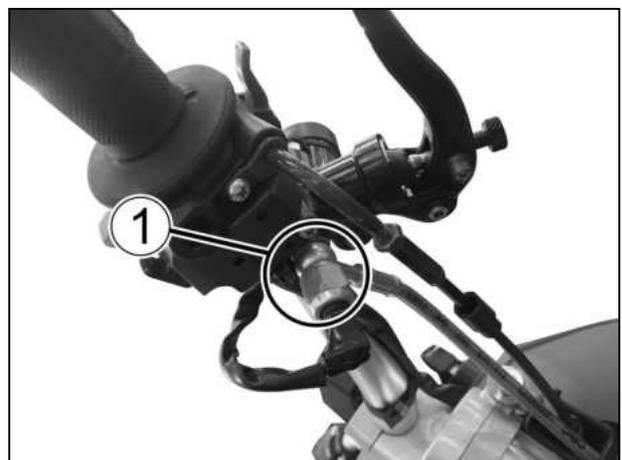
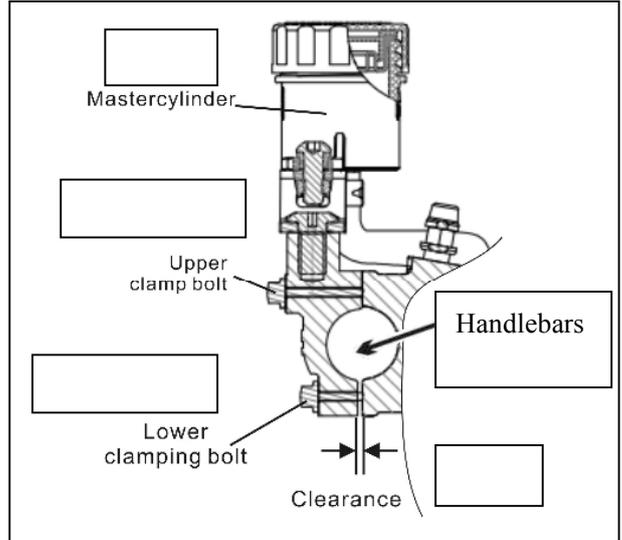
Front brake master cylinder mounting bolt
: 10N·m (1.0kg·m)

- Install the brake hose union, tighten the union bolt to the specified torque.

Front brake hose union bolt
: 23N·m (2.3kg·m)

CAUTION

Bleed air from the brake system after reassembling the master cylinder.



HANDLEBARS

□ HANDLEBARS RIGHT SIDE PARTS REMOVAL

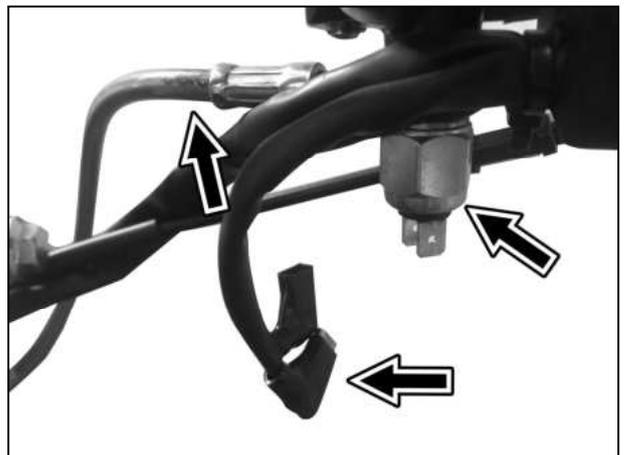
- Remove the right rearview mirror ①.



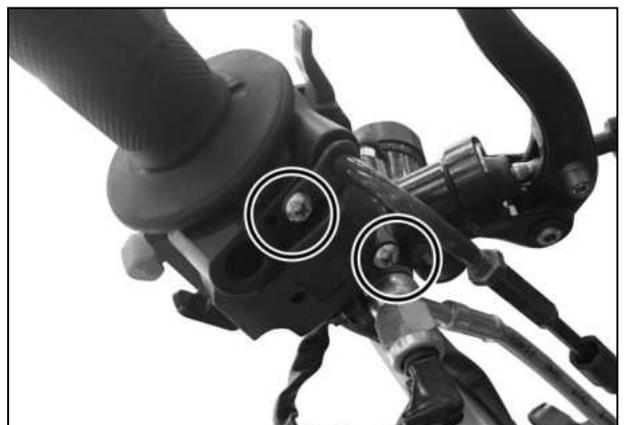
- Remove fixing bolts from the front brake pump assembly.



- Disconnect the brake light switch wire and remove the switch assembly and oil pipe.
- Remove brake lever.



Remove the right handlebar switches.



- Remove the throttle cable.



- Remove the handlebar grip .



□ **HANDLEBARS LEFT SIDE PARTS
REMOVAL**

- Remove the rearview mirror ①.



- Remove the clutch lever rear holder.



- Disconnect the clutch switch lead wires.
- Remove the clutch cable.
- Remove the clutch lever.



- Remove the left handlebar switches.



- Remove the handlebar grip.



- Remove the clamp bolts and detach the handlebar holders.
- Remove the handlebar.



□ **REMOUNTING**

Perform the remounting work in the reverse order of the removal procedures while observing the following instructions.

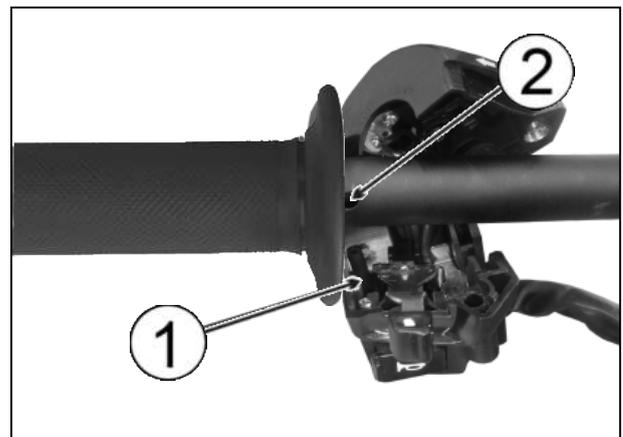
- Tighten the handlebar clamp bolts to the specified torque.

 **Handlebar clamp bolt**
: 18~28 N·m (1.8 ~2.8 kg·m)

NOTE

The gap between the handlebar clamp and holder should be even.

- Align the mating face ① of left handle switch with the respective punch marks ② and tighten the bolt.



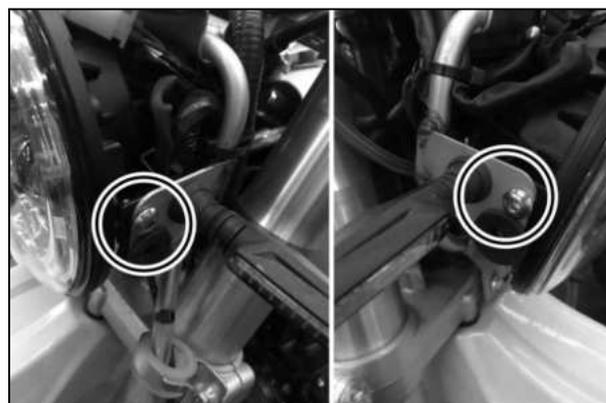
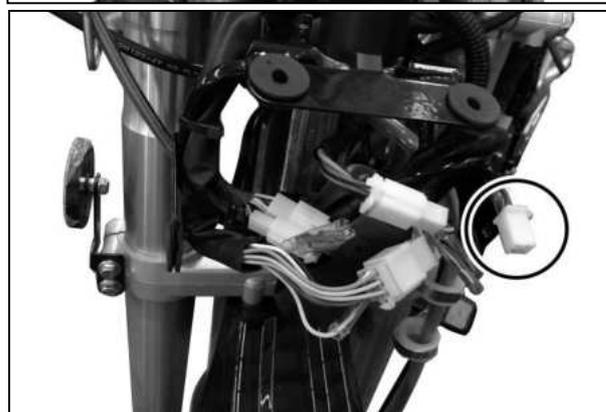
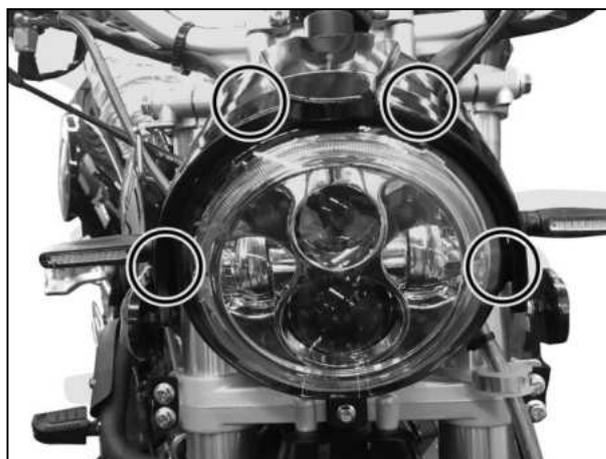
HEADLAMP COMP&SPEEDOMETER COMP

□ REMOVE THE HEADLAMP ASSEMBLY

□ Remove the fixing hook of the front headlight cover and remove the front headlight cover.

□ Disconnect the connecting wire of the front headlight assembly.

□ Remove the two mounting screws of the headlamp.
□ Remove the headlamp.



□ **REMOVE THE SPEED ODOMETER COMBINATION**

□ Remove the speed odometer combination mounting bolts.

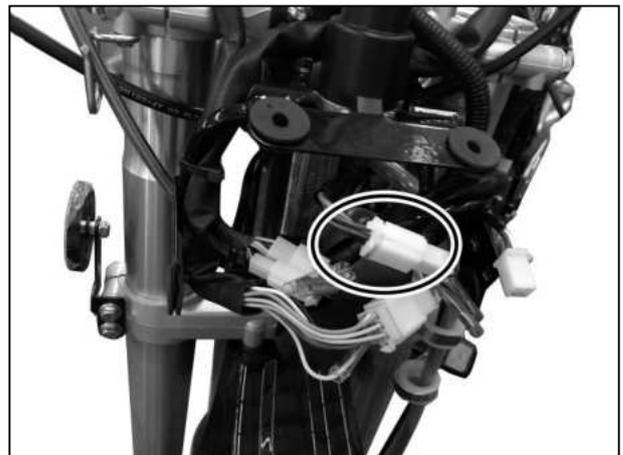
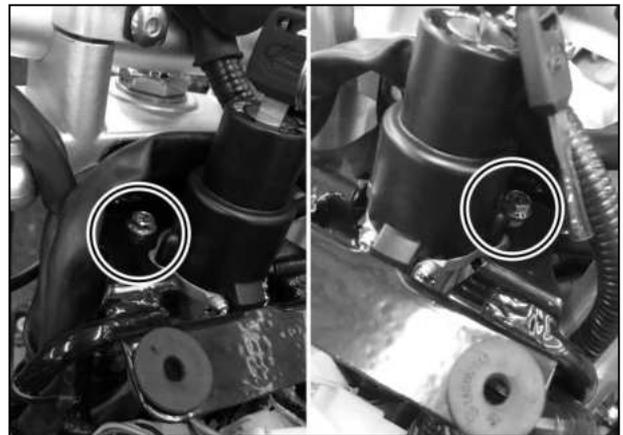
□ Disconnect the connecting wire of the speed odometer combination.

□ Remove the speed odometer combination.

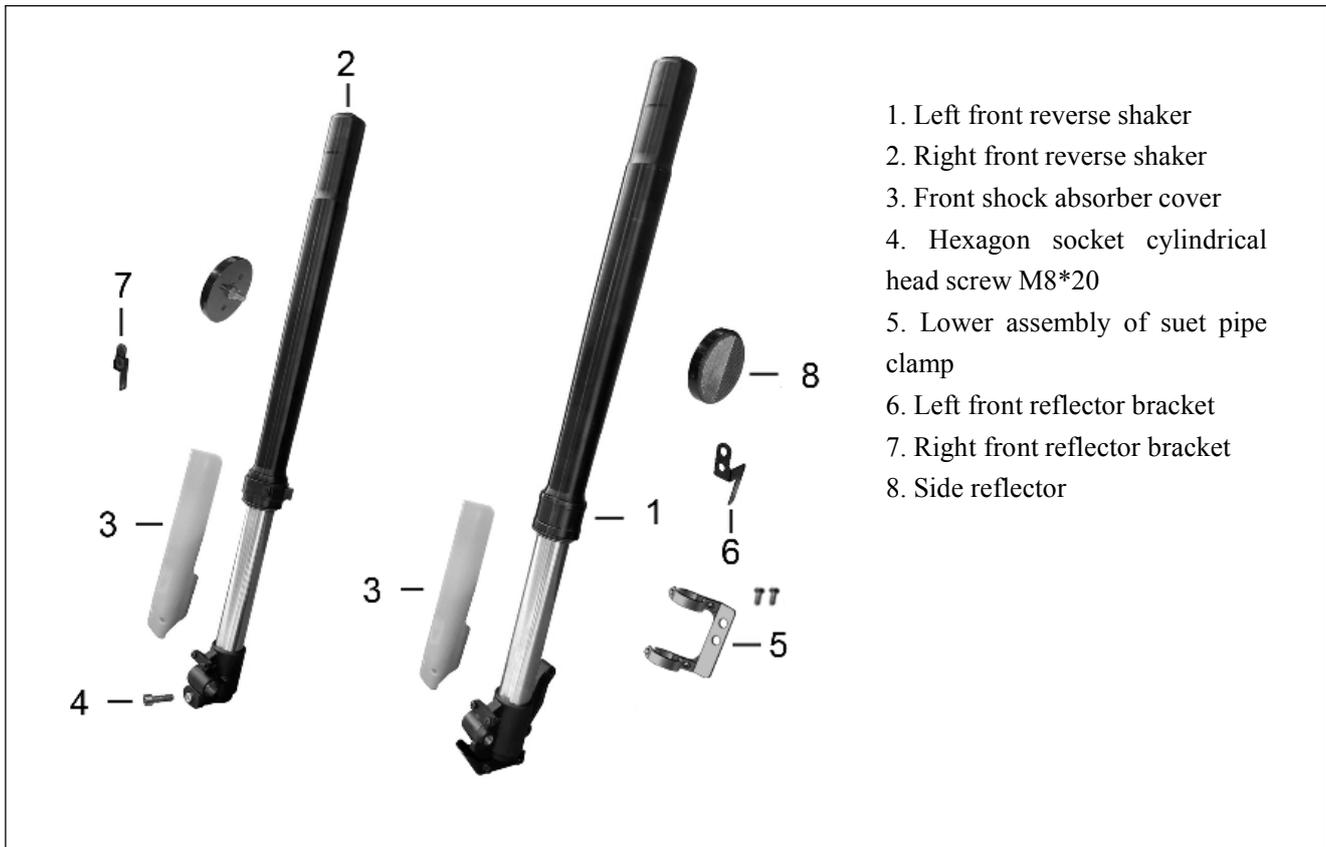
● Remove the two mounting screws on the left and right of the electric lock.



● Disconnect the connecting wire of the electric lock and remove the electric lock.

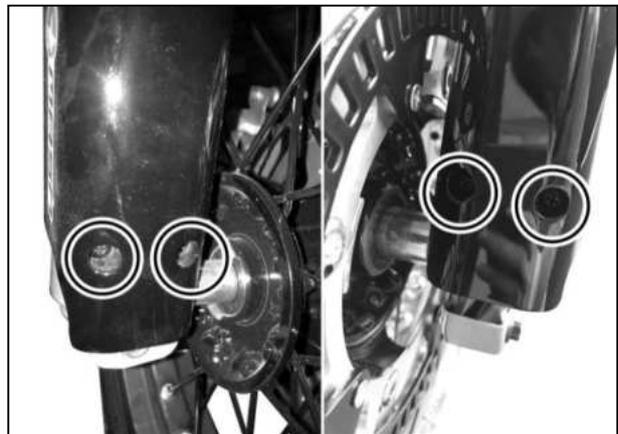


FRONT FORK



□ DISASSEMBLY

- Remove the left and right front fork guards.
- Remove the front wheel.
- Remove the front brake caliper.



CAUTION

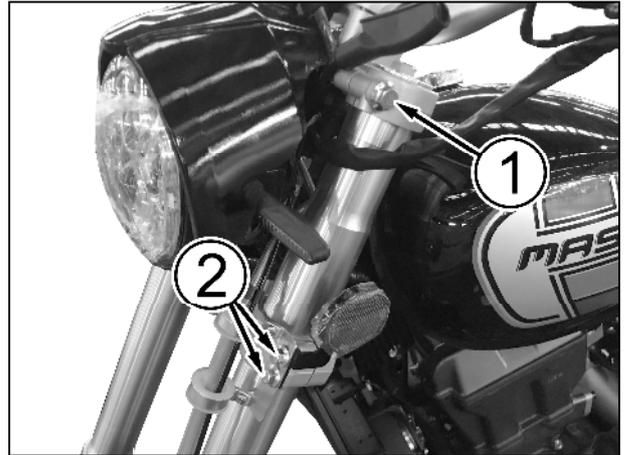
Secure the brake caliper to the frame with a string etc., taking care not to bend the brake hose.

- Remove the front fender.

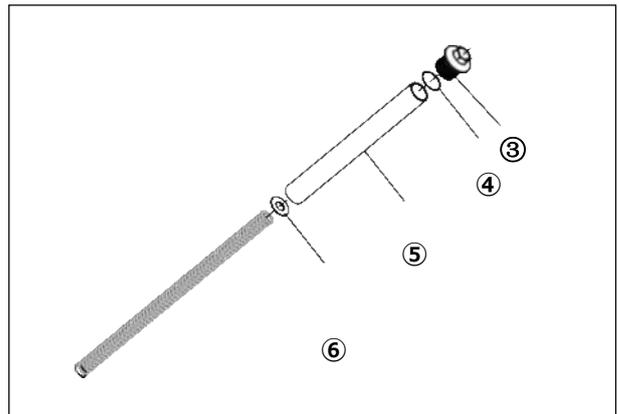
- Remove the front fork after loosening the front fork upper ① and lower clamp bolts② .

NOTE

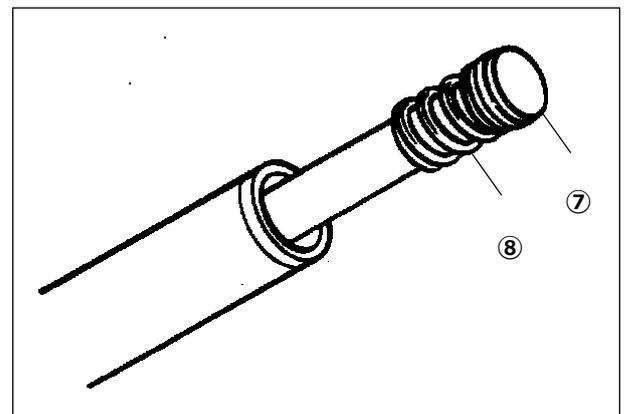
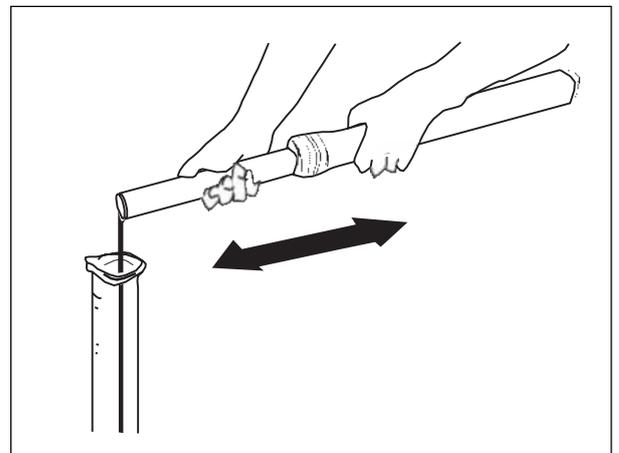
Slightly loosen the front fork upper bolt ③ to facilitate later disassembly.



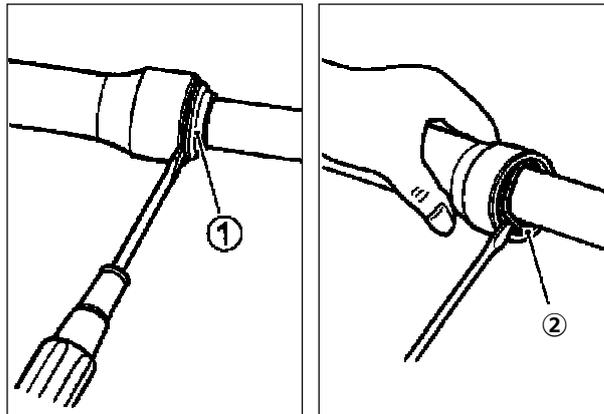
- Remove the front fork upper bolt ③, O-ring ④, front fork inner spacer ⑤ and spring guide ⑥.
- Invert the front fork and stroke it several times to drain out the fork oil.
- Hold the front fork in the inverted position for a few minutes to allow the fork oil to fully drain.



- With the damper rod held immovable, remove the damper rod bolt.
- Remove the damper rod ⑦ and rebound spring ⑧ from the inner tube.



□ Remove the dust seal ① and oil seal stopper ring ②.

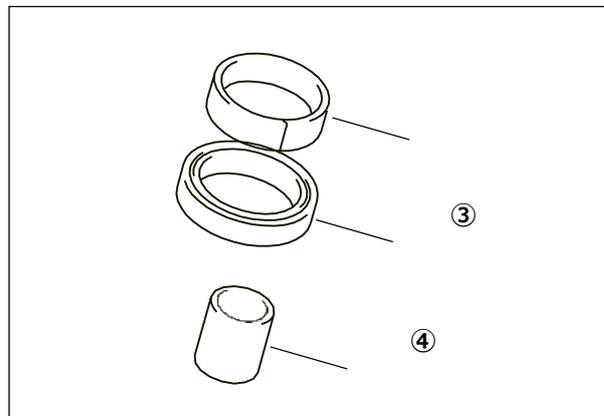


□ Separate the inner tube from the outer tube.

□ Remove the following parts.

- ③ Oil seal
- ④ Slide metal
- ⑤ Oil lock piece

⚠ CAUTION
 The removed oil seal and slide metal should be replaced with new ones.



□ INSPECTION

FRONT FORK SPRING

Measure the free length of the front fork spring. If the length is found shorter than the service limit, replace the spring.

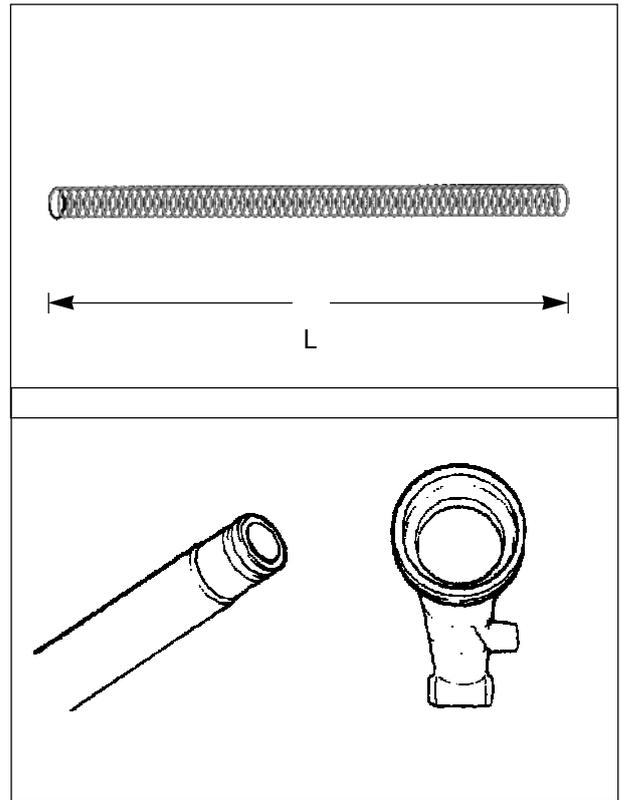
Front fork spring free length L	Service limit
	301 mm

INNER TUBE AND OUTER TUBE

Check the sliding of the inner tube, outer tube and damper rod ring for scratch, wear, bending, or other abnormal condition.

□ REASSEMBLY

Perform the reassembly and remounting work in the reverse order of the disassembly and removal procedures while observing the following instructions.



⚠ CAUTION

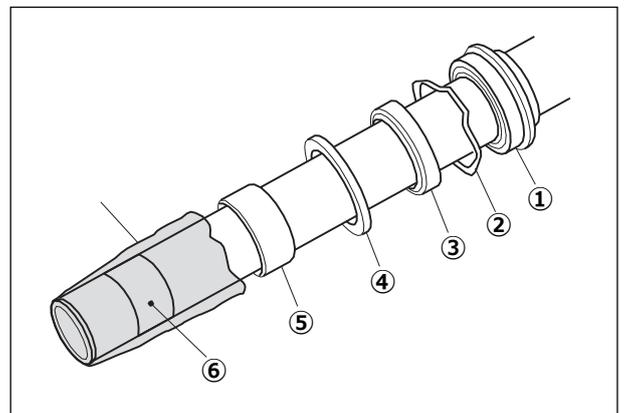
- ❖ Thoroughly wash all the component parts being assembled. Insufficient washing can result in oil leakage or premature wear of the parts.
- ❖ When reassembling the front fork, use new fork oil.
- ❖ Use the specified fork oil for the front fork.
- ❖ When reassembling, replace the slide metals, oil seal, dust seal and damper rod bolt gasket with new ones.

□ On the inner tube, assemble the following parts.

- ① Dust seal
- ② Oil seal stopper ring
- ③ Oil seal
- ④ Oil seal retainer
- ⑤ Slide metal
- ⑥ Guide bushing

⚠ CAUTION

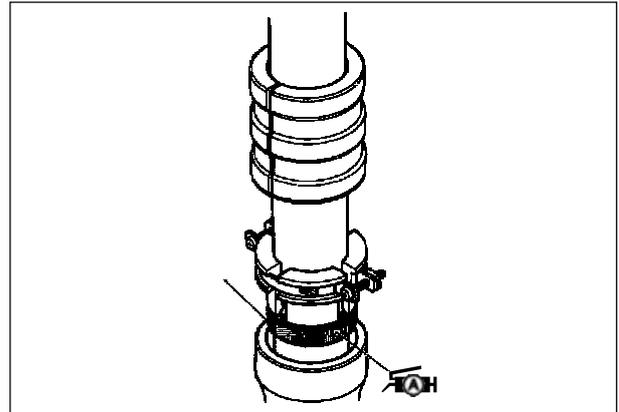
To prevent the lip of oil seal ③ from being damaged, cover the inner tube with vinyl sheet during installation.



- With the oil lock piece fitted to the inner tube, assemble the inner tube to the outer tube.
- Apply SUPER GREASE“ A” to the lip of the oil seal and install it into the outer tube using the front fork oil seal installer.

 SUPERGREASE“ A”

 Front fork oil seal installer set:09940-52861



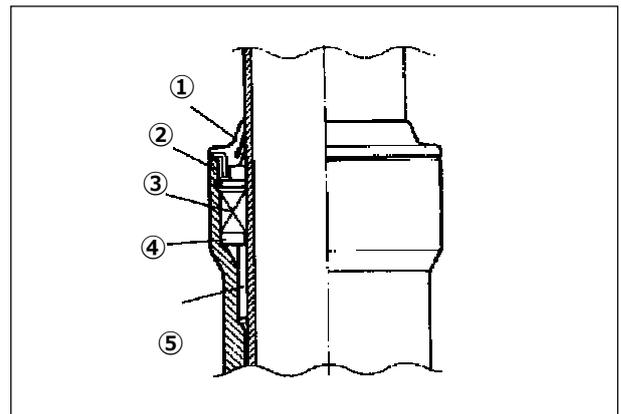
 **CAUTION**

Wash and clean the front fork oil seal installer before using. If dirt is on the installer, the inner tube may possibly be damaged during press- fitting work.

- Fit the stopper ring ② and dust seal ①.

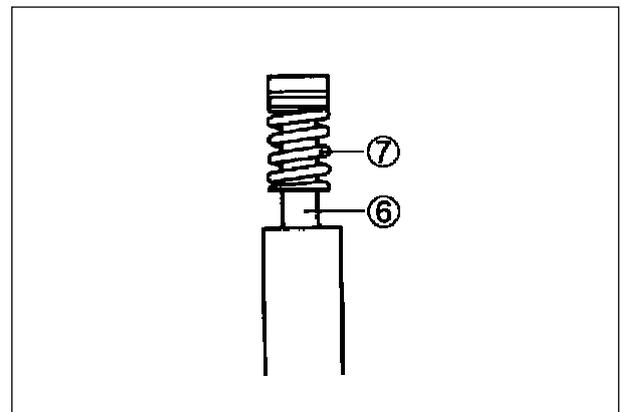
 **CAUTION**

Make sure that the stopper ring is securely fitted into the groove on the outer tube.



- ① Dust seal
- ② Oil seal stopper ring
- ③ Oil seal
- ④ Oil seal retainer
- ⑤ Slide metal

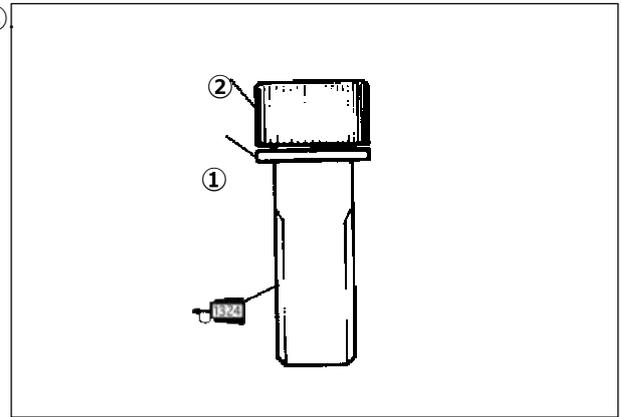
- Fit the rebound spring ⑦ on the damper rod ⑥ and install them together to the inner tube.



- Apply THREAD LOCK“1324”to the damper rod bolt②.
- With the damper rod held immovable, with the gasket ①fitted, tighten the damper rod bolt②.

🔧 Front fork damper rod bolt
: 20N·m (2.0kg·m)

🔧 THREAD LOCK“1324”



CAUTION

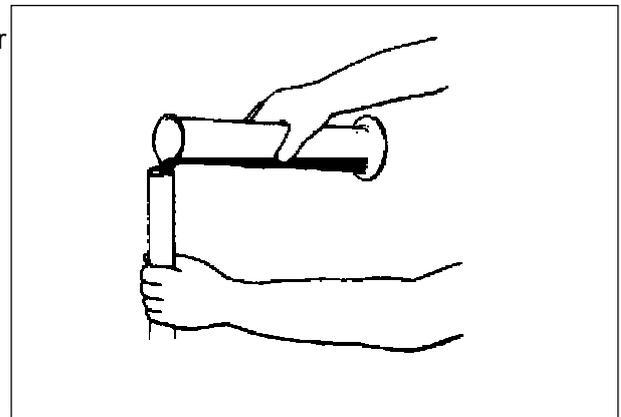
Replace the gasket with a new one.

□ **FRONT FORK OIL**

- With the inner tube in fully compressed position, pour the specified amount of fork oil and stroke the tube several times to expel air.

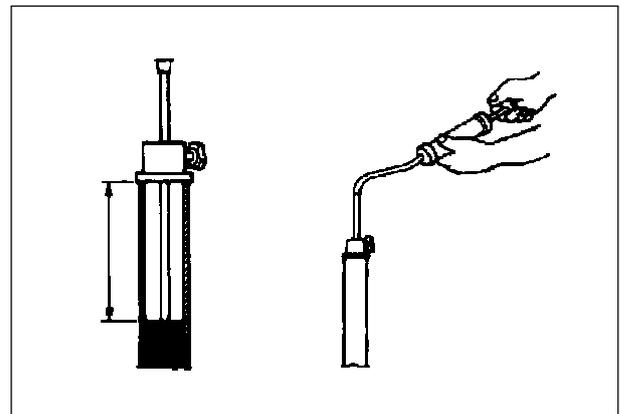
🔧 Front fork oil specification: TELLUS #22

Front fork oil capacity	Each leg
	369ml



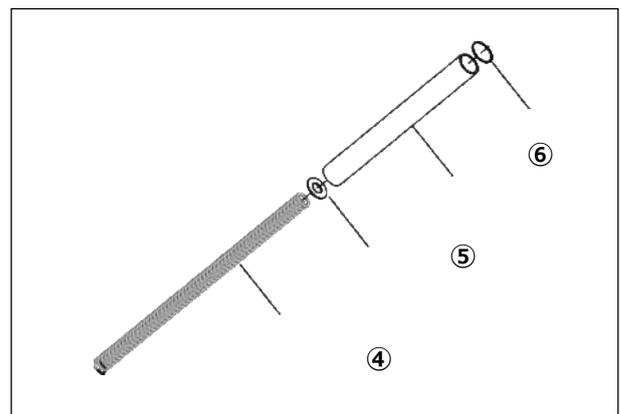
- With the front fork held in vertical position, compress the inner tube all the way.
- Wait until the fluid level stabilizes, measure and adjust the level to specification using the special tool.

Front fork oil level	105 mm
	(without spring)



🔧 Front fork oil level gauge : 09943-74111

- Install the front fork spring ③.
- Install the spring guide ④, front fork inner spacer⑤, and O-ring ⑥.



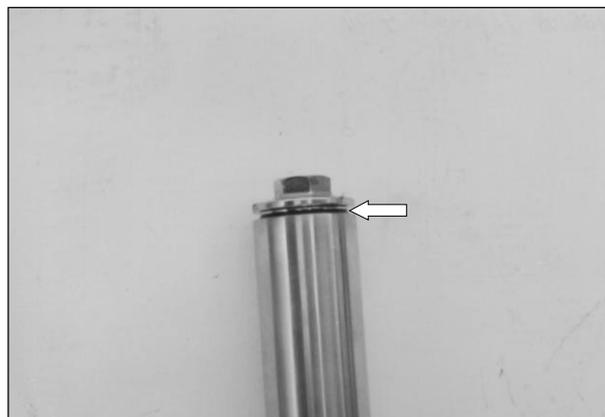
- Fit the O-ring to the front fork upper bolt and apply SUPER GREASE“A”.



SUPER GREASE“A”

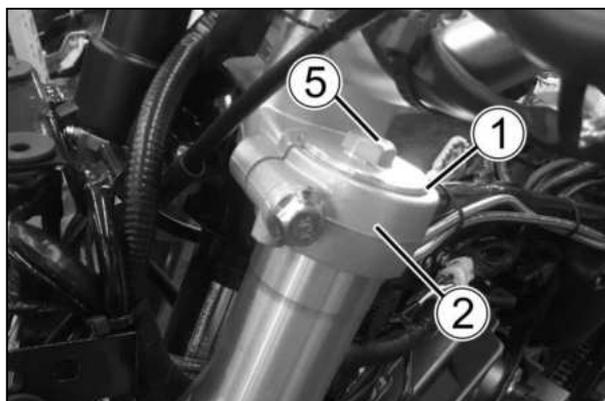
CAUTION

Use a new O-ring to prevent oil leakage.



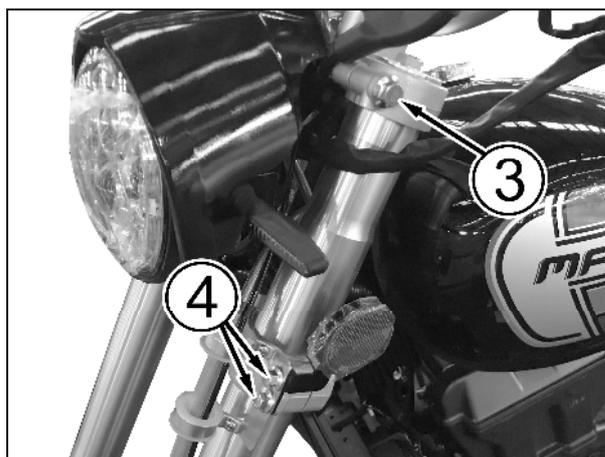
- Install the front fork to the motorcycle.
- Align the upper surface of the inner tube with the upper surface of the steering stem upper bracket.

- Tighten the front fork lower clamp bolts④ and front fork upper bolts⑤ to the specified torque.
- Tighten the front fork upper clamp bolts③ to the specified torque.

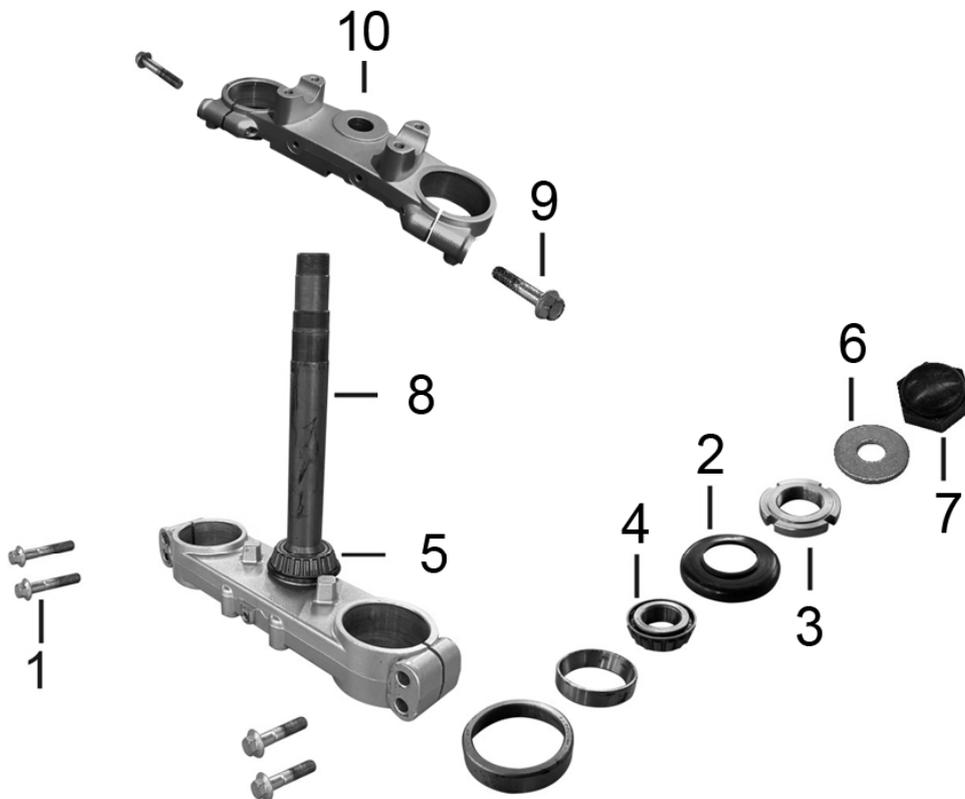


- Front fork upper clamp bolt**
: 23N·m (2.3kg·m)
- Front fork lower clamp bolt**
: 23N·m (2.3kg·m)
- Front fork upper bolt**
: 23N·m (2.3kg·m)

- Install the front wheel.
- Install the front brake caliper.
- Move the front fork up and down several times.
- Install the front fender and tighten the mounting bolts temporarily.



LATE STEERING&BRACKET COMP UNDER

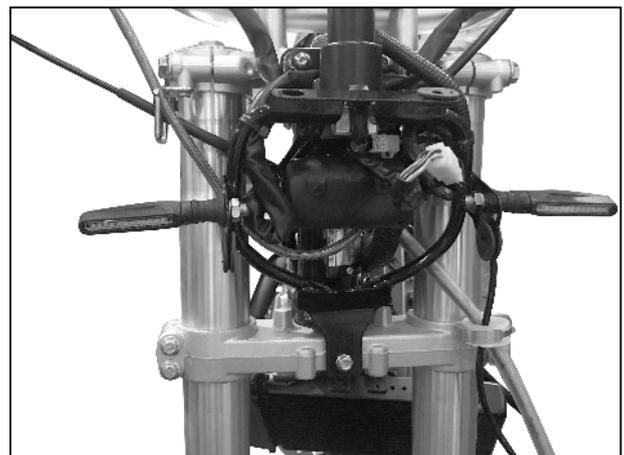


1. Hex flange bolt M8* 45GB5789-86
2. Dust cover (including upper&lower dust cover)
3. Lock the nut
4. Needle roller bearing assembly 30205 with baffle bowl
5. Needle roller bearing assembly 32006 with baffle bowl

6. Gasket
7. Cover nut M22*1.25
8. Lower header assembly
9. Hex flange bolt M10*50* 1.25GB5789-86
10. Upper board assembly

□ DISASSEMBLY

- Remove the front wheel.
- Remove the front fork.
- Remove the head lamp.
- Remove the speedometer comp .
- Remove the key set .



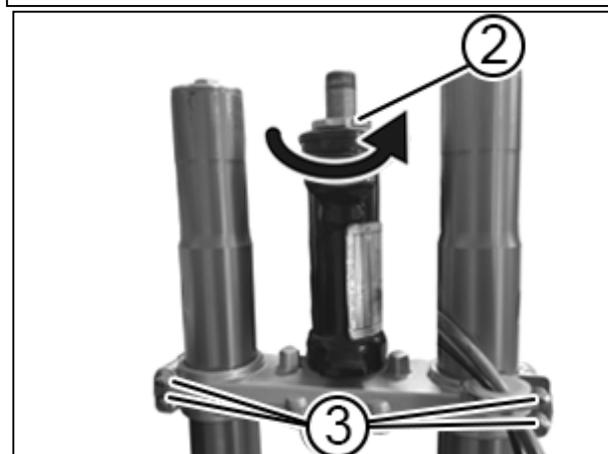
- Remove the steering stem head nut ①.
- Tap the steering rod bracket lightly to remove the upper steering rod bracket.



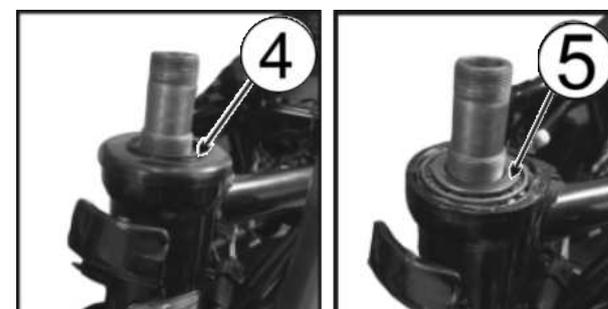
- Remove the steering stem nut ② using the special tool.

 **Clamp wrench : 09940-10122**

- Loosen the four left and right clamping bolts ③.



- Remove the dust cover ④ and the upper bearing ⑤.



- Remove the lower bearing ①.

CAUTION

- ❖ Unless corrosion, damage or other abnormal condition is found, the bearing race need not be replaced.
- ❖ Once the lower inner race has been removed, replace it with a new one.



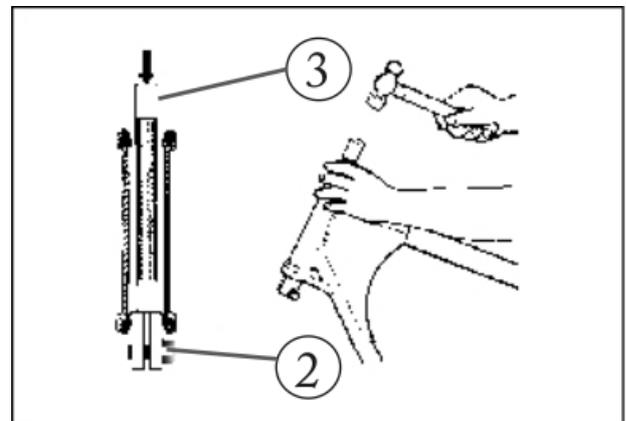
- Drive out the steering stem bearing outer races using the special tools ② and a suitable wedge bar ③.

 **Bearing outer race remover①:09941-54911**

□ **INSPECTION**

Check the steering stem and steering stem head for any damage.

Check the bearing and race for corrosion, nick or other damage.



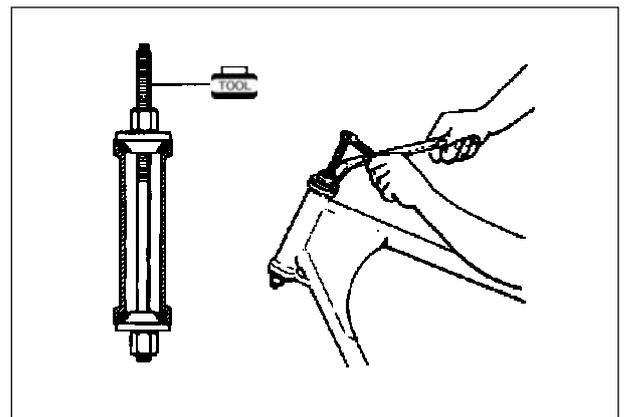
□ **REASSEMBLY**

Reassembly can be performed in reverse order of disassembly procedures.

However, operate the work taking care for the following points.

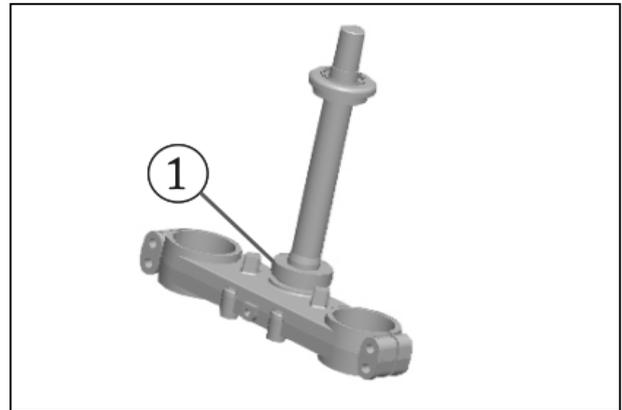
- Press in the upper and lower outer race using the special tool.

Steering race installer : 09941-34513



- Press in the lower inner race ①.

 **Bearing installer : 09913-80112**



- Apply SUPER GREASE“A”to the upper bearing, lower bearing and outer races prior to installing the steering stem.

 **SUPER GREASE A**

- Install the upper bearing ② and dust cover ③.

- Install the lock nut and tighten it to the specified torque.

Steering stem nut :45N·m (4.5kg·m)

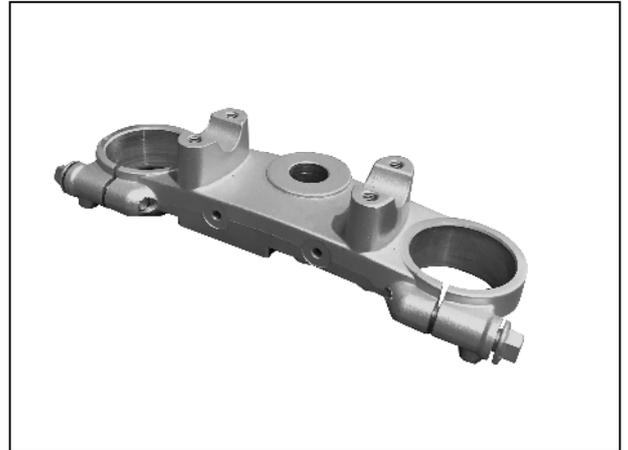


- Turn the steering stem lower bracket about five or six times to the left and right.
- Loosen the steering stem nut $\frac{1}{4}$ - $\frac{1}{2}$ of a turn .

NOTE

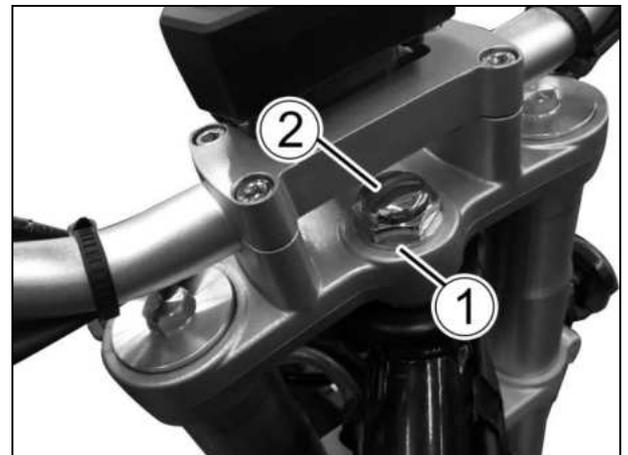
This adjustment will vary from motorcycle to motor- cycle. Make sure that the steering turns smoothly and easily in both directions without play.

- Install the left and right shock absorber combination before installation.
- Tighten the clamping bolts under the front shock absorber.
- Install the front fender.
- Install the front wheel.
- Install the upper tray.



- Install the steering stem upper bracket ① and washer ②.

 **Big nut: 65N·m (6.5kg·m)**



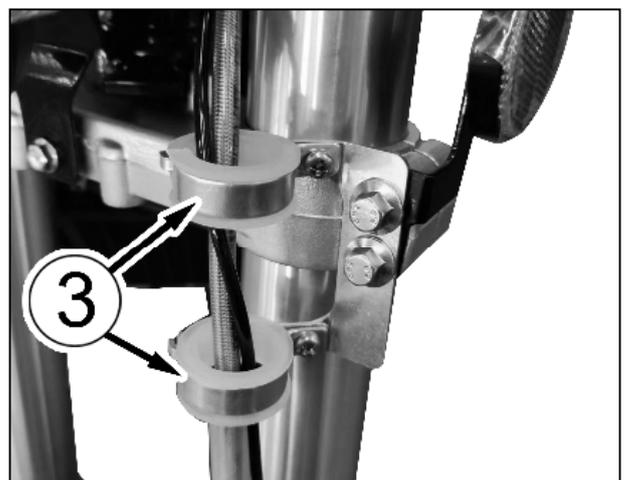
- Align the upper surface of the inner tube of the front shock absorber with the upper surface of the upper bracket of the steering rod.
- Tighten the upper and lower front shock absorber clamping bolts to the specified torque.
- Install the oil pipe clamp ③ at the same time before tightening the torque.

 **Front shock absorber clamping bolt:**

Upper: 23N·m (2.3kg·m)

Under: 33N·m (3.3kg·m)

- Install the ignition switch lock and wire clamp. Make sure that the ignition switch lock connector is correctly and firmly connected to the connector on the main wiring harness.
- Install speed odometer. Connect the soft axis of the speedometer. Make sure that the speedometer connector is correctly and firmly connected to the connector on the main wiring harness. Then tighten the waterproof jacket on the main wiring harness with a cable tie.



- Install headlight combination. First, connect the headlight connector correctly and firmly with the connector on the main wiring harness.
- Install the handlebar welding assembly.

NOTE

The gap between the handle block and the holder shall be uniform



- Tighten the clamp bolts to the specified torque.

Holder Bolt:

16N·m (1.6kg·m)

- Install the front wheel.

NOTE

Hold the front fork legs, move them back and forth and make sure that the steering is not loose.

- Install the left and right front fork guards.



REAR WHEEL



- 1. Rear tire (120/70-17)
- 2. Rear inner tube (120/70-17)
- 3. Left axle sleeve of rear wheel
- 4. Rear disk brake plate
- 5. Rear rim assembly
- 6. Sprocket
- 7. Hex bolt M10*30*1.25
- 8. Right axle sleeve of rear wheel
- 9. Rear wheel shaft (including nut)
- 10. Oil seal chain

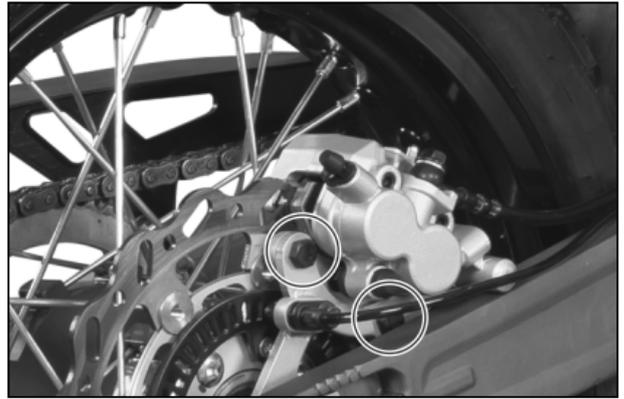
- 12. Wheel axle rubber cap
- 13. Wheel axle rubber cap
- 14. Rear gear ring (flat plate)
- 15. Gear ring bushing
- 16. Cross screws
- 17. Hex bolt M8*25

□ REMOVAL

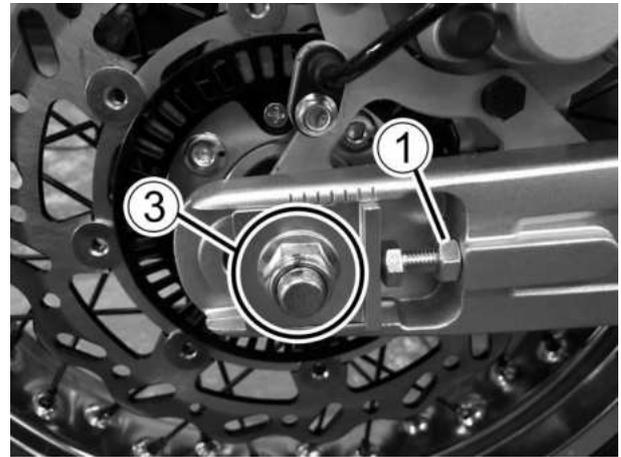
- Raise the rear wheel off the ground with a jack or block.
- Remove the drive chain cover.



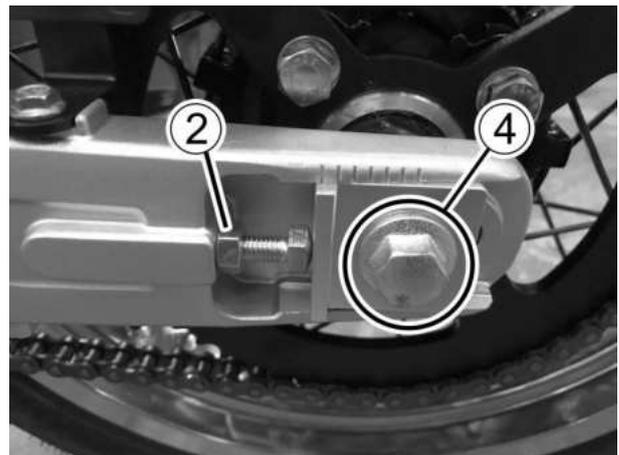
- Remove the mounting bolts of the rear caliper, and remove the rear caliper.



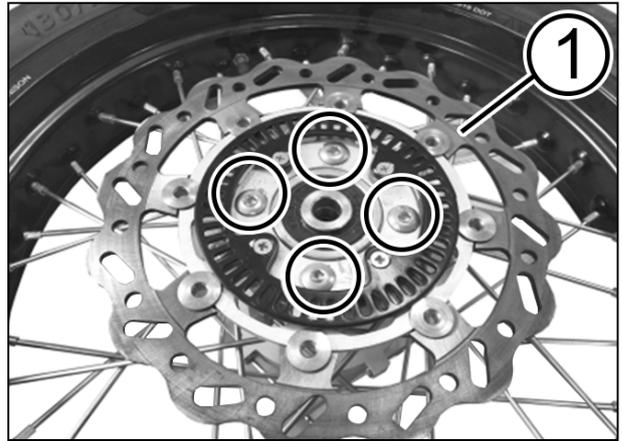
- Loosen the right drive chain adjuster nut ① and left drive chain adjuster nut ②.
- Disengage the drive chain from the rear sprocket.



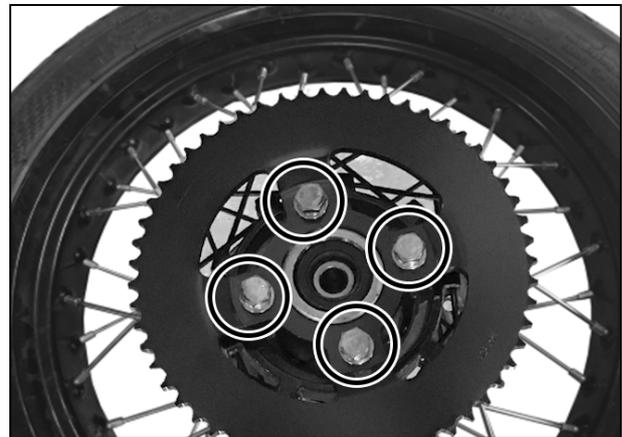
- Remove the rear axle nut ③.
- Draw out the rear axle ④ with the rear wheel push to the bottom.
- Pull the rear wheel assembly rear ward.



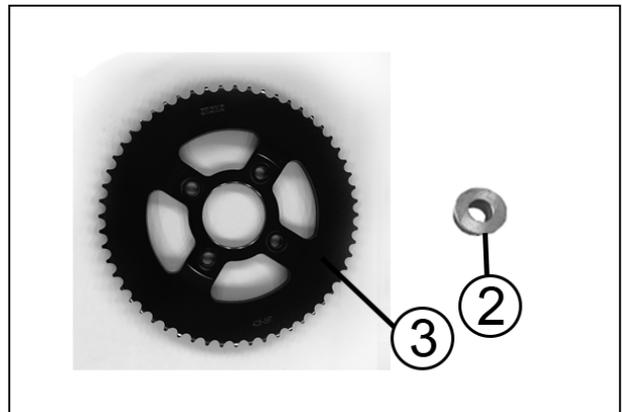
- Remove the rear brake panel ①.



- Remove the large sprocket mounting nut.



- Remove the left spacer ② of the rear wheel.
- Remove the large sprocket ③ .



- Remove the dust seal.

 Oil seal remover : 09913-50121

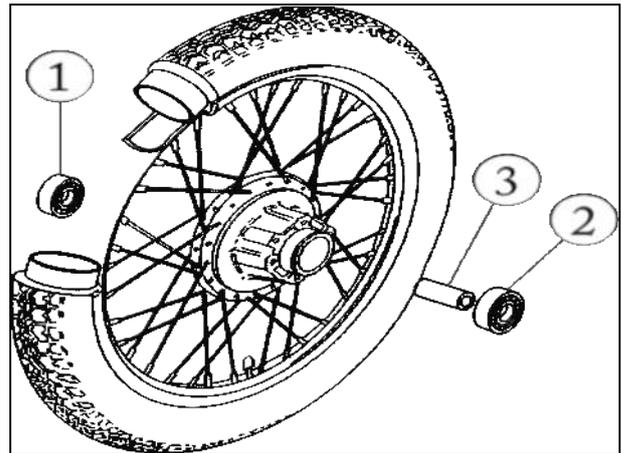


- Use special tools to remove the left and right side bearings ①② and the intermediate bush ③ of the hub.

 Wheel bearing remover :09941-50111

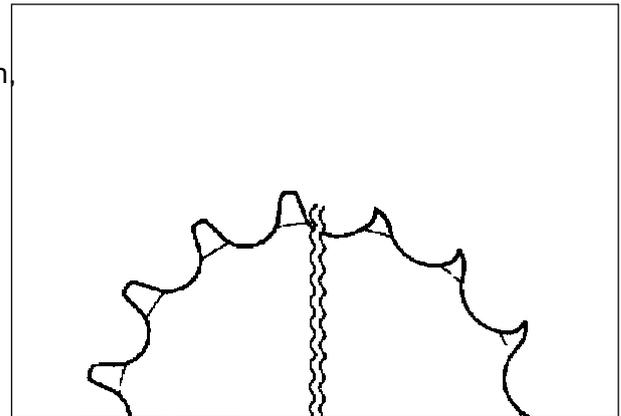
CAUTION

The removed bearing should be replaced with new one.



SPROCKET

- Inspect the sprocket's teeth for wear. If they are worn, replace the sprocket and drive chain as a set.



REASSEMBLY AND INSTALLATION

- Reassemble and install the rear wheel in the reverse order of disassembly and disassembly.
- Use special tools to press-fit the bearing into the wheel.
- Tools used: bearing assembly tools

CAUTION

First install the right wheel bearing, then left wheel bearing.

 Steering race installer :09941-34513

REAR SPROCKET

- Tighten the rear sprocket nuts to the specified torque.

 Rear sprocket nut : 50N·m (5.0kg·m)

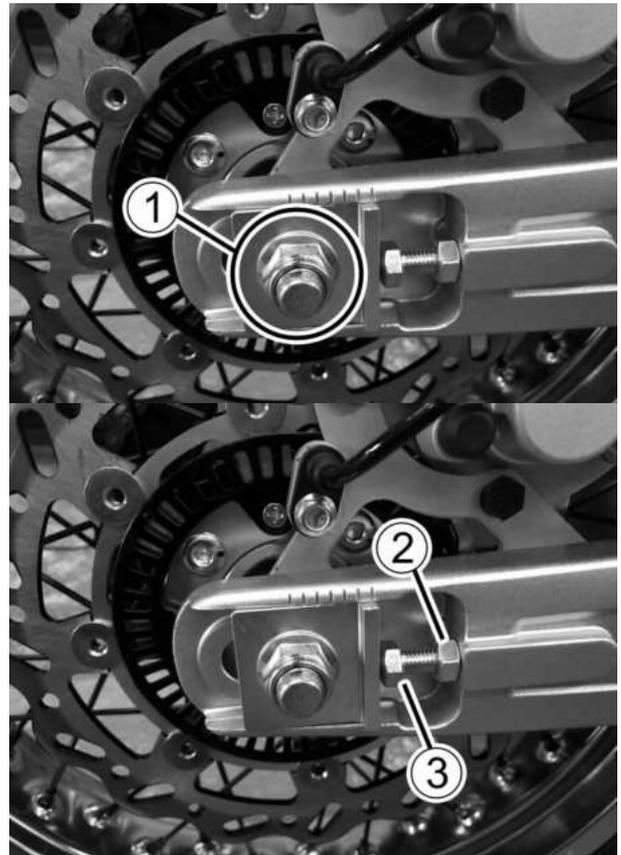


□ **REAR WHEEL**

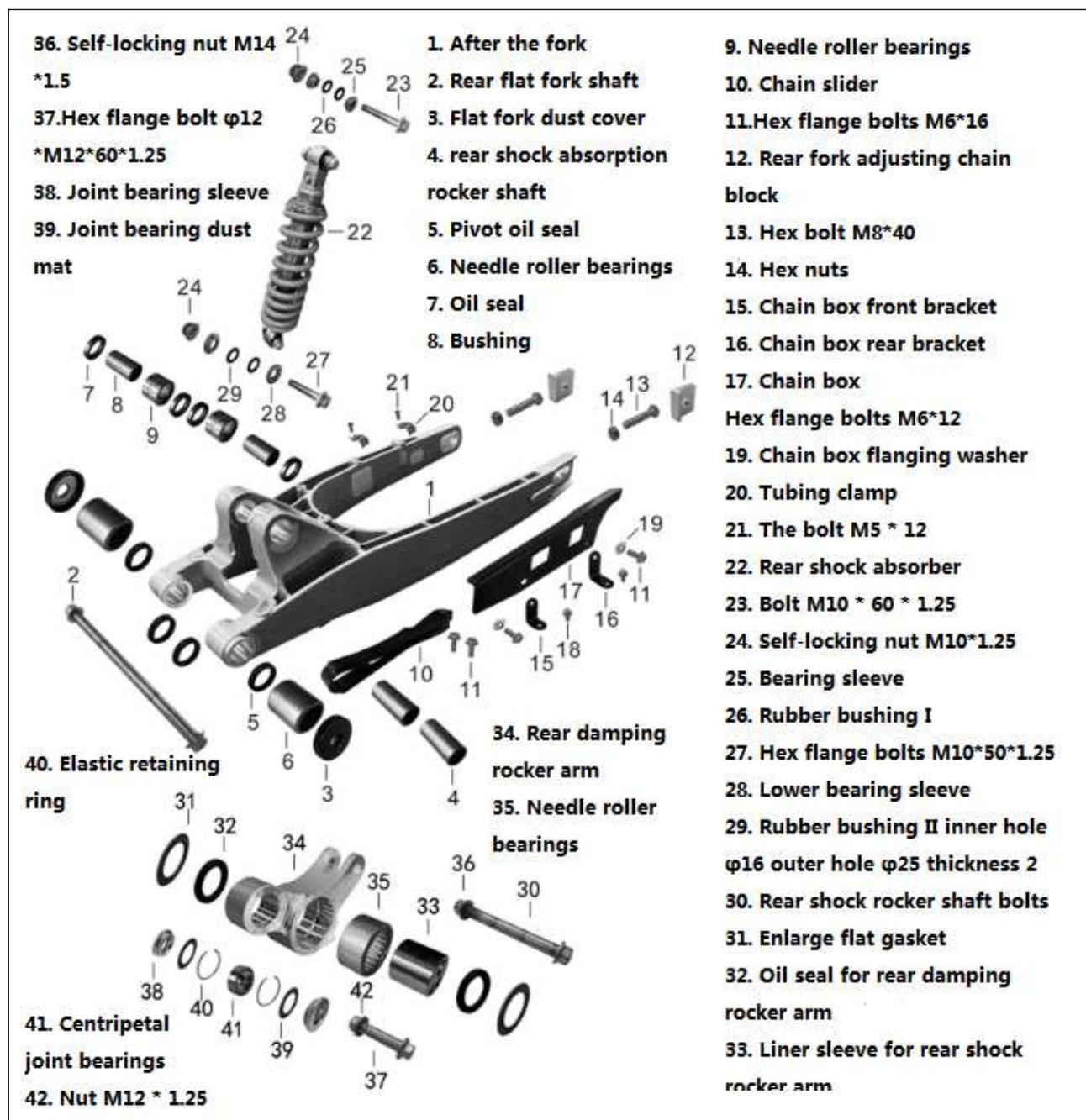
□ After the rear wheel install, tighten the rear axle nut ① to the specified torque.

🔧 **Rear axle nut : 78 N·m (7.8 kg·m)**

- After installing the drive chain to the rear sprocket, adjust the drive chain.
Tighten the left and right drive chain adjusting nuts ② and drive chain adjusting bolts ③.
- Adjust the rear brake pedal free travel.



REARSHOCKABSORBER&SWINGARM



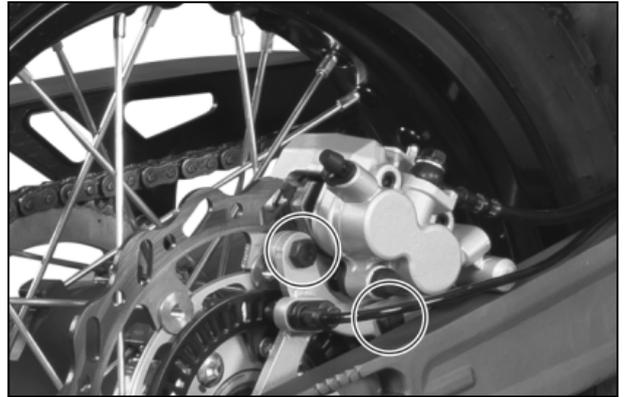
□ REMOVAL

- Remove the drive chain cover.

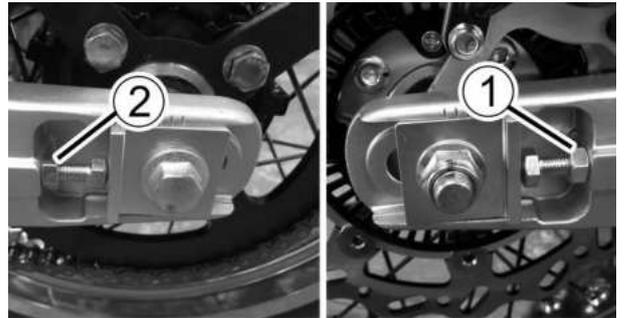


7-45 CHASSIS

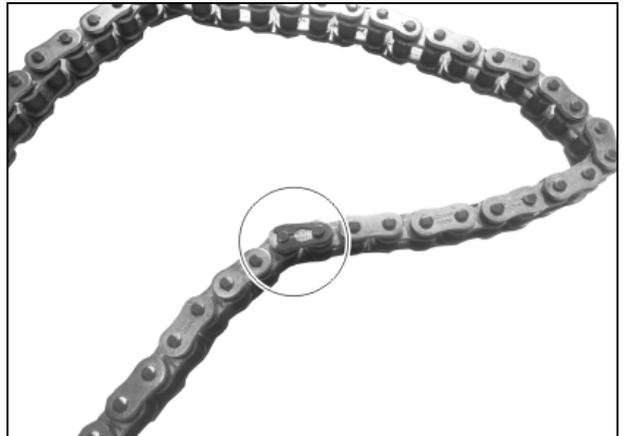
- ▣ Remove the mounting bolts of the rear caliper, and remove the rear caliper.



- ▣ Loosen the right drive chain adjuster nut ① and leftdrive chain adjuster nut ②.
- ▣ Disengage the drive chain from the rear sprocket.



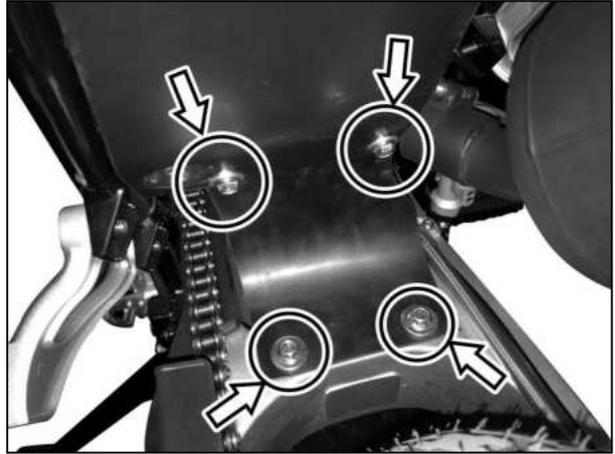
- ▣ Open the link clamp and remove the chain.



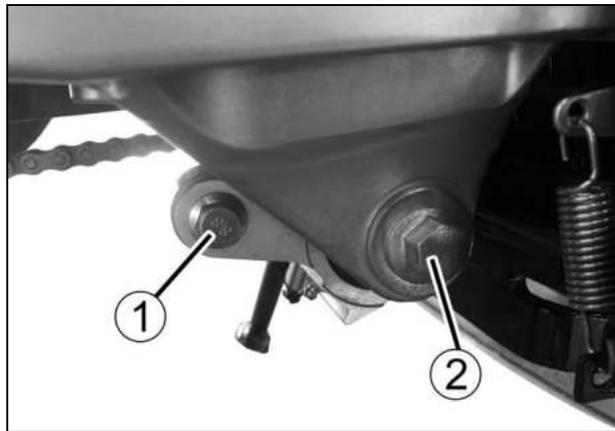
- ▣ Raise the rear wheel off the ground with a jack or block.
- ▣ Remove the rear axle self-locking nut ③, pull out the rear axle, and remove the rear wheel.



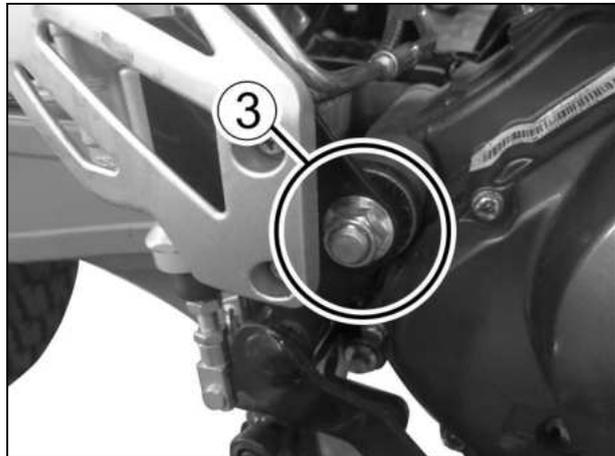
- Remove the water baffle.



- Remove the lower bolt ① of the rear shock absorber, and remove the bolt ② of the rear shock absorber rocker arm. Separate rear shock absorber and rear rocker arm combination.



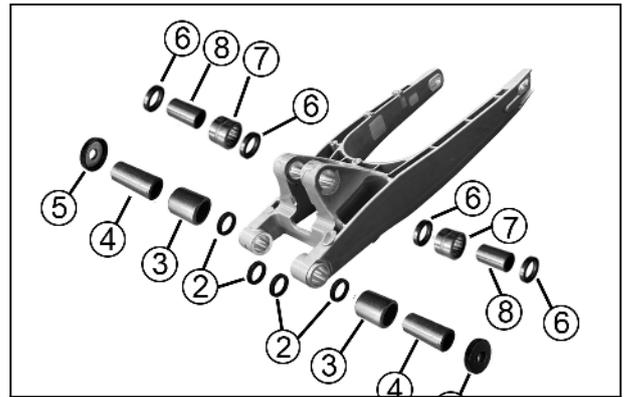
- Remove the flat fork self-locking nut ③, pull out the rear flat fork shaft, and remove the rear flat fork and chain slider.



- Remove the two bolts and remove the chain slider ①.

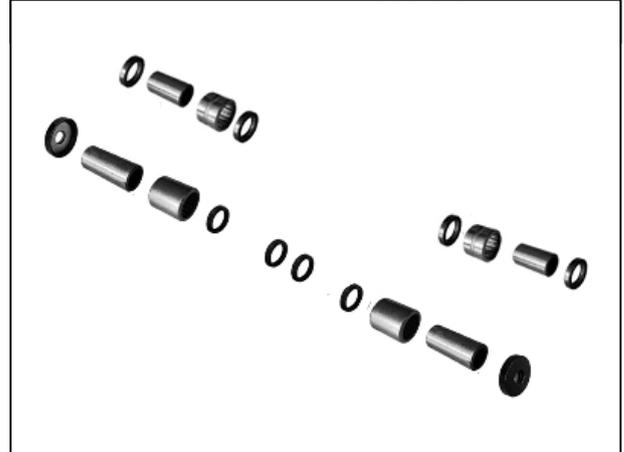
- Remove the pivot oil seal ②, rear rocker arm pivot inner bush ③, needle roller bearing ④, rear shock absorber pivot oil seal ⑤, rear shock absorber rocker arm pivot bush ⑥, needle roller bearing ⑦.

 **Bearing remover :09923-73210**



INSPECTION AND DISASSEMBLY

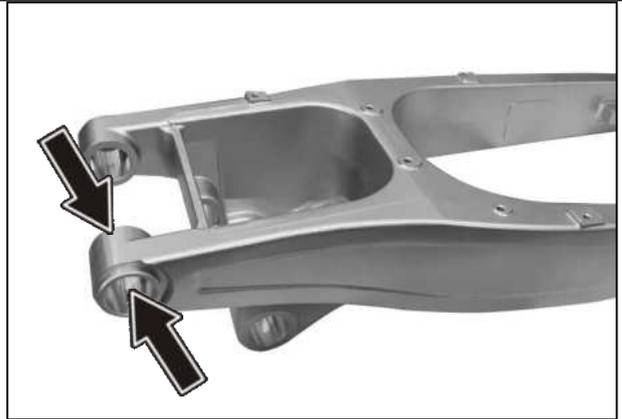
- Check the pivot oil seal, rear rocker arm pivot inner bushing, needle bearing, rear shock absorber pivot oil seal, rear shock absorber pivot bush, and needle roller bearing for damage. If there is a defect, it needs to be replaced with a new one.



7-47 CHASSIS

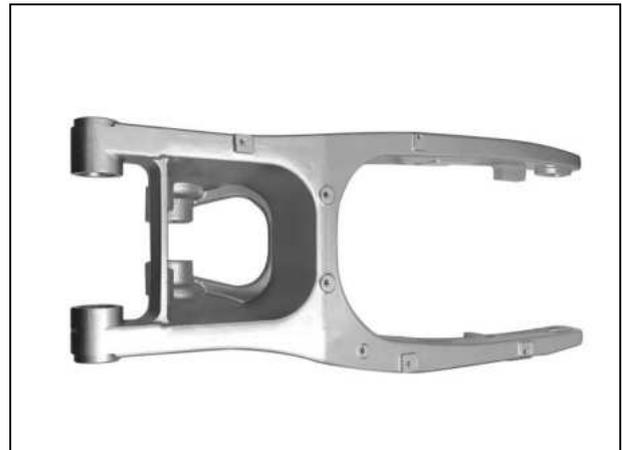
□ SWINGARM NEEDLE BEARINGS

- Insert the washer into the needle bearing, rotate the washer, and check if there is any abnormal sound and rotate smoothly.
- If there is any abnormality, please replace the bearing with a new one.



□ SWINGARM

- Inspect the swing arm for damage.
-
- If any defects are found, replace the swing arm with a new one.



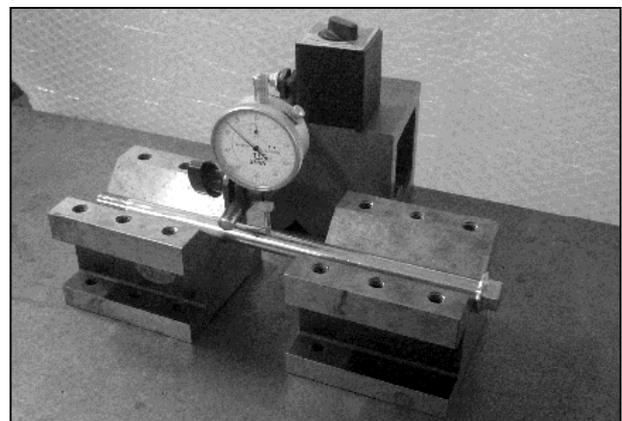
□ BUFFER, CHAIN TOUCH

- Check it for damage and wear. If it is defective, it needs to be replaced with a new one.



□ SHAFT, the rear flat fork

- Use a dial indicator to measure the pivot runout. If the pivot is beyond the repair limit, replace it with a new one.



Swingarm pivot shaft runout	Service limit
	0.3 mm

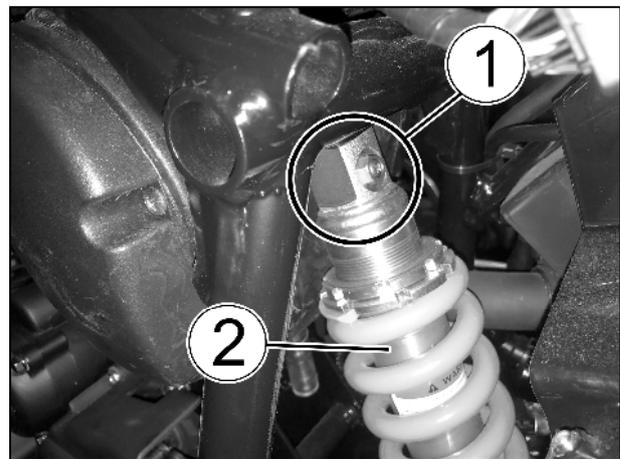
 Dial gauge : 09900-20606

Magnetic stand : 09900-20701

V-block : 09900-21304

□ REAR SHOCK ABSORBER COMBINATION REMOVAL

- Remove the fixing bolt ① on the rear shock absorber, and remove the rear shock absorber ②.



□ REAR SHOCK ABSORBER

- Check the gas nozzle, needle bearing, bolt, and replace if necessary.
- Inspect the rear shock absorber for damage and oil leakage. If any defects are found, replace the rear shock absorber with a new one.

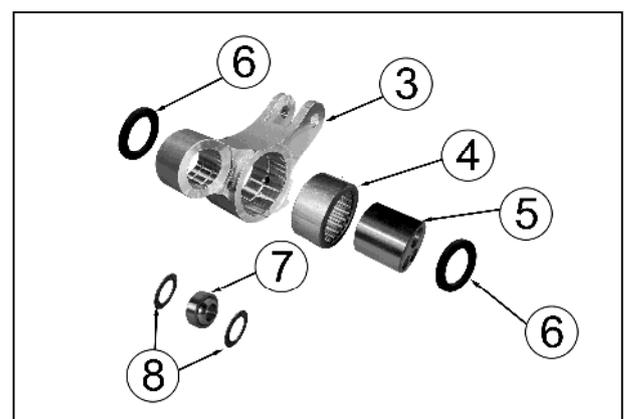


CAUTION

Do not attempt to disassemble the rear shock absorber. It is unserviceable.

□ LEVER, REAR CUSHION

- Remove the rear shock-absorbing rocker arm ③, the needle bearing ④, the rear shock-absorbing rocker arm inner bushing ⑤, and the radial joint bearing ⑥. Check if it is damaged. If there is a defect, it needs to be replaced with a new one.



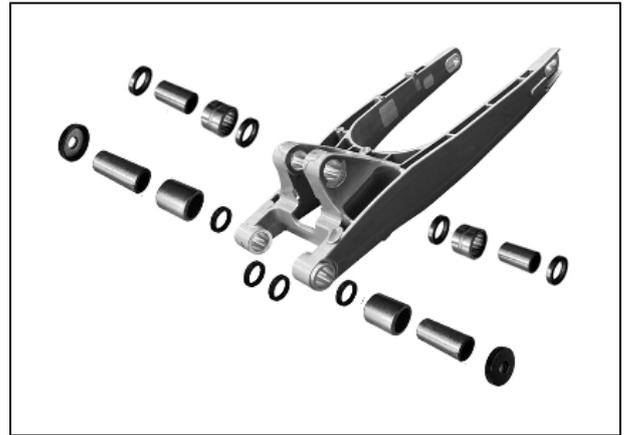
CAUTION

The removed needle bearing needs to be replaced with a new one.

REMountING

- Reassemble the swingarm and rear shock absorber in the reverse order of disassembly. Pay attention to the following points : Press the needle bearings into the swingarm. Pivoting using the special tool.

TOOL Steering race installer : 09941-34513



CAUTION

When assembling the needle bearing, let the embossed mark outward.

- Apply SUPER GREASE "A" to the needle bearing and spacers.

FAH SUPER GREASE "A"

- Install the rear flat fork and tighten the rear flat fork pivot nut ③ to the specified torque.

Swingarm pivot nut : 72N·m (7.2kg·m)

- After installing the shock absorber ②, tighten the upper and lower mounting bolts and nuts ⑧, ⑨ according to the specified torque.

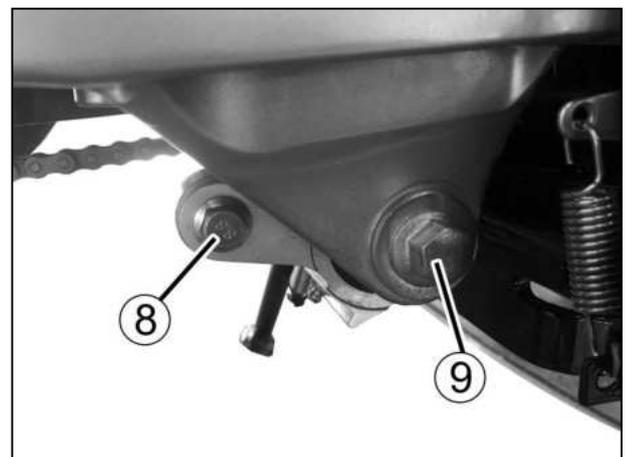
Shock absorber mounting nut: 29N·m (2.9kg·m)

Rear shock-absorbing rocker arm mounting nut



CAUTION

When installing the rear shock absorber, position the nozzle cap toward the right side of the vehicle.



- Install the rear wheels and rear brakes.
- After installing the rear flat fork and rear wheel, make the following adjustments before driving:
 - Drive chain slack.
 - Rear brake pedal free travel
 - Tire pressure.

CONTENTS

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TROUBLESHOOTING

□ MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
noEr	NO FAULT		—
P0031	O ₂ Sheater Circuit	Low Voltage	After engine running,if oxygen sensor heater signal open or is happened the ground short fault for 1second by 10 times in12 times test cycle,the code 0031 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0032		High Voltage	After engine running, if oxygen sensor heater signal is happened the high short fault for 1 second by 10 times in 12 times test cycle, the code 0032 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0107	MAP & IAT Sensor (MAP) Circuit	Low Voltage or Open	The sensor should produce following voltage. 0.15 V ≤ Sensor output voltage Without the above range for 2.2 sec. and more,0107 is indicated.
			Intake air pressure sensor, lead wire / coupler connection.
P0108		High Voltage	The sensor should produce following voltage. Sensor output voltage ≤ 5 V Without the above range for 10.0sec. and more,0108 is indicated.
			Intake air pressure sensor, lead wire / coupler connection.
P0112	MAP & IAT Sensor(IAT) Circuit	Low Voltage	The sensor voltage should be the following. 0.1 V ≤ Sensor output voltage Without the above range for 6.25sec. and more,0112 is indicated.
			Intake air temperature sensor, lead wire / coupler connection.
P0113		High Voltage or Open	The sensor voltage should be the following. Sensor output voltage ≤ 4.9V Without the above range for 6.25sec. and more,0113 is indicated.
			Intake air temperature sensor, lead wire / coupler connection.
P0117	CLT Circuit	Low Voltage	The sensor voltage should be the following. 0.1 V ≤ Sensor output voltage 0.1 V ≤ Without the above range for 25sec. and more,0117 is indicated.
			Water temperature sensor, lead wire / coupler connection.
P0118		High Voltage or Open	The sensor voltage should be the following. Sensor output voltage ≤ 5V Without the above range for 6.25sec. and more,0118 is indicated.
			Water temperature sensor, lead wire / coupler connection.

8-2 SERVICING INFORMATION

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0122	TP Sensor Circuit	Low Voltage or Open	The sensor should produce following voltage. $0.2\text{ V} \leq \text{Sensor output voltage} \leq 0.2\text{ V}$ Without the above range for 7.8sec. and more, 0122 is indicated.
			Throttle position sensor, lead wire / coupler connection.
P0123		High Voltage	The sensor should produce following voltage. Sensor output voltage $\leq 4.9\text{ V}$ Without the above range for 7.8sec. and more, 0123 is indicated.
			Throttle position sensor, lead wire / coupler connection.
P0131	O ₂ Scircuit	Low Voltage	After engine running, the oxygen sensor signal is in putted in ECU since then 300sec. In this case, the sensor voltage should be the following. $30\text{mV} \leq \text{Sensor output voltage}$ Without the above range for 28.1sec. and more, 0131 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0132		High Voltage	After engine running, the oxygen sensor signal is in putted in ECU since then 300sec. In this case, the sensor voltage should be the following. Sensor output voltage $\leq 1.0\text{V}$ Without the above range for 29.4 sec. And more, 0132 is indicated.
			Oxygen sensor, lead wire / coupler connection.
P0261	Fuel Injector Circuit	Open/Short Low	After engine running, if fuel injector signal open or is happened the ground short fault for 1second by 5 times in 10 times test cycle, the code P0261 is indicated.
P0262		Short High	After engine running, if fuel injector signal is happened the high short fault for 1second by 5 times in 10 times test cycle, the code P0262 is indicated.
P0231	Fuel pump Circuit	Low Voltage or Open	After engine running, if fuel pump relay signal open or is happened the ground short fault for 1 second by 10time sin 20 times test cycle, the code 0230 is indicated.
			Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.
P0232		High Voltage	After engine running, if fuel pump relay signal is happened the high short fault for 1 second by 10time sin 20 times test cycle, the code 0232 is indicated.
			Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.

MALFUNCTION CODE	DETECTED ITEM		DETECTED FAILURE CONDITION
			CHECK FOR
P0336	CKP	Noisy Signal	After engine running, if the magneto rotor tooth's error is happened continuously by 10 times in 100 times test cycle,the code P0336 is indicated.10010, P0336 CKP wiring and mechanical parts.(CKP lead wire coupler connection)
		No Signal	After engine running, if the CKP signal does not reach ECU for more than 0.5 sec., the code P0337 is indicated.0.5ECU, P0335 CKP wiring and mechanical parts. (CKP,leadwire coupler connection)
P0500	Speed sensor Malfunction		Motorcycle speed < 10km/h Water temperature < 20°C IAP&TS pressure > 40kpa 20% < TPS open angle < 100% 2,000rpm < Engine speed < 6,000rpm If the above conditions are maintained for 32.5sec.and more, The code P0500 is indicated
			Speedo sensor, wiring/coupler connection to ECU
P0505	ISC Error		After engine running, if idle speed is different to 500 rpm from the specified range in 25 seconds test cycle,the code P0505 is indicated.
			Idle speed control solenoid, wiring / coupler connection.
P0562	Battery Voltage	Low	The battery voltage should be the following following 9 V ≤ Battery voltage Without the above range for 3.125sec.and more,P0562is indicated. Battery, wiring / coupler connection to ECU.
		High	The battery voltage should be the following. Battery voltage ≤ 16V Without the above range for 3.125 sec.and more,P0563is indicated.3 Battery, wiring / coupler connection to ECU.
P0601	ECU Fault		When ML on The ECU will check malfunction code, if there's ECU error the code P0601 is indicated.
			The fuel injection will be cut off Accordingly ECU

8-4 SERVICING INFORMATION

MALFUNCTION CODE	DETECTED ITEM	DETECTED FAILURE CONDITION
		CHECK FOR
P0650	Engine warning lamp Circuit Malfunction	After engine running, if "FI" check lamp signal open or is happened the high / ground short fault for 1 second by 40 times in 80 times test cycle, the code P0650 is indicated.
		"FI" check lamp, wiring / coupler connection.
P0850	GPor Clutch lever Switch Circuit Malfunction	If gear position or clutch lever switch signal feedback is not active in continuous by 20 times in fully power down cycles, the code P0850 is indicated. (Fully power down cycle : Ignition switch "ON" "OFF" position)
		Gear position or clutch lever switch,wiring/coupler connection, gearshift cam etc.

Complaint	Symptom and possible causes	Remedy
<p>Engine runs poorly in high speed range.</p>	<p>Defective engine internal / electrical parts/</p> <ol style="list-style-type: none"> 1. Weakened valvesprings. 2. Worn camshafts. 3. Valve timing out of adjustment. 4. Too narrow sparkplug gaps. 5. Ignition not advanced sufficiently due to poorly working timing advance circuit. 6. Defective ignitioncoils. 7. Defective CKP. 8. DefectiveECU. 9. Clogged fuel hose,resulting in inadequate fuel supply to injector. 10. Defective fuel pump. 11. Defective TP sensor. 12. Clogged air cleaner element. <p>Defective air flow system</p> <ol style="list-style-type: none"> 1. Clogged air cleaner element. 2. Defective throttle valve. 3. Sucking air from throttle body joint. 4. DefectiveECU. <p>Defective control circuit or sensor</p> <ol style="list-style-type: none"> 1. Low fuel pressure. 2. Defective IAT sensor. 3. Defective CKP. 4. Defective IAT sensor. 5. DefectiveECU.ECU 6. Defective TP sensor. 	<p>Replace. Replace. Adjust. Adjust. Replace ECU. Replace. Replace. Replace. Clean and prime. Replace. Replace. Clean. Clean or replace. Adjust or replace. Repair or replace. Replace. Repair or replace. Replace. Replace. Replace. Replace. Replace.</p>

Complaint	Symptom and possible causes	Remedy
Engine lacks power.	<p>Defective engine internal / electrical parts/</p> <ol style="list-style-type: none"> 1. Loss of tappet clearance. 2. Weakened valvesprings. 3. Valve timing out of adjustment. 4. Worn piston rings or cylinders. 5. Poor seating of valves. 6. Fouled sparkplugs. 7. Incorrect spark pluggaps. 8. Clogged injectors. 9. Clogged air cleaner element. 10. Sucking air from throttle valve or vacuum hose. 11. Too much engine oil. 12. Defective fuel pump or ECU. 13. Defective CKP and ignition coils. 14. Defective TP sensor. <p>Defective control circuit or sensor</p> <ol style="list-style-type: none"> 1. Low fuel pressure. 2. Defective IAT sensor. 3. Defective CKP. 4. Defective IAT sensor. 5. Defective ECU. 6. Defective TP sensor. 7. Defective GP switch. 	<p>Adjust. Replace. Adjust. Replace. Repair. Clean or replace. Adjust or replace. Clean. Clean. Retighten or replace. Drain out excess oil. Replace. Replace.</p> <p>Replace. Repair or replace. Replace. Replace. Replace. Replace. Replace.</p>
Engine overheats.	<p>Defective engine internal parts</p> <ol style="list-style-type: none"> 1. Heavy carbon deposit on piston crowns. 2. Not enough oil in the engine. 3. Defective oil pump or clogged oil circuit. 4. Sucking air from intake pipes. 5. Use incorrect engine oil. 6. Defective radiator. <p>Lean fuel / air mixture/</p> <ol style="list-style-type: none"> 1. Short-circuited MAP & IAT sensor / leadwire. 2. Short-circuited IAT sensor / leadwire. 3. Sucking air from intake pipe joint. 4. Defective fuel injectors. 5. Defective CLT sensor. <p>The other factors</p> <ol style="list-style-type: none"> 1. Ignition timing too advanced due to defective timing advance system (CLT sensor, CKP, GP switch and ECU). 2. Drive chain is too tight. 	<p>Clean. Add oil. Replace or clean. Retighten or replace. Change. Clean or replace.</p> <p>Repair or replace. Repair or replace. Repair or replace. Replace. Replace.</p> <p>Replace. Adjust.</p>

8-10 SERVICING INFORMATION

Complaint	Symptom and possible causes	Remedy
Dirty or heavy exhaust smoke.	<ol style="list-style-type: none"> 1. Too much engine oil in the engine. 2. Worn piston rings or cylinders. 3. Worn valveguides. 4. Cylinder walls cored or scuffed. 5. Worn valves stems. 6. Defective stemseals. 7. Worn siderails. 	<p>Check with inspection window, drain out excess oil.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Slipping clutch.	<ol style="list-style-type: none"> 1. Weakened clutchsprings. 2. Worn or distorted pressure plates. 3. Distorted clutch plates or pressure plates. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Dragging clutch.	<ol style="list-style-type: none"> 1. Some clutch springs weakened while others are not. 2. Distorted pressure plates or clutch plates. 	<p>Replace.</p> <p>Replace.</p>
Transmission will not shift.	<ol style="list-style-type: none"> 1. Broken gearshiftcam. 2. Distorted gearshift forks. 3. Worn gearshiftpawl. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>
Transmission will not shift back.	<ol style="list-style-type: none"> 1. Broken return spring on shift shaft. 2. Rubbing or sticky shift shaft. 3. Distorted or worn gearshift forks. 	<p>Replace.</p> <p>Repair or replace.</p> <p>Replace.</p>
Transmission jumps out of gear.	<ol style="list-style-type: none"> 1. Worn shifting gears on drive shaft or counter shaft. 2. Distorted or worn gearshift forks. 3. Weakened stopper spring on gear shift stopper. 	<p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

RADIATOR (COOLING SYSTEM)

Complaint	Symptom and possible causes	Remedy
Engine overheats.	<ol style="list-style-type: none"> 1. Not enough engine coolant. 2. Radiator core clogged with dirt or scale. 3. Faulty cooling fan. 4. Defective cooling fan thermo-switch. 5. Clogged water passage. 6. Air trapped in the cooling circuit. 7. Defective water pump. 8. Use of incorrect engine coolant. 9. Defective thermostat. 	<p>Add coolant.</p> <p>Clean.</p> <p>Repair or replace.</p> <p>Replace.</p> <p>Clean.</p> <p>Bleed out air.</p> <p>Replace.</p> <p>Replace.</p> <p>Replace.</p>

Engine overcools.	<ol style="list-style-type: none">1. Defective cooling fan thermo-switch.2. Extremely cold weather.3. Defective thermostat.	Replace. Put on the radiator cover. Replace.
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□ ELECTRICAL

Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	<ol style="list-style-type: none"> 1. Defective ignition coils or sparkplug caps. 2. Defective spark plugs. 3. Defective CKP. 4. Defective ECU. 5. Defective ROswitch. 6. Open-circuited wiring connections. 	Replace. Replace. Replace. Replace. Replace. Check and repair.
Spark plug soon become fouled with carbon.	<ol style="list-style-type: none"> 1. Mixture too rich. 2. Idling speed set too high. 3. Incorrect gasoline. 4. Dirty element in air cleaner. 5. Spark plugs too cold. 	Inspect EI system. Inspect EI system. Change. Clean or replace. Replace by hot type plug.
Spark plug become fouled too soon.	<ol style="list-style-type: none"> 1. Worn piston rings. 2. Pistons or cylinders worn. 3. Excessive clearance of valve stems in valve guides. 4. Worn stem oil seal. 	Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	<ol style="list-style-type: none"> 1. Spark plugs too hot. 2. The engine overheats. 3. Spark plugs loose. 4. Mixture too lean. 	Replace by cold type plug. Tune up. Retighten. Inspect EI system.
Magneto charge, but charging rate is below the specification.	<ol style="list-style-type: none"> 1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals. 2. Grounded or open-circuited stator coils of magneto. 3. Defective regulator /rectifier. 4. Defective cell plates in the battery. 	Repair or retighten. Replace. Replace. Replace the battery.
Magneto overcharges.	<ol style="list-style-type: none"> 1. Internal short-circuit in the battery. 2. Resistor element in the regulator/rectifier damaged or ineffective 3. Regulator/rectifier poorly grounded. 	Replace the battery. Replace. Clean and tighten ground connection.
Magneto does not charge.	<ol style="list-style-type: none"> 1. Open or short-circuited lead wires, or loose lead connections 2. Short-circuited, grounded or open stator coil. 3. Short-circuited or punctured regulator/rectifier. 	Repair or replace or retighten. Replace. Replace.
Unstable charging.	<ol style="list-style-type: none"> 1. Lead wire insulation frayed due to vibration resulting in intermittent shorting. 7. Magneto internally shorted. 2. Defective regulator /rectifier. 	Repair or replace. Replace. Replace.
Starter switch is not effective.	<ol style="list-style-type: none"> 1. Battery rundown. 2. Defective switch contacts. 3. Brushes not seating properly on commutator in starter motor. 4. Defective starter relay/ignition inter locks switch. 5. Defective main fuse. 	Recharge or replace. Replace. Repair or replace. Replace. Replace.

BATTERY

Complaint	Symptom and possible causes	Remedy
<p>“Sulfation” acidic white powdery substance or spots on surfaces of cell plates.</p>	<ol style="list-style-type: none"> 1. Battery case is cracked. 2. Battery has been left in a run-down condition for a long time. 	<p>Replace the battery. Replace the battery or recharge.</p>
<p>Battery runs down quickly.</p>	<ol style="list-style-type: none"> 1. The charging method is not correct. 2. Cell plates have lost much of their active material as are sult of over-charging. 3. A short-circuit condition exists within the battery due to excessive accumulation of sediments caused by the high electrolyte specific gravity. 4. Battery is too old. 	<p>Check the generator, regulator/rectifier and circuit connections, and make necessary adjustments to obtain specified charging operation.</p> <p>Replace the battery, and correct the charging system. Replace the battery. Replace the battery.</p>
<p>Reversed battery polarity.</p>	<p>The battery has been connected the wrong way round in the system, so that it is being charged in the reverse direction.</p>	<p>Replace the battery and be sure to connect the battery properly.</p>
<p>Battery “sulfation”</p>	<ol style="list-style-type: none"> 1. Charging rate too low or too high. (When not in use, batteries should be recharged at least once a month to avoid sulfation.) 2. The battery left unused for too long in cold climate. 	<p>Replace the battery. Replace the battery.</p>
<p>Battery discharges too rapidly.</p>	<ol style="list-style-type: none"> 1. Dirty container top and sides. 	<p>Clean.</p>

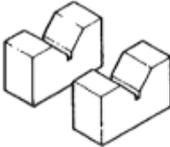
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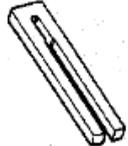
Complaint	Symptom and possible causes	Remedy
Steering feels too heavy or stiff.	<ol style="list-style-type: none"> 1. Steering stem nut overtightened. 2. Worn bearing or race in steering stem. 3. Distorted steering stem. 4. Not enough pressure in tires. 	Adjust. Replace. Replace. Adjust.
Steering oscillation.	<ol style="list-style-type: none"> 1. Loss of balance between right and left front suspensions. 2. Distorted front fork. 3. Distorted front axle or crooked tire. 	Replace. Repair or replace. Replace.
Wobbling front wheel.	<ol style="list-style-type: none"> 1. Distorted wheel rim. 2. Worn-down wheel bearings. 3. Defective or incorrect tire. 4. Loosen nut on axle. 	Replace. Replace. Replace. Retighten.
Front suspension too soft.	<ol style="list-style-type: none"> 1. Weakened springs. 2. Not enough fork oil. 	Replace. Refill.
Front suspension too stiff.	<ol style="list-style-type: none"> 1. Fork oil too viscous. 2. Too much fork oil. 	Replace. Drain excess oil.
Noisy front suspension.	<ol style="list-style-type: none"> 1. Not enough fork oil. 2. Loosen nuts on suspension. 	Refill. Retighten.
Wobbling rear wheel.	<ol style="list-style-type: none"> 1. Distorted wheel rim. 2. Worn-down rear wheel bearing. 3. Defective or incorrect tire. 4. Loose nut on axle. 5. Worn swing arm bushing or bearing. 6. Loosen nut on the rear shock. 	Replace. Replace. Replace. Retighten. Replace. Retighten.
Rear suspension too soft.	<ol style="list-style-type: none"> 1. Weakened springs. 2. Rear suspension adjuster improperly set. 	Replace. Adjust.
Rear suspension too stiff.	<ol style="list-style-type: none"> 1. Rear suspension adjuster improperly set. 2. Worn swing arm bushing or bearing. 	Adjust. Replace.
Noisy rear suspension.	<ol style="list-style-type: none"> 1. Loosen nuts on suspension. 2. Worn swing arm bushing or bearing. 	Retighten. Replace.

BRAKES

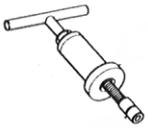
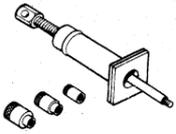
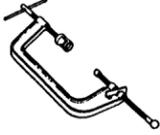
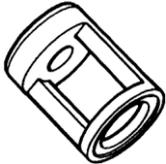
Complaint	Symptom and possible causes	Remedy
Poor braking (FRONT and REAR)	<ol style="list-style-type: none"> 1. Not enough brake fluid in the reservoir. 2. Air trapped in brake fluid circuit. 3. Pads worn down. 4. Too much play on brake lever or pedal. 5. Shoes worn down. 	<p>Refill to level mark.</p> <p>Bleed air out.</p> <p>Replace.</p> <p>Adjust.</p> <p>Replace.</p>
Insufficient brake power.	<ol style="list-style-type: none"> 1. Leakage of brake fluid from hydraulic system. 2. Worn pads. 3. Oil adhesion of engaging surface of pads. 4. Worn disk. 5. Air in hydraulic system. 	<p>Repair or replace.</p> <p>Replace.</p> <p>Clean disk and pads.</p> <p>Replace.</p> <p>Bleed air.</p>
Brake squeaking.	<ol style="list-style-type: none"> 1. Carbon adhesion on pad surface. 2. Tilted pad. 3. Damaged wheel bearing. 4. Loosen front-wheel axle or rear-wheel axle. 5. Worn pads. 6. Foreign material in brake fluid. 7. Clogged return port of master cylinder. 	<p>Repair surface with sandpaper.</p> <p>Modify pad fitting.</p> <p>Replace.</p> <p>Tighten to specified torque.</p> <p>Replace.</p> <p>Replace brake fluid.</p> <p>Disassemble and clean master cylinder.</p>
Excessive brake lever stroke.	<ol style="list-style-type: none"> 1. Air in hydraulic system. 2. Worn brake lever cam. 3. Insufficient brake fluid. 4. Improper quality of brake fluid. 	<p>Bleed air.</p> <p>Replace brake lever.</p> <p>Replenish fluid to specified level ; bleed air</p> <p>Replace with correct fluid.</p>
Leakage of brake fluid.	<ol style="list-style-type: none"> 1. Insufficient tightening of connection joints. 2. Cracked hose. 3. Worn piston and/or cup. 	<p>Tighten to specified torque.</p> <p>Replace.</p> <p>Replace piston and/or cup.</p>

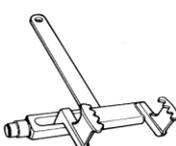
SPECIAL TOOLS

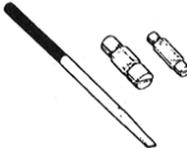
Special tools	PartNumber – PartName – Description	Special tools	PartNumber – PartName – Description
	09900-20101 Vernier Caliper Used to conveniently measure various dimensions.		09900-21109 Torque wrench Measure torque of tightening.
	09900-20201 Micrometer(0~25mm) Used for precise measurement (00~25mm measure ranges).		09900-21304 V-blockV With using magnetic stand.
	09900-20202 Micrometer(25~50mm) Used for precise measurement (25~50mm measure ranges).		09900-22301 Plastigauge Measure clearance of crankshaft thrust.
	09900-20203 Micrometer(50~75mm) Used for precise measurement (50~75mm measure ranges).		09900-22401 Small bore gauge Measure inside diameter of conrod small-end.
	09900-20508 Cylinder gauge set Measure inside diameter of cylinder.		09900-25002 Pocket tester Measure voltage, electric current, resistance
	09900-20605 Dial calipers Measure width of conrod big-end.		09900-26006 Engine tachometer Measure rotational frequency of engine.
	09900-20606 Dial gauge Measure oscillation of wheel with using magnetic stand.		09900-28107 Electro tester Inspect ignition coil.
	09900-20701 Magnetic stand With using dial gauge.		09900-28500 Battery charger Used to charge the discharged battery.

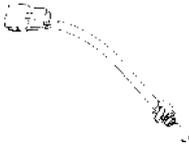
	09900-20806 Thickness gauge		09910-20115 Conrodholder
	Measure clearance of piston ring.		Used to lock the crankshaft.

8-16 SERVICING INFORMATION

Special tools	PartNumber – PartName – Description	Special tools	PartNumber – PartName – Description
	09910-32812 Crankshaft installer		09913-80112 Bearing installer
	Used to install the crankshaft in the crankcase. Used to install the crankshaft in the crankcase.		Used to drive bearing in.
	09910-34510 Piston pin puller		09915-63310 Compression gauge adapter
	Use to remove the piston pin.		Used with compression gauge.
	09915-54510 Fuel pump pressure gauge		09915-64510 Compression gauge
	Measure fuel pressure of fuel pump.		Measure cylinder compression.
	09913-50121 Oil seal remover		09915-74510 Oil pressure gauge
	Used to remove the oil seal.		Measure oil pressure of 4-stroke engine.
	09913-70122 Bearing installer		09915-74531 Oil pressure gauge hose attachment
	Used to drive bearing in.		Used with oil pressure gauge.
	09913-75520 Bearing installer		09916-14510 Valve spring compressor
	Used to drive bearing in.		Used to remove and remounting valve stem.
	09913-75820 Bearing installer		09916H35C00 Valve spring compressor attachment
	Used to drive bearing in.		Used with valve spring compressor.
	09913-75830 Bearing installer		09920-13120 Crankcase separator
	Used to install rear axle shaft oil seal.		Separate to crankcase.

	09913-76010 Bearing installer		09920-53710 Clutch sleeve hub holder
	Used to drive crankshaft bearing in.		Used to install or remove clutch sleeve hub nut.

Special tools	PartNumber – PartName – Description	Special tools	PartNumber – PartName – Description
	09921-20200 Bearing remover(10mm) Used to remove oil seal or bearing.		09930-44510 Rotor holder Widely used to lock rotary parts such as a flywheel magnet.
	09921-20210 Bearing remover(12mm) Used to remove oil seal or bearing.		09940-10122 Clamp wrench A hook wrench to adjust the steering head of motorcycle.
	09923-73210 Bearing remover(17mm) Used to remove bearing with the rotor remove sliding shaft.		09940-34520 T-handle T Remove and remounting front fork oil cylinder.
	09923-74510 Bearing remover(20~35mm) Used to remove bearing with the rotor remove sliding shaft.		09940-34561 Front fork assembling tool attachment "D" Used with T-handle.
	09924-84521 Bearing installer Used to drive small bearing in.		09940-50113 Front fork oil seal installer Install front fork oil seal.
	09930-10121 Spark plug socket wrench set Used to remove or remounting spark plug.		09941-34513 Steering race installer Used to install steering outerrace.
	09930-30102 Rotor remove sliding shaft Used to with bearing remover or rotor remover.		09941-50111 Wheel bearing remover Used to remove wheel bearing.
	09930-30164 Rotor remover Attached to the top of sliding shaft when removing rotor.		09943-74111 Front fork oil level gauge Used to drain the fork oil to the specified level.

	09930-40113 Rotor holder		09900-27000 Mode select switch
	Widely used to lock rotary parts such as a flywheel magneto.		Inspect EI system sensor. EI

TIGHTENING TORQUE

□ ENGINE

ITEM	N·m	Kg·m
Spark plug	23	2. 3
Crankcase bolt	23	2. 3
Camshaft housing bolt	10	1. 0
Camshaft comp bolt	11	1. 1
Gear shift pawllifterbolt	19	1. 9
Cylinder head bolt	23	2. 3
Cylinder head cover bolt	12 ~ 16	1. 2~ 1. 6
Cylinder nut	10	1. 0
Starter clutch bolt	10	1. 0
Engine sprocket nut	90	9. 0
Tensioner adjuster bolt	7	0. 7
Water pump drive gear nut	49	4. 9
Magneto rotor nut	55	5. 5
Engine oil drain plug	28	2. 8
Engine oil check plug	23	2. 3
Primary drive gear nut	50	5. 0
Clutch sleeve hub nut	40	4. 0
Exhaust joint bolt	18 ~ 28	1. 8 ~ 2. 8
Muffler connector clamp bolt	18 ~ 28	1. 8 ~ 2. 8

□ CHASSIS

ITEM	N·m	Kg·m
Rear shock absorber fitting bolt or nut	29	2. 9
Rear sprocket nut	50	5. 0
Rear axle nut	78	7. 8
Swing arm pivot nut	72	7. 2
Swingarmpivot shaft nut	13	1. 3
Steering stem nut	45	4. 5
Steering stem head nut	65	6. 5
Front brake disc bolt	23	2. 3
Front brake master cylinder mounting bolt	10	1. 0
Front brake caliper air bleeder valve	7.5	0. 75
Front brake caliper mounting bolt	39	3. 9
Front brake hose union bolt	23	2. 3
Front axle	65	6. 5
Front axle pinch bolt	23	2. 3
Front fork damper rod bolt	20	2. 0
Front fork cap clamp bolt	23	2. 3
Front fork lower clamp bolt	33	3. 3
Front fork upper bolt	23	2. 3
Front footrest bolt	26	2. 6
Handlebar clamp bolt	16	1. 6
Handlebar holder lower nut	40 ~ 60	4. 0 ~ 6. 0
Wheel spoke nipple	4.5	0. 45

SERVICE DATA□ **VALVE + GUIDE**

Unit : mm

ITEM	STANDARD		LIMIT
Valve diam.	IN.	30	----
	EX.	26	----
Valve clearance (When cold)	IN.	0. 08—0. 13	----
	EX.	0. 13—0. 18	----
Valve guide to valve stem clearance	IN.	0. 010—0. 037	----
	EX.	0. 030—0. 057	----
Valve stem deflection	IN. & EX.	----	0. 05
Valve guide I.D.	IN. & EX.	5. 500—5. 512	----
Valve stem O.D.	IN.	5. 475—5. 490	----
	EX.	5. 455—5. 470	----
Valve stem runout	IN. & EX.	----	0. 35
Valve head thickness	IN. & EX.	----	0. 5
Valve seat width	0. 9—1. 1		----
Valve seat angle	IN. & EX.	45°	
Valve head radial runout	IN. & EX.	----	0. 03
Valve spring free length	IN.	----	35. 1
	EX.	----	39. 9
Valve spring tension	IN.	7. 1—9. 2kg	----
	EX.	17. 3—21. 3kg	----

□ **CAMSHAFT + CYLINDER HEAD**

Unit :mm

ITEM	STANDARD		LIMIT
Cam height	IN.	33. 120—33. 160	32. 82 0
	EX.	33. 120—33. 160	32. 82 0
Camshaft journal holder I.D.	IN. & EX.	22. 012—22. 025	----
Cylinder head distortion	----		0. 05
Cylinder head cover distortion	----		0. 05
Cam chain pin (Arrow“3”)	16th pin		----

□ **CYLINDER + PISTON + PISTON RING**

Unit:mm

ITEM	STANDARD		LIMIT
Compression pressure	1000—1500kpa (10.0—15.0kg/cm ²)		800 kpa (8kg/cm ²)
Piston to cylinder clearance	0.020—0.030		0.120
Cylinder bore	57.000—57.015		57.110
Piston diam.	56.975—56.990 (Measure at 12mm from the skirt end)		56.880
Cylinder or cylinder head distortion	----		0.05
Piston ring free end gap	1st	7.0	5.6
	2nd	8.5	6.8
Piston ring end gap (Assembly condition)	1st	0.10—0.25	0.50
	2nd	0.10—0.25	0.50
Piston ring to groove clearance	1st	----	0.180
	2nd	----	0.150
Piston ring to groove width	1st	1.21—1.23	----
	2nd	1.21—1.23	----
	Oil	2.51—2.53	----
Piston ring thickness	1st	1.175—1.190	----
	2nd	1.170—1.190	----
Piston pin hole I.D.	14.002—14.008		14.030
Piston pin O.D.	13.994—14.002		13.982

□ **CONROD + CRANKSHAFT**

Unit:mm

ITEM	STANDARD		LIMIT
Conrod small end I.D.	14.004—14.012		14.040
Conrod deflection	----		3.0
Conrod big end side clearance	0.10—0.45		1.0
Conrod big end width	15.95—16.00		----
Crank web to web width	53.0±0.1		----
Crankshaft runout	----		0.08

□ **OIL PUMP**

Unit:mm

ITEM	STANDARD	NOTE
Oil pressure	1.0±0.2 kg/cm ² (at 60 °C, 3,000 rpm)	----
Oil pump reduction ratio	2.000 (30/15)	----

8-22 SERVICING INFORMATION

□ CLUTCH

Unit:mm

ITEM	STANDARD	LIMIT
Clutch cable play	10—15	----
Drive plate thickness	2. 9—3. 1	2. 6
Drive plate claw width	11. 8—12. 0	11. 0
Driven plate distortion	----	0. 10
Clutch spring free length	----	29. 5

□ TRANSMISSION + DRIVE CHAIN

Unit:mm

ITEM	STANDARD		LIMIT
Primary reduction ratio	3. 500		----
Final stage reduction ratio	4. 000		----
Gear ratio	1st	3. 000	----
	2nd	1. 857	----
	3rd	1. 368	----
	4th	1. 143	----
	5th	0. 957	----
	6th	0. 840	----
Shift fork to groove clearance	0. 10—0. 30		0. 50
Shift fork groove width	NO.1 & NO.2	5. 0—5. 1	----
	NO.3	5. 3—5. 6	----
Shift fork thickness	NO.1 & NO.2	4. 8—4. 9	----
	NO.3	5. 3—5. 6	----
Drive chain	Type	428H /428UO	----
	Links	136	----
	20-pitch length 20	----	259. 0
Drive chain slack	5—15		----

EI SYSTEM PARTS

ITEM	N - m	kgf - m
Coolant temperature sensor (CLT sensor)	5 ~ 8	0. 5 ~ 0. 8
Fuel injector mounting bolt	5 ~ 8	0. 5 ~ 0. 8
MAP & IATsensor (MAP & IAT)	5 ~ 8	0. 5 ~ 0. 8

SERVICE DATA

□ EI SENSORS

ITEM	SPECIFICATION	
MAP & IAT sensor input voltage	4.9 ~ 5.1V	
MAP & IAT sensor output voltage	Approx. 1.5V at. idle speed 1.5V	
TP sensor input voltage	4.8 ~ 5.2V	
TPsensor output voltage	Closed	Approx. 0.6 ~ 1.0V
	Opened	Approx.4.0 ~ 4.6V
MAP & IAT sensor resistance	0.075~ 14.541 KΩ [When Intake air temperature is -20°C ~ 120°C (-40°F ~ 248°F)]	
MAP & IAT sensor resistance (each temperature)	-20 °C (-40°F)	Approx 14.541kΩ
	-0 °C (32°F)	Approx 5.627kΩ
	20 °C (68 °F)	Approx 2.429kΩ
	40 °C (104 °F)	Approx 1.155kΩ
	60 °C (140 °F)	Approx 0.594kΩ
	80 °C (176 °F)	Approx 0.3277kΩ
	120 °C (248°F)	Approx 0.1168kΩ
	140 °C (284°F)	Approx 0.0749kΩ
Oxygen sensor heater voltage	Battery voltage	
CLT sensor resistance	0.317 ~ 452.252 KΩ [When Water temperature is-40°C ~ 120°C (-40°F ~ 248°F)][-40°C ~ 120°C(-40°F ~ 248°F)	
CLT sensor resistance [To ECU] (each temperature)	-40°C (-40°F)	Approx 48.140 KΩ
	0°C (32°F)	Approx 5.790 KΩ
	20°C (68°F)	Approx 2.450 KΩ
	40°C (104°F)	Approx 1.148 KΩ
	60°C (140°F)	Approx 0.586 KΩ
	80°C (176°F)	Approx 0.322 KΩ
	120°C (248°F)	Approx 0.1163 KΩ

8-24 SERVICING INFORMATION

□ THROTTLE BODY

ITEM	SPECIFICATION	NOTE
I.D. No.	1114400031000	
Bore size	∅30	
Idle rpm	1,500 ~ 1,700 rpm	
Throttle cable play	0.5 ~ 1.0 mm (0.02 ~ 0.04 in)	

□ FUEL INJECTOR + FUEL PUMP

ITEM	SPECIFICATION	NOTE
Fuel injector resistance	11.4 ~ 12.6 Ω at 20°C (68°F)	
Fuel injector voltage	Battery voltage	
Fuel pressure of fuel pump	Approx. 3.46 ~ 3.67 kgf/cm ² (340 ~ 360 kPa, 49.31 ~ 52.21 psi)	

□ ELECTRICAL

Unit : mm (in)

ITEM	SPECIFICATION		NOTE
Ignition timing	BTDC 10° / 2,000 rpm and 28° / 6,000 rpm		
Spark plug	Type	CR8E	
	Gap	0.7 ~ 0.8 (0.028 ~ 0.032)	
	Hot type	CR7E	
	Standard type	CR8E	
	Cold type	CR9E	
Spark performance	More than 8 (0.32)8 (0.32)		
Ignition coil primary peak voltage	400 V and more 400 V		
Ignition coil resistance	Primary	0.52 ~ 0.64 Ω	1st ⊕ - ⊖
	Secondary	6.4 ~ 7.8 kΩ	2nd ⊕ - ⊖
Spark plug cap resistance	10 kΩ		
Ignition coil secondary/ Spark plug cap resistance	16.4 ~ 17.8 kΩ		spark plug cap - ⊖
Stator coil resistance	Pick-up coil	Approx. 95 ~ 125 Ω	G - L
	Charging coil	Approx. 0.3 ~ 0.6 Ω	Y - Y
Magneto no-load performance	Over 60 V / 5,000 rpm		
Battery standard charging voltage	13.5 ~ 15.0 V / 5,000 rpm		
Fuse	REC. REG/ IGN、	15A	
	ECU/ M. RELAY ECU	15A	
	Head light	15A	
	ABS PUMP	25A	
	ABS ECU	15A	
	ABS IGN	5A	

8-26 SERVICING INFORMATION

□ WATTAGE

Unit:W

ITEM	SPECIFICATION
Head lamp	LED 12V 34.2W/24.3W
Position lamp	LED 12V 2.9W
License lamp	LED 12V 0.1W
Brake/Tail lamp	LED 12V 0.4W/0.1W
Turn signal lamp	LED 12V 2.2WX4
Speedometer lamp	LED 12V 2W
Engine warning lamp	LED 12V 0.1W
Turn signal indicator lamp	LED 12V 0.1W
High beam indicator lamp	LED 12V 0.1W
Odometer/ Trip meter/ clock//	LCD TYPE
Fuel meter/ Coolant temp. meter/	LED 12V 0.1W
Neutral indicator lamp	LED 12V 0.1W

- ※ LED: Light Emitting Diode
LCD: Liquid Crystal Display



CAUTION

Donotuseexceptthespecifiedbulb(Wattage).

□ SUSPENSION

Unit:mm

ITEM	STANDARD	LIMIT
Front fork stroke	200	——
Front fork spring free length	560	——
Front fork oil type	ISO VIG46, JSK2001	——
Front fork oil level	————	——
Front fork oil capacity (each leg)	420 ml	——
Rear wheel travel	110	——
Swingarm pivot shaft runout	——	0.6
Rear shock absorber pre-load position	2 / 5 position	——
Rear shock absorber spring length	229	——

□ BRAKE+WHEEL+

Unit:mm

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20—30		——
Rear brake pedal height	50		——
Brake disc thickness	Front	4	3
Brake disc runout	Front	——	0.15
Master cylinder bore	Front	17.4~17.427 $\Phi 17.4$	——
	Rear	13.5~13.527 $\Phi 13.5$	
Master cylinder piston diam	Front	17.323~17.35 $\Phi 17.3$	——
	Rear	13.378~13.450 $\Phi 13.4$	
Brake caliper cylinder bore	Front	(25~25.043) ×2 $\Phi 25 \times 2 + \Phi 25 \times 2$	——
	Rear	(25~25.043) ×2	
Brake caliper piston diam	Front	(24.914~24.935) ×2 $\Phi 24.9 \times 2 + \Phi 24.9 \times 2$	——
	Rear	(24.914~24.935) ×2	
Brake fluid type	DOT4		——
Wheel rim runout	Axial	——	2.0
	Radial	——	2.0
Wheel axle runout	Front	——	0.25
	Rear	——	0.25
Wheel rim size	Front	110/70-17	——
	Rear	120/70-17	——

8-28 SERVICING INFORMATION

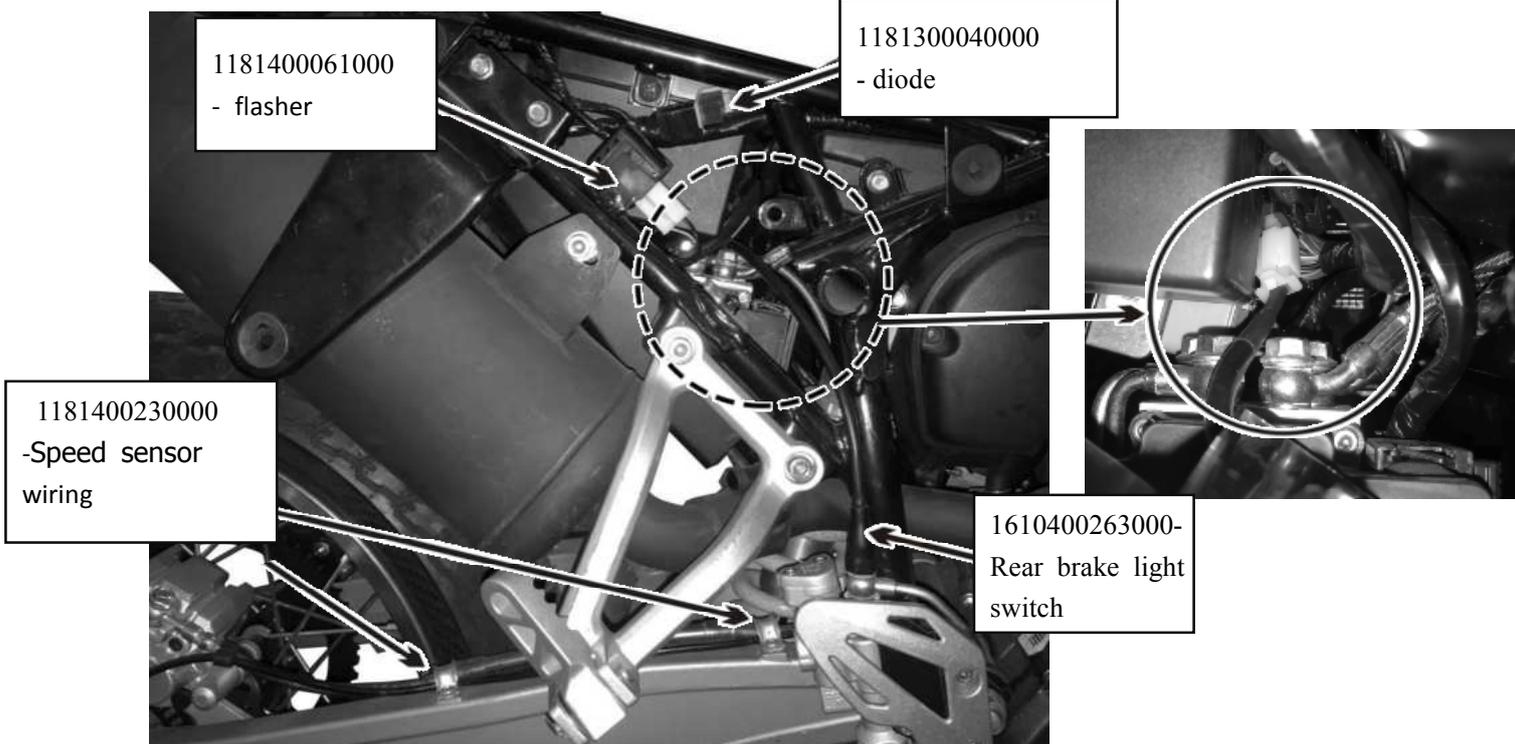
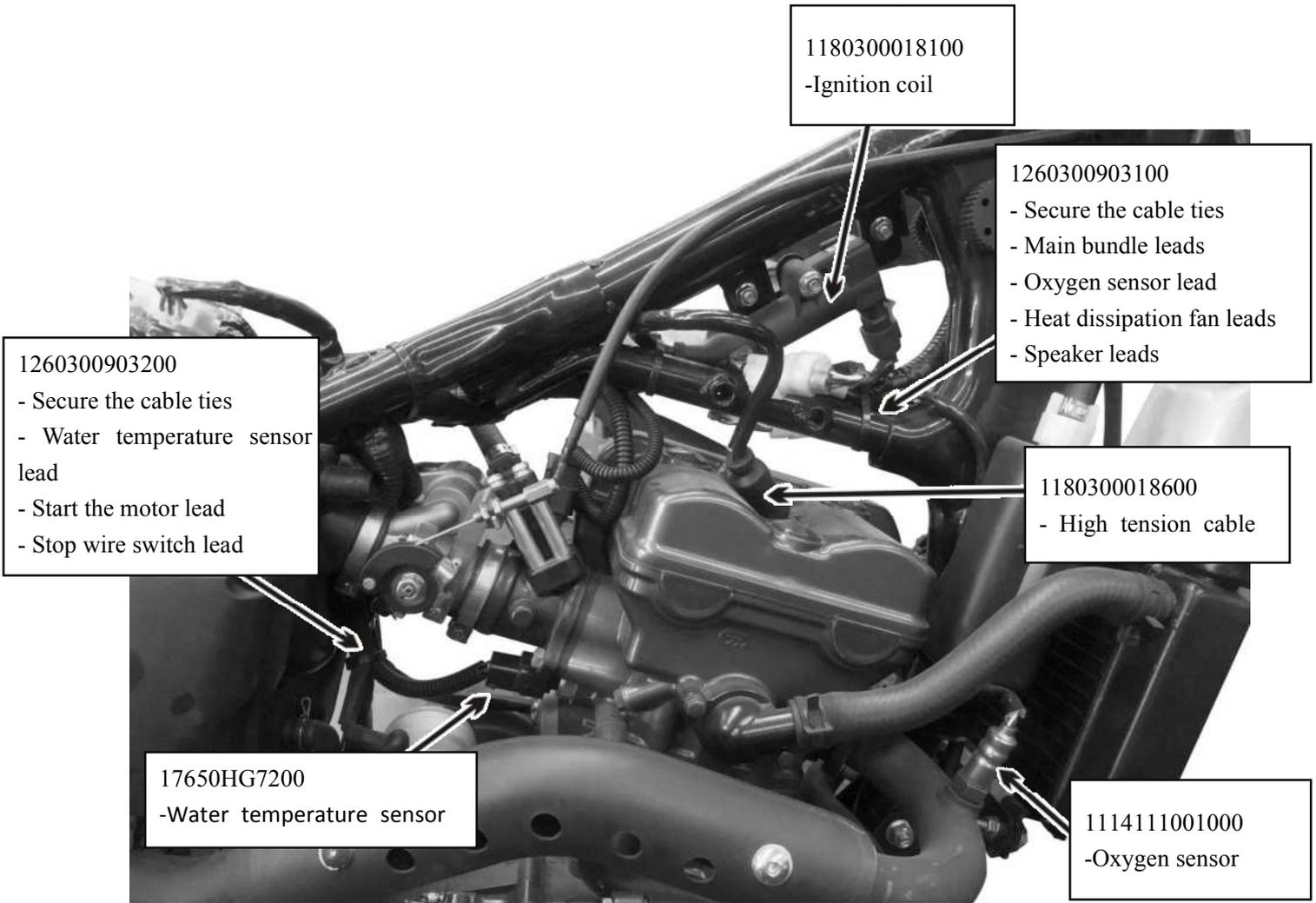
□ TIRE

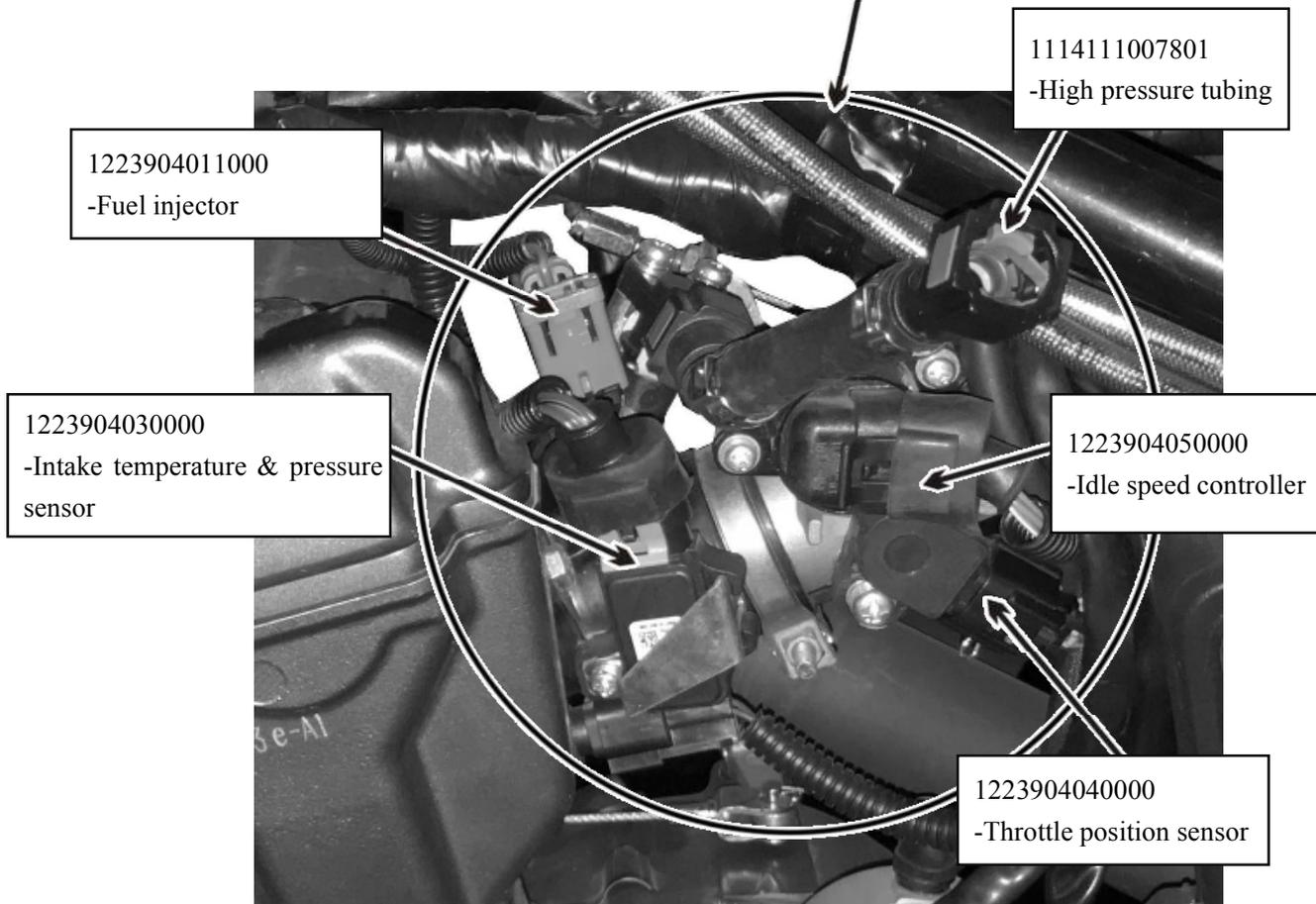
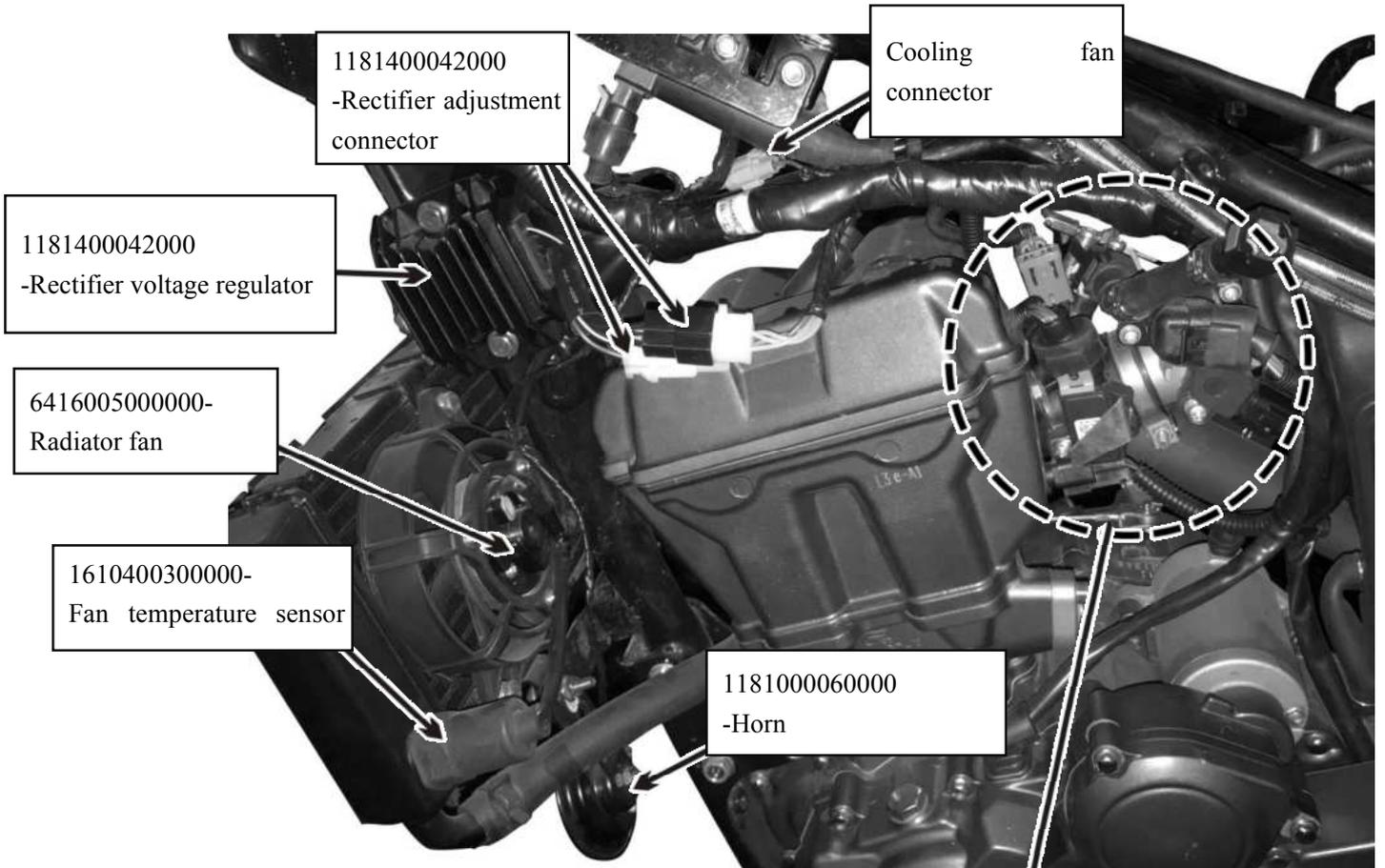
ITEM	STANDARD		LIMIT
Cold inflation tire pressure (Solo riding)	Front	225Kpa(33psi)	250Kpa(36psi)
	Rear	225Kpa(33psi)	280Kpa(41psi)
Cold inflation tire pressure (Dual riding)	Front	225Kpa(33psi)	225Kpa(36psi)
	Rear	225Kpa(33psi)	280Kpa(41psi)
Tire tread depth	Front	——	1.6
	Rear	——	1.6

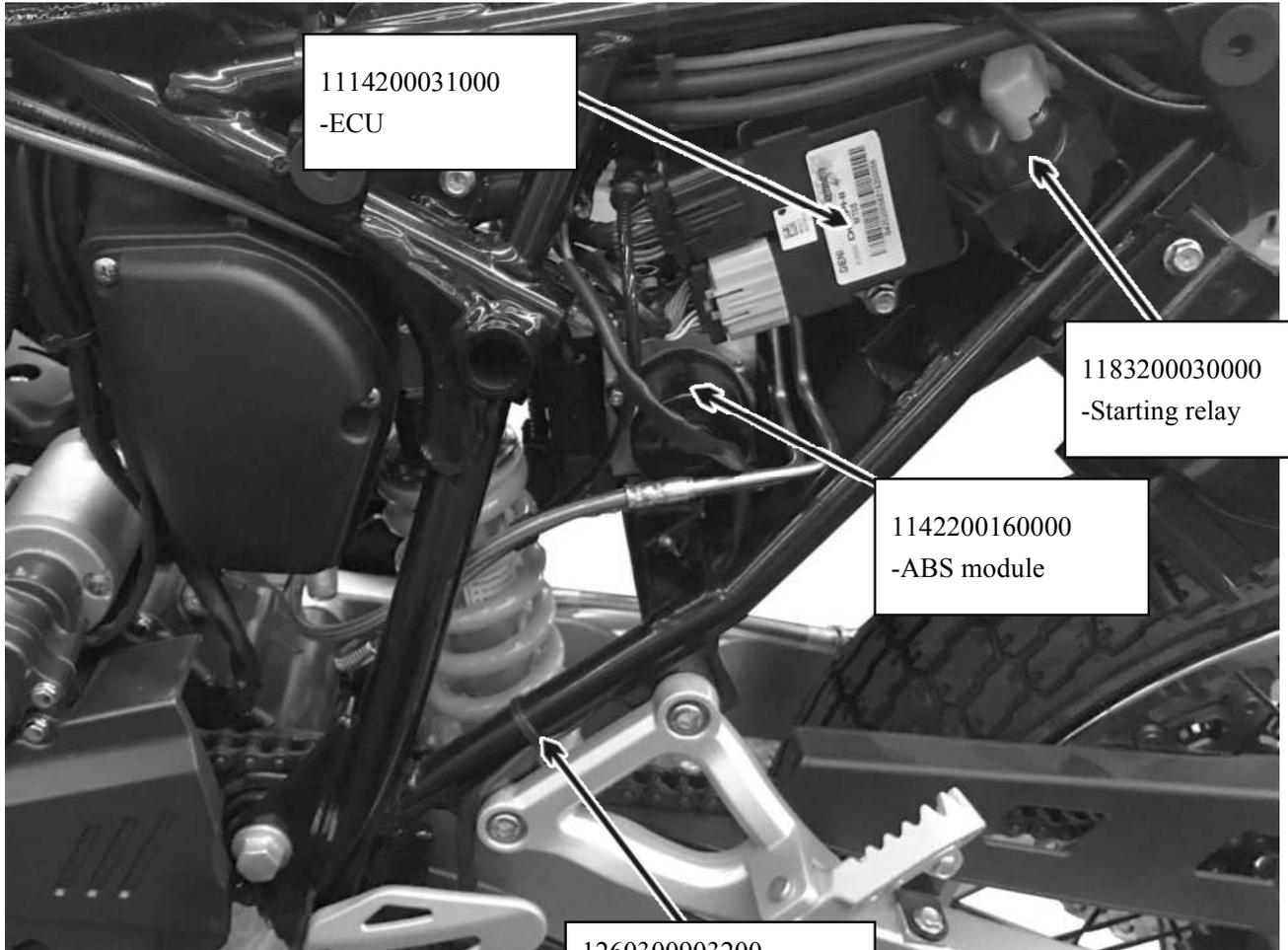
□ FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Gasoline used should be graded 92octane or higher. An unleaded gasoline is recommended.92		
Fuel tank capacity	Including reserve	10.5L	
	Reserve	——	
Engine oil type	SAE 10W40		
Engine oil capacity	Change	850 ml	
	First change	950ml	
	Overhaul	1,200 ml	

WIRING AND CABLE ROUTING







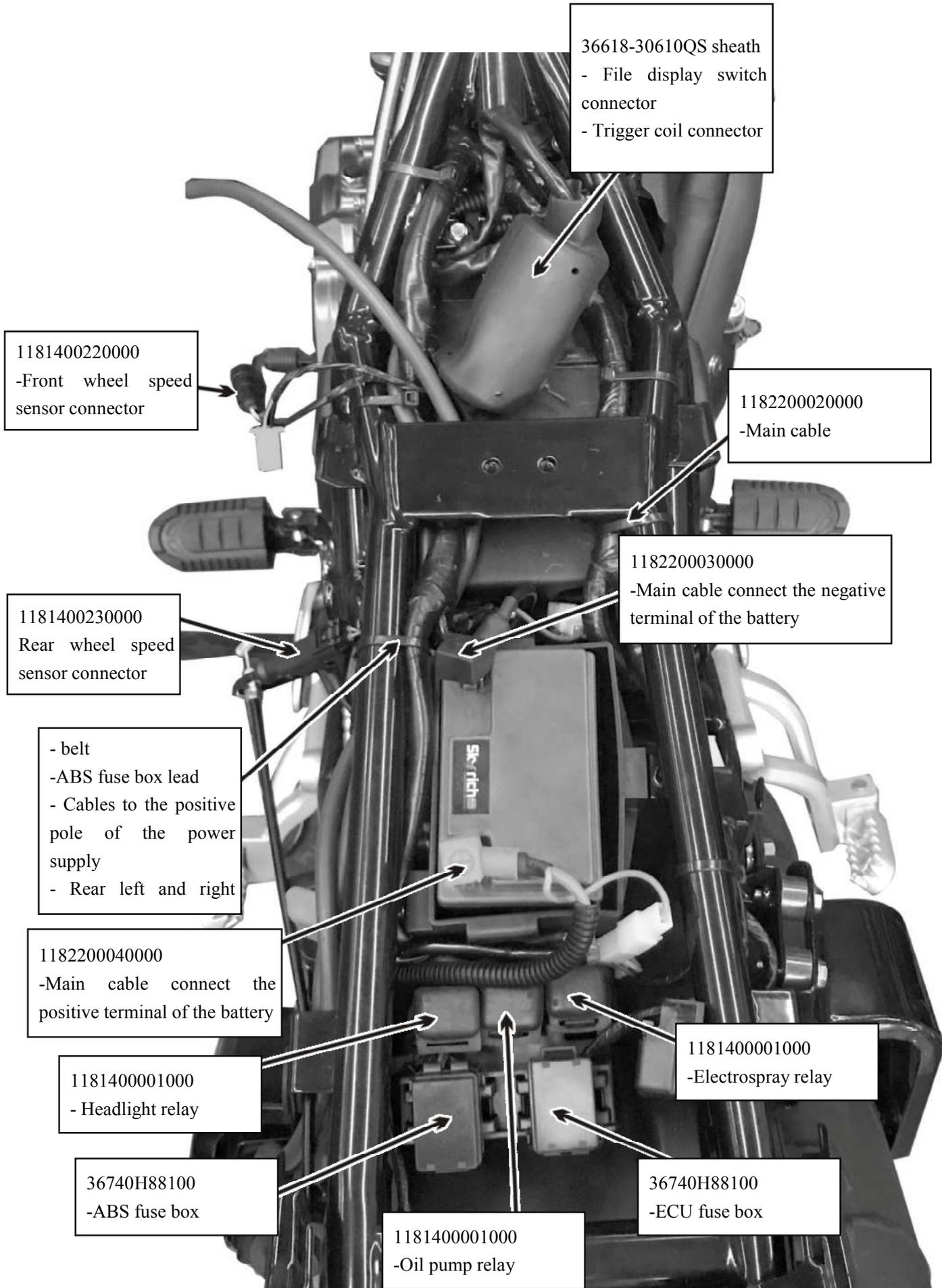
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-ECU

1183200030000
-Starting relay

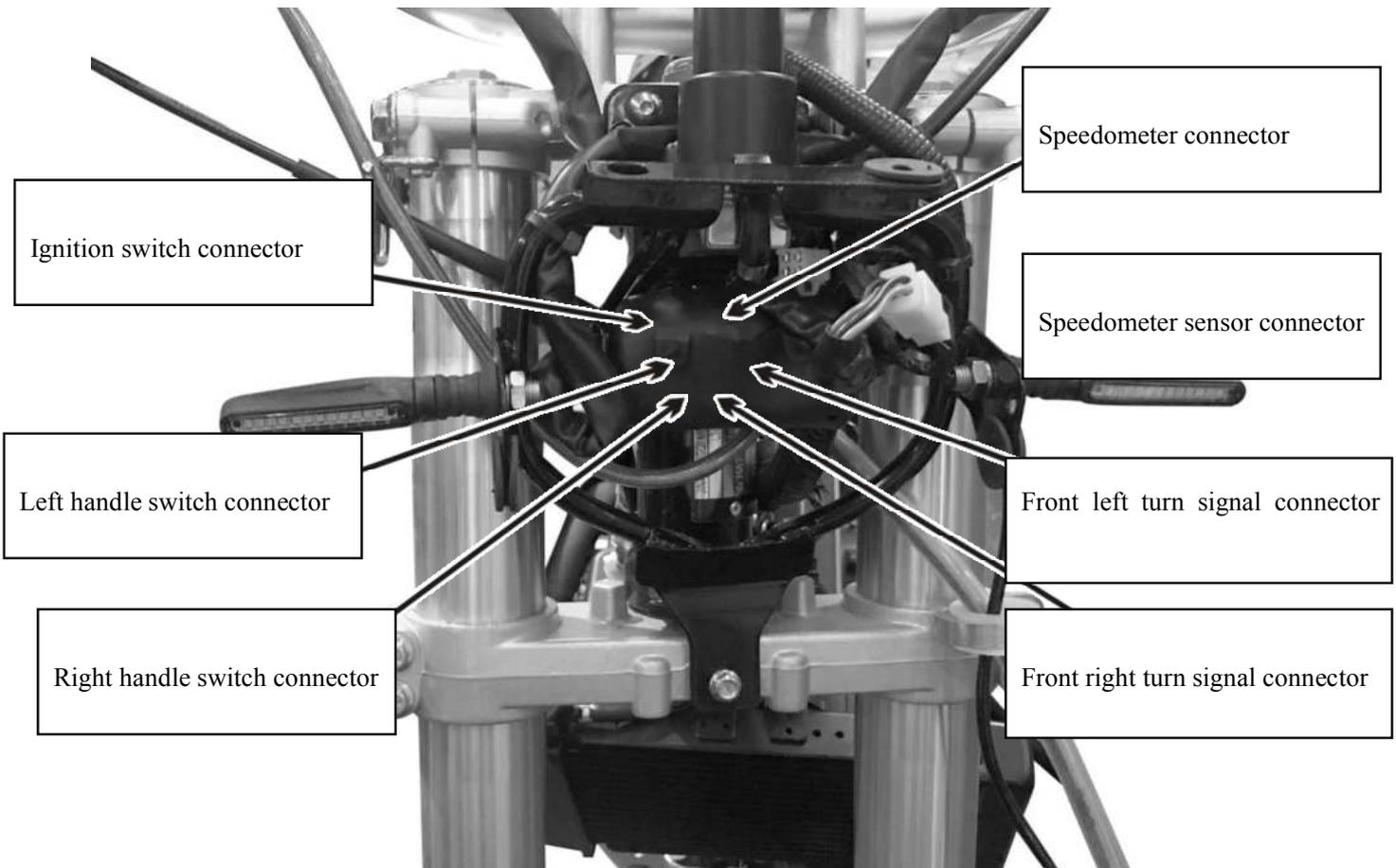
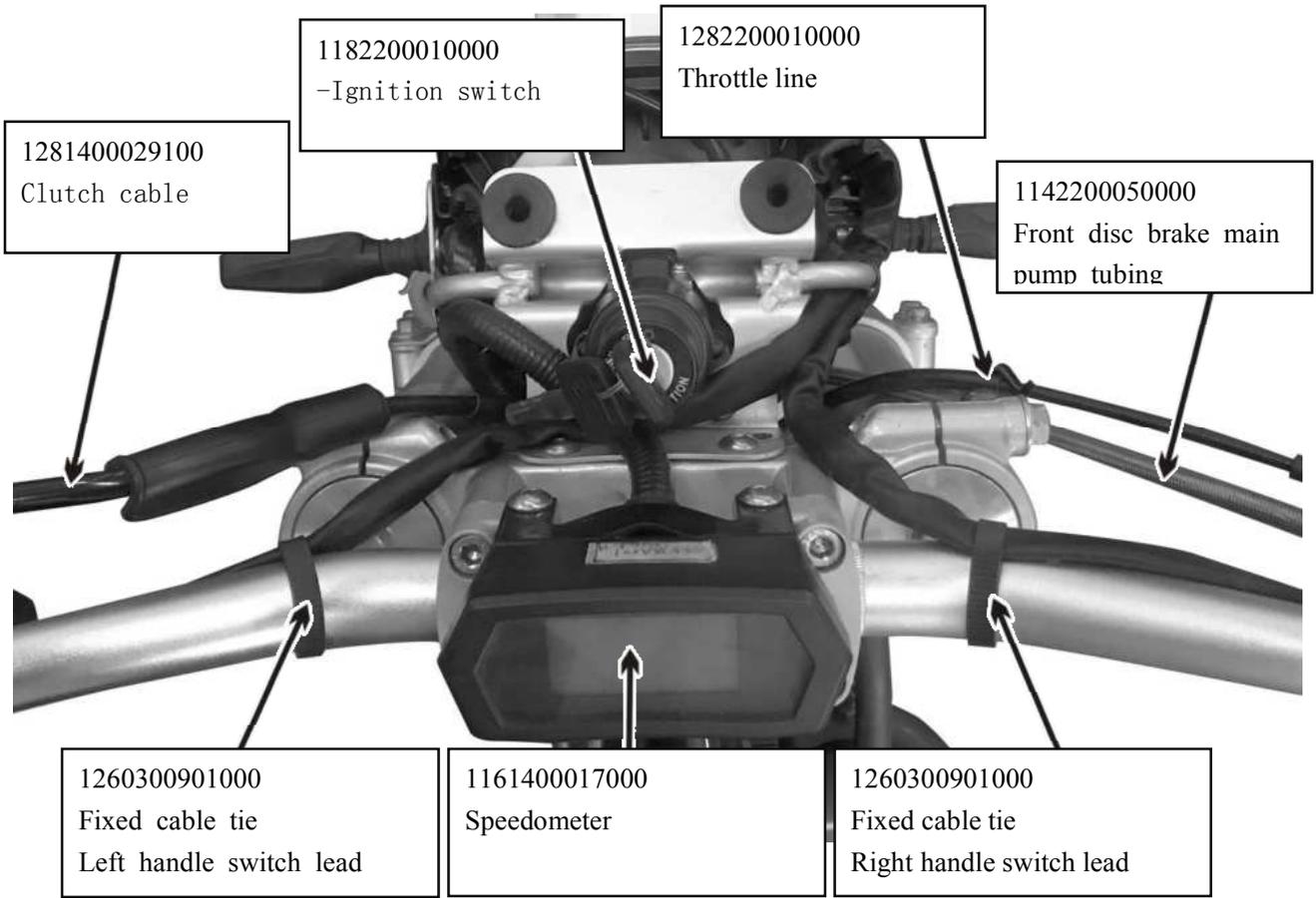
1142200160000
-ABS module

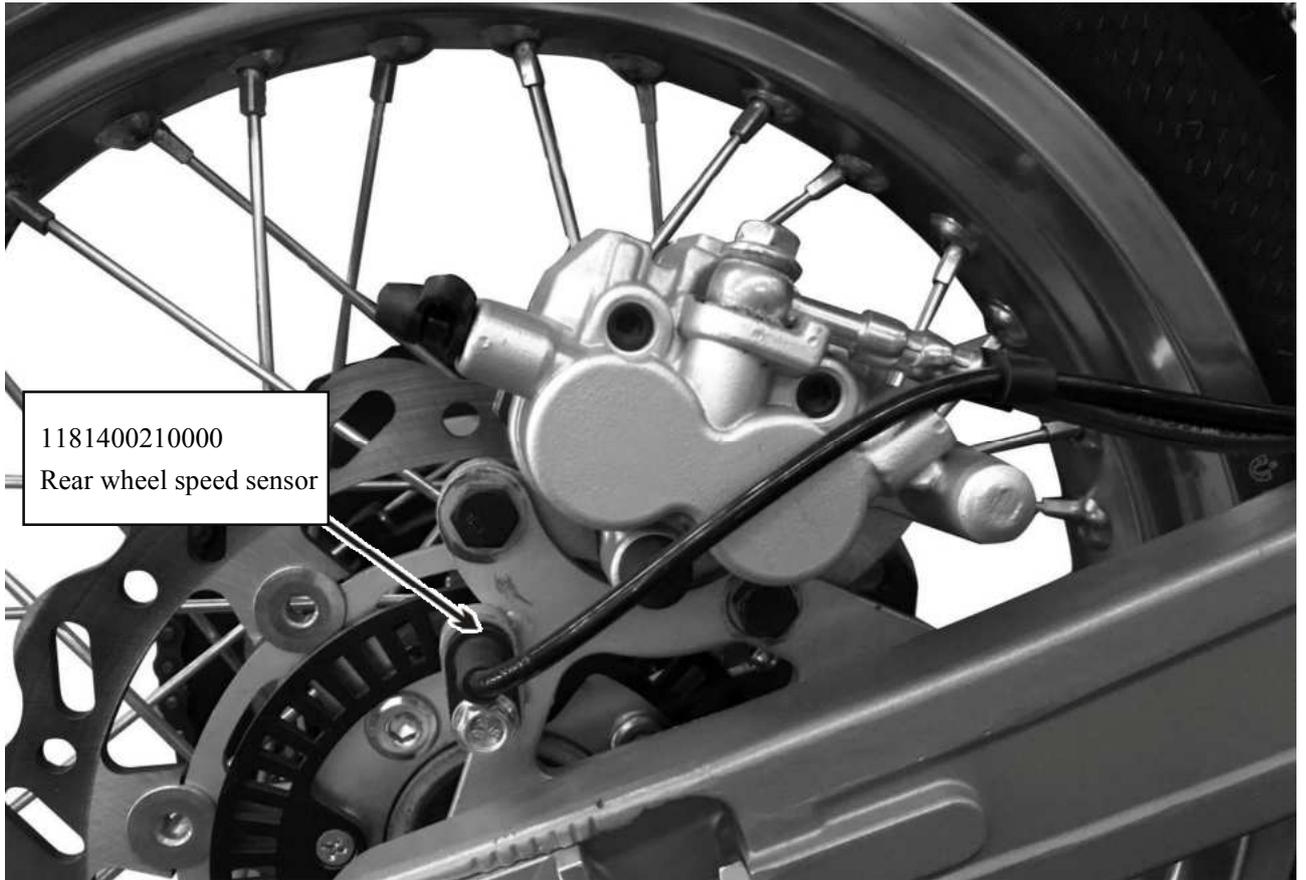
1260300903200
Fixed cable tie
Side support switch lead



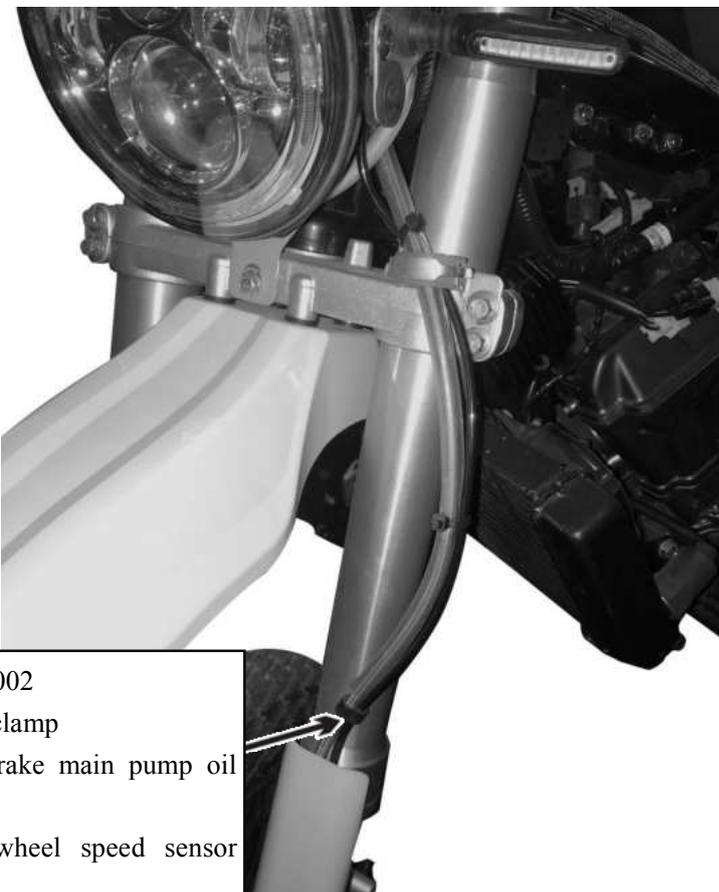


SERVICING INFORMATION 8-33

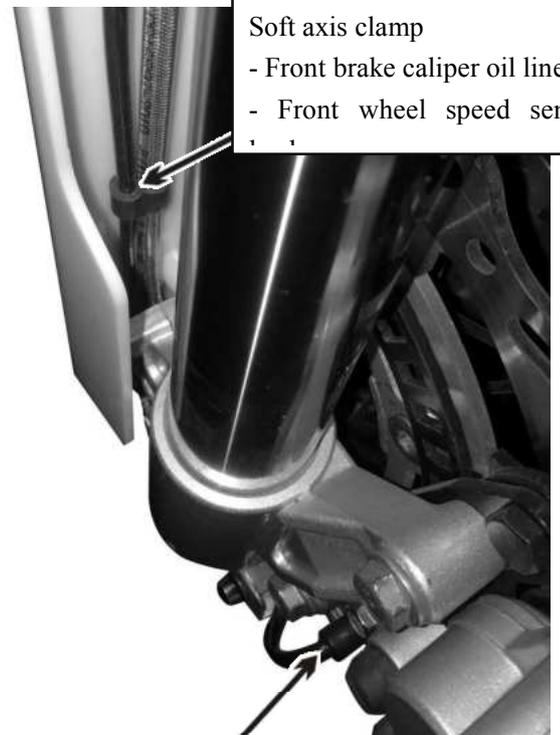




1181400210000
Rear wheel speed sensor



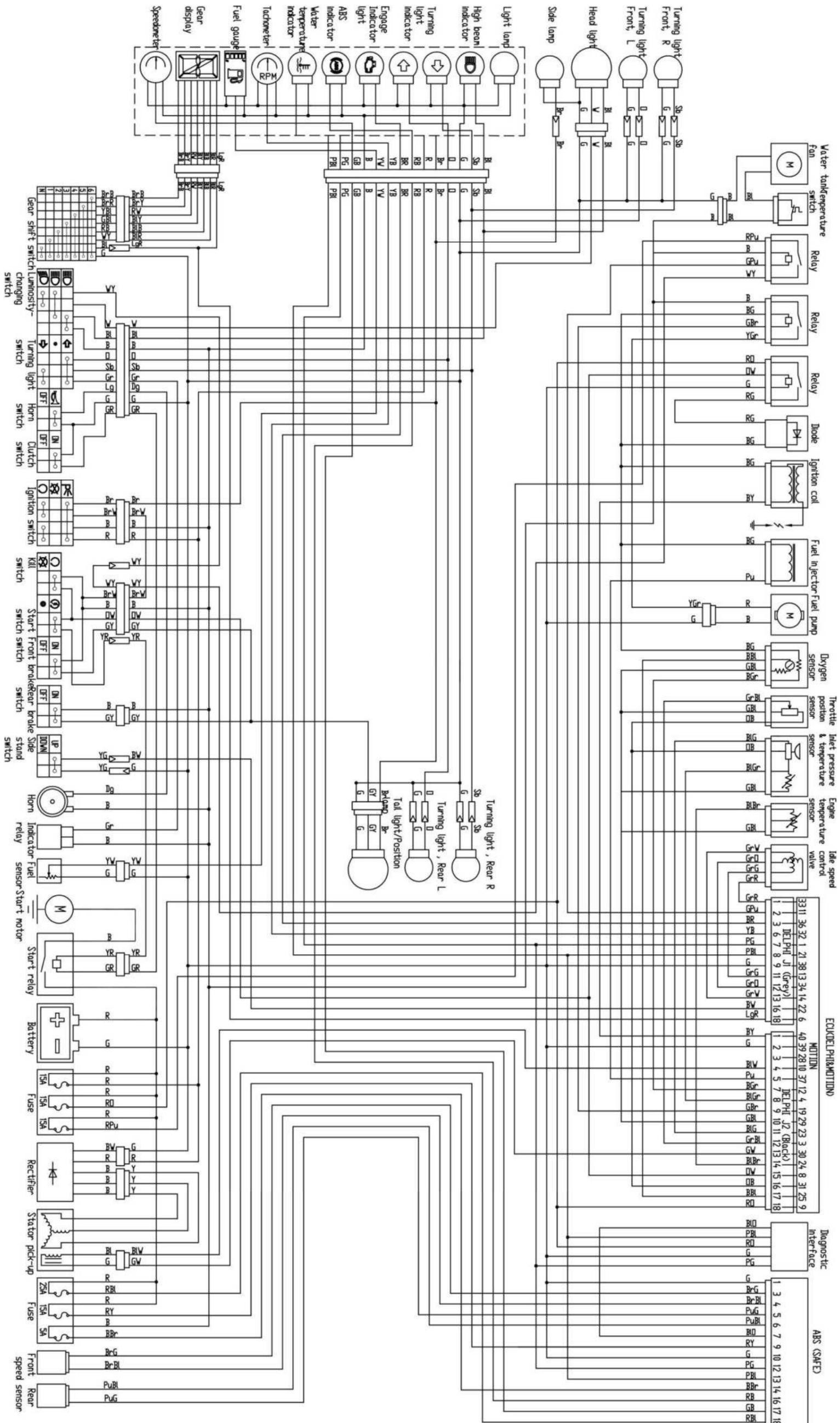
09408-00002
Soft axis clamp
- Front brake main pump oil line
- Front wheel speed sensor leads



09408-00002
Soft axis clamp
- Front brake caliper oil line
- Front wheel speed sensor

1181400110000
-Front wheel speed sensor

WIRING DIAGRAM



1nd Ed. Sep. 2022.