A FEW WORDS ABOUT SAFETY

SERVICE INFORMATION

The service and repair information contained in this manual is intended for use by qualified, professional technicians.

Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Hero MotoCorp, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Hero MotoCorp parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement part of inferior quality.

FOR YOUR CUSTOMER'S SAFETY

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

⚠ WARNING

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed. Follow the procedures and precautions in this manual and other service materials carefully.

FOR YOUR SAFETY

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., Hot parts- wear gloves). Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

⚠ WARNING

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.
Follow the procedures and precautions in this manual carefully.

IMPORTANT SAFETY PRECAUTION

Make sure you have a clear understanding of all basic shop safety practices and that you are wearing appropriate clothing and using safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin and make sure you have the tools, the replacement or repair parts and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids and springs or other stored- energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure that it is always securely supported. Use jack stands.

Make sure the engine is off before you begin any servicing procedures, unless the instruction tells you to do otherwise.

This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire of explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel- related parts.

MEMO

HOW TO USE THIS MANUAL

This shop manual describes the service procedures for **HUNK 160R PROGRAMMED FI.**

Follow the Maintenance Schedule **(Section 3)** recommendations to ensure that the vehicle is in peak operating condition.

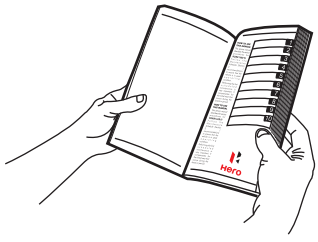
Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 and 3 apply to the whole vehicle. **Section 2** illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.

Section 4 through **20** describe parts of the vehicle, grouped according to location.

TO LOCATE WHAT YOU ARE LOOKING FOR

1. The text of this manual is divided into sections.
2. As the title of these sections is 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.



You will find important safety information in a variety of forms including:

- Safety Labels- on the vehicle
- Safety Messages- preceded by a safety alert symbol and one of three signal words, **DANGER, WARNING** or **CAUTION**.

  These signal words mean:

  ⚠ DANGER — You WILL be SERIOUSLY HURT if you don't follow instructions.

  ⚠ WARNING — You CAN be SERIOUSLY HURT if you don't follow instructions.

  ⚠ CAUTION — You CAN be HURT if you don't follow instructions.
- Instructions- how to service this vehicle correctly and safely.

As you read this manual, will find information that is preceded by a **NOTE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property or the environment.

ALL INFORMATION, ILLUSTRATIONS, PHOTOGRAPHS, DIRECTIONS, SPECIFICATIONS AND OTHER CONTENTS COVERED IN THIS WORKSHOP MANUAL ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF ITS PUBLISHING APPROVAL, AND THE ACCURACY OR CORRECTNESS OF THE SAME IS NOT UNDERTAKEN OR GUARANTEED. **Hero MotoCorp Limited** RESERVES THE RIGHT TO MAKE CHANGES IN ITS CONTENTS AT ANY TIME WITHOUT NOTICE AND/OR INCURRING ANY OBLIGATION, WHATSOEVER. NO ONE IS ALLOWED TO REPRODUCE ANY PART OF THIS PUBLICATION WITHOUT OBTAINING PRIOR WRITTEN PERMISSION FROM **Hero MotoCorp Limited**.

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Hero

SYMBOLS

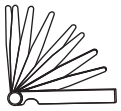
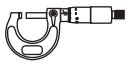
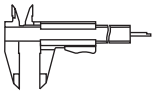
SYMBOLS

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

SYMBOLS	DESCRIPTION
	Replace the part(s) with new one (s) before assembly.
	Apply oil. Use engine oil unless otherwise specified.
	Use Molybdenum oil solution (Mixture of the engine oil and molybdenum grease in a ratio of 1:1).
	Apply grease
	Apply silicone grease.
	Apply moly paste.
	Apply sealant
	Use fork oil.
	Apply a locking agent
	Apply or use brake fluid.
	Measure in voltage range.
	Measure in resistance range.
	Measure in current range.
	Check for continuity.
	Use special tool.
	Torque control required. Data beside it indicates specified torque.

SYMBOLS

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

SYMBOLS	DESCRIPTION
	Feeler gauge
	Micrometer
	Cylinder bore gauge
	Dial gauge
	Vernier caliper

MEMO

General Service Precautions	1-1	General Torque Values	1-18
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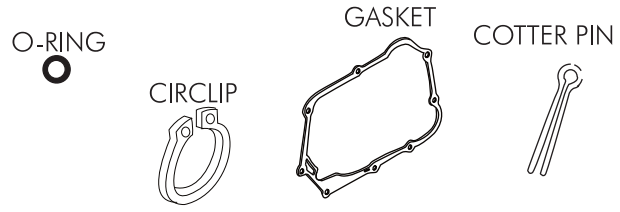
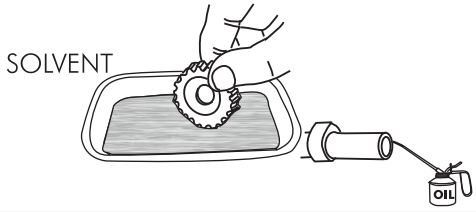
Engine Torque Values	1-14	Cable/Wiring Harness/Tubes/Hoses Routing	1-32
Frame Torque Values	1-15		

GENERAL SERVICE PRECAUTIONS

Always replace gaskets, O-rings, circlips and cotter pins with new ones.

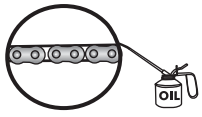


When engine and final drive components are disassembled and inspected, coat the mating surface with a lubricant to prevent corrosion.

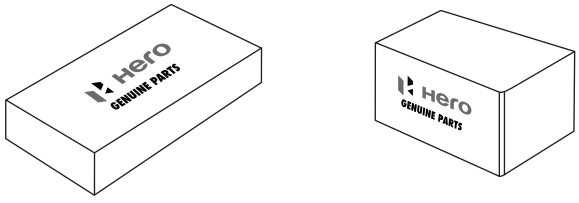


When tightening nuts and bolts, start first with the larger or centre ones. Tighten these to the specified torque using a criss- cross pattern.

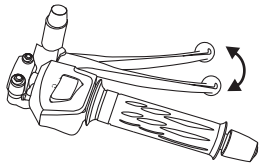
After assembling components, use proper assembly lubricants.



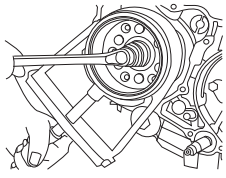
Use only genuine Hero MotoCorp parts and recommended lubricants.



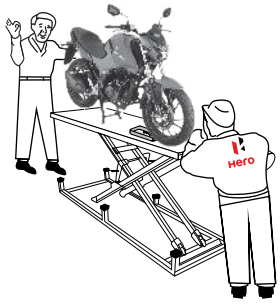
After assembling, check every part for proper installation, movement and operation.



Use specified special and common tools only.



Always ensure mutual safety when working with a partner.



GENERAL SAFETY

CARBON MONOXIDE

If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.

⚠ WARNING

The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.

Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

GASOLINE

⚠ WARNING

Work in a well ventilated area. Keep cigarettes, flames or sparks away from the area or where gasoline is stored.

⚠ WARNING

Gasoline is extremely flammable and is explosive under certain conditions.

KEEP OUT OF REACH OF CHILDREN.

HOT COMPONENTS

⚠ WARNING

- Engine and exhaust system parts become very hot and remain hot for some time after the engine is run.
- Wear insulated gloves or wait the engine and exhaust system have cooled before handling these parts.

BATTERY

⚠ WARNING

The battery gives of explosive gases: keep sparks, flame and cigarettes away. Provide adequate ventilation for charging.

ELECTRICAL WIRES

⚠ WARNING

Route all electrical wire/harness and cables. Keep them away from sharp edges and area where they might be pinched between moving parts.

USED ENGINE/TRANSMISSION OIL

⚠ WARNING

- Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods.
- Although this is unlikely unless you handle used oil on daily bases, it is still advisable to thoroughly wash hands with soap and water as soon as possible after handling used oil.

KEEP OUT OF REACH OF CHILDREN

BRAKE DUST

Never use an air hose or dry brush to clean brake assemblies.

⚠ WARNING

Inhaled fibers have been found to cause respiratory disease and cancer.

BRAKE FLUID

CAUTION

Spilling fluid on painted, plastic or rubber parts will damage them. Place a clean shop towel over these parts whenever the system is serviced.

KEEP OUT OF REACH OF CHILDREN

BATTERY HYDROGEN GAS & ELECTROLYTE

⚠ WARNING

- Battery gives off explosive gases ; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.
- Battery contains sulphuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and face shield.
  - If electrolyte gets on your skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician.
- If swallowed, drink large quantity of water or milk of magnesia or vegetable oil and call a physician.

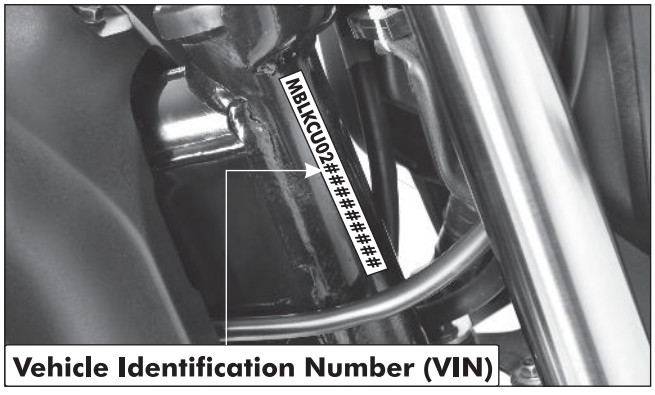
KEEP OUT OF REACH OF CHILDREN.

SERVICE RULES

1. Use genuine Hero MotoCorp recommended parts, lubricants and sealants.
   Parts that do not meet Hero MotoCorp's design specifications may damage the vehicle.
2. Use the special tools designed for this product.
3. Install new gaskets, O-rings, Cotter pins, Lock plates etc. when reassembling.
4. When tightening a series bolts or nuts, begin with the larger diameter of inner bolts first, and tighten to specified torque diagonally, in incremental steps unless a particular sequence is specified.
5. Clean parts in cleaning solvent on disassembly. Lubricate any sliding surfaces before reassembly.
6. After assembly, check all parts for proper installation and operation.
7. Route all electrical wires, Cable/Wiring Harness/Tubes/Hoses as shown from (page 1-32 through 1-66).

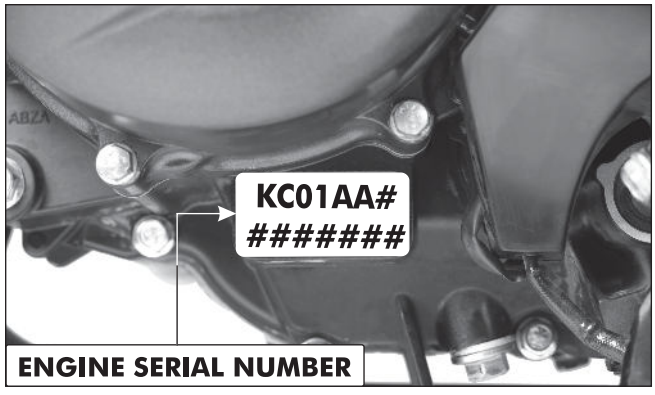
MODEL IDENTIFICATION - HUNK 160R PROGRAMMED FI

FRONT



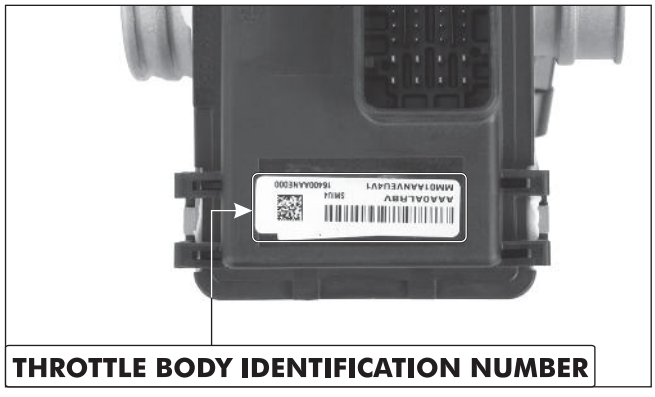
The VIN is stamped on the right side of the steering head.

FRONT



The engine serial number is stamped on the lower left side of the crankcase.

FRONT



SPECIFICATIONS

GENERAL

ITEM				SPECIFICATIONS
Dimensions	Overall length			2029 mm
	Overall width			793 mm
	Overall height			1052 mm
	Wheelbase			1327 mm
	Saddle height			795 mm
	Kerb weight			138.5 kg (Disc-Drum)/139.5 kg (Disc-Disc)
	Ground clearance			165 mm
Frame	Frame type			Tubular, Diamond type
	Front suspension			Telescopic Hydraulic
	Front cushion stroke			130 mm
	Rear suspension			Monoshock
	Rear cushion stroke			39 mm
	Front tyre size			100/80 17 52 P (Tubeless tyre)
	Rear tyre size			130/70 R17 62 P (Radial tubeless tyre)
	Cold tyre pressure	Rider only	Front	1.75 kgf/cm^2 (25 psi)
			Rear	1.96 kgf/cm^2 (28 psi)
		Rider & Pillion	Front	1.75 kgf/cm^2 (25 psi)
			Rear	2.10 kgf/cm^2 (30 psi)
	Front brake	Disc type		Dia. 276 mm
	Rear brake	Disc type		Dia. 220 mm
		Drum type		Dia. 130 mm
	Fuel tank capacity			12 litres (Minimum fuel to be maintained above one segment blinking of fuel level indicator)
	Caster angle			25.5°
	Trail length			98 mm
	Front fork oil at disassembly			305 cc
Engine	Type			2V Air cooled
	Cylinder arrangement			15° inclined fully vertical
	Maximum power			11.2 kW @ 8500±500 rpm
	Maximum torque			14 N-m @ 6500±500 rpm
	Bore and stroke			57.3x63.3 mm
	Displacement			163.23 cc
	Compression ratio			9.8:1
	Valve train			2 Valve
	Engine oil capacity			1.3 litres at disassembly and 1.09 litres at oil draining
	Lubrication system			Forced pressure and wet sump
	Oil pump type			Trochoid
	Oil filtration			Centrifugal type
	Air filtration			Viscous paper type
	Cylinder compression pressure			12.0±2.0 kgf/cm^2
	Intake valve		Open	0° (TDC)
			Close	37° (ABDC)
	Exhaust valve		Open	36° (BBDC)
			Close	0° (TDC)

SPECIFICATIONS

GENERAL

ITEM			SPECIFICATIONS
	Valve clearance	Intake	0.12 mm
		Exhaust	0.13mm
	Idle speed		1400±100 rpm
Drive train	Clutch system		Push type 4 lug clutch system.
	Transmission		5-speed constant mesh
	Primary reduction		3.136 (69/22)
	Gear ratio	1st	3.077 (40/13)
		2nd	1.789 (34/19)
		3rd	1.304 (30/23)
		4th	1.1 (22/20)
		5th	0.958 (23/24)
	Final reduction		3.077 (40/13)
	Gearshift pattern		Toe shift 1-N-2-3-4-5
Electrical system	Ignition system		Fuel injection system
	Alternator		120W @ 5000 rpm (single phase full DC system)
	Battery capacity		*MF Battery-12V-4 Ah/ETZ5
	Spark plug		NGK-CPR 8 EA9, BOSCH UR5DC
	Spark plug gap		0.8-0.9 mm
	Fuse	Starter magnetic switch	20 A (Circuit fuse) & 20A (Spare fuse)
		Fuse box	15 A, 10A, 10A & 10A (Main fuse)
			15 A & 10A (Spare fuse)
Lamps/ Indicators	Headlamp (High/Low)		LED
	Position lamp		LED
	Tail/stop lamp		LED
	Turn signal lamp		LED
	Meter illumination		Module illuminated LCD
	Neutral indicator		LED
	Turn signal indicator (RH/LH)		LED
	High beam indicator		LED
	ABS indicator		LED
	Service reminder indicator		Module illuminated LCD
	Programmed FI malfunction indicator lamp (MIL)		LED
	Side stand indicator		LED
	Licence plate lamp		12V-5W

***MF stands for Maintenance Free**

SERVICE LIMITS

MAINTENANCE

ITEM			SPECIFICATIONS
Throttle grip free play			2-6 mm
Spark plug			NGK-CPR 8 EA 9, BOSCH UR5DC
Spark plug gap			0.8-0.9 mm
Valve clearance (In cold condition)		Intake	0.12 mm
		Exhaust	0.13 mm
Engine oil capacity		At draining	1.09 litres
		At disassembly	1.3 litres
Recommended engine oil			Brand : Hero 4T Plus Grade : SAE 10W 30 SL Grade (JASO MA2) Manufactured by : 1. Tide Water Oil Co. (India) Ltd. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.
Engine idle speed			1400±100 rpm
Cylinder compression			12.0±2.0 kgf/cm^2
Drive chain slack			20-25 mm
Recommended brake fluid			DoT 3 or DoT 4
Clutch lever free play			10-20 mm
Tyre size		Front	100/80 17 52 P (Tubeless tyre)
		Rear	130/70 R17 62 P (Radial tubeless tyre)
Cold tyre pressure	Rider only	Front	1.75 kgf/cm^2 (25 psi)
		Rear	1.96 kgf/cm^2 (28 psi)
	Rider & Pillion	Front	1.75 kgf/cm^2 (25 psi)
		Rear	2.10 kgf/cm^2 (30 psi)
Recommended minimum tyre tread depth		Front	0.8 mm
		Rear	1.0 mm

LUBRICATION SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	1.09 litres	-
	At disassembly	1.3 litres	-
Recommended engine oil		Brand: Hero 4T Plus Grade: SAE 10W 30 SL Grade (JASO MA2) Manufactured by: 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.	-
Oil pump	Outer rotor-body clearance	0.15-0.21 mm	0.26 mm
	Rotor tip clearance	0.15 mm	0.20 mm
	Pump end clearance	0.03-0.09 mm	0.15 mm

FUEL INJECTION SYSTEM

ITEM	SPECIFICATIONS
Fuel injector resistance	14.5 Ω
EOT sensor voltage	5 V ± 0.1 V
EOT sensor resistence	2.645±5% kΩ @ 20 C
Fuel pressure	300±10 kPa
Injector voltage	Battery voltage
Oxygen sensor resistance	<300 KΩ @ element tip temp >300° C
Oxygen sensor voltage	Vrich >0.7V and Vlean <0.12 V @ element tip temp >300° C
IACV resistance	47.7-58.3 Ω at 25° C
BAS tilt angle	58±7°

ENGINE REMOVAL/INSTALLATION

ITEM		SPECIFICATIONS
Engine oil capacity	At draining	1.09 litres
	At disassembly	1.3 litres

CYLINDER HEAD/VALVES

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			12.0±2.0 kgf/cm^2	-
Valve clearance		Intake	0.12 mm	-
		Exhaust	0.13 mm	-
Camshaft cam lobe height		Intake	33.590-33.790mm	33.55 mm
		Exhaust	33.458-33.658 mm	33.42 mm
Cylinder head warpage			-	0.1 mm
Rocker arm	I.D		10.000-10.015 mm	10.06 mm
	Shaft O.D		9.972-9.987 mm	9.95 mm
	Rocker arm-to-shaft clearance		-	0.11 mm
Valve	Stem O.D	Intake	4.975-4.990 mm	4.945 mm
		Exhaust	4.955-4.970 mm	4.925 mm
	Guide I.D	Intake	5.000-5.012 mm	5.03 mm
		Exhaust	5.000-5.012 mm	5.03 mm
	Stem-to-guide clearance	Intake	0.010-0.037 mm	0.08 mm
		Exhaust	0.030- 0057	0.10 mm
	Spring free length	Inner	37.78 mm	36.78 mm
Valve seat width			1.1-1.2 mm	1.5 mm
Specified height of inlet valve guide			18.0±0.1 mm	-
Specified height of exhaust valve guide			14.25±0.1 mm	-

CYLINDER/PISTON

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D		57.300-57.310mm	57.38 mm
	Ovality		-	0.1 mm
	Taper		-	0.1mm
	Warpage		-	0.1mm
Piston	Piston O.D		57.280-57.295 mm	57.21 mm
	Piston pin hole I.D		14.002-14.008 mm	14.04 mm
	Piston pin O.D		13.994-14.000 mm	13.96 mm
	Piston-to-piston pin clearance		0.002-0.014 mm	0.07 mm
	Connecting rod small end I.D		14.010-14.028 mm	14.06 mm
	Cylinder-to-piston clearance		0.005-0.030 mm	0.10 mm
	Connecting rod-to-piston clearance		0.010-0.034 mm	0.10 mm
	Piston ring-to-groove clearance	Top	0.03-0.060 mm	0.10 mm
		Second	0.03-0.060 mm	0.10 mm
	Piston ring end gap	Top	0.10-0.25 mm	0.60 mm
		Second	0.25-0.40 mm	0.70 mm
		Oil (side rail)	0.10-0.40 mm	0.70 mm

CLUTCH/GEARSHIFT LINKAGE/PRIMARY GEAR DRIVE

ITEM			STANDARD	SERVICE LIMIT
Clutch	Lever free play		10-20 mm	-
	Spring free length		40.50 mm	39.6 mm
	Disc thickness	Disc-A (n=2) green	2.92-3.08 mm	2.62 mm
		Disc-B (n=3)	2.92-3.08 mm	2.62 mm
	Plate warpage		-	0.2 mm
	Clutch outer guide I.D		16.991-17.009 mm	17.05 mm
	Clutch outer guide O.D		22.959-22.980 mm	22.93 mm
	Clutch outer I.D		23.000-23.021 mm	23.08 mm
Kick starter	Pinion I.D		16.016-16.034 mm	16.09 mm
	Spindle O.D		15.966-15.984mm	15.95 mm

ALTERNATOR/STARTER CLUTCH

ITEM		STANDARD	SERVICE LIMIT
Gear reduction	Shaft O.D	8.972-8.987 mm	8.92 mm
Starter driven gear	I.D	29.000-29.021mm	29.06 mm
	O.D	45.660-45.673 mm	45.64 mm

CRANKCASE/CRANKSHAFT/TRANSMISSION

ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D		10.000-10.018 mm	10.05 mm
	Claw thickness		4.93-5.00 mm	4.53 mm
	Shaft O.D		9.986-9.995 mm	9.93 mm
Shift drum	O.D	Left	23.959-23.980 mm	23.94 mm
		Right	20.959-20.980 mm	20.94 mm
	Journal I.D	Left	24.000-24.033 mm	24.05 mm
		Right	21.000-21.021 mm	21.04 mm
Transmission	Gear I.D	M4, M5	20.000-20.021 mm	20.06 mm
		C3	23.025-23.046 mm	23.09 mm
		C2	23.020-23.041 mm	23.08 mm
		C1	20.500-20.521 mm	20.56 mm
	Bushing O.D	M4, M5	19.959-19.980 mm	19.91 mm
		C1	20.459-20.480 mm	20.41 mm
		C2, C3	22.984-23.005 mm	22.93 mm
	Bushing I.D	M4, C1	17.000-17.018 mm	17.04 mm
		C2, C3	20.020-20.041 mm	20.07 mm
	Gear to bushing clearance	M5, C1, C3	0.020-0.062 mm	0.10 mm
		C2	0.015-0.057 mm	0.10 mm
		M4	0.020-0.062 mm	0.11 mm
	Mainshaft/Countershaft O.D	At M4, C1	16.966-16.984 mm	16.93 mm
		At C2	19.978-19.989 mm	19.94 mm
		C3	19.979-20.000 mm	19.94 mm
	Gear to shaft clearance	M2, M3	0.016-0.052 mm	0.09 mm
		C4	0.020-0.062 mm	0.1 mm
	Bushing-to-shaft clearance	M4, C1	0.016-0.052 mm	0.09 mm
		C2	0.020-0.057 mm	0.10 mm
		C3	0.020-0.062 mm	0.10 mm
Crankshaft	Runout		-	0.05 mm
	Big end side clearance		0.10-0.35 mm	0.60 mm
	Big end radial clearance		0-0.008 mm	0.05 mm

Kick starter	Piston ID	20.000.20.021	20.08
	Spindle OD	19-959-19-980	19.94

FRONT WHEEL/SUSPENSION/STEERING

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		0.8 mm	-
Cold tyre pressure	Rider only	1.75 kgf/cm^2 (25 psi)	-
	Rider & Pillion	1.75 kgf/cm^2 (25 psi)	-
Front axle runout		0.2 mm	-
Front wheel rim runout	Radial	0.4 mm	2 mm
	Axial	0.4 mm	2 mm
Wheel balance weight		max 60 gm	-
Fork spring free length		463.6 mm	-
Fork fluid level		154 mm	-
Fork fluid capacity		305 cc	-

REAR WHEEL/BRAKE/SUSPENSION

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		1.0 mm	
Cold tyre pressure	Rider only	1.96 kgf/cm^2(28 psi)	-
	Rider & Pillion	2.10 kgf/cm^2 (30 psi)	-
Rear axle runout		0.2 mm	-
Rear wheel rim runout	Radial	0.4 mm	2 mm
	Axial	0.4 mm	2mm
Wheel balance weight		max.60gm	-
Rear brake lever fee play		10-15mm	-
Rear brake drum I.D		130 mm	-
Rear brake lining thickness		4 mm	-

ANTI-LOCK BRAKING SYSTEM

ITEM	SPECIFICATIONS
Wheel speed sensor resistance	50 Ω±2% - 115 Ω±2%
Wheel speed sensor air gap	0.9 mm Maximum
Operating temperature	-10°C to 80°C
Operating voltage	9.8 to 16.1V
ABS unit inclination angle	5°±5° Inclined

TUBELESS TYRES

ITEM			STANDARD	SERVICE LIMIT
Minimum tyre tread depth	Front		0.8 mm	-
	Rear		1.0 mm	-
Cold tyre pressure	Front	Rider only	1.75 kgf/cm^2 (25 psi)	-
		Rider & Pillion	1.75 kgf/cm^2 (25 psi)	-
	Rear	Rider only	1.96 kgf/cm^2 (28 psi)	-
		Rider & Pillion	2.1 kgf/cm^2 (30 psi)	-
Wheel rim runout	Front	Radial	0.4 mm	2.0 mm
		Axial	0.4 mm	2.0 mm
	Rear	Radial	0.4 mm	2.0 mm
		Axial	0.4 mm	2.0 mm
Wheel balance weight			60g max	60g max

HYDRAULIC BRAKE SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DoT3-DoT4	
	Brake disc thickness	4 mm	3.5 mm
	Brake disc runout	0.1 mm	-
	Master cylinder piston I.D	12 mm	-
	Master cylinder piston O.D	12 mm	-
	Brake caliper piston O.D	26 mm	
Rear	Specified brake fluid	DoT-3 or DoT-4	
	Brake disc thickness	5.0 mm	4.0 mm
	Brake disc runout	0.1mm	-
	Master cylinder piston I.D	12.7 mm	-
	Master cylinder piston O.D	12.7 mm	-
	Brake caliper piston O.D	32.03mm	-

BATTERY/CHARGING SYSTEM

ITEM		SPECIFICATIONS
Battery	Capacity	*MF Battery-12V-4 Ah/ETZ5
	Current leakage	0.20 mA
	Voltage @ 20°C/68°F	12.4 V
Alternator	Capacity	125W @5000rpm (Single Phase Full DC System)
	Charging coil resistance (20°C/68°F)	0.2~1.0 Ω
Regulated voltage (with battery)		14.3± 0.5 V @ 5000 RPM
Regulated current (with battery)		7.6A Min @ 2500rpm @ 25°C and 8.2A Min @ 6000rpm @ 25°C

***MF stands for Maintenance Free**

IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	Standard	NGK-CPR 8EA9, BOSCH UR5DC
	Spark plug gap	0.8-0.9 mm
Peak voltage	CKP sensor	1.5 V (Minimum) @ 300 rpm (gap 1.1 mm)
Ignition coil	Primary coil resistance @ 20°C/68°F	2.3Ω±10%
	Secondary coil resistance (without noise suppressor cap) @ 20°C/68°F	11kΩ±20%
CKP sensor resistance		50-200Ω

ELECTRIC STARTER

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	7.0 mm	3.5 mm

LAMPS/METERS/SWITCHES

ITEM			SPECIFICATIONS
Bulbs	Headlamp (High/Low)		LED
	Position lamp		LED
	Tail/Stop lamp		LED
	Turn signal lamp		LED
	Meter illumination		Module illuminated LCD
	Neutral indicator		LED
	Turn signal indicator (RH/LH)		LED
	High beam indicator		LED
	ABS indicator		LED
	Service reminder indicator		Module illuminated LCD
	Programmed FI malfunction indicator lamp (MIL)		LED
	Side stand indicator		LED
	Licence plate lamp		12V-5W
Fuse		Starter magnetic switch	20A (Circuit fuse) and 20A (Spare fuse)
		Fuse box	15A, 10A, 10A, & 10A, (Main fuse)
			15A, & 10A, (Spare fuse)

ENGINE TORQUE VALUES

SR. NO.	ITEM	THREAD SIZE & TYPE	TORQUE		PR VALUES N-m	REMARKS
			N-m	kgf-m		
1	Bearing hold plate right crankcase	M6x1.0 Flange bolt	10~14	1.0~1.4	12	TB#1322N Equiv
2	Bearing push plate left crankcase	M6x1.0, SH flange bolt	8~12	0.8~1.2	10	TB#1322N Equiv
3	Oil drain bolt (Left case)	M12x1.5	25~34	2.5~3.5	30	
4	Left cover	M14x1.5 Cap, 14mm	8~12	0.8~1.2	10	
		M32x1.5 Cap, 32mm	10~20	1.0~2.0	15	Apply grease
5	Cam shaft holder	M8x1.25 Special nut	30~34	3.1~3.5	32	Apply engine oil
		M5x0.8, Flange bolt	4.4~6.0	0.45~0.6	5	
6	Head cover	M6x1.0, Special bolt	8~12	0.8~1.2	10	
7	Cam sprocket	M5x0.8, Flange knock bolt	7~11	0.7~1.1	9	
8	Tappet adjusting nut	M6x0.75 Nut	12~16	1.2~1.6	14	Apply engine oil
9	Tensioner lifter adjust hole	M6x1.0, Screw pan	3.4~5.0	0.35~0.5	4	
10	Oil pump	Tapping screw 4x8	2.5~3.9	0.25~0.4	3	
11	Oil filter rotor	M14x1.0, Lock nut	59~69	6.0~7.0	64	Apply engine oil
12	Cap, oil filter rotor	M5x0.8, Oval screw	3~5	0.3~0.5	4	
13	Clutch assembly	M14x1.0, Special flange nut	69~78	7.0~8.0	74	Apply engine oil
		M6x1.0, Flange bolt	10~14	1.0~1.4	12	
14	Drive sprocket	M6x1.0, Special hex bolt	10~14	1.0~1.4	12	
15	Shift drum stopper plate	M6x1.0, bolt hex	10~14	1.0~1.4	12	TB#1322N Equiv
16	Shift drum stopper	M6x1.0, Special flange bolt	10~14	1.0~1.4	12	TB#1322N Equiv
17	Engine oil temp sensor	M10x1.25, Special flange bolt	13~16	1.3~1.6	14	TB#1322N Equiv
18	Oxygen sensor	M12x1.25, Special flange bolt	20~30	2.0~3.0	25	TB#1322N Equiv
19	Speed sensor	M6.0x1.0	8~12	0.8~1.2	1.0	TB#1322N Equiv
20	Starting clutch outer	M6x1.0, Special socket bolt	14~18	1.4~1.8	16	TB#1322N Equiv
21	ACG flywheel	M14x1.0,flange nut	69~78	7.0~8.0	74	Apply engine oil
22	Pulser	M5x0.8, socket bolt	4.4~6.0	0.45~0.6	5	TB#1322N Equiv
23	ACG cord clamper	M6x1.0, socket bolt	10~14	1.0~1.4	12	TB#1322N Equiv
24	Spark plug	M10x1.0	14~18	1.4~1.8	16	
25	Balancer shaft	Nut flange M12	49~59	5~6	56	
26	Right/Left cranckcase	M8x1.25, Bolt cylinder stud	7~15	0.7~1.5	11	
27	Insulator band	M5x0.8, Screw pan	0.8~1.2	0.8~0.12	1	
28	Pin shift return spring	M8x1.25	25~34	2.5~3.4	30	TB#1322N Equiv

NOTE

1. Factor for conversion of torque value SI unit (N-m) from customary unit (kgf-m) shall be 9.81 in this table.
2. Center Values in PR value. (Those shall be entered in shop/service manual).

FRAME TORQUE VALUES

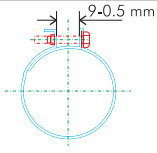
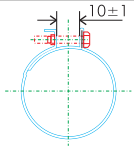
SR. NO.	ITEM	THREAD SIZE & TYPE	TORQUE		PR VALUES N-m	REMARKS
			N-m	kgf-m		
1	Steering					
	Steering stem nut	M 22x1.0	59~88	6.0~9.0	74	
	Thread component hd top	M 22x1.0	2.5~3.4	0.25~0.35	3	
	Fork socket bolt	M 8x1.25	15~25	1.5~2.5	20	
	Front fork bolt	M 34x1.5	20~30	2.0~3.0	25	
	Top bridge bolt	M 10x1.25	22~25	2.0~2.5	22	BF
	Bottom bridge bolt	M 10x1.25	30~35	3.0~3.5	32	BF
2	Wheel					
	Front axle nut	M 12x1.25	54~64	5.5~6.5	59	PT nut
	Rear axle nut	M 14x1.5	59~78	6.0~8.0	68	PT nut
	Front disc bolt	M 8x1.25	39~44	4.0~4.5	42	Disc bolt (TB2361)
	Rear disc bolt	M 8x1.25	39~44	4.0~4.5	42	Disc bolt (TB2361)
	Driven sprocket nut	M 10x1.25	59~69	6.0~7.0	64	PT nut
	Front speed sensor disc bolt	M 6x1.0	8~10	0.8~1.0	9	Bolt flange
3	Engine hanger					
	Front engine hanger	M 8x1.25	24~29	2.4~3.0	26	
	Upper engine hanger	M 8x1.25	24~29	2.4~3.0	26	
	Rear engine hanger	M 10x1.25	49~59	5.0~6.0	54	
	Gear change lever (Engine)	M 6x1.0	8~12	0.8~1.2	10	
4	Brake					
	Front caliper (Front fork fitting use)	M 8x1.25	27~33	2.8~3.4	30	BF (TB2361)
	Front stop switch	M 4x0.7	0.8~1.5	0.08~0.15	1.2	Screw
	Front master cylinder cap	M 4x0.7	1.0~2.0	0.1~0.2	1.5	Screw
	Right handlebar lever pivot (Bolt)	M 6x1.0	0.5~1.5	0.05~0.15	1	
	Right handlebar lever pivot (Nut)	M 6x1.0	5~7	0.5~0.7	6	
	Master cylinder holder	M 6x1.0	8~10	0.8~1.0	9	BF
	Oil bolt	M 10x1.25	29~39	3.0~4.0	34	BF
	Front caliper bleeder	M 10x1.25	12~16	1.2~1.6	14	
	Front caliper secondary pin	M 8x1.25	12~16	1.2~1.6	14	Apply adhesive
	Rear caliper bleeder	M 8x1.25	3.9~6.9	0.4~0.7	5.4	
	Rear caliper pin bolt	M 8x1.25	9.8~14.7	1.0~1.5	12.2	
	Rear caliper nut flange	M 8x1.25	19.6~24.5	2.0~2.5	22	Apply asec AS10-AQ
	Rear caliper hanger pin	M 10x1.0	14.7~19.6	1.5~2.0	17	
	Rear master cylinder cap	M 4x0.7	1.0~2.0	0.1~0.2	1.5	Screw
	Rear master cylinder rod joint	M 8x1.25	14.7~19.6	1.5~2.0	17	
	Rear master cylinder connector	M 4x0.7	1.0~2.0	0.1~0.2	1.5	Apply loctite 569
	Rear master cylinder (step holder fitting use)	M 6x1.0	10~14	1.0~1.4	12	
	Rear brake arm nut	M 6x1.0	7.8~12	0.8~1.2	10	BF
	Clamper front brake	M 6x1.0	8~10	0.8~1.0	9	BF

FRAME TORQUE VALUES

SR. NO.	ITEM	THREAD SIZE & TYPE	TORQUE		PR VALUES N-m	REMARKS
			N-m	kgf-m		
5	Suspension					
	Rear cushion upper	M 10x1.25	45~55	4.5~5.5	50	BF
	Rear cushion under	M 10x1.25	45~55	4.5~5.5	50	BF
6	Swingarm					
	Swingarm pivot nut	M 14x1.5	55~65	5.5~6.5	60	
7	Handle bar					
	Left handle lever pivot	M 6x1.0	0.5~1.5	0.05~0.15	1	
	Left handle lever nut	M 6x1.0	4.9~6.9	0.5~0.7	5.9	
	Handle holder upper bolt	M 6x1.0	10~14	1.0~1.4	12	
8	Fuel tank					
	Plate setting	M 6x1.0	10~14	1.0~1.4	12	
	Tank mounting bolt	M 8x1.25	18~25	1.8~2.5	21.5	
	Purge valve mounting bolt	M 6x1.0	8~10	0.8~1.0	9	
	Stay purge valve mounting bolt	M 6x1.0	8~12	0.8~1.2	10	
9	Step					
	Step plate bolt	M 6x1.0	8~12	0.8~1.2	10	
	Feel peg bolt	M 8x1.25	18~25	1.8~2.5	21	
	Left main step assembly	M 8x1.25	18~25	1.8~2.5	21	
	Right main step assembly	M 8x1.25	18~25	1.8~2.5	21	
	Left step pillion assembly	M 8x1.25	18~25	1.8~2.5	21	
	Right step pillion assembly	M 8x1.25	18~25	1.8~2.5	21	
	Gear change pivot bolt	M 6x1.0	9.8~14	1.0~1.4	12	
10	Side stand					
	Pivot bolt	M 10x1.25	29~39	3.0~4.0	34	
	Lock nut	M 10x1.25	39~49	4.0~5.0	44	U nut
11	Cables					
	Throttle cable (Grip side)	M 10x1.25	1~2	0.1~0.2	1.5	
12	Switch assy. comb. & lock mounting	M 8x1.25	18~25	1.8~2.5	21	Apply loctite
13	Body cover					
	Front fender mounting	M 6x1.0	7~11	0.7~1.1	9	Screw special
	Fairing mounting structure	M 5x0.8	3.4~5	0.34~0.5	4.2	Screw pan
	Front cowl upper	M 5x0.8	3.4~5	0.34~0.5	4.2	Screw
	Tank cover front	M 6x1.0	7~11	0.7~1.1	9	
	Tank cover rear	M 5x0.8	3.4~5	0.34~0.5	4.2	Screw
	Side cover	M 6x1.0	7~11	0.7~1.1	9	Screw
	Rear cowl	M 5x0.8	3.4~5	0.34~0.5	4.2	
	Rear fender	M 6x1.0	9.8~14	0.98~1.4	11.9	
		M 4x1.41	1.7~2.5	0.17~0.25	2.1	Screw tapping
	Stay meter sub assy.	M 6x1.0	9.8~14	1.0~1.4	12	

FRAME TORQUE VALUES

SR. NO.	ITEM	THREAD SIZE & TYPE	TORQUE		PR VALUES N-m	REMARKS
			N-m	kgf-m		
	Stay aiming sub assy	M 6x1.0	9.8~14	1.0~1.4	12	
	Bracket inner panel support	M 6x1.0	9.8~14	1.0~1.4	12	
	Stay front number plate	M 6x1.0	9.8~14	1.0~1.4	12	
	Chain case	M 6x1.0	8~12	0.8~1.2	10	
	Battery case	M 6x1.0	8~12	0.8~1.2	10	
14	Seat					
	Hook seat catch	M 6x1.0	9.8~14	1.0~1.4	12	
15	Rear grip					
	Grip Right/Left rear sub assy.	M 8x1.25	24~29	2.4~3.0	27	
16	Kick mounting bolt	M 8x1.25	18~25	1.8~2.5	21	
17	Other					
	Leg guard	M 8x1.25	18~25	1.8~2.5	21	
	Saree guard	M 8x1.25	18~25	1.8~2.5	21	
18	Muffler					
	Muffler assembly mounting	M 8x1.25	24~29	2.4~2.9	26.5	
19	Air cleaner					
	Cover Air/C case	M 5x0.8	1.3~1.7	0.13~0.17	1.5	
20	O_2 sensor	M 12x1.25	20~30	2.0~3.0	25	
21	Main stand lock nut	M 10x1.25	15~18	1.5~1.8	16.5	

Special tightening method procedure etc.	
Item: Side stand Main stand	When tightening lock nut pivot
Pivot screw & Lock nut	Bolt shall be fixed by tool
Item: Handle lever	When tightening lock nut pivot
Pivot screw & Lock nut	Bolt shall be fixed by tool
Item: Air cleaner connecting tube	
A  B 	A. Width at fastening of band of air cleaner connecting shall be 9-0.5 mm B. Width at fastening of band of insulator shall be 10±1 mm

NOTE

1. Factor for conversion of torque value SI unit (N-m) from customary unit (kgf-m) shall be 9.81.
2. Center values in PR values (those shall be entered in shop/service manual).

GENERAL TORQUE VALUES

STANDARD

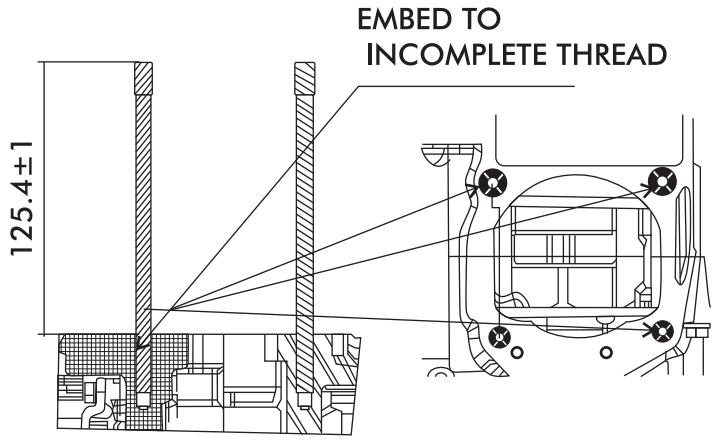
FASTENER TYPE	TORQUE (N-m)	TORQUE (kgf-m)
5 mm bolt and nut	4.4~6.0	0.45~0.6
6 mm bolt and nut (include SH flange bolt)	8~12	0.8~1.2
8 mm bolt and nut	18~25	1.8~2.5
10 mm bolt and nut	29~39	3.0~4.0
12 mm bolt and nut	49~59	5.0~6.0
4 mm screw	1.75~2.5	0.17~0.25
5 mm screw	3.4~5	0.35~0.5
6 mm screw	7~11	0.7~1.1
6 mm flange bolt (including NSHF) and nut	9.8~14	1.0~1.4
8 mm flange bolt and nut	24~29	2.4~3.0
10 mm flange bolt and nut	34~44	3.5~4.5

NOTE

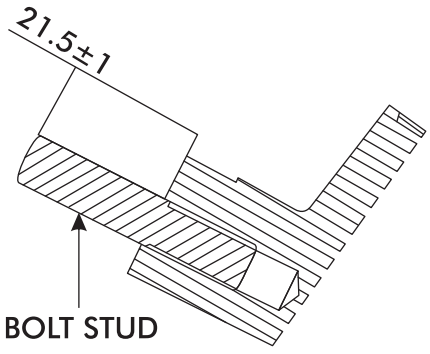
- Torque specifications listed above and on the following pages are for important fasteners.
- Others should be tightened to standard torque values listed above.

SPECIAL TIGHTENING PROCEDURE

R/L CRANKCASE

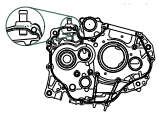


CYLINDER HEAD



LUBRICATION & SEAL POINTS

ENGINE

BLOCK NAME OR PARTS NAME	APPLIED AREA	MATERIAL	METHOD AND AMOUNT	PUR-POSE	REMARKS
Left crankcase	Mating surface	Three-bond #1215 or # 1207G	Spreading	2	
Bearing push plate SH, 6x18 (Left crankcase)	Threaded portion	TB#1322 #1322N or #1324Z or #2415 or Loctite#200	Precoating or spreading	3	Coating width 6.5±1 mm from tip
Bearing hold plate BF, 6x16 (Right crankcase)					
Push plug	Whole surface	Engine oil with MoS_2	Spreading	1	
ACG grommet	Sealing surface	Three-bond #1141 or # 1215 or #1207G		2	
Cap 32mm	Threaded portion	Engine oil	Spreading or dripping	5	
Cylinder	Inner surface of cylinder sleeve			1	
M8 special nut (cylinder stud)	Threaded portion, Seating surface			4	
Crankshaft component	Needle bearing of connecting rod big end	Engine oil with MoS_2	Dripping (1~2cm^3)	1	
	Inner surface of connecting rod small end		Spreading or dripping	1	
Piston	Pin hole, ring groove, sliding area	Engine oil		1	
Piston pin	Outer surface	Engine oil with MoS_2	Oil bath or spreading	1	
Piston ring	Whole surface	Engine oil		1	
ACG & Left crankshaft	Tapered surface		Degreasing	5	
M-14 Flange nut (Flywheel)	Threaded portion seating surface	Engine oil	Oil bath	4	
Valve (Intake/Exhaust)	Outer surface of stem, stem end	Engine oil with MoS_2	Spreading or dripping	1	
Camshaft component	Whole cam surface		Spreading or dripping	1	
Cam chain	Whole surface	Engine oil	Oil bath or spreading	1	
Rocker arm shaft	Whole surface		Oil bath or spreading	1	
Rocker arm	Inner surface of boss, roller surface		Spreading or dripping	1	
Tappet adjusting nut	Threaded portion seating surface		Oil bath	4	
Oil pump assembly	Rotor		Pouring from oiler	1	
M-14 Lock nut (Oil filter rotor)	Threaded portion seating surface		Oil bath	4	

LUBRICATION & SEAL POINTS

ENGINE

BLOCK NAME OR PARTS NAME	APPLIED AREA	MATERIAL	METHOD AND AMOUNT	PUR-POSE	REMARKS
Oil through	Sliding surface	Engine oil	Spreading	1	
Clutch outer guide	Ø23 outer surface	Engine oil with MoS_2	Oil bath or spreading	1	
Clutch disk	Whole surface	Engine oil	Oil bath	1	
Clutch outer component	Sliding surface	Engine oil with MoS_2	Spreading	1	
Clutch lifter rod	Whole surface	Engine oil	Oil bath	1	
M-14 Flange nut (Clutch center)	Threaded portion seating surface	Engine oil		4	
M-4, 5 gear	Inner surface	Engine oil with MoS_2	Spreading	1	
M-4, 5 gear inner bush	Whole surface		Oil bath or spreading	1	
C-1,2,3 gear	Inner surface		Spreading	1	
C-1,2,3 gear inner bush	Whole surface		Oil bath or spreading	1	
M-3, C-4, C-5 gear	Shift fork groove surface		Spreading	1	
Gear (Primary mission, Starter)	Tooth flank	Engine oil		1	
Shift fork shaft	Whole surface	Engine Oil	Oil bath or spreading	1	
Shift drum journal	Outer surface sliding area		Spreading or dripping	1	
Change spindle journal				1	
Shift drum stopper plate	Threaded portion	TB #1322,#1322N or #1324Z or #2415 or Loctite #200	Precoating or spreading	3	Coating width 6.5±1 mm from tip
Shift drum stopper				3	
Starter driven gear	Inner surface	Engine oil with MoS_2	Spreading	1	
Kick starter pinion				1	
Kick idle gear inner bush	Whole surface		Oil bath or spreading	1	
Starter clutch	Rolling surface	Engine Oil		1	
Socket bolt 6x16 (Starter clutch outer)	Threaded portion	TB#1322, #1322N or 1324Z or #2415 or Loctile #200	Precoating or spreading	3	Coating width 6.5±1 mm from tip
Starter reduction gear shaft	Whole surface	Engine Oil	Spreading	1	
Socket bolt 6x16 (Pulser)	Threaded portion	TB#1322, #1322N or 1324Z or #2415 or Loctile #200	Precoating or spreading	3	Coating width 6.5±1 mm from tip
Socket bolt 6x16 (ACG cord clamper)				3	

LUBRICATION & SEAL POINTS

ENGINE

BLOCK NAME OR PARTS NAME	APPLIED AREA	MATERIAL	METHOD AND AMOUNT	PUR-POSE	REMARKS
Ball/Needle bearing	Rolling surface	Engine oil	Pouring from oiler	1	
O-ring	Whole surface		Oil bath	1	
Engine oil	Inside of crank case	MC 4-stroke gasoline engine oil	1200cc (Upper level) 900cc (Lower level)	1	10W 30 SL (JASO MA2)
Engine oil (for service only)			1200cc (Upper level) 900cc (Lower level) 1000cc (Exchange)		
Bearing, Roller 35x72x15	Ball surface	Engine oil with MoS_2	Spreading or dripping	1	

NOTE

1. Engine oil for spreading shall be 4 stroke vehicle gasoline engine oil which does not contain molybdenite.
2. Molybdenum disulfide paste content in Molybdenum disulfide oil shall be 50% in volume percent.

PURPOSE

1. **Lubrication**
2. **Seal**
3. **Lock**
4. **Apply for torque stabilizing**
5. **Others**

LUBRICATION & SEAL POINTS

FRAME

SR. NO.	BLOCK NAME OF PARTS NAME	APPLIED AREA	MATERIAL	METHOD OF AMOUNT	PUR-POSE	REMARKS
1	Steering					
	Steering cone race	Rolling contact surface	Shell alvania EP2 or excelite Ep2 (Kyodo yushi co.ltd.) or equivalent	Filling 3~5 gm	1	
	Steering ball race					
	Steering dust seal	Lip surface		Spreading	1	
2	Suspension					
	Front fork	Inside	Oil type1F, oil	Inject	5	
	Front fork oil seal	Lip surface	Berutox FB-22 grease	Spreading	1	
	Swingarm bearing needle	Inside	HES D 2012-3-1-2	Filling	1	
	Swingarm pivot dust seal	Lip surface	HES D 2012-3-1-2	Spreading	1	
	Swingarm pivot nut	Threaded portion	HES D 2012-3-1-2	Spreading 1 gm min	4	
3	Brake					
	Front brake caliper pin bolt	Sliding portion	Brake grease special	Spreading 0.4 gm min	1	No grease on lining surface allowed
	Front brake caliper pin bolt A	Sliding portion	Brake grease special	Spreading 0.4 gm min	1	
	Front brake piston	Sliding portion	Assembly oil CC1- No.20	Spreading	1	
	Front brake caliper torque nut	Threaded portion	ASEC AS10 AQ or Equivalent	Spreading	3	
	Front brake lever pivot	Sliding portion	Brake grease special	Spreading 0.1 gm min	1	
	Front brake master cylinder piston	Inner surface and sliding portion	Assembly oil CC1- No.20	Spreading	1	
	Front brake master cylinder push rod	Sliding portion	Brake grease special	Spreading 0.1 gm min	1	
	Front brake master cylinder	Inside of master cylinder cup	DOT 3 or DOT 4	Inject to upper level	5	To up level after complete air bleeding
	Rear brake caliper pin bolt	Sliding portion	Brake grease special	Spreading 0.2-0.25 gm min	1	No grease on lining surface allowed
	Rear brake caliper pin bolt A	Sliding portion	Brake grease special	Spreading 0.2-0.25 gm min	1	
	Rear brake piston	Sliding portion	Assembly oil CC1- No.20	Spreading	1	
	Rear brake caliper stopper ring	All around	Silicon grease	Spreading	1	

LUBRICATION & SEAL POINTS

FRAME

SR. NO.	BLOCK NAME OF PARTS NAME	APPLIED AREA	MATERIAL	METHOD OF AMOUNT	PUR-POSE	REMARKS
	Rear brake caliper torque nut	Threaded portion	Asec as 5010 or Equivalent	Spreading	3	
	Rear brake master cylinder piston	Inner surface and sliding area	Assembly oil CC1- No.20	Spreading	1	
	Rear brake master cylinder push rod comp.	Sliding area	Brake grease special	Spreading 0.1 gm each	1	
	Rear brake master cylinder	Inside of master cylinder cup	DoT 3 or DoT 4	Inject to upper level	5	To up level after complete air bleeding
4	Wheel					
	Front wheel oil seal	Lip surface	HES D 2012-2-1-2	Spreading	1	
	Driven flange dust seal					
	Rear wheel hub O-ring	All around	HES D 2012-2-1-2	Spreading	1	
	Rear wheel oil seal	Lip surface	HES D 2012-2-1-2	Spreading	1	
	Front and rear tyre	Bead seat area	Vegetable soap solution	Spreading	5	
5	Speed sensor assy					
	Dust seal	Lip	Shell alvania grease	Spreading	1	
	Magnet	Inner dia	Shell alvania grease	Spreading	1	
6	Handle					
	Clutch lever pivot bolt	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	Grip left handle	Matching surface	#540 (cemedine) or equivalent	Spreading	3	Bonded area to be 80% min of contact area
	Grip comp. Throttle	Contact area of throttle cable end	HES D 2012-2-1-2	Spreading	1	
7	Change					
	Change pedal pivot	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	Tie rod					
8	Air cleaner					
	Air cleaner case, Conn. Tube, duct	Case connecting area	#540 (cemedine) or equivalent	Spreading	2	Adhesive shall not over flow to clean side
9	Control cable					
	Throttle cable	Inside of boot	Silicon grease (TSG3251) or equivalent	Filling	2	
		Inside of casing	TSG 3203 or molybdenum alloy oil M-A0 or equivalent	Filling	1	

LUBRICATION & SEAL POINTS

FRAME

SR. NO.	BLOCK NAME OF PARTS NAME	APPLIED AREA	MATERIAL	METHOD OF AMOUNT	PUR-POSE	REMARKS
	Clutch cable	Inside of boot	Silicon grease (TSG3251) or equivalent	Filling	2	
		Inside of casing	TSG 3203 or molybdenum alloy oil M-A0 or equivalent	Filling	1	
	Seat lock cable	Inside of casing	TSG 3203 or molybdenum alloy oil M-A0 or equivalent	Filling	1	
10	Others					
	Side stand pivot	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	Main stand pivot	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	Comb. & Lock switch bolt	Threaded portion	Threebond TB-1342n or loctite 262 or equivalent	Spreading	3	
	Seat lock	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	M/Step	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	P/Step	Sliding portion	HES D 2012-2-1-2	Spreading	1	
	P/Step (SPG)	Sliding portion	HES D 2012-2-1-2	Filling	1	
11	Brake					
	Rear brake pedal	Sliding portion	HES D 2012-2-1-2	Spreading	1	

PURPOSE

1. **Lubrication**
2. **Seal**
3. **Lock**
4. **Apply for torque stabilizing**
5. **Others**

SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
1	Flywheel puller	To remove the flywheel from crankshaft.	070HHKTC004
2	Socket wrench	To remove lock nut from clutch assembly and rotor filter.	070HH198002
3	Universal holder	To hold the flywheel while removing flywheel nut.	070HH198003
4	Clutch centre holder	To hold the centre clutch while removing the lock nut.	070HH198004
5	Valve spring compressor	To compress the valve spring and remove the cotters and valve.	070HH198005
6	Tappet adjuster with socket, 9 mm	To adjust valve clearance.	070HH198006
7	Ball race driver	To remove and install ball races from head pipe.	070HH198007
8	Bottom cone race punch (Driver stem bearing)	To insert bottom cone race in steering stem.	070HH198008
9	Universal bearing puller	To remove crankshaft bearing.	070HH198009
10	Valve guide remover	To remove valve guide from cylinder head.	070HH198010
11	Tappet cover wrench	To open and tighten the tappet cover.	070HH198011
12	Socket, 17.5 mm	To be used with pneumatic gun-clutch lock nut.	070HH198012
13	Aluminum plug	To block fuel pipe hose while removing from carburetor.	070HH198014
14	Average testing bottle with fixture	To measure fuel average.	070HH198015
15	Plastic oil seal guide kit, 5 pcs.	To install stator plate oil seal.	070HH198016
16	GPD holder	To provide gear locking between GPD and clutch outer.	070HH198017
17	Front fork oil seal driver body	To drive in new oil seal.	070HH198018
18	Front fork dismantling tool	To hold fork tube seat while opening the bottom allen key bolt.	070HH198020
19	Compressor rear shock absorber	To compress spring for dismantling rear shock absorber.	070HH198021
20	Oil pump spindle holder	To remove and lock the oil pump spindle.	070HH198023
21	Swing arm pivot nut socket, 17mm	To open and lock pivot nut.	070HH198024
22	Collet bearing remover, 12mm	To remove bearing from crankcase.	070HH198026
23	Piston slide base	To secure piston while assembling cylinder.	070HH198027
24	Race steering cone inserter	To insert ball race in steering pipe.	070HH198028
25	Socket rotor filter nut (Pneumatic, 24 mm)	To be used with pneumatic gun-rotor filter nut.	070HH198029
26	Ratchet spring inserter	To insert kick shaft ratchet spring.	070HH198030
27	Driver, 40x46 mm	To seat on outer race surface and drive out/in the bearing.	070HH198031
28	Pilot, 17mm	To seat in the inner race and drive out/in the bearing.	070HH198033
29	Cap, Muffler (100 CD series)	To restrict water entry during washing.	070HH198035
30	Brake pad hanger pin remover	To remove brake pad hanger pin from caliper assembly.	070HH198036
31	Main/side stand spring installer	To install main and side stand spring.	070HH198037
32	Socket steering stem nut, 32 mm	To remove and tightening the steering stem nut.	070HHGBG004
33	Front fork oil seal driver attachment dia, 30 mm	To drive in new oil seal.	070HHKCC001
34	Tappet adjuster with socket, 10 mm	To adjust valve clearance.	070HHKFN001
35	Flywheel puller (CBZ)	To remove the flywheel from crankshaft.	070HHKFN002
36	Pierer's plier	To remove snap ring from master cylinder and driven face bearing.	070HHKFN003
37	Front fork oil seal driver attachment dia, 31mm	To drive in new oil seal.	070HHKFN004

SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
38	Crankcase bearing remover collect, 15mm	To remove bearing from crankcase.	070HHKFN005
39	Crankcase bearing remover shaft	To remove bearing from crankcase.	070HHKFN006
40	Crankcase bearing remover weight	To remove bearing from crankcase.	070HHKFN007
41	Handle bearing driver	To hold pilot and driver outer to remove/insert bearing.	070HHKFN008
42	Driver outer, 42x47	To seat on outer race surface and drive out/in the bearing.	070HHKFN011
43	Pilot driver, 12mm	To seat in the inner race and drive out/in the bearing.	070HHKFN012
44	Pilot driver, 15mm	To seat in the inner race and drive out/in the bearing.	070HHKFN013
45	Pilot driver, 21mm	To seat in the inner race and drive out/in the bearing.	070HHKFN014
46	Pilot driver, 28mm	To seat in the inner race and drive out/in the bearing.	070HHKFN015
47	Remover head, 12mm	To remove wheel bearing from wheel hub.	070HHKFN017
48	Steering bearing adjuster nut socket	To adjust/remove the steering bearing adjuster nut.	070HHKFN018
49	Driver, 24x27mm	To seat on outer race surface and drive out/in the bearing.	070HHKFN021
50	TPS test connector	To reset throttle position sensor.	070HHKRY001
51	Flywheel puller	To remove the flywheel from crankshaft.	070HHKRYH001
52	Flywheel puller holder	To hold the flywheel puller.	070HHKRYH002
53	Crankshaft pilot	To avoid the damage of crankshaft threads during removal of flywheel.	070HHKRYH003
54	Magnet holder (Clamp type)	To hold magnet while removing the lock nut.	070HHKRYH004
55	Oil cooler holder cover	To be used for protecting oil cooler fins during water wash.	070HHKRYH005
56	Hose pipe plier	To pinch the fuel hose during fuel tank removal.	070HHKRYH006
57	Pin-out box	For diagnosing the Programmed-FI electrical system.	070HHKRYH007
58	Tester (MF-battery)	To test the condition of a MF-battery.	070HHKRYH008
59	T-stem cone puller	To remove T-stem bottom cone.	070HHKST001
60	Bottom cone race driver	To install T-stem bottom cone.	070HHKST002
61	Upper and bottom cone installer	To install upper and bottom cone race to steering head pipe.	070HHKST003
62	Steering bearing adjusting nut socket, 41mm	To adjust the steering bearings.	070HHKST004
63	Socket wrench (Rotor filter and clutch)	To remove lock nut clutch assembly and rotor filter.	070HHKTC001
64	Socket clutch nut (Pneumatic, 20 mm)	To be used with pneumatic gun-clutch lock nut opening.	070HHKTC002
65	Clutch pressure plate holder	To hold clutch center while removing lock nut.	070HHKTC003
66	Driver outer, 32x35	To remove/install wheel bearing.	070HHKFN010
67	Crankshaft bearing (RHS) puller cum Inserter	To install/remove (RHS) crankshaft bearing.	070HHKTC005
68	T-Stem cone puller	To remove bottom cone race from the T-stem.	070HHKTC006
69	Socket, 19mm	To open and lock pivot nut.	070HHKTC007
70	Cap, Muffler (Super splendor)	To be used for protecting oil cooler fins during water wash.	070HHKTC008
71	Counter shaft oil seal guide	To protect the counter shaft while separating the crankcase.	070HHKTC009
72	Flywheel puller	To remove the flywheel from crankshaft.	070HHKTN001
73	Collet, 17mm	To remove bearing from crankcase.	070HHKTN002

SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
74	Crankshaft bearing (LHS) puller	To remove the bearing from crankshaft.	070HHKTN003
75	Bottom cone race driver	To remove top and bottom cone races from the steering head pipe.	070HHKTN005
76	Pilot, 20mm	To seat in the inner race and drive out/in the bearing.	070HHKTN006
77	Crankshaft bearing (LHS) inserter	To install crankshaft (LHS) bearing.	070HHKTN007
78	Counter shaft oil seal guide	To protect the counter shaft while separating the crankcase.	070HHKTN009
79	Rear engine foundation bush remover, 8x20	To remove/install the rear engine foundation bush.	070HHKTP01
80	Front engine foundation bush remover, 10x27	To remove/install the front engine foundation bush.	070HHKTP02
81	Drive shaft installer extension	To install the drive shaft into the left crankcase.	070HHKTP03
82	Drive shaft bearing remover with sleeve	To remove the drive shaft bearing.	070HHKTP04
83	Drive face holder	To hold the drive face for removal/installation.	070HHKTP05
84	Driven face nut socket	To remove/install driven face nut.	070HHKTP06
85	Centrifugal clutch spring remover	To remove/install the centrifugal clutch spring.	070HHKTP08
86	Driven face bearing remover & installer	To remove/install the driven face bearing.	070HHKTP09
87	Flywheel puller	To remove flywheel.	070HHKTP10
88	Flywheel holder	To hold the flywheel for removal/installation of flywheel.	070HHKTP11
89	Steering bearing adjuster nut socket, 45.3mm	To adjust/remove/install the bearing adjustment nut.	070HHKTP12
90	Upper cone race remover	To remove the upper cone race.	070HHKTP13
91	Bottom cone race remover head	To remove the bottom ball race from the steering head.	070HHKTP14
92	Bottom cone race remover shaft	To remove the bottom cone race.	070HHKTP15
93	Bottom cone race remover weight	To remove the bottom cone race.	070HHKTP16
94	Upper & bottom cone installer	To install upper and bottom cone race.	070HHKTP17
95	Clutch lever spring pin remover/installer	To install and remove clutch lever spring pin.	HMCL0415AABA01
96	T-stem cone installer	To install the T-stem cone race.	070HHKTP18
97	Shock absorber extractor	To compress spring for dismantling front/rear shock absorber.	070HHKTP19
98	Washing kit (Pleasure)	To restrict water entry during washing.	070HHKTP20
99	Cap, Muffler (Glamour)	To restrict water entry during washing.	070HHKTR001
100	DLC short connector	To read and erase the data from ECU.	070HHKTRF001
101	Fuel pressure gauge	To check the fuel pressure in fuel delivery system.	070HHKTRF003
102	Multimeter probe	To check the wiring in Programmed-FI connectors.	070HHKTRF004
103	Fuel pressure gauge adaptor	To check the fuel pressure in fuel delivery system.	070HHKTRF005
104	Remover head, 15mm	To remove wheel bearing from wheel hub.	070HHKVN001
105	Swingarm bearing remover/installer	To remove and install the swingarm bearing.	070HHKVN003
106	TPS test connector	To reset throttle position sensor.	070HHKVN004
107	T-stem cone remover	To remove T-stem bottom cone.	070HHKZJ001
108	Steering race remover	To remove upper/bottom steering race.	070HHKZJ002

SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
109	Steering race installer	To install the bottom/upper steering races.	070HHKZJ003
110	Steering adjuster nut socket	To remove/adjust the steering adjusting nut.	070HHKZJ004
111	Swingarm bearing remover	To remove the swingarm bearing.	070HHKZJ005
112	Swingarm bearing installer	To Install the swingarm bearing.	070HHKZJ006
113	Mono-shock bearing remover & installer	To remove/install the rear mono shock needle bearing.	070HHKZJ007
114	Wheel bearing remover head, 17mm	To remove wheel bearing from wheel hub.	070HHKZJ008
115	Wheel bearing remover shaft	To remove the wheel bearing.	070HHKZJ009
116	TPS test harness	To reset throttle position sensor.	070HHKZJ010
117	Swingarm stand	To raise the rear wheel off the ground and vehicle in upright position.	070HHKZJ011
118	Frame stand	To support the vehicle while doing major repairs.	070HHKZJ012
119	Drive shaft installer extension	To install drive shaft into the crankcase.	070HHKZN001
120	Driven face spring compressor	To compress the driven face spring for removal/installation.	070HHKZN002
121	Collet, 20 mm	To remove driven face needle bearing.	070HHKZN003
122	Top cone race holder	To hold the steering stem lock nut.	070HHKZN004
123	Washing kit (Maestro)	To restrict water entry during washing.	070HHKZN005
124	Timing sprocket remover	To remove the timing sprocket from the crankshaft.	070HHK06001
125	Timing sprocket installer	To install the timing sprocket on the crankshaft.	070HHK06002
126	Crankshaft bearing driver	To install the crankcase bearing.	070HHK06003
127	Crankshaft bearing collar	To install crankshaft bearing and timing sprocket.	070HHKZA001
128	Driver (RHS) crankshaft bearing	To install the crankshaft bearing in (RHS) crankcase.	070HHKZA002
129	Crankshaft installer adapter	To install the crankshaft in the (RHS) crankcase.	070HHKZA003
130	Muffler plug (Big)	To restrict water entry during washing.	070HHKZA004
131	Muffler plug (Small)	To restrict water entry during washing.	070HHK06004
132	Hero integrate diagnostic instrument	For immobilizer diagnosis & key registration.	HMCL0214AABA01
133	HIDI wire harness	For sync between instrument & bike wire harness.	HMCL0214AABA02
134	TPS test harness	To reset throttle position sensor.	HMCL1214AABA04
135	Service stand	To park the splendor pro classic in upright position.	HMCL0415AADF01
136	Cam sprocket driver	To rotate the cam sprocket for TDC position.	HMCL041519801
137	Left crankshaft oil seal guide	To remove crankshaft oil seal guide.	HMCL1014AALB01
138	Left crankshaft oil seal installer	To install crankshaft oil seal guide.	HMCL1014AALB02
139	Right crankshaft oil seal installer	To install crankshaft oil seal guide.	HMCL1014AALB03
140	Flywheel puller	To remove the flywheel from crankshaft (splendor+).	070HH198001
141	Washing kit duet/maestro edge	To avoid water entry during water wash.	HMCL0815AAWA01
142	T-stem cone remover	To remove bottom cone race from T-stem.	HMCL0815AAWA02
143	Front fork spring spacer compressor	To depress front fork bolt and remove the inner circlip.	HMCL0815AAWA03
144	Fuel pressure gauge adaptor	To check the fuel pressure in fuel delivery system.	HMCL0316AANC01
145	Pinout box	For diagnosing the Programmed-FI electrical system.	HMCL0316AANC02

SPECIAL TOOLS

SL. NO.	DESCRIPTION	APPLICATION	PART NUMBER
146	Cam sprocket driver	To rotate the cam sprocket for TDC position.	HMCL1216AANG001
147	Left crankshaft oil seal guide	To remove crankshaft oil seal guide.	HMCL0117AAWD01
148	Left crankshaft oil seal installer	To install crankshaft oil seal guide.	HMCL0117AAWD02
149	Drive face holder	To hold the drive face for removal/installation.	HMCL0117AAWD04
150	Drive face bearing remover and installer	To remove/install the driven face bearing.	HMCL0117AAWD05
151	Front fork oil seal driver body with attachment dia, 37 mm	To drive in new oil seal & anti friction bush.	HMCL0418AABM001
152	Front fork dismantling shaft	To hold fork tube seat while opening the bottom allen key bolt.	HMCL0418AABM002
153	Front fork dismantling shaft adapter	To hold fork tube seat while opening the bottom allen key bolt.	HMCL0418AABM003
154	Counter shaft oil seal guide	To protect the counter shaft oil seal while separating the crankcase.	HMCL0418AABM004
155	Muffler plug	To restrict water entry during washing.	HMCL0418AABM005
156	Washing kit	To avoid water entry during water wash.	HMCL0318ABSA01
157	Oxygen sensor socket	To remove/install the oxygen sensor socket.	HMCL0519ABW01
158	Hero vehicle communication interface	To diagnose the FI system.	HMCL0419HVCI01
159	Crankshaft bearing (RHS) puller cum inserter	To remove/install the bearing from crankshaft.	HMCL0120ABZA01
160	Steering top cone inserter adapter	To install upper and bottom cone race to steering head pipe.	HMCL0120ABZA02

EMISSION CONTROL SYSTEM

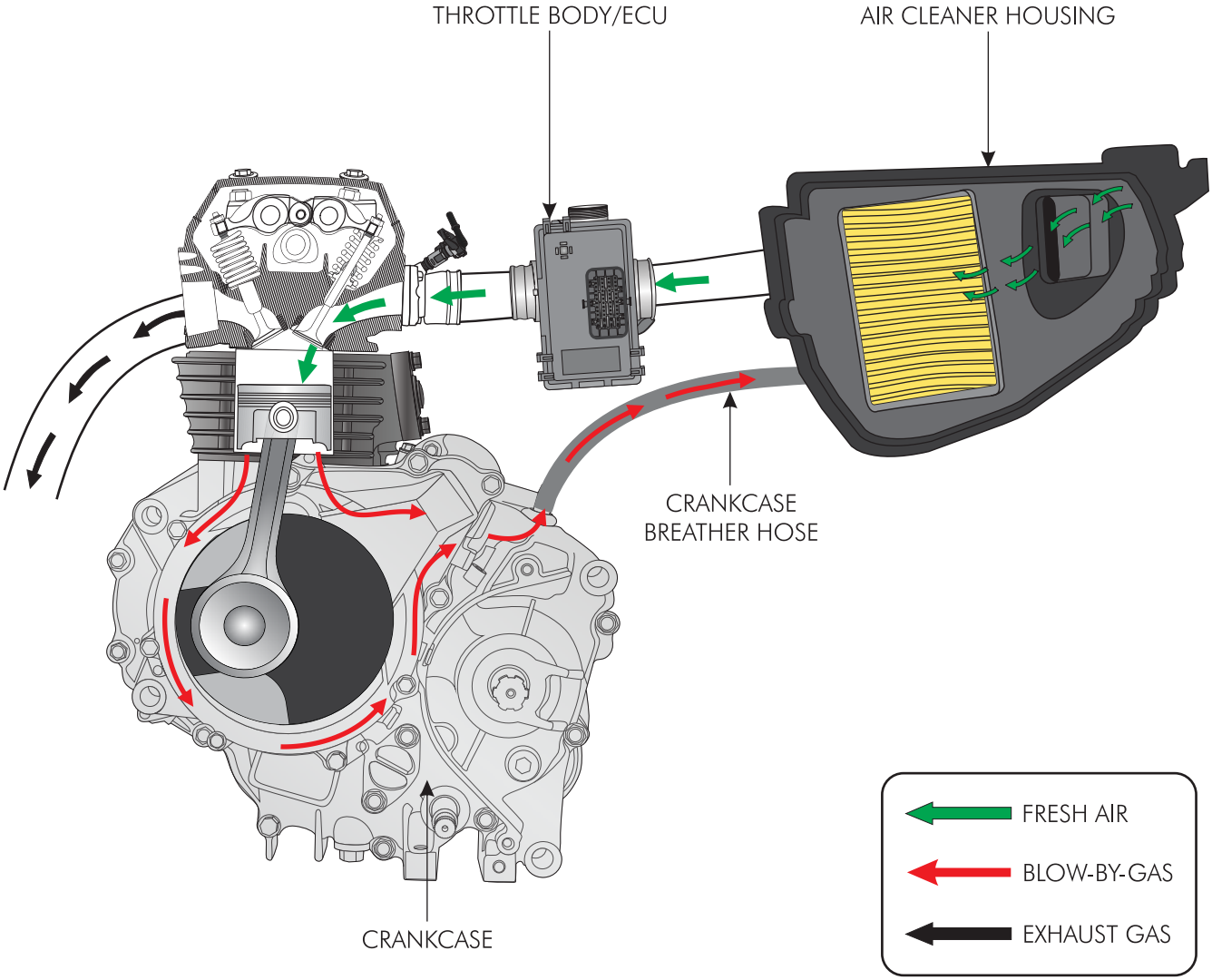
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide (CO), oxides of nitrogen (NOx) and hydrocarbons (HC). Control of carbon monoxide, oxides of nitrogen and hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but is toxic.

Hero MotoCorp Ltd. utilizes appropriate systems, to reduce carbon monoxide and hydrocarbons.

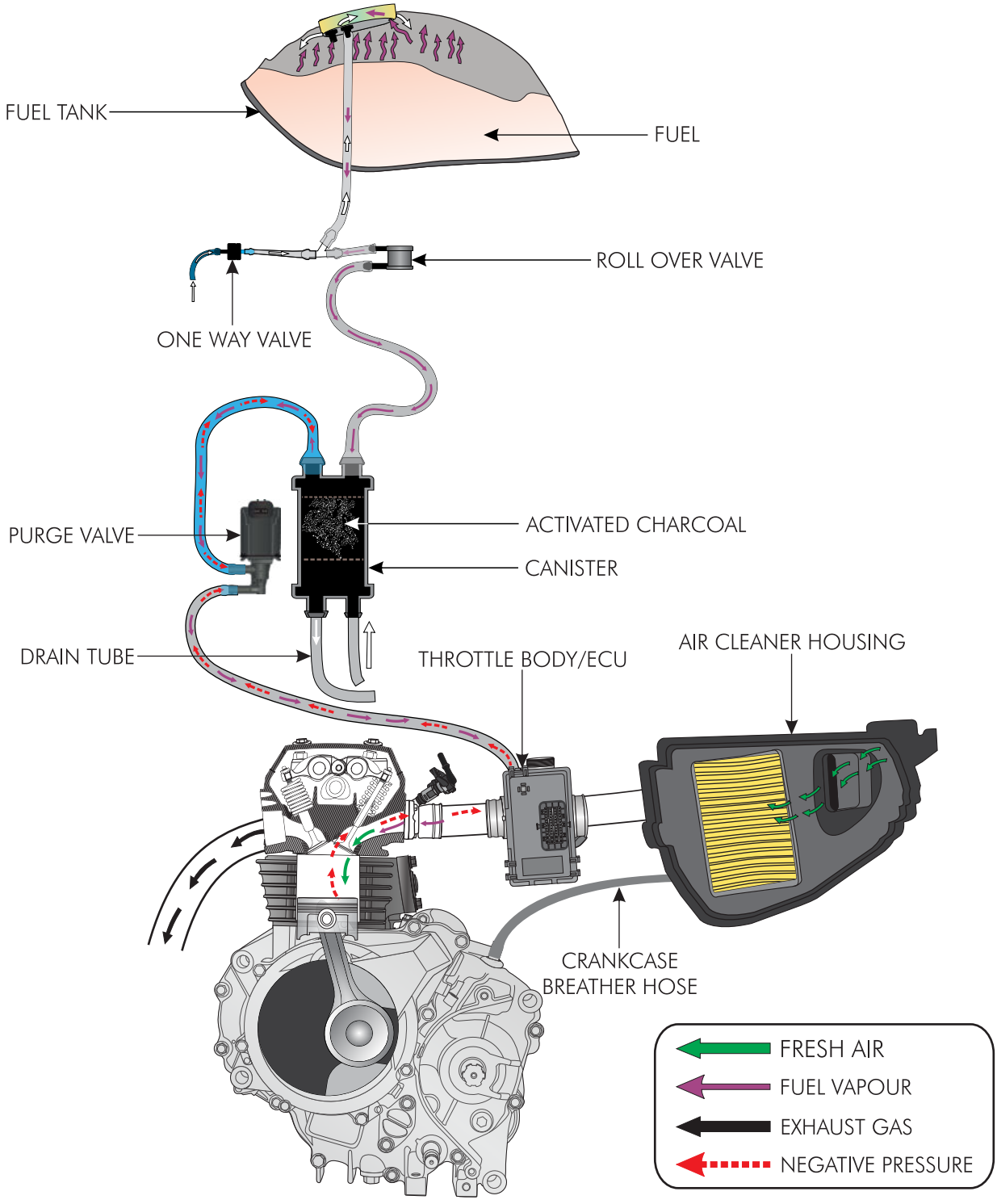
CRANKCASE EMISSION CONTROL SYSTEM

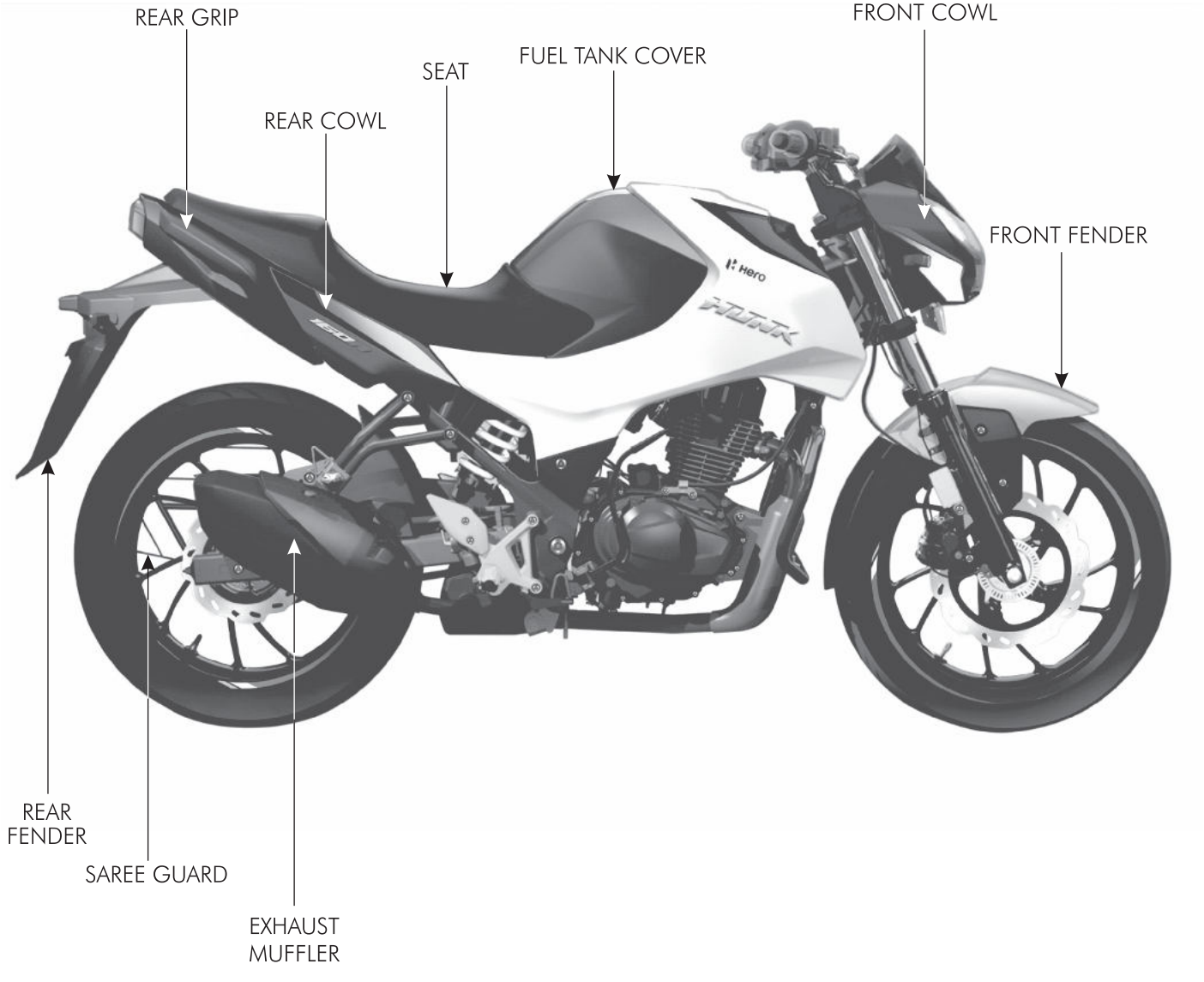
The engine is equipped with a closed crankcase system to prevent discharging crankcase emission into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and throttle body.



EVAPORATIVE EMISSION CONTROL SYSTEM

This motorcycle is equipped with an evaporative emission control system to meet emission standards. During warm weather, the petrol vapours which contain HC evaporates easily into the atmosphere from the fuel tank, if the fuel system is unsealed or open. The evaporative emission control system is used to prevent petrol vapours from escaping into the atmosphere from fuel tank. Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body for re-burning to avoid pollution caused by the fuel vapour diffused into the air.




REAR GRIP
REAR COWL
SEAT
FUEL TANK COVER
FRONT COWL
FRONT FENDER
REAR FENDER
SAREE GUARD
EXHAUST MUFFLER

System Location	2-0	Cooling Duct	2-7
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Front Fender	2-3	Exhaust Muffler Cover	2-10
Leg Guard (Optional)	2-4	Rear Cowl	2-11
Horn	2-4	Saree Guard	2-12
Seat	2-5	Hugger Fender	2-12
Fuel Tank Cover	2-5	Rear Fender	2-13

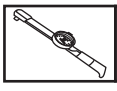
SERVICE INFORMATION

⚠ WARNING

Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced .

GENERAL

- This section covers removal and installation of the body panels and exhaust system. The body panels installation is in the reverse order of removal, unless noted other wise.
- Always replace the exhaust pipe gaskets with new ones after loosening or removing the exhaust pipe joint nuts.
- When installing the exhaust system, loosely install all the exhaust pipe fasteners. Always tighten the exhaust mounting nuts from the cylinder head side first, then tighten the other mounting fasteners. If you tighten the mounting bolt and nut first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leak after installation.



TORQUE VALUES

EXHAUST MUFFLER JOINT NUT	**: 1.2 kgf-m**
EXHAUST MUFFLER MOUNTING BOLT	**: 2.7 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

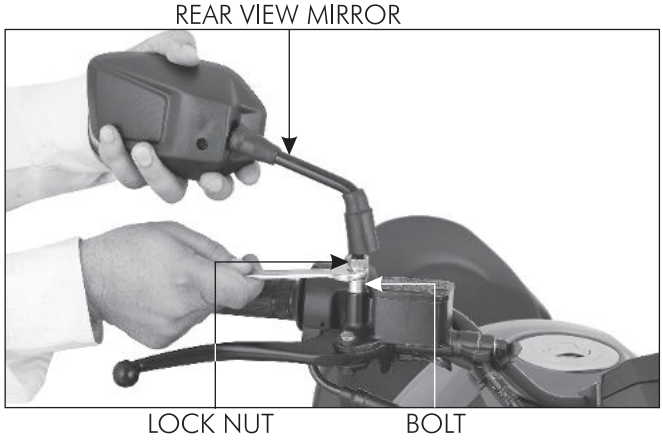
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

REAR VIEW MIRROR

REMOVAL

Slide the lock nut cap.

Loosen the bolt and remove the right side rear view mirror.
Follow the same procedure for the left side rear view mirror.



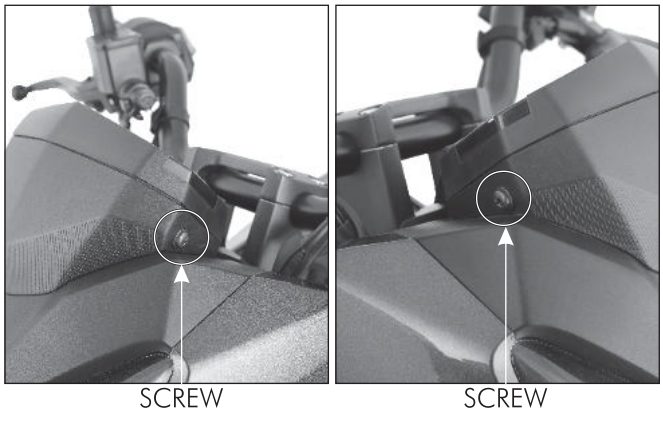
INSTALLATION

Installation is in the reverse order of removal.

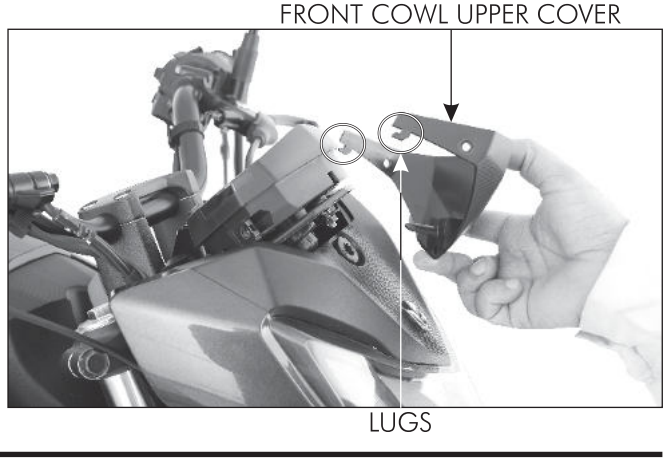
FRONT COWL

REMOVAL

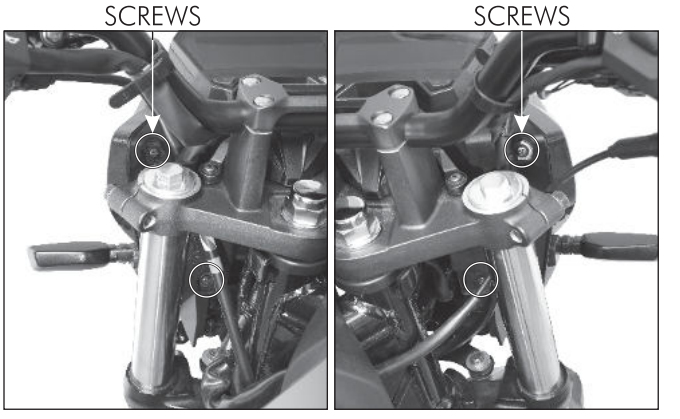
Remove the screws of front cowl upper cover.



Remove the front cowl upper cover by removing its lugs.

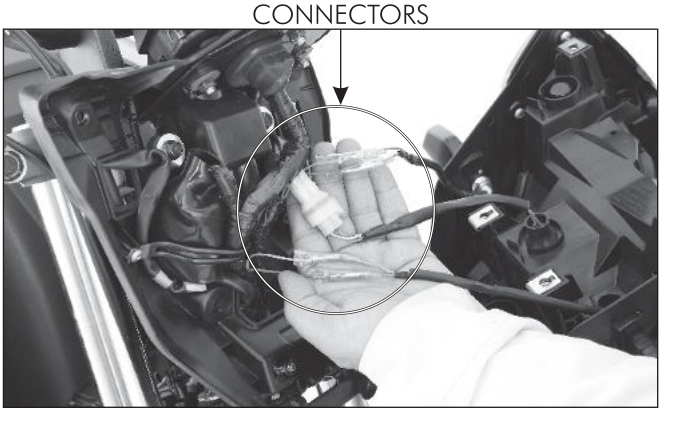


Remove the front cowl screws (4 nos.) from both side.



Dislodge the front cowl carefully by releasing from the bosses of front cowl stay.

Disconnect the headlamp/position lamp connector, front turn signal lamp connector and remove the front cowl assembly.



INSTALLATION

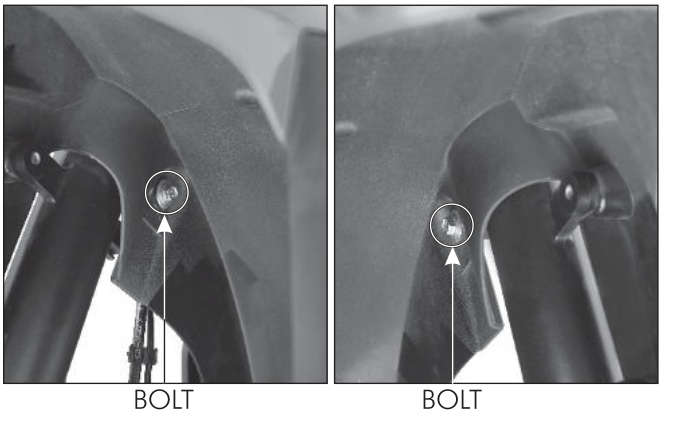
Installation is in the reverse order of removal.

FRONT FENDER

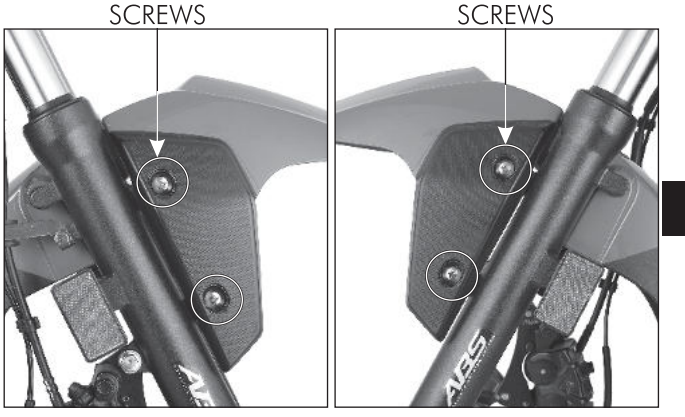
REMOVAL

Remove the front wheel (page 12-8).

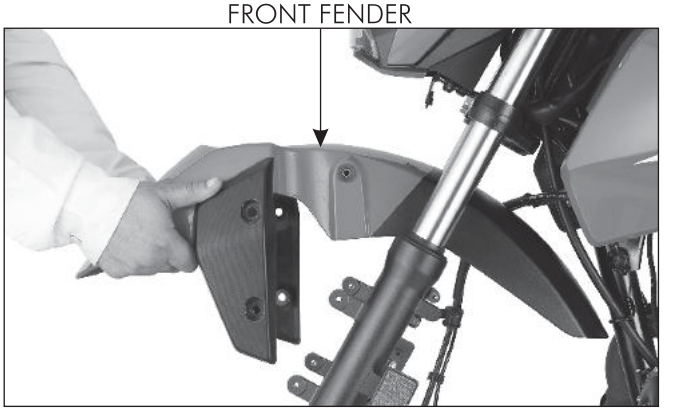
Remove the front fender bolts (2 nos.).



Remove the mounting screw from both the side (4 nos.).



Remove the front fender by sliding it towards front.



INSTALLATION

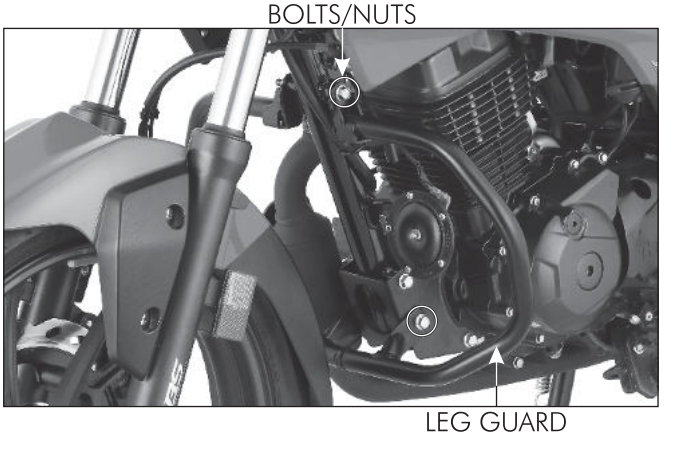
Installation is in the reverse order of removal.

LEG GUARD (OPTIONAL)

REMOVAL

Remove the mounting bolt/nut (2 nos.) from the engine hanger plate.

Remove the leg guard.



INSTALLATION

Installation is in the reverse order of removal.

NOTE

Take extra care while removing leg guard to avoid any damage to the exhaust muffler.

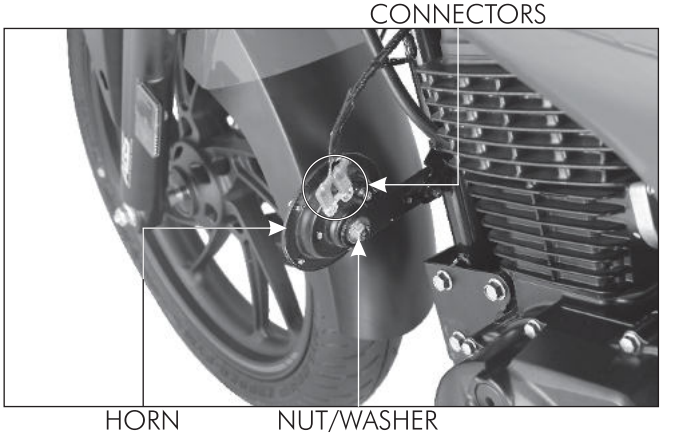
HORN

REMOVAL

Disconnect the horn wire connectors.

Remove the nut/washer.

Remove the horn.



INSTALLATION

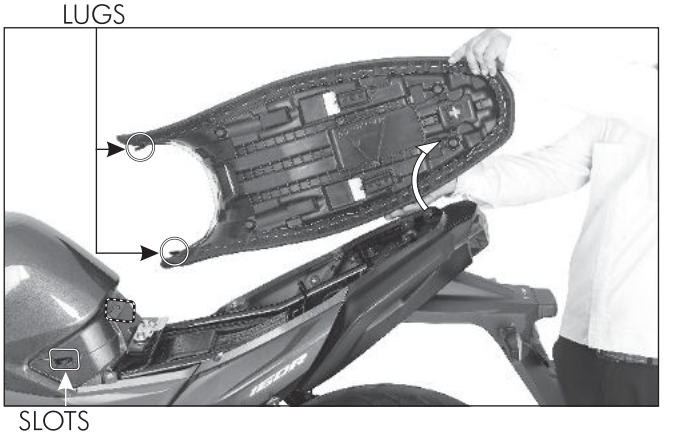
Installation is in the reverse order of removal.

SEAT

REMOVAL

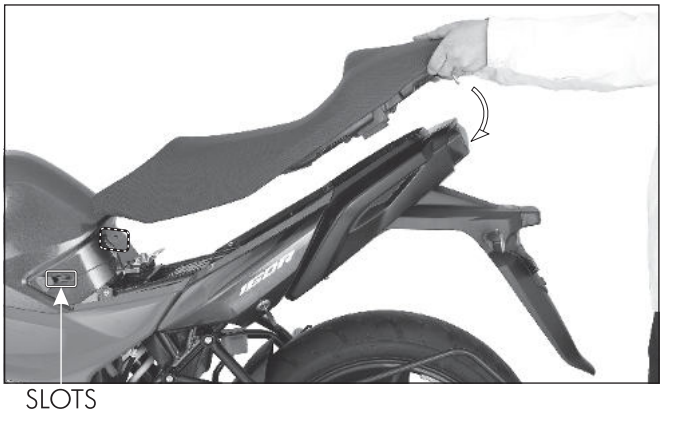
Insert the ignition key into the seat lock and unlock by turning the key clockwise.

Remove the seat while releasing the lugs from the slots on the fuel tank cover.



INSTALLATION

To install the seat, engage the lugs on the under side of the seat with the slots on the fuel tank cover and press on the top rear side of the seat until the lock clicks.

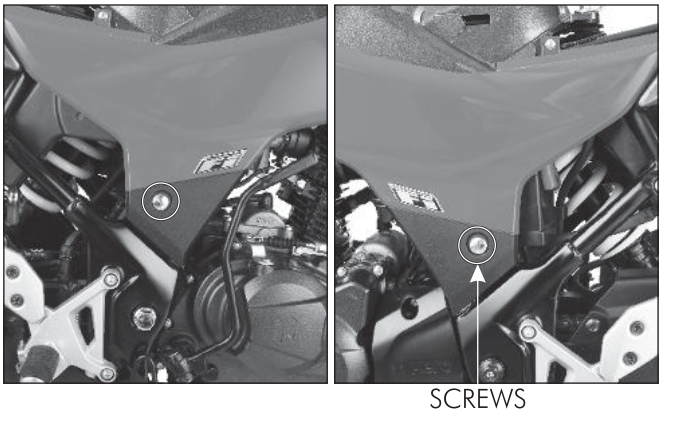


FUEL TANK COVER

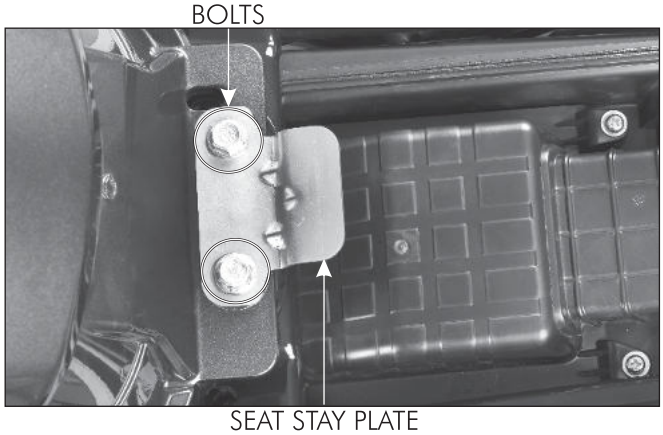
REMOVAL

Remove the seat (page 2-5).

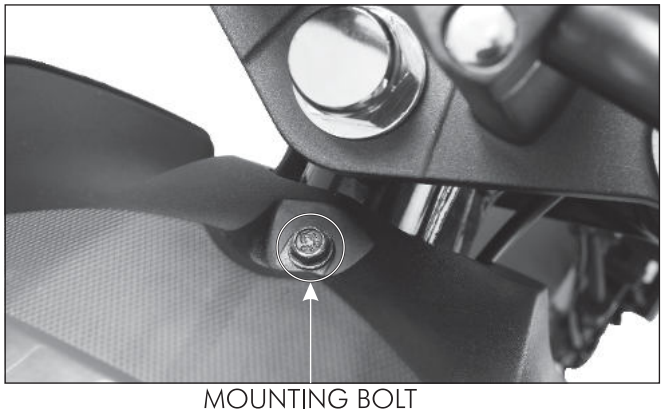
Remove the screws (2 nos.) from the both the sides.



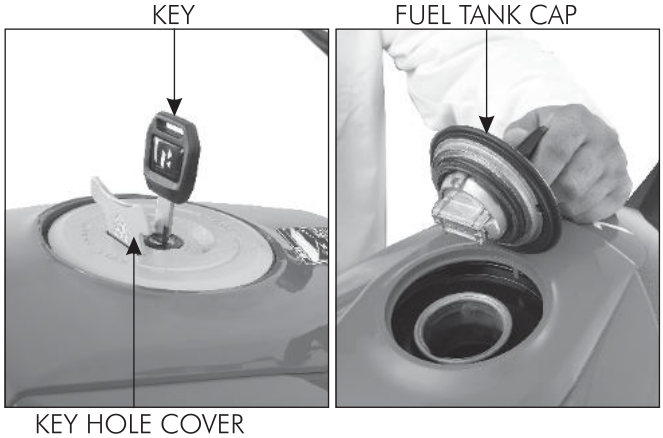
Remove the mounting bolts (2 nos.) and remove the seat stay plate.



Remove the mounting bolts.



Remove the fuel tank cap by lifting the key hole cover, insert key turn it clockwise and lift open the cap.



Remove the fuel tank cover.

Install the fuel tank cap.

INSTALLATION

Installation is in the reverse order of removal.

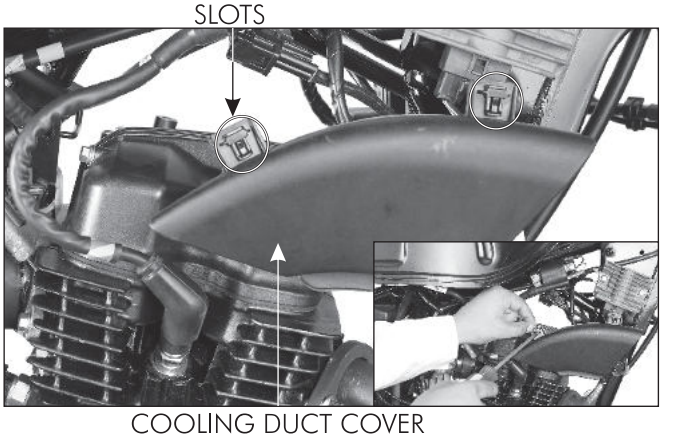
COOLING DUCT

REMOVAL

Remove the fuel tank cover (page 2-5).

With the help of screwdriver, remove the slot from cooling duct cover.

Remove the cooling duct cover.

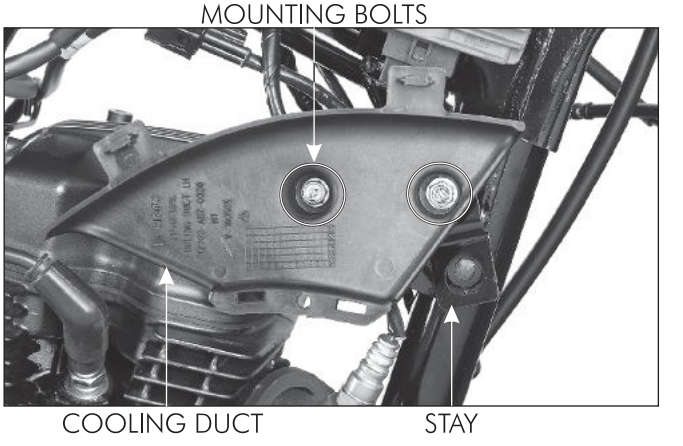


Remove the mounting bolts (2 nos.) from the cooling duct.

Remove the cooling duct with its stay.

INSTALLATION

Installation is in the reverse order of removal.



STEP HOLDER

LEFT SIDE

REMOVAL

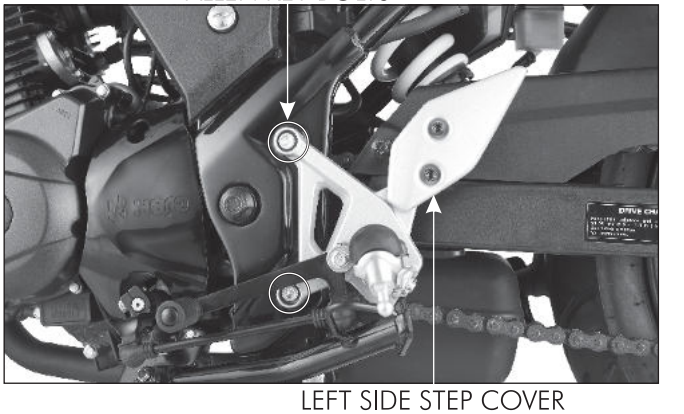
Remove the gear shift pedal (page 6-3).

Remove the left side step holder allen key bolts.

Remove the left side step holder.

INSTALLATION

Installation is in the reverse order of removal.



RIGHT SIDE

REMOVAL

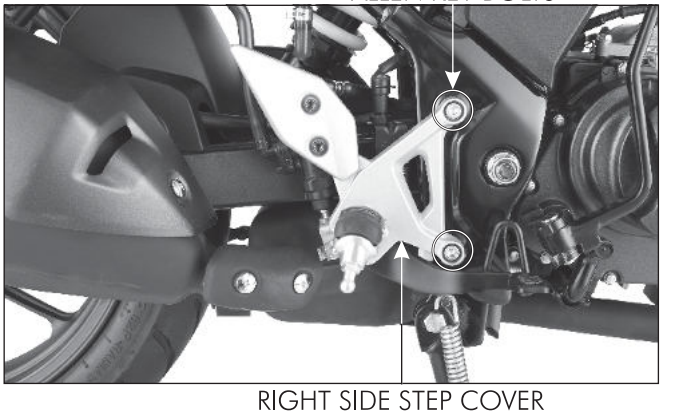
Remove the right side step holder allen key bolts.

Position aside the right step holder.

Remove the right side step holder (page 13-12).

INSTALLATION

Installation is in the reverse order of removal.



FUEL TANK

REMOVAL

Remove the fuel tank cover (page 2-5).

Remove the cooling duct (page 2-7).

Keep the vehicle idle to cool the engine for 10-20 minutes.

Remove the fuel feed hose from the injector joint (page 5-57).

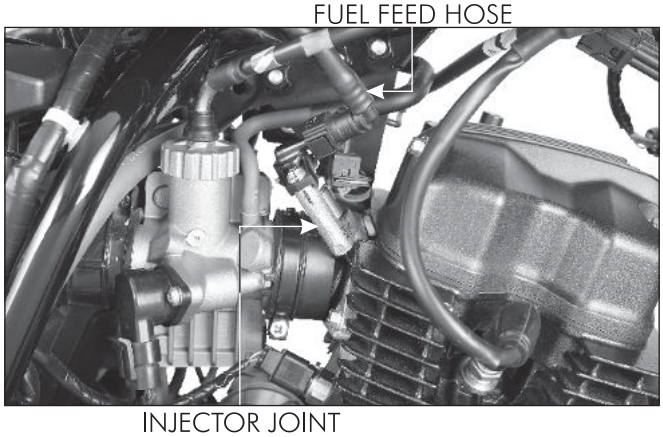
NOTE

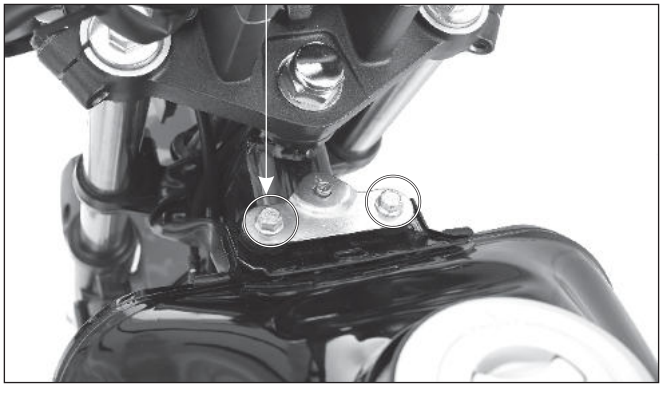
- To avoid fuel spillage on engine, beaker can be used to collect extra fuel present in tube.
- Whenever fuel feed hose is disconnected ensure to plug the hose and cover injector joint to prevent dust entry.
- Take extra care while lifting the fuel tank to avoid any damage to fuel pump hose connection or injector joint.

⚠ WARNING

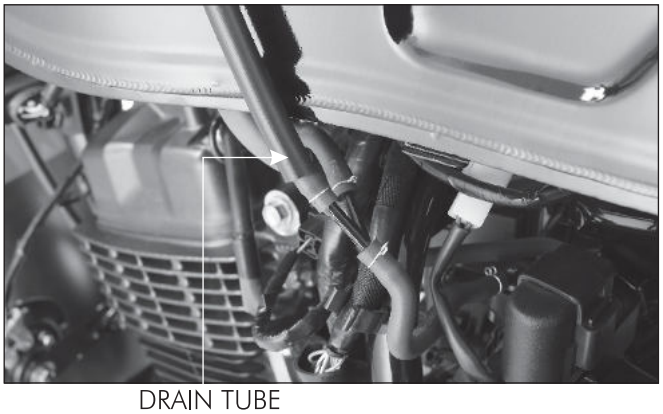
- Keep petrol away from flames or sparks.
- Wipe up spilled petrol at once.

Remove the fuel tank mounting bolts (2 nos.).

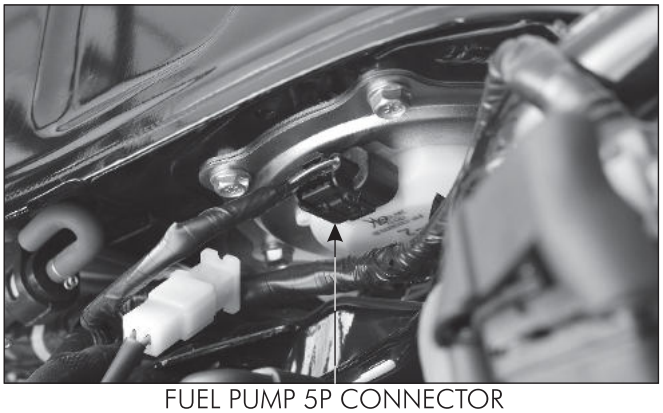




Disconnect the fuel tank drain tube.



Disconnect the fuel pump 5P connector.



Remove the fuel tank by lifting up.

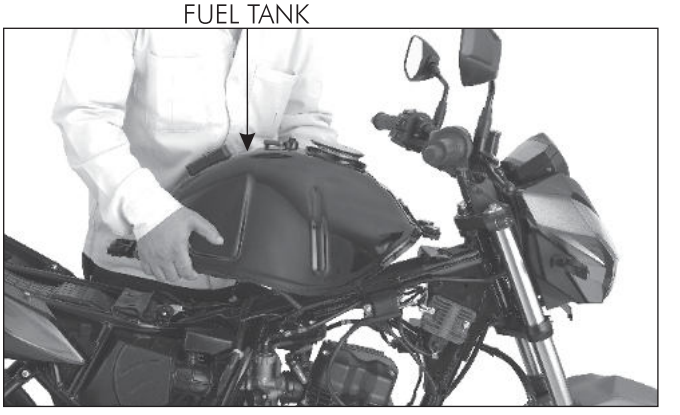
INSTALLATION

Installation is in the reverse order of removal.

NOTE

Route the hoses properly. Ensure the hoses are not pinched or kinked during assembly.

FUEL TANK



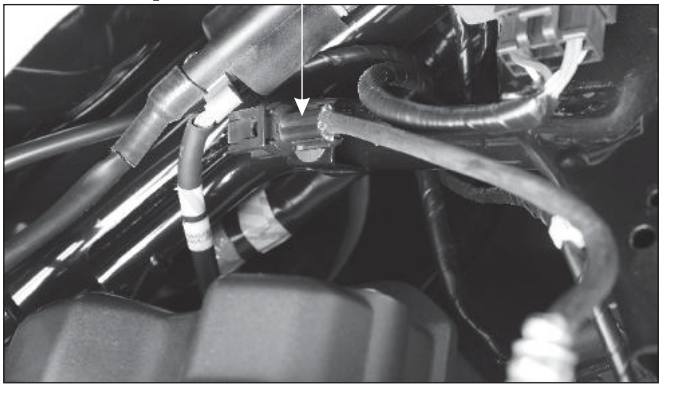
EXHAUST MUFFLER

REMOVAL

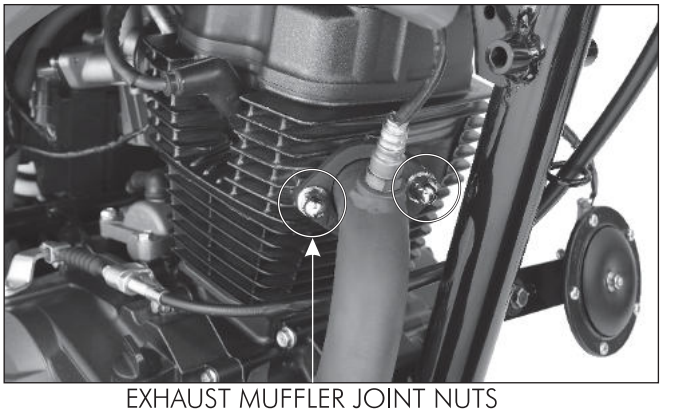
Remove the fuel tank cover (page 2-5).

Disconnect the O_2 sensor 2P connector.

O_2 SENSOR 2P CONNECTOR

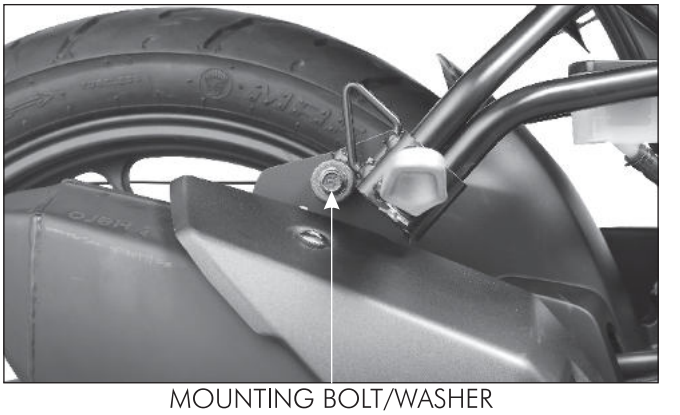


Remove the exhaust muffler joint nuts.



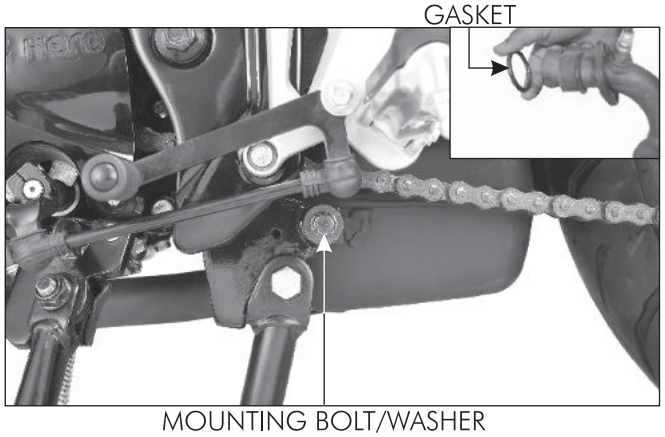
EXHAUST MUFFLER JOINT NUTS

Remove the muffler mounting bolt/washer.



MOUNTING BOLT/WASHER

Remove the muffler mounting bolt/washer from the left side.
Remove the exhaust muffler and gasket.



INSTALLATION

Install a new muffler gasket.

Align the exhaust pipe and install the muffler mounting bolt/washer and exhaust muffler joint nuts.

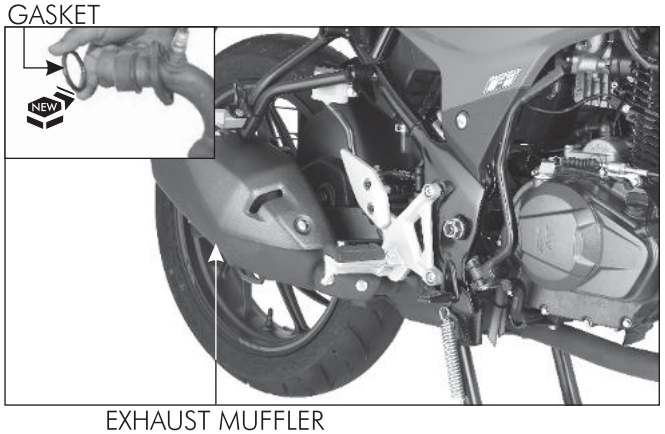
Tighten the exhaust pipe joint nuts and muffler mounting bolt to the specified torque.

TORQUE

EXHAUST MUFFLER JOINT NUT: 1.2 kgf-m
EXHAUST MUFFLER MOUNTING BOLT: 2.7 kgf-m

NOTE

- Always replace the exhaust muffler gasket with a new one whenever the muffler is removed from the engine.
- While loosening and tightening always tighten the muffler joint nuts at the cylinder head first and then the muffler mounting bolt.



EXHAUST MUFFLER COVERS

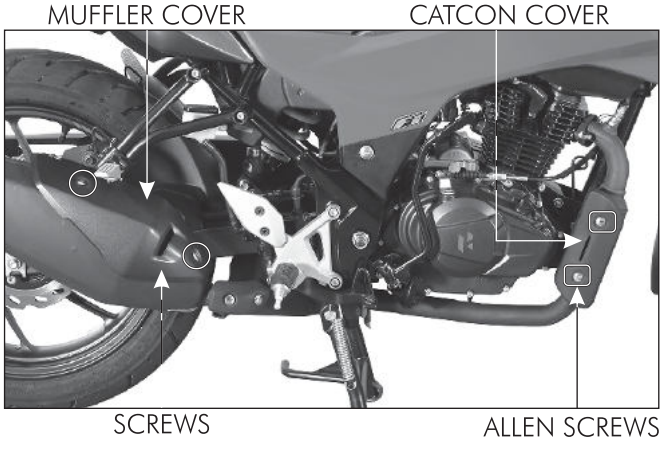
REMOVAL

Remove the muffler cover by removing screws (2 nos.).

Remove the muffler catcon cover by removing allen screws (2 nos.).

INSTALLATION

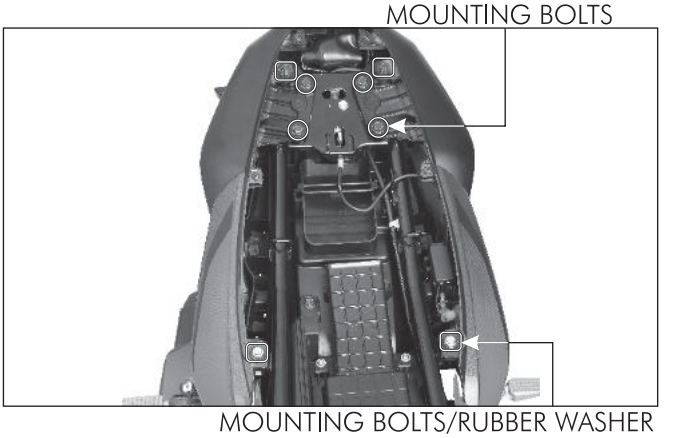
Installation is in the reverse order of removal.



REAR COWL

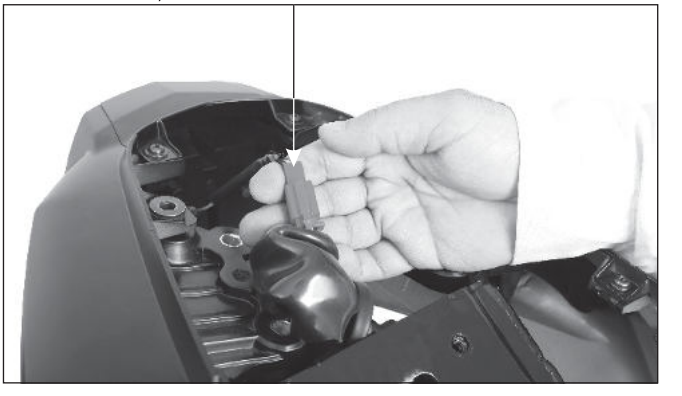
REMOVAL

Remove the seat (page 2-5).
Remove the mounting bolts (4 nos.).
Remove the mounting bolts/rubber washer (4nos.).

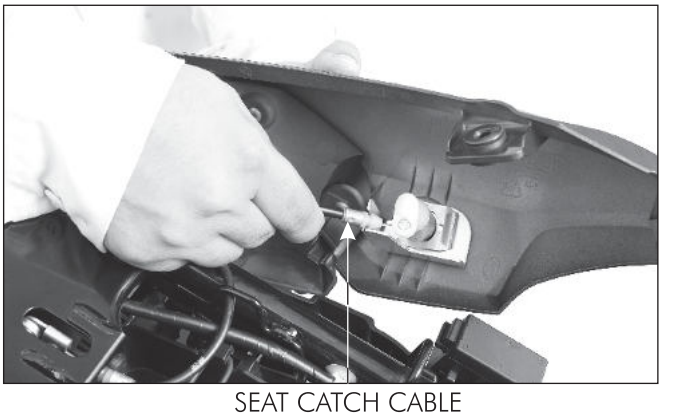


Remove the screws from the bottom (2 nos.) as shown.

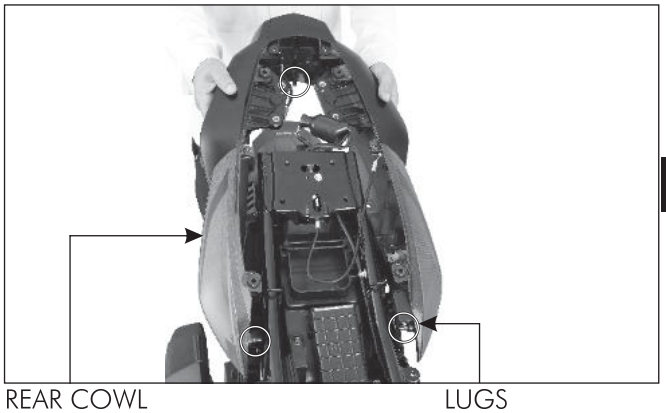
Disconnect the tail/stop lamp connector.



Remove the seat catch cable.



Release the lugs from the rear cowl.
Remove the rear cowl.

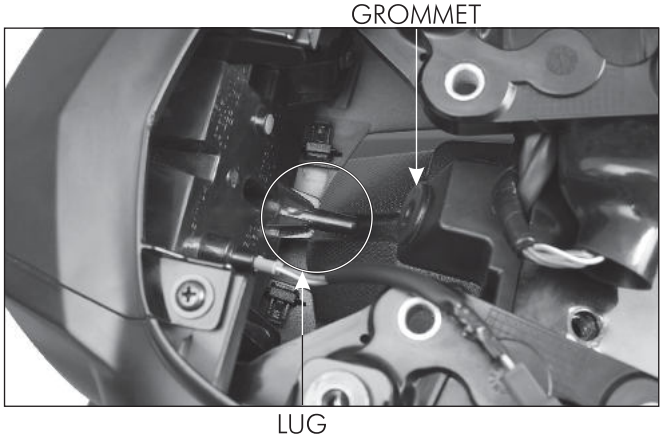


INSTALLATION

Installation is in the reverse order of removal.

NOTE

Install the rear cowl by aligning its lug to the grommet.



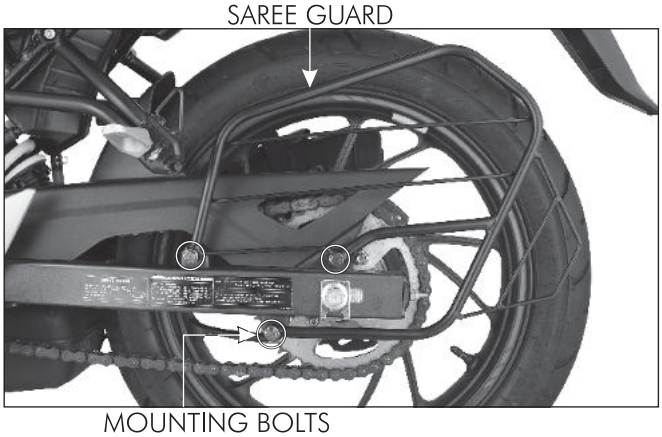
SAREE GUARD

REMOVAL

Remove the saree guard mounting bolts (3 nos.) and saree guard.

INSTALLATION

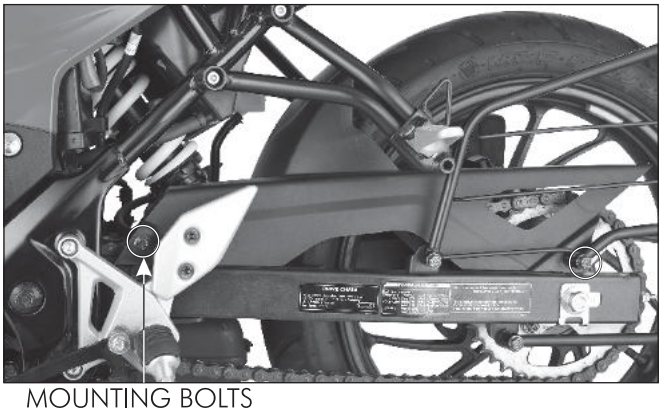
Installation is in the reverse order of removal.



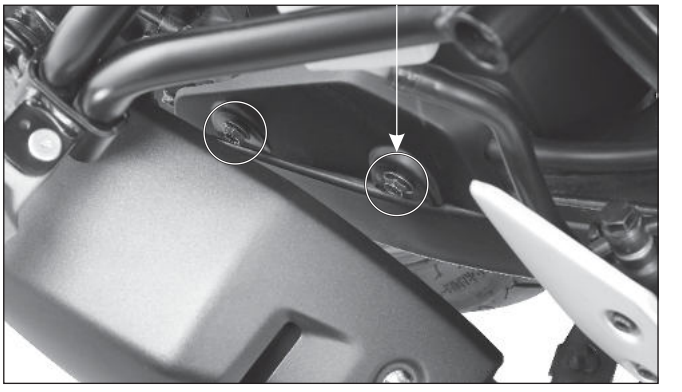
HUGGER FENDER

REMOVAL

Remove the hugger fender mounting bolts from the left side of the vehicle.



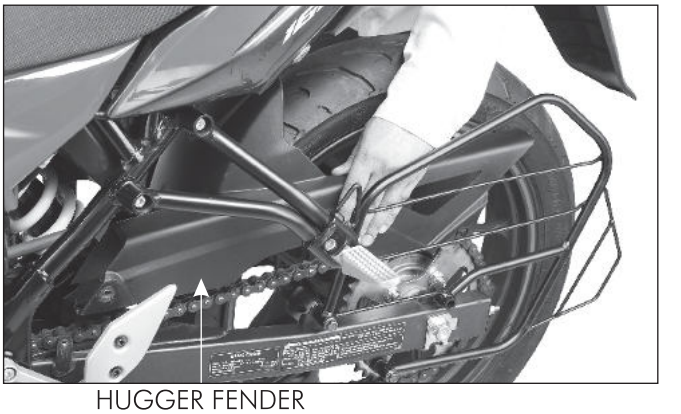
Remove the hugger fender mounting bolts from the right side of the vehicle.



Remove the hugger fender towards rear.

INSTALLATION

Installation is in the reverse order of removal.

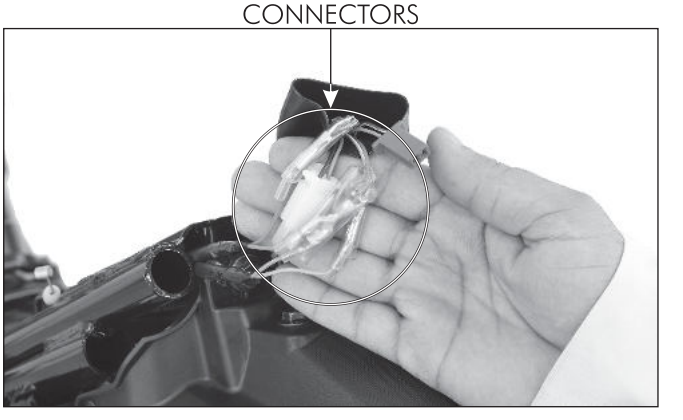


REAR FENDER

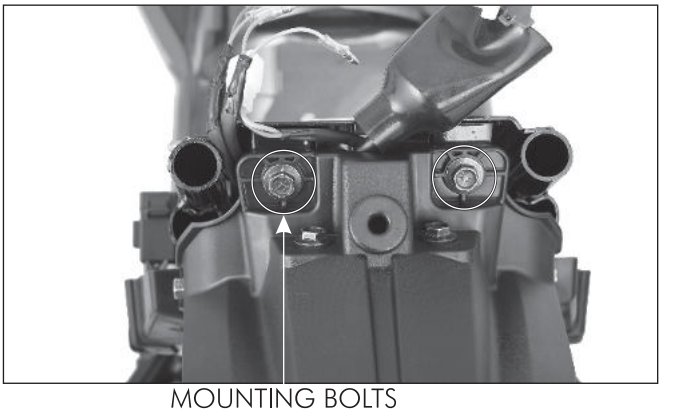
REMOVAL

Remove the rear cowl (page 2-11).

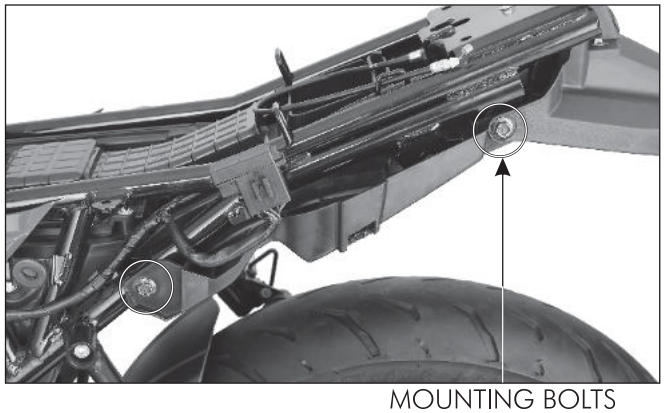
Disconnect the licence plate/rear turn signal connectors.



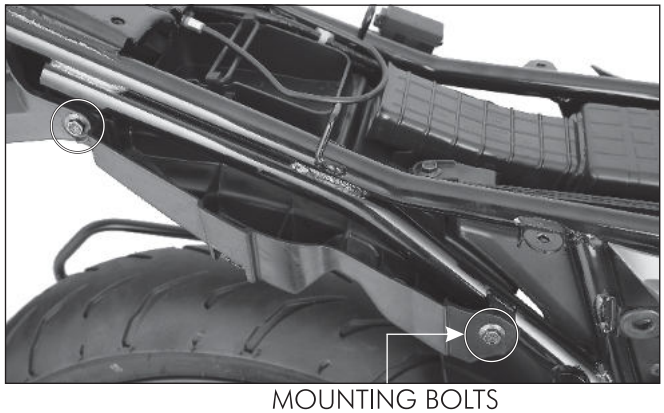
Remove the mounting bolts (2 nos.).



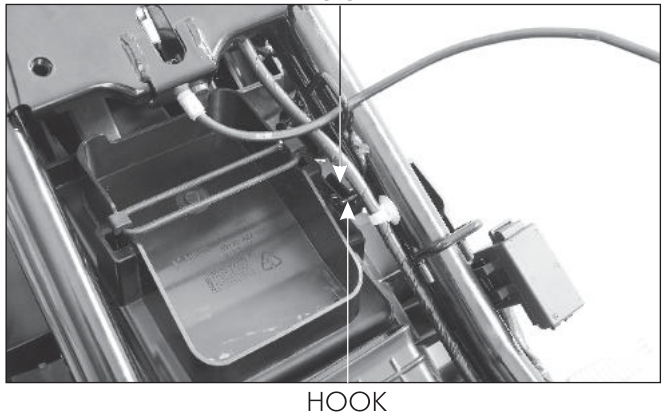
Remove the mounting bolts (2 nos.) from the left side.



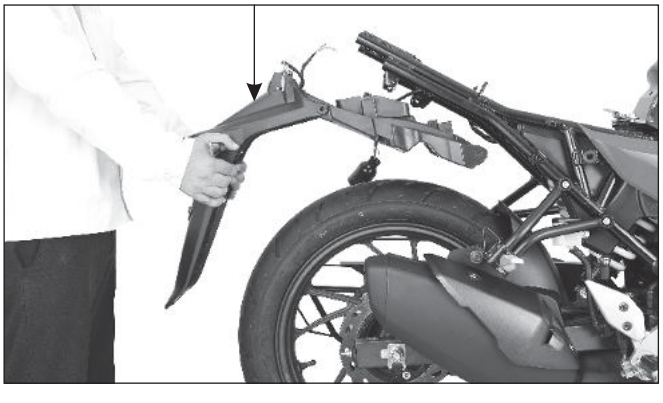
Remove the mounting bolts (2 nos.) from the right side.



Dislodge the rear cowl lock from its hook.



Remove the rear fender towards the rear.



INSTALLATION

Installation is in the reverse order of removal.

MEMO

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Air Cleaner Element	3-5	Side Stand Switch/Suspension	3-22
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Engine Oil	3-9	Steering Head Bearings	3-24
Oil Strainer Screen Cleaning	3-10	Crankcase Breather Tube	3-24
Oil Filter Rotor Cleaning	3-11	Air Cleaner Drain Tube	3-24
Drive Chain	3-12	Exhaust Emission	3-25
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Brake Fluid	3-17		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- If the engine is running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.
- Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.
- Petrol is extremely inflammable and is explosive under certain condition. Work in a well ventilated area with the engine in stop condition. Do not smoke, allow flames, sparks in the work area where petrol is stored.

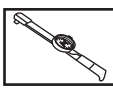
- Park the vehicle on ramp before starting any work.
- The oil filter screen, oil filter rotor cleaning and oil pump servicing can be done with engine in the frame.
- Some maintenance jobs requires removal of body panels. Refer to (**SECTION-2**) for the removal/installation of required body panels.

SPECIFICATIONS

MAINTENANCE

ITEM		SPECIFICATIONS
Throttle grip free play		2-6 mm
Spark plug		NGK-CPR 8 EA 9, BOSCH UR5DC
Spark plug gap		0.8-0.9 mm
Valve clearance	Intake	0.12 mm
	Exhaust	0.13 mm
Engine oil capacity	At draining	1.09 litre
	At disassembly	1.3 litre
Recommended engine oil		Brand : Hero 4T Plus Grade : SAE 10W 30 SL Grade (JASO MA2) Manufactured by : 1. Tide Water Oil Co. (India) Ltd. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.

Engine idle speed			1400±100 rpm
Cylinder compression			12.0±2.0 kgf/cm^2
Drive chain slack			20-25 mm
Recommended brake fluid			DoT 3 or DoT 4
Clutch lever free play			10-20 mm
Tyre size		Front	100/80 17 52 P (Tubeless tyre)
		Rear	130/70 R17 62 P (Radial tubeless tyre)
Cold tyre pressure	Rider only	Front	1.75 kgf/cm^2 (25 psi)
		Rear	1.96 kgf/cm^2 (28 psi)
	Rider & Pillion	Front	1.75 kgf/cm^2 (25 psi)
		Rear	2.10 kgf/cm^2 (30 psi)
Recommended minimum center tyre tread depth		Front	0.8 mm
		Rear	1.0 mm

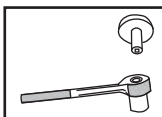


TORQUE VALUES

SPARK PLUG	**: 1.6 kgf-m**
TAPPET ADJUSTING SCREW LOCK NUT	**: 1.4 kgf-m**
OIL DRAIN BOLT	**: 3.0 kgf-m**
REAR AXLE NUT	**: 6.8 kgf-m**
CRANKSHAFT HOLE CAP	**: 1.5 kgf-m**
SWINGARM PIVOT NUT	**: 6.0 kgf-m**
REAR AXLE NUT	**: 6.8 kgf-m**
LEFT STEP HOLDER BRACKET BOLT	**: 2.1 kgf-m**
REAR SHOCK ABSORBER LOWER MOUNTING BOLT	**: 5.0 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values (**SECTION-1**).

SPECIAL TOOLS



TAPPET ADJUSTER WITH SOCKET, 10mm
PART NO: 070 HH KFN 001

MAINTENANCE SCHEDULE

	ITEMS	SERVICE	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
		DAYS	1st 60	Next 90	Next 90	Next 90	Next 90	Next 90	Next 90	Next 90	Next 90	Next 90	Next 90
		KM Note-1	500-750	3000-3500	6000-6500	9000-9500	12000-12500	15000-15500	18000-18500	21000-21500	24000-24500	27000-27500	30000-30500
	Fuel Line		I	I	I	I	I	I	I	I	I	I	I
🔧	Throttle Operation		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A
	Air Cleaner Element	Note-2	Do not open air cleaner element unless there is a drivability problem					R					R
	Spark Plug		I, C, A	I, C, A	I, C, A	I, C, A	R	I, C, A	I, C, A	I, C, A	R	I, C, A	I, C, A
✕	Valve Clearance		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A
	Engine Oil	Note-3	O	I, T	O	I, T	O	I, T	I, T	O	I, T	O	I, T
✕	Engine Oil Strainer Screen		C		C		C		C		C		C
✕	Engine Oil Centrifugal Filter		C		C		C		C		C		C
	Electric Starter		I	I	I	I	I	I	I	I	I	I	I
	Oil Circulation		I	I	I	I	I	I	I	I	I	I	I
✕	Drive Chain	Note-4	I,C,L,A at every 1000 km						I,C,L,A at every 1000 km				
	Drive Chain Slider			I	I	I	I	I	I	I	I	I	I
	Battery Voltage Inspection with Midtronics tester		I	I	I	I	I	I	I	I	I	I	I
	Brake Shoe (Drum type)		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A
	Disc Wear/ Pad Wear (Disc type)		I	I	I	I	I	I	I	I	I	I	I
	Brake Fluid (Disc type)	Note-5	I	I	I	I	I	I	I	I	I	I	I
	Brake System (Brake Cam & Brake pedal)			C, L		C, L		C, L		C, L		C, L	
🔧	Stop Lamp Switch		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A
🔧	Headlamp Focus		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A
	Clutch Lever Free Play		I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A	I, A
	Side Stand/Main Stand		L	L	L	L	L	L	L	L	L	L	L
	Side Stand Switch		I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C	I, C
🔧	Nuts, Bolts & Fasteners	Note-6	I	I	I	I	I	I	I	I	I	I	I
✕	Wheel Bearings	Note-7	I	I	I	I	I	I	I	I	I	I	I
✕	Wheels/Tyres		I	I	I	I	I	I	I	I	I	I	I
✕	Steering Head Bearings		I	I, A	I	I, A	I, L, A	I	I	I, A	I, L, A	I	I, A
✕	Front Suspension/Oil	Note-8	I	I	I	I	I	I	I	I	I	I	I
🔧	Rear Suspension	Note-9	I	I	I	I	I	I	I	I	I	I	I
✕	Muffler (Catalytic Converter)	Note-10			I, E		I, E		I, E		I, E		I, E
🔧	Evaporative Emission Control System	Note-11	I	I	I	I	I	I	I	I	I	I	I

🔧 To be serviced by your Authorised Authorised Distributor/Dealer unless the owner has the relevant tools, technical information and is technically qualified.

✕ In the interest of safety, we recommend that these jobs are carried out only by your Authorised Distributor/Dealer.

Note-1 : At higher odometer readings, repeat the frequency interval established here.

Note-2 : Replace air cleaner element once in every 15000 km or early replacement may be required when riding in dusty areas.

Note-3 : Replace engine oil once in every 6000 km. Top up if the oil level is at or near the lower level mark.

Note-4 : Visit Authorised Distributor/Dealer for inspection, cleaning, lubrication and adjustment of drive chain at every 1000 km

Note-5 : Replace brake fluid once in every two years or 30000 km, whichever is earlier.

Note-6 : Inspect & maintain specified torque.

Note-7 : Inspect the bearings free play, replace if necessary.

Note-8 : Replace front fork oil once in a every 2 years or 30000 km, whichever is earlier.

Note-9 : Inspect rear suspension mounting bushes play, replace rear shock absorber if necessary.

Note-10 : Check idle CO emission at idle.

Note-11 : Inspect the canister hoses for deterioration, damage or loose connections and canister for cracks or other damages.

Ensure that each paid service is availed within 90 days or 3000 km from the date of previous service, whichever is earlier.

Note: Always wipe the water from the vehicle after washing. Use clean soft cloth or pressurised air for completely drying the water.

I: INSPECT R: REPLACE C: CLEAN L: LUBRICATE A: ADJUST IF REQUIRED O: OIL CHANGE T: TOP UP E: EMISSION CHECK

FUEL LINES

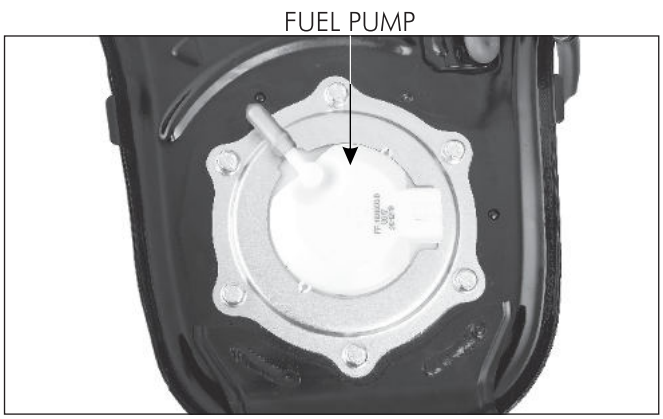
FUEL HOSE INSPECTION

Check the fuel line for any leakage, deterioration, damage, cracks or any other damage.

Replace the fuel hose if necessary. For quick connect fitting removal and installation (page 5-57).

NOTE

- It is required to disconnect the fuel hose from the injector side first.
- Always ensure to clean any dust or dirt around the quick connect fitting area before removal.
- Use a shop towel to prevent the remaining fuel in the fuel feed hose from falling out.
- Be careful not to damage the hose or other parts.
- Do not use any tool to press the retainer tabs.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it comes off easily.



THROTTLE OPERATION

Check for any deterioration or damage to the throttle cables.

Check the throttle grip for smooth operation. Check that the throttle grip returns from the full open to the full closed position smoothly and automatically in all steering positions.

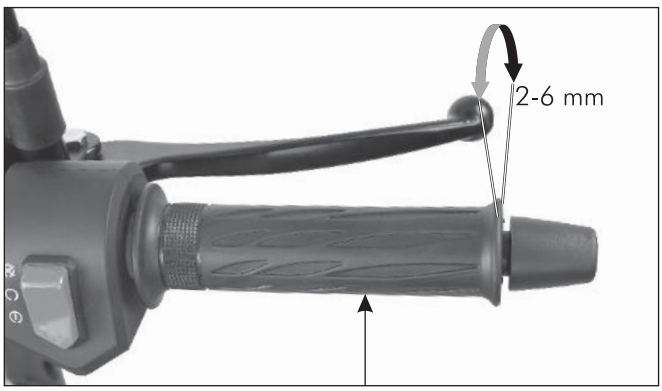
If the throttle grip does not return properly, lubricate the throttle grip housing.

For cable lubrication: Disconnect the throttle cable at their upper end. Throughly lubricate the cable and its pivot points with silicon grease (TSG 3251) or equivalent.

If the throttle grip still does not return properly, replace the throttle cables.

⚠ WARNING

Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle operation and may lead to a loss of throttle control while riding.



With the engine idling, turn the handlebar all the way to the left and right to ensure that the idle speed does not change. If idle speed increases, check the throttle grip free play and throttle cable connection.

Measure the throttle grip free play at the throttle grip flange.

FREE PLAY: 2-6 mm

If the throttle grip free play is not correct, adjust as follows:

Slide the boot off the adjuster.

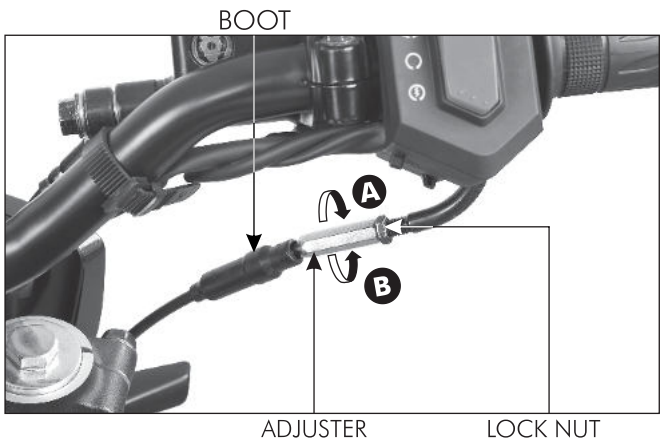
Loosen the lock nut and turn the adjuster as required.

NOTE

Replace the throttle cable if the above procedure is no longer effective.

After adjustment, tighten the lock nut and reposition the boot.

Recheck the throttle operation in all steering positions.



A- DECREASE FREE PLAY B- INCREASE FREE PLAY

AIR CLEANER ELEMENT

NOTE

If the vehicle is used in unusually wet or dusty areas, more frequent replacement may be necessary.

CAUTION

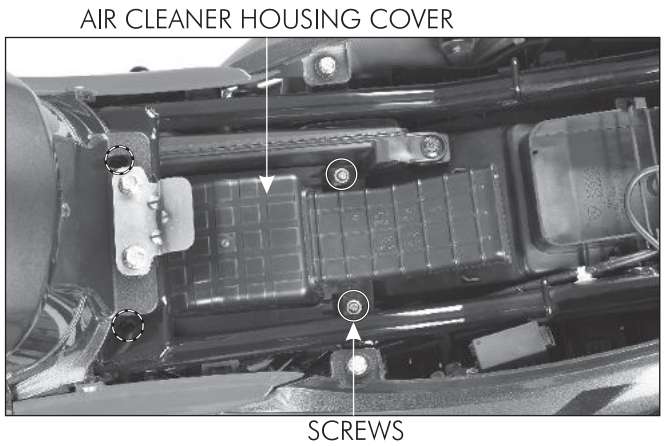
Never operate the engine when the air cleaner element is removed, it may leads to engine wear or damage.

Remove the seat (page 2-5).

Remove the air cleaner cover screws (4 nos.).

Remove the air cleaner housing cover.

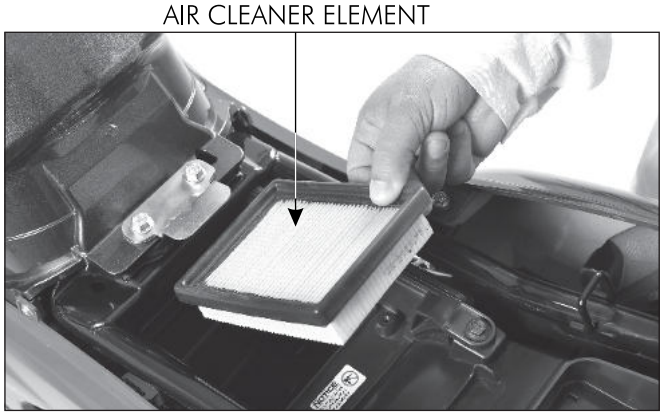
Replace the air cleaner element as per the maintenance schedule (page 3-3) or any time it is excessively dirty or damaged and performance may not be proper.



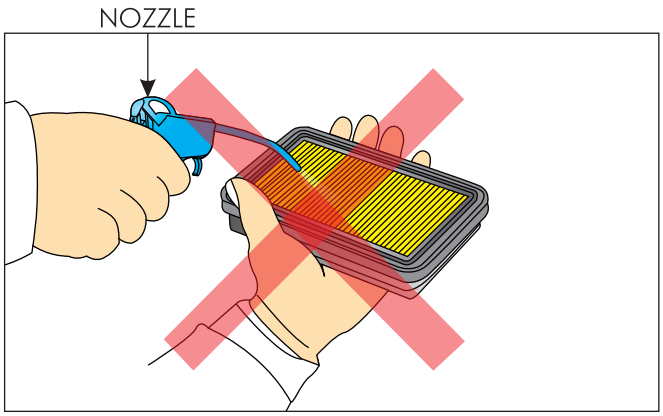
Remove the air cleaner element.

CAUTION

- Never wash or clean the viscous filter. Replace paper filter element every 15000 km.
- Replace it earlier if it becomes very dirty, damaged on surface or on the sealing area.
- Check that the air cleaner element seal is in good condition, replace if necessary.



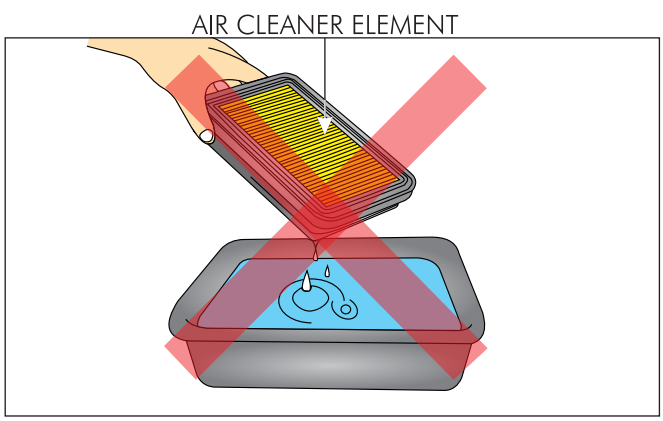
Do not clean with solvent to remove dust and also do not use forced air on it. The viscous oil will be lost and filter becomes dry. As the base filter paper is coarse, it cannot block fine dust when it becomes dry.



Do not place air cleaner element horizontally on any surface as dust can stick to the filter due to presence of oil. If necessary place it vertically. Install immediately after inspection.

Install a new air cleaner element & air cleaner housing cover in the reverse order of removal.

Install the seat (page 2-5).



SPARK PLUG

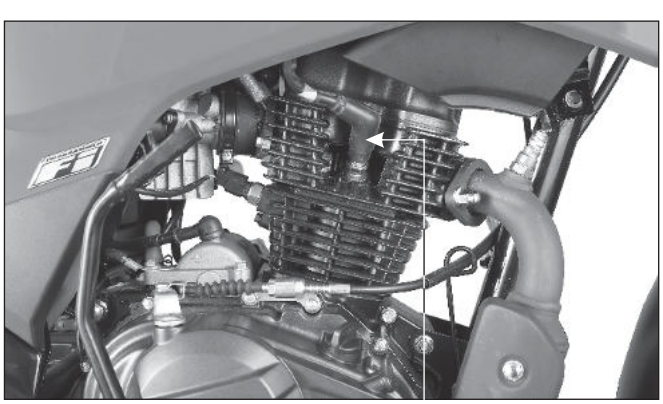
Disconnect the noise suppressor cap and clean any dirt around the spark plug area.

NOTE

Clean around the spark plug area with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plug using the spark plug wrench.

Inspect, clean or replace as described in the maintenance schedule (page 3-3).



NOISE SUPPRESSOR CAP

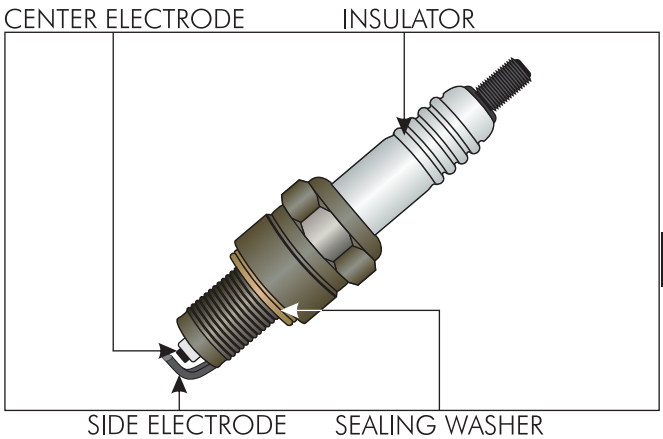
INSPECTION

Check the following and replace, if necessary.

- Insulator for cracks or damage
- Electrodes for fouling, damage, discoloration or wear
- Burning condition, colorations;

NOTE

If carbon deposits are accumulated on to the spark plug electrode, clean the electrode using wire brush or spark plug cleaner.



REUSING A SPARK PLUG

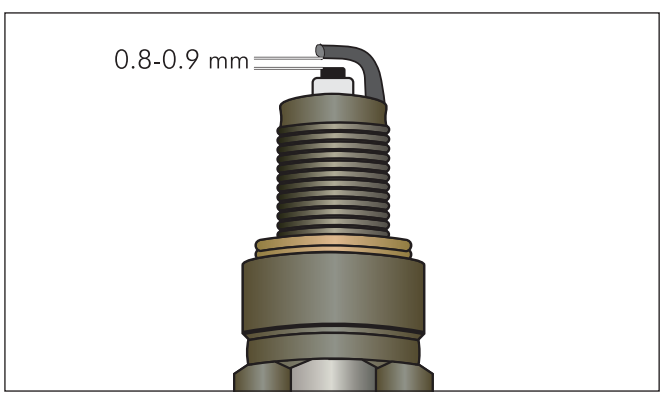
Clean the spark plug electrodes in a spark plug cleaner.

Check the gap between the center and side electrodes with a wire-type feeler gauge. If necessary, adjust the gap by bending the side electrodes carefully.

SPARK PLUG GAP: 0.8-0.9 mm

CAUTION

To prevent damage to the cylinder head, hand-tighten the spark plug before using a wrench to-tighten to the specified torque.



TORQUE

SPARK PLUG: 1.6 kgf-m

RECOMMENDED SPARK PLUG

NGK-CPR 8 EA 9, BOSCH UR5DC

REPLACING A SPARK PLUG

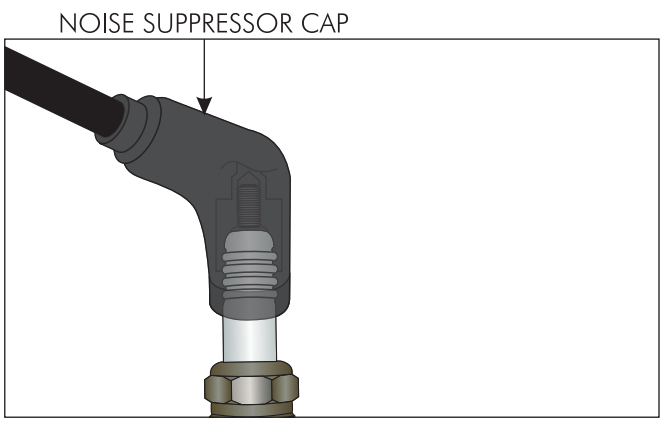
Set the plug gap to specification with a wire-type feeler gauge.

CAUTION

Do not over tighten the spark plug.

Install and hand tighten the new spark plug, then tighten it about 1/2 of turn after sealing washer contacts the seat of the plug hole.

Incase of Reusing the sparkplug, it should only take 1/8-1/4 turn after the plug seats.



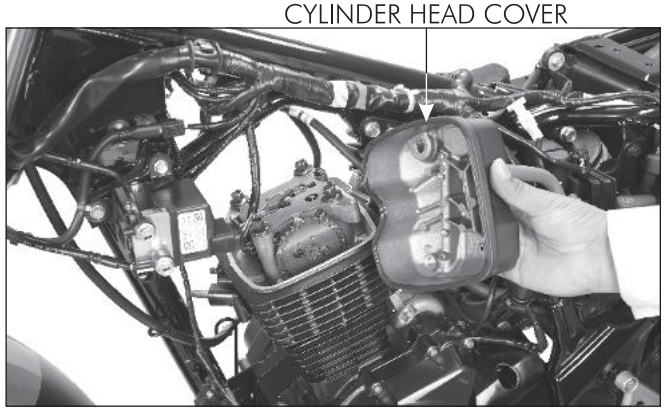
VALVE CLEARANCE

NOTE

Inspect and adjust the valve clearance when the engine is cold (below 35°C/95°F).

Remove the fuel tank (page 2-8).

Remove the cylinder head cover (page 7-4).

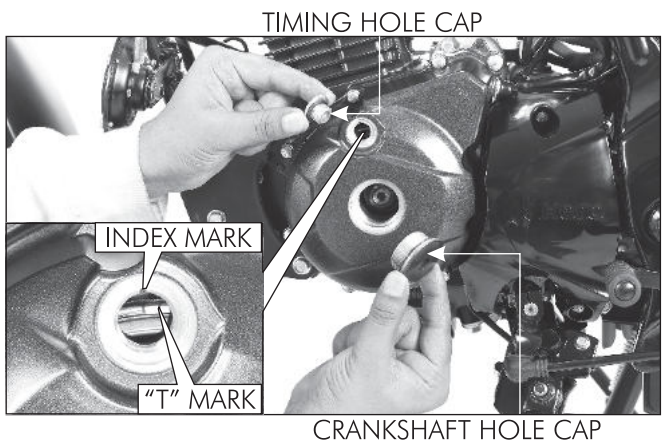


Remove the crankshaft hole cap and timing hole cap.

Rotate the crankshaft counterclockwise and align the "T" mark on the flywheel with the index mark on the left crankcase cover.

Make sure that the piston is at TDC (Top Dead Centre) on the compression stroke. (The rocker arms should be free in this condition).

If the rocker arms are not free, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and the match then "T" mark again.



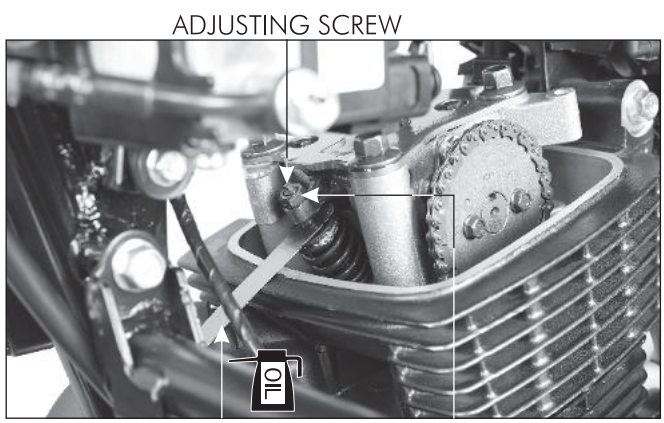
Apply clean engine oil on the feeler gauge.

Check the valve clearance by inserting a feeler gauge between the valve adjusting screw and the valve stem.

VALVE CLEARANCE

INTAKE: 0.12 mm

EXHAUST: 0.13 mm



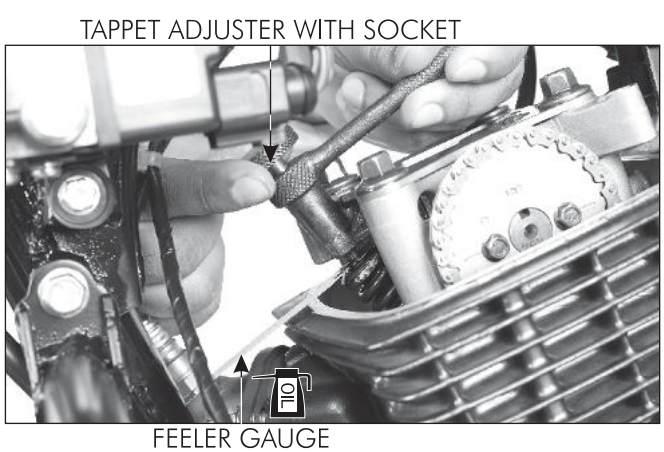
Adjust the valve clearance by loosening the lock nut and turning the adjusting screw until there is slight drag on the feeler gauge.

Hold the adjusting screw and tighten the lock nut.

TOOL

TAPPET ADJUSTER WITH SOCKET, 10 mm

PART NO: 070 HH KFN 001



Recheck the valve clearance.

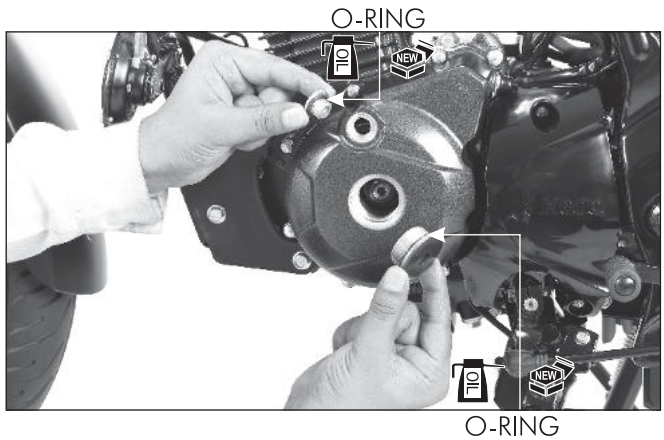
TORQUE

TAPPET ADJUSTING SCREW LOCK NUT: 1.4 kgf-m

NOTE

An improperly tightened lock nut may cause damage to the engine.

Install new O-rings to the crankshaft hole cap and timing hole cap.
Apply clean engine oil to the O-rings.

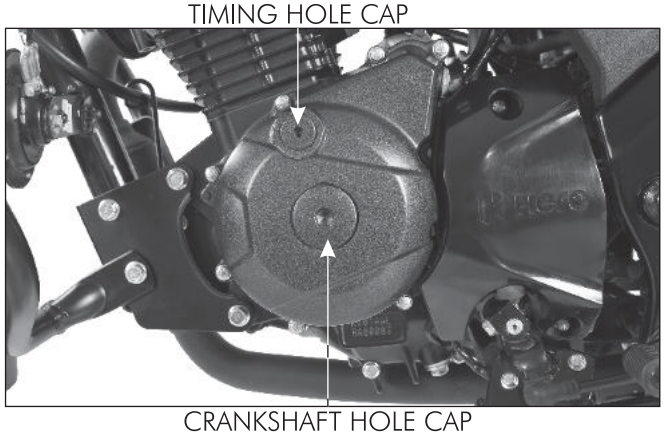


Install and tighten the timing hole cap.
Install and tighten the crankshaft hole cap to the specified torque.

TORQUE

CRANKSHAFT HOLE CAP: 1.5 kgf-m

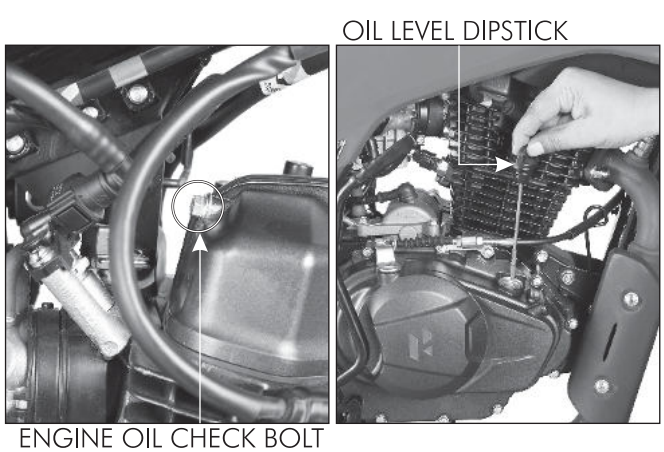
Install the cylinder head cover (page 7-5).
Install the fuel tank (page 2-6).

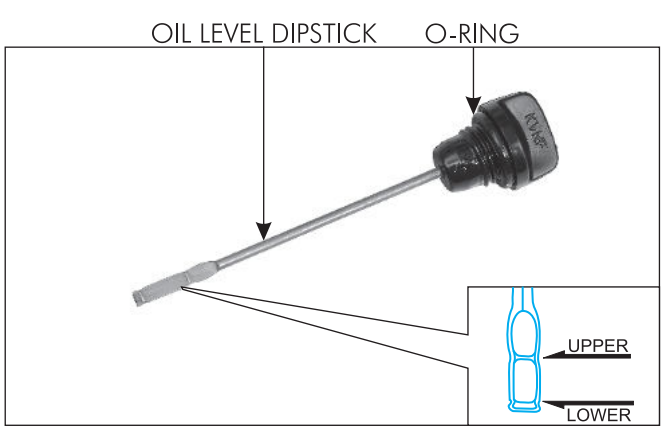


ENGINE OIL

OIL LEVEL INSPECTION

- Park the vehicle on its main stand.
- Start the engine and let it idle for 3-5 minutes.
- Remove the fuel tank cover (page 2-5), slightly loosen the engine oil check bolt and check the engine oil entry into the cylinder head cover.
- After checking the oil circulation, tighten the engine oil check bolt and install the fuel tank cover (page 2-6).
- Stop the engine and wait for 2-3 minutes.
- Remove the oil level dipstick, wipe it clean and insert without screwing it in.
- Remove the oil level dipstick and check the oil level.
- If required add the specified oil upto the upper level mark. Do not overfill.
- Quantity of the oil to be filled is approximately 1.09 litres during oil change when right crankcase cover is not removed.
- Reinstall oil level dipstick with new O-ring and check for oil leaks.





OIL CHANGE

NOTE

- Clean around the dipstick area with compressed air before removing, and be sure that no debris is allowed to enter inside the engine.
- Drain engine oil while engine is warm and the vehicle is on the main stand or held upright. This ensures complete and rapid draining.
- While inspecting the oil level do not screw in the oil level dipstick in the right crankcase cover.

- To drain the oil, remove oil level dipstick and drain bolt and sealing washer.
- After the oil has completely drained, reinstall the drain bolt with new sealing washer and tighten it to the specified torque.

TORQUE

OIL DRAIN BOLT: 3.0 kgf-m

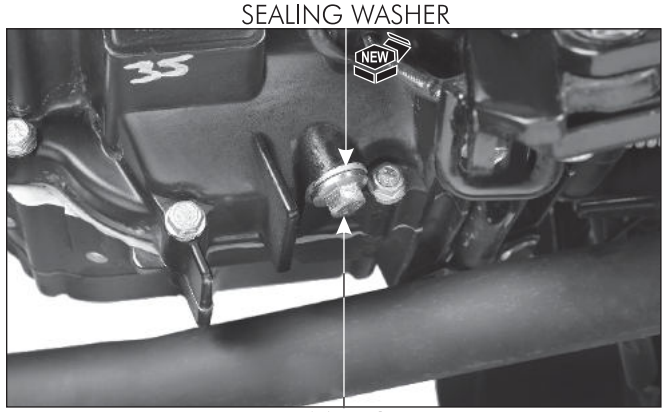
- Fill the crankcase with recommended engine oil (Approx. 1.09 litres when right crankcase cover is not removed).

Engine Oil Capacity : 1.09 litres at oil change
1.3 litres at disassembly of right crankcase cover

- Re-install the oil level dipstick with a new O-ring.
- Make sure that the oil level is till the upper level mark and there are no oil leaks.

OIL LEVEL DIPSTICK

SEALING WASHER



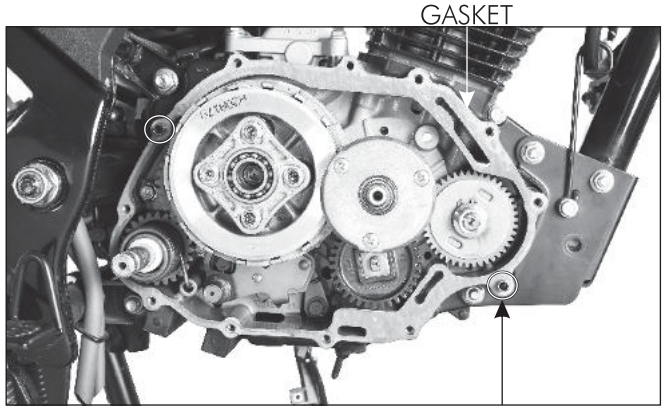
DRAIN BOLT

OIL STRAINER SCREEN CLEANING

Remove the right crankcase cover (page 9-3).

Remove the gasket and dowel pins.

GASKET

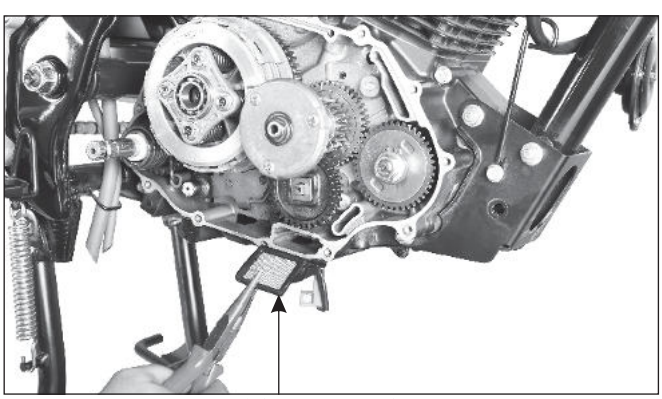


DOWEL PINS

Pull the strainer screen out of the crankcase.

NOTE

Be careful not to damage the oil strainer screen.



STRAINER SCREEN

Wash the oil strainer screen thoroughly in nonflammable or high flash point solvent until all accumulated dirt has been removed.

Check the screen and the sealing rubber for damage/ deterioration and replace if necessary

Blow dry it with compressed air to clean completely.

Coat the oil strainer screen rubber with engine oil.

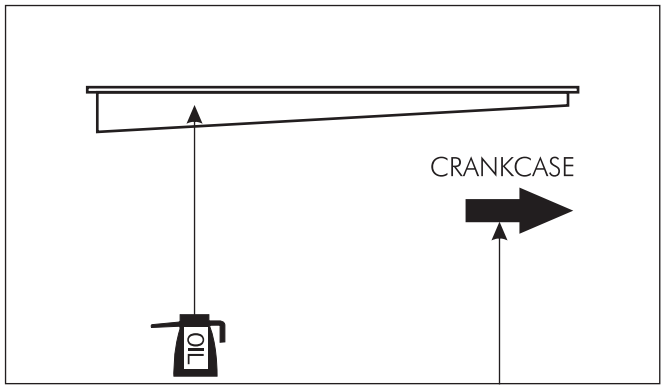
Install the oil strainer screen with the thin sharp edge facing inwards towards the crankcase.

Install the dowel pins and new gasket.

Install the right crankcase cover (page 9-5).

NOTE

Adjust the clutch free play (page 3-21).



OIL STRAINER SCREEN DIRECTION

OIL FILTER ROTOR CLEANING

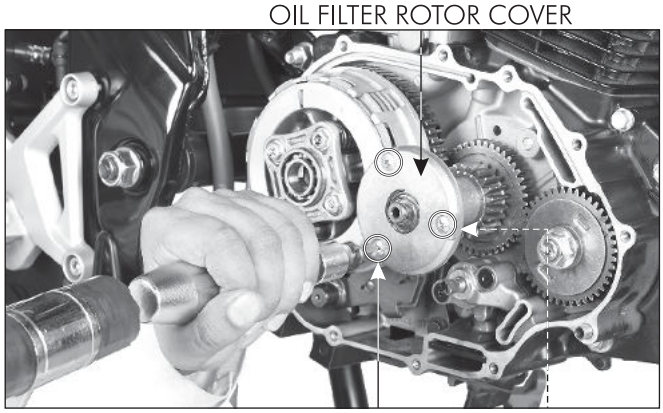
Remove the right crankcase cover (page 9-3).

Remove the oil filter rotor cover and gasket (page 9-6).

NOTE

- Always use an impact driver to remove rotor oil filter cover screws.
- Do not use GPD holder when using impact driver.

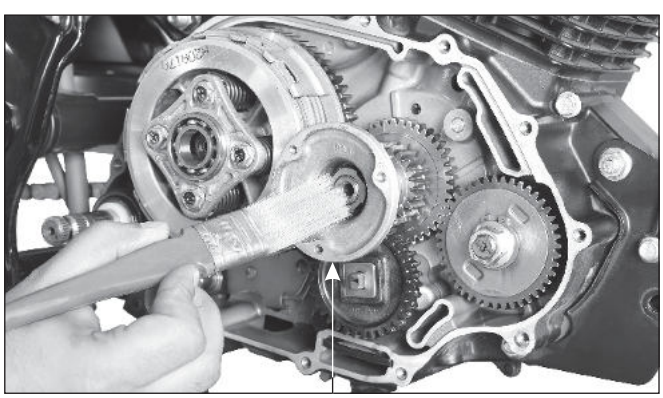
OIL FILTER ROTOR COVER



SCREWS GASKET

Clean the oil filter rotor at the periphery using a clean soft nylon brush.

Then clean the oil filter rotor in side and oil filter rotor cover with non flammable or high flash point solvent (Kerosene)



OIL FILTER ROTOR

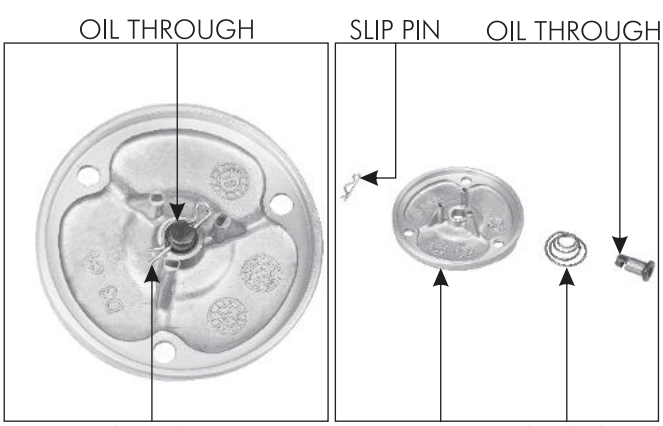
While pressing down the oil through from the reverse side, remove the slip pin.

CAUTION

- Do not allow dust or dirt to enter the crankshaft oil passage.
- Do not use compressed air to clean the filter rotor.

Remove the oil through and spring. Blow and clean the oil through with compressed air.

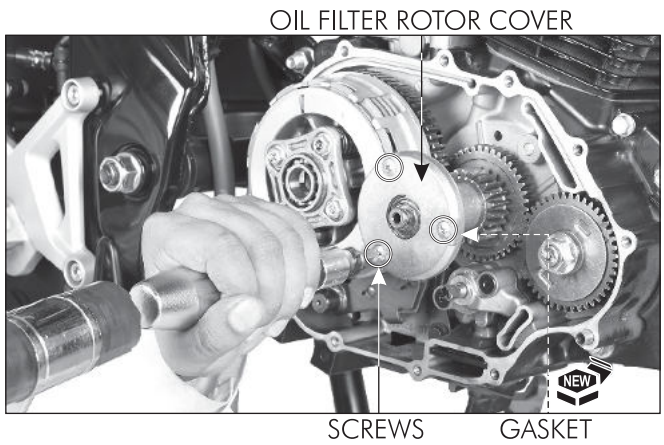
Apply clean engine oil to the oil through surface and install the spring, oil through and slip pin.



Install the oil filter rotor cover with a new gasket aligning the screw holes in the cover and gasket.

Install and tighten the three screws.

Install the right crankcase cover (page 9-5).



DRIVE CHAIN

⚠ WARNING

Never inspect and adjust the drive chain while the engine is running.

DRIVE CHAIN SLACK INSPECTION

NOTE

Excessive chain slack may damage the frame.

Park the vehicle on its main stand.

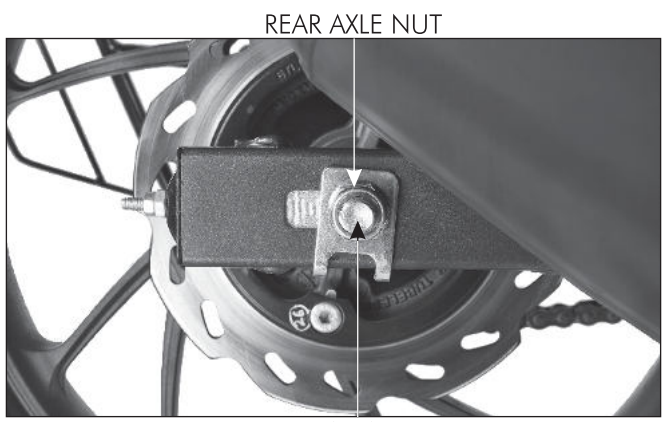
Turn "OFF" the ignition switch, shift the transmission into neutral.

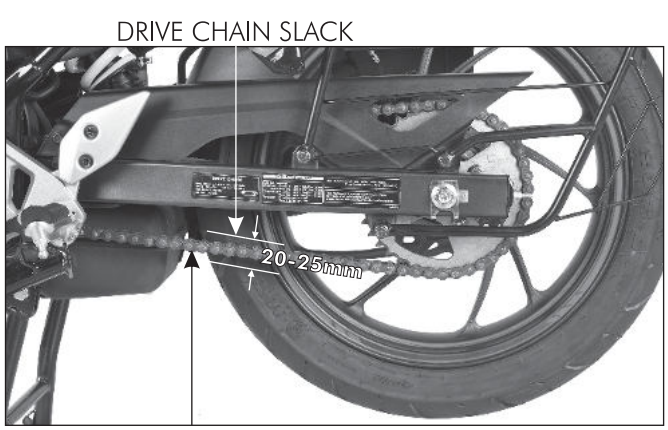
Check the slack in the drive chain lower run midway between the sprockets.

Drive chain slack should be checked in the lower run midway between the sprockets. Move the drive chain up and down by hand and chain slack should be adjusted to 20-25 mm vertical movement by hand.

Drive Chain Slack: 20-25 mm

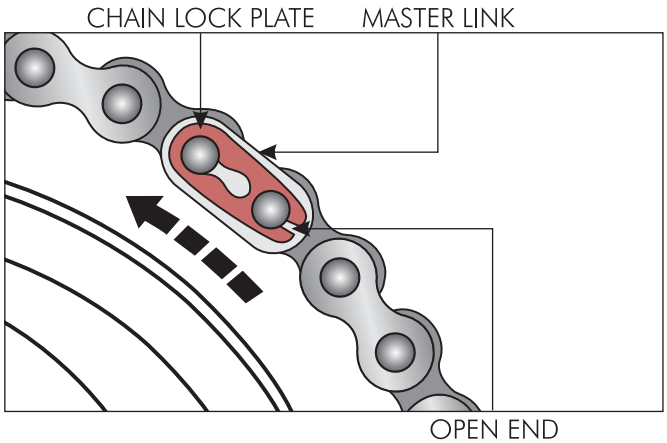
Rotate the wheel and check drive chain slack as the wheel rotates. Drive chain slack should remain constant as the wheel rotates. If the chain is slack in one section and tight in another, some links are kinked and bound. Binding can frequently be eliminated by lubrication.





Turn the chain to view chain lock plate. Ensure that the chain lock plate open end is installed in the opposite direction of the chain rotation.

Rotate the rear wheel slowly, inspect the drive chain and sprockets for any of the following conditions.



Drive chain

- Damaged rollers
- Loose pins
- Dry or rusted links
- Kinked or binding links
- Excessive wear
- Improper adjustment
- Damaged or missing O-rings

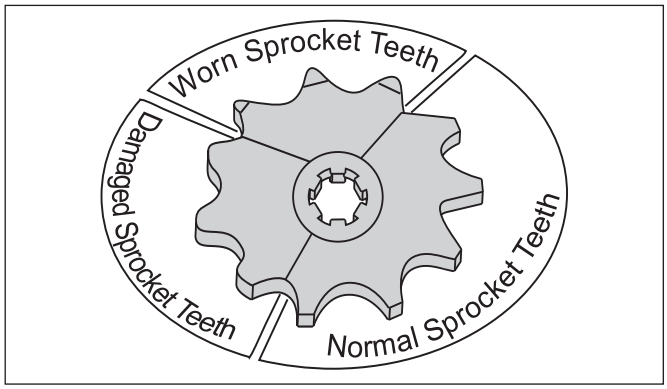
Sprockets

- Excessively worn teeth
- Broken or damaged teeth

If the drive chain has damaged rollers, loose links or missing O-rings, replace it. If the chain is dry or rusted, it should be lubricated.

NOTE

Never install a new drive chain on a worn sprocket or a worn chain on new sprocket. Always replace drive chain and both sprockets as set.



ADJUSTMENT

CAUTION

If the adjustment is at the same, the wheel is out of alignment and can cause excessive tyre, sprocket and chain wear.

Park the vehicle on its main stand with the transmission is in neutral and the ignition switch in "OFF" position.

Loosen the rear axle nut.

Loosen the both adjuster lock nuts.

Turn both adjusting nuts until the correct drive chain slack is obtained. Turn the adjusting nut clockwise to decrease the slack or anticlockwise to increase the slack of the chain..

Make sure the index mark on both adjusters are aligned with the rear edges of the axle slots in the swingarm.

If after adjustment of drive chain slack, axle touches to the rear edge of adjustment slot. Chain kit has to be replaced.

Tighten the rear axle nut to the specified torque.

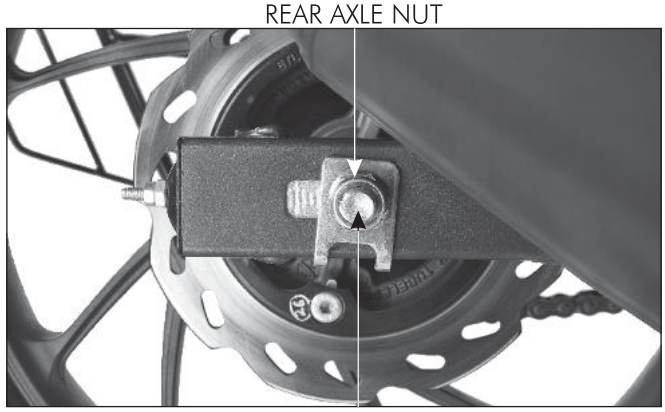
TORQUE

REAR AXLE NUT: 6.8 kgf-m

Tighten the both adjusting nuts and lock nuts.

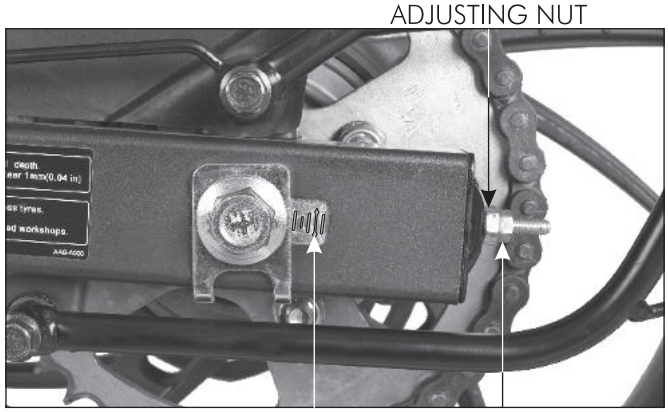
Recheck the drive chain slack and free wheel rotation.

REAR AXLE NUT



REAR AXLE

ADJUSTING NUT



INDEX MARKS LOCK NUT

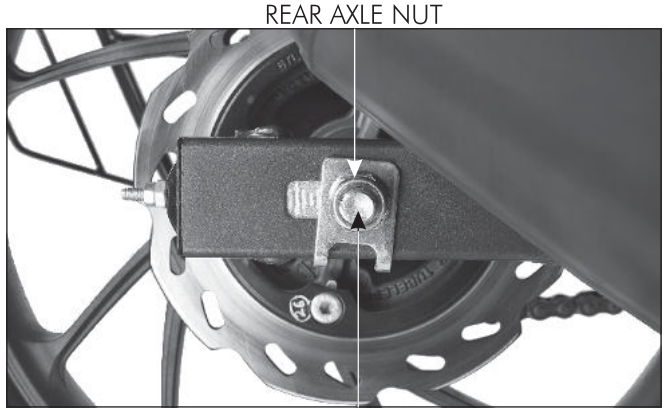
REMOVAL

Park the vehicle on its main stand with th transmission is in neutral and the ignition switch in "OFF" position.

Remove the left rear crankcase cover (page 6-3).

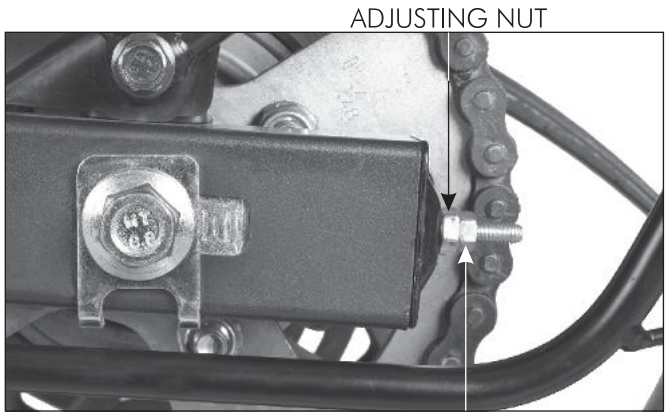
Loosen the rear axle nut.

REAR AXLE NUT

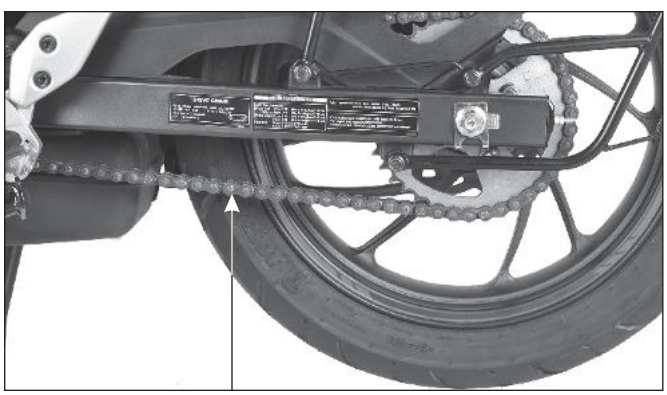


REAR AXLE

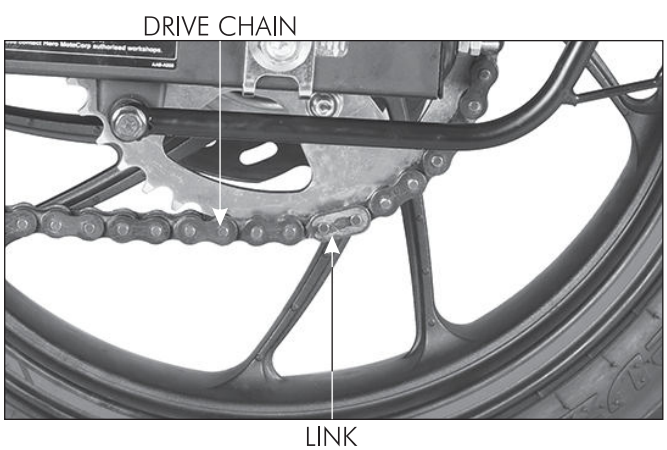
Loosen the adjusting nut and lock nut.



Push the rear wheel towards front to increase the drive chain slack.



Remove the lock plate, master link and remove the drive chain.



CLEANING

If the drive chain becomes extremely dirty, it should be removed and cleaned prior to lubrication.

Dip a soft nylon brush in a mixture of kerosene and 10W30 engine oil (in the ratio of 1:1) and clean the dirt accumulated on the chain with the help of this soft brush.

Wait for approx 3-5 minutes to allow the mixture to penetrate in between bush and roller for proper cleaning of the drive chain. Repeat the process few times depending on the dirt accumulation on the drive chain.

Finally wipe the chain with a dry shop towel to remove the oil + kerosene traces from it. Visibly inspect the chain after cleaning and ensure no mud or dust is left out.

NOTE

- Ensure that the cleaner & lubricant used is the one recommended for use on an O-ring chain, otherwise O-ring may deteriorate, fail and lose their sealing properties.
- Visit Authorised HeroMotoCorp workshop for inspection, cleaning, lubrication and adjustment of drive chain at every 1000 km.

LUBRICATION

Apply SAE 90 Grade oil on the inner side of the entire length of the chain using the oil can.

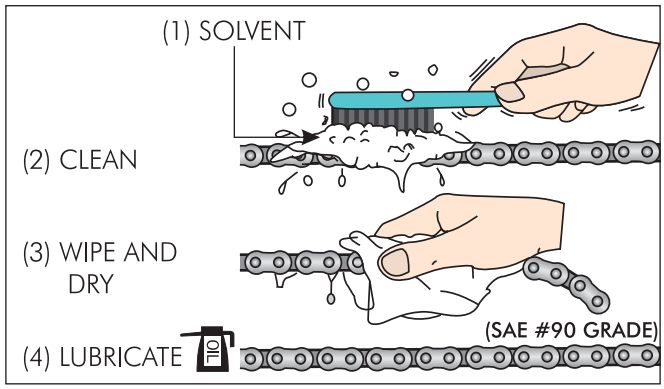
Wait for 7-10 minutes for penetration of the lubricant inside the bush & roller for better lubrication. Wipe the excess lubricant from the chain and nearby parts by using a dry shop towel.

CAUTION

- Steam cleaning, high pressure washers and certain solvents can damage the drive chain O-rings.
- While lubricating and cleaning hold the rear wheel with one hand to prevent the possibility of your finger being trapped between the chain and sprocket.
- The drive chain is fitted with O-rings between the link plates. These O-rings retain grease inside the chain to improve its service life. However, special precautions must be taken when adjusting, lubricating, washing and replacing the chain.
- Regular adjustment and lubrication as per the maintenance schedule would ensure high performance and longer life.

NOTE

Excessive lubricant should be wiped off with a clean gag before use. Excessive lubricant if not wiped off, will aid in accumulation of dust, sand and dirt on the drive chain, increasing its wear and will also be sprayed on the vehicle as well due to chain movement.



INSTALLATION

After cleaning and lubrication, install the drive chain in the reverse order of removal.

The torque values required while installation are as follows:-

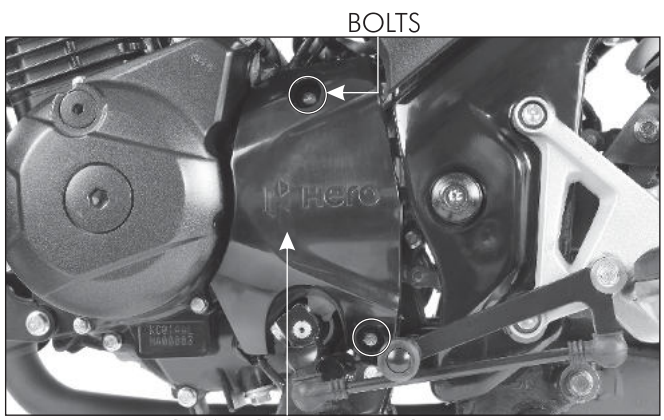
TORQUE

SWINGARM PIVOT NUT: 6.0 kgf-m
LEFT STEP HOLDER BRACKET BOLT: 2.1 kgf-m
REAR AXLE NUT: 6.8 kgf-m

Adjust the drive chain slack (page 3-12).

DRIVE CHAIN SLIDER

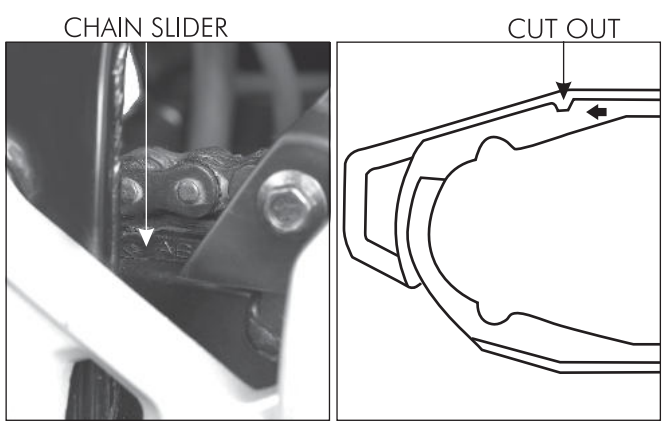
Remove two bolts and the left crankcase rear cover.



Clean the drive chain slider. Check the chain slider for wear or damage.

The chain slider must be replaced if it is worn till the wear limit cut-out (page 13-16).

Installation is in the reverse order of removal.



BATTERY VOLTAGE

It is not necessary to check the battery electrolyte level or add distilled water as the battery is an Maintenance- Free (sealed) type.

Remove the fuel tank cover (page 2-5).

Measure the battery voltage using a MF-Battery Tester (page 17-6).

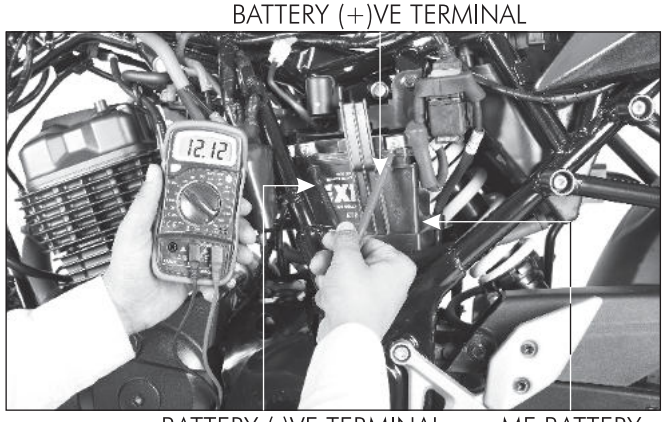
STANDARD VOLTAGE: 12.4V (Minimum)

For battery charging procedure (page 17-9).

⚠ WARNING

This vehicle is equipped with a Maintenance- Free Battery and can be permanently damaged if the cap sealing strip is removed.

Install the fuel tank cover (page 2-6).



INTEGRATED START-KILL SWITCH

ELECTRIC STARTER OPERATION

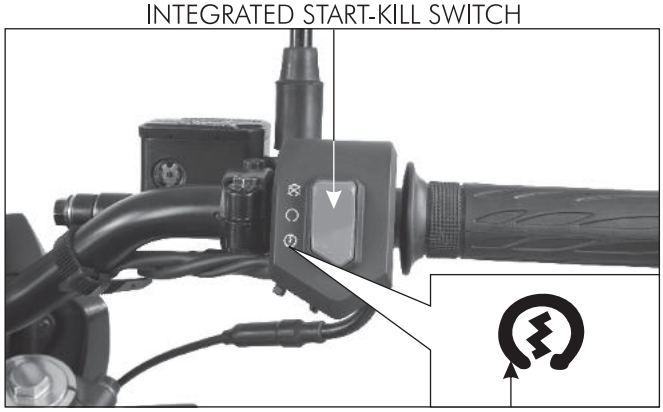
Press the electric starter (⊛) of integrated start-kill switch downwards to start the vehicle.

Check for the operation of electric starter switch for sticky moment.

NOTE

Do not operate electric starter (⊛) of integrated start-kill switch continuously more than 5 seconds as continuous cranking of engine will discharge the battery.

INTEGRATED START-KILL SWITCH



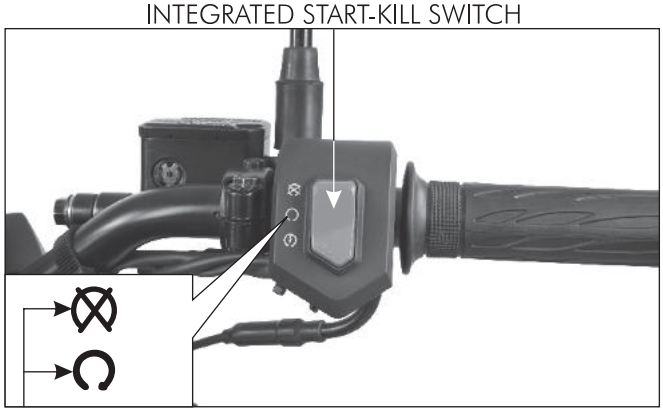
ELECTRIC STARTER

ENGINE STOP SWITCH OPERATION

For engine stop operation integrated start-kill switch has two positions. In "ON" (○) position, engine will operate and in "OFF" (⊗) position, engine will not operate. The prime function of it is to stop the engine during emergency (Vehicle tip over, throttle cable stuck etc.). The switch should normally remain in "ON" (○) position. During emergency, put the switch to "OFF" (⊗) position.

If the vehicle is stopped with the ignition switch "ON" (○) and the engine stop switch "OFF" (⊗), the headlamp, position lamp, tail/stop lamp and licence lamp will still be on, resulting in battery discharge.

INTEGRATED START-KILL SWITCH



ENGINE ON/OFF

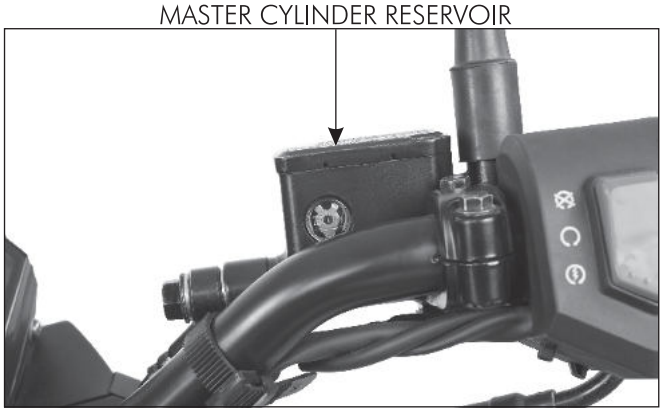
BRAKE FLUID

Recommended brake fluid: **DoT 3 or DoT 4**

CAUTION

- Do not remove the cover or cap unless the reservoir is in level or else fluid may spill out.
- Do not mix DoT 3 and DoT 4 as they are not compatible.
- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling of fluid on painted, plastic or rubber parts. Place a rug over these parts whenever the system is serviced.

MASTER CYLINDER RESERVOIR



When the fluid level is low, check the brake pads for wear (page 3-18).

A low fluid level may be due to wear of the brake pads.

If brake pads are worn, the caliper piston is pushed out, and this accounts for low reservoir level. If the brake pads are not worn and the fluid level is low, check the entire system for leaks.

RESERVOIR CAP

"MIN" MARK

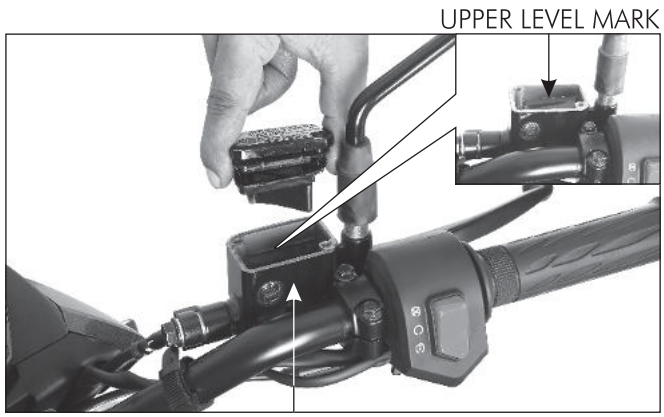
FRONT BRAKE

Turn the handlebar so that the reservoir is in level and check the front brake reservoir level through the sight glass. If the level is near mark, check the brake pad wear (page 3-18).

To top up the brake fluid, remove the cover, set plate and diaphragm and fill the reservoir to the casting edge with DoT 3 or DoT 4 brake fluid from a sealed container.

NOTE

Replace brake fluid once in every 2 years or 30000 km, whichever is earlier.



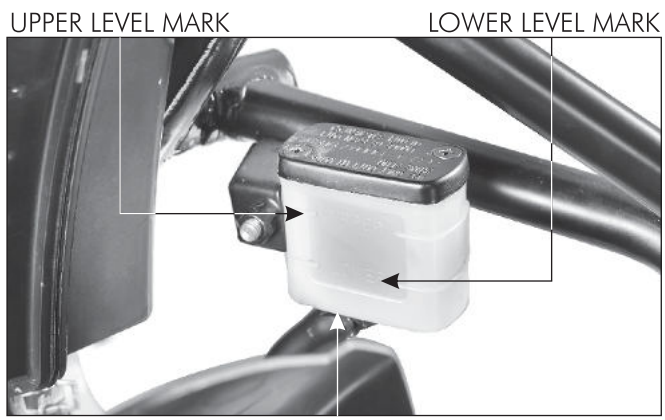
FRONT MASTER CYLINDER

REAR BRAKE

Park the vehicle on a level surface and support it an upright position.

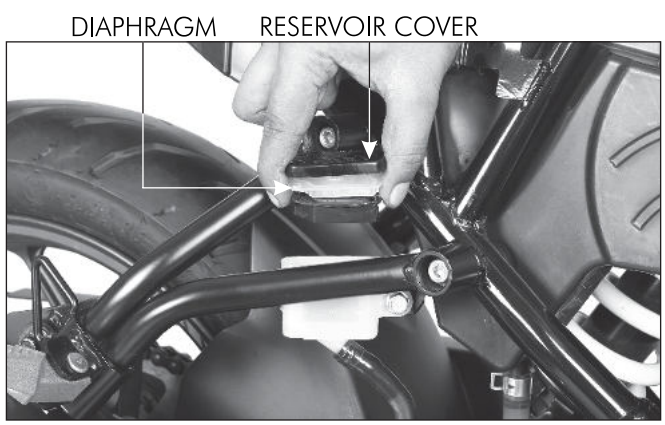
Check the rear brake fluid level.

If the level is near the lower level line, check the brake pad wear.



REAR MASTER CYLINDER RESERVOIR

To top up the brake fluid, remove the cover, set plate and diaphragm and fill the reservoir with DoT 3 or DoT 4 brake fluid from a sealed container.



BRAKE PAD WEAR

FRONT BRAKE PADS

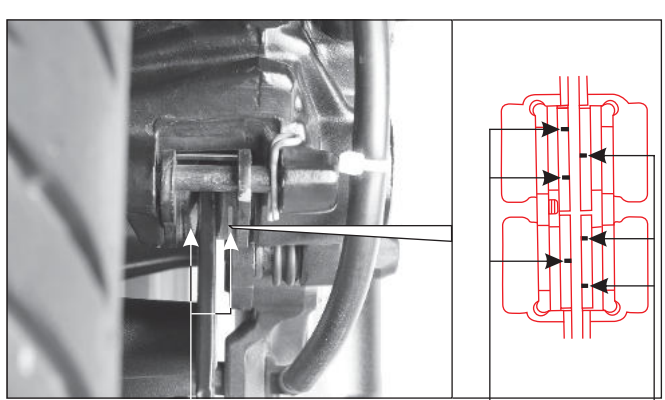
Check the brake pads for wear.

Replace the brake pads if either pad is worn to the bottom of wear limit line.

Brake pad replacement (page 16-8).

CAUTION

Always replace the brake pads in pairs to assure even pressure is applied on disc.


BRAKE PAD WEAR LIMIT LINES

REAR BRAKE PADS

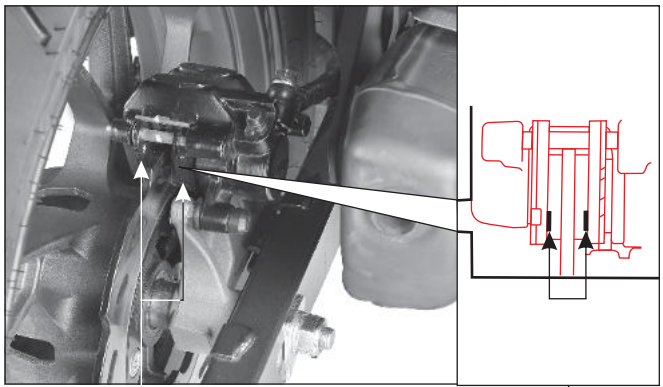
Check the brake pads for wear.

Replace the brake pads if either pad is worn to the bottom of wear limit line.

Brake pad replacement (page 16-10).

CAUTION

Always replace the brake pads in pairs to assure even pressure is applied on disc.



BRAKE PAD WEAR LIMIT LINES

BRAKE SYSTEM

INSPECTION

Firmly apply the brake lever or pedal, and check that no air has entered the system.

If the lever or pedal feels soft or spongy when operated, bleed the air from the system (page 16-4).

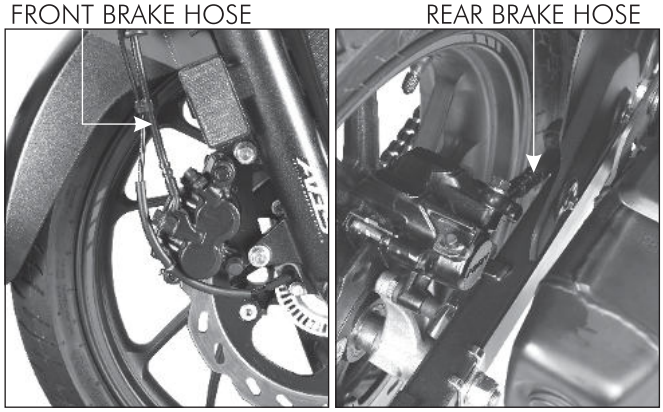
Inspect the brake hose and fittings for deterioration, cracks and signs of leakage.

Tighten any loose fittings.

Replace hoses and fittings as required.

For brake air bleeding (page 16-4).

FRONT BRAKE HOSE REAR BRAKE HOSE

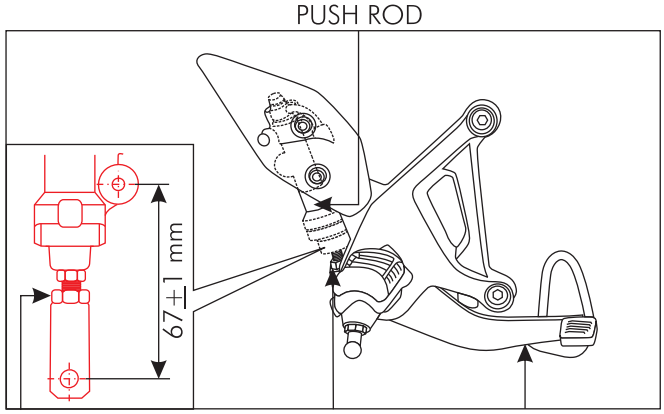


BRAKE PEDAL HEIGHT ADJUSTMENT

Loosen the lock nut and turn the push rod until the correct pedal height is obtained.

Adjust the push rod length so that the distance between the center of the master cylinder lower mounting bolt hole and joint pin hole is 67±1 mm. After adjustment, tighten the lock nut.

PUSH ROD



LOCK NUT LOCK NUT BRAKE PEDAL

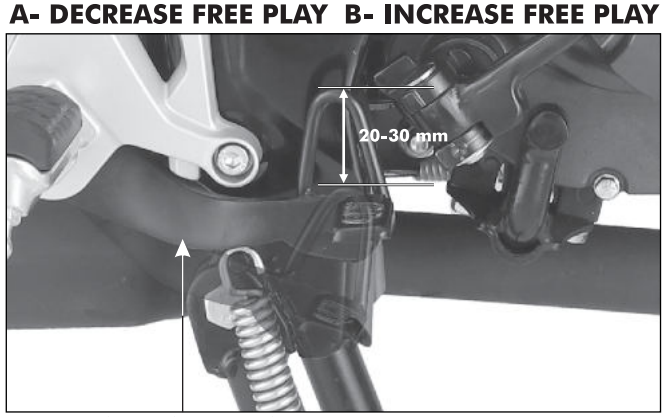
A- DECREASE FREE PLAY B- INCREASE FREE PLAY

REAR BRAKE INSPECTION (DRUM TYPE)

ADJUSTMENT

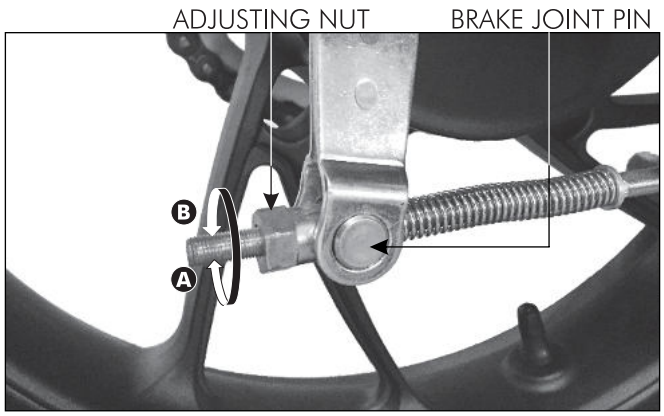
Park the vehicle on its main stand.

Measure the brake pedal free play before the brake starts to take hold. Free play should be 20-30 mm.



REAR BRAKE PEDAL

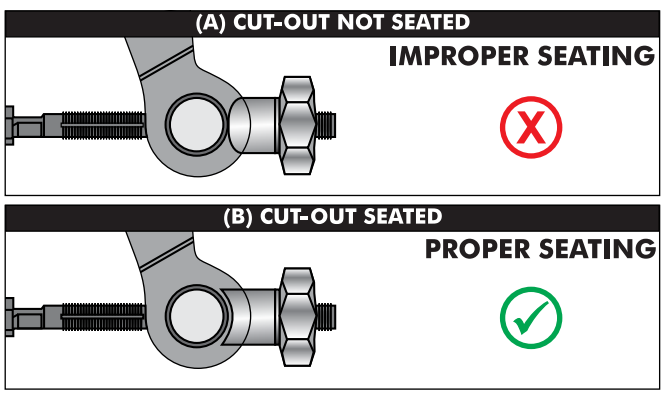
If adjustment is necessary, turn the rear brake adjusting nut.



A- DECREASE FREE PLAY B- INCREASE FREE PLAY

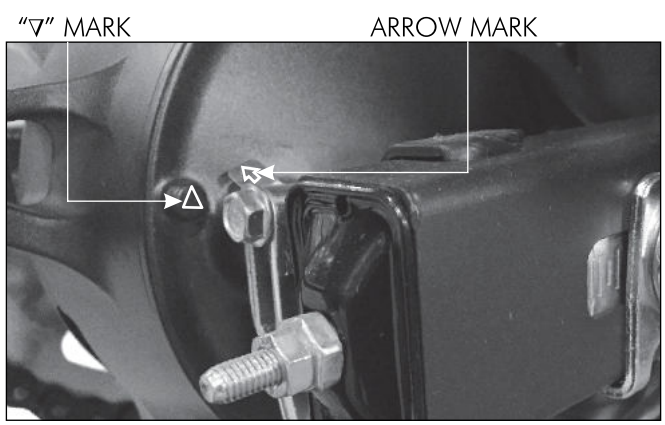
NOTE

- Make sure that the cut- out on the adjusting nut is seated on the brake joint pin after the final adjustment is made.
- After adjusting the brake pedal free play, check the rear brake lamp switch operation and adjust if necessary.



REAR BRAKE SHOES (DRUM TYPE)

Replace the brake shoes if the arrow on the wear indicator plate aligns with the reference mark "▽" on the brake panel when the brake pedal is fully depressed.



STOP LAMP SWITCH

NOTE

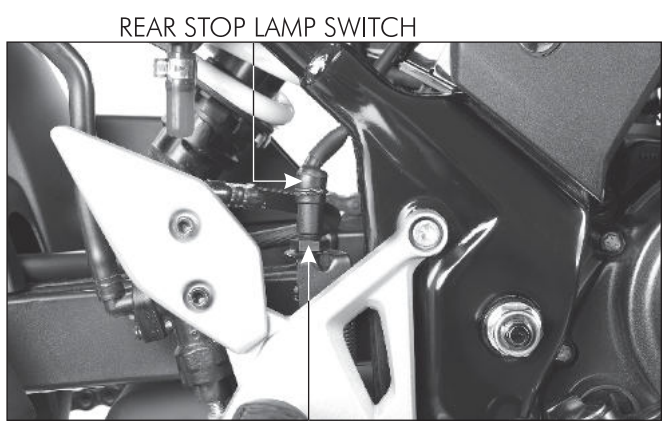
- Perform stop lamp switch adjustment after adjusting the brake pedal height and free play.
- The front stop lamp switch does not require adjustment.

Check that the stop lamp comes "ON" when the brake pedal is depressed and the brake engagement begins.

To adjust, hold the switch body and turn the adjusting nut.

NOTE

Do not turn the stop lamp switch body.



HEADLAMP FOCUS

⚠ WARNING

An improperly adjusted headlamp may blind oncoming drivers, or it may fail to light the road for a safe distance.

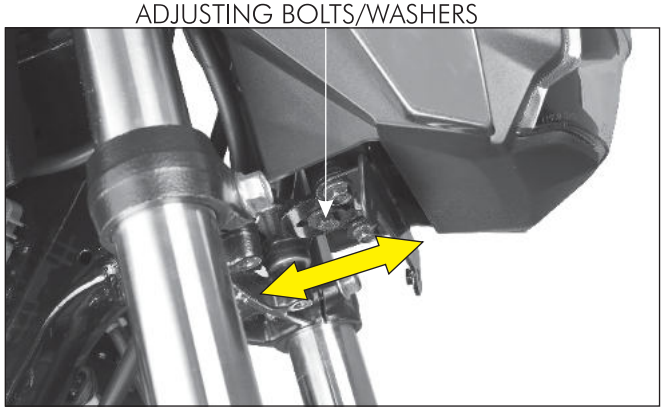
Park the vehicle on level ground on its main stand.

Headlamp adjustment is done by the headlamp adjuster bolt located below headlamp.

Adjust the headlamp beam vertically by loosening the bolt by moving the headlamp unit forward & backward for correct focus adjustment.

After adjusting the headlamp, tighten the headlamp adjusting bolt to the specified torque.

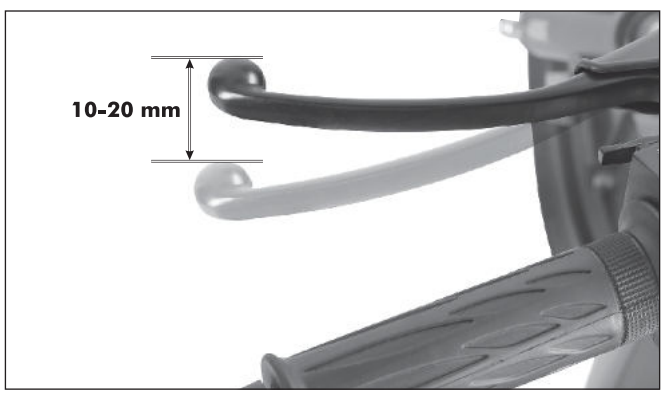
ADJUSTING BOLTS/WASHERS



CLUTCH SYSTEM

Measure the clutch lever free play at the end of the lever.

FREE PLAY: 10-20 mm



Adjustments are made by adjusting the nut of the clutch cable mounted at the engine. Loosen the lock nut and turn the adjusting nut for adjusting the clutch lever free play.

A-Decrease free play (Anti-Clockwise)

B-Increase free play (Clockwise)

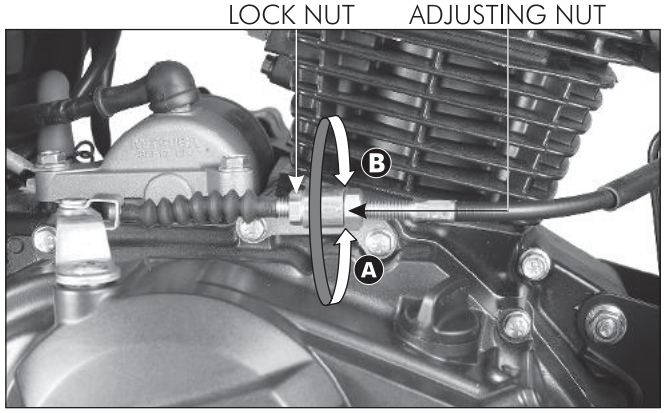
After the adjustment is complete, tighten the lock nut while holding the adjusting nut securely.

If the proper free play cannot be obtained, or the clutch slips during the drive, disassemble and inspect the clutch.

NOTE

Check the cable routing and any signs of cable damage that could cause improper clutch operation.

LOCK NUT ADJUSTING NUT



A-Decrease free play **B-Increase free play**

SIDE STAND/MAIN STAND

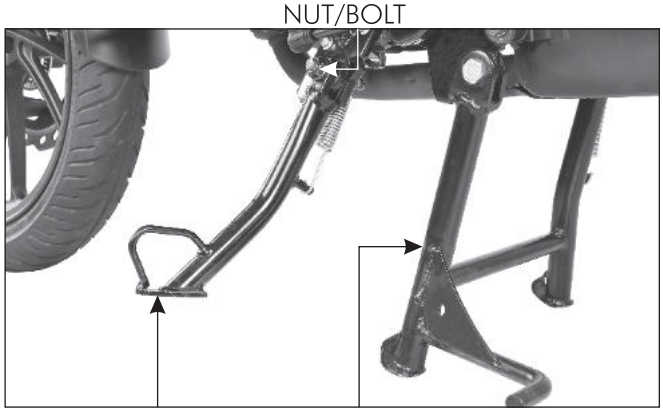
Support the vehicle on the level surface.

Check the side/main stand return spring for damage or loss of tension.

Check the side/main stand for freedom of movement. Lubricate the side stand pivot with grease if necessary.

Make sure the side stand is not bend.

NUT/BOLT



SIDE STAND MAIN STAND

SIDE STAND SWITCH

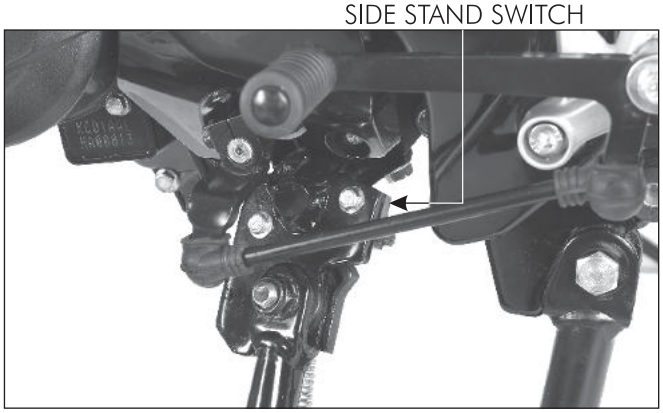
A side stand switch is provided on the side stand, if the side stand is put down, the side stand indicator on the speedometer console glows.

Inspect the side stand switch for any wear or physical damage. Clean the side stand switch periodically as per the maintenance schedule.

CAUTION

Never remove the side stand switch from its mounting for cleaning.

SIDE STAND SWITCH



SUSPENSION

⚠ WARNING

Loose, worn, or damaged suspension parts impair vehicle stability and control. Repair or replace any damaged components before riding. Riding a vehicle with faulty suspension increases your risk of an accident and possible injury.

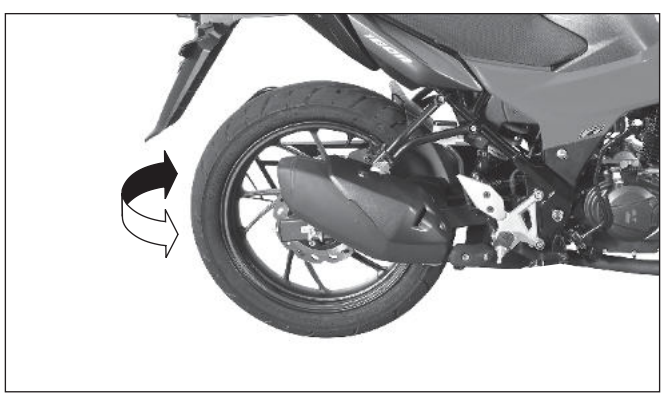
FRONT

Check the action of the forks by applying the front brakes and compressing the front suspension several times.

Check the entire fork assembly for signs of leaks, scratches, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.



REAR

Support the vehicle securely and raise the rear wheel off the ground.

Check for worn swing arm needle bearing by grabbing the rear wheel and attempting to move the wheel side to side.

Replace the bearing, if found defective.

Check the action of the shock absorbers by compressing them several times.

Check the entire shock absorber assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

NOTE

Rear suspension adjustment should be done as per maintenance schedule.

NUTS, BOLTS, FASTENERS

Tighten bolts and nuts at regular interval shown in the maintenance schedule.

Check that all chassis nuts and bolts are tightened to correct torque values (page 1-18)

Check that all cotter pins, slip pins, hose clamps and cable stays are in place.

WHEELS/TYRES

Make sure the fork is not allowed to move, raise the front wheel and check for play. Turn the wheel and check that it rotates smoothly with no unusual noise.

If faults are found, inspect the wheel bearings.

Support the vehicle securely and raise the rear wheel off the ground.

Check for play in either the wheel or the swing arm pivot. Turn the wheel and check that it rotates smoothly with no unusual noise.

If abnormal conditions are suspected, check the rear wheel bearings.

NOTE

As the swing arm pivot is included in this check, be sure to confirm the location of the play; i.e. from the wheel bearings or the swing arm pivot.

Check and adjust the tyre pressure

NOTE

The tyre pressure should be checked when the tyres are **"COLD"**.

COLD TYRE PRESSURE	FRONT (kgf/ cm^2)/ psi	REAR (kgf/cm^2)/psi
Rider only	(1.75)/25	(1.96)/28
Rider and pillion	(1.75)/25	(2.10)/30

AIR PRESSURE GAUGE

Check the tyre treads and side wall for cuts, imbedded nails, or other damage.

Measure the tread depth at the centre of tyre. Replace the tyre when the tread depth reaches the following limits:

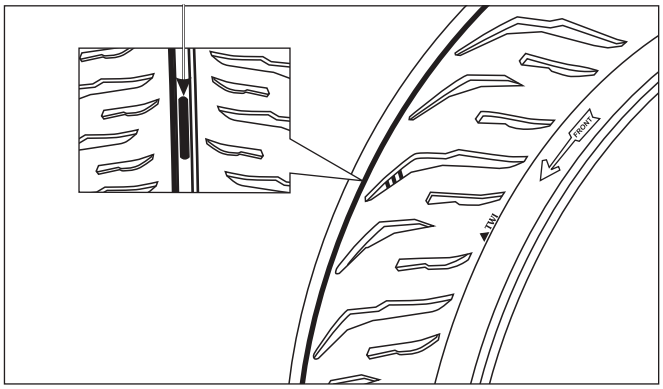
RECOMMENDED TREAD DEPTH

FRONT: 0.8 mm

REAR: 1.0 mm

Tyre wear indicators are distributed at several locations around the tyre for easy inspection. Replace tyres immediately when the tyre wear indicator contacts the road.

TYRE WEAR INDICATOR



STEERING HEAD BEARINGS

NOTE

Check that the control cables do not interfere with the handlebar rotation.

Raise the front wheel off the ground by placing a jack or other support under the engine.

Check that the handlebar rotates freely from side to side. If the handlebar moves unevenly, binds, or has play, inspect and adjust the steering head bearings.

If the operation is not smooth check for any interference of cable or wiring harness.

Check for misalignment of front wheel with respect to handlebar.

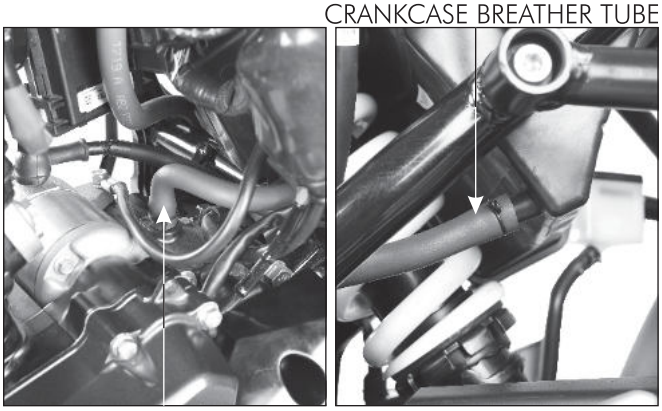
CRANKCASE BREATHER TUBE

Remove the fuel tank cover (page 2-5).

Check the crankcase breather tube for deterioration, damage or loose connection. Make sure that the tubes are not kinked pinched or cracked.

Install the fuel tank cover (page 2-6).

CRANKCASE BREATHER TUBE



CRANKCASE BREATHER TUBE

AIR CLEANER DRAIN TUBE

Remove the fuel tank cover (page 2-5).

Remove the drain tube from the air cleaner housing and drain deposit into a container.

Reinstall the drain tube.

Follow the above process more frequently when ridden in rain or at full throttle.

NOTE

Always ensure to reinstall the drain tube after draining the deposit.

Install the fuel tank cover (page 2-6).

AIR CLEANER TUBE

EXHAUST EMISSION

MEASUREMENT AT IDLE

1. Check the following items before inspection;
   - Air cleaner
   - Spark plug
   - Crankcase breather
2. Warm up the engine to the normal operating temperature (Engine oil temperature: Approx 80°C).
3. Park the vehicle on the main stand on a level surface.
4. Seal the muffler drain hole using the sealing tape.
5. Connect an appropriate pipe or hose (heat resistant, chemical resistant) to the muffler so that the probe can be inserted by more than 30 cm (12 inch).
6. Measure the CO% and RPM with exhaust gas analyzer.
7. Check the engine idle speed.

Idle speed: 1400±100 rpm

8. Insert the probe into the muffler and measure the carbon monoxide (CO%) concentration.

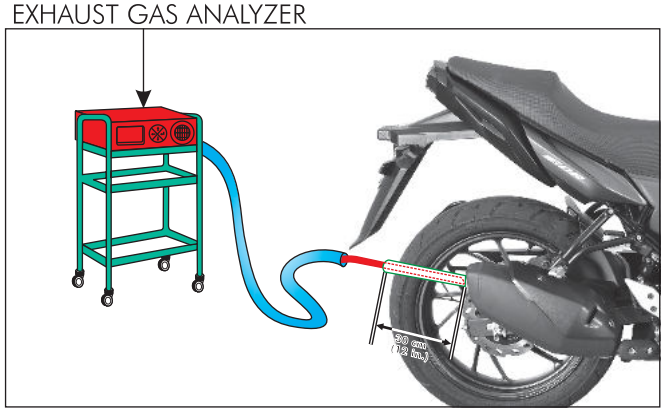
CO Measurement at idle: 0.5 %

HC Measurment at idle: 500 ppm

NOTE

Sealing tape for drain hole must be removed after idle check.

EXHAUST GAS ANALYZER



EVAPORATIVE EMISSION CONTROL SYSTEM

Remove the fuel tank cover (page 2-5).

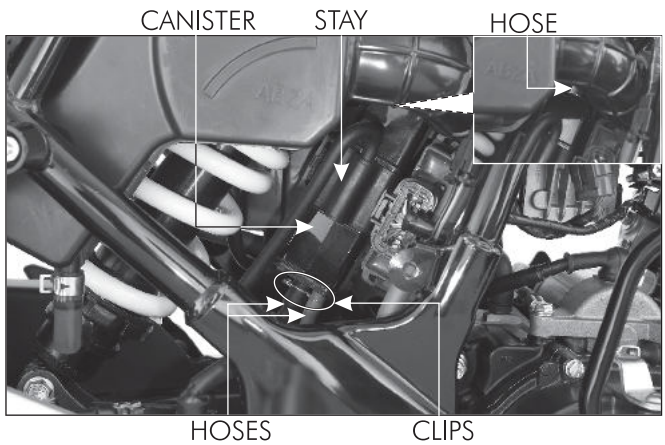
Inspect the hoses for deterioration, damage or loose connections and canister for cracks or other damages.

Inspect the system as described in the maintenance schedule (page 3-3).

NOTE

- Reinstall the clips or hoses properly.
- Route the hose pipes and ensure the hose pipes are not pinched/kincked.

Install the fuel tank cover (page 2-6).



SERVICING AND CLEANING PROCESS

In some conditions, key insertion & removal and fuel tank cap lid operation might get slightly hard due to entry of dust particles and water. In such cases, servicing and cleaning is required with anti-rust spray. Servicing and cleaning procedures are given as:

Guidelines:

- Hard or sticky insertion or withdrawl of key.
- Anti-rust should be used as per requirement not on regular interval.

IGNITION SWITCH / FUEL TANK CAP LID

Nozzle pipe of the Anti-rust spray bottle should be fitted into the chamber properly.

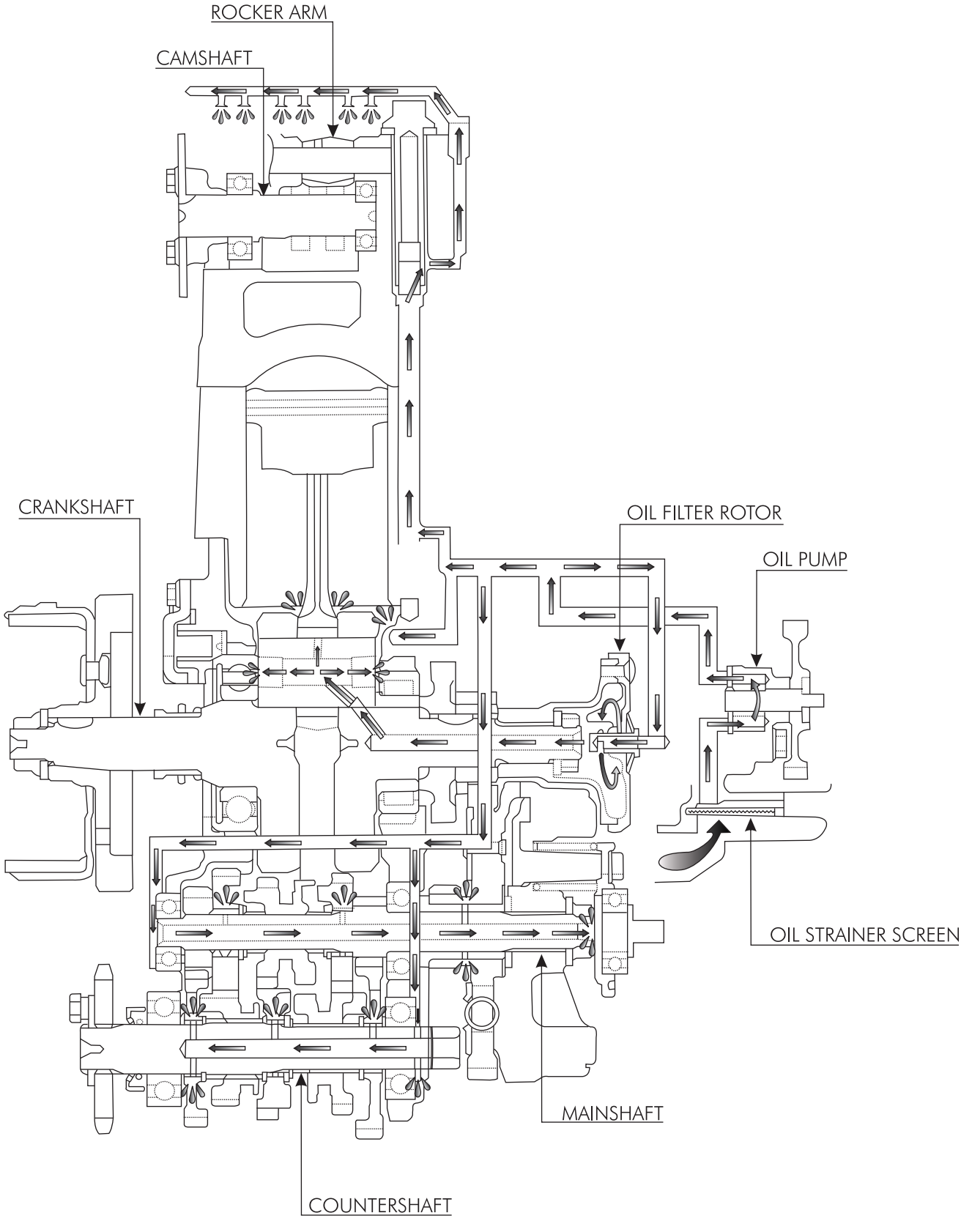
Insert the nozzle pipe into the ignition switch or fuel tank cap lid as shown in image.

Spray the anti-rust (2-3ml or 4-5 drops approx.).

Insert the ignition key or open the fuel tank cap lid at least five times after the spray to check the operation.

NOTE

Do not over flow the anti-rust spray.


ROCKER ARM
CAMSHAFT
CRANKSHAFT
OIL FILTER ROTOR
OIL PUMP
OIL STRAINER SCREEN
MAINSHAFT
COUNTERSHAFT

LUBRICATION SYSTEM

System Diagram	**4-0**	**Oil Pump**	**4-3**
Service Information	**4-1**	**Inspection**	**4-4**
Specification	**4-1**	**Lubrication Points**	**4-8**
Troubleshooting	**4-2**		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged period. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.
- If the engine is running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

- This section covers service of the oil pump.
- The oil pump can be serviced with the engine installed on the frame.
- The service procedure in the section must be performed with the engine oil drained.
- Always lubricate the oil pump components with clean engine oil before assembling the oil pump.
- When removing and installing the oil pump, care to be taken to avoid dust or dirt entry into the engine.
- If any portion of the oil pump is worn beyond the specified service limits, replace the oil pump as an assembly.

SPECIFICATIONS

LUBRICATION SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	1.09 litres	-
	At disassembly	1.3 litres	-
Recommended engine oil		Brand: Hero 4T Plus Grade: SAE 10W 30 SL Grade (JASO MA2) Manufactured by: 1. Tide Water Oil Co. (India) Limited. 2. Savita Oil Technologies Limited. 3. Bharat Petroleum Corporation Limited.	-
Oil pump	Outer rotor-body clearance	0.15-0.21 mm	0.26 mm
	Rotor tip clearance	0.15 mm	0.20 mm
	Pump end clearance	0.03-0.09 mm	0.15 mm

TROUBLESHOOTING

Oil level too low

- External oil leaks
- Worn valve guide or seal
- Worn piston rings or cylinder

Oil contamination

- Oil not changed periodically
- Faulty cylinder head gasket
- Worn piston rings
- Air cleaner element dirty/not replaced periodically

Low oil pressure

- Oil level low
- Clogged oil strainer
- Internal oil leak
- Incorrect engine oil grade being used

No oil pressure

- Oil level too low
- Internal oil leaks
- Damaged oil pump

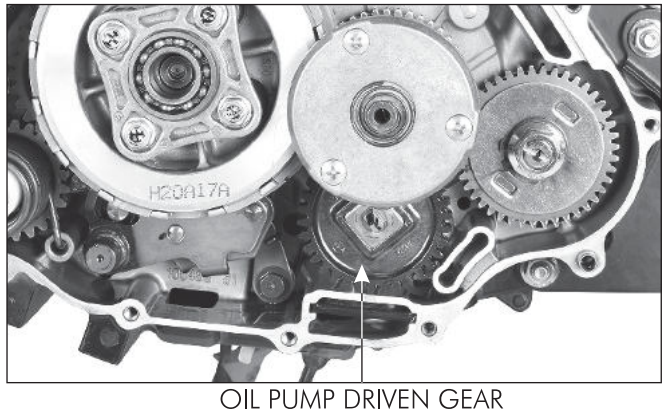
OIL PUMP

REMOVAL

NOTE

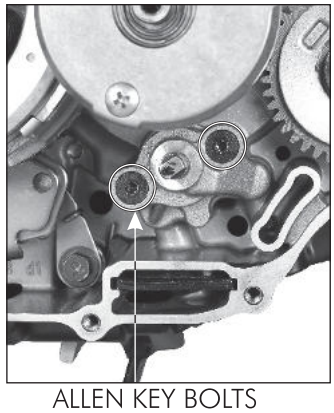
Oil pump can be removed with engine on frame.

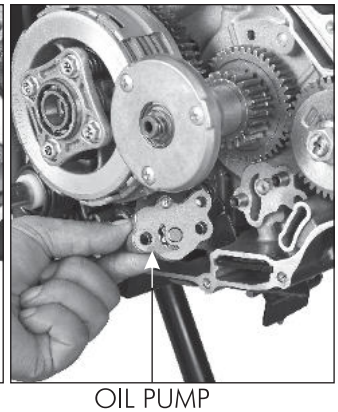
Remove the right crankcase cover (page 9-3).
Remove the oil pump driven gear.



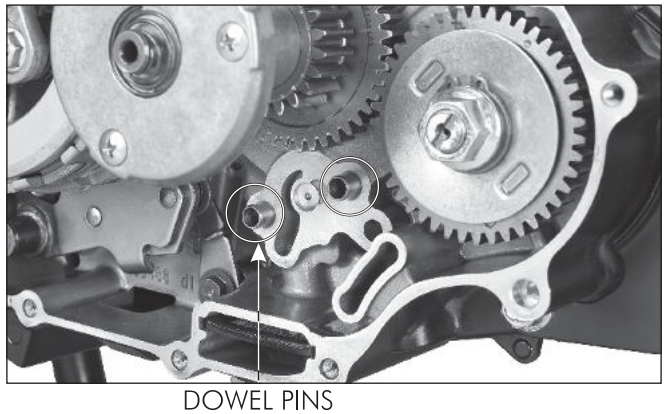
OIL PUMP DRIVEN GEAR

Remove the two allen key bolts and oil pump.


ALLEN KEY BOLTS


OIL PUMP

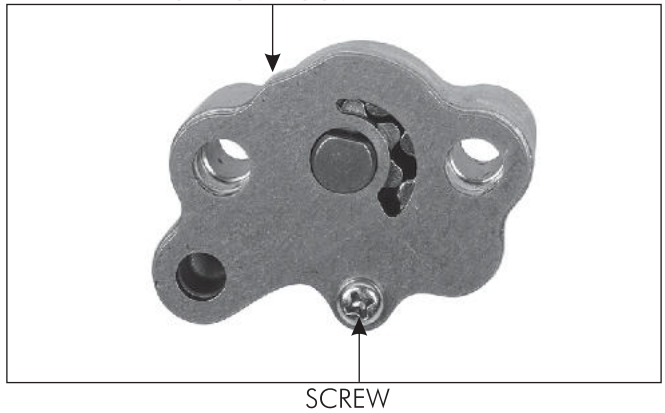
Remove the dowel pins.


DOWEL PINS

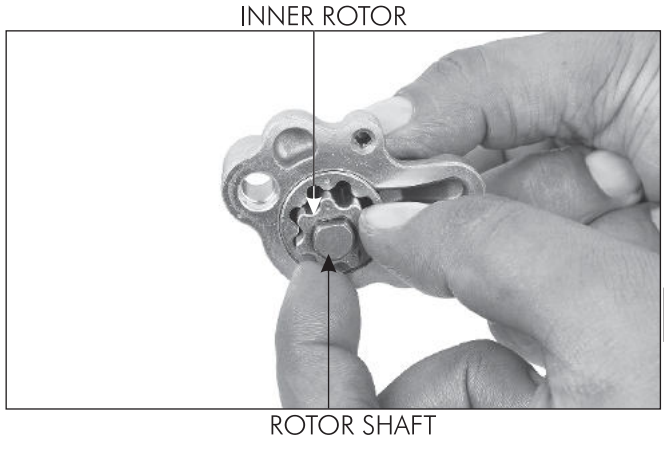
OIL PUMP COVER

DISASSEMBLY

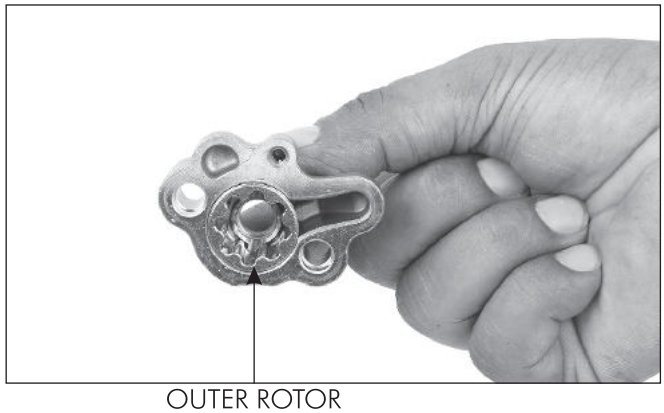
Remove the tapping screw and oil pump cover.


SCREW

Remove the rotor shaft with clip and inner rotor.



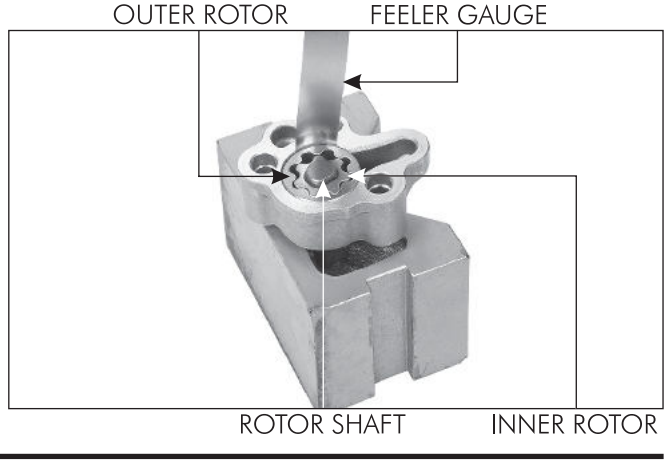
Remove the outer rotor from the oil pump body.



INSPECTION

Install the outer rotor, inner rotor and rotor shaft into the oil pump body and measure the clearance between outer rotor and oil pump body.

SERVICE LIMIT
OIL PUMP BODY CLEARANCE: 0.26 mm



Measure the rotor tip clearance between the inner and outer rotors.

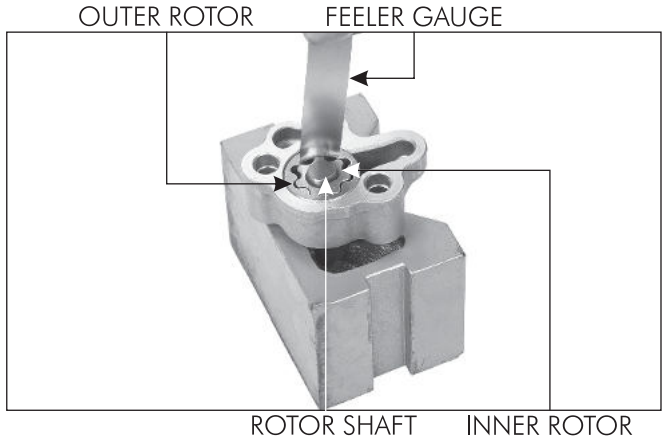
SERVICE LIMIT

ROTOR TIP CLEARANCE: 0.20 mm

NOTE

- Measure the clearance at several places and use the largest reading to compare with the service limit.
- If any portion of the oil pump is worn beyond the specified service limit, replace the oil pump and pump cover as an assembly.

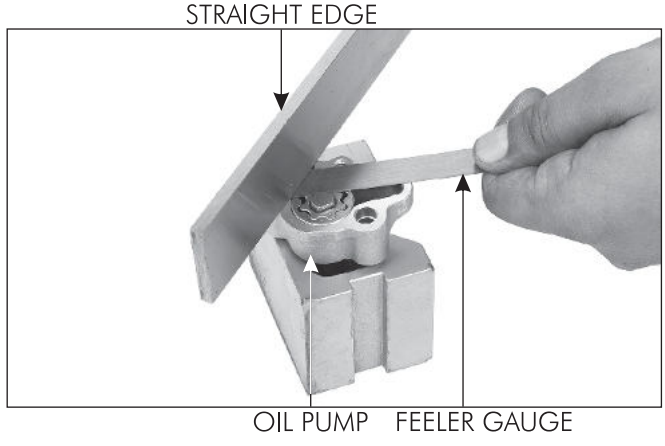
Remove the rotor shaft.



Measure the pump end clearance using a straight edge and feeler gauge.

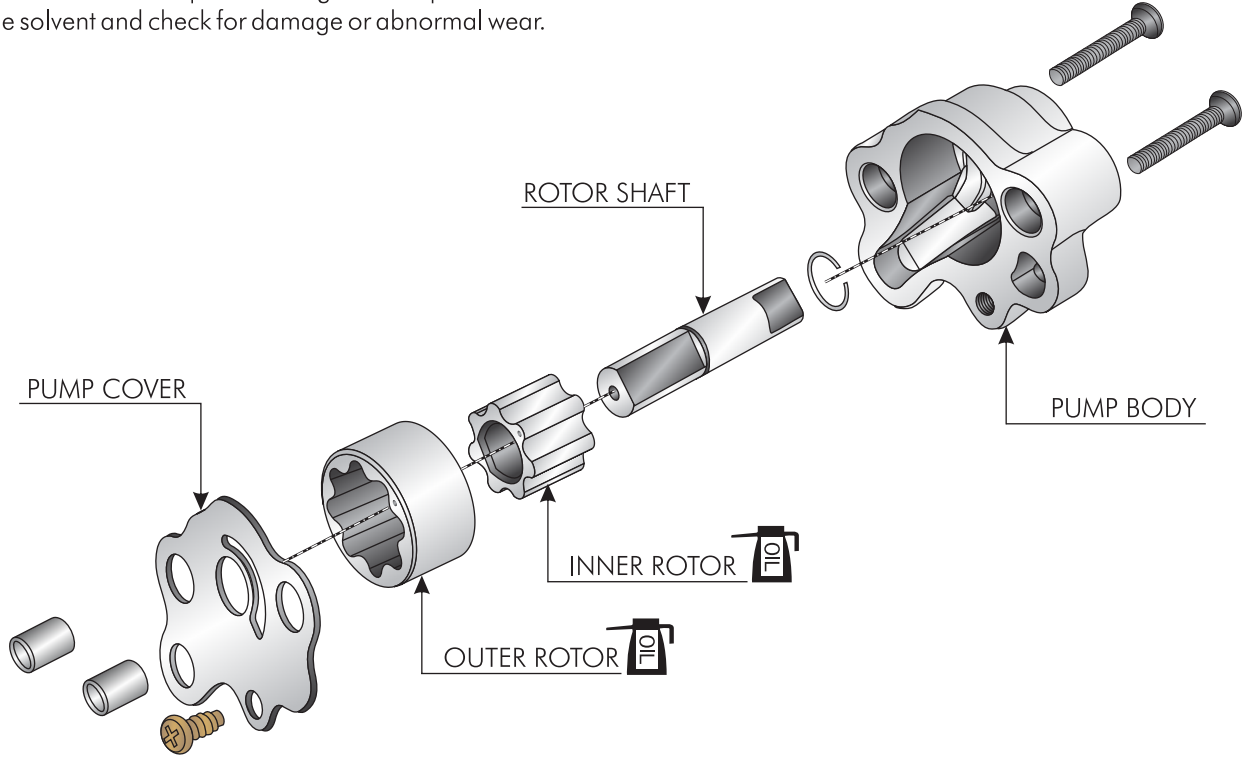
SERVICE LIMIT

PUMP SIDE CLEARANCE: 0.15 mm

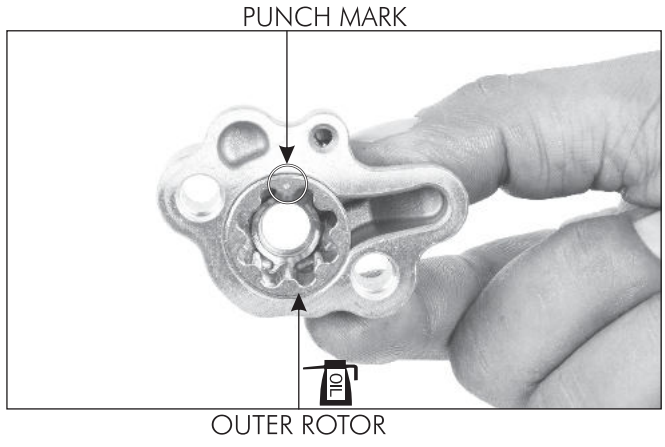


ASSEMBLY

Clean all disassembled parts in high flash point non-flammable solvent and check for damage or abnormal wear.



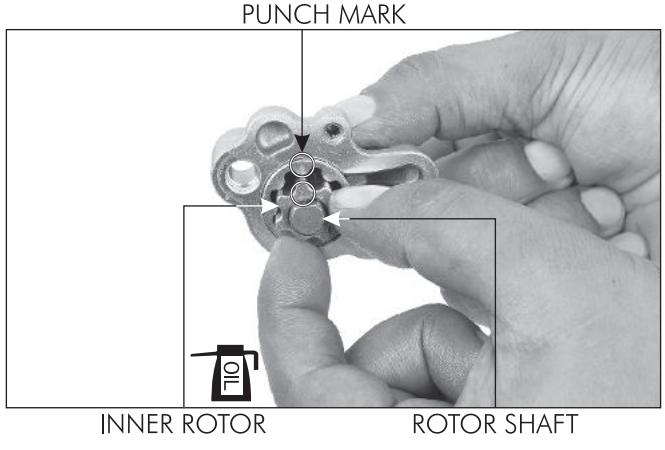
Apply clean engine oil to the outer rotor and install it into the oil pump body with its punch mark facing up.



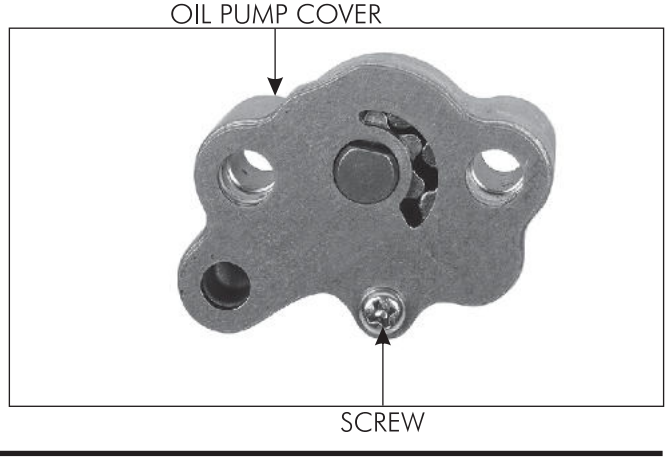
Apply clean engine oil to the inner rotor and install them by aligning the flat end of the rotor shaft with clip and inner rotor.

NOTE

While assembling the oil pump make sure that the punch marks on the inner and outer rotor are facing outwards.

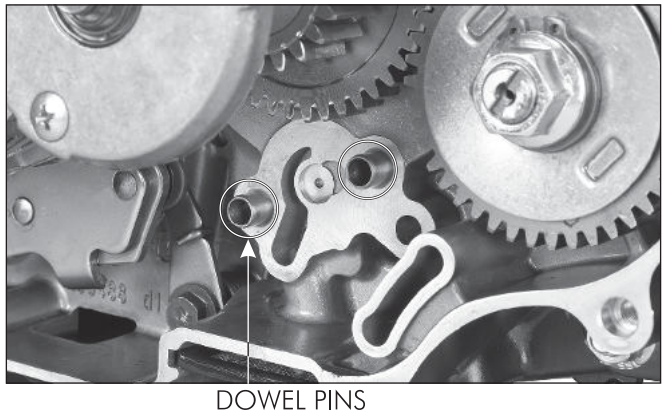


Install the oil pump cover and tighten the screw.

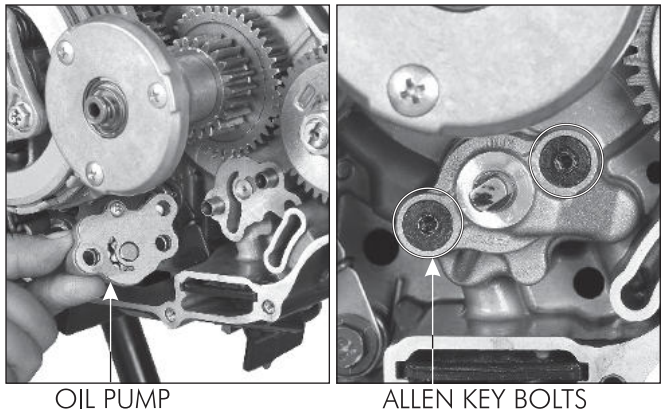


INSTALLATION

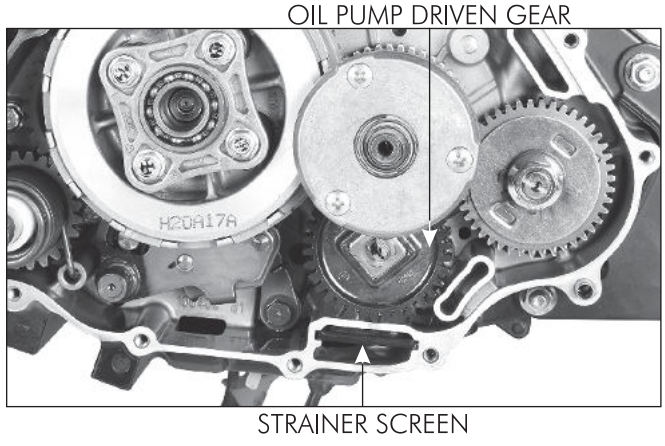
Install the dowel pins onto the crankcase.



Install the oil pump and tighten the allen key bolts.



Install the oil pump driven gear.
Clean the oil strainer screen and oil rotor filter (page 3-11).
Install the right crankcase cover (page 9-5).



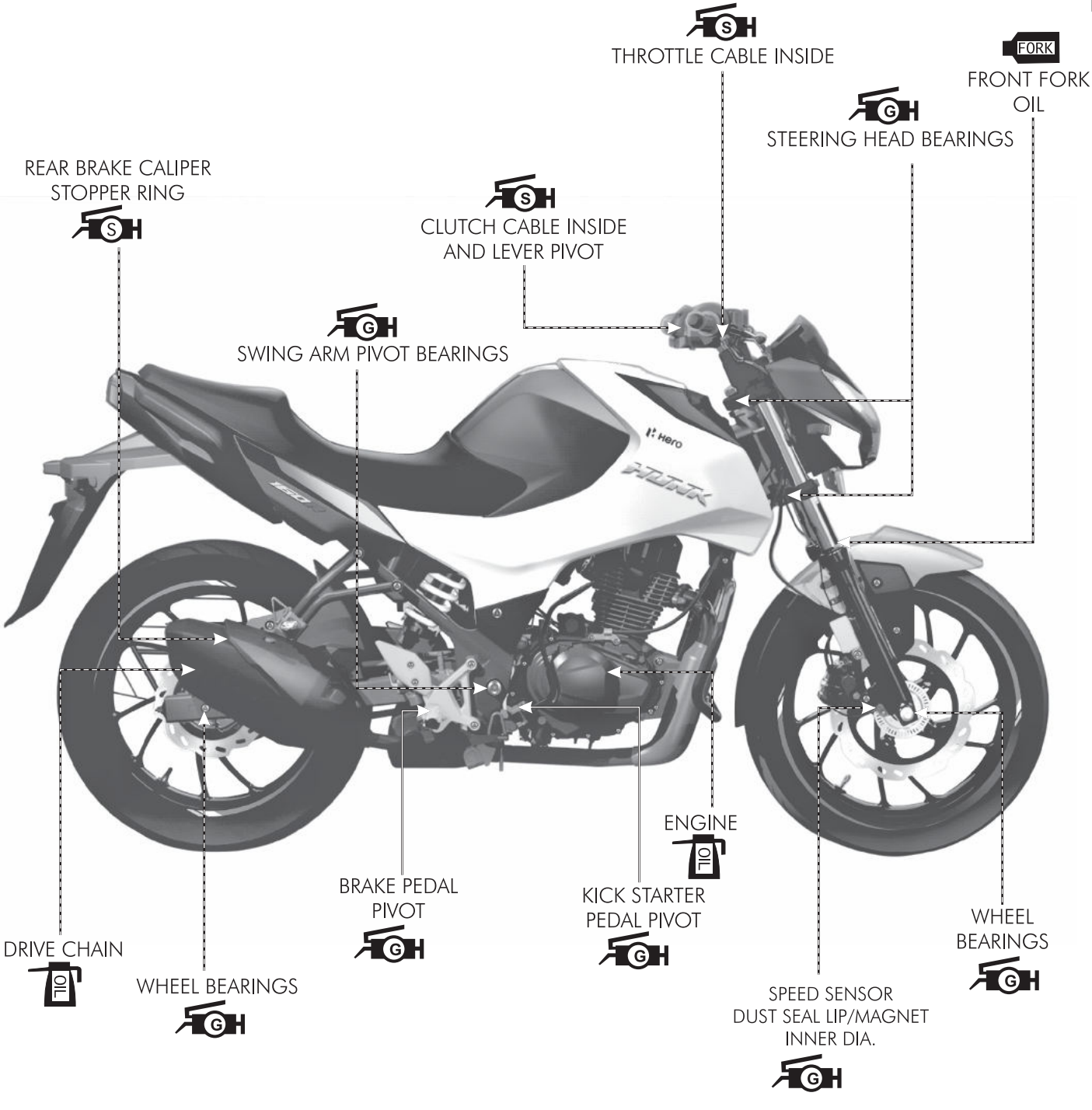
LUBRICATION POINTS

Use general purpose grease wherever specification is not given.

Apply oil or grease to all other sliding surfaces and cables not shown here

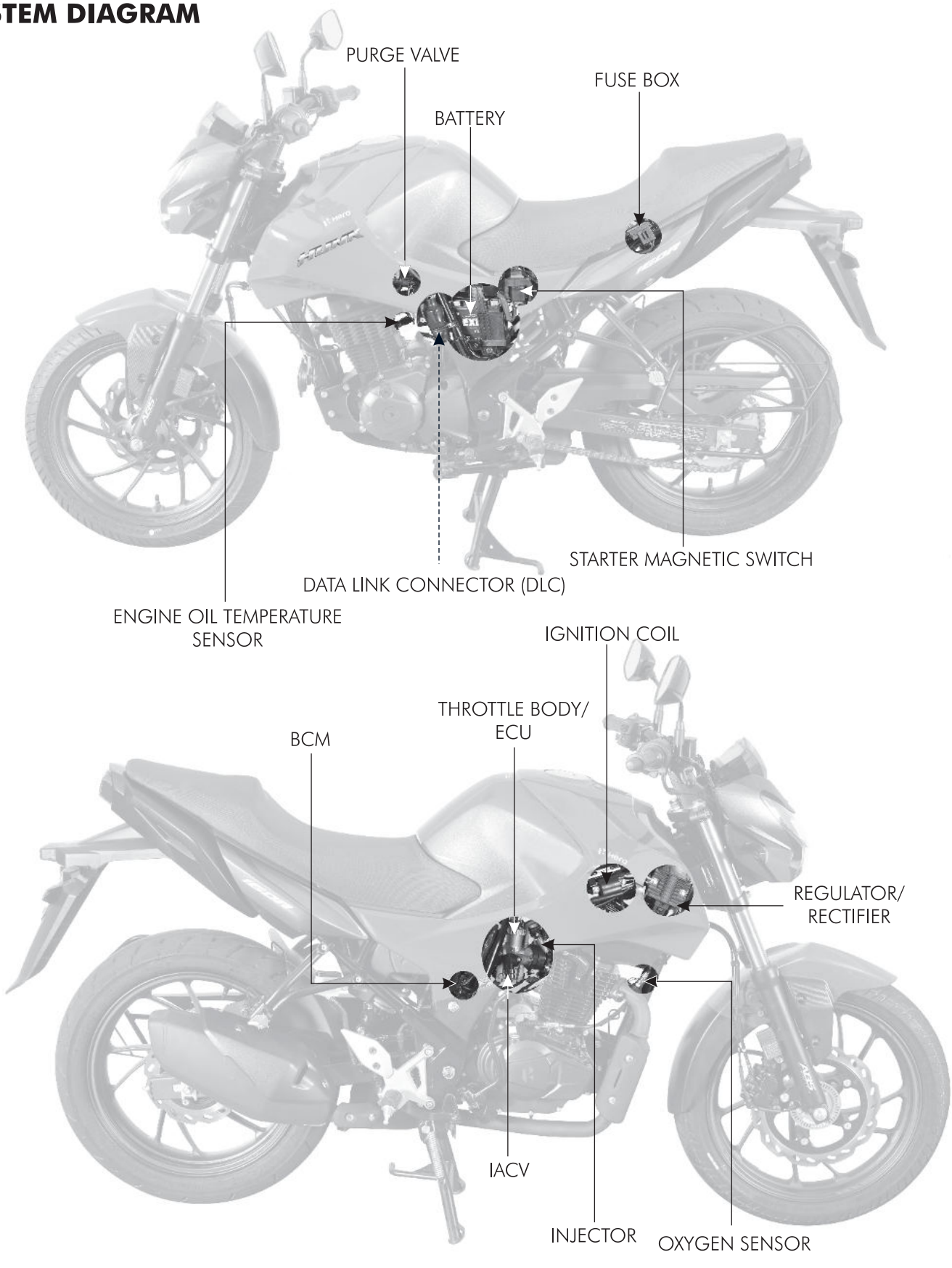
CONTROL CABLES

Periodically disconnect the throttle cable at its upper end. Throughly lubricate the cable and its pivot points with commercially available recommended cable lubricant or low viscosity oil.

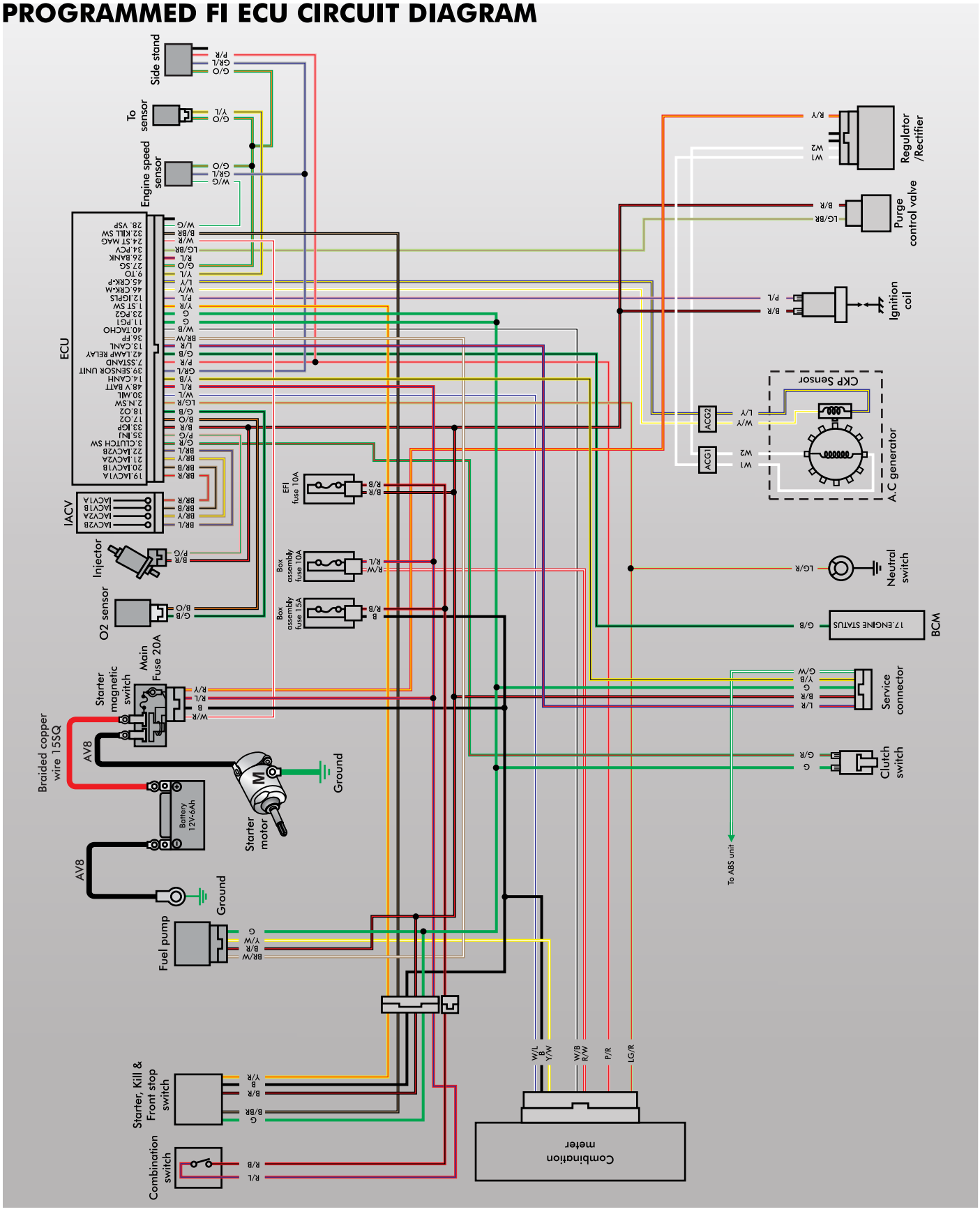


MEMO

SYSTEM DIAGRAM



PROGRAMMED FI ECU CIRCUIT DIAGRAM



System Diagram	5-0	Quick Connect Fitting	5-57
Programmed FI ECU Circuit Diagram	5-1	Fuel Pressure Test	5-60
Service Information	5-2	Fuel Pump	5-61
Specification	5-3	IACV	5-65
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Troubleshooting	5-35		

5

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where petrol is stored can cause a fire or explosion.
- Before disconnecting fuel feed hose, drop the fuel pressure and keep the vehicle idle to cool the engine for 10-20 minutes.
- Inspection of high tension output voltage on the vehicle should be carried out by clamping timing light to high tension coil cord.

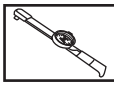
- Whenever fuel feed hose is disconnected ensure to plug the hose and cover injector joint to prevent dust entry.
- Always ensure to keep the fuel tank lid closed whenever working on the fuel system to avoid dust entry.
- During PDI always ensure that there are no malfunction codes stored in the ECU memory.
- Do not accelerate while cranking the engine.
- Ensure ECU and harness connectors are fastened securely. A poor or loose connection can cause high voltage surge and result in damaging the integrated circuits in ECU.
- Bending or twisting the control cable will impair smooth operation and could cause the cable to stick or bend, resulting in loss of control on the vehicle.
- Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.
- Seal the cylinder head intake port with a tape or a clean cloth to keep dirt and debris from entering the intake port after the throttle body has been removed. Do not damage the throttle body. It may cause incorrect throttle valve calibration.
- Prevent dirt and debris from entering the throttle bore and fuel feed hose, clean them using compressed air.
- The throttle body/ECU is factory pre-set. Do not try to disassemble ECU from throttle body. ECU is integrated to throttle body. Throttle body/ECU to be replaced as a single unit.
- Do not disassemble the fuel pump in case of any malfunction. It has to be replaced as a single unit.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- The bank angle sensor is factory pre-set and does not require BAS initialization. Ensure to install the throttle body correctly by aligning the boss to the insulator groove for proper functioning of bank angle sensor.
- If the Malfunction Indicator Lamp (MIL) glows continuously until the vehicle starts, follow the Malfunction Diagnosis procedures to remedy the problem.
- When checking the Programmed- FI, always follow the steps in the troubleshooting (page 5-35).
- Refer to Programmed FI system component location (page 5-0).

- The Programmed-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the Programmed- FI Malfunction Diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map. The engine does not start, if the injector or CKP sensor has a problem.
- A faulty Programmed FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Use a Hero vehicle communication interface (Hero VCI) (part no. HMCL0419HVCI01 for Programmed FI system inspection.
- For troubleshooting Programmed-FI system remove the body panels **(SECTION-2)**.

SPECIFICATIONS

FUEL INJECTION SYSTEM

ITEM	SPECIFICATIONS
Fuel injector resistance	14.5 Ω
EOT sensor voltage	5 V ± 0.1 V
EOT sensor resistence	2.645±5% kΩ @ 20 C
Fuel pressure	300±10 kPa
Injector voltage	Battery voltage
Oxygen sensor resistance	<300 KΩ @ element tip temp >300° C
Oxygen sensor voltage	Vrich >0.7V and Vlean <0.12 V @ element tip temp >300° C
IACV resistance	47.7-58.3 Ω at 25° C
BAS tilt angle	58±7°

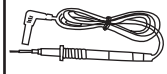
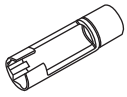


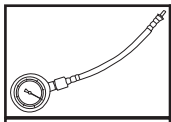
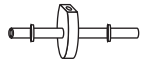
TORQUE VALUES

INJECTOR MOUNTING BOLTS	**: 1.0 kgf-m**
FUEL PUMP MOUNTING NUTS	**: 1.2 kgf-m**
OXYGEN SENSOR	**: 2.5 kgf-m**
PIPE COMPLETE INLET BOLTS	**: 1.0 kgf-m**
EOT SENSOR	**: 1.4 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

SPECIAL TOOLS

	**MULTIMETER PROBE** **PART NO: 070 HH KTRF 004**
	**OXYGEN SENSOR SOCKET** **PART NO: HMCL0519ABW01**
	HERO VEHICLE COMMUNICATION INTERFACE (HERO VCI) **PART NO: HMCL0419HVCI01**

	**FUEL PRESSURE GAUGE** **PART NO: 070 HH KTRF 003**
	**FUEL PRESSURE GAUGE ADAPTOR** **PART NO: 070 HH KTRF 005**

HERO VEHICLE COMMUNICATION INTERFACE (HERO VCI)

PART NO: HMCL0419HVCI01

DESCRIPTION

It is a computer-based system originally designed to reduce emissions by monitoring the performance of major engine components.

A basic Hero VCI system consists of an ECU (Electronic Control Unit), which uses input from various sensors (e.g., oxygen sensors) to control the actuators (e.g., fuel injectors) to get the desired performance. The MIL (Malfunction Indicator Light), provides an early warning of malfunctions to the vehicle owner.

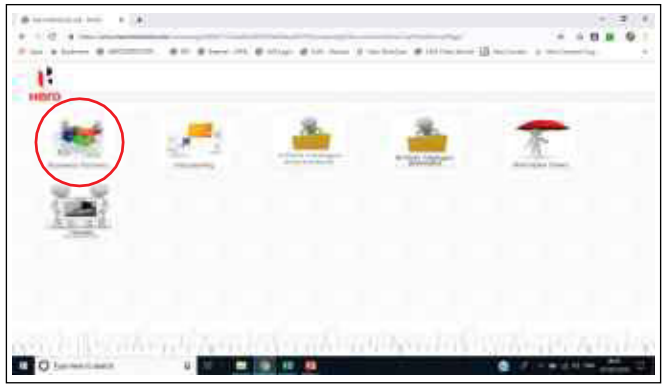
HERO VCI COMPONENTS

VCI bag consists of following components:

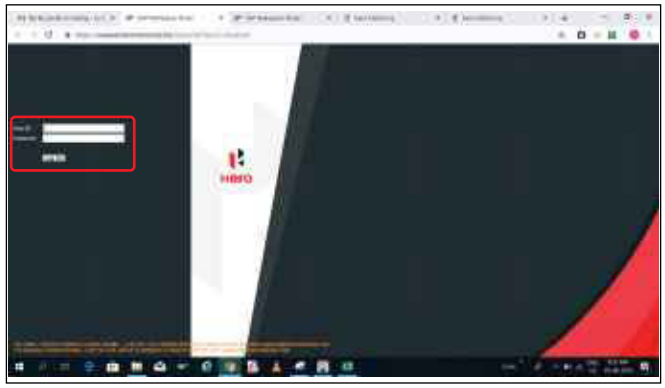
1. VCI tool
2. VCI cable
3. USB cable
4. Bluetooth dongle

DOWNLOAD PROCEDURE FOR HERO VCI APPLICATION SOFTWARE

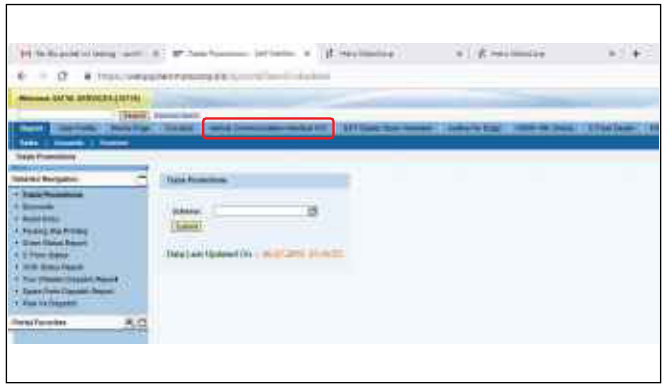
- Go to the www.heromotocorp.biz portal and click on "BUSINESS PARTNERS".



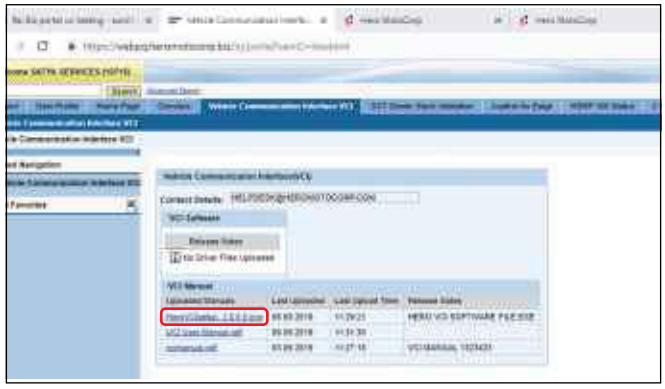
- Enter your credential used for .biz login.



- Select the Vehicle Communication Interface VCI tab

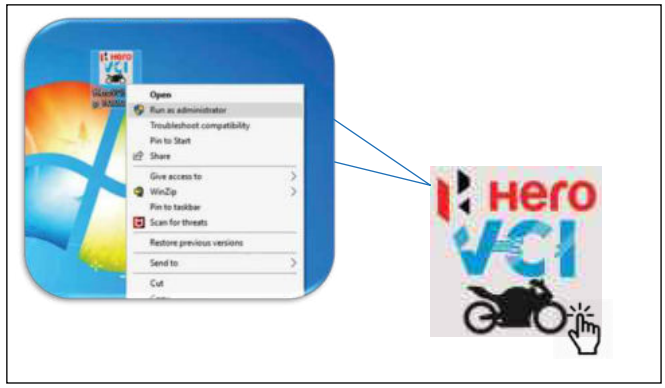


- Download the "HeroVCIsetup.exe" File.

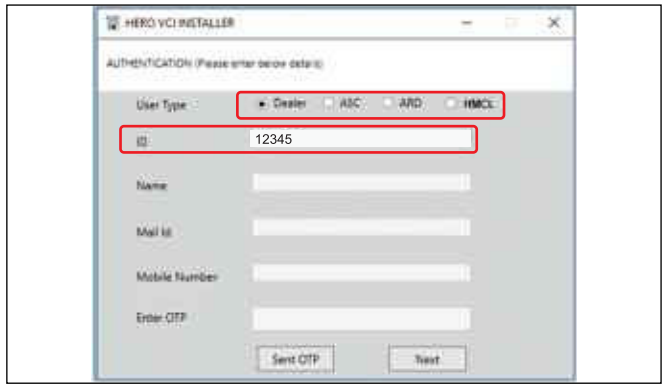


HERO VCI EXE INSTALLATION

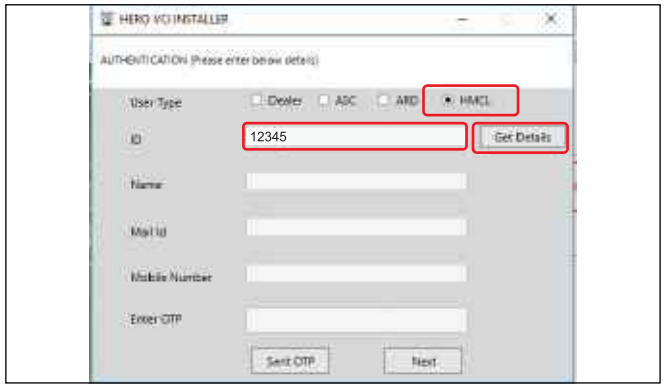
- Right click on HeroVCIsetup.exe file and run with administrator



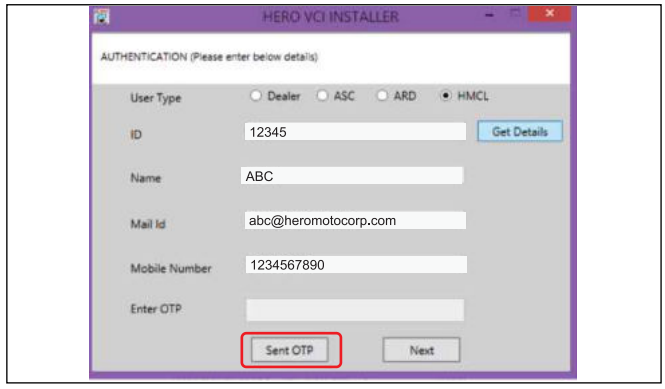
- New window pop up will be appeared on the computer screen.
- Select "DEALER/ASC/ARD" from the given selection list.
- Enter your user "ID" ie., Dealer/ASC/ARD code.
- Dealer details will automatically fetch in the blank spaces.



- **For HMCL employees-** Select "HMCL" from the given selection list.
- Enter your user Employee ID.
- Click on "GET DETAILS" for fetching the details.



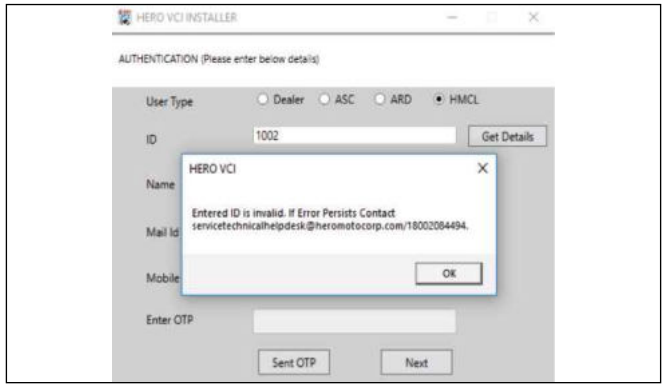
- If details are available on the server, they will get filled in the blank cells.
- Now click on "Send OTP" button to generate an OTP.



- An OTP will be shared on registered E-mail id and mobile number to the assigned dealer.

- An OTP will be shared on registered E-mail id and mobile number.
- Enter the received OTP into the "ENTER OTP" tab to run the application.

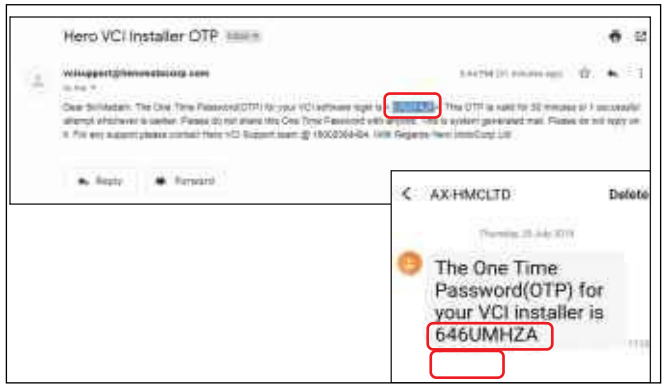
- If Dealer/ASC/ARD data is not available on the Hero server then a error message will pop-up.
- For any support, contact at THD (Technical Helpdesk)
  Toll-free No : 18002084494
  Mail id : servicetechnicalhelpdesk@heromotocorp.com



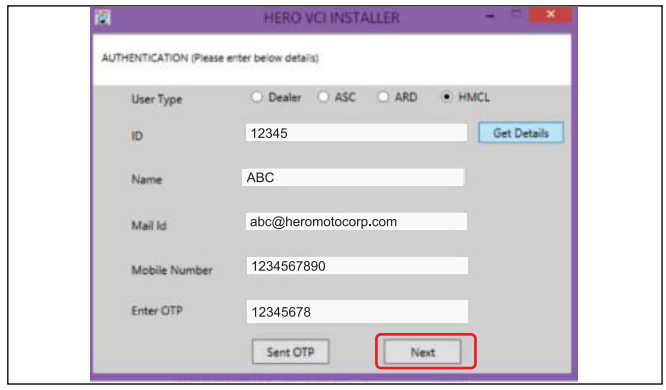
- Enter the received OTP to run the application.

NOTE

Same OTP will be used as a password while login.



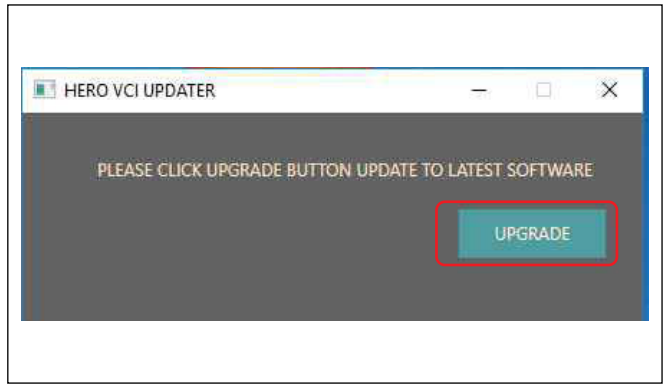
- Enter the 8 character OTP and Click on "NEXT" to run the application file.



- Accept the terms and conditions and click "NEXT" to proceed.

- Once the installation is completed and new software update is available, then a pop-up will appear to update the software.
- To update the software click on "OK"

- Click on "UPGRADE" to proceed.
- After the software update, always ensure to update the Hero VCI tool.



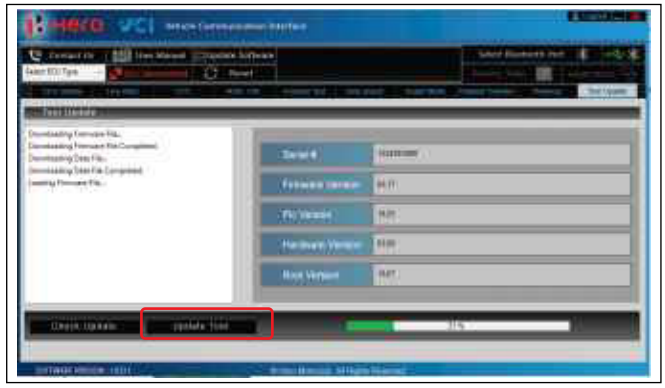
- Once the setup is installed, a Hero VCI diagnostic tool window will appear on the screen.
- Now login the tool with user ID and received OTP.

- To reset the password, enter the received OTP and enter the desired password (Max 8 Characters).

- Connect the HERO VCI with the system and ensure proper internet connectivity.

- If update is available then a pop-up will appear.

- Click on "UPDATE TOOL" to update the latest VCI software.

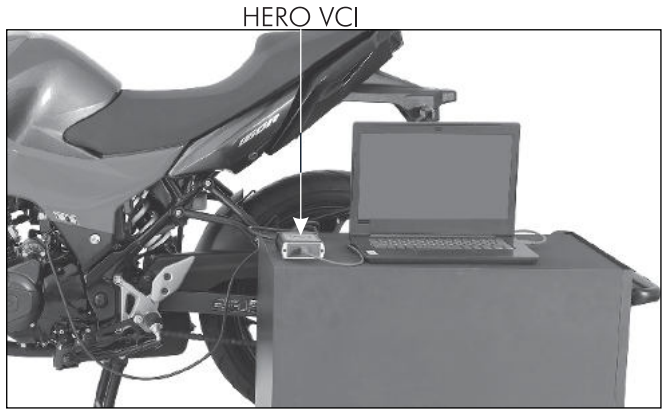


- Once update is completed a confirmation message will appear on the screen.

- The communication of the software with the vehicle is possible with either with a USB cable or using the Bluetooth connectivity.

USB Cable

- Connect the Hero VCI with the cable and other end with vehicle diagnostic link connector (DLC).
- Connect USB cable to HERO VCI and Laptop / Desktop.



- Turn "ON" the ignition switch.

NOTE

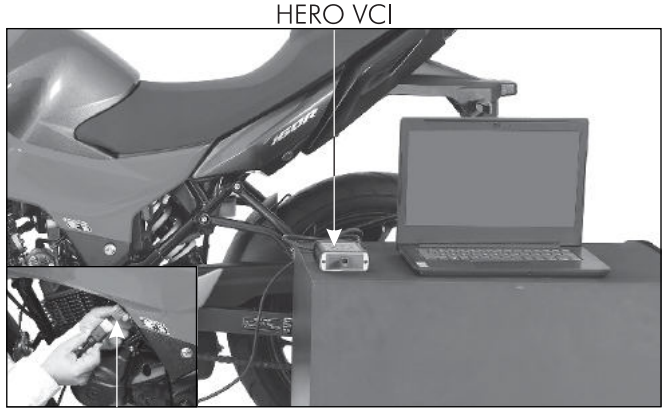
Engine should not to be cranked during the process.

- Open HERO VCI application and login with username and password credentials.

Bluetooth mode

- Connect the Hero VCI with the cable and other end with vehicle diagnostic link connector (DLC).

HERO VCI

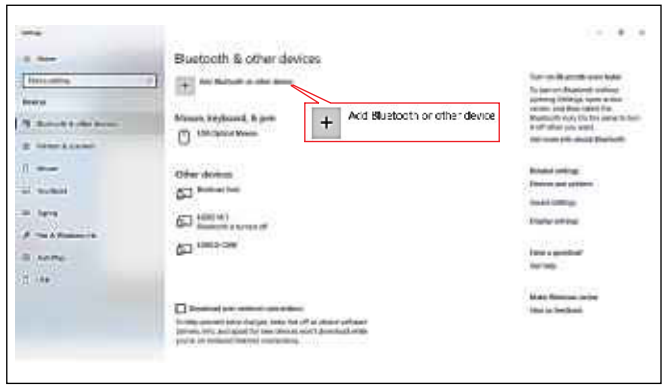


DATA LINK CONNECTOR (DLC)

- Open "Bluetooth Control Settings" in the computer and click on "ADD BLUETOOTH OR OTHER DEVICE ".

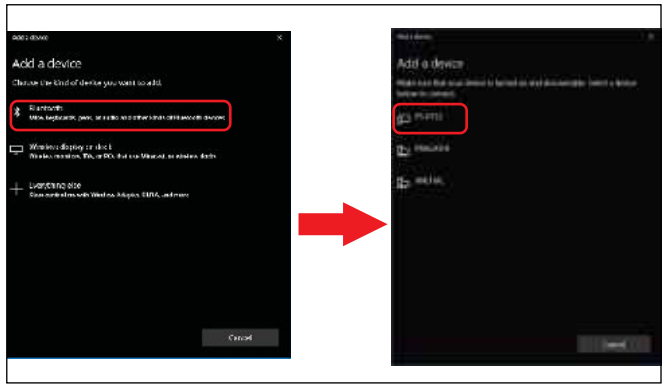
NOTE

Laptop/Desktop without Bluetooth need to connect the provided Bluetooth dongle for connection.

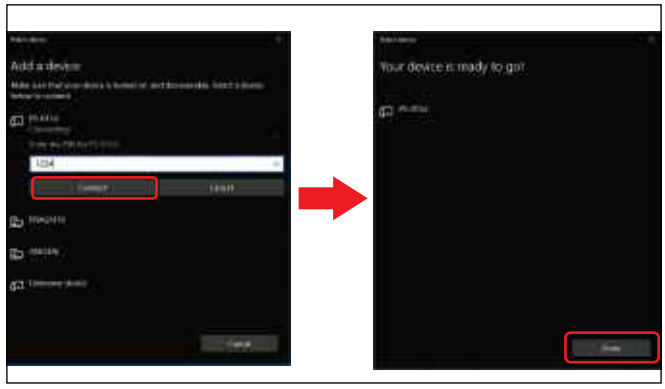


- Choose a device you would like to add – select the Bluetooth device.
- A list of available Bluetooth devices will be displayed in a window.

For example: If the Serial Number of the tool is HM02 190153 then the HERO VCI Bluetooth device name will appear as PS-0153

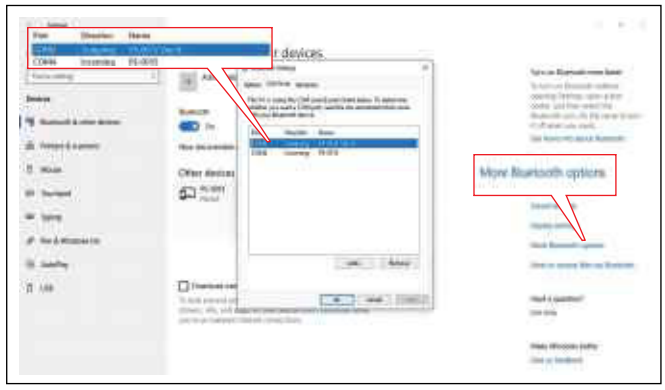


- Select the appropriate device, enter the password 1234 and click on "CONNECT" for pairing.
- Once the device is paired, it is ready to communicate with the ECU.
- Click on "DONE".



- Go to "MORE BLUETOOTH OPTIONS" and select "OUTGOING COM" port.

For example: COM 3 is an outgoing port for PS-0013



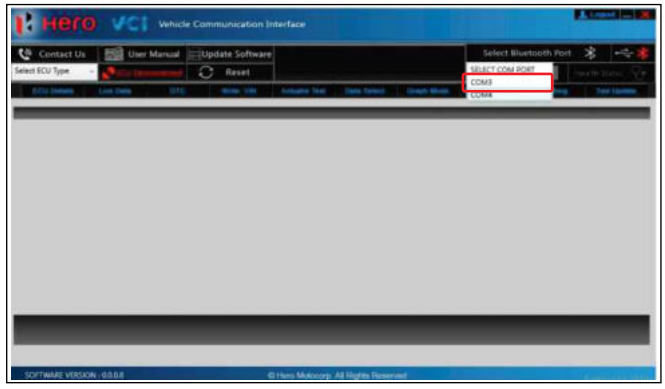
- Turn "ON" the ignition switch.

NOTE

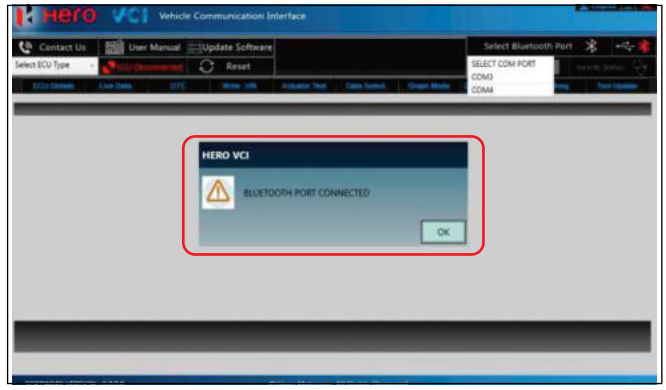
Engine should not to be cranked during the process.

- Open HERO VCI application and login with username and password credentials.

- Click on "SELECT BLUETOOTH PORT" and select the COM 3 is an outgoing port for PS-0013.



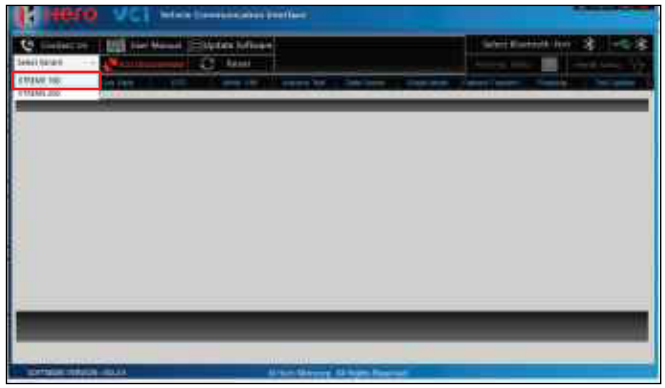
- Once an outgoing COM Port is selected, a message will be displayed on the screen "BLUETOOTH PORT CONNECTED".



USAGE

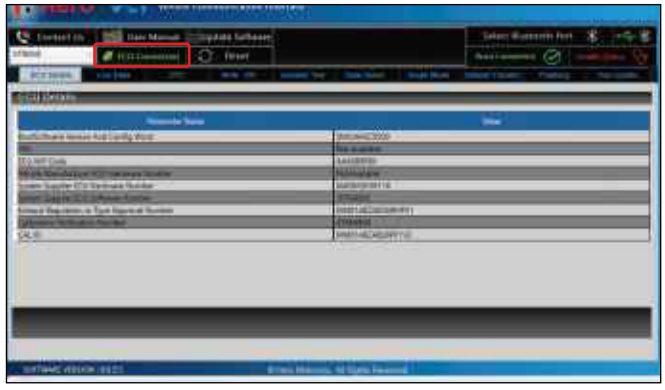
- Select ECU type by clicking on “SELECT ECU TYPE” from the drop down list.

- Select model “XTREME”.
- Select variant “XTREME 160R”.



ECU DETAILS

- Once the variant is selected, VCI will be connected with vehicle and ECU details will be displayed.
- “ECU CONNECTED” will be displayed in green color.



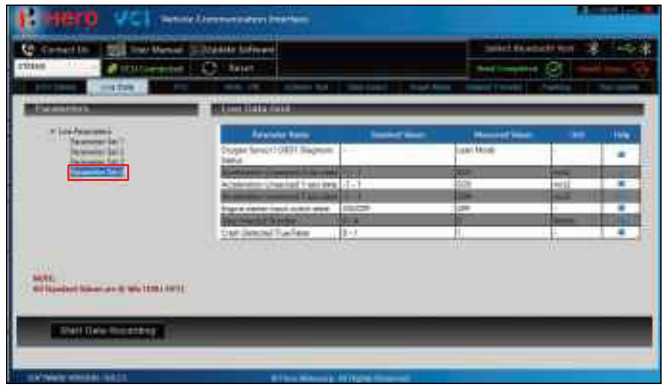
DATA LIST

- LIVE DATA button is used to view the engine ECU live data parameters.
- Click on live data Parameter set 1, Parameter set 2, Parameter set 3 and Parameter set 4 to view the parameters.

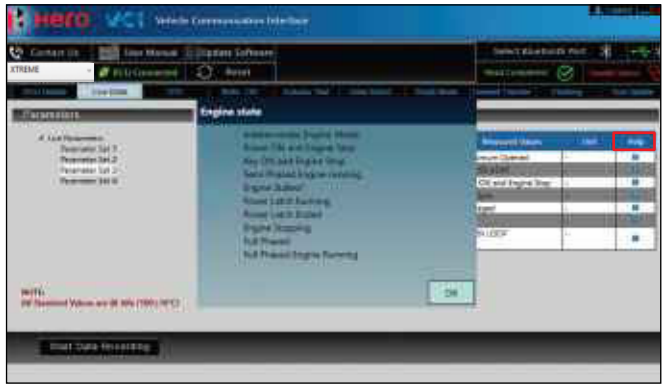
- LIVE DATA parameter set 2.

- LIVE DATA parameter set 3.

- LIVE DATA parameter set 4.

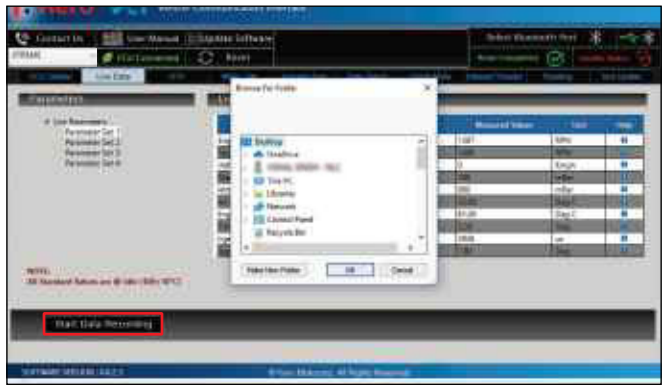


- Click on to "HELP" button to know more about the selected parameter. Pop can be shift with the help of mouse of the desktop/laptop.

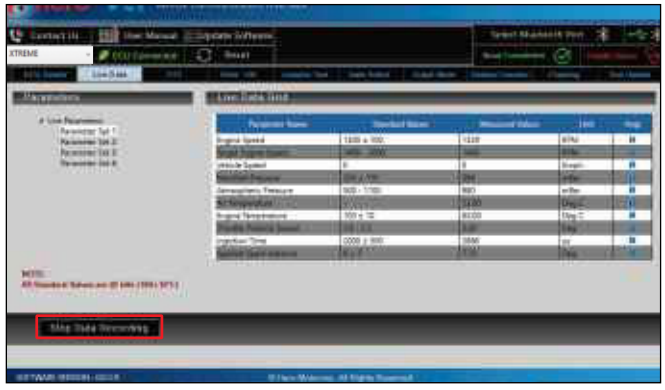


DATA LIST RECORD

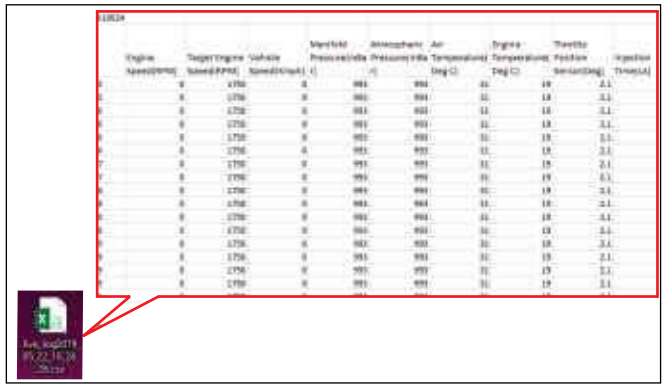
- To record the live data click on to "START DATA RECORDING" a pop-up will appear on the screen.
- Select the desktop or other location to save the live data parameters.



- To stop the live data recording click on to "STOP DATA RECORDING".

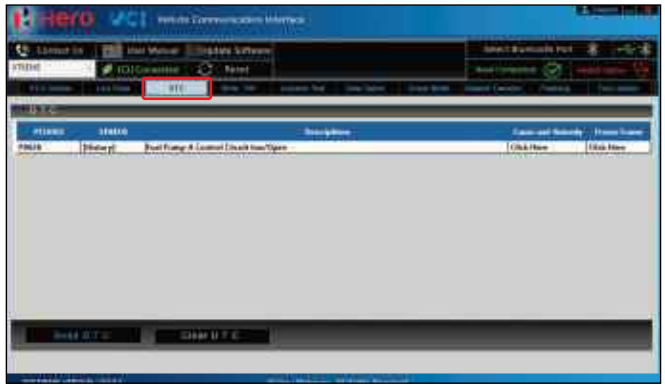


- A live data excel file will be saved on the selected location.
- File syntax : Year_Month_Date_Hours_Min_Sec



DTC

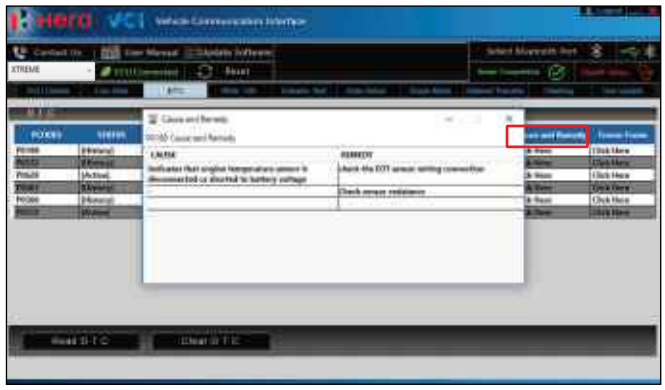
- Click on to "DTC" tab to view the diagnostics trouble codes stored in the ECU memory.
- Codes will reflect as an "ACTIVE" for current codes and "HISTORY" for rectified codes (which were not deleted after repairing the vehicle).



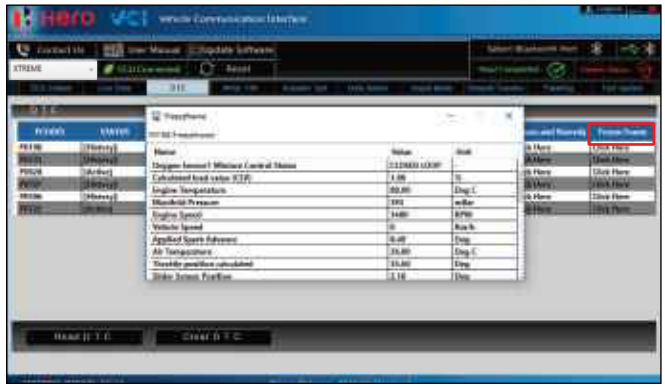
- To know about the causes and remedies of a particular error, click on to "CAUSE AND REMEDY" button of that particular error code a popup will appear with related information.

NOTE

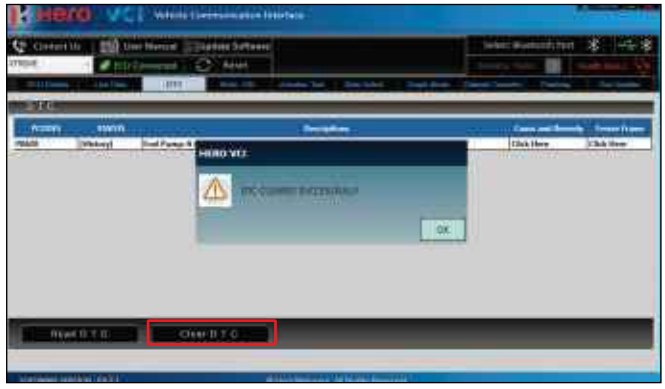
Refer to diagnostic trouble code chart (page 5-25) to know more about diagnosis information.



- Vehicle parameters detail can be checked when the DTC appered, to know click on to "FREEZE FRAME" of a particular error code a popup will appear with related information.

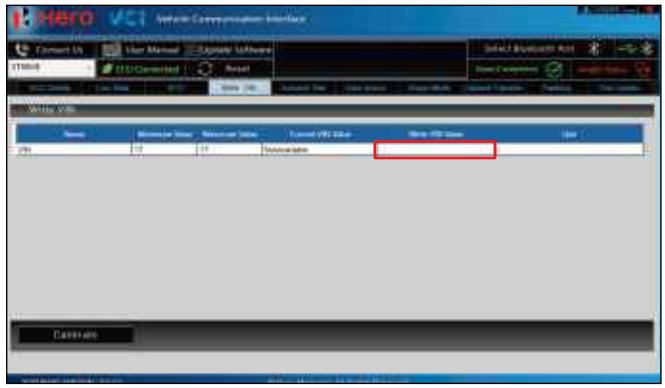


- To erase the existing DTC codes, click on to "CLEAR DTC" button.



WRITE VIN

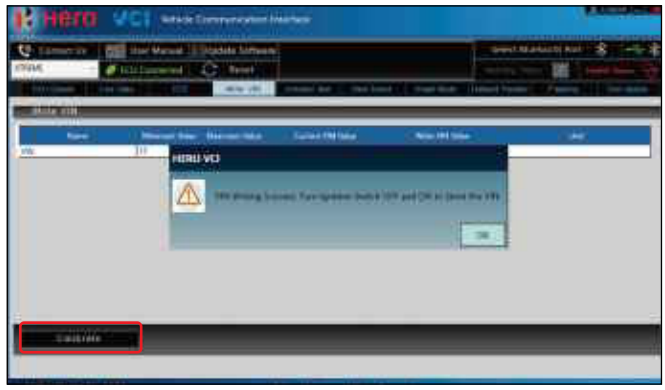
- In this option we can read and edit the VIN number.
- By clicking the tab below the "WRITE VIN VALUE", write/edit the VIN Number.



- Click on to "CALIBRATE" to save the edited value, once the value is saved a pop-up message will appear on the screen.

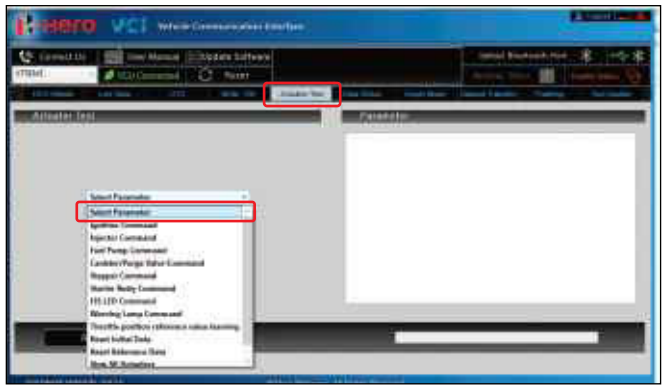
NOTE

Don't turned OFF the ignition switch before saving the value.

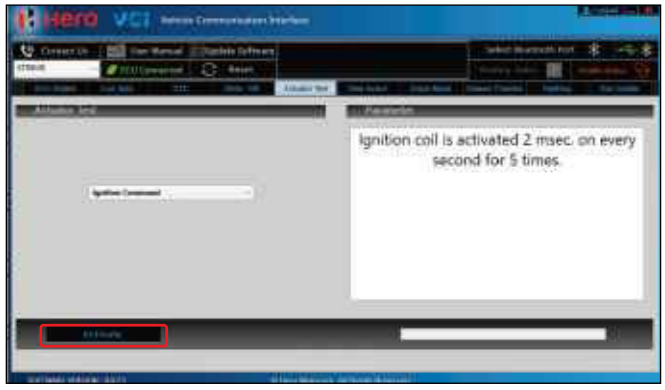


ACTUATOR TEST

- Click on to "SELECT PARAMETER", a dropdown list will appear for actuator selection.
- Select the desired actuator to perform the test.

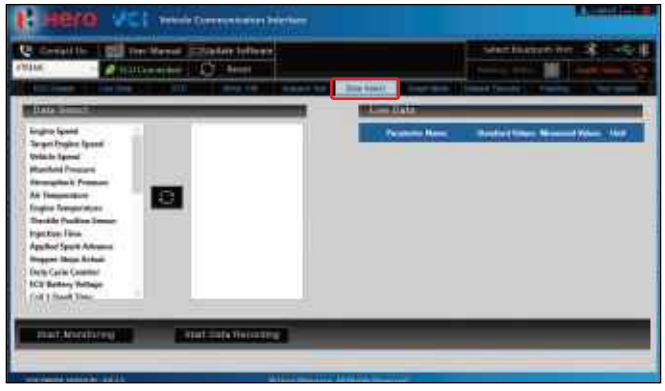


- After selecting the actuator, click on to "ACTIVATE" to start the testing.
- In status bar, the status will be displayed as Activated / Processing / Test Success.

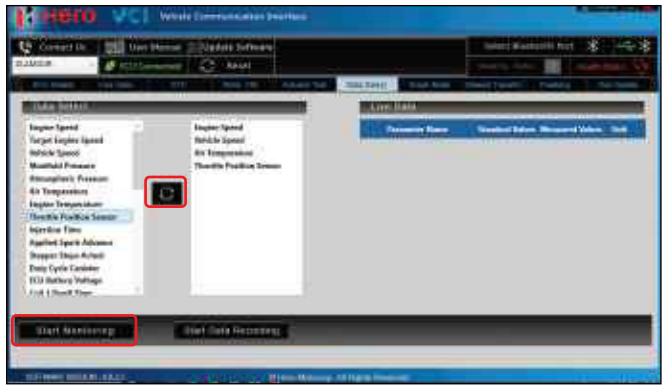


DATA SELECT

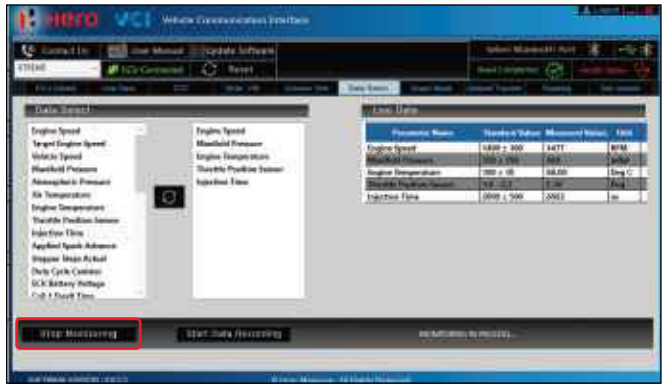
- Data Select tab is used to monitor the selected parameters.



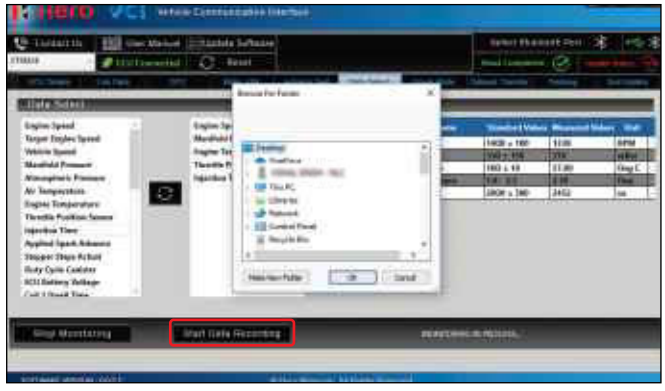
- To select the parameter, double click on the required parameter to swap into the monitor window.
- To remove the selected parameter double click on the parameter.
- To remove all selected parameter click on reset button.
- Click on to "START MONITORING" button to start the live data monitoring of selected parameters.



- To stop the monitoring click on to "STOP MONITORING" button once the monitoring is done.

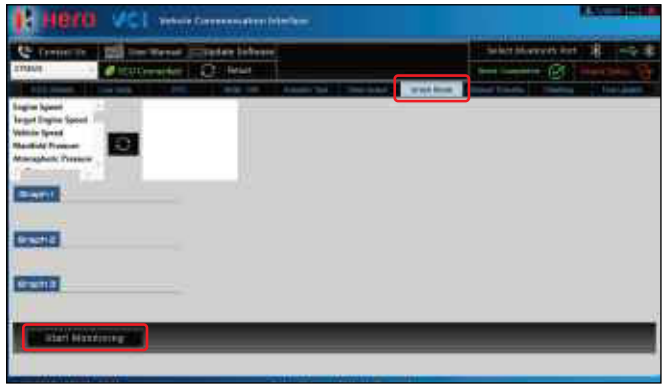


- To record the data of selected parameters click on to "START DATA RECORDING" same as "LIVE DATA" recording.

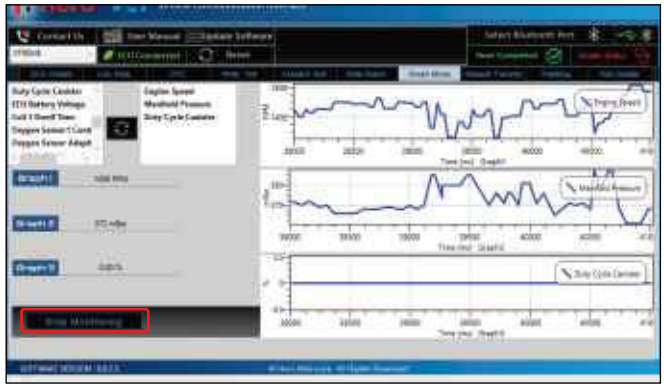


GRAPH MODE

- To select the parameter, double click on the required parameter to swap into the monitor window.
- To remove the selected parameter double click on the parameter.
- To remove all selected parameter click on reset button.
- Click on to "START MONITORING" to view the selected parameters in graph mode.

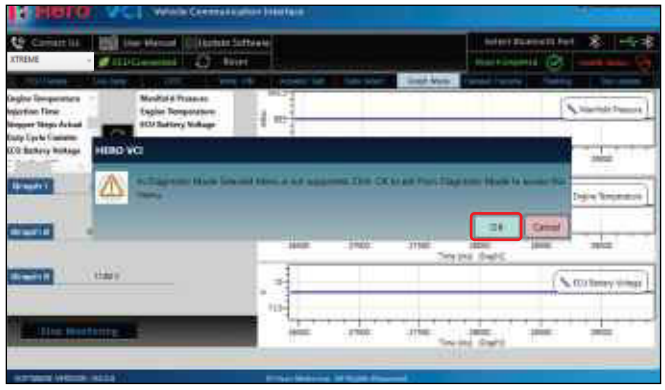


- To stop the graph click on to "STOP MONITORING".
- Maximum three parameters can be view in graph mode.



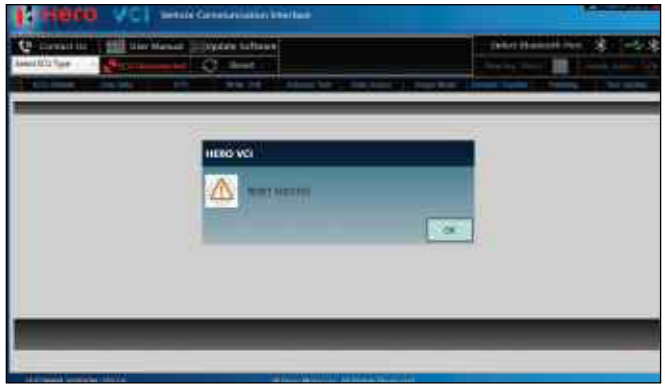
DATASET TRANSFER

- Dataset transfer option is used for uploading the ECU dataset to the HERO VCI tool for ECU upgradation.
- This option can not be used during diagnostic operation.
- During diagnosis if you click on to "DATA TRANSFER" a pop-up message will appear on the screen to rest the device/software. Click on to "OK" to use the option.

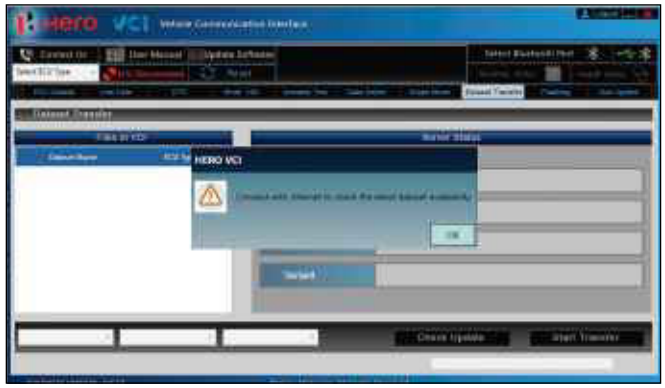


DATA TRANSFER

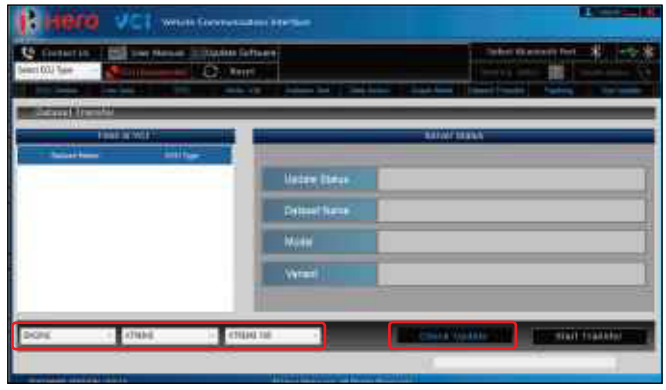
- Once we click on to "OK" device / software will reset and a pop-up message will appear.



- To check the availability of new ECU update, internet connection is required.

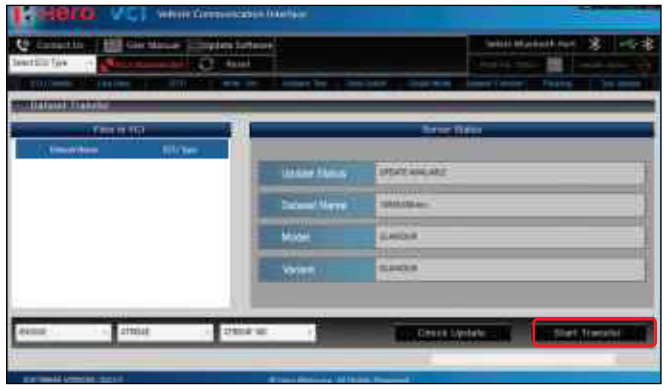


- Once "DATASET TRANSFER" is clicked all the available dataset will be shown in left side grid in the application.
- Select the appropriate dataset by selecting the ECU type, vehicle model, vehicle variant from bottom drop down box and click on to "CHECK UPDATE".

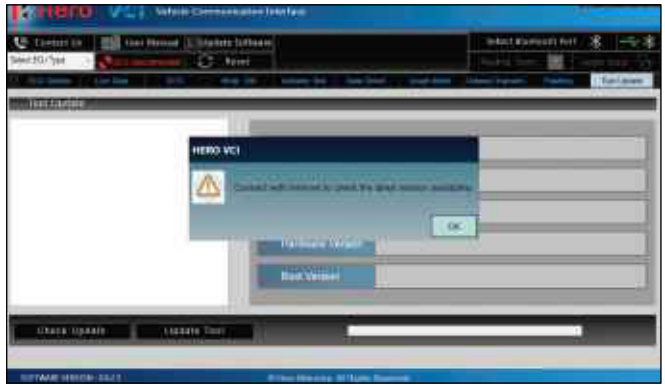


- If update is available, then it will show update status, dataset name, model, variant in the application.

- To transfer the available date set in the tool click on to "START TRANSFER".

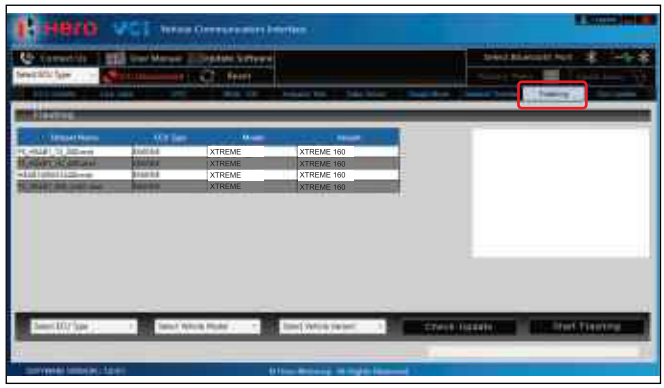


- Once dataset is transferred in the VCI, a success message will appear on the screen.

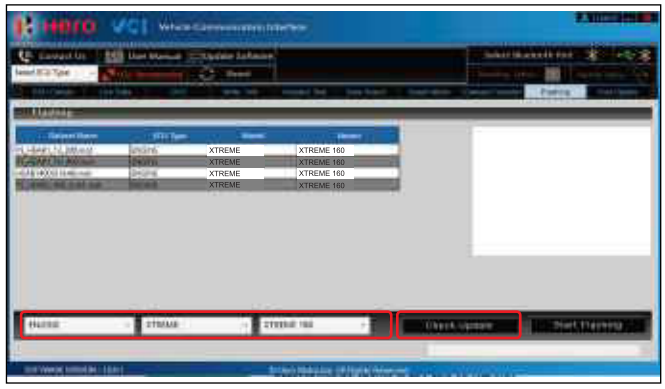


FLASHING

- This option is used for flashing the ECU with new dataset present in the HERO VCI tool. In this mode it will show all the dataset present in the tool.



- Select appropriate dataset by selecting ECU type, vehicle model and vehicle variant form the drop box available at the bottom of the screen.
- Click on to "CHECK UPDATE" once sorted, only the corresponding dataset will be shown in the grid on left side.

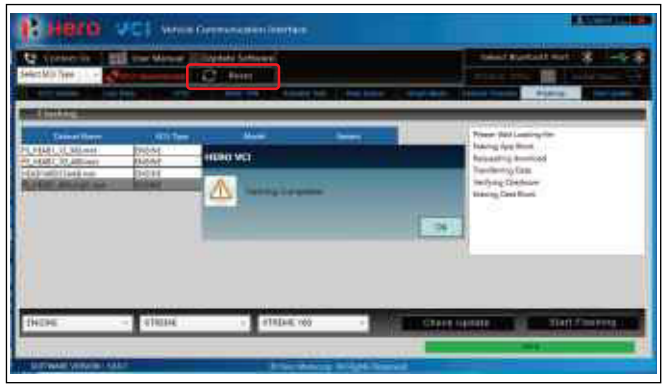


- Select the dataset from the grid to update and click on to "Start Flashing".

NOTE

- During flashing don't remove the HERO VCI Cables.
- Do not switch "OFF" the ignition switch.
- Do not reset the Hero VCI.
- Do not turn "OFF" the computer.

- Once the flashing is completed, press on to "RESET" button before re-starting the engine.



TOOL UPDATE

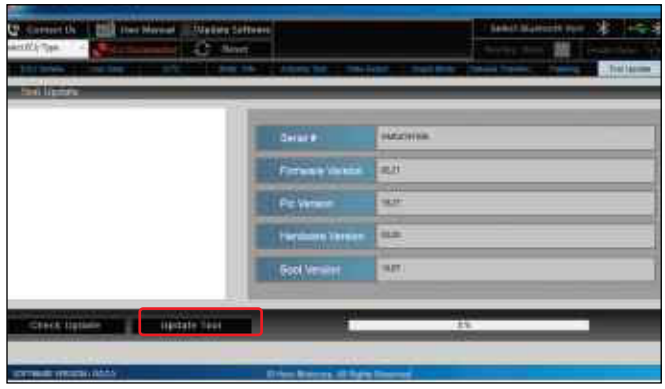
NOTE

Every time after updating the VCI software, before proceeding for any test update the VCI tool.

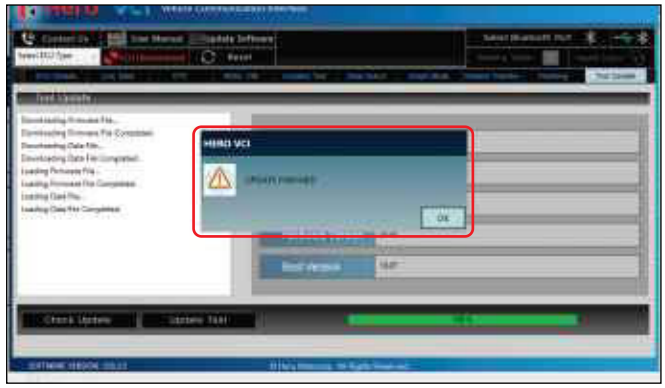
- Tool update option is used to update the HERO VCI with latest firmware.
- To check the availability of new firmware, internet connection is required.

- Click on to "CHECK UPDATE" to check the new update, if new update is available a pop-up message will appear to update the tool.

- Press "UPDATE TOOL" button, file will start downloading from the internet server.



- Once the tool got successfully updated, a pop-up message will appear "UPDATE FINISHED".



MALFUNCTION DIAGNOSTIC PROCEDURE

Park the vehicle on its main stand.

Turn the ignition switch to "ON".

If the programmed-FI malfunction indicator lamp (MIL) glows continuously until the vehicle starts, it indicates that programmed FI system is OK.

If MIL remains "ON" even if the vehicle is started, there is an abnormality in the programmed FI system.

If you wish to read the Programmed FI memory for malfunction data, perform the following:

MALFUNCTION INDICATOR LAMP (MIL)

MALFUNCTION CODE READING PROCEDURE

Turn the ignition switch to "OFF".

Remove wire band clamp from boot of main wiring.

Disconnect the connector cover from the data link connector (DLC).

CONNECTOR COVER

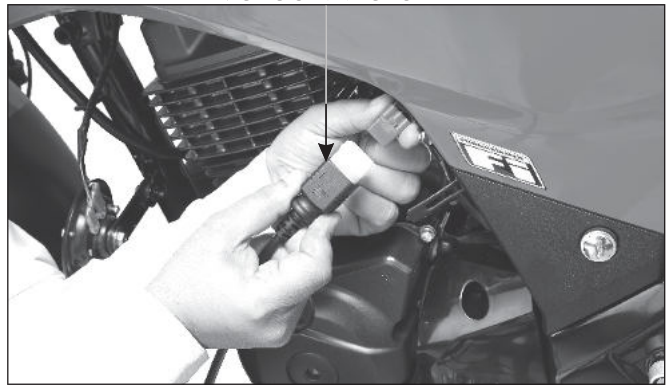
DATA LINK CONNECTOR (DLC)

Connect the VCI wire harness connector to data link connector (DLC).

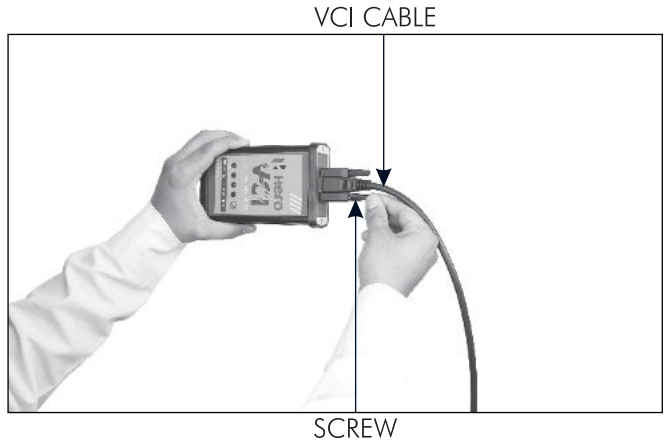
TOOL

HERO VEHICLE COMMUNICATION INTERFACE
PART NO: HMCL0419HVCI01

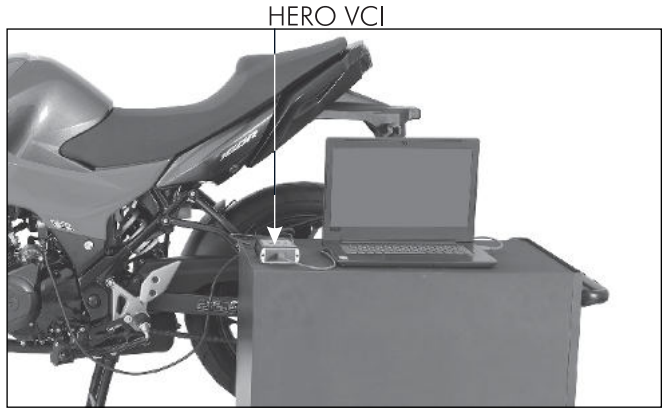
VCI CONNECTOR



Connect the VCI connector to the Hero VCI and tighten it by rotating its screw.



- Connect HERO VCI and Laptop / Desktop either with USB cable or using the Bluetooth connectivity (page 5-10).



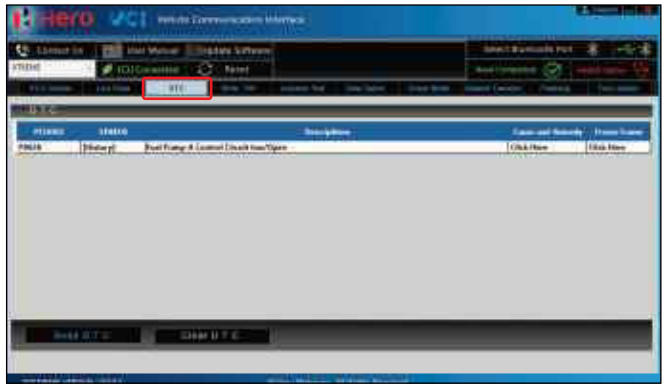
- Turn "ON" the ignition switch.

NOTE

Engine should not to be cranked during the process.

- Open HERO VCI application and login with username and password credentials.

- Click on to "DTC" tab to view the diagnostics trouble codes stored in the ECU memory.



DIAGNOSTIC TROUBLE CODE CHART

To identify the programmed FI System malfunction, connect the Hero VCI & check the malfunction as per the malfunction code and repair or replace the defective component. After replacing a defective component, again check for any malfunction.

DTC CODE	DESCRIPTION	MIL	CAUSES	REMEDIES	REFER TO
P0107	Manifold absolute pressure /Barometric pressure sensor circuit low	ON	MAP sensor is mounted on the PCBA. This monitoring is done signal output Pin of pressure sensor (No access in ThB Assy). For DTC • P0108 > 4.9 V • P0107 < 0.01 V	With VCI tool, check DTC code while cranking, if ambient pressure is shown as 1013, change the ECU and troubleshoot.	Page 5-35
P0108	Manifold absolute pressure/ barometric pressure sensor circuit high				Page 5-35
P0112	Intake air temperature sensor 1 circuit low bank 1	ON	TAIR sensor is mounted on the PCBA. This monitoring is done of voltage on the output pin of the sensor. (No access in ThB Assy) For DTC • P0110.15 > 4.9 V • P0110.11 < 0.07 V	With VCI tool, check DTC code while idling. If air temperature shows 40°C consistently then change the ECU and troubleshoot.	Page 5-36
P0113	Intake air temperature sensor 1 circuit high bank 1				Page 5-36
P0122	Throttle/pedal position sensor /switch-A circuit low	ON	TPS is mounted on the PCBA. This monitoring is done of voltage on the output pin of the sensor. (No access in ThB Assy). For DTC • P0120 > 4.9 V • P0122 < 0.1 V	With VCI tool, check DTC while cranking and SPS value if is changing by opening throttle. Perform SPS learning if shows error then change the ECU and troubleshoot.	Page 5-36
P0123	Throttle/pedal position sensor/switch-A circuit high				Page 5-36
P0131	O2 sensor circuit low voltage bank 1 sensor 1	ON	• Detection of Voltage 0V on ECU pin 17 or 5V on ECU pin 18 or open connector, or Plausibility error. • After dew point waiting O2 sensor voltage should be >0.45 V when rich and <0.45V when lean. If this condition is not identified switching does not takes place so after 1000 TDC (~90Sec), the error is generated.	• With VCI tool, check DTC code while idling along with RDI (Oxygen sensor1 voltage). • Check wiring harness and/or change the sensor to troubleshoot.	Page 5-37
P0132	O2 sensor circuit high voltage bank 1 sensor 1	ON	Detection of voltage 5V on ECU pin 17 or 0 V on ECU pin 18.	• With VCI tool, check DTC code while idling along with RDI (Oxygen sensor1 voltage). • Check wiring harness &/or change the sensor to troubleshoot.	Page 5-37
P0171	Fuel system is drifting toward lean	OFF		Check the ECU connection with O2 sensor	Page 5-38

DTC CODE	DESCRIPTION	MIL	CAUSES	REMEDIES	REFER TO
P0197	Engine oil temperature sensor 1 circuit low	ON	Voltage at ECU pin 9 <0.05 V.	With VCI tool, check DTC code while idling. If EOT shows 105°C consistently after sufficient warmup, then change the sensor and check again.	Page 5-38
P0198	Engine oil temperature sensor 1 circuit high		Voltage at ECU pin 9 >4.9 V.		Page 5-38
P0201	Cylinder 1 injector-A circuit open	ON	Detection of injector primary circuit monitor signal on ECU pin 35.	• With VCI tool, check DTC code while cranking, check wiring harness and/or change the injector. • Test actuator functionality.	Page 5-40
P0217	Engine over-heat condition	OFF	EOT>178°C.	• With VCI tool, check DTC code status, and freeze frame data. • Clear error and re-trigger to verify. • May occur along with P0197.	Page 5-38
P0219	Engine over-speed condition	OFF	RPM>9300.	• With VCI tool, check DTC code status, and freeze frame data. • Clear error and re-trigger to verify.	Page 5-42
P0261	Cylinder 1 injector circuit low or output open or short to ground	ON	Detection of injector primary circuit monitor signal on ECU pin 35.	• With VCI tool, check DTC code while cranking, check wiring harness and/or change the injector. • Test actuator functionality.	Page 5-40
P0262	Cylinder 1 injector circuit high or short to battery				
P0335	Crankshaft position sensor-A circuit signal not plausible error	ON	Indicates a problem of "integrity" on the variable reluctance sensor. ECU pin 45 and pin 46.	With VCI tool, check engine rpm while cranking, if no rpm detection, replace sensor/wiring & check for rpm at cranking.	Page 5-42
P0457	EVAP system purge control value open circuit	ON	Indicates that canister purge valve connector is open (ECU pin 34).	• With VCI tool, check DTC code status, and freeze frame data. • Clear Error and re-trigger to verify. • Test actuator functionality.	Page 5-44
P0458	EVAP system purge control value-A circuit low	ON	Indicates that canister purge valve is shorted to ground (ECU pin 34)		Page 5-44
P0459	EVAP system purge control value-A circuit high	ON	Indicates that canister purge valve is shorted to battery voltage (ECU pin 34).		Page 5-44
P0500	Vehicle speed sensor circuit malfunction	ON	• If engine is running and RPM >3000 in geared and clutch released condition and vehicle speed is<1 km/h. • Vehicle speed >120 km/h	With VCI tool, check DTC code while vehicle running (rear wheel rotating, with engine RPM> 3000), change the sensor.	Page 5-45
P0506	Idle air control system RPM lower than expected	OFF	At idle rpm less than target (EOT> 100°C, PREATM >930).	• With VCI tool, check DTC code status, and freeze frame data. • Clear error and re-trigger to verify. • Air flow higher (leakage), or lower (dirt accumulation).	Page 5-46
P0507	Idle air control system RPM higher than expected	OFF	At idle rpm more than target (EOT> 100°C, PREATM >930).		Page 5-46

DTC CODE	DESCRIPTION	MIL	CAUSES	REMEDIES	REFER TO
P0508	Idle air control system circuit low	ON	Indicates that idle stepper is shorted to ground (ECU pin 19, 20, 21, 22).	• With VCI tool, check DTC code status, and freeze frame data. • Clear Error and re-trigger to verify. • Test actuator functionality.	Page 5-46
P0509	Idle air control system circuit high	ON	Indicates that idle stepper is shorted to battery voltage (ECU pin 19, 20, 21, 22).		Page 5-46
P0511	Idle air control open circuit	ON	Indicates that idle stepper connector is open (ECU pin 19, 20, 21, 22).		Page 5-46
P0560	System voltage signal not plausible or short circuit to ground	ON	• Battery voltage at ECU pin 48 is higher than 16V or lower than 7V. • Diagnosis is performed from 4 seconds after power on only if battery in present on board.	With VCI tool, check DTC code at engine running, check wiring harness or RR unit or ACG.	Page 5-47
P0601	Internal control module check -sum memory error	OFF	Read and verification error for at least one of Eeprom cells.	• With VCI tool, check DTC code at relevant diagnosis events. • Flash the ECU to verify. • Change the ECU and re-check.	Page 5-48
P0604	Internal control module RAM error	OFF	At power "ON", the BIOS execute an read write test on all ram cells.		Page 5-48
P0605	Internal control module ROM error	OFF	Indicates a checksum error occurred on flash contents.		Page 5-48
P0606	ECM/PCM processor error	OFF	Indicates CPU HW or SW fault.	• With VCI tool, check DTC code at relevant diagnosis events. • Flash the ECU to verify. • Change the ECU and re-check.	Page 5-48
P0616	Starter relay circuit low and starter relay circuit open	OFF	Indicates that starter relay is shorted to ground (ECU pin 24).	• With VCI tool, check DTC code status, and freeze frame data. • Clear Error and re-trigger to verify. • Test actuator functionality. • May show active during battery less condition.	Page 5-48
P0617	Starter relay circuit high	OFF	Indicates that starter relay is shorted to battery voltage (ECU pin 24).		Page 5-48
P0628	Fuel pump-A control circuit low/open	ON	Indicates that fuel pump is shorted to ground (ECU pin 36).	• With VCI tool, check DTC code status, and freeze frame data. • Clear Error and re-trigger to verify. • Test actuator functionality. • P0629 may cause FI_OUT 10A fuse to blow.	Page 5-49
P0629	Fuel pump-A control circuit high	ON	Indicates that fuel pump is shorted to battery voltage (ECU pin 36).		Page 5-49
P0650	Warning lamp/MIL lamp is disconnected or shorted to ground or shorted to battery	OFF	Indicates that MIL lamp is short to VCC or ground or is open connector (ECU pin 30).	• With VCI tool, check DTC code status, and freeze frame data. • Clear Error and re-trigger to verify. • Test actuator functionality. • May show active during battery less condition.	Page 5-50

DTC CODE	DESCRIPTION	MIL	CAUSES	REMEDIES	REFER TO
P0654	Tachometer	OFF	Indicates that tachometer is shorted to battery voltage, ground or disconnected	• With VCI tool, check DTC code while engine running. • Check wiring harness and/or console. • Test actuator functionality to verify.	Page 5-51
P1501	SPS (Self learning signal) was not plausible	ON	Internal to ECU	With VCI tool, check DTC code execute SPS learning procedure.	Page 5-52
P1530	Rollover sensor circuit	OFF	Sensor data not updated for a calibratable amount of time.	• With VCI tool, check DTC code status, and freeze frame data. • Replace ECU for verification.	Page 5-53
P1590	Side stand switch circuit	OFF	Indicated that the side stand switch is higher/lower than expected.	• With VCI tool, check DTC code while engine running. • Check voltage at pin 7 ≥ 1V and ≤5 V.	Page 5-53
P1631	Headlamp relay	OFF	Digital communication internal to ECU	• With VCI tool, check DTC code status, and freeze frame data. • Clear error and perform key-OFF ->ON to re-verify. • Perform Actuator test to verify.	Page 5-54
P1698	VCC circuit malfunction	OFF	Voltage at ECU pin 39> 6V or < 0.5 V	• With VCI tool, check DTC code status, and freeze frame data. • Clear error and check voltage at ECU pin.	Page 5-55
P2300	Ignition coil-A primary control circuit low/open	ON	Detection of ignition coil primary circuit monitor signal on ECU pin 12	• With VCI tool, check DTC code while cranking, check wiring harness and/or change the coils • Test actuator functionality.	Page 5-56
P2301	Ignition coil-A primary control circuit high				Page 5-56

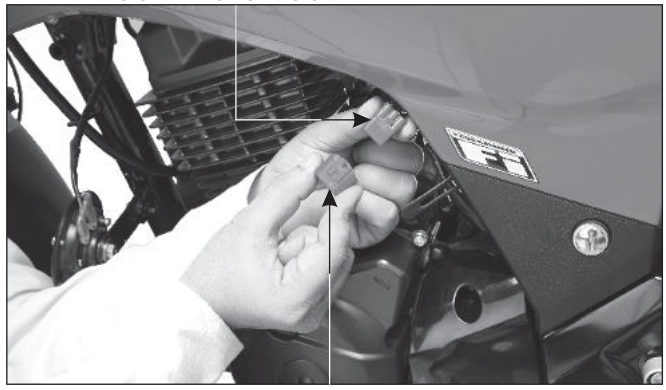
MALFUNCTION CODE ERASING PROCEDURE

Turn the ignition switch to "OFF".

Remove wire band clamp from boot of main wiring.

Disconnect the connector cover from the data link connector (DLC).

CONNECTOR COVER



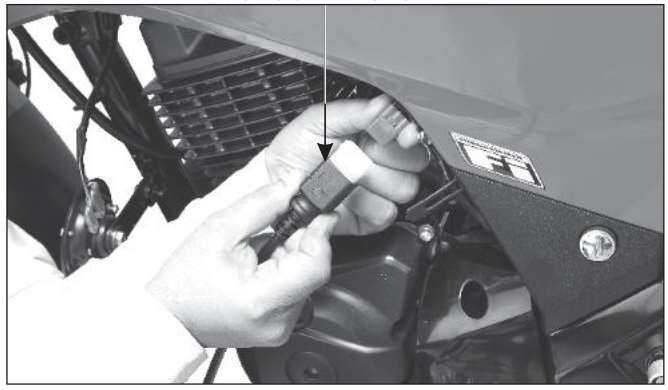
DATA LINK CONNECTOR (DLC)

Connect the Hero VCI wire harness connector to data link connector (DLC).

TOOL

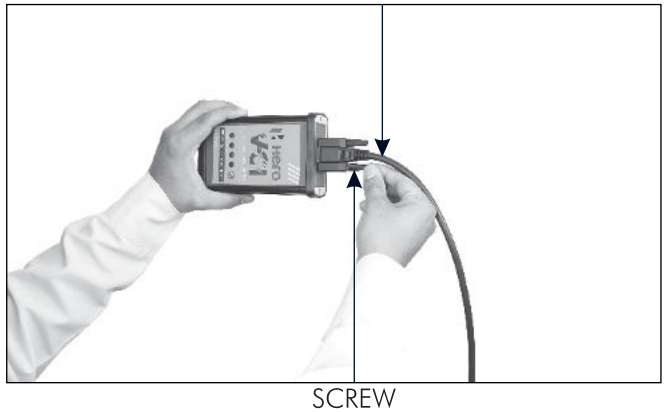
HERO VEHICLE COMMUNICATION INTERFACE
PART NO: HMCL0419HVCI01

VCI CONNECTOR



Connect the VCI connector to the Hero VCI and tighten it by rotating its screw.

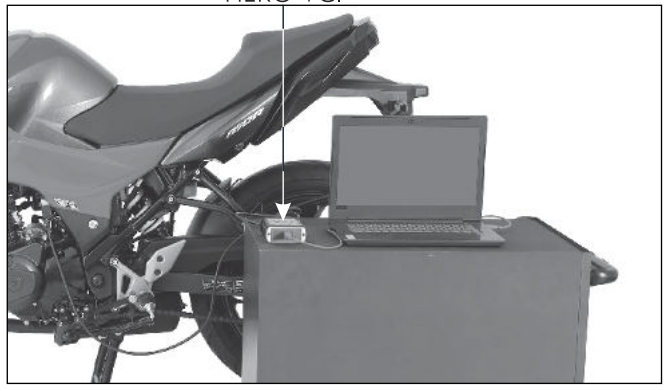
VCI CABLE



SCREW

- Connect HERO VCI and Laptop / Desktop either with USB cable or using the Bluetooth connectivity (page 5-10).

HERO VCI



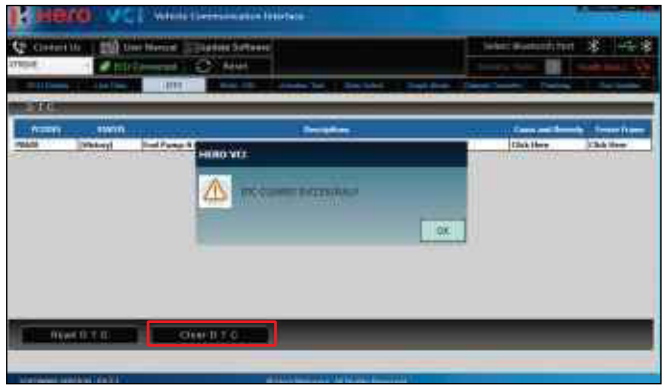
- Turn "ON" the ignition switch.

NOTE

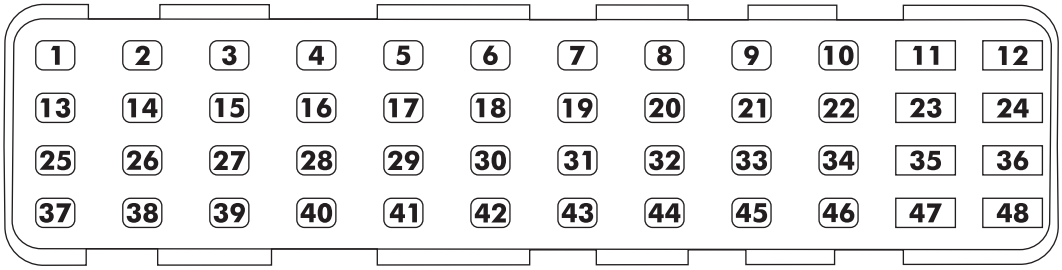
Engine should not to be cranked during the process.

- Open HERO VCI application and login with username and password credentials.

- To clear the DTC codes, go to DTC tab and click on "Clear DTC" button to clear the existing error codes.



ELECTRONIC CONTROL UNIT (ECU)- INPUTS AND OUTPUTS



ECU PIN	COLOUR	SIGNAL NAME	DESCRIPTION
1	Y/R	ST. SW	Input-Starter switch
2	LG/R	NEUTRAL SW	Input-Neutral switch
3	G/R	CLUTCH SW	Input-Clutch switch
4	Blank	-	-
5	Blank	-	-
6	Blank	-	-
7	P/R	SStand	Side stand switch
8	Blank	-	-
9	Y/L	EOT	Input-EOT sensor
10	Blank	-	-
11	G	PG1	Power ground 1
12	P/L	IGPLS	Output-Ignition pulse
13	L/R	CANL	CAN line (low)
14	Y/B	CANH	CAN line (high)
15	Blank	-	-
16	Blank	-	-
17	B/O	O2 (+)	Input O_2 sensor
18	G/B	O2 (-)	Sensor ground
19	BR/R	IACV 1A	IACV terminal A
20	BR/B	IACV 1B	IACV terminal D
21	BR/Y	IACV 2A	IACV terminal C
22	BR/L	IACV 2B	IACV terminal B
23	G	PG2	Power ground 2
24	W/R	ST MAG	Output-Starter relay
25	Blank	-	-
26	Blank	-	-
27	G/O	Sensor GND	Sensor ground
28	W/G	VSP	Vehicle speed sensor input
29	Blank	-	-
30	W/L	MIL	Malfunction indicator output
31	Blank	-	-
32	B/BR	KILL SW	Kill switch

COLOUR CODE	
Black	B
Yellow	Y
Blue	L
Green	G
Red	R
White	W
Brown	BR
Orange	O
Sky Blue	SB
Light Green	LG
Pink	P
Gray	GR

COMBINATION
Base colour/marking colour

Example
BR/W: Brown/White

ECU PIN	COLOUR	SIGNAL NAME	DESCRIPTION
33	B/R	IGP	Key ON
34	LG/BR	PCV	Output-Purge control valve
35	P/G	INJ	Output-Injector
36	BR/W	FP	Output-Fuel pump
37	Blank	-	-
38	Blank	-	-
39	GR/L	Sensor unit	Engine speed sensor output
40	W/B	TACHO	Engine speed output
41	Blank	-	-
42	G/B	Light Relay	Head lamp relay driver
43	Blank	-	-
44	Blank	-	-
45	L/Y	CRK -P	Input-Crank sensor (-)
46	W/Y	CRK -M	Input-Crank sensor (+)
47	Blank	-	-
48	R/L	V BATT	Voltage

COLOUR CODE	
Black	B
Yellow	Y
Blue	L
Green	G
Red	R
White	W
Brown	BR
Orange	O
Sky Blue	SB
Light Green	LG
Pink	P
Gray	GR

COMBINATION
Base colour/marking colour

Example
BR/W: Brown/White

NOTE

Frequent/Unwanted disconnection of ECU connector is not recommended. Hence, ECU connector to be disconnected when electrical check is must.

VCI NOT RESPONDING

Check the VCI tool connection with laptop/computer.

Check the VCI cable connection on DLC.

Turn the ignition switch to "ON" and measure the voltage between the DLC connector and ground.

CONNECTION

Black/Red- Ground

STANDARD: Battery Voltage

Check the DLC harness input voltage at DLC connector.

Yellow/Black- Ground

STANDARD: 2.52 V

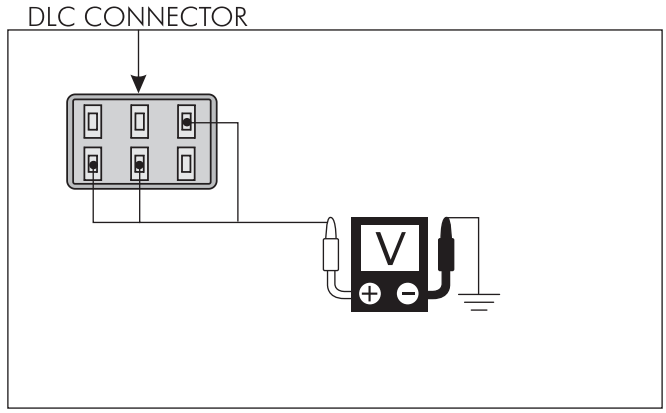
Blue/Red- Ground

STANDARD: 2.51 V

If the voltage is out of range check for the following.

- Inspect the ignition switch.
- Blown fuse: 15A or 10Ax3

If the battery voltage is still out of range check the continuity between the DLC connector ground and body ground.



CONNECTION

Green- Body Ground

STANDARD: Continuity

Check for no continuity between the DLC connector and ground.

CONNECTION

Black/Red- Ground

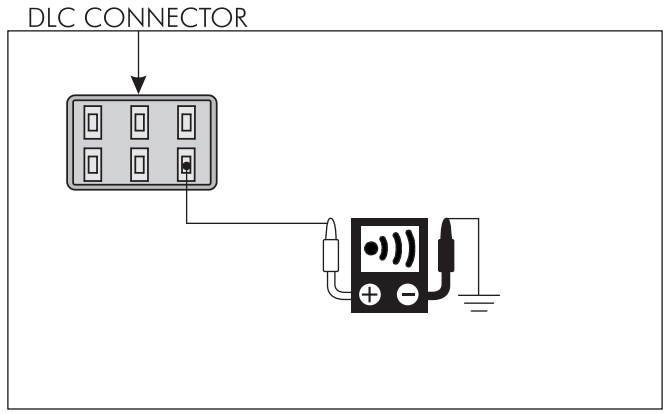
STANDARD: No Continuity

Yellow/Black- Ground

STANDARD: No Continuity

If no continuity is found check the continuity of the following component with DLC ground:

- RR unit (page 17-12).
- Stator coil (page 17-14).
- Starter magnetic switch (page 19-8).



Disconnect the ECU 48P connector. Check for the continuity between ECU 48P connector of the wiring harness side and DLC.

CONNECTION

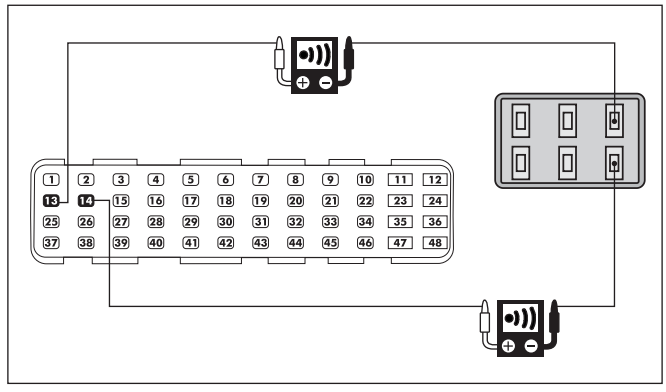
Blue/Red (ECU Pin- 13)- Blue/Red

STANDARD: Continuity

Yellow/Black (ECU Pin- 14)- Yellow/Black

STANDARD: Continuity

If there is no continuity, replace the wiring harness with new one and inspect again.



ECU POWER/GROUND INSPECTION

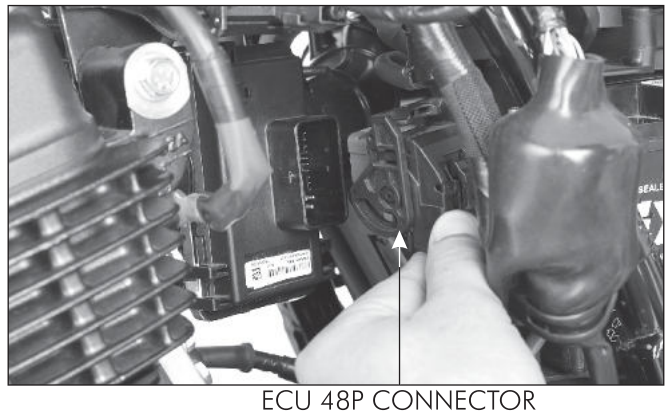
- This vehicle has two types of power supply to operate the ECU.
- If the battery is in proper-working condition, it is used as the first power supply. Else it uses the ACG power supply.
- If the engine does not start with the electric starter, inspect the ECU power/ground first, then inspect the alternator and regulator/rectifier as the secondary power supply.
- Before inspecting the ECU power/ground inspection, be sure that battery is fully charged.

ENGINE DOES NOT START

Turn ignition switch to "OFF".

Remove the fuel tank cover (page 2-5).

Disconnect the ECU 48P connector. Check for loose or poor connection on the ECU 48P connector.

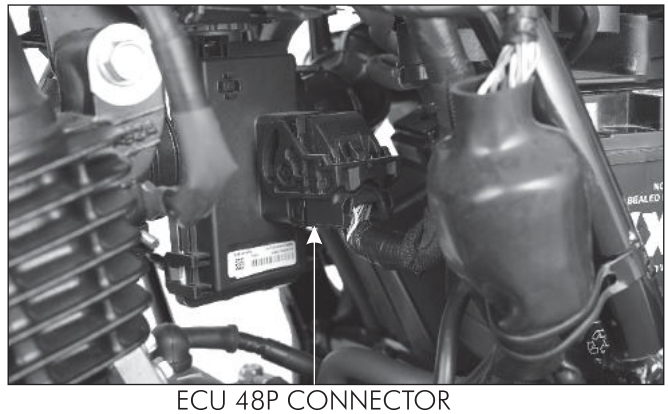


ECU 48P CONNECTOR

Connect ECU 48P connector. Start the engine. If the engine starts there has been a loose or poor contact on the ECU 48P connector.

NOTE

Exercise due care while connecting the ECU 48P connector to avoid damages to ECU pins.



ECU 48P CONNECTOR

If the engine does not start then turn ignition switch to "OFF".

Disconnect the ECU 48P connector. Check for the continuity between ECU 48P connector of the wiring harness side and ground.

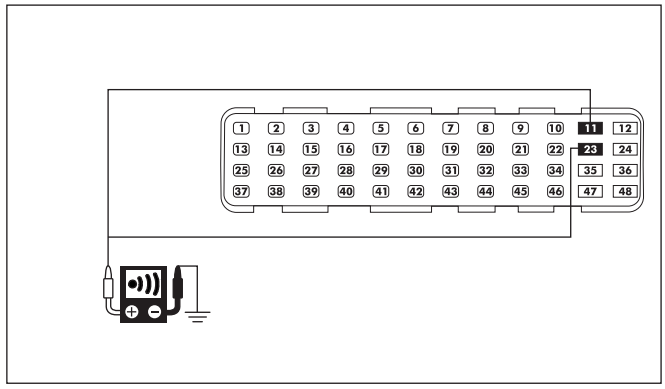
CONNECTION

Green (ECU Pin- 11)- Ground

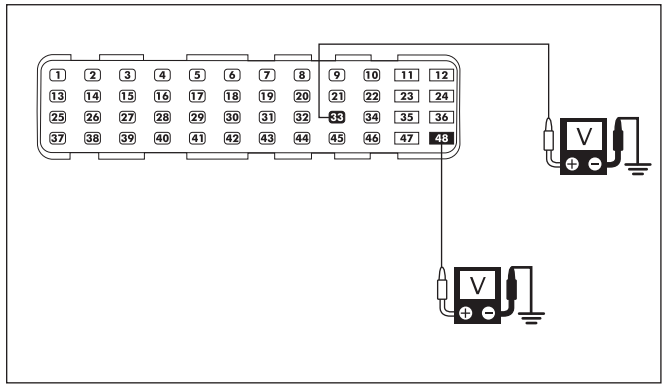
Green (ECU Pin- 23)- Ground

STANDARD: Continuity

If there is no continuity, check for open circuit.



Turn the ignition switch to "ON" and measure the battery voltage between the ECU 48P connector of the wire harness side and ground.



CONNECTION

Red/Blue (ECU Pin- 48) (+)ve- Ground (-)ve
STANDARD: Battery Voltage
Black/Red (ECU Pin- 33) (+)ve- Ground (-)ve
STANDARD: Battery Voltage

If the battery voltage is out of range check for the following.

- Loose or poor connector contact
- Inspect the ignition switch.
- Blown fuse: 15A or 10Ax3
- Open or short circuit in following wire harness:
  - Black/Red or Red/Blue wire between the battery and ignition switch
  - Pink/blue between ignition control relay and ECU

If voltage exists then replace the throttle body/ECU with new one and inspect again.

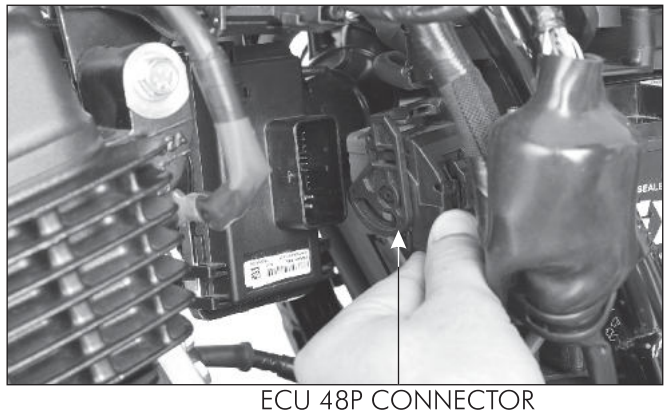
TROUBLESHOOTING

MAP SENSOR (DTC: P0107, P0108)

Read the DTC code in Hero VCI (page 5-23).

If P0107, P0108 codes appear in VCI

1. To know about the causes and remedies of a P0107, P0108 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the ECU 48P connector.
5. Check for loose or poor contact on ECU 48P connector.
6. Connect the ECU 48P connector and turn ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in ECU 48P connector
8. If DTC code appear then turn the ignition switch to "OFF".
9. Replace the throttle body/ECU with new one and inspect again.



ECU 48P CONNECTOR

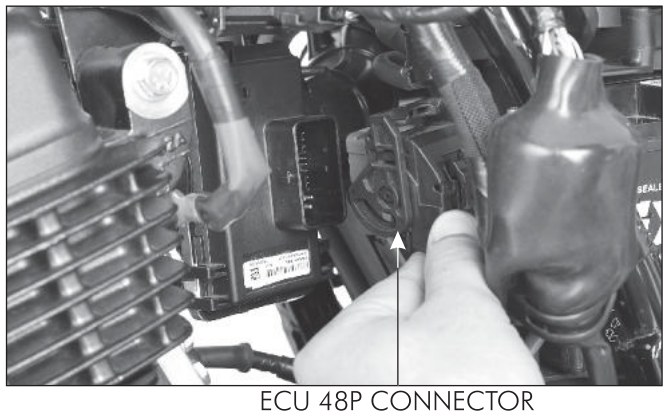
THROTTLE BODY/ECU

IAT SENSOR (DTC: P0112, P0113)

Read the DTC code in Hero VCI (page 5-23).

If P0112, P0113 codes appear in VCI

1. To know about the causes and remedies of a P0112 and P0113 code, click on to “CAUSE AND REMEDY” button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the ECU 48P connector.
5. Check for loose or poor contact on ECU 48P connector.
6. Connect the ECU 48P connector and turn ignition switch to “ON”. Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in ECU 48P connector
8. If DTC code appear then turn the ignition switch to “OFF”.
9. Replace the throttle body/ECU with new one and inspect again.



ECU 48P CONNECTOR

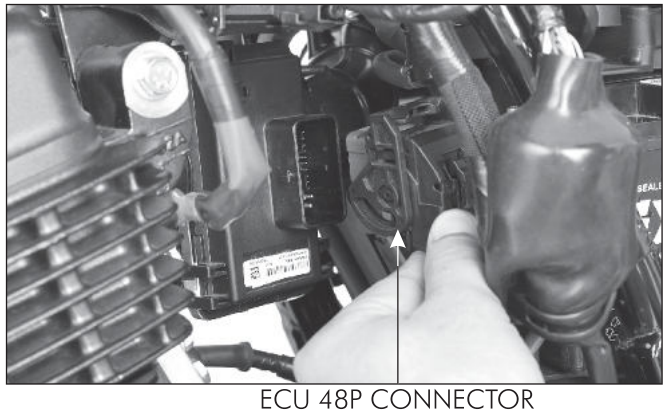
THROTTLE BODY/ECU

TP SENSOR (DTC: P0122, P0123)

Read the DTC code in Hero VCI (page 5-23).

If P0122, P0123 codes appear in VCI

1. To know about the causes and remedies of a P0122 and P0123 code, click on to “CAUSE AND REMEDY” button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the ECU 48P connector.
5. Check for loose or poor contact on ECU 48P connector.
6. Connect the ECU 48P connector and turn ignition switch to “ON”. Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in ECU 48P connector
8. If DTC code appear then turn the ignition switch to “OFF”.
9. Replace the throttle body/ECU with new one and inspect again.



ECU 48P CONNECTOR

THROTTLE BODY/ECU

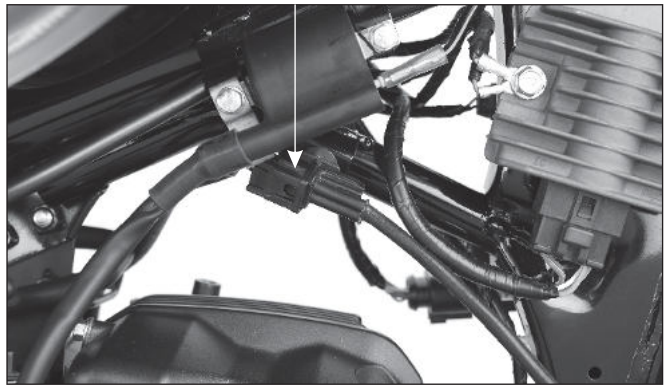
OXYGEN SENSOR (DTC: P0131 AND P0132)

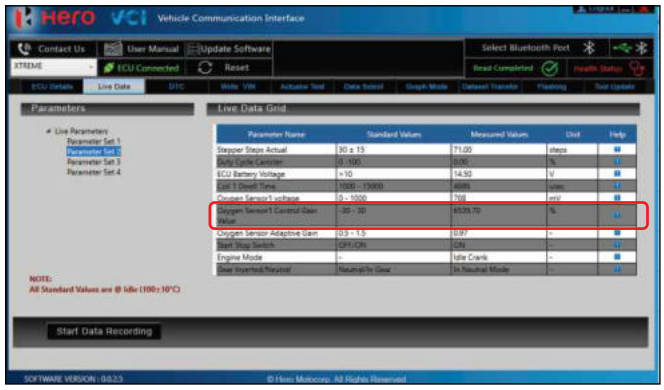
Read the DTC code in Hero VCI (page 5-23).

If P0131and P0132 codes appear in VCI

1. To know about the causes and remedies of a P0131and P0132 codes, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect oxygen sensor 2P connector and check for loose or poor contact on the oxygen sensor 2P connector.
5. If code doesn't appear then there has been loose or poor contact on the oxygen sensor 2P connector.
6. If code still appears then turn the ignition switch to "OFF".
7. Run the live parameter in Hero VCI and check oxygen sensor measured voltage (page 5-13).

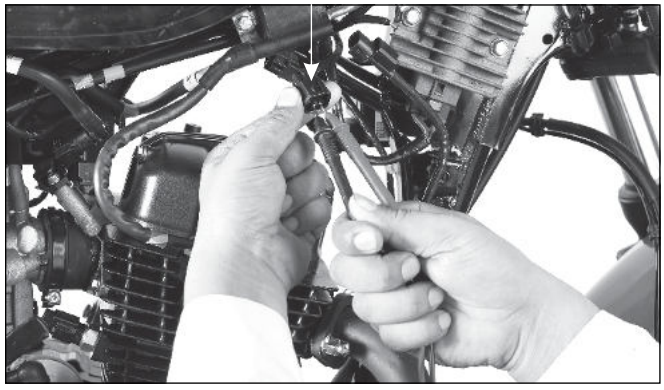
OXYGEN SENSOR CONNECTOR





8. If the voltage is not in range, then turn the ignition switch to "ON" and check the voltage at O_2 sensor connector.

OXYGEN SENSOR CONNECTOR

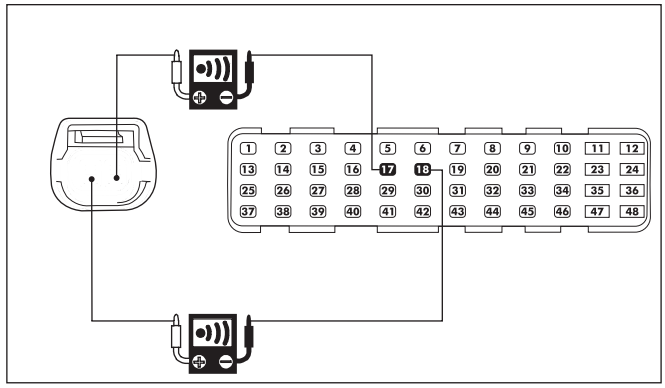


CONNECTION

Black/Orange-Green/Black

STANDARD: 0.38 V

9. If voltage is out of range. This can be due to :
   - Open circuit in Green/ Black or Black/Orange wire.
10. If voltage exist then turn the ignition switch to "OFF". Disconnect the ECU 48P connector and check for continuity between the O_2 sensor 2P connector and ECU 48P connector at the wire harness side.



CONNECTION

Green/Black (ECU Pin-18) - Green/Black

STANDARD: Continuity

Black/Orange (ECU Pin-17) - Black/Orange

STANDARD: Continuity

If there is any abnormality, it means O_2 sensor is faulty.

Replace O_2 sensor (page 5-73) & inspect again.

If all above connections are normal then replace the throttle body/ECU with a new one and inspect again.

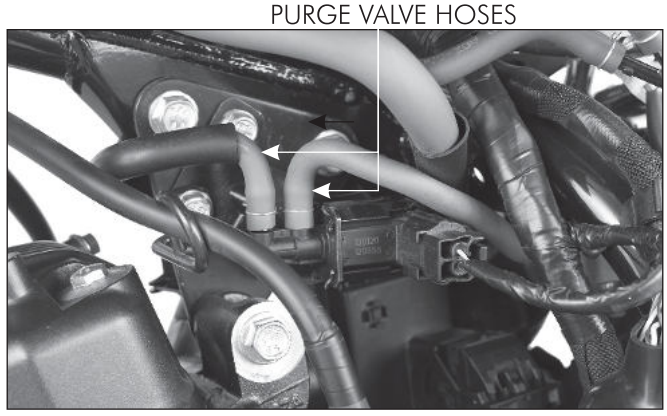
SYSTEM TOO LEAN OR TOO RICH (DTC: P0171)

Read the DTC code in Hero VCI (page 5-23).

If P0171 code appear in VCI

1. To know about the causes and remedies of a P0171 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Check the fuel pressure (page 5-60).
3. Check the fuel injector for clogging.
4. If DTC cord still appears then turn the ignition switch to "OFF".
5. Remove the fuel tank cover (page 2-5).
6. Inspect all the purge valve hoses for damages, replace if found damaged or kinked.
7. Check the intake manifold O-ring for any leakage, replace if found damaged (page 5-74). Check the DTC code.
8. If DTC codes appear change the O_2 sensor (page 5-74).
9. If DTC code still appear, replace the throttle body/ECU with new one and inspect again.

PURGE VALVE HOSES



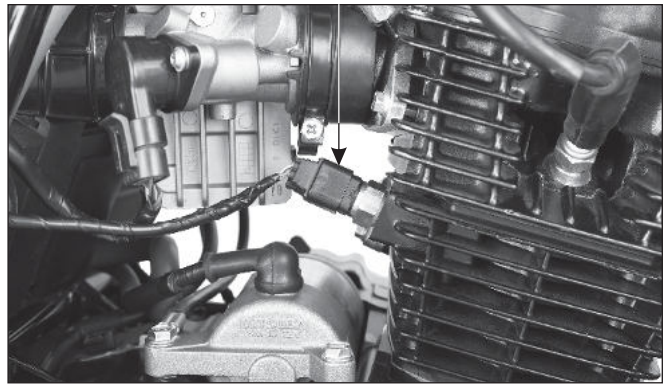
EOT SENSOR (DTC: P0197, P0198, P0217)

Read the DTC code in Hero VCI (page 5-23).

If P0298, P0197, P0198 codes appear in VCI

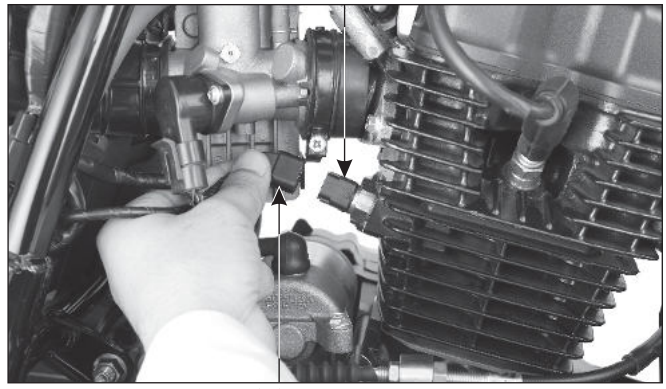
1. To know about the causes and remedies of a P0197, P0198 & P0217 codes, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).

EOT SENSOR 2P CONNECTOR



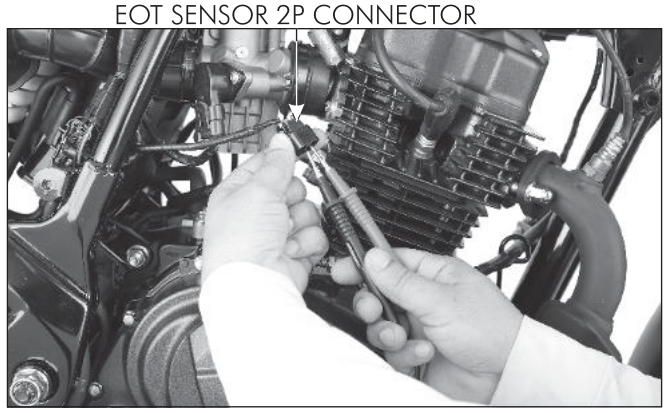
4. Disconnect the EOT sensor 2P connector.
5. Check for loose or poor contact on the EOT sensor 2P connector.
6. Connect the EOT sensor 2P connector and turn the ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in EOT sensor 2P connector.

EOT SENSOR



2P CONNECTOR

EOT SENSOR 2P CONNECTOR



8. Disconnect the EOT sensor 2P connector and measure the voltage at EOT sensor terminal connector and ground.

CONNECTION
Yellow/Blue-Green/Orange
STANDARD: 5±0.1V
Yellow/Blue-Ground
STANDARD: 5±0.1V

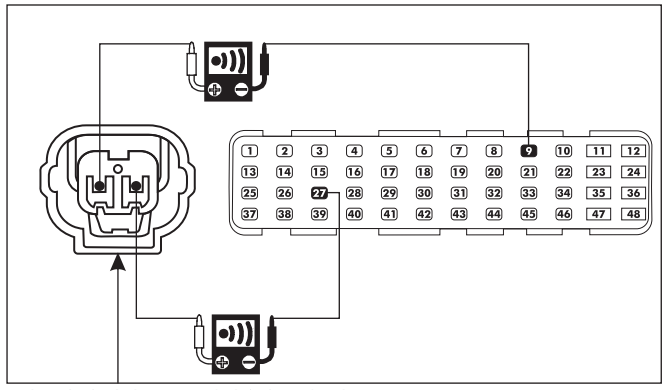
9. Turn the ignition switch "ON".
10. If voltage is out of range. This can be due to :
    - Open circuit in Green/Orange wire.
    - Loose or poor contact on the ECU connector.

11. If voltage exist then turn the ignition switch to "OFF". Disconnect the ECU 48P connector and check for continuity between the EOT sensor 2P connector and ECU 48P connector at the wire harness side.

CONNECTION
Yellow/Blue (ECU Pin- 9)- Yellow/Blue
STANDARD: Continuity
Green/Orange (ECU Pin- 27)- Green
STANDARD: Continuity

Check for continuity between the EOT sensor 2P connector at the wire harness side and ground.

CONNECTION
Green/Orange-Ground
STANDARD: Continuity



EOT SENSOR 2P CONNECTOR

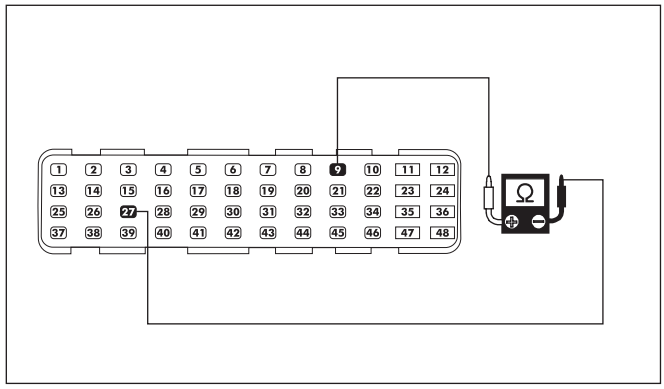
12. If there is any abnormality, the following can be due to:
    • Open or short circuit in Green/Orange wire.
13. If all above connections are normal, then disconnect the ECU 48P connector and check the EOT sensor resistance.

CONNECTION
Yellow/Blue (ECU Pin- 9)- Green/Orange (ECU Pin- 27)
STANDARD: 2.645±5% kΩ

If there is any abnormality, it means EOT sensor is faulty.

Replace EOT sensor (page 5-76) & inspect again.

If all above connections are normal then replace the throttle body/ECU with a new one and inspect again.



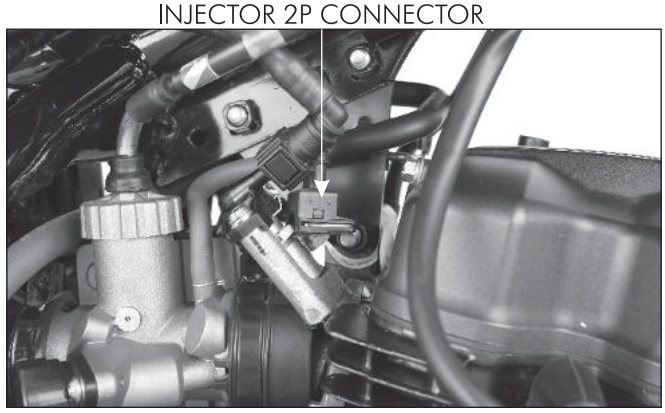
INJECTOR (DTC: P0201, P0261 & P0262)

Read the DTC code in Hero VCI (page 5-23).

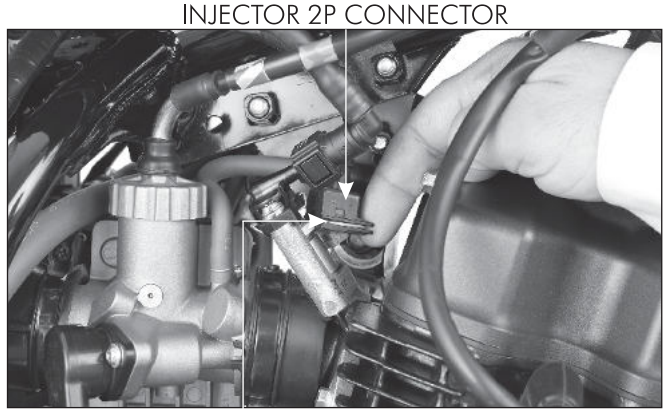
If P0201, P0261& P0262 codes appear in VCI

1. To know about the causes and remedies of a P0201, P0261 & P0262 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the injector 2P connector by pressing the clip and check for loose or poor contact on the injector 2P connector.
5. Connect the injector 2P connector. Turn the ignition switch to "ON". Check the DTC code.
6. If there is no DTC code then there has been loose or poor contact on the injector connector.

INJECTOR 2P CONNECTOR

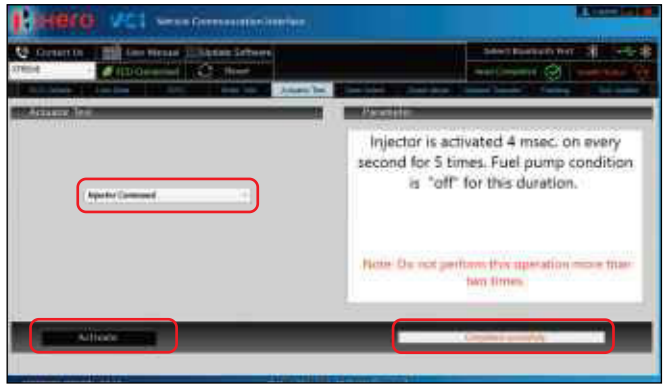


INJECTOR 2P CONNECTOR

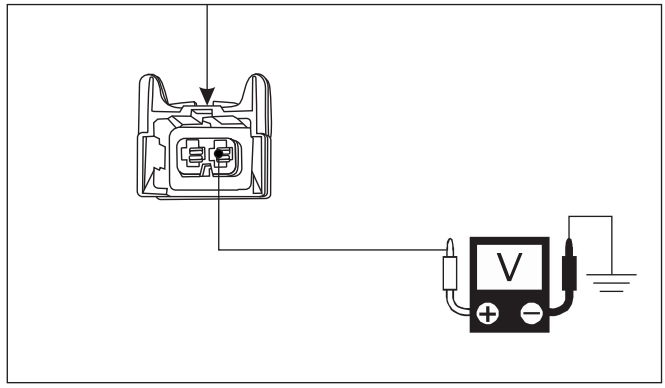


CLIP

7. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
8. Select the "INJECTOR COMMAND", click on to "ACTIVATE" to start the testing.
9. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK.
10. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU.



INJECTOR 2P CONNECTOR



11. If test is successful, then disconnect the injector 2P connector.

    Measure the battery voltage between the injector connector at the wire harness side and ground.

CONNECTION

Black/Red-Ground

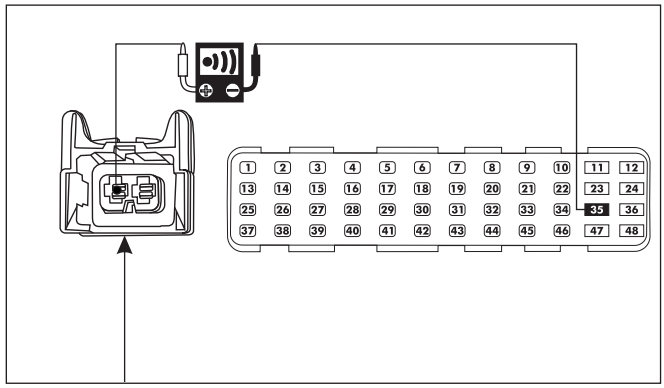
STANDARD: Battery voltage

12. If voltage exists then turn the ignition switch to "OFF".
    Disconnect the ECU 48P connector and check for continuity between the injector connector and ECU 48P connector at the wire harness side.

CONNECTION :
Pink/Green (ECU Pin- 35)- Pink/Green
STANDARD : Continuity

Check for no continuity between the injector 2P connector at the wire harness side and ground.

CONNECTION :
Pink/Green-Ground
STANDARD : No continuity

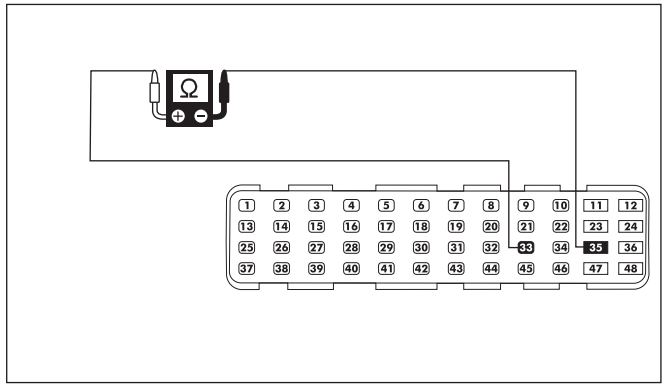


INJECTOR 2P CONNECTOR

If there is any abnormality then this can be due to open or short circuit in Pink/Green wire.

13. If all above connections are normal, then measure the resistance at injector terminals.

CONNECTION
Pink/Green (ECU Pin-35)-
Black/Red (ECU Pin 33)
STANDARD: 14.5 Ω @ 20°C

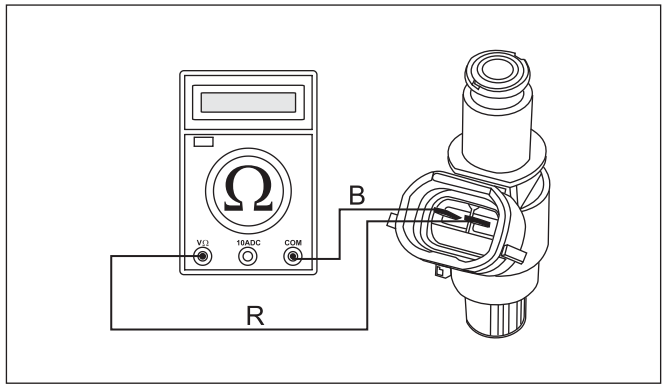


If resistance is abnormal, this can be due to a faulty injector. Replace the injector (page 5-71) and inspect again.

If resistance is normal then replace the throttle body/ECU with a new one and inspect again.

NOTE

Incase the injector is removed from the throttle body then the resistance can be checked directly on the injector pins.



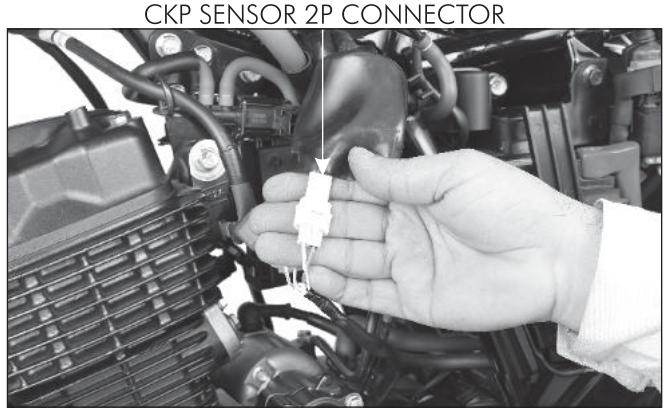
ENGINE OVERSPEED CONDITION (DTC:P0219)

Read the DTC code in Hero VCI (page 5-23).

If P0219 codes appears in VCI

1. To know about the causes and remedies of a P0219 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Check for proper cable routing **(Section 1)**. Re-route the cable routing, if found improper.
3. Turn the ignition switch to "ON". Check the DTC code.
4. If there is no DTC code then there has been improper cable routing
5. If P0219 code still appears then, turn the ignition switch to "OFF".
6. Remove the fuel tank cover (page 2-5).
7. Disconnect the CKP sensor 2P connector.
8. Check for loose or poor contact on the CKP sensor 2P connector.
9. Connect the CKP sensor 2P connector. Turn the ignition switch to "ON". Check the DTC code.
10. If there is no DTC code then there has been a loose or poor contact on the CKP sensor 2P connector.
11. If DTC code appear then turn the ignition switch to "OFF".
12. Check the CKP sensor troubleshooting for diagnosys (page 5-42).

CKP SENSOR 2P CONNECTOR



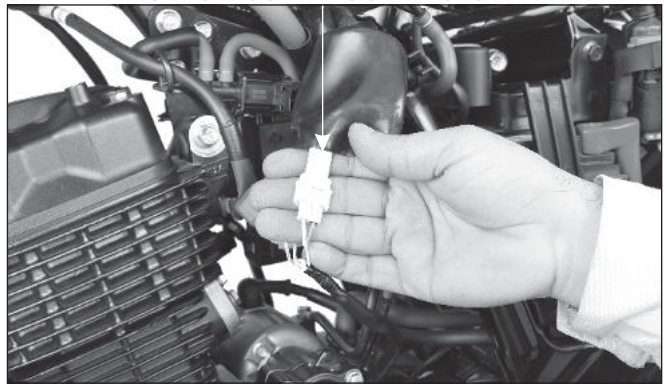
CKP SENSOR (DTC: P0335)

Read the DTC code in Hero VCI (page 5-23).

If P0335 code appears in VCI.

1. To know about the causes and remedies of a P0335 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the CKP sensor 2P connector.
5. Check for loose or poor contact on the CKP sensor 2P connector.
6. Connect the CKP sensor 2P connector. Turn the ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact on the CKP sensor 2P connector.
8. If DTC code appears then turn the ignition switch to "OFF".

CKP SENSOR 2P CONNECTOR



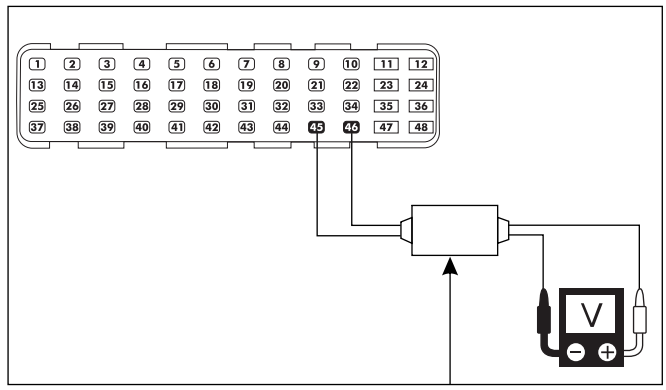
9. Disconnect the ECU 48P connector and check the CKP sensor peak voltage.
10. Turn the ignition switch to "ON".

NOTE

Use peak voltage adapter for measuring the peak voltage.

CONNECTION

White/Yellow (ECU Pin- 46)-
Blue/Yellow (ECU Pin- 45)
STANDARD : 1.5 V @ 300 rpm (min) @ 1.1 mm gap



PEAK VOLTAGE ADAPTOR
(+)VE PROBE

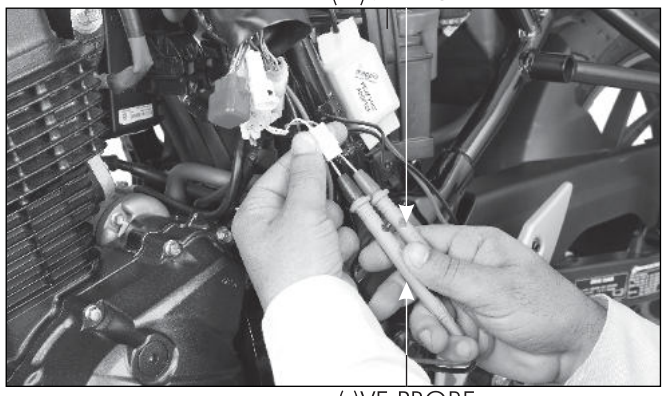
11. If the peak voltage checked at the ECU is abnormal, check at CKP sensor connector.
12. Disconnect the CKP sensor 2P connector and check the peak voltage at CKP sensor 2P connector.

NOTE

Use peak voltage adapter for measuring the peak voltage.

CONNECTION

White/Yellow-Blue/Yellow
STANDARD : 1.5 V @ 300 rpm (min) @ 1.1 mm gap

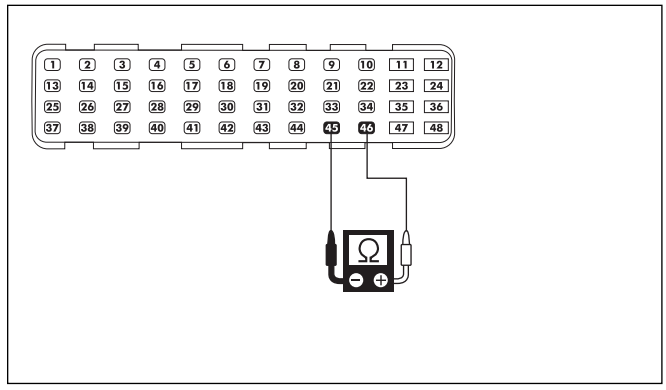


(-)VE PROBE

13. If the peak voltage checked at the ECU 48P connector is abnormal and checked at CKP sensor connector is normal, then check for an open or loose connection from CKP sensor 2P connector to ECU 48P connector.
    If both are abnormal, check the resistance of CKP sensor.
14. Disconnect the ECU 48P connector and check the CKP sensor resistance.

CONNECTION

White/Yellow (ECU Pin- 46)-
Blue/White (ECU Pin- 45)
Standard : 50-200 Ω at 20°C/68°F



(+)VE PROBE

15. Check the CKP sensor resistance value at 2P connector.

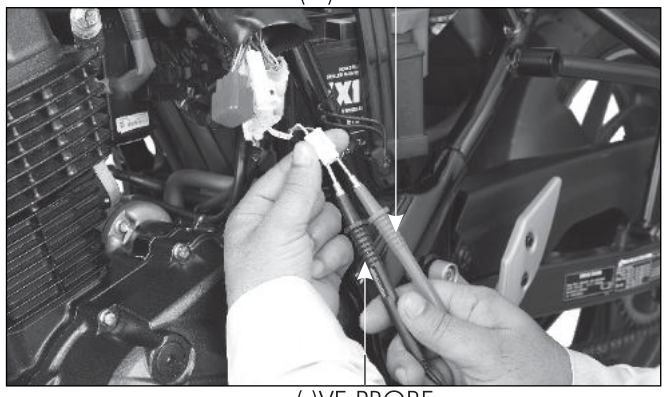
CONNECTION

White/Yellow-Blue/Yellow
Standard : 50-200 Ω at 20°C/68°F

If resistance is abnormal, this can be due to an open or loose connection.

Replace the CKP sensor (page 10-4) and check again.

If resistance is normal and peak voltage is abnormal replace the ACG and check again.



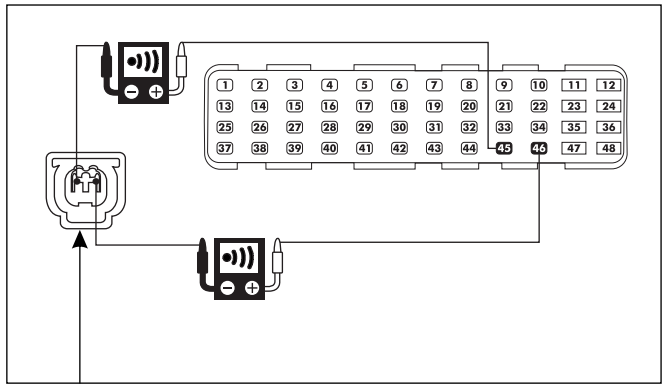
(-)VE PROBE

16. If voltage and resistance both are normal at CKP 2P connector, disconnect the ECU 48P connector and check the continuity between ECU 48P connector and CKP sensor 2P connector.

White/Yellow (ECU Pin-46)- White/Yellow
STANDARD: Continuity
Blue/Yellow (ECU Pin-45)- Blue/Yellow
STANDARD: Continuity

If there is any abnormality then replace wire harness with new one and inspect again.

If the problem still persists replace the throttle body/ECU with new one and inspect again.



CKP SENSOR 2P CONNECTOR

PURGE VALVE (DTC: P0457, P0458 & P0459)

Read the DTC code in Hero VCI (page 5-23).

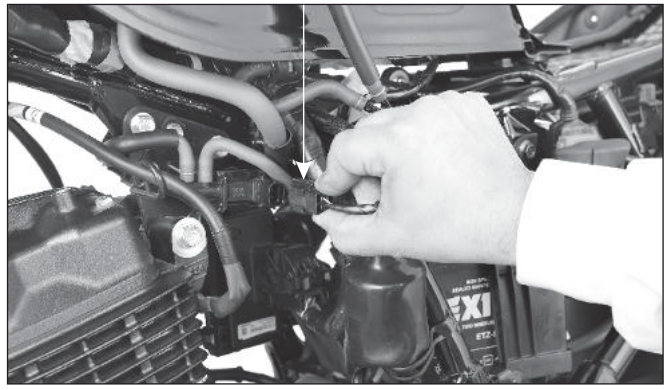
If P0457, P0458 & P0459 codes appear in VCI

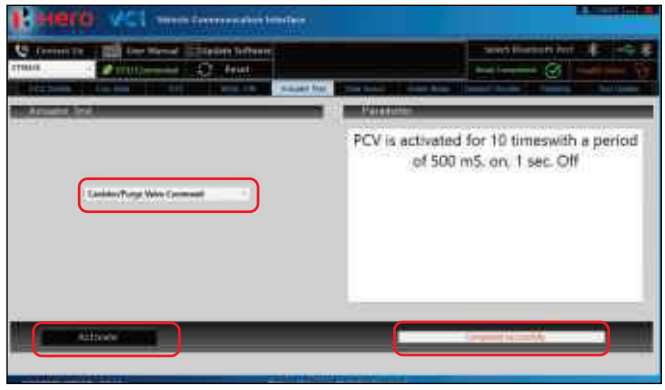
1. To know about the causes and remedies of a P0457, P0458 & P0459 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the purge valve 2P connector.
5. Check for loose or poor contact on the purge valve 2P connector.
6. Connect the purge valve 2P connector and turn the ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in the purge valve 2P connector.
8. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
9. Select the "CANISTER/PURGE VALVE COMMAND", click on to "ACTIVATE" to start the testing.
10. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK
11. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU.
12. If test is successful, turn the ignition switch to "OFF".
13. Disconnect the purge valve 2P connector.
14. Disconnect the ECU 48P connector check for continuity between the purge valve 2P connector at the wire harness side and ECU 48P connector.

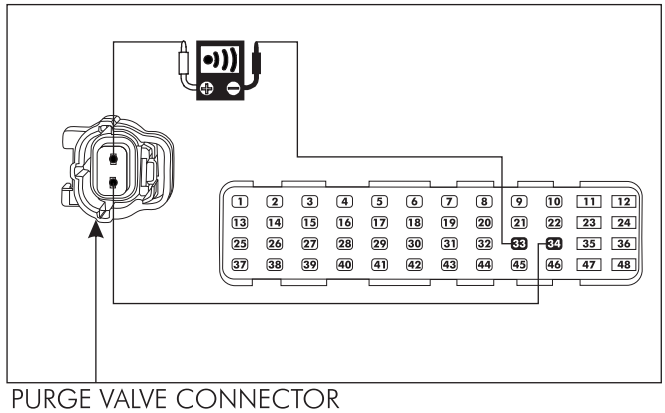
CONNECTION
Light green/Brown (ECU Pin-34)- Light green/Brown
STANDARD: Continuity
Black/Red (ECU Pin-33)-Black/Red
STANDARD: Continuity

If continuity exist then replace the purge valve (page 5-78) and inspect again.

PURGE VALVE 2P CONNECTOR







PURGE VALVE CONNECTOR

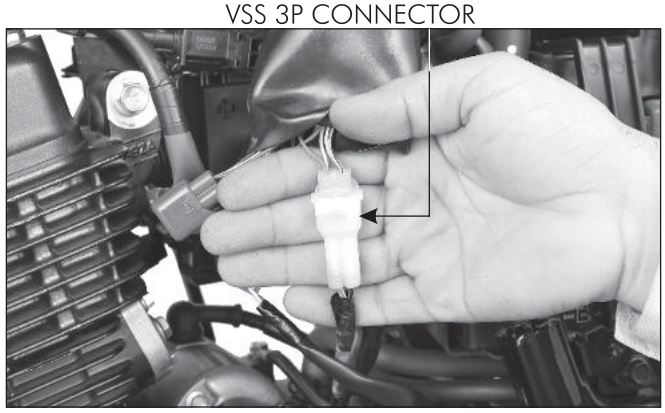
VEHICLE SPEED SENSOR (DTC: P0500)

Read the DTC code in Hero VCI (page 5-23).

If P0500 code appear in VCI

1. To know about the causes and remedies of a P0500 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the vehicle speed sensor (VSS) 3P connector.
5. Check for loose or poor contact on the vehicle speed sensor (VSS) 3P connector.
6. Connect the VSS 3P connector and turn the ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in the VSS 3P connector.

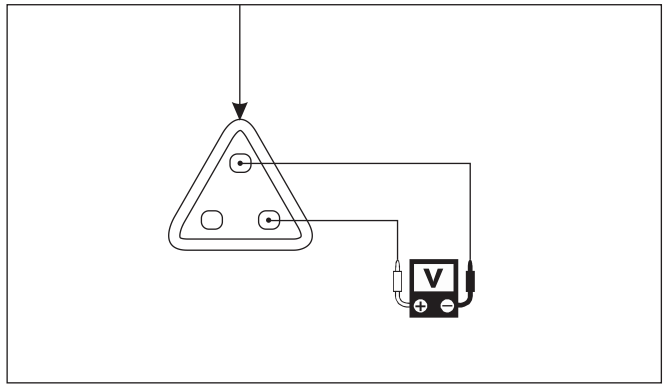
VSS 3P CONNECTOR



8. If there is DTC code appear then disconnect the VSS 3P connector and measure the voltage at VSS 3P terminal connector and ground.

CONNECTION
White/Green-Green/Orange
STANDARD: 4.73 V

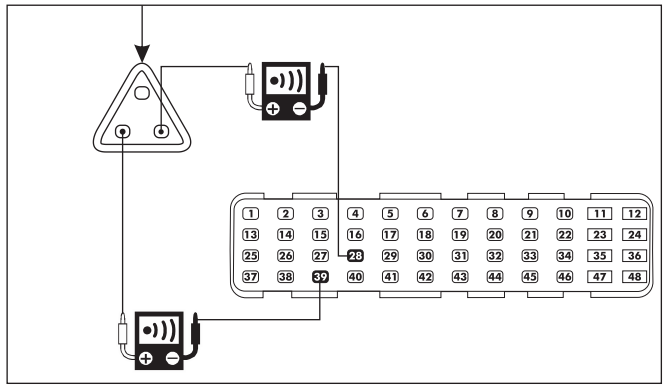
VSS 3P CONNECTOR



9. If voltage exist then turn the ignition switch to "OFF". Disconnect the ECU 48P connector and check the continuity between the ECU 48P connector and VSS 3P connector at the wire harness side.

CONNECTION
Grey/Blue (ECU Pin-39)-Grey/Blue
STANDARD: Continuity
White/Green (ECU Pin-28)-White/Green
STANDARD: Continuity

VSS 3P CONNECTOR

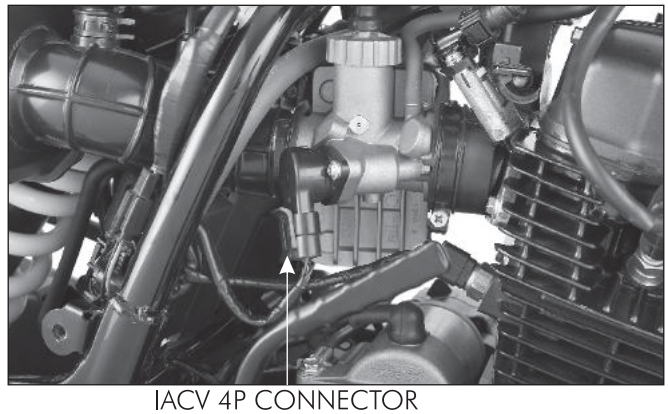


IACV (DTC: P0506, P0507 P0508, P0509 & P0511)

Read the DTC code in Hero VCI (page 5-23).

If P0506, P0507, P0508, P0509 & P0511 codes appear in VCI

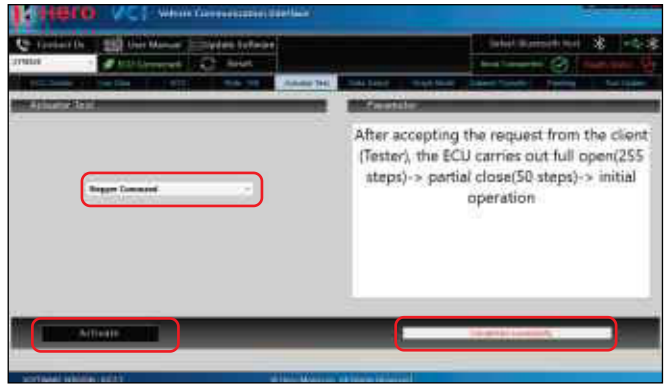
1. To know about the causes and remedies of a P0506, P0507, P0508 and P0509 & P0511 codes, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the IACV 4P connector.
5. Check for loose or poor contact on IACV 4P connector.
6. Connect the IACV 4P connector and turn ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in IACV 4P connector



IACV 4P CONNECTOR

5

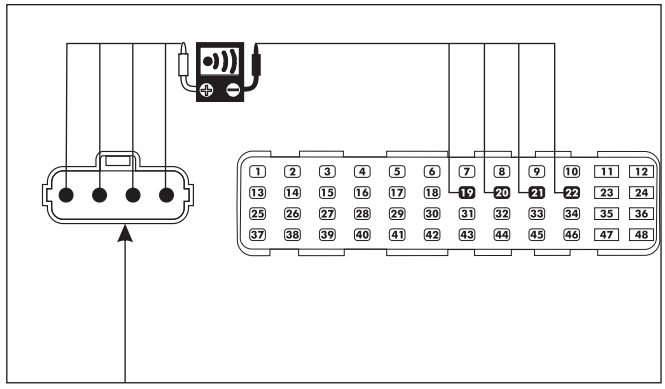
8. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
9. Select the "STEPPER COMMAND", click on to "ACTIVATE" to start the testing.
10. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK.
11. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU.



12. If test is successful, then disconnect the IACV 4P connector.
13. Disconnect the ECU 48P connector and check for continuity between the IACV 4P connector and ECU 48P connector at the wire harness side.

CONNECTION

Brown/Red (ECU Pin- 19)- Brown/Red
STANDARD : Continuity
Brown/Black (ECU Pin- 20)- Brown/Black
STANDARD : Continuity
Brown/Yellow (ECU Pin- 21)- Brown/Yellow
STANDARD : Continuity
Brown/Blue (ECU Pin- 22)- Brown/Blue
STANDARD : Continuity



IACV 4P CONNECTOR

Check for no continuity between the IACV 4P connector at the wire harness side and ground.

CONNECTION
Brown/Yellow- Ground
STANDARD: No Continuity
Brown/Blue - Ground
STANDARD: No Continuity
Brown/Black - Ground
STANDARD: No Continuity
Brown/Red - Ground
STANDARD: No Continuity

If continuity exist this can be due to

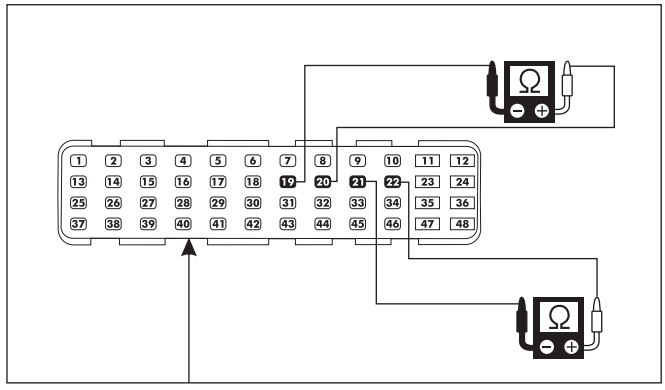
- Short circuit in Brown/Blue or Brown/Yellow wire.
- Short circuit in Brown/Red or Brown/Black wire.

13. If all above connections are normal, disconnect the ECU 48P connector and check for resistence between the ECU 48P connector at the wire harness side.

CONNECTION
Brown/Blue (ECU Pin-22)-
Brown/Yellow (ECU Pin-21)
STANDARD: 47.7-58.3 Ω at 25° C
Brown/Black (ECU Pin-20)-
Brown/Red (ECU Pin-19)
STANDARD: 47.7-58.3 Ω at 25° C

If resistance is normal, this can be due to a faulty IACV. Replace the IACV (page 5-65) and inspect again.

If resistance is abnormal then replace the throttle body/ECU with a new one and inspect again.



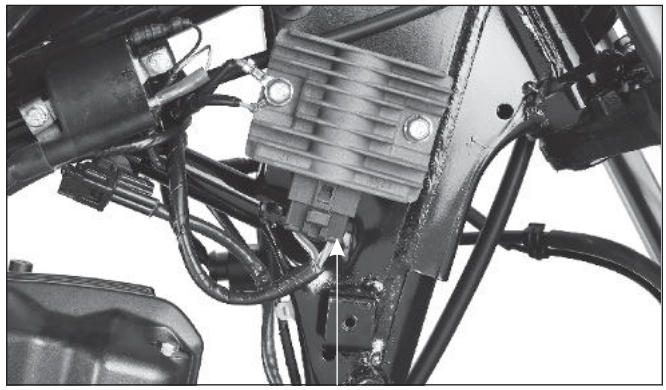
ECU 48P CONNECTOR

SYSTEM VOLTAGE HIGH (DTC: P0560)

Read the DTC code in Hero VCI (page 5-23).

If P0560 code appear in VCI

1. To know about the causes and remedies of a P0560 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Check for loose or poor contact on regulator/rectifier 6P connector.
5. Turn the ignition switch to "ON". Check the DTC code.
6. If there is no DTC code then there has been a loose or poor contact in regulator/rectifier 6P connector.
7. If the DTC code still appears, check the continuity, voltage and resistance.

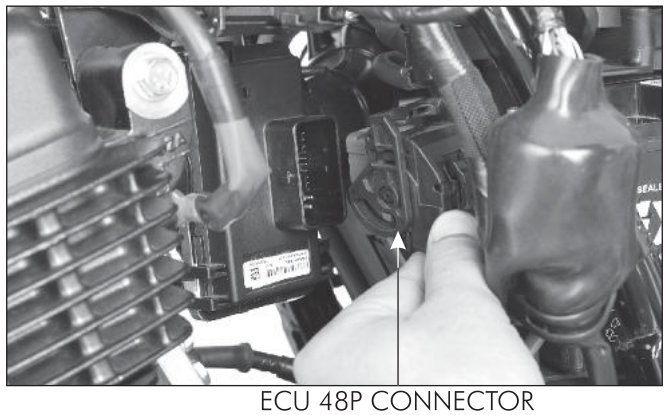

6P CONNECTOR

INTERNAL CONTROL MODULE ERROR (DTC: P0601, P0604, P0605 & P0606)

Read the DTC code in Hero VCI (page 5-23).

If P0601, P0604, P0605 & P0606 codes appear in VCI

1. To know about the causes and remedies of a P0601, P0604, P0605 & P0606, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Disconnect the ECU 48P connector.
4. Remove the fuel tank cover (page 2-5).
5. Check for loose or poor contact on ECU 48P connector.
6. Connect the ECU 48P connector and turn ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in ECU 48P connector
8. If DTC code appear then flash the ECU to verify (page 5-21).
9. If DTC code still appear then, replace the throttle body/ECU with new one and inspect again.



ECU 48P CONNECTOR

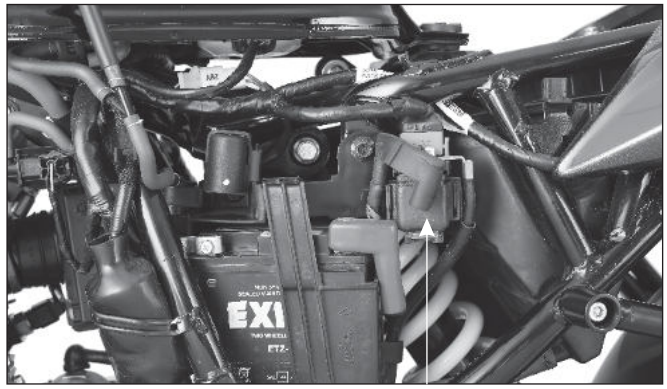
THROTTLE BODY/ECU

STARTER RELAY CIRCUIT (DTC: P0616 & P0617)

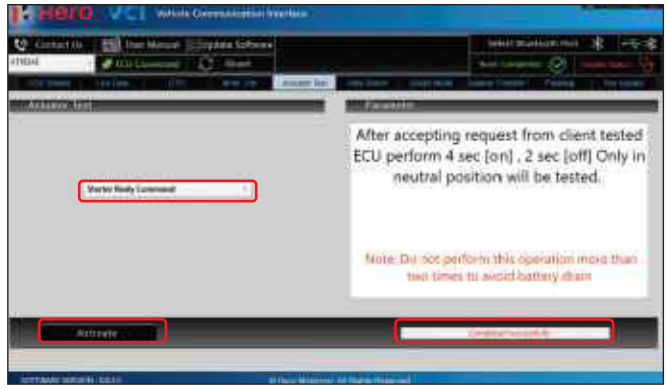
Read the DTC code in Hero VCI (page 5-23).

If P0616 & P0617 code appear in VCI

1. To know about the causes and remedies of a P0616 & P0617 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Check for loose or poor contact on starter mag. switch.
5. Turn the ignition switch to "ON". Check the DTC code.
6. If there is no DTC code then there has been a loose or poor contact in starter mag. switch.
7. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
8. Select the "STARTER RELAY COMMAND", click on to "ACTIVATE" to start the testing.
9. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK
10. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU.



STARTER MAG. SWITCH



11. If test is successful, turn the ignition switch to "OFF". Disconnect the ECU 48P connector and check for continuity between the starter mag. switch 4P connector and ECU 48P connector at the wire harness side.

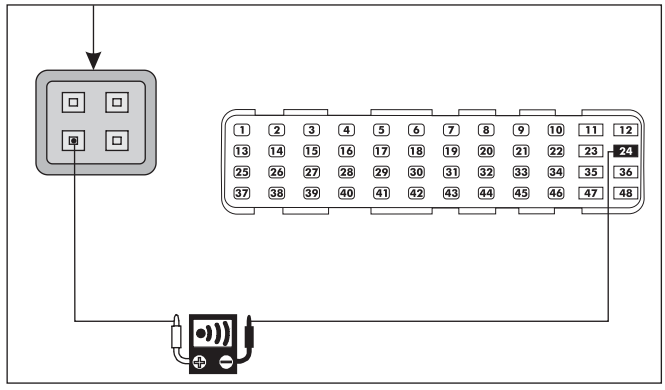
CONNECTION

White/Red (ECU Pin-24)-White/Red

STANDARD: Continuity

12. If continuity exist, then this can be due to starter mag. switch is shorted to battery voltage.
13. Check the battery voltage and resistance at starter mag. switch (page 19-9).

STARTER MAGNETIC SWITCH 4P CONNECTOR

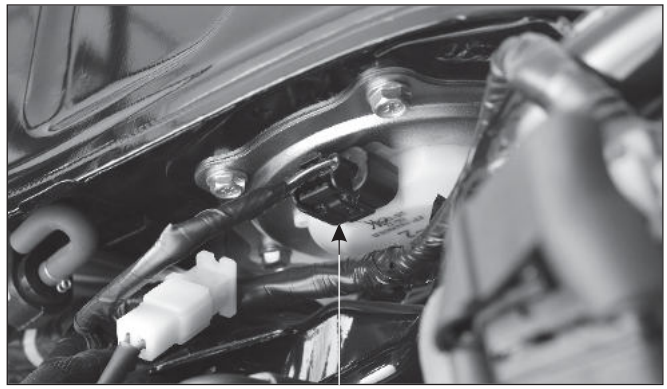


FUEL PUMP (DTC: P0628, P0629)

Read the DTC code in Hero VCI (page 5-23).

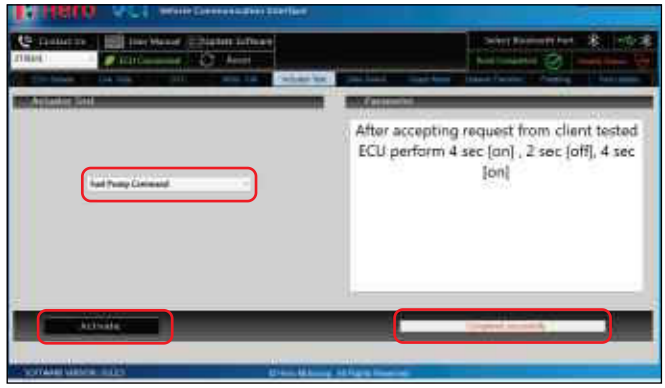
If P0628, P0629 codes appear in VCI

1. To know about the causes and remedies of a P0628, P0629 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Remove the fuel tank cover (page 2-5).
3. Disconnect the fuel pump 5P connector.
4. Check for loose or poor contact on the fuel pump 5P connector.
5. Connect the fuel pump 5P connector and turn the ignition switch to "ON". Check the DTC code.
6. If there is no DTC code then there has been a loose or poor contact in the fuel pump 5P connector.



FUEL PUMP 5P CONNECTOR

7. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
8. Select the "FUEL PUMP COMMAND", click on to "ACTIVATE" to start the testing.
9. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK
10. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU.
11. If test is successful, turn the ignition switch to "OFF".



12. Disconnect the ECU 48P connector check for continuity between the fuel pump 5P connector at the wire harness side and ECU 48P connector.

CONNECTION

Brown/White (ECU Pin-36)- Brown/White
STANDARD: Continuity
Black/Red (ECU Pin-33)- Black/Red
STANDARD: Continuity

13. Check for no continuity between the fuel pump 5P connector at the wire harness side and ground.
14. If there is any abnormality, the following can be due to :

- Open circuit in Brown/White wire.
- Open circuit in Black/Red

CONNECTION

Brown/White-Ground
Black/Red-Ground
STANDARD: No continuity (ignition switch "ON")

15. If all the connection are normal connect the ECU 48P connector and turn the ignition switch to "ON".
16. Measure the voltage between fuel pump 5P connector at the wire harness side and ground.

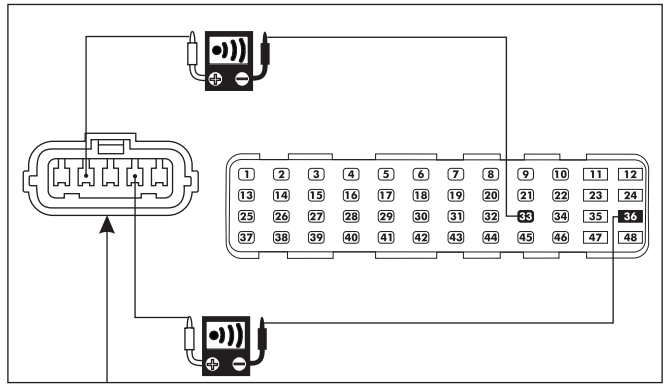
CONNECTION
Black/Red-Ground
STANDARD: Battery voltage

If voltage is within the specification then turn the ignition switch to "OFF" and check fuel pump (page 5-61).

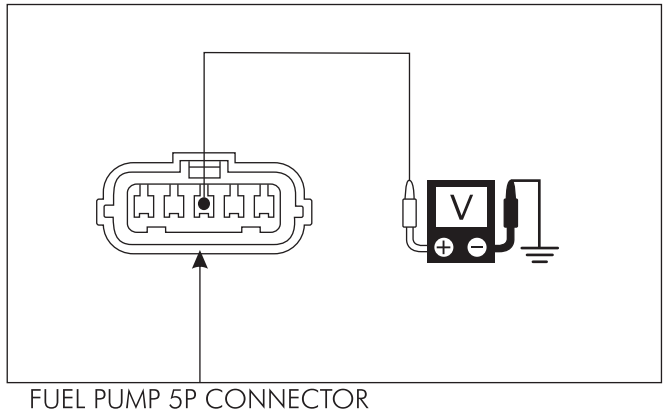
If voltage is out of range/battery voltage exist. This can be due to:

• Fuel pump is shorted to battery voltage.

Replace the fuel pump and inspect again.



FUEL PUMP 5P CONNECTOR



FUEL PUMP 5P CONNECTOR

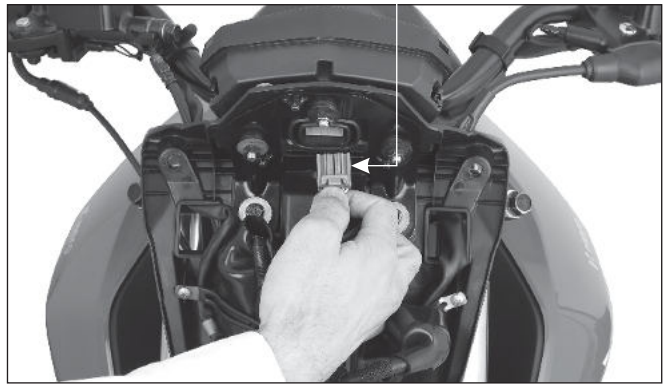
MIL INDICATOR (DTC: P0650)

Read the DTC code in Hero VCI (page 5-23).

If P0650 codes appear in VCI

1. To know about the causes and remedies of a P0650 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the front cowl (page 2-4) and disconnect the 16P connector and check for loose or poor contact on the 16P connector.
4. Connect the 16P connector. Turn the ignition switch to "ON". Check the DTC code.
5. If there is no DTC code then there has been loose or poor contact on the 16P connector.

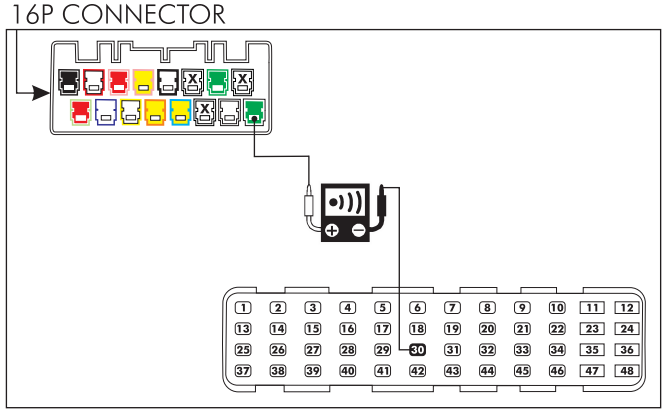
16P CONNECTOR



6. If DTC code appear then turn the ignition switch to "OFF".
7. Disconnect the ECU 48P connector and check the continuity between the ECU 48P connector and 16P connector at the wire harness side.

CONNECTION
White/Blue (ECU Pin-30)-
White/Green (16P connector)
STANDARD: Continuity

16P CONNECTOR



8. If continuity exist then inspect the MIL indicator run the actuator test in Hero VCI (page 5-17).
8. Select the "WARNING LAMP COMMAND", click on to "ACTIVATE" to start the testing.
9. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK.
10. If the status displayed as "TEST NOT COMPLETED" then replace the combination meter.

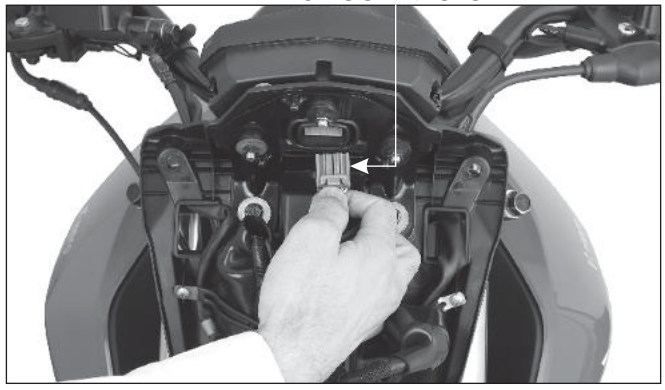
TACHOMETER (DTC: P0654)

Read the DTC code in Hero VCI (page 5-23).

If P0654 code appear in VCI

1. To know about the causes and remedies of a P0654 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the front cowl (page 2-4) and disconnect the 16P connector and check for loose or poor contact on the 16P connector.
4. Connect the 16P connector. Turn the ignition switch to "ON". Check the DTC code.
5. If there is no DTC code then there has been loose or poor contact on the 16P connector.
6. If DTC code appear then turn the ignition switch to "OFF".

16P CONNECTOR



7. Disconnect the ECU 48P connector and check the continuity between the ECU 48P connector and 16P connector at the wire harness side.

CONNECTION
White/Black (ECU Pin-40)-
White/Black (16P connector)
STANDARD: Continuity

Check for no continuity between the 16P connector at the wire harness side and ground.

CONNECTION
White/Black - Ground
STANDARD: No continuity

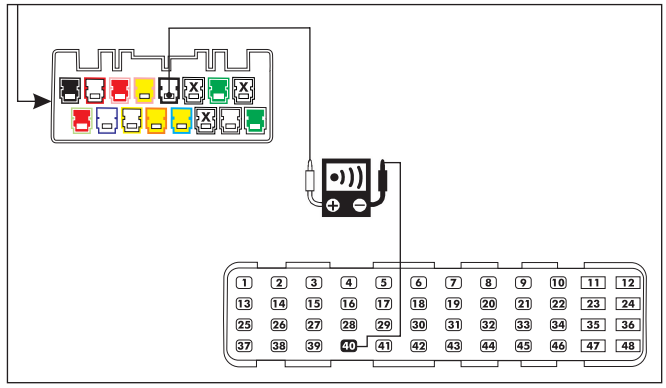
If continuity exist then this can be due to tachometer circuit is shorted to battery voltage.

Disconnect the ECU 48P connector, turn the ignition switch to "ON" and check the voltage between the ECU 48P connector.

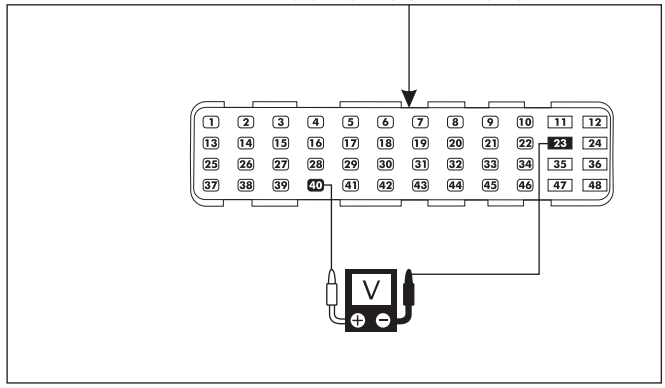
CONNECTION
White/Black (ECU Pin-40)-Green (ECU Pin-23)
STANDARD: 4.74 V

If there is any abnormality then replace the throttle body/ECU with new one and inspect again.

16P CONNECTOR



ECU 48P CONNECTOR

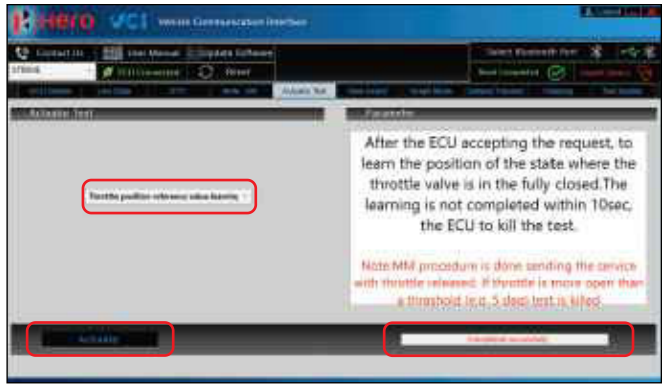


SLIDER POSITION SENSOR LEARNING (SPS) (DTC: P1501)

Read the DTC code in Hero VCI (page 5-23).

If P1501 codes appear in VCI

1. To know about the causes and remedies of a P1501 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
3. Select the "THROTTLE POSITION REFERENCE VALUE LEARNING ", click on to "ACTIVATE" to start the testing.
4. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK.
5. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU with new one and inspect again.



NOTE

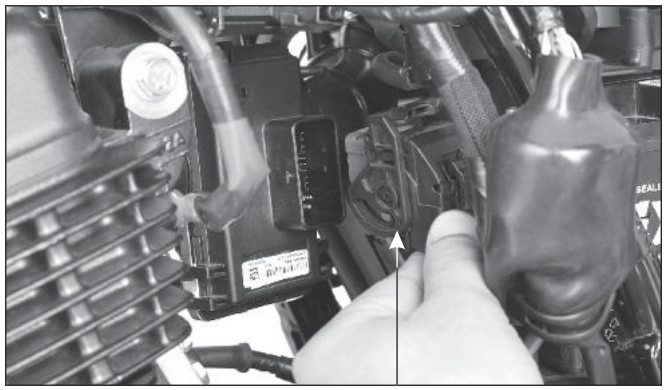
SPS learning need to be performed in following cases:
- If P1501 code appears in VCI.
- In case of replacing throttle valve, spring, throttle top or throttle cable.
- Run the live parameter in Hero VCI and measure TPS/SPS value (page 5-13), if value is not matching with standard value, then SPS learning is required.
- After installing the throttle body/ECU.

BANK ANGLE SENSOR (BAS) (DTC: P1530)

Read the DTC code in Hero VCI (page 5-23).

If P1530 codes appear in VCI

1. To know about the causes and remedies of a P1530 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the ECU 48P connector.
5. Check for loose or poor contact on ECU 48P connector.
6. Connect the ECU 48P connector and turn ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in ECU 48P connector
8. If DTC code appear then turn the ignition switch to "OFF".
9. Replace the throttle body/ECU with new one and inspect again.



ECU 48P CONNECTOR

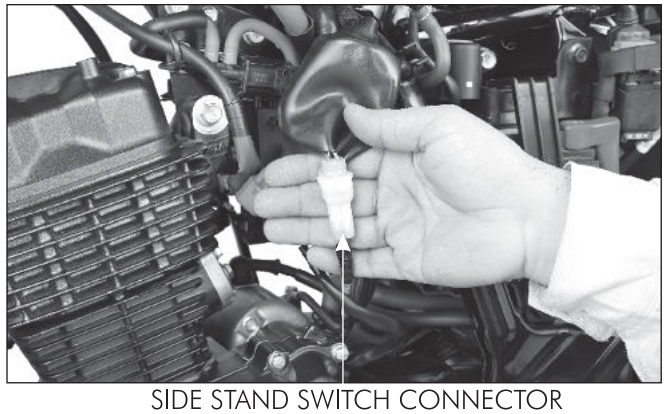
THROTTLE BODY/ECU

SIDE STAND SWITCH (DTC: P1590)

Read the DTC code in Hero VCI (page 5-23).

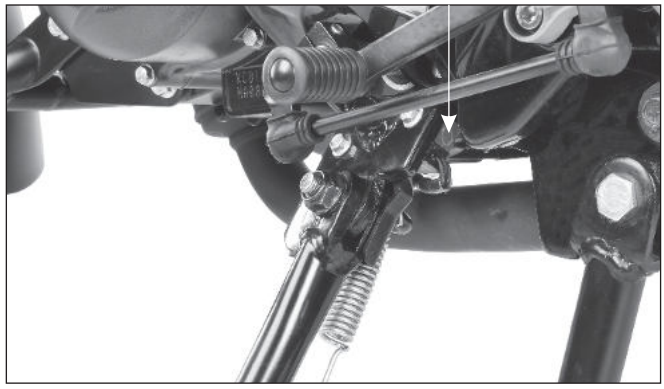
If P1530 codes appear in VCI

1. To know about the causes and remedies of a P1590 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the side stand switch 4P connector.
5. Check for loose or poor contact on side stand switch 4P connector.
6. Connect the side stand switch 4P connector and turn ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in side stand switch 4P connector.
8. If DTC code appear then turn the ignition switch to "OFF".



SIDE STAND SWITCH CONNECTOR

SIDE STAND SWITCH



9. Disconnect the ECU 48P connector and check the continuity between the ECU 48P connector and side stand switch 4P connector at the wire harness side.

CONNECTION

Pink/Red (ECU pin 7) - Pink/Red

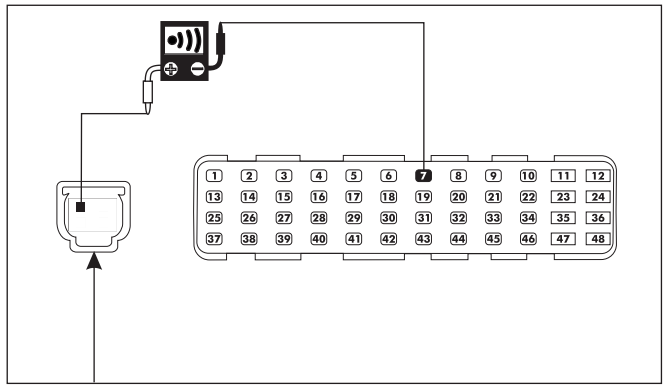
STANDARD: Continuity

Check for no continuity between side stand switch 4P connector at wire harness side and ground.

CONNECTION

Pink/Red - Ground

STANDARD: No Continuity



SIDE STAND SWITCH 4P CONNECTOR

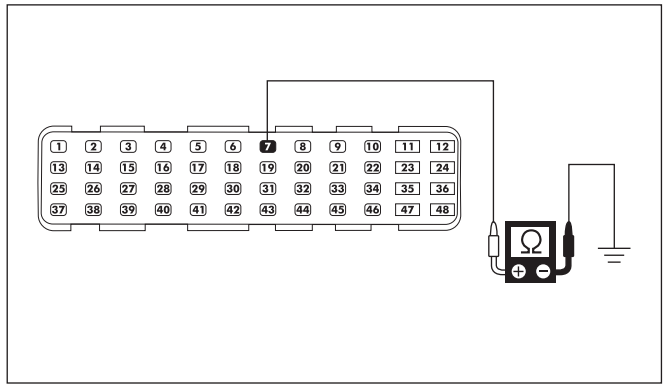
10. If there is any abnormality, then check the resistence at ECU 48P connector.

CONNECTION

Pink/Red (ECU pin 7) -Ground

STANDARD: 7Ω

If there is any abnormality, inspect the side stand switch.

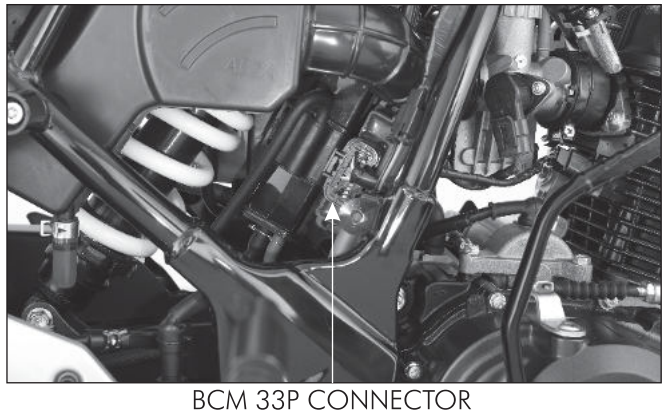


HEADLAMP RELAY (DTC: P1631)

Read the DTC code in Hero VCI (page 5-23).

If P1631 codes appear in VCI

1. To know about the causes and remedies of a P1631 code, click on to “CAUSE AND REMEDY” button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the BCM 33P connector.
5. Check for loose or poor contact on BCM 33P connector.
6. Connect the BCM 33P connector and turn ignition switch to “ON”. Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in BCM 33P connector.
8. If DTC code appear then turn the ignition switch to “OFF”.



BCM 33P CONNECTOR

9. Disconnect the ECU 48P connector and check the continuity between the ECU 48P connector and BCM 33P connector at wire harness side.

CONNECTION

Green/Black (ECU pin 42) - Green/Black

STANDARD: Continuity

Check for no continuity between BCM 33P connector at wire harness side and ground.

CONNECTION

Green/Black - Ground

STANDARD: No Continuity

If continuity exist, then this can be due to BCM 33P connector is shorted to battery voltage.

Disconnect the ECU 48P connector and measure the voltage ECU 48P connector and ground.

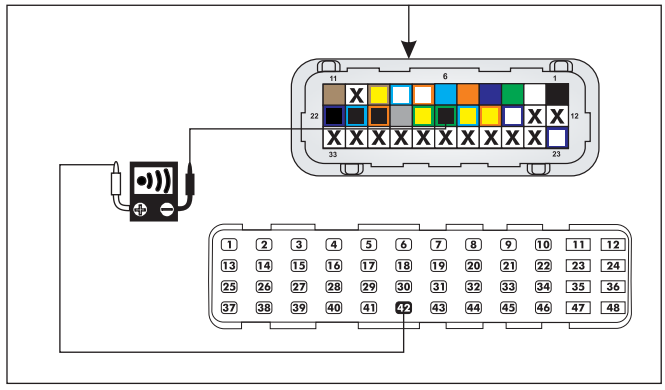
CONNECTION

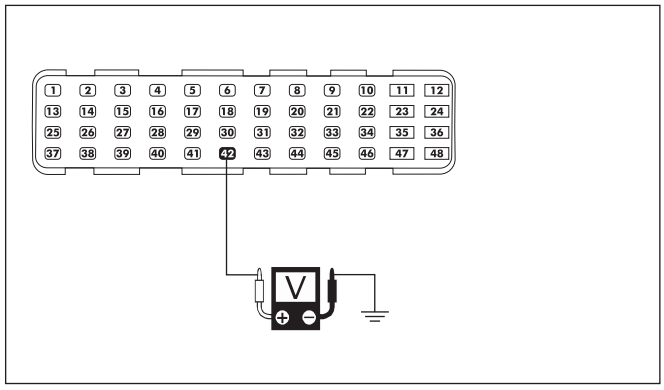
Green/Black (ECU pin 42) - Ground

STANDARD: 4.71 V

If there is any abnormality, then inspect the BCM.

BCM 33P CONNECTOR





VCC CIRCUIT (DTC: P1698)

Read the DTC code in Hero VCI (page 5-23).

If P0500 code appear in VCI

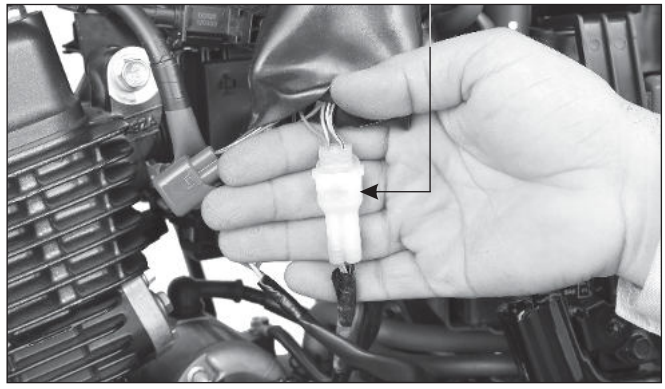
1. To know about the causes and remedies of a P1698 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the vehicle speed sensor (VSS) 3P connector.
5. Check for loose or poor contact on the vehicle speed sensor (VSS) 3P connector.
6. Connect the VSS 3P connector and turn the ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been a loose or poor contact in the VSS 3P connector.
8. If there is DTC code appear then, disconnect the ECU 48P connector and check the voltage between the ECU 48P connector and ground.

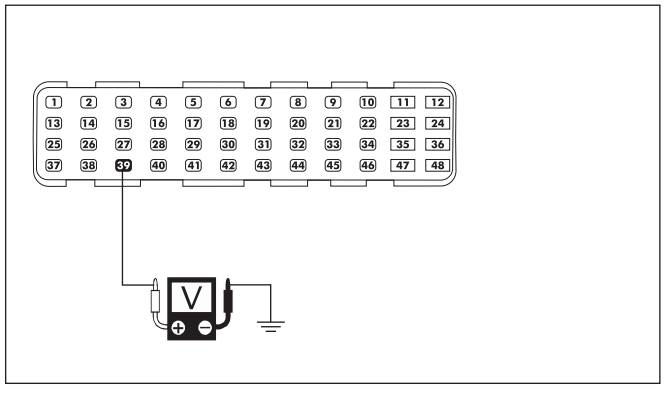
CONNECTION

Grey/Blue (ECU Pin-39)-Ground

STANDARD: 5±0.25V

VSS 3P CONNECTOR



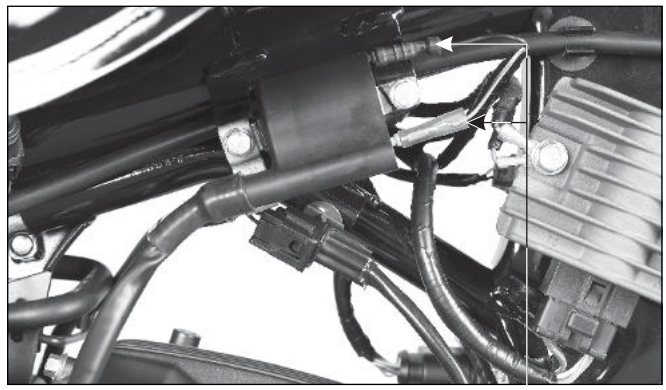


IGNITION COIL (DTC: P2300, P2301)

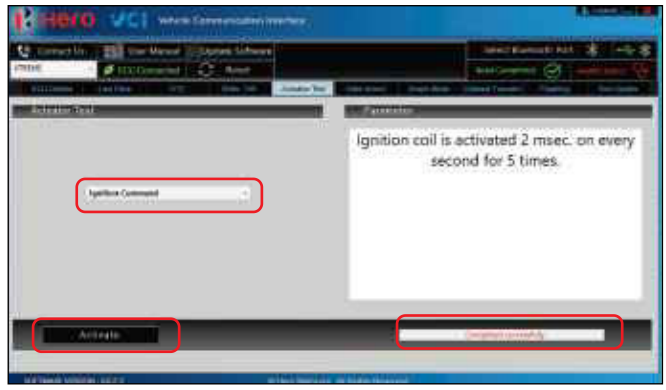
Read the DTC code in Hero VCI (page 5-23).

If P2300, P2301 codes appear in VCI

1. To know about the causes and remedies of a P2300, P2301 code, click on to "CAUSE AND REMEDY" button on VCI application, a popup will appear with related information (page 5-15).
2. Turn the ignition switch to "OFF".
3. Remove the fuel tank cover (page 2-5).
4. Disconnect the ignition coil connectors.
5. Check for loose or poor contact on the ignition coil connectors.
6. Connect the ignition coil connectors. Turn the ignition switch to "ON". Check the DTC code.
7. If there is no DTC code then there has been loose or poor contact on the ignition connector.
8. If DTC code appear then run the actuator test in Hero VCI (page 5-17).
9. Select the "IGNITION COMMAND", click on to "ACTIVATE" to start the testing.
10. In the status bar, if the status displayed as "COMPLETED SUCCESSFULLY" this means that ECU is OK
11. If the status displayed as "TEST NOT COMPLETED" then replace the throttle body/ECU.



IGNITION COIL CONNECTORS

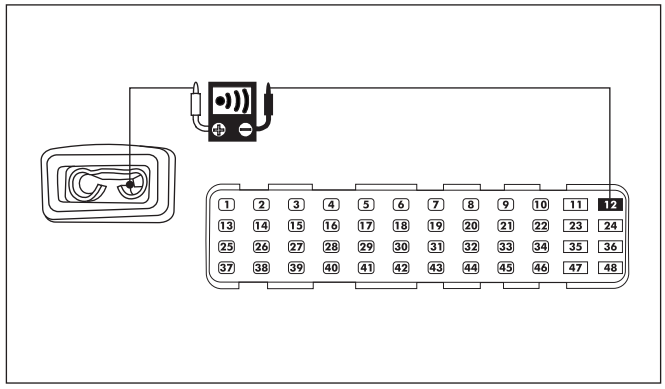


12. Disconnect the ECU 48P connector at wire harness side and check the continuity between the ECU 48P connector and ignition coil connector at wire harness side.

CONNECTION

Pink/Blue (ECU Pin-12)-Pink/Blue

STANDARD: Continuity



13. If continuity exist, then this can be due to ignition coil connector are shorted to battery voltage.
14. Measure the battery voltage between the ignition coil connector at the wire harness side and ground.

CONNECTION

Black/Red-Ground

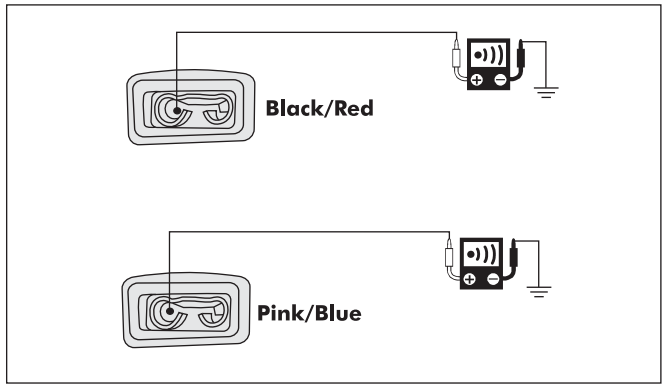
STANDARD: Battery Voltage

If voltage exists then turn the ignition switch to "OFF" and measure the resistance between the connector terminal.

If resistance is abnormal, this can be due to a faulty ignition coil.

Replace the ignition coil and inspect again.

If there is any abnormality then replace throttle body/ECU with new one and inspect again.



QUICK CONNECT FITTING

REMOVAL

INJECTOR SIDE

Drop the fuel pressure (page 5-60).

Turn the ignition switch to "OFF".

Keep the vehicle idle to cool the engine for 10-20 minutes.

Remove the fuel tank cover (page 2-5).

Disconnect the injector 2P connector by pressing the clip

Place a shop towel over the quick connect fitting.

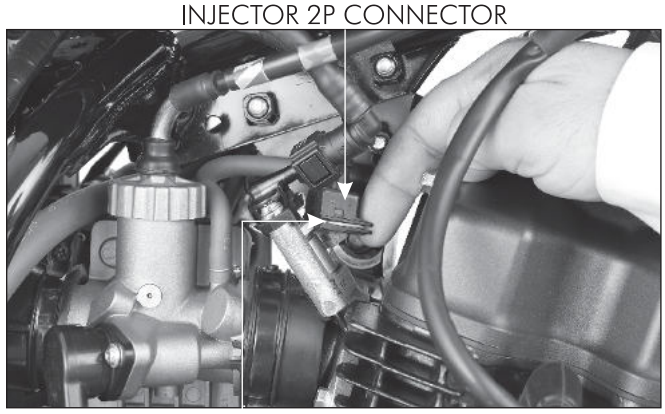
Hold the connector with one hand and press the retainer tabs with the other hand (from both the sides) and release them from the locking pawls.

Pull out the fuel feed hose.

NOTE

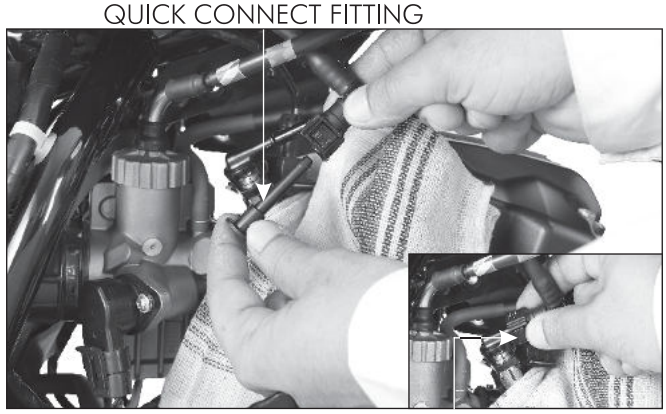
- To avoid fuel spillage on engine, beaker can be used to collect extra fuel present in tube.
- Whenever fuel feed hose is disconnected ensure to plug the hose and cover injector joint to prevent dust entry.
- Always ensure to clean any dust or dirt around the quick connect fitting area before removal.
- Use a shop towel to prevent the remaining fuel in the fuel feed hose from falling out.
- Be careful not to damage the hose or other parts.
- Do not use any tool to press the retainer tabs.
- If the connector does not move, keep the retainer tabs out, and alternately pull and push the connector until it comes off easily.
- Take extra care while lifting the fuel tank to avoid any damage to fuel pump hose connection or injector joint.

INJECTOR 2P CONNECTOR



CLIP

QUICK CONNECT FITTING

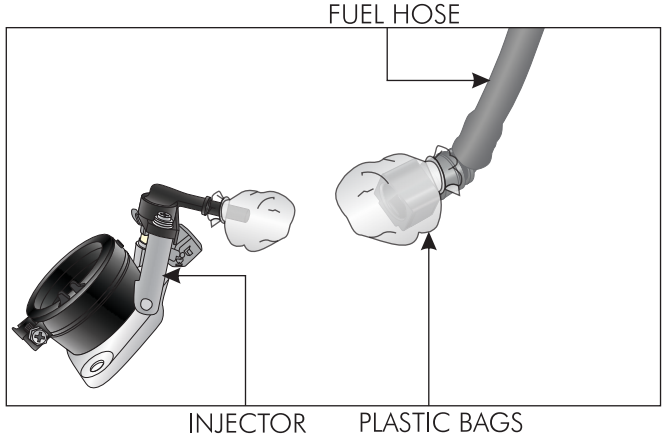


RETAINER TAB

CAUTION

To prevent dust entry into the fuel delivery system always ensure to plug the fuel hose and cover the fuel hose joints with a plastic bag/cover.

FUEL HOSE



INJECTOR PLASTIC BAGS

FUEL PUMP SIDE

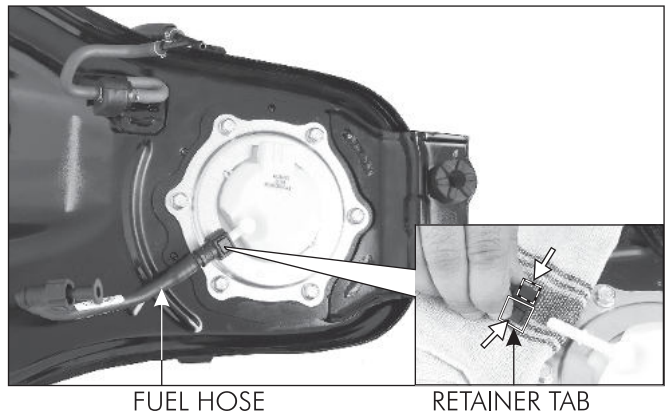
Remove the fuel tank.

Place a shop towel over the quick connect fitting.

Hold the connector with one hand and press the retainer tabs with the other hand (from both the sides) and release them from the locking pawls.

NOTE

Take extra care while lifting the fuel tank to avoid any damage to fuel pump hose connection or injector joint.



FUEL HOSE INSPECTION

Remove fuel tank (page 2-8).

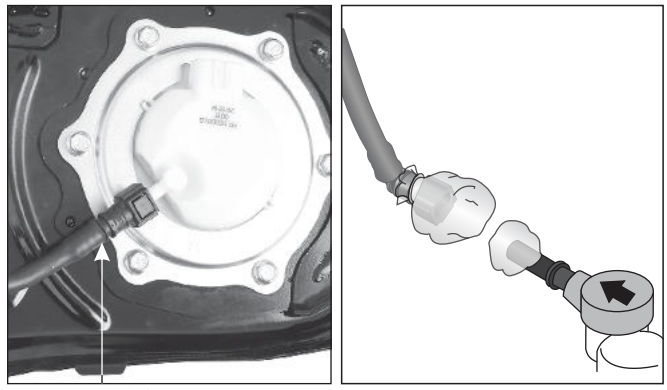
Remove quick fitting connectors from injector side and pump side (page 5-57).

Inspect the fuel hose for any deterioration, damage or leakage.

Replace the fuel hose if necessary.

CAUTION

To prevent dust entry into the fuel delivery system always ensure to plug the fuel hose and cover the fuel hose joints with a plastic bag/cover.



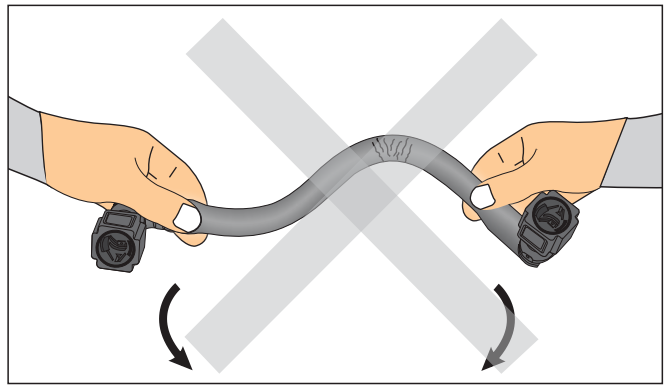
QUICK CONNECT FITTING INSTALLATION

NOTE

- Do not bend or twist the fuel feed hose.
- Always ensure to clean any dust or dirt around the quick connect fitting area before installation.

Inspect fuel hose for any signs of leakage/cracks.

Clean around the fuel hose joint.

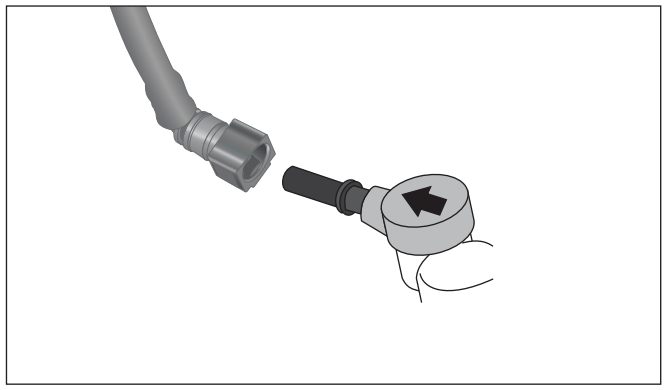


FUEL PUMP SIDE

Clean around the fuel hose joint.

Align the quick fitting connector with the fuel pump then press the quick fitting connector until both the retainer pawls lock with a "CLICK".

If it is hard to connect, put a small amount of engine oil on the pipe end.



NOTE

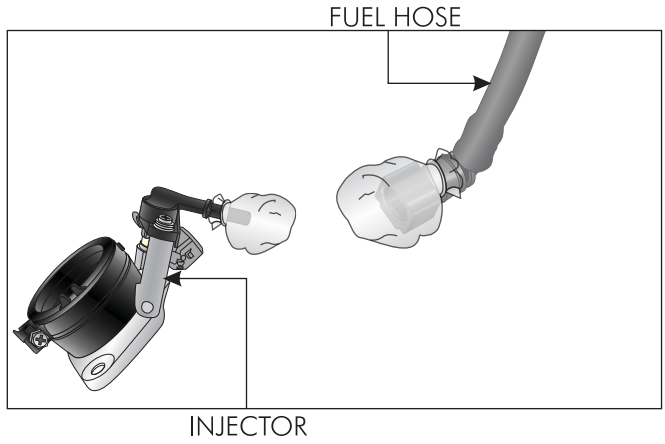
Make sure the connection is secure and that the pawls are firmly locked into place, check visually and also by pulling the connector.

Install the removed parts in the reverse order of the removal.

INJECTOR SIDE

Align the quick connect fitting with the injector joint then press the quick connect fitting until both the retainer pawls lock with a "CLICK".

If it is hard to connect, put a small amount of engine oil on the pipe end.



NOTE

Make sure the connection is secure and that the pawls are firmly locked into place, check visually and also by pulling the connector.

Install the removed parts in the reverse order of the removal.

FUEL PRESSURE TEST

Remove the fuel tank cover (page 2-5).

To drop the fuel line pressure, disconnect the fuel pump connector (page 5-61) and start the vehicle.

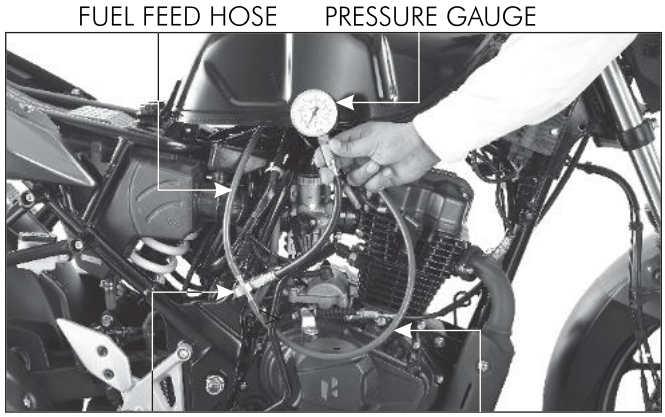
Engine will stop once the pressure is dropped.

Disconnect the fuel hose from the injector side.

Attach one side of pressure gauge adaptor to the fuel feed hose and the other side to the fuel attachment hose.

Attach the other side of fuel attachment hose to the injector.

Thread in the fuel hose of pressure gauge into the hole given in the adaptor.



TOOL

FUEL PRESSURE GAUGE
PART NO: 070 HH KTRF 003
FUEL PRESSURE GAUGE ADAPTOR
PART NO: 070 HH KTRF 005

Connect the fuel pump connector back to its position (page 5-65).

Turn the ignition switch "ON" and inspect for any leakage.

Start the engine and keep it in idling rpm.

Read the fuel pressure.

IDLE SPEED: 1400±100 rpm
FUEL PRESSURE: 300±10 kPa

If the fuel pressure is higher than specified, replace the fuel pump assembly.

If the fuel pressure is lower than specified, inspect the following:

- Fuel line leaking
- Fuel pump (page 5-61)

After inspection, to drop the fuel pressure, disconnect the fuel pump 5P connector (page 5-61) and start the vehicle.

Engine will stop once the pressure is dropped.

Disconnect the fuel hose from the adaptor.

Remove the fuel pressure gauge and pressure gauge adaptor from the fuel hose.

Connect fuel hose onto the injector.

Connect the fuel pump 5P connector back to its position (page 5-65).

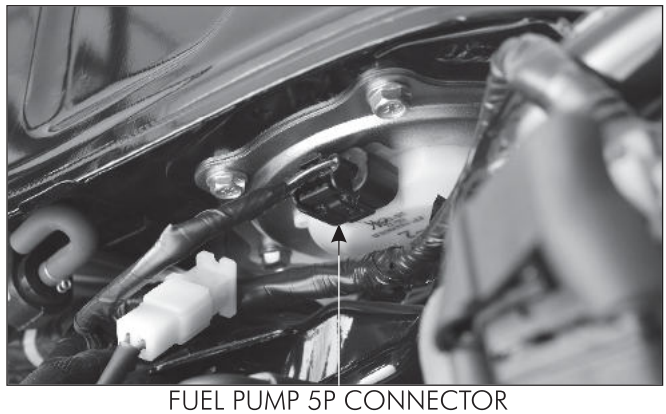
NOTE

Take extra care while lifting the fuel tank to avoid any damage to fuel pump hose connection or injector joint.

FUEL PUMP

INSPECTION

Turn the ignition switch to "ON" and confirm that the fuel pump operates for a few seconds.
If the fuel pump does not operate, inspect as follows:
Turn the ignition switch to "OFF".
Remove fuel tank cover (page 2-5).
Disconnect the fuel pump 5P connector.
Remove the fuel tank.
Turn the ignition switch to "ON" and measure the voltage between the terminals.


FUEL PUMP 5P CONNECTOR

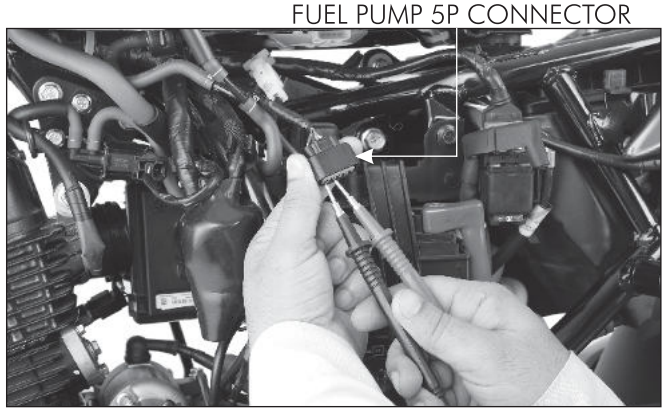
CONNECTION
Brown/White (-)ve- Black/Red (+)ve
STANDARD: 7 V

If the voltage exists, inspect for continuity in black/red from fuel pump connector to ECU connector.
If there is continuity, then replace the fuel pump.
If there is no continuity, then inspect the following:

- Main fuse (15A)
- Open circuit in Brown/White or Black/Red wire
- ECU

NOTE

Take extra care while lifting the fuel tank to avoid any damage to fuel pump hose connection or injector joint.

FUEL PUMP 5P CONNECTOR


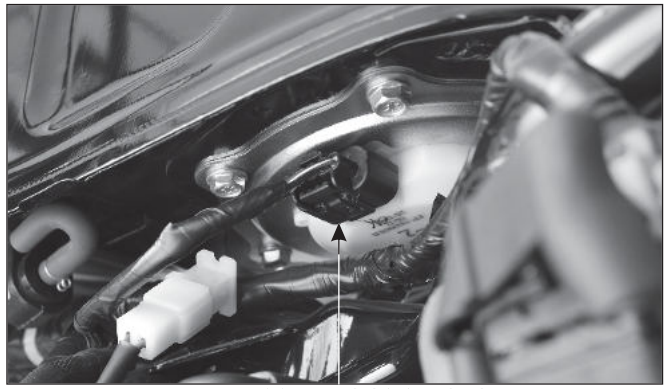
REMOVAL

Remove the following :

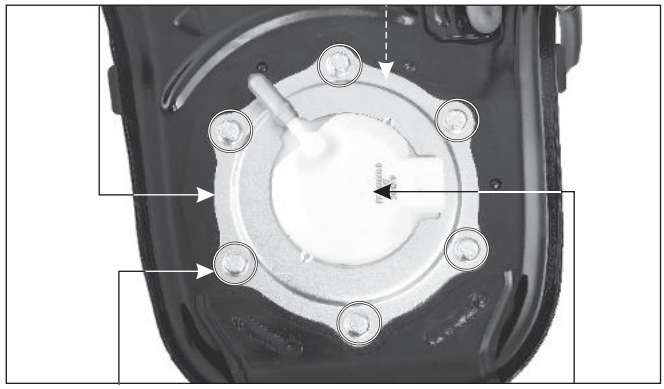
- Seat (page 2-5)
- Fuel tank (page 2-8)

NOTE

- Always ensure to clean any dust or dirt around the fuel pump before removal.
- Take extra care while removing the fuel pump to avoid any damaged to the fuel pump unit.

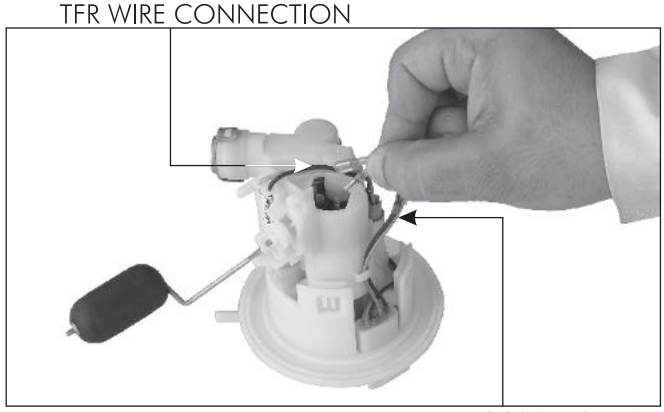

FUEL PUMP 5P CONNECTOR

Remove the fuel pump mounting bolts.
Remove the set plate/fuel pump unit assembly with gasket.

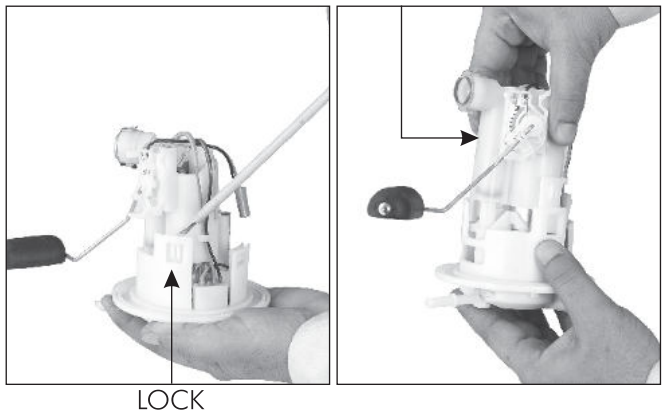
SET PLATE GASKET

FUEL PUMP MOUNTING BOLTS FUEL PUMP UNIT

DISASSEMBLY

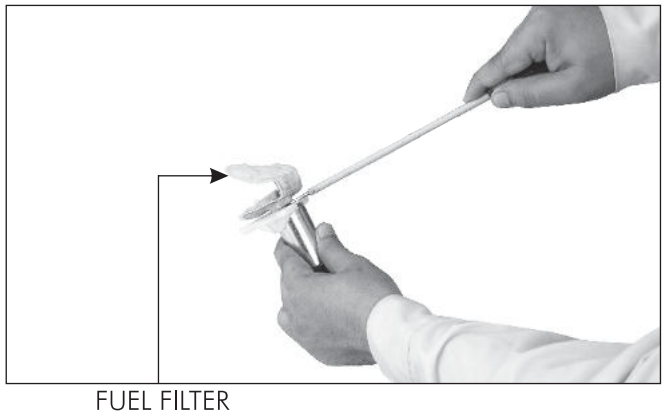
Disconnect the TFR and pump wire connection.



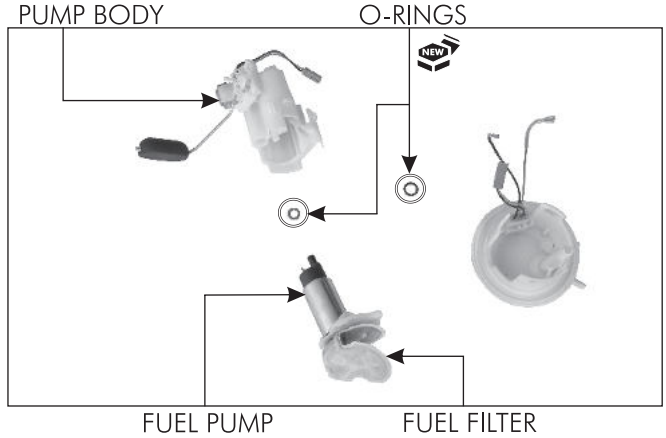
Unlock the pump from the flange by opening its three lock. Hold the pump body and take it out of the flange.



Remove fuel filter from fuel pump as shown.

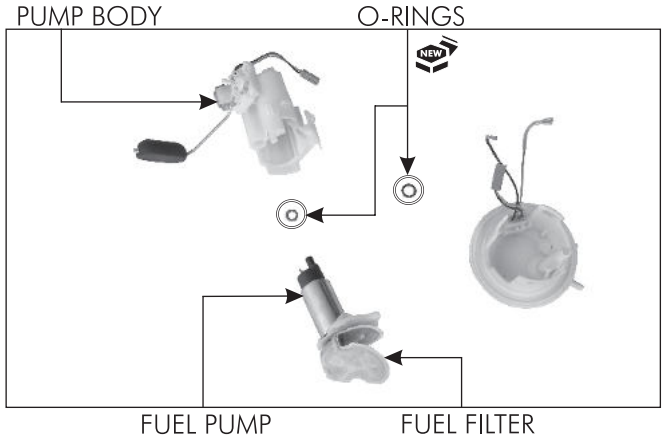


Remove the gasket, O-rings and fuel pump from the pump body.

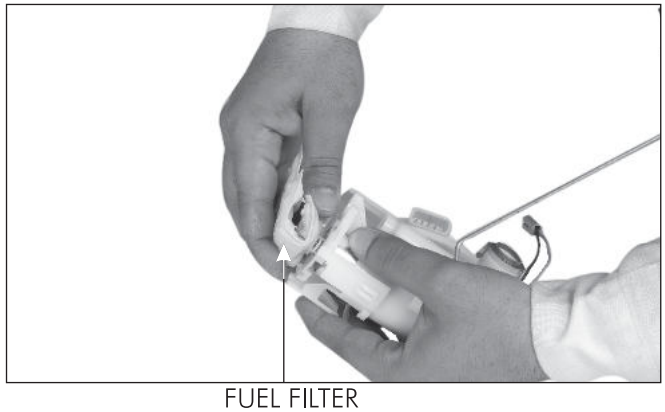


ASSEMBLY

Install the new O-rings, new gasket and fuel pump to pump body.



Install the fuel filter to fuel pump by hand pressing, ensure it has been properly locked as shown.



Take pump body housing assembly & guide on flange inner surface. Ensure that outlet O-ring is seated properly. Push the whole pump body housing assembly until it is properly locked as shown.

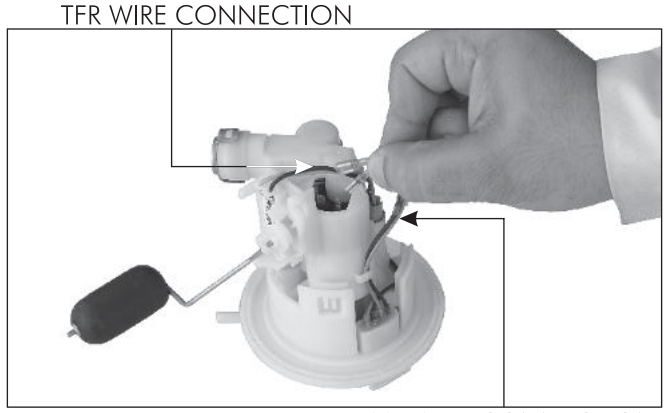
Connect the TFR and pump wire connection.

In case of filter serviceability, following precaution must be taken during re-assembly of fuel pump:

- There is a chance that filter may not be properly fitted in the motor inlet which will lead to dirt entry into motor and pump.
- Improper wire connection leading to malfunctioning of pump.
- Sealing O-rings might not be properly seated causing leakage and inappropriate pressures.
- The three mounting lugs may not be properly locked which will lead to disorientation of pump body, FLS casing incorrect fuel level readings, possibility of dislocation and pump not functioning.
- In case the pump does not work properly after re-assembly then the complete pump has to be replaced.

NOTE

This filter serviceability is applicable only for the pumps which are out of warranty period. The pump including the filter is designed to last until the warranty period & need no filter replacement.



5

INSTALLATION

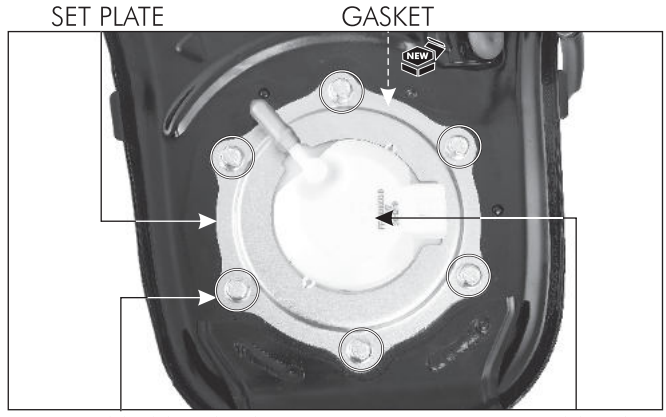
NOTE

- Install the fuel pump carefully so as not to damage the fuel filter.
- Be careful not to pinch the dirt and debris between the fuel pump and gasket.

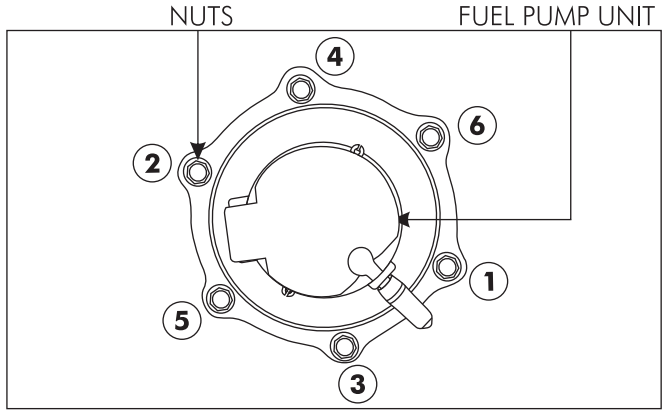
Place a new gasket onto the fuel pump unit.

Install the fuel pump assembly in the fuel tank.

Install the set plate the fuel pump properly.



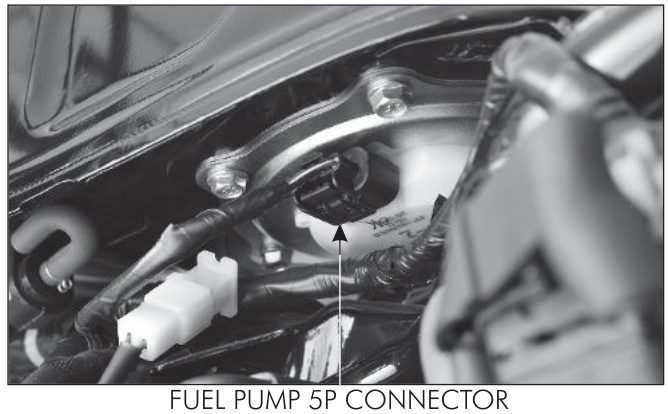
Tighten the fuel pump mounting nuts in the sequence shown.



TORQUE

FUEL PUMP MOUNTING NUTS: 1.2 kgf-m

Install the fuel tank (page 2-9).
Connect the quick connect fitting (page 5-57).
Connect the fuel pump 5P connector.
Install the following :
- Fuel tank cover (page 2-6).
- Seat (page 2-5).


FUEL PUMP 5P CONNECTOR

SAFETY INSTRUCTION FOR FUEL PUMP

Do's	Don'ts
• Maintain storage temperature between -30°C / +85°C. • Fuel hose should be free from tensions and compressive stresses or other cause of deformation. • Maintain FIFO principle (First in- First out) for fuel pump consumption. • Connect/disconnect the connector only after removal of battery from vehicle. • Ensure leak proof connection after assembly to achieve best performance. • Torque wrench should be used to tighten the bolts.	• Do not store fuel pump in open condition. • Do not assemble tampered fuel pump. • Do not use the dropped fuel pump assembly. • Do not connect/disconnect the module with battery connected to harness. • Avoid welding operation near fuel pump. • Do not exceed the tightening torque.

IACV

REMOVAL

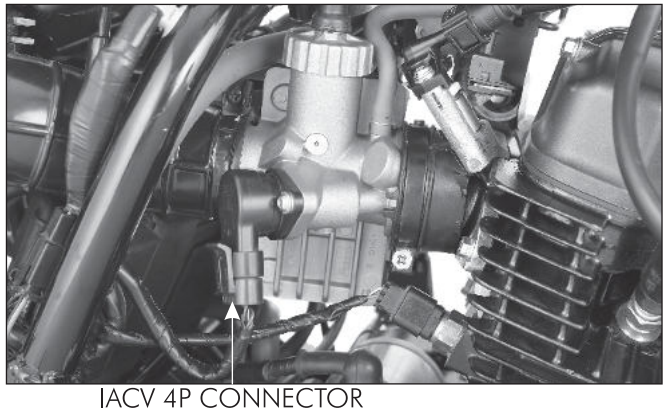
The IACV is installed on the throttle body and is operated by the step motor. When the ignition switch is turned "ON", the IACV operates for a few seconds.

Check the step motor operating (beep) sound with the ignition switch turned "ON".

The IACV operation can be checked visually as follows :

Remove the fuel tank cover.

Disconnect the IACV 4P connector.

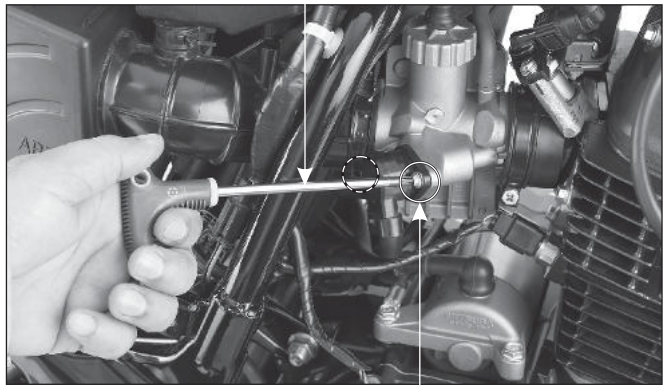

IACV 4P CONNECTOR

Remove the torx screws and set plate by using torx driver.

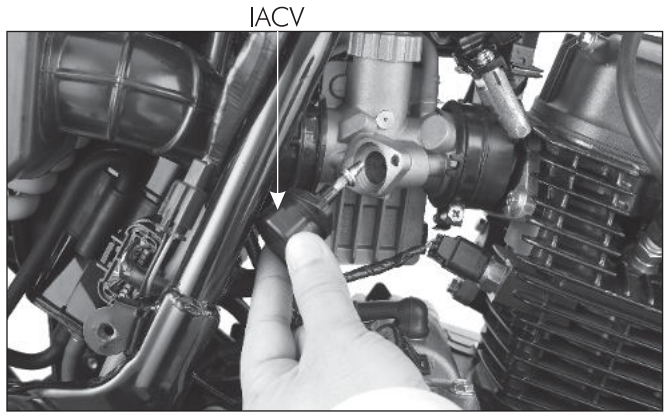
TOOL

TORX DRIVER

TORX DRIVER


IACV BOLTS

Remove the IACV from the throttle body.



Remove the O-ring from the IACV.

INSTALLATION

Install the new O-ring in the IACV.

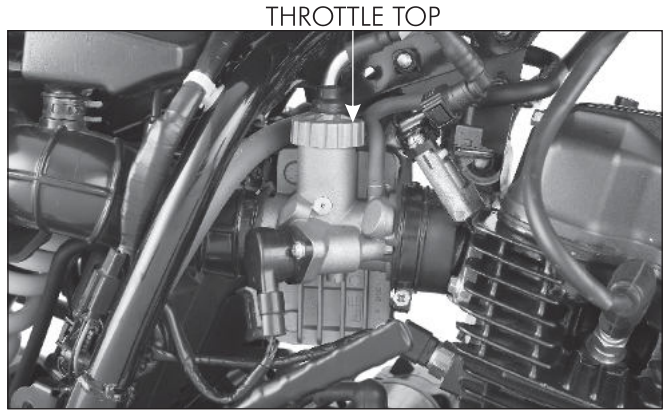
Installation is in the reverse order of removal.

THROTTLE VALVE

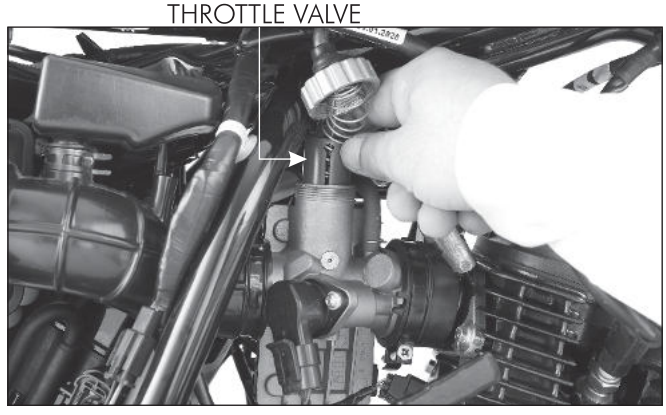
REMOVAL

Remove the fuel tank cover (page 2-5).

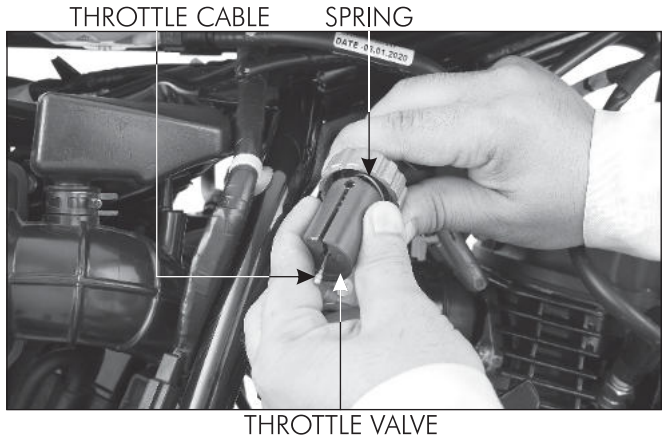
Loosen the throttle top.



Remove the throttle top and throttle valve from the throttle body.

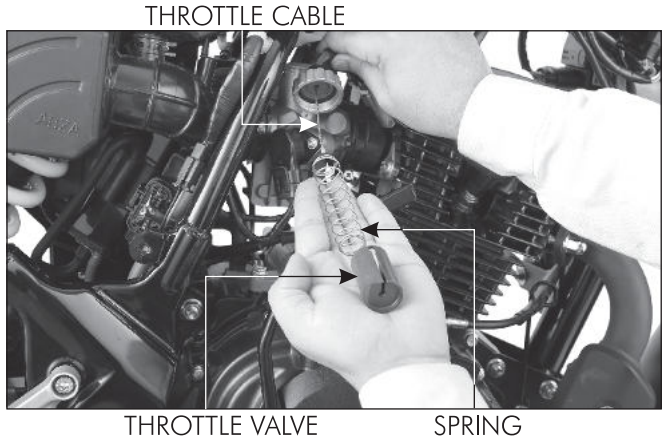


Remove the throttle cable from the throttle valve while compressing the throttle valve spring.



Disassemble the following:-
- Spring
- Throttle valve
- Throttle cable

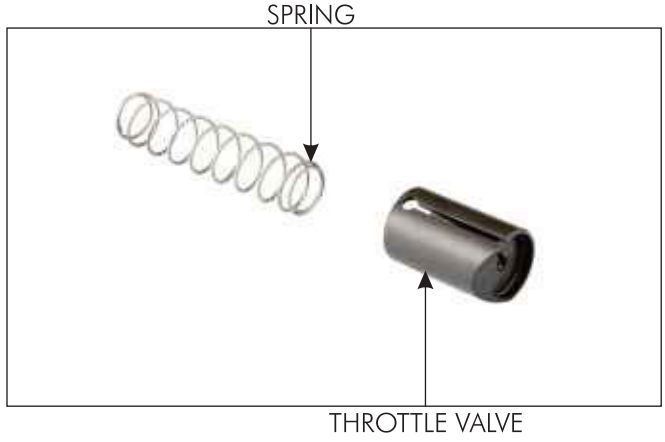
Check the throttle valve for scratch, wear or damage, replace if necessary.



THROTTLE VALVE

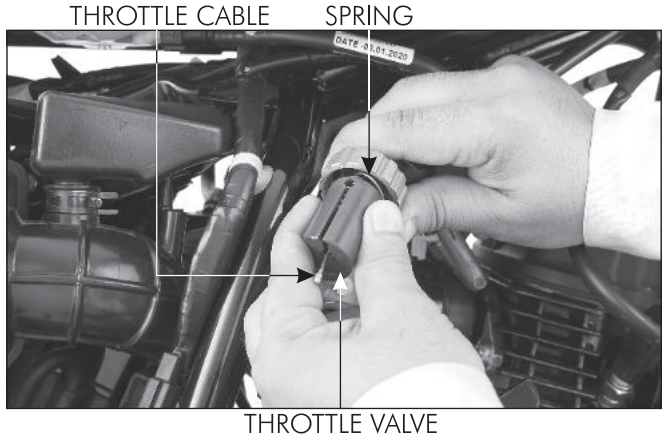
INSTALLATION

Assemble the following:-
- Throttle valve
- Spring



Install the throttle valve spring onto the throttle cable.

Install the throttle cable to the throttle cable valve while compressing the throttle spring.

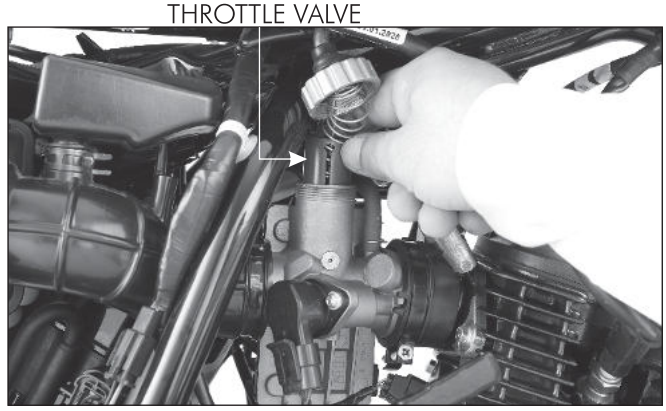


Install the throttle valve and throttle top into the throttle body.

NOTE

Install the throttle valve with the cut-out facing towards IACV.

THROTTLE VALVE



Tighten the throttle top securely.

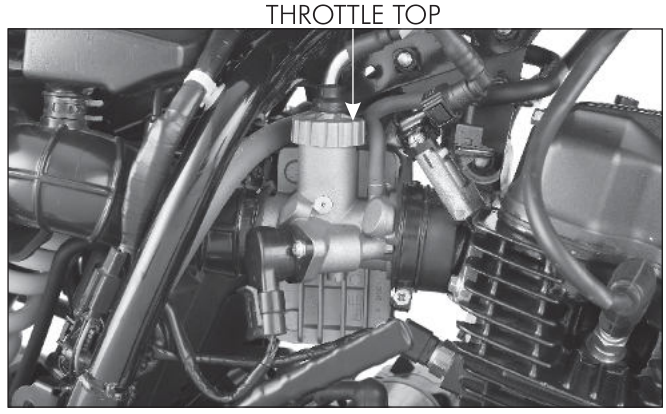
Check the throttle grip free play.

Install the fuel tank cover (page 2-6).

NOTE

Perform the slider position sensor learning in case of replacing throttle valve, spring, throttle top or throttle cable (page 5-52).

THROTTLE TOP

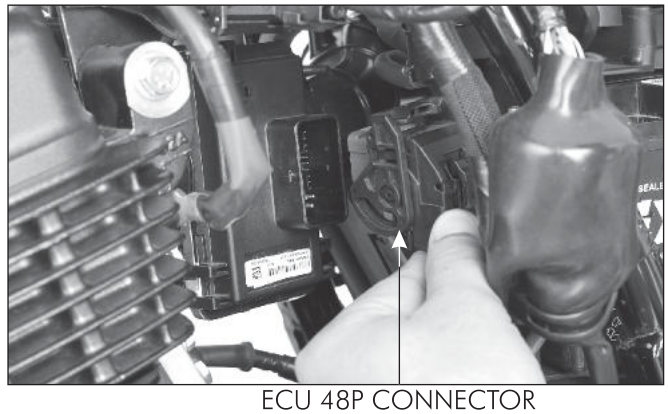


THROTTLE BODY/ ECU

REMOVAL

Remove the fuel tank cover (page 2-5).

Disconnect the ECU 48P connector.



ECU 48P CONNECTOR

Unscrew throttle top and pull out the throttle valve.

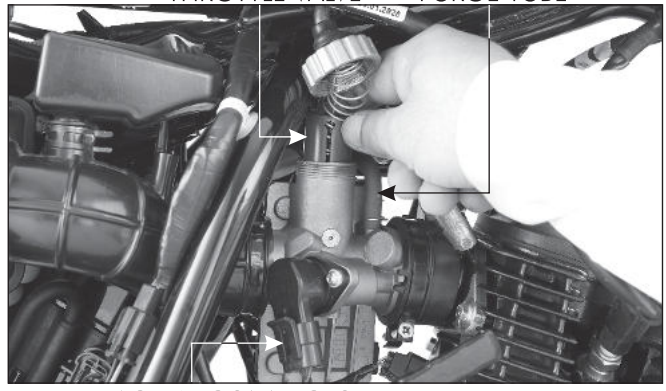
NOTE

Cover the throttle valve with a lint-free cloth to avoid damages/scratches to throttle valve.

Disconnect the IACV 4P connector

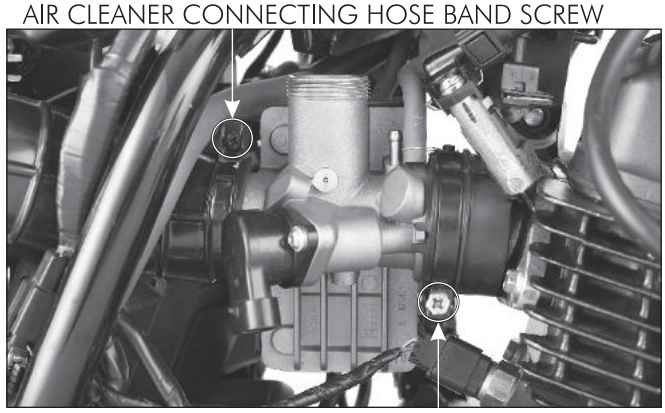
Remove the purge tube.

THROTTLE VALVE PURGE TUBE

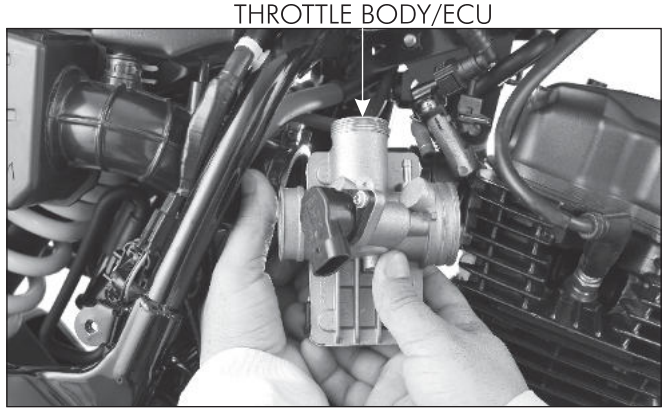


IACV 4P CONNECTOR

Loosen the air cleaner connecting hose band screw and insulator band screw.



Remove the throttle body/ECU from the vehicle.

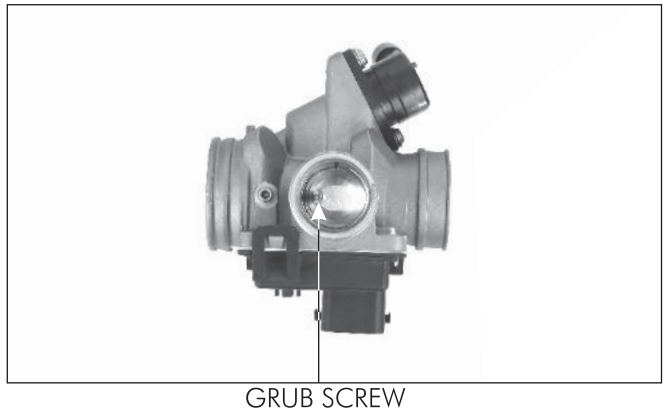


NOTE

- The throttle body/ECU is factory pre-set. Do not try to disassemble ECU from throttle body. ECU is integrated to throttle body.
- Do not damage the throttle body. It may cause incorrect throttle valve operation.
- Throttle body/ECU and throttle valve to be replaced as a unit.

NOTE

The grub screw is factory pre-set. Do not remove/tamper the grub screw setting.

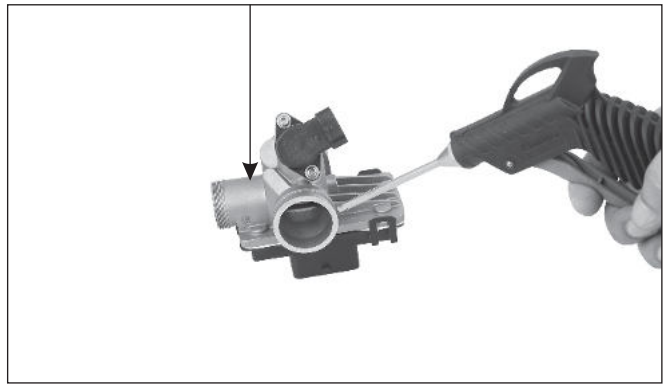


Blow open each air passage in the throttle body with the compressed air.

NOTE

Do not use high pressure air or bring the nozzle too close to the throttle body.

THROTTLE BODY



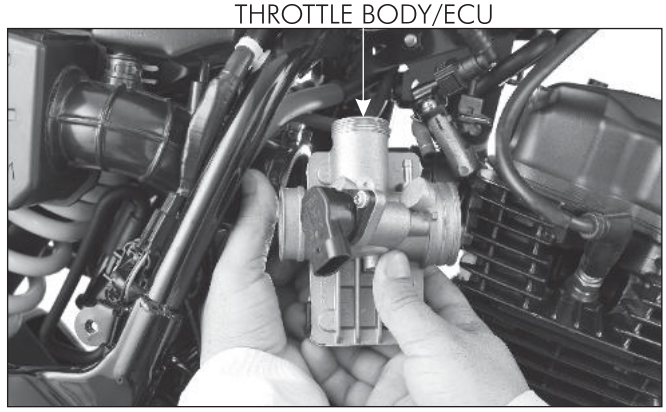
INSTALLATION

NOTE

Be careful not to damage the insulator.

Install the throttle body to the insulator.

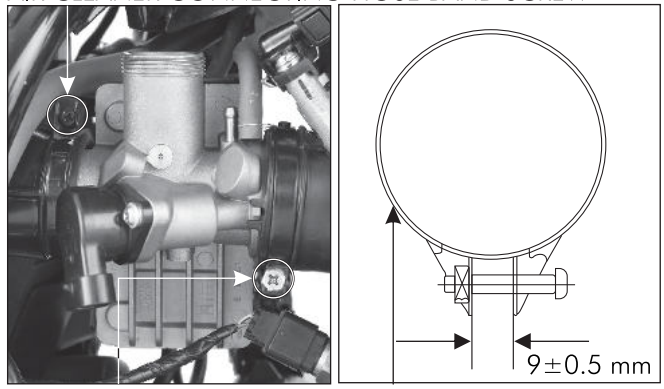
THROTTLE BODY/ECU



Tighten the air cleaner connecting hose band screw and insulator band screw.

Tighten the insulator band screw so that the band ends clearance is 9±0.5 mm.

AIR CLEANER CONNECTING HOSE BAND SCREW



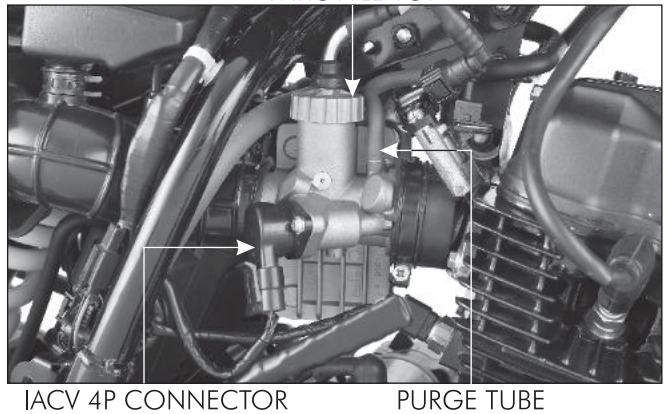
INSULATOR BAND SCREW INSULATOR BAND

Install the throttle valve and screw in the throttle top.

Connect the IACV 4P connector

Connect the purge tube.

THROTTLE TOP



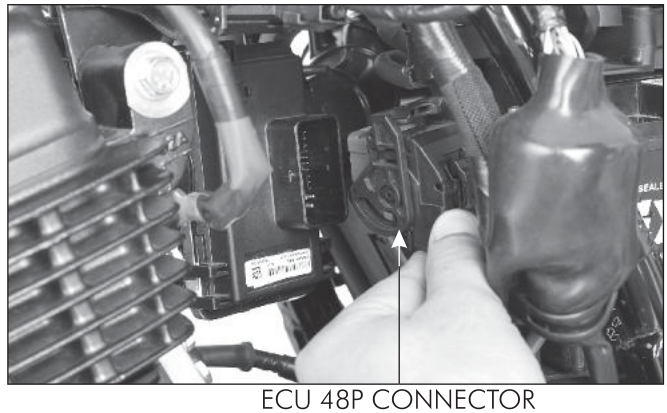
IACV 4P CONNECTOR PURGE TUBE

Connect the ECU 48P connector.

Install the fuel tank cover (page 2-6).

NOTE

After installing the throttle body/ECU, always do the slider position sensor learning (page 5-52).



ECU 48P CONNECTOR

SAFETY INSTRUCTION FOR THROTTLE BODY/ECU

Do's	Don'ts
• Store in proper packing. • Maintain storage temperature from -10°C/+50°C • ECU should be free from tensions and compressive stresses or other cause of deformation. • Maintain FIFO principle (First in-First out) for ECU consumption. • Only unpack during assembly operation. • Ensure leak proof connection after assembly to achieve best performance. • Connect/disconnect the connector only after removal of battery from vehicle. • Always refer tilt angle value after engine is stopped.	• Do not store ECU in open condition. • No stack permitted between unpacking and assembly. • Do not assemble tampered ECU. • No other contact than wire harness is allowed with module connector pins. • When handling module, do not rotate the quadrant from idle to WOT, if it has rotated then it is allowed to release the quadrant gradually from WOT to idle position, not abruptly • Module should not be exposed to alcohol/gasoline/any other liquid prior assembly. • Do not connect/disconnect the module with battery connected to harness. • Avoid welding operation near ECU. • Do not place the throttle body/ECU towards the potting. • Do not drop the throttle body/ECU.

INJECTOR

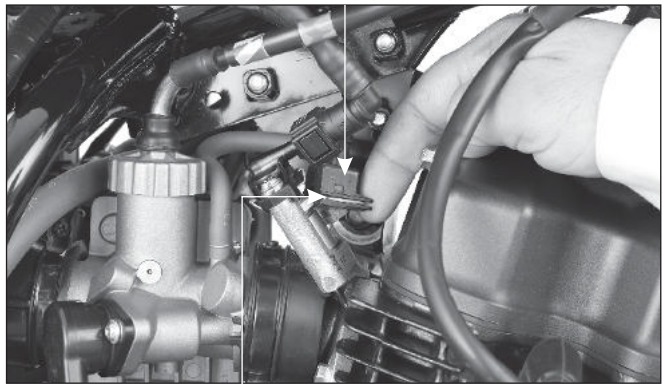
REMOVAL

Remove the fuel tank cover (page 2-5).

Disconnect the quick connector fitting from injector side (page 5-57).

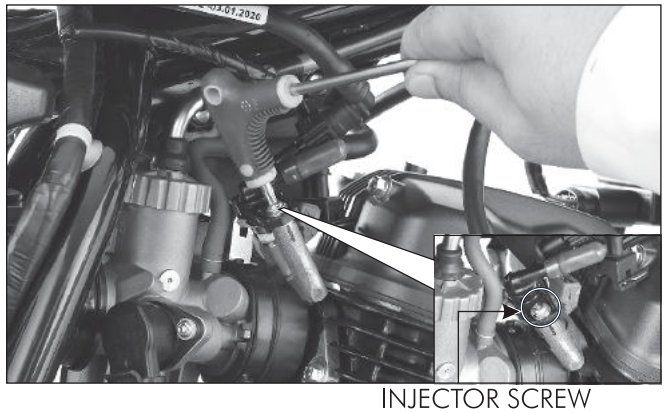
Disconnect the injector 2P connector by pressing the clip.

INJECTOR 2P CONNECTOR



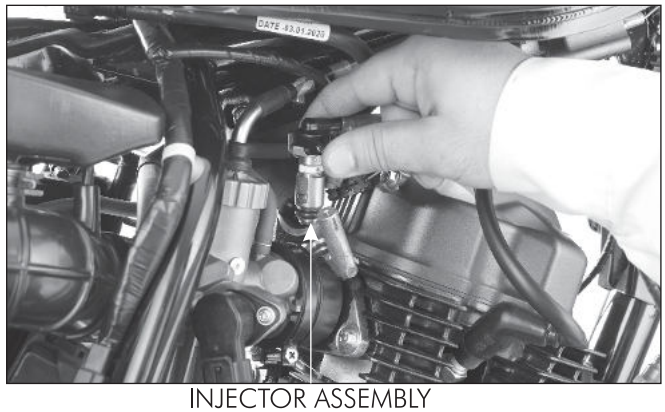
CLIP

Remove the injector screw (T-20).



INJECTOR SCREW

Remove the injector assembly with O-ring.

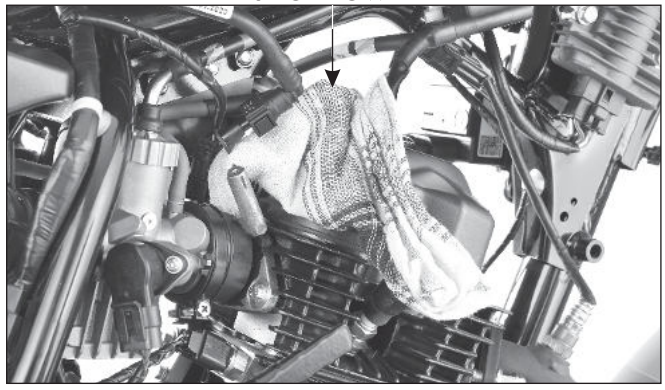


INJECTOR ASSEMBLY

NOTE

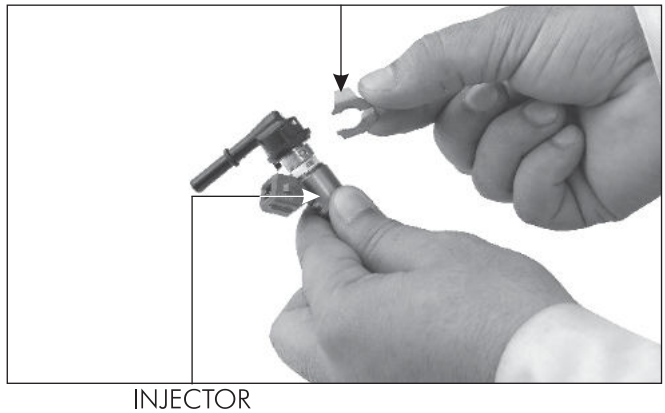
Seal the injector port with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine.

SHOP TOWEL



Remove the fuel injector joint by removing the clip.

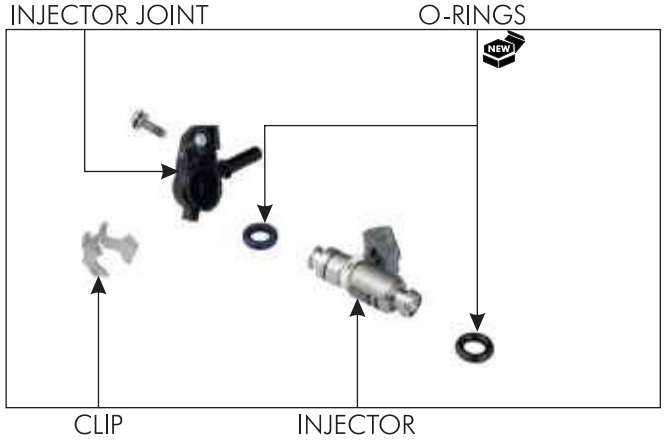
CLIP



INJECTOR

Remove O-rings from the injector.

Check the removed parts for wear or damage and replace them if necessary.



INSTALLATION

Coat new O-rings with engine oil.

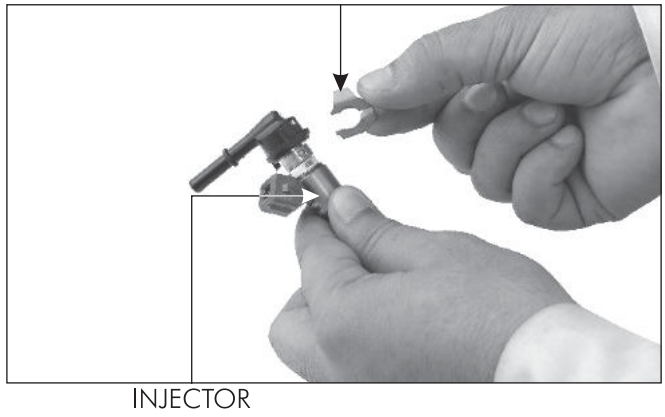
NOTE

- Replace the O-rings with new ones.
- Be careful not to damage the O-rings.
- Position the clip locator into the injector slot properly.

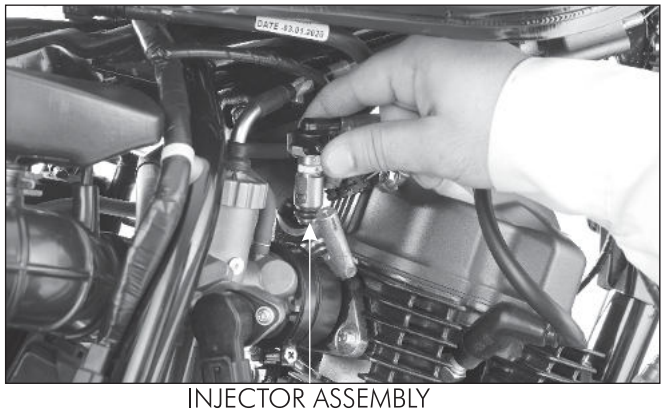
Install new O-rings to the injector.

Install the injector to the fuel injector joint.

Install the fuel injector clip to lock the injector joint and injector.



Install the fuel injector assembly.

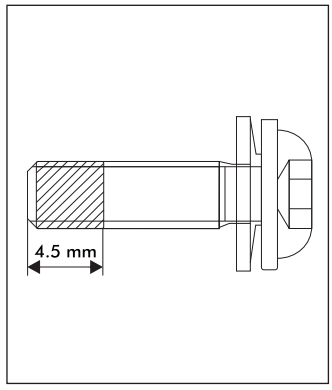


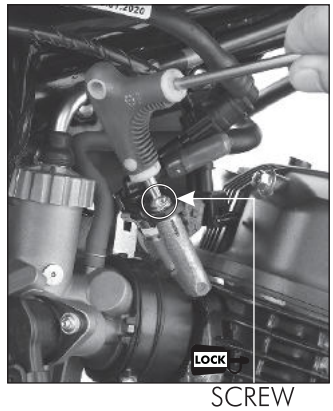
Clean and apply locking agent to injector fitting screw threads.

Tighten the injector screw (T-20) to specified torque value.

TORQUE VALUE

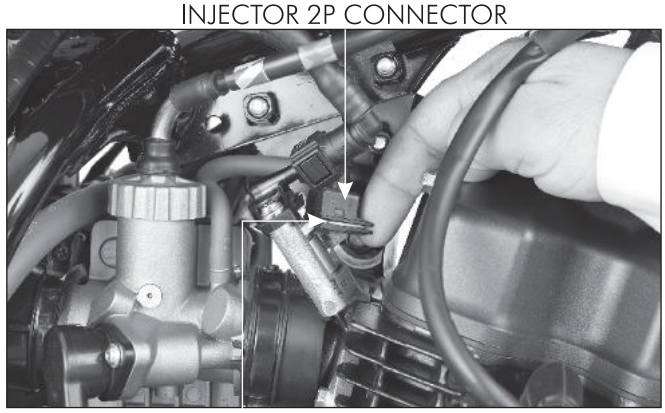
TORX SCREW: 0.25 kgf-m





SCREW

Connect the injector 2P connector.
Connect the quick connector fitting from injector side (page 5-58).
Install the fuel tank cover (page 2-6).



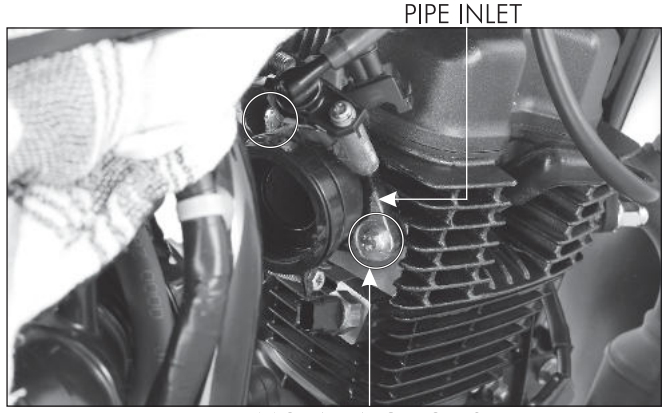
SAFETY INSTRUCTION FOR INJECTOR

Do's	Don'ts
• Maintain storage temperature between -40°C /+60°C. • Injector should be free from tensions and compressive stresses or other cause of deformation. • Maintain FIFO principle (First in- First out) for injector consumption. • Connect/disconnect the connector only after removal of battery from vehicle. • Ensure leak proof connection after assembly to achieve best performance. • Torque wrench should be used to tighten the bolts.	• Do not store injector in open condition. • Do not assemble tampered injector's. • Do not use the dropped injector assembly. • Do not connect/disconnect the module with battery connected to harness. • Avoid welding operation near injector. • Do not exceed the tightening torque.

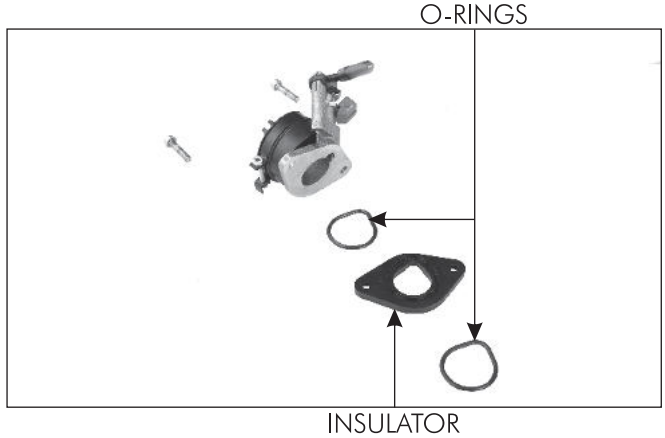
PIPE INLET

REMOVAL

Remove the throttle body/ECU (page 5-68).
Remove the mounting bolts (2 nos.).
Remove the pipe inlet from the cylinder head.



Remove the insulator O-rings.

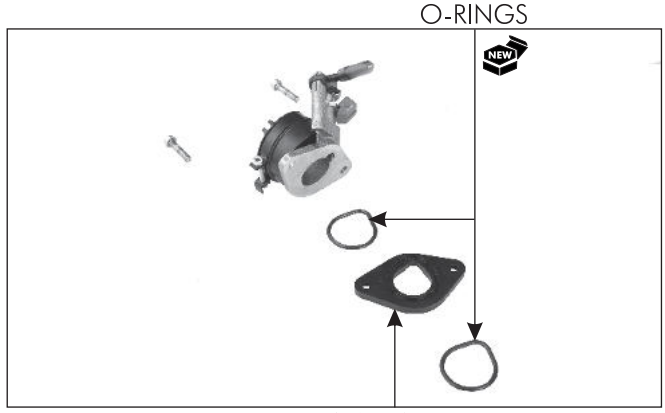


INSTALLATION

NOTE

Be careful not to damage the insulator/pipe inlet.

Install a new O-rings.

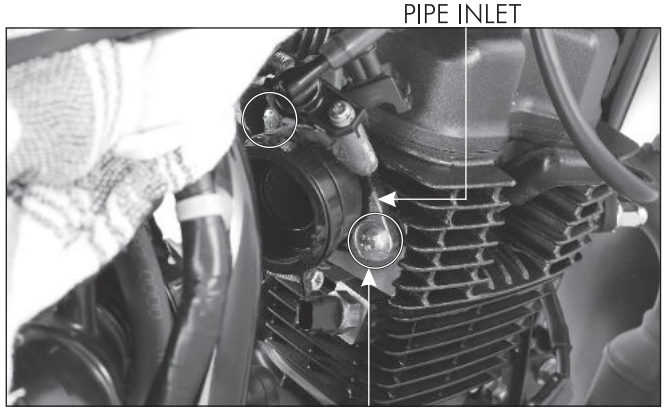


Install the pipe inlet to the cylinder head and insulator.
Tighten the mounting bolts to specified torque.

TORQUE

PIPE INLET BOLTS: 1.0 kgf-m

Install the throttle body/ECU (page 5-70).

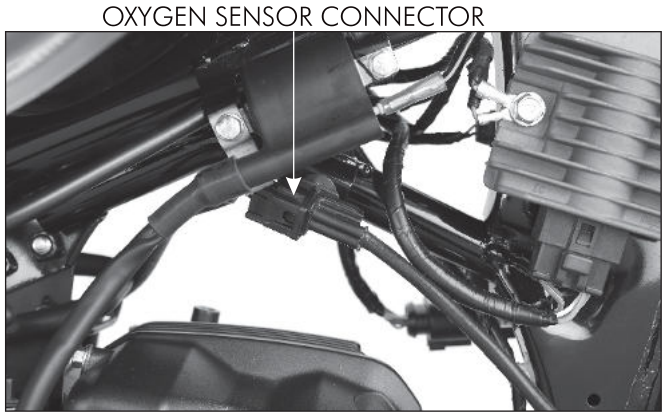


OXYGEN SENSOR

REMOVAL

NOTE

- Do not apply grease, oil or other materials in the oxygen sensor air hole.
- The oxygen sensor may be damaged if dropped. Replace it with a new one, if dropped.
- If the oxygen sensor cap is disconnected, replace the oxygen sensor cord with a new one, do not reuse oxygen sensor cord.
- Handle the oxygen sensor with care.
- Do not service the oxygen sensor while it is hot.



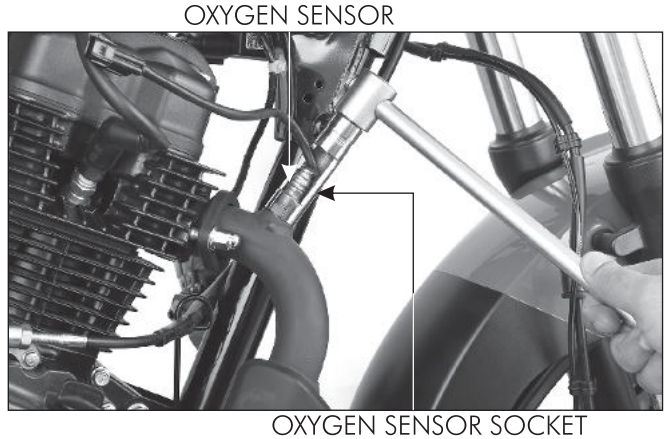
Remove the fuel tank cover (page 2-5).
Disconnect the oxygen sensor connector.
Remove the oxygen sensor by using the special tool.

TOOL

OXYGEN SENSOR SOCKET
PART NO: HMCL0519ABW01

CAUTION

- Be careful not to damage the sensor wire.
- Do not use a impact wrench while removing or installing the oxygen sensor, or it may be damaged.



INSTALLATION

Install and tighten the oxygen sensor to the specified torque.

TOOL

OXYGEN SENSOR SOCKET
PART NO: HMCL0519ABW01

TORQUE

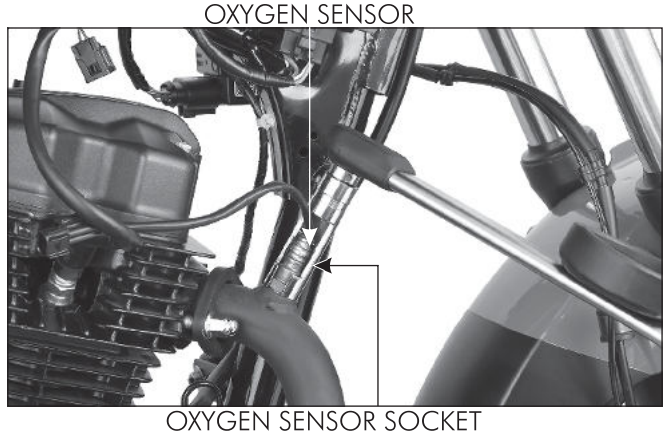
OXYGEN SENSOR: 2.5 kgf-m

NOTE

Anti-seize coating applied on thread from supplier end. Do not apply grease or oil, when assembling.

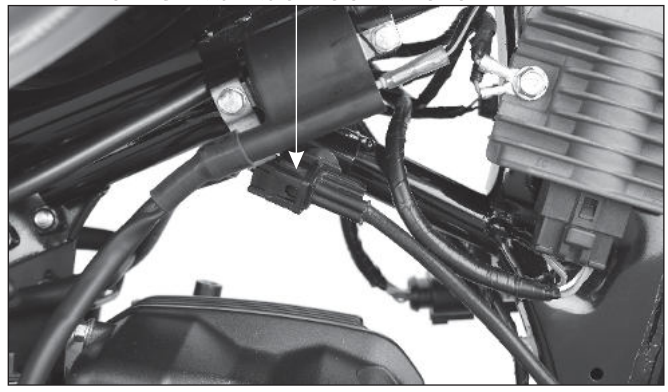
Connect the oxygen sensor connector.
Install the fuel tank cover (page 2-5).

OXYGEN SENSOR



OXYGEN SENSOR SOCKET

OXYGEN SENSOR CONNECTOR

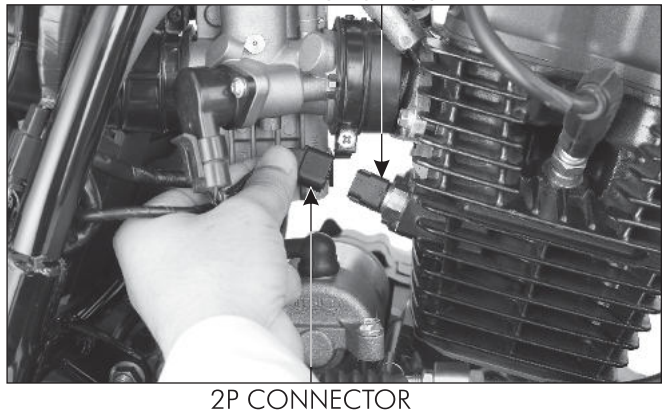


ENGINE OIL TEMPERATURE SENSOR (EOT)

REMOVAL

Remove the fuel tank cover (page 2-5).
Disconnect the EOT sensor 2P connector from the sensor.

EOT SENSOR



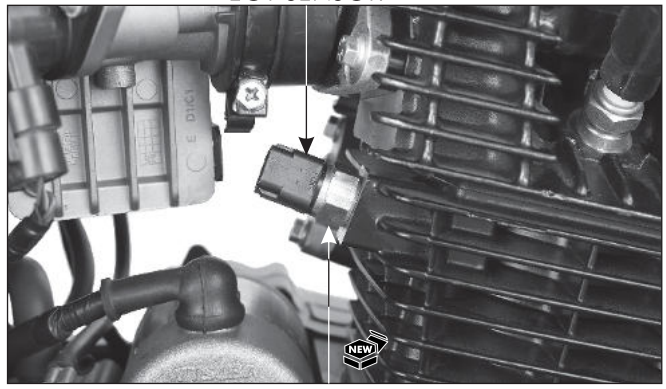
2P CONNECTOR

Remove the EOT sensor and sealing washer.

NOTE

Replace the EOT sensor when the engine is cold.

EOT SENSOR



SEALING WASHER

INSPECTION

NOTE

Keep all flammable materials away from the electric heating element.

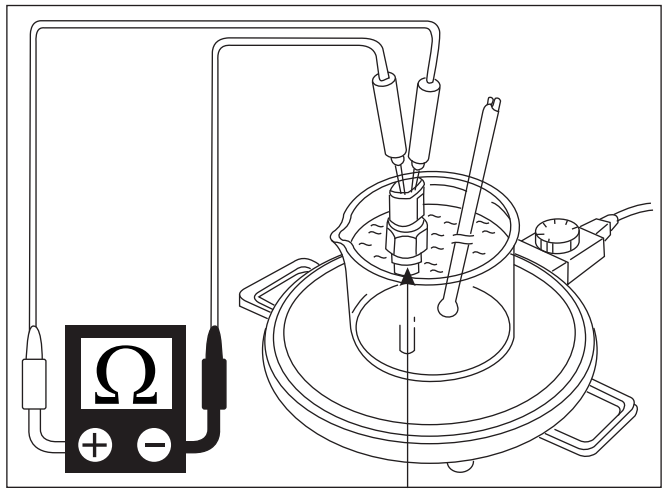
Suspend the EOT sensor in a pan of pure coolant and distilled water (50-50 mixture) on an electric heating element and measure the resistance at the EOT sensor terminals as the coolant heats up.

NOTE

- Soak the EOT sensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect reading. Do not let the thermometer or EOT sensor touch the pan.
- Measure the resistance at the EOT sensor terminals as shown.

TEMPERATURE	20°C (68°F)	100°C (212°F)
RESISTANCE	2.645± 5% kΩ	0.2156±2.5% kΩ

If the resistance is out of specification at any temperature listed, replace the EOT sensor.



EOT SENSOR

INSTALLATION

NOTE

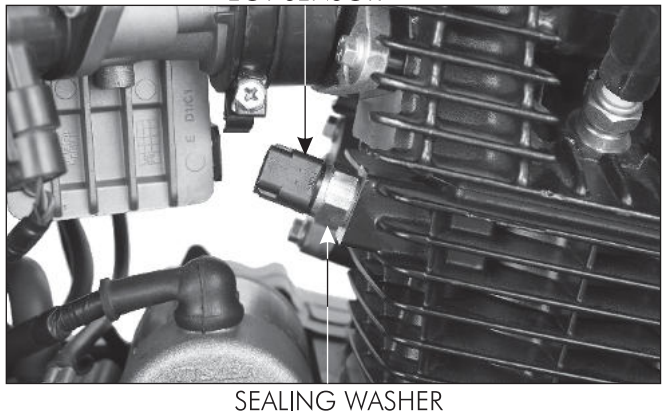
Always replace a sealing washer with a new one.

Install the new sealing washer and EOT sensor. Tighten the EOT sensor to the specified torque.

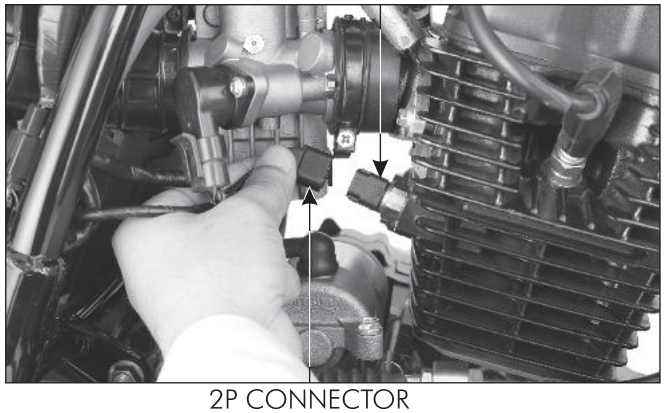
TORQUE

EOT SENSOR: : 1.45 kgf-m

EOT SENSOR


SEALING WASHER

EOT SENSOR


2P CONNECTOR

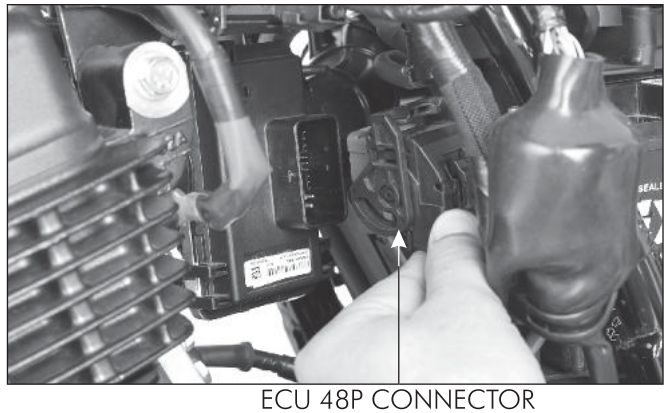
Connect the EOT sensor 2P connector.

Install the fuel tank cover (page 2-5).

BANK ANGLE SENSOR (BAS)

NOTE

- This is a safety related control provided to minimize the damage in case of an accident by shutting down all engine operations.
- Bank angle sensor is integrated inside ECU.



ECU 48P CONNECTOR

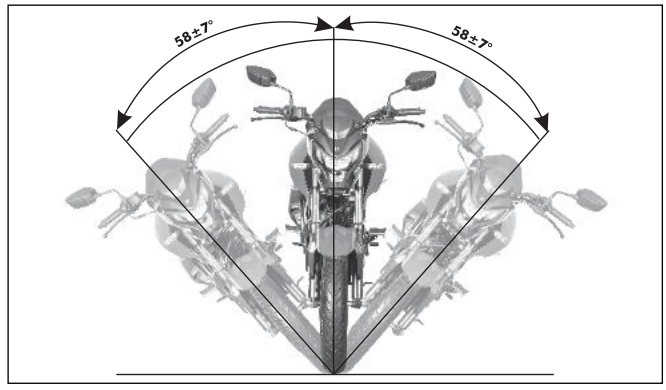
INSPECTION

Turn the ignition switch "ON" and start the engine.

Tilt the motorcycle to the right or left side in the range of 58±7°.

NOTE

To restart the engine bring the motorcycle to up-right position. Turn the ignition switch to "OFF" and then "ON".



PURGE VALVE

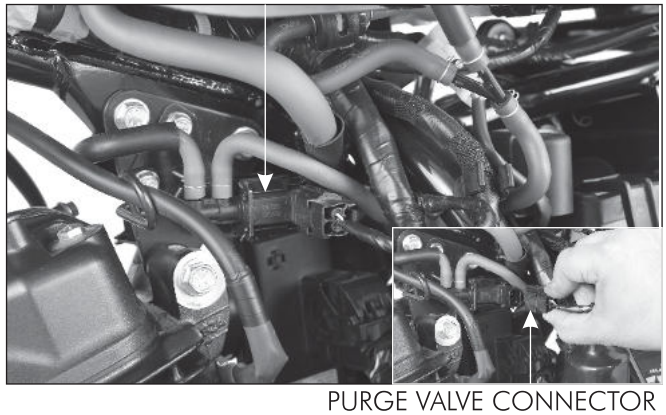
REMOVAL

Remove the fuel tank cover (page 2-5).

Disconnect the purge valve 2P connector.

Remove the purge hose from the canister end and the other hose from throttle body purge port.

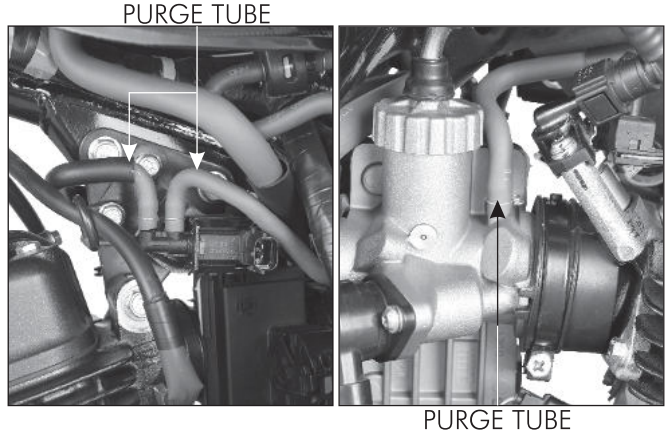
PURGE VALVE



PURGE VALVE CONNECTOR

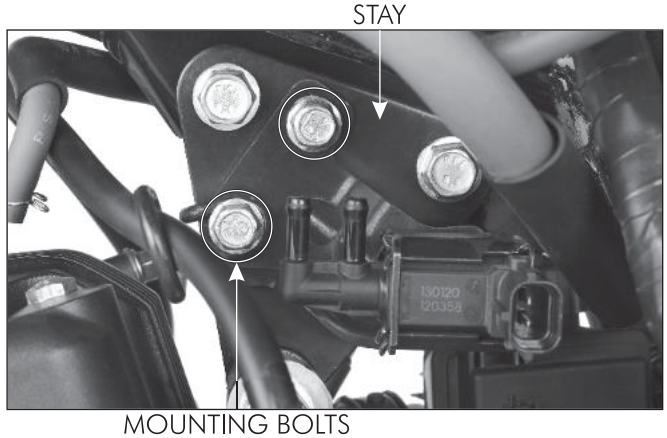
Remove the purge hose from the canister end and the other hose from throttle body purge port.

PURGE TUBE

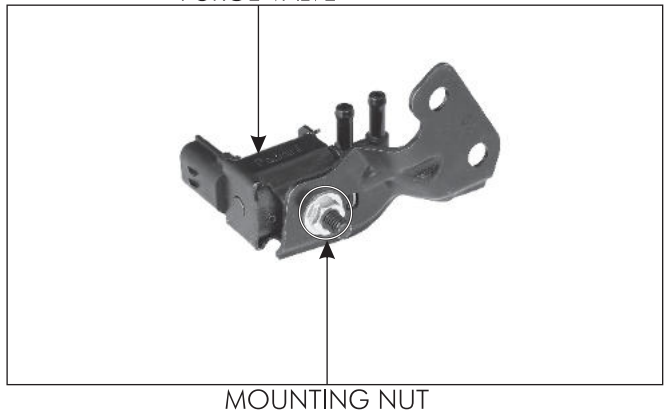


PURGE TUBE

Remove the mounting bolts (2 nos.) and remove the purge valve with the stay.



Remove the mounting nut and purge valve.



INSTALLATION

Installation is in the reverse order of the removal.

INSPECTION

CONNECTION

Light green/Brown-Ground

STANDARD: No continuity

Black/Red-Ground

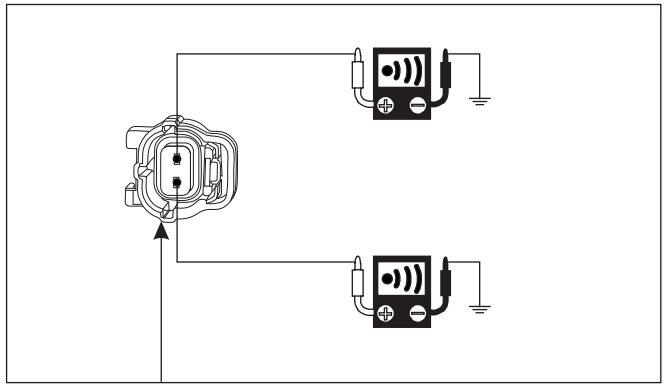
STANDARD: No continuity (ignition switch "ON")

If the no continuity exists, inspect for continuity in black/red from purge valve connector to ECU connector.

If there is continuity, then replace the purge valve.

If there is no continuity, then inspect the following:

- Main fuse (15A)
- Open circuit in Light green/Brown or Black/Red wire
- ECU



CONNECTION

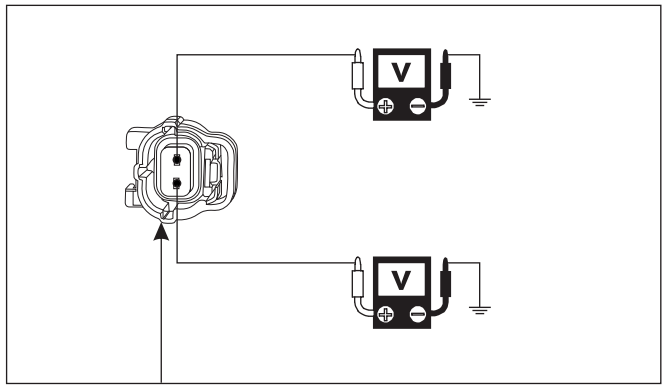
Black/Red-Ground

STANDARD: Battery voltage

If the voltage exists, then replace the purge valve.

If there is no voltage, then inspect the following:

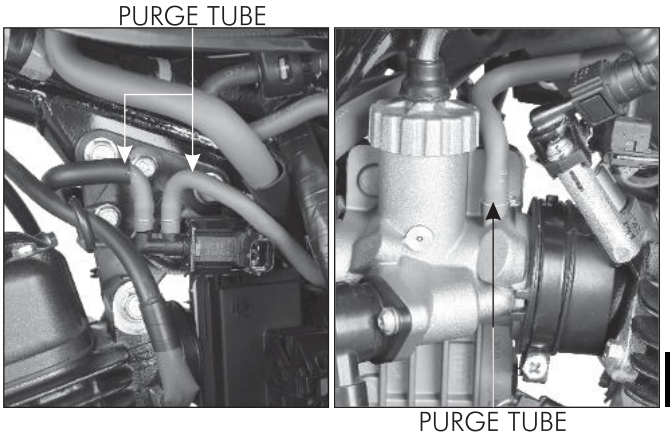
- Main fuse (15A)
- Open circuit in Brown/White or Black/Red wire
- ECU



Remove the fuel tank cover (page 2-5).

Disconnect the purge valve 2P connector.

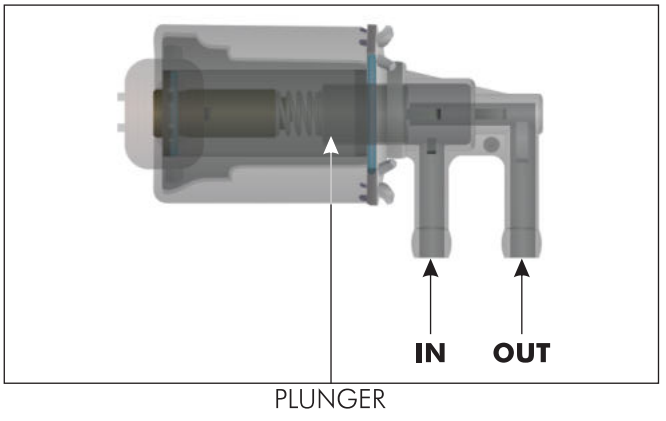
Remove the purge hose from the canister end and the other hose from throttle body purge port.



If a clicking sound is observed, the plunger is operating.

Now, blow air from one end of the tube, the air should flow and it should block when connection are removed.

If the plunger doesn't operate or opens the passage when "ON" or block when "OFF" replace with a new one and check again. If the problem still persists go to the next step.



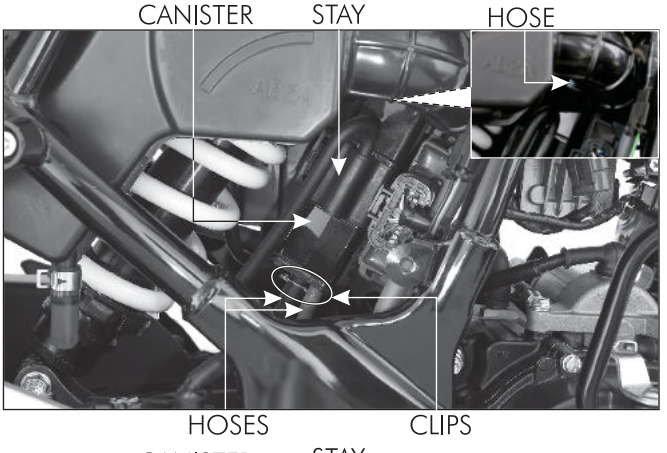
CANISTER

REMOVAL

Remove the fuel tank cover (page 2-5).

Disconnect the hoses by removing the clips.

Pull out the canister from the mounting stay from the right side.



INSPECTION

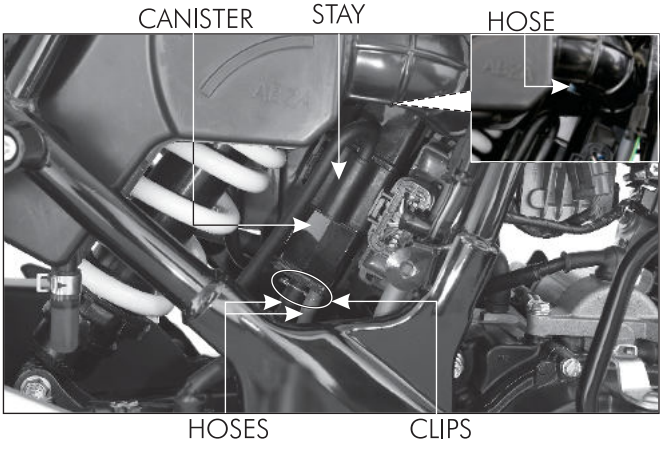
Inspect the hoses for deterioration, damage or loose connections and canister for cracks or other damages.

Check the weight of canister after running the vehicle for certain km, the weight should be reduced to some grams.

Check the weight of canister after parking the vehicle in hot summer day, the weight should be increased to some grams.

INSTALLATION

Installation is in the reverse order of the removal.



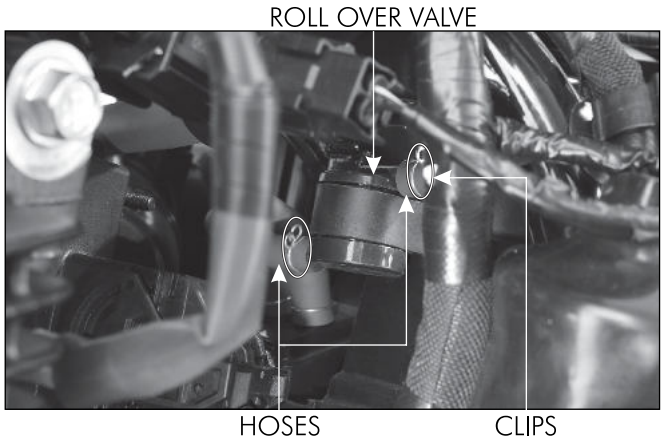
ROLL OVER VALVE

REMOVAL

Remove the fuel tank cover (page 2-5).
Disconnect the hoses by removing the clips.
Remove the roll over valve from the stay.

INSTALLATION

Installation is in the reverse order of the removal.



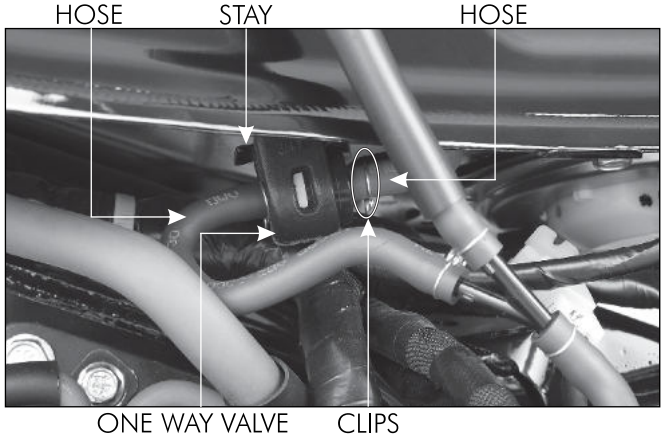
ONE WAY VALVE

REMOVAL

Remove the fuel tank cover (page 2-5).
Disconnect the hoses by removing the clips.
Remove the one way valve from the stay.

INSTALLATION

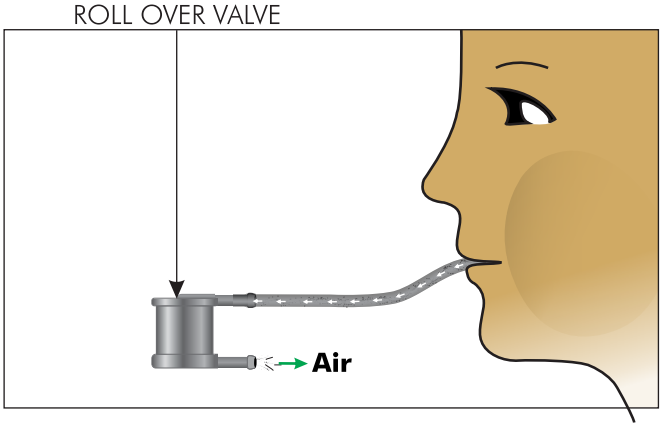
Installation is in the reverse order of the removal.



INSPECTION

(A) ROLL OVER VALVE

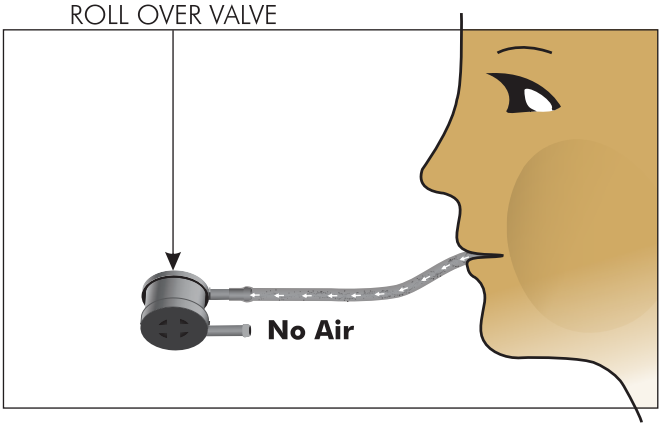
Blow air from one side in upright position and observe if air is coming out from other end or not.



Try the same by turning the roll over valve in 90°, the air should not pass.

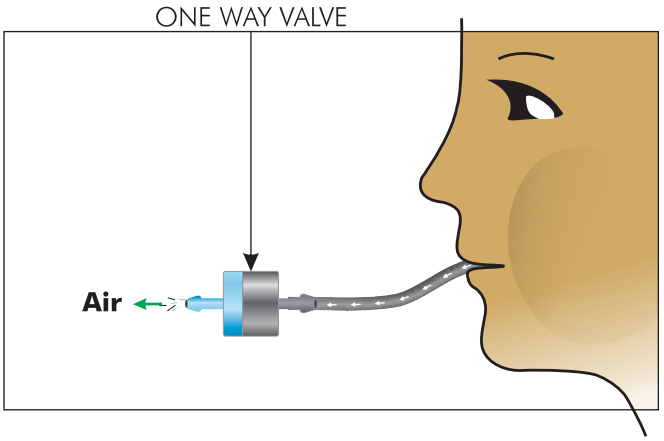
INSTALLATION

Installation is in the reverse order of the removal.

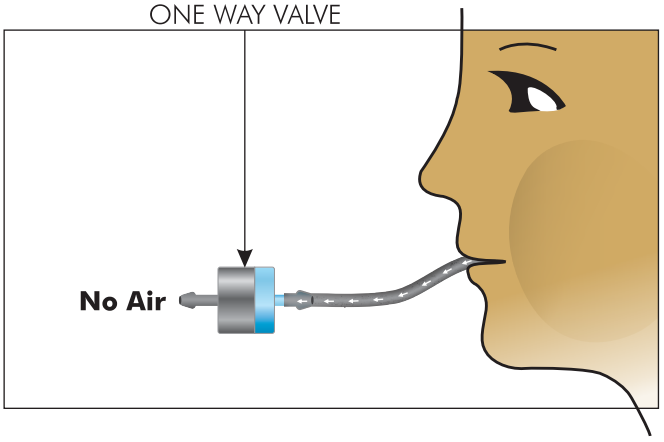


(B) ONE WAY VALVE

Blow air from one side and observe if air is coming out from other end or not. Air should pass in this condition.



Try the same from other side as well-in this case the air should not pass.



INSTALLATION

Installation is in the reverse order of the removal.

MEMO

SYSTEM LOCATION

ENGINE REMOVAL/INSTALLATION

System Location	**6-0**	**Torque Values**	**6-1**
Service Information	**6-1**	**Engine Removal**	**6-2**
Specifications	**6-1**	**Engine Installation**	**6-5**

SERVICE INFORMATION

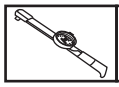
GENERAL

- A floor jack or other adjustable support is required to support the engine.
- The following components require engine removal for service:
  - Crankshaft/transmission
- The following component can be serviced with the engine installed in the frame:
  - Cylinder head
  - Cylinder piston
  - Alternator/starter clutch
  - Electric start motor
  - Clutch
  - Oil strainer
  - Oil filter rotor
  - Oil pump
  - Gearshift linkage
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque.

SPECIFICATIONS

ENGINE REMOVAL/INSTALLATION

ITEM		SPECIFICATIONS
Engine oil capacity	At draining	1.09 litres
	At disassembly	1.3 litres



TORQUE VALUES

FRONT ENGINE HANGER NUT	**: 2.6 kgf-m**
REAR ENGINE HANGER NUT	**: 5.4 kgf-m**
FIXING PLATE BOLTS	**: 1.2 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

ENGINE

REMOVAL

Park the motorcycle on its main stand.

Drain the engine oil (page 3-10).

Remove the following:

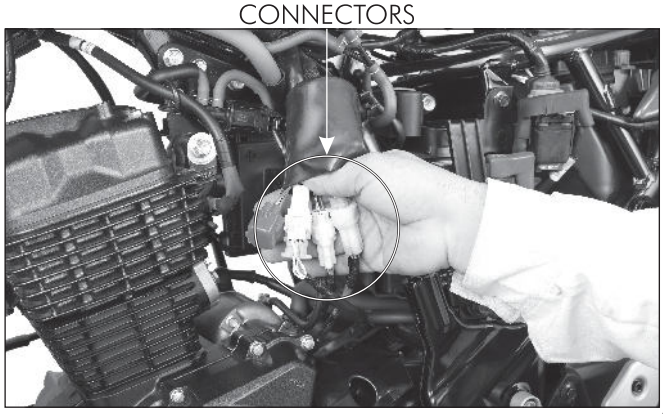
- Leg guard (optional) (page 2-4).
- Fuel tank (page 2-8)
- Horn (page 2-4).
- Clutch cable (page 9-3)
- Noise suppressor cap (page 3-6)

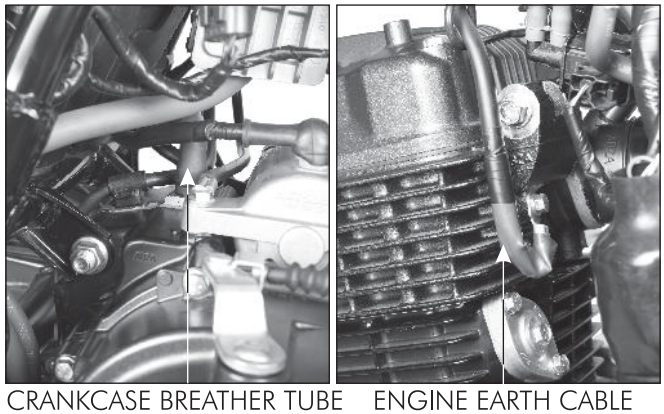
Disconnect the ACG connector, CKP sensor connector, side stand switch wire connector and vehicle speed sensor wire connector.

Disconnect the crankcase breather tube and engine earth cable.

Disconnect the starter motor cable and battery earth cable on starter motor (page 19-4)

CONNECTORS

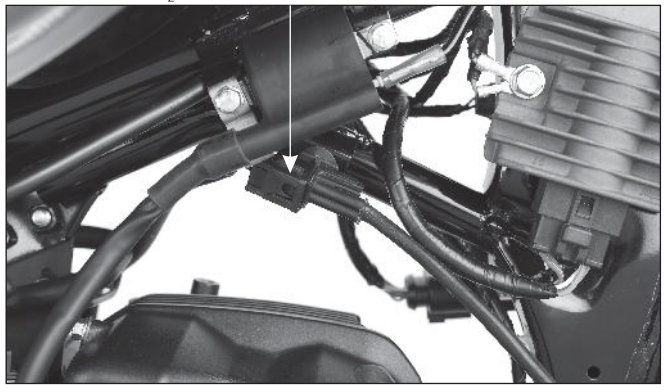




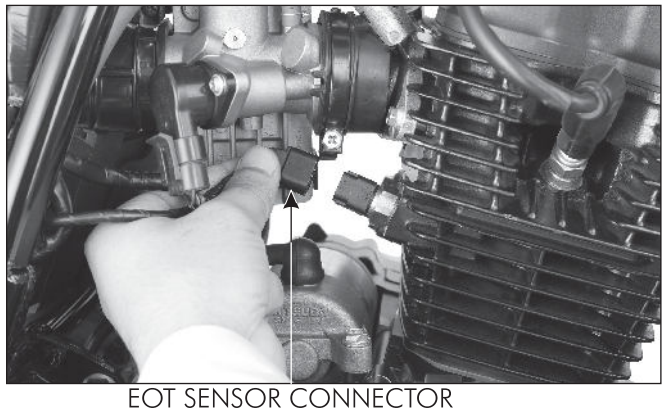
CRANKCASE BREATHER TUBE ENGINE EARTH CABLE

Disconnect the O_2 sensor connector.

O_2 SENSOR CONNECTOR



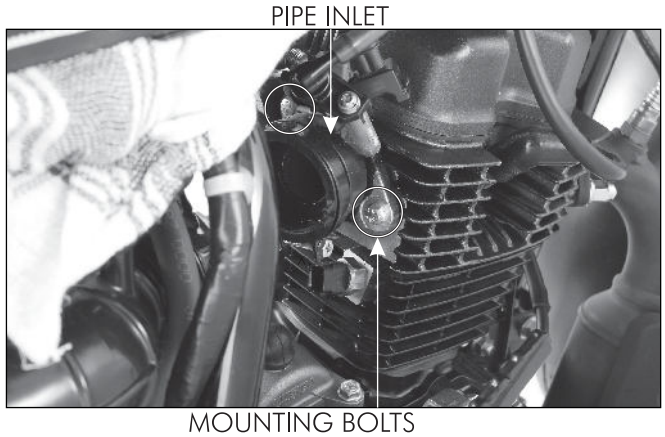
Disconnect the EOT sensor connector.



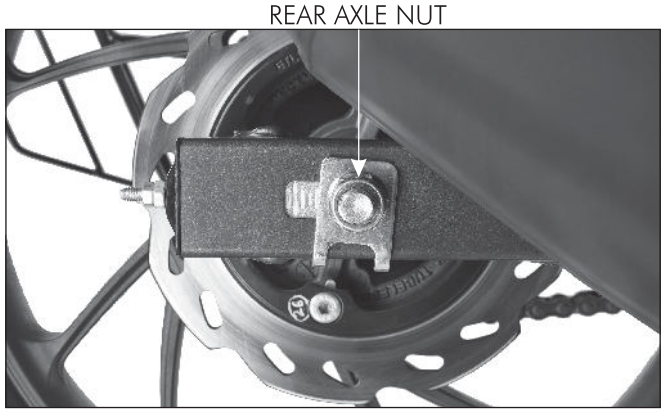
EOT SENSOR CONNECTOR

Remove the throttle body/ECU (page 5-68).

Remove the pipe inlet mounting bolts and insulator (page 5-74).

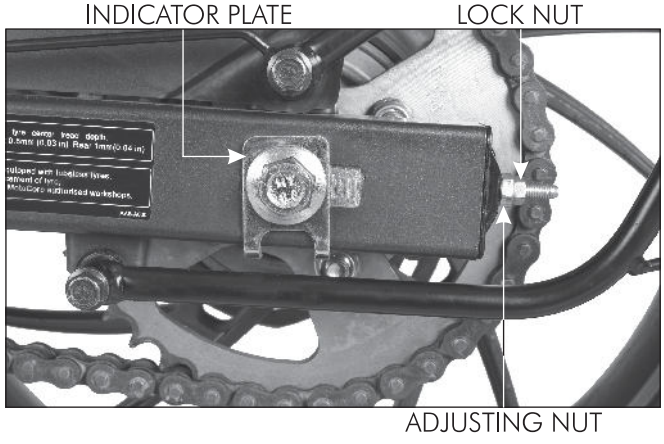


Loosen the rear axle nut.



Loosen the indicator plate, both side drive chain adjusting lock nuts and adjusting nuts.

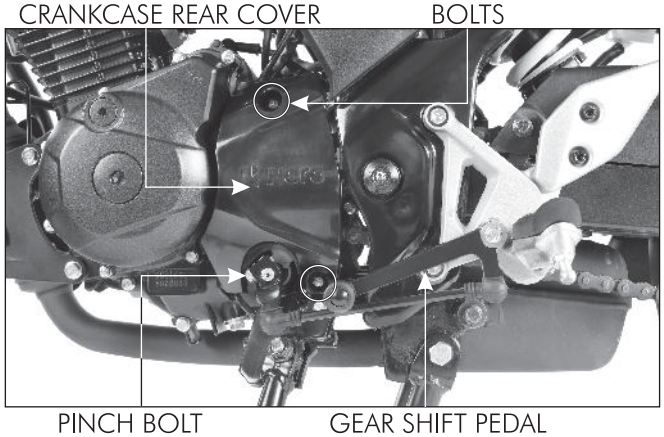
Push the rear wheel forward and slacken the drive chain fully.



Remove the pinch bolt and gear shift pedal.

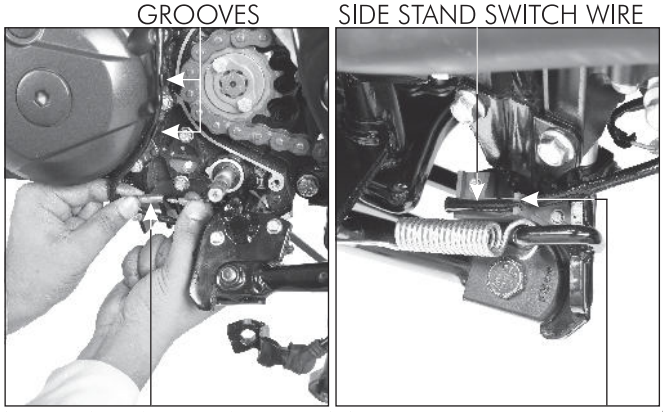
Remove the two left crankcase rear cover bolts and left crankcase rear cover.

Remove the exhaust muffler (page 2-9).

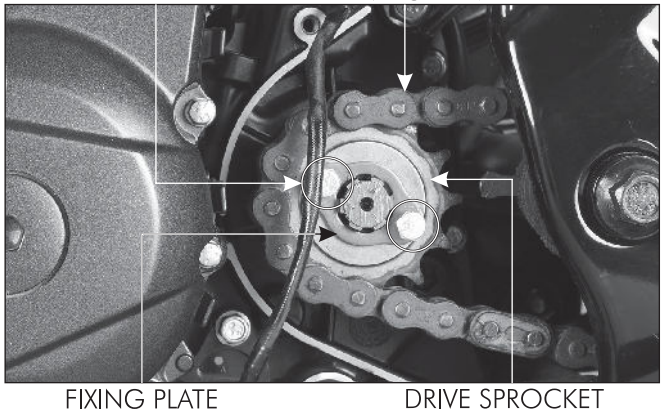


Disconnect the neutral switch wire connector.

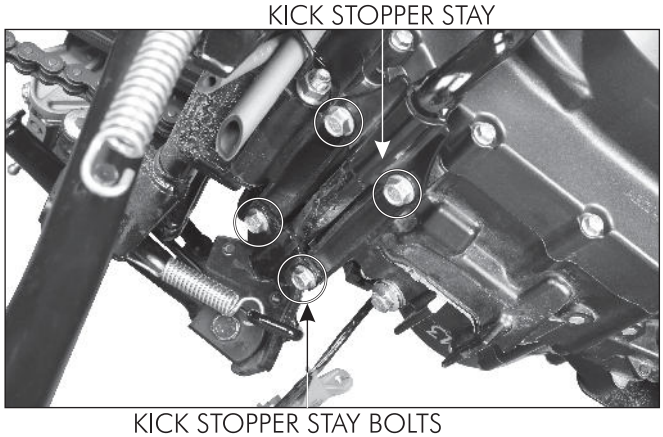
Remove the neutral/side stand switch wire from the grooves and disconnect the side stand switch wire from the guide on side stand switch.



Remove the fixing plate bolts, fixing plate and drive sprocket with chain.



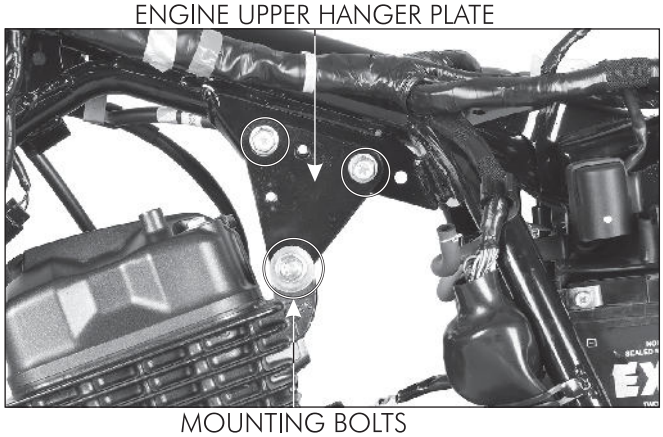
Remove the bolts and kick stopper stay with side stand switch (page 9-3).



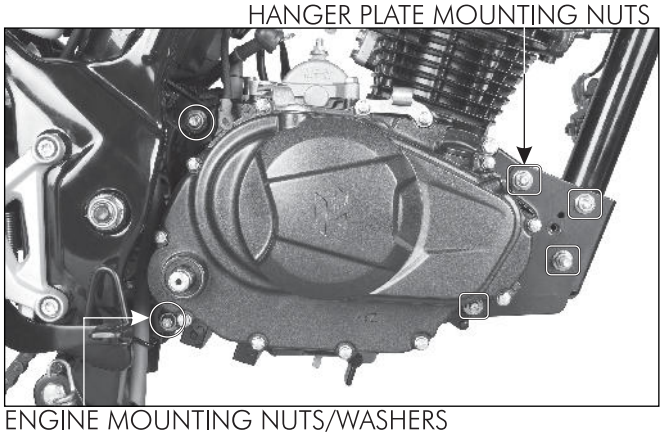
Remove the purge valve (page 5-78).

Remove the engine upper hanger plate mounting bolts.

Remove the engine upper hanger plate.

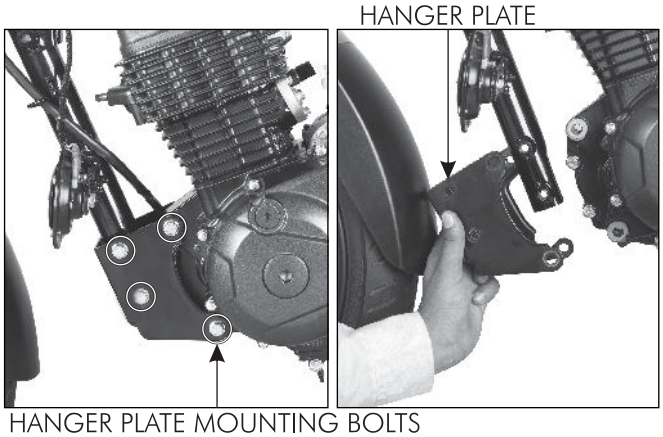


Remove the engine and hanger plate mounting nuts.



ENGINE MOUNTING NUTS/WASHERS

Remove the hanger plate mounting bolts.
Remove the engine hanger plates.

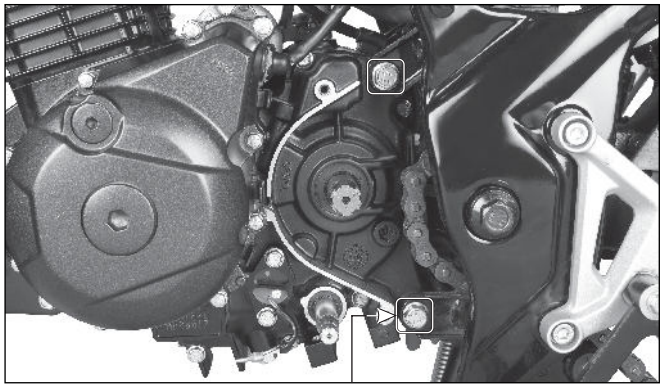


HANGER PLATE MOUNTING BOLTS

Remove the engine mounting bolts.
From the right side of the motorcycle, hold the kick starter pedal and lift it from the frame by slightly sliding it forward/backward and then supporting the engine at the other end by hand.

NOTE

During engine removal, hold the engine securely and be careful not to damage the frame and engine.


ENGINE MOUNTING BOLTS

ENGINE INSTALLATION

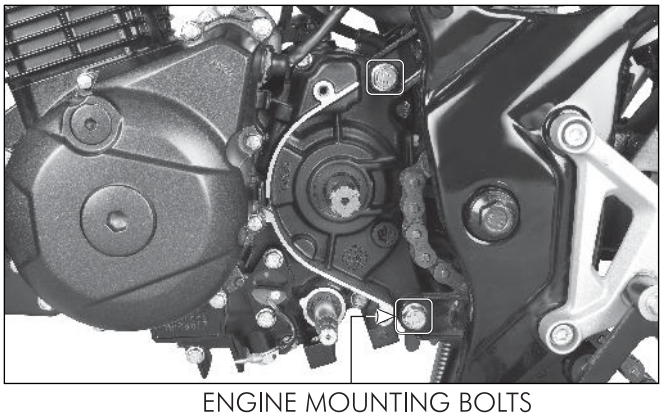
CAUTION

Carefully align the mounting points with the jack to prevent damage to engine, frame, wires and cables.

NOTE

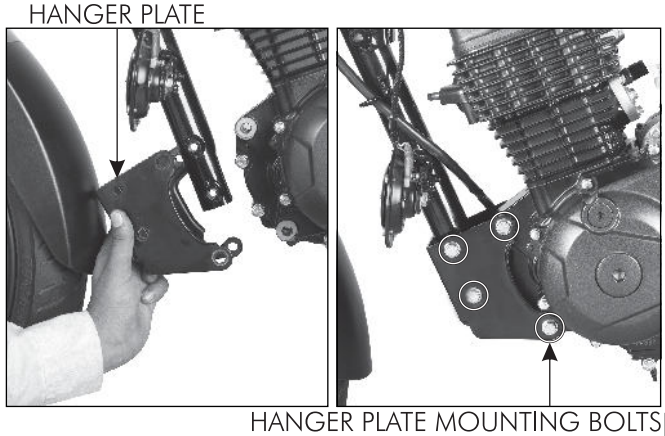
- Install and hand tighten the engine mounting bolts then tighten them to the specified torque.
- During engine installation, hold the engine securely and be careful not to damage the frame and engine.

Place the engine on the frame and carefully align the bolt holes in the frame and engine.
Install the engine and mounting bolts.


ENGINE MOUNTING BOLTS

Install the engine hanger plates.
Install the hanger plate mounting bolts.

HANGER PLATE

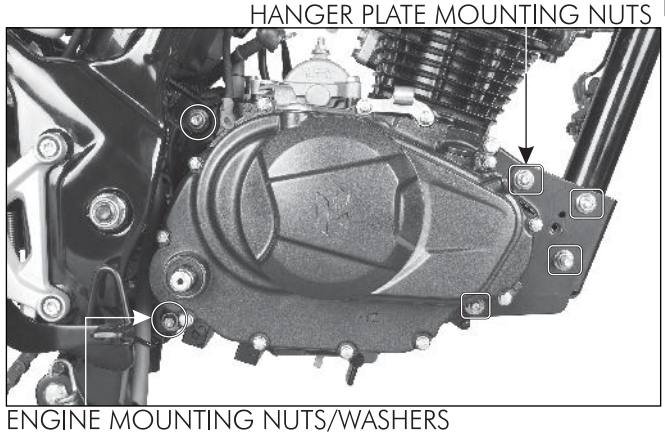


HANGER PLATE MOUNTING BOLTS

HANGER PLATE MOUNTING NUTS

Install and tighten the engine and hanger plate mounting nuts/washers.

TORQUE
FRONT ENGINE HANGER BOLT/NUT: 2.6 kgf-m
REAR ENGINE HANGER BOLT/NUT: 5.4 kgf-m



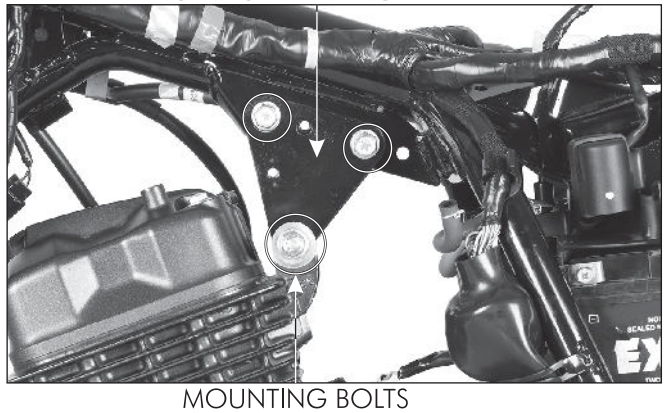
ENGINE MOUNTING NUTS/WASHERS

ENGINE UPPER HANGER PLATE

Install the engine upper hanger plate.
Install the engine upper hanger plate mounting bolts.

TORQUE
ENGINE UPPER HANGER BOLT: 2.6 kgf-m

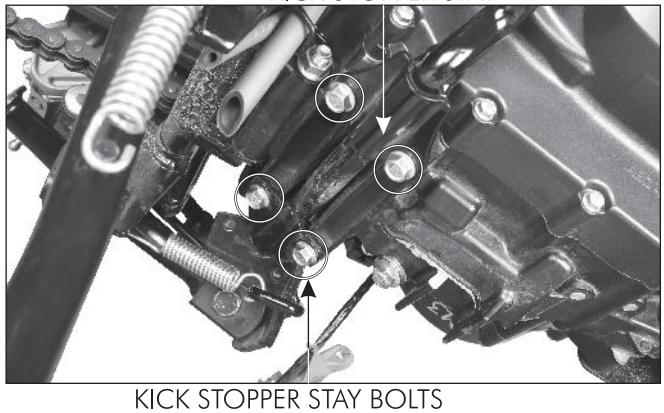
Install the purge valve (page 5-79).



MOUNTING BOLTS

KICK STOPPER STAY

Install the kick stopper stay and bolts with side stand (page 9-5).

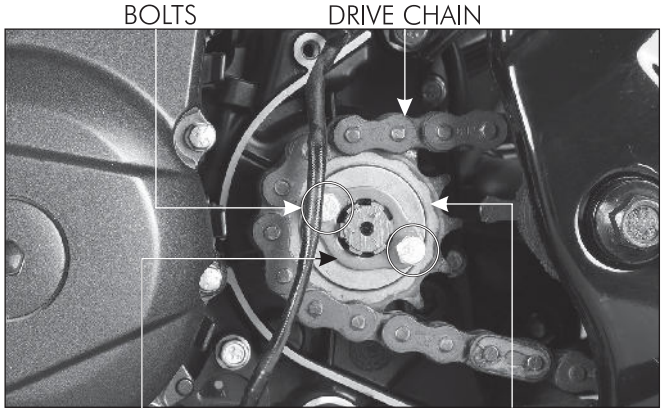


KICK STOPPER STAY BOLTS

Install the fixing plate bolts, fixing plate and drive sprocket with drive chain.

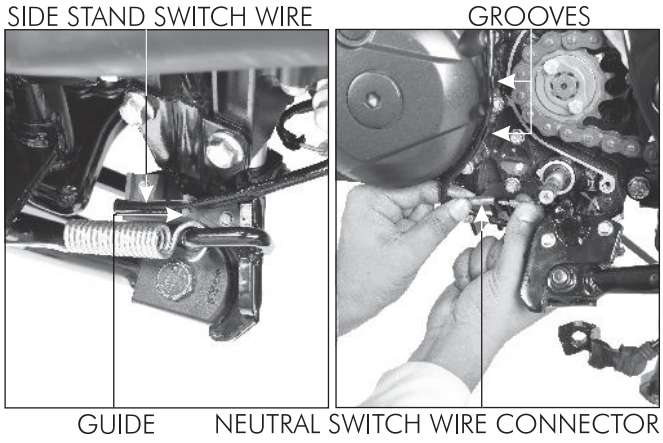
TORQUE

FIXING PLATE BOLTS: 1.2 kgf-m



Route the side stand switch wire to the guide on side stand switch and route the neutral/side stand switch wire properly on the grooves in the left crankcase cover.

Connect the neutral switch wire connector.



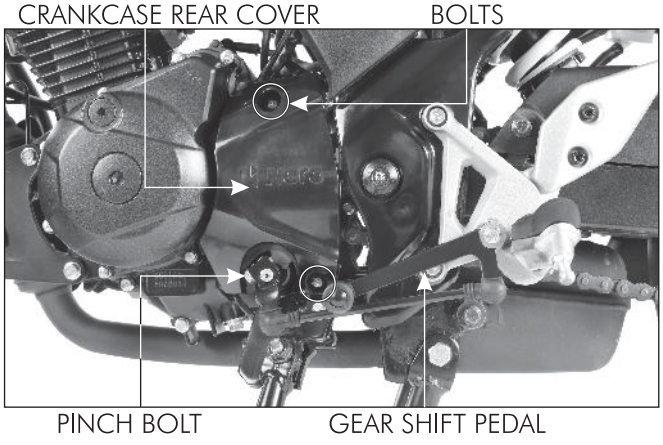
Install the exhaust muffler (page 2-9).

Install the left crankcase rear cover and left crankcase rear cover bolts.

Install the gear shift pedal.

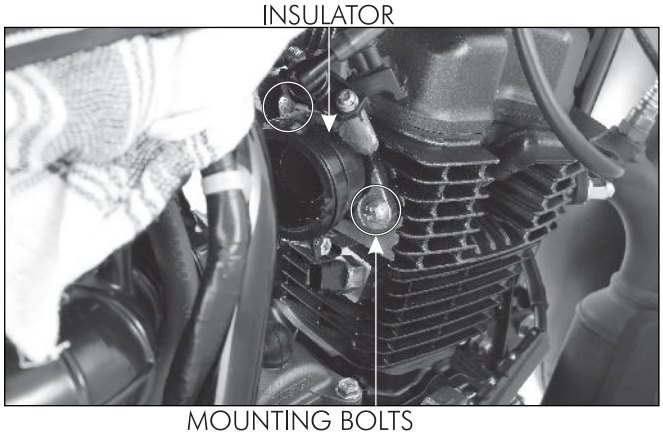
Install and tighten the pinch bolt.

Inspect and adjust the drive chain slack (page 3-12).

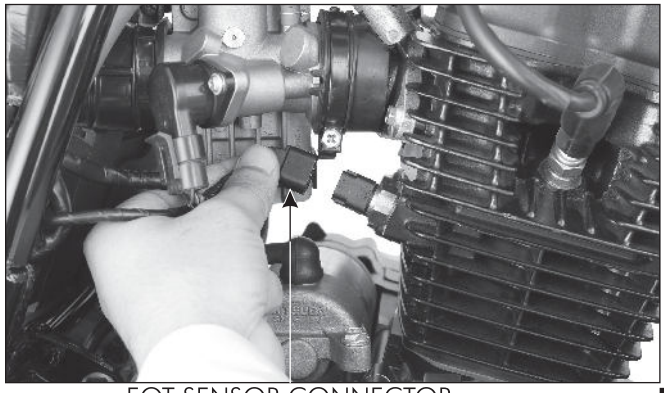


Install and tighten the insulator mounting bolts.

Install the throttle body/ECU (page 5-70).



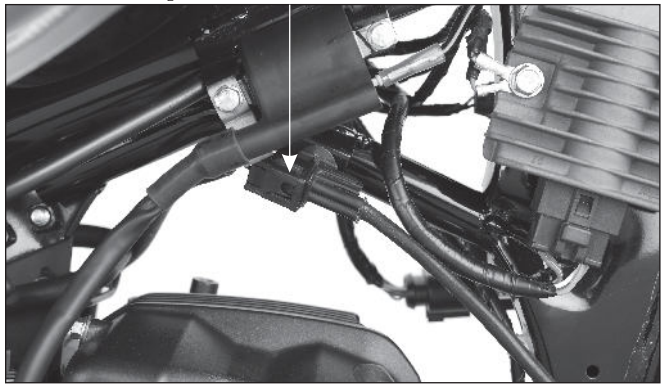
Connect the EOT sensor connector.



EOT SENSOR CONNECTOR

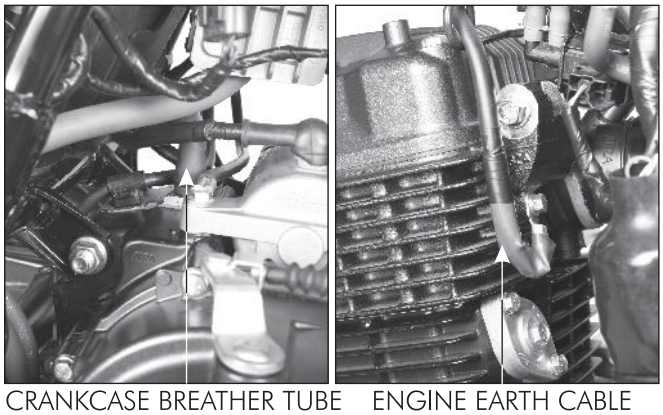
O_2 SENSOR CONNECTOR

Connect the O_2 sensor connector.



Connect the starter motor cable and battery earth cable to the starter motor (page 19-8).

Connect the crankcase breather tube and engine earth cable.



CRANKCASE BREATHER TUBE ENGINE EARTH CABLE CONNECTORS

Connect the ACG connector, CKP sensor connector, side stand switch wire connector and vehicle speed sensor wire connector.

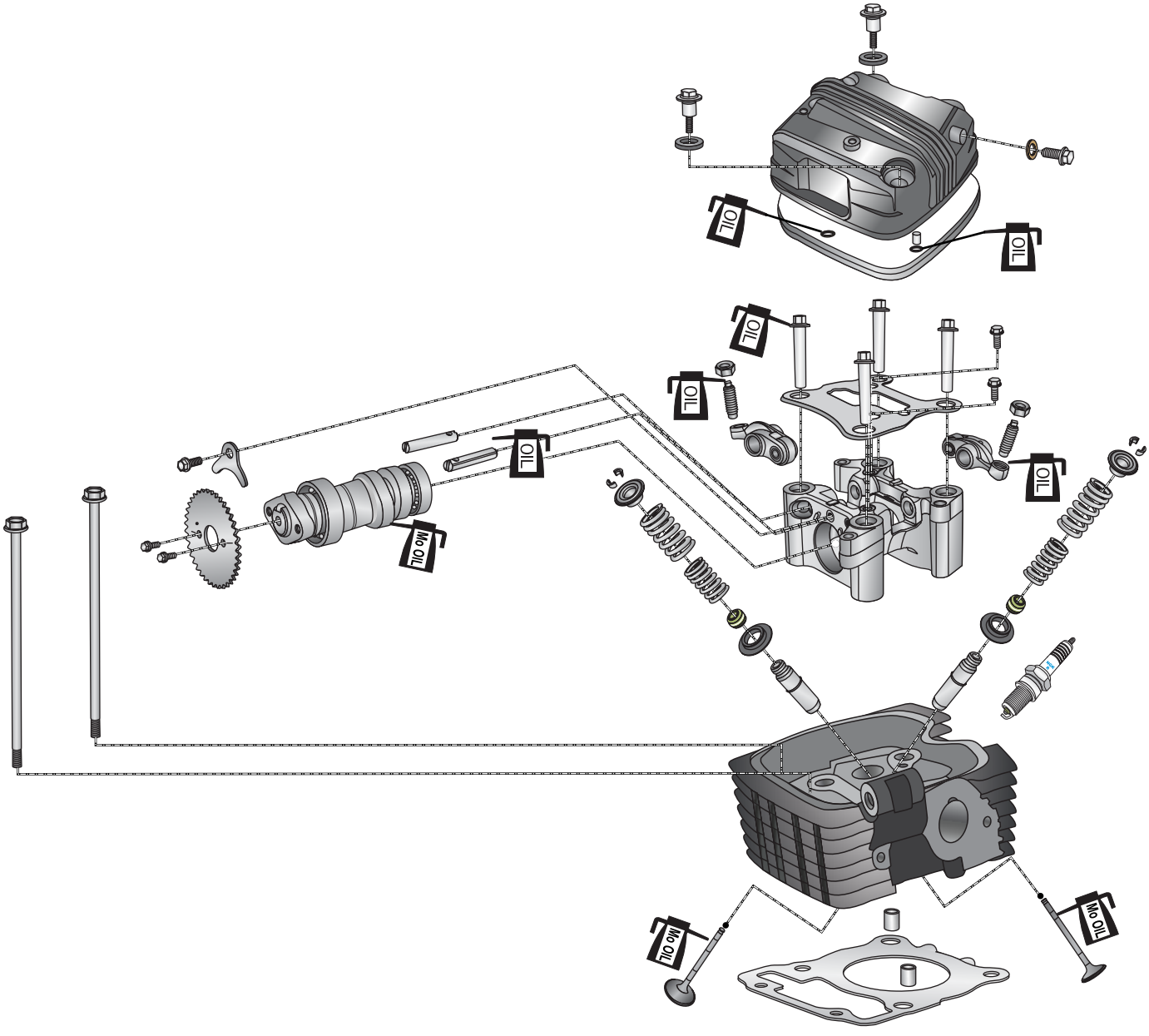
Install the following:

- Noise suppressor cap (page 3-6).
- Clutch cable (page 9-5).
- Horn (page 2-4).
- Fuel tank (page 2-9)
- Leg guard (optional) (page 2-4).

Fill the crankcase with recommended engine oil to the proper level (page 3-10).

MEMO

SYSTEM DIAGRAM



System Diagram	7-0	Cylinder Head Removal	7-6
Service Information	7-1	Camshaft Holder Disassembly	7-9
Specifications	7-1	Camshaft Holder Assembly	7-11
Torque Values/Special Tools	7-2	Cylinder Head Disassembly	7-12
Troubleshooting	7-2	Valve Guide Replacement	7-15
Cylinder Compression	7-3	Cylinder Head Installation	7-21
Cylinder Head Cover	7-4		

SERVICE INFORMATION

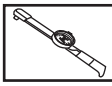
GENERAL

- The cylinder head can be serviced with the engine installed in the fame..
- The camshaft can be serviced with the engine installed on the fame.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with clean solvent and dry them using compressed air before inspection.
- When installing camshaft, apply molybdenum disulfide oil to the cam lobes and journals.
- Camshaft lubricating oil is fed through oil passages in the cylinder head cover and camshaft holder. Clean the oil passages before assembling the cylinder head and camshaft holder.

SPECIFICATIONS

CYLINDER HEAD/VALVES

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			12.0±2.0 kgf/cm^2	-
Valve clearance		Intake	0.12 mm	-
		Exhaust	0.13 mm	-
Camshaft cam lobe height		Intake	33.590-33.790mm	33.55 mm
		Exhaust	33.458-33.6581 mm	33.42 mm
Cylinder head warpage			-	0.1 mm
Rocker arm	I.D		10.000-10.015 mm	10.06 mm
	Shaft O.D		9.972-9.987 mm	9.95 mm
	Rocker arm-to-shaft clearance		-	0.11 mm
Valve	Stem O.D	Intake	4.975-4.990 mm	4.945 mm
		Exhaust	4.955-4.970 mm	4.925 mm
	Guide I.D	Intake	5.000-5.012 mm	5.03 mm
		Exhaust	5.000-5.012 mm	5.03 mm
	Stem-to-guide clearance	Intake	0.010-0.037 mm	0.08 mm
		Exhaust	0.025-0.057 mm	0.10 mm
	Spring free length	Inner	37.78 mm	36.78 mm
Valve seat width			1.1-1.2 mm	1.5 mm
Specified height of inlet valve guide			18.0±0.1 mm	-
Specified height of exhaust valve guide			14.25±0.1 mm	-

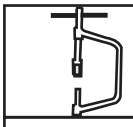
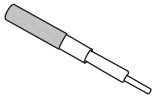


TORQUE VALUES

CYLINDER HEAD COVER BOLT	**:1.0 kgf-m**
CAM SPROCKET BOLT	**:0.9 kgf-m**
INSULATOR BOLTS	**: 1.0 kgf-m**
CAMSHAFT HOLDER SPECIAL NUTS	**: 3.2 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values (**SECTION-1**).

TOOL **SPECIAL TOOLS**

	**VALVE SPRING COMPRESSOR PART NO: 070 HH 198 005**
	**VALVE GUIDE REMOVER PART NO: 070 HH 198 010**

TROUBLESHOOTING

- Engine top- end problems usually affect engine performance. These can be diagnosed by a compression test or leak down test or by tracing noises at the top- end with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky check for a seized piston ring.

Compression too low, hard starting or poor performance at low speed

- Valves
  - Incorrect valve clearance
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- faulty cylinder or piston (**SECTION-8**)

Compression too high

- excessive carbon built- up on piston or Combustion chamber

Rough idle

- low cylinder compression

Excessive smoke

- worn valve stem or valve guide
- damaged stem seal
- faulty cylinder or piston (**SECTION-8**)

Excessive noise

- incorrect valve clearance
- sticking valve or broken valve spring
- worn or damaged camshaft
- worn or damaged rocker arm and/or shaft
- worn or damaged cam sprocket teeth
- loose or worn cam chain
- worn or damaged cam chain tensioner
- loose spark plug
- faulty cylinder or piston (**SECTION-8**)
- faulty connecting rod, crankshaft or Transmission (**SECTION-11**)

CYLINDER COMPRESSION

⚠ WARNING

- If the engine must be running to do some work, make sure that the area is well-ventilated. Never run the engine in an enclosed area.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.

Warm up the engine to normal operating temperature (40°C to 60°C).

Ten minutes of stop-and-go riding is sufficient.

Stop the engine, disconnect the noise suppressor cap.

Remove the spark plug.

Install the compression gauge in the spark plug hole.

Shift the transmission in neutral.

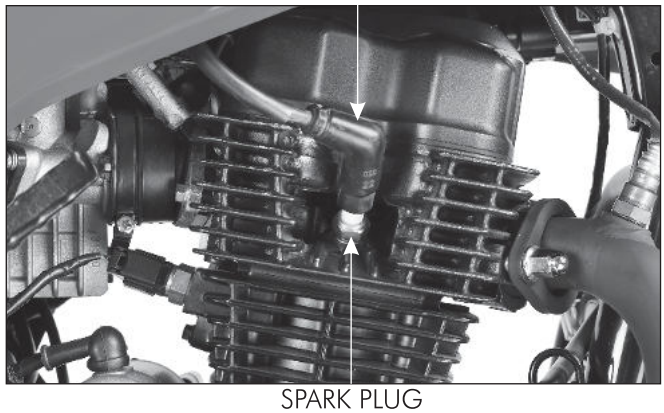
Check choke lever operation.

Open the throttle all the way and crank the engine with the kick starter until the gauge reading stops rising.

Repeat the same procedure 5-6 times.

Take average of three readings.

NOISE SUPPRESSOR CAP



SPARK PLUG

COMPRESSION PRESSURE:

12.0±2.0kgf/cm²

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown. Usage of improper head gasket of less thickness or cylinder head facing also leads to high compression.

If compression is low, pour 3-5 ml of clean engine oil into the cylinder through the spark plug hole and recheck the compression.

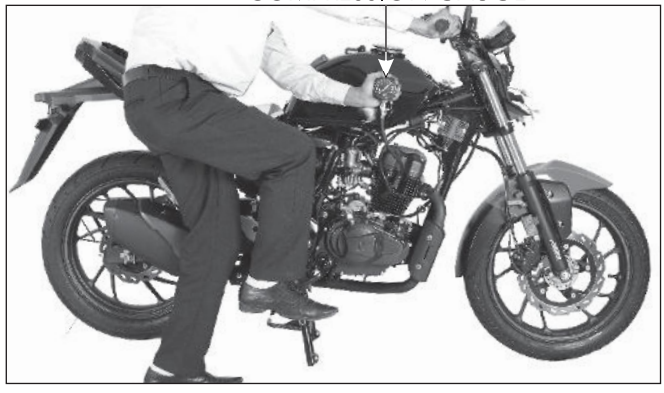
If the compression increases from the previous value, check the cylinder, piston and piston rings.

- Leaking cylinder head gasket/warped cylinder head
- Worn piston ring
- Worn cylinder and piston

If the compression is the same as the previous value, check the valves for leakage. Other reasons may be:

- Improper valve adjustment
- Air filter blockage
- Damage spark plug seat
- Pressure leakage at valve seats
- In correct valve timing/valve stem sticky movement

COMPRESSION GAUGE

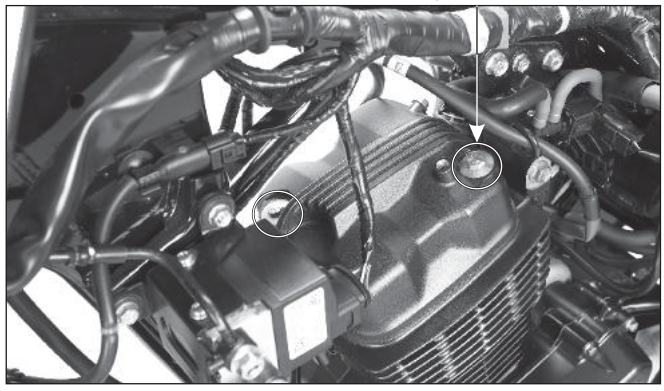


CYLINDER HEAD COVER

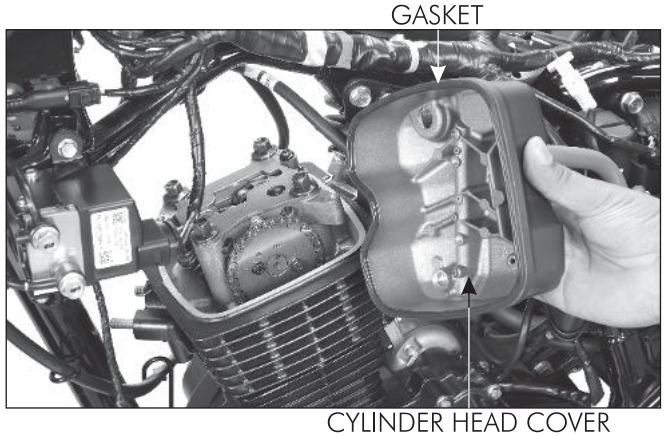
REMOVAL

Remove the fuel tank (page 2-8).

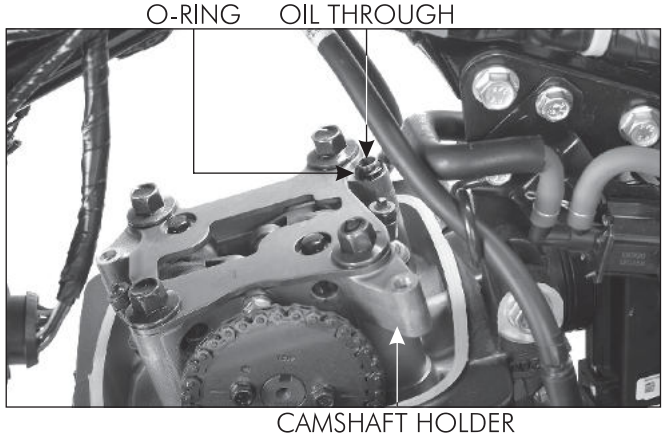
Remove the cylinder head cover mounting bolts/rubber washers.



Remove the cylinder head cover and cover gasket.



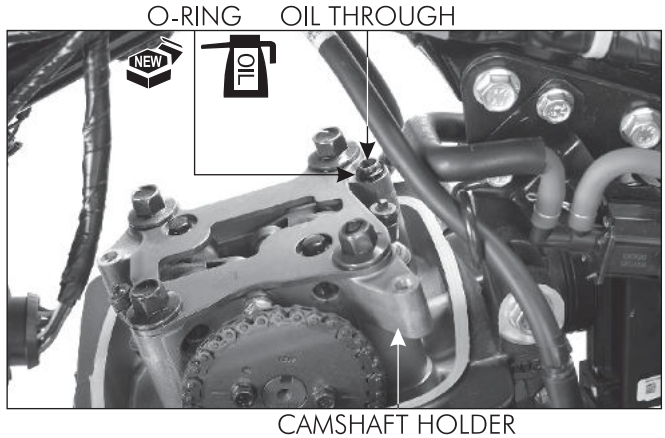
Remove the oil through and O-ring from the camshaft holder.



INSTALLATION

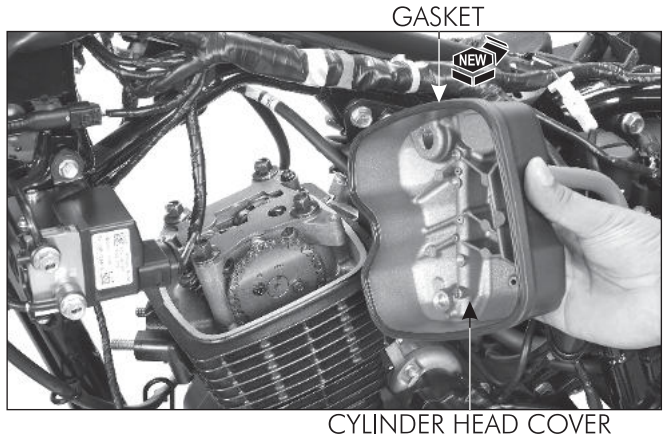
Apply clean engine oil to a new O-ring.

Install the oil through and O-ring to the camshaft holder.

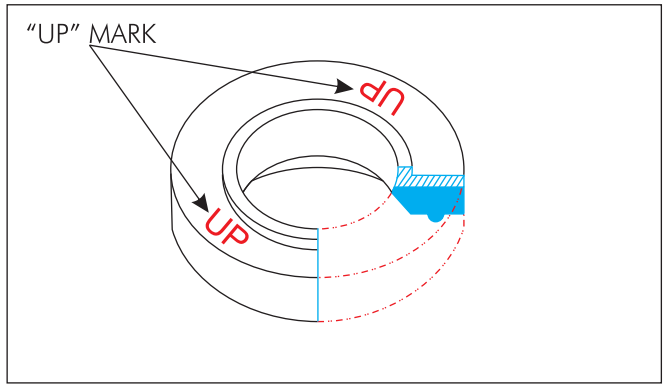


Install a new cylinder head cover gasket into the cylinder head cover groove.

Install the cylinder head cover onto the cylinder head.

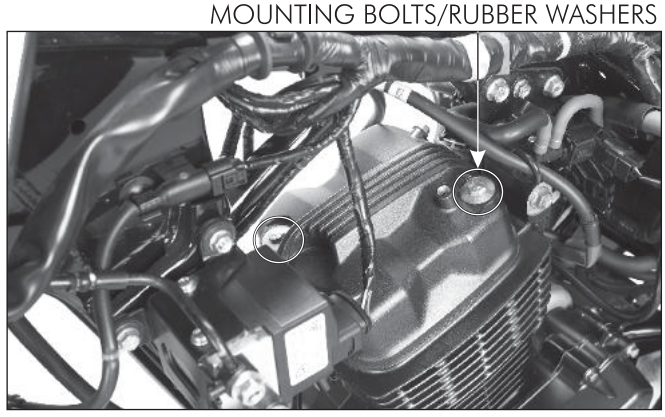


Install the rubber washer to the cylinder head cover with their "UP" mark facing up.



Install the cylinder head cover mounting bolts/rubber washers.

Tighten the cylinder head cover bolts to the specified torque.



TORQUE

CYLINDER HEAD COVER BOLT: 1.0 kgf-m

Install the fuel tank (page 2-9).

CYLINDER HEAD

REMOVAL

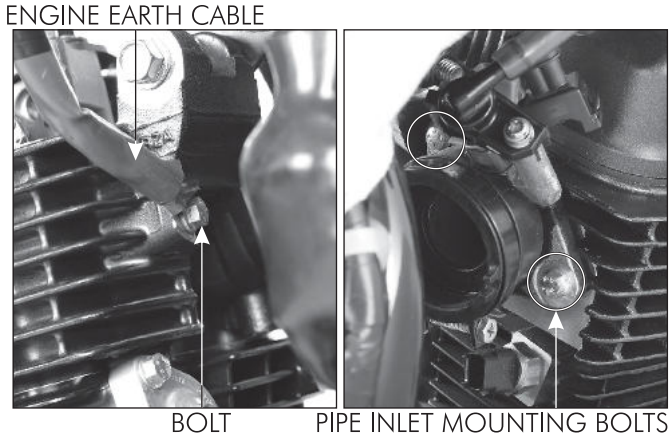
Remove the following:

- Cylinder head cover (7-4).
- Engine earth cable by removing the bolt.
- Noise suppressor cap (page 3-6).
- Exhaust muffler (page 2-9).
- Throttle body/ECU (page 5-68).

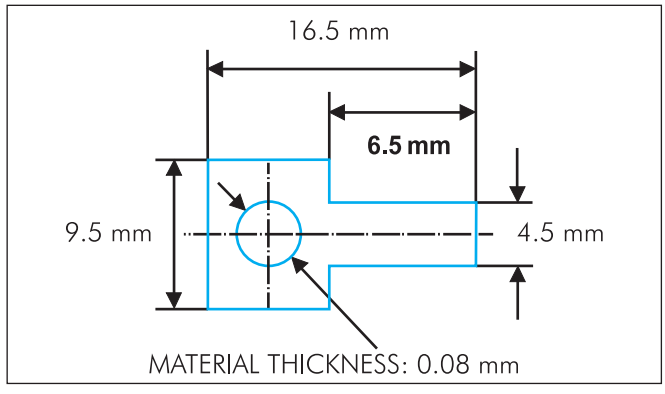
Loosen the spark plug (page 3-6).

Remove the pipe inlet mounting bolts and O-ring (page 5-74).

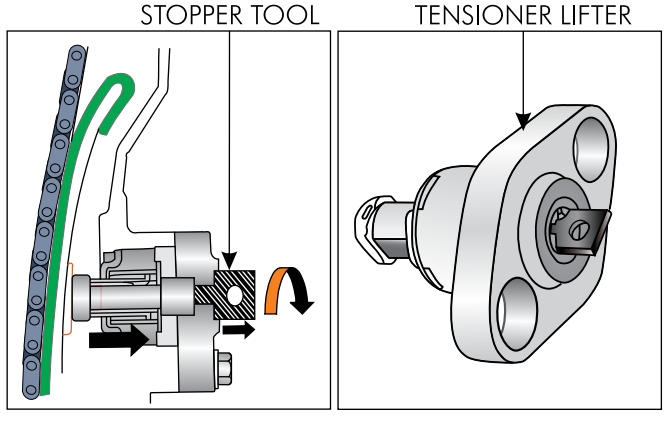
Remove the cam chain tensioner lifter bolt and O-ring.



Make a tensioner shaft stopper tool out of a thin piece of steel (0.8 mm thickness) using the diagram.



Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.



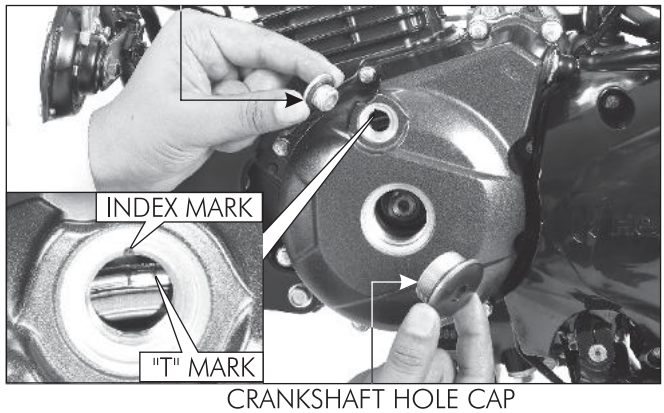
Remove the crankshaft hole cap and timing hole cap.

Rotate the crankshaft counterclockwise and align the"T" mark on the flywheel with the index mark on the left crankcase cover.

Make sure that the piston is at TDC (Top Dead Centre) on the compression stroke. (Both inlet and exhaust rocker arms should be free in this condition.)

If the rocker arms are not free, it is because the piston is moving through the exhaust stroke to TDC. Rotate the crankshaft one full turn and the match the "T" mark again.

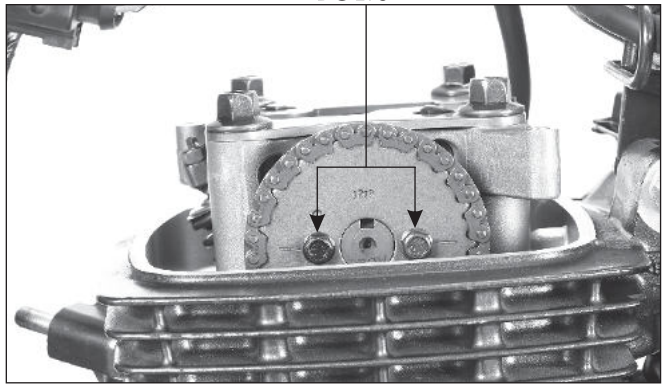
TIMING HOLE CAP



CRANKSHAFT HOLE CAP

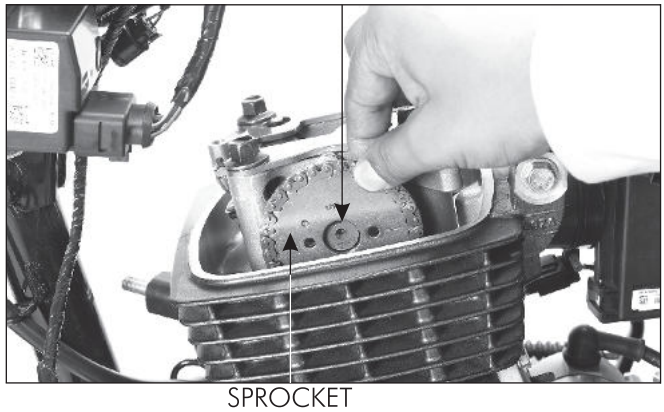
Remove the cam sprocket bolts.

BOLTS



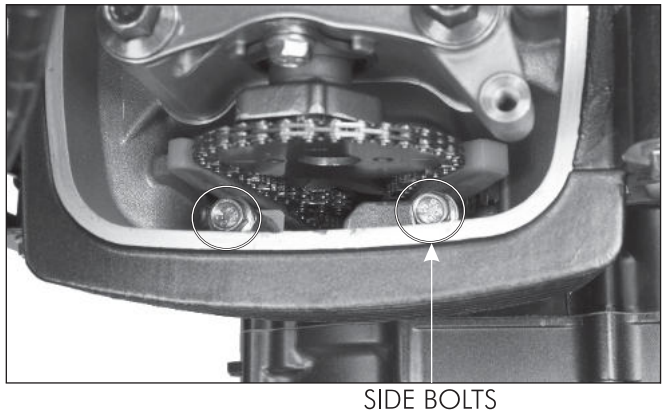
Remove the cam sprocket off the camshaft flange.

CAMSHAFT FLANGE



SPROCKET

Remove the two cylinder head side bolts.

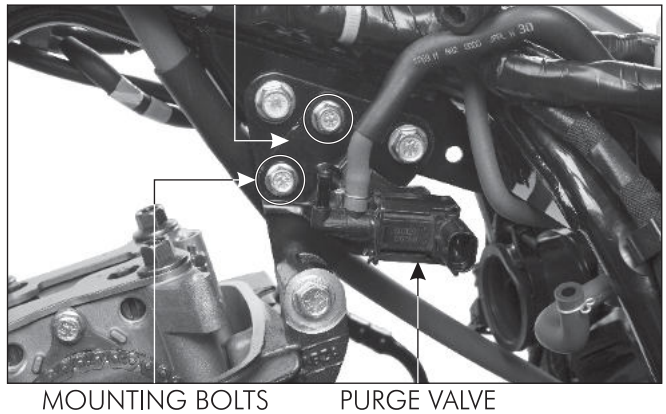


SIDE BOLTS

Disconnect the purge valve 2P connector (page 5-78).

Remove the purge valve stay with purge valve by removing the mounting bolts as shown.

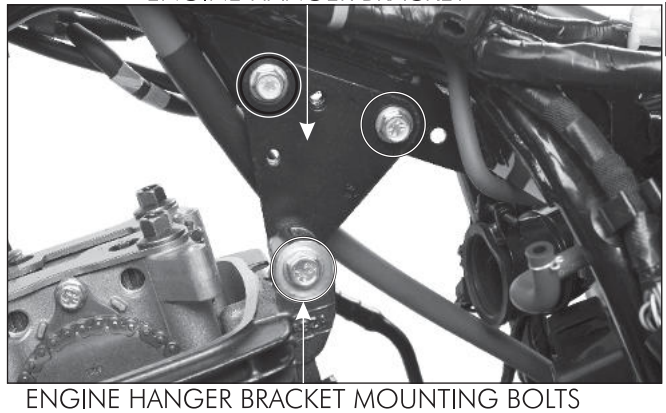
PURGE VALVE STAY



MOUNTING BOLTS PURGE VALVE

Remove the engine hanger bracket mounting bolts and engine hanger bracket.

ENGINE HANGER BRACKET



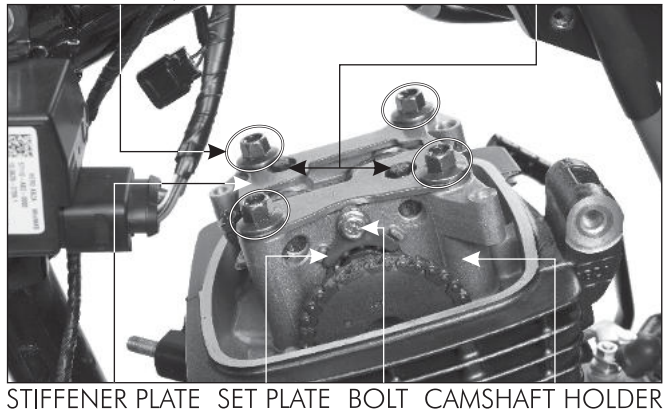
ENGINE HANGER BRACKET MOUNTING BOLTS

Loosen the camshaft set plate bolt.

Loosen the rocker arm shaft bolts.

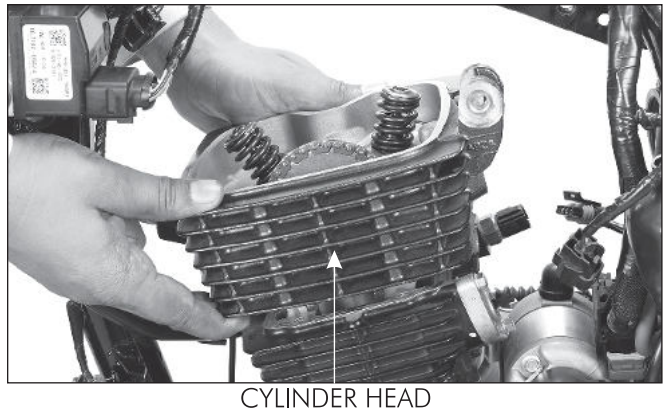
Remove the four special nuts, stiffener plate and camshaft holder.

SPECIAL NUTS/WASHERS ROCKER ARM SHAFT BOLTS



STIFFENER PLATE SET PLATE BOLT CAMSHAFT HOLDER

Remove the cylinder head.

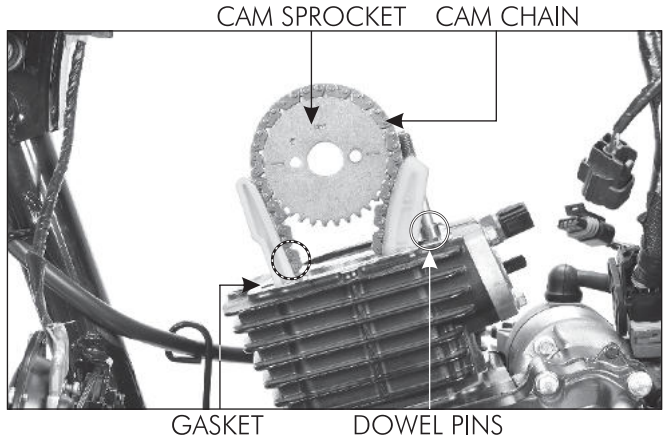


CYLINDER HEAD

Remove the cam sprocket from the cam chain.
Remove the gasket and dowel pins.

NOTE

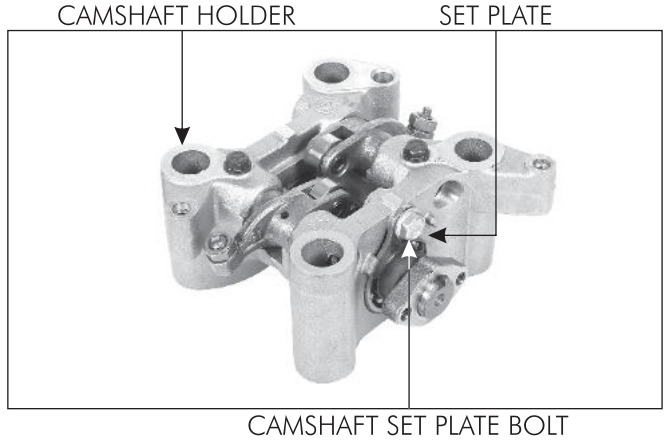
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase



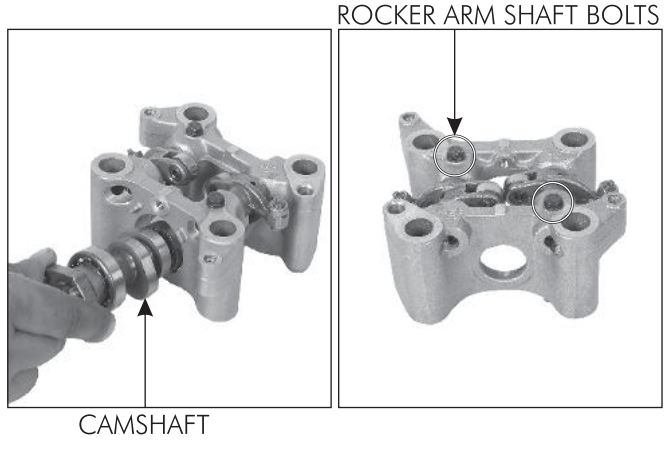
CAMSHAFT HOLDER

DISASSEMBLY

Remove the camshaft set plate bolt and camshaft set plate.



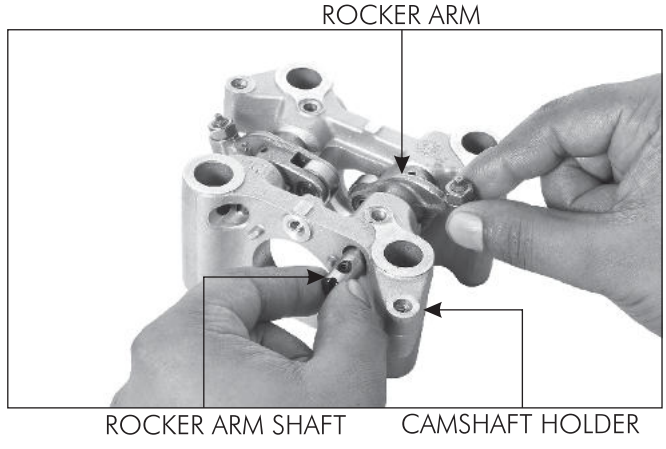
Remove the camshaft from the camshaft holder.
Remove the rocker arm shaft bolts.



Remove the rocker arm shafts and rocker arms from the camshaft holder.

NOTE

Mark all parts during disassembly so that they can be placed back in their original locations during installation.



INSPECTION

CAMSHAFT BEARING

Turn the outer race of each bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the bearing inner race fits tightly on the camshaft.

Replace the camshaft assembly if the outer race does not turn smoothly and quietly, or if it is loose on the camshaft. check cam lobe height.

Always inspect the bearing after thoroughly washing with a high flash point solvent, air drying and lubricating with clean engine oil.

CAUTION

While air drying the bearing with compressed air, prevent its outer race from spinning. This can cause permanent damage.

CAM LOBE

Measure the height of each cam lobe.

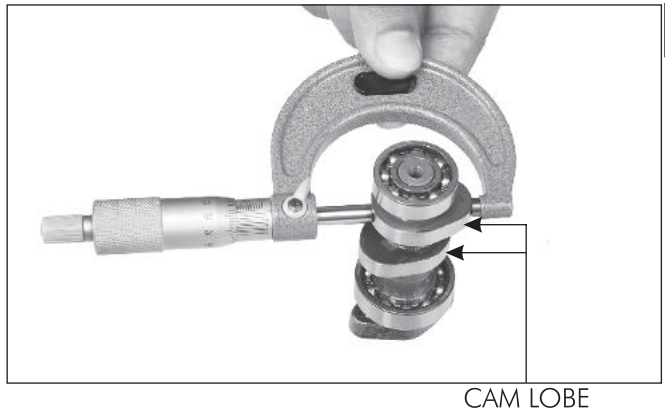
SERVICE LIMIT

INTAKE: 33.55 mm

EXHAUST: 33.42 mm

Inspect the cam lobe for damage or excessively worn.

Inspect the oil passages and rocker arms for wear or damage.



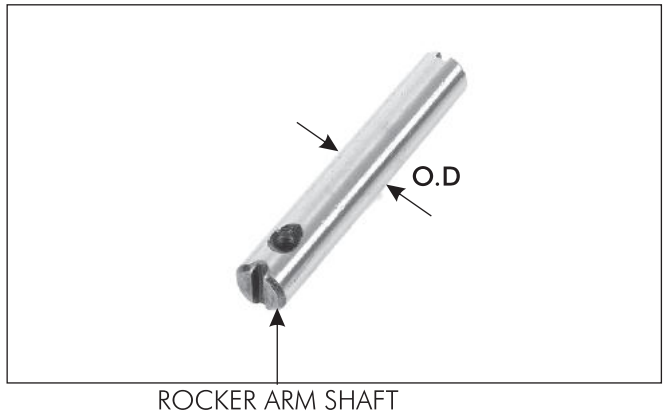
ROCKER ARM SHAFT

Measure the rocker arm shaft O.D.

SERVICE LIMIT

ROCKER ARM SHAFT O.D: 9.95 mm

Inspect the rocker arm shaft for wear or damage.



ROCKER ARM

Turn the rocker arm roller with your finger.

The roller should turn smoothly and quietly.

NOTE

If either of the rocker arm rollers require service or replacement, inspect the cam lobes for scoring, chipping or flat spot.

Measure the rocker arm I.D.

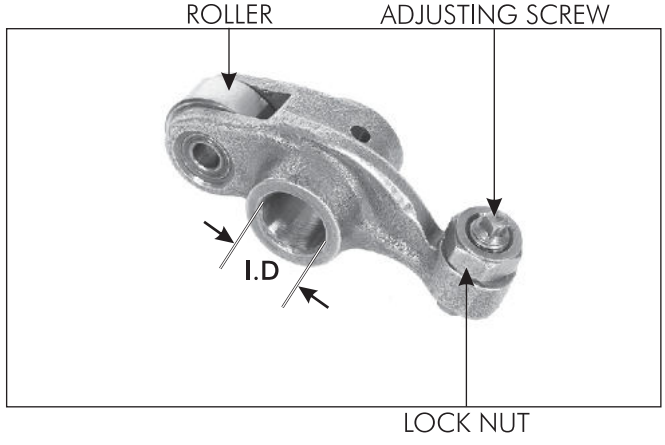
SERVICE LIMIT

ROCKER ARM I.D: 10.06 mm

Calculate the rocker arm-to-shaft clearance.

SERVICE LIMIT

ROCKER ARM-TO-SHAFT CLEARANCE: 0.11 mm

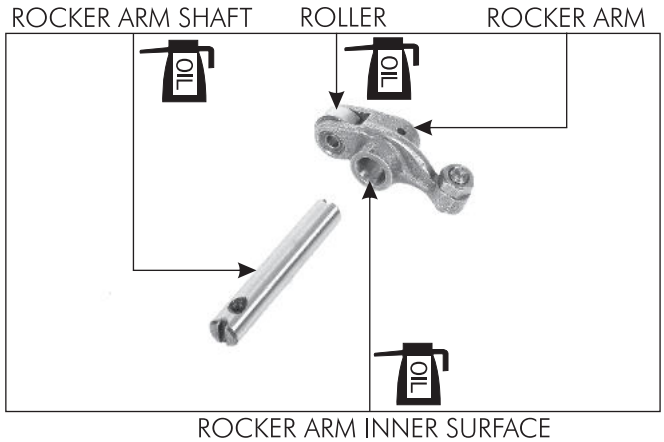


CAMSHAFT HOLDER

ASSEMBLY

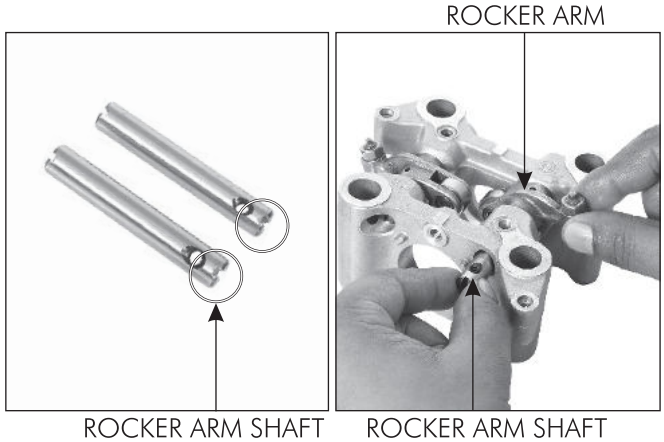
Clean the threads of each rocker arm shaft thoroughly.

Apply clean engine oil to the rocker arm's inner surface and rocker arm shaft whole surface.



ROCKER ARM INNER SURFACE

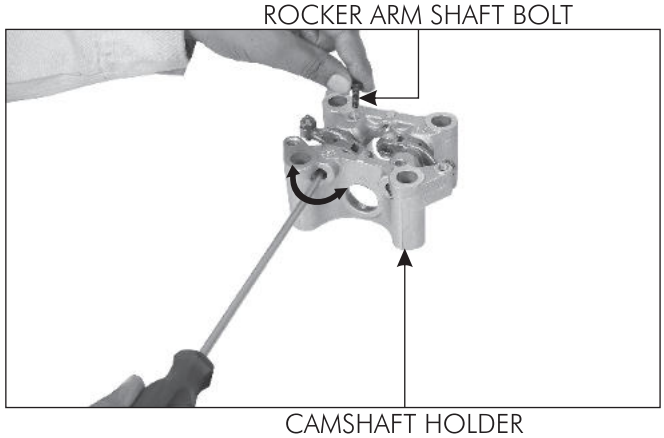
Set the rocker arm in the camshaft holder, then install the rocker arm shaft into the camshaft holder through the rocker arm.



ROCKER ARM SHAFT ROCKER ARM SHAFT

Align the hole of the rocker arm shaft with the hole of the camshaft holder.

Install the rocker arm shaft bolts.

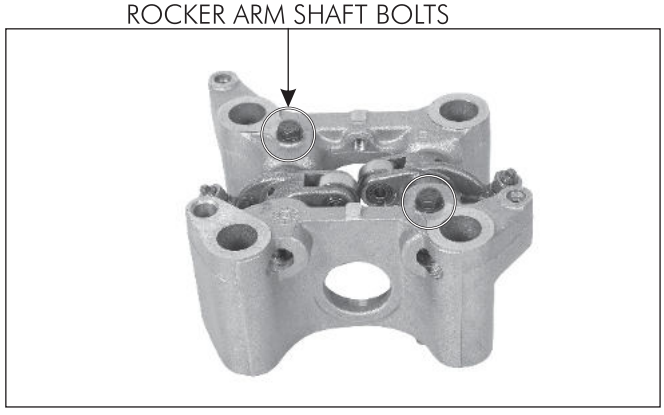


CAMSHAFT HOLDER

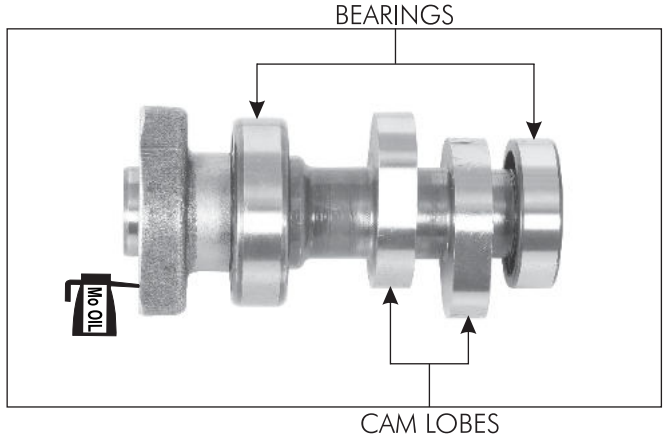
Tighten the rocker arm shaft bolts to the specified torque.

TORQUE

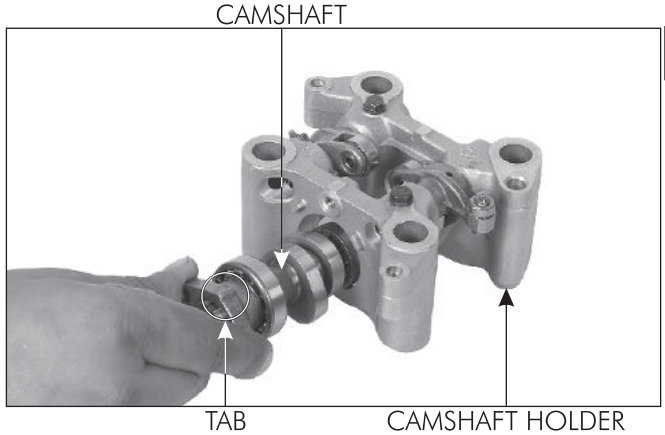
ROCKER ARM SHAFT BOLT: 0.5 kgf-m



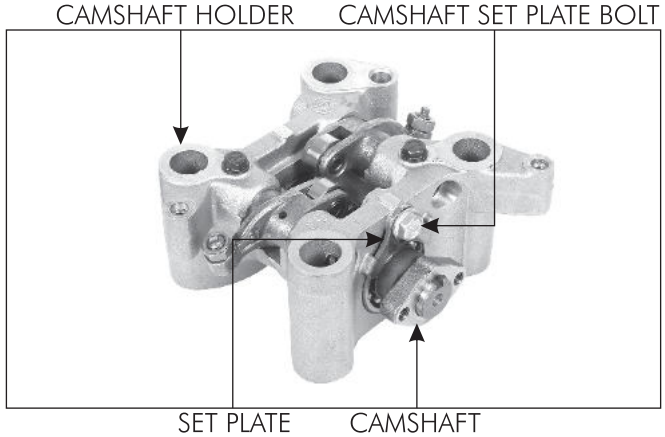
Apply clean engine oil with MOS_2 to whole surface of camshaft.



Make sure the tab on the camshaft flange is facing upward. Install the camshaft into the camshaft holder.



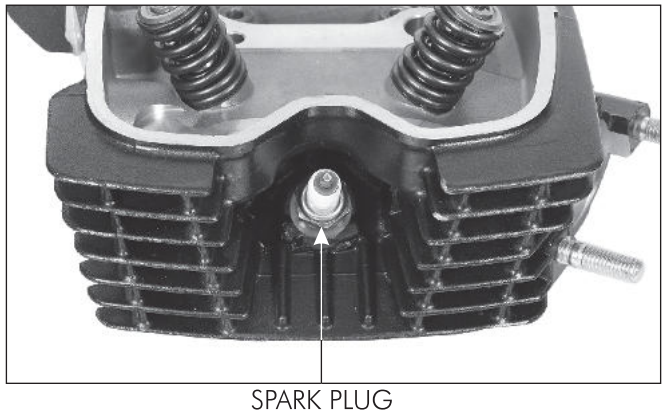
Install the camshaft set plate and tighten the bolt.



CYLINDER HEAD

DISASSEMBLY

Remove the spark plug.



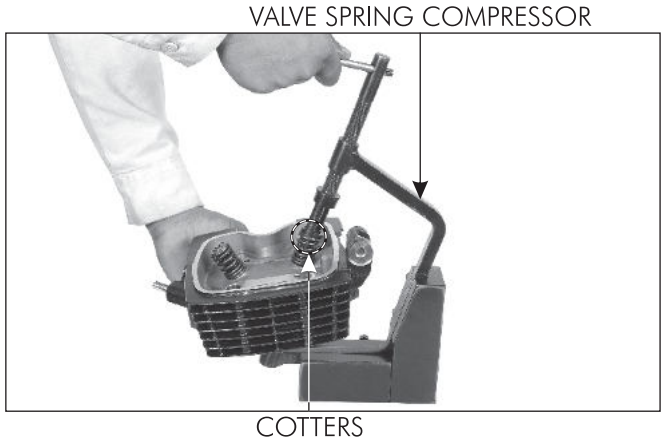
Compress the valve spring with the valve spring compressor and remove the valve cotters.

TOOL

VALVE SPRING COMPRESSOR
PART NO: 070 HH 198 005

CAUTION

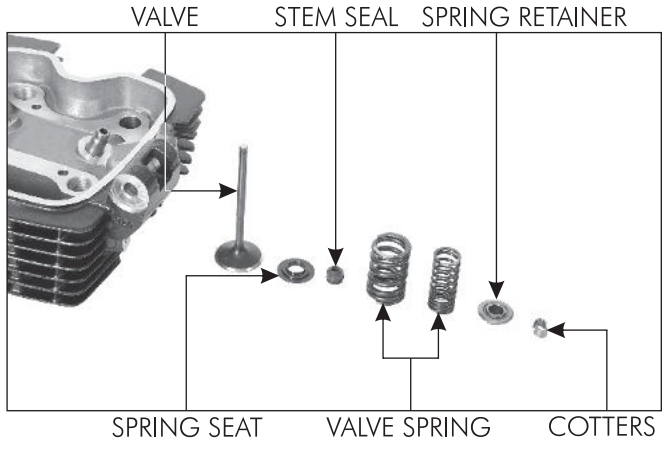
To prevent loss of tension do not compress the valve spring more than necessary to remove the cotters.



Loosen the valve spring compressor and remove the following:
- Cotters
- Spring retainer
- Valve springs
- Inlet/exhaust valve
- Stem seals
- Spring seats
- Valve

NOTE

Mark all parts during disassembly so that they can be placed back in their original location during installation.

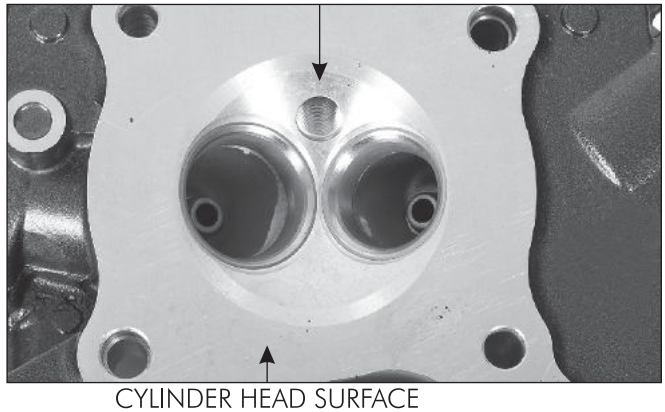


Remove the carbon deposits from the combustion chamber.

Clean off any gasket materials from the cylinder head surface.

NOTE

Avoid damaging the cylinder head surface.



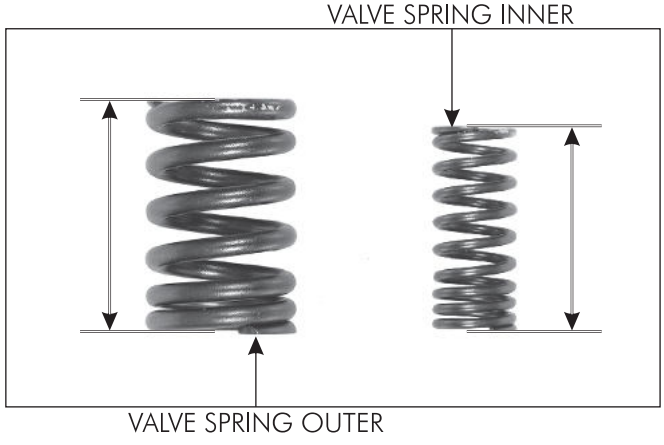
INSPECTION

VALVE SPRING

Measure the valve springs free length.

SERVICE LIMIT

FREE LENGTH (INNER): 37.78 mm
FREE LENGTH (OUTER): 40.16 mm



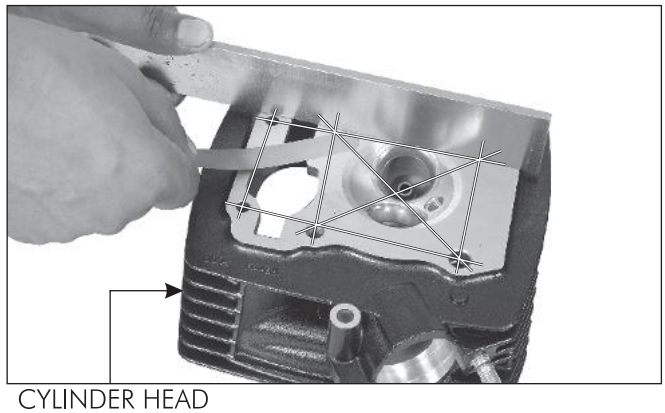
CYLINDER HEAD

Check the spark plug hole and valve area for cracks.

Check the cylinder head for warpage with a straight edge and a feeler gauge.

SERVICE LIMIT

WARPAGE: 0.10 mm



CYLINDER HEAD

VALVE

Inspect the valve for trueness, burning, scoring or abnormal stem wear.

Measure the valve stem O.D.

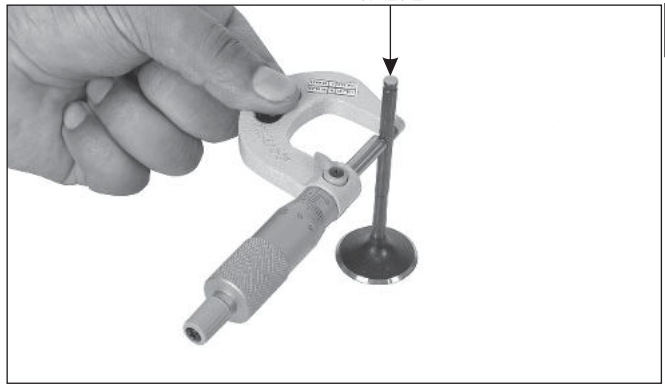
SERVICE LIMIT

INTAKE: 4.945 mm

EXHAUST: 4.925 mm

Insert each valve into the valve guide and check the valve movement in the guide.

VALVE



VALVE GUIDE

Ream the valve guide to remove the carbon buildup before checking the valve guide.

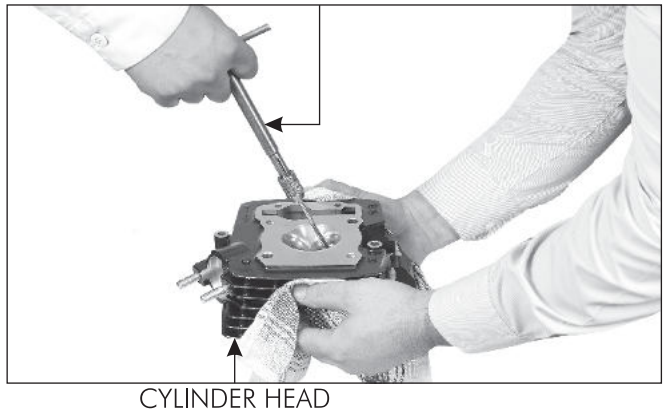
TOOL

VALVE GUIDE REAMER

NOTE

- Always insert the reamer from the combustion chamber side.
- Use cutting oil on reamer during this operation.
- Always rotate the reamer clockwise, never rotate counter-clockwise even while inserting or removing the reamer.
- Take care not to tilt or lean the reamer in the guide while reaming.
- If reaming is irregular, oil will leak past the valve stem seal. it could cause improper seat contact that cannot be corrected by refacing

VALVE GUIDE REAMER



CYLINDER HEAD

Measure and record each valve guide I.D with a ball gauge.

SERVICE LIMIT

INTAKE/EXHAUST: 5.03 mm

Calculate the stem-to-guide clearance.

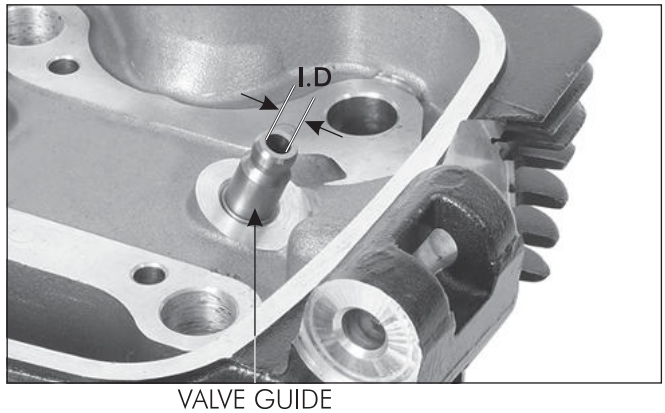
SERVICE LIMIT

INTAKE: 0.08 mm

EXHAUST: 0.10 mm

If the stem-to-guide clearance is out of the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so replace the guides as necessary and ream to fit.

If the stem-to-guide clearance still exceeds the service limit with new guides, replace the valve.



VALVE GUIDE

NOTE

Inspect and reface the valve seat whenever new valve guides are installed.

VALVE GUIDE

REPLACEMENT

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.

Heat the cylinder head to 130°C-140°C (275°F-290°F) with a hot plate or oven. Do not heat the cylinder head beyond 150°C (300°F). Use temperature indicator sticks available at welding supply stores, to be sure the cylinder head is heated to the proper temperature.

CAUTION

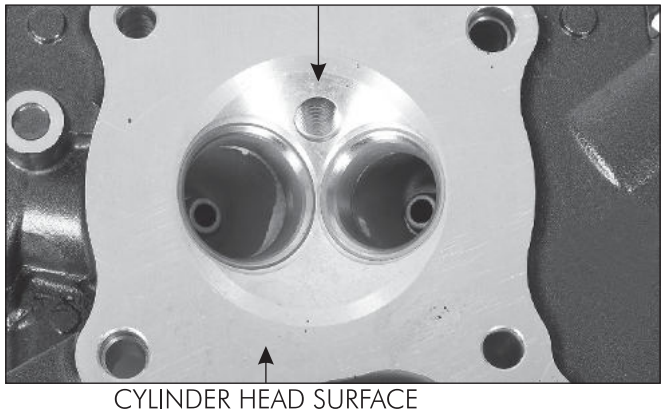
- Using a torch to heat the cylinder head may cause warpage.
- Be careful not to damage the mating surface.

Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

TOOL

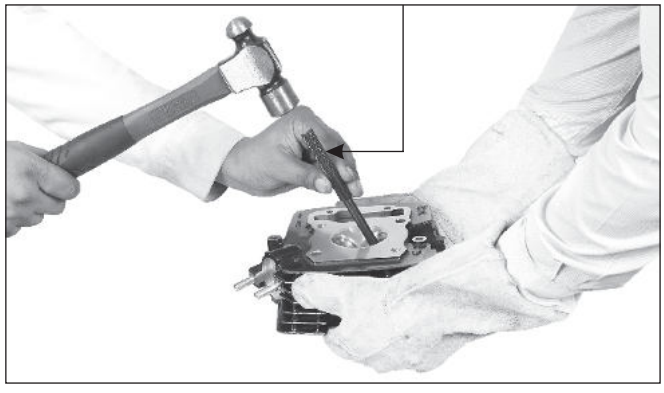
VALVE GUIDE REMOVER
PART NO: 070 HH 198 010

COMBUSTION CHAMBER



CYLINDER HEAD SURFACE

VALVE GUIDE REMOVER



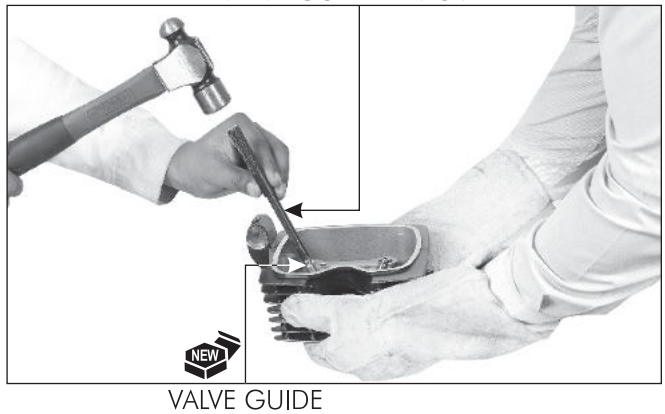
Take out the new valve guides from the freezer.

Install and drive in the new valve guides from the camshaft side of the cylinder head while cylinder head is still heated.

TOOL

VALVE GUIDE REMOVER
PART NO: 070 HH 198 010

VALVE GUIDE REMOVER



VALVE GUIDE

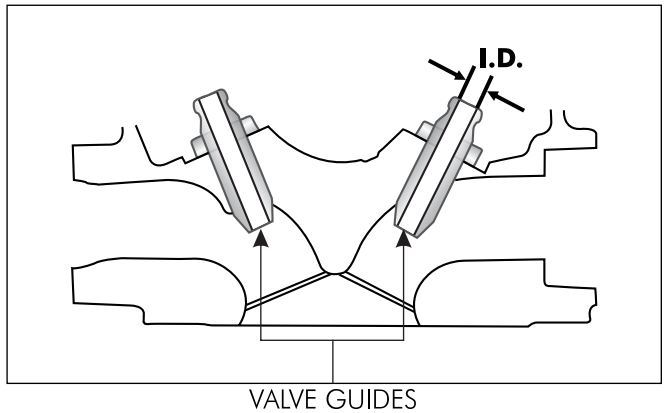
After installing the valve guides, measure the valve guides height from the cylinder head.

SPECIFIED HEIGHT:

Inlet valve guide :18.0±0.1 mm

Exhaust valve guide:14.25±0.1mm

Let the cylinder head cool to room temperature.



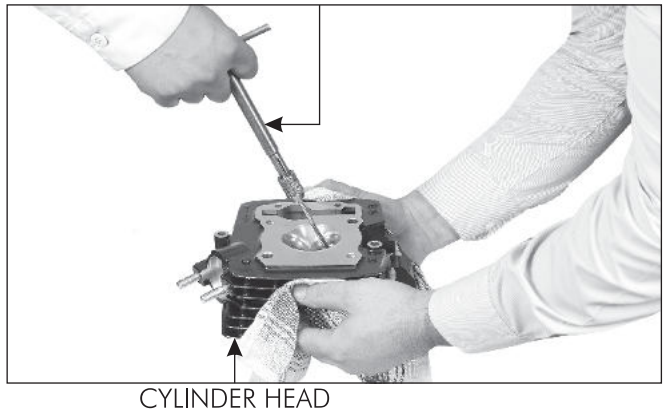
VALVE GUIDES

Ream the new valve guides.

TOOL

VALVE GUIDE REAMER

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valve is reamed slanted, that causes oil leaks from the stem seal and improper valve set contact and result in the valve seat refacing not able to be performed.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise, while inserting or pulling out the reamer from the guide.
- Use cutting oil on the reamer during this operation.
- Clean the cylinder thoroughly to remove any metal particles after reaming and reface the valve seat.



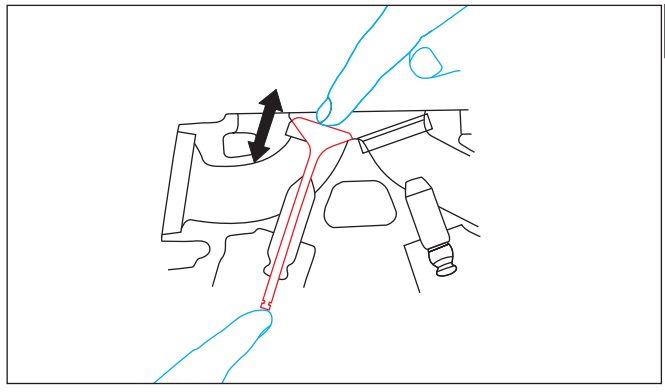
VALVE SEAT INSPECTION

Clean the intake and exhaust valves thoroughly to remove the carbon deposits.

Apply light coating of Prussian Blue to the valve seats.

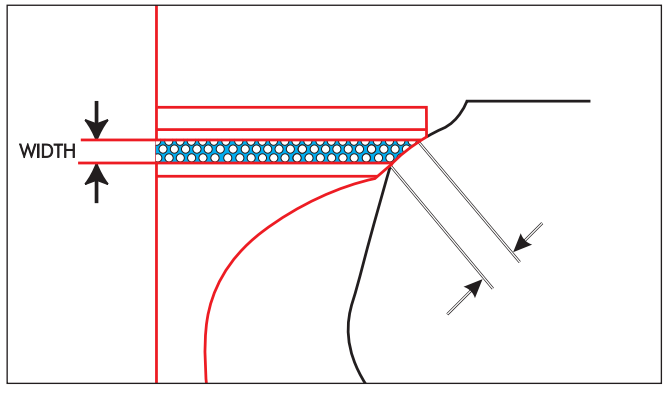
NOTE

Tap the valve against the valve seat several times with your finger, without rotating the valve, to check for proper valve seat contact.



Remove the valve and inspect the width of each valve seat.

The valve seat contact should be within the specified width and even all around the circumference.



SERVICE LIMIT

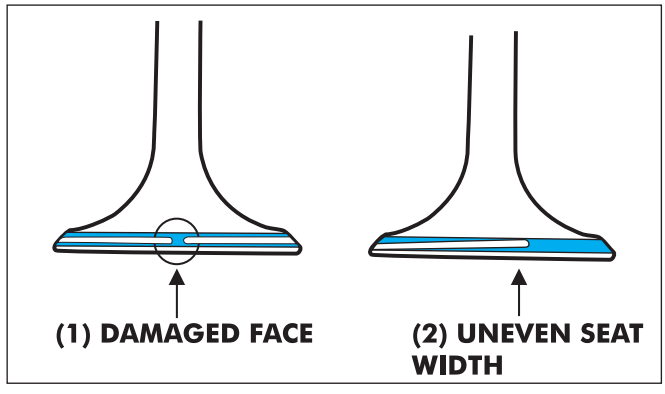
VALVE SEAT WIDTH: 1.5 mm

STANDARD: 1.1-1.2 mm

Valve seat width is not within specification, reface the valve seat (page 7-17).

CAUTION

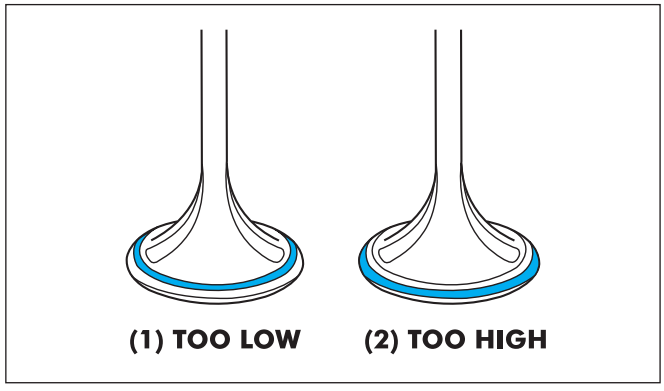
The valve cannot be ground. If a valve face is burnt or badly worn or if it contacts the seat unevenly, replace the valve.



Inspect the valve seat face for:

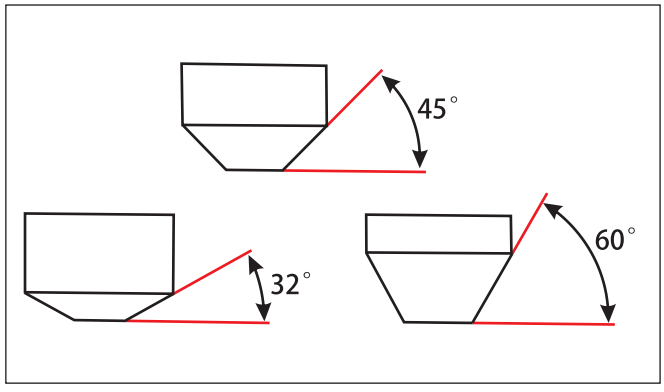
- Damaged face:
  - Replace the valve and reface the valve seat.
- Uneven seat width:
  - Bent or collapsed valve stem;
  - Replace the valve and reface the valve seat.

- Contact area (too high or too low area)
  - Reface the valve seat.



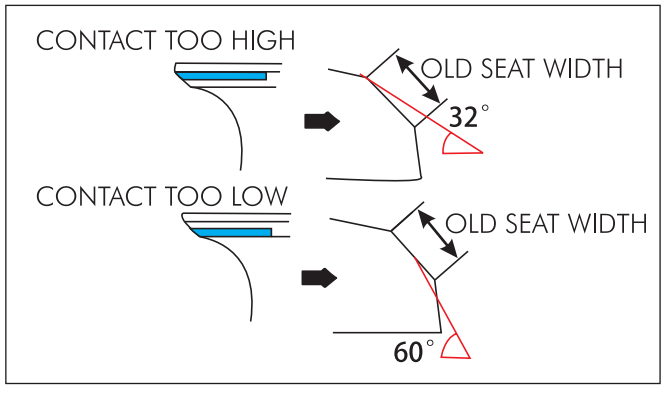
VALVE SEAT REFACING

Valve Seat Cutters, a grinder or equivalent valve seat refacing equipment are recommended to correct worn valve seat.



If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

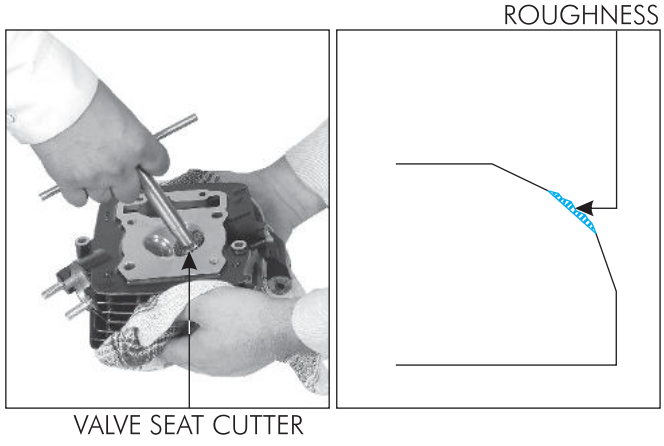
If the contact area is too low on the valve, the seat must be raised using a 60° inner cutter.



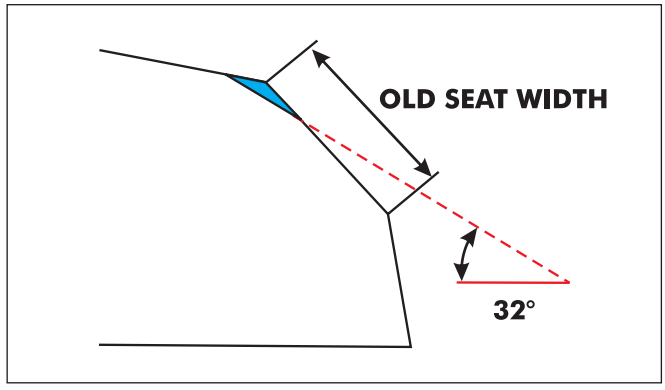
NOTE

Reface the valve seat with a 45° cutter when a valve guide is replaced.

Use a 45° cutter to remove the roughness or irregularities from the seat.

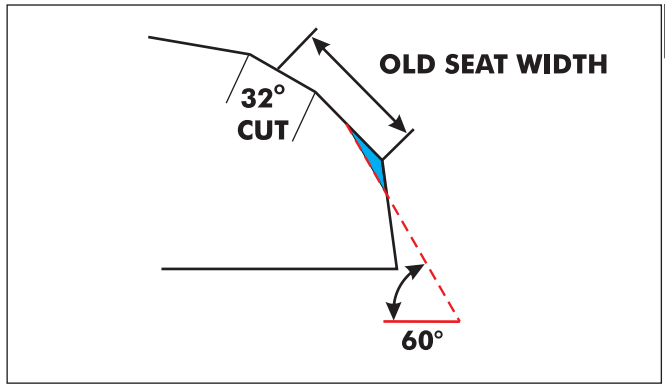


Using 32° cutter, remove top ¼ of the existing valve seat material.



Using 60° cutter, remove the bottom ¼ of the old seat.

Remove the cutter and inspect the area you have just removed.



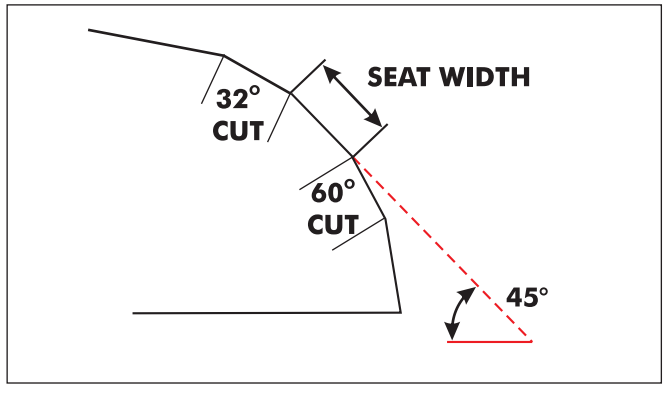
Install a 45° finish cutter and cut the seat to proper width.

Make sure that all pitting and irregularities are removed.

Refinish if necessary.

STANDARD SEAT WIDTH: 1.5 mm

After cutting the seat, apply lapping compound to the valve face and lap the valve using light pressure.



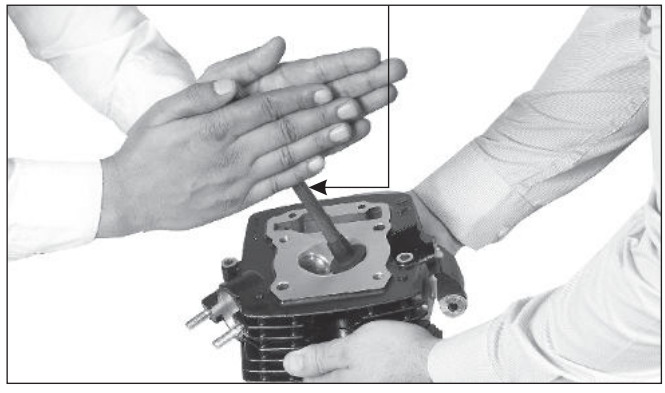
NOTE

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

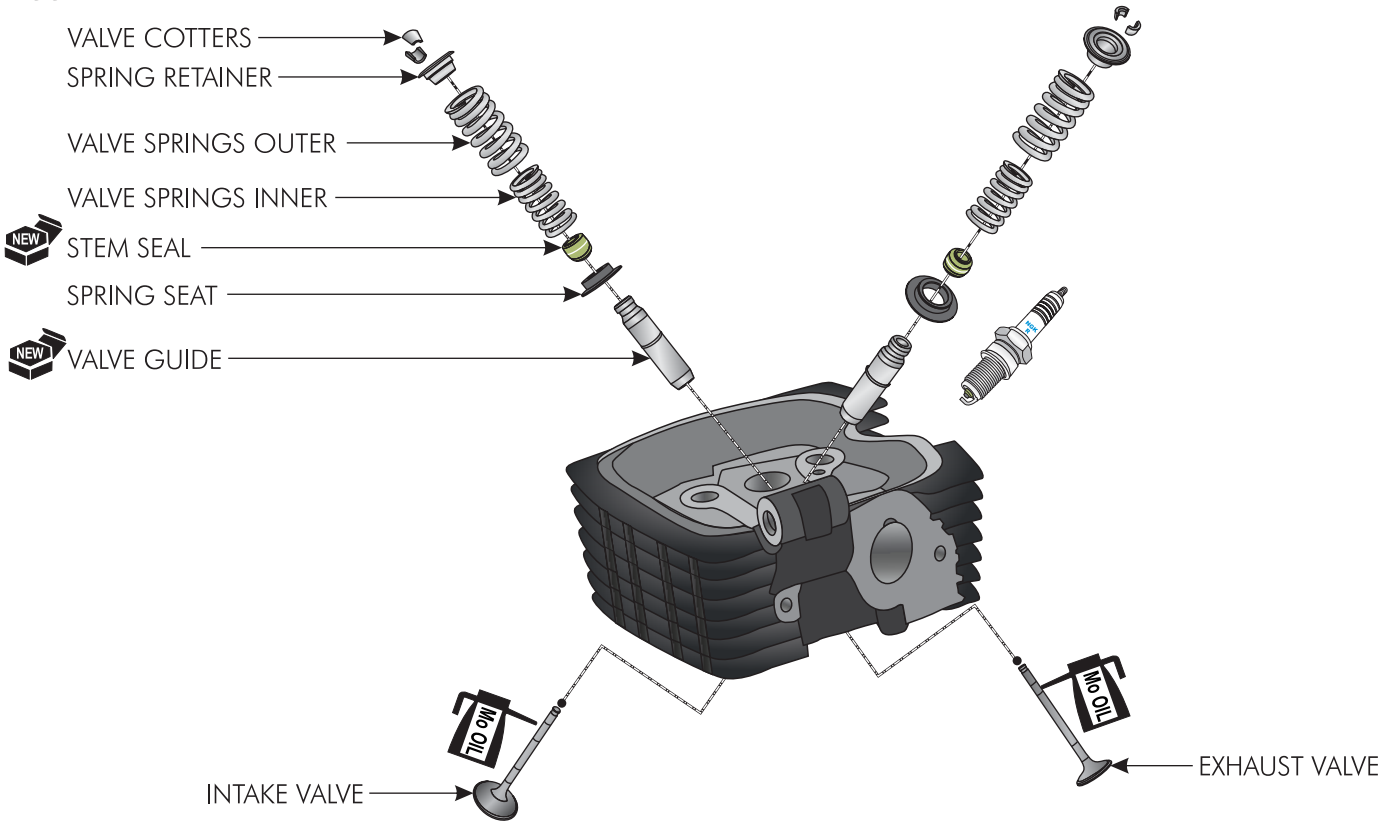
After lapping, wash any residual compound off the cylinder head and valve.

Recheck the seat contact after lapping.

HAND LAPPING TOOL



ASSEMBLY



Clean the cylinder head assembly with high flash point nonflammable solvent and blow through all oil passages with compressed air.

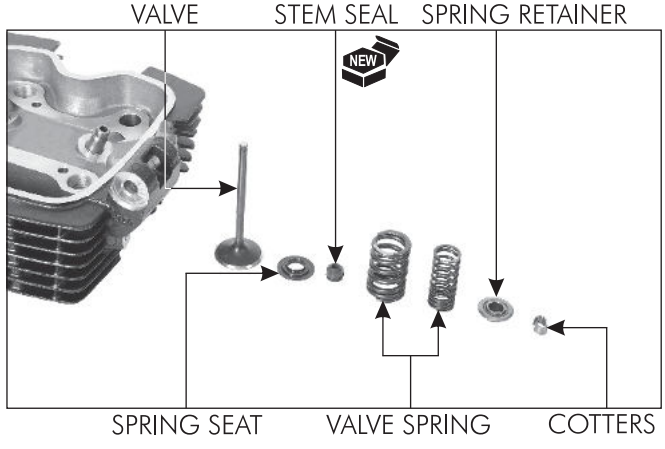
Install the valve spring seats and new valve stem seals.

Lubricate each valve stem with molybdenum oil solution.

Insert the intake and exhaust valve into the valve guides.

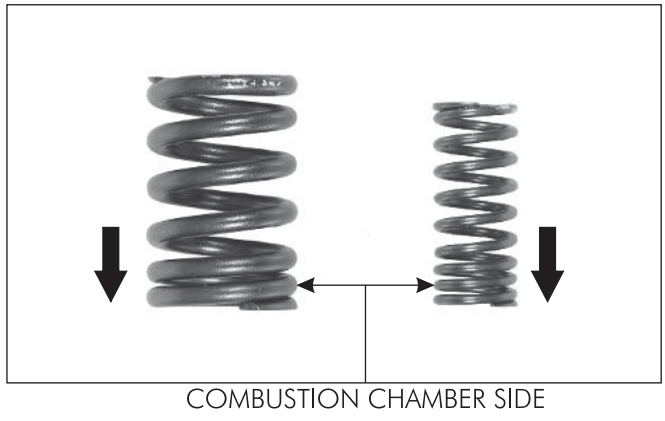
NOTE

To avoid the damage of stem seal turn the valve slowly while inserting.



Install the valve springs with the tightly wound coils facing towards the combustion chamber.

Install the valve springs.



Compress the valve springs and install the valve cotters.

TOOL

VALVE SPRING COMPRESSOR
PART NO: 070 HH 198 005

CAUTION

To prevent the loss of tension, do not compress the valve springs more than necessary

NOTE

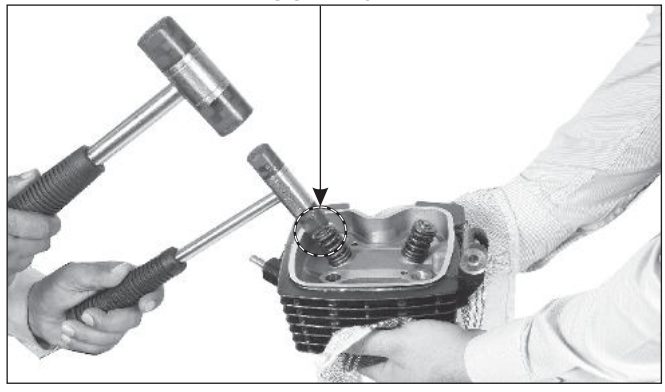
To ease installation of the cotters, grease them first.

VALVE SPRING COMPRESSOR

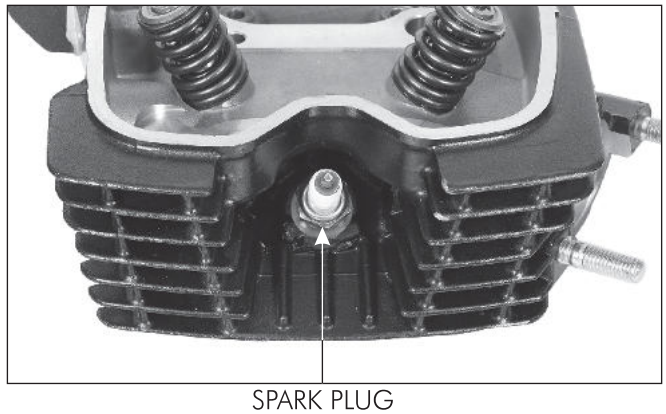
COTTERS

Tap the stem gently with two plastic mallet to firmly seat the cotters.

COTTERS



Install the spark plug.



SPARK PLUG

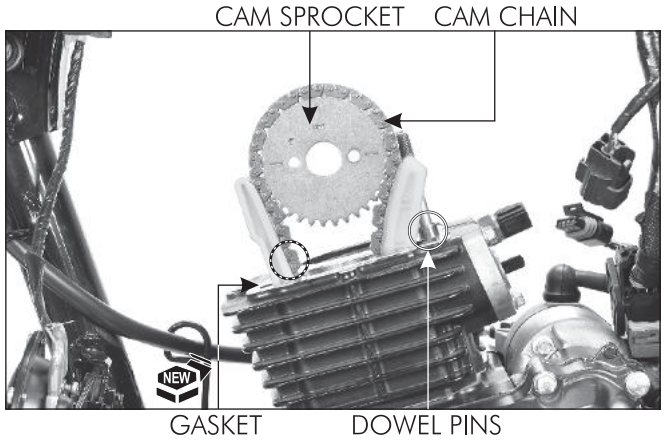
CYLINDER HEAD

INSTALLATION

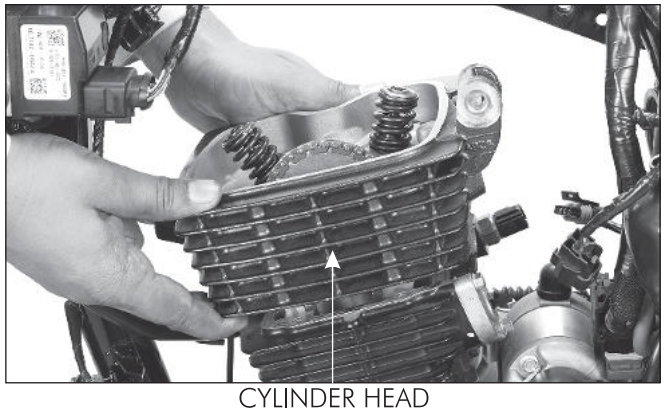
Clean the gasket material from the cylinder mating surface.

Install the dowel pins and new gasket.

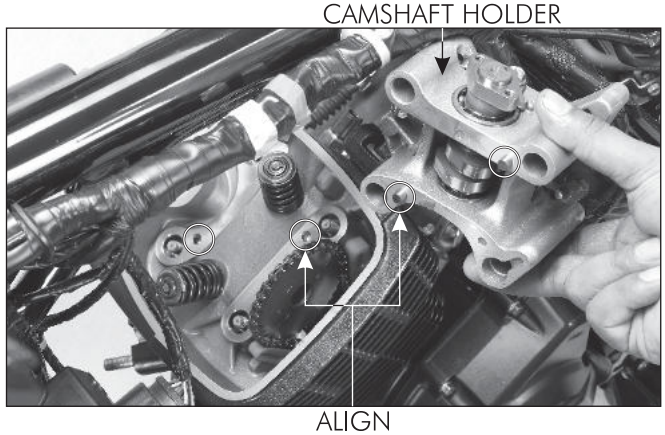
Temporarily install the cam chain on the cam sprocket with the index line facing outwards and 'O' mark facing towards the exhaust manifold.



Install the cylinder head onto the cylinder.



Install the camshaft holder to the cylinder head, while aligning the holes in the cylinder head with dowel pins in the camshaft holder.



Apply clean engine oil to the threads and seating surfaces of the camshaft holder special nuts.

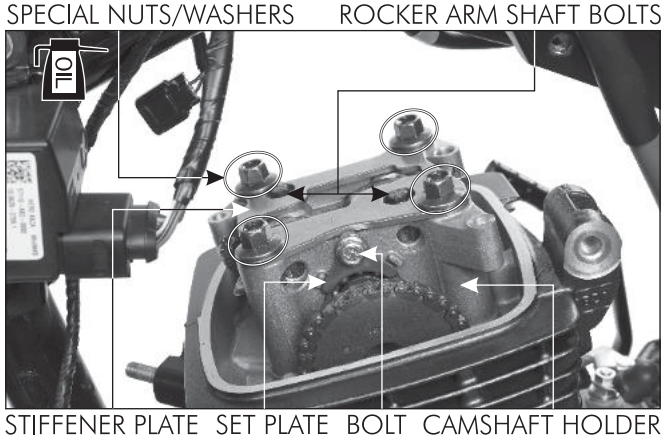
Install the stiffener plate onto the camshaft holder special nuts.

Install and hand tighten the special nuts.

Tighten the rocket arm shaft bolts.

Tighten the camshaft set plate bolt.

Tighten the camshaft holder special nuts to the specified torque.

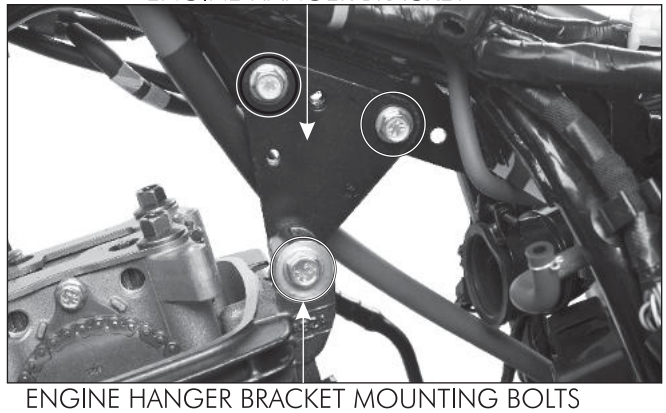


TORQUE

CAMSHAFT HOLDER SPECIAL NUTS: 3.2 kgf-m

Install the engine hanger bracket.
Install the engine hanger mounting bolts.

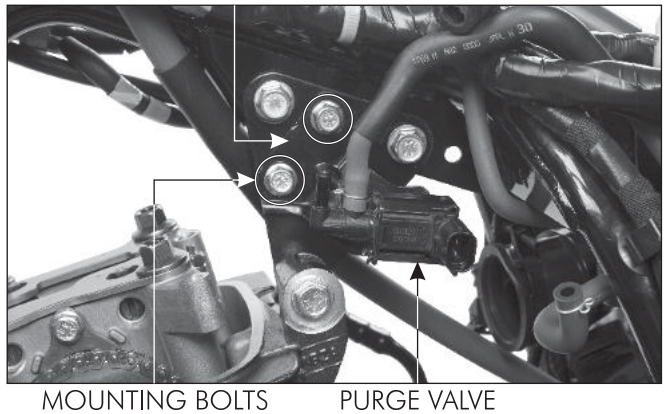
ENGINE HANGER BRACKET



ENGINE HANGER BRACKET MOUNTING BOLTS

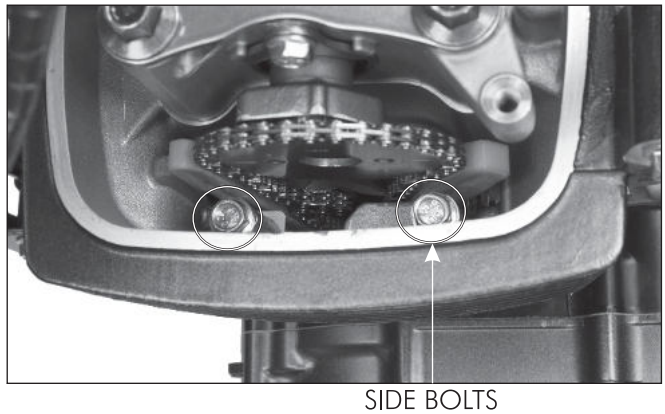
Install the purge valve stay with purge valve by installing the mounting bolts as shown.
Connect the purge valve 2P connector (page 5-79).

PURGE VALVE STAY



MOUNTING BOLTS PURGE VALVE

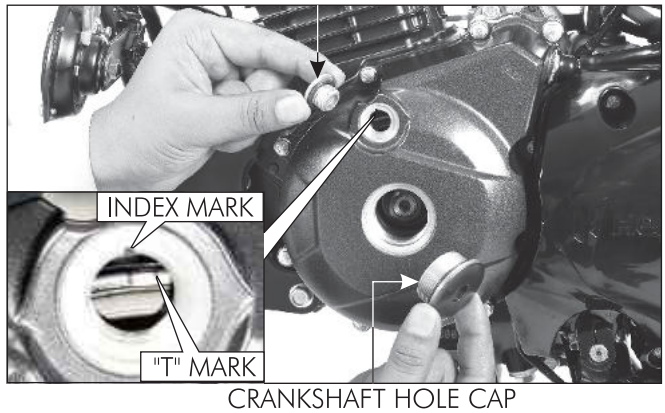
Install and tighten the cylinder head side bolts.



SIDE BOLTS

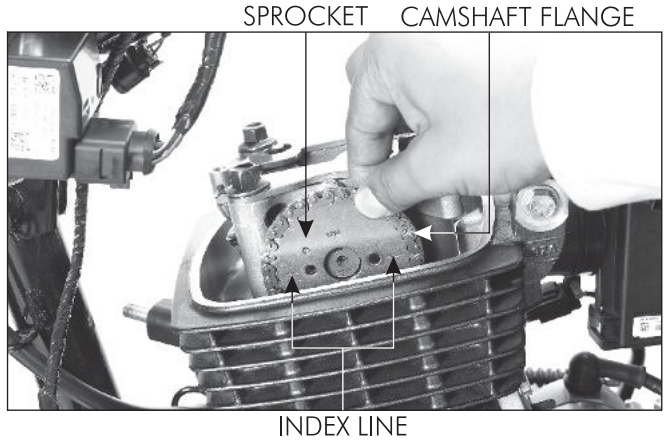
Holding the cam chain rotate the crankshaft counter-clockwise and align the "T" mark on the flywheel with the index notch on the left crankcase cover.
Make sure the piston is at the TDC (Top Dead Center).

TIMING HOLE CAP



CRANKSHAFT HOLE CAP

Align the index line on the sprocket with the upper surface of the cylinder head without moving the cam chain.



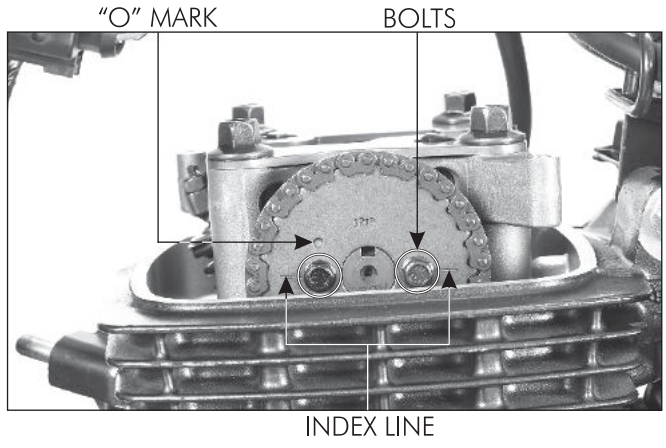
Install the cam sprocket onto the camshaft flange.

Be sure that the index lines on the cam sprocket align with the upper surface of the cylinder head when the index line of the "T" mark on the flywheel is aligned with the index mark on the crankcase cover and 'O' mark facing towards the exhaust.

Install and tighten the cam sprocket bolts to the specified torque.

TORQUE

CAM SPROCKET BOLT: 0.9 kgf-m



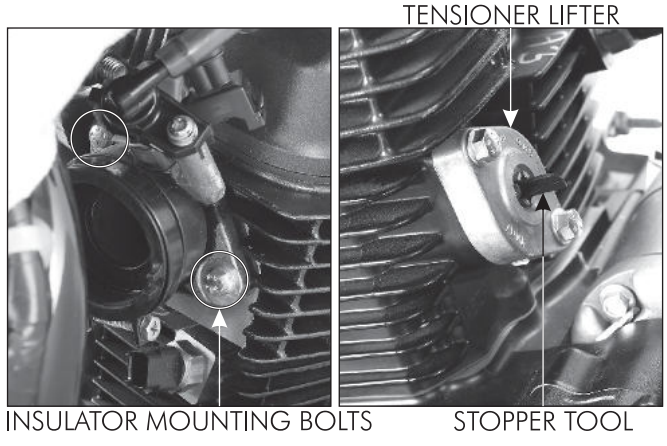
Install the pipe inlet (page 5-75).

Install and tighten the pipe inlet mounting bolts to the specified torque.

TORQUE

PIPE INLET MOUNTING BOLTS: 1.0 kgf-m

Remove the stopper tool from the cam chain tensioner lifter.



Apply clean engine oil to a new O-ring and install it on the lifter.

Install the pan screw and tighten it.

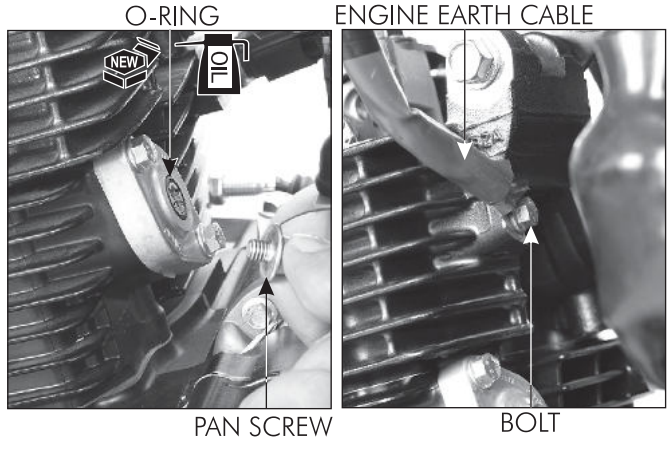
TORQUE

PAN SCREW: 0.4 kgf-m

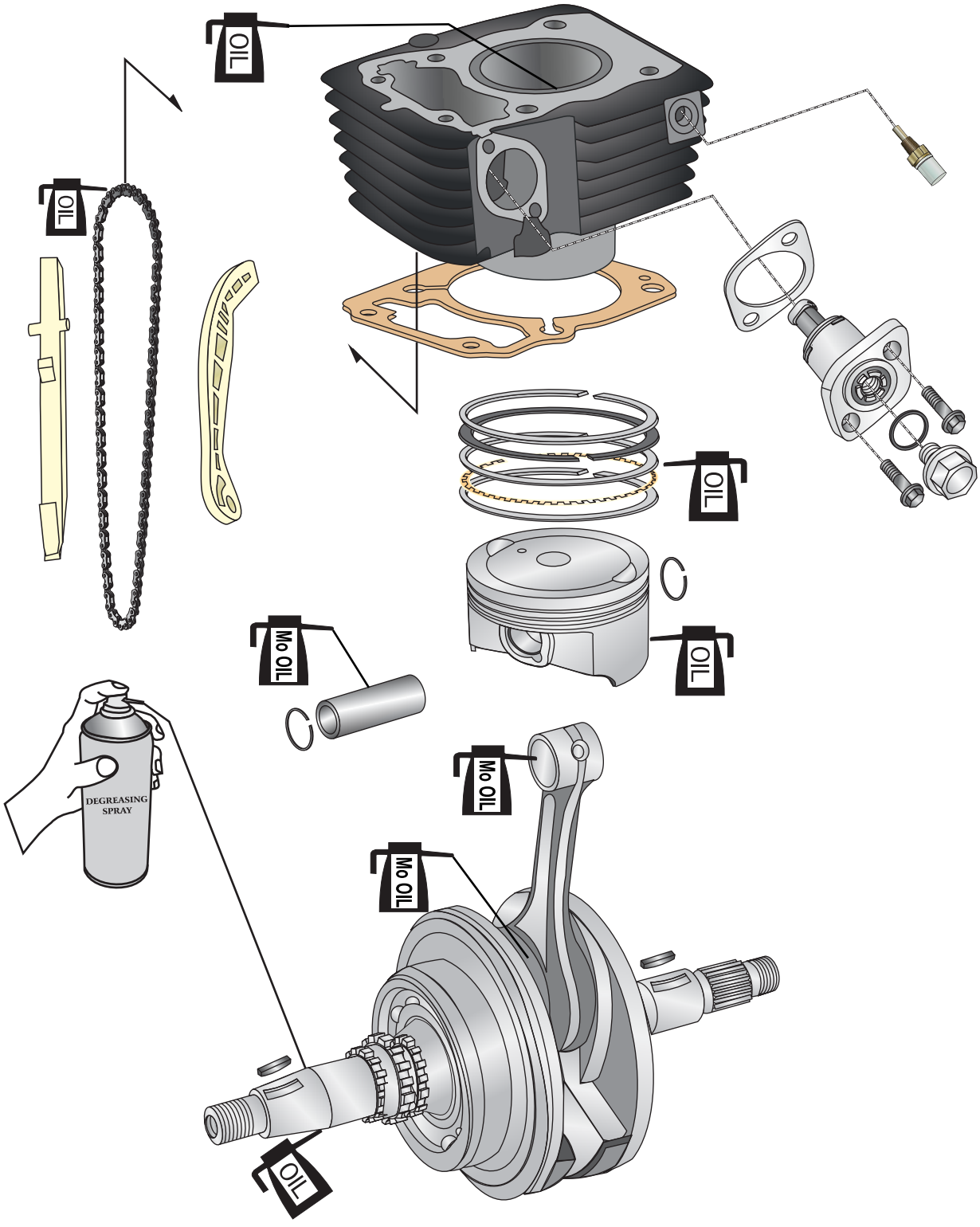
Install the following:

- Throttle body/ECU (page 5-70).
- Exhaust muffler (page 2-10).
- Noise suppressor cap (page 3-7).
- Engine earth cable by installing the bolt.
- Fuel tank (page 2-9).

Tighten the spark plug to the specified torque (page 3-7).



SYSTEM DIAGRAM



System Diagram	8-0	Piston Ring Installation	8-7
Service Information	8-1	Piston Installation	8-9
Specification/Torque Values	8-1	Cylinder Installation	8-10
Special Tools/Troubleshooting	8-2	Cam Chain Tensioner	
Cylinder Removal	8-3	Lifter Removal	8-11
Piston Removal	8-4	Cam Chain Tensioner	
Piston/Piston Ring Inspection	8-5	Lifter Installation	8-12

SERVICE INFORMATION

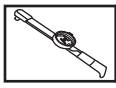
GENERAL

- Cylinder and piston can be serviced with the engine installed in the frame.
- Be careful not to damage the mating surfaces by using a screwdriver when removing the cylinder. Do not strike the cylinder too hard during removal, even with a rubber or plastic hammer, to prevent the possibility of damage to the fins.
- When installing piston pin apply molybdenum disulfide oil to its whole surface.
- Take care not to damage the cylinder wall and piston.

SPECIFICATIONS

CYLINDER/PISTON

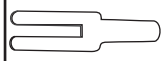
ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D		57.300-57.310mm	57.38 mm
	Ovality		-	0.1 mm
	Taper		-	0.1mm
	Warpage		-	0.1mm
Piston	Piston O.D		57.280-57.295 mm	57.21 mm
	Piston pin hole I.D		14.002-14.008 mm	14.04 mm
	Piston pin O.D		13.994-14.000 mm	13.96 mm
	Piston-to-piston pin clearance		0.002-0.014 mm	0.07 mm
	Connecting rod small end I.D		14.010-14.028 mm	14.06 mm
	Cylinder-to-piston clearance		0.005-0.030 mm	0.10 mm
	Connecting rod-to-piston clearance		0.010-0.034 mm	0.10 mm
	Piston ring-to-groove clearance	Top	0.03-0.060 mm	0.10 mm
		Second	0.03-0.060 mm	0.10 mm
	Piston ring end gap	Top	0.10-0.25 mm	0.60 mm
		Second	0.25-0.40 mm	0.70 mm
		Oil (side rail)	0.10-0.40 mm	0.70 mm



TORQUE VALUES

STUD BOLT	**: 1.1 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

TOOL	SPECIAL TOOLS
	**PISTON SLIDE BASE** **PART NO: 070 HH 198 027**

TROUBLESHOOTING

Compression too low, hard to start or poor performance at low speed

- Worn, stuck or broken piston rings
- Worn or damaged cylinder or piston
- Leaking cylinder head gasket

Excessive smoke

- Worn cylinder or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Excessive noise (piston)

- Worn cylinder and piston
- Worn piston pin and piston pin hole
- Worn connecting rod small end

Overheating, knocking/compression too high

- Excessive carbon deposit on piston or combustion chamber

CYLINDER

REMOVAL

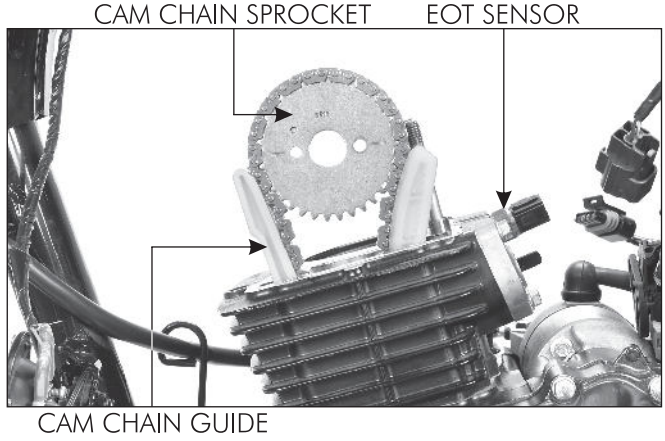
Remove the cylinder head (page 7-4).

Disconnect the EOT sensor connector (page 5-76).

Loosen the EOT sensor.

Remove the dowel pins and gasket (page 7-9).

Remove the cam chain guide and cam sprocket.

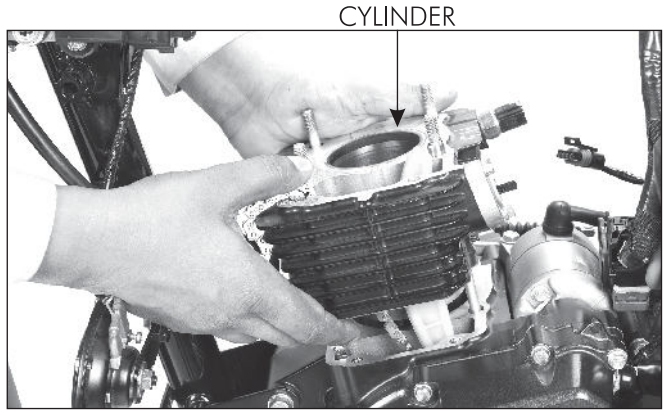


Lift the cylinder and remove it, being careful not to damage the piston with the studs.

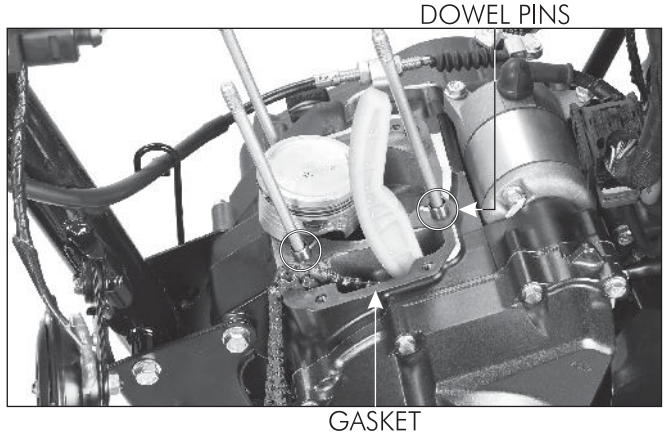
Clean the top of the cylinder throughly.

NOTE

Be careful not to damage the mating surfaces by using a screwdriver when splitting the cylinder from the crankcase.



Remove the dowel pins and gasket.



STUD REPLACEMENT

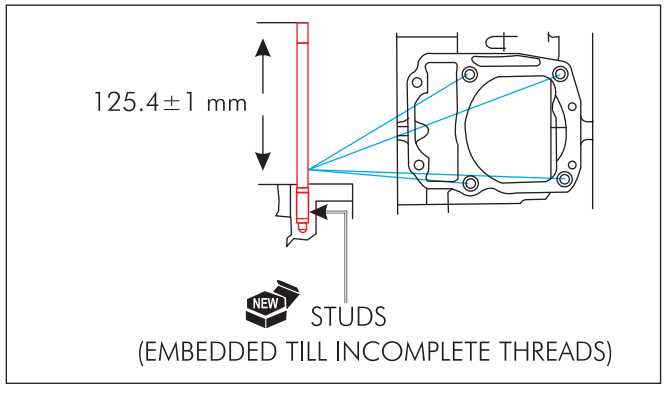
Remove the studs from the crankcase.

Install the new studs into the crankcase embedded till incomplete threads.

TORQUE

STUD BOLT: 1.1 kgf-m

After installing the studs check that the length from the head to the crankcase surface is within specification.



CYLINDER

INSPECTION

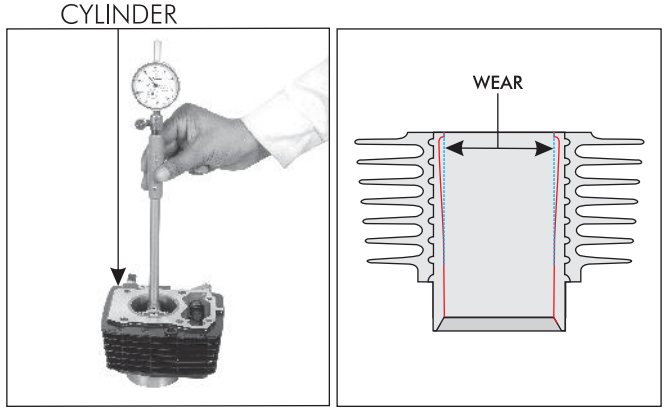
Inspect the cylinder wall for scoring and wear.

Measure and record the cylinder I.D at three levels in both the X and Y axis. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT

CYLINDER I.D: 57.38 mm

CYLINDER



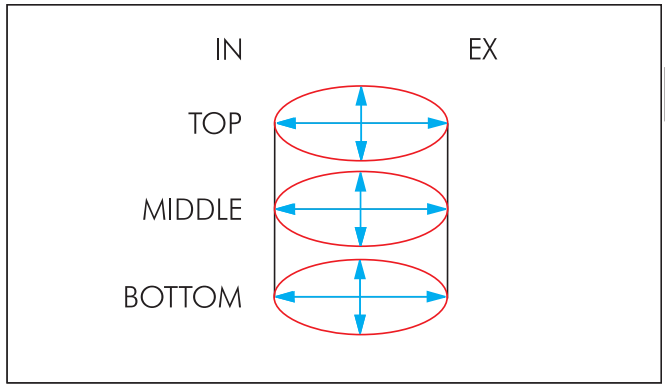
Calculate the cylinder for taper and ovality at three levels in an X and Y axis. Take the maximum reading to determine the ovality.

SERVICE LIMIT

TAPER: 0.10 mm

OVALITY: 0.10 mm

The cylinder must be rebored and an oversize piston fitted if the service limit is exceeded.

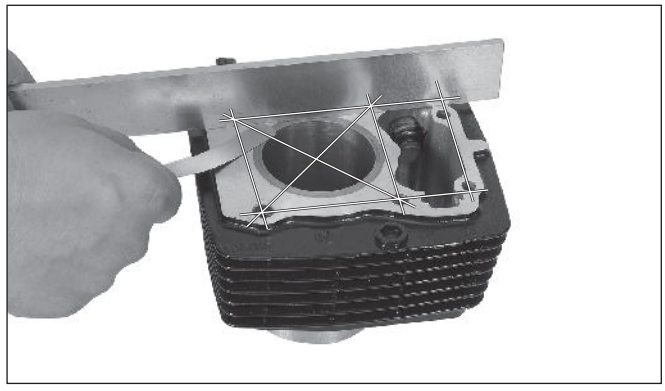


Check the cylinder for warpage by placing a straight edge and a feeler gauge across the studs and bolt holes as shown.

SERVICE LIMIT

CYLINDER WARPAGE: 0.10 mm

Remove the EOT sensor.



PISTON

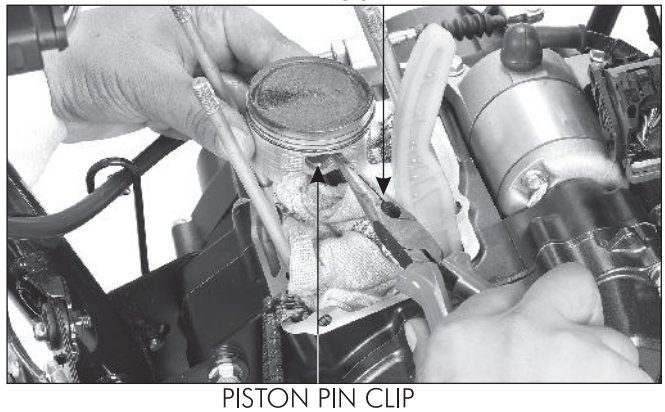
REMOVAL

Remove the piston pin clip using nose plier.

NOTE

Place a clean shop towel over the crankcase to prevent the possibility of the piston pin clip falling into the crankcase.

NOSE PLIER

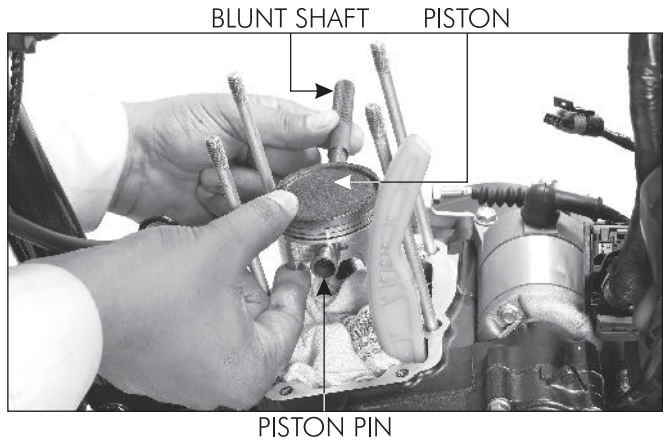


PISTON PIN CLIP

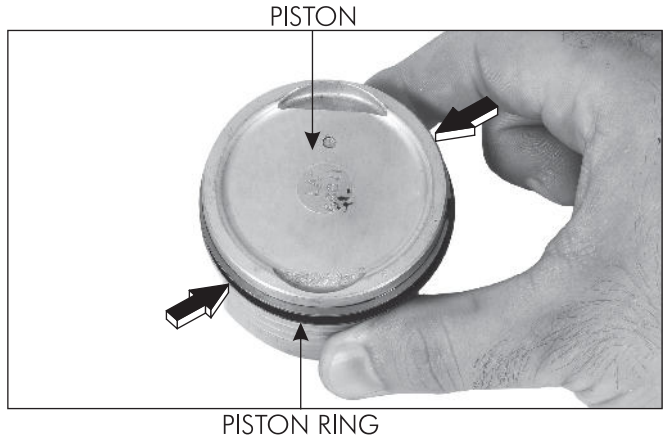
Remove the piston pin out by driving it with a blunt shaft.

CAUTION

- Do not damage or scratch the piston
- Do not apply side force to the connecting rod.



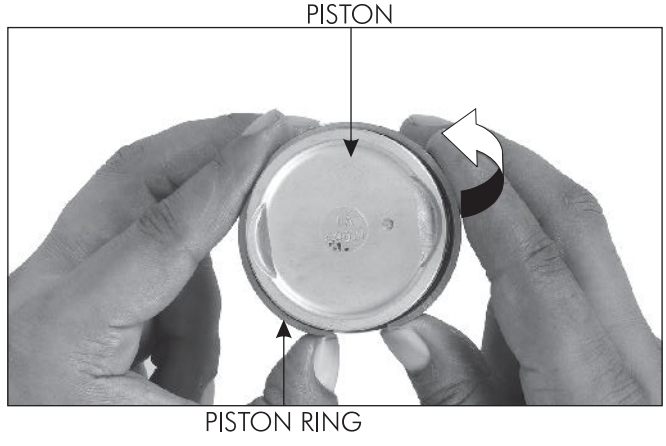
Inspect the piston rings for movement by pressing the rings. The rings should be able to move in its groove without catching.



Spread each piston ring and remove it by lifting it up at a point opposite the gap.

CAUTION

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston during the piston ring removal.



PISTON/PISTON RING

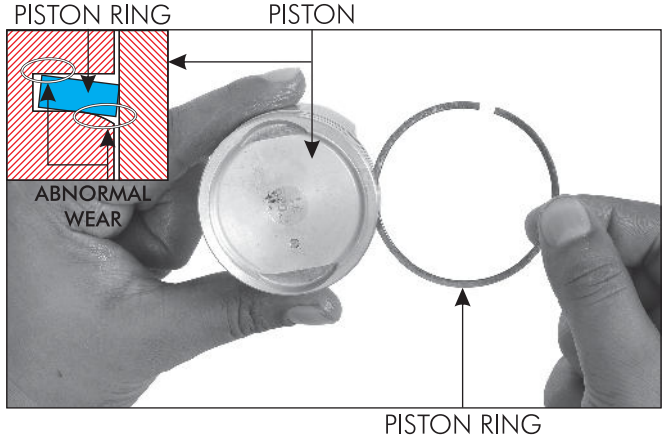
INSPECTION

NOTE

- Clean carbon deposits from the piston.
- Clean carbon deposits from the piston ring grooves with a ring that will be discarded. Never use a wire brush; it will damage the grooves.

Inspect the piston for cracks or other damage.

Inspect the ring grooves for excessive wear and carbon build-up.



Measure piston O.D at 10 mm from the bottom, and 90° to the piston pin hole.

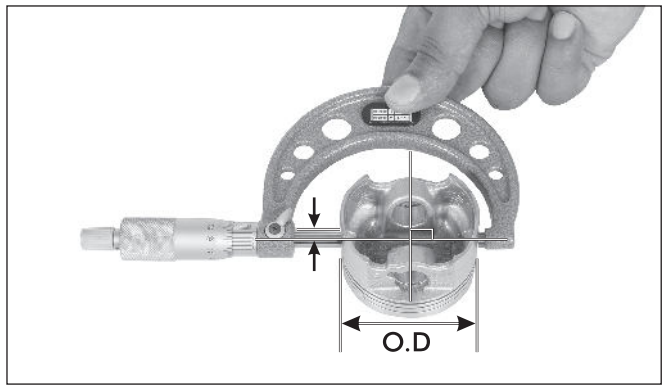
SERVICE LIMIT

PISTON O.D: 57.21 mm

Calculate the cylinder- to- piston clearance. Take the maximum calculate the cylinder-to-piston clearance reading to determine the clearance.

SERVICE LIMIT

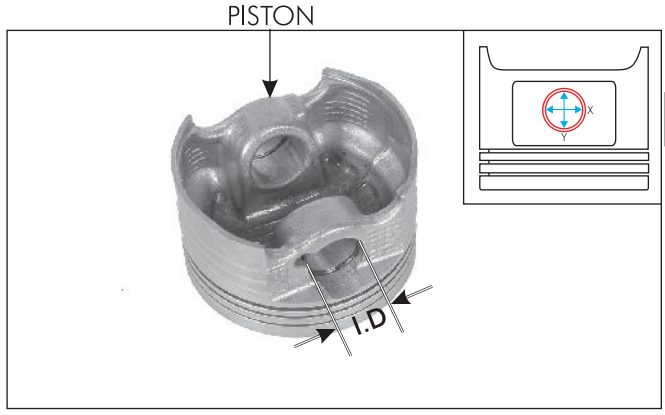
CYLINDER- TO- PISTON CLEARANCE: 0.10 mm



Measure each piston pin hole I.D. in an X and Y axis. Take the maximum reading to determine I.D.

SERVICE LIMIT

PISTON PIN HOLE I.D: 14.04 mm



Measure the piston pin O.D. at three points.

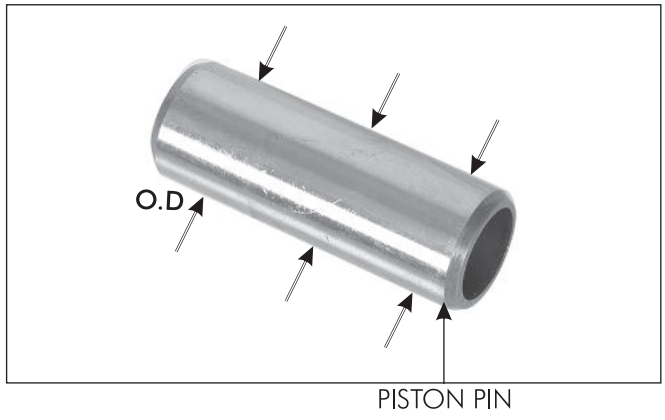
SERVICE LIMIT

PISTON PIN O.D: 13.96 mm

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT

PISTON-TO-PISTON PIN CLEARANCE: 0.07 mm



Measure the connecting rod small end I.D.

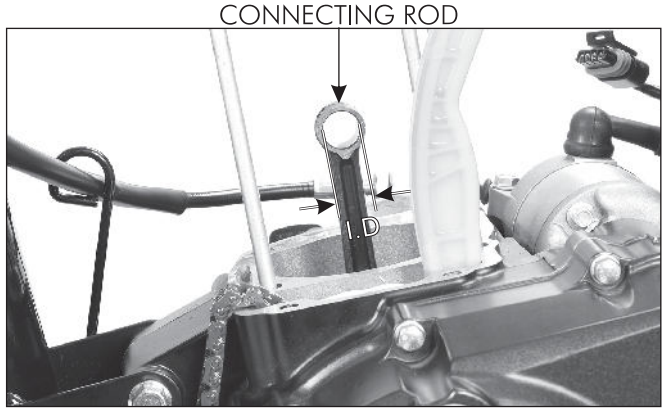
SERVICE LIMIT

CONNECTING ROD SMALL END I.D: 14.06 mm

Calculate the connecting rod small end-to-piston pin clearance.

SERVICE LIMIT

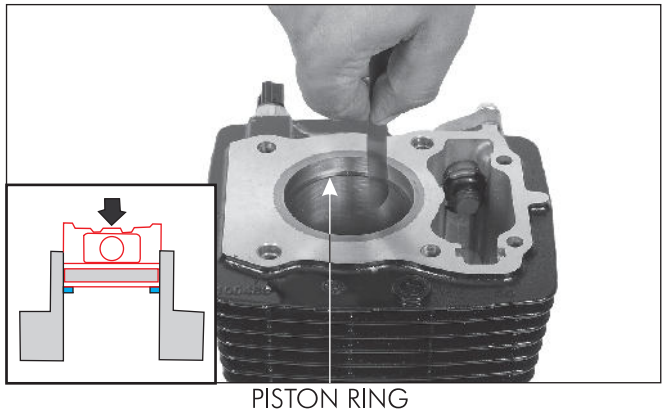
CONNECTING ROD SMALL END-PISTON PIN CLEARANCE: 0.10 mm



Using a piston, push the ring securely into the cylinder and measure the piston ring end gap using a feeler gauge.

SERVICE LIMIT

TOP RING END GAP: 0.60 mm
SECOND RING END GAP: 0.70 mm
OIL RING END GAP: 0.70 mm



Inspect the piston rings and replace them if they are worn.

NOTE

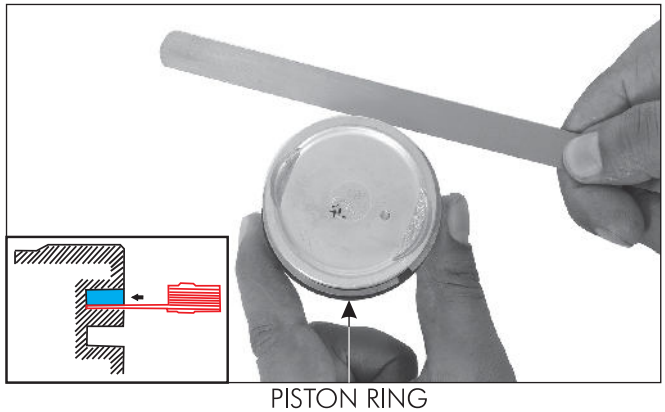
Always replace the piston rings as a set.

Reinstall the piston rings into the piston grooves.

Push in until the outer surface of the piston ring is nearly flushed with the piston and measure the clearance using a feeler gauge.

SERVICE LIMIT

TOP: 0.10 mm
SECOND: 0.10 mm



PISTON RING INSTALLATION

Clean the piston heads, ring land and skirt.

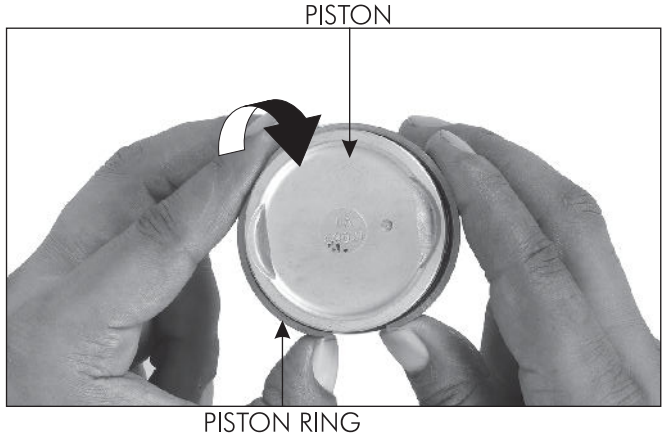
Carefully install the piston rings onto the piston with their marking facing up.

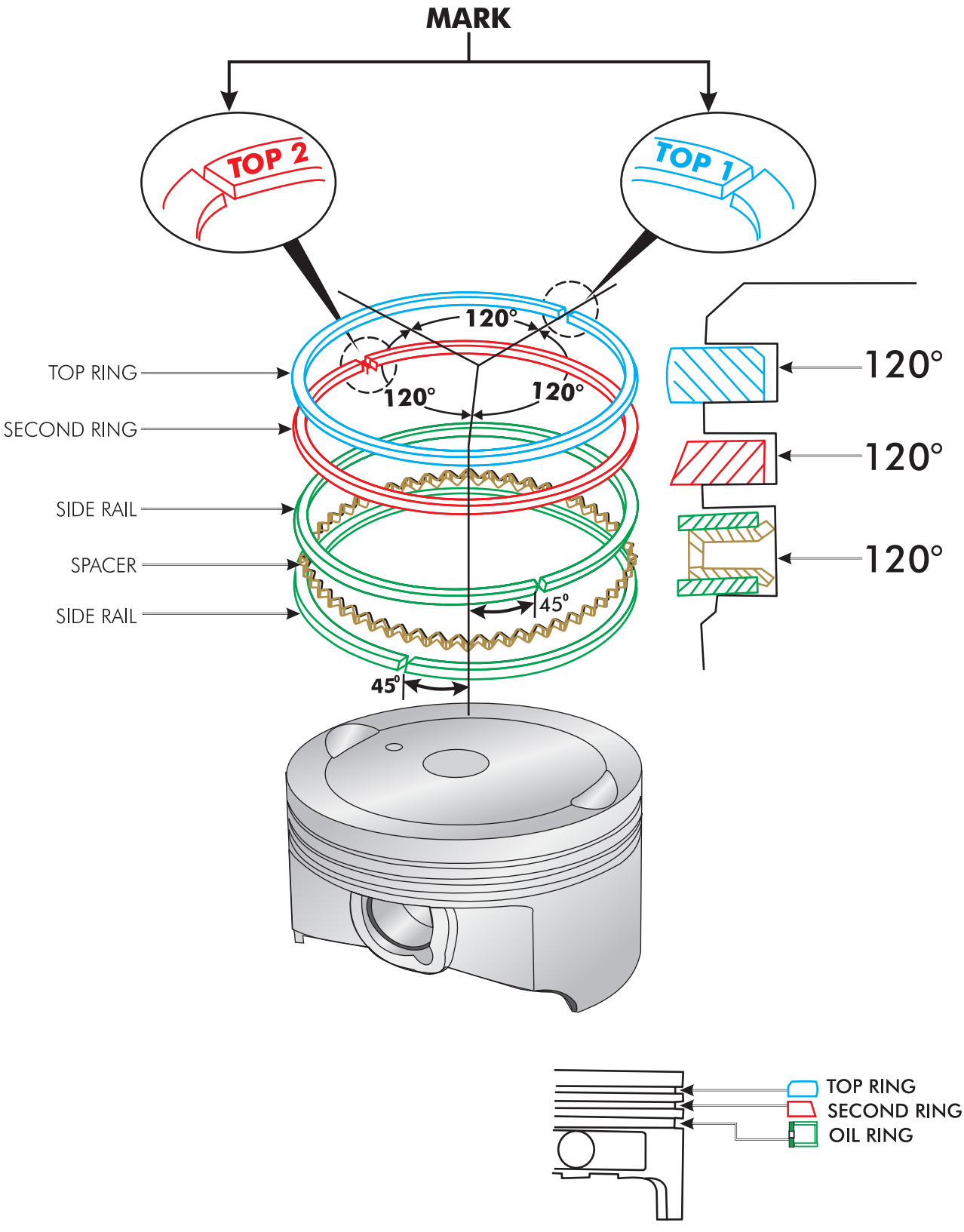
CAUTION

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston when the piston ring installation.

NOTE

- Do not confuse the top and second rings.
- After installing the rings they should rotate freely, without sticking.
- Space the ring end gaps 120° apart.




MARK
TOP 2
TOP 1
120°
120°
120°
TOP RING
SECOND RING
SIDE RAIL
SPACER
SIDE RAIL
45°
45°
120°
120°
120°
TOP RING
SECOND RING
OIL RING

PISTON

INSTALLATION

NOTE

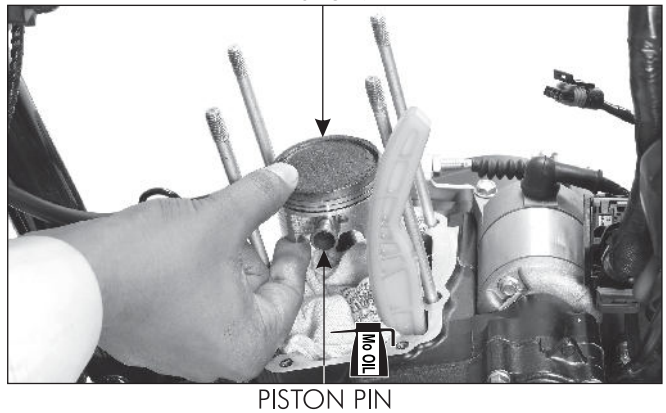
When cleaning the cylinder mating surface, place a shop towel over the crankcase opening to prevent dirt entry into the engine.

Clean any gasket material from the cylinder mating surface of the crankcase.

Apply molybdenum oil solution to the piston pin outer surfaces.

Install the piston with its "IN" mark facing the intake side.

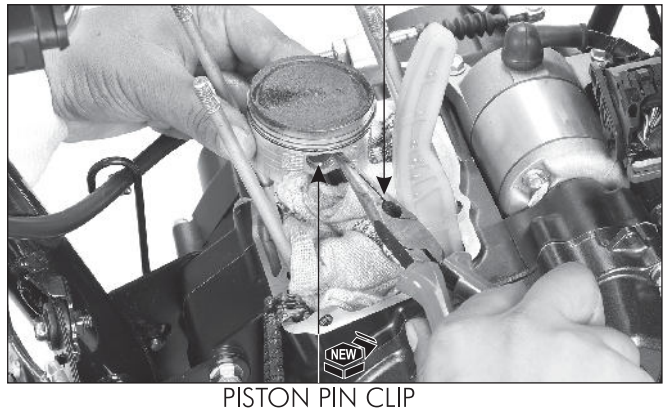
Install the piston pin.



Install new piston pin clips.

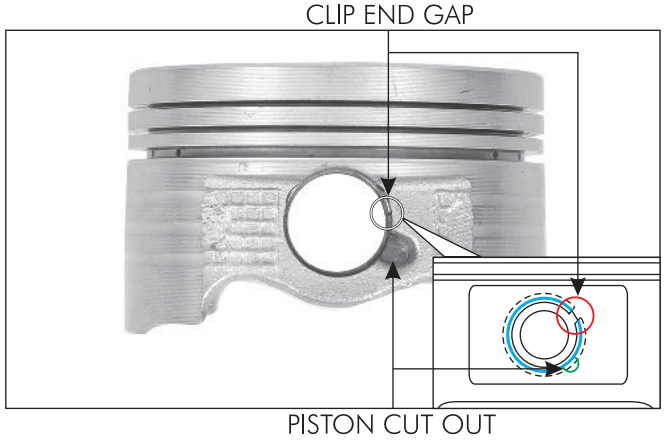
CAUTION

Always use new piston pin clips . Reinstalling used piston pin clips may lead to serious engine damage.



NOTE

- Place a shop towel over the crankcase opening to prevent piston pin clips from the falling into the crankcase.
- Set the piston pin clip in the groove properly.
- Do not align the clip's end gap with the piston cut-out.



CYLINDER

INSTALLATION

Install the dowel pins and a new gasket.

NOTE

- When cleaning the cylinder mating surface, place a shop towel over the crankcase opening to prevent dirt entry into the engine.
- Do not reuse the gasket, replace with new one.

CAUTION

- Be careful not to damage the piston rings and cylinder wall.
- Be careful not to jam the piston rings to the cutaway of the cylinder sleeve.

Apply clean engine oil to the cylinder wall, piston outer surface and piston rings.

Place piston slide base under the piston.

Install the cylinder over the piston compressing the piston rings with your fingers.

Route the cam chain through the cylinder.

TOOL

PISTON SLIDE BASE

PART NO: 070 HH 198 027

Insert the cam chain guide into the cylinder and crankcase groove.

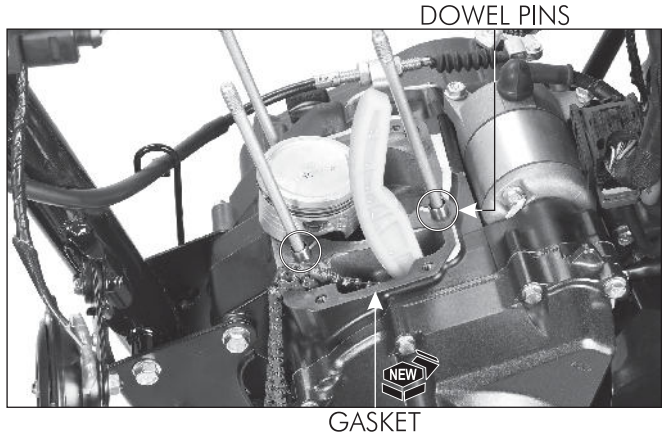
Temporarily, install the cam sprocket on the cam chain.

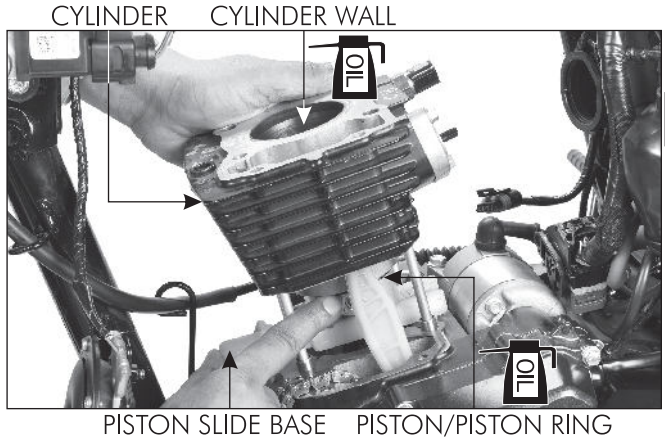
Install the gasket and dowel pins (page 7-21).

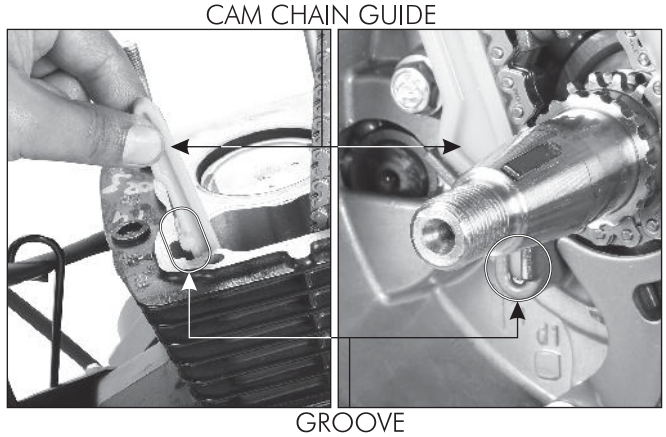
Tighten the EOT sensor.

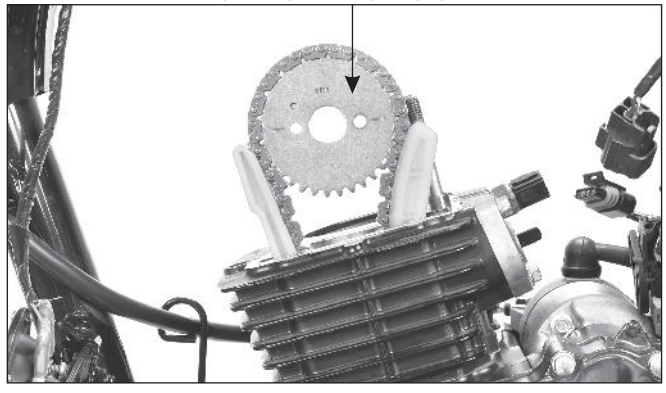
Connect the EOT sensor connector (page 5-77).

Install the cylinder head (page 7-21).





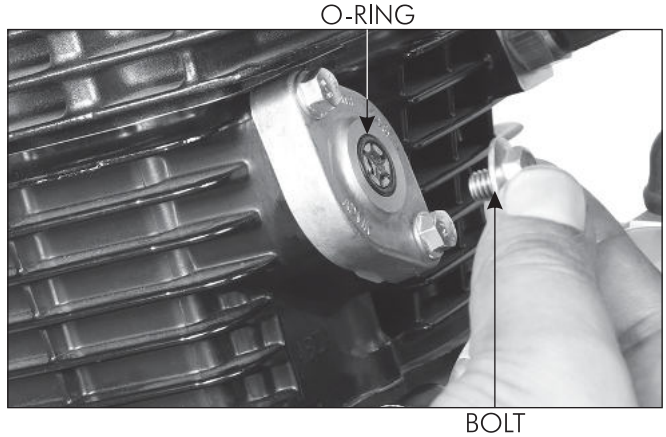




CAM CHAIN TENSIONER LIFTER

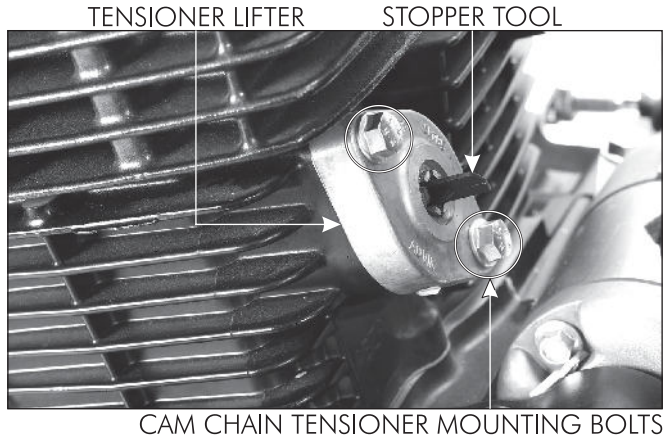
REMOVAL

Remove the tensioner bolt and O-ring.

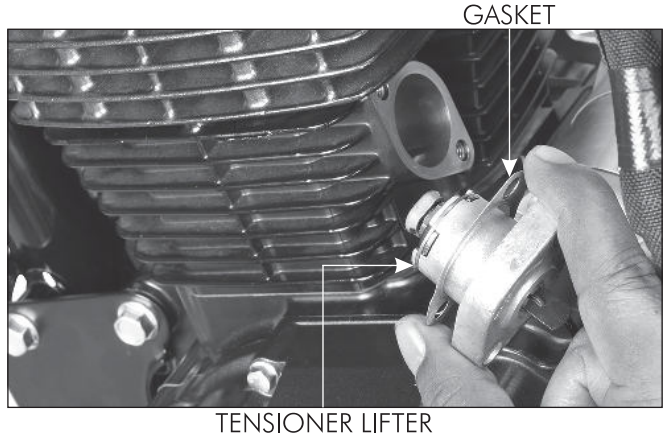


Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.

Remove the two mounting bolts.



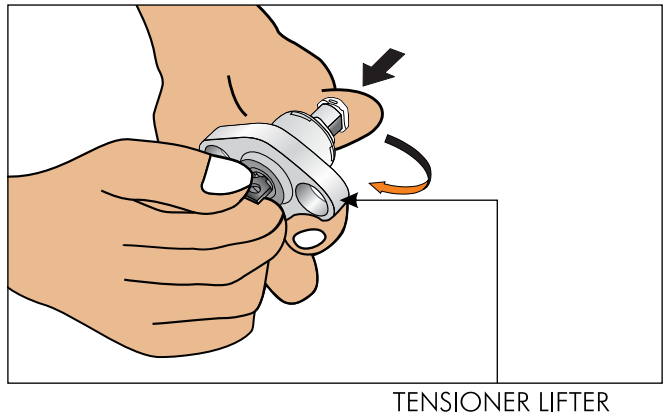
Remove the cam chain tensioner lifter and gasket.



INSPECTION

Check the lifter operation:

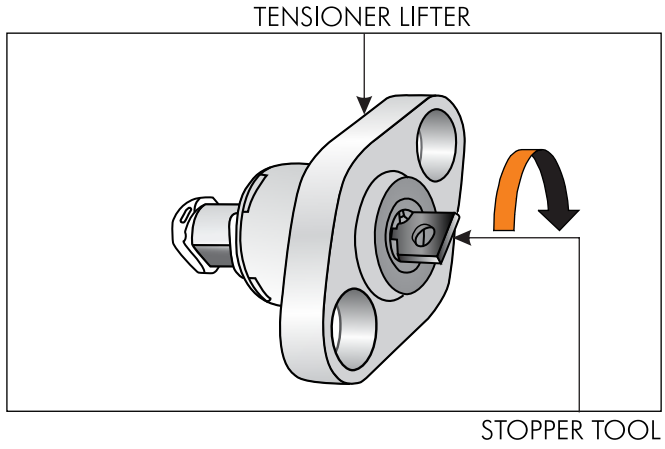
- The tensioner shaft should not go into the body when it is pushed.
- When it is turned clockwise with a stopper tool the tensioner lifter shaft should be pulled into the body .
- The shaft should spring out of the body as soon as the stopper tool is released.



CAM CHAIN TENSIONER LIFTER

INSTALLATION

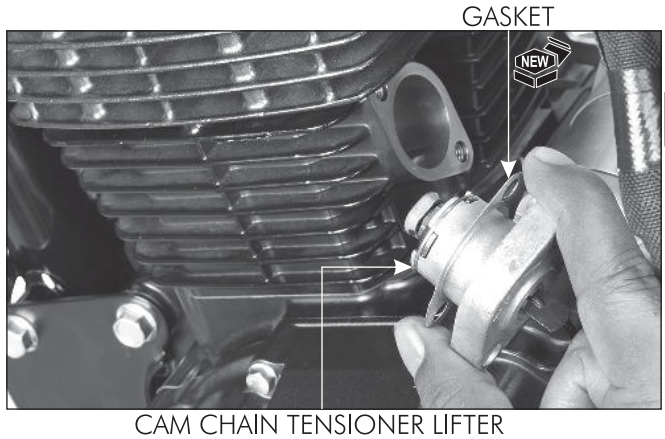
Turn the cam chain tensioner lifter shaft clockwise with the stopper tool to retract the cam chain tensioner lifter, then insert the stopper fully to hold the cam chain tensioner lifter in the retracted position.



Install the cam chain tensioner lifter along with a new gasket.

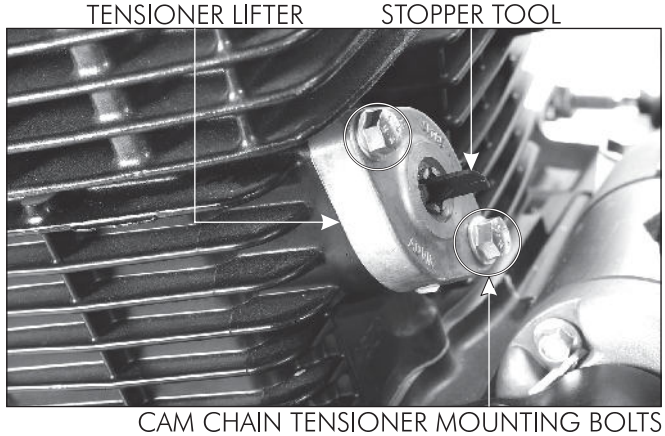
NOTE

Never assemble the cam chain tensioner lifter to the engine with the tension condition, as it may cause cam chain noise/wear.



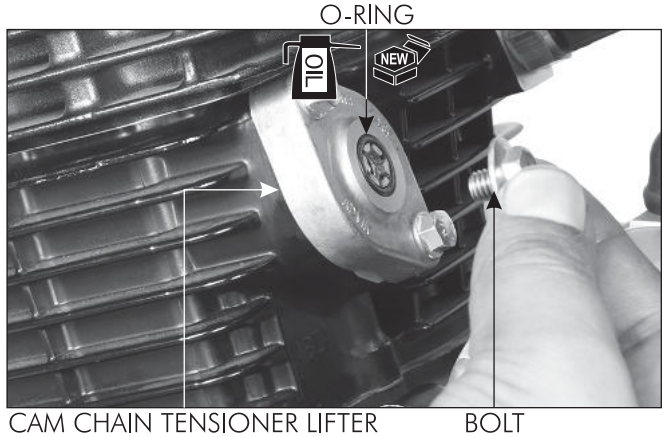
Install the mounting bolts and tighten them.

Remove the stopper tool from the cam chain tensioner lifter.



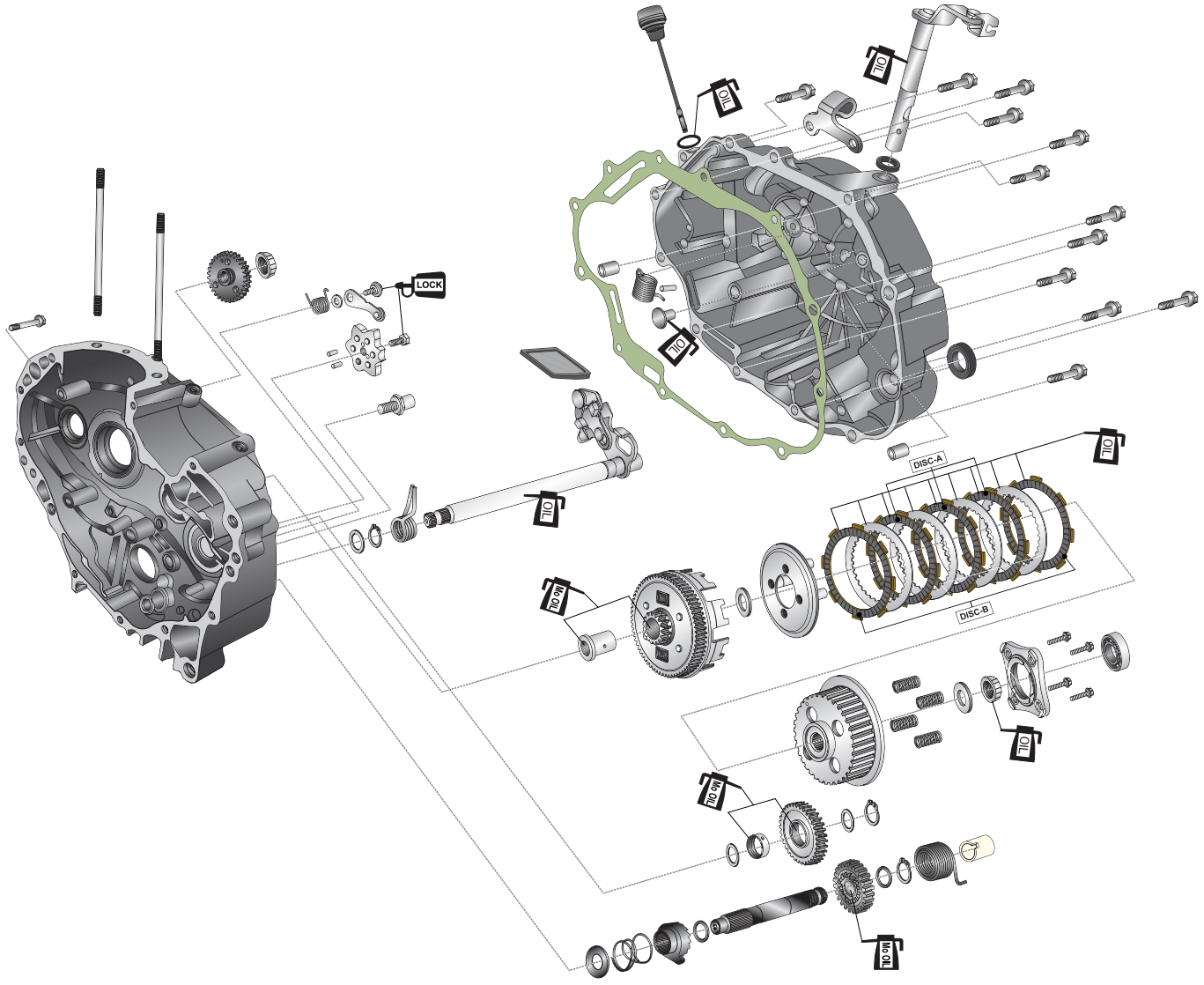
Apply clean engine oil to a new O-ring and install it to the lifter.

Install the cam chain tensioner lifter bolt and tighten it.



MEMO

SYSTEM DIAGRAM



CLUTCH/GEARSHIFT LINKAGE/KICK STARTER

System Diagram	**9-0**	**Primary Drive Gear**	**9-15**
Service Information	**9-1**	**Crankshaft Collar/Balancer Drive Gear**	**9-16**
Specifications/Torque Values	**9-1**	**Gearshift Linkage**	**9-18**
Special Tools/Troubleshooting	**9-2**	**Kick starter Idle Gear**	**9-21**
Right Crankcase Cover	**9-3**	**Kick starter**	**9-23**
Clutch	**9-6**		

SERVICE INFORMATION

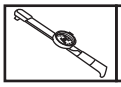
GENERAL

- The clutch and the gearshift linkage can be serviced with the engine installed on the frame.
- Engine oil viscosity and level have an effect on clutch operation. When the clutch does not disengage or the vehicle creeps with the clutch disengaged, inspect the engine oil and oil level before servicing the clutch system.
- When removing and installing the oil pump, care to be taken to avoid oil or dirt entry into the engine.

SPECIFICATIONS

CLUTCH/GEARSHIFT LINKAGE/PRIMARY GEAR DRIVE

ITEM			STANDARD	SERVICE LIMIT
Clutch	Lever free play		10-20 mm	-
	Spring free length		40.50 mm	39.6 mm
	Disc thickness	Disc-A (n=2) green	2.92-3.08 mm	2.62 mm
		Disc-B (n=3)	2.92-3.08 mm	2.62 mm
	Plate warpage		-	0.2 mm
	Clutch outer guide I.D		16.991-17.009 mm	17.05 mm
	Clutch outer guide O.D		22.959-22.980 mm	22.93 mm
	Clutch outer I.D		23.000-23.021 mm	23.08 mm
Kick starter	Pinion I.D		16.016-16.034 mm	16.09 mm
	Spindle O.D		15.966-15.984mm	15.95 mm

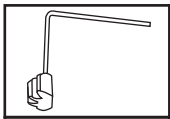
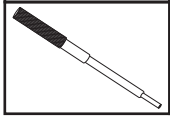


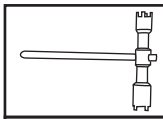
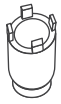
TORQUE VALUES

OIL FILTER ROTOR LOCK NUT	**: 6.4 kgf-m**
CLUTCH CENTER LOCK NUT	**: 7.4 kgf-m**
CLUTCH LIFTER PLATE BOLT	**: 1.2 kgf-m**
SHIFT DRUM STOPPER PLATE BOLT	**: 1.2 kgf-m**
SHIFT DRUM STOPPER PLATE ARM BOLT	**: 1.2 kgf-m**
BALANCER DRIVEN GEAR LOCK NUT	**: 5.5 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

TOOL	SPECIAL TOOLS

	**GPD HOLDER** **PART NO: 070 HH 198 017**
	CLUTCH CENTER HOLDER **PART NO: 070 HH 198 004**
	**CLUTCH LEVER SPRING PIN REMOVER/INSTALLER** **PART NO: HMCL O214 AABA 03**

	**SOCKET WRENCH** **PART NO: 070 HH KTC 001**
	**SOCKET, 20 mm** **PART NO: 070 HH KTC 002**

TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the free play.

Clutch lever too hard

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter plate bearing

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Excessive clutch lever free play
- Clutch plate warped
- Oil level too high, improper oil viscosity, or additive used.
- Check for oil additive

Clutch slips

- Clutch lifter sticking
- Worn clutch discs
- No clutch lever free play
- Check for oil additive
- Weak clutch springs

Clutch operation feels rough

- Rough clutch outer slots

Hard to shift

- Misadjusted clutch cable
- Damaged or bent shift fork
- Bent shift fork shaft
- Incorrect engine oil viscosity
- Incorrect gearshift spindle assembly
- Damaged shift drum guide grooves

Transmission jumps out of gear

- Worn shift drum stopper arm
- Worn or broken gearshift spindle return spring
- Bent shift fork shaft
- Damaged shift drum guide grooves
- Worn gear dogs or dog holes

Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

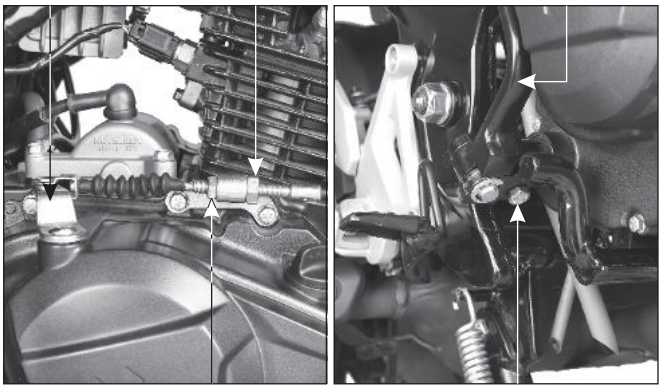
RIGHT CRANKCASE COVER

REMOVAL

Drain the engine oil (page 3-10).

Loosen the lock nut and adjusting nut, then disconnect the clutch cable from the clutch lever.

Remove the pinch bolt and kick starter pedal.

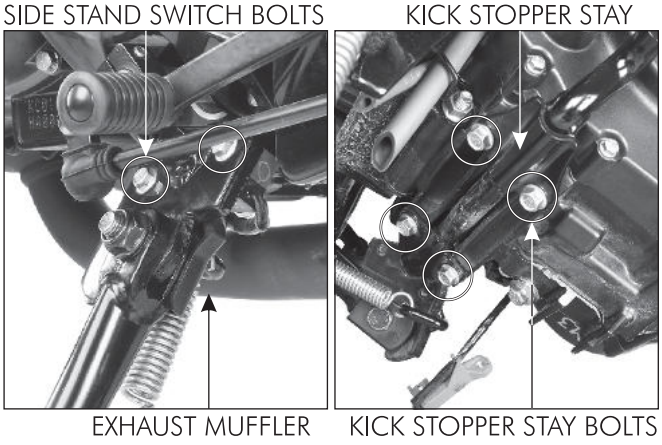


Remove the exhaust muffler (page 2-9).

Remove the side stand switch by removing the bolts.

Remove the kick stopper stay mounting bolts.

Remove the kick stopper stay.



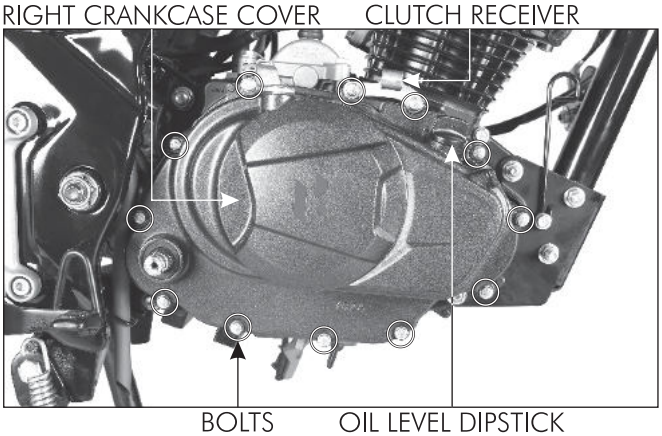
NOTE

- The right crankcase cover can be serviced with the engine installed in the frame.
- Apply multipurpose grease to the kick shaft serrated area.
- Clean around the dipstick area with compressed air before removing and be sure that no debris are allowed to enter inside the engine.

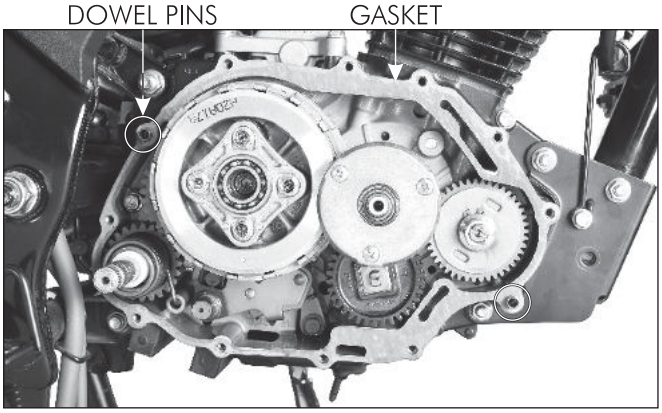
Remove the oil level dipstick.

Loosen and remove the right crankcase cover bolts in a crisscross pattern in 2 or 3 steps.

Remove the clutch receiver and the right crankcase cover.



Remove the gasket and dowel pins.



DISASSEMBLY

Remove the clutch lifter rod.

Unhook the return spring from right crankcase cover.

Measure and record the length of spring pin protrusion.

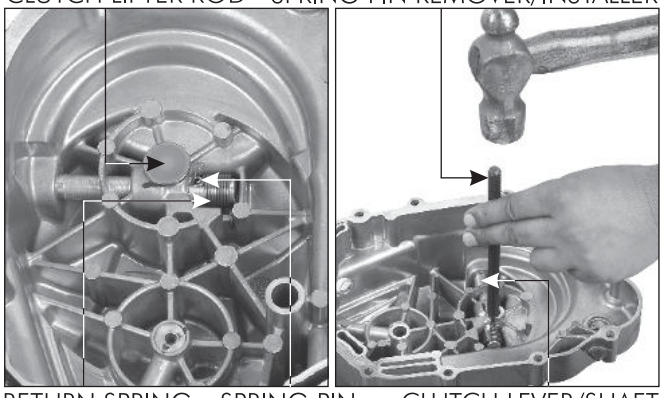
Drive the spring pin into the clutch lever/shaft until the pin end is flush with the clutch lever/shaft surface.

Pull the clutch lever/shaft out and remove the return spring.

TOOL

CLUTCH LEVER SPRING PIN REMOVER/INSTALLER
PART NO: HMCL O214 AABA 03

CLUTCH LIFTER ROD SPRING PIN REMOVER/INSTALLER



RETURN SPRING SPRING PIN CLUTCH LEVER/SHAFT

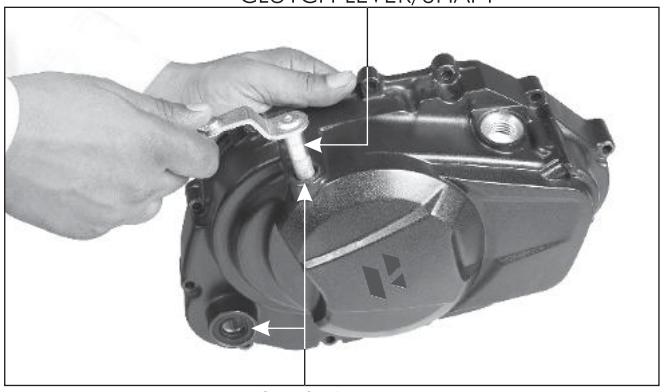
Remove the clutch lever/shaft, clutch lever shaft oil seal and kick starter spindle oil seal.

Check the clutch lifter rod and clutch lever/shaft for wear or damage.

Check the return spring for fatigue or damage.

Replace the oil seals with the new one.

CLUTCH LEVER/SHAFT



OIL SEAL

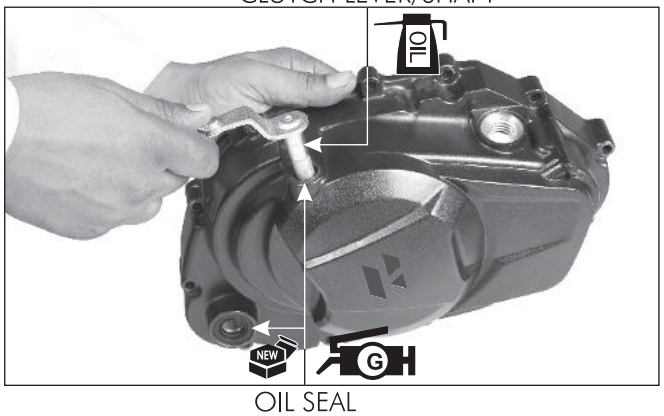
ASSEMBLY

Apply grease to a new clutch lever shaft oil seal lip and install it into the right crankcase cover.

Apply clean engine oil to the clutch lever shaft sliding surface and install it into the right crankcase cover.

Apply grease to kick starter spindle oil seal lip and install it into the right crankcase cover.

CLUTCH LEVER/SHAFT



OIL SEAL

Install the return spring onto the clutch lever shaft end.

From the opposite side, drive the spring pin until it projects the same amount as recorded at disassembly.

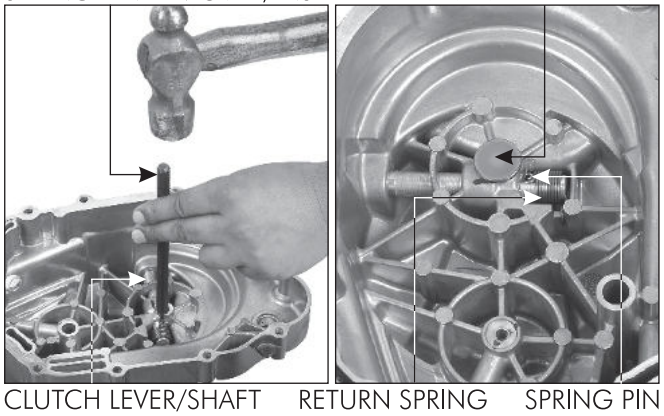
Hook the return spring ends as shown.

Install the clutch lifter rod into the clutch lever shaft groove while aligning the groove with the clutch lifter rod hole.

TOOL

CLUTCH LEVER SPRING PIN REMOVER/INSTALLER
PART NO: HMCL O214 AABA 03

SPRING PIN REMOVER/INSTALLER CLUTCH LIFTER ROD

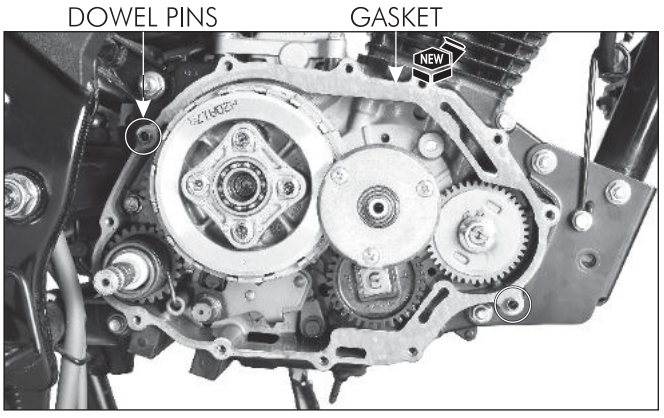


CLUTCH LEVER/SHAFT RETURN SPRING SPRING PIN

INSTALLATION

Clean off any gasket material from the mating surfaces of the right crankcase and cover.

Install the dowel pins and new gasket.



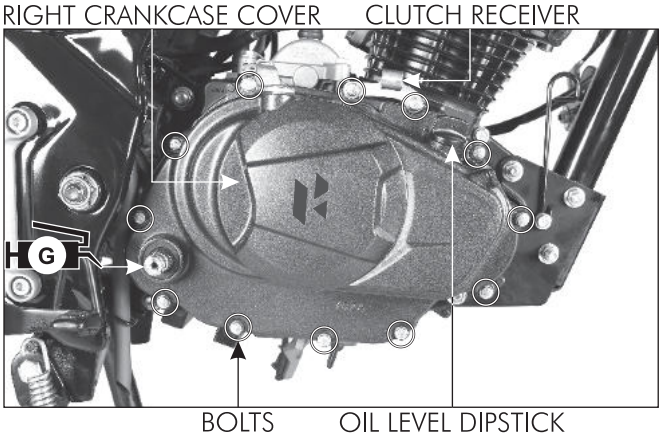
NOTE

Apply multipurpose grease to the kick starter serrated area.

Install the right crankcase cover, clutch receiver and cover bolts.

Tighten the bolts in a criss-cross pattern in 2 or 3 steps.

Install the oil level dipstick.

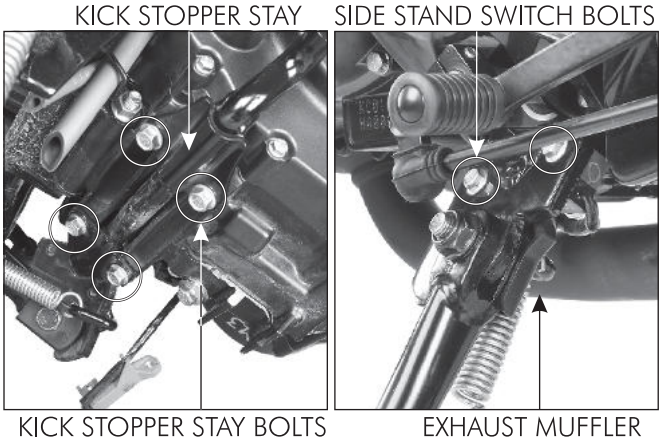


Install the kick stopper stay.

Install the kick stopper stay mounting bolts.

Install the side stand switch by installing the bolts.

Install the exhaust muffler (page 2-10).

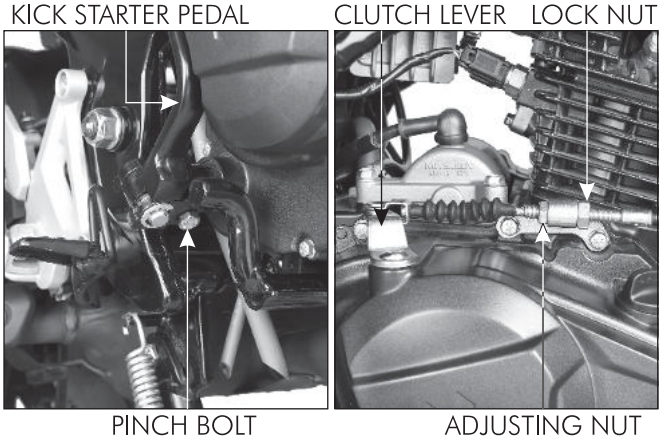


Install the kick starter pedal and tighten the pinch bolt.

Connect the clutch cable to the clutch lever.

Adjust the clutch lever free play (page 3-21).

Fill the crankcase with the recommended engine oil (page 3-10).



CLUTCH

DISASSEMBLY

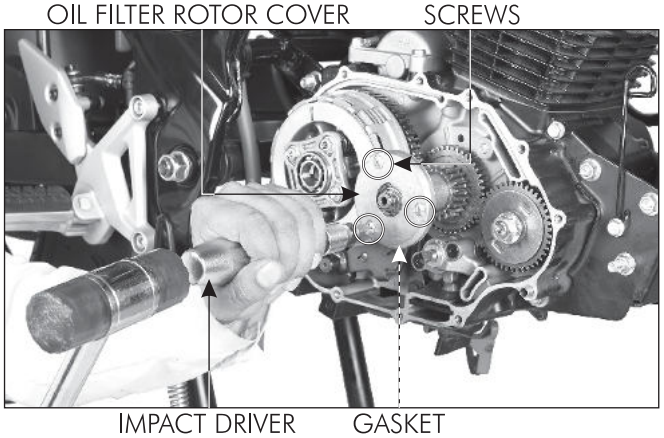
Remove the right crankcase cover (page 9-3).

Remove the screws from oil filter rotor cover using an impact driver.

Remove the oil filter rotor cover and gasket.

NOTE

Do not use GPD holder while using impact driver.

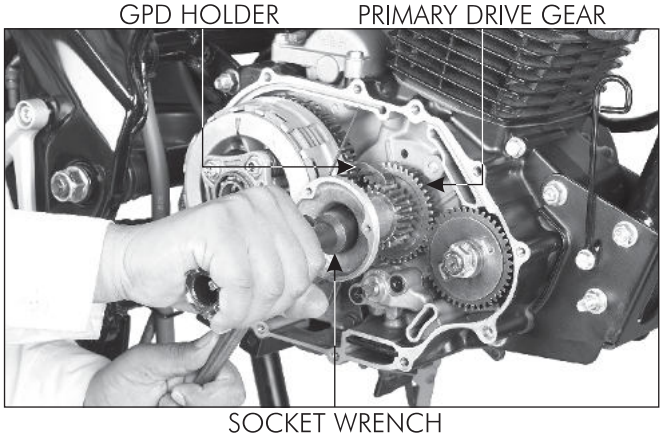


Remove the oil pump driven gear (page 4-3).

Install the GPD holder between the primary drive and driven gears as shown and loosen the oil filter rotor lock nut by using socket wrench.

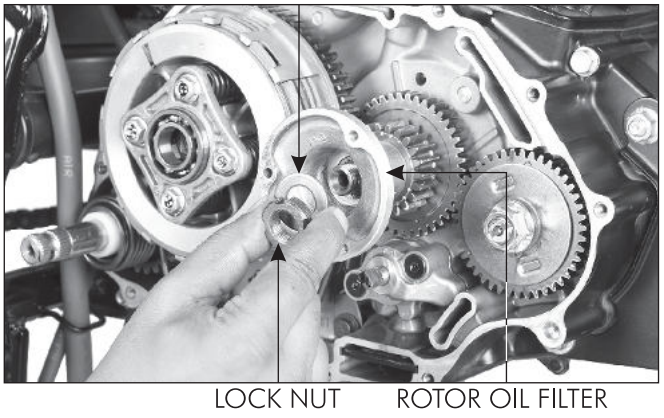
TOOL

GPD HOLDER
PART NO: 070 HH 198 017
SOCKET WRENCH
PART NO: 070 HH KTC 001



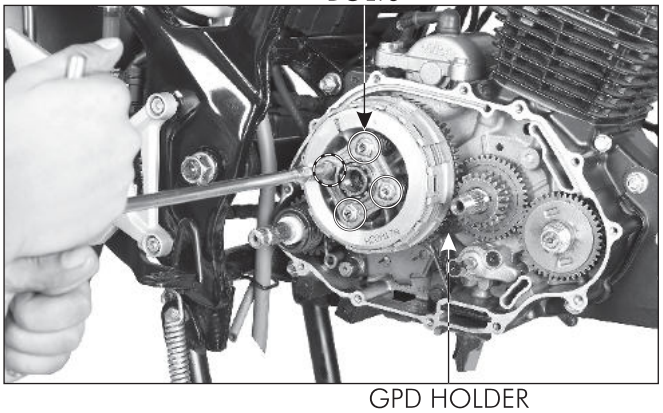
Remove the lock nut and washer

Remove the rotor oil filter.

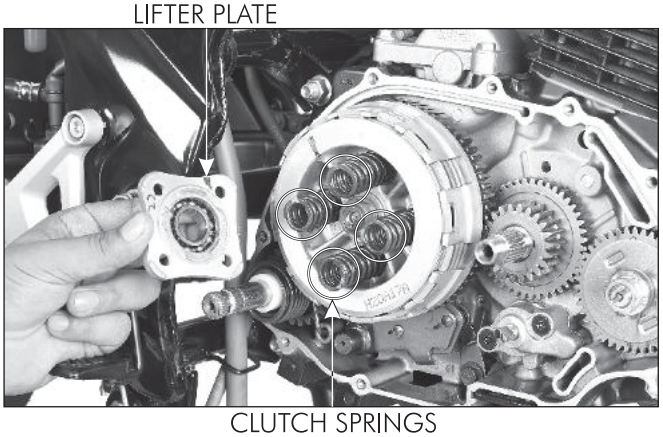


Loosen the clutch lifter plate bolts in a criss-cross pattern in several steps using GPD holder.

Remove the lifter plate bolts.



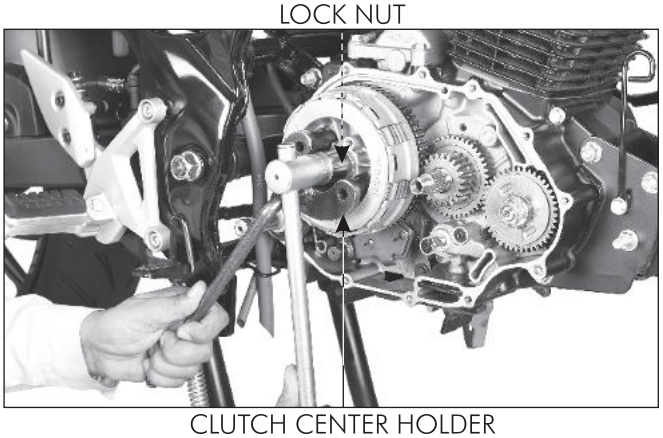
Remove the lifter plate and clutch springs.



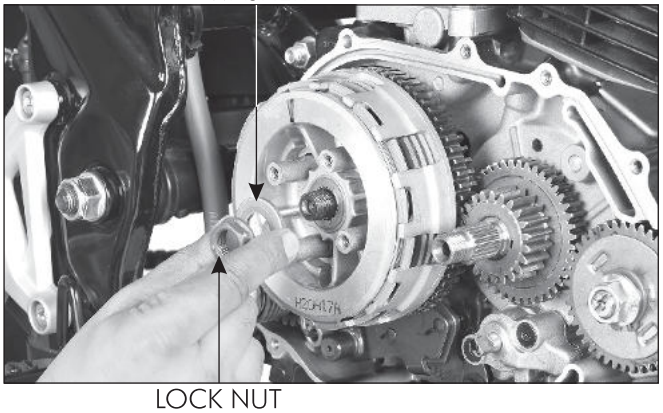
Hold the pressure plate with clutch center holder and loosen the clutch center lock nut.

TOOL

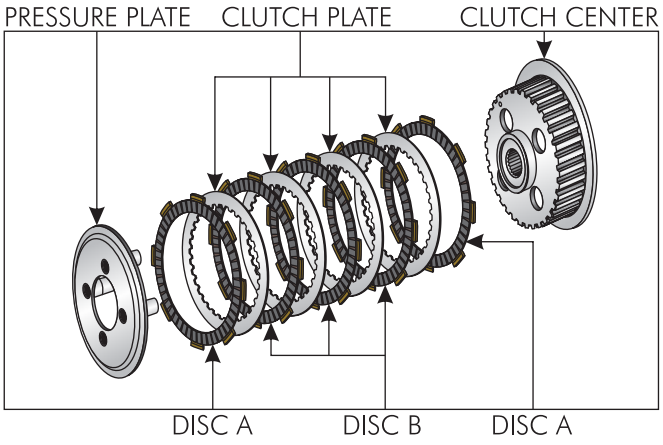
CLUTCH CENTER HOLDER
PART NO: 070 HH 198 004



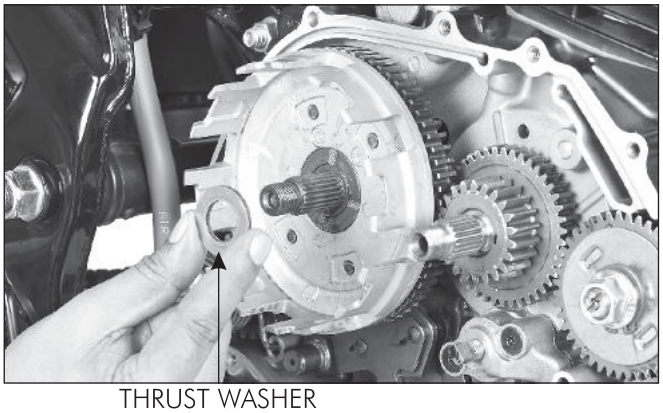
Remove the clutch center lock nut and washer.



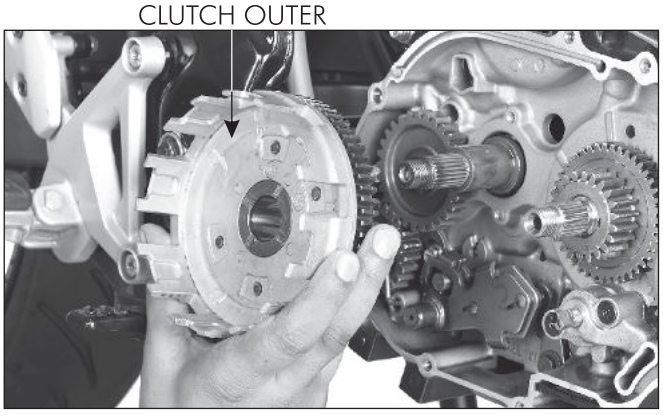
Remove the following:
- Clutch center
- Clutch friction discs A
- Clutch plates
- Clutch friction discs B
- Pressure plate



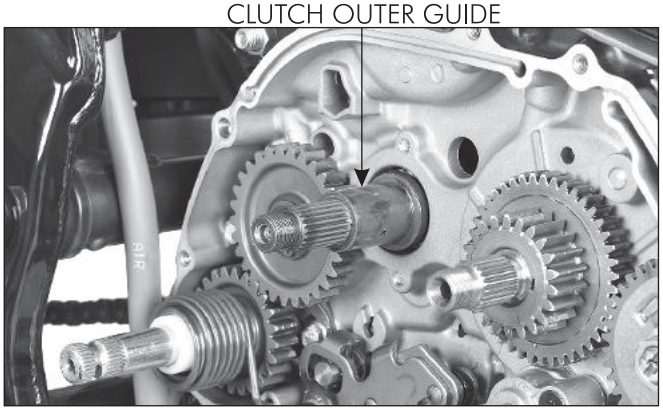
Remove the thrust washer.



Remove the clutch outer.



Remove the clutch outer guide.



INSPECTION

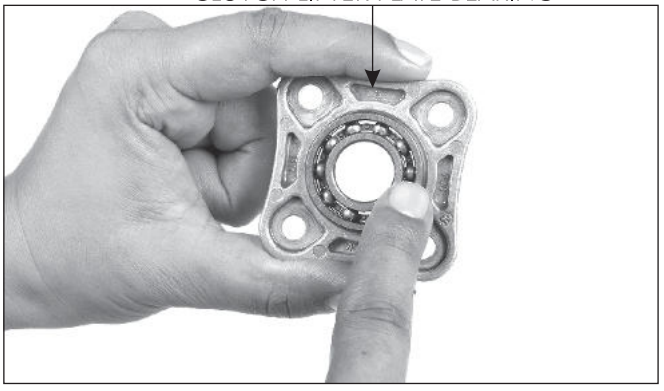
CLUTCH LIFTER PLATE BEARING

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and quietly.

Also check that the outer race of the bearing fits tightly in the lifter plate.

Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fits loosely in the lifter plate.



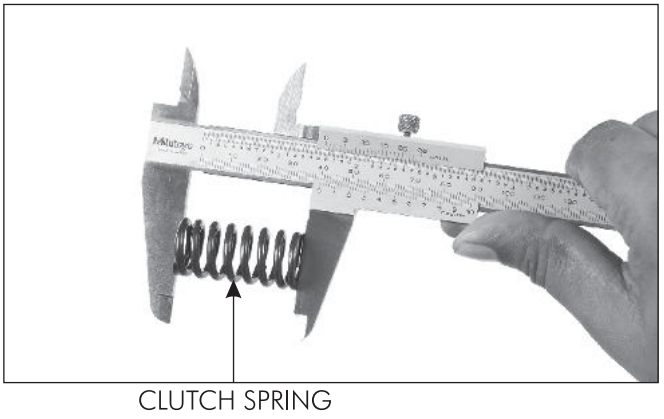
CLUTCH SPRING

Check the clutch spring for fatigue or damage.

Measure the clutch spring free length.

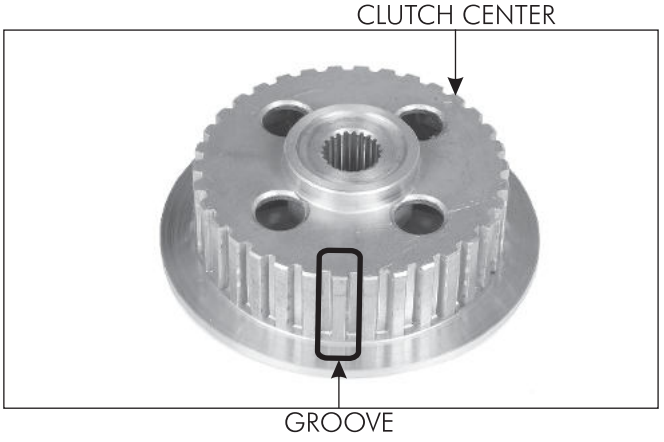
SERVICE LIMIT

CLUTCH SPRING FREE LENGTH: 39.6 mm



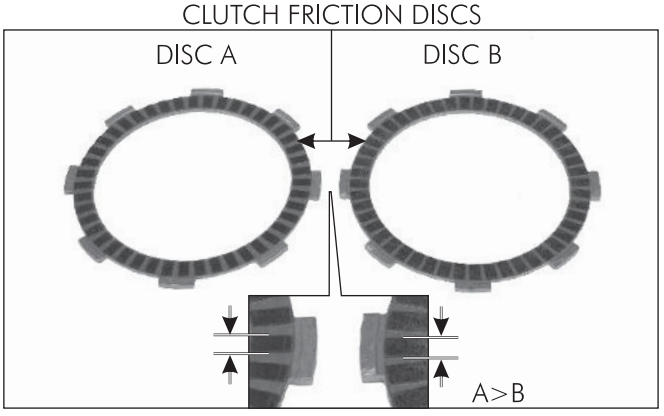
CLUTCH CENTER

Check the grooves of the clutch center for damage or wear caused by the clutch plates.



CLUTCH FRICTION DISC

Check the clutch friction discs for signs of scoring or discoloration.

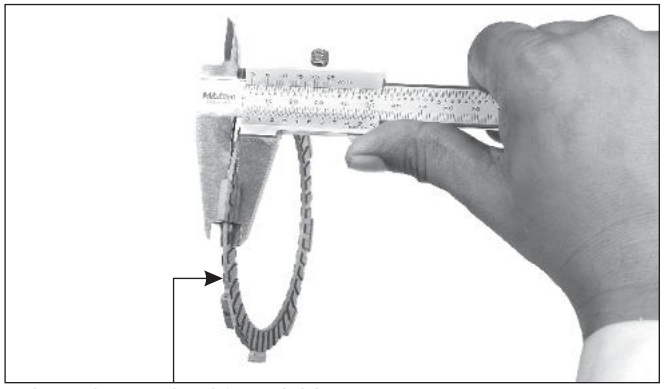


Measure the thickness of each disc.

SERVICE LIMIT

Disc A: 2.62 mm

Disc B: 2.62 mm



CLUTCH FRICTION DISCS

CLUTCH PLATE

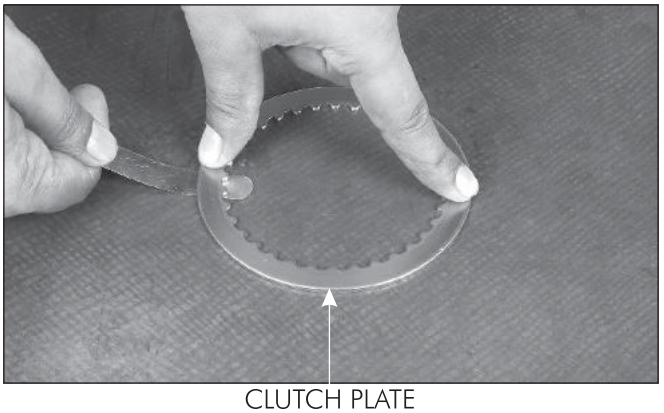
Check the clutch plates for discoloration.

Check the clutch plates for warpage on a surface plate using a feeler gauge.

SERVICE LIMIT

WARPAGE: 0.20 mm

Warped clutch plates prevent the clutch from disengaging properly.



CLUTCH PLATE

CLUTCH OUTER/OUTER GUIDE

Check the slots in the clutch outer for nicks, cuts or indentations made by the clutch discs.

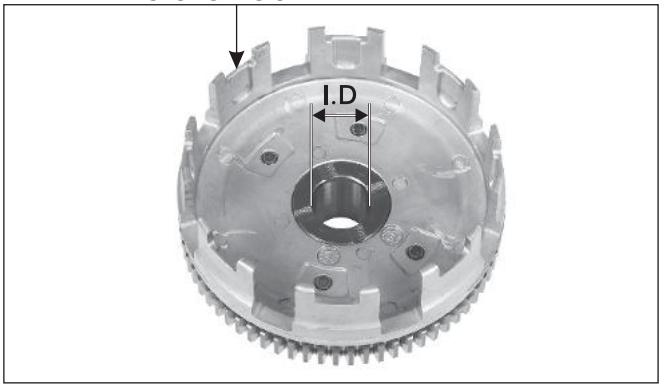
Check the primary driven gear teeth for wear or damage.

Measure the clutch outer I.D.

SERVICE LIMIT

I.D: 23.08 mm

CLUTCH OUTER



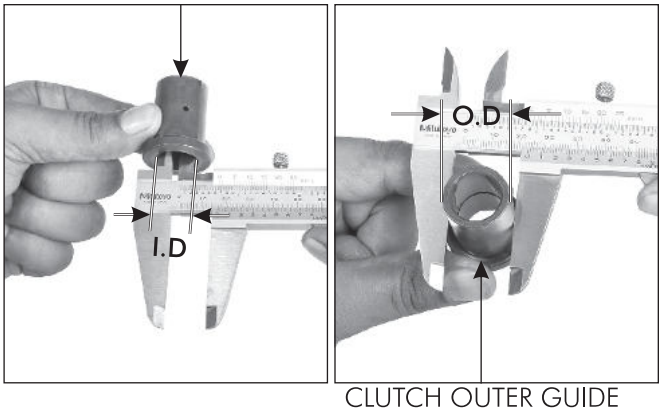
Measure the clutch outer guide I.D and O.D.

SERVICE LIMIT

I.D: 17.05 mm

O.D: 22.93 mm

CLUTCH OUTER GUIDE



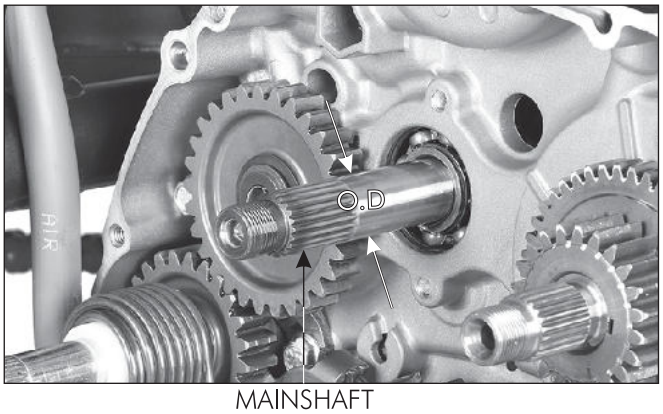
CLUTCH OUTER GUIDE

MAINSHAFT

Measure the mainshaft O.D. at the clutch outer guide.

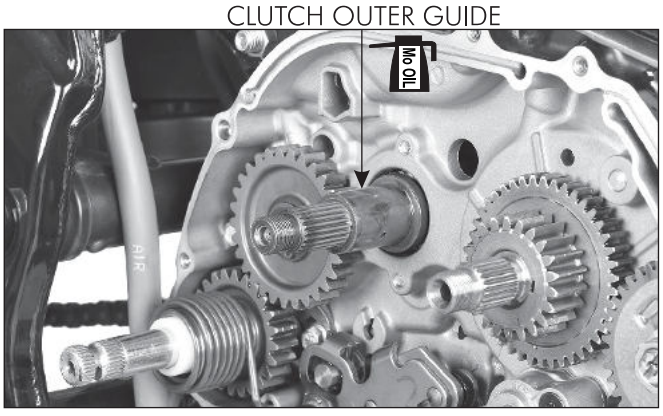
SERVICE LIMIT

O.D: 16.93 mm

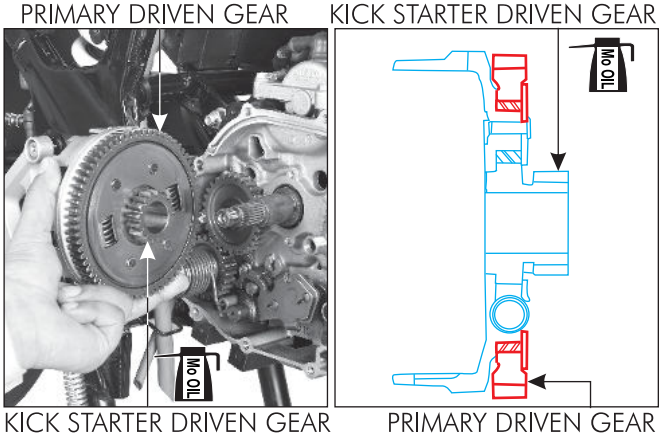


ASSEMBLY

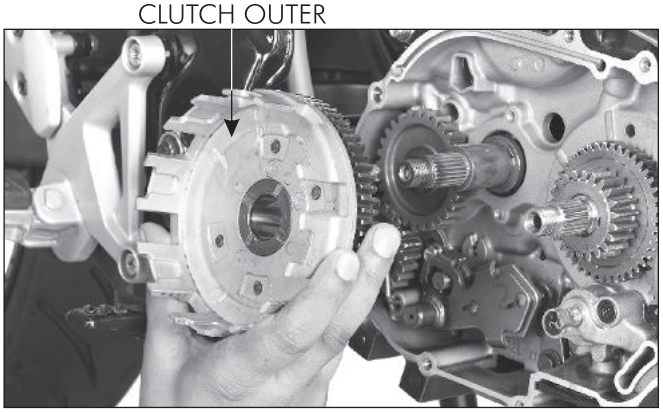
Apply molybdenum oil solution to the entire surface of the clutch outer guide and install it into the mainshaft.



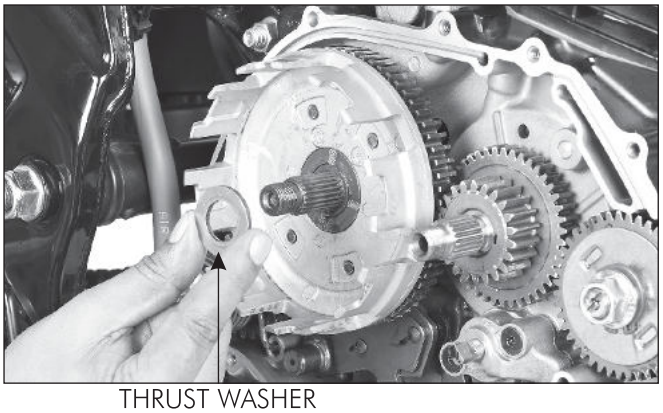
Apply clean engine oil with MOS_2 to the kick starter driven gear.



Install the clutch outer.



Install the clutch outer and thrust washer.

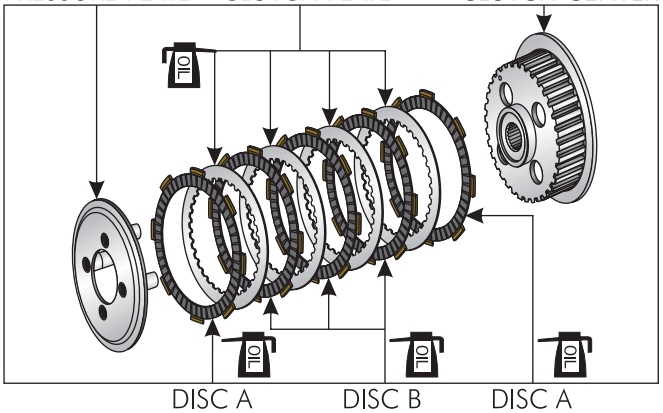


THRUST WASHER

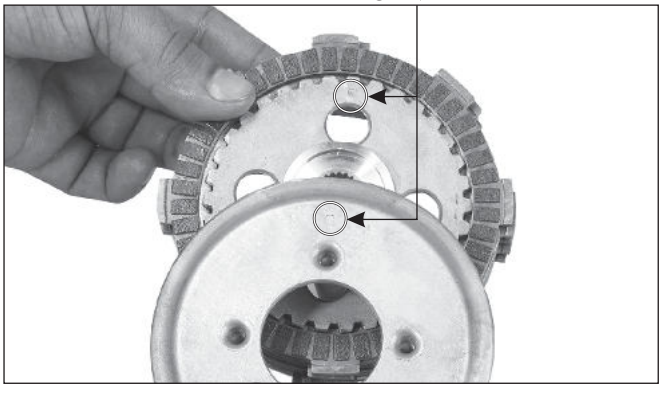
Coat the clutch friction discs with clean engine oil.

NOTE

Stack the discs and plates alternately.



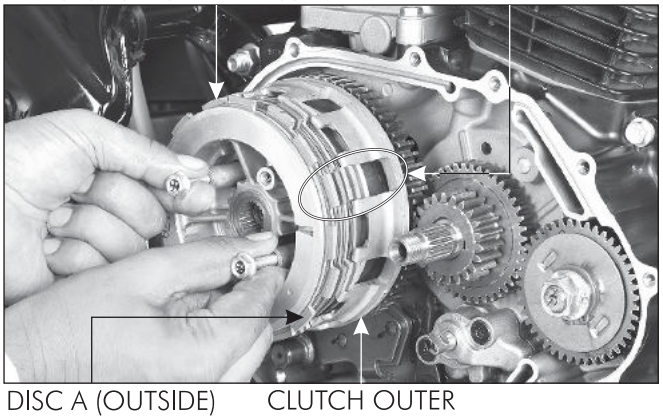
Install pressure plate on to the clutch center assembly while aligning the "O" mark of clutch center and the pressure plate.



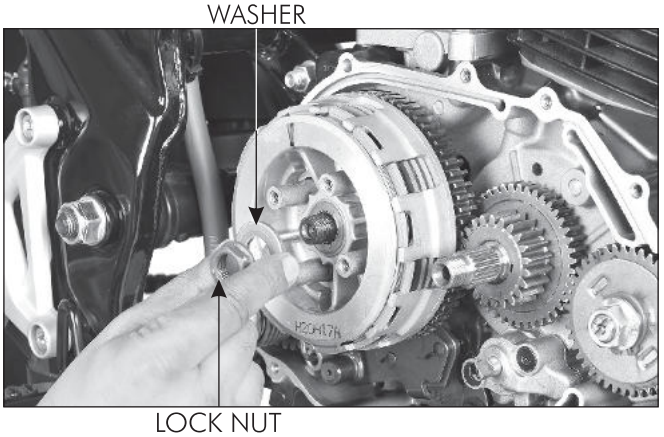
Install the clutch center assembly into the clutch outer.

NOTE

Install the tabs of clutch disc A (outside) into the shallow slots in the clutch outer.



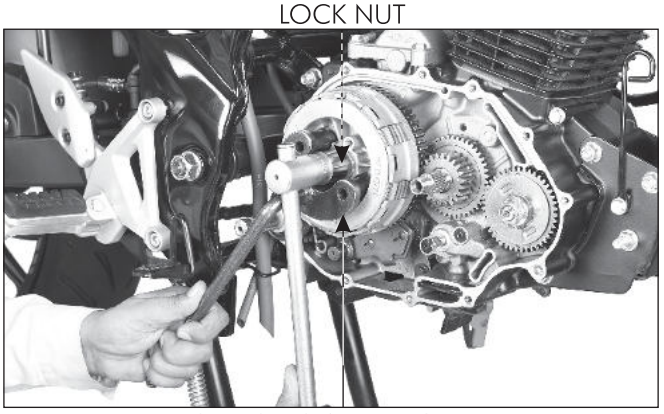
Install the washer and flange nut.



Hold the pressure plate with the clutch center holder.
Tighten the clutch center lock nut using the special tool.

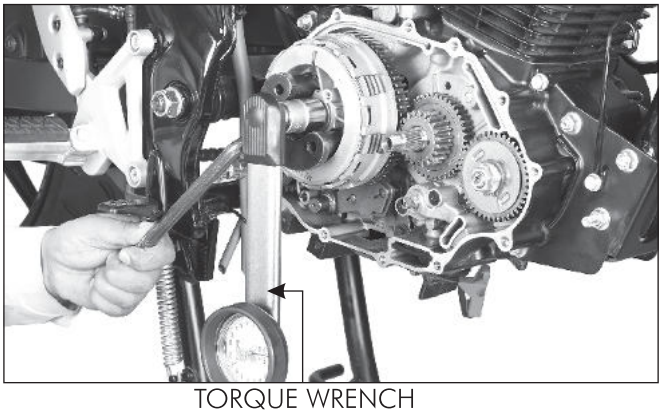
TOOL

CLUTCH CENTER HOLDER
PART NO: 070 HH 198 004

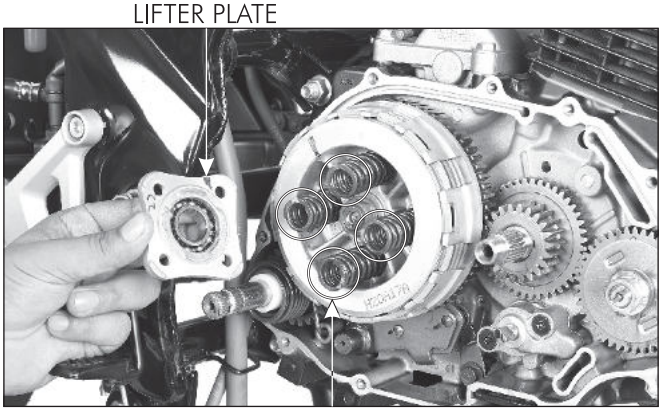


Tighten the clutch center lock nut to the specified torque using torque wrench.

TORQUE
CLUTCH CENTER LOCK NUT: 7.4 kgf-m



Install the clutch springs and lifter plate.



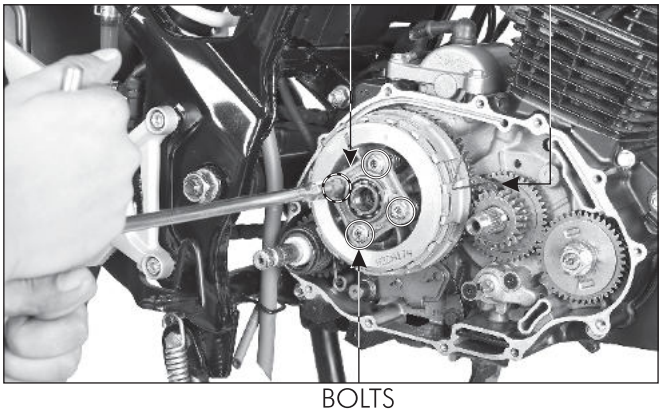
Tighten the lifter plate bolts in a crisscross pattern in several steps, using GPD holder.

TORQUE

CLUTCH LIFTER PLATE BOLT: 1.2 kgf-m

TOOL

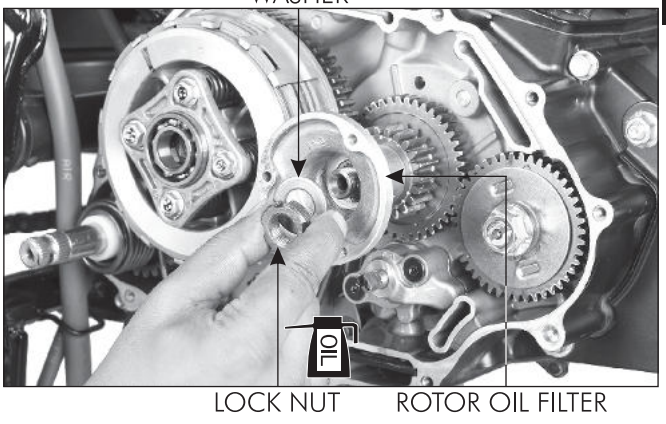
GPD HOLDER
PART NO: 070 HH 198 017



Install the rotor oil filter onto the crankshaft.

Install the rotor oil filter washer onto the crankshaft.

Apply clean engine oil to the threads and seating surface of the lock nut and install it with the chamfered side facing in.



Install the GPD holder between the primary drive and driven gear as shown and tighten the oil filter rotor lock nut by using socket wrench.

TOOL

GPD HOLDER
PART NO: 070 HH 198 017
SOCKET WRENCH
PART NO: 070 HH KTC 001

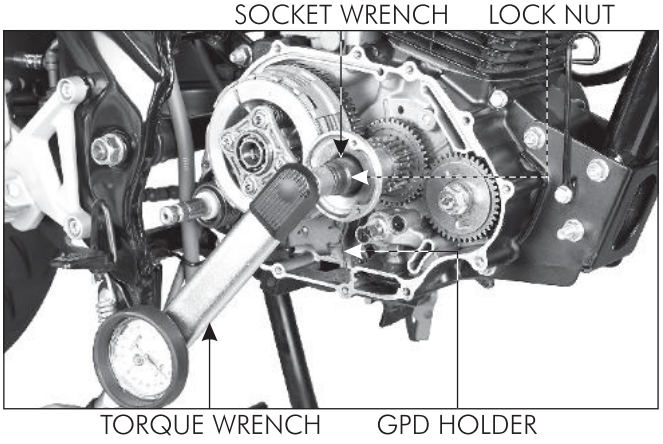
Tighten the oil filter rotor lock nut to the specified torque using a torque wrench.

TOOL

SOCKET, 20 mm
PART NO: 070 HH KTC 002

TORQUE

OIL FILTER ROTOR LOCK NUT: 6.4 kgf-m



Install the new gasket.

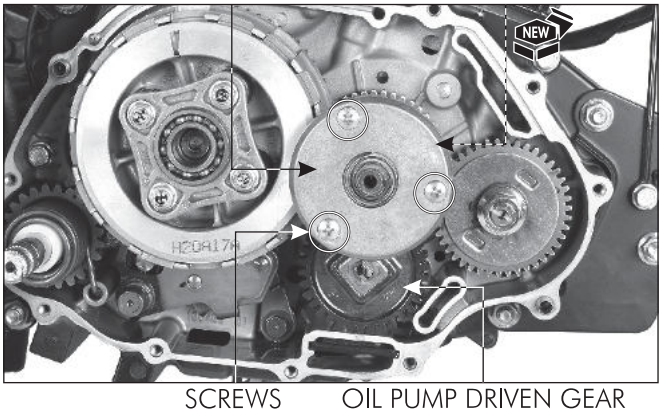
Install the oil filter rotor cover and screws by using an impact driver.

NOTE

Do not use GPD holder while using impact driver.

Install the oil pump driven gear (page 4-7).

Install the right crankcase cover (page 9-5).

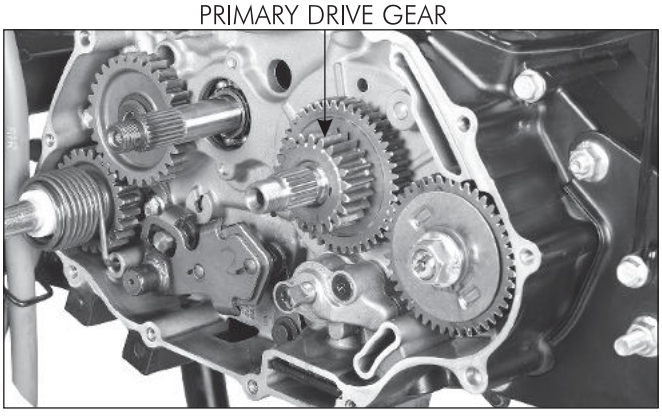


PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch assembly (page 9-6).

Remove the primary drive gear.

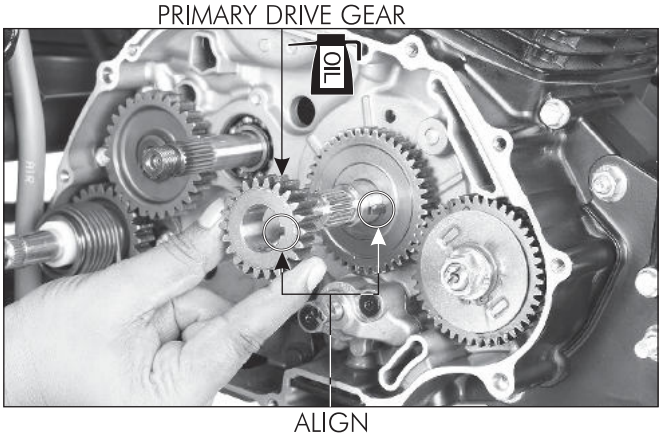


INSTALLATION

Apply clean engine oil to the primary drive gear.

Install the primary drive gear, aligning the groove with the woodruff key.

Install the clutch assembly.



BALANCER DRIVE GEAR/BALANCER DRIVEN GEAR

REMOVAL

Remove the primary drive gear (page 9-15).

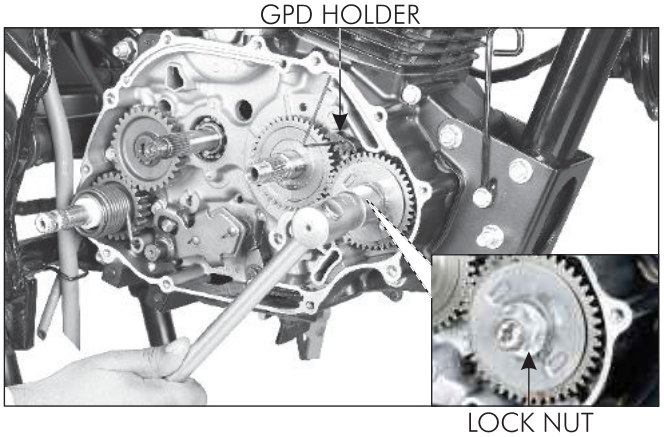
Remove the oil pump (page 4-4).

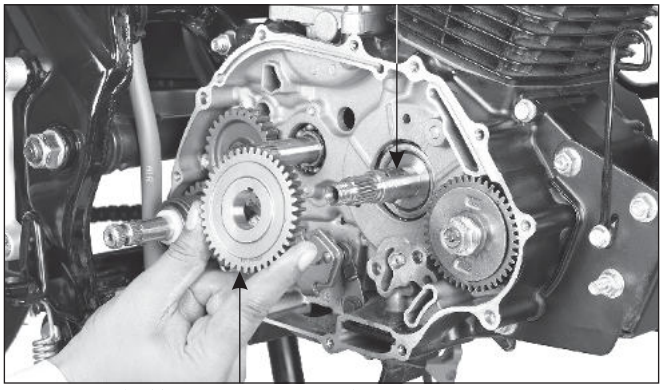
Install the GPD holder between the balancer drive gear and balancer driven gear as shown, and loosen the driven gear lock nut.

TOOL

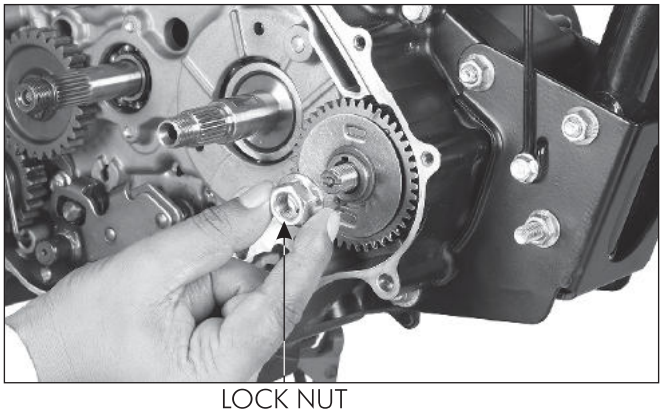
GPD HOLDER
PART NO: 070 HH 198 017

Remove the balancer drive gear and woodruff key.

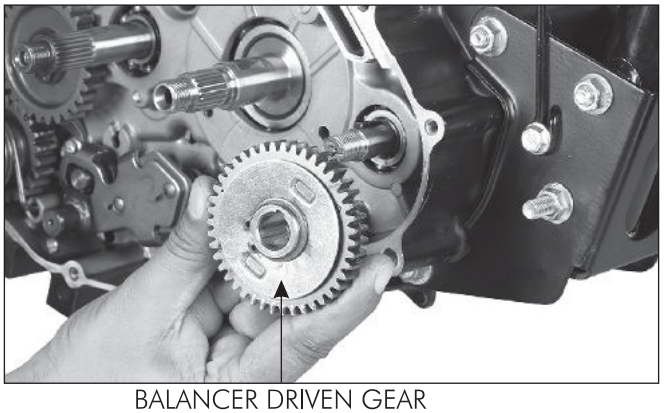




Remove the lock nut.



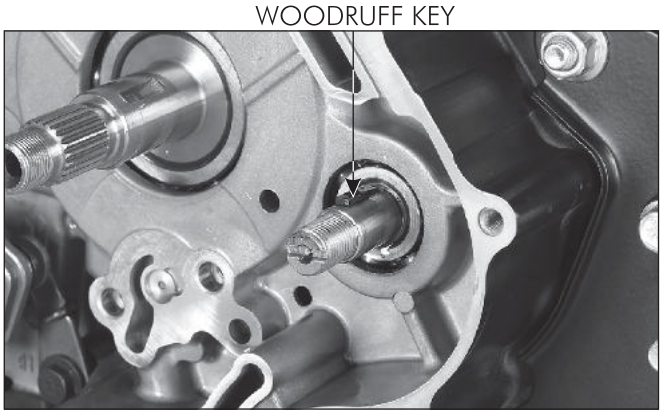
Remove the balancer driven gear.



Remove the woodruff key

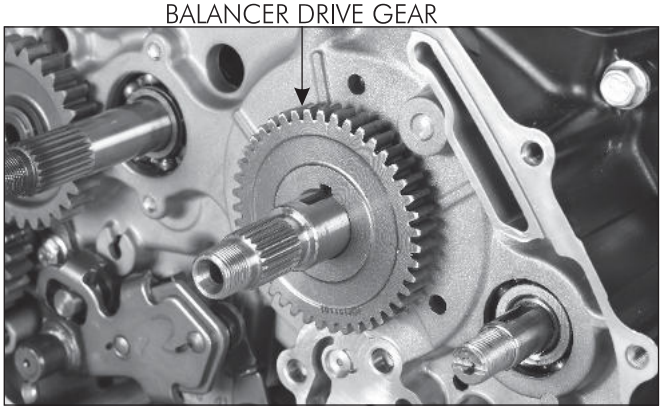
NOTE

When remove the woodruff key, be careful not to damage the key groove and balancer shaft.

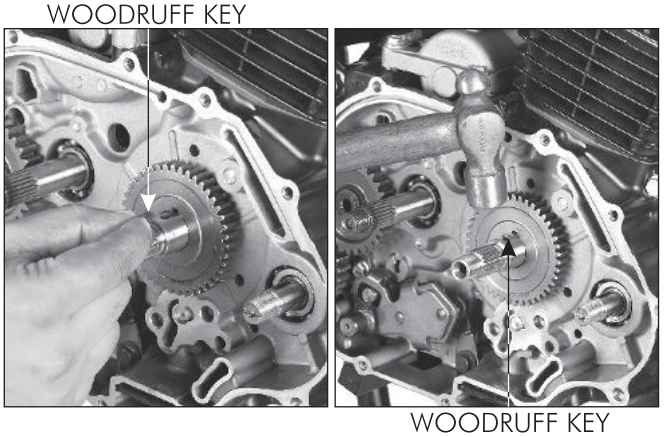


INSTALLATION

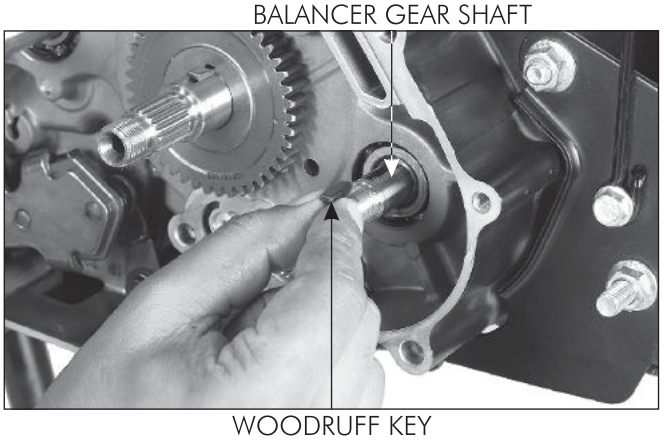
Install the balancer drive gear.



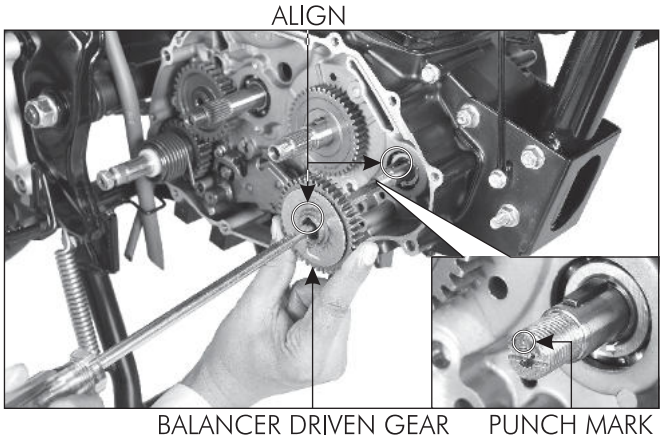
Install the woodruff key



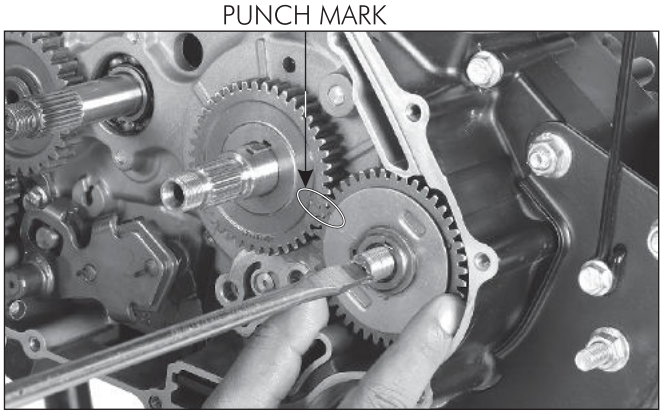
Install the woodruff key onto the balancer gear shaft.



By holding the balancer driven gear shaft with the screw driver as shown, install the balancer driven gear, aligning the groove with the woodruff key and punch mark on balancer shaft.



Aligning the punch marks of balancer drive gear and balancer driven gear.



Install the GPD holder between the balancer drive and balancer driven gear, and tighten the driven gear lock nut to the specified torque.

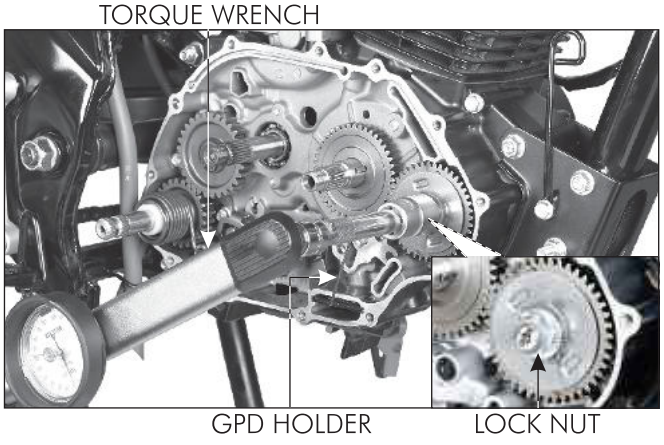
TOOL

GPD HOLDER
PART NO: 070 HH 198 017

TORQUE

BALANCER DRIVEN GEAR LOCK NUT: 5.5 kgf-m

Install the primary drive gear (page 9-15).



GEARSHIFT LINKAGE

REMOVAL

Remove the following:

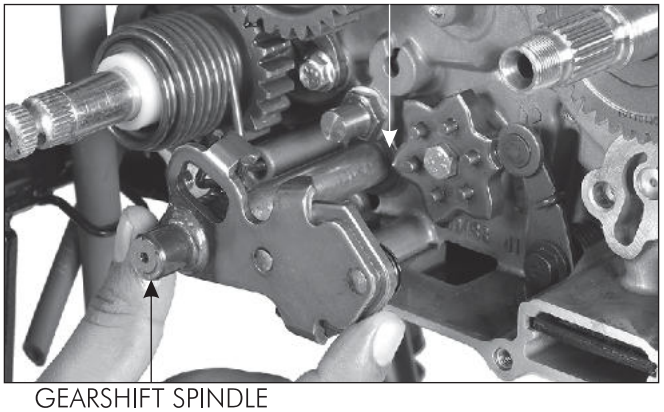
- Gearshift pedal (page 6-3).
- Clutch assembly (page 9-6).

NOTE

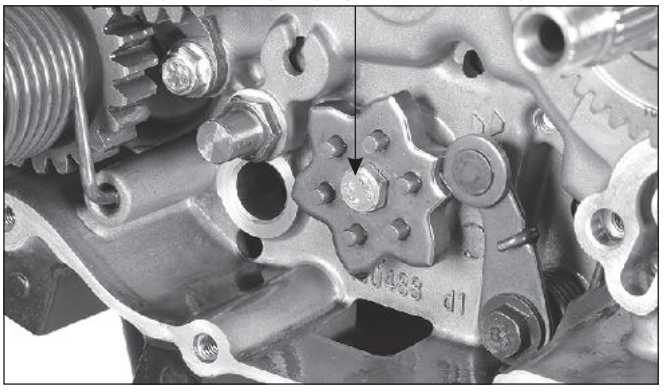
Apply multipurpose grease to the gearshift spindle serrated area.

Pull the gearshift spindle out of the crankcase.

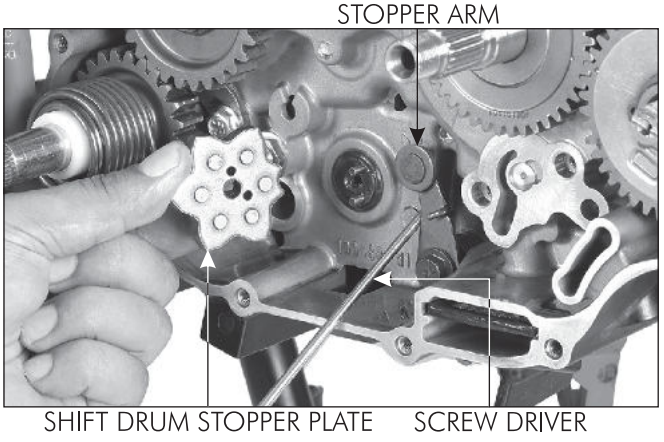
Remove the thrust washer.



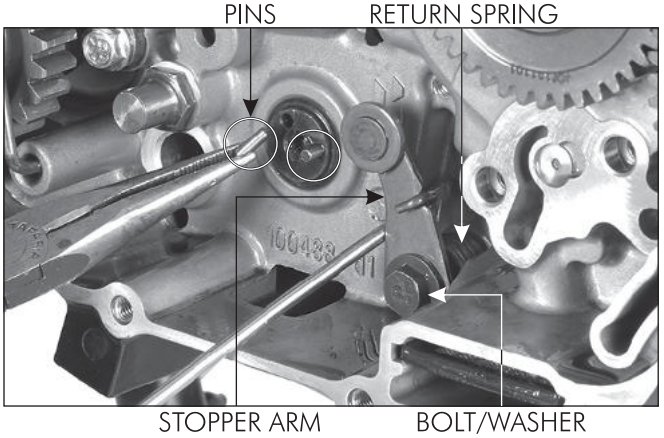
Remove the shift drum stopper plate bolt.



Hold the stopper arm with a screw driver and remove the shift drum stopper plate.

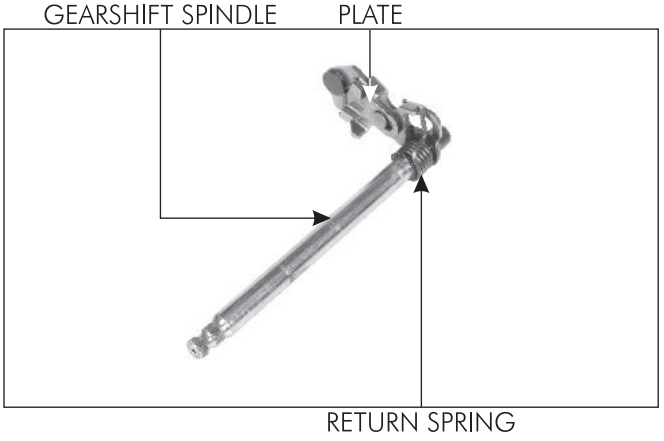


Remove the following:
- Pins from the shift drum
- Stopper arm bolt
- Stopper arm
- Washer
- Return spring



INSPECTION

Check the gearshift spindle for wear or bend.
Check the spindle plate for wear, damage or deformation.
Check the return spring for fatigue or damage.



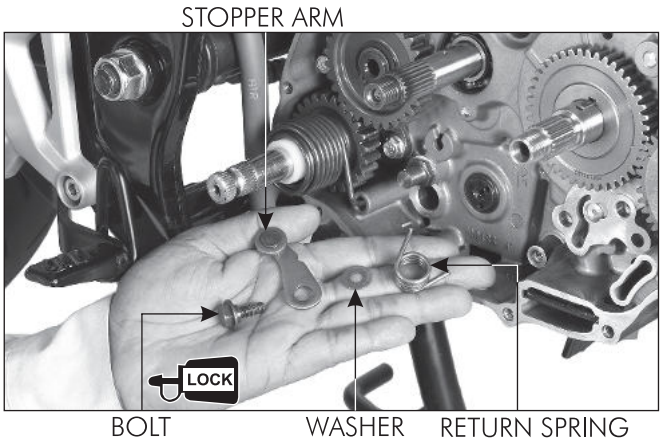
INSTALLATION

Apply locking agent to the stopper arm bolt threads.

Install the return spring, washer, stopper arm and bolt, and tighten the bolt to the specified torque.

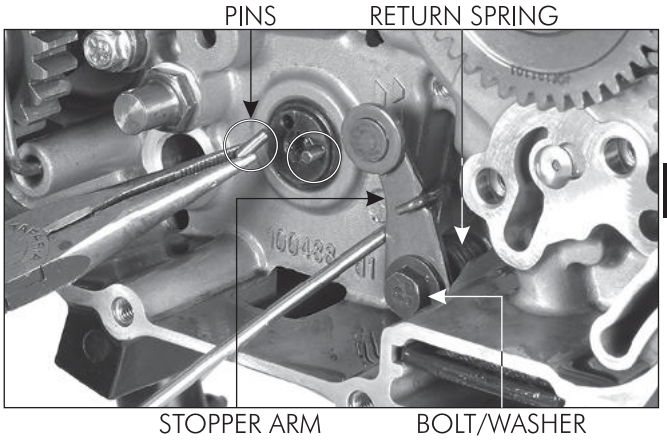
TORQUE

SHIFT DRUM STOPPER PLATE ARM BOLT: 1.2 kgf-m

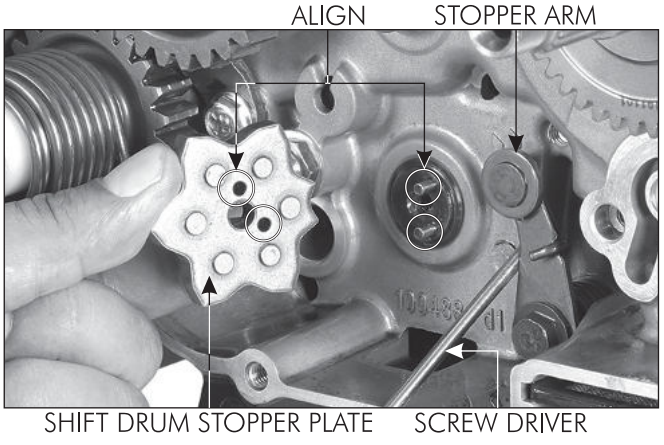


Hook the return spring to the stopper arm groove.

Install the pins into the shift drum hole.



Hold the stopper arm with a screw driver and install the shift drum stopper plate, aligning the pins hole with the dowel pins.

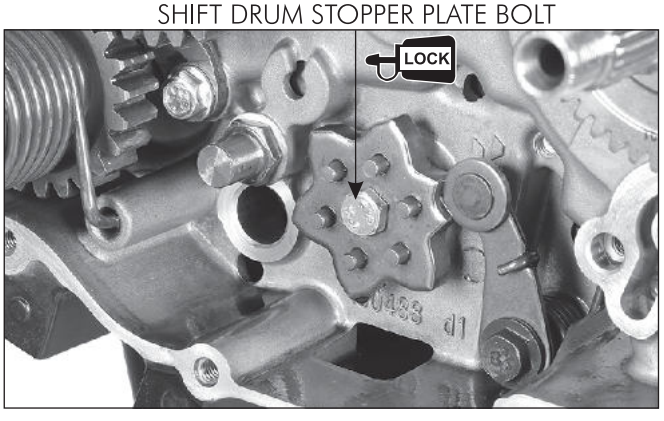


Apply locking agent to the shift drum stopper plate bolt threads.

Install the shift drum stopper plate bolt and tighten it.

TORQUE

SHIFT DRUM STOPPER PLATE BOLT: 1.2 kgf-m

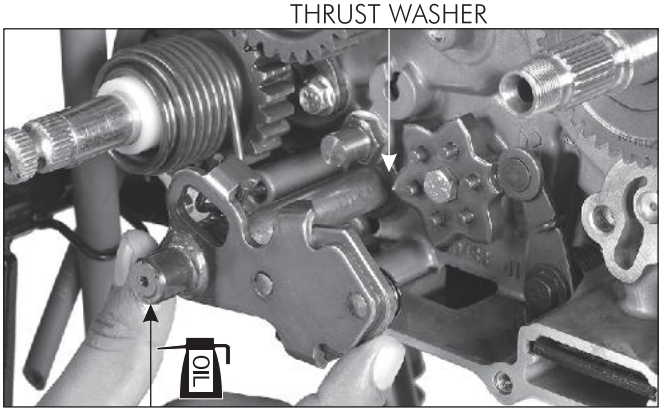


Apply clean engine oil to the gearshift spindle journal rotating area.

Install the thrust washer onto the gearshift spindle and insert the spindle into the crankcase.

NOTE

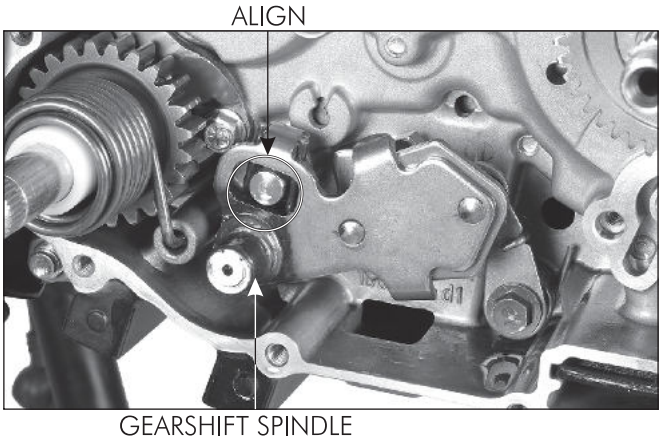
Apply multipurpose grease to the gearshift spindle serrated area.



Install the spindle, while aligning the return spring ends with the stopper pin.

Install the following:

- Clutch assembly (page 9-12).
- Gearshift pedal (page 6-7).

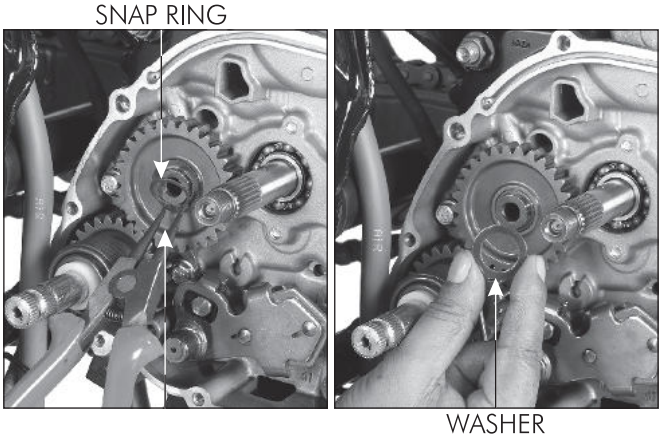


KICK STARTER IDLE GEAR

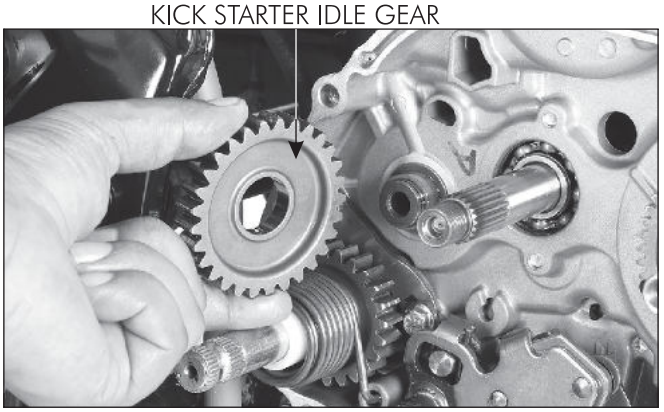
REMOVAL

Remove the clutch assembly (page 9-6).

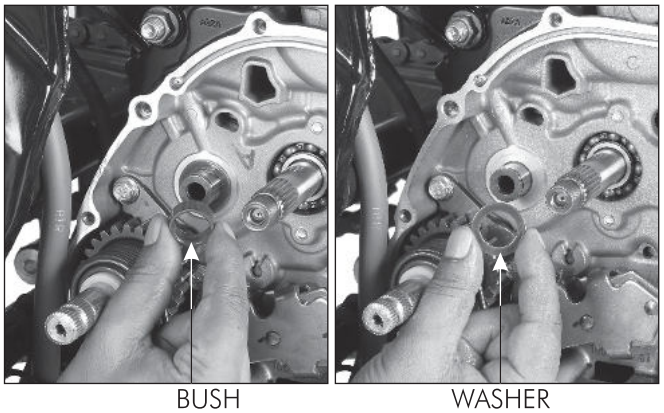
Remove the snap ring and washer.



Remove the kick starter idle gear.



Remove the bush and washer.



INSPECTION

Measure the kick starter idle gear I.D.

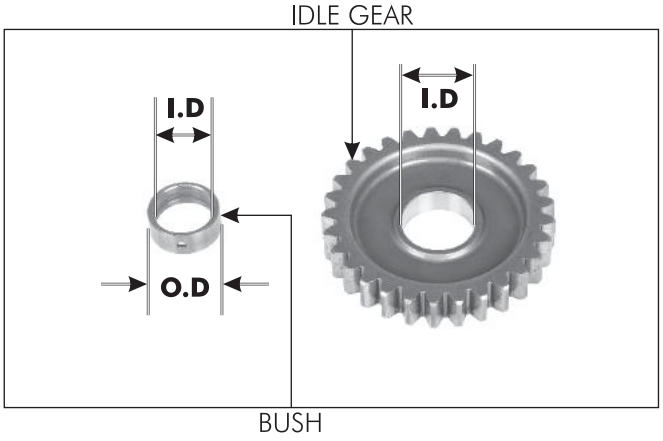
SERVICE LIMIT

IDLE GEAR I.D: 20.58 mm

Measure the bush I.D. and O.D.

SERVICE LIMIT

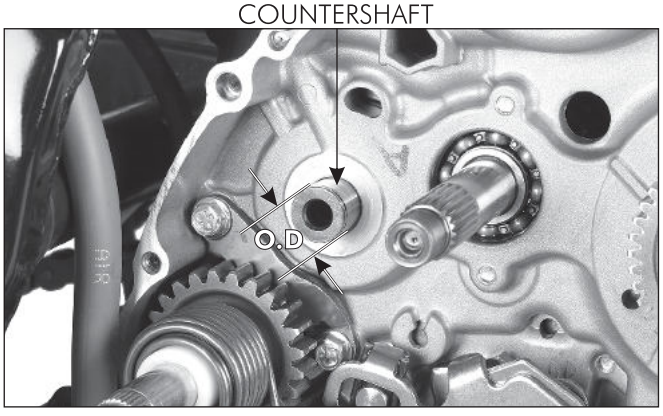
BUSH I.D: 17.04 mm
BUSH O.D: 20.41 mm



Measure the countershaft O.D. at the kick starter idle gear end.

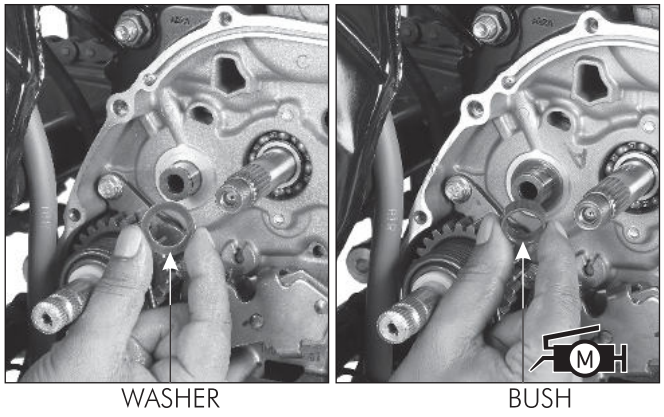
SERVICE LIMIT

COUNTERSHAFT O.D: 16.93 mm



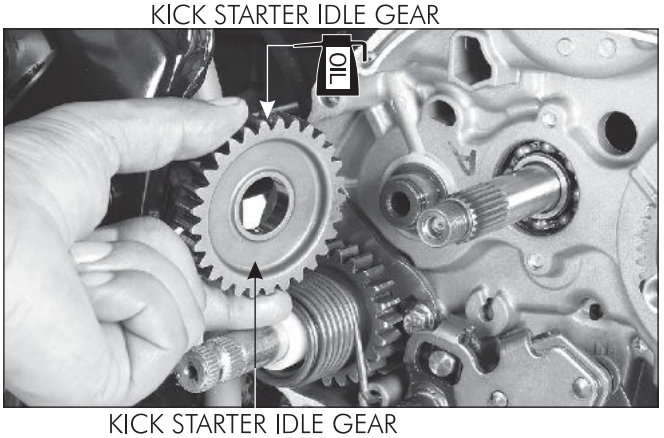
INSTALLATION

Apply molybdenum oil solution to the bush.
Install the washer and bush.



Apply clean engine oil to the kick starter idle gear teeth.
Install the kick starter idle gear.

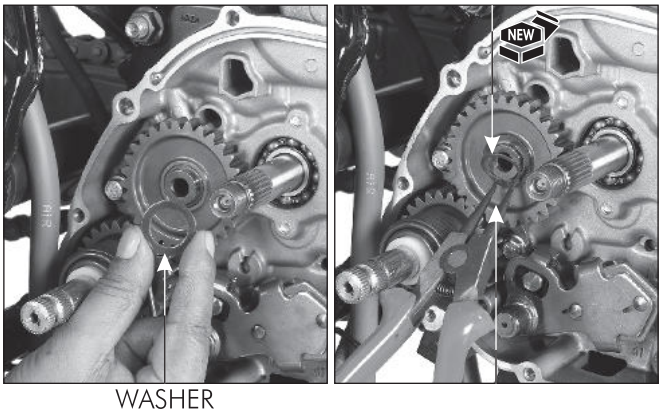
KICK STARTER IDLE GEAR



KICK STARTER IDLE GEAR

Install the washer and new snap ring.
Install the clutch assembly (page 9-12).

SNAP RING

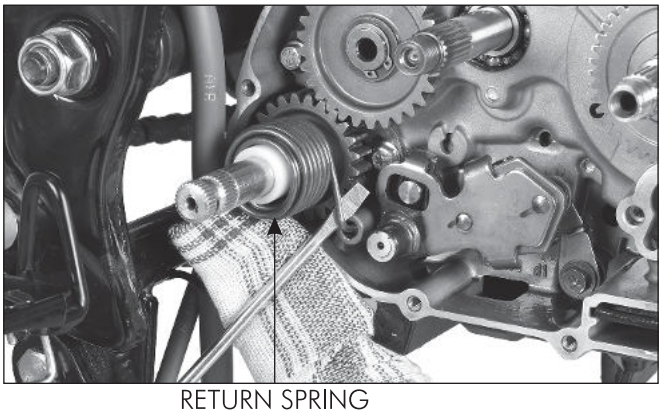


WASHER

KICK STARTER

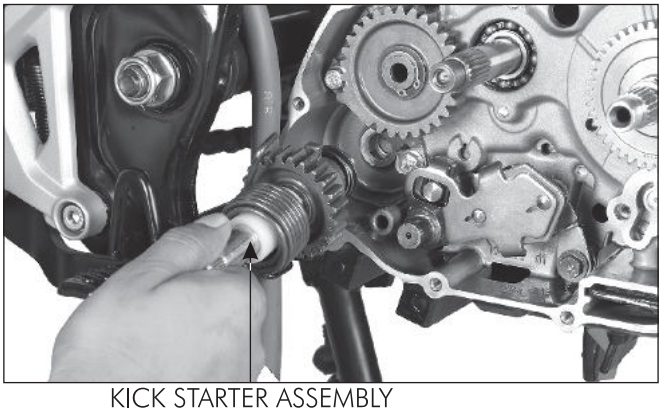
REMOVAL

Remove the clutch assembly (page 9-6).
Unhook the return spring from the crankcase.



RETURN SPRING

Remove the kick starter assembly.

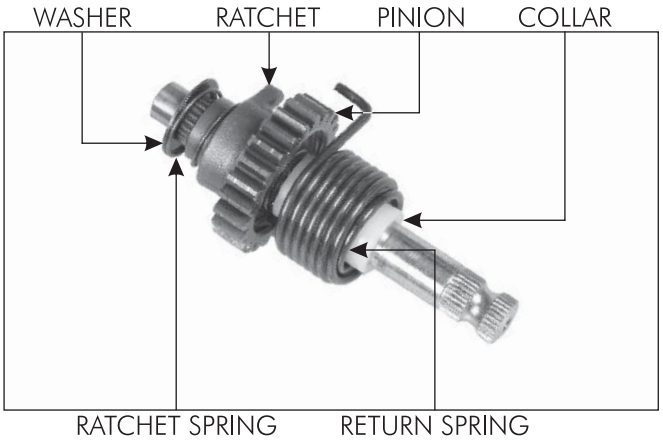


KICK STARTER ASSEMBLY

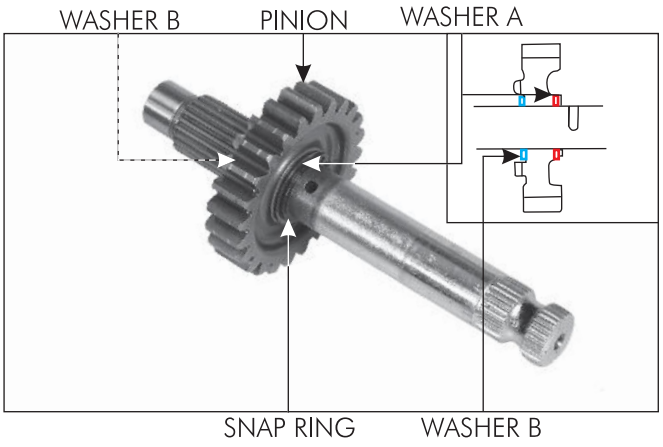
DISASSEMBLY

Remove the following:

- Washer
- Rachet spring
- Rachet
- Collar
- Return spring



- Snap ring
- Washer A
- Kick starter pinion
- Washer B



INSPECTION

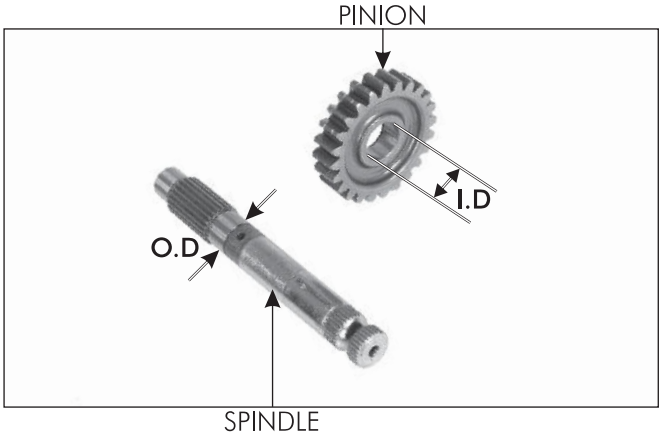
Check the following:

- Ratchet and pinion for excessive wear or damage.
- Spindle for bend or damage.

Measure the pinion I.D. and spindle O.D. at the drive gear.

SERVICE LIMIT

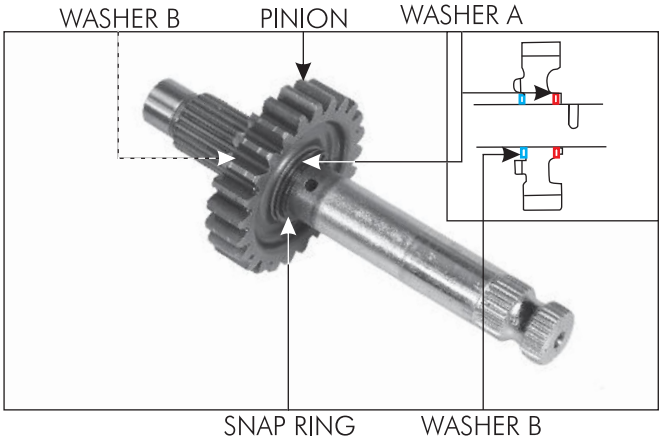
Pinion I.D: 16.09 mm
Spindle O.D: 15.95 mm



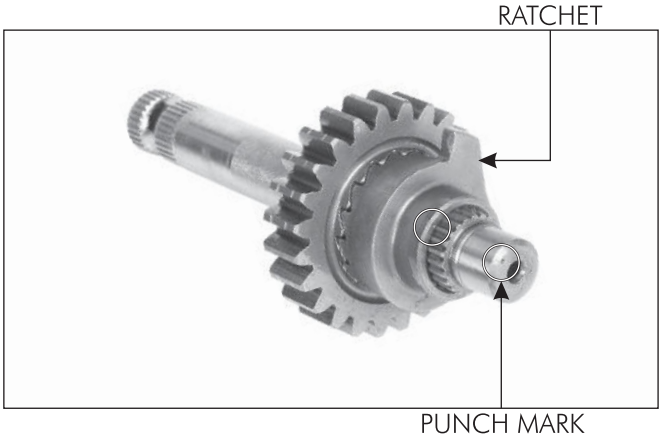
ASSEMBLY

Install the following:

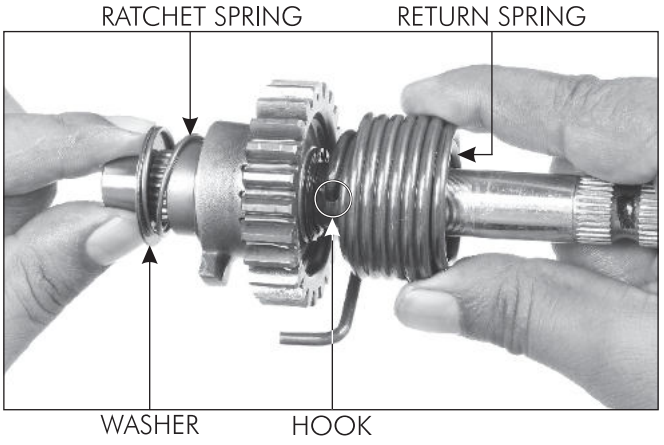
- Washer B
- Kick starter pinion
- Washer A
- Snap ring



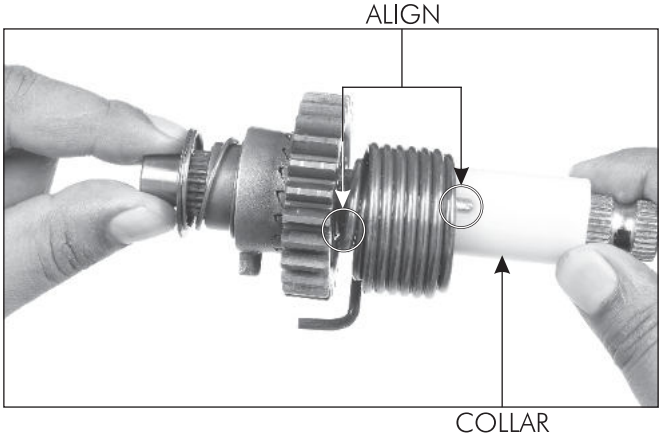
Install the ratchet aligning the punch mark on it with the punch mark on the spindle.



Install ratchet spring.
Install the washer.
Hook the return spring to the hole of the spindle.

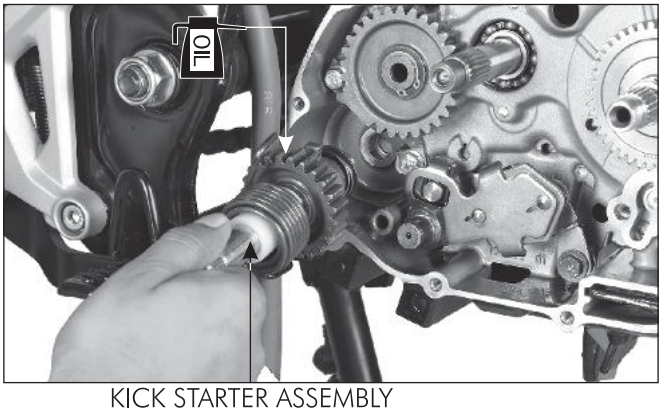


Install the collar to the return spring, while aligning the cut-out of the collar with the spring.



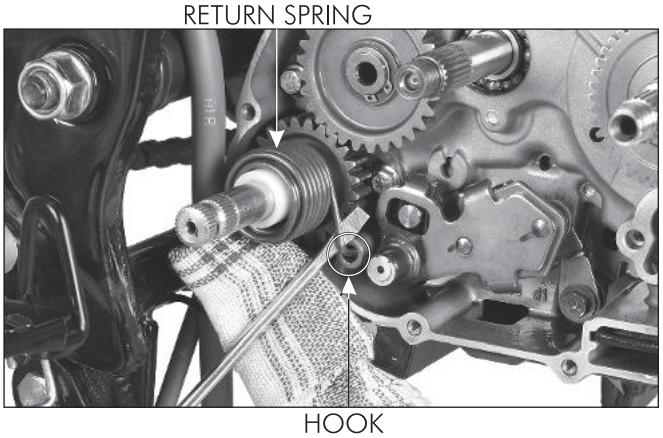
INSTALLATION

Apply clean engine oil to the pinion.
Install the kick starter assembly.



Hook the return spring to the crankcase.
Install the clutch assembly (page 9-12).

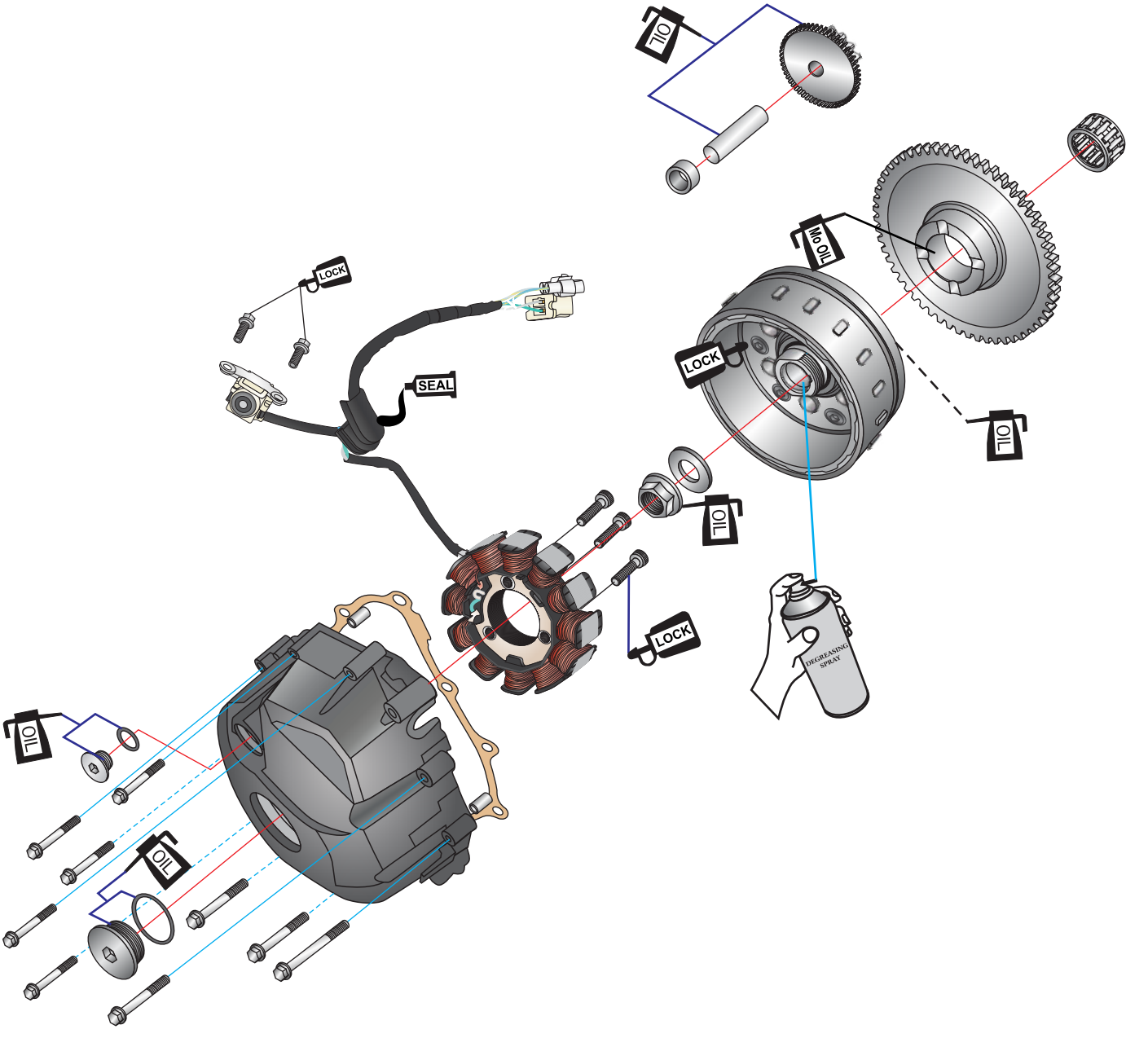
RETURN SPRING



HOOK

MEMO

SYSTEM DIAGRAM



ALTERNATOR/STARTER CLUTCH

System Diagram	10-0	Left Crankcase Cover	10-2
Service Information/Specifications	10-1	Stator/CKP Sensor	10-4
Torque Values/Special Tools	10-1	Flywheel/Starter Driven Gear	10-6
Troubleshooting	10-1	Starter Driven Gear/ Starter Clutch	10-7

SERVICE INFORMATION

GENERAL

- This section covers the removal and installation of the starter reduction gear, alternator stator, flywheel and starter clutch.
- These services can be done with the engine installed in the frame.
- See page 10-4 for alternator stator inspection.

SPECIFICATIONS

ALTERNATOR/STARTER CLUTCH

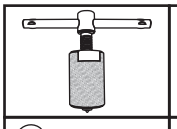
ITEM		STANDARD	SERVICE LIMIT
Gear reduction	Shaft O.D	8.972-8.987 mm	8.92 mm
Starter driven gear	I.D	29.000-29.021mm	29.06 mm
	O.D	45.660-45.673 mm	45.64 mm

TORQUE VALUES

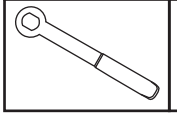
FLYWHEEL LOCK NUT	**: 7.4 kgf-m**
WIRE GUIDE ALLEN KEY BOLT	**: 1.2 kgf-m**
STATOR ALLEN KEY BOLT	**: 1.2 kgf-m**
STARTER ONE WAY CLUTCH ALLEN KEY BOLT	**: 1.6 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

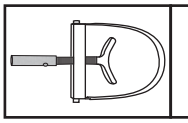
SPECIAL TOOLS



FLYWHEEL PULLER
PART NO: 070 HH KTC 004



FLYWHEEL PULLER HOLDER
PART NO: 070 HH KRYH 002



MAGNET HOLDER (CLAMP TYPE)
PART NO: 070 HH KRYH 004

TROUBLESHOOTING

Engine does not turn

- Faulty starter clutch
- Faulty starter reduction, idle, driven gears
- Electric starter system malfunction

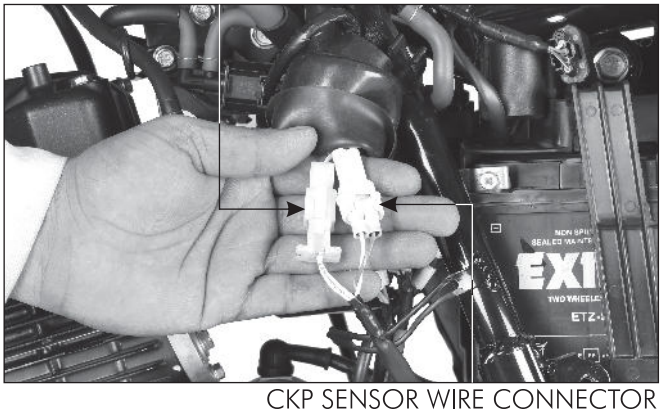
LEFT CRANKCASE COVER REMOVAL

Drain the engine oil.

Remove the fuel tank cover (page 2-5).

Slide the boot and disconnect the alternator connector/CKP sensor wire connector.

ALTERNATOR CONNECTOR

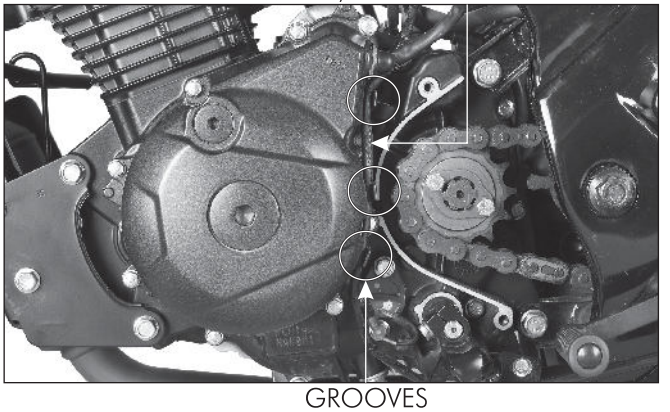


CKP SENSOR WIRE CONNECTOR

Remove the left crankcase rear cover (page 6-3).

Remove the neutral switch/side stand switch wire from the left crankcase cover grooves.

NEUTRAL SWITCH/SIDE STAND SWITCH WIRE



GROOVES

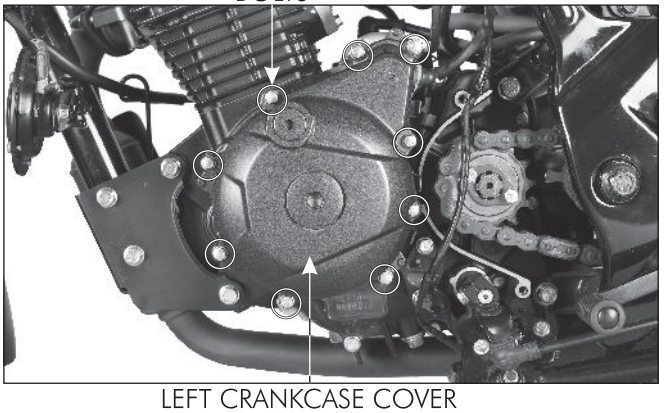
Loosen the left crankcase cover bolts in a criss-cross pattern in several steps.

Remove the left crankcase cover bolts

NOTE

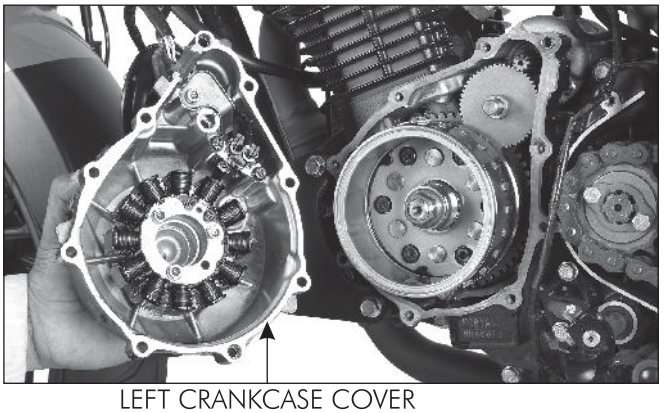
- Loosen the left crankcase cover bolts in a criss-cross pattern.
- The left crankcase cover (stator) is magnetically attached to the flywheel, be careful during removal.

BOLTS



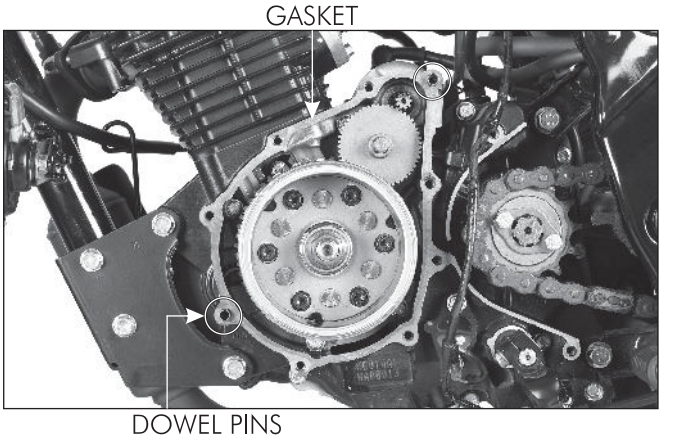
LEFT CRANKCASE COVER

Remove the left crankcase cover.



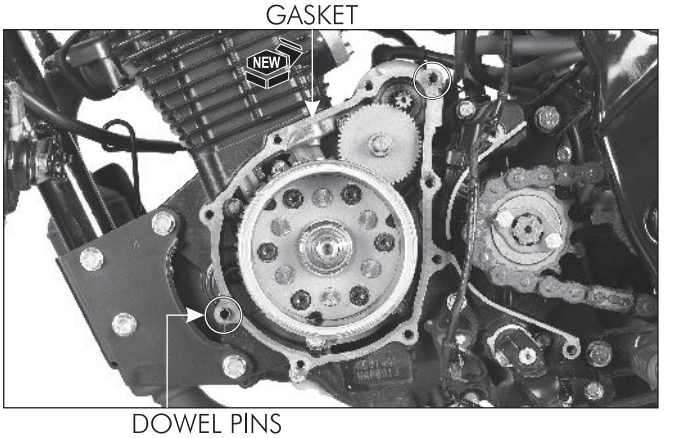
LEFT CRANKCASE COVER

Remove the dowel pins and gasket.

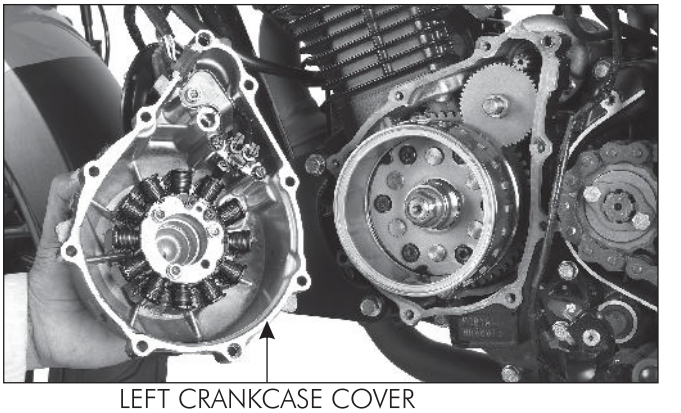


INSTALLATION

Install the dowel pins and new gasket.



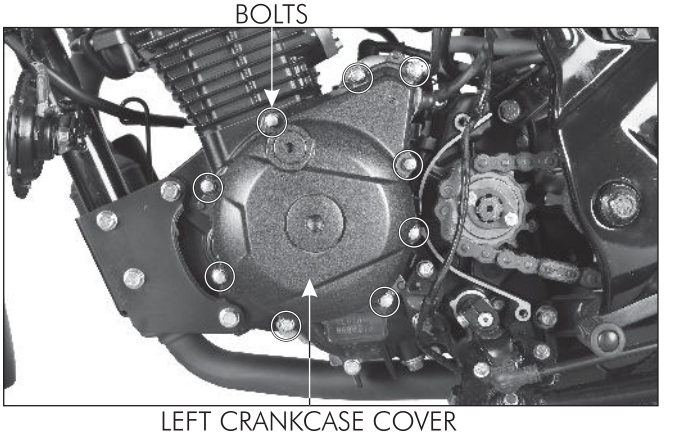
Install the left crankcase cover.



Install the left crankcase cover being careful not to pinch the neutral/side stand switch wires. Tighten the bolts in a criss-cross pattern in several steps.

NOTE

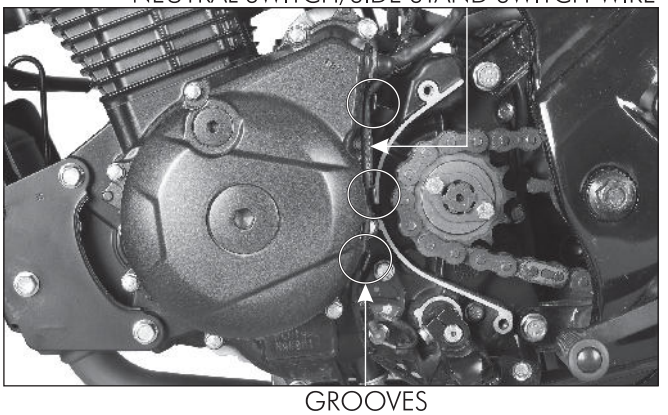
- The left crankcase cover (stator) is magnetically attached to the flywheel, be careful during installation.
- Tighten the left crankcase cover bolts in a criss-cross pattern.



Route the neutral/side stand switch wire to the left crankcase grooves.

Install the left crankcase rear cover (page 6-7).

NEUTRAL SWITCH/SIDE STAND SWITCH WIRE



GROOVES

Connect the alternator connector/CKP sensor wire connector and slide the boot on the connectors properly.

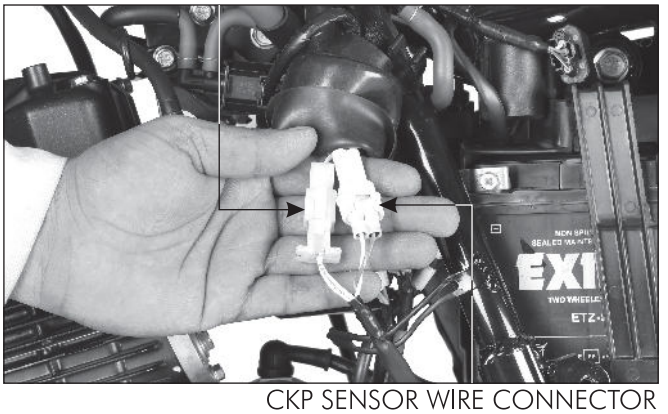
NOTE

Route the alternator wire properly.

Install the fuel tank cover (page 2-5).

Fill the crankcase with recommended engine oil to the proper level.

ALTERNATOR CONNECTOR



CKP SENSOR WIRE CONNECTOR

STATOR/CKP SENSOR

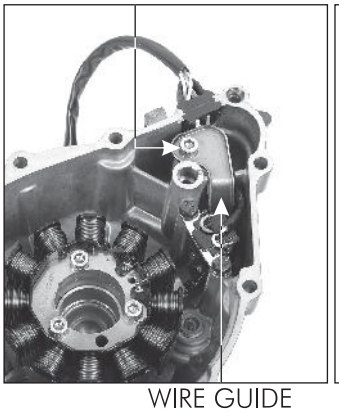
REMOVAL

Remove the left crankcase cover (page 10-2).

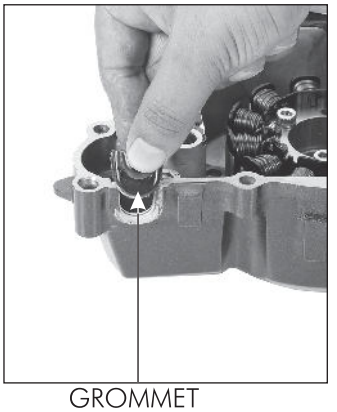
Remove the wire guide by removing the allen key bolt.

Remove the grommet from the left crankcase cover.

ALLEN KEY BOLT



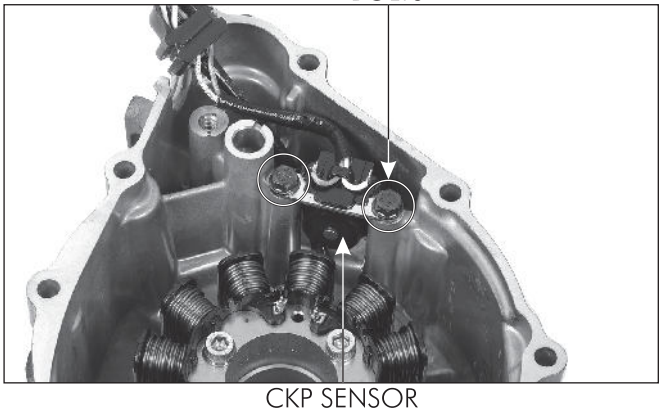
WIRE GUIDE



GROMMET

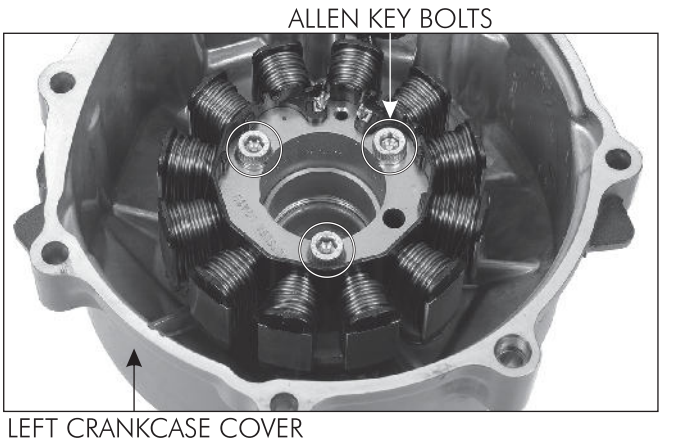
Remove the CKP sensor by removing the bolts (2 nos.).

BOLTS

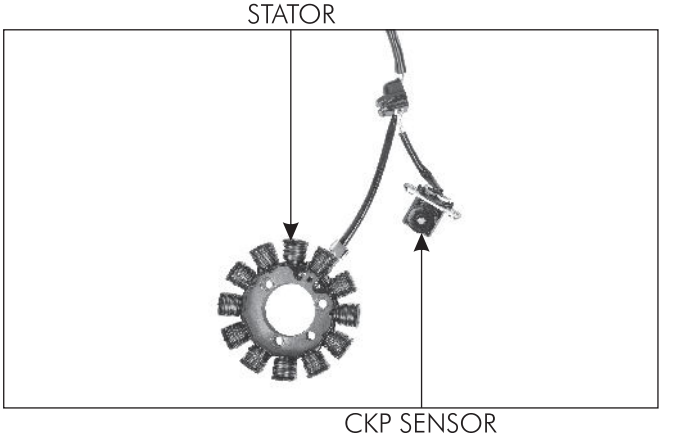


CKP SENSOR

Remove the stator allen key bolts (3 nos.) from the left crankcase cover.



Remove the stator assembly. Replace if necessary.



INSTALLATION

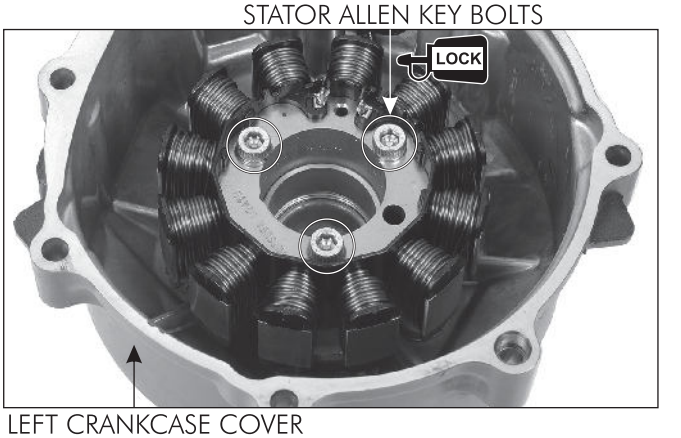
Install the stator to left crankcase cover.

Clean and apply locking agent to the stator mounting bolt threads.

Install and tighten the stator allen key bolts to the specified torque.

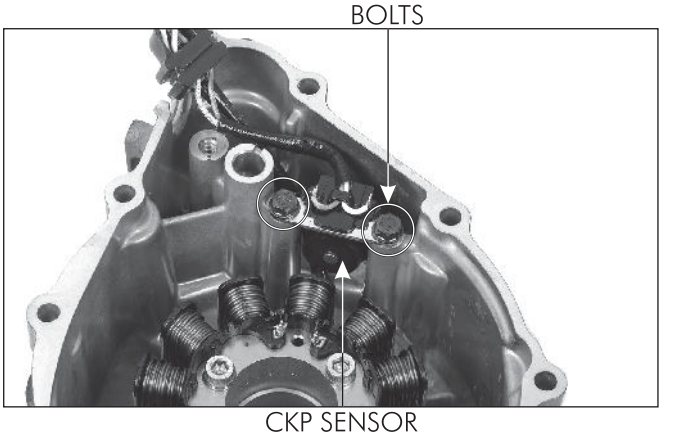
TORQUE

STATOR ALLEN KEY BOLT: 1.2 kgf-m



Install the CKP sensor.

Install and tighten the CKP sensor bolts.



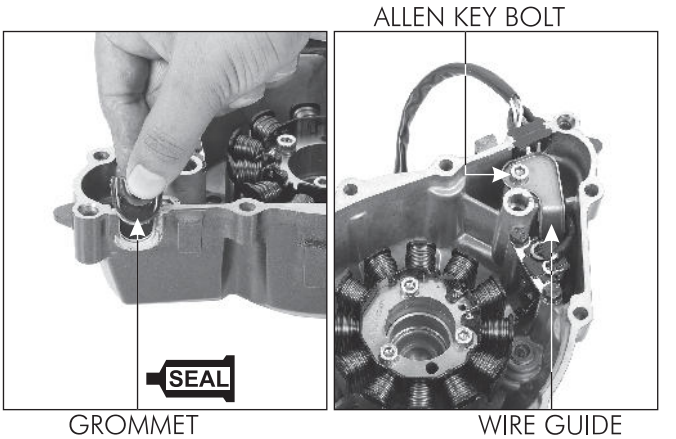
Apply liquid sealant to the wire grommet seating surface and install the grommet into the groove.

Install the wire guide to the specified torque.

TORQUE

WIRE GUIDE ALLEN KEY BOLT: 1.2 kgf-m

Install the left crankcase cover (page 10-3).

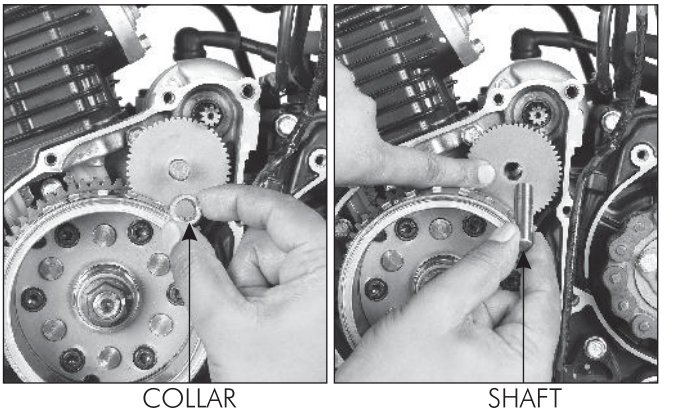


FLYWHEEL/STARTER DRIVEN GEAR

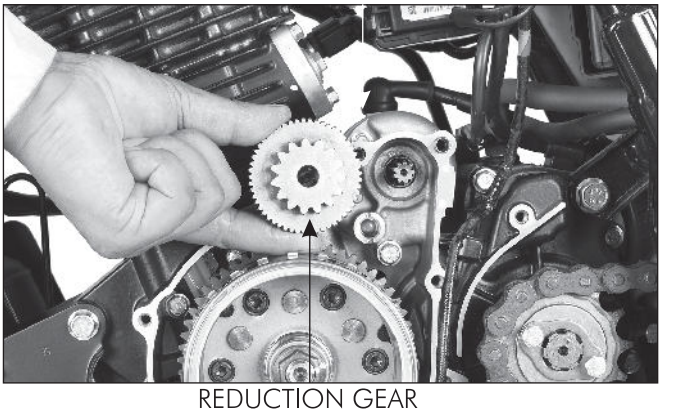
REMOVAL

Remove the left crankcase cover (page 10-2).

Remove the collar and shaft.



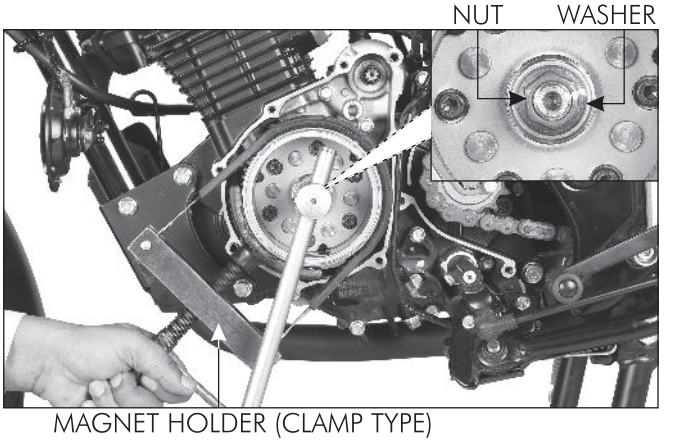
Remove the starter reduction gear.



Hold the flywheel with the magnet holder clamp type and remove the flywheel lock nut and washer.

TOOL

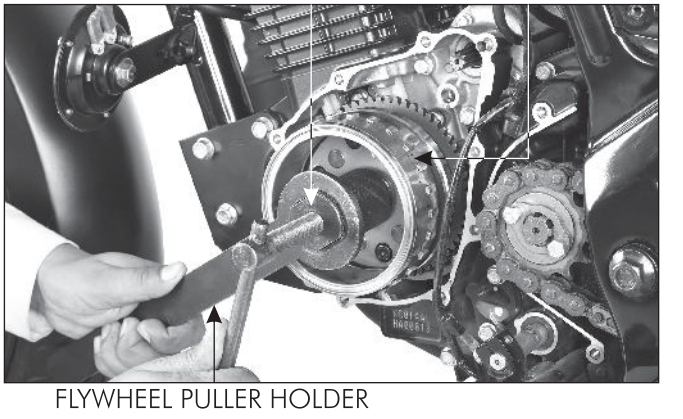
MAGNET HOLDER (CLAMP TYPE)
PART NO: 070 HH KRYH 004



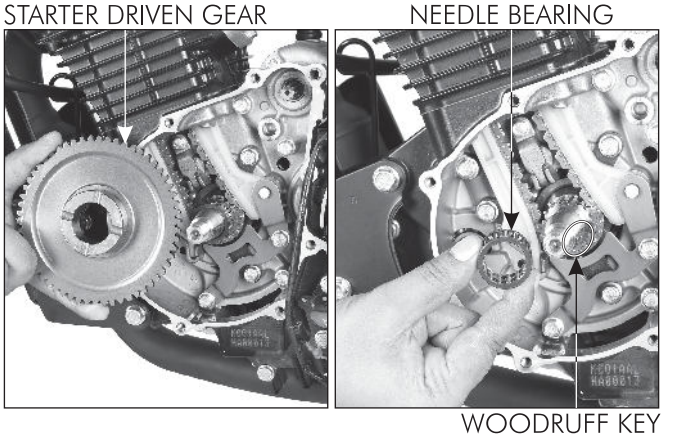
Remove the flywheel using the flywheel puller.

TOOL

FLYWHEEL PULLER
PART NO: 070 HH KTC 004
FLYWHEEL PULLER HOLDER
PART NO: 070 HH KRYH 002



Remove the starter driven gear.
Remove the needle bearing and woodruff key.

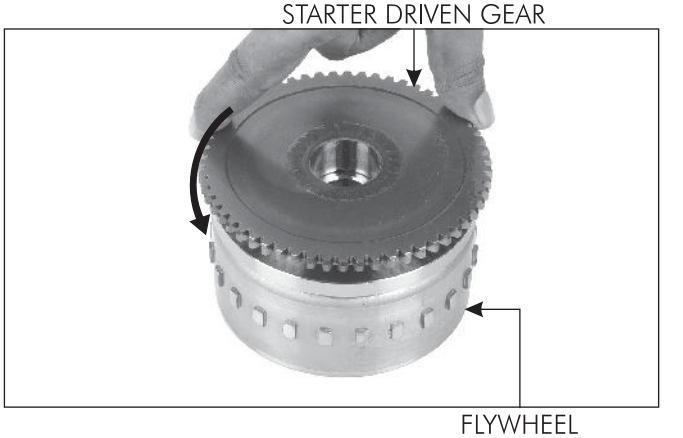


STARTER DRIVEN GEAR/STARTER CLUTCH

DISASSEMBLY

Check that the starter driven gear turns freely in counter clockwise direction and locks up in clockwise direction.

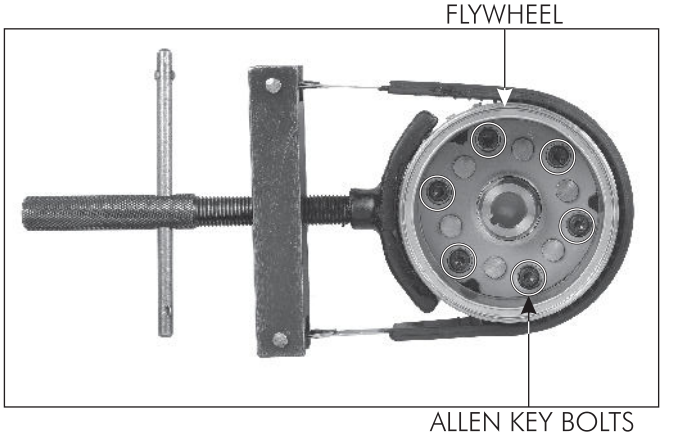
Remove the starter driven gear from the flywheel while turning the driven gear counterclockwise.



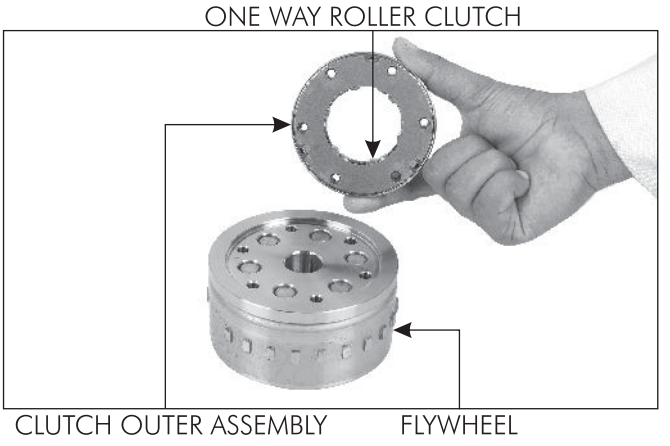
Remove the starter one way clutch allen key bolts while holding the flywheel.

NOTE

Use flywheel holder (clamp type) for holding the flywheel.



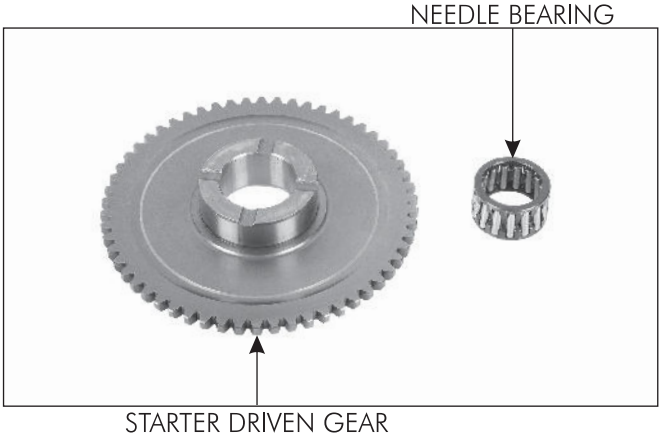
Remove the starter clutch outer assembly.



STARTER DRIVEN GEAR/STARTER CLUTCH INSPECTION

Check the roller contact surface for wear or damage.

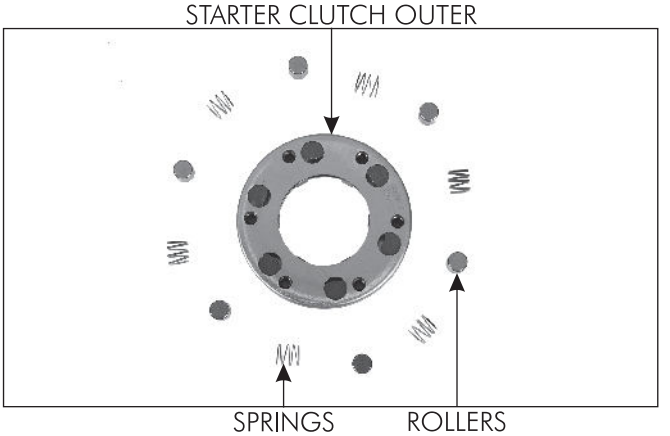
Check the needle bearing for abnormal wear or damage.



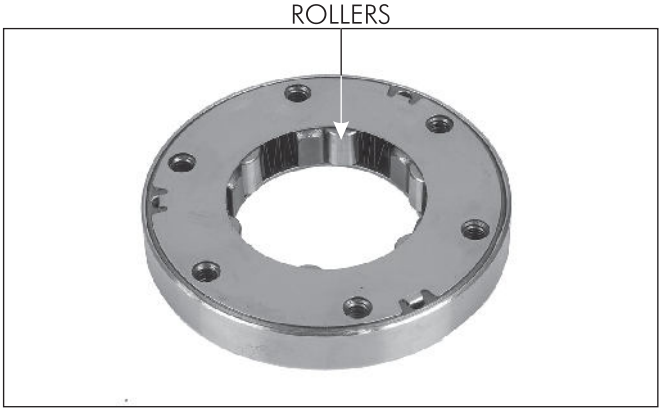
Remove the one-way clutch rollers, springs and starter clutch outer.

Check the one-way clutch rollers, springs, starter clutch outer for wear or damage.

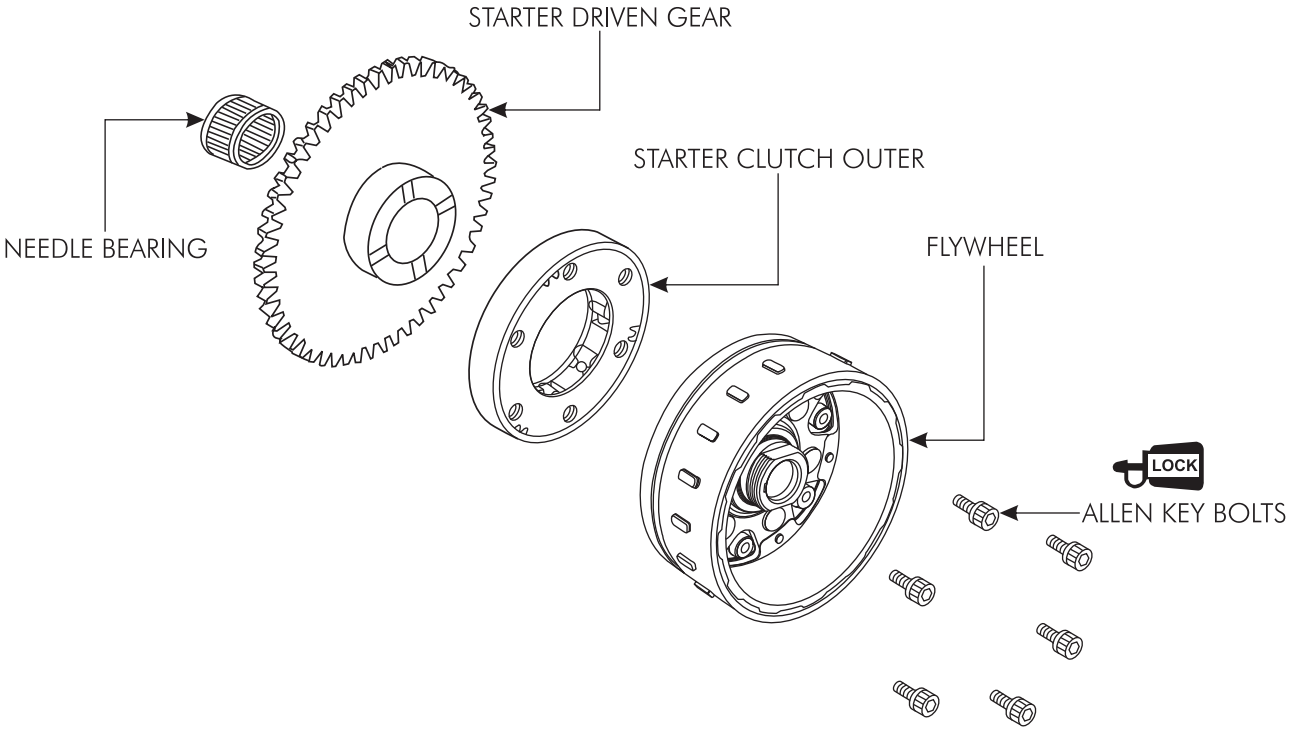
If damaged replace the starter clutch outer as an assembly.



Install the springs and one-way clutch rollers to the starter clutch outer as shown.

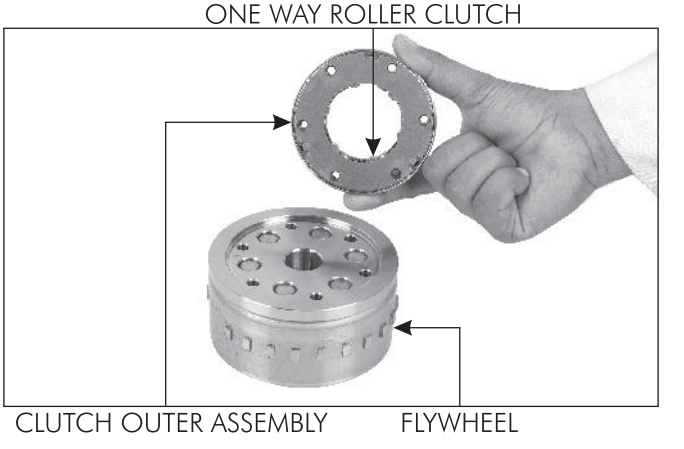


STARTER DRIVEN GEAR/STARTER CLUTCH ASSEMBLY



Clean one-way roller clutch.

Install the starter clutch outer assembly on to the flywheel.



Hold the flywheel by using the magnet holder clamp type.

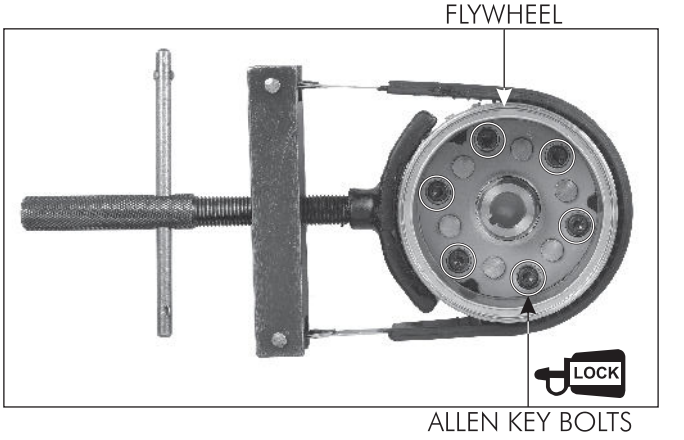
Clean and apply locking agent to the starter one way roller clutch allen key bolt threads.

Install and tighten the starter one way clutch allen key bolts to the specified torque.

TORQUE

STARTER ONE WAY CLUTCH

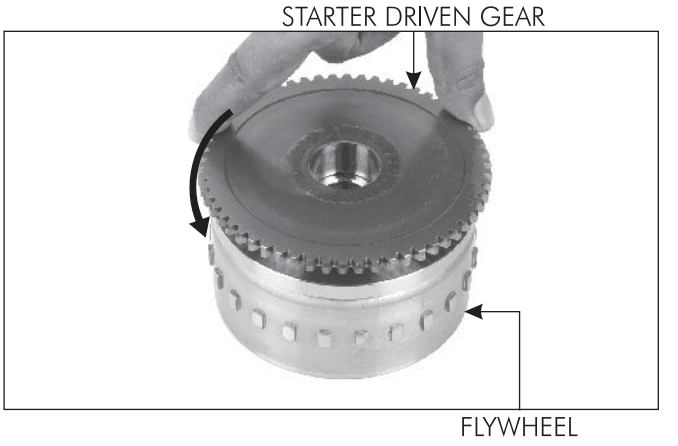
ALLEN KEY BOLT: 1.6 kgf-m



Install the starter driven gear to the flywheel by turning counterclockwise.

Make sure that starter driven gear turns counterclockwise and does not turn clockwise.

Install the flywheel.



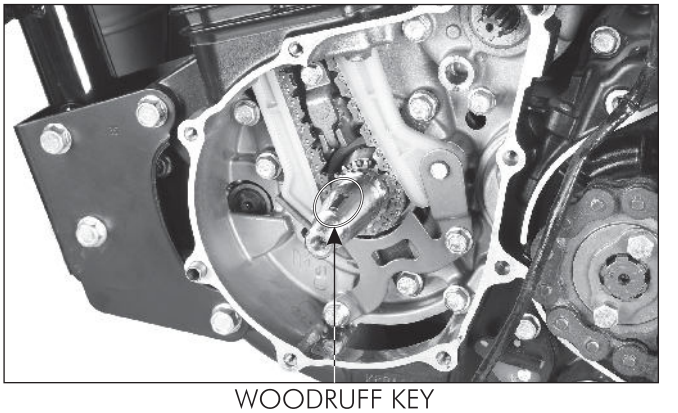
FLYWHEEL/STARTER DRIVEN GEAR

INSTALLATION

NOTE

- When woodruff key installation, be careful not to damage the key groove or crankshaft.
- Degrease the crankshaft taper area before installing the flywheel.

Install the woodruff key to the key groove of crankshaft.

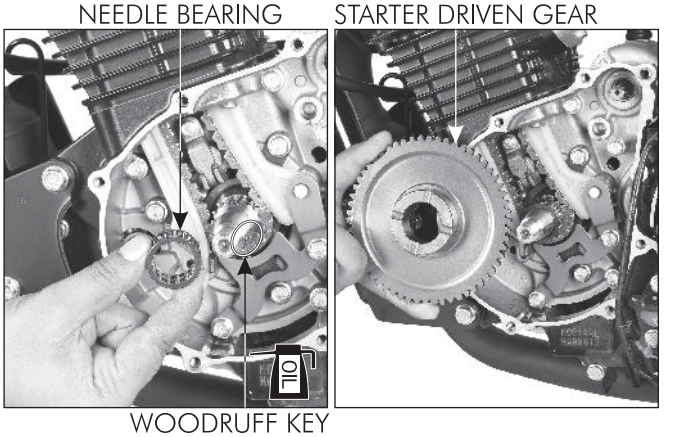


Install the needle bearing and apply engine oil on it.

Install starter driven gear on the crankshaft.

Degrease the mating surface of the flywheel and crankshaft tapered area.

Install flywheel to the crankshaft aligning the key groove of the flywheel with the woodruff key on the crankshaft.



NOTE

- Check that there is no debris inside the flywheel before installation. The magnets attract steel filings and other ferrous material.
- Degrease the mating surface of the flywheel and crankshaft tapered area before installation.

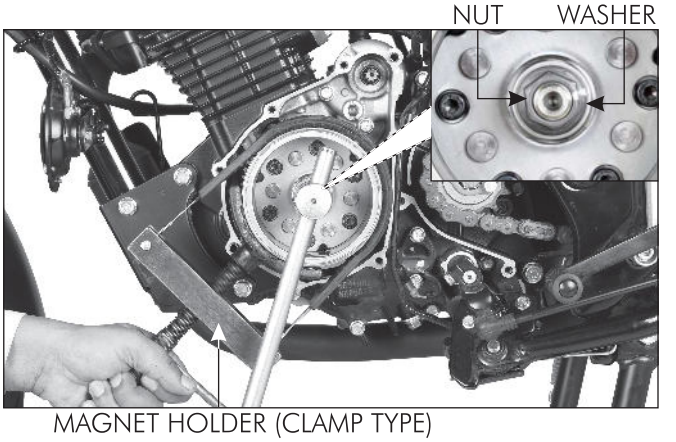
Hold the flywheel using magnet holder clamp type.

TOOL

MAGNET HOLDER (CLAMP TYPE)
PART NO: 070 HH KRY 004

Instal the washer.

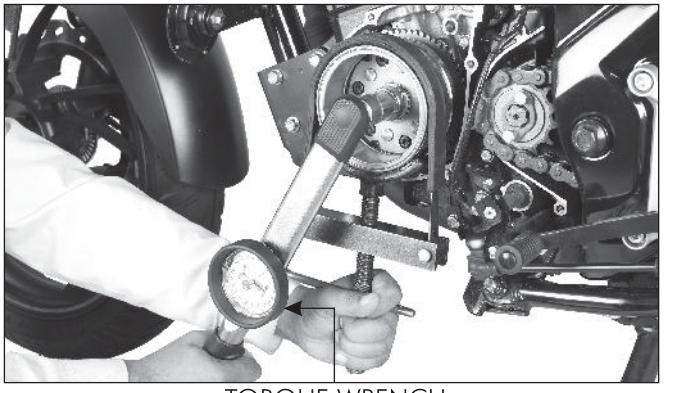
Install and tighten the flywheel nut.



Tighten the flywheel nut to the specified torque with torque wrench.

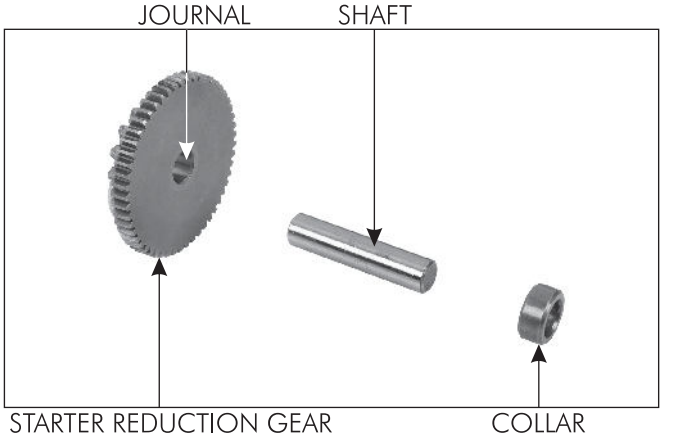
TORQUE

FLYWHEEL LOCK NUT: 7.4 kgf-m



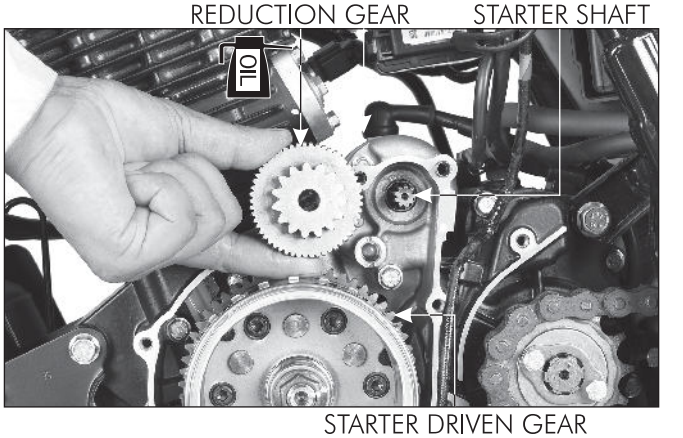
TORQUE WRENCH

Check the starter reduction gear, journal, shaft and collar for wear or damage.



Apply clean engine oil to starter reduction gear both journal and driven gear teeth.

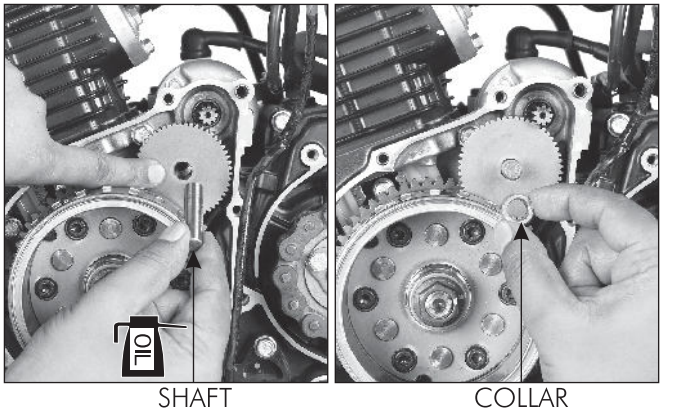
Install the starter reduction gear aligning it between the starter driven gear and starter shaft.



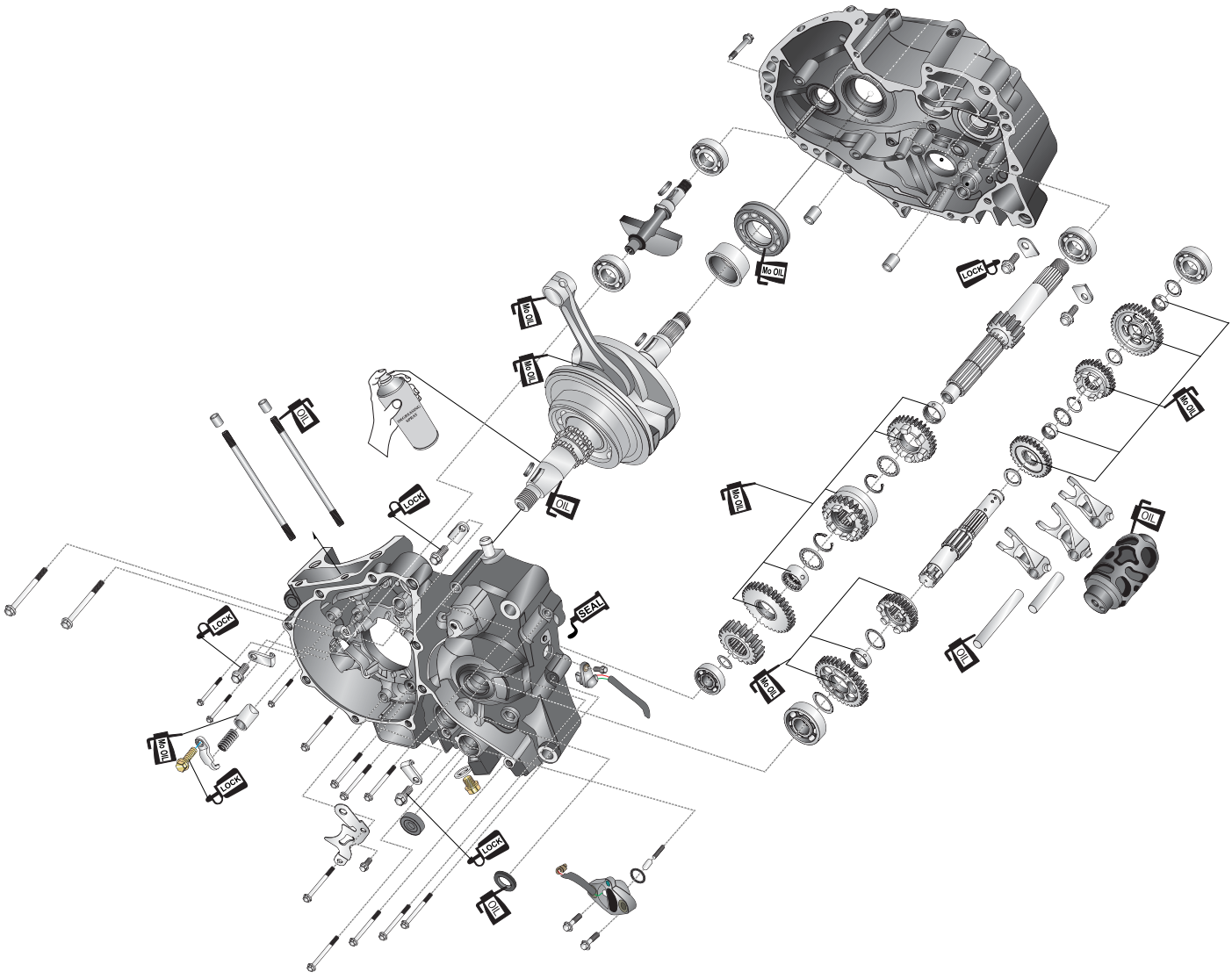
Apply clean engine oil to the starter reduction gear shaft and install it.

Install the collar on the reduction gear shaft.

Install the left crankcase cover (page 10-3).



SYSTEM DIAGRAM



System Diagram	11-0	Right Crankcase Countershaft Bearing	11-19
Service Information	11-1	Right Crankcase Mainshaft Bearing	11-20
Specifications	11-2	Right Crankcase Balancer Shaft Bearing	11-21
Torque Values/Special Tools	11-3	Left Crankcase Oil Seal	11-22
Troubleshooting	11-3	Left Crankcase Countershaft Bearing	11-22
Crankcase Separation	11-4	Left Crankcase Countershaft Bearing	11-23
Balancer Shaft/Crankshaft	11-9	Left Crankcase Balancer Shaft Bearing	11-24
Transmission	11-12		

SERVICE INFORMATION

GENERAL

- The engine needs to be dismounted from the frame to separate the crankcase.
- The following components must be removed before separating the crankcase:

- Flywheel
- Cylinder head
- Cylinder/piston
- Oil pump
- Clutch
- Gearshift linkage
- Kick starter idle gear
- Kick starter
- Primary drive gear/crankshaft collar
- Neutral switch

- Be careful not to damage the crankcase mating surfaces when servicing.
- Clean the oil passage before assembling the crankcase halves.

SPECIFICATIONS

CRANKCASE/CRANKSHAFT/TRANSMISSION

ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D		10.000-10.018 mm	10.05 mm
	Claw thickness		4.93-5.00 mm	4.53 mm
	Shaft O.D		9.986-9.995 mm	9.93 mm
Shift drum	O.D	Left	23.959-23.980 mm	23.94 mm
		Right	20.959-20.980 mm	20.94 mm
	Journal I.D	Left	24.000-24.033 mm	24.05 mm
		Right	21.000-21.021 mm	21.04 mm
Transmission	Gear I.D	M4, M5	20.000-20.021 mm	20.06 mm
		C3	23.025-23.046 mm	23.09 mm
		C2	23.020-23.041 mm	23.08 mm
		C1	20.500-20.521 mm	20.56 mm
	Bushing O.D	M4, M5	19.959-19.980 mm	19.91 mm
		C1	20.459-20.480 mm	20.41 mm
		C2, C3	22.984-23.005 mm	22.93 mm
	Bushing I.D	M4, C1	17.000-17.018 mm	17.04 mm
		C2, C3	20.020-20.041 mm	20.07 mm
	Gear to bushing clearance	M5, C1, C3	0.020-0.062 mm	0.10 mm
		C2	0.015-0.057 mm	0.10 mm
		M4	0.020-0.062 mm	0.11 mm
	Mainshaft/Countershaft O.D	At M4, C1	16.966-16.984 mm	16.93 mm
		At C2	19.978-19.989 mm	19.94 mm
		C3	19.979-20.000 mm	19.94 mm
	Gear to shaft clearance	M2, M3	0.016-0.052 mm	0.09 mm
		C4	0.020-0.062 mm	0.1 mm
	Bushing-to-shaft clearance	M4, C1	0.016-0.052 mm	0.09 mm
		C2	0.020-0.057 mm	0.10 mm
		C3	0.020-0.062 mm	0.10 mm
Crankshaft	Runout		-	0.05 mm
	Big end side clearance		0.10-0.35 mm	0.60 mm
	Big end radial clearance		0-0.008 mm	0.05 mm
Kick starter	Piston ID		20.000.20.021 mm	20.08 mm
	Spindle OD		19-959-19-980 mm	19.94 mm

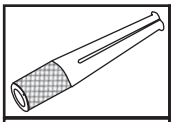
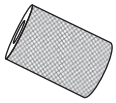
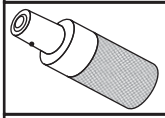
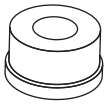
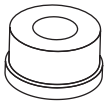
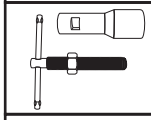
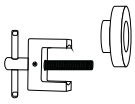
TORQUE VALUES

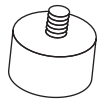
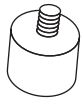
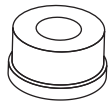
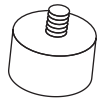
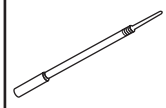
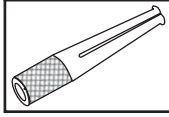
MAINSHAFT BEARING SET PLATE BOLT	: 1.2 kgf-m
PUSH PLUG BOLT	: 1.0 kgf-m

CRANKSHAFT BEARING SET PLATE BOLT	: 1.2 kgf-m

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

SPECIAL TOOLS

	**COLLET BEARING REMOVER, 12 mm** **PART NO: 070 HH 198 026**
	**CRANKCASE BEARING REMOVER WEIGHT** **PART NO: 070 HH KFN 007**
	**HANDLE BEARING DRIVER** **PART NO: 070 HH KFN 008**
	**DRIVER ATTACHMENT, 40x46 mm** **PART NO: 070 HH 198 031**
	**DRIVER ATTACHMENT, 32x35 mm** **PART NO: 070 HH KFN 010**
	COUNTERSHAFT OIL SEAL GUIDE **PART NO: HMCL0418AABM004**
	**CRANKSHAFT BEARING (LHS) INSERTER** **PART NO: 070 HH KTN 007**
	**CRANKSHAFT BEARING (RHS) PULLER CUM INSERTER** **PART NO: HMCL0120ABZA01**

	**PILOT DRIVER, 17 mm** **PART NO: 070 HH 198 033**
	**PILOT DRIVER, 12 mm** **PART NO: 070 HH KFN 012**
	**DRIVER ATTACHMENT, 24x 27 mm** **PART NO: 070 HH KFN 021**
	**PILOT DRIVER, 20 mm** **PART NO: 070 HH KTN 006**
	**CRANKCASE BEARING REMOVER SHAFT** **PART NO: 070 HH KFN 006**
	CRANKSHAFT BEARING (LHS) PULLER **070 HH KTN 003**
	**CRANKCASE BEARING REMOVER COLLET 17 mm** **PART: 070 HH KTN 002**

TROUBLESHOOTING

Excessive noise

- Worn or chipped transmission gear
- Worn or damaged transmission bearing
- Worn or damaged connecting rod big end bearing
- Worn crankshaft bearing
- Worn connecting rod small end

Hard to shift

- Bent shift fork
- Bent shift fork shaft
- Damaged shift drum guide groove
- Damaged shift fork guide pin
- Improper clutch operation

Gear Slippage

- Worn gear dogs or slots
- Worn shift drum guide groove
- Worn shift fork guide pin
- Worn shift fork groove in gear
- Worn shift fork shaft
- Bent fork shaft
- Scored or scratched piston or cylinder wall

CRANKCASE SEPARATION

Refer to service information (page 11-1) for removal of necessary parts before disassembling the crankcase.

CAUTION

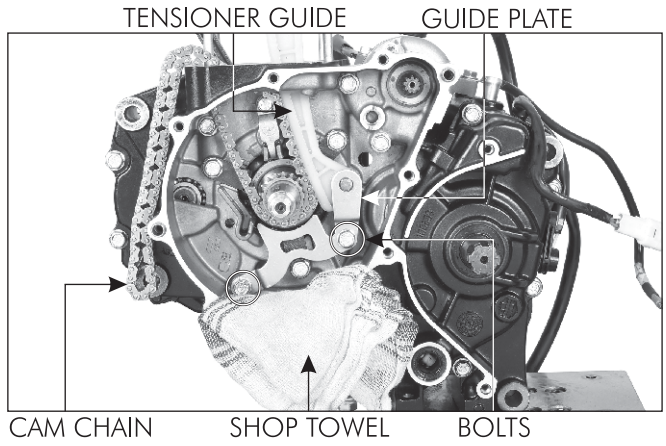
Place a shop towel to close the lower open portion as shown, to prevent any bolt etc. from falling inside the engine.

Remove the starter motor (page 19-4).

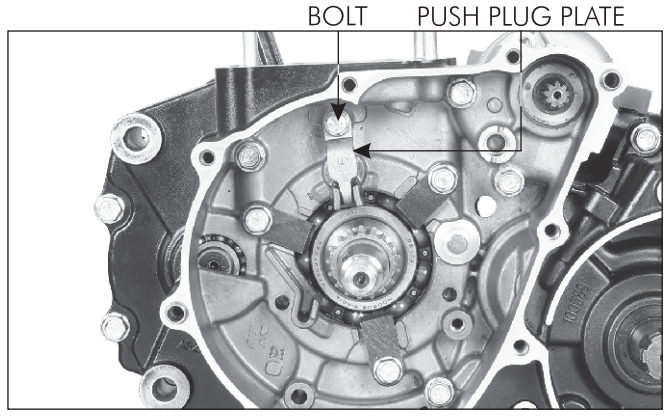
Remove the neutral switch (page 20-10).

Remove the tensioner guide plate bolts, guide plate and tensioner guide.

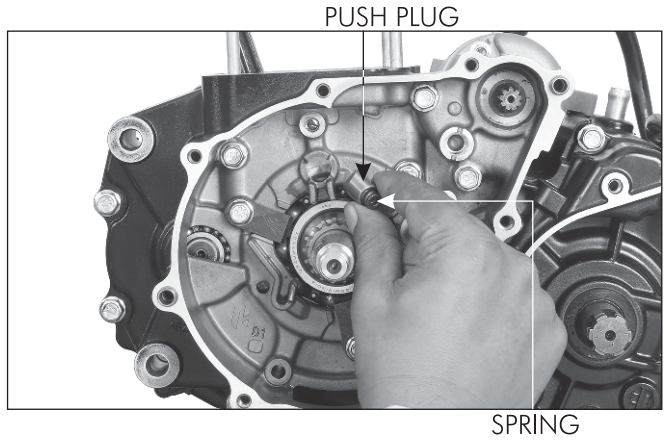
Remove the cam chain.



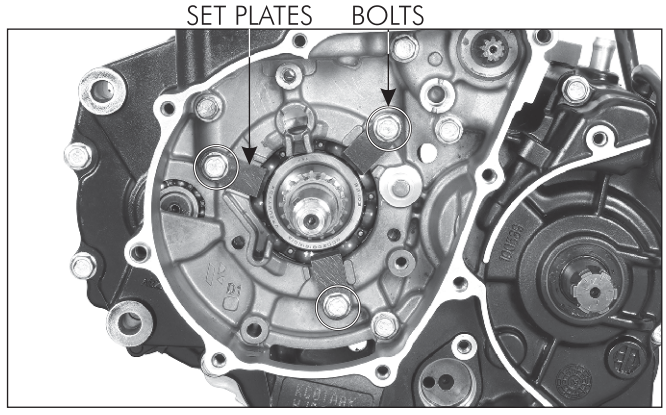
Remove the bolt and push plug plate.



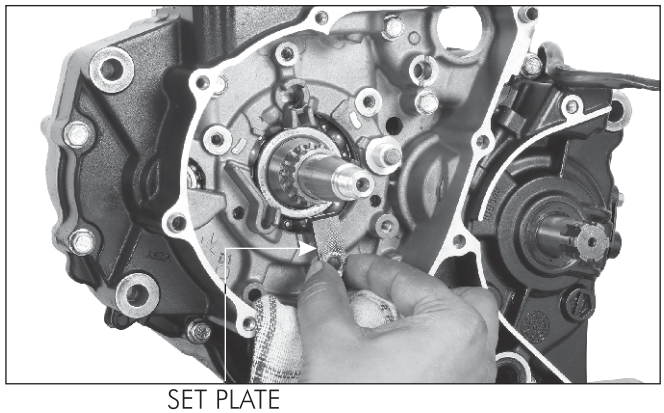
Remove the push plug and spring.



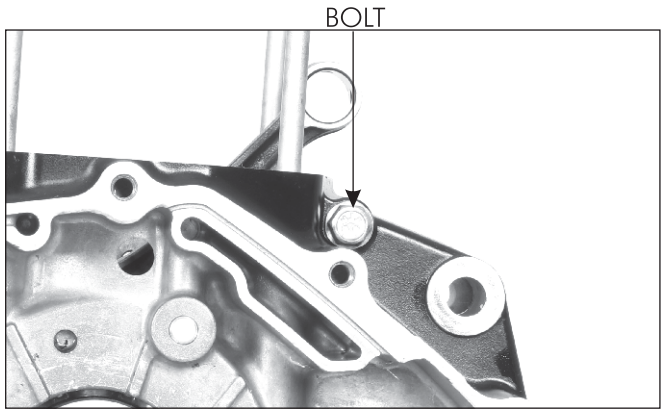
Remove the bearing set plate bolts.



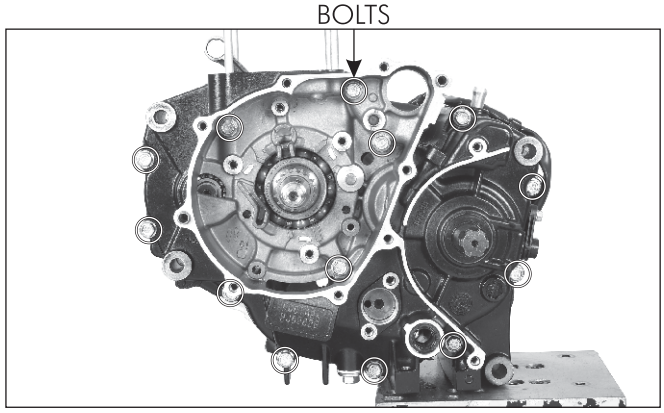
Remove bearing set plates.


SET PLATE

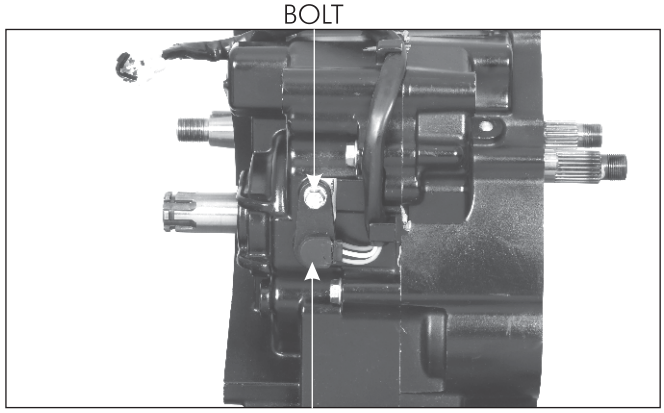
Remove the crankcase bolt from the right side.



Loosen the left crankcase bolts in crisscross pattern in 2 or 3 steps and remove the bolts.



Remove the vehicle speed sensor by removing its bolt.



VEHICLE SPEED SENSOR

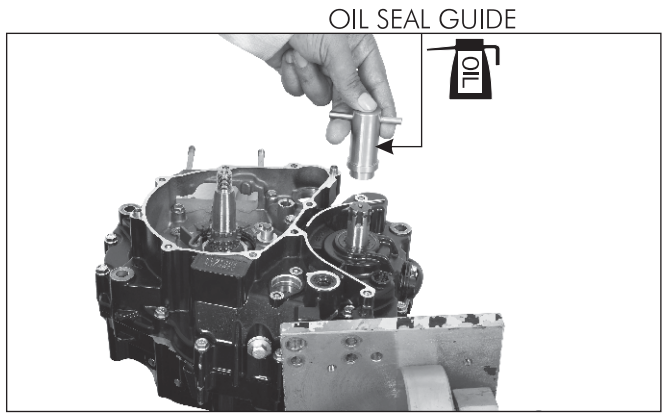
Place the crankcase assembly with the right side down.

Apply clean engine oil on the countershaft oil seal guide.

Install the oil seal guide on countershaft till it seats inside the oil seal.

TOOL

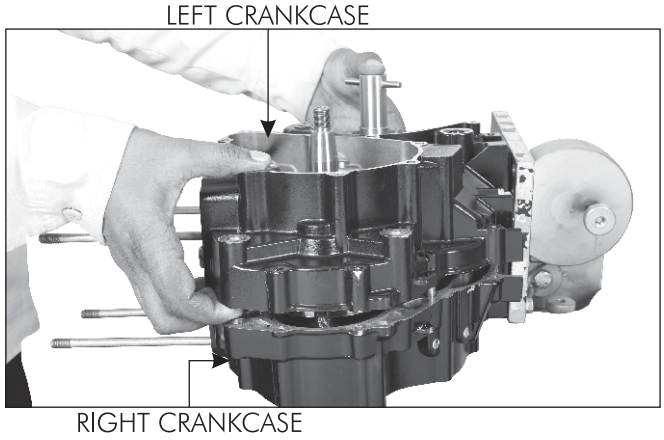
COUNTERSHAFT OIL SEAL GUIDE
PART NO: HMCL0418AABM004



Carefully separate the left crankcase from the right crankcase while tapping them at several locations with a mallet.

NOTE

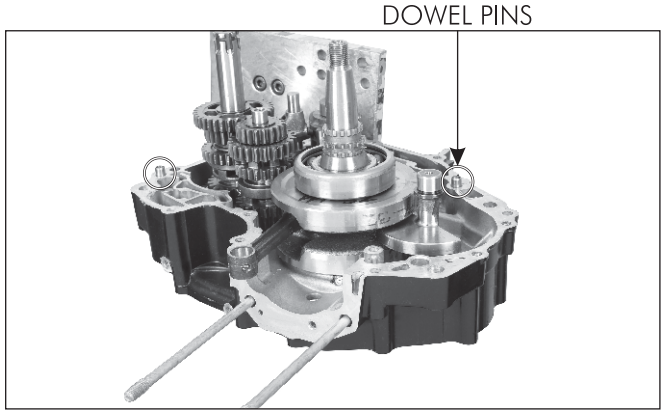
- Do not split crankcase using sharp tool.
- If engine is dismantled on the engine jig, then remove the left crankcase.
- Install counter shaft oil seal guide before spreading the crankcase.



TOOL

COUNTERSHAFT OIL SEAL GUIDE
PART NO: HMCL0418AABM004

Remove the dowel pins.



CRANKCASE

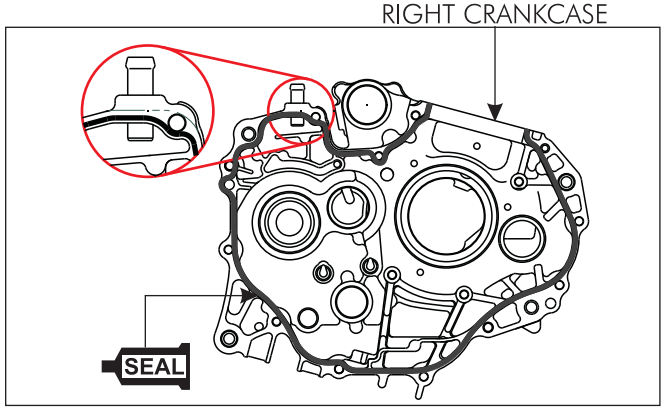
ASSEMBLY

Clean the left and right crankcase mating surfaces thoroughly, and ensure not to damage to mating surfaces.

Check for any damage.

NOTE

- Dress the surfaces with an oil stone if necessary to correct any minor roughness or irregularities.
- After cleaning, lubricate the crankshaft bearings and other contacting surfaces with clean engine oil.

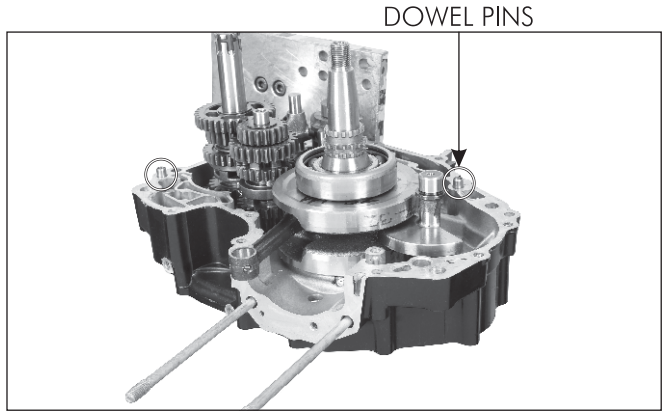


NOTE

Apply "Three- bond 1215" or equivalent.

Apply a light but thorough coating of sealant to all crankcase mating surface except the oil passage area.

Install the dowel pins.



Apply clean engine oil on the countershaft oil seal guide.

install the oil seal guide in the crankcase.

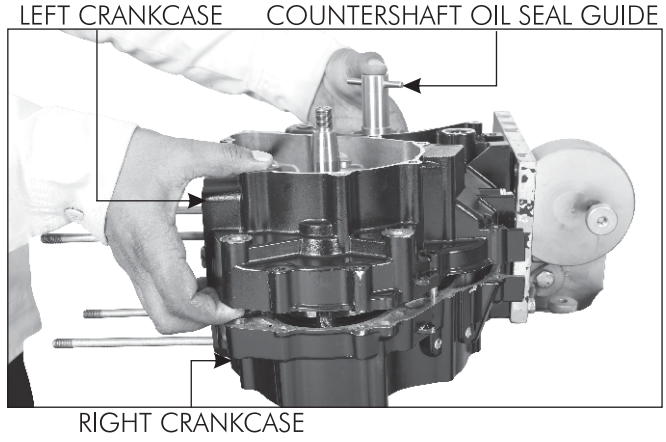
TOOL

COUNTERSHAFT OIL SEAL GUIDE
PART NO: HMCL0418AABM004

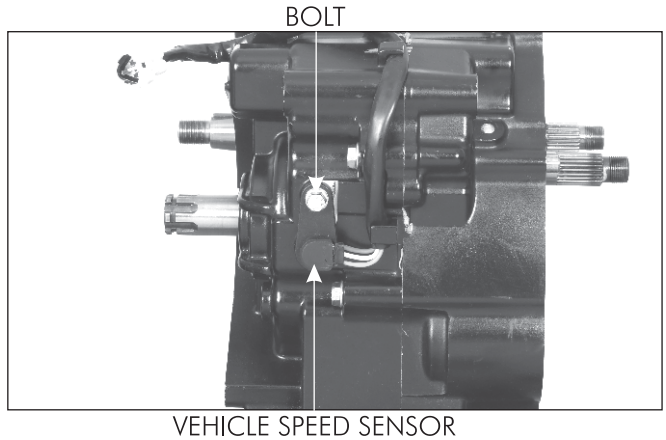
Install the left crankcase over the right crankcase.

CAUTION

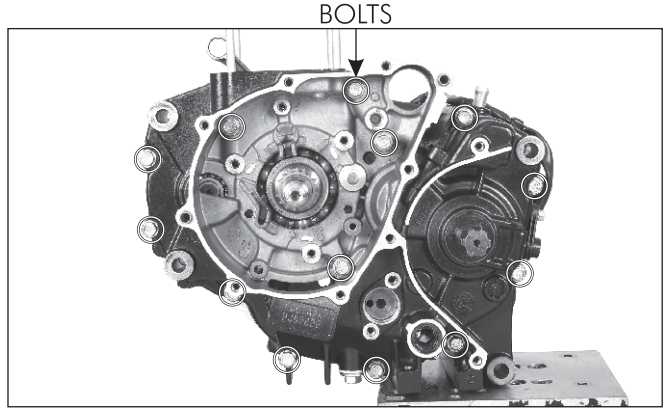
Do not force crankcase halves together. If there is excessive force required, something is wrong. Remove the left crankcase and check for misaligned parts.



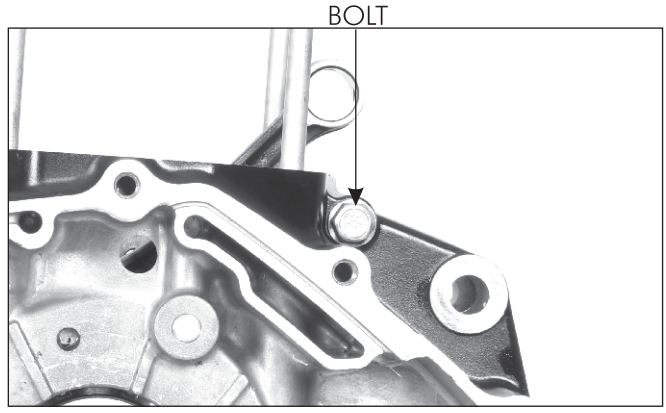
Install the vehicle speed sensor by installing its bolt.



Install the left crankcase bolts, and tighten the bolts in a crisscross pattern in 2-3 steps.

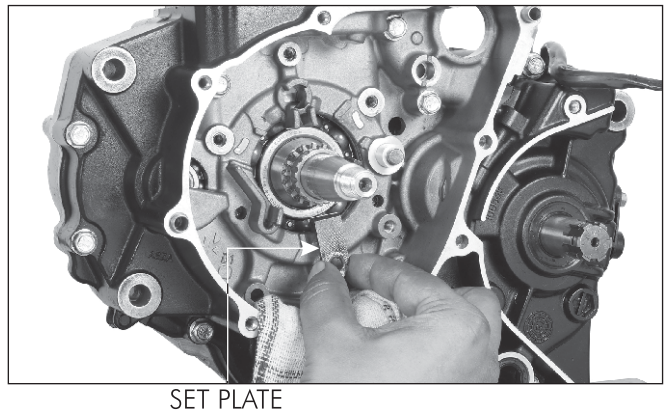


Install and tighten the right crankcase bolt.



NOTE

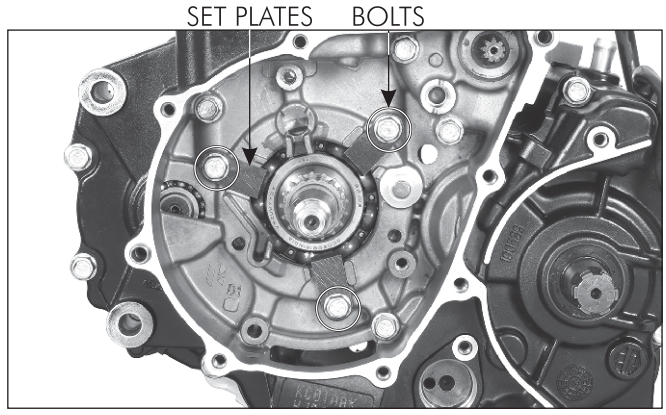
When installing the set plate, pull the crankshaft and hook the plate tab to the crankshaft bearing groove.



Install the bearing set plates and bolts to the specified torque.

TORQUE

CRANKSHAFT BEARING SET PLATE BOLT: 1.2 kgf-m

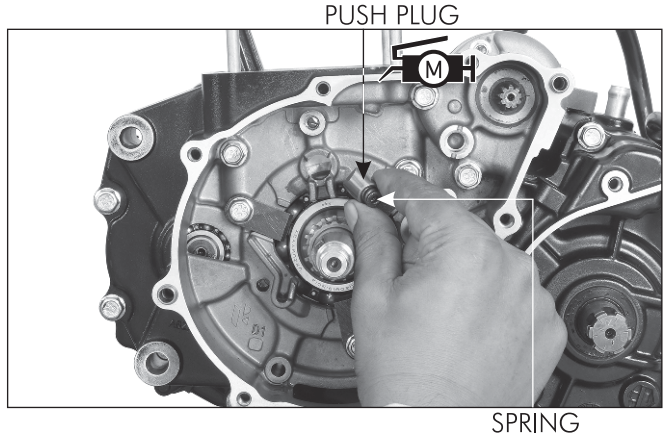


Apply molybdenum oil solution to the push plug.

Install the push plug and spring.

NOTE

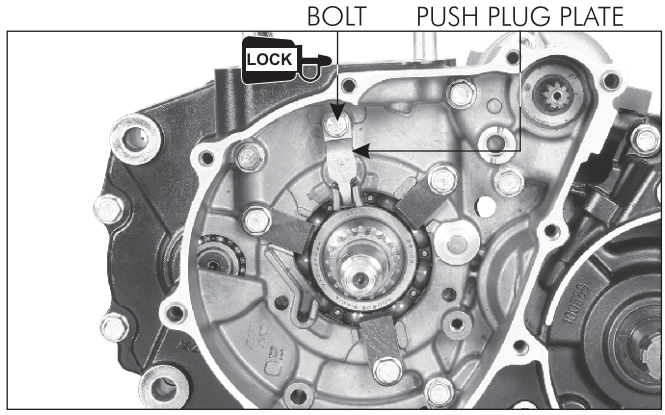
When installing the push plug, make sure the crankshaft bearing outer race touches the taper part of push plug.



Apply locking agent to the threads of the push plug bolt.
Install the push plug plate and bolt.
Tighten the bolt to the specified torque.

TORQUE

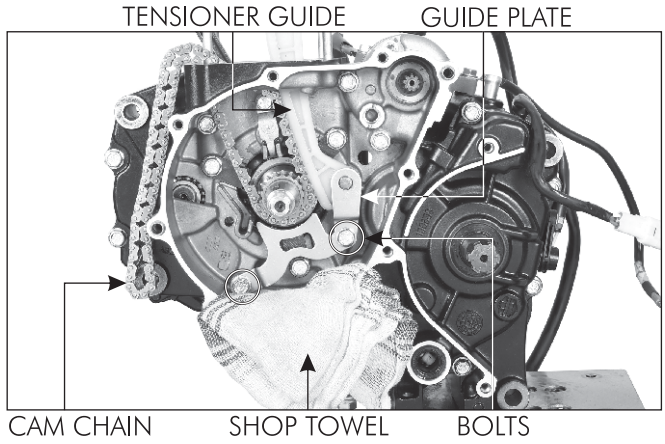
PUSH PLUG BOLT: 1.0 kgf-m



Install the cam chain to the sprocket through the crankcase.
Install the tensioner guide and tensioner guide plate.
Install and tighten the tensioner guide plate bolts.
Install the starter motor (page 19-8).
Install the neutral switch (20-11).

CAUTION

Place a shop towel to close the lower open portion as shown, to prevent any bolt etc. from falling inside the engine.



BALANCER SHAFT/CRANKSHAFT

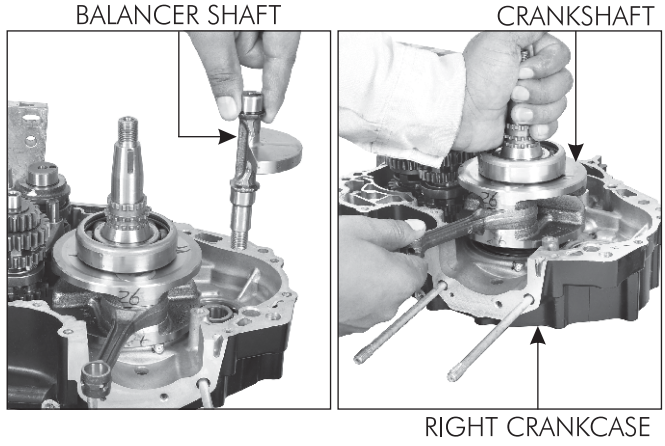
REMOVAL

Remove the crankcase assembly (page 11-4).
Remove the balancer shaft from the right crankcase.

CAUTION

When removing, installing and inspecting the crankshaft, be careful not to damage or kink crank web.

Remove the crankshaft from the right crankcase.

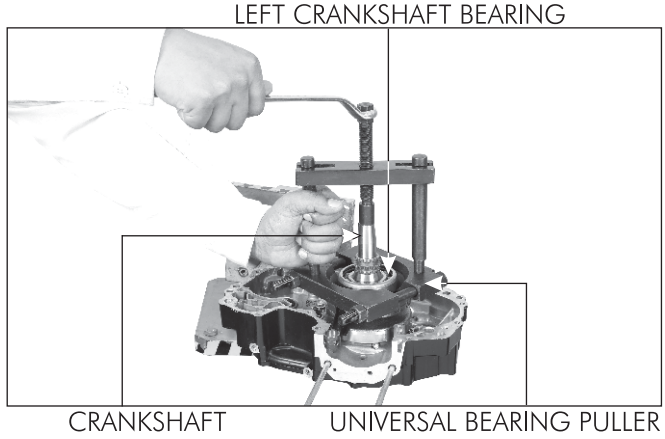


LEFT CRANKSHAFT BEARING

Remove the transmission (page 11-12).
Place the crankshaft on the right crankcase.
The left crankshaft bearing is press fitted on the crankshaft. Remove it using a special tool as shown in the figure.

TOOL

CRANKSHAFT BEARING (LHS) PULLER
PART NO: 070 HH KTN 003



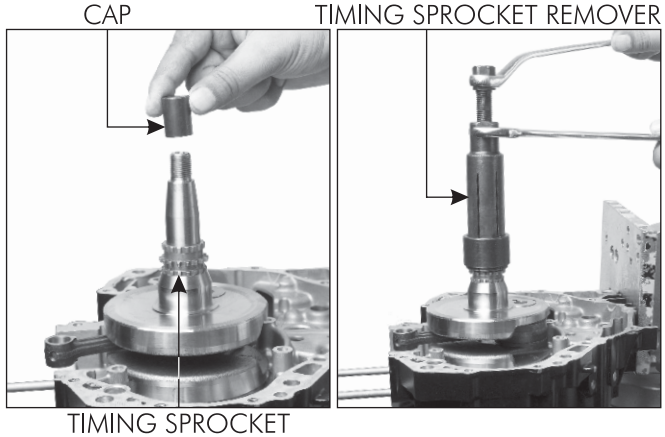
Remove the timing sprocket using the special tool as shown.

CAUTION

Always use cap before using special tool to avoid any damage to the threaded area on the crankshaft.

TOOL

TIMING SPROCKET REMOVER
PART NO: 070 HH K06001

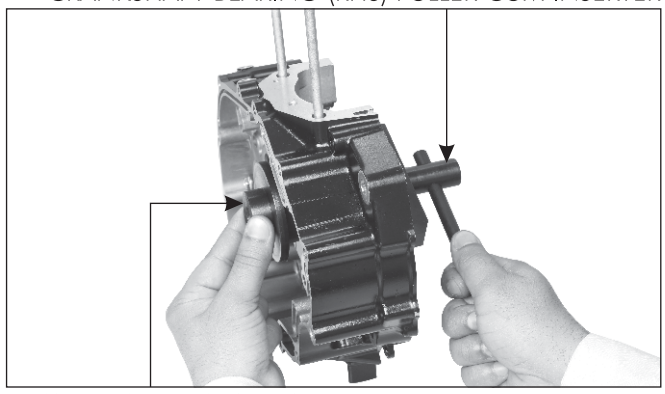


RIGHT CRANKSHAFT BEARING

Drive out the bearings from the crankcase using the following special tool.

TOOL

CRANKSHAFT BEARING (RHS) PULLER CUM INSERTER
PART NO: HMCL0120ABZA01



11

CRANKSHAFT INSPECTION

CRANKSHAFT RUNOUT

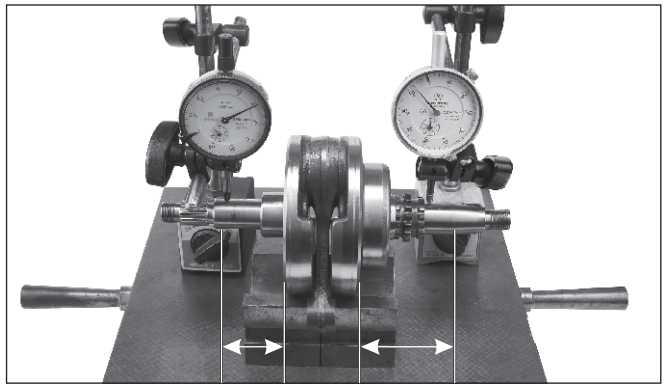
Place the crankshaft on a stand or V-blocks.

Set the dial indicator on the shafts.

Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT

CRANKSHAFT RUNOUT: 0.05 mm

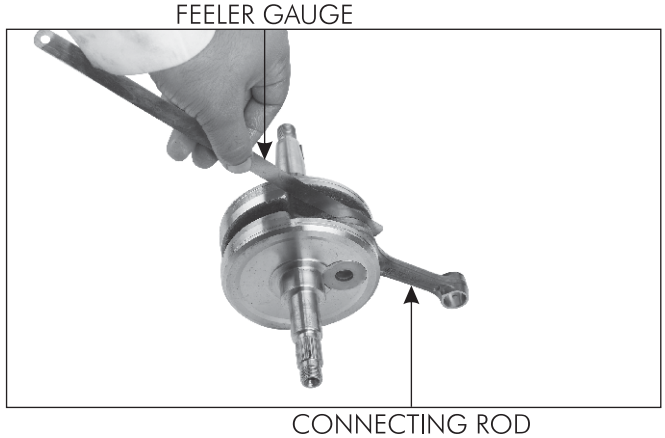


BIG END SIDE CLEARANCE

Measure the side clearance of the connecting rod big end with feeler gauge.

SERVICE LIMIT

CONNECTING ROD BIG END: 0.60 mm



TIMING SPROCKET

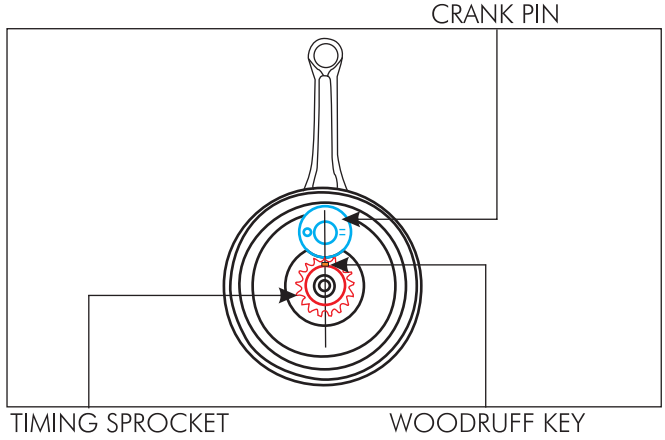
Check the timing sprocket teeth for wear or damage.

Remove the timing sprocket if necessary.

When installing the timing sprocket, align the center of the timing sprocket teeth with the center of the woodruff key.

NOTE

If the timing sprocket teeth are worn or damaged, check the cam chain, tensioner and cam sprocket.



BEARING REPLACEMENT

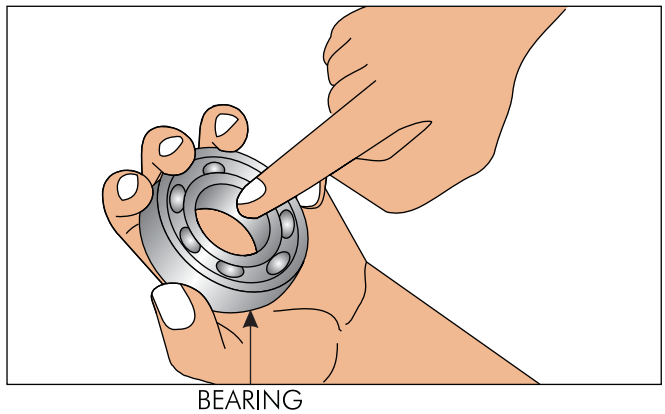
INSPECTION

Turn the inner race of bearing with your finger.

The bearing should turn smoothly and quietly.

Also check that bearing outer races fit tightly in the crankcase.

Remove and discard the bearing, if the race does not turn smoothly, quietly, or fits loosely in the crankcase.

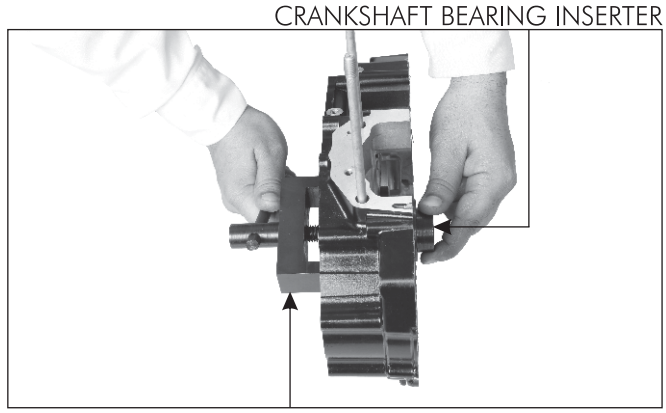


INSTALLATION

The right crankshaft bearing is fitted on the right crankcase using the special tool as shown.

TOOL

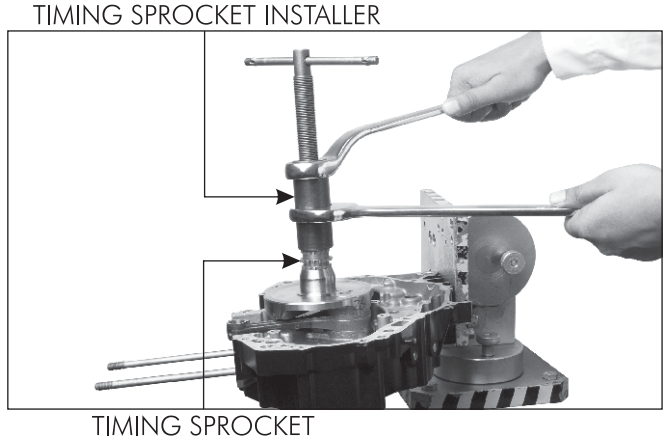
CRANKSHAFT BEARING (RHS) PULLER CUM INSERTER
PART NO: HMCL0120ABZA01



Install the timing sprocket using special tool as shown.

TOOL

TIMING SPROCKET INSTALLER
PART NO: 070 HH K06002



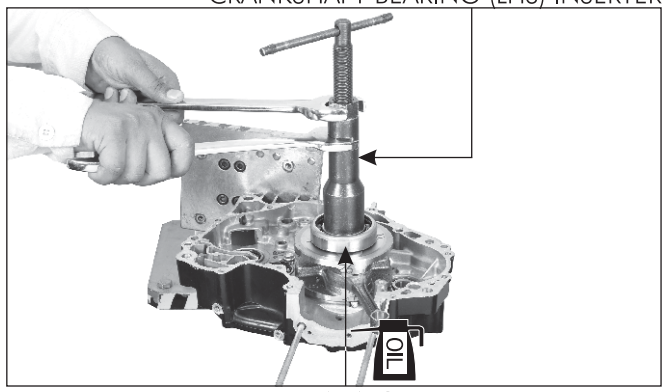
Apply clean engine oil to the new crankshaft bearing.

Install the left crankshaft bearing using the crankshaft bearing inserter.

TOOL

CRANKSHAFT BEARING (LHS) INSERTER
PART NO: 070 HH KTN 007

CRANKSHAFT BEARING (LHS) INSERTER



BEARING

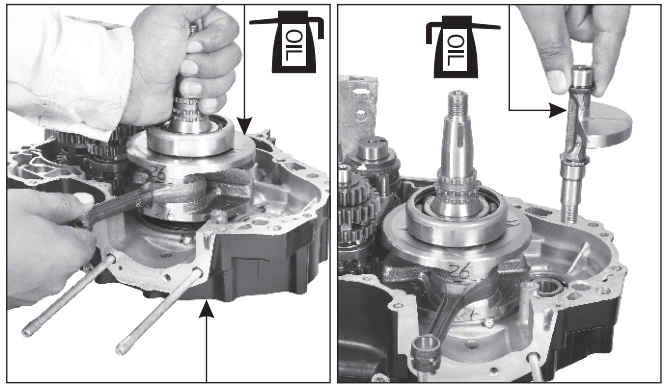
Apply clean engine oil to main bearing sliding surfaces and install the crankshaft into the right crankcase.

Install the balancer shaft into the right crankcase.

Install the transmission (page 11-15).

Assemble the crankcase (page 11-6).

CRANKSHAFT BALANCER SHAFT



RIGHT CRANKCASE

11

TRANSMISSION

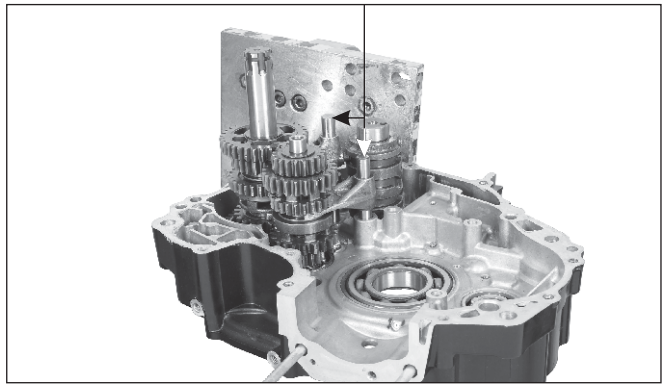
REMOVAL

Separate the crankcase halves (page 11-4).

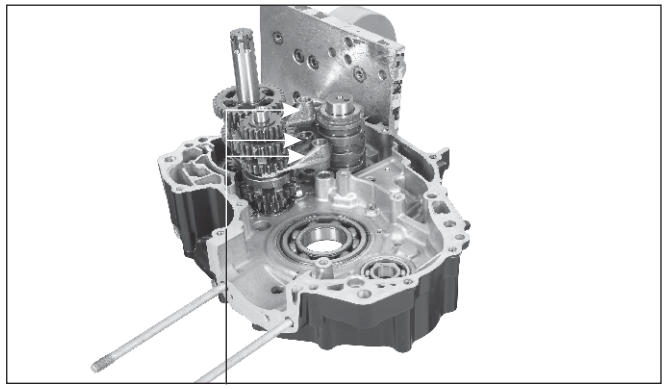
Remove the crankshaft (page 11-9).

Pull the shift fork shafts and remove it from the shift forks.

SHIFT FORK SHAFTS

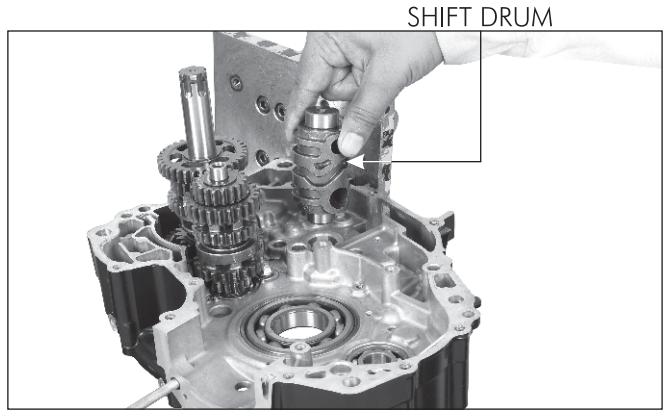


Remove the shift forks.

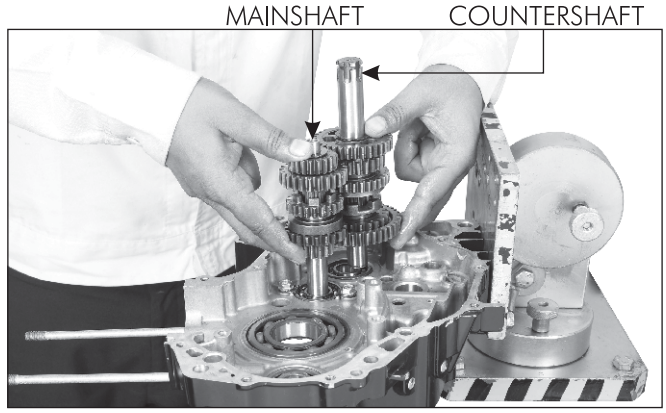


SHIFT FORKS

Remove the shift drum.



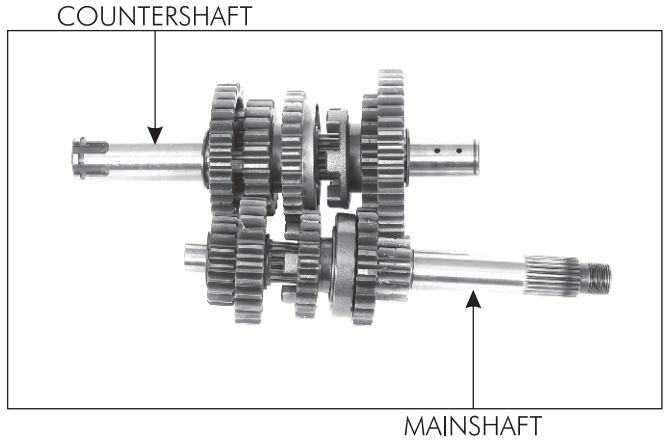
Remove the mainshaft and countershaft together.



Disassemble the mainshaft and countershaft.

NOTE

- Keep track of the disassembled parts (gears, bushes, washers and snap rings) by stacking them on a tool or slipping them onto a piece of wire.
- Do not expand the snap ring more than necessary for removal. To remove snap ring, expand the snap ring and pull it off using the gear behind it.



INSPECTION

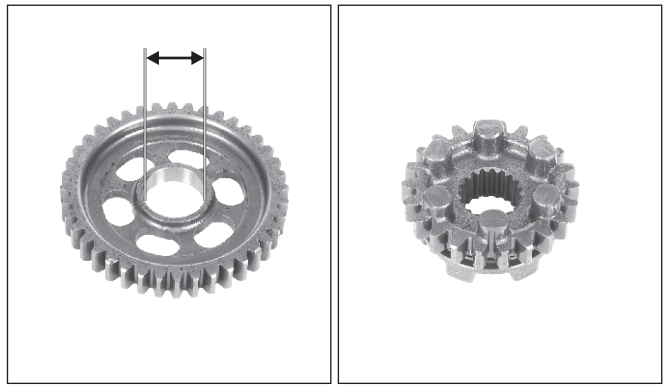
GEARS

Check the gear dogs, dog holes and teeth for damage or excessive wear.

Measure the I.D of each gear.

SERVICE LIMIT

M4, M5: 20.06 mm
C1: 20.56 mm
C2: 23.08 mm
C3: 23.09 mm



BUSHES

Check the bushes for wear or damage.
Measure the O.D of each bush.

SERVICE LIMIT

M4, M5: 19.91 mm
C1: 20.41 mm
C2, C3: 22.93 mm

Measure I.D of each bush.

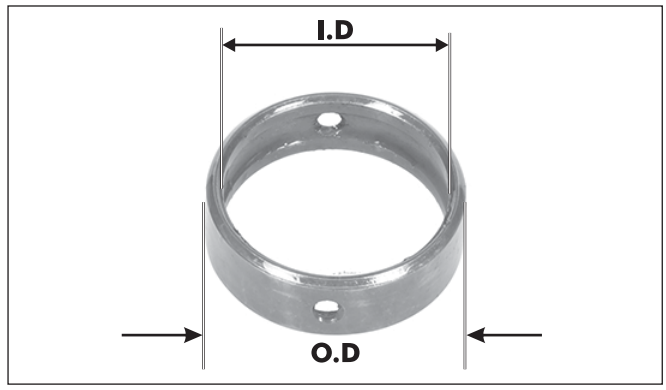
SERVICE LIMIT

M4, C1: 17.04 mm
C2,C3: 20.07 mm

Calculate the gear-to-bush clearance.

SERVICE LIMIT

M4: 0.11 mm
M5, C1, C2, C3: 0.10 mm



MAINSHAFT/COUNTERSHAFT

Check the spline grooves and sliding surfaces for abnormal wear or damage.
Measure the O.D of the mainshaft and countershaft at the gear and bush sliding areas.

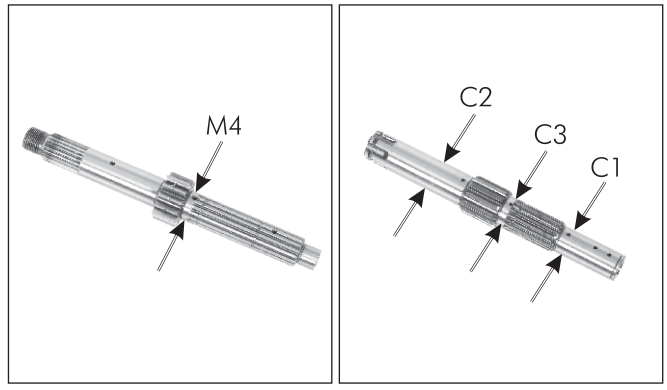
SERVICE LIMIT

Mainshaft (at M4 gear bush): 16.93 mm
Countershaft (at C1 gear bush): 16.93 mm
(at C2, C3 gear bush): 19.94 mm

Calculate the bush- to- shaft clearance.

SERVICE LIMIT

M4, C1: 0.09 mm
C2, C3: 0.10 mm

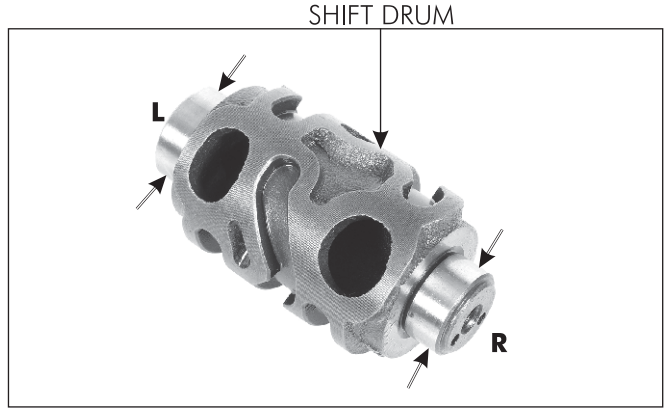


SHIFT DRUM

Inspect the shift drum end for scoring or evidence of insufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.
Measure the shift drum O.D at each end.

SERVICE LIMIT

LEFT SIDE: 23.94 mm
RIGHT SIDE: 20.94 mm



Check the shift drum journals on the left crankcase for excessive wear or damage.

Measure the shift drum journal I.D.

SERVICE LIMIT

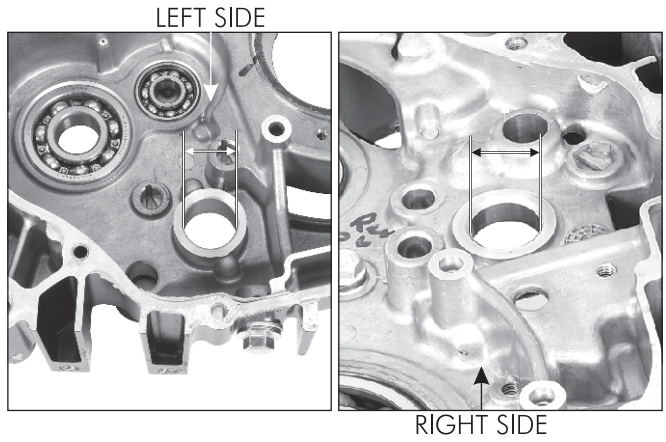
LEFT SIDE: 24.05 mm

Check the shift drum journals on the right crankcase for excessive wear or damage.

Measure the shift drum journal I.D.

SERVICE LIMIT

RIGHT SIDE: 21.04 mm



SHIFT FORK

Check the shift forks for deformation or abnormal wear.

Measure each shift fork claw thickness

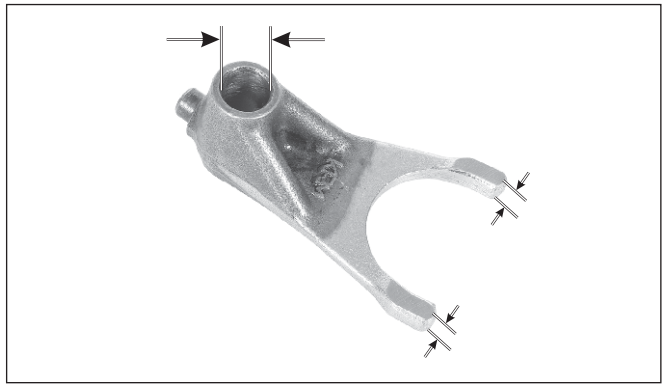
SERVICE LIMIT

SHIFT FORK CLAW THICKNESS: 4.53 mm

Measure the I.D of each fork.

SERVICE LIMIT

FORK: 10.05 mm



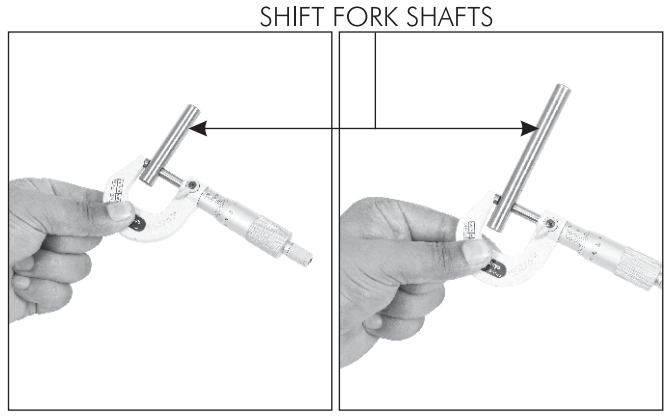
SHIFT FORK SHAFT

Check the shift fork shafts for damage and straightness.

Measure the shift fork shaft O.D

SERVICE LIMIT

SHIFT FORK SHAFT O.D: 9.93 mm



INSTALLATION

Clean all parts in high flash point nonflammable solvent.

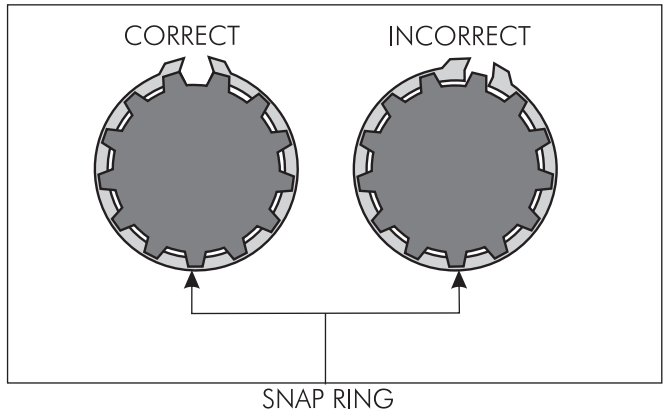
Apply clean engine oil to each gear teeth.

Apply molybdenum oil solution to the bush sliding surface to ensure initial lubrication.

Assemble all parts into their original positions.

NOTE

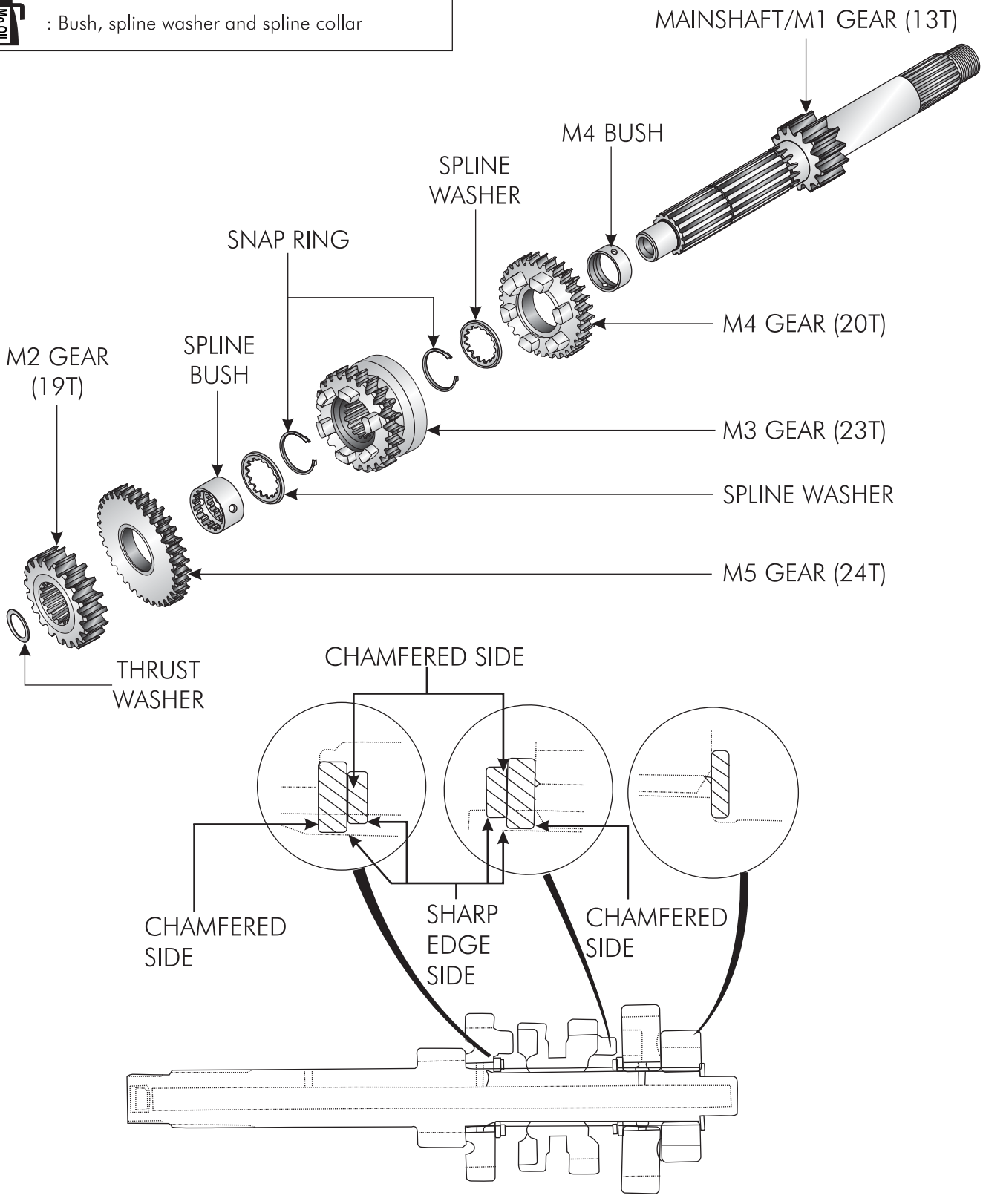
- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered side facing of the thrust load side. Confirm the inner side of snap rings and washer when you detect the chamfered side.
- Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.
- Align the splined bush with the oil hole on the shaft.



MAINSHAFT

: Each gear teeth

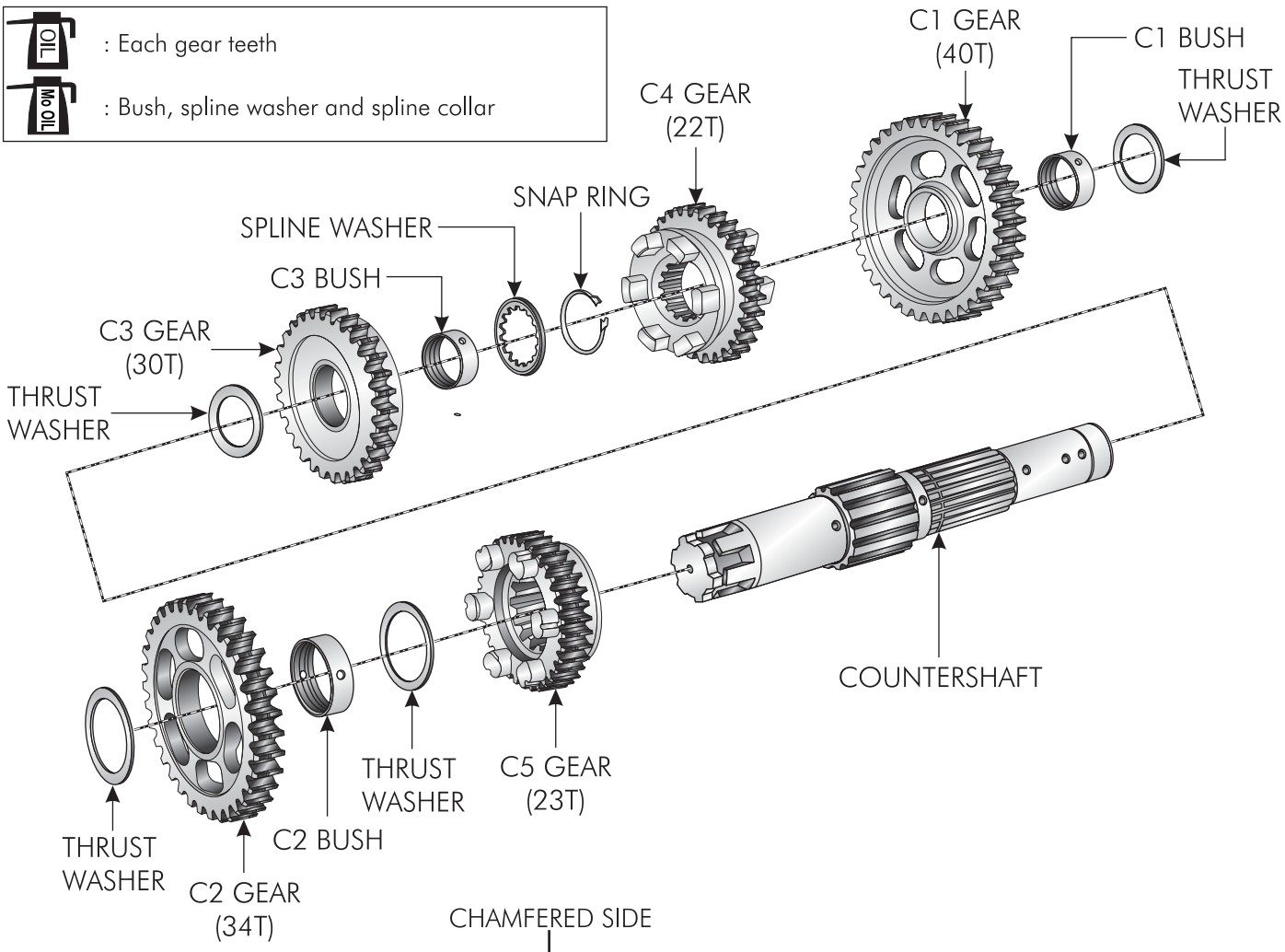
: Bush, spline washer and spline collar

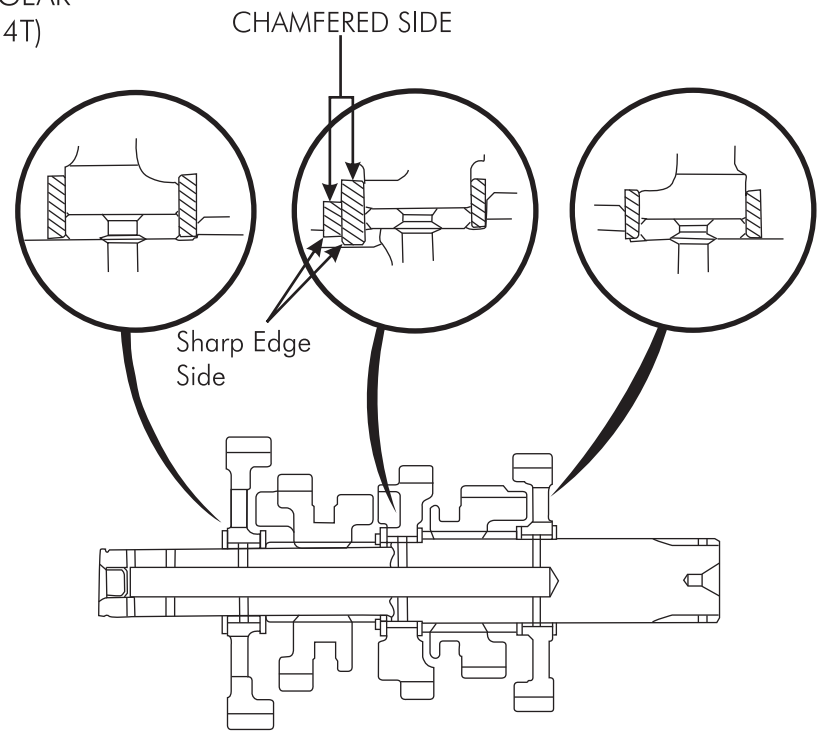


COUNTERSHAFT

OIL : Each gear teeth

MO OIL : Bush, spline washer and spline collar



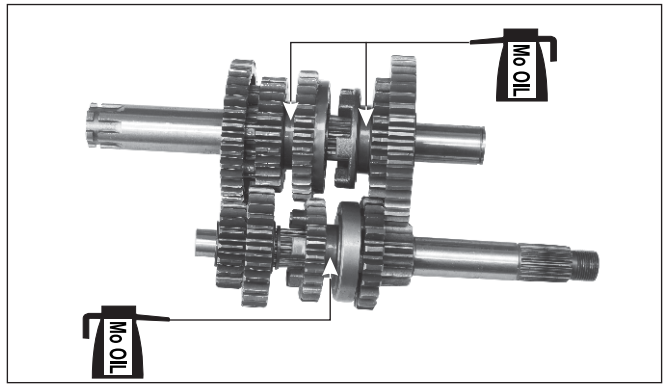


Apply molybdenum oil solution to the shift fork grooves.

Apply clean engine oil to the transmission gear teeth.

Check the transmission gear for free rotation and sliding on the shaft.

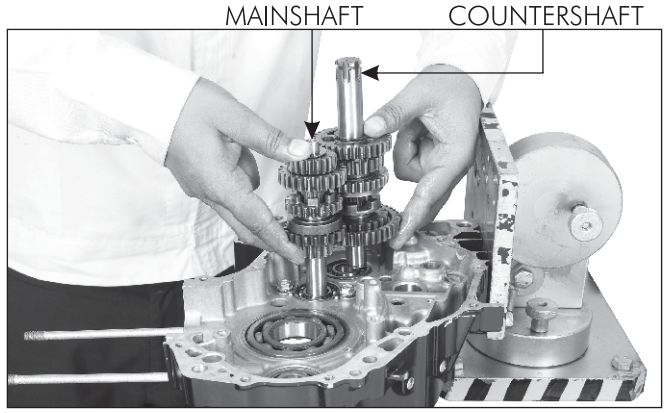
Engage the mainshaft and countershaft.



Install the mainshaft and countershaft together into the right crankcase. Be sure to install the three end washers (mainshaft; left only/countershaft; both ends).

NOTE

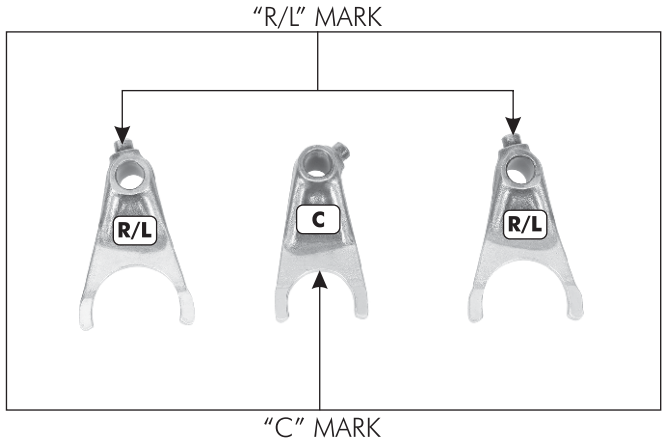
- Do not forget to install the transmission end washer.
- During mainshaft and countershaft installation, be careful not to damage the countershaft oil seal.



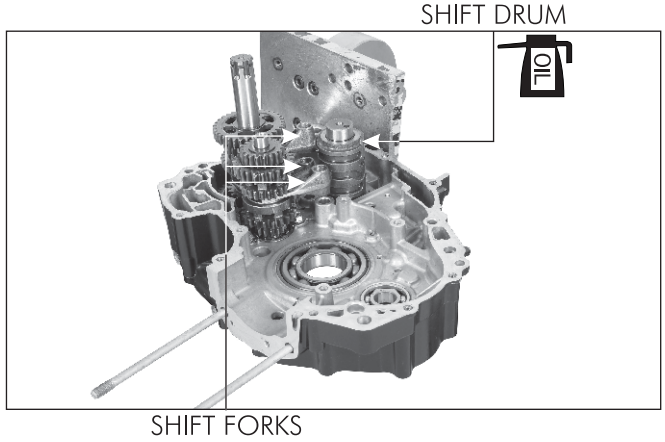
NOTE

Each shift fork has an identification mark; "R/ L" (right and left, "C" (Center).

Install the shift forks into the shifter gear grooves with the marks facing up (left crankcase side).



Apply clean engine oil to the guide grooves in the shift drum and install it, while aligning the shift fork guide pins with the guide grooves.

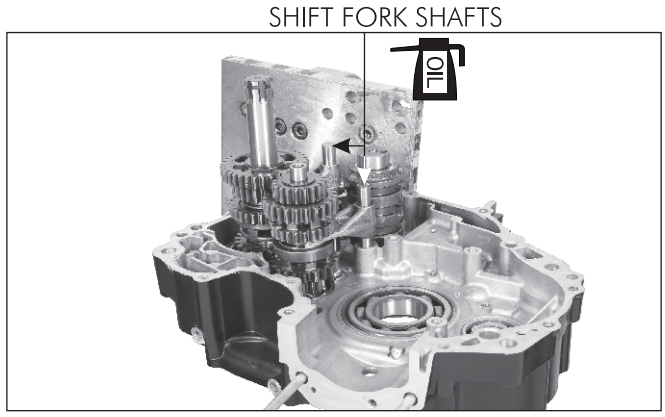


Apply clean engine oil to the shift fork shaft and insert it through the shift forks into the right crankcase.

Rotate the mainshaft by hand to see if the gears rotate freely.

Install the crankshaft (page 11-11).

Assemble the crankcase page (page 11-6).



RIGHT CRANKCASE COUNTERSHAFT BEARING

REMOVAL

Separate the crankcase (page 11-4).

Remove the crankshaft (page 11-9).

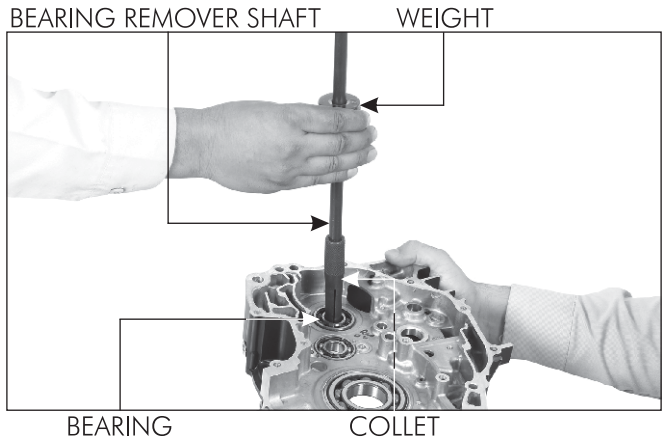
Remove the transmission (page 11-12).

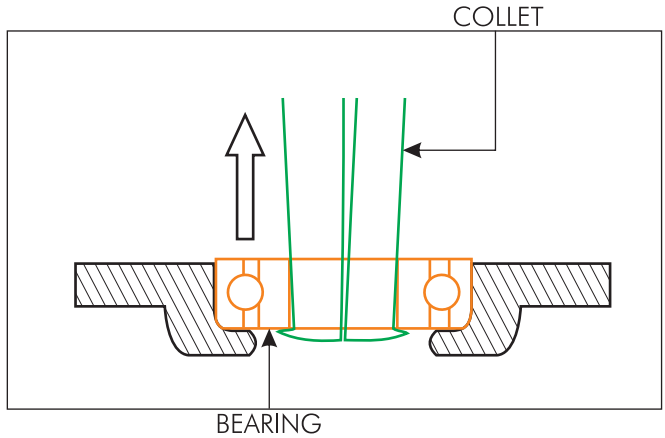
Drive out the countershaft bearing from the right crankcase.

TOOL

CRANKCASE BEARING REMOVER SHAFT
PART NO: 070 HH KFN 006
CRANKCASE BEARING REMOVER WEIGHT
PART NO: 070 HH KFN 007
CRANKCASE BEARING REMOVER COLLET, 17 mm
PART NO: 070 HH KTN 002

To remove the bearings from the crankcase, install the collet in to the bearing and then drive in the bearing remover shaft along with the bearing remover weight in to the collet, then remove the bearing out by sliding the bearing remover weight on the shaft.





INSTALLATION

Drive new countershaft bearing into the right crankcase.

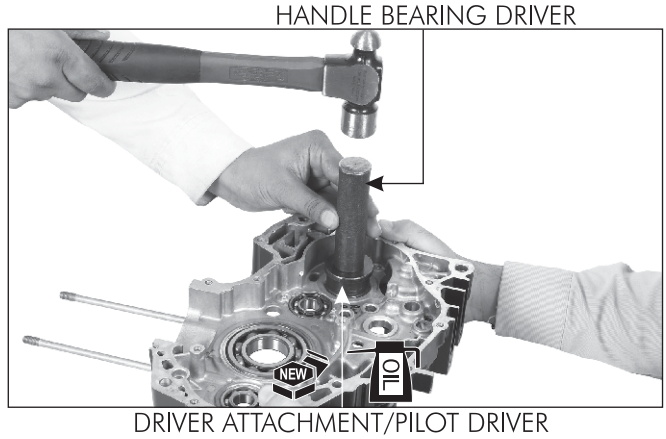
TOOL

PILOT DRIVER, 17 mm
PART NO: 070 HH 198 033
DRIVER ATTACHMENT, 40x46 mm
PART NO: 070 HH 198 031
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008

Install the transmission (page 11-15).

Install the crankshaft (page 11-11).

Install the crankcase (page 11-6).



RIGHT CRANKCASE MAINSHAFT BEARING

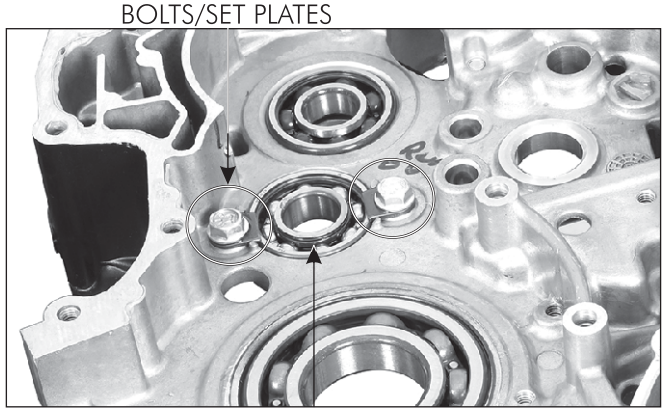
REMOVAL

Separate the crankcase (page 11-4).

Remove the crankshaft (page 11-9).

Remove the transmission (page 11-12).

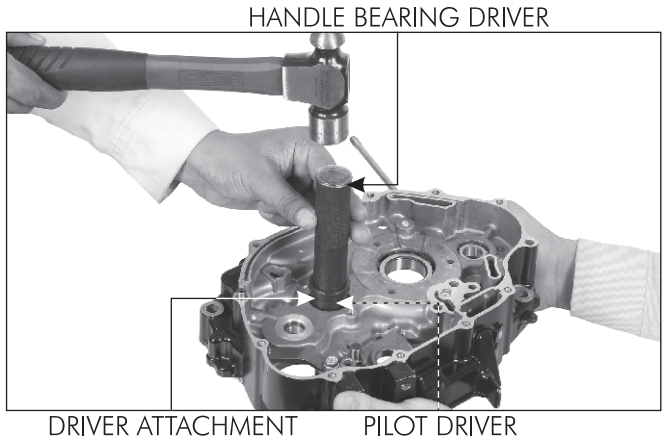
Remove the bolts and mainshaft bearing set plates from the right crankcase.



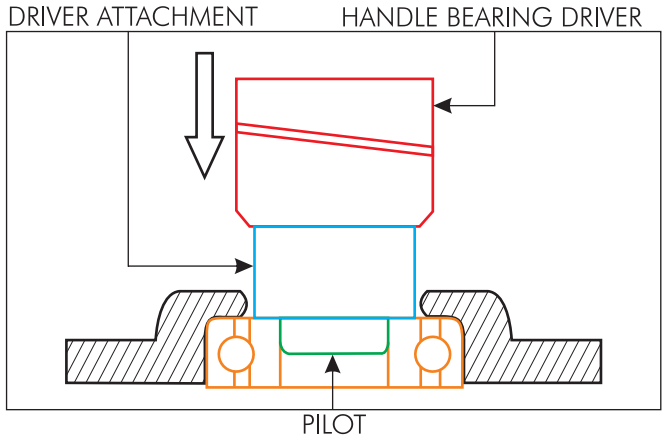
Drive out the mainshaft bearing from the right crankcase.

TOOL

PILOT DRIVER, 17 mm
PART NO: 070 HH 198 033
DRIVER ATTACHMENT, 32x35 mm
PART NO: 070 HH KFN 010
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008



To remove the bearings from the crankcase, set the required driver attachment and pilot to the driver handle as shown and drive out the bearings.

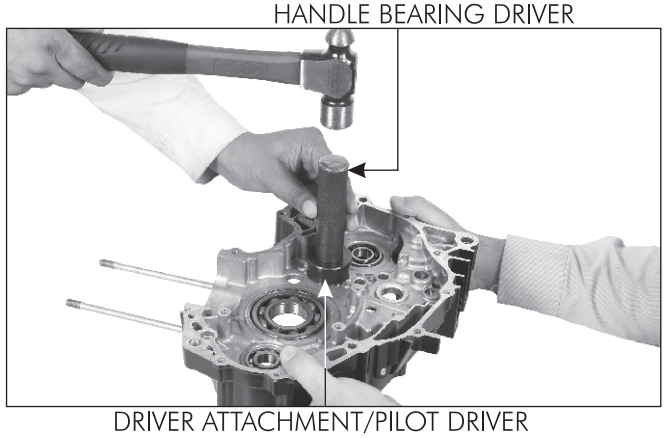


INSTALLATION

Drive new mainshaft bearing into the right crankcase.

TOOL

PILOT DRIVER, 17 mm
PART NO: 070 HH 198 033
DRIVER ATTACHMENT, 40x46 mm
PART NO: 070 HH 198 031
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008



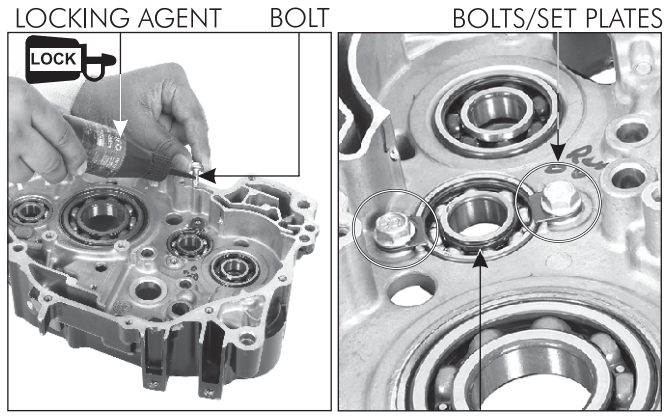
11

Apply locking agent to the threads of the set plate bolt.
Install the set plates and bolts.
Tighten the bolts to the specified torque.

TORQUE

MAINSHAFT BEARING SET PLATE BOLT: 1.2 kgf-m

Install the transmission (page 11-15).
Install the crankshaft (page 11-11).
Install the crankcase (page 11-6).



RIGHT CRANKCASE BALANCER SHAFT BEARING

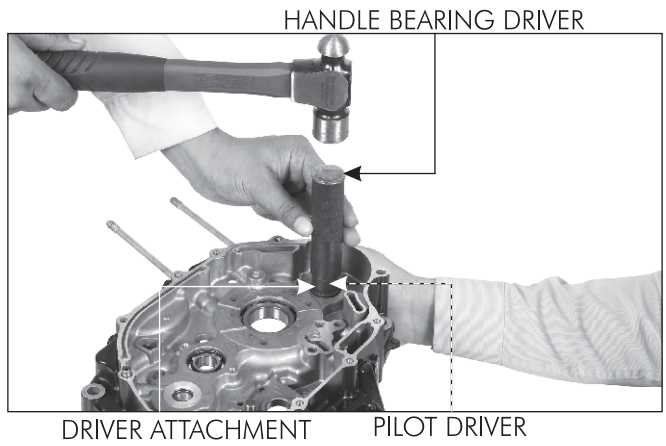
REMOVAL

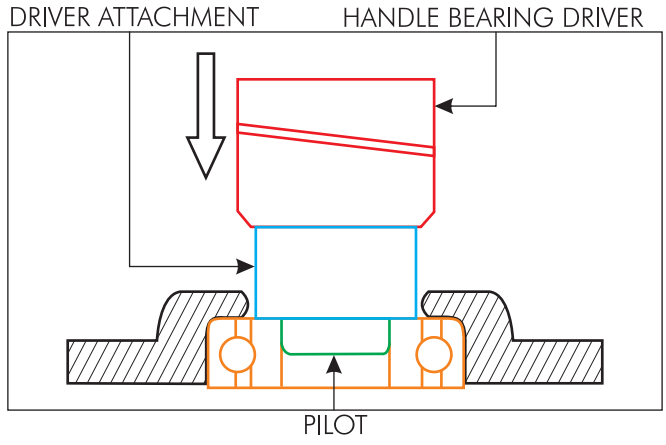
Separate the crankcase (page 11-4).
Remove the crankshaft (page 11-9).
Remove the transmission (page 11-12).
Drive out the balancer shaft bearing from the right crankcase.

TOOL

PILOT DRIVER, 17 mm
PART NO: 070 HH 198 033
DRIVER ATTACHMENT, 24x27 mm
PART NO: 070 HH KFN 021
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008

To remove the bearings from the crankcase, set the required driver attachment and pilot to the driver handle as shown and drive out the bearings.





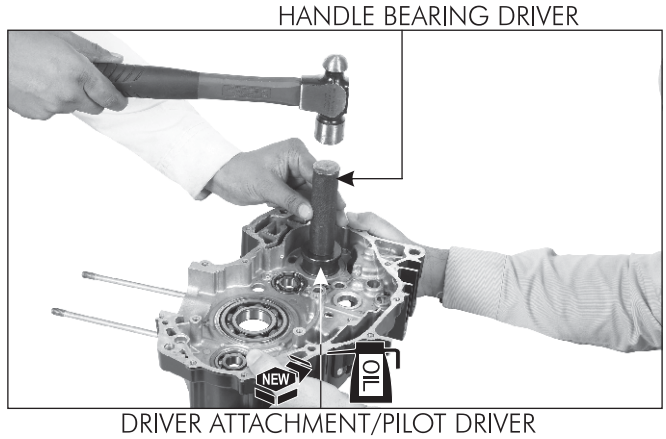
INSTALLATION

Lubricate all the bearings with clean engine oil.
Drive new balancer bearing into the right crankcase.

TOOL

PILOT DRIVER, 17 mm
PART NO: 070 HH 198 033
DRIVER ATTACHMENT, 40x46 mm
PART NO: 070 HH 198 031
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008

Install the transmission (page 11-15).
Install the crankshaft (page 11-11).
Install the crankcase (page 11-6).



LEFT CRANKCASE OIL SEAL

REMOVAL

Separate the crankcase (page 11-2).

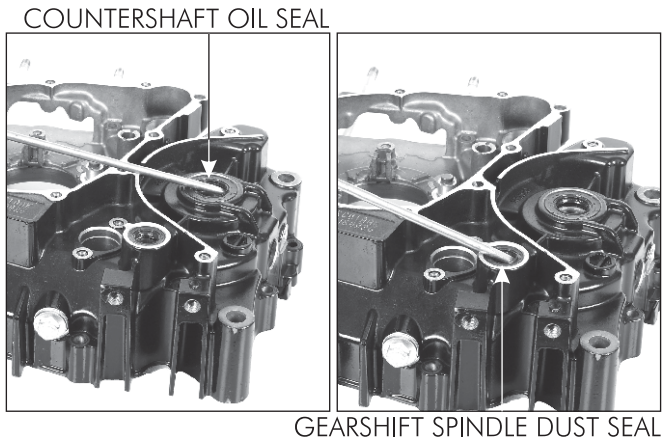
Remove the transmission (page 11-7).

Remove the crankshaft (page 11-14).

Remove the countershaft oil seal and gear shift spindle dust seal from the left crankcase.

INSTALLATION

Installation is in the reverse order of removal.



LEFT CRANKCASE COUNTERSHAFT BEARING

REMOVAL

Separate the crankcase (page 11-4).

Remove the crankshaft (page 11-9).

Remove the transmission (page 11-12).

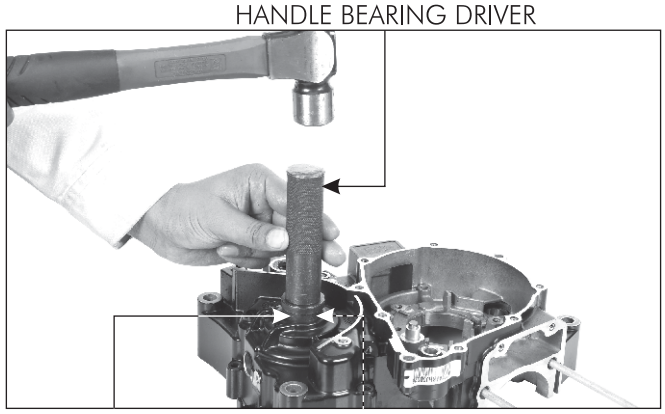
Remove the countershaft oil seal.

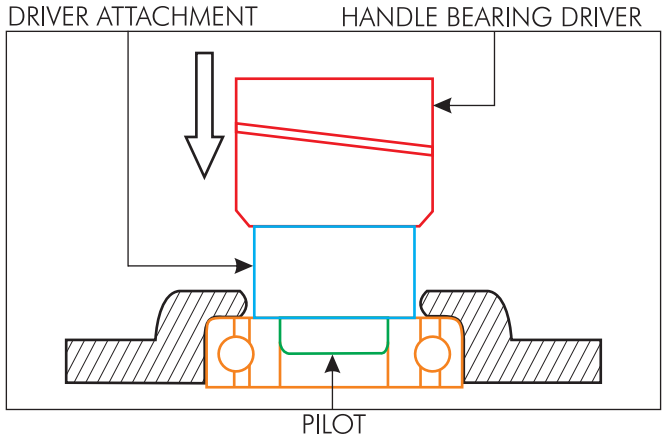
Drive out the countershaft bearing from the left crankcase with following tools.

TOOL

PILOT DRIVER, 20 mm
PART NO: 070 HH KTN 006
DRIVER ATTACHMENT, 32x35 mm
PART NO: 070 HH KFN 010
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008

To remove the bearings from the crankcase, set the required driver attachment and pilot to the driver handle as shown and drive out the bearings.



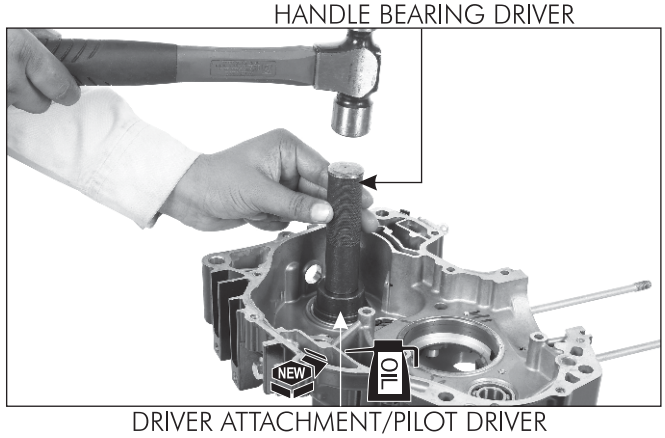


INSTALLATION

Drive new countershaft bearing into the left crankcase.

TOOL

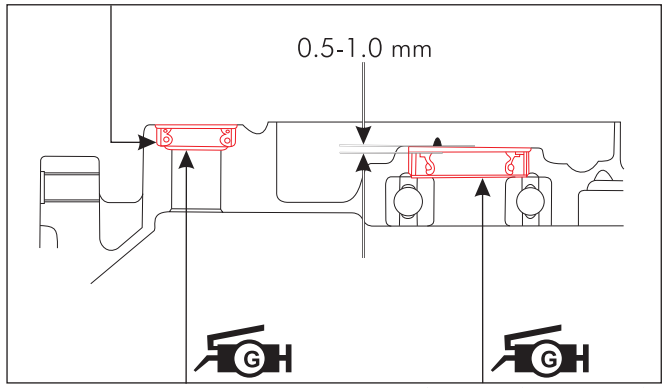
PILOT DRIVER, 20 mm
PART NO: 070 HH KTN 006
DRIVER ATTACHMENT, 40x46 mm
PART NO: 070 HH 198 031
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008



11

Apply grease to new oil seal lips.
Install countershaft and gearshift spindle oil seals.
Install the transmission (page 11-15).
Install the crankshaft (page 11-11).
Install the crankcase (page 11-6).

DRIVE TO CASE END FACE



GEAR SHIFT SPINDLE OIL SEAL COUNTERSHAFT OIL SEAL

LEFT CRANKCASE MAINSHAFT BEARING

REMOVAL

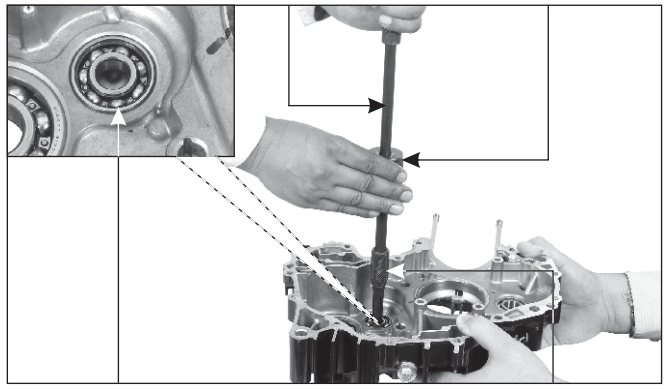
Separate the crankcase (page 11-4).
Remove the crankshaft (page 11-9).
Remove the transmission (page 11-12).
Drive out the main shaft bearing from the left crankcase with following tools.

TOOL

CRANKCASE BEARING REMOVER SHAFT
PART NO: 070 HH KFN 006
CRANKCASE BEARING REMOVER WEIGHT
PART NO: 070 HH KFN 007
COLLET BEARING REMOVER, 12 mm
PART NO: 070 HH 198 026

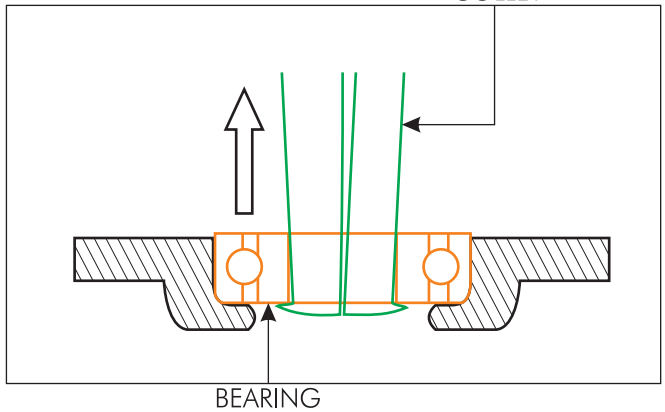
To remove the bearings from the crankcase, install the collet in to the bearing and then drive in the bearing remover shaft along with the bearing remover weight in to the collet, then remove the bearing out by sliding the bearing remover weight on the shaft.

BEARING REMOVER SHAFT WEIGHT



MAINSHAFT BEARING COLLET

COLLET



BEARING

INSTALLATION

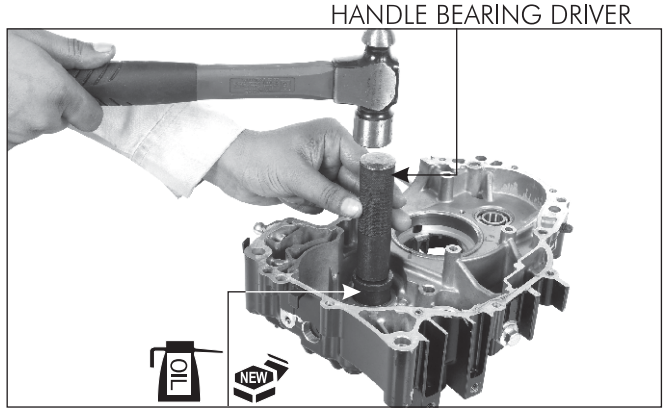
Drive new mainshaft bearing into the left crankcase.

TOOL

PILOT DRIVER, 12 mm
PART NO: 070 HH KFN 012
DRIVER ATTACHMENT, 32x35 mm
PART NO: 070 HH KFN 010
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008

Install the transmission (page 11-15).
Install the crankshaft (page 11-11).
Install the crankcase (page 11-6).

HANDLE BEARING DRIVER



DRIVER ATTACHMENT/PILOT DRIVER

LEFT CRANKCASE BALANCER SHAFT BEARING

REMOVAL

Separate the crankcase (page 11-4).

Remove the crankshaft (page 11-9).

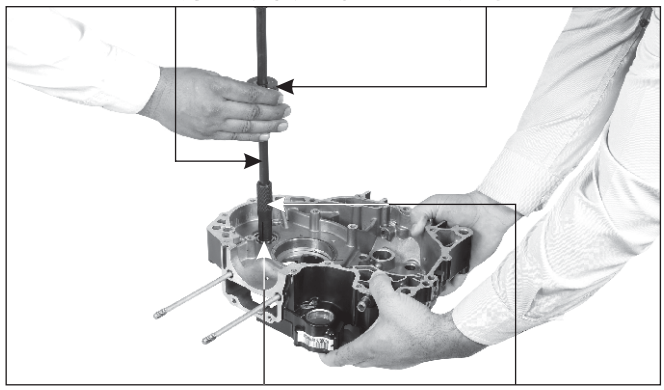
Remove the transmission (page 11-12).

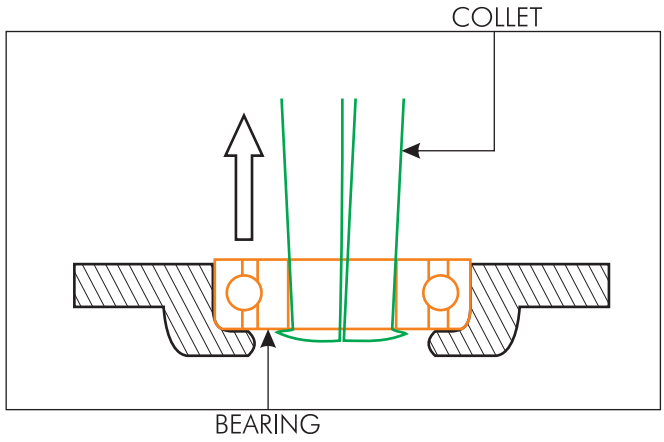
Drive out the balancer shaft bearing from the left crankcase.

TOOL

CRANKCASE BEARING REMOVER SHAFT
PART NO: 070 HH KFN 006
CRANKCASE BEARING REMOVER WEIGHT
PART NO: 070 HH KFN 007
COLLET BEARING REMOVER, 12 mm
PART NO: 070 HH 198 026

To remove the bearings from the crankcase, install the collet in to the bearing and then drive in the bearing remover shaft along with the bearing remover weight in to the collet, then remove the bearing out by sliding the bearing remover weight on the shaft.





INSTALLATION

Lubricate all the bearings with clean engine oil.

Drive new balancer bearing into the left crankcase.

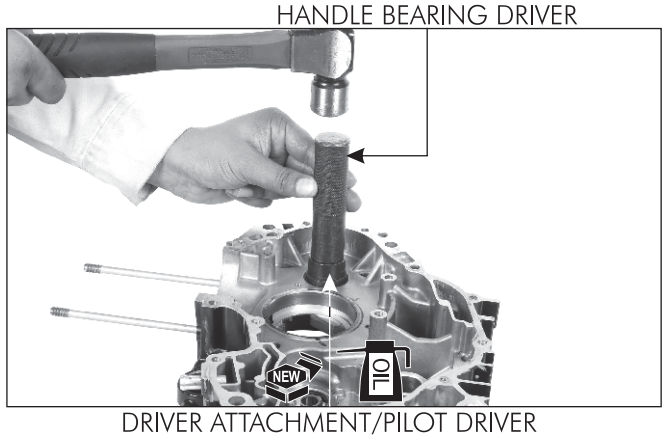
TOOL

PILOT DRIVER, 17 mm
PART NO: 070 HH 198 033
DRIVER ATTACHMENT, 32x35 mm
PART NO: 070 HH KFN 010
HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008

Install the transmission (page 11-15).

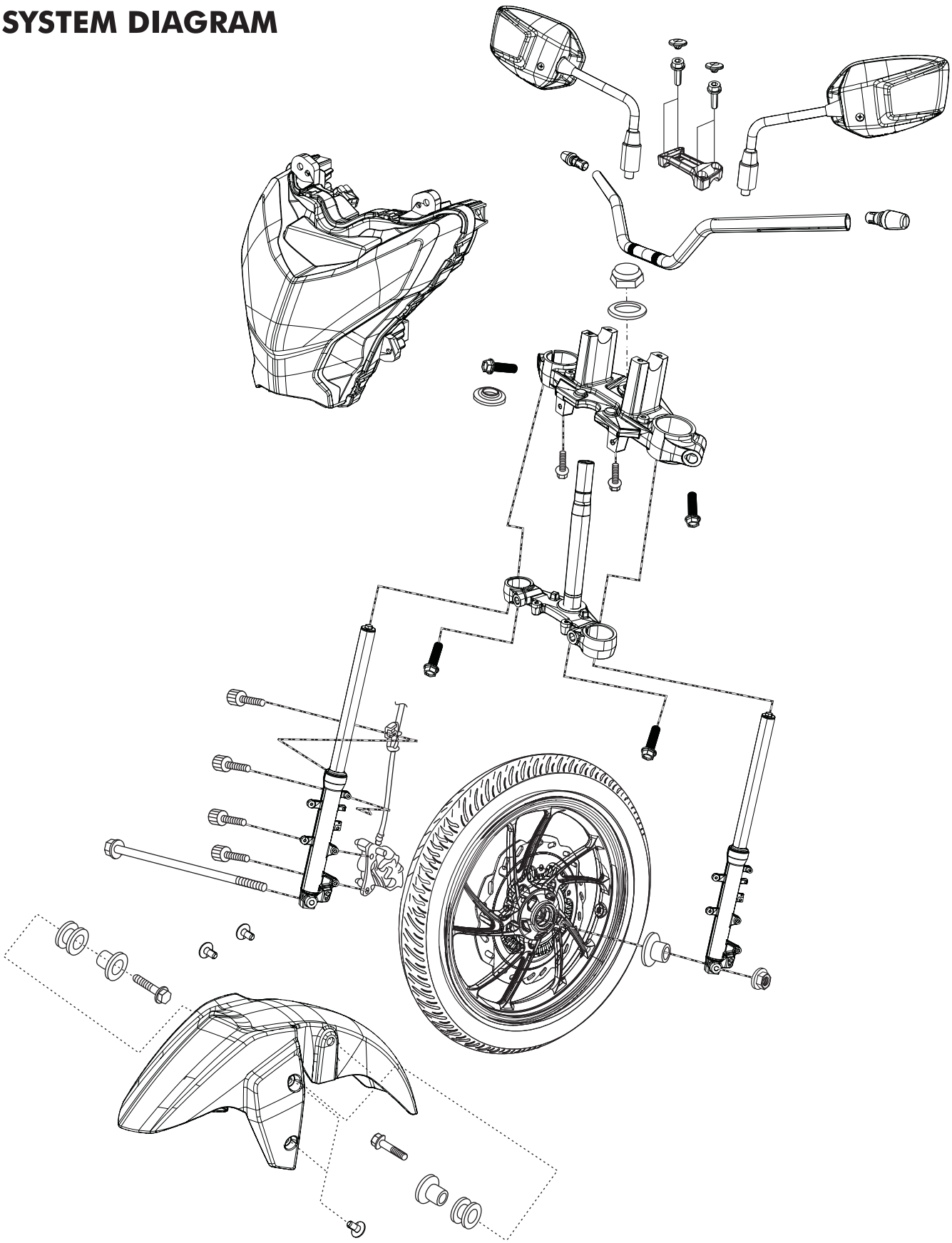
Install the crankshaft (page 11-11).

Install the crankcase (page 11-6).



MEMO

SYSTEM DIAGRAM



System Diagram	**12-0**	**Handlebar**	**12-4**
Service Information	**12-1**	**Front Wheel**	**12-8**
Specifications	**12-1**	**Fork**	**12-13**
Torque Values/Special Tools	**12-2**	**Steering Stem**	**12-23**
Troubleshooting	**12-3**		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Riding on damaged wheels impairs safe operation of the motorcycle.
- A contaminated brake disc or pad increases stopping distance. Discard contaminated pad and clean a contaminated disc with a high quality brake degreasing agent.

- This section covers maintenance of the front wheel, forks and steering stem.
- Raise the front wheel off the ground by supporting the motorcycle securely with a jack or other support under the engine.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Use only tyres marked "TUBELESS" and tubeless valves on wheels marked "TUBELESS TYRE APPLICABLE".
- Brake system information (page16-1).
- Lamps, meters and switches information (page 20-1).
- Take extra care while removing and installing the wheel bearing to avoid any damage to the encoder.

SPECIFICATIONS

FRONT WHEEL/SUSPENSION/STEERING

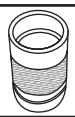
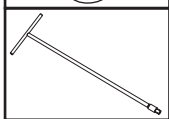
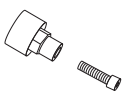
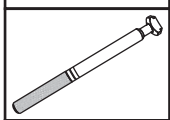
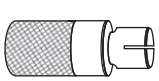
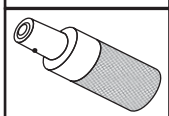
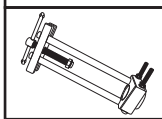
ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		0.8 mm	-
Cold tyre pressure	Rider only	1.75 kgf/cm^2 (25 psi)	-
	Rider & Pillion	1.75 kgf/cm^2 (25 psi)	-
Front axle runout		0.2 mm	-
Front wheel rim runout	Radial	0.4 mm	2 mm
	Axial	0.4 mm	2 mm
Wheel balance weight		max 60 gm	-
Fork spring free length		463.6 mm	-
Fork fluid level		154 mm	-
Fork fluid capacity		305 cc	-

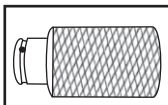
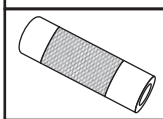
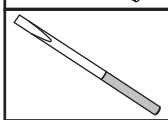
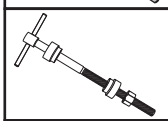
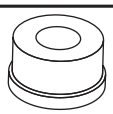
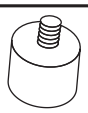
TORQUE VALUES

TOP BRIDGE PINCH BOLT	: 2.2 kgf-m
BOTTOM BRIDGE PINCH BOLT	: 3.2 kgf-m
FRONT AXLE NUT	: 5.9 kgf-m
FORK CAP BOLT	: 2.5 kgf-m
STEERING STEM NUT	: 7.4 kgf-m
FRONT FORK SOCKET BOLT	: 2.0 kgf-m
STEERING BEARING ADJ. NUT	: 2.5 kgf-m
FRONT CALIPER MOUNTING BOLT	: 3.0 kgf-m
HANDLEBAR UPPER HOLDER ALLEN KEY BOLTS	: 1.2 kgf-m

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

SPECIAL TOOLS

	FRONT FORK OIL SEAL DRIVER BODY WITH ATTACHMENT (DIA 37 mm) PART NO: HMCL0418AABM001
	FRONT FORK DISMANTLING SHAFT PART NO: HMCL0418AABM002
	FRONT FORK DISMANTLING SHAFT ADAPTER PART NO: HMCL0418AABM003
	BALL RACE DRIVER PART NO: 070 HH KTN 005
	BEARING REMOVER HEAD, 12 mm PART NO: 070 HH KFN 017
	HANDLE BEARING DRIVER PART NO: 070 HH KFN 008
	T-STEM CONE PULLER PART NO: 070 HH KST 001

	STEERING BEARING ADJUSTING NUT SOCKET, 41 mm PART NO: 070 HH KZJ 004
	BOTTOM CONE RACE DRIVER PART NO: 070 HH KST 002
	WHEEL BEARING REMOVER HEAD SHAFT PART NO: 070 HH KZJ 009
	STEERING TOP CONE INSERTER ADAPTER PART NO: HMCL0120ABZA02
	DRIVER ATTACHMENT, 31 mm PART NO: 070 HH KFN 004
	DRIVER ATTACHMENT, 32x35 mm PART NO: 070 HH KFN 010
	PILOT DRIVER, 12 mm PART NO: 070 HH KFN 012

TROUBLESHOOTING

Hard steering
- Steering bearing adjustment nut too tight
- Worn or damaged steering head bearing
- Bent steering stem
- Insufficient tyre pressure
- Faulty tyre

Steers to one side or does not track straight
- Bent front tube
- Bent front axle
- Wheel installed incorrectly
- Faulty steering head bearing
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings
- Unevenly assembled left and right fork tubes
- Unequal oil quantity in each fork tube

Front wheel wobbling
- Bent rim
- Worm wheel bearings
- Bent or loose spoke
- Faulty tyre
- Unbalanced front tyre and wheel
- Axle not tightened properly

Wheel turns hard
- Damaged front wheel bearing
- Brake dragging
- Bent front axle
- Insufficient tyre pressure

Brake squeaks
- Worn brake lining/pad/disc
- Contaminated brake lining/pad/disc

Soft suspension
- Weak fork spring
- Insufficient fork oil
- Oil viscosity too low (wrong grade of oil)
- Insufficient tyre pressure

Hard suspension
- Bent or damaged fork tube
- Clogged fluid passage
- Incorrect fluid viscosity
- Oil volume too high
- Damaged fork slider

Front suspension noisy
- Faulty slider bushing
- Insufficient fork fluid
- Loose front suspension fasteners
- Uneven fluid quantity in fork tubes

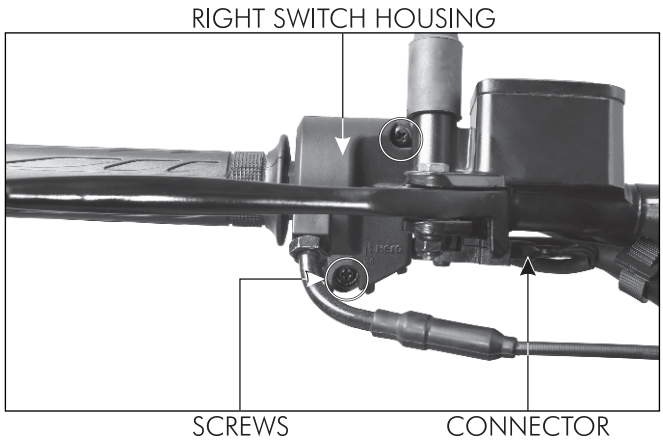
Poor brake performance
- Contaminated brake lining/pad/disc

HANDLEBAR

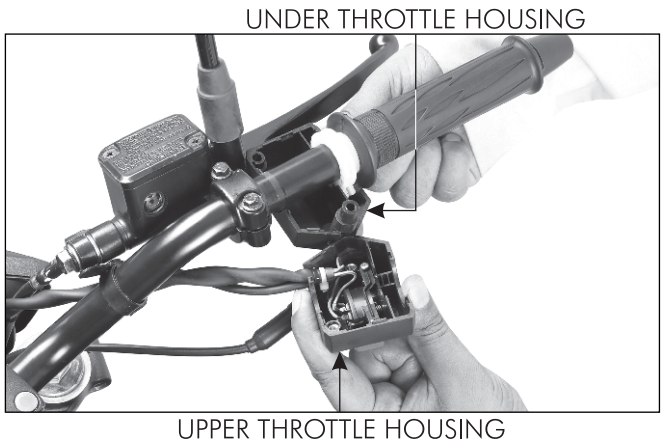
REMOVAL

Disconnect the front brake switch connection.

Remove the right handlebar switch housing screws.



Separate the right handlebar switch housing.

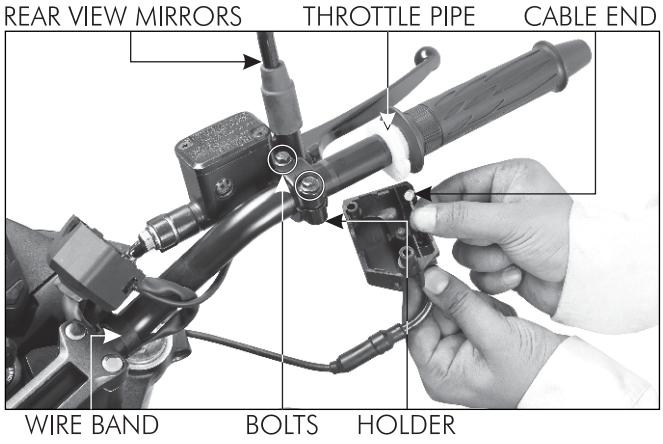


Remove the rear view mirrors (page 2-2).

Remove the right side handlebar wire band.

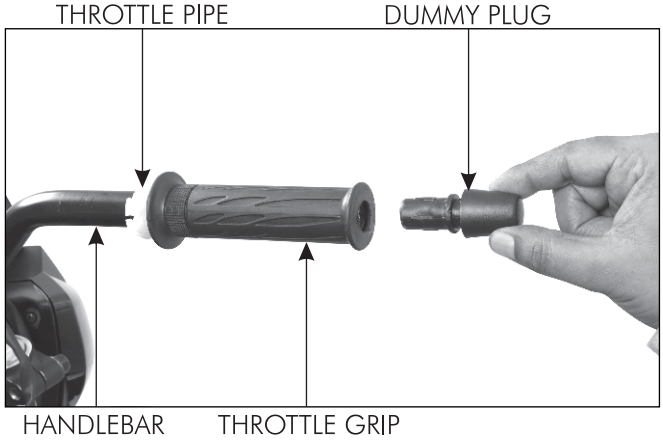
Disconnect the throttle cable end from the throttle pipe, then remove the under throttle housing.

Remove the bolts, holder and brake master cylinder.

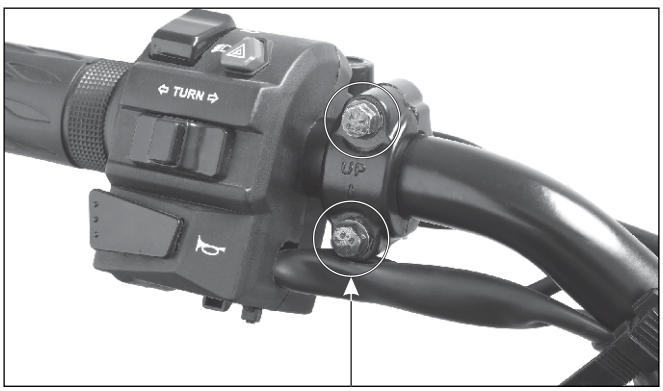


Pull and remove the dummy plug from the handlebar.

Remove the throttle grip and throttle pipe from the handlebar.



Loosen the clutch lever bracket pinch bolts.

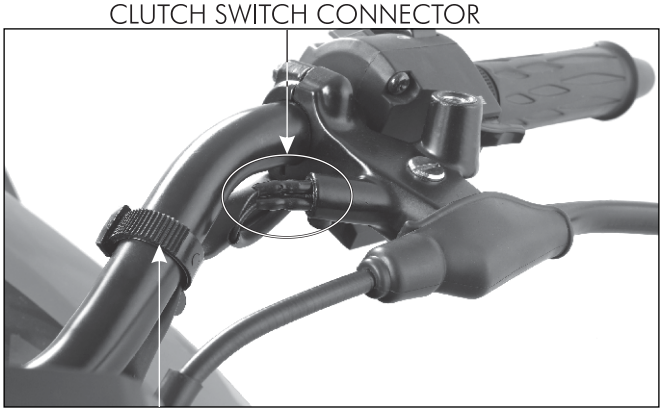


CLUTCH LEVER BRACKET PINCH BOLTS

CLUTCH SWITCH CONNECTOR

Remove the left side handlebar wire band.

Disconnect the clutch switch connectors on the left side of the handlebar.



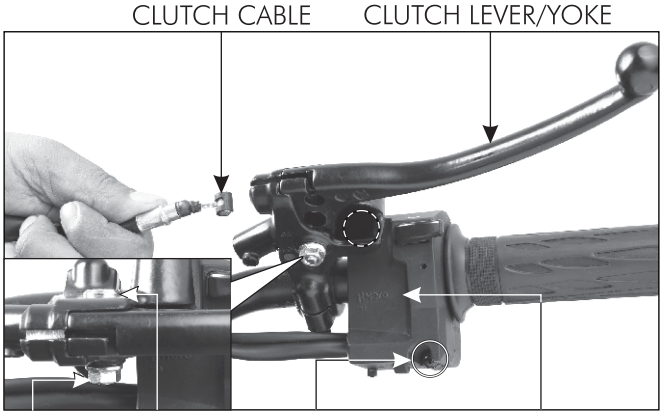
WIRE BAND

CLUTCH CABLE CLUTCH LEVER/YOKE

Loosen the clutch lever/yoke screw bolt and adjusting nut, if necessary.

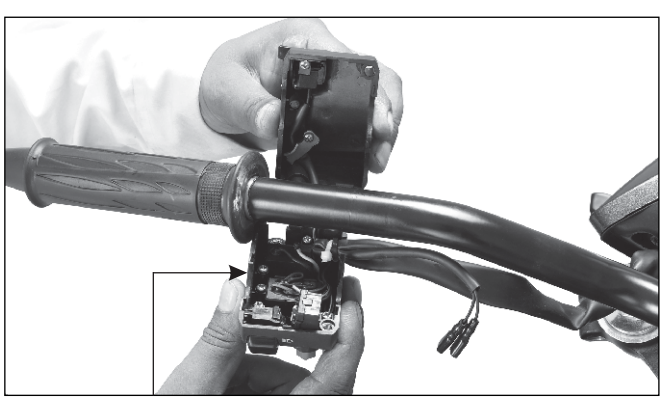
Disconnect the clutch cable from the clutch lever/yoke.

Remove the left handlebar switch housing screws as shown.



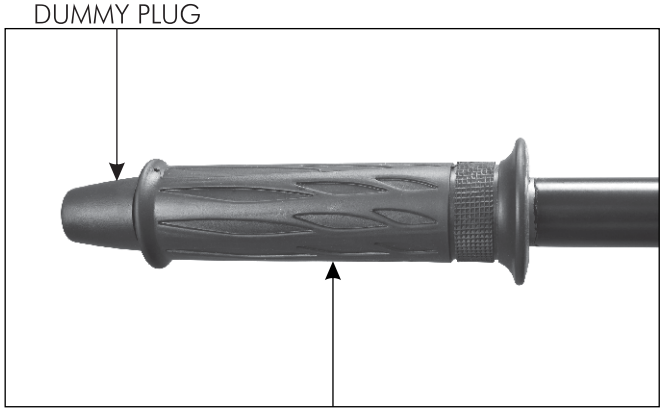
NUT SCREW BOLT SCREWS LEFT SWITCH HOUSING

Separate the left handlebar switch housing.

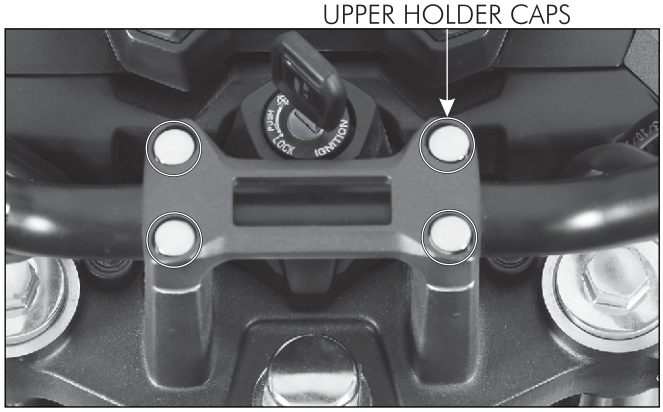


LEFT SWITCH HOUSING

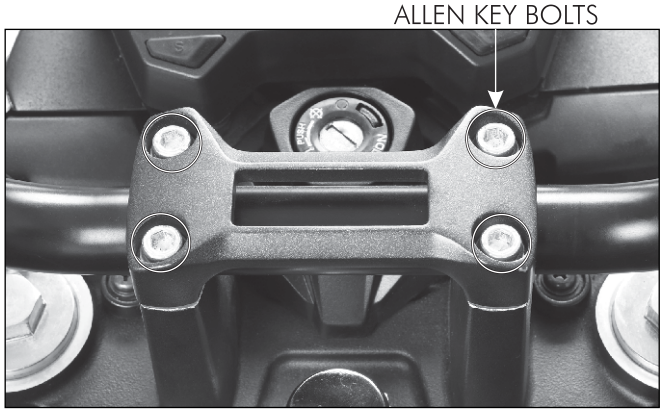
Pull and remove dummy plug from the handlebar.
Remove the left handlebar grip.



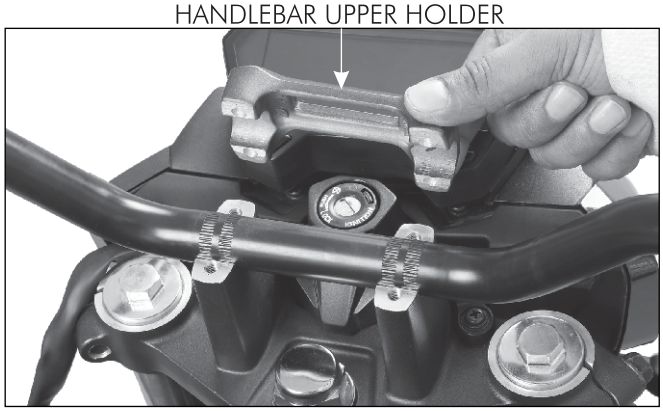
Remove the handlebar upper holder caps.



Remove the allen key bolts from the top bridge.



Remove the handlebar upper holder.



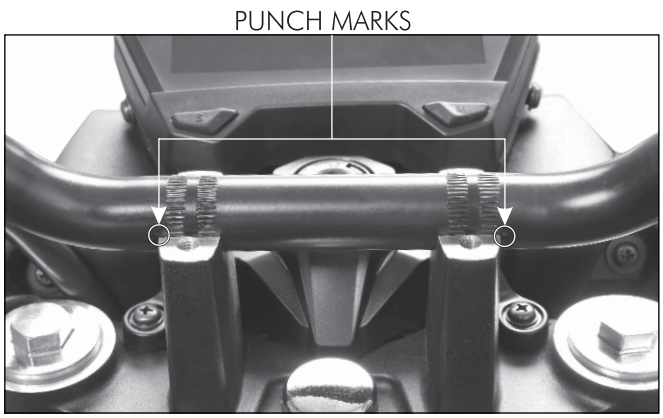
Remove the handlebar from the top bridge.

INSTALLATION

Installation is in the reverse order of removal.

NOTE

Align the punch marks on the handle bar with the top of the handlebar lower holder.



TORQUE

HANDLEBAR UPPER HOLDER ALLEN KEY BOLTS: 1.2 kgf-m

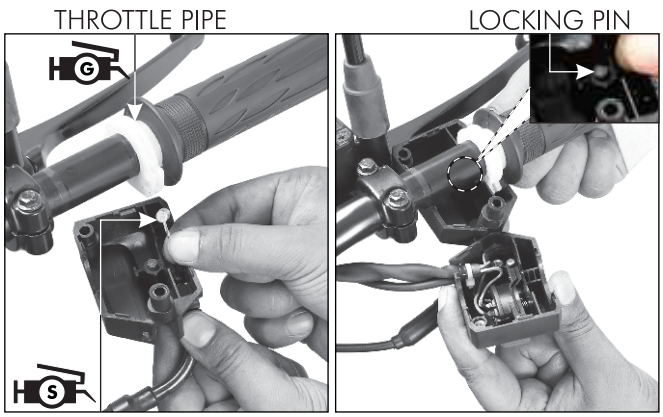
CAUTION

The adhesive should not leak off to the inside portion of the head pipe.

NOTE

- Apply silicon grease to the throttle cable end.
- Apply grease to the throttle pipe rotating area on the handlebar.
- Apply #540(cemedine) or its equivalent to the inner side of the left handlebar grip and wait for 3-5 minutes then install the grip.

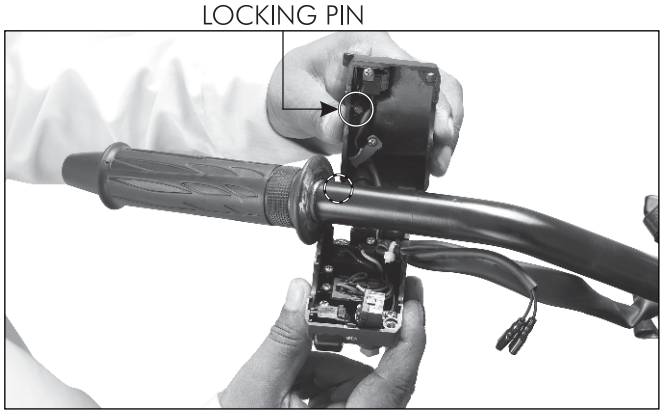
While installing the right handlebar switch housing, align the locating pin in the housing with the hole on the handle bar.



While Installing the left handlebar switch housing, align the locating pin in to the throttle housing.

Check the throttle grip free play (page 3-4).

Adjust the clutch lever free play (page 3-21).



FRONT WHEEL

⚠ WARNING

A contaminated brake disc pad increases stopping distance. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.

REMOVAL

Loosen the axle nut.

Raise the front wheel off the ground by placing a jack or other support under the engine.

Remove the wheel speed sensor cable (page 15-11).

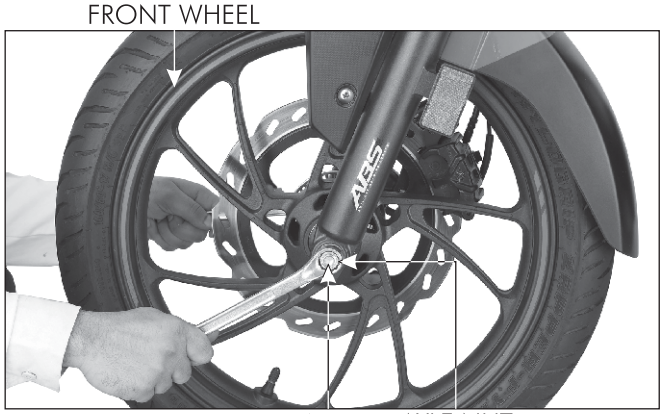
Remove the front caliper assembly (page 16-8).

Remove the front axle nut, axle and wheel.

NOTE

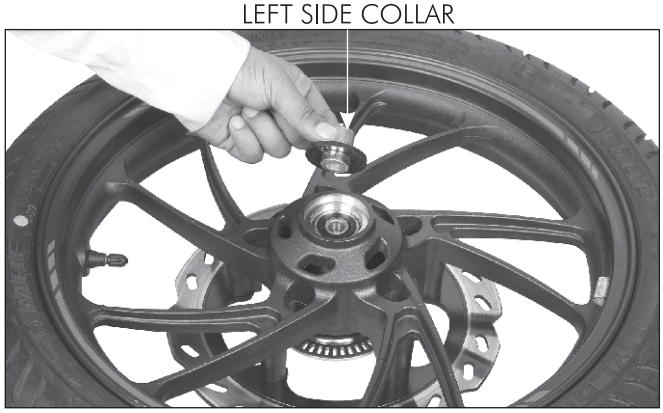
Do not operate the brake lever after removing the caliper and front wheel. If done so, will cause difficulty in fitting the brake disc between the brake pads.

FRONT WHEEL



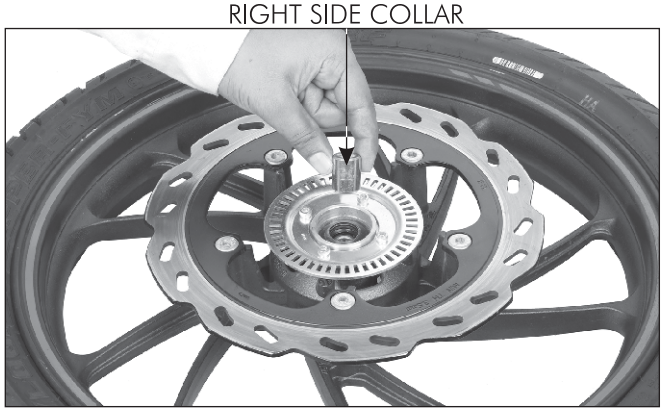
Remove the left side collar.

LEFT SIDE COLLAR



Remove the right side collar.

RIGHT SIDE COLLAR



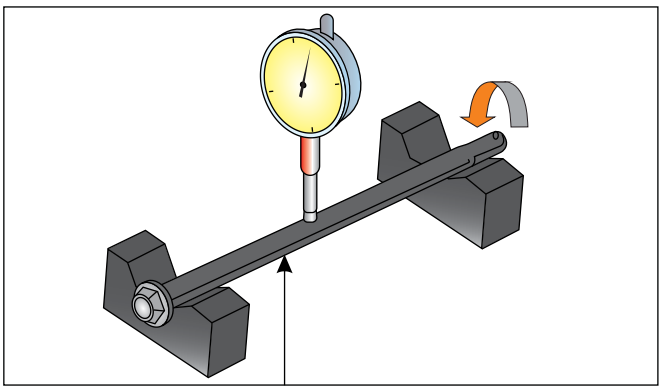
INSPECTION

Place the axle in V-blocks and measure the runout with a dial indicator.

Actual runout is ½ of the total indicator reading.

SERVICE LIMIT

RUNOUT WITH DIAL INDICATOR: 0.2 mm



FRONT AXLE

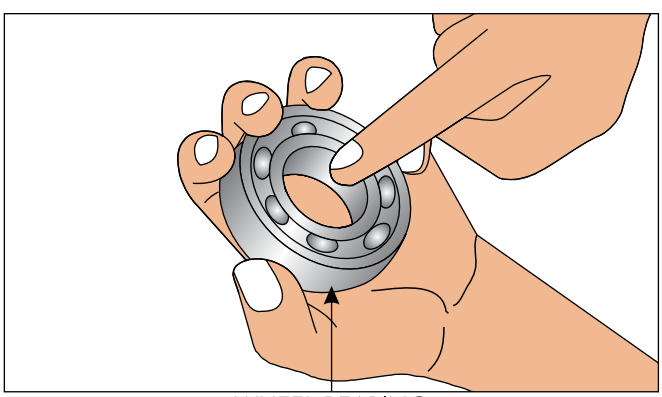
Turn the inner race of each bearing with your finger, the bearing should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or of they fit loosely in the hub.

NOTE

Replace the wheel bearings in pairs.



WHEEL BEARING

Check the wheel rim runout by placing the wheel in a turning stand.

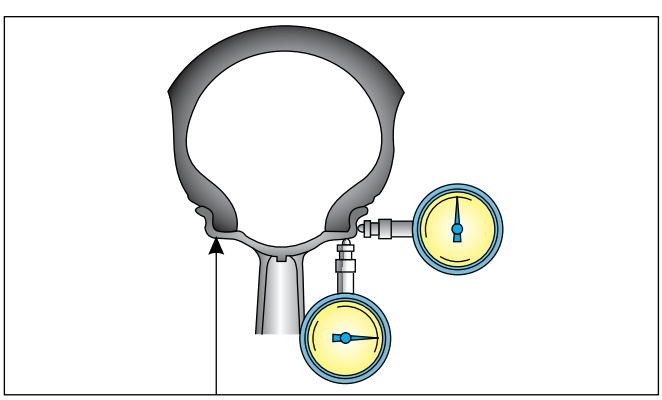
Spin the wheel by hand and read the runout using a dial indicator.

Actual runout is ½ of the total indicator reading.

SERVICE LIMIT

AXIAL: 2.0 mm

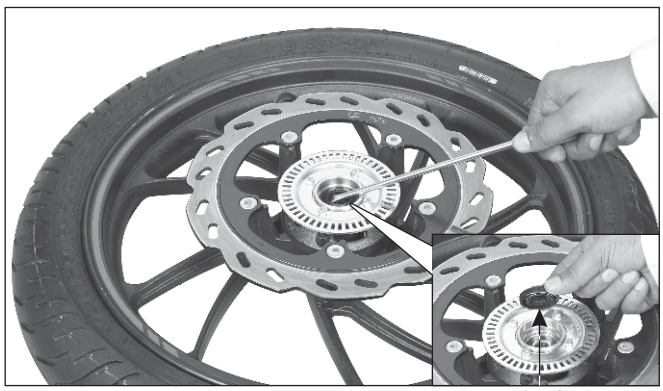
RADIAL: 2.0 mm



WHEEL RIM

DISASSEMBLY

Remove the dust seal from the right side of front wheel.



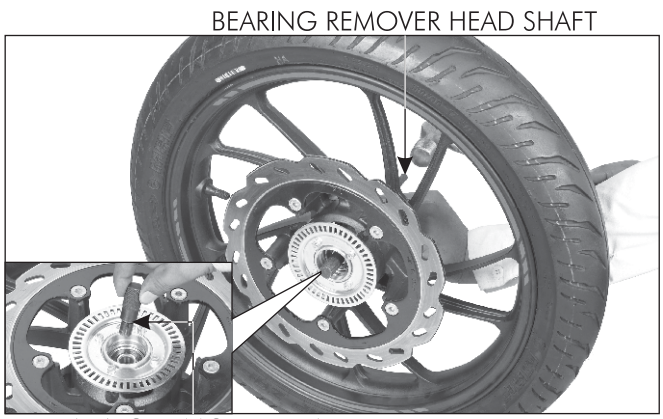
Insert the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.

TOOL

BEARING REMOVER HEAD, 12 mm
PART NO: 070 HH KFN 017
WHEEL BEARING REMOVER HEAD SHAFT
PART NO: 070 HH KZJ 009

NOTE

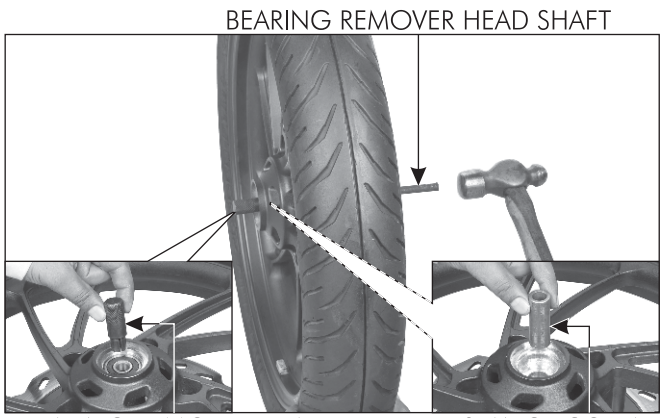
Take extra care while removing the wheel bearing to avoid any damage to the encoder.



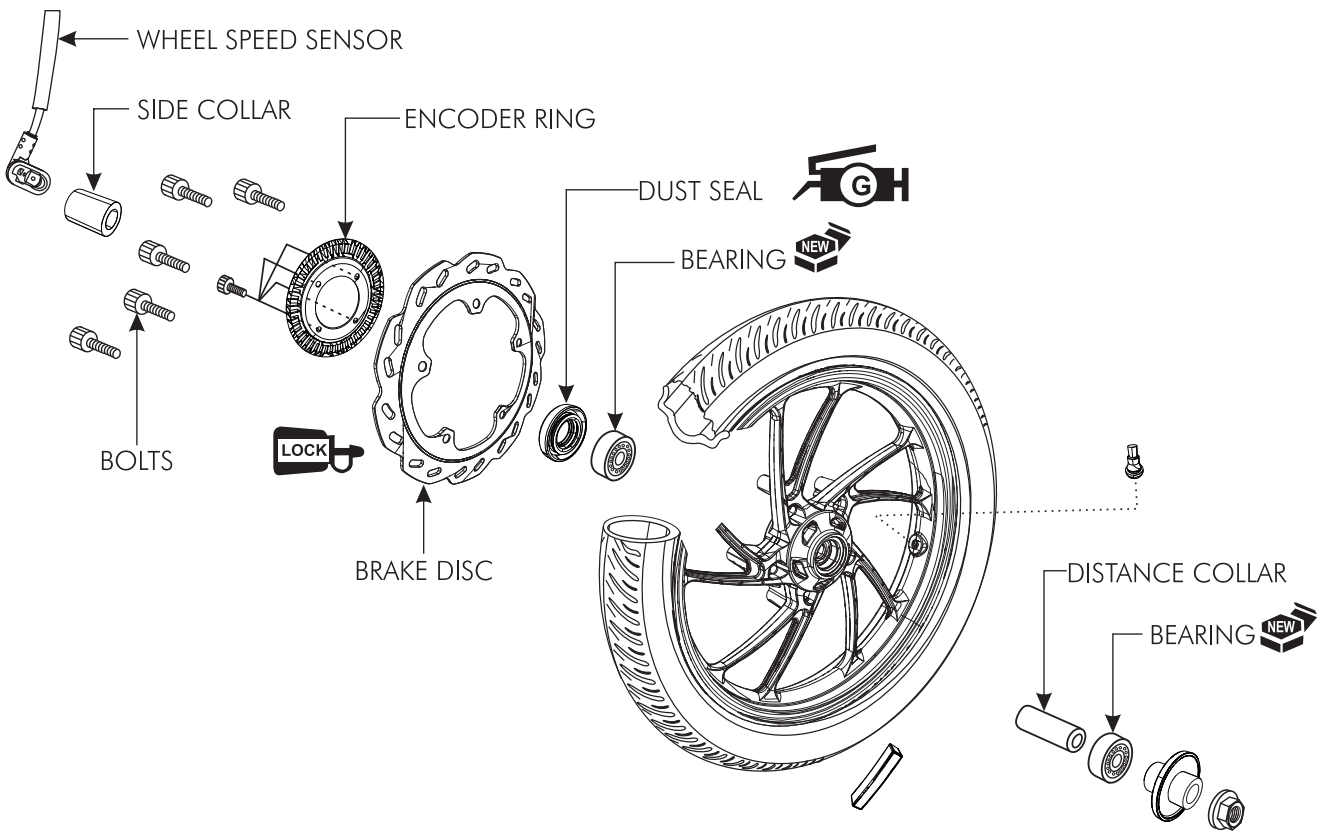
Remove the distance collar and drive out the other bearing.

TOOL

BEARING REMOVER HEAD, 12 mm
PART NO: 070 HH KFN 017
WHEEL BEARING REMOVER HEAD SHAFT
PART NO: 070 HH KZJ 009



ASSEMBLY



Pack in the bearing cavities with grease. Drive in a new left wheel bearing first with the marking facing up until it is fully seated.

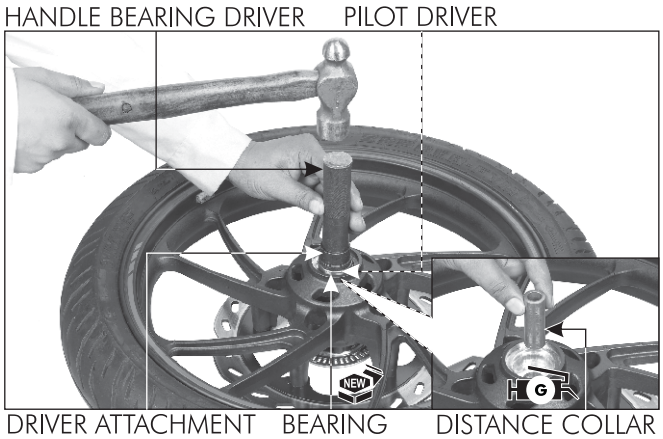
Apply a thin coating of grease to the distance collar and install it.

TOOL

HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008
PILOT DRIVER, 12 mm
PART NO: 070 HH KFN 012
DRIVER ATTACHMENT, 32x35 mm
PART NO: 070 HH KFN 010

NOTE

- Never install the old bearing, once the bearing has been removed, the bearing must be replaced with new ones.
- Take extra care while installing the wheel bearing to avoid any damage to the encoder.

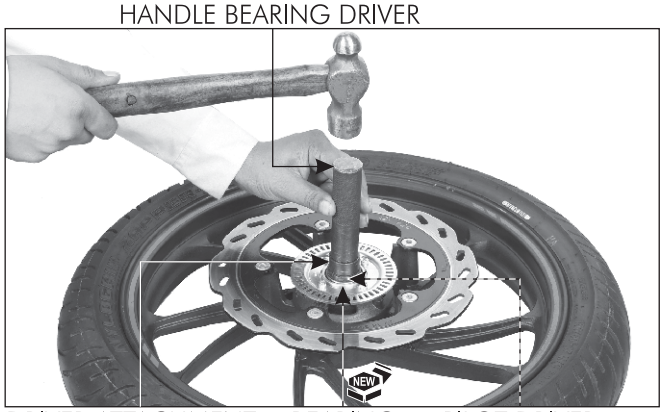


Pack in the bearing cavities with grease. Drive in a new right wheel bearing first with the marking facing up until it is fully seated.

TOOL

HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008
PILOT DRIVER, 12 mm
PART NO: 070 HH KFN 012
DRIVER ATTACHMENT, 32x35 mm
PART NO: 070 HH KFN 010

HANDLE BEARING DRIVER



DRIVER ATTACHMENT BEARING PILOT DRIVER

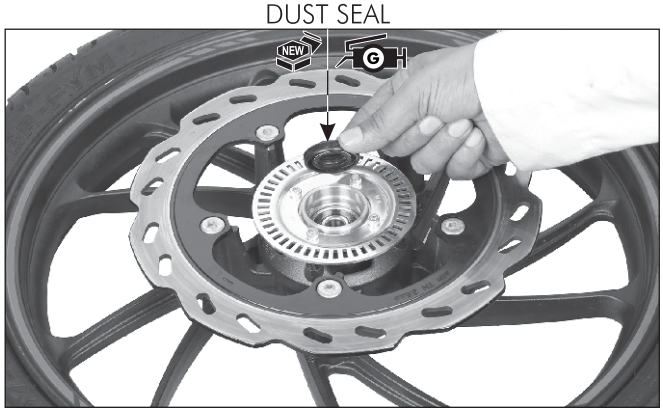
FRONT WHEEL INSTALLATION

Apply grease to the new right dust seal lip.
Install the new dust seal to the right wheel hub.

⚠ WARNING

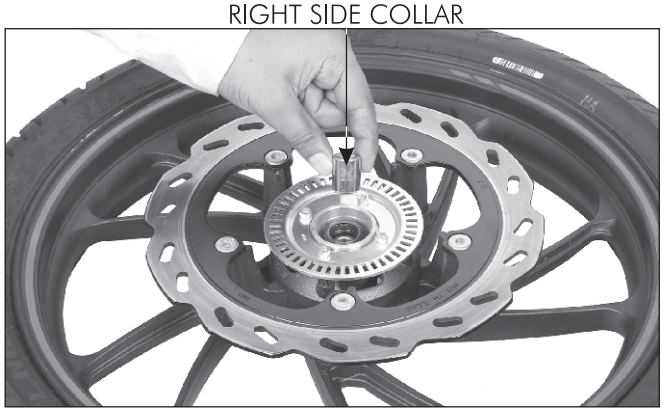
Do not get grease on the brake disc or stopping distance will be increased.

DUST SEAL



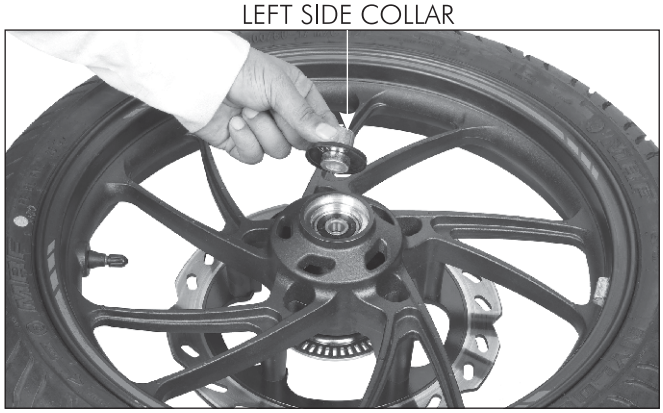
Install the right side collar.

RIGHT SIDE COLLAR



Install the left side collar.

LEFT SIDE COLLAR



Install the front wheel.

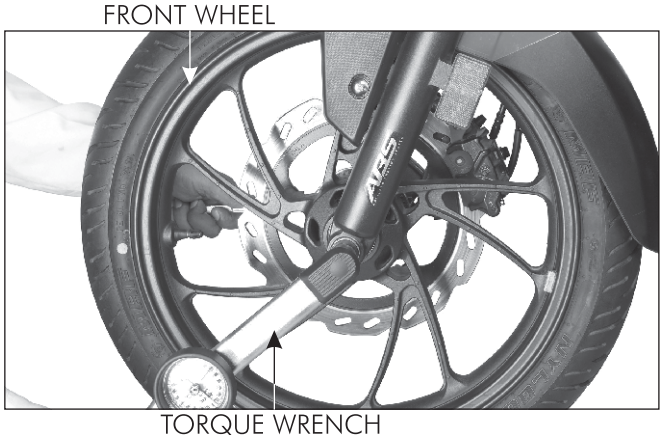
Lower the front wheel and tighten the axle nut to the specified torque.

TORQUE

FRONT AXLE NUT: 5.9 kgf-m

Install the front caliper assembly (page 16-9).

Connect the wheel speed sensor cable (15-11).



FORK

REMOVAL

Remove the front caliper mounting bolts (page 16-8).

Remove the brake hose clamp bolt and remove the clamp from fork slider. Remove the caliper.

CAUTION

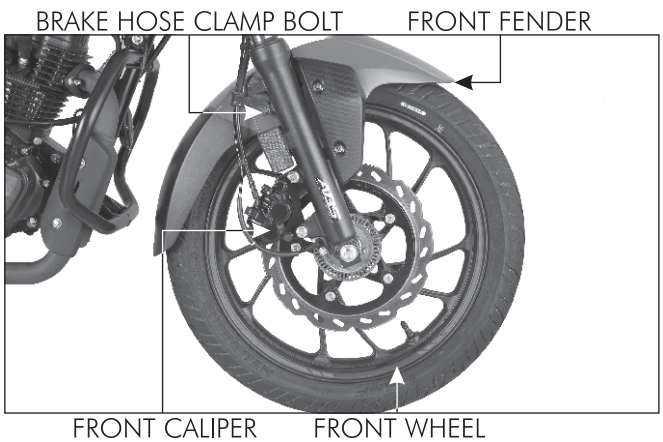
- Do not suspend the brake caliper from the brake hose.
- Do not twist the brake hose.

NOTE

Do not operate the front brake lever after removing the caliper and front wheel. If done so will cause difficulty in fitting the brake disc between the brake pads.

Remove the front wheel (page12-8).

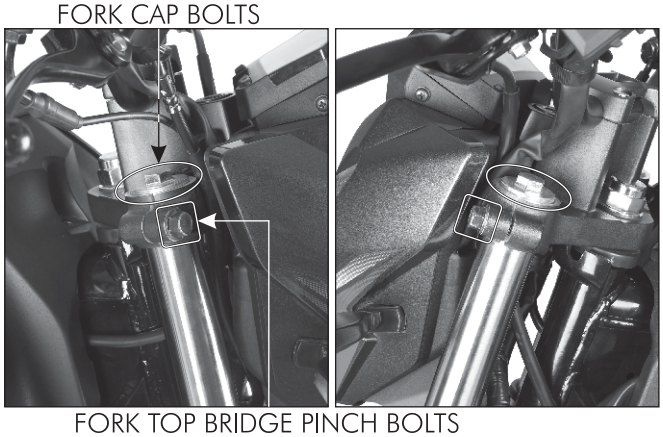
Remove the front fender (page 2-3).



Loosen the fork top bridge pinch bolts.

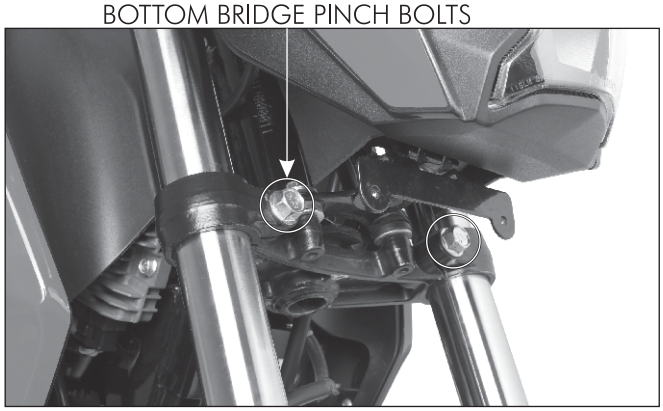
NOTE

If the fork is to be disassembled then loosen the fork cap before loosening the top and bottom bridge pinch bolts.



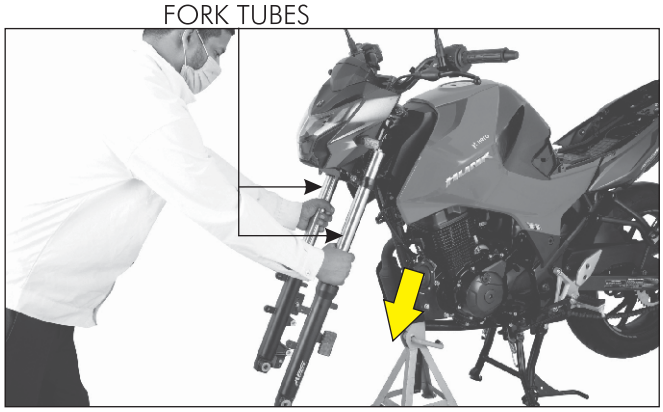
While holding the fork slider, loosen the fork bottom bridge pinch bolts.

BOTTOM BRIDGE PINCH BOLTS



Remove the fork tubes by sliding it down from top and bottom bridge while rotating with hand as shown.

FORK TUBES



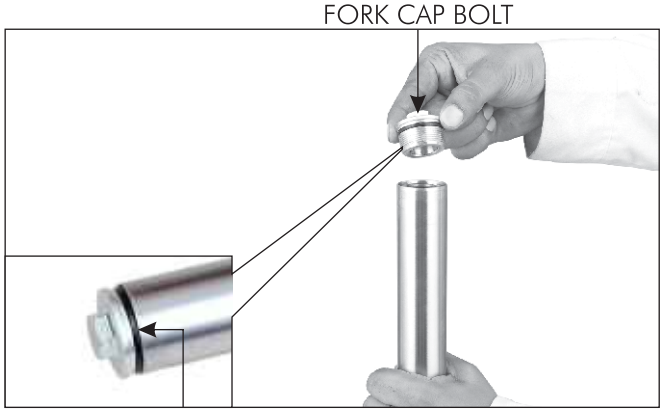
DISASSEMBLY

Remove the fork cap and O-ring.

⚠ WARNING

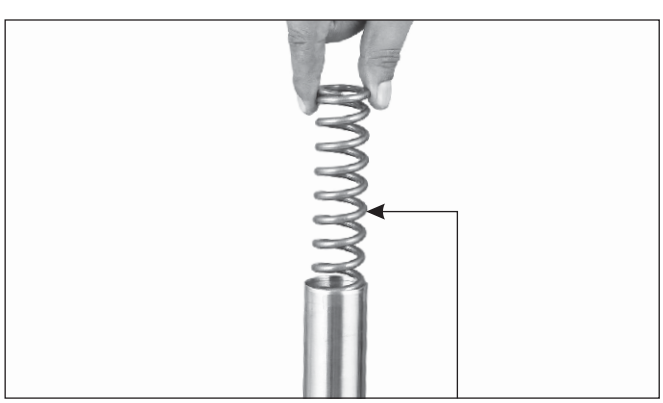
The cap is under spring pressure. Be careful when removing.

FORK CAP BOLT



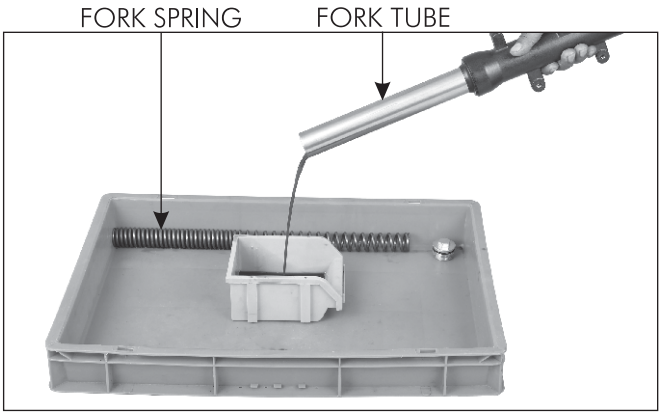
O-RING

Remove the fork spring from the fork tube.

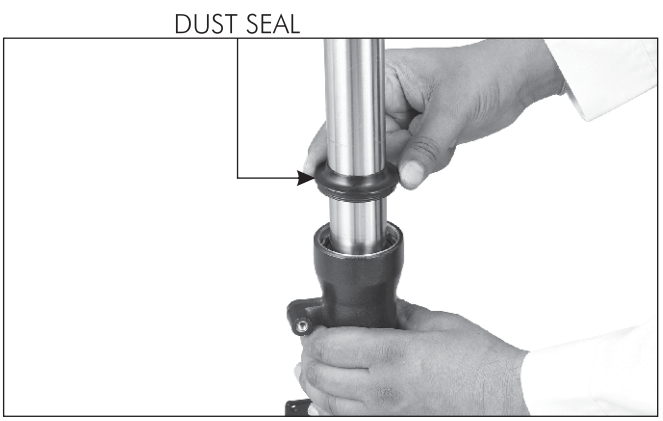


FORK SPRING

Pour out the fork oil from the fork slider by pumping the fork several times (8-10 times).



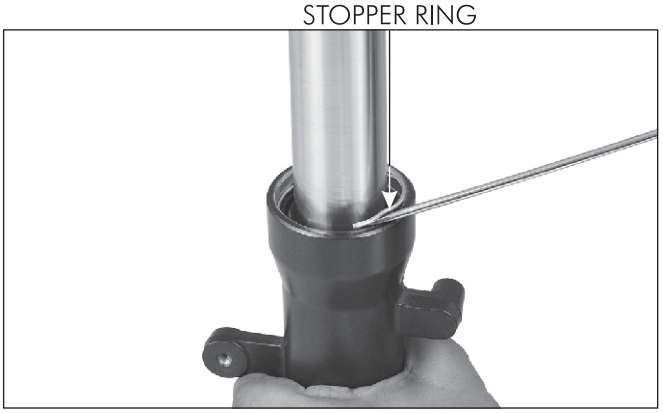
Remove the dust seal.



Remove the oil seal stopper ring.

NOTE

Be careful not to scratch the fork tube.



Unlock the fork piston using special tool as shown.

Remove the socket bolt/sealing washer using an impact drive.

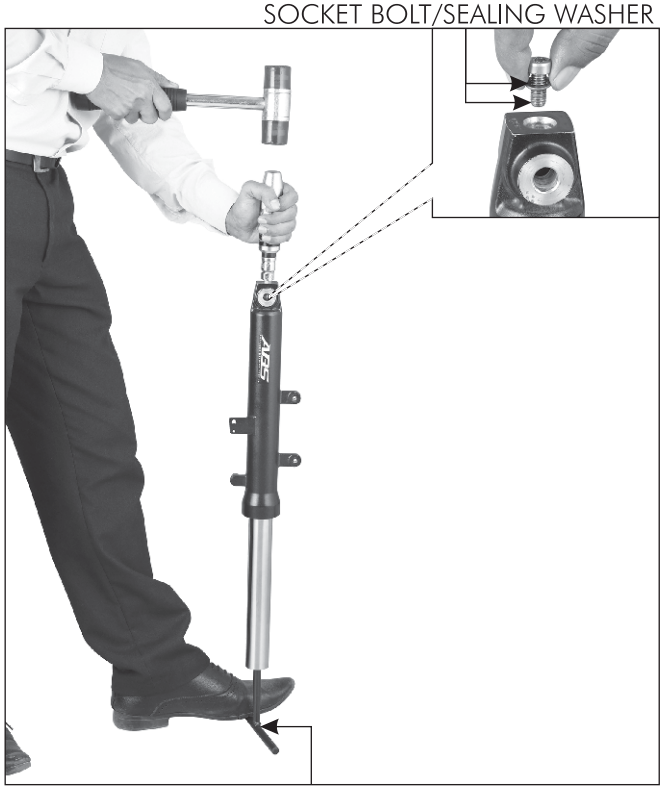
TOOL

FRONT FORK DISMANTLING SHAFT
PART NO: HMCL0418AABM002
FRONT FORK DISMANTLING SHAFT ADAPTER
PART NO: HMCL0418AABM003

NOTE

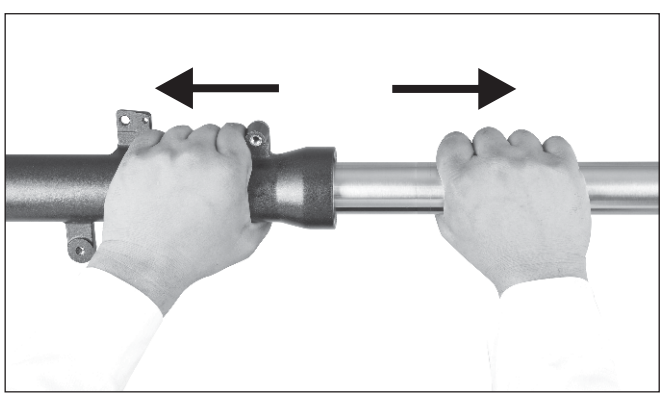
Use your foot on front fork dismantling tool to lock and to avoid fork piston turning with the socket bolt.

SOCKET BOLT/SEALING WASHER



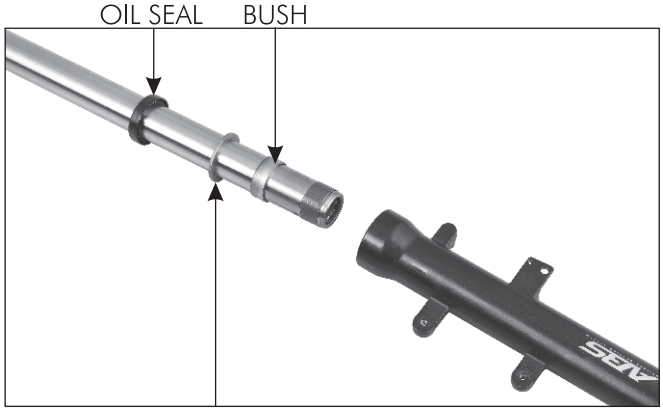
FRONT FORK DISMANTLING TOOL

Hold the fork tube and slider with left and right hands respectively and hit them against each other to separate them.



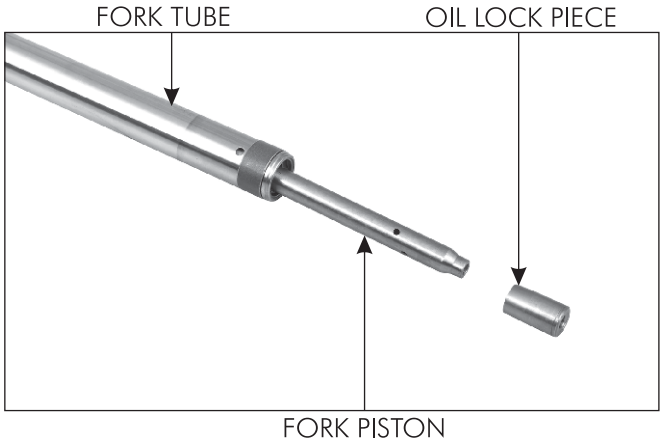
Now remove the oil seal, back-up ring and bush.

OIL SEAL BUSH

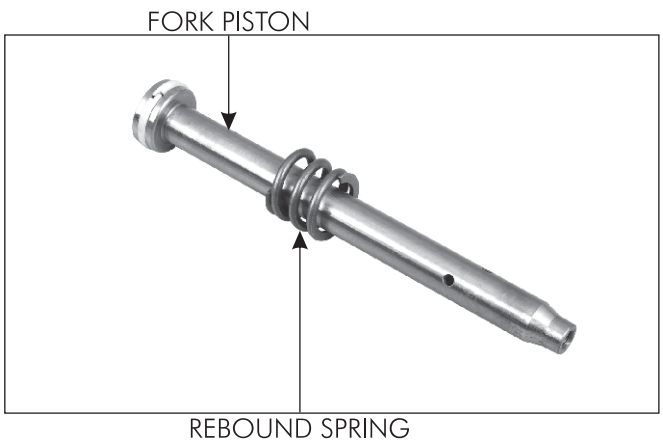


BACK-UP RING

Remove the fork tube and the oil lock piece from the slider.

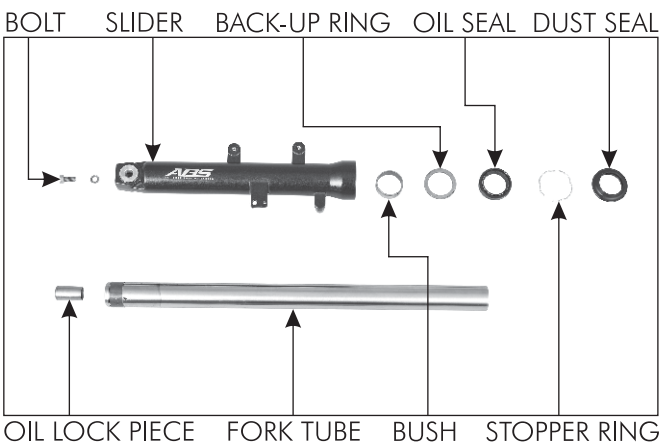


Remove the fork piston and rebound spring from the fork tube.



NOTE

- Do not score the inner fork tube sliding surface.
- Check that the fork tube moves smoothly in the fork slider. If it does not, check the fork tube for bend or damage.



INSPECTION

FORK SPRING

Check the fork spring for fatigue or damage.

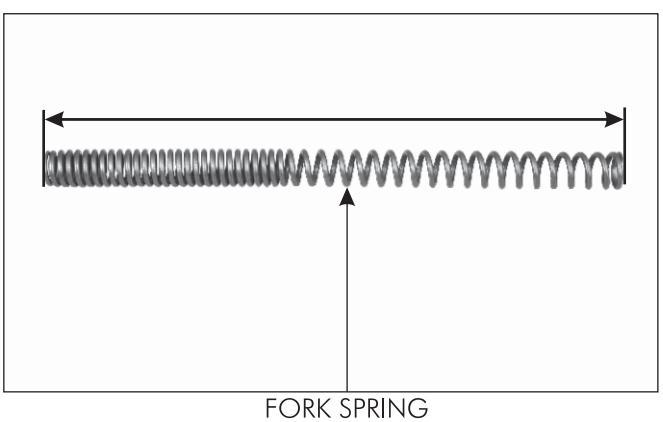
Measure the fork spring free length by placing the spring on a flat surface.

SERVICE LIMIT

FORK SPRING: 463.6 mm

NOTE

Before inspection of free length, drop the spring to release steady stresses from it.

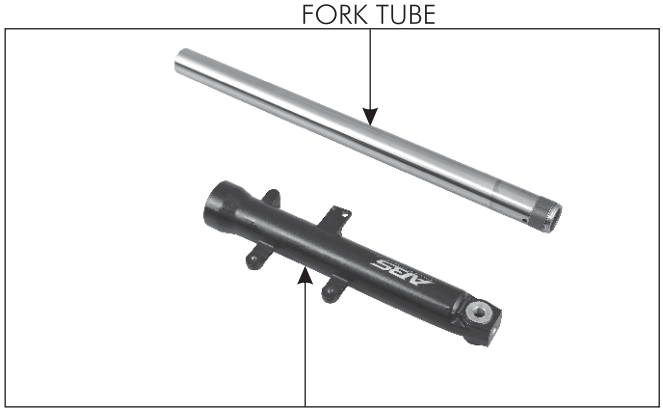


FORK TUBE/SLIDER/PISTON

If there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than ¾ of the entire surface, replace the slider.

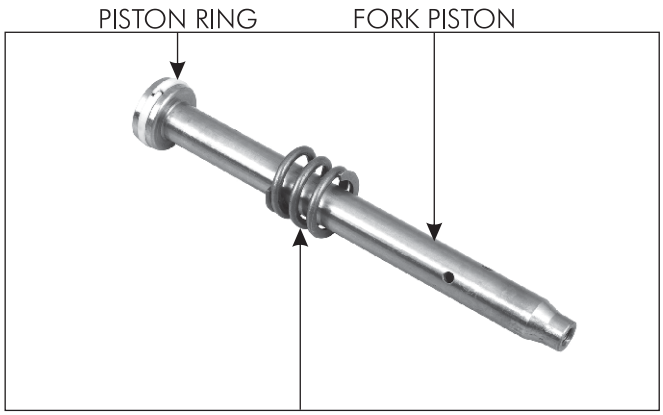
Check the fork tube, slider and piston for score marks, scratches or excessive or abnormal wear.

Replace the components if necessary.



Check the piston ring for wear or damage.

Replace any components that are worn or damage.



Set the fork tube in V- block and measure the fork tube runout by rotating it with a dial indicator.

The actual runout is ½ of the total indicator reading.

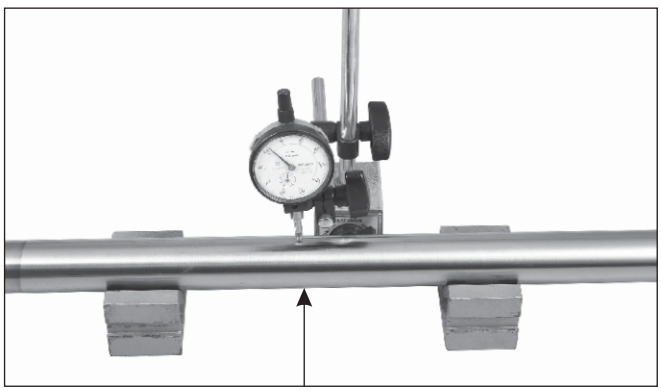
SERVICE LIMIT

FORK TUBE: 0.20 mm

Replace if the service limit is exceeded or there are scoring or knicks that will allow fork oil to leak past the seals.

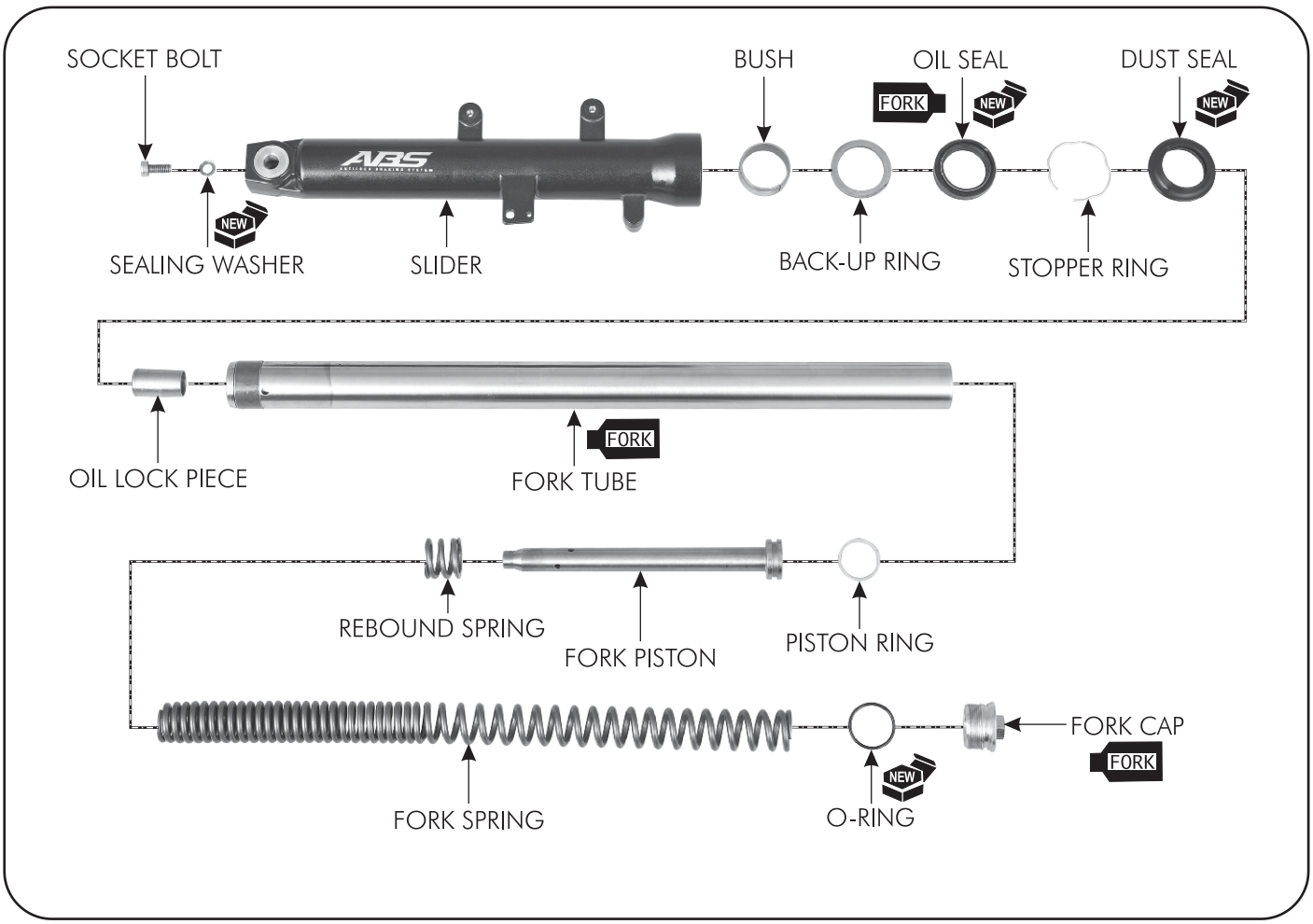
NOTE

Do not reuse fork tube if it cannot be perfectly straightened with minimal effort.



ASSEMBLY

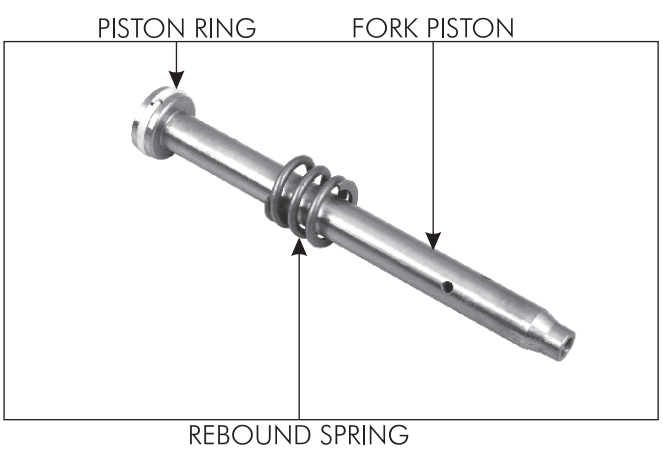
Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.



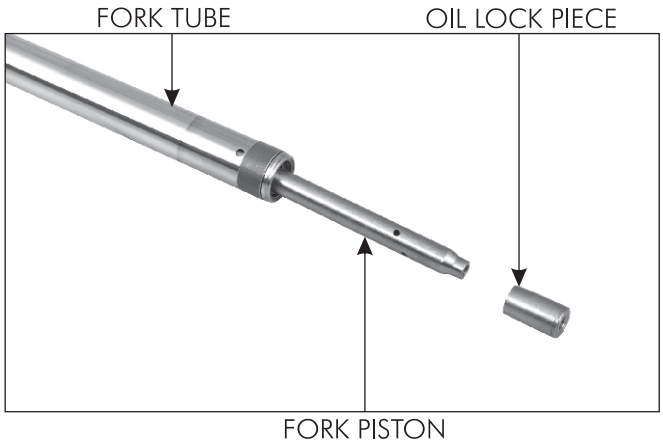
Install the rebound spring and fork piston into the fork tube.

NOTE

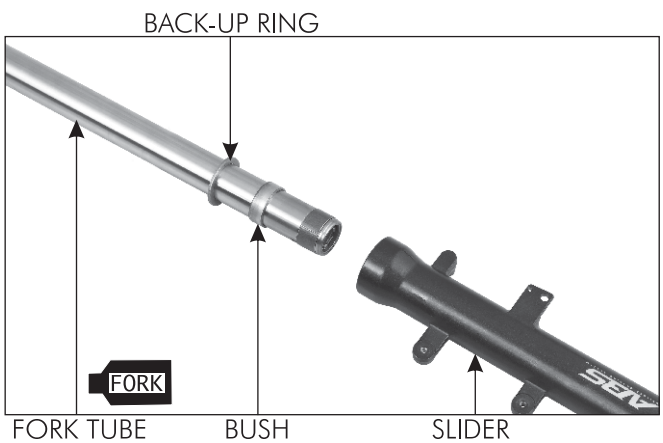
Install the piston ring in the same orientation as shown in the manual.



Install the oil lock piece onto the fork piston end.



Install the new bush.
Install the back-up ring.
Install the fork tube into the fork slider.



Lock the fork piston using special tool as shown.

TOOL

FRONT FORK DISMANTLING SHAFT
PART NO: HMCL0418AABM002
FRONT FORK DISMANTLING SHAFT ADAPTER
PART NO: HMCL0418AABM003

Clean and apply a locking agent to the fork socket bolt threads and install it with a new sealing washer into the fork piston.

Tighten the fork socket bolt to the specified torque.

TORQUE

FORK SOCKET BOLT: 2.0 kgf-m

NOTE

Use your foot on front fork dismantling tool to lock and to avoid fork piston turning with the socket bolt.

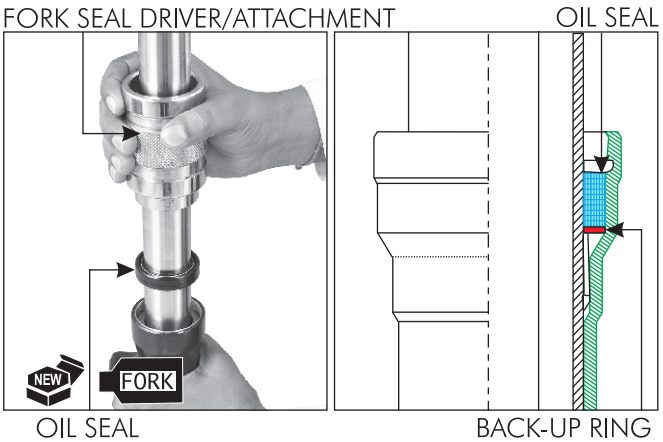
Apply fork fluid to a new oil seal lip and install it onto the fork tube with the marking side facing up.

Install the oil seal on the fork tube from the working area side.

Drive the oil seal in the slider.

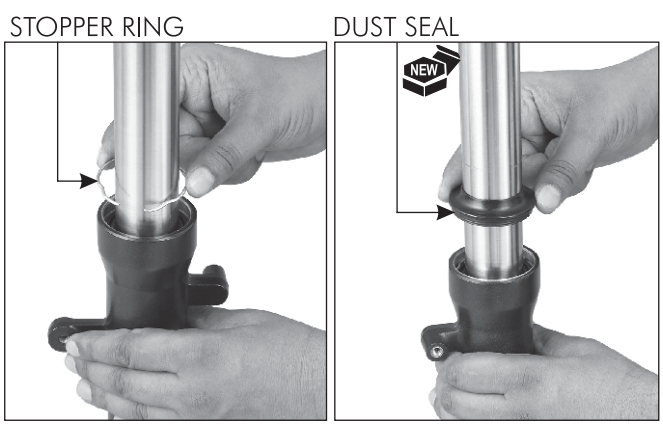
TOOL

FRONT FORK OIL SEAL DRIVER BODY WITH ATTACHMENT (DIA 37 mm)
PART NO: HMCL0418AABM001



Install the oil seal stopper ring into the groove of the fork slider.

Install a new dust seal.

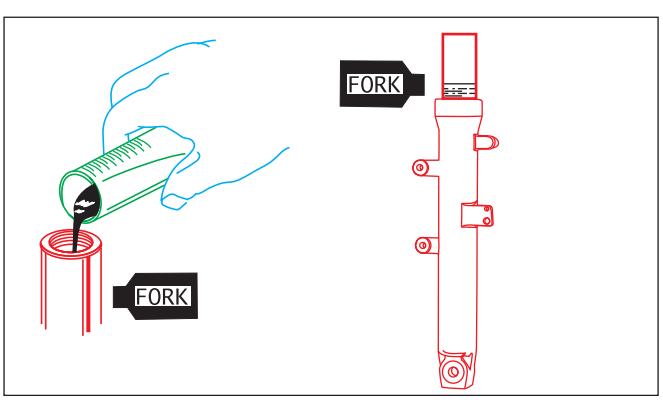


Pour the specified amount of recommended fork fluid into the fork tube.

FORK FLUID CAPACITY: 305 cc

Pump the fork tube several times to remove trapped air from the lower portion of the fork tube.

Compress the fork slider fully and measure the oil level from the top of the fork tube.

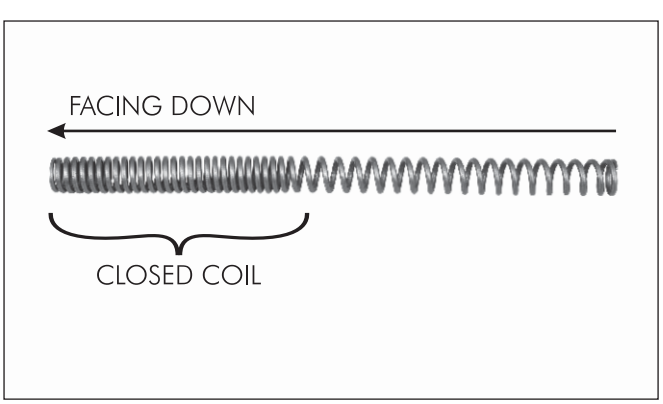


Clean the spring with petrol and allow it to dry.

NOTE

Do not wipe the spring with shop towel.

Install the fork spring with the closely wound coil side facing down into the fork tube.

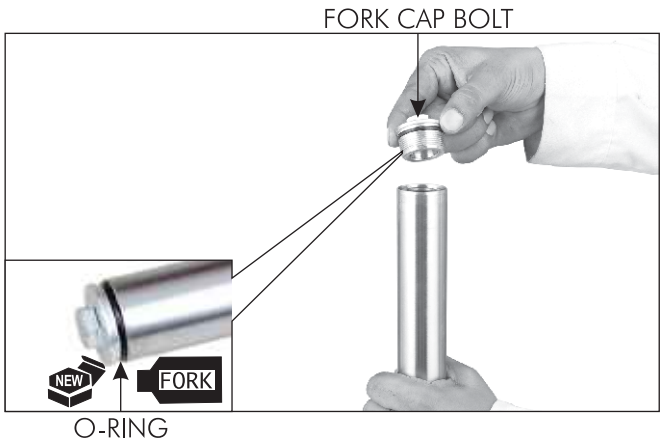


Apply fork fluid to a new O-ring and install the new O-ring to the fork cap.

Install the fork cap by pushing it onto the fork tube.

NOTE

- Be careful not to cross thread the fork cap.
- Tighten the fork of after installing the fork tube into the fork bridge.

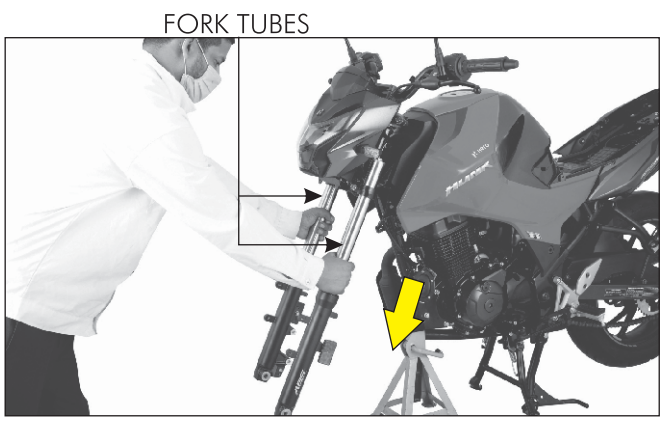


INSTALLATION

Install the fork tubes through the bottom bridge, top bridge.

NOTE

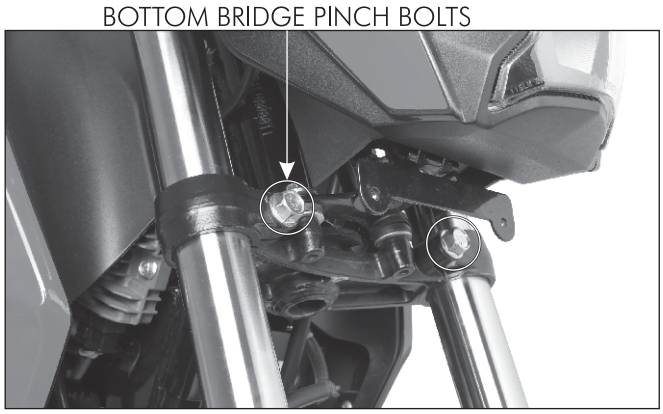
Make sure that fork tubes and cap should be align with top bridge.



Install and tighten the bottom bridge pinch bolts to the specified torque.

TORQUE

BOTTOM BRIDGE PINCH BOLT: 3.2 kgf-m



Tighten the fork cap bolt to the specified torque.

TORQUE

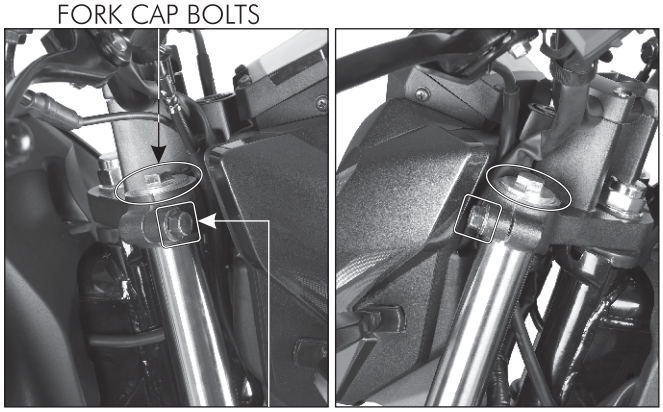
FORK CAP BOLT: 2.5 kgf-m

Install and tighten the top bridge pinch bolt to the specified torque.

TORQUE

TOP BRIDGE PINCH BOLT: 2.2 kgf-m

FORK CAP BOLTS



FORK TOP BRIDGE PINCH BOLTS

Install the following:

- Front fender (page 2-3).
- Front wheel (page12-12).

Install the brake hose clamp to the fork slider.

Install the clamp bolt and tighten it.

Install the front brake caliper to the front fork.

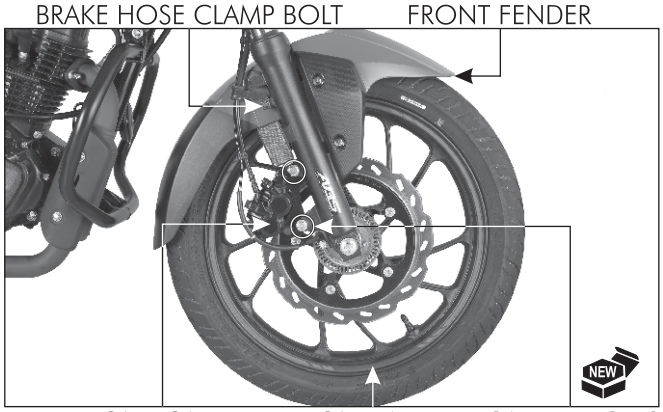
Install and tighten the new front caliper mounting bolts to the specified torque.

TORQUE

FRONT CALIPER MOUNTING BOLT: 3.0 kgf-m

Connect the wheel speed sensor cable (page 15-11).

BRAKE HOSE CLAMP BOLT FRONT FENDER



FRONT CALIPER FRONT WHEEL CALIPER BOLTS

STEERING STEM

REMOVAL

Remove the handlebar (page 12-4).

Remove the front cowl (page 2-2).

Remove the combination meter (page 20-7).

Remove the front wheel (page 12-8).

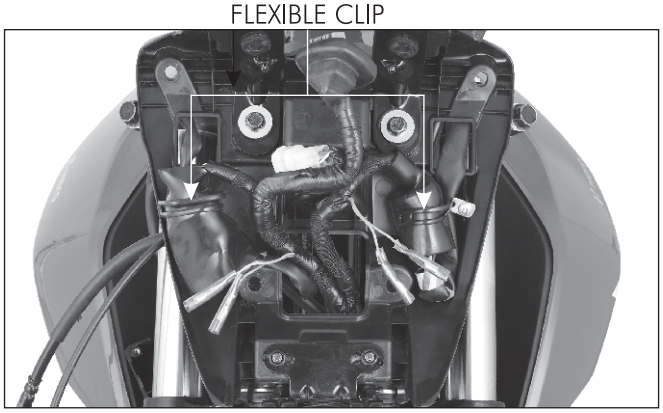
Remove the front fender (page 2-3).

FRONT COWL

HANDLEBAR

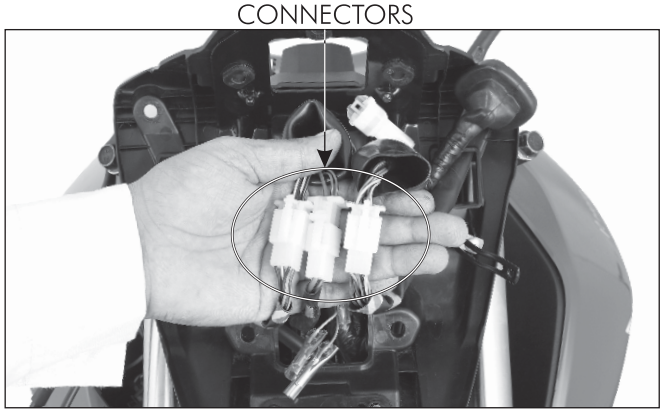
Slide the flexible clip/boot away.

FLEXIBLE CLIP



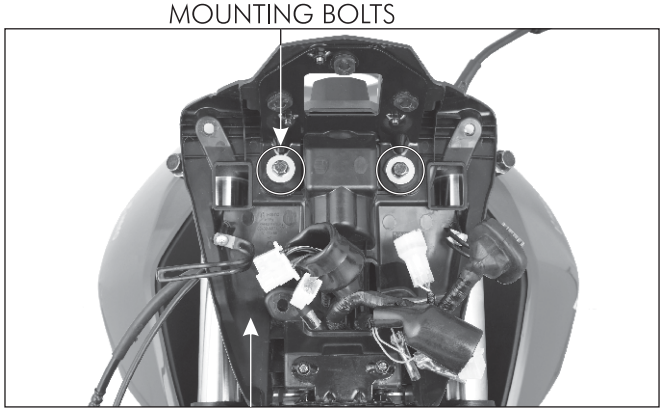
Disconnect the following connectors:
- Wheel speed sensor connector.
- Ignition switch connector.
- Left switch housing connectors.
- Right switch housing connectors.

CONNECTORS



Remove the front cowl mounting bolt and stay.
Loosen the front fork bolts (page 12-13).

MOUNTING BOLTS



FRONT COWL STAY

Loosen the steering stem nut using steering stem socket.

TOOL

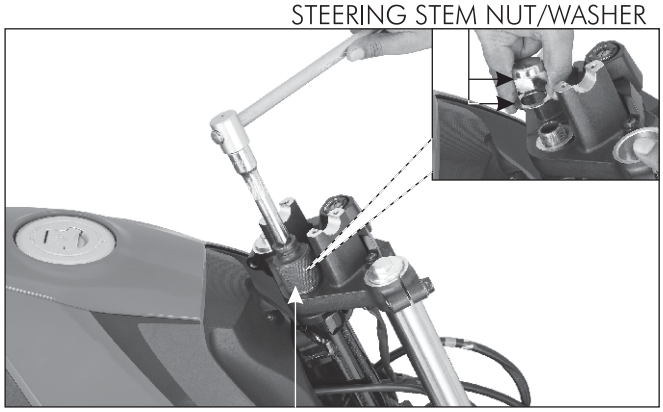
STEERING STEM SOCKET, 32 mm
PART NO: 070 HH GBG 004

Remove the front fork (page 12-14).
Remove the steering stem nut/washer.

NOTE

Ensure that the front forks are installed while loosening the steering stem nut.

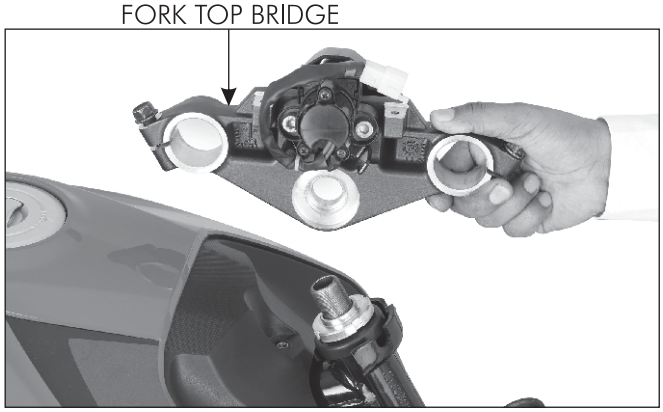
STEERING STEM NUT/WASHER



STEERING STEM SOCKET

Remove the fork top bridge.

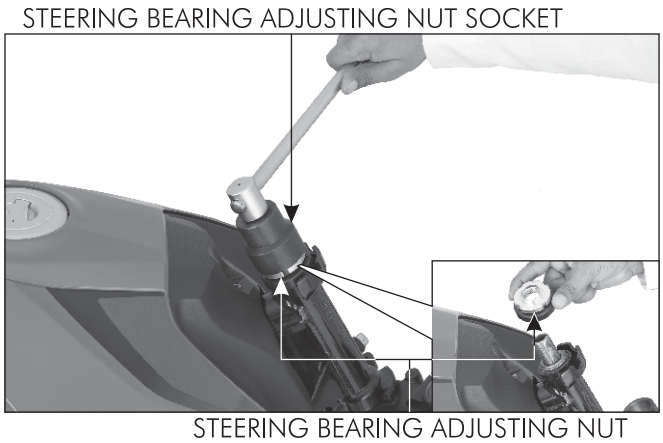
FORK TOP BRIDGE



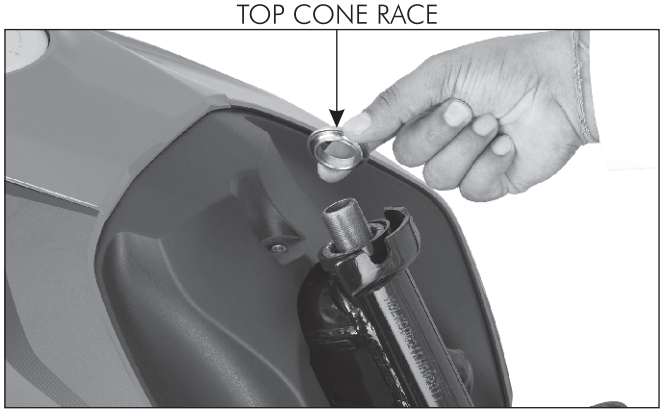
Hold the steering stem from the bottom and remove the steering stem bearing adjusting nut using the special tool.

TOOL

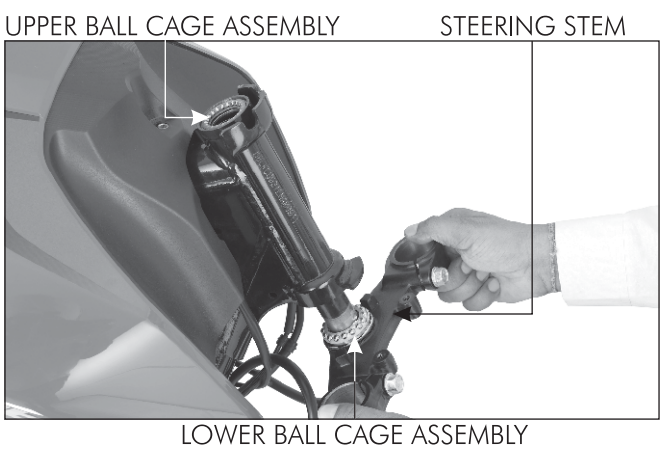
STEERING BEARING ADJUSTING NUT SOCKET, 41 mm
PART NO: 070 HH KZJ 004



Remove the top cone race from the steering head pipe.



Remove the steering stem from the steering head pipe along with the lower ball cage bearing assembly.
Remove the upper ball cage from the steering head pipe.
Remove the lower ball cage from the steering stem.
Check the ball cage assembly for wear or damage.



Check the steering stem bearing races for wear or damage.

STEERING STEM BEARING RACE REPLACEMENT

NOTE

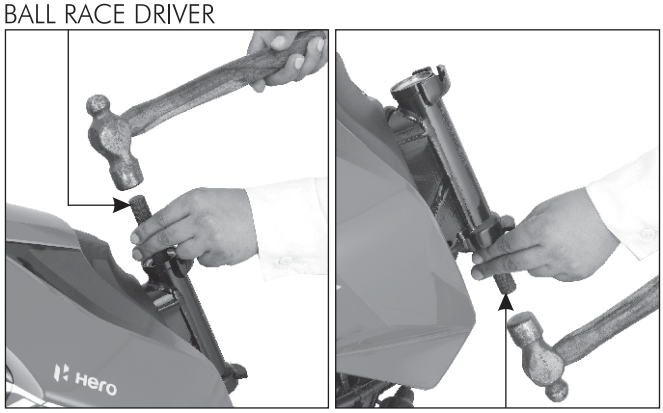
Always replace the bearings and races as a set.

Drive the top and bottom ball races out of the steering head pipe by using ball race driver.

TOOL

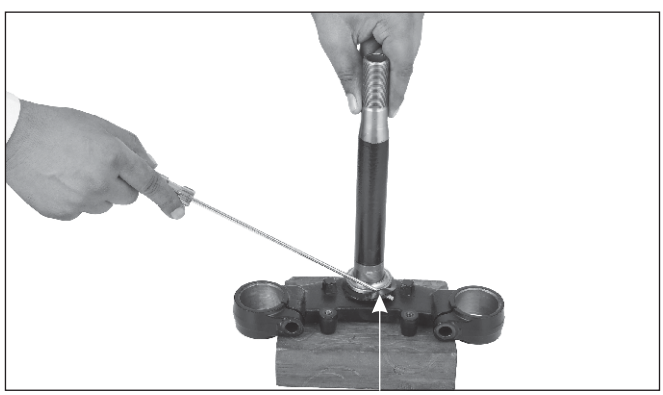
BALL RACE DRIVER
PART NO: 070 HH KTN 005

BALL RACE DRIVER



BALL RACE DRIVER

Remove the dust seal from the steering stem.

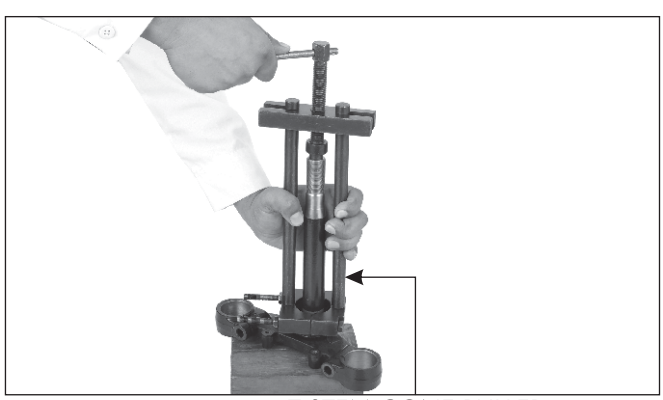


DUST SEAL

Remove the bottom cone race with special tool as shown.

TOOL

T-STEM CONE PULLER
PART NO: 070 HH KST 001



T-STEM CONE PULLER

BOTTOM CONE RACE DRIVER

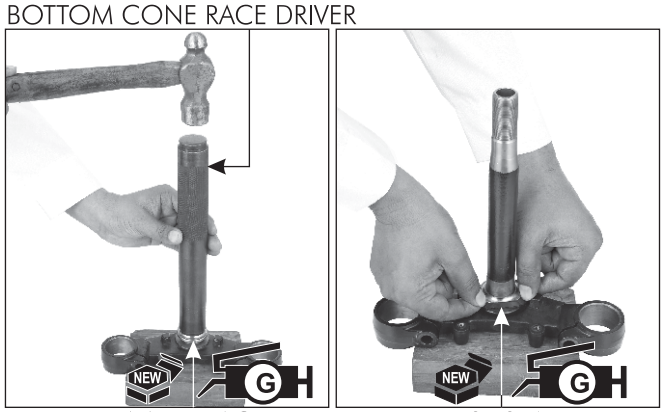
INSTALLATION

Install the new bottom cone race using the special tool.

TOOL

BOTTOM CONE RACE DRIVER
PART NO: 070 HH KST 002

Apply grease to the new dust seal lip and install it to the steering stem.



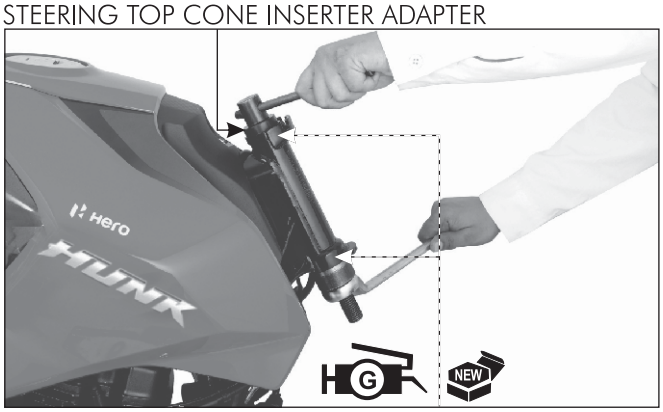
INNER RACE DUST SEAL

Install a new upper and lower steering stem bearing races using the special tool.

TOOL

STEERING TOP CONE INSERTER ADAPTER
PART NO: HMCL0120ABZA02

STEERING TOP CONE INSERTER ADAPTER

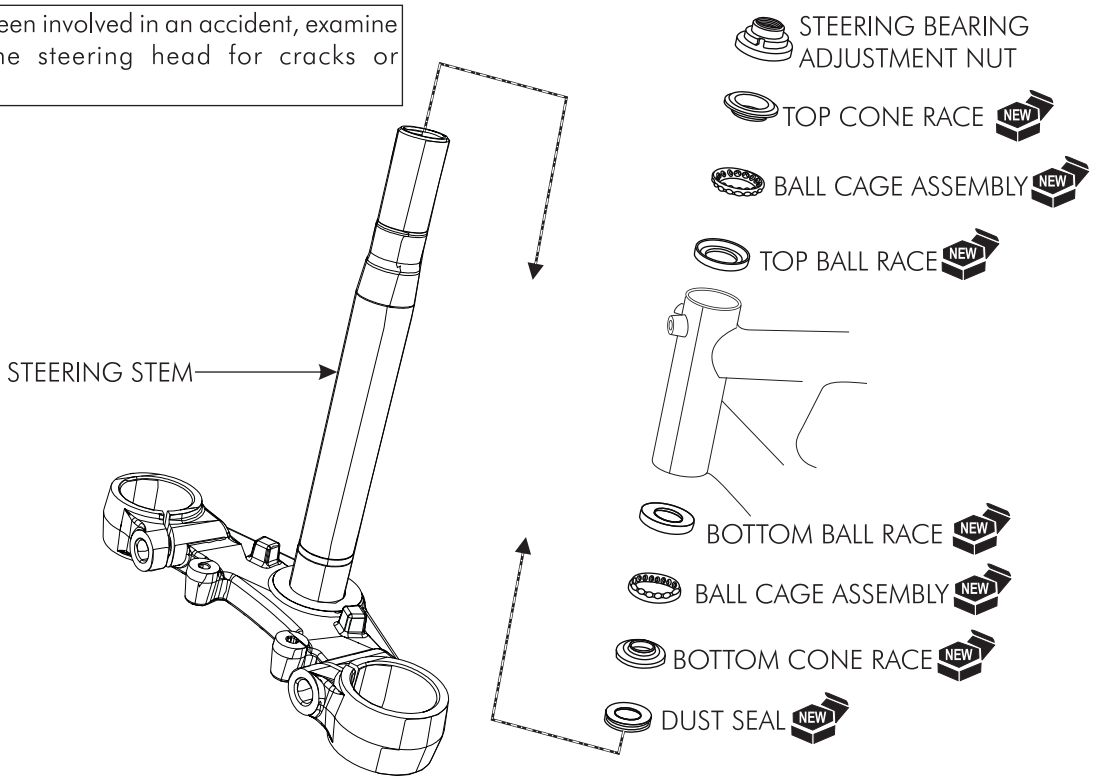


STEERING STEM BEARING RACES

INSTALLATION

NOTE

If the motorcycle has been involved in an accident, examine the area around the steering head for cracks or deformation.



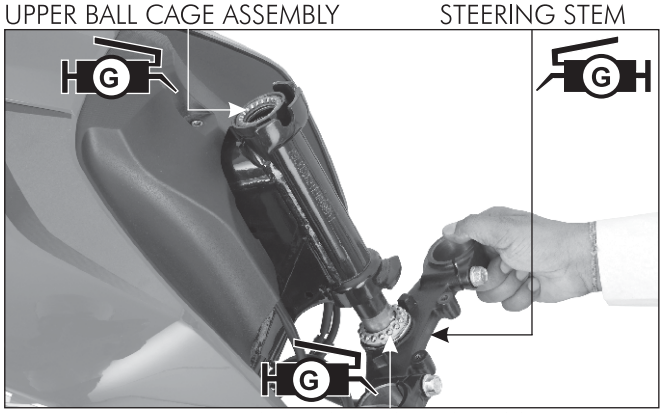
Apply recommended grease (Shell alvania EP2 or excelite Ep2 {Kyodo yushi co.ltd.} or equivalent) to the new top and bottom ball and cone races.

Install the upper ball cage assembly onto the top ball race.

Install the lower ball cage assembly onto the bottom cone race.

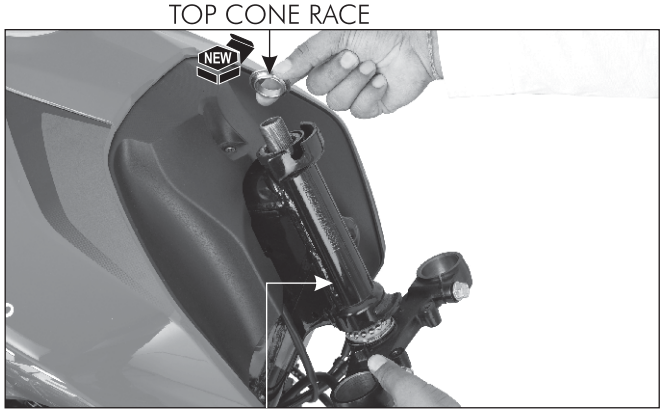
Install the steering stem into the steering head pipe.

UPPER BALL CAGE ASSEMBLY STEERING STEM



LOWER BALL CAGE ASSEMBLY

Apply grease to the new top cone race.
Install the top cone race on the steering head pipe.



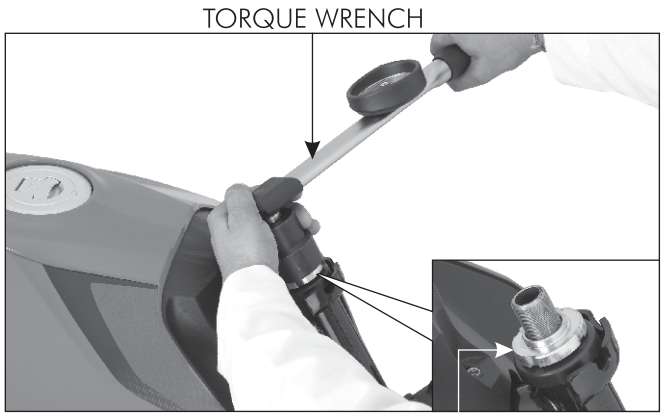
Install the steering bearing adjusting nut.
Check that the steering stem rotates freely and that there is no vertical play.
Tighten the steering bearing adjusting nut to the initial specified torque.

TORQUE

STEERING BEARING ADJUSTING NUT: 2.5 kgf-m

TOOL

STEERING BEARING ADJUSTING NUT SOCKET
PART NO: 070 HH KST 004



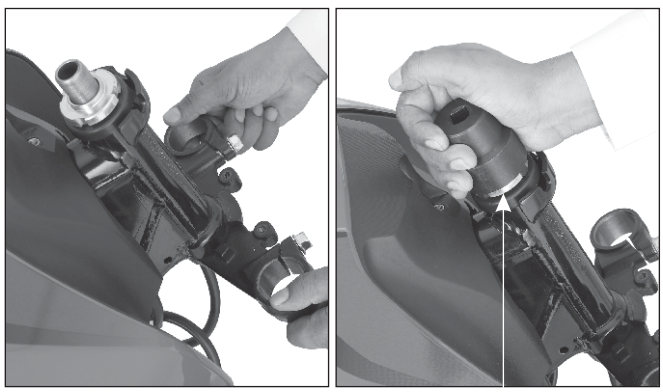
Rotate the steering stem lock to lock several times to seat the steering bearing, then loosen the steering bearing adjustment nut.
Retighten the steering bearing adjustment nut to the final specified torque.

TORQUE

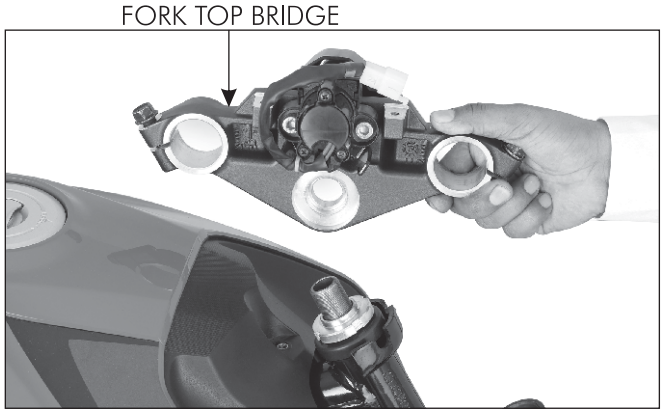
STEERING STEM NUT: 0.3 kgf-m

TOOL

STEERING BEARING ADJUSTING NUT SOCKET
PART NO: 070 HH KST 004



Install the fork top bridge.



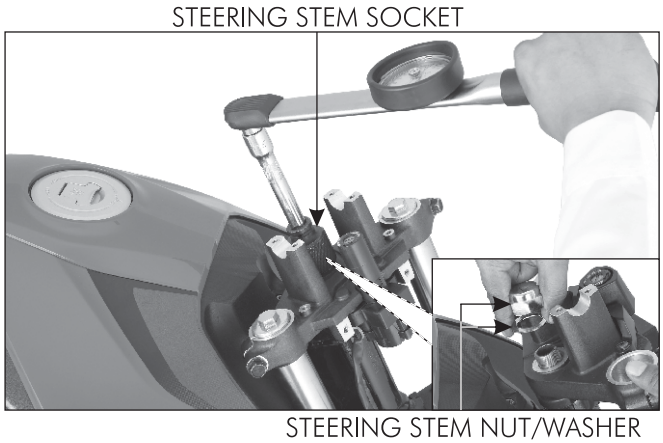
Install the plain washer and steering stem nut onto the fork top bridge.

Install the front forks (page 12-22).

Tighten the steering stem nut to the specified torque.

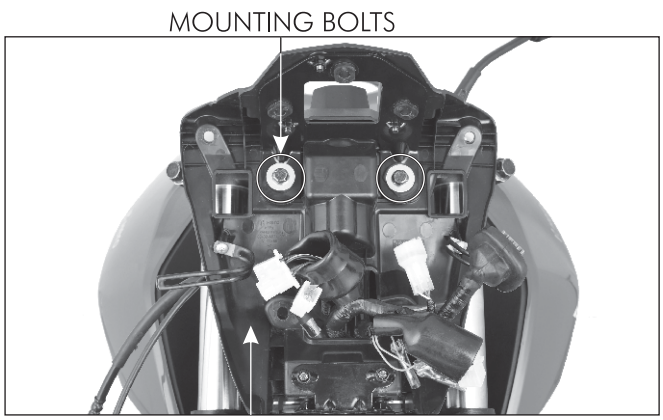
TORQUE

STEERING STEM NUT: 7.4 kgf-m



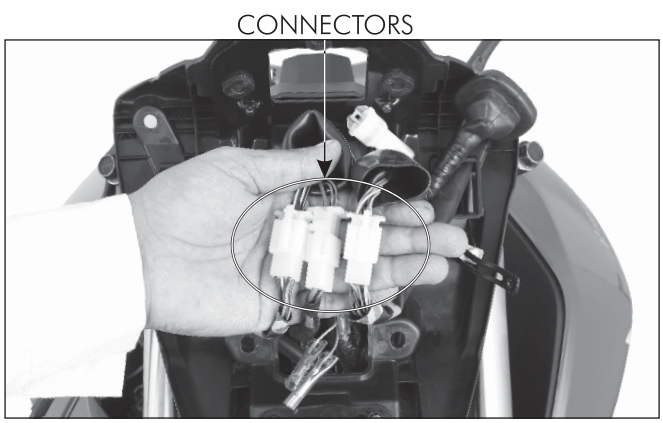
Install the front cowl stay.

Install the front cowl mounting stay bolts.

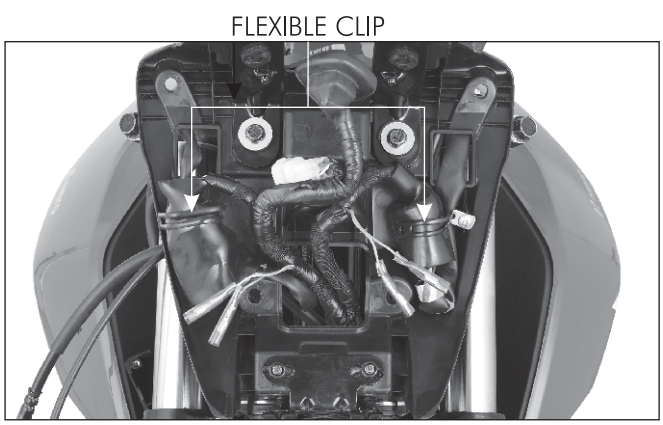


Connect following connectors:

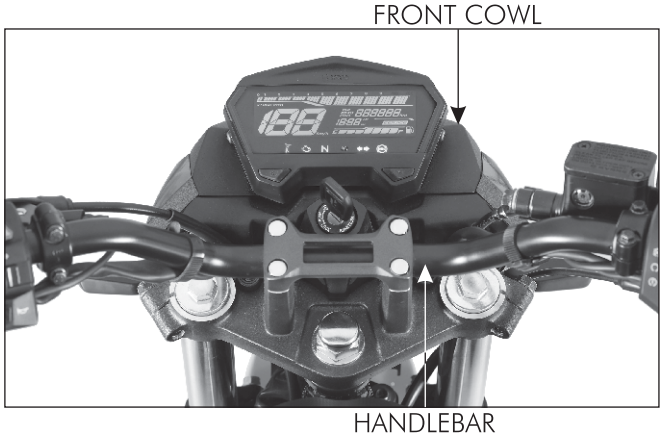
- Right switch housing connectors.
- Left switch housing connectors.
- Ignition switch connector.
- Wheel speed sensor connector.



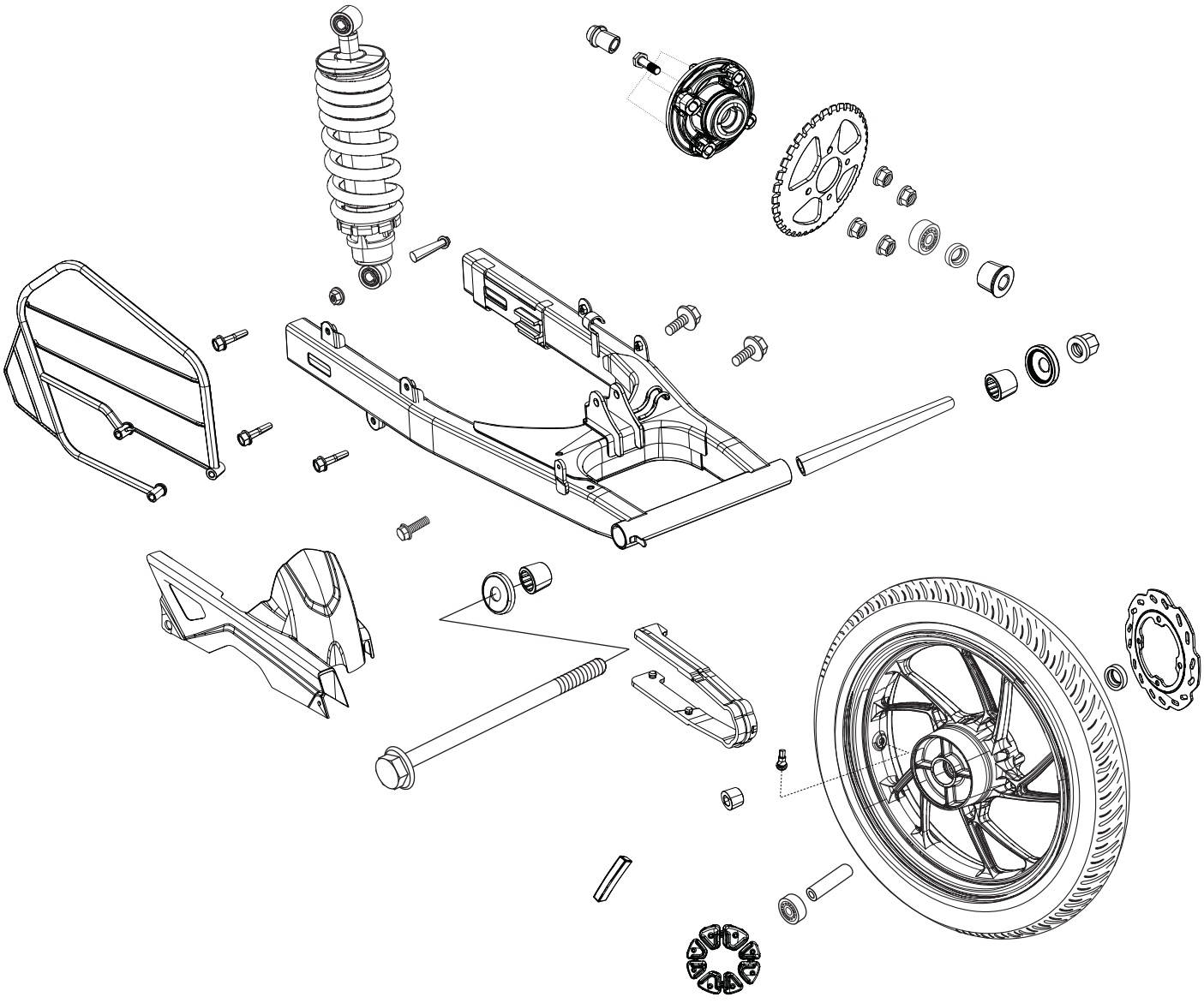
Slide the boot and fix the flexible clip properly.



Install the front cowl (page 2-3).
Install the combination meter (page 20-9).
Install the handlebar (page 12-7).
Install the front wheel (page 12-12).
Install the front fender (page 2-4).



MEMO



System Diagram	13-0	Rear Wheel	13-3
Service Information	13-1	Driven Flange	13-8
Specifications	13-1	Brake Pedal/Step Holder	13-12
Torque Values	13-1	Rear Shock Absorber	13-15
Special Tools/Troubleshooting	13-2	Swingarm	13-16

SERVICE INFORMATION

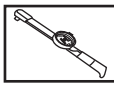
GENERAL

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the rear wheel installation, check the brake operation by applying the brake pedal.
- When servicing the rear wheel and suspension, support the motorcycle using a safety stand or hoist.
- Use only tyres marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TYRE APPLICABLE".
- Use Hero genuine replacement bolts and nuts for all suspension pivot and mounting point.
- For brake system information refer to **(SECTION-16)**.

SPECIFICATIONS

REAR WHEEL/BRAKE/SUSPENSION

ITEM		STANDARD	SERVICE LIMIT
Minimum tyre tread depth		1.0 mm	
Cold tyre pressure	Rider only	1.96 kgf/cm^2 (28 psi)	-
	Rider & Pillion	2.10 kgf/cm^2 (30 psi)	-
Rear axle runout		0.2 mm	-
Rear wheel rim runout	Radial	0.4 mm	2 mm
	Axial	0.4 mm	2mm
Wheel balance weight		max.60gm	-
Rear brake lever fee play		10-15mm	-
Rear brake drum I.D		130 mm	-
Rear brake lining thickness		4 mm	-

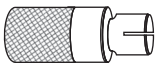
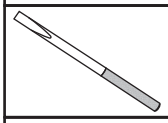
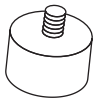
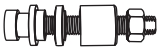
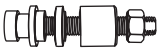


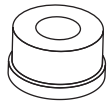
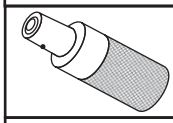
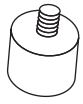
TORQUE VALUES

DRIVEN SPROCKET NUT	**: 6.4 kgf-m**
REAR AXLE NUT	**: 6.8 kgf-m**
SWINGARM PIVOT NUT	**: 6.0 kgf-m**
SHOCK ABSORBER UPPER MOUNTING NUT	**: 5.0 kgf-m**
SHOCK ABSORBER LOWER MOUNTING BOLT	**: 5.0 kgf-m**

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

TOOL	SPECIAL TOOLS

	**WHEEL BEARING REMOVER HEAD, 15 mm** **PART NO: 070 HH KVN 001**
	**WHEEL BEARING REMOVER HEAD SHAFT** **PART NO: 070 HH KZJ 009**
	**PILOT DRIVER, 21 mm** **PART NO: 070 HH KFN 014**
	**SWINGARM BEARING REMOVER** **PART NO: 070 HH KZJ 005**
	**SWINGARM BEARING INSTALLER** **PART NO: 070 HH KZJ 006**

	DRIVER OUTER, 40x46 mm **PART NO: 070 HH 198 031**
	**DRIVER OUTER, 42x47 mm** **PART NO: 070 HH KFN 011**
	**HANDLE BEARING DRIVER** **PART NO: 070 HH KFN 008**
	**PILOT DRIVER, 15 mm** **PART NO: 070 HH KFN 013**

TROUBLESHOOTING

Rear wheel wobbles
- Bent wheel
- Worn or damaged rear wheel bearings
- Worn or damaged driven flange bearing
- Faulty rear tyre
- Unbalanced rear tyre and wheel
- Worn or damaged swingarm bearings
- Bent frame or swingarm
- Axle fastener not tightened properly
- Tyre pressure too low

Wheel turns hard
- Brake drag
- Faulty wheel bearings
- Faulty driven flange bearings
- Bent axle
- Driven chain too tight

Soft suspension
- Incorrect suspension adjustment
- Weak shock absorber springs
- Oil leakage from damper unit
- Low tyre pressure

Hard suspension
- Incorrect suspension adjustment
- Bent shock absorber damper rod
- Damaged suspension or swingarm pivot bearings
- Bent swingarm pivot or frame
- High tyre pressure

Steers to one side or does not tract straight
- Drive chain adjusters not adjusted equally
- Bent axle
- Bent frame
- Worn swingarm pivot components

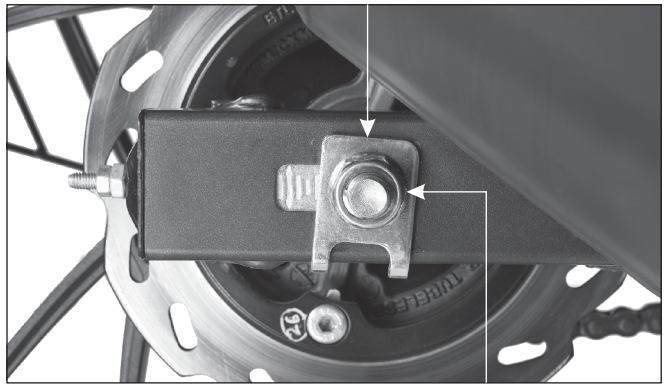
Rear suspension noise
- Loose suspension fasteners
- Worn or damaged suspension pivot bearings
- Faulty shock absorber

REAR WHEEL

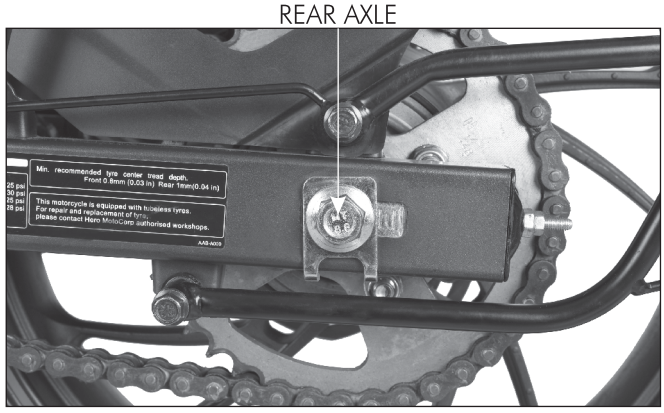
REMOVAL

Support the motorcycle securely on ramp, raise the rear wheel off the ramp.

Remove the rear axle nut and indicator plate.



Pull out the rear axle.

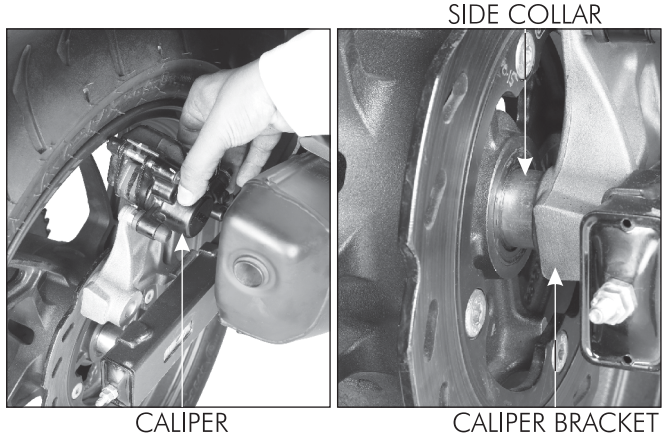


Lift the rear brake caliper bracket upwards.

NOTE

Do not hang the caliper by the brake hose. Do not twist brake hose.

Remove the side collar from the right side of the wheel.

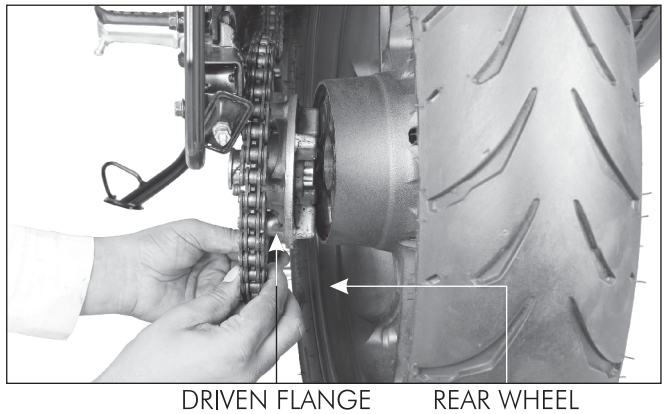


Dislodge the rear wheel flange from hub.

Remove the rear wheel.

NOTE

Do not operate the brake pedal after removing the rear wheel.



DAMPER RUBBER

Remove the damper rubbers.

Check the condition of the damper rubbers. Replace the damper rubbers if they are damaged or deteriorated.

NOTE

Replace the damper rubber as a set.

Install the damper rubbers to the wheel hub.

DAMPER RUBBER

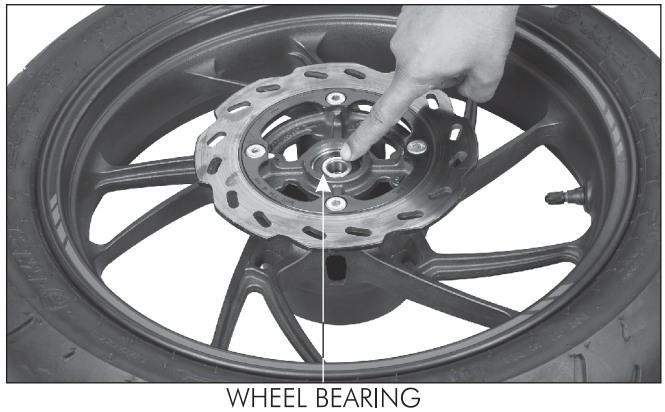
WHEEL BEARING

Check the wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand.

Replace the bearings with new ones if they are noisy or have excessive play.

NOTE

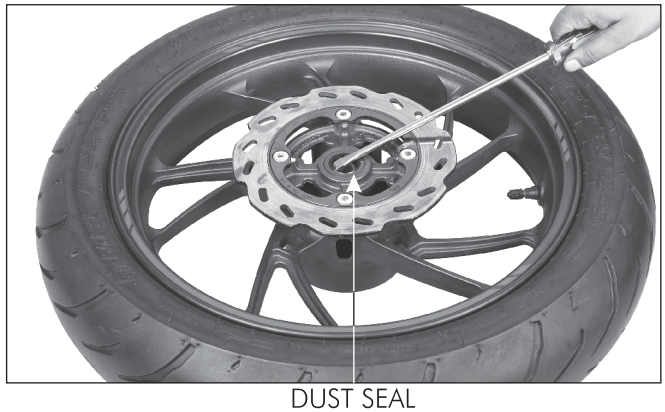
Replace the wheel bearings in pair.



WHEEL BEARING

WHEEL BEARING REPLACEMENT

Remove the dust seal.



DUST SEAL

Install the bearing remover head into the bearing.

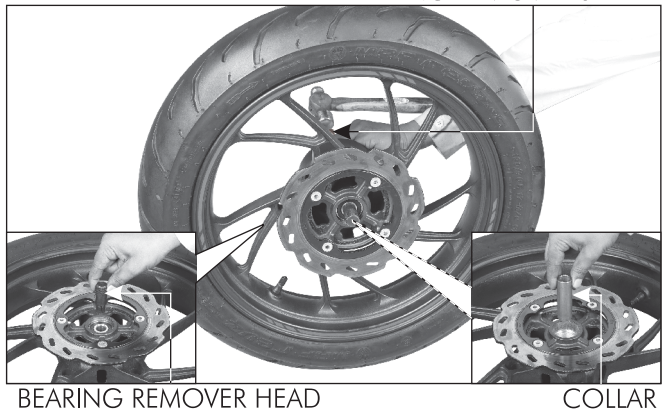
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.

Remove the distance collar and drive out the other bearing.

TOOL

WHEEL BEARING REMOVER HEAD SHAFT
PART NO: 070 HH KZJ 009
WHEEL BEARING REMOVER HEAD, 15 mm
PART NO: 070 HH KVN 001

BEARING REMOVER SHAFT



BEARING REMOVER HEAD COLLAR

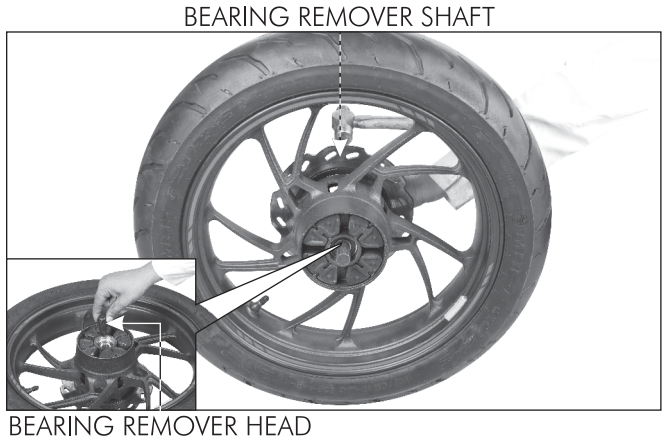
Similarly remove the right side bearing using special tool.

NOTE

Once the bearings are removed, they must be replaced with new ones.

TOOL

WHEEL BEARING REMOVER HEAD SHAFT
PART NO: 070 HH KZJ 009
WHEEL BEARING REMOVER HEAD, 15 mm
PART NO: 070 HH KVN 001



INSTALLATION

Pack all the bearing cavities with grease.

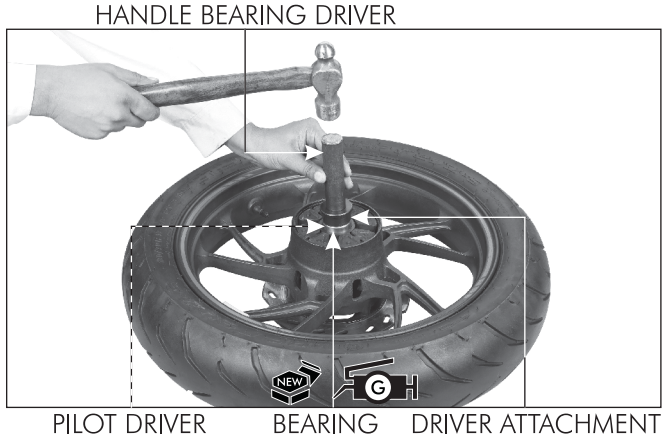
Drive in the new left bearing first, squarely with the marked side facing up until it is fully seated.

TOOL

HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008
PILOT DRIVER, 15 mm
PART NO: 070 HH KFN 013
DRIVER ATTACHMENT, 42x47 mm
PART NO: 070 HH KFN 011

NOTE

Keep the grease off the brake disc.

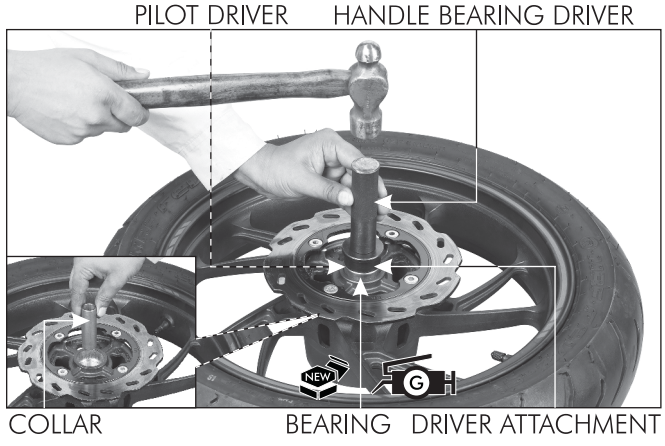


Install the distance collar.

Drive in the new right bearing squarely with marked side facing up until it is fully seated.

TOOL

HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008
DRIVER OUTER, 32 x35 mm
PART NO: 070 HH KFN 010
PILOT DRIVER, 12 mm
PART NO: 070 HH KFN 012



AXLE INSPECTION

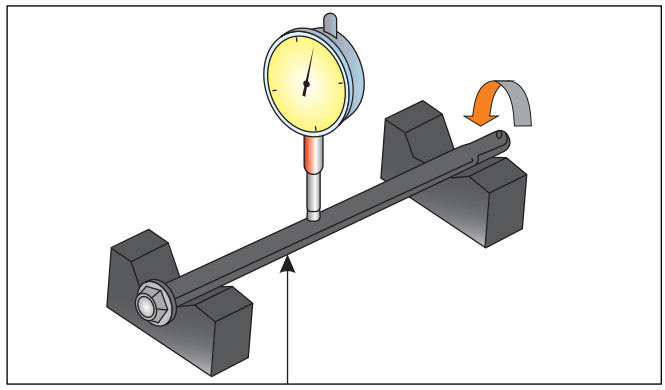
Set the rear axle in V-blocks to measure the run-out.

Turn the axle and measure the runout using a dial indicator.

Actual run-out is ½ the total indicator reading.

SERVICE LIMIT

REAR AXLE: 0.2 mm



REAR AXLE

WHEEL BALANCE

For wheel balance servicing (page 14-7).

When checking wheel balance, install the brake disc onto the wheel.

WHEEL/DRIVEN FLANGE BEARINGS

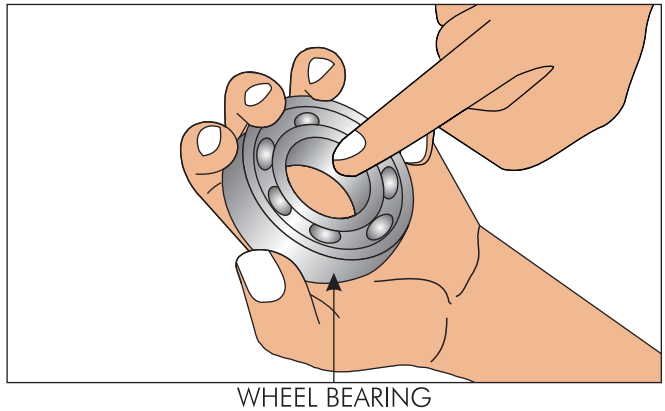
Turn the inner race of each bearing with your finger, the bearing should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or of they fit loosely in the hub.

NOTE

Replace the wheel bearings in pairs.



WHEEL BEARING

13

Check the wheel rim run-out by placing the wheel in a turning stand.

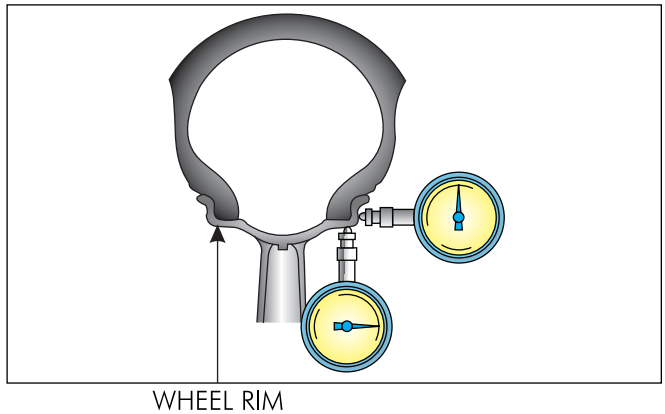
Spin the wheel by hand and read the run-out using a dial indicator.

Actual run-out is ½ of the total indicator reading.

SERVICE LIMIT

AXIAL: 2.0 mm

RADIAL: 2.0 mm



WHEEL RIM

SIDE COLLAR

INSTALLATION

Install new dust seal.

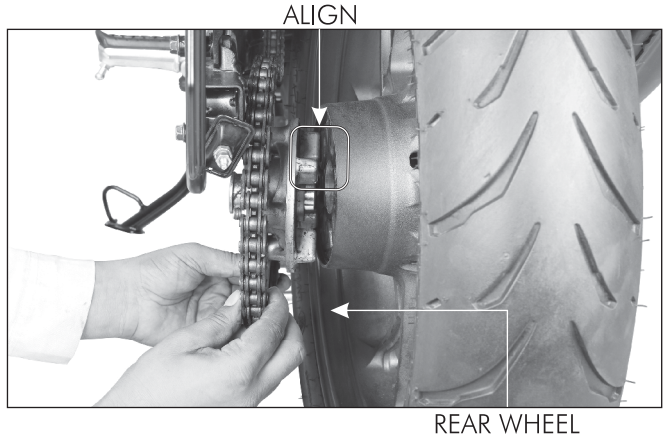
Install the collar to the right side of the wheel.

DUST SEAL

Install the damper rubbers.

Place the rear wheel in the swingarm.

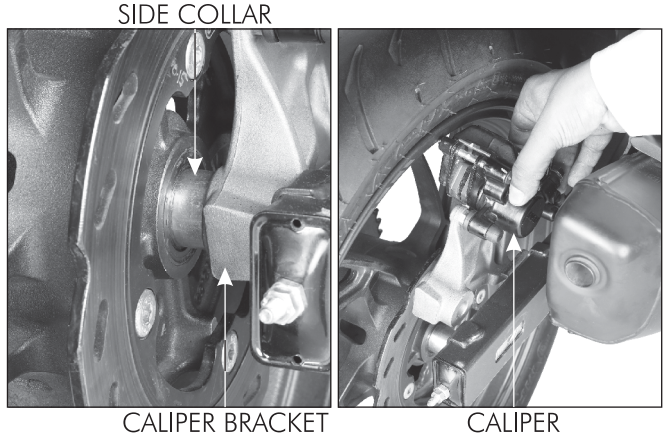
Align & engage the driven flange lugs with the slots of damper rubber.



Install the rear brake caliper bracket while placing the rear wheel into the swingarm.

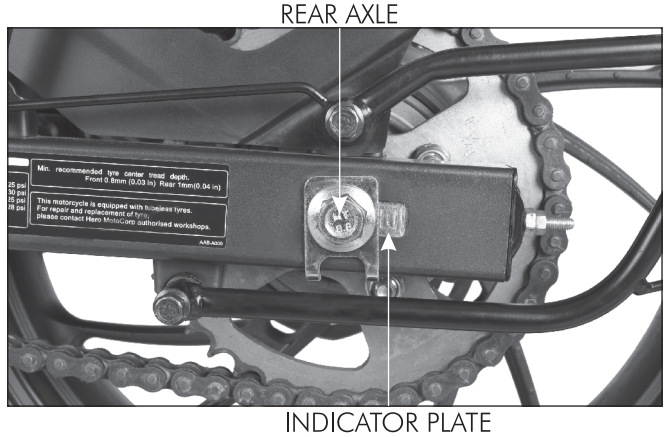
NOTE

Be careful not to damage the brake pads.



Apply a thin coat of grease to axle outer surface.

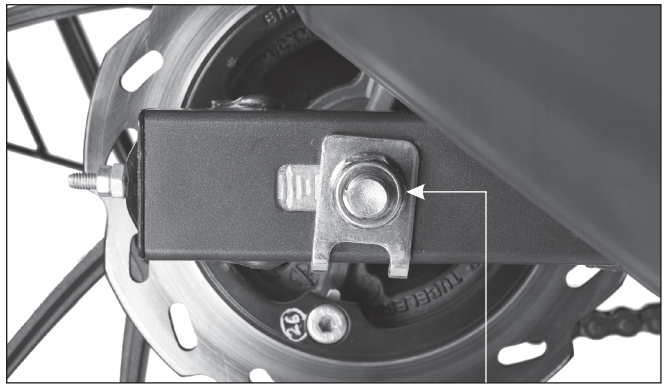
Insert the axle from the left side through the left indicator plate, left drive chain adjuster, driven flange, wheel hub, caliper bracket and right drive chain adjuster, right indicator plate.



Install the rear axle nut.
Adjust the drive chain slackness (page 3-12).
Tighten the rear axle nut to the specified torque.

TORQUE

REAR AXLE NUT: 6.8 kgf-m

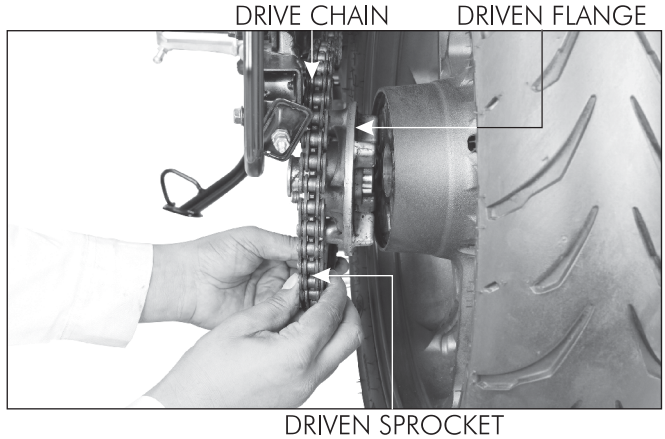


REAR AXLE NUT

DRIVEN FLANGE

REMOVAL

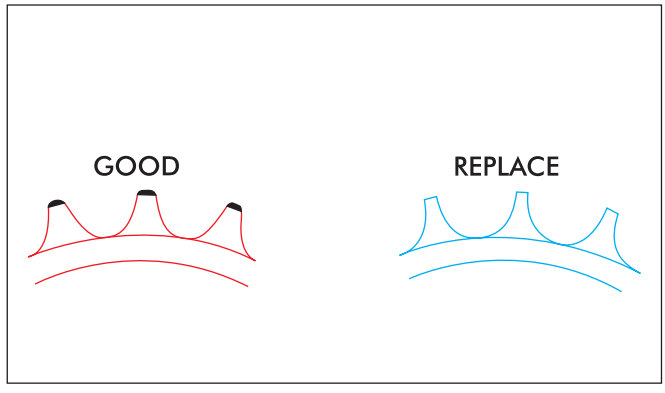
Remove the rear wheel (page13-3).
Derail the drive chain from the driven sprocket and remove the driven flange from the wheel hub .



Check the condition of final driven sprocket teeth. Replace the sprocket if it is worn out or damaged.

NOTE

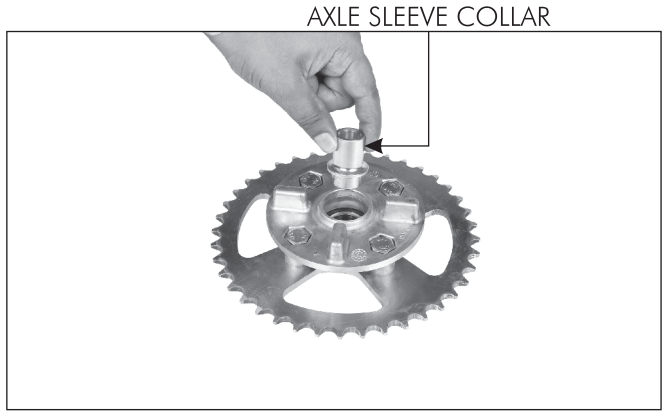
If the driven sprocket is worn out or damaged, the drive chain and the driven sprocket must be inspected and replace as a complete set.



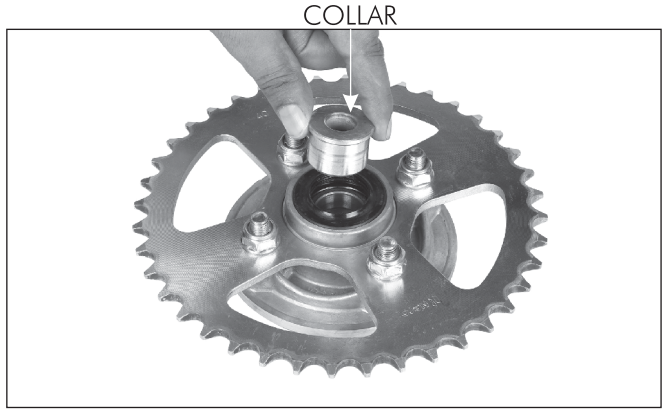
DISASSEMBLY

DRIVEN SPROCKET

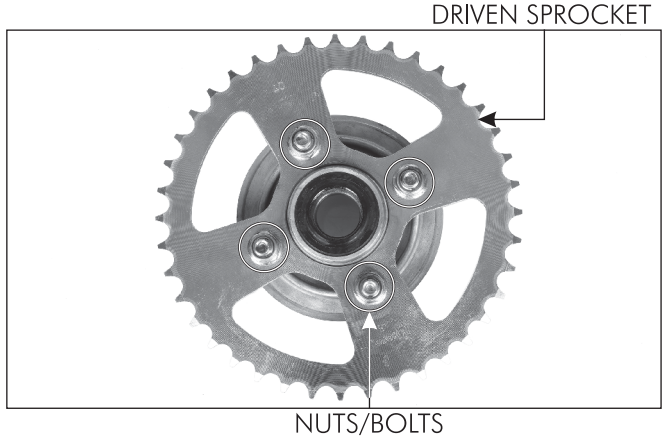
Remove the axle sleeve collar.



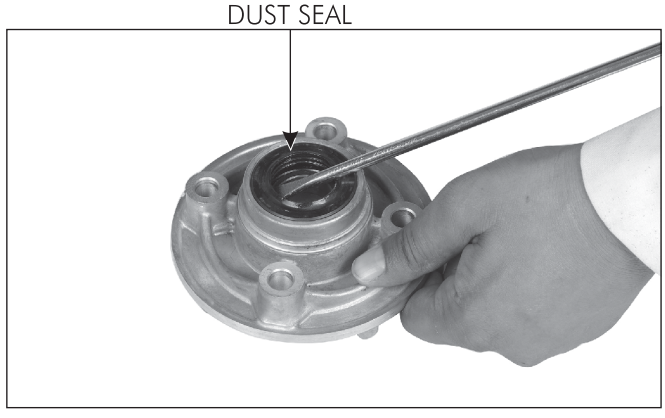
Remove the collar.



Remove the nuts/bolts and driven sprocket.



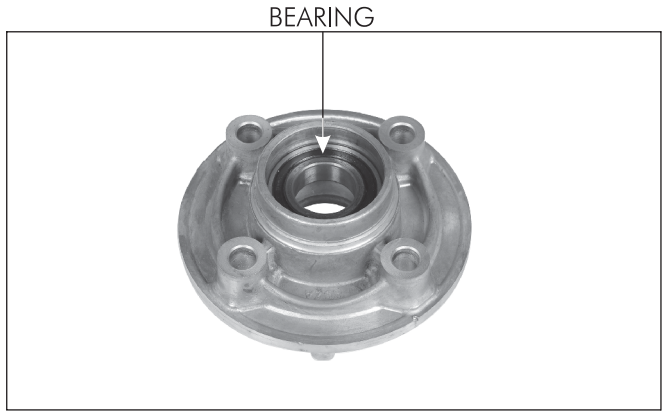
Remove the dust seal.



DRIVEN FLANGE BEARING

Check the driven flange bearing by turning the inner race with your finger.

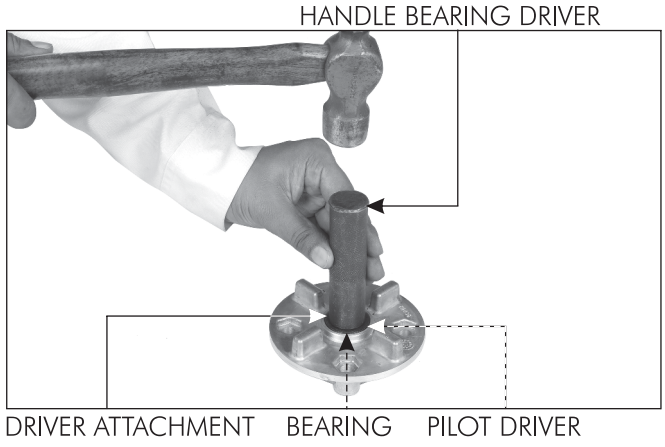
Replace the bearing with a new one if it is noisy or has excessive play.



Replace the bearing with a new one if it is noisy or has excessive play.

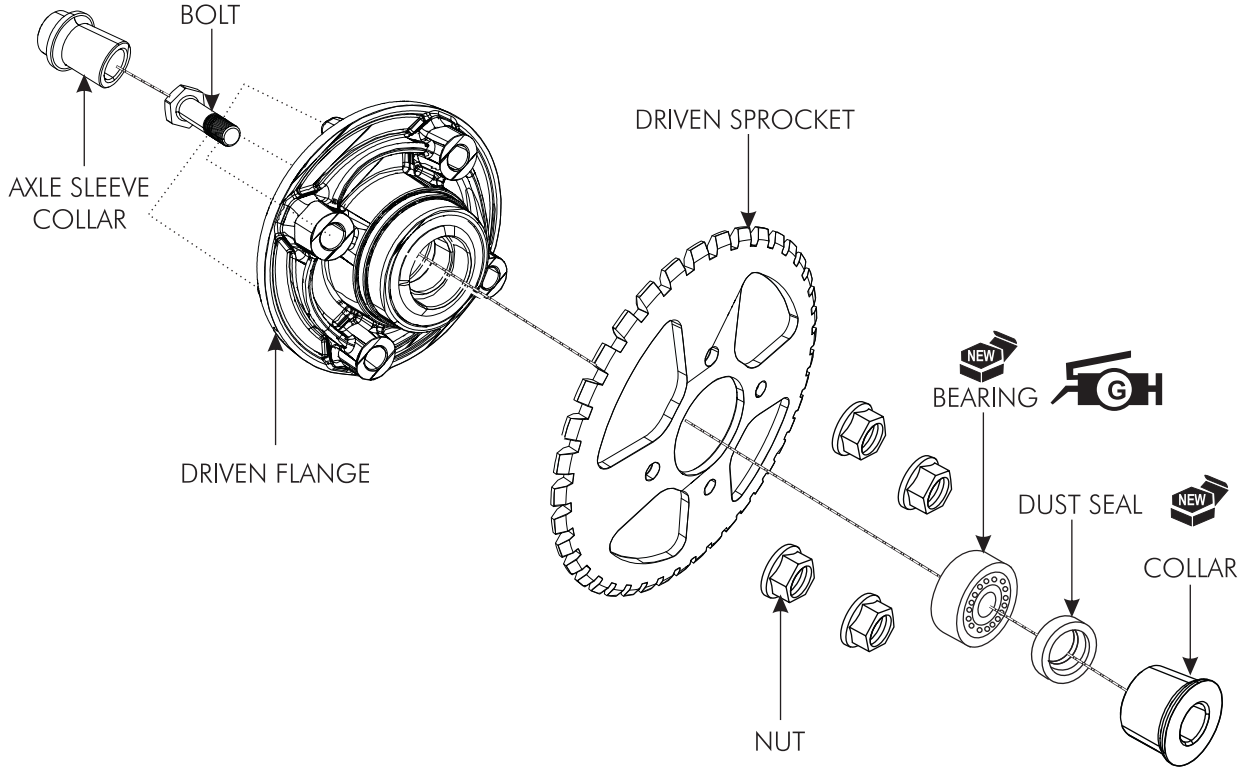
TOOL

HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008
PILOT DRIVER, 21 mm
PART NO: 070 HH KFN 014
DRIVER ATTACHMENT, 40x46 mm
PART NO: 070 HH 198 031



13

ASSEMBLY



DRIVEN FLANGE BEARING

Pack new bearing cavities with grease.

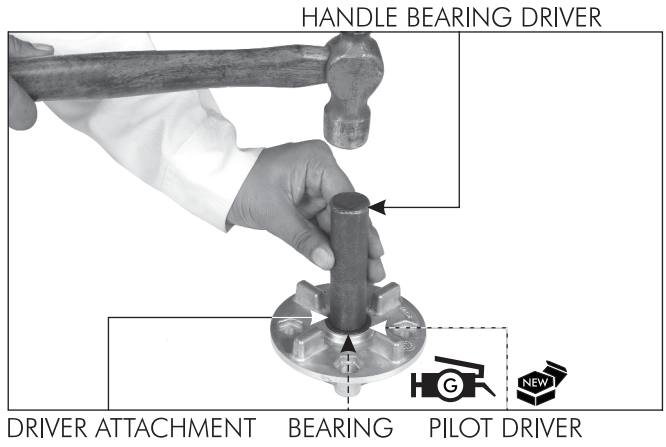
Drive in a new bearing squarely until it is fully seated.

TOOL

HANDLE BEARING DRIVER
PART NO: 070 HH KFN 008
PILOT DRIVER, 21 mm
PART NO: 070 HH KFN 014
DRIVER ATTACHMENT, 40x46 mm
PART NO: 070 HH 198 031

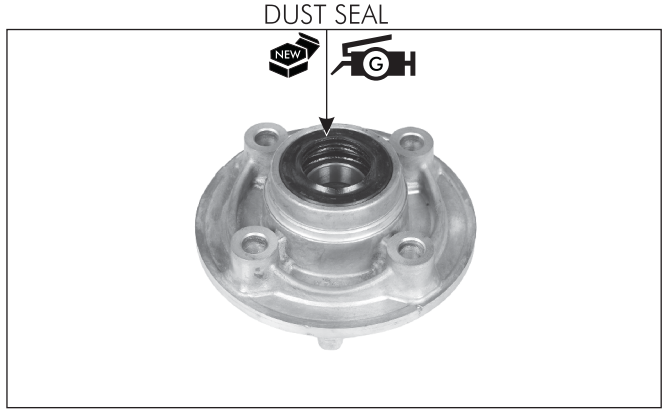
NOTE

- Drive the bearing squarely, not allowing it to tilt.
- Install the bearing with the sealed end facing outside.



DRIVEN SPROCKET

Apply grease to the lip of a new dust seal and install it.

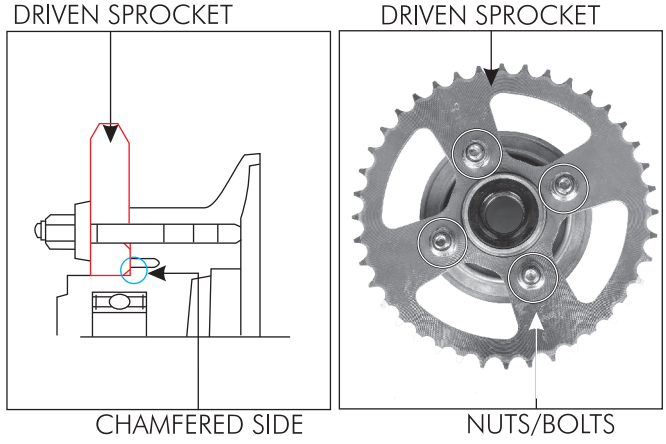


Install the driven sprocket with the numbering side facing towards the drive flange side.

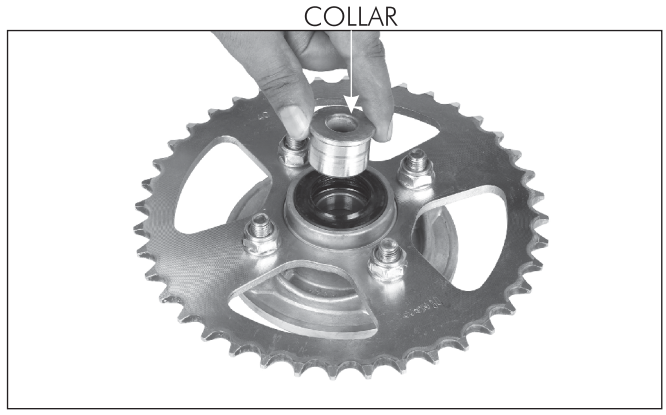
Install the nuts/bolts and tighten them.

TORQUE

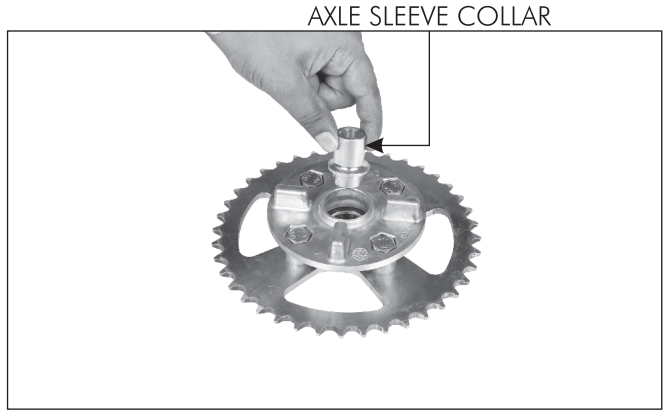
DRIVEN SPROCKET NUT: 6.4 kgf-m
Apply grease to the lip of a new dust seal.



Install the collar.



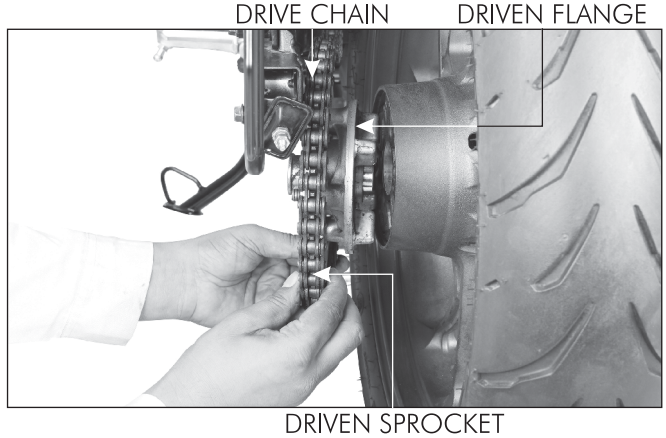
Install the axle sleeve collar.



INSTALLATION

Align the driven flange next to rear wheel and install chain onto the sprocket.

Install the rear wheel (page 13-6).



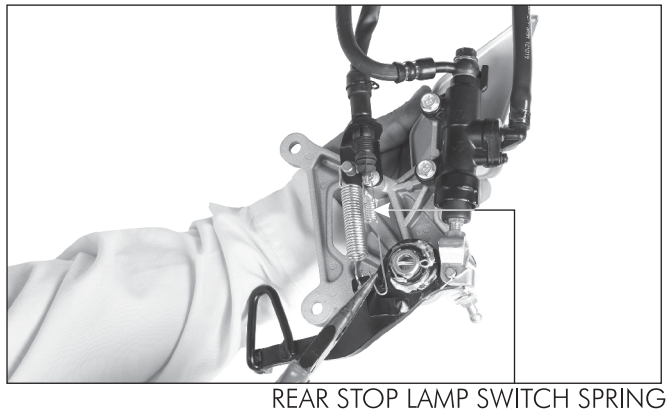
13

BRAKE PEDAL/STEP HOLDER

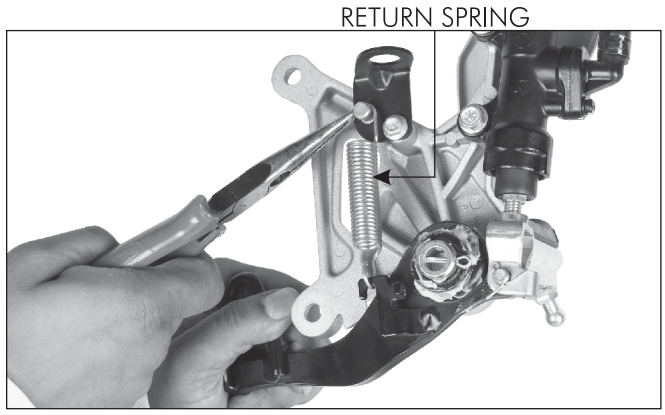
REMOVAL

Position aside the right side step holder bracket (page 2-7).

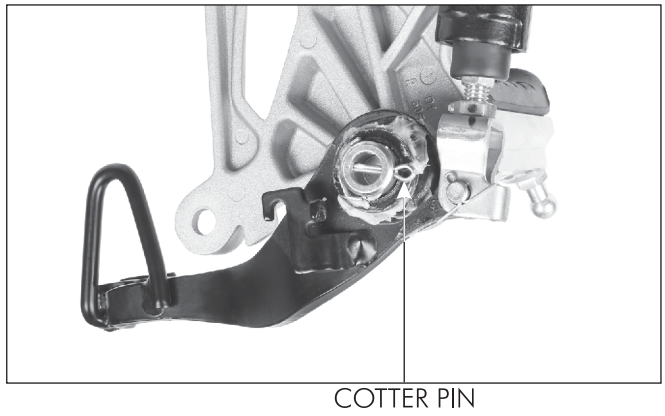
Remove the rear stop lamp switch spring.



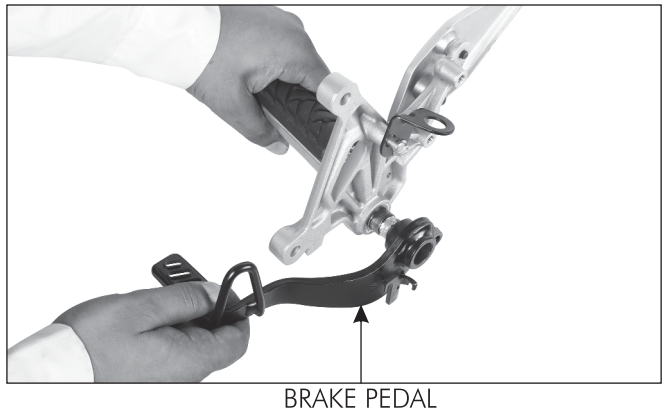
Remove the brake pedal return spring.



Remove the cotter pin from the brake pedal.
Remove the master cylinder (page 16-17).

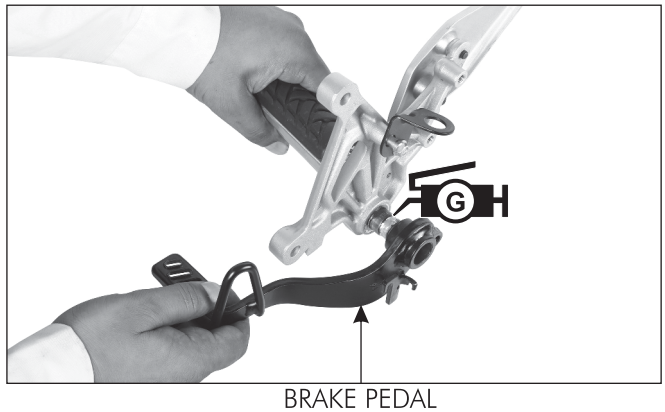


Remove the brake pedal.

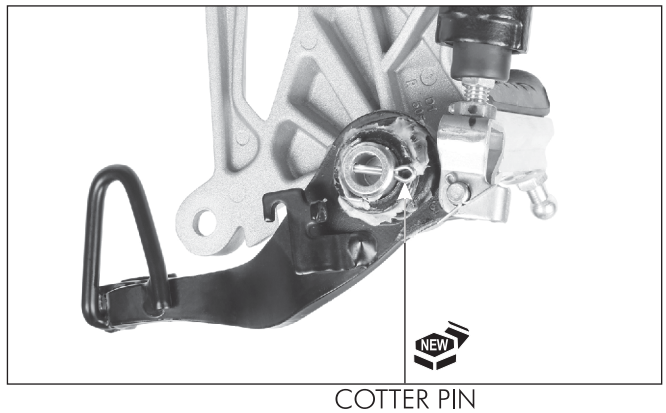


INSTALLATION

Apply grease to the brake pedal pivot shaft and install it on to the right step holder.

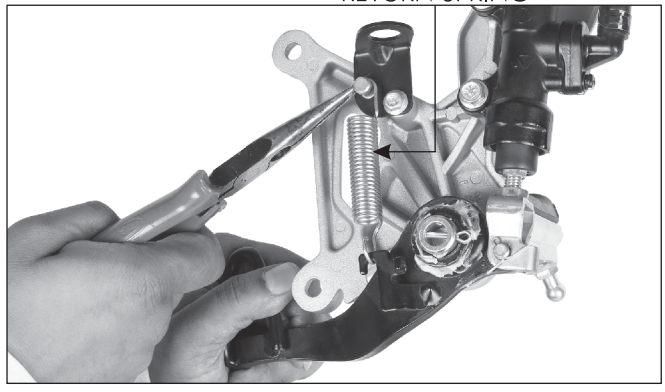


Install the master cylinder (page 16-19).
Install the new cotter pin into the brake pedal.

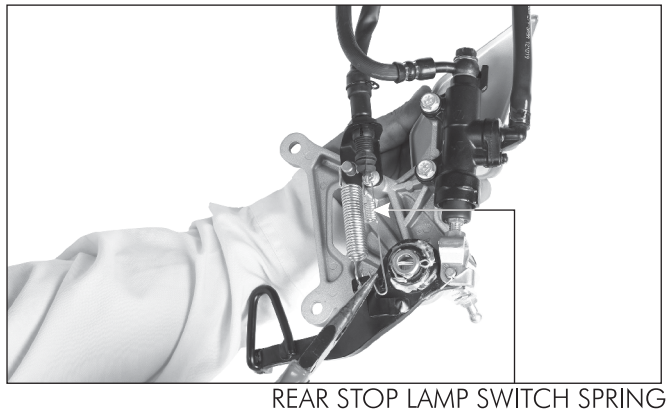


COTTER PIN

Install the brake pedal return spring.

RETURN SPRING


Install the rear stop lamp switch spring.
Install the right side step holder bracket (page 2-5).
Adjust the brake pedal height (page 3-19).


REAR STOP LAMP SWITCH SPRING

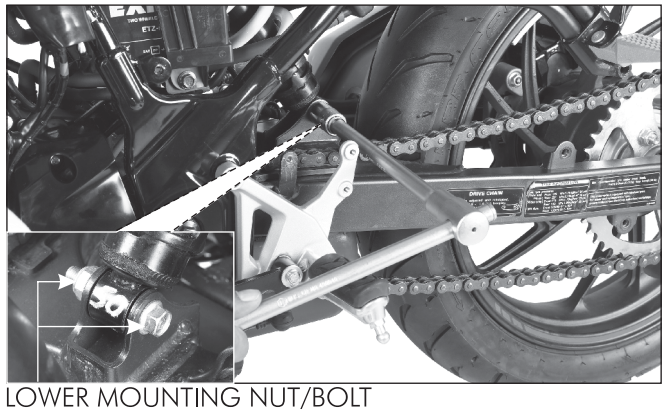
REAR SHOCK ABSORBER

REMOVAL

Remove the fuel tank (page 2-8).
Remove the hugger fender (page 2-12).
Support the using a maintenance stand, safety stand or hoist.
Remove the upper mounting nut and bolt.

UPPER MOUNTING NUT/BOLT

Remove the rear shock absorber lower mounting nut and bolt.



LOWER MOUNTING NUT/BOLT

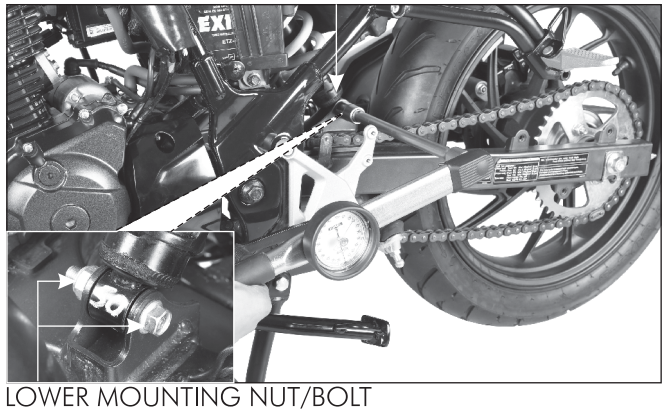
SHOCK ABSORBER

INSTALLATION

Install the rear shock absorber.
Install and tighten the lower mounting bolt and nut to the specified torque.

TORQUES

SHOCK ABSORBER LOWER MOUNTING BOLT: 5.0 kgf-m



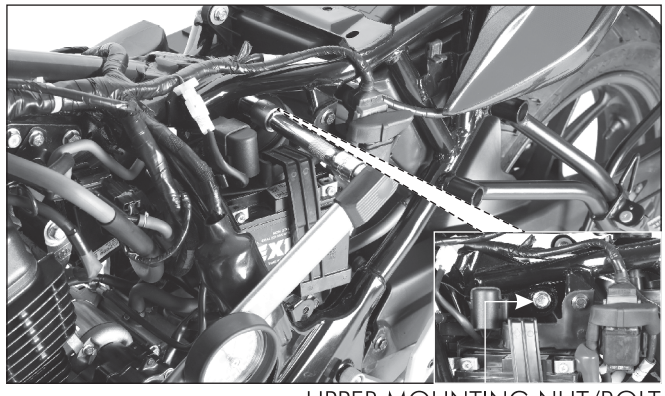
LOWER MOUNTING NUT/BOLT

Install and tighten the upper mounting bolt and nut to the specified torque.

TORQUES

SHOCK ABSORBER UPPER MOUNTING NUT: 5.0 kgf-m

Install the hugger fender (page 2-13).
Install the fuel tank (page 2-9).

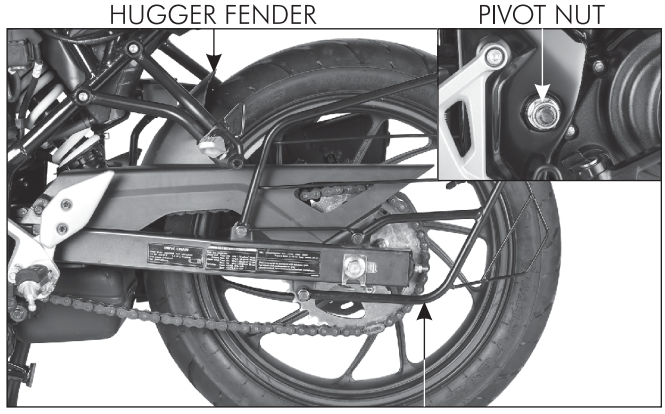


UPPER MOUNTING NUT/BOLT

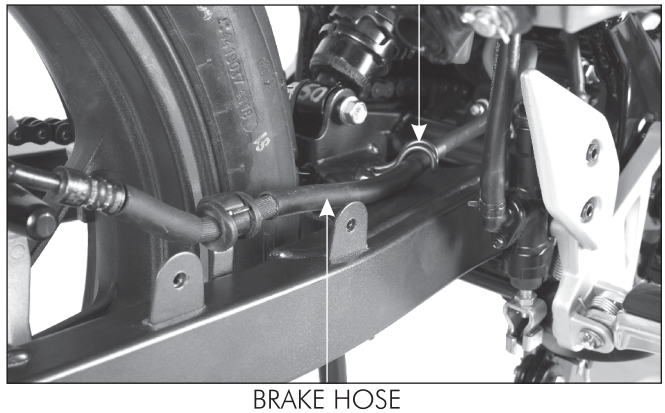
SWINGARM

REMOVAL

Remove the exhaust muffler (page 2-9).
Remove the hugger fender (page 2-12).
Remove the saree guard (page 2-12).
Remove left side rear crankcase cover (page 6-3).
Remove the driven flange (page 13-8).
Loosen the swingarm pivot nut.
Remove the rear shock absorber lower mounting nut and bolt (page 13-15).



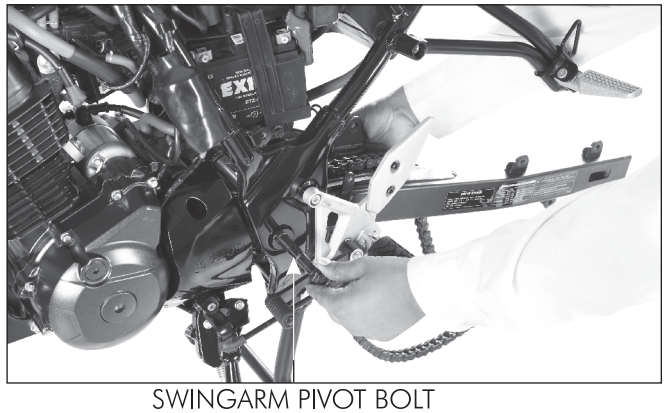
Dismount the brake hose from the clamp mounted on the swingram.



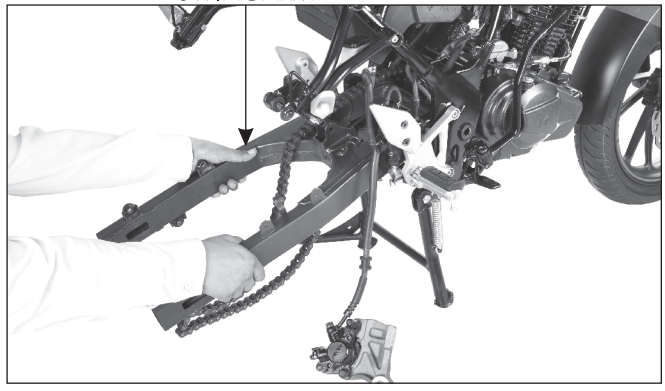
Remove the swingarm pivot nut/bolt.

NOTE

Be careful not to damage the rear stop lamp switch spring.

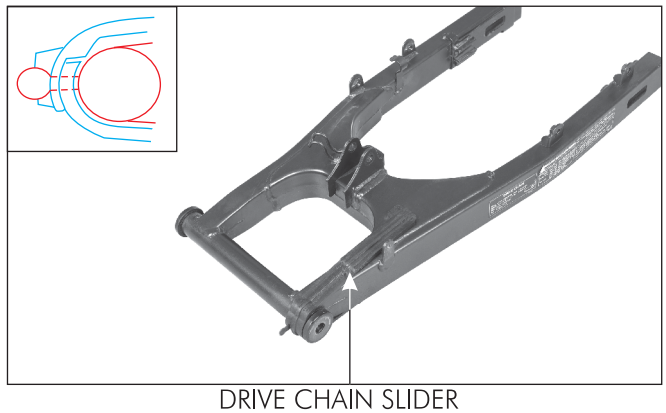


Remove the swingarm from the frame.

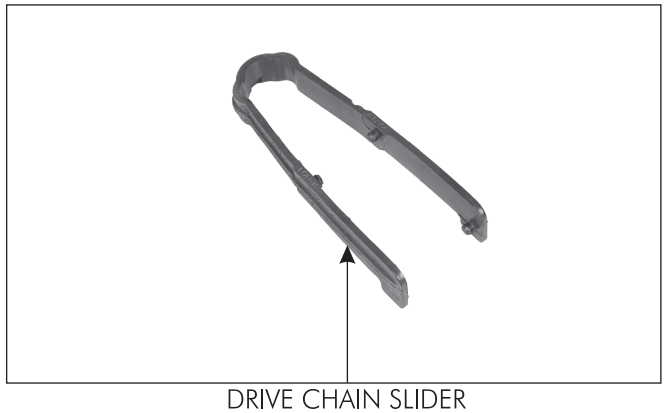


DISASSEMBLY

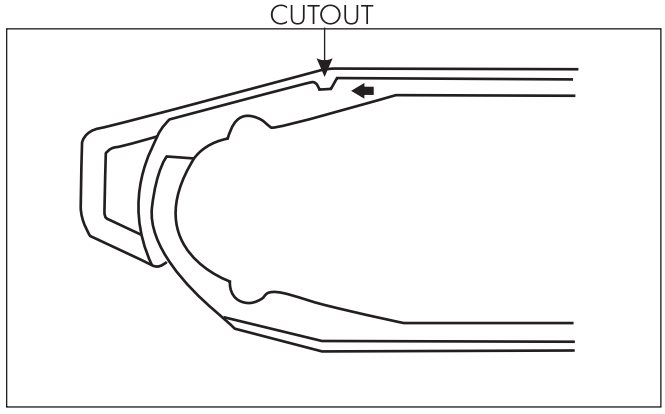
Remove the chain slider while releasing the bosses from tabs.



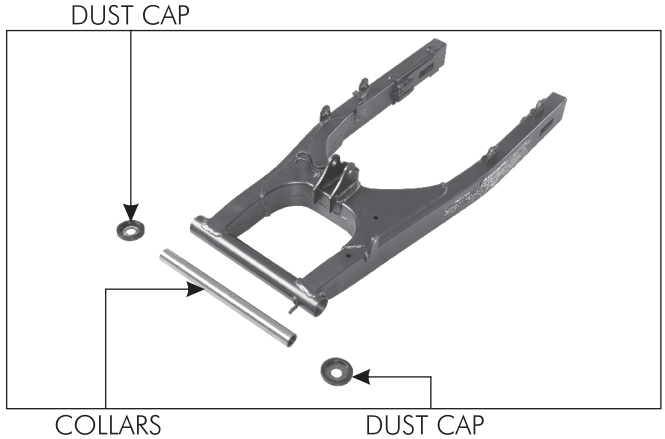
Check the chain slider for wear or damage.



The chain slider must be replaced if it is worn to the wear limit cut-out.



Remove the dust caps and collar.



NEEDLE BEARING REPLACEMENT

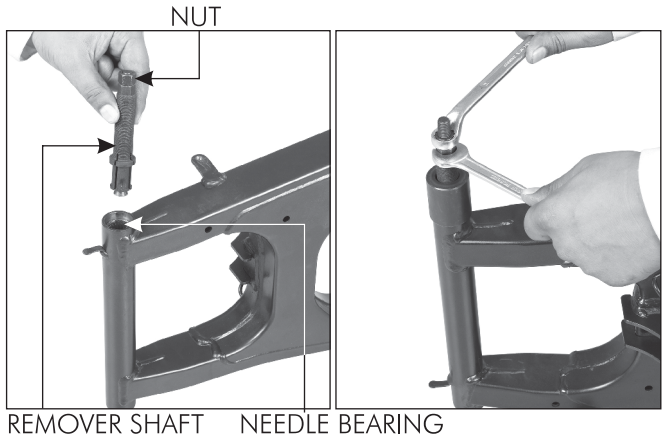
Remove the swingarm needle bearing by using the special tool.

TOOL

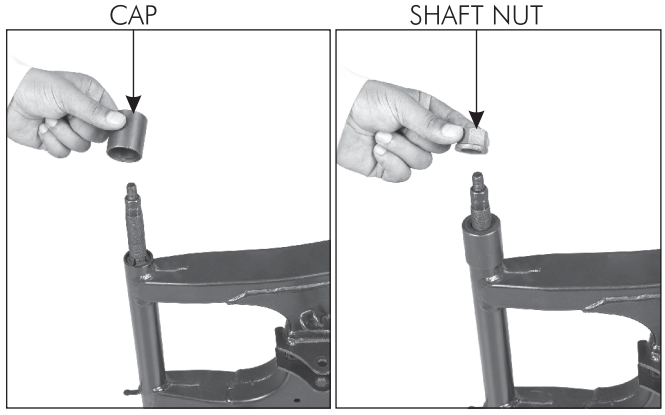
SWINGARM BEARING REMOVER
PART NO: 070 HH KZJ 005

Seat the remover shaft on the needle bearing.

Tighten the nut, while holding the shaft, so that the shaft grips the bearing firmly.



After seating the remover shaft, install the cap and shaft nut as shown.



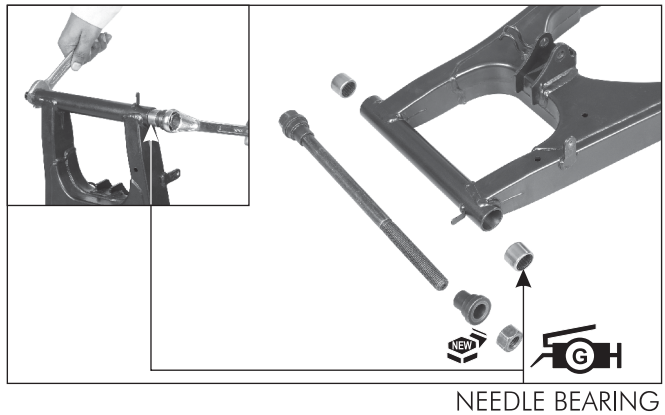
Remove the needle bearings by holding the shaft and tightening the shaft nut as shown.

INSTALLATION

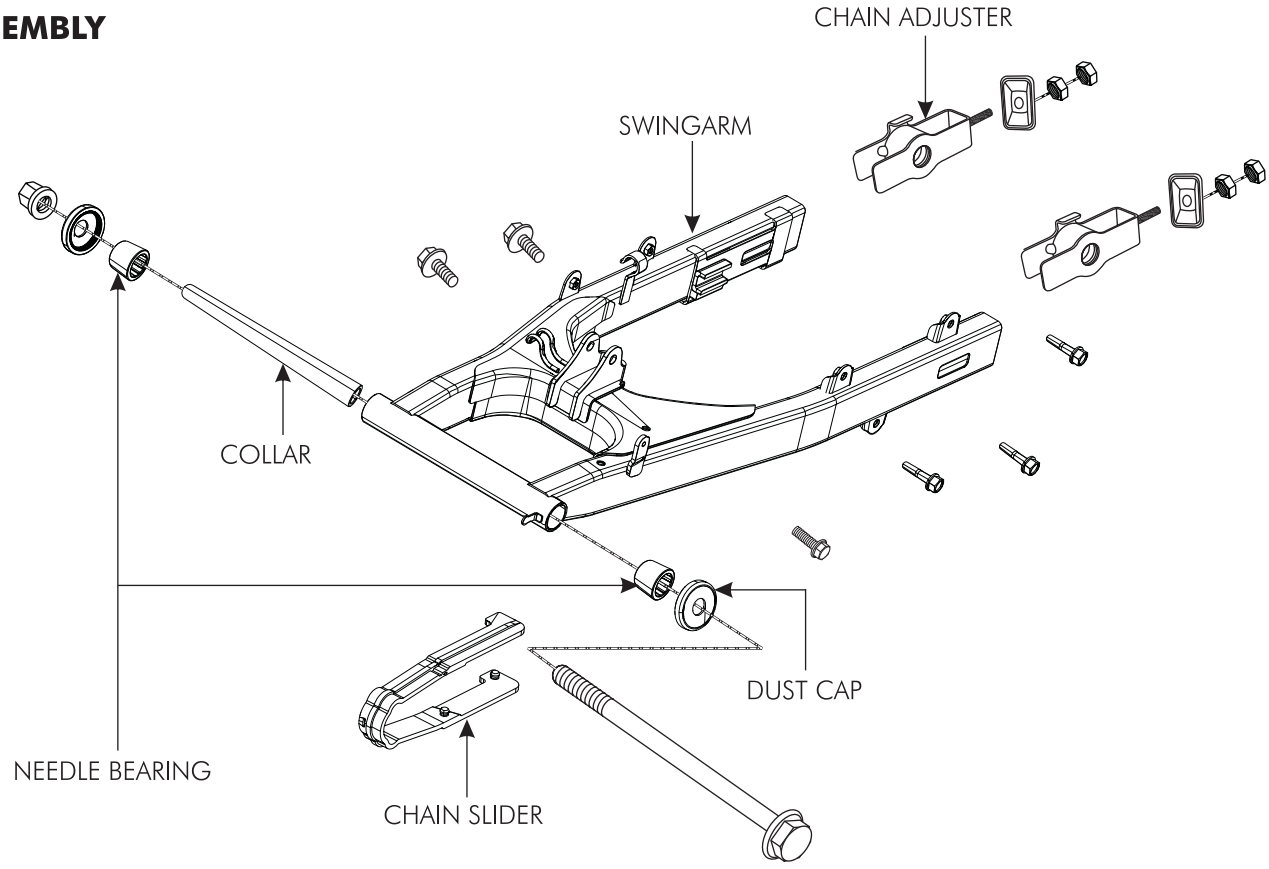
Press the needle bearings into the pivot on both sides until the depth from the pivot outer surface is 8.0 – 9.0 mm.

TOOL

SWINGARM BEARING INSTALLER
PART NO: 070 HH KZJ 006

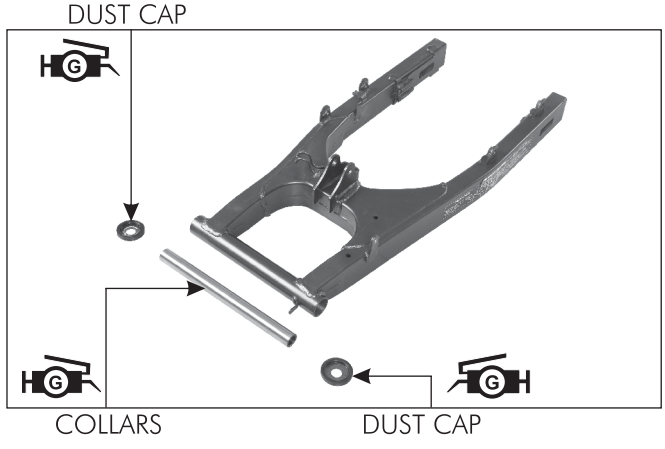


ASSEMBLY

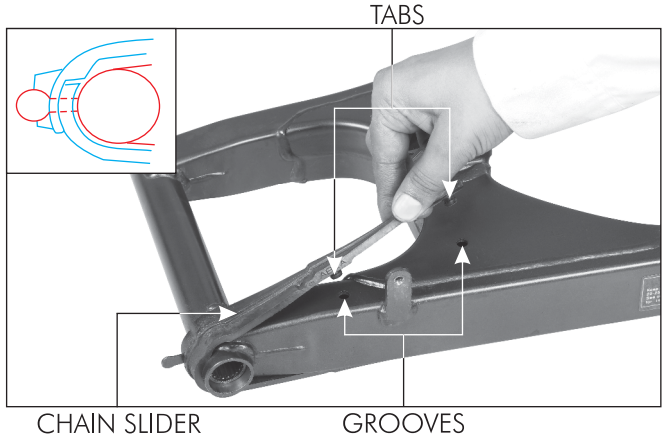


Apply grease to the collar surface and install it into the swingarm pivot.

Apply grease to the dust cap lips and install them to the swingarm pivot.

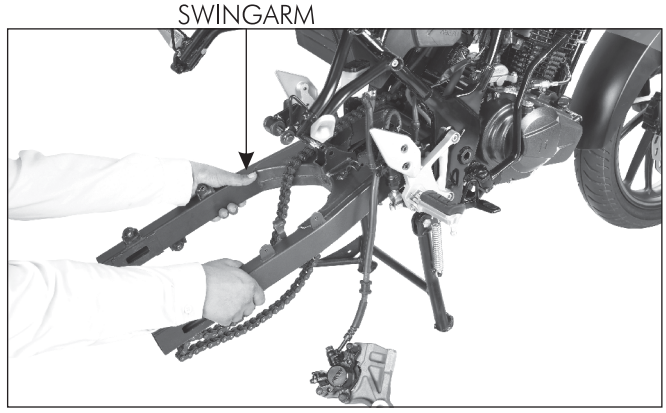


Install the chain slider while aligning tabs with grooves.



Install the swingarm to the frame.

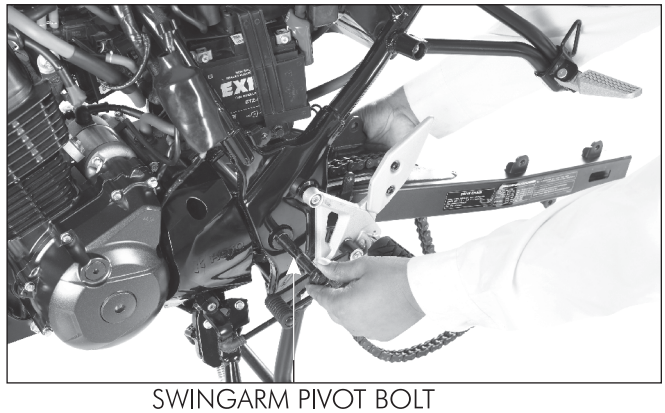
SWINGARM



Install and tighten the pivot nut to the specified torque.

TORQUE

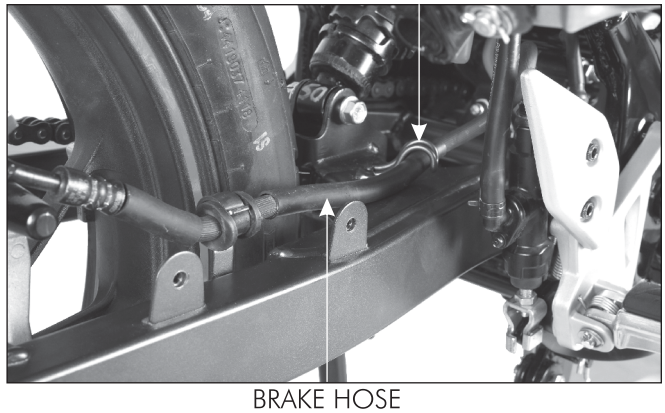
SWINGARM PIVOT NUT: 6.0 kgf-m



SWINGARM PIVOT BOLT

Connect the brake hose to the clamp mounted on the swingram.

CLAMP



BRAKE HOSE

Install the rear shock absorber lower mounting nut and bolt (page 13-15).

Install the driven flange (page 13-10).

Install left side engine rear crankcase cover (page 6-7).

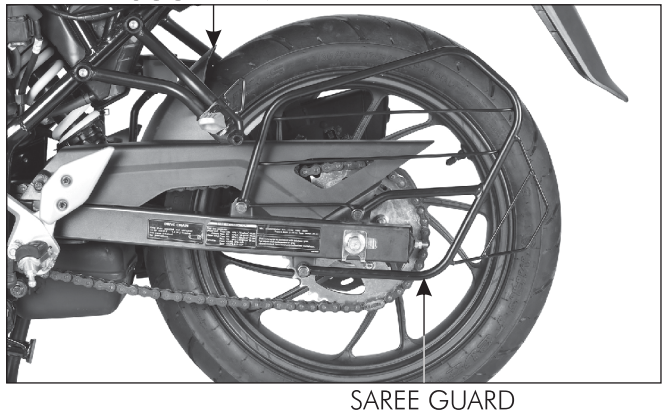
Install the saree guard (page 2-12).

Install the hugger fender (page 2-12).

Install the exhaust muffler (page 2-10).

Adjust the drive chain slack (page 3-12).

HUGGER FENDER



SAREE GUARD

MEMO

Service Information	**14-1**	**Rim Valve Replacement**	**14-3**
Specifications	**14-1**	**Tyre Installation**	**14-4**
Tyre Removal	**14-2**	**Wheel Balance**	**14-7**

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Riding on damaged wheels impairs safe operation of the motorcycle.
- Installing improper tyres or using tyres that are excessively worn or improperly inflated tyres on motorcycle can affect handling and stability. This can cause a crash in which you can be seriously hurt.
- Do not try install a tube inside a TUBELESS TYRE. Excessive heat build up can cause the tube to burst. The wheels are specially designed for TUBELESS TYRES, during hard acceleration or braking a tube installed in TUBELESS TYRES could slip on the wheel and cause the tyre to rapidly deflate.

- This section covers removal and installation of TUBELESS TYRES.
- Raise the front wheel off the ground by supporting the motorcycle securely with a jack or other support under the engine.
- After the front wheel installation, check the brake operation by applying the brake lever.
- Use only tyres marked "TUBELESS" and tubeless valves on wheels marked "TUBELESS TYRE APPLICABLE".
- Brake system information (page 16-1).

SPECIFICATIONS

TUBELESS TYRES

ITEM			STANDARD	SERVICE LIMIT
Minimum tyre tread depth	Front		0.8 mm	-
	Rear		1.0 mm	-
Cold tyre pressure	Front	Rider only	1.75 kgf/cm^2 (25 psi)	-
		Rider & Pillion	1.75 kgf/cm^2 (25 psi)	-
	Rear	Rider only	1.96 kgf/cm^2 (28 psi)	-
		Rider & Pillion	2.1 kgf/cm^2 (30 psi)	-
Wheel rim runout	Front	Radial	0.4 mm	2.0 mm
		Axial	0.4 mm	2.0 mm
	Rear	Radial	0.4 mm	2.0 mm
		Axial	0.4 mm	2.0 mm
Wheel balance weight			60g max	60g max

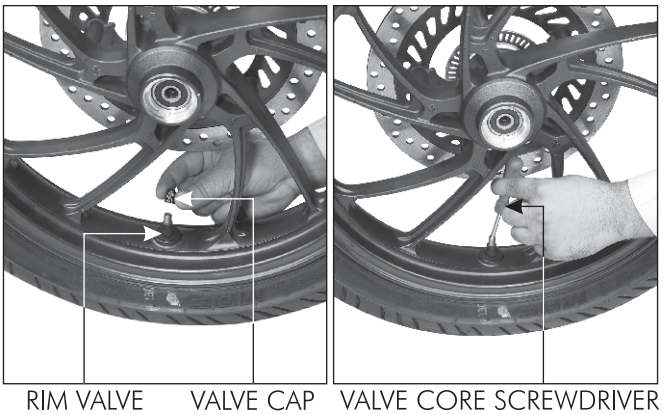
TYRE

REMOVAL

Remove the front wheel (page 12-8).

Remove the rear wheel (page 13-3).

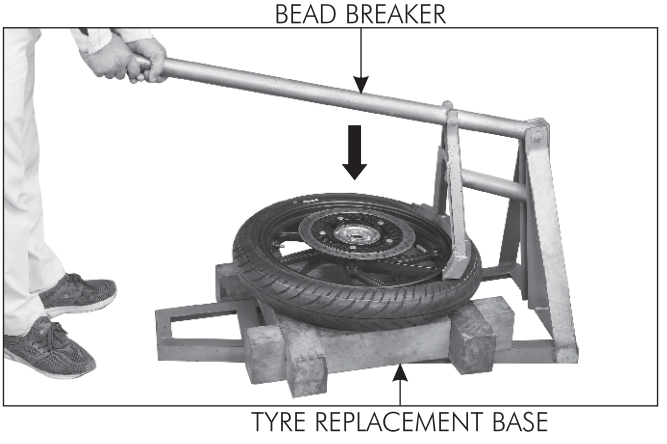
Remove the valve cap and bleed air by pressing the valve core.



Collapse the bead with a tyre bead breaker.

NOTE

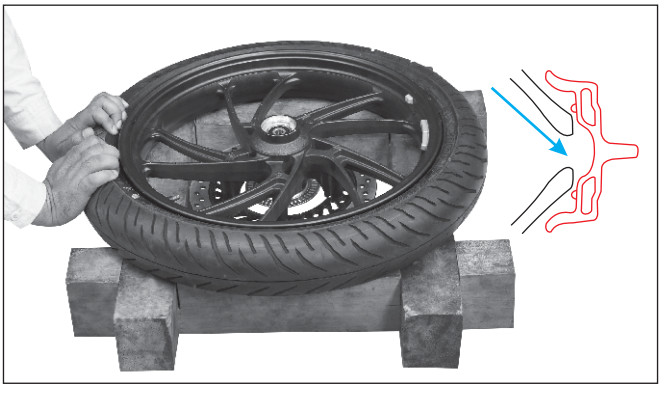
Be careful not to damage the rim while pressing the bead breaker.



After Loosening the bead from the rim, from opposite side of the valve push the bead to the centre of the rim so that the tyre become off-centre.

NOTE

The tyre can be removed once the beads on both sides are collapsed completely.

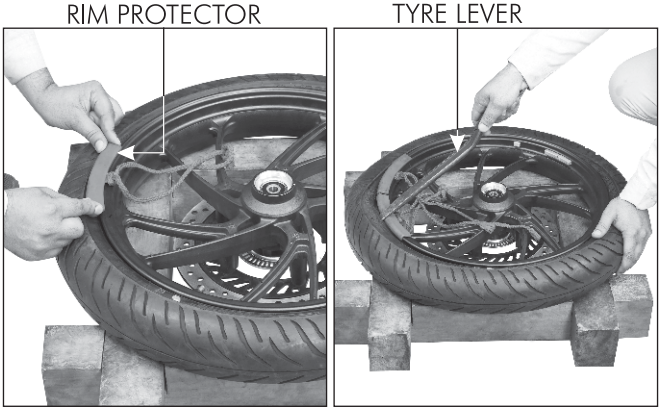


Apply a mild detergent solution to the rim and the mating surfaces.

Check the beads opposite to the valve are completely loosened from the rim. Install the rim protector on the section of the rim close to the valve and insert a tyre lever to pry it out.

NOTE

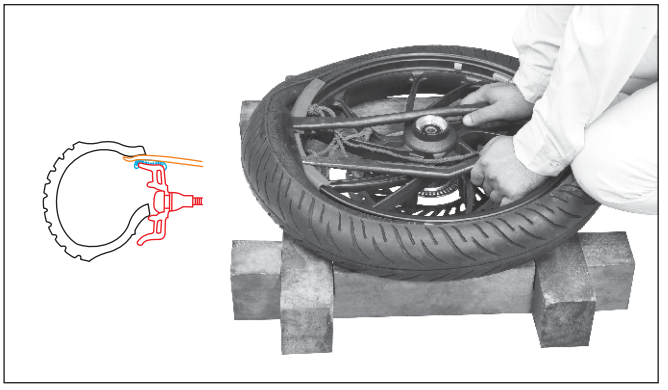
- Be sure to use motorcycle tyre levers.
- To avoid damaging the rim, use rim protectors.



Insert another tyre lever 30~50 mm from the first tyre lever and pry the tyre over the rim little by little.

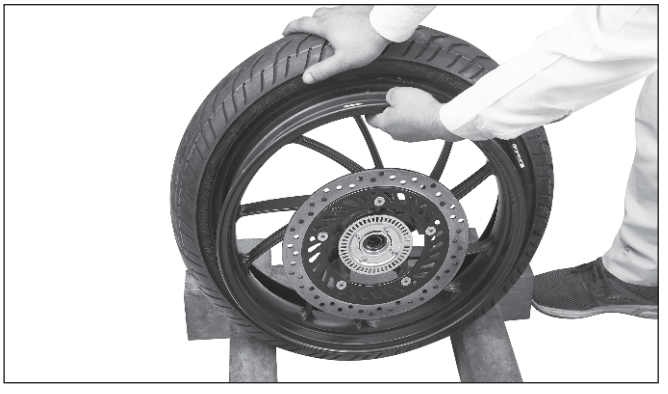
NOTE

Do not try to remove too much of the bead at one time.



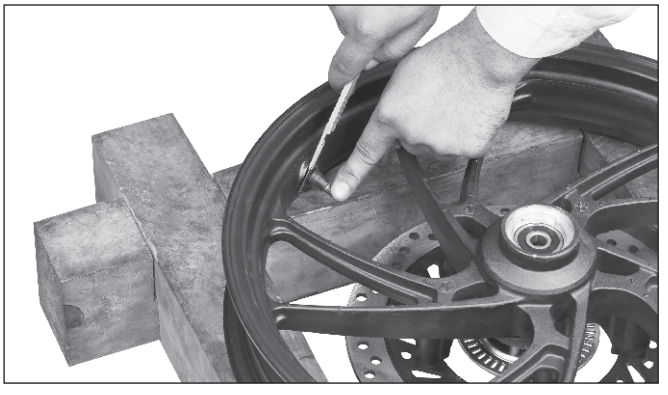
Repeat the above procedures until half of the bead is removed. Remove the remaining bead by hand.

Remove the tyre from the rim.



RIM VALVE REPLACEMENT

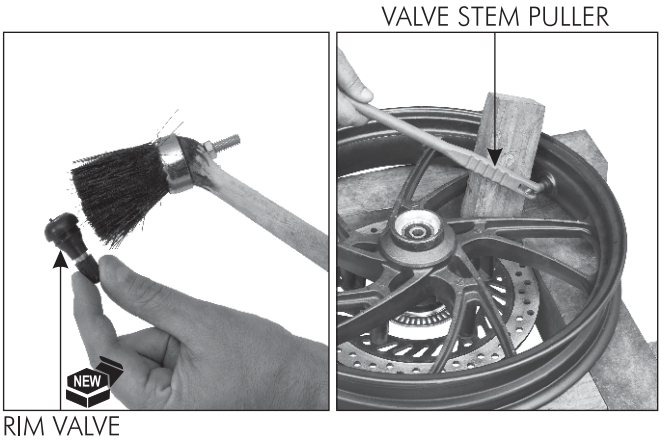
Cut off the rim valve at the base.



Apply mild detergent solution to the replacement rim valve and insert it from inside of the rim. pull it in radially towards the center of the wheel using a special tool.

NOTE

- Be sure to use the recommended rim valve.
- Take care not to damage the valve hole.
- Replace the rim valve whenever installing a new tubeless tyre.



WHEEL

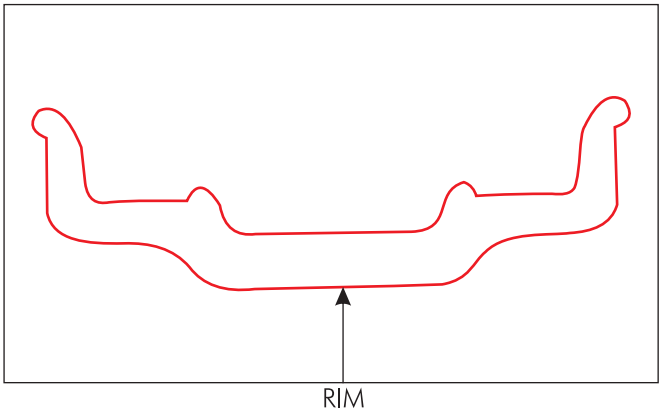
INSPECTION

When a tubeless tyre is incorrectly installed on a rim, it may be dislodged from the rim leading to a serious accident. Make sure to observe the following points while installing.

When an organic solvent (Brake cleaner, gasoline, paint thinner etc) is used to remove rust or dirt, be sure to clean the rim completely so that no solvent is left on the rim which may damage the rubber.

When the rim has a large deformation, distortion, crack, replace the rim as it may cause air leak.

Always change the rim if there is scratch on the surface of the rim where it (0.5 mm in depth and 1.0 mm in width) contacts the bead.



TYRE

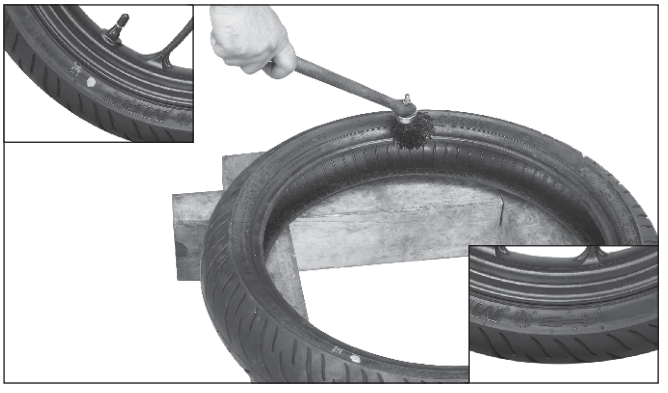
INSTALLATION

⚠ WARNING

Any attempt to mount a passenger car tyre on a motorcycle rim may cause the tyre bead to separate from the rim with enough explosive force to cause serious injury.

Check overall condition of the tyre and apply a mild detergent solution to the bead.

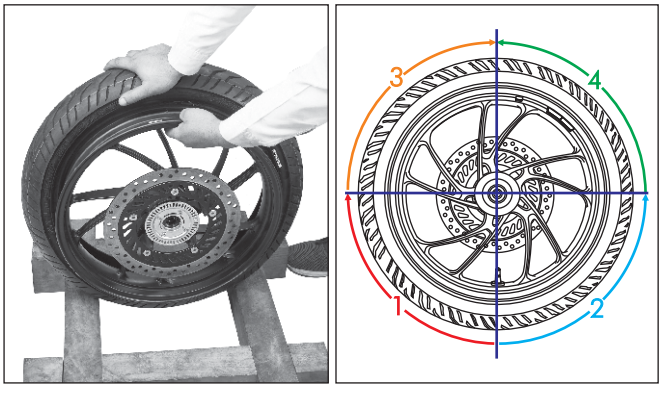
Mount the tyre with the balance mark ('O' paint mark) aligned with the valve. Install the tyre with arrow mark pointing with the direction of rotation.



⚠ WARNING

A tyre that shifts on the rim may lead to a sudden loss of air pressure while riding and an accident could occur.

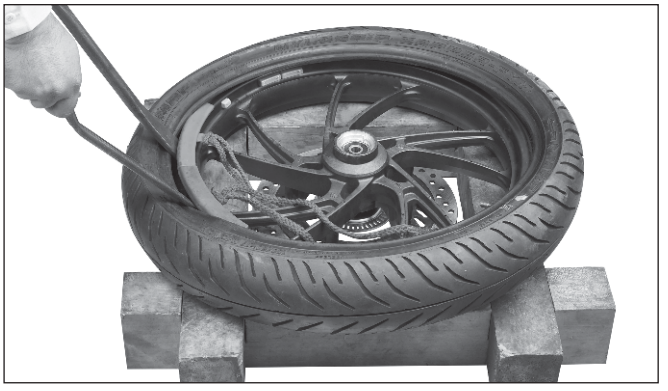
Stand the tyre upright, hold it with one hand and starting from the apposite side to the valve, install one side of the tyre from the rim as much as possible by hand. Be sure to assemble in the sequence as shown.



NOTE

- Be sure to use motorcycle tyre levers.
- For easy assembly, apply a mild detergent solution to the tyre and rim mating surface.

Place the wheel on the tyre replacement base on a level surface and mount the remaining portion of the tyre using two tyre levers. At the last section, you may need to pry with the two levers simultaneously. Make sure the installed bead is loose from the rim and stays along the centre of the rim.



Install the bead by holding the bead with your knees so that the bead may not come off.

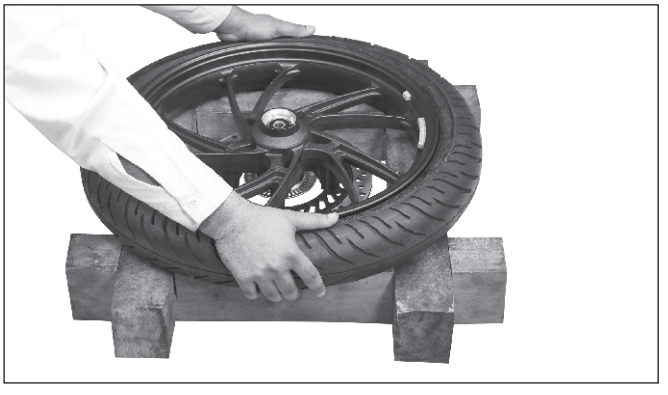
After half of the bead has been mounted, insert the two tyre levers 30-40 mm apart and pry the bead over the rim. Repeat until ¾ of the bead has been mounted.

NOTE

Before using the levers, be sure that the bead on the opposite side is positioned in the center of the rim.

NOTE

Hold one tyre lever upright to allow removal of the other tyre lever.



After installing the valve core, apply a mild detergent solution to the bead again.

Tap on the tyre tread surface with a mallet so that the tyre and rim fit evenly around the circumference. Be sure that the tyre centre and rim centre are aligned.

Inflate the tyre to 1.5 times the standard recommended pressure to seat the bead on the rim.

Use the tyre pressure specified in the Model Specific manual or on the tyre label. Overinflation may cause a tyre to burst with sufficient force to result in serious injury.

NOTE

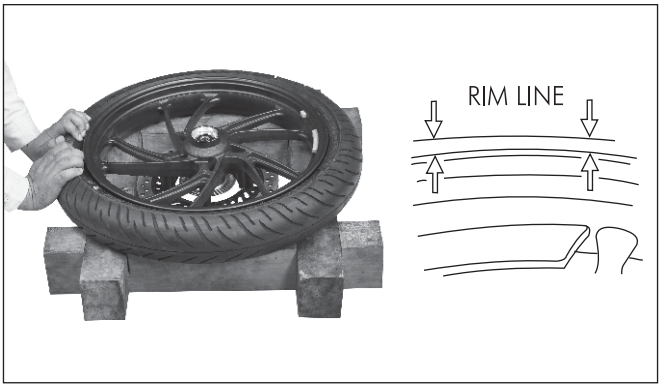
- You may hear a loud sound as the bead seats on the rim. This is normal.
- If air leaks from between the rim and bead, stand the wheel up with the valve at the bottom and put air in while pushing down on the tyre.

Check that the tyre bead seats on the tyre rim securely and that the rim line of the tyre is concentric with the rim.

Adjust the tyre pressure as per specification.

Check the wheel balance (page 14-7).

Install the wheel.



WHEEL BALANCE

Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the wheel.

For optimum balance, the tyre balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tyre if necessary.

Note the rotating direction marks on the wheel and tyre.

NOTE

Install the tyre with arrow mark pointing with the direction of rotation.

Remove the dust seals from the wheel.

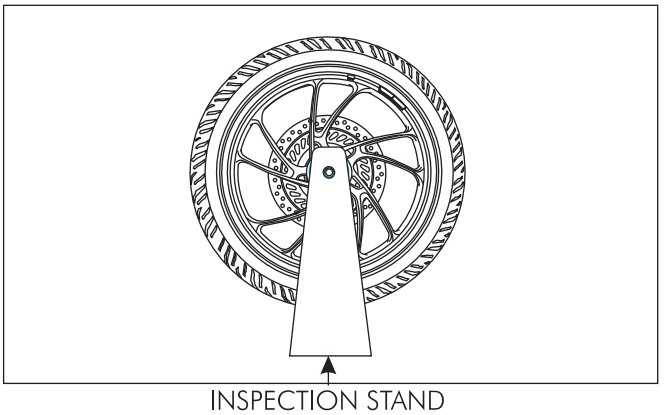
Mount the wheel, tyre and brake discs assembly in an inspection stand.

Spin the wheel slowly, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.

Do this two or three times to verify the heaviest area.

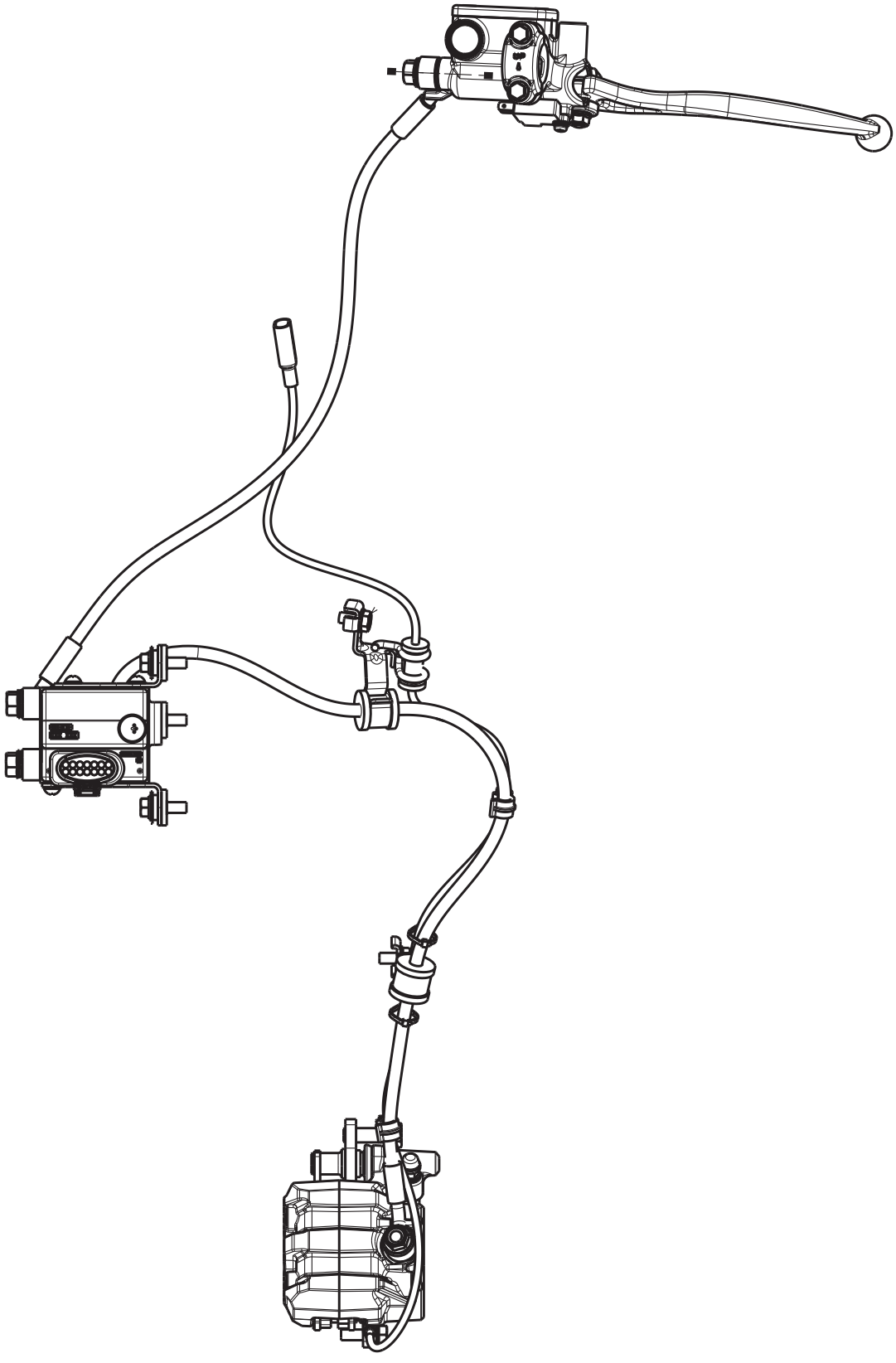
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install the wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so that wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



MEMO

SYSTEM DIAGRAM



System Diagram	15-0	Actuator Testing	15-7
Service Information	15-1	Hydraulic Electronic Control Unit	15-9
Specifications	15-2	Wheel Speed Sensor Cable	15-11
Torque Values/Special Tools	15-2	Encoder	15-11
ABS Circuit Diagram	15-3	HECU Inspection	15-12
Malfunction Indication	15-4	HECU data reading	15-13
Diagnostic Trouble Description Chart	15-6	VIN data writing	15-13

SERVICE INFORMATION

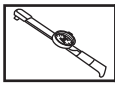
GENERAL

- The Anti-lock braking system (ABS) doesn't function without battery. The normal operating voltage of ABS Hydraulic Electronic Control Unit (HECU) is 9.8 to 16.1 voltage.
- HECU is non serviceable. Do not dismantle the HECU unit in case of any malfunction.
- Do not attempt to correct the encoder teeth by bending manually.
- During PDI always ensure that there are no malfunction description stored in the HECU memory.
- Ensure all HECU and harness connectors are properly connected and locked. A poor or loose connection can cause high voltage surge and result in damaging the integrated circuits in HECU.
- Ensure all the brake hoses are routed properly and are not bent or kinked.
- Prevent dirt and debris from entering into the HECU unit after it has been removed or whenever hose pipe joints are removed at HECU. Seal the HECU brake hose ports with suitable caps / plugs / threaded connectors.
- HECU Assemblies must not be placed on top of each other without a suitable layer placed in between.
- Do not drop the HECU as it may damage the internal components due to shock.
- Brake pipes, brake hoses or electrical lines may not be used as a handle to lift or carry an assembly. Assemblies must be held by the fixed body e.g. hydraulic black or motor.
- Do not touch or bend the HECU connector PINS.
- HECU must be installed under as little tension as possible and there must also be a certain amount of clearance to the rigid part of the suspension to dampen the vibrations. Tighten the bolts to the specified torque.
- Check the brake pads and make sure that the brake fluid is clean. ABS systems can also fail due to worn brake pads or air or dirt in brake fluid.
- Use the recommended brake fluid.
- Carefully remove the wheel during the puncture/tyre replacement to prevent the encoder damage/bend.
- Use only the recommended make, type and size of tyre (page 1-6).
- During riding, speed display on speedometer can go off due to battery loose connections, battery low voltage or removing front wheel keeping ignition "ON". As a result, ABS warning lamp starts illuminating continuously. In that case, system becomes ok as soon as ignition is turned "OFF" & "ON" again. (page 22-5)
- Do not adjust the wheel speed sensor air gap.
- Do not attempt to correct the encoder teeth by bending manually or by using any other mode.
- Do not insert any metallic part near wheel speed sensor.
- Use only genuine spares like pads & discs (page 1-6).

SPECIFICATIONS

ANTI-LOCK BRAKING SYSTEM

ITEM	SPECIFICATIONS
Wheel speed sensor resistance	50 Ω±2% - 115 Ω±2%
Wheel speed sensor air gap	1.2 mm Maximum
Operating temperature	-20°C to 50°C
Operating voltage	9.8 to 16.1V
ABS unit inclination angle	5°±5° Inclined



TORQUE VALUES

WHEEL SPEED SENSOR (WSS) MOUNTING BOLT	**: 1.0-1.4 kgf-m**
HYDRAULIC ELECTRONIC CONTROL UNIT MOUNTING SCREW	**: 0.4-0.6 kgf-m**
HYDRAULIC ELECTRONIC CONTROL UNIT MOUNTING BOLT	**: 1.0-1.4 kgf-m**

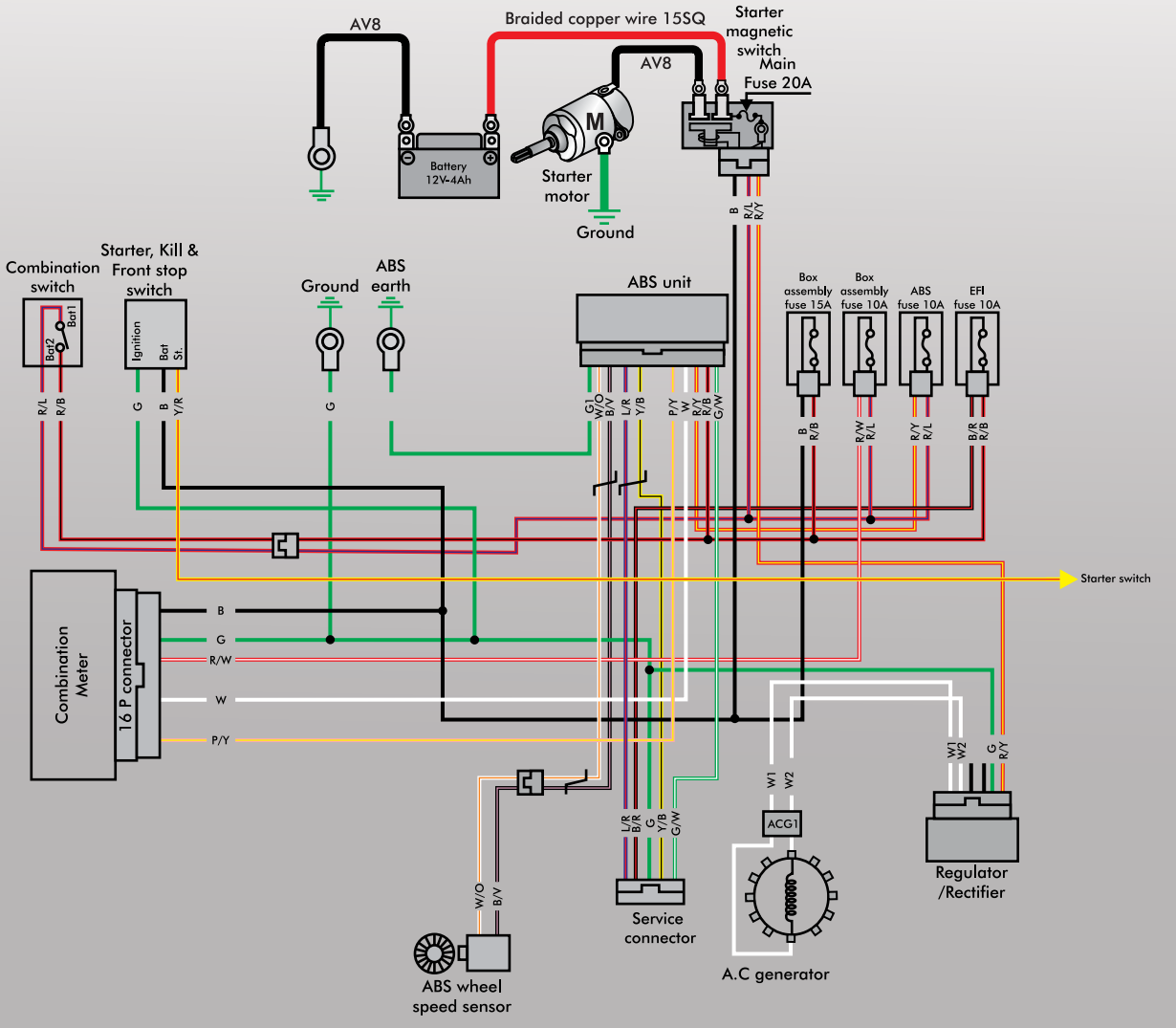
For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

TOOL **SPECIAL TOOLS**

HERO VEHICLE COMMUNICATION INTERFACE (HERO VCI)
PART NO: HMCL0419HVCI01

15

ABS CIRCUIT DIAGRAM



MALFUNCTION INDICATION

Park the vehicle on its main stand.

Turn the ignition switch to "ON".

ABS indicator will illuminate for 1.8 seconds and then it will start blinking until vehicle speed exceeds 5 km/h.

If it goes "OFF" after vehicle speed exceeds 5 km/h, then system is normal.

At any point, if there is a malfunction in ABS system, the ABS indicator will remain "ON" or illuminates continuously.

Then perform the following procedure to read the Anti-lock braking system (ABS) malfunction :

ABS INDICATOR

MALFUNCTION CODE READING PROCEDURE

Turn the ignition switch to "OFF".

Remove wire band clamp from boot of main wiring.

Disconnect the connector cover from the data link connector (DLC).

CONNECTOR COVER

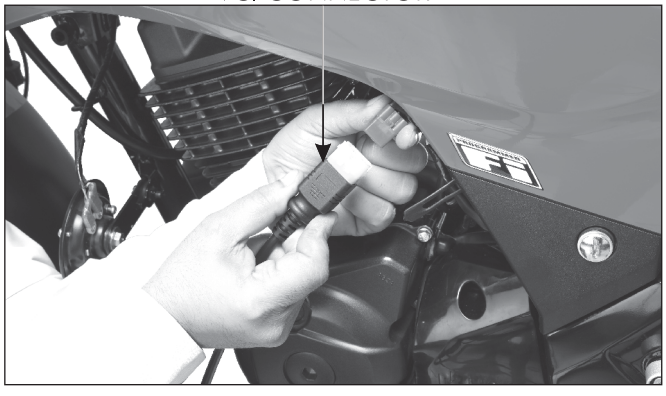
DATA LINK CONNECTOR (DLC)

Connect the VCI wire harness connector to data link connector (DLC).

TOOL

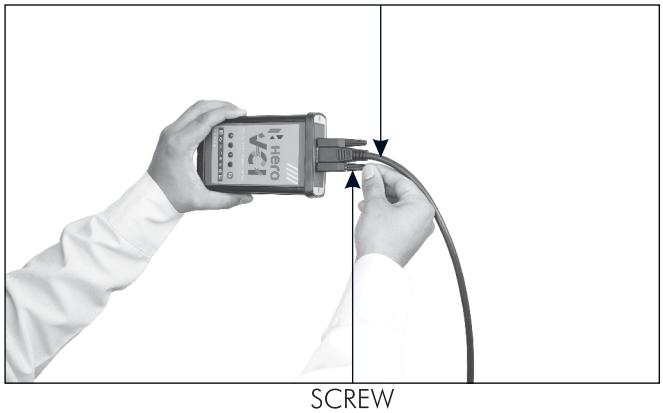
HERO VEHICLE COMMUNICATION INTERFACE
PART NO: HMCL0419HVCI01

VCI CONNECTOR



Connect the VCI connector to the Hero VCI and tighten it by rotating its screw.

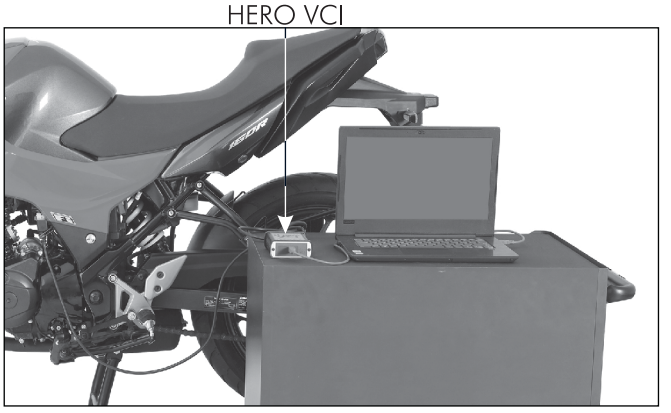
VCI CABLE



SCREW

- Connect HERO VCI and Laptop / Desktop either with USB cable or using the Bluetooth connectivity (page 5-10).

HERO VCI



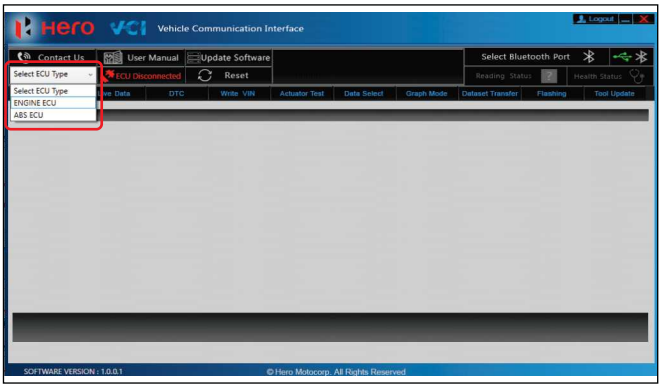
- Turn "ON" the ignition switch.

NOTE

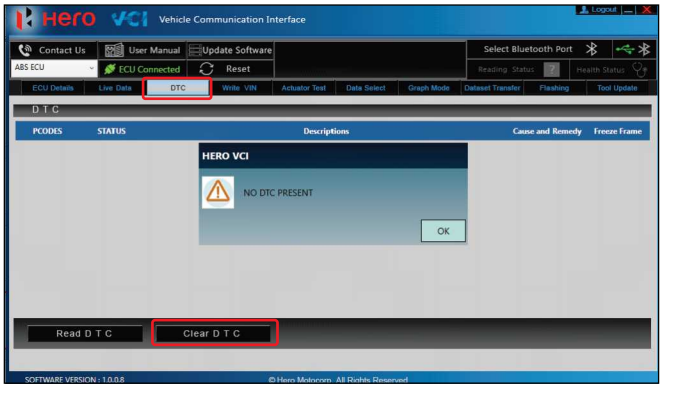
Engine should not to be cranked during the process.

- Open HERO VCI application and login with username and password credentials.

- Select ECU type by clicking on "SELECT ECU TYPE" from the drop down list.
- Select "ABS ECU" from the drop down list.



- Click on to "DTC" tab to view the diagnostics trouble codes stored in the ECU memory.
- Codes will reflect as an "ACTIVE" for current codes and "HISTORY" for rectified codes (which were not deleted after repairing the vehicle).
- To clear the DTC codes, click on "Clear DTC" button to clear the existing error codes.



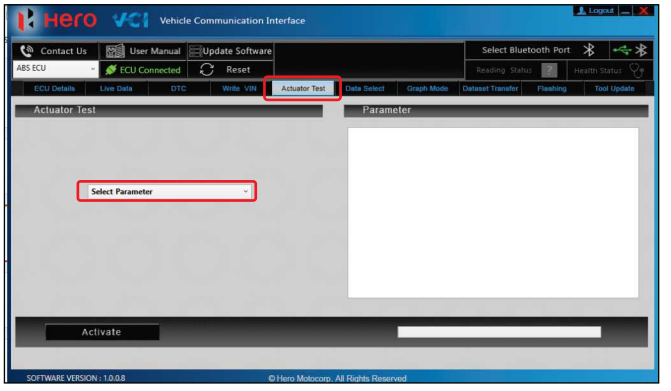
DIAGNOSTIC TROUBLE DESCRIPTION CHART

To identify the ABS malfunction, connect the VCI tool & check the malfunction as per the malfunction description and repair or replace the defective component. After replacing a defective component, again check for any malfunction.

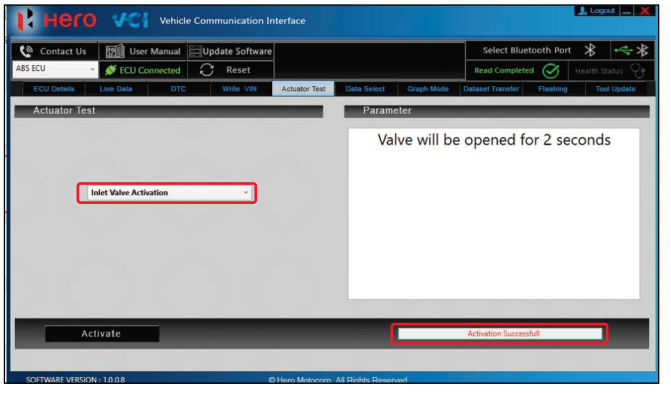
Description	Problem	Action to be taken
Wheel speed sensor- el. Fault front.	Open circuit error.	• Check wheel speed sensor harness for loose connections and continuity (page 20-20). • Check wheel speed sensor for any damage.
Wheel speed sensor-Double frequency check front.	Interference disturbance.	Check gap between Wheel speed sensor and encoder
Wheel speed sensor- periodic fault front.	Encoder tooth broken.	Replace encoder (page 15-11).
Wheel speed sensor -Extrapolation fault front.	Wheel speed sensor.	Replace wheel speed sensor (page 15-10)
Wheel speed sensor-Start Recognition fault front.	Encoder is present but has sensing error.	• Check encoder for any damage. • Replace wheel speed sensor (page 15-11)
Wheel speed sensor -Phase length- supervision fault front.	Actuator.	Replace wheel speed sensor (page 15-11)
KL 30 disconnection.	ECU circuit is open or no power supply to ECU.	Check for open circuit and input voltage to HECU (page 15-12).
OSEK fatal error.	ECU got corrupted.	Replace HECU (page 15-10).
Pump defective.	Pump defective.	Replace HECU (page 15-10).
Pump-connection	Pump missing.	Replace HECU (page 15-10).
Hardware fault.	Hardware fault.	Replace HECU (page 15-10).
Internal hardware fault (Main driver, valves etc.)	Internal hardware fault (Main driver, valves etc.)	Replace HECU (page 15-10).
Voltage low- long term detection.	Battery missing.	Check battery connections and its voltage (**SEC 17**)
Voltage low.	Low voltage.	Check battery connections and its voltage (**SEC 17**)
Voltage high	High voltage.	Check battery connections and its voltage (**SEC 17**)

ACTUATOR TESTING

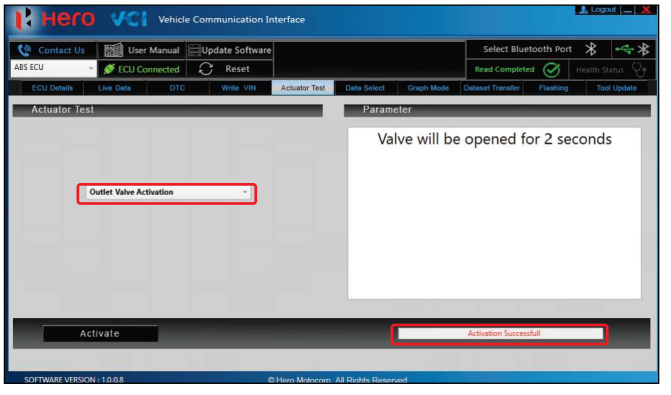
- Click on to "SELECT PARAMETER", a dropdown list will appear for actuator selection.
- Select the desired actuator to perform the test.



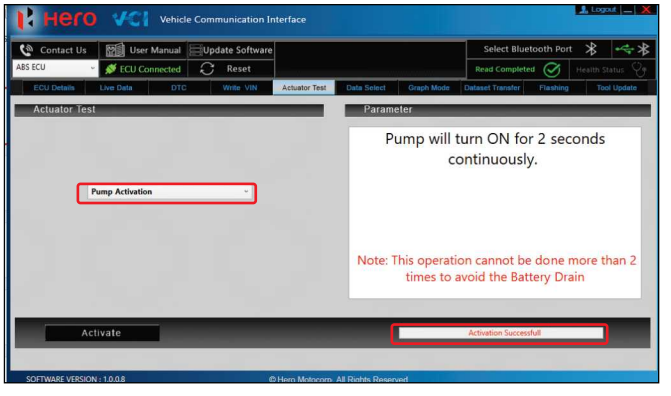
- For inlet valve testing.
- After selecting the actuator, click on to "ACTIVATE" to start the testing.
- In the status bar, if the status displayed as "ACTIVATION SUCCESSFUL" this means that inlet valve is working fine.
- If the status displayed as "NOT SUCCESSFUL" then replace the HECU (page 15-9).



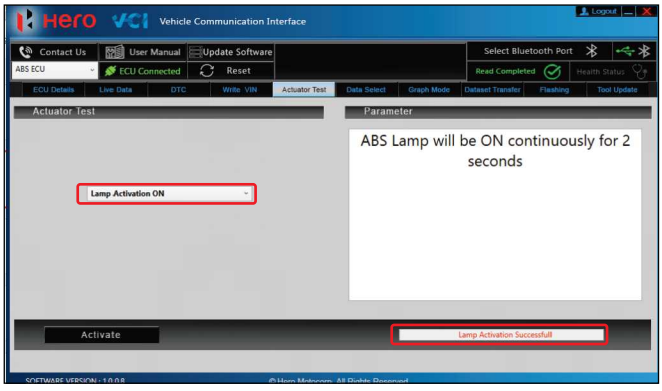
- For outlet valve testing.
- After selecting the actuator, click on to "ACTIVATE" to start the testing.
- In the status bar, if the status displayed as "ACTIVATION SUCCESSFUL" this means that outlet valve is working fine.
- If the status displayed as "NOT SUCCESSFUL" then replace the HECU (page 15-9).



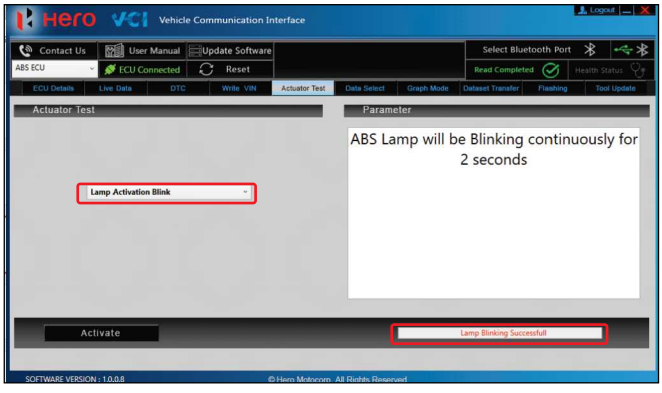
- For pump testing.
- After selecting the actuator, click on to "ACTIVATE" to start the testing.
- In the status bar, if the status displayed as "ACTIVATION SUCCESSFUL" this means that pump is working fine.
- If the status displayed as "NOT SUCCESSFUL" then replace the HECU (page 15-9).



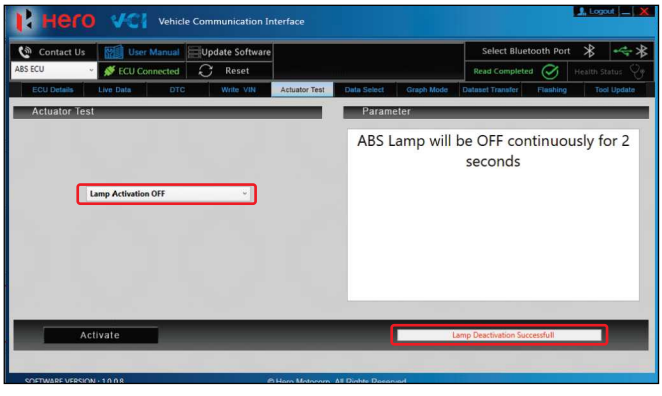
- For lamp activation “ON”.
- After selecting the actuator, click on to “ACTIVATE” to start the testing.
- In the status bar, if the status displayed as “LAMP ACTIVATION SUCCESSFUL” this means that lamp is working fine.
- If the status displayed as “NOT SUCCESSFUL” then replace the HECU (page 15-9).



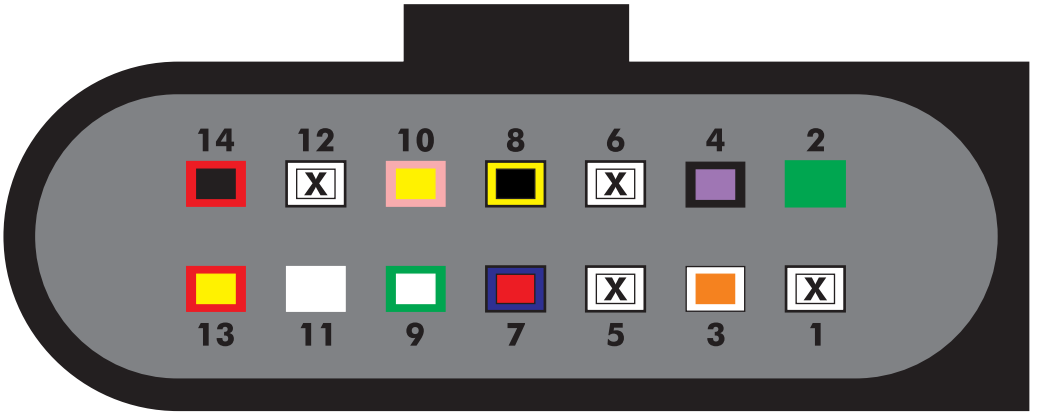
- For lamp activation blink.
- After selecting the actuator, click on to “ACTIVATE” to start the testing.
- In the status bar, if the status displayed as “LAMP BLINKING SUCCESSFUL” this means that lamp is working fine.
- If the status displayed as “NOT SUCCESSFUL” then replace the HECU (page 15-9).



- For lamp activation “OFF”.
- After selecting the actuator, click on to “ACTIVATE” to start the testing.
- In the status bar, if the status displayed as “LAMP DEACTIVATION SUCCESSFUL” this means that lamp is working fine.
- If the status displayed as “NOT SUCCESSFUL” then replace the HECU (page 15-9).



HYDRAULIC ELECTRONIC CONTROL UNIT (HECU)



HECU PIN		
PIN NO.	**COLOUR**	**DESCRIPTION**
1	-	None
2	G	ABS Ground
3	W/O	Wheel Speed Sensor Input
4	B/V	Wheel Speed Sensor Ground
5	-	None
6	-	None
7	L/R	CANL
8	Y/B	CANH
9	G/W	DLC Connector
10	P/Y	ABS Lamp Indicator
11	W	Tachometer Input
12	-	Power Input (Optional)
13	R/Y	ABS Fuse 10A
14	R/B	Ignition Switch Input

COLOUR CODE	
Black	B
Violet	V
Yellow	Y
Blue	L
Green	G
Red	R
White	W
Brown	BR
Orange	O
Sky Blue	SB
Light Green	LG
Pink	P
Gray	GR

COMBINATION:
Base Colour / Marking Colour
e.g. Brown / White
BR / W

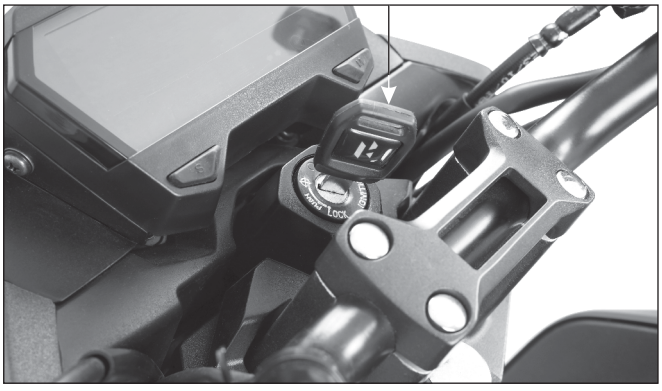
HYDRAULIC ELECTRONIC CONTROL UNIT

REMOVAL

Turn the ignition switch to "OFF" position.

Drain the brake fluid (page 16-4).

Remove the fuel tank cover (page 2-5).



Disconnect the HECU connector.

Remove the banjo bolts and disconnect the brake hoses from HECU unit.

NOTE

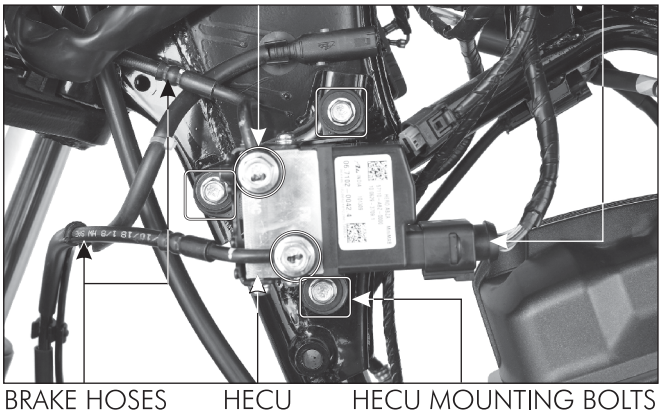
- Seal the HECU brake hose ports with suitable caps/ plugs/threaded connectors
- Do not bend and kinked the brake hoses.

Remove the HECU mounting bolts from the HECU.

Remove the HECU unit from the vehicle.

NOTE

Prevent dirt and debris from entering into the HECU unit after it has been removed.



Remove the HECU mounting bracket screws & separate it from HECU unit.

INSTALLATION

Installation is in the reverse order of removal.

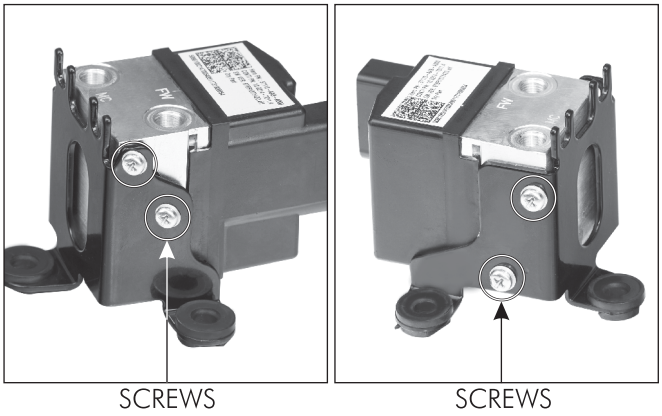
NOTE

- Ensure all the brake hoses are routed properly and are not bent or kinked.
- Always update the VIN number after replacing the HECU on a mandatory basis (page 15-13) .

TORQUE

HYDRAULIC ELECTRONIC CONTROL UNIT MOUNTING SCREW : 0.4-0.6 kgf-m

HYDRAULIC ELECTRONIC CONTROL UNIT MOUNTING BOLT : 1.0-1.4 kgf-m

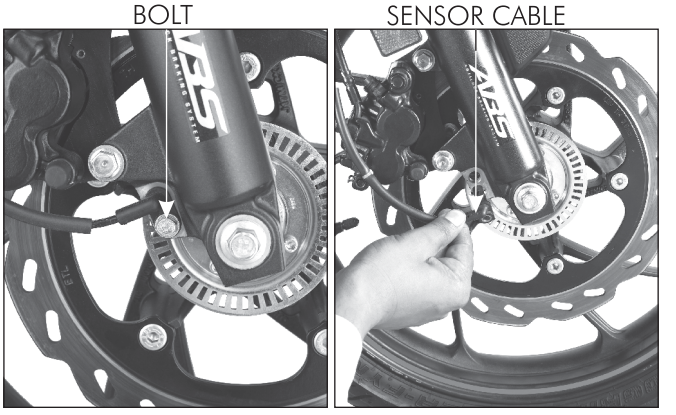


WHEEL SPEED SENSOR (WSS) CABLE

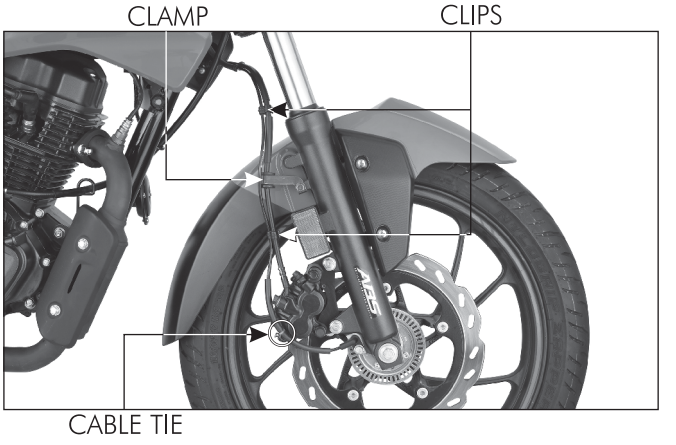
REMOVAL

Remove the sensor bolt from front fork bracket.

Remove the sensor cable along with wheel speed sensor (WSS) from front fork bracket.



Dislodge sensor cable from the clamp, cable ties and clips.



Remove the fuel tank cover (page 2-5).

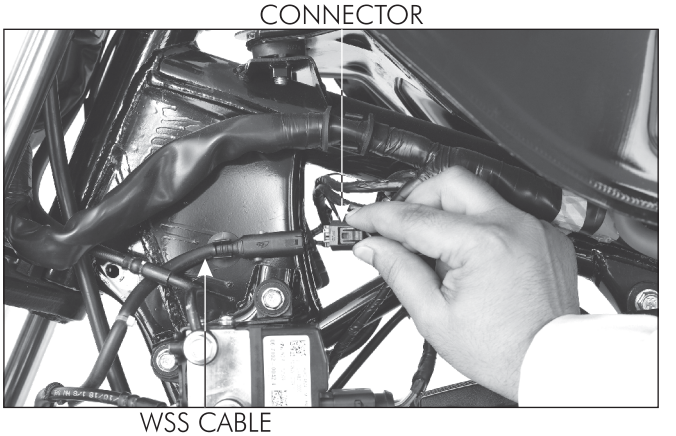
Disconnect the connector and remove the WSS cable.

INSTALLATION

Installation is in the reverse order of removal.

TORQUE

WHEEL SPEED SENSOR (WSS) MOUNTING BOLT: 1.0-1.4 kgf-m



ENCODER

REMOVAL

Remove the front wheel (page 12-7).

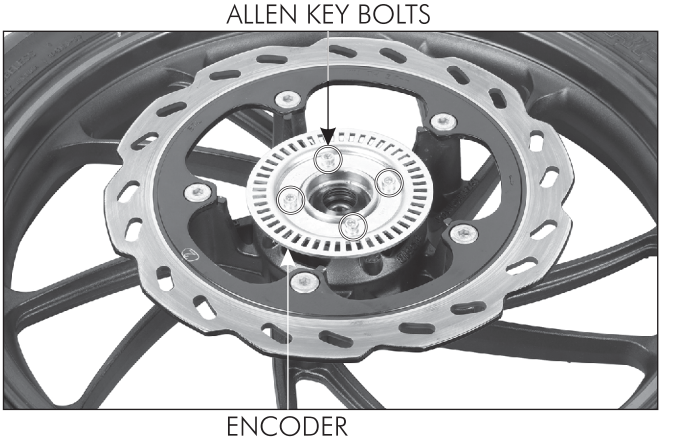
Remove the allen key bolts from wheel hub & remove the encoder.

INSTALLATION

Installation is in the reverse order of removal.

NOTE

- Use thread lock before installing allen key bolts.
- Inspect the encoder for bend or damage before its installation.



HECU INSPECTION

NOTE

Ensure that the battery is in good condition **(SEC-17)**. If not, then replace with a new battery and then inspect.

Read the DTC code in Hero VCI (page 15-5).

A. If "OSEK fatal error" code appear in VCI tool then replace HECU with a new one and inspect it again.

B. If "KL 30 disconnection" code appear in VCI tool, then perform the following:

1. Turn the ignition switch to "OFF".
2. Clear the DTC from the VCI tool (page 15-5).
3. Turn the ignition switch to "ON" and recheck the DTC.
4. If "KL 30 disconnection" code still appear, then disconnect the HECU connector and check for loose or poor connection on the HECU connector.
5. Connect the HECU connector. Turn the ignition switch to"ON" and recheck the DTC.
   If the "KL 30 disconnection" code still appears, then check the continuity of HECU wire harness:

CONNECTIONS

Green (HECU)	**-**	**Green (ABS Earth)**
White/Orange (HECU)	**-**	**White/Orange (ABS Wheel speed sensor)**
Black/Voilet (HECU)	**-**	**Black/Voilet (ABS Wheel speed sensor)**
Blue/Red (HECU)	**-**	**Blue/Red (Service connector)**
Yellow/Black (HECU)	**-**	**Yellow/Black (Service connector)**
White/Green (HECU)	**-**	**White/Green (Service connector)**
Pink/Yellow (HECU)	**-**	**Pink/Yellow (Meter combination)**
White (HECU)	**-**	**White (Meter combination)**
Red/Yellow (HECU)	**-**	**Red/Yellow (ABS Fuse 10A)**
Red/Black (HECU)	**-**	**Red/Black (Combination switch)**

Standard: CONTINUITY

6. If no continuity is detected then replace the harness.
7. If continuity exist, then go to next step.
8. Disconnect the HECU connector (page 15-9).
9. Measure the voltage at 14P HECU connector.

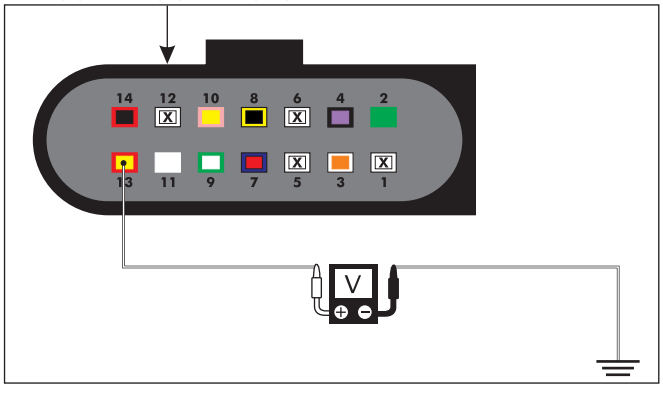
VOLTAGE

Connection: Red/Yellow(+)- Ground (-)

Standard: 9.8-16.1 V

If voltage is out of range then replace the HECU.

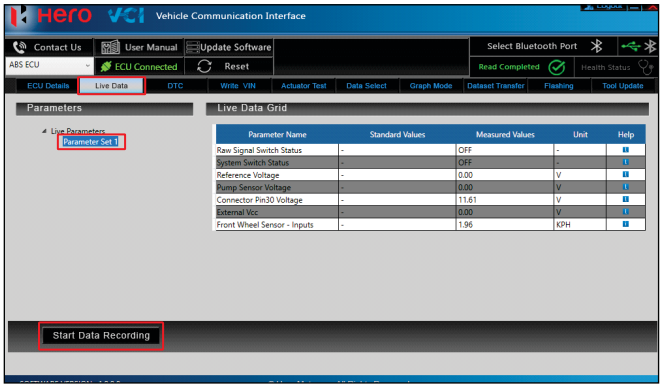
HECU 14P CONNECTOR



HECU DATA READING

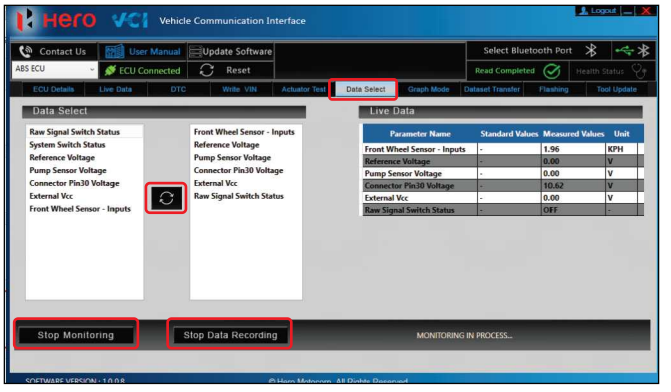
LIVE DATA

- Click on live data Parameter set 1.
- To record the live data click on to "START DATA RECORDING" a pop-up will appear on the screen.
- Select the desktop or other location to save the live data parameters.



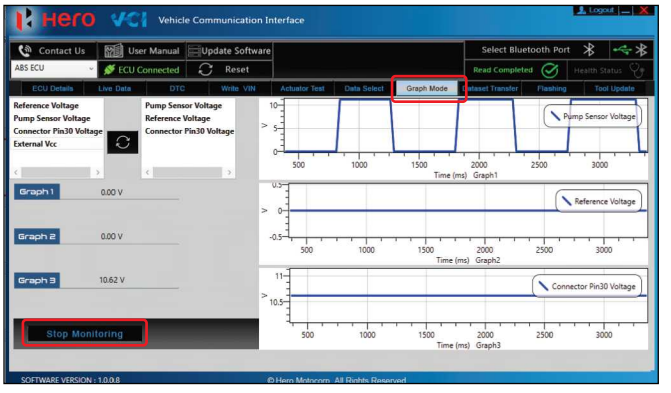
DATA SELECT

- Data Select tab is used to monitor the selected parameters.
- To select the parameter, double click on the required parameter to swap into the monitor window.
- To remove the selected parameter double click on the parameter.
- To remove all selected parameter click on reset button.
- Click on to "START MONITORING" button to start the live data monitoring of selected parameters.
- To stop the monitoring click on to "STOP MONITORING" button once the monitoring is done.
- To record the data of selected parameters click on to "START DATA RECORDING" same as "LIVE DATA" recording.



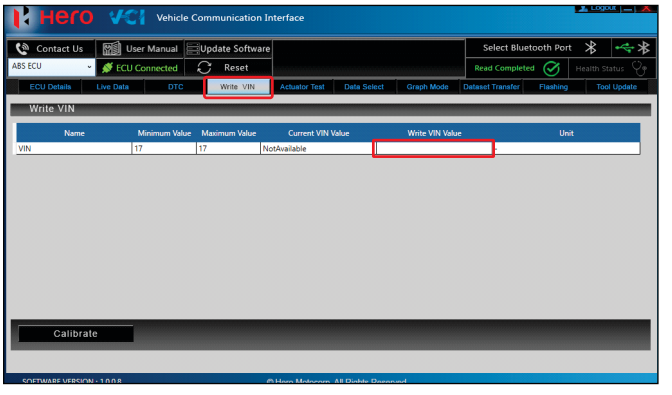
GRAPH MODE

- To select the parameter, double click on the required parameter to swap into the monitor window.
- To remove the selected parameter double click on the parameter.
- To remove all selected parameter click on reset button.
- Click on to "START MONITORING" to view the selected parameters in graph mode.
- To stop the graph click on to "STOP MONITORING".
- Maximum three parameters can be view in graph mode.

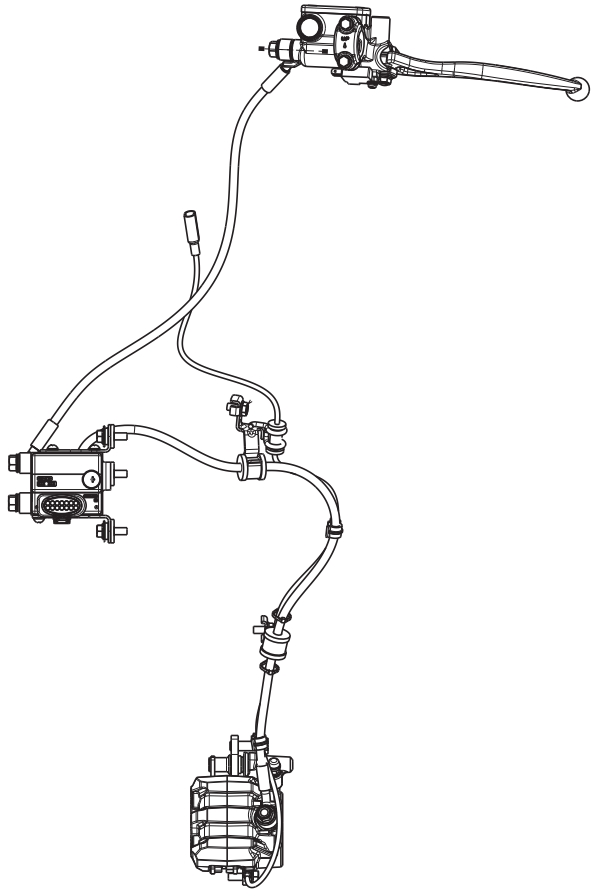


VIN DATA WRITING

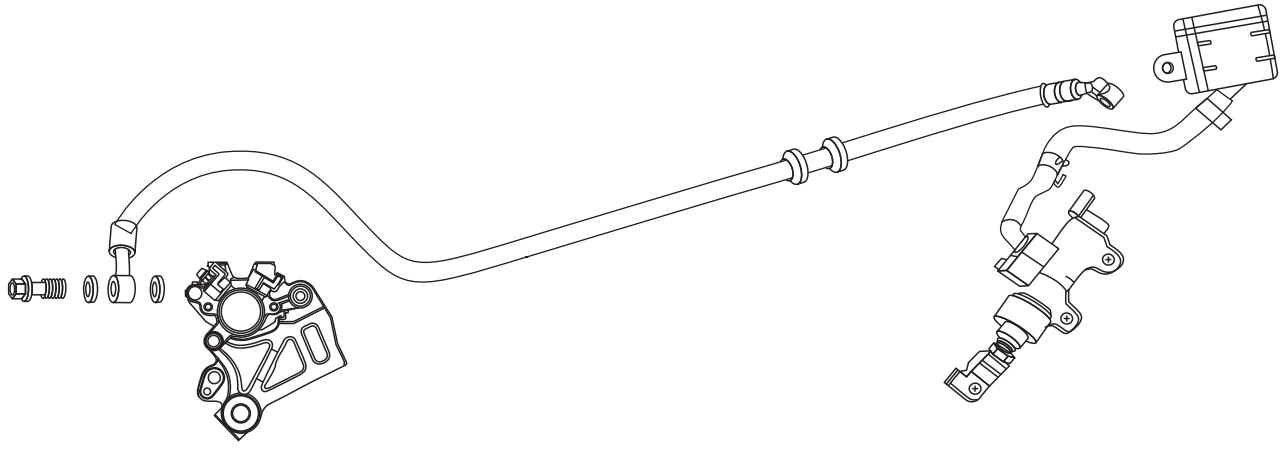
- Click on "WRITE VIN".
- By clicking the tab below the "WRITE VIN VALUE", write/edit the VIN Number.



FRONT



REAR



System Diagram	16-0	Reverse Bleeding Procedure	16-6
Service Information	16-1	Brake Pad/Disc	16-8
Specification	16-1	Front Master Cylinder	16-13
Torque Values/Special Tools	16-2	Rear Master Cylinder	16-17
Troubleshooting	16-3	Front Brake Caliper	16-22
Brake Fluid Replacement/Bleeding	16-4	Rear Brake Caliper	16-25

SERVICE INFORMATION

GENERAL

⚠ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

CAUTION

- Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use an vacuum cleaner.

- Spilled brake fluid will severely damage the instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap: make sure the reservoir is horizontal first.
- Never allow contaminates when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the motorcycle (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened or if the brake feel is spongy, the system must be bleed.
- Always use fresh DoT 3 or DoT 4 brake fluid from a sealed container

SPECIFICATIONS

HYDRAULIC BRAKE SYSTEM

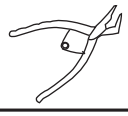
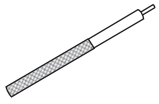
ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DoT3-DoT4	
	Brake disc thickness	4 mm	3.5 mm
	Brake disc runout	0.1 mm	-
	Master cylinder piston I.D	12 mm	-
	Master cylinder piston O.D	12 mm	-
	Brake caliper piston O.D	26 mm	
Rear	Specified brake fluid	DoT-3 or DoT-4	
	Brake disc thickness	5.0 mm	4.0 mm
	Brake disc runout	0.1mm	-
	Master cylinder piston I.D	12.7 mm	-
	Master cylinder piston O.D	12.7 mm	-
	Brake caliper piston O.D	32.03mm	-

TORQUE VALUES

FRONT CALIPER BLEED VALVE	: 1.4 kgf-m
BRAKE HOSE BANJO BOLT	: 3.4 kgf-m
FRONT CALIPER MOUNTING BOLT	: 3.0 kgf-m
FRONT BRAKE DISC BOLT	: 4.2 kgf-m
REAR CALIPER MOUNTING BOLT	: 3.0 kgf-m
REAR CALIPER PIN BOLT	: 1.2 kgf-m

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

SPECIAL TOOLS

	**PIERER'S PLIER** **PART NO: 070 HH KFN 003**
	**BRAKE PAD HANGER PIN REMOVER** **PART NO: 070 HH 198 036**

TROUBLESHOOTING

Brake lever soft or spongy.

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard

- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal
- Sticking rear brake pedal sliding surface

Brake drag

- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage .
- Sticking/worn caliper piston
- Sticking master cylinder piston
- Sticking rear brake pedal sliding surface

Poor brake performance

- Check brake discs to inspect wear
- Brake cable sticking (need lubrication)

Brake lever hard or slow return

- Worn or broken return spring
- Improperly adjusted brakes
- Brake cable sticking (needs lubrication)

BRAKE FLUID REPLACEMENT/ BLEEDING

NOTE

A contaminated brake disc or pad increases stopping distance. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.

CAUTION

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

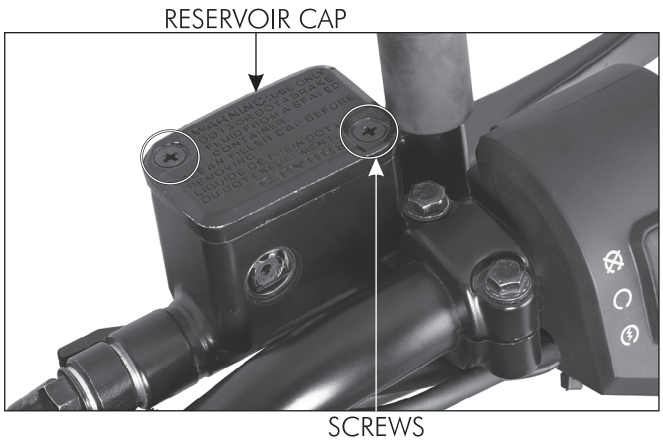
BRAKE FLUID DRAINING

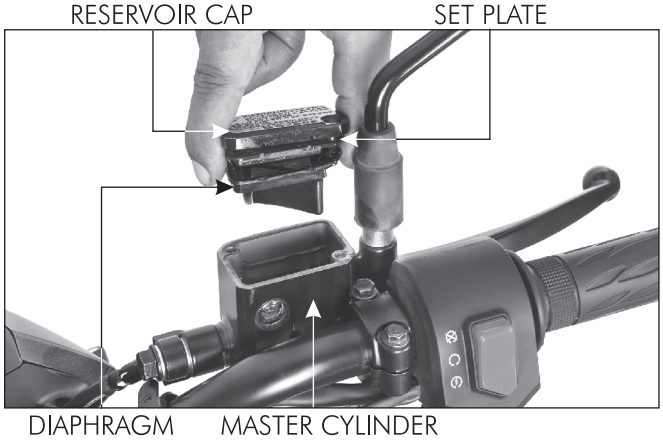
FRONT BRAKE

Turn the handlebar until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screw by impact driver and reservoir cap.

Remove the set plate and diaphragm.





Remove the bleed valve cap.

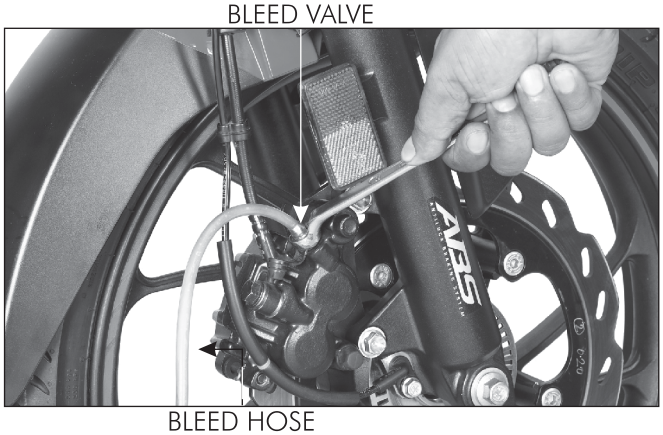
Connect a hose to the bleed valve.

Loosen the bleed valve and pump the brake lever until no more fluid flows out of the bleed valve.

Tighten the bleed valve to the specified torque.

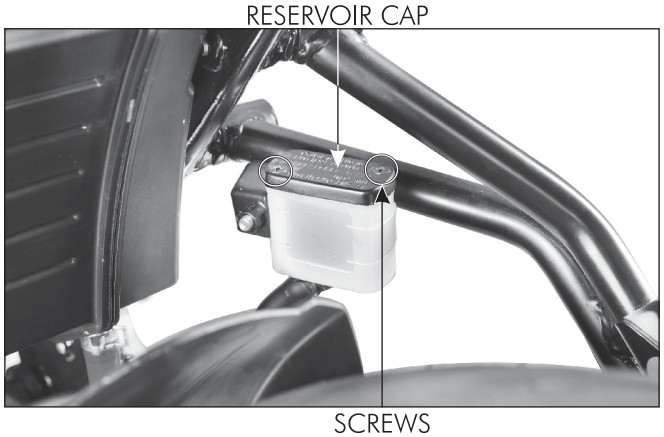
TORQUE

FRONT CALIPER BLEED VALVE: 1.4 kgf-m

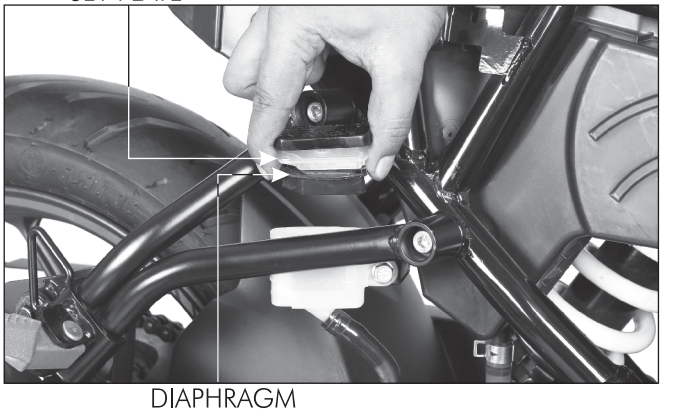


REAR BRAKE

Remove the screws and reservoir cap.



Remove the set plate and diaphragm.

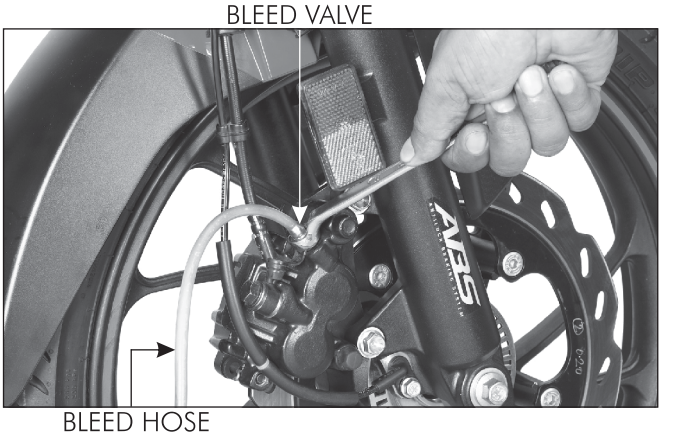


Connect a bleed hose to the caliper bleed valve.

Loosen the bleed valve and pump the brake pedal.

Pump the brake pedal until no more fluid flows out of the bleeder valve.

Tighten the bleeder valve to the specified torque.



BRAKE FLUID FILLING/BLEEDING

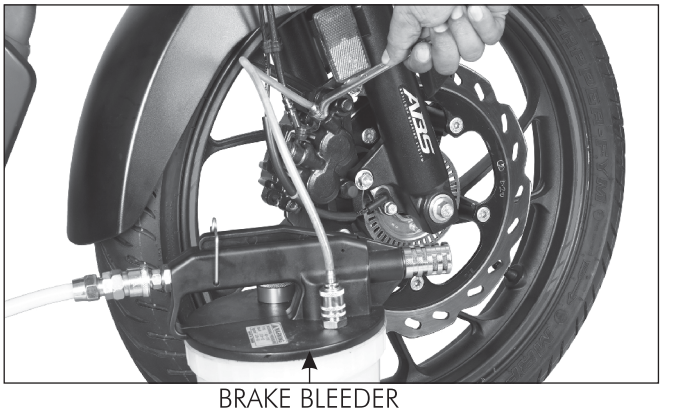
Fill the reservoir with DoT-3 or DoT-4 brake fluid from a sealed container.

CAUTION

Do not mix different types of fluid as they may not be compatible.

Connect a commercially available brake bleeder to the bleed valve.

Pump the brake bleeder and loosen the bleed valve. Add brake fluid when the fluid level in the reservoir is low.



NOTE

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat the above procedures until air bubbles do not appear in the plastic hose.

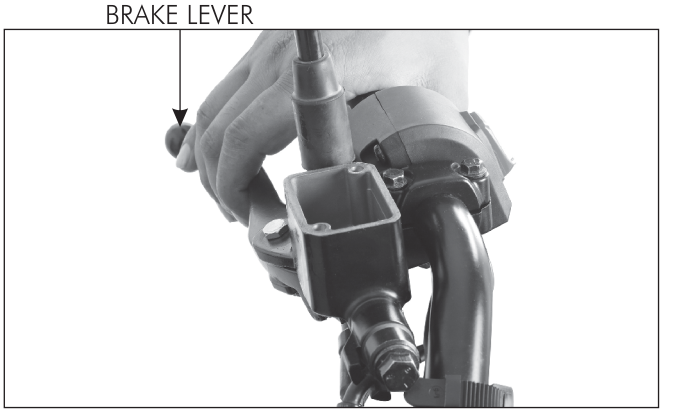
Close the bleed valve.

If a brake bleeder is not available, perform the following procedures.

Pump up the system pressure with the brake lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.

Connect a hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever or push the brake pedal, open the bleed valve ½ turn and then close it.



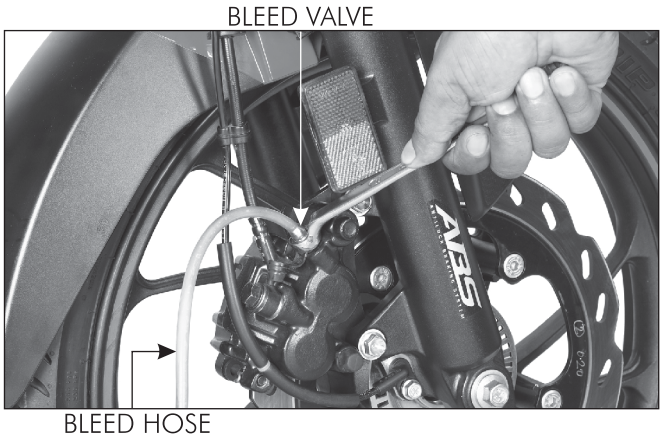
NOTE

Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

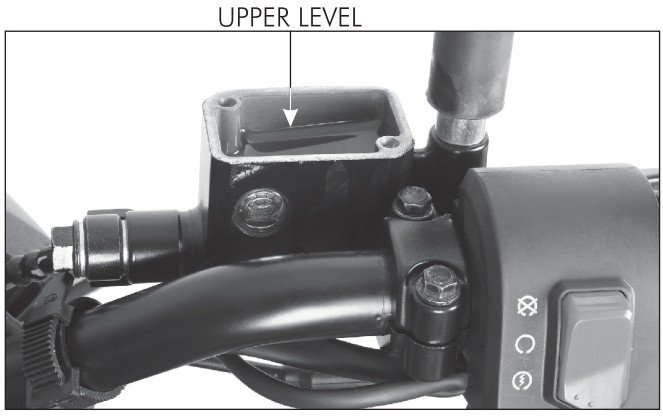
Repeat steps 1 and 2 until air bubbles cease to appear in the fluid coming out of the bleed valve.

Tighten the bleed valve to the specified torque.



Fill the reservoir to the upper level with DoT-3 or DoT-4 brake fluid from a sealed container..

Install the diaphragm, set plate and reservoir cap. Tighten the cap screws.



REVERSE BLEEDING PROCEDURE

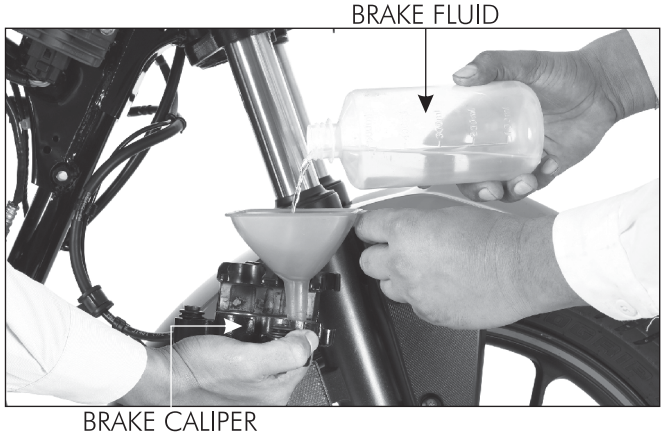
Remove the brake pads (page 16-8).

Remove the caliper piston (page 16-23).

Pour brake fluid till the top seal of caliper.

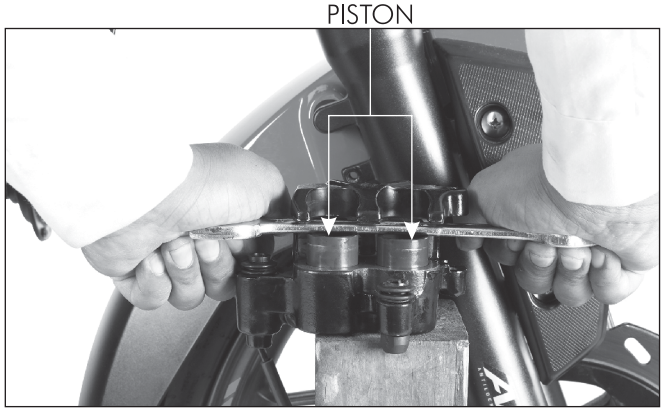
NOTE

Remove piston using pressurized air protecting the piston using a soft base.



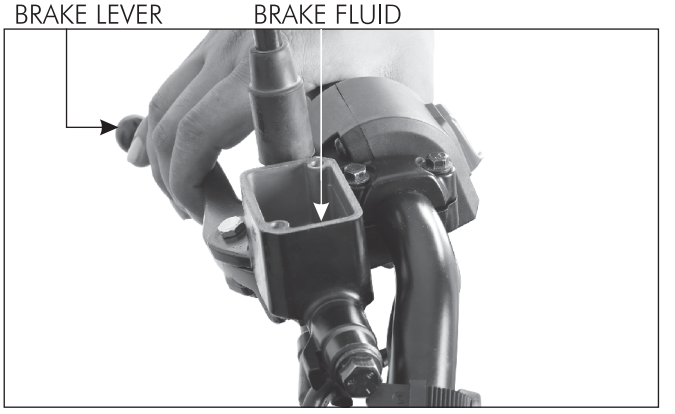
Install the caliper piston (page 16-24) and press both the pistons simultaneously and force the fluid upwards to master cylinder.

Install the brake pads and install the brake caliper assembly.

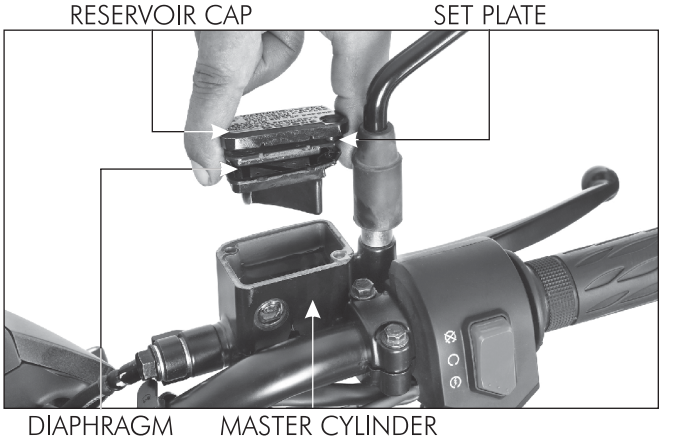


Press and release the brake lever until the air bubbles stops coming in master cylinder.

Top up the brake fluid from a sealed container if brake fluid level is low. Ensure that the fluid does not fall below 'MIN' mark on the master cylinder.



Install the diaphragm on the fluid filled master cylinder. Install the set plate.



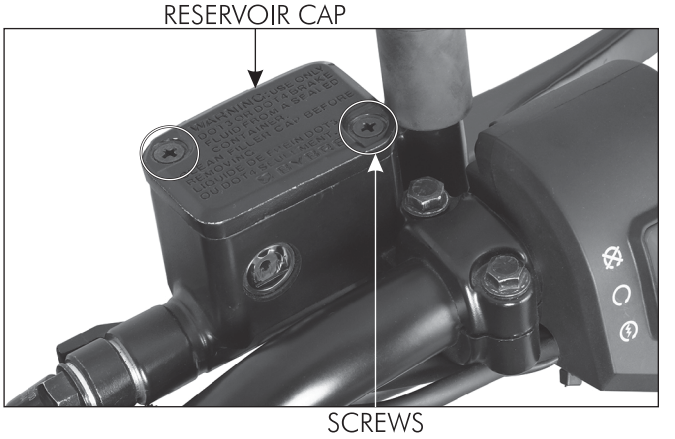
Install the reservoir cap. Tighten the screws securely.

NOTE

Ensure that no dust enters the caliper assembly.

Check the brake performance by pressing the brake lever.

Follow the same procedure for the rear brake bleeding.



BRAKE PAD/DISC

⚠ WARNING

A contaminated brake disc or pad increases stopping distance. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.

FRONT BRAKE PAD REPLACEMENT

NOTE

Always replace the brake pads in pairs to assure even disc pressure.

Remove the caliper mounting bolts.

Remove the caliper assembly.

Push the caliper piston all the way in by pushing the caliper body inward to allow installation of new brake pads.

NOTE

Check the brake fluid level in the master cylinder reservoir as this operation causes the brake fluid level to rise.

Remove the pin lock and pad pin.

Remove the pad pin by using special tool.

NOTE

While removing the pad pin, hold the caliper assembly carefully.

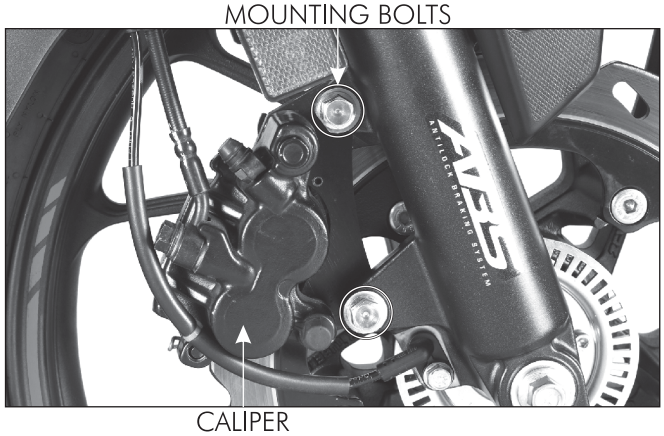
TOOL

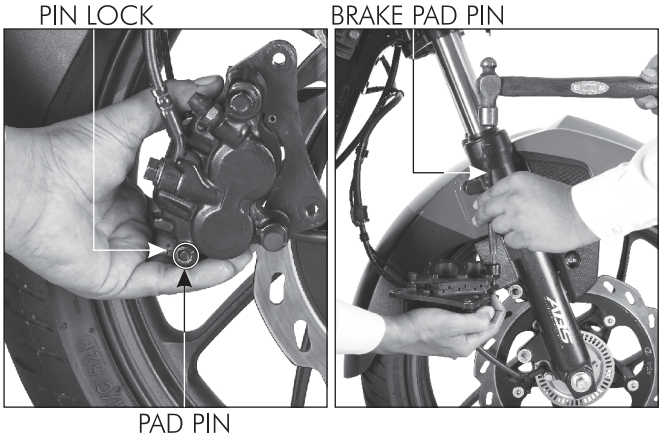
BRAKE PAD HANGER PIN REMOVER
PART NO: 070 HH 198 036

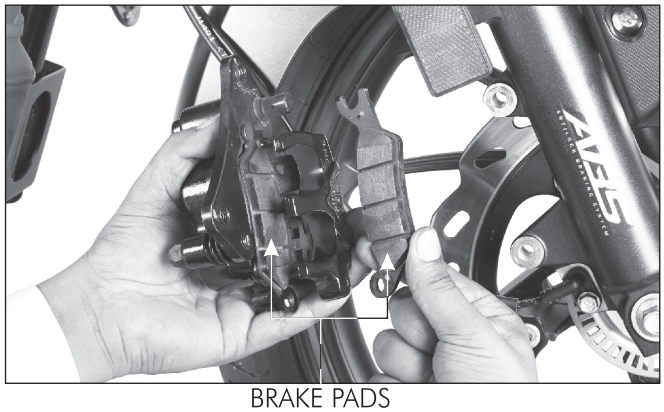
Remove the brake pads.

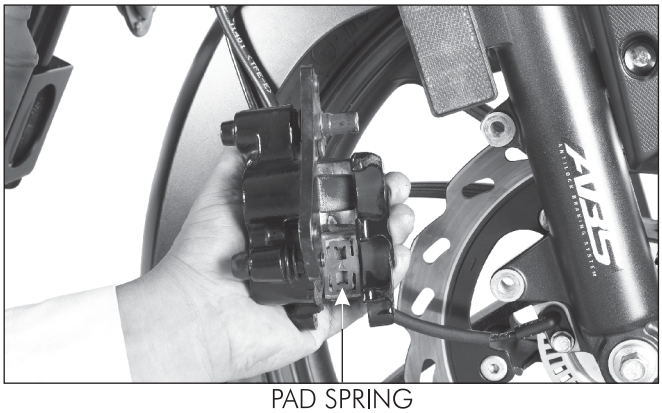
Clean the inside of the caliper especially around the caliper piston.

Make sure that the pad spring is installed in position.

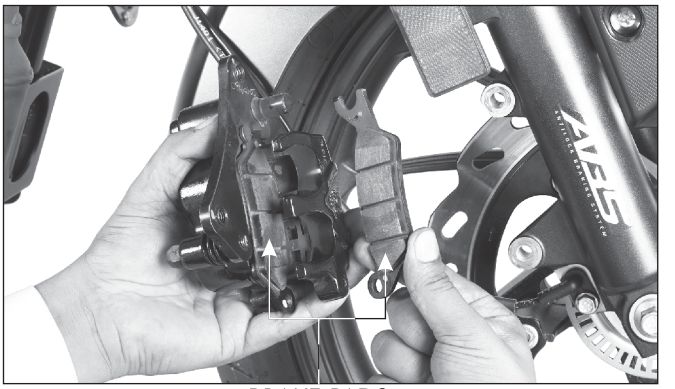








Install new pads so that their ends rest on the pad spring.



Install the pad pin by using special tool.

TOOL

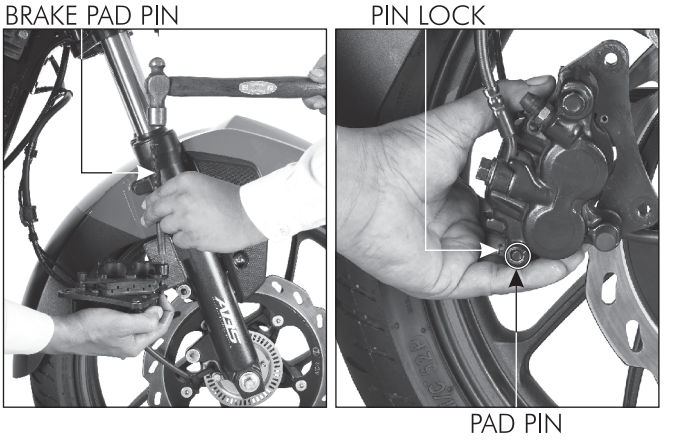
BRAKE PAD HANGER PIN REMOVER
PART NO: 070 HH 198 036

Install the pin lock.

Install the front brake caliper to the fork leg so that the disc is positioned between the pads.

NOTE

Be careful not to damage the brake pads.



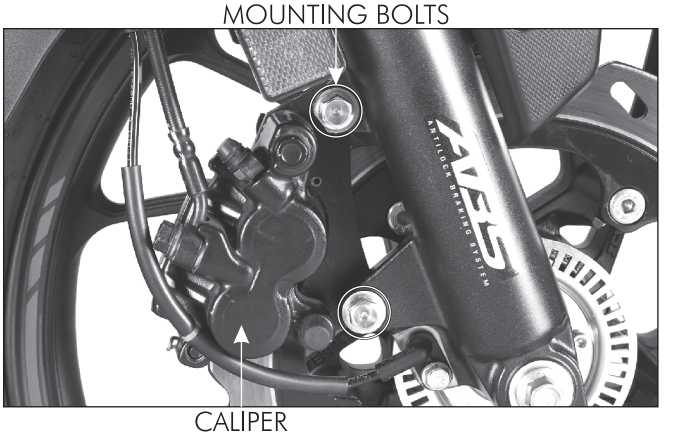
Install and tighten the front caliper with new mounting bolts to the specified torque.

TORQUE

FRONT CALIPER MOUNTING BOLT: 3.0 kgf-m

CAUTION

After replacement, operate the brake lever to seat the caliper pistons against the pads.



REAR BRAKE PAD REPLACEMENT

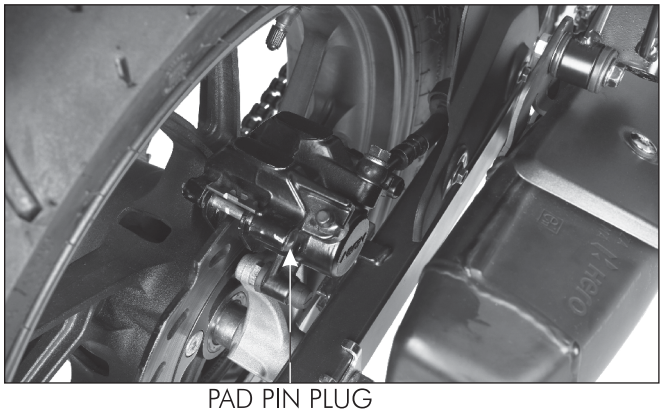
Push the caliper piston all the way in by pushing the caliper body inward to allow installation of new brake pads.

NOTE

Check the brake fluid level in the master cylinder reservoir as this operation causes the brake fluid level to rise.

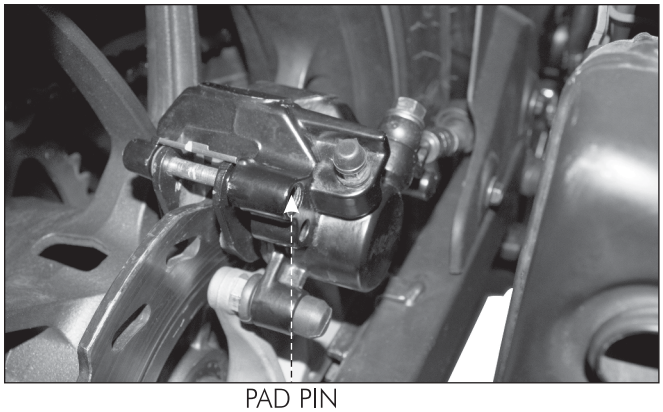
CALIPER PISTON

Remove the pad pin plug.



PAD PIN PLUG

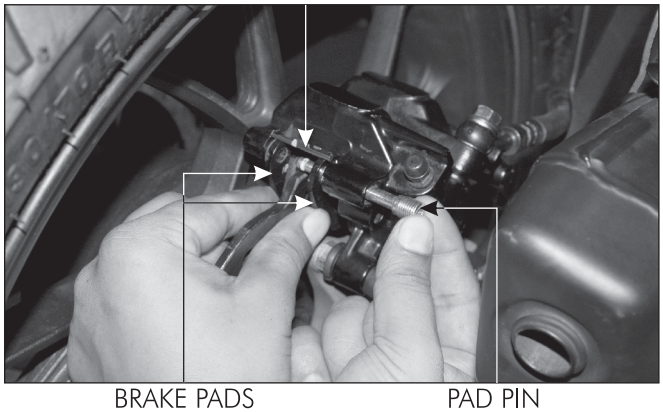
Remove the pad pin by using allen key.



PAD PIN

PAD SPRING

Remove the brake pads and clean the inside of the caliper especially around the caliper piston.



BRAKE PADS PAD PIN

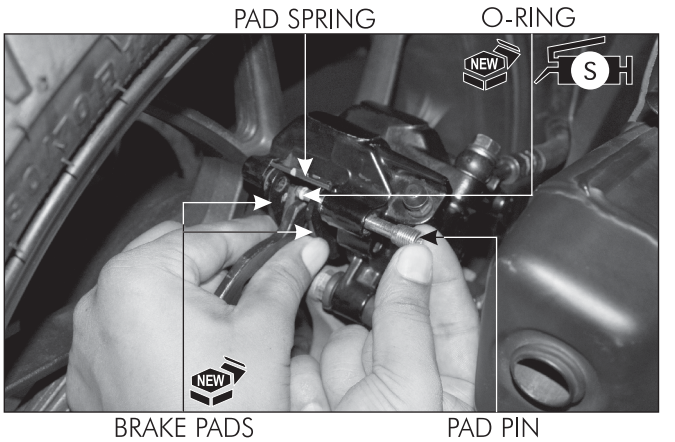
Install a new O-ring on the pad pin apply silicone grease to the O-ring.

Make sure the pad spring is in place and install new brake pads securely.

Install the pad pin by pushing the pads against the pad spring to align the pad pin hole in the pads in the caliper.

NOTE

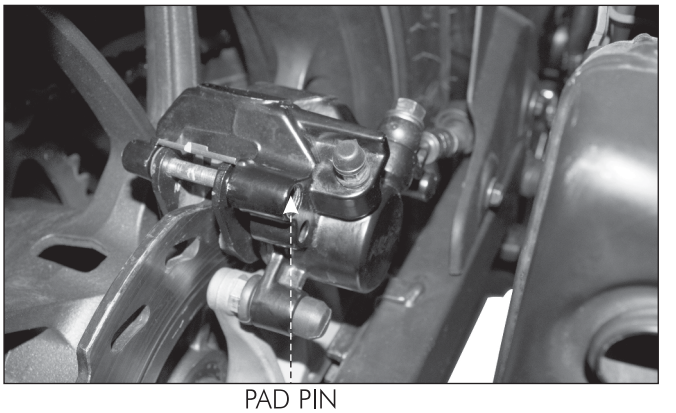
Always replace the brake pads in pairs to assure even disc pressure.



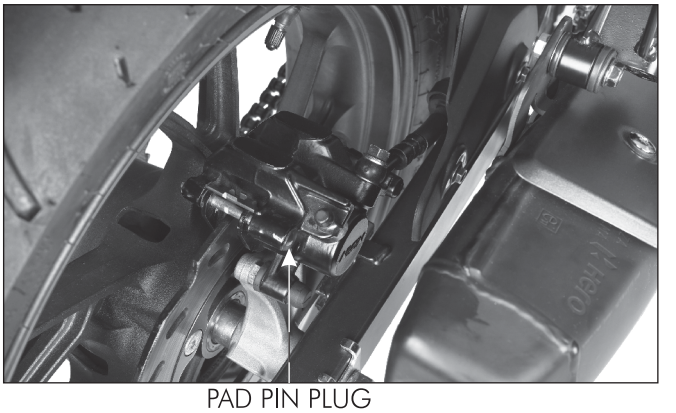
Tighten the pad pin to the specified torque.

TORQUE

REAR CALIPER PIN BOLT: 1.2 kgf-m



Install the pad pin plug.



BRAKE DISC

INSPECTION

Visually inspect the brake discs for damage or cracks.

Measure the brake disc thickness with a micrometer.

SERVICE LIMITS

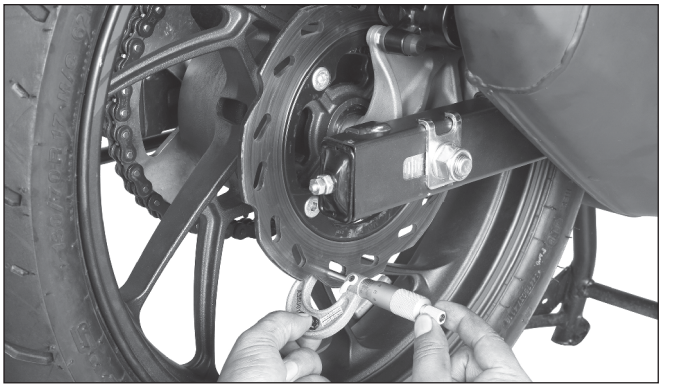
FRONT: 4.0 mm

REAR: 5.0 mm

NOTE

The service unit is stamped on the brake disc.

Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc runout with a dial indicator.

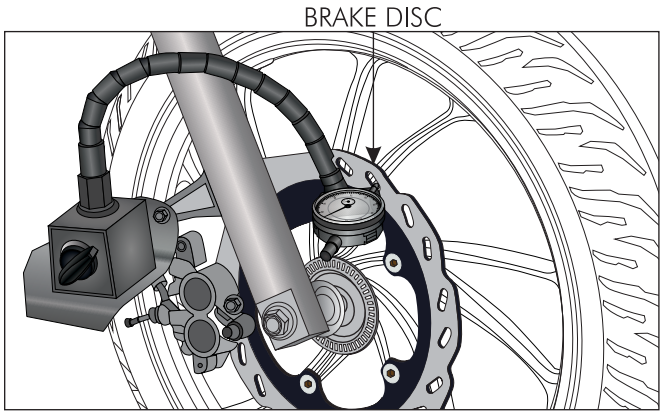
SERVICE LIMITS

FRONT: 0.1 mm

REAR: 0.1 mm

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.

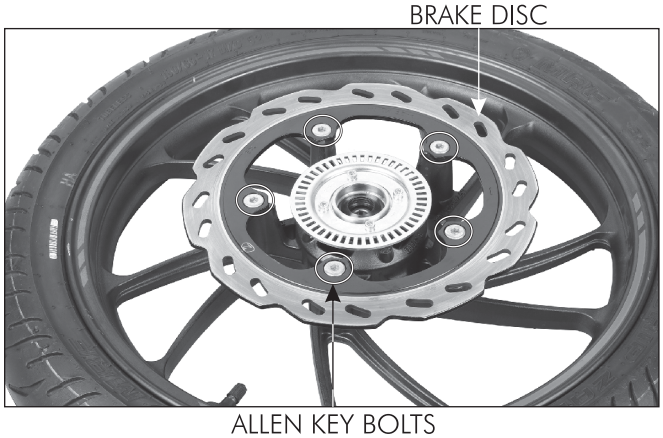
Replace the brake disc if the wheel bearings are normal.



BRAKE DISC REPLACEMENT

Remove the front wheel (page 12-8) or rear wheel (page 13-3).

Remove the brake disc allen key bolts.



Remove the brake disc.

⚠ WARNING

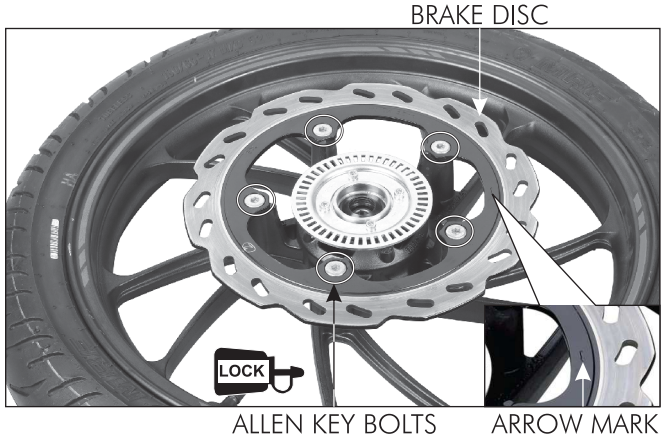
Do not get grease on the brake disc or else stopping distance will be reduced.

Install the brake disc with the arrow mark facing out in the direction of rotation of the wheel.

Install new disc allen key bolts apply thread lock and tighten them in a criss-cross pattern into or three steps to the specified torque.

TORQUE

FRONT BRAKE DISC ALLEN KEY BOLT: 4.2 kgf-m



FRONT MASTER CYLINDER

REMOVAL

CAUTION

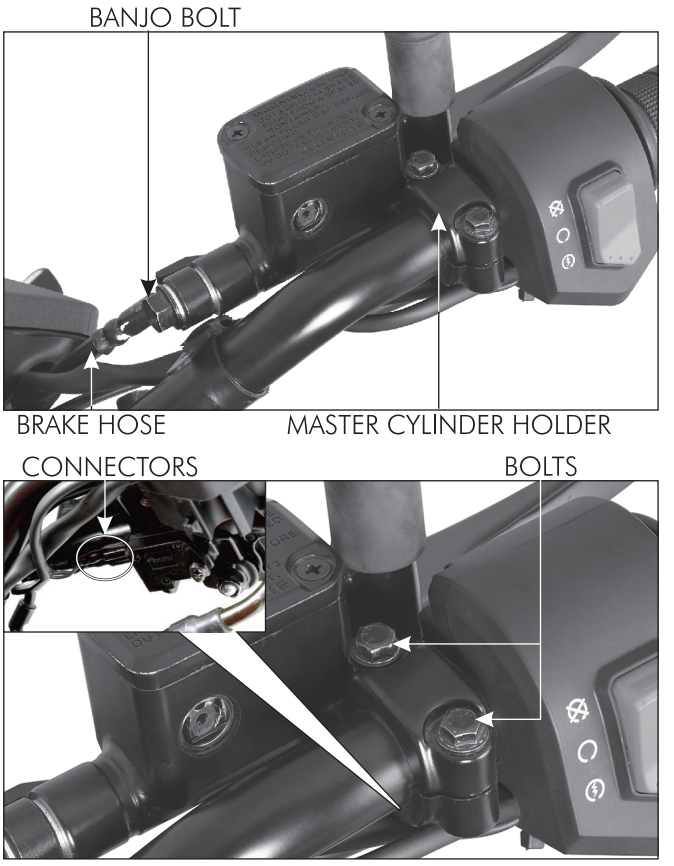
- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- When removing the brake hose banjo bolt, cover the end of the hose. to prevent contamination.

Drain the brake fluid from the hydraulic system (page 16-4).
Remove the right rear view mirror (page 2-2).

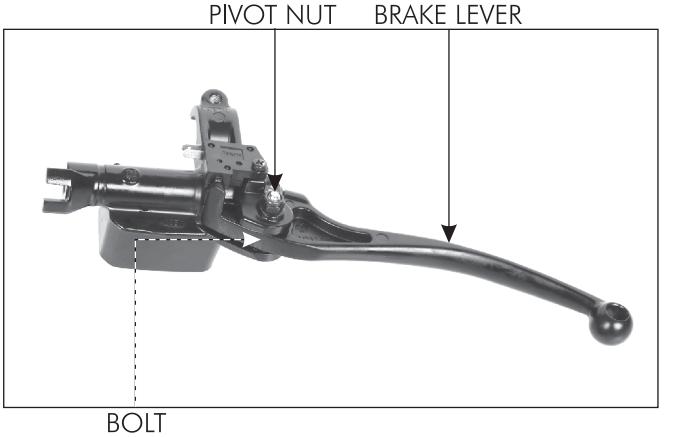
Disconnect the brake hose by removing the brake hose banjo bolt and sealing washers.

Disconnect the front stop lamp switch connectors.

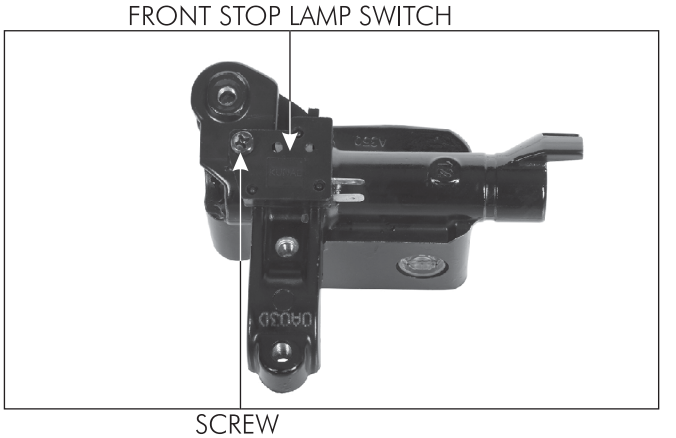
Remove the master cylinder holder bolts, holder and the master cylinder from the handlebar.



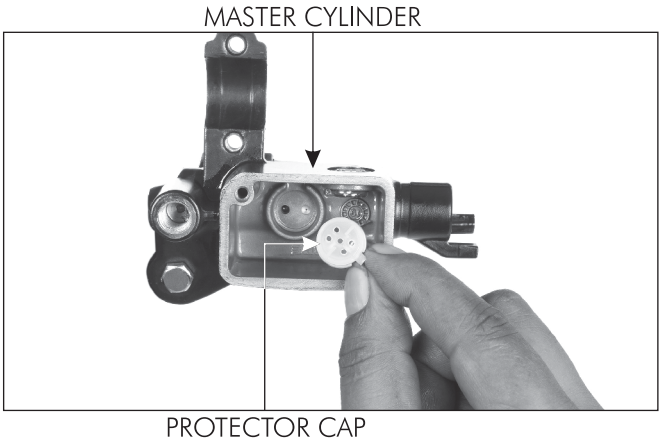
Remove the pivot nut, bolt and the brake lever assembly.



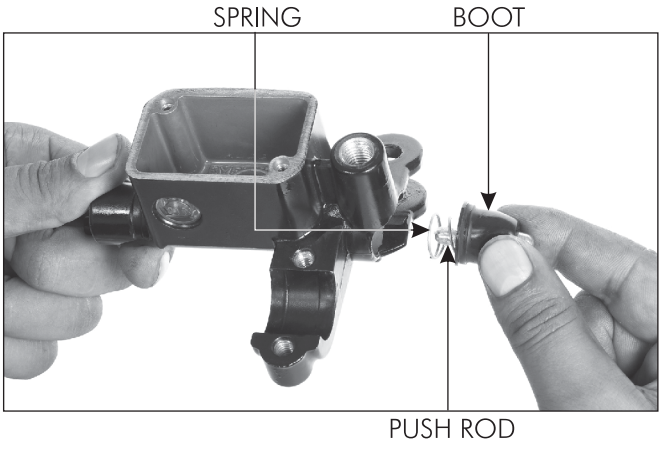
Remove the screw and stop lamp switch.



Remove the protector cap from the master cylinder.



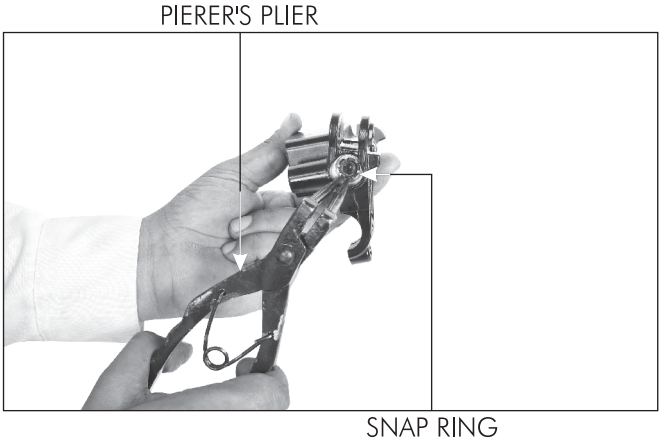
Remove the piston boot, spring and push rod from the master cylinder and the master piston.



Remove the snap ring from the master cylinder body.

TOOL

PIERER'S PLIER
PART NO : 070 HH KFN 003



Remove the master cylinder piston and spring from the master cylinder.

Clean the master cylinder, reservoir and master cylinder piston, spring, piston cups and snap ringwith clean brake fluid.

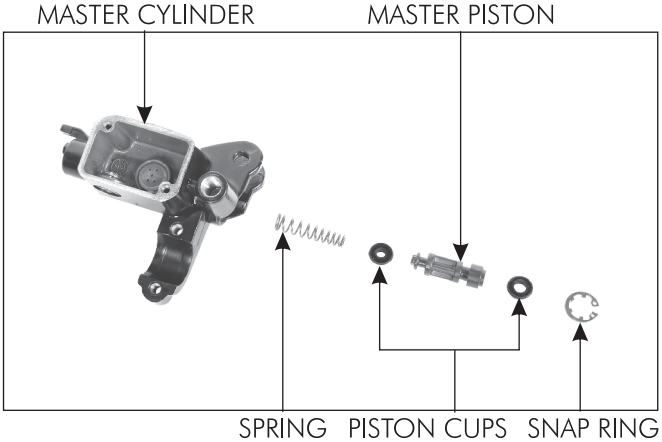
NOTE

- Replace the master cylinder piston, spring, cups and snap ring as a set whenever they are disassembled.
- Be sure that each part is free from the dust or dirt b e f o r e reassembly.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.

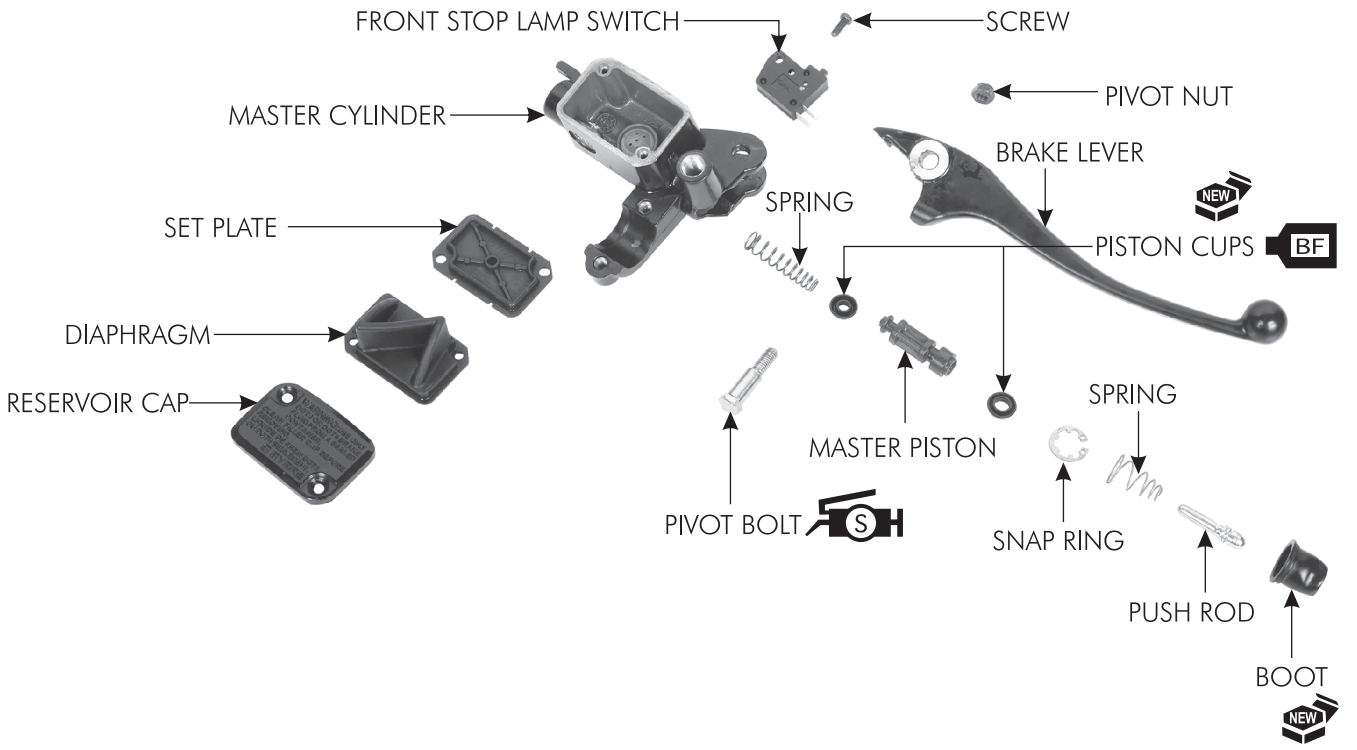
INSPECTION

Check the piston cups for damage.

Check the master cylinder and piston for scoring or other damage.



ASSEMBLY



NOTE

- Replace the master piston, spring, cups and snap ring as a set.
- Replace the boot if it is worn, deteriorated or damaged.
- Apply silicone grease to the boot inner surface.
- Be sure that each part is free from dust or dirt before reassembly.

Coat the master cylinder piston and piston cups with clean brake fluid. Install spring onto the master piston end. Install master cylinder piston/spring into the master cylinder.

CAUTION

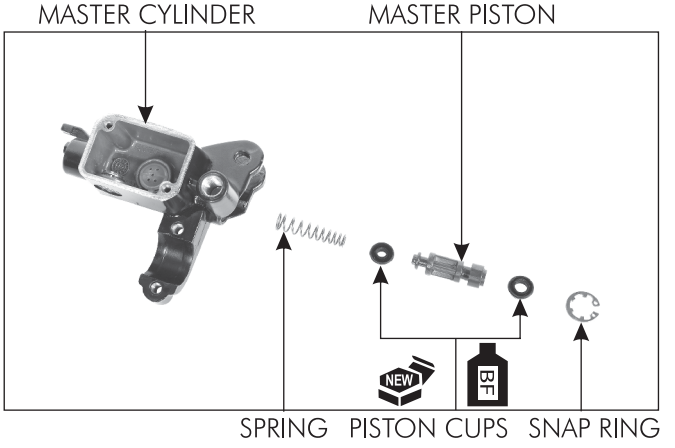
Do not allow the piston cup lips to turn inside out. Install the snap ring into the groove in the master cylinder.

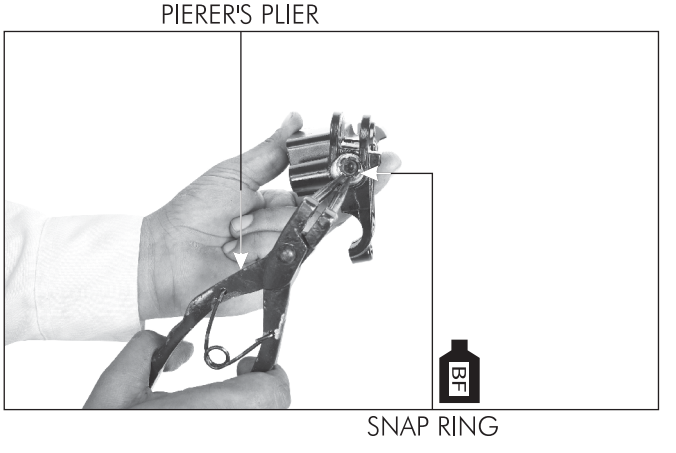
TOOL

PIERER'S PLIER
PART NO: 070 HH KFN 003

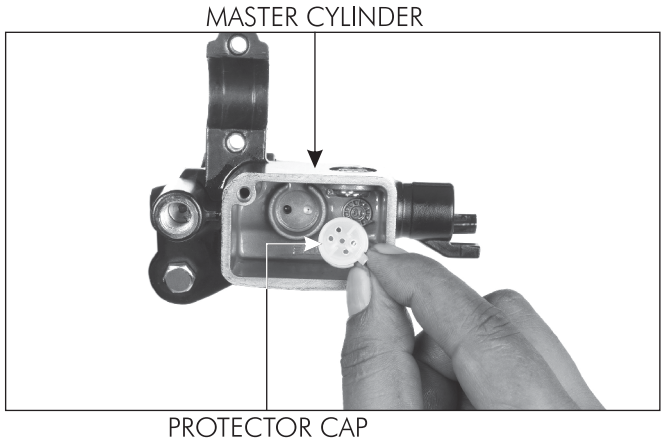
CAUTION

Be certain the snap ring is firmly seated in the groove.





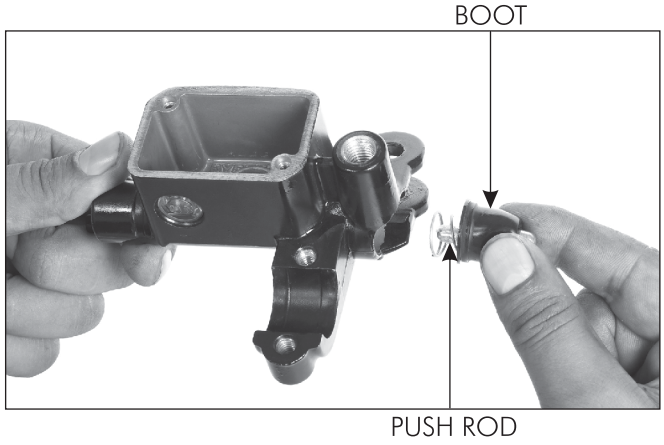
Install the protector cap onto the master cylinder securely.



Apply silicone grease to the contacting surface of the master piston and push rod.

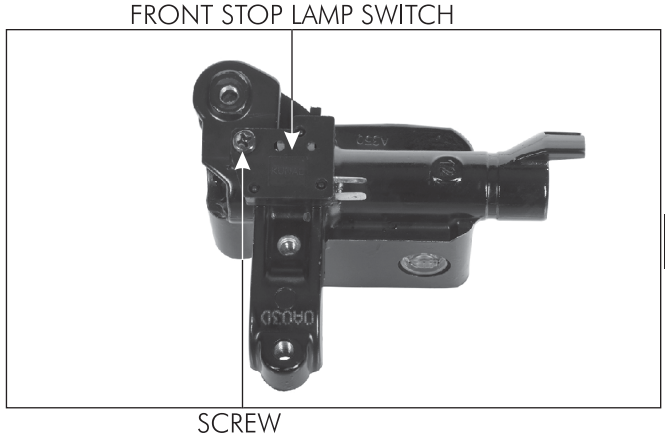
Install the boot into the master cylinder at one end and the groove in the master piston at the other.

Apply silicone grease to the push rod tip and brake lever contacting surface.



Install the front stop lamp switch to the master cylinder aligning the front stop lamp switch tab and master cylinder groove.

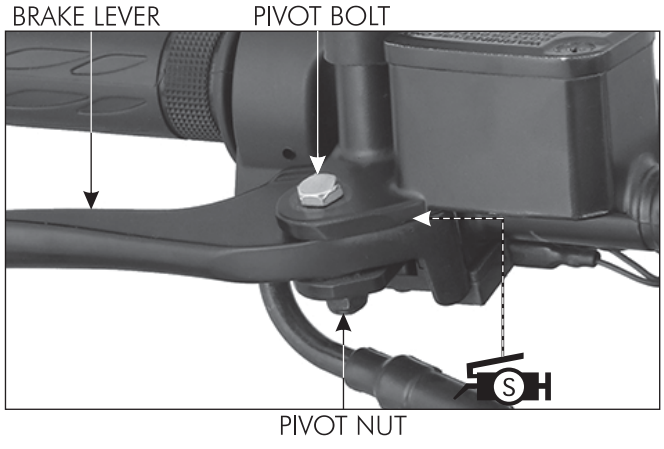
Install and tighten the screw securely.



Apply silicone grease to the brake lever pivot bolt sliding surface.

Install the brake, lever and pivot bolt and tighten the bolt.

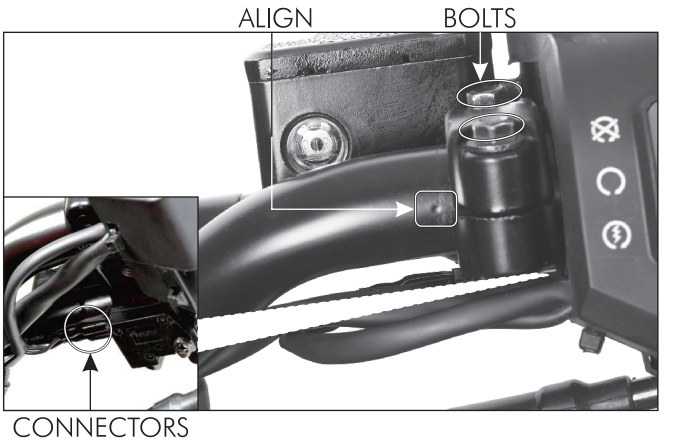
Hold the pivot bolt and install and tighten the pivot nut to the specified torque.



Align the end of the master cylinder with the punch mark on the handlebar.

Install the front master cylinder bolts and tighten to the specified torque.

Connect the front stop lamp switch connectors.



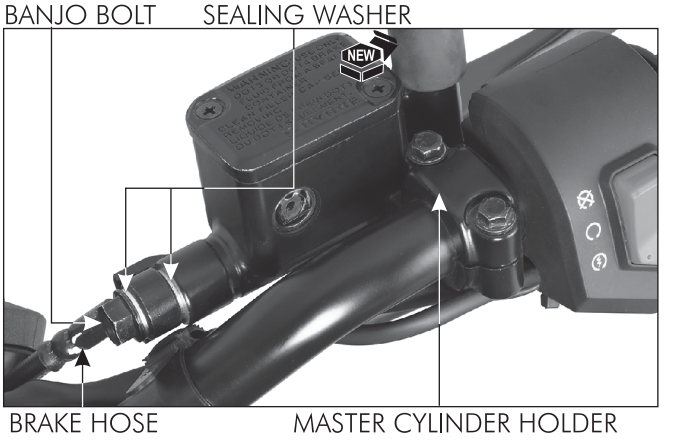
Connect the brake hose to the master cylinder with the banjo bolt and new sealing washers, and tighten the banjo bolt.

TORQUE

BRAKE HOSE BANJO BOLT: 3.4 kgf-m

Install the rear view mirror (page 2-2).

Fill and bleed the hydraulic system (page 16-5).



REAR MASTER CYLINDER

REMOVAL

CAUTION

- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.
- When removing the brake hose banjo bolt, cover the end of the hose. to prevent contamination.

Drain the brake fluid from the hydraulic system (page 16-4).

Position aside the right side step holder (page 2-7).

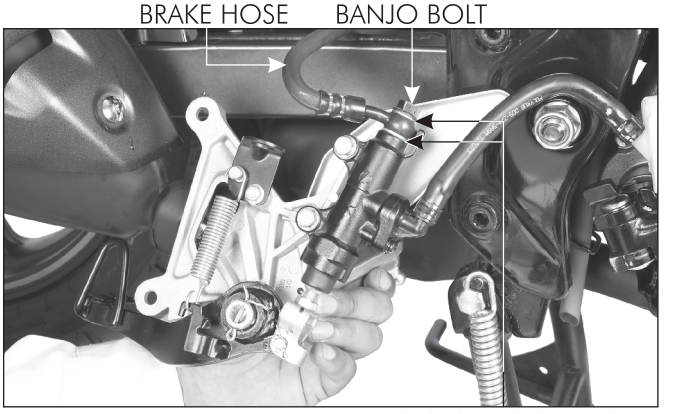
Remove the rider footrest assembly.

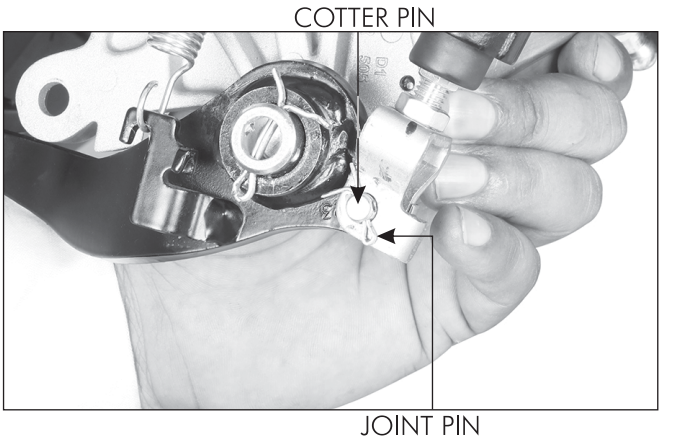
Disconnect the brake hose by removing the brake hose banjo bolt and sealing washers.

Remove the master cylinder mounting bolts.

Remove the rear master cylinder.

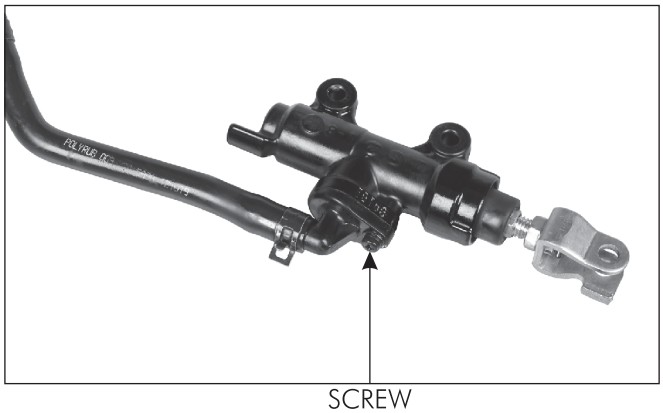
Remove the cotter pin and joint pin from the rear master cylinder.



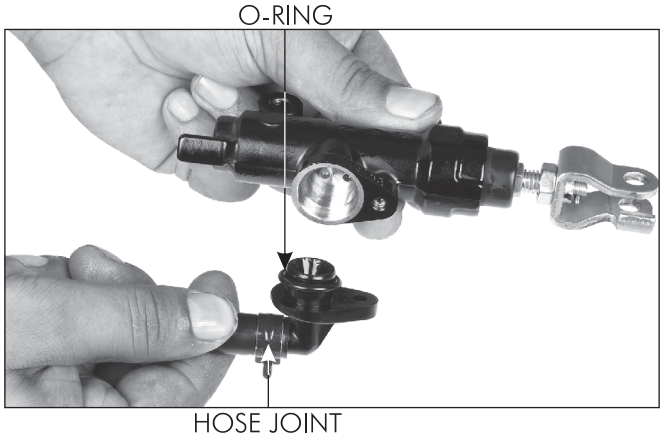


DISASSEMBLY

Remove the connector screw.



Disconnect the hose joint from the master cylinder.
Remove the O-ring from the hose joint.

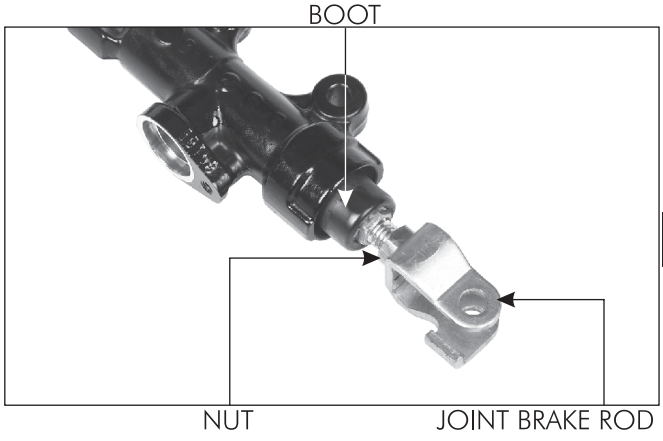


Remove the boot from the master cylinder body.

NOTE

Be careful not to damage the boot.

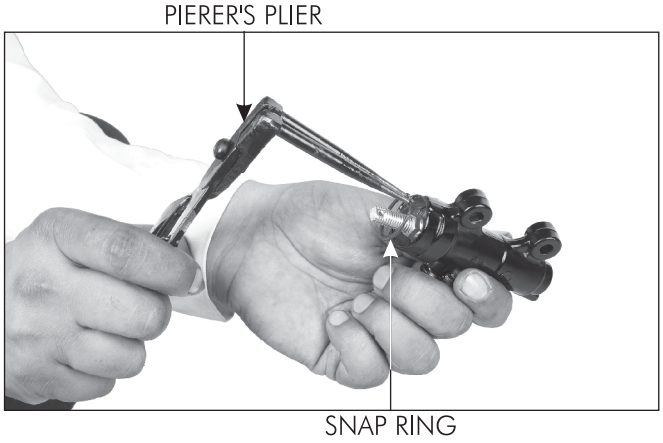
Remove the joint brake rod by removing the nut.



Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL

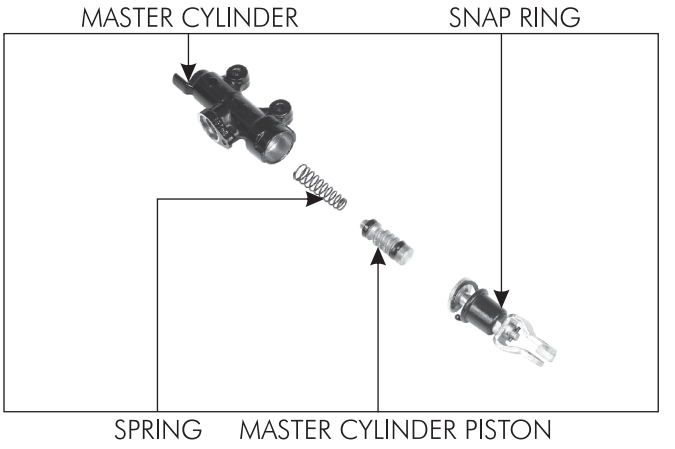
PIERER'S PLIER
PART NO: 070 HH KFN 003



16

Remove the push rod assembly, master cylinder piston and spring.

Clean the inside of the master cylinder with clean brake fluid.



INSPECTION

Check the piston boot, piston cups for fatigue or damage.

Check the master cylinder and piston for scoring or other damage.

Measure the master cylinder I.D.

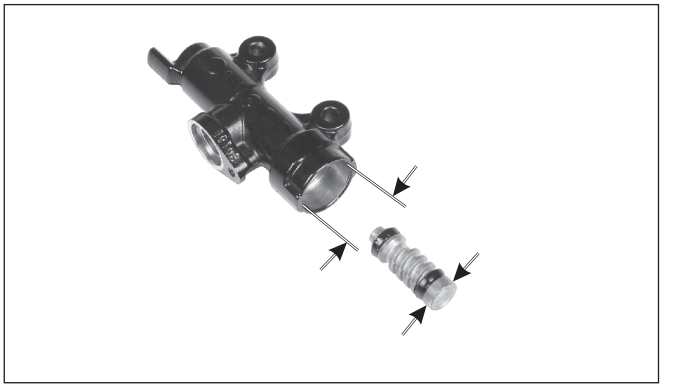
SERVICE LIMIT

MASTER CYLINDER I.D: 12.7 mm

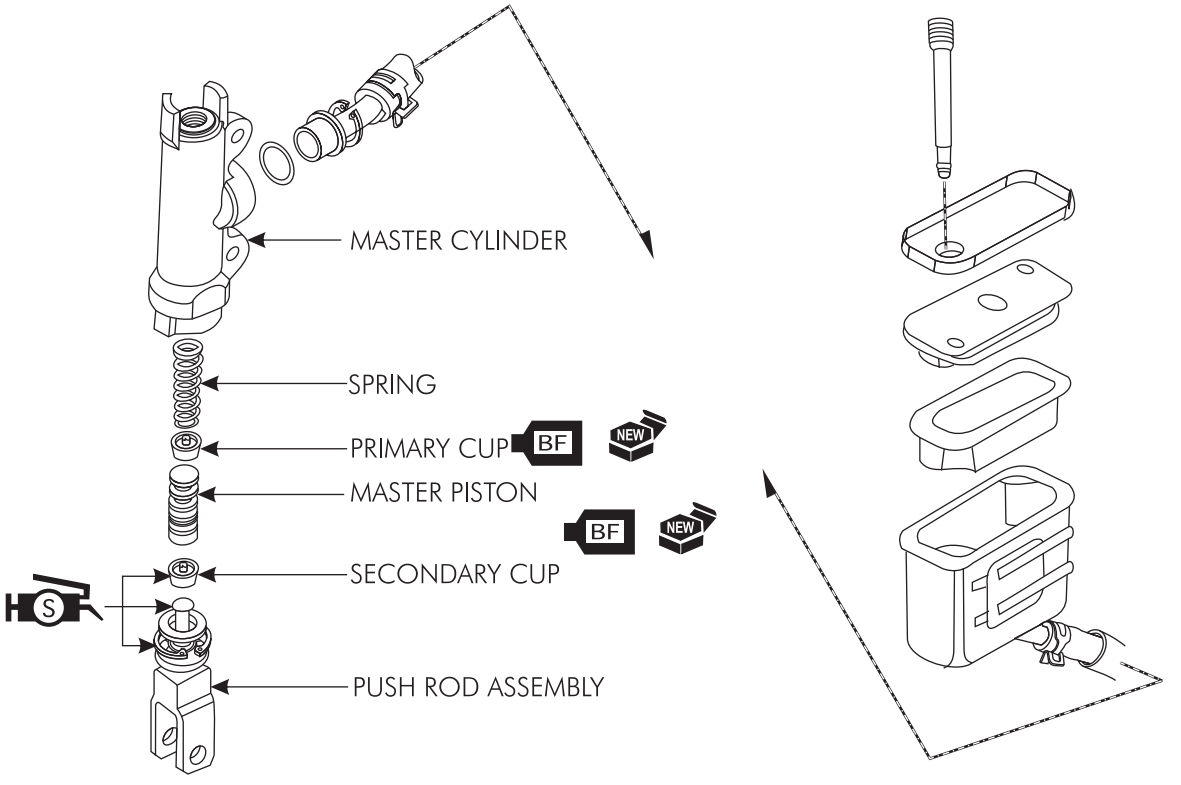
Measure the master cylinder piston O.D.

SERVICE LIMIT

MASTER CYLINDER PISTON O.D: 12.7 mm



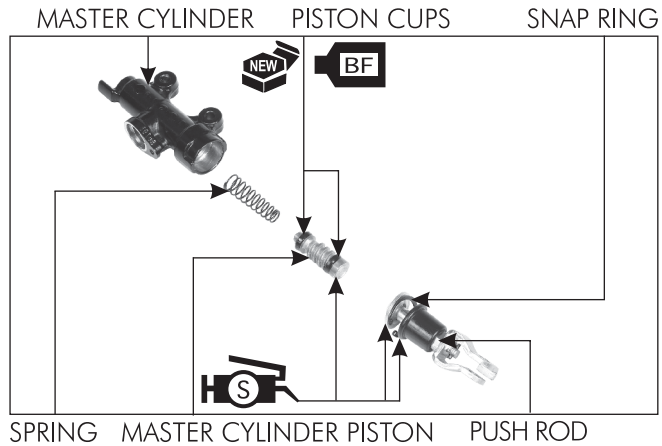
ASSEMBLY



NOTE

- Keep the piston, cups, springs, snap rings and boot as a set. Do not substitute individual parts.
- Replace the master piston, spring, cups and snap ring as a set.
- Replace the boot if it is worn, deteriorated or damaged.
- Apply silicone grease to the boot inner surface.
- Be sure that each part is free from dust or dirt before reassembly.

Coat the master cylinder piston and piston cups with clean brake fluid. Install spring onto the master piston end. Install master cylinder piston/spring into the master cylinder.



CAUTION

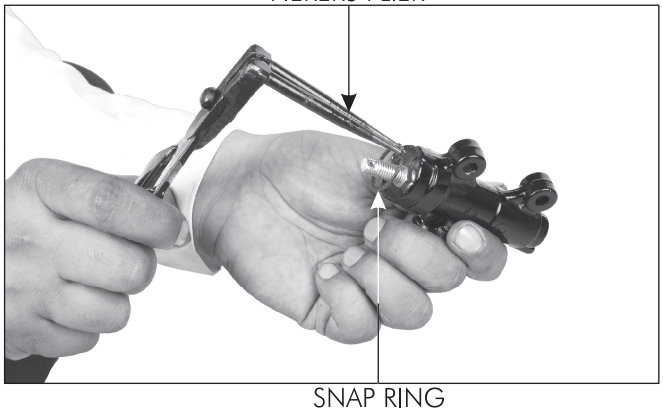
Do not allow the piston cup lips to turn inside out.

Install the snap ring into the groove in the master cylinder.

TOOL

PIERER'S PLIER

PART NO: 070 HH KFN 003



CAUTION

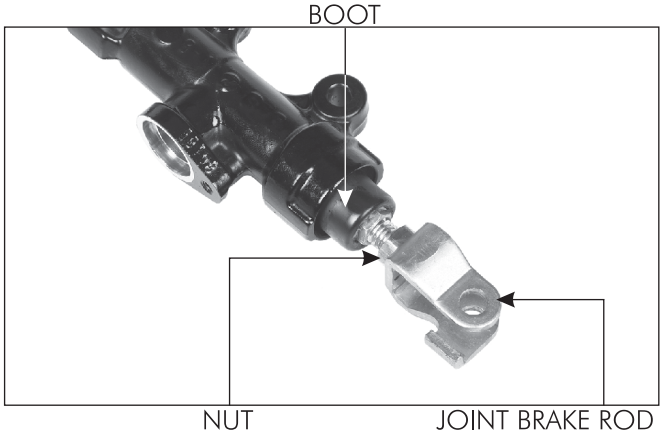
Be certain the snap ring is firmly seated in the groove.

Install the joint brake rod by tightening the nut.

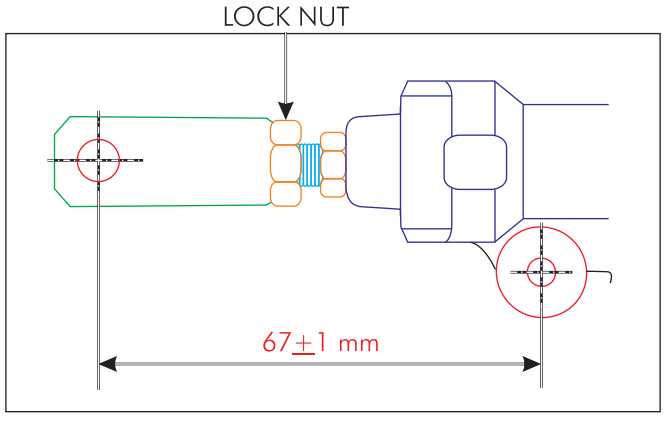
Install the boot into the master cylinder body.

NOTE

Be careful not to damage the boot.



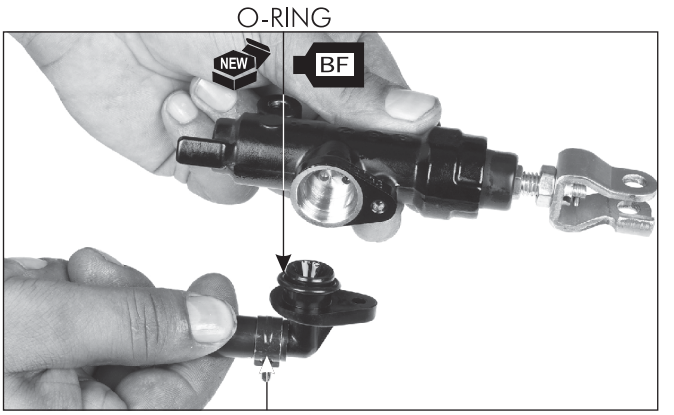
If the push rod is disassembled, adjust the push rod length so that the distance between the center of the master cylinder lower mounting bolt hole and joint pin hole is 67±1 mm. After adjustment, tighten the lock nut.



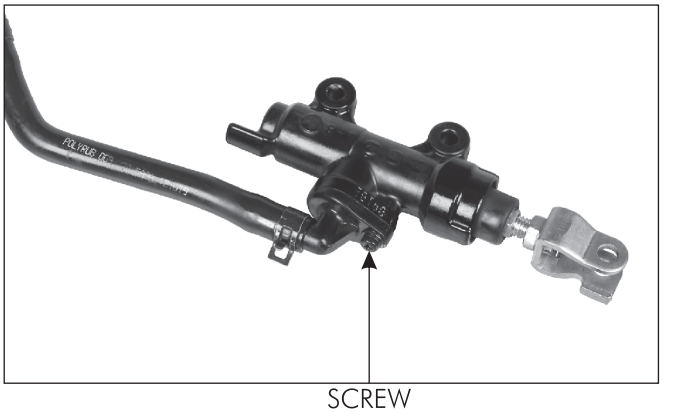
16

Apply brake fluid to a new O-ring and install it to the hose joint.

Connect the hose joint to the master cylinder.



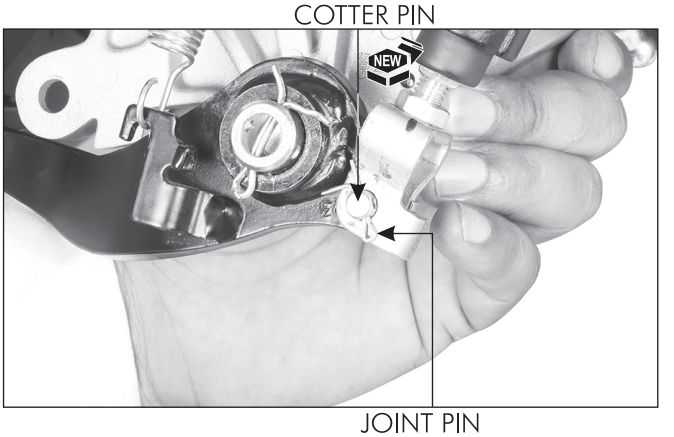
Install the hose joint connector screw securely.



INSTALLATION

Install the rear master cylinder.

Install the joint pin and a new cotter pin to the rear master cylinder.



Install and tighten the master cylinder mounting bolts.

Connect the brake hose to the master cylinder with the banjo bolt and new sealing washers, tighten the banjo bolt to the specified torque.

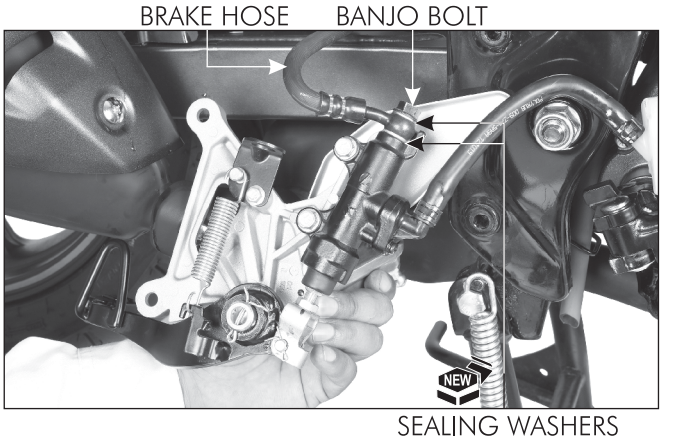
TORQUE

BRAKE HOSE BANJO BOLT: 3.4 kgf-m

Install the right side pillion step holder (page 2-13).

Fill and bleed the hydraulics system (page 16-4).

Adjust the rear brake pedal height (page 3-21).



FRONT BRAKE CALIPER

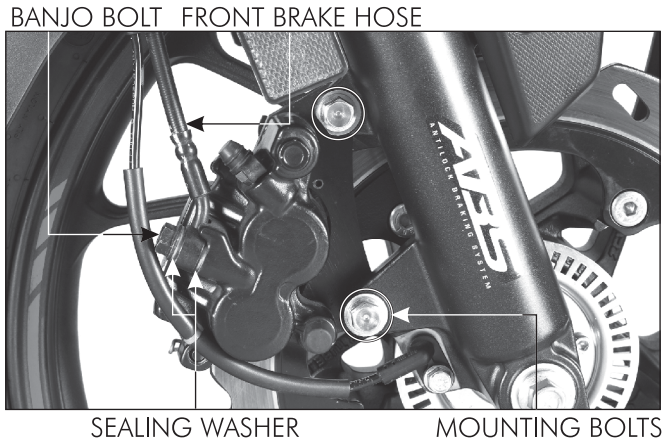
REMOVAL

CAUTION.

- Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced
- When removing the banjo bolt, cover the end of the hose to prevent contamination.

Drain the brake fluid from the hydraulic system (page 16-4). Disconnect the brake hose by removing the brake hose banjo bolt and sealing washers.

Remove the front brake caliper mounting bolts and front brake caliper.



Remove the pin lock and pad pin.

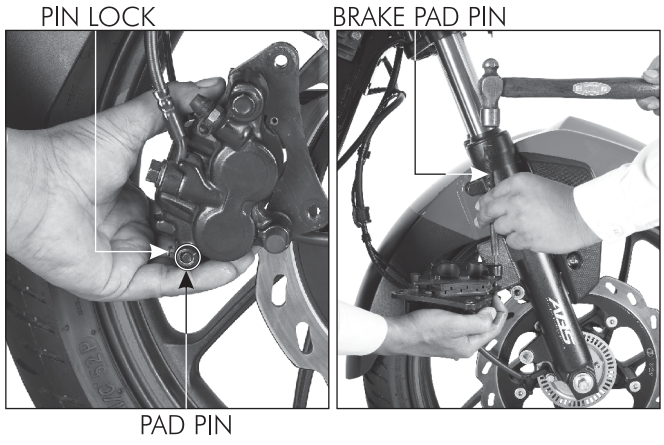
Remove the pad pin by using special tool.

NOTE

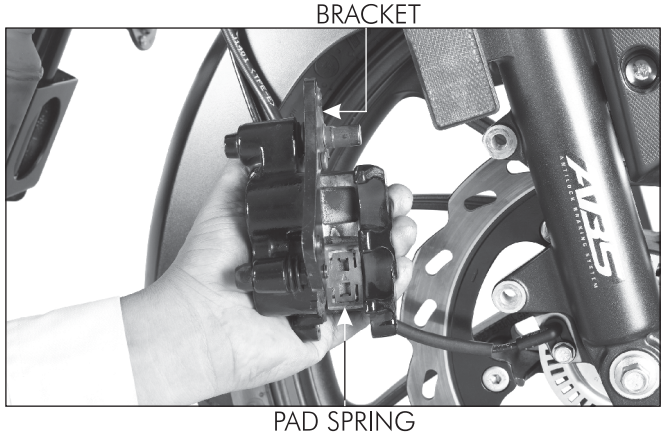
While removing the pad pin, hold the caliper assembly carefully.

TOOL

BRAKE PAD HANGER PIN REMOVER
PART NO: 070 HH 198 036



Remove the pad spring and bracket.

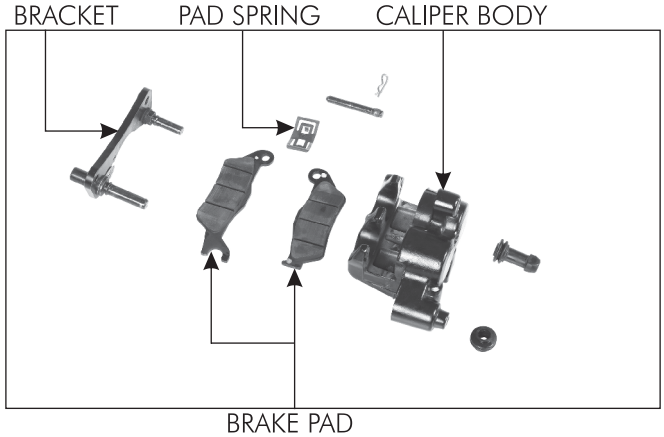


Remove the brake pads.

DISASSEMBLY

NOTE

- Do not remove the caliper and bracket pins unless replacement is required.
- Remove the caliper bracket from the caliper body.
- Remove the pad spring and bracket pin boot from the cylinder body.

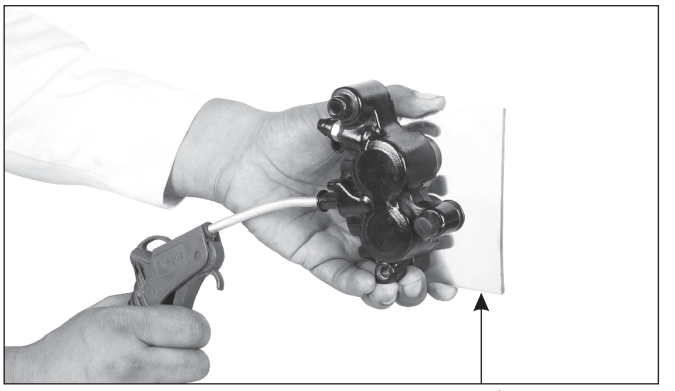


16

Place shop towel or a soft rubber sheet over the pistons. Position the caliper body with the pistons down and apply instant air pressure to the fluid inlet to remove the pistons.

NOTE

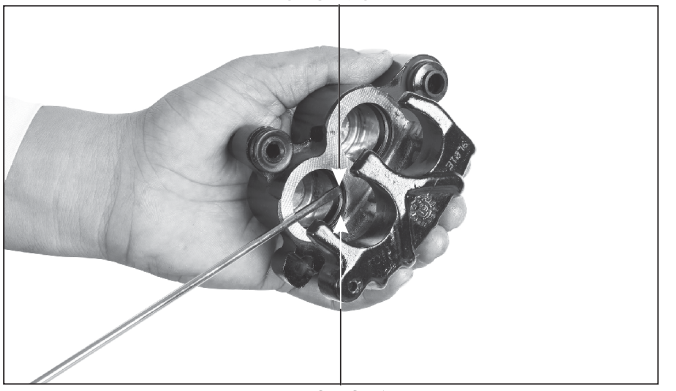
- Do not use high pressure air or bring the nozzle too close to the inlet.
- Mark the pistons to ensure correct reassembly.



Push the dust and piston seals in and lift them out.

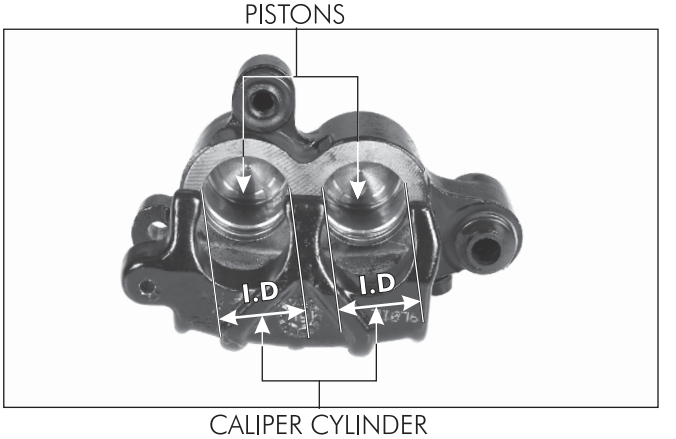
CAUTION

- Be careful not to damage the piston sliding surface.
- Clean the seal grooves, caliper pistons and caliper piston sliding surfaces with clean brake fluid.



INSPECTION

Check the caliper cylinder and pistons for scoring, scratches or damage.

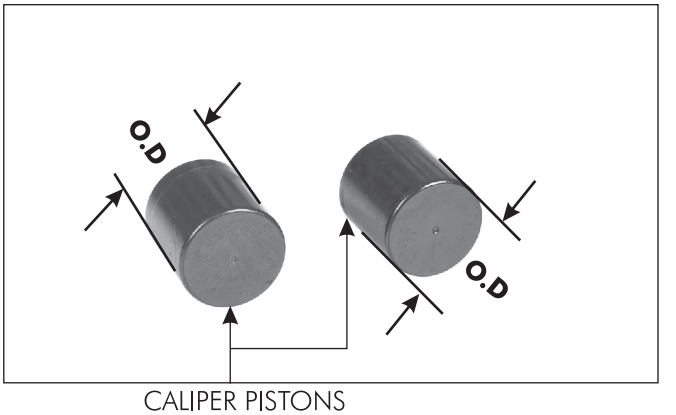


Check the caliper piston for scoring, scratches or damage.

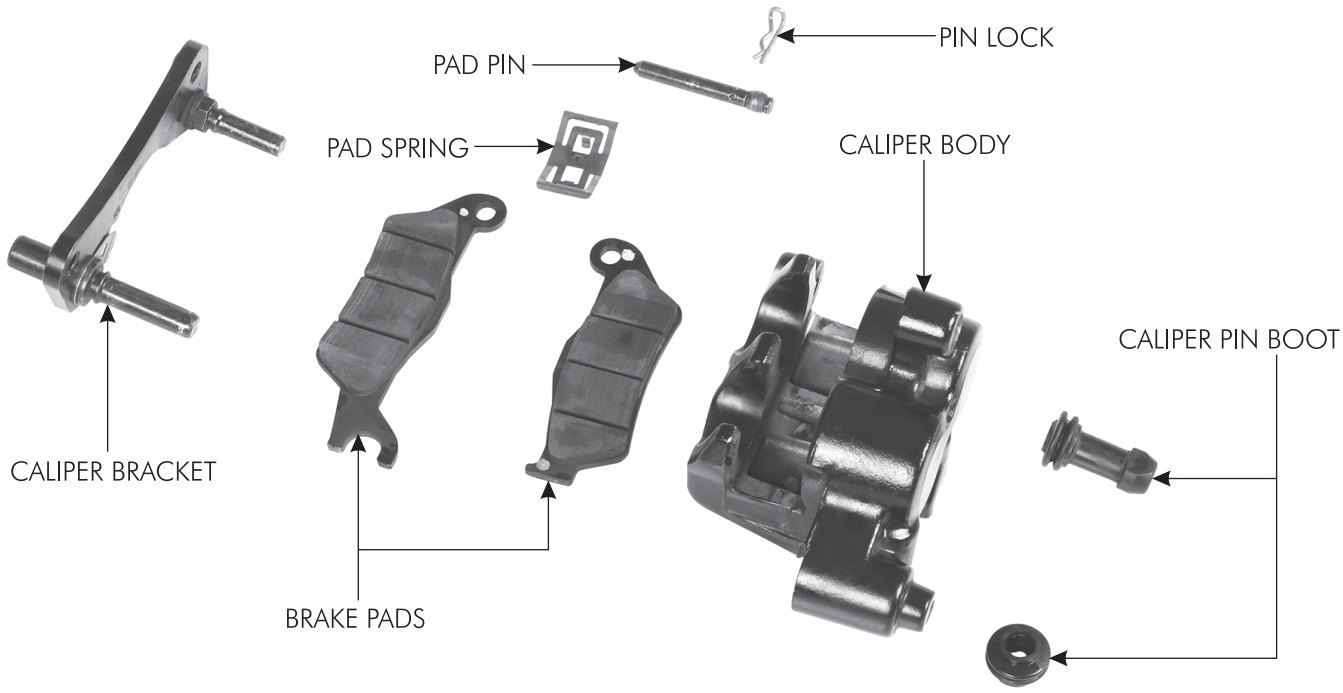
Measure the caliper piston O.D.

SERVICE LIMIT

CALIPER PISTON O.D: 26 mm



ASSEMBLY



NOTE

- Replace the dust seals and piston seals with new ones.
- Replace the caliper and bracket pin boot if it is worn, deteorated or damaged. Apply silicone grease to boot inner surface.
- Be sure that each part is free from the dust or dirt before reassembly.

Coat new piston seals with clean brake fluid and install them in the seal grooves in the caliper.

Coat new dust seals with silicone grease and install them in the seal grooves in the caliper.

Coat the caliper pistons with clean brake fluid & install it into caliper cylinder with opening towards the pads.

If the caliper pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the caliper pins and boots.

Install the caliper pin boots and caliper bracket into the caliper body.

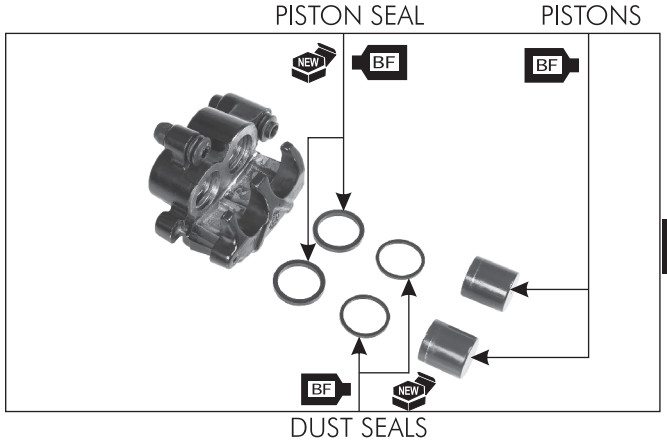
Install the pad spring in the caliper.

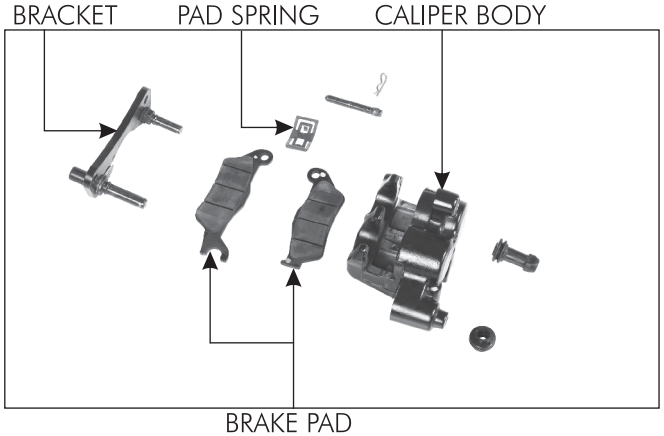
Install the brake pads.

Install the pad pin.

TOOL

BRAKE PAD HANGER PIN REMOVER
PART NO: 070 HH 198 036





16

Install the front brake caliper to the front fork.

Install and tighten the front caliper mounting bolts to the specified torque.

TORQUE

FRONT CALIPER MOUNTING BOLT: 3.0 kgf-m

Connect the brake hose to the brake caliper with new sealing washers.

Install and tighten the banjo bolt to the specified torque.

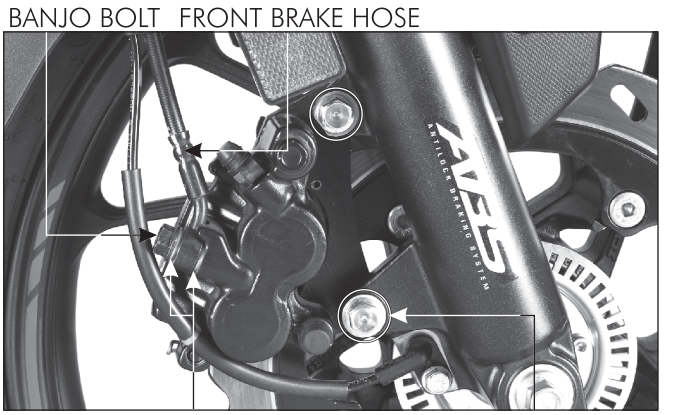
TORQUE

BRAKE HOSE BANJO BOLT: 3.4 kgf-m

NOTE

Be careful not to twist the brake hose.

Fill and bleed the hydraulic system (page 16-5).



REAR BRAKE CALIPER

REMOVAL

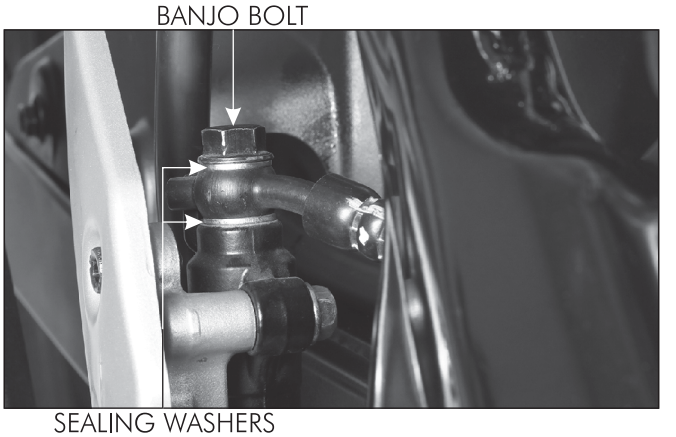
CAUTION

• Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced • When removing the banjo bolt, cover the end of the hose to prevent contamination.

Remove the rear wheel (page 13-3).

Remove the banjo bolt and caliper assembly.

Remove the brake pads (page 16-8).



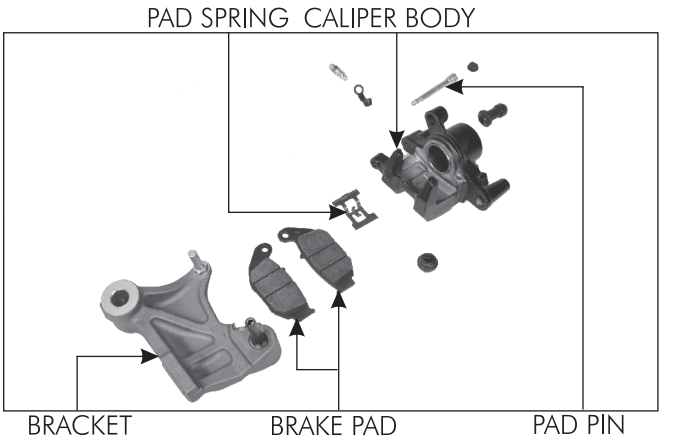
DISASSEMBLY

NOTE

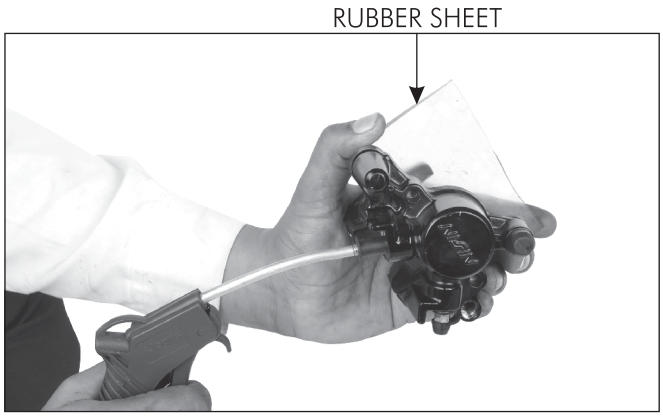
Do not remove the caliper and bracket pins unless replacement is required.

Remove the caliper bracket from the caliper body.

Remove the pad spring and bracket pin boot from the cylinder body.



Place shop towel or a soft rubber sheet over the piston. Position the caliper body with the piston down and apply instant air pressure to the fluid inlet to remove the piston.

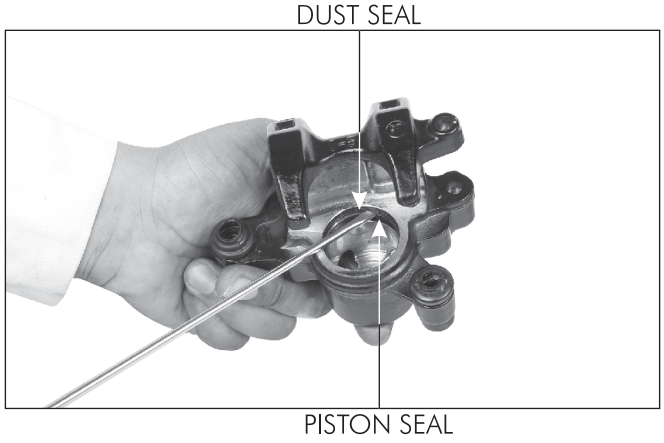


Push the dust and piston seals in and lift them out.

CAUTION

Be careful not to damage the piston sliding surface.

Clean the seal grooves, caliper piston and caliper piston sliding surfaces with clean brake fluid.



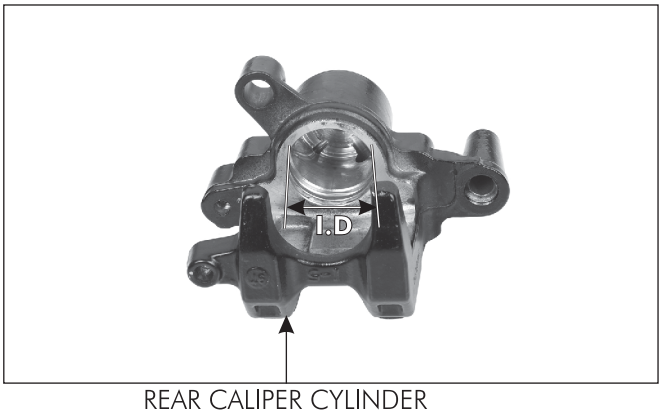
INSPECTION

Check the caliper cylinder for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMIT

CALIPER CYLINDER I.D: 32.03 mm

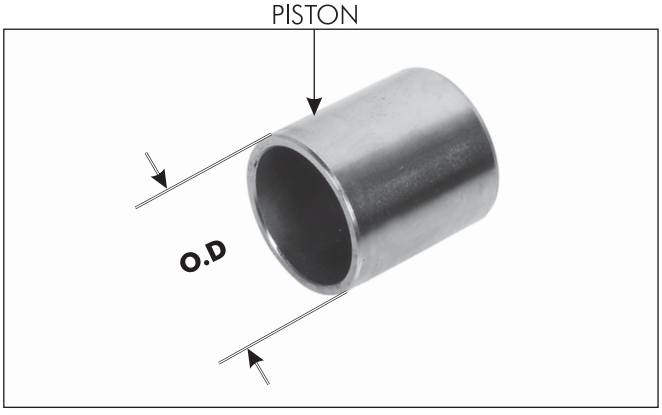


Check the caliper piston for scoring, scratches or damage.

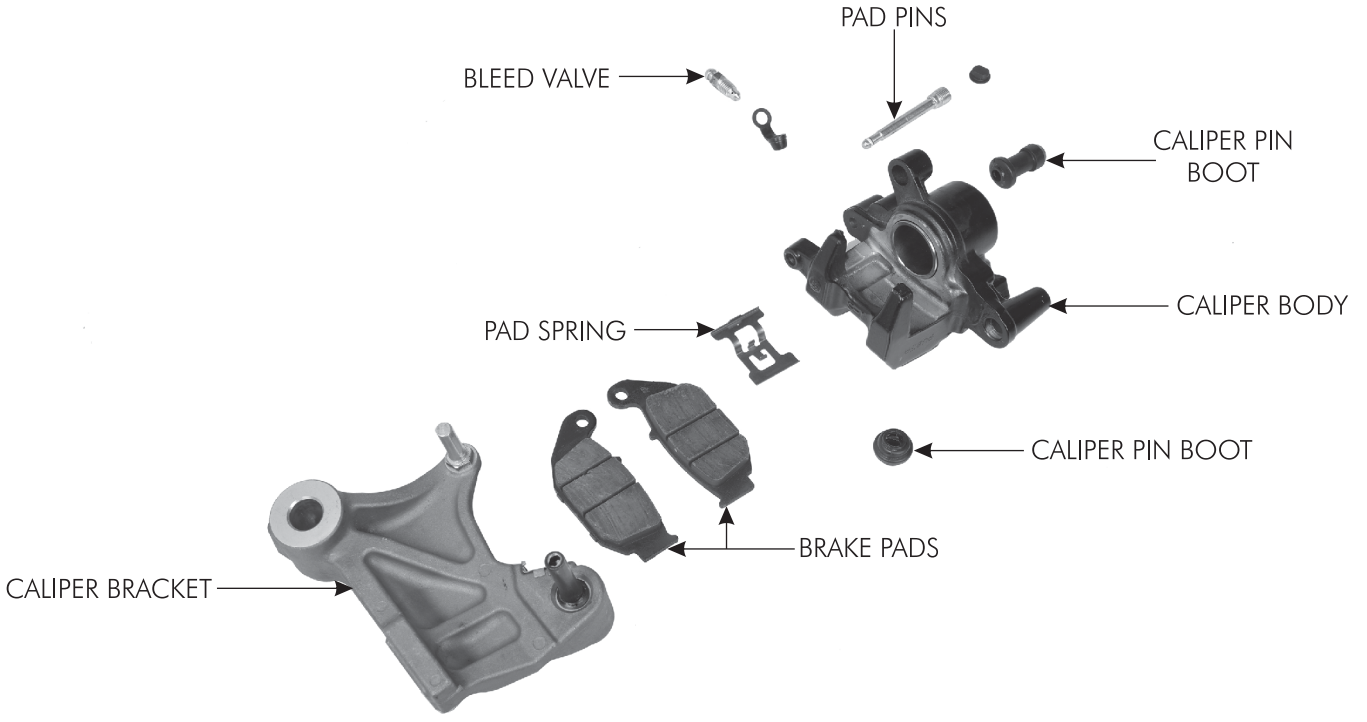
Measure the caliper piston O.D.

SERVICE LIMIT

CALIPER PISTON O.D: 32.03 mm

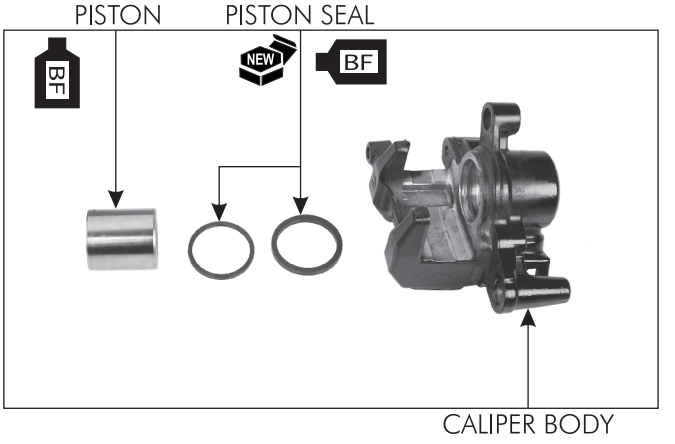


ASSEMBLY



NOTE

- Replace the dust seal and piston seal with new ones.
- Replace the caliper and bracket pin boot if it is wear, deterioration or damage. Apply silicone grease to boot inner surface.
- Be sure that each part is free from the dust or dirt before reassembly.



Coat new piston seal with clean brake fluid and install it in the seal groove in the caliper.

Coat new dust seal with silicone grease and install it in the seal groove in the caliper.

Coat the caliper piston with clean brake fluid & install it into caliper cylinder with opening towards the pads.

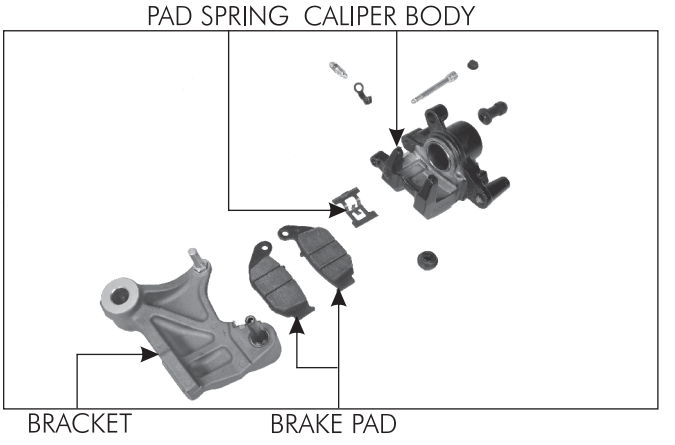
If the caliper pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the caliper pins and boots.

Install the caliper pin boots and caliper bracket into the caliper body.

Install the pad spring in the caliper.

Install the brake pads.



INSTALLATION

Install the rear brake caliper to the caliper bracket.

TORQUE

REAR CALIPER MOUNTING BOLT: 3.0 kgf-m

Connect the brake hose to the brake caliper with new sealing washers.

Install and tighten the banjo bolt to the specified torque.

TORQUE

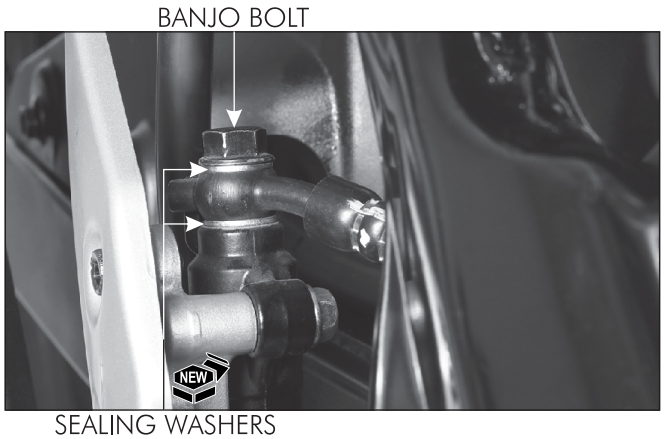
BRAKE HOSE BANJO BOLT: 3.4 kgf-m

NOTE

Be careful not to twist the brake hose.

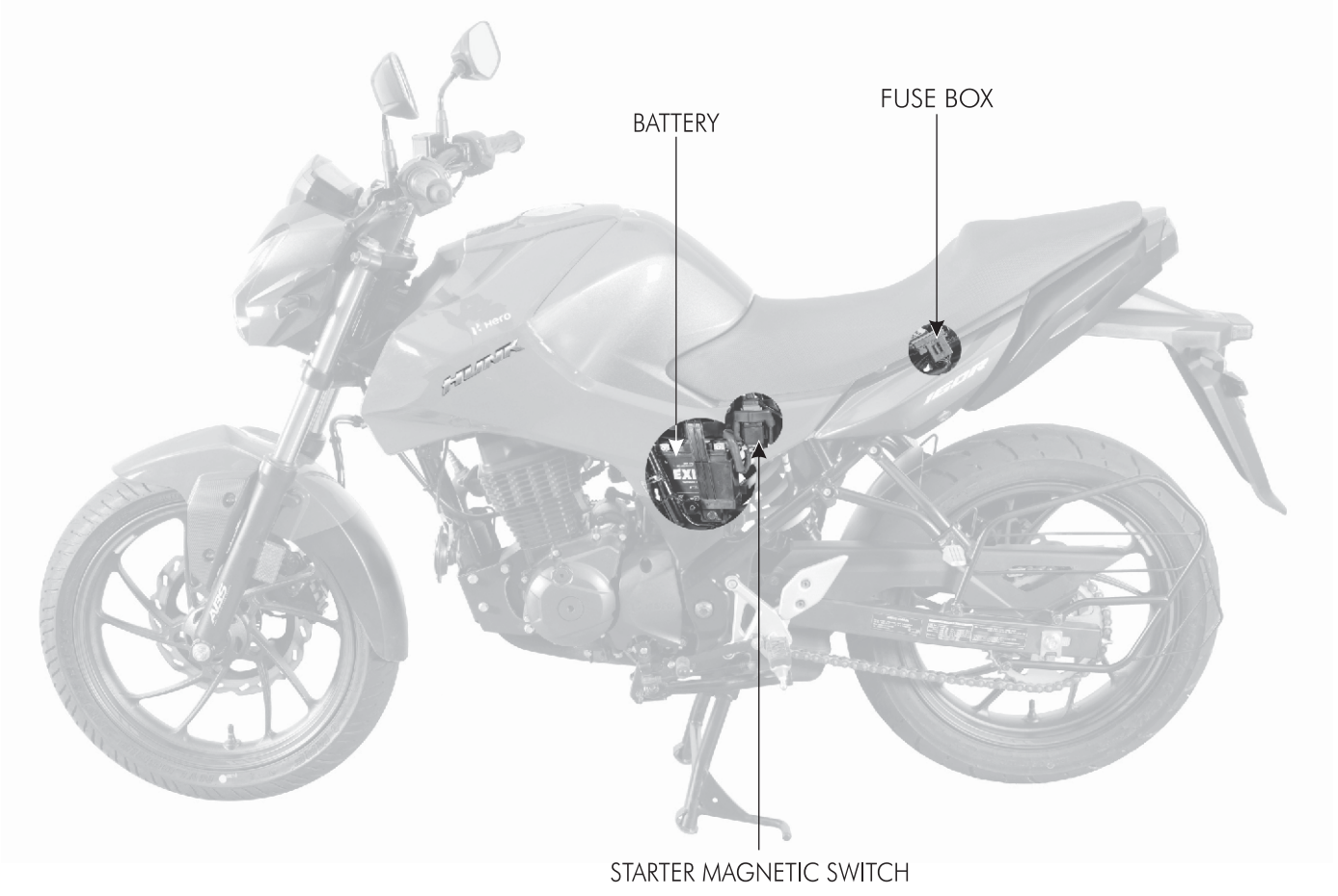
Fill and bleed the hydraulic system (page 16-5).

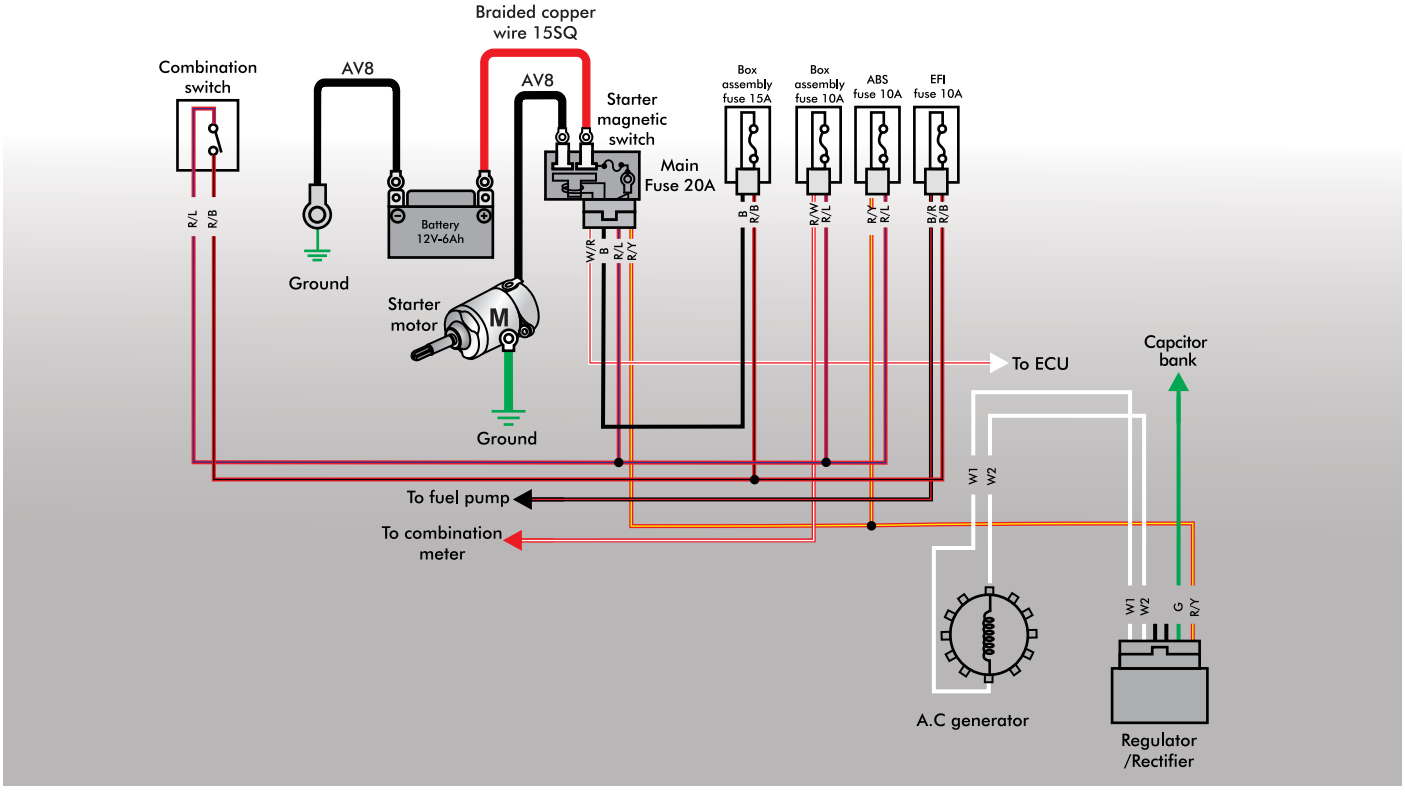
Install the rear wheel (page 13-6).



SEALING WASHERS

MEMO


BATTERY
FUSE BOX
STARTER MAGNETIC SWITCH


Braided copper wire 15SQ
Combination switch
AV8
AV8
Starter magnetic switch
Main Fuse 20A
Box assembly fuse 15A
Box assembly fuse 10A
ABS fuse 10A
EFI fuse 10A
R/L
R/B
Battery 12V-6Ah
Ground
W/R
B
R/L
R/Y
B
R/B
R/W
R/L
R/Y
R/L
B/R
R/B
Starter motor
M
Ground
To ECU
Capcitor bank
To fuel pump
To combination meter
W1
W2
W1
W2
G
R/Y
A.C generator
Regulator /Rectifier

System Diagram	17-0	Electrolyte Filling	17-8
Service Information	17-1	Charging Procedure	17-9
Specifications	17-1	Storing Batteries	17-10
Troubleshooting	17-2	Charging System Inspection	17-11
Battery	17-5	Regulator/Rectifier	17-12
MF-Battery Testing	17-6	Charging line	17-14

SERVICE INFORMATION

GENERAL

⚠ WARNING

- The battery gives off explosive gases; keep spark, flames, and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.
- The battery contains sulphuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
  - If electrolyte gets on you skin, flush with water.
  - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.
- Keep out of reach of children.

CAUTION

- Always turn "OFF" the ignition switch before disconnecting any electrical component.
- For extended storage, remove the battery, give it a full charge and store it in a cool dry place.
- For a battery remaining in a stored vehicle, disconnect the negative battery cable from the battery terminal.
- Battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These conditions contribute to shortening the "Life Span" of the battery. Even under normal use, the performance of batteries deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die. For this reason, the charging system is often suspected to be the problem. Battery overcharge often results from problems the battery itself, which may appear to be an overcharge symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level drops down quickly, and service life is reduced, as filling is impossible. If you force open the seals to fill, the seal will be broken and battery will be damaged.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the tail lamp "ON" for a long periods of time without riding the vehicle.
- The battery will self-discharge when the vehicle is not in use for long duration. For this reason, charge the battery once in a month to prevent sulfation forming.
- When checking the charging system, always follow the steps in the troubleshooting flow chart.

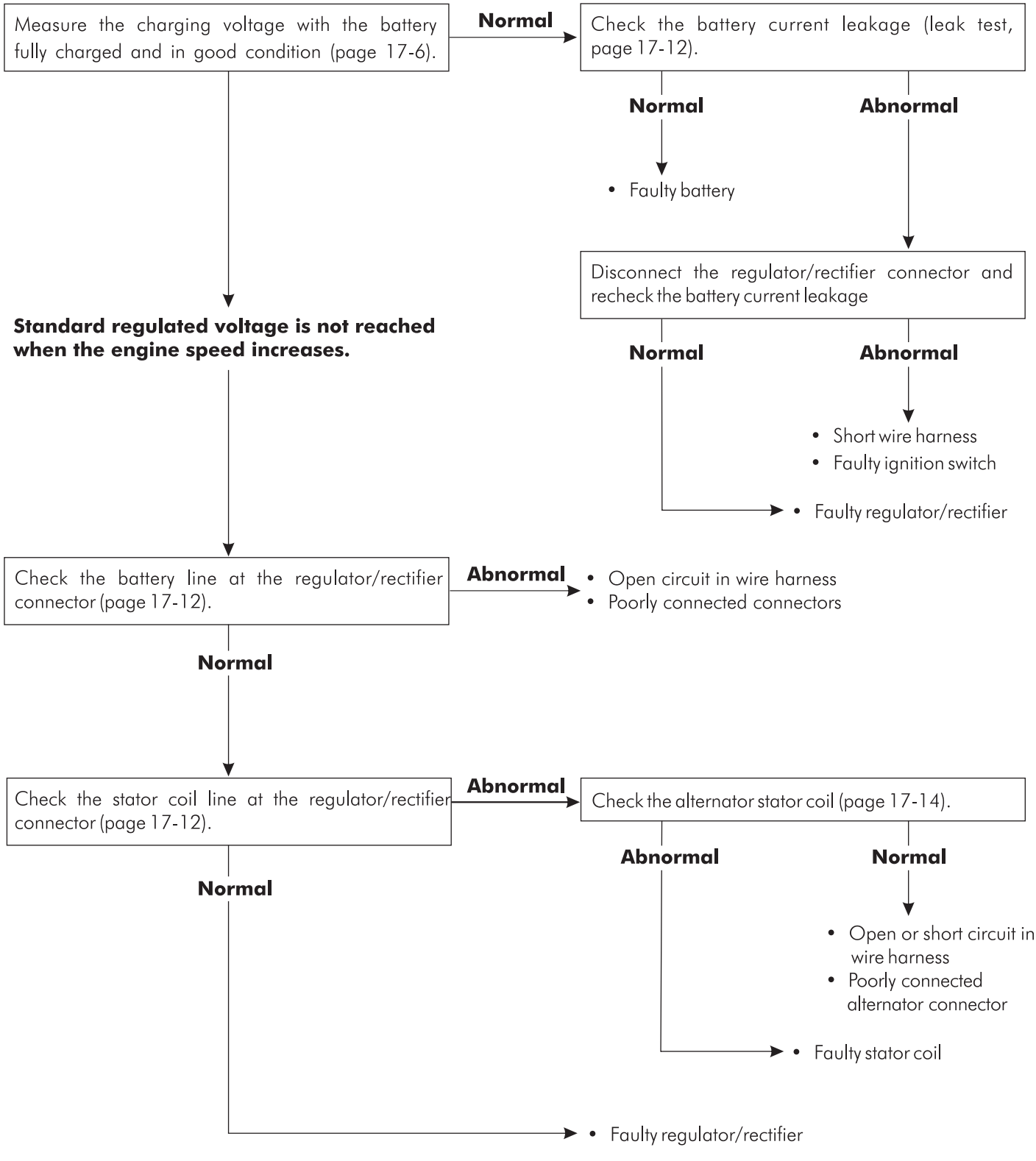
SPECIFICATIONS

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12V-4Ah (ETZ-5) *MF Battery
	Current leakage		0.20 mA
	Voltage @ 20°C/68°F		12.4 V / Green Display in Midtronics Tester
Alternator	Capacity		120 W @ 5000 rpm (Single Phase Full DC Stystem
	Charging coil resistance (20°C/68°F)		0.2-1.0 Ω
Lamp coil regulated voltage (with battery)			14.3±0.5 V @ 5000 rpm
Lamp coil regulated current (with battery)		Night	7.6A Min at 2500rpm @ 25°C and 8.2A Min at 6000rpm @ 25°C

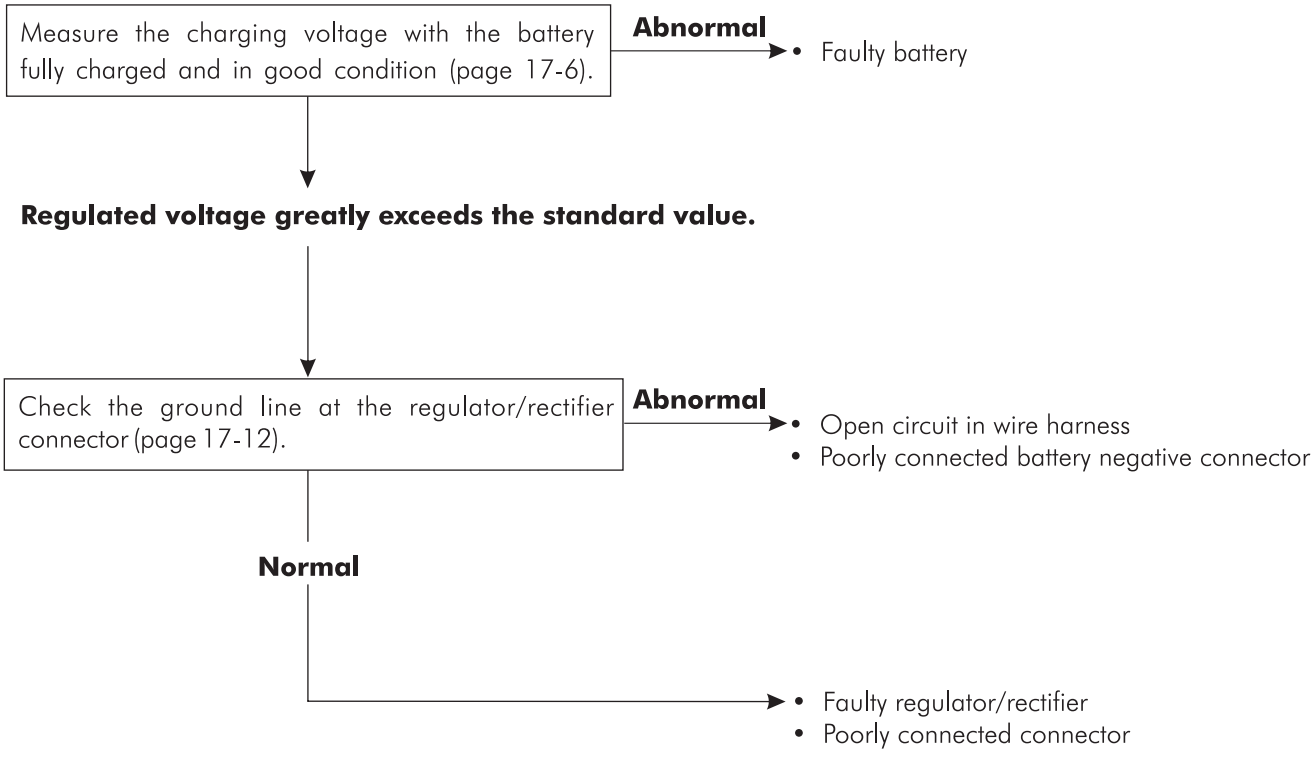
TROUBLESHOOTING

Battery undercharging (voltage not raised to regulated voltage)



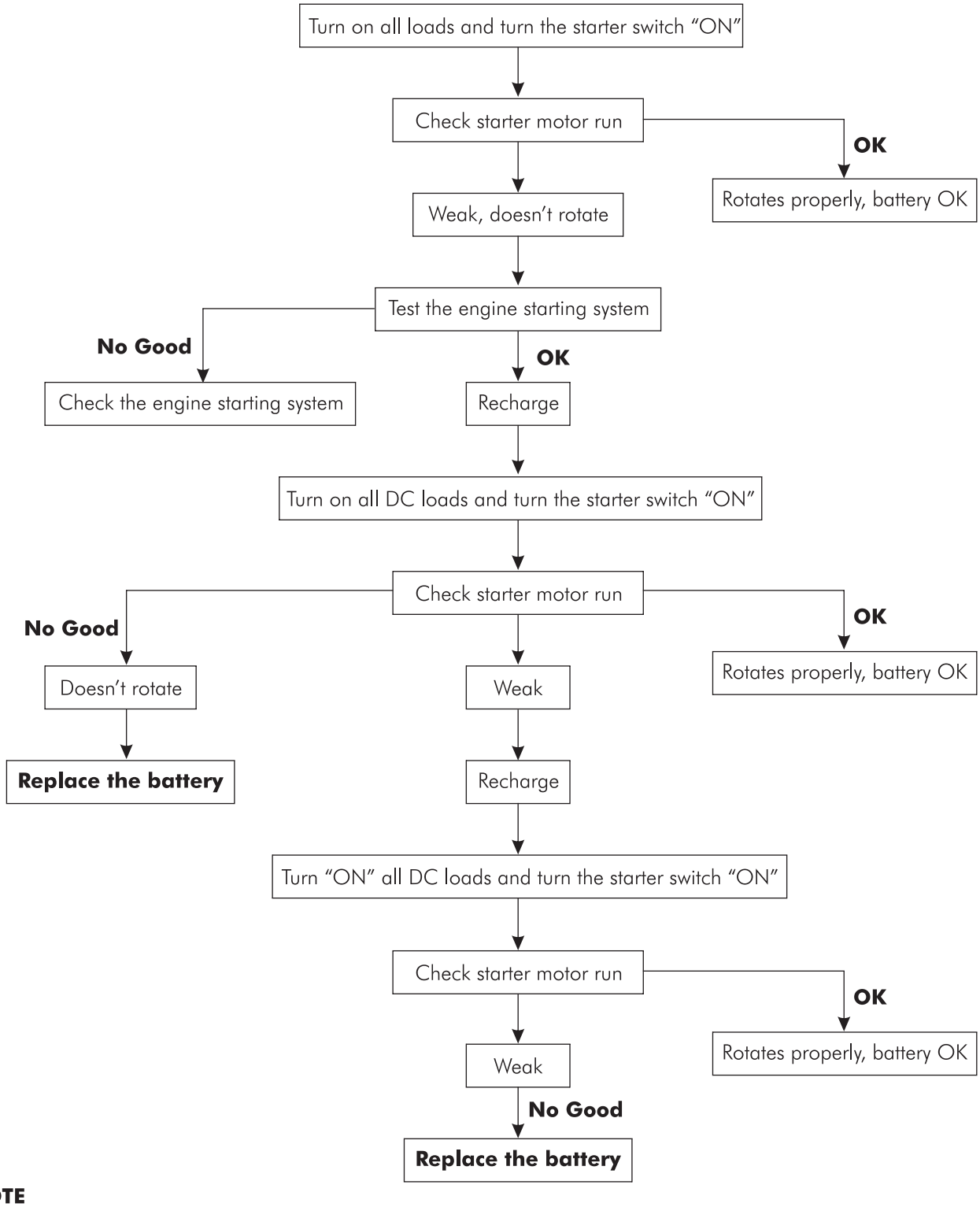
TROUBLESHOOTING

Battery overcharging (regulated voltage too high)



TROUBLESHOOTING

Battery performance check with battery installed on the motorcycle.



NOTE

- "All DC loads" indicates turn signals, stop lamp and position lamp.
- Recharging should be done based on the charging capacity indicated in the battery charging procedure (page 17-9).
- Decision for battery replacement to be taken after using the MF-battery tester, after recharging the battery.

BATTERY

REMOVAL

NOTE

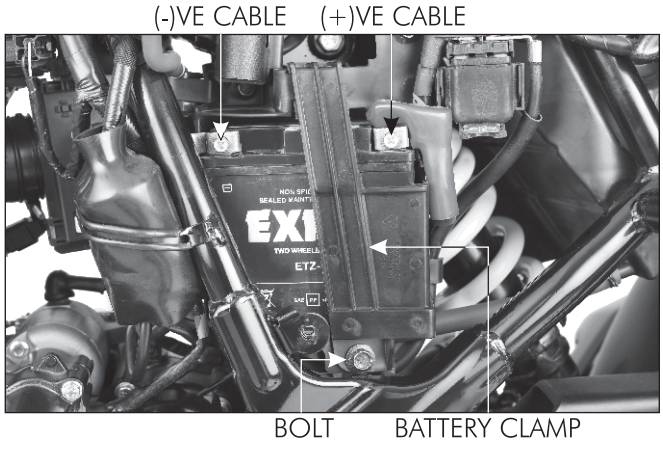
Always turn the ignition switch "OFF" before removing or installing the battery.

Remove the fuel tank cover (page 2-5).

Disconnect the negative (-)ve cable from the battery, then disconnect the positive (+)ve cable.

Remove the battery clamp by removing the bolt.

Remove the battery from the battery case.



INSTALLATION

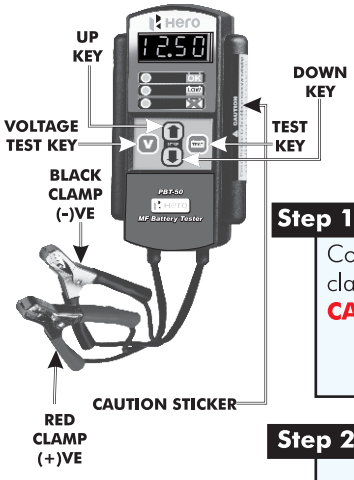
Install the battery in the reverse order of removal.

NOTE

Connect the positive terminal first and then the negative cable.

After installing the battery coat the terminal with petroleum jelly to prevent corrosion.

MF-BATTERY TESTING



- MF Batteries can be tested IN vehicle and "OFF" the vehicle.

IN Vehicle Test: Turn "OFF" the vehicle and all electrical loads.

Caution : Testing with the ignition switch "ON" or vehicle electrical loads "ON" may lead to inaccurate readings.

OFF Vehicle Test : Remove the battery from the Motorcycle.

Step 1

Connect the MF-Battery tester clamps to the battery terminals: Red clamp to the (+)ve terminal and Black clamp to (-)ve terminal

CAUTION : Clean both the battery terminals before connecting with the MF-Battery Tester.
: Do not charge the battery before the test, check in "as is" condition.
: If the battery is charged by MF- Battery Charger or on vehicle, wait for minimum 30 minutes before testing.

Step 2

"conn" display

Confirm the indication on display screen

No Display

REF. NO. Display

Loose connection of MF-Battery Tester clamps with battery

Reconnect the tester clamps to the battery properly

- Reverse connection of MF-Battery Tester clamps on battery terminals

Correct the MF-Battery tester clamps connection
Red clamp ⇨ (+)ve terminal
Black clamp ⇨ (-)ve terminal

- Battery open circuit voltage less than 8V.
- Battery internal resistance is very high

Full charge the battery with MF-Battery charger and retest after 30 minutes

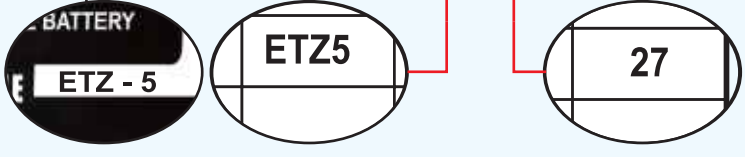
REF NO. LIST IS AT BACK PANEL

TEST INSTRUCTIONS-12V Motorcycle Battery

- Find the battery Ref Number in the table below
- Use the UP/DOWN ARROWS to scroll to the Ref Number
- Press TEST for the results

Reference number table

Vehicle	Battery		Ref. Number
	Make	Model	
HUNK 160R FI.	EXIDE	ETZ5	27



Check and decide the battery reference number as per the battery type and vendor from reference sheet given on rear panel of the tester

Set the correct battery reference number by using up and down keys

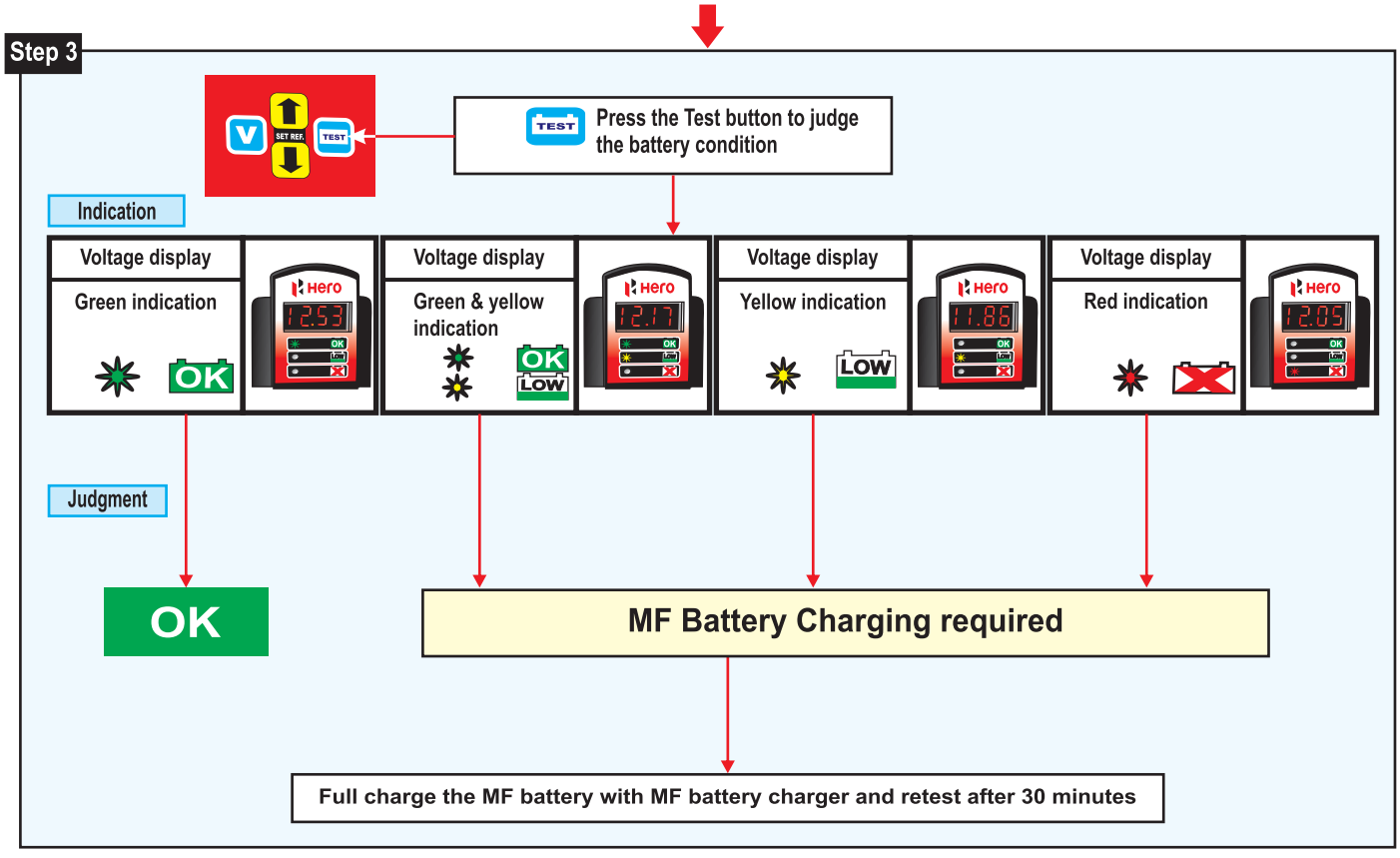
DO'S

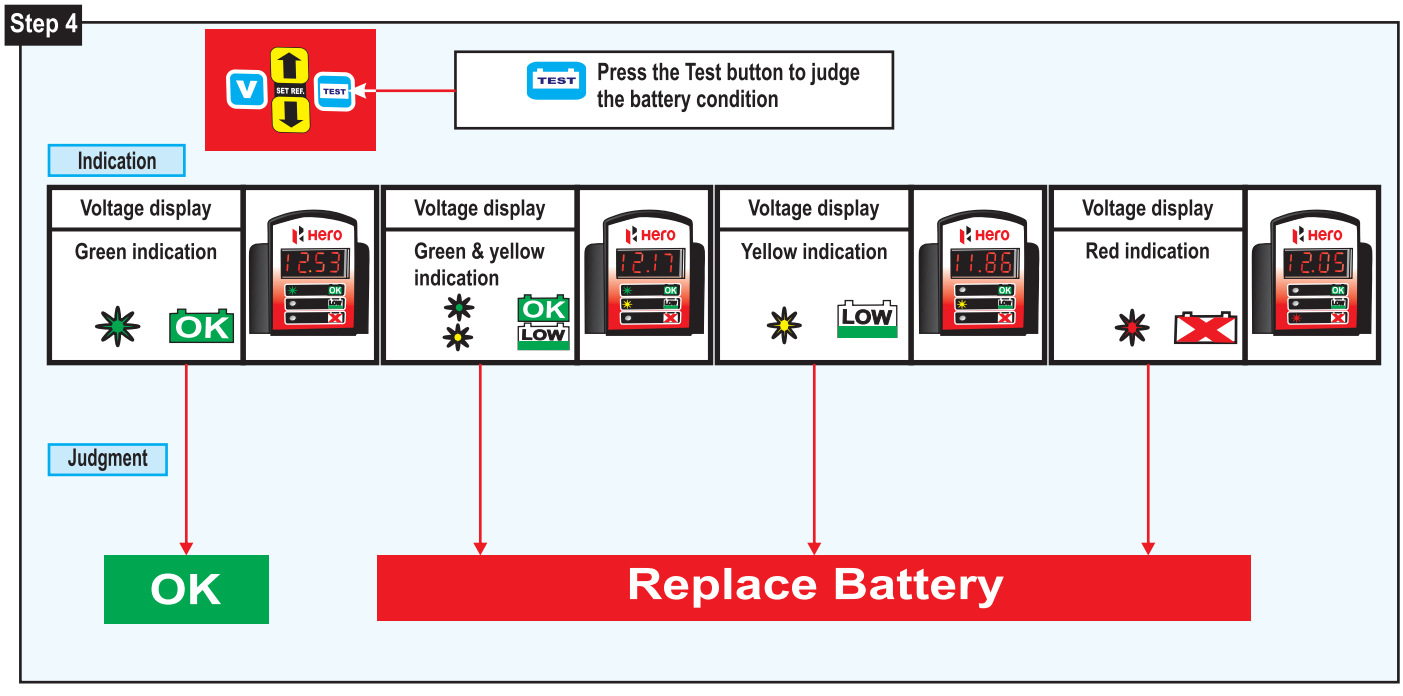
- Store MF Batteries in a cool, dry location with minimal temperature change
- Check MF Batteries OCV as per the maintenance schedule. If the battery open circuit voltage is less then 12.4V charge the battery with MF battery charger only.
- Make sure the area around the MF Battery Charger is well ventilated, clear of flammable materials, and away form heat, humidity, water and dust.
- Check the MF Battery with MF Battery tester in "as is" condition. Incase of MF Battery charged with MF Battery Charger or in vehicle, wait for minimum 30 minutes before testing.

DONT'S

- Do not store MF Batteries in a place directly exposed to sunlight or at high temperature
- Do not charge the MF battery on conventional battery charger.
- Do not squeeze a battery pack that is draining into a battery.
- Do not reopen the sealing cap from the battery for any reason.
- Do not interchange conventional and Maintenance-Free batteries.
- Do not install a filled, but uncharged (or untested) battery.
- Do not add any type of additives to any Maintenance-Free battery.

17


Step 3
Press the Test button to judge the battery condition
Indication
Voltage display
Green indication
OK
Voltage display
Green & yellow indication
OK
LOW
Voltage display
Yellow indication
LOW
Voltage display
Red indication
Judgment
OK
MF Battery Charging required
Full charge the MF battery with MF battery charger and retest after 30 minutes


Step 4
Press the Test button to judge the battery condition
Indication
Voltage display
Green indication
OK
Voltage display
Green & yellow indication
OK
LOW
Voltage display
Yellow indication
LOW
Voltage display
Red indication
Judgment
OK
Replace Battery

ELECTROLYTE FILLING IN A NEW DRY TYPE BATTERY

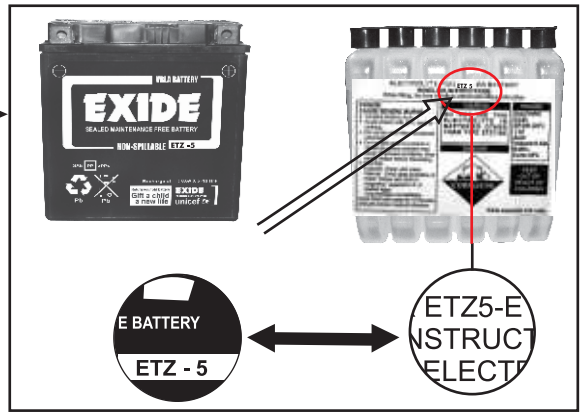
1. Match the electrolyte container to the battery.
2. Peel-off the aluminum sealing tape from the battery.
3. Remove the RUBBER SEALING CAP STRIP from the battery container.
   - Do not damage or remove the electrolyte container aluminum seals.
   - Do not cut or puncture the container.
4. Invert the electrolyte container over the battery ports. Align the container spouts with the battery port and firmly press the container into the ports.

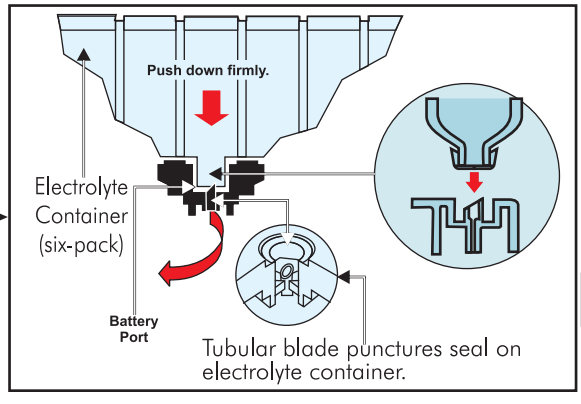
   Once the container seals are punctured, be sure the container remains PERFECTLY UPRIGHT until the electrolyte has COMPLETELY DRAINED.

   Check each container cell to be sure the fluid level is dropping, you may lightly tap the container a few times on the top.
5. Allow the electrolyte to drain COMPLETELY from the container. There MUST BE NO ELECTROLYTE LEFT in the container.
   - Leave the electrolyte container for about 20 minutes.
   - Do not SQUEEZE the electrolyte container.
   - Do not ADD anything else to the battery.
6. Install the RUBBER SEALING CAP STRIP onto the battery port.
7. Allow the battery to idle for 10 minutes after completion of the filling & sealing process to enable the electrolyte to soak into the plates before checking the OPEN CIRCUIT VOLTAGE:
8. If the OPEN CIRCUIT VOLTAGE is 12.4 V and above the battery can be installed and used as it is. If the OPEN CIRCUIT VOLTAGE is less than 12.4 V the battery needs to be charged on MF-Battery Charger on "Initial Mode" before use.
9. Dispose the electrolyte container in an environmentally safe manner.

⚠ WARNING

- Battery acid is highly corrosive.
- Contact with battery acid can damage your eyes, skin, or clothing.
- Wear eye protection and protective clothing when working with battery acid.





17

HERO MOTOCORP MF-BATTERY CHARGER

Hero MotoCorp MF Battery Charger is designed for vehicles with 12V MF-Batteries only and can be used both for regular charging of service batteries and initial charging of new batteries. LED indicator glows when the battery is fully charged, and automatically switches over to a sustained charging mode.

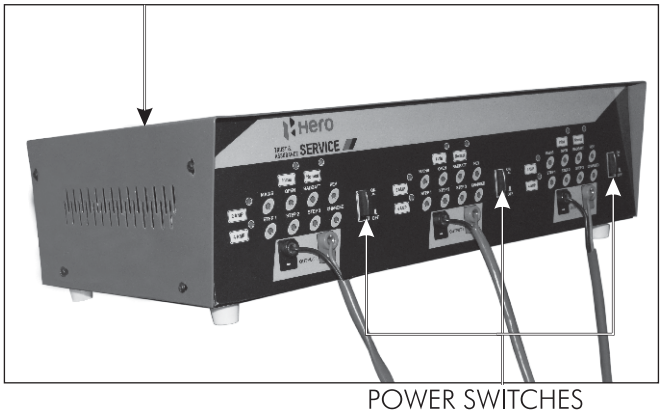
It has a forced recovery function using maximum of 20V/200mA for a deeply discharged battery that cannot be recovered with regular charging. However, not all the deeply discharged batteries can be recovered.

This charger also has a failure inspection function which indicates if the battery cannot be charged properly due to a short-circuit, electrolyte shortage, or sulfation after 30 minutes of inspection time.

NOTE

Make sure the area around the charger is well ventilated, clear off flammable materials, away from heat, humidity, water, and dust.

MF-BATTERY CHARGER



POWER SWITCHES

CHARGING PROCEDURE

1. Connect mains lead to a 220V AC power supply and switch "ON" the main supply.
2. Connect the battery charger leads to battery terminals (Red lead to (+)ve terminal and Black lead to (-)ve terminal) .
3. Switch "ON" the battery charger main switch, a "GREEN" LED will glow on the battery charger.
   - If the battery is not connected to the charger prior to switching "ON", a open circuit "RED" LED will start blinking to indicate a open circuit.
   - Switch "OFF" the battery charger and connect the battery to the battery charger properly and then switch "ON" the battery charger.
4. Select and press the button for charging mode as "Normal" or Initial.

   Initial - Initially filled Dry type MF Batteries.
   - Select the maximum charging current to 2 AMP for all battery capacity i.e. 3 Ah, 4 Ah, 5 Ah & 6 Ah.

   Normal - Wet type MF-Batteries in use in vehicles.
   - Select the maximum charging current to **2 AMP** or **4 AMP** depending upon the battery capacity. For 3Ah & 4Ah batteries select-**2 AMP** and for 5Ah & 6Ah batteries select-**4 AMP**.
5. MF-Battery Charger detects the battery voltage and if the voltage is less than 5V it will switch over to Step 1 (20V/200mA charging - Forced Recovery Mode).
   - In this step the MF-Battery Charger detects the battery voltage after every 3 minutes continuously. If the battery voltage is more than 5V it switches over to Step 2/Step 3 directly depending on the charging mode ("Normal" or "Initial").
   - Charging duration in this mode is 30 minutes.
   - If the battery voltage is less than 5V after 30 minutes a "RED" LED indicating a "BAD BATTERY" will glow. This indicates that the battery is not suitable for charging.
   - If the MF-Battery Charger switches to Step 2/Step 3 the battery would undergo charge for 5~10Hrs. depending on the battery condition.
6. After Completion of the battery charging a "GREEN" LED will glow to indicate completion of charging and the MF-Battery Charger will switch over to "Sustained Charging Mode".

NOTE

- All MF-Batteries (Dry type/Wet type) indicating an Open Circuit Voltage (OCV) less than 12.4 Volts require a charging using Hero MotoCorp MF-Battery Charger. Ensure to follow the battery charging procedure.
  - **Dry type MF Batteries:** Batteries that needs an initial electrolyte filling in workshop (Supplied through spare parts along with electrolyte container).
  - **Wet type MF Batteries:** Batteries filled with electrolyte and charged in the factory (Installed in new vehicles).
- During charging if the battery is disconnected an AUDIO INDICATOR will beep for 2 minutes with a "RED" LED blinking to indicate a "OPEN CIRCUIT".
- OPEN CIRCUIT "RED" LED will continue blinking until the battery is connected properly.

⚠ WARNING

- Charging a battery creates highly explosive hydrogen gas.
- You can be burned or seriously injured if it explodes.
- Do not allow smoking, flames, or sparks in the area where you are charging batteries.

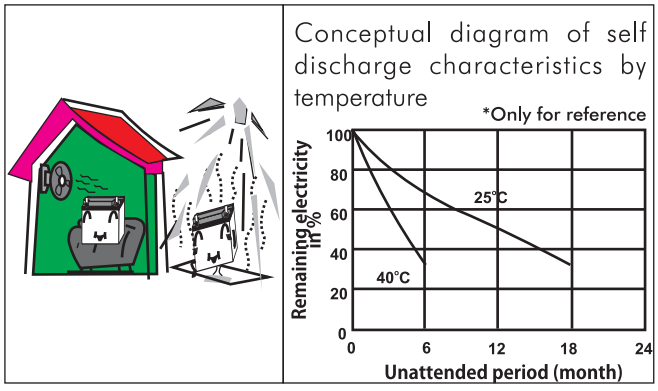
STORING BATTERIES

STORAGE PLACE

Keep batteries in a cool place.

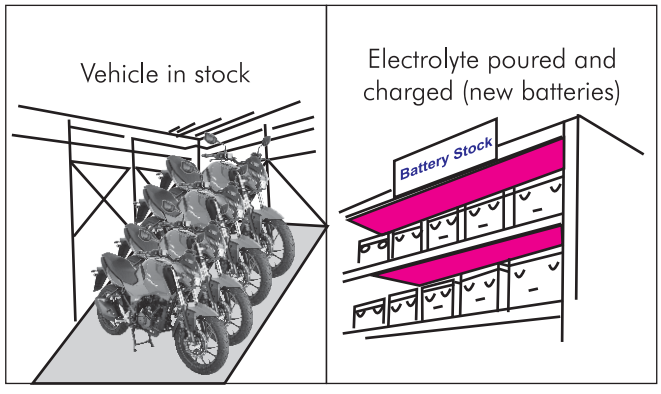
- A cool place (-5 to 15°C) is desirable.
- A dust free place which is neither exposed to rain nor direct sun.
- Self discharge.

The battery, after the electrolyte is filled, loses its electrolyte with the progress of time at a very small rate, even if the external circuit is not connected. This is called self discharge, and the rate is generally greater when the temperature is high.

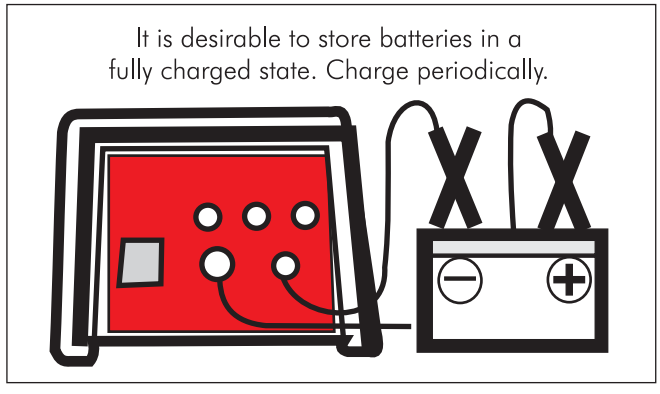


ELECTROLYTE IS POURED AND CHARGED

When new vehicles are stocked with charged batteries for which the electrolyte is filled, charge them once in every three months. This is the same for stocked batteries.

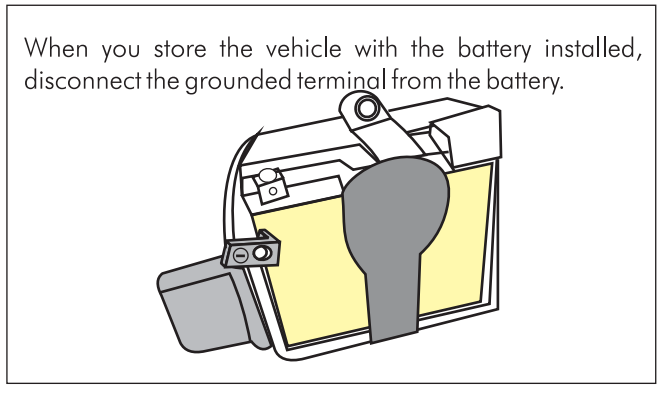


When the open voltage becomes below 12.4V even if the time is less than six months, charge the battery. This is to compensate the self discharge. Moreover, this will reduce sulfation when the batteries are stored at discharged state for a long period of time.



LONG TERM VEHICLE STORAGE

When you do not use the vehicle for a long period of time, remove and keep the battery in a safe place. When you store the vehicle with the battery installed, disconnect the grounded terminal from the battery. Charge the battery periodically to compensate for self discharge storage. The charging interval will be one month.

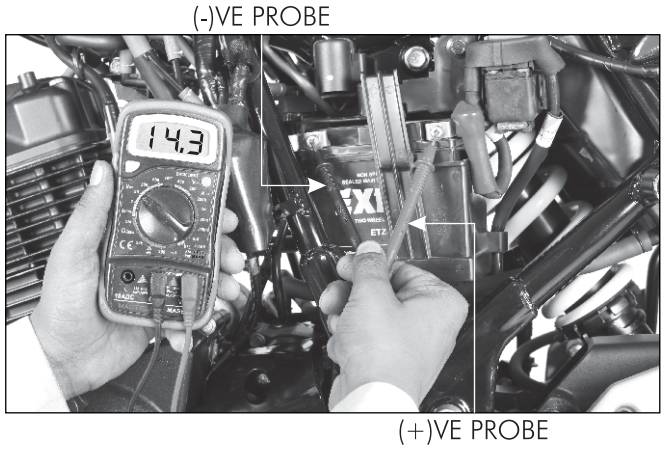


CHARGING SYSTEM

INSPECTION

NOTE

- Measuring circuits with a large capacity that exceeds the capacity of the multimeter may cause damage to the multimeter.
- Before starting each test, set the multimeter at the high capacity range first, then gradually down to low capacity ranges in order to ensure that you have the correct range and do not damage the multimeter.



REGULATED VOLTAGE INSPECTION

If the engine is running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.

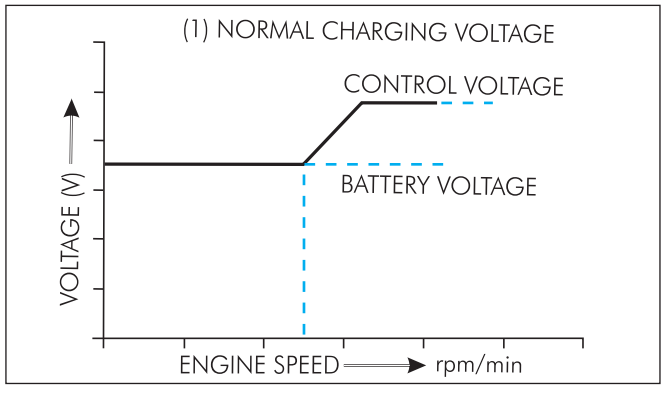
The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.

NOTE

Before performing this test, be sure that the battery is in good condition. Use of a battery with low charge will result in different readings. Start the engine and warm it up to normal operating temperature, then turn the ignition switch "OFF".

Remove the fuel tank cover.

Connect the multimeter between battery terminals.



CAUTION

- To prevent short circuit, make absolutely certain which are the positive and negative terminals or cable.
- Do not disconnect the battery or any cable in the charging system without switching "OFF" the ignition switch. Failure to follow this precaution can damage the multimeter or electrical components.

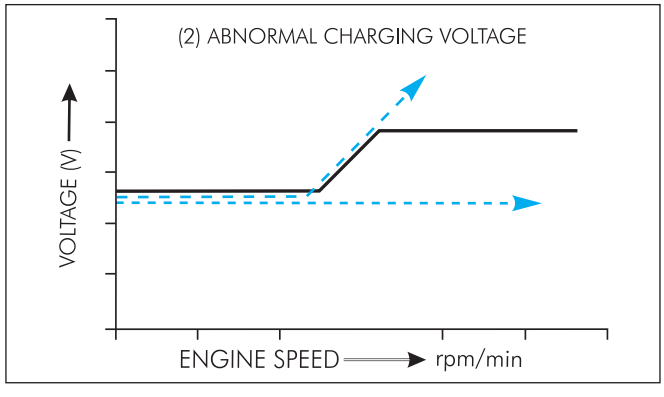
Start the engine and increase the engine speed gradually.

Read the multimeter.

Battery regulated voltage: 14.3±0.5V at 5000 rpm (with the charged battery)

The speed at which voltage starts to rise cannot be checked as it varies with the temperature and loads of the generator.

A frequently discharged battery is an indication that it is deteriorated even if it proves normal in the regulated voltage inspection.



CURRENT LEAKAGE TEST

Remove the fuel tank cover (page 2-5).

Turn the ignition switch "OFF" and disconnect the negative (-)ve cable from the battery.

Connect the multimeter (+)ve probe to the battery negative cable and the multimeter (-)ve probe to the battery negative terminal.

With the ignition switch "OFF", check for current leakage.

Current leakage: 0.20 mA maximum

If current leakage exceeds the specified value a shorted circuit is likely.

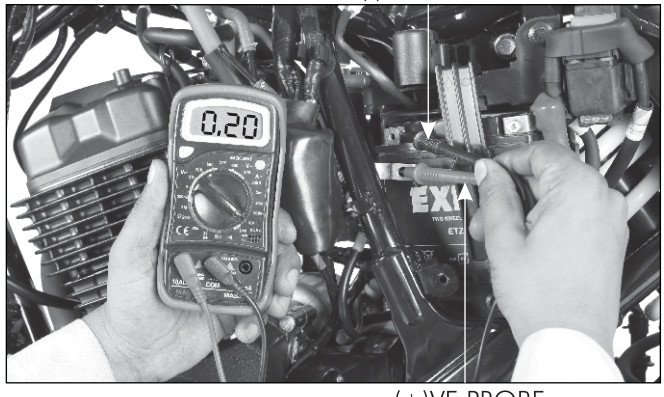
NOTE

When measuring current using a multimeter, set it to a high range and then bring the range down to an appropriate level. Current flow larger than the range selected may blowout the fuse in the multimeter.

CAUTION

While measuring current, do not turn the ignition switch "ON". A sudden surge of current may blowout the fuse in the multimeter.

(-)VE PROBE



(+)VE PROBE

REGULATOR/RECTIFIER

REMOVAL/INSTALLATION

Remove the fuel tank cover (page 2-5).

Disconnect the regulator/rectifier 6P connector.

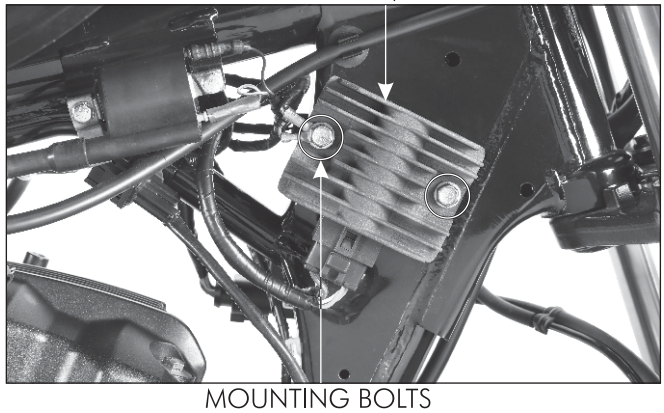
Remove the regulator/rectifier by removing bolts.

Installation is in the reverse order of removal.

NOTE

Route the wire harness properly.

REGULATOR/RECTIFIER



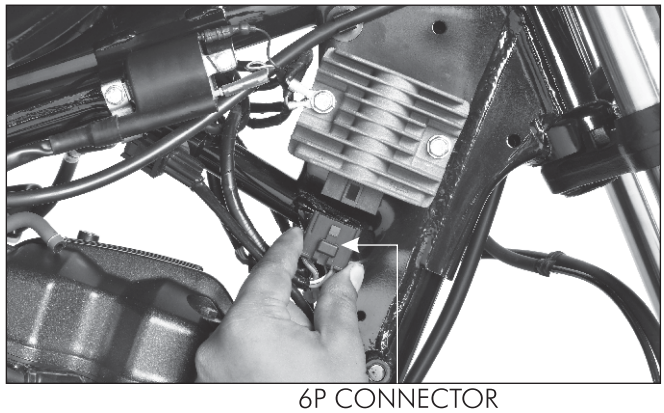
MOUNTING BOLTS

17

WIRE HARNESS INSPECTION

Disconnect the regulator/rectifier 6P connector.

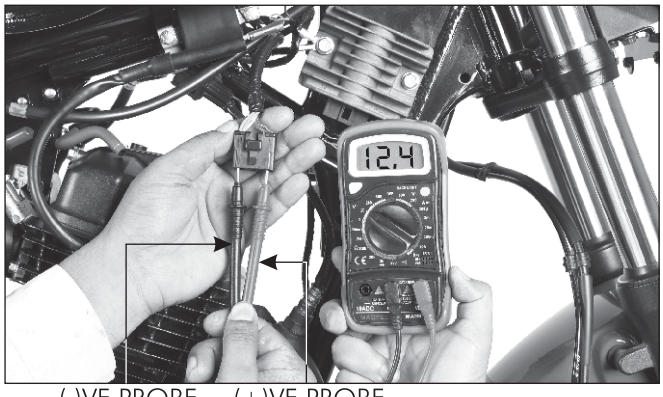
Check the connectors for loose or corroded terminal.



6P CONNECTOR

Check the voltage between red/yellow wire & green.

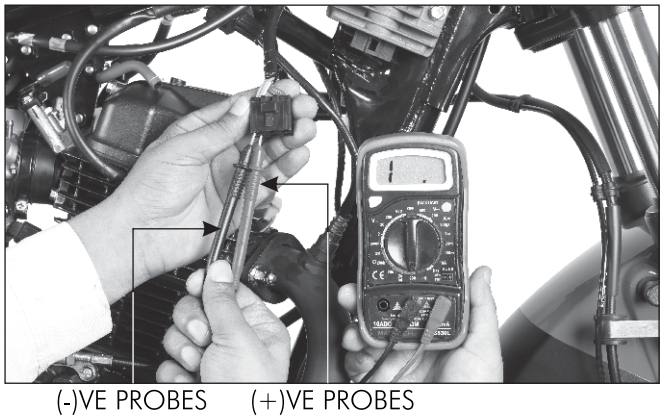
STANDARD: BATTERY VOLTAGE
CONNECTION
(+)VE PROBE: RED/YELLOW WIRE
(-)VE PROBE: GREEN



(-)VE PROBE (+)VE PROBE

Check the resistance between white wire and green.

STANDARD: 0.2-1.0Ω
CONNECTION
(+)VE PROBE: WHITE WIRE
(-)VE PROBE: GREEN


(-)VE PROBES (+)VE PROBES

Check the continuity between white wire and green.

STANDARD: CONTINUITY

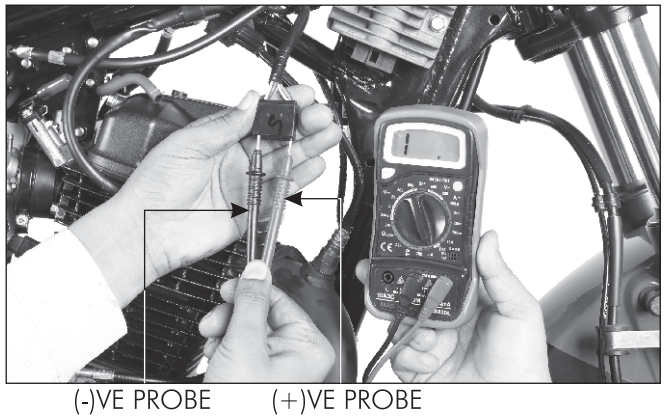
If all components of the charging system are normal and there are no loose connection at the regulator/rectifier connectors, replace the regulator/rectifier unit.

INSTALLATION

Installation is in the reverse order of removal.

NOTE

Route the wire harness properly.


(-)VE PROBE (+)VE PROBE

CHARGING LINE

NOTE

- This inspection can be performed with the alternator stator installed.
- Disconnect the alternator connector.

Remove the fuel tank cover (page 2-5).

Disconnect the ACG connectors.

Measure the stator coil resistance between each connector terminal and ground.

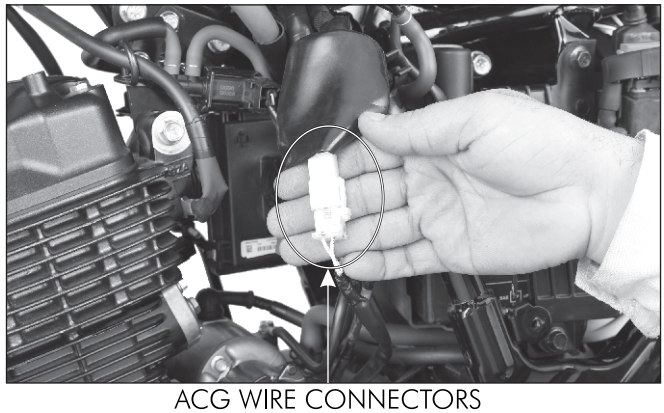
STANDARD: 0.2-1.0Ω

CONNECTION

(+)VE PROBE: WHITE WIRE

(-)VE PROBE: GROUND

If the stator coil reading is out of specification, check the wiring harness if ok then replace the stator (page 10-4).

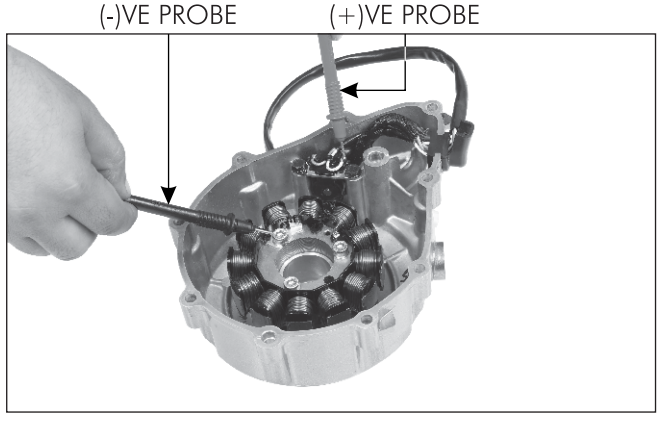


ACG WIRE CONNECTORS

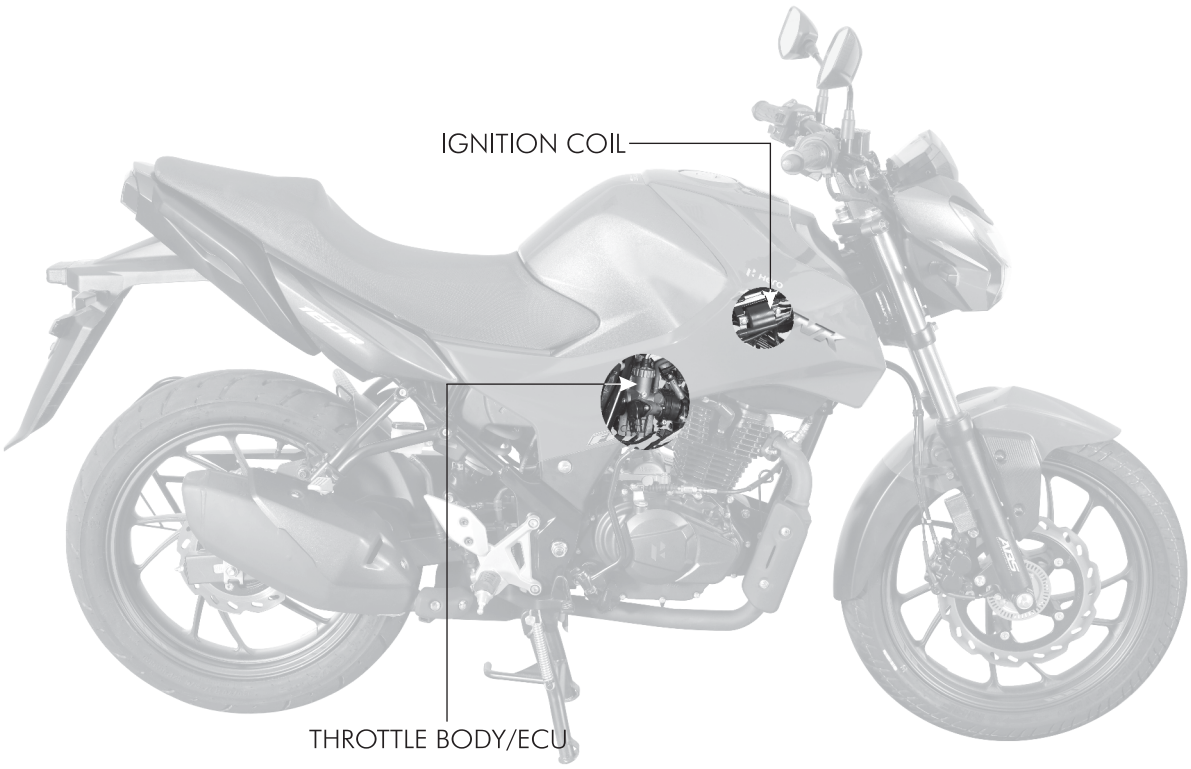
Check for continuity between the stator coil wire terminals white and ground.

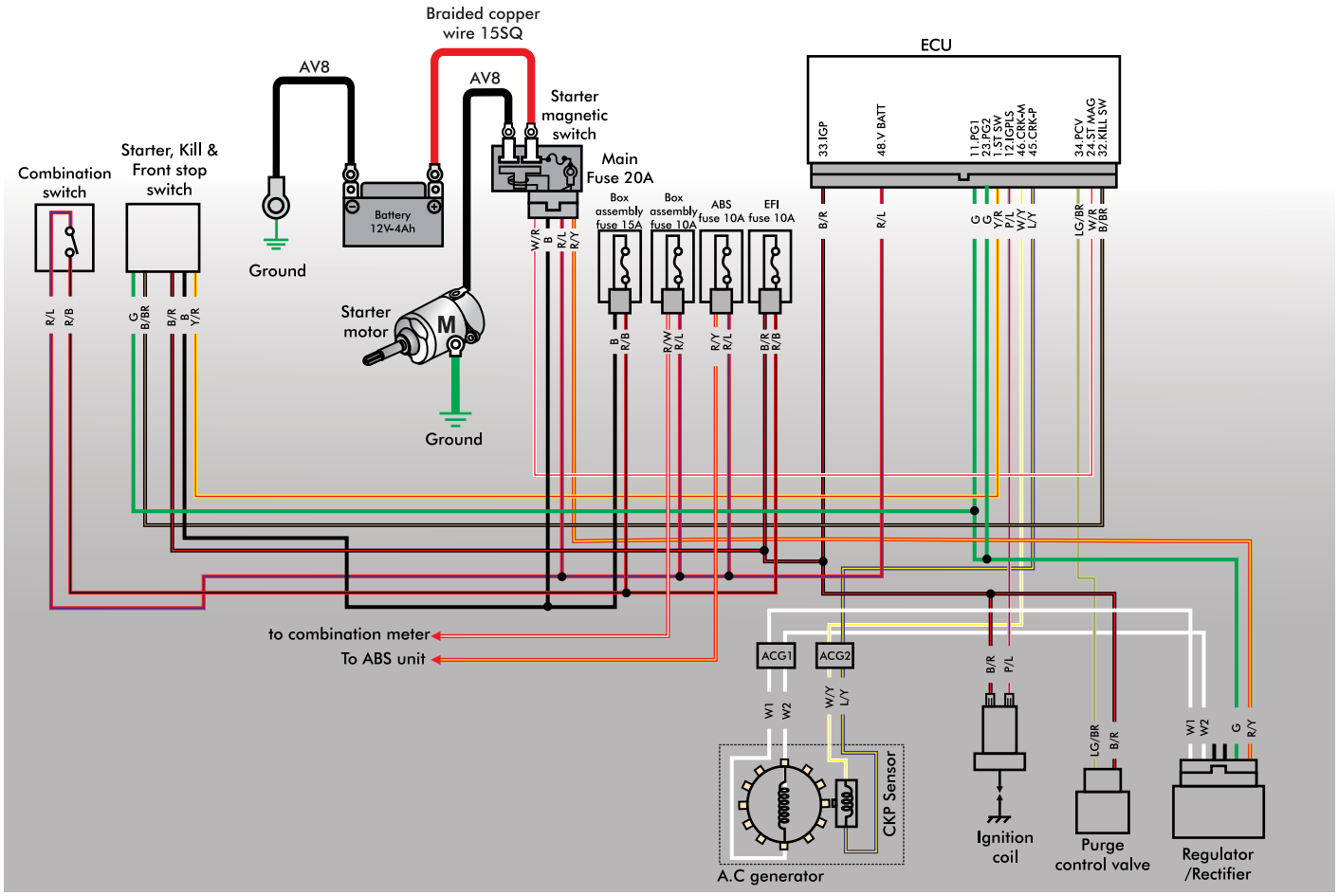
There should be continuity.

If there is no continuity between the connector and ground, replace the stator (page 10-4).



MEMO


IGNITION COIL
THROTTLE BODY/ECU


Braided copper wire 15SQ
AV8
AV8
Starter magnetic switch
Main Fuse 20A
Combination switch
Starter, Kill & Front stop switch
Battery 12V-4Ah
Ground
Starter motor
M
Ground
Box assembly fuse 15A
Box assembly fuse 10A
ABS fuse 10A
EFI fuse 10A
ECU
33.IGP
48.V BATT
11.PG1
23.PG2
1.ST SW
12.CRK-S
46.CRK-M
45.CRK-P
34.PCV
24.ST MAG
32.KILL SW
R/L
R/B
G
B/BR
B/R
B
Y/R
W/R
B
R/L
R/Y
B
R/B
R/W
R/L
R/Y
R/L
B/R
R/B
B/R
R/L
G
G
Y/R
P/L
W/Y
L/Y
LG/BR
W/R
B/BR
to combination meter
To ABS unit
ACG1
ACG2
W1
W2
W/Y
L/Y
CKP Sensor
A.C generator
B/R
P/L
Ignition coil
LG/BR
B/R
Purge control valve
W1
W2
G
R/Y
Regulator /Rectifier

System Diagram	18-0	Ignition System Inspection	18-3
Service Information	18-1	Ignition Coil	18-4
Specifications	18-1	CKP Sensor Inspection	18-6
Troubleshooting	18-2		

SERVICE INFORMATION

⚠ WARNING

- If the engine is running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.
- The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

CAUTION

- The ECU may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.

- Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is "ON" and current is present.
- When checking the ignition system, always follow the steps in the troubleshooting sequence (page 18-2).
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- For Programmed FI troubleshooting information (page 5-35).
- For alternator/starter clutch removal and installation, see **(SECTION 10).**
- The following components information
  - Ignition switch.
  - Clutch switch.
  - Neutral switch.
  - ECU (page 5-34).

SPECIFICATIONS

IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	Standard	NGK-CPR 8EA9, BOSCH UR5DC
	Spark plug gap	0.8-0.9 mm
Peak voltage	CKP sensor	1.5 V (Minimum) @ 300 rpm (gap 1.1 mm)
Ignition coil	Primary coil resistance @ 20°C/68°F	2.3Ω±10%
	Secondary coil resistance (without noise suppressor cap) @20°C/68°F	11kΩ±20%
CKP sensor resistance		50-200Ω

TROUBLESHOOTING

Inspect the following before diagnosing the system.

- Faulty spark plug
- Loose noise suppressor cap or spark plug wire
- Water got into the noise suppressor cap (Leaking the ignition coil secondary voltage)

UNUSUAL CONDITION		PROBABLE CAUSE (CHECK IN NUMERICAL ORDER)
Ignition coil primary voltage	No primary voltage (battery voltage) with the ignition switch "ON"	1. Open circuit in primary wire (incase when "NO CONTINUITY" is observed between PIN-12 of ECU and ignition coil (+)ve terminal) (page 5-56). 2. Faulty 10A fuse. 3. Loose connections at battery terminals or open circuit in battery cables. 4. Battery undercharged or discharged. 5. Open circuit in ECU green wire. 6. Faulty ECU (incase when above 1-5 are normal and battery voltage in not observed at PIN-48 (page 5-35) of ECU).
	Primary voltage is normal, but does not spark.	1. Faulty noise suppresser cap. 2. Faulty spark plug or leaking ignition coil secondary current. 3. Faulty ignition coil. 4. Faulty ECU.
CKP sensor	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/ DCV. 2. Cranking speed is too slow (Battery is undercharged). 3. The sampling timing of the tester and measured pulse were not synchronized (System is normal if measured voltge is over the standard voltage at lease once). 4. Faulty ECU (In case when above No. 1-3 are normal).
	No peak voltage	1. Faulty peak voltage adaptor 2. Faulty CKP sensor

IGNITION SYSTEM INSPECTION

Inspect the ignition switch (page 20-13).

Remove the noise suppressor cap from the plug, install a known good spark plug to the noise suppressor cap and ground it to the engine.

Turn the ignition switch "ON" and crank the engine.

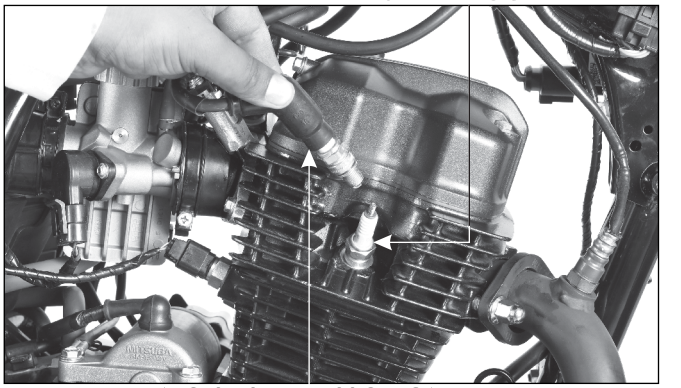
Spark should jump at the plug.

If there is no spark, check the ignition circuit.

NOTE

If no spark jumps at the plug, check all connections for loose or poor contact before measuring voltage.

SPARK PLUG



NOISE SUPPRESSOR CAP

IGNITION COIL PRIMARY VOLTAGE

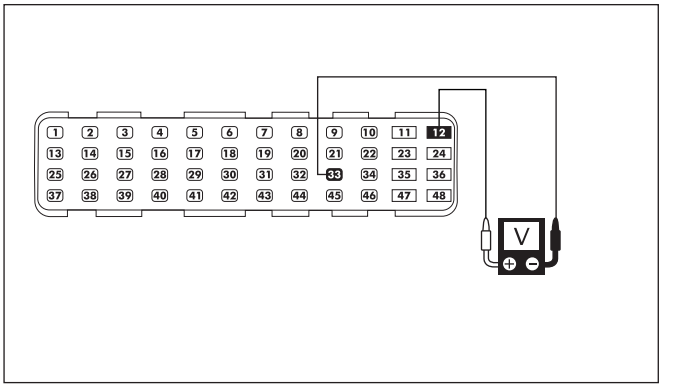
NOTE

- Check the system connections before inspection. Poor connected connectors can cause incorrect readings.
- Check that the cylinder compression is normal and the spark plug is installed correctly into the cylinder head.
- Do not connect the fuel pump 5P connector.

Remove the fuel tank cover (page 2-5).

Disconnect the ECU 48P connector from the ECU.

Connect the multimeter (+) probe and (-) probe as shown.



CONNECTION

Pin- 12 and Pin- 33

Turn the ignition switch ON.

Check for initial voltage at this time, battery voltage should be present.

Voltage: Battery Voltage

If the initial voltage cannot be measure, check the power supply circuit.

For ignition system troubleshooting (page 18-2).

⚠ WARNING

To avoid possible electrical shock during voltage measurements, do not touch test probe metal parts.

It the peak voltage is abnormal, check for an open circuit or poorly connected connectors in pink/blue wire.

If no defects are found in the harness, refer to the troubleshooting chart (page 18-2).

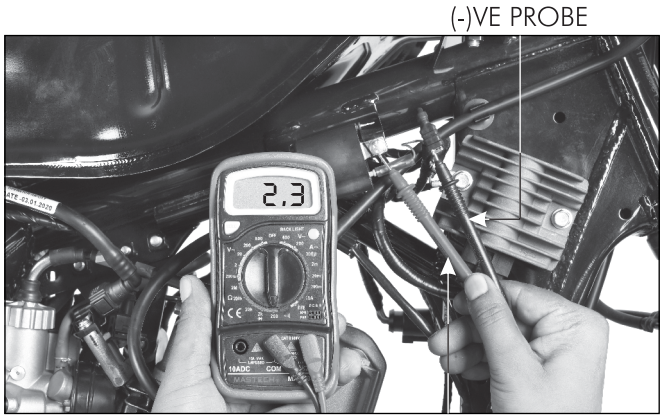
IGNITION COIL

Remove the fuel tank cover (page 2-5).

INSPECTION

Disconnect the ignition coil primary wire connectors. Measure the primary coil resistance between the connector terminals.

Standard: 2.3Ω±10%



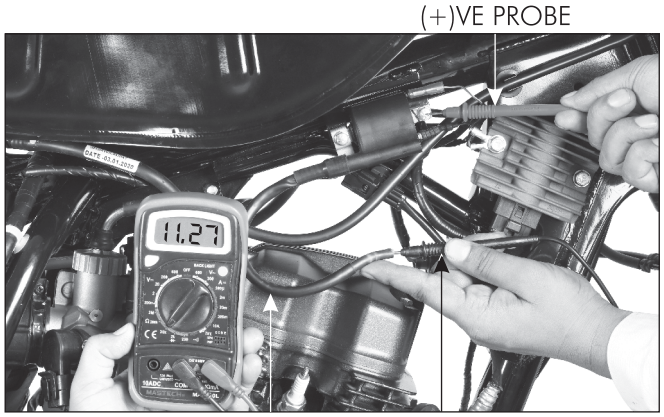
SECONDARY COIL

Remove the noise suppressor cap from the spark plug wire (HT cable) and measure the secondary coil resistance between the spark plug wire and ignition coil ground.

SECONDARY COIL RESISTANCE (WITHOUT NOISE SUPPRESSOR CAP): 11 kΩ±20%

INSTALLATION

Installation is in the reverse order of removal.



18

REMOVAL

Remove the fuel tank cover (page 2-5).

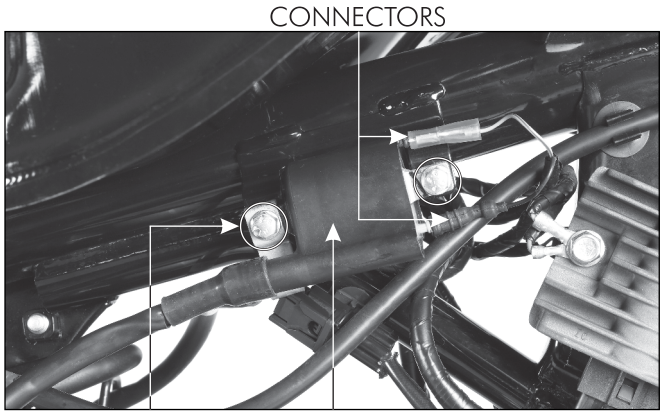
Disconnect the ignition coil primary wire connectors.

Remove the noise suppressor cap from the spark plug.

Remove the bolts and the ignition coil from the frame.

INSTALLATION

Installation is in the reverse order of removal.



CKP SENSOR PEAK VOLTAGE

NOTE

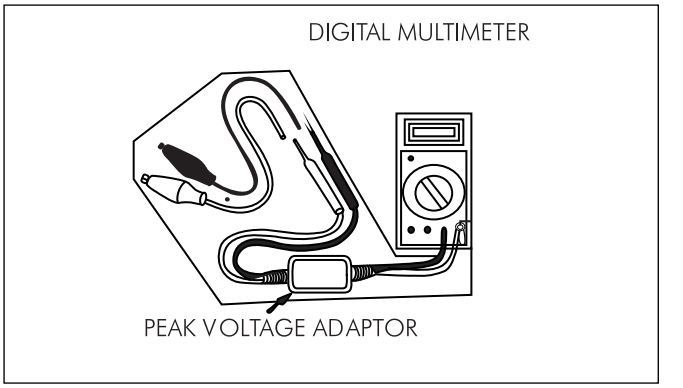
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Install the spark plug into the cylinder head and measure the peak voltage under normal cylinder compression.
- The reading differs depending on the multimeter input impedance. Therefore, use only commercially available multimeter with the input impedance higher than 10MΩ/ DCV.

Disconnect the ECU 48P connector from the throttle body/ ECU (page 5-34).

Connect the peak voltage adaptor (+) probe and (-) probe as shown.

TOOL

PEAK VOLTAGE ADAPTOR
MULTIMETER



CONNECTION

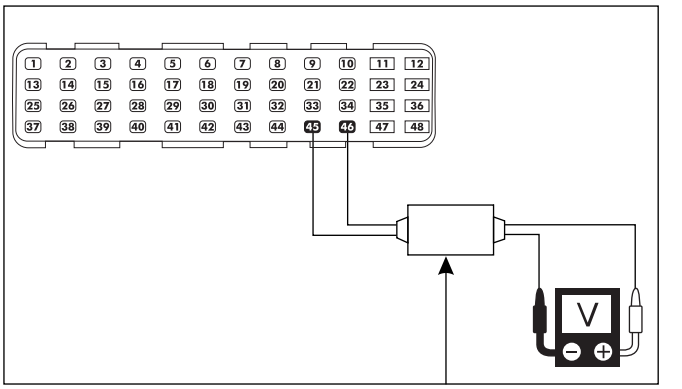
Pin- 45 and Pin- 46

Crank the engine and read the CKP sensor peak voltage.

Peak voltage: 1.5V @ 300 rpm (Min) @ 1.1 mm gap

If the peak voltage measured at the ECU 48P connector is abnormal, measure the peak voltage at the CKP sensor connector.

Disconnect the CKP sensor 2P connector and connect the tester probes to the terminal.



CONNECTION

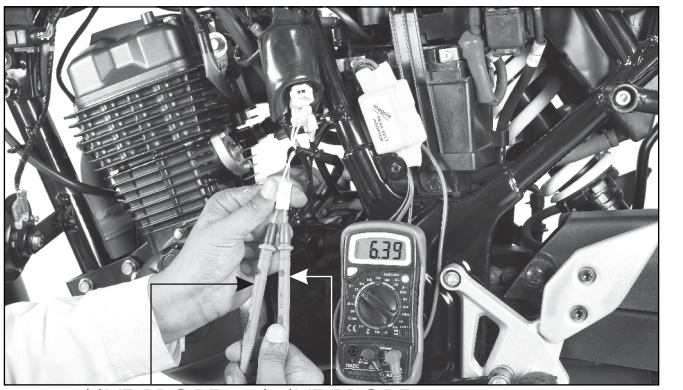
Blue/ Yellow and White/Yellow

Connect the peak voltage adaptor (+)ve probe to the CKP sensor (blue/yellow) wire connector terminal and (-)ve probe to the (white/yellow) wire connector terminal.

Measure the peak voltage and compare it to the voltage measured at the ECU 48P connector.

NOTE

- If the peak voltage measured at the ECU is abnormal and the one measured at the CKP sensor is normal check the 2P connector for loose connection and the wire harness for an open circuit or loose connection.
- If both peak voltage measured are abnormal, refer to the troubleshooting chart (page 18-2).
- If all items are normal, the ignition pulse generator is faulty. For CKP sensor replacement.



CKP SENSOR INSPECTION

NOTE

It is not necessary to remove alternator stator and CKP sensor to make this inspection.

Disconnect the CKP sensor 2P wire connector. Measure the CKP sensor resistance.

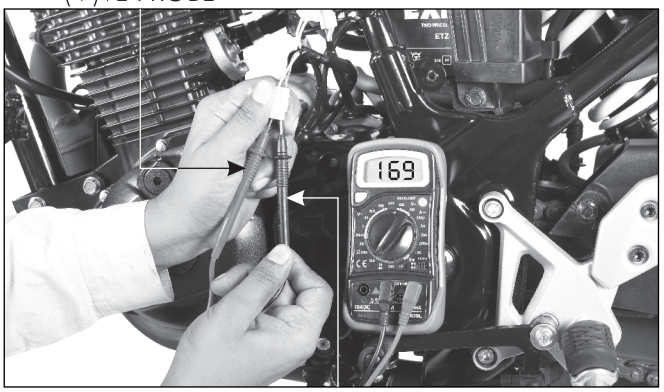
INSPECTION

Blue/Yellow and White/Yellow

Standard: 50-200 Ω at 20°C/68° F

For ignition CKP sensor replacement.

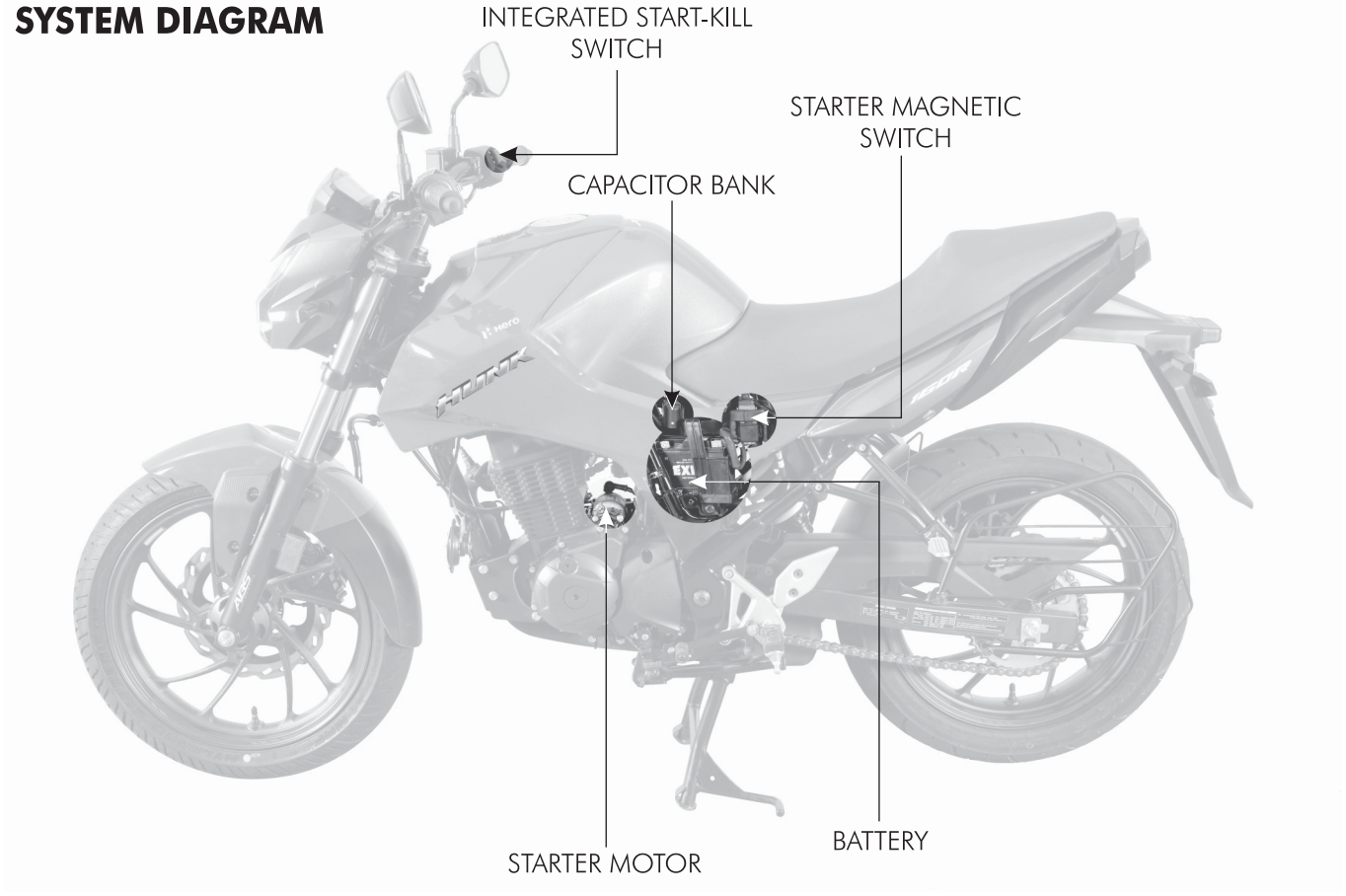
(+)VE PROBE

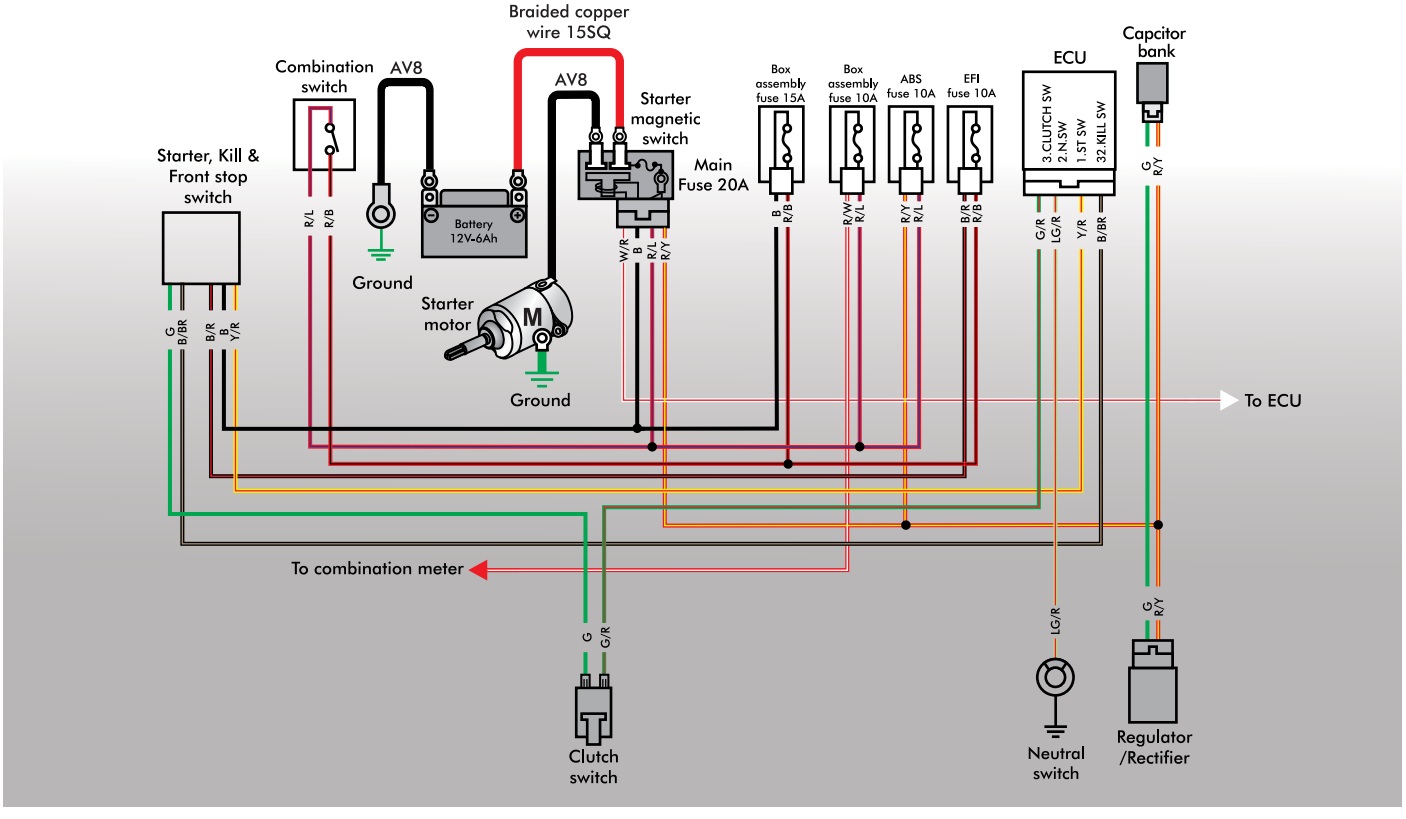


(-)VE PROBE

MEMO

SYSTEM DIAGRAM





System Diagram	19-0	Starter Motor	19-4
Service Information	19-1	Starter Magnetic Switch	19-8
Specifications	19-1	Capacitor Bank	19-9
Troubleshooting	19-2		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- Always turn the ignition switch "OFF" before servicing the starter motor. The motor could suddenly start, causing serious injury.
- If the current keeps flowing through the starter motor to operate it while the engine is unable to crank, the starter motor may be damaged.

- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- For the starter clutch servicing.
- Refer to the following components information.
  - Ignition switch (page 20-13).
  - Starter magnetic switch (page 19-8).
  - Neutral switch (page 20-10).
  - Clutch switch (page 20-17).

SPECIFICATIONS

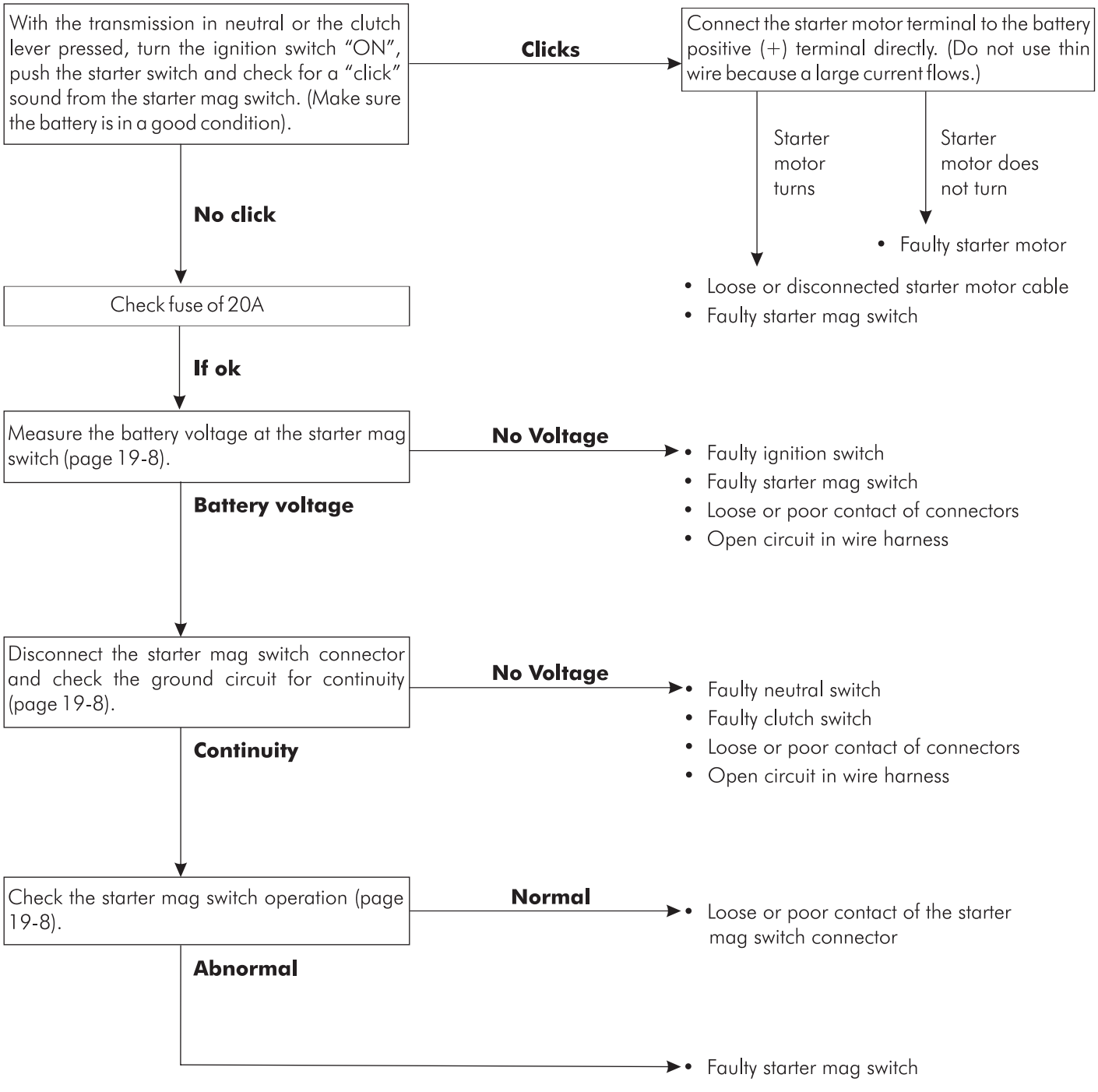
ELECTRIC STARTER

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	7.0 mm	3.5 mm

TROUBLESHOOTING

Starter motor will not turn

- Check for blown fuse before checking



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any gear position except neutral.

- Faulty clutch switch

Starter Motor turns engine slowly

- Low battery voltage
- Poorly connected battery cables
- Poorly connected starter motor cable
- Poorly connected battery ground cable
- Faulty starter motor

Starter Motor turns, but engine does not crank

- Starter motor is running backwards
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear, driven gear, idle gear and/or reduction gear

Starter Relay "CLICKS", but engine does not crank

- Crankshaft does not turn due to engine problems

STARTER MOTOR

REMOVAL

⚠ WARNING

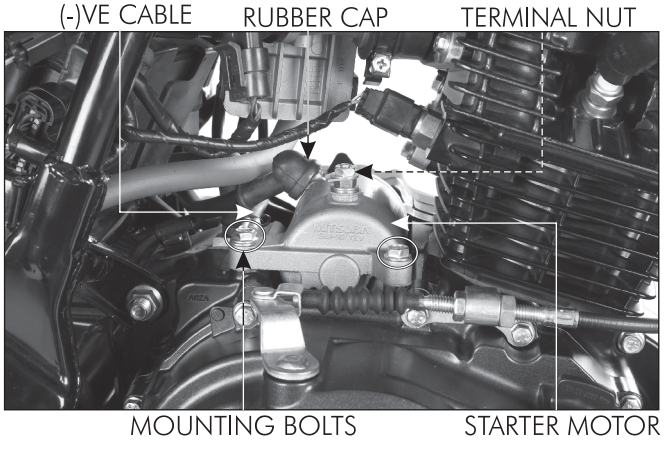
Always turn the ignition switch "OFF" before servicing the starter motor.

Remove fuel tank cover (page 2-5).

Disconnect the negative (-)ve cable from the battery terminal.

Remove the rubber cap and then hold the terminal nut of starter motor to remove the cable mounting nut and cable from the starter motor.

Remove the two mounting bolts, disconnect the battery negative (-)ve cable and the starter motor.



DISASSEMBLY

Remove the two starter motor case bolts and O-ring.

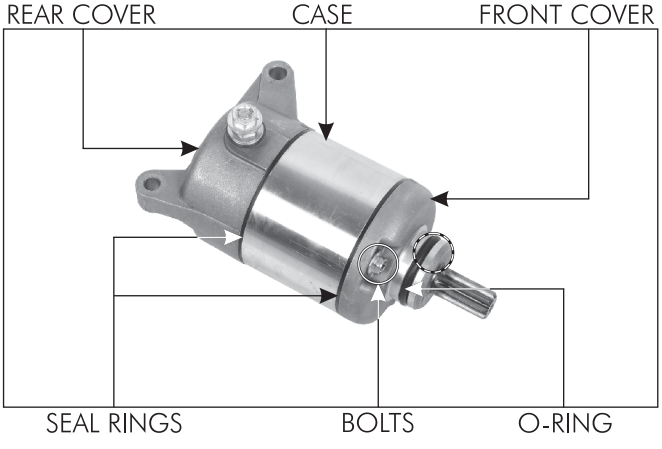
Remove the front and rear covers from the motor case and seal rings.

NOTE

For correct assembly, record the location and number of shims between the armature and covers.

Remove the O-rings and armature from the motor case.

Remove the lock washer.

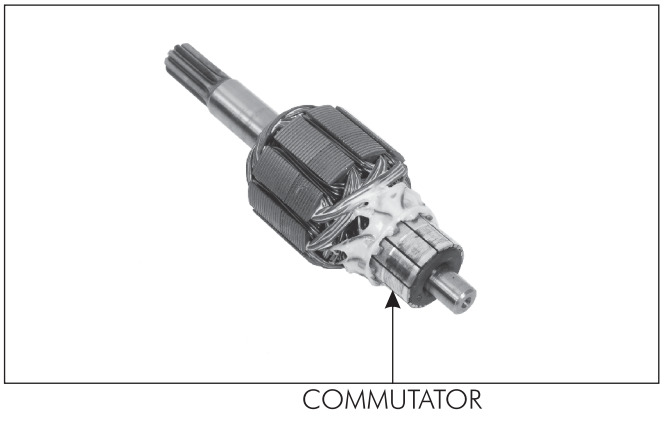


COMMUTATOR INSPECTION

Inspect the commutator bars for discolouration. Bars discoloured in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

NOTE

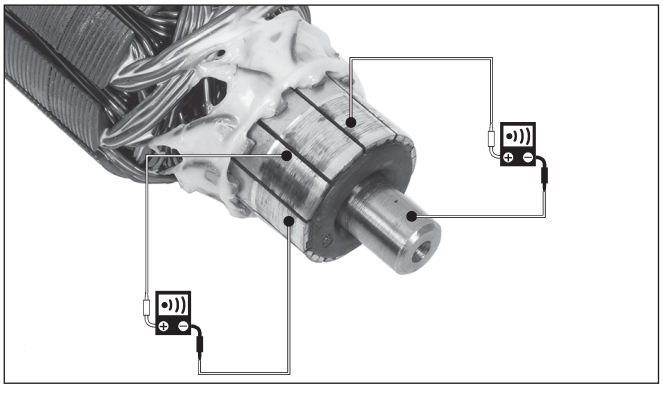
Do not use emery or sand paper on the commutator.



Check for continuity between pairs of commutator bars. There should be continuity.

Also, check for continuity between the individual commutator bars and the armature shaft.

There should be no continuity.

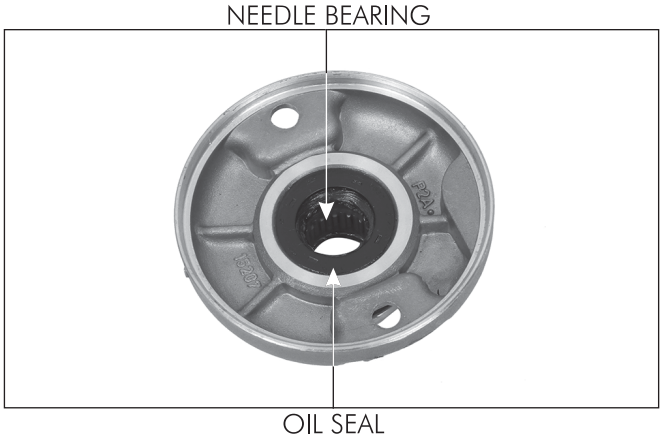


19

FRONT COVER INSPECTION

Check the oil seal for wear, damage or deterioration.

Check the needle bearing for wear or damage.

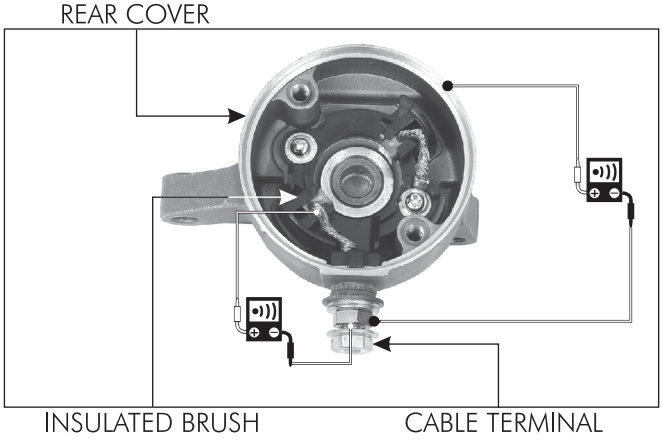


INSULATOR INSPECTION

Check for continuity between the cable terminal and rear cover. There should be no continuity.

Check for continuity between the cable terminal and insulated brush.

There should be continuity.

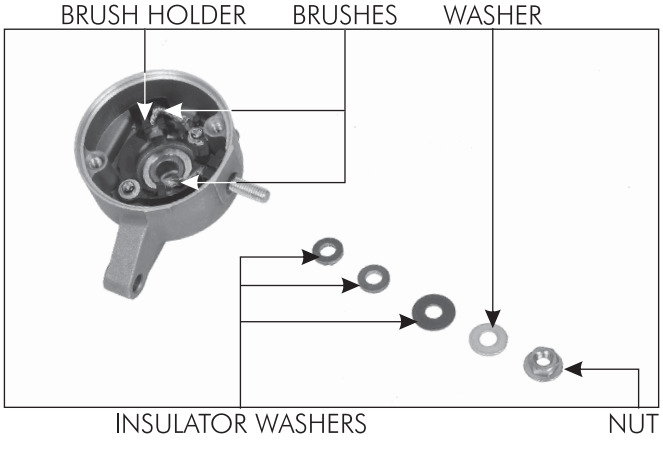


BRUSH INSPECTION

Remove the nut, washer, insulator washers from the cable terminal.

Remove the brush holder from the rear cover.

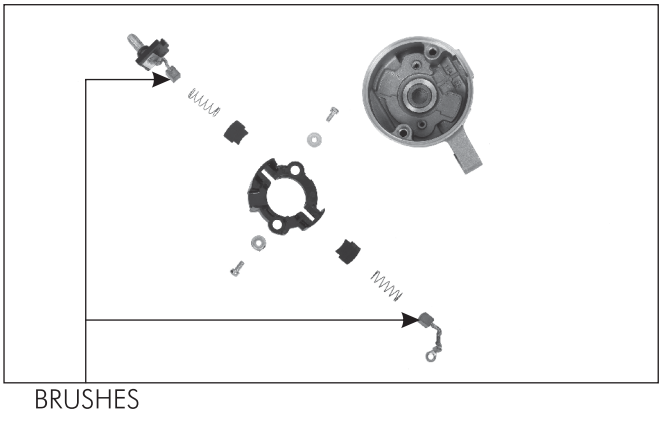
Remove the brushes from the holder.



Measure the brush length.

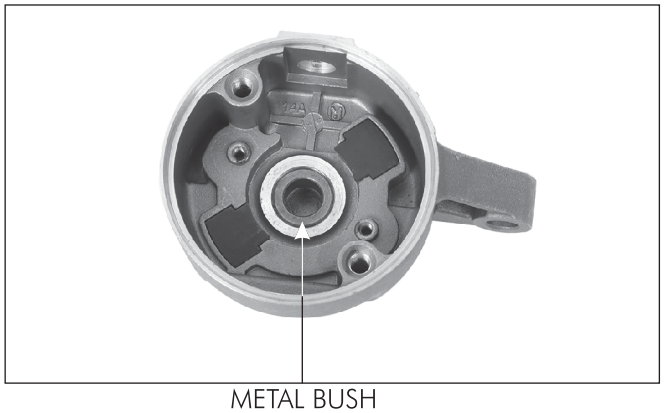
SERVICE LIMIT

BRUSH LENGTH: 3.5 mm

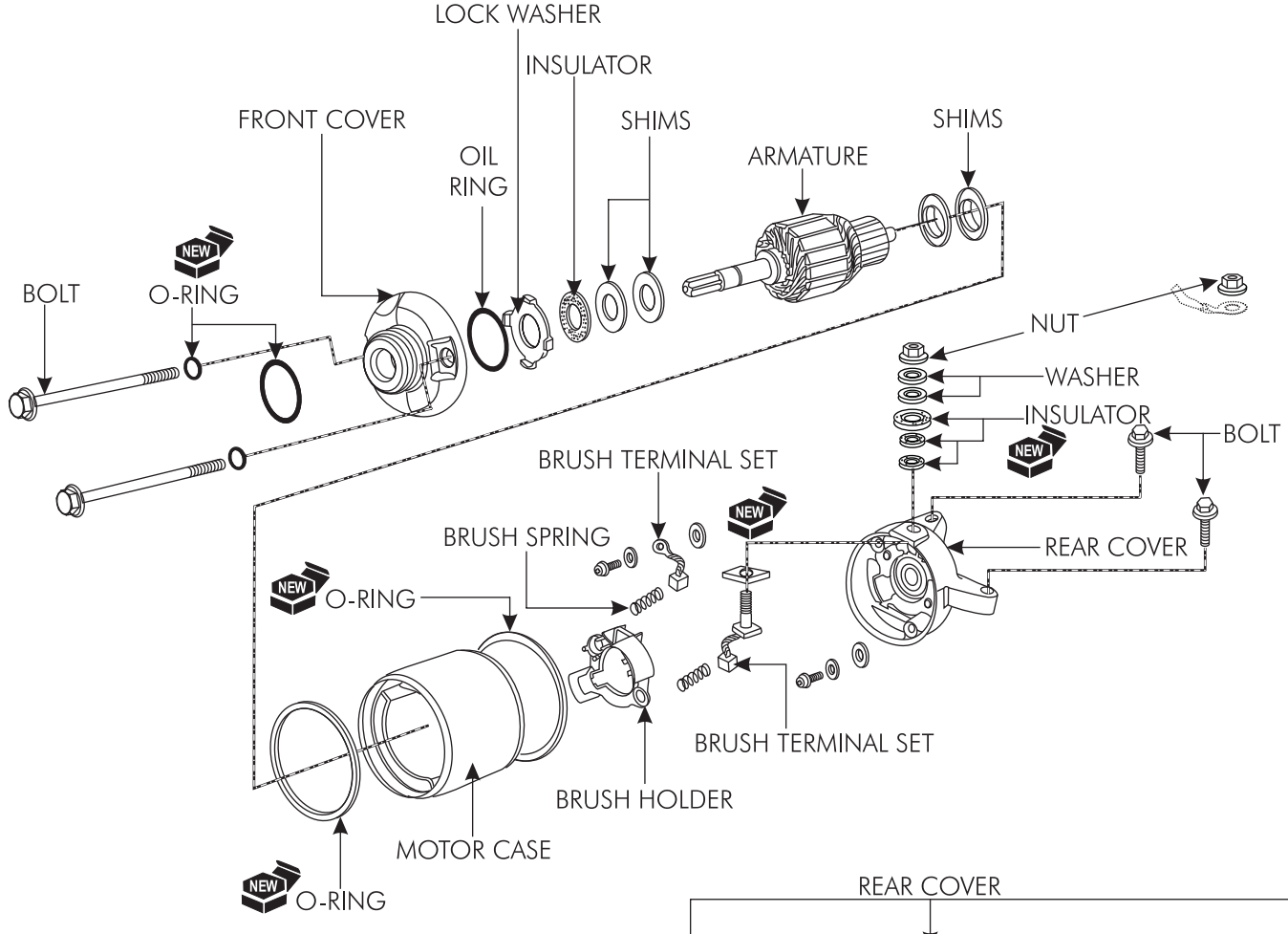


REAR COVER INSPECTION

Check the metal bush for wear or damage.

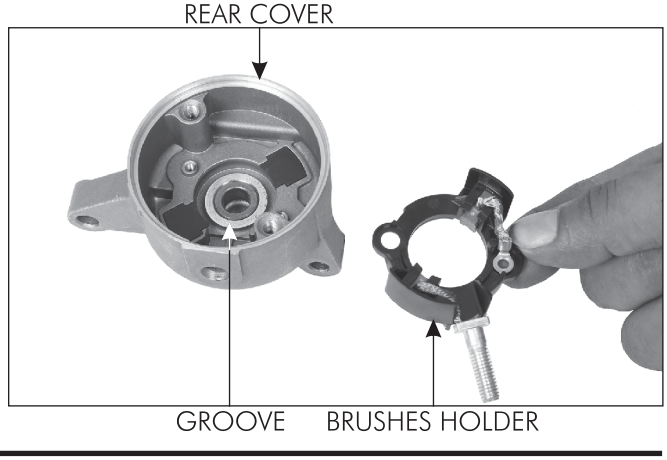


ASSEMBLY

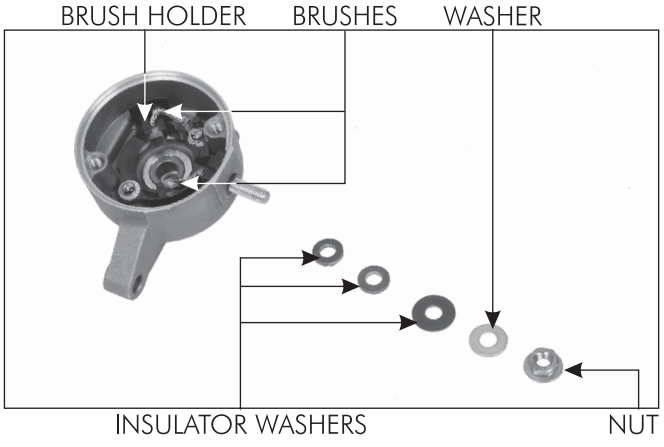


Install the brushes into the holder.

Install the brush holder into the rear cover while aligning the brush holder into the rear cover.



Install the insulator washers, washer and nut onto the cable terminal as shown.



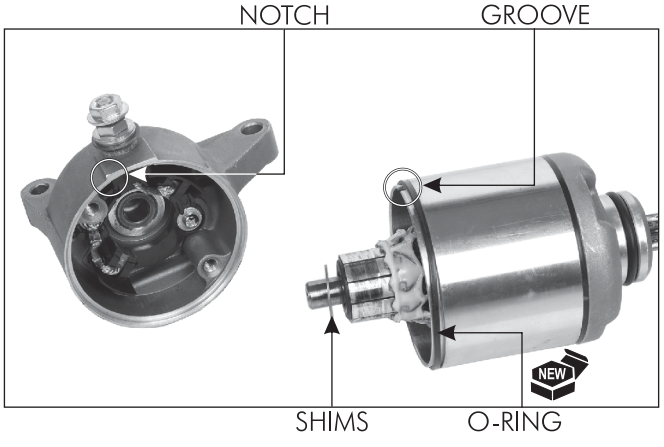
Install the armature into the motor case.

Install a new O-ring onto the motor case.

Install the shims onto the commutator shaft.

NOTE

- Be sure that proper number and location of shims, as previously noted, have been placed on the shaft.
- Align the brush holder groove with the motor case notch and install the rear cover onto the motor case while pushing in the brushes.



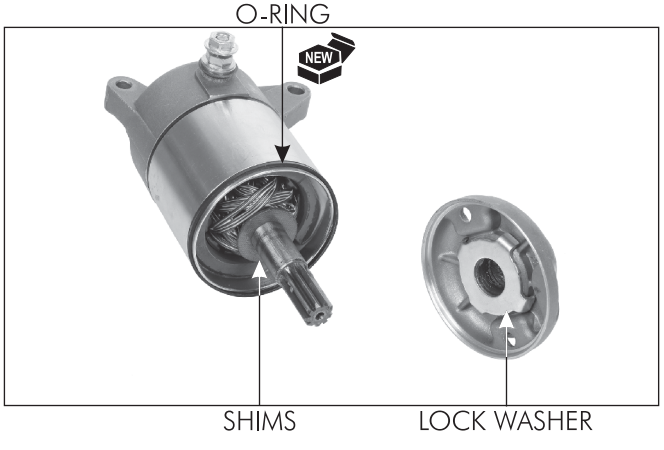
Install a new O-ring onto the motor case.

Install the shims onto the commutator shaft.

NOTE

Be sure that proper number and location of shims, as previously noted, have been placed on the shaft.

Install the lock washer onto the front cover.

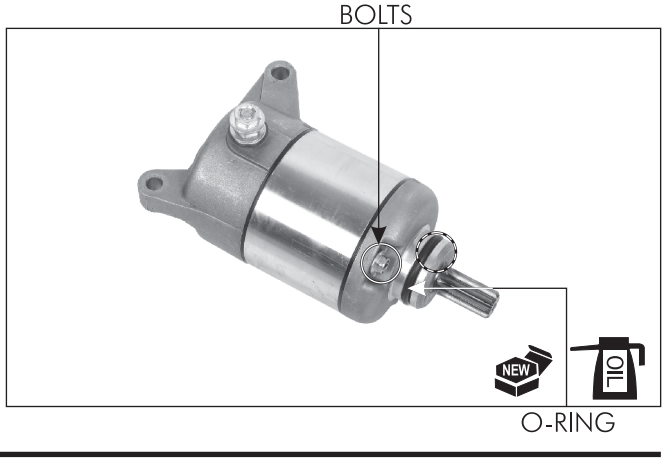


Install the front cover onto the motor case.

Install the washers and new O-rings onto the motor case bolts.

Install and tighten the two bolts.

Grease a new O-ring and install it into the front cover groove.



INSTALLATION

Install the starter motor in place.

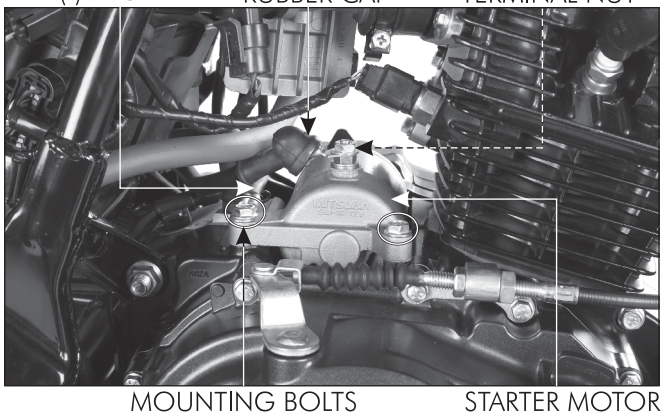
Install the two mounting bolts with the ground cable and tighten the bolts securely.

Install the starter motor cable and tighten the nut securely.

Install the terminal cover over the cable terminal properly.

Install the negative(-)ve cable on the battery terminal.

Install the fuel tank cover (page 2-5).



STARTER MAGNETIC SWITCH

INSPECTION

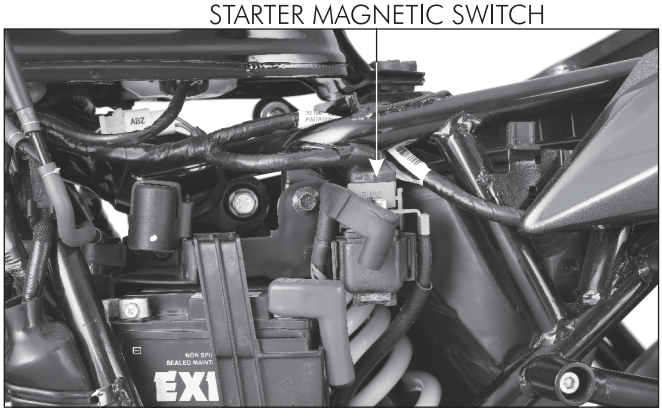
Remove the fuel tank cover (page 2-5).

Shift the transmission into neutral.

Turn the ignition switch "ON" and press the starter switch. The starter magnetic switch coil is normal, if it clicks.

Check the starter magnetic main fuse 20A.

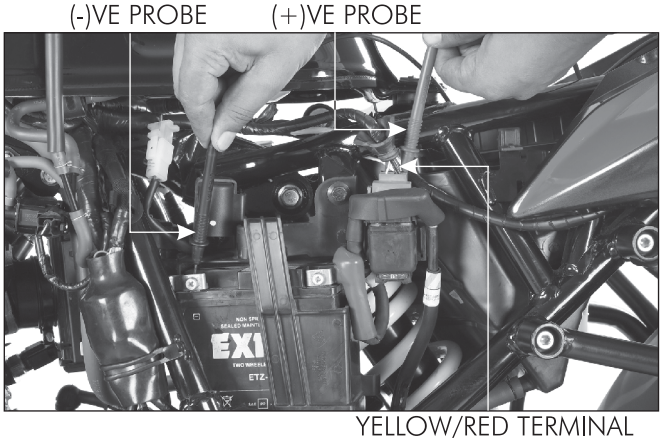
If it does not click, check the starter magnetic voltage and ground circuit.



STARTER MAGNETIC SWITCH VOLTAGE

Measure the voltage between the yellow/red wire terminal of the start mag switch connector and body ground.

There should be battery voltage when the starter switch is pressed with the ignition switch "ON".

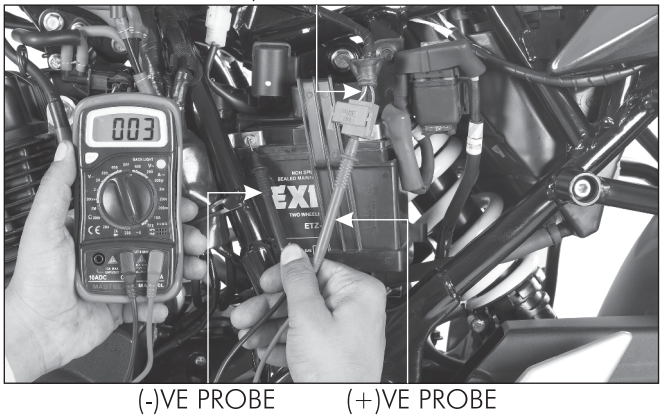


START MAG SWITCH GROUND CIRCUIT

Disconnect the start mag switch connector.

Check for continuity between the red/blue wire terminal of the start mag switch connector and body ground.

There should be continuity when the transmission is in neutral and/ or the clutch lever is pressed.

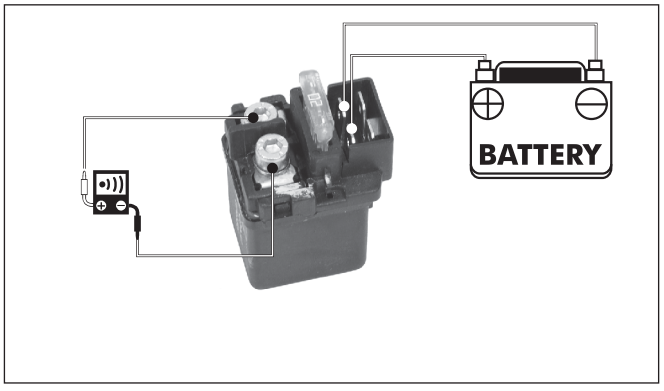


OPERATION CHECK

Disconnect the connector and cables from the starter magnetic switch.

Connect an multimeter to the starter cable terminals. Connect the 12V battery to the starter magnetic switch terminal as shown.

The starter magnetic switch is normal, if there is continuity between the cable terminals when the battery is connected, and no continuity when the battery is disconnected.



CAPACITOR BANK

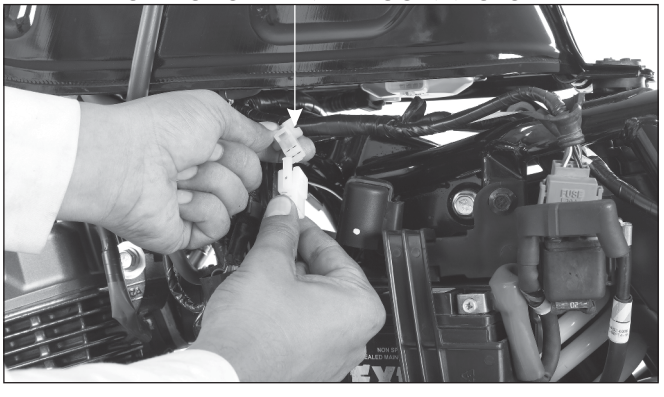
It is provided to supply required voltage to FI components, winkers, horn, position lamps and meter console during battery low or battery less conditions.

REMOVAL

Remove the fuel tank cover (page 2-5).

Disconnect the capacitor 2P connector.

CAPACITOR BANK 2P CONNECTOR



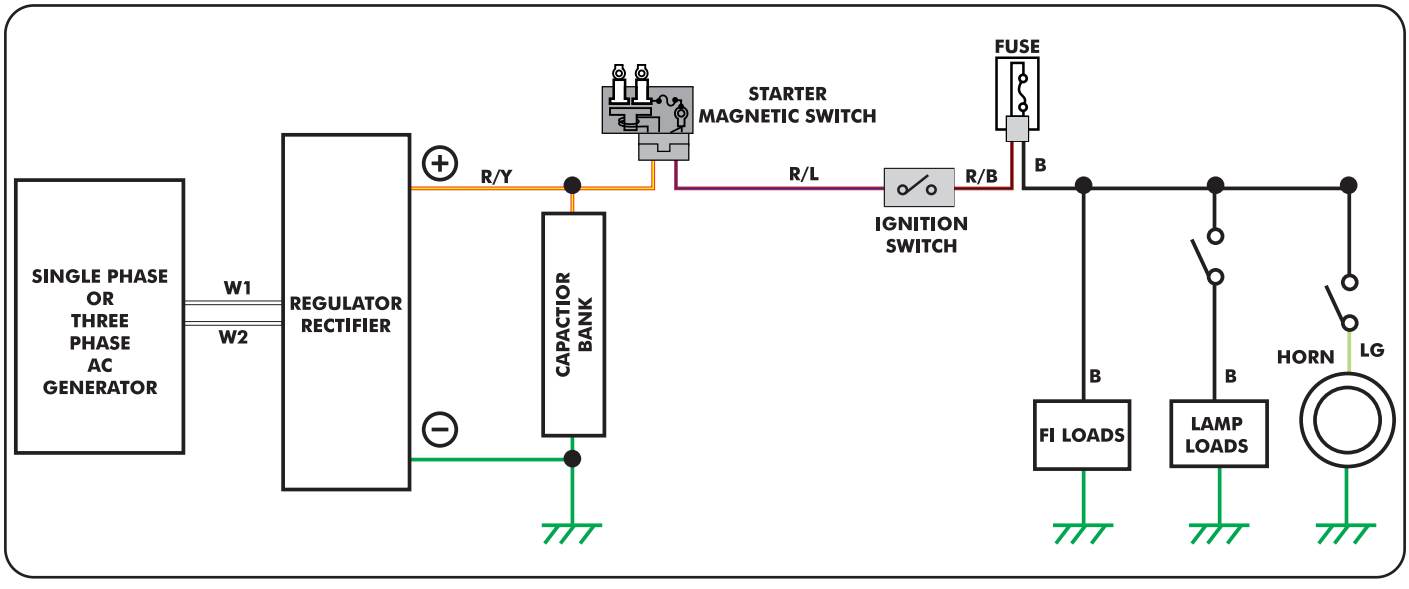
Remove the capacitor bank from the battery stay.

CAPACITOR BANK

INSTALLATION

Installation is the reverse order of removal.

CAPCITOR BANK CIRCUIT DIAGRAM



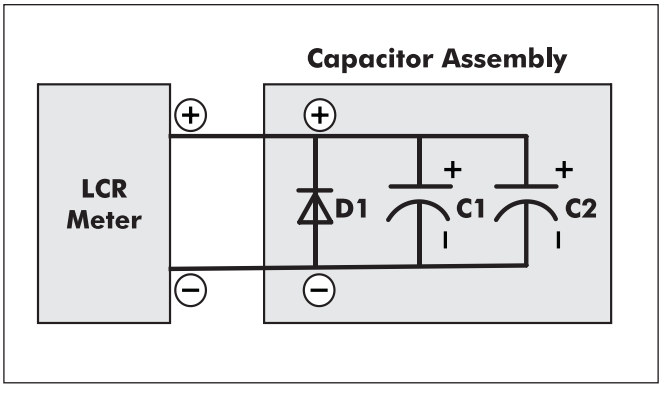
INSPECTION

Measure capacitance using LCR meter.

Capacitance value:

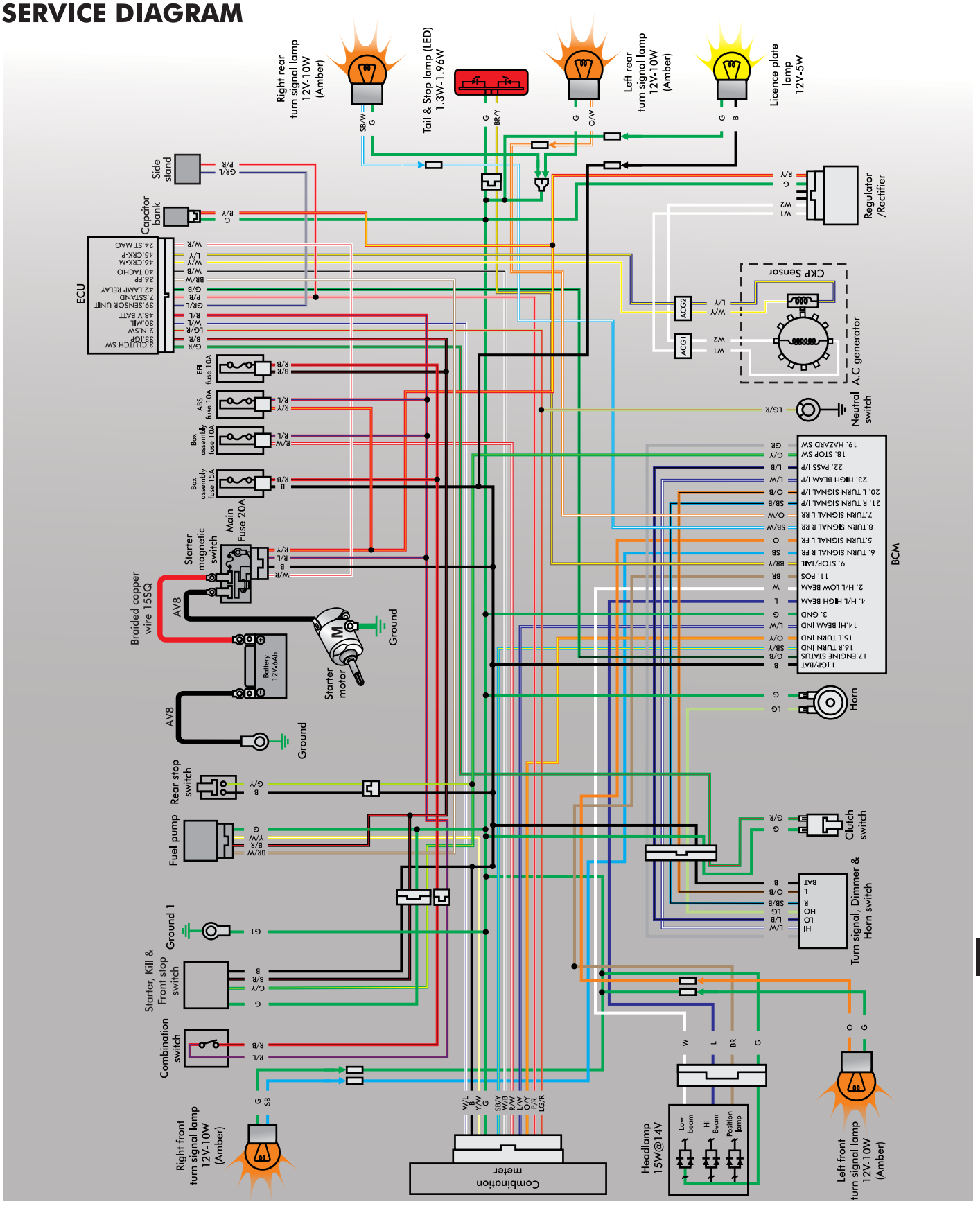
6600μF ± 20% to be measured @ 25°C

Capacitance bank endurance life: 5000hrs



MEMO

SERVICE DIAGRAM



Service Diagram	20-0	Stop Lamp Switch	20-12
Service Information	20-1	Ignition Switch	20-13
Specifications	20-1	Horn	20-14
Torque Values/Troubleshooting	20-2	Handlebar Switch	20-14
Headlamp/Position Lamp Assembly	20-3	Fuel Meter/Fuel Level Sensor	20-16
Front Turn Signal Lamp	20-3	Clutch Switch	20-17
Rear Turn Signal Lamp	20-4	Meter Console Functions	20-18
Tail/Stop Lamp	20-5	Wheel Speed Sensor	20-20
Licence Plate Lamp	20-6	Combination Meter Inspection	20-21
Combination Meter	20-7	Body Control Module (BCM)	20-23
Neutral/Side Stand Switch	20-10	Side Stand Switch	20-26

SERVICE INFORMATION

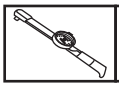
GENERAL

- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the connectors and connect a continuity tester to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved or when checking for high resistance caused by corroded connections.
- Check the battery condition before performing any inspection that requires proper battery voltage.

SPECIFICATIONS

LAMPS/METERS/SWITCHES

ITEM		SPECIFICATIONS
Bulbs	Headlamp (High/Low)	LED
	Position lamp	LED
	Tail/Stop lamp	LED
	Turn signal lamp	LED
	Meter illumination	Module illuminated LCD
	Neutral indicator	LED
	Turn signal indicator (RH/LH)	LED
	High beam indicator	LED
	ABS indicator	LED
	Service reminder indicator	Module illuminated LCD
	Side stand indicator	LED
	Licence plate lamp	12V-5W
	Programmed-Fi Malfunction indicator lamp (MIL)	LED
Fuse	Starter magnetic switch	20A (Circuit fuse) & 20A (Spare fuse)
	Fuse box	15A, 10A, 10A & 10A (Circuit fuse)
		15A & 10A (Spare fuse)



TORQUE VALUES

IGNITION SWITCH MOUNTING BOLT : 2.0 kgf-m

For other nuts, bolts, fasteners etc. refer to standard torque values **(SECTION-1)**.

TROUBLESHOOTING

Headlamp does not come "ON" when the ignition switch is "ON".

- Faulty LED
- Open circuit in wire harness or loose connection
- Weak or dead battery
- Faulty capacitor bank or its loose connections

Headlamp beam does not shift when dimmer switch is operated.

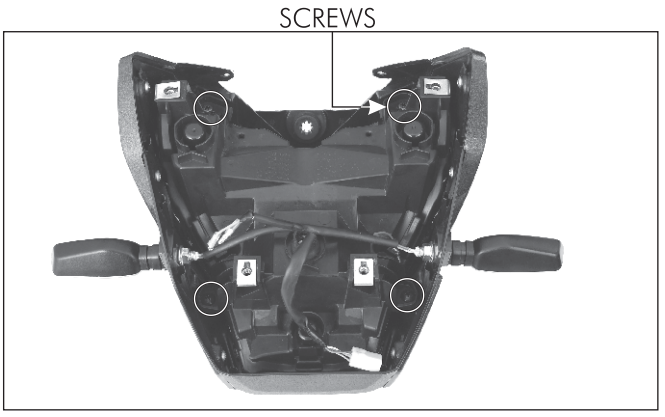
- Faulty LED
- Faulty dimmer switch
- Faulty BCM or its loose connections

HEADLAMP/POSITION LAMP ASSEMBLY

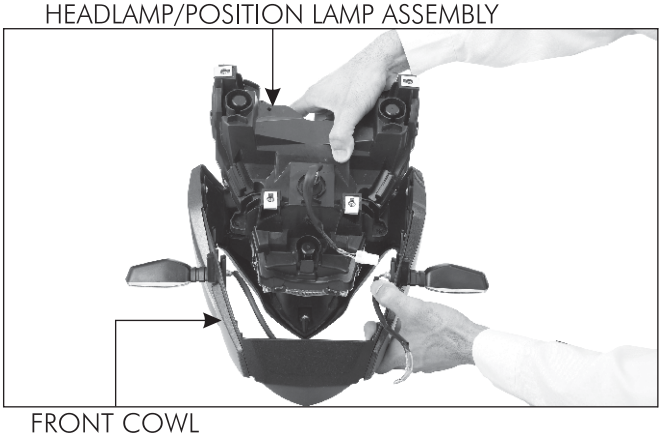
REMOVAL

Remove the front cowl (page 2-4).

Remove the headlamp assembly screws (4 nos.).



Pull out the headlamp/position lamp assembly from the front cowl.

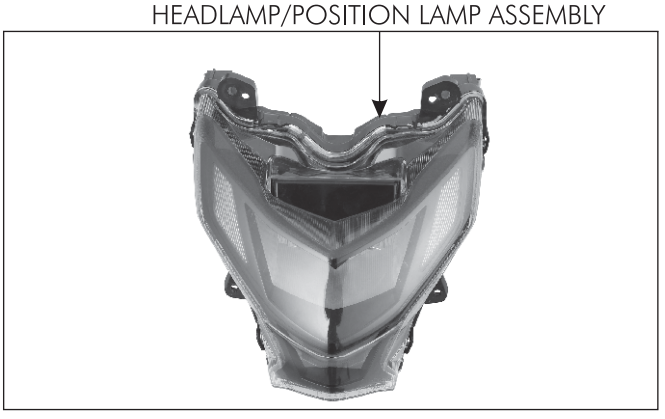


Replace headlamp/position lamp assembly with the new one, if necessary.

INSTALLATION

Installation is in the reverse order of removal.

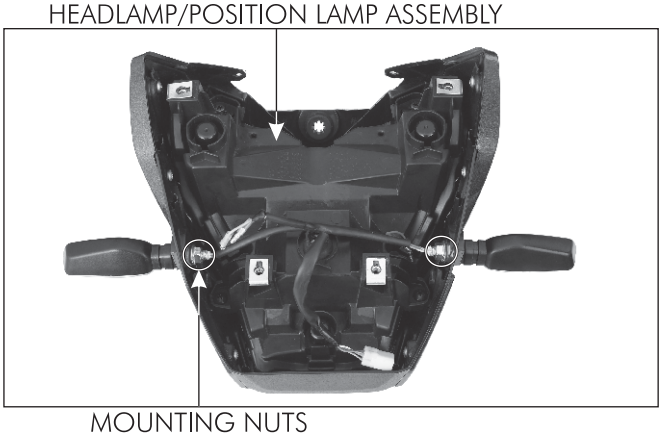
Adjust the headlamp focus (page 3-21).



FRONT TURN SIGNAL LAMP

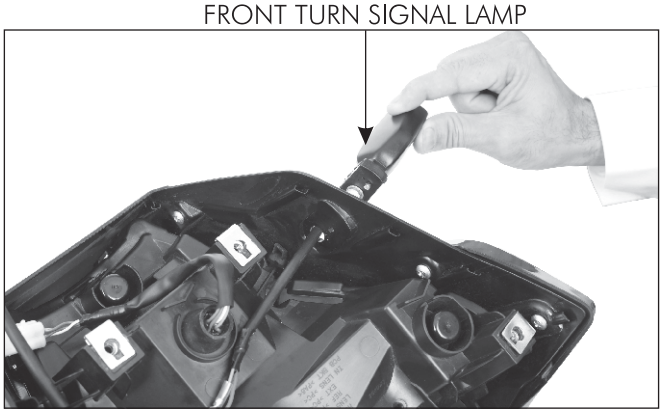
Remove the headlamp/position lamp assembly (page 20-3).

Remove the mounting nuts from the turn signal lamp.



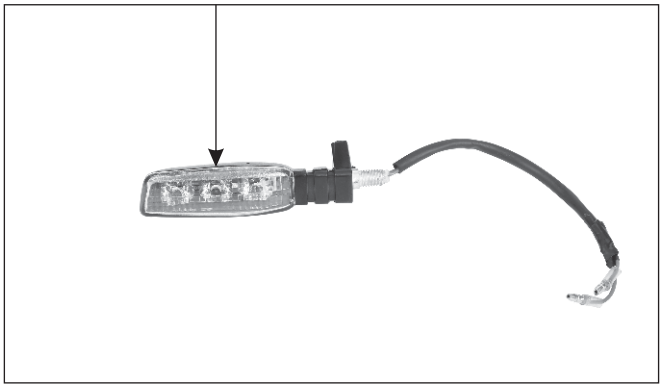
Remove the front turn signal lamp.

FRONT TURN SIGNAL LAMP



Replace the LED indicator with the new one, if necessary.

LED INDICATOR



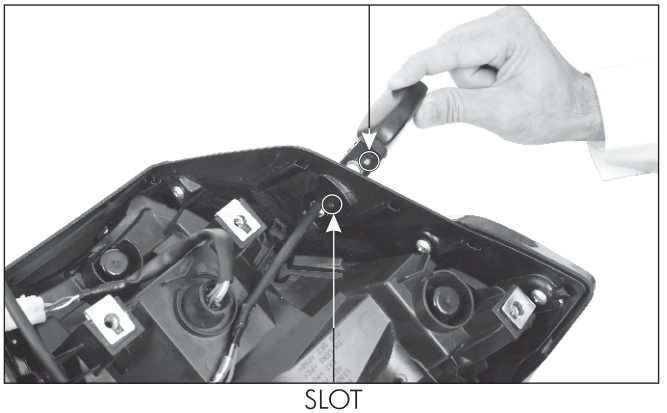
INSTALLATION

Installation is in the reverse order of removal.

NOTE

While installing LED indicator, carefully align pin with slot on front cowl stay.

PIN



SLOT

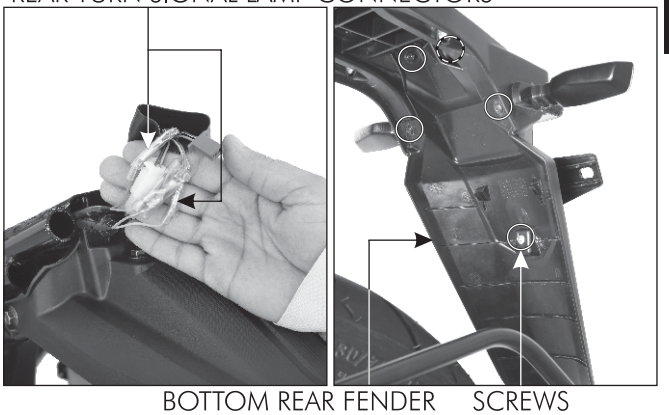
REAR TURN SIGNAL LAMP

Remove the rear cowl (page 2-11).

Disconnect the rear turn signal lamp connector.

Remove the screws (5 nos.) from the bottom rear fender.

REAR TURN SIGNAL LAMP CONNECTORS



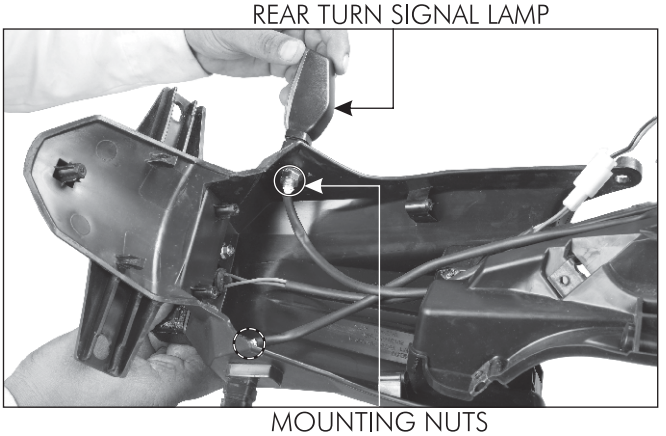
BOTTOM REAR FENDER SCREWS

Remove the mounting nuts from the rear turn signal lamp.
Remove the rear turn signal lamp.
Replace the LED indicator with the new one, if necessary.

INSTALLATION

Installation is in the reverse order of removal.

REAR TURN SIGNAL LAMP

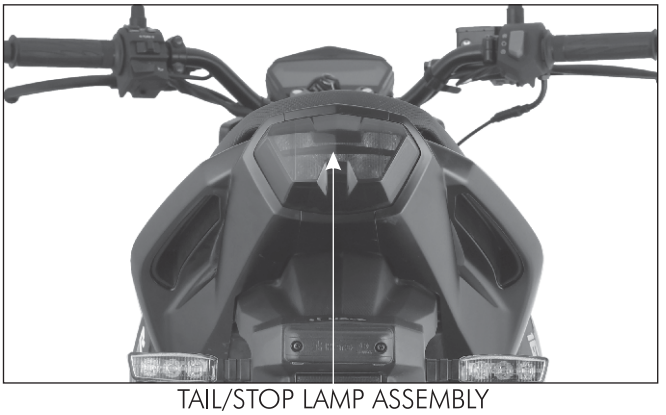


MOUNTING NUTS

TAIL/STOP LAMP

REMOVAL

Turn the ignition switch "ON", and check the tail/stop lamp operation.
Check that all LED in the tail/stop lamp unit illuminate with the front brake lever/rear brake pedal applied.
If any LED does not turn "ON", replace the tail/stop lamp assembly.



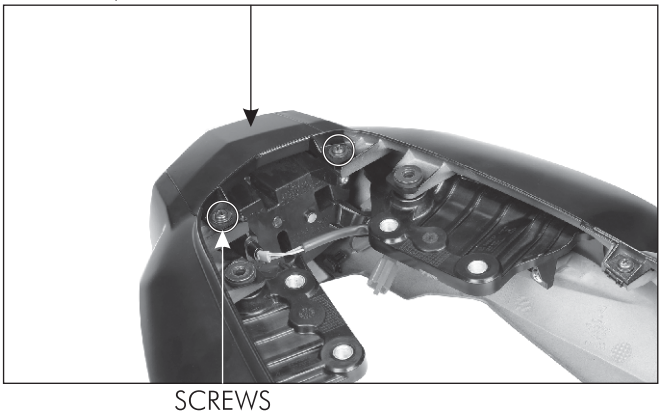
TAIL/STOP LAMP ASSEMBLY

Disconnect the tail/stop lamp connector.
Remove the rear cowl (page 2-11).

TAIL/STOP LAMP CONNECTOR

Remove the tail/stop lamp upper cover screws.

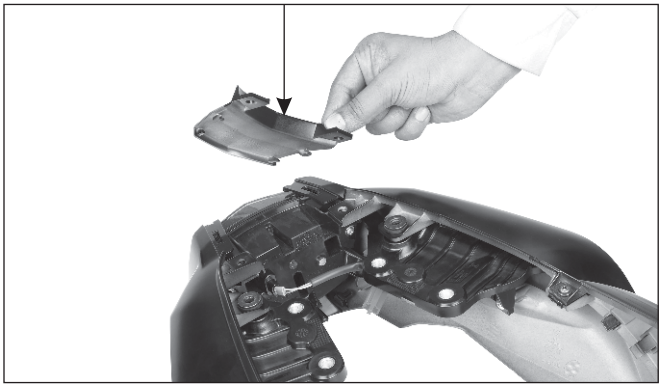
TAIL/STOP LAMP UPPER COVER



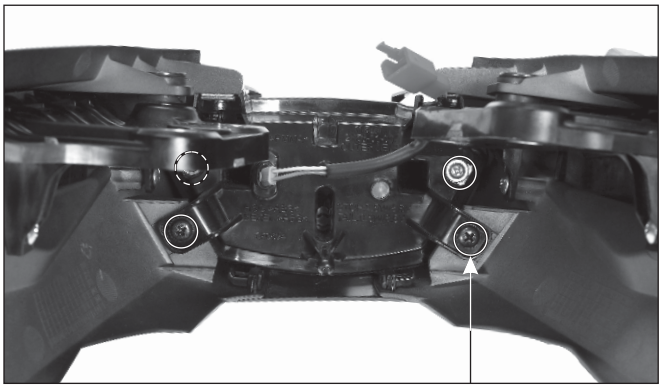
SCREWS

Remove the tail/stop lamp upper cover.

TAIL/STOP LAMP UPPER COVER



Remove the tail/stop lamp mounting screws (4 nos.).

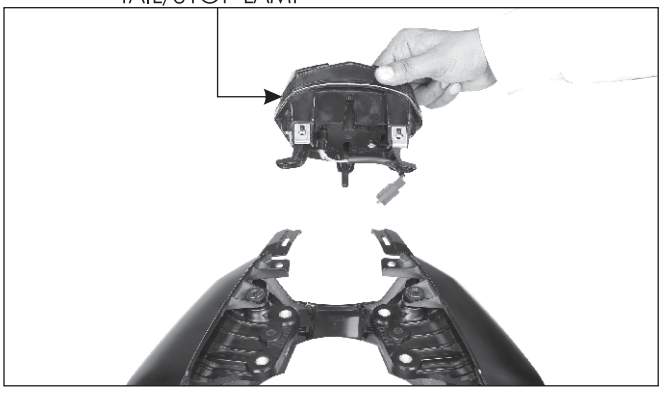


SCREWS

Remove the tail/stop lamp.

Replace the tail/stop lamp assembly with the new one.

TAIL/STOP LAMP



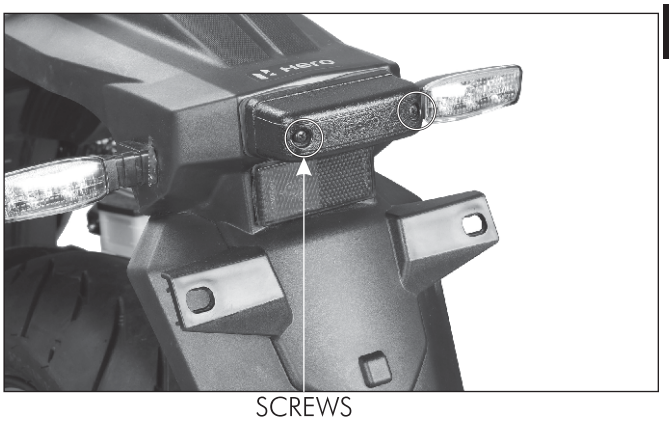
INSTALLATION

Installation is in the reverse order of removal.

LICENCE PLATE LAMP

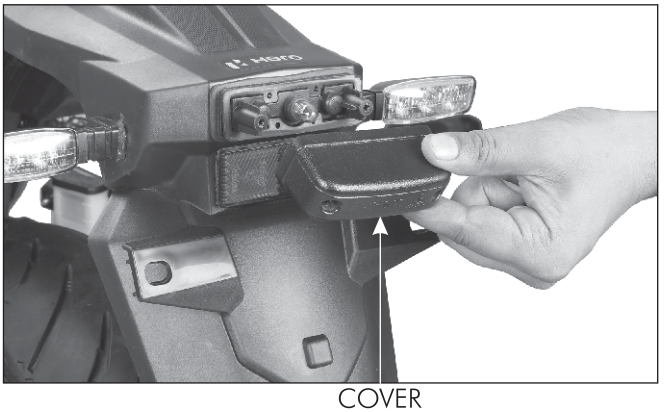
BULB REPLACEMENT

Remove the licence plate lamp screws.



SCREWS

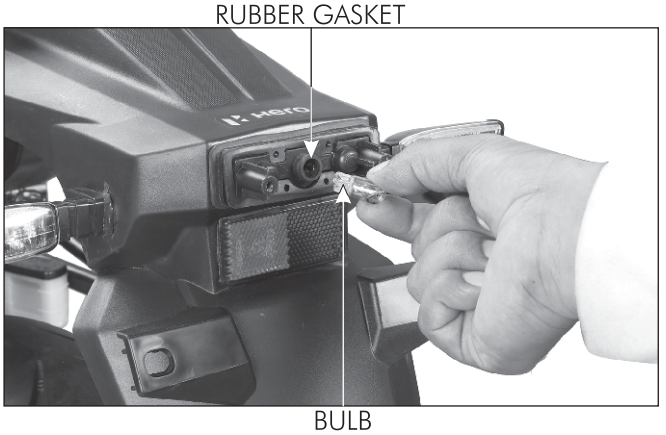
Remove the licence plate lamp cover.



Remove the licence plate lamp bulb and replace it with a new one, if necessary.

Replace the rubber gasket with a new one if necessary.

Installation is in the reverse order of removal.

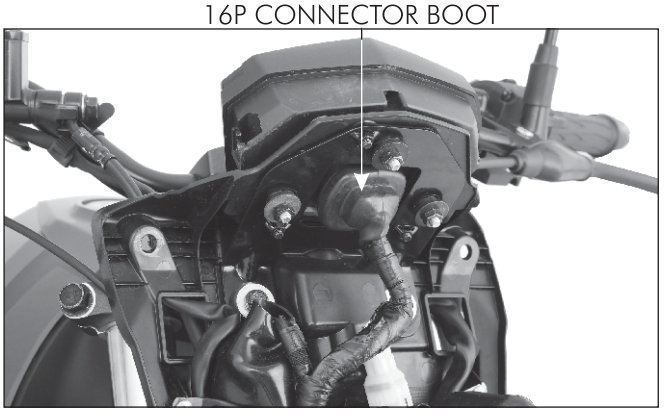


COMBINATION METER

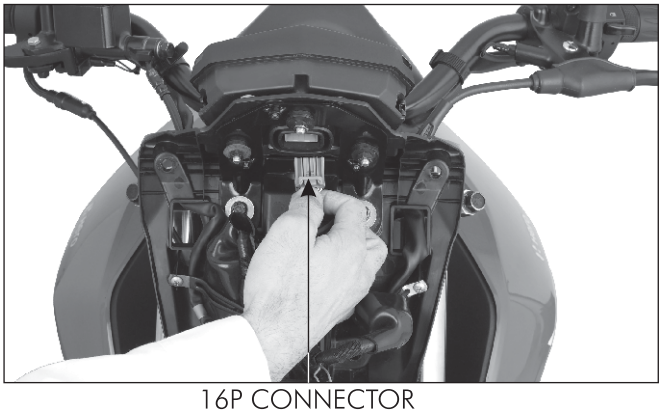
REMOVAL

Remove the front cowl (page 2-4).

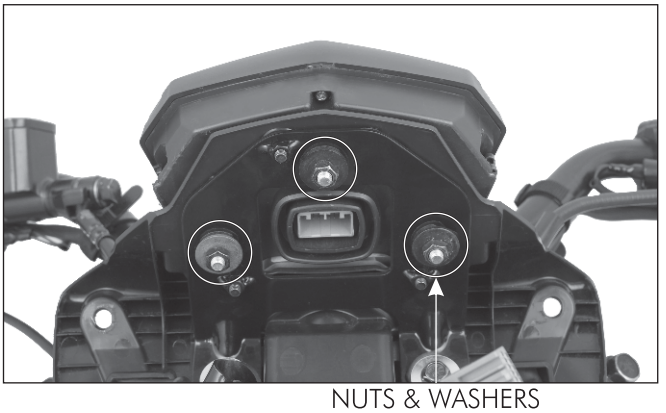
Slide the 16P connector boot.



Disconnect the combination meter wire 16P connector.



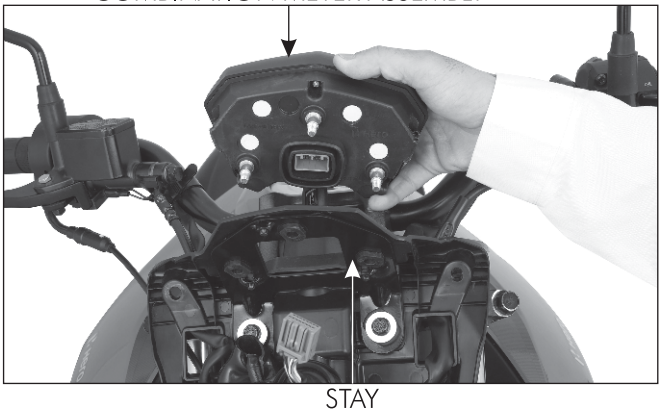
Remove the three mounting nuts and washers.



NUTS & WASHERS

COMBINATION METER ASSEMBLY

Remove the combination meter assembly from the stay.

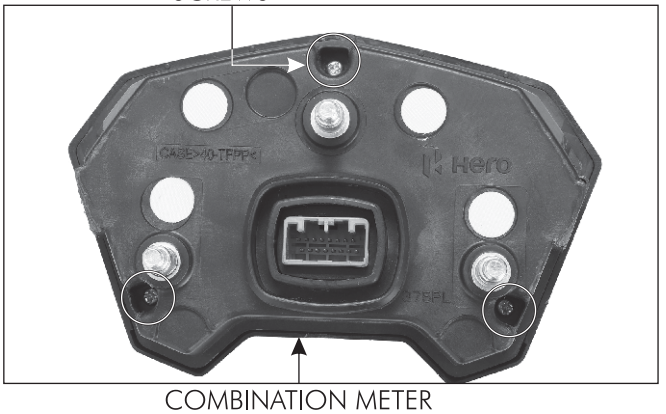


STAY

SCREWS

DISASSEMBLY

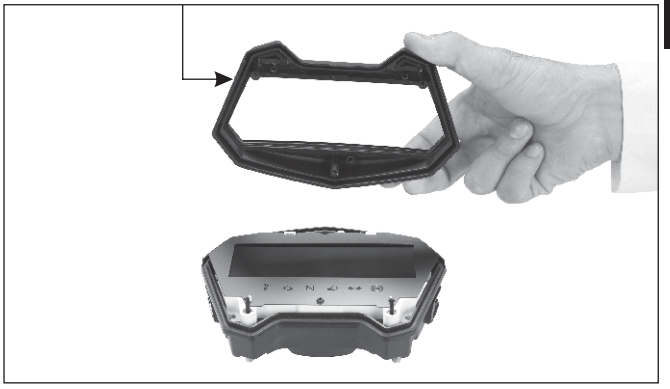
Remove the screws (3 nos.) from lower case of combination meter.



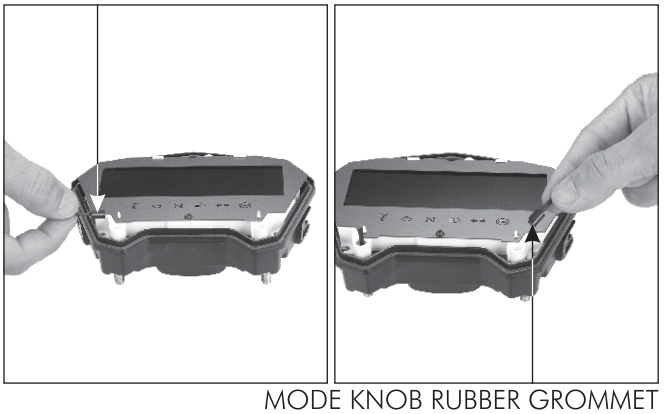
COMBINATION METER

BEZEL

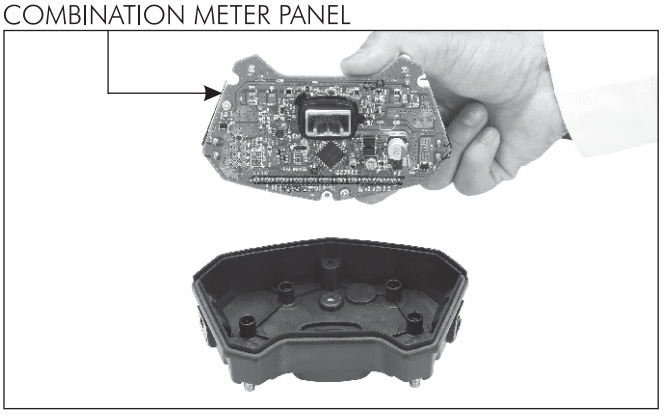
Remove the bezel, combination meter panel and combination meter upper cover.



Remove the set knob rubber grommet.
Remove the mode knob rubber grommet.

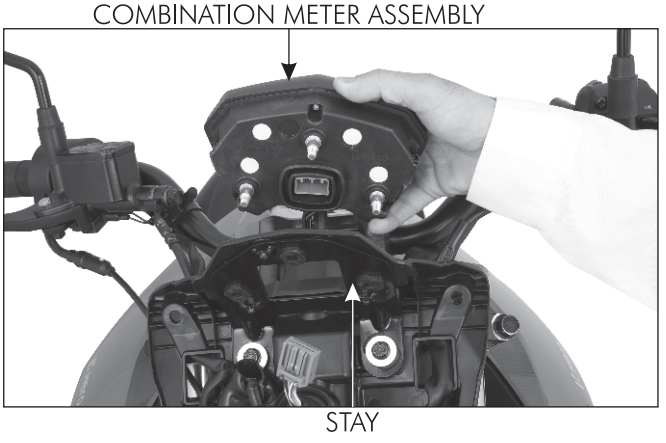


Remove the combination meter panel.
Assembly is in the reverse order of disassembly.

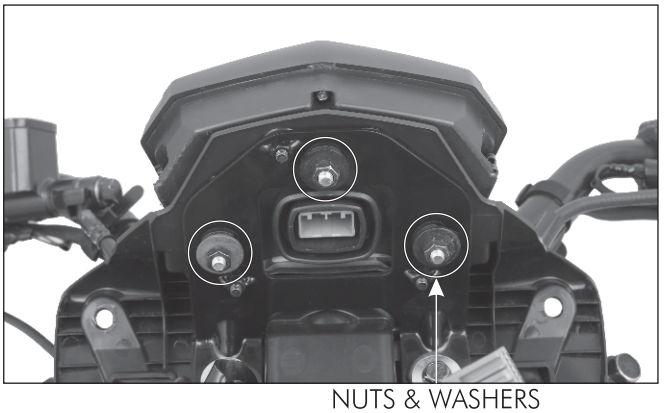


INSTALLATION

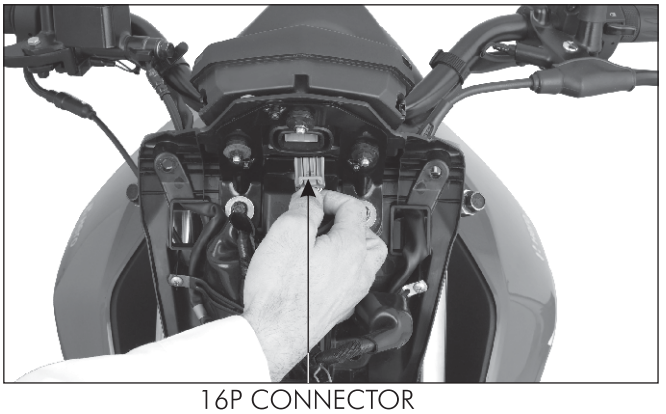
Install the combination meter assembly to the stay.



Install the mounting nuts and washers.



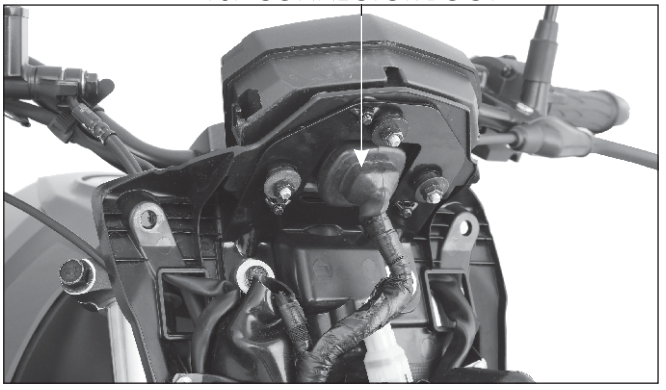
Connect the combination meter wire 16P connector.



16P CONNECTOR

16P CONNECTOR BOOT

Slide and fix the 16P connector boot properly.
Install the front cowl.

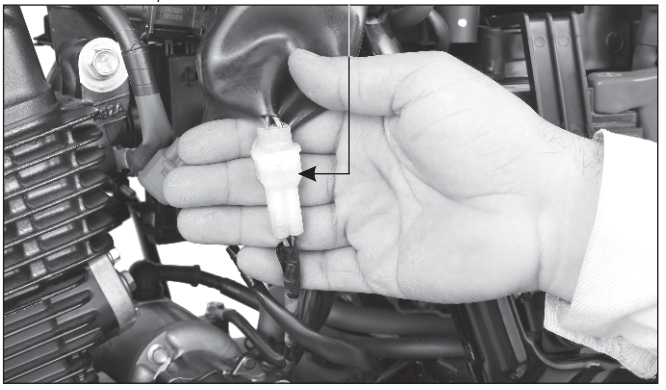


NEUTRAL/SIDE STAND SWITCH WIRE CONNECTOR

NEUTRAL/SIDE STAND SWITCH

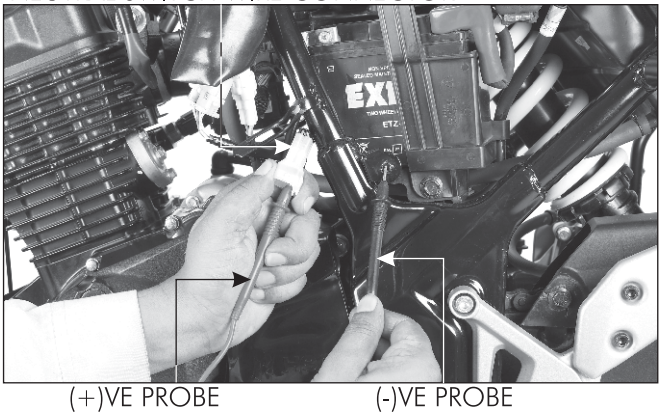
REMOVAL

Remove the fuel tank cover (page 2-5).
Disconnect the neutral/side stand switch wire connector.
Shift the gear position to the neutral.



NEUTRAL SWITCH WIRE CONNECTOR

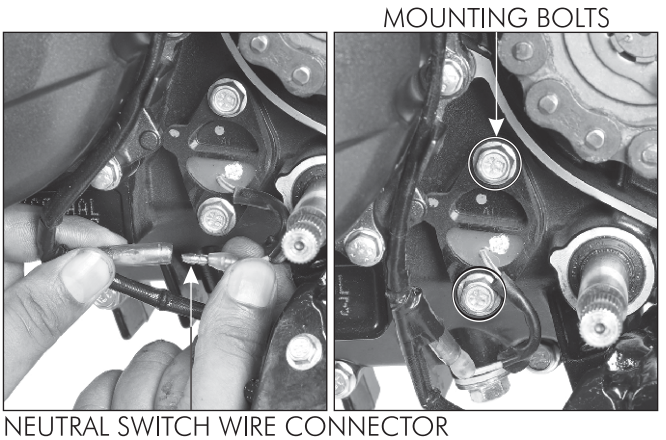
Check for continuity between the light green/red terminal and body ground.
There should be continuity with the transmission is in neutral, and no continuity when the transmission is in gear.
In case of any abnormality remove and check neutral switch



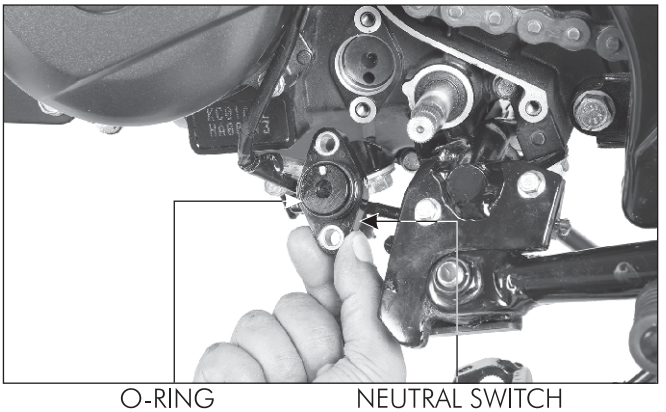
(+)VE PROBE (-)VE PROBE

20

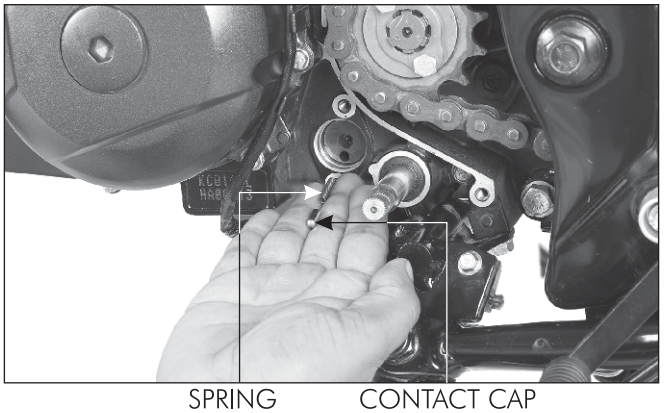
Remove the left crankcase rear cover (page 6-3).
Disconnect the neutral switch wire connector.
Remove the neutral switch mounting bolts.



Remove the neutral switch and O-ring.

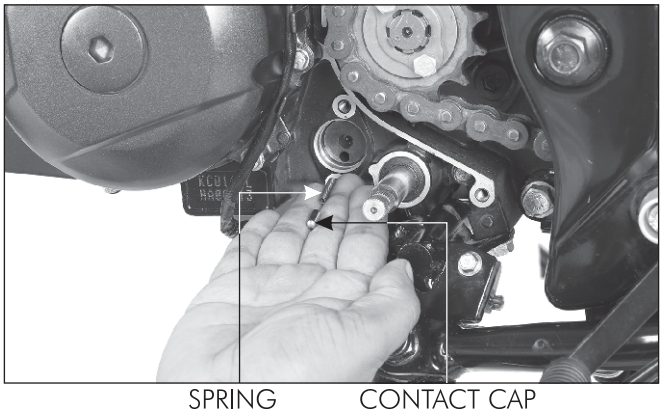


Remove the contact cap and spring.

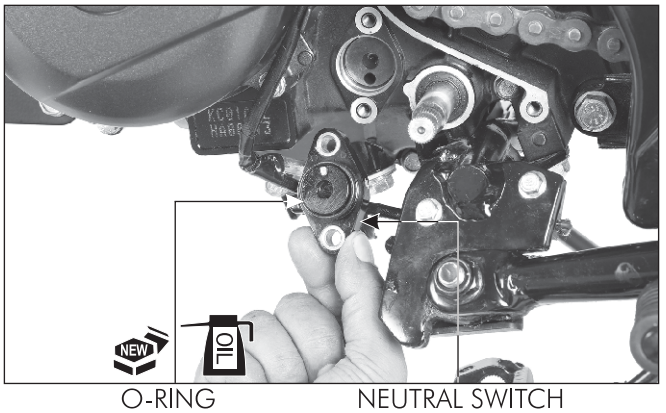


INSTALLATION

Check the contact cap for wear or damage, replace if necessary.
Bent or crushed contact point will cause poor continuity.
Install the spring and contact cap.



Apply clean engine oil to a new O-ring and install it to the neutral switch.



O-RING NEUTRAL SWITCH

Install the neutral switch.

Install the neutral switch mounting bolts and tighten them.

Connect the neutral switch wire connector.

Install the left crankcase rear cover (page 6-7).

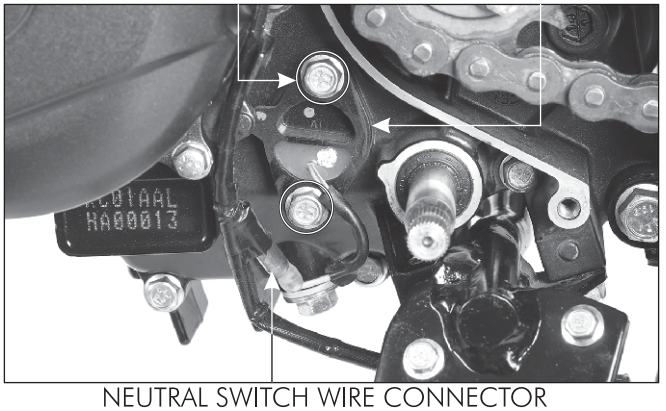
Connect the neutral/side stand switch wire connector.

Install the fuel tank cover (page 2-6).

NOTE

Route the neutral/side stand switch wire in to the left crankcase cover tabs properly.

MOUNTING BOLTS NEUTRAL SWITCH



NEUTRAL SWITCH WIRE CONNECTOR

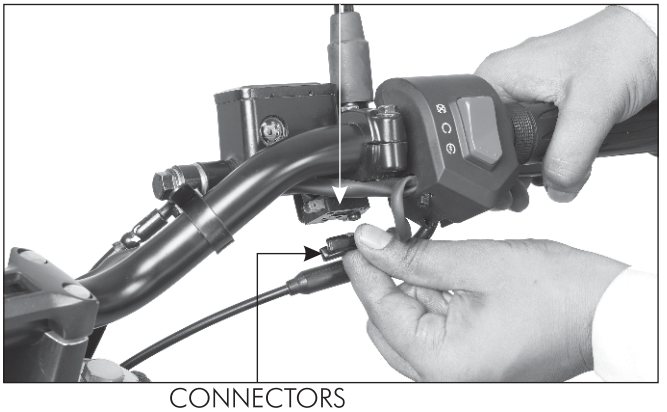
STOP LAMP SWITCH

FRONT

Disconnect the front stop lamp switch connectors.

There should be continuity with the brake lever pressed and no continuity with the brake lever is released.

FRONT STOP LAMP SWITCH



CONNECTORS

REAR

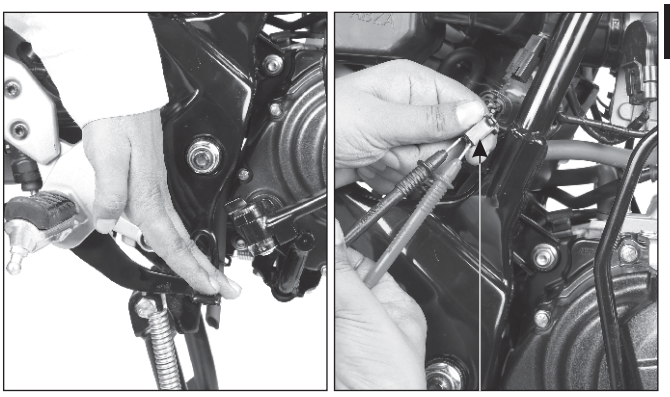
Remove the fuel tank cover (page 2-5).

Disconnect the rear stop lamp switch wire connector.

Check for continuity between the connector terminals of the switch side.

There should be continuity with the brake pedal depressed and no continuity with the brake pedal released.

Installation is in the reverse order of the removal.



REAR STOP LAMP SWITCH CONNECTOR

IGNITION SWITCH

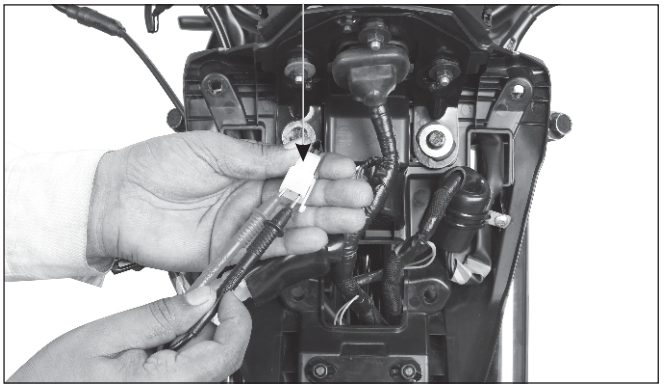
INSPECTION

Remove the front cowl (page 2-4).

Disconnect the ignition switch wire connector.

Check for continuity between the connector terminals in each switch position.

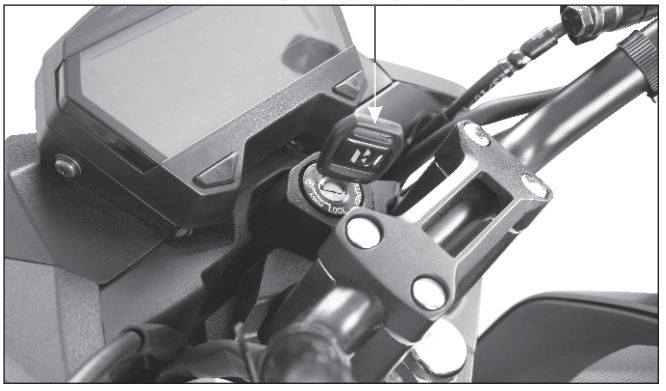
IGNITION SWITCH WIRE CONNECTOR



Continuity should exist between the colour coded wires in the chart.

Colour / Position	Red/Black	Red
LOCK		
OFF		
ON	●	●

IGNITION SWITCH



REMOVAL/INSTALLATION

Remove the combination meter and the stay (page 20-7).

Disconnect the ignition switch wire connector.

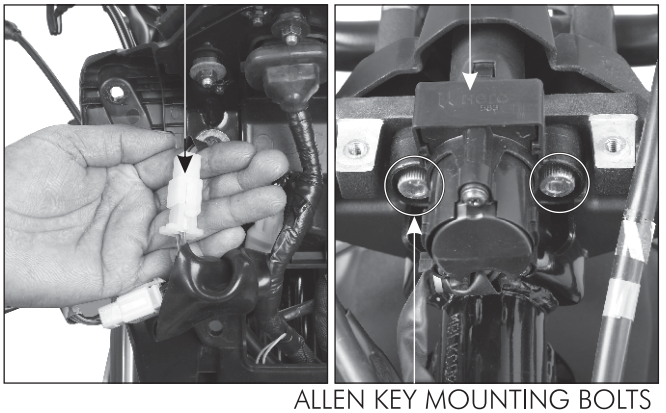
Remove the allen key mounting bolts and the ignition switch from the top bridge.

Install the ignition switch in the reverse order of removal.

TORQUE

IGNITION SWITCH MOUNTING BOLT: 2.0 kgf-m

CONNECTOR IGNITION SWITCH



ALLEN KEY MOUNTING BOLTS

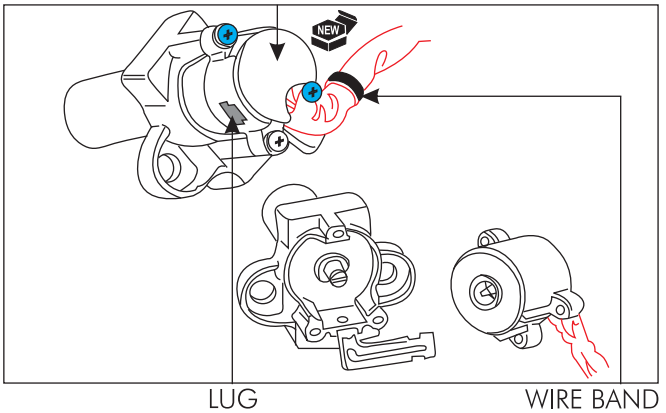
CONTACT BASE REPLACEMENT

Cut the wire band and remove the three attaching screws. Insert the ignition key into the switch cylinder and position it between the "ON" and "OFF" positions.

Push the lugs in the slots and remove the contact base from the switch cylinder.

Install a new contact base and tighten the attaching screws. Secure the switch wire with a new wire band.

CONTACT BASE



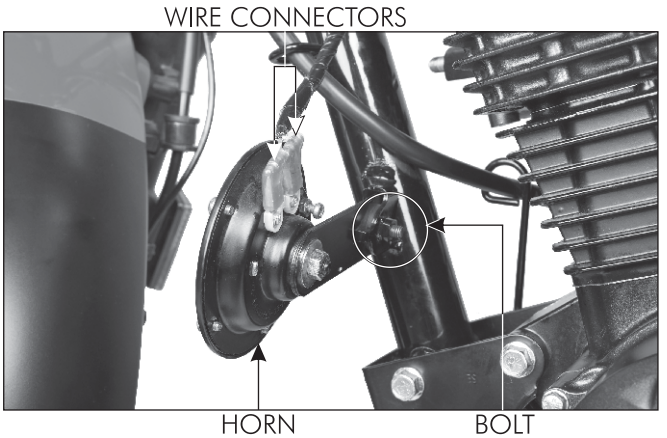
LUG WIRE BAND

HORN

REMOVAL

Disconnect the wire connectors from the horn.

Remove the mounting bolt and horn.



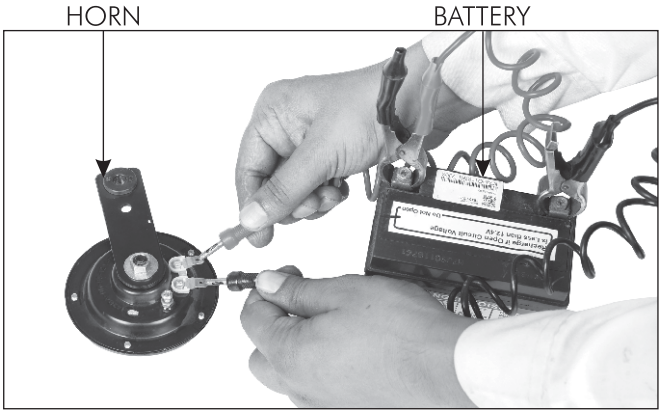
INSPECTION

Connect the battery voltage to the horn terminals.

The horn is normal if it sounds when the battery voltage is connected across the horn terminals.

INSTALLATION

Installation is in the reverse order of the removal.



HANDLEBAR SWITCH

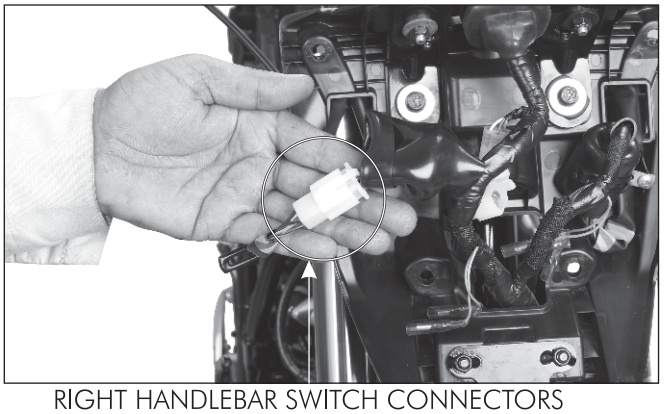
RIGHT HANDLEBAR SWITCH

Remove the front cowl (page 2-4).

Disconnect the right handlebar switch wire connectors.

Check each switch for continuity between the connector terminal.

There should be continuity between the colour coded wire in each chart.



ENGINE KILL SWITCH

Colour / Position	Black/Green	Black/Brown
OFF (⊗)		
ON (○)	●	●

STARTER SWITCH

Colour / Position	Yellow/Red	Black
Free		
Push	●	●

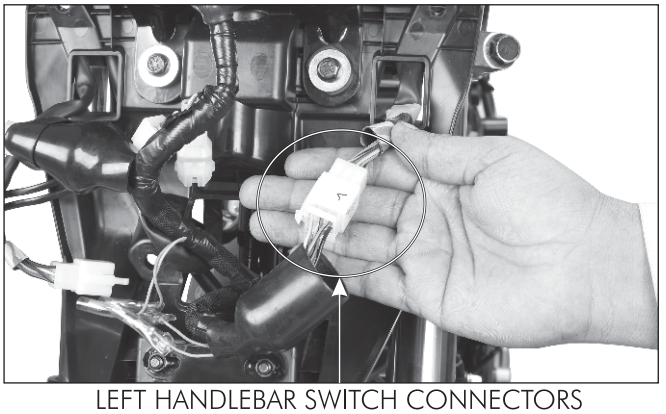
LEFT HANDLEBAR SWITCH

Remove the front cowl (page 2-4).

Disconnect the left handlebar switch wire connectors.

Check each switch for continuity between the connector terminal.

There should be continuity between the colour coded wire in each chart.

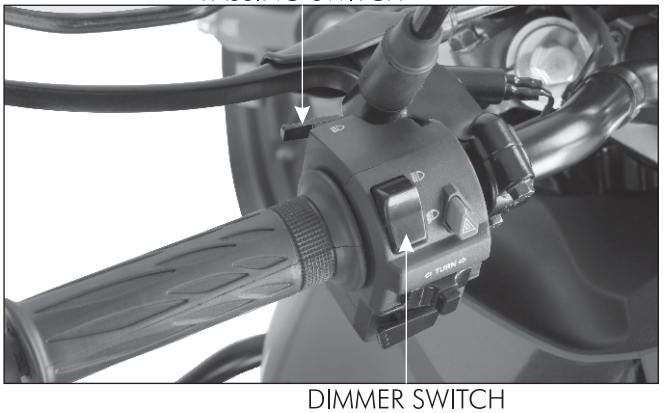


LEFT HANDLEBAR SWITCH CONNECTORS

DIMMER SWITCH

Colour / Position	Yellow	White	Blue	Black
≡D	●	●		
(N)	●	●	●	
≡D	●		●	
PASS	●	●	●	●

PASSING SWITCH

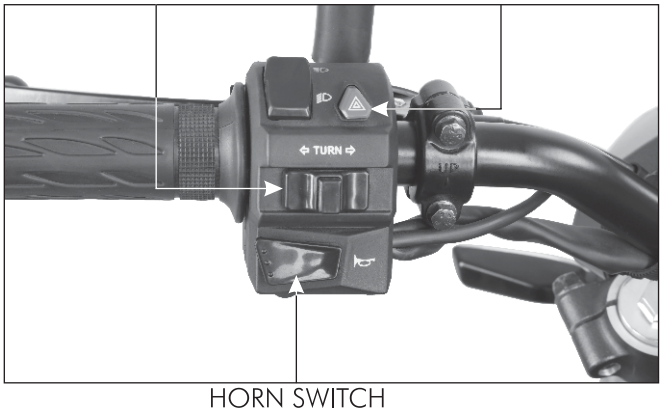


DIMMER SWITCH

TURN SIGNAL SWITCH

Colour / Position	Sky Blue/ Black	Gray	Orange/ Black
⇨	●	●	
(N)			
⇦		●	●

TURN SIGNAL SWITCH HAZARD SWITCH



HORN SWITCH

HORN SWITCH

Colour / Position	Black	Light Green
Free		
Push	●	●

HAZARD SWITCH

Colour / Position	Black	Grey
Free		
Push	●	●

FUEL METER/FUEL LEVEL SENSOR

FUEL METER INSPECTION

Turn the ignition switch to "ON" and check for the fuel gauge display.

FUEL GAUGE

If the fuel meter does not indicate properly, perform the following:

Remove the fuel tank cover.

Disconnect the fuel pump 5P connector (page 5-61).

Turn the ignition switch "ON" and check the fuel meter.

If the fuel meter indication is "Empty", wire harness is normal.

If the fuel meter indication is "Full", check for short circuit in Yellow/ White wire.

FUEL PUMP 5P CONNECTOR

Turn the ignition switch to "OFF".

Ground the fuel pump 5P connector terminals with a jumper wire.

CONNECTION:

Yellow/ White- Green

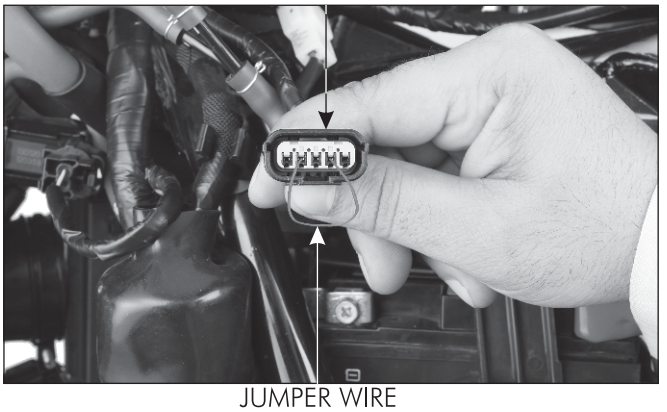
Turn the ignition switch "ON" and check the fuel meter.

If the fuel meter indication is "Full", wire harness is normal.

If the fuel meter indication is "Empty", check for open circuit in Yellow/ White wire and green wire.

If the wires are normal, check the fuel level sensor (see below).

FUEL PUMP 5P CONNECTOR



JUMPER WIRE

FUEL LEVEL SENSOR INSPECTION

Remove the fuel pump (page 5-61).

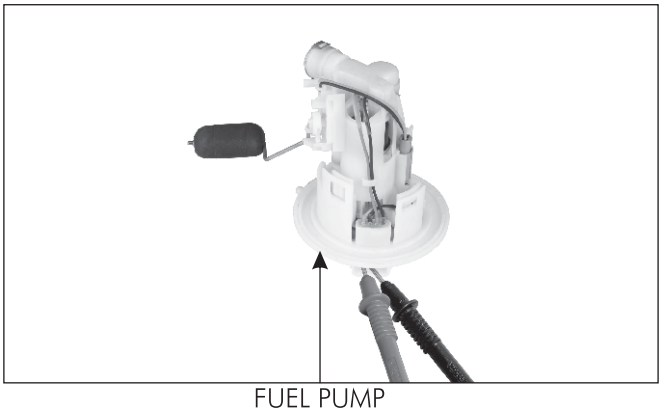
Connect the multimeter to the fuel level sensor terminals of the fuel pump 5P connector.

CONNECTION:

Yellow/White-Green

Inspect the resistance of the float at the top and bottom positions.

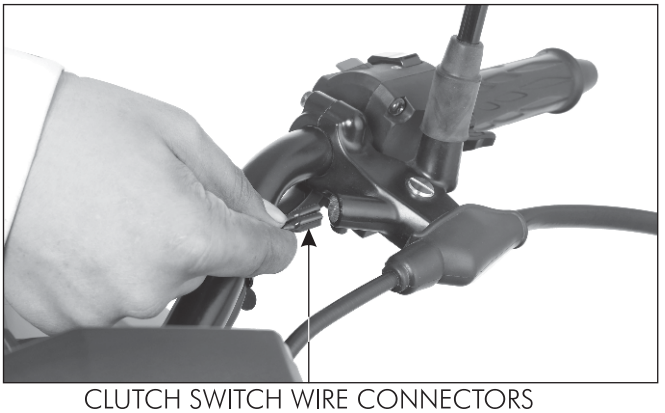
Installation is in the reverse order of the removal.



FUEL PUMP

CLUTCH SWITCH

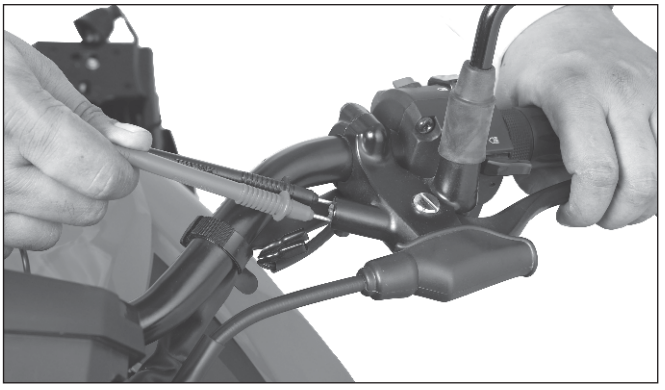
Disconnect the clutch switch connectors.



CLUTCH SWITCH WIRE CONNECTORS

Check for continuity between the switch terminals.

There should be continuity with the clutch lever pressed and no continuity with the clutch lever released.

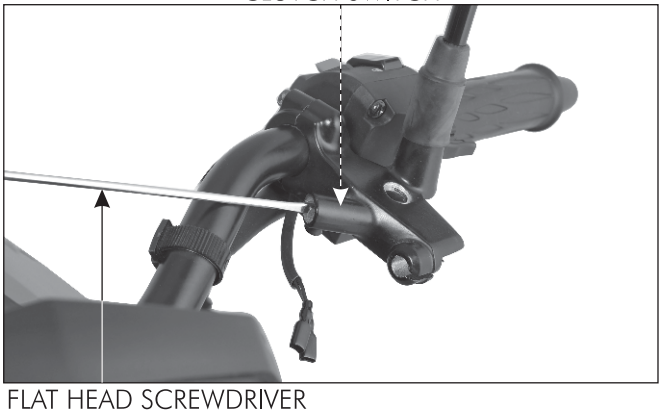


REMOVAL

Remove the clutch lever.

Using a flat head screwdriver, gently tap out the clutch switch as shown in fig.

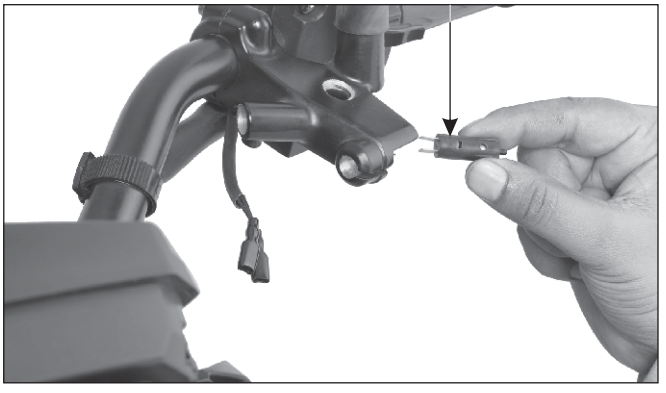
CLUTCH SWITCH



FLAT HEAD SCREWDRIVER

Remove the clutch switch from its location in the clutch yoke.

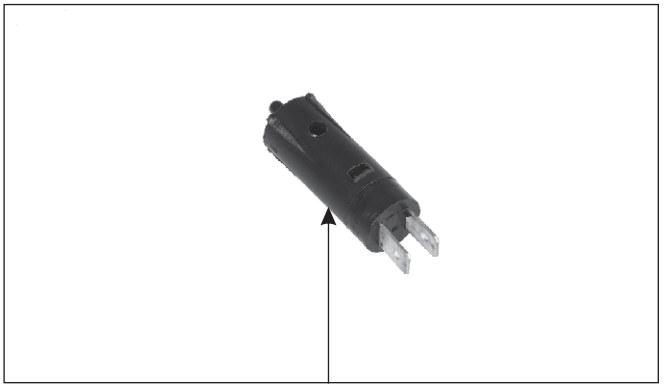
CLUTCH SWITCH



Replace the clutch switch, if required.

INSTALLATION

Installation is in the reverse order of removal.



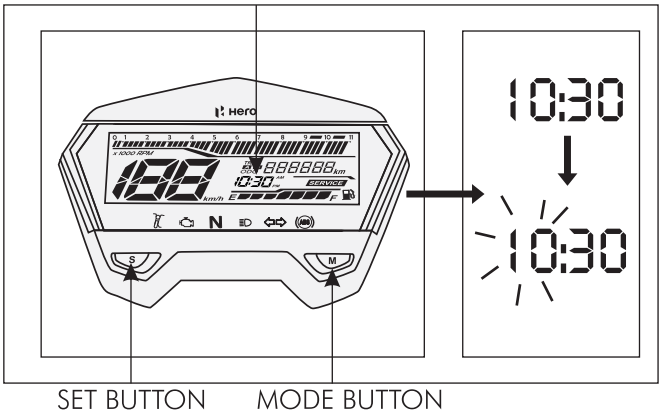
CLUTCH SWITCH

METER CONSOLE FUNCTIONS

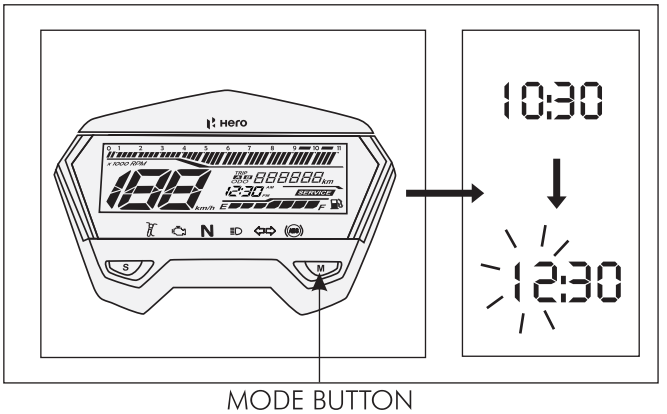
DIGITAL CLOCK

Digital clock shows hour and minute. To adjust the time, proceed as follows :

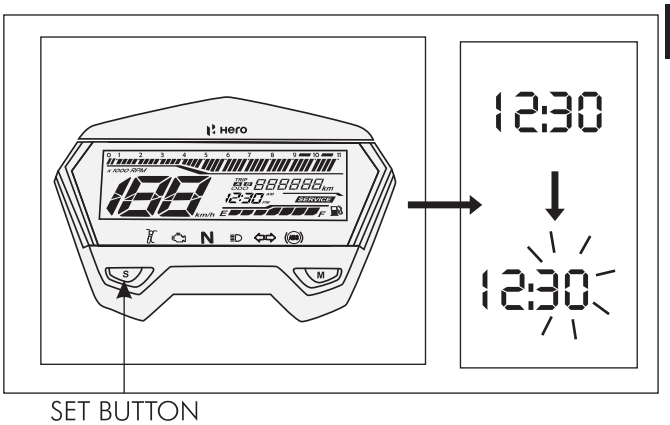
1. Turn the ignition switch "ON".
2. Press and hold set button and mode button simultaneously for more than 2 seconds. The clock will be set in the adjust mode with the hour's digit display blinking.



3. To set the hour, press mode button until the desired hour is displayed.
- The time is advanced by 1 hour each time the button is pressed.
- The time advances fast when the button is pressed and held.
- AM will change to PM after 12.



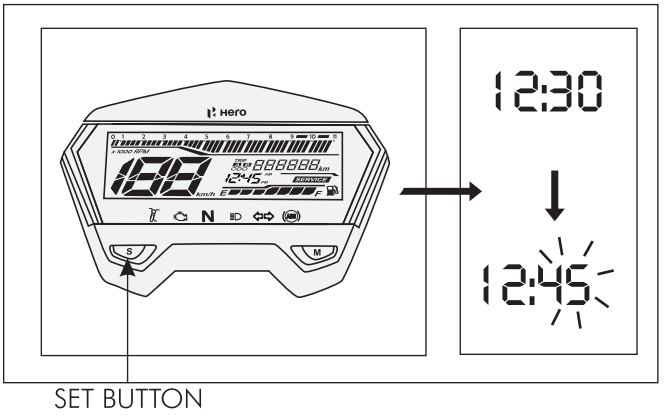
4. Press the set button. The minutes display starts blinking.



5. To set the minute press mode button until the desired minute is displayed. The minute display will return to "00" when "60" is reached without affecting the hour display.
   - The time advances by 1 minute, each time the button is pressed.
   - The time advances fast when the button is pressed and held.
6. To end the adjustment press set button. The display will stop flashing automatically and it will return to its pervious value if the button is not pressed for 30 seconds or more.

NOTE

The clock will reset "1:00" if the battery is disconnected.



ODOMETER/TRIPMETER

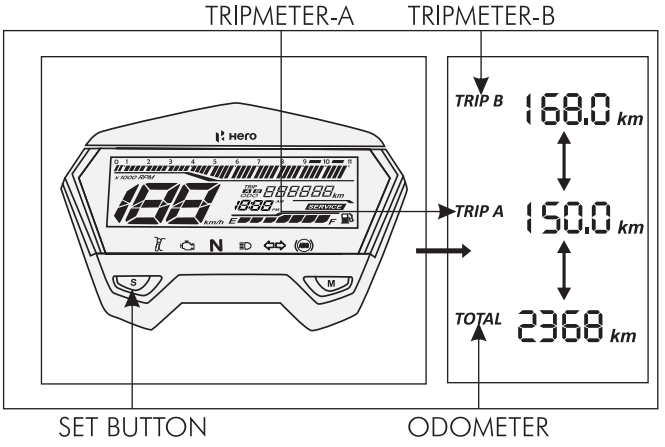
The odometer shows accumulated distance traveled.

The tripmeter shows distance traveled per trip. There are two tripmeters, tripmeter-A and tripmeter-B.

Push the mode button to select odometer, tripmeter-A or tripmeter-B. Tripmeter-A or tripmeter-B can be displayed upto "9999.9" km. If the tripmeter exceeds "9999.9" km it will return to "0.0" km automatically.

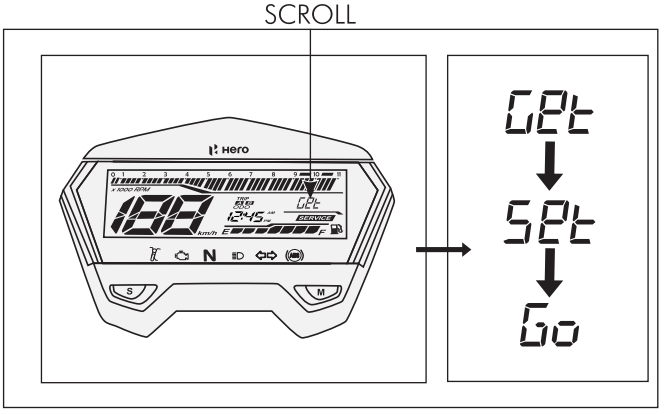
When tripmeter is selected long press the set button to reset tripmeter to zero.

The odometer can be displayed from "0 to 9999.9" km.



SCROLL MESSAGE

The scroll displays a message “GET SET GO” for few seconds whenever the ignition switch is turned "ON".



SERVICE REMINDER INDICATOR

The service reminder indicator is to indicate the user to bring the vehicle to an Authorised Hero MotoCorp workshop for service. The indicator shall start blinking when the vehicle covers kilometers as specified in the maintenance schedule. The indicator will keep on blinking throughout the kilometer interval for a particular service and will stay "ON" thereafter.

The service reminder indicator can only be reset at an Authorised Hero MotoCorp workshop.

NOTE

After getting the vehicle serviced, make sure that the service reminder indicator has been reset.

SERVICE REMINDER INDICATOR

WHEEL SPEED SENSOR

INSPECTION

NOTE

Ensure that the battery is in good condition (SEC-17). If not, then replace with a new battery and then inspect.

Remove the fuel tank cover (page 2-5).

Check for loose or poor contact terminals at HECU connector and wheel speed sensor connector.

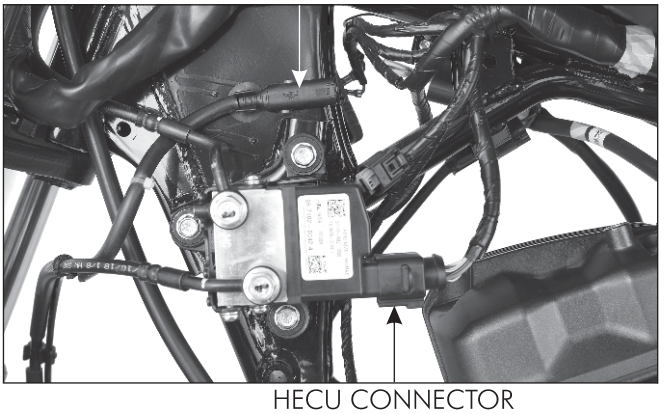
If connections are normal, then check for continuity between the HECU connector and wheel speed sensor connector.

Connection:
Black/Voilet (WSS)-Black/Voilet (HECU)
White/Orange (WSS)-White/Orange (HECU)
Standard: Continuity

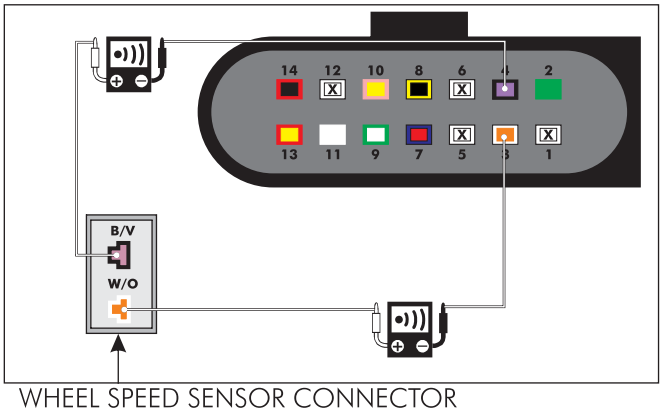
If no continuity is detected, then replace the harness.

If continuity exist, then measure the resistance of wheel speed sensor.

WHEEL SPEED SENSOR CONNECTOR



HECU CONNECTOR

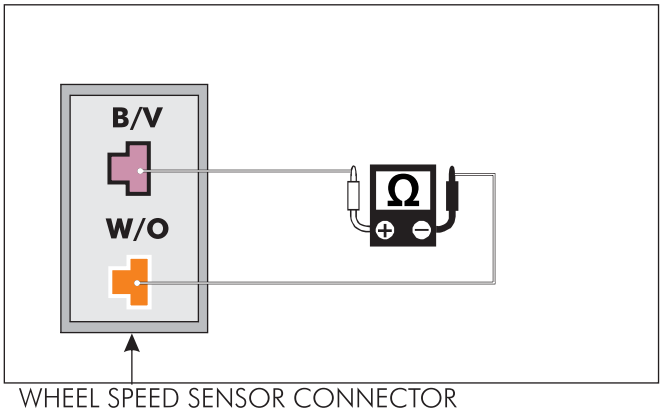


WHEEL SPEED SENSOR CONNECTOR

Measure the resistance of the wheel speed sensor connector.

RESISTANCE
Connection: Black/Voilet-White/Orange
Standard: 50 Ω±2% - 115 Ω±2%

If resistance is out of specification, then replace the wheel speed sensor.



WHEEL SPEED SENSOR CONNECTOR

COMBINATION METER

INSPECTION

NOTE

Ensure that the battery is in good condition (SEC-17). If not, then replace with a new battery and then inspect.

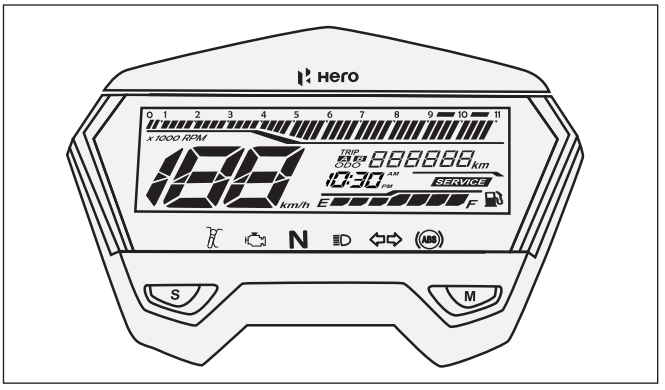
Turn the ignition switch "ON".

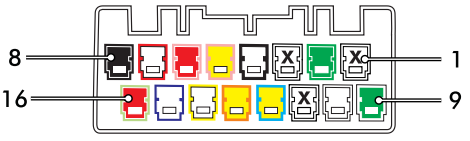
Check the following:

- All LCD segments are displayed for speedometer. A figure of '*188*' is visible.
- All LCD segments are displayed for clock. A figure of '*18:88*' is visible.
- All LCD segments are displayed for odometer. A figure of '*88888.8*' is visible.
- The tachometer needle swings from MIN-MAX-MIN.
- The fuel gauge needle swings from MIN-MAX-MIN.

If no display is observed:

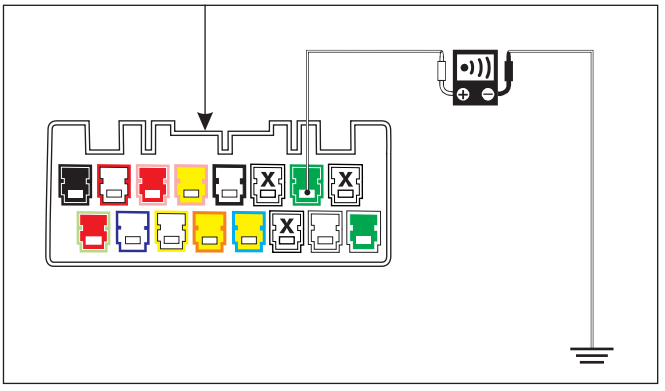
Disconnect the combination meter 16P connector (page 20-7).





1	: Not Used	- Empty
2	: Ground	- Green
3	: Not Used	- Empty
4	: Tacho input	- White/Black
5	: ABS W/L	- Pink/Yellow
6	: Side stand indicator	- Pink/Red
7	: Battery	- Red/White
8	: Ignition	- Black
9	: MIL	- White/Green
10	: Speed input	- White
11	: Not Used	- Empty
12	: Turn R	- Sky blue/Yellow
13	: Turn L	- Orange/Yellow
14	: Fuel input	- Yellow/White
15	: High Beam	- Blue/White
16	: Neutral	- Light green/Red

COMBINATION METER 16P CONNECTOR



Check pin 2 with body ground for continuity.

Connection: Pin 2 (Green)- Body Ground

Standard: Continuity

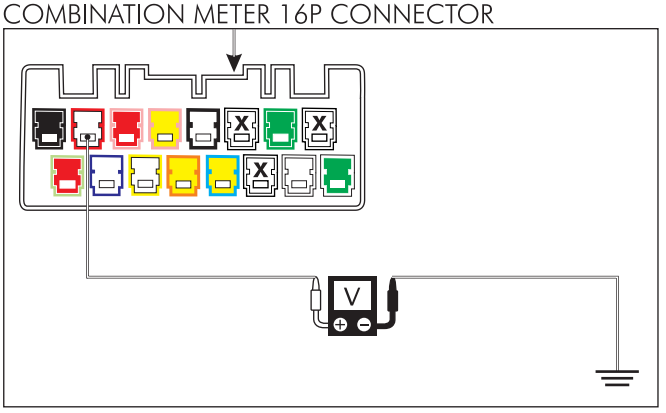
If no continuity is observed then replace harness.

If continuity is observed then check the voltage at pin 7.

Connection: Pin 7 (Red/ White)- Ground

Standard: Battery Voltage

COMBINATION METER 16P CONNECTOR



If the voltage in above step is OK then check the voltage at pin 8 with ground.

Connection: Pin 8 (Black)- Ground

Standard: No Voltage

Turn the ignition switch "ON" and check the voltage at pin 8 with ground.

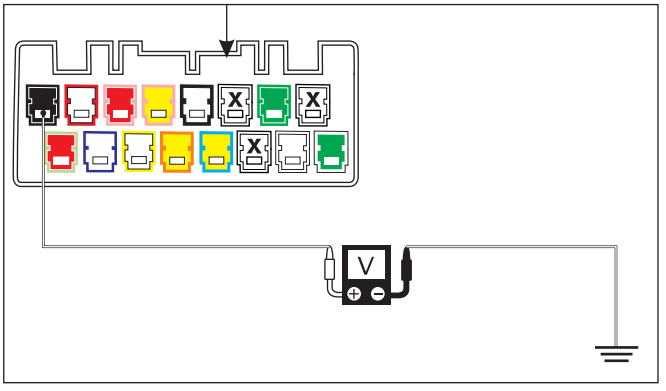
Connection: Pin 8 (Black)- Ground

Standard: Battery Voltage

If no voltage is observed then replace harness.

If voltage is OK then replace combination meter.

COMBINATION METER 16P CONNECTOR



FUEL METER

Turn the ignition switch "ON".

Check the following.

- All LCD segments are displayed for fuel gauge. A figure of 'E▬▬▬▬F' is visible.

If the above display is OK then check the fuel unit.

If the fuel gauge needle does not function then disconnect the combination meter 16P connector.

Check the continuity between meter unit 16P connector and fuel pump 5P connector.

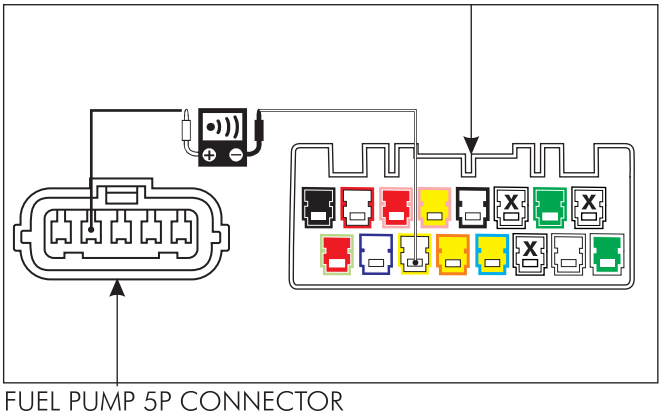
Connection: Pin 14 (Yellow/ White)- Fuel Pump 5P Connector (Yellow/ White)

Standard: Continuity

If continuity is not observed then replace harness.

If continuity is observed then replace fuel unit.

COMBINATION METER 16P CONNECTOR



FUEL PUMP 5P CONNECTOR

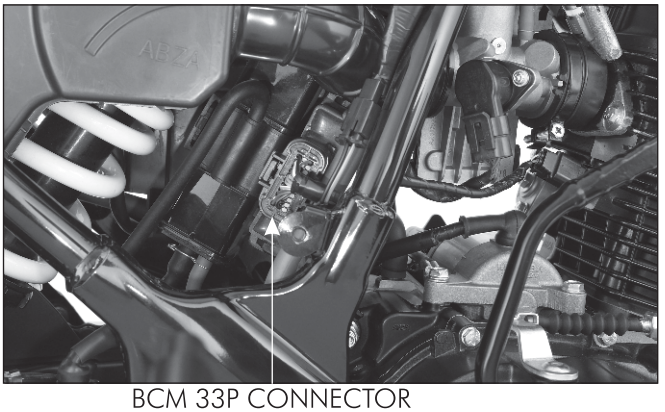
BODY CONTROL MODULE (BCM)

BCM is provided to control the vehicle lighting system. When engine turns "ON", its send a signal to BCM to turn headlamp "ON".
Key Features:

- To incorporate functioning of hazard lighting system.
- Provides integrated control of all LED lighting system.

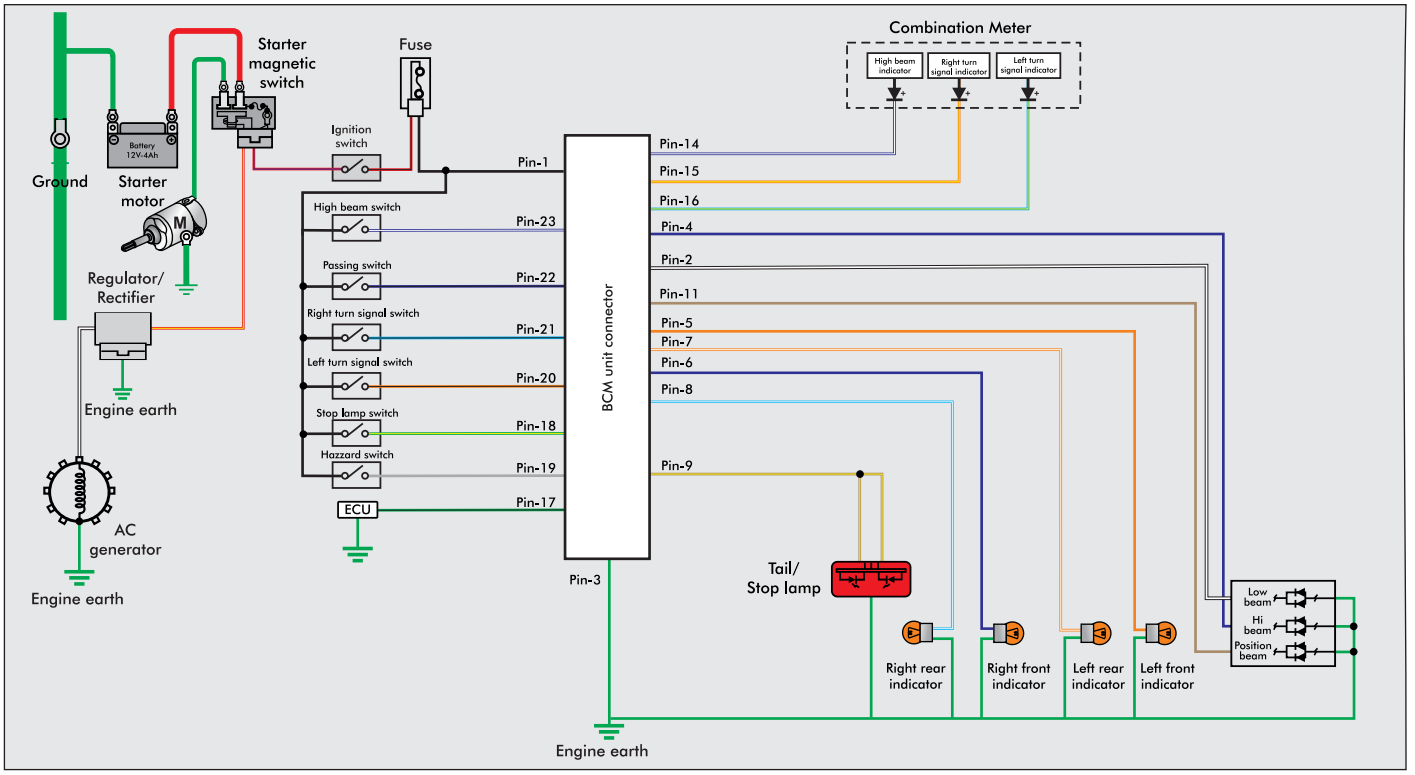
REMOVAL

Remove the fuel tank cover (page 2-5).
Disconnect the BCM 33P connector.

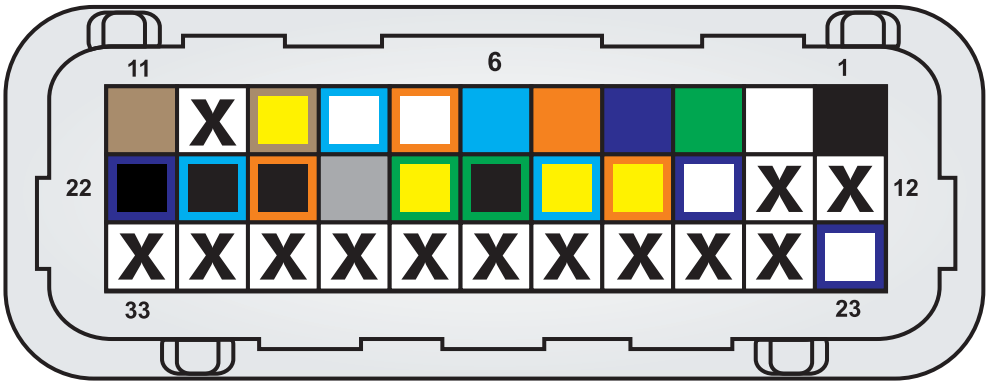


BCM 33P CONNECTOR

CIRCUIT DIAGRAM



BODY CONTROL MODULE (BCM) PIN DETAILS



BCM PIN		
PIN NO.	**COLOUR**	**DESCRIPTION**
1	B	Ignition
2	W	H/L Low beam
3	G	Ground
4	L	H/L High beam
5	O	Left turn signal lamp (Front)
6	SB	Right turn signal lamp (Front)
7	O/W	Left turn signal lamp (Rear)
8	SB/W	Right turn signal lamp (Rear)
9	BR/Y	DLC connector
10	Blank	-
11	BR	Position lamp
12	Blank	-
13	Blank	-
14	L/W	High beam indicator
15	O/Y	Left turn signal indicator
16	SB/Y	Right turn signal indicator
17	G/B	Engine status
18	G/Y	Stop switch
19	GR	Hazard switch
20	O/B	Left turn signal input
21	SB/B	Right turn signal input
22	L/B	Passing switch input
23	L/W	High beam input
24	Blank	-
25	Blank	-
26	Blank	-
27	Blank	-
28	Blank	-
29	Blank	-
30	Blank	-
31	Blank	-
32	Blank	-
33	Blank	-

COLOUR CODE	
Black	B
Violet	V
Yellow	Y
Blue	L
Green	G
Red	R
White	W
Brown	BR
Orange	O
Sky Blue	SB
Light Green	LG
Pink	P
Gray	GR

COMBINATION:
Base Colour / Marking Colour
e.g. Brown / White
BR / W

BODY CONTROL MODULE (BCM) INPUT AND OUTPUT COMBINATION

Output	Input							
	Ignition key ON (Apply battery voltage)	High beam switch pressed (Apply battery voltage)	Passing switch pressed (Apply battery voltage)	Left turn signal switch pressed (Apply battery voltage)	Right turn signal switch pressed (Apply battery voltage)	Stop switch pressed (Apply battery voltage)	Hazard switch pressed (Apply battery voltage)	Engine status signal coming low (Nearly 0V) to BCM unit
Tail mode ON with 50±10 mA current in tail/stop lamp load.	Yes	×	×	×	×	No	×	×
Position lamp ON with 150±15 mA current.	Yes	×	×	×	×	×	×	×
High beam ON	Yes	Yes	No	×	×	×	×	Yes
High beam ON	Yes	×	Yes	×	×	×	×	×
Low beam ON	Yes	No	No	×	×	×	×	Yes
Left front, left rear turn signal lamp and cluster indicator blink with normal frequency (85±10 flash/min.)	Yes	×	×	Yes	×	×	No	×
Left front faulty and left rear turn signal and cluster indicator blink with double frequency (170±10 flash/min.)	Yes	×	×	Yes	×	×	No	×
Left rear faulty and left front turn signal and cluster indicator blink with double frequency (170±10 flash/min.)	Yes	×	×	Yes	×	×	No	×
Right front, right rear turn signal and cluster indicator blink with normal frequency (85±10 flash/min.)	Yes	×	×	×	Yes	×	No	×
Right front faulty and right rear turn signal and cluster indicator blink with double frequency (170±10 flash/min.)	Yes	×	×	×	Yes	×	No	×
Right rear faulty and right front turn signal and cluster indicator blink with normal frequency (170 ±10 flash/min.)	Yes	×	×	×	Yes	×	No	×
Left front, rear turn signal, right front and right rear blink with normal frequency 85±10 flash/min.	Yes	×	×	×	×	×	Yes	×
Stop mode ON with 280±28 mA current in tail/stop lamp load.	Yes	×	×	×	×	Yes	×	×

Inspection

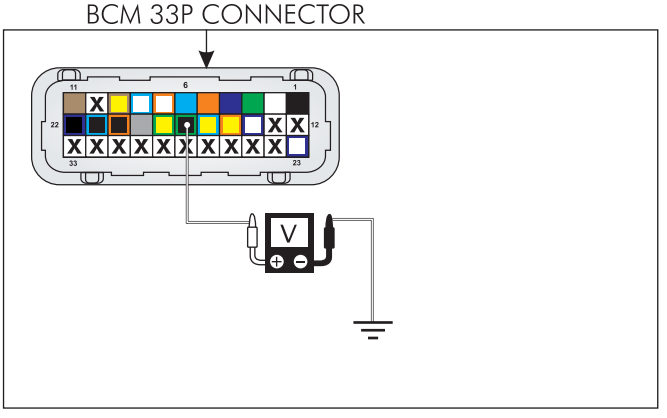
Disconnect the BCM 33P connector and turn the ignition switch to "ON" and check the voltage between BCM 33P connector and ground.

Connection

Green/Black (BCM Pin 17)- Ground

Standard: Battery Voltage

If the voltage does not exist then replace the BCM.



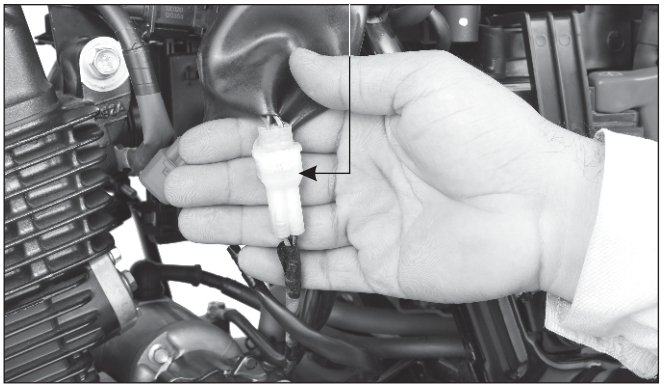
SIDE STAND SWITCH

Remove the fuel tank cover (page 2-5).

Release the routing clip for the connectors of the side stand switch from the frame.

Disconnect the side stand switch 4P connector.

SIDE STAND SWITCH 4P CONNECTOR

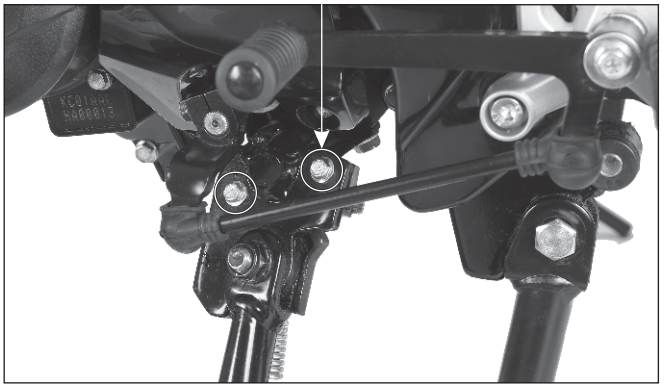


Remove the side stand switch mounting bolts.

Remove the side stand switch.

Installation is in the reverse order of removal.

MOUNTING BOLTS



"Side stand engine kill" feature for safety purpose

This feature has following functions:

- It prevents starting the engine when transmission is in gear (irrespective of clutch lever operation) and side stand is down.
- It stops the running engine when transmission is in gear (irrespective of clutch lever operation) and side stand is moved down.

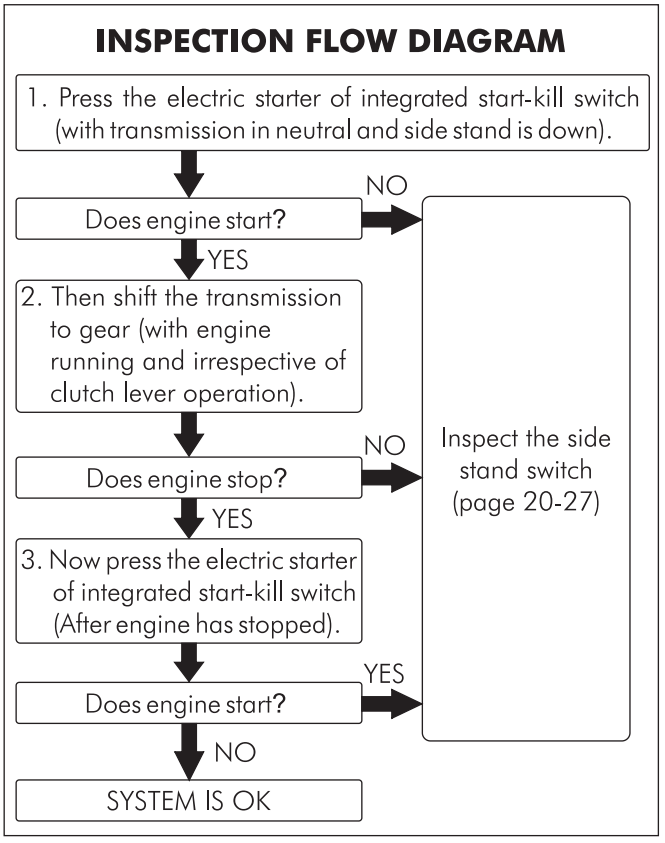
⚠ WARNING

"Side stand engine kill" system is not affected by clutch lever operation.

To inspect the functionality of this feature, park the vehicle on its main stand and check all the conditions described in the inspection flow diagram.

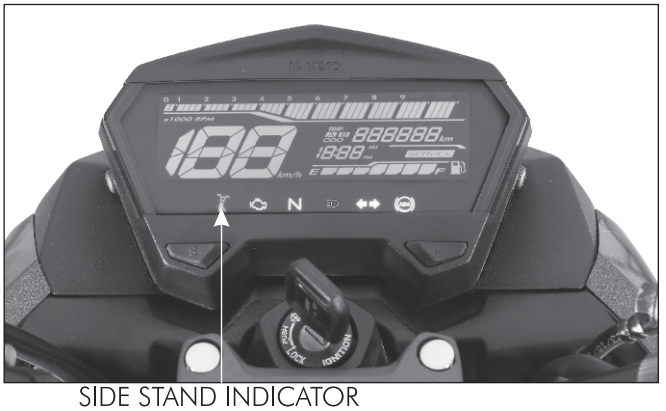
If vehicle doesn't operate as described in flow diagram then inspect the side stand switch.

INSPECTION FLOW DIAGRAM



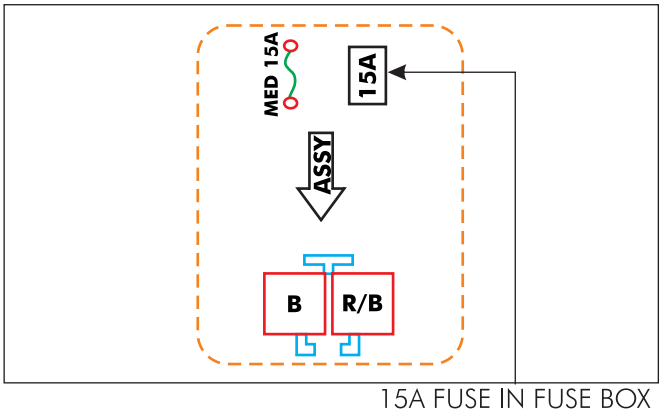
INSPECTION

- Turn the ignition of the vehicle to the "ON" position.
- Check if the side stand indicator comes on and goes off when the side stand is operated.
  The indicator must be "ON" when the side stand is "DOWN" and "OFF" when the side stand is "UP"
  If the indicator does not function as required, check the side stand switch and indicator LED.
- Check DTC code for side stand switch, if DTC code appear then do the troubleshooting for the code (page 5-53). If DTC code does not appear then inspect the side stand switch.



SIDE STAND INDICATOR

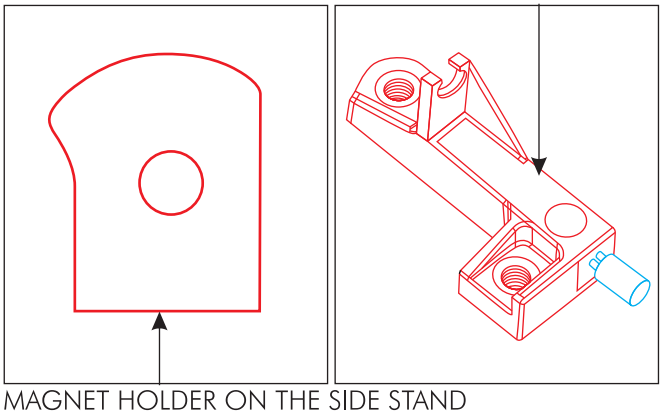
- Check the 15A fuse in the fuse box. If the fuse is damaged, replace the fuse and repeat step 2.
- Ensure that the battery voltage is normal. If battery voltage is low, battery must be recharged or replaced.
- Ensure that the side stand switch connector is properly attached to the connector on the wiring harness.
- Check that the magnet holder is installed on the side stand, and is not damaged (cracked or broken). Also ensure that there is no mud covering the magnet holder.
- Use an Iron object to check the working of the magnet.
- Check the gap between the magnet holder and the sensor when the side stand is in the "DOWN" position.
  Gap should be 3±2 mm



15A FUSE IN FUSE BOX

- If the magnet is not working or if the magnet holder is damaged, replace the magnet holder and repeat step 2.
- Check that the side stand switch sensor is installed on the frame and is not damaged (cracked or broken).
- Visually inspect the wire to ensure that there is no cuts or breakages.
  If any damage is observed, replace the side stand switch sensor, and repeat step 2
- Remove the sensor and ensure that there is no debris or spatter at the sensor mounting.
  If there is debris or spatter, clean the area, remount the sensor and repeat step 2.

SIDE STAND SWITCH SENSOR



MAGNET HOLDER ON THE SIDE STAND

WIRING HARNESS INSPECTION

- Checking the power:

  Check continuity between: supply pin (black wire) on the connector and black wire of the 15A fuse of the fuse box ground pin (green wire) on the connector and the Frame body
- Checking connection to meter assy.: open the front fairing and disconnect the connector from the meter.

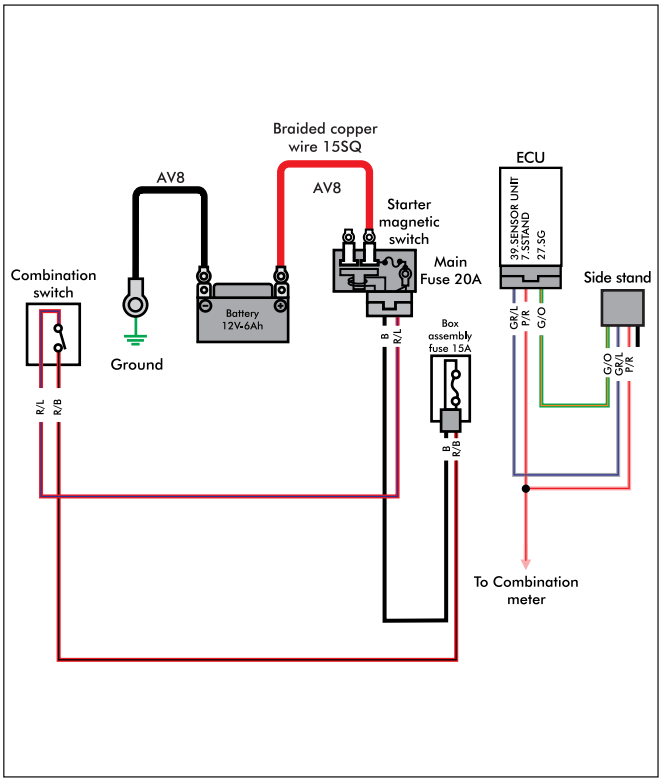
  Check continuity between the O/P pin (pink/red) on the side stand switch connector on the wiring harness and the Pink/Red wire on the meter connector on the wiring harness

  Ensure that there is continuities in the 3 mentioned wires
- With the key in the "ON" position, connect the supply pin (black wire) to the O/P pin (pink/red wire) of the side stand switch connector on the wiring harness and check if the side stand indicator glows.

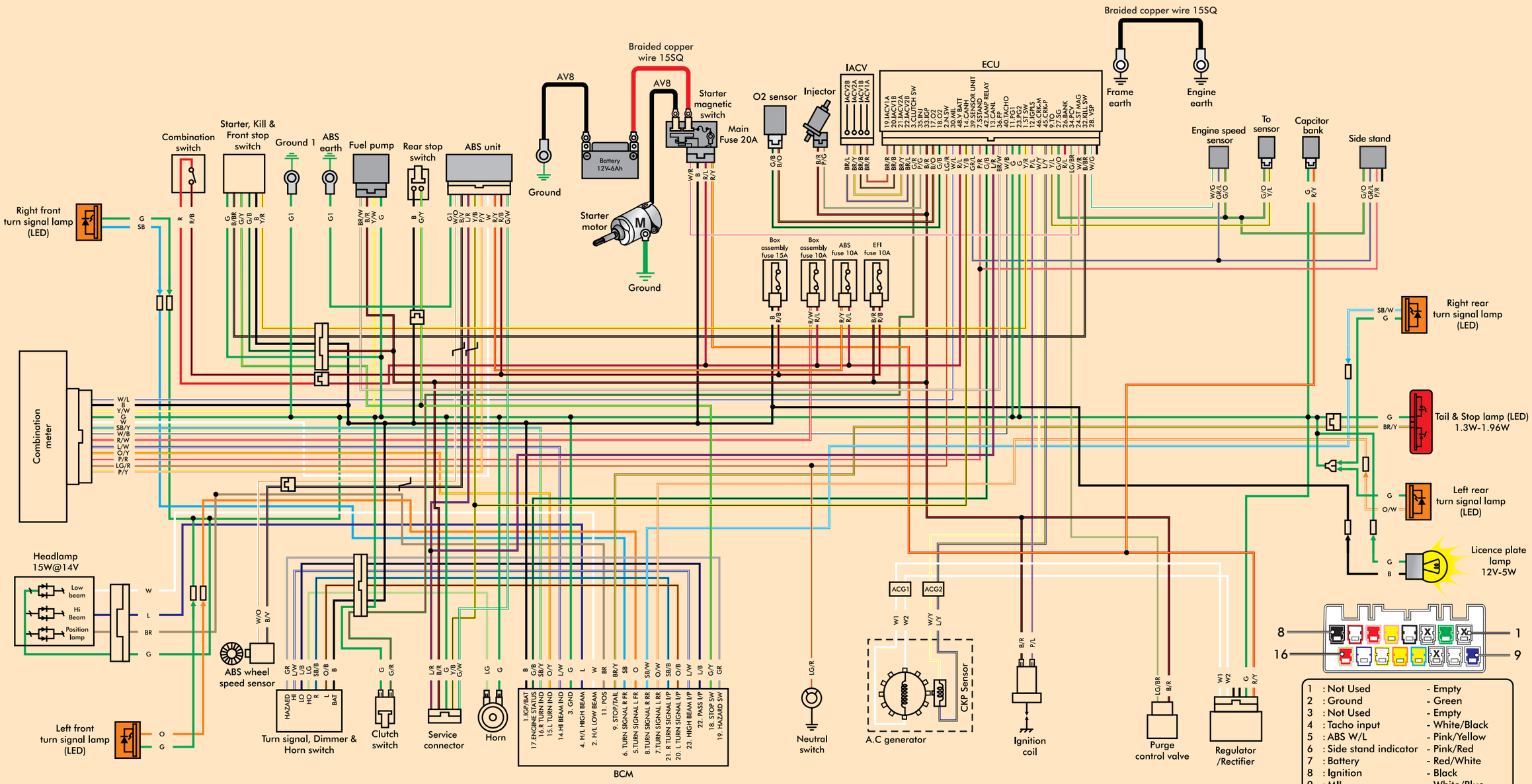
  If the indicator does not glow, replace the meter assy. and repeat step 2
- With the key in the "ON" position,

  Check the voltage difference between the pink/red wire on the meter connector and ground (frame body). When the side stand is operated, the voltage must be either 12V or 0V.

  If the voltage shows any other value, replace the side stand switch sensor and repeat step 2
- If the problem is not found in steps 2-16, the side stand switch sensor has to be replaced



MEMO



B	BLACK	BR	BROWN
Y	YELLOW	O	ORANGE
L	BLUE	SB	SKY BLUE
G	GREEN	LG	LIGHT GREEN
R	RED	P	PINK
W	WHITE	GR	GREY
V	VIOLET		

COLOR COMB: GROUND/ MARKING

1 : Not Used	- Empty
2 : Ground	- Green
3 : Not Used	- Empty
4 : Tacho input	- White/Black
5 : ABS W/L	- Pink/Yellow
6 : Side stand indicator	- Pink/Red
7 : Battery	- Red/White
8 : Ignition	- Black
9 : MIL	- White/Blue
10 : Speed input	- White
11 : Not Used	- Empty
12 : Turn R	- Sky blue/Yellow
13 : Turn L	- Orange/Yellow
14 : Fuel input	- Yellow/White
15 : High Beam	- Blue/White
16 : Neutral	- Light green/Red

COMBINATION SWITCH

	BAT_2	BAT_1
LOCK		
OFF		
ON	●	
COLOR	R/B	R

DIMMER SWITCH

	HL	LO	HI	BA
(N)	●	●		
	●	●	●	
PASS	●		●	●
COLOR	Y	W	L	B

TURN SIGNAL SWITCH

	R	WR	L
(N)	●		
		●	●
COLOR	SB/B	GR	O/B

HORN SWITCH

	BAT	HO
FREE		
PUSH	●	
COLOR	B	B/ LG

ENGINE KILL

	IGN	ECU
OFF		
ON	●	●
CORD COLOR	B/BR	G/B

STARTER SWITCH

	ST	BAT
FREE		
PUSH	●	●
CORD COLOR	Y/ R	B

HAZARD SWITCH

	BAT	HZ
FREE		
PUSH	●	
COLOR	B	GR

MEMO

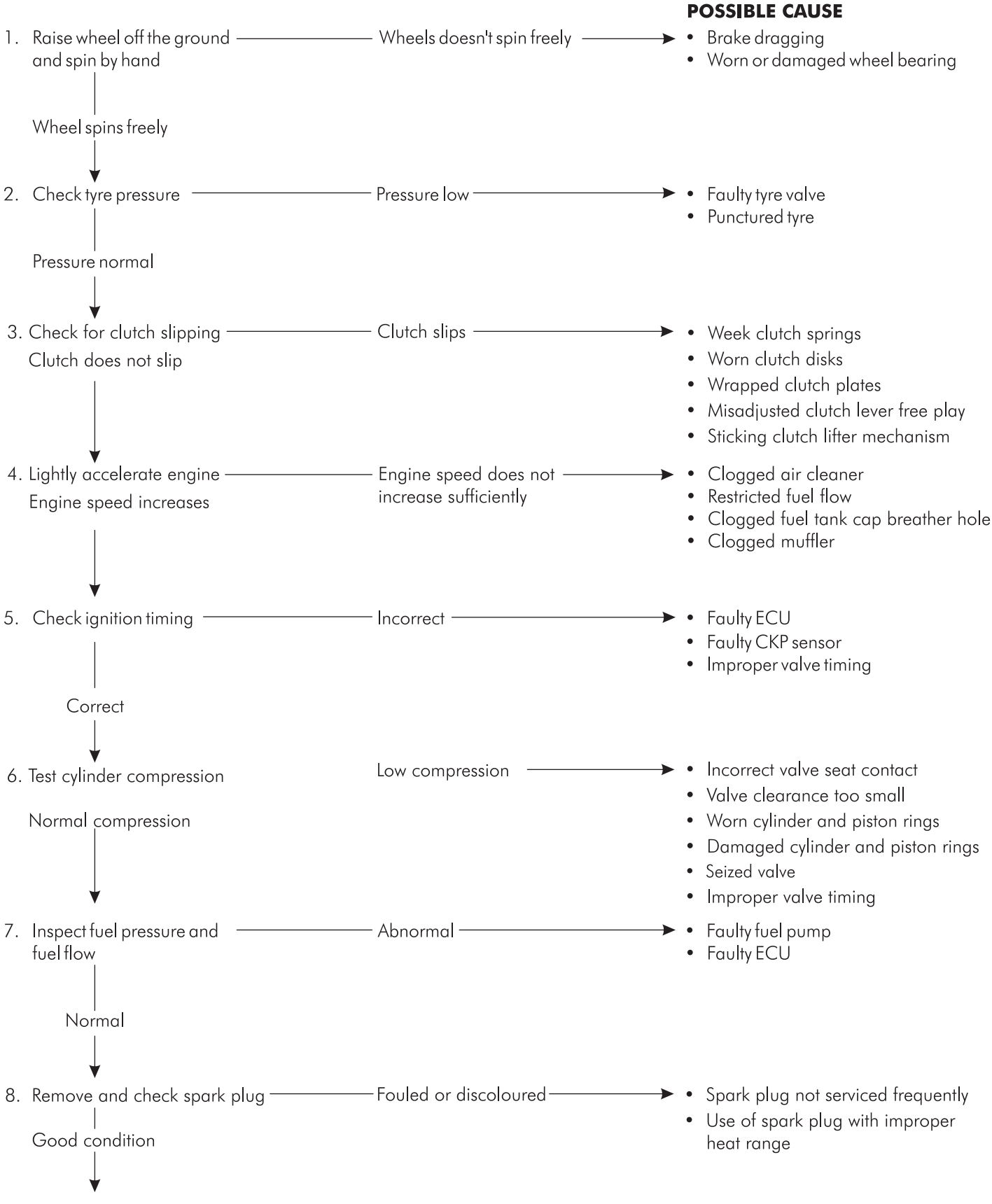
Engine will not start or is hard to start	**22-1**	**Poor performance at high speed**	**22-4**
Engine lacks power	**22-2**	**Poor handling**	**22-4**
Poor performance at idle and low speeds	**22-3**	**ABS Troubleshooting**	**22-5**

TROUBLESHOOTING

ENGINE DOES NOT START OR ENGINE IS HARD TO START

		POSSIBLE CAUSE
1. Check the charging system	Abnormal	• Faulty battery • Faulty charging system
Normal ↓		
2. Check the Programmed-FI system	Abnormal	• Faulty ECU
Normal ↓		
3. Check for operating sound of the fuel pump	Sound not heard	• Loose or disconnected fuel pump • Broken or shorted fuel pump wire • Faulty fuel pump
Sound heard ↓		
4. Inspect the fuel pressure and fuel flow	Abnormal	• Faulty fuel pump • Faulty ECU
Normal ↓		
5. Perform a spark test	Weak or no spark	• Faulty spark plug • Incorrect spark plug heat range • Incorrect spark plug gap • Broken or shorted spark plug wire • Faulty CKP sensor • Faulty battery • Faulty bank angle sensor • Faulty ECU • Loose or disconnected ignition system wires
Good spark ↓		
6. Test cylinder compression	Low compression	• Incorrect valve seat contact • Valve clearance too small • Valve stuck open • Worn cylinder and piston rings • Damaged cylinder head gasket • Seized valve • Improper valve timing
Normal compression ↓		
7. Starting following normal procedure	Engine starts but stops	• Intake manifold leaking • Improper ignition timing (Faulty CKP sensor) • Faulty IACV • Fuel contaminated
Engine does not start ↓		
8. Remove and inspect spark plug	Wet plug	• Clogged air cleaner • Faulty ECU
	Dry plug	• Faulty injector

ENGINE LACKS POWER



9. Check oil level and condition — Incorrect →
   - Oil level too high
   - Oil level too low
   - Contaminated oil

   Correct ↓

10. Remove cylinder head cover and inspect lubrication — Valve train not lubricated properly →
    - Clogged oil passage
    - Faulty oil pump
    - Clogged oil strainer screen

    Valve train lubricated properly ↓

11. Check if engine overheats — Engine overheats →
    - Excessive carbon build- up on combustion chamber
    - Use of improper quality of fuel
    - Clutch slipping
    - Wrong type of fuel

    Engine does not overheat ↓

12. Accelerate or run at high speed — Engine knocks →
    - Excessive carbon built-up on combustion chamber
    - Use of improper quality of fuel
    - Worn cylinder and piston
    - Ignition timing too advance (Faulty ECU)
    - Faulty CKP

    Engine does not knock ↓

POOR PERFORMANCE AT LOW AND IDLE SPEED

1. Check ignition timing and valve clearance — Incorrect →
   - Faulty ECU unit
   - Faulty CKP
   - Improperly adjusted valve clearance
   - Improperly installed CKP

   Correct ↓

2. Inspect the fuel pressure and fuel flow — Abnormal →
   - Faulty fuel pump
   - Faulty ECU

   Normal ↓

3. Check for leaks in the intake manifold — Leaking →
   - Loose intake manifold band or mounting bolts
   - Damaged intake manifold

   Not leak ↓

4. Perform spark test — Weak or intermittent spark →
   - Faulty spark plug
   - Faulty carbon or wet fouled spark plug
   - Faulty ECU
   - Faulty ignition coil
   - Broken or shorted spark plug wire
   - Faulty CKP sensor
   - Faulty ignition switch
   - Loose or disconnected ignition system wires
   - Faulty injector

POOR PERFORMANCE AT HIGH SPEED

1. Check ignition timing — Incorrect → • Faulty ECU • Faulty CKP sensor • Improper valve timing
   - Correct ↓
2. Inspect the fuel pressure and fuel flow — Abnormal → • Faulty fuel pump • Faulty ECU
   - Normal ↓
4. Check valve timing — Incorrect → • Improperly installed cam sprocket
   - Correct ↓
4. Check valve spring — Weak → • Faulty valve spring
   - Not weak ↓
   - → • Faulty injector

POOR HANDLING

1. If steering is heavy →
   - Steering bearing adjusting nut too tight
   - Damaged steering head bearings
   - Low tyre pressure
2. If either wheel is wobbling →
   - Excessive wheel bearing play
   - Bent rim
   - Loose swingarm pivot bolt
   - Excessively worn swingarm pivot bushing
   - Bent frame
3. If vehicle pulls to one side →
   - Front and rear wheel not aligned
   - Faulty shock absorber
   - Bent fork
   - Bent swingarm
   - Bent axle
   - Bent frame

ABS TROUBLESHOOTING

PROBLEM

During riding, speed display on speedometer goes off and ABS warning lamp starts glowing, which indicates ABS malfunction. The system becomes ok as soon as ignition is turned "OFF" & "ON" again.

In case of malfunction the DTC code will be generated which can be read through the VCI tool.

PROBABLE CAUSE	TROUBLESHOOTING
Battery connection loose	Check battery terminal connections & tighten them if found loose. Also, assure no loose couplers (no open loop circuit)
Front wheel taken out while keeping the ignition "ON"	Ensure that ignition key is "OFF"
Low voltage due to ignition kept on for very long duration which causes battery to drain	Recharge the battery to fully charged or replace the battery, if required.

For other ABS related troubleshooting refer anti-lock braking system **(Refer base manual section-15)**.

MEMO